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INDUSTRY CANADA RSS-210 ISSUE 8

CERTIFICATION TEST REPORT

FOR

802.11abgn 2X2 MIMO + BT/BLE RADIO MODULE

MODEL NUMBER: DWM-W095A

FCC ID: EW4DWMW095A
IC: 4250A-DWMW095A

REPORT NUMBER: 13J14910-5

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Prepared for

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NVLAP LAB CODE 200065-0

Revision History

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: MITSUMI ELECTRIC CO., LTD.
1601, SAKAI, ATSUGI-SHI,
KANAGAWA- KEN, 243-8533 JAPAN

EUT DESCRIPTION: 802.11abgn 2X2 MIMO + BT/BLE RADIO MODULE

MODEL: DWM-W095A

SERIAL NUMBER: B4-06

DATE TESTED: MARCH 29 – JULY 9, 2013

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

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

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

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UL Verification Services Inc.

Tested By:

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EMC ENGINEER
UL Verification Services Inc.

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2003, RSS-GEN Issue 3, and RSS-210 Issue 8.

3. FACILITIES AND ACCREDITATION

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

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

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

4.3. MEASUREMENT UNCERTAINTY

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

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

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

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is an 802.11abgn 2X2 MIMO + BT/BLE Radio Module

The radio module is manufactured by Mitsumi.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

Frequency Range (MHz)	Mode	Power, Chain 0 (dBm)	Power, Chain 1 (dBm)	Output Power (dBm)	Output Power (mW)
2412 - 2462	802.11b LEGACY	19.30	N/A	19.30	85.11
2412 - 2462	802.11g CDD 2TX	22.94	24.18	26.61	458.61
2412 - 2462	802.11n HT20 CDD 2TX	22.78	23.39	26.11	407.94
2412 - 2462	802.11n HT20 SDM 2TX	21.53	22.25	24.92	310.11
2422 - 2452	802.11n HT40 CDD 2TX	22.36	22.56	25.47	352.489
2422 - 2452	802.11n HT40 SDM 2TX	22.06	22.40	25.24	334.474
5745 - 5825	802.11a CDD 2TX	21.88	21.11	24.52	283.292
5745 - 5825	802.11n HT20 CDD 2TX	20.31	20.05	23.19	208.557
5745 - 5825	802.11n HT20 SDM 2TX	20.43	21.09	23.78	238.937
5755 - 5795	802.11n HT40 CDD 2TX	20.29	21.09	23.72	235.434
5755 - 5795	802.11n HT40 SDM 2TX	20.46	21.85	24.22	264.282

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List of test reduction and modes covering other modes:

2400 - 2483.5 MHz Authorized Frequency Band (Antenna Port Testing)		
Frequency Range (MHz)	**Mode**	**Covered by**
2412 - 2462	802.11b Legacy 1TX	802.11b Legacy Mode
2412 - 2462	802.11g CDD 2TX	802.11g CDD 2TX
2412 - 2462	802.11n HT20 CDD MCS0 2TX	802.11n HT20 CDD MCS0 2TX
2412 - 2462	802.11n HT20 SDM MCS8 2TX	802.11n HT20 SDM MCS8 2TX
2412 - 2462	802.11n HT40 CDD MCS0 2TX	802.11n HT40 CDD MCS0 2TX
2412 - 2462	802.11n HT40 SDM MCS8 2TX	802.11n HT40 SDM MCS8 2TX

5725 - 5850 MHz Authorized Frequency Band (Antenna Port Testing)		
Frequency Range (MHz)	**Mode**	**Covered by**
5745 - 5825	802.11a Legacy 2TX	802.11a CDD 2TX
5745 - 5825	802.11n HT20 CDD MCS0 2TX	802.11n HT20 CDD MCS0 2TX
5745 - 5825	802.11n HT20 SDM MCS8 2TX	802.11n HT20 SDM MCS8 2TX
5755 - 5795	802.11n HT40 CDD MCS0 2TX	802.11n HT40 CDD MCS0 2TX
5755 - 5795	802.11n HT40 SDM MCS8 2TX	802.11n HT40 SDM MCS8 2TX

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5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes 2 PIFA antennas, with a maximum gain of 3dBi for 2.4GHz band and 4 dBi for 5GHz band.

5.4. SOFTWARE AND FIRMWARE

The EUT driver software installed in the host support equipment during was testing BCM4324B3_002.004.006.0012.0017.hcd; version 6.10.197.6

The test utility software used during testing was Window NT Command Script batch files.

5.5. WORST-CASE CONFIGURATION AND MODE

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

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

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

802.11b mode: 1 Mbps
802.11g mode: 6 Mbps
802.11a mode: 6 Mbps
802.11n HT20mode: MCS0 and MCS8
802.11n HT40mode: MCS0 and MCS8

There is no colocation between radios for this EUT.

Protocol used for measuring radiated emissions was: radiated for EUT with antenna.

For all modes with single chain, chain 0 (connector J0, Main port) was selected per the software provided by the client. Based on the client a preliminary investigation was performed on the two chains and chain 0 was found to be worst-case.

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5.6. SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop	IBM	ThinkPad	99-M9YGR	DoC
AC Adaptor	IBM	08K8204	11S08K8204Z1Z6LV44Y0SZ	DoC
DC Power Supply	XANTREX	XHR 60-18	27519	N/A
DC Power Supply	HP	6296A	1140A01869	N/A
Test board	Mitsumi	DMW-W095	R1	N/A

I/O CABLES

I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	AC	2	US 115V	Shielded	1.5m	NA
2	DC	2	DC	Un-shielded	1.5m	NA
3	PCI	1	PCI Adapter	Un-shielded	.20m	Flat Ribbon cable
4	DC	1	Banana Clip	Un-shielded	1.20m	DC cable power line

TEST SETUP

The EUT is installed in a PCB test board connected to the host laptop computer by flat cable and the PCI adapter during the executed command then removed the Laptop outside the chamber.

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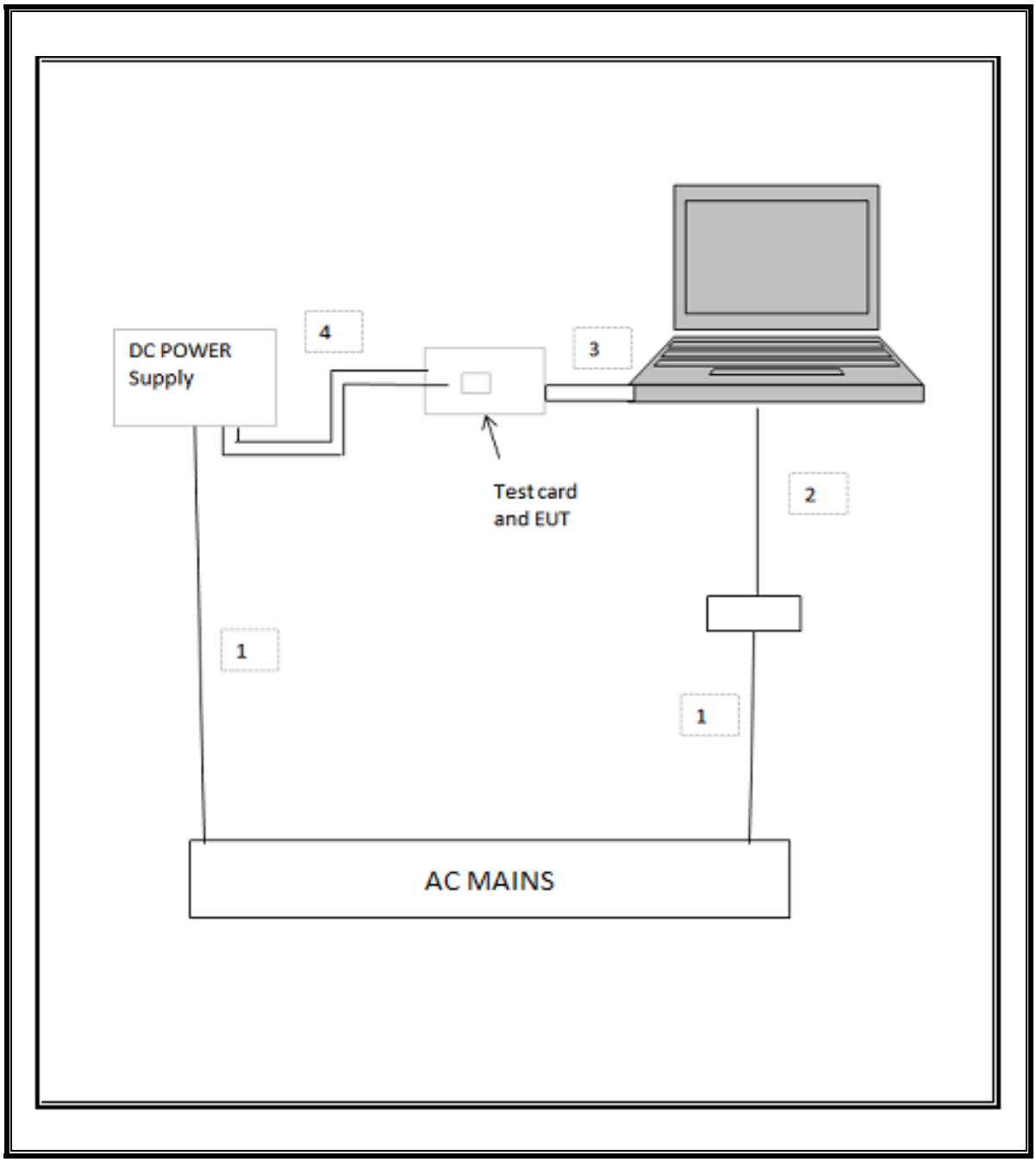
SETUP DIAGRAM FOR TESTS



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6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List				
Description	**Manufacturer**	**Model**	**Asset**	**Cal Date**
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C00996	05/11/12
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	08/08/12
Antenna, Bilog, 30MHz-1 GHz	Sunol Sciences	JB1	C01016	08/14/12
Antenna, Horn, 18 GHz	ETS	3117	C01006	12/11/12
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00946	11/12/12
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00558	03/23/13
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C00749	10/19/12
Peak Power Meter	Agilent / HP	E4416A	C00963	12/13/11
Peak Power Sensor	HP	E9327A	C00964	12/13/12
Reject Filter, 2.4-2.5 GHz	Micro-Tronics	BRC13192	N02683	CNR
Reject Filter, 5.725-5.825 GHz	Micro-Tronics	BRC13192	N02676	CNR
HiPass Filter 7-6-18GHz	Micro-Tronics	HPM113195	N02682	CNR
LISN, 30 MHz	FCC	50/250-25-2	N02396	08/08/12

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7. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

7.1. ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/T Minimum VBW (kHz)
2.4GHz						
802.11b Legacy	2.005	2.1	0.955	95.5%	0.20	0.499
802.11g CDD 6Mbps 2TX	2.013	2.093	0.962	96.2%	0.17	0.497
802.11n HT20 CDD MCS0	2.888	2.916	0.990	99.0%	0.00	0.010
802.11n HT20 SDM MCS8	1.456	1.484	0.981	98.1%	0.00	0.010
802.11n HT40 CDD MCS0	1.395	1.422	0.981	98.1%	0.00	0.010
802.11n HT40 SDM MCS8	0.712	0.738	0.965	96.5%	0.16	1.404
5 GHz						
802.11a CDD 6MBps	3.108	3.142	0.989	98.9%	0.00	0.010
802.11n HT20 SDM MCS8	1.449	1.485	0.976	97.6%	0.11	0.690
802.11n HT20 CDD MCS0	2.883	2.917	0.988	98.8%	0.00	0.010
802.11n HT40 CDD MCS0	1.397	1.430	0.977	97.7%	0.10	0.716
802.11n HT40 SDM MCS8	0.710	0.738	0.963	96.3%	0.17	1.408

7.2. MEASUREMENT METHODS

6 dB BW: KDB 558074 D01 v02, Section 7.0.

Output Power: KDB 558074 D01 v02, Sections 8.2.3 and 8.2.4.

Power Spectral Density: KDB 558074 D01 v02, Sections 9.2 and 9.4.

Out-of-band emissions in non-restricted bands: KDB 558074 D01 v02, Sections 10.1.

Out-of-band emissions in restricted bands: KDB 558074 D01 v02, Sections 10.2.1.

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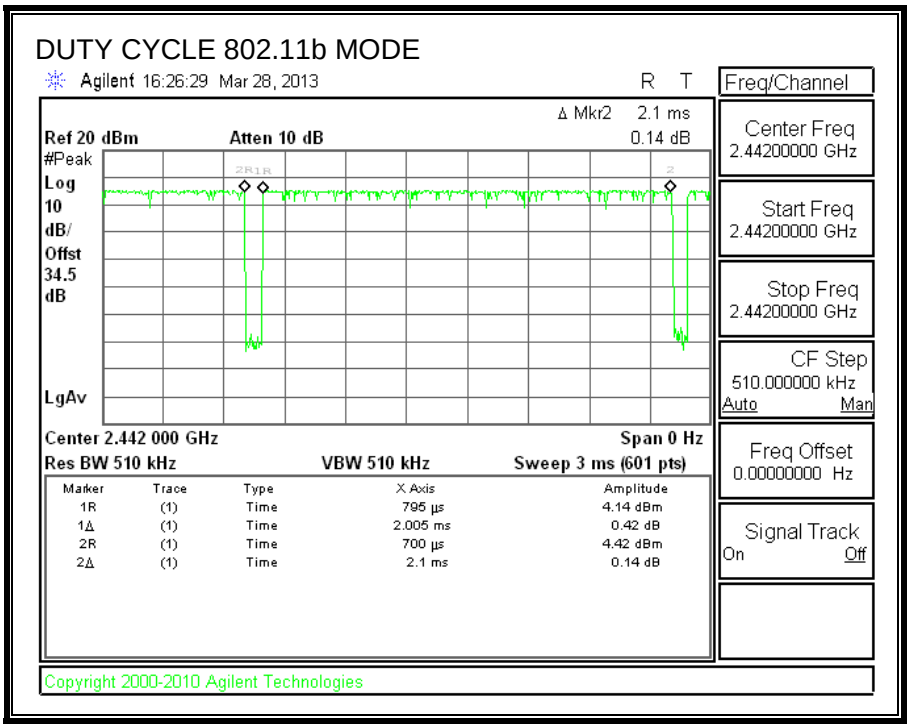
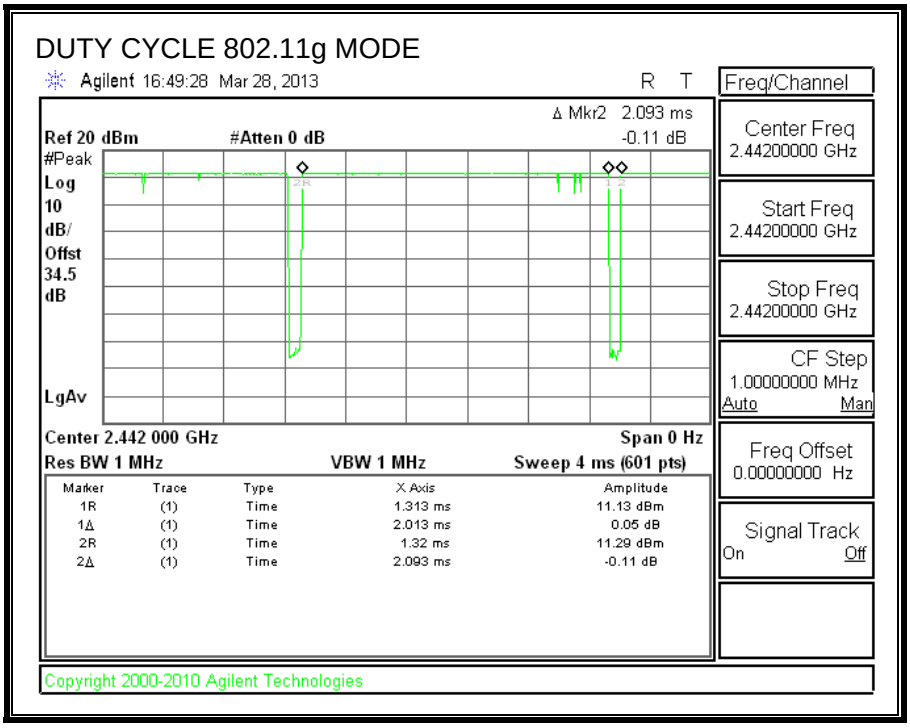
7.3. DUTY CYCLE PLOTS

7.3.1. 2.4GHz Band





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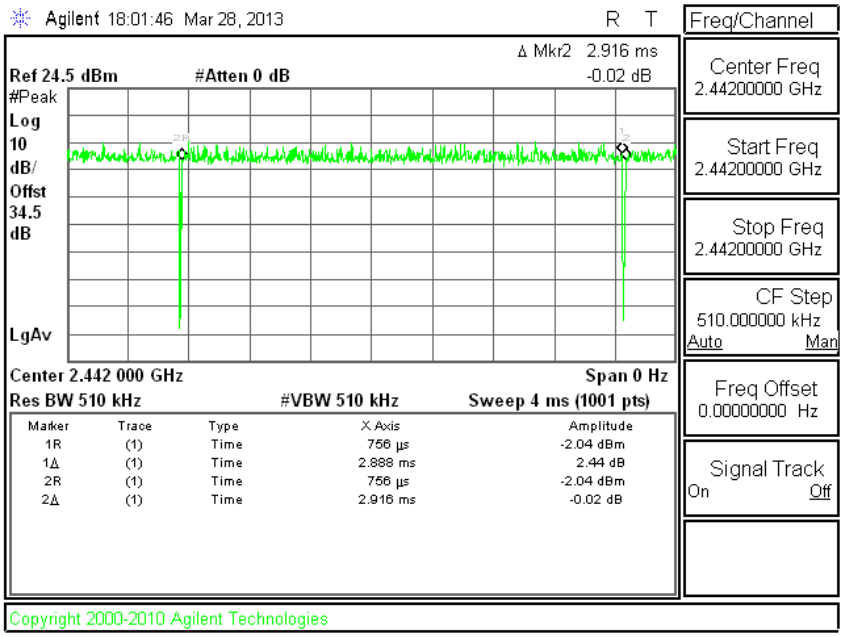
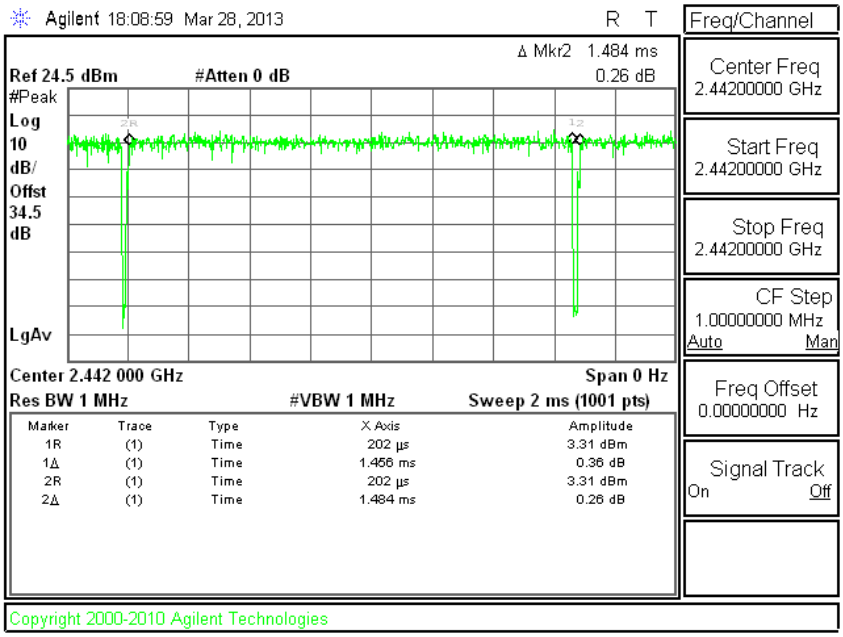
DUTY CYCLE 802.11n HT20 CDD MCS 0 2TX MODE



DUTY CYCLE 802.11n HT20 SDM MCS 8 2TX MODE



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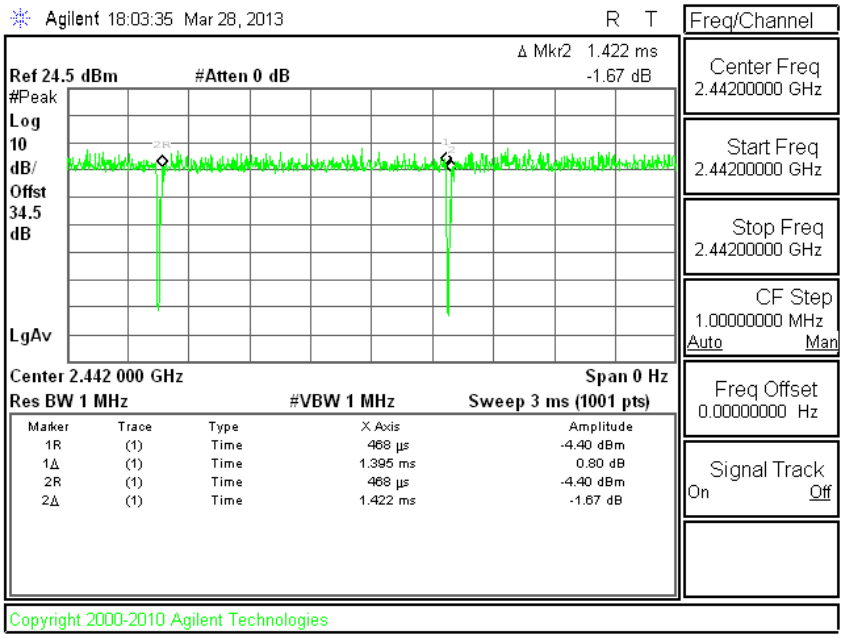
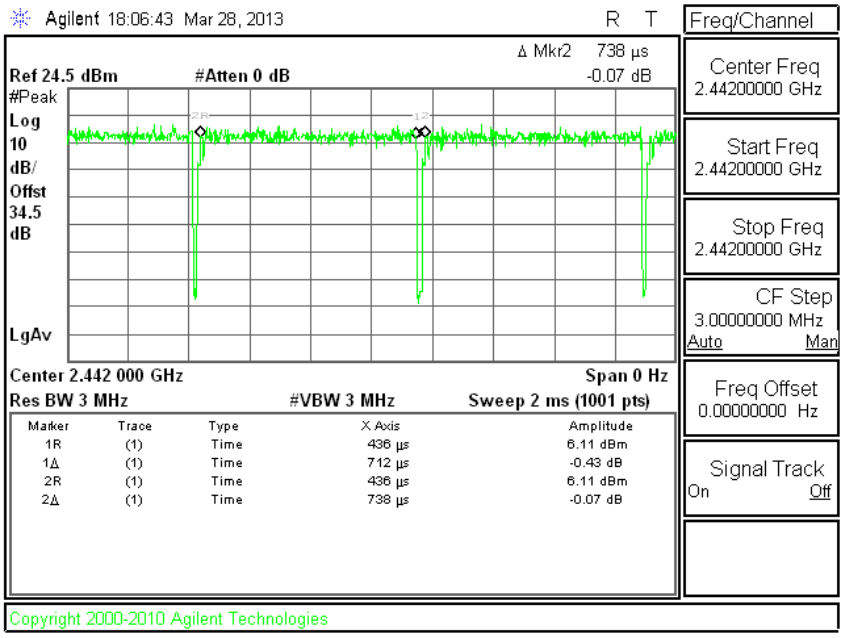
DUTY CYCLE 802.11n HT40 CDD MCS 0 2TX MODE



DUTY CYCLE 802.11n HT40 SDM MCS 8 2TX MODE



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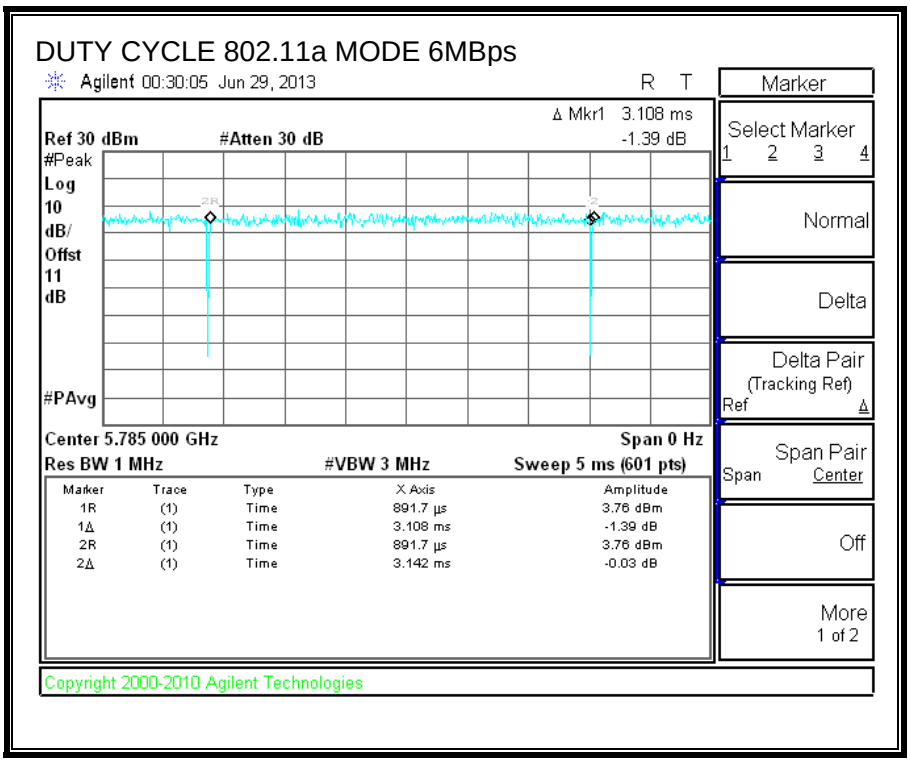
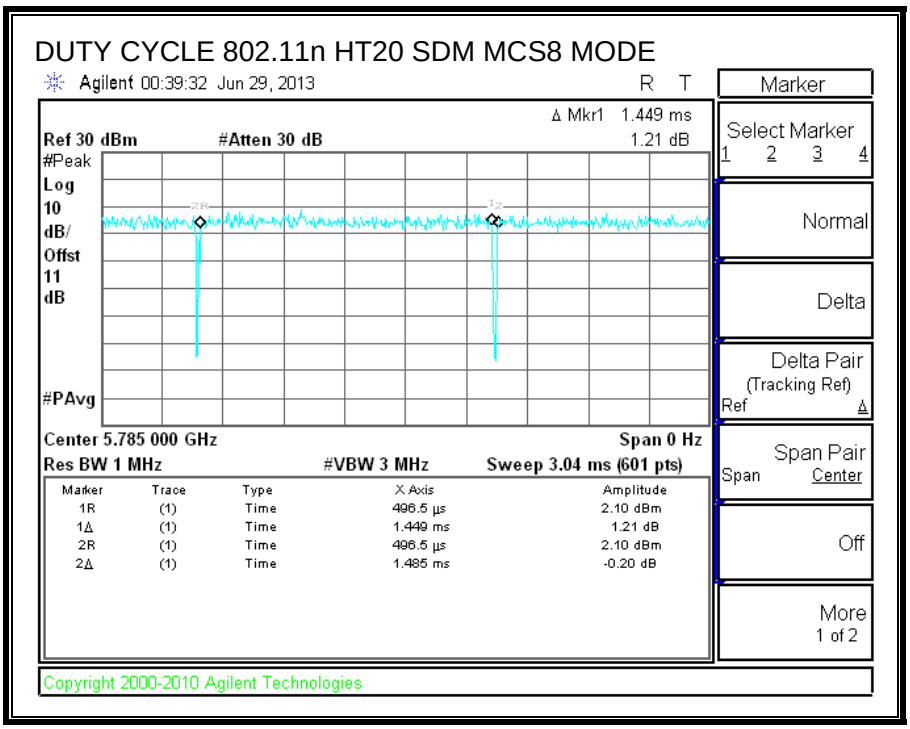
7.3.2. 5GHz Band





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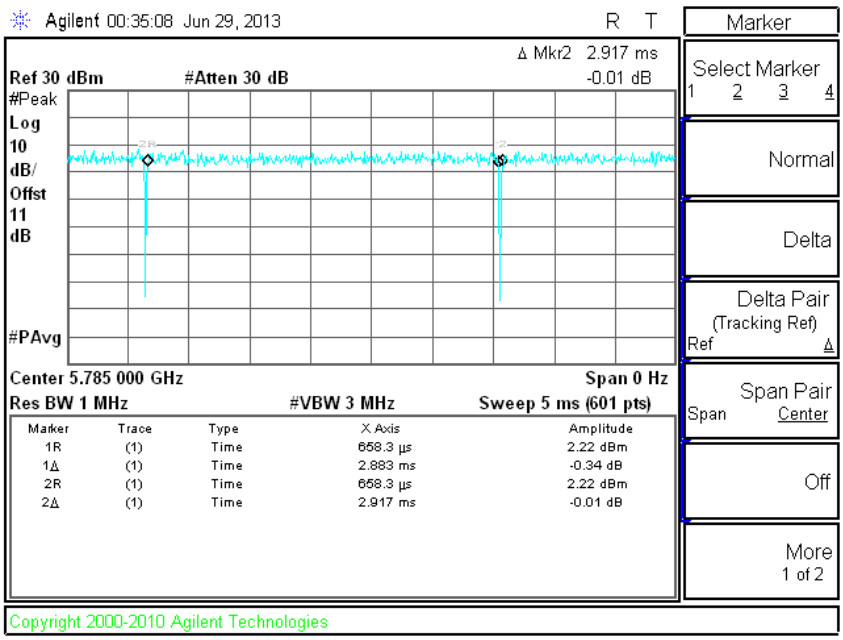
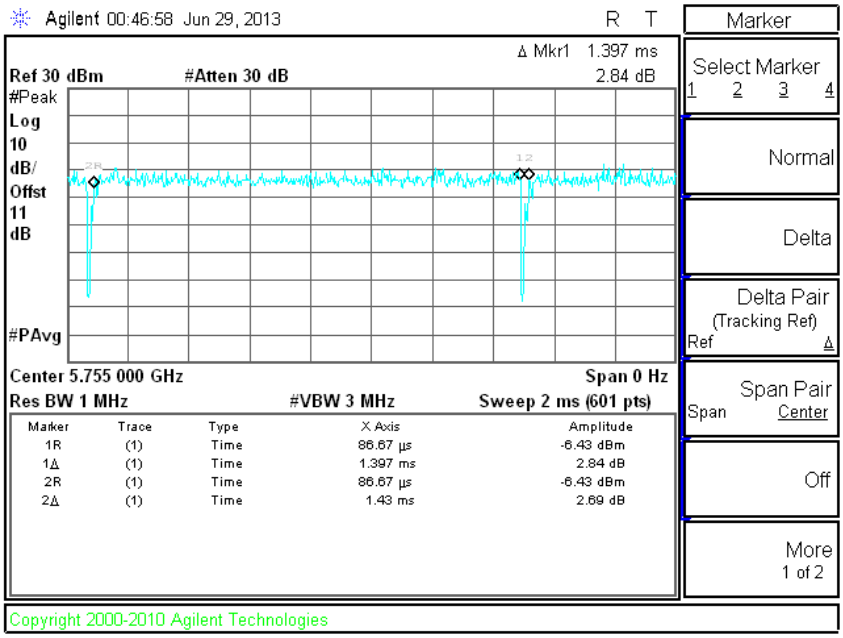
DUTY CYCLE 802.11n HT20CDD MCS0 MODE



DUTY CYCLE 802.11n HT40 CDD MCS0 Mode



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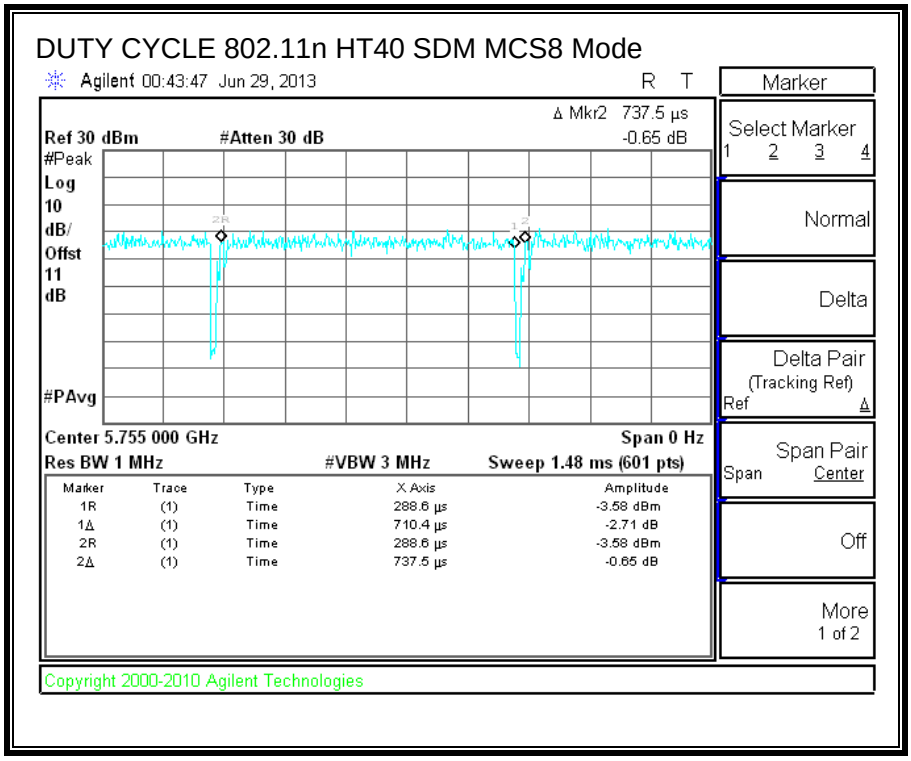
DUTY CYCLE 802.11n HT40 SDM MCS8 Mode



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8. ANTENNA PORT TEST RESULTS

8.1. 802.11b LEGACY MODE, 2.4 GHz BAND

8.1.1. 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.

RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	8.18	0.5
Mid	2437	8.18	0.5
High	2462	8.18	0.5

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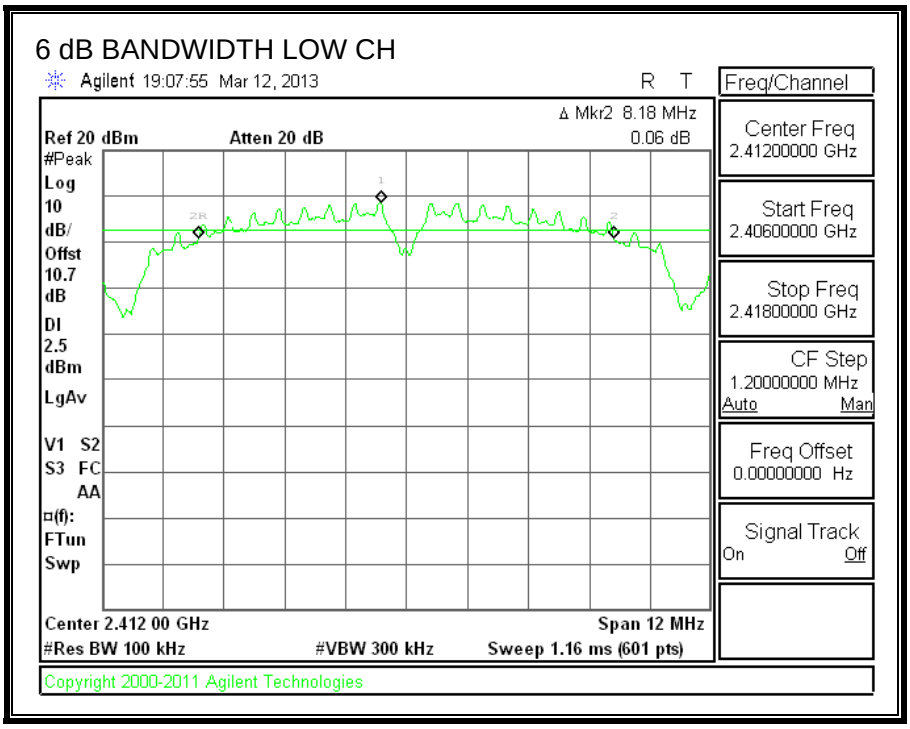
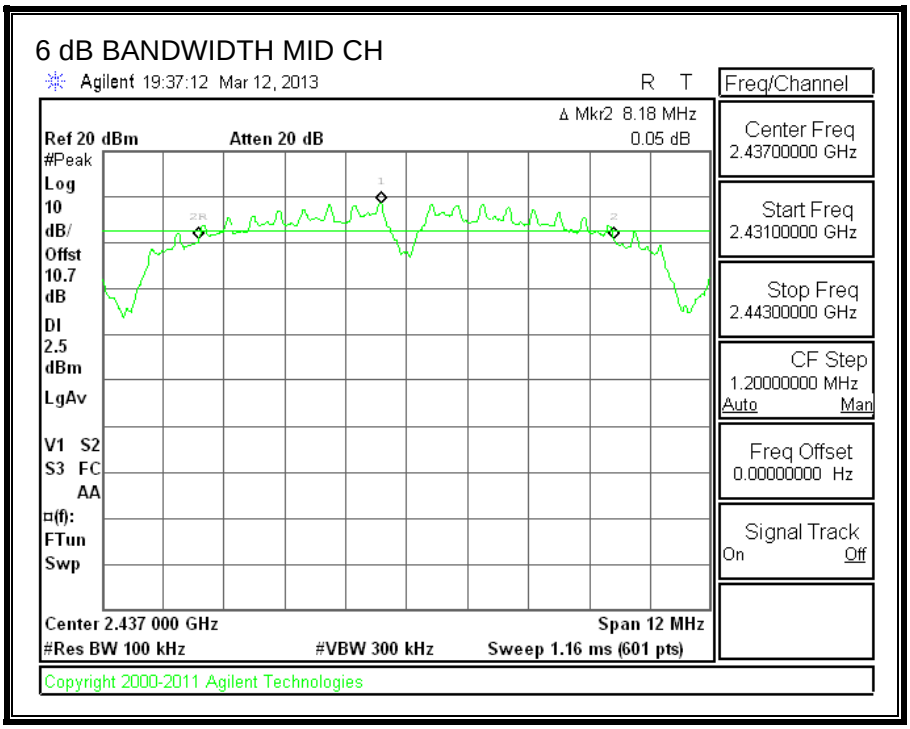
6 dB BANDWIDTH





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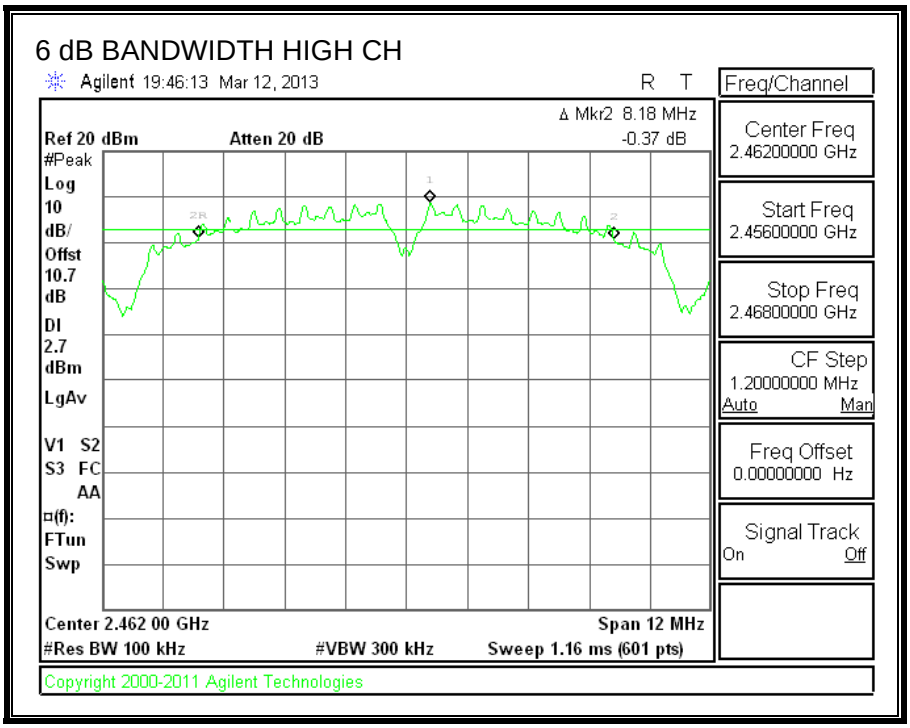
6 dB BANDWIDTH HIGH CH



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8.1.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	10.3214
Mid	2437	10.1265
High	2462	10.0920

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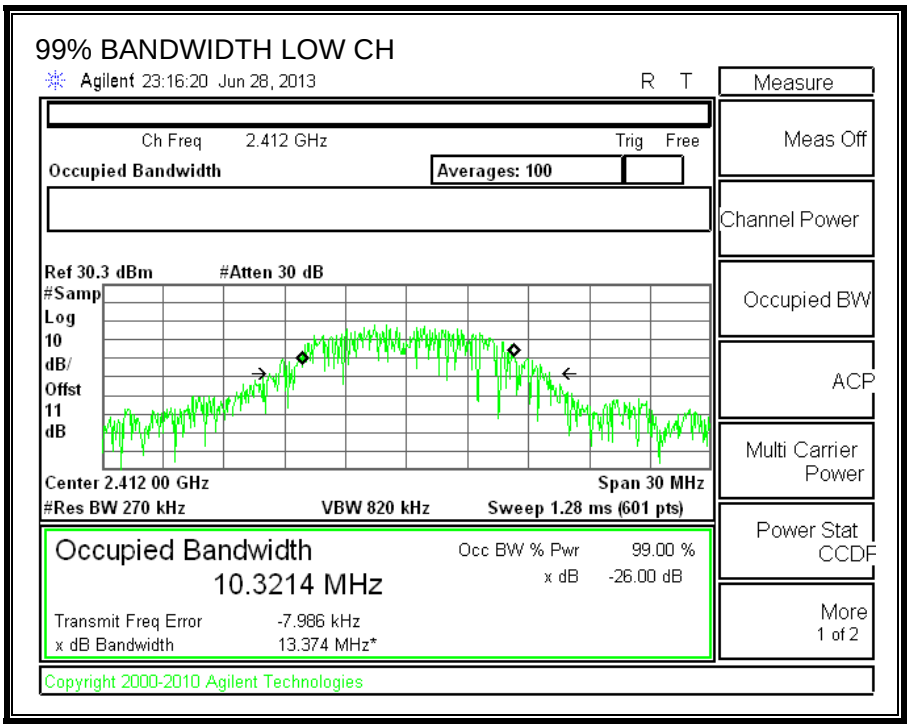
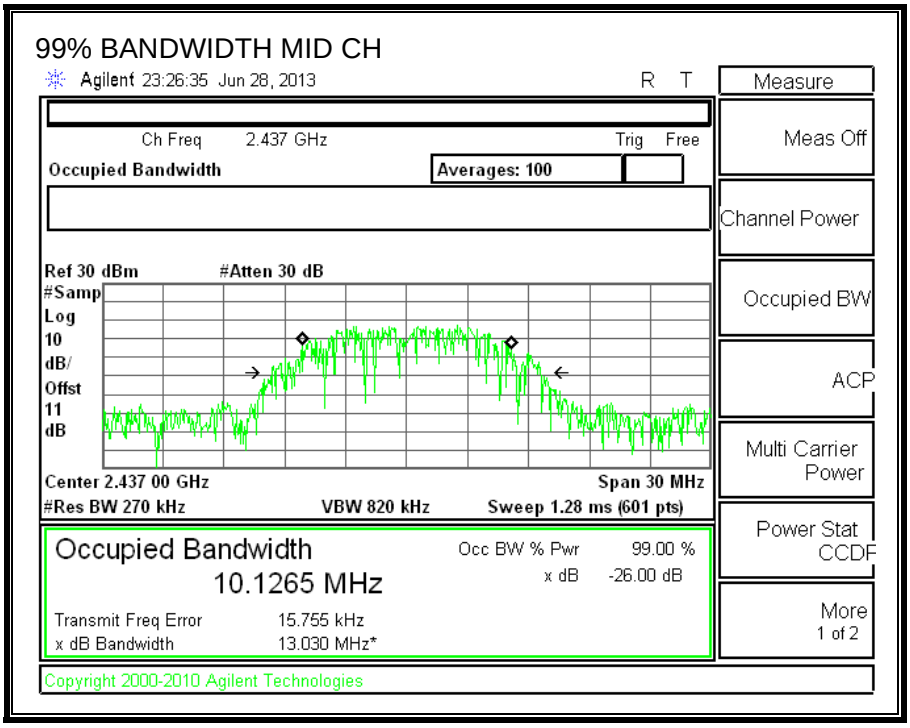
99% BANDWIDTH





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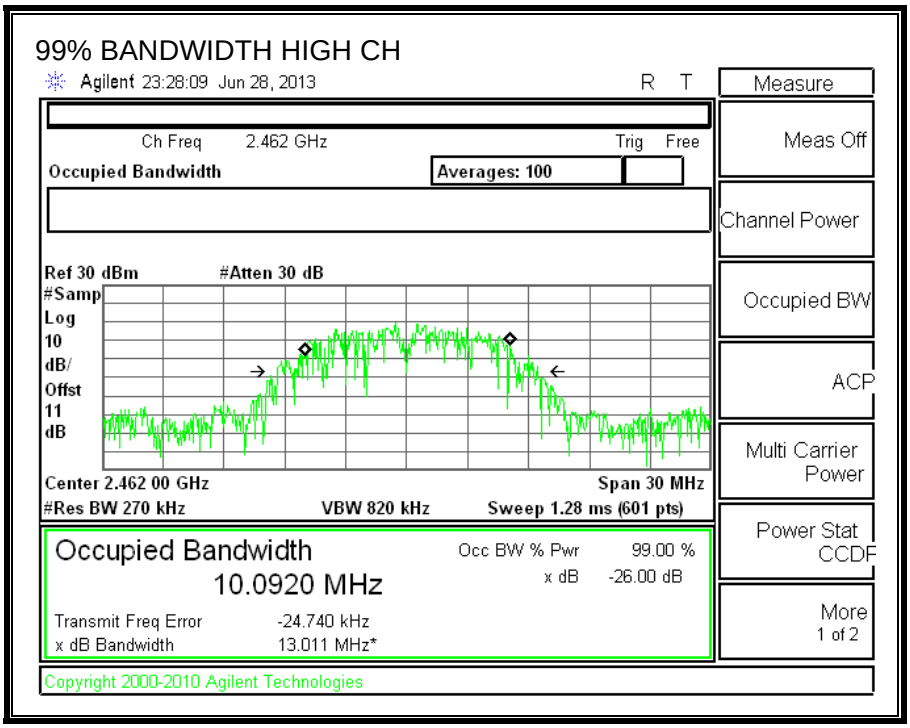

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8.1.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.68 dB (including 10 dB pad and .68 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	2412	16.00
Mid	2437	16.10
High	2462	16.20

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8.1.4. OUTPUT POWER

LIMITS

FCC §15.247

IC RSS-210 A8.4

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

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

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RESULTS

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	3.00	30.00	30	36	30.00
Mid	2437	3.00	30.00	30	36	30.00
High	2462	3.00	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	19.07	19.07	30.00	-10.93
Mid	2437	19.22	19.22	30.00	-10.78
High	2462	19.30	19.30	30.00	-10.70

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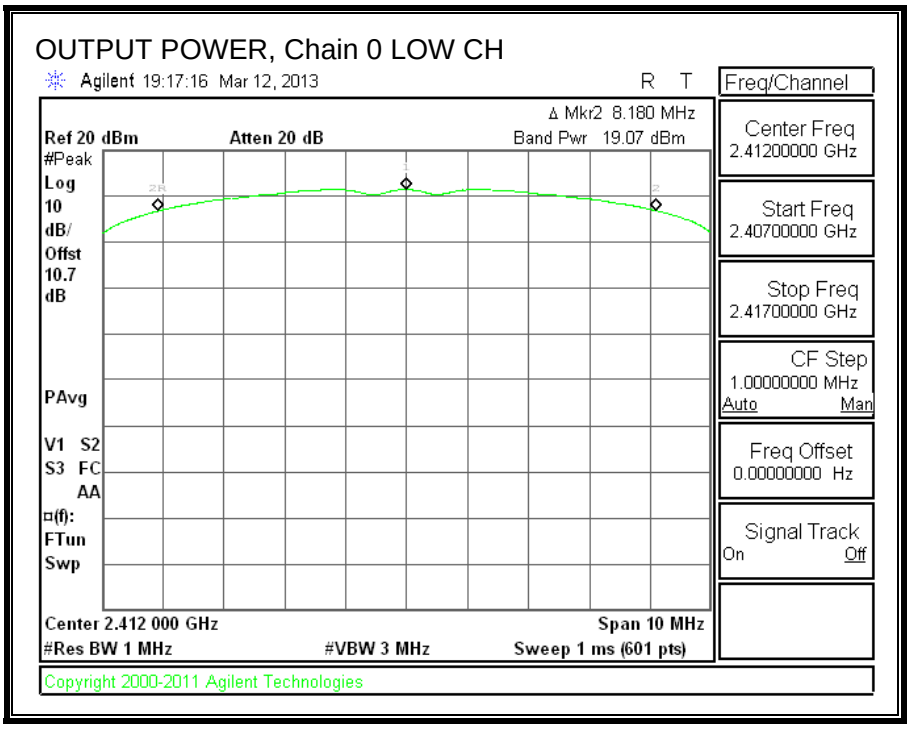
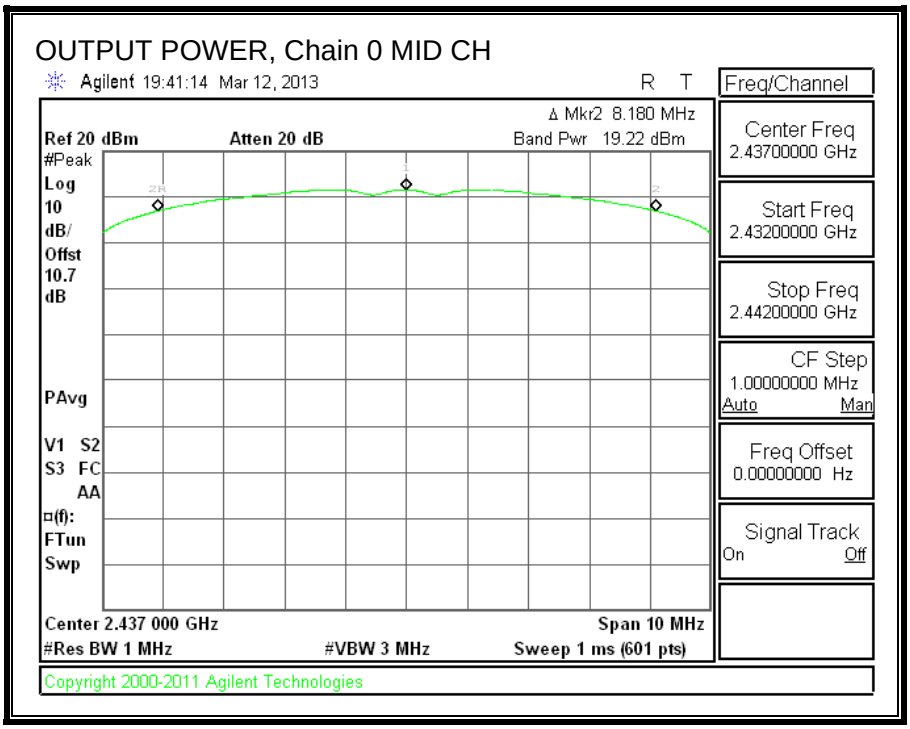
OUTPUT POWER, Chain 0





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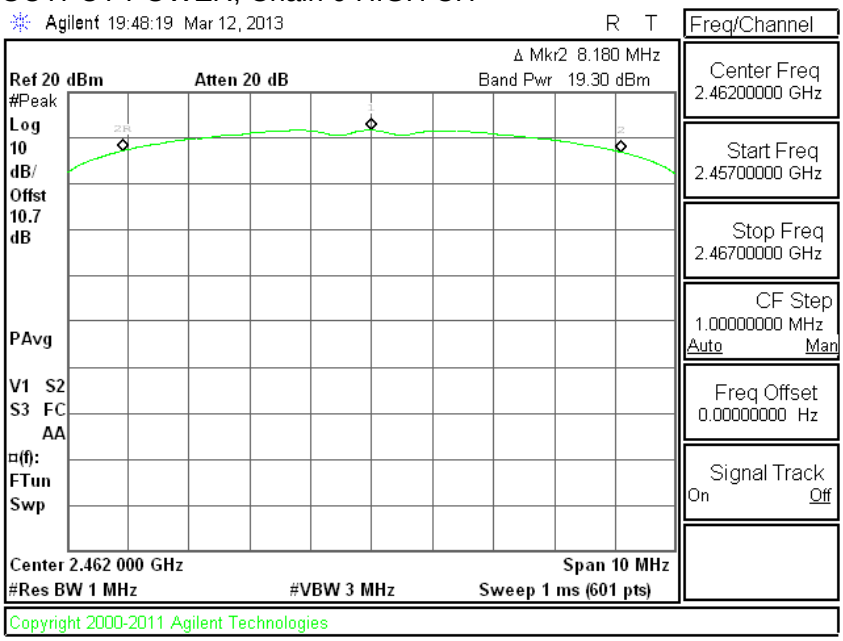
OUTPUT POWER, Chain 0 HIGH CH



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8.1.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247

IC RSS-210 A8.2

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.

RESULTS

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-5.38	8.0	-13.4
Mid	2437	-4.68	8.0	-12.7
High	2462	-4.93	8.0	-12.9

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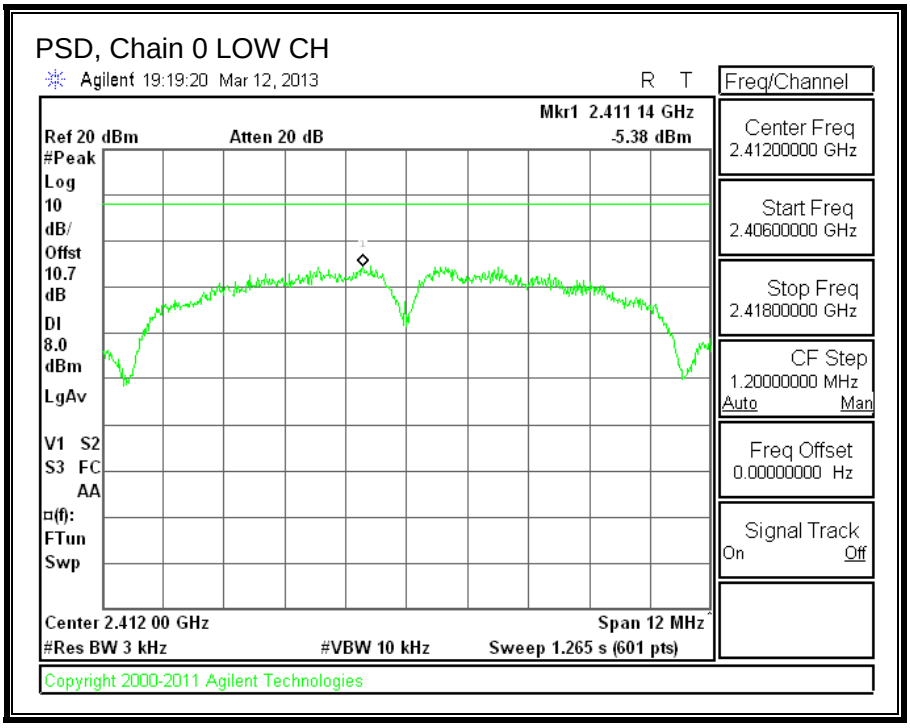
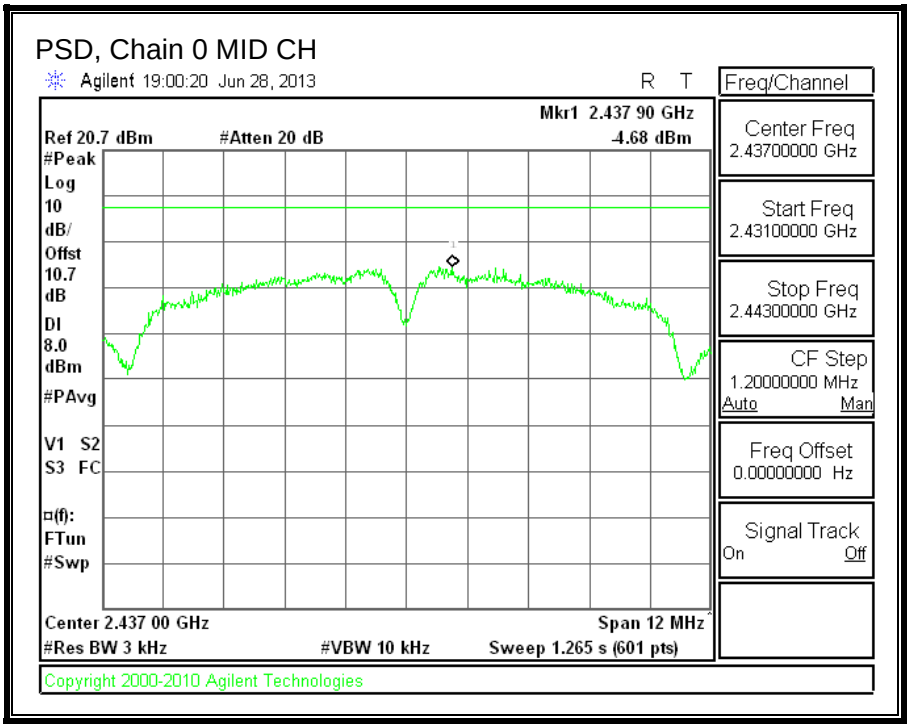
PSD, Chain 0





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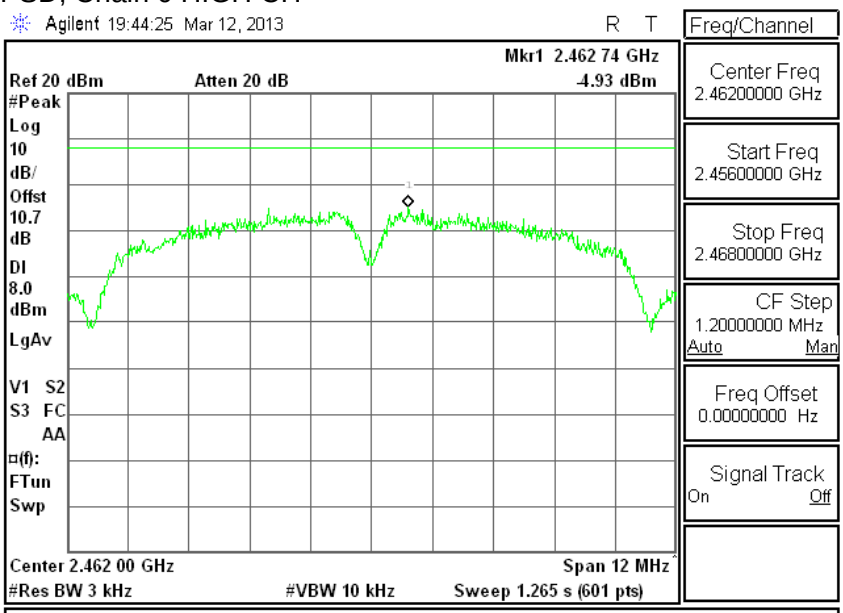
PSD, Chain 0 HIGH CH



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8.1.6. OUT-OF-BAND EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

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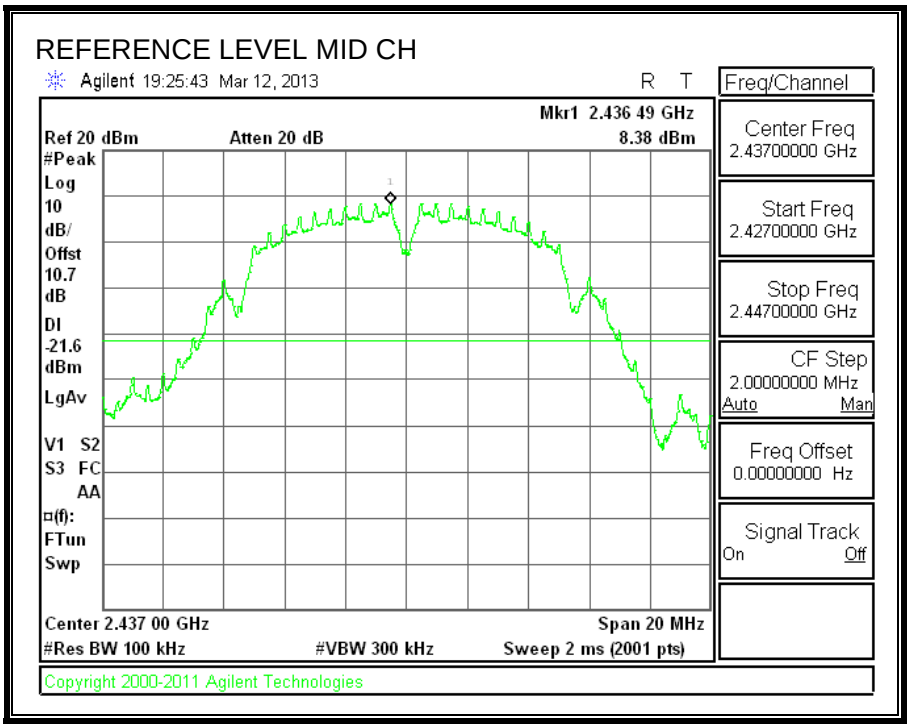
RESULTS

IN-BAND REFERENCE LEVEL



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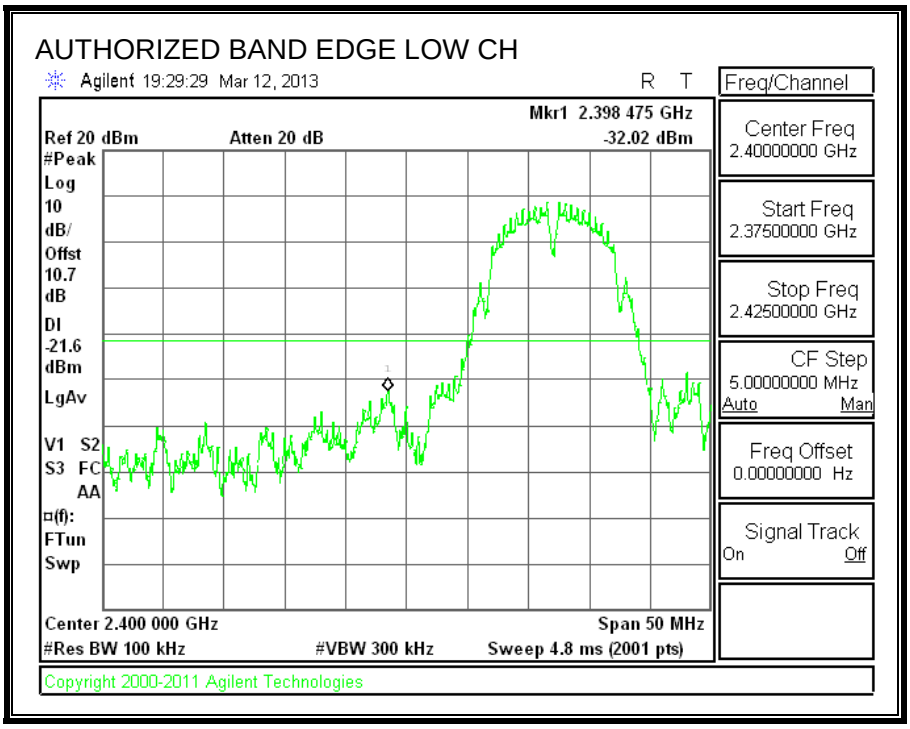
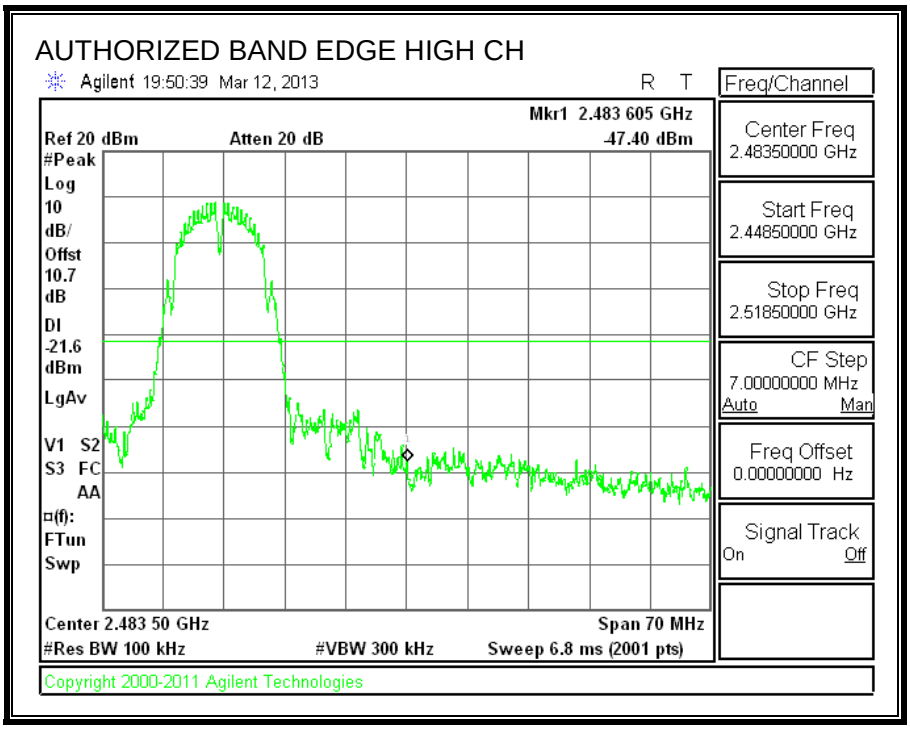
LOW CHANNEL BANDEDGE



HIGH CHANNEL BANDEDGE



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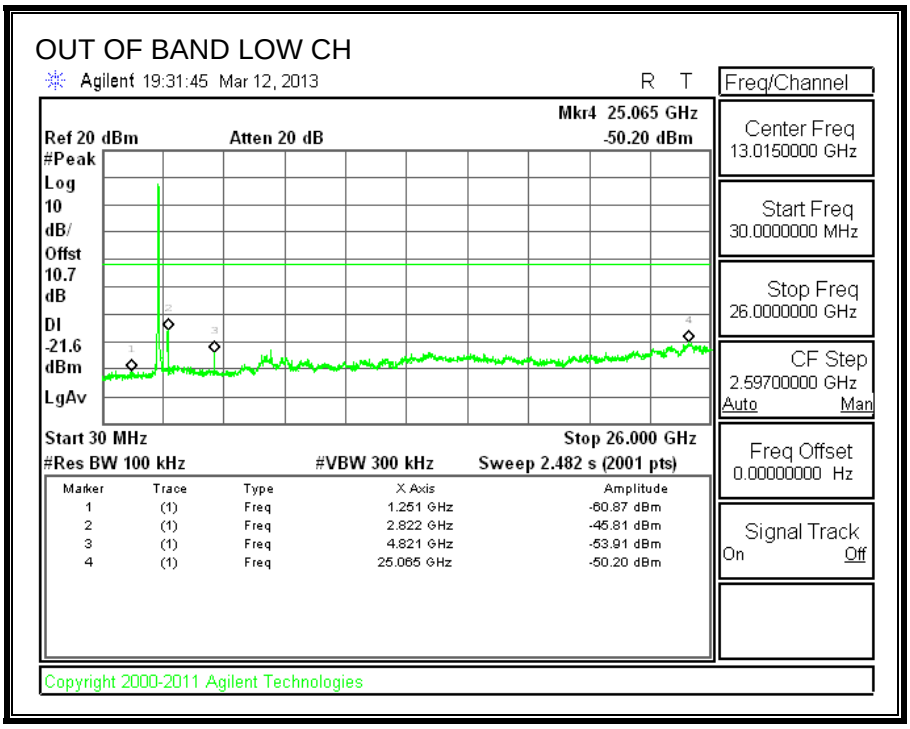
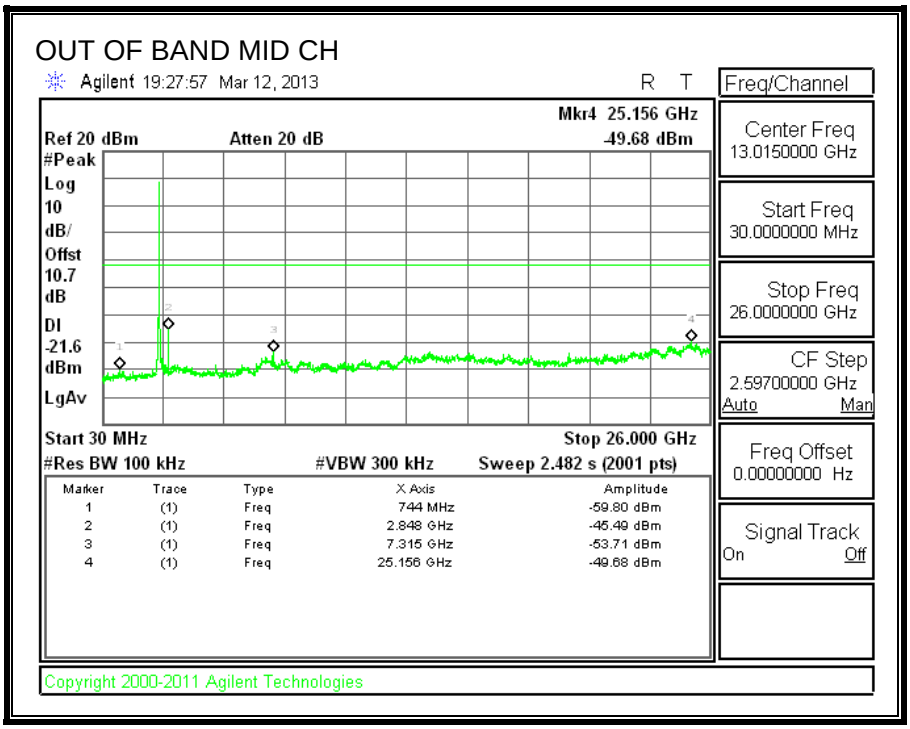
OUT-OF-BAND EMISSIONS





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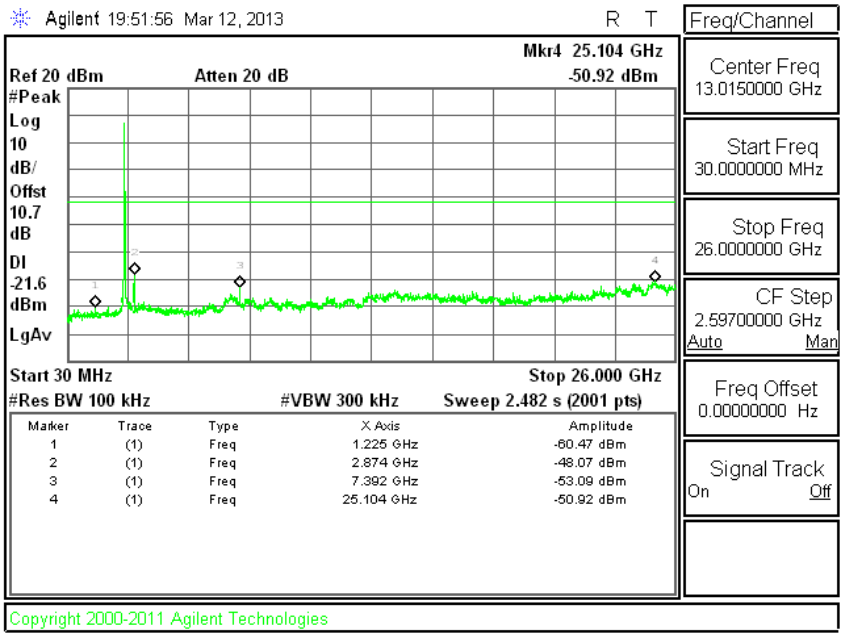
OUT OF BAND HIGH CH



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8.2. 802.11g CDD 2TX, 2.4 GHz BAND

8.2.1. 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.

RESULTS

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low	2412	15.64	15.60	0.5
Mid	2437	15.80	15.84	0.5
High	2462	15.76	15.52	0.5

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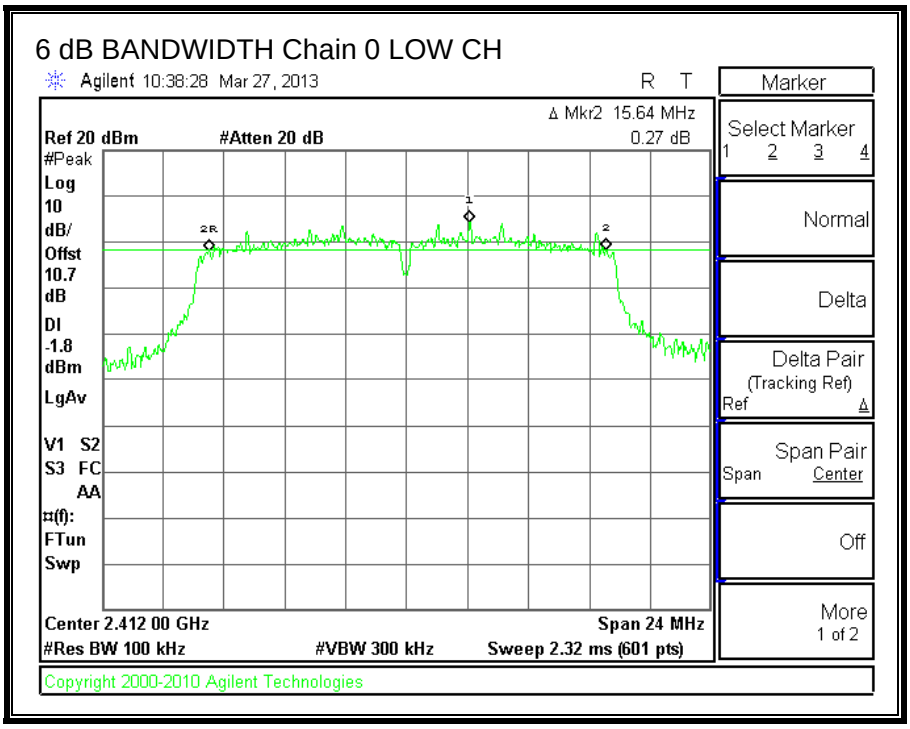
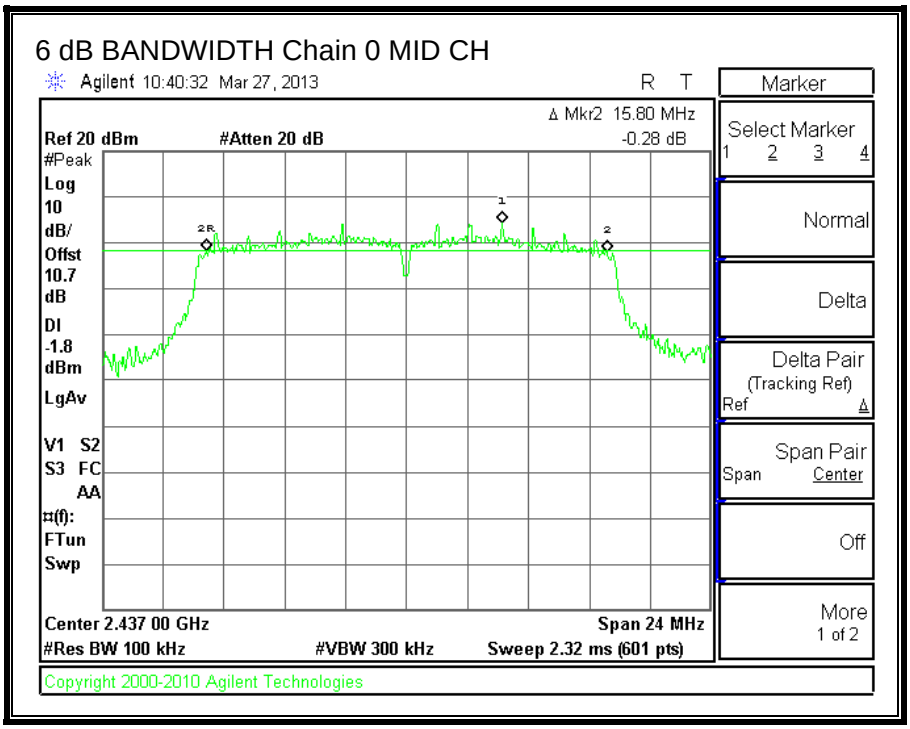
6 dB BANDWIDTH, Chain 0





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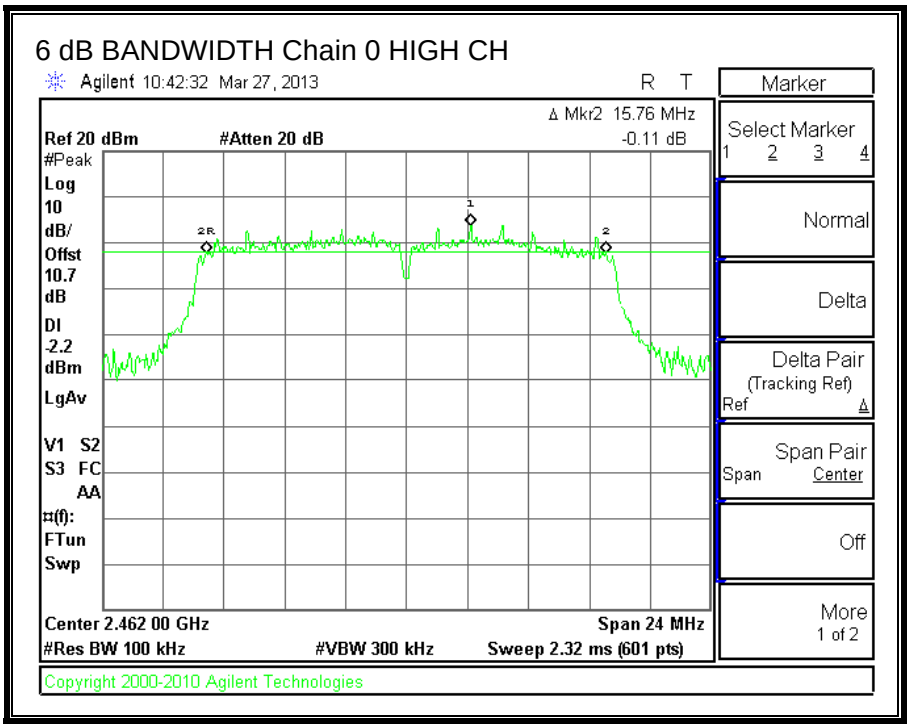
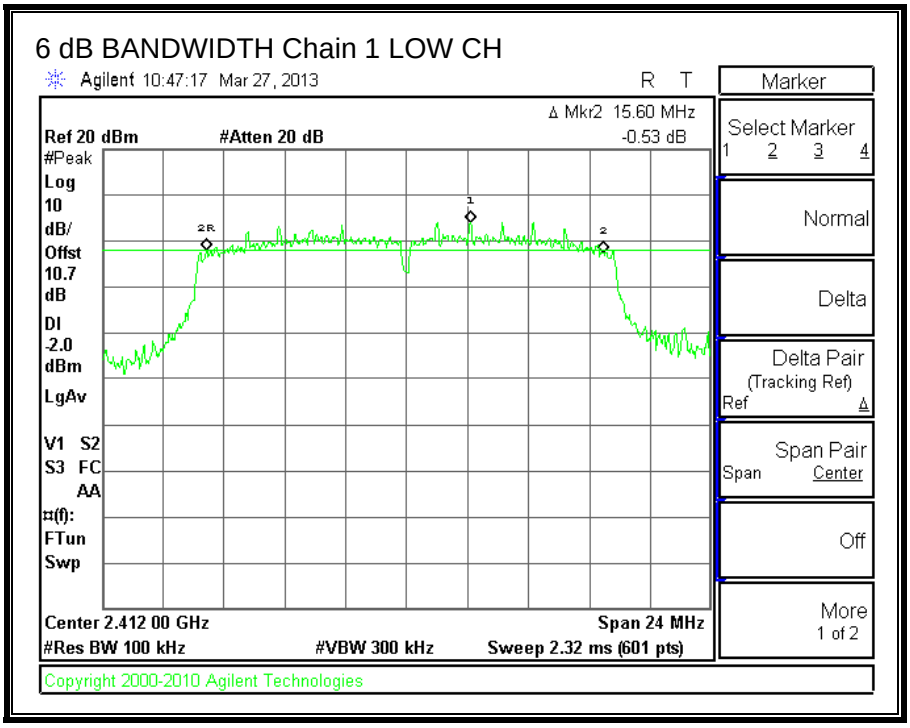


6 dB BANDWIDTH, Chain 1



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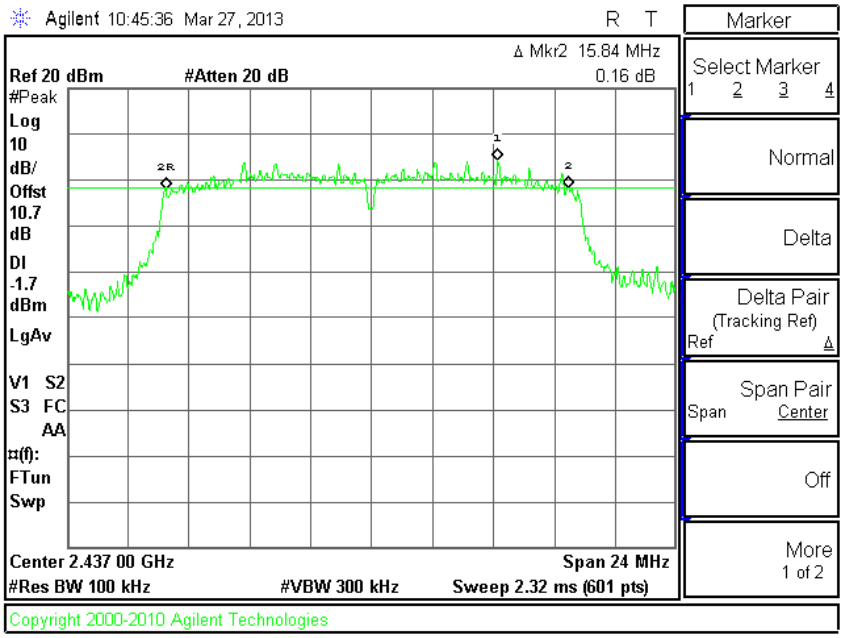
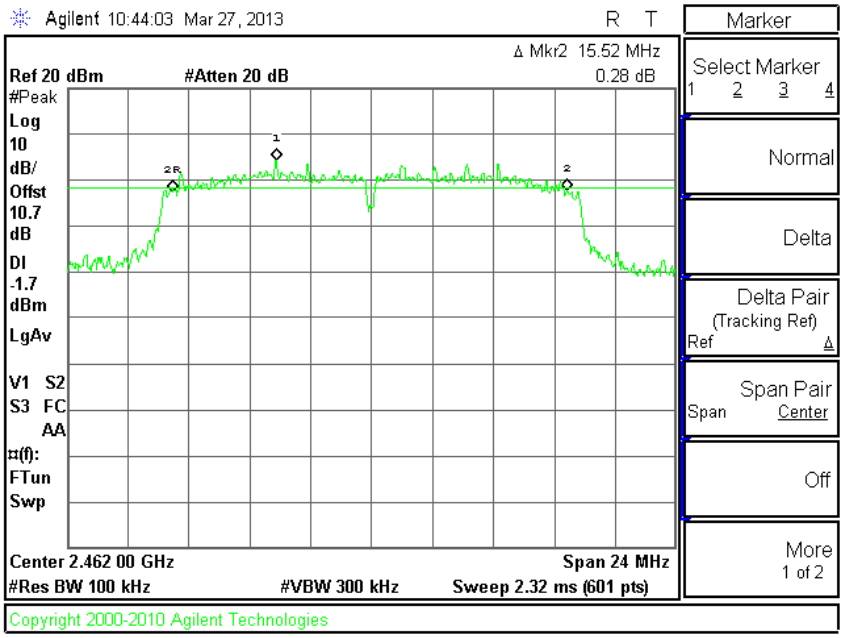
6 dB BANDWIDTH Chain 1 MID CH



6 dB BANDWIDTH Chain 1 HIGH CH



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8.2.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)
Low	2412	16.3385	16.3088
Mid	2437	16.3296	16.3012
High	2462	16.4614	16.2726

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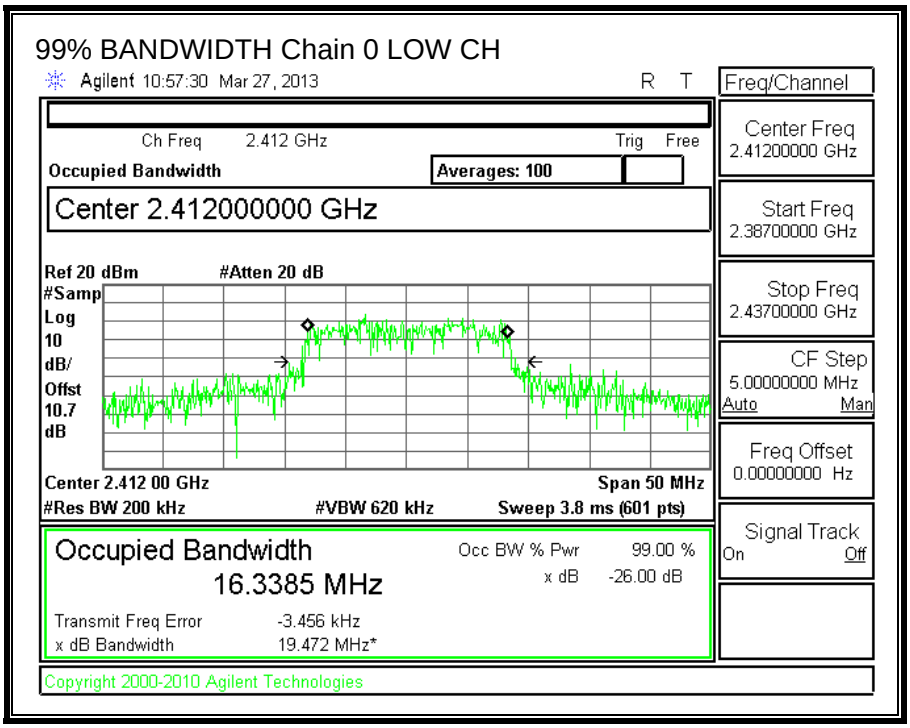
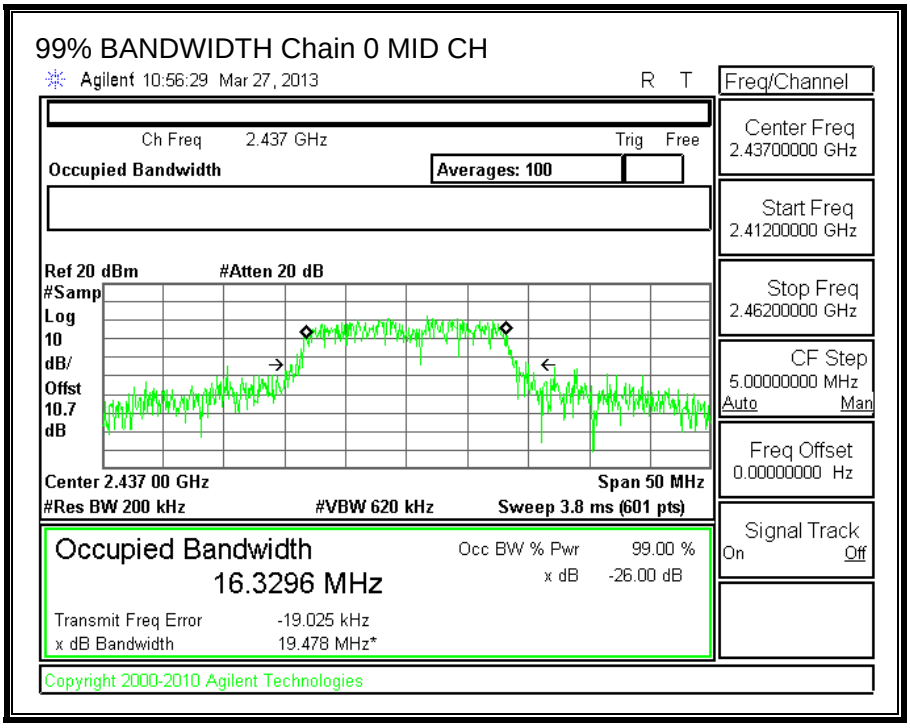
99% BANDWIDTH, Chain 0





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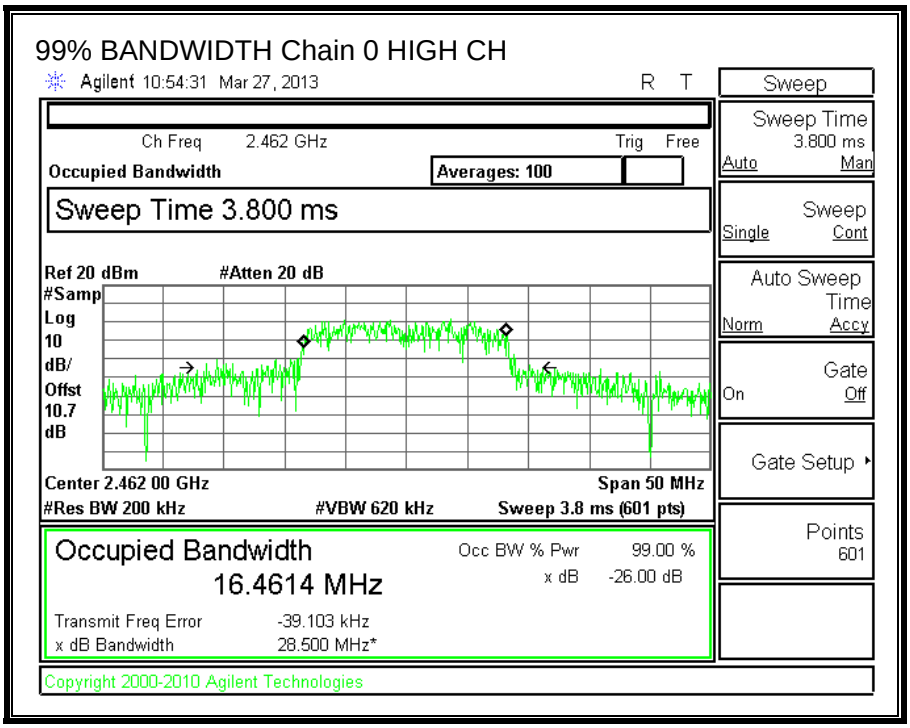
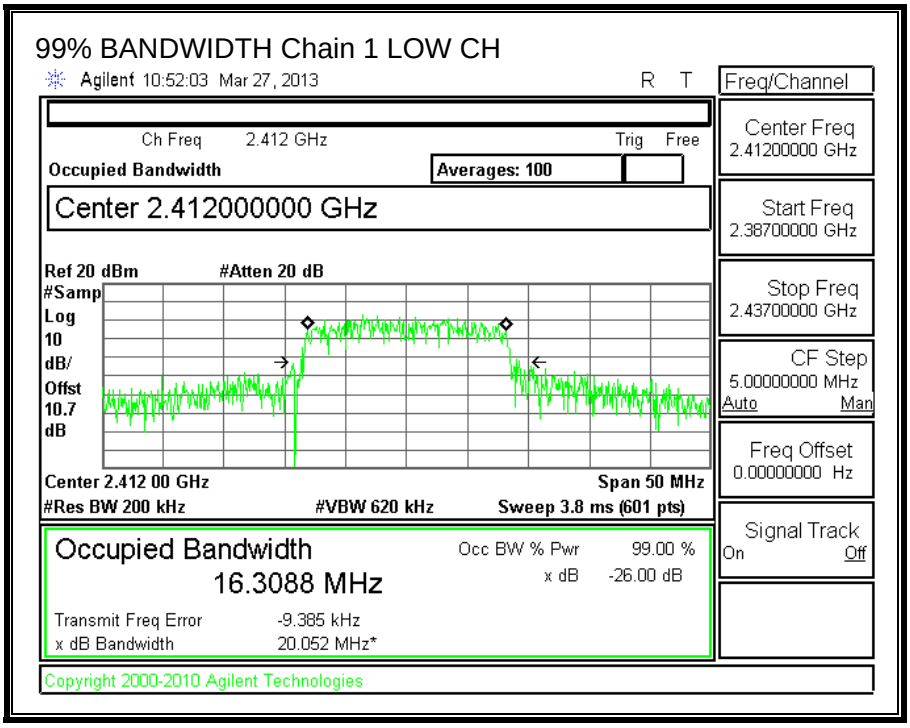


99% BANDWIDTH, Chain 1



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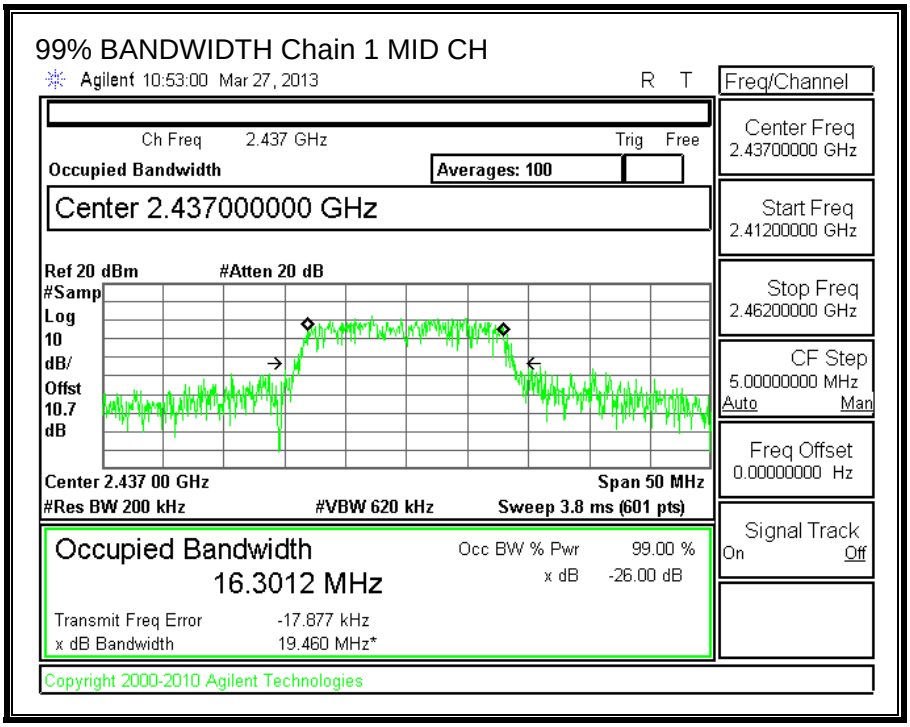

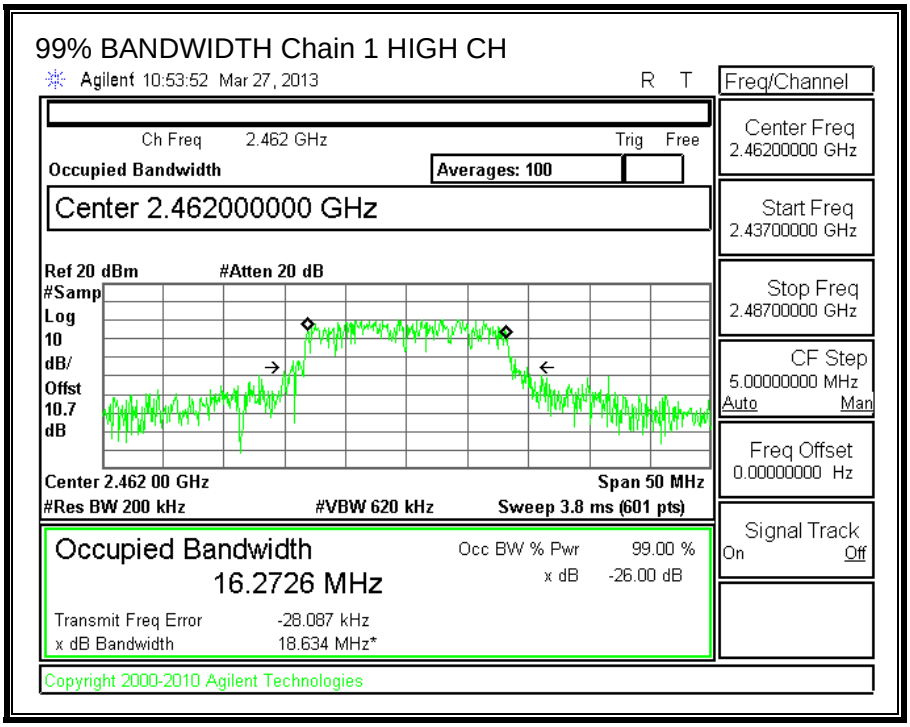

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8.2.1. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.7 dB (including 10 dB pad and 0.7 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
Low	2412	12.50	13.10	15.82
Mid	2437	14.00	14.80	17.43
High	2462	14.10	14.10	17.11

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8.2.2. OUTPUT POWER

LIMITS

FCC §15.247

IC RSS-210 A8.4

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain.

