



**FCC CFR47 PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 7**

CERTIFICATION TEST REPORT

FOR

2WIRE WIRELESS 802.11b/g/n ADSL RESIDENTIAL GATEWAY

MODEL NUMBERS: 5011NV, 5012NV*

**FCC ID: PGR2W5012NV
IC: 3439B-5012NV**

REPORT NUMBER: 10U13195-1, Revision A

ISSUE DATE: JULY 12, 2010

Prepared for

2WIRE, INC.

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* Explanation of models differences are contained in the body of this report.



NVLAP LAB CODE 200065-0

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	05/28/10	Initial Issue	F. Ibrahim
A	07/12/10	Revised model numbers	A. Zaffar

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: 2WIRE, INC.
310 PROVIDENCE MINE ROAD, SUITE 200
NEVADA CITY, CA 95959, USA

EUT DESCRIPTION: 2WIRE WIRELESS 802.11b/g/n ADSL RESIDENTIAL GATEWAY

MODEL: 5011NV, 5012NV

SERIAL NUMBER: 15101A000045, 19101A000025, 19101A000016

DATE TESTED: MAY 5-20, 2010

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-210 Issue 7 Annex 8	Pass
INDUSTRY CANADA RSS-GEN Issue 2	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:

Tested By:



FRANK IBRAHIM
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

MONICA HARRISON
SENIOR RF ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 2, and RSS-210 Issue 7.

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:

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

4.3. MEASUREMENT UNCERTAINTY

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

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

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a WIRELESS 802.11b/g/n ADSL RESIDENTIAL GATEWAY.
The radio module is manufactured by Broadcom.

5.2. DESCRIPTION OF MODEL(S) DIFFERENCES

5011NV:

Ethernet WAN: 1 port (Fast Ethernet - 10/100)
Ethernet LAN: 4 port (Fast Ethernet - 10/100)

5012NV:

Ethernet WAN: 1 port (10/100/1000)
Ethernet LAN: 1 port (GigE- 1000) - 3 ports (Fast Ethernet - 10/100)

5012NV was selected as a representative model.

5.3. 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	26.49	445.66
2412 - 2462	802.11g	25.77	377.57
2412 - 2462	802.11n HT20	25.97	395.37
2422 - 2452	802.11n HT40	19.12	81.66

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PCB PIFA and a Stamped Metal PIFA antenna, with a maximum gain of 2.4dBi.

5.5. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was Factory Version 8.99.3.

The EUT wireless driver software installed during the testing was 5.10.120.0.cpe4.403.9

The Telnet gateway test utility software used during the testing was BusyBox v1.00 (2010.03.24-21:10+0000)

5.6. WORST-CASE CONFIGURATION AND MODE

The worst-case channel is determined as the channel with the highest output power. Radiated emissions 30-1000 MHz was performed with the EUT set to the channel with highest output power.

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

802.11b Mode: (20 MHz BW operation) – 1Mbps, CCK

802.11g Mode: (20 MHz BW operation) – 6 Mbps, OFDM

802.11n MIMO HT20 Mode: (20 MHz BW operation) – MCS0, 6.5Mbps, OFDM

802.11n MIMO HT40 Mode: (40 MHz BW operation) – MCS0, 6.5Mbps, OFDM

EUT is for desktop configurations; therefore two possible orientations (X and Y) were investigated and it was determined that orientation Y was worst-case, see photos for details.

Based on input from the client Chain 0 was selected as a default for testing the modes that require tests on single chain, such as 11b, 11g, HT20 single chain, and HT40 single chain.

For conducted spurious and PPSD preliminary investigation was conducted for individual chains versus combiner and it was determined that individual chains were worst-case, therefore final measurement were performed on individual chains.

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop Computer	Dell	Lattitude 131L	20336311441	DoC
AC Power Supply	Dell	LA65NS0-00	CN-0DF263-71615-71P-7FB9	N/A
Laptop Computer	Dell	PP05XA	28977642901	DoC
AC Power Supply	Dell	NADP-130ABD	CN-X7329-48661-63D-0L80	N/A

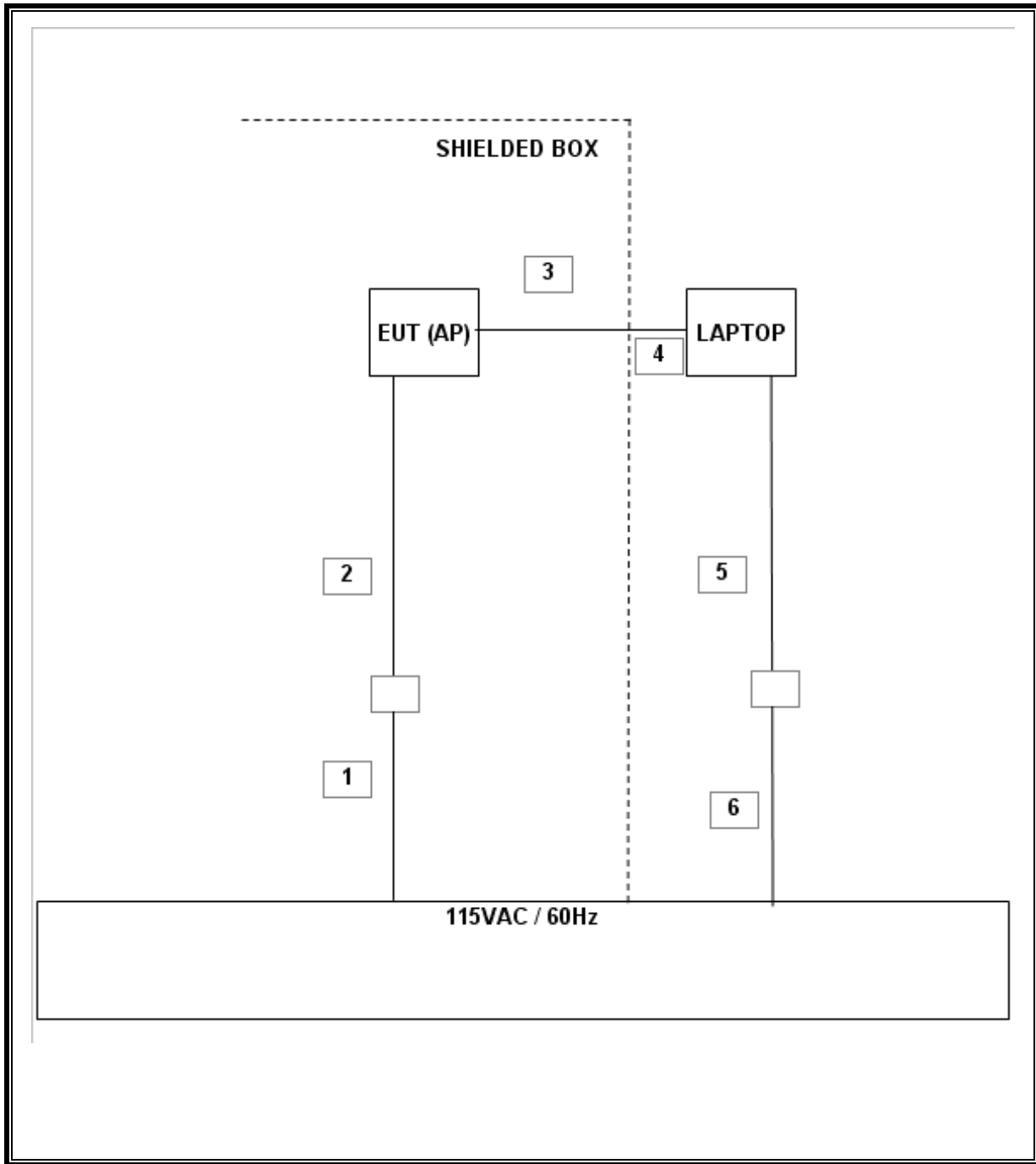
I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	1	AC	UNSHIELDED	3m	N/A
2	DC	1	DC	UNSHIELDED	1m	N/A
3	RJ-45	1	RJ-45	UNSHIELDED	3m	N/A
4	RJ-45	1	RJ-45	UNSHIELDED	0.5m	N/A
5	DC	1	DC	UNSHIELDED	1m	N/A
6	AC	1	AC	UNSHIELDED	3m	N/A

TEST SETUP

The EUT is a standalone device. Test software was used to exercise the radio.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST					
Description	Manufacturer	Model	Asset	Cal Date	Cal Due
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C00986	2/5/2010	5/5/2011
Power Meter	Agilent / HP	437B	N02785	12/4/2009	9/4/2011
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	2/4/2009	8/4/2010
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01178	8/31/2009	8/31/2010
Antenna, Horn, 26.5 GHz	ARA	SWH-28	C01015	1/29/2009	7/29/2010
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01178	8/31/2009	8/31/2010
Antenna, Horn, 18 GHz	EMCO	3115	C00783	1/29/2009	7/29/2010
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	2/4/2009	8/4/2010
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01016	1/14/2009	7/14/2010
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00778	1/6/2010	7/6/2010
Reject Filter, 2.0-2.9 GHz	Micro-Tronics	BRM50702	N02684		CNR
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	11/6/2009	11/6/2010
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	8/6/2009	5/6/2011

7. ANTENNA PORT TEST RESULTS

7.1. 802.11b 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

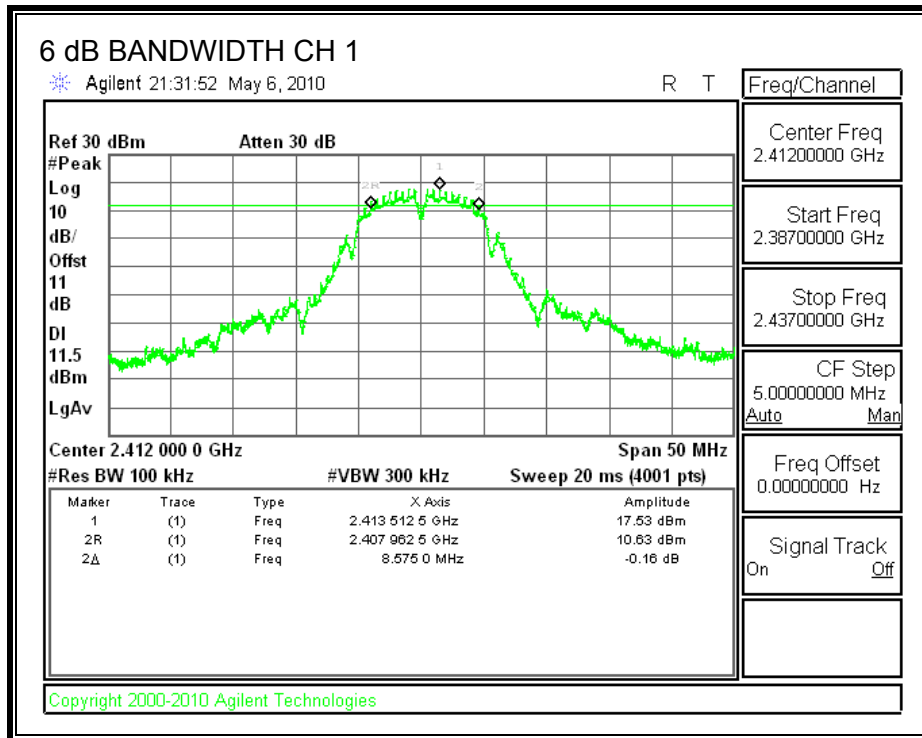
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

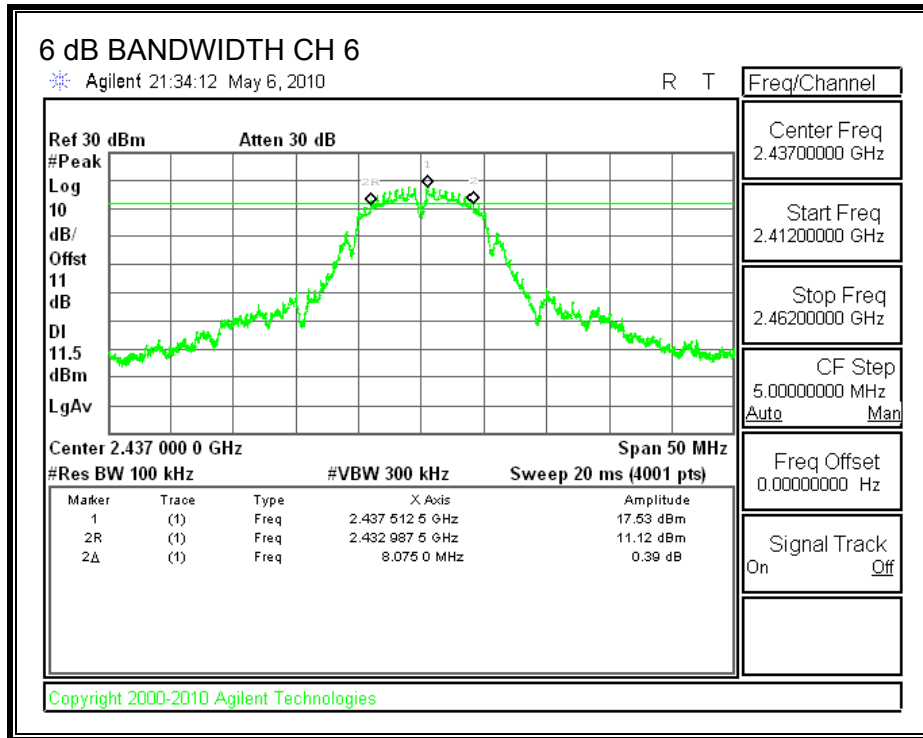
RESULTS

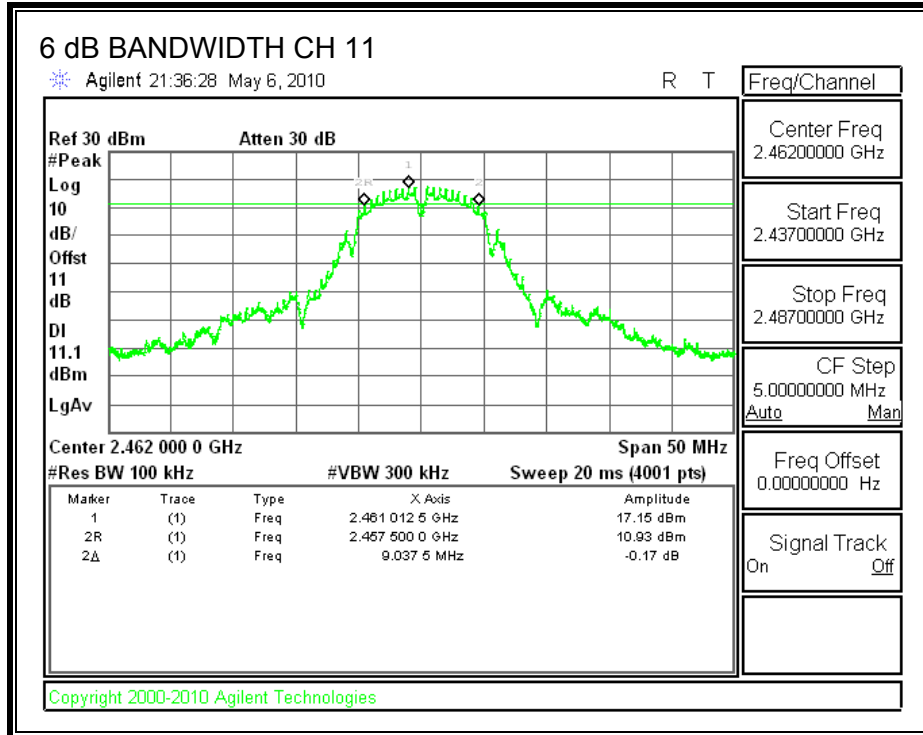
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
1	2412	8.575	0.5
6	2437	8.075	0.5
11	2462	9.037	0.5

Note: channels 1 and 11 were tested at the power levels of channels 2 and 10 respectively, the power levels for CH2 and CH10 are higher than the power levels of CH1 and CH11; hence this is worst-case measurement.

6 dB BANDWIDTH







7.1.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

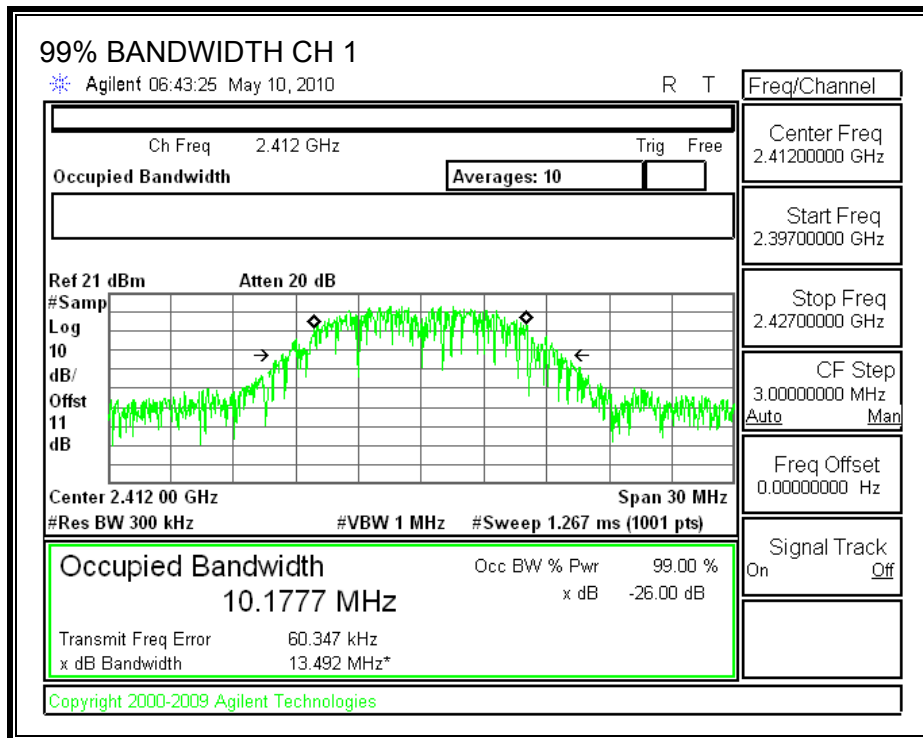
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

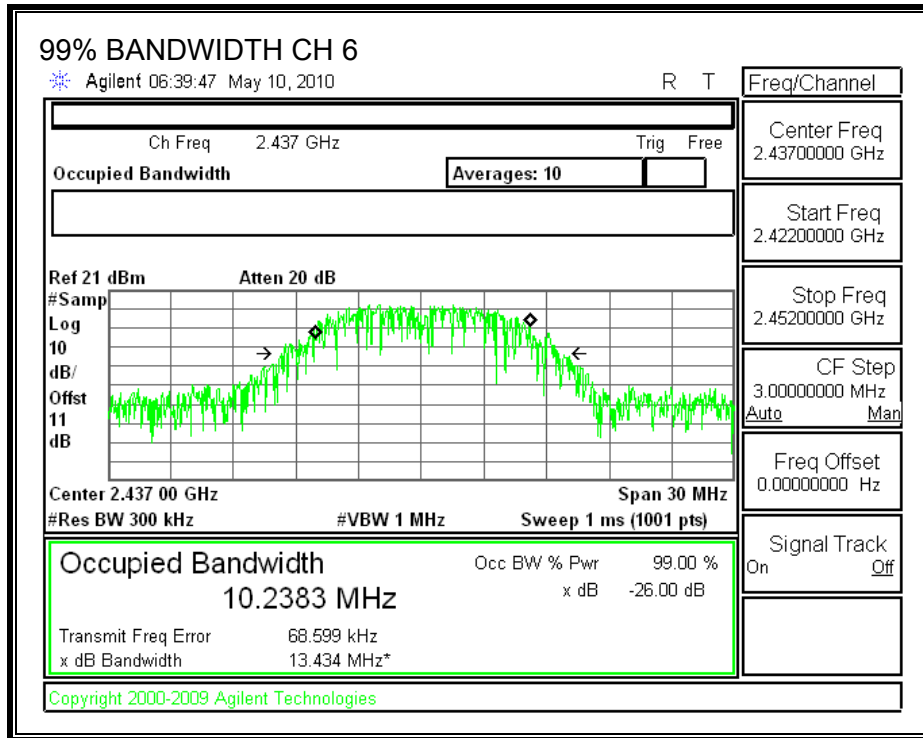
RESULTS

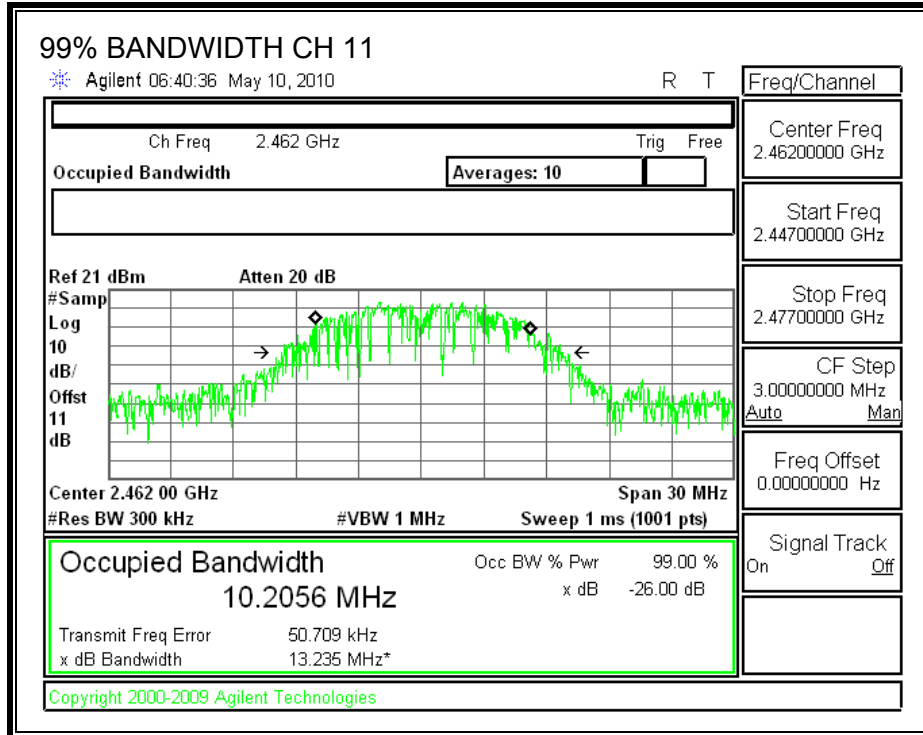
Channel	Frequency (MHz)	99% Bandwidth (MHz)
1	2412	10.1777
6	2437	10.2383
11	2462	10.2056

Note: channels 1 and 11 were tested at the power levels of channels 2 and 10 respectively, the power levels for CH2 and CH10 are higher than the power levels of CH1 and CH11; hence this is worst-case measurement.

99% BANDWIDTH







7.1.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

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

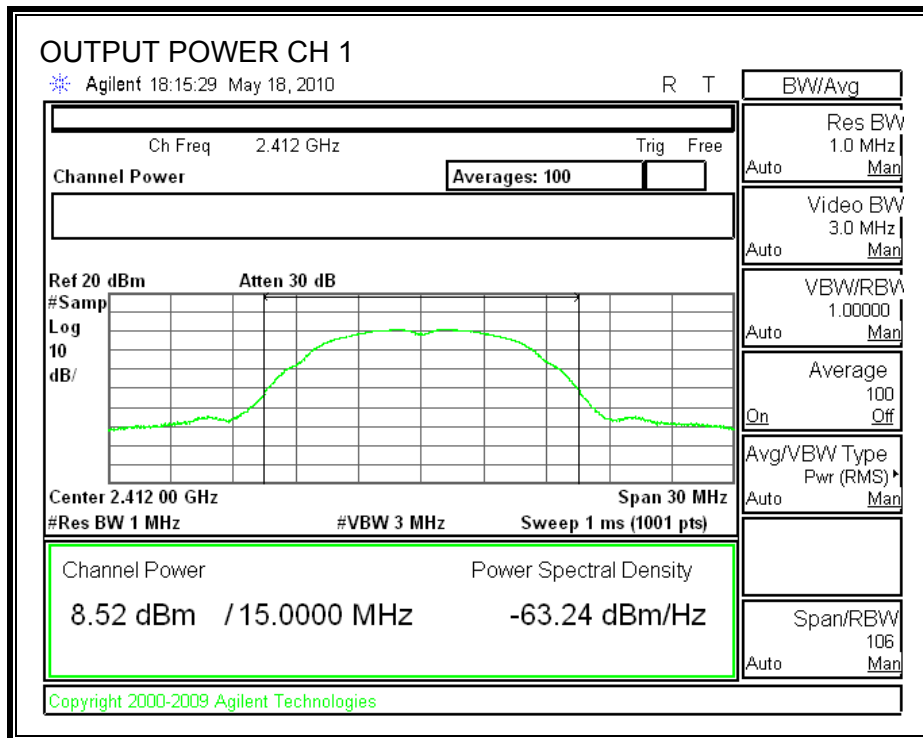
TEST PROCEDURE

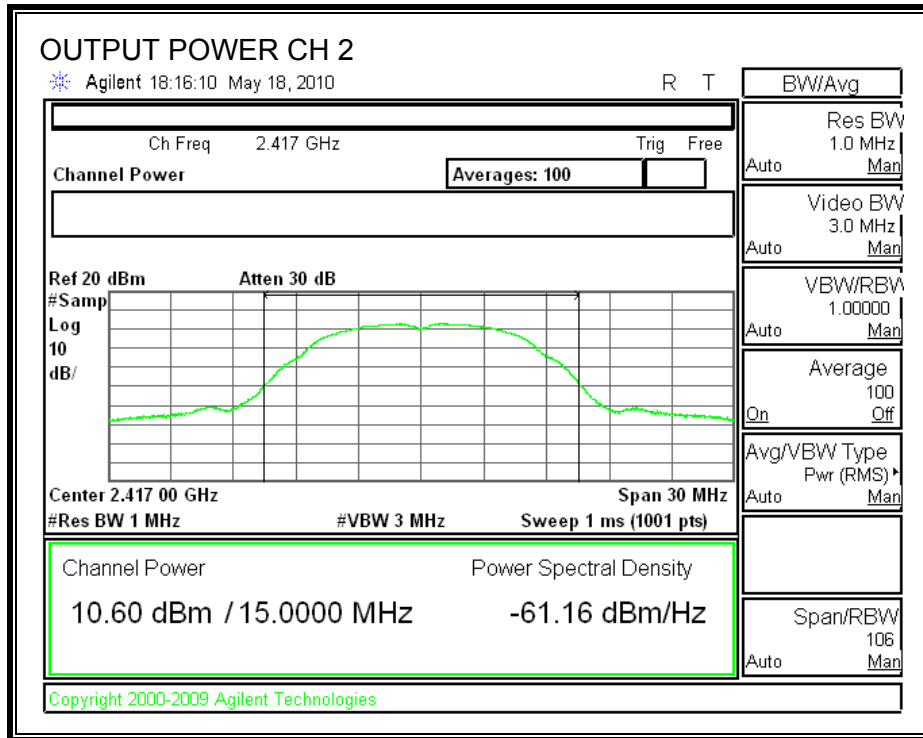
Output power was measured based on the use of RMS averaging over a time interval in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

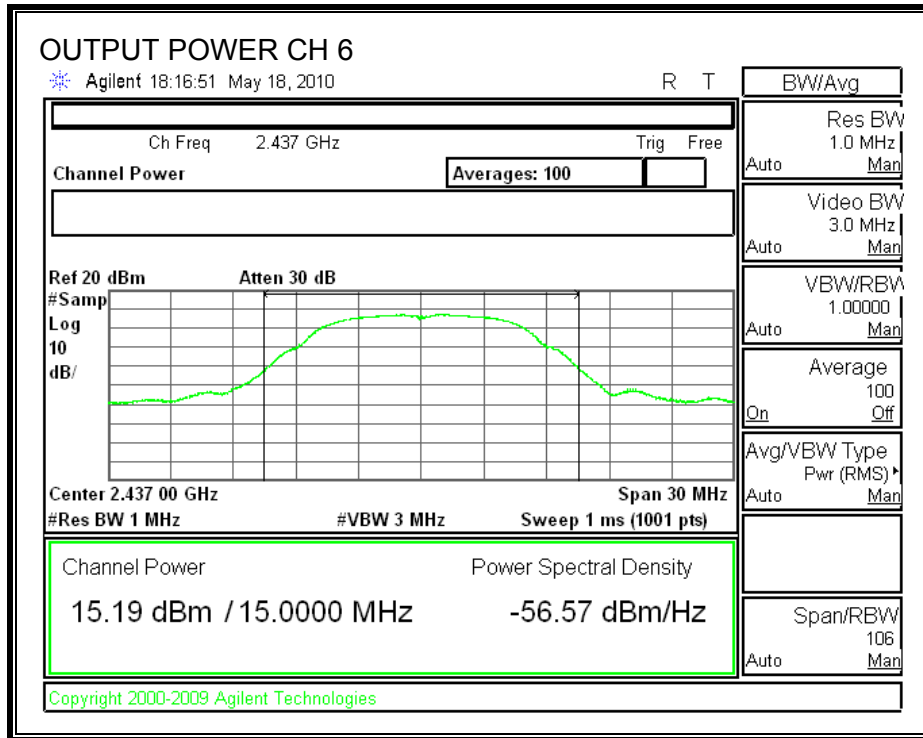
RESULTS

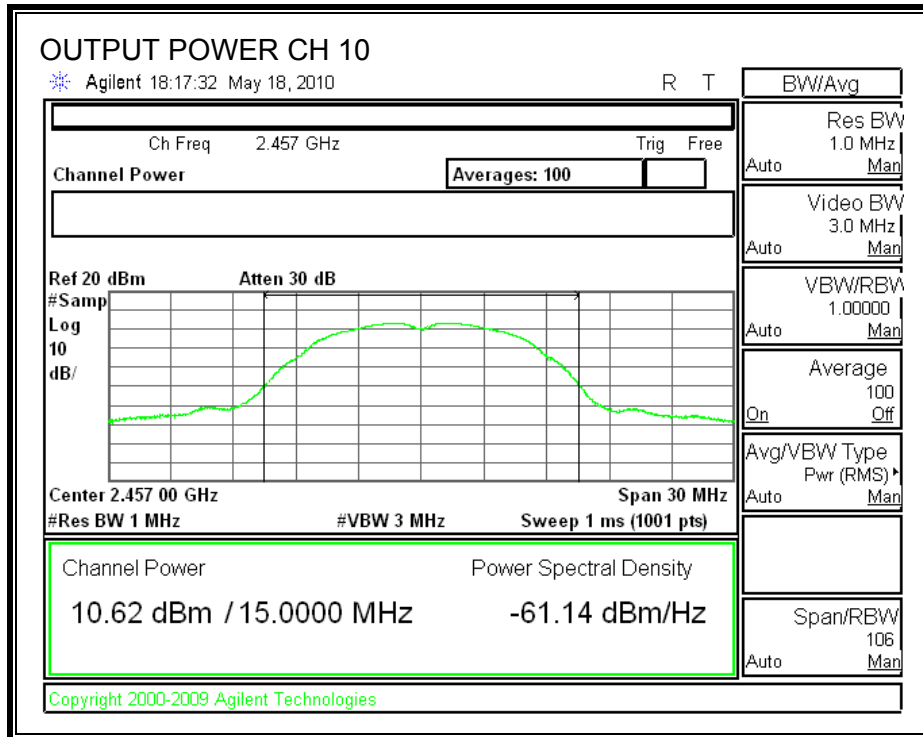
Channel	Frequency (MHz)	Spectrum Analyzer Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
1	2412	8.52	11.3	19.82	30	-10.18
2	2417	10.6	11.3	21.90	30	-8.10
6	2437	15.19	11.3	26.49	30	-3.51
10	2457	10.62	11.3	21.92	30	-8.08
11	2462	8.52	11.3	19.82	30	-10.18

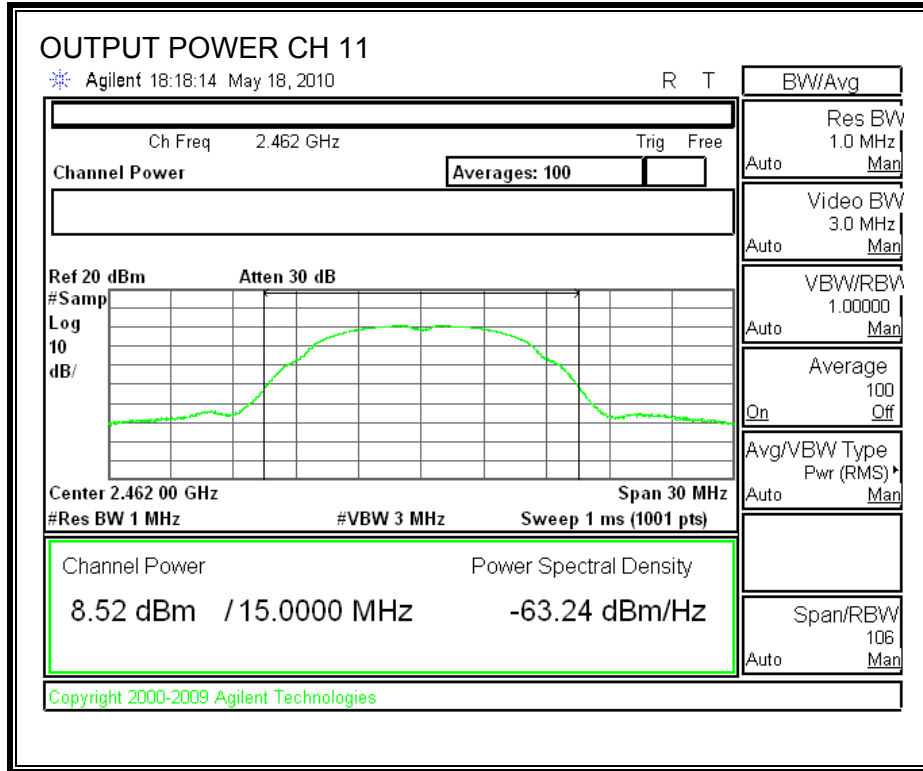
OUTPUT POWER











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

Channel	Frequency (MHz)	Power (dBm)
1	2412	19.68
2	2417	21.71
6	2437	26.46
10	2457	21.52
11	2462	19.55

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

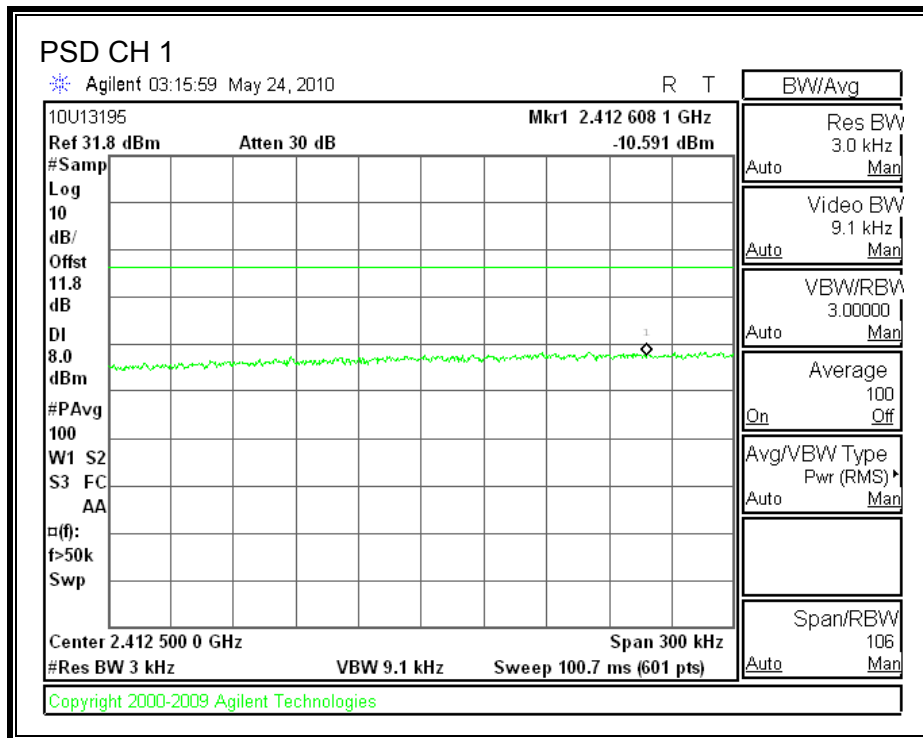
Output power was measured based on the use of RMS averaging over a time interval, therefore the power spectral density was measured using PSD Option 2 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

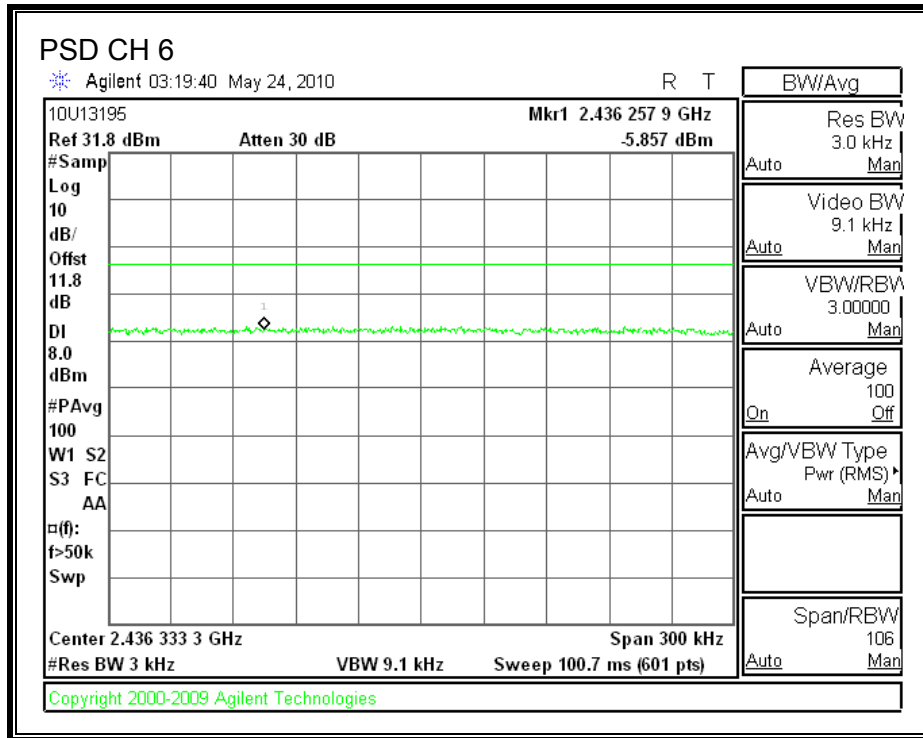
RESULTS

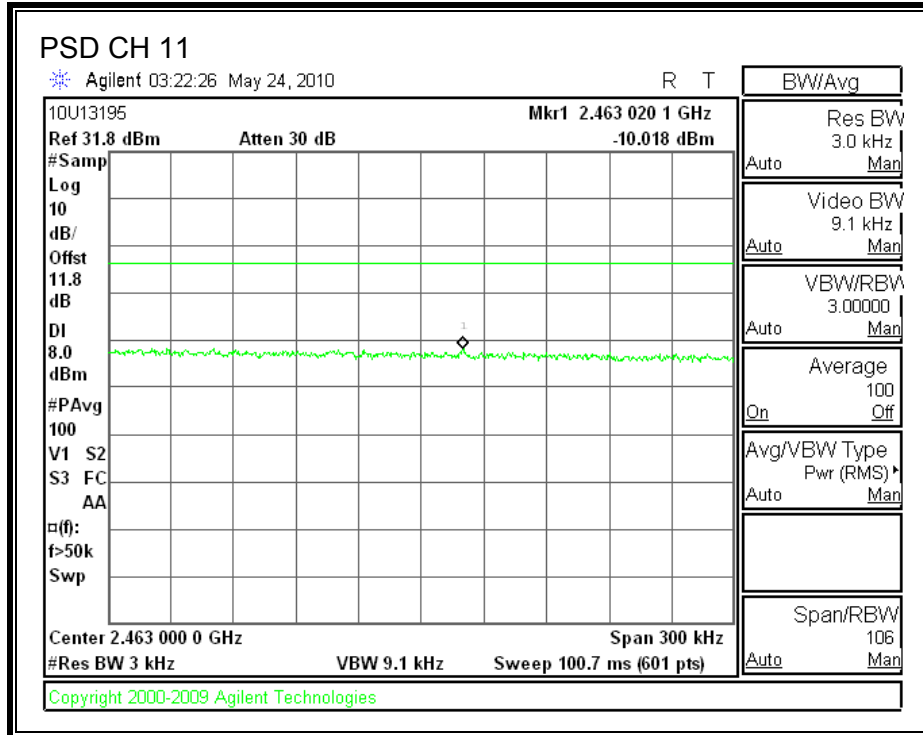
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
1	2412	-10.591	8	-18.59
6	2437	-5.857	8	-13.86
11	2462	-10.018	8	-18.02

Note: channels 1 and 11 were tested at the power levels of channels 2 and 10 respectively, the power levels for CH2 and CH10 are higher than the power levels of CH1 and CH11; hence this is worst-case measurement.

POWER SPECTRAL DENSITY







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 RMS averaging over a time interval, therefore the required attenuation is 30 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.

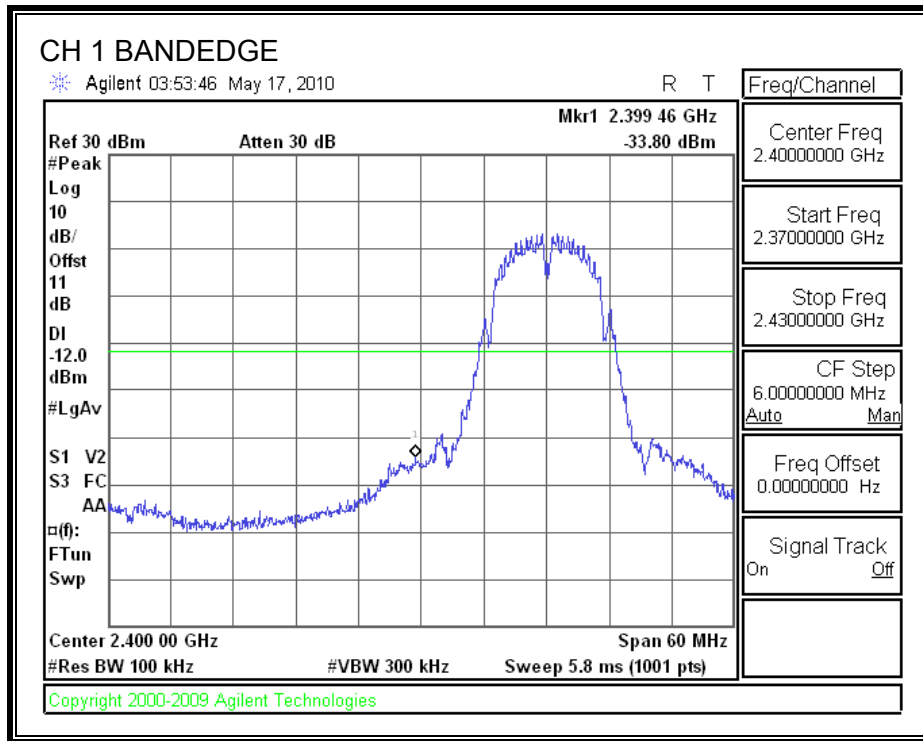
The EUT was set to transmit at mid channel, 30 dBc display line was set with reference to mid channel level.

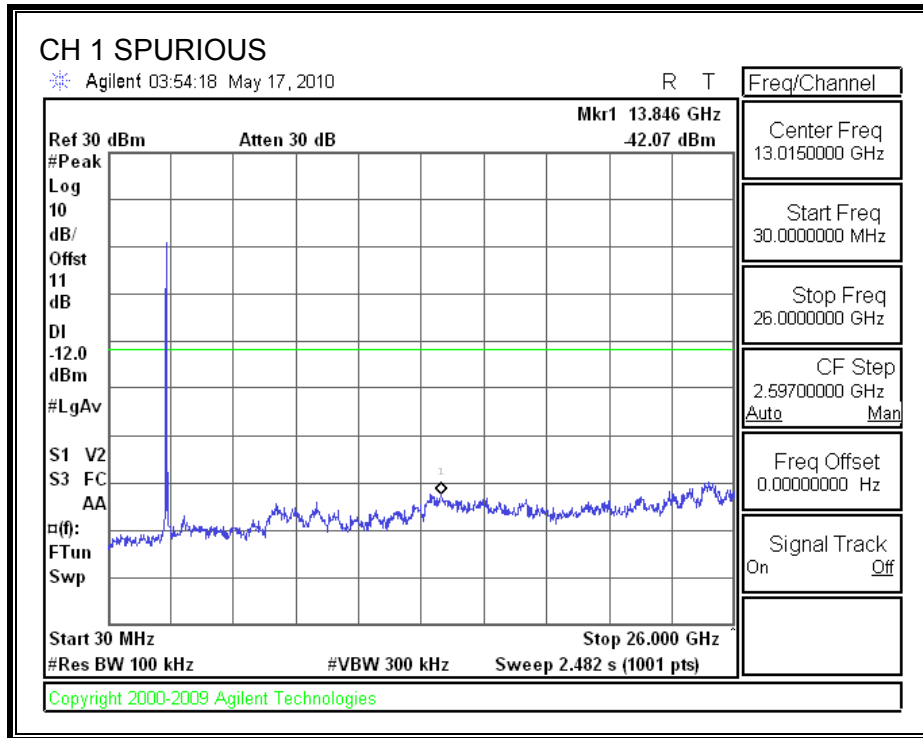
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

Note: channels 1 and 11 were tested at the power levels of channels 2 and 10 respectively, the power levels for CH2 and CH10 are higher than the power levels of CH1 and CH11; hence this is worst-case measurement.

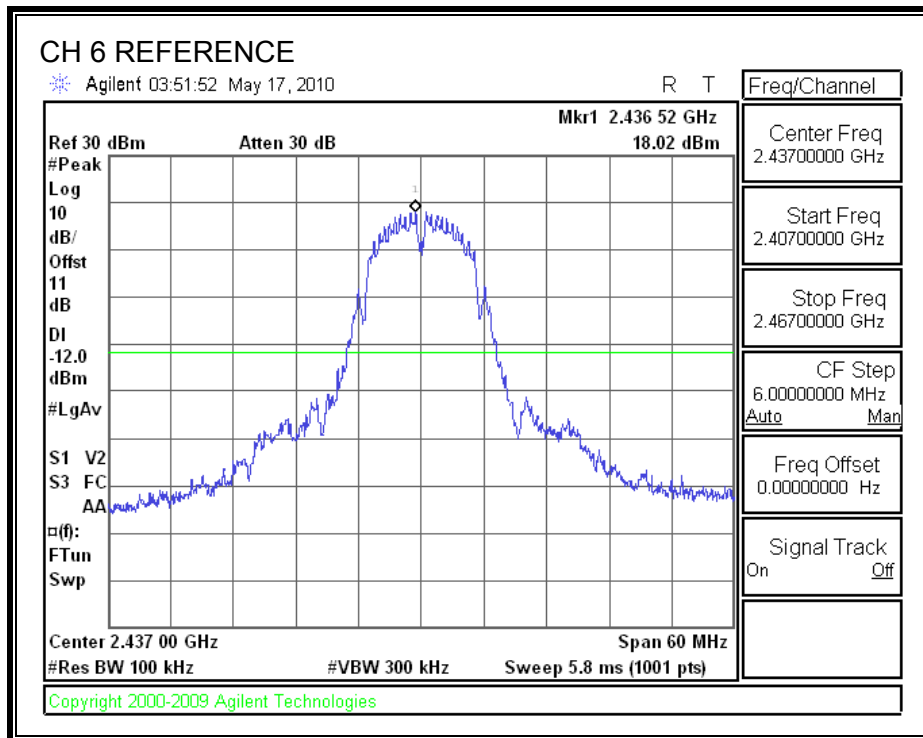
RESULTS

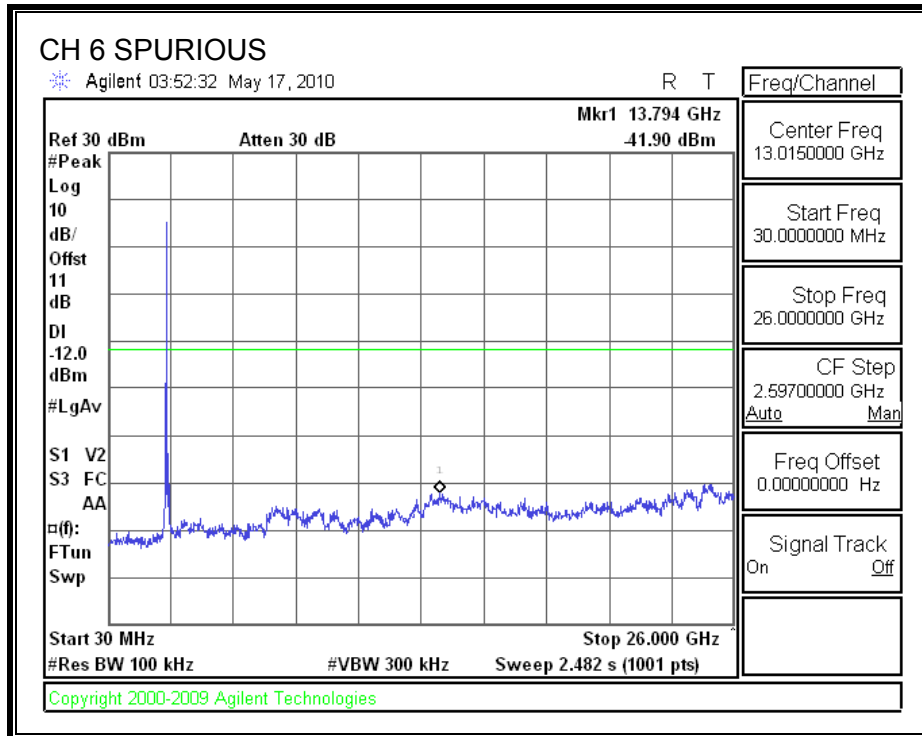
SPURIOUS EMISSIONS, CHANNEL 1



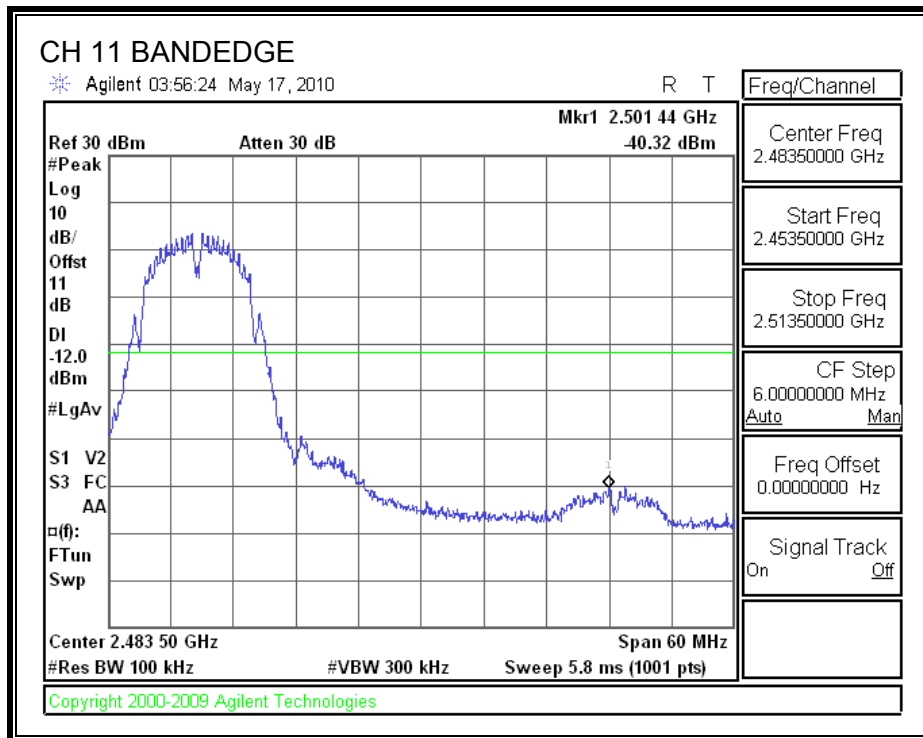


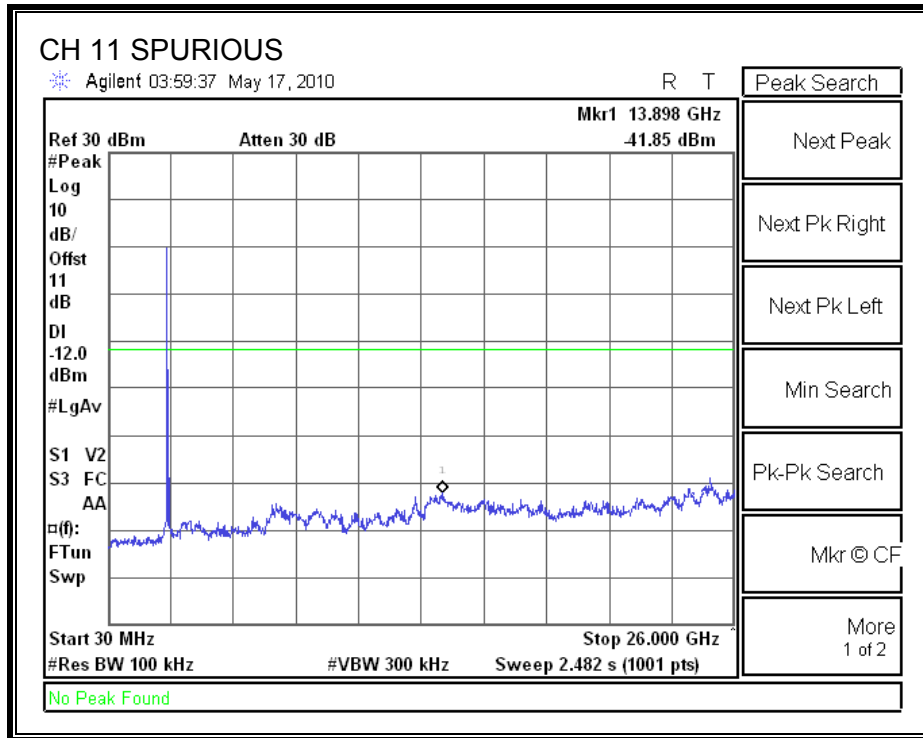
SPURIOUS EMISSIONS, CHANNEL 6





SPURIOUS EMISSIONS, CHANNEL 11





7.2. 802.11g 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

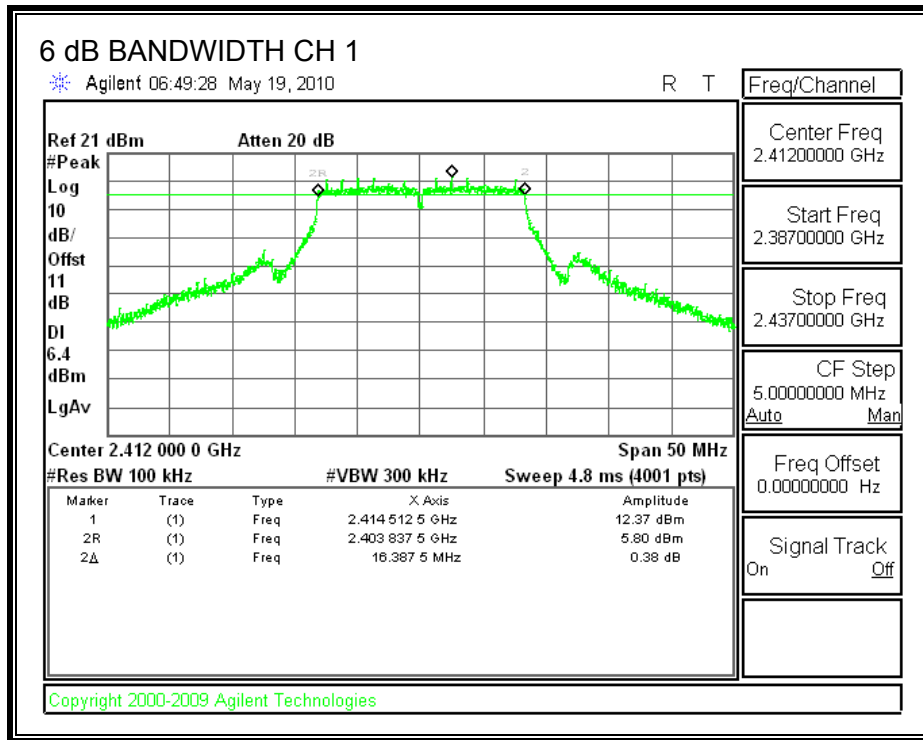
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

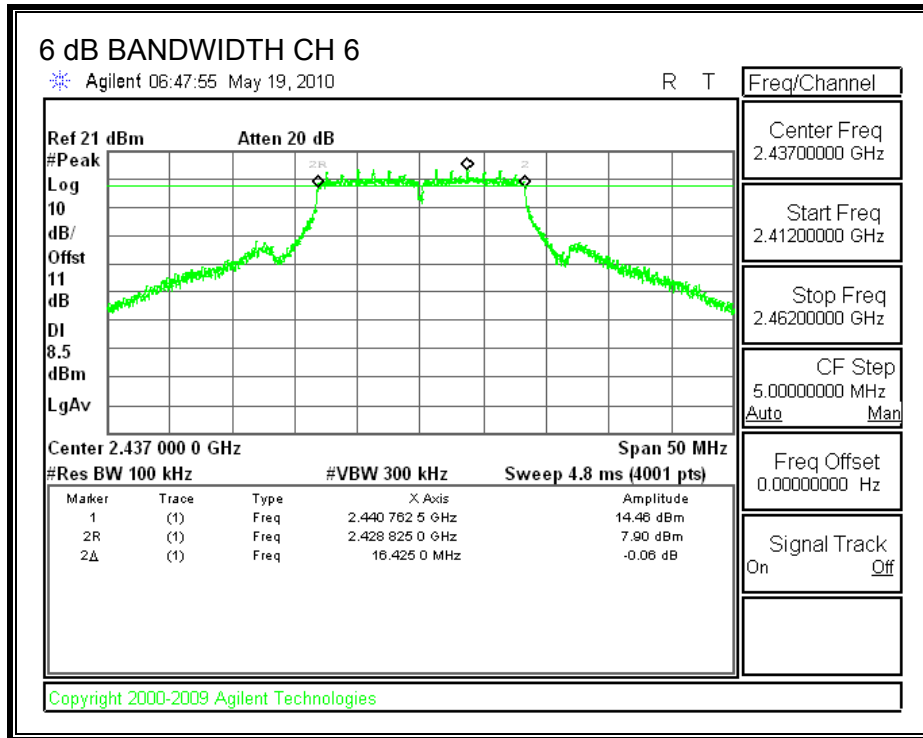
RESULTS

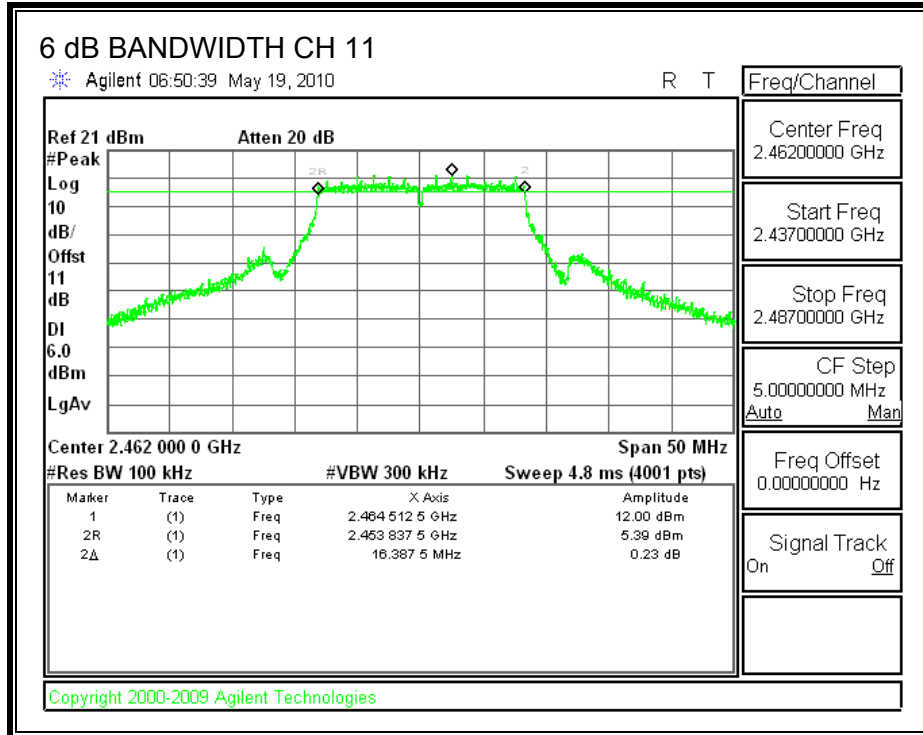
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
1	2412	16.3875	0.5
6	2437	16.425	0.5
11	2462	16.3875	0.5

Note: channels 1 and 11 were tested at the power levels of channels 2 and 10 respectively, the power levels for CH2 and CH10 are higher than the power levels of CH1 and CH11; hence this is worst-case measurement.

