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

CERTIFICATION TEST REPORT

FOR

802.11a/g/n/ac WLAN + Bluetooth PCI-E Custom Combination

MODEL NUMBER: BCM94360CD

FCC ID: QDS-BRCM1070
IC: 4324A-BRCM1070

REPORT NUMBER: 12U14669-1, Revision A

ISSUE DATE: FEBRUARY 06, 2013

Prepared for
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	02/01/13	Initial Issue	F. Ibrahim
A	02/06/13	Revised justification description for testing 3TX to cover 2TX where applicable, revised section 5.2 (changed PK to AVG on the columns headers), revised section 5.3, and removed the second set of antennas including their gains from the report	F. Ibrahim

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	BROADCOM CORPORATION 190 MATHILDA PLACE SUNNYVALE, CA 94086, USA
EUT DESCRIPTION:	802.11a/b/g/n WLAN + Bluetooth PCI-E Custom Combination Card
MODEL:	BCM94360CD
SERIAL NUMBER:	1626297
DATE TESTED:	OCTOBER 26, 2012 – JANUARY 04, 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 CCS tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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

Approved & Released For UL CCS By:

FRANK IBRAHIM
WiSE PROJECT LEAD
UL CCS

Tested By:

DAVID GARCIA
EMC ENGINEER
UL CCS

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

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is an 802.11a/g/n/ac WLAN + Bluetooth PCI-E Custom Combination.

The radio module is manufactured by Broadcom.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

2400 - 2483.5 MHz Authorized Frequency Band						
Frequency Range (MHz)	Mode	Avg Power, Chain 0 (dBm)	Avg Power, Chain 1 (dBm)	Avg Power, Chain 2 (dBm)	Total Avg power (dBm)	Total Avg power (mW)
2412 - 2462	802.11b Legacy 1TX	Covered by the worst case 802.11b CDD 3TX Mode testing				
2412 - 2462	802.11b CDD 2TX	Covered by the worst case 802.11b CDD 3TX Mode testing				
2412 - 2462	802.11b CDD 3TX	21.43	21.47	21.64	26.29	425.60
2412 - 2462	802.11g Legacy 1TX	22.37	N/A	N/A	22.37	172.58
2412 - 2462	802.11g CDD 2TX	Covered by the worst case 802.11n HT20 CDD 3TX Mode testing				
2412 - 2462	802.11g CDD 3TX	Covered by the worst case 802.11n HT20 CDD 3TX Mode testing				
2412 - 2462	802.11g BF 2TX	Covered by the worst case 802.11n AC20 BF 3TX Mode testing				
2412 - 2462	802.11g BF 3TX	Covered by the worst case 802.11n AC20 BF 3TX Mode testing				
2412 - 2462	802.11n HT20 1TX	Covered by the worst case 802.11n HT20 CDD 3TX Mode testing				
2412 - 2462	802.11n HT20 2TX	Covered by the worst case 802.11n HT20 CDD 3TX Mode testing				
2412 - 2462	802.11n HT20 3TX	20.26	19.95	20.01	24.85	305.26
2412 - 2462	802.11n HT20 BF 2TX	Covered by the worst case 802.11n AC20 BF 3TX Mode testing				
2412 - 2462	802.11n AC20 BF 3TX	20.26	19.95	20.01	24.85	305.26
5725 - 5850 MHz Authorized Frequency Band						
Frequency Range (MHz)	Mode	Avg Power, Chain 0 (dBm)	Avg Power, Chain 1 (dBm)	Avg Power, Chain 2 (dBm)	Total Avg power (dBm)	Total Avg power (mW)
5745 - 5825	802.11a Legacy 1TX	Covered by the worst case 802.11n HT20 CDD 3TX Mode testing				
5745 - 5825	802.11a CDD 2TX	Covered by the worst case 802.11n HT20 CDD 3TX Mode testing				
5745 - 5825	802.11a CDD 3TX	Covered by the worst case 802.11n HT20 CDD 3TX Mode testing				
5745 - 5825	802.11a BF 2TX	Covered by the worst case 802.11n AC20 BF 3TX Mode testing				
5745 - 5825	802.11a BF 3TX	Covered by the worst case 802.11n AC20 BF 3TX Mode testing				
5745 - 5825	802.11n HT20 1TX	Covered by the worst case 802.11n HT20 CDD 3TX Mode testing				
5745 - 5825	802.11n HT20 2TX	Covered by the worst case 802.11n HT20 CDD 3TX Mode testing				
5745 - 5825	802.11n HT20 3TX	22.89	22.84	22.89	27.64	581.38
5745 - 5825	802.11n HT20 BF 2TX	Covered by the worst case 802.11n AC20 BF 3TX Mode testing				
5745 - 5825	802.11n AC20 BF 3TX	22.89	22.84	22.89	27.64	581.38
5755 - 5795	802.11n HT40 1TX	Covered by the worst case 802.11n HT40 CDD 3TX Mode testing				
5755 - 5795	802.11n HT40 2TX	Covered by the worst case 802.11n HT40 CDD 3TX Mode testing				
5755 - 5795	802.11n HT40 3TX	22.76	22.48	22.26	27.28	534.08
5755 - 5795	802.11n HT40 BF 2TX	Covered by the worst case 802.11n AC40 BF 3TX Mode testing				
5755 - 5795	802.11n AC40 BF 3TX	22.76	22.48	22.26	27.28	534.08
5775	802.11n AC80 1TX	Covered by the worst case 802.11n HT80 CDD 3TX Mode testing				
5775	802.11n AC80 2TX	Covered by the worst case 802.11n HT80 CDD 3TX Mode testing				
5775	802.11n AC80 3TX	17.43	16.78	17.04	21.86	153.46
5775	802.11n HT80 BF 2TX	Covered by the worst case 802.11n AC80 BF 3TX Mode testing				
5775	802.11n AC80 BF 3TX	17.43	16.78	17.04	21.86	153.46

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

No.	Antenna Manufacturer	Antenna Type	Model	Peak gain @ 2412, 2422, 2432MHz, (BT)	Peak gain @ 2412, 2422, 2432MHz, (WL:AN)	Peak gain (5150-5250MHz) @5200MHz	Peak gain (5250-5350MHz) @5320MHz	Peak gain (5470-5725MHz) @5500, 5700MHz	Peak gain (5725-5850MHz) @5785, 5805MHz
1	Amphenol/Molex	802.11abgn WLAN Antenna	WF2 (604-3073)	NA	4.32	4.83	4.52	4.72	4.86
1	Amphenol/Molex	802.11abgn WLAN Antenna	WF3 (604-3075)	NA	4.77	2.84	3.21	2.09	1.95
1	Amphenol/Molex	802.11abgn WLAN Antenna	WF4 (604-3074)	NA	3.72	1.18	1.48	2.85	3.09
1	Amphenol/Molex	BT Antenna	WF1 (604-3076)	3.29					

Band (GHz)	Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Chain 2 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
2.40	4.32	4.77	3.72	4.29
5.20	4.83	2.84	1.18	3.21
5.30	4.52	3.21	1.48	3.24
5.60	4.72	2.09	2.85	3.36
5.80	4.86	1.95	3.09	3.47

Band (GHz)	Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Chain 2 Antenna Gain (dBi)	Correlated Chains Directional Gain (dBi)
2.40	4.32	4.77	3.72	9.05
5.20	4.83	2.84	1.18	7.85
5.30	4.52	3.21	1.48	7.93
5.60	4.72	2.09	2.85	8.06
5.80	4.86	1.95	3.09	8.15

5.4. SOFTWARE AND FIRMWARE

The EUT driver software installed during testing was Broadcom, rev. 6.30.118.23.
The test utility software used during testing was BCM Internal, rev. 6.30.RC118.23.

5.5. WORST-CASE CONFIGURATION AND MODE

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

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

For 2.4 GHz Band:
802.11b: 1 Mb/s.
802.11g: 6 Mb/s.
802.11n 20MHz: MCS0.

For 5.8 GHz Band:
802.11a: 6 Mb/s.
802.11n 20MHz: MCS0.
802.11n 40MHz: MCS0.
802.11n 80MHz: MCS0.

Worst-case mode and channel used for 30-1000 MHz radiated and power line conducted emissions was the mode and channel with the highest output power.

For Radiated Band Edge measurements preliminary testing showed that the worst case was vertical polarization, so some final measurements were performed with vertical polarization only.

For the modes where CH2 and CH10 were tested for output power, all other test items at CH1 and CH11 were performed with the higher power level between CH1 and CH2, and between CH10 and CH11 as worst-case scenario.

For all modes with single chain, chain 1 was selected per the software provided by the client. Based on the client a preliminary investigation was performed on the three chains and chain 1 was found to be worst-case.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	HP	DV6000	CNF7120G34	DoC
Laptop	Apple	MacBook Pro	CO2GJ4PYDW48	DoC
AC Adapter	HP	PA-1900-08R1	599830ALLUB6N1	N/A
AC Adapter	Apple	PA-1343	N/A	N/A
Adapter Board	Catalyst	MINI2EXP	BRCM 07	N/A
Adapter Board	Adex	PE-MINI-FLEX	HH	N/A
Adapter Board	Broadcom	BCM94331CSMFG	1458947	N/A

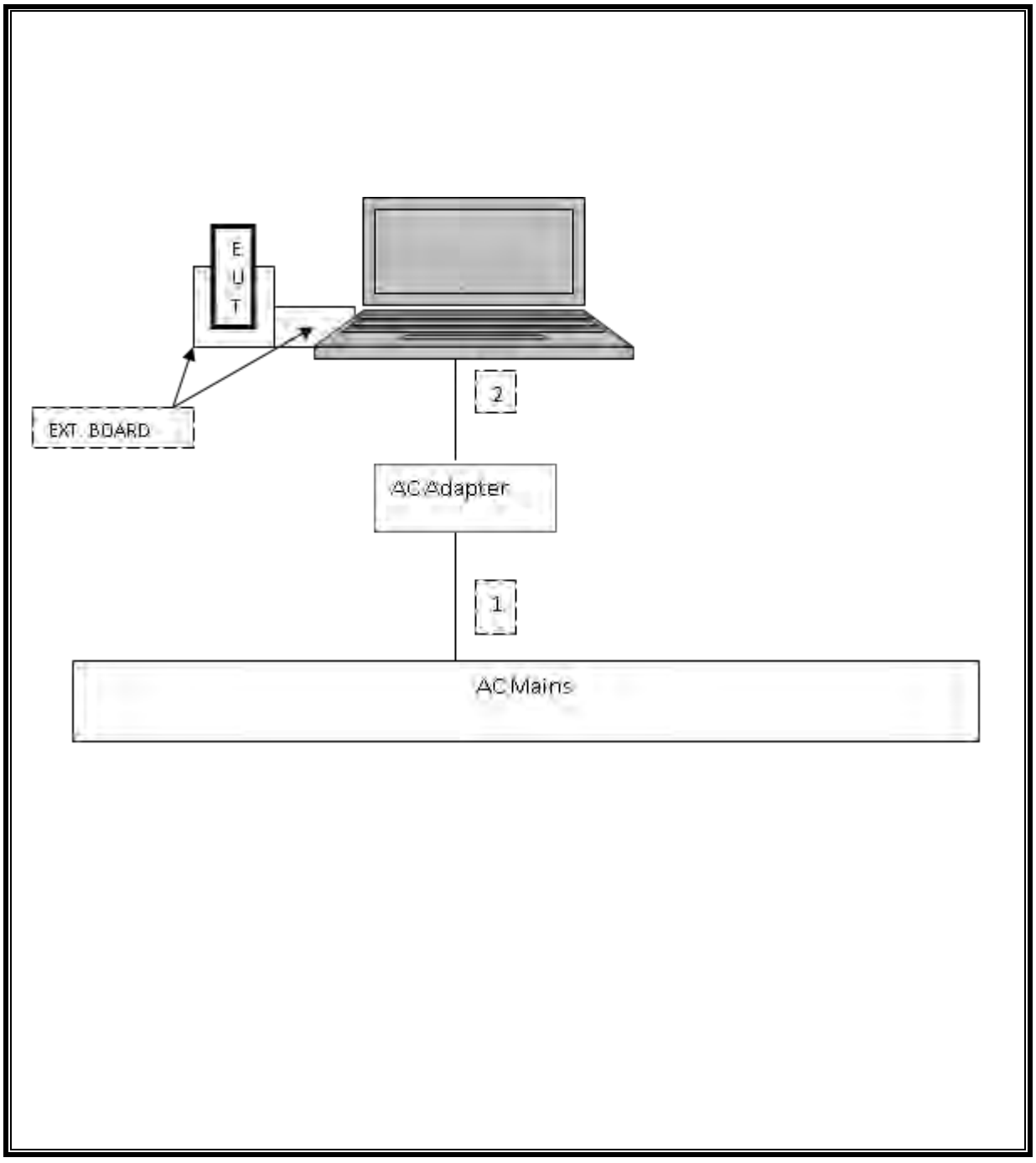
I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	US 115V	Un-Shielded	1m	NA
2	DC	1	DC	Un-Shielded	1.8m	NA

TEST SETUP

The EUT is attached to a jig board which is installed in the PCMCI slot of a host laptop computer during the tests. Test software exercised the radio card.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List					
Description	**Manufacturer**	**Model**	**Asset**	**Cal Date**	**Cal Due**
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01179	02/16/12	02/16/13
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C00986	03/22/12	03/22/13
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01012	10/21/12	10/21/13
EMI Test Receiver, 9 kHz-7 GHz	R & S	ESCI 7	1000741	08/08/12	08/08/13
EMI Test Receiver, 9 kHz-7 GHz	R & S	ESCI 7		08/21/12	08/21/13
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	08/08/12	08/08/13
Antenna, Horn, 18 GHz	EMCO	3115	C00945	11/12/12	11/12/13
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00980	11/14/12	11/14/13
Antenna, Horn, 40 GHz	ARA	MWH-2640/B	C00981	06/14/11	06/14/13
Antenna, Bilog, 30MHz-1 GHz	Sunol Sciences	JB1		02/07/12	02/07/13
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C00749	10/19/12	10/19/13
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	10/22/12	10/22/13
Preamplifier, 40 GHz	Miteq	NSP4000-SP2	C00990	08/02/11	08/02/13
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	12/20/11	12/30/13
P-Series single channel Power Meter	Agilent / HP	N1911A		07/27/12	07/27/13
Peak / Average Power Sensor	Agilent / HP	E9323A		07/26/12	07/26/13
LISN, 30 MHz	FCC	50/250-25-2	C00626	12/13/11	01/13/14

7. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 558074 D01 v02; 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)
802.11b	12.4800	12.6000	0.990	99.0%	0.00
802.11g	2.0600	2.0870	0.987	98.7%	0.00
802.11a 20 MHz	2.0620	2.0870	0.988	98.8%	0.00
802.11n HT20 CDD	1.9250	1.9500	0.987	98.7%	0.00
802.11n HT20 STBC	11.5300	11.6700	0.988	98.8%	0.00
802.11n HT40	0.9133	0.9633	0.948	94.8%	0.23
802.11n HT40 CDD	0.9167	0.9633	0.952	95.2%	0.22
802.11n HT40 STBC	0.9200	0.9700	0.948	94.8%	0.23
802.11n HT80	0.4317	0.4800	0.899	89.9%	0.46
802.11n HT80 CDD	0.4317	0.4800	0.899	89.9%	0.46

7.2. MEASUREMENT METHODS

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

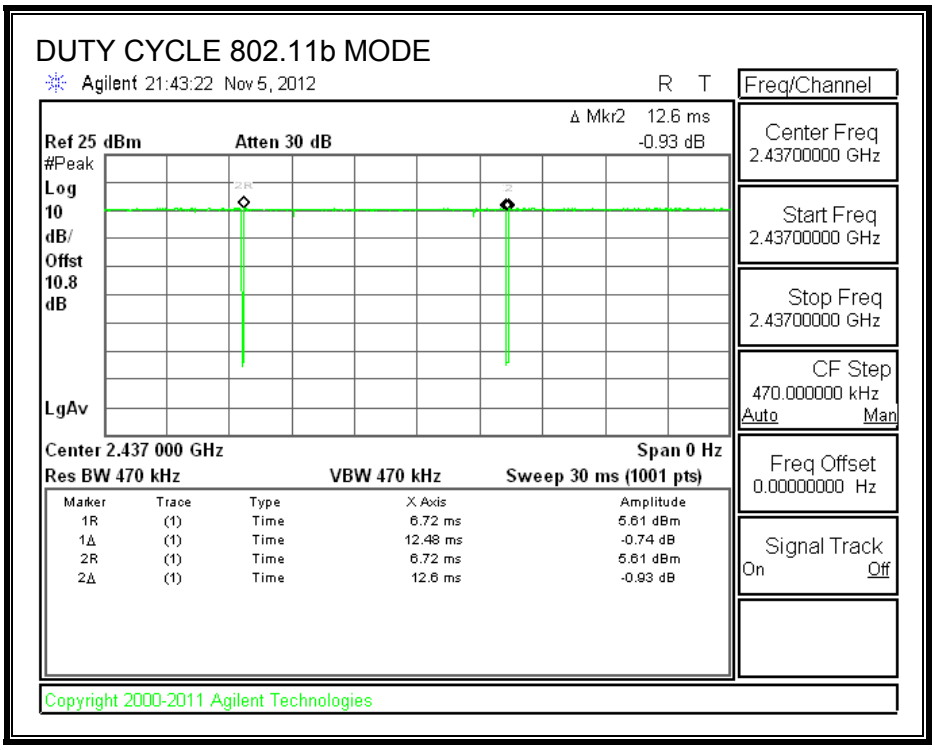
Output Power: KDB 558074 D01 v02, Sections 8.2.3 and 8.2.4.

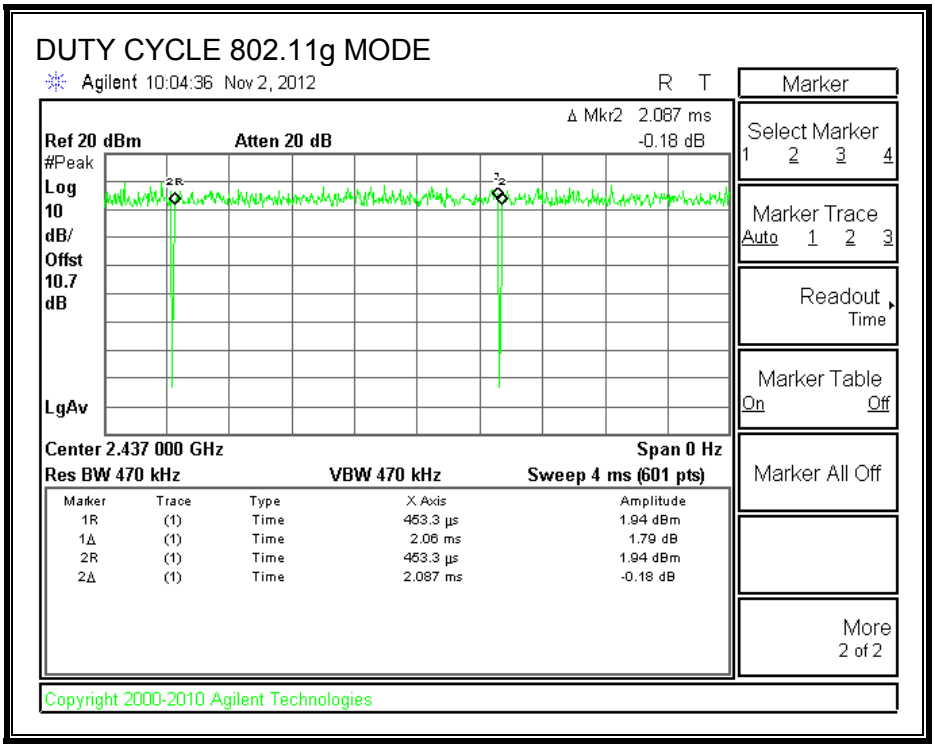
Power Spectral Density: KDB 558074 D01 v02, Sections 9.2 and 9.4.

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

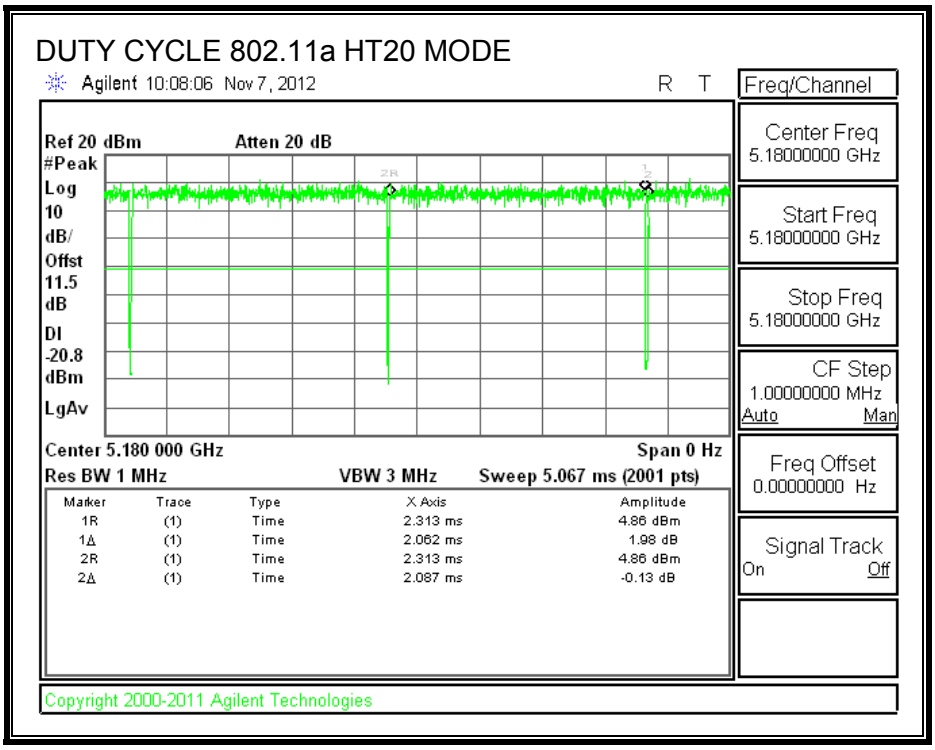
Out-of-band emissions in restricted bands: KDB 558074 D01 v02, Sections 10.2.1.

7.3. DUTY CYCLE PLOTS

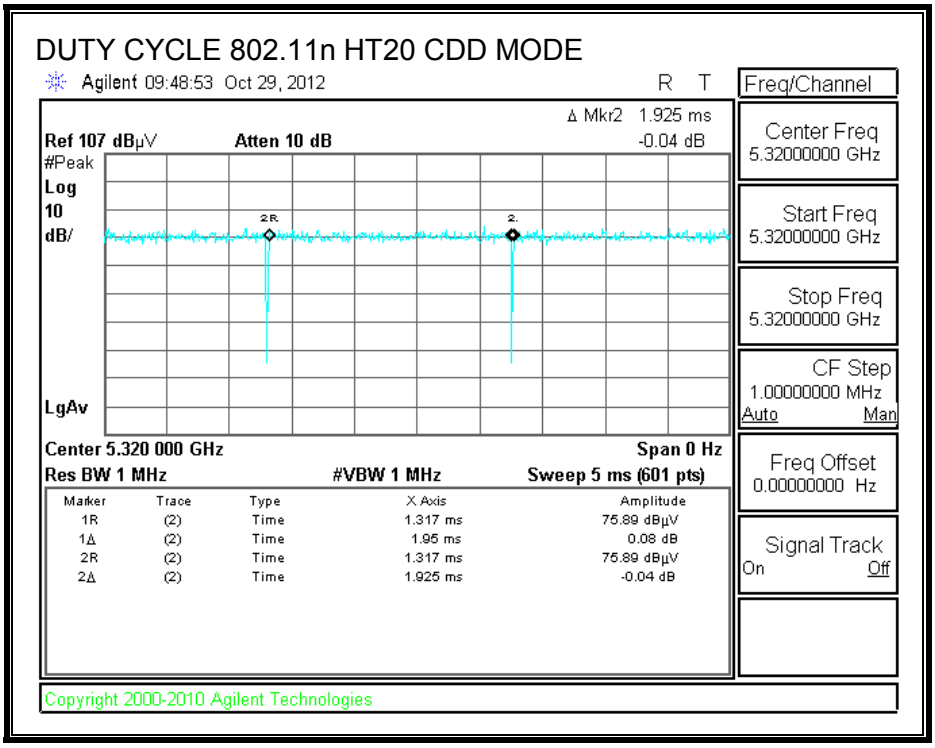




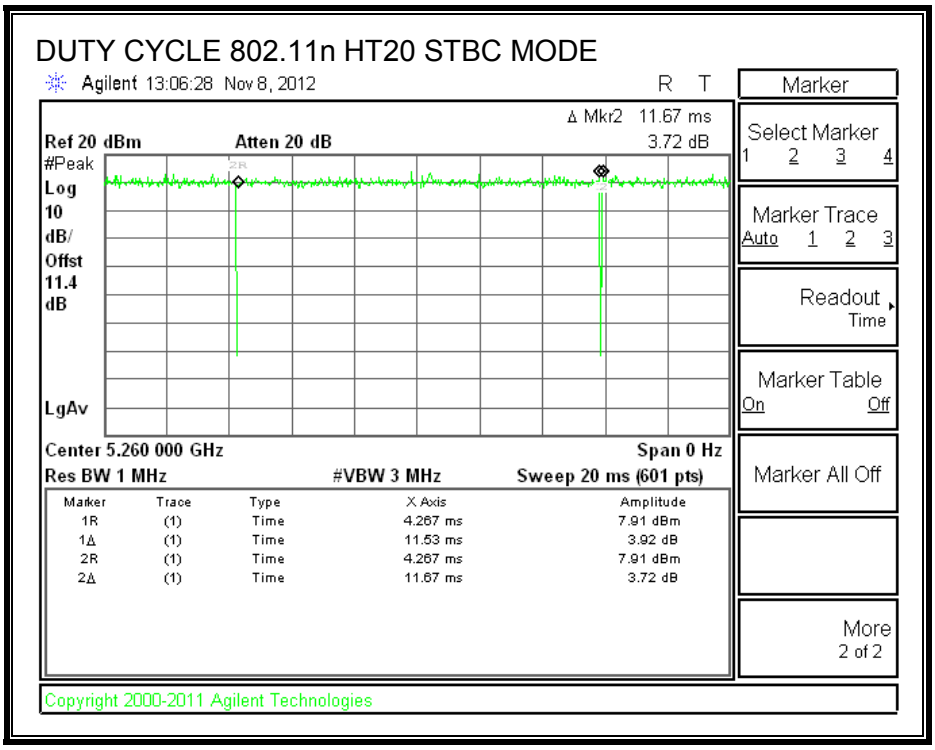
DUTY CYCLE 802.11a HT20 MODE



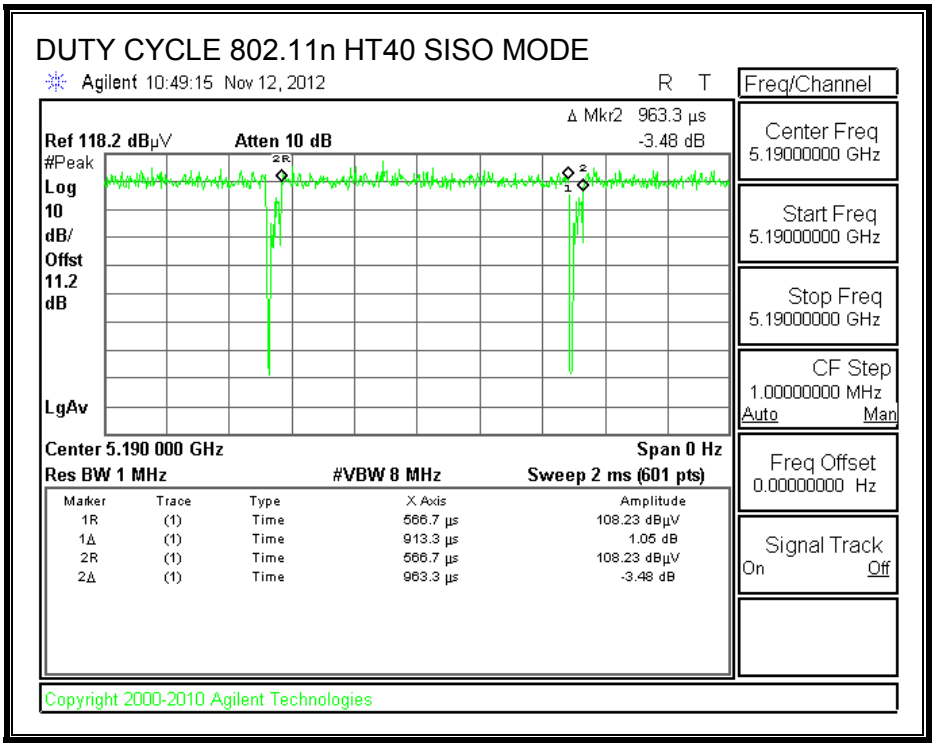
DUTY CYCLE 802.11n HT20 CDD MODE

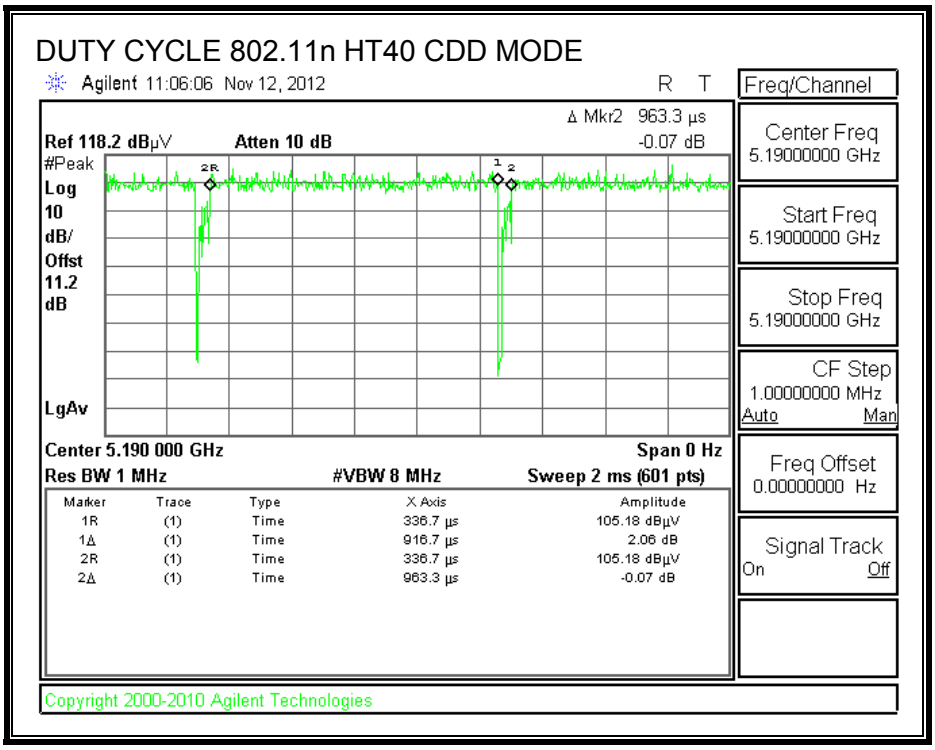


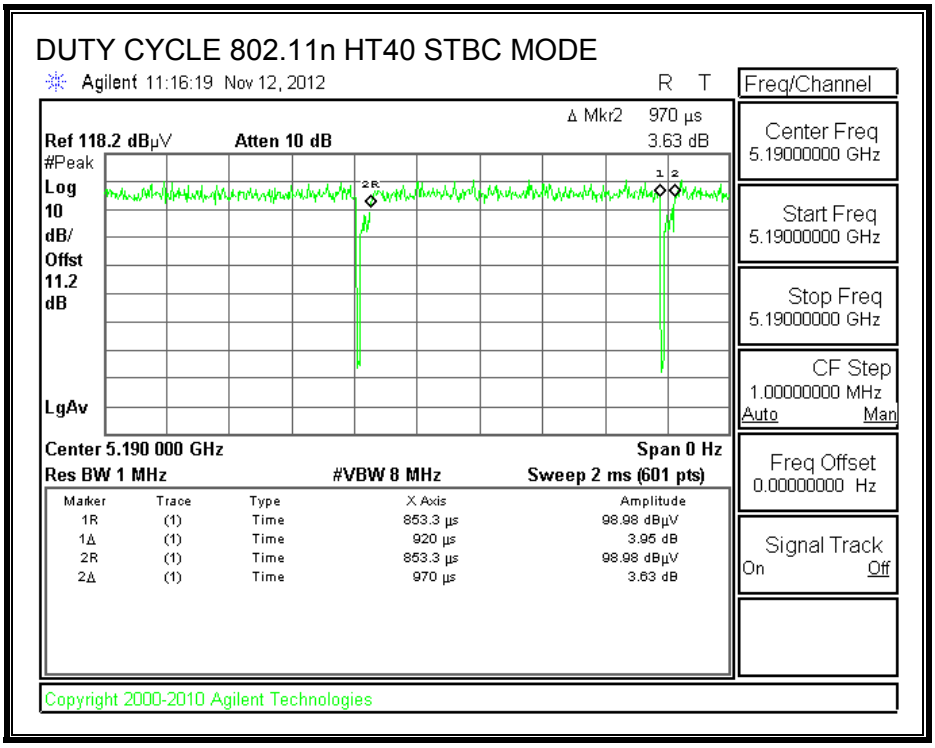
DUTY CYCLE 802.11n HT20 STBC MODE

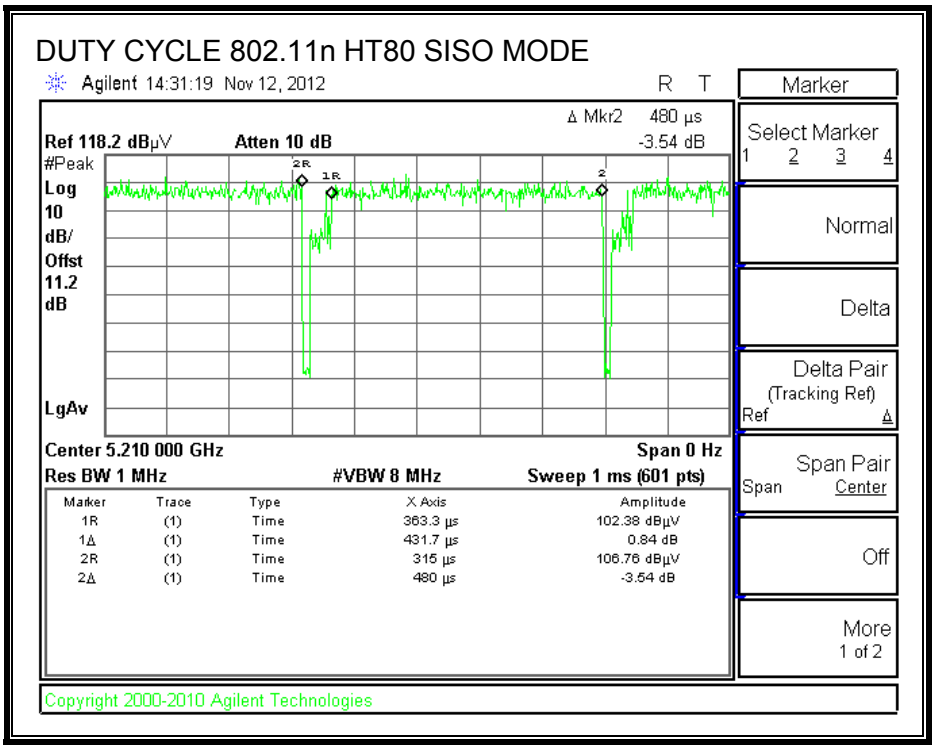


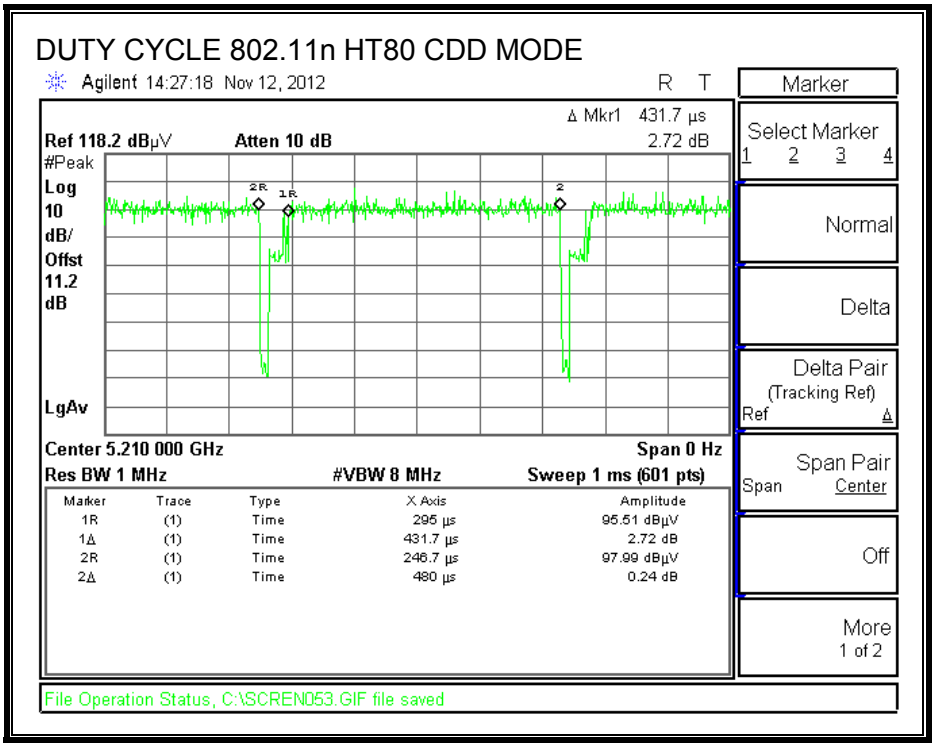
DUTY CYCLE 802.11n HT40 SISO MODE











8. ANTENNA PORT TEST RESULTS

8.1. 802.11b 1TX MODE IN THE 2.4 GHz BAND

Covered by testing 802.11b 3TX CDD mode, total power across all three chains is higher than the power level the device will operate at.