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
3.00	3.00	3.00

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RESULTS

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	3.00	30.00	30	36	30.00
Mid	2437	3.00	30.00	30	36	30.00
High	2462	3.00	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margi (dB)
Low	2412	22.94	24.18	26.61	30.00	-3.39
Mid	2437	22.22	24.04	26.23	30.00	-3.77
High	2462	22.98	23.19	26.10	30.00	-3.90

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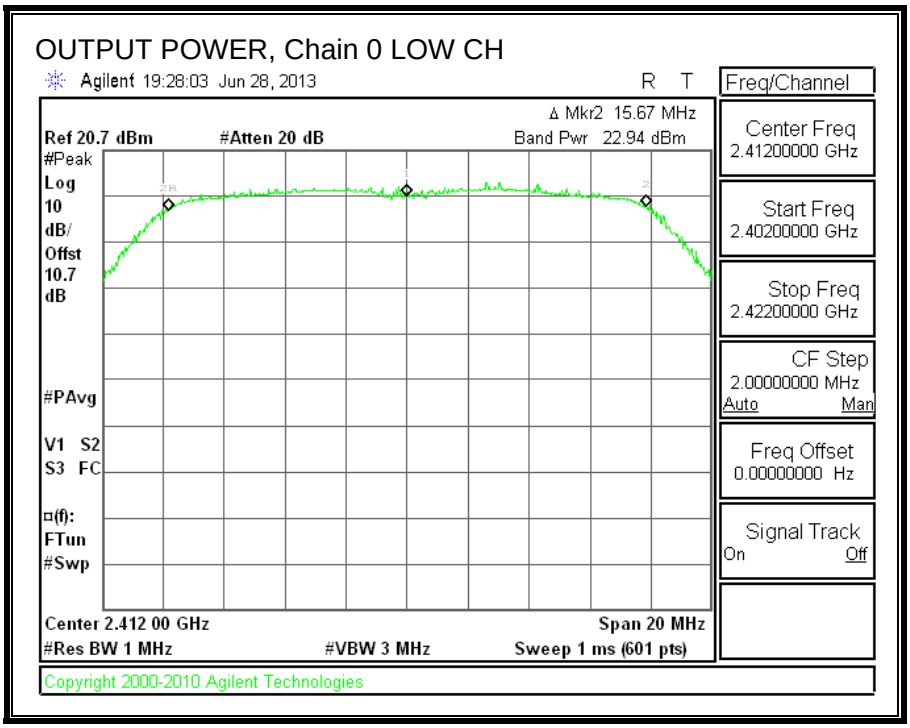
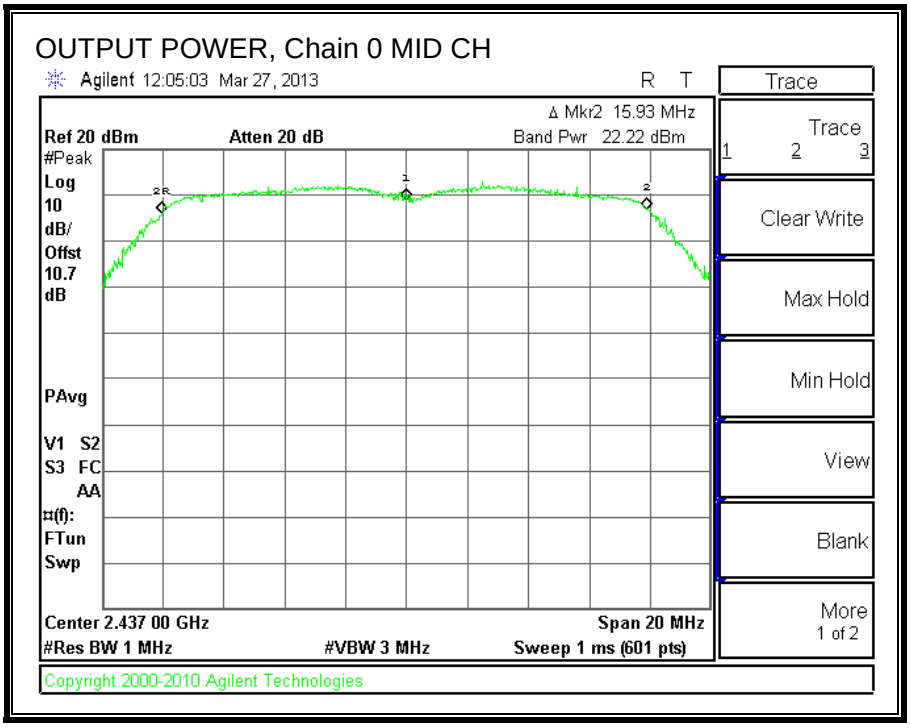
OUTPUT POWER, Chain 0





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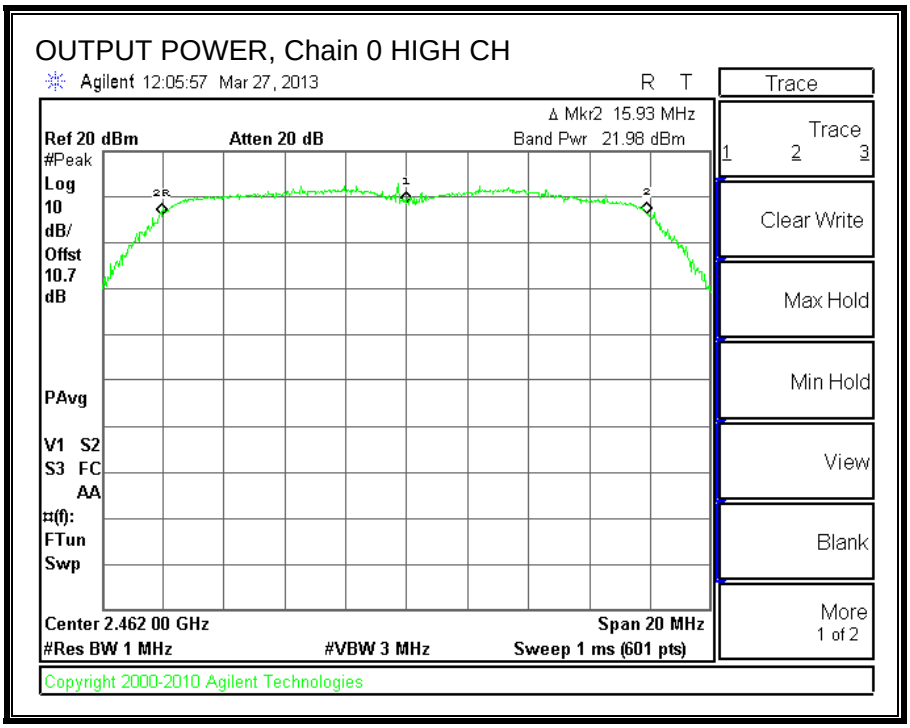
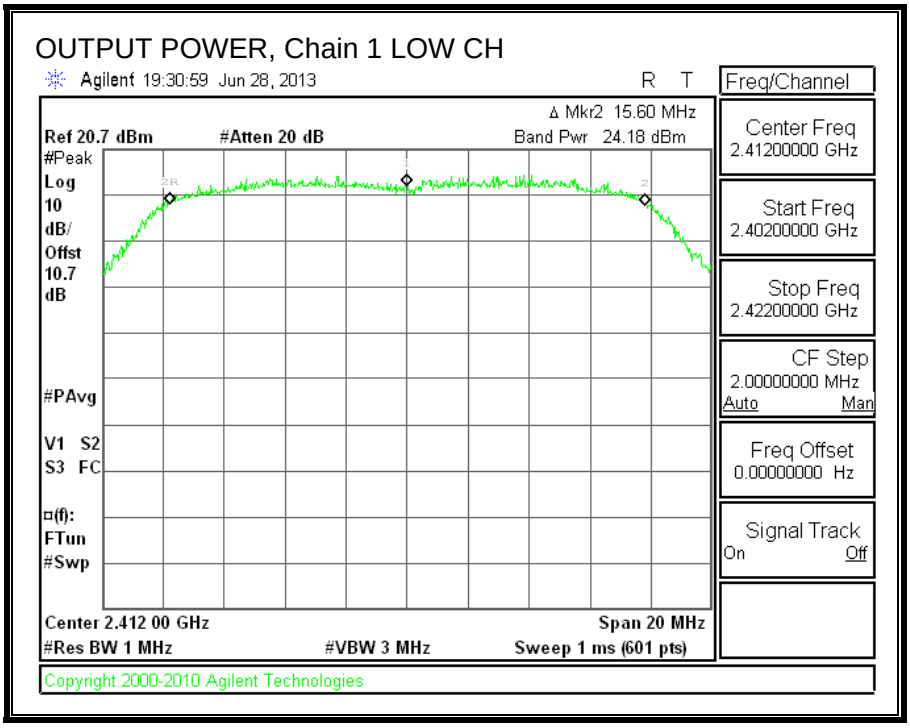


OUTPUT POWER, Chain 1



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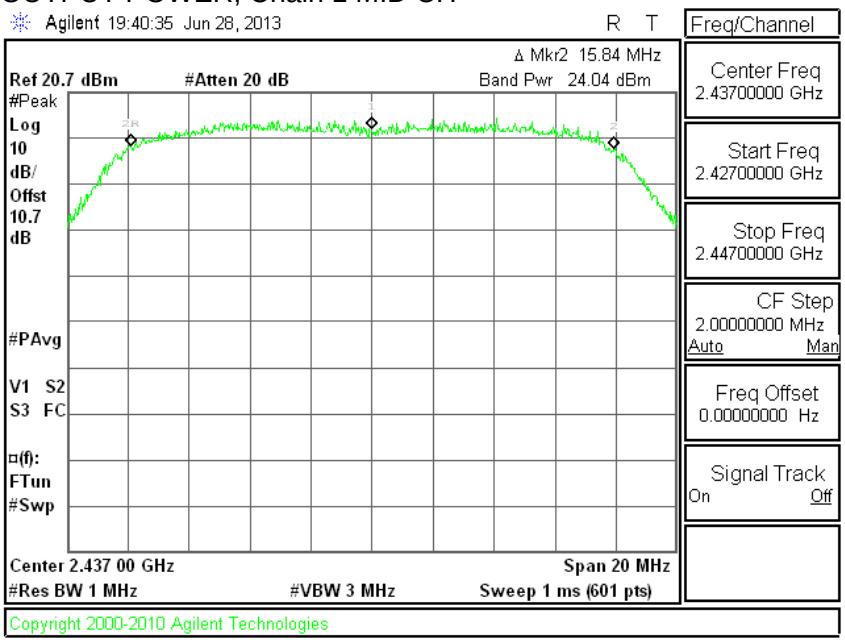
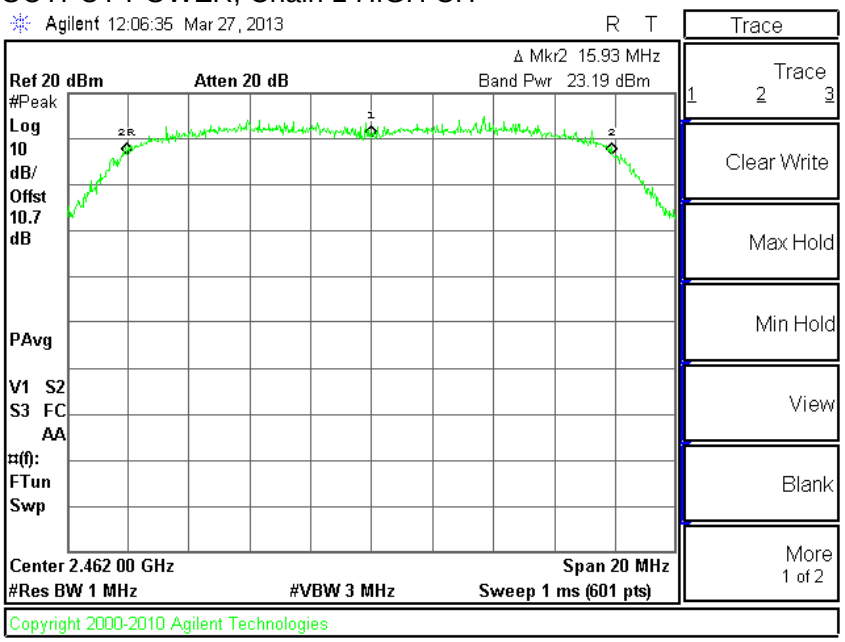
OUTPUT POWER, Chain 1 MID CH



OUTPUT POWER, Chain 1 HIGH CH



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8.2.3. PSD

LIMITS

FCC §15.247

IC RSS-210 A8.2

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.

RESULTS

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Chain 1 Meas (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-10.58	-9.91	-7.22	8.0	-15.2
Mid	2437	-10.23	-9.81	-7.00	8.0	-15.0
High	2462	-10.04	-9.98	-7.00	8.0	-15.0

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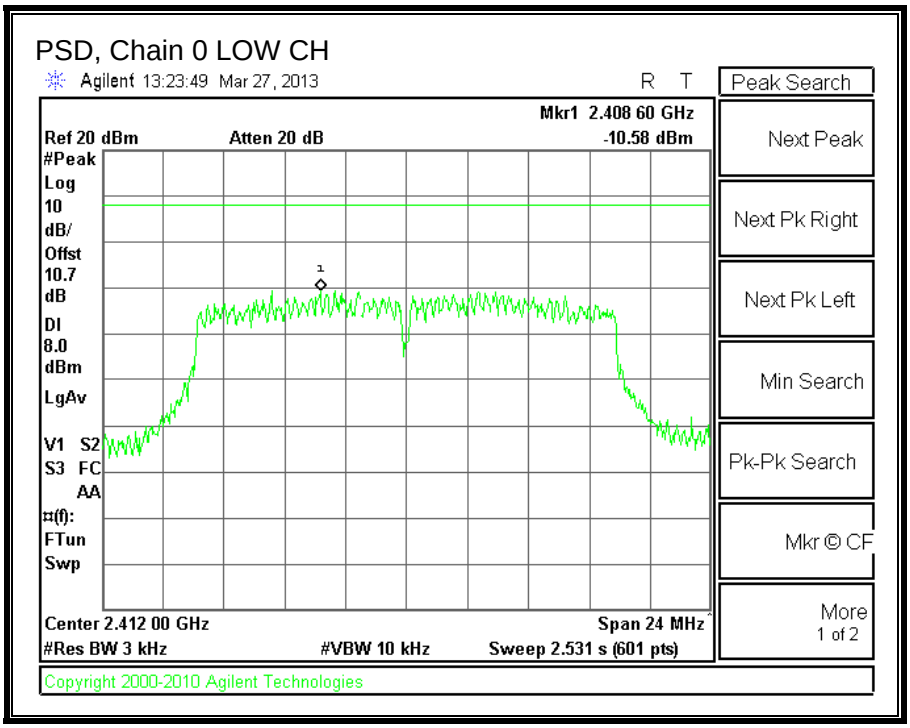
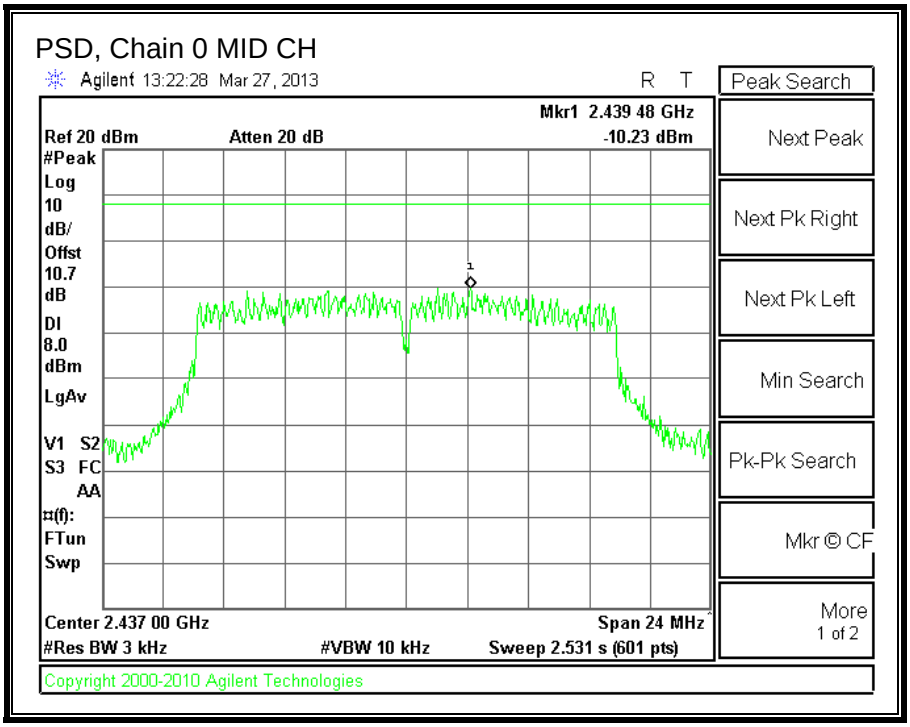
PSD, Chain 0





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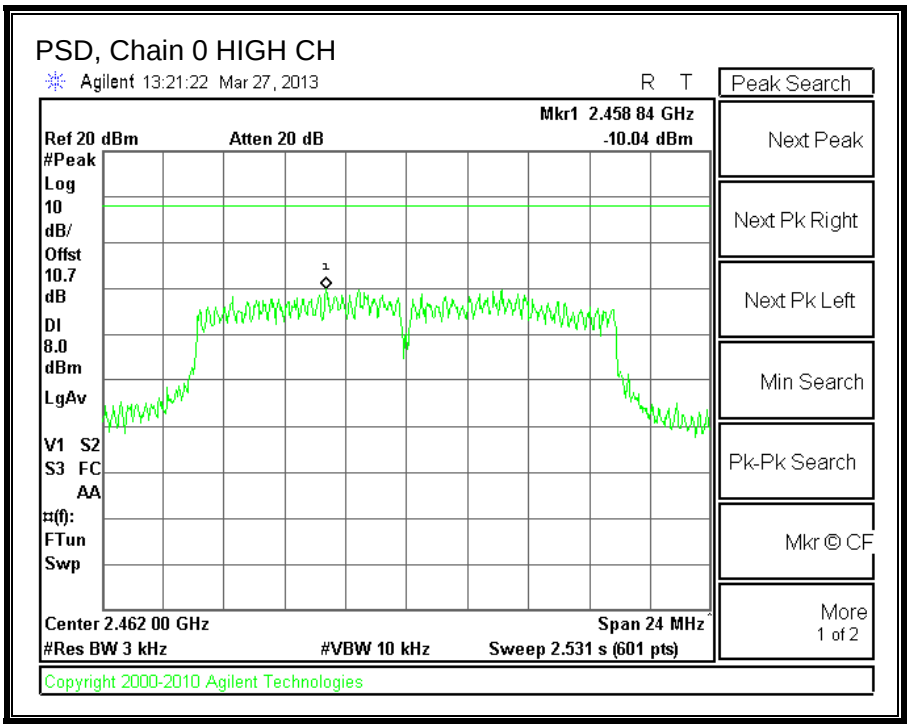
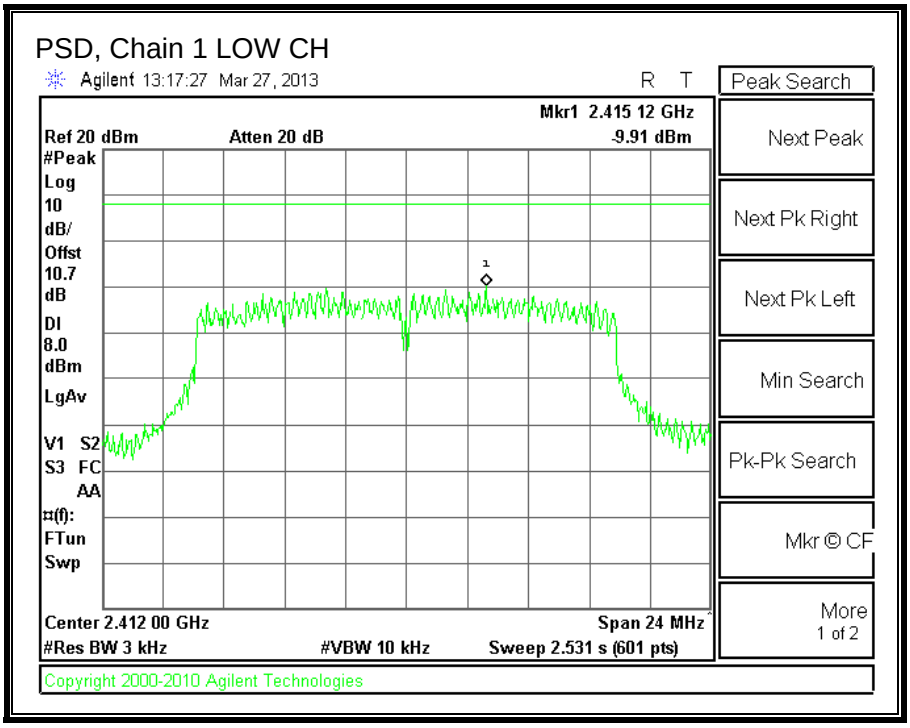


PSD, Chain 1



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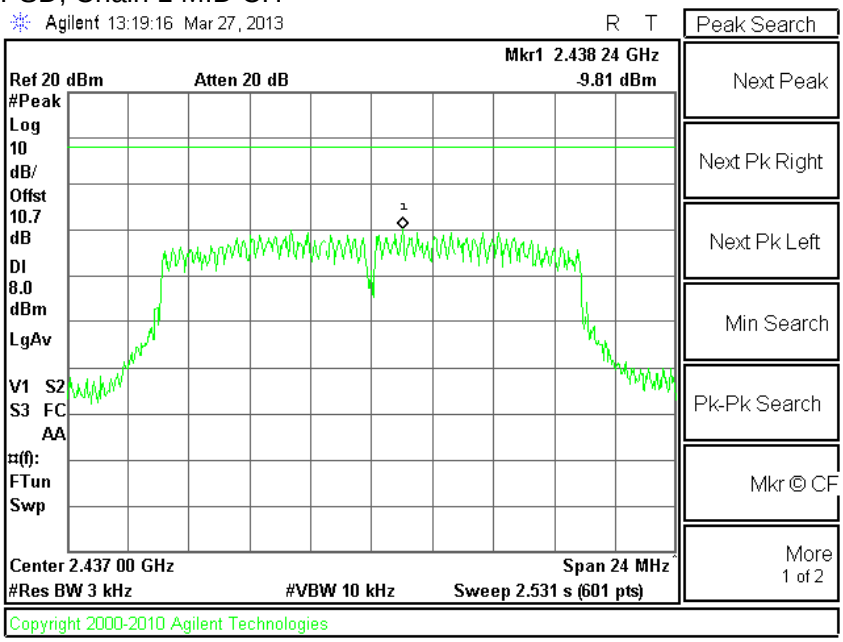
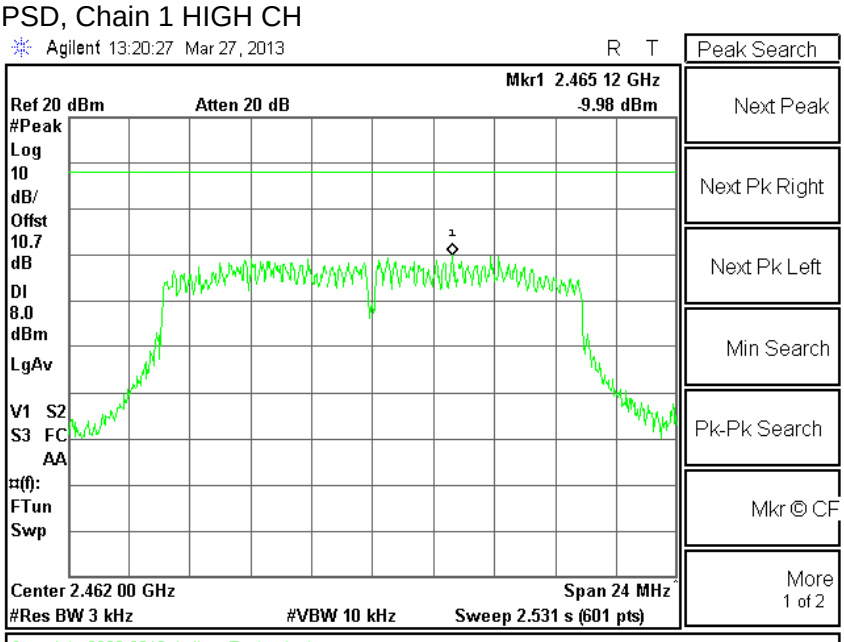
PSD, Chain 1 MID CH



PSD, Chain 1 HIGH CH



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8.2.4. OUT-OF-BAND EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the in-band reference level, band edge (where measurements to the general radiated limits will not be made) and out-of-band emissions.

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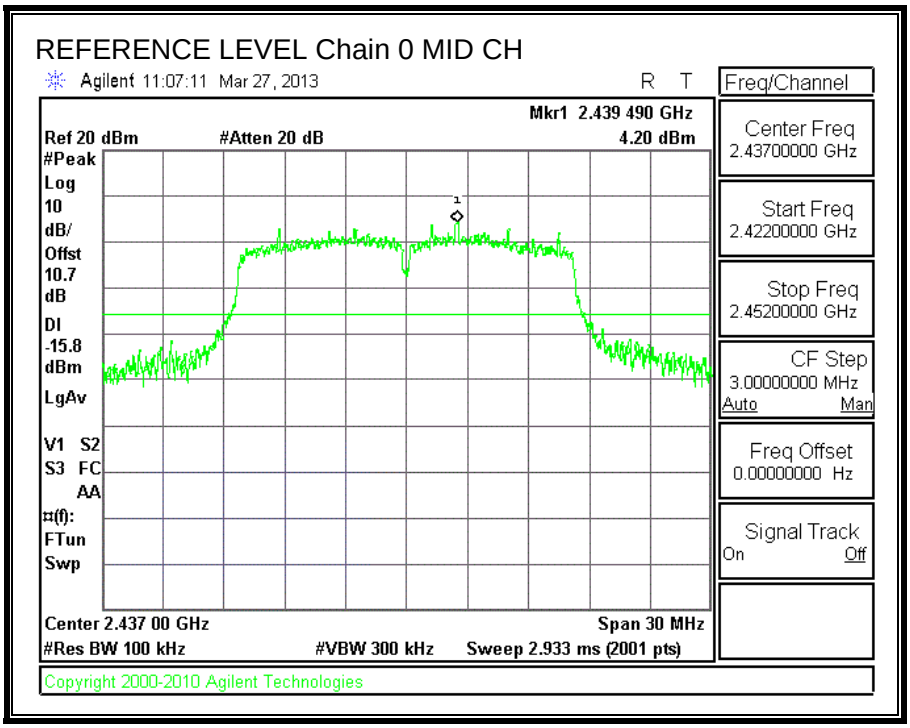
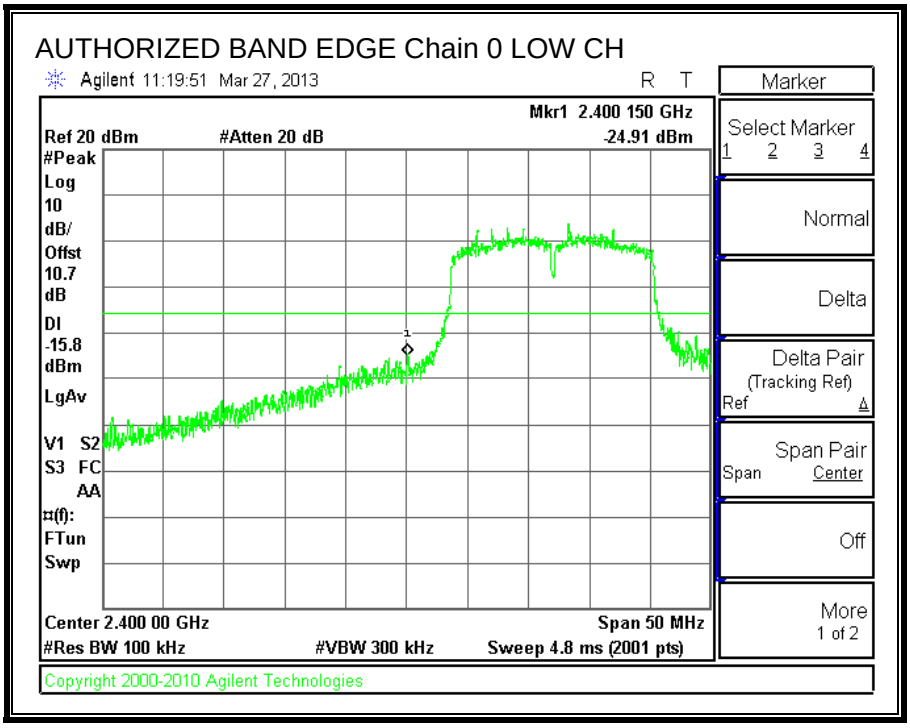
IN-BAND REFERENCE LEVEL, Chain 0



LOW CHANNEL BANDEDGE, Chain 0



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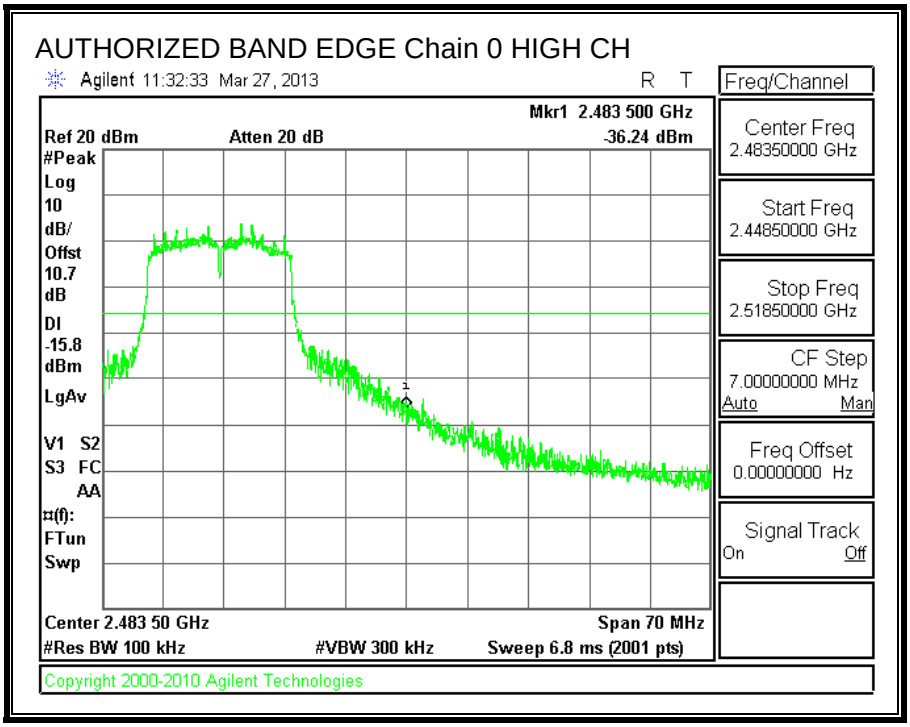
HIGH CHANNEL BANDEDGE, Chain 0



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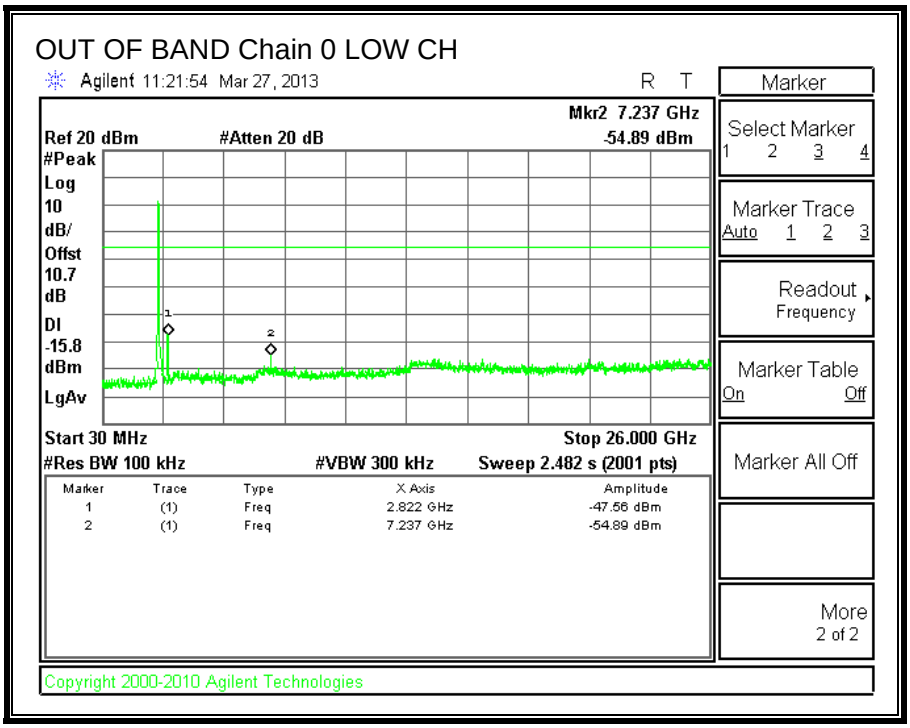
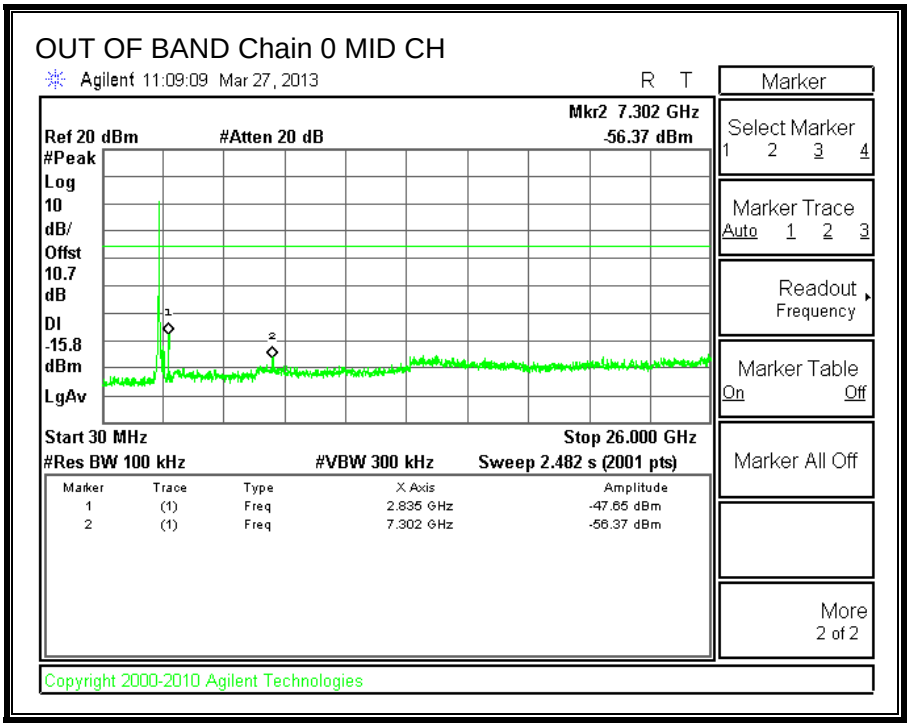
OUT-OF-BAND EMISSIONS, Chain 0





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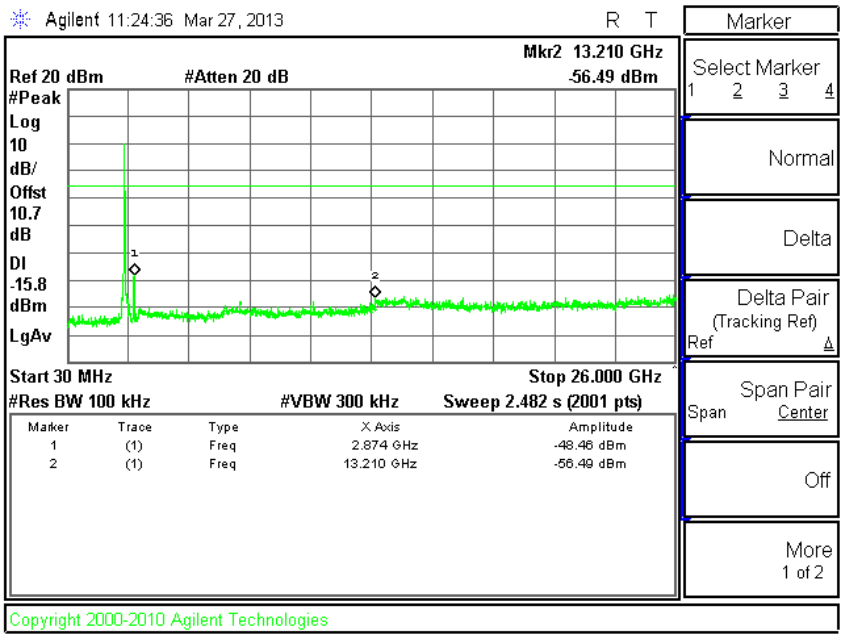
OUT OF BAND Chain 0 HIGH CH



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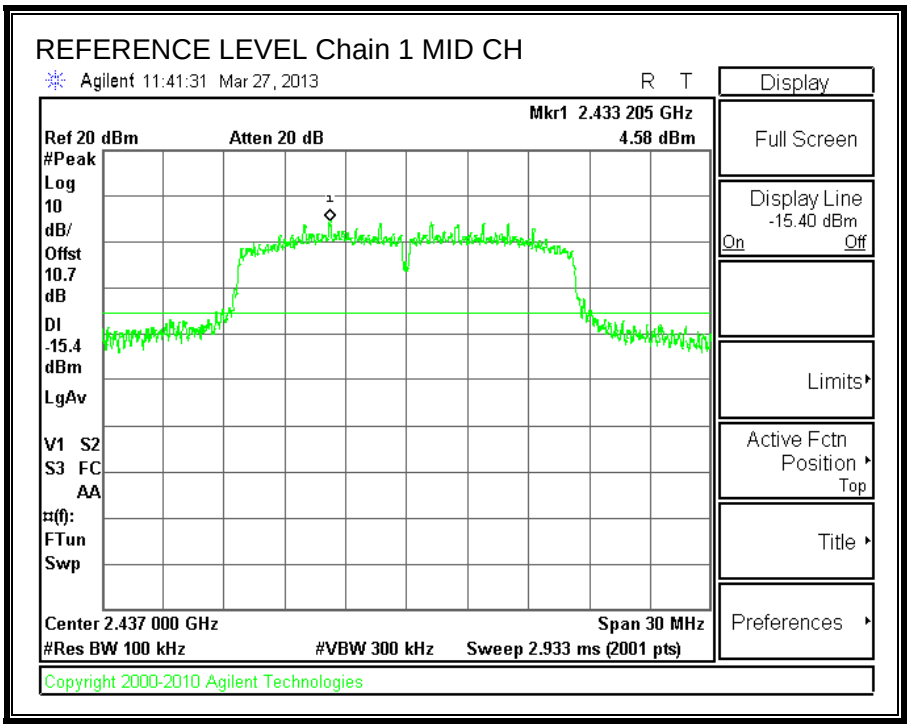
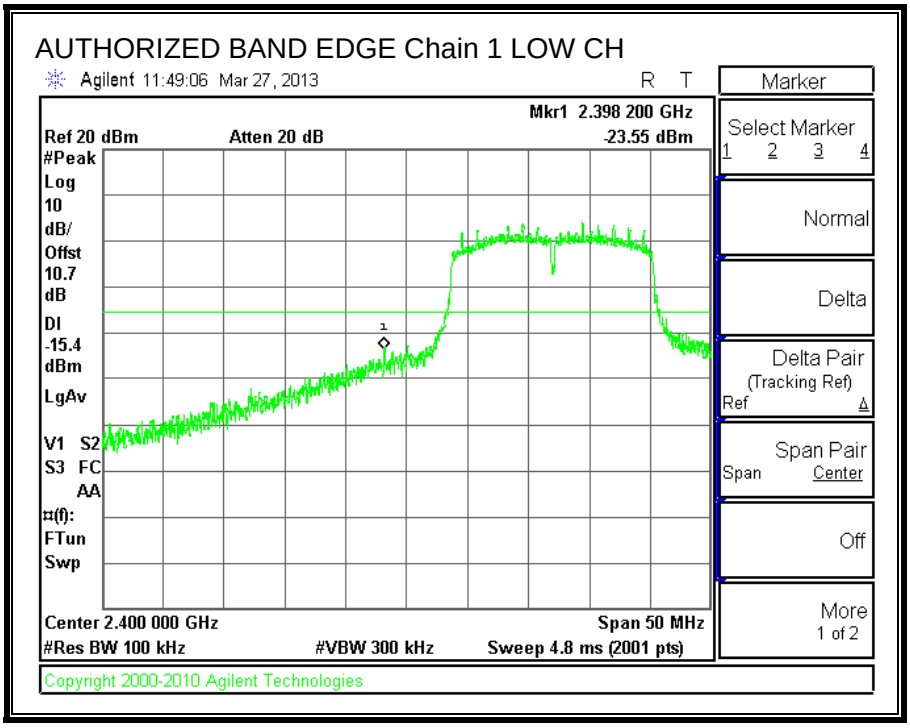
IN-BAND REFERENCE LEVEL, Chain 1



LOW CHANNEL BANDEDGE, Chain 1



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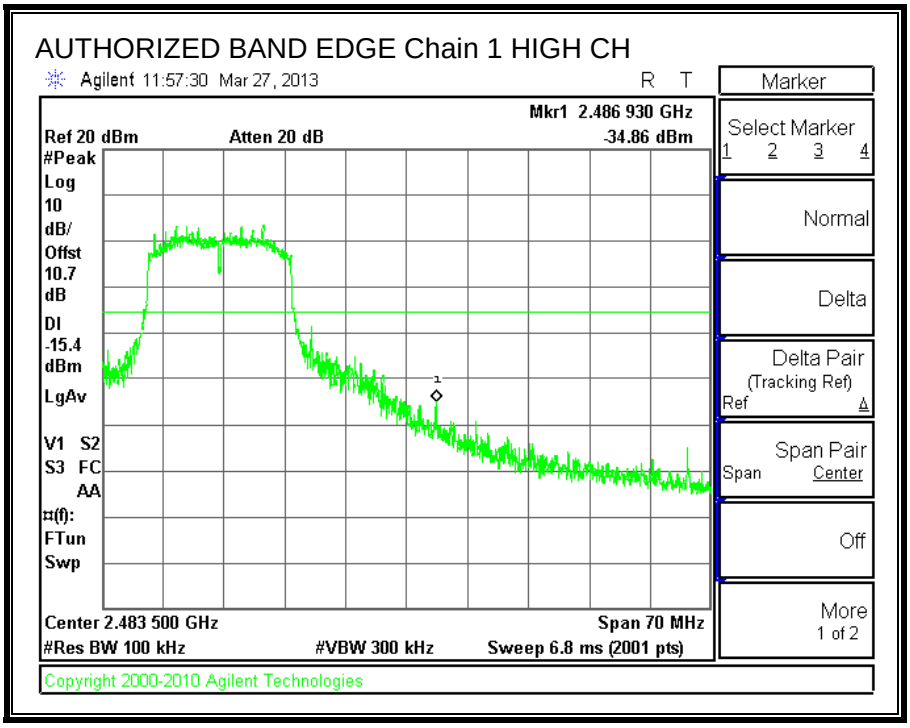
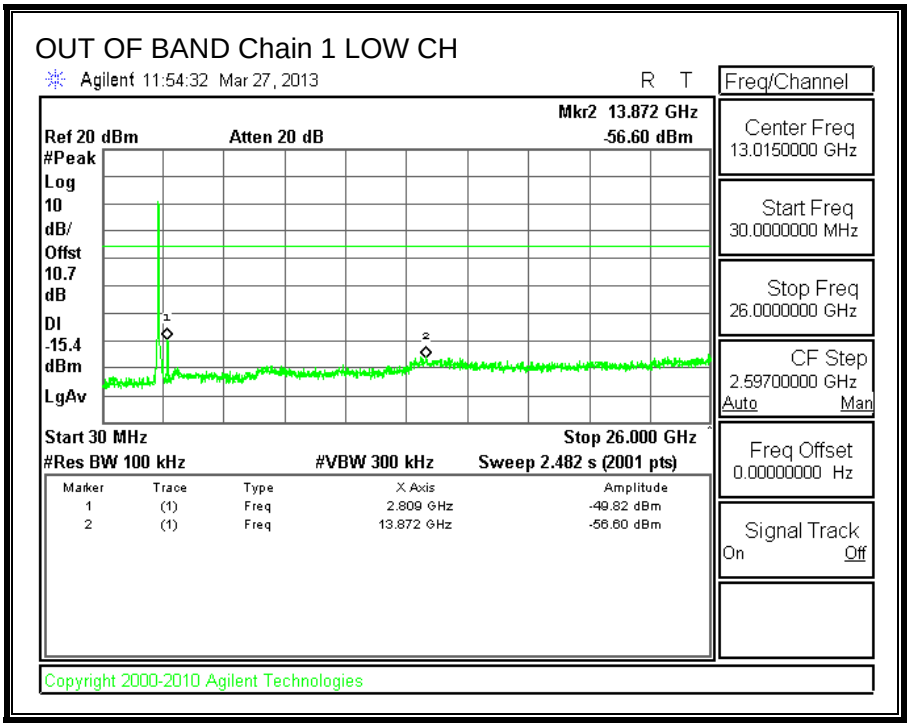
HIGH CHANNEL BANDEDGE, Chain 1





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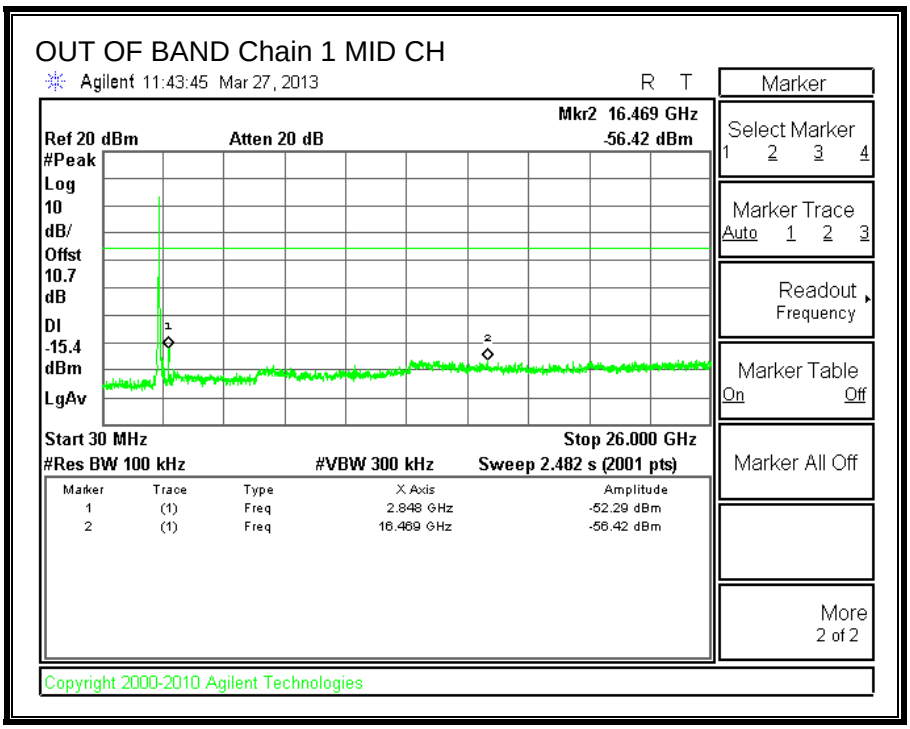
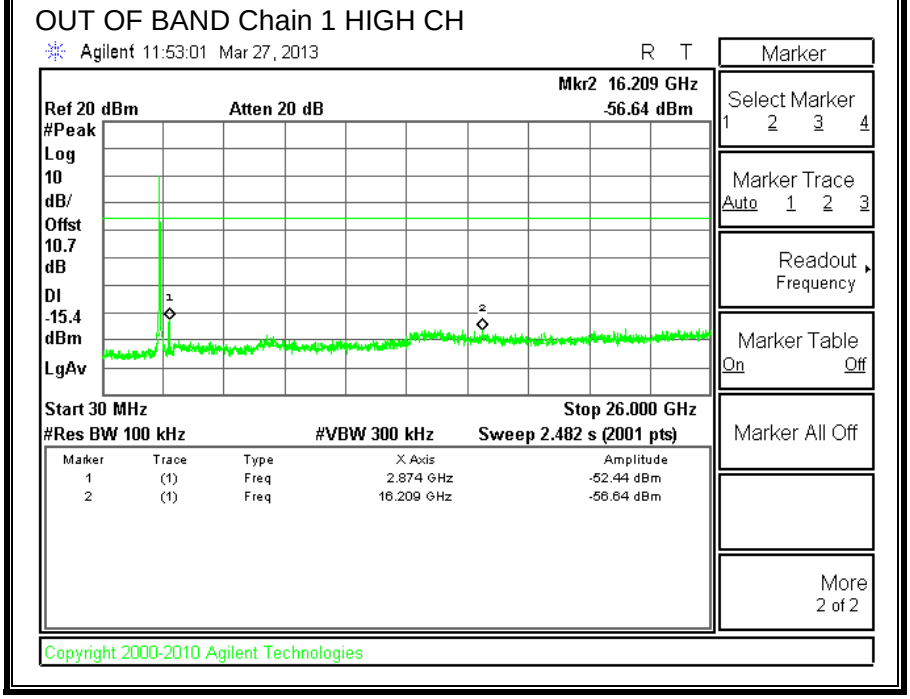
OUT OF BAND Chain 1 MID CH



OUT OF BAND Chain 1 HIGH CH



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8.3. 802.11n HT20 CDD MCS0 2TX MODE, 2.4 GHz BAND

8.3.1. 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 with the RBW set between 1% and 5% of the EBW, the VBW >= 3 x RBW, peak detector and max hold.

RESULTS

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low	2412	16.000	16.212	0.5
Mid	2437	16.000	16.250	0.5
High	2462	16.268	16.262	0.5

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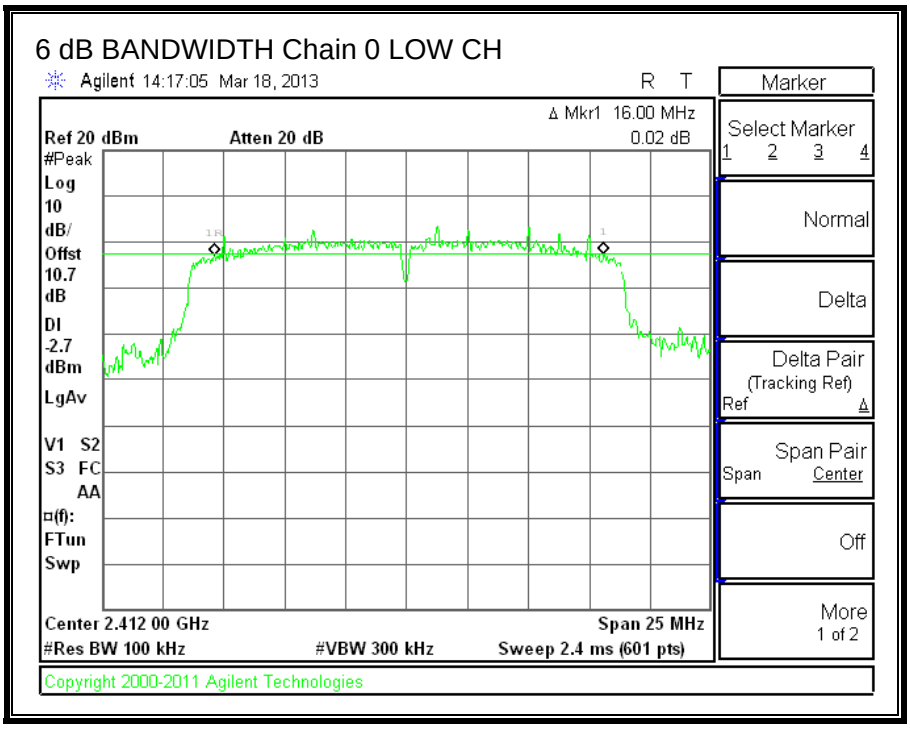
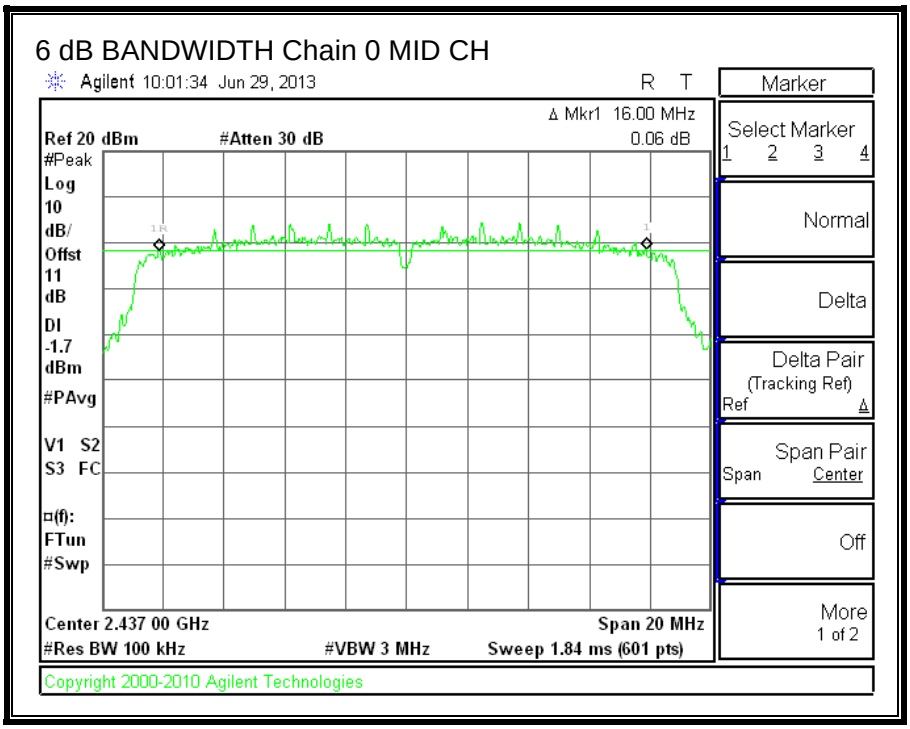
6 dB BANDWIDTH, Chain 0





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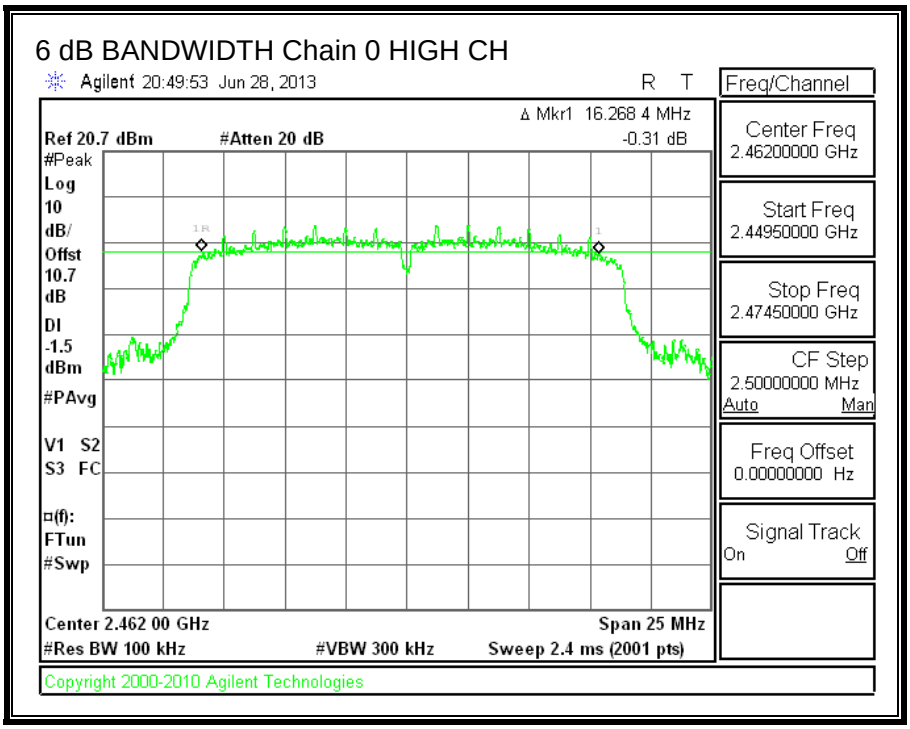
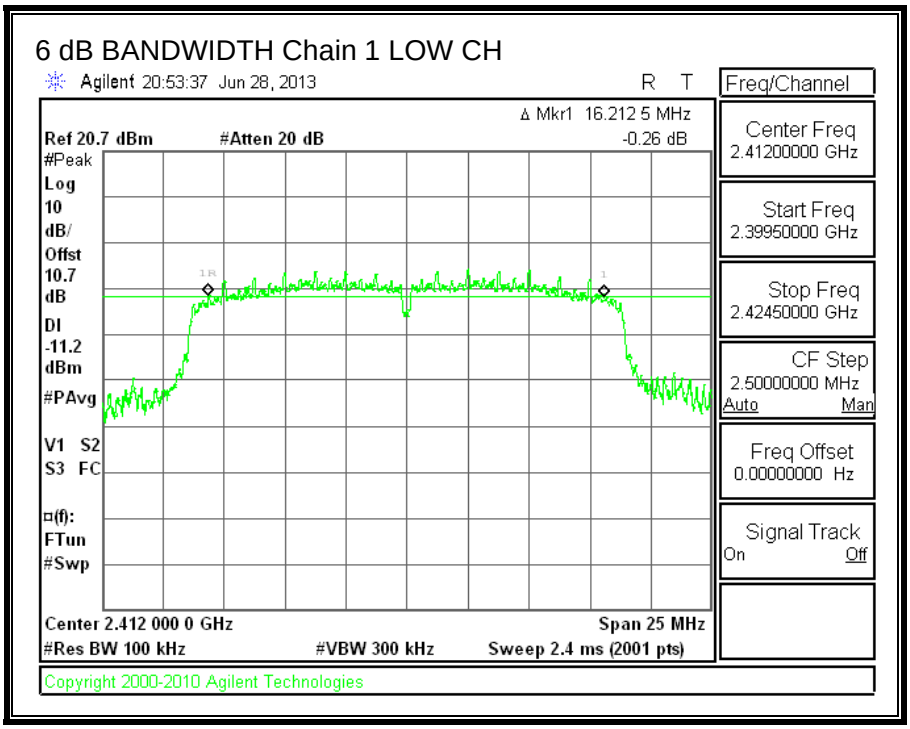


6 dB BANDWIDTH, Chain 1



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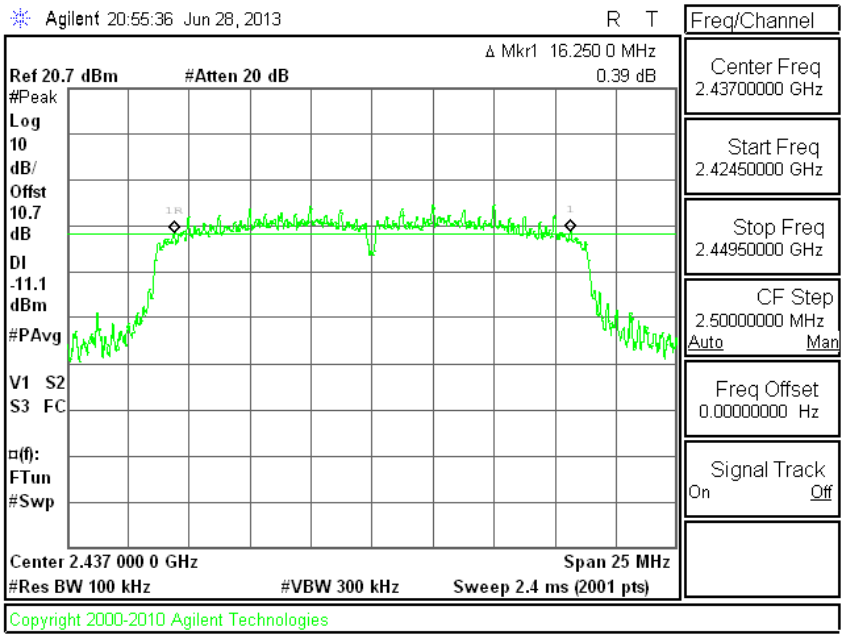
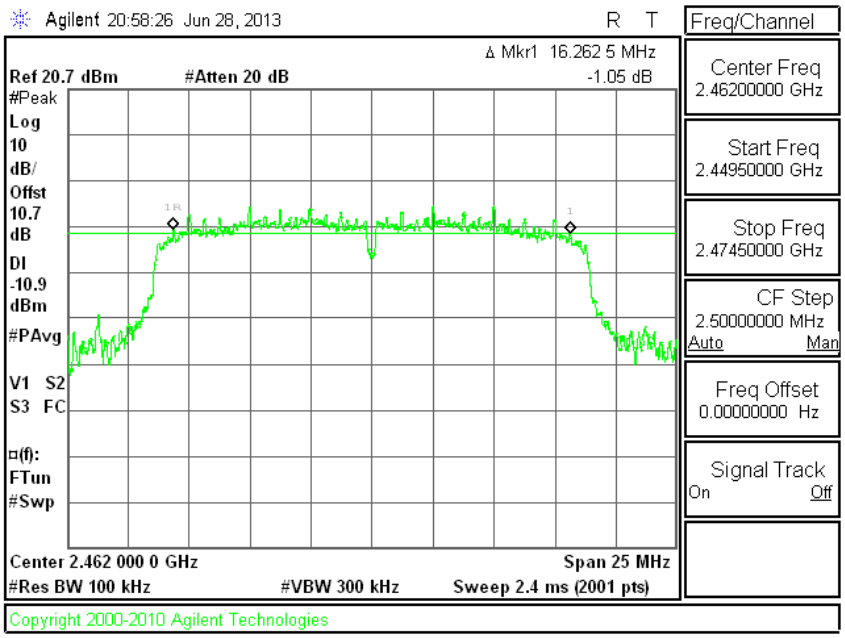
6 dB BANDWIDTH Chain 1 MID CH



6 dB BANDWIDTH Chain 1 HIGH CH



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8.3.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)
Low	2412	17.6293	17.4667
Mid	2437	17.4760	17.4462
High	2462	17.4736	17.3977

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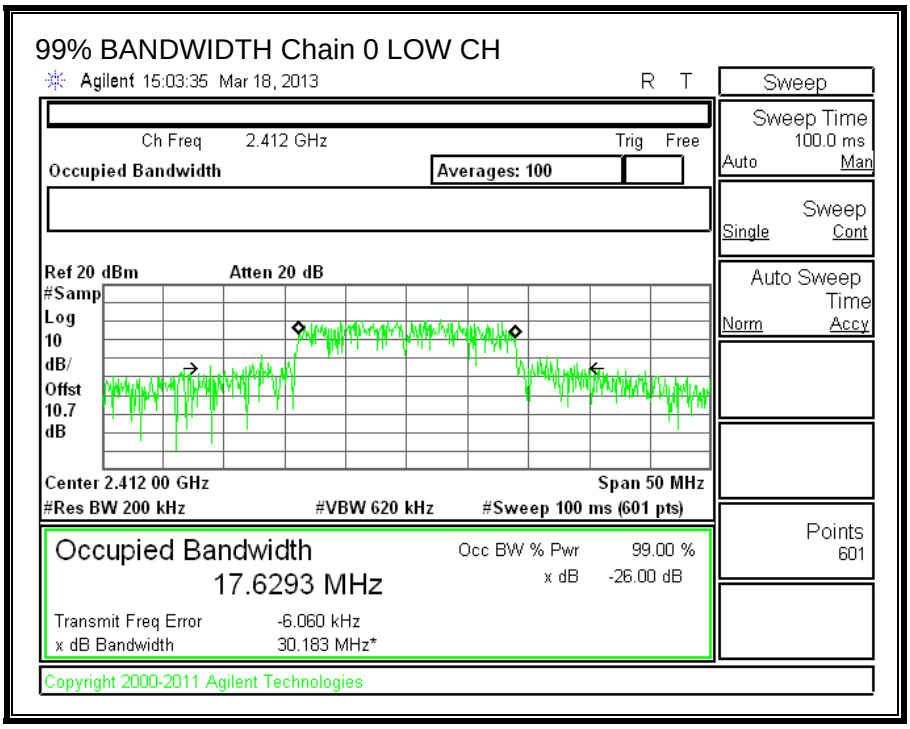
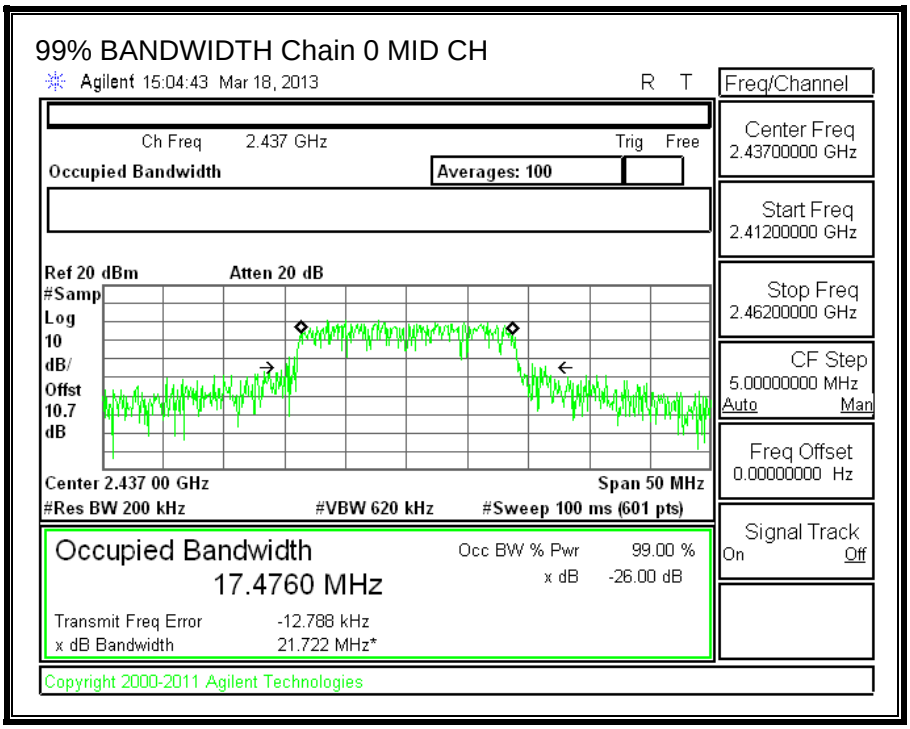
99% BANDWIDTH, Chain 0





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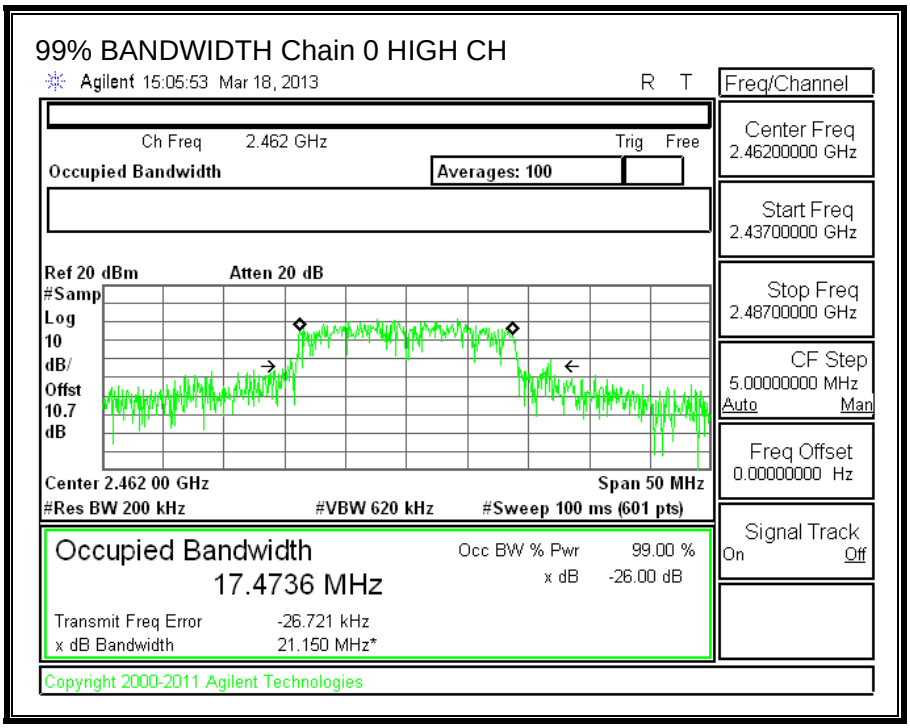
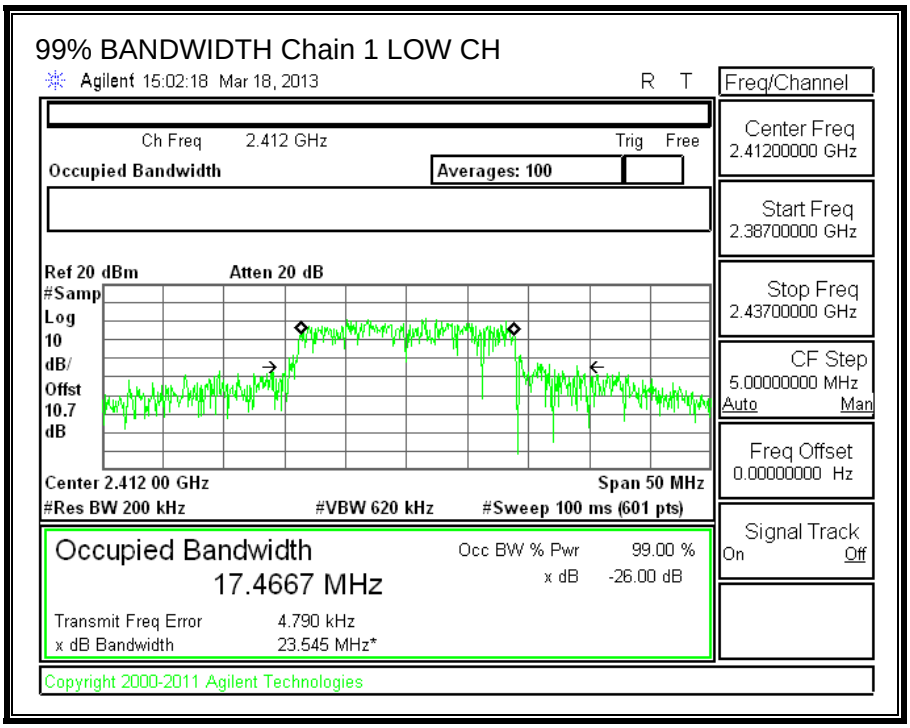


99% BANDWIDTH, Chain 1



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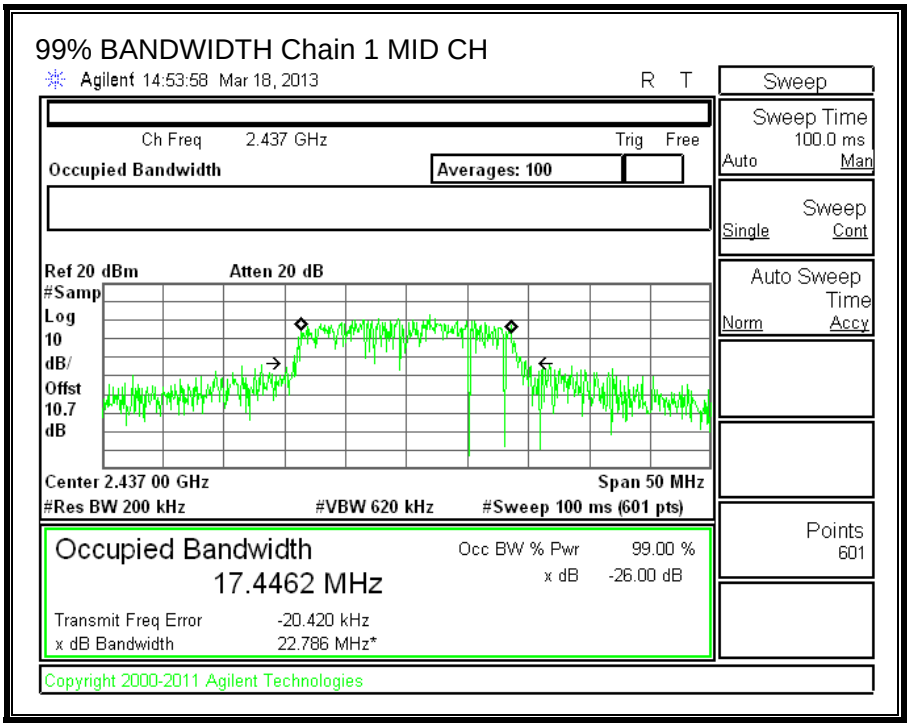

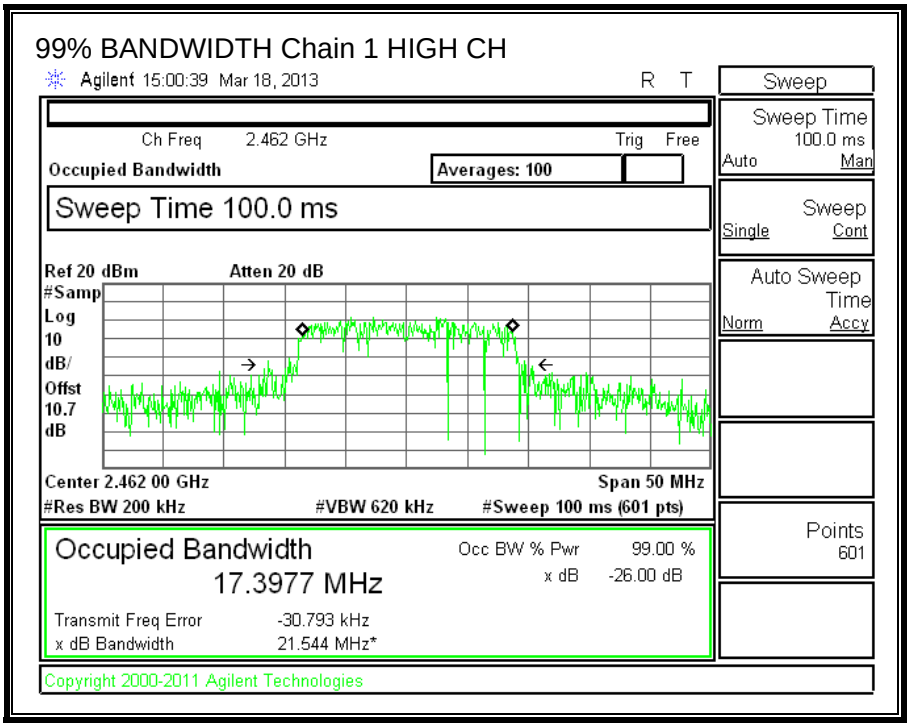

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8.3.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.68 dB (including 10 dB pad and 0.68 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
Low	2412	12.80	13.00	15.91
Mid	2437	13.90	14.40	17.17
High	2462	13.60	14.10	16.87

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8.3.4. OUTPUT POWER

LIMITS

FCC §15.247

IC RSS-210 A8.4

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain.

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
3.00	3.00	3.00

RESULTS

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	3.00	30.00	30	36	30.00
Mid	2437	3.00	30.00	30	36	30.00
High	2462	3.00	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margi (dB)
Low	2412	21.71	23.26	25.56	30.00	-4.44
Mid	2437	21.95	22.88	25.45	30.00	-4.55
High	2462	22.78	23.39	26.11	30.00	-3.89

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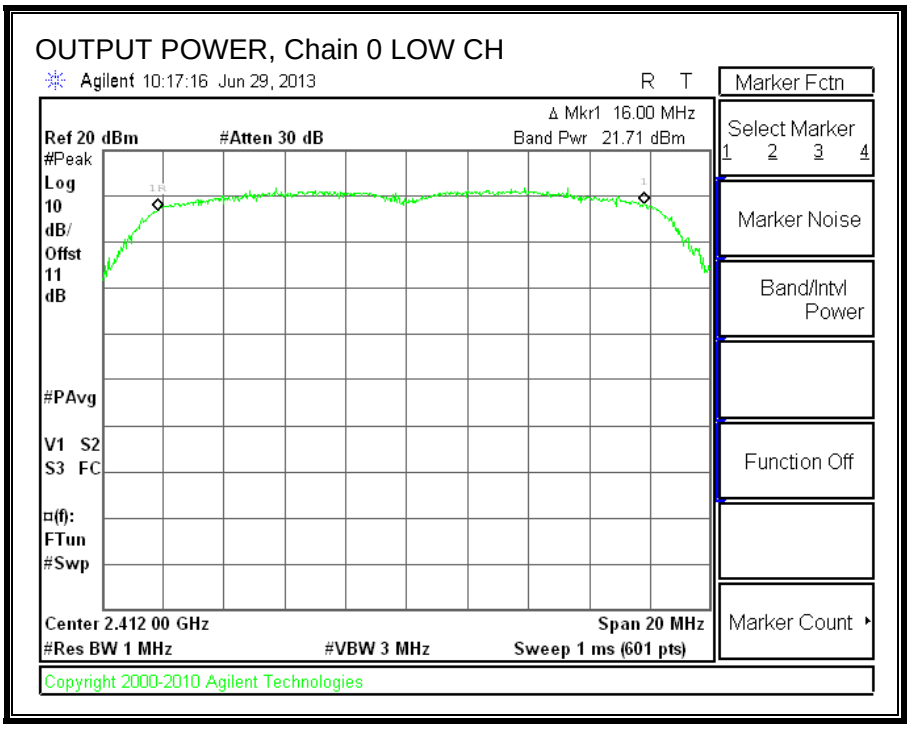
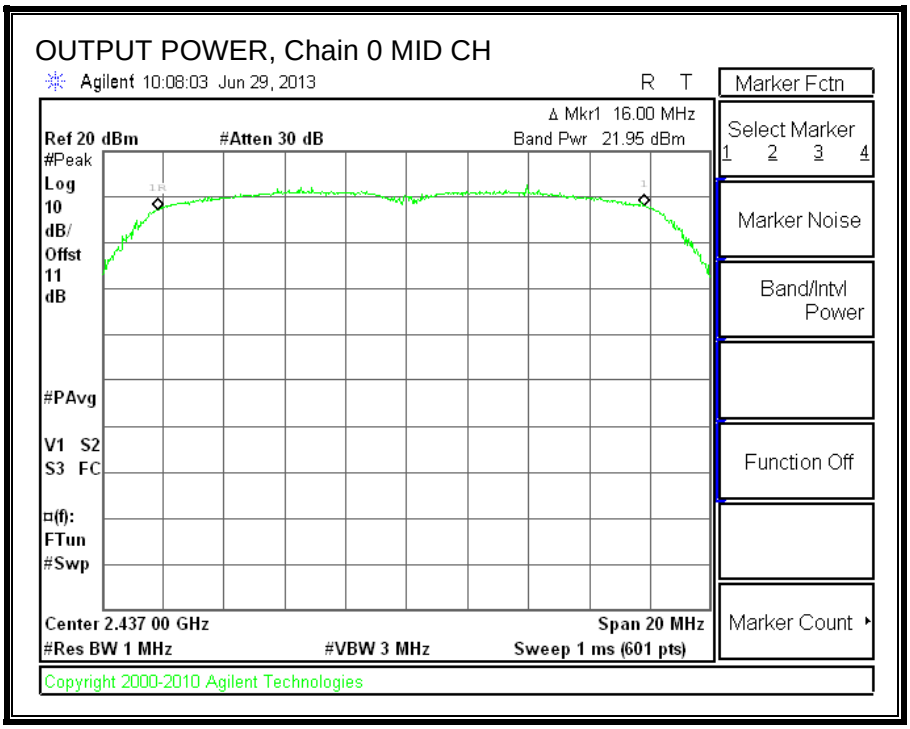
OUTPUT POWER, Chain 0





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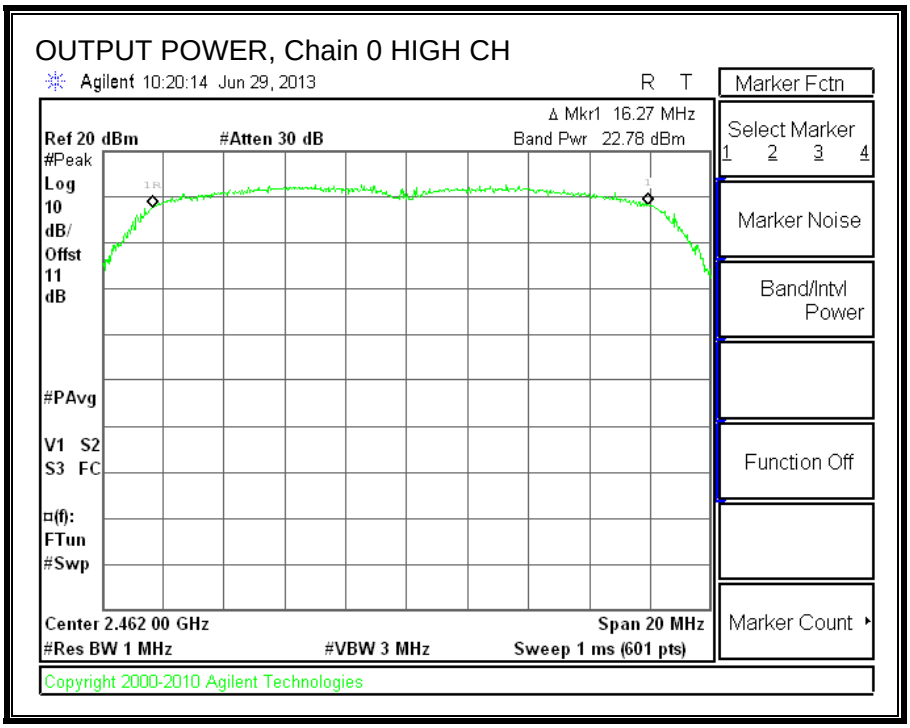
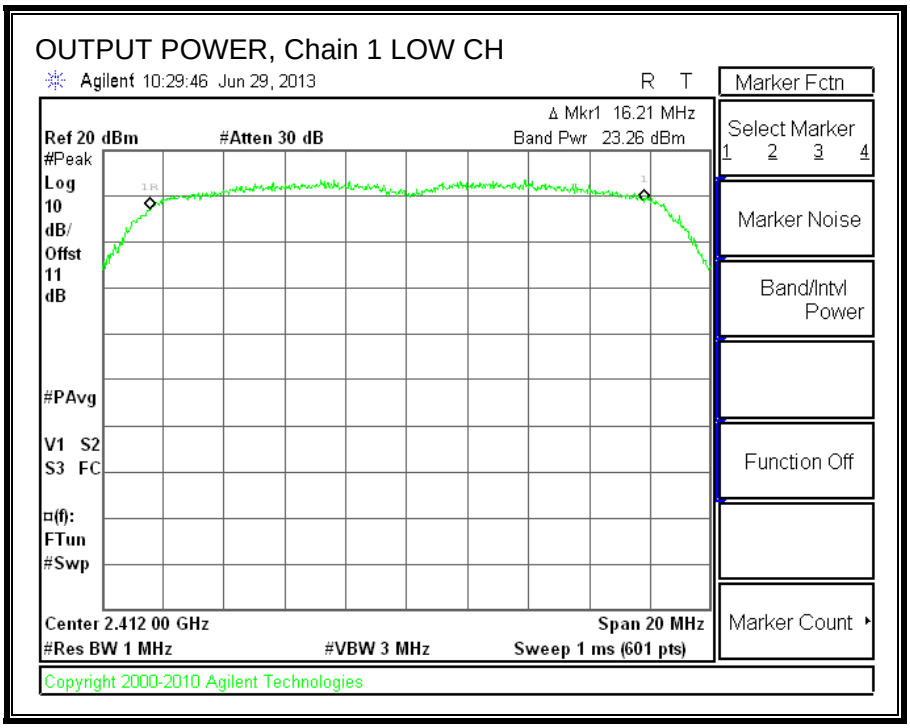


OUTPUT POWER, Chain 1



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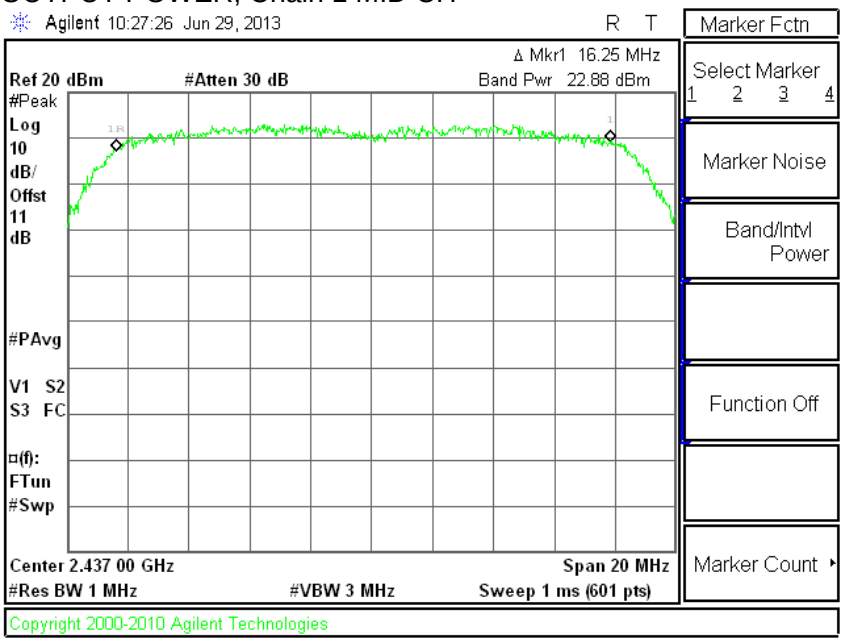
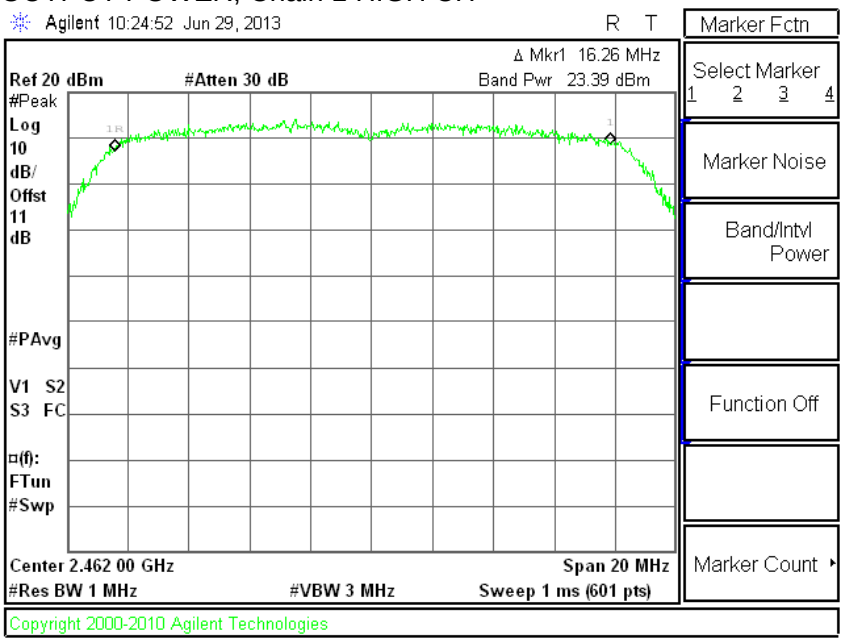
OUTPUT POWER, Chain 1 MID CH



OUTPUT POWER, Chain 1 HIGH CH



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8.3.5. PSD

LIMITS

FCC §15.247

IC RSS-210 A8.2

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.

RESULTS

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Chain 1 Meas (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-11.57	-11.21	-8.38	8.0	-16.4
Mid	2437	-11.78	-9.82	-7.68	8.0	-15.7
High	2462	-11.23	-9.54	-7.29	8.0	-15.3

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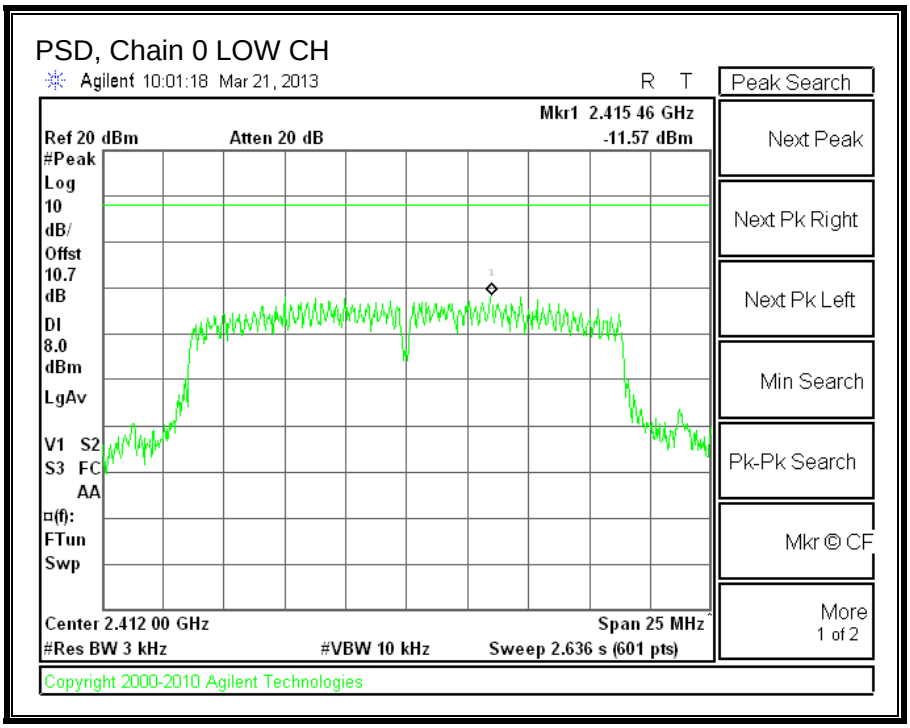
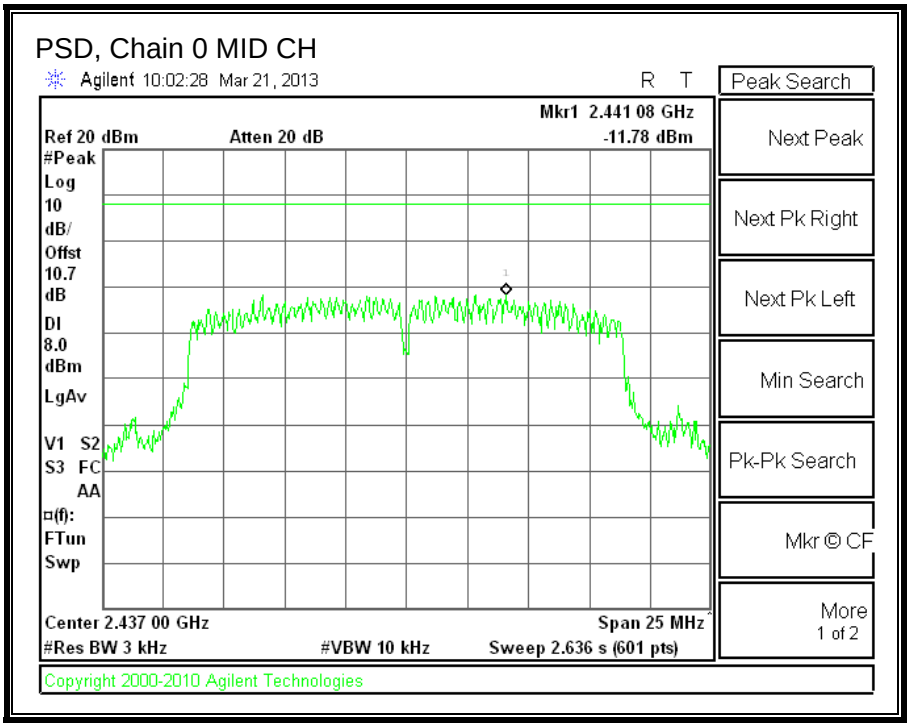
PSD, Chain 0





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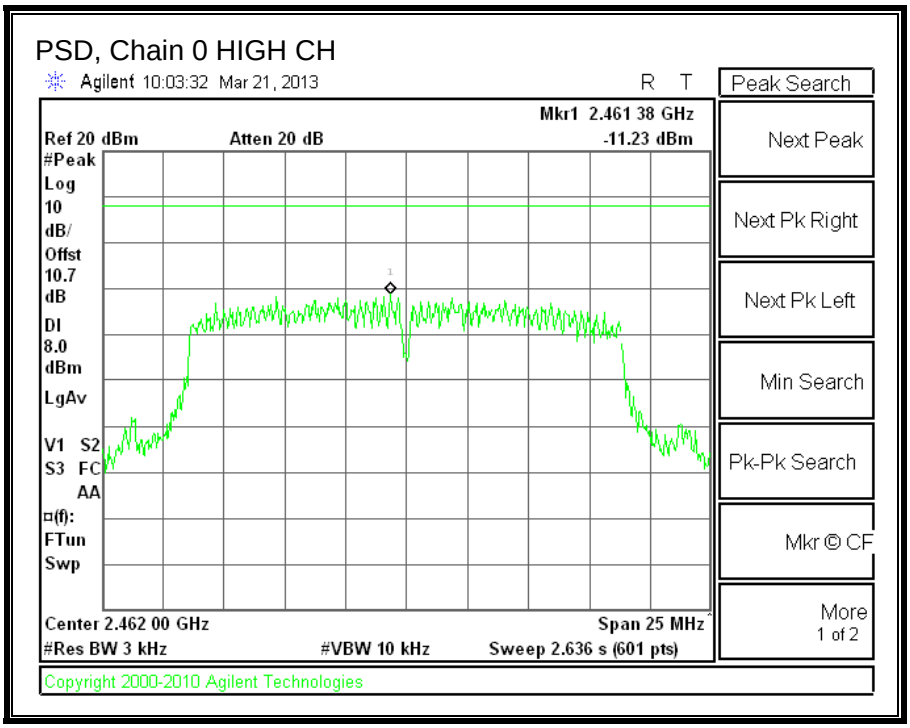
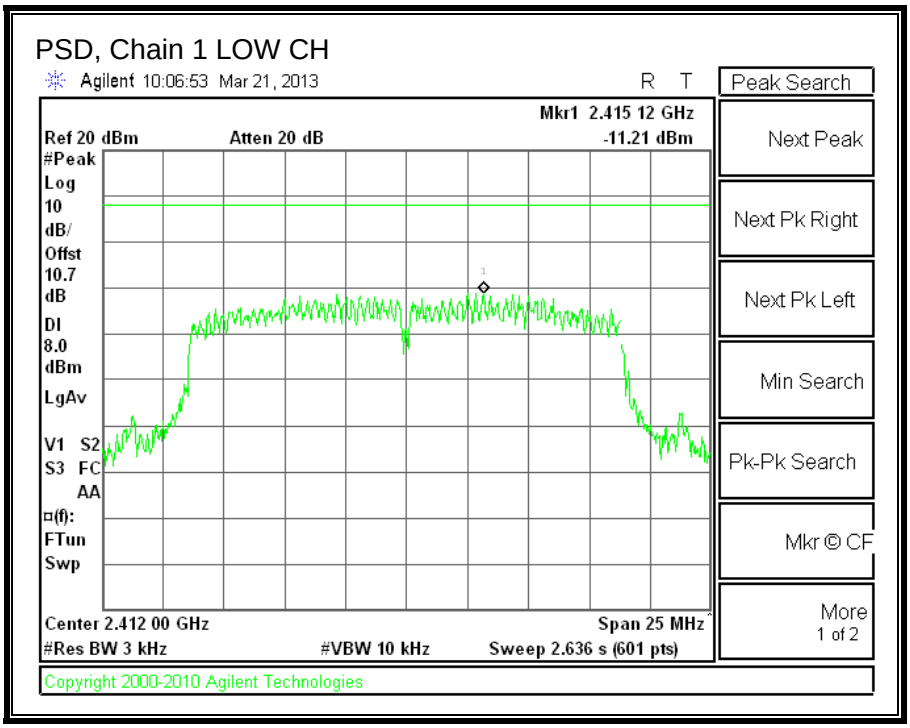


PSD, Chain 1



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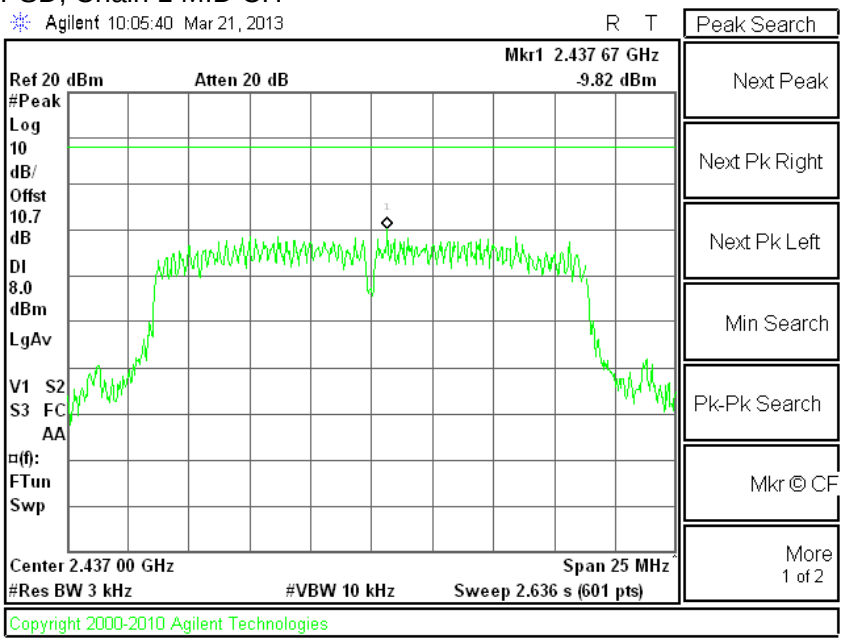
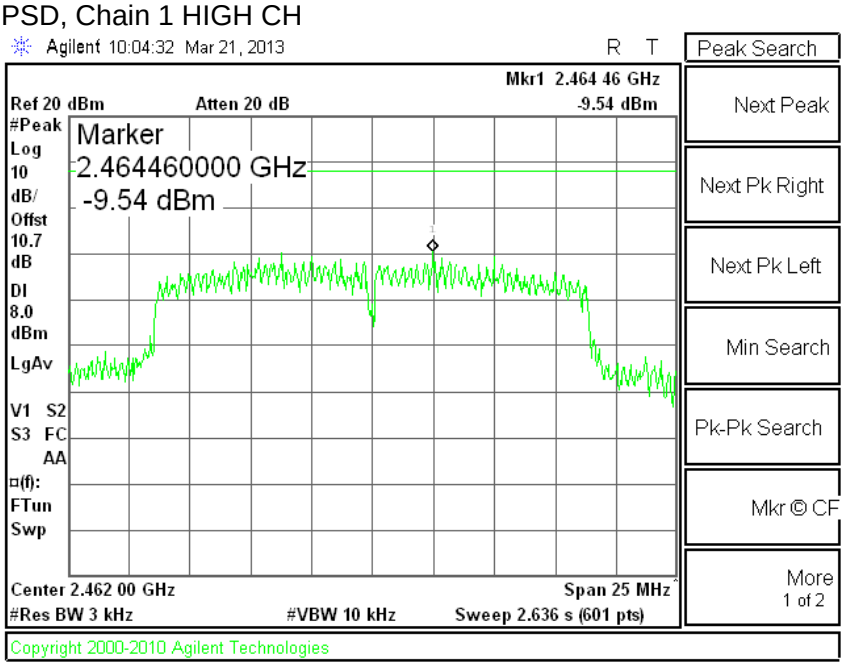
PSD, Chain 1 MID CH



PSD, Chain 1 HIGH CH



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8.3.6. OUT-OF-BAND EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the in-band reference level, band edge (where measurements to the general radiated limits will not be made) and out-of-band emissions.