6 dB BANDWIDTH







7.2.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

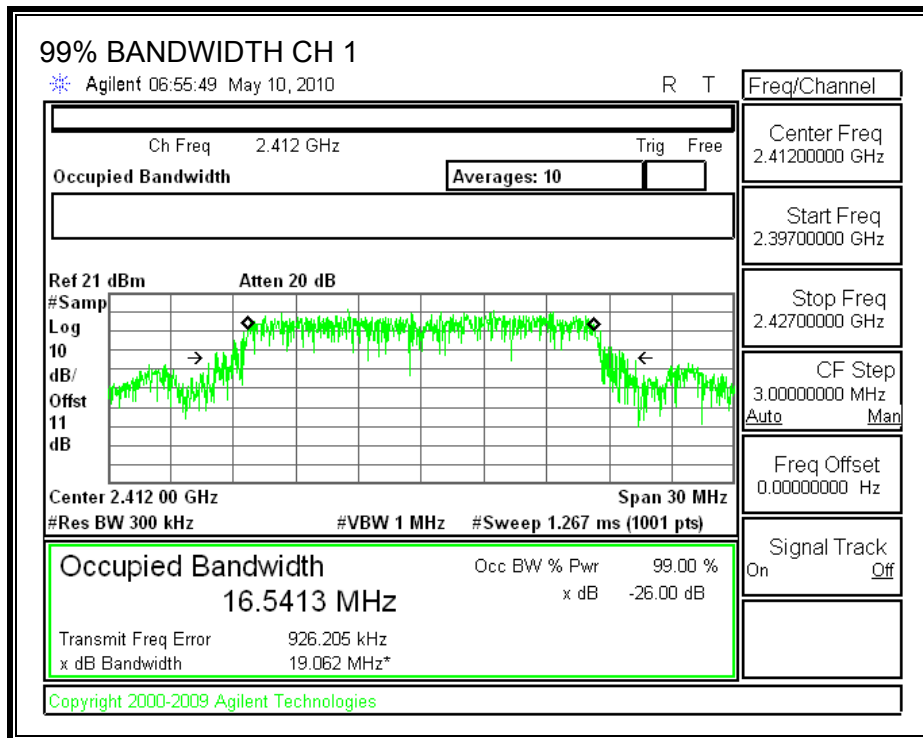
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

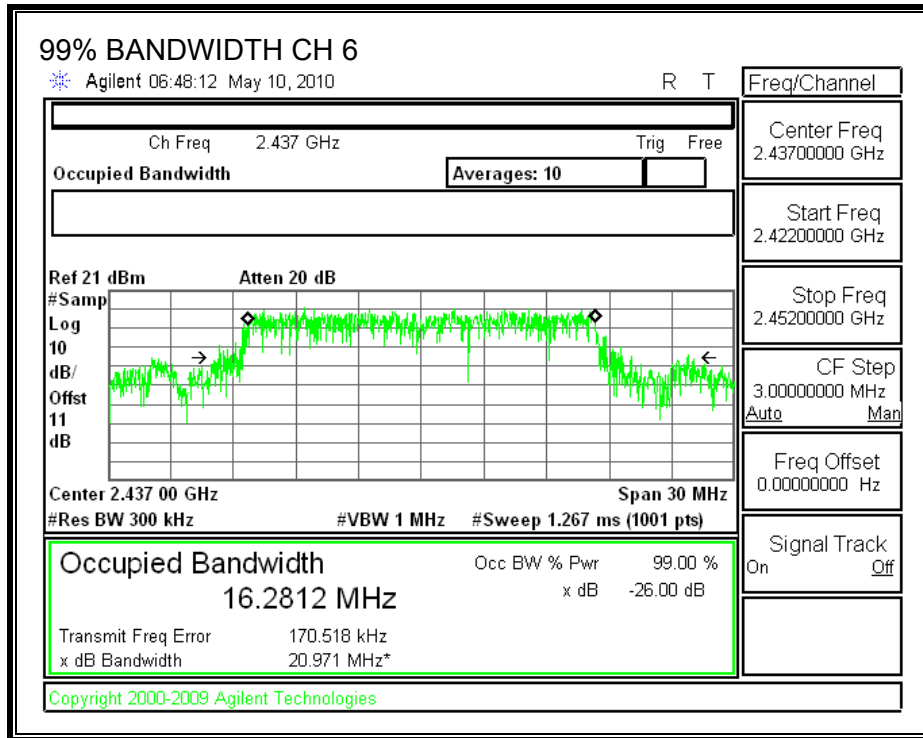
RESULTS

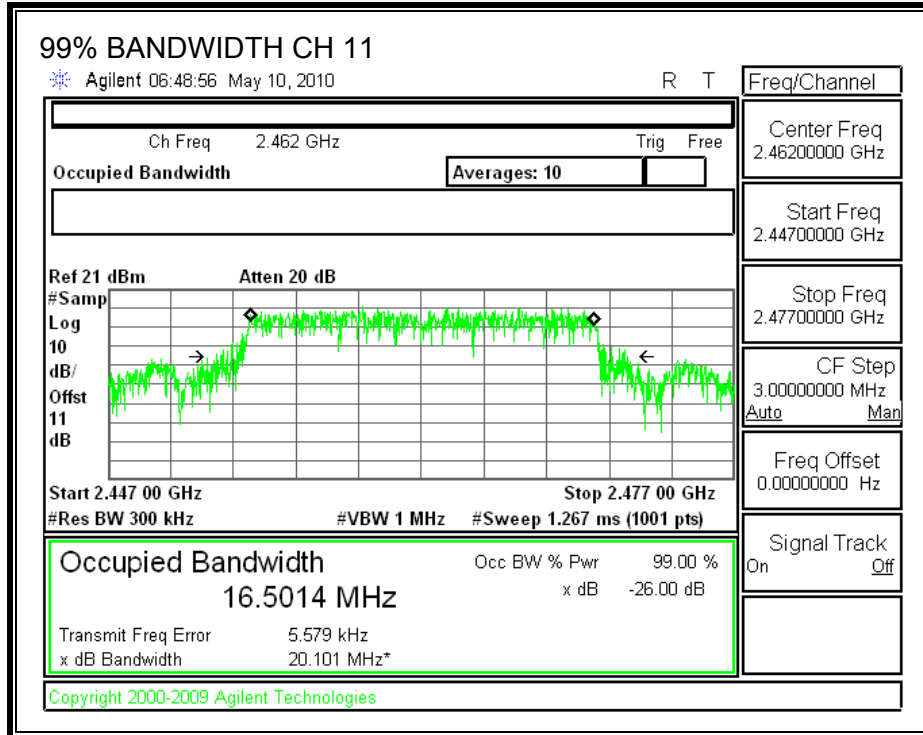
Channel	Frequency (MHz)	99% Bandwidth (MHz)
1	2412	16.5413
6	2437	16.2812
11	2462	16.5014

Note: channels 1 and 11 were tested at the power levels of channels 2 and 10 respectively, the power levels for CH2 and CH10 are higher than the power levels of CH1 and CH11; hence this is worst-case measurement.

99% BANDWIDTH







7.2.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

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

TEST PROCEDURE

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

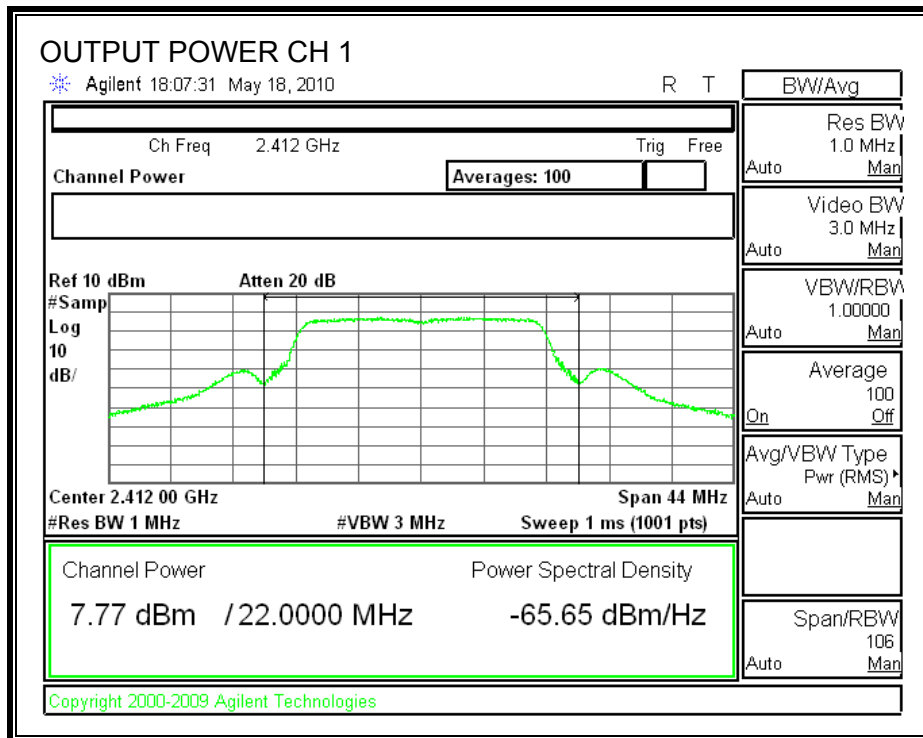
RESULTS FOR 6Mbps

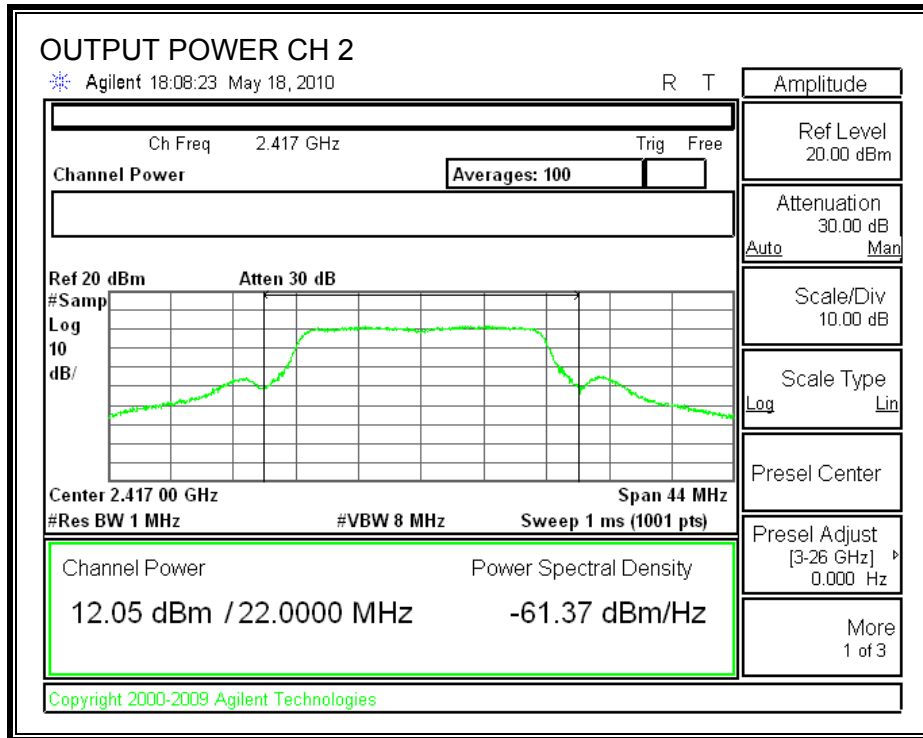
Channel	Frequency (MHz)	Spectrum Analyzer Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
1	2412	7.77	11.3	19.07	30	-10.93
2	2417	12.05	11.3	23.35	30	-6.65
6	2437	14.47	11.3	25.77	30	-4.23
10	2457	12.12	11.3	23.42	30	-6.58
11	2462	7.96	11.3	19.26	30	-10.74

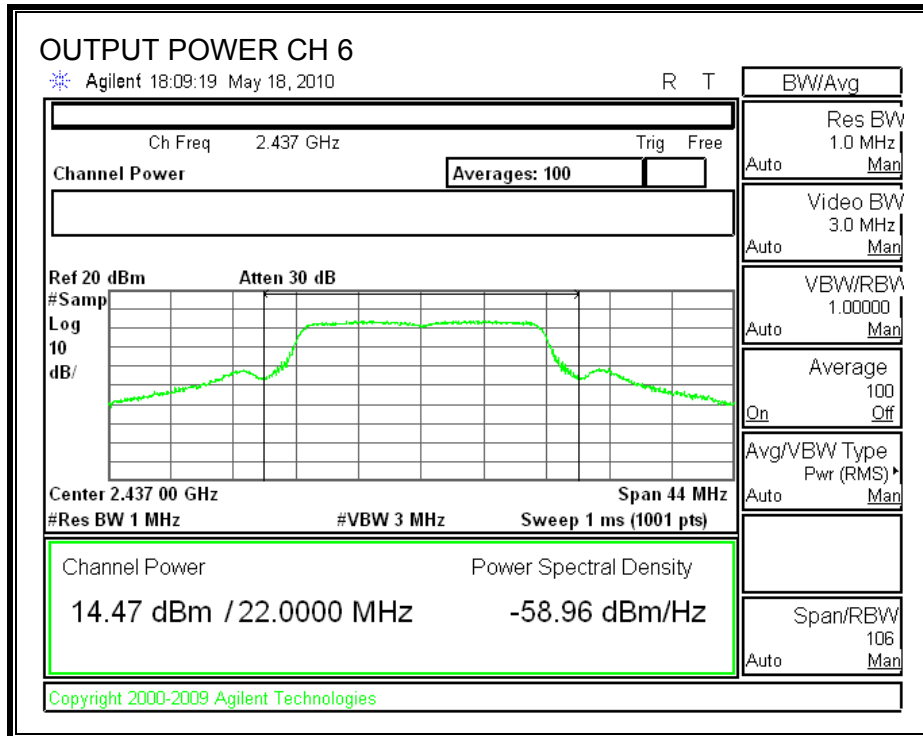
RESULTS FOR 54Mbps

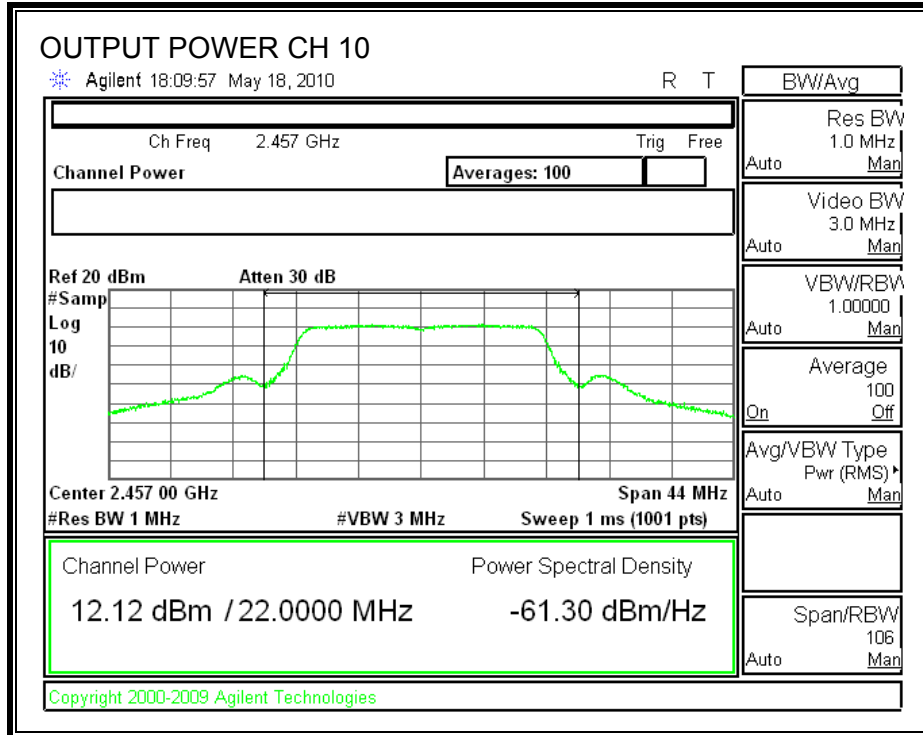
Channel	Frequency (MHz)	Spectrum Analyzer Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
1	2412	7.39	11.3	18.69	30	-11.31
2	2417	10.62	11.3	21.92	30	-8.08
6	2437	10.85	11.3	22.15	30	-7.85
10	2457	10.71	11.3	22.01	30	-7.99
11	2462	7.47	11.3	18.77	30	-11.23

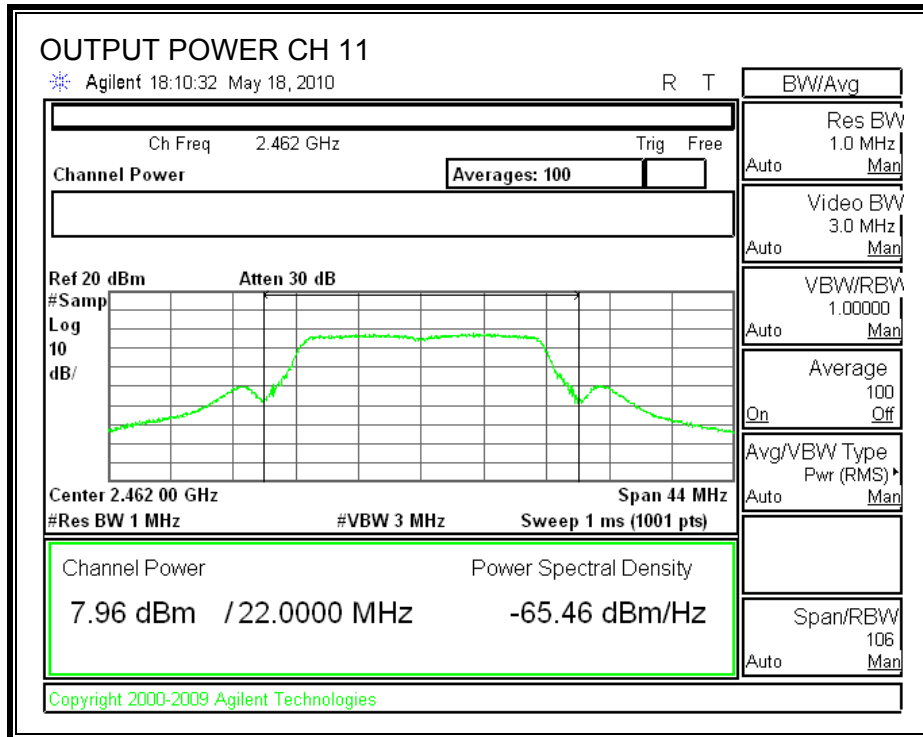
OUTPUT POWER 802.11g 6Mbps



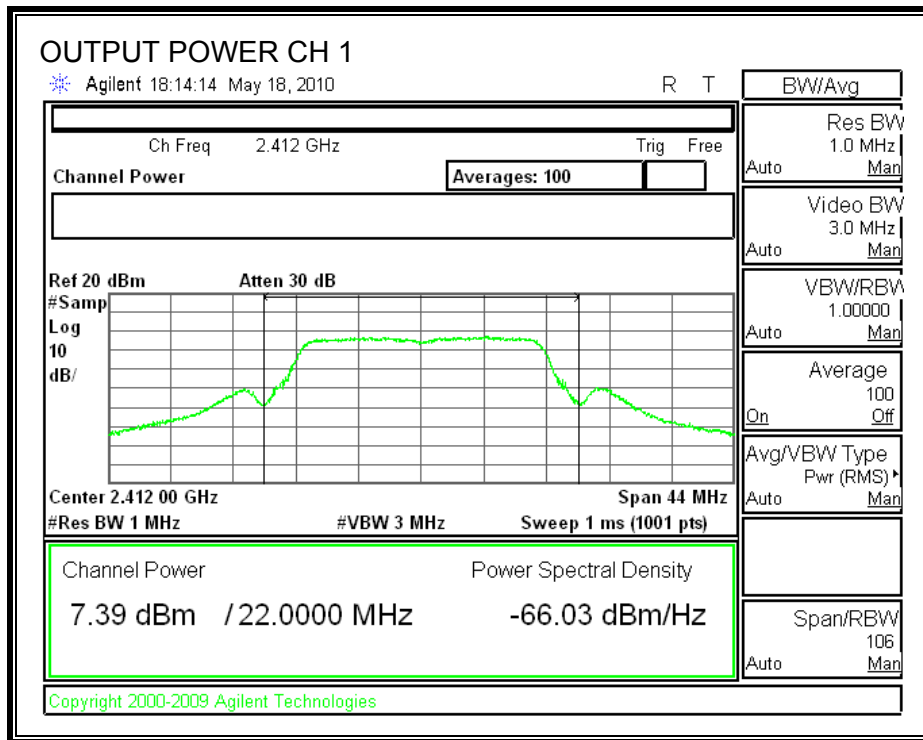


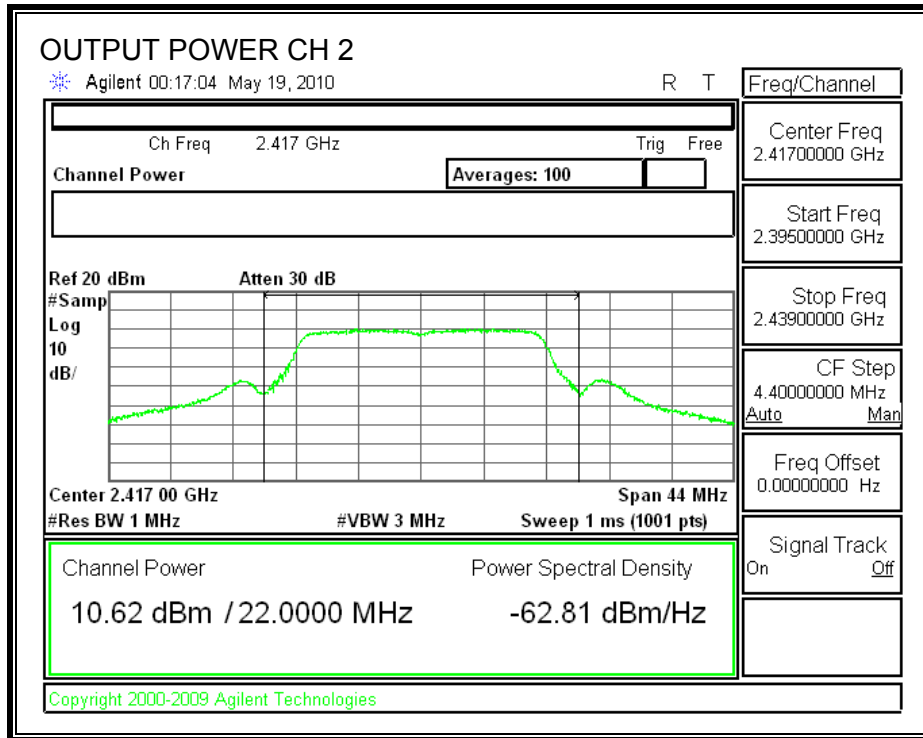


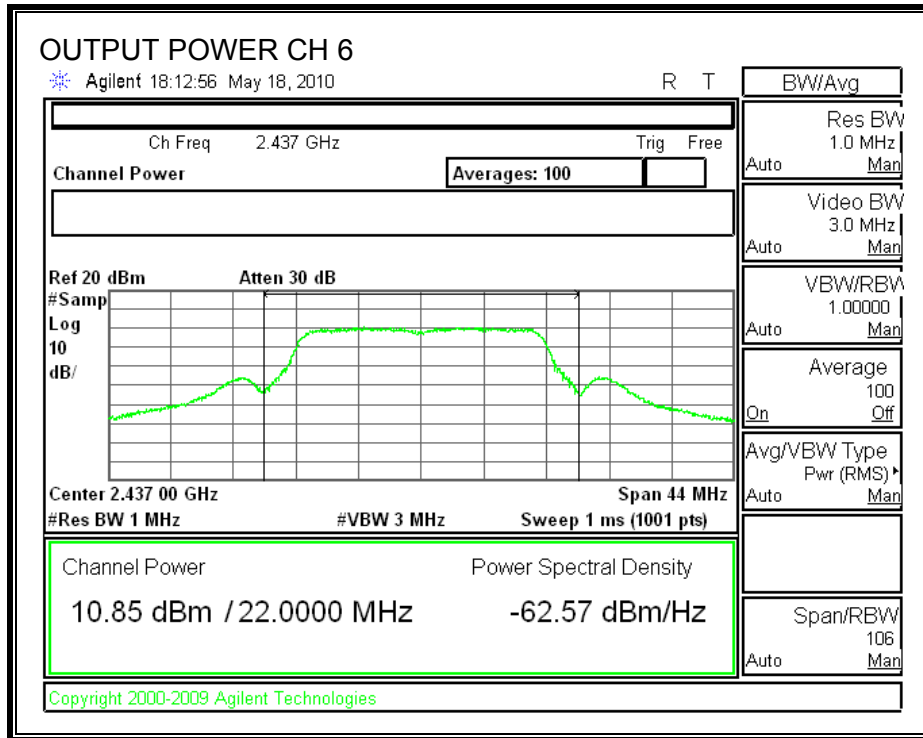


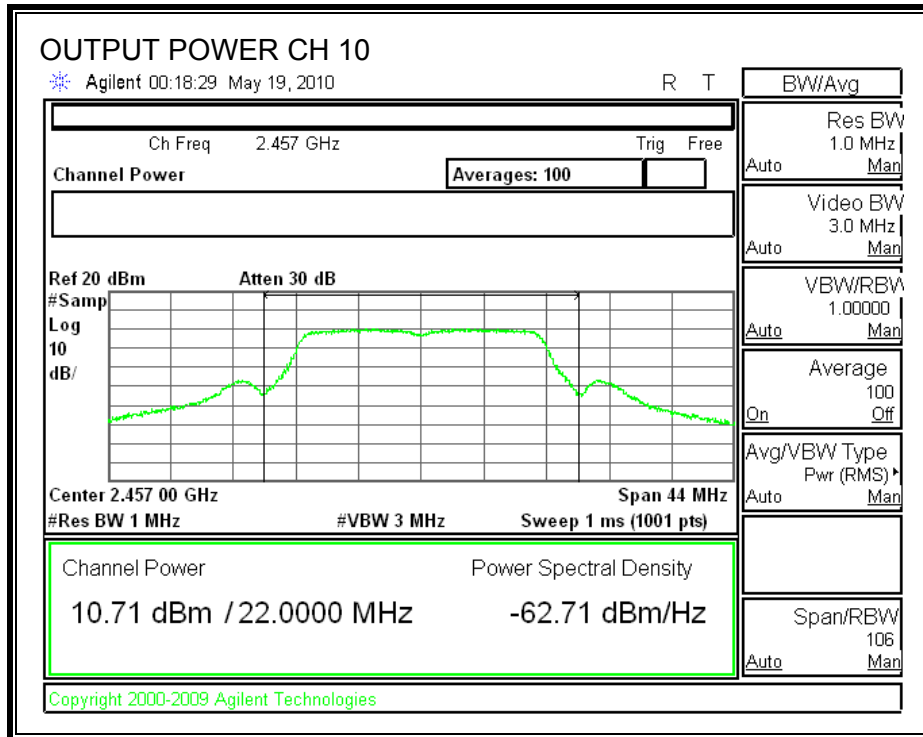


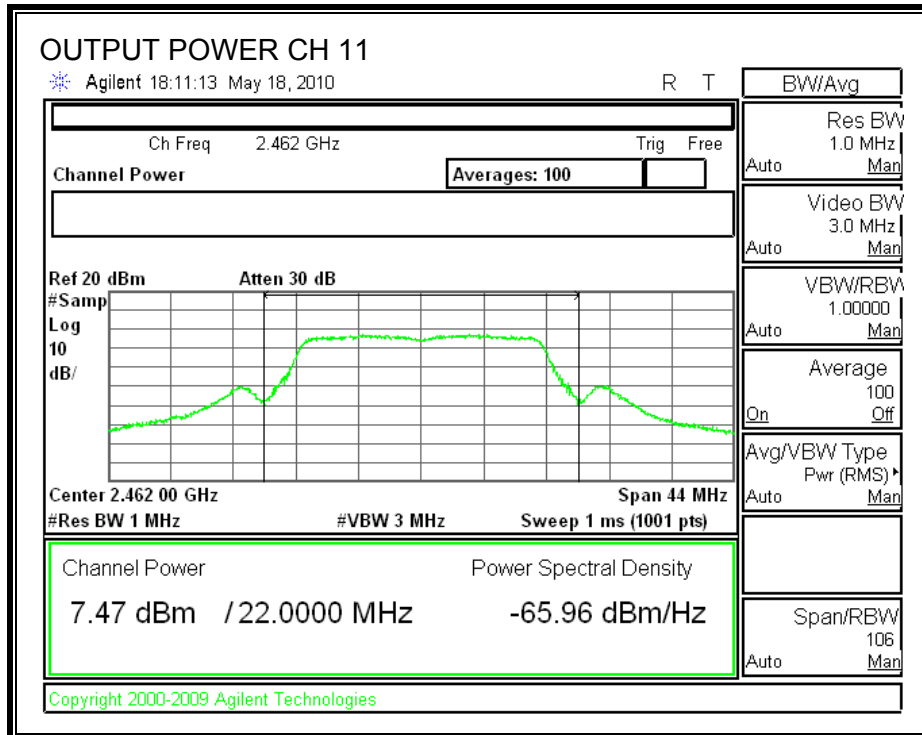
OUTPUT POWER 802.11g 54Mbps











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

802.11 g 6Mbps

Channel	Frequency (MHz)	Power (dBm)
1	2412	19.15
2	2417	23.33
6	2437	25.54
10	2457	23.35
11	2462	19.13

802.11 g 54Mbps

Channel	Frequency (MHz)	Power (dBm)
1	2412	18.89
2	2417	21.83
6	2437	22.06
10	2457	22
11	2462	18.83

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.

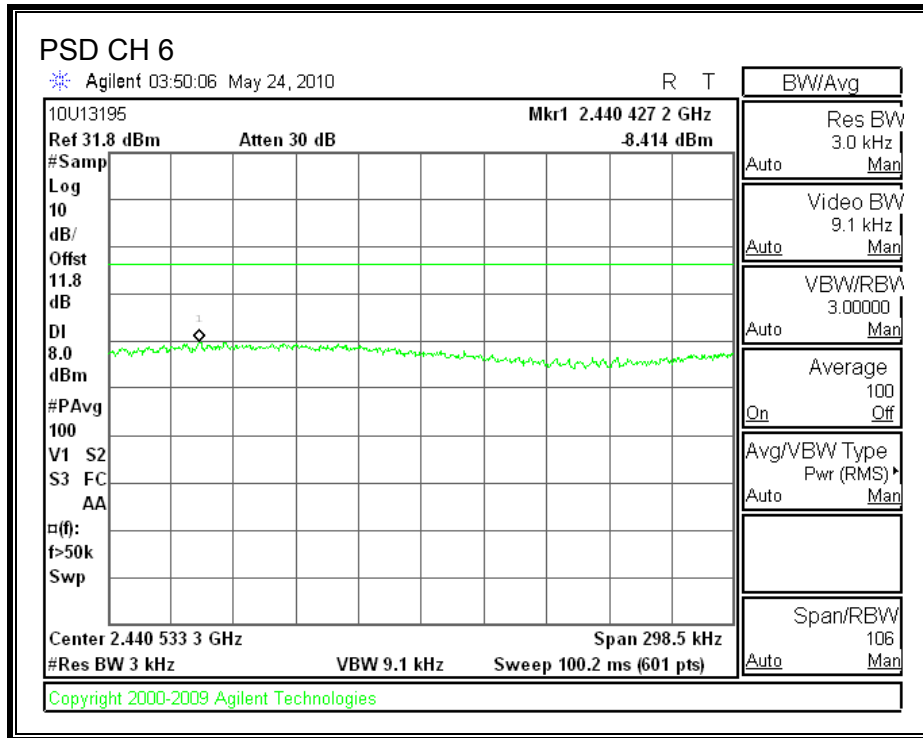
TEST PROCEDURE

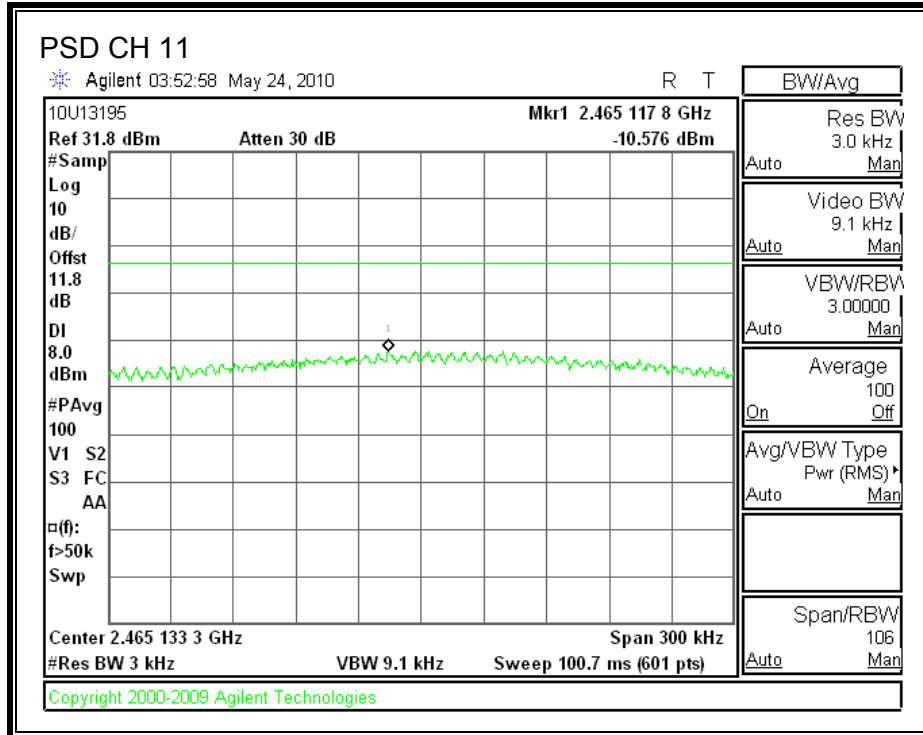
Output power was measured based on the use of RMS averaging over a time interval, therefore the power spectral density was measured using PSD Option 2 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
1	2412	-10.598	8	-18.60
6	2437	-8.414	8	-16.41
11	2462	-10.576	8	-18.58

Note: channels 1 and 11 were tested at the power levels of channels 2 and 10 respectively, the power levels for CH2 and CH10 are higher than the power levels of CH1 and CH11; hence this is worst-case measurement.





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 RMS averaging over a time interval, therefore the required attenuation is 30 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.

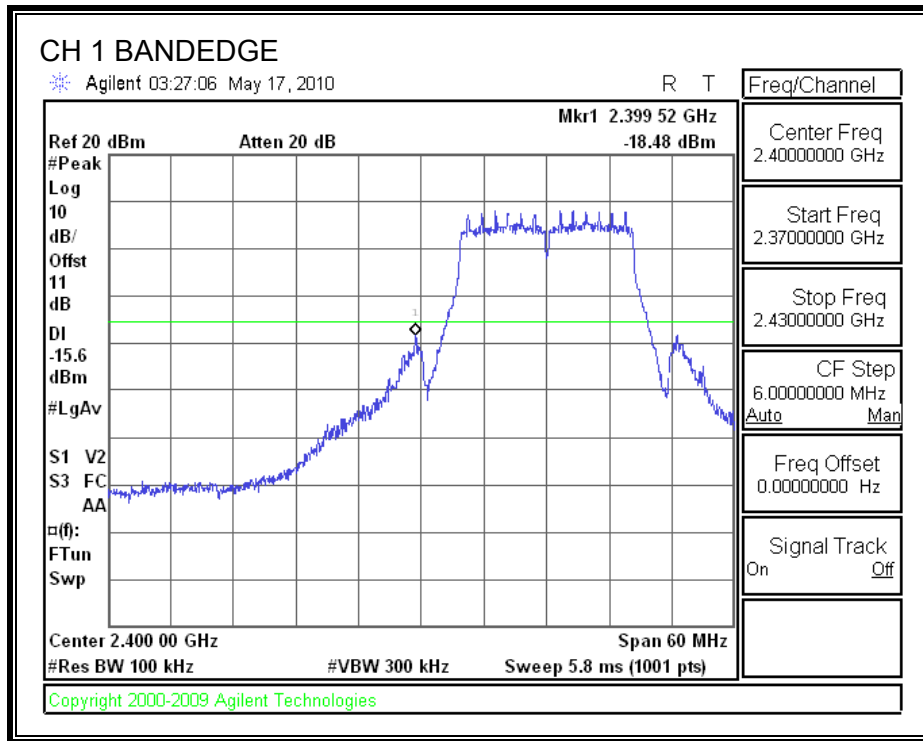
The EUT was set to transmit at mid channel, 30 dBc display line was set with reference to mid channel level.

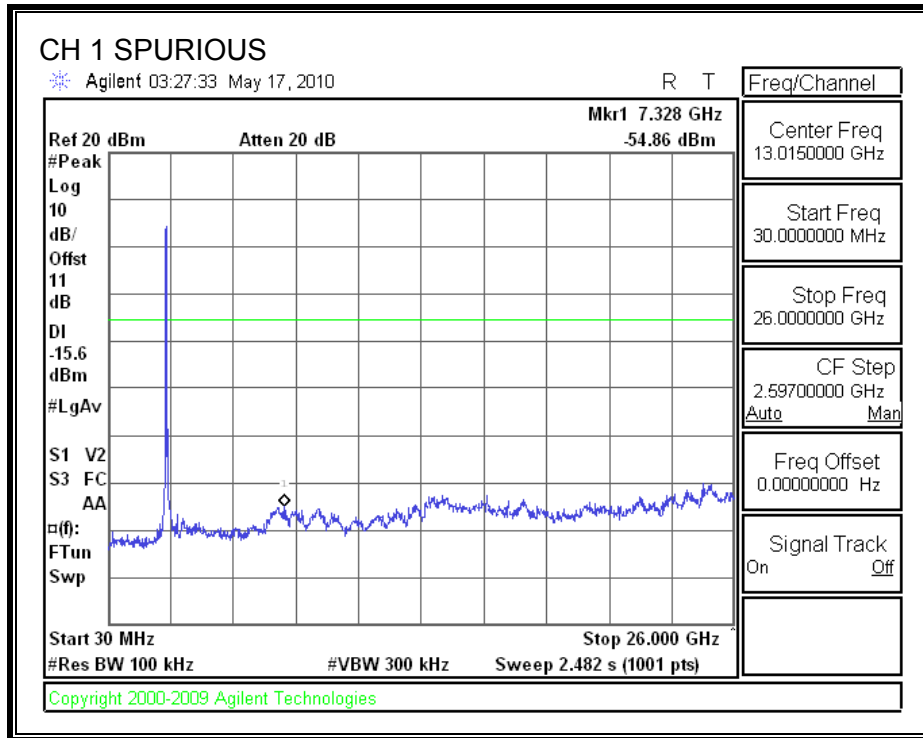
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

Note: channel 11 was tested at the power levels of channel 10, the power levels for CH10 is higher than the power level of CH11; hence this is worst-case measurement.

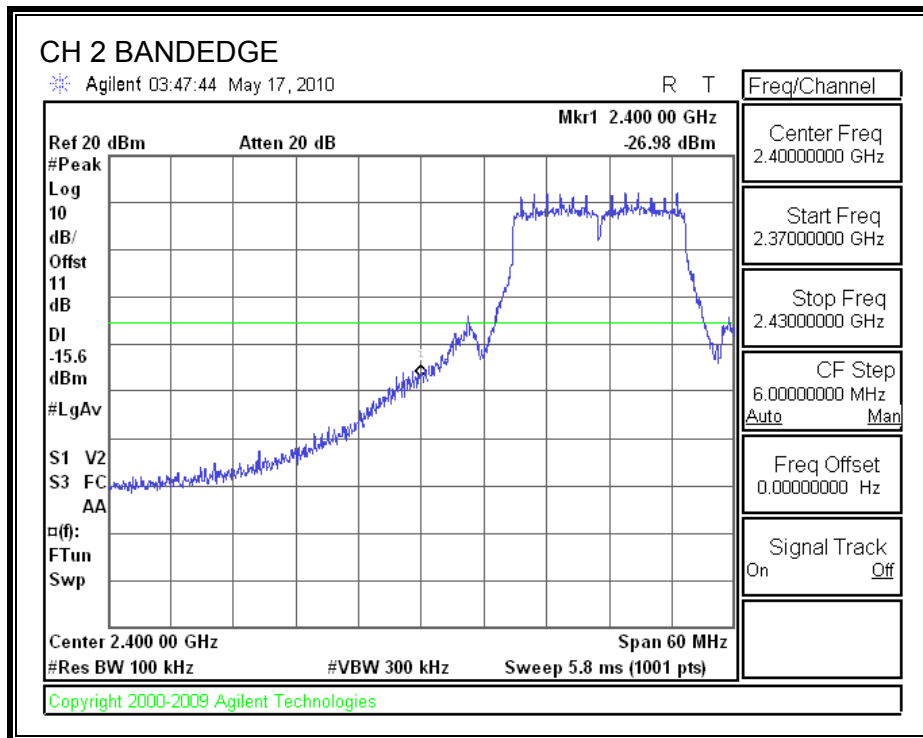
RESULTS

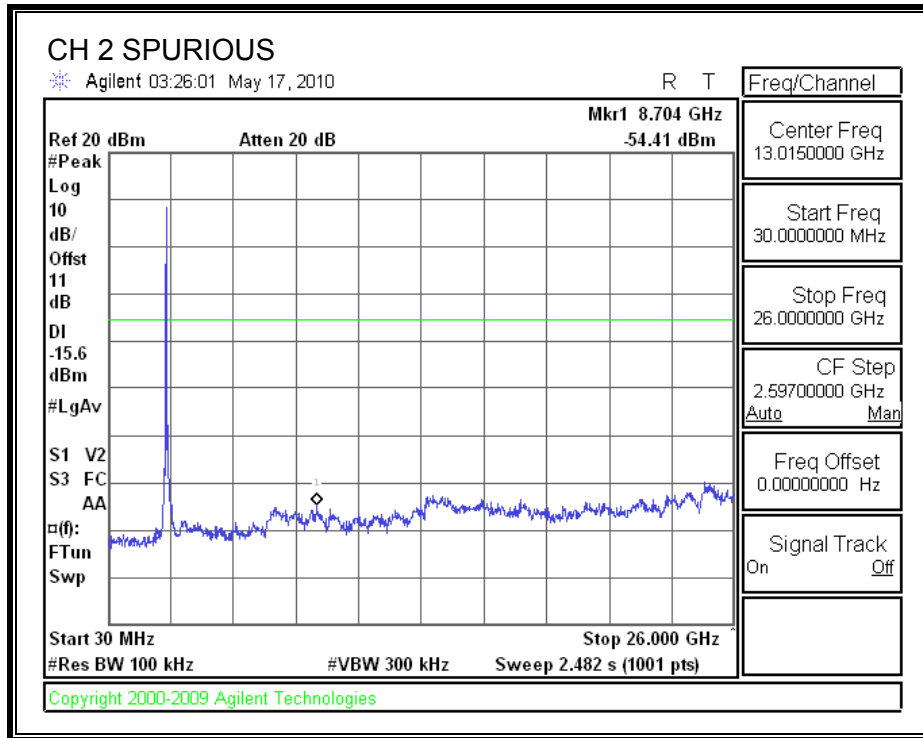
SPURIOUS EMISSIONS, CHANNEL 1



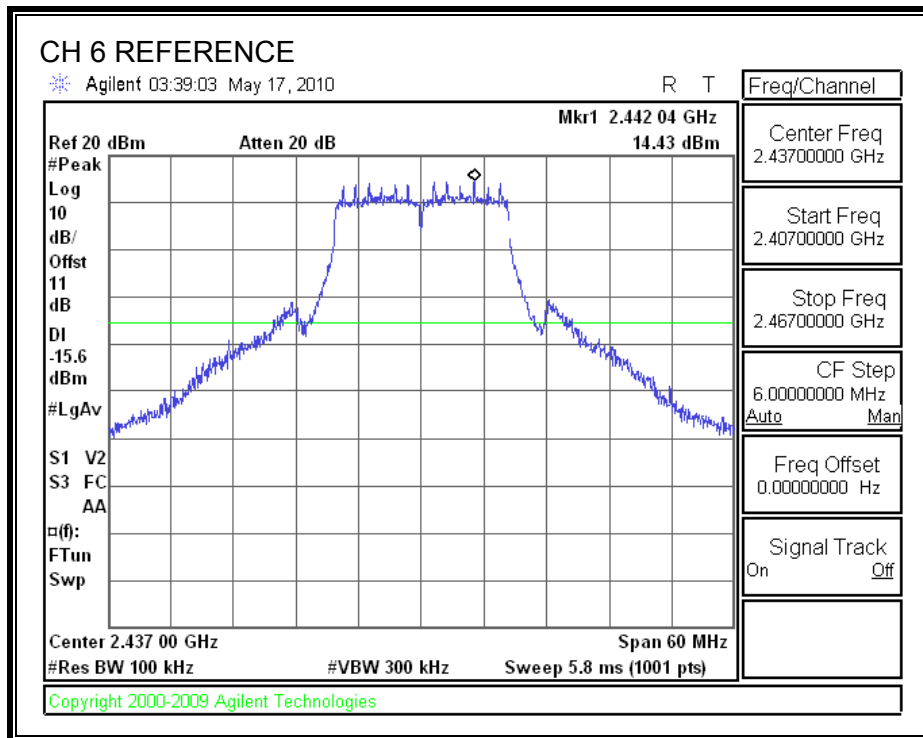


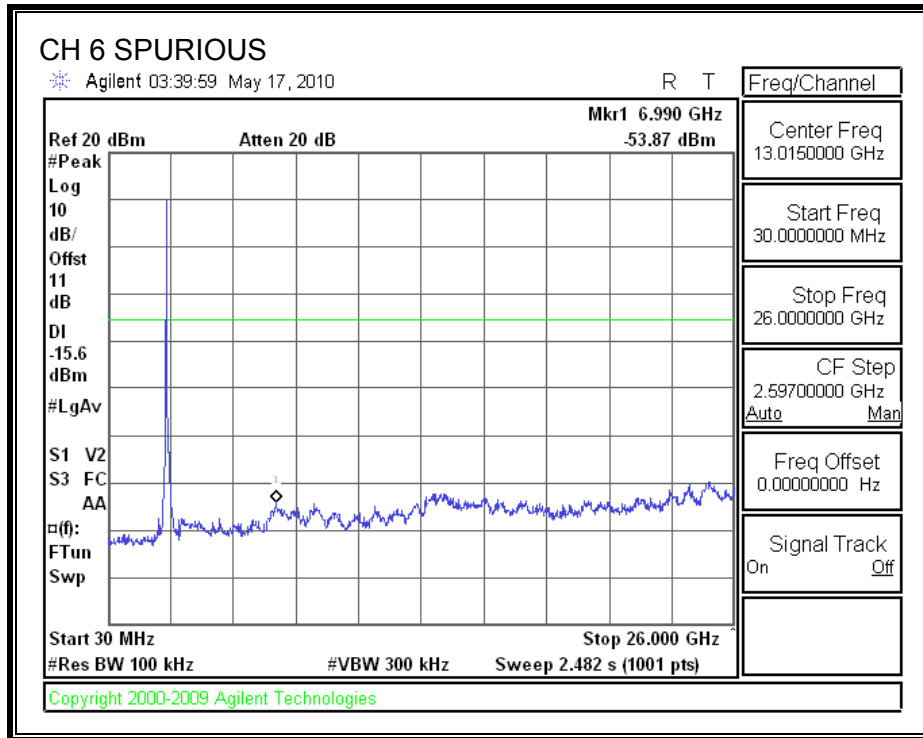
SPURIOUS EMISSIONS, CHANNEL 2



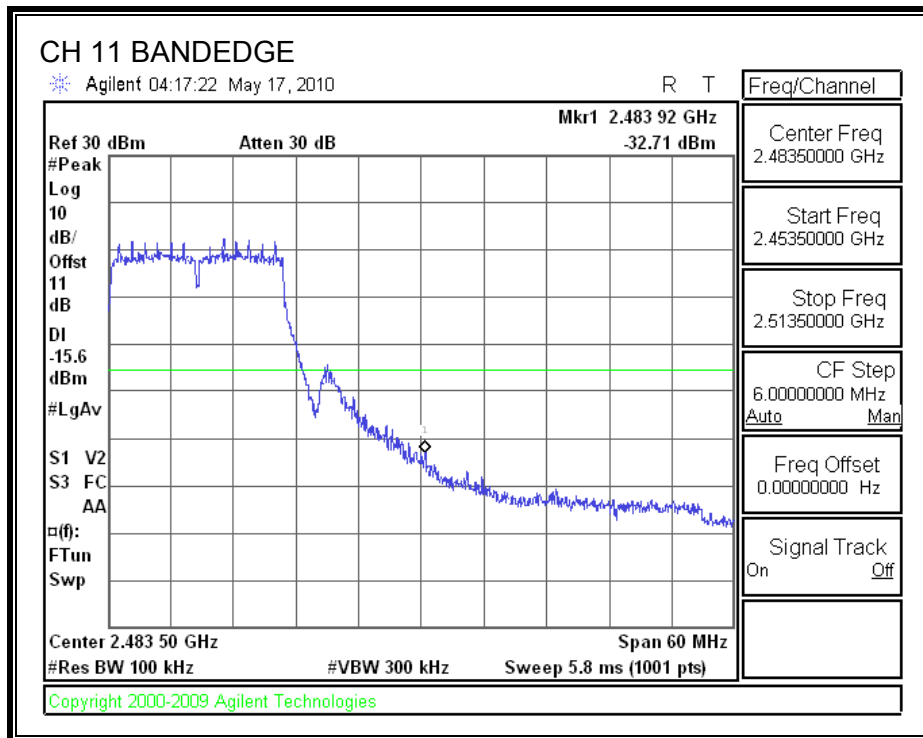


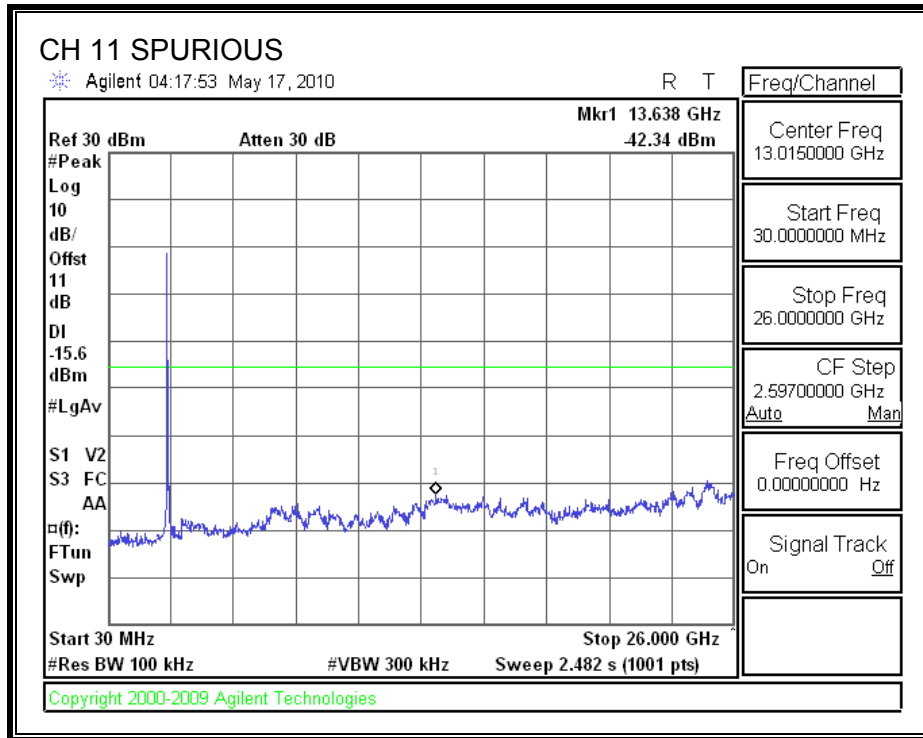
SPURIOUS EMISSIONS, CHANNEL 6





SPURIOUS EMISSIONS, CHANNEL 11





7.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND SINGLE CHAIN

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

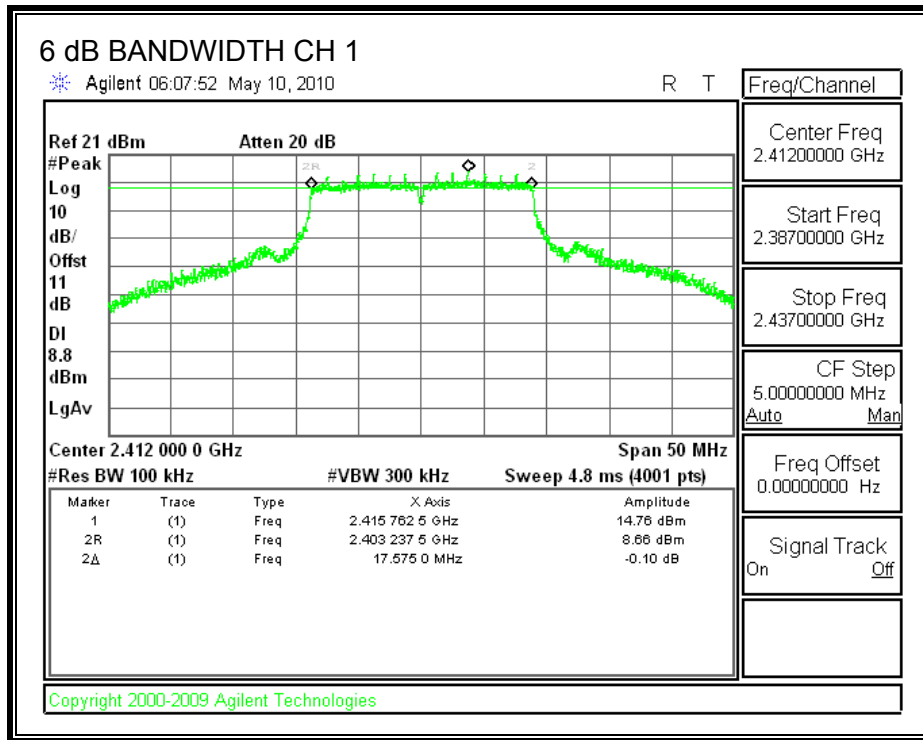
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

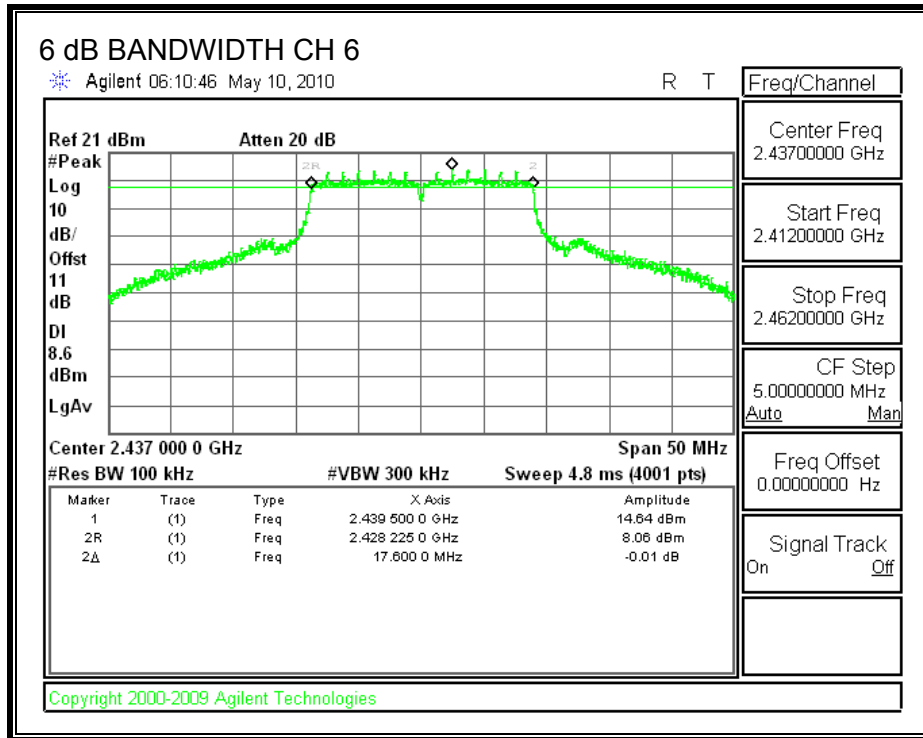
RESULTS

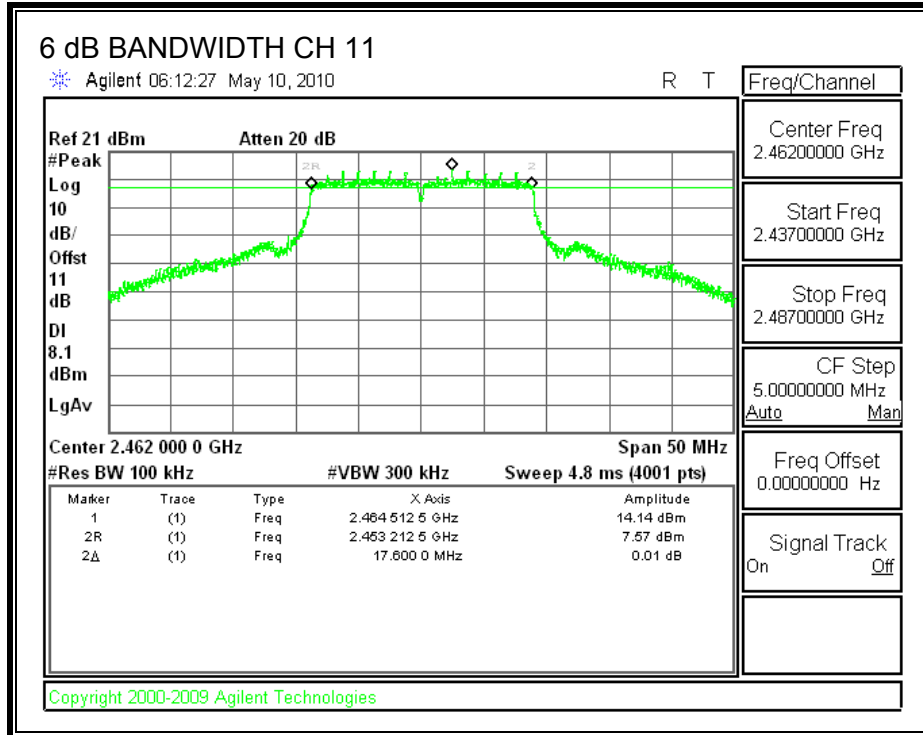
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
1	2412	17.575	0.5
6	2437	17.6	0.5
11	2462	17.6	0.5

Note: channels 1 and 11 were tested at the power levels of channels 2 and 10 respectively, the power levels for CH2 and CH10 are higher than the power levels of CH1 and CH11; hence this is worst-case measurement.

6 dB BANDWIDTH







7.3.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

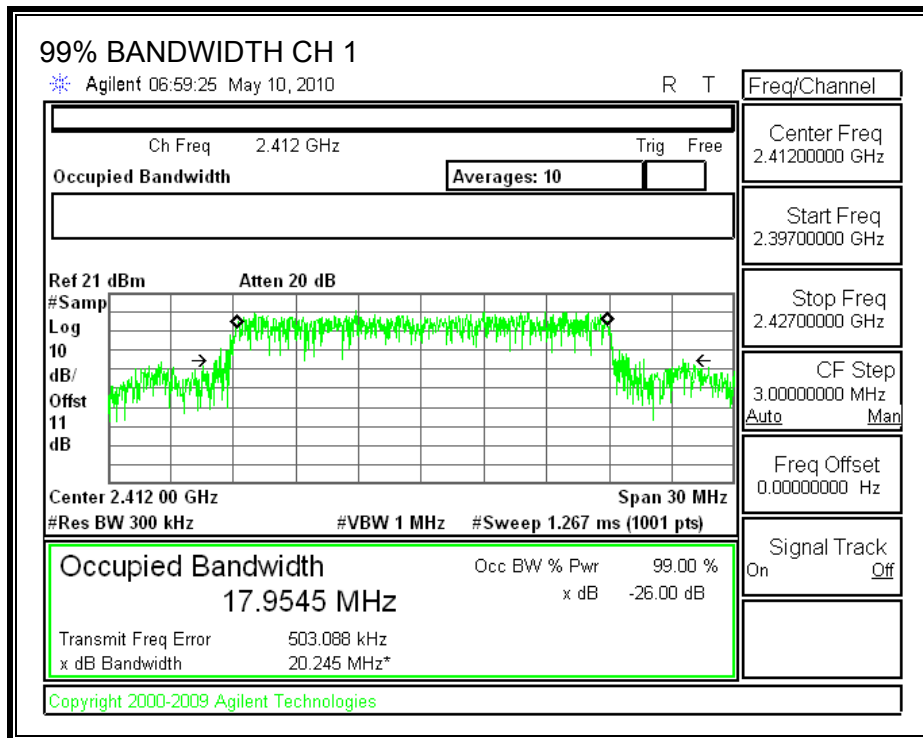
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

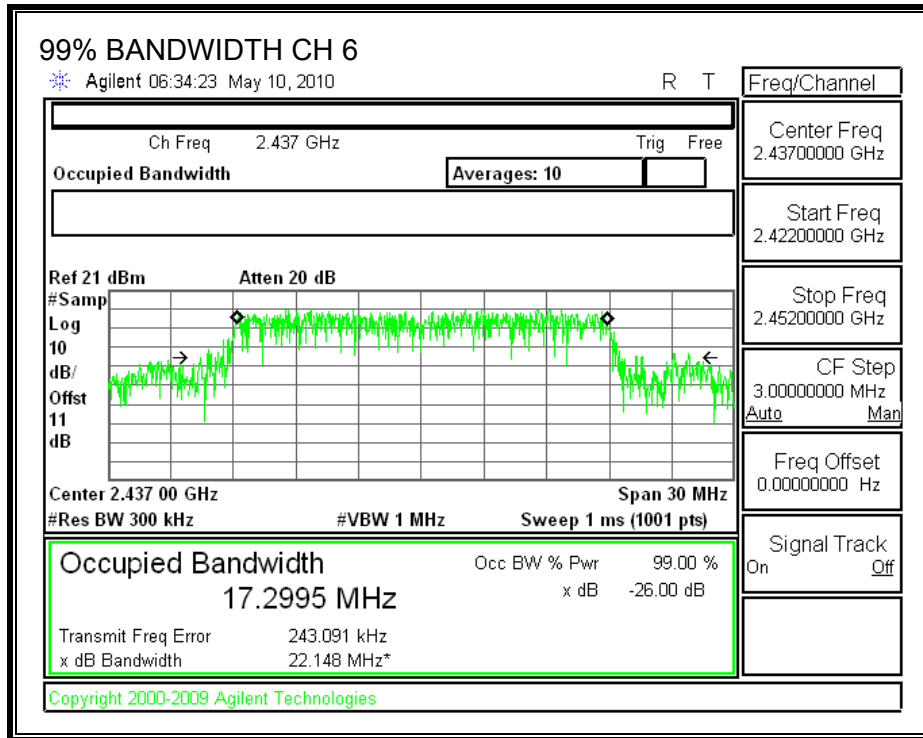
RESULTS

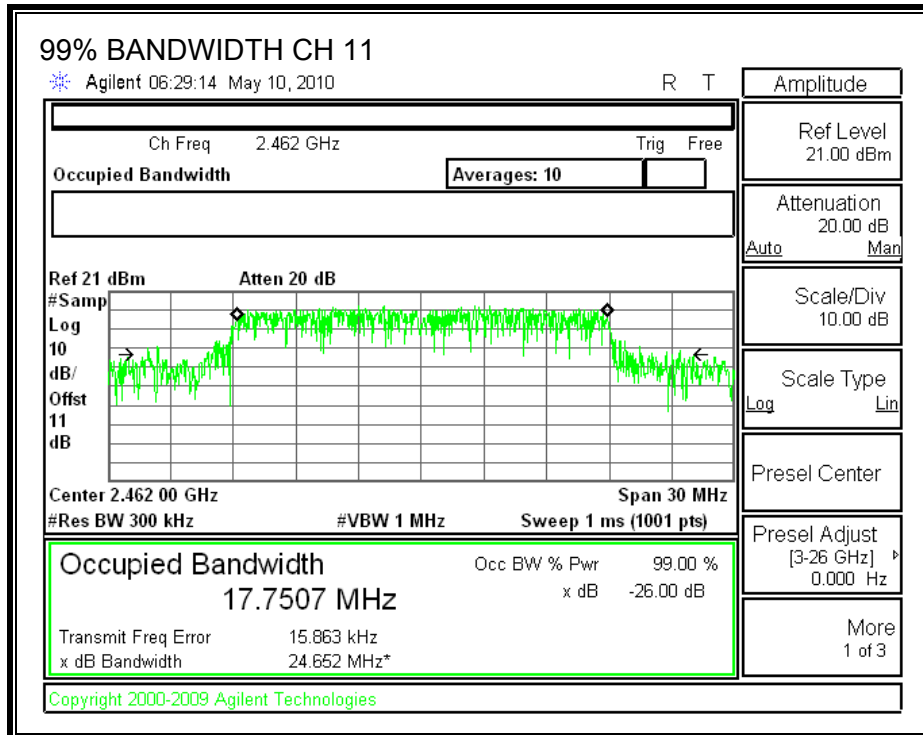
Channel	Frequency (MHz)	99% Bandwidth (MHz)
1	2412	17.9545
6	2437	17.2995
11	2462	17.7507

Note: channels 1 and 11 were tested at the power levels of channels 2 and 10 respectively, the power levels for CH2 and CH10 are higher than the power levels of CH1 and CH11; hence this is worst-case measurement.