8.2. 802.11b 2TX CDD MODE IN THE 2.4 GHz BAND

Covered by testing 802.11b 3TX CDD mode, total power across all three chains is higher than the power level the device will operate at.

8.3. 802.11b 3TX CDD MODE IN THE 2.4 GHz BAND

8.3.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

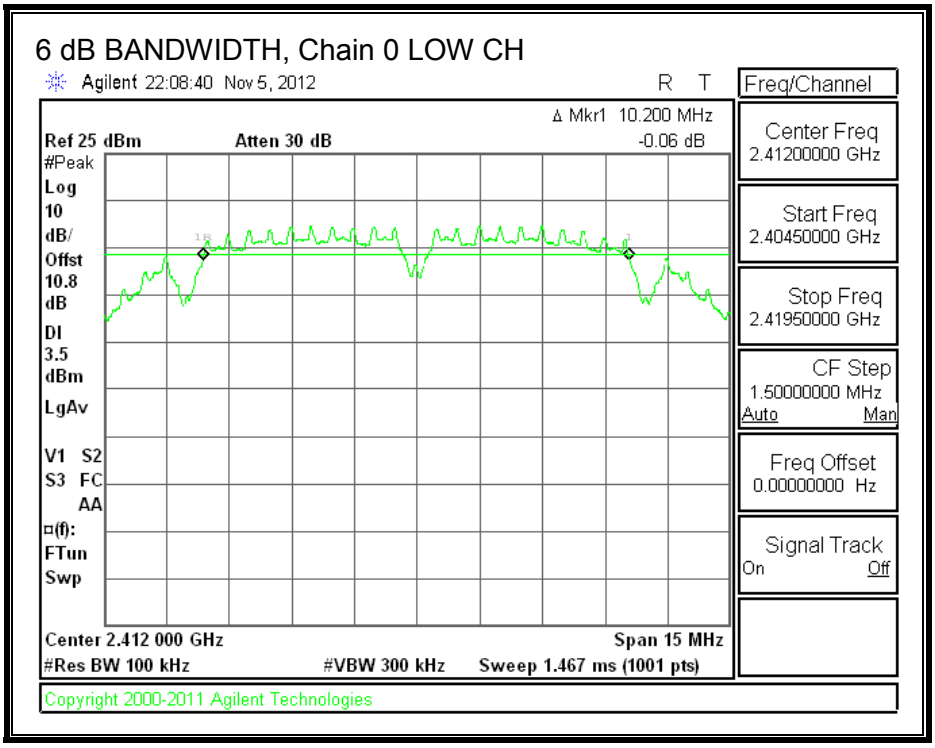
IC RSS-210 A8.2 (a)

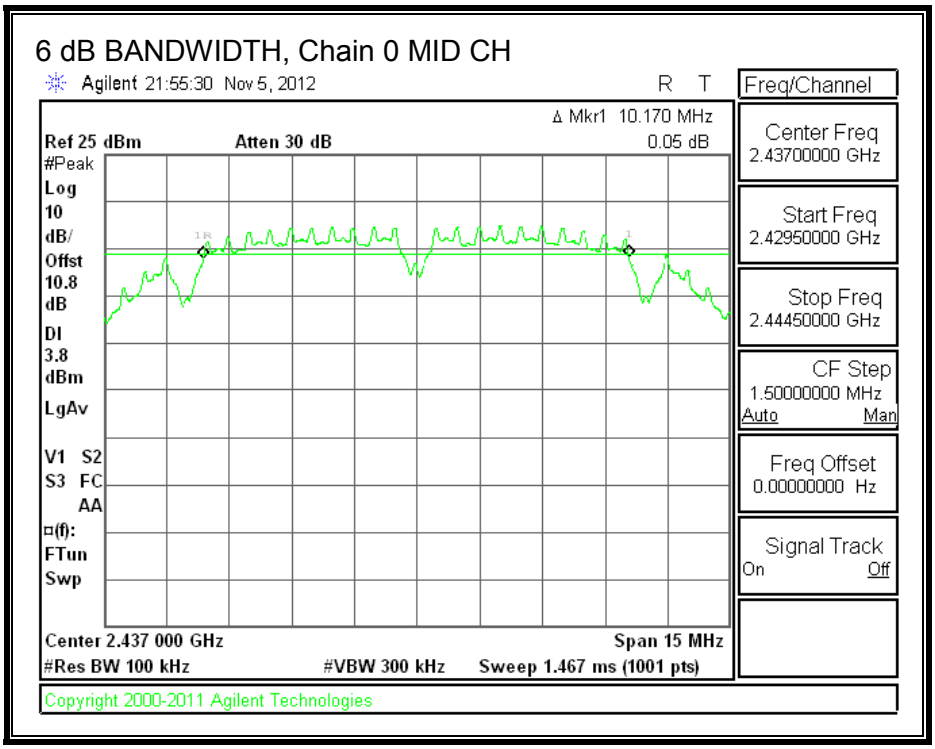
The minimum 6 dB bandwidth shall be at least 500 kHz.

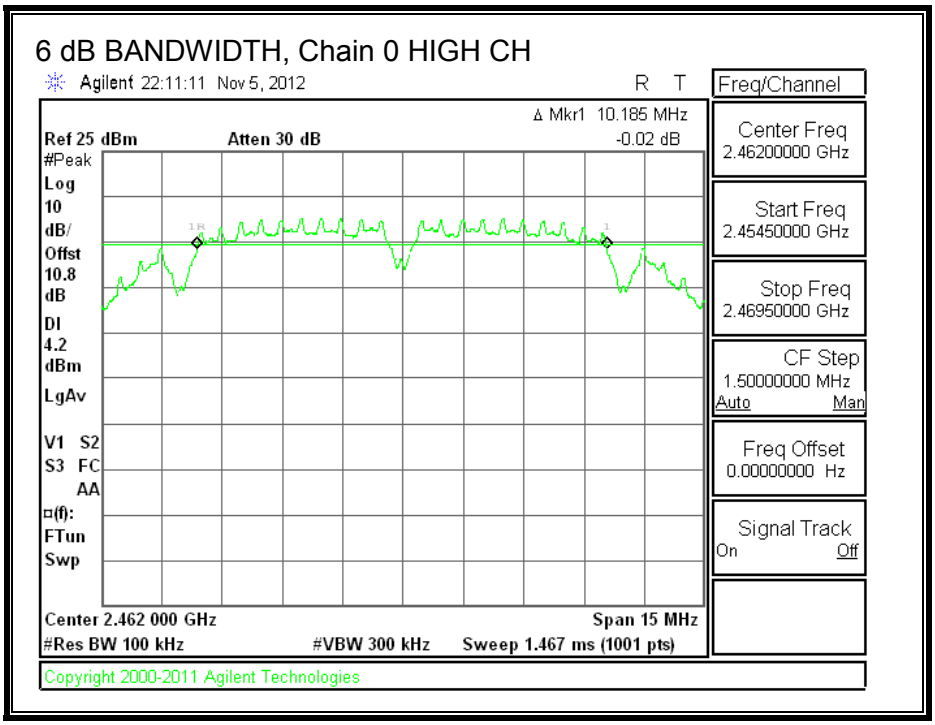
RESULTS

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	6 dB BW Chain 2 (MHz)	Minimum Limit (MHz)
Low	2412	10.200	10.185	10.170	0.5
Mid	2437	10.170	10.185	10.185	0.5
High	2462	10.185	10.185	10.185	0.5

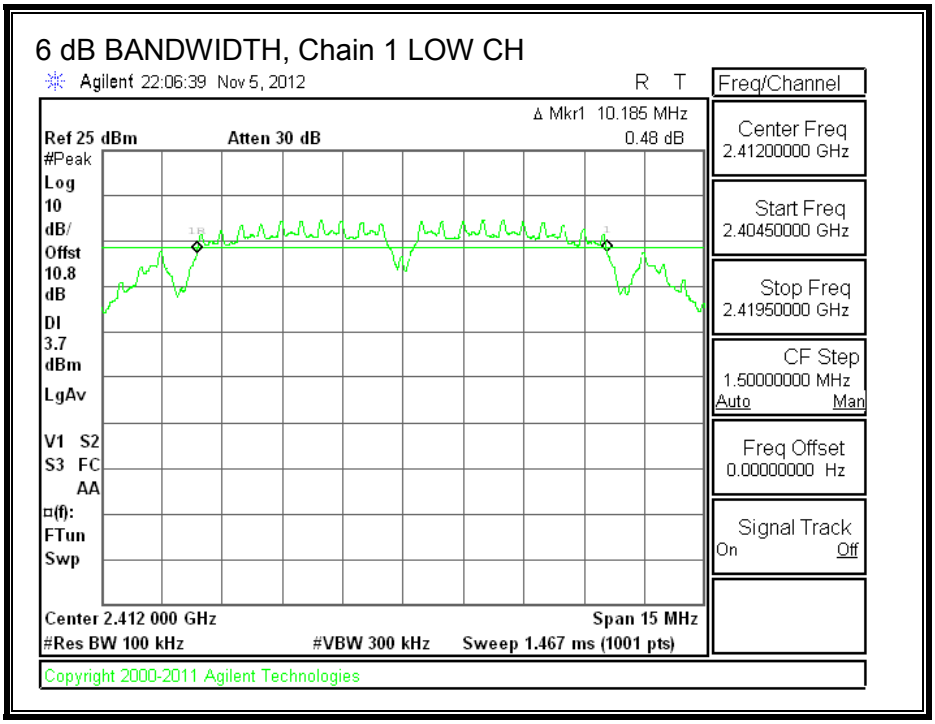
6 dB BANDWIDTH, Chain 0



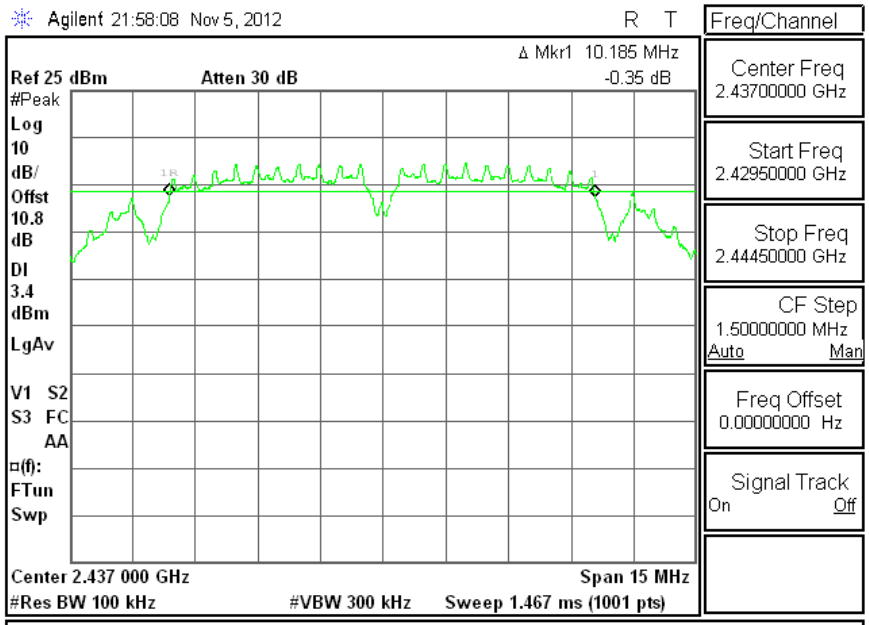




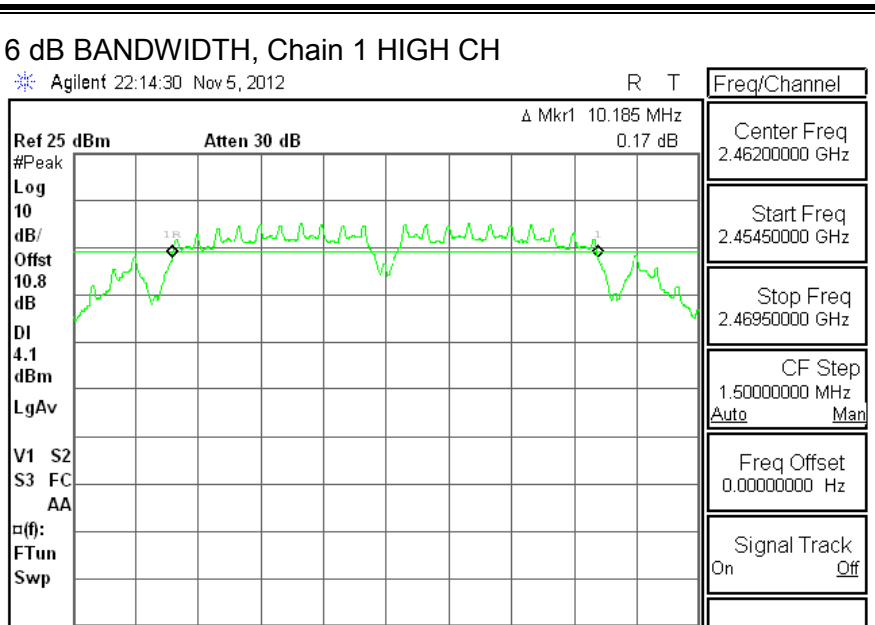
6 dB BANDWIDTH, Chain 1



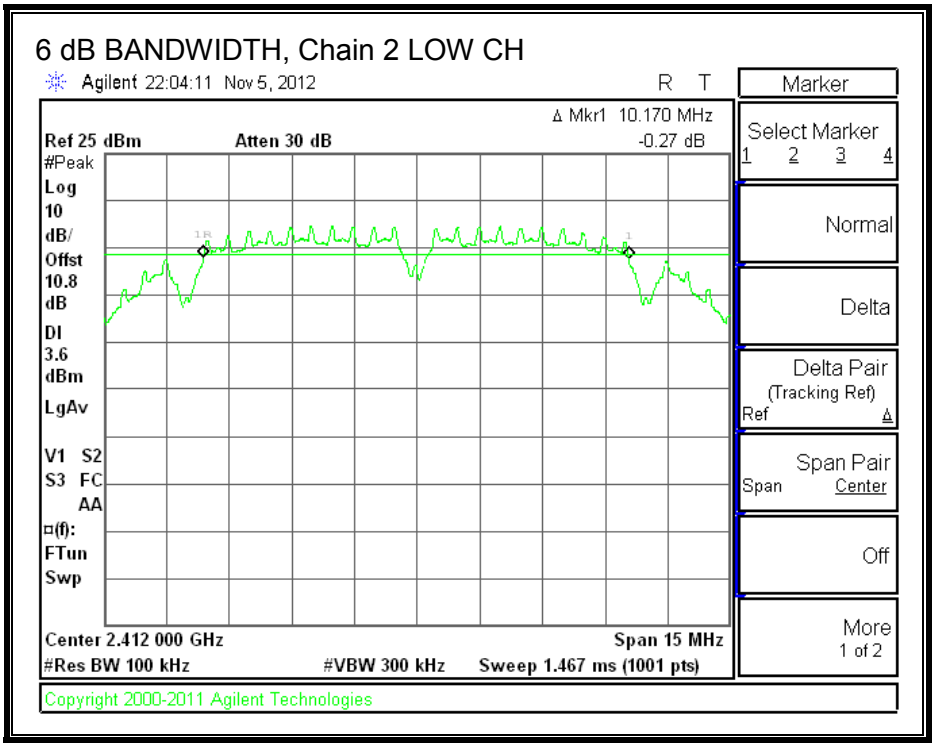
6 dB BANDWIDTH, Chain 1 MID CH

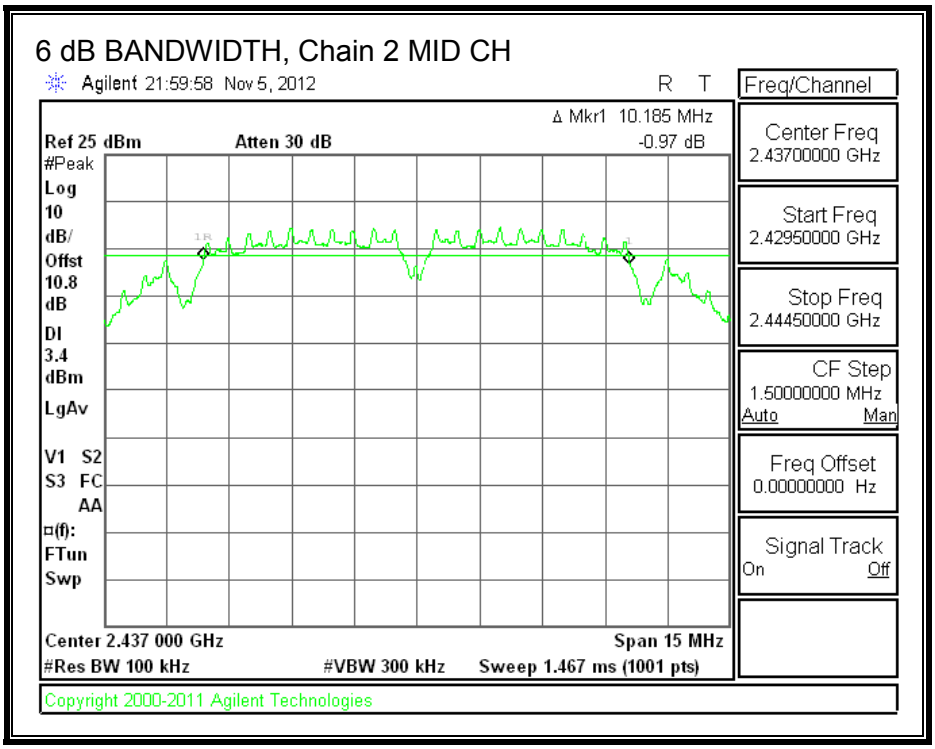


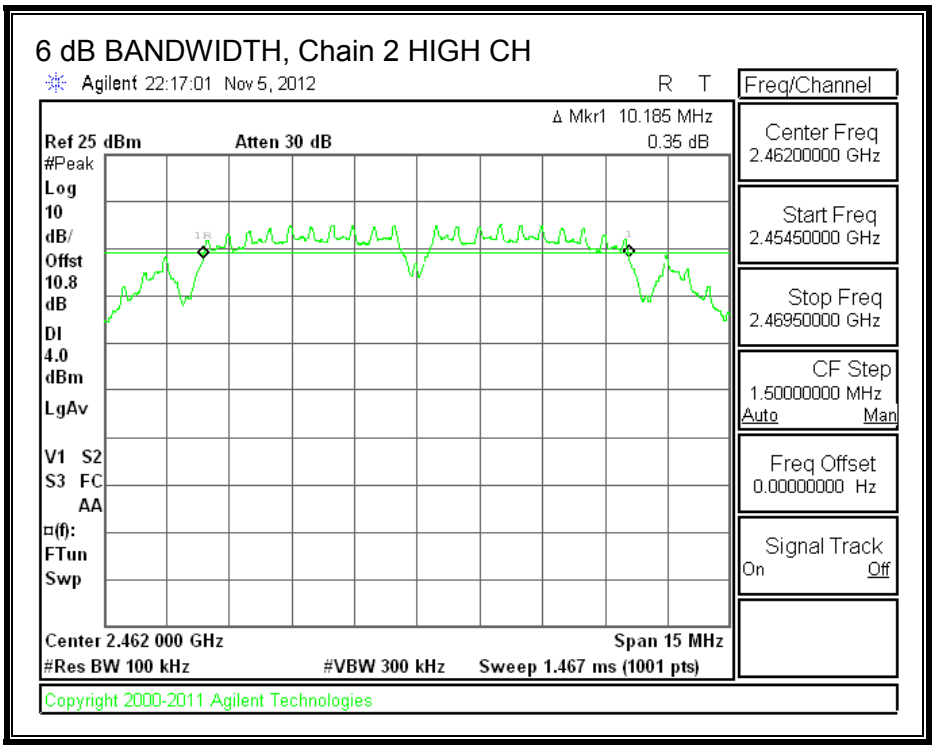
6 dB BANDWIDTH, Chain 1 HIGH CH



6 dB BANDWIDTH, Chain 2







8.3.2. 99% BANDWIDTH

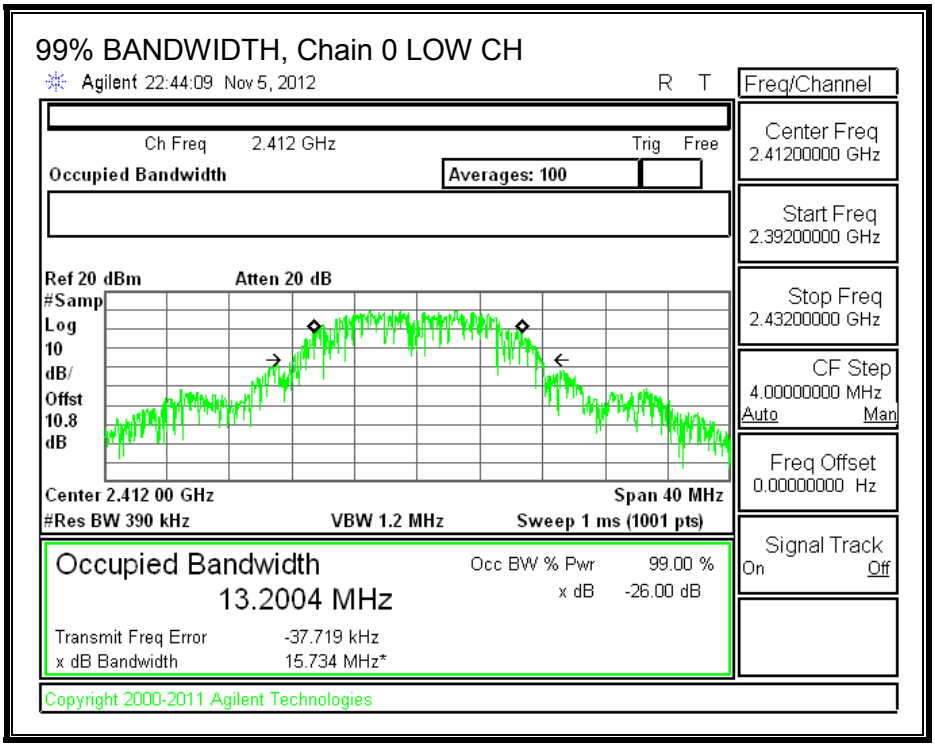
LIMITS

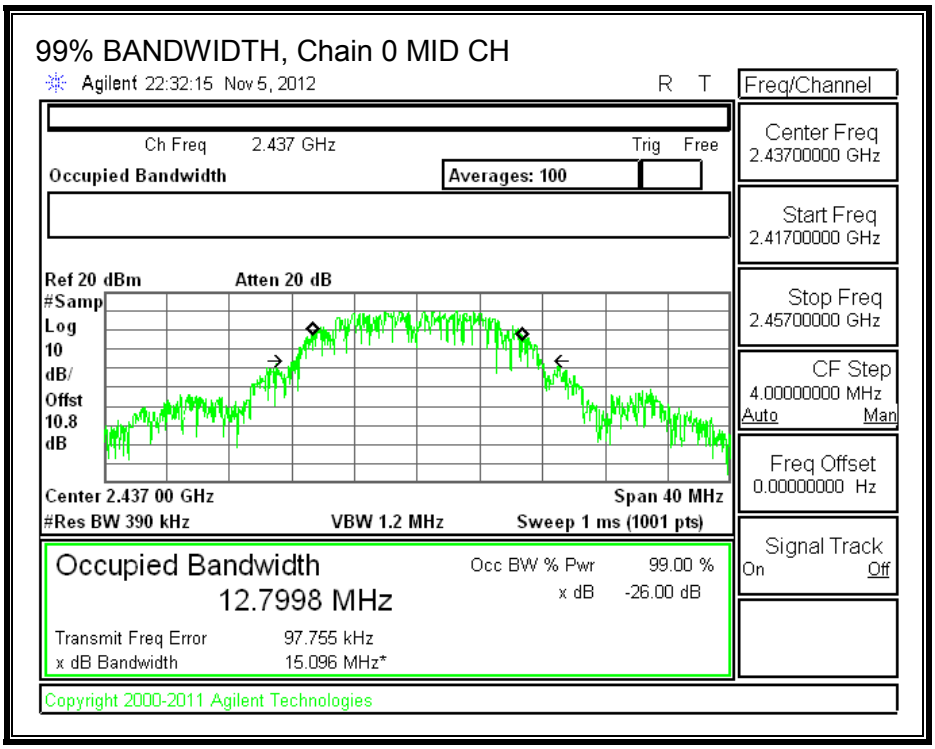
None; for reporting purposes only.