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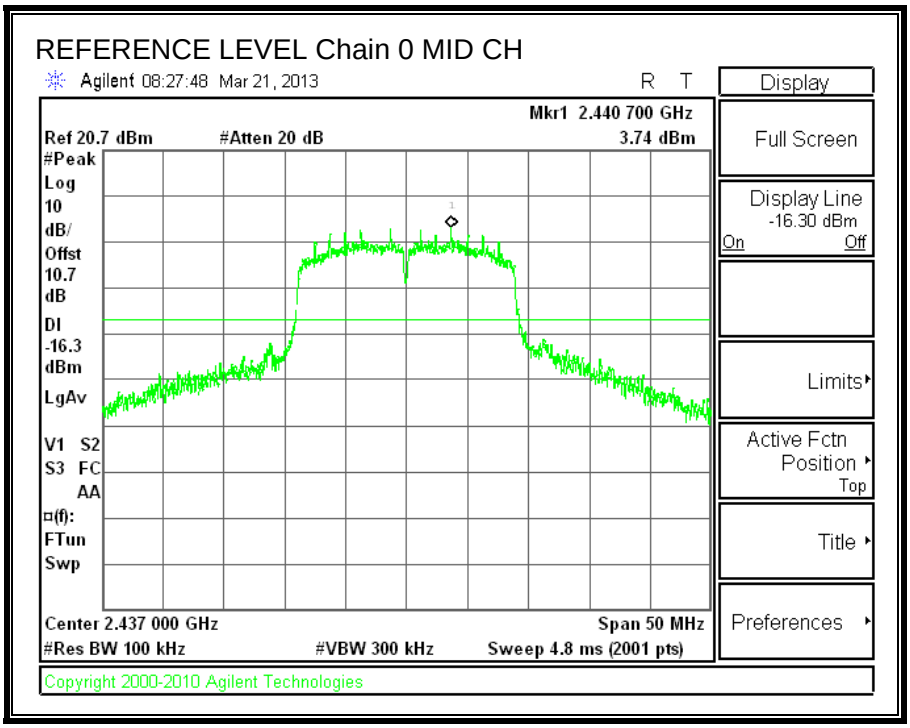
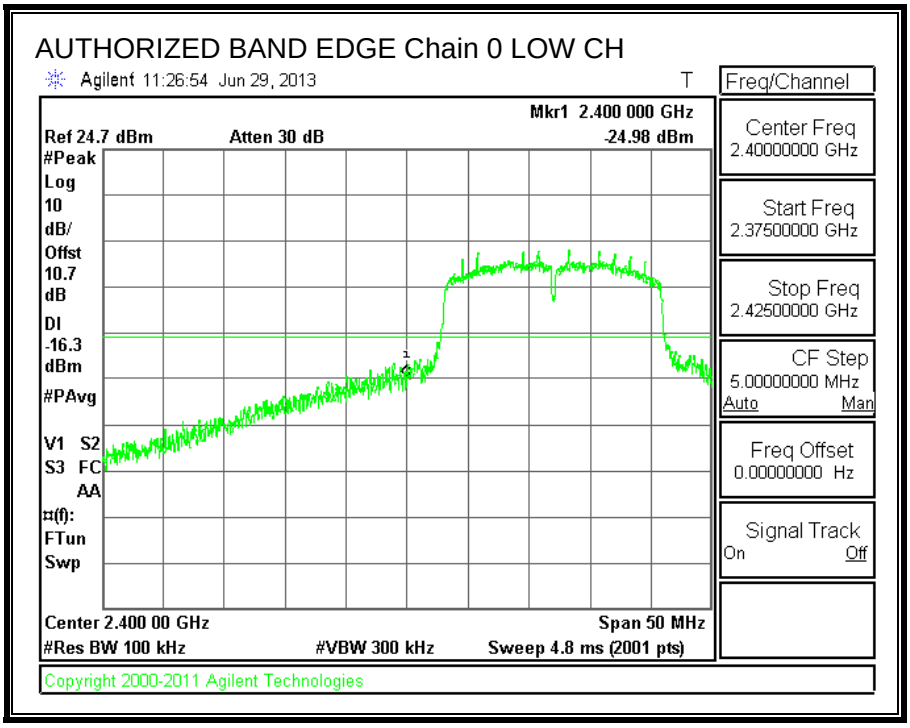
IN-BAND REFERENCE LEVEL, Chain 0



LOW CHANNEL BANDEDGE, Chain 0



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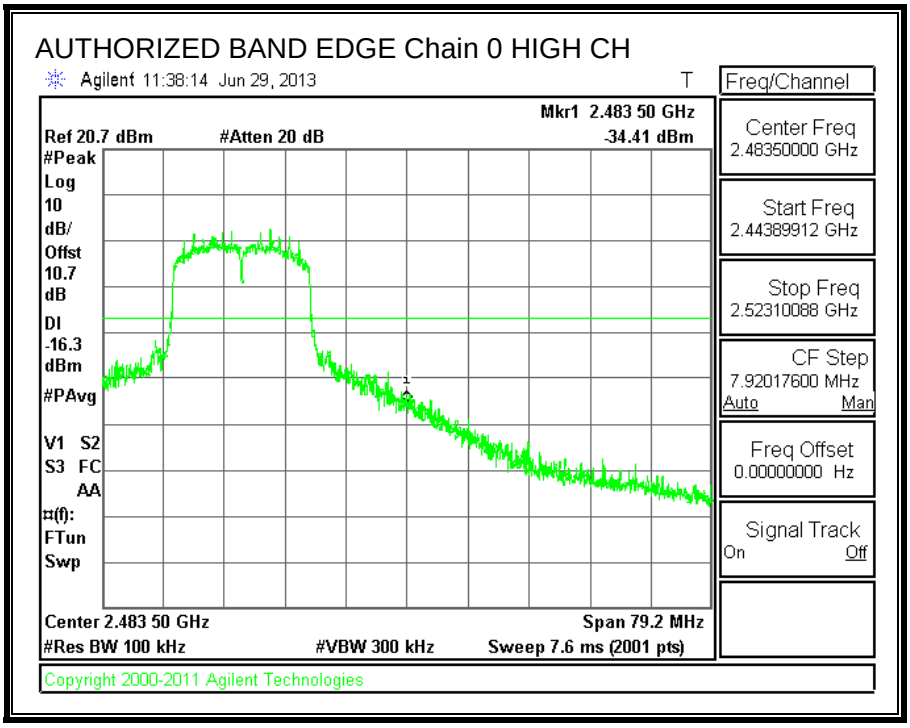
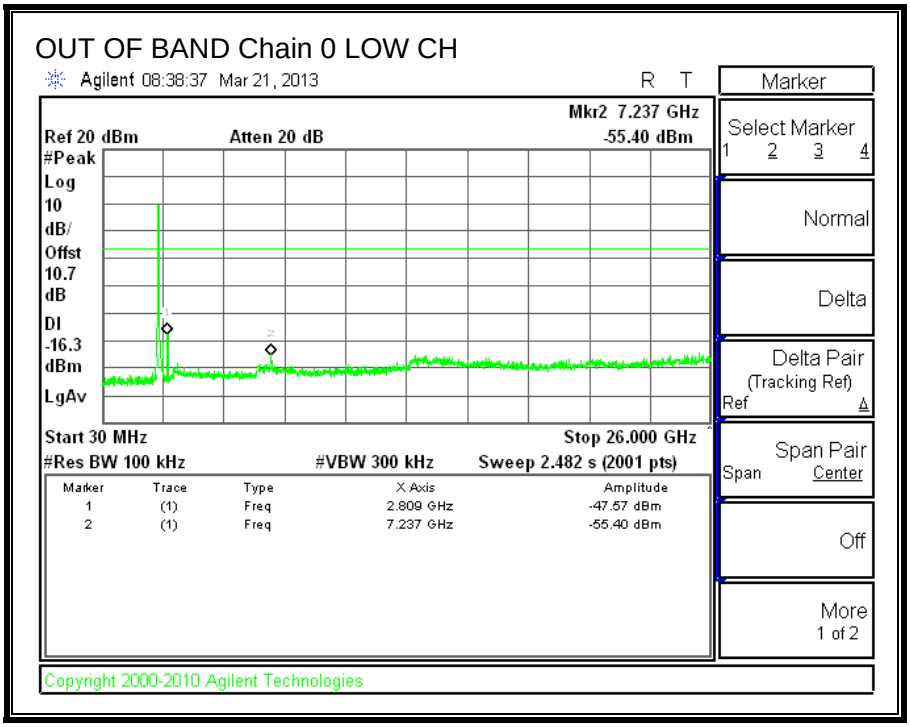
HIGH CHANNEL BANDEDGE, Chain 0



OUT-OF-BAND EMISSIONS, Chain 0



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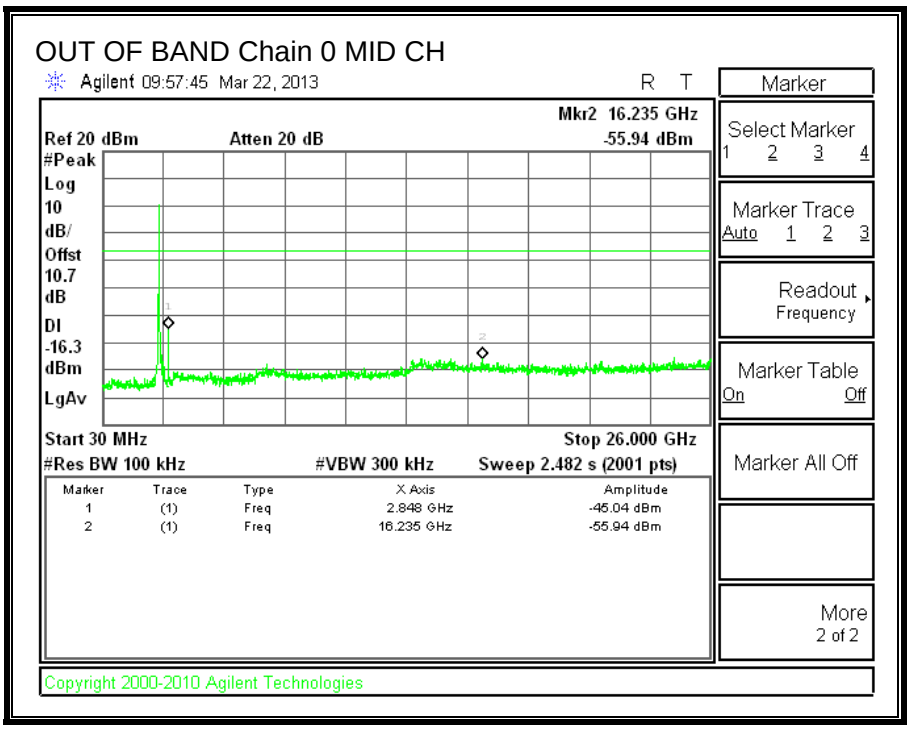
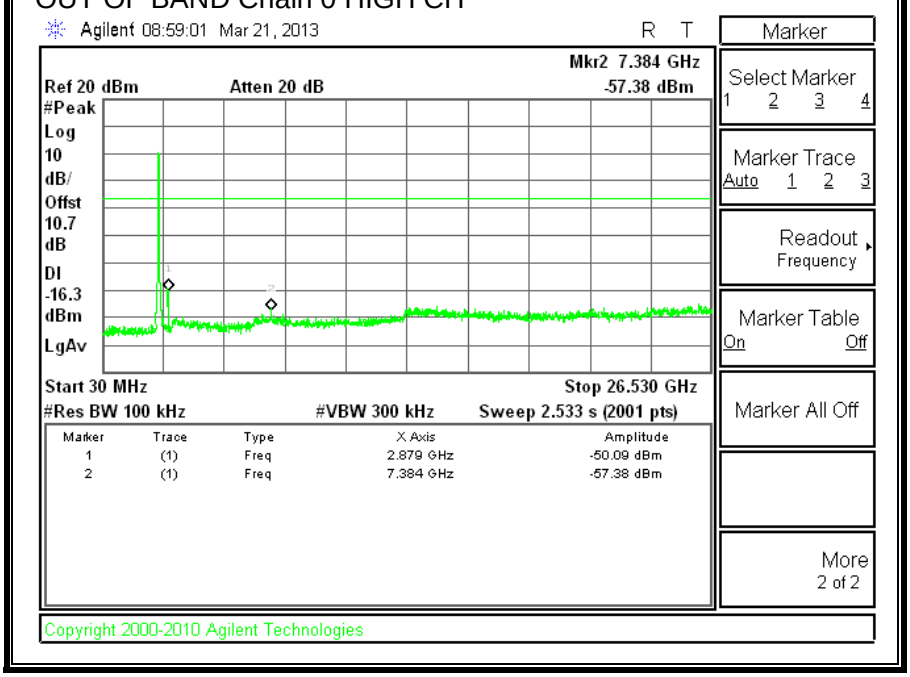
OUT OF BAND Chain 0 MID CH



OUT OF BAND Chain 0 HIGH CH



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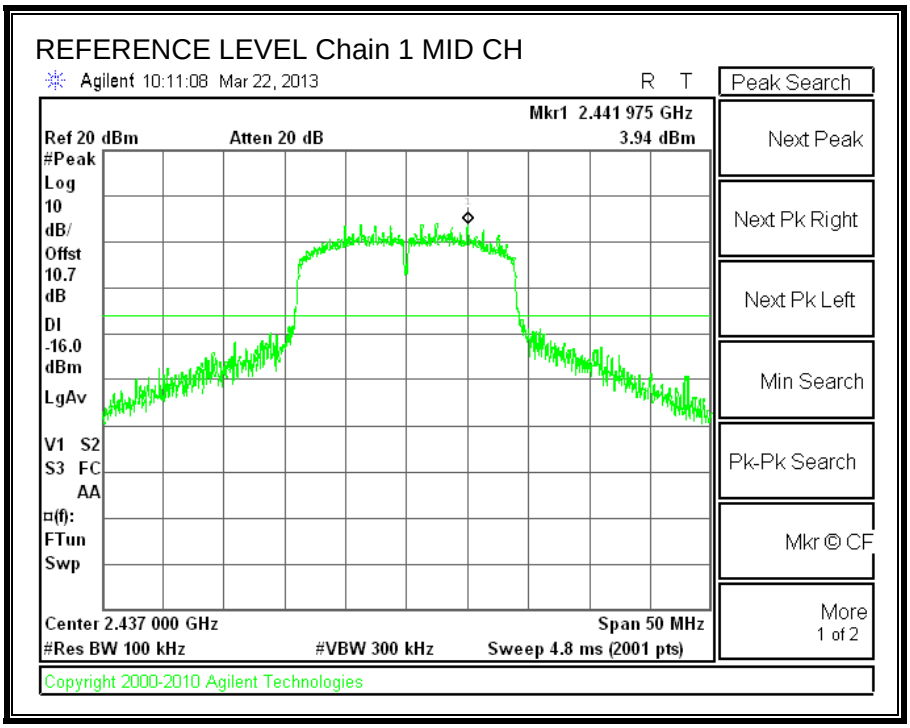
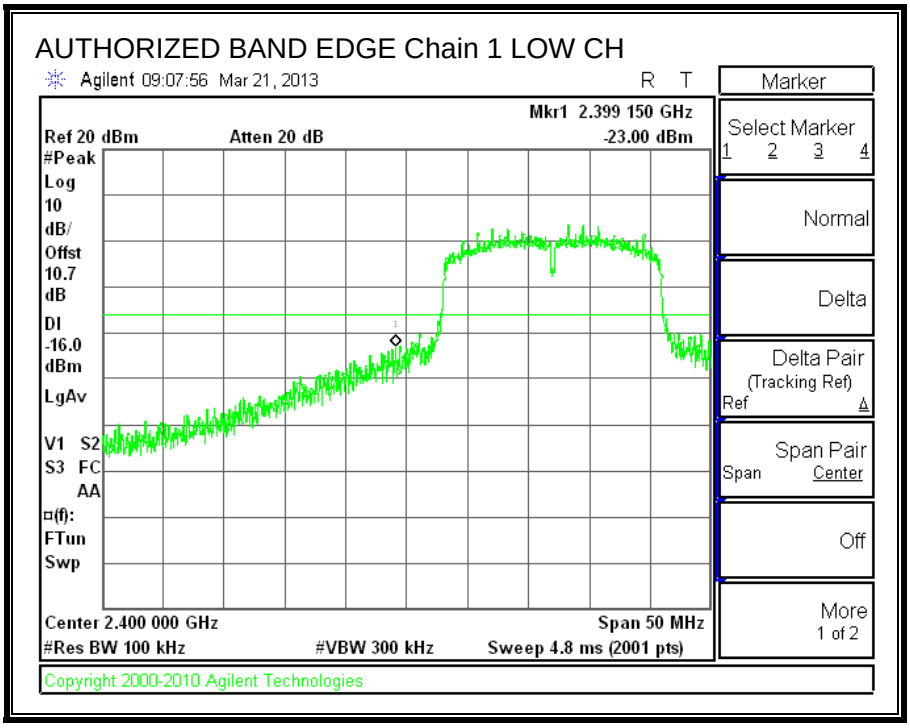
IN-BAND REFERENCE LEVEL, Chain 1



LOW CHANNEL BANDEDGE, Chain 1



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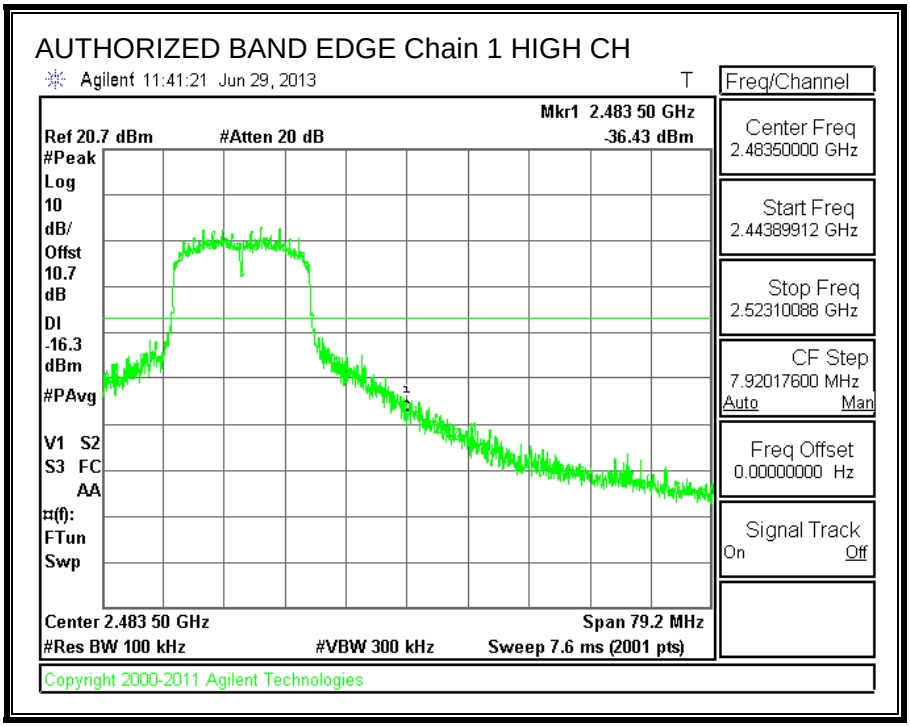
HIGH CHANNEL BANDEDGE, Chain 1



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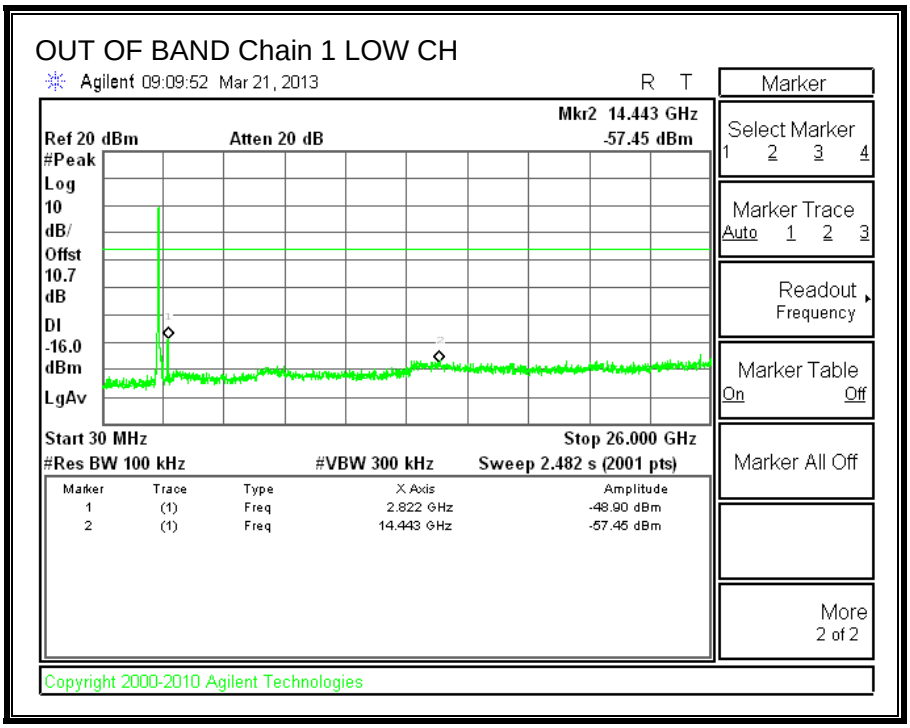
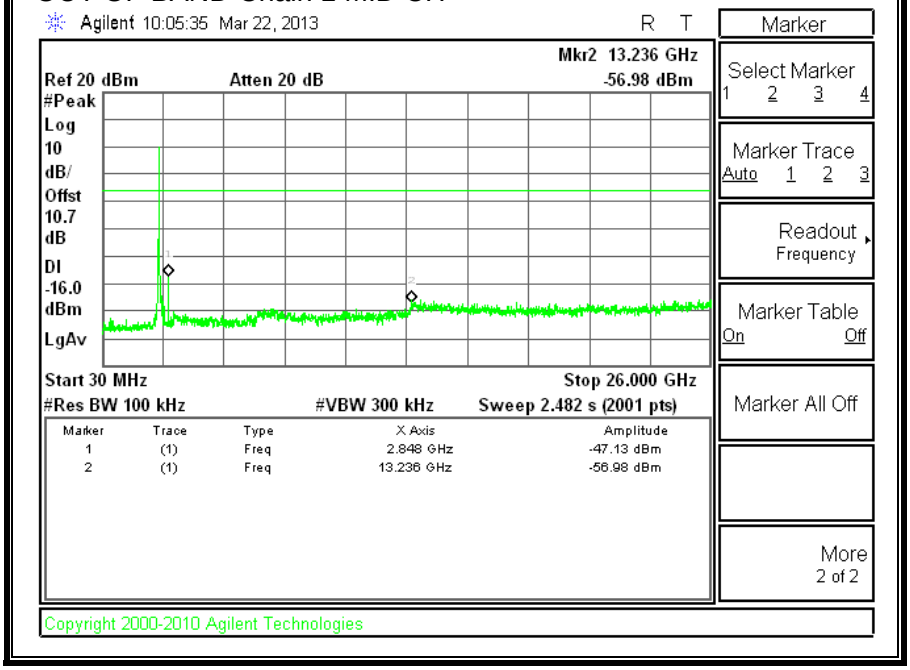
OUT OF BAND Chain 1 LOW CH



OUT OF BAND Chain 1 MID CH



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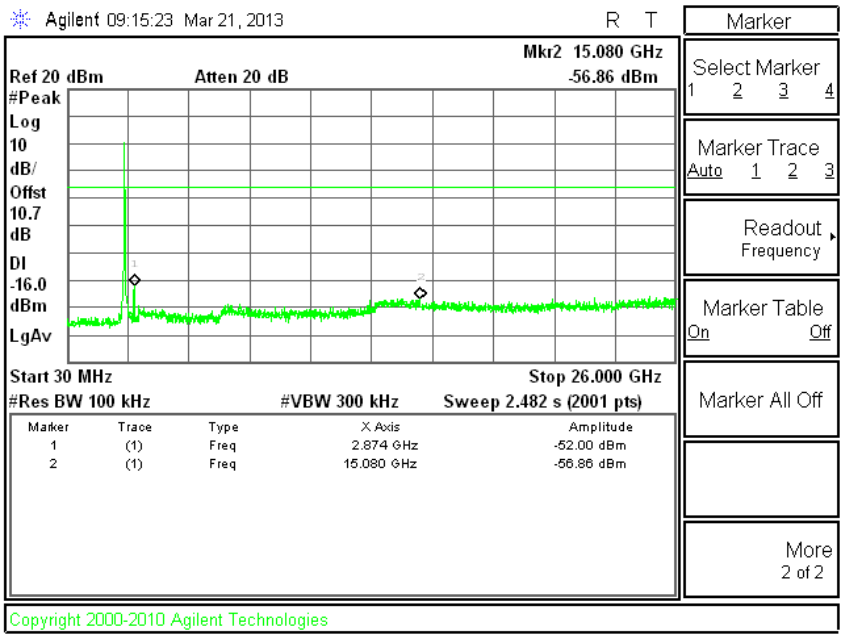
OUT OF BAND Chain 1 HIGH CH



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8.4. 802.11n HT20 SDM MCS8 2TX MODE, 2.4 GHz BAND

8.4.1. 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 with the RBW set between 1% and 5% of the EBW, the VBW >= 3 x RBW, peak detector and max hold.

RESULTS

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low	2412	15.90	16.01	0.5
Mid	2437	16.29	16.29	0.5
High	2462	16.02	16.50	0.5

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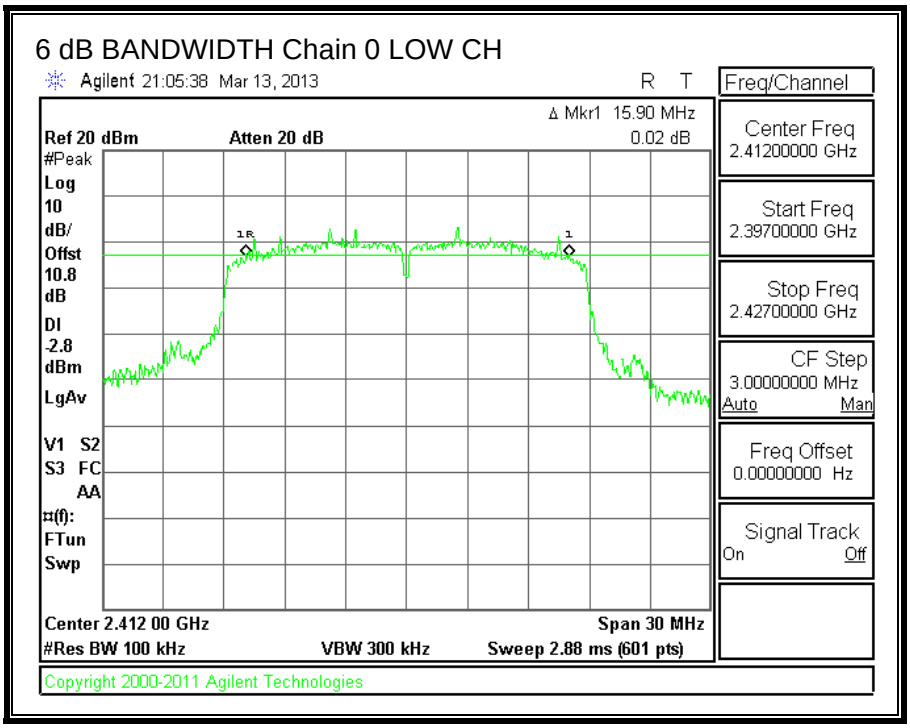
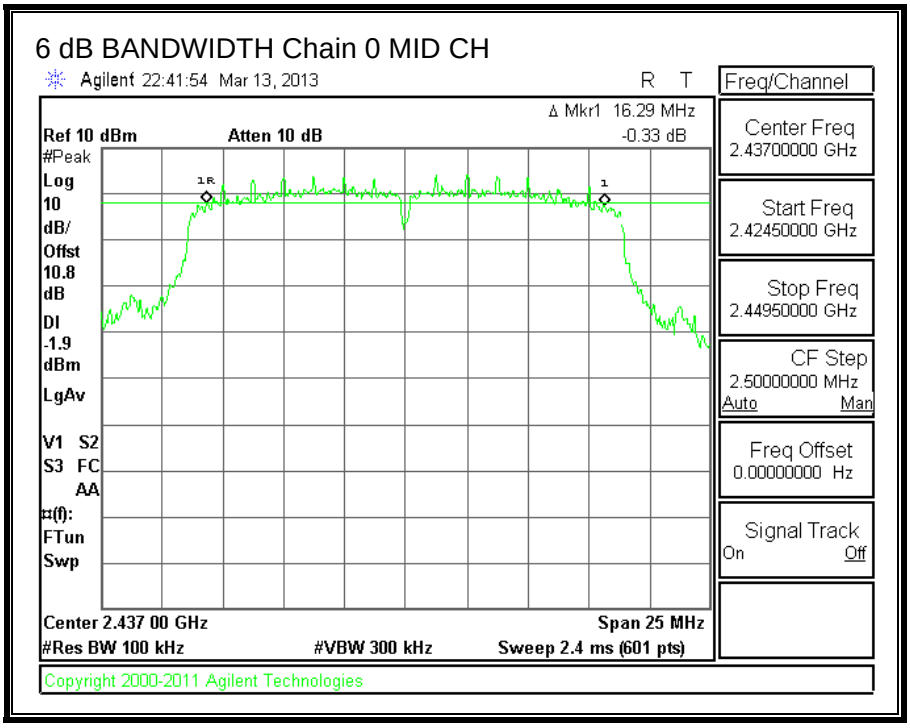
6 dB BANDWIDTH, Chain 0





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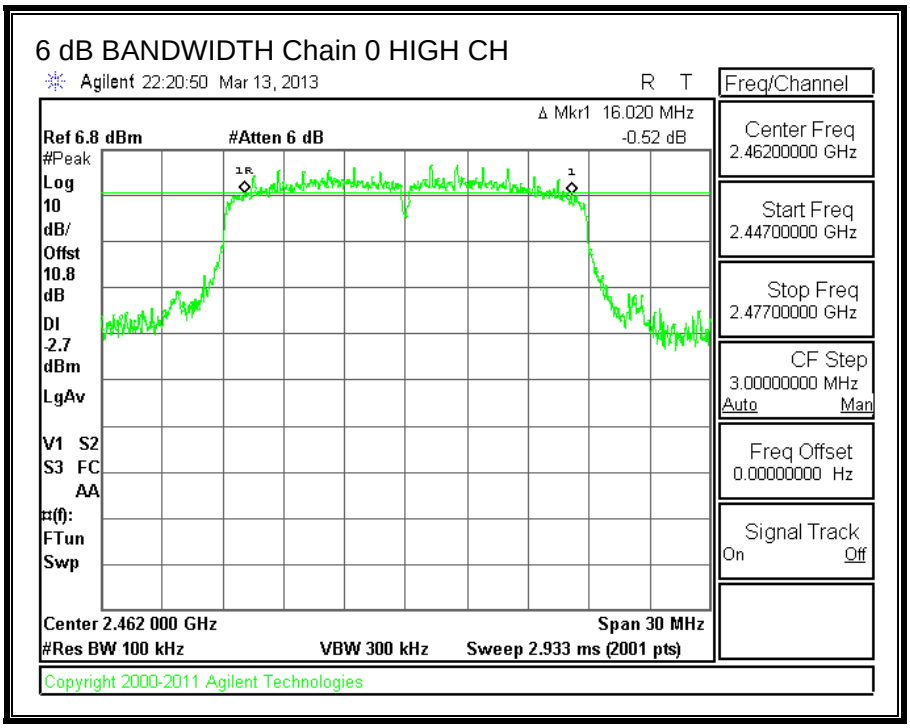
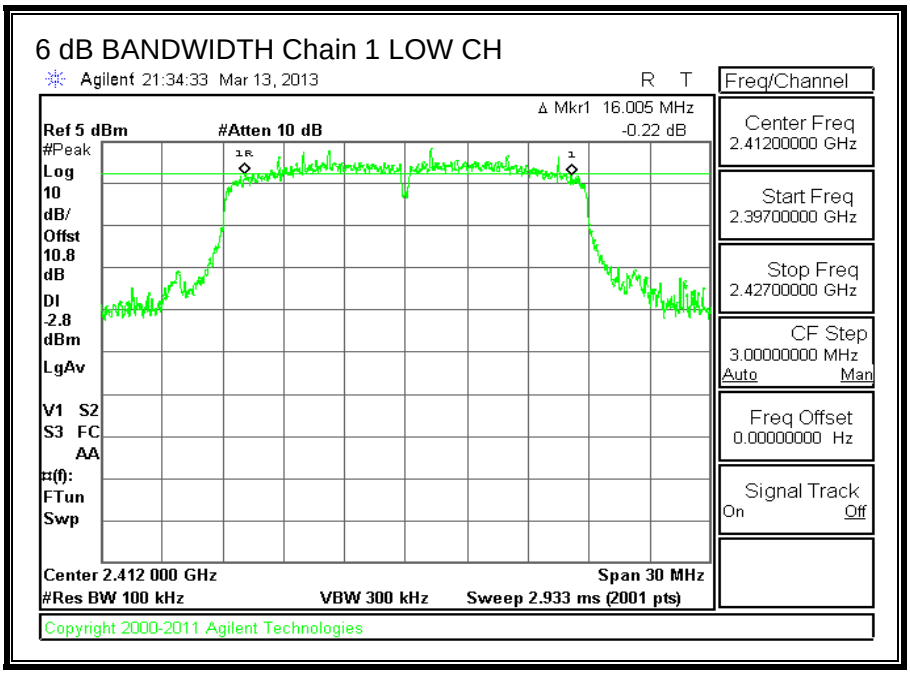


6 dB BANDWIDTH, Chain 1



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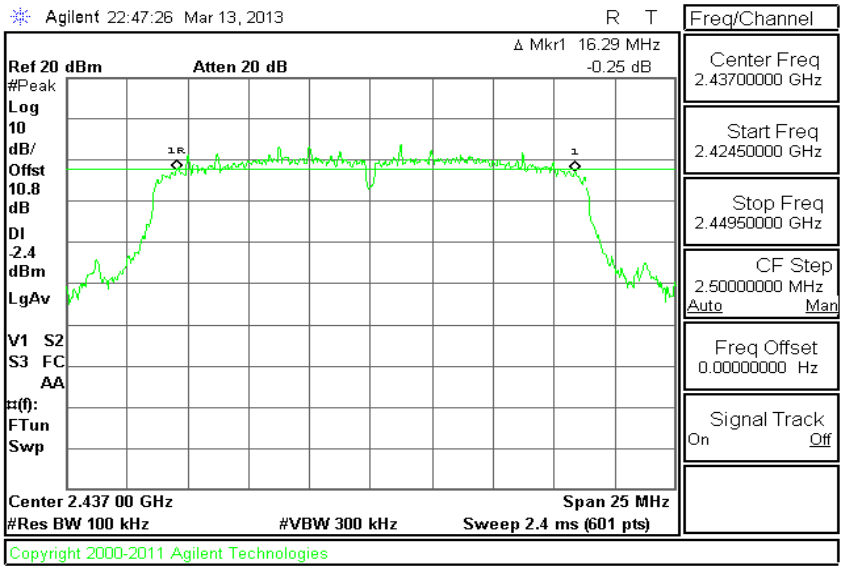
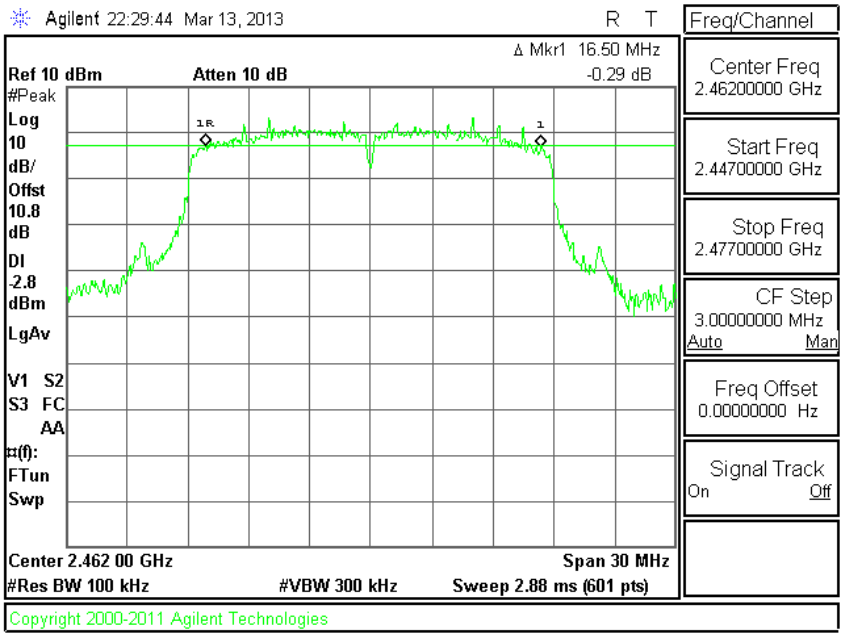
6 dB BANDWIDTH Chain 1 MID CH



6 dB BANDWIDTH Chain 1 HIGH CH



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8.4.1. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)
Low	2412	17.4366	17.4424
Mid	2437	17.4224	17.3978
High	2462	17.4484	17.4020

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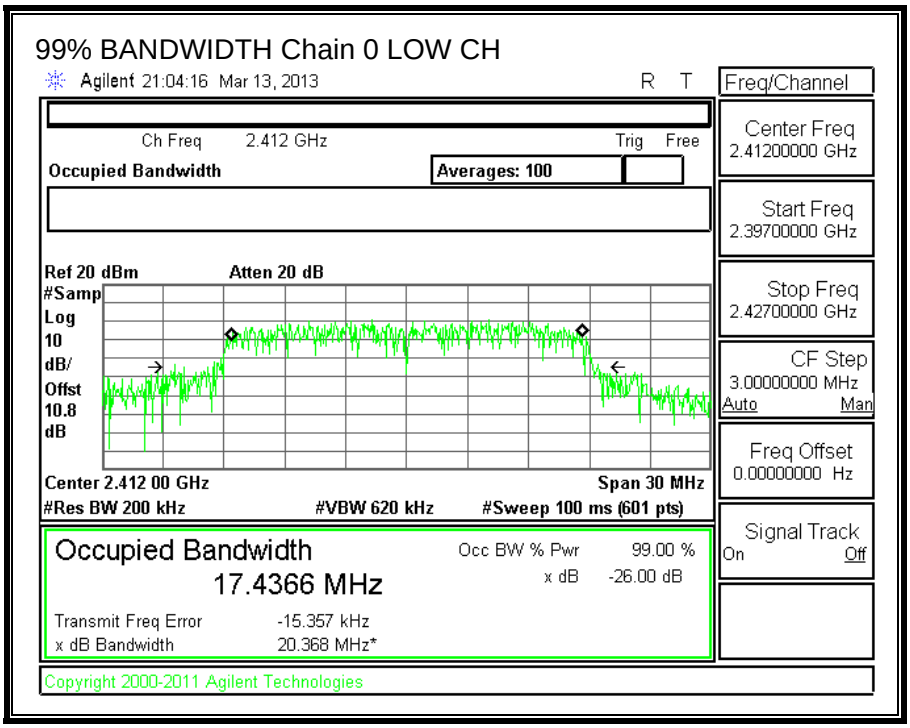
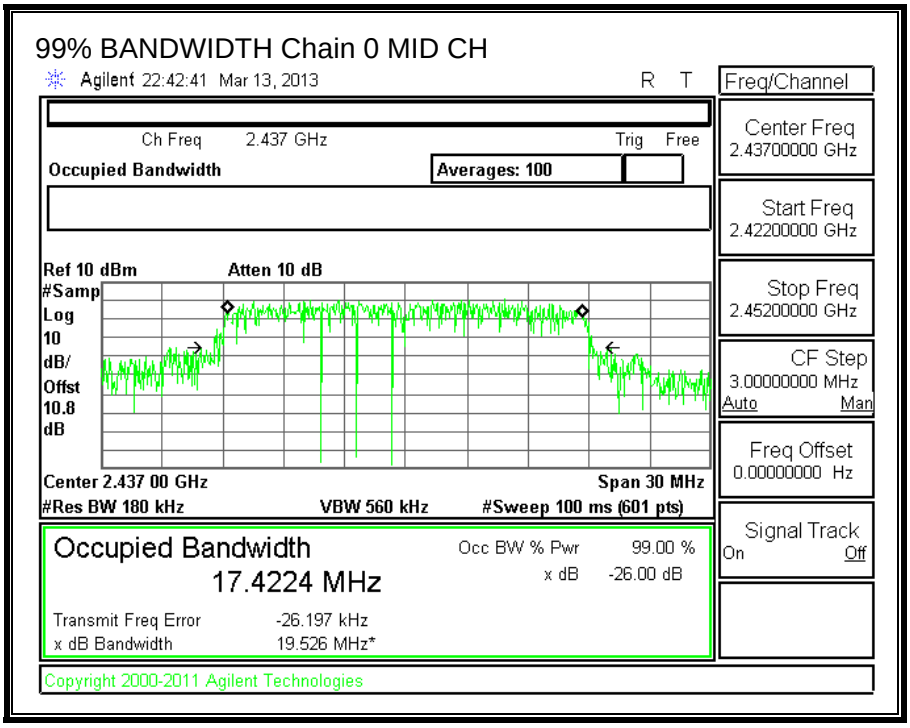
99% BANDWIDTH, Chain 0





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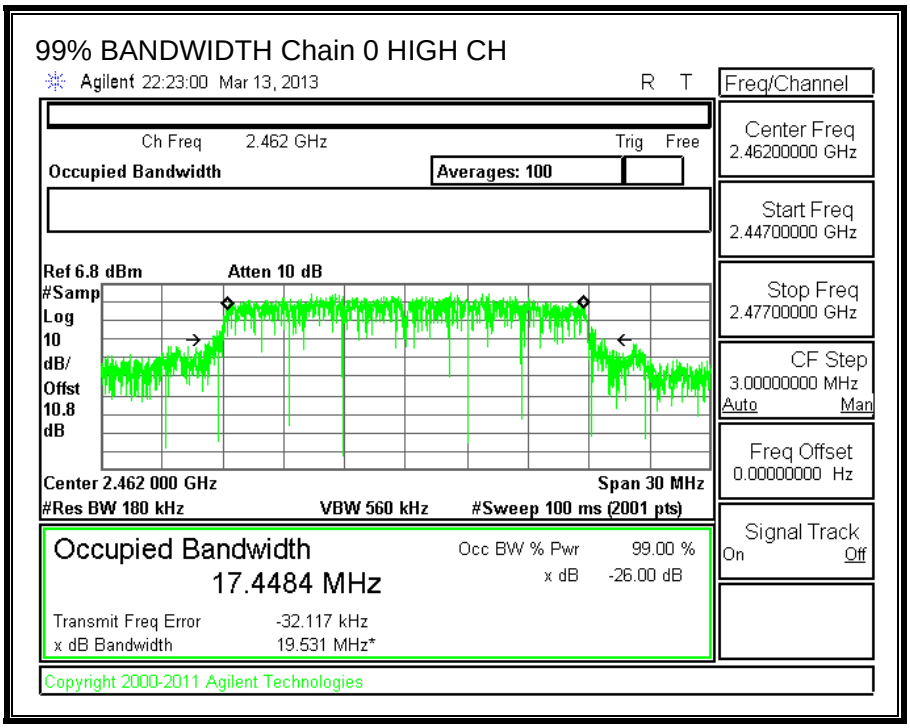
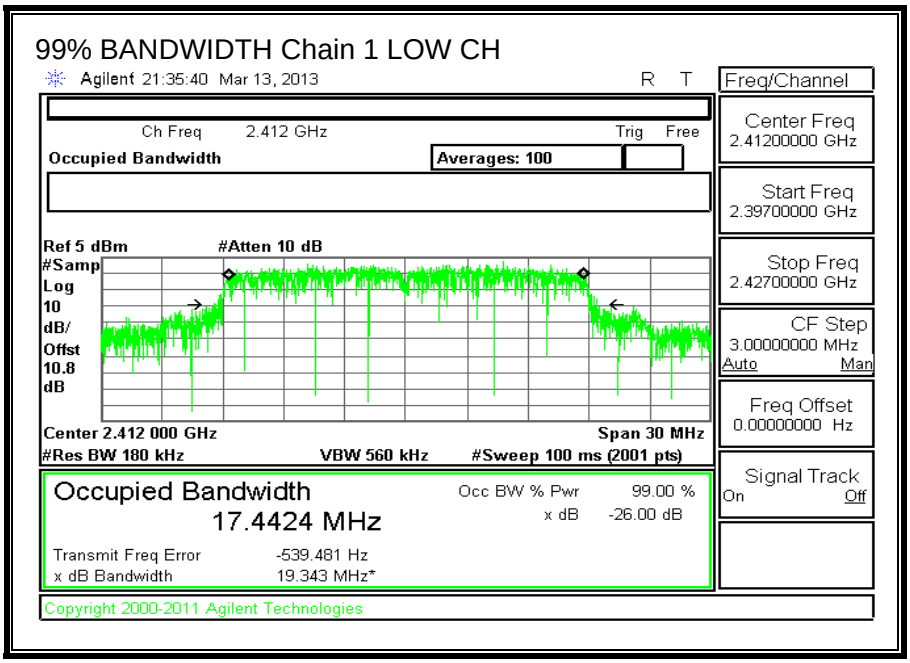


99% BANDWIDTH, Chain 1



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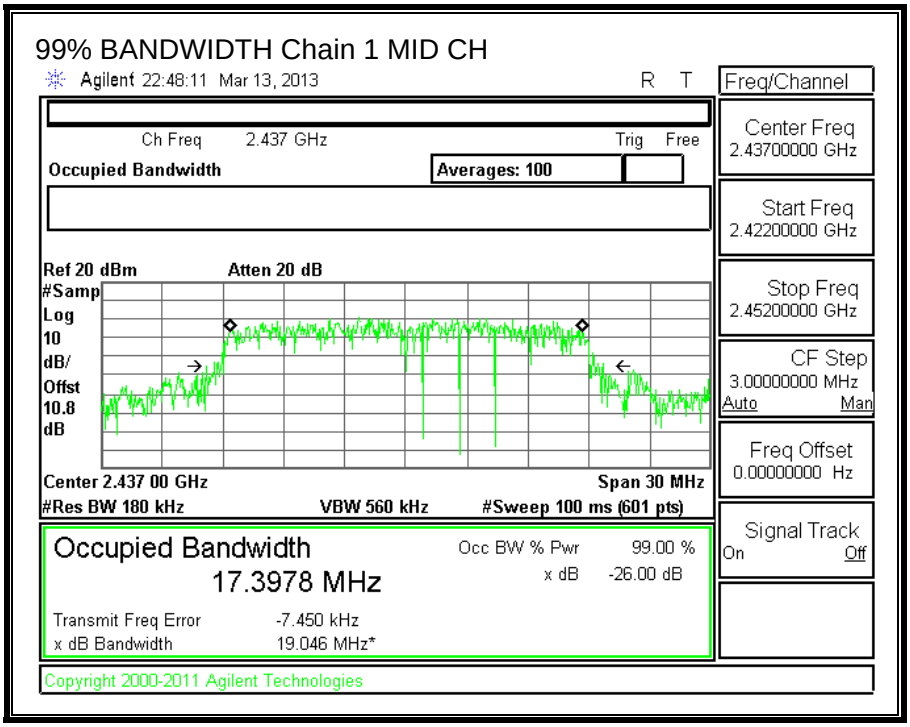

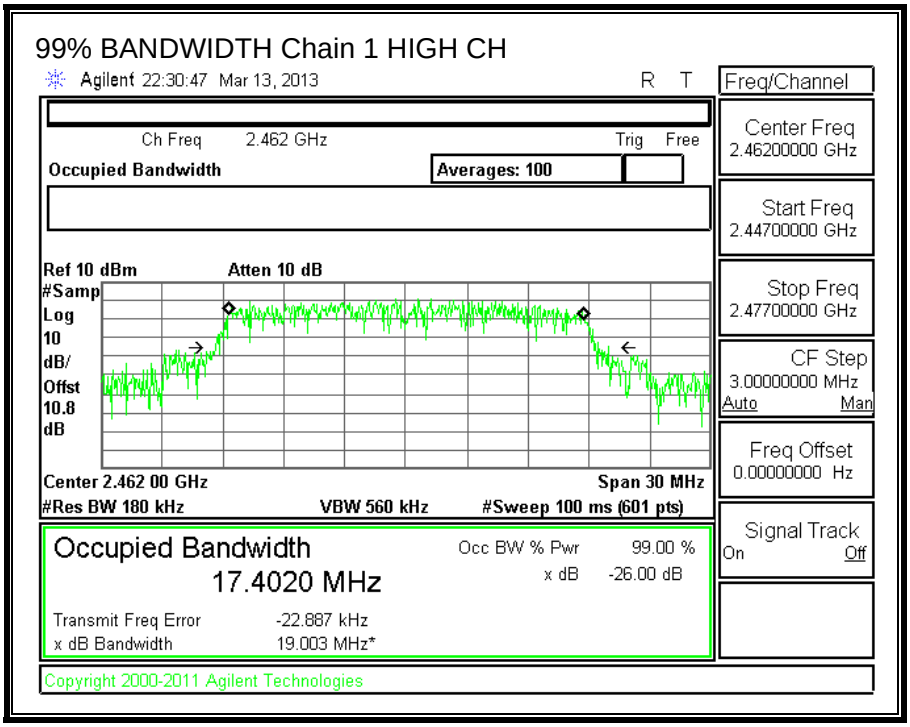

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8.4.2. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.68 dB (including 10 dB pad and 0.68 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
Low	2412	14.20	14.10	17.16
Mid	2437	13.80	14.30	17.07
High	2462	13.20	13.50	16.36

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8.4.3. OUTPUT POWER

LIMITS

FCC §15.247

IC RSS-210 A8.4

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

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

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
3.00	3.00	3.00

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RESULTS

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	3.00	30.00	30	36	30.00
Mid	2437	3.00	30.00	30	36	30.00
High	2462	3.00	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margi (dB)
Low	2412	21.53	22.25	24.92	30.00	-5.08
Mid	2437	21.90	21.54	24.73	30.00	-5.27
High	2462	21.83	21.56	24.71	30.00	-5.29

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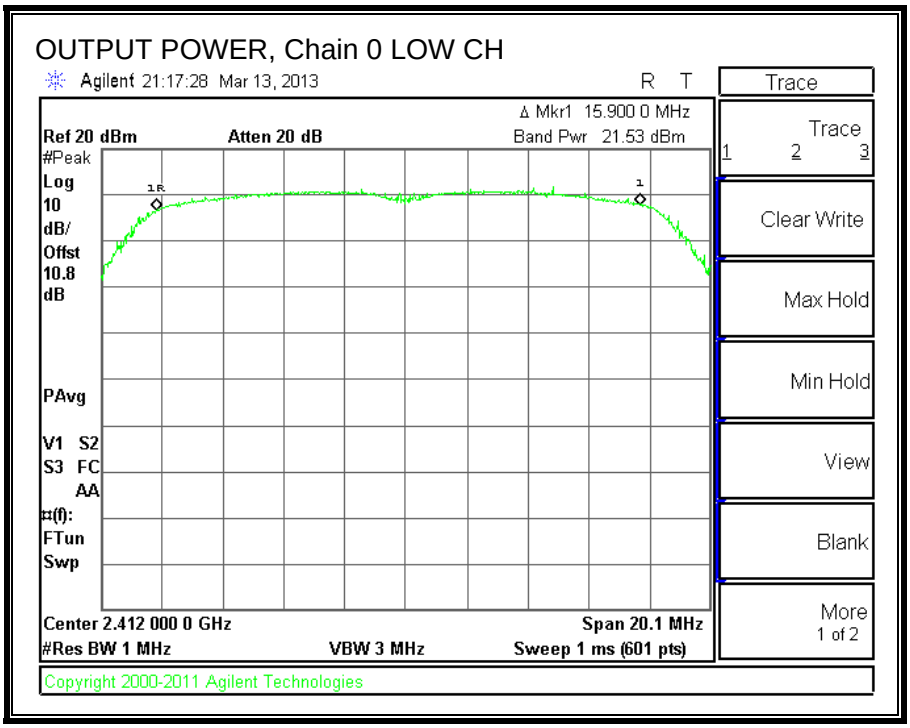
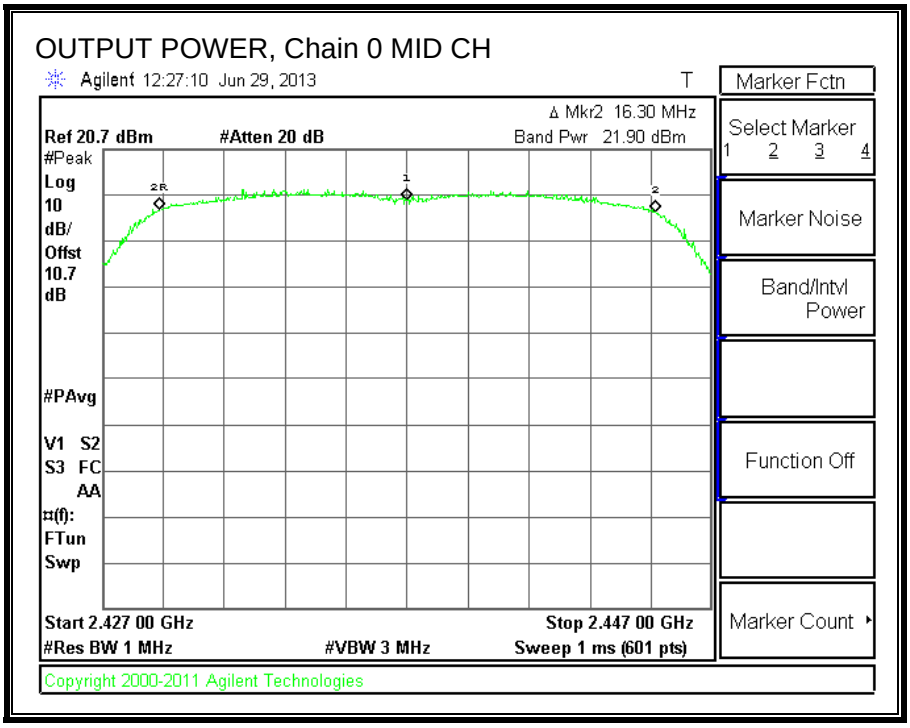
OUTPUT POWER, Chain 0





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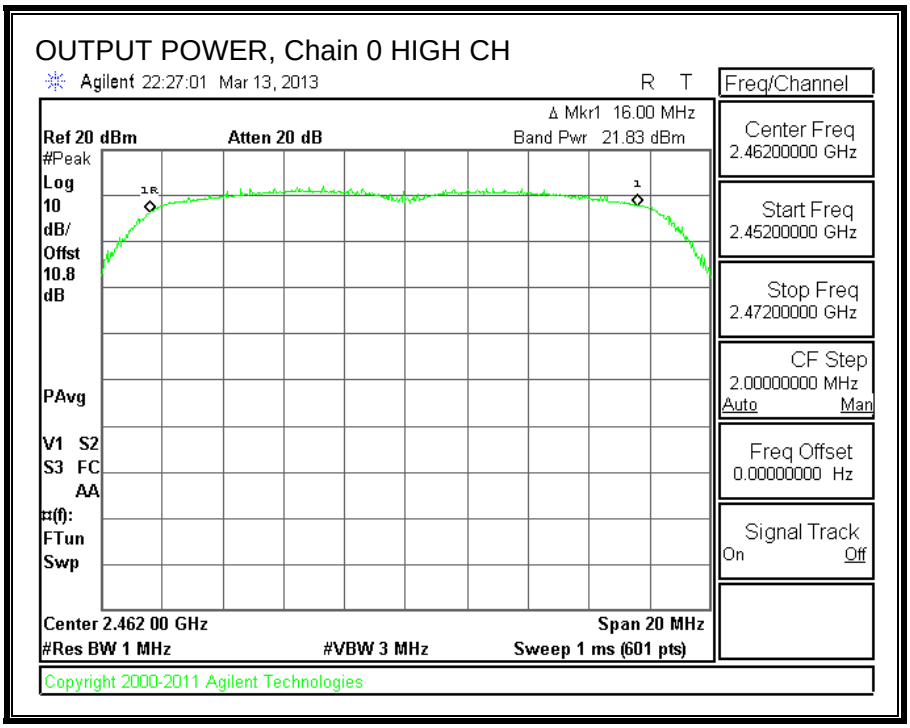
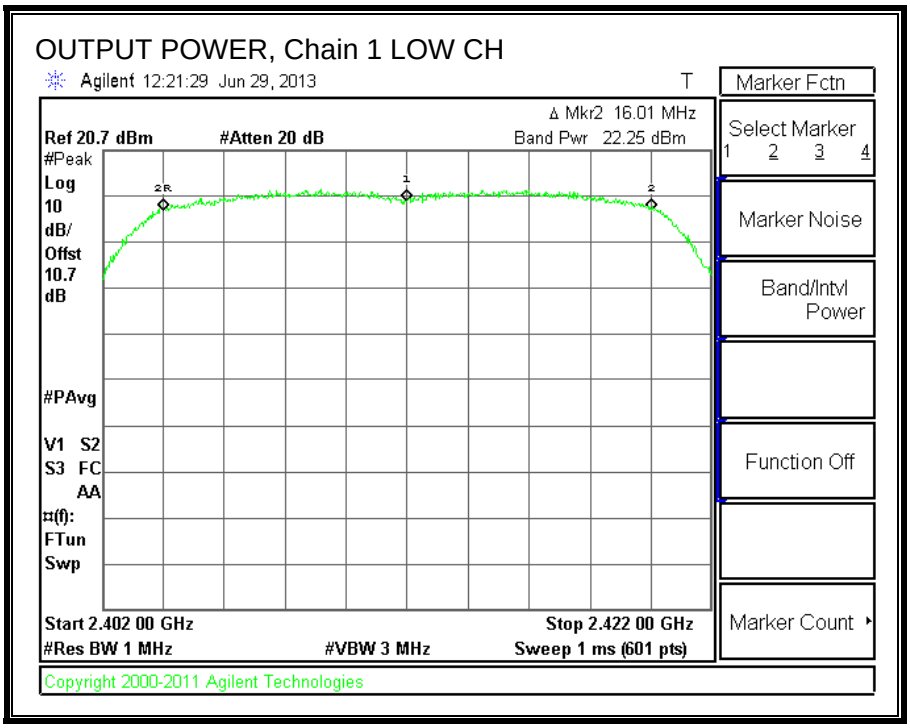


OUTPUT POWER, Chain 1



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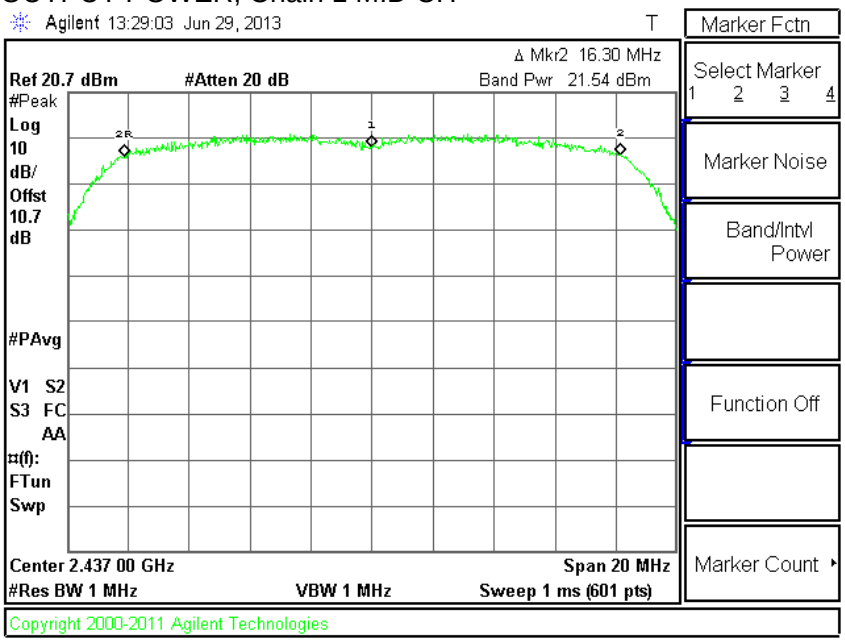
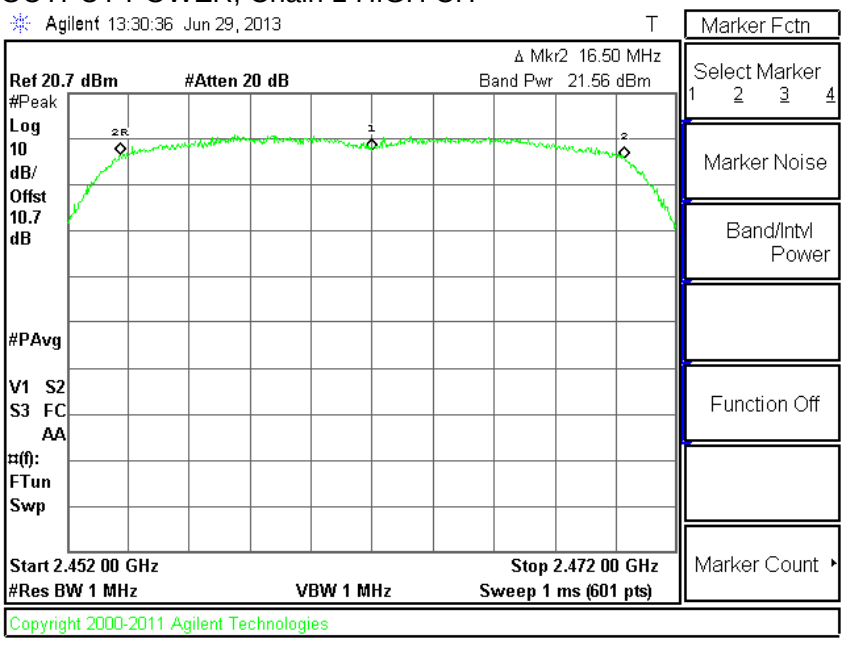
OUTPUT POWER, Chain 1 MID CH



OUTPUT POWER, Chain 1 HIGH CH



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8.4.4. PSD

LIMITS

FCC §15.247

IC RSS-210 A8.2

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.

RESULTS

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Chain 1 Meas (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-10.43	-10.22	-7.31	8.0	-15.3
Mid	2437	-9.89	-10.23	-7.05	8.0	-15.0
High	2462	-11.00	-10.31	-7.63	8.0	-15.6

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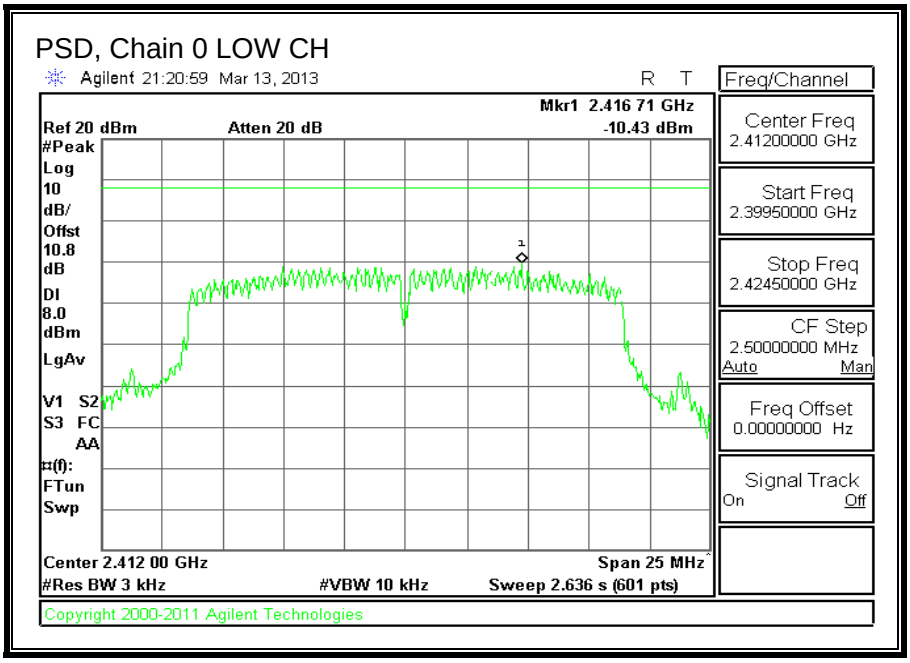
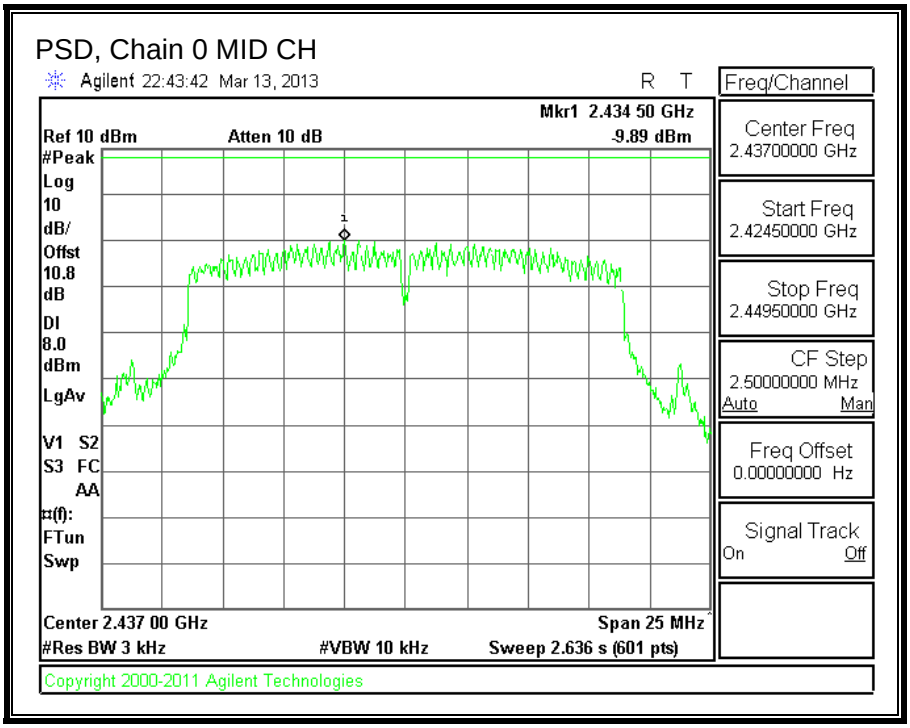
PSD, Chain 0





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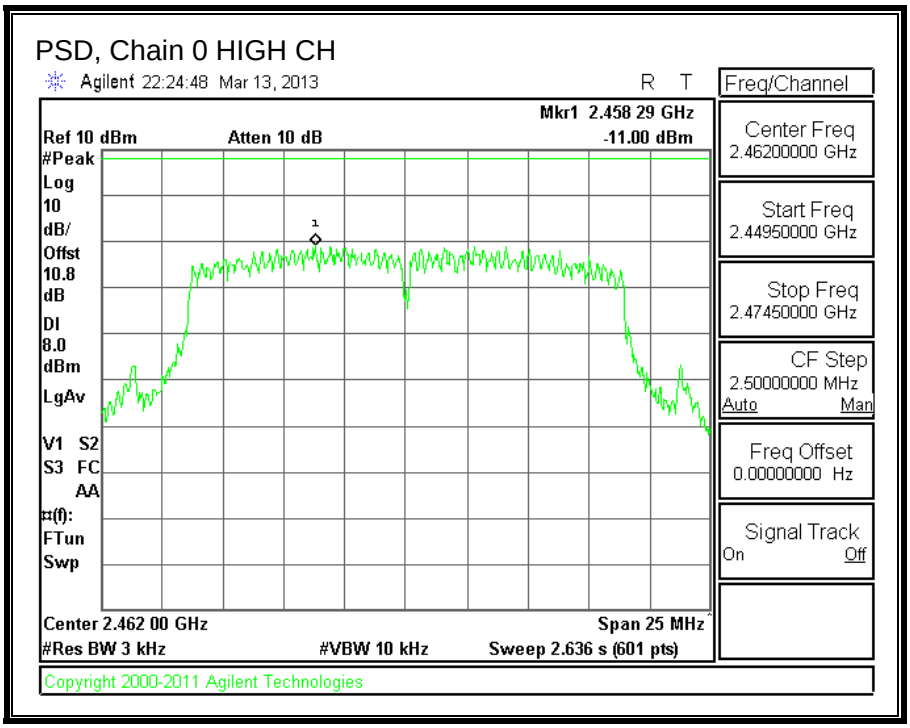
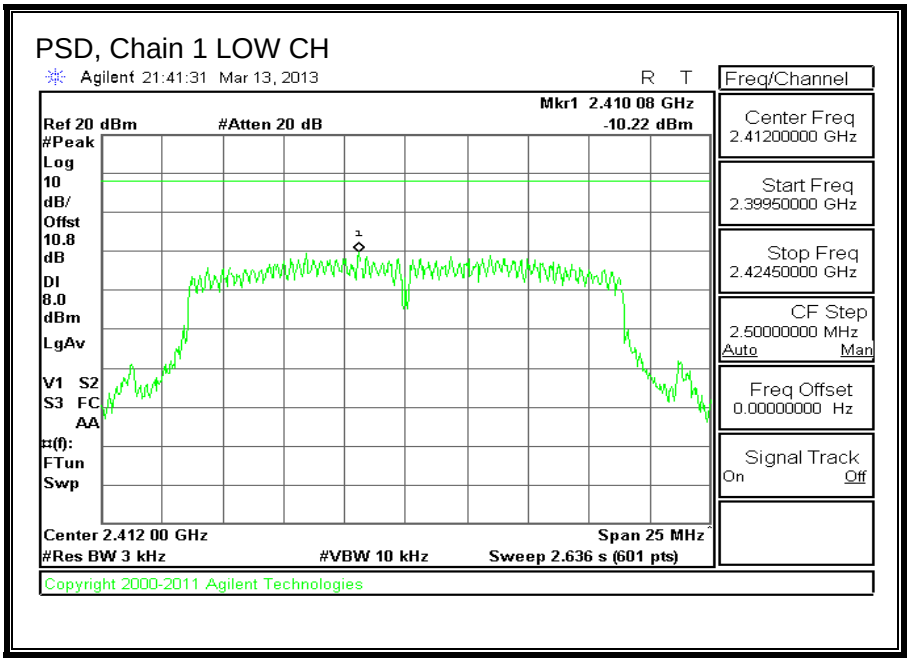


PSD, Chain 1



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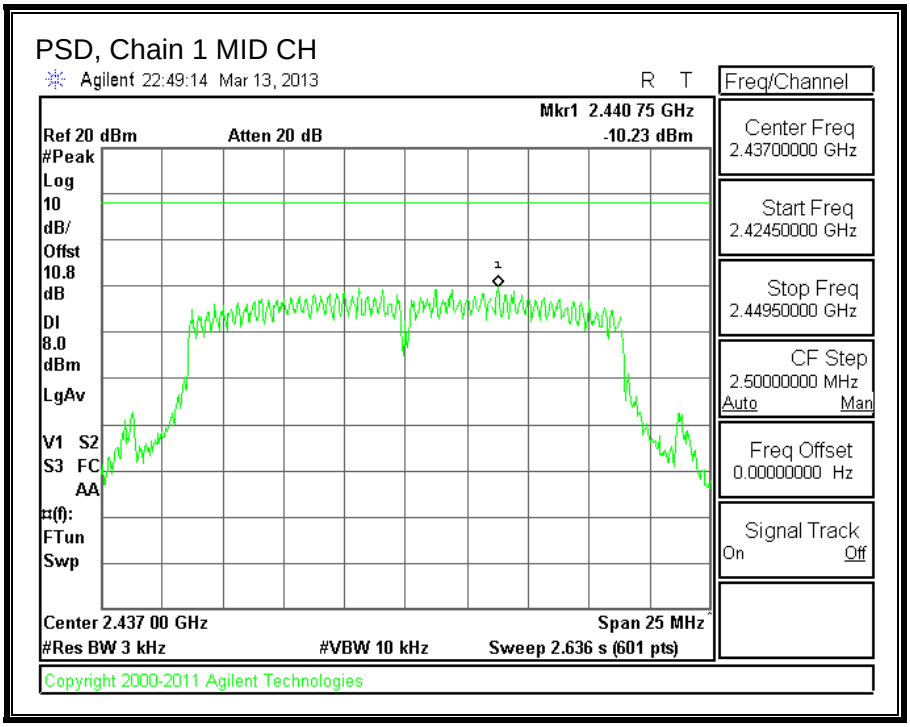

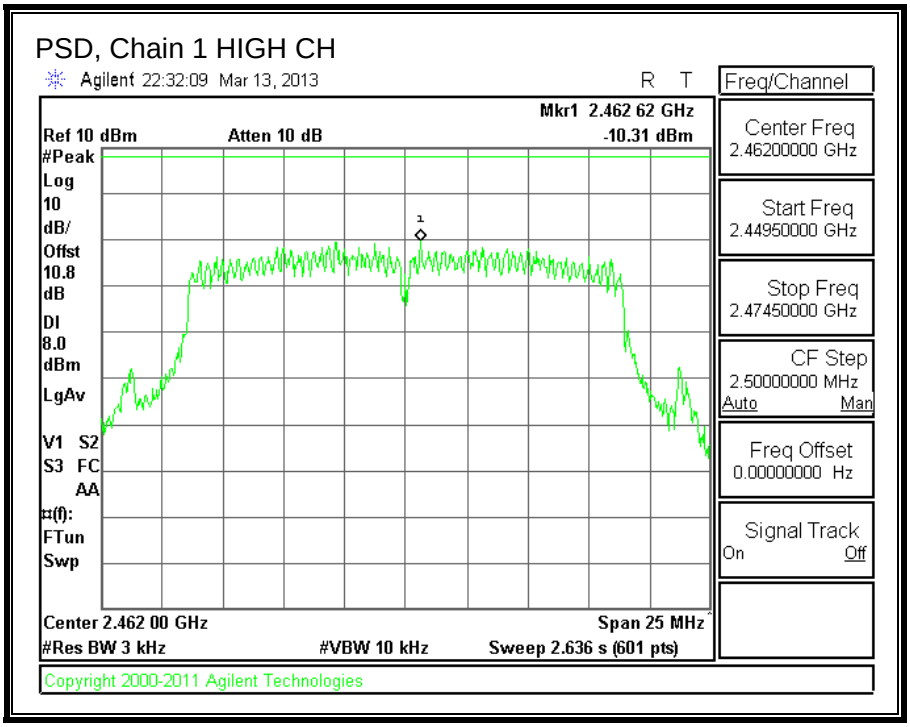

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8.4.5. OUT-OF-BAND EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the in-band reference level, bandedge (where measurements to the general radiated limits will not be made) and out-of-band emissions.

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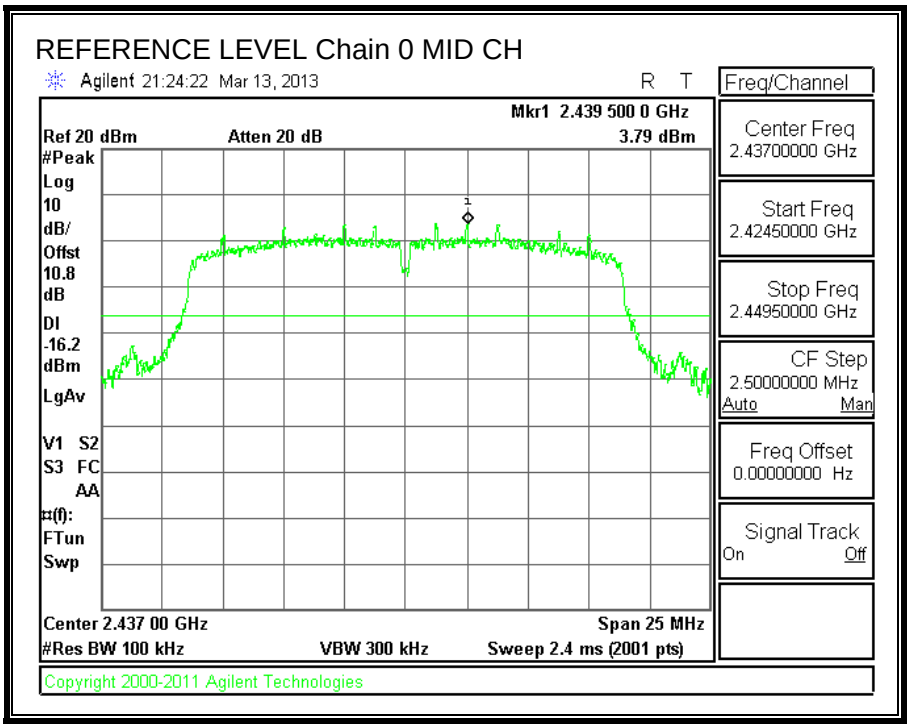
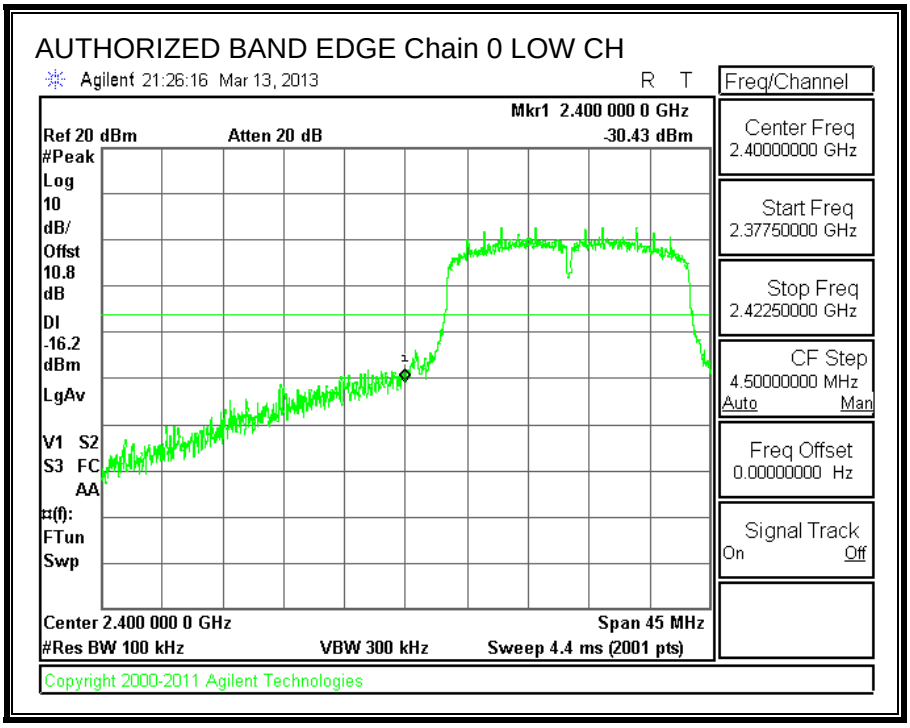
IN-BAND REFERENCE LEVEL, Chain 0



LOW CHANNEL BANDEDGE, Chain 0



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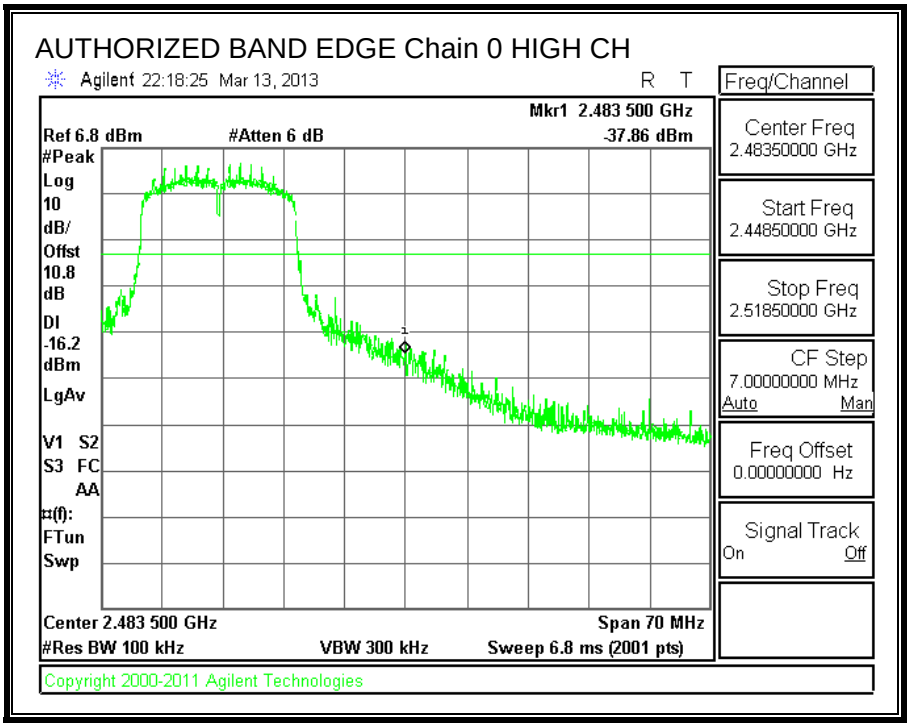
HIGH CHANNEL BANDEDGE, Chain 0



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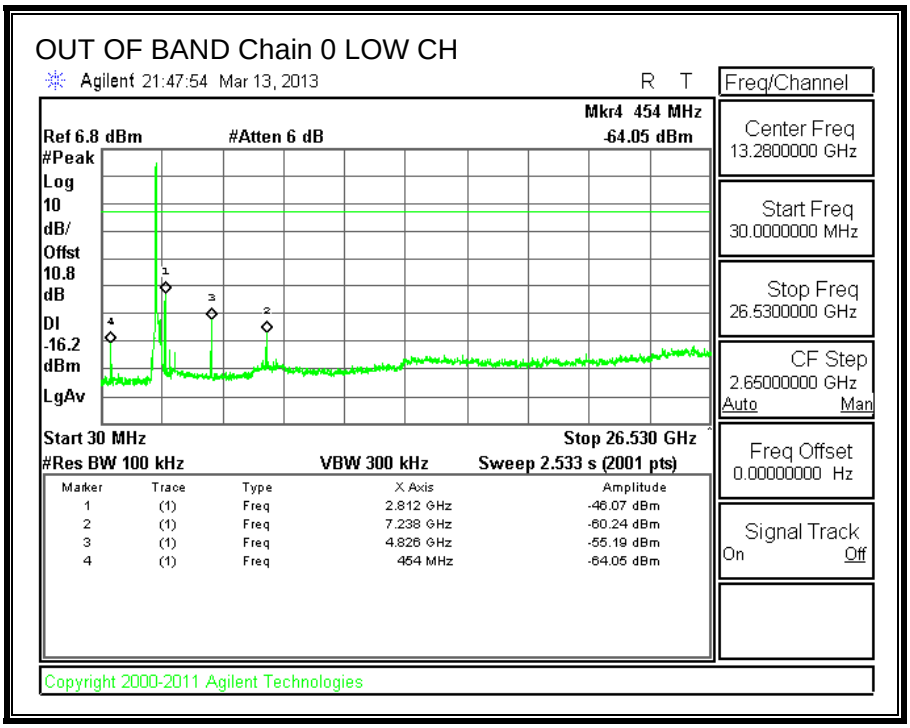
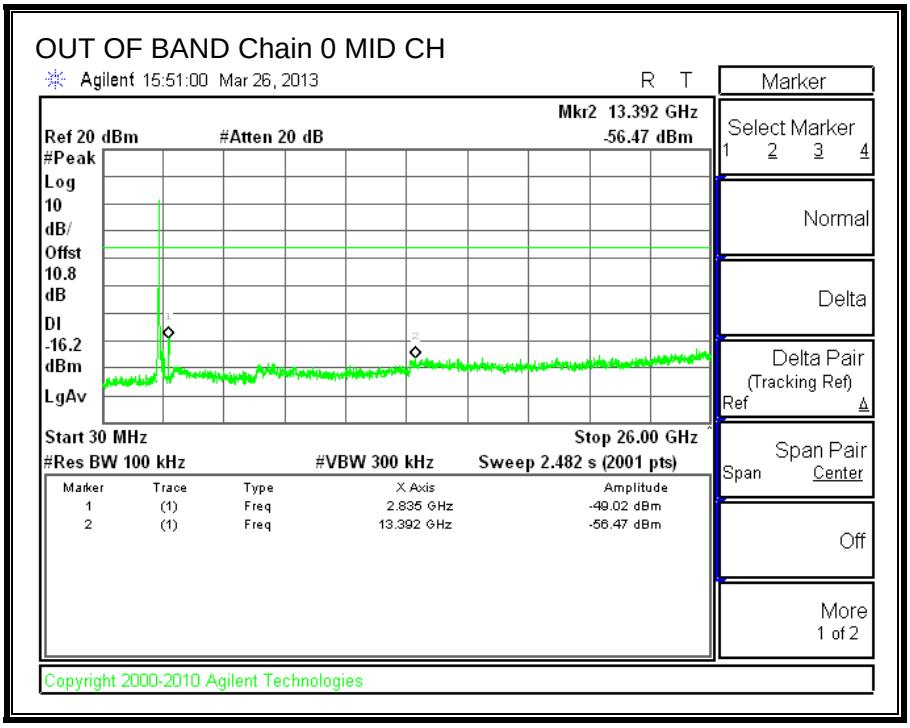
OUT-OF-BAND EMISSIONS, Chain 0





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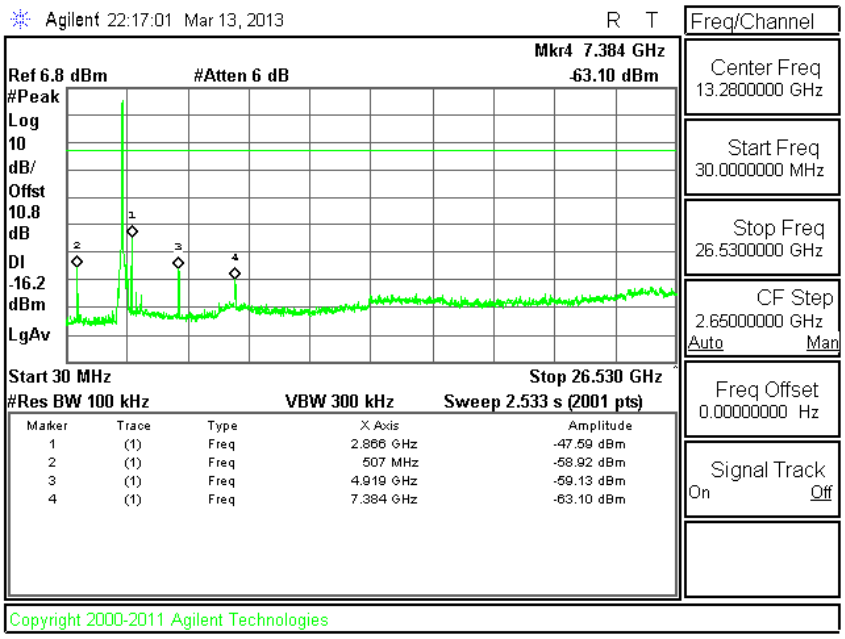
OUT OF BAND Chain 0 HIGH CH



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.866 GHz	-47.59 dBm
2	(1)	Freq	507 MHz	-58.92 dBm
3	(1)	Freq	4.919 GHz	-59.13 dBm
4	(1)	Freq	7.384 GHz	-63.10 dBm

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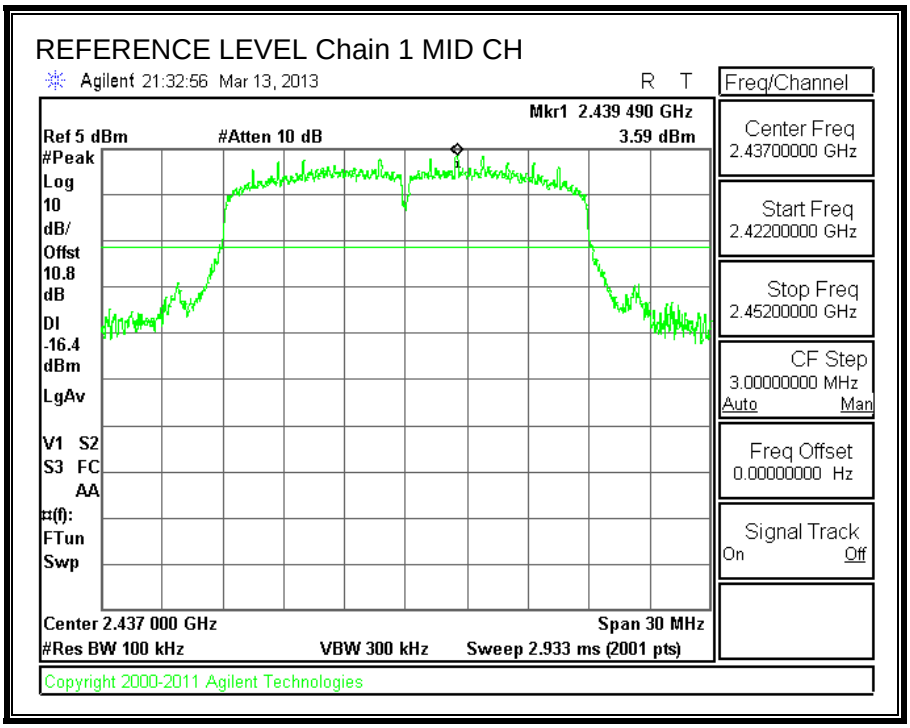
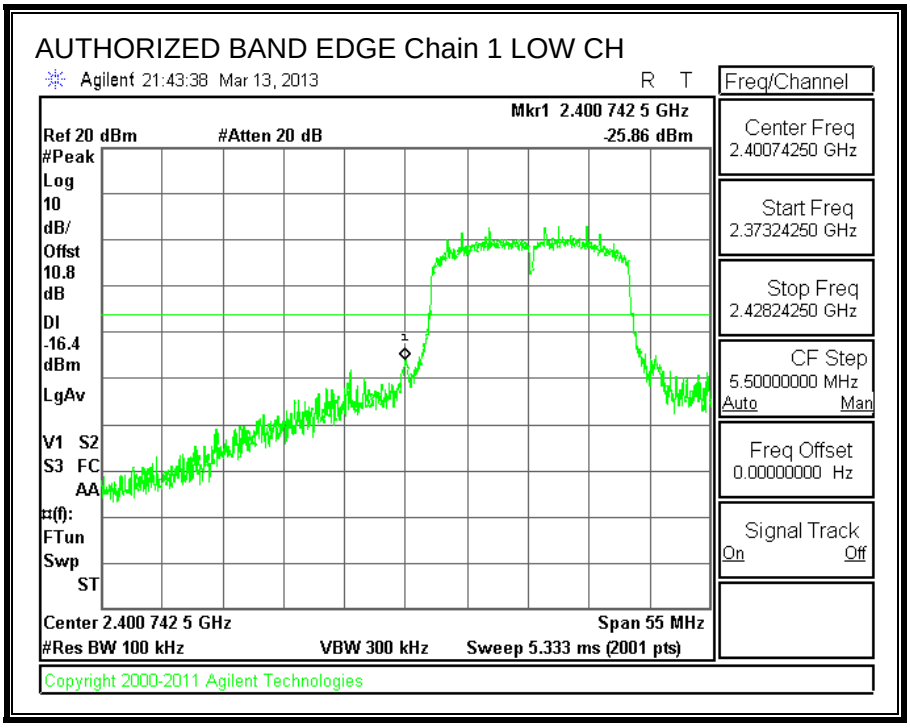
IN-BAND REFERENCE LEVEL, Chain 1



LOW CHANNEL BANDEDGE, Chain 1



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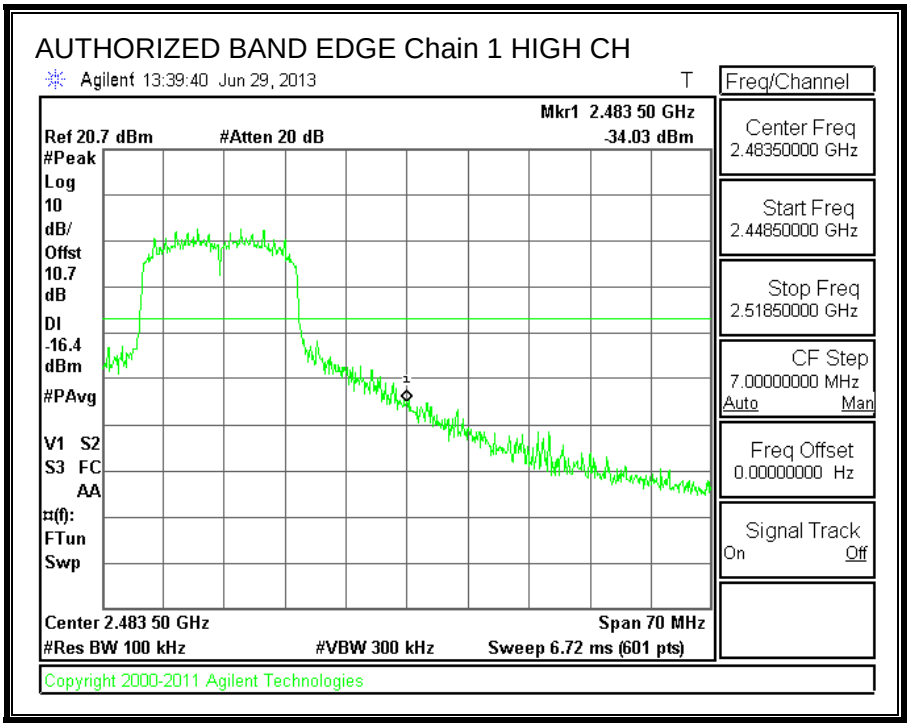
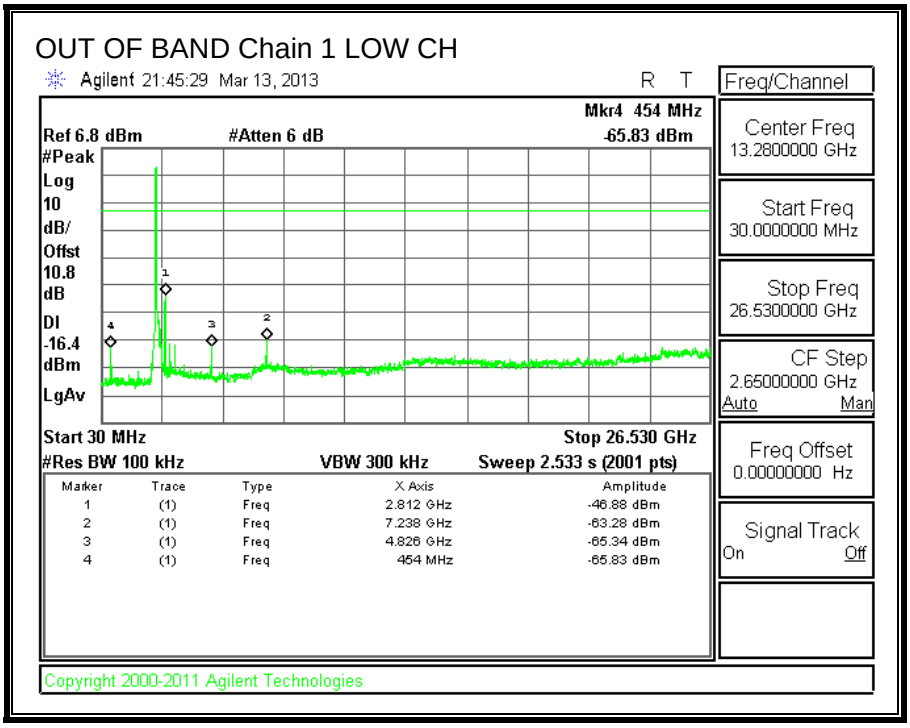
HIGH CHANNEL BANDEDGE, Chain 1





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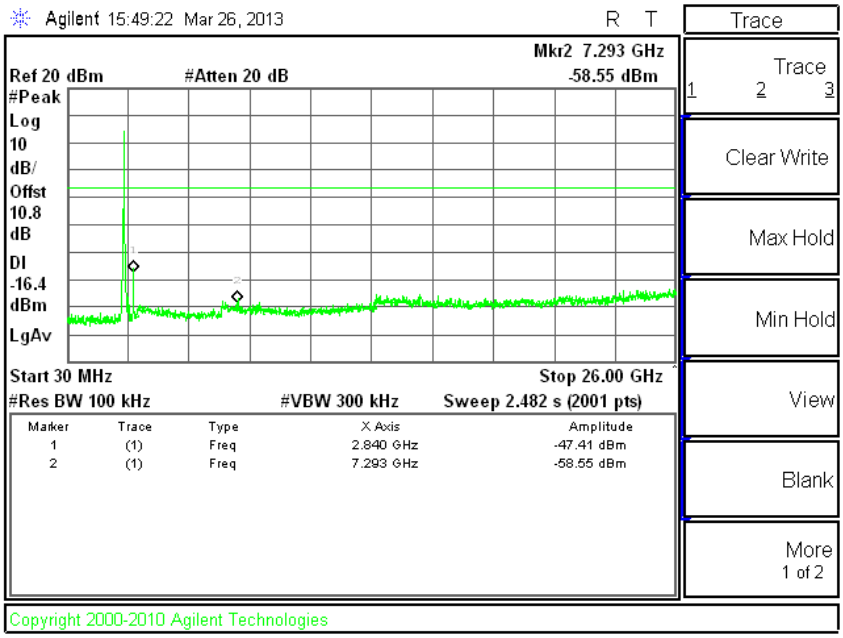
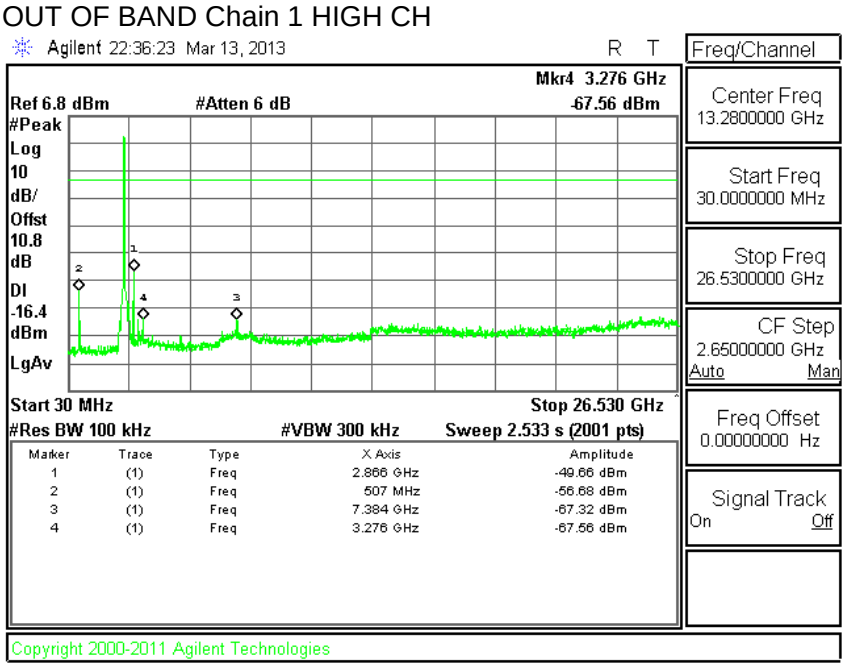
OUT OF BAND Chain 1 MID CH



OUT OF BAND Chain 1 HIGH CH



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8.5. 802.11n HT40 CDD MCS0 2TX MODE, 2.4 GHz BAND

8.5.1. 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 with the RBW set between 1% and 5% of the EBW, the VBW >= 3 x RBW, peak detector and max hold.