99% BANDWIDTH







7.3.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

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

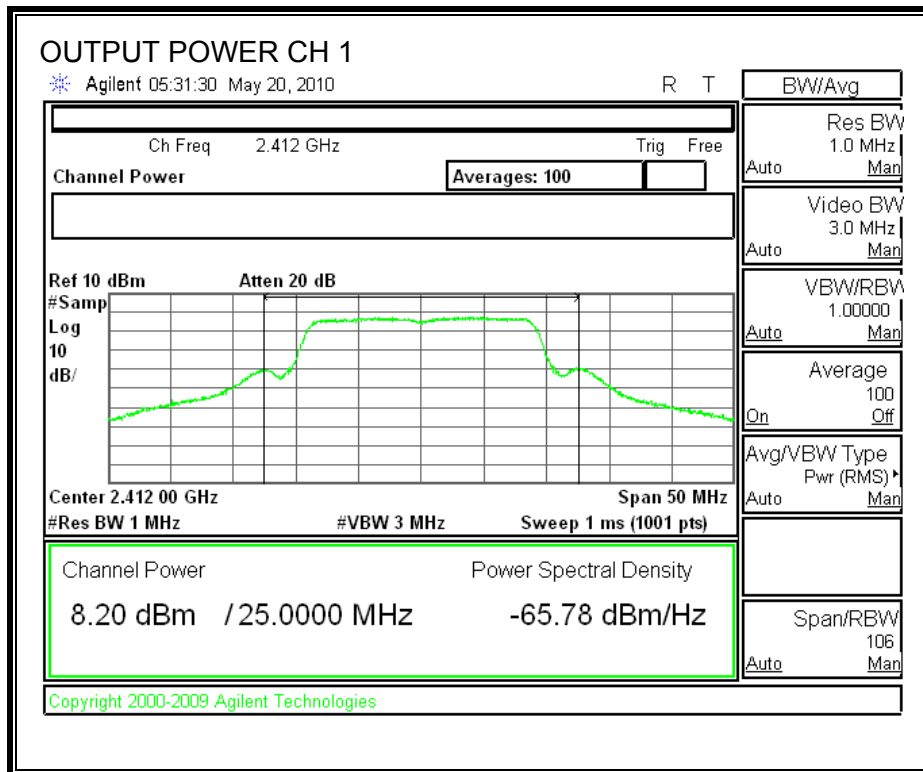
TEST PROCEDURE

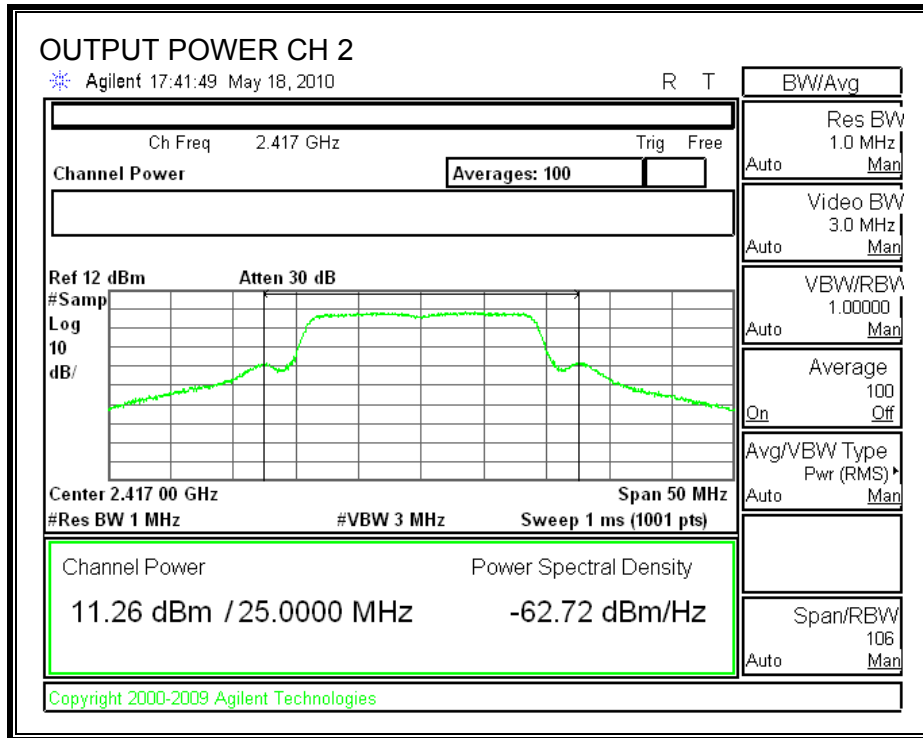
Output power was measured based on the use of RMS averaging over a time interval in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

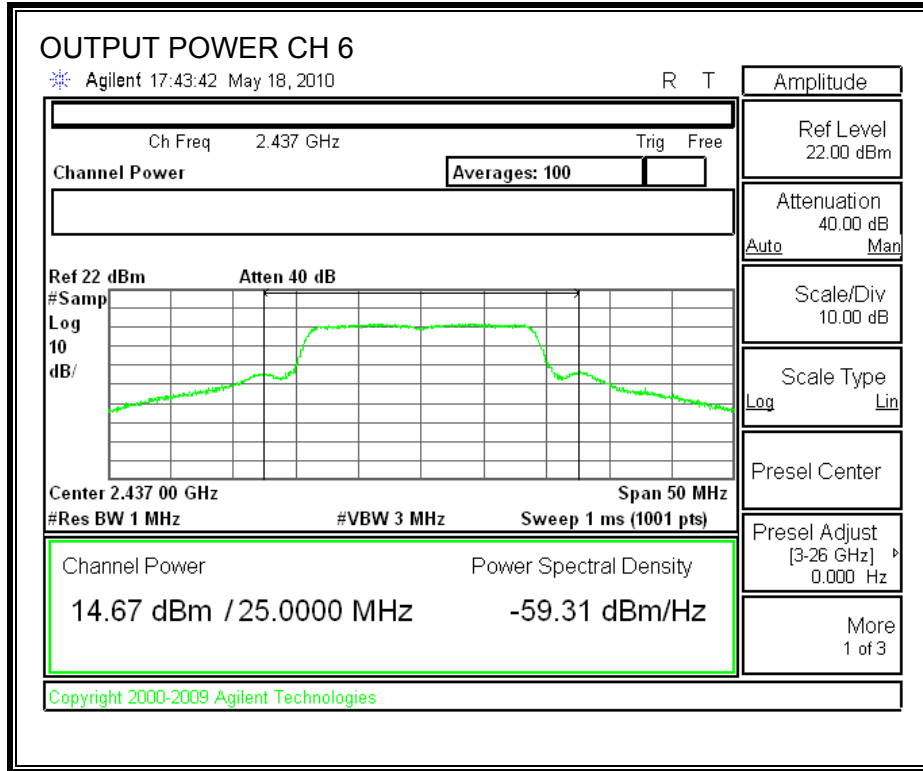
RESULTS

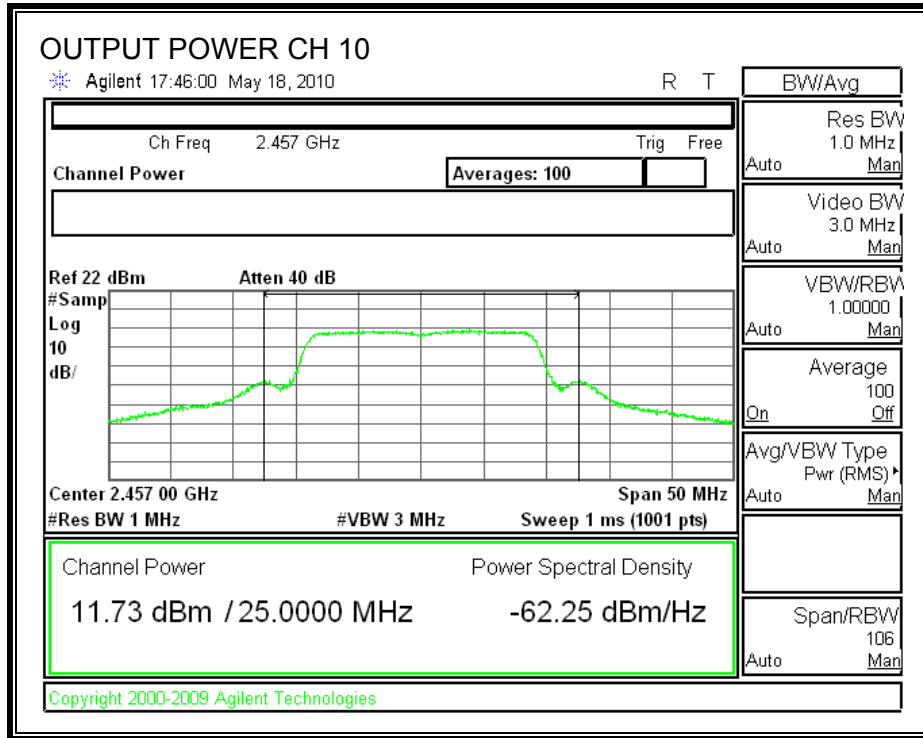
Channel	Frequency (MHz)	Limit (dBm)	Power (dBm)	Attenuator + Cable Offset (dB)	Total Power (dBm)	Margin (dB)
1	2412	30.00	8.20	11.30	19.50	-10.50
2	2417	30.00	11.26	11.30	22.56	-7.44
6	2437	30.00	14.67	11.30	25.97	-4.03
10	2457	30.00	11.73	11.30	23.03	-6.97
11	2462	30.00	8.39	11.30	19.69	-10.31

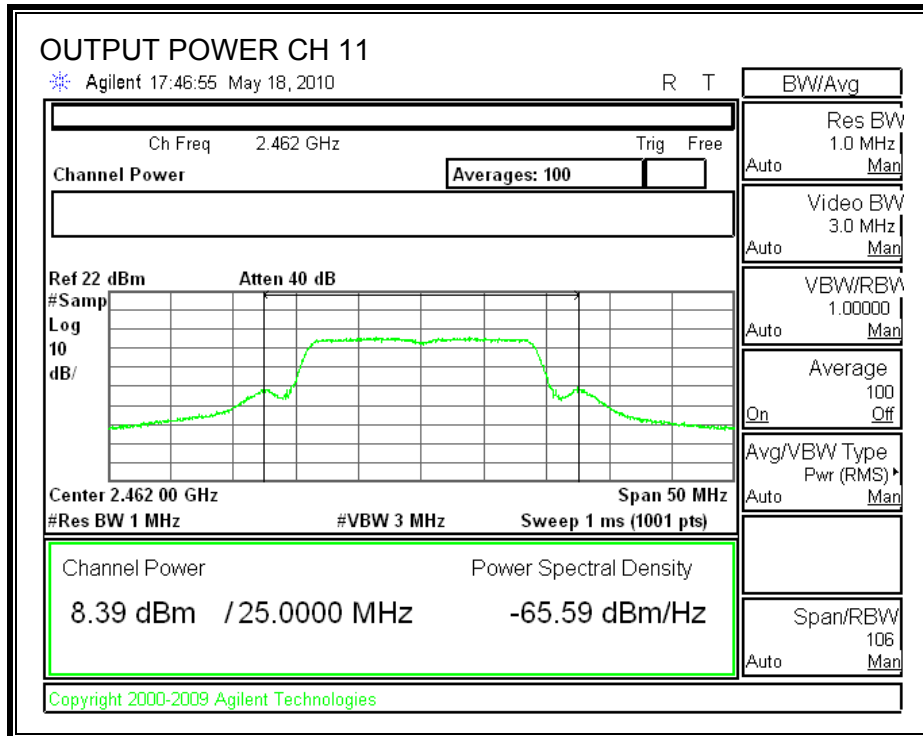
OUTPUT POWER











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

Channel	Frequency (MHz)	Power (dBm)
1	2412	19.47
2	2417	22.49
6	2437	25.72
10	2457	22.47
11	2462	19.55

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

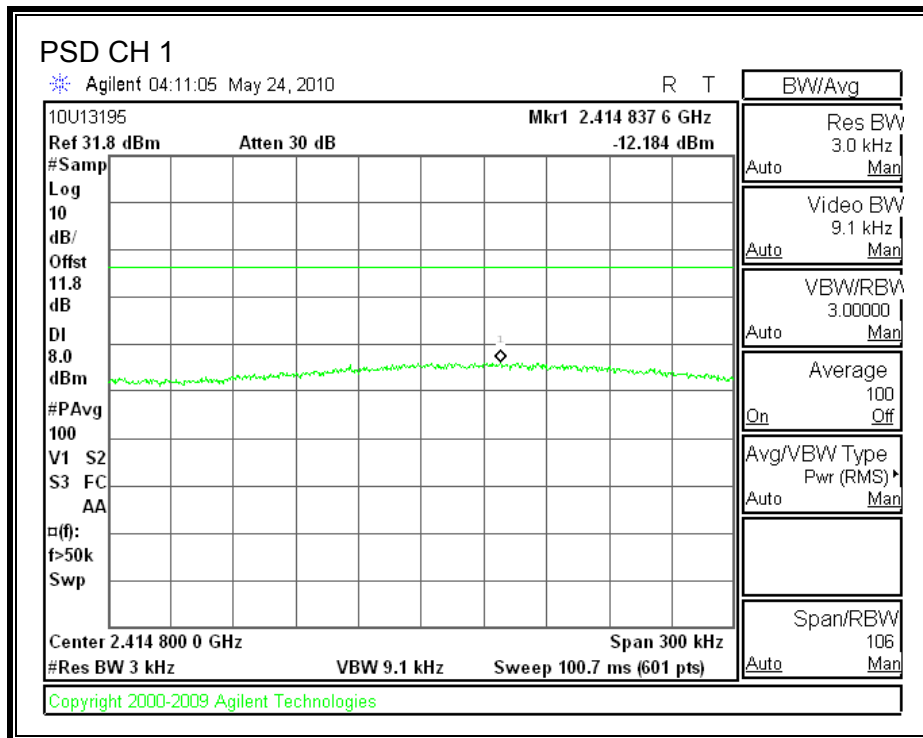
Output power was measured based on the use of RMS averaging over a time interval, therefore the power spectral density was measured using PSD Option 2 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

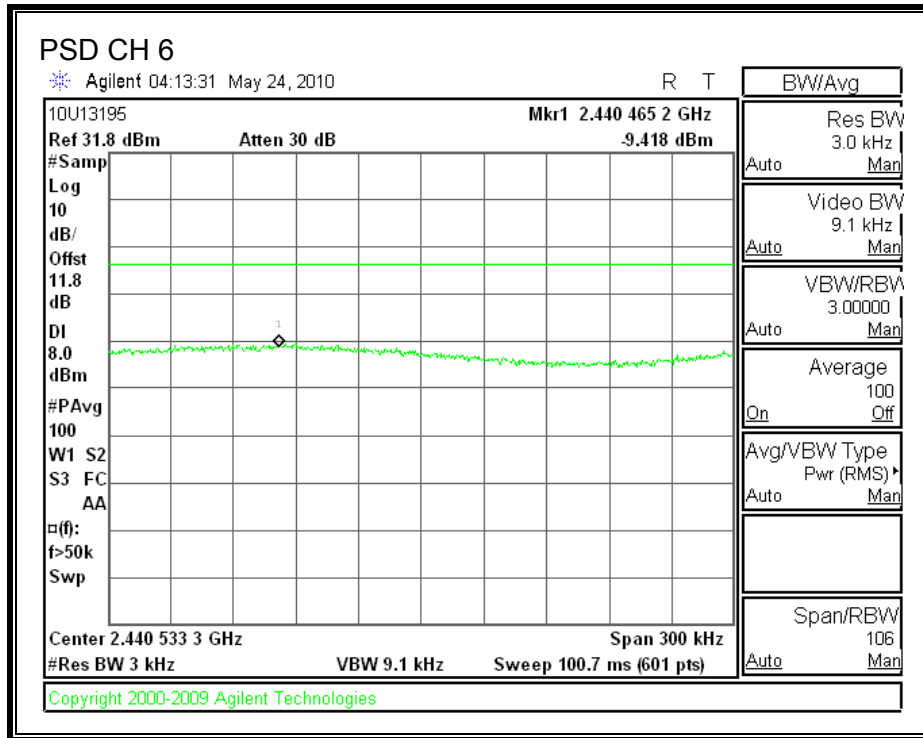
RESULTS

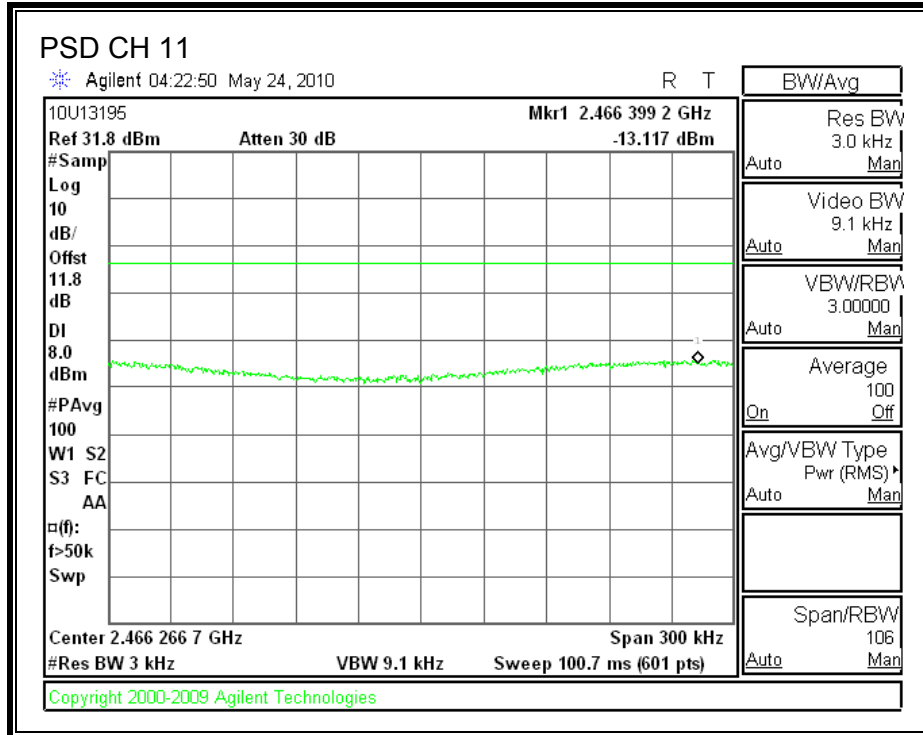
Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)
1	2412	-12.184	8	-20.18
6	2437	-9.418	8	-17.42
11	2462	-13.117	8	-21.12

Note: channels 1 and 11 were tested at the power levels of channels 2 and 10 respectively, the power levels for CH2 and CH10 are higher than the power levels of CH1 and CH11; hence this is worst-case measurement.

POWER SPECTRAL DENSITY







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 RMS averaging over a time interval, therefore the required attenuation is 30 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.

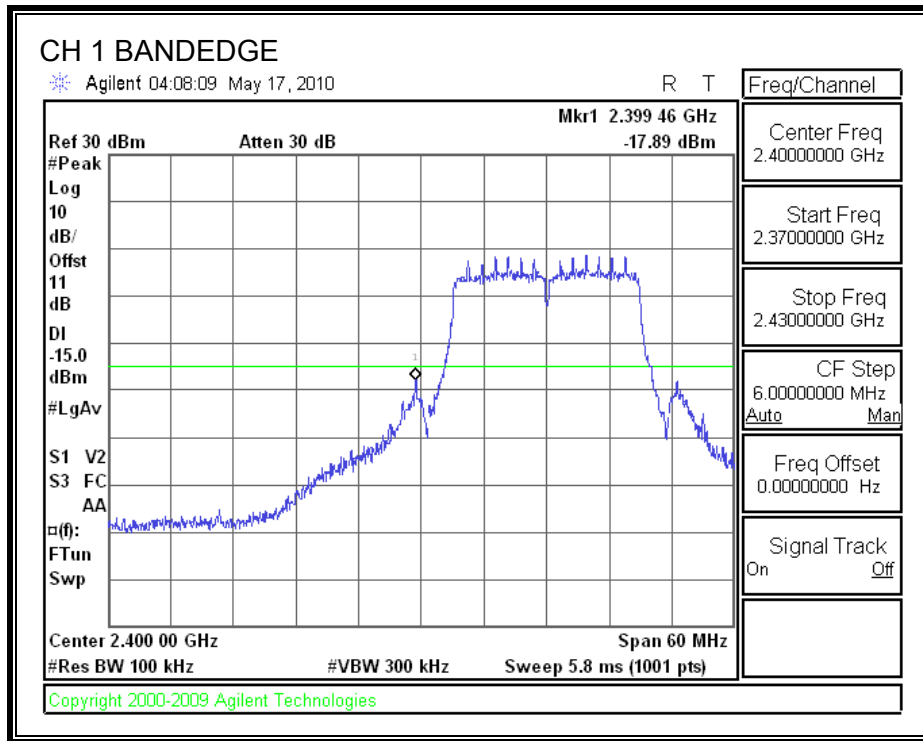
The EUT was set to transmit at mid channel, 30 dBc display line was set with reference to mid channel level.

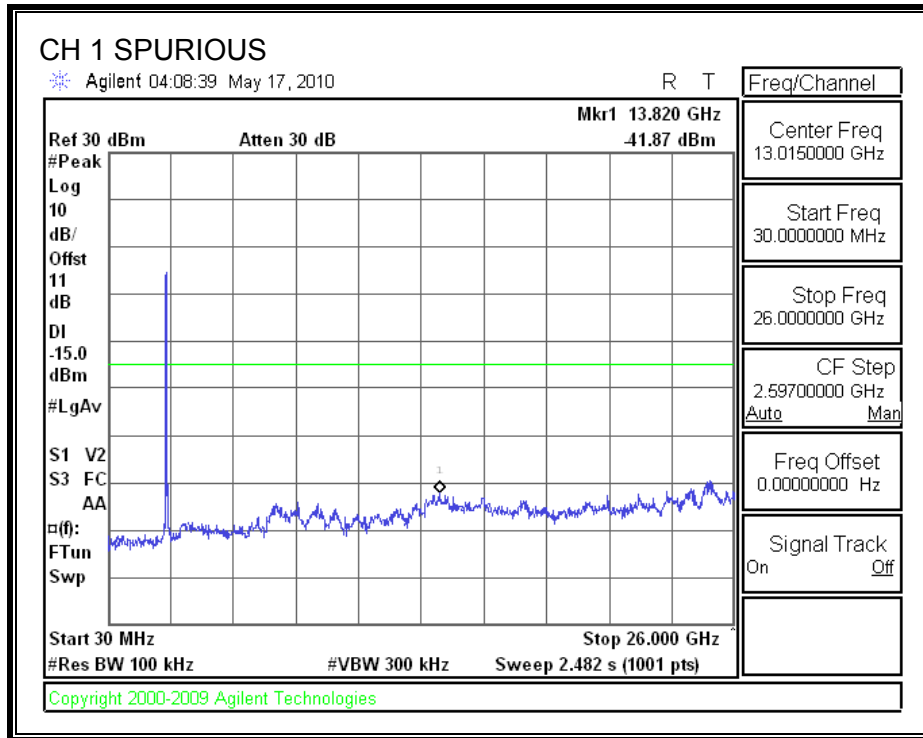
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

Note: channel 11 was tested at the power level of channel 10, the power levels for CH10 is higher than the power level of CH11; hence this is worst-case measurement.

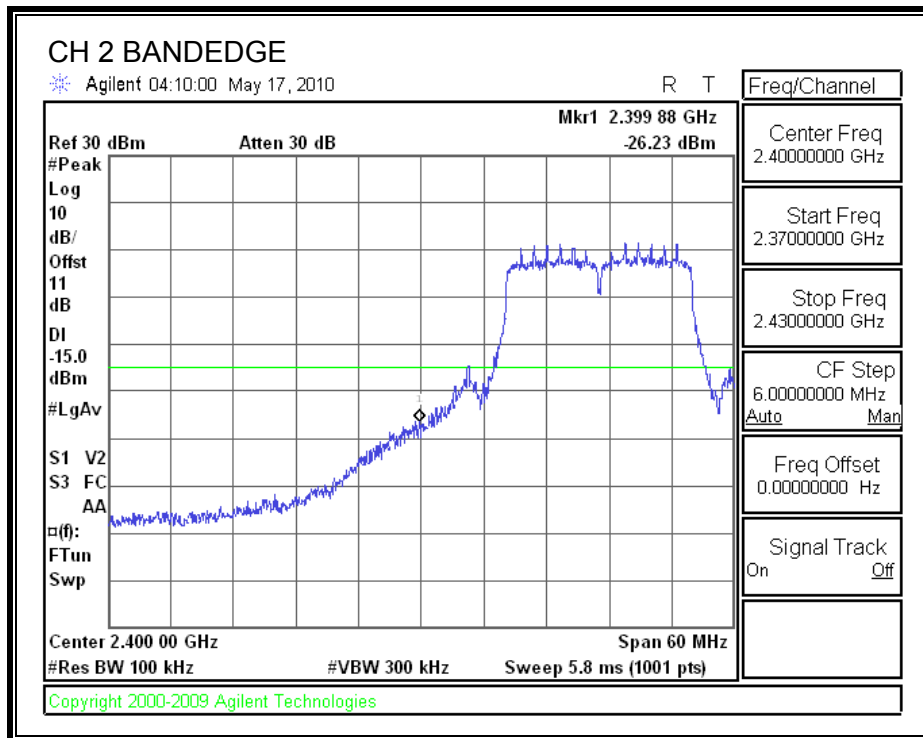
RESULTS

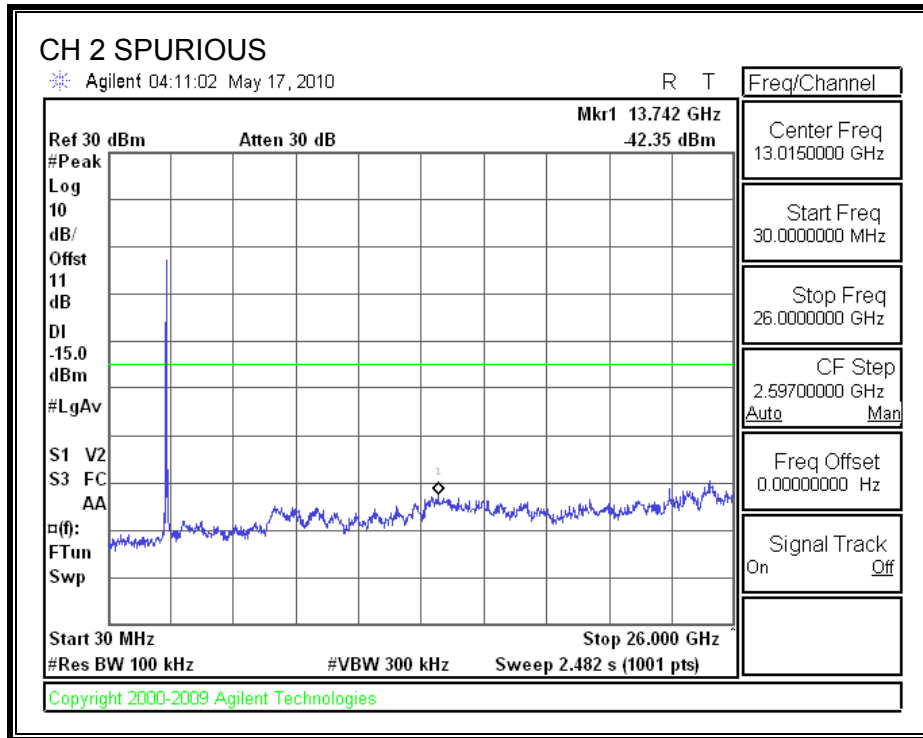
SPURIOUS EMISSIONS, CHANNEL 1



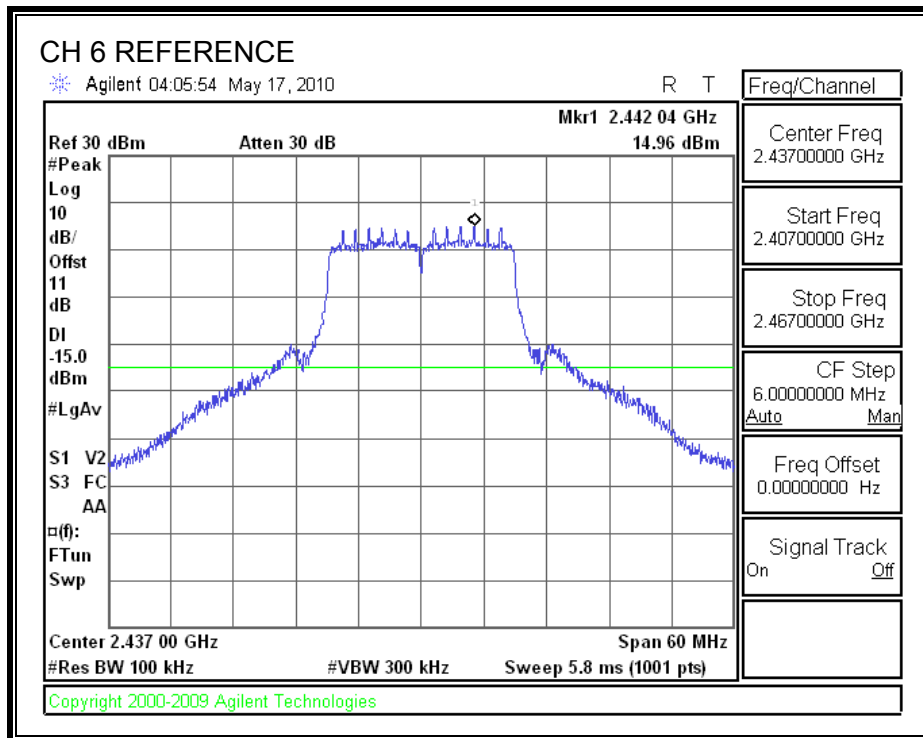


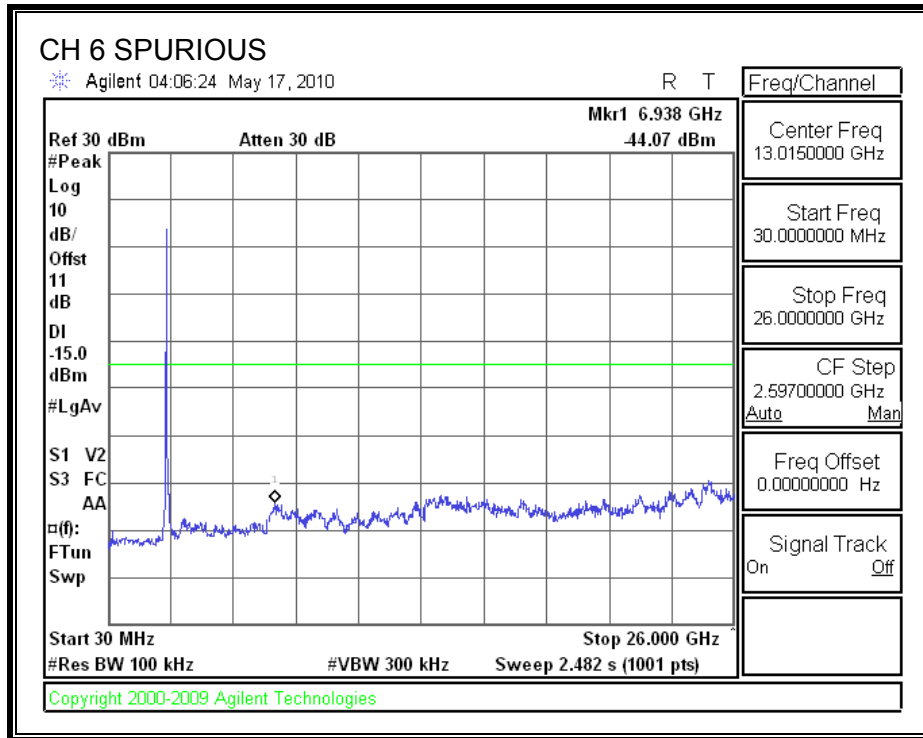
SPURIOUS EMISSIONS, CHANNEL 2



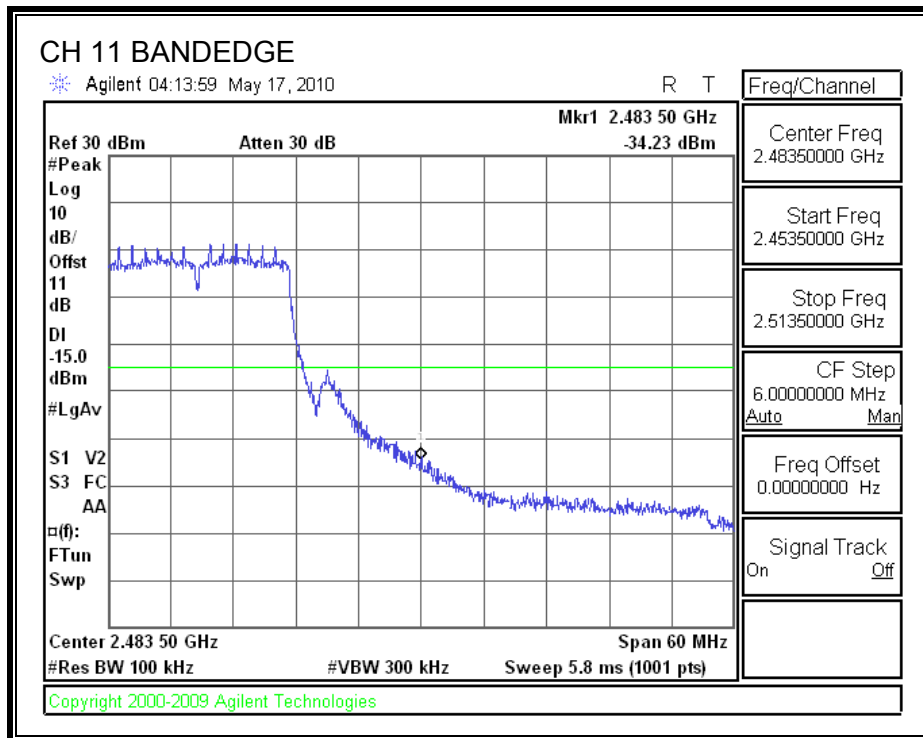


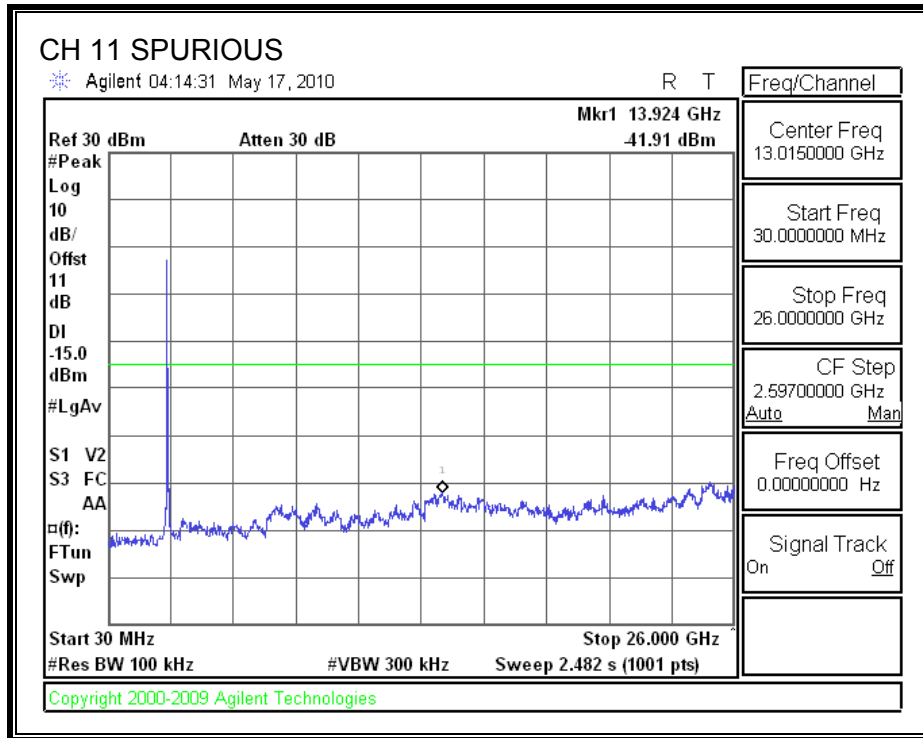
SPURIOUS EMISSIONS, CHANNEL 6





SPURIOUS EMISSIONS, CHANNEL 11





7.4. 802.11n HT20 MODE IN THE 2.4 GHz BAND DUAL CHAIN

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

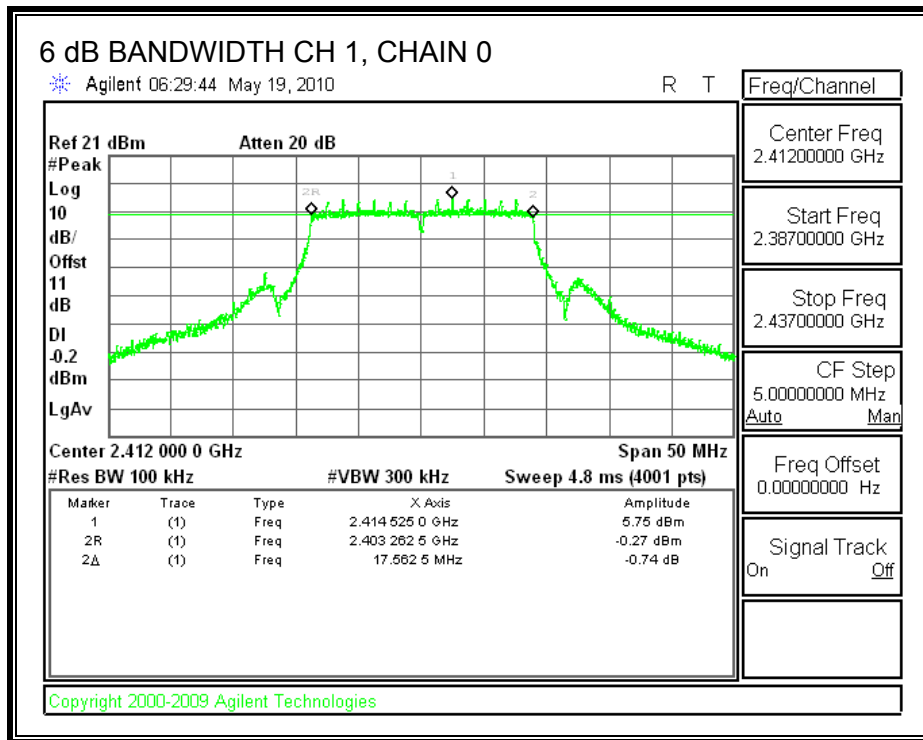
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

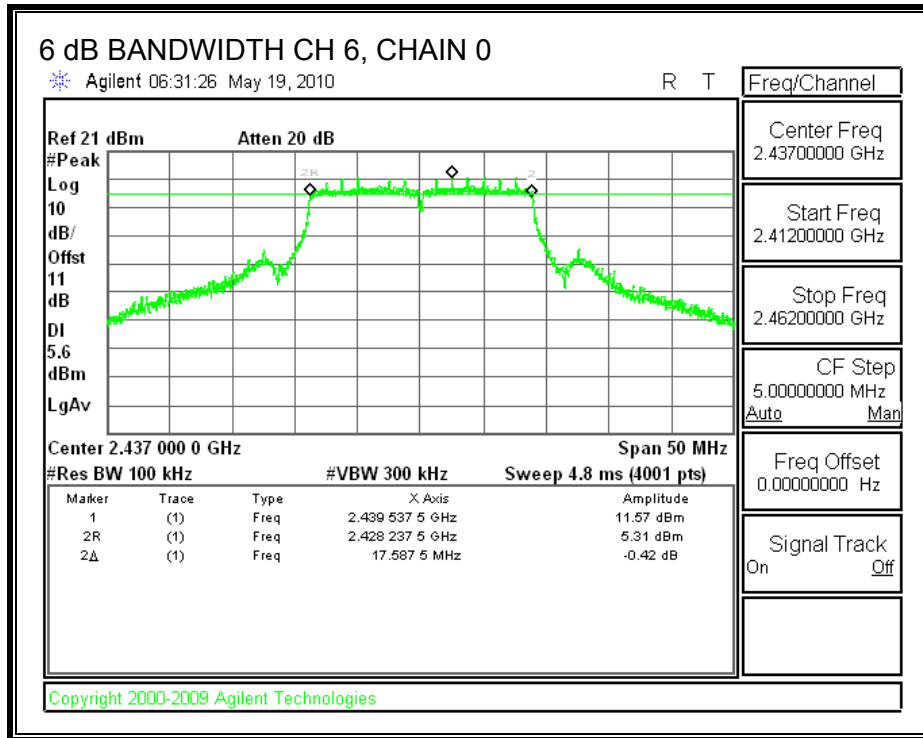
RESULTS

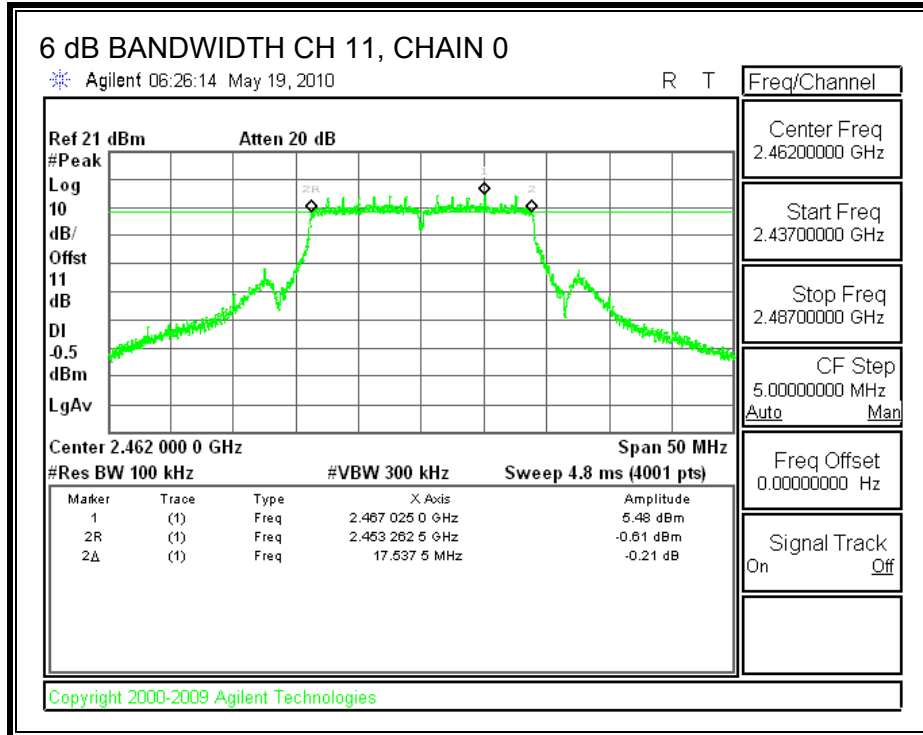
Channel	Frequency (MHz)	Chain 0 6 dB BW (MHz)	Chain 1 6 dB BW (MHz)	Minimum Limit (MHz)
1	2412	17.5625	17.6125	0.5
6	2437	17.5875	17.6	0.5
11	2462	17.5375	17.6375	0.5

Note: channels 1 and 11 were tested at the power levels of channels 2 and 10 respectively, the power levels for CH2 and CH10 are higher than the power levels of CH1 and CH11; hence this is worst-case measurement.

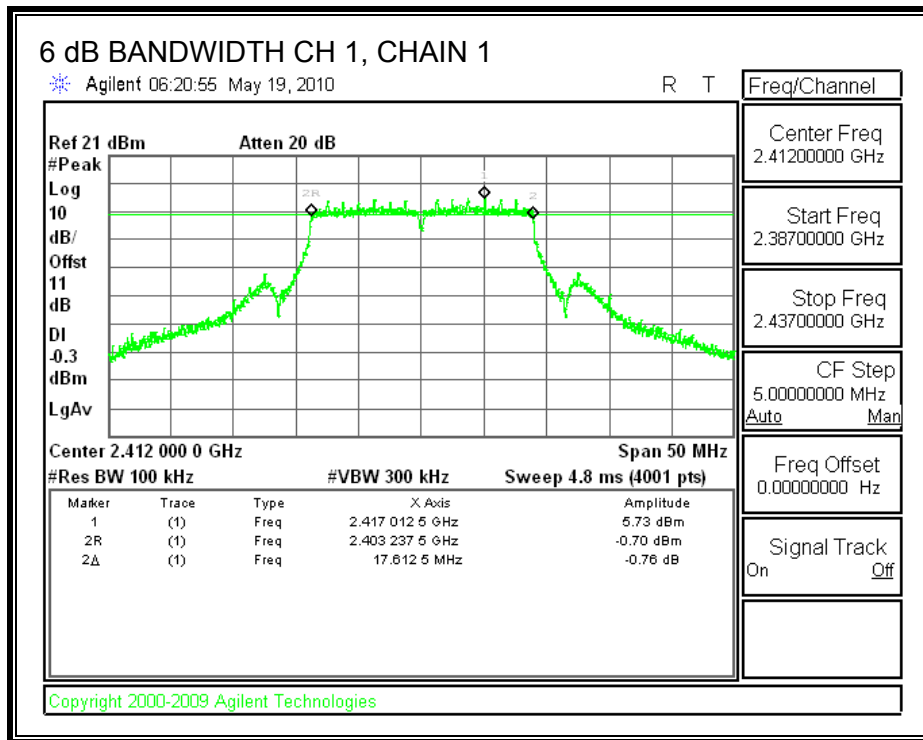
6 dB BANDWIDTH, CHAIN 0

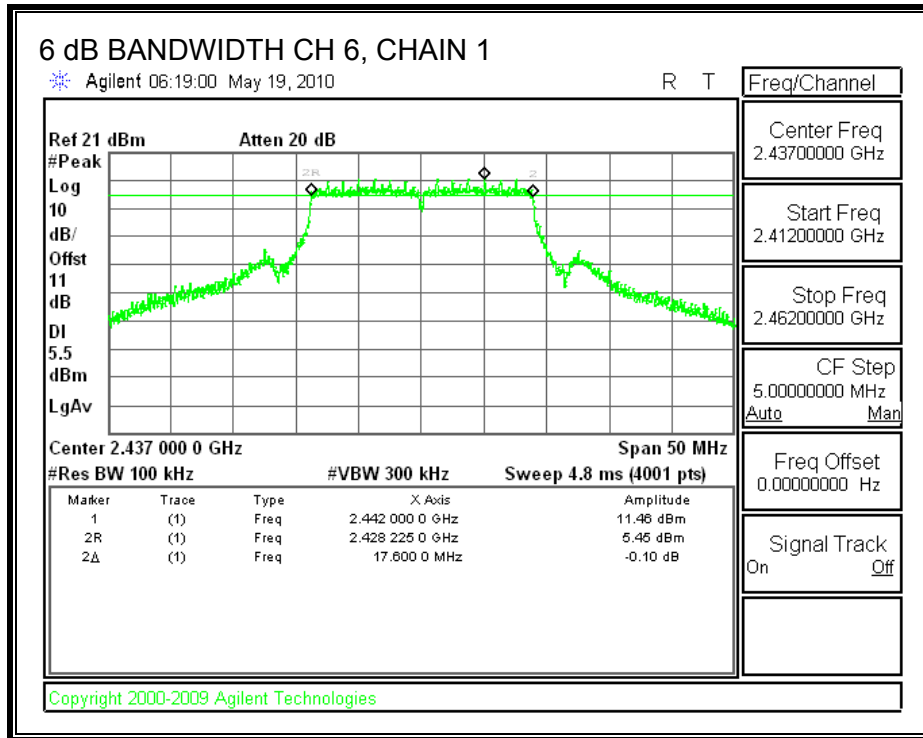


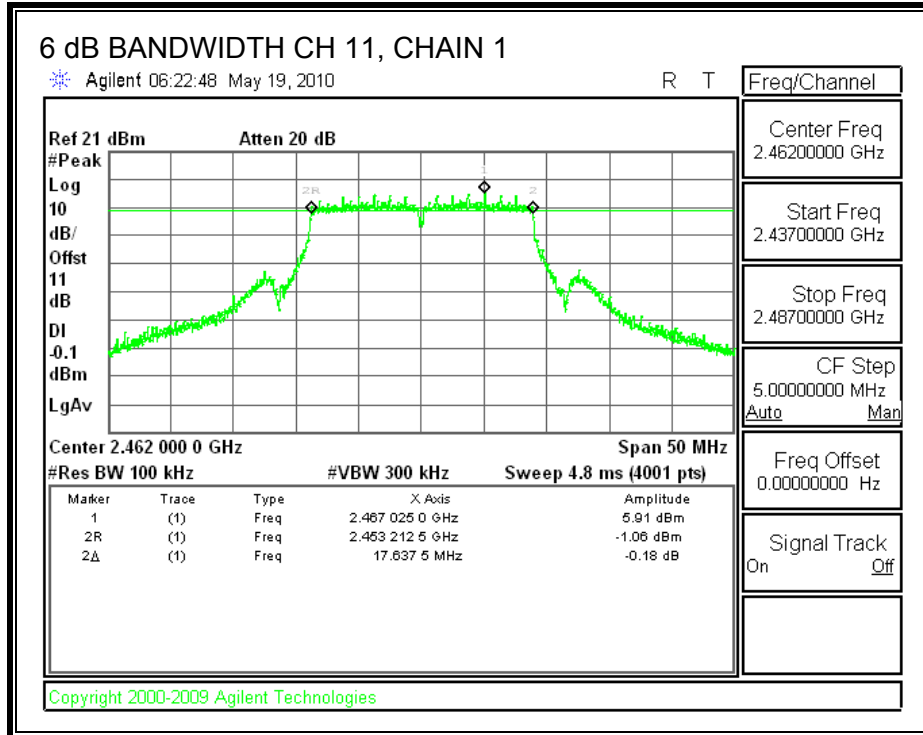




6 dB BANDWIDTH, CHAIN 1







7.4.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

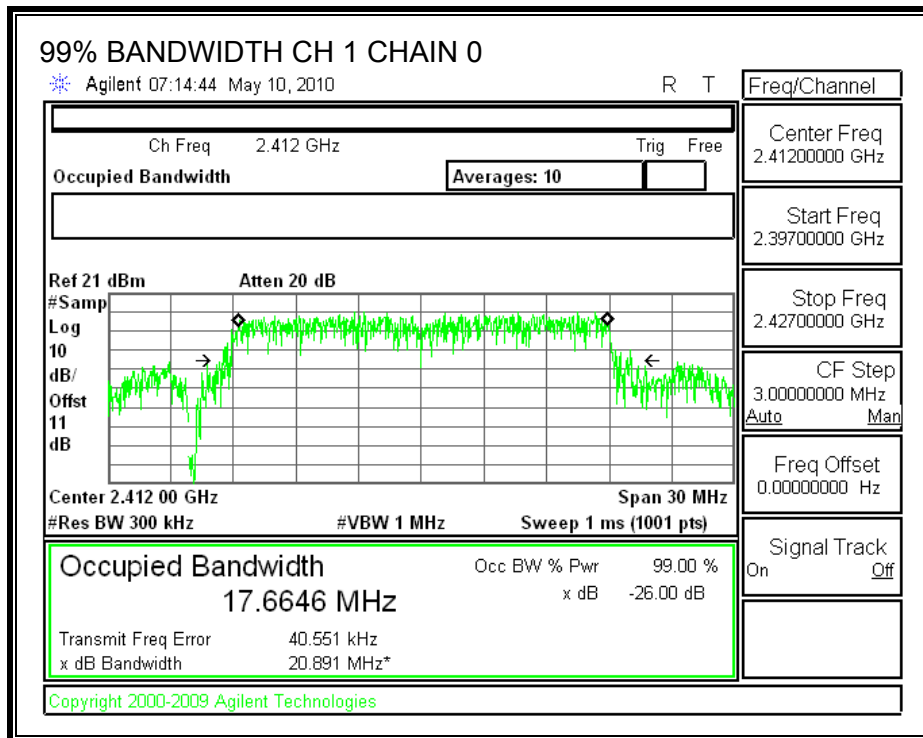
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

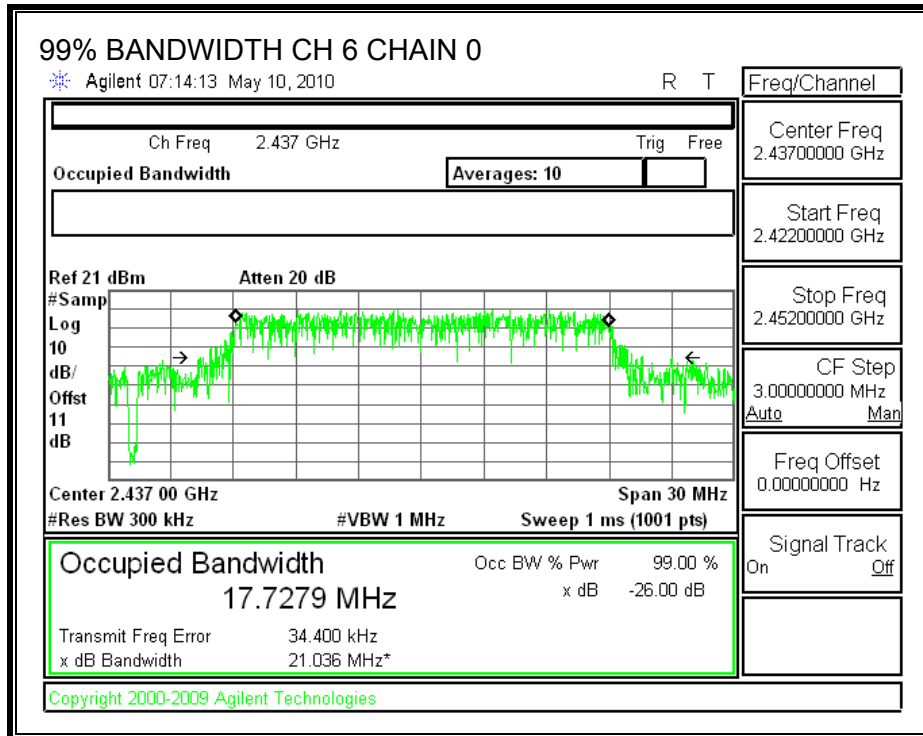
RESULTS

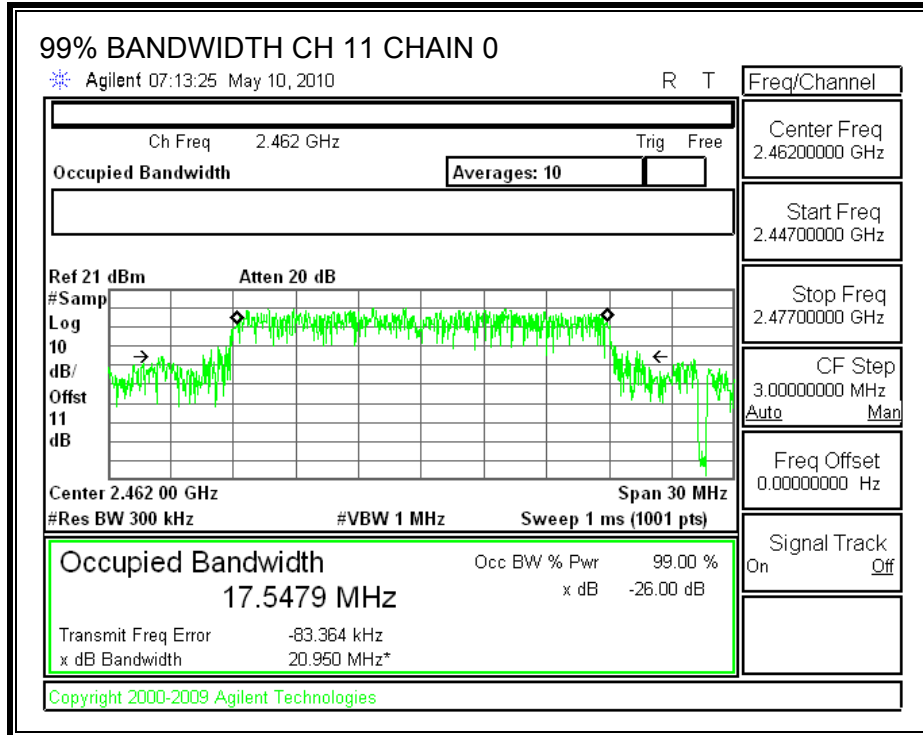
Channel	Frequency (MHz)	Chain 0 99% Bandwidth (MHz)	Chain 1 99% Bandwidth (MHz)
1	2412	17.6646	17.6567
6	2437	17.7279	17.7303
11	2462	17.5479	17.6154

Note: channels 1 and 11 were tested at the power levels of channels 2 and 10 respectively, the power levels for CH2 and CH10 are higher than the power levels of CH1 and CH11; hence this is worst-case measurement.