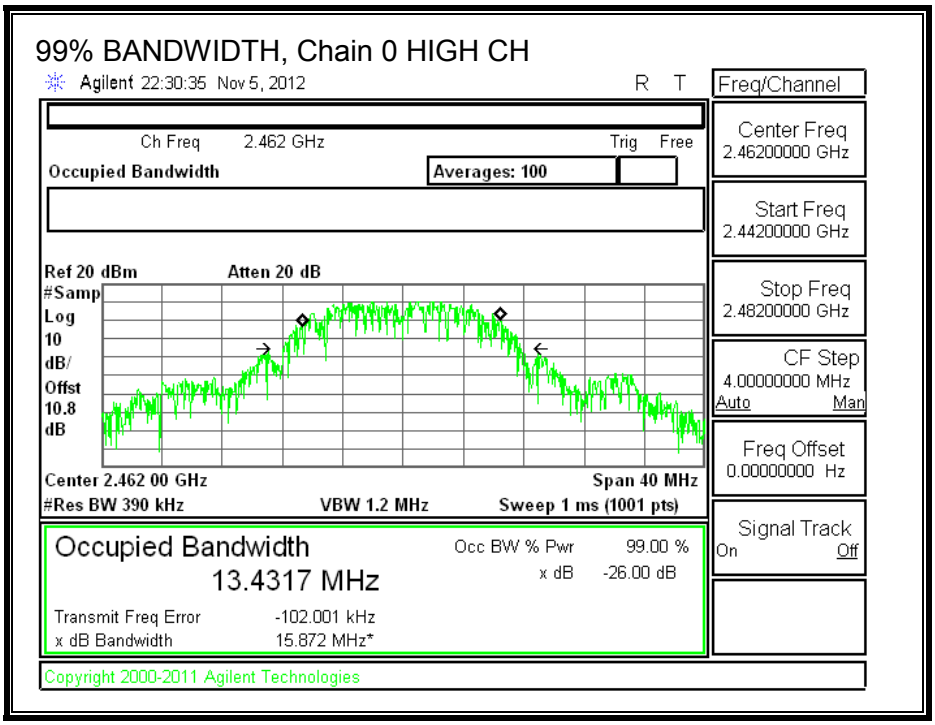
RESULTS

Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)	99% BW Chain 2 (MHz)
Low	2412	13.2004	12.8665	13.3183
Mid	2437	12.7998	13.0213	13.5619
High	2462	13.4317	13.0173	13.1041

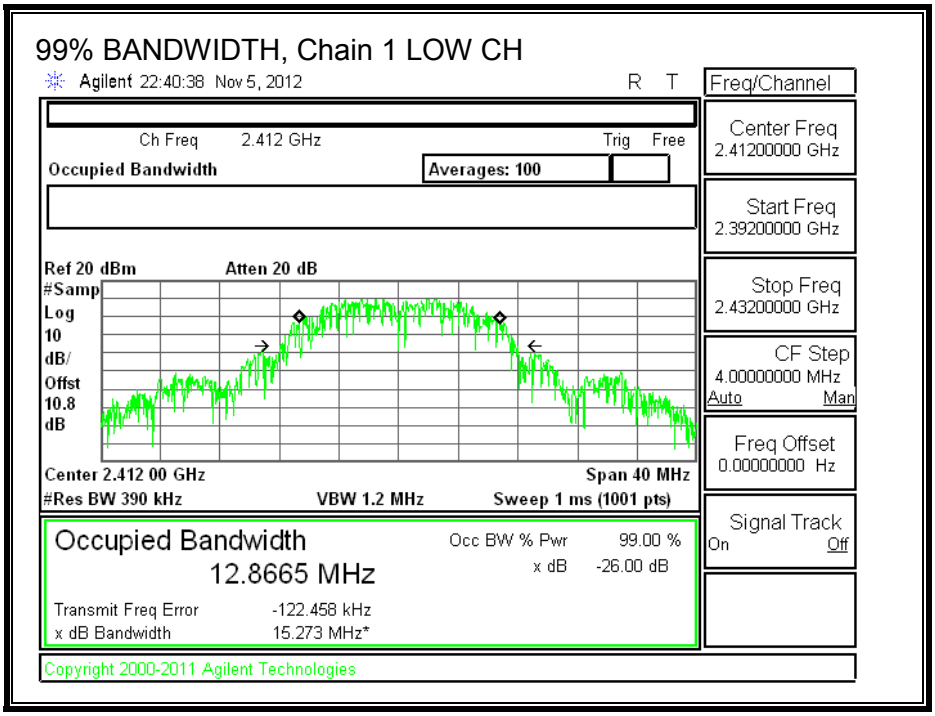
99% BANDWIDTH, Chain 0

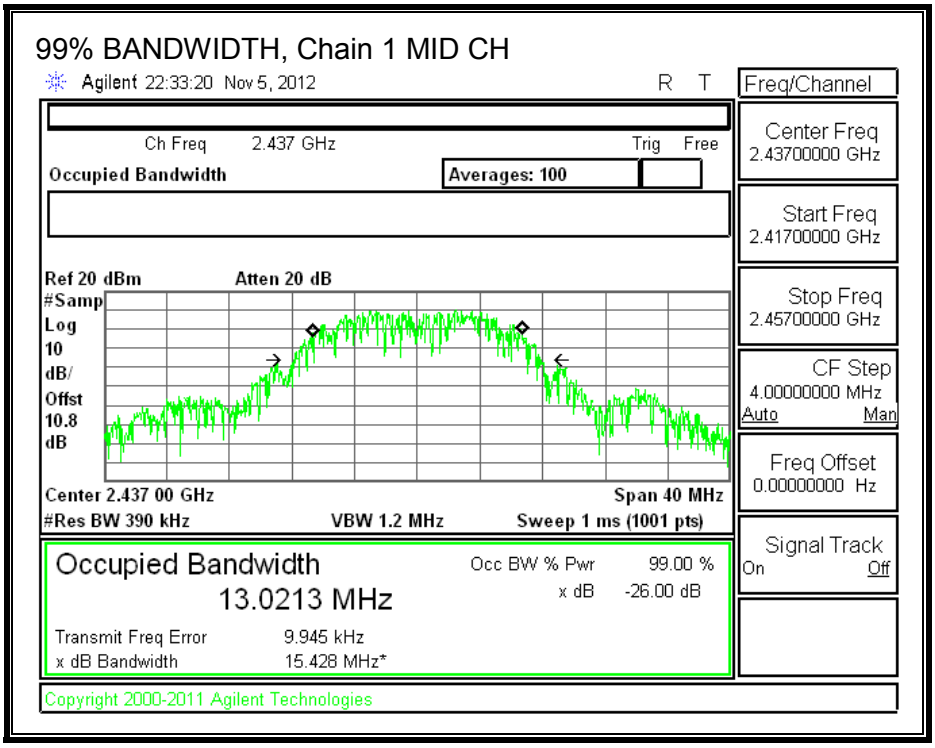


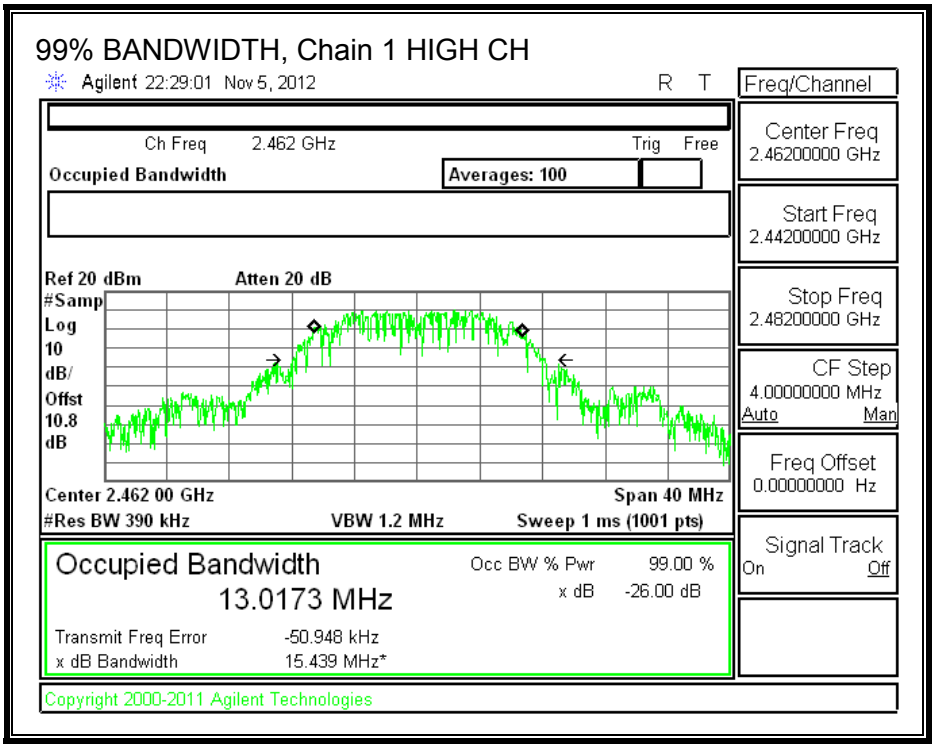




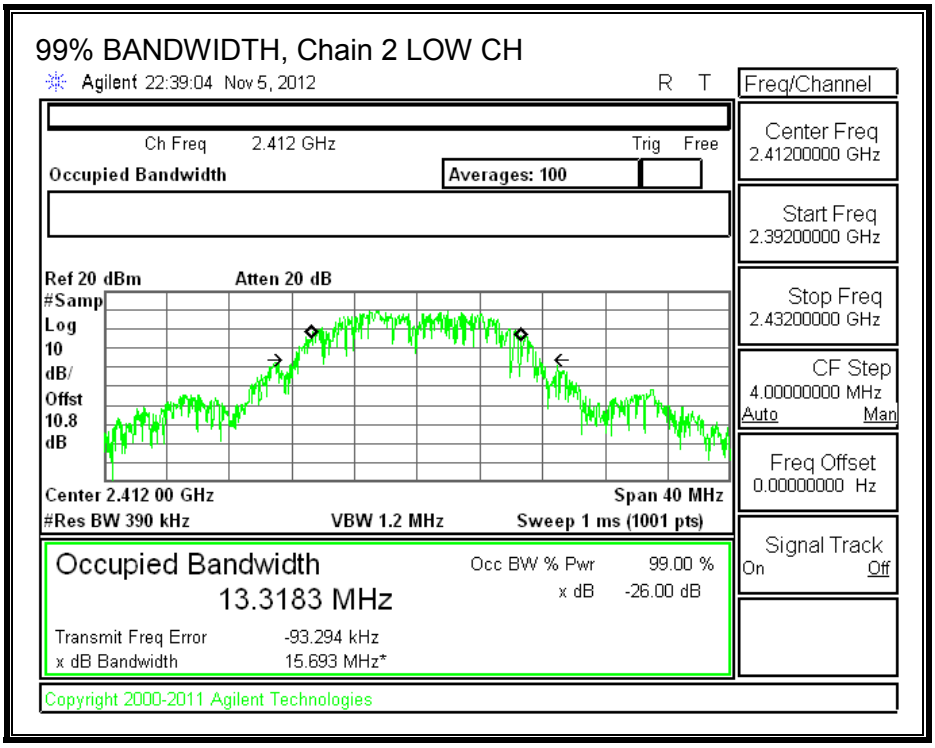
99% BANDWIDTH, Chain 1

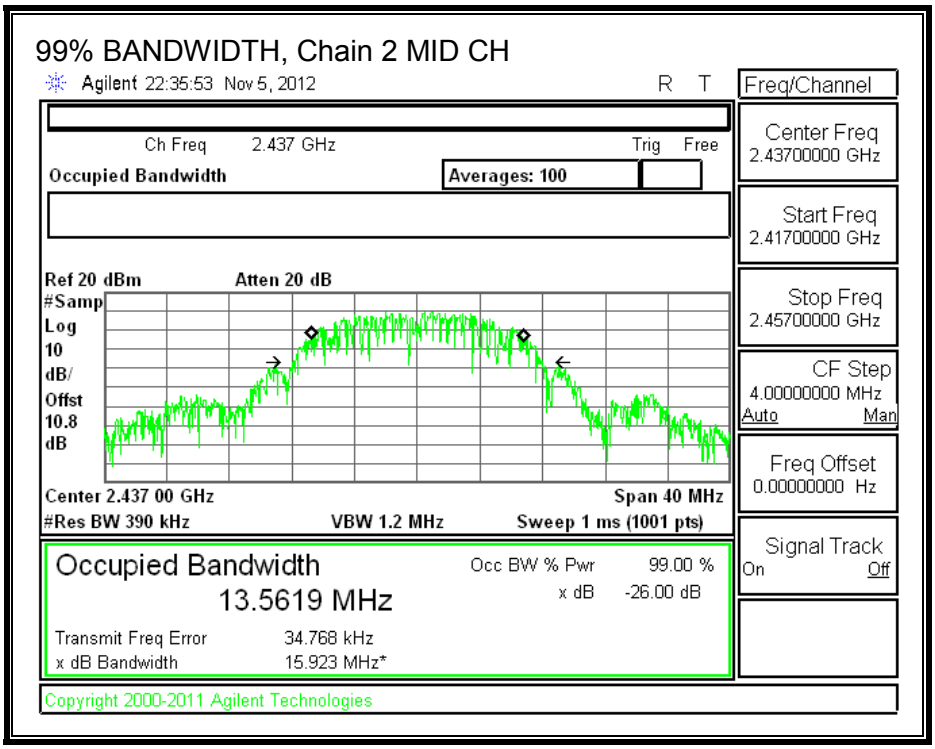


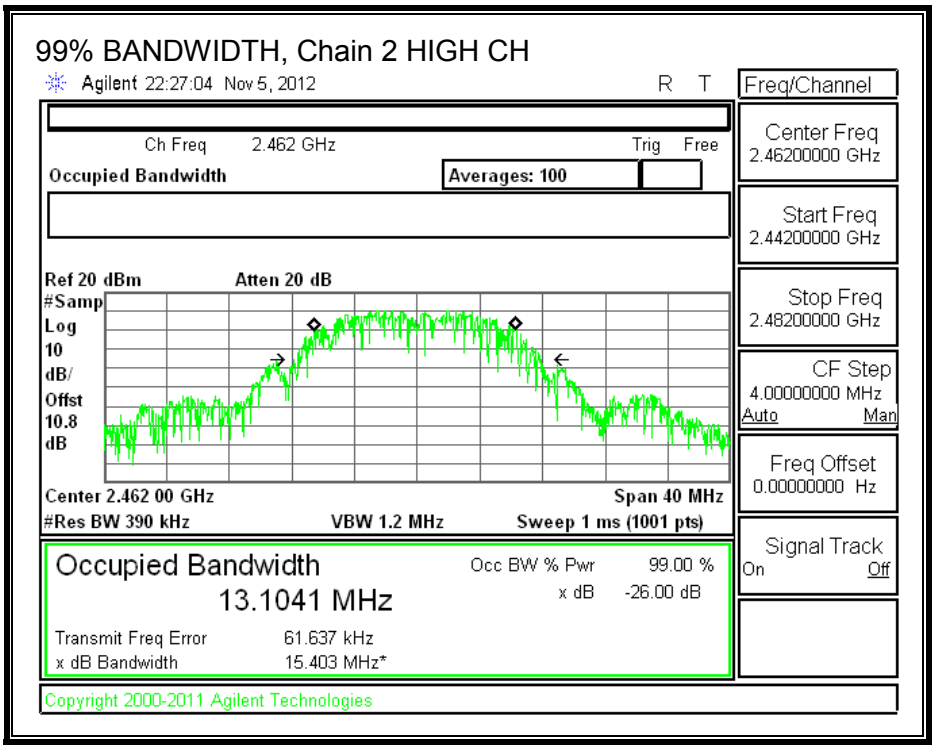




99% BANDWIDTH, Chain 2







8.3.3. 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 for output power consideration, and the antenna gain is unequal among the chains. The directional gain is:

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Chain 2 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
4.32	4.77	3.72	4.29

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	4.29	30.00	30	36	30.00
Mid	2437	4.29	30.00	30	36	30.00
High	2462	4.29	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Chain 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	19.49	19.29	19.28	24.13	30.00	-5.87
Mid	2437	21.43	21.47	21.64	26.29	30.00	-3.71
High	2462	20.03	19.94	19.76	24.68	30.00	-5.32

8.3.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247

IC RSS-210 A8.2

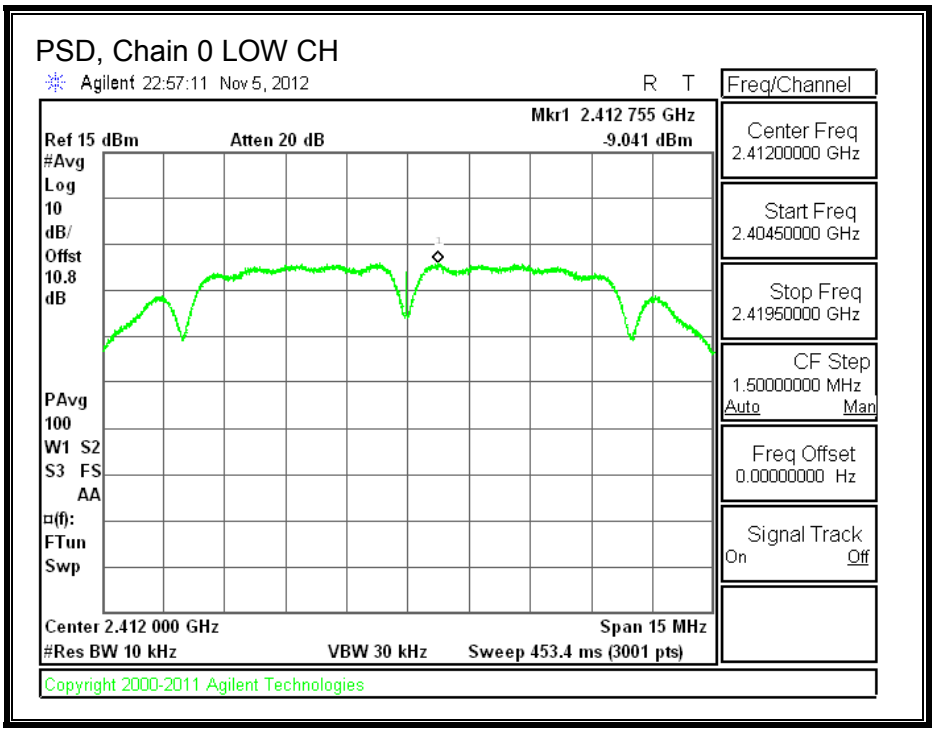
The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

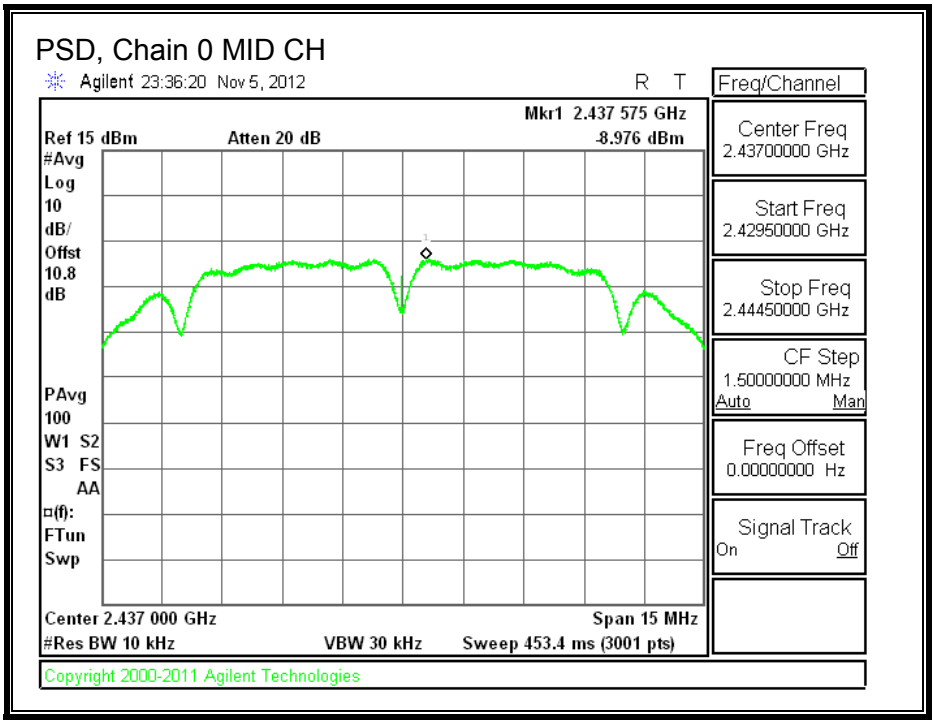
RESULTS

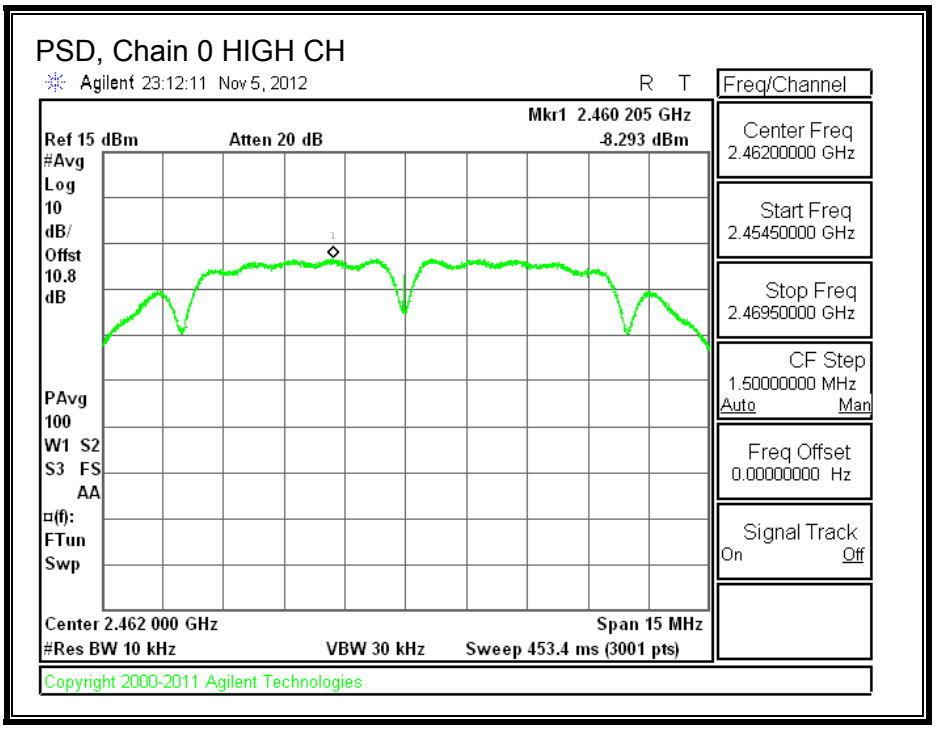
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Chain 1 Meas (dBm)	Chain 2 Meas (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-9.041	-9.062	-9.239	-4.342	8.0	-12.342
Mid	2437	-8.976	-9.096	-9.129	-4.295	8.0	-12.295
High	2462	-8.293	-8.418	-8.536	-3.643	8.0	-11.643

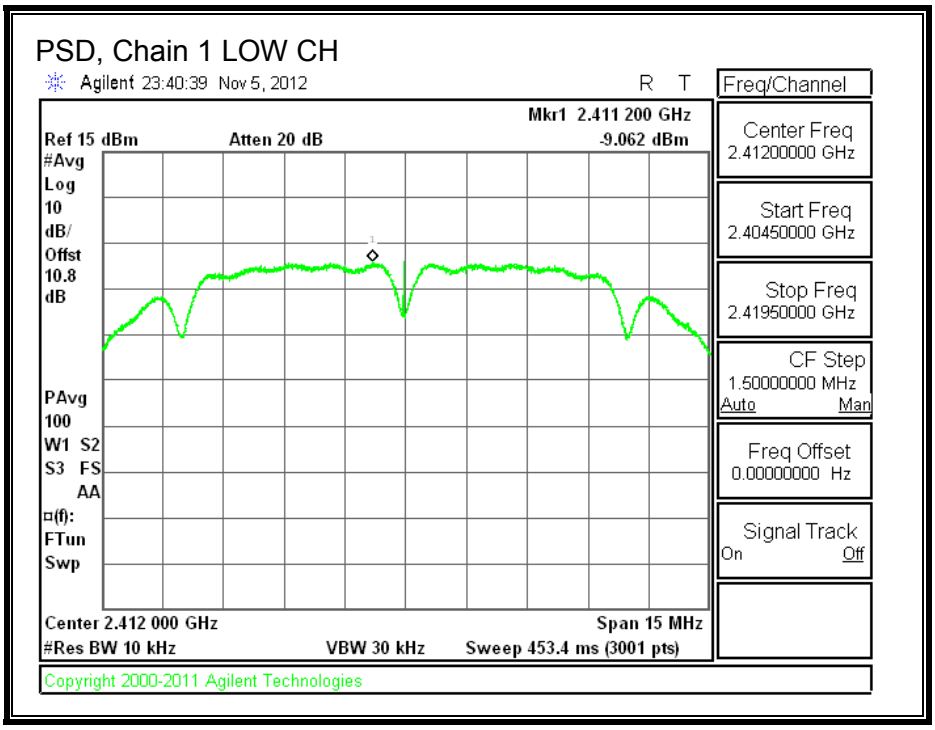
PSD, Chain 0



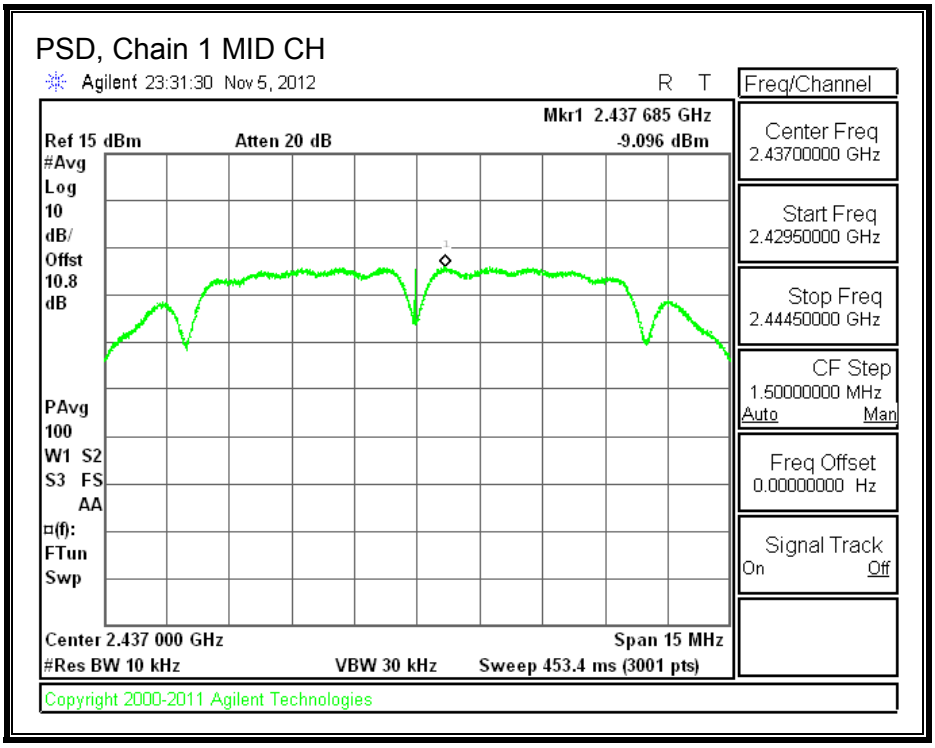




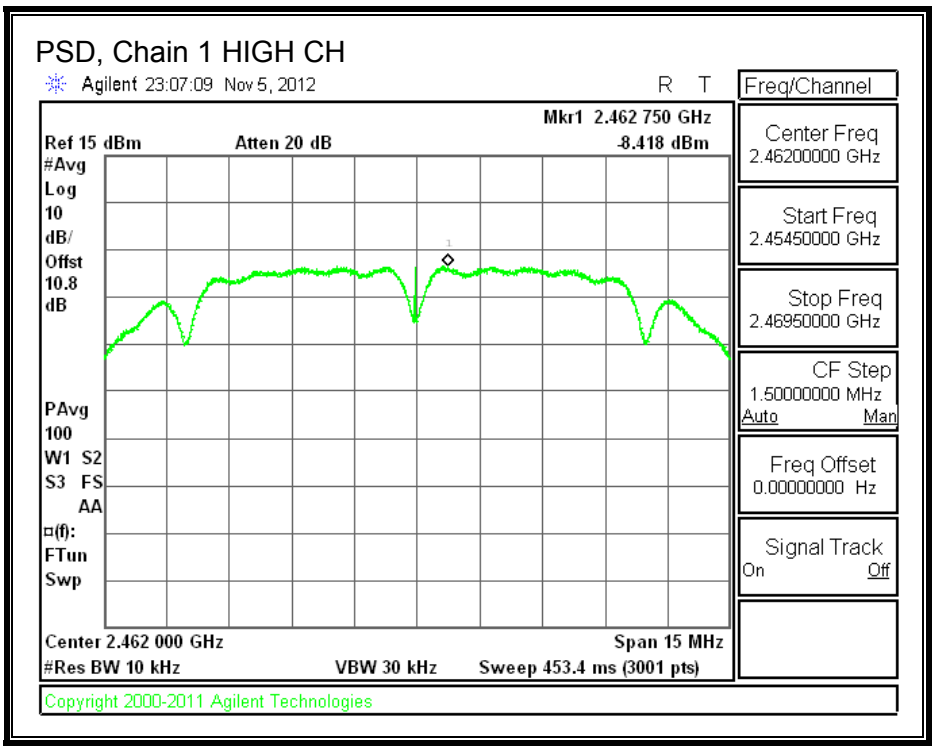
PSD, Chain 1



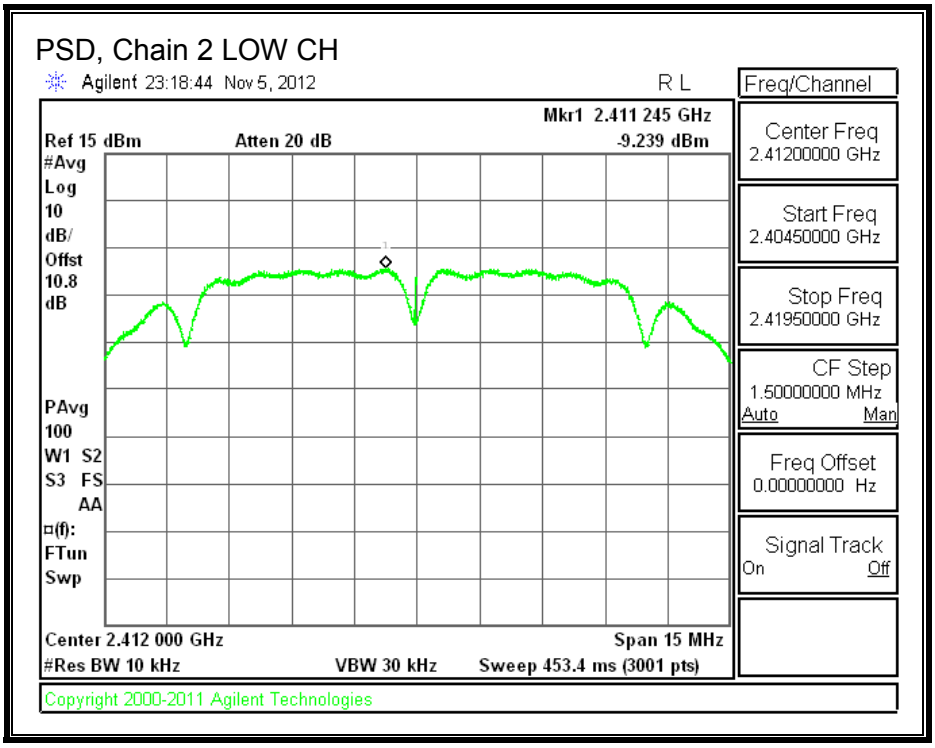
PSD, Chain 1 MID CH

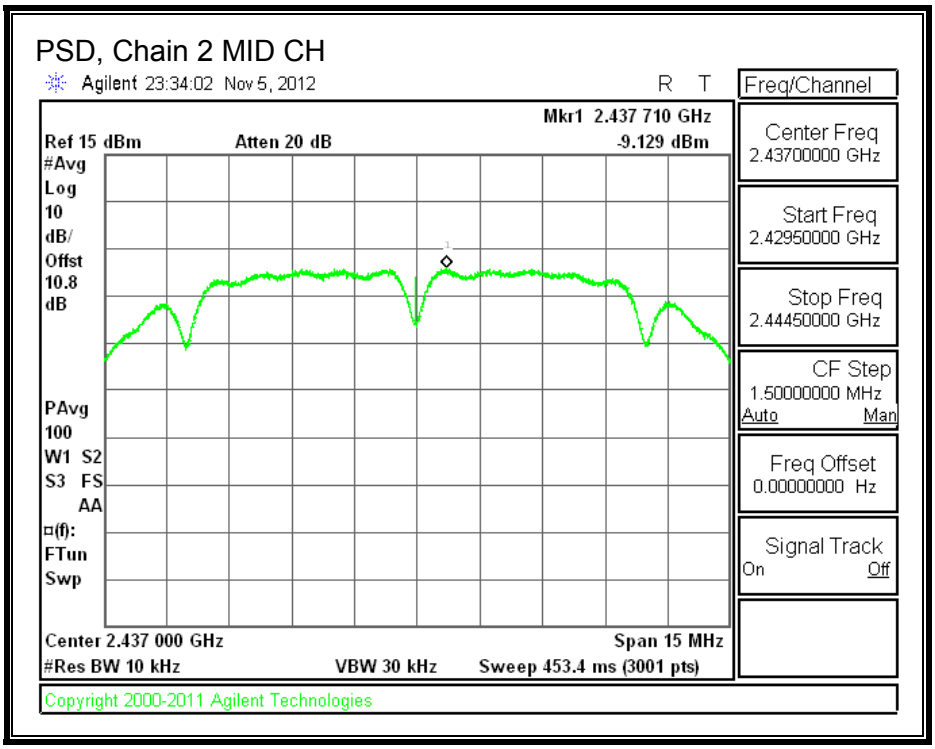


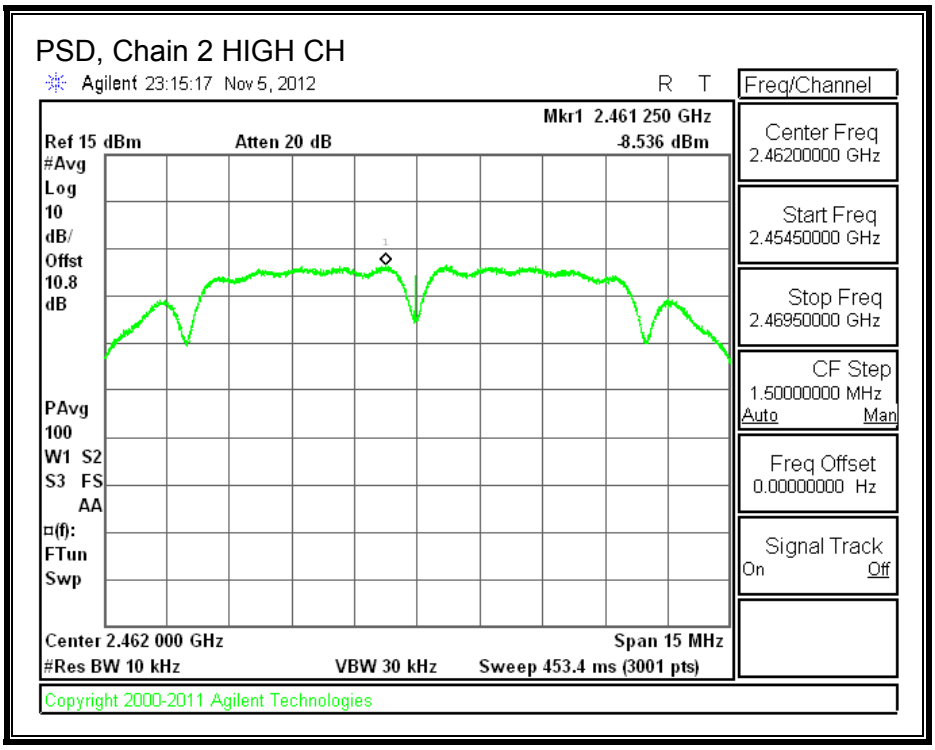
PSD, Chain 1 HIGH CH



PSD, Chain 2







8.3.5. OUT-OF-BAND EMISSIONS

LIMITS

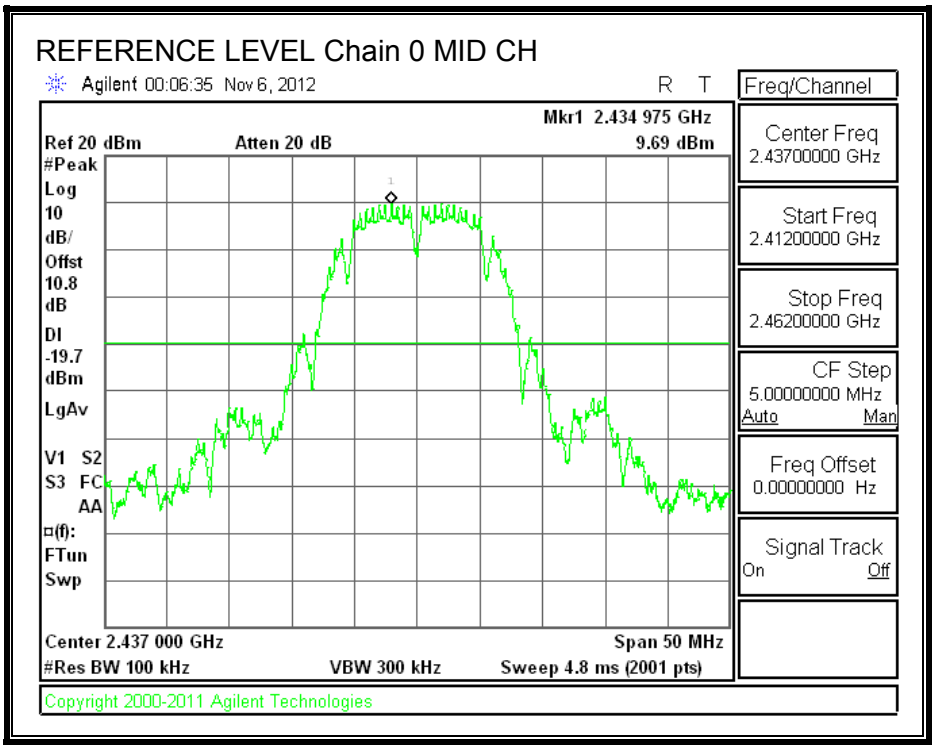
FCC §15.247 (d)

IC RSS-210 A8.5

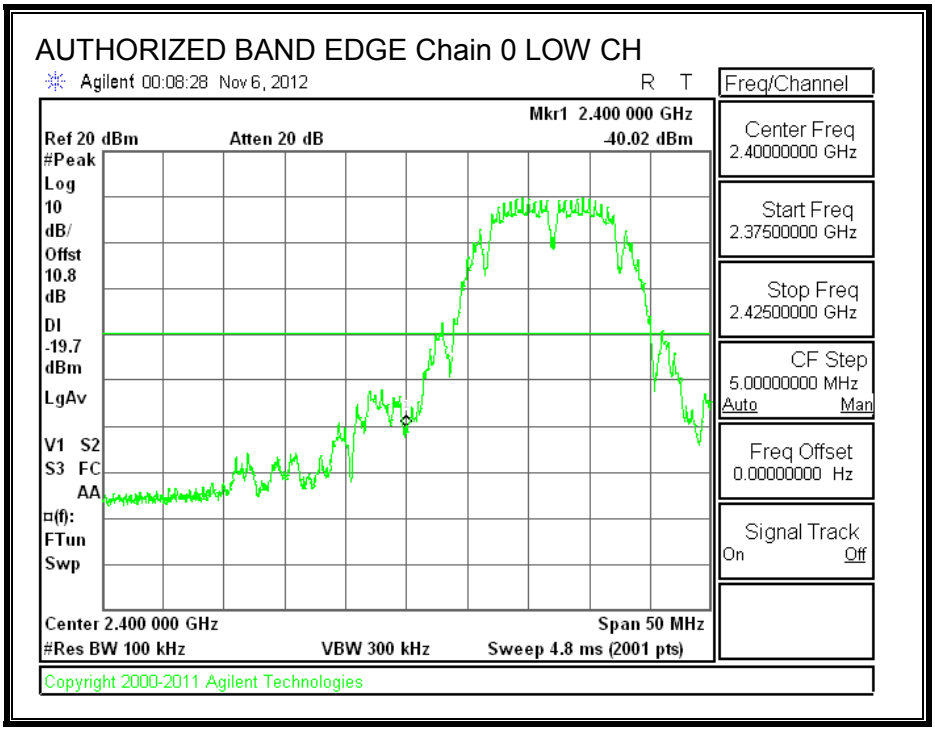
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the 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.