RESULTS

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low	2422	36.250	36.500	0.5
Mid	2437	36.250	36.500	0.5
High	2452	36.330	36.080	0.5

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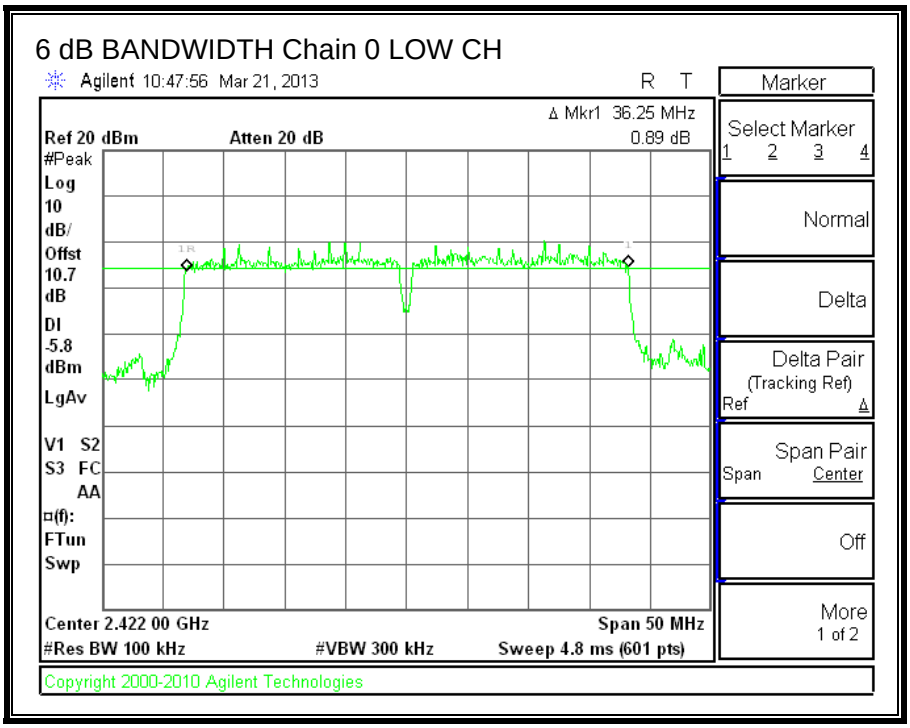
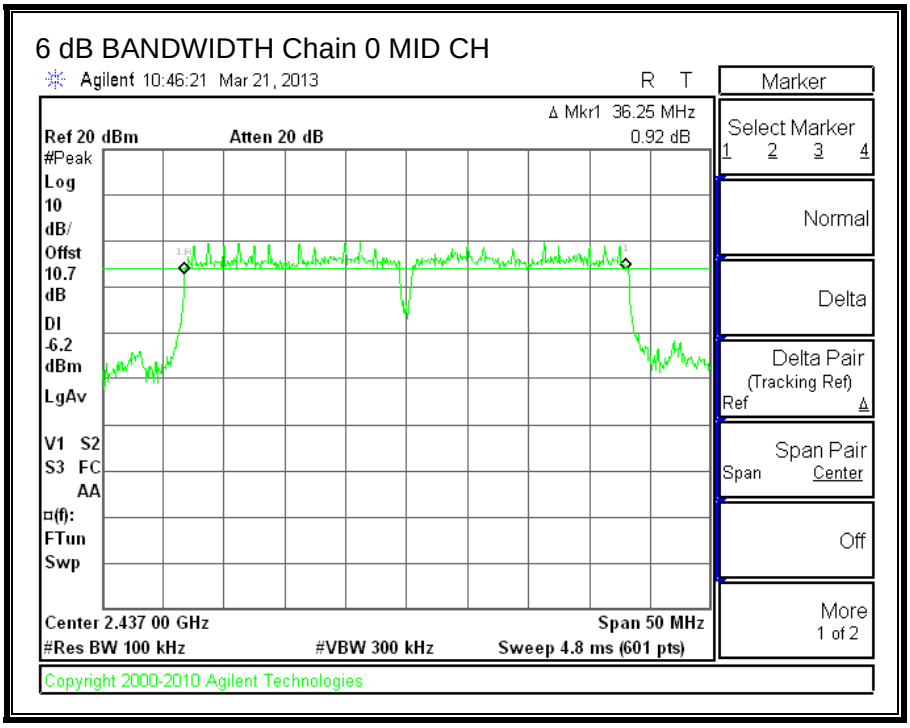
6 dB BANDWIDTH, Chain 0





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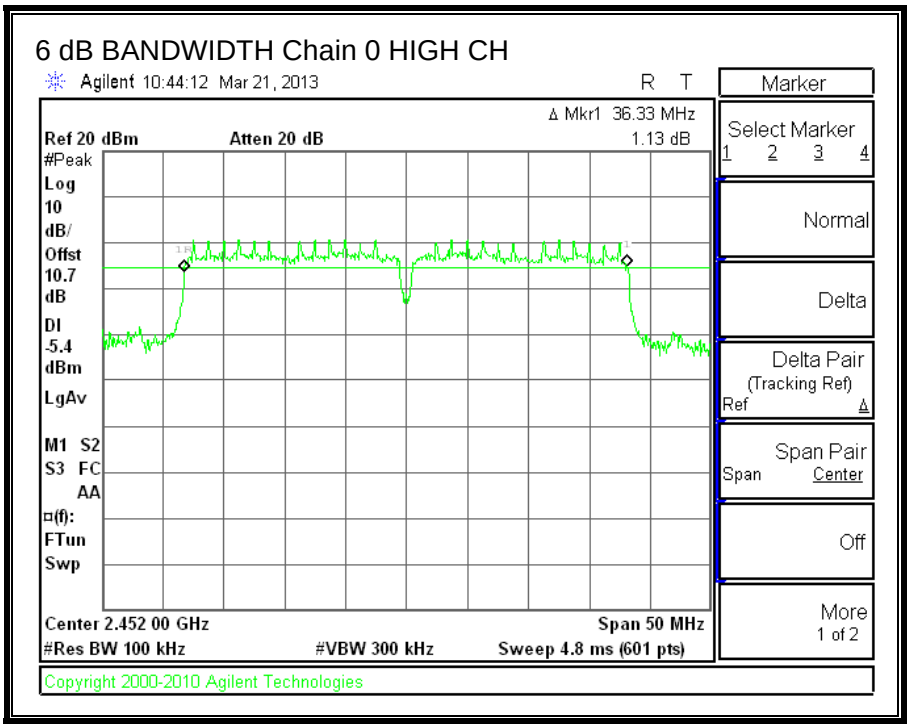
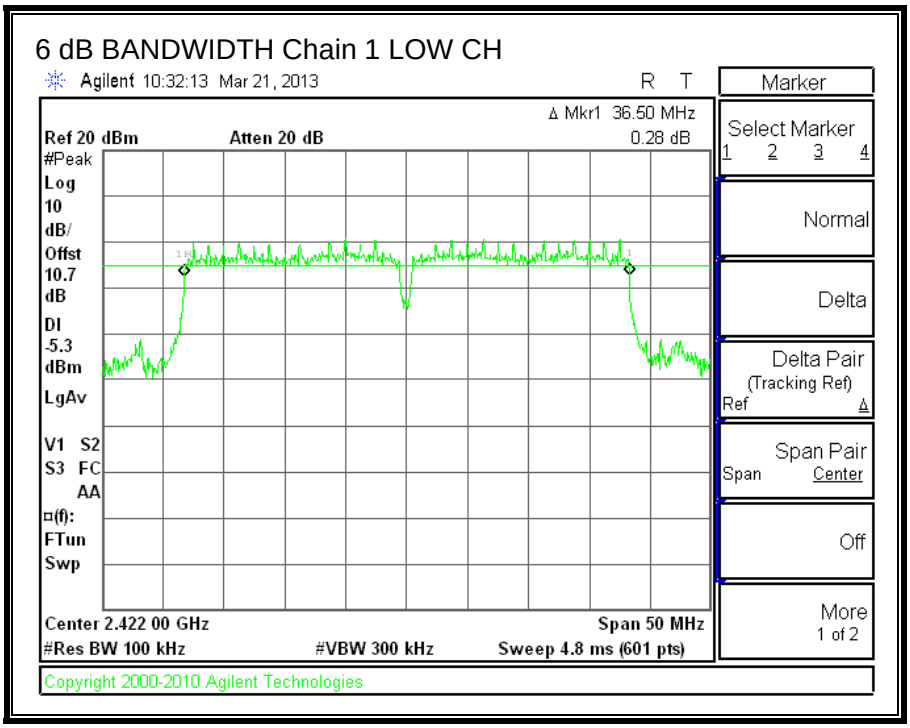


6 dB BANDWIDTH, Chain 1



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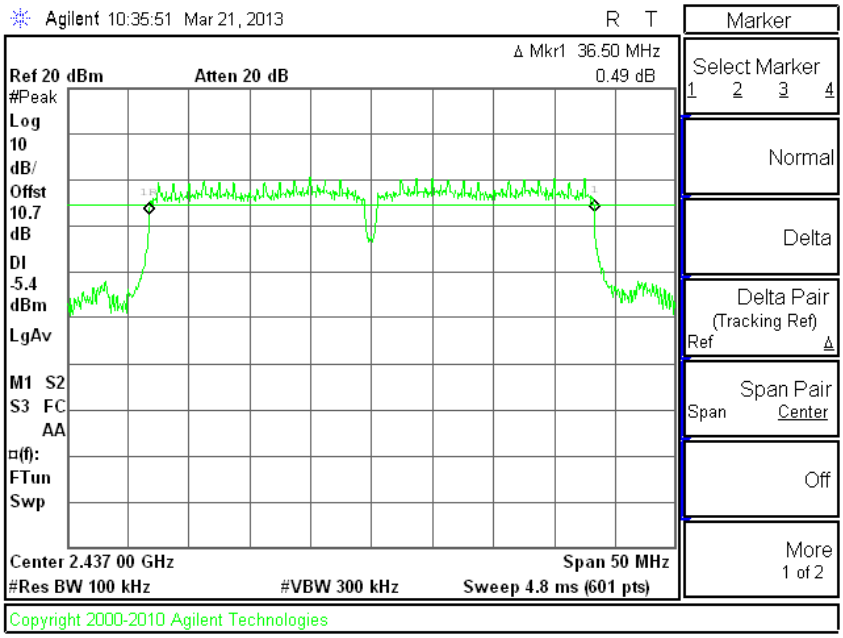
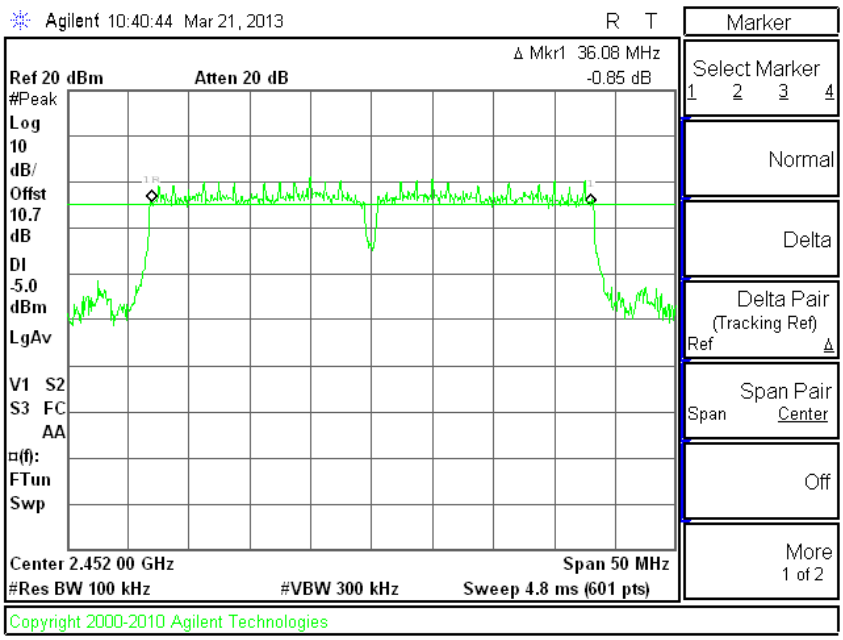
6 dB BANDWIDTH Chain 1 MID CH



6 dB BANDWIDTH Chain 1 HIGH CH



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8.5.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)
Low	2422	36.5146	36.4964
Mid	2437	36.4881	36.4964
High	2452	36.5355	36.6997

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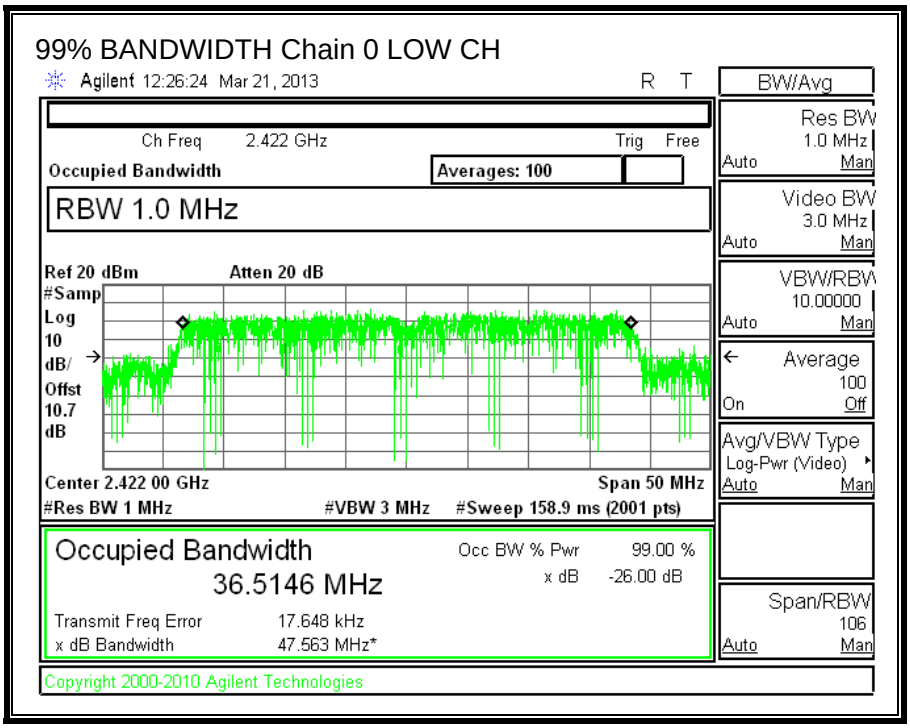
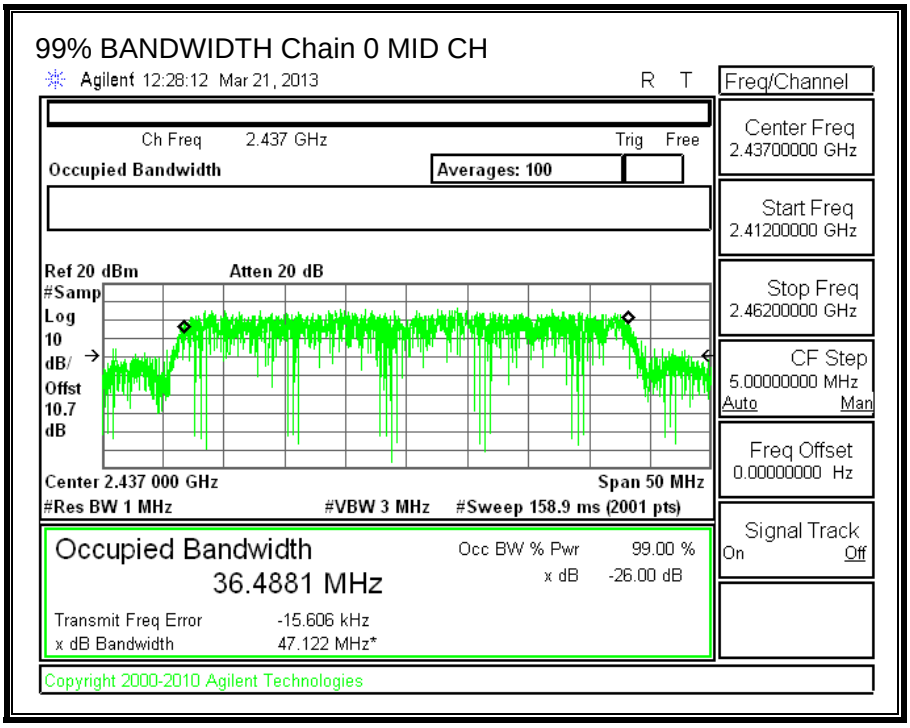
99% BANDWIDTH, Chain 0





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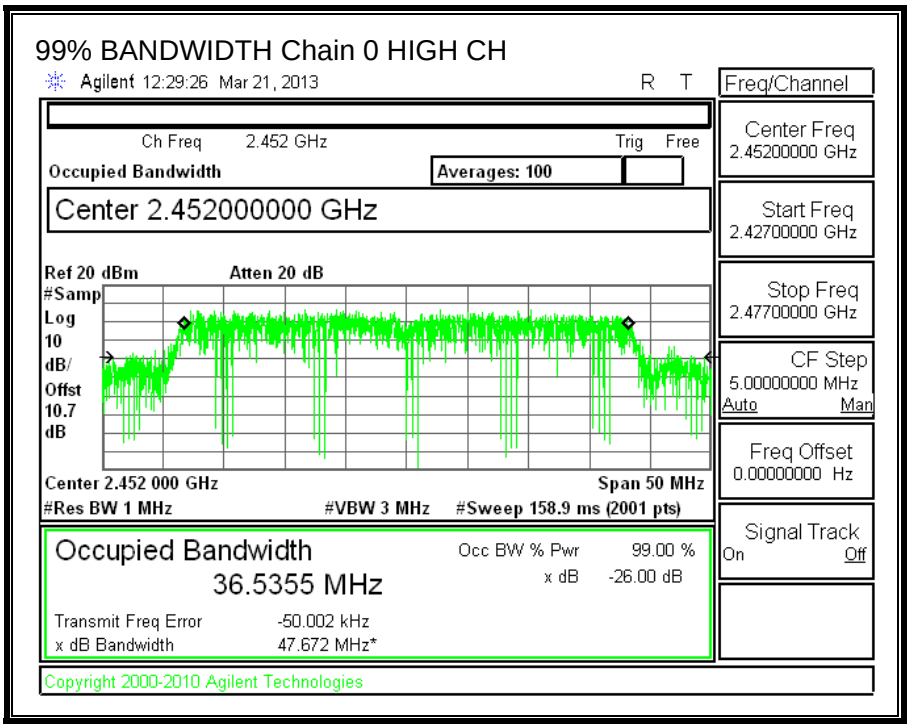
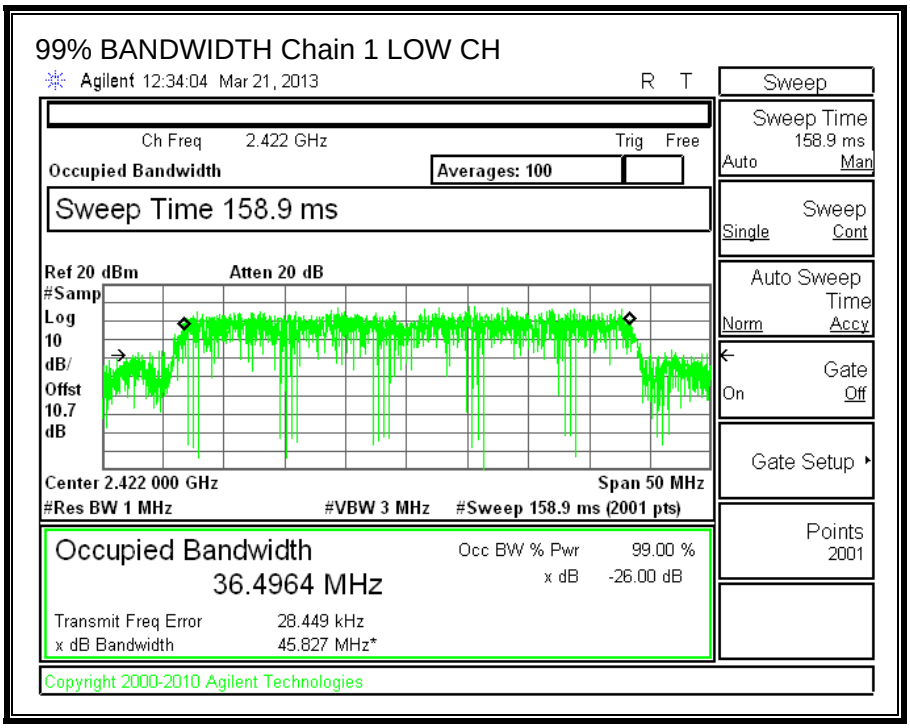


99% BANDWIDTH, Chain 1



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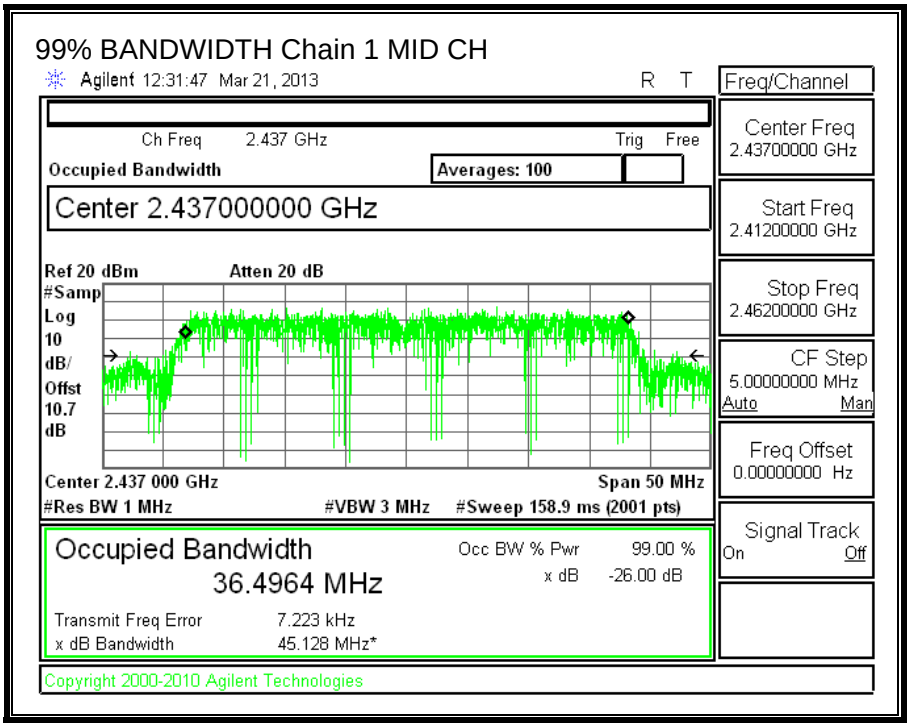

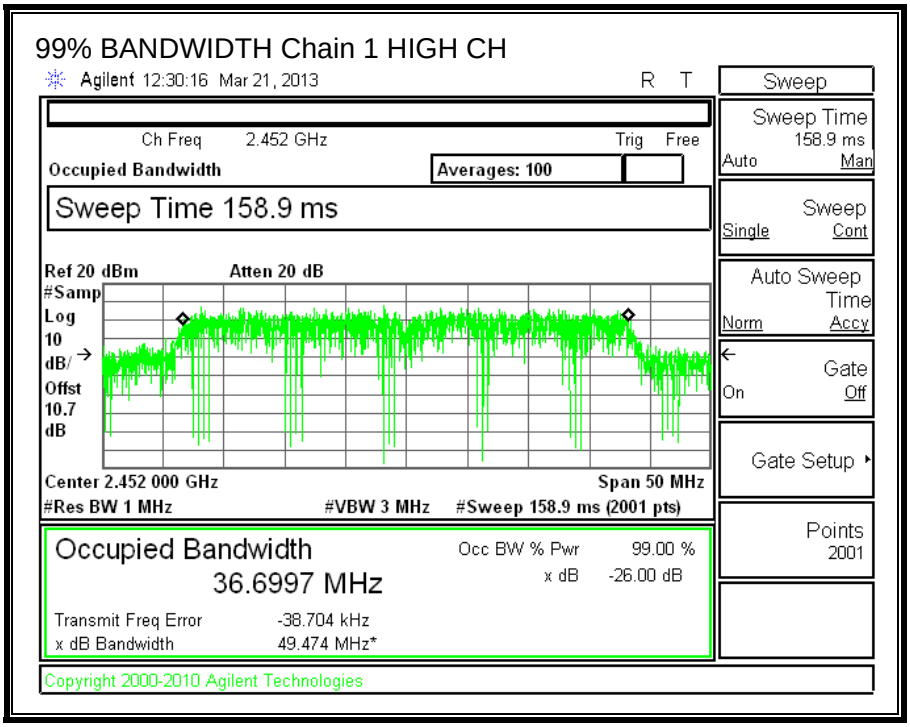

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8.5.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.7 dB (including 10 dB pad and 0.7 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
Low	2422	11.80	11.80	14.81
Mid	2437	13.90	14.08	17.00
High	2452	12.50	12.80	15.66

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8.5.4. OUTPUT POWER

LIMITS

FCC §15.247

IC RSS-210 A8.4

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain.

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
3.00	3.00	3.00

RESULTS

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2422	3.00	30.00	30	36	30.00
Mid	2437	3.00	30.00	30	36	30.00
High	2452	3.00	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margi (dB)
Low	2422	22.36	22.56	25.47	30.00	-4.53
Mid	2437	22.02	22.31	25.18	30.00	-4.82
High	2452	21.80	22.62	25.24	30.00	-4.76

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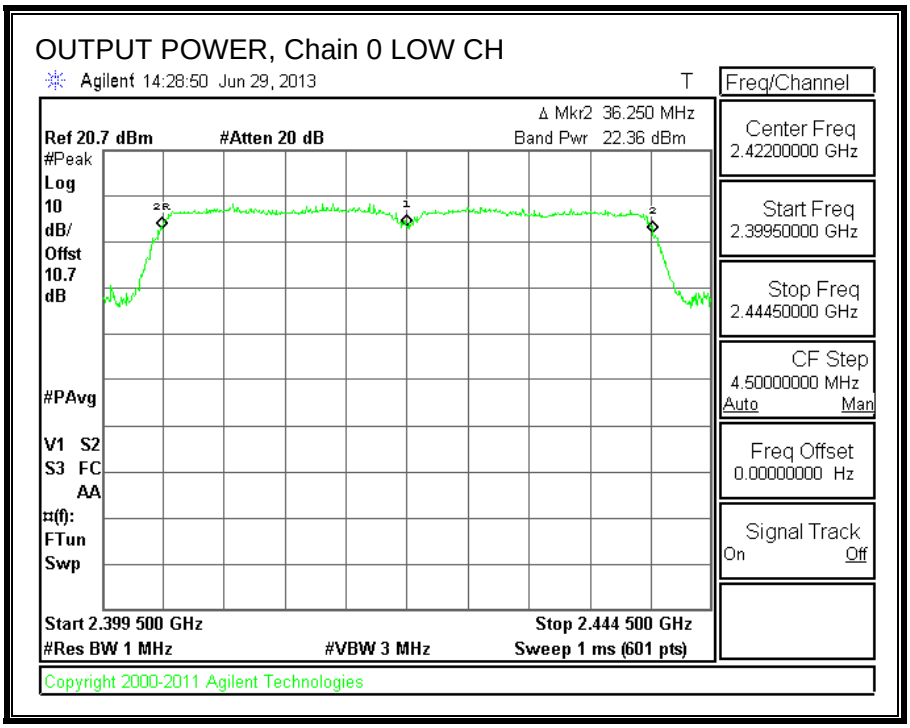
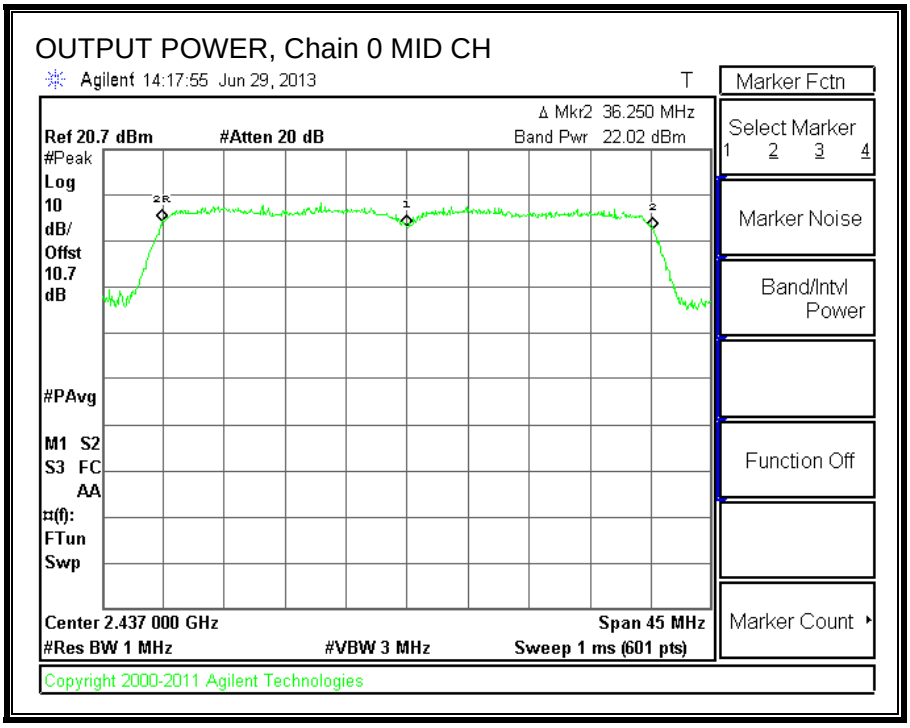
OUTPUT POWER, Chain 0





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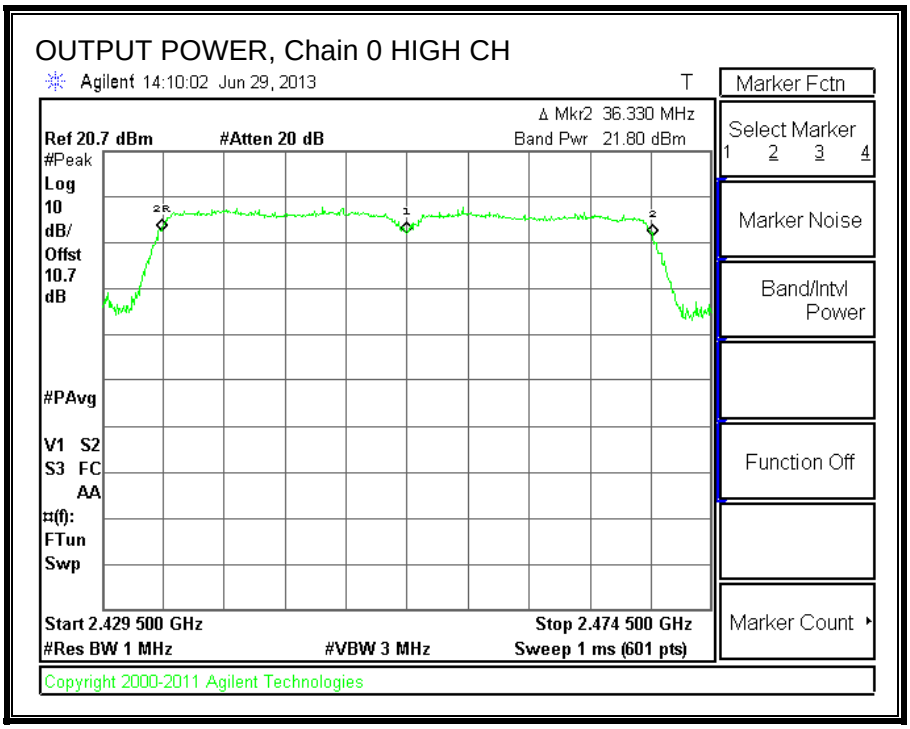
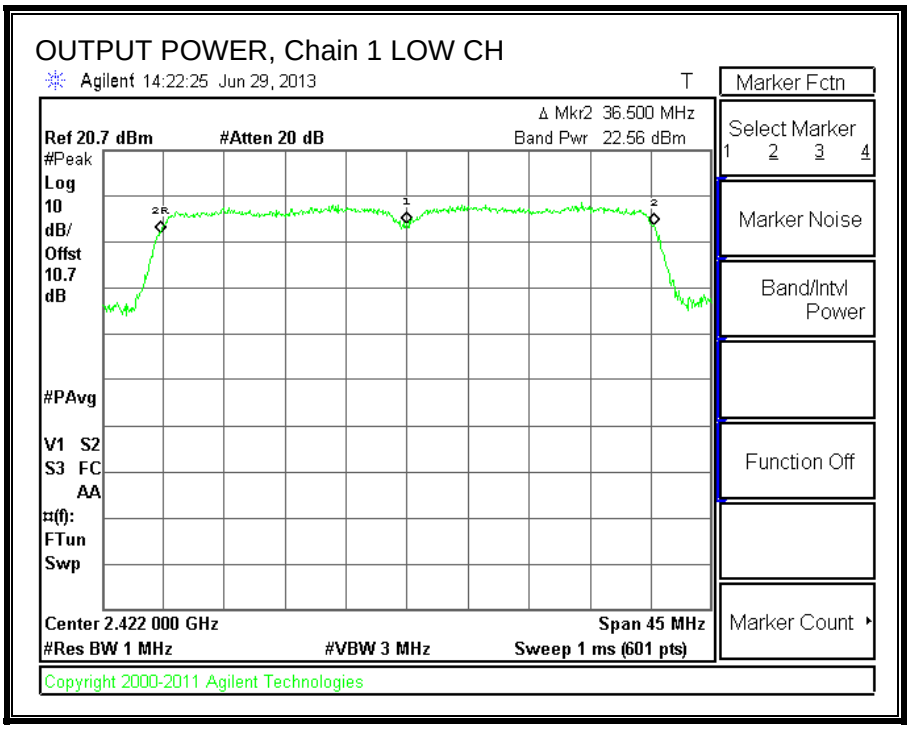


OUTPUT POWER, Chain 1



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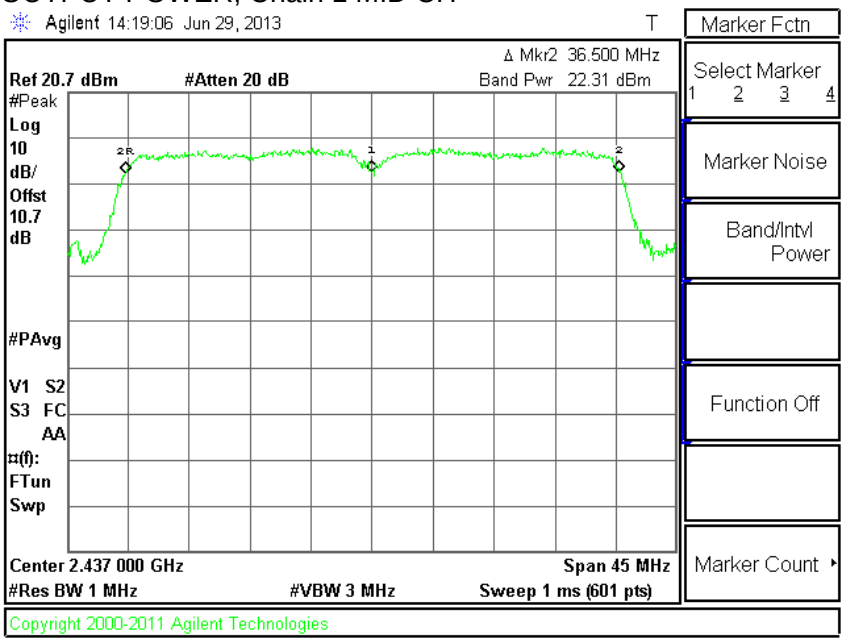
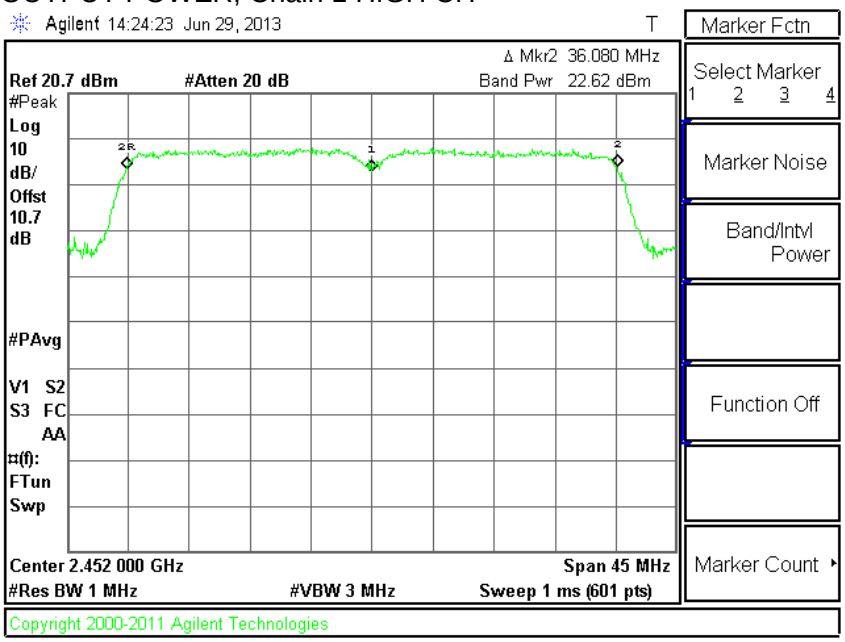
OUTPUT POWER, Chain 1 MID CH



OUTPUT POWER, Chain 1 HIGH CH



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8.5.5. PSD

LIMITS

FCC §15.247

IC RSS-210 A8.2

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.

RESULTS

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Chain 1 Meas (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2422	-13.02	-13.87	-10.41	8.0	-18.4
Mid	2437	-11.89	-12.05	-8.96	8.0	-17.0
High	2452	-14.11	-13.64	-10.86	8.0	-18.9

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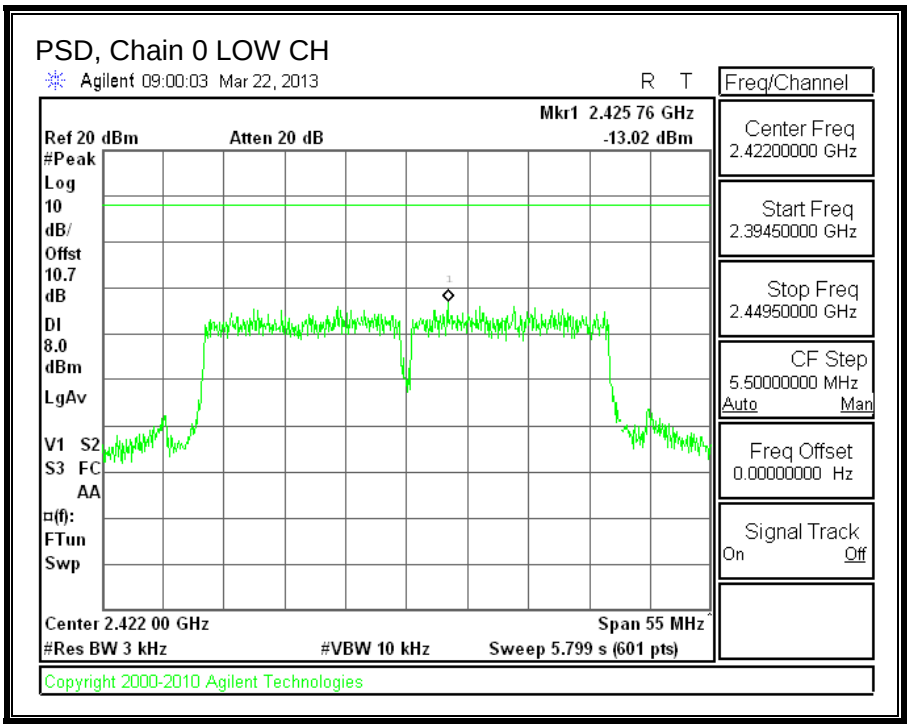
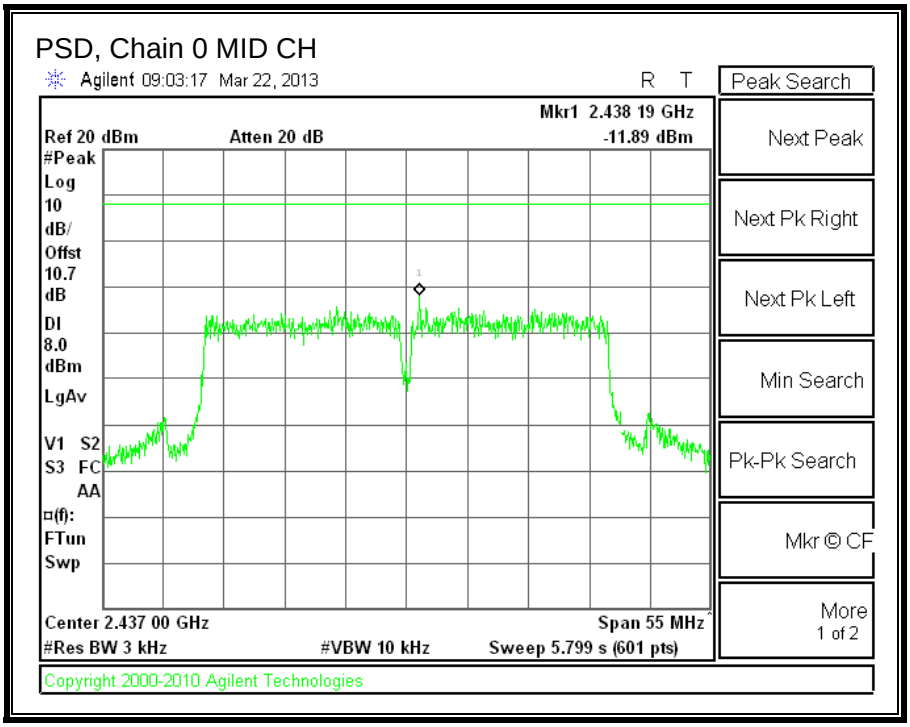
PSD, Chain 0





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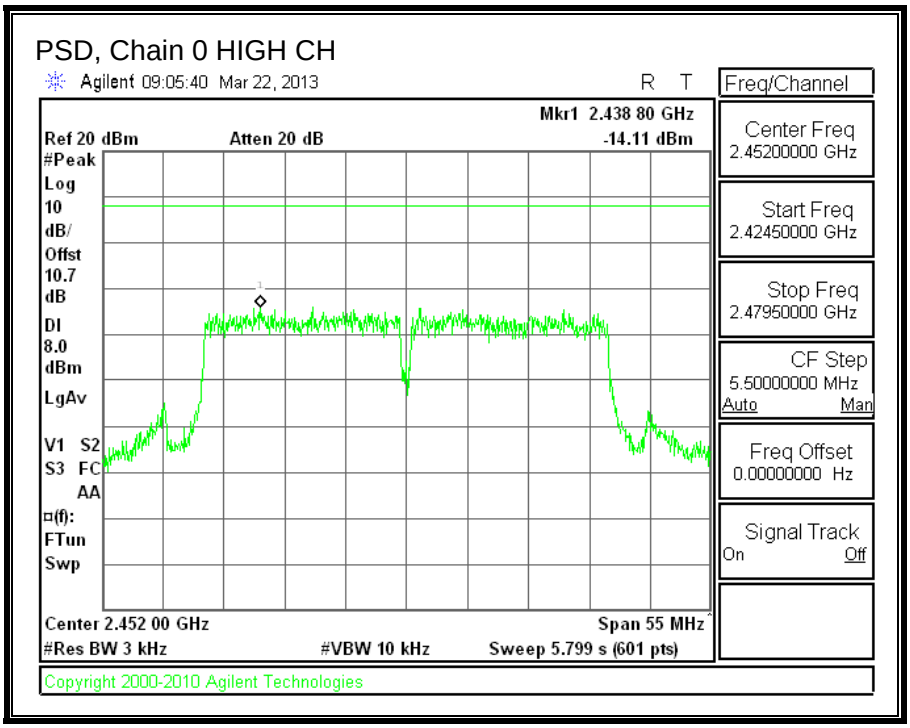
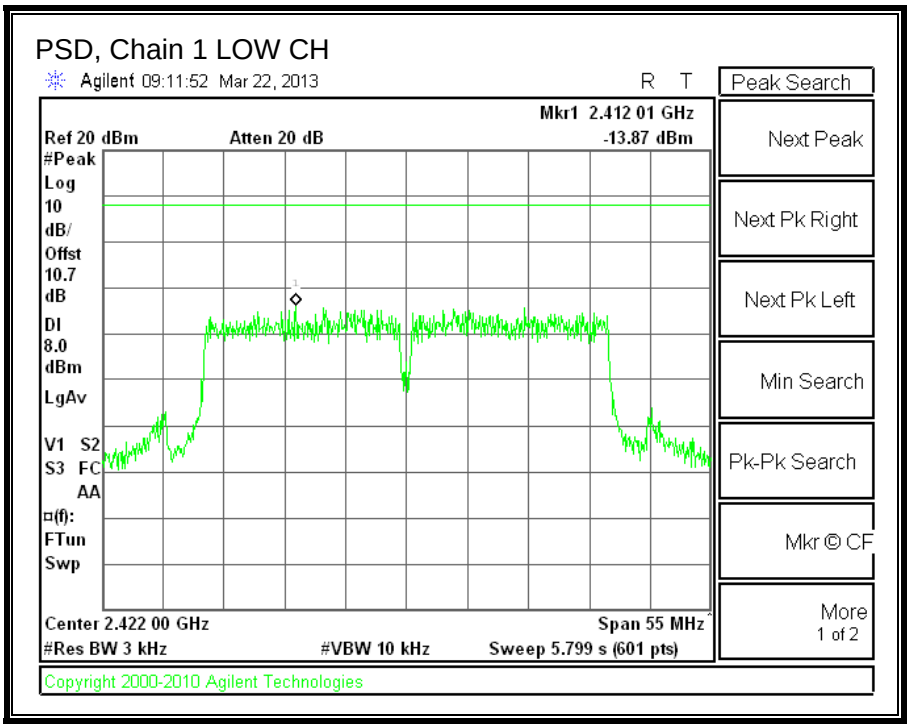


PSD, Chain 1



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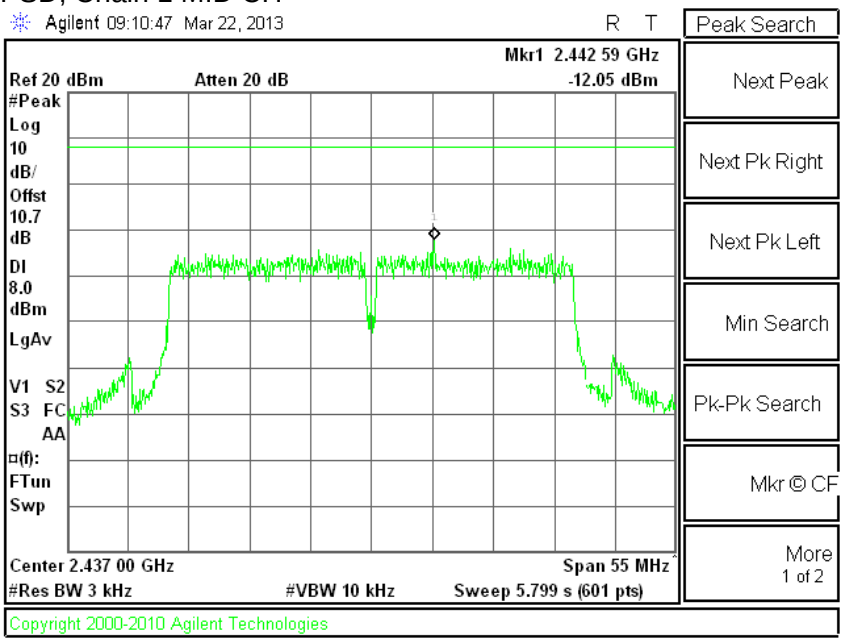
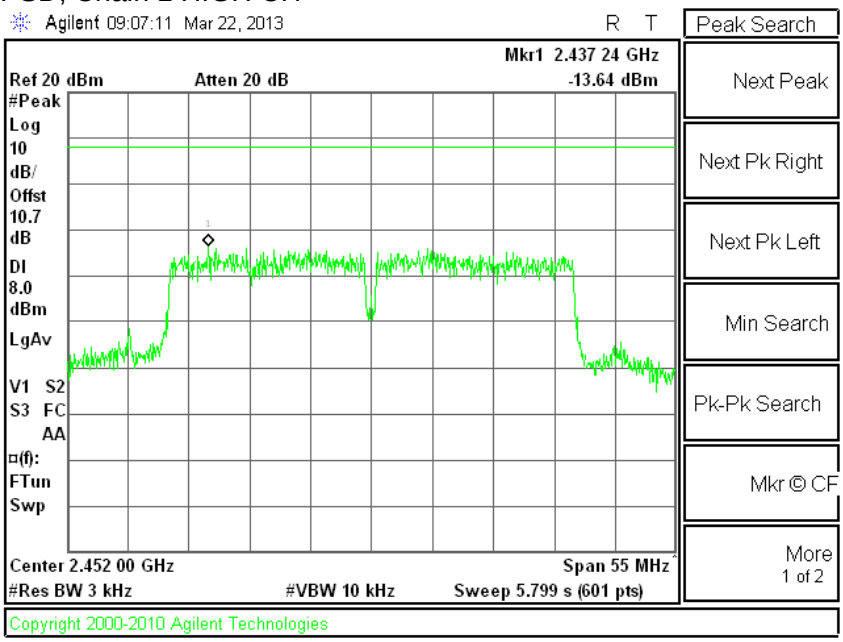
PSD, Chain 1 MID CH



PSD, Chain 1 HIGH CH



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8.5.6. OUT-OF-BAND EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the in-band reference level, band edge (where measurements to the general radiated limits will not be made) and out-of-band emissions.

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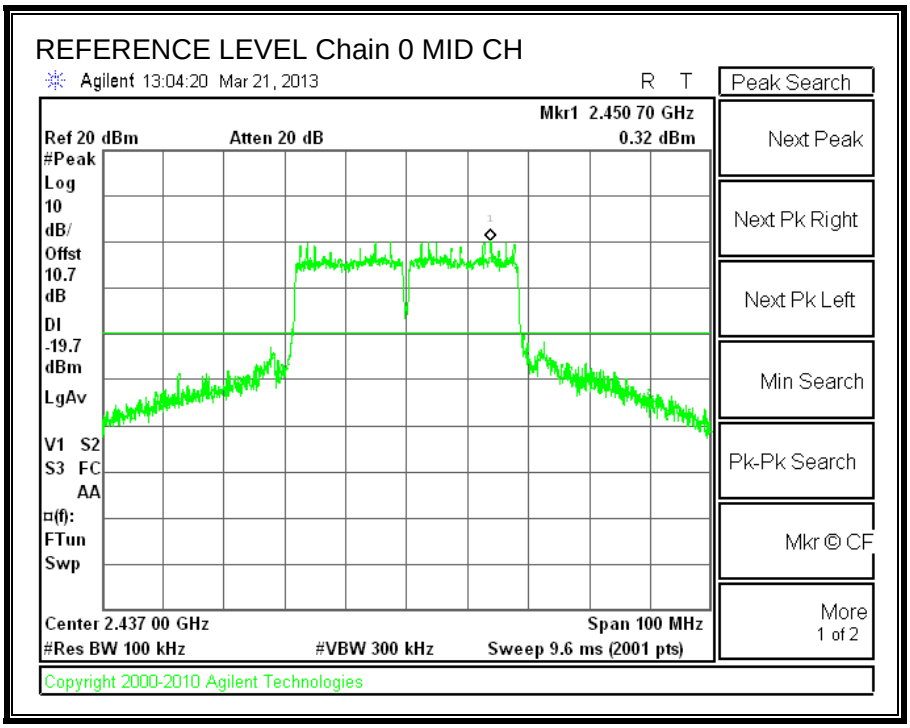
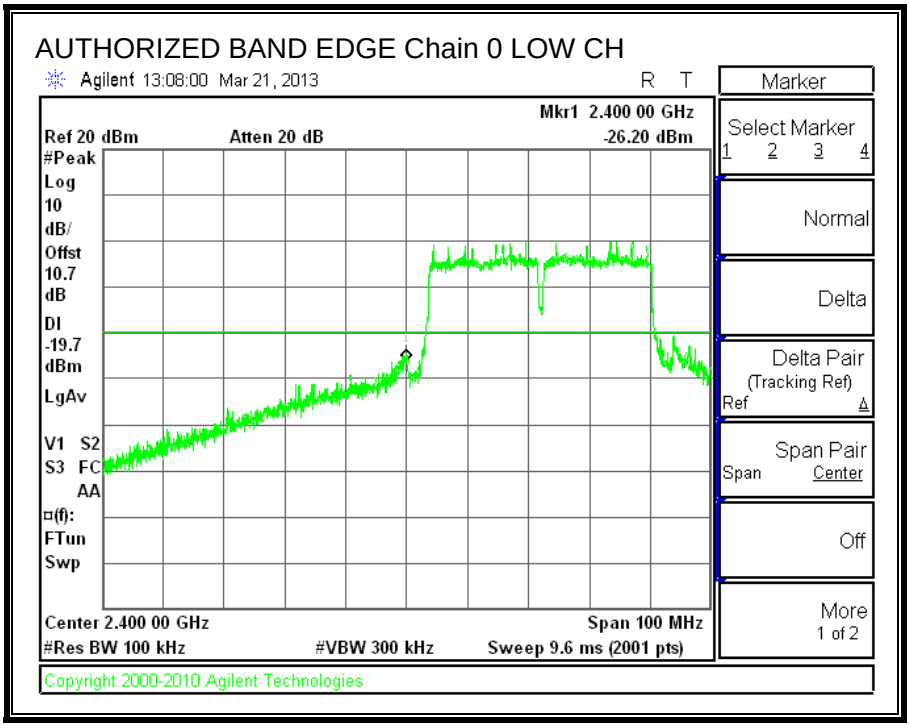
IN-BAND REFERENCE LEVEL, Chain 0



LOW CHANNEL BANDEDGE, Chain 0



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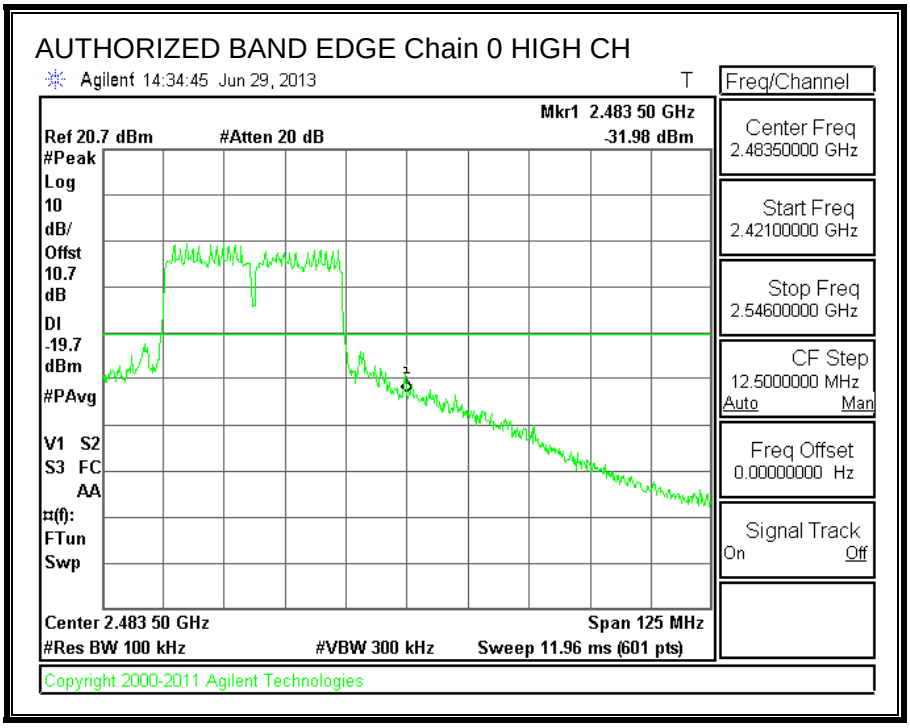
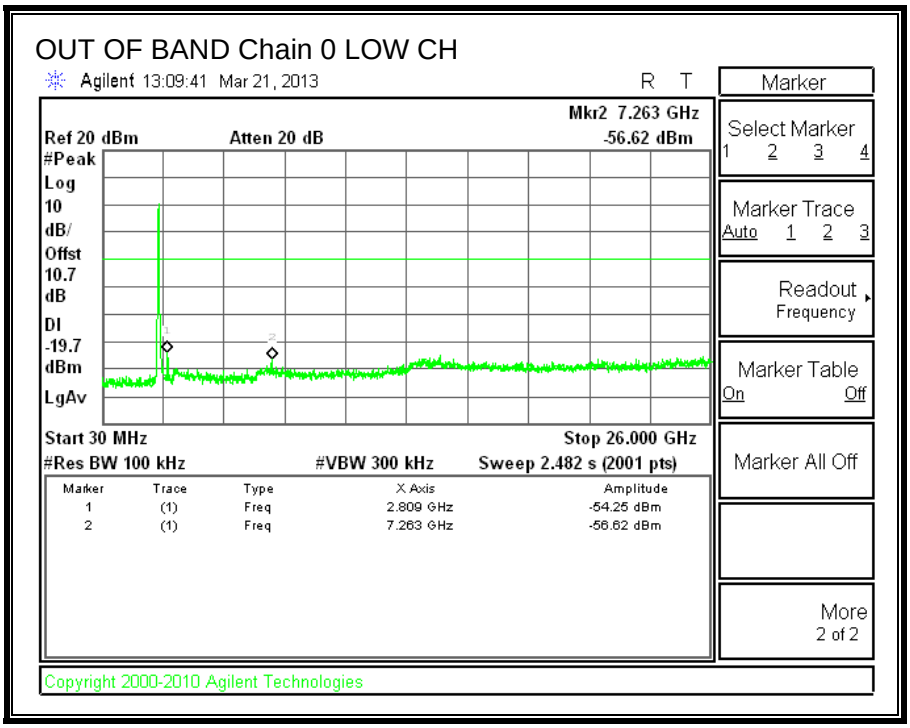
HIGH CHANNEL BANDEDGE, Chain 0



OUT-OF-BAND EMISSIONS, Chain 0



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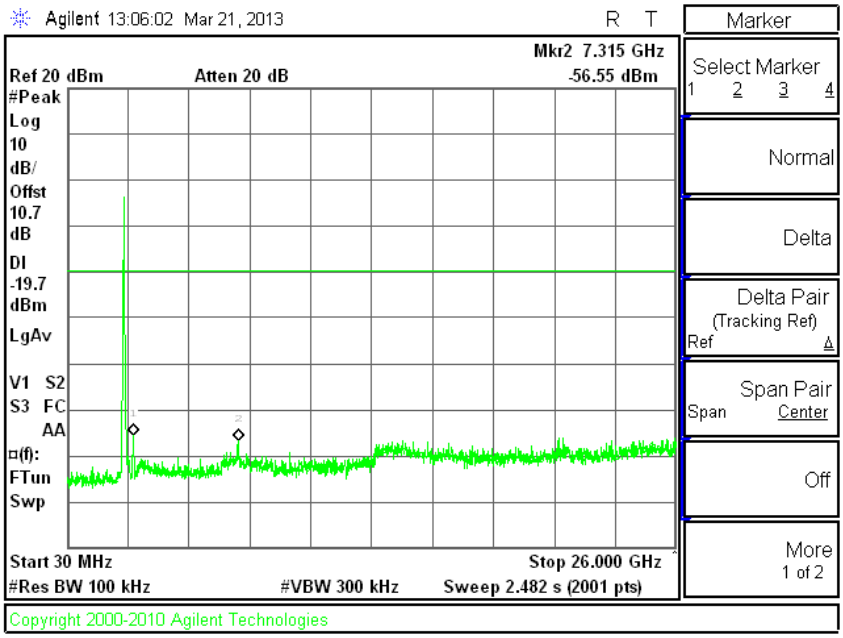
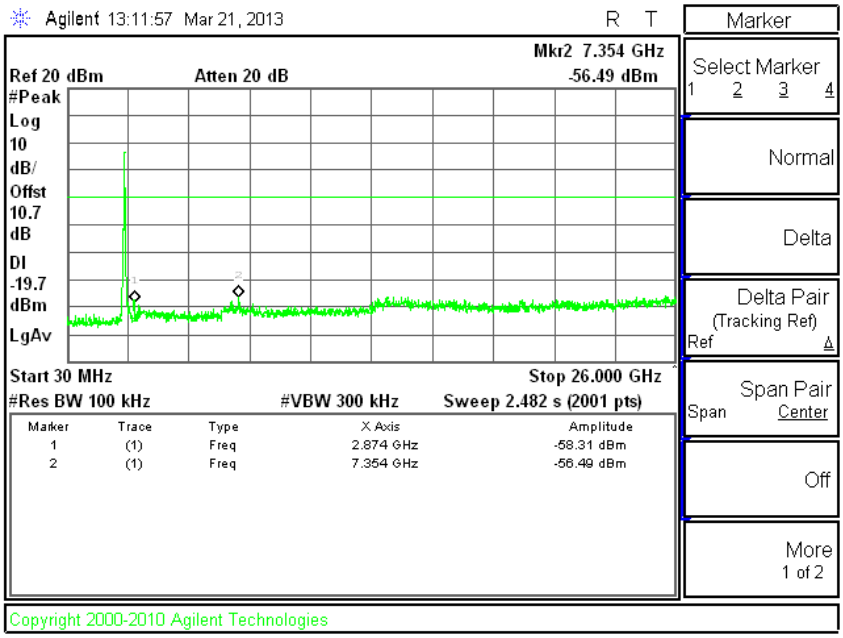
OUT OF BAND Chain 0 MID CH



OUT OF BAND Chain 0 HIGH CH



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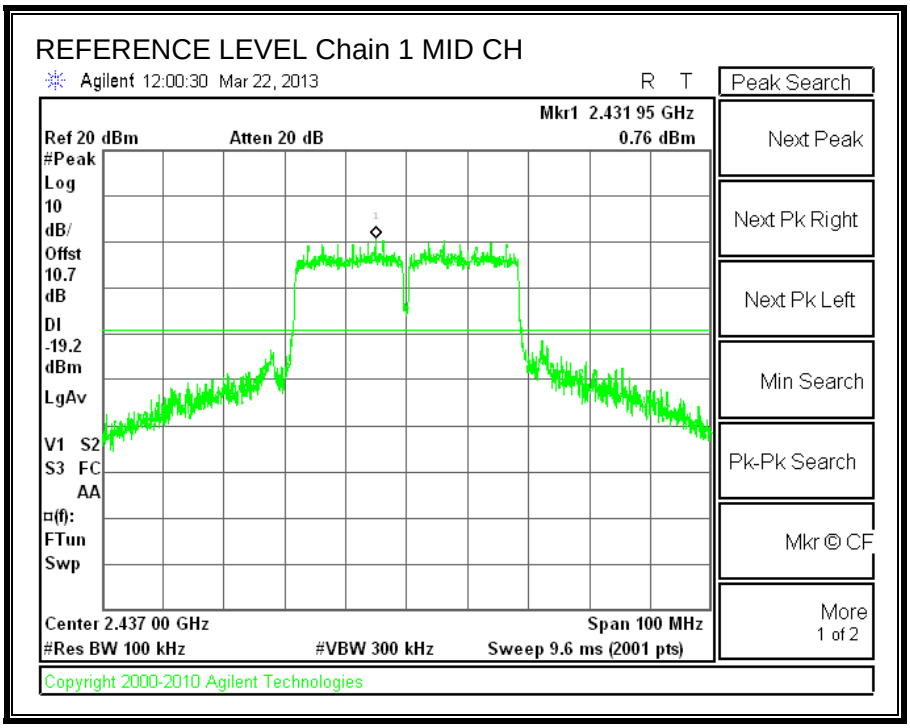
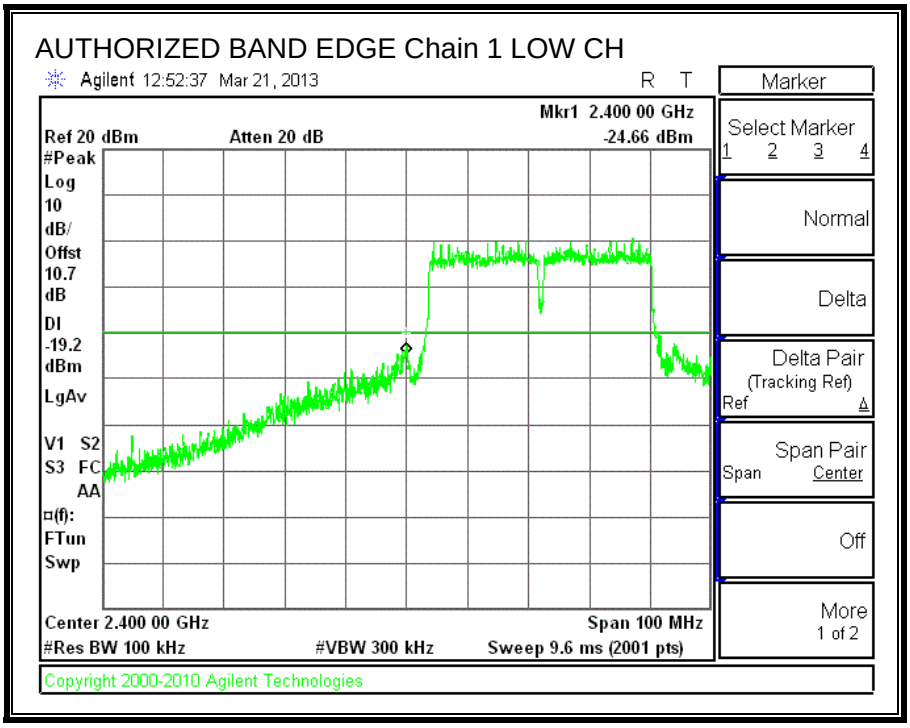
IN-BAND REFERENCE LEVEL, Chain 1



LOW CHANNEL BANDEDGE, Chain 1



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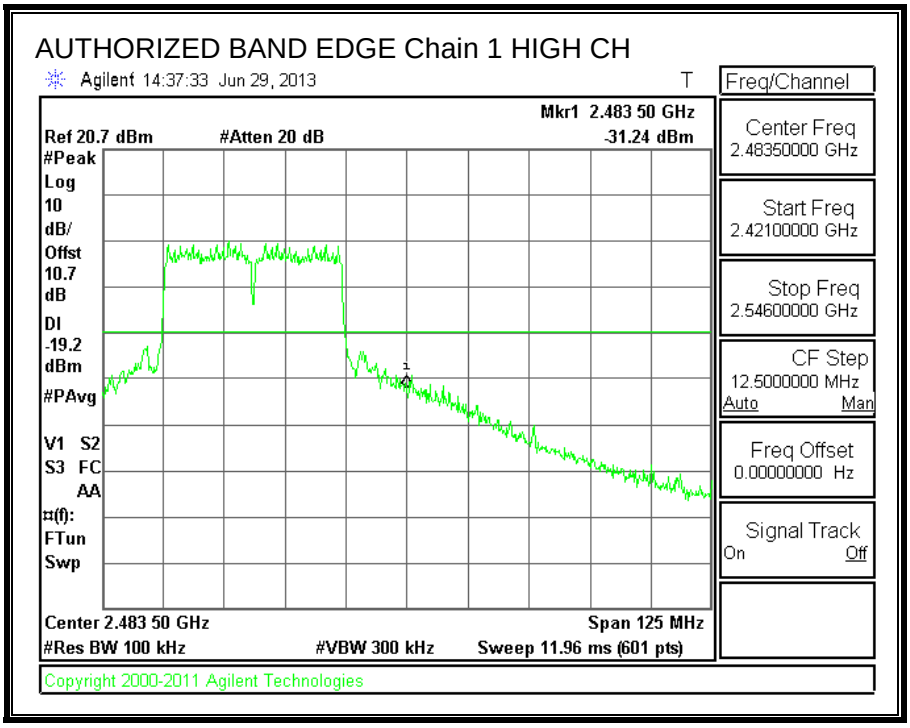
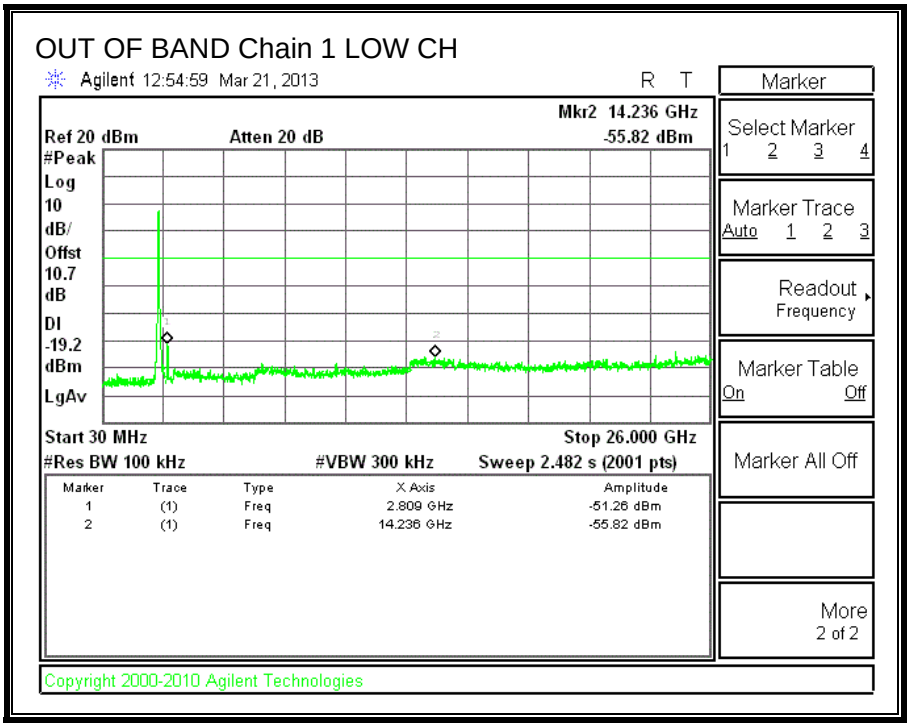
HIGH CHANNEL BANDEDGE, Chain 1





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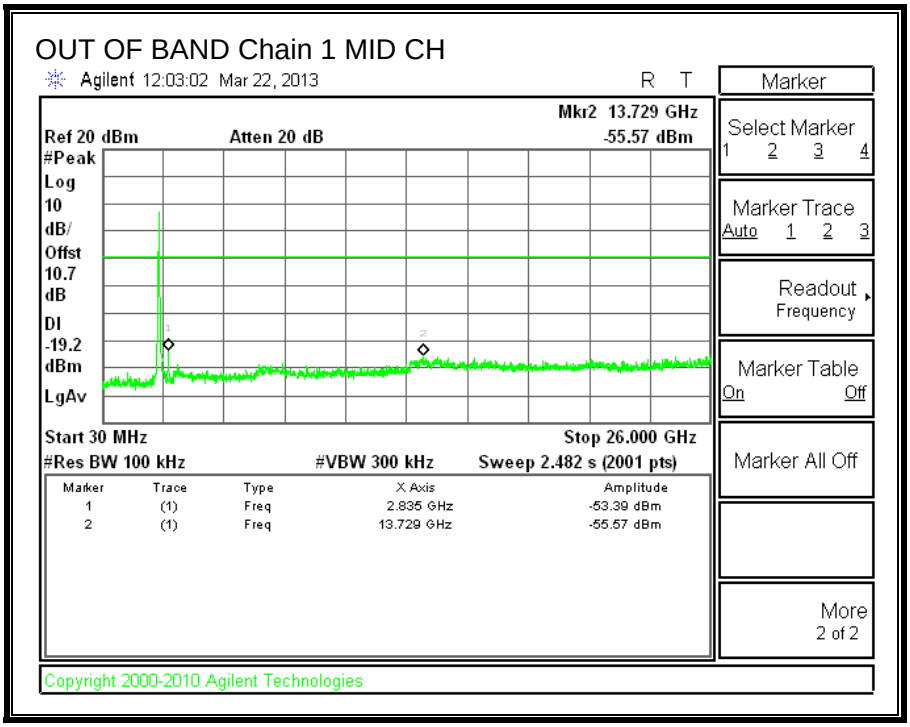
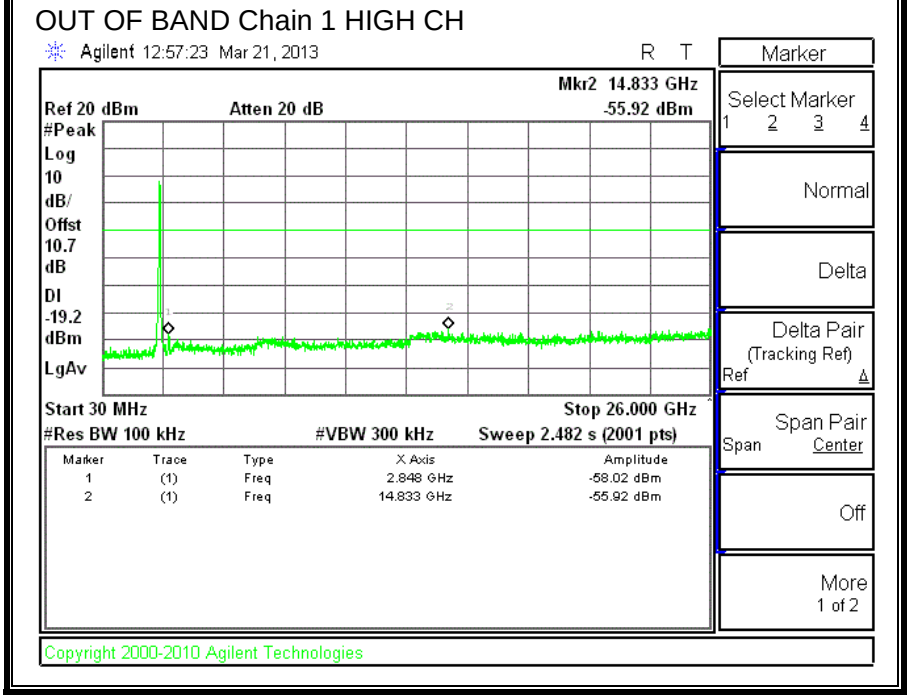
OUT OF BAND Chain 1 MID CH



OUT OF BAND Chain 1 HIGH CH



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8.6. 802.11n HT40 SDM MCS8 2TX MODE, 2.4 GHz BAND

8.6.1. 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 with the RBW set between 1% and 5% of the EBW, the VBW >= 3 x RBW, peak detector and max hold.

RESULTS

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low	2422	36.210	36.300	0.5
Mid	2437	36.390	36.300	0.5
High	2452	36.025	36.300	0.5

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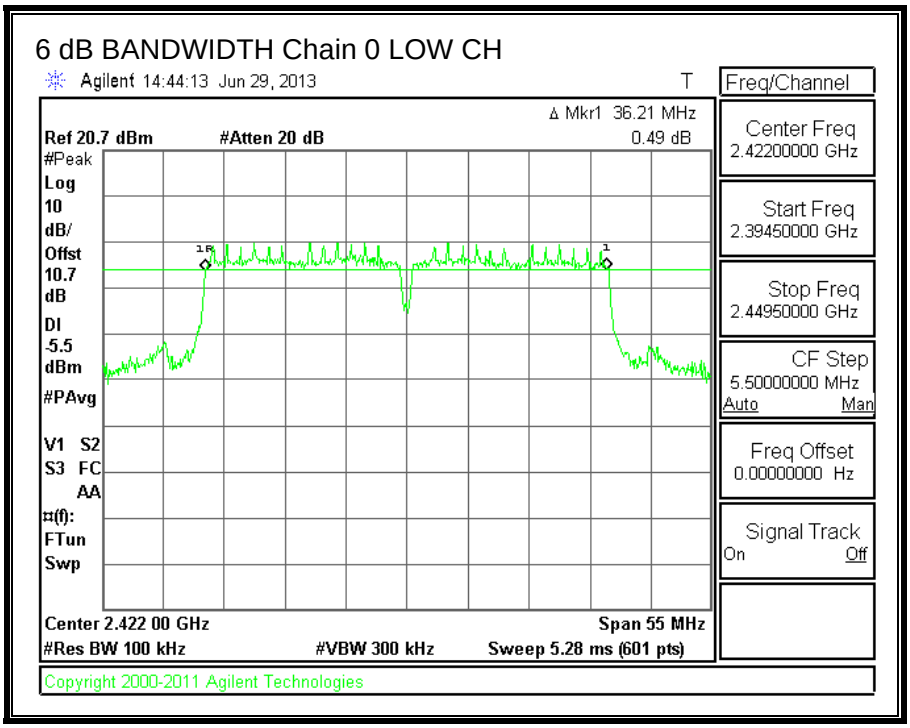
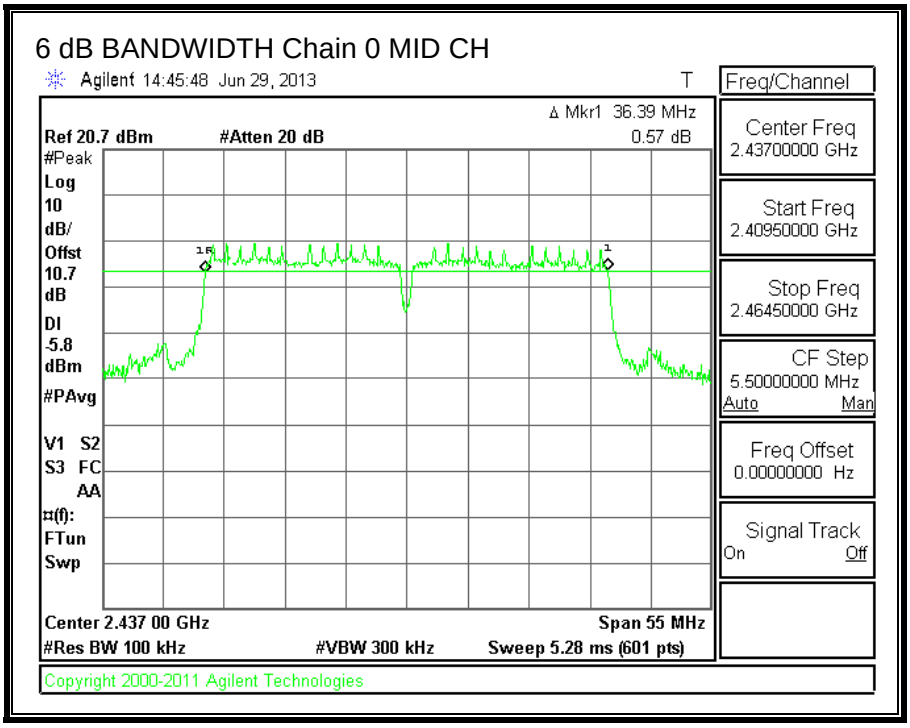
6 dB BANDWIDTH, Chain 0





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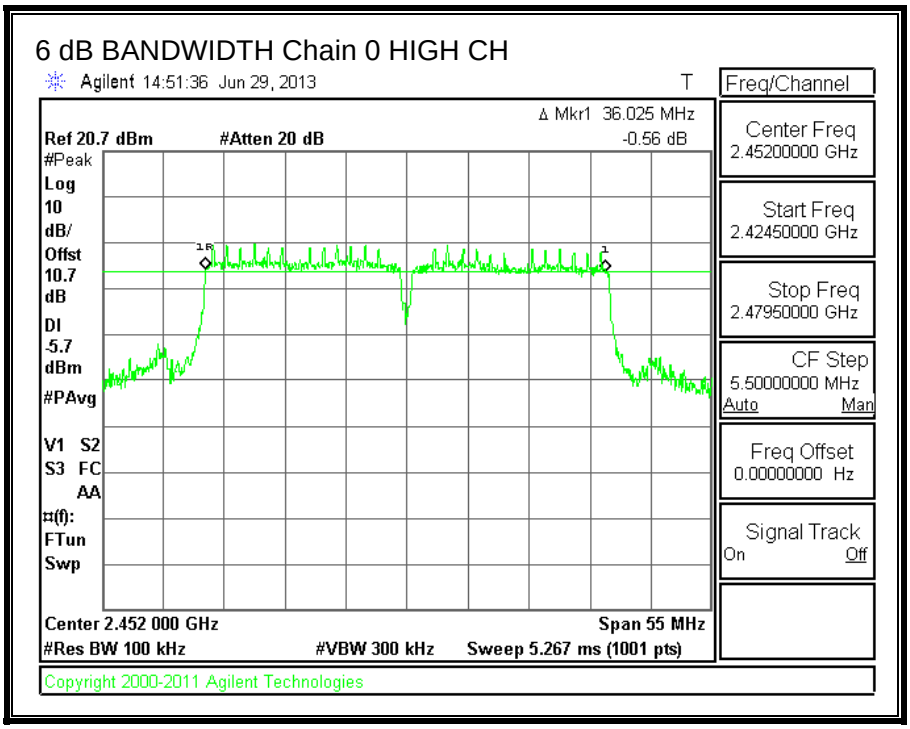
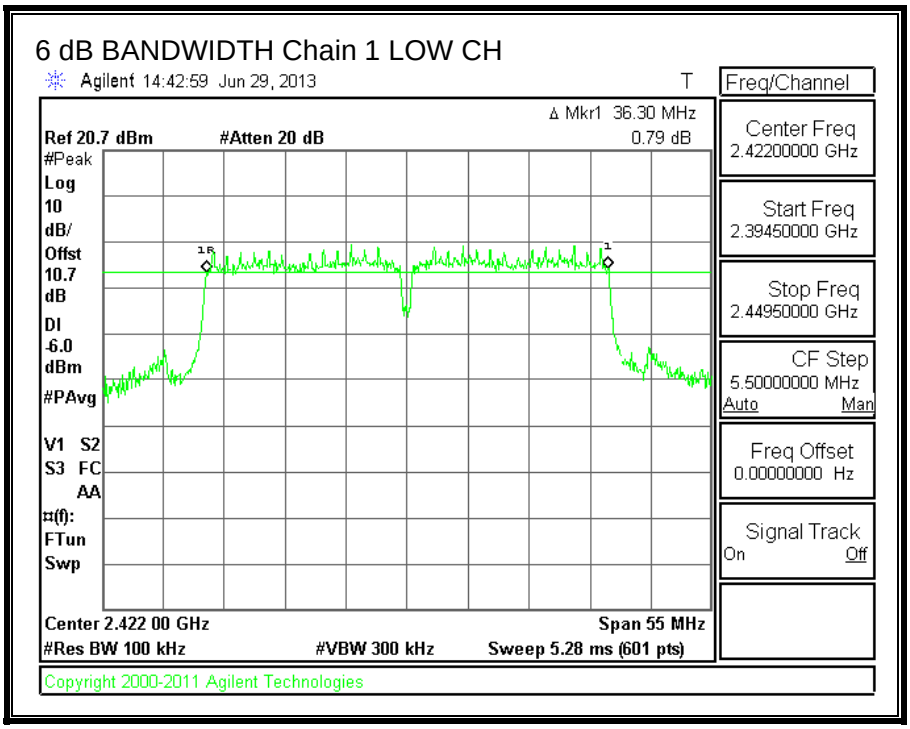


6 dB BANDWIDTH, Chain 1



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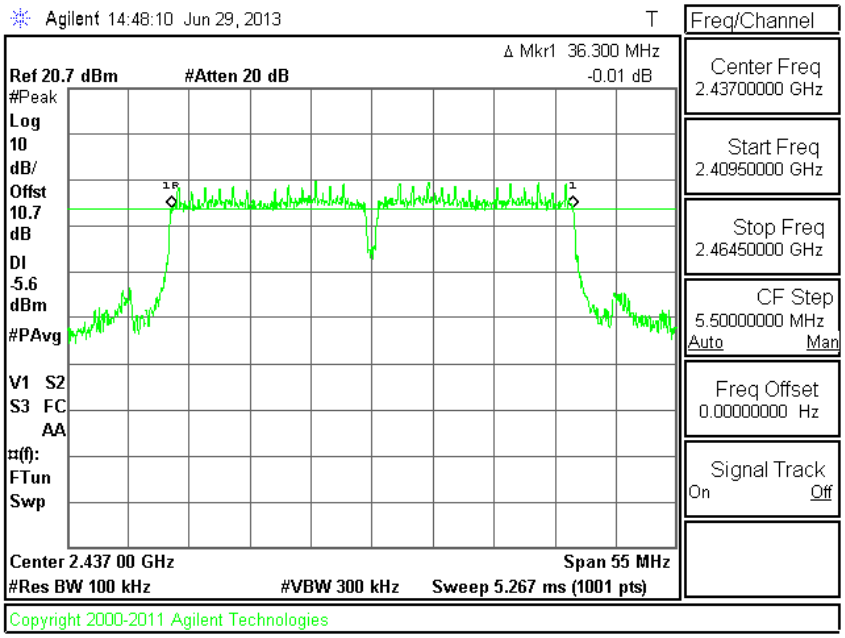
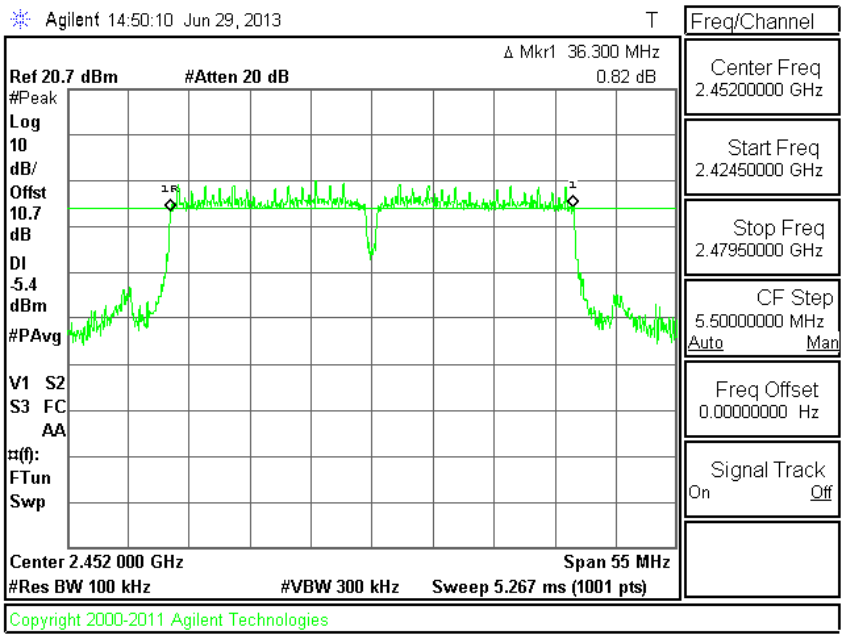
6 dB BANDWIDTH Chain 1 MID CH



6 dB BANDWIDTH Chain 1 HIGH CH



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8.6.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)
Low	2422	36.2530	36.2370
Mid	2437	36.2760	36.3040
High	2452	36.2790	36.2590

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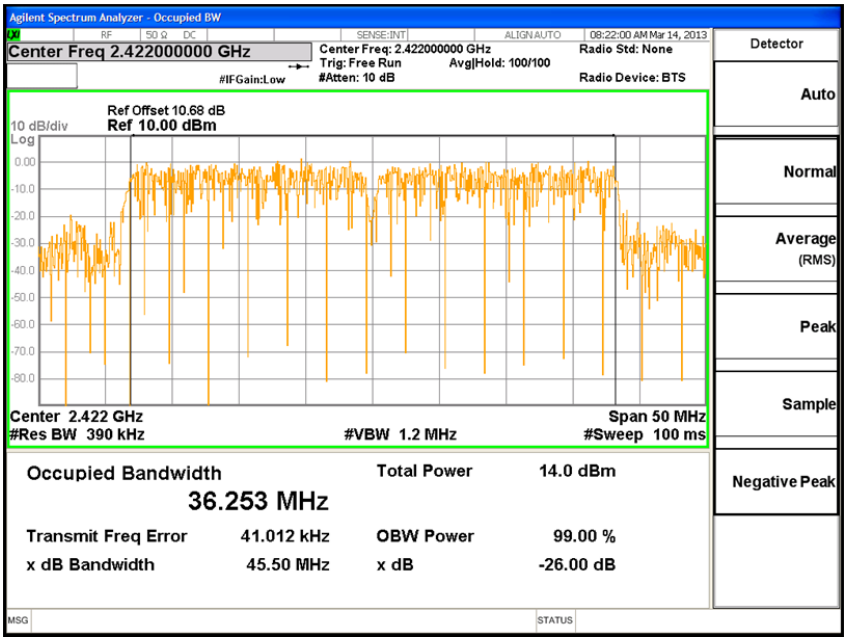
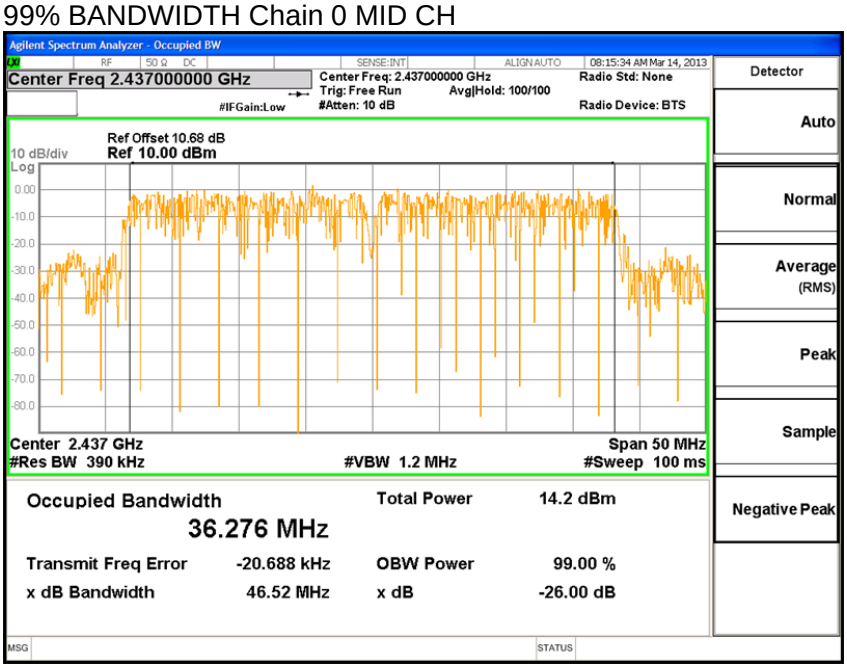
99% BANDWIDTH, Chain 0

99% BANDWIDTH Chain 0 LOW CH



99% BANDWIDTH Chain 0 MID CH



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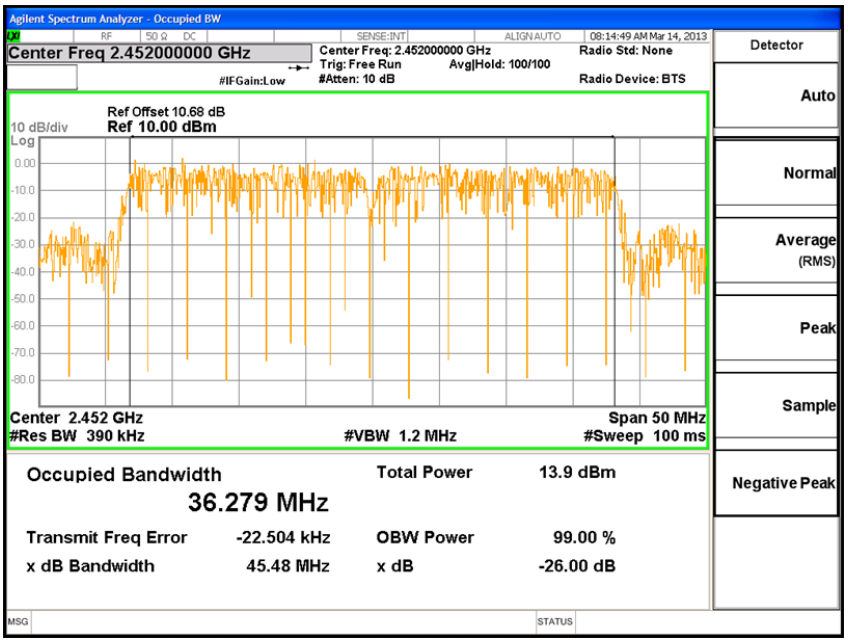
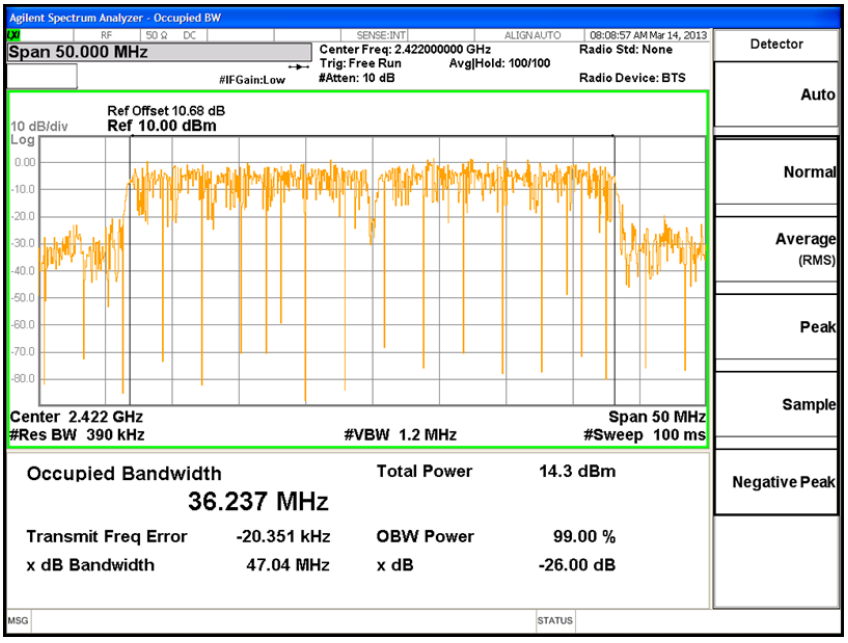
99% BANDWIDTH Chain 0 HIGH CH



99% BANDWIDTH, Chain 1

99% BANDWIDTH Chain 1 LOW CH



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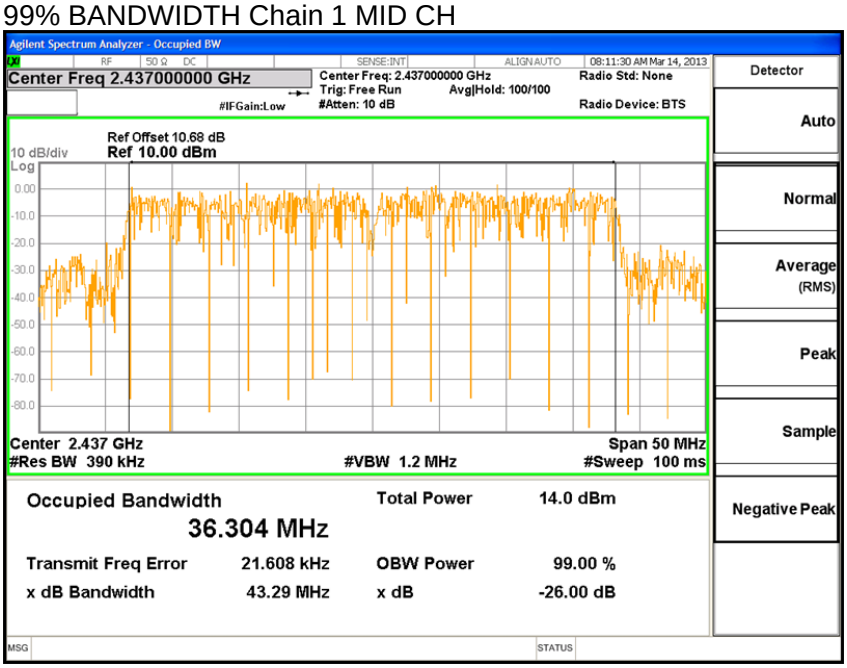
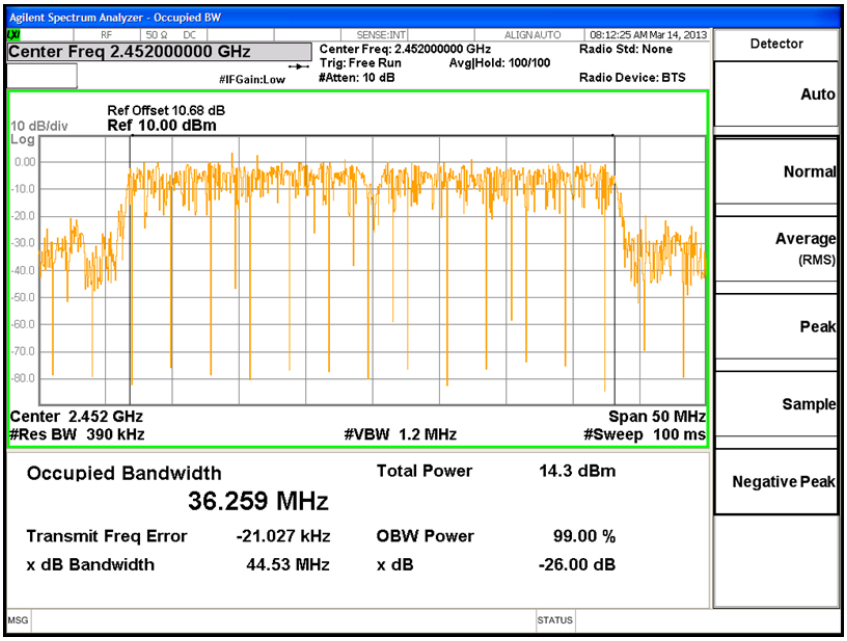
99% BANDWIDTH Chain 1 MID CH



99% BANDWIDTH Chain 1 HIGH CH



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8.6.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.68 dB (including 10 dB pad and 0.68 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
Low	2422	11.80	12.20	15.01
Mid	2437	14.00	14.20	17.11
High	2452	12.70	13.00	15.86

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8.6.4. OUTPUT POWER

LIMITS

FCC §15.247

IC RSS-210 A8.4

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain.