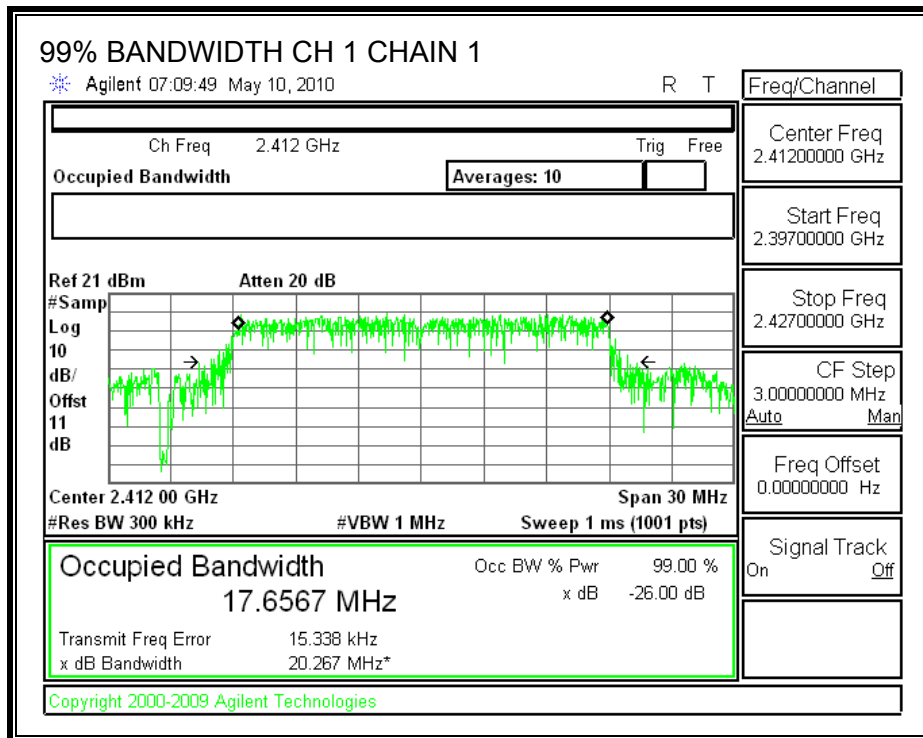
99% BANDWIDTH, CHAIN 0

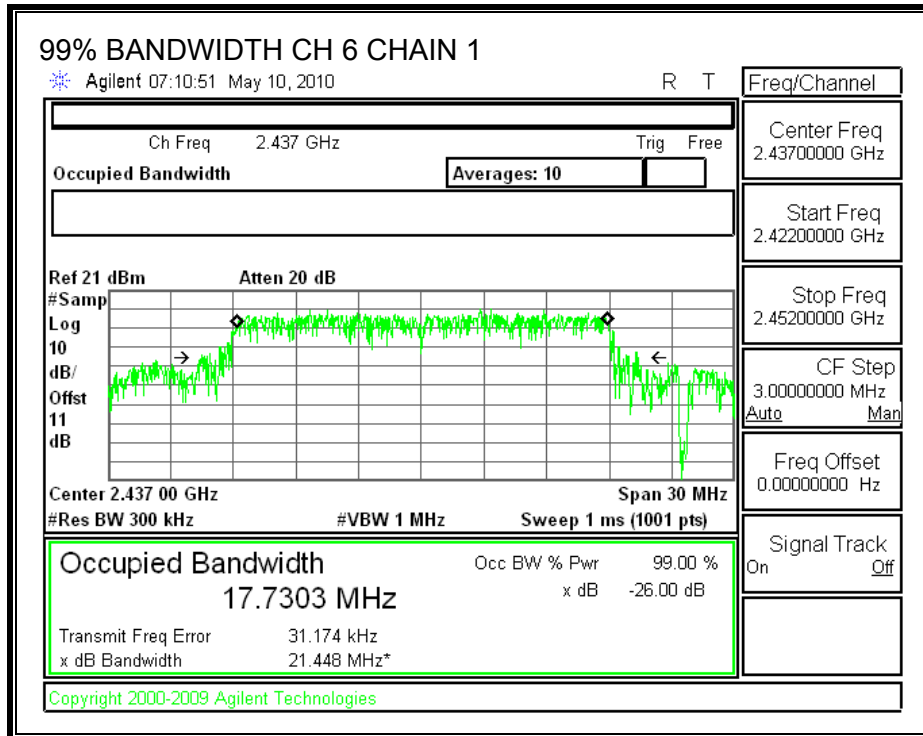


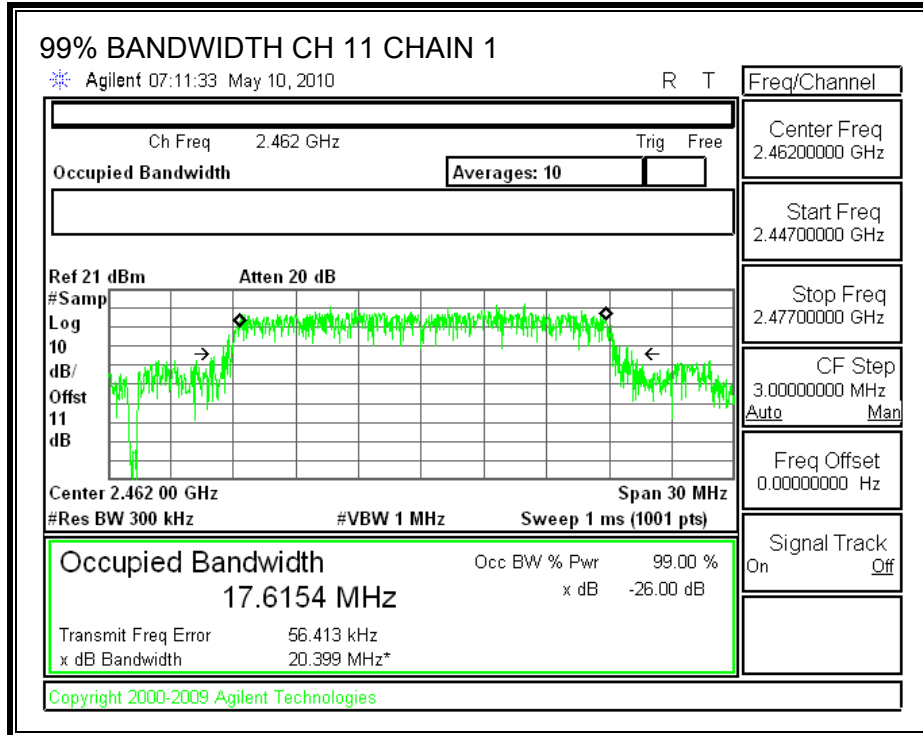




99% BANDWIDTH, CHAIN 1







7.4.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

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

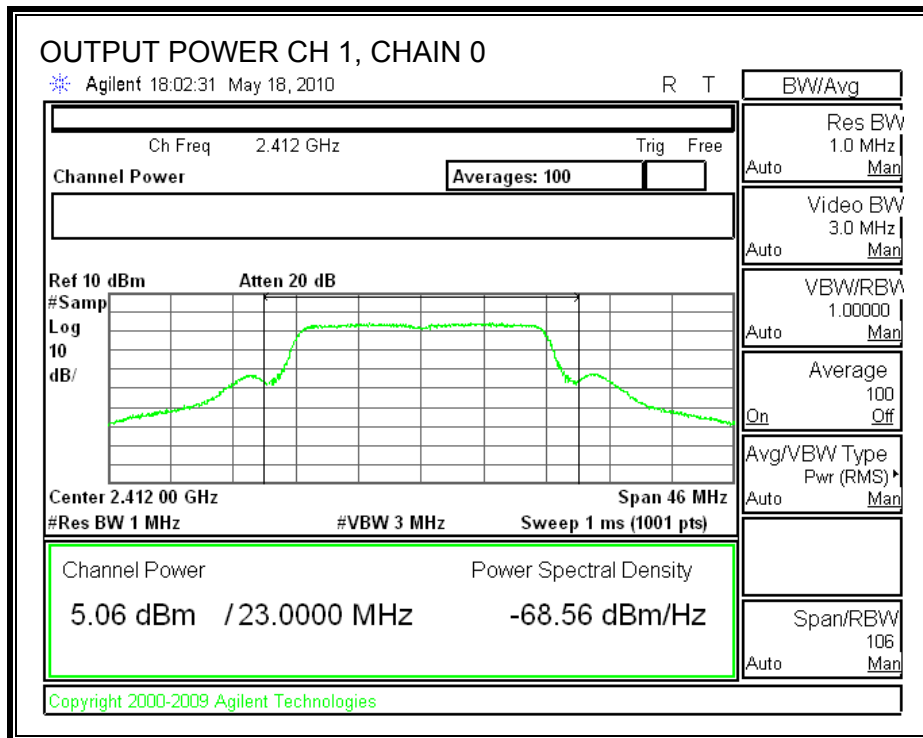
TEST PROCEDURE

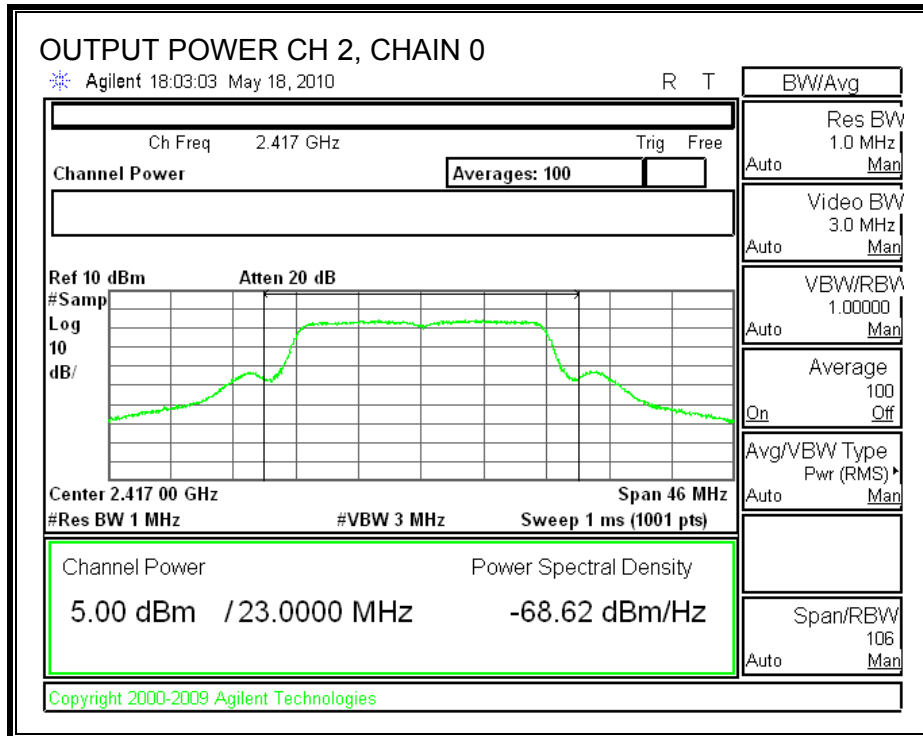
Output power was measured based on the use of RMS averaging over a time interval in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

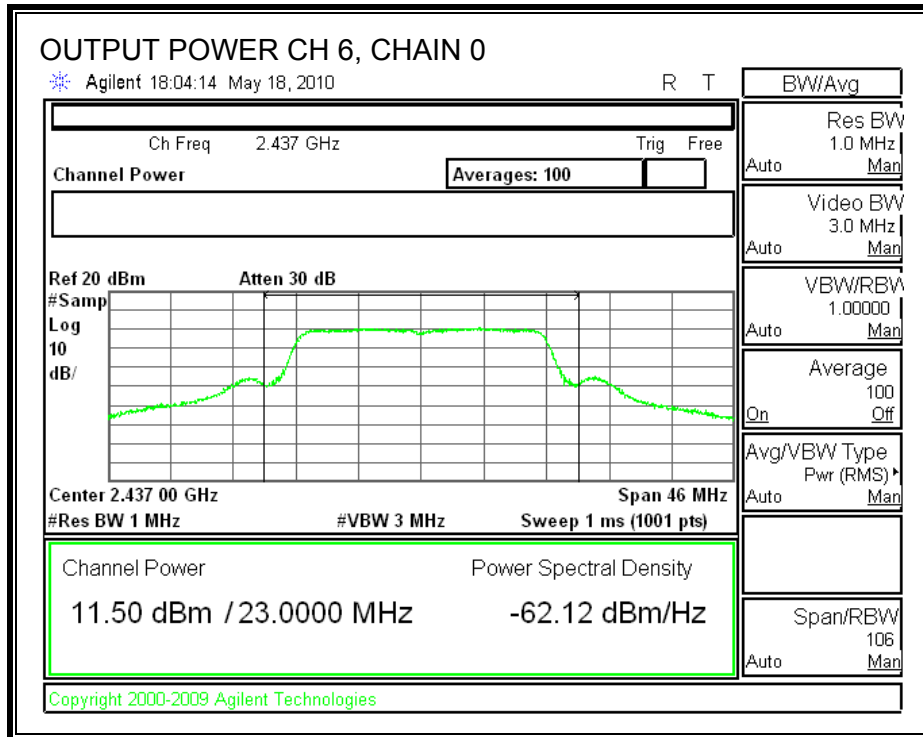
RESULTS

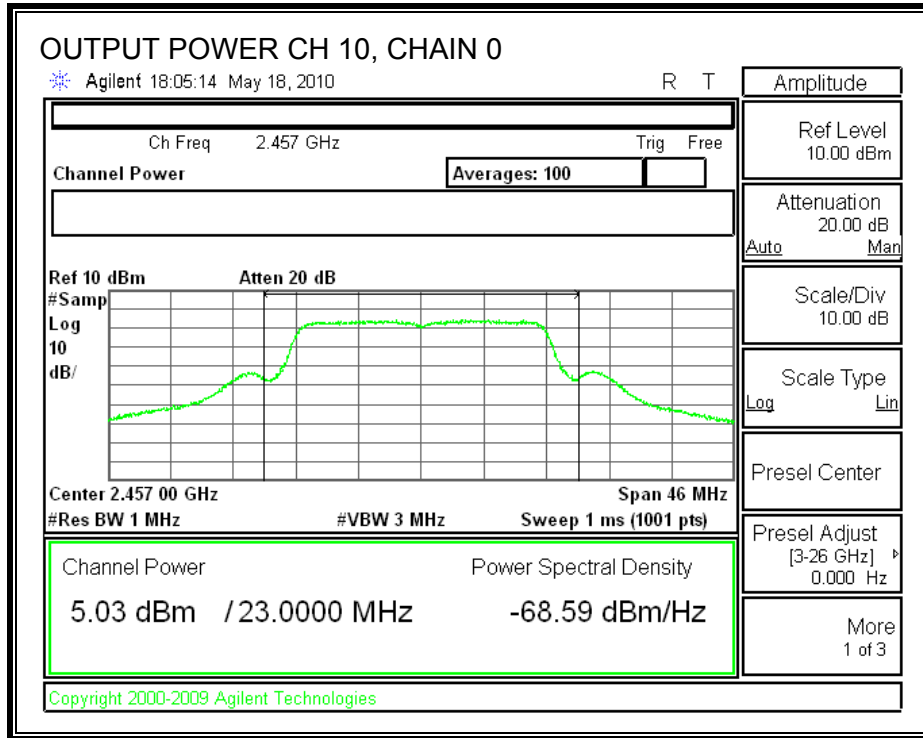
Channel	Frequency (MHz)	Limit (dBm)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Attenuator + Cable Offset (dB)	Total Power (dBm)	Margin (dB)
1	2412	30.00	5.06	5.31	11.30	19.50	-10.50
2	2417	30.00	5.00	5.37	11.30	19.50	-10.50
6	2437	30.00	11.50	11.39	11.30	25.76	-4.24
10	2457	30.00	5.03	5.41	11.30	19.53	-10.47
11	2462	30.00	5.10	5.18	11.30	19.45	-10.55

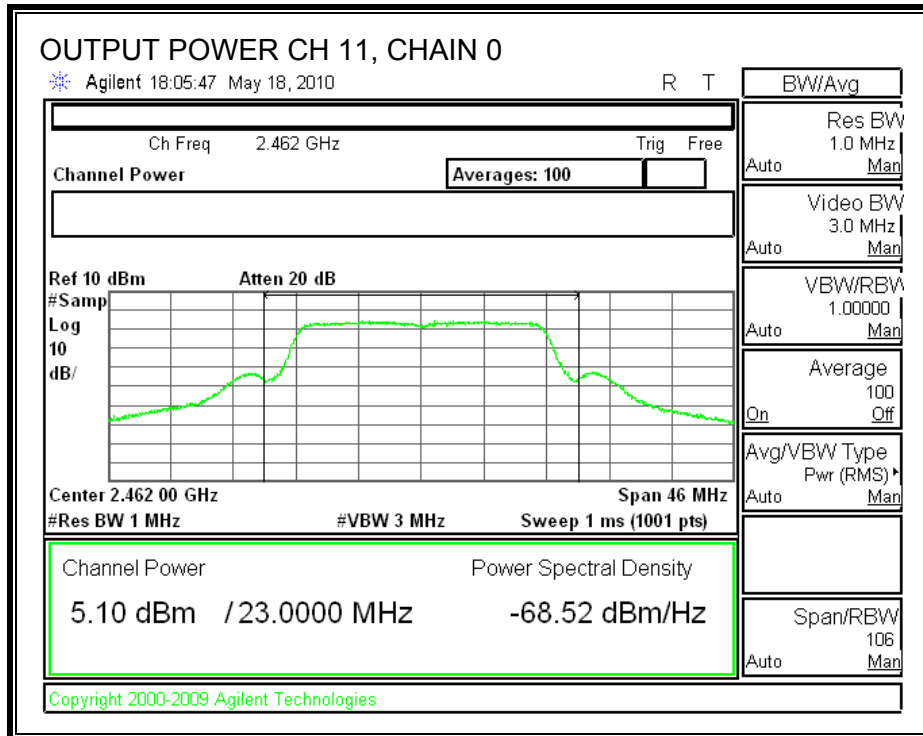
CHAIN 0 OUTPUT POWER



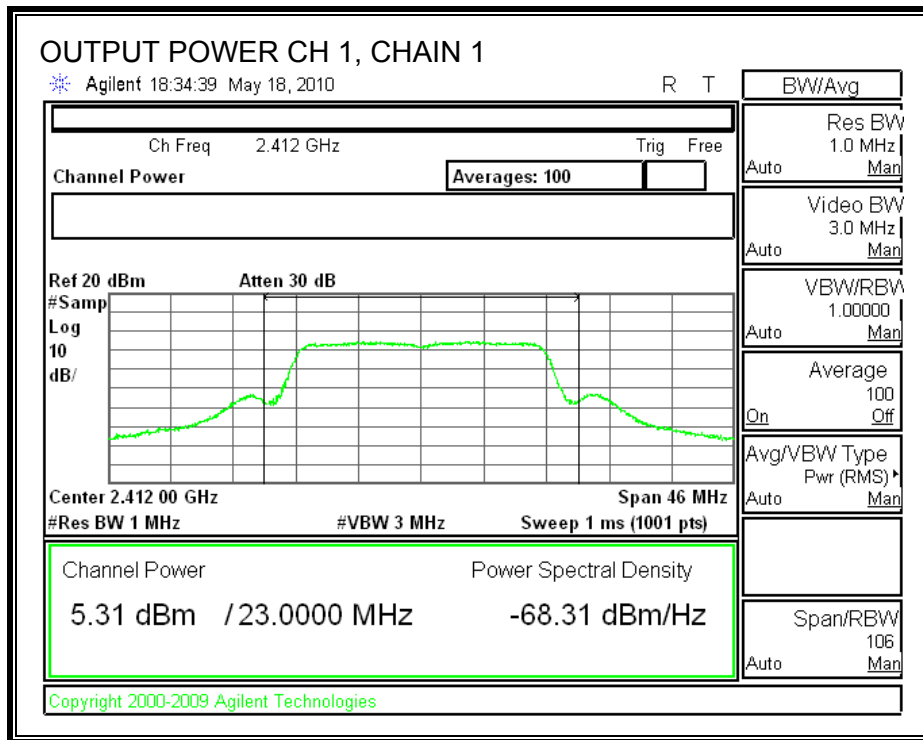


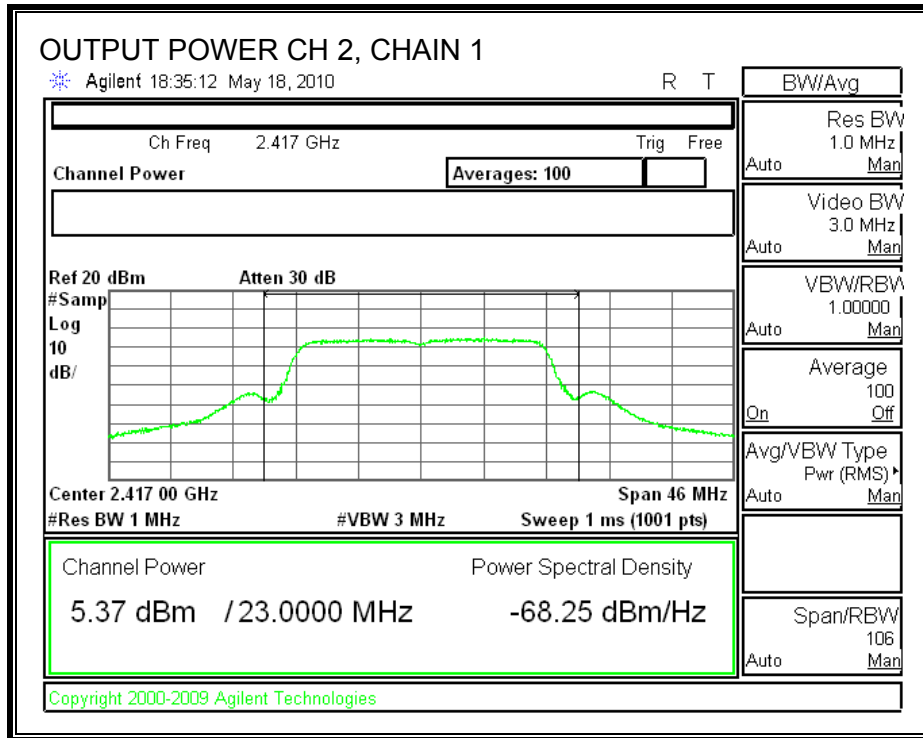


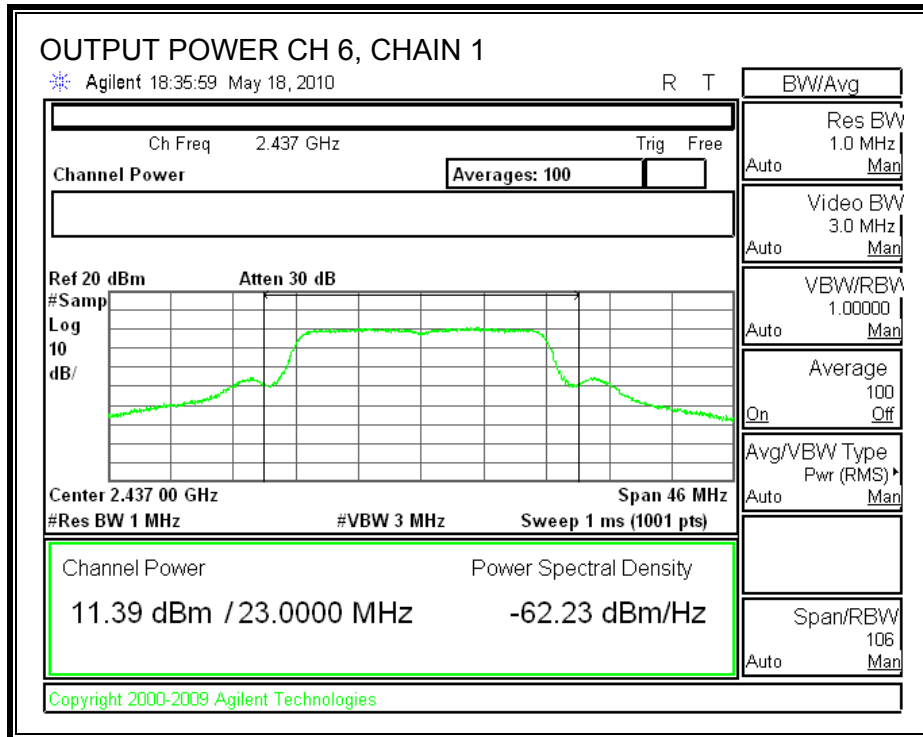


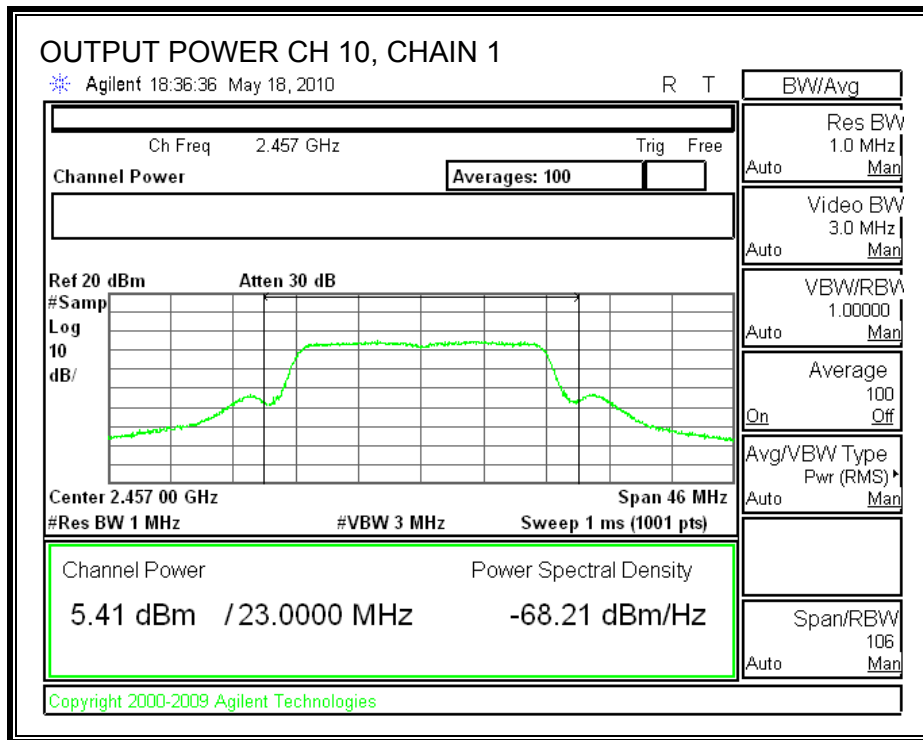


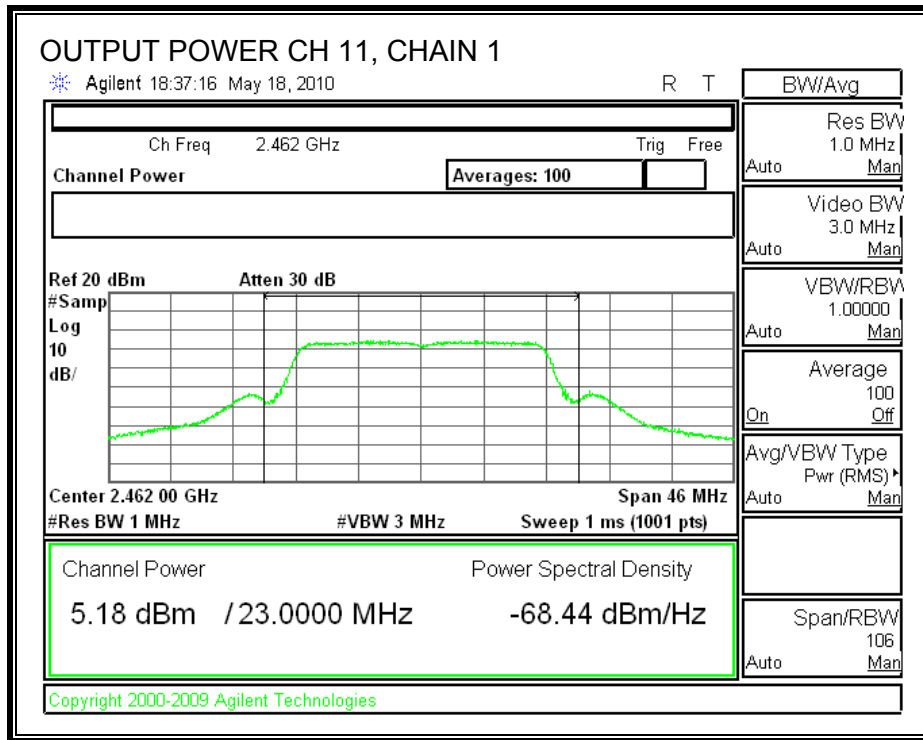
CHAIN 1 OUTPUT POWER











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

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
1	2412	16.27	16.4	19.35
2	2417	16.23	16.59	19.42
6	2437	22.63	22.56	25.61
10	2457	16.21	16.5	19.37
11	2462	16.21	16.57	19.40

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

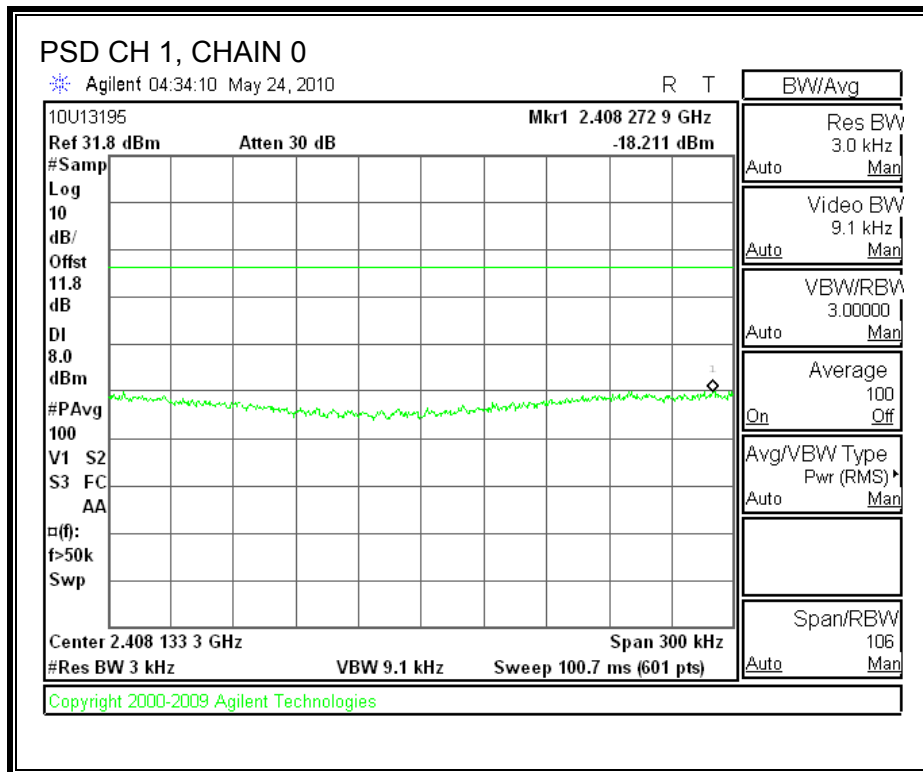
Output power was measured based on the use of RMS averaging over a time interval, therefore the power spectral density was measured using PSD Option 2 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

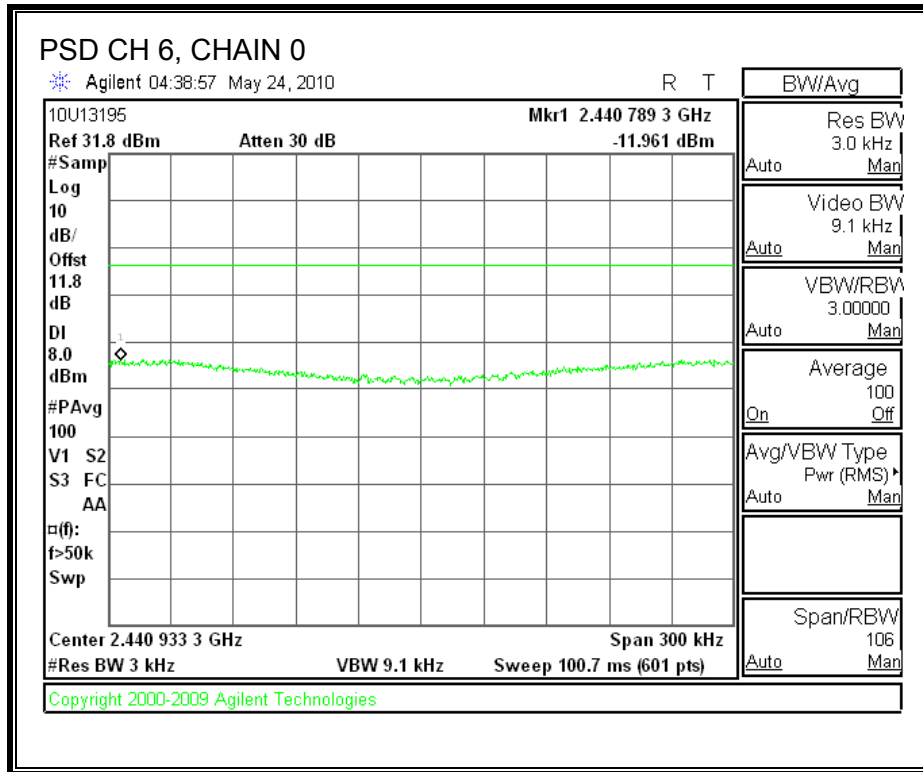
RESULTS

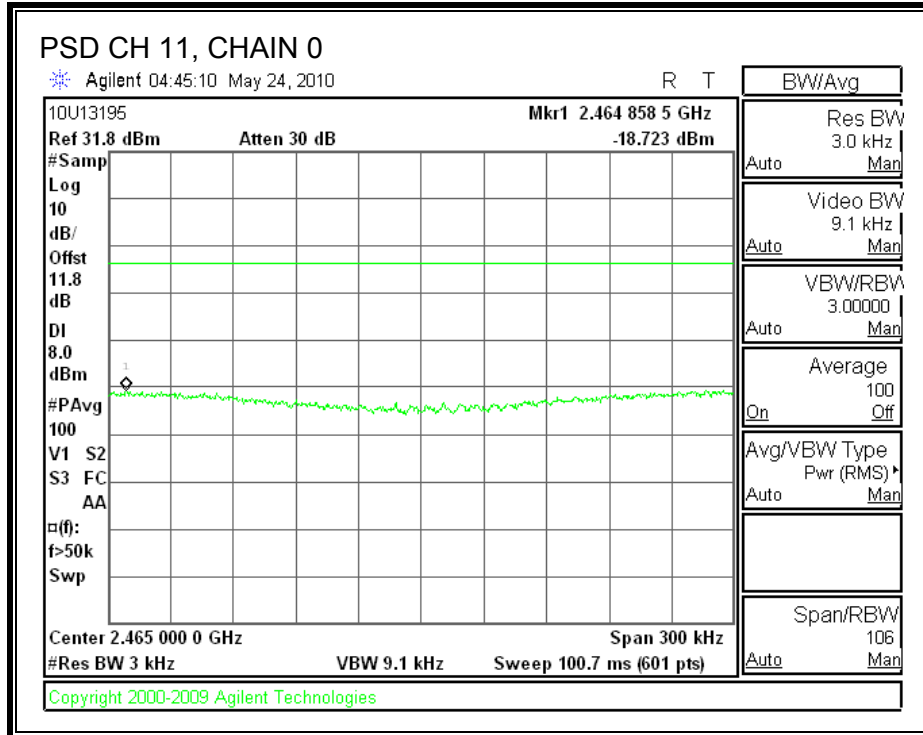
Channel	Frequency (MHz)	Chain 0 PSD (dBm)	Chain 1 PSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
1	2412	-18.211	-18.398	-15.29	8	-23.29
6	2437	-11.961	-12.097	-9.02	8	-17.02
11	2462	-18.723	-18.493	-15.60	8	-23.60

Note: channels 1 and 11 were tested at the power levels of channels 2 and 10 respectively, the power levels for CH2 and CH10 are higher than the power levels of CH1 and CH11; hence this is worst-case measurement.

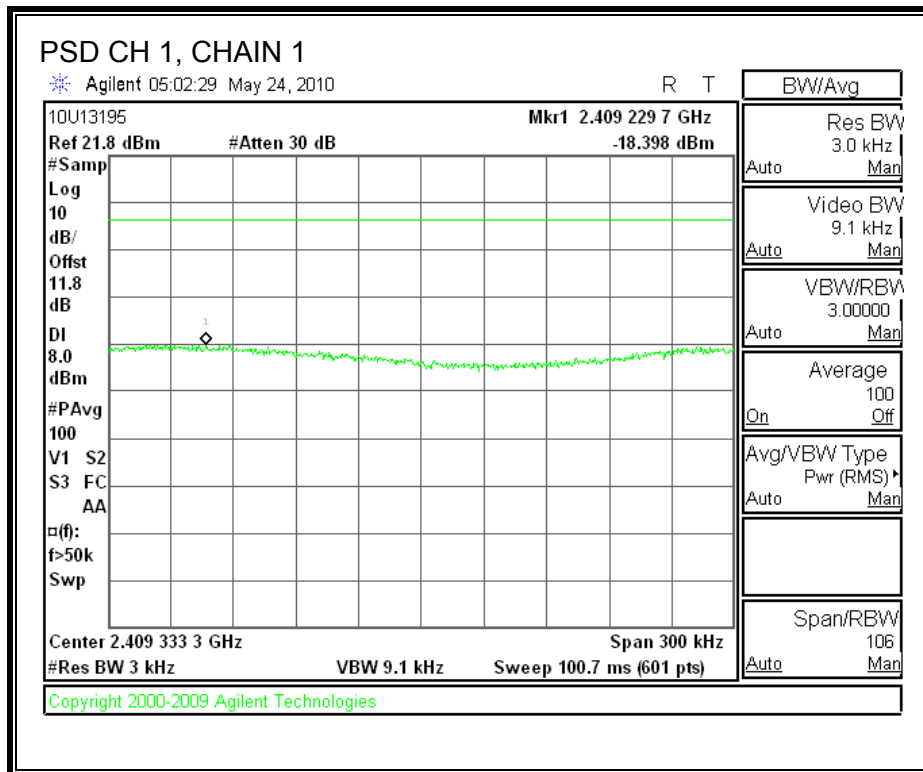
POWER SPECTRAL DENSITY, CHAIN 0

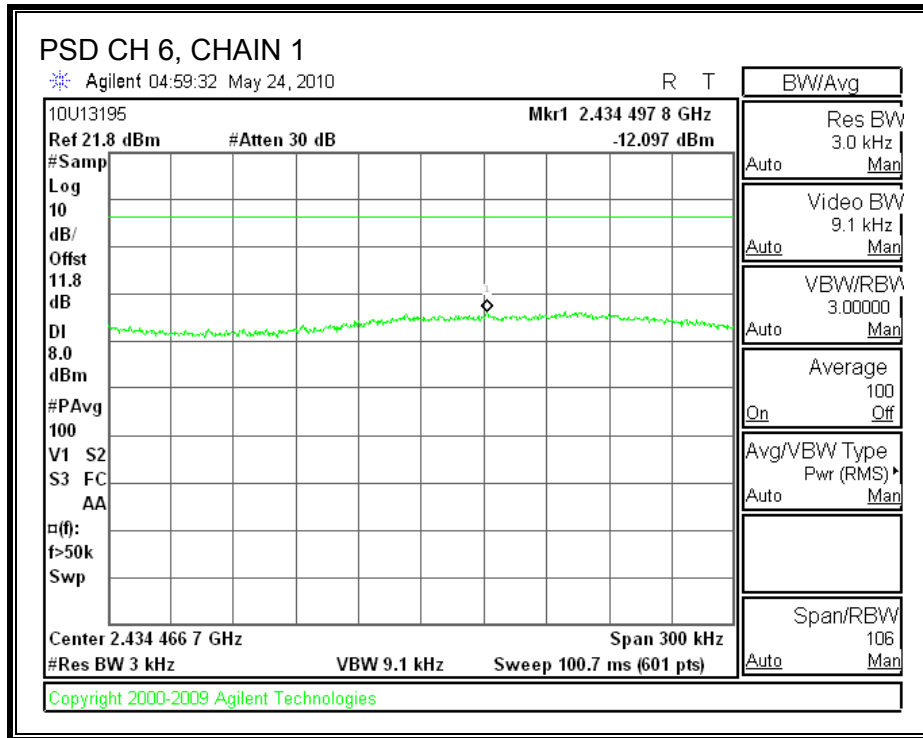


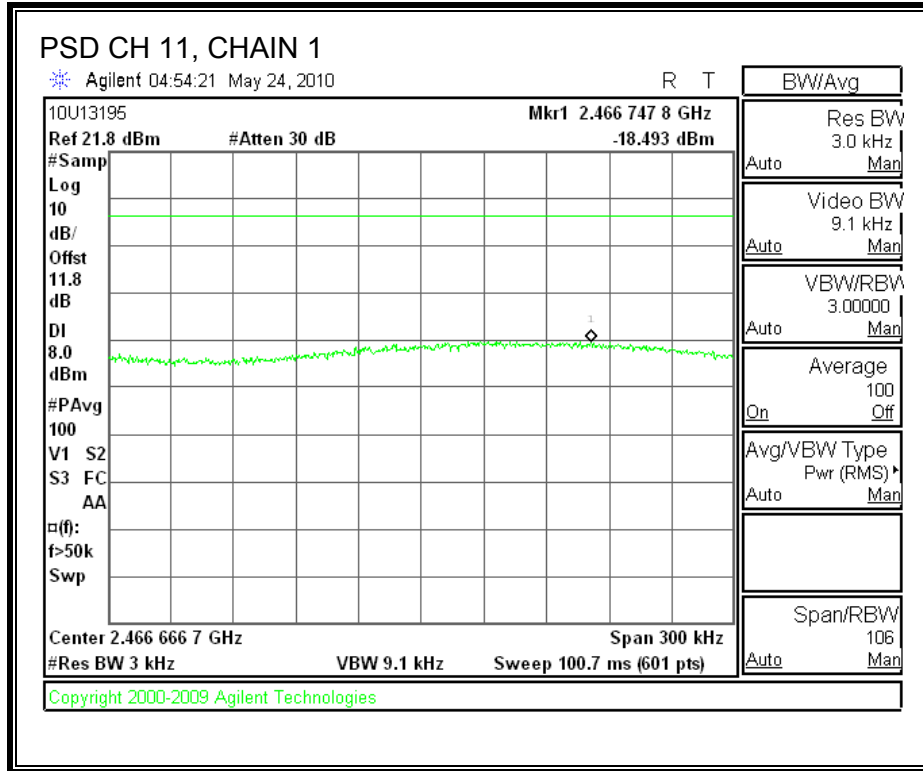




POWER SPECTRAL DENSITY, CHAIN 1







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 RMS averaging over a time interval, therefore the required attenuation is 30 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.

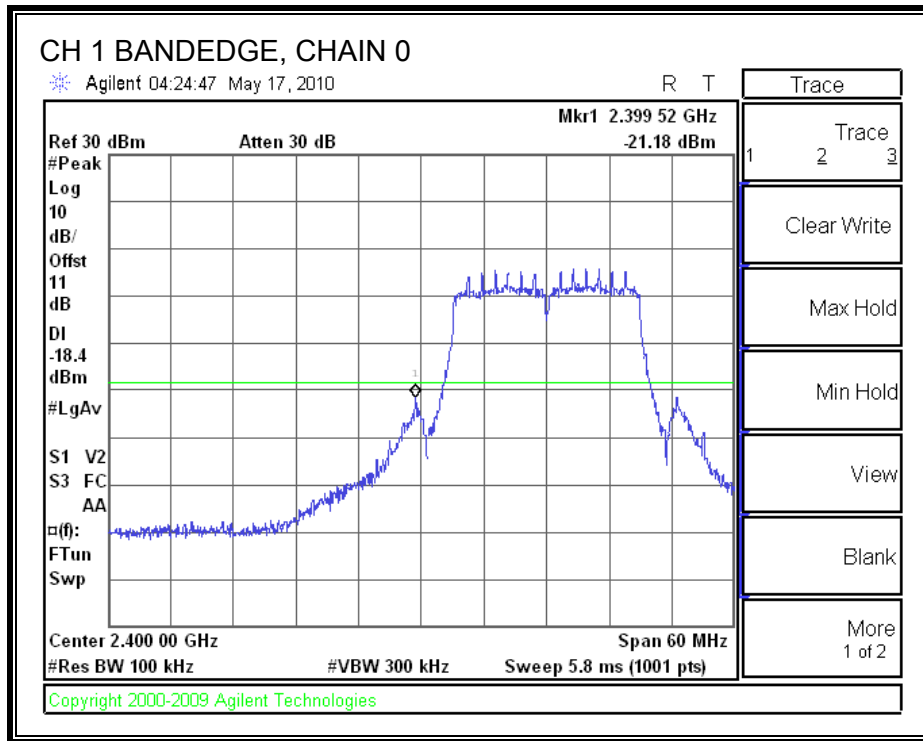
The EUT was set to transmit at mid channel, 30 dBc display line was set with reference to mid channel level.

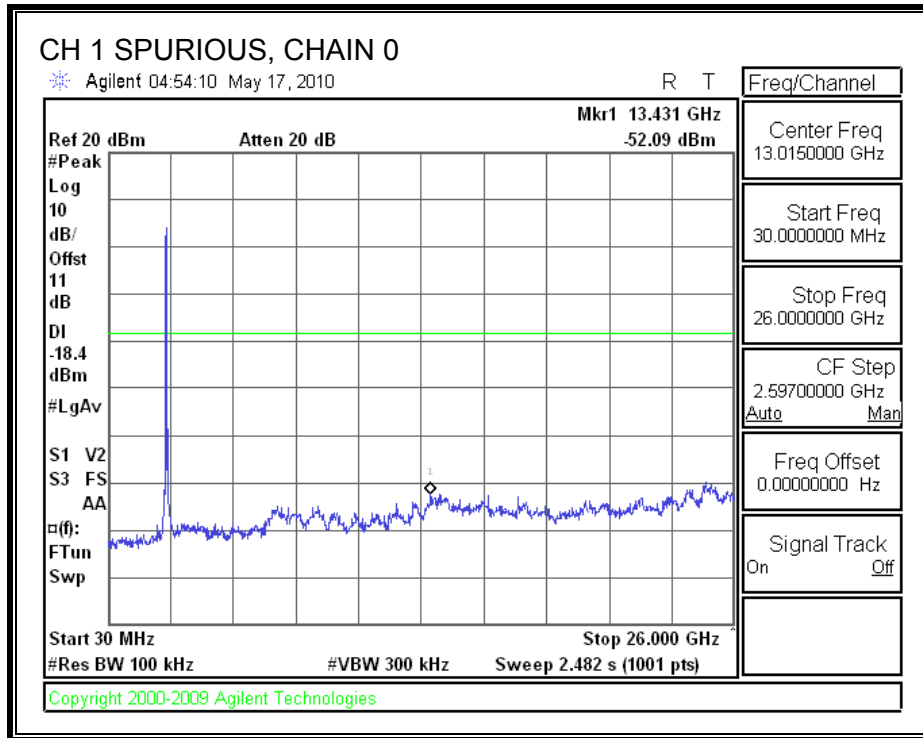
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

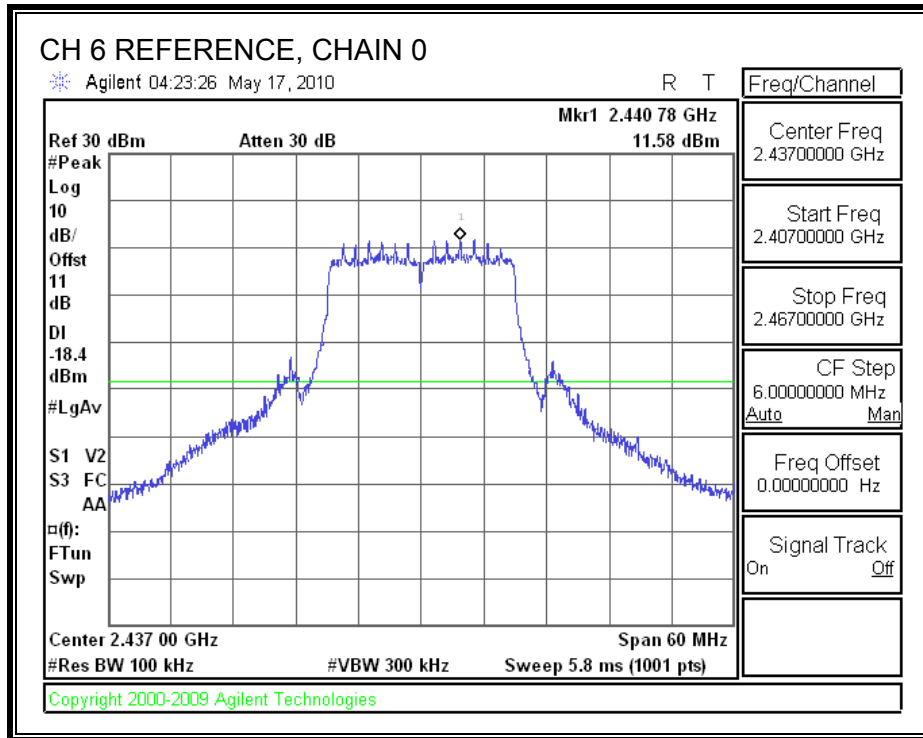
Note: channels 1 and 11 were tested at the power levels of channels 2 and 10 respectively, the power levels for CH2 and CH10 are higher than the power levels of CH1 and CH11; hence this is worst-case measurement.

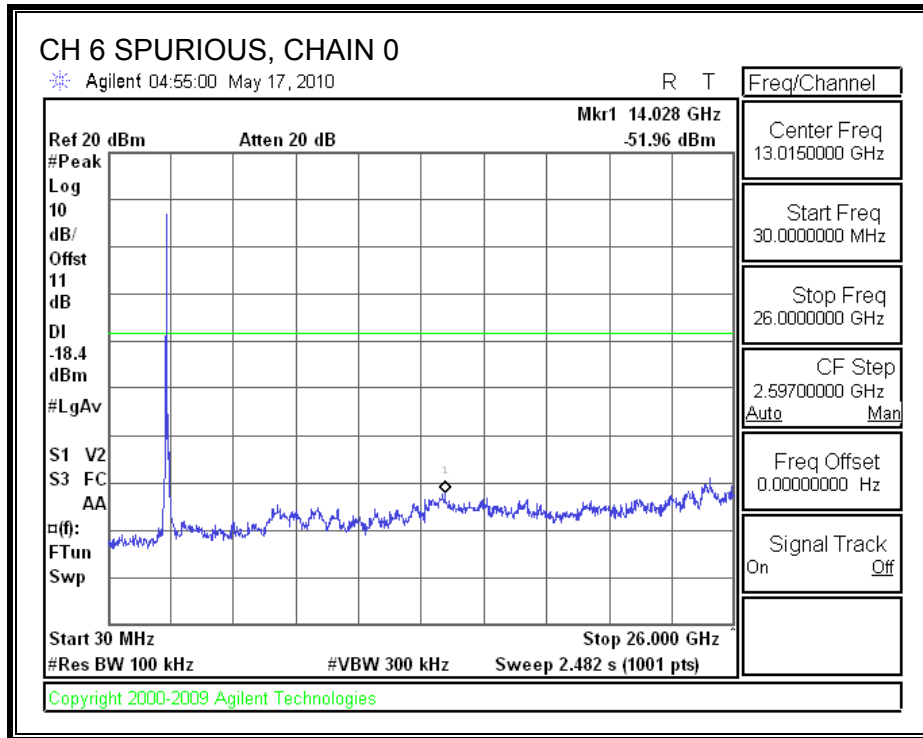
RESULTS

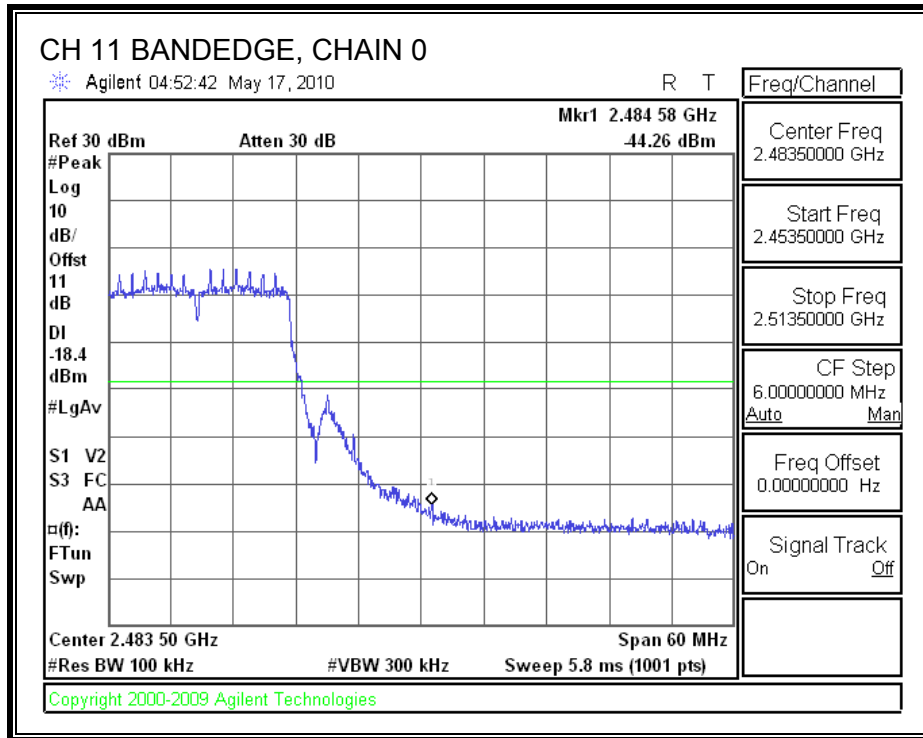
CHAIN 0 SPURIOUS EMISSIONS

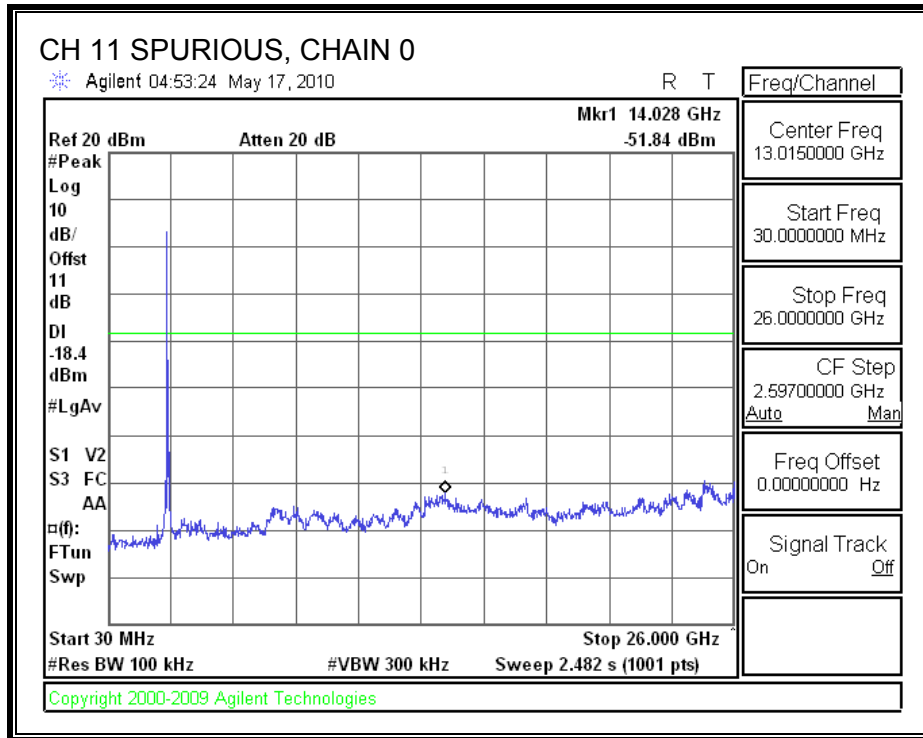




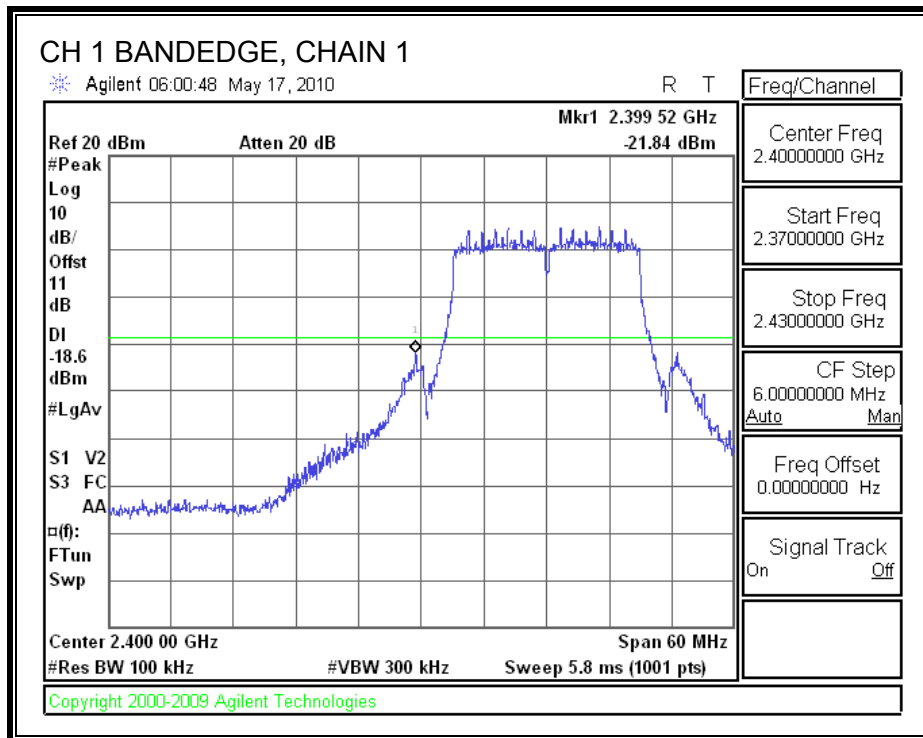


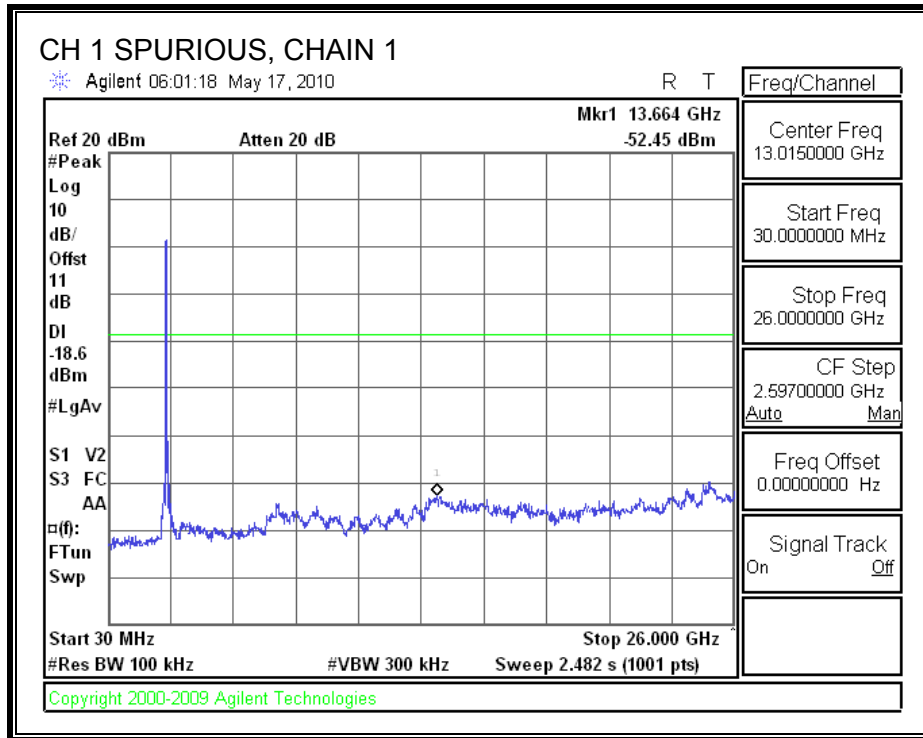


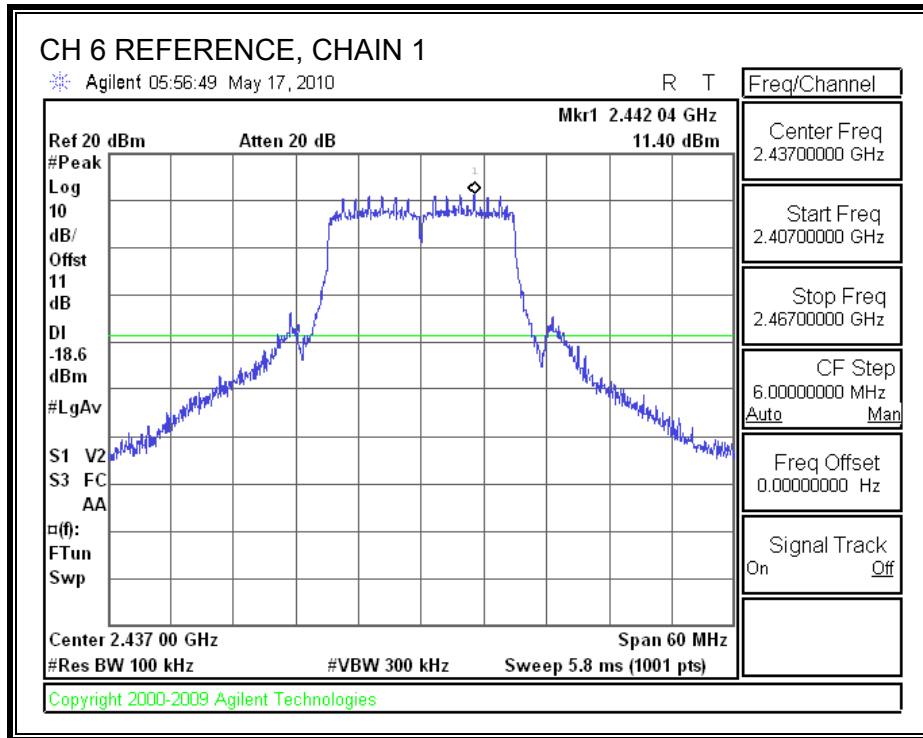


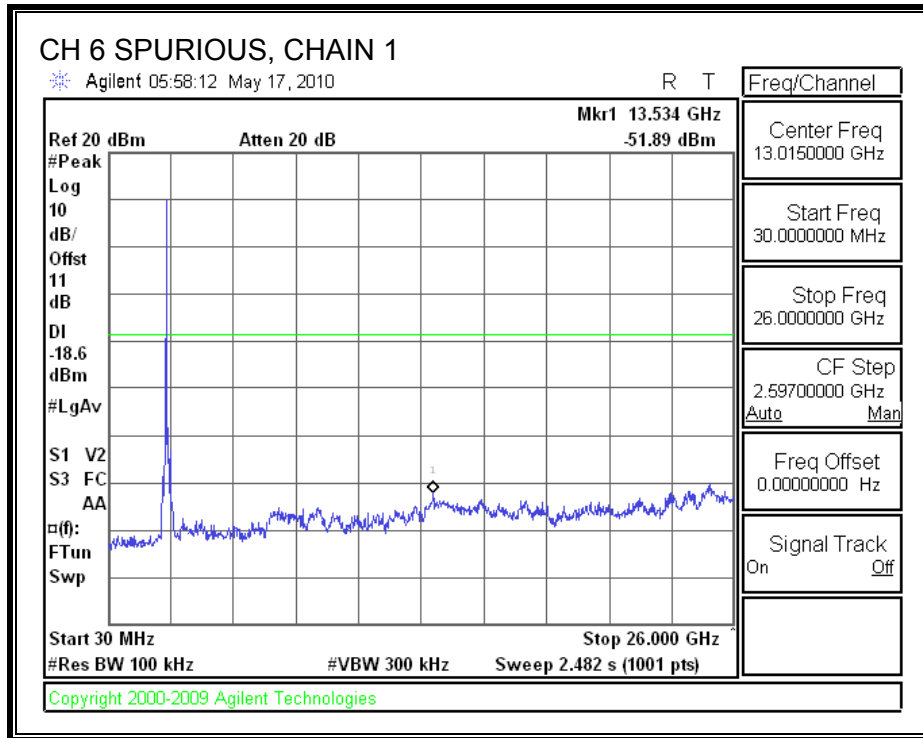


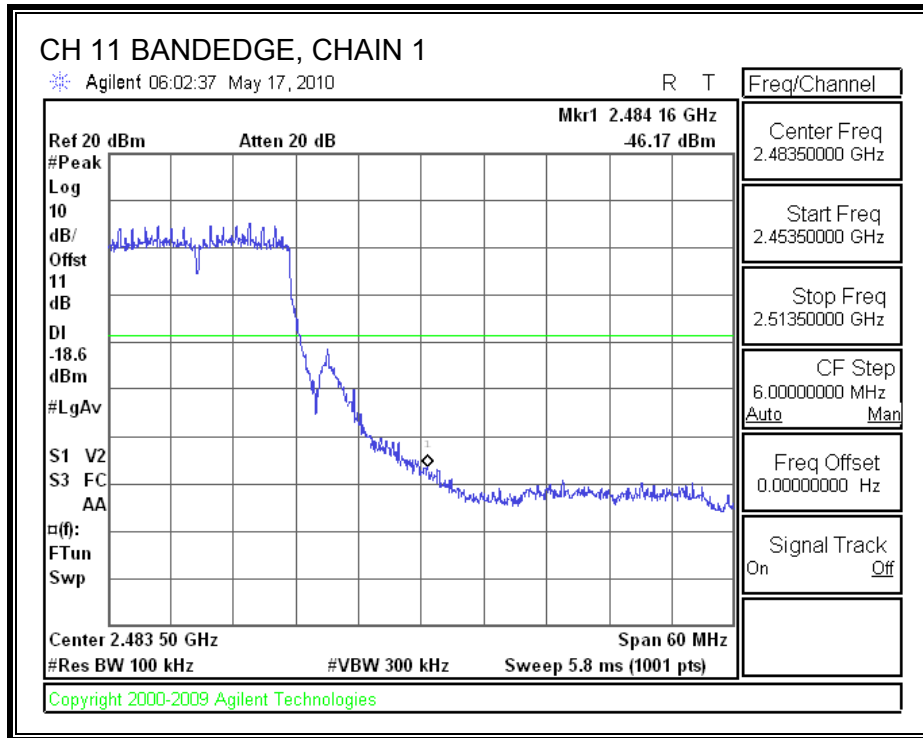
CHAIN 1 SPURIOUS EMISSIONS

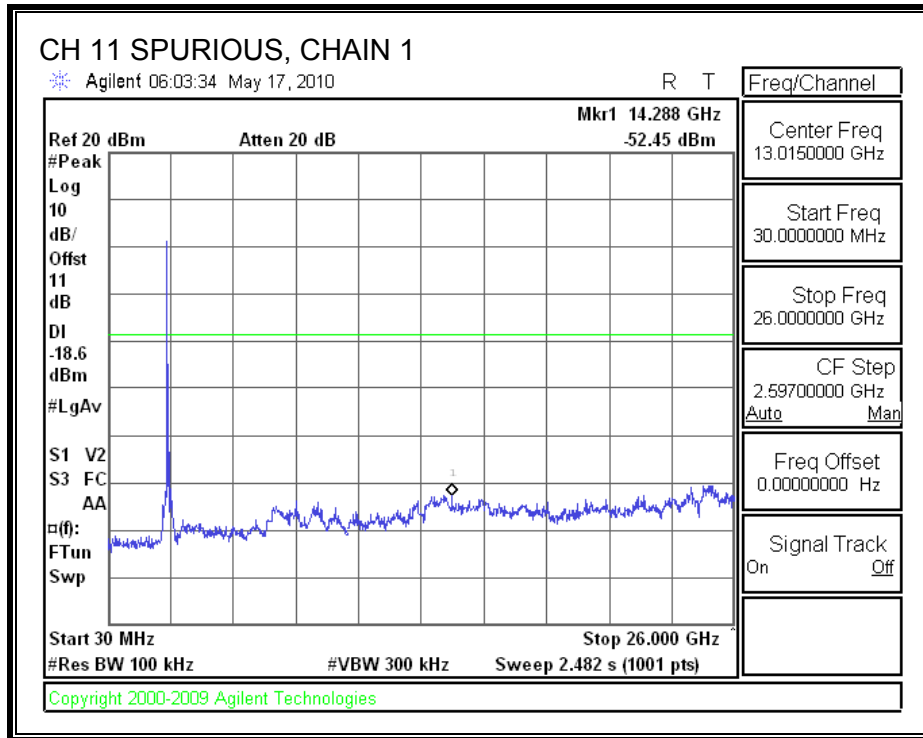












7.5. 802.11n HT40 MODE IN THE 2.4 GHz BAND SINGLE CHAIN

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.