RESULTS

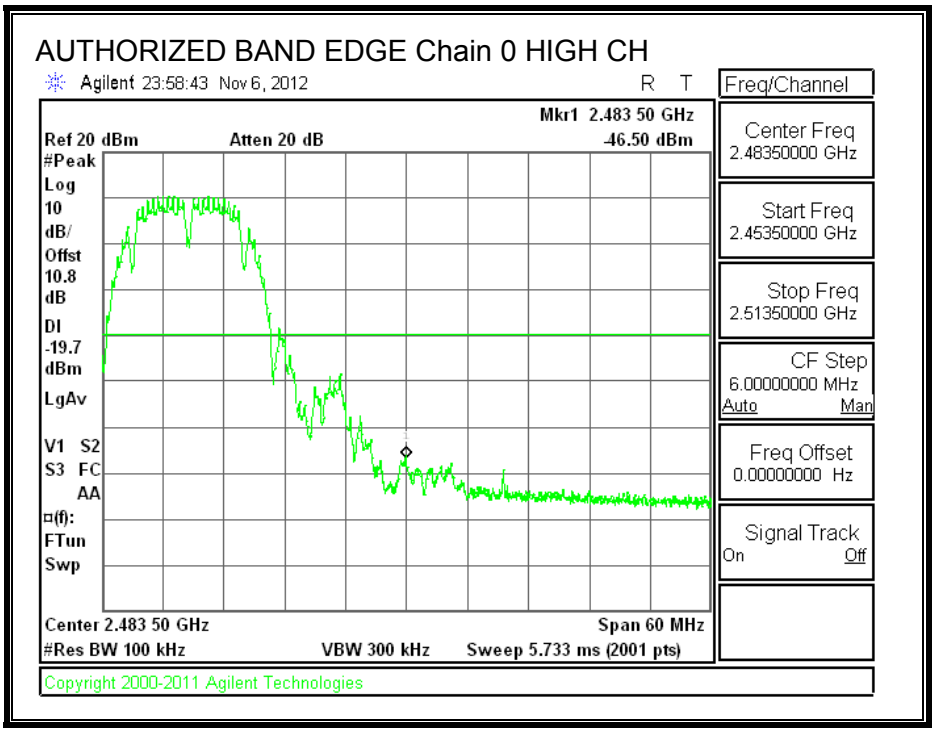
IN-BAND REFERENCE LEVEL, Chain 0



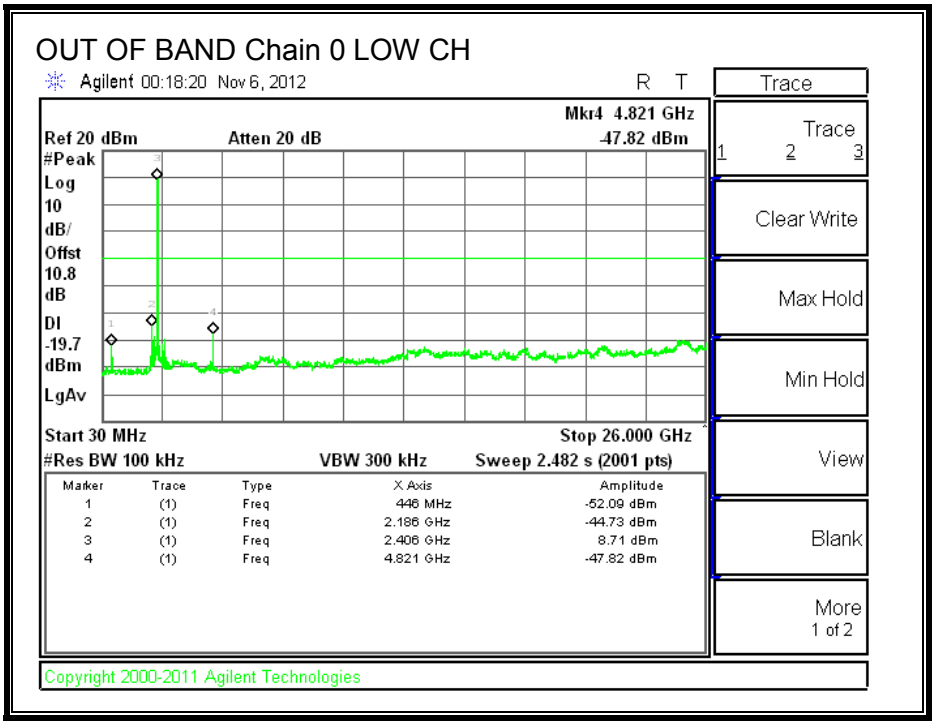
LOW CHANNEL BANDEDGE, Chain 0

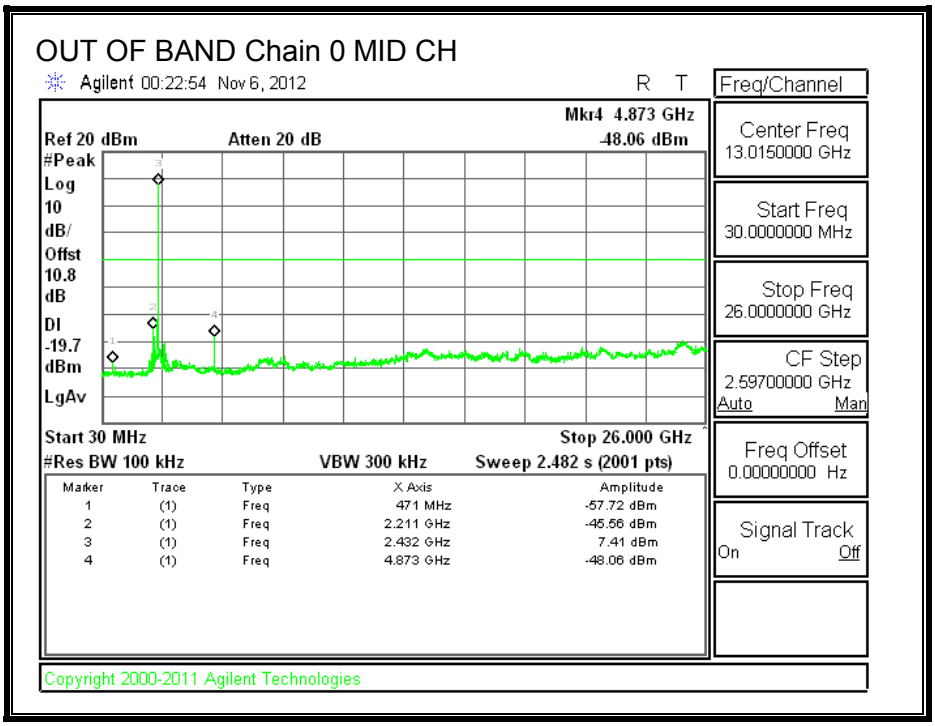


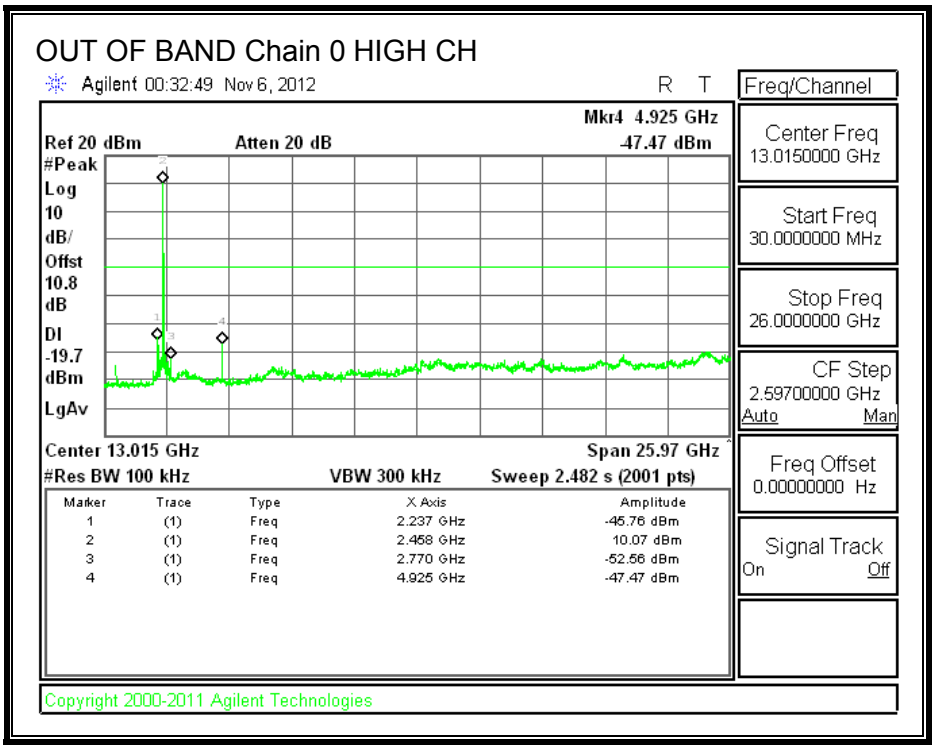
HIGH CHANNEL BANDEDGE, Chain 0



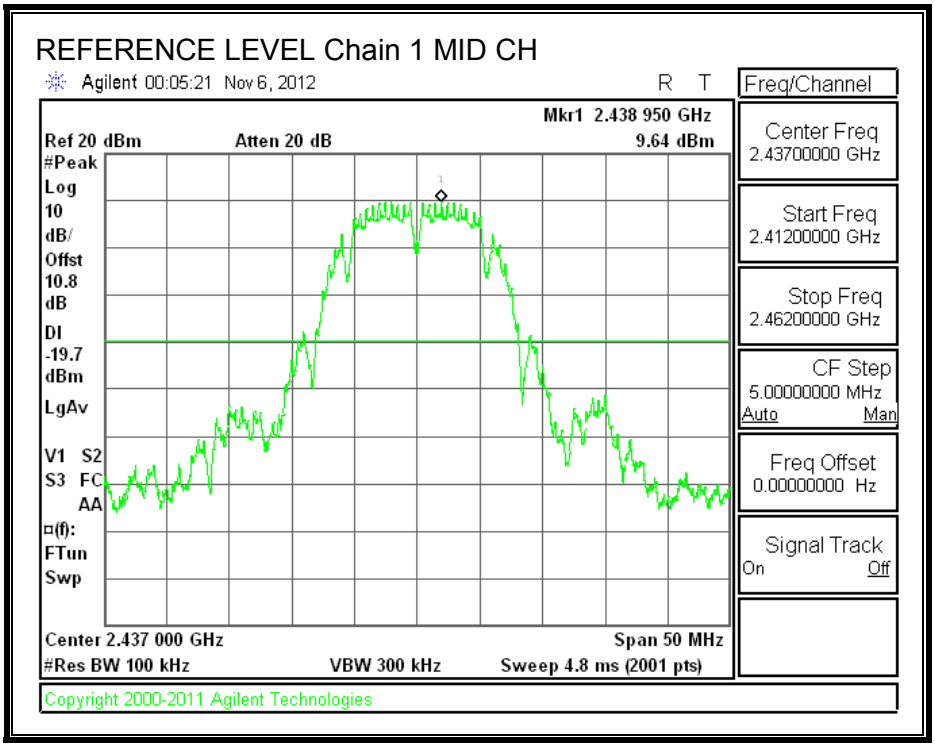
OUT-OF-BAND EMISSIONS, Chain 0



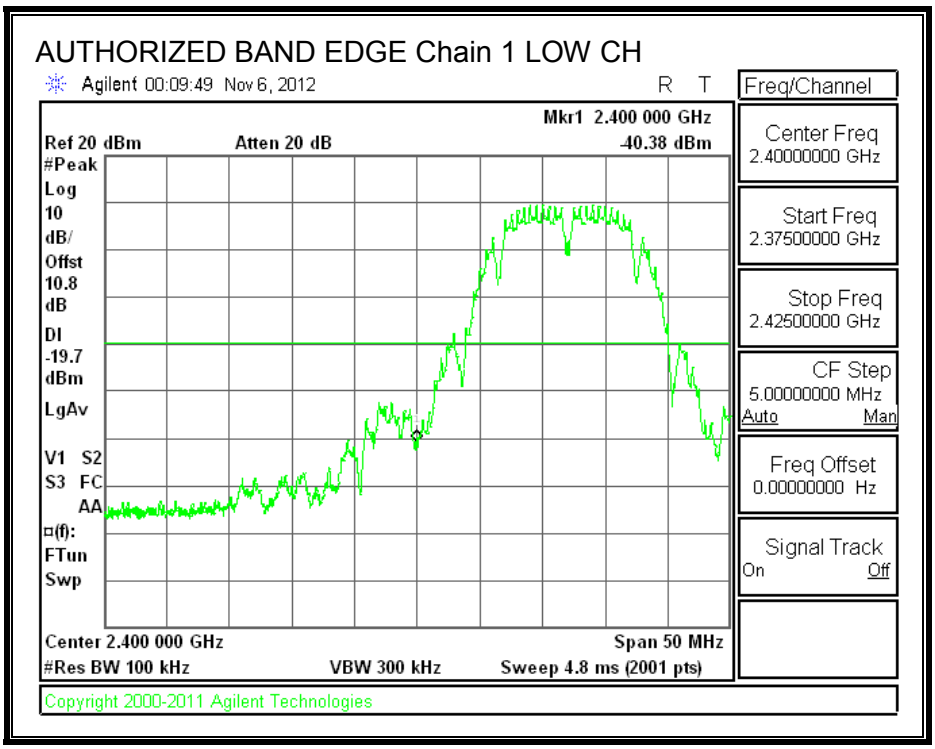




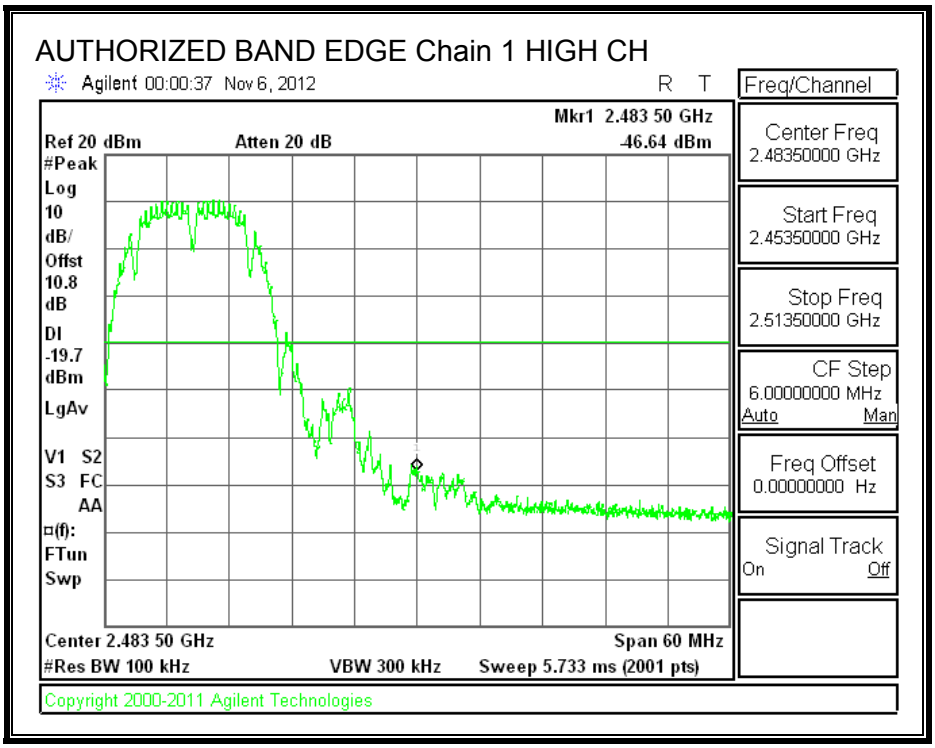
IN-BAND REFERENCE LEVEL, Chain 1



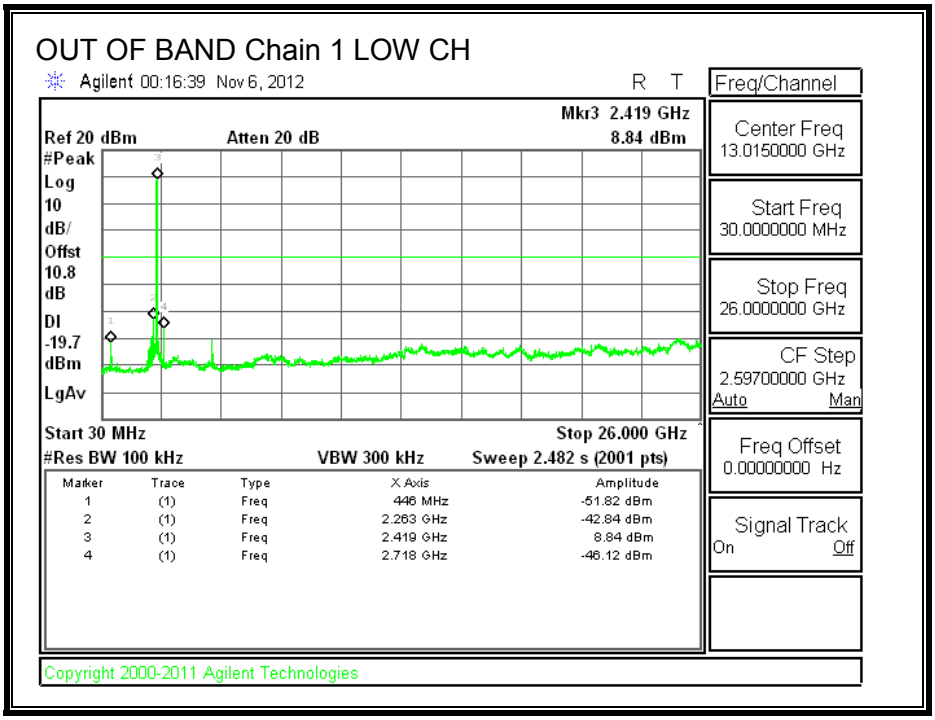
LOW CHANNEL BANDEDGE, Chain 1

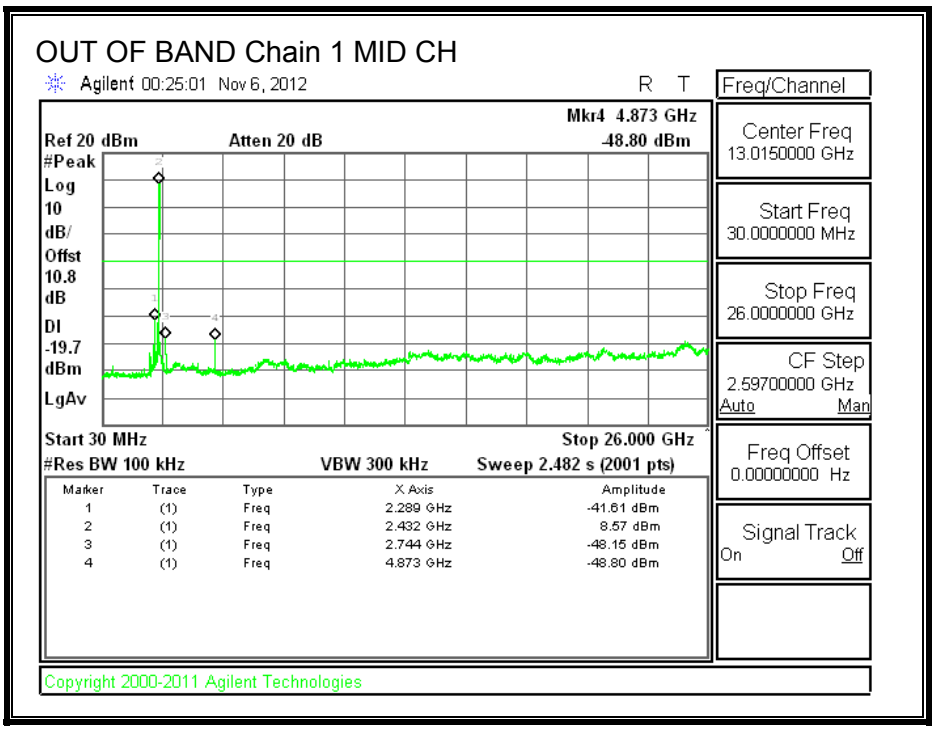


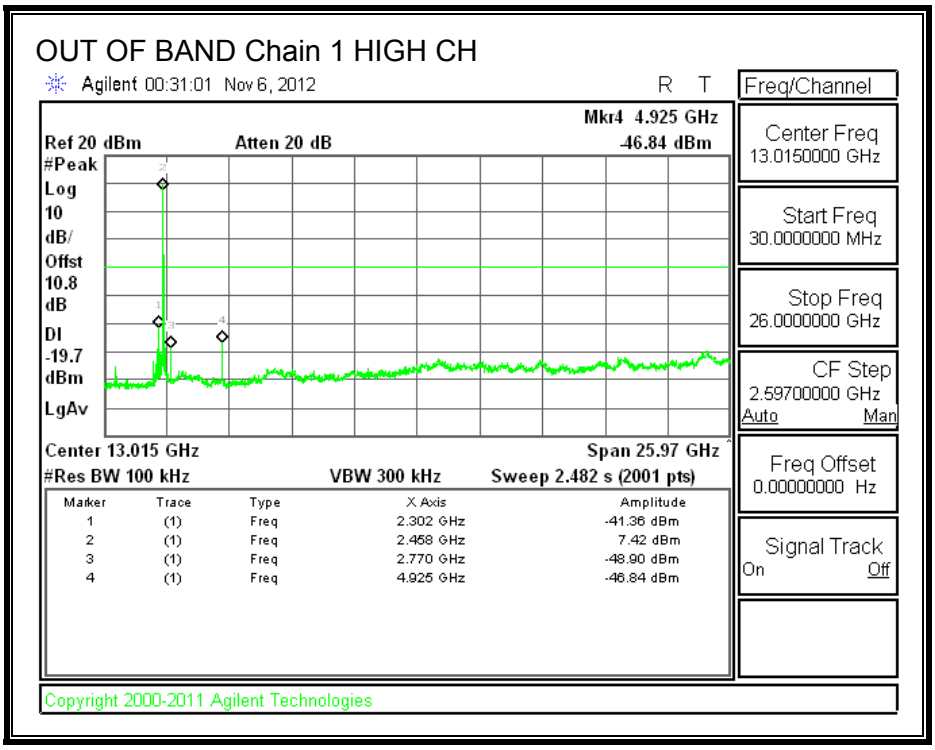
HIGH CHANNEL BANDEDGE, Chain 1



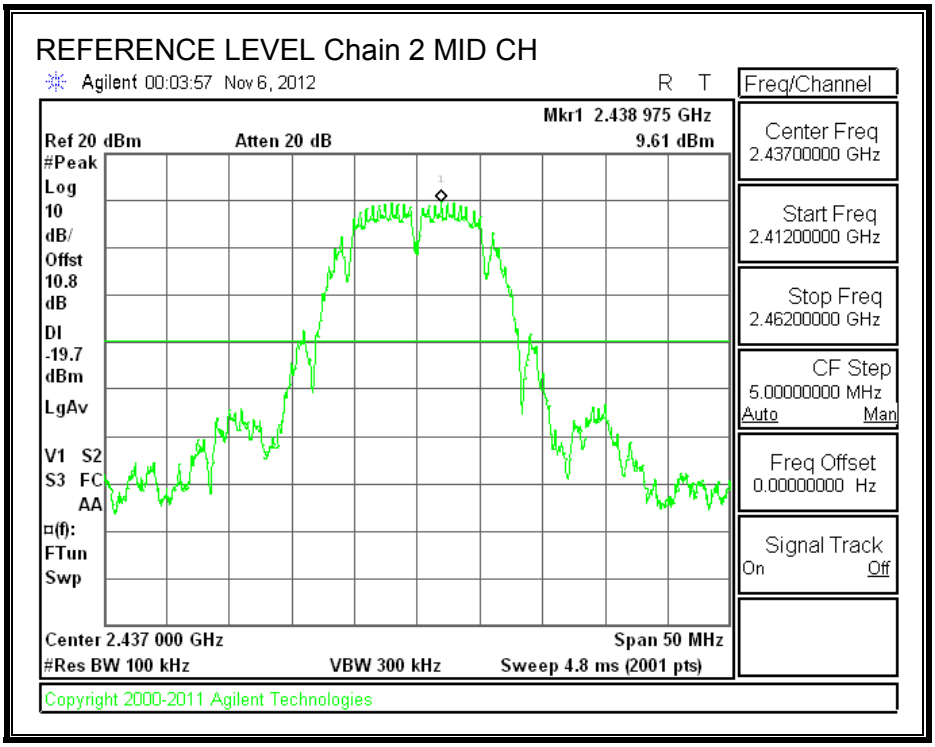
OUT-OF-BAND EMISSIONS, Chain 1



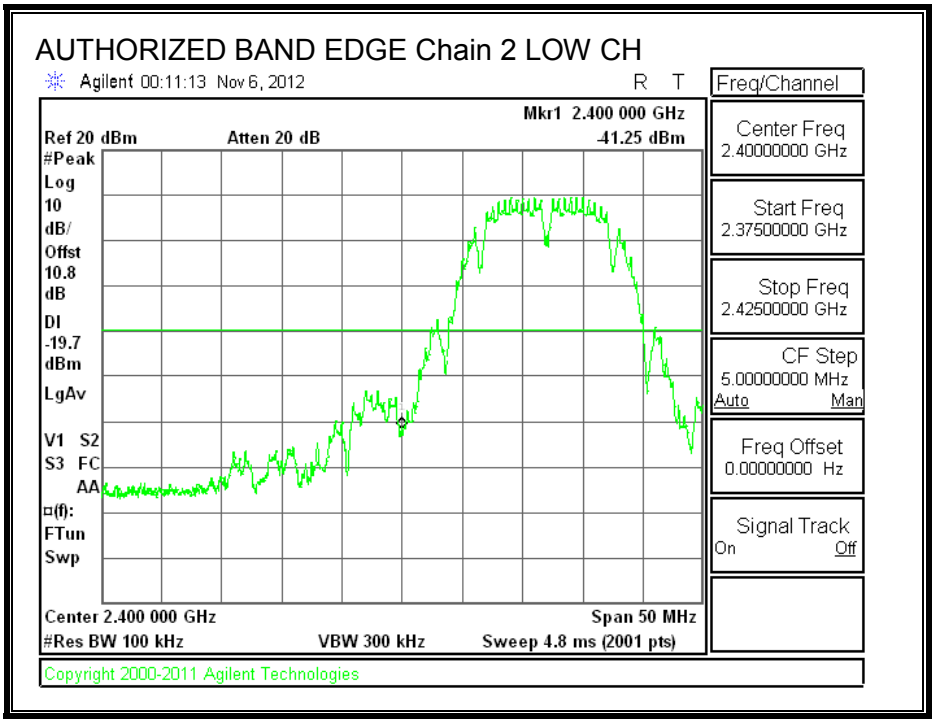




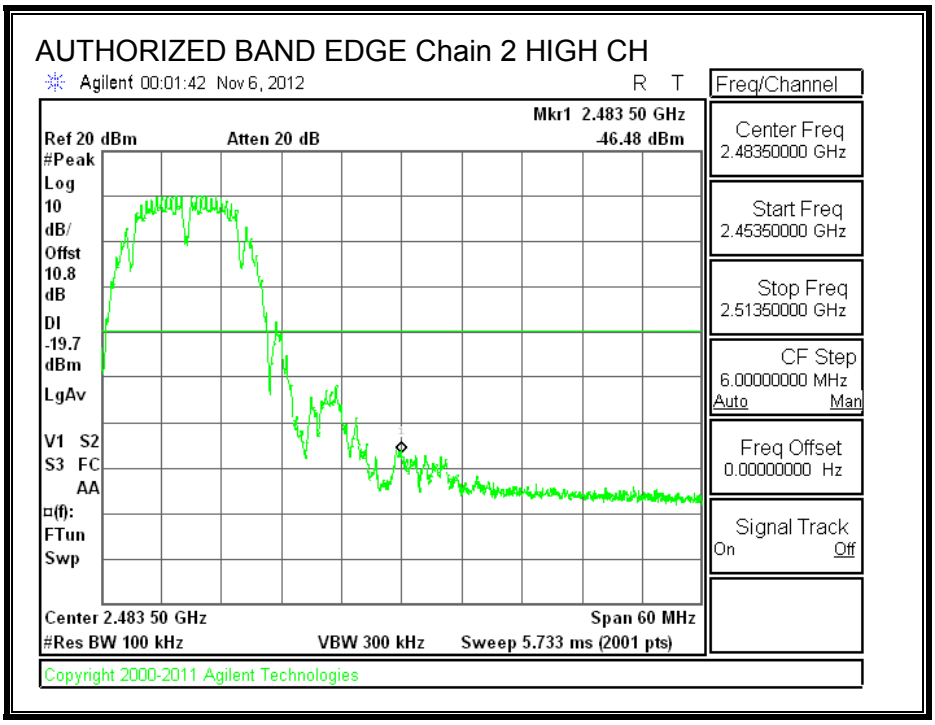
IN-BAND REFERENCE LEVEL, Chain 2



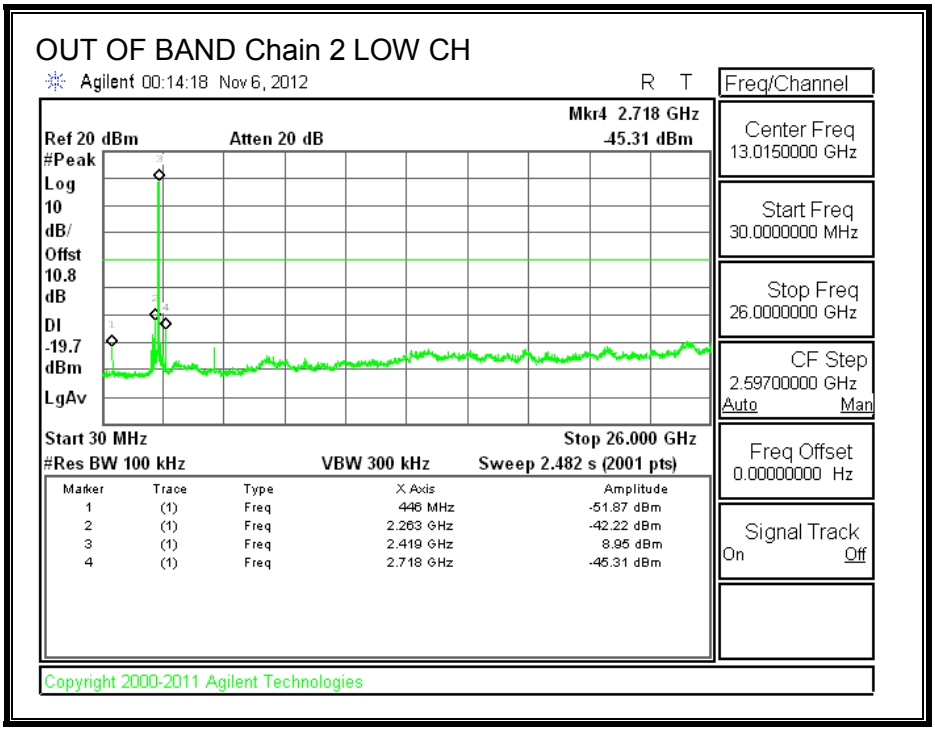
LOW CHANNEL BANDEDGE, Chain 2

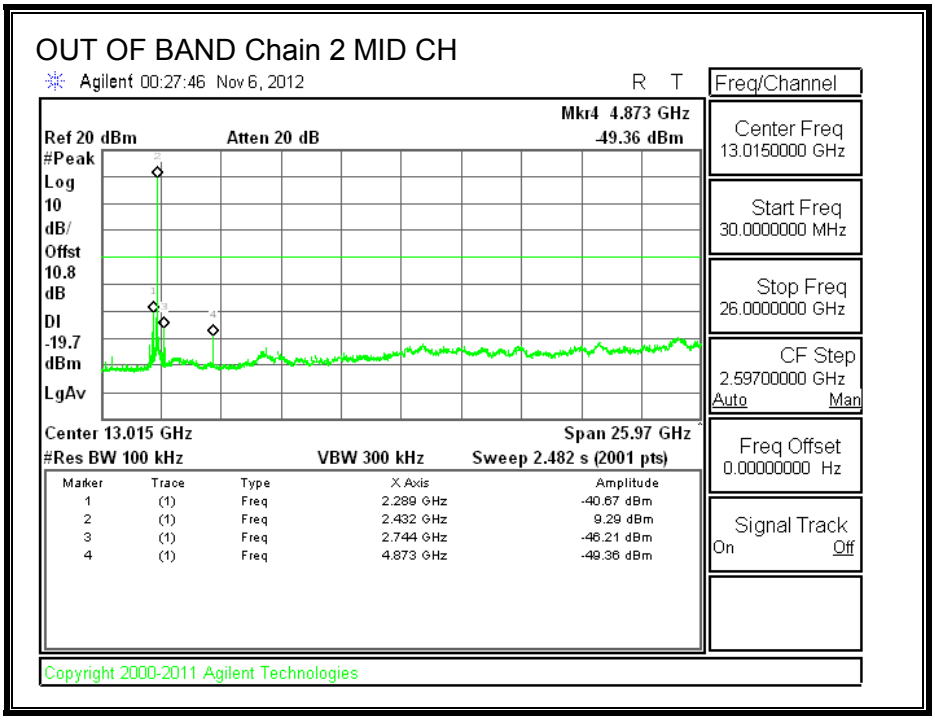


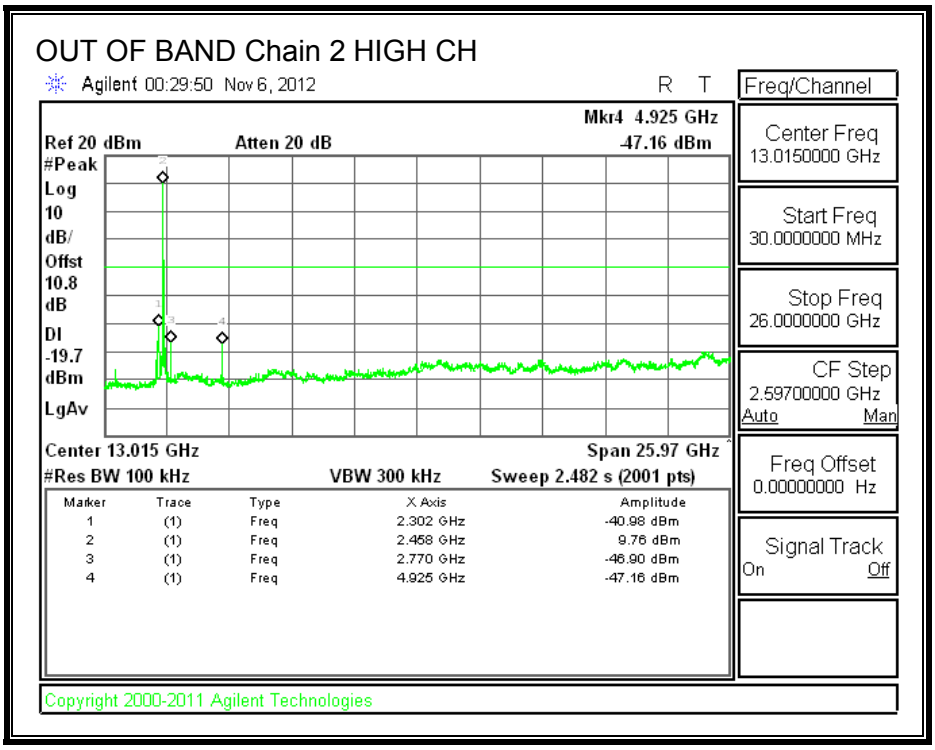
HIGH CHANNEL BANDEDGE, Chain 2



OUT-OF-BAND EMISSIONS, Chain 2







8.4. 802.11g 1TX MODE IN THE 2.4 GHz BAND

8.4.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

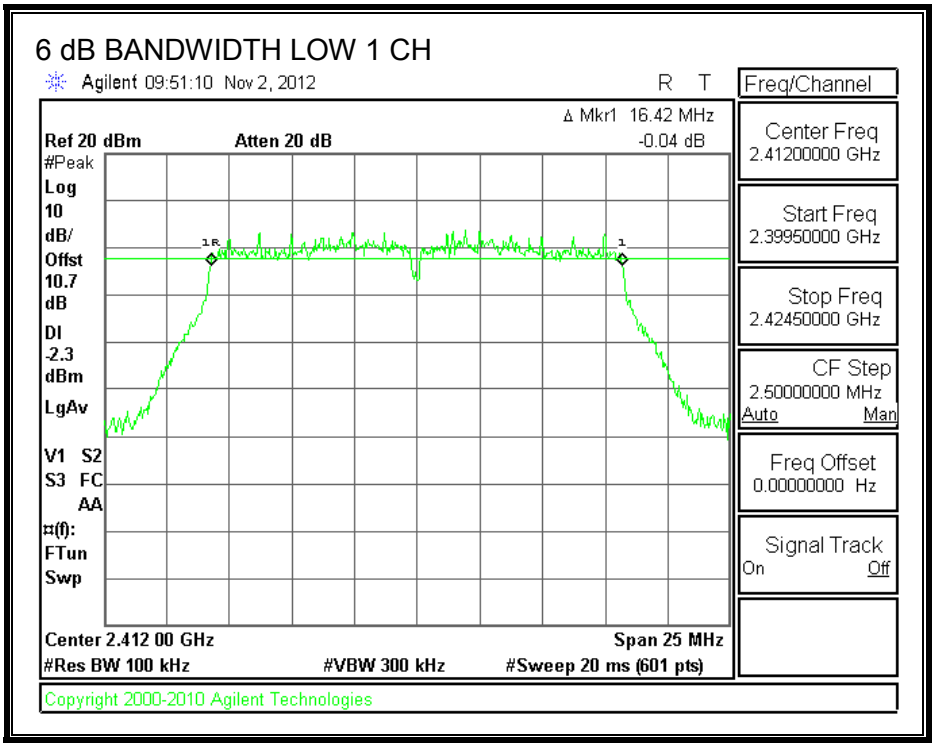
IC RSS-210 A8.2 (a)

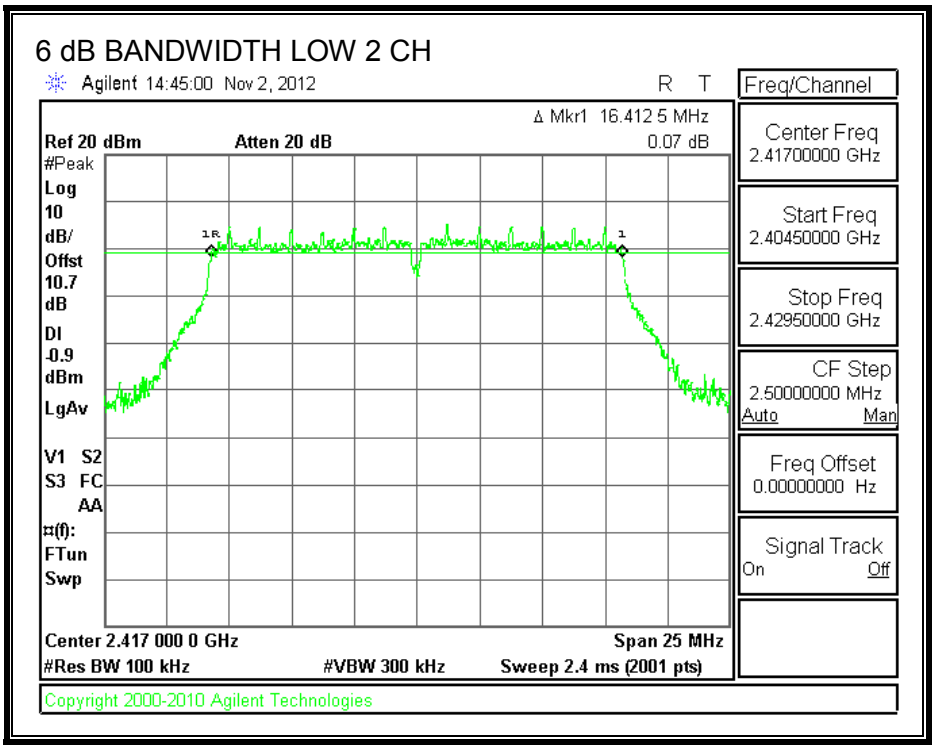
The minimum 6 dB bandwidth shall be at least 500 kHz.

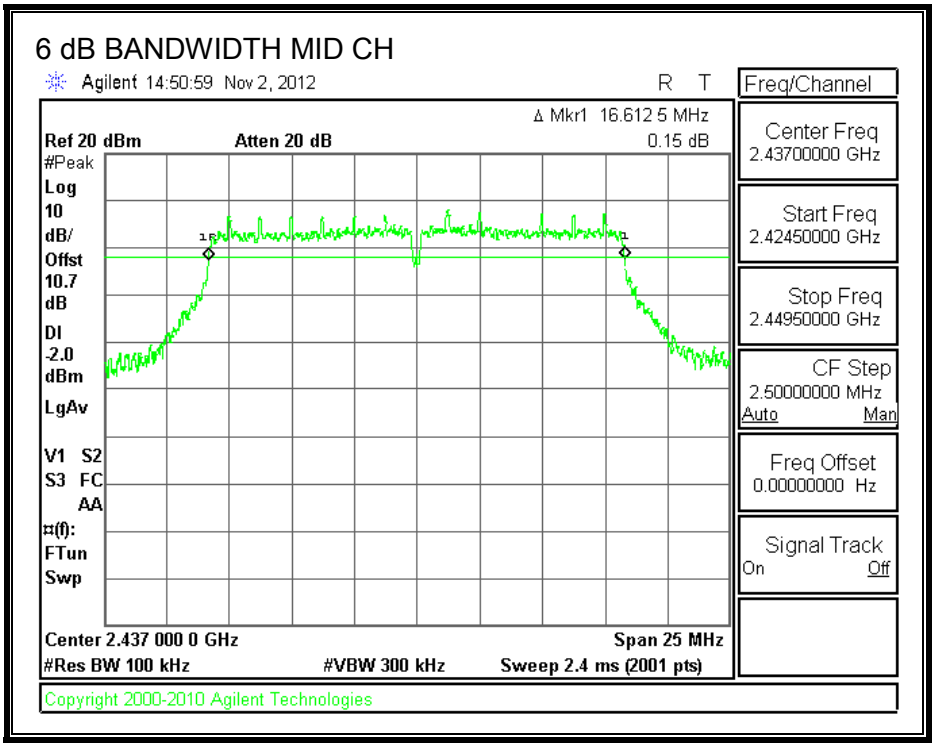
RESULTS

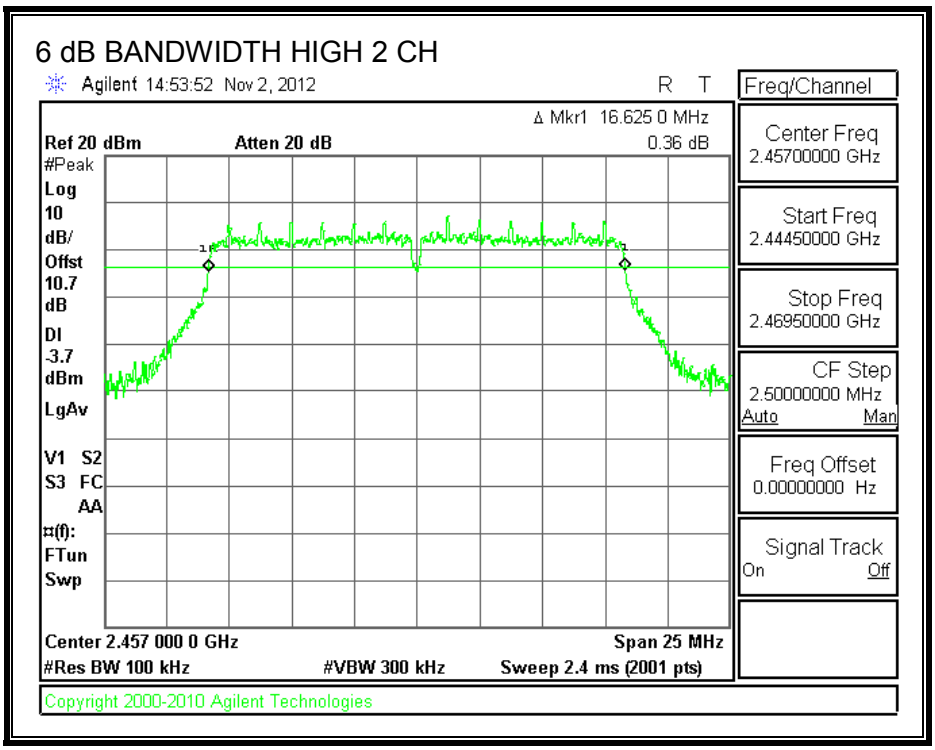
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	16.4200	0.5
Low 2	2417	16.4125	0.5
Mid	2437	16.6125	0.5
High 2	2457	16.6250	0.5
High 1	2462	16.5250	0.5

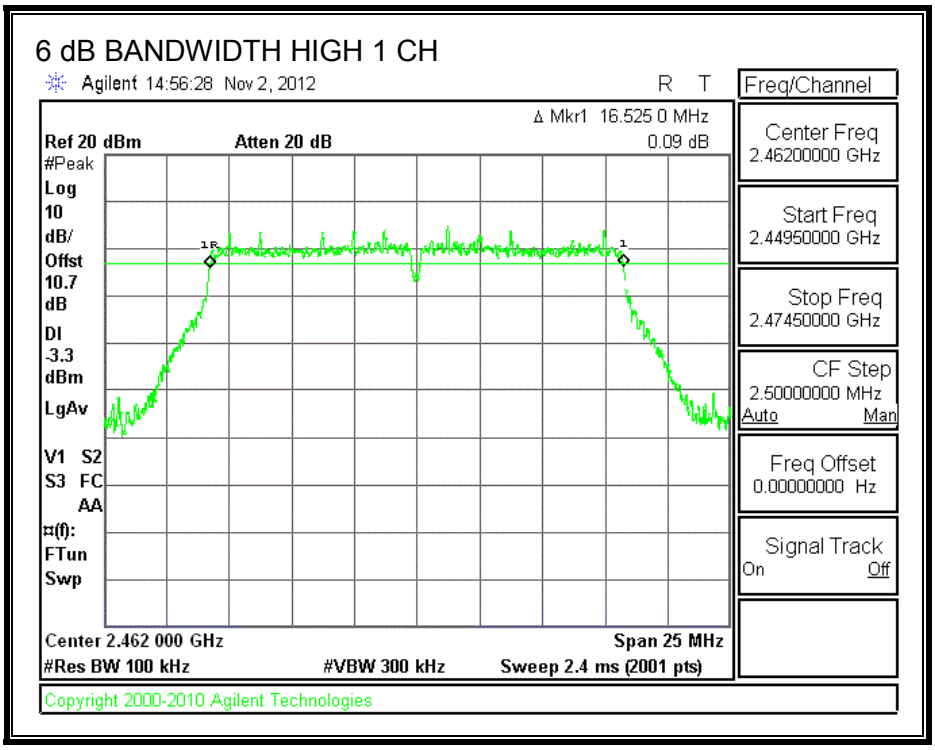