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
3.00	3.00	3.00

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RESULTS

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2422	3.00	30.00	30	36	30.00
Mid	2437	3.00	30.00	30	36	30.00
High	2452	3.00	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margi (dB)
Low	2422	22.01	21.99	25.01	30.00	-4.99
Mid	2437	21.83	22.42	25.15	30.00	-4.85
High	2452	22.06	22.40	25.24	30.00	-4.76

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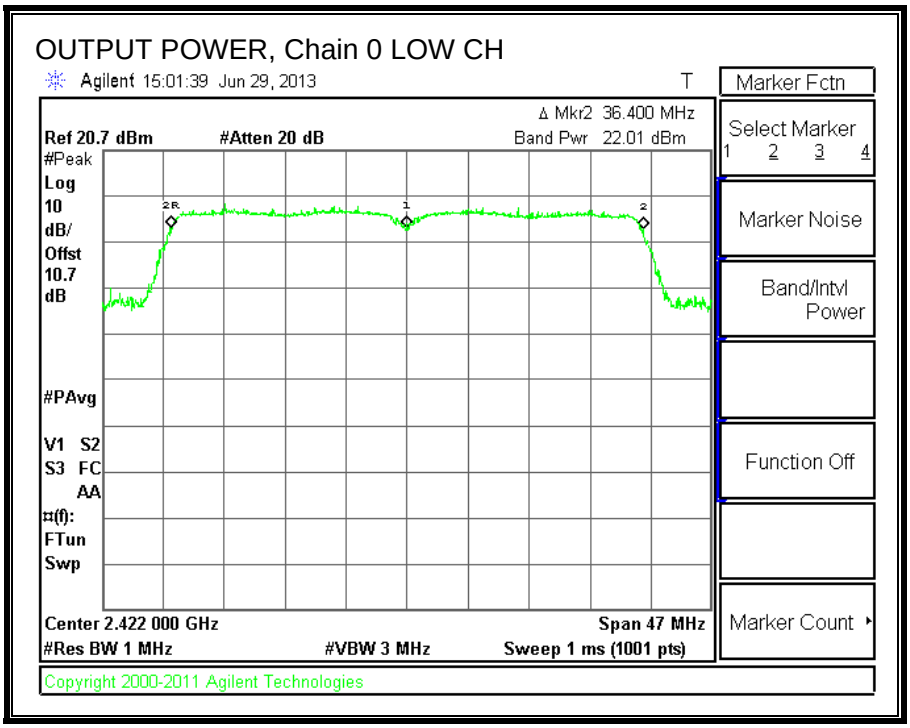
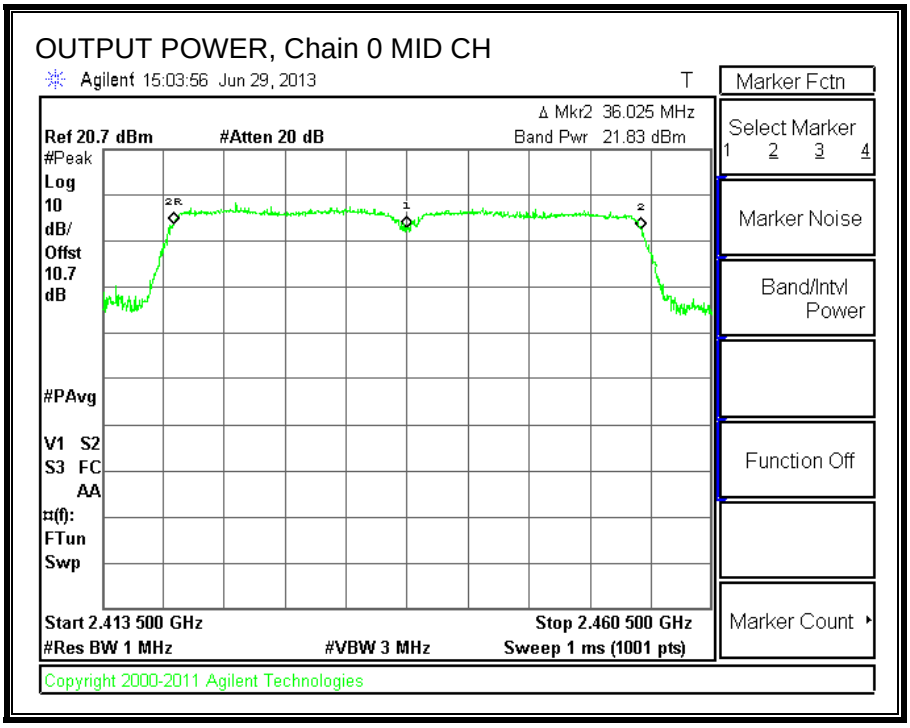
OUTPUT POWER, Chain 0





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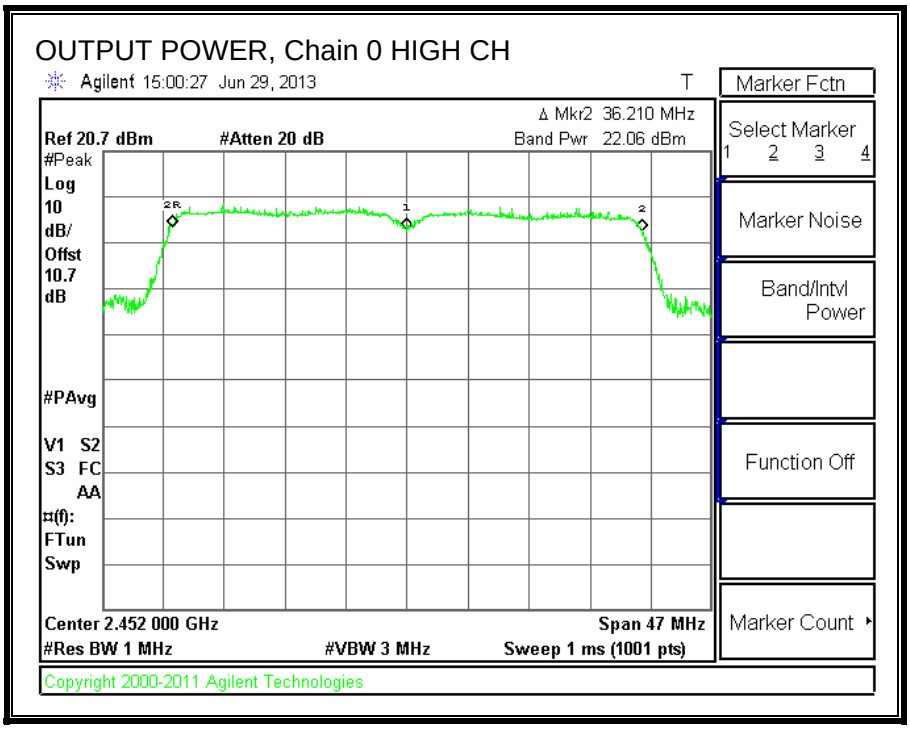
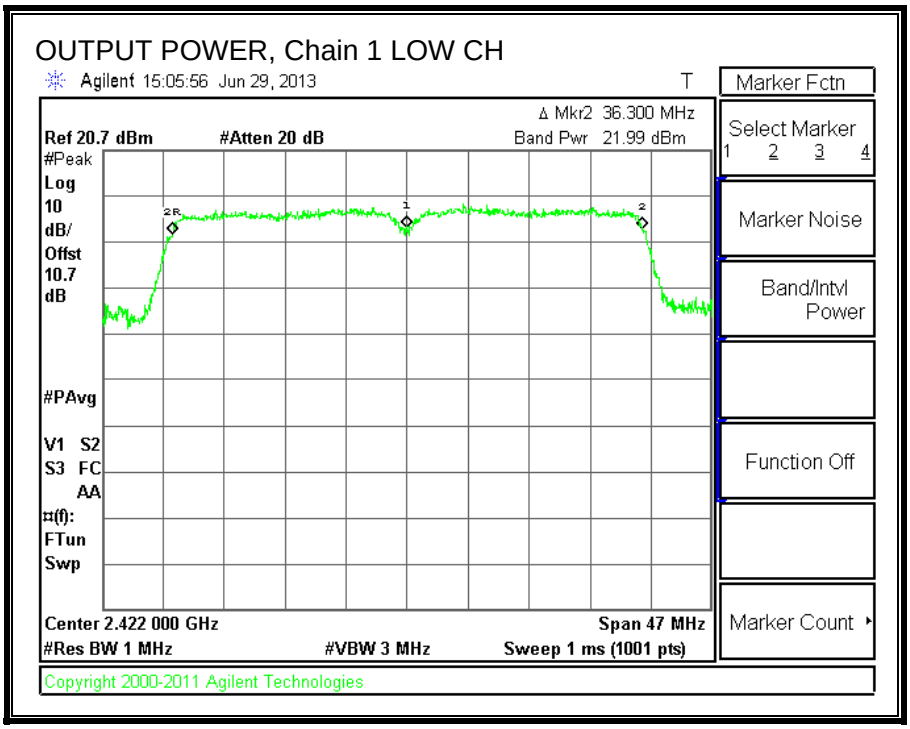


OUTPUT POWER, Chain 1



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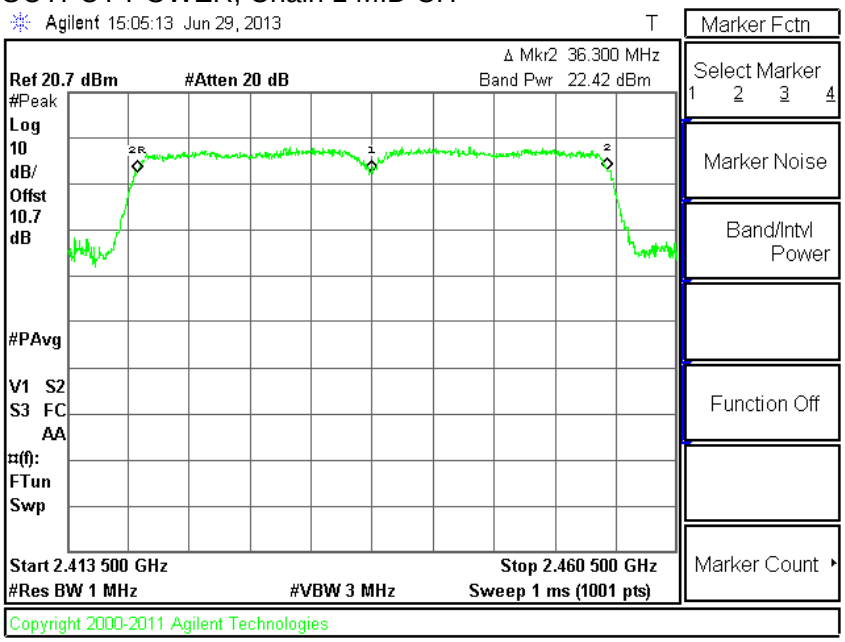
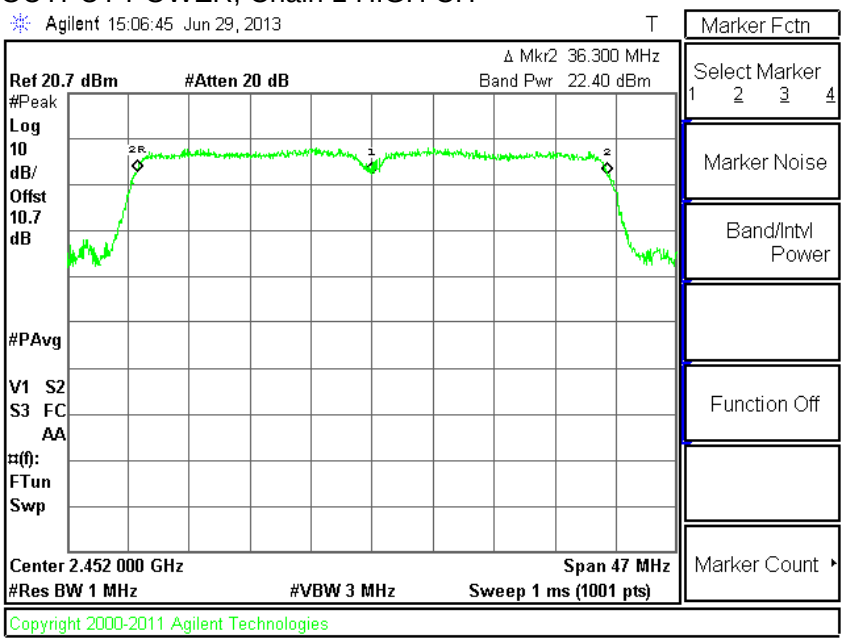
OUTPUT POWER, Chain 1 MID CH



OUTPUT POWER, Chain 1 HIGH CH



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8.6.5. PSD

LIMITS

FCC §15.247

IC RSS-210 A8.2

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.

RESULTS

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Chain 1 Meas (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2422	-13.60	-13.24	-10.41	8.0	-18.4
Mid	2437	-13.28	-13.78	-10.51	8.0	-18.5
High	2452	-13.28	-13.61	-10.43	8.0	-18.4

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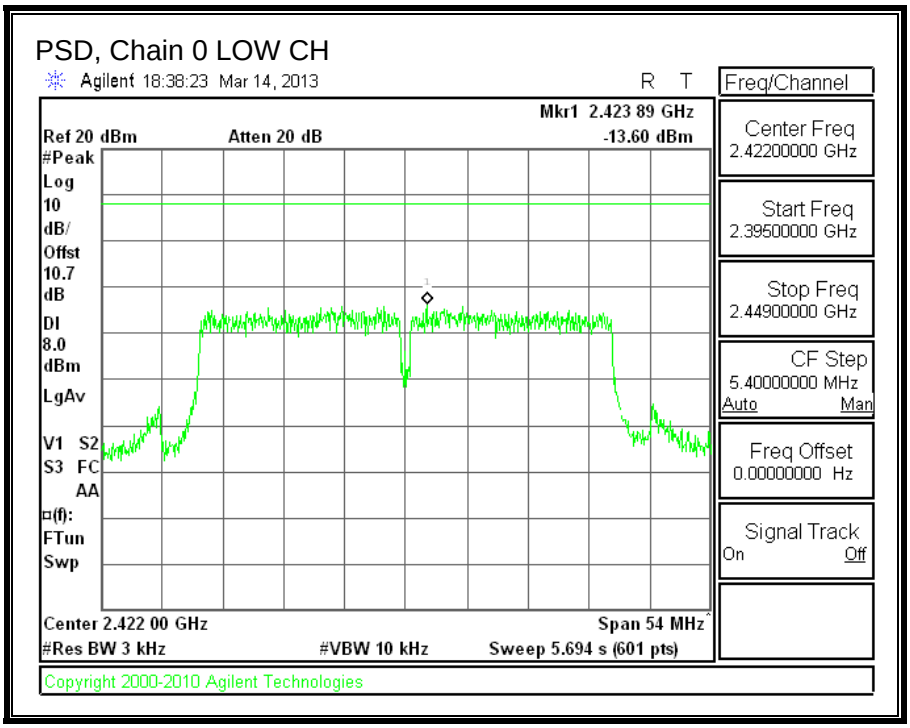
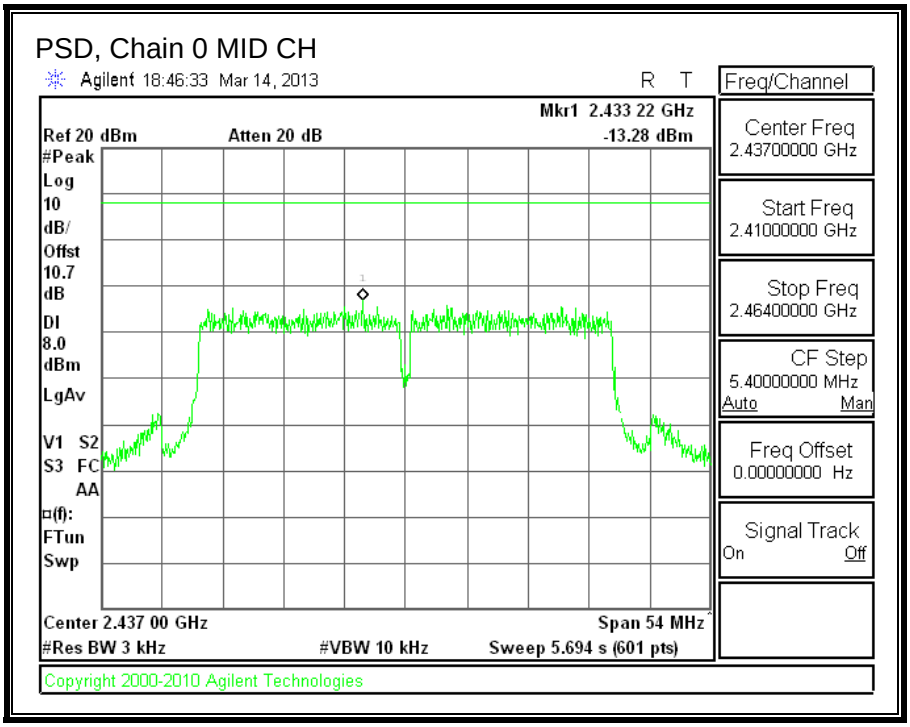
PSD, Chain 0





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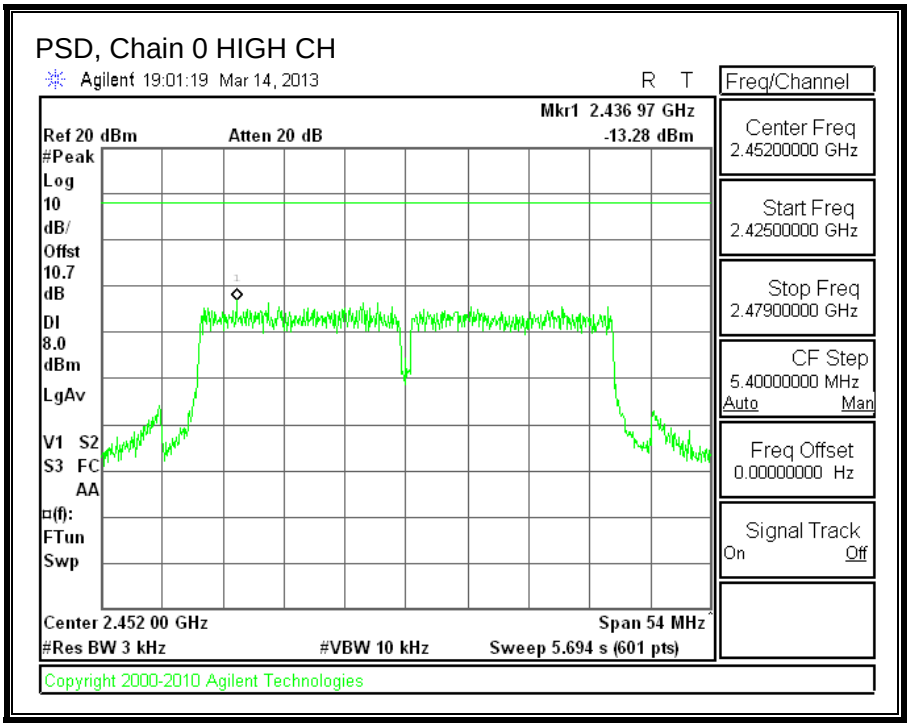
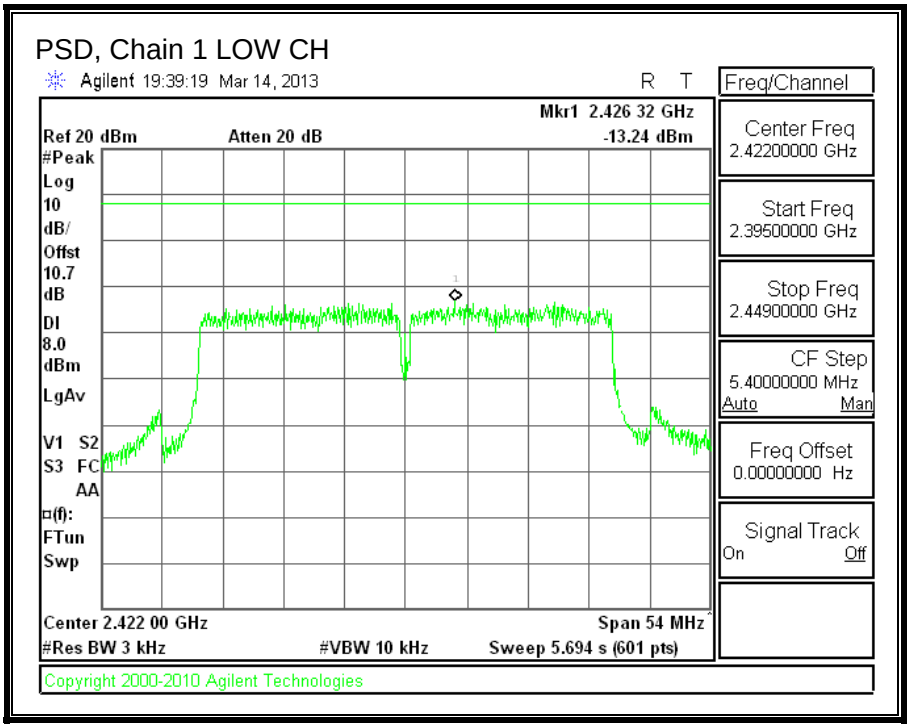


PSD, Chain 1



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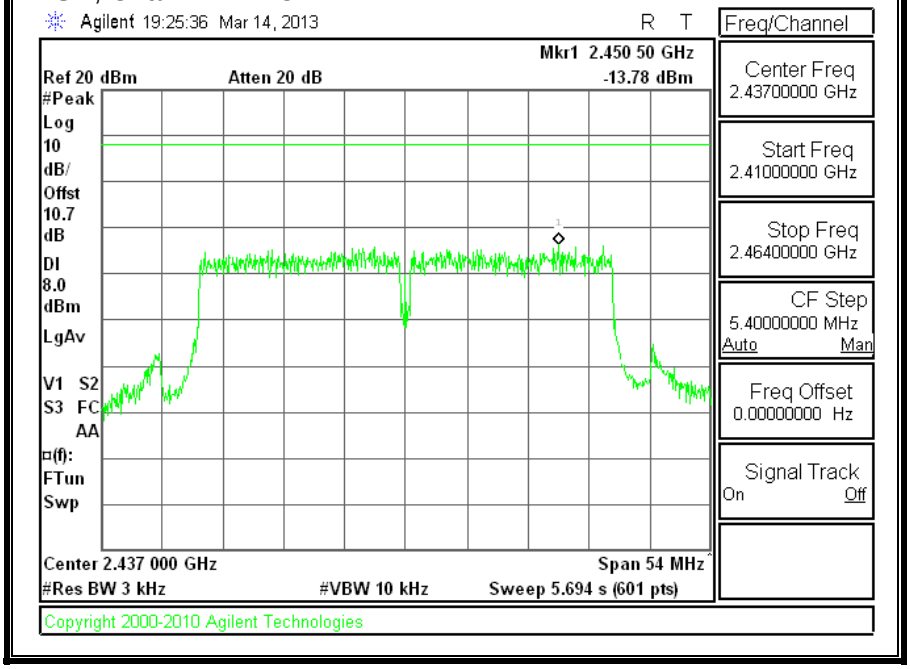
PSD, Chain 1 MID CH



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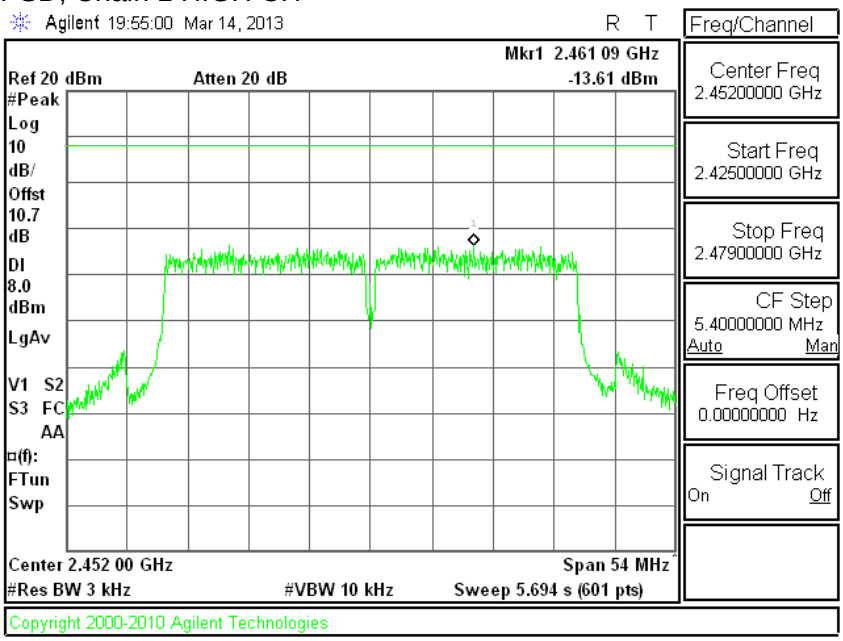
PSD, Chain 1 HIGH CH



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8.6.6. OUT-OF-BAND EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the in-band reference level, bandedge (where measurements to the general radiated limits will not be made) and out-of-band emissions.

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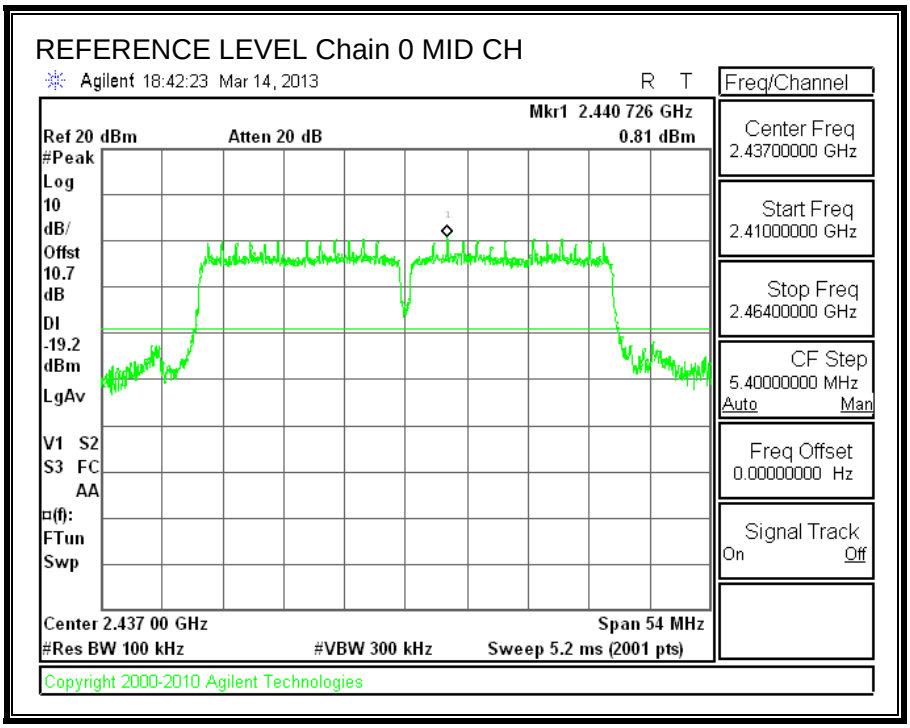
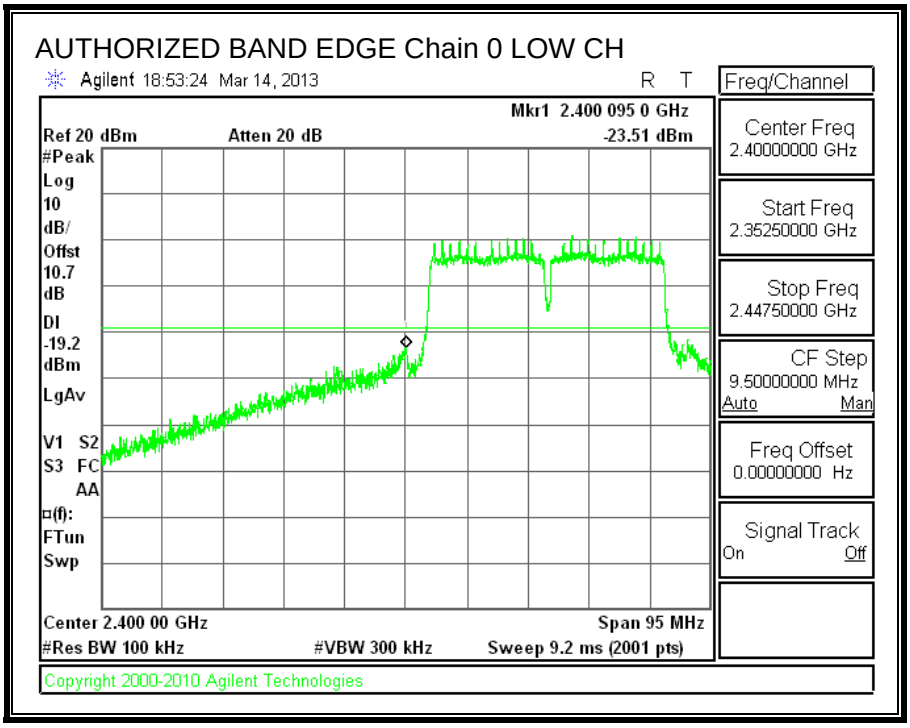
IN-BAND REFERENCE LEVEL, Chain 0



LOW CHANNEL BANDEDGE, Chain 0



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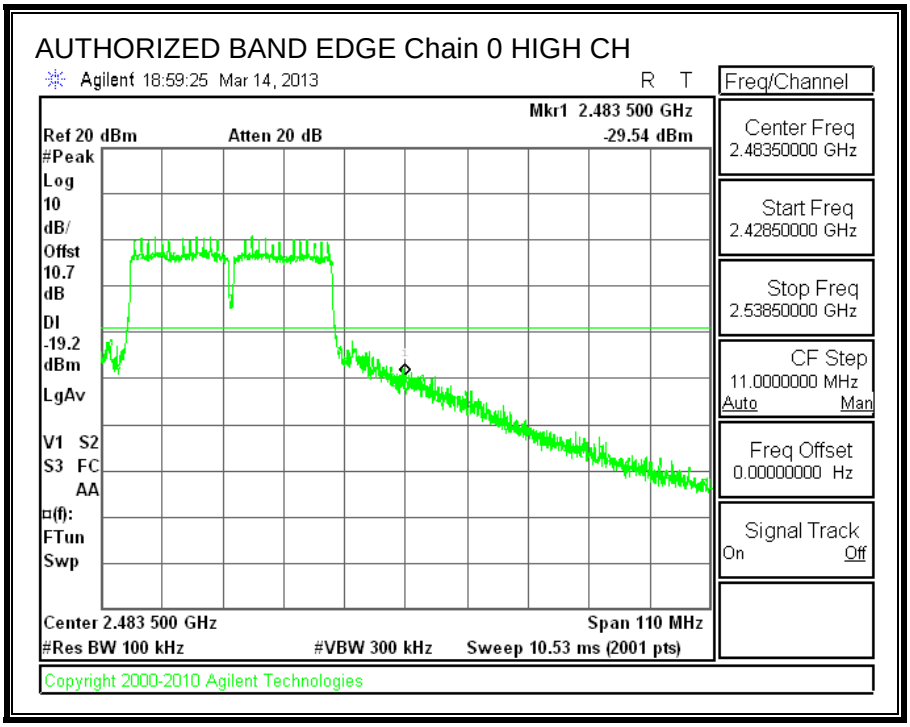
HIGH CHANNEL BANDEDGE, Chain 0



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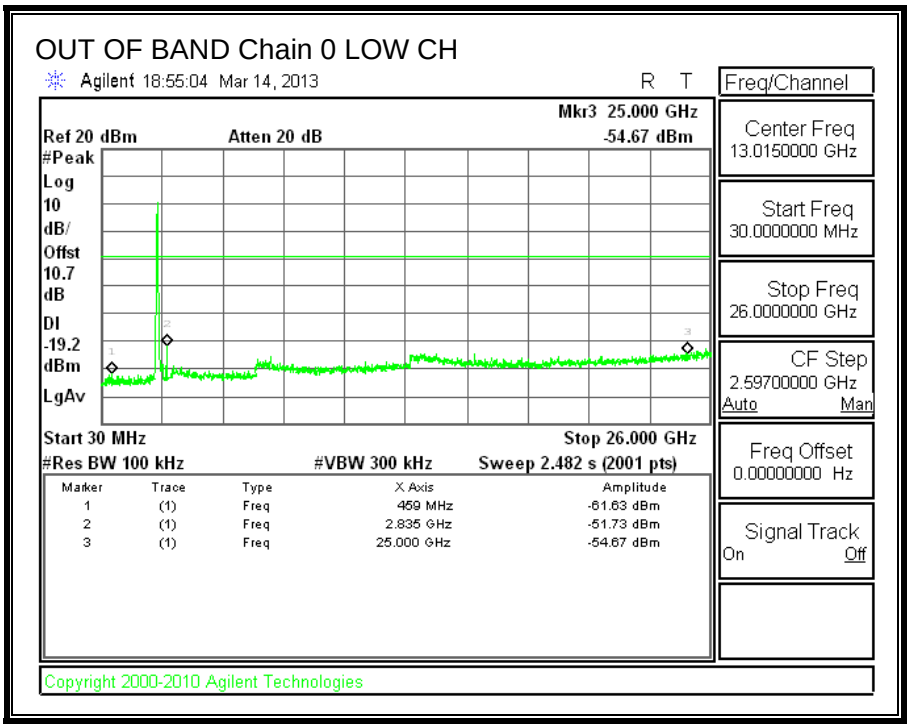
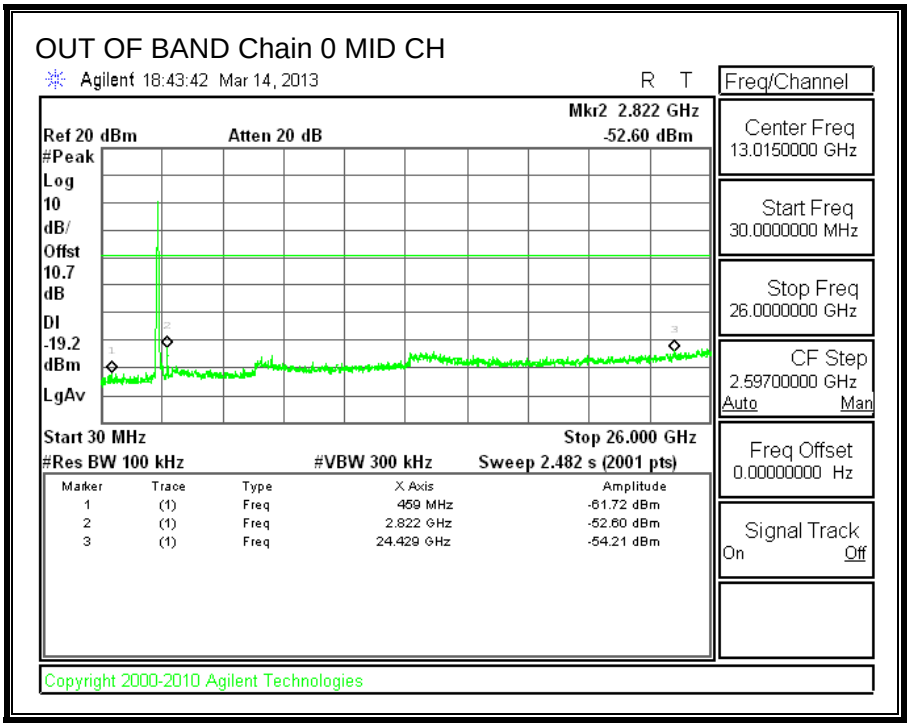
OUT-OF-BAND EMISSIONS, Chain 0





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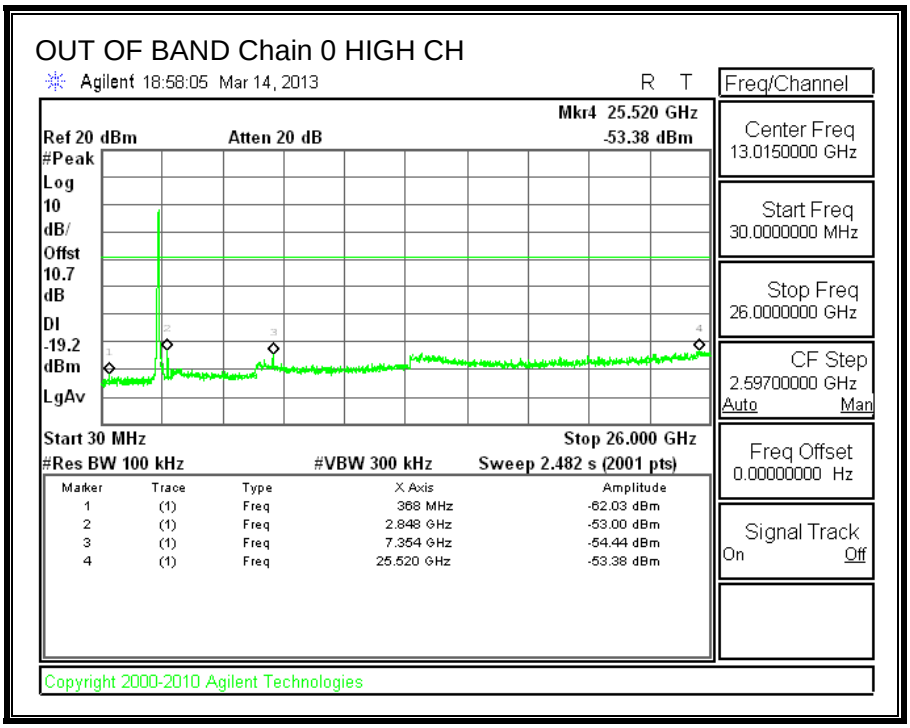
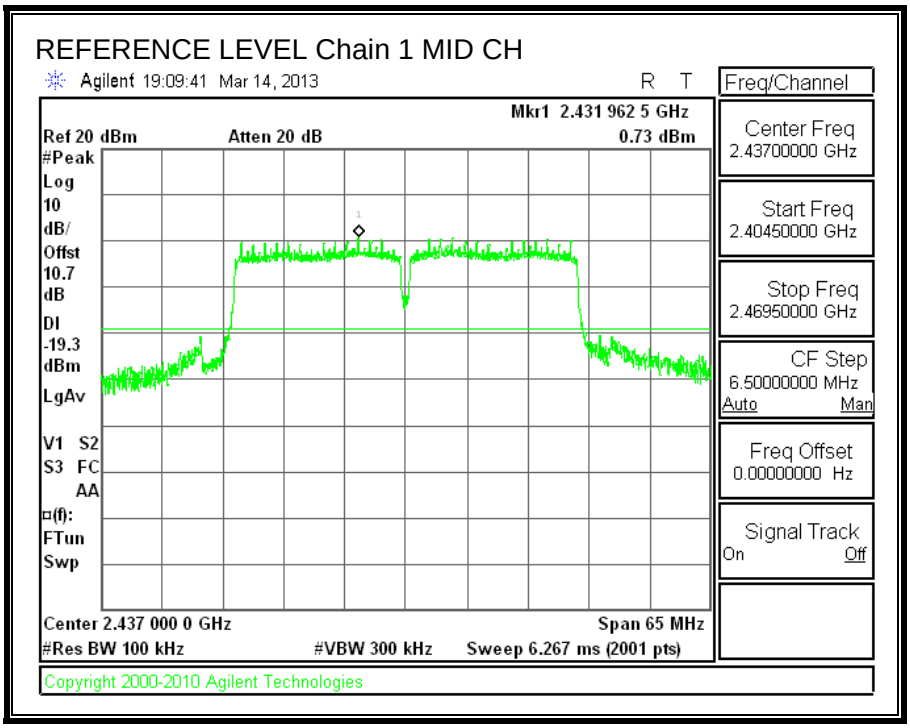


IN-BAND REFERENCE LEVEL, Chain 1



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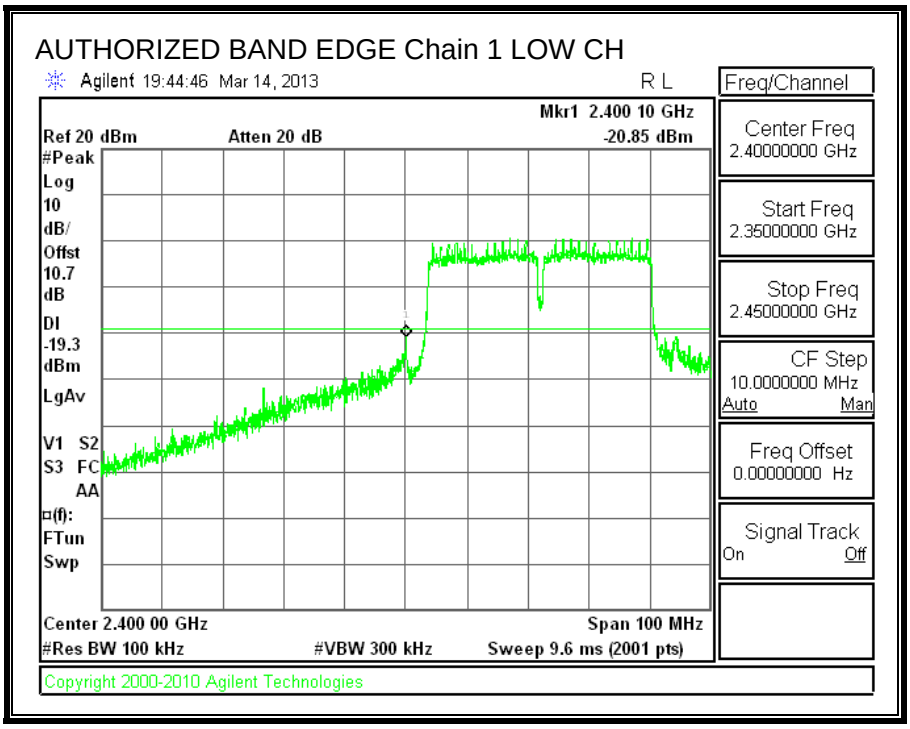
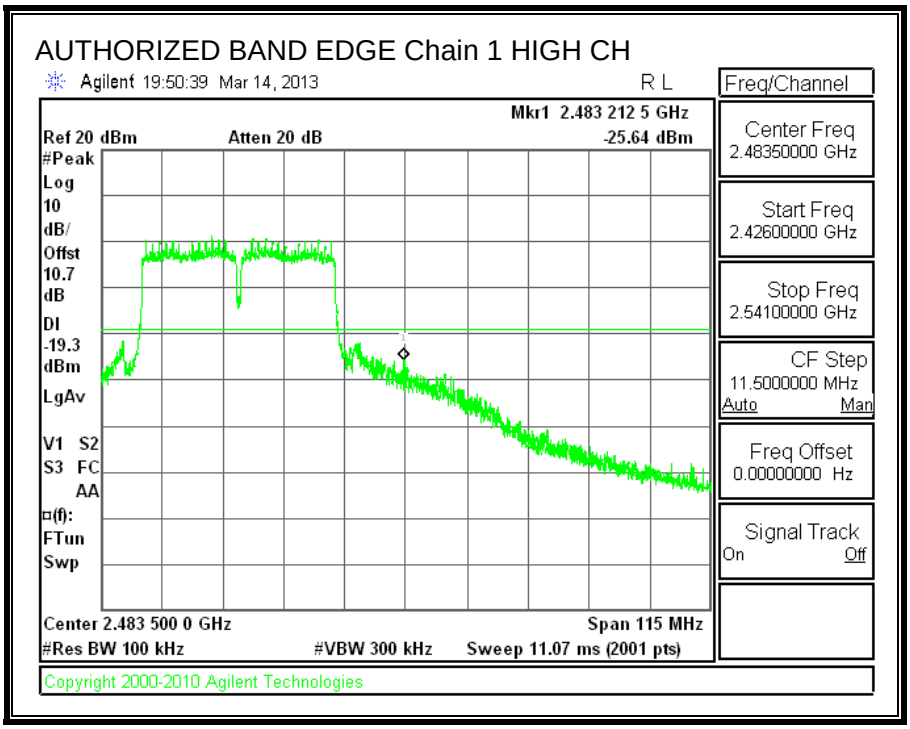
LOW CHANNEL BANDEDGE, Chain 1



HIGH CHANNEL BANDEDGE, Chain 1



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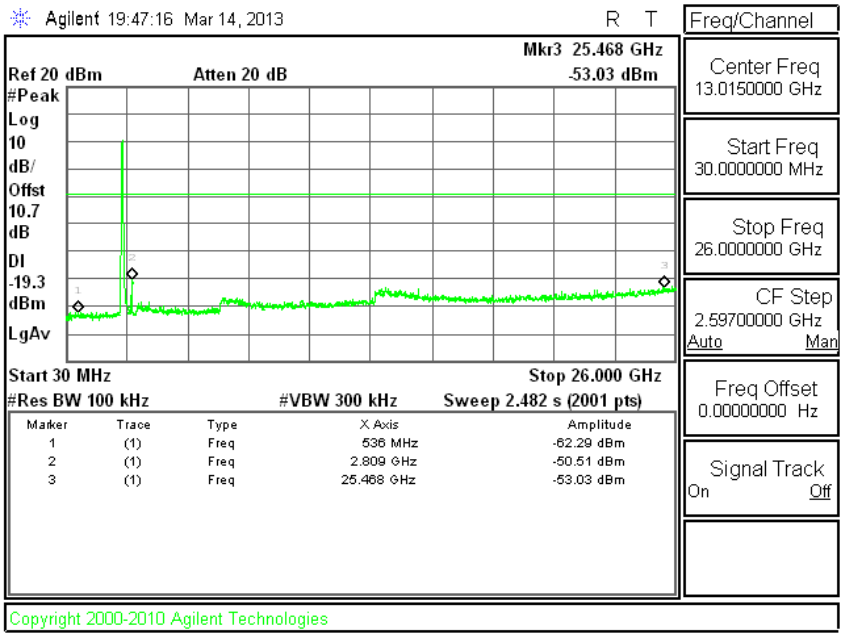
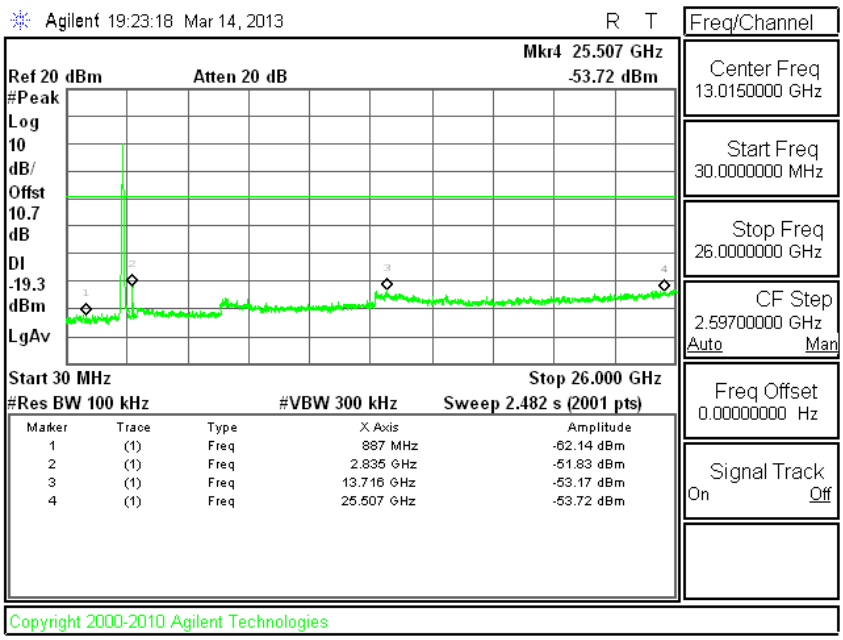
OUT OF BAND Chain 1 LOW CH



OUT OF BAND Chain 1 MID CH



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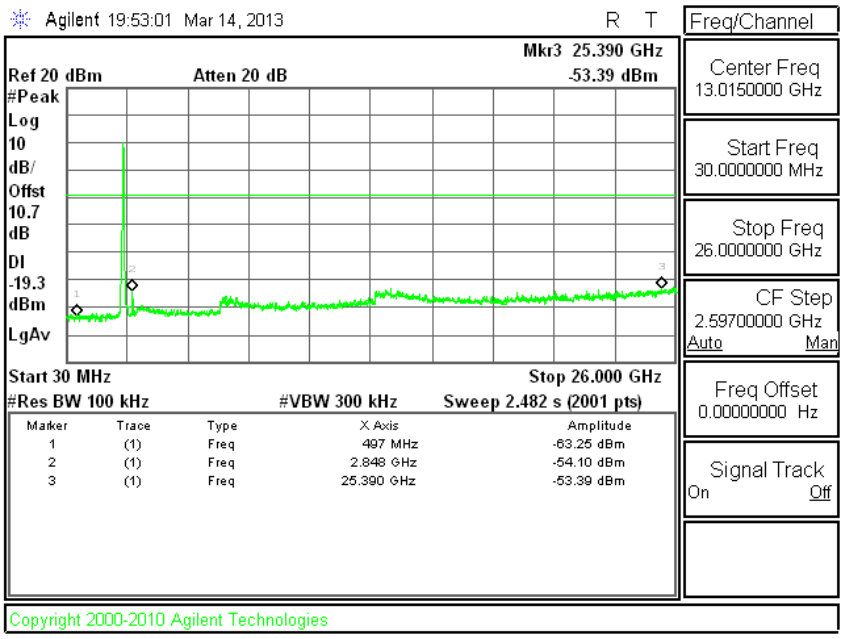
OUT OF BAND Chain 1 HIGH CH



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8.7. 802.11a CDD 2TX MODE, 5.8 GHz BAND

8.7.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

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

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer with the RBW set between 1% and 5% of the EBW, the VBW >= 3 x RBW, peak detector and max hold.

RESULTS

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low	5745	16.250	15.790	0.5
Mid	5785	15.790	16.250	0.5
High	5825	15.580	16.620	0.5

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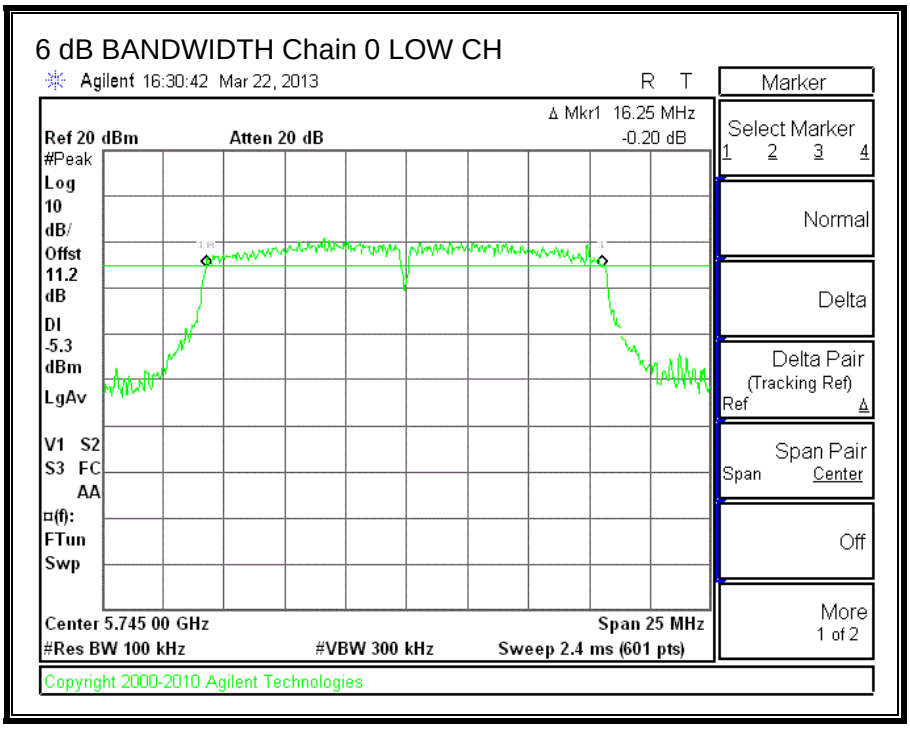
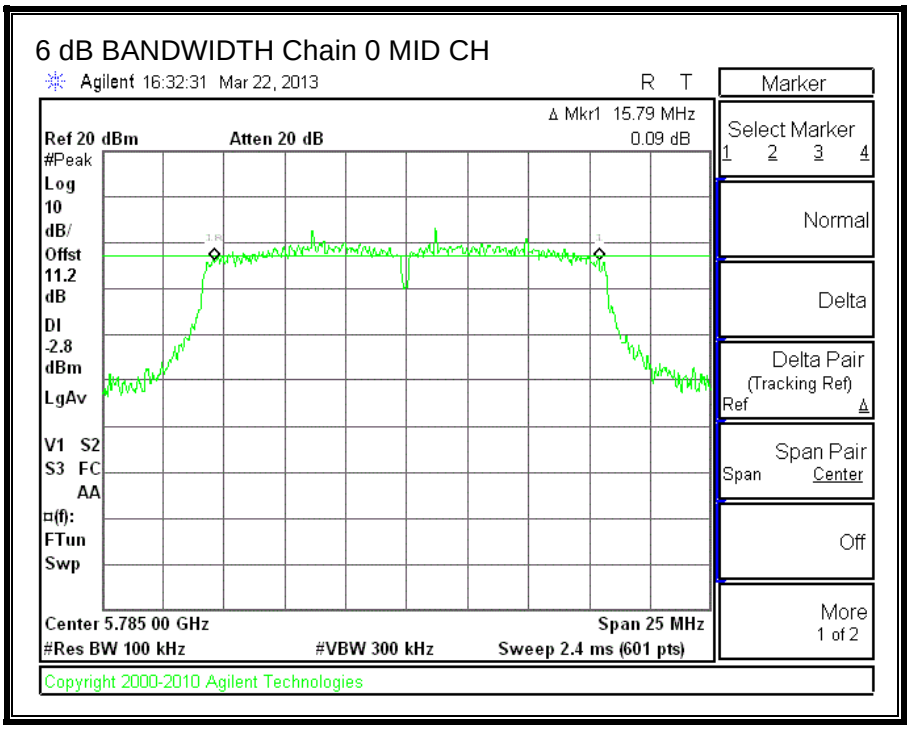
6 dB BANDWIDTH, Chain 0





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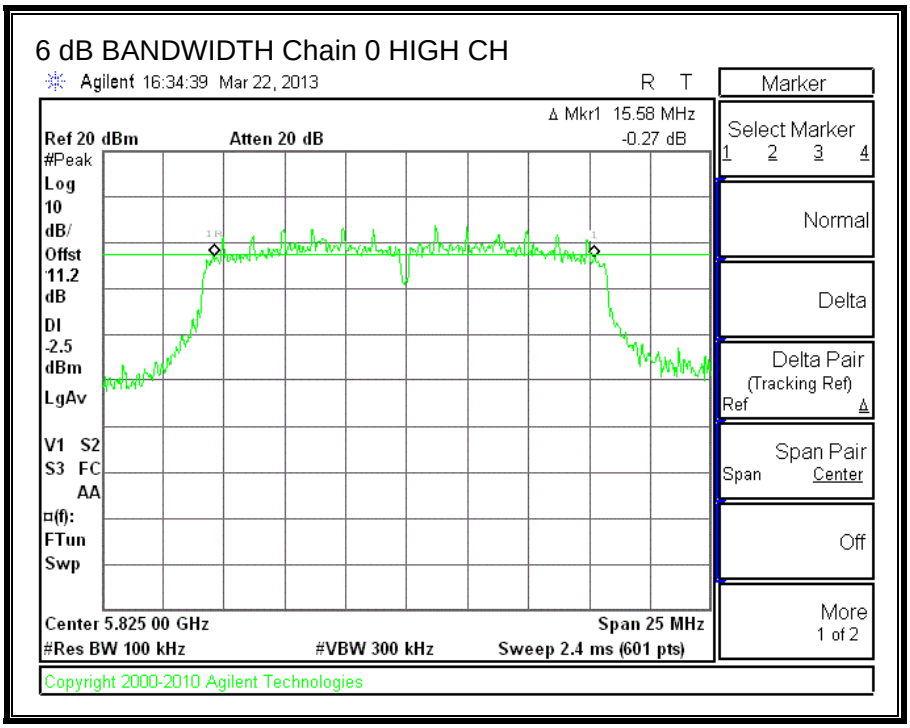
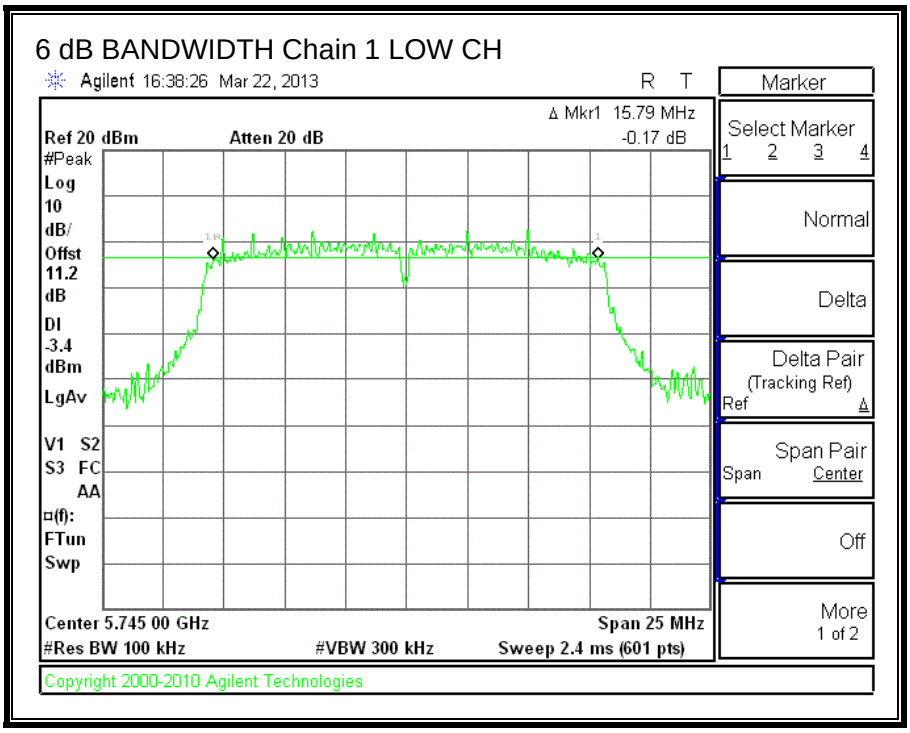


6 dB BANDWIDTH, Chain 1



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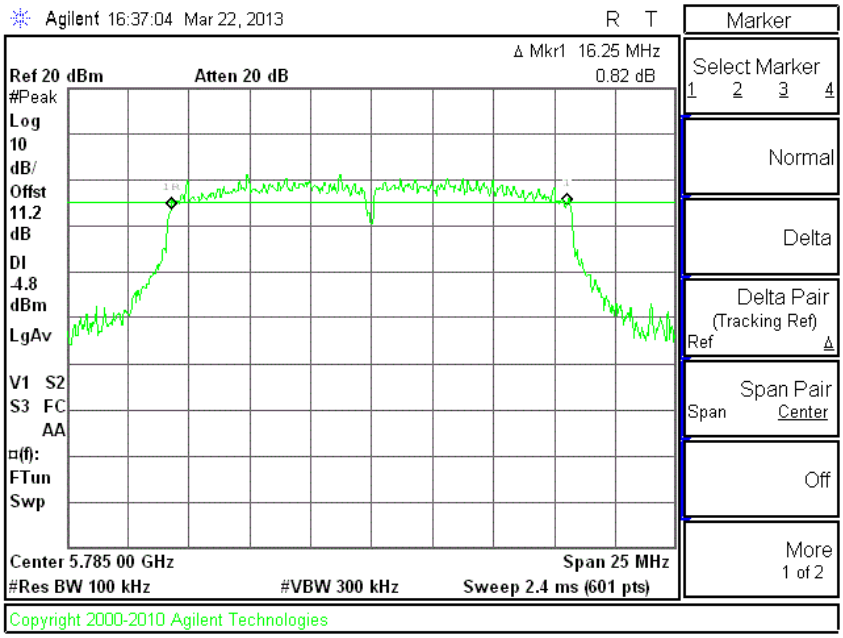
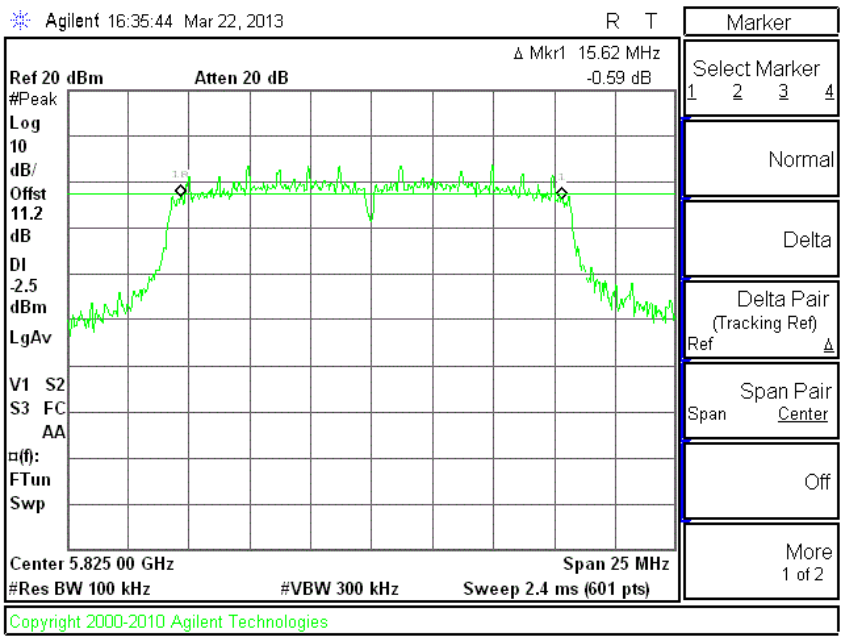
6 dB BANDWIDTH Chain 1 MID CH



6 dB BANDWIDTH Chain 1 HIGH CH



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8.7.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)
Low	5745	16.2952	16.2907
Mid	5785	16.3091	16.2840
High	5825	16.3098	16.2753

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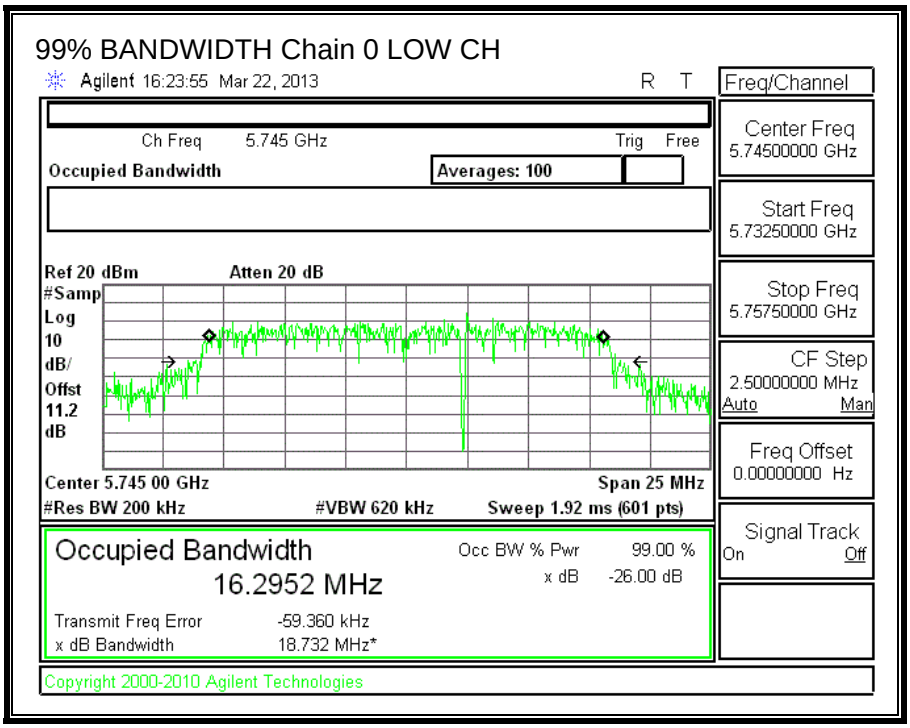
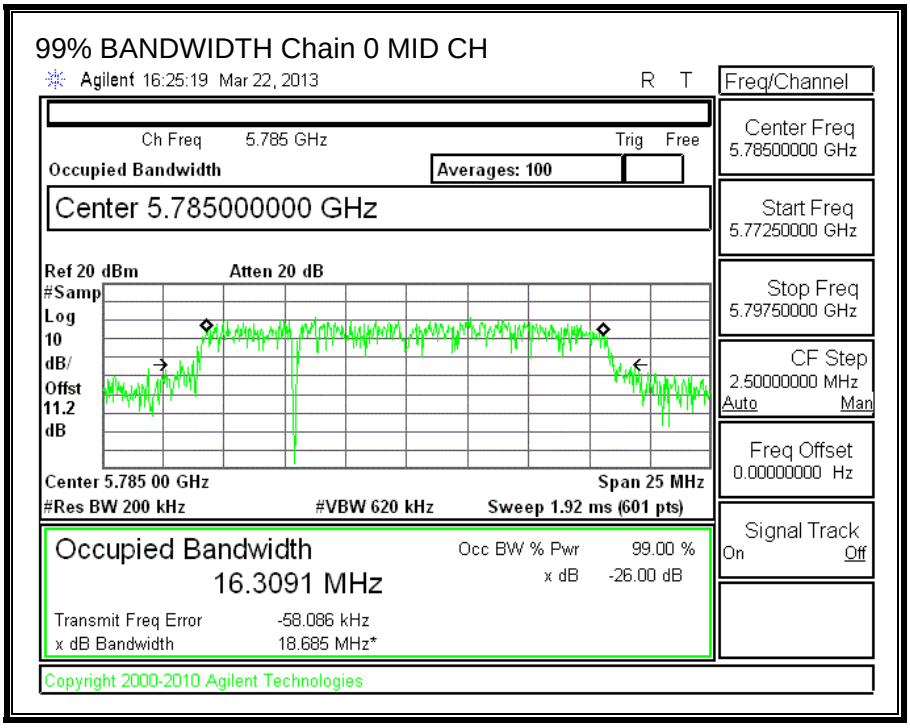
99% BANDWIDTH, Chain 0





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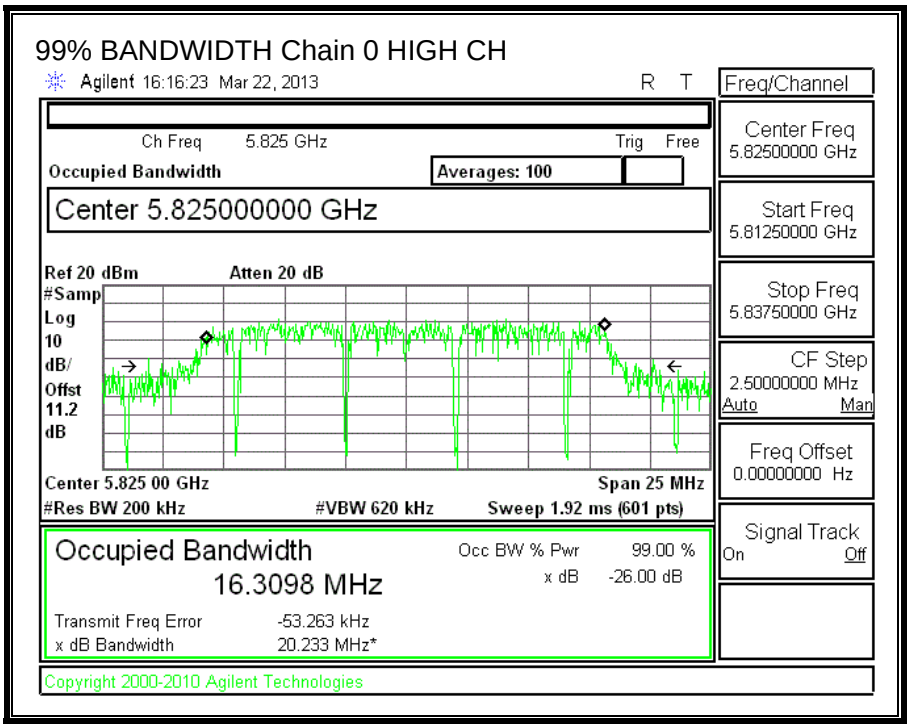
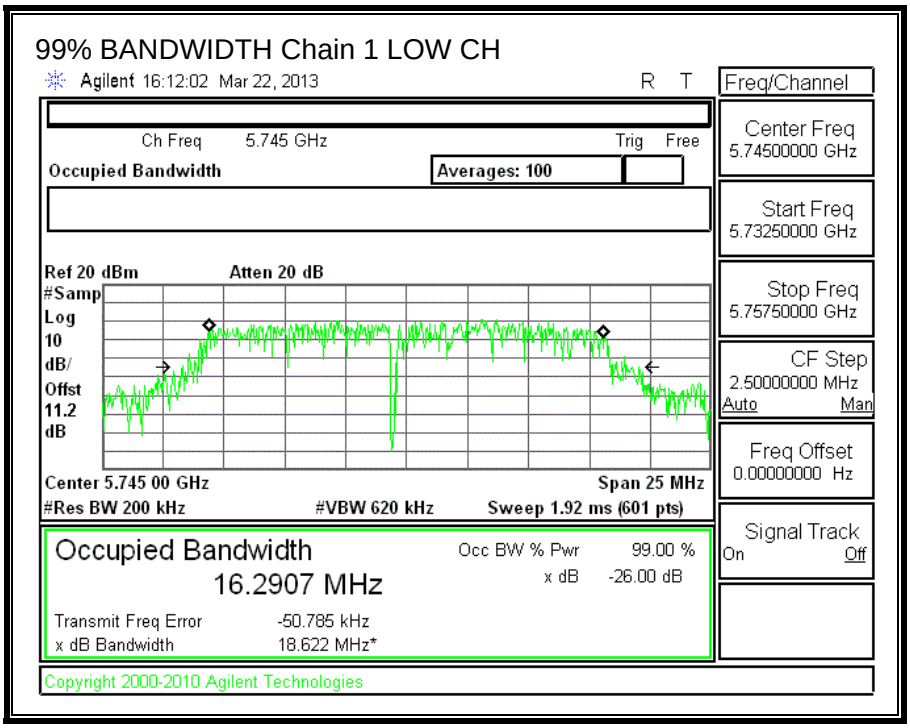


99% BANDWIDTH, Chain 1



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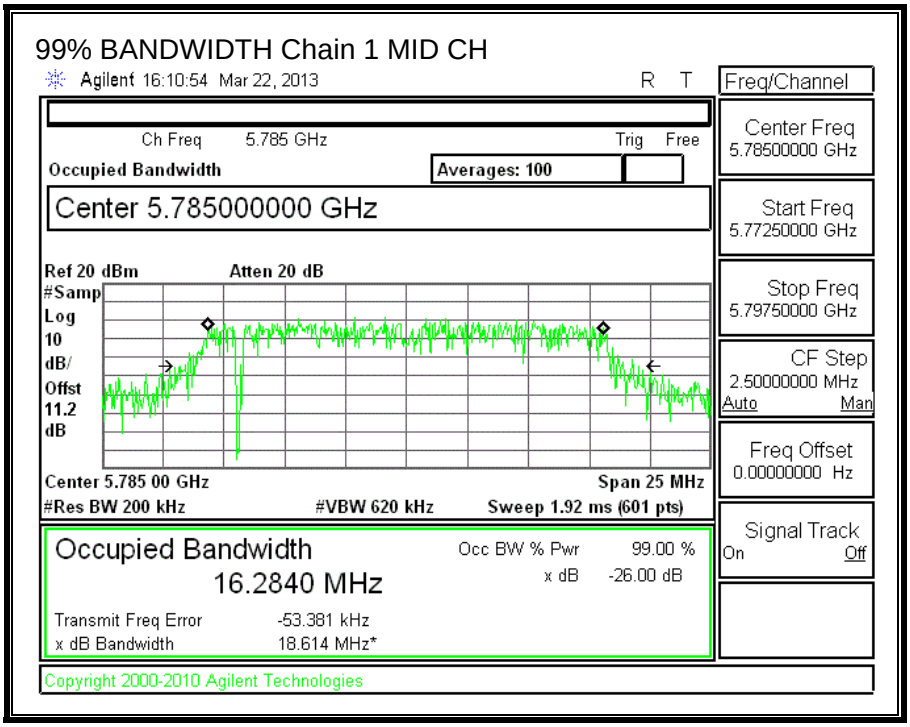

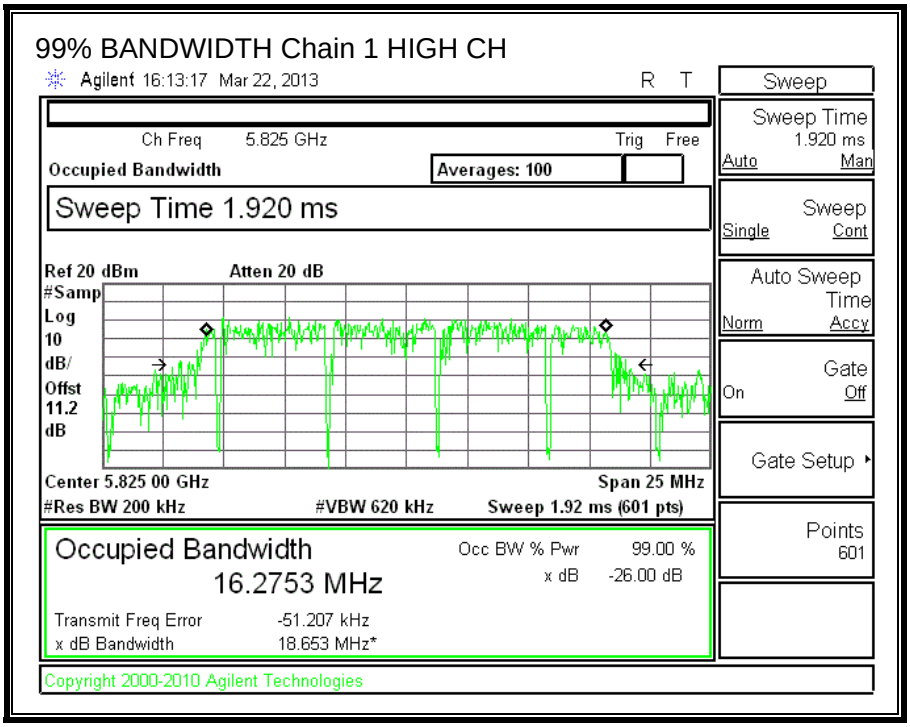

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8.7.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

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

RESULTS

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
Low	5745	12.20	12.80	15.52
Mid	5785	12.10	12.70	15.42
High	5825	12.30	12.40	15.36

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8.7.4. OUTPUT POWER.

LIMITS

FCC §15.247

IC RSS-210 A8.4

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain.

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
4.00	4.00	4.00

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RESULTS

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	5745	4.00	30.00	30	36	30.00
Mid	5785	4.00	30.00	30	36	30.00
High	5825	4.00	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margi (dB)
Low	5745	21.35	20.79	24.09	30.00	-5.91
Mid	5785	21.08	21.26	24.18	30.00	-5.82
High	5825	21.88	21.11	24.52	30.00	-5.48

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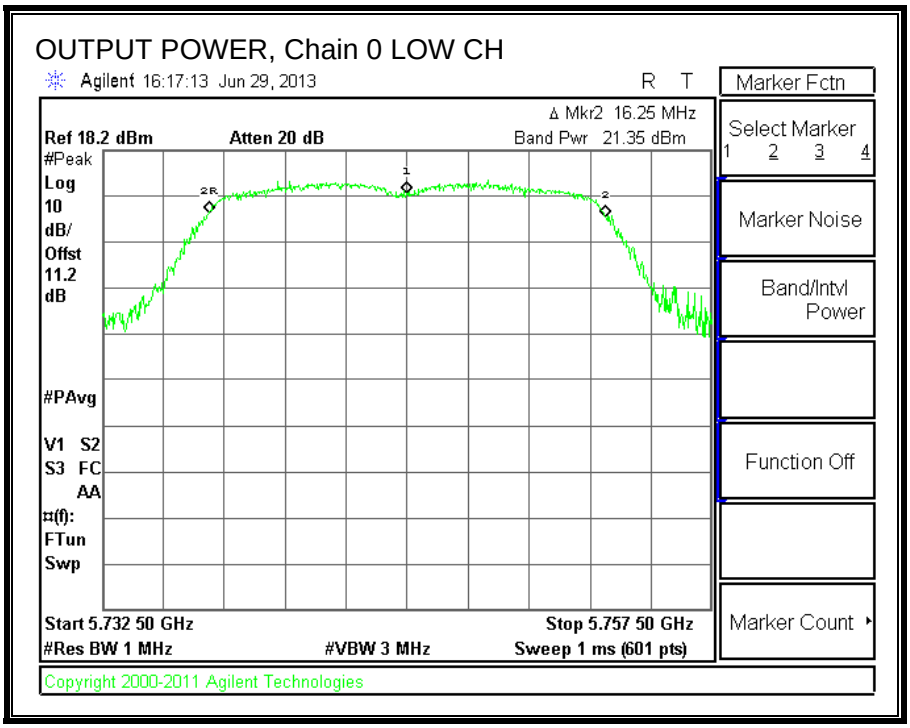
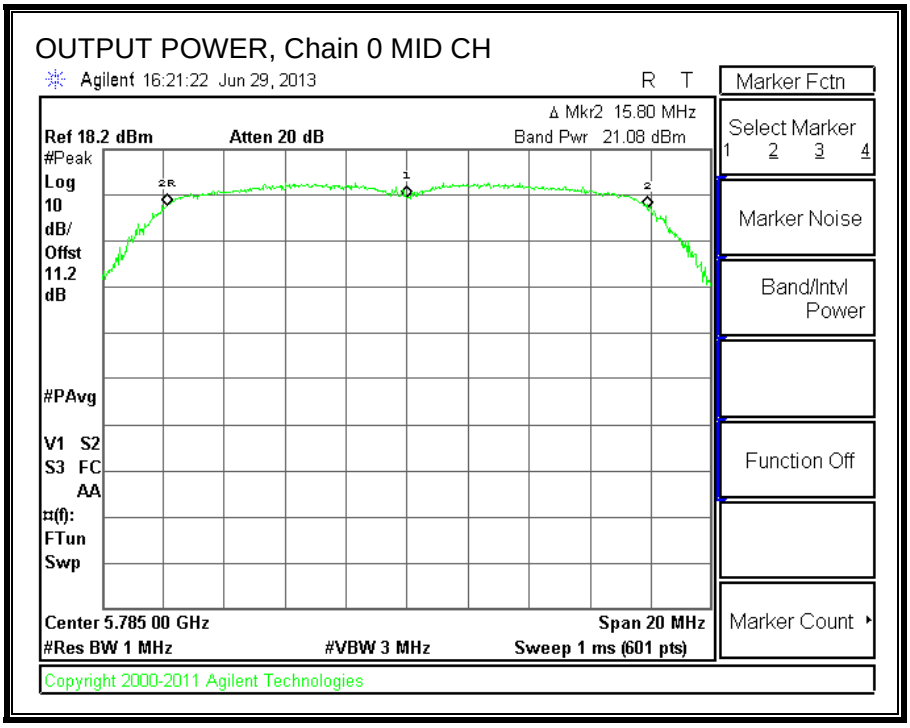
OUTPUT POWER, Chain 0





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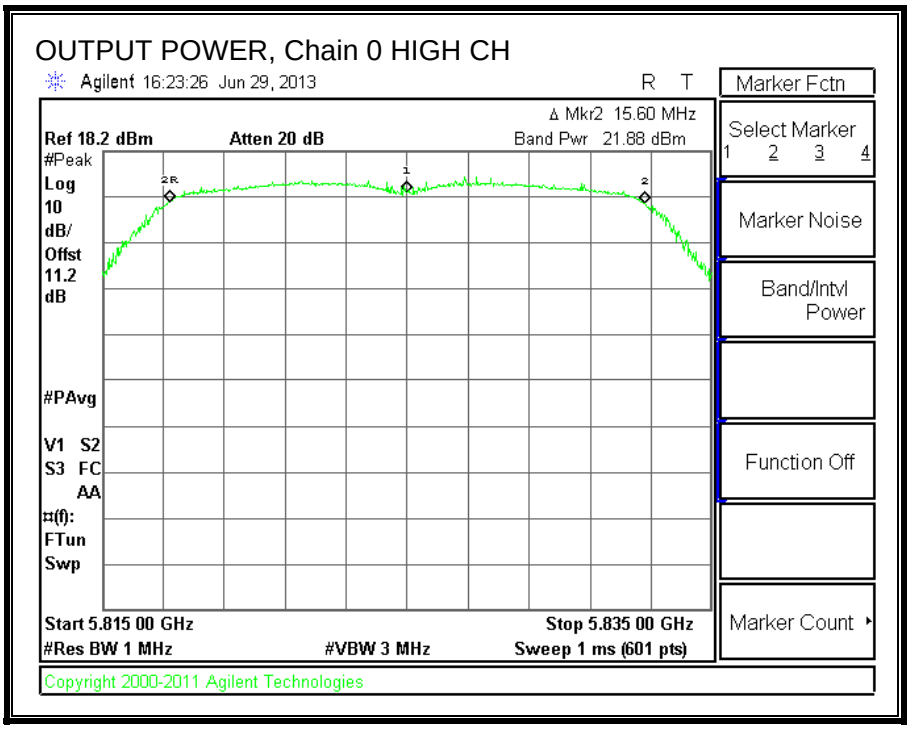
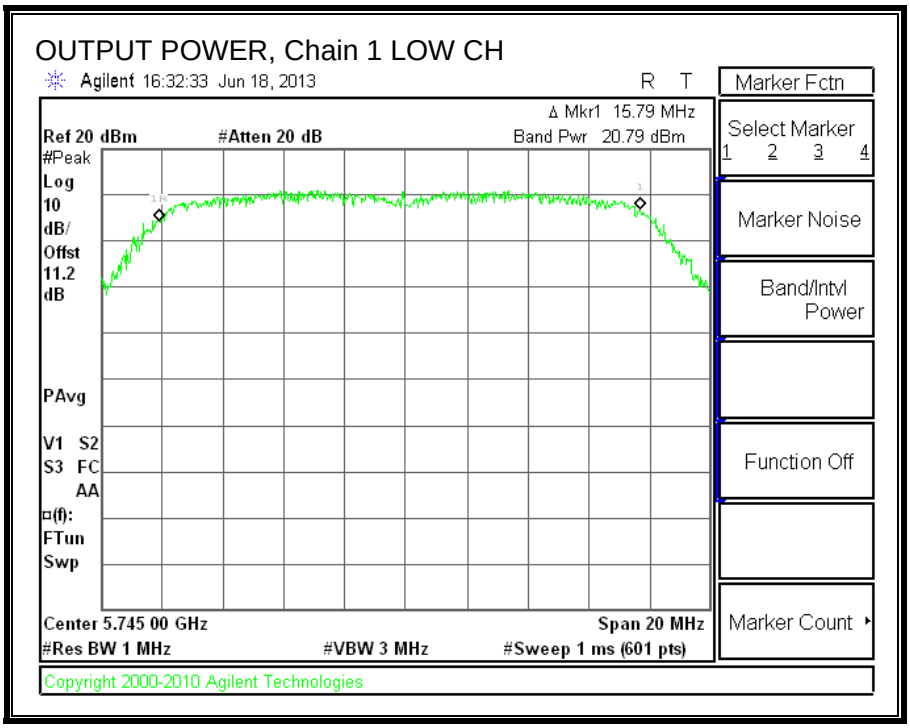


OUTPUT POWER, Chain 1



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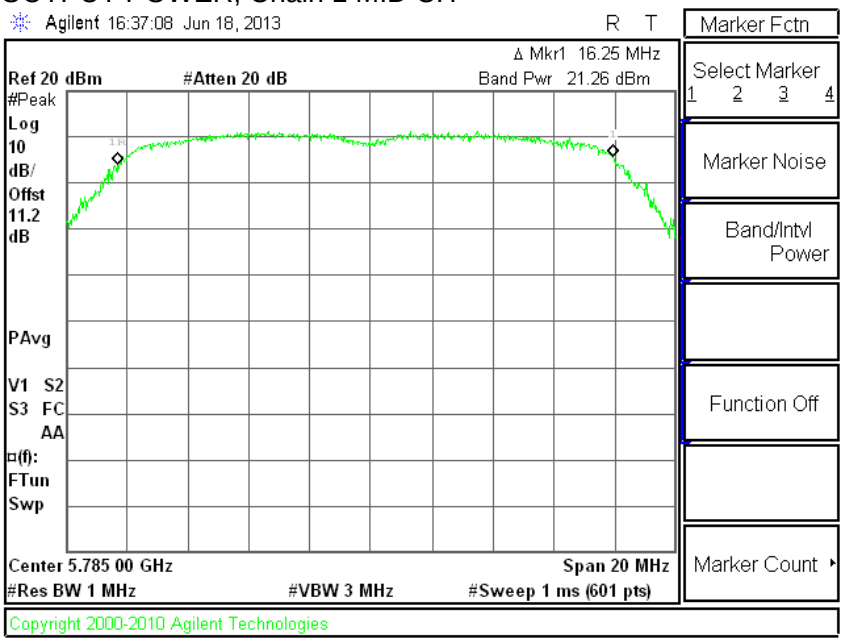
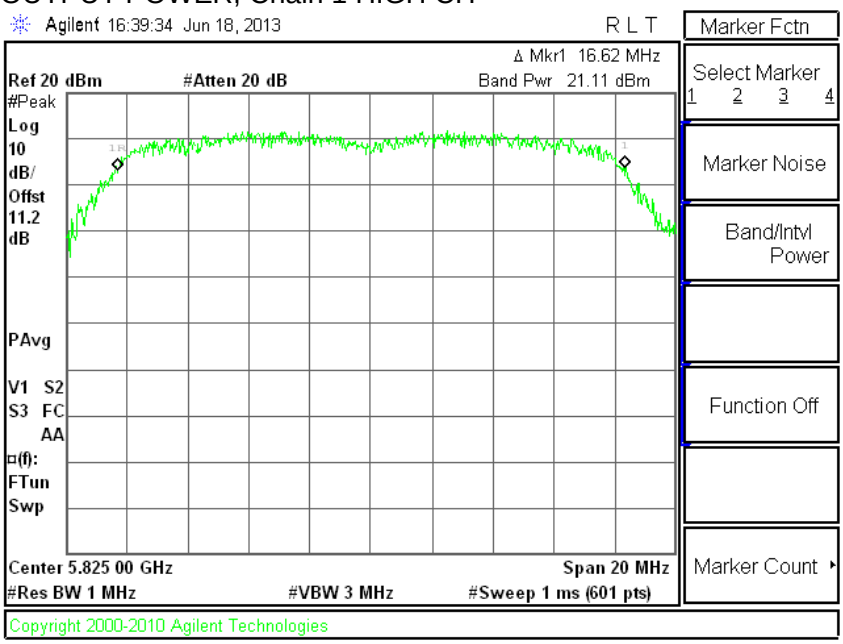
OUTPUT POWER, Chain 1 MID CH



OUTPUT POWER, Chain 1 HIGH CH



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8.7.5. PSD

LIMITS

FCC §15.247

IC RSS-210 A8.2

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.

RESULTS

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Chain 1 Meas (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	5745	-12.35	-12.13	-9.23	8.0	-17.2
Mid	5785	-11.61	-11.76	-8.67	8.0	-16.7
High	5825	-12.46	-11.49	-8.94	8.0	-16.9

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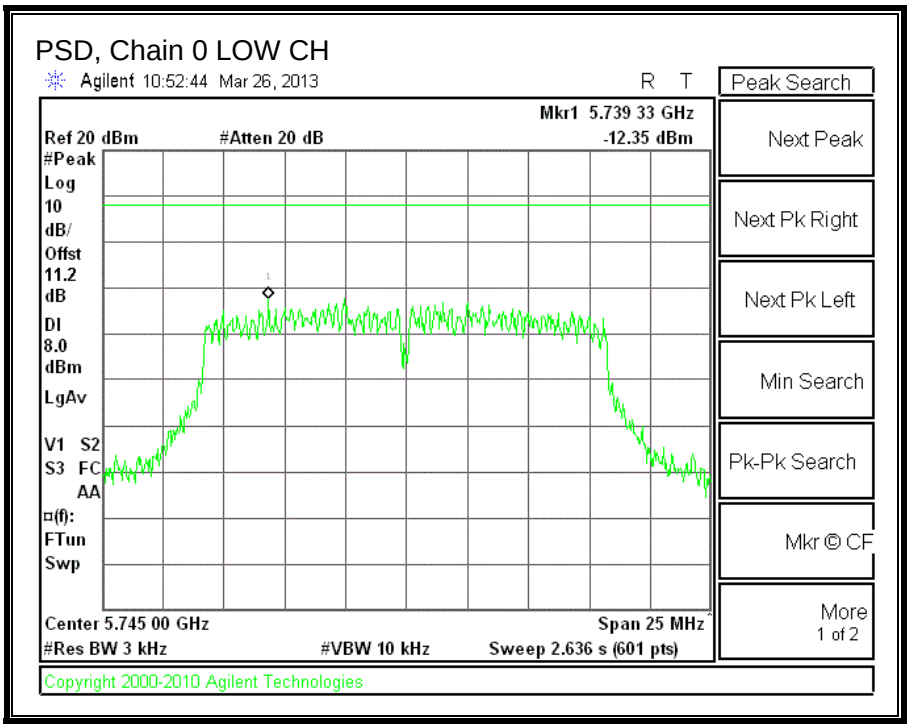
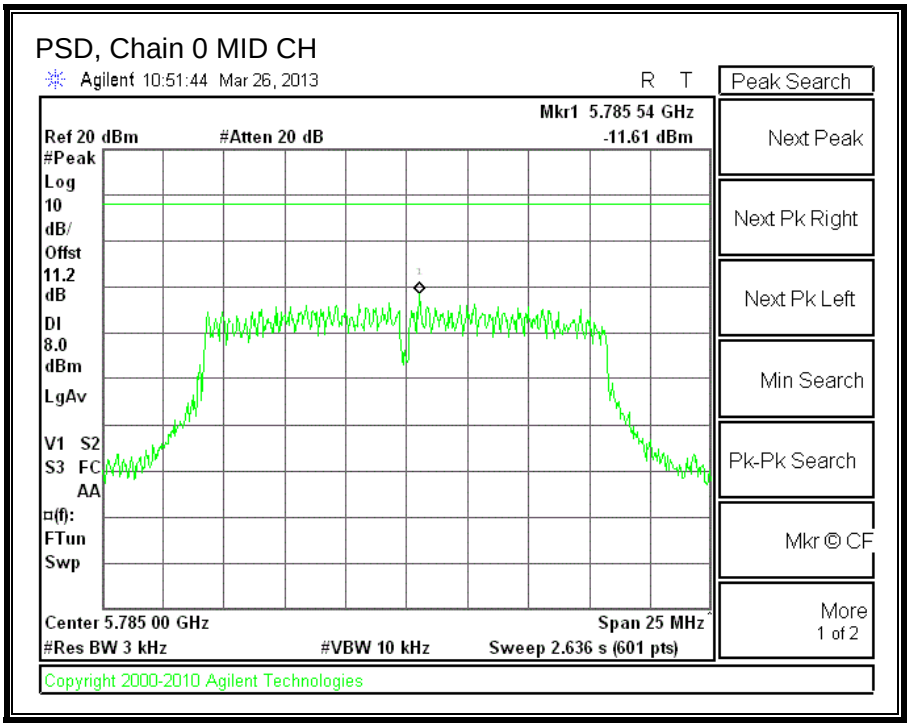
PSD, Chain 0





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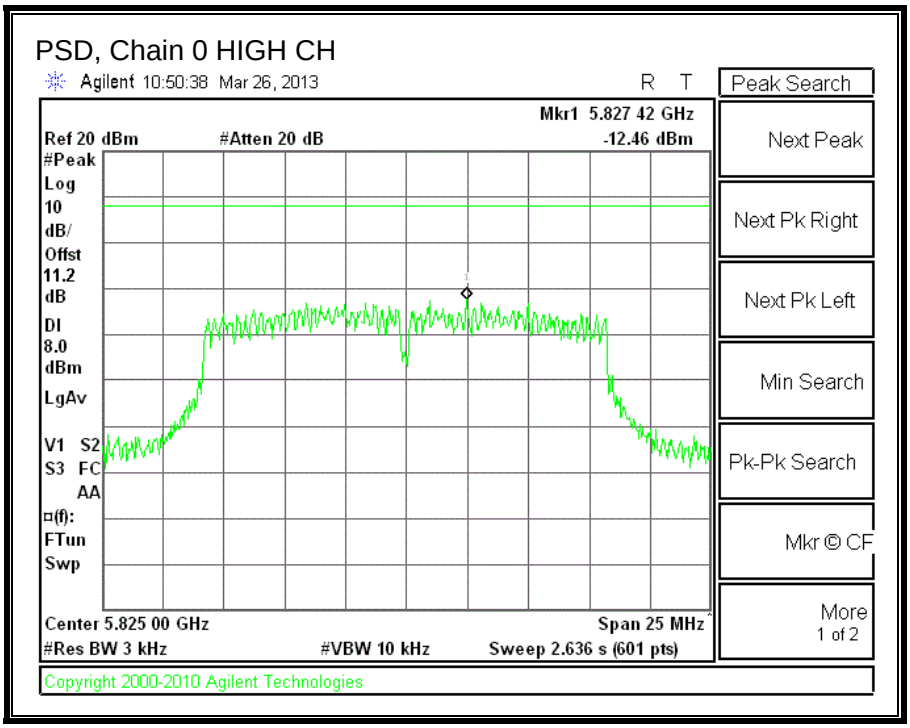
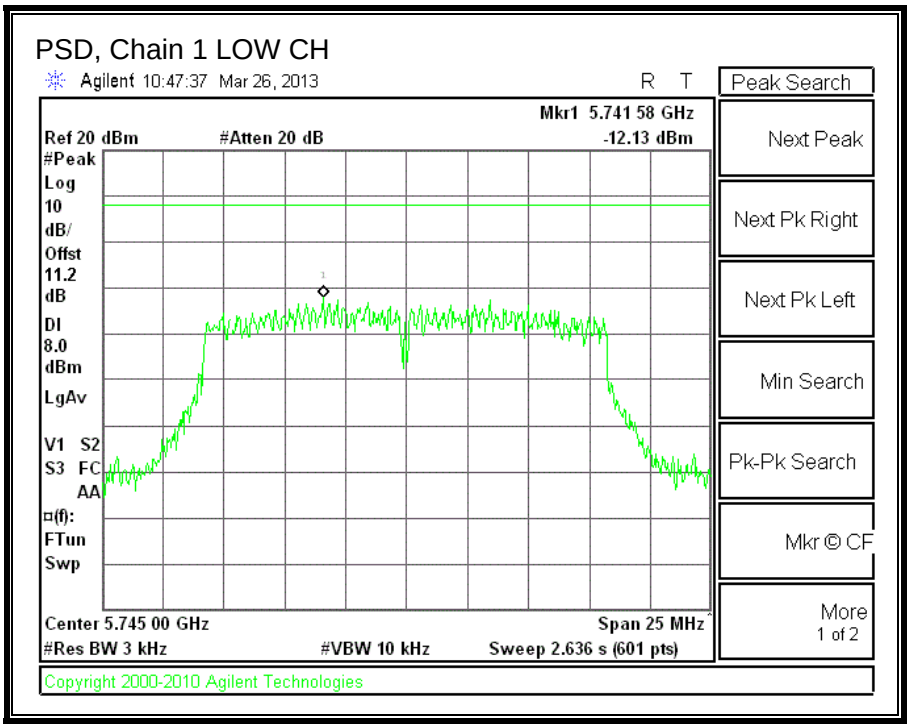


PSD, Chain 1



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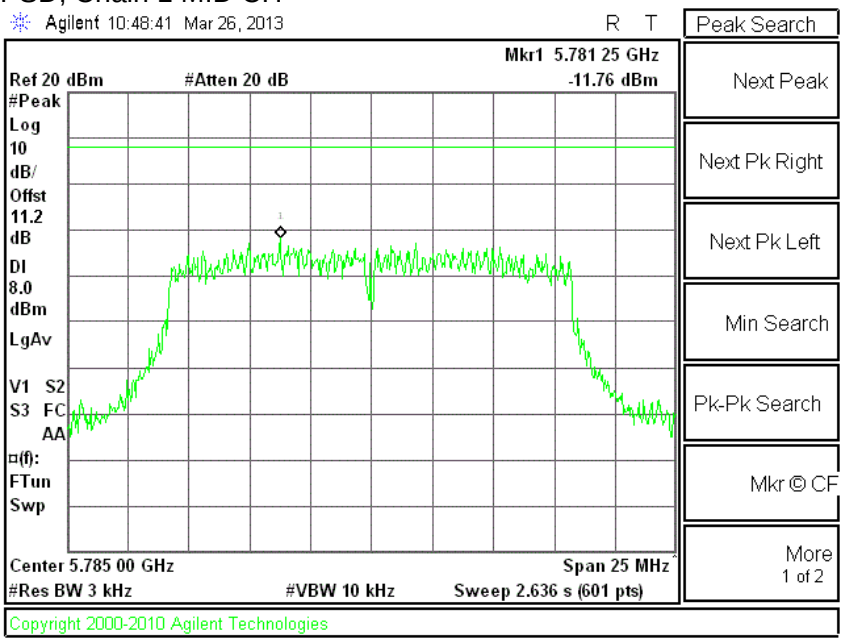
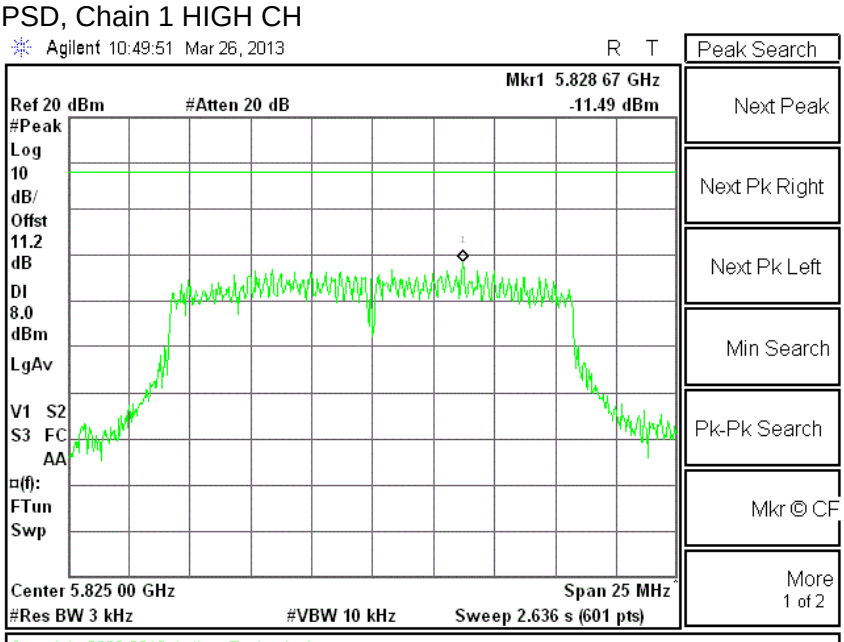
PSD, Chain 1 MID CH



PSD, Chain 1 HIGH CH



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8.7.6. OUT-OF-BAND EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the in-band reference level, band edge (where measurements to the general radiated limits will not be made) and out-of-band emissions.