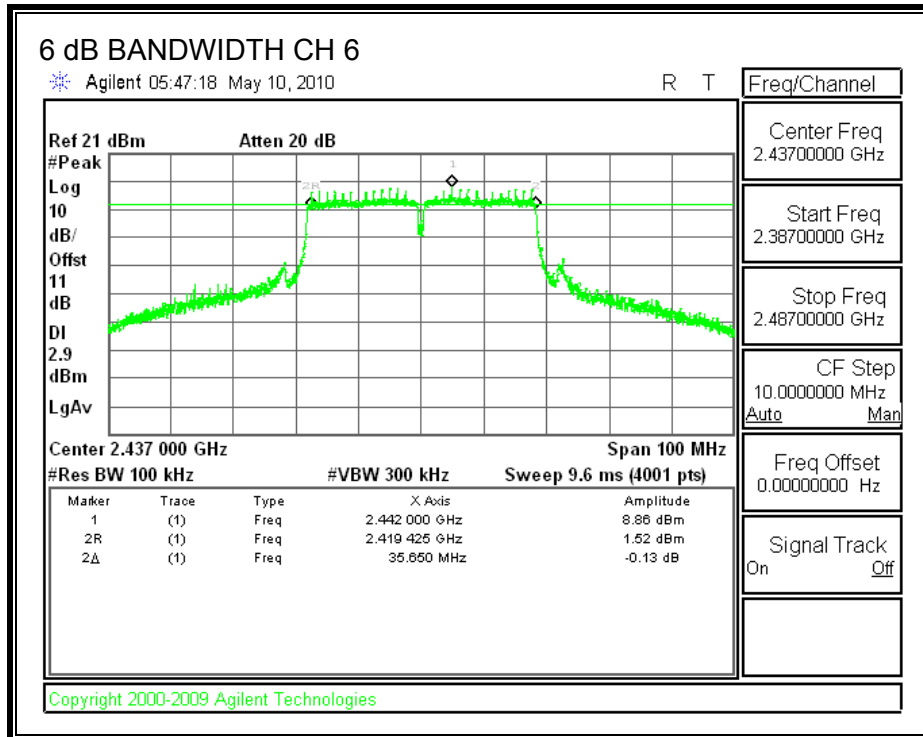
TEST PROCEDURE

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)	6 dB BW (MHz)	Minimum Limit (MHz)
6	2437	35.65	0.5

6 dB BANDWIDTH



7.5.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

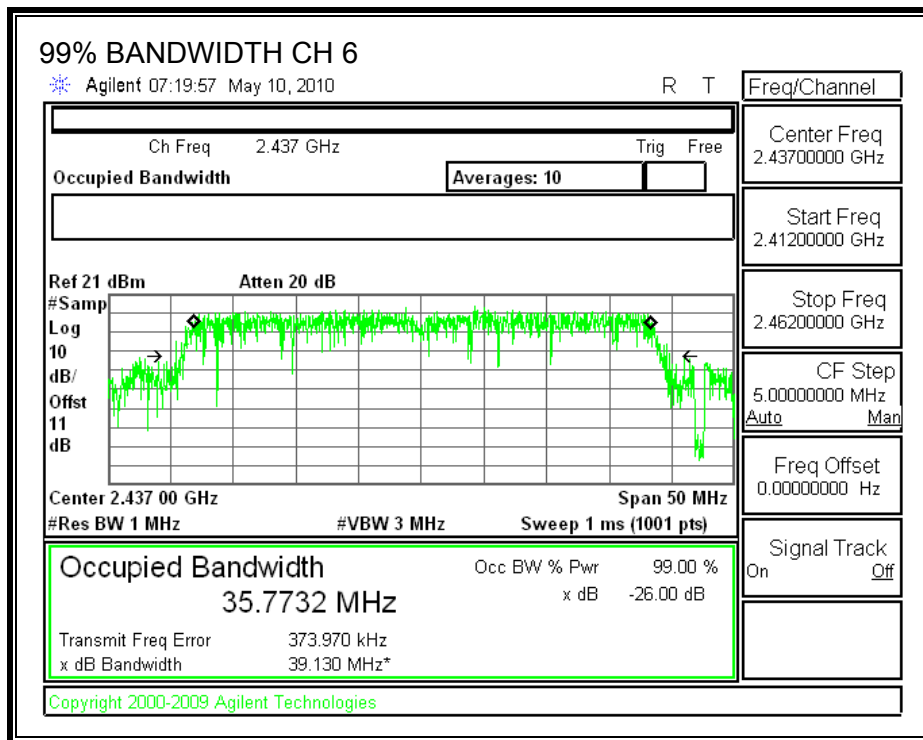
TEST PROCEDURE

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)	99% Bandwidth (MHz)
6	2437	35.7732

99% BANDWIDTH



7.5.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

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

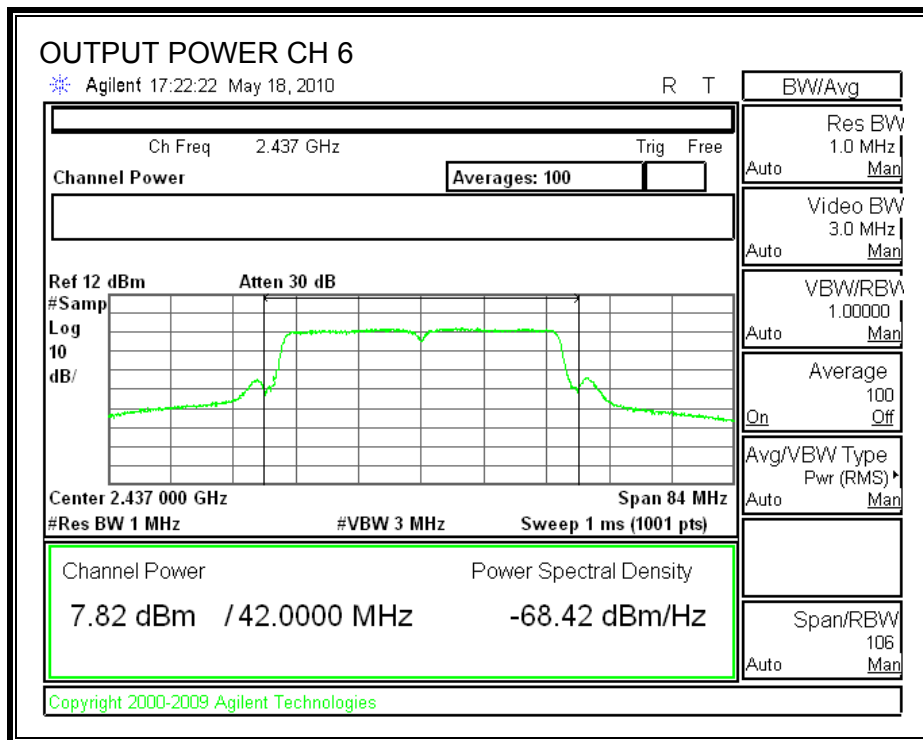
TEST PROCEDURE

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

RESULTS

Channel	Frequency (MHz)	Limit (dBm)	Power (dBm)	Attenuator + Cable Offset (dB)	Total Power (dBm)	Margin (dB)
6	2437	30.00	7.82	11.30	19.12	-10.88

OUTPUT POWER



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

Channel	Frequency (MHz)	Power (dBm)
6	2437	18.96

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.

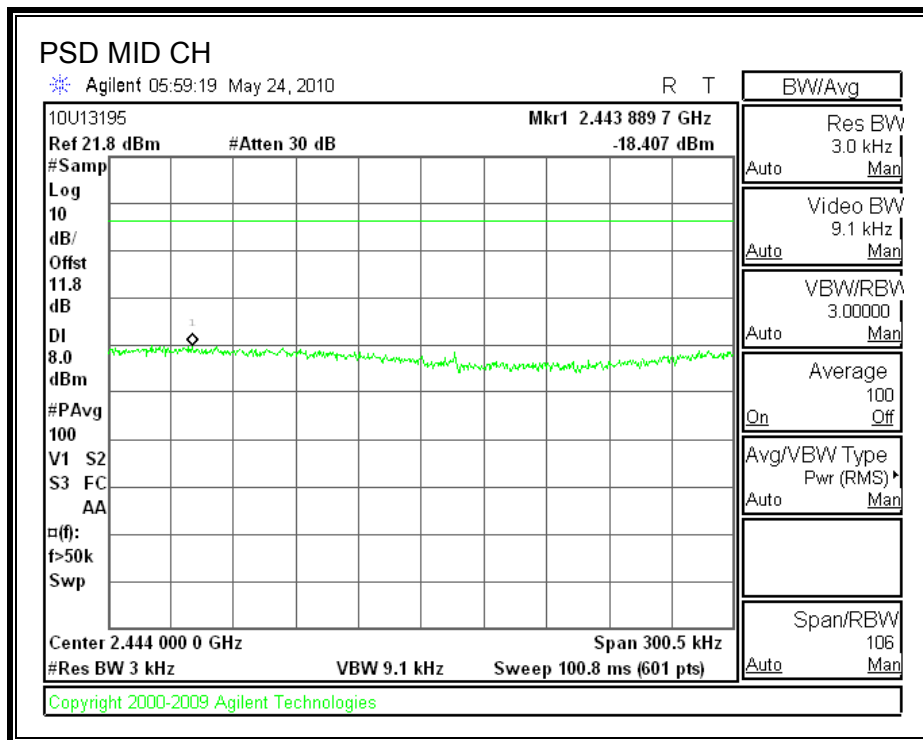
TEST PROCEDURE

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 (dBm)	Limit (dBm)	Margin (dB)
6	2437	-18.407	8	-26.41

POWER SPECTRAL DENSITY



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 RMS averaging over a time interval, therefore the required attenuation is 30 dB.

TEST PROCEDURE

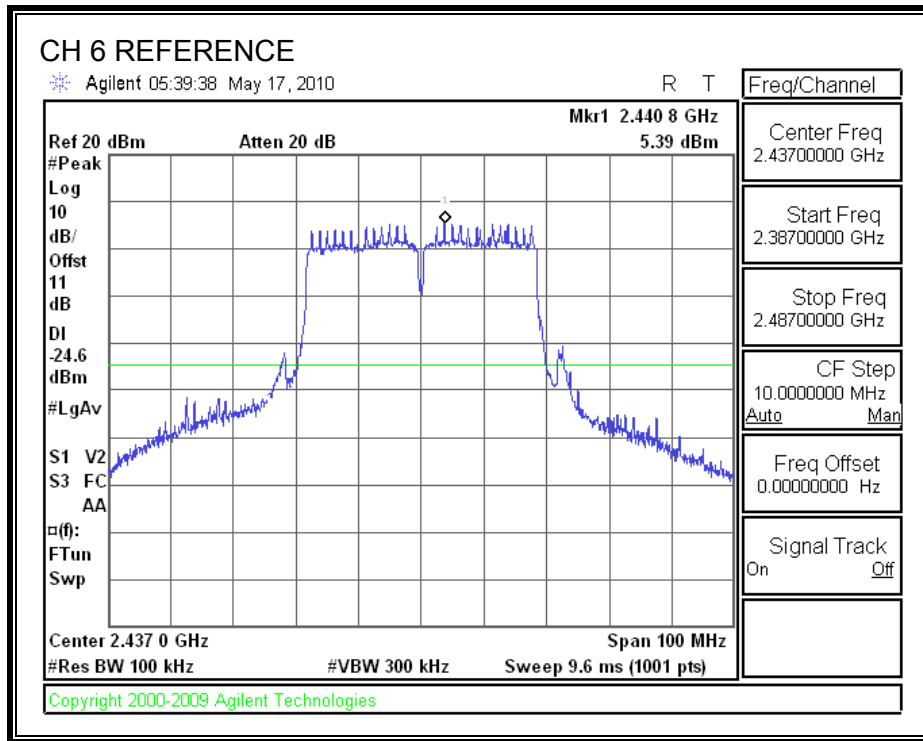
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

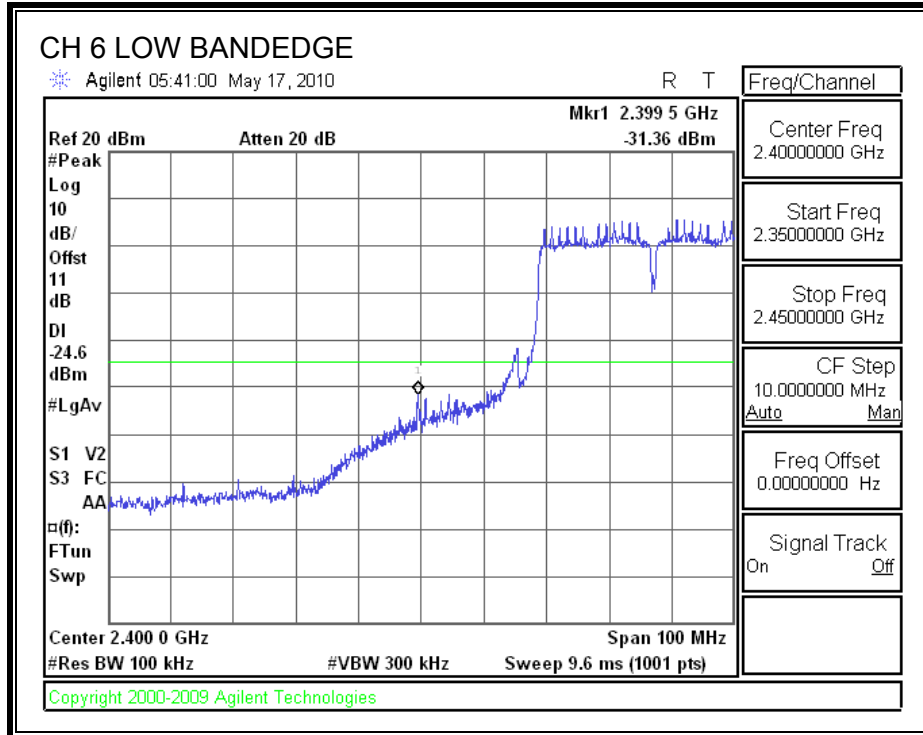
The EUT was set to transmit at mid channel, 30 dBc display line was set with reference to mid channel level.

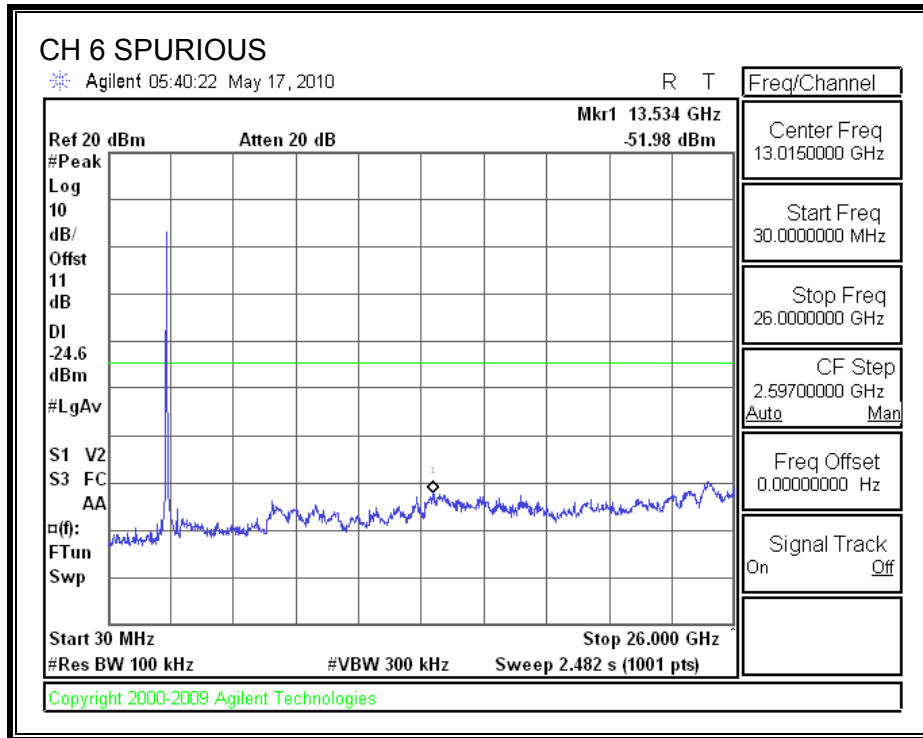
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the middle channel.

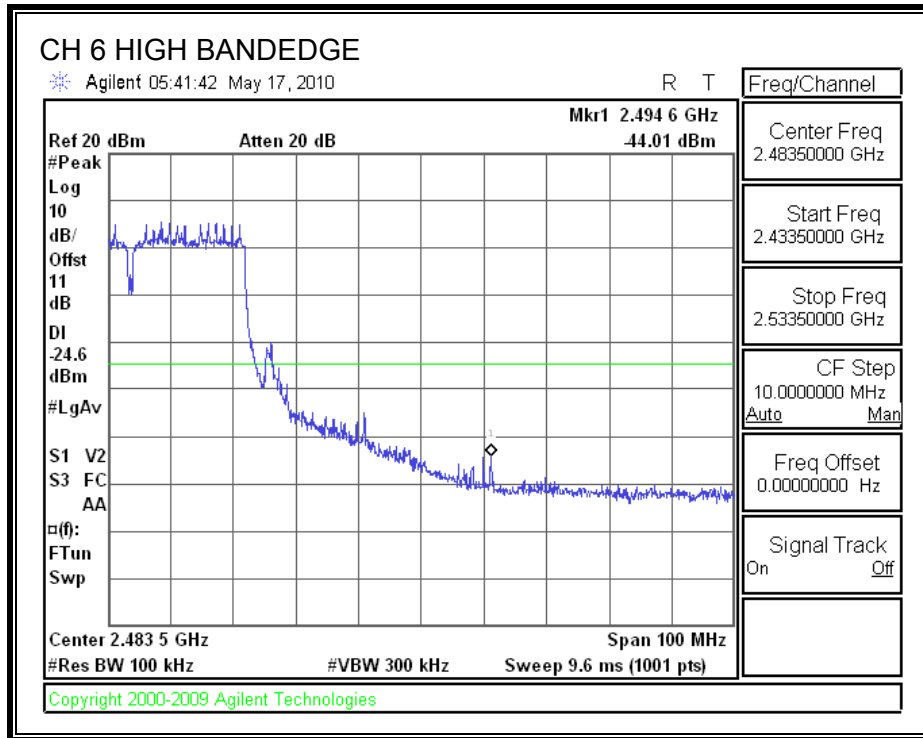
RESULTS

SPURIOUS EMISSIONS









7.6. 802.11n HT40 MODE IN THE 2.4 GHz BAND DUAL CHAIN

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.

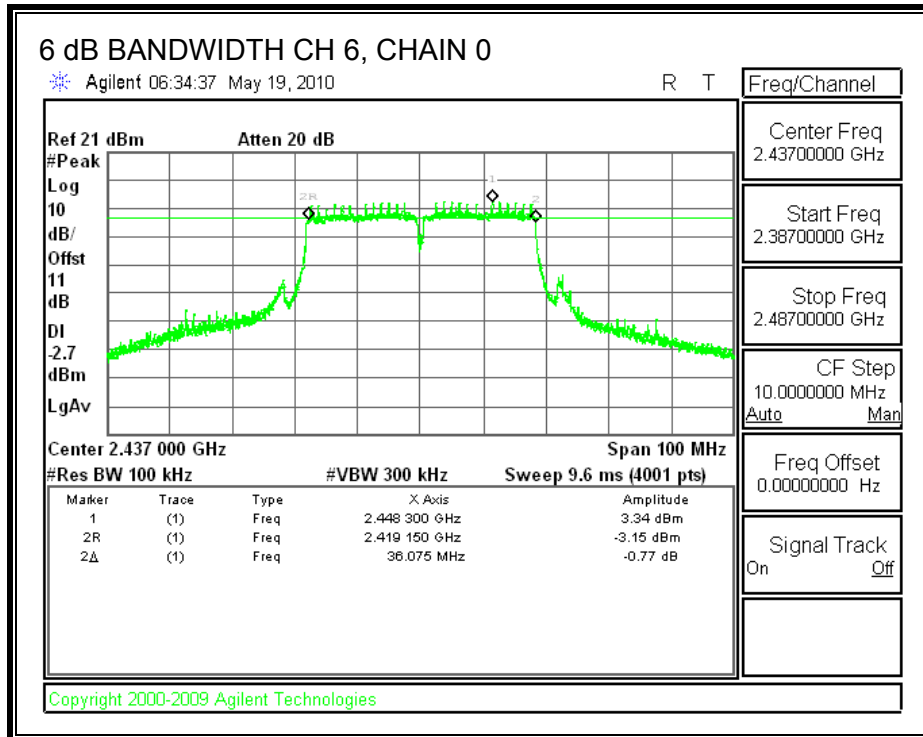
TEST PROCEDURE

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.

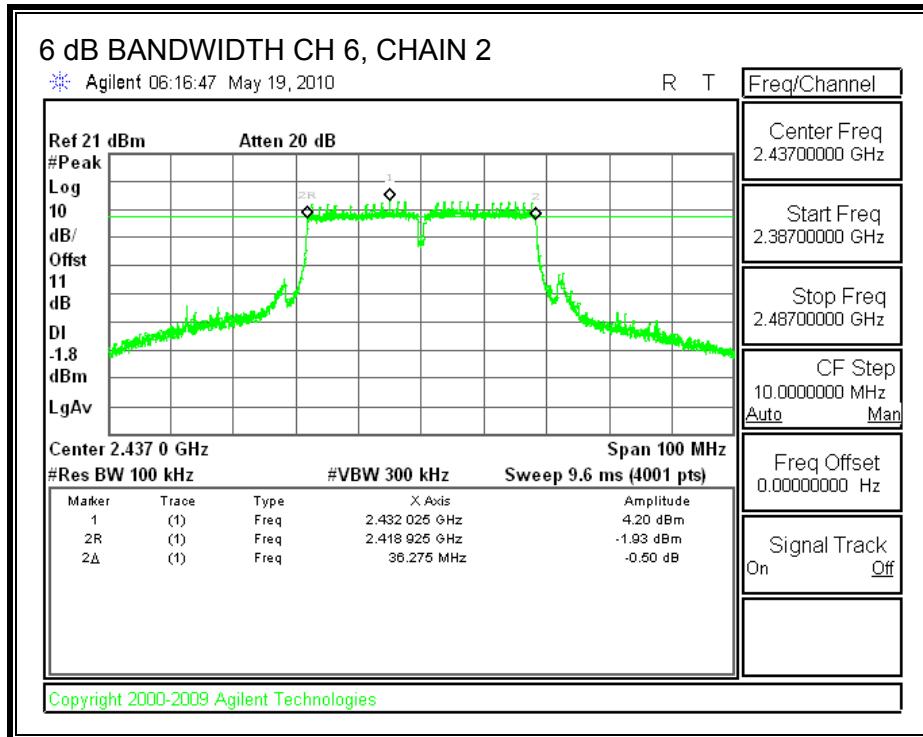
RESULTS

Channel	Frequency (MHz)	Chain 0 6 dB BW (MHz)	Chain 1 6 dB BW (MHz)	Minimum Limit (MHz)
6	2437	36.075	36.275	0.5

6 dB BANDWIDTH, CHAIN 0



6 dB BANDWIDTH, CHAIN 1



7.6.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

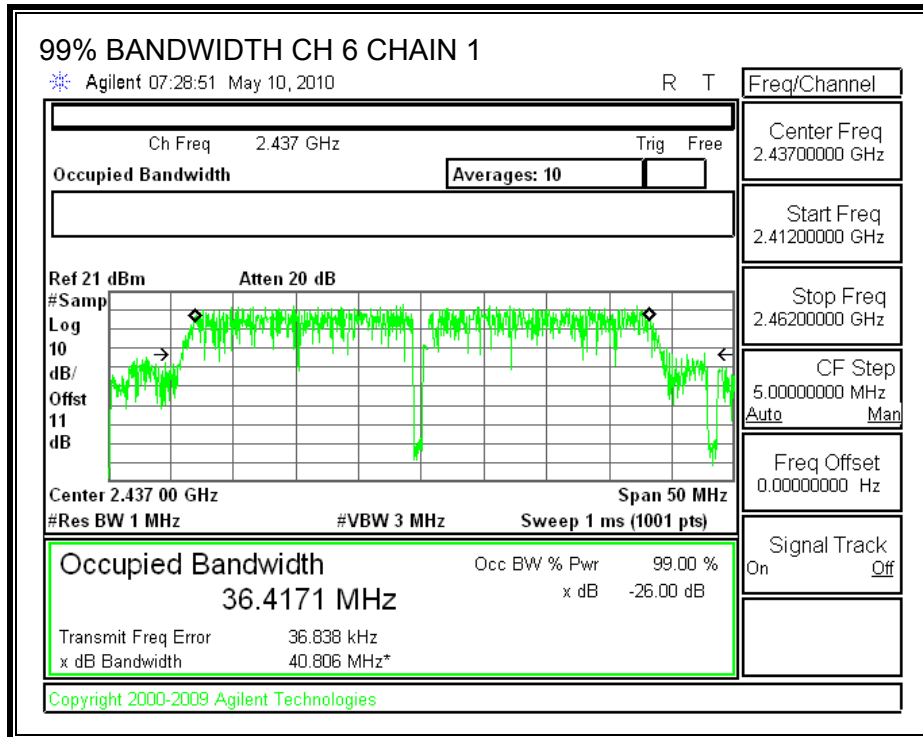
TEST PROCEDURE

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.

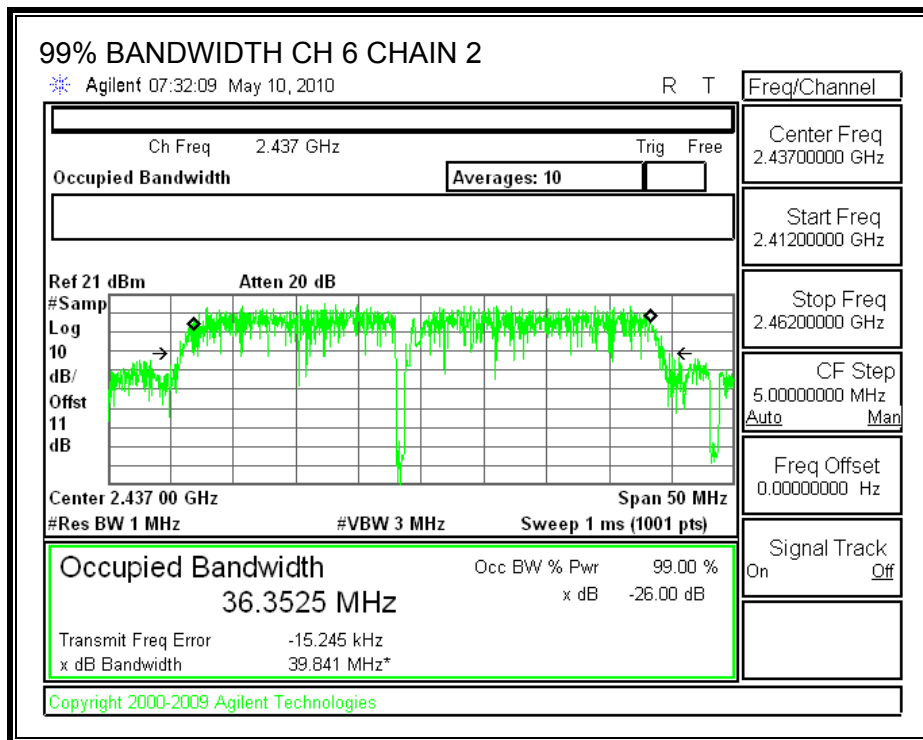
RESULTS

Channel	Frequency (MHz)	Chain 1 99% Bandwidth (MHz)	Chain 2 99% Bandwidth (MHz)
6	2437	36.4171	36.3525

99% BANDWIDTH, CHAIN 1



99% BANDWIDTH, CHAIN 2



7.6.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

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

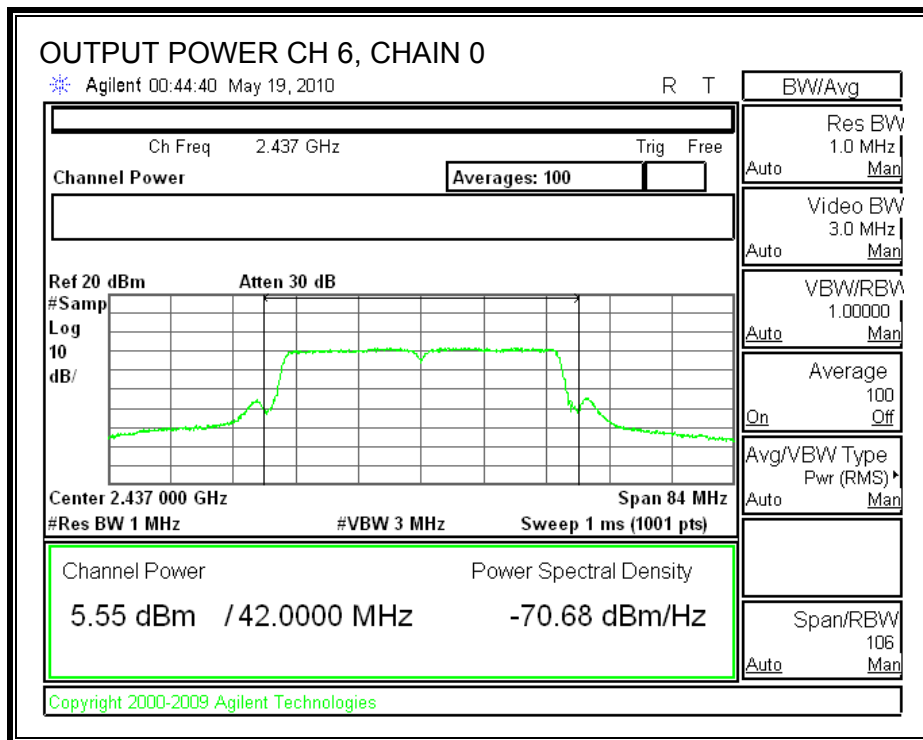
TEST PROCEDURE

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

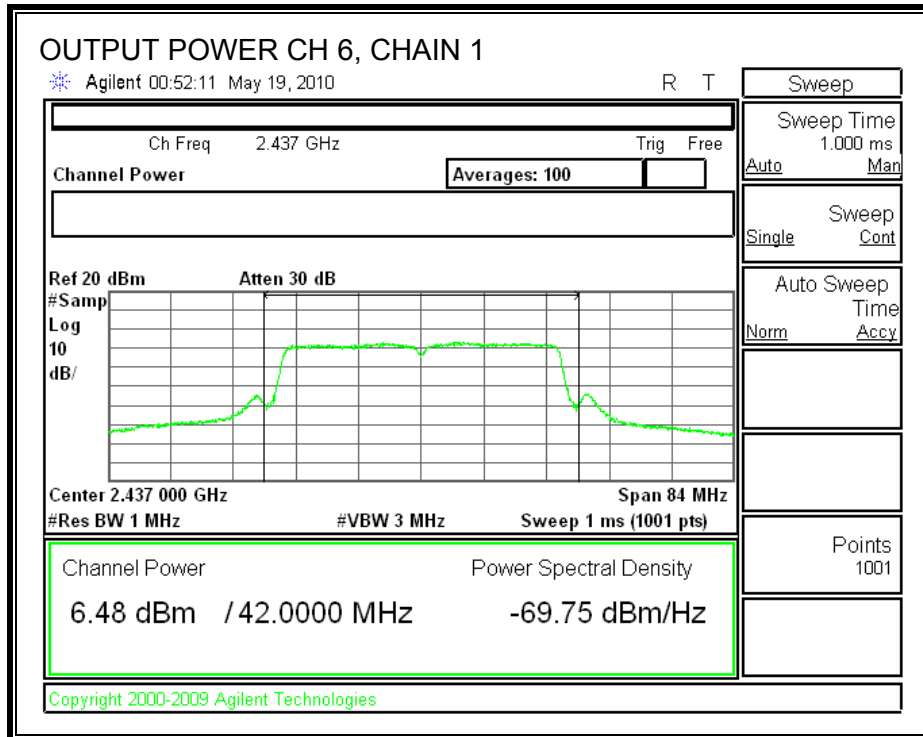
RESULTS

Channel	Frequency (MHz)	Limit (dBm)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Attenuator + Cable Offset (dB)	Total Power (dBm)	Margin (dB)
6	2437	30.00	5.55	6.48	11.30	20.35	-9.65

CHAIN 0 OUTPUT POWER



CHAIN 1 OUTPUT POWER



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

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
6	2437	16.97	17.44	20.22

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.

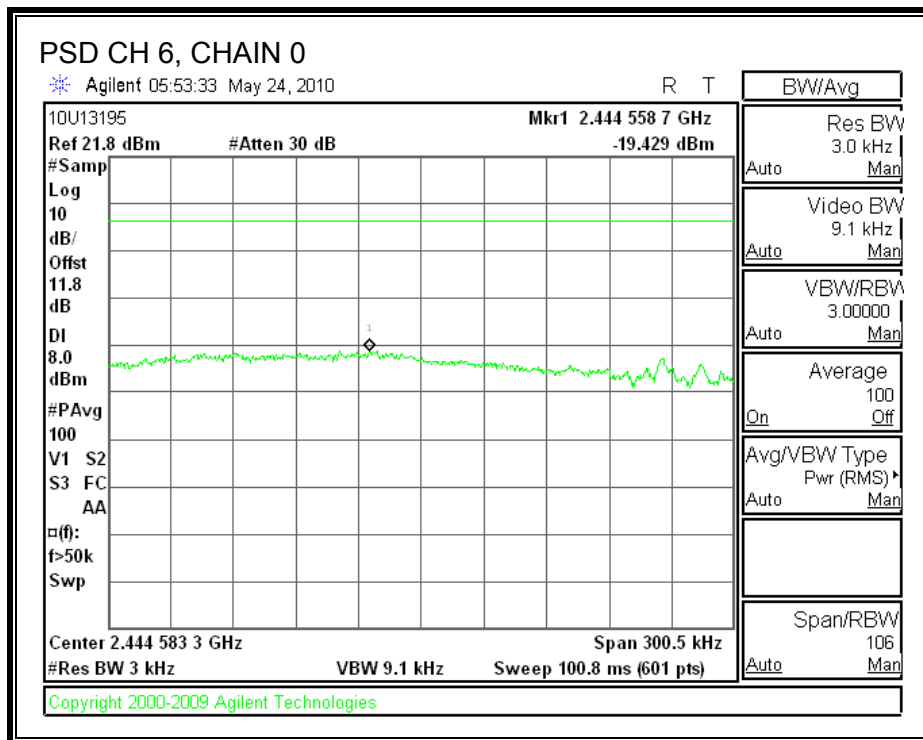
TEST PROCEDURE

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.

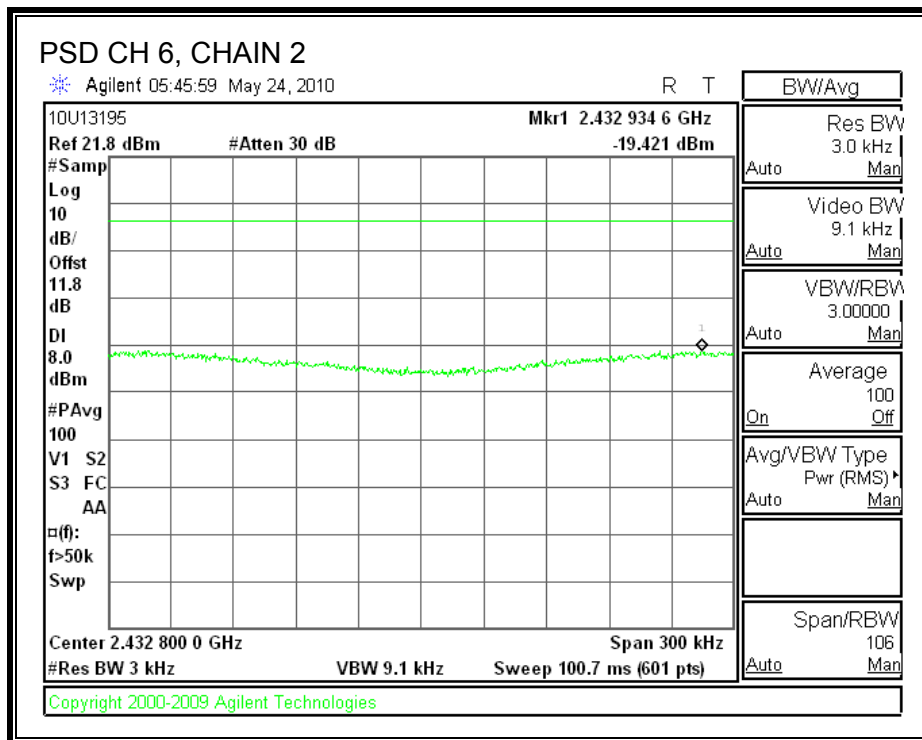
RESULTS

Channel	Frequency (MHz)	Chain 0 PSD (dBm)	Chain 1 PSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
6	2437	-19.429	-19.421	-16.41	8	-24.41

POWER SPECTRAL DENSITY, CHAIN 0



POWER SPECTRAL DENSITY, CHAIN 1



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 RMS averaging over a time interval, therefore the required attenuation is 30 dB.

TEST PROCEDURE

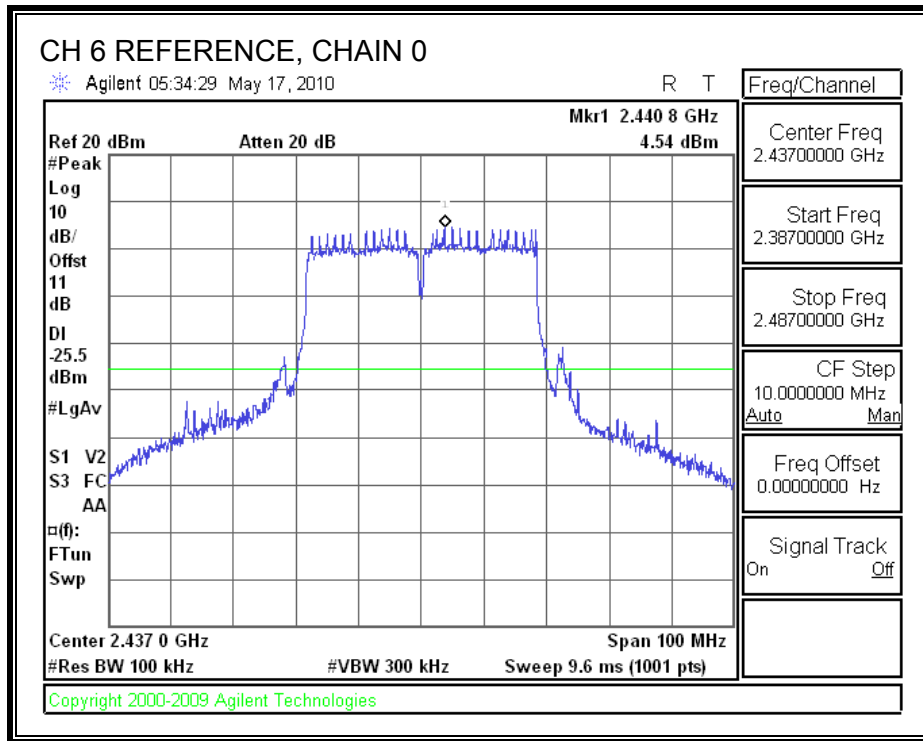
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

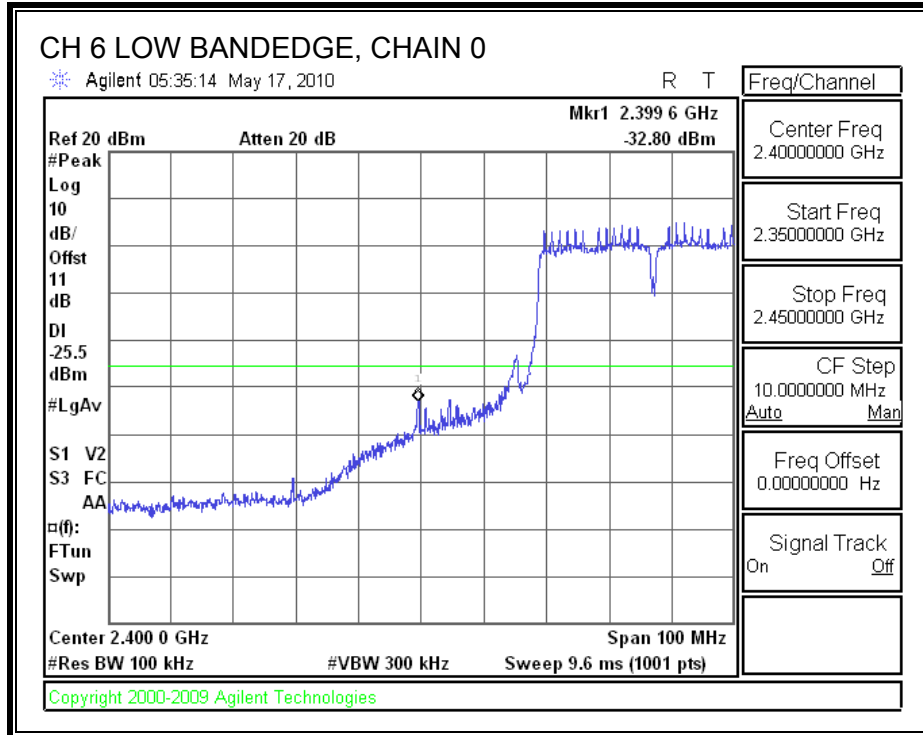
The EUT was set to transmit at mid channel, 30 dBc display line was set with reference to mid channel level.

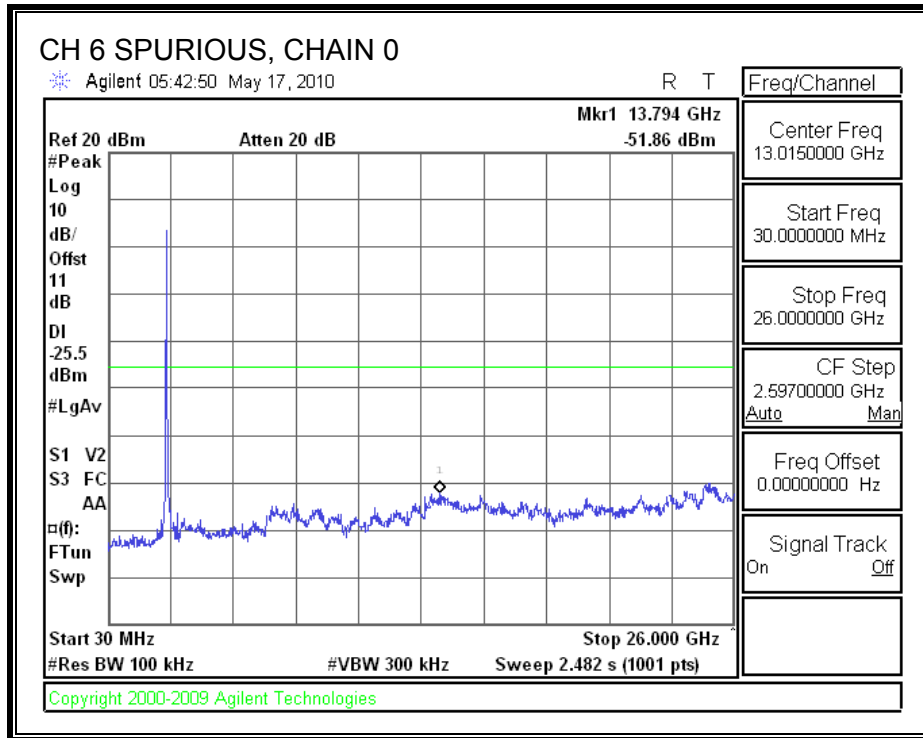
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the middle channel.

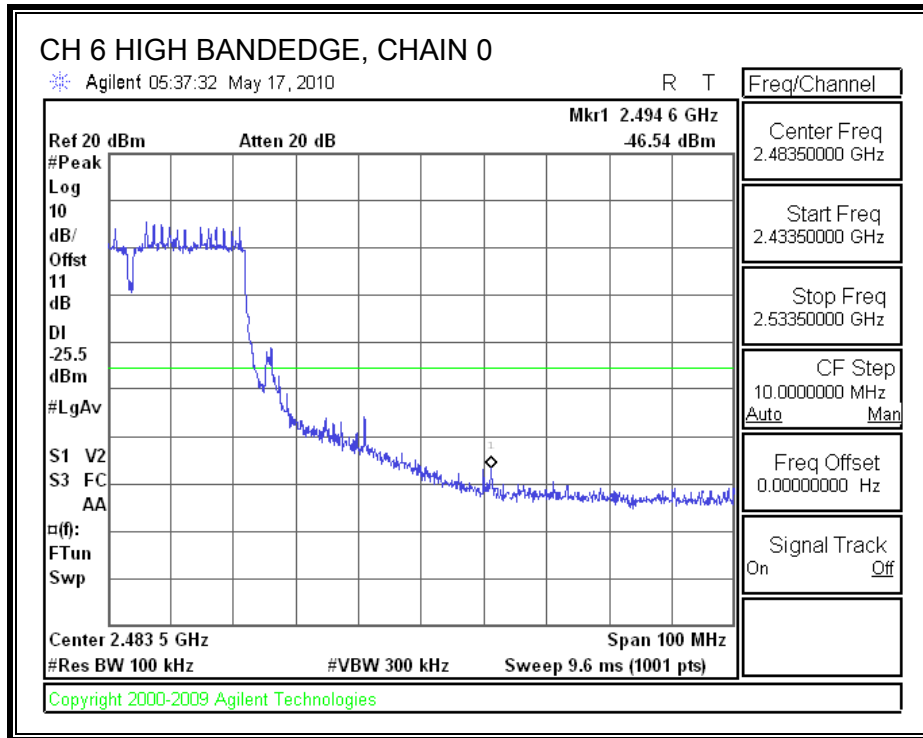
RESULTS

CHAIN 0 SPURIOUS EMISSIONS

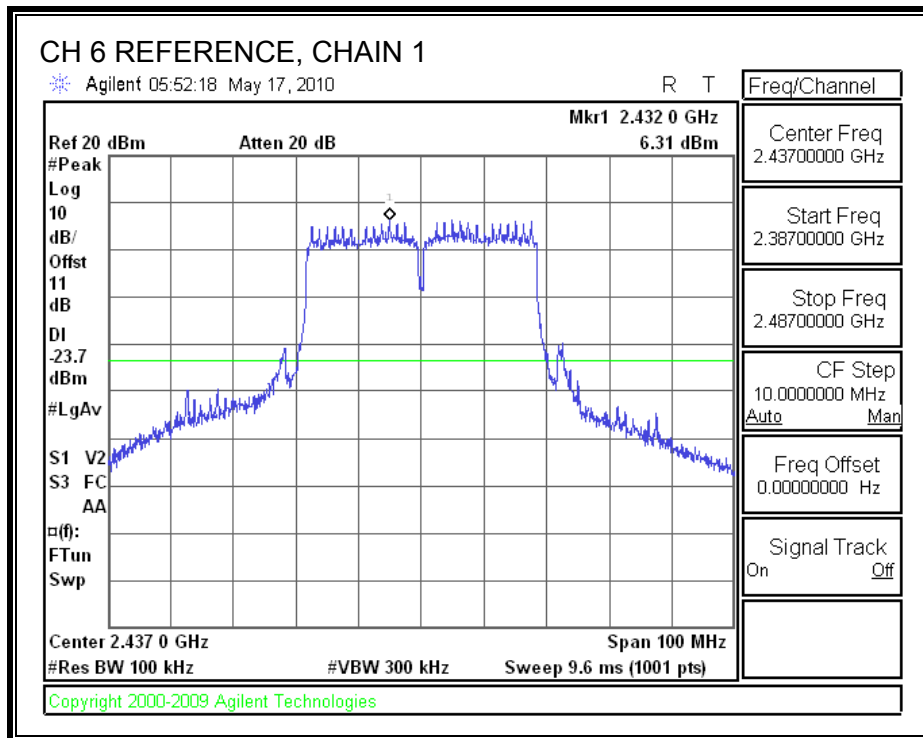


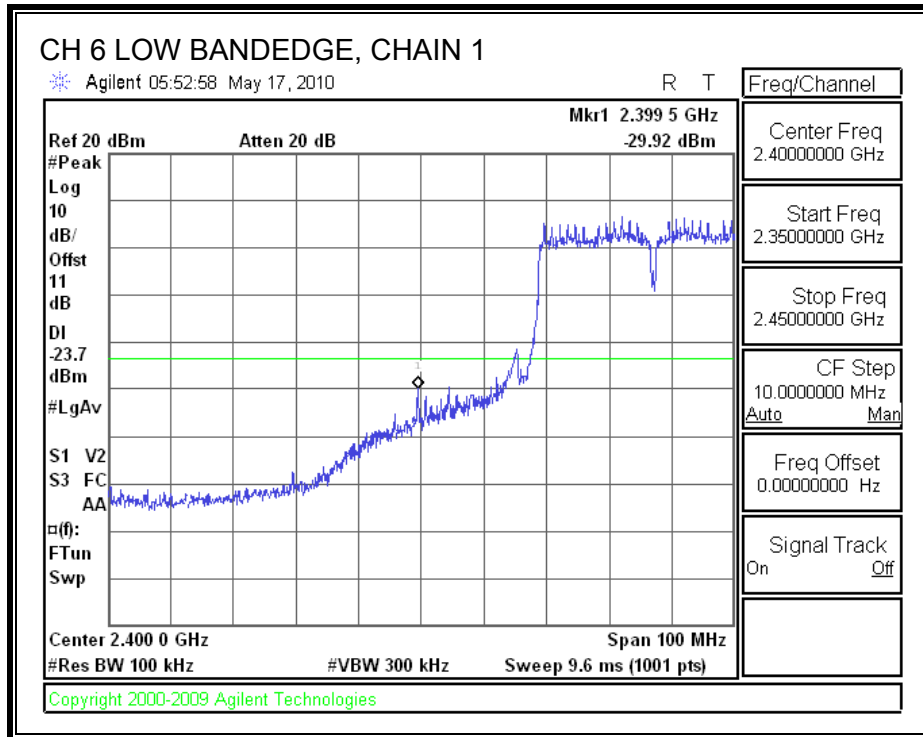


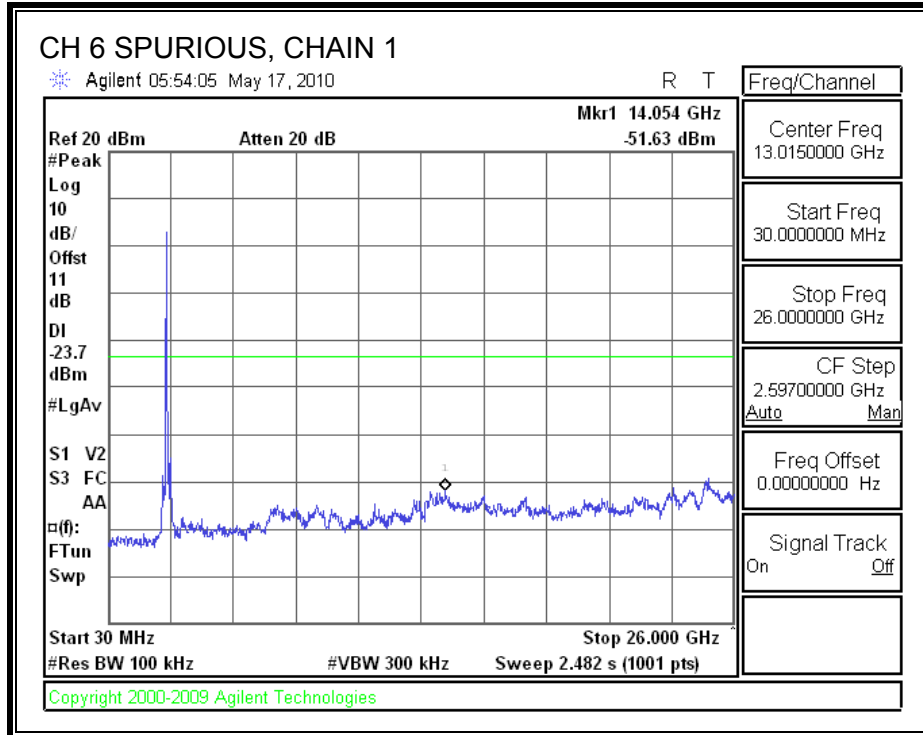


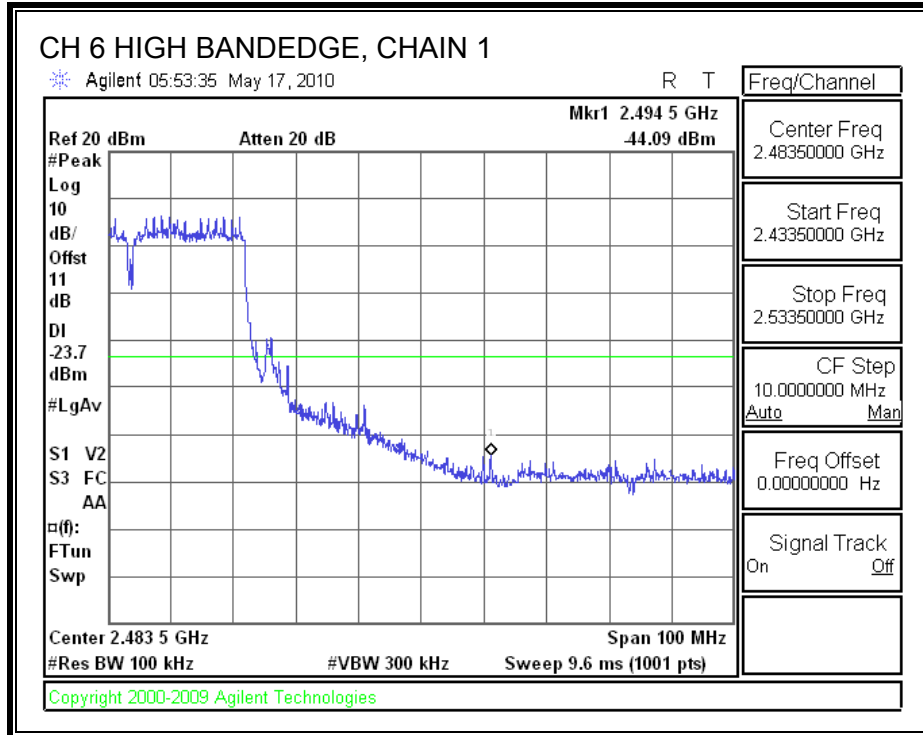


CHAIN 1 SPURIOUS EMISSIONS









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, and 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.

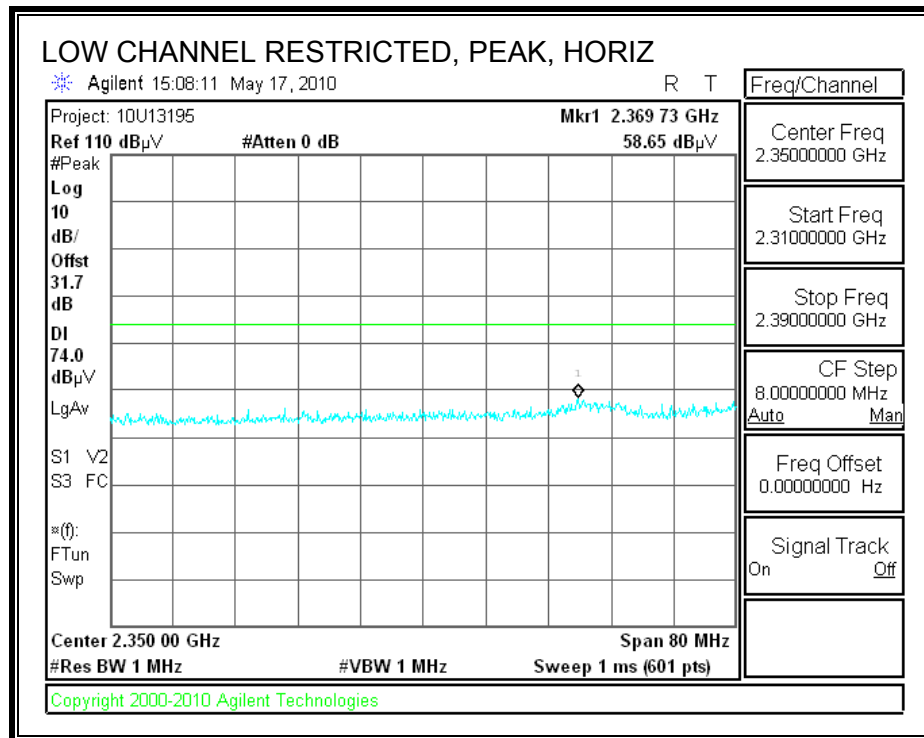
8.2. TRANSMITTER ABOVE 1 GHz

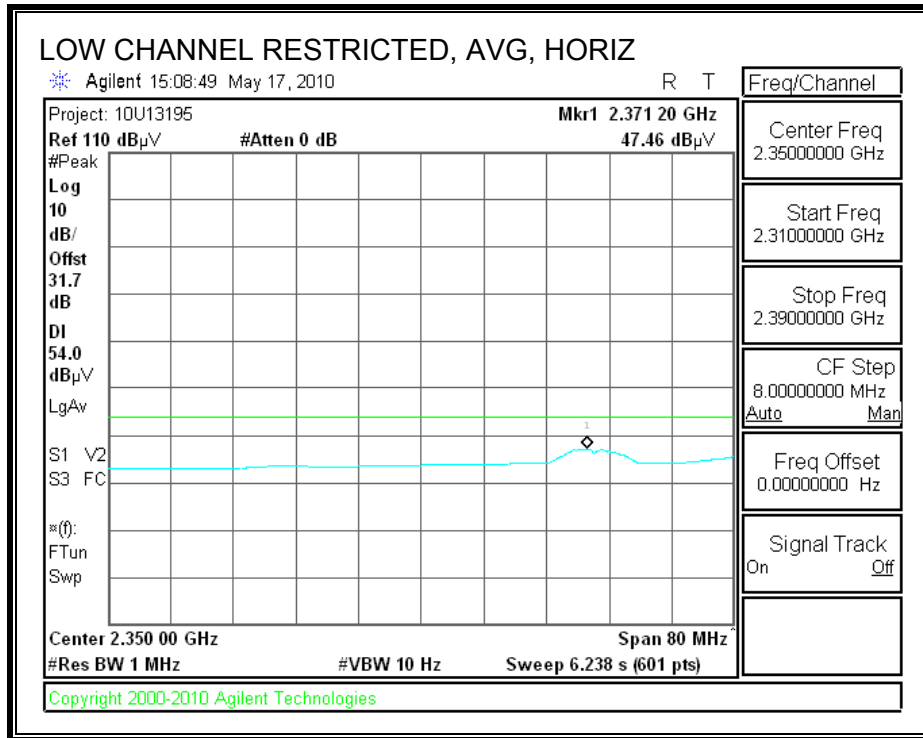
8.2.1. TX ABOVE 1 GHz FOR 802.11b MODE IN THE 2.4 GHz BAND

Note: channel 1 was tested at the power level of channel 2, the power levels for CH2 is higher than the power level of CH1; hence this is worst-case measurement.