6 dB BANDWIDTH











8.4.2. 99% BANDWIDTH

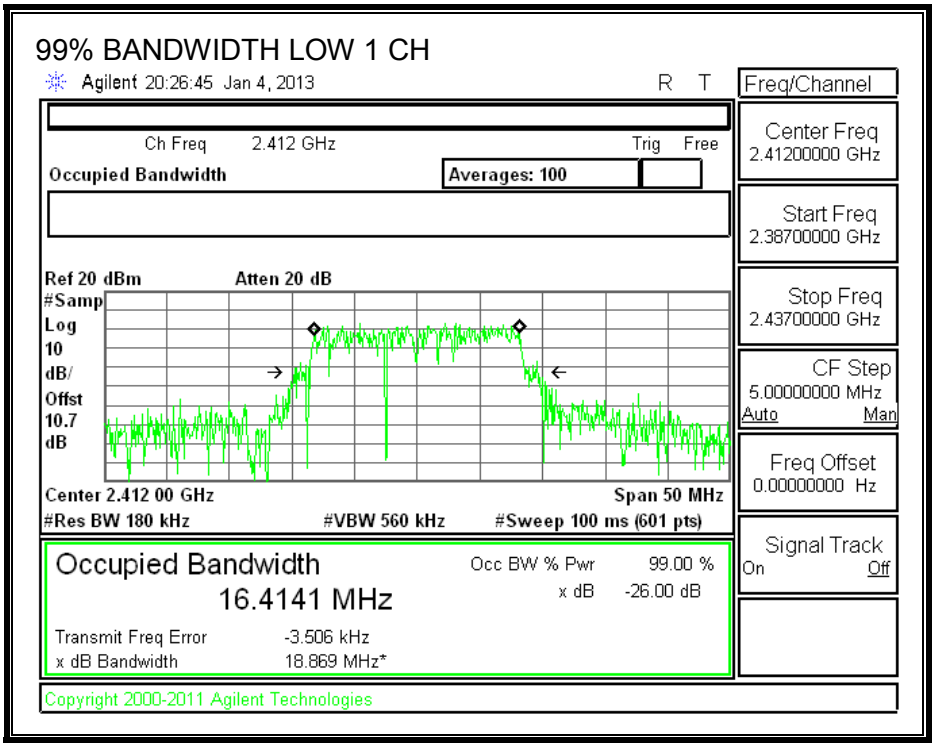
LIMITS

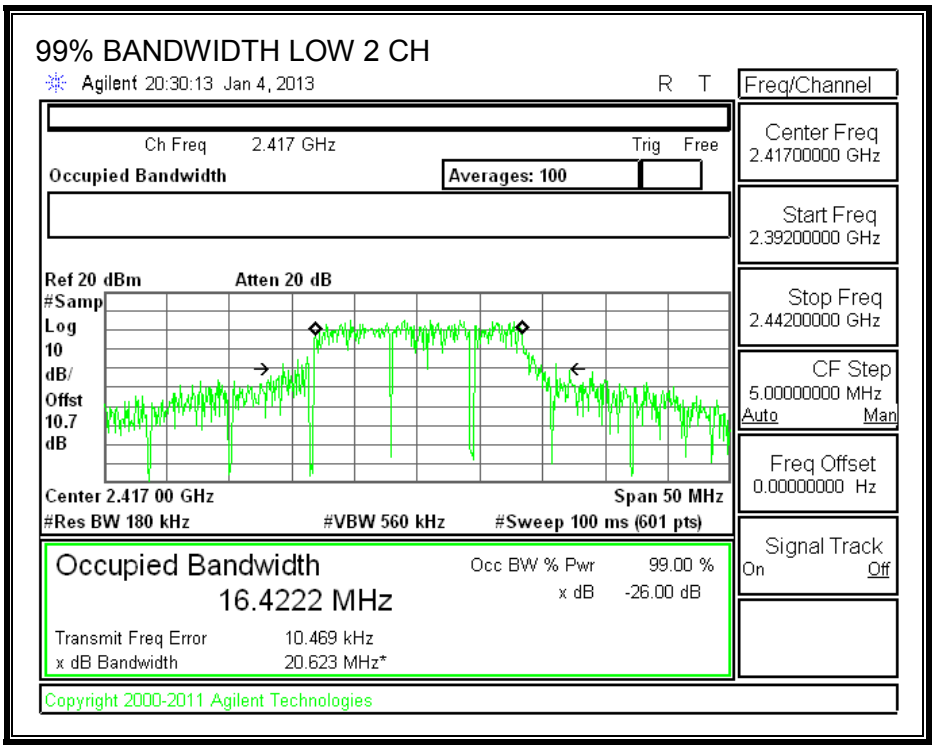
None; for reporting purposes only.

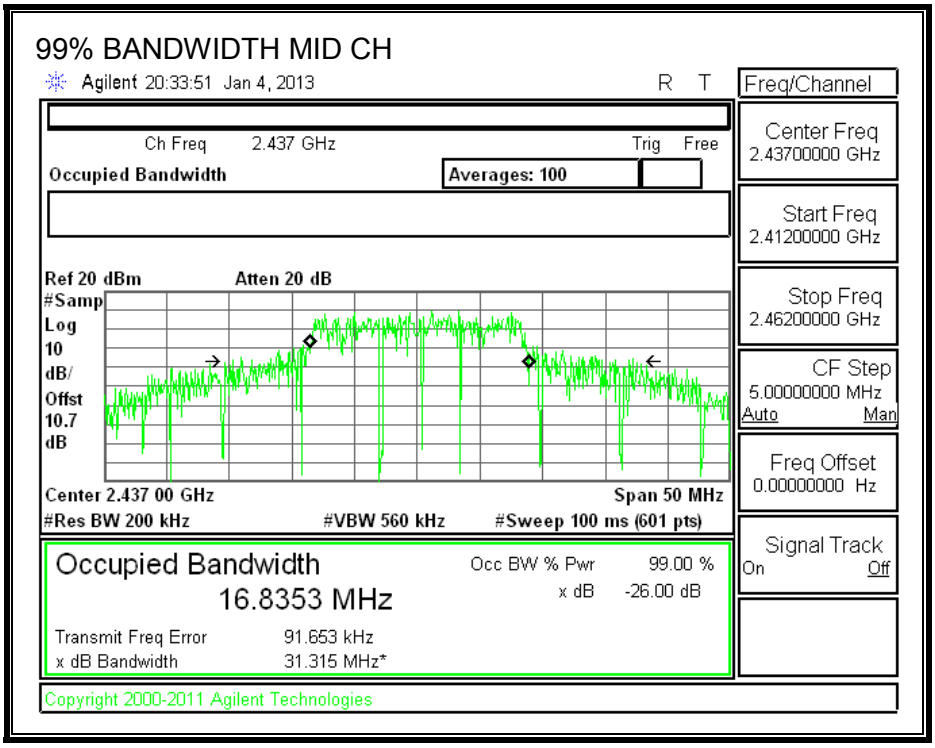
RESULTS

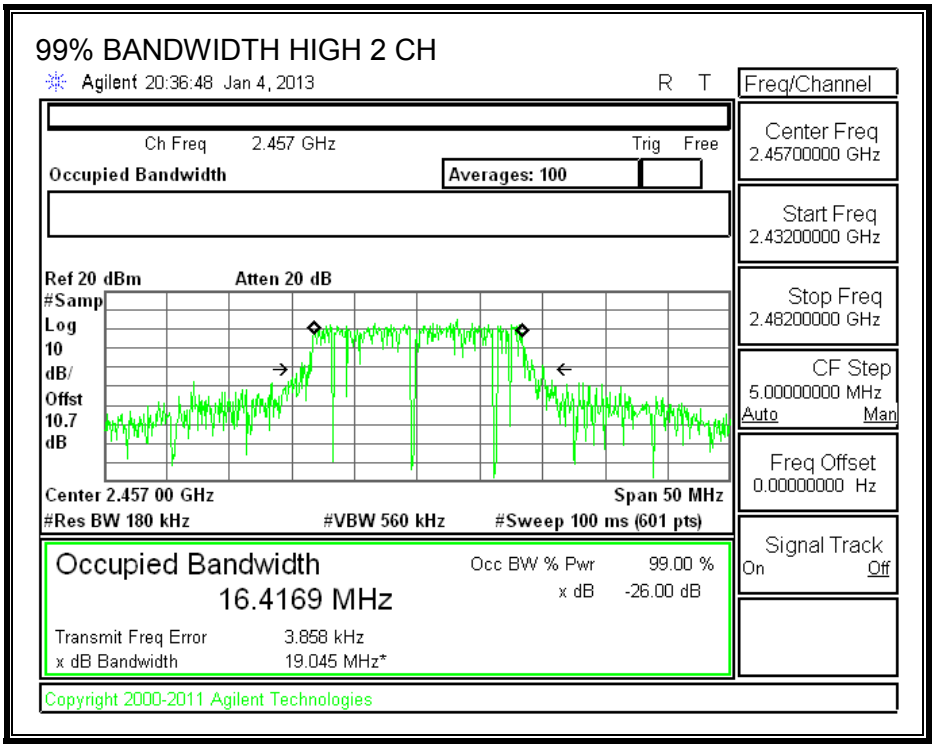
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	16.4141
Low 2	2417	16.4222
Mid	2437	16.8353
High 2	2457	16.4169
High 1	2462	16.4116

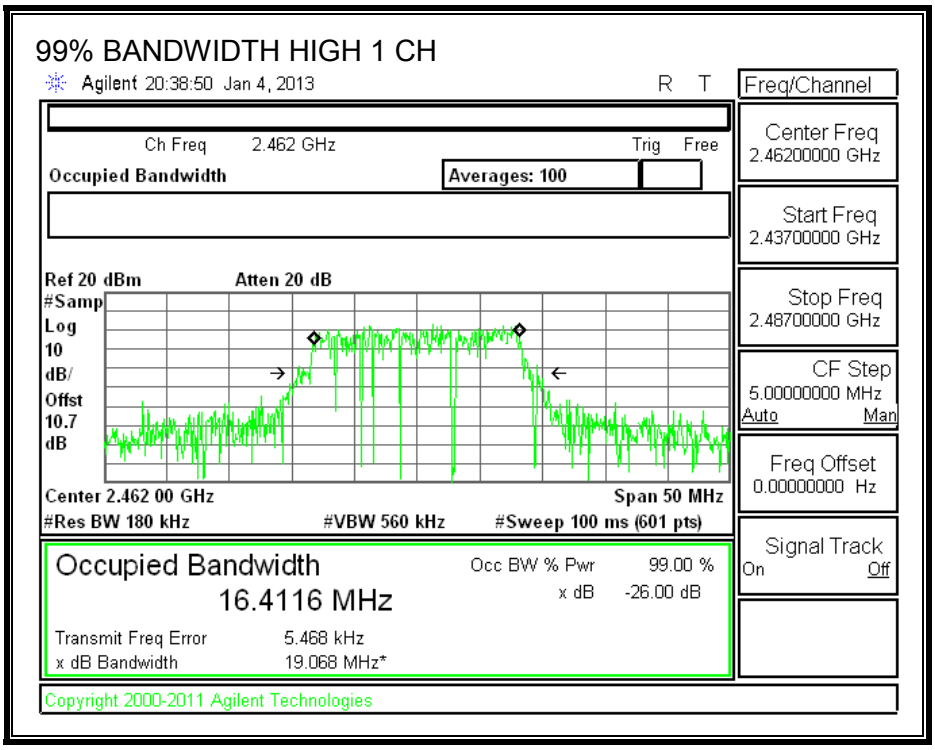
99% BANDWIDTH











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

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

RESULTS

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	4.77	30.00	30	36	30.00
Low 2	2417	4.77	30.00	30	36	30.00
Mid	2437	4.77	30.00	30	36	30.00
High 2	2457	4.77	30.00	30	36	30.00
High 1	2462	4.77	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	16.40	16.40	30.00	-13.60
Low 2	2417	19.20	19.20	30.00	-10.80
Mid	2437	22.37	22.37	30.00	-7.63
High 2	2457	17.80	17.80	30.00	-12.20
High 1	2462	15.84	15.84	30.00	-14.16

8.4.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247

IC RSS-210 A8.2

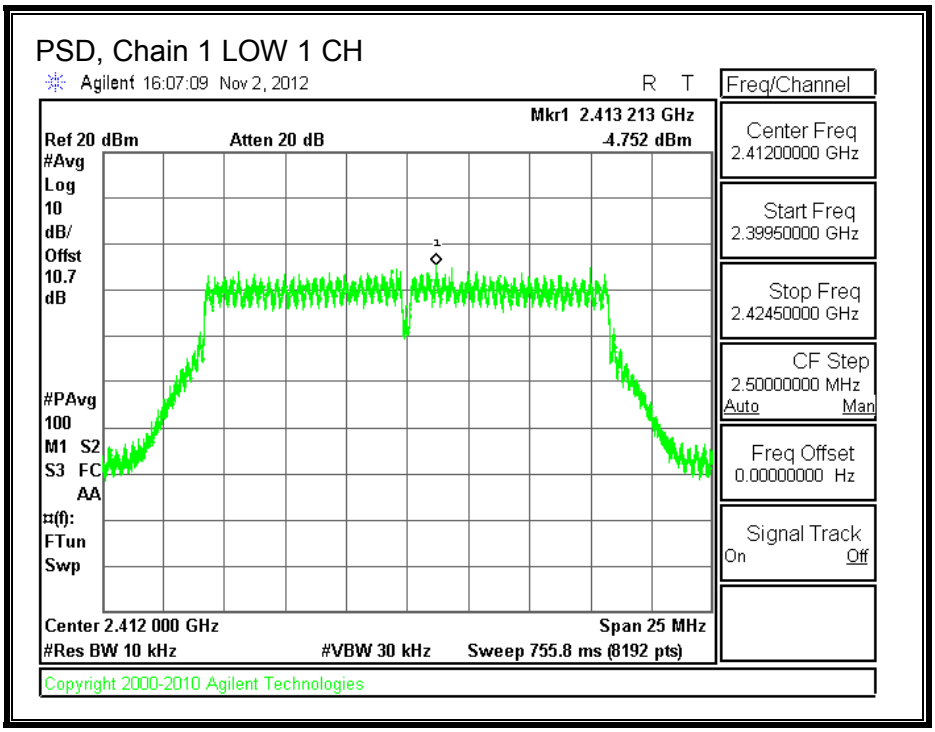
The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

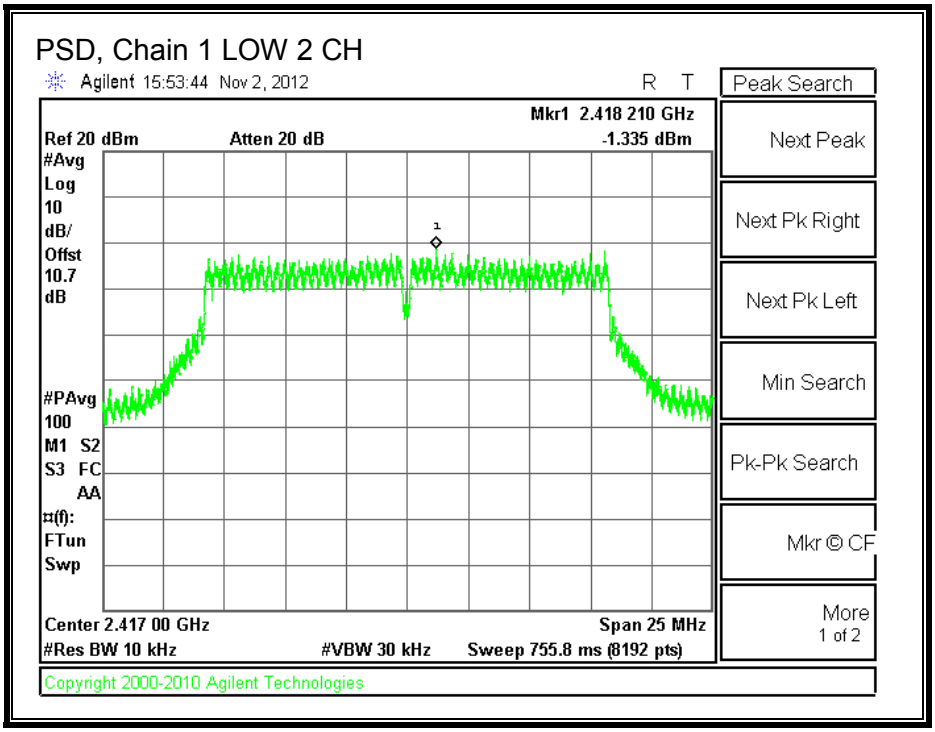
RESULTS

PSD Results

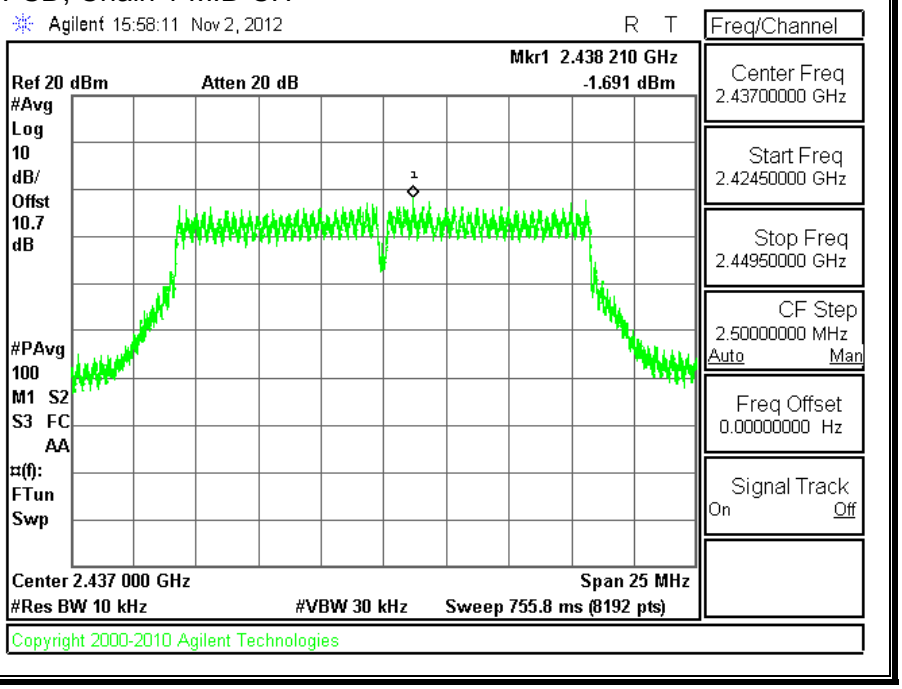
Channel	Frequency (MHz)	Chain 1 Meas (dBm)	DCCF (dB)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low 1	2412	-4.752	0.00	-4.752	8.0	-12.752
Low 2	2417	-1.335	0.00	-1.335	8.0	-9.335
Mid	2437	-1.691	0.00	-1.691	8.0	-9.691
High 2	2457	-3.189	0.00	-3.189	8.0	-11.189
High 1	2462	-6.029	0.00	-6.029	8.0	-14.029