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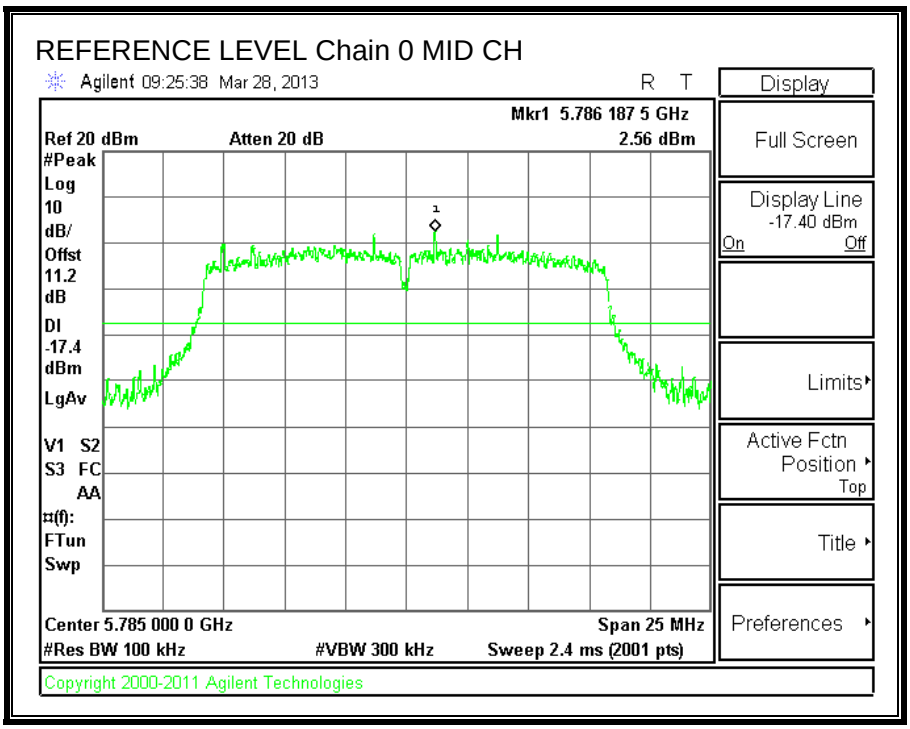
RESULTS

IN-BAND REFERENCE LEVEL, Chain 0



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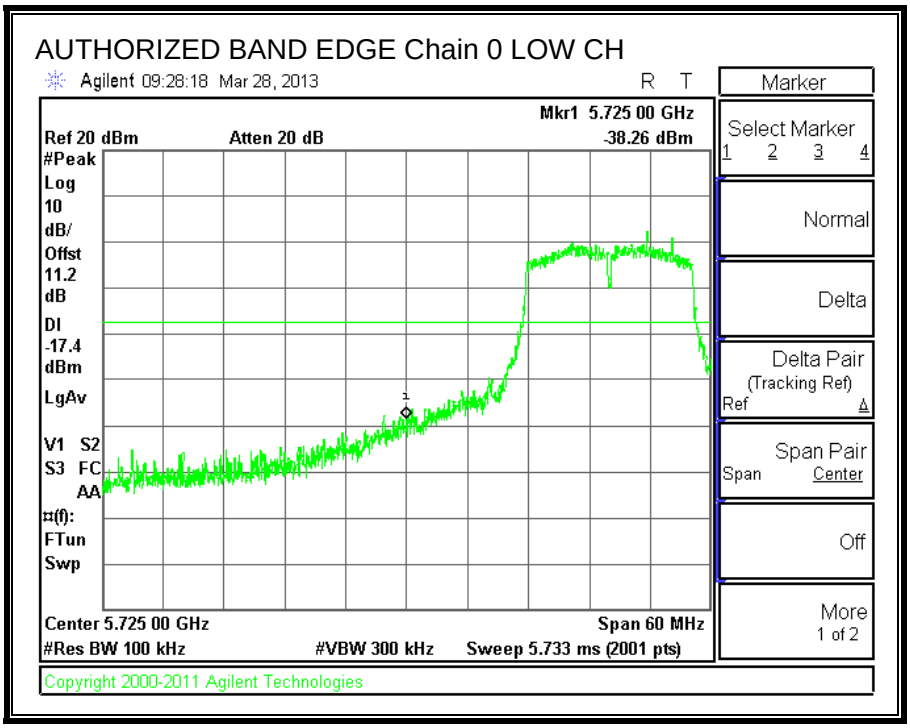
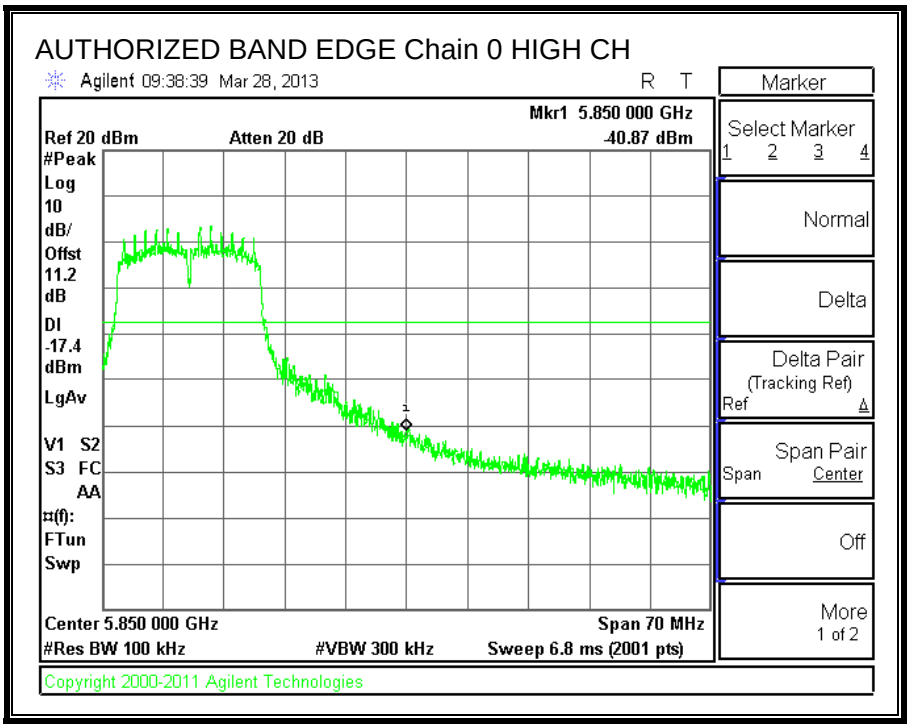
LOW CHANNEL BANDEDGE, Chain 0



HIGH CHANNEL BANDEDGE, Chain 0



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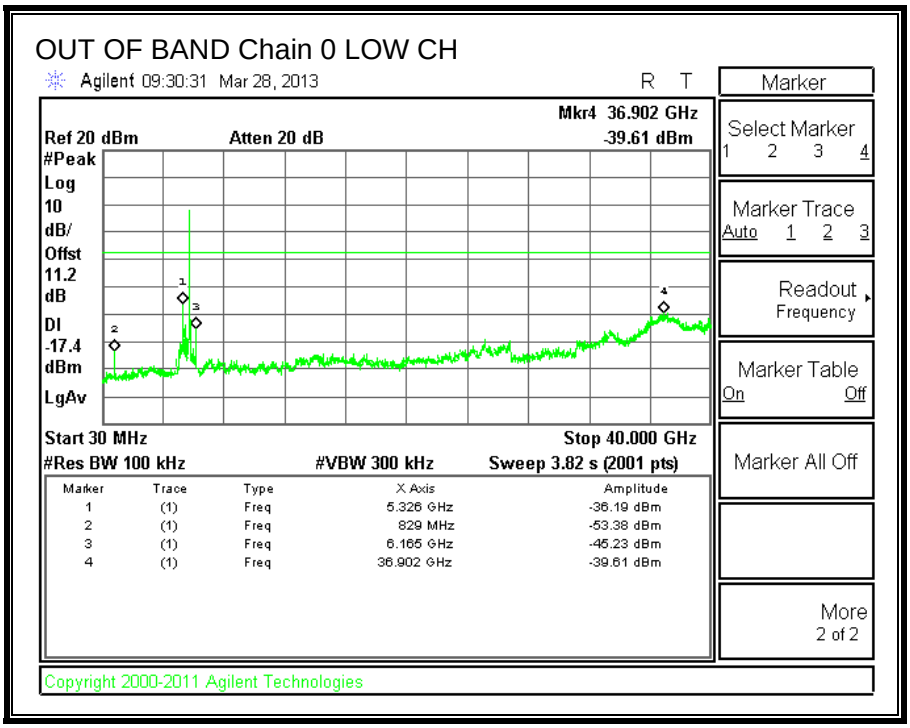
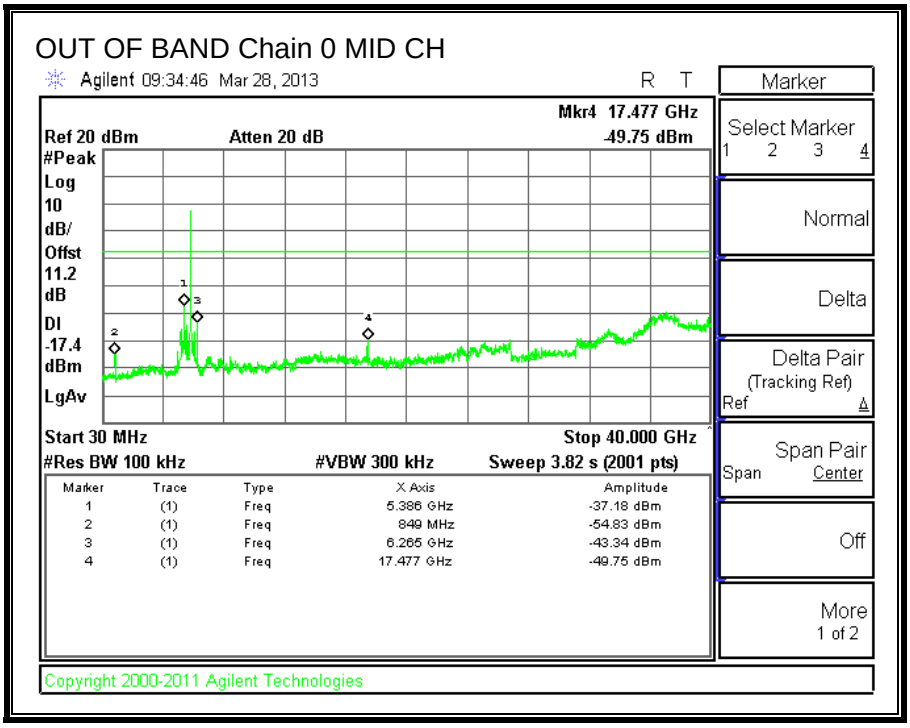
OUT-OF-BAND EMISSIONS, Chain 0





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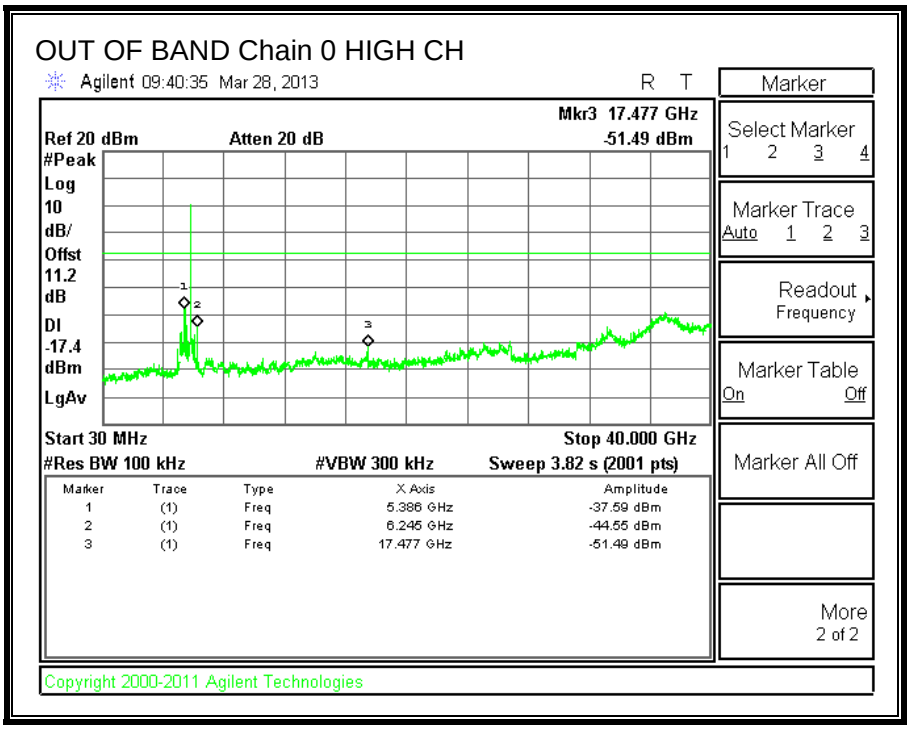
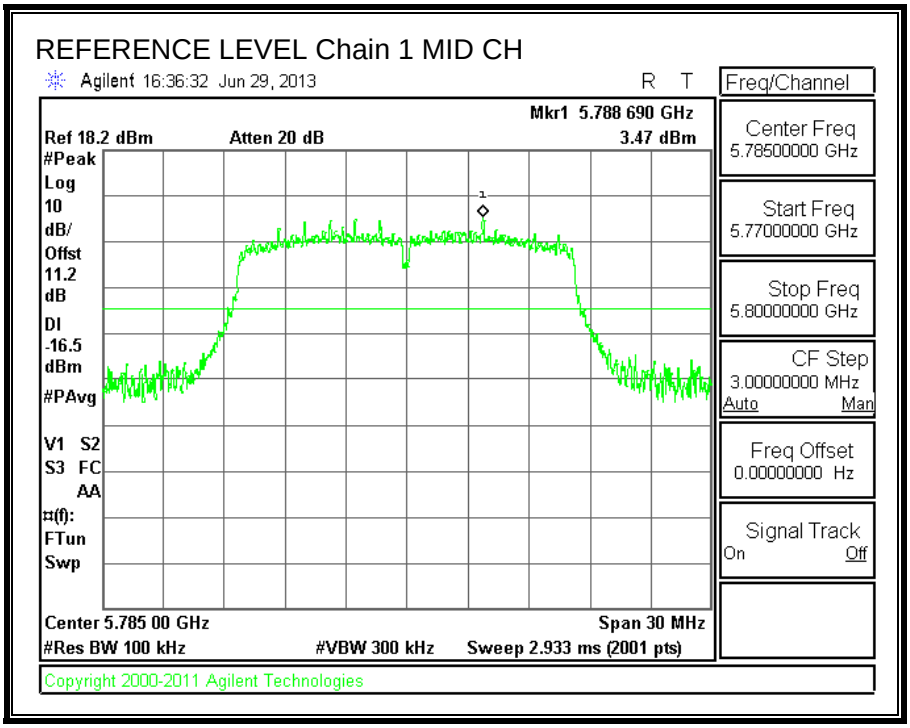


IN-BAND REFERENCE LEVEL, Chain 1



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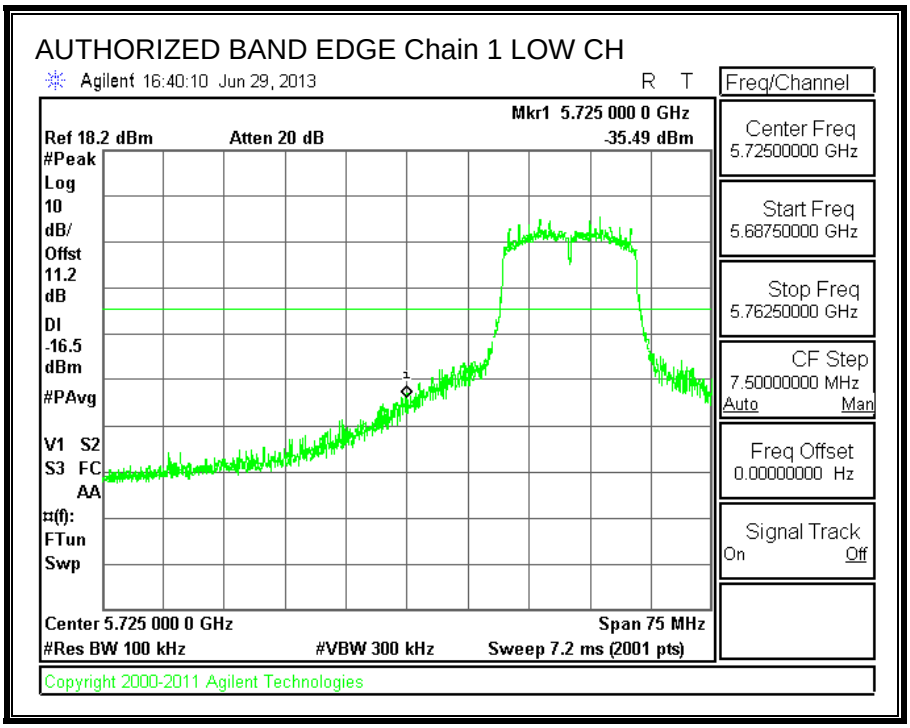
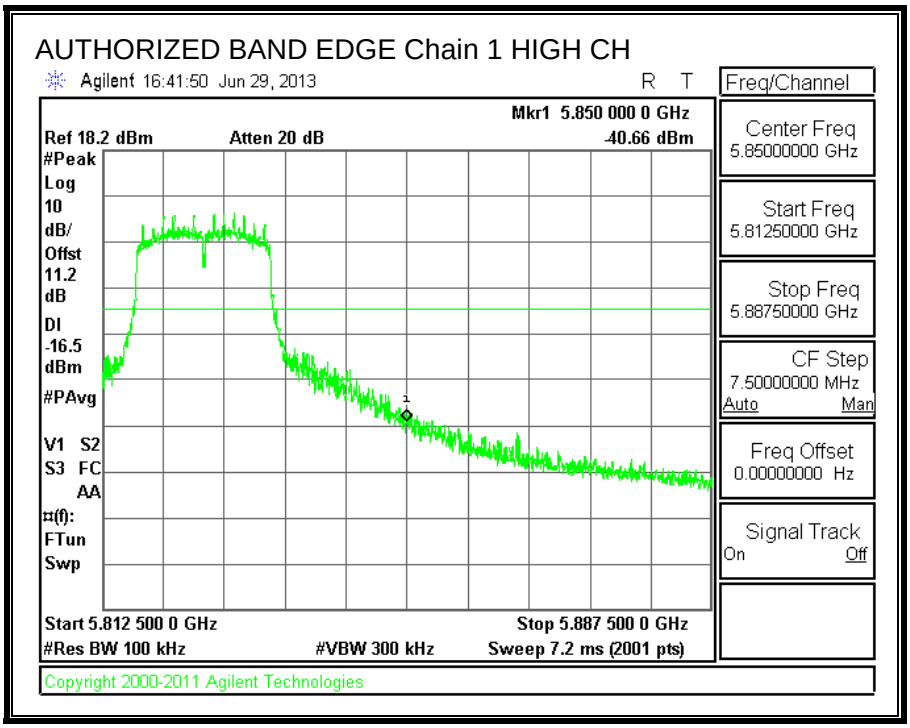
LOW CHANNEL BANDEDGE, Chain 1



HIGH CHANNEL BANDEDGE, Chain 1



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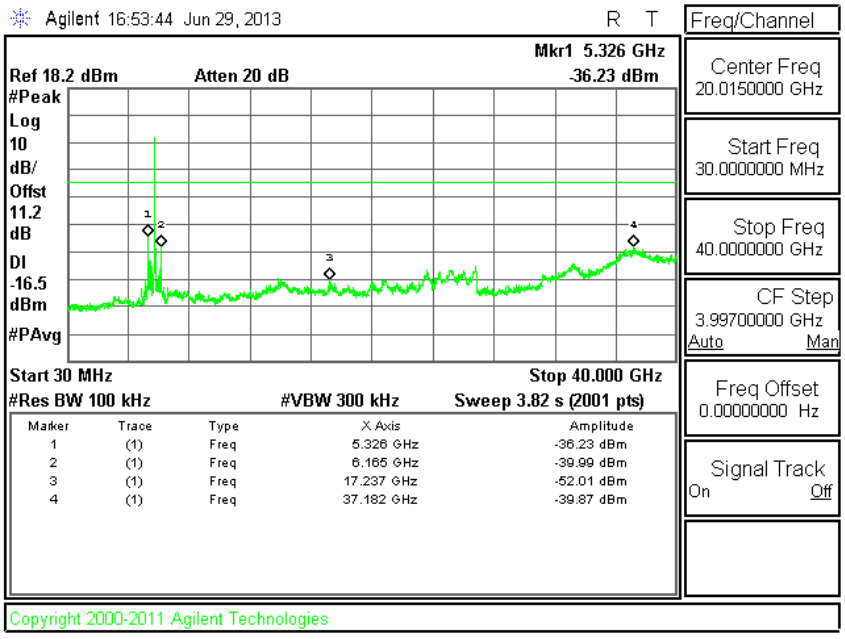
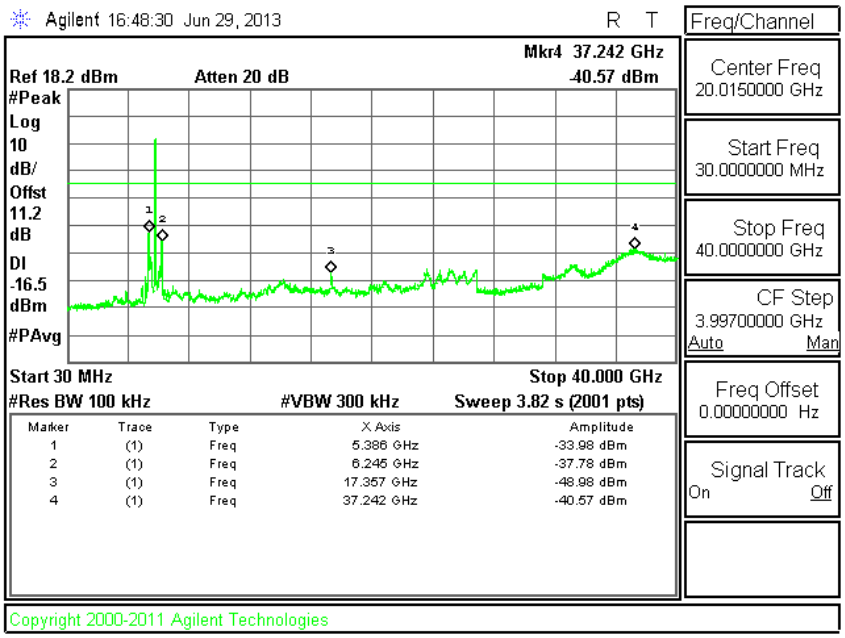
OUT OF BAND Chain 1 LOW CH



OUT OF BAND Chain 1 MID CH



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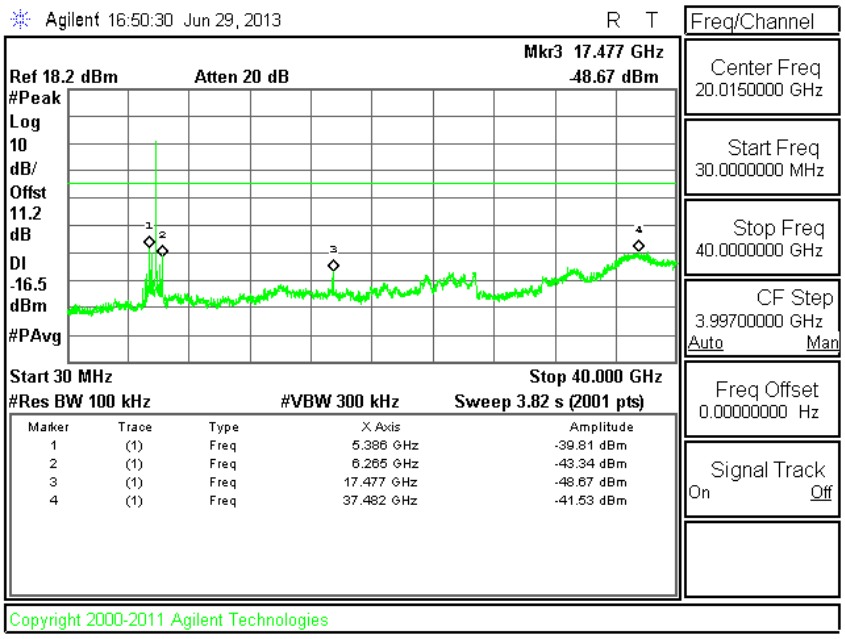
OUT OF BAND Chain 1 HIGH CH



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8.8. 802.11n HT20 CDD MCS0 2TX MODE, 5.8 GHz BAND

8.8.1. 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 with the RBW set between 1% and 5% of the EBW, the VBW >= 3 x RBW, peak detector and max hold.

RESULTS

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low	5745	15.520	16.020	0.5
Mid	5785	14.990	15.790	0.5
High	5825	15.370	16.290	0.5

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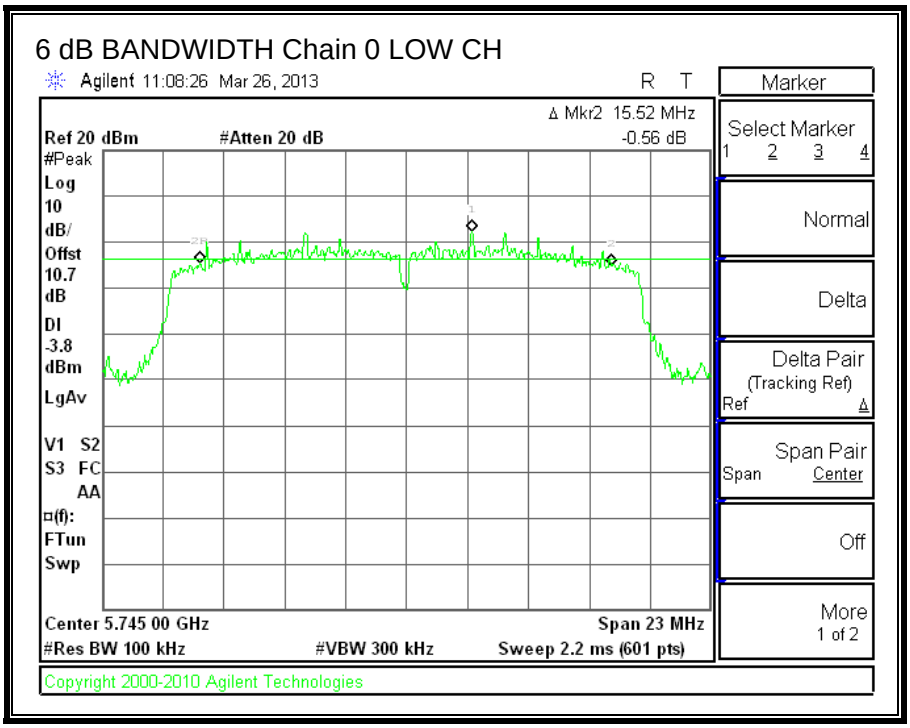
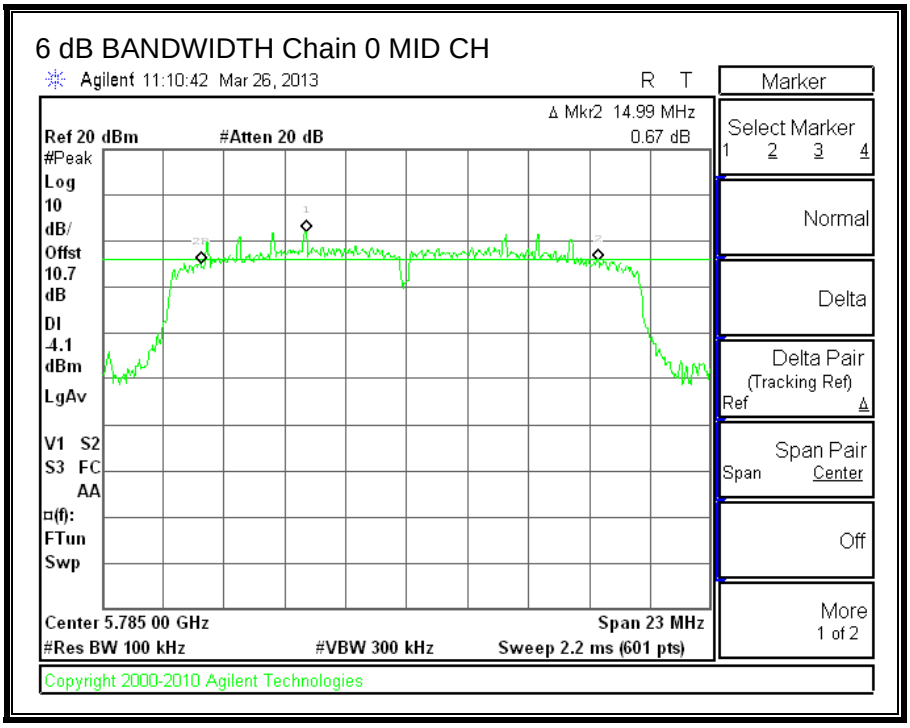
6 dB BANDWIDTH, Chain 0





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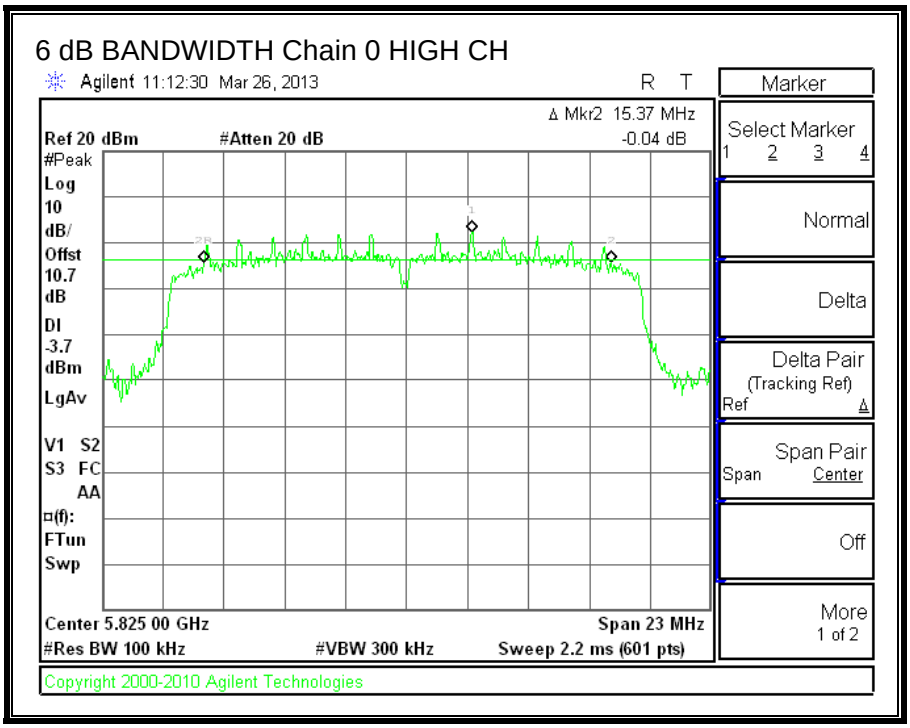
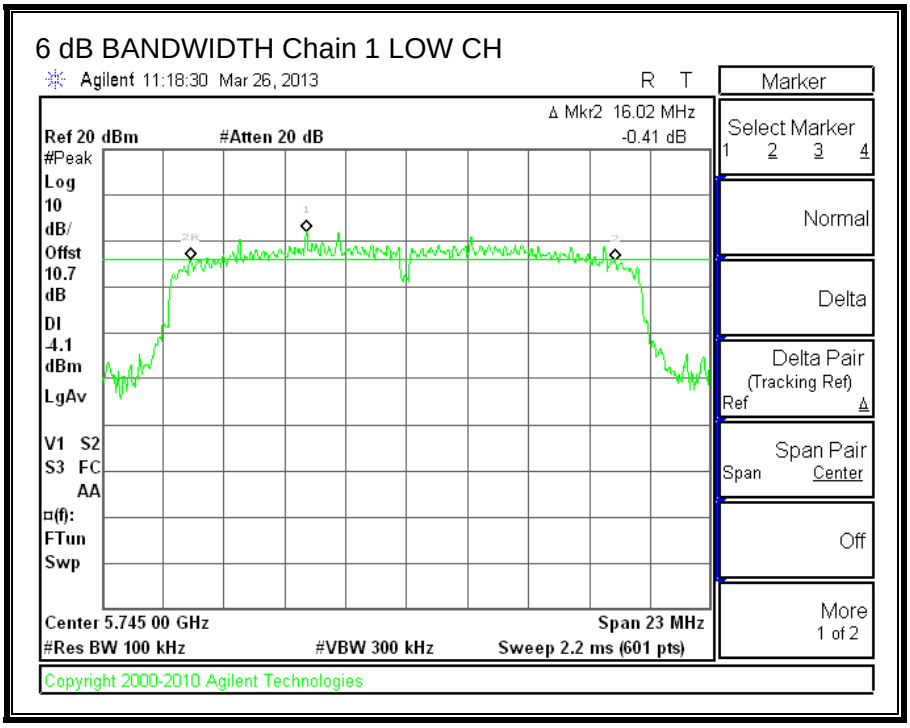


6 dB BANDWIDTH, Chain 1



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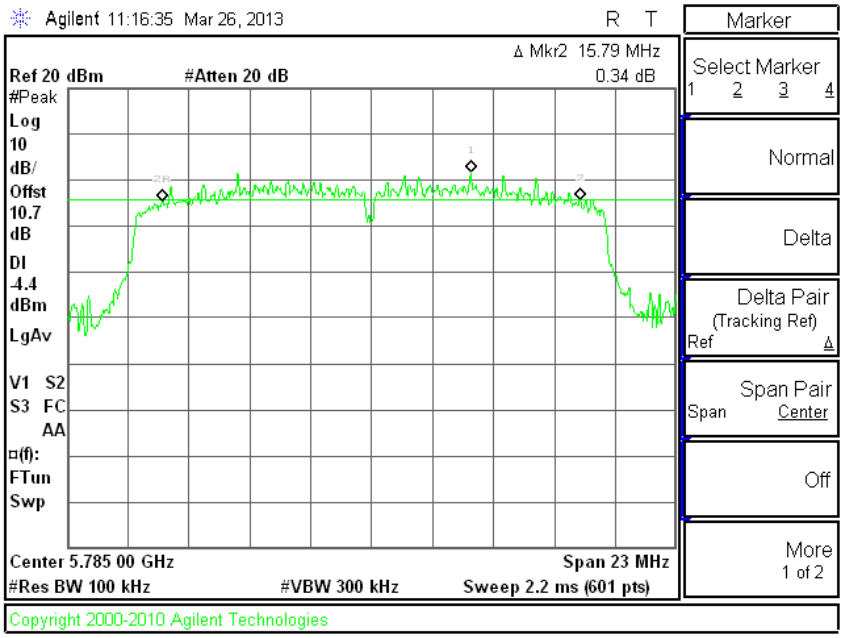
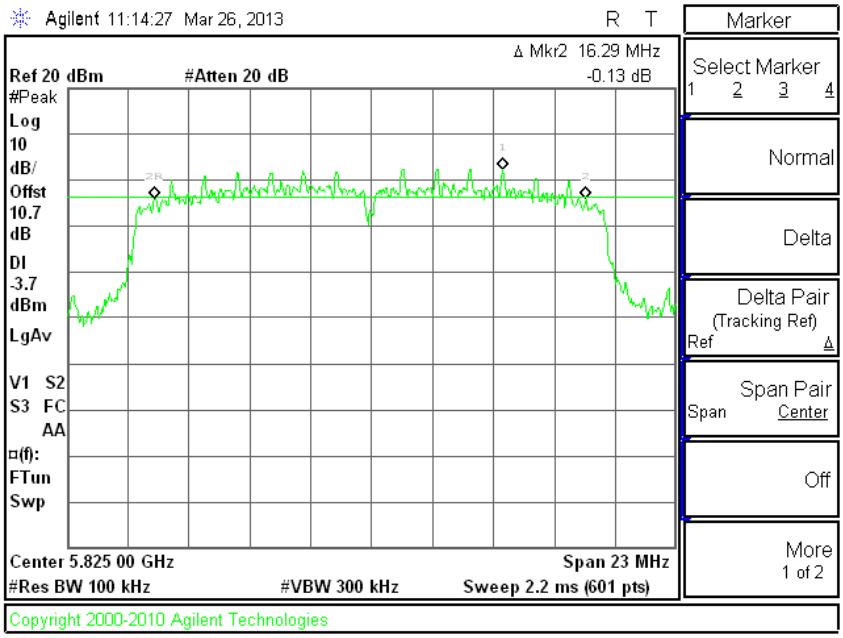
6 dB BANDWIDTH Chain 1 MID CH



6 dB BANDWIDTH Chain 1 HIGH CH



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8.8.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)
Low	5745	17.4264	17.3956
Mid	5785	17.4228	17.4118
High	5825	17.3873	17.3559

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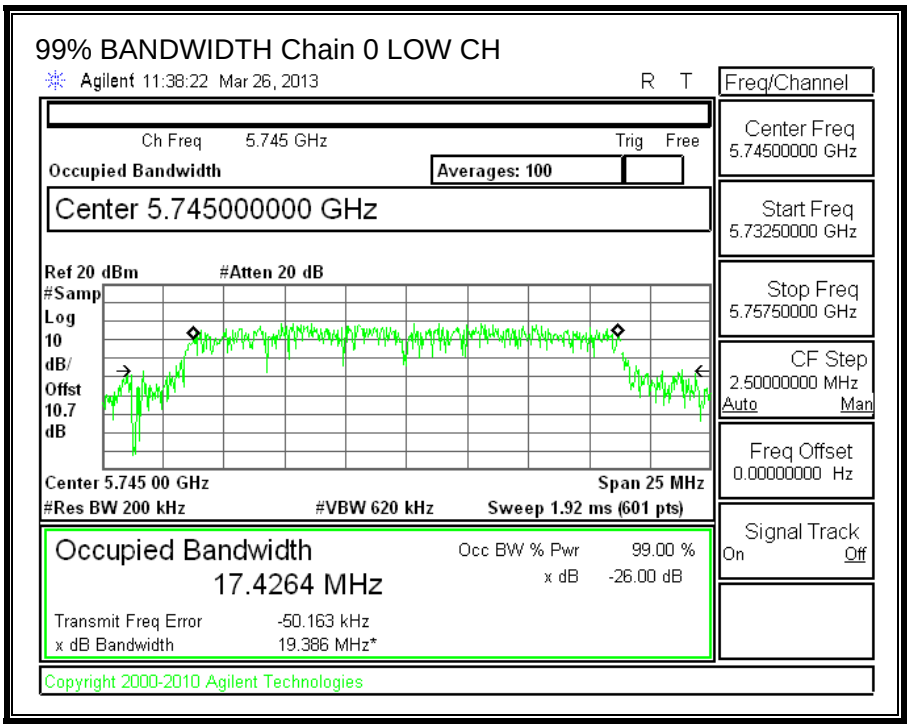
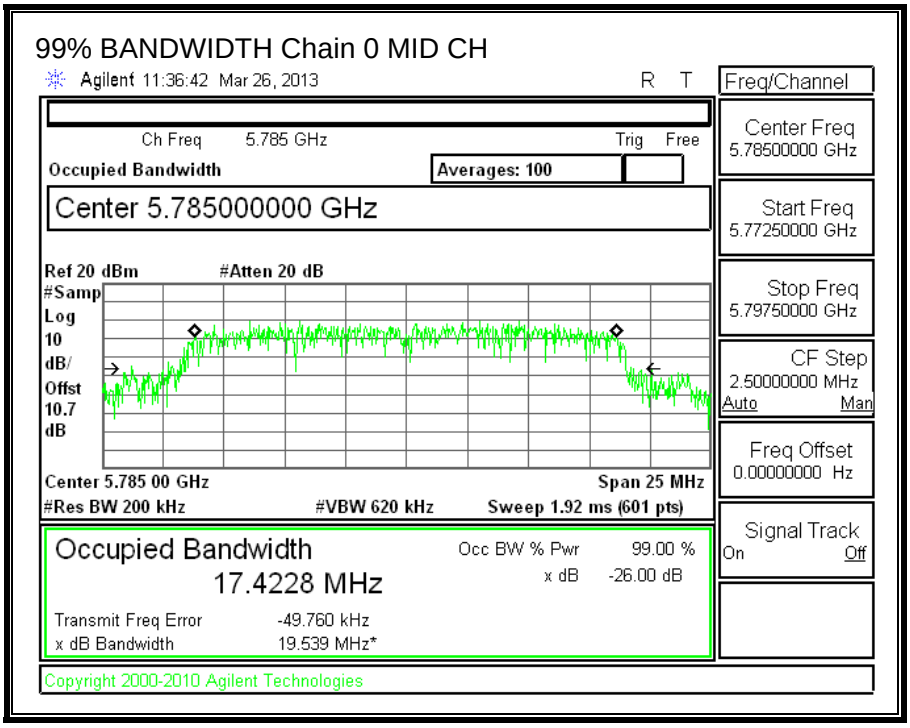
99% BANDWIDTH, Chain 0





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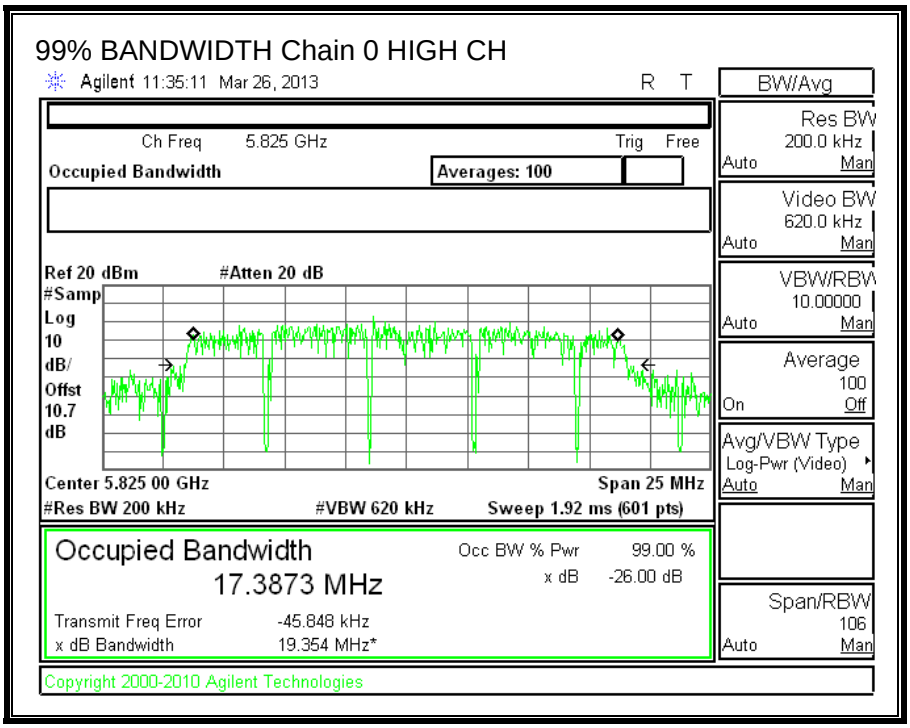
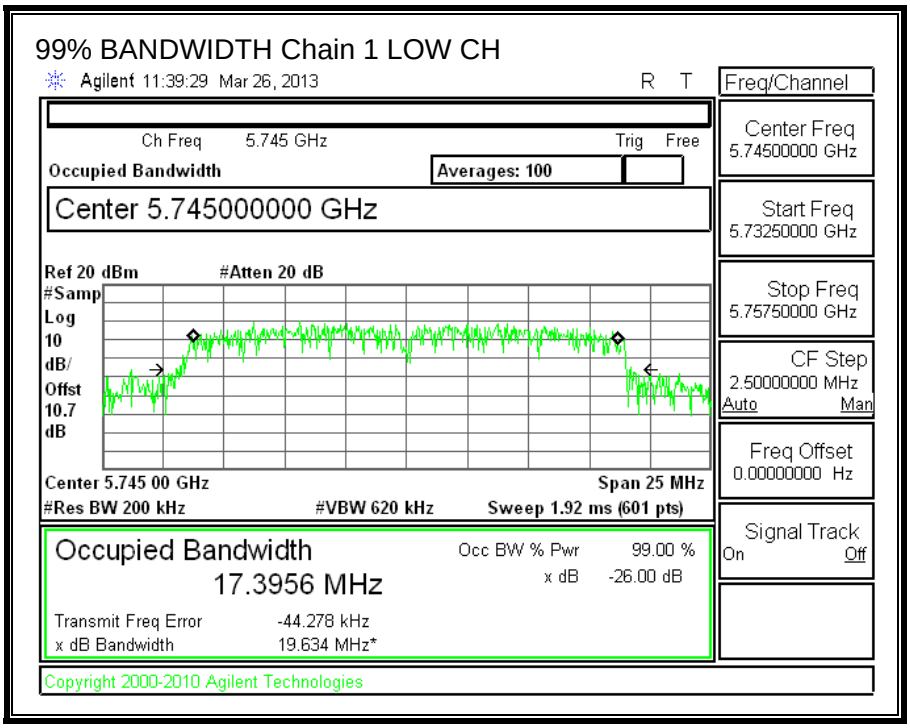


99% BANDWIDTH, Chain 1



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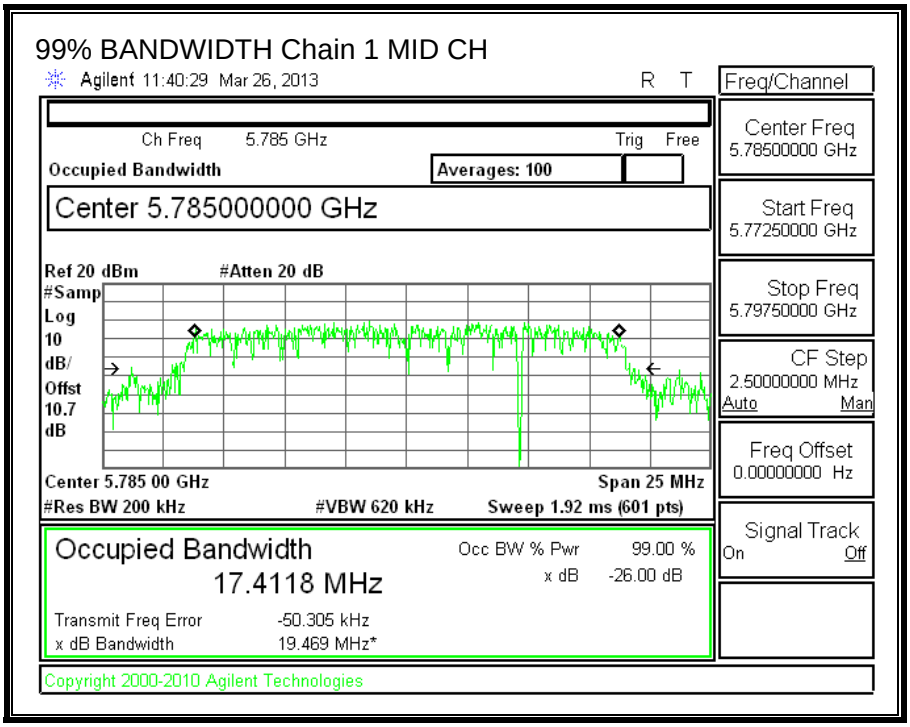

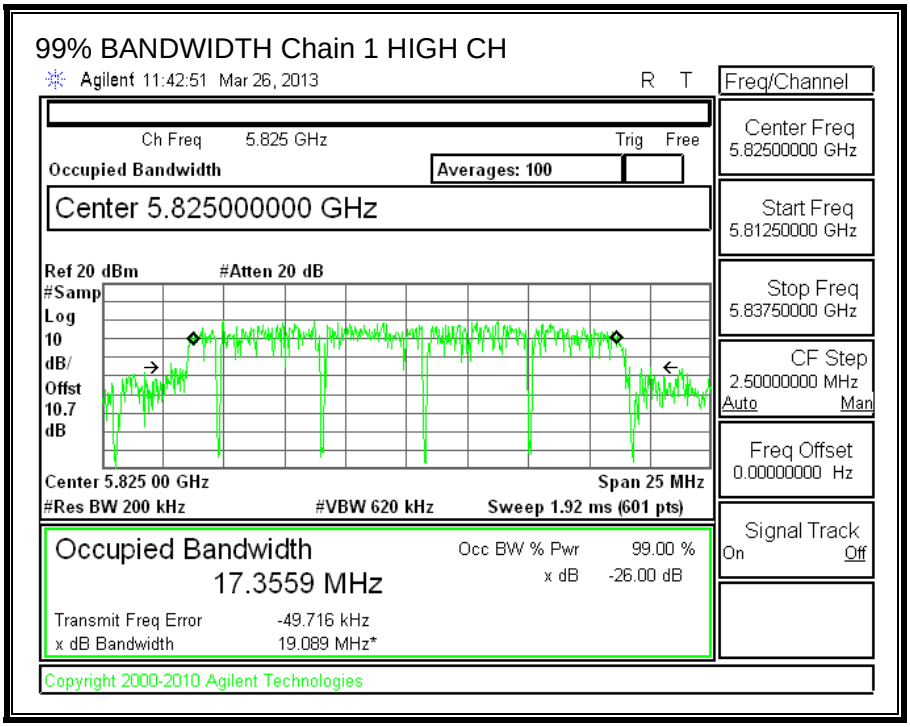

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8.8.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

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

RESULTS

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
Low	5745	12.20	12.70	15.47
Mid	5785	12.10	12.20	15.16
High	5825	12.02	12.40	15.22

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8.8.4. OUTPUT POWER

LIMITS

FCC §15.247

IC RSS-210 A8.4

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain.

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
4.00	4.00	4.00

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RESULTS

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	5745	4.00	30.00	30	36	30.00
Mid	5785	4.00	30.00	30	36	30.00
High	5825	4.00	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margi (dB)
Low	5745	20.08	19.39	22.76	30.00	-7.24
Mid	5785	20.08	20.08	23.09	30.00	-6.91
High	5825	20.31	20.05	23.19	30.00	-6.81

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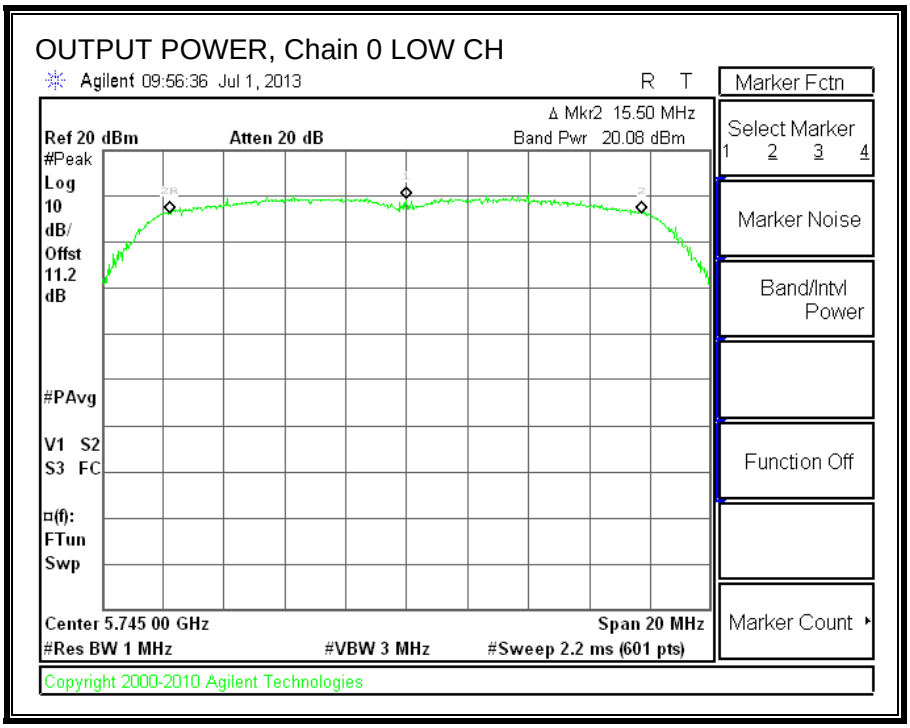
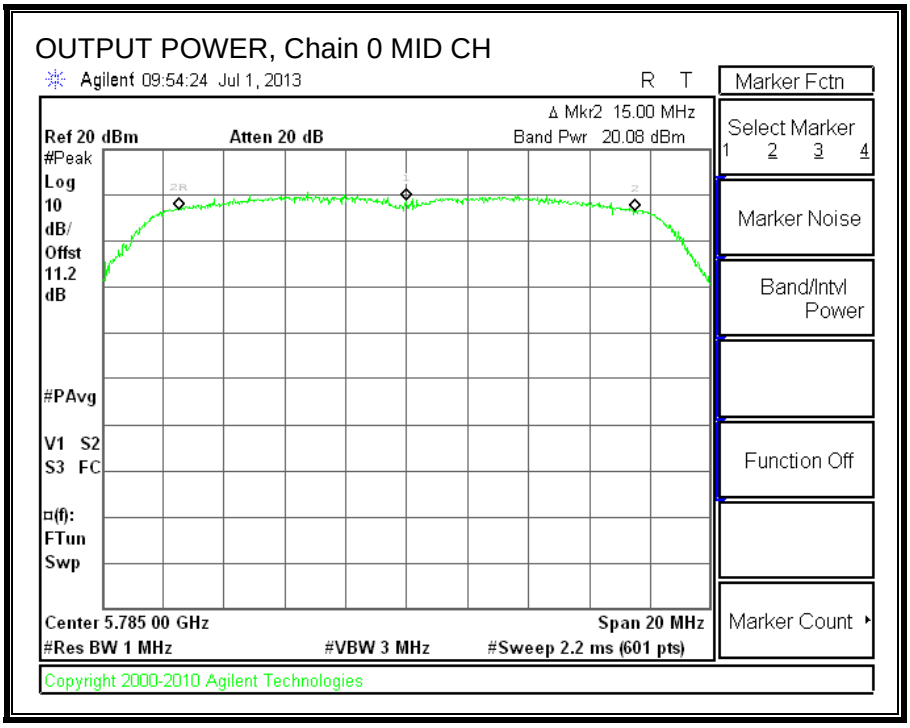
OUTPUT POWER, Chain 0





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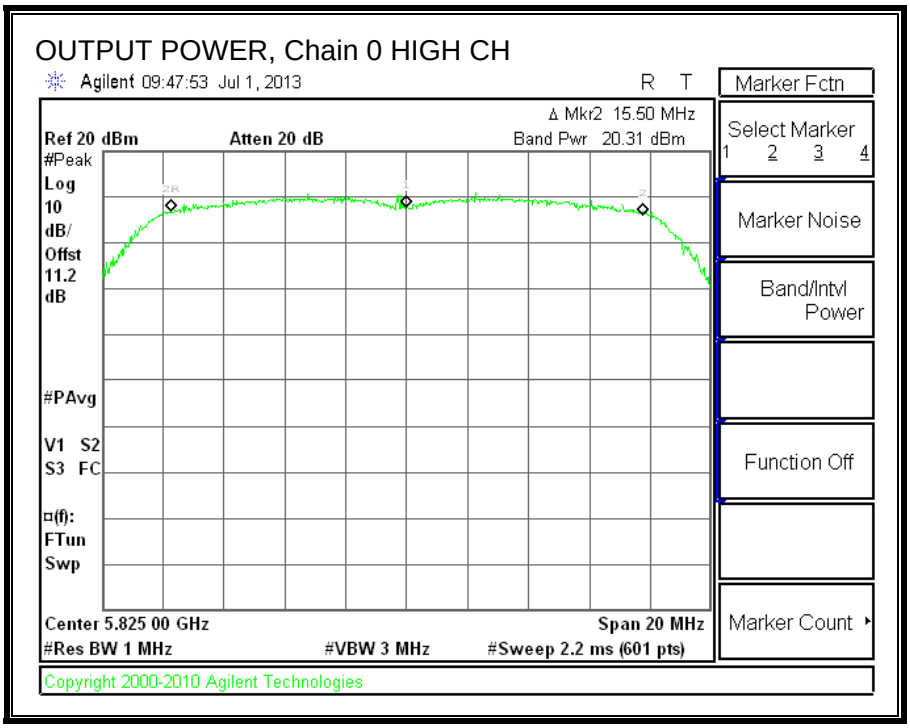
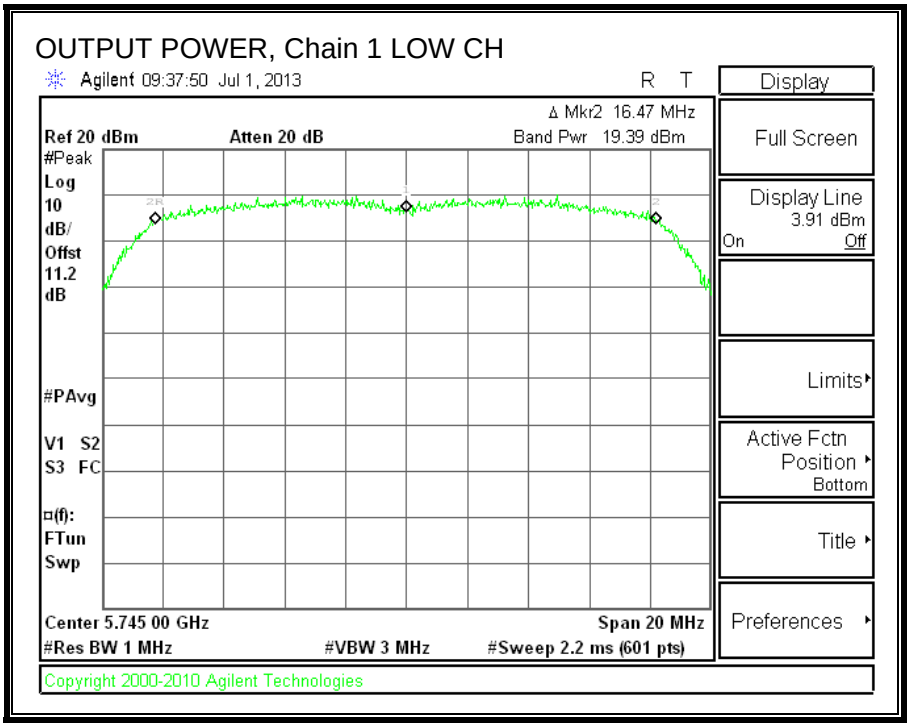


OUTPUT POWER, Chain 1



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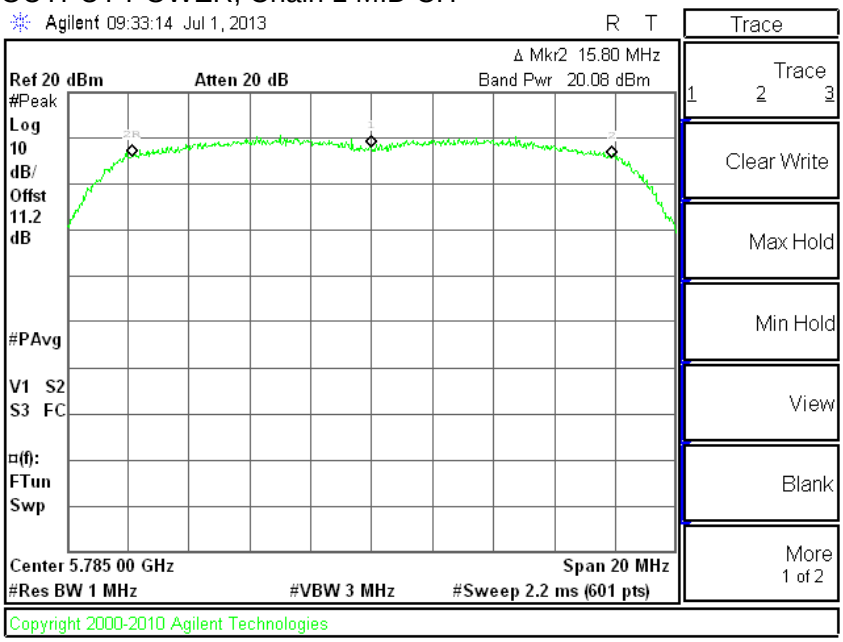
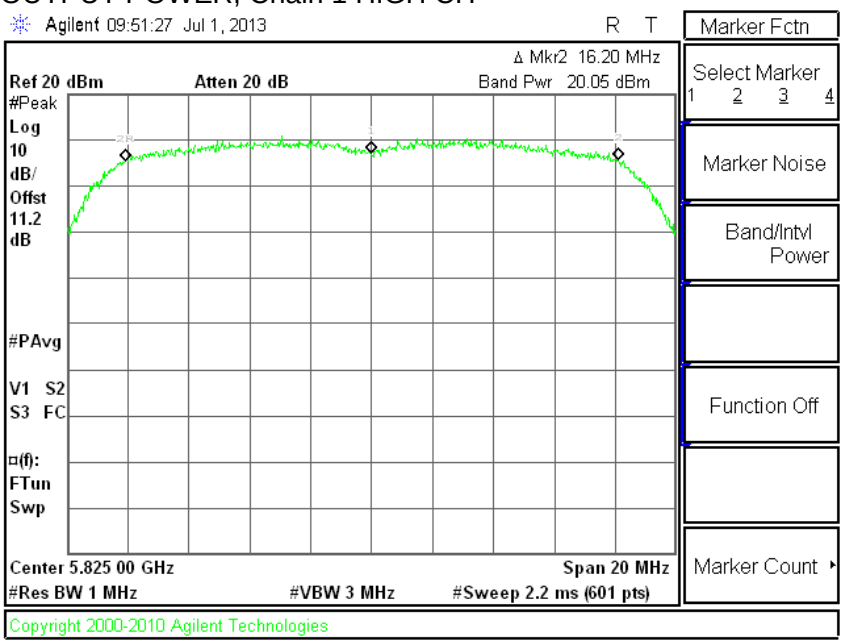
OUTPUT POWER, Chain 1 MID CH



OUTPUT POWER, Chain 1 HIGH CH



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8.8.5. PSD

LIMITS

FCC §15.247

IC RSS-210 A8.2

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.

RESULTS

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Chain 1 Meas (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	5745	-12.73	-10.70	-8.59	8.0	-16.6
Mid	5785	-13.20	-12.04	-9.57	8.0	-17.6
High	5825	-12.45	-13.21	-9.80	8.0	-17.8

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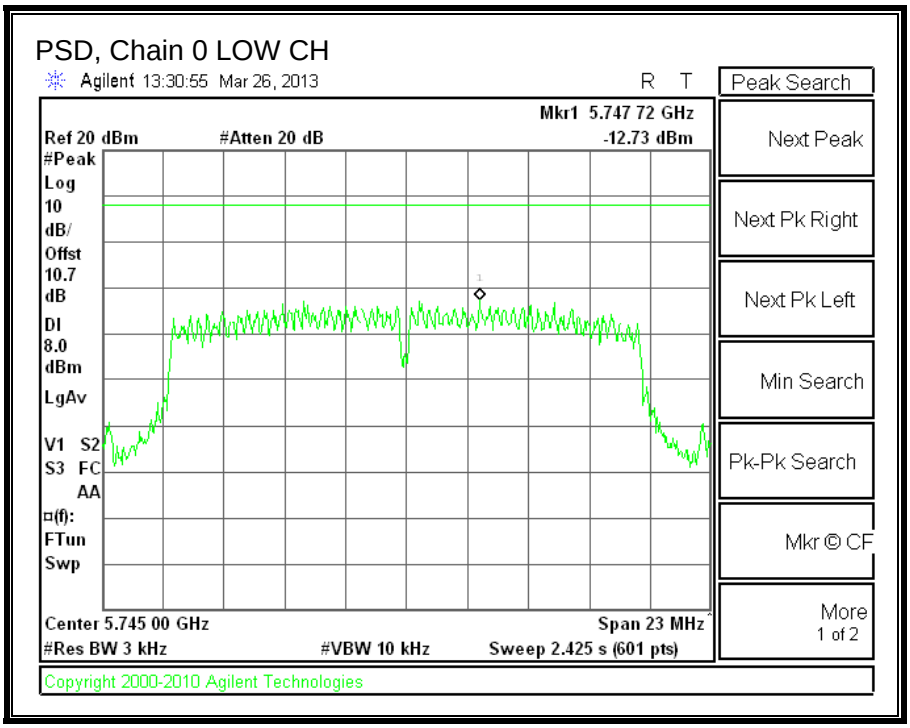
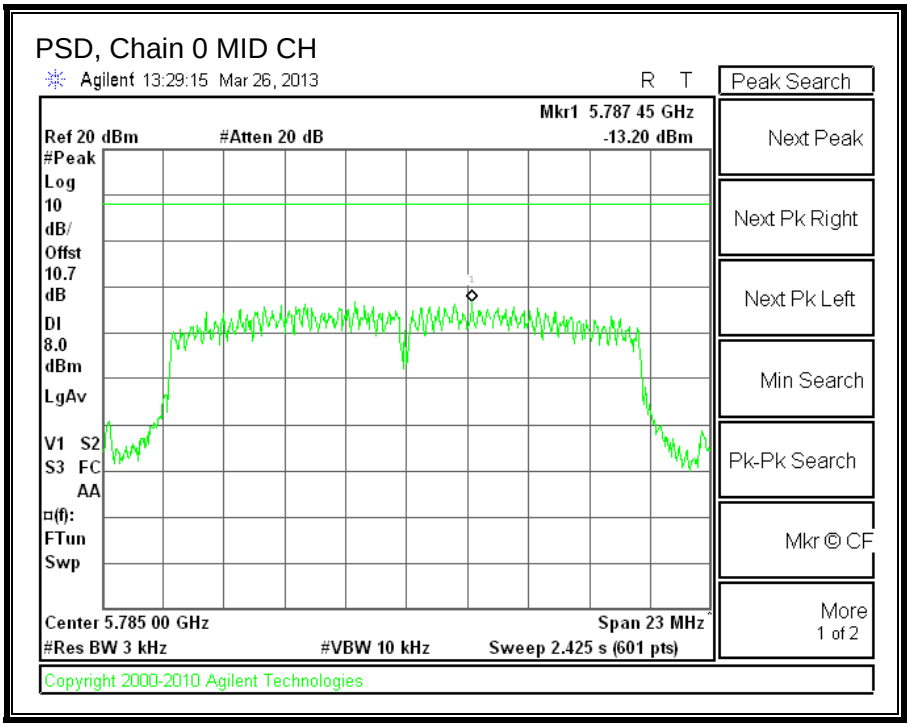
PSD, Chain 0





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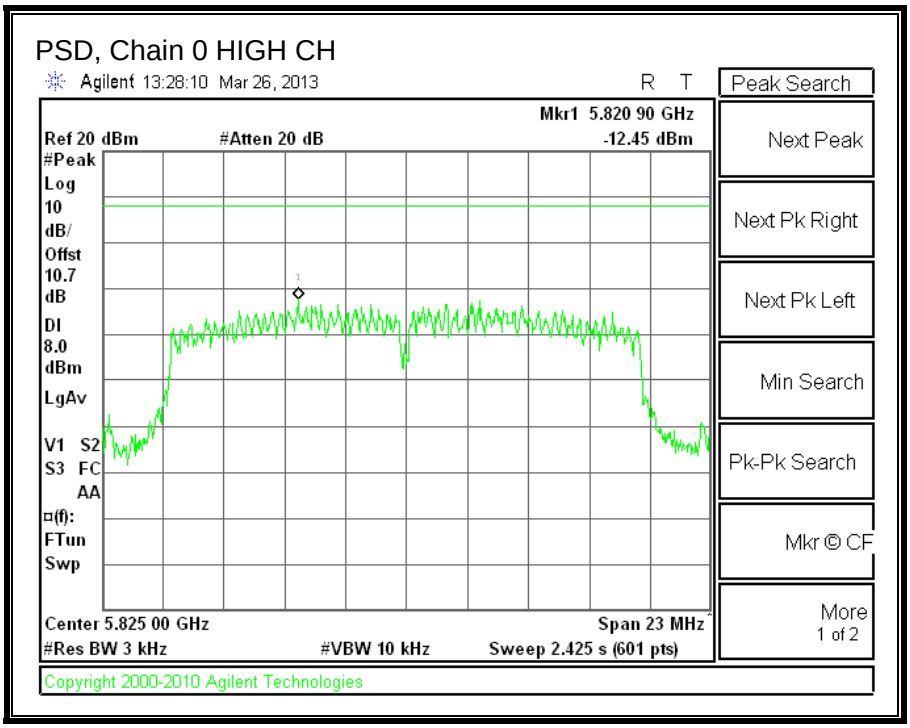
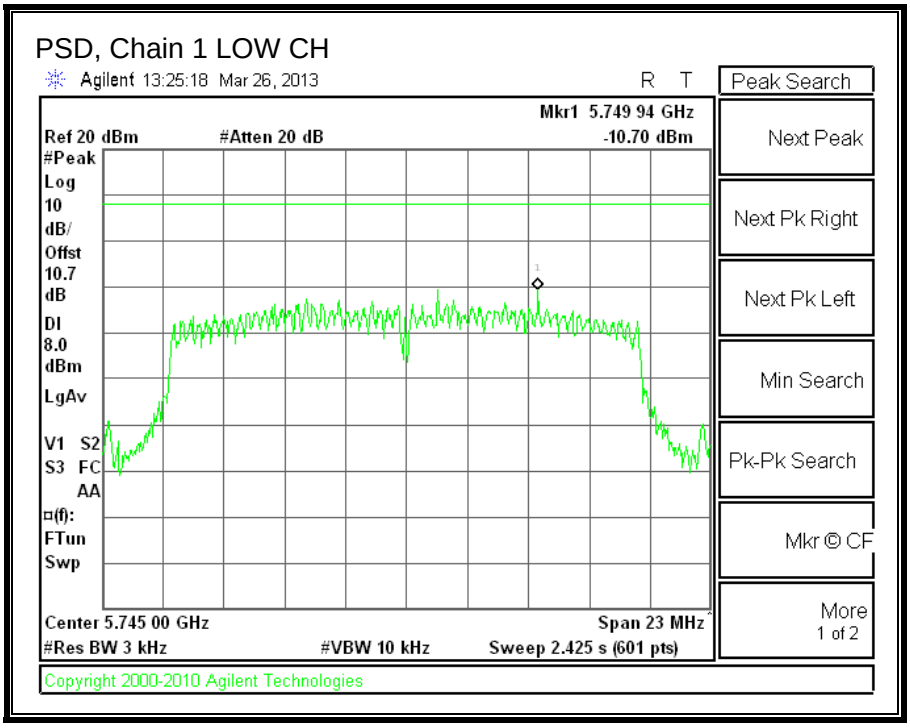


PSD, Chain 1



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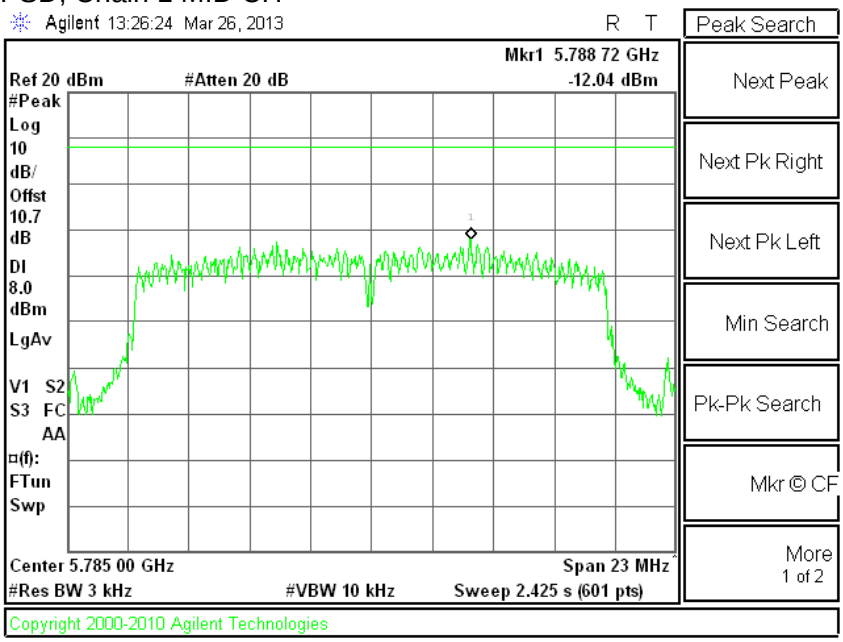
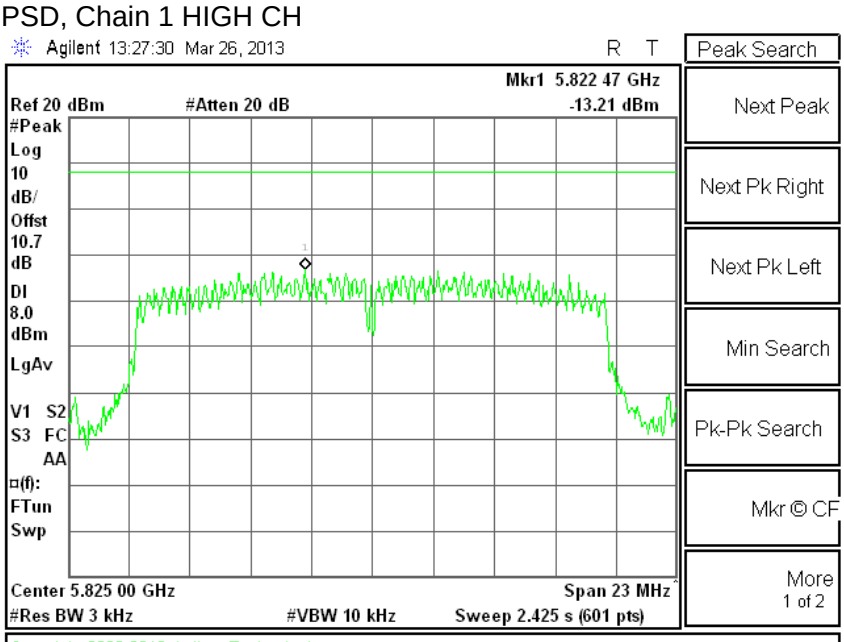
PSD, Chain 1 MID CH



PSD, Chain 1 HIGH CH



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8.8.6. OUT-OF-BAND EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the in-band reference level, bandedge (where measurements to the general radiated limits will not be made) and out-of-band emissions.

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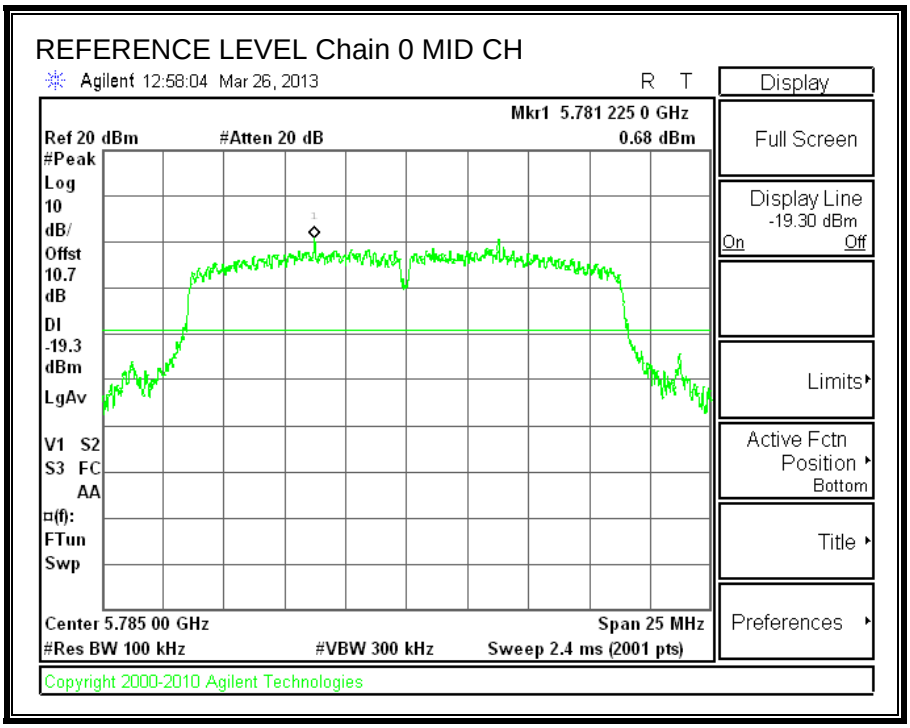
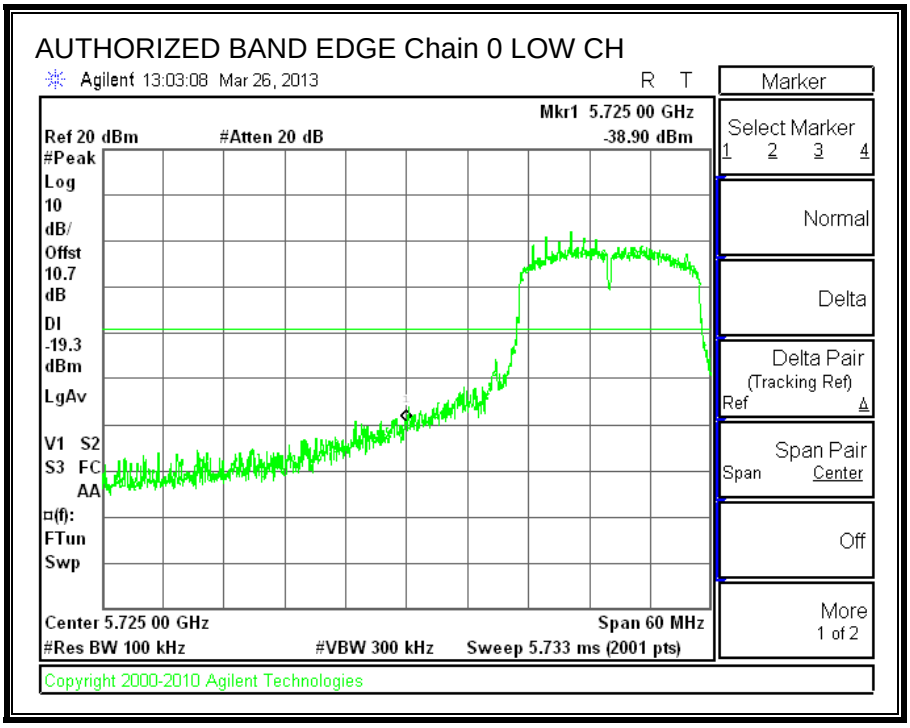
IN-BAND REFERENCE LEVEL, Chain 0



LOW CHANNEL BANDEDGE, Chain 0



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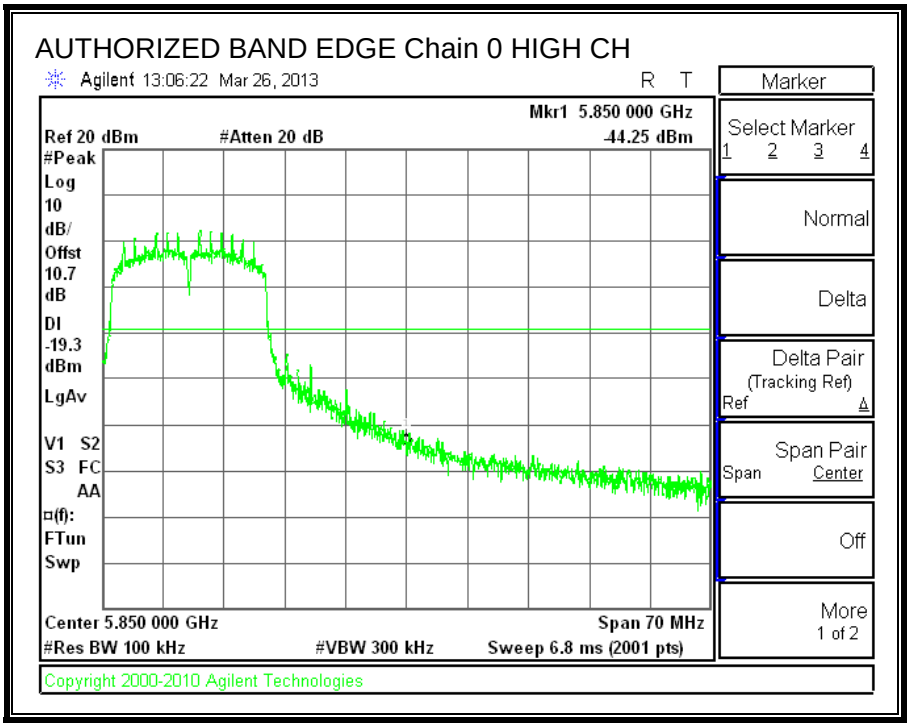
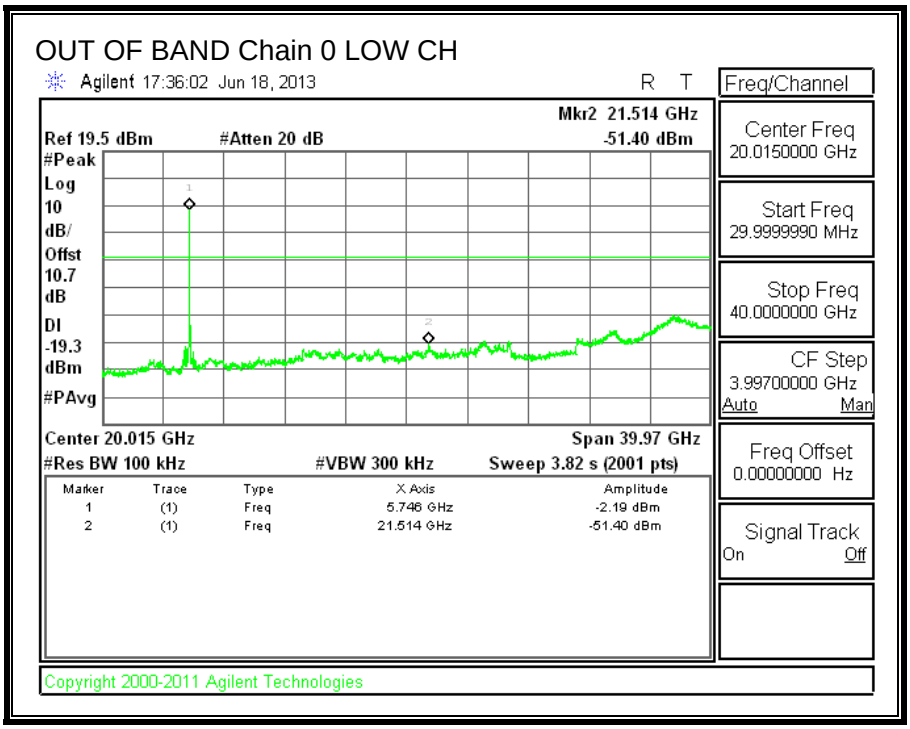
HIGH CHANNEL BANDEDGE, Chain 0



OUT-OF-BAND EMISSIONS, Chain 0



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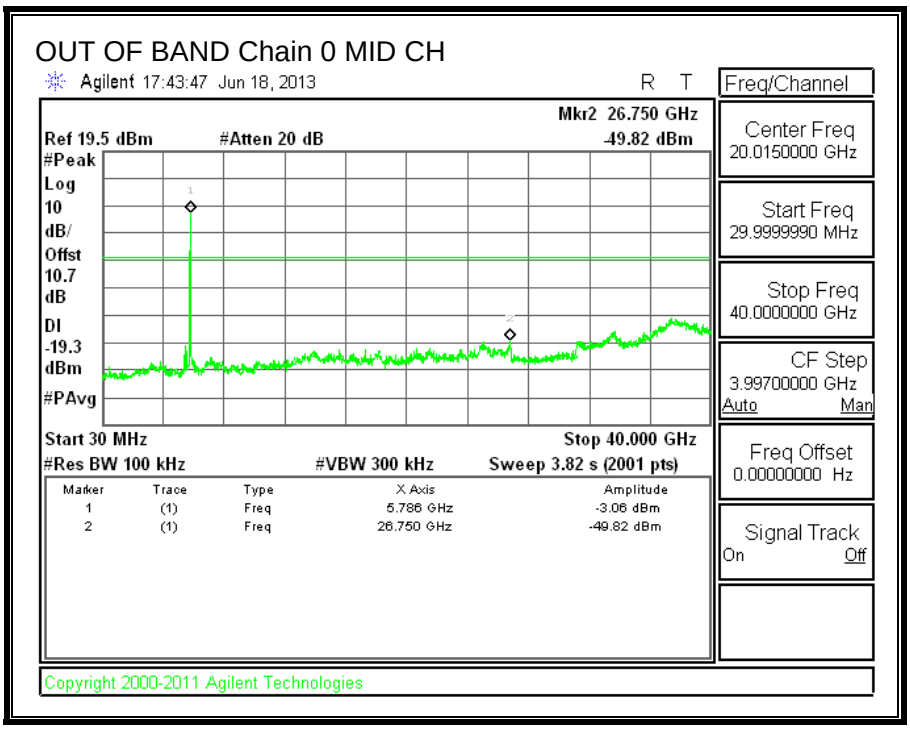
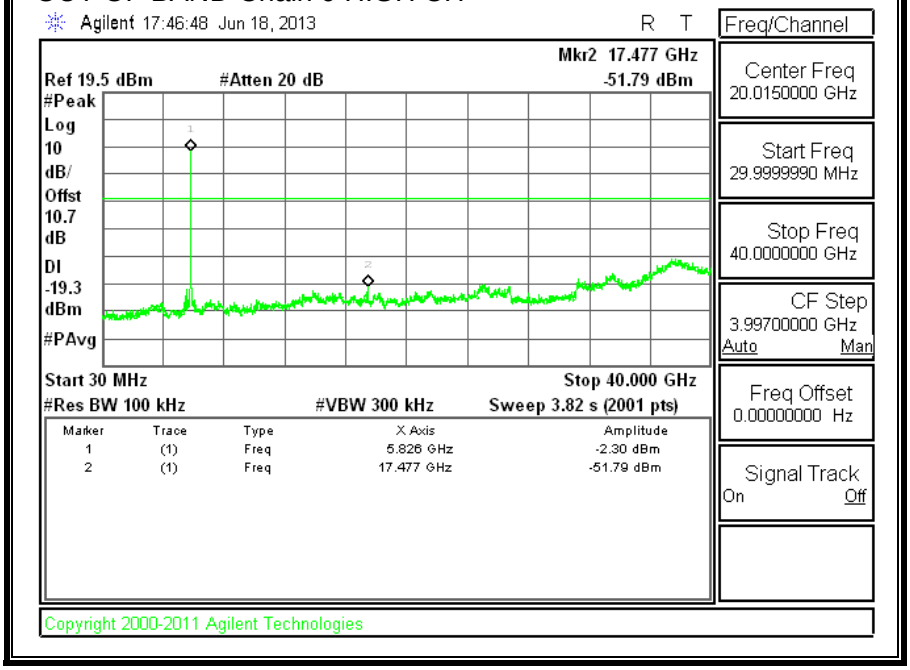
OUT OF BAND Chain 0 MID CH



OUT OF BAND Chain 0 HIGH CH



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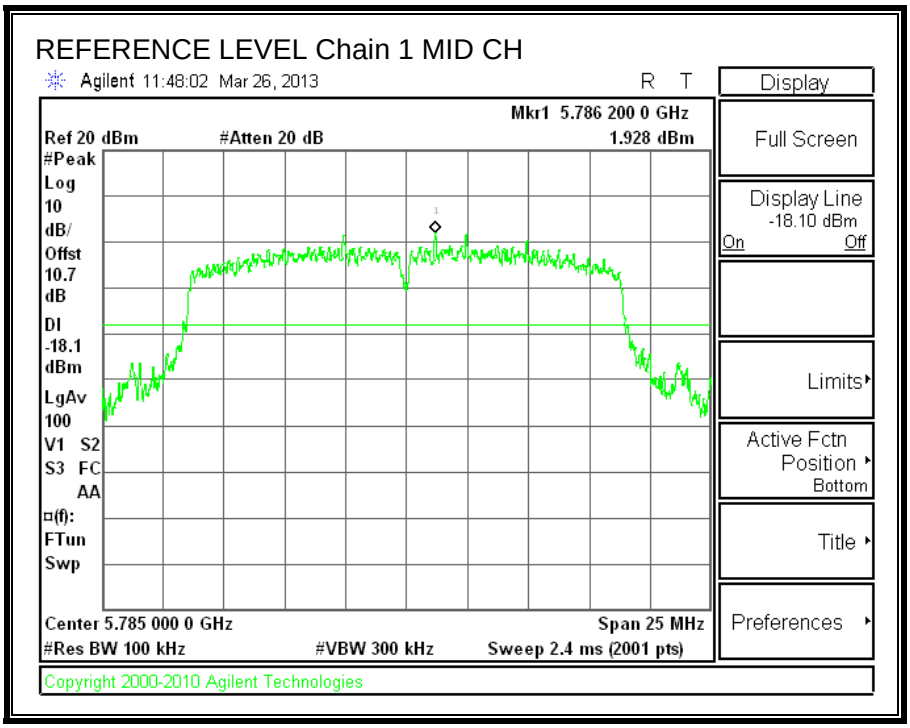
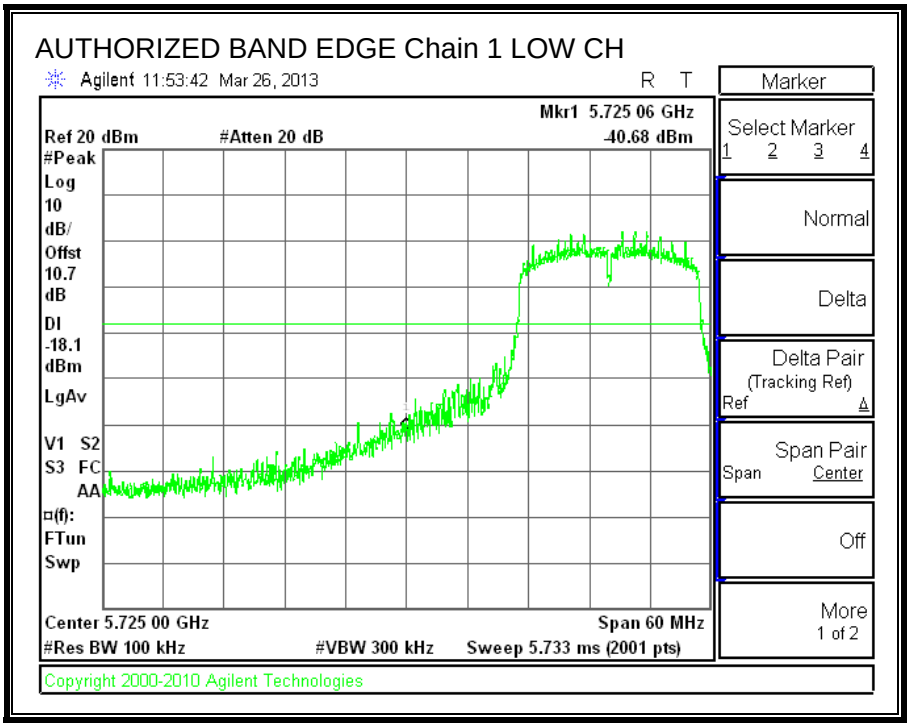
IN-BAND REFERENCE LEVEL, Chain 1



LOW CHANNEL BANDEDGE, Chain 1



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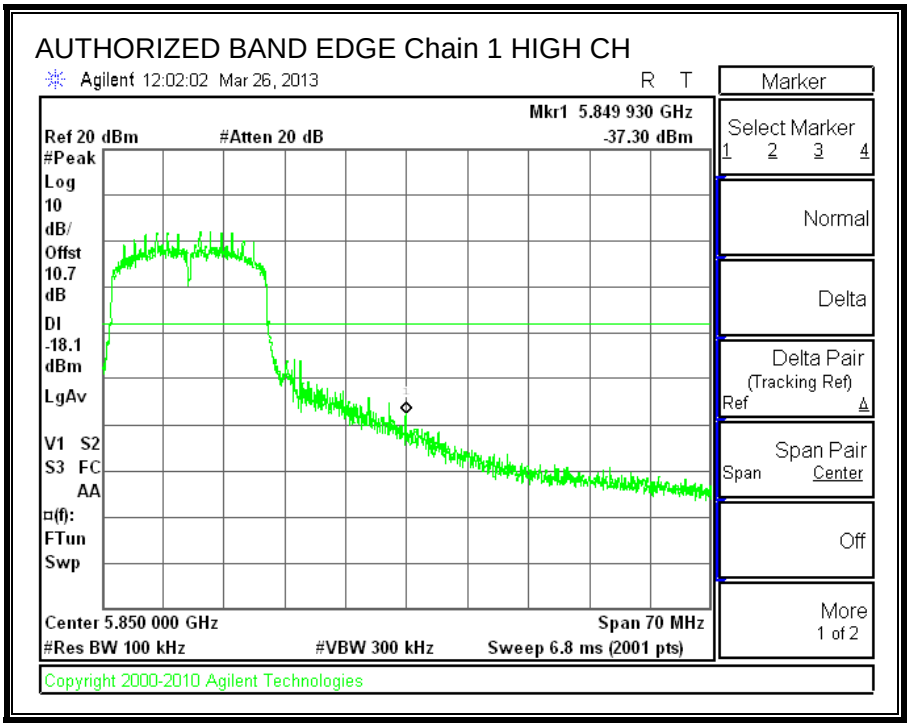
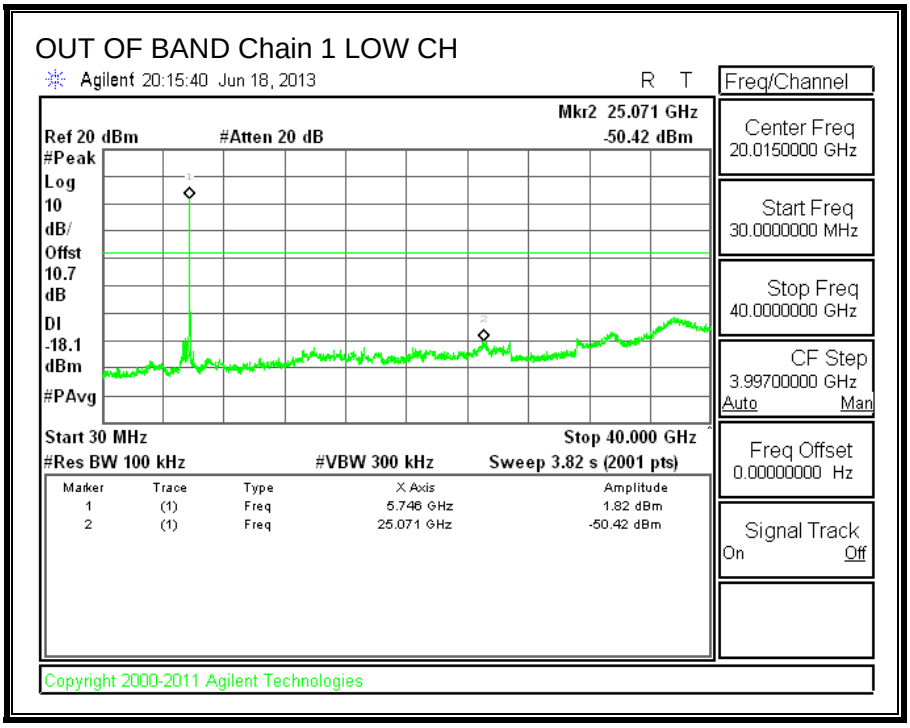
HIGH CHANNEL BANDEDGE, Chain 1





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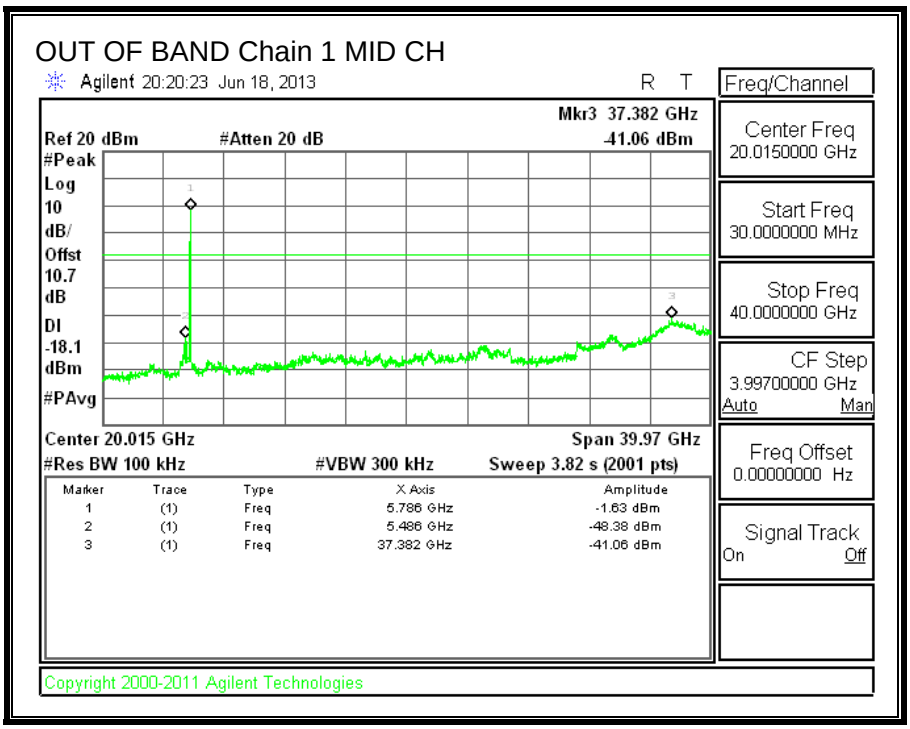
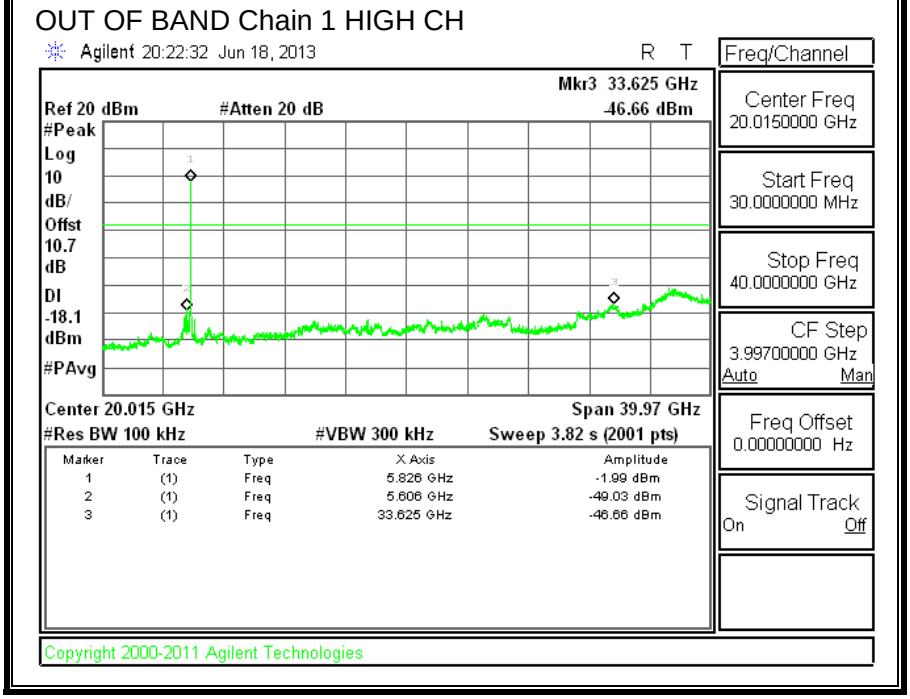
OUT OF BAND Chain 1 MID CH



OUT OF BAND Chain 1 HIGH CH



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8.9. 802.11n HT20 SDM MCS8 2TX MODE, 5.8 GHz BAND

8.9.1. 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 with the RBW set between 1% and 5% of the EBW, the VBW >= 3 x RBW, peak detector and max hold.