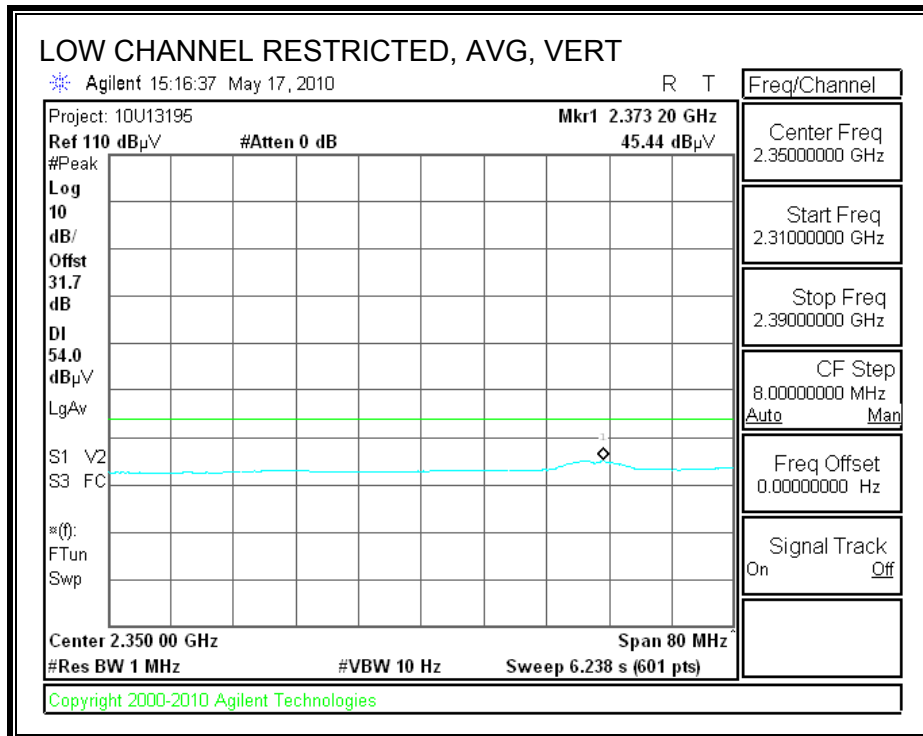
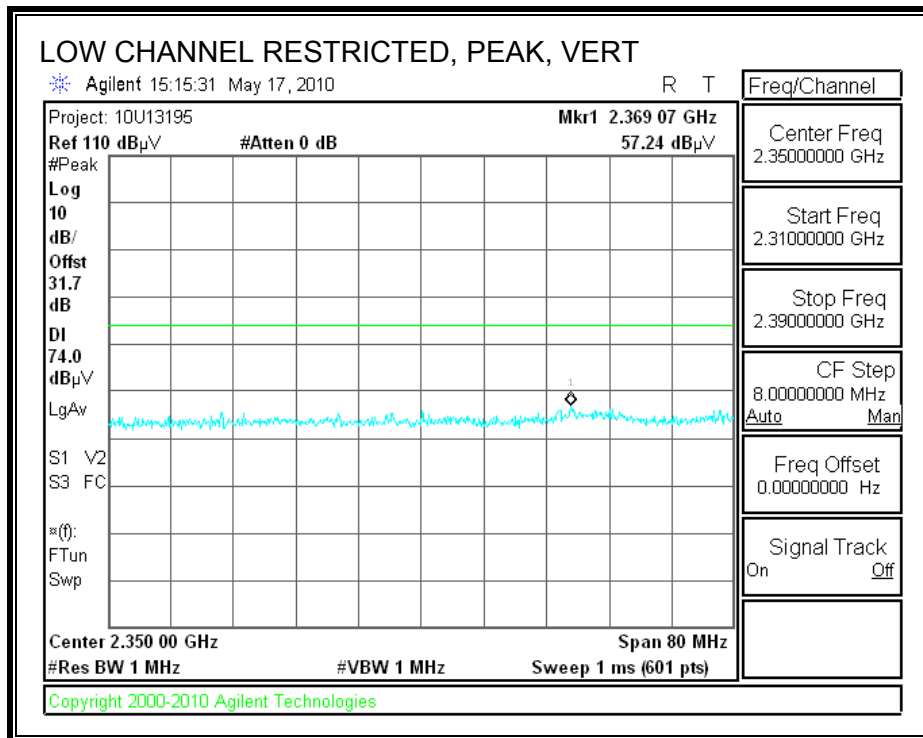
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

CH1



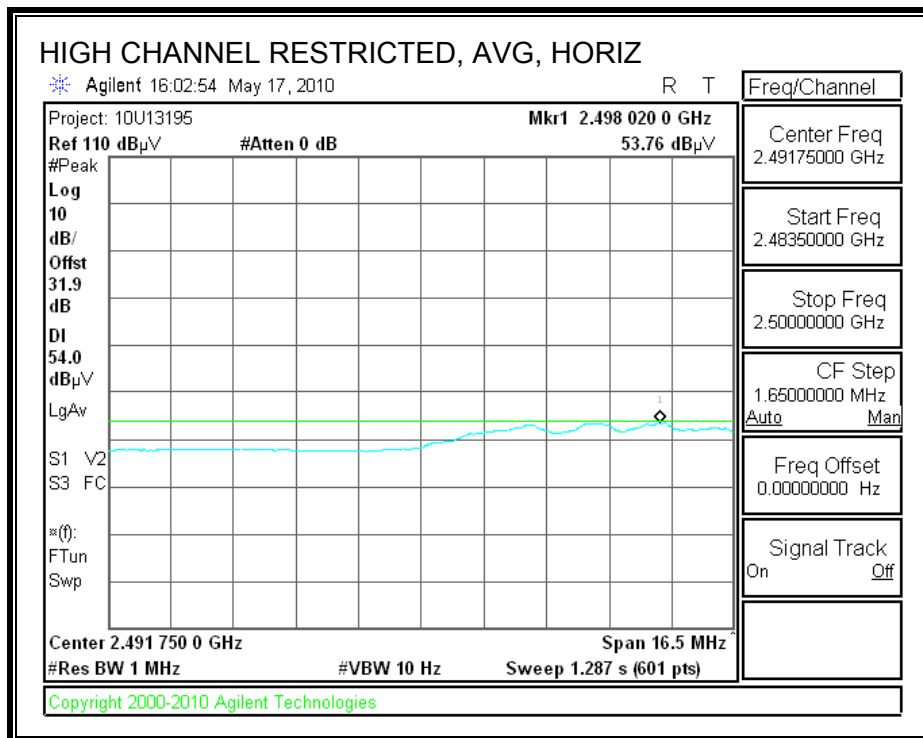
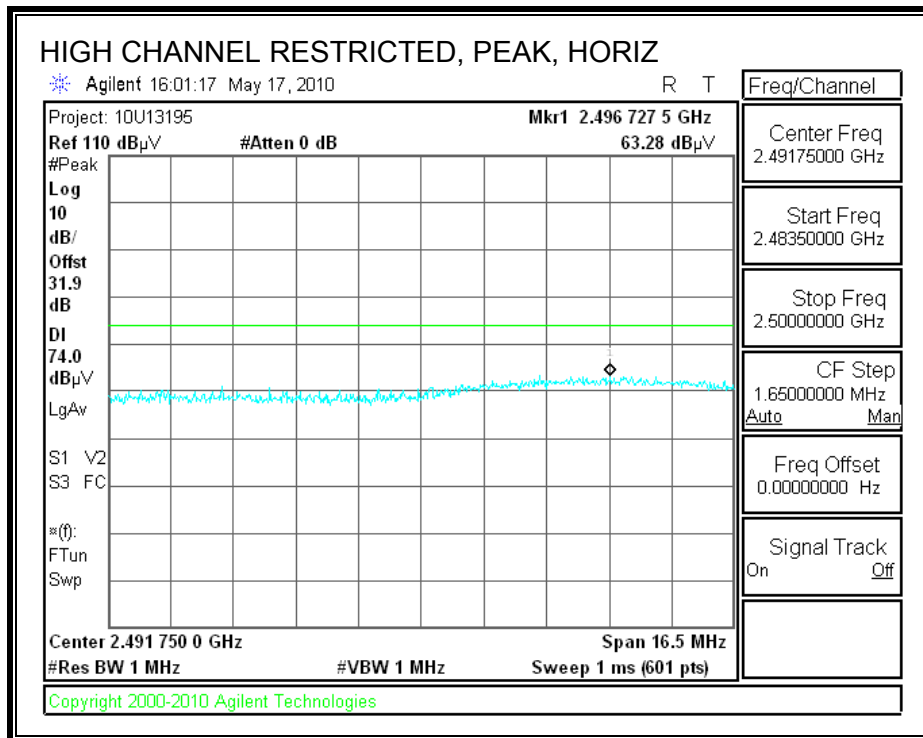


RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

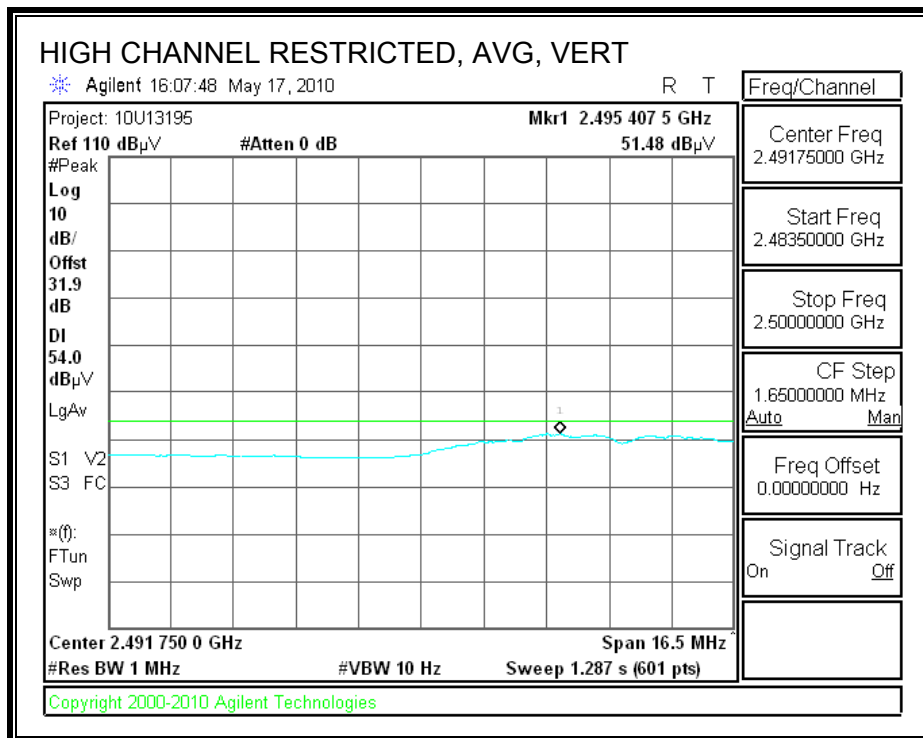
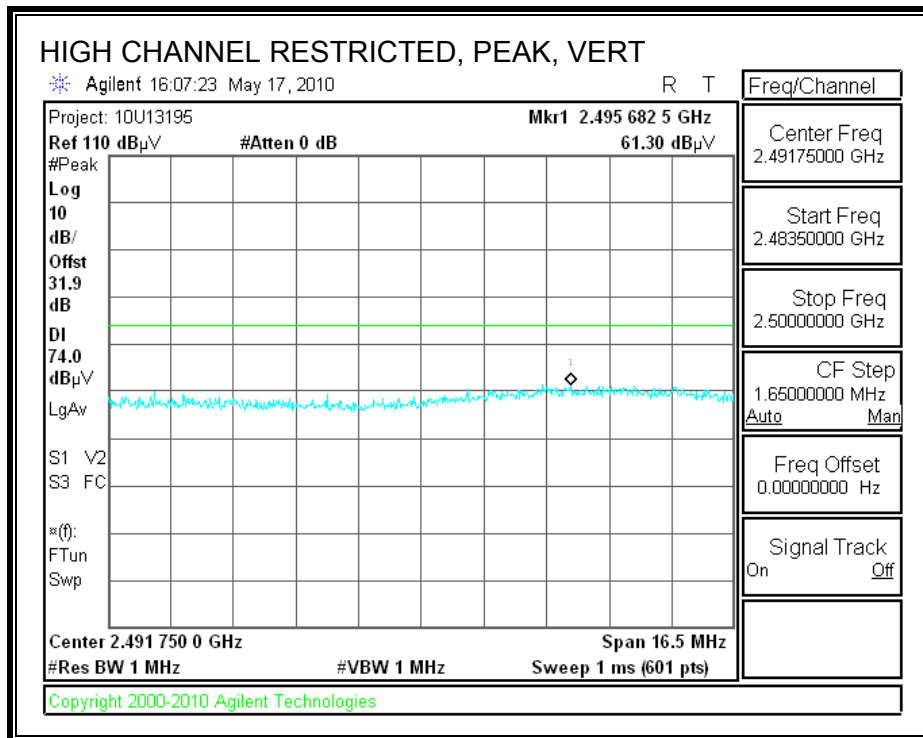


RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

CH10

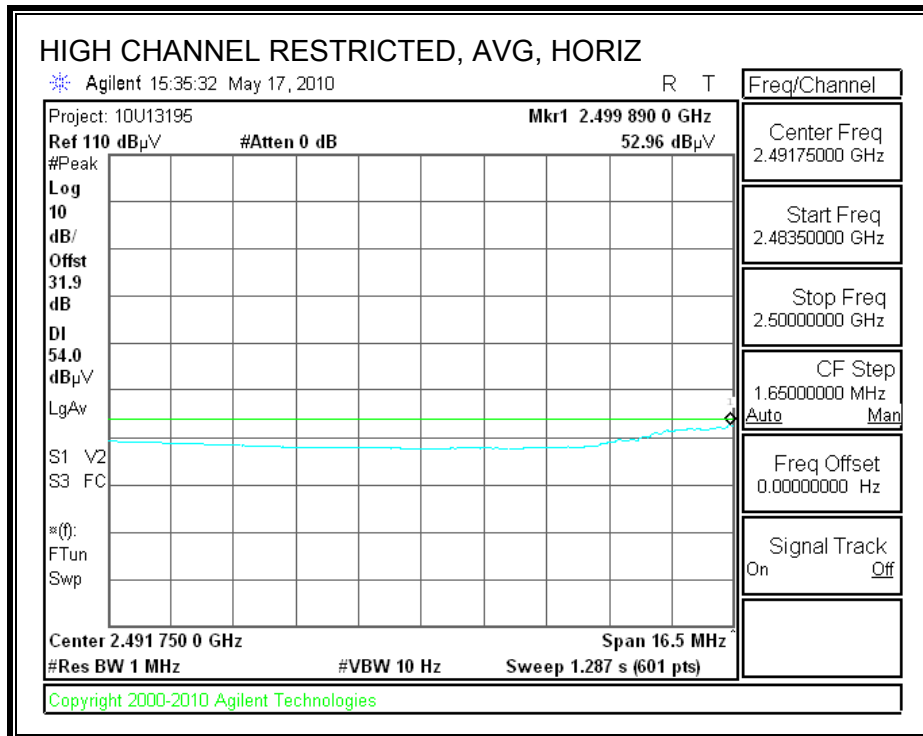
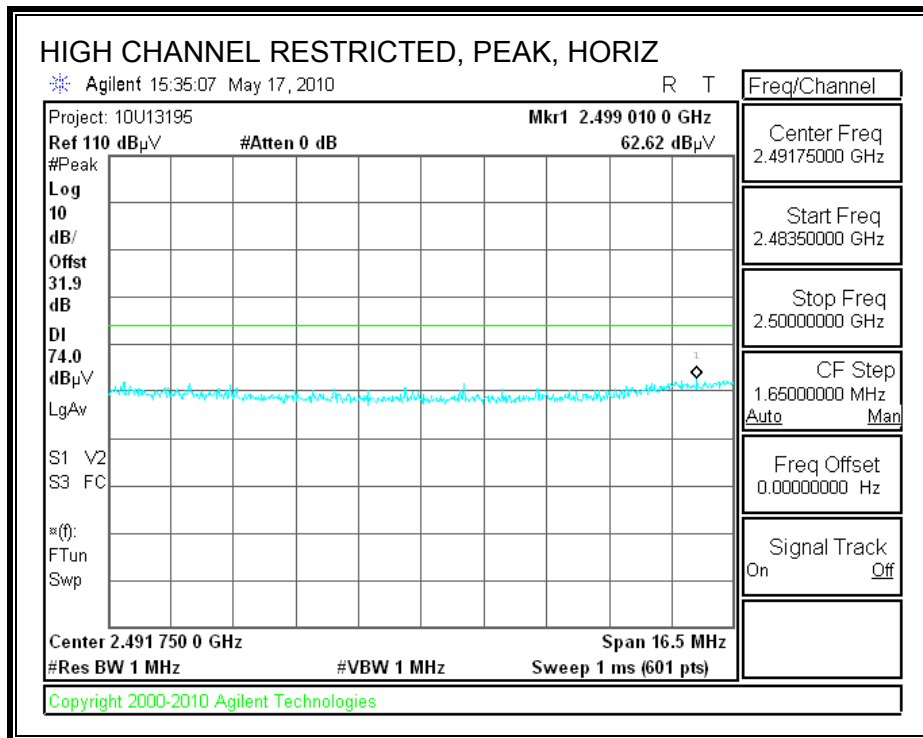


RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

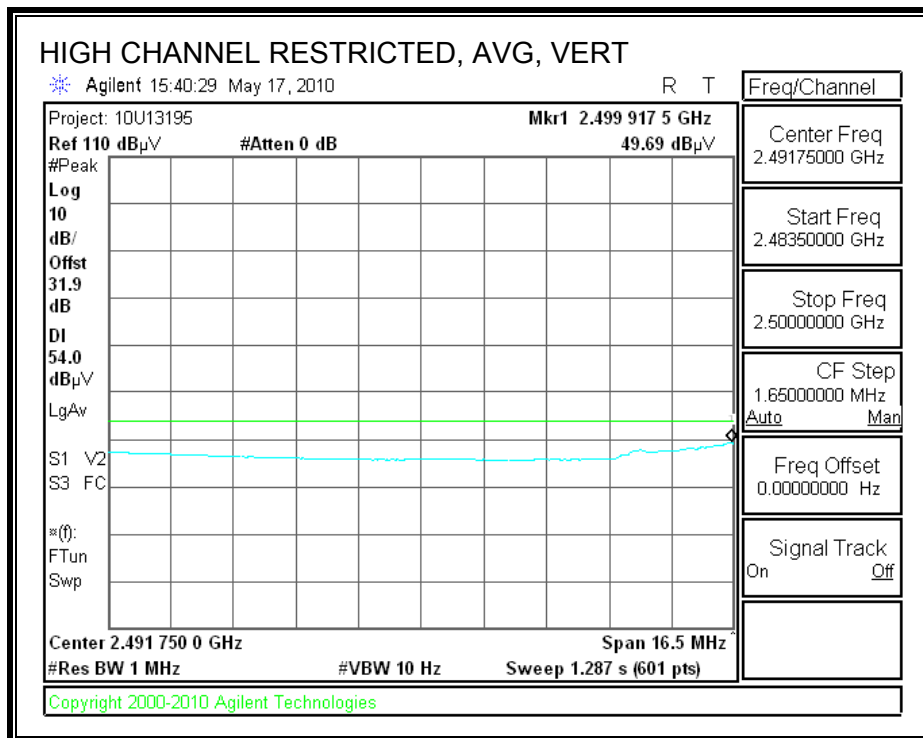
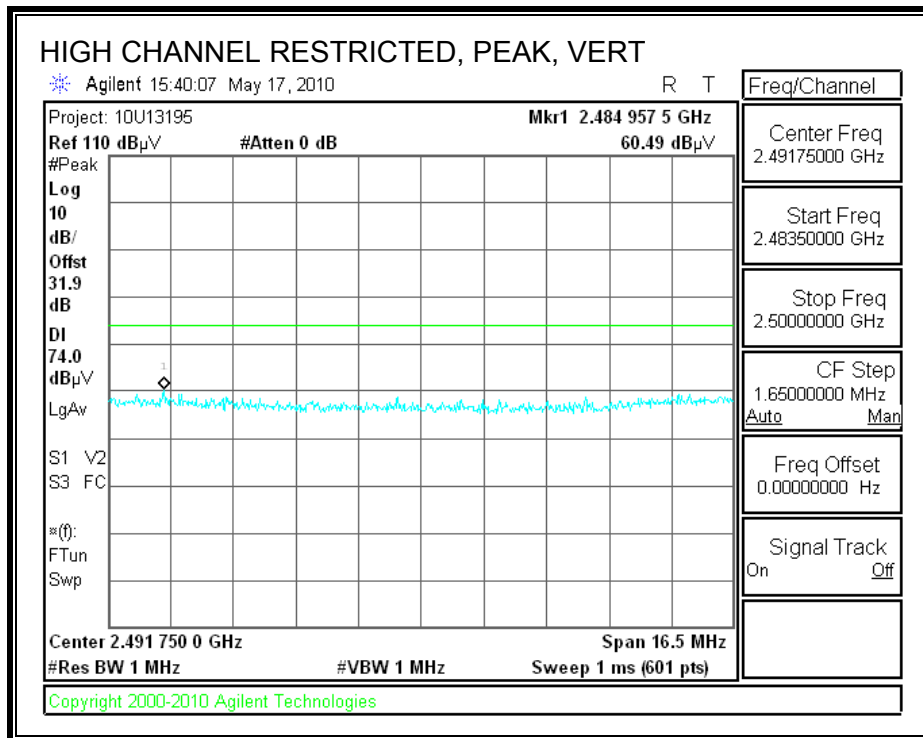


RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

CH11



RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement

Compliance Certification Services, Fremont 5m Chamber

Test Engr: Tom Chen
 Date: 05/13/10
 Project #: 10U13195
 Company: 2-Wire Inc.,
 EUT Description: Wifi AP, 5011NV, 5012NV, (19101A000025)
 EUT M/N: EUT with laptop PC
 Test Target: FCC 15.247
 Mode Oper: Continuously TX, b 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	Notes
2412 MHz b mode													
4.824	3.0	40.6	32.8	5.8	-34.8	0.0	0.0	44.3	74.0	-29.7	H	P	
4.824	3.0	33.6	32.8	5.8	-34.8	0.0	0.0	37.3	54.0	-16.7	H	A	
7.236	3.0	38.5	35.1	7.2	-34.7	0.0	0.0	46.2	74.0	-27.8	H	P	
7.236	3.0	28.9	35.1	7.2	-34.7	0.0	0.0	36.6	54.0	-17.4	H	A	
9.648	3.0	45.9	37.1	8.5	-35.0	0.0	0.0	56.5	74.0	-17.5	H	P	
9.648	3.0	42.5	37.1	8.5	-35.0	0.0	0.0	53.1	54.0	-0.9	H	A	
4.824	3.0	40.1	32.8	5.8	-34.8	0.0	0.0	43.8	74.0	-30.2	V	P	
4.824	3.0	32.7	32.8	5.8	-34.8	0.0	0.0	36.4	54.0	-17.6	V	A	
7.236	3.0	37.2	35.1	7.2	-34.7	0.0	0.0	44.8	74.0	-29.2	V	P	
7.236	3.0	24.8	35.1	7.2	-34.7	0.0	0.0	32.4	54.0	-21.6	V	A	
9.648	3.0	42.1	37.1	8.5	-35.0	0.0	0.0	52.7	74.0	-21.3	V	P	
9.648	3.0	38.3	37.1	8.5	-35.0	0.0	0.0	48.9	54.0	-5.1	V	A	
2437 MHz b mode													
4.874	3.0	43.6	32.8	5.8	-34.9	0.0	0.0	47.3	74.0	-26.7	H	P	
4.874	3.0	38.1	32.8	5.8	-34.9	0.0	0.0	41.8	54.0	-12.2	H	A	
7.311	3.0	43.9	35.2	7.3	-34.7	0.0	0.0	51.7	74.0	-22.3	H	P	
7.311	3.0	36.8	35.2	7.3	-34.7	0.0	0.0	44.6	54.0	-9.4	H	A	
9.748	3.0	45.7	37.2	8.6	-35.0	0.0	0.0	56.4	74.0	-17.6	H	P	
9.748	3.0	42.3	37.2	8.6	-35.0	0.0	0.0	53.1	54.0	-0.9	H	A	
4.874	3.0	40.4	32.8	5.8	-34.9	0.0	0.0	44.2	74.0	-29.8	V	P	
4.874	3.0	32.8	32.8	5.8	-34.9	0.0	0.0	36.6	54.0	-17.4	V	A	
7.311	3.0	41.5	35.2	7.3	-34.7	0.0	0.0	49.3	74.0	-24.7	V	P	
7.311	3.0	34.5	35.2	7.3	-34.7	0.0	0.0	42.3	54.0	-11.7	V	A	
9.748	3.0	41.6	37.2	8.6	-35.0	0.0	0.0	52.3	74.0	-21.7	V	P	
9.748	3.0	36.3	37.2	8.6	-35.0	0.0	0.0	47.0	54.0	-7.0	V	A	
2462 MHz b mode													
4.924	3.0	39.8	32.8	5.9	-34.9	0.0	0.0	43.6	74.0	-30.4	H	P	
4.924	3.0	31.1	32.8	5.9	-34.9	0.0	0.0	34.9	54.0	-19.1	H	A	
7.386	3.0	37.4	35.3	7.3	-34.6	0.0	0.0	45.3	74.0	-28.7	H	P	
7.386	3.0	25.4	35.3	7.3	-34.6	0.0	0.0	33.4	54.0	-20.6	H	A	
9.848	3.0	43.6	37.2	8.7	-35.1	0.0	0.0	54.4	74.0	-19.6	H	P	
9.848	3.0	39.1	37.2	8.7	-35.1	0.0	0.0	49.9	54.0	-4.1	H	A	
4.924	3.0	38.3	32.8	5.9	-34.9	0.0	0.0	42.2	74.0	-31.8	V	P	
4.924	3.0	28.6	32.8	5.9	-34.9	0.0	0.0	32.5	54.0	-21.5	V	A	
7.386	3.0	38.5	35.3	7.3	-34.6	0.0	0.0	46.4	74.0	-27.6	V	P	
7.386	3.0	25.1	35.3	7.3	-34.6	0.0	0.0	33.1	54.0	-20.9	V	A	
9.848	3.0	36.0	37.2	8.7	-35.1	0.0	0.0	46.8	74.0	-27.2	V	P	
9.848	3.0	25.0	37.2	8.7	-35.1	0.0	0.0	35.8	54.0	-18.2	V	A	

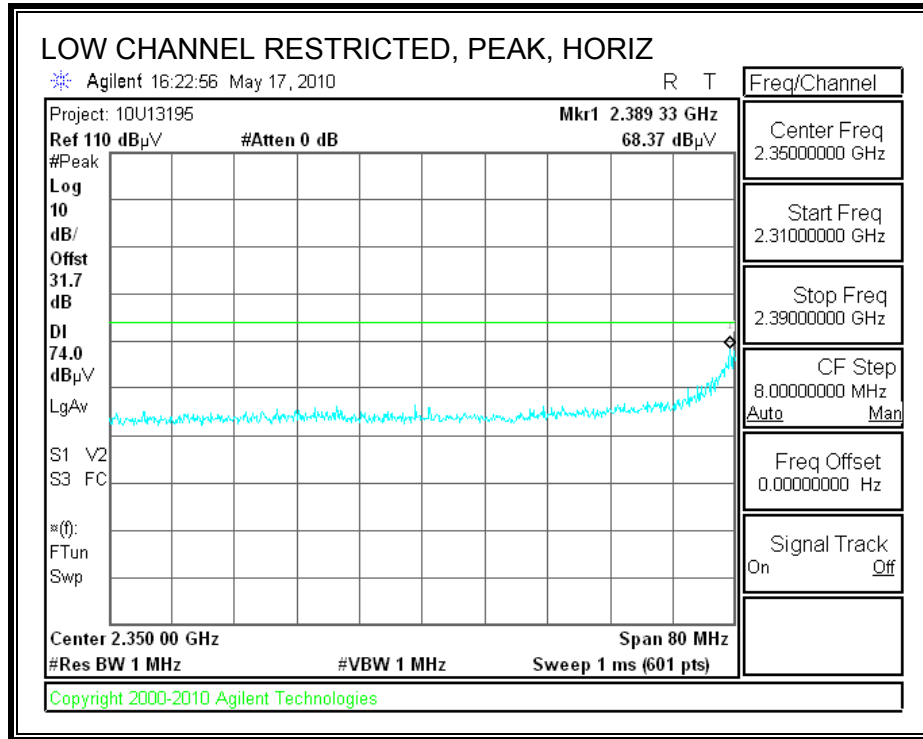
Rev. 4.1.2.7

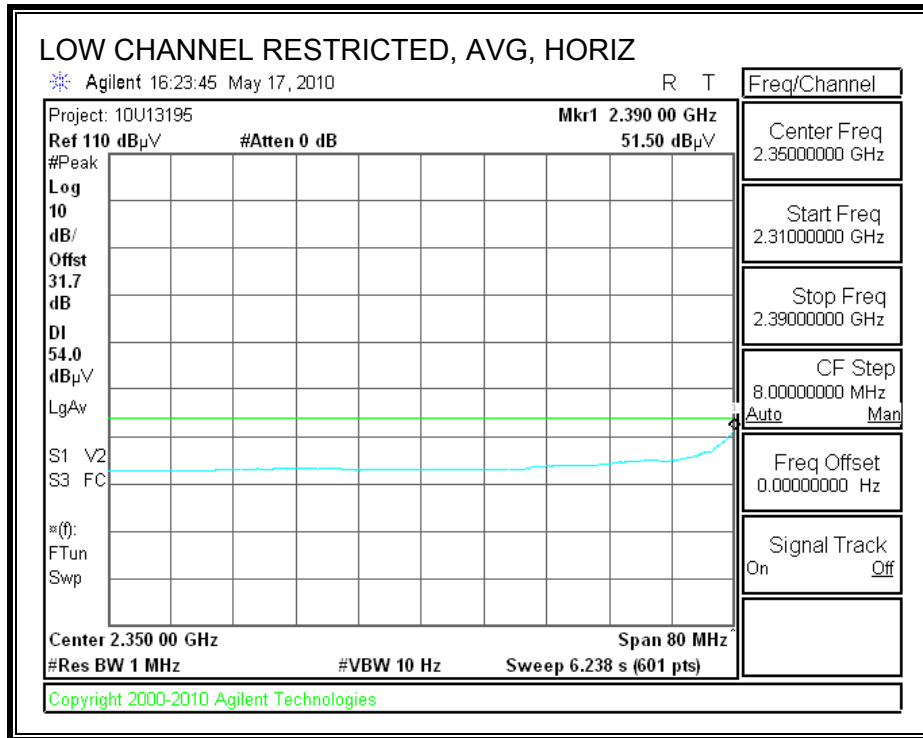
Note: No other emissions were detected above the system noise floor.

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

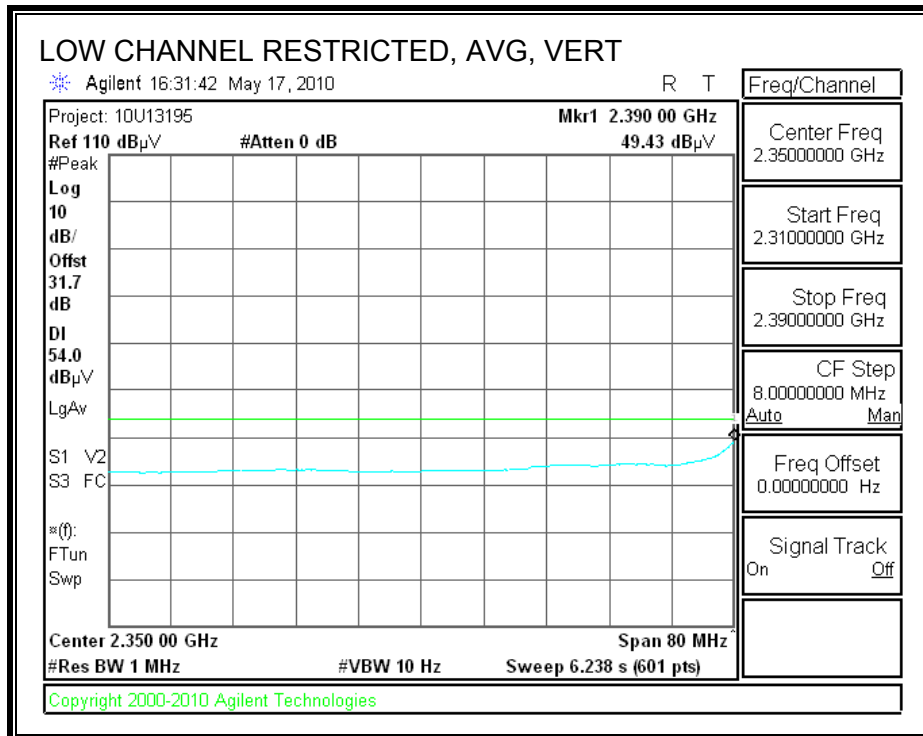
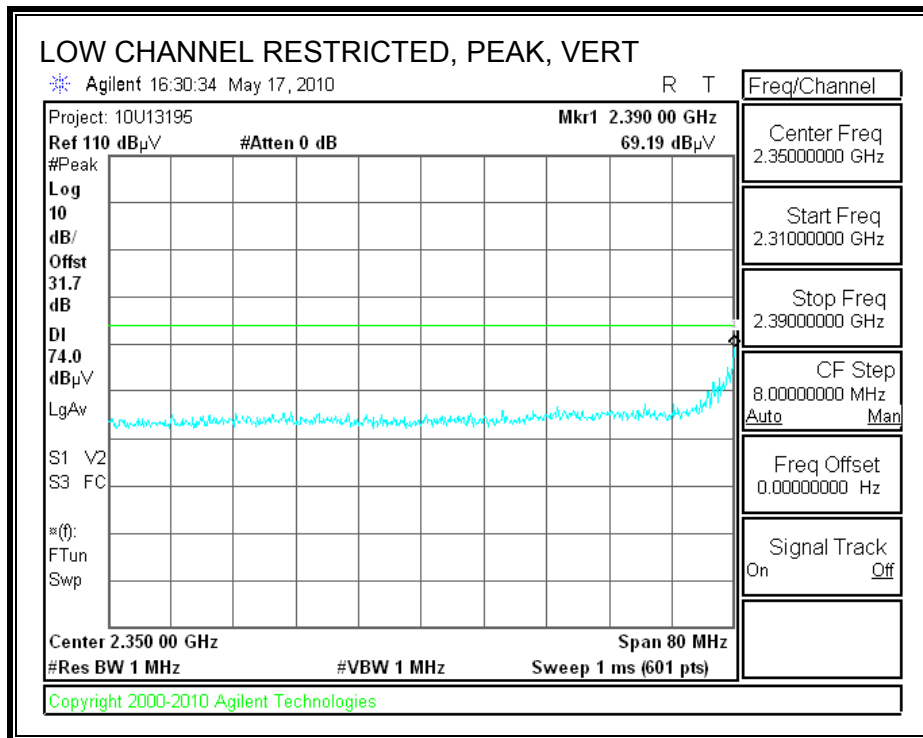
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

CH1



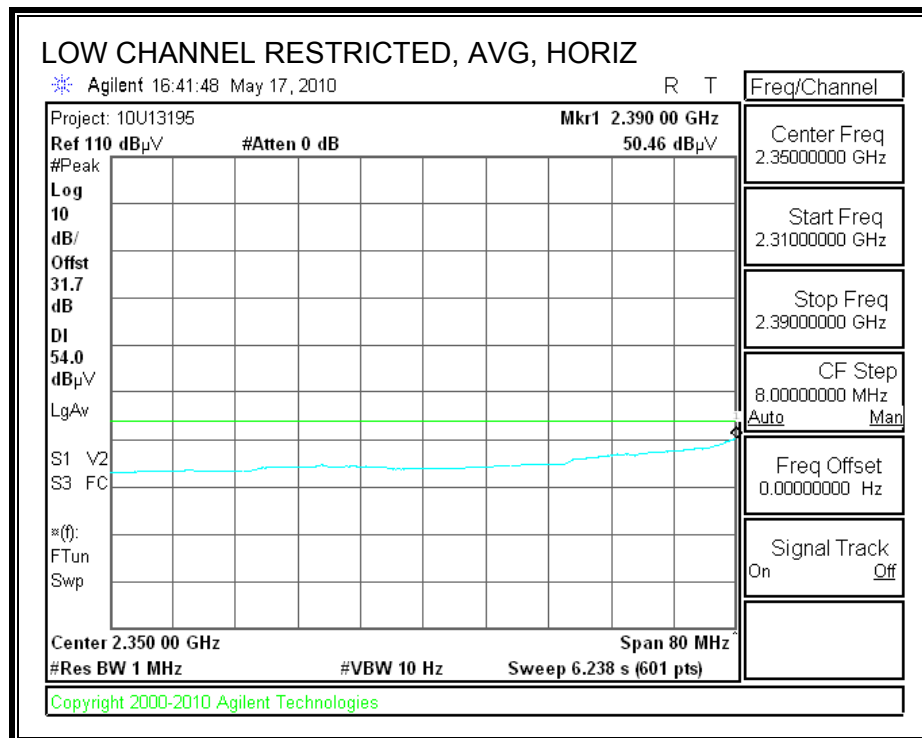
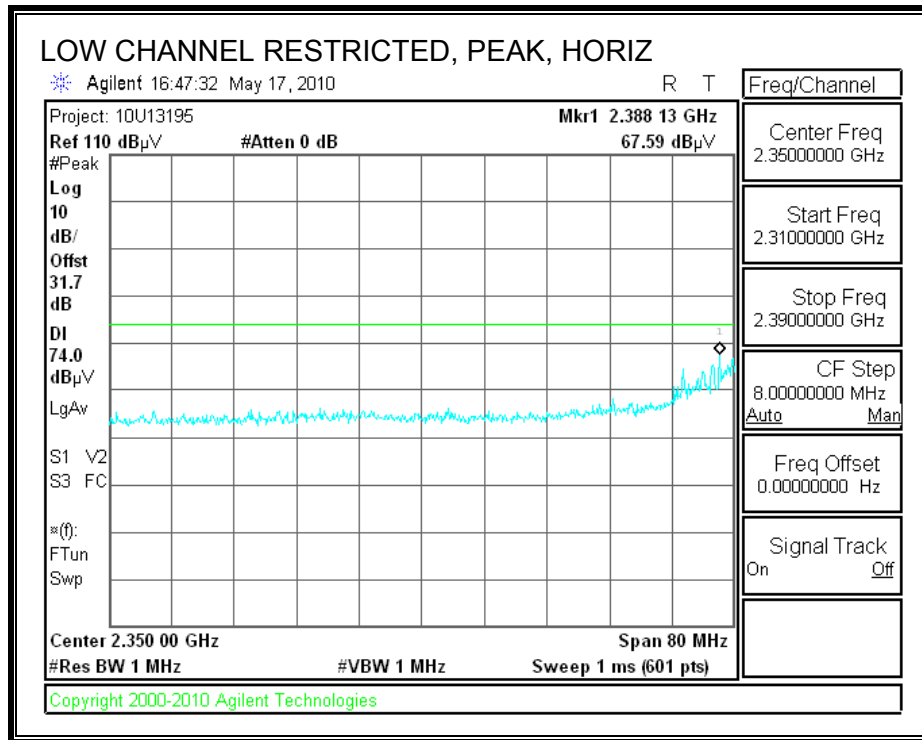


RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

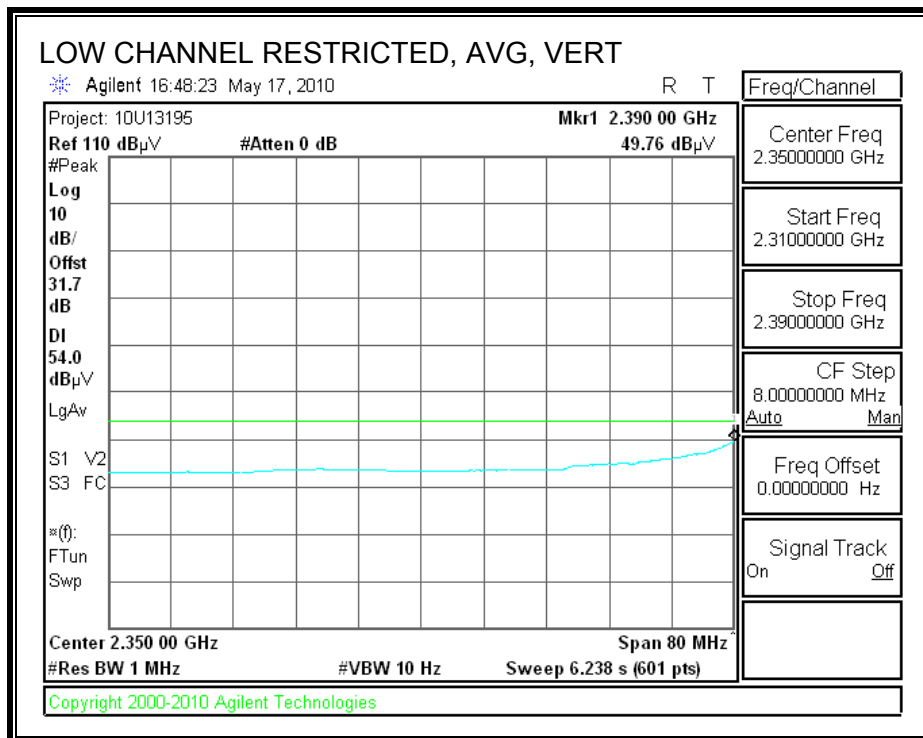
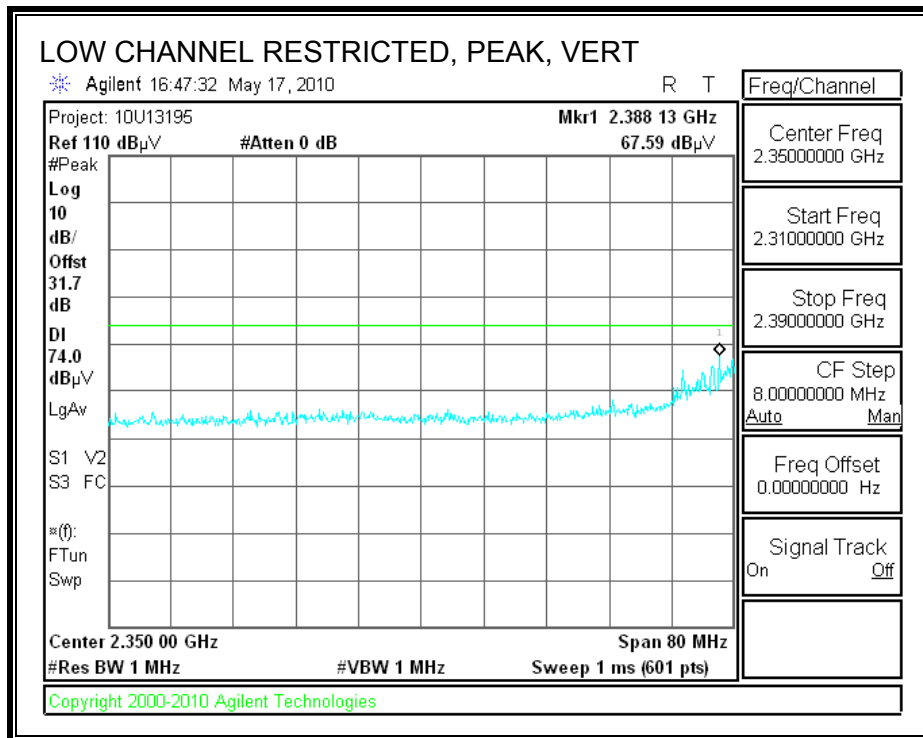


RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

CH2

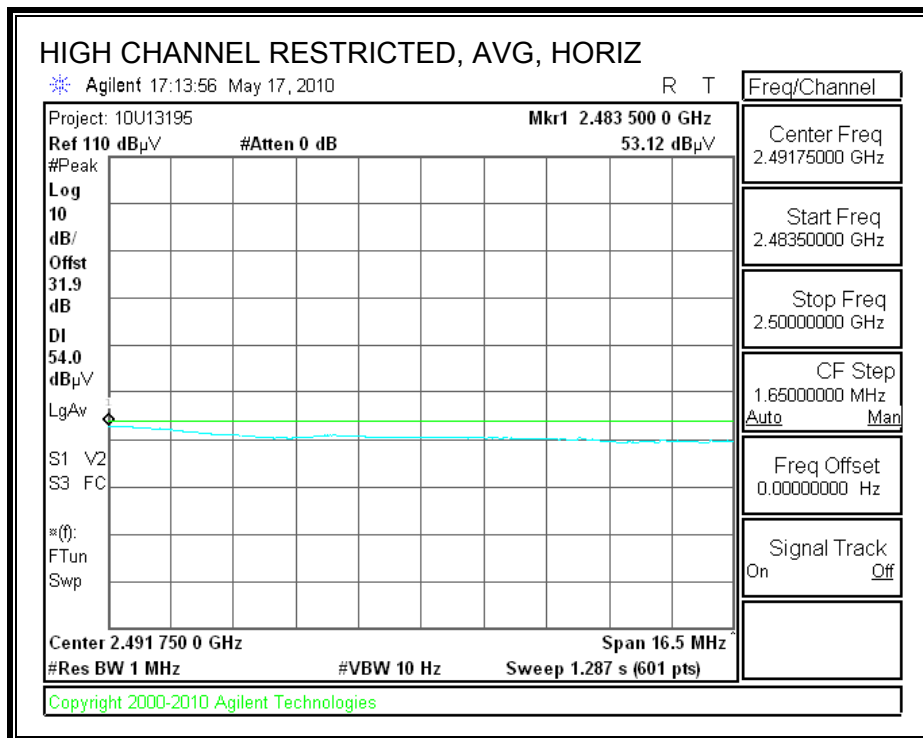
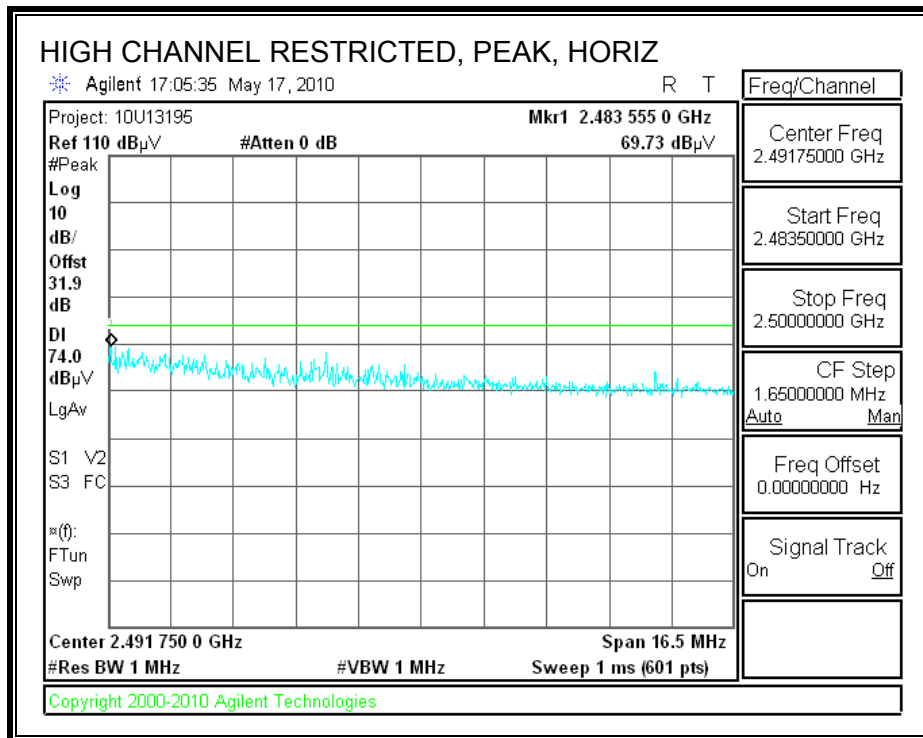


RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

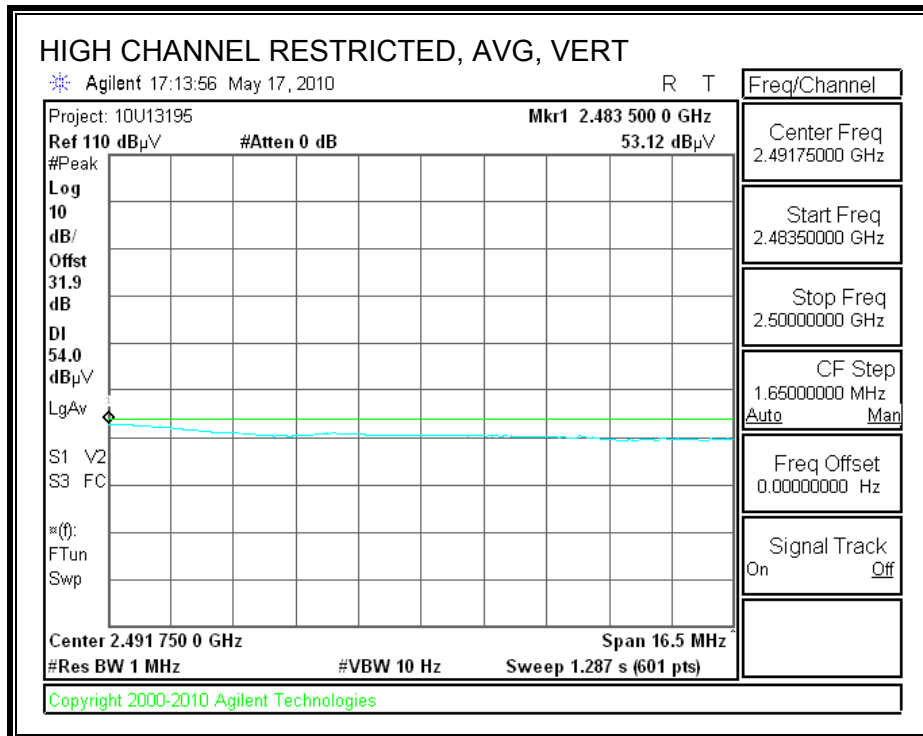
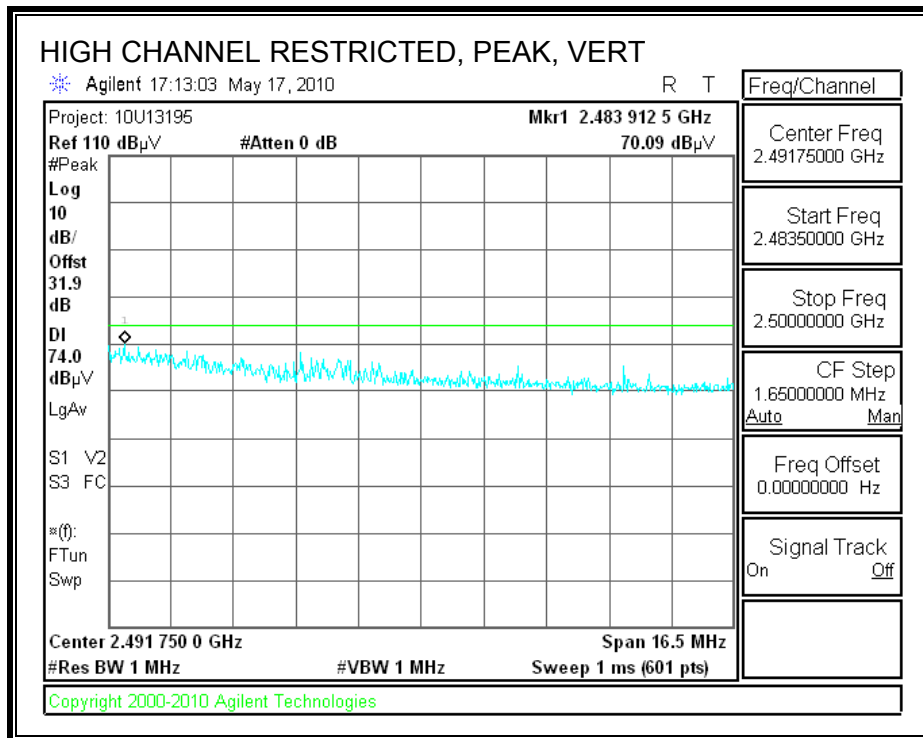


RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

CH10

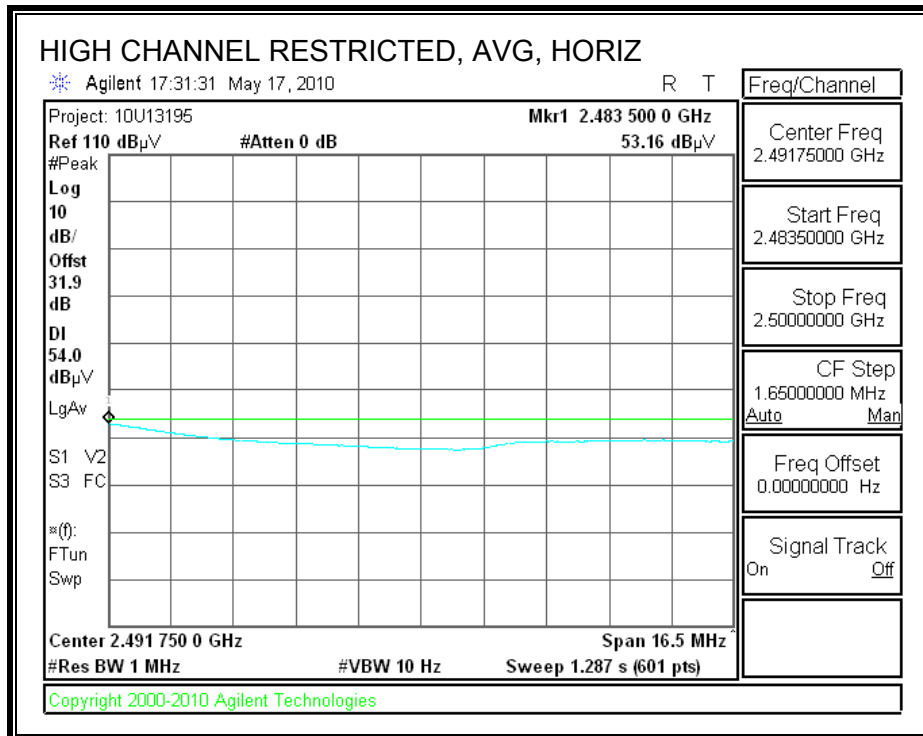
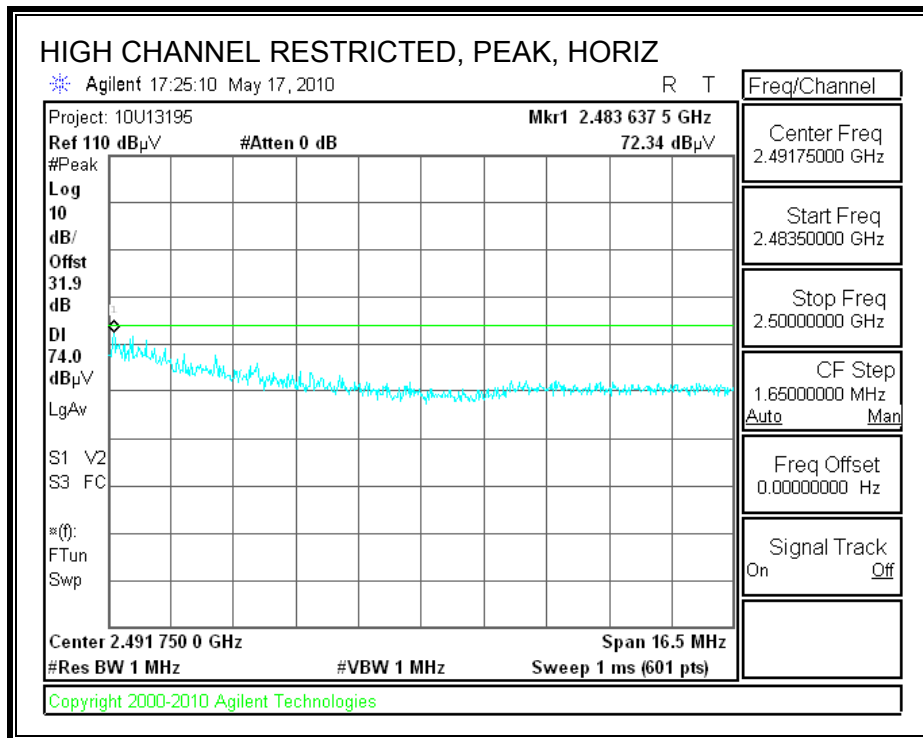


RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

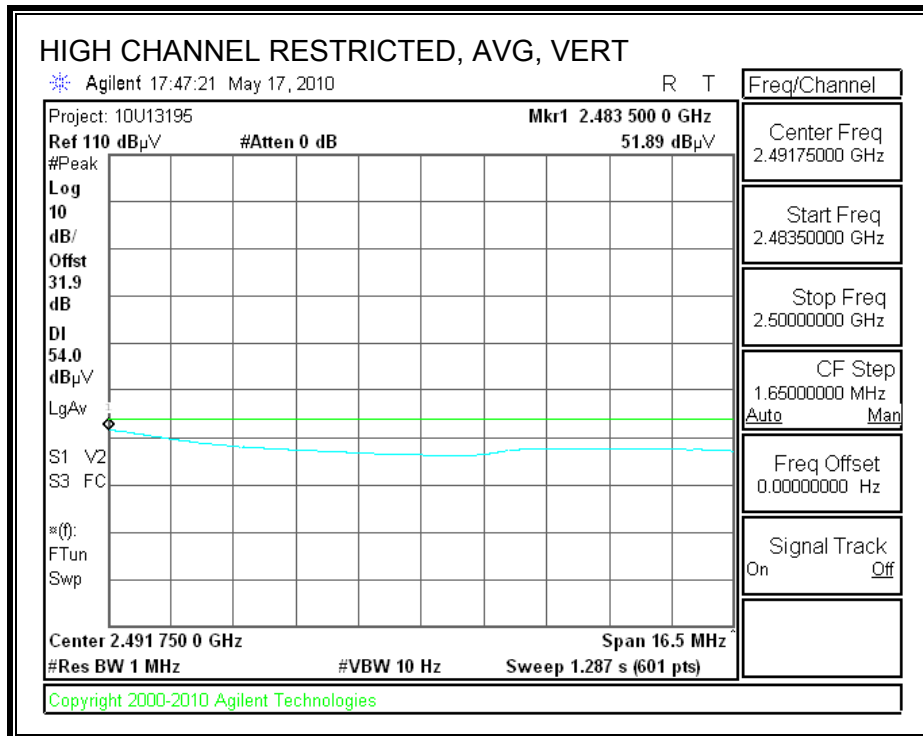
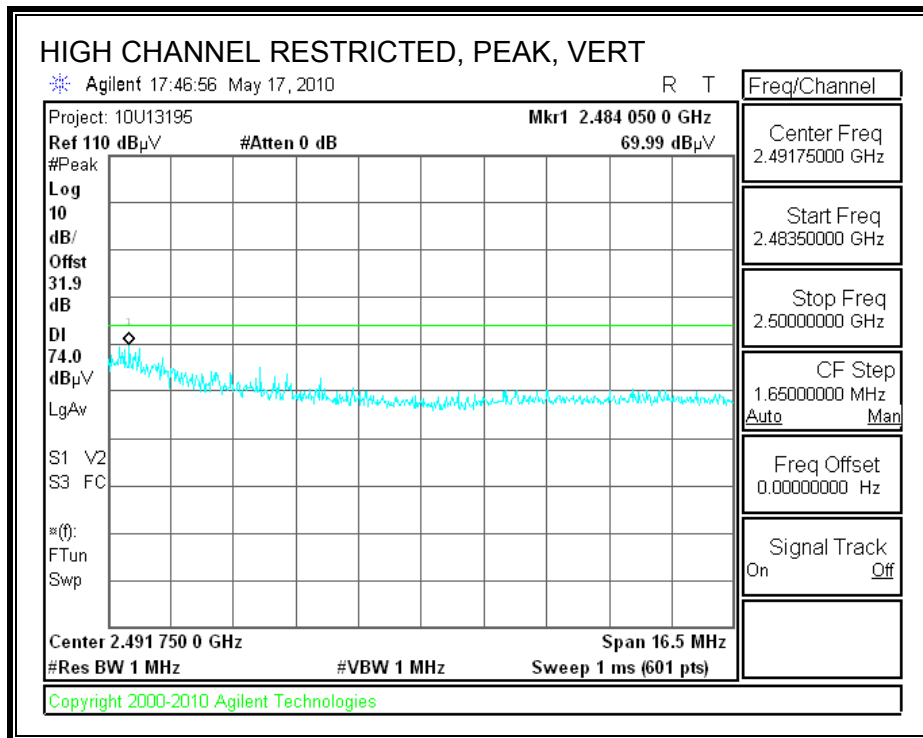


RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

CH11



RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



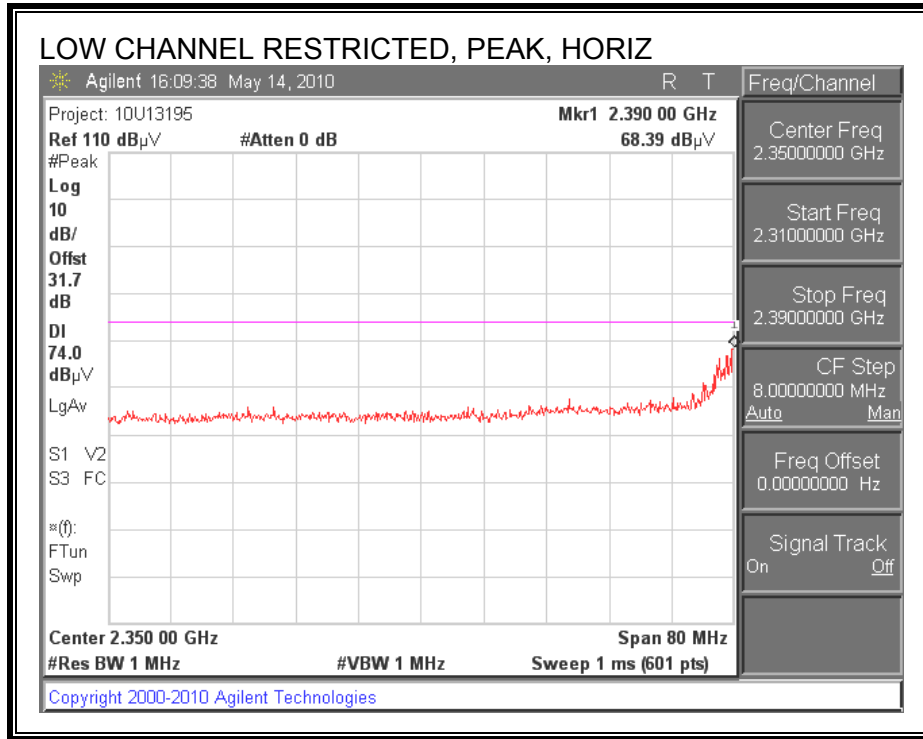
HARMONICS AND SPURIOUS EMISSIONS

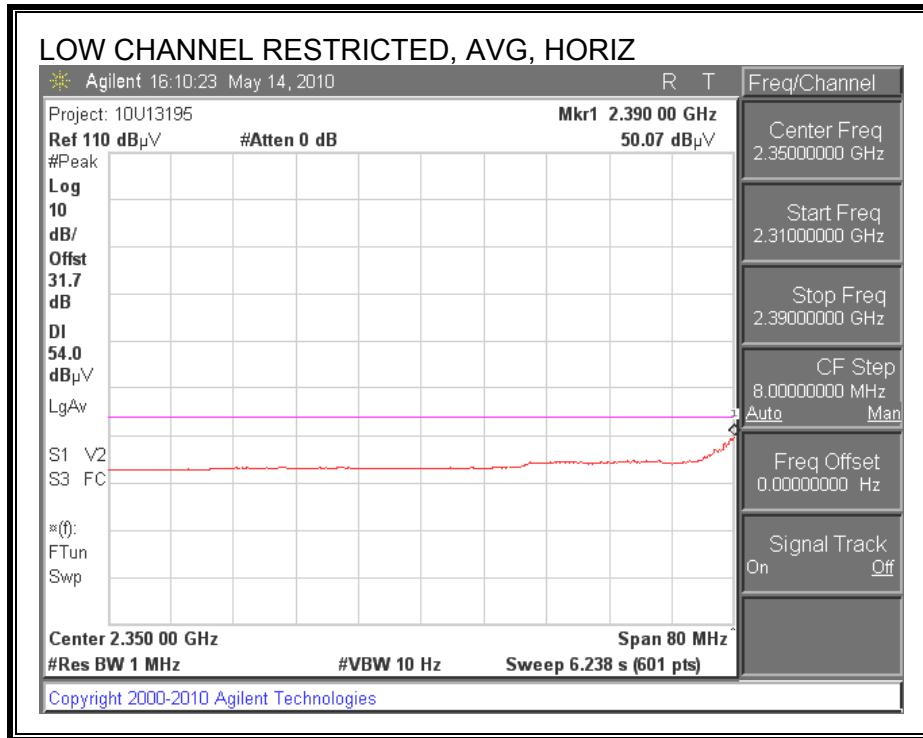
High Frequency Measurement													
Compliance Certification Services, Fremont 5m Chamber													
Test Engr:		Tom Chen											
Date:		05/18/10											
Project #:		10U13195											
Company:		2-Wire Inc.,											
EUT Description:		Wifi AP, 5011NV, 5012NV, (19101A000025)											
EUT M/N:		EUT with laptop PC											
Test Target:		FCC 15.247											
Mode Oper:		Continuously TX, g 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	Filtr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
2412 MHz g mode													
4.824	3.0	39.5	32.8	5.8	-34.8	0.0	0.0	43.2	74.0	-30.8	H	P	
4.824	3.0	28.2	32.8	5.8	-34.8	0.0	0.0	31.9	54.0	-22.1	H	A	
7.236	3.0	36.8	35.1	7.2	-34.7	0.0	0.0	44.4	74.0	-29.6	H	P	
7.236	3.0	24.8	35.1	7.2	-34.7	0.0	0.0	32.5	54.0	-21.5	H	A	
4.824	3.0	38.4	32.8	5.8	-34.8	0.0	0.0	42.1	74.0	-31.9	V	P	
4.824	3.0	26.9	32.8	5.8	-34.8	0.0	0.0	30.6	54.0	-23.4	V	A	
7.236	3.0	37.4	35.1	7.2	-34.7	0.0	0.0	45.1	74.0	-28.9	V	P	
7.236	3.0	24.8	35.1	7.2	-34.7	0.0	0.0	32.4	54.0	-21.6	V	A	
2437 MHz g mode													
4.874	3.0	38.3	32.8	5.8	-34.9	0.0	0.0	42.0	74.0	-32.0	H	P	
4.874	3.0	26.7	32.8	5.8	-34.9	0.0	0.0	30.4	54.0	-23.6	H	A	
7.311	3.0	37.3	35.2	7.3	-34.7	0.0	0.0	45.1	74.0	-28.9	H	P	
7.311	3.0	25.0	35.2	7.3	-34.7	0.0	0.0	32.8	54.0	-21.2	H	A	
4.874	3.0	40.1	32.8	5.8	-34.9	0.0	0.0	43.9	74.0	-30.1	V	P	
4.874	3.0	27.7	32.8	5.8	-34.9	0.0	0.0	31.5	54.0	-22.5	V	A	
7.311	3.0	37.3	35.2	7.3	-34.7	0.0	0.0	45.1	74.0	-28.9	V	P	
7.311	3.0	25.0	35.2	7.3	-34.7	0.0	0.0	32.8	54.0	-21.2	V	A	
2462MHz g mode													
4.924	3.0	39.6	32.8	5.9	-34.6	0.0	0.0	43.7	74.0	-30.3	H	P	
4.924	3.0	27.3	32.8	5.9	-34.6	0.0	0.0	31.4	54.0	-22.6	H	A	
7.386	3.0	38.8	35.3	7.3	-34.6	0.0	0.0	46.8	74.0	-27.2	H	P	
7.386	3.0	26.8	35.3	7.3	-34.6	0.0	0.0	34.8	54.0	-19.2	H	A	
4.924	3.0	38.7	32.8	5.9	-34.6	0.0	0.0	42.8	74.0	-31.2	V	P	
4.924	3.0	27.2	32.8	5.9	-34.6	0.0	0.0	31.3	54.0	-22.7	V	A	
7.386	3.0	38.1	35.3	7.3	-34.6	0.0	0.0	46.1	74.0	-27.9	V	P	
7.386	3.0	25.2	35.3	7.3	-34.6	0.0	0.0	33.2	54.0	-20.8	V	A	
Rev. 4.1.2.7													
Note: No other emissions were detected above the system noise floor.													