PSD, Chain 0

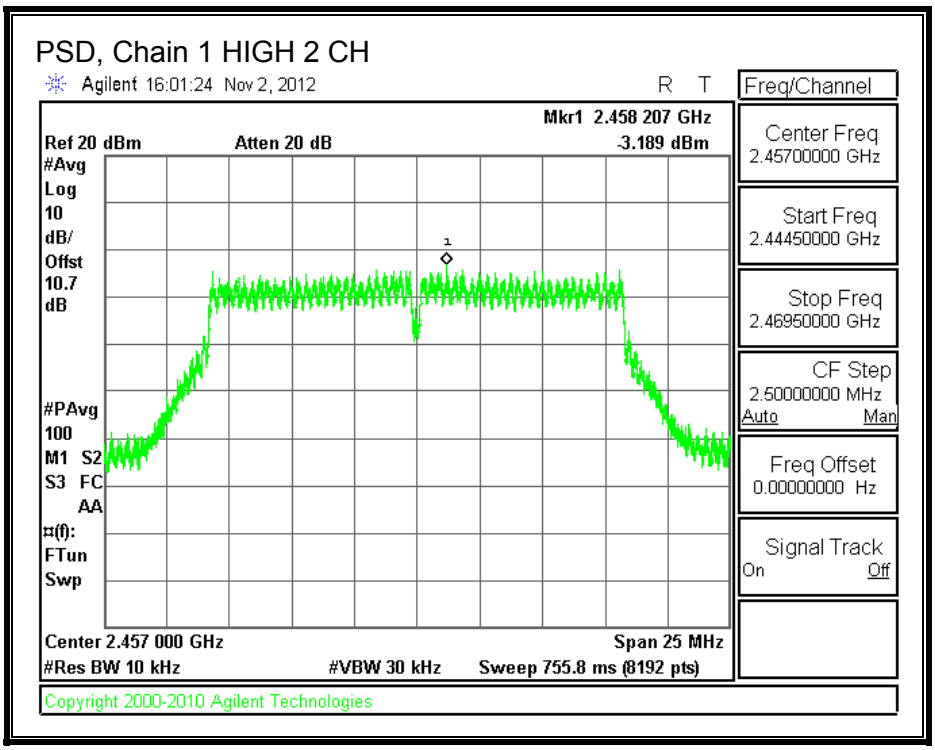


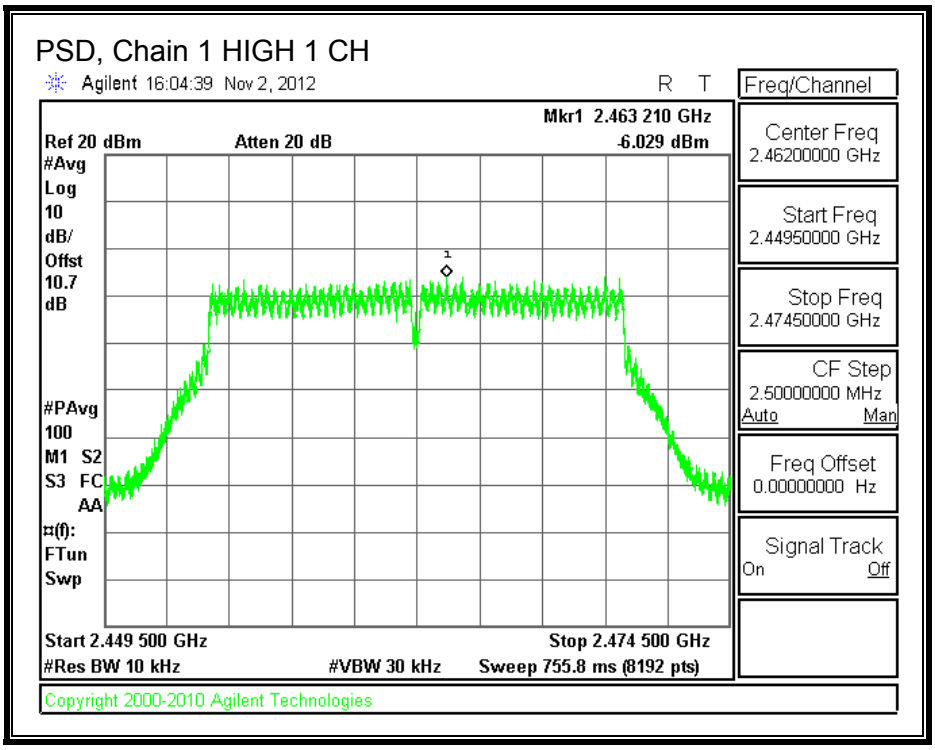


PSD, Chain 1 MID CH



PSD, Chain 1 HIGH 2 CH





8.4.5. OUT-OF-BAND EMISSIONS

LIMITS

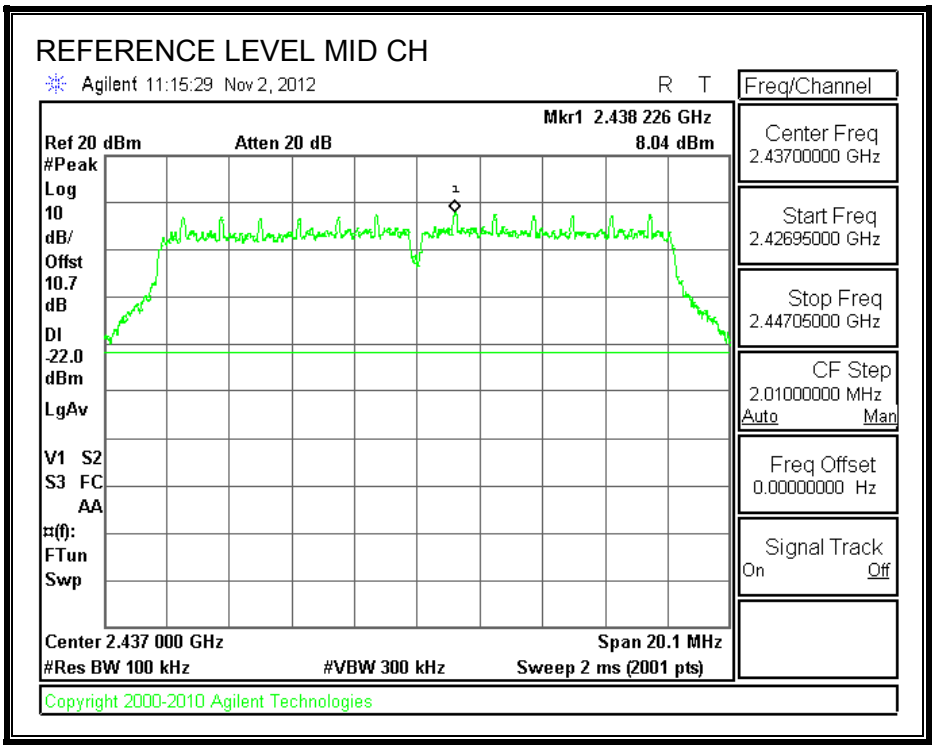
FCC §15.247 (d)

IC RSS-210 A8.5

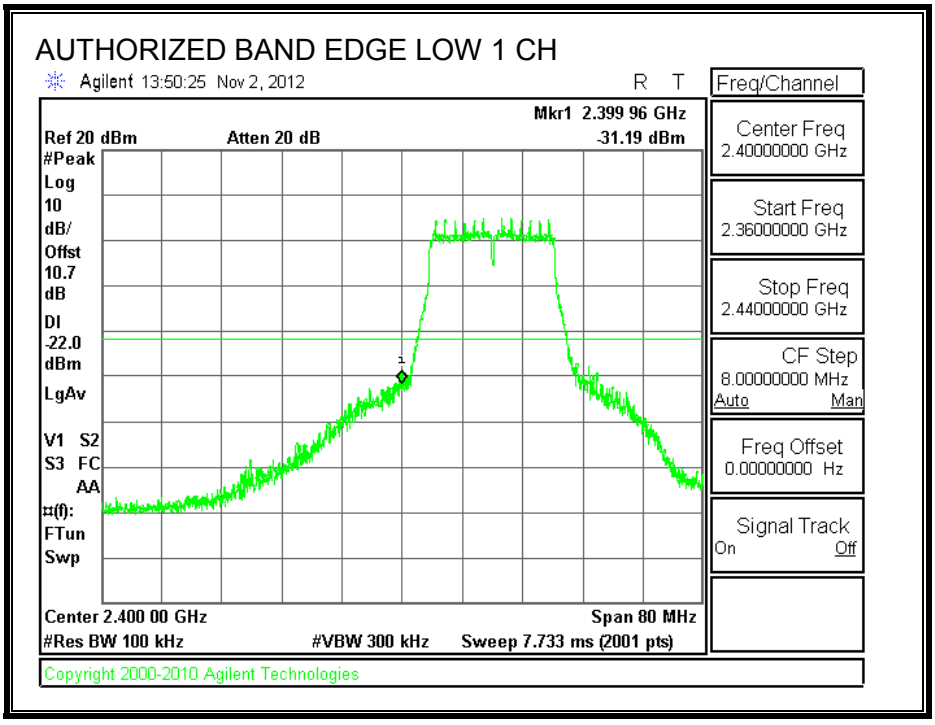
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the 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.

RESULTS

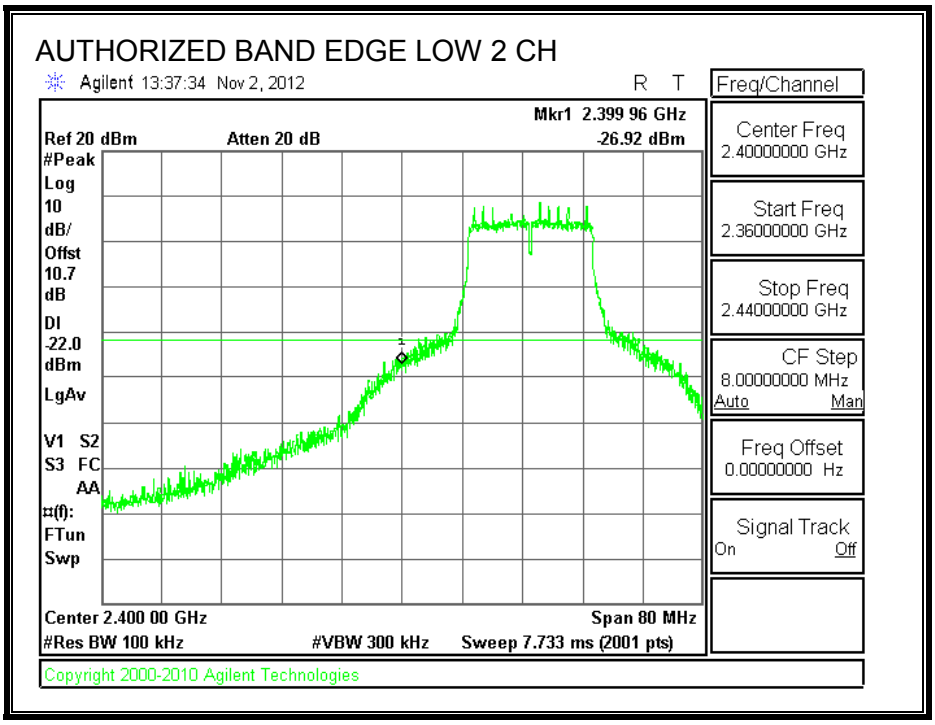
IN-BAND REFERENCE LEVEL



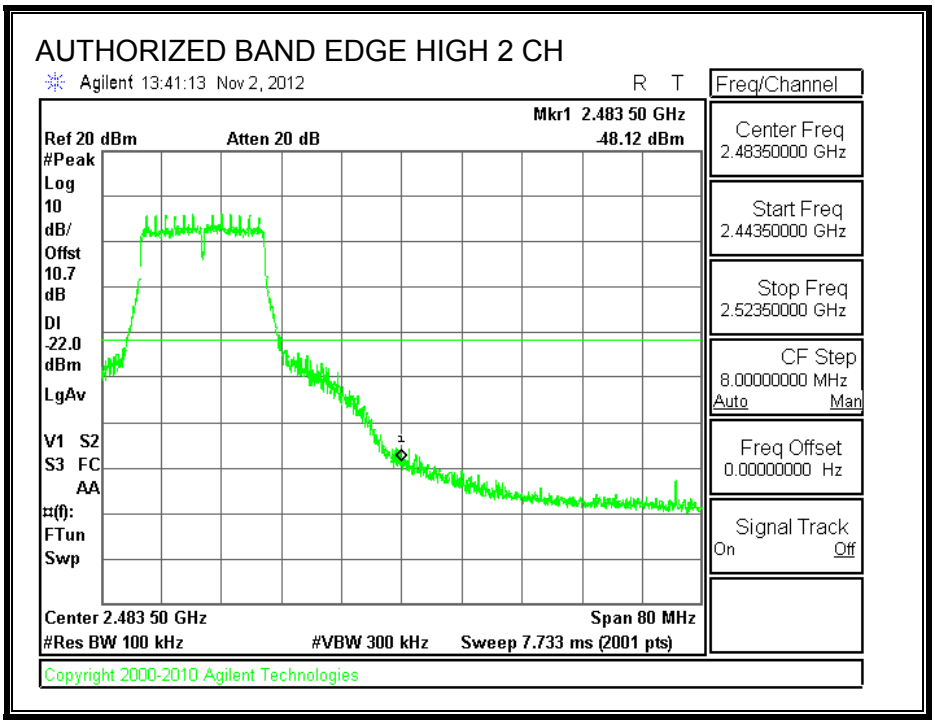
LOW CHANNEL BANDEDGE



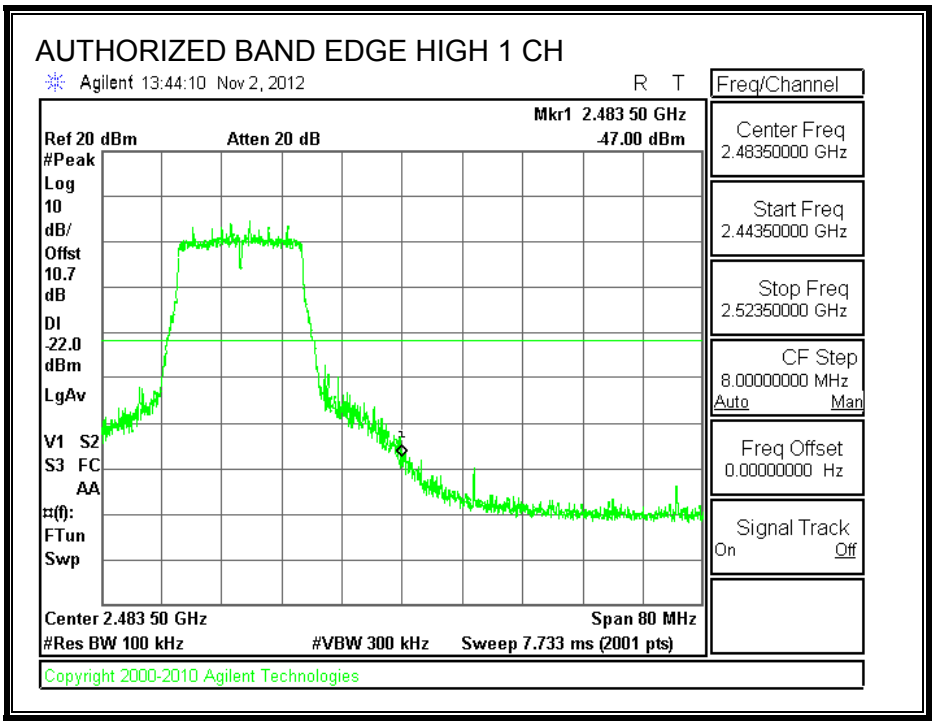
LOW CHANNEL BANDEDGE



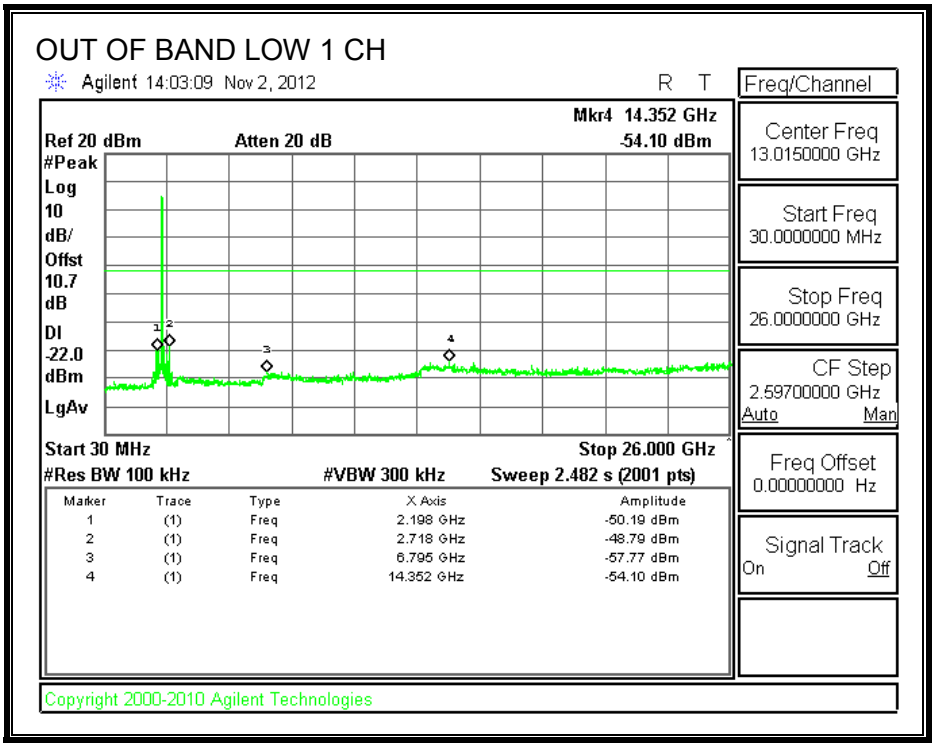
HIGH CHANNEL BANDEDGE

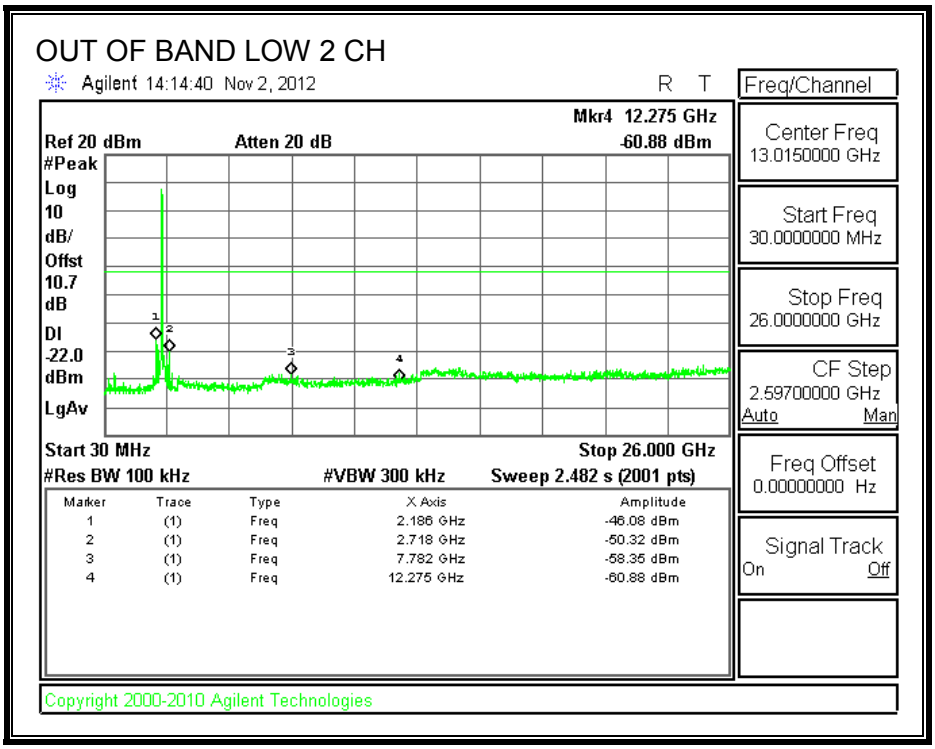


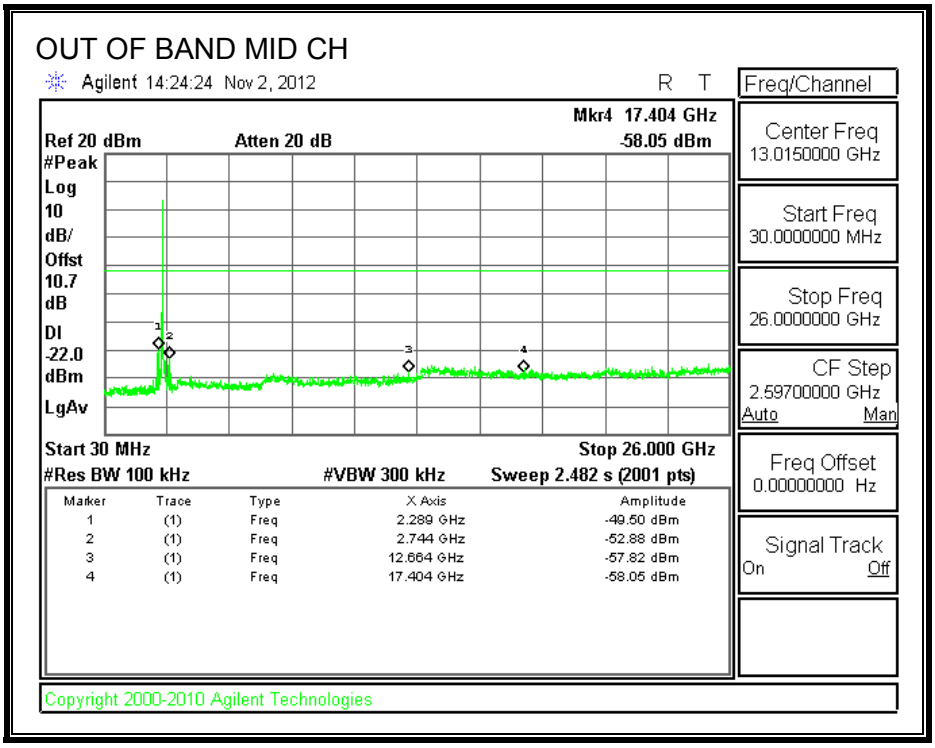
HIGH CHANNEL BANDEDGE

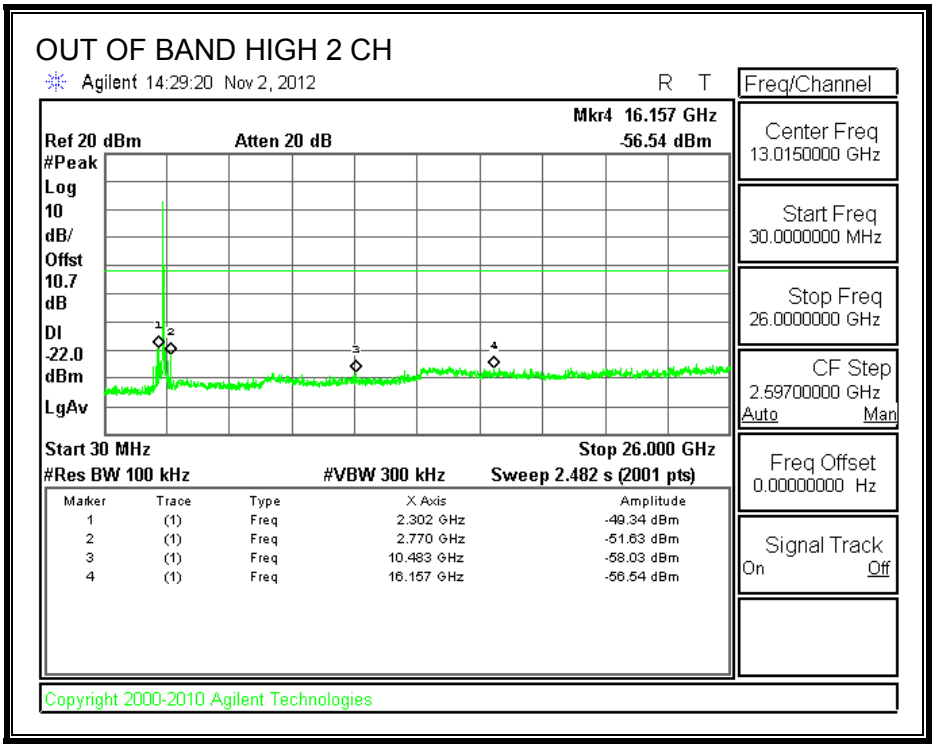


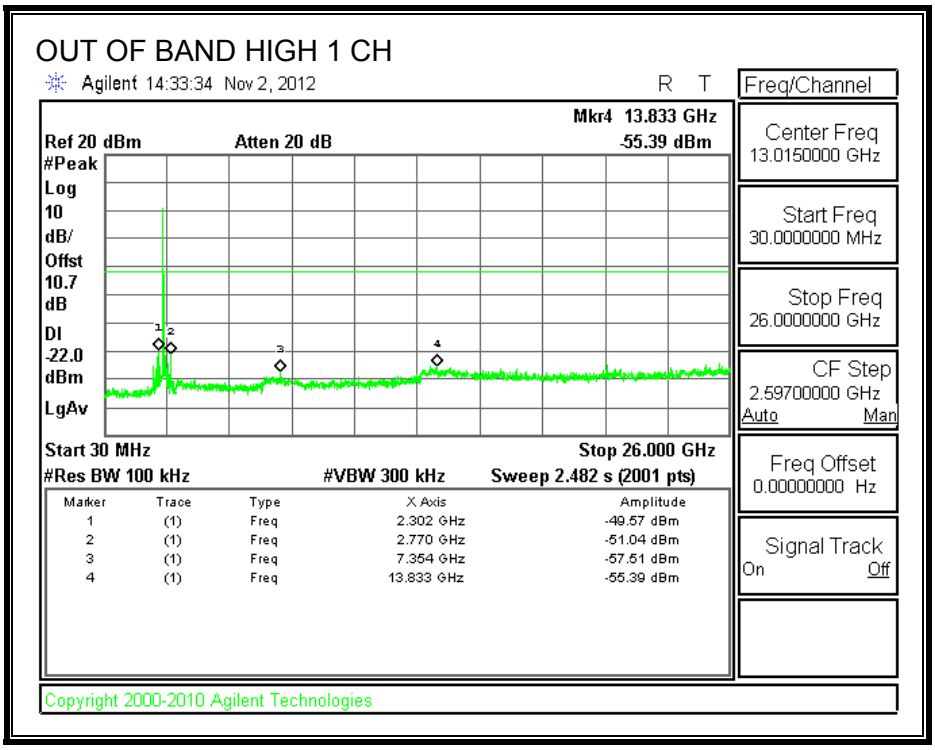
OUT-OF-BAND EMISSIONS











8.5. 802.11g CDD 2TX MODE IN THE 2.4 GHz BAND

Covered by testing 11n HT20 CDD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

8.6. 802.11g CDD 3TX MODE IN THE 2.4 GHz BAND

Covered by testing 11n HT20 CCD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

8.7. 802.11g BF 2TX MODE IN THE 2.4 GHz BAND

Covered by testing 11n HT20 CCD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

8.8. 802.11g BF 3TX MODE IN THE 2.4 GHz BAND

Covered by testing 11n HT20 CCD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

8.9. 802.11n HT20 1TX MODE IN THE 2.4 GHz BAND

Covered by testing 11n HT20 CCD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

8.10. 802.11n HT20 2TX MODE IN THE 2.4 GHz BAND

Covered by testing 11n HT20 CCD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

8.11. 802.11n HT20 BF 2TX MODE IN THE 2.4 GHz BAND

Covered by testing 11n HT20 CCD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

8.12. 802.11n AC20 BF 2TX MODE IN THE 2.4 GHz BAND

Covered by testing 11n HT20 CCD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

8.13. 802.11n HT20 CDD MCS0 3TX MODE IN THE 2.4 GHz BAND

8.13.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

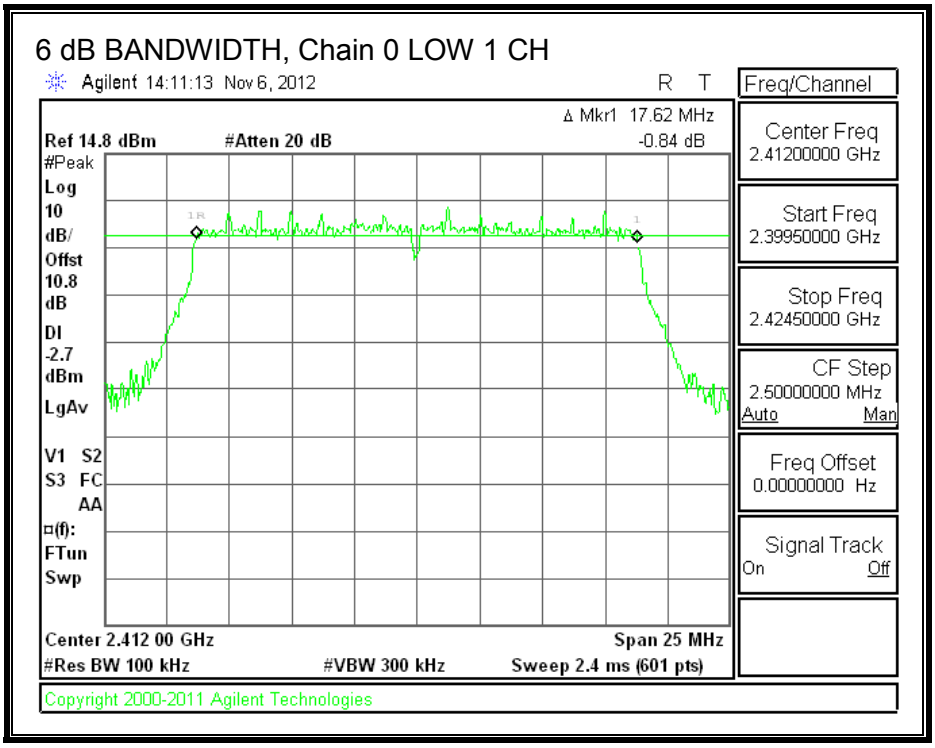
IC RSS-210 A8.2 (a)

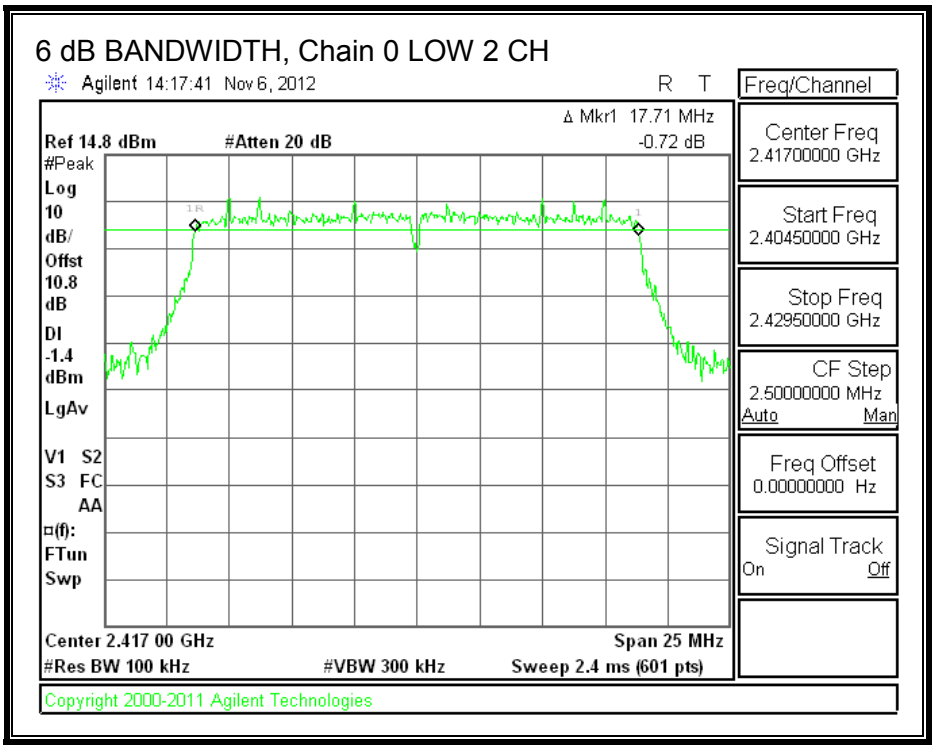
The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