RESULTS

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low	5745	15.330	16.040	0.5
Mid	5785	15.100	16.440	0.5
High	5825	15.220	16.440	0.5

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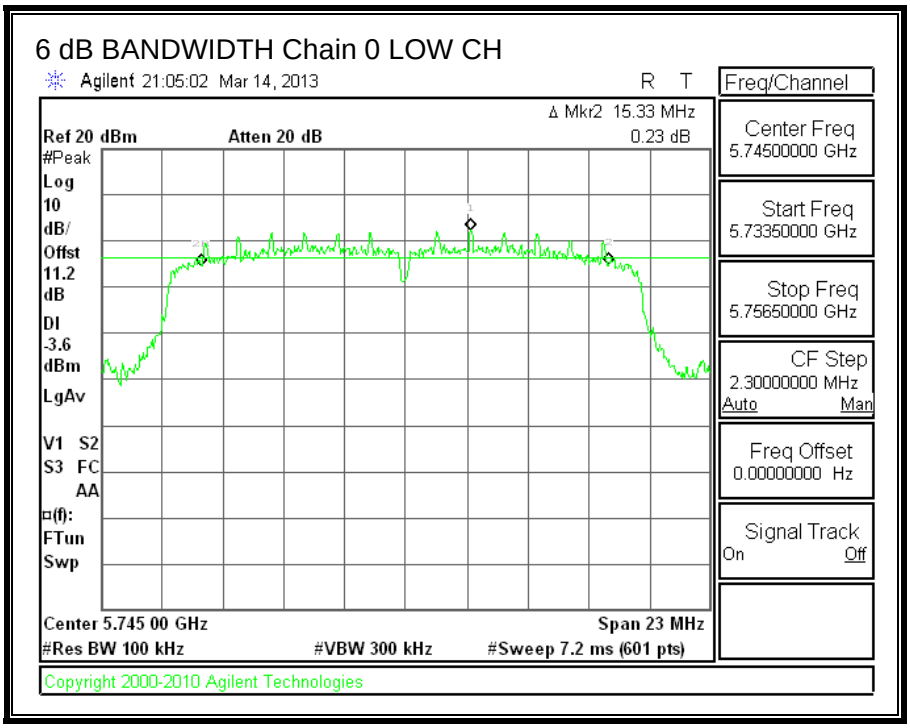
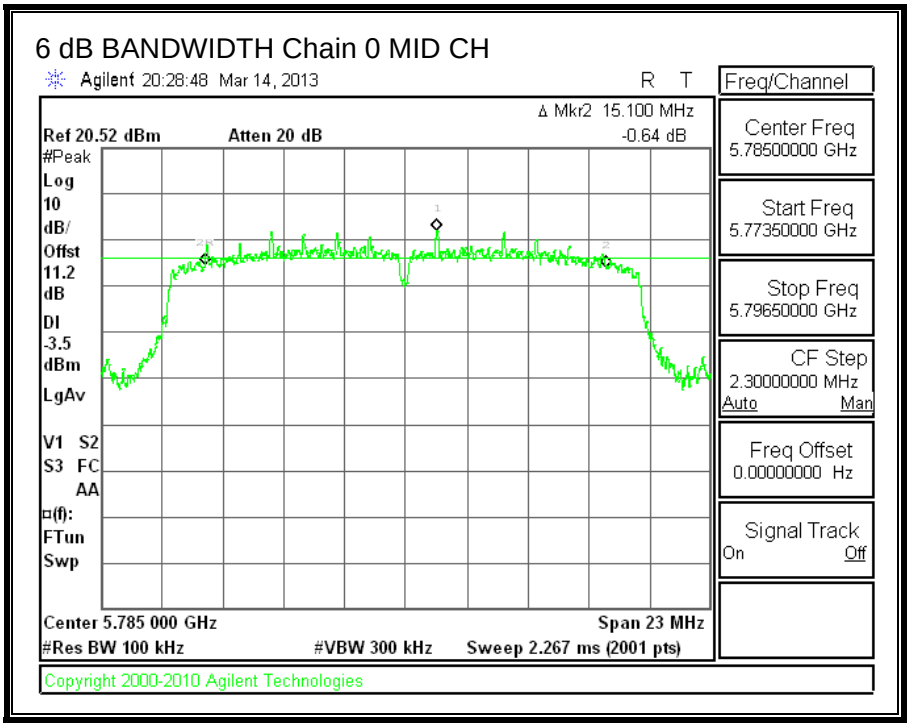
6 dB BANDWIDTH, Chain 0





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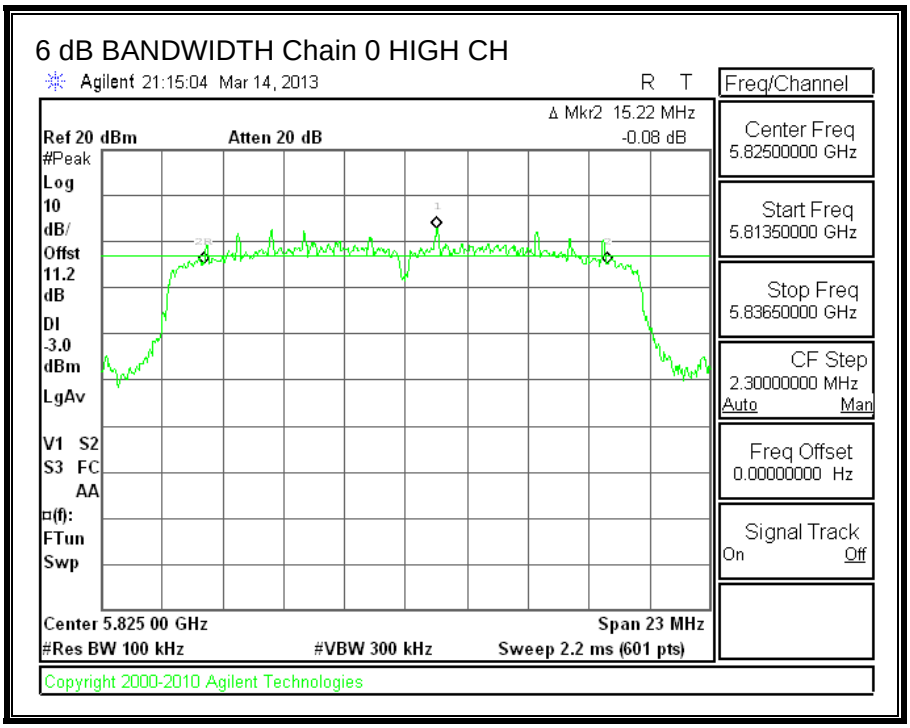
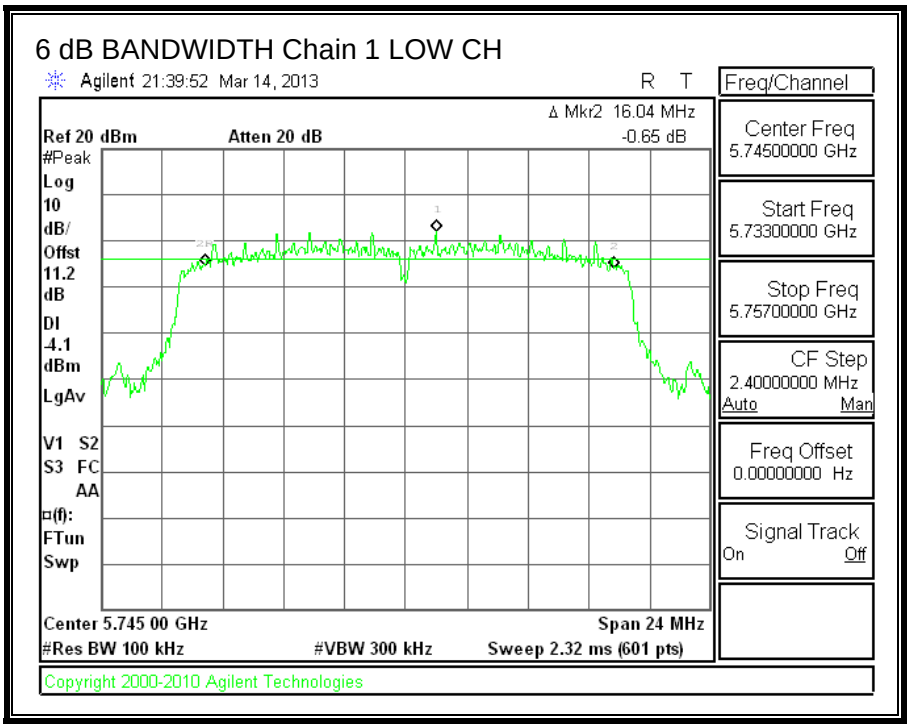


6 dB BANDWIDTH, Chain 1



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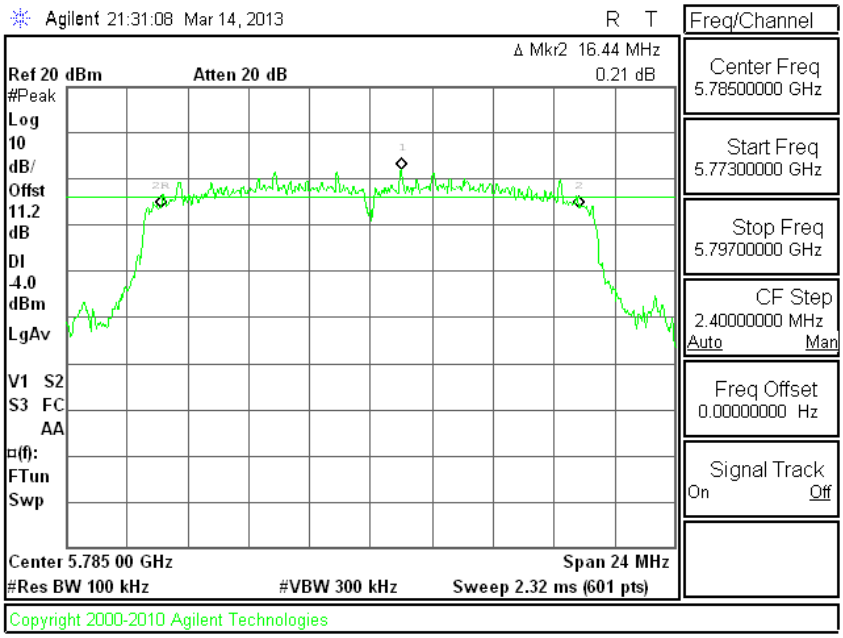
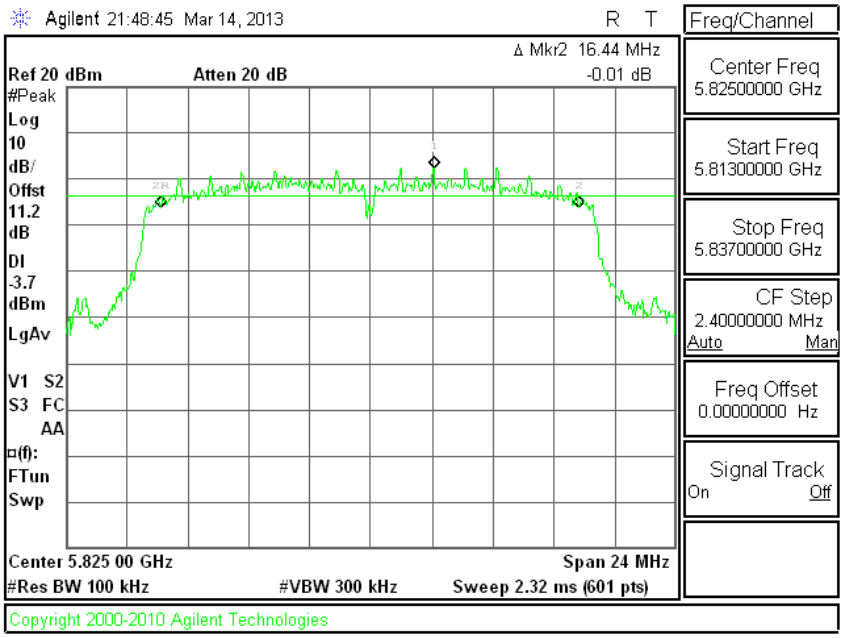
6 dB BANDWIDTH Chain 1 MID CH



6 dB BANDWIDTH Chain 1 HIGH CH



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8.9.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)
Low	5745	17.4557	17.4497
Mid	5785	17.4786	17.4662
High	5825	17.5111	17.4625

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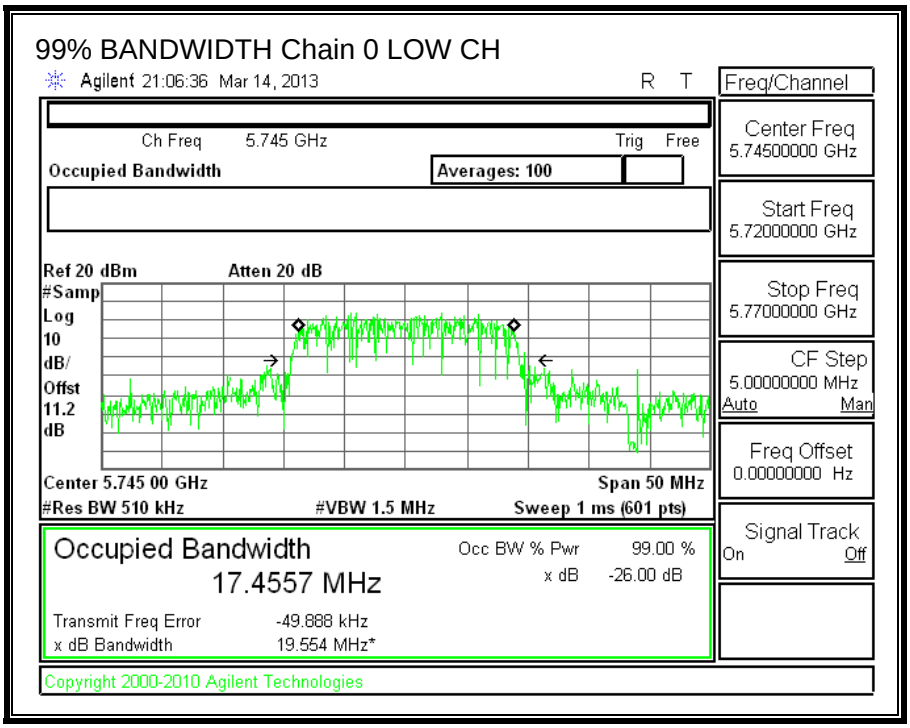
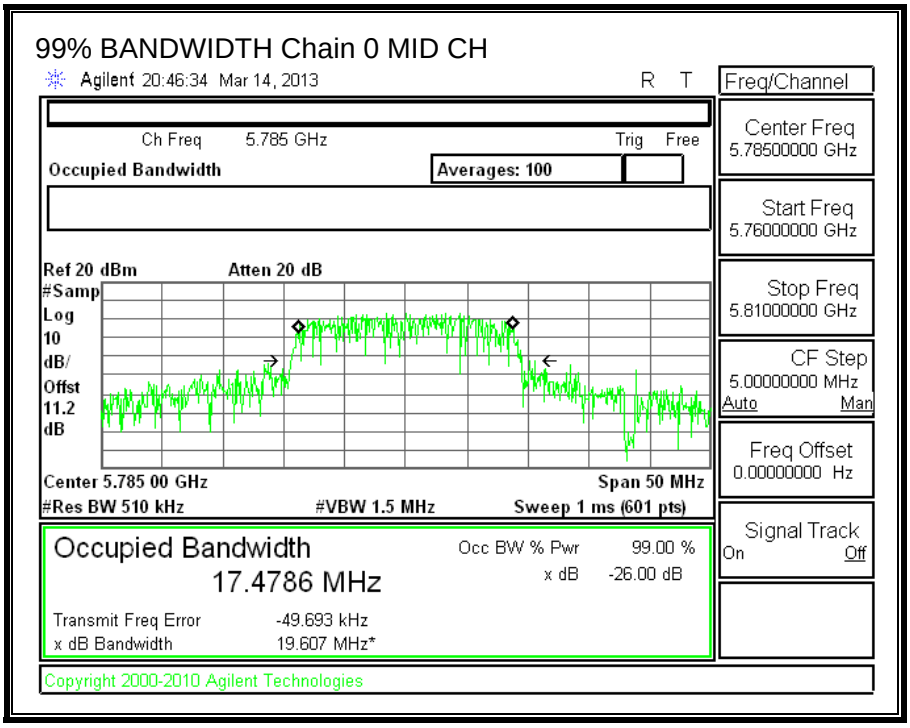
99% BANDWIDTH, Chain 0





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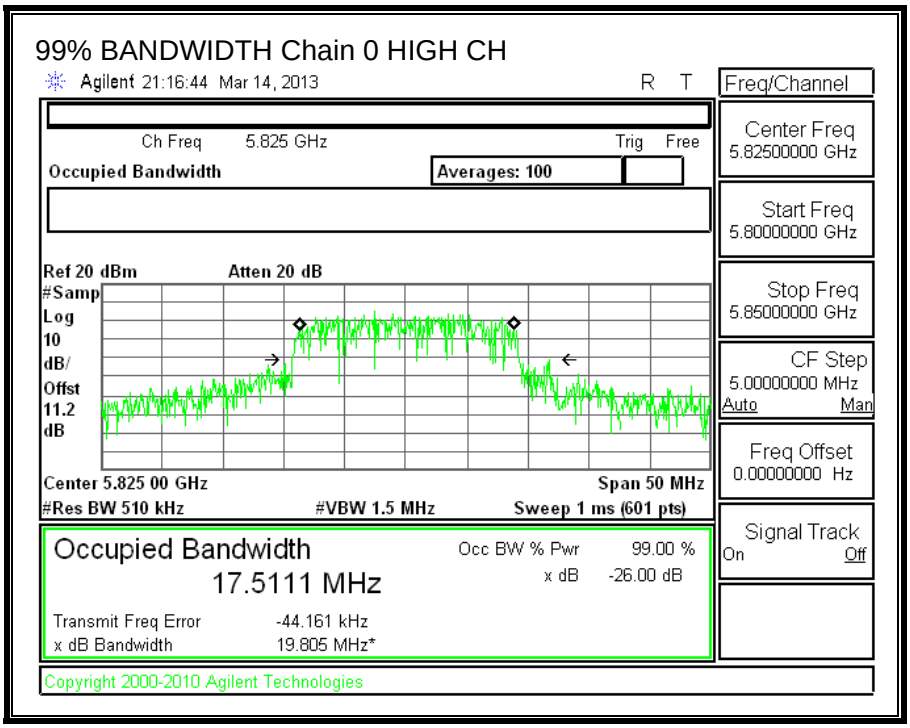
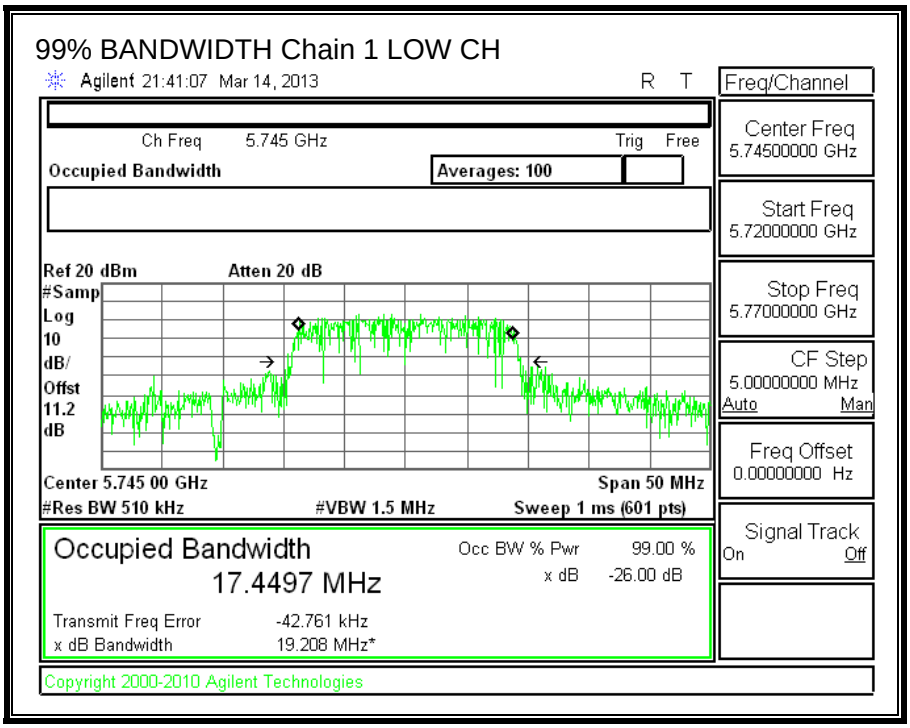


99% BANDWIDTH, Chain 1



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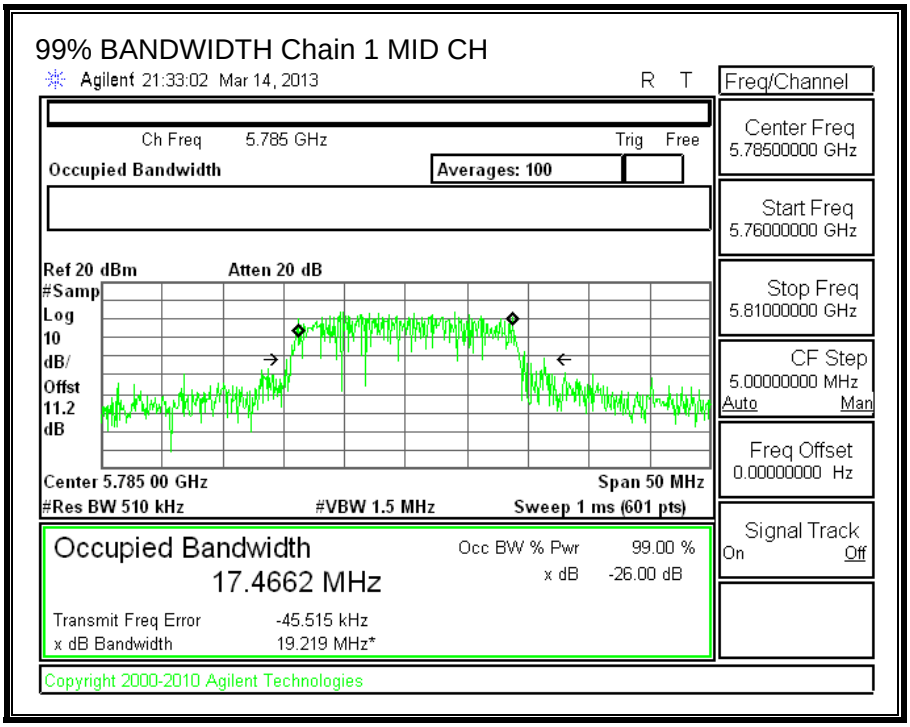

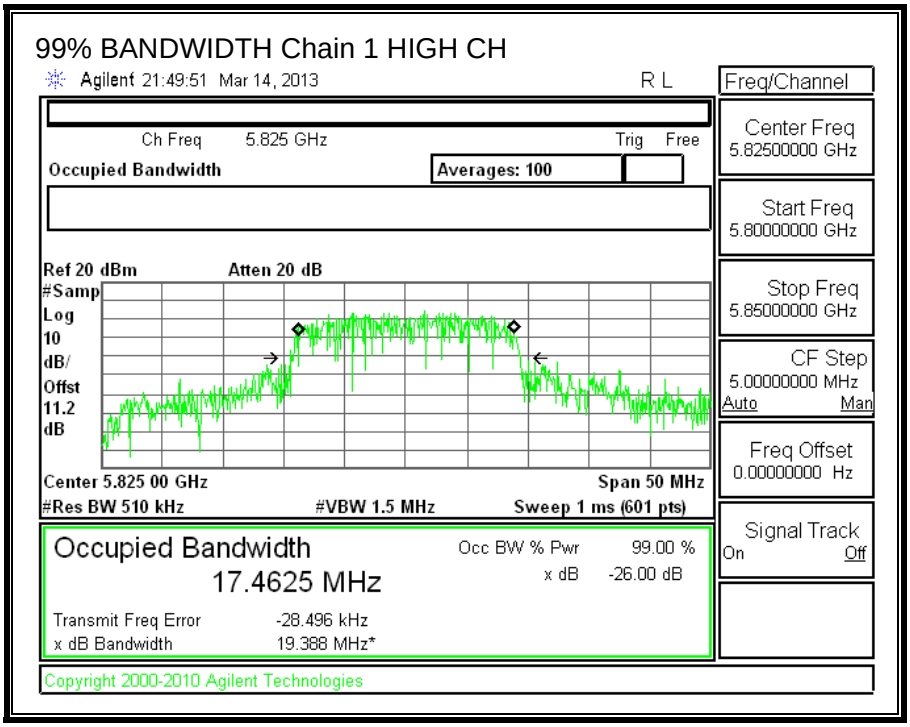

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8.9.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

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

RESULTS

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
Low	5745	12.00	12.20	15.11
Mid	5785	12.00	12.10	15.06
High	5825	11.90	12.10	15.01

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8.9.4. OUTPUT POWER

LIMITS

FCC §15.247

IC RSS-210 A8.4

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain.

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
4.00	4.00	4.00

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RESULTS

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	5745	4.00	30.00	30	36	30.00
Mid	5785	4.00	30.00	30	36	30.00
High	5825	4.00	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margi (dB)
Low	5745	20.06	20.60	23.35	30.00	-6.65
Mid	5785	20.36	20.70	23.54	30.00	-6.46
High	5825	20.43	21.09	23.78	30.00	-6.22

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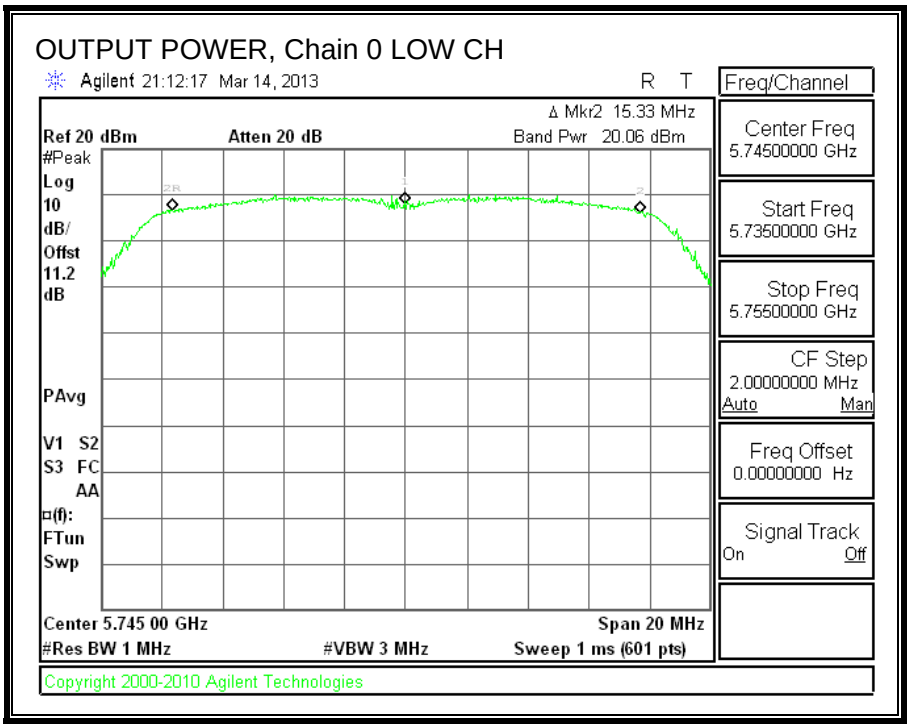
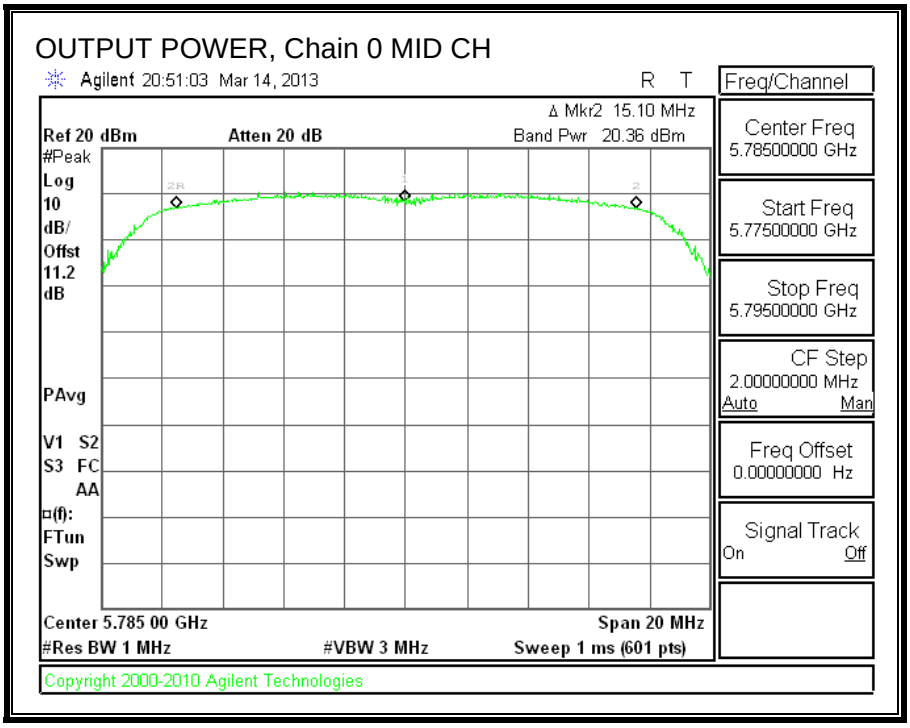
OUTPUT POWER, Chain 0





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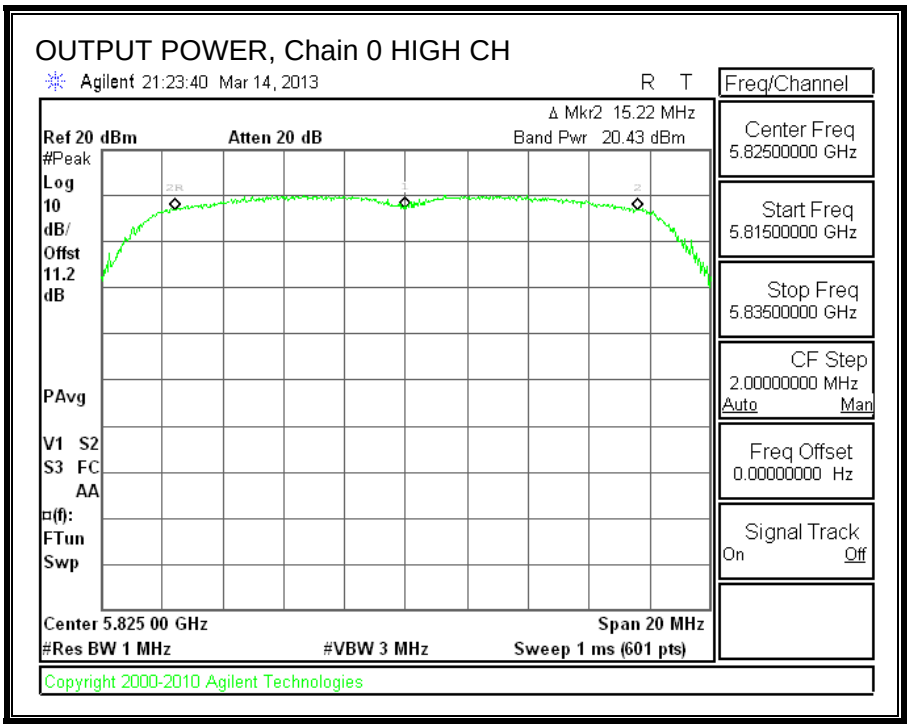
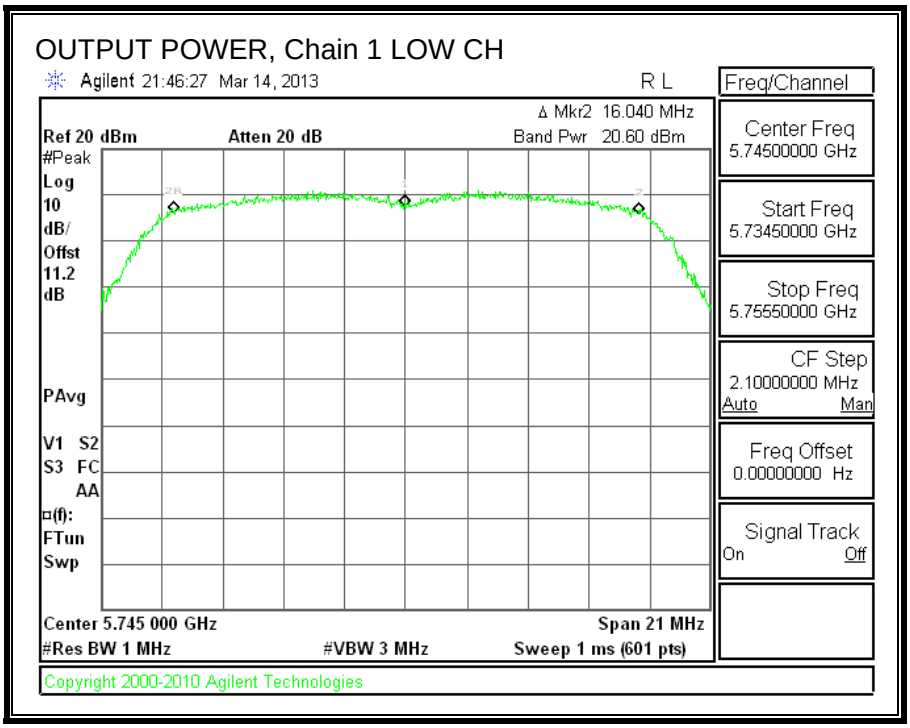


OUTPUT POWER, Chain 1



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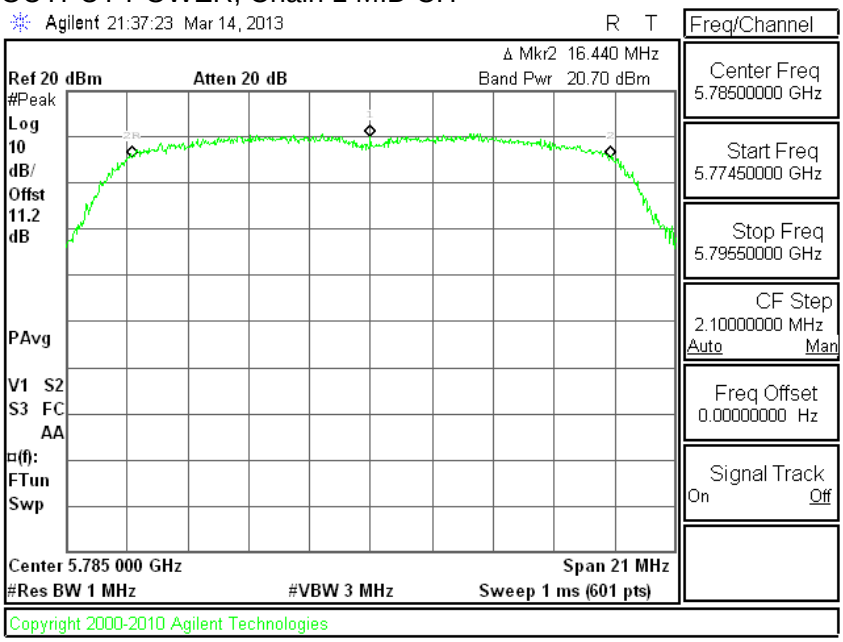
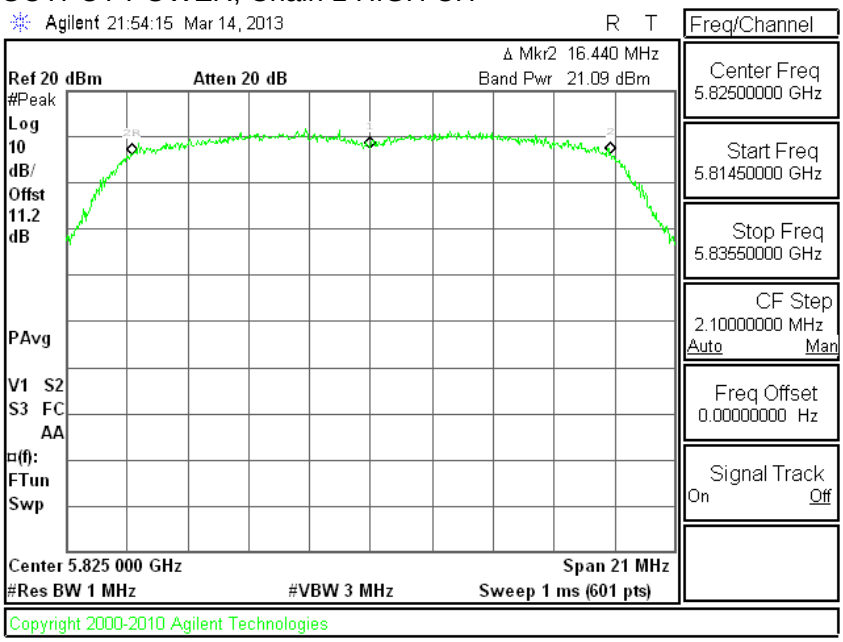
OUTPUT POWER, Chain 1 MID CH



OUTPUT POWER, Chain 1 HIGH CH



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8.9.5. PSD

LIMITS

FCC §15.247

IC RSS-210 A8.2

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.

RESULTS

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Chain 1 Meas (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	5745	-12.51	-12.60	-9.54	8.0	-17.5
Mid	5785	-12.40	-11.26	-8.78	8.0	-16.8
High	5825	-11.16	-11.14	-8.14	8.0	-16.1

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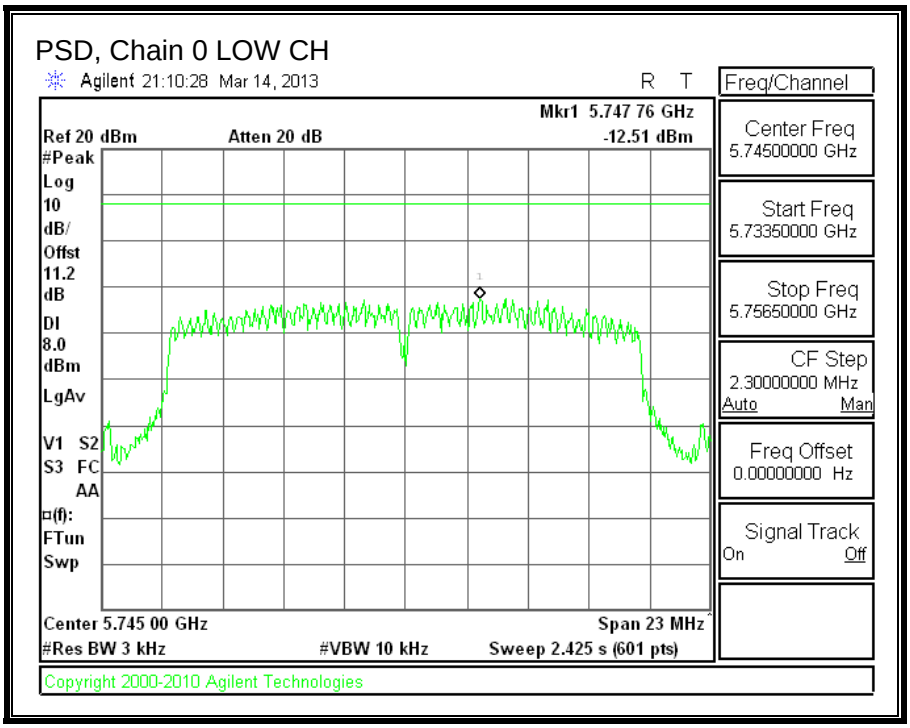
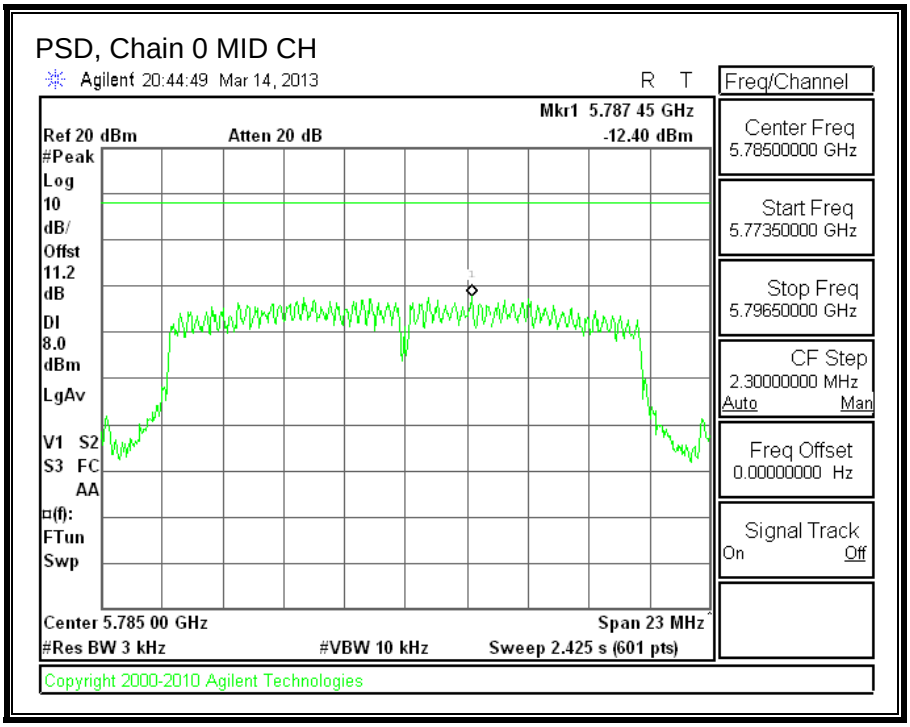
PSD, Chain 0





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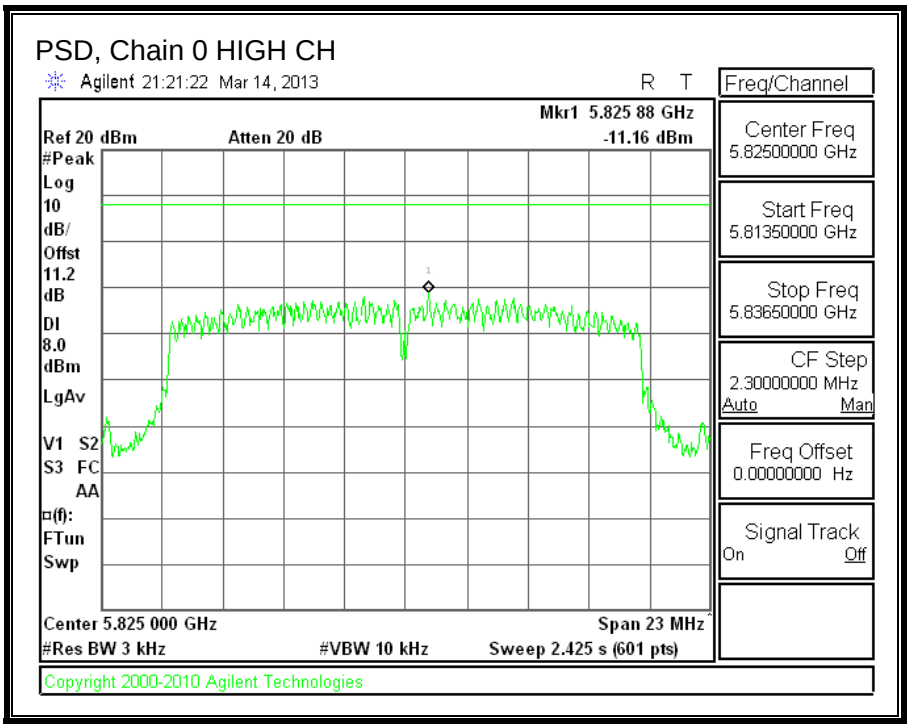
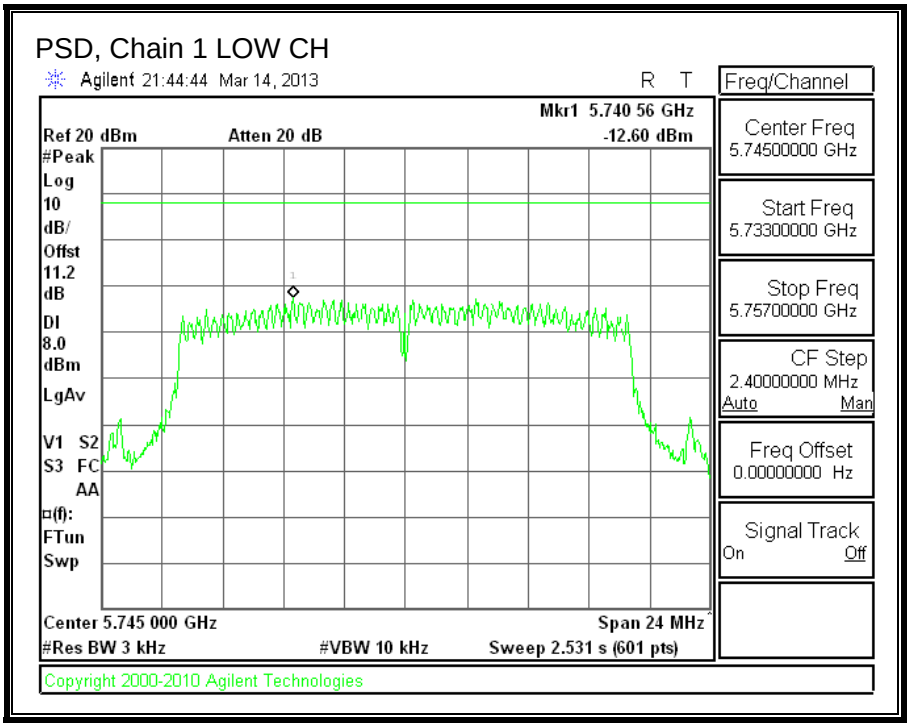


PSD, Chain 1



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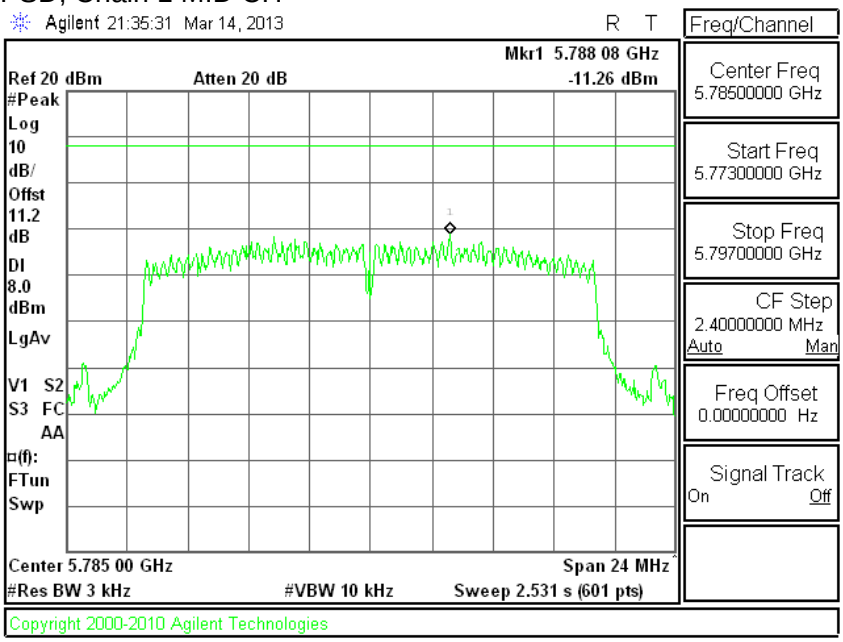
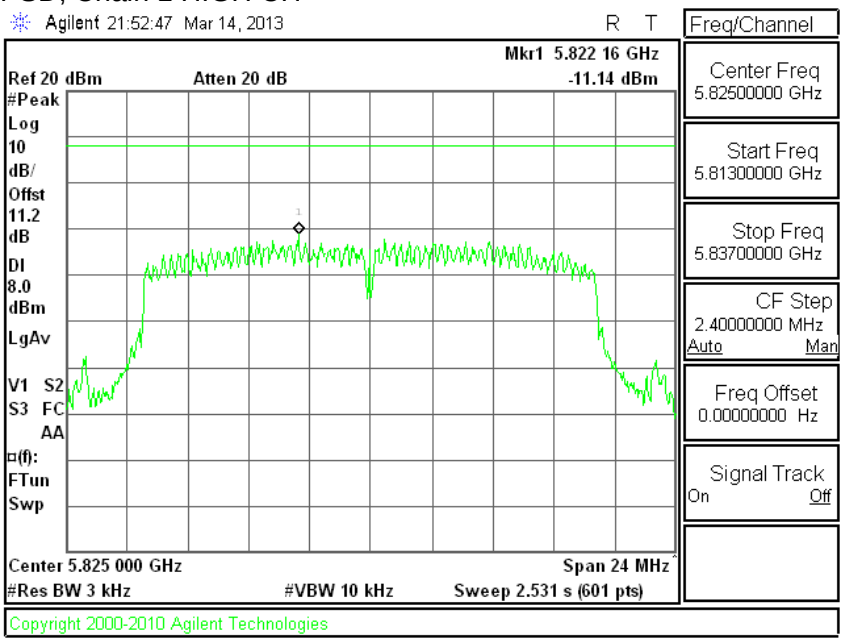
PSD, Chain 1 MID CH



PSD, Chain 1 HIGH CH



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8.9.6. OUT-OF-BAND EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the in-band reference level, bandedge (where measurements to the general radiated limits will not be made) and out-of-band emissions.

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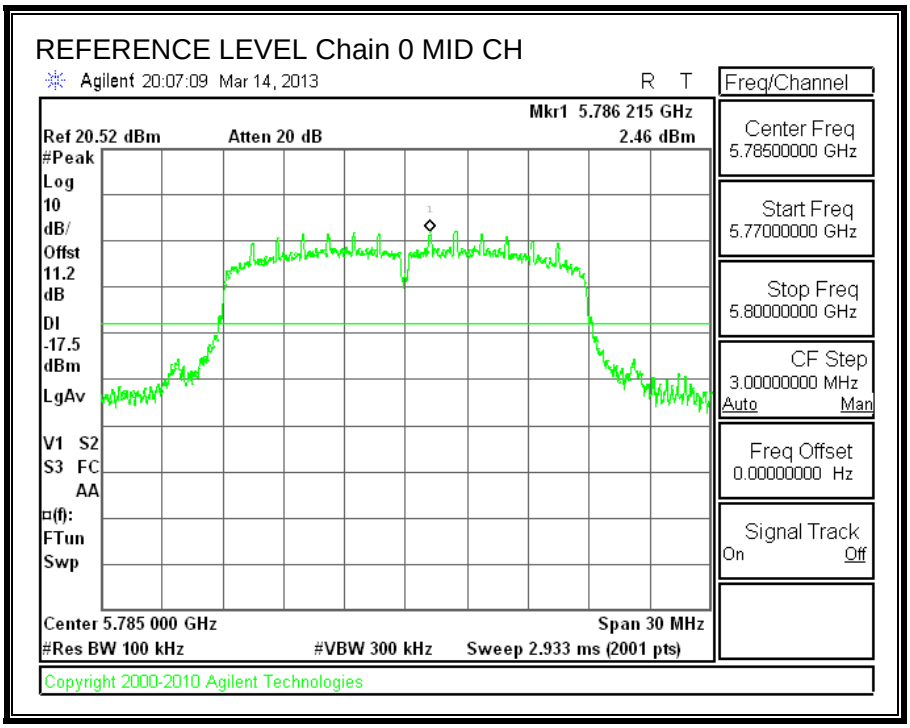
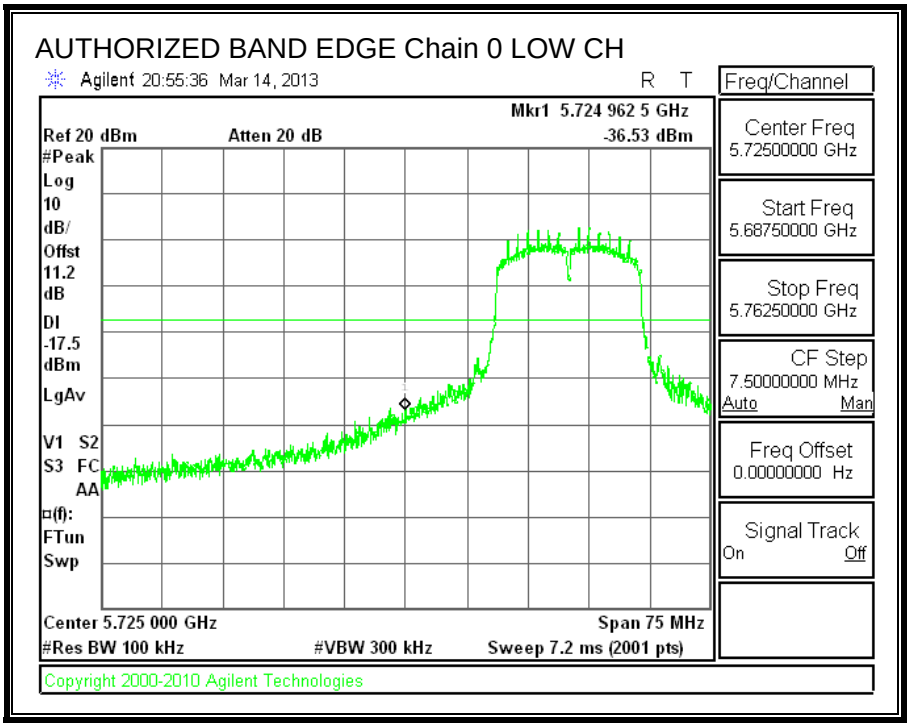
IN-BAND REFERENCE LEVEL, Chain 0



LOW CHANNEL BANDEDGE, Chain 0



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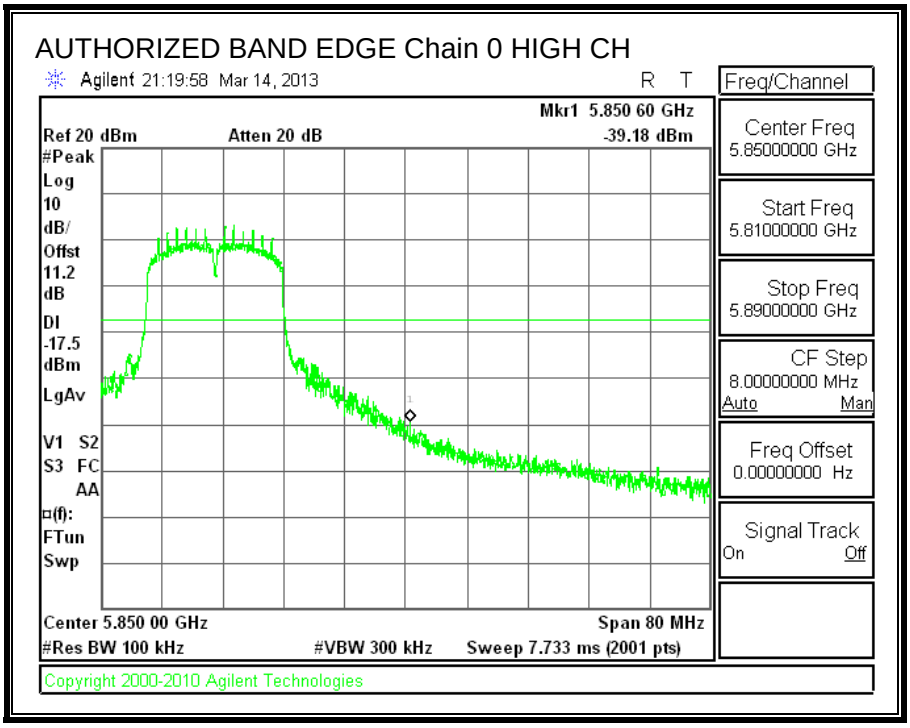
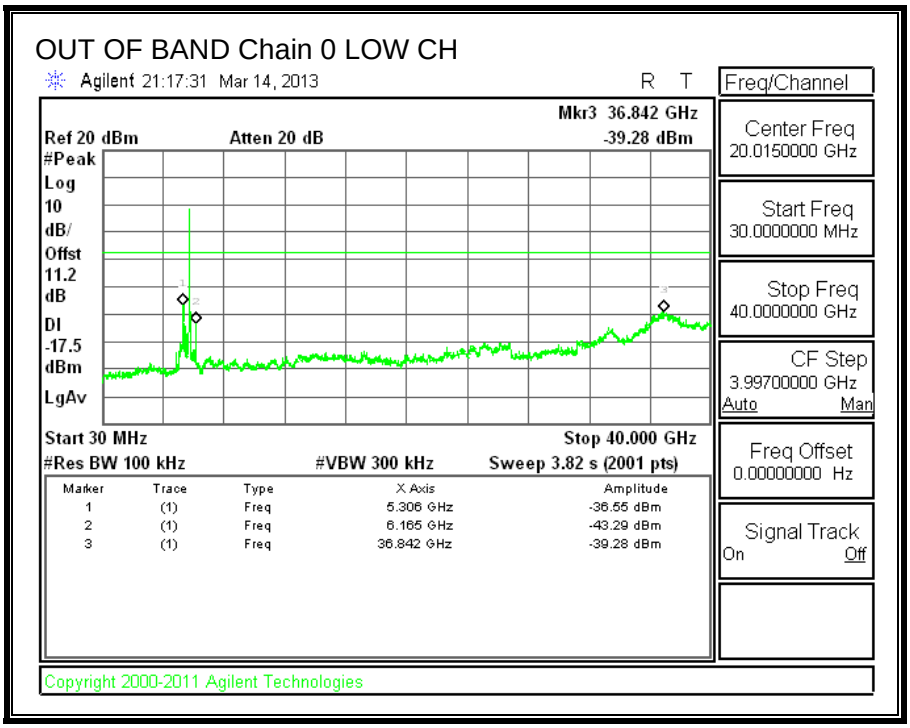
HIGH CHANNEL BANDEDGE, Chain 0



OUT-OF-BAND EMISSIONS, Chain 0



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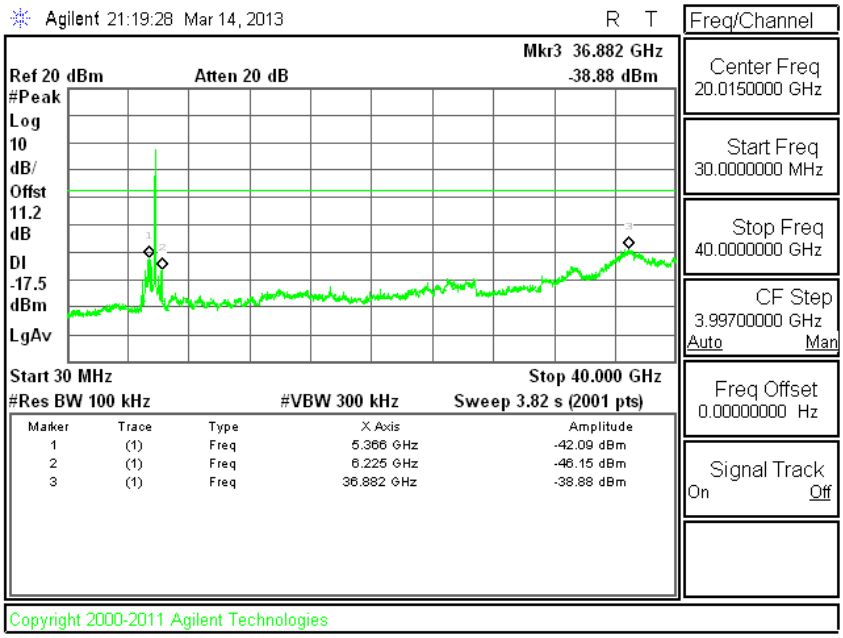
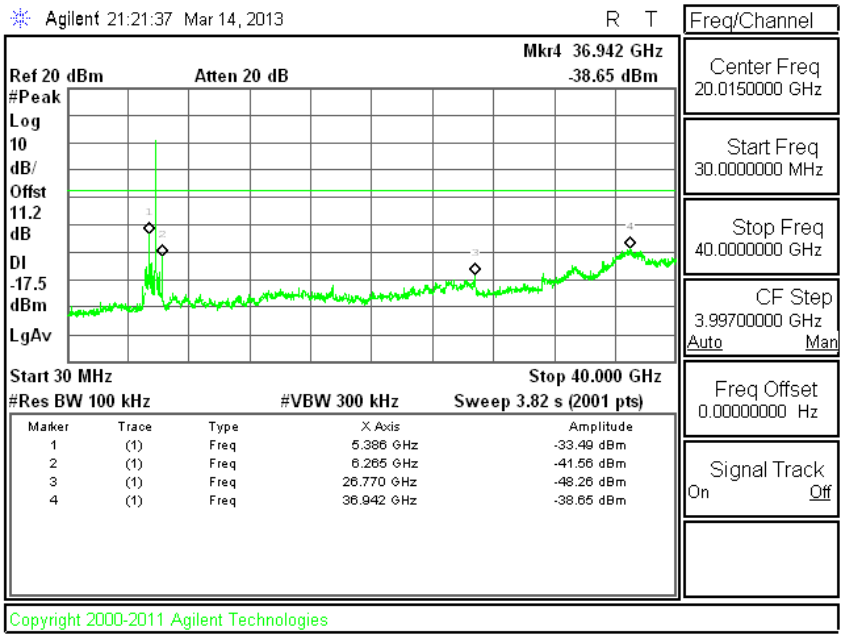
OUT OF BAND Chain 0 MID CH



OUT OF BAND Chain 0 HIGH CH



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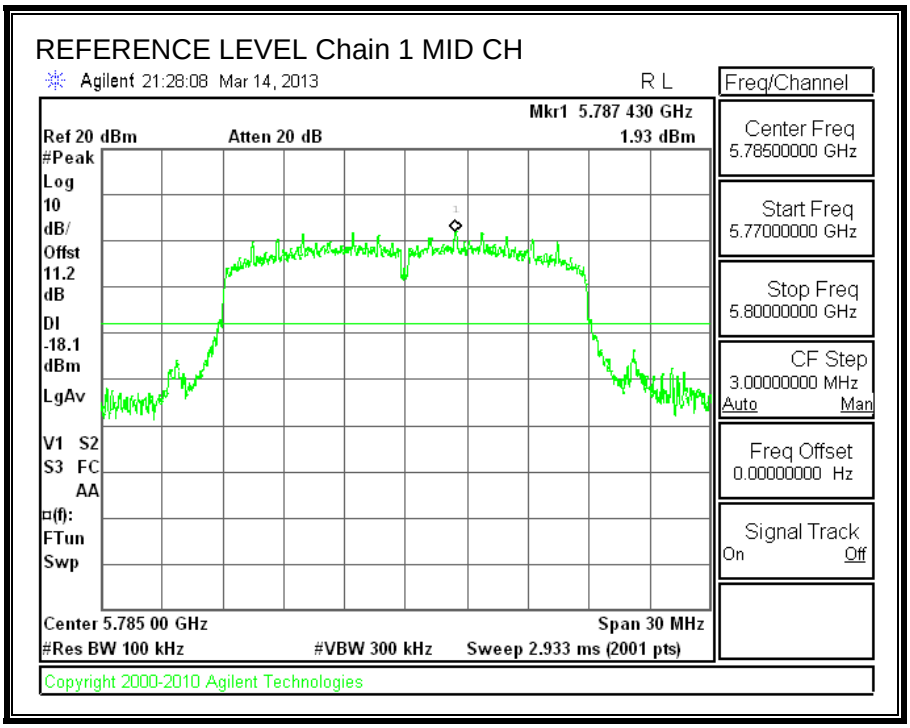
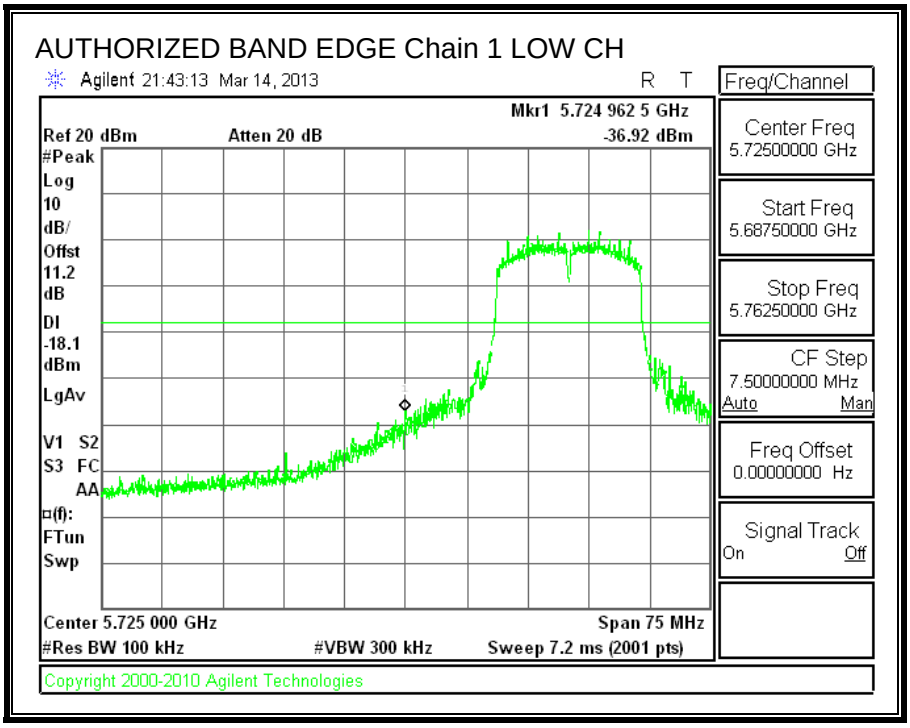
IN-BAND REFERENCE LEVEL, Chain 1



LOW CHANNEL BANDEDGE, Chain 1



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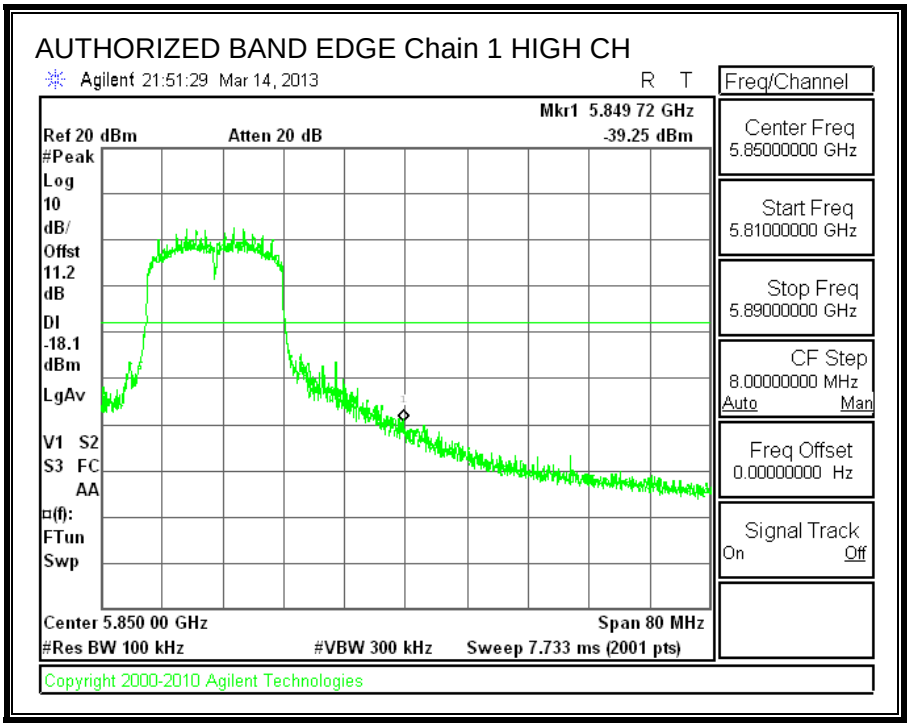
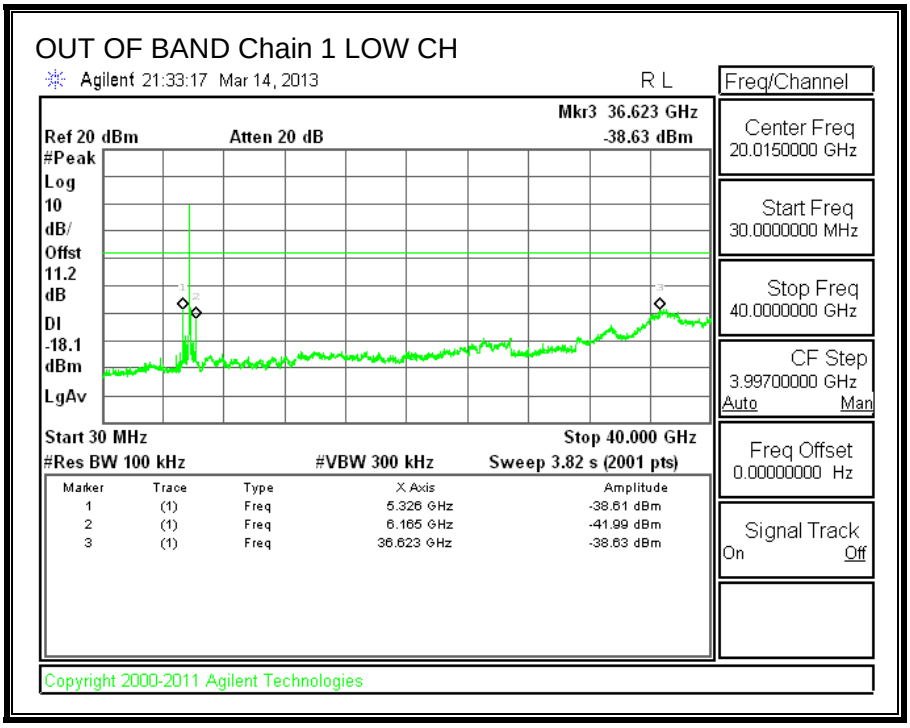
HIGH CHANNEL BANDEDGE, Chain 1





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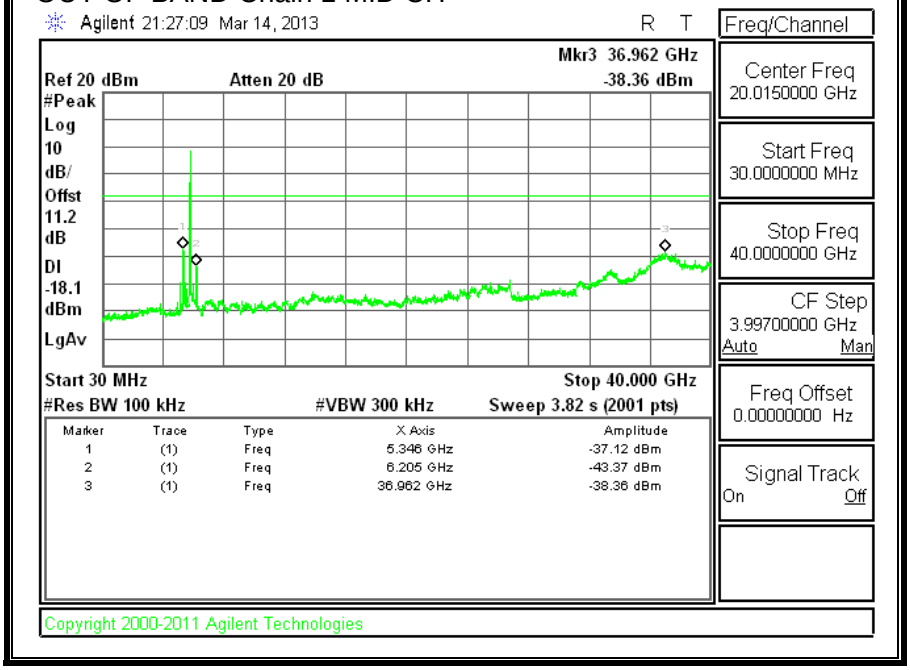
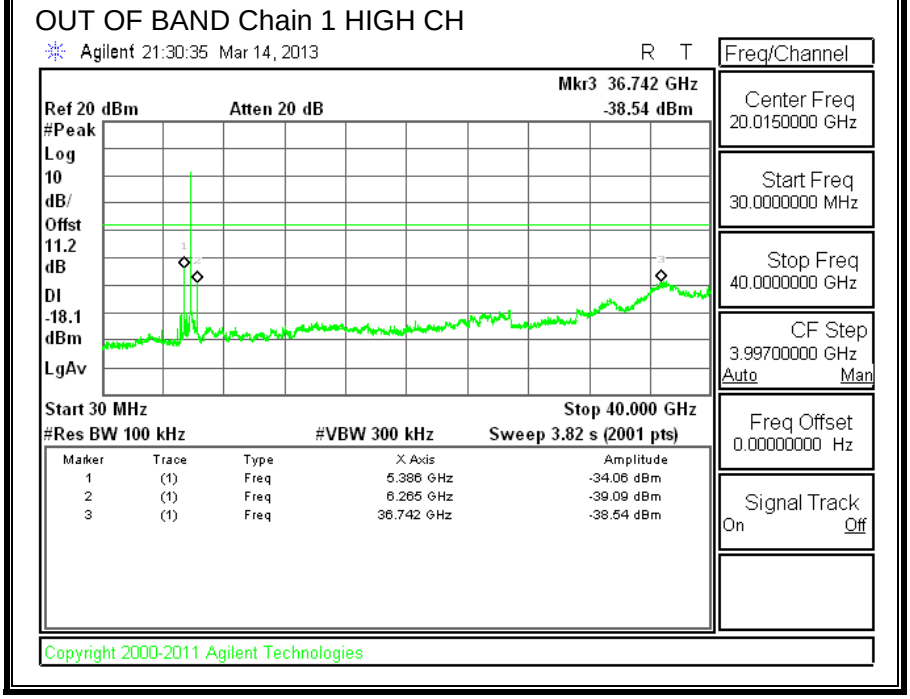
OUT OF BAND Chain 1 MID CH



OUT OF BAND Chain 1 HIGH CH



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8.10. 802.11n HT40 CDD 2TX MODE, 5.8 GHz BAND

8.10.1. 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 with the RBW set between 1% and 5% of the EBW, the VBW >= 3 x RBW, peak detector and max hold.

RESULTS

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low	5755	36.210	36.210	0.5
High	5795	36.300	36.200	0.5

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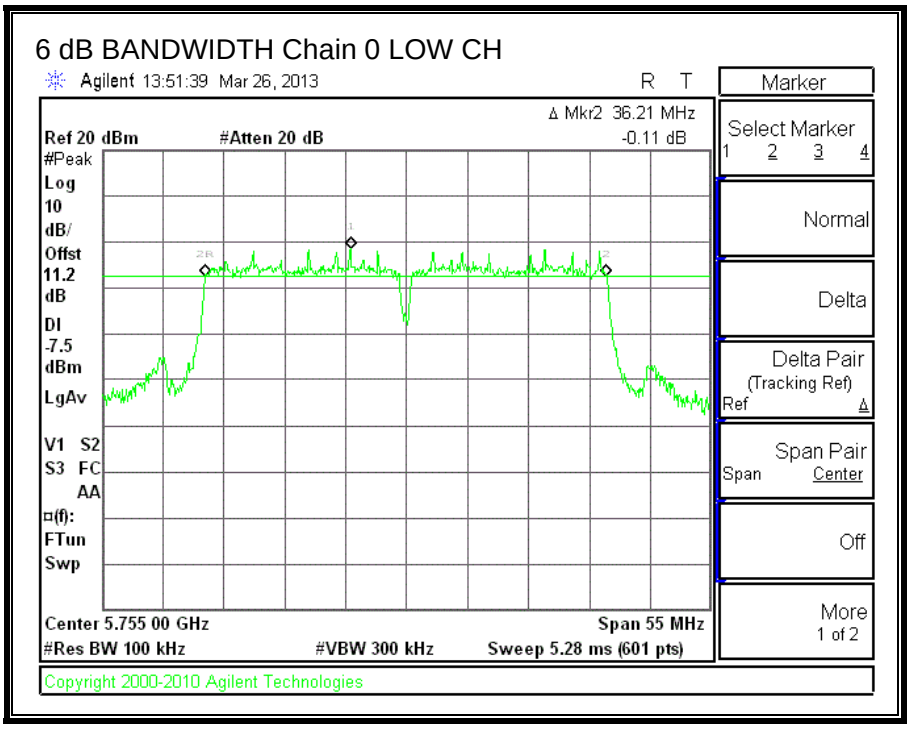
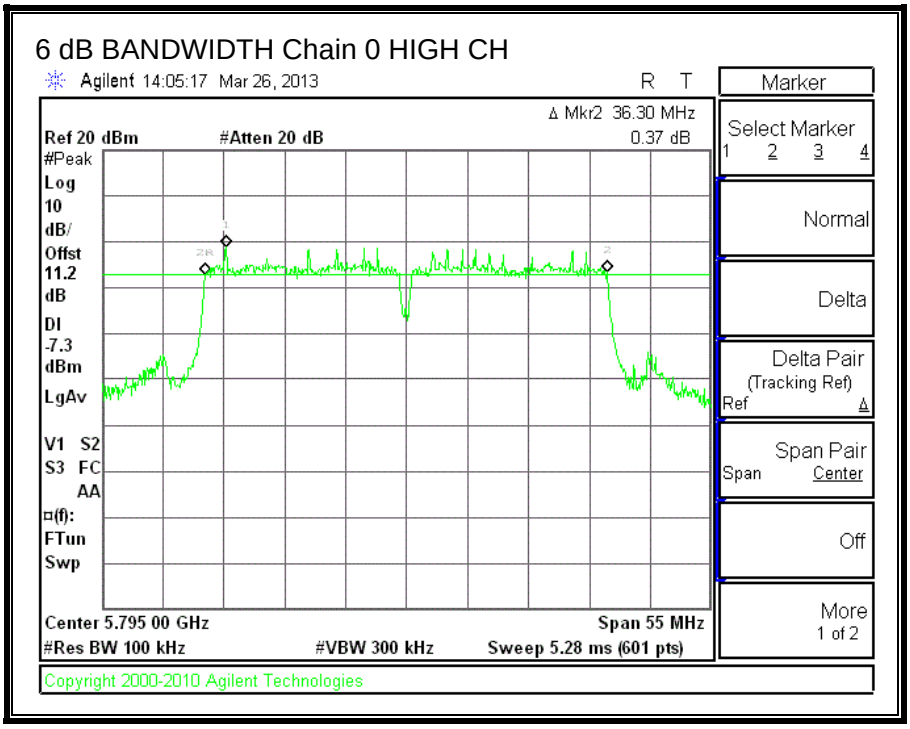
6 dB BANDWIDTH, Chain 0





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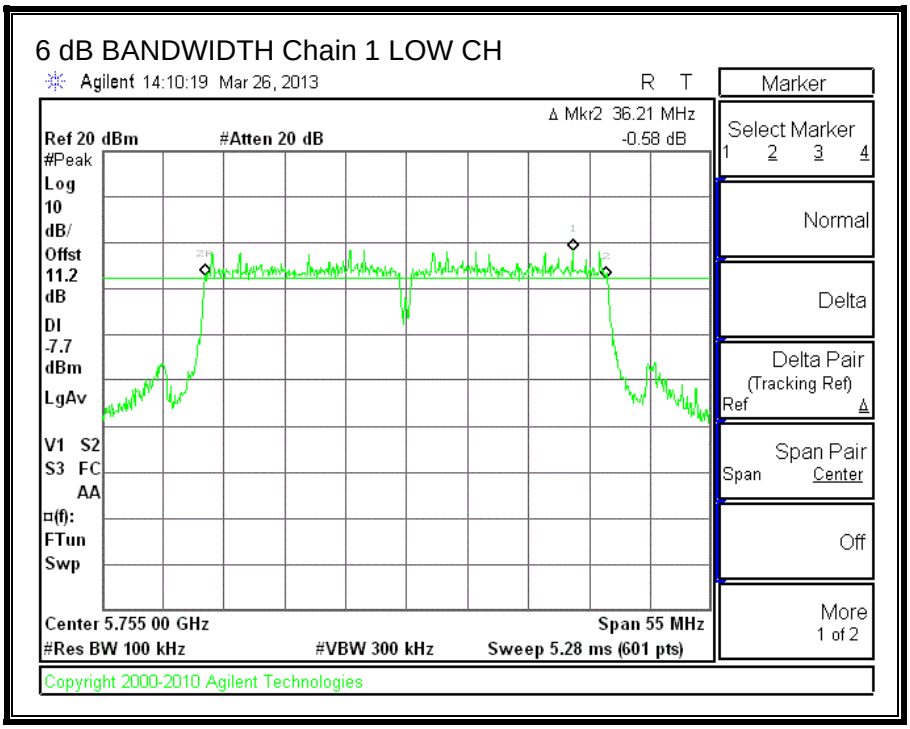
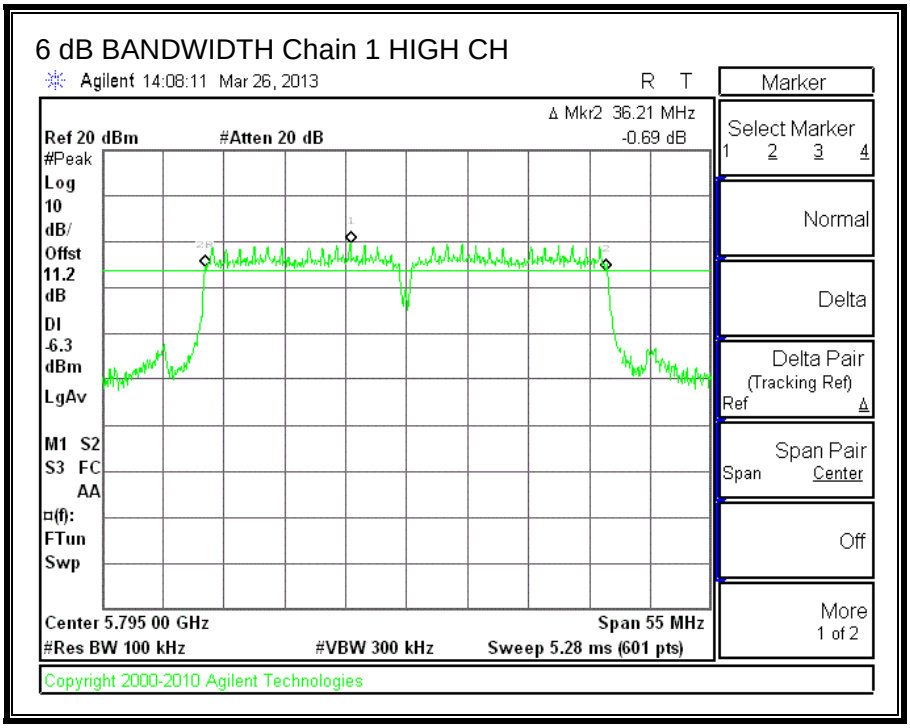
6 dB BANDWIDTH, Chain 1





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8.10.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)
Low	5755	36.1406	36.1352
High	5795	36.1109	36.1519

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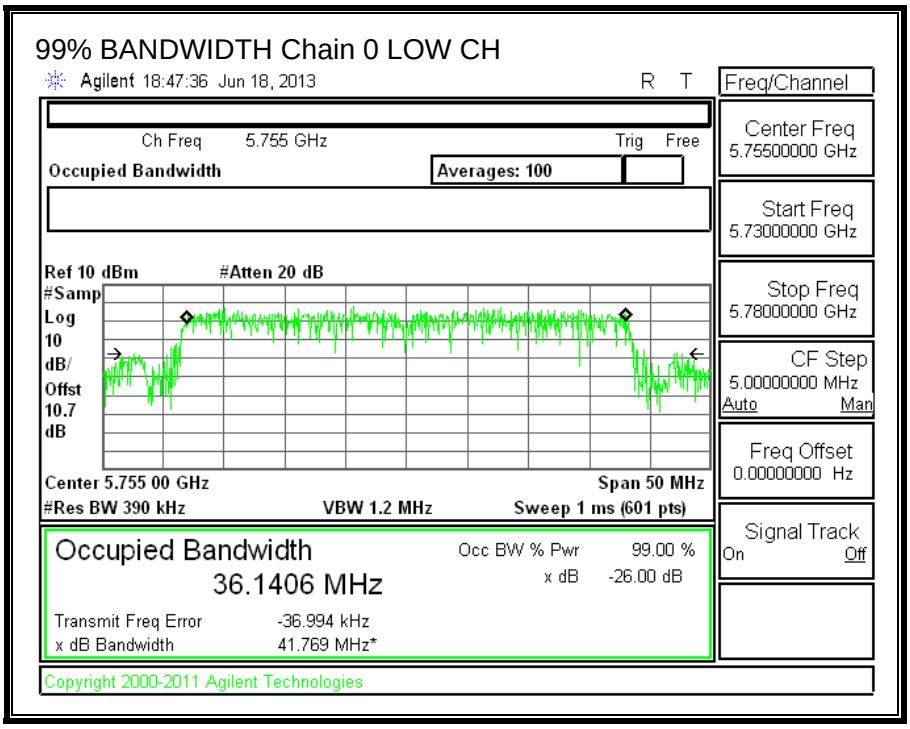
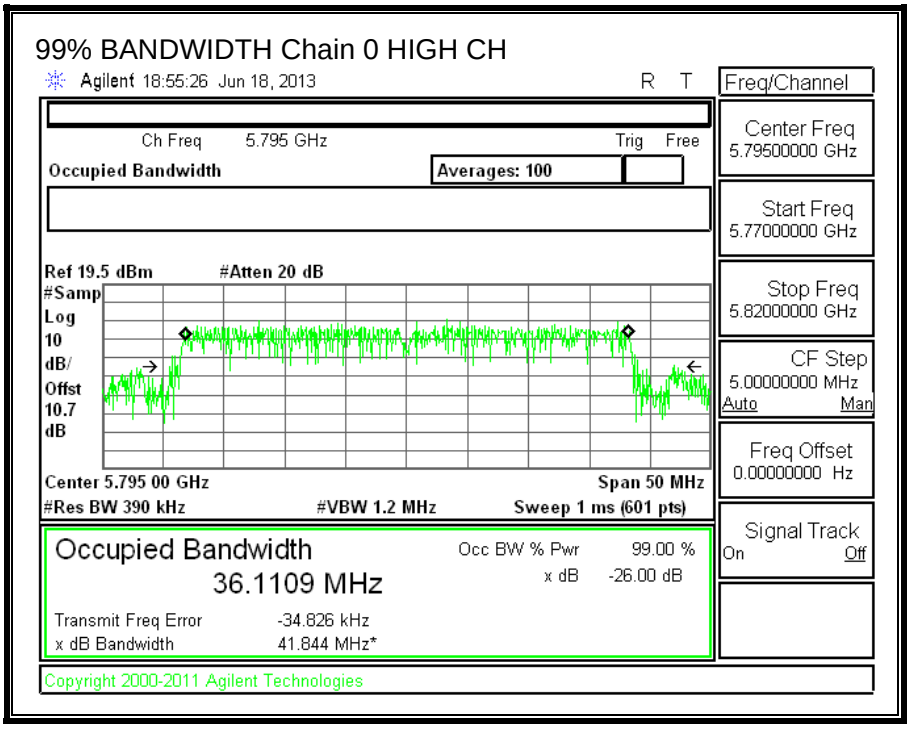
99% BANDWIDTH, Chain 0





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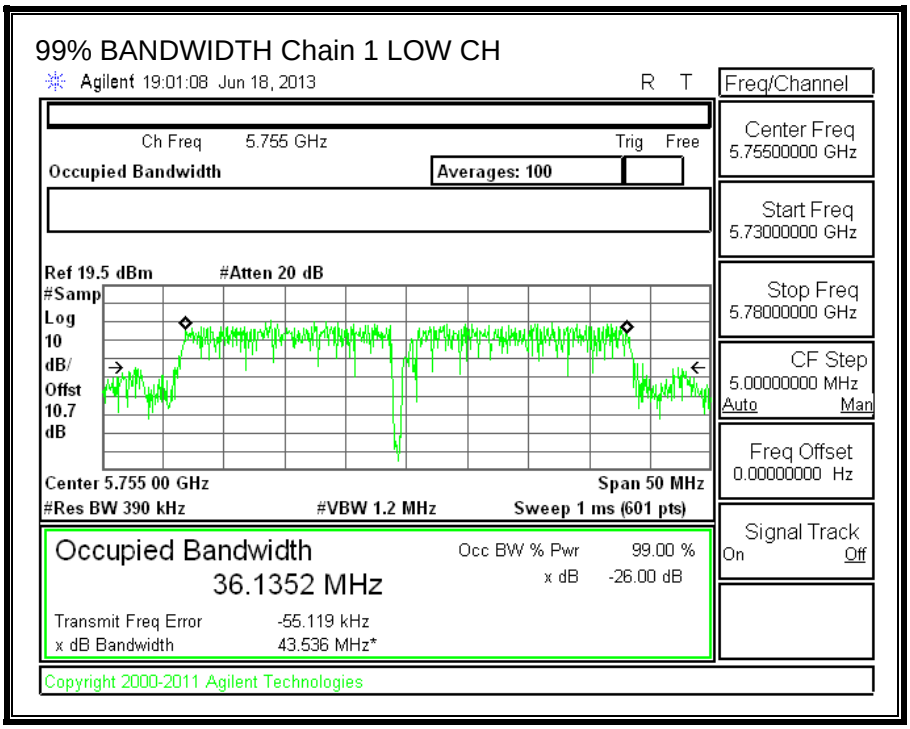
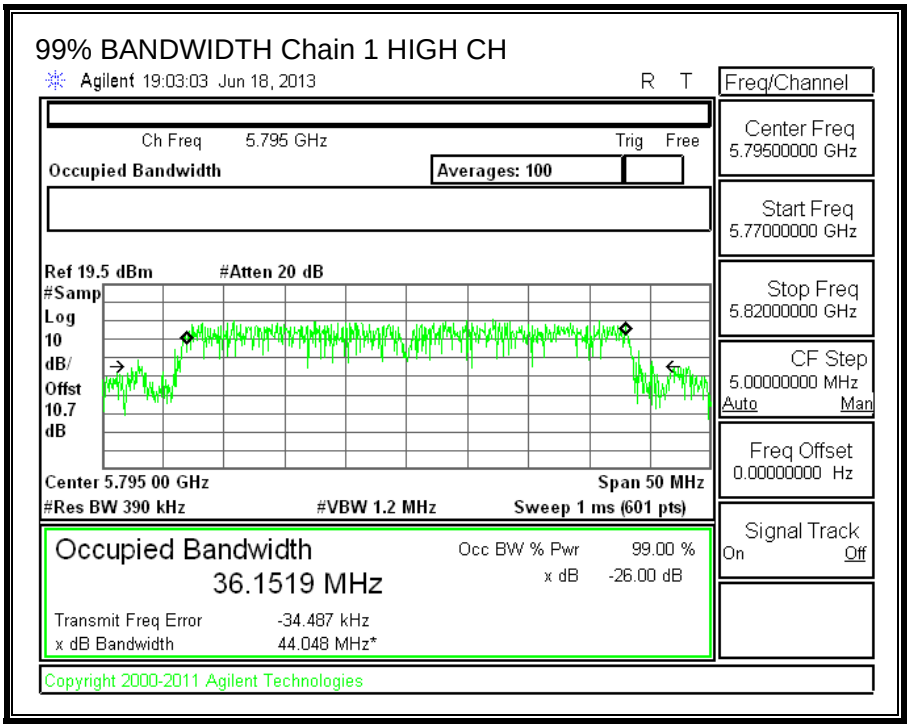
99% BANDWIDTH, Chain 1





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8.10.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

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

RESULTS

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
Low	5755	12.30	12.30	15.31
High	5795	12.20	12.60	15.41

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8.10.4. OUTPUT POWER

LIMITS

FCC §15.247

IC RSS-210 A8.4

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain.

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
4.00	4.00	4.00

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RESULTS

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	5755	4.00	30.00	30	36	30.00
High	5795	4.00	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margi (dB)
Low	5755	19.97	20.29	23.14	30.00	-6.86
High	5795	20.29	21.09	23.72	30.00	-6.28

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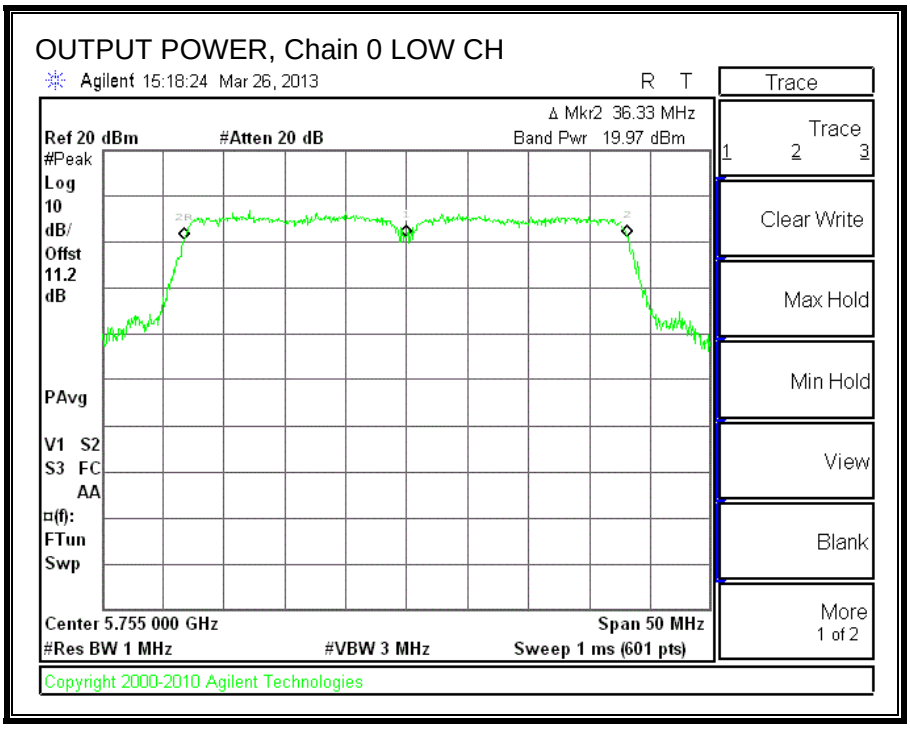
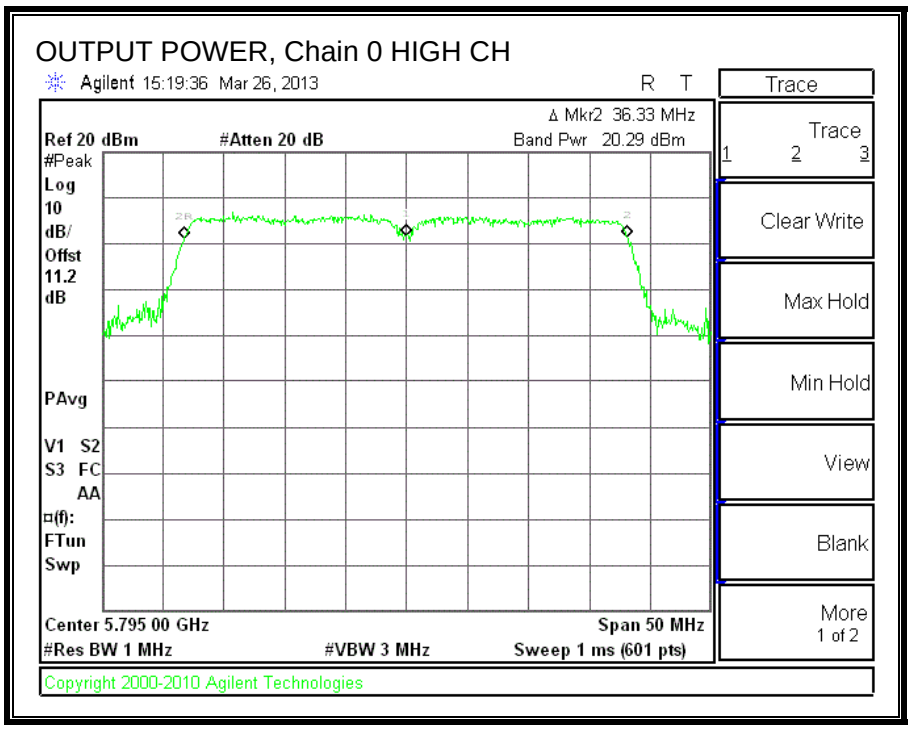
OUTPUT POWER, Chain 0





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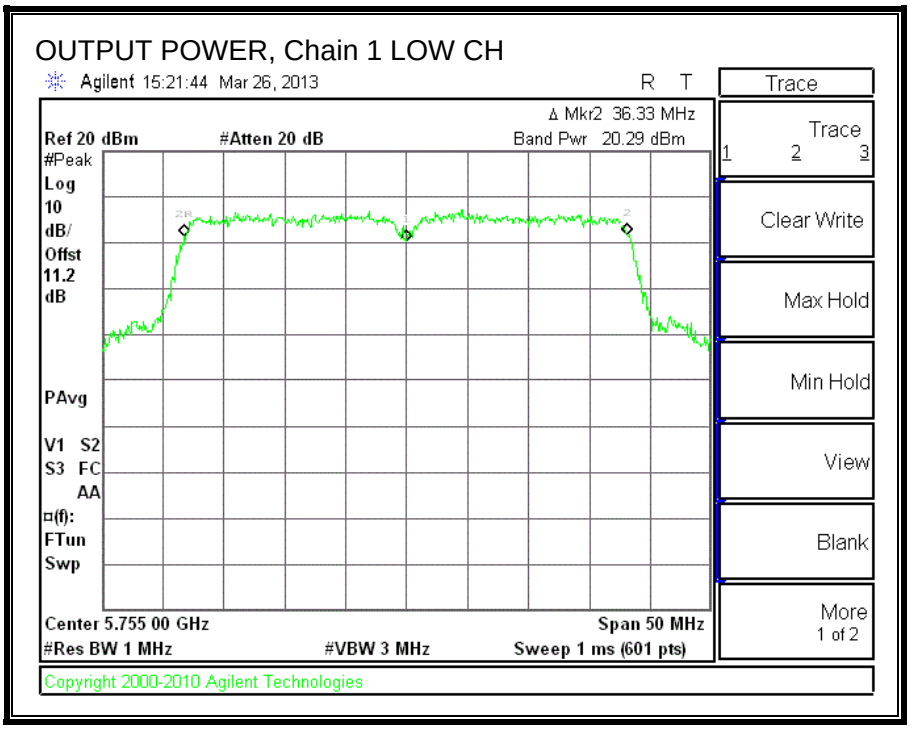
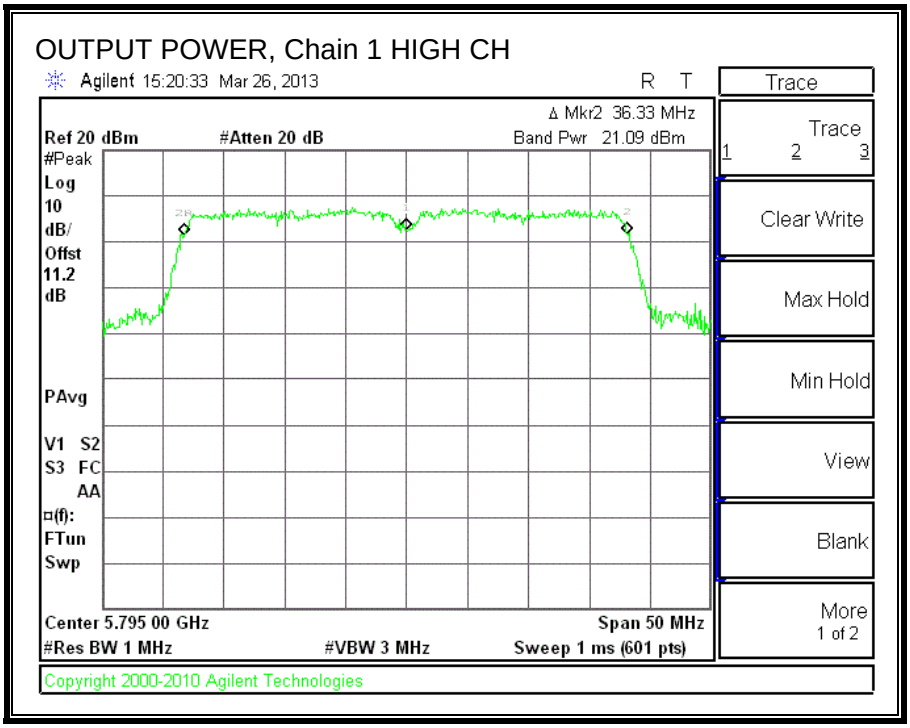
OUTPUT POWER, Chain 1





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8.10.5. PSD

LIMITS

FCC §15.247

IC RSS-210 A8.2

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.