8.2.3. TX ABOVE 1 GHz 802.11n HT20 (1 STREAM IN 2.4 GHz BAND)

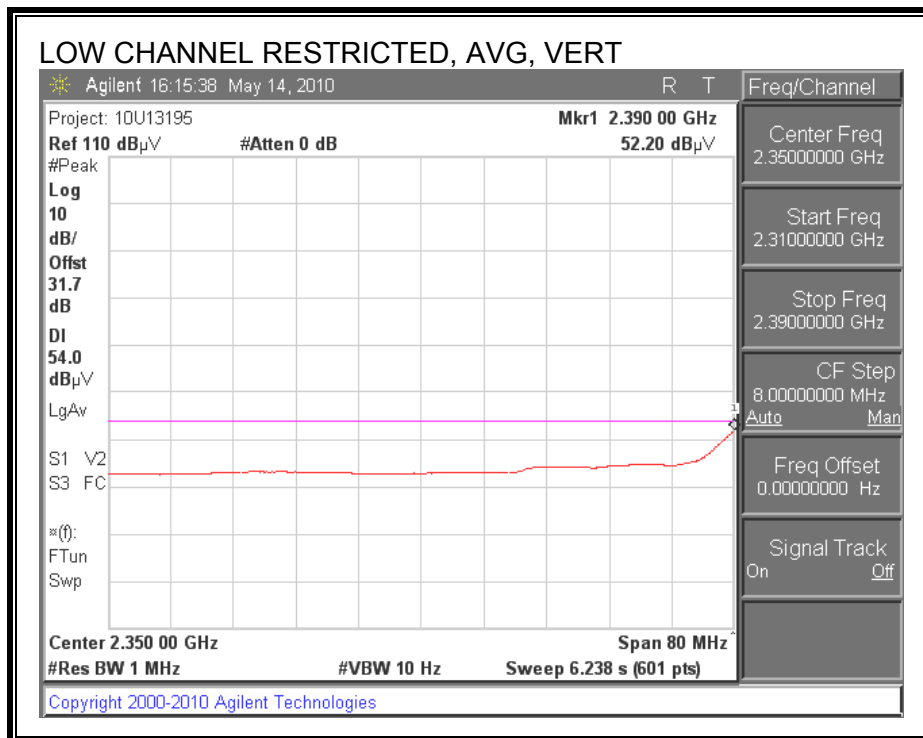
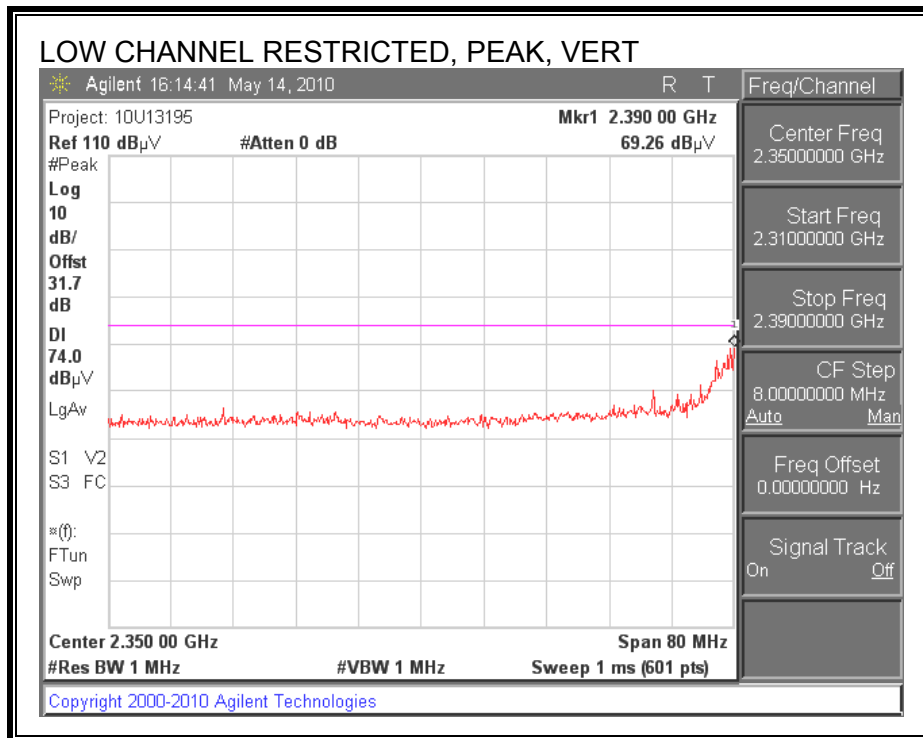
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

CH 1



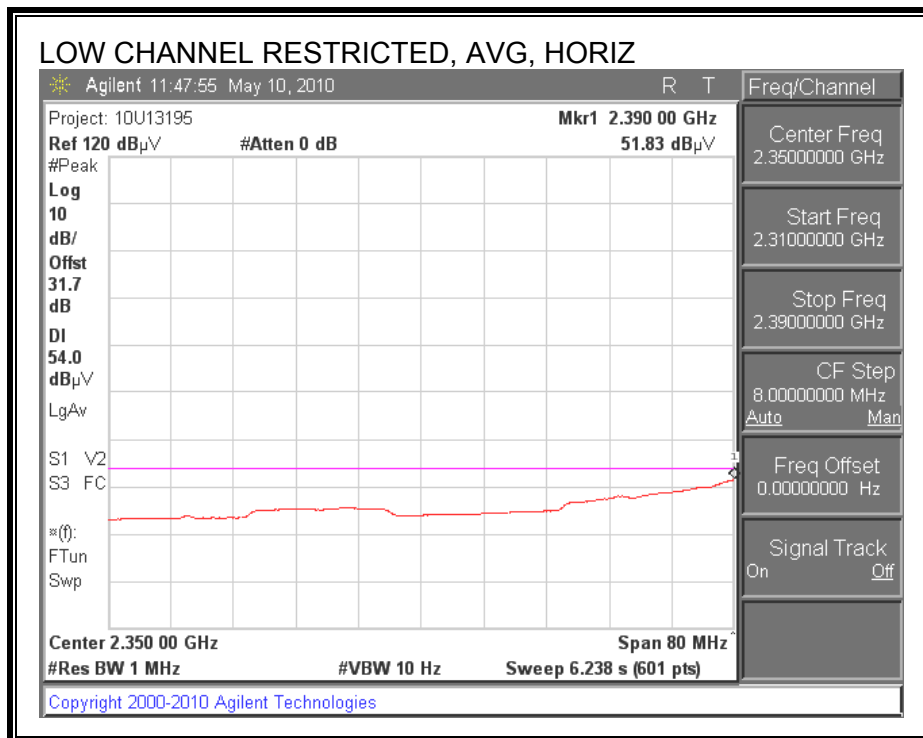
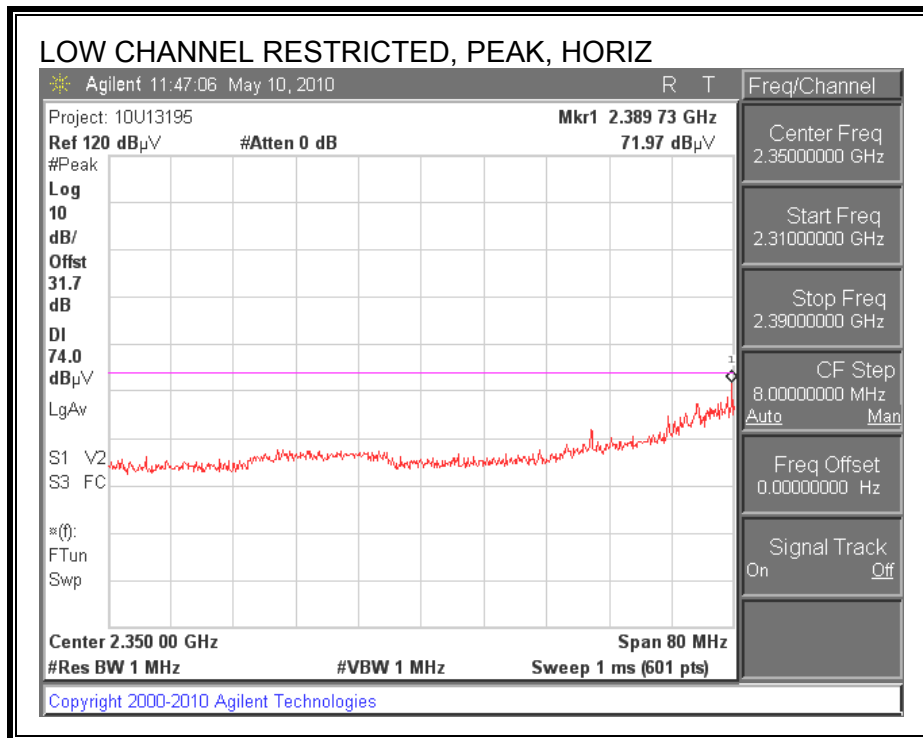


RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

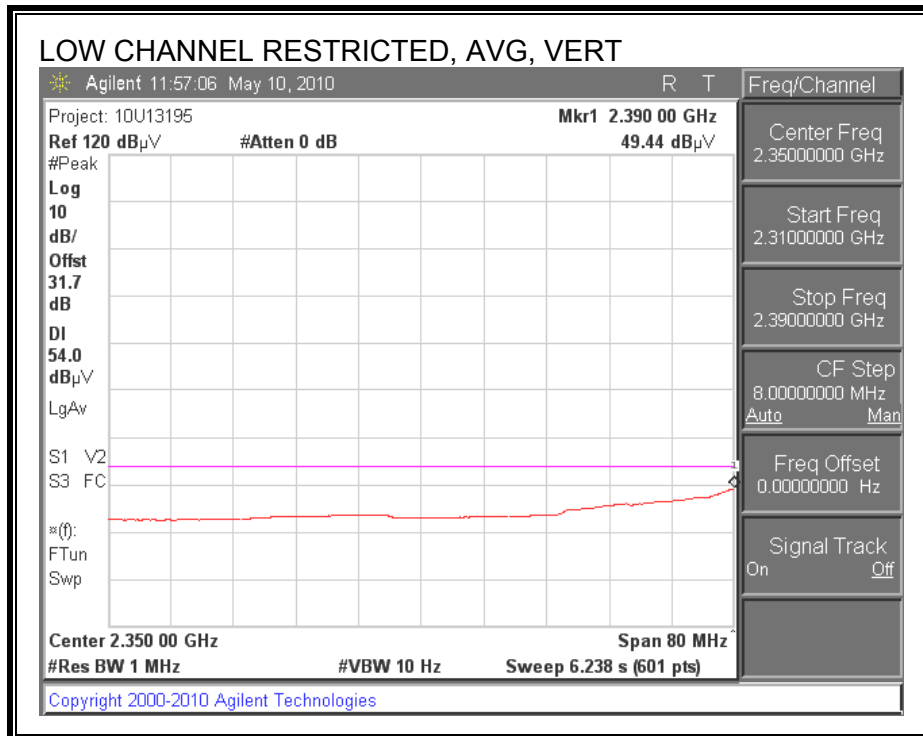
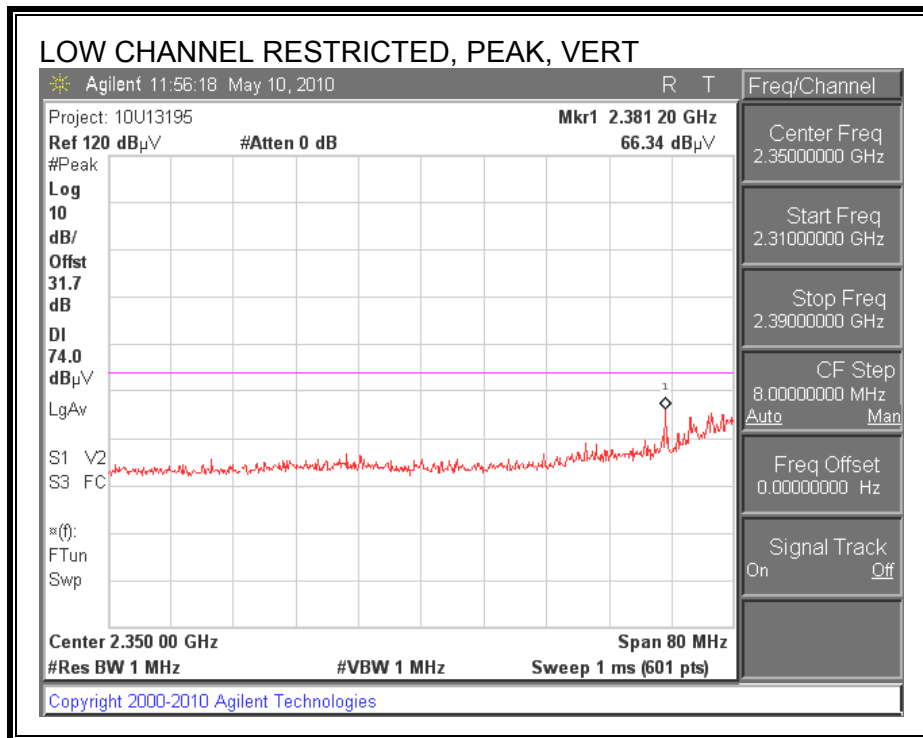


RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

CH 2

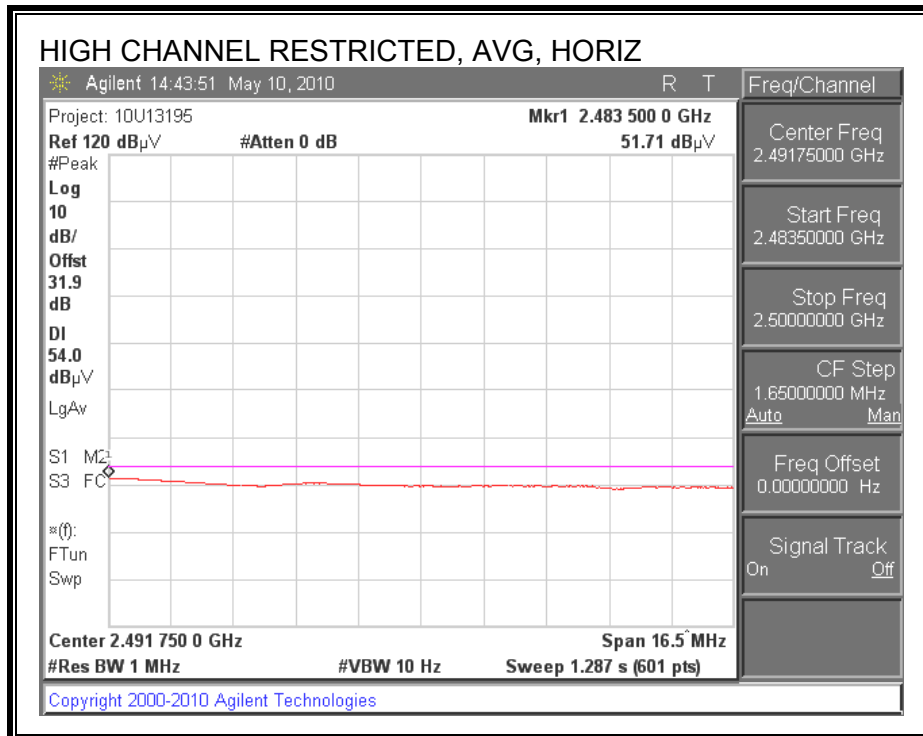
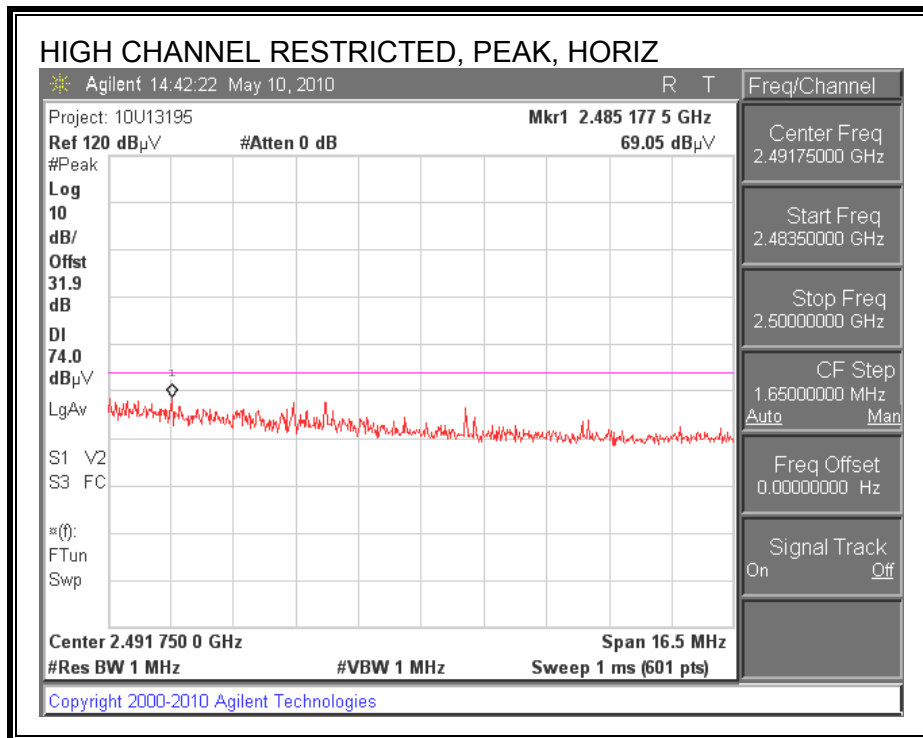


RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

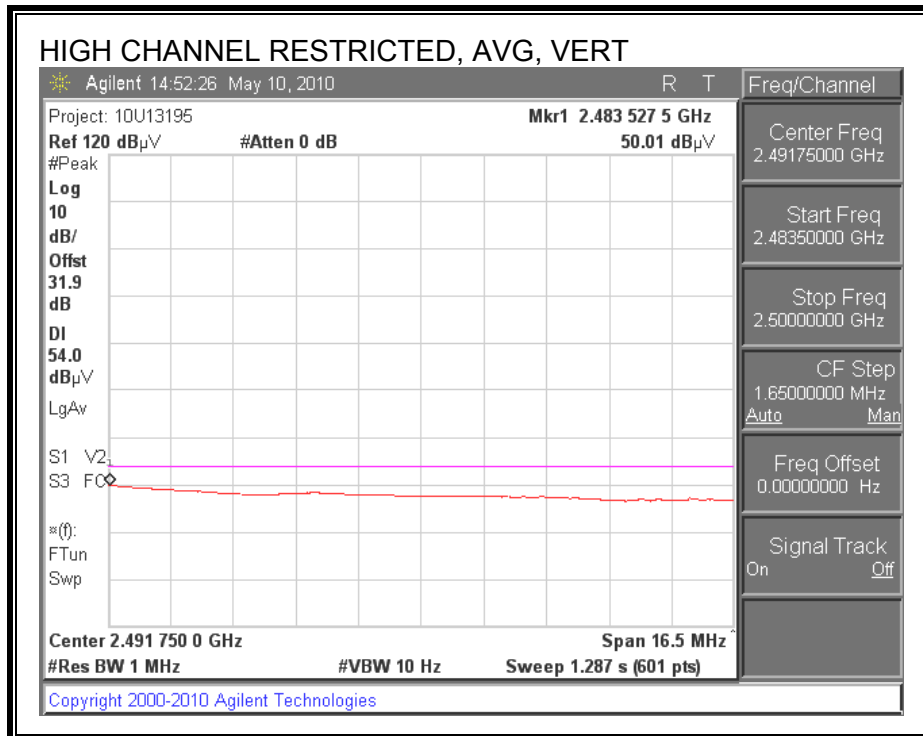
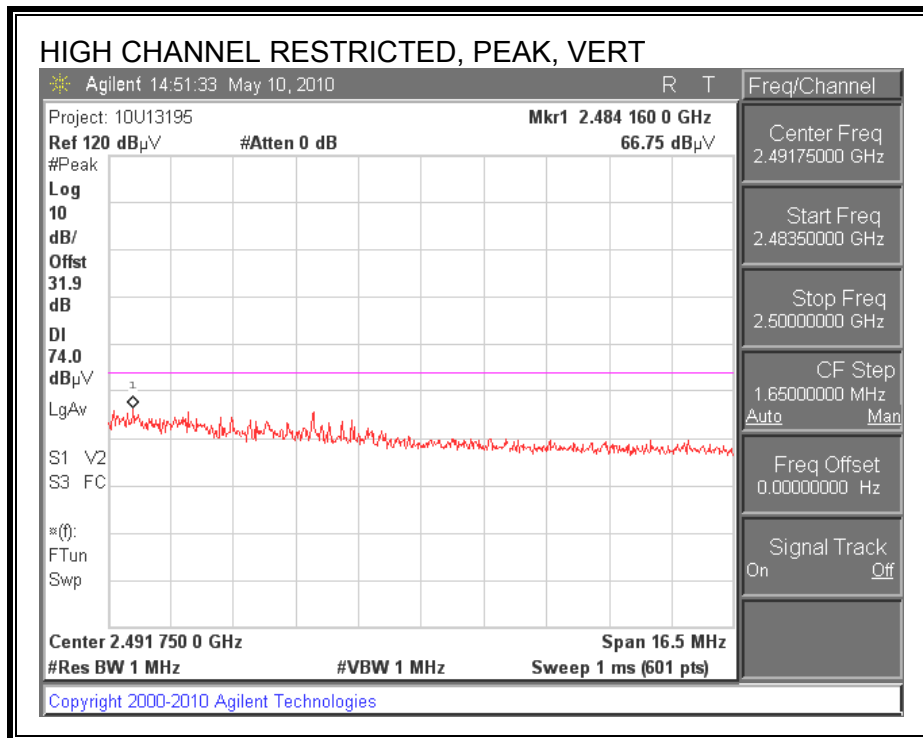


RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

CH 10

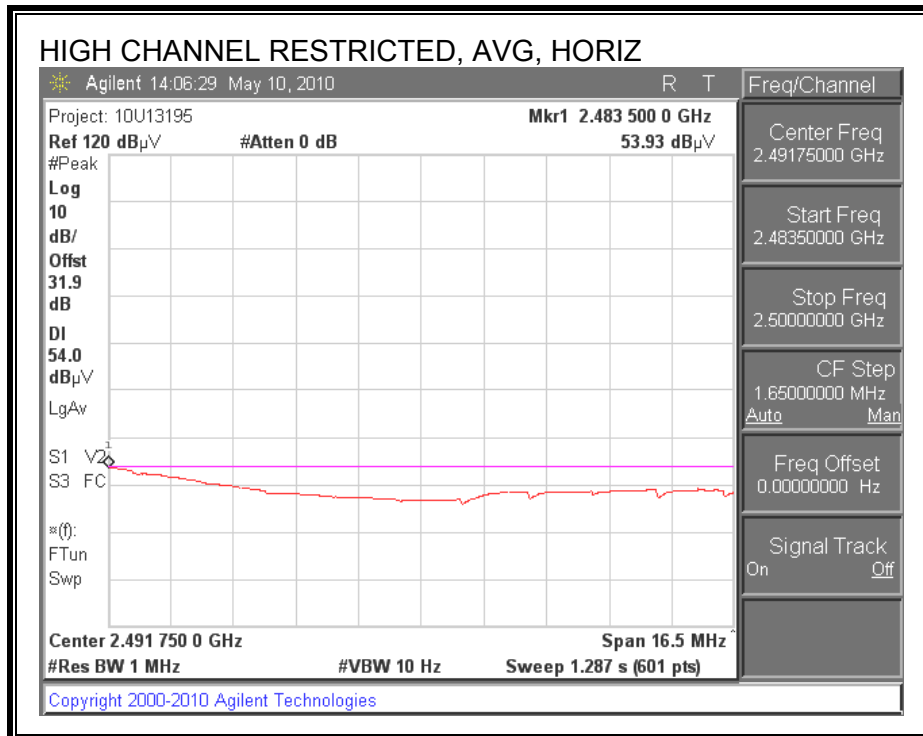
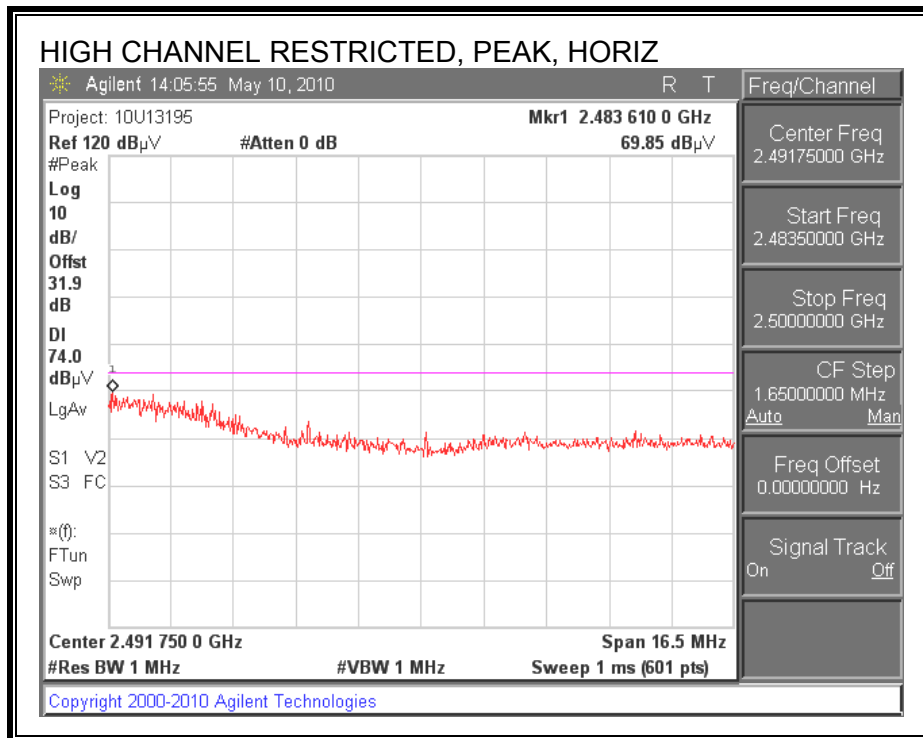


RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

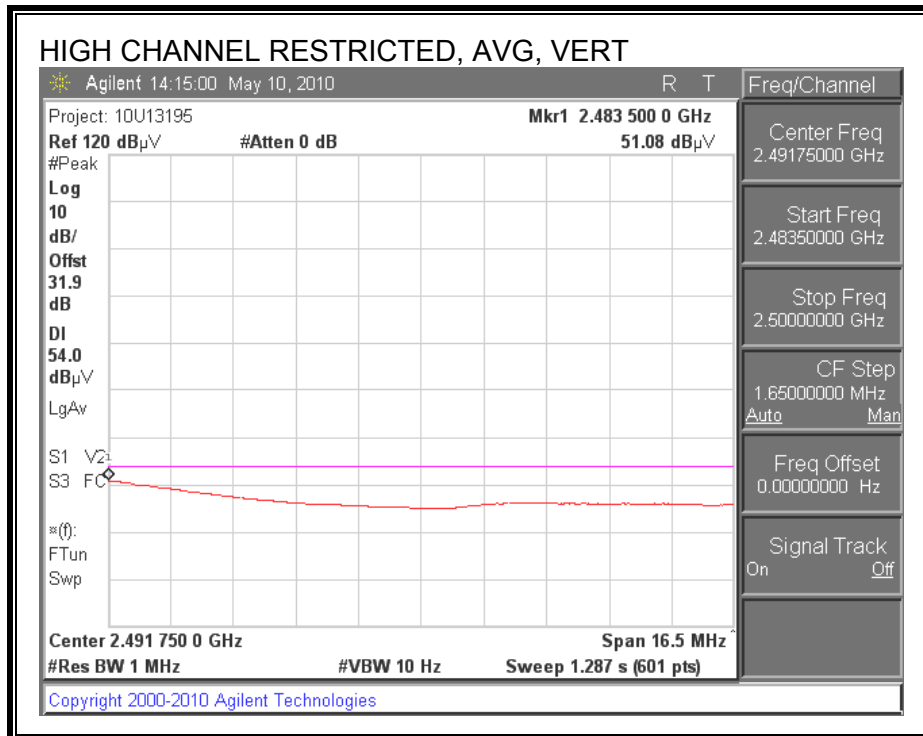
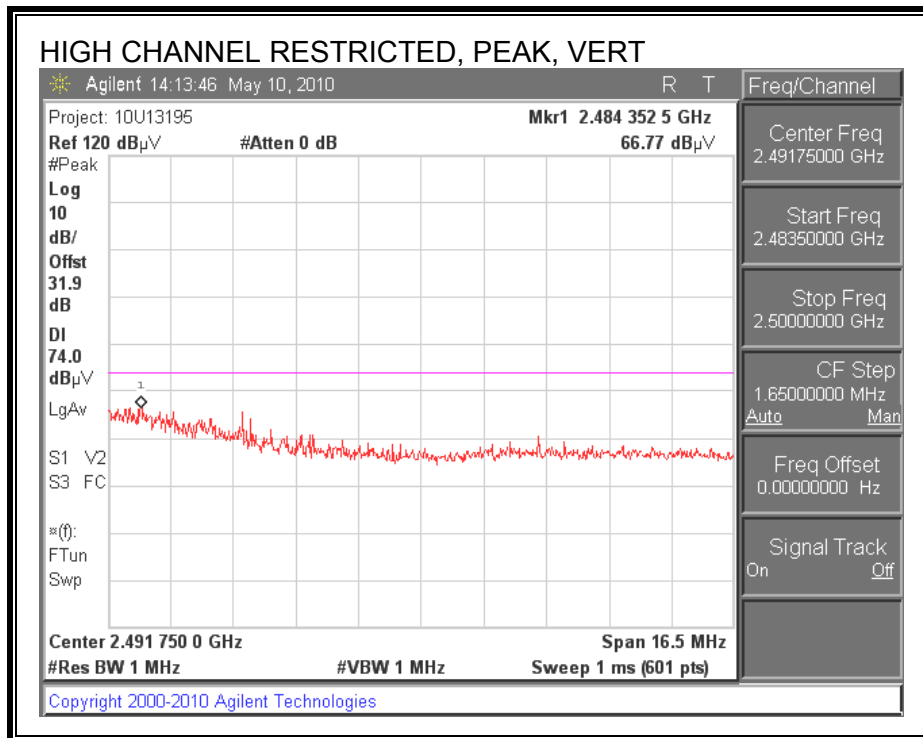


RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

CH 11



RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



HARMONICS AND SPURIOUS EMISSIONS

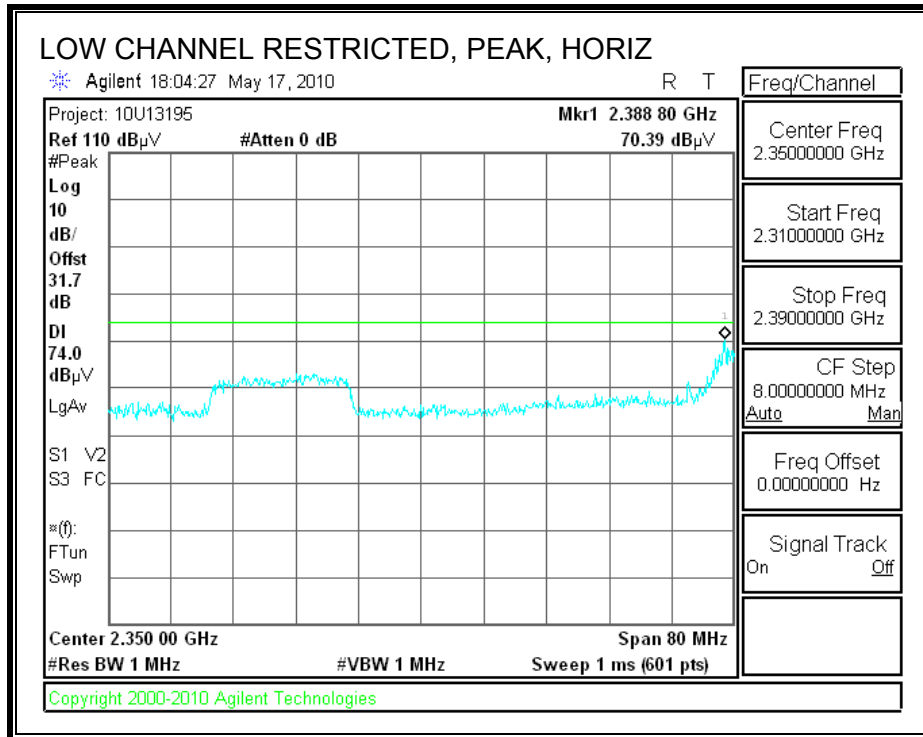
High Frequency Measurement													
Compliance Certification Services, Fremont 5m Chamber													
Test Engr:		Tom Chen											
Date:		05/19/10											
Project #:		10U13195											
Company:		2-Wire Inc.,											
EUT Description:		Wifi AP, 5011NV, 5012NV, (19101A000025)											
EUT M/N:		EUT with laptop PC											
Test Target:		FCC 15.247											
Mode Oper:		Continuously TX, MCS0 HT20 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	Filtr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
2412MHz MCS0 HT20 mode 1 stream													
4.824	3.0	38.8	32.8	5.8	-34.8	0.0	0.0	42.6	74.0	-31.5	H	P	
4.824	3.0	26.9	32.8	5.8	-34.8	0.0	0.0	30.6	54.0	-23.4	H	A	
7.236	3.0	38.1	35.1	7.2	-34.7	0.0	0.0	45.7	74.0	-28.3	H	P	
7.236	3.0	24.9	35.1	7.2	-34.7	0.0	0.0	32.6	54.0	-21.4	H	A	
4.824	3.0	38.7	32.8	5.8	-34.8	0.0	0.0	42.5	74.0	-31.5	V	P	
4.824	3.0	27.4	32.8	5.8	-34.8	0.0	0.0	31.1	54.0	-22.9	V	A	
7.236	3.0	37.9	35.1	7.2	-34.7	0.0	0.0	45.6	74.0	-28.4	V	P	
7.236	3.0	24.9	35.1	7.2	-34.7	0.0	0.0	32.6	54.0	-21.4	V	A	
2437 MHz MCS0HT20 mode 1 stream													
4.874	3.0	39.4	32.8	5.8	-34.9	0.0	0.0	43.2	74.0	-30.8	H	P	
4.874	3.0	27.6	32.8	5.8	-34.9	0.0	0.0	31.4	54.0	-22.6	H	A	
7.311	3.0	36.5	35.2	7.3	-34.7	0.0	0.0	44.3	74.0	-29.7	H	P	
7.311	3.0	24.7	35.2	7.3	-34.7	0.0	0.0	32.5	54.0	-21.5	H	A	
4.874	3.0	38.7	32.8	5.8	-34.9	0.0	0.0	42.5	74.0	-31.5	V	P	
4.874	3.0	27.2	32.8	5.8	-34.9	0.0	0.0	31.0	54.0	-23.0	V	A	
7.311	3.0	36.7	35.2	7.3	-34.7	0.0	0.0	44.5	74.0	-29.5	V	P	
7.311	3.0	24.3	35.2	7.3	-34.7	0.0	0.0	32.1	54.0	-21.9	V	A	
2462 MHz MCS0 HT20 mode 1 stream													
4.924	3.0	36.8	32.8	5.9	-34.9	0.0	0.0	40.7	74.0	-33.3	H	P	
4.924	3.0	25.1	32.8	5.9	-34.9	0.0	0.0	28.9	54.0	-25.1	H	A	
7.386	3.0	35.6	35.3	7.3	-34.6	0.0	0.0	43.6	74.0	-30.4	H	P	
7.386	3.0	23.6	35.3	7.3	-34.6	0.0	0.0	31.5	54.0	-22.5	H	A	
4.924	3.0	37.0	32.8	5.9	-34.9	0.0	0.0	40.9	74.0	-33.1	V	P	
4.924	3.0	24.4	32.8	5.9	-34.9	0.0	0.0	28.2	54.0	-25.8	V	A	
7.386	3.0	35.6	35.3	7.3	-34.6	0.0	0.0	43.5	74.0	-30.5	V	P	
7.386	3.0	23.6	35.3	7.3	-34.6	0.0	0.0	31.6	54.0	-22.4	V	A	
Rev. 4.1.2.7													
Note: No other emissions were detected above the system noise floor.													

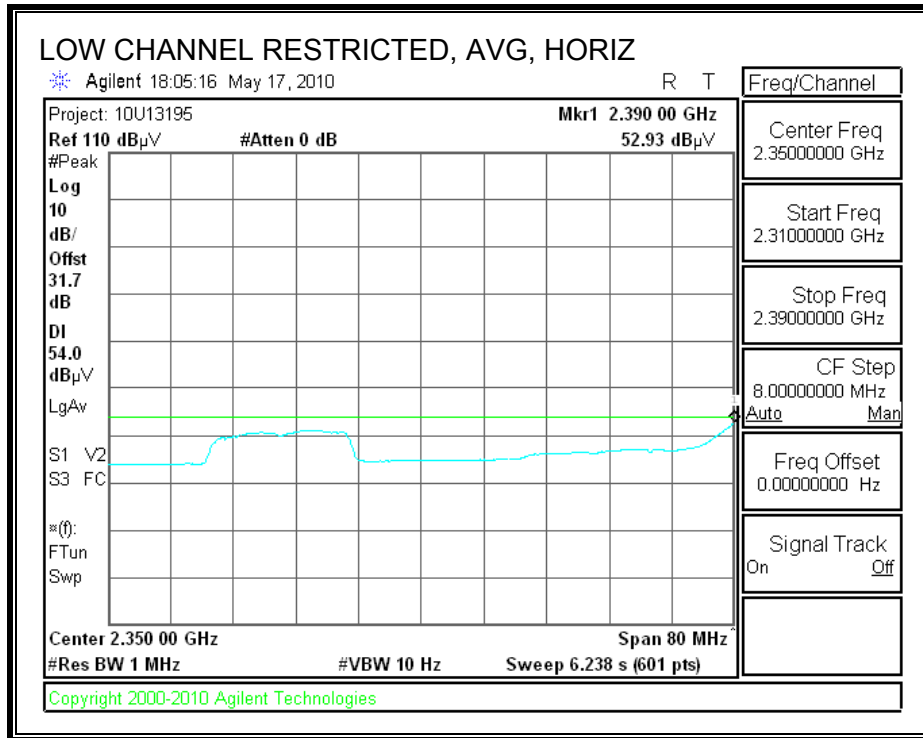
8.2.4. TX ABOVE 1 GHz 802.11n HT20 (2 STREAM IN 2.4 GHz BAND)

Note: channels 1 and 11 were tested at the power levels of channels 2 and 10 respectively, the power levels for CH2 and CH10 are higher than the power levels of CH1 and CH11; hence this is worst-case measurement.

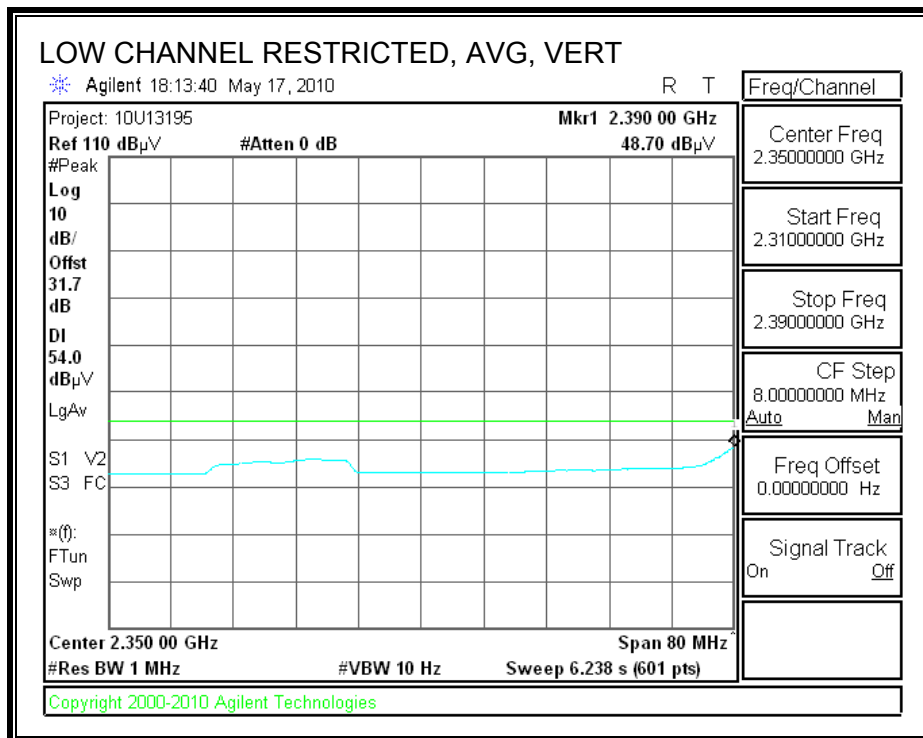
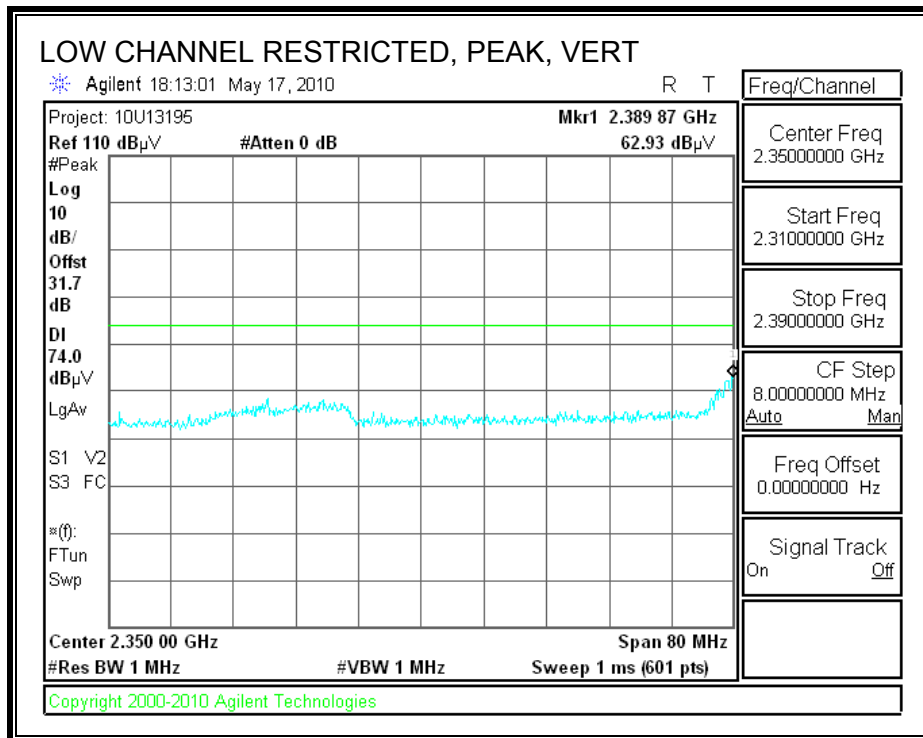
RESTRICTED BANEDGE (LOW CHANNEL, HORIZONTAL)

CH 1



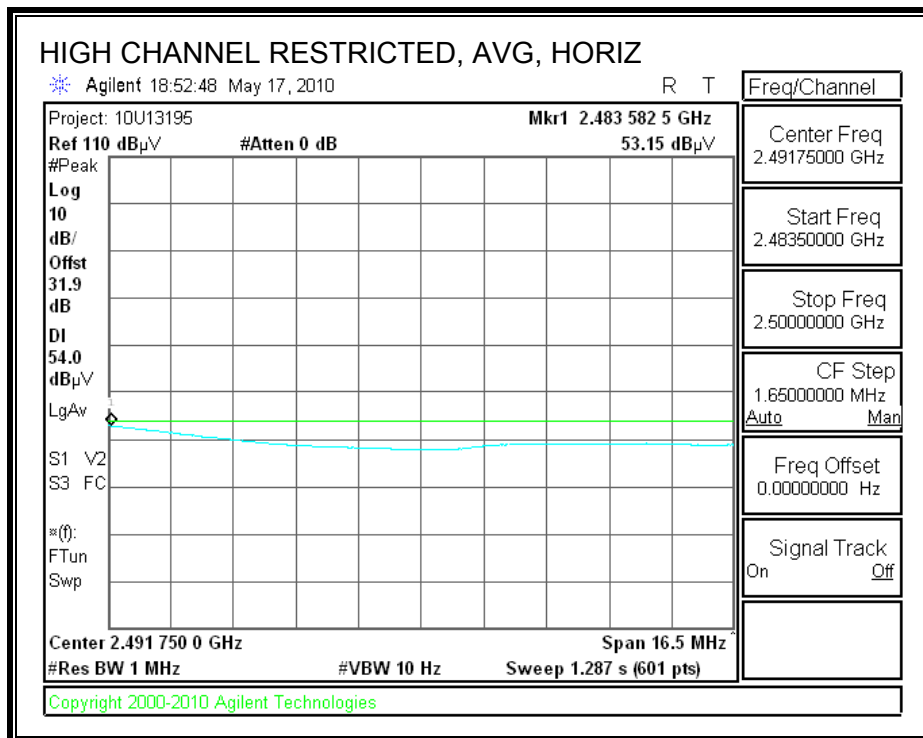
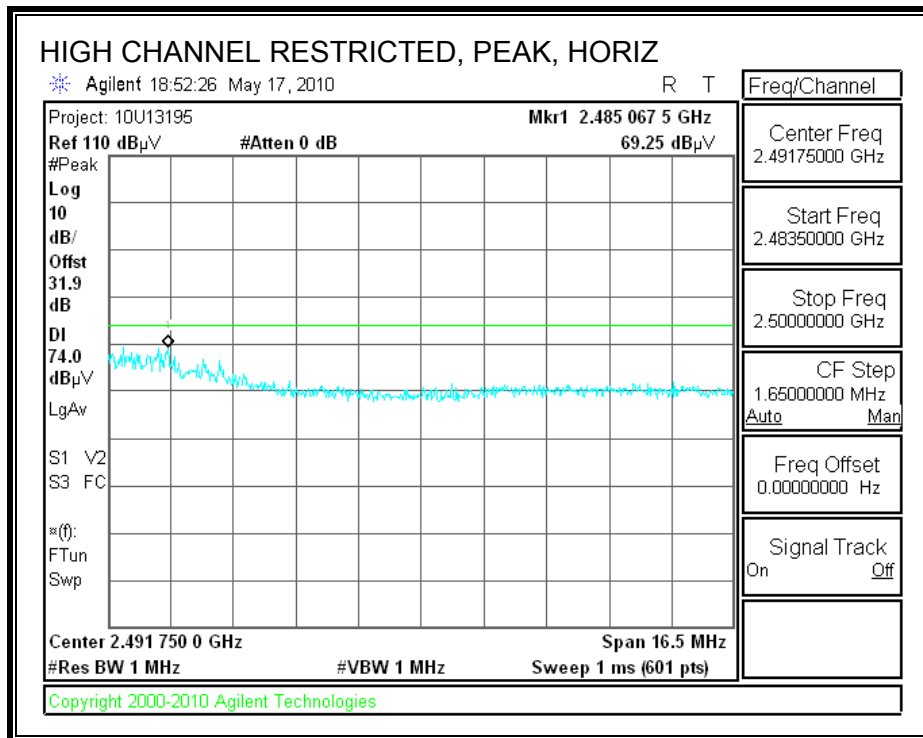


RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

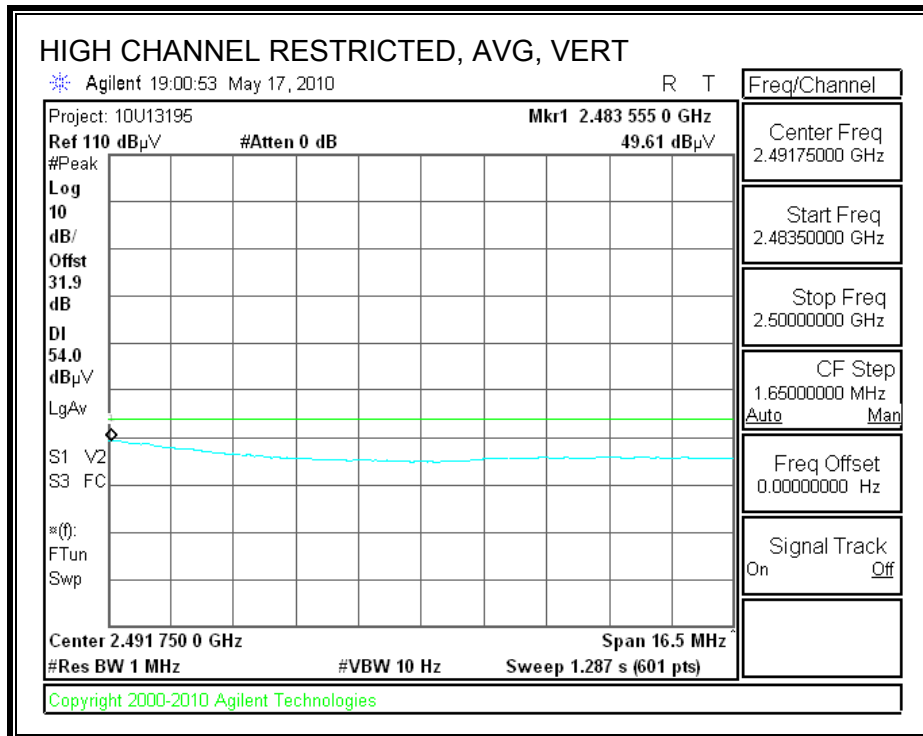
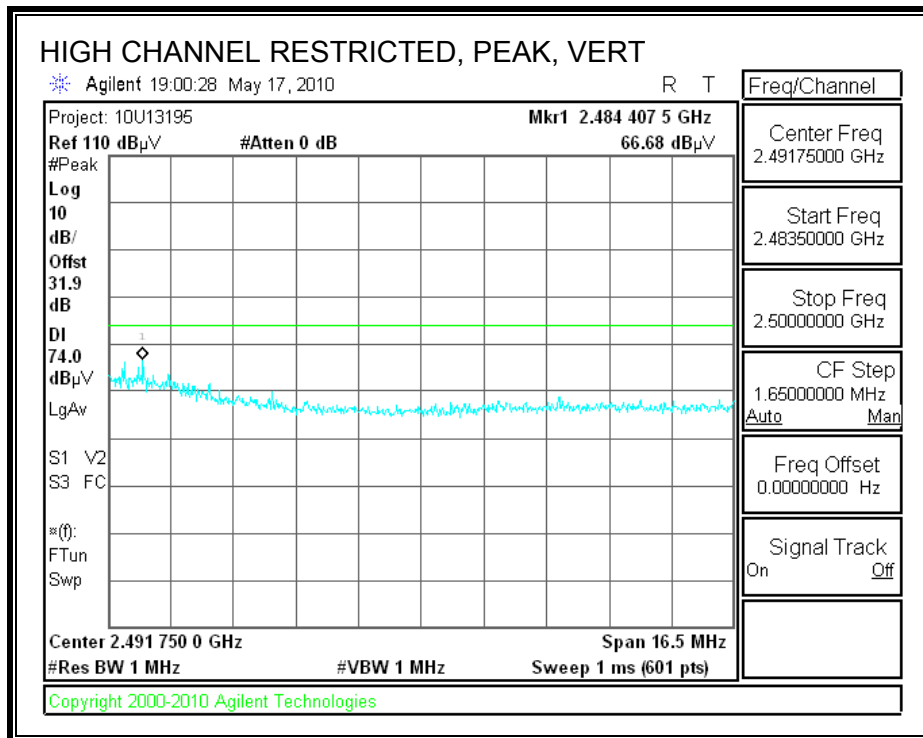


RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

CH 11



RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
 Compliance Certification Services, Fremont 5m Chamber

Test Engr: Tom Chen
 Date: 05/19/10
 Project #: 10U13195
 Company: 2-Wire Inc.,
 EUT Description: Wifi AP, 5011NV, 5012NV, (19101A000025)
 EUT M/N: EUT with laptop PC
 Test Target: FCC 15.247
 Mode Oper: Continuously TX, MCS8 HT20 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	Notes
2412MHz MCS8 HT20 mode 2 stream													
4.824	3.0	41.9	32.8	5.8	-34.8	0.0	0.0	45.6	74.0	-28.4	H	P	
4.824	3.0	29.6	32.8	5.8	-34.8	0.0	0.0	33.3	54.0	-20.7	H	A	
7.236	3.0	36.9	35.1	7.2	-34.7	0.0	0.0	44.6	74.0	-29.4	H	P	
7.236	3.0	24.8	35.1	7.2	-34.7	0.0	0.0	32.5	54.0	-21.5	H	A	
4.824	3.0	44.8	32.8	5.8	-34.8	0.0	0.0	48.5	74.0	-25.5	V	P	
4.824	3.0	32.1	32.8	5.8	-34.8	0.0	0.0	35.8	54.0	-18.2	V	A	
7.236	3.0	37.6	35.1	7.2	-34.7	0.0	0.0	45.3	74.0	-28.7	V	P	
7.236	3.0	24.8	35.1	7.2	-34.7	0.0	0.0	32.4	54.0	-21.6	V	A	
2437 MHz MCS8 HT20 mode 2 stream													
4.874	3.0	49.5	32.8	5.8	-34.9	0.0	0.0	49.9	74.0	-24.1	H	P	
4.874	3.0	36.4	32.8	5.8	-34.9	0.0	0.0	36.8	54.0	-17.2	H	A	
7.311	3.0	41.8	35.2	7.3	-34.7	0.0	0.0	46.2	74.0	-27.8	H	P	
7.311	3.0	26.6	35.2	7.3	-34.7	0.0	0.0	31.0	54.0	-23.0	H	A	
4.874	3.0	41.3	32.8	5.8	-34.9	0.0	0.0	41.7	74.0	-32.3	V	P	
4.874	3.0	29.1	32.8	5.8	-34.9	0.0	0.0	29.4	54.0	-24.6	V	A	
7.311	3.0	40.4	35.2	7.3	-34.7	0.0	0.0	44.8	74.0	-29.2	V	P	
7.311	3.0	26.8	35.2	7.3	-34.7	0.0	0.0	31.2	54.0	-22.8	V	A	
2462 MHz MCS8 HT20 mode 2 stream													
4.924	3.0	45.7	32.8	5.9	-34.9	0.0	0.0	49.6	74.0	-24.4	H	P	
4.924	3.0	31.6	32.8	5.9	-34.9	0.0	0.0	35.5	54.0	-18.5	H	A	
7.386	3.0	32.1	35.3	7.3	-34.6	0.0	0.0	40.1	74.0	-33.9	H	P	
7.386	3.0	19.9	35.3	7.3	-34.6	0.0	0.0	27.8	54.0	-26.2	H	A	
4.924	3.0	35.9	32.8	5.9	-34.9	0.0	0.0	39.8	74.0	-34.2	V	P	
4.924	3.0	23.8	32.8	5.9	-34.9	0.0	0.0	27.6	54.0	-26.4	V	A	
7.386	3.0	33.1	35.3	7.3	-34.6	0.0	0.0	41.1	74.0	-32.9	V	P	
7.386	3.0	20.8	35.3	7.3	-34.6	0.0	0.0	28.7	54.0	-25.3	V	A	

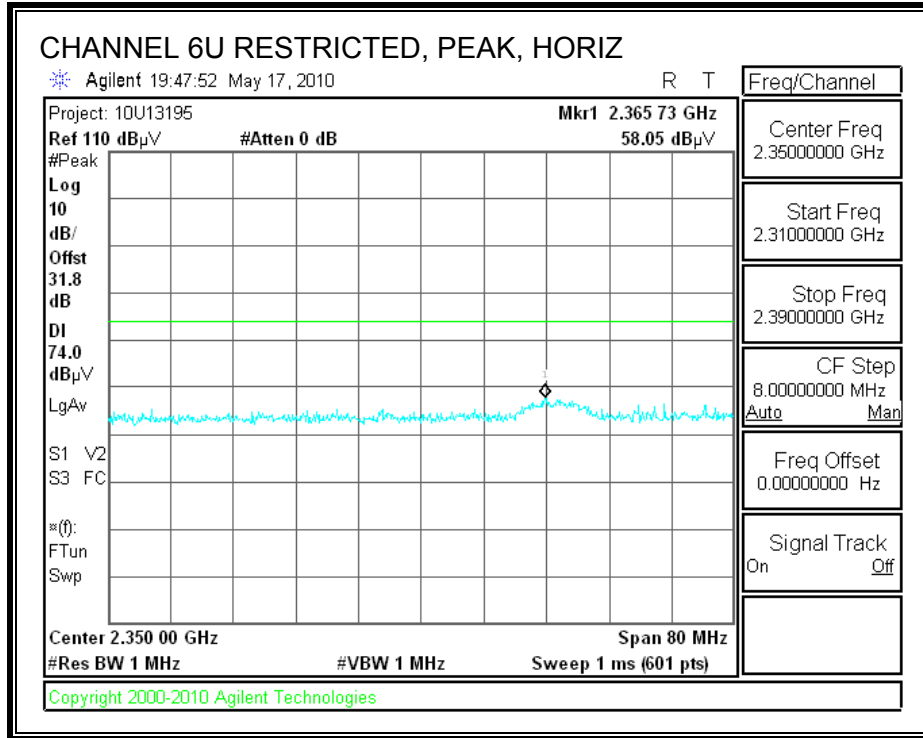
Rev. 4.1.2.7

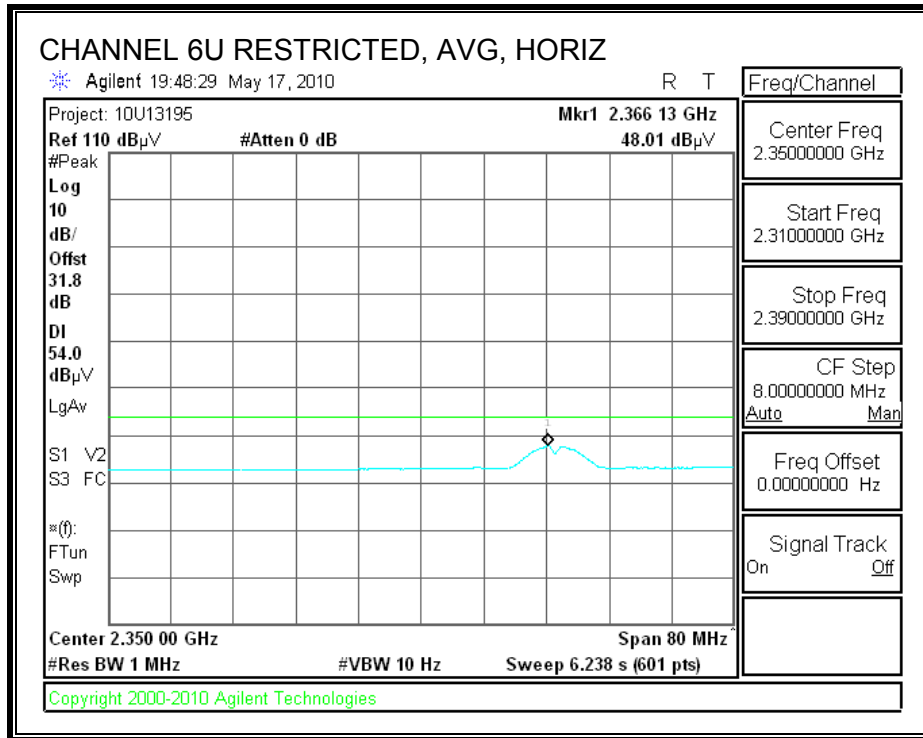
Note: No other emissions were detected above the system noise floor.