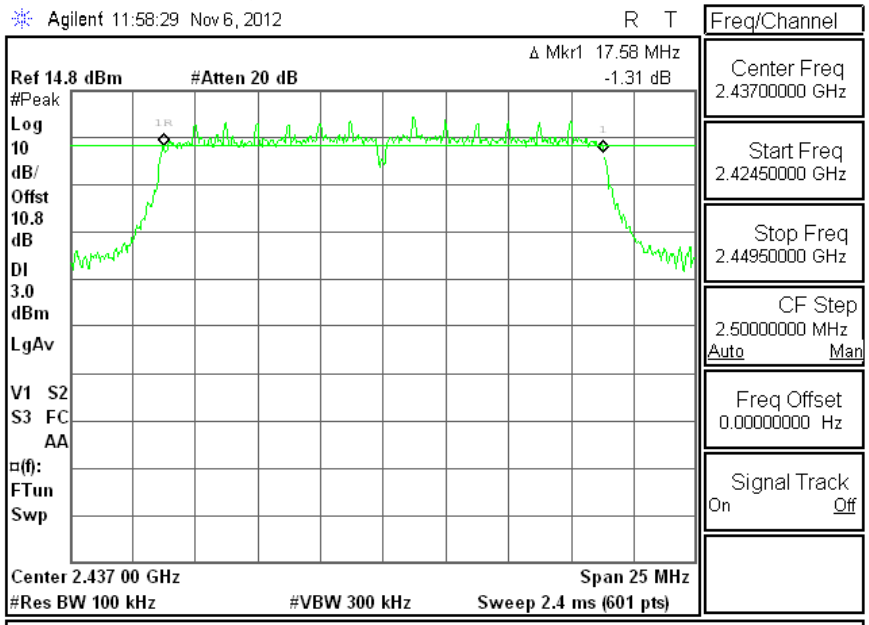
Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	6 dB BW Chain 2 (MHz)	Minimum Limit (MHz)
Low 1	2412	17.62	17.71	17.67	0.5
Low 2	2417	17.71	17.67	17.67	0.5
Mid	2437	17.58	17.67	17.67	0.5
High 2	2457	17.62	17.67	17.67	0.5
High 1	2462	17.62	17.67	17.67	0.5

6 dB BANDWIDTH, Chain 0

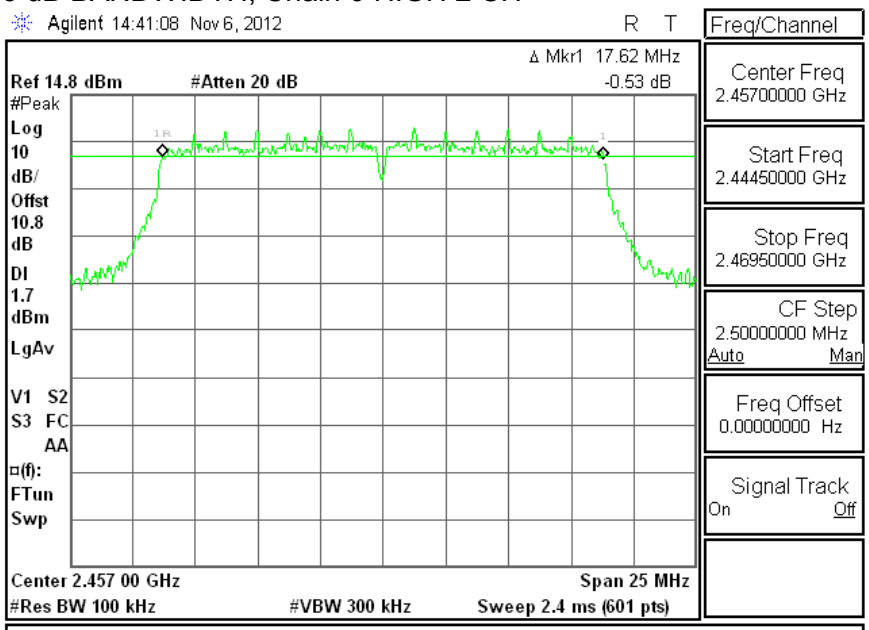


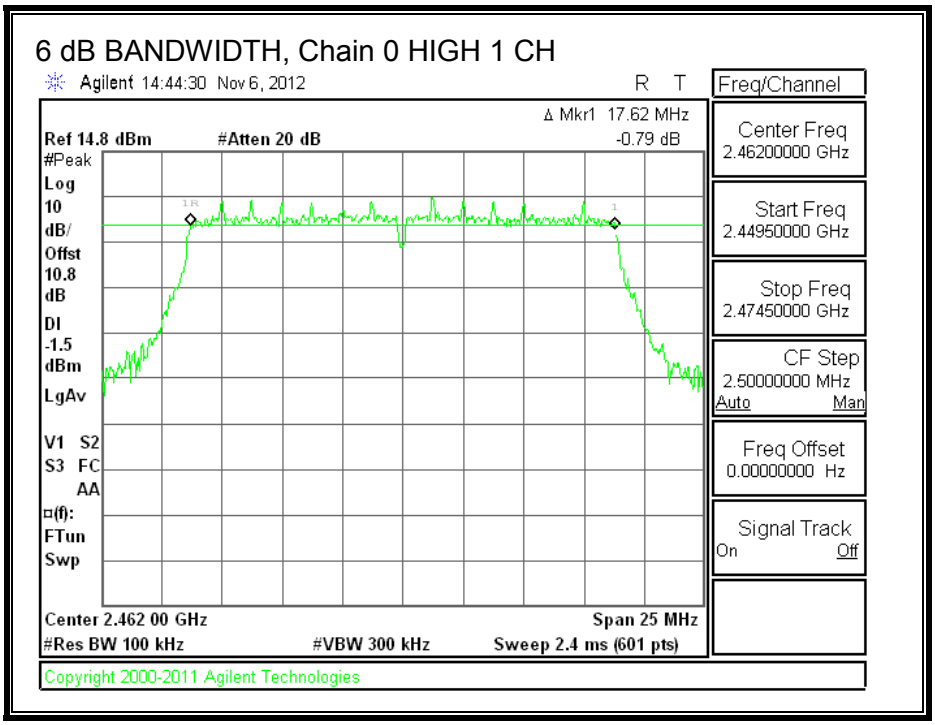


6 dB BANDWIDTH, Chain 0 MID CH

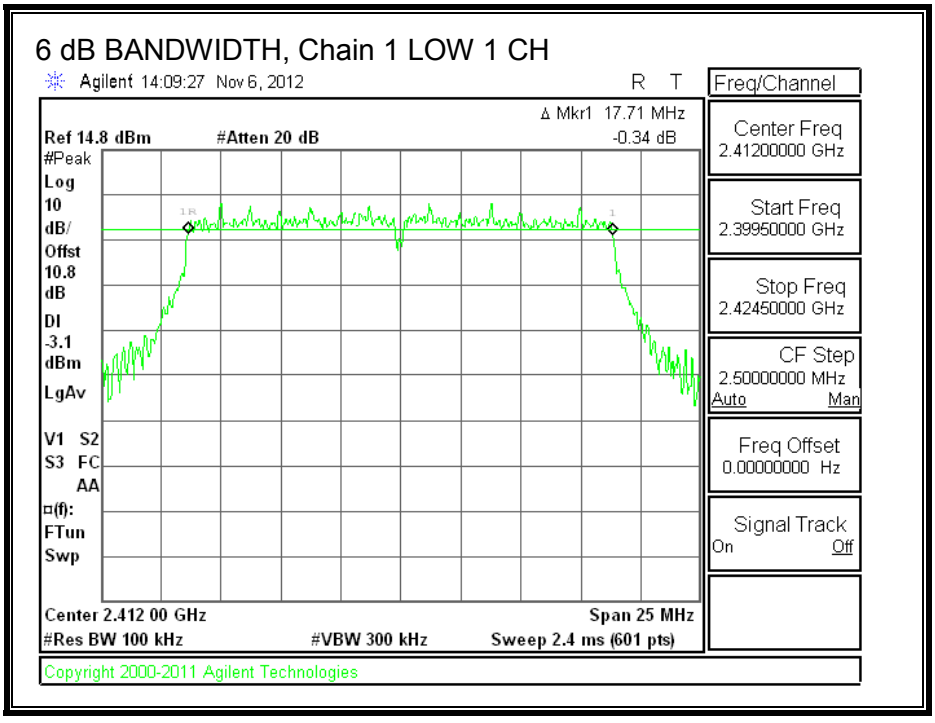


6 dB BANDWIDTH, Chain 0 HIGH 2 CH

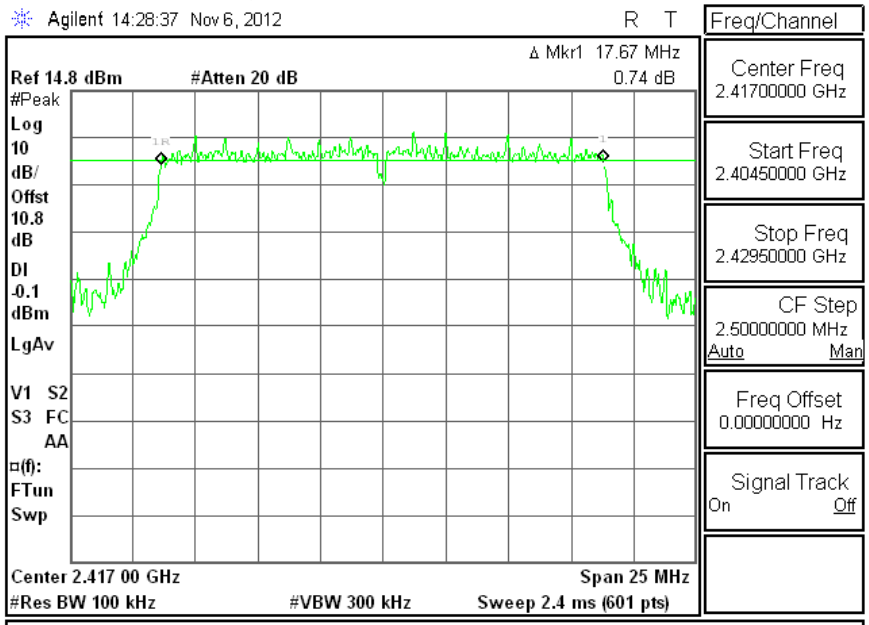




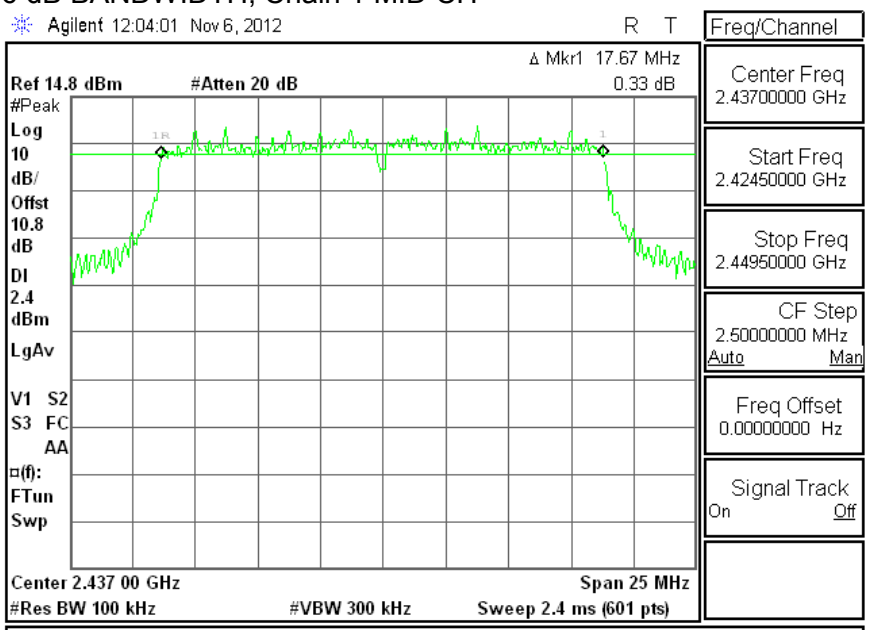
6 dB BANDWIDTH, Chain 1

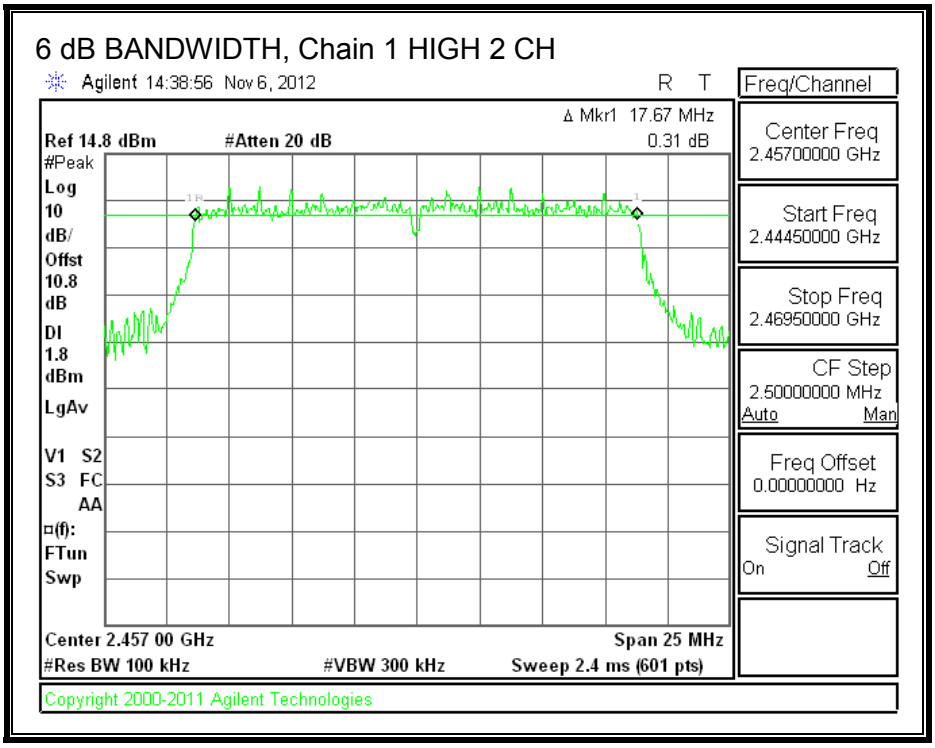


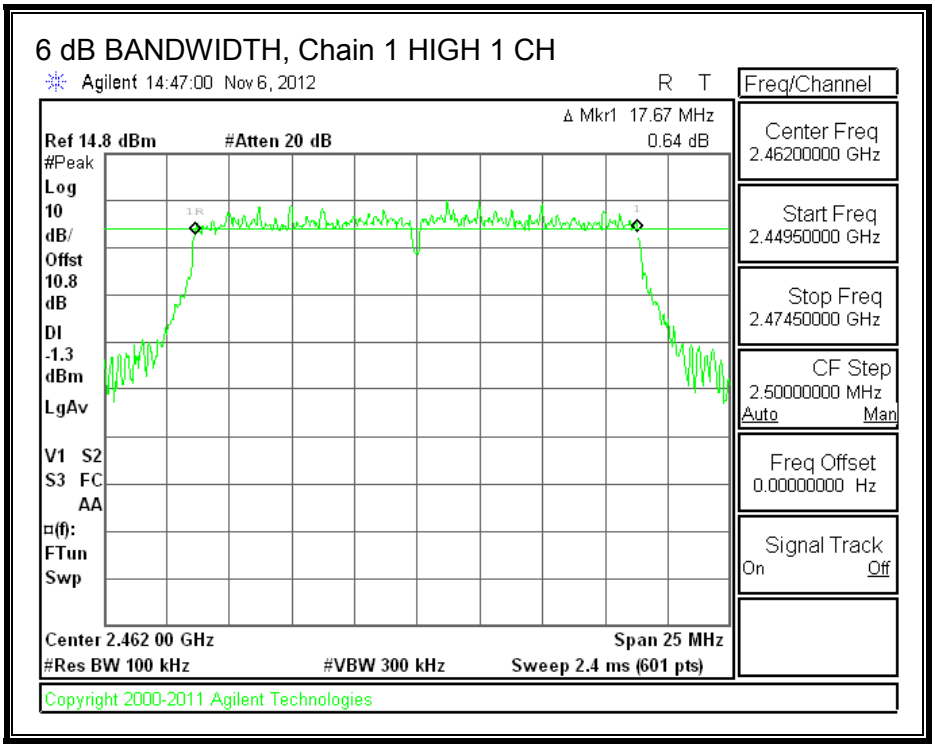
6 dB BANDWIDTH, Chain 1 LOW 2 CH



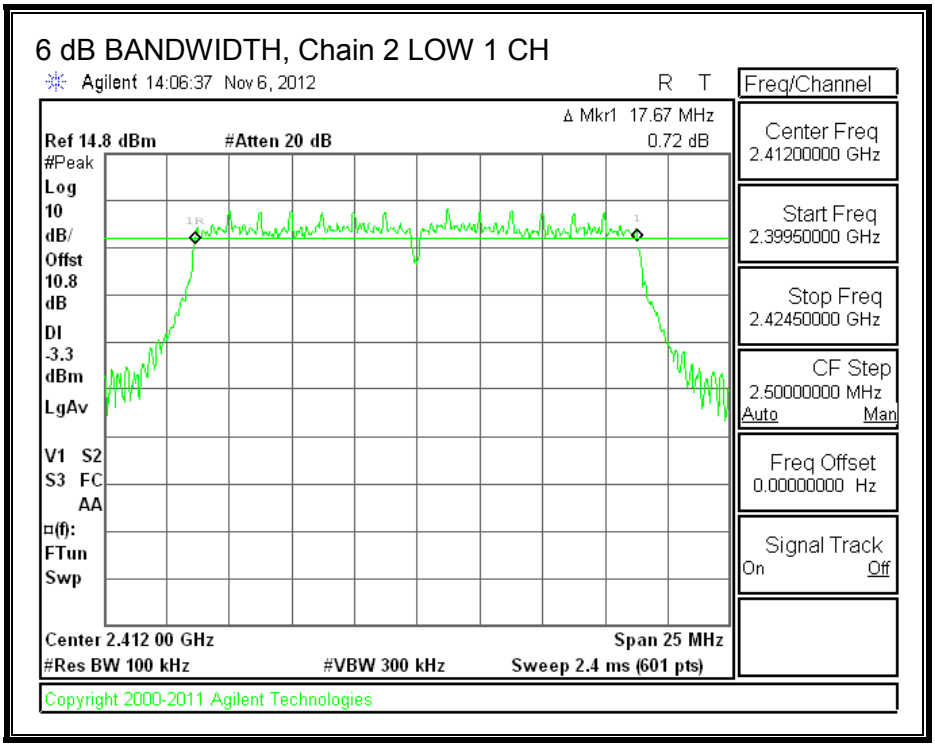
6 dB BANDWIDTH, Chain 1 MID CH

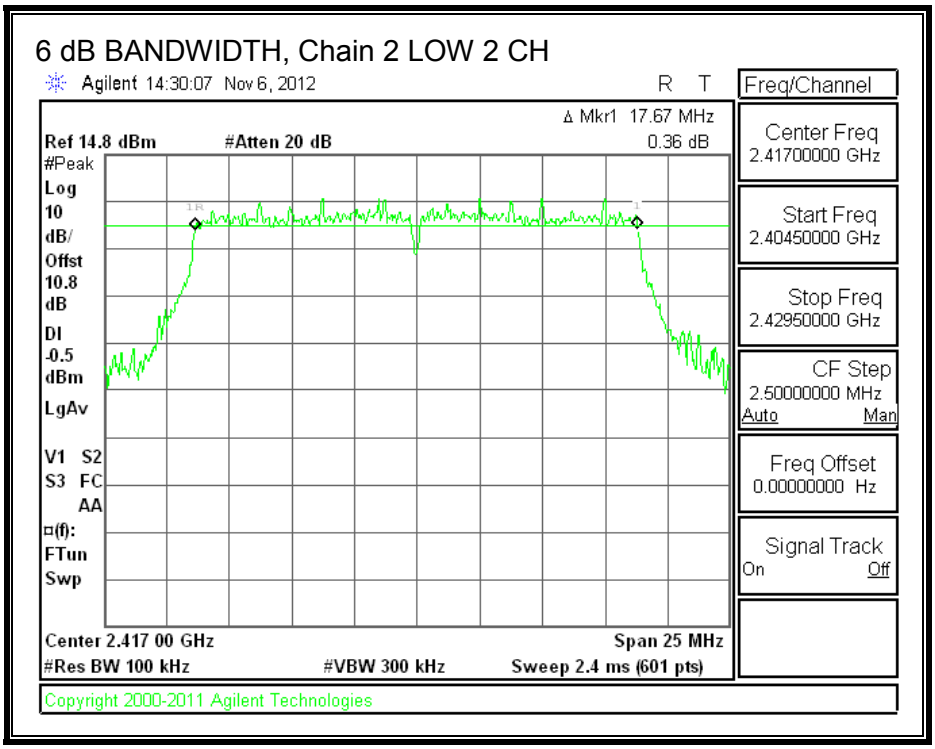


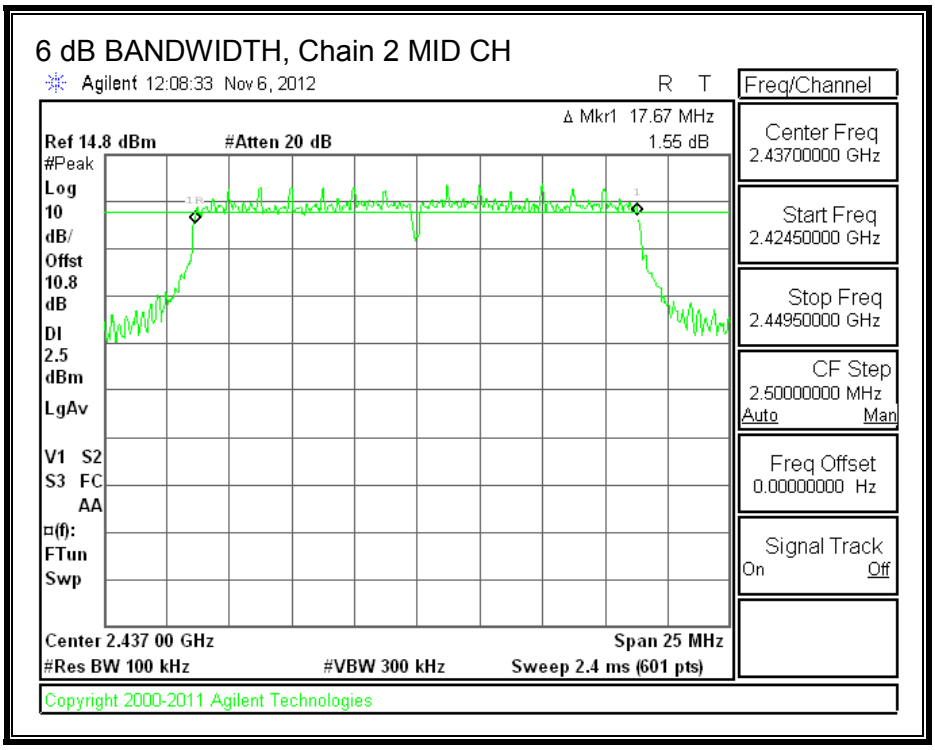


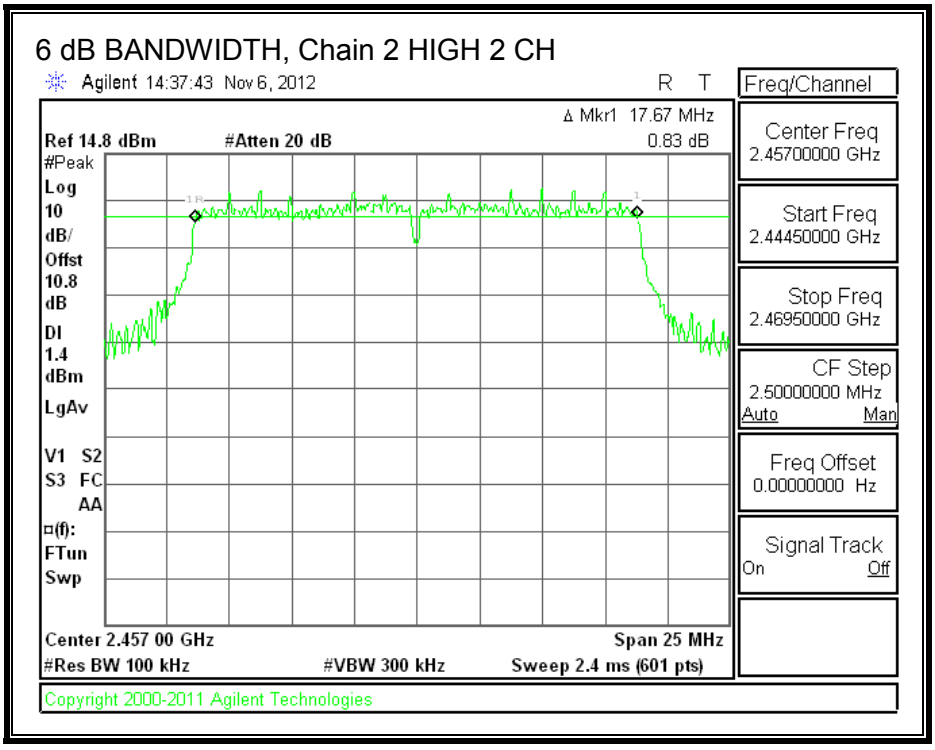


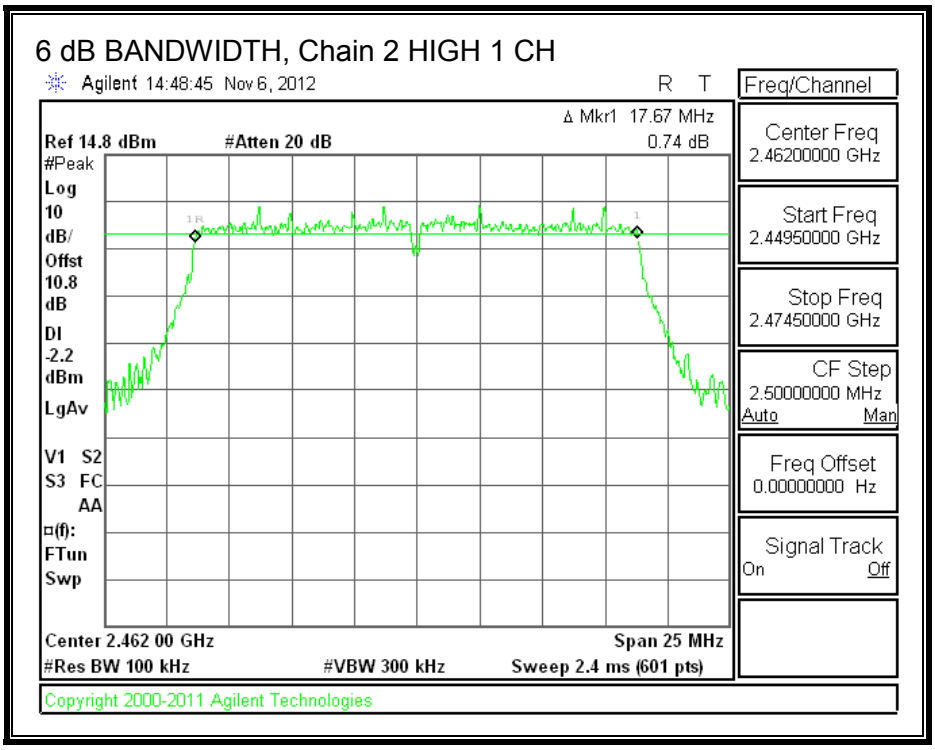
6 dB BANDWIDTH, Chain 2











8.13.2. 99% BANDWIDTH

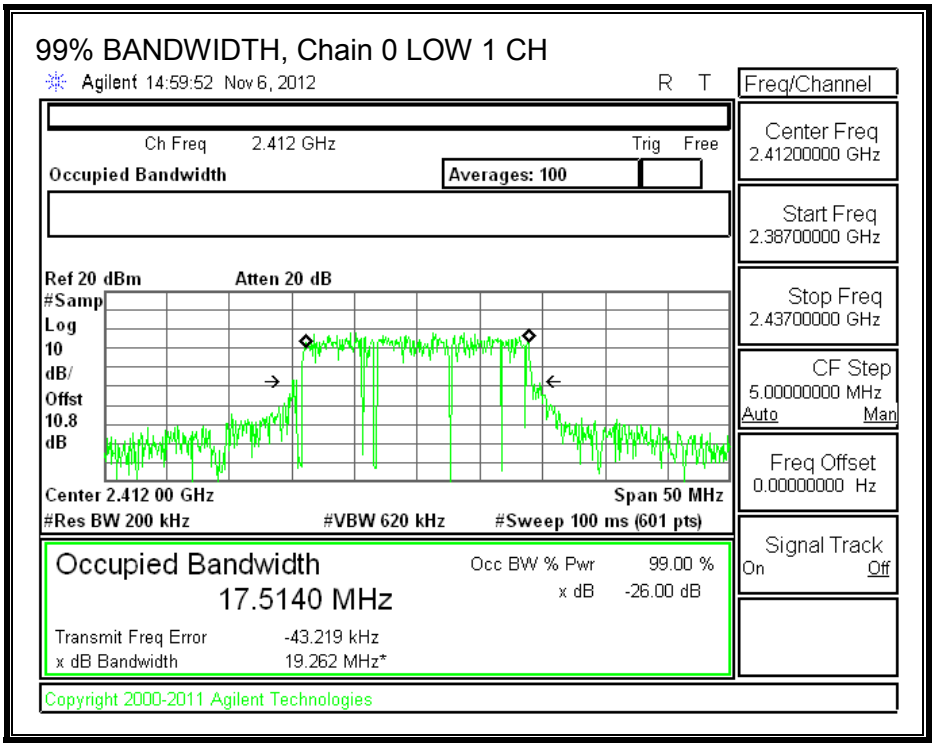
LIMITS

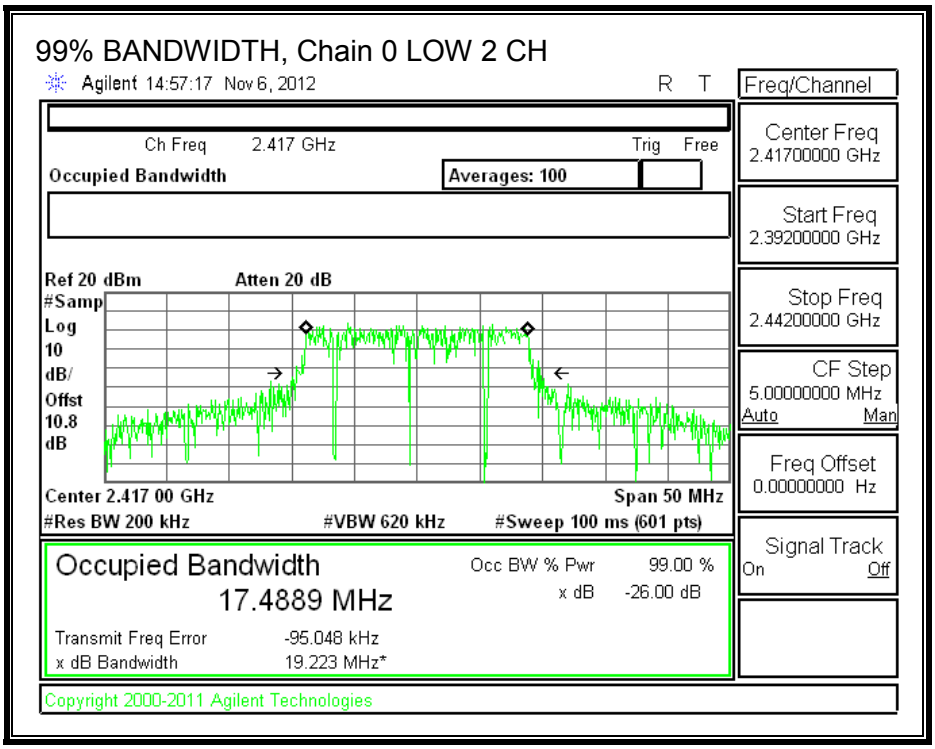
None; for reporting purposes only.

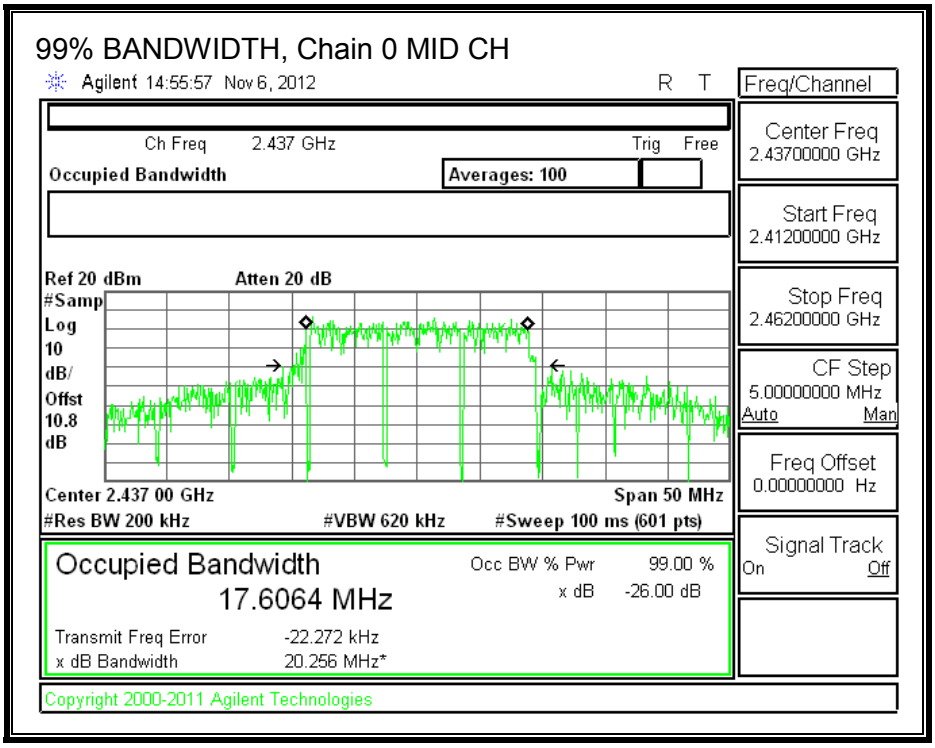
RESULTS

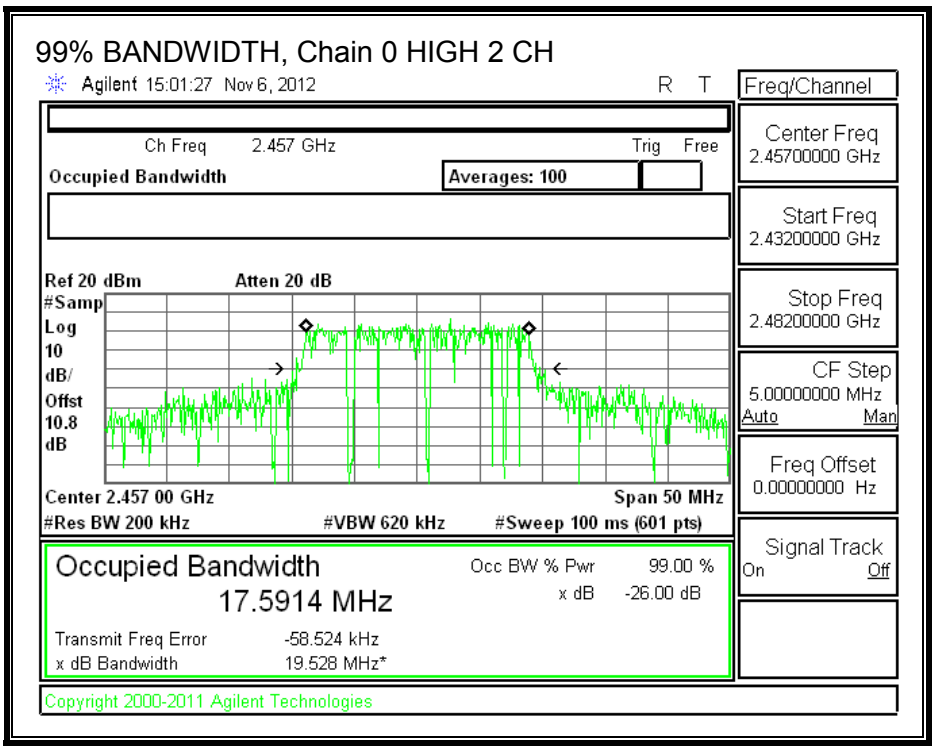
Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)	99% BW Chain 2 (MHz)
Low 1	2412	17.5140	17.5643	17.5187
Low 2	2417	17.4889	17.5775	17.5846
Mid	2437	17.6064	17.5905	17.5923
High 2	2457	17.5914	17.5954	17.5142
High 1	2462	17.5547	17.5250	17.6008

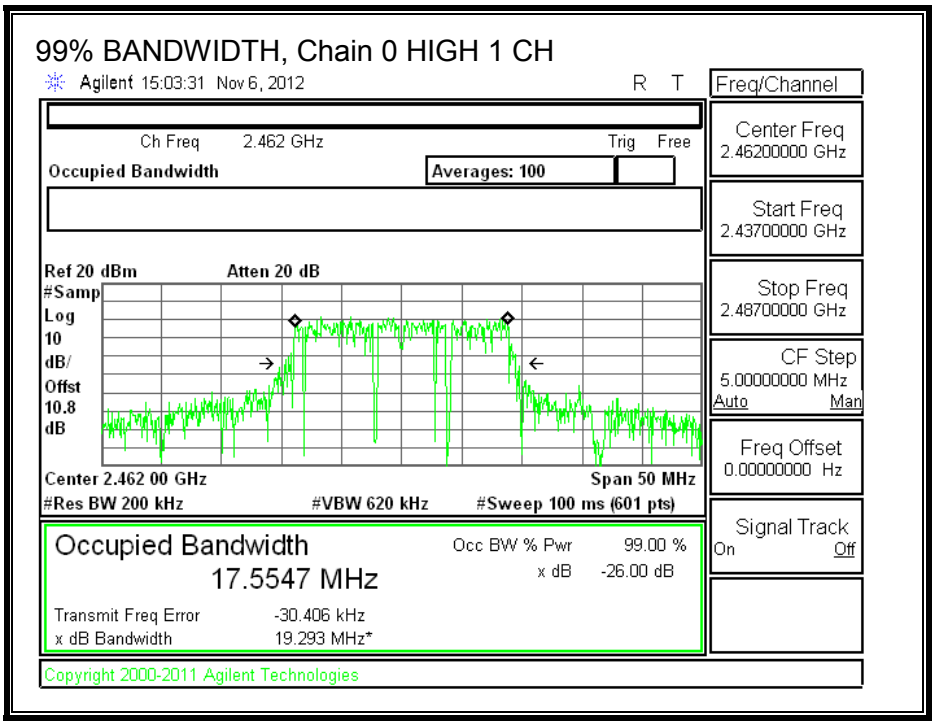
99% BANDWIDTH, Chain 0



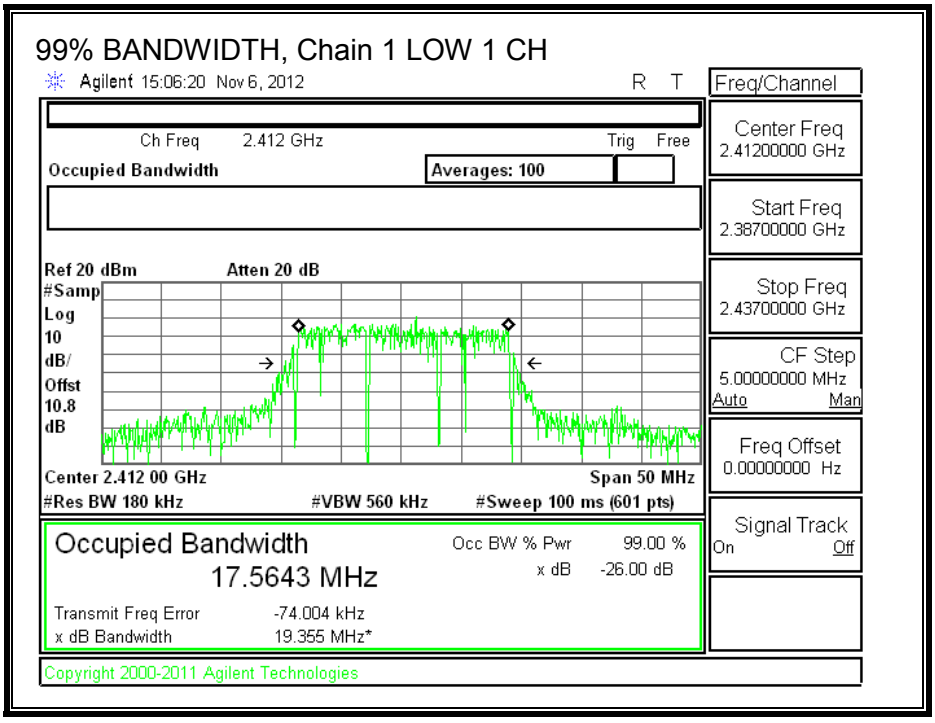


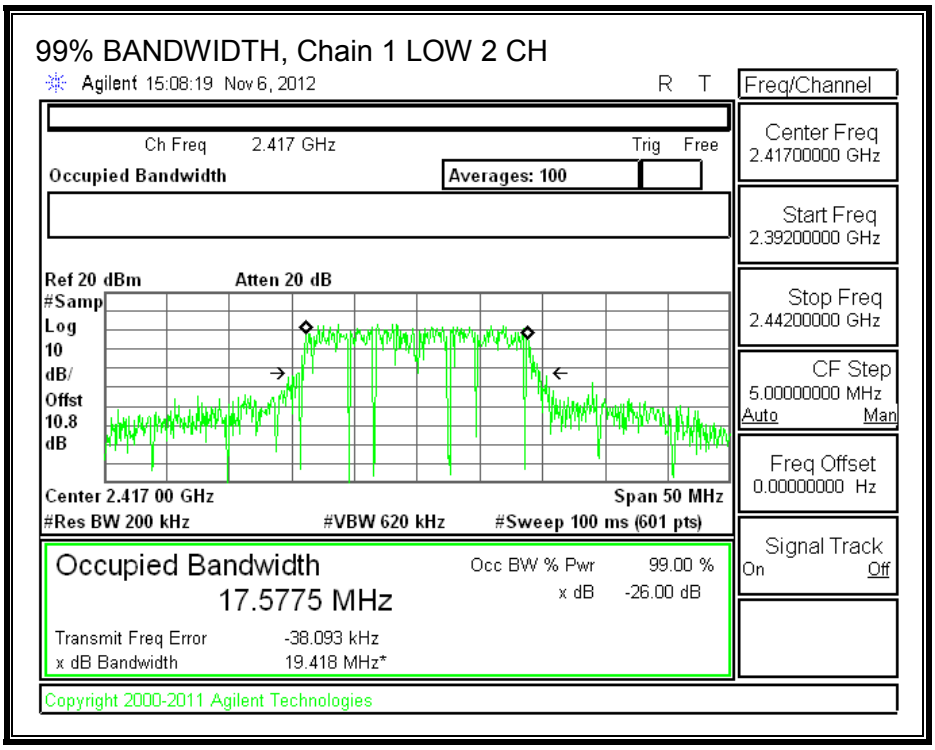


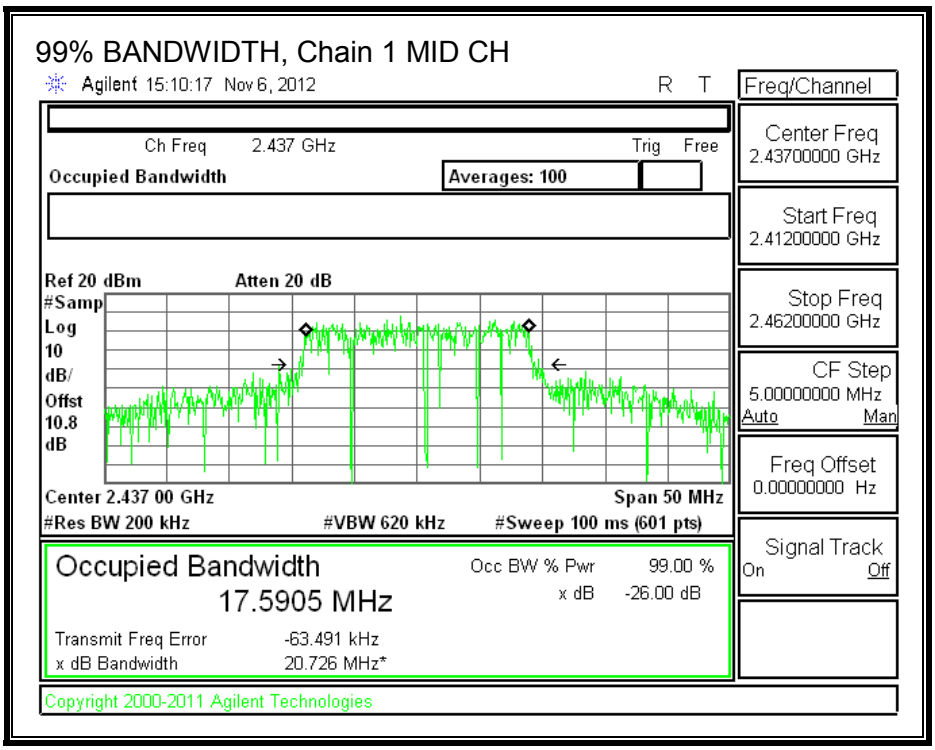


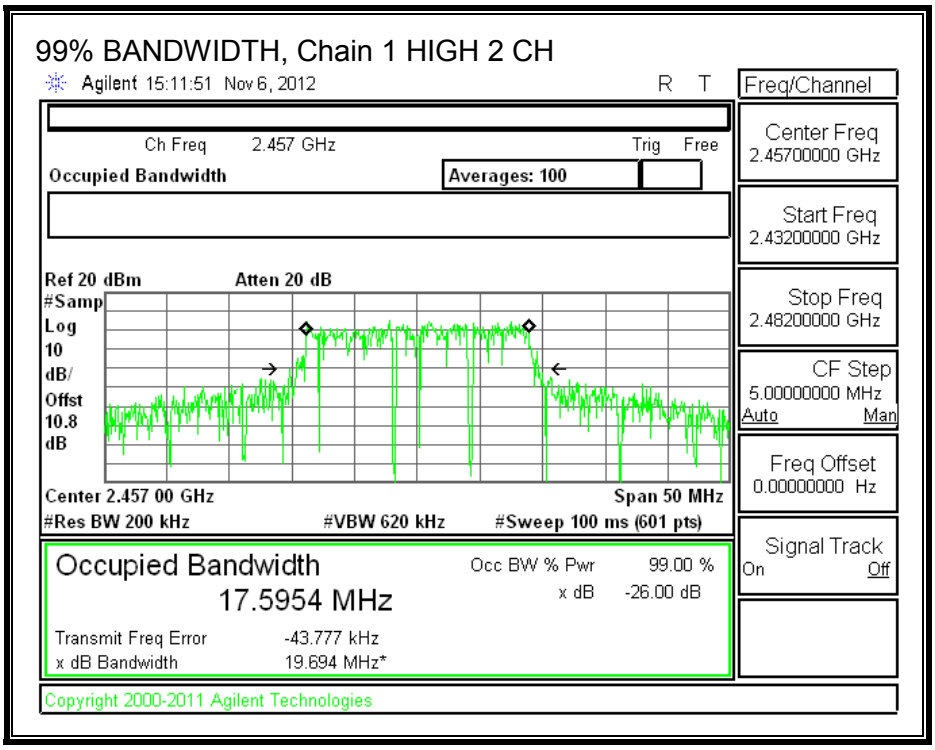


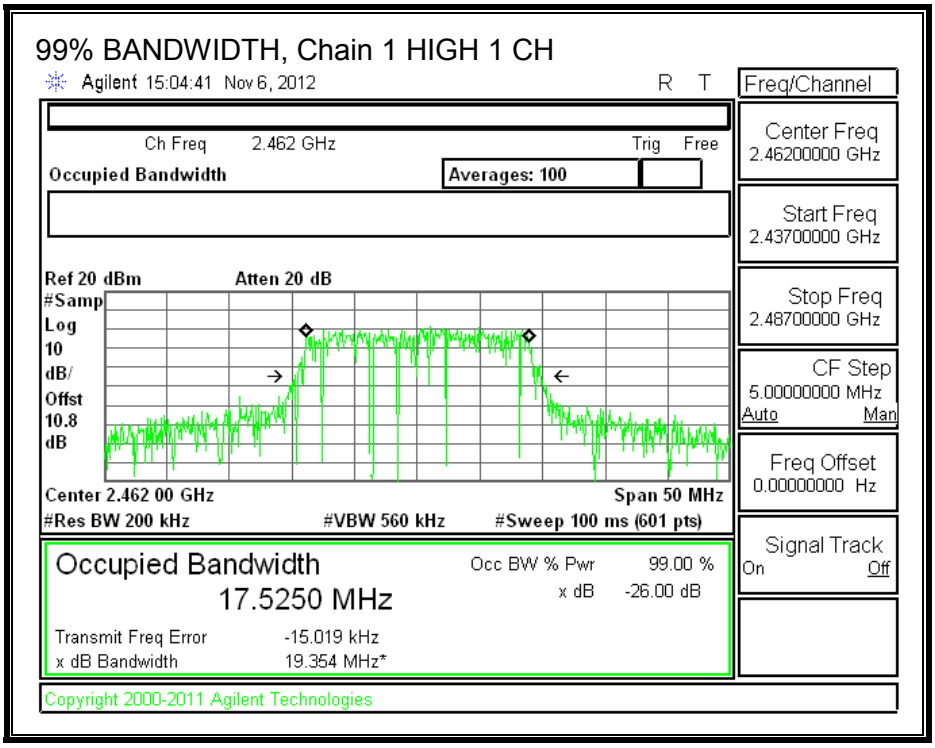
99% BANDWIDTH, Chain 1



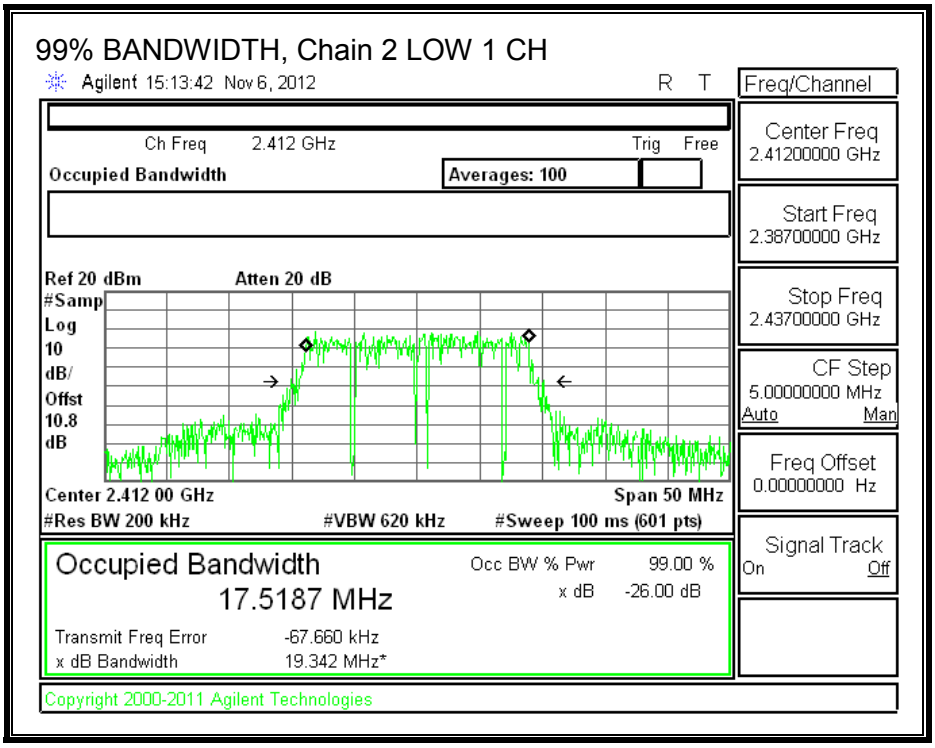


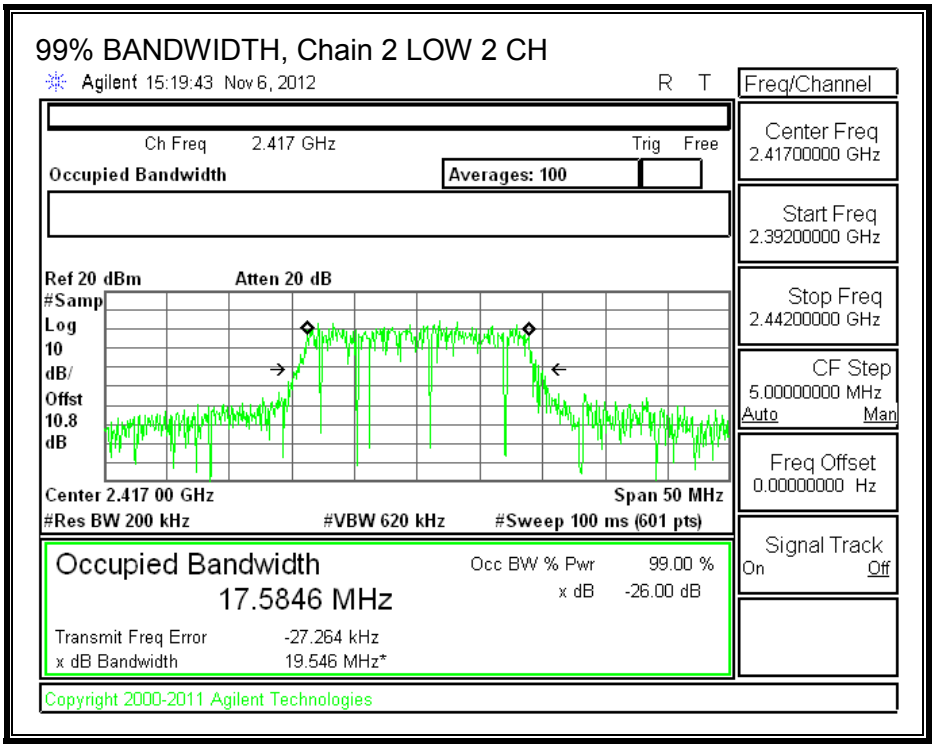


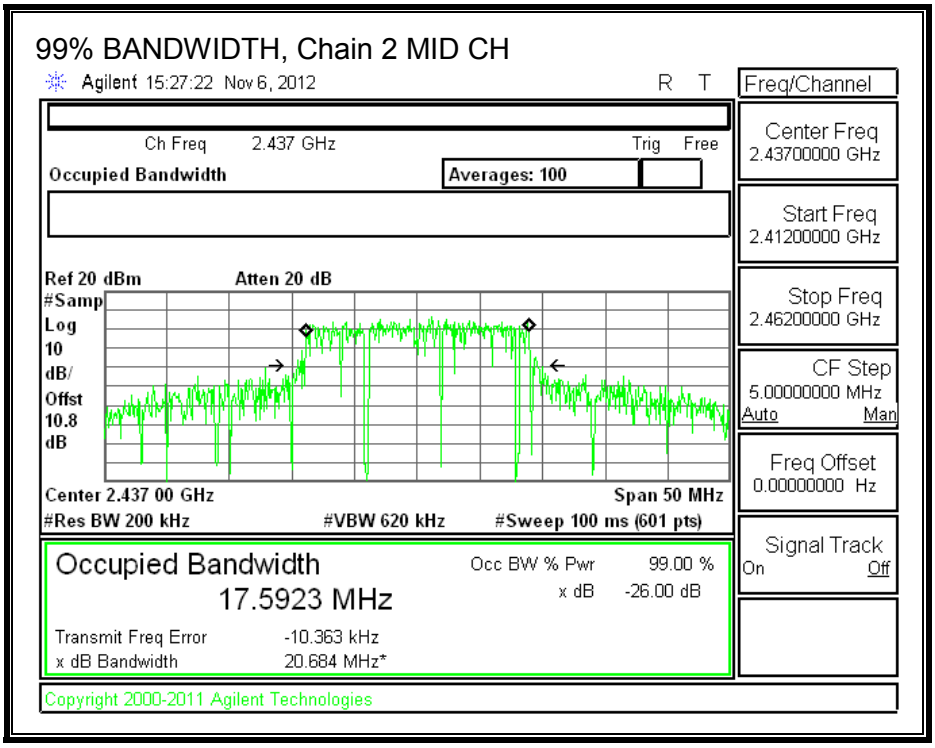


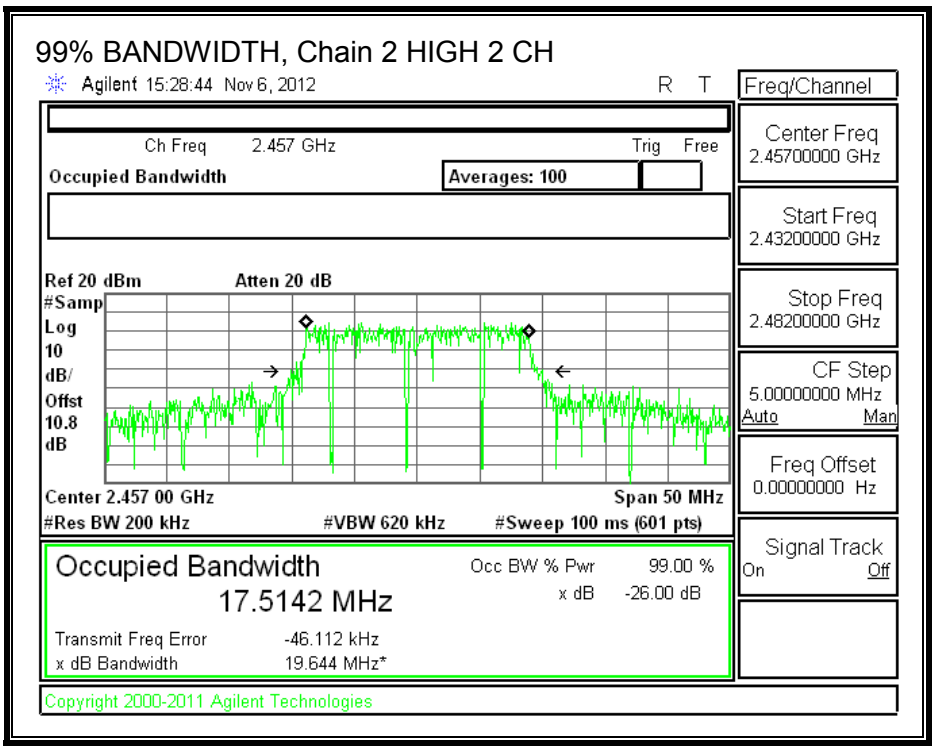


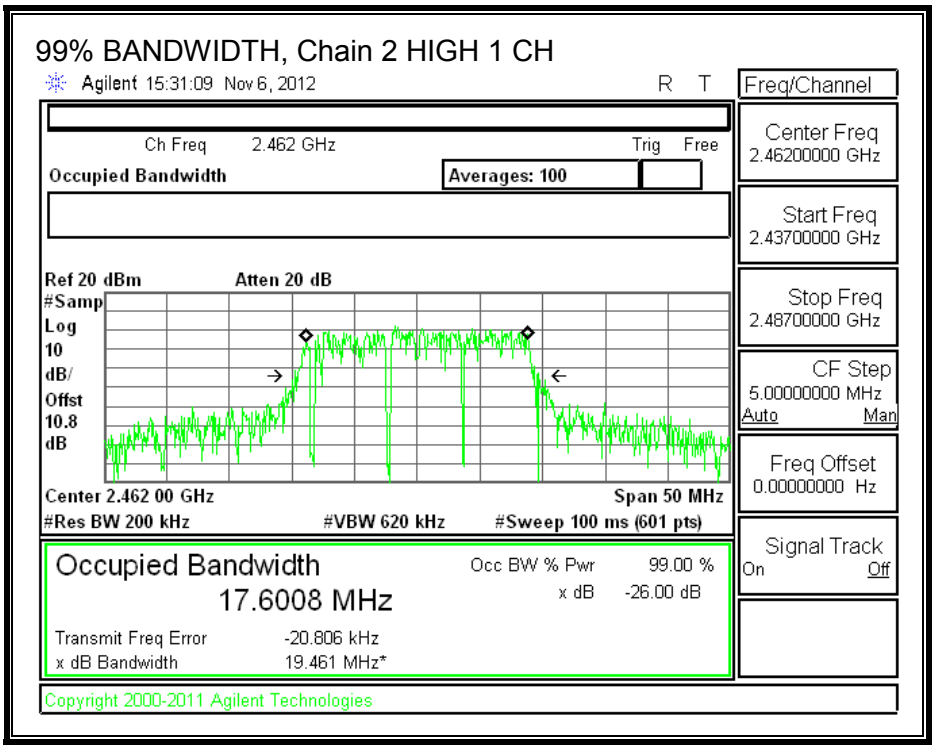
99% BANDWIDTH, Chain 2











8.13.3. 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 for output power consideration, and the antenna gain is unequal among the chains. The directional gain is:

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Chain 2 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
4.32	4.77	3.72	4.29

RESULTS

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	4.29	30.00	30	36	30.00
Low 2	2417	4.29	30.00	30	36	30.00
Mid	2437	4.29	30.00	30	36	30.00
High 2	2457	4.29	30.00	30	36	30.00
High 1	2462	4.29	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Chain 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	16.48	15.83	15.84	20.83	30.00	-9.17
Low 2	2417	16.30	16.13	16.14	20.96	30.00	-9.04
Mid	2437	20.26	19.95	20.01	24.85	30.00	-5.15
High 2	2457	18.02	17.74	17.81	22.63	30.00	-7.37
High 1	2462	14.81	14.45	14.56	19.38	30.00	-10.62

8.13.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247

IC RSS-210 A8.2

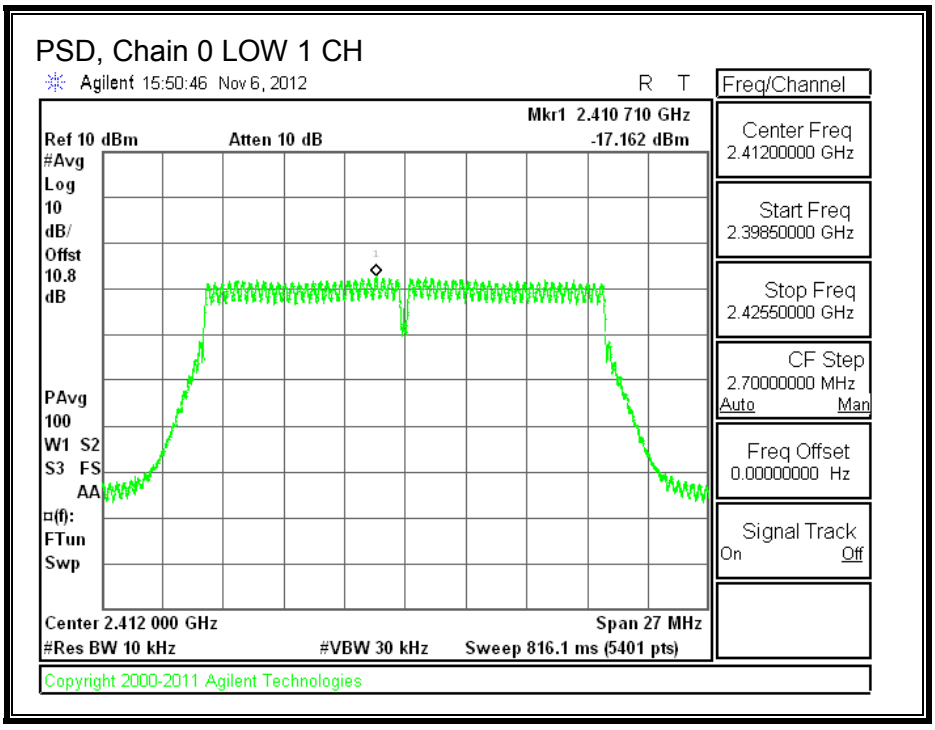
The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

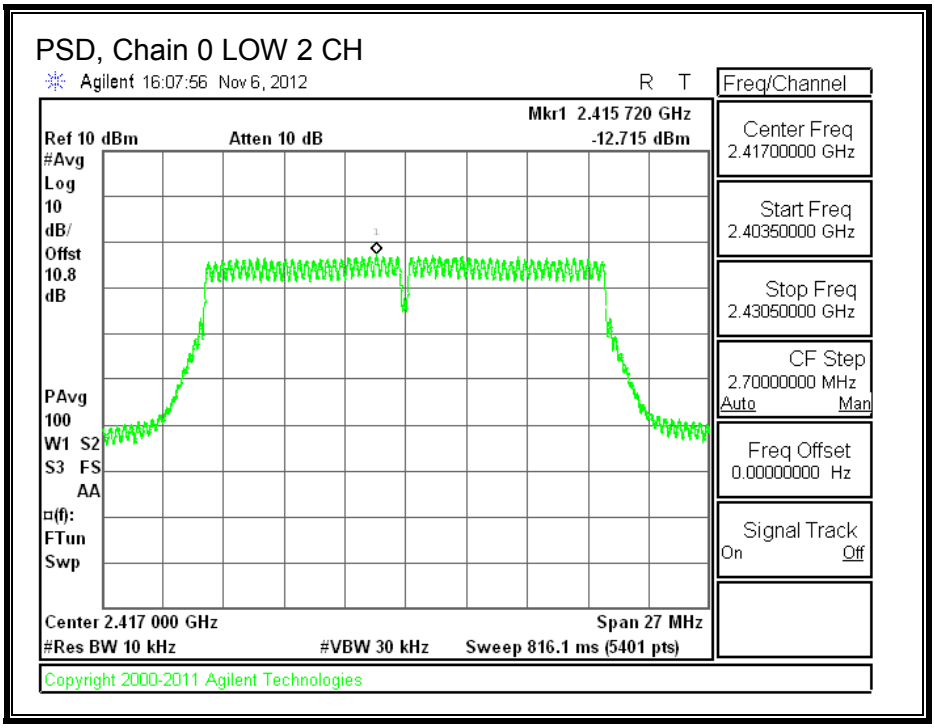
RESULTS

PSD Results