RESULTS

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Chain 1 Meas (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	5755	-15.48	-16.13	-12.78	8.0	-20.8
High	5795	-15.69	-16.20	-12.93	8.0	-20.9

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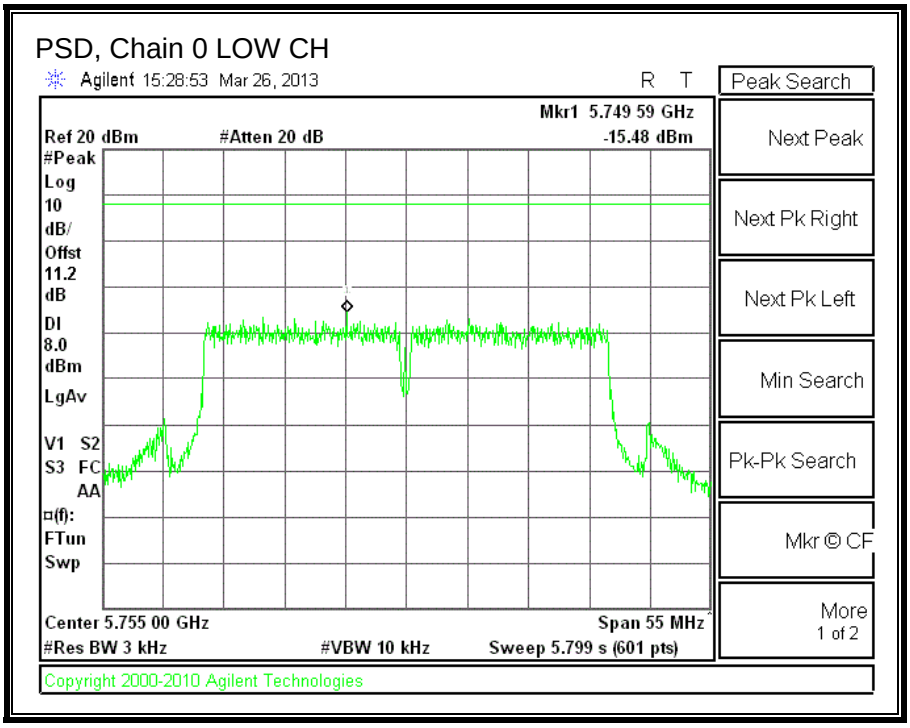
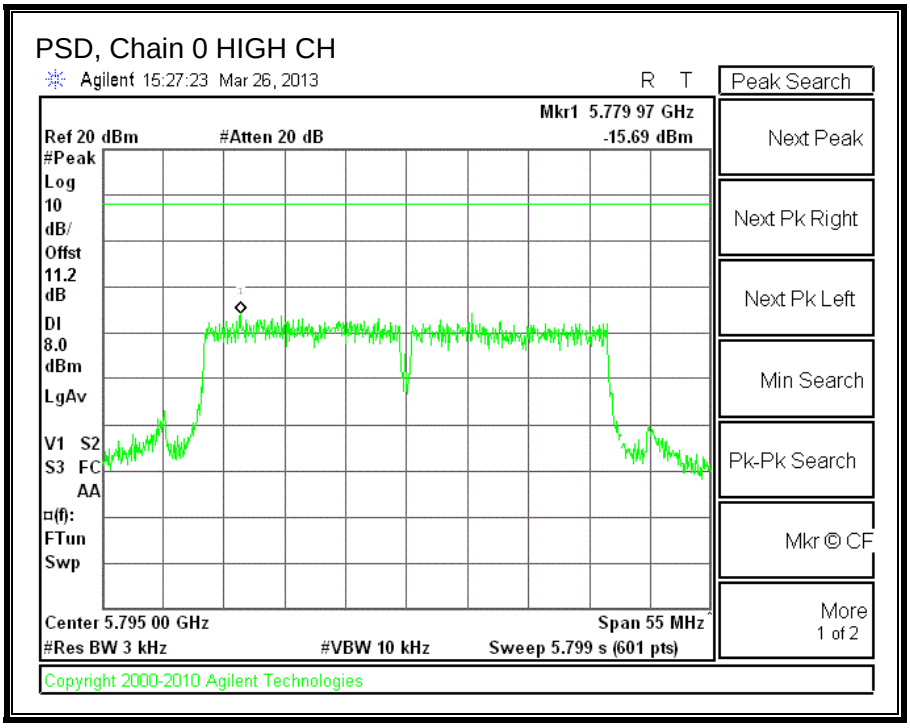
PSD, Chain 0





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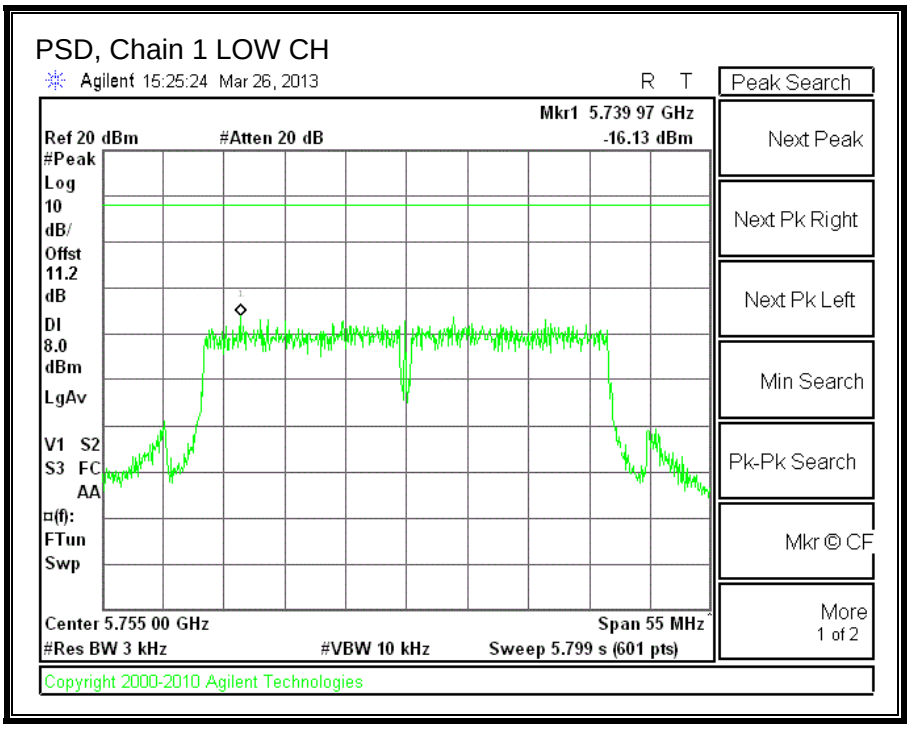
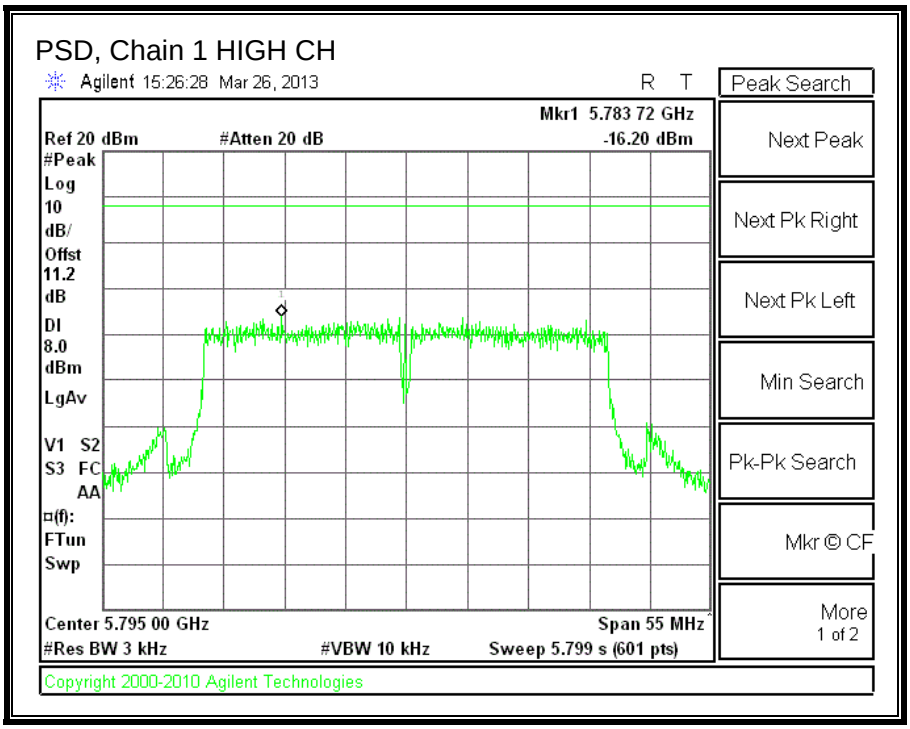
PSD, Chain 1





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8.10.6. OUT-OF-BAND EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the in-band reference level, bandedge (where measurements to the general radiated limits will not be made) and out-of-band emissions.

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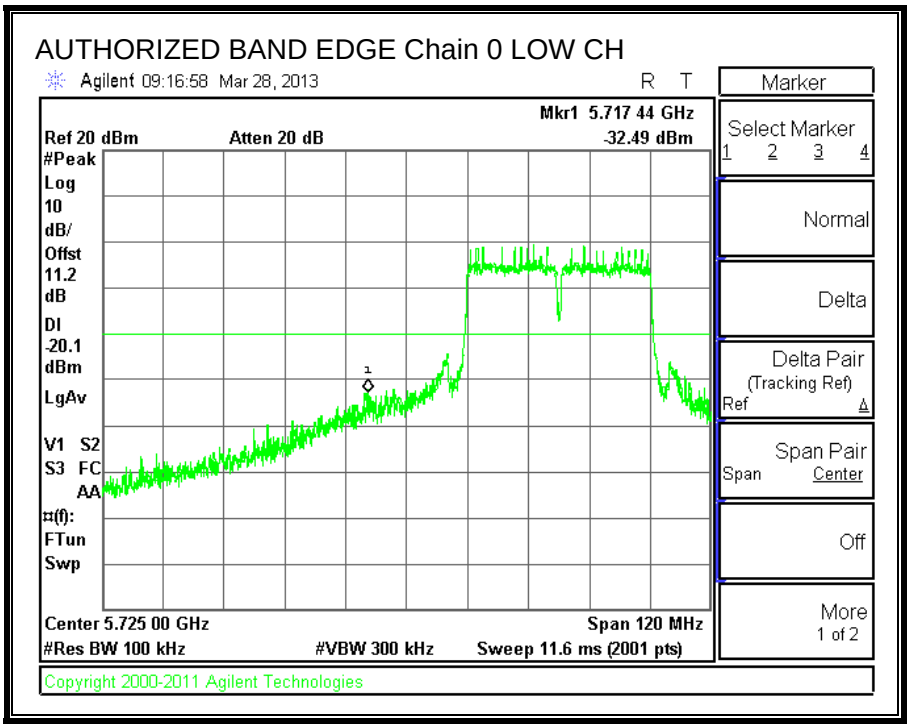
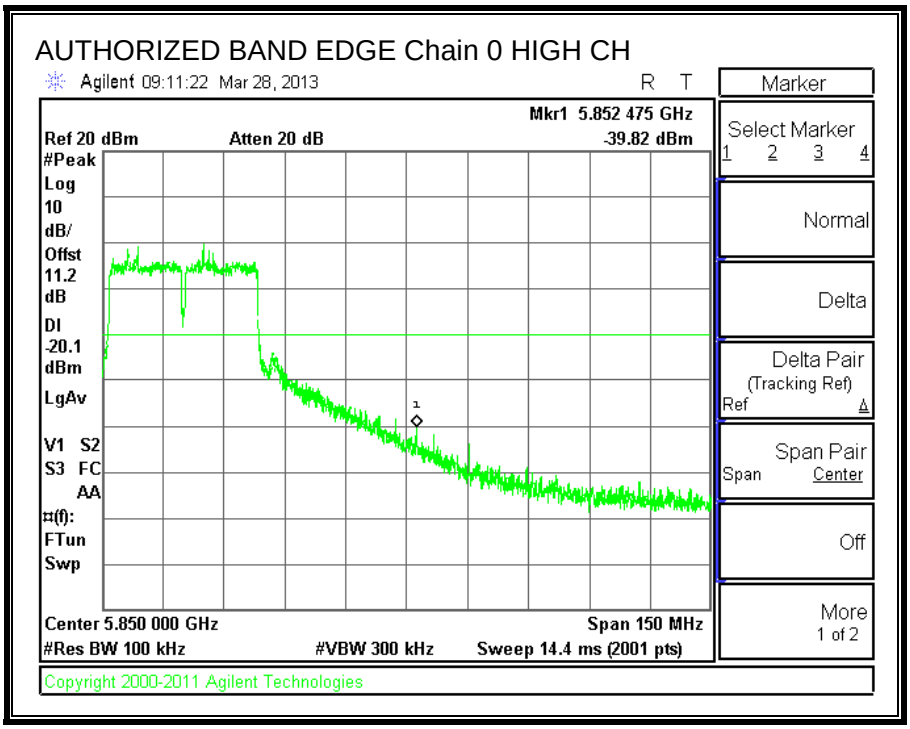
RESULTS

LOW CHANNEL BANDEDGE, Chain 0



HIGH CHANNEL BANDEDGE, Chain 0



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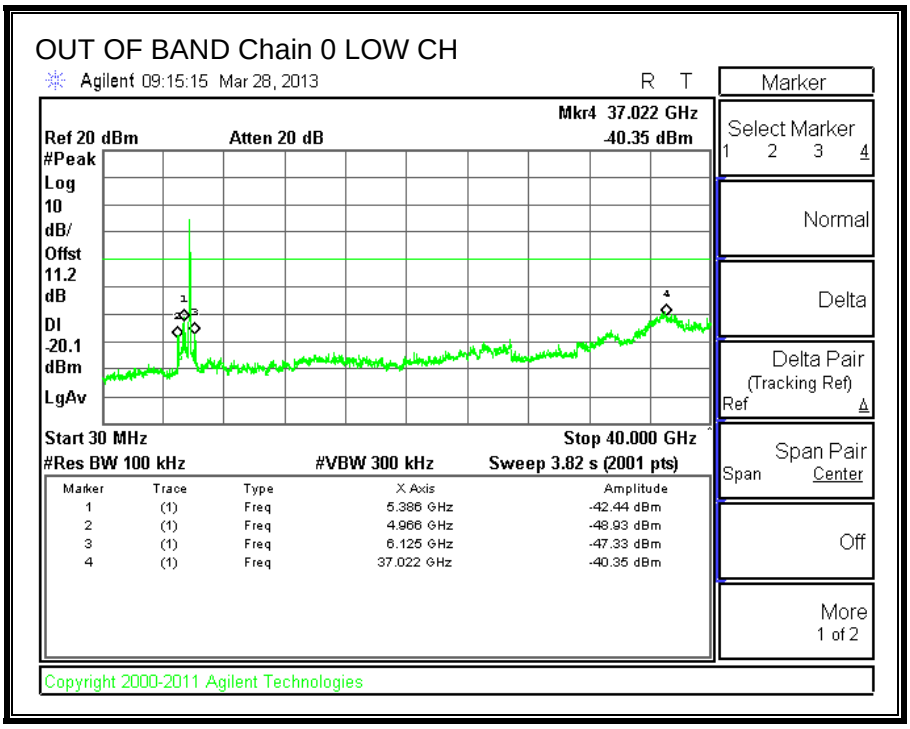
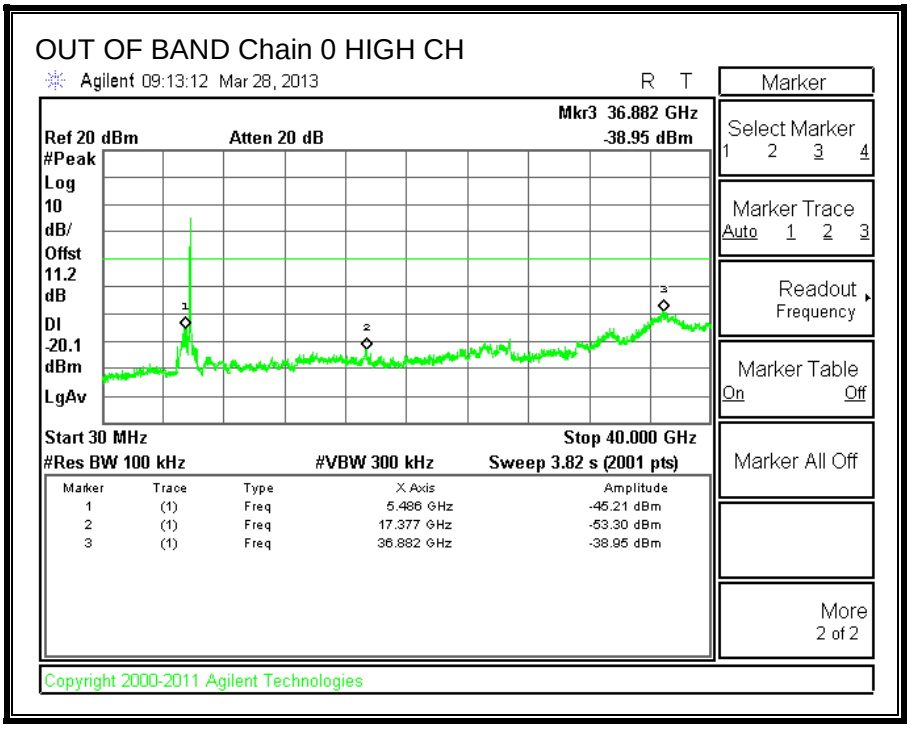
OUT-OF-BAND EMISSIONS, Chain 0





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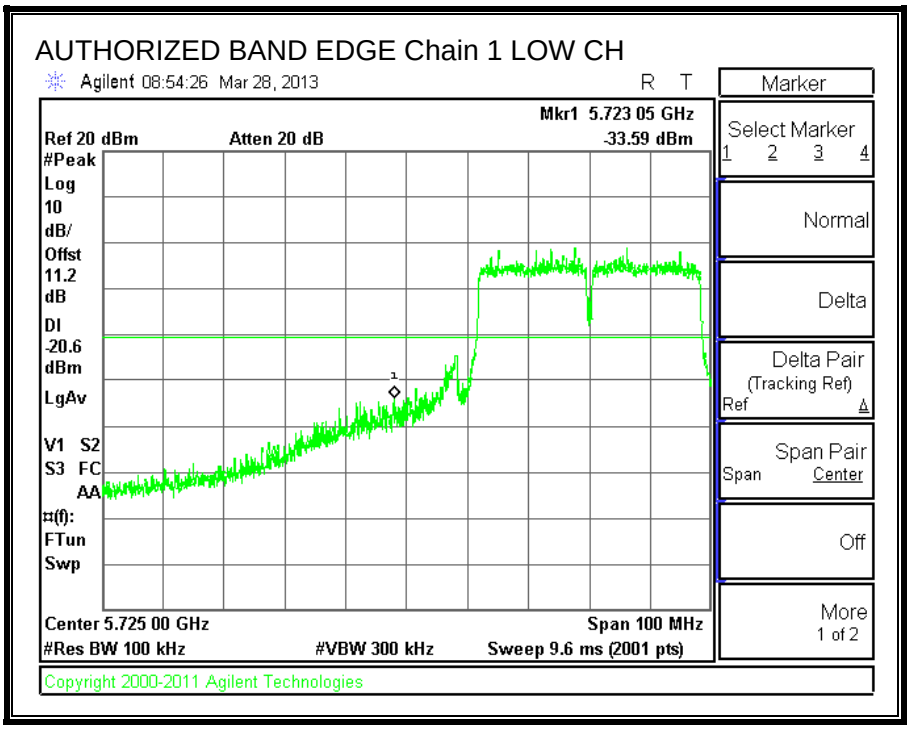
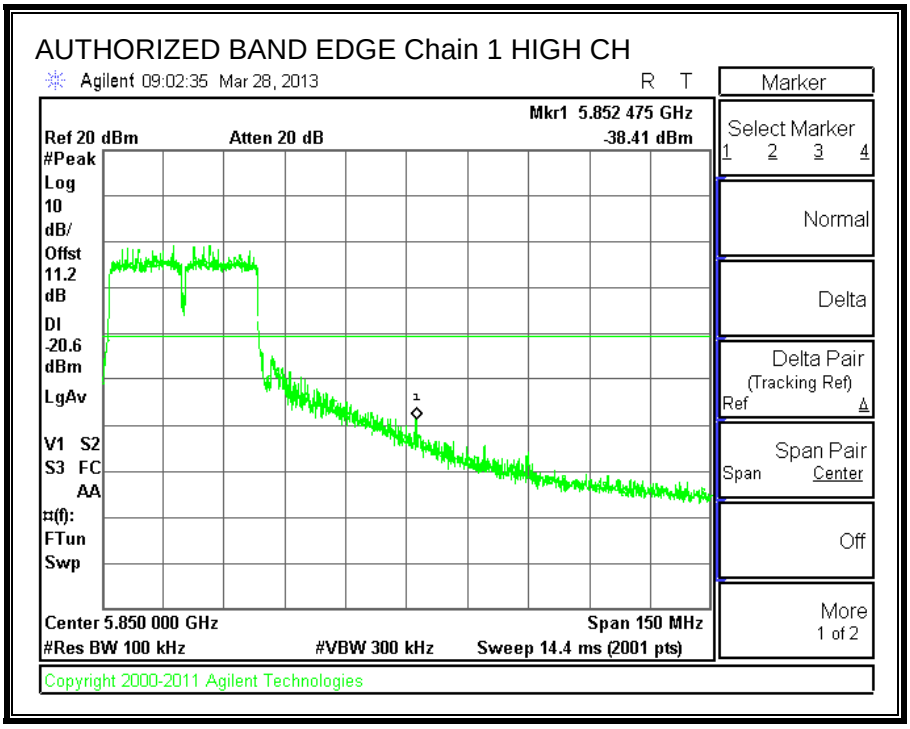
LOW CHANNEL BANDEDGE, Chain 1



HIGH CHANNEL BANDEDGE, Chain 1



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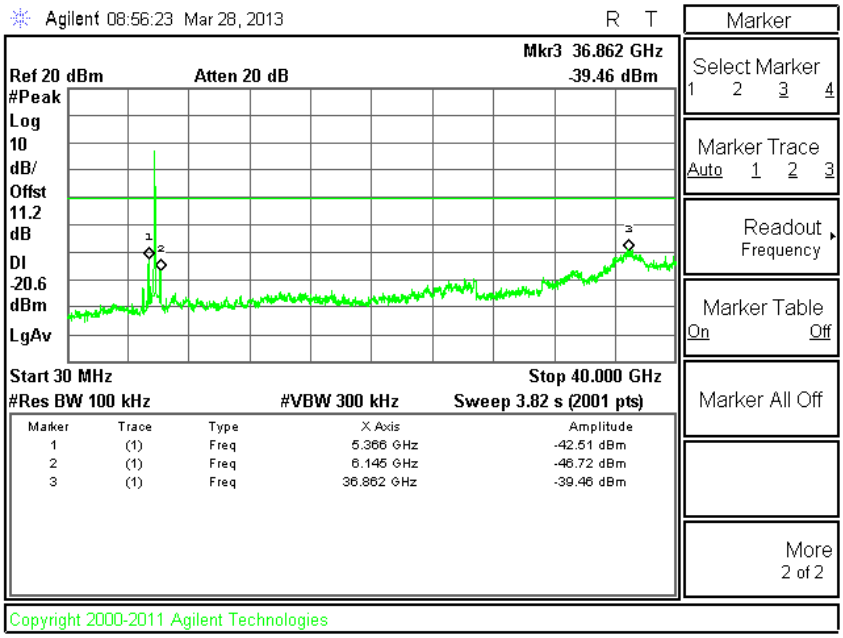
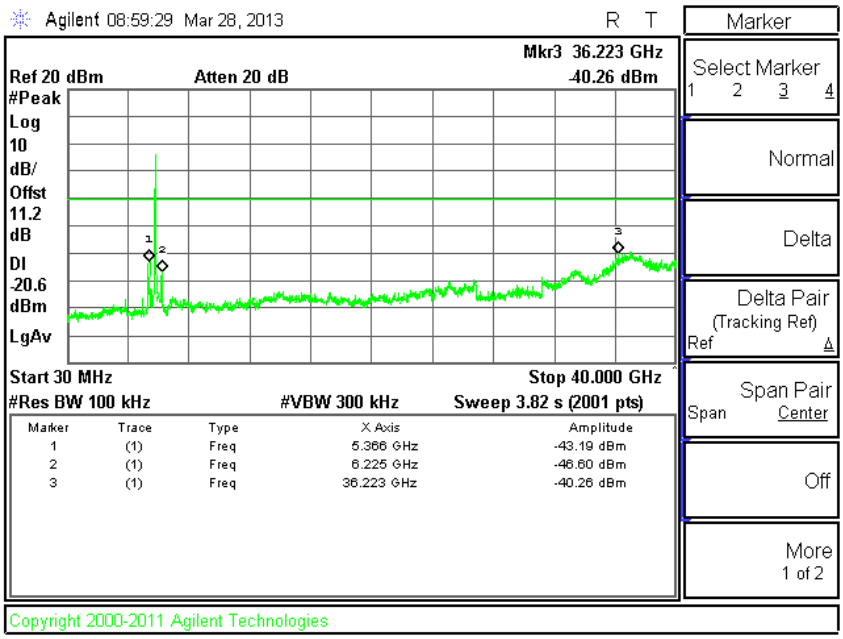
OUT OF BAND Chain 1 LOW CH



OUT OF BAND Chain 1 HIGH CH



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8.11. 802.11n HT40 SDM MCS8 2TX MODE IN THE 5.8 GHz BAND

8.11.1. 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 with the RBW set between 1% and 5% of the EBW, the VBW >= 3 x RBW, peak detector and max hold.

RESULTS

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low	5755	36.580	36.550	0.5
High	5795	36.480	35.540	0.5

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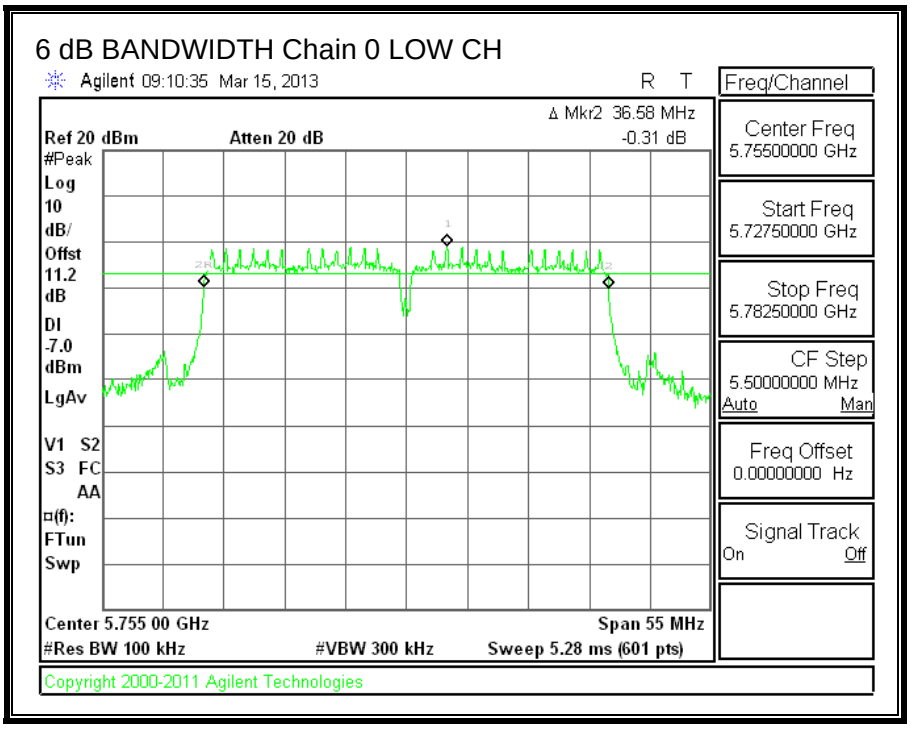
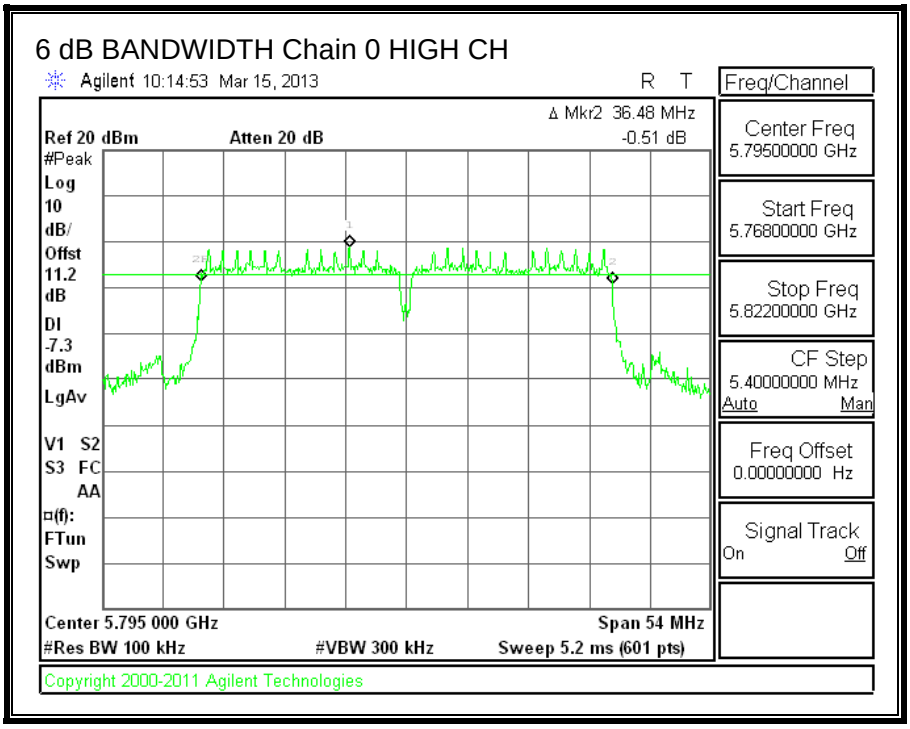
6 dB BANDWIDTH, Chain 0





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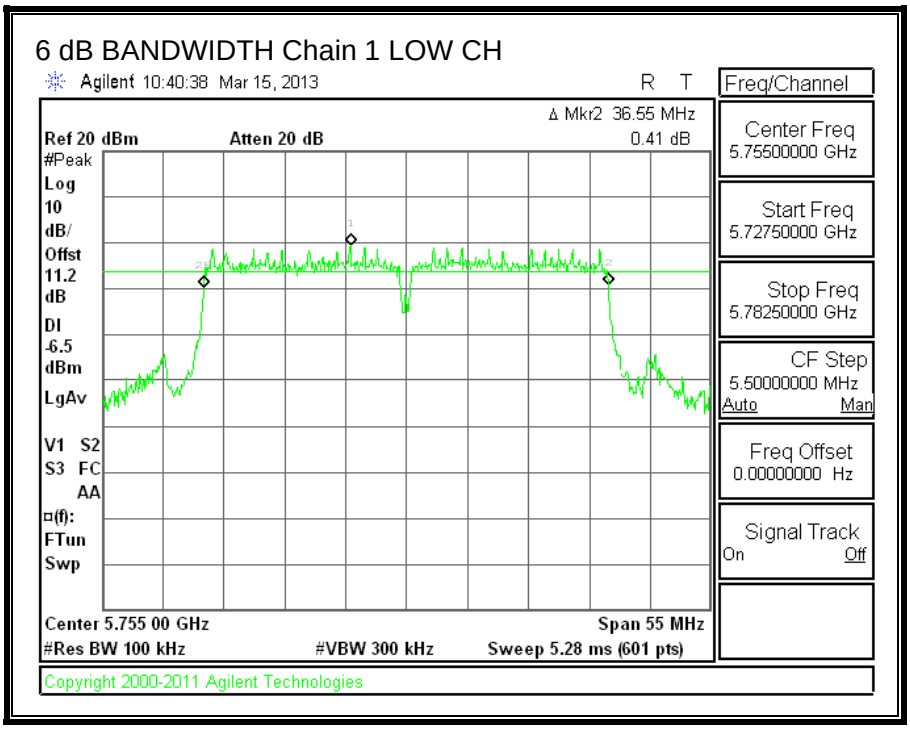
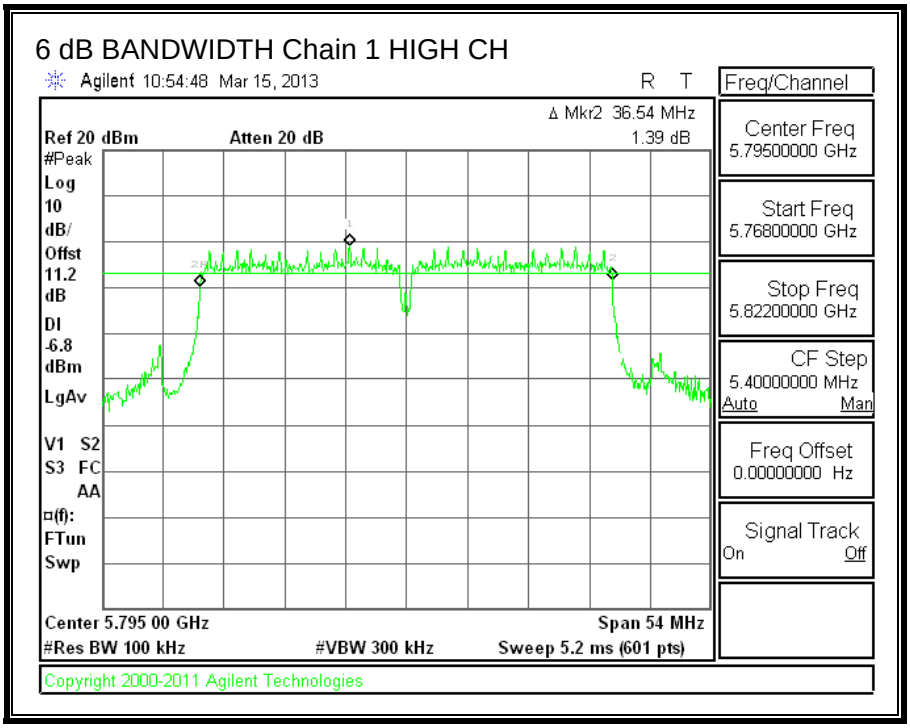
6 dB BANDWIDTH, Chain 1





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8.11.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)
Low	5755	36.0983	36.1191
High	5795	36.1321	36.1438

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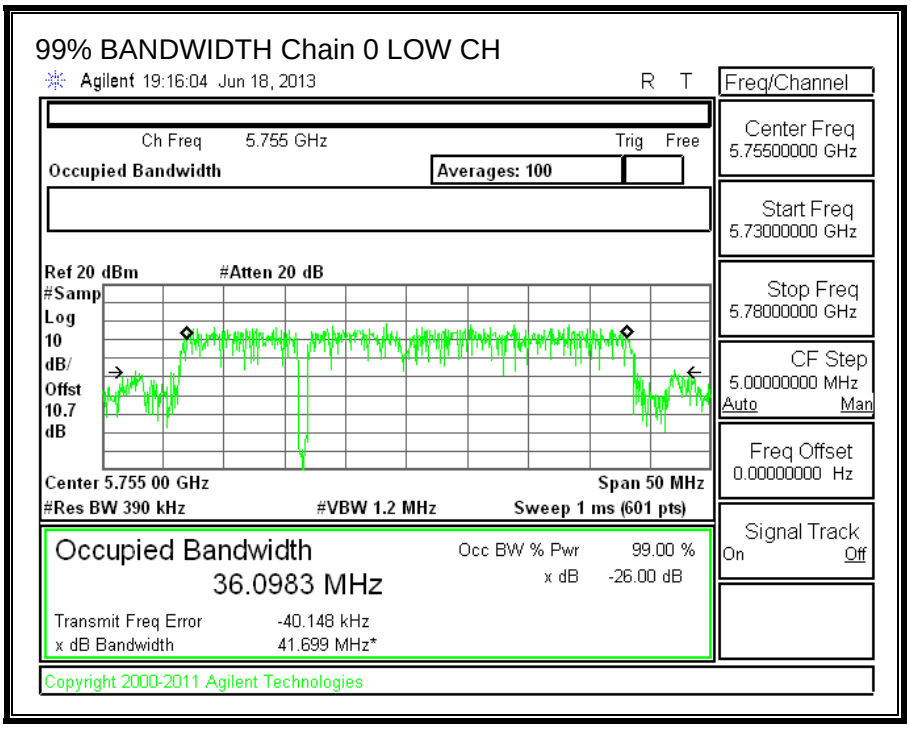
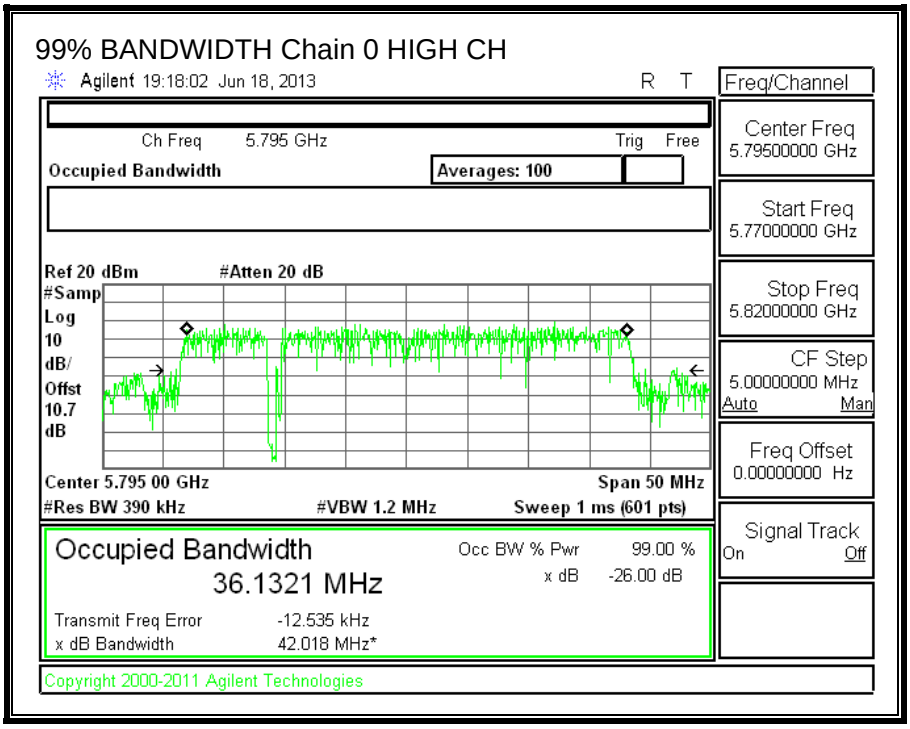
99% BANDWIDTH, Chain 0





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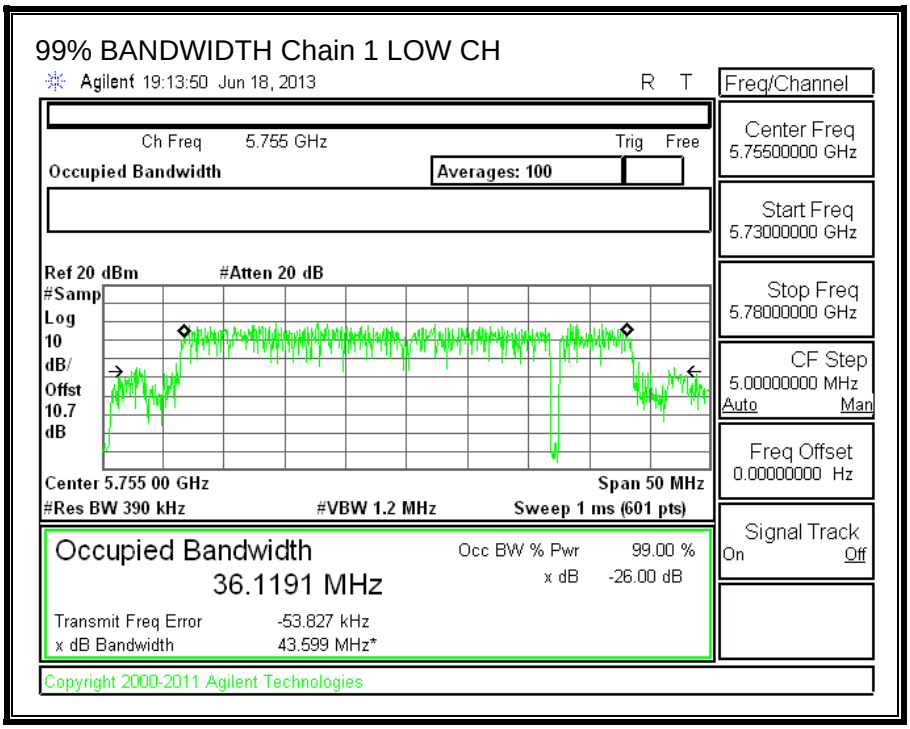
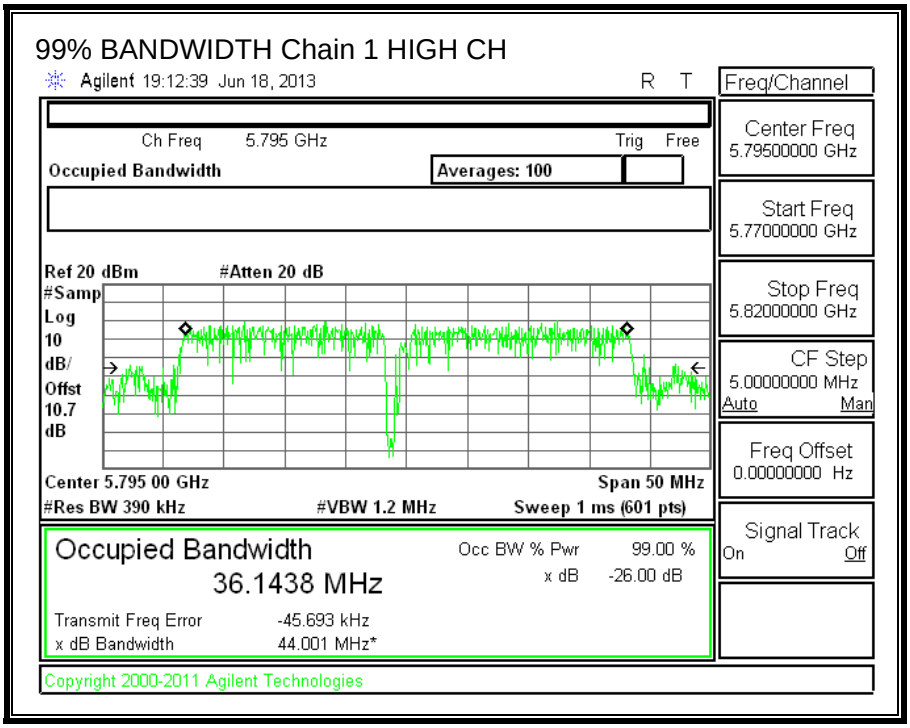
99% BANDWIDTH, Chain 1





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8.11.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

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

RESULTS

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
Low	5755	12.10	12.10	15.11
High	5795	12.10	12.10	15.11

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8.11.4. OUTPUT POWER

LIMITS

FCC §15.247

IC RSS-210 A8.4

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain.

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
4.00	4.00	4.00

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RESULTS

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	5755	4.00	30.00	30	36	30.00
High	5795	4.00	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margi (dB)
Low	5755	20.37	21.56	24.02	30.00	-5.98
High	5795	20.46	21.85	24.22	30.00	-5.78

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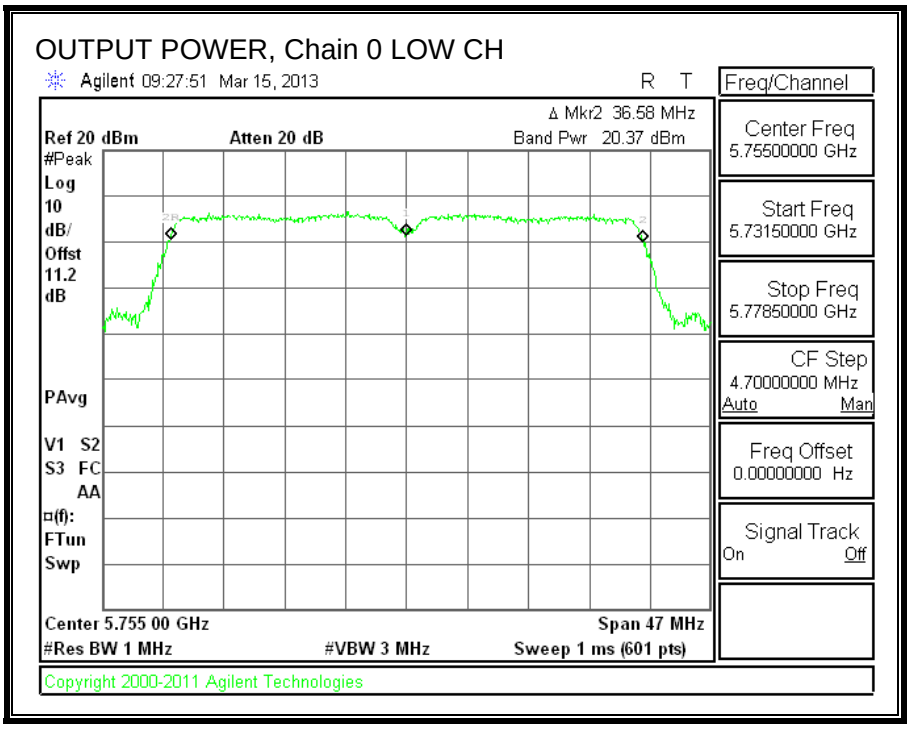
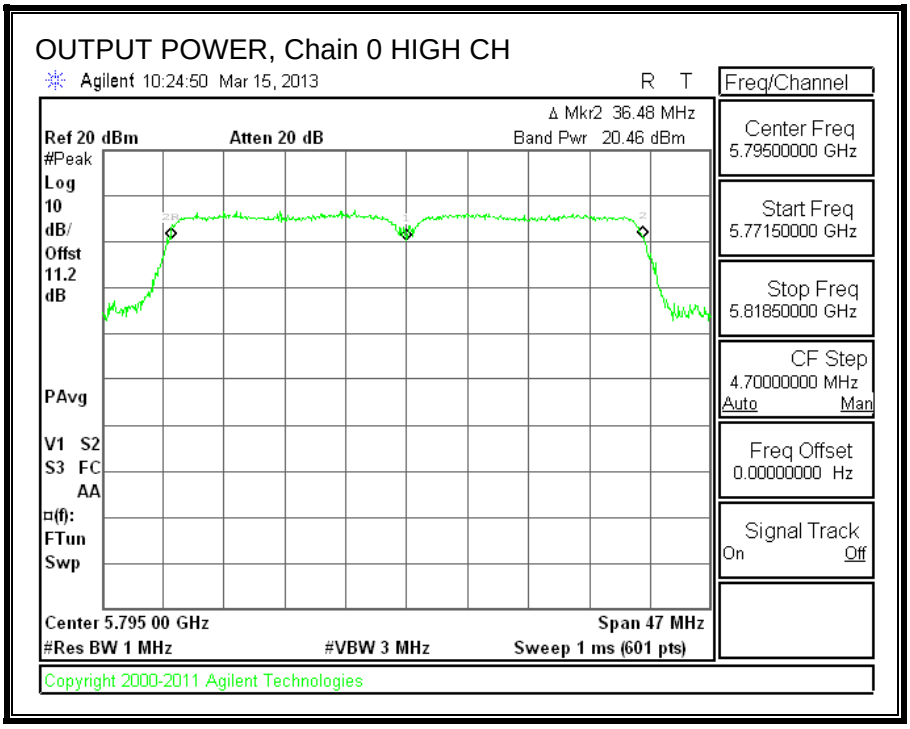
OUTPUT POWER, Chain 0





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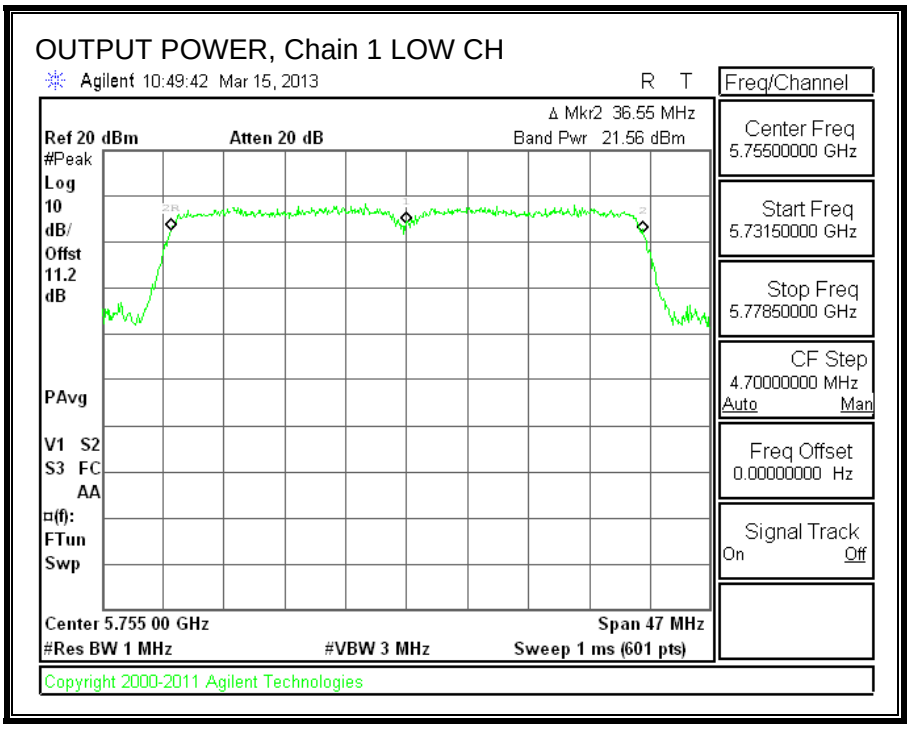
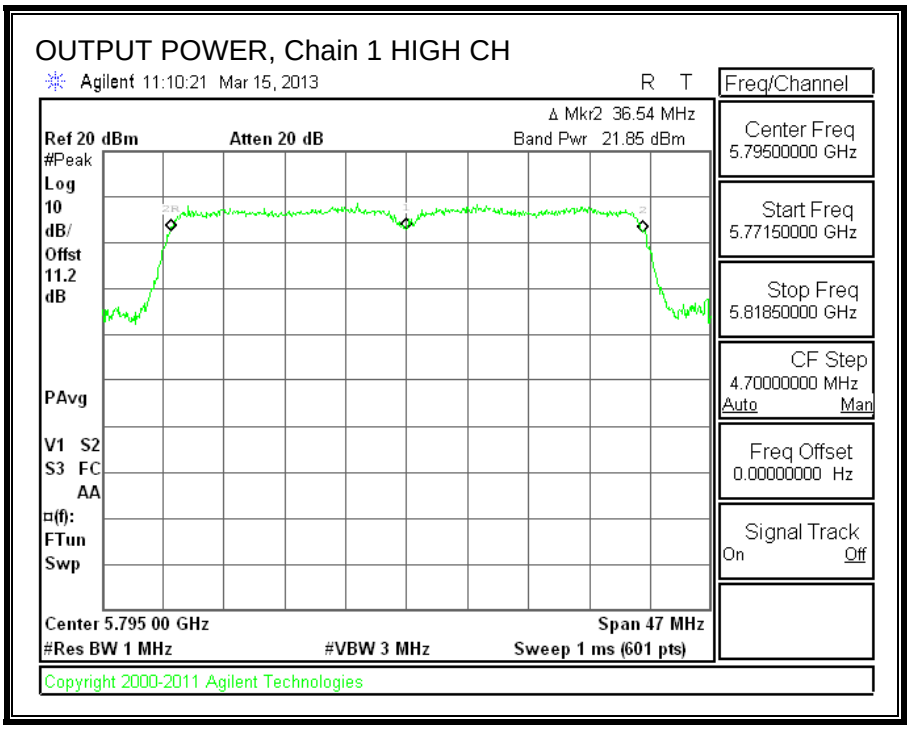
OUTPUT POWER, Chain 1





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8.11.5. PSD

LIMITS

FCC §15.247

IC RSS-210 A8.2

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.

RESULTS

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Chain 1 Meas (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	5755	-15.80	-13.79	-11.67	8.0	-19.7
High	5795	-14.67	-14.09	-11.36	8.0	-19.4

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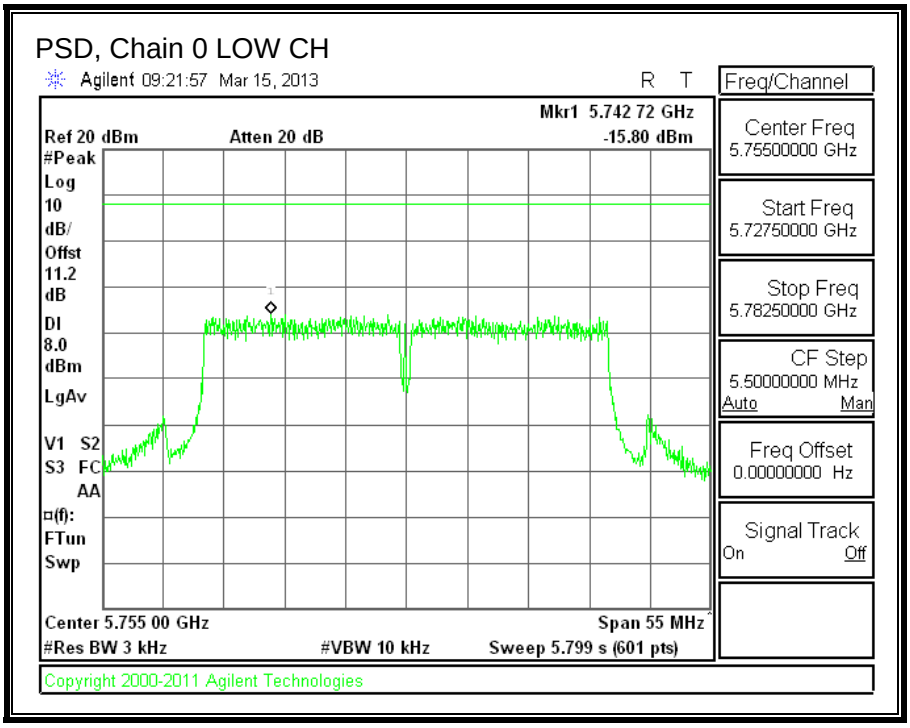
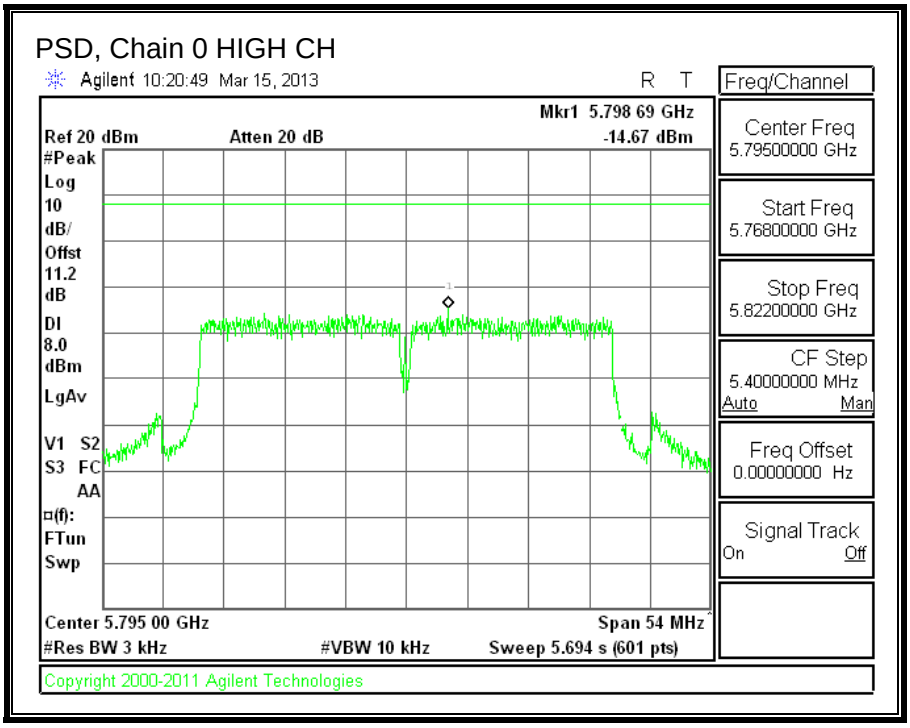
PSD, Chain 0





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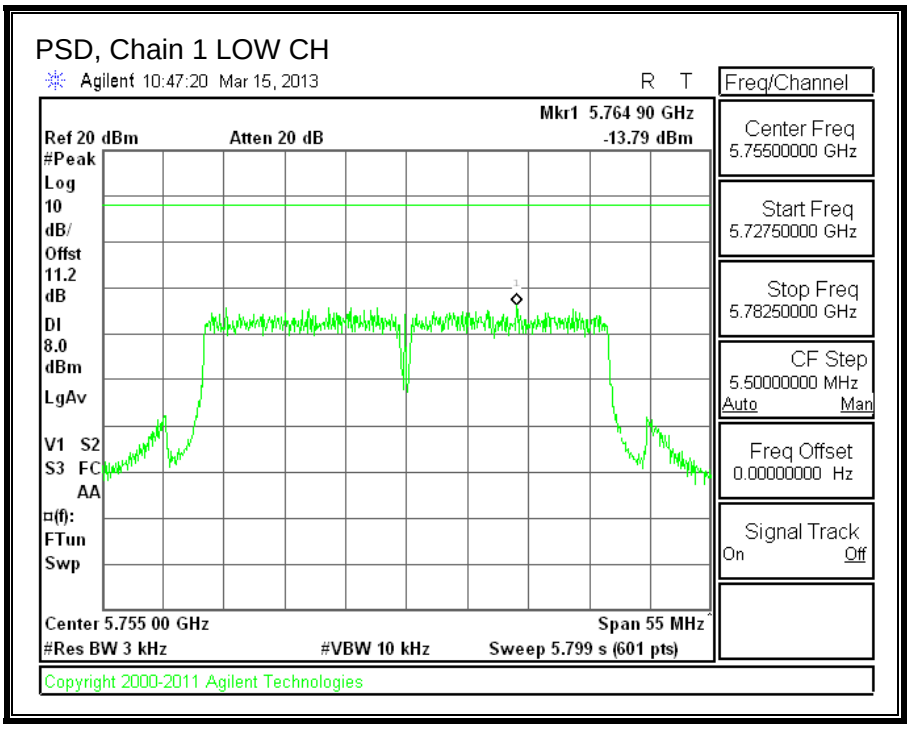
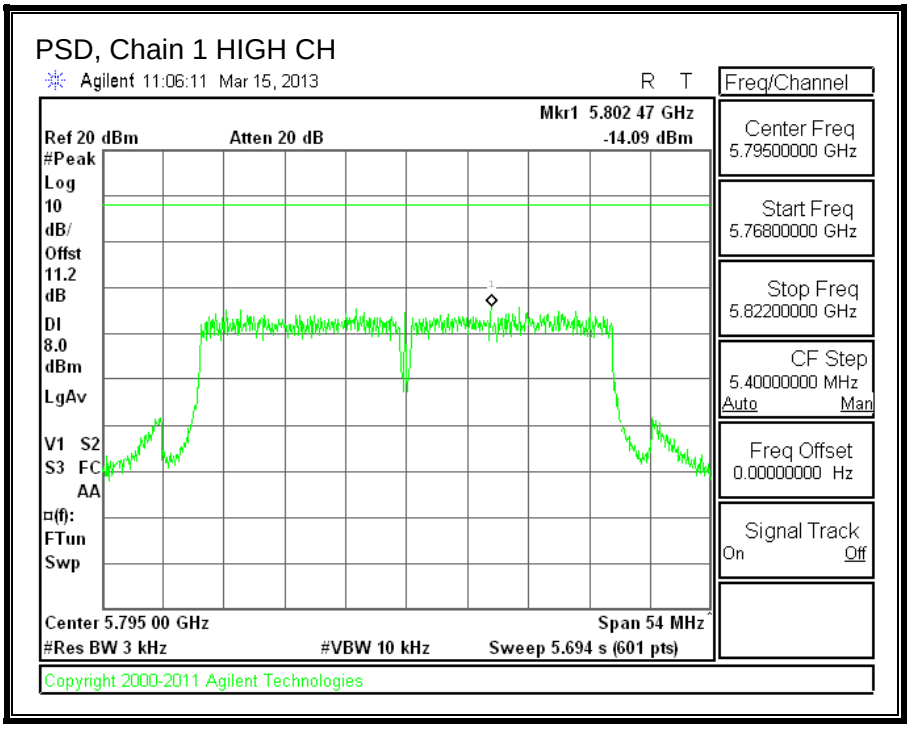
PSD, Chain 1





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8.11.6. OUT-OF-BAND EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the in-band reference level, bandedge (where measurements to the general radiated limits will not be made) and out-of-band emissions.

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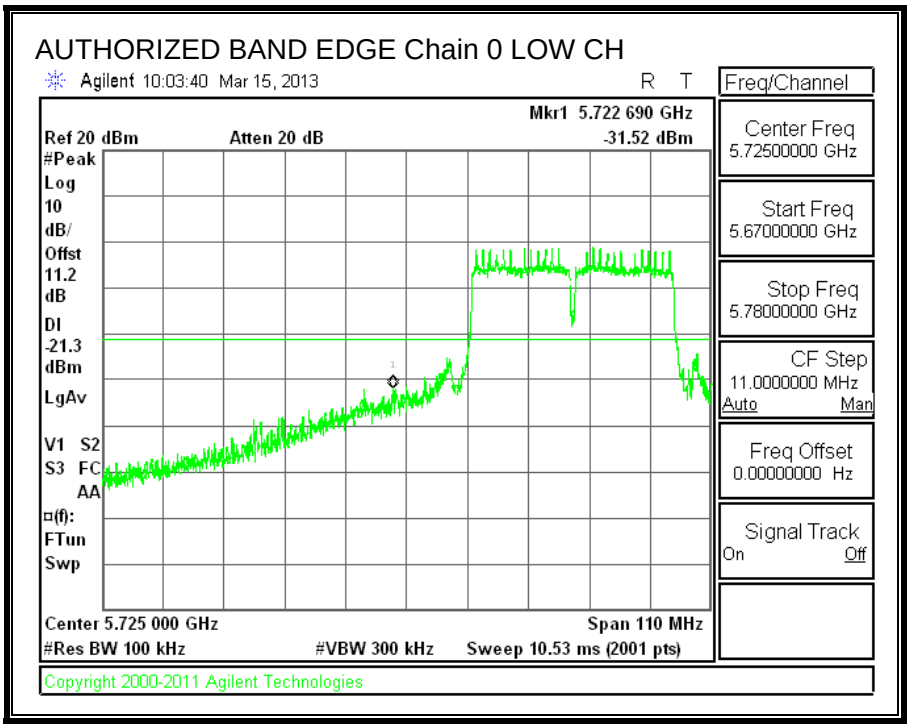
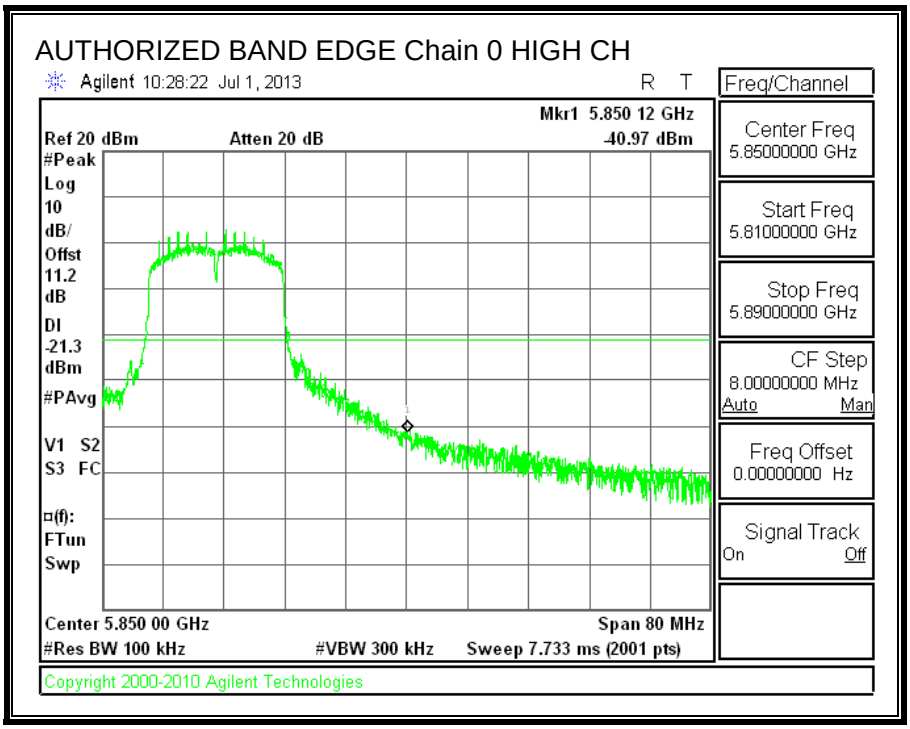
RESULTS

LOW CHANNEL BANDEDGE, Chain 0



HIGH CHANNEL BANDEDGE, Chain 0



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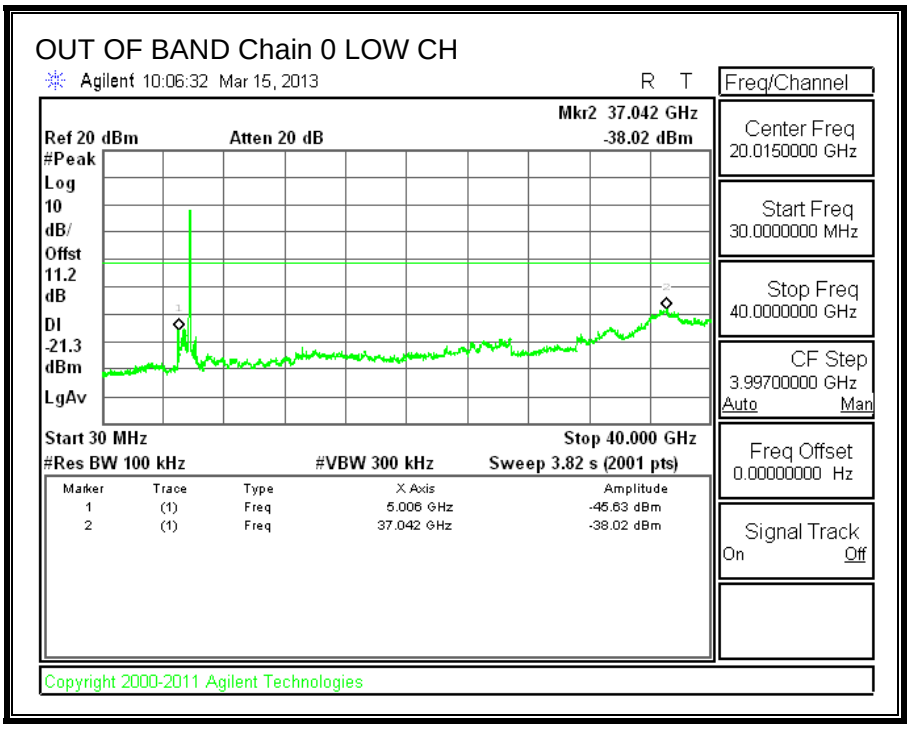
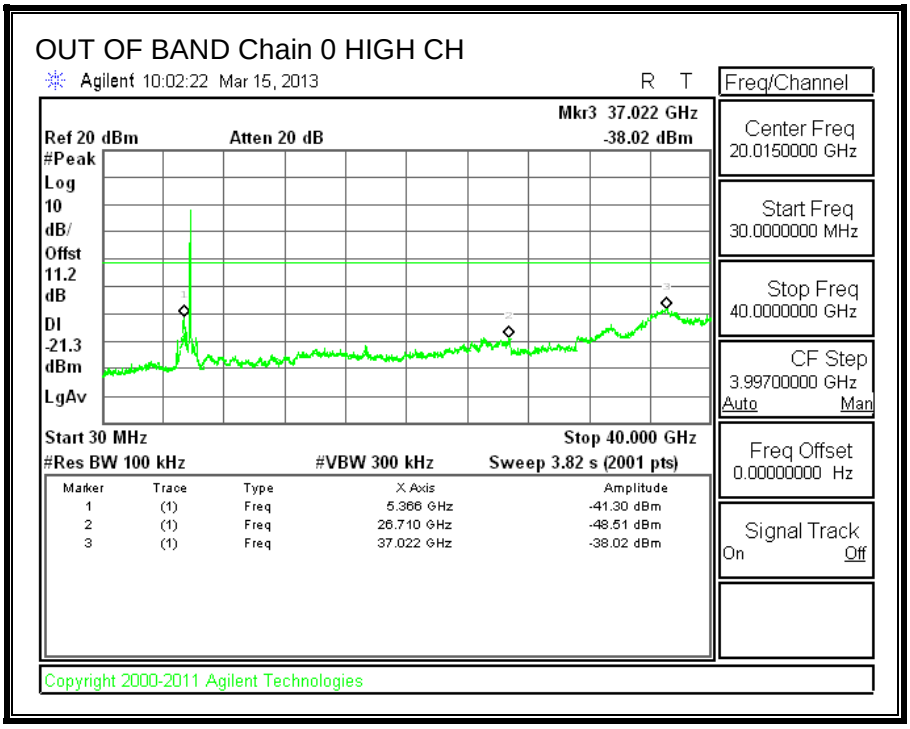
OUT-OF-BAND EMISSIONS, Chain 0





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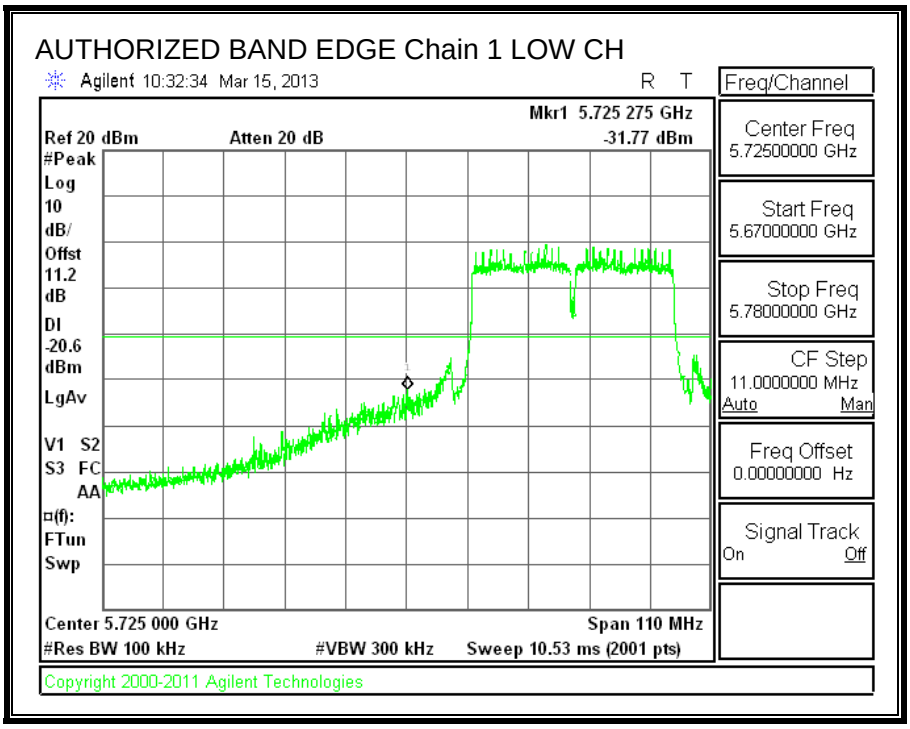
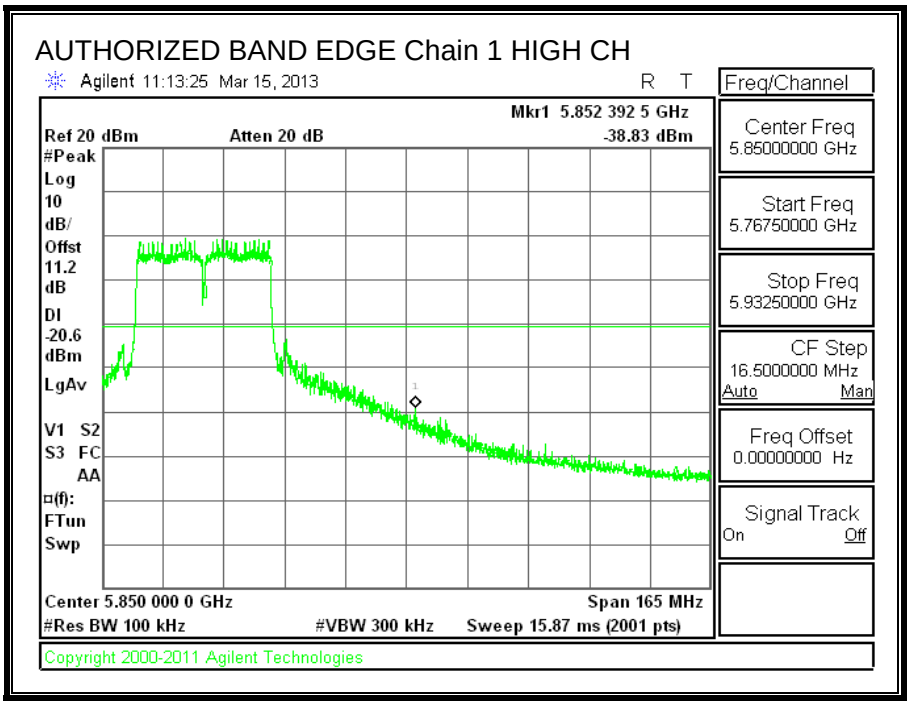
LOW CHANNEL BANDEDGE, Chain 1



HIGH CHANNEL BANDEDGE, Chain 1



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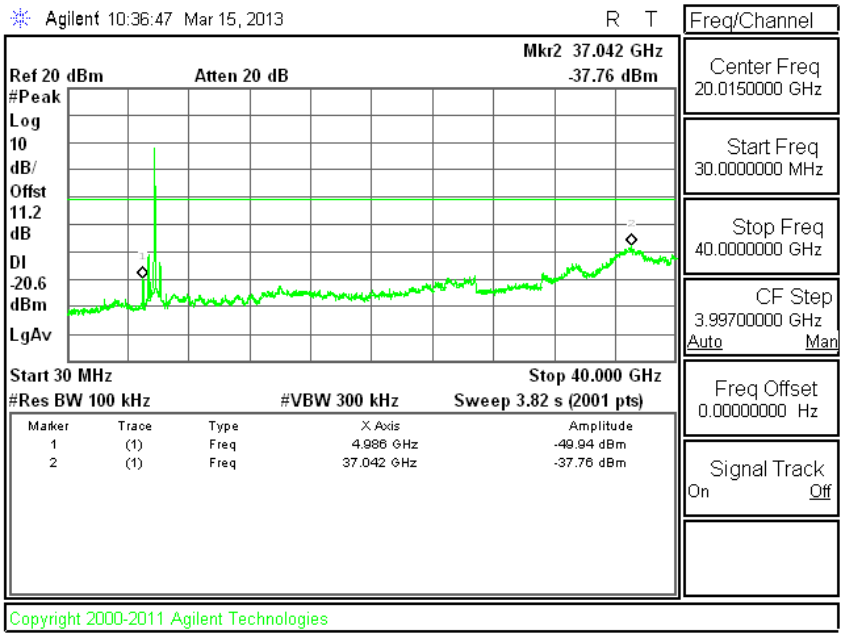
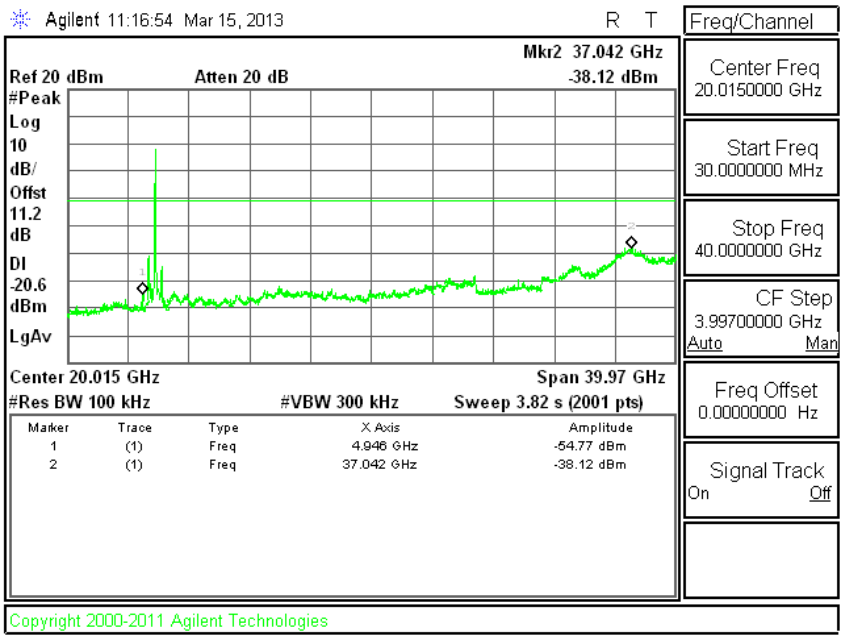
OUT OF BAND Chain 1 LOW CH



OUT OF BAND Chain 1 HIGH CH



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9. RADIATED TEST RESULTS

9.1. 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.

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; the video bandwidth is set to 1 MHz for peak measurements and as applicable for average measurements.

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.

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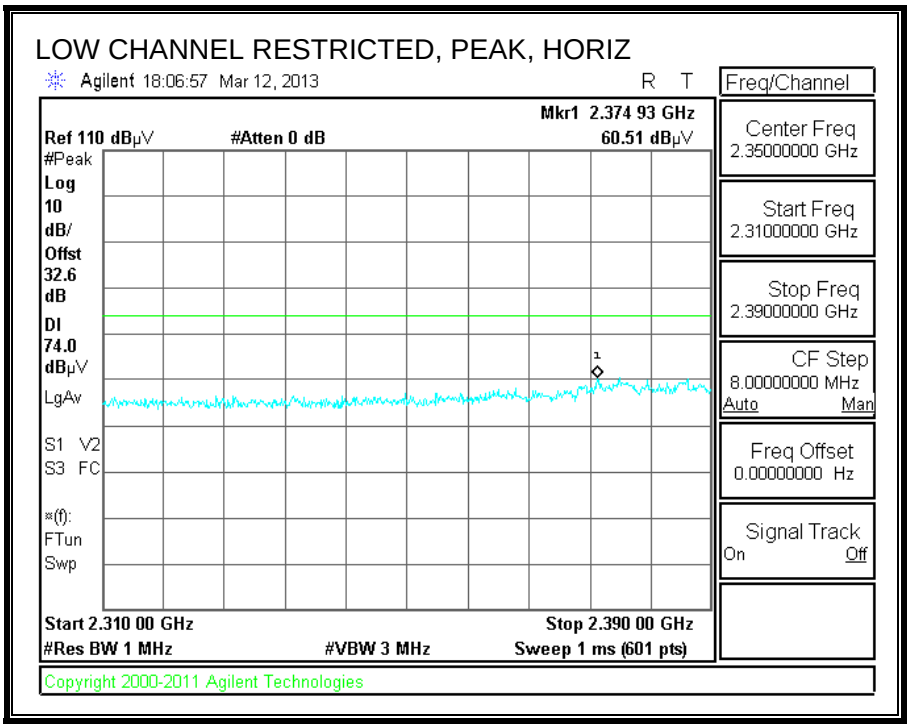
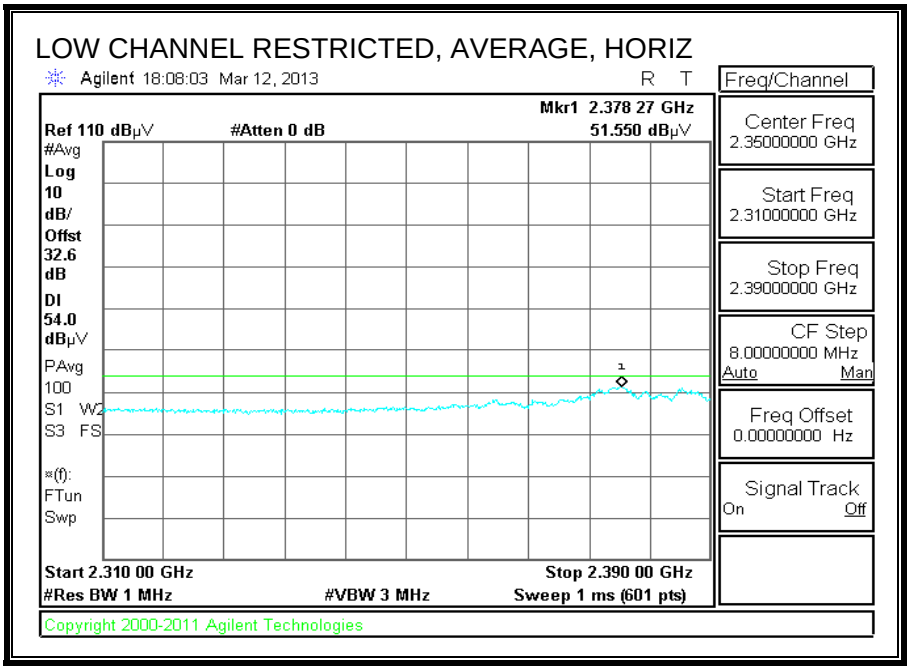
9.2. TRANSMITTER ABOVE 1 GHz

9.2.1. 802.11b LEGACY MODE, 2.4 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)





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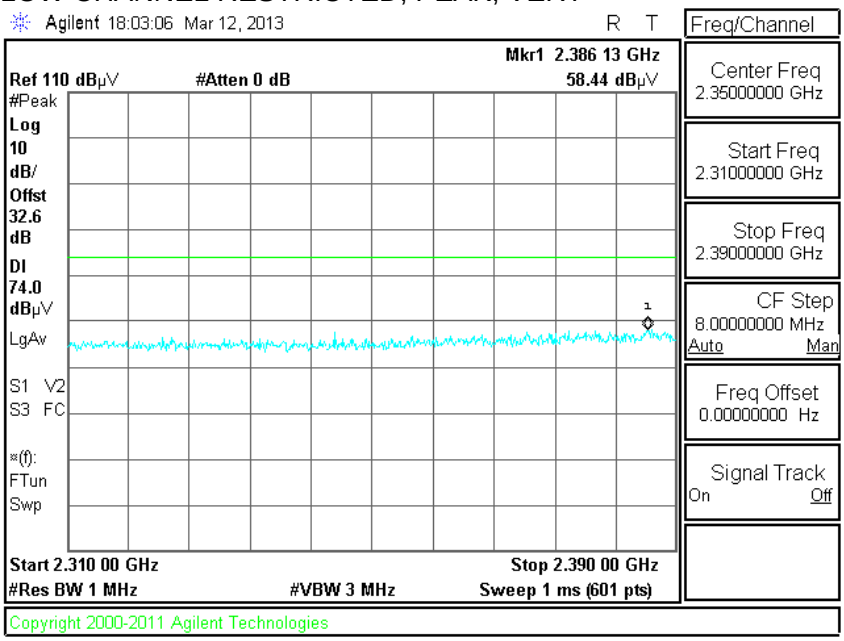
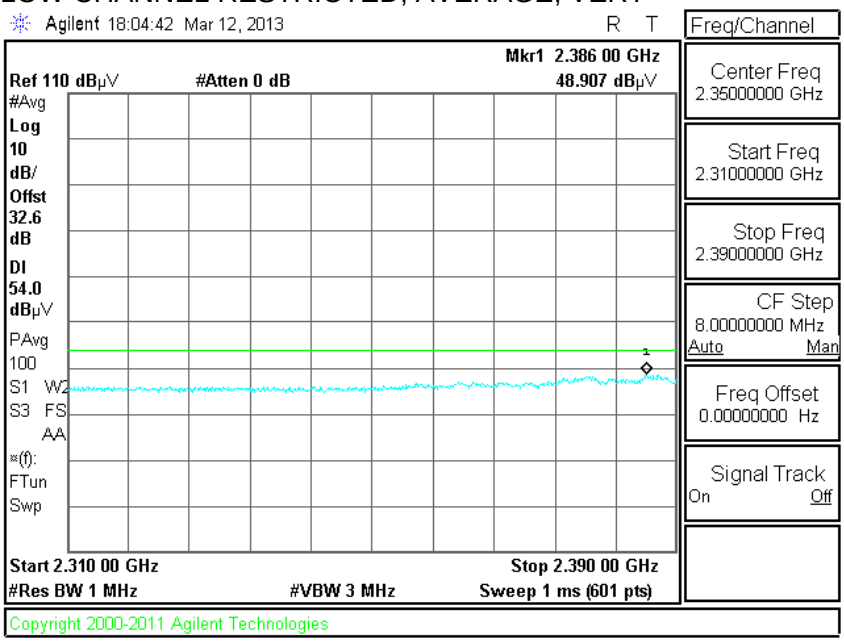
LOW CHANNEL RESTRICTED, PEAK, VERT



LOW CHANNEL RESTRICTED, AVERAGE, VERT



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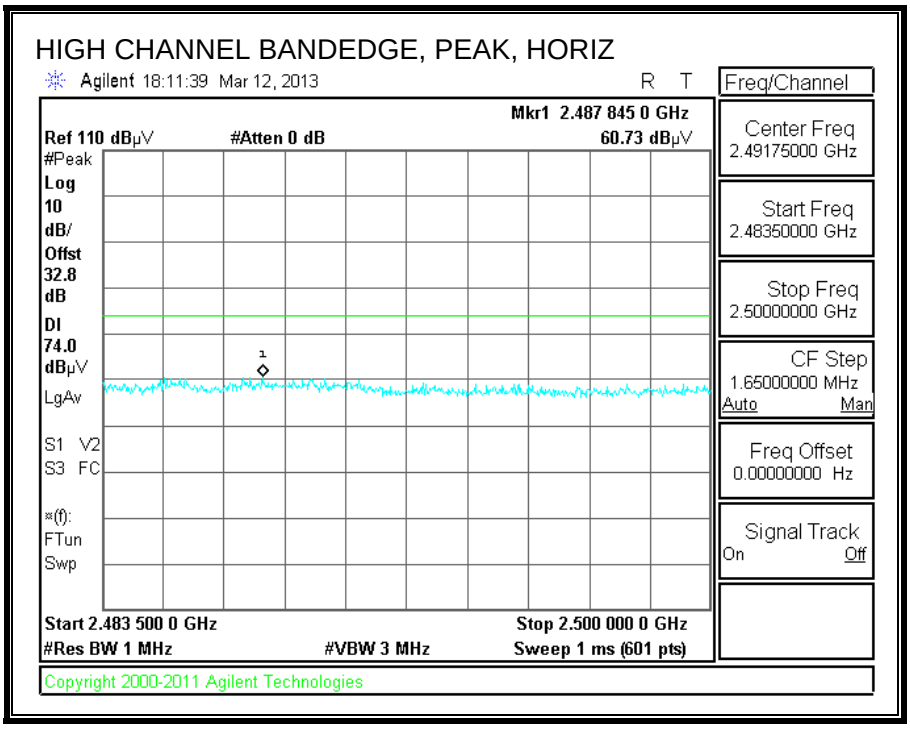
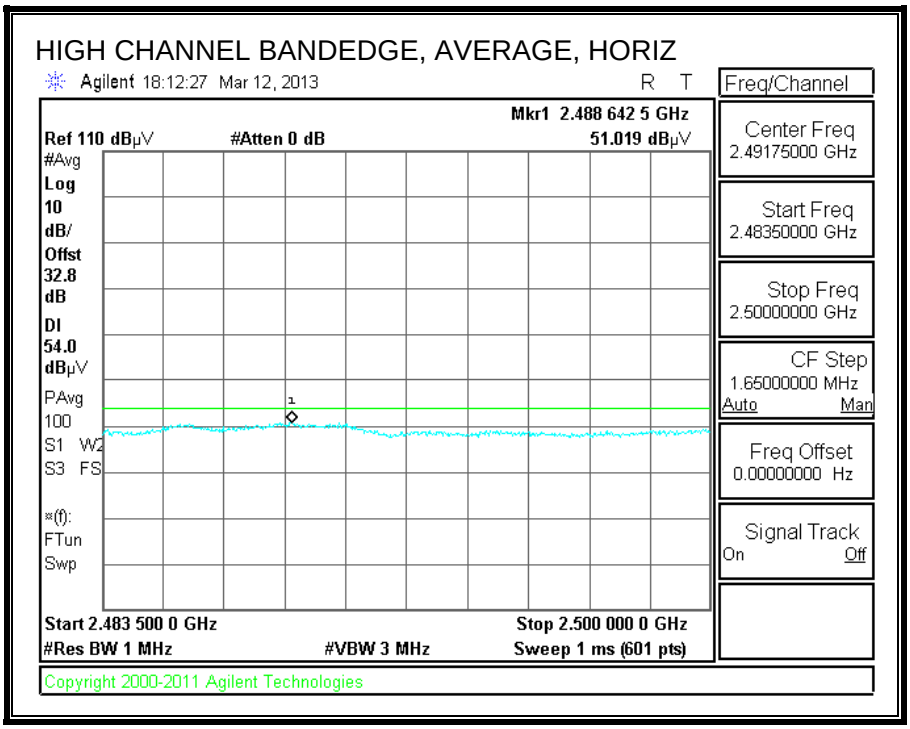
AUTHORIZED BANDEDGE (HIGH CHANNEL)





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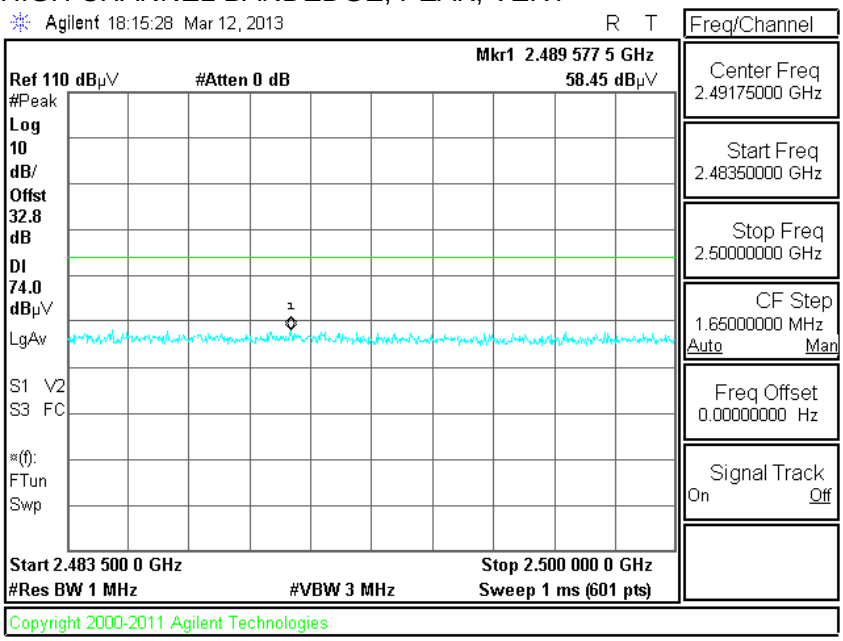
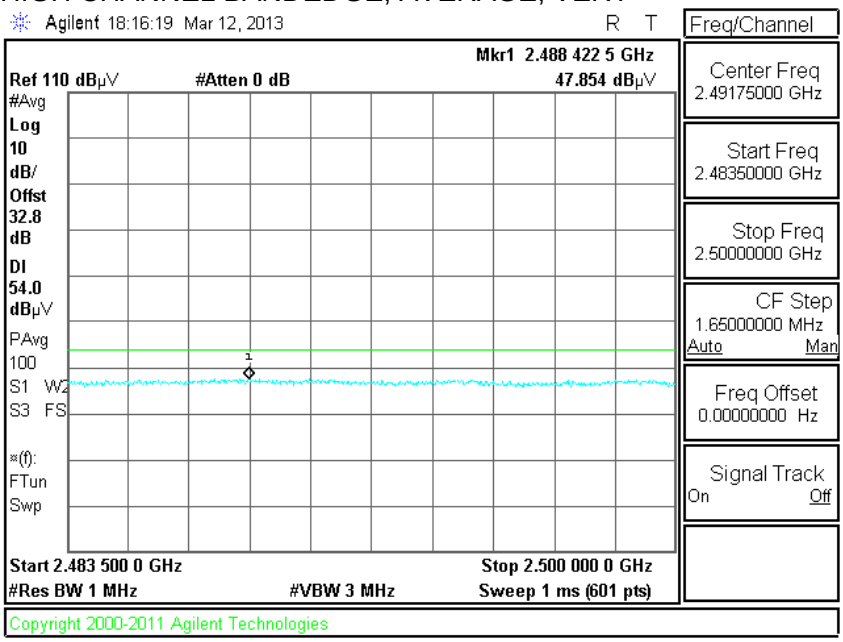
HIGH CHANNEL BANDEDGE, PEAK, VERT



HIGH CHANNEL BANDEDGE, AVERAGE, VERT



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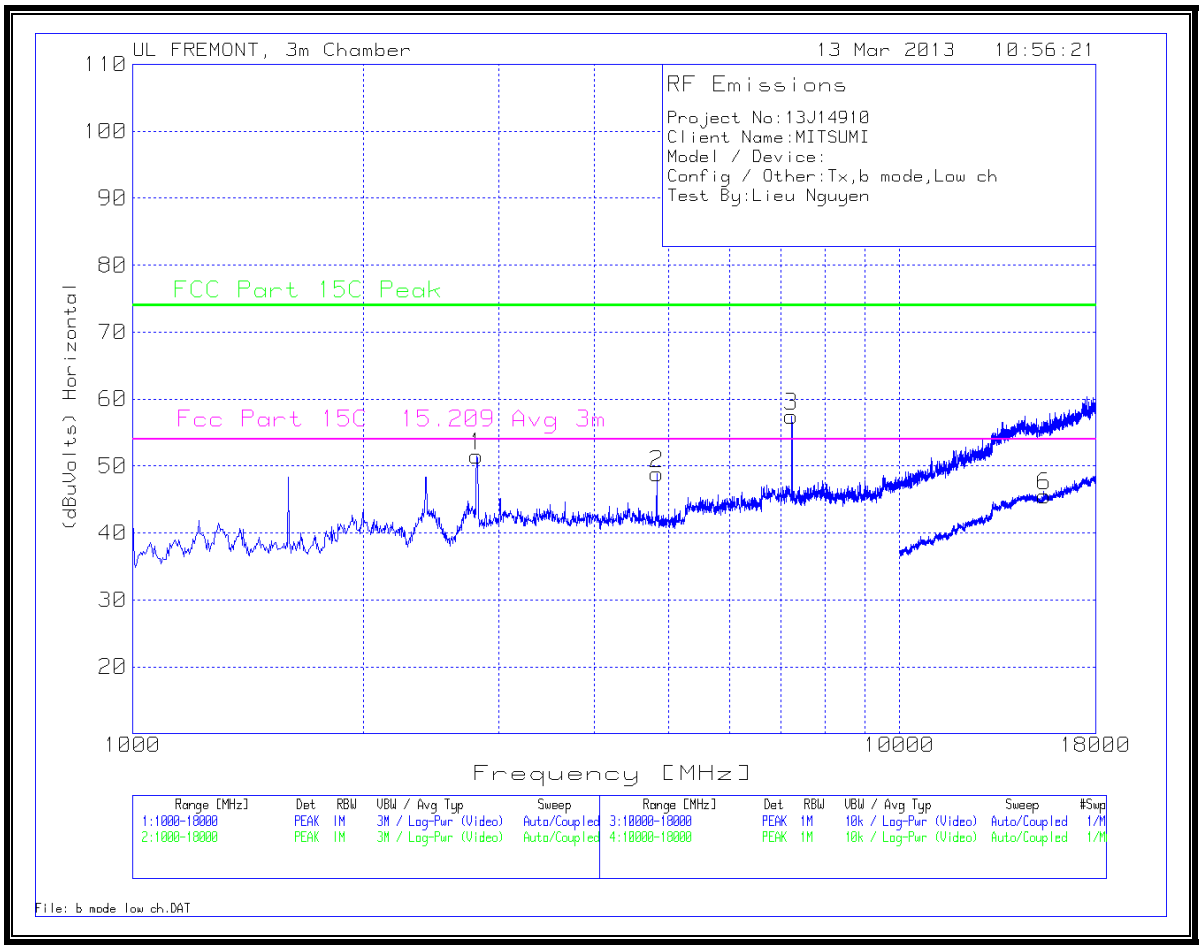
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL

HORIZONTAL PLOT



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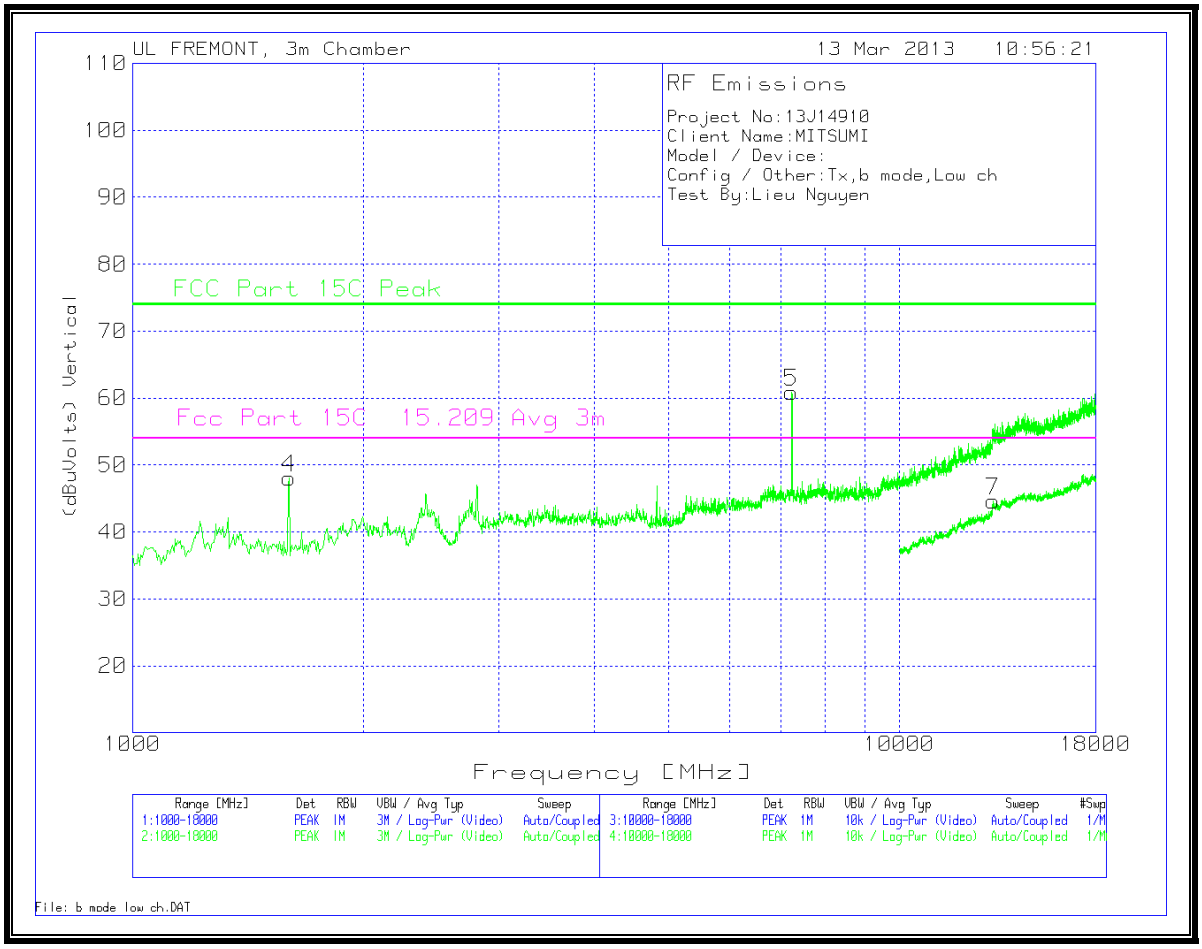
VERTICAL PLOT



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