8.2.5. TX ABOVE 1 GHz 802.11n HT40 (1 STREAM IN 2.4 GHz BAND)

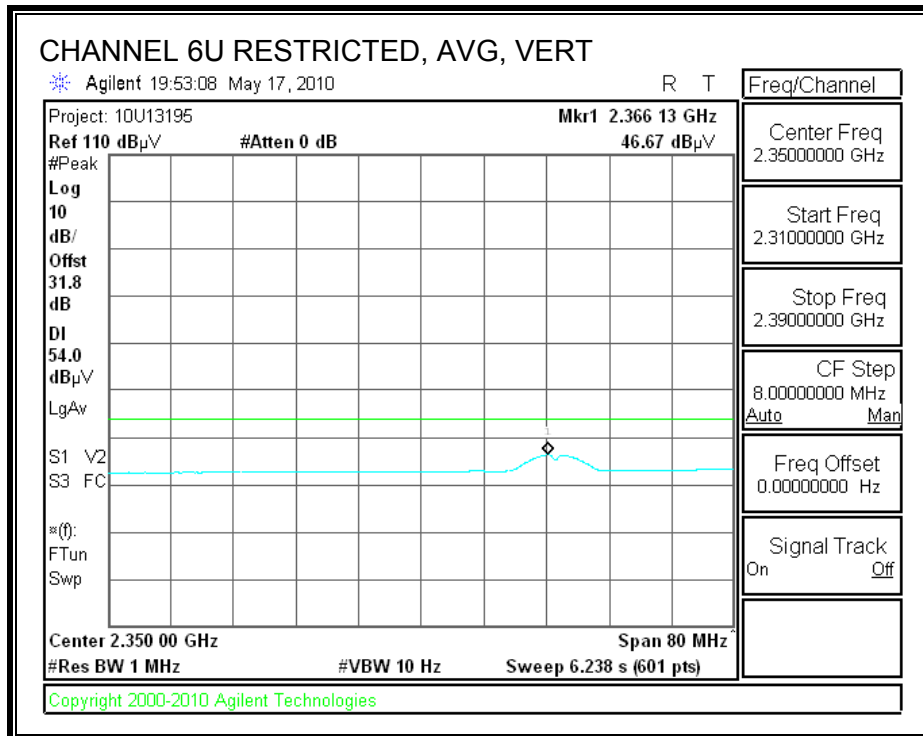
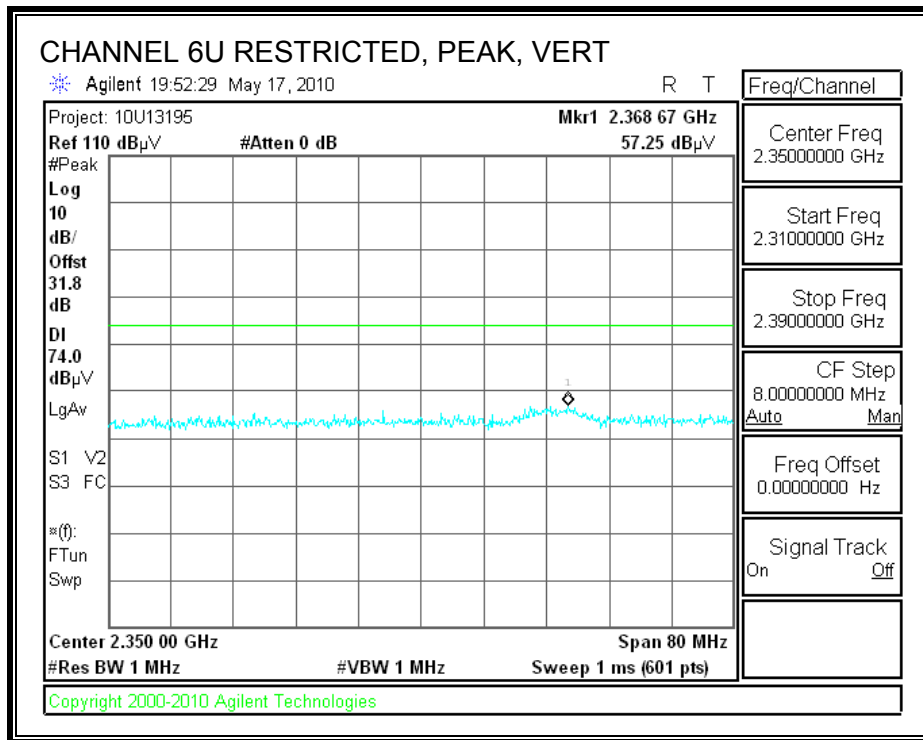
RESTRICTED BANDEDGE (CHANNEL 6U, HORIZONTAL)

LOW BAND EDGE



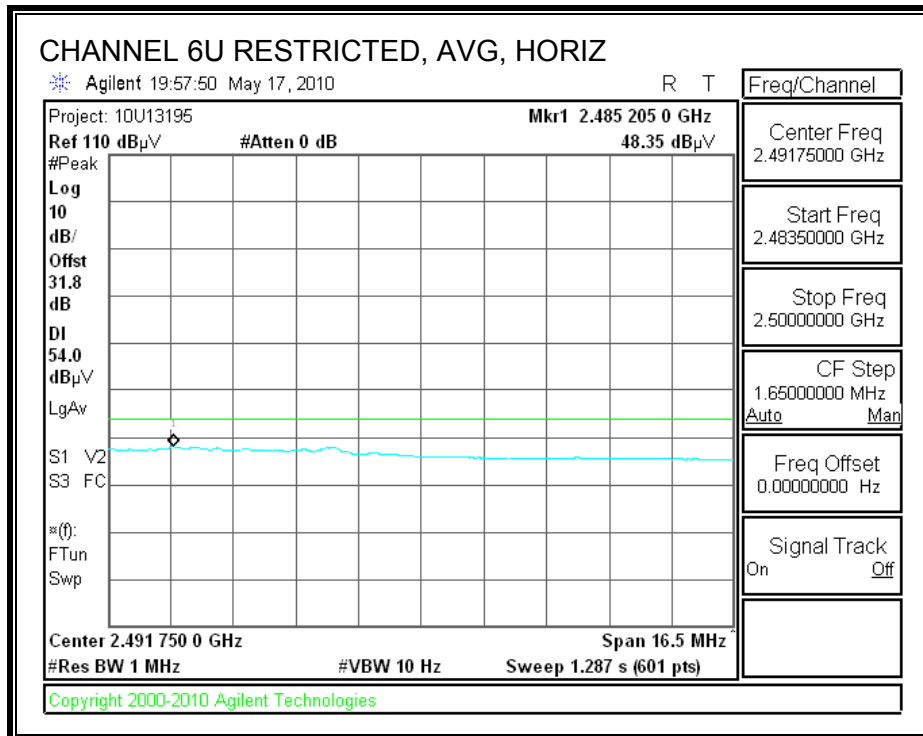
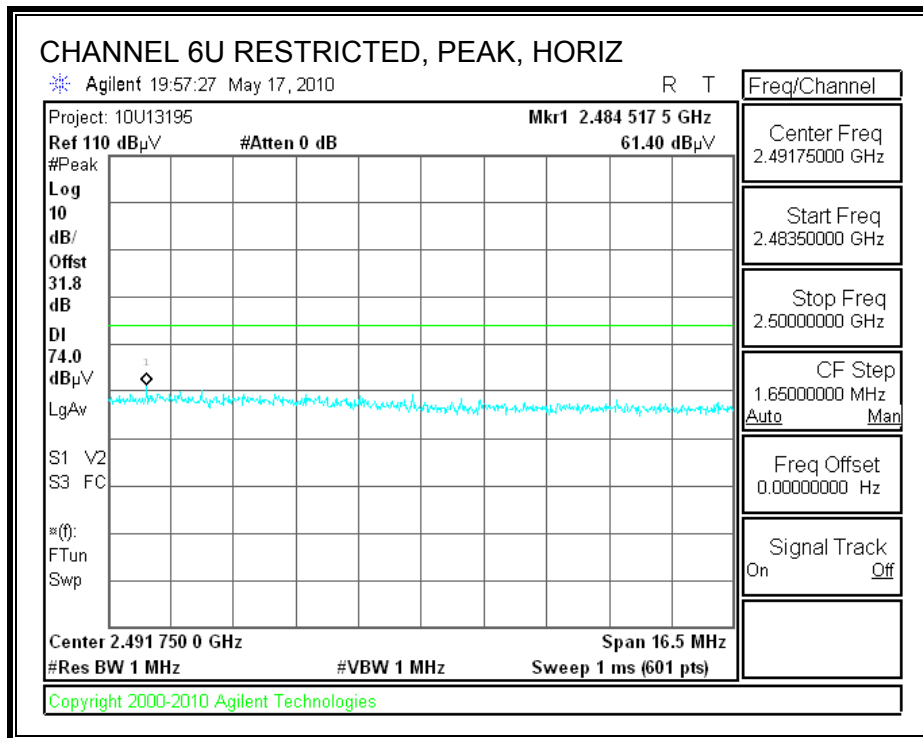


RESTRICTED BANDEDGE (CHANNEL 6U, VERTICAL)

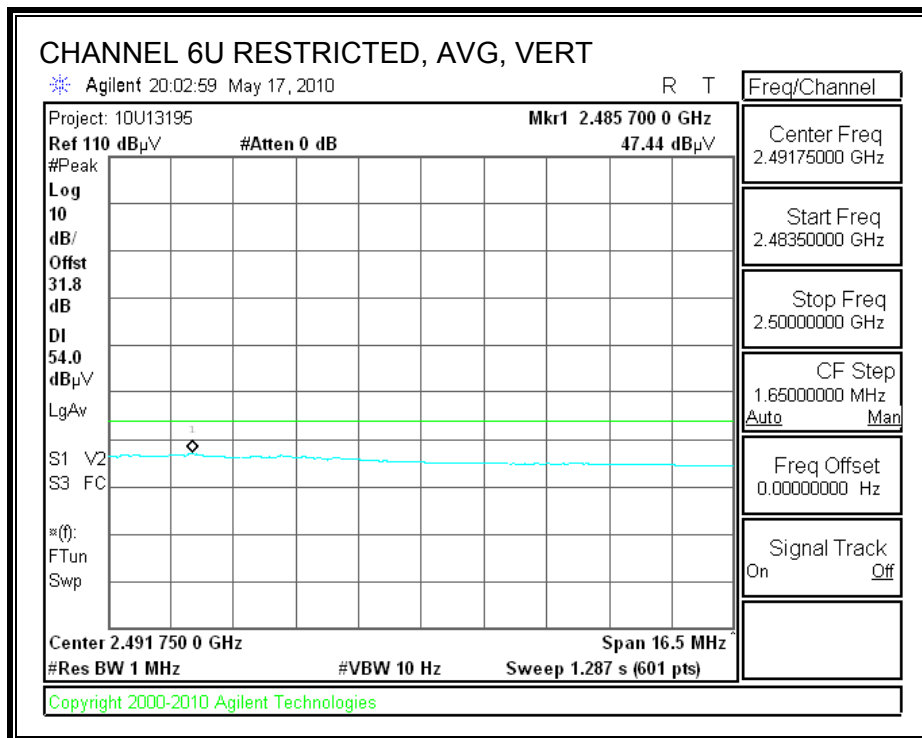
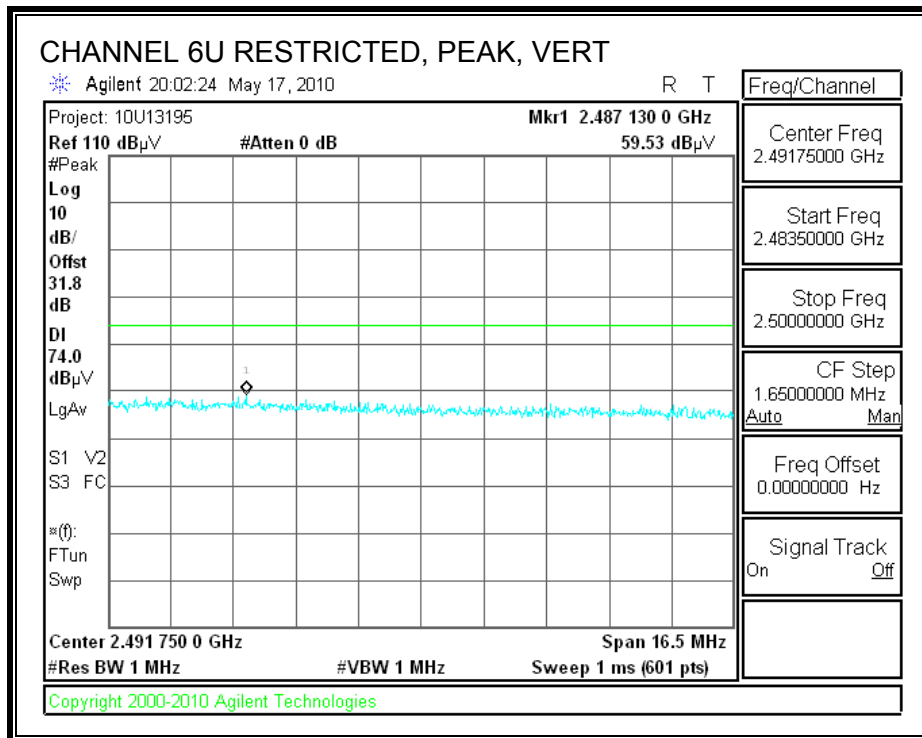


RESTRICTED BANDEDGE (CHANNEL 6U, HORIZONTAL)

HIGH BAND EDGE



RESTRICTED BANDEDGE (CHANNEL 6U, VERTICAL)



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
 Compliance Certification Services, Fremont 5m Chamber

Test Engr: Tom Chen
Date: 05/18/10
Project #: 10U13195
Company: 2-Wire Inc.,
EUT Description: Wifi AP, 5011NV, 5012NV
EUT M/N: EUT with laptop PC
Test Target: FCC 15.247
Mode Oper: Continuously TX, HT40 MCS0

f	Measurement Frequency	Amp	Preamplifier 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	Notes
2437 MHz MCS0 HT40 Istream													
4.874	3.0	42.8	32.8	5.8	-34.9	0.0	0.0	46.6	74.0	-27.4	H	P	
4.874	3.0	29.2	32.8	5.8	-34.9	0.0	0.0	33.0	54.0	-21.0	H	A	
7.311	3.0	37.7	35.2	7.3	-34.7	0.0	0.0	45.5	74.0	-28.5	H	P	
7.311	3.0	25.1	35.2	7.3	-34.7	0.0	0.0	33.0	54.0	-21.1	H	A	
4.874	3.0	45.4	32.8	5.8	-34.9	0.0	0.0	49.2	74.0	-24.8	V	P	
4.874	3.0	31.8	32.8	5.8	-34.9	0.0	0.0	35.6	54.0	-18.4	V	A	
7.311	3.0	37.7	35.2	7.3	-34.7	0.0	0.0	45.5	74.0	-28.5	V	P	
7.311	3.0	25.0	35.2	7.3	-34.7	0.0	0.0	32.8	54.0	-21.2	V	A	

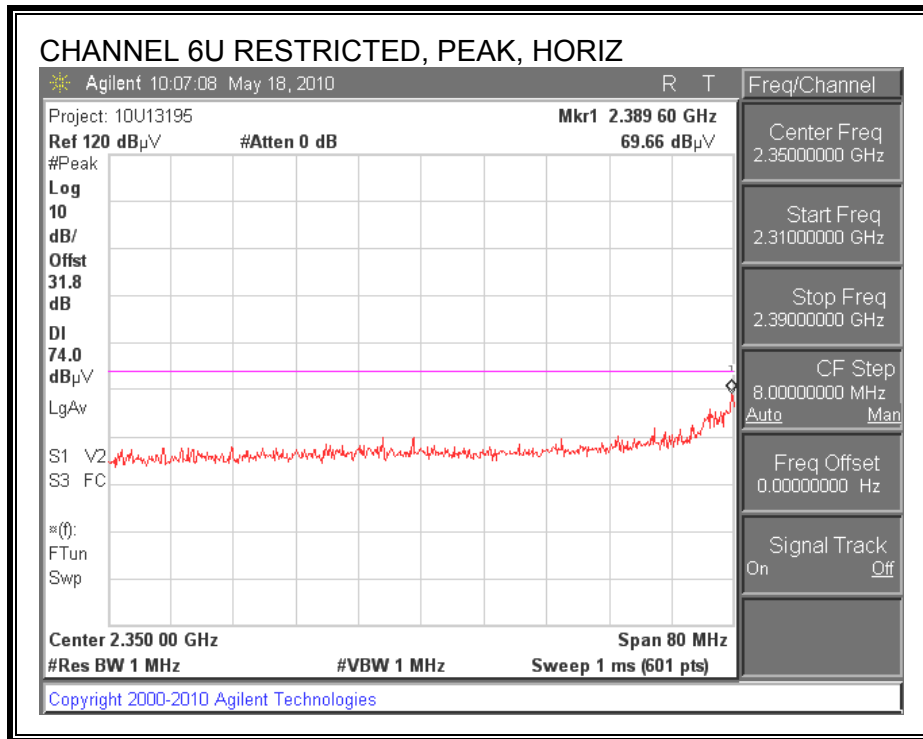
Rev. 4.1.2.7

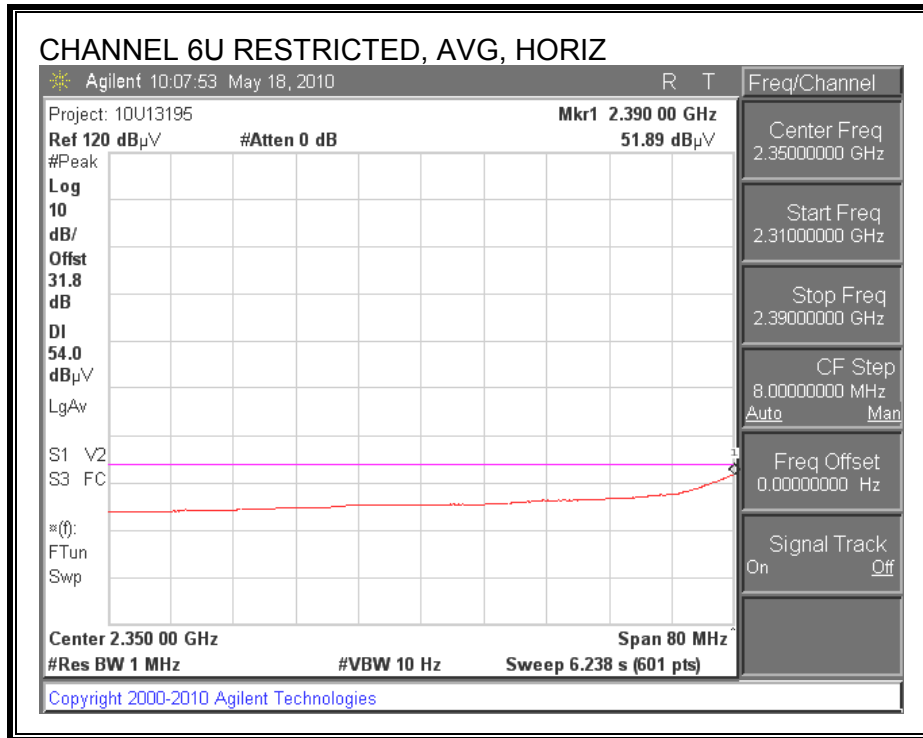
Note: No other emissions were detected above the system noise floor.

8.2.6. TX ABOVE 1 GHz 802.11n HT40 (2 STREMA IN 2.4 GHz BAND)

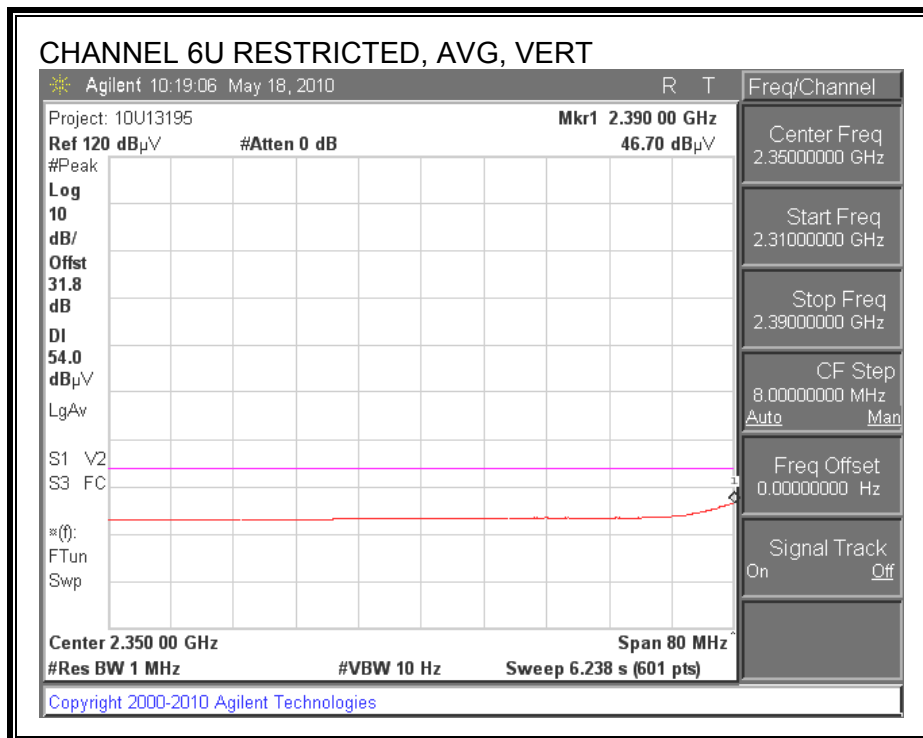
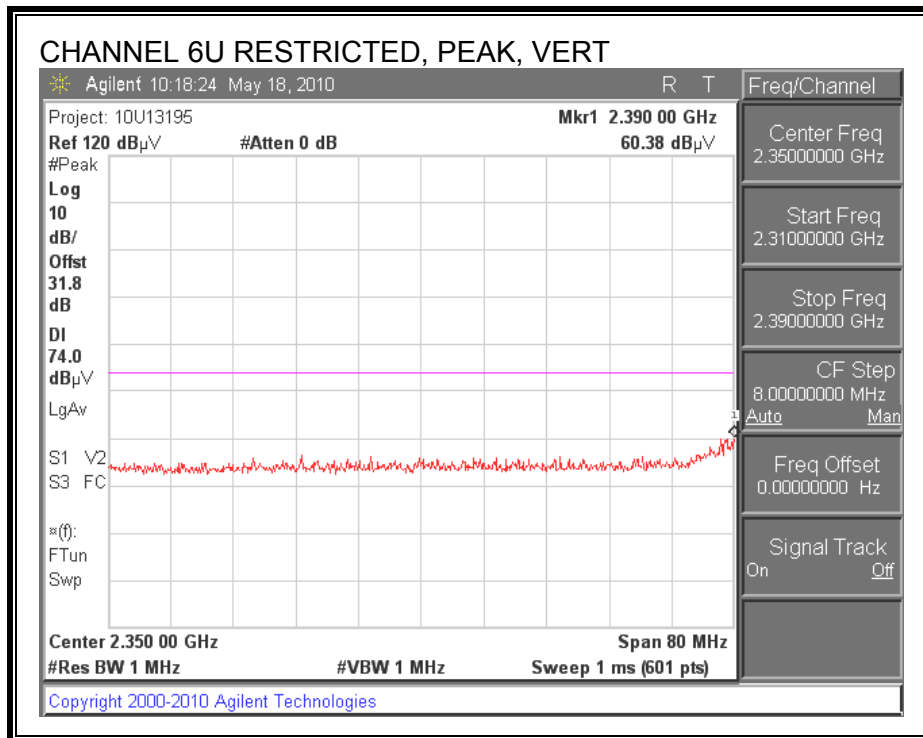
RESTRICTED BANDEDGE (CHANNEL 6U, HORIZONTAL)

LOW BAND EDGE



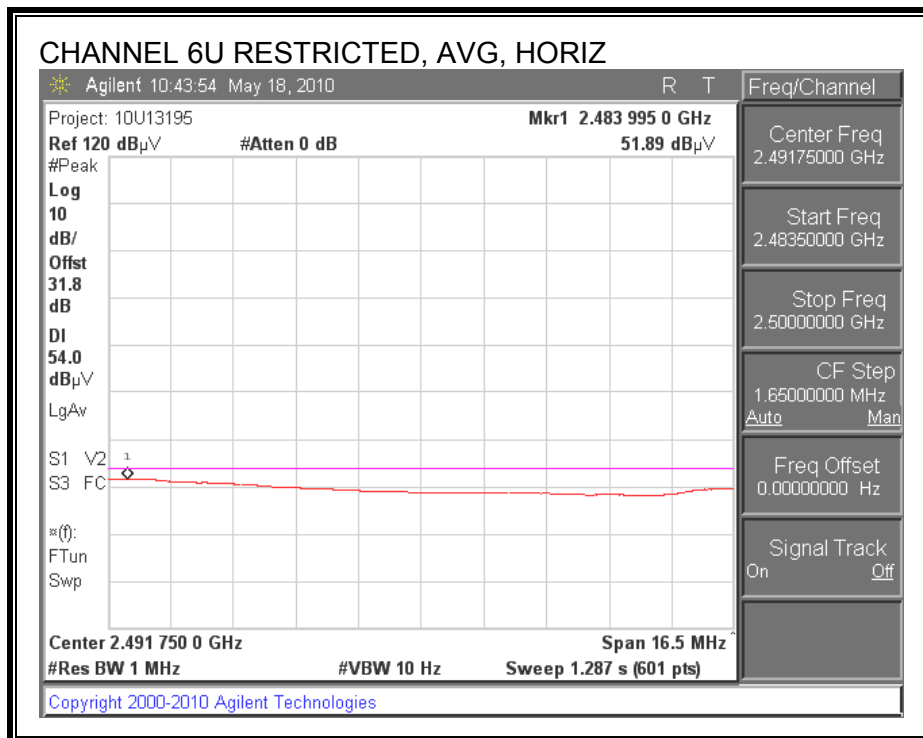
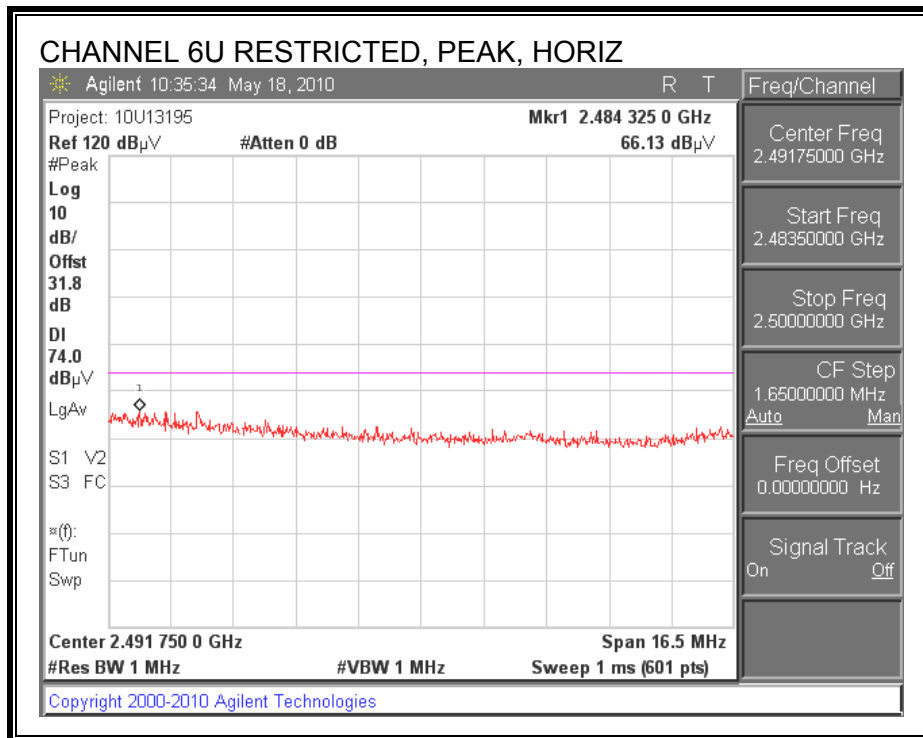


RESTRICTED BANDEDGE (CHANNEL 6U, VERTICAL)

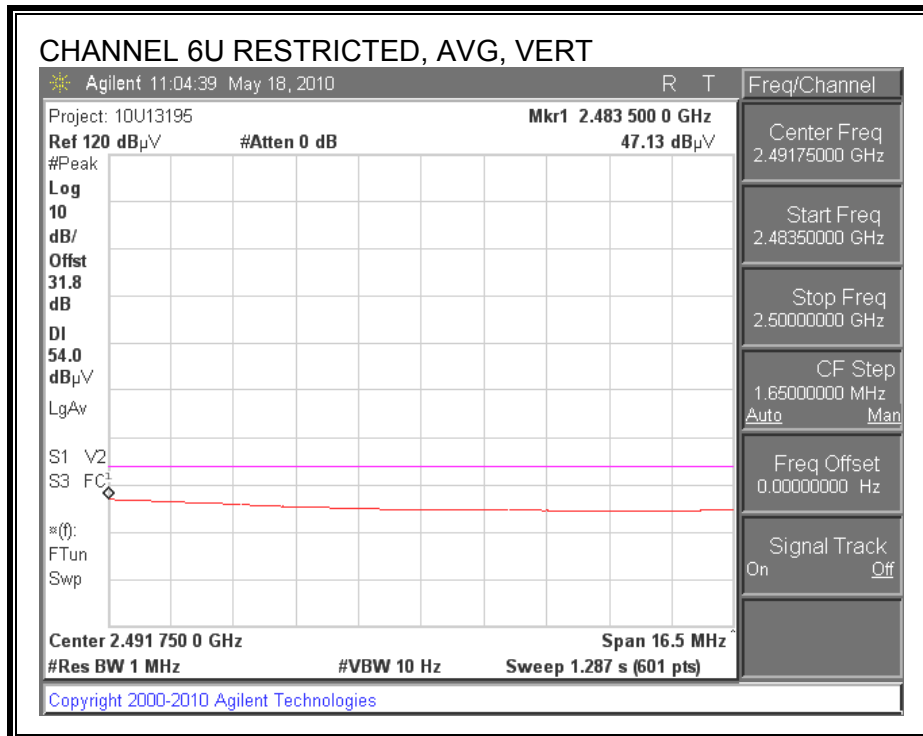
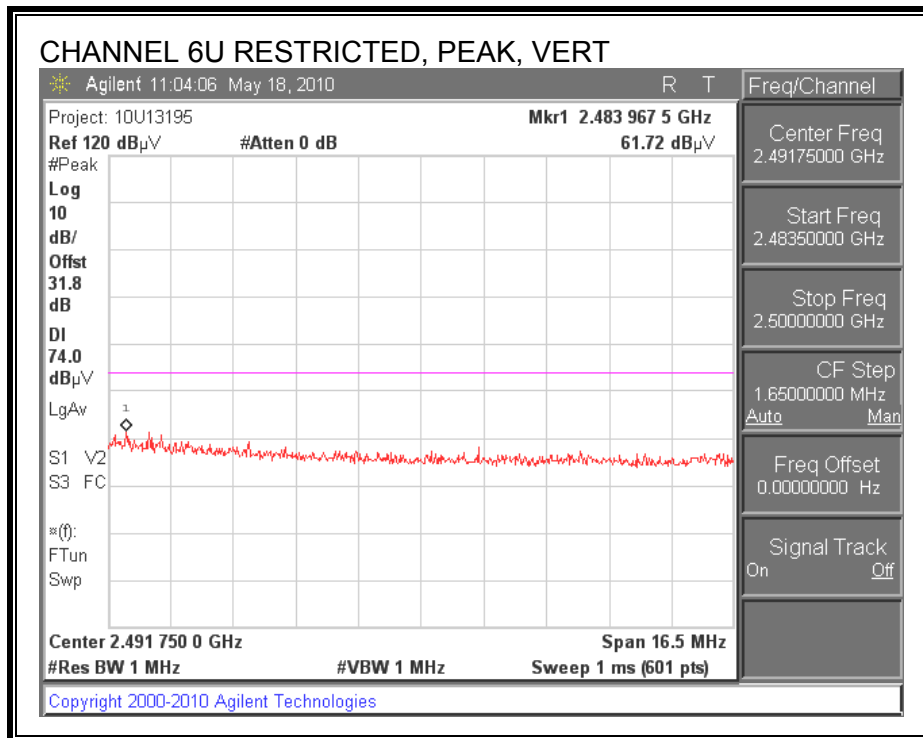


RESTRICTED BANDEDGE (CHANNEL 6U, HORIZONTAL)

HIGH BAND EDGE



RESTRICTED BANDEDGE (CHANNEL 6U, VERTICAL)



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
 Compliance Certification Services, Fremont 5m Chamber

Test Engr: Tom Chen
Date: 05/18/10
Project #: 10U13195
Company: 2-Wire Inc.,
EUT Description: Wifi AP, 5011NV, 5012NV
EUT M/N: EUT with laptop PC
Test Target: FCC 15.247
Mode Oper: Continuously TX, 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

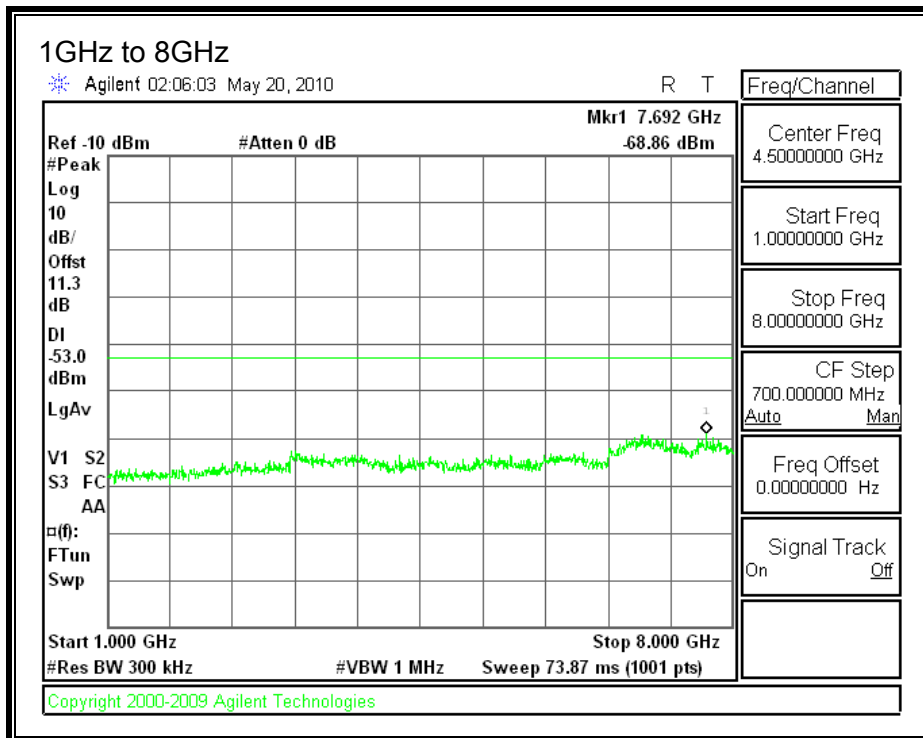
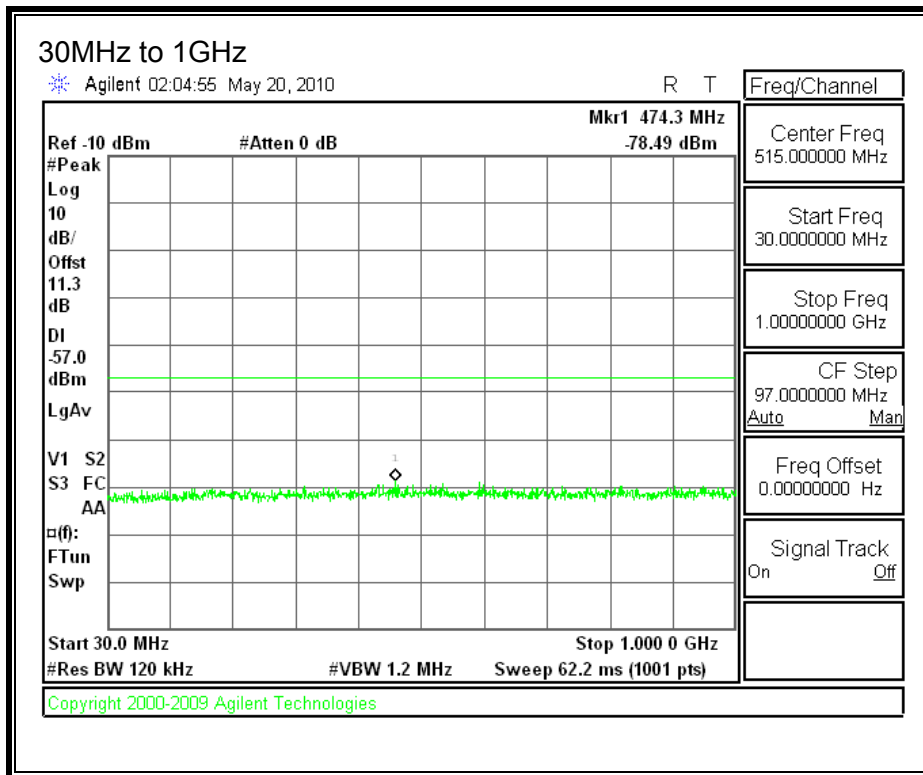
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
2437 MHz MCS8 HT40 2stream													
4.874	3.0	39.3	32.8	5.8	-34.9	0.0	0.0	43.1	74.0	-30.9	H	P	
4.874	3.0	27.1	32.8	5.8	-34.9	0.0	0.0	30.9	54.0	-23.1	H	A	
7.311	3.0	37.4	35.2	7.3	-34.7	0.0	0.0	45.2	74.0	-28.8	H	P	
7.311	3.0	25.2	35.2	7.3	-34.7	0.0	0.0	33.0	54.0	-21.0	H	A	
4.874	3.0	41.3	32.8	5.8	-34.9	0.0	0.0	45.1	74.0	-28.9	V	P	
4.874	3.0	28.3	32.8	5.8	-34.9	0.0	0.0	32.1	54.0	-21.9	V	A	
7.311	3.0	37.5	35.2	7.3	-34.7	0.0	0.0	45.3	74.0	-28.7	V	P	
7.311	3.0	25.1	35.2	7.3	-34.7	0.0	0.0	32.9	54.0	-21.1	V	A	

Rev. 4.1.2.7

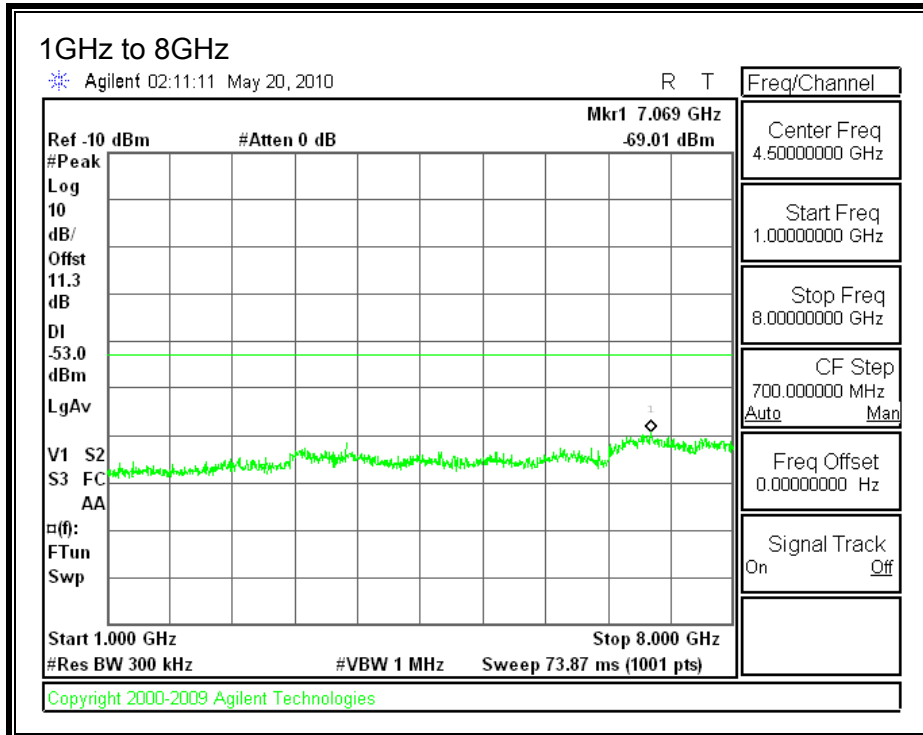
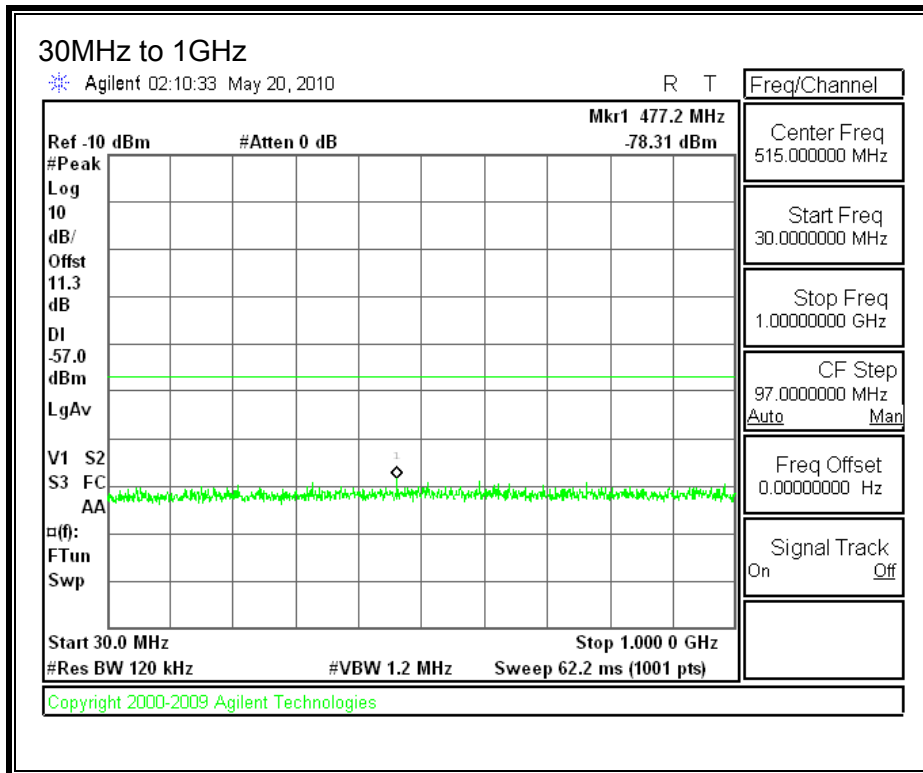
Note: No other emissions were detected above the system noise floor.

8.3. RECEIVER ABOVE 1 GHz

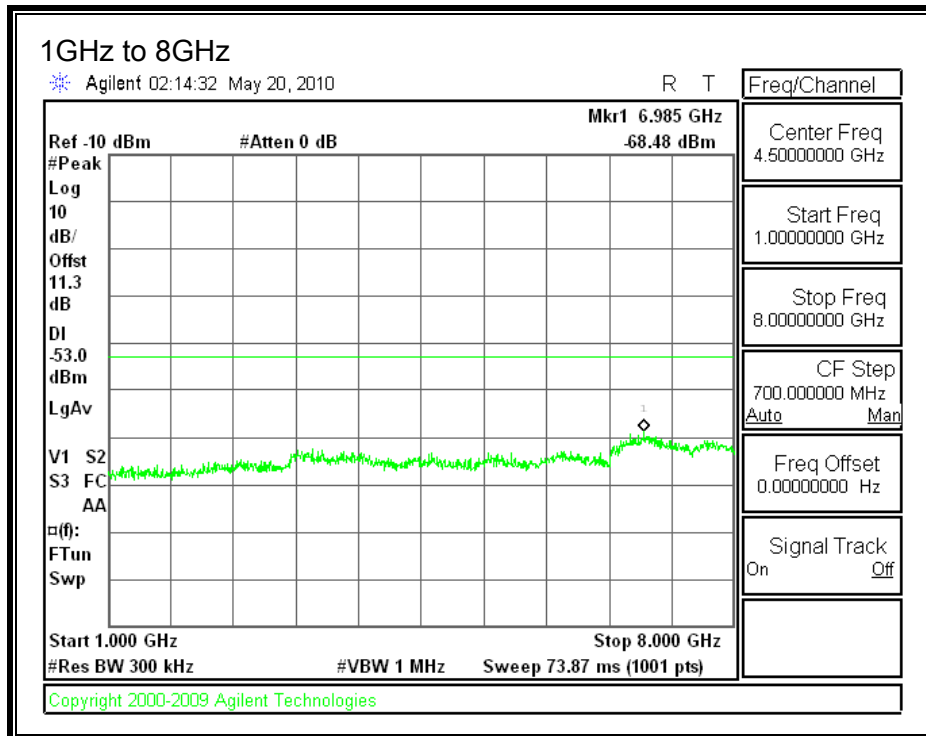
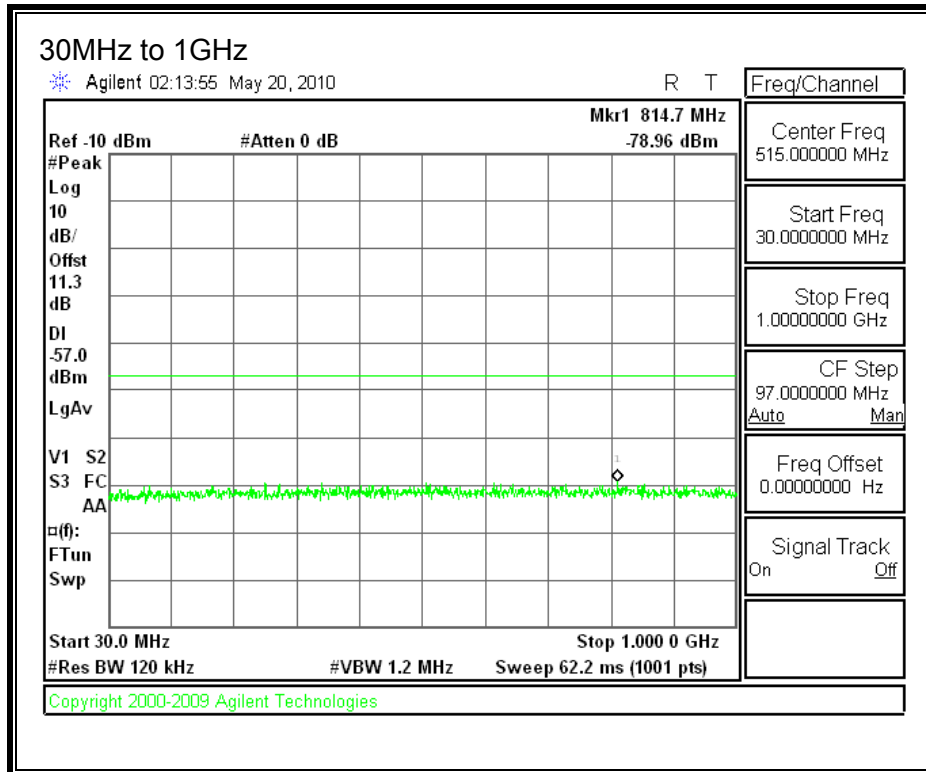
8.3.1. RX ABOVE 1 GHz 802.11b 20 MHz BW IN THE 2.4 GHz BAND



8.3.2. RX ABOVE 1 GHz 802.11g 20 MHz BW IN THE 2.4 GHz BAND

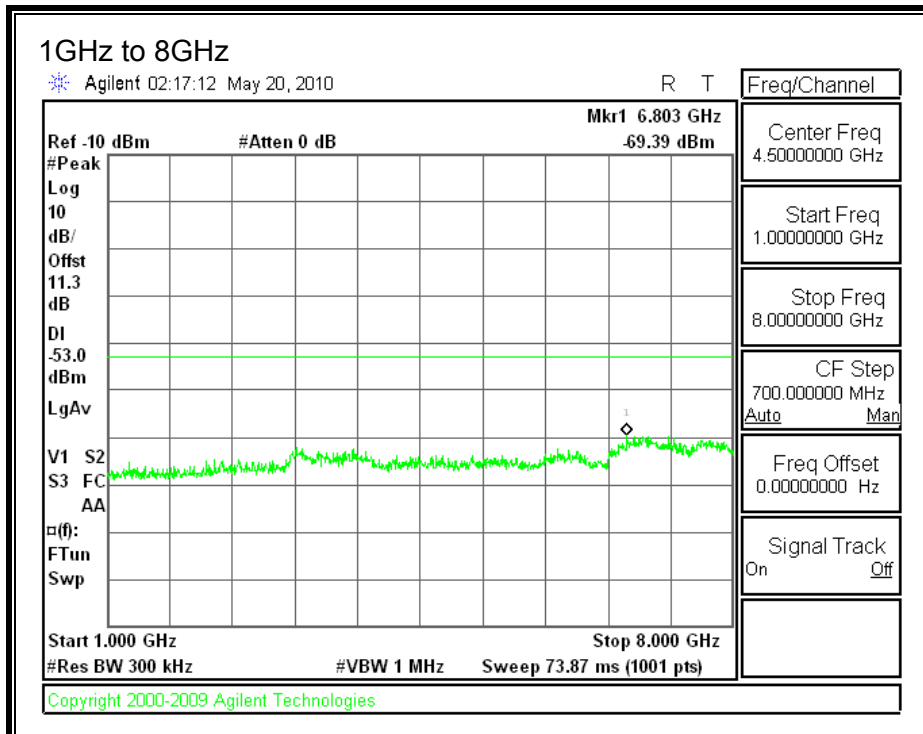
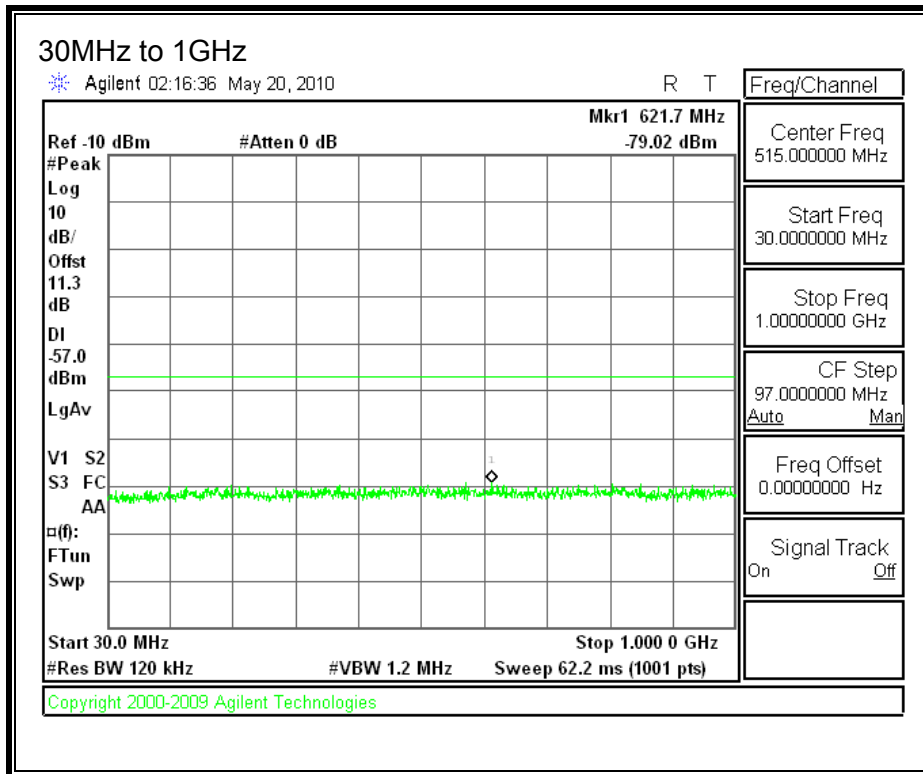


8.3.3. RX ABOVE 1 GHz 802.11n 20 MHz BW IN 2.4 GHz BAND ONE CHAIN

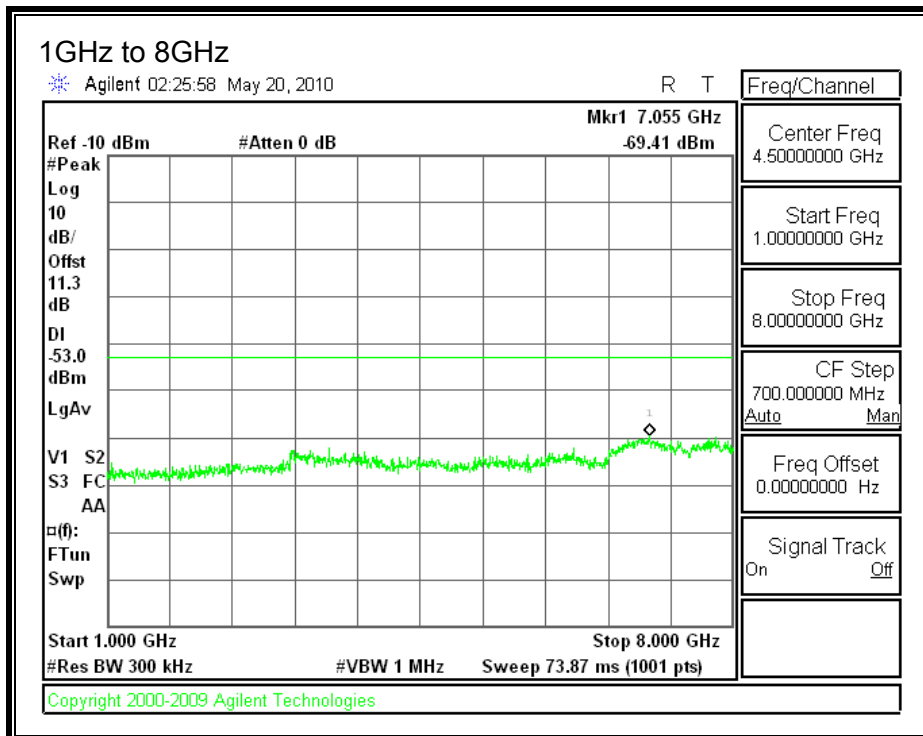
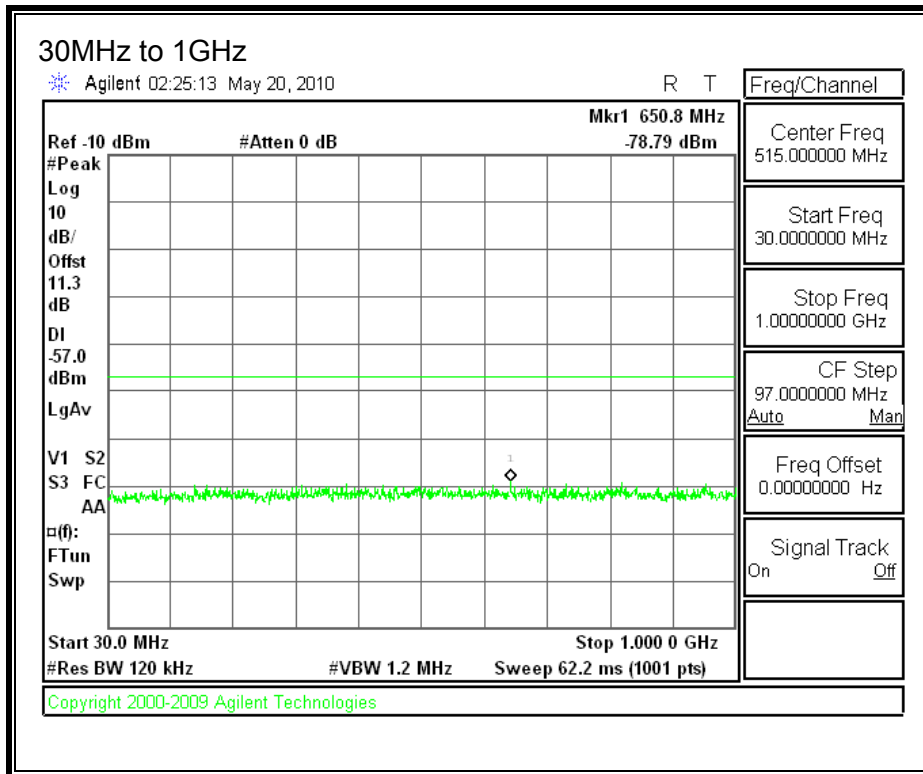


8.3.4. RX ABOVE 1 GHz 802.11n 20 MHz BW IN 2.4 GHz BAND TWO CHAIN

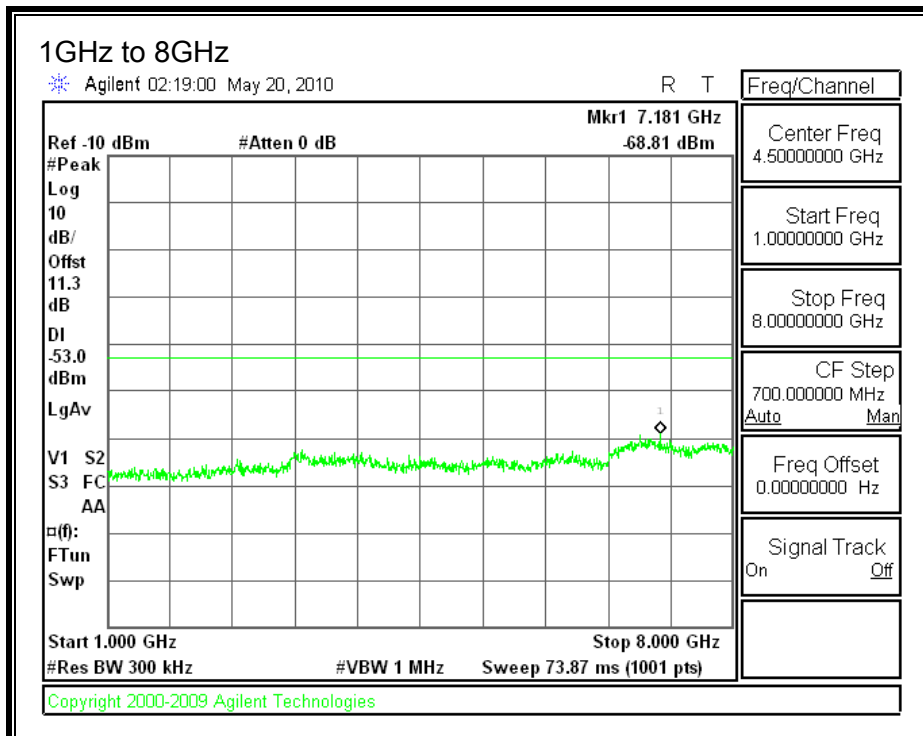
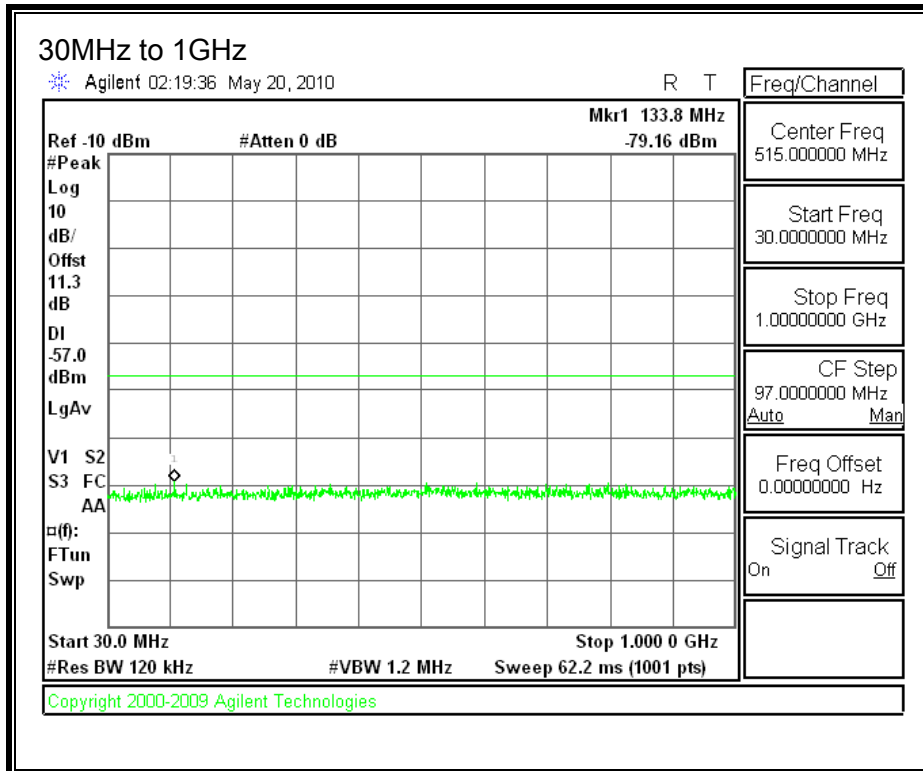
CHAIN 0



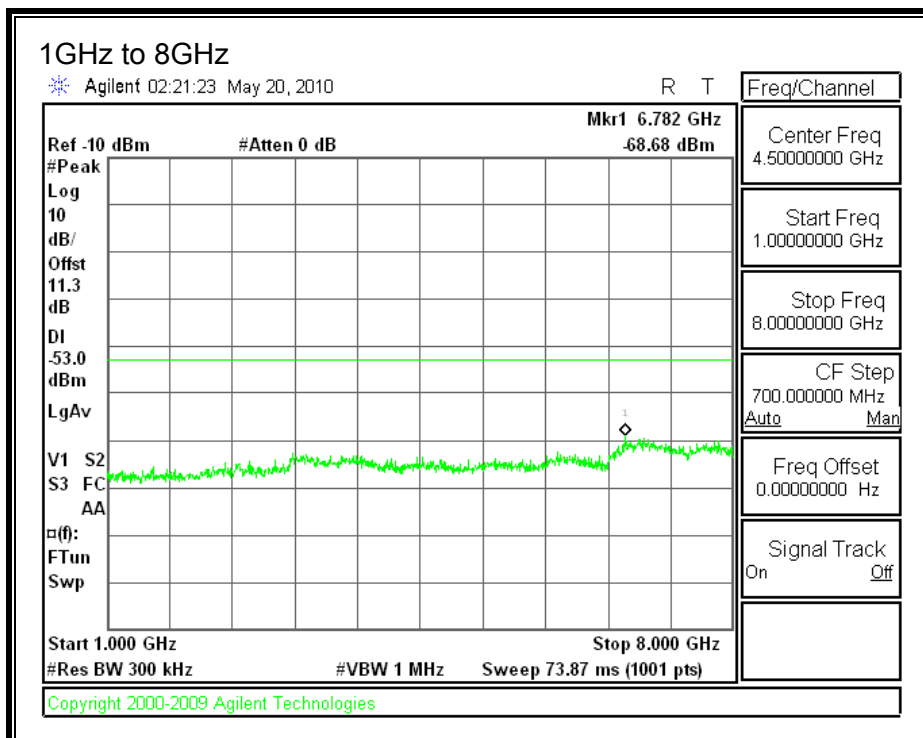
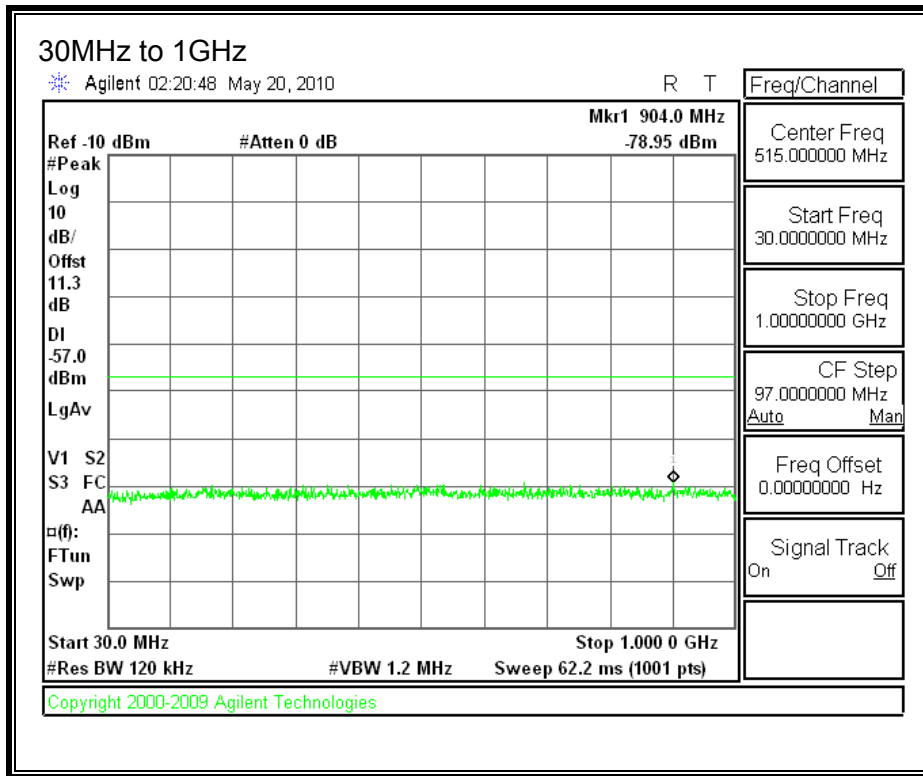
CHAIN 1



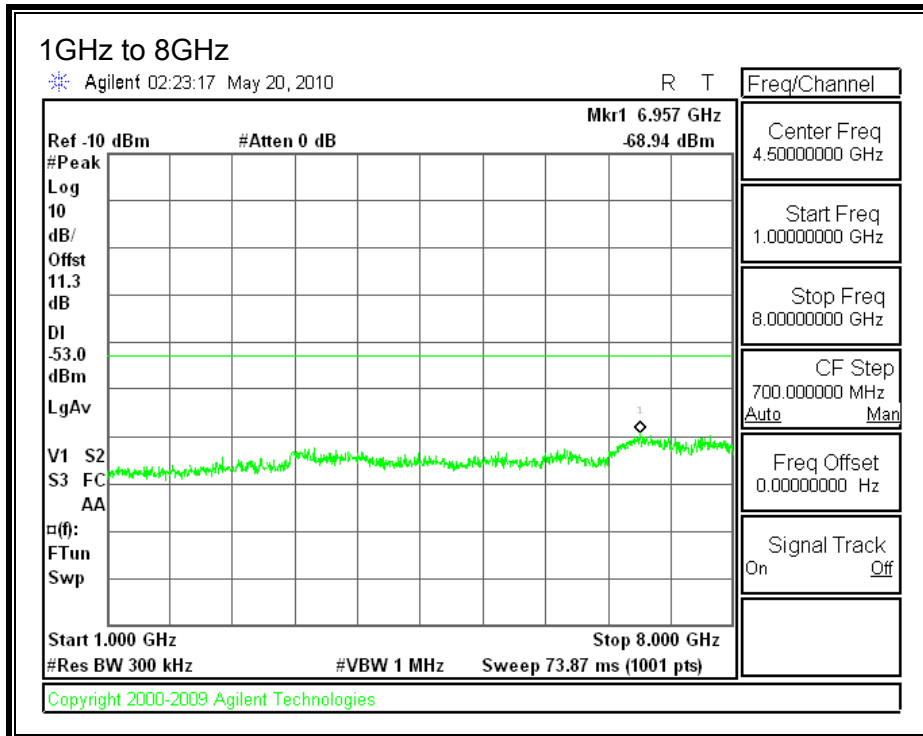
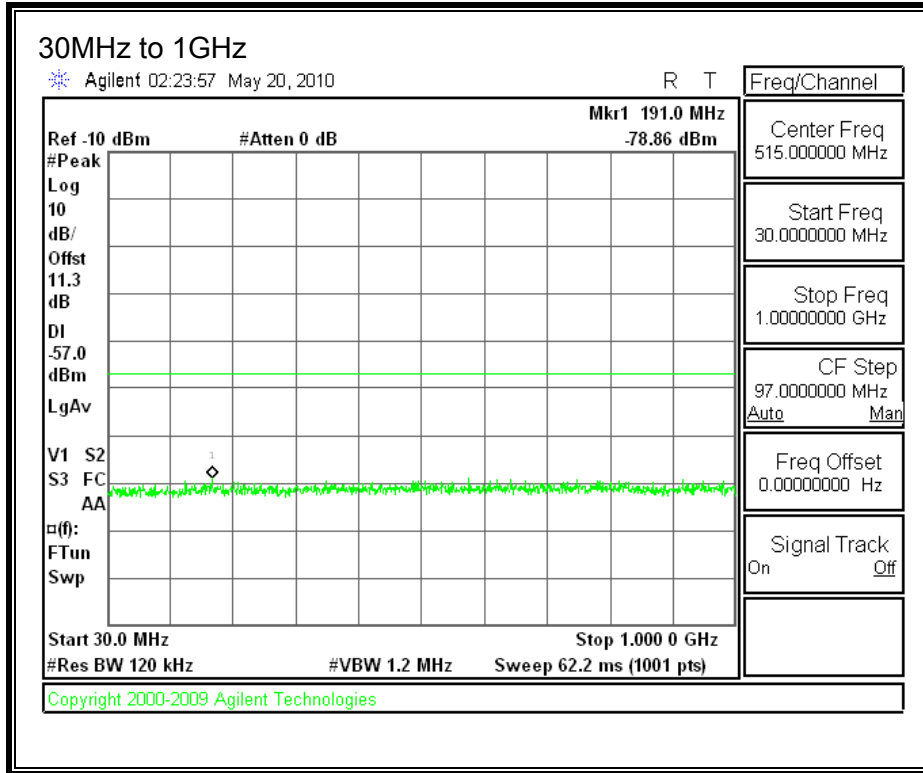
8.3.5. RX ABOVE 1 GHz 802.11n 40 MHz BW IN 2.4 GHz BAND ONE CHAIN



8.3.6. RX ABOVE 1 GHz 802.11n 40 MHz BW IN 2.4 GHz BAND TWO CHAIN
CHAIN 0



CHAIN 1



9. 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/ <i>f</i>	2.19/ <i>f</i>		6
10–30	28	2.19/ <i>f</i>		6
30–300	28	0.073	2*	6
300–1 500	1.585 <i>f</i> ^{0.5}	0.0042 <i>f</i> ^{0.5}	<i>f</i> /150	6
1 500–15 000	61.4	0.163	10	6
15 000–150 000	61.4	0.163	10	616 000 / <i>f</i> ^{1.2}
150 000–300 000	0.158 <i>f</i> ^{0.5}	4.21 x 10 ⁻⁴ <i>f</i> ^{0.5}	6.67 x 10 ⁻⁵ <i>f</i>	616 000 / <i>f</i> ^{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:

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

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:

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

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.

$$\text{Total EIRP} = (P1 * G1) + (P2 * G2) + \dots + (Pn * Gn)$$

where

- Px = Power of transmitter x
- Gx = 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

Band	Mode	Separation Distance (m)	Output Power (dBm)	Antenna Gain (dBi)	IC Power Density (W/m ²)	FCC Power Density (mW/cm ²)
2.4 GHz	WLAN	0.20	26.49	2.40	1.54	0.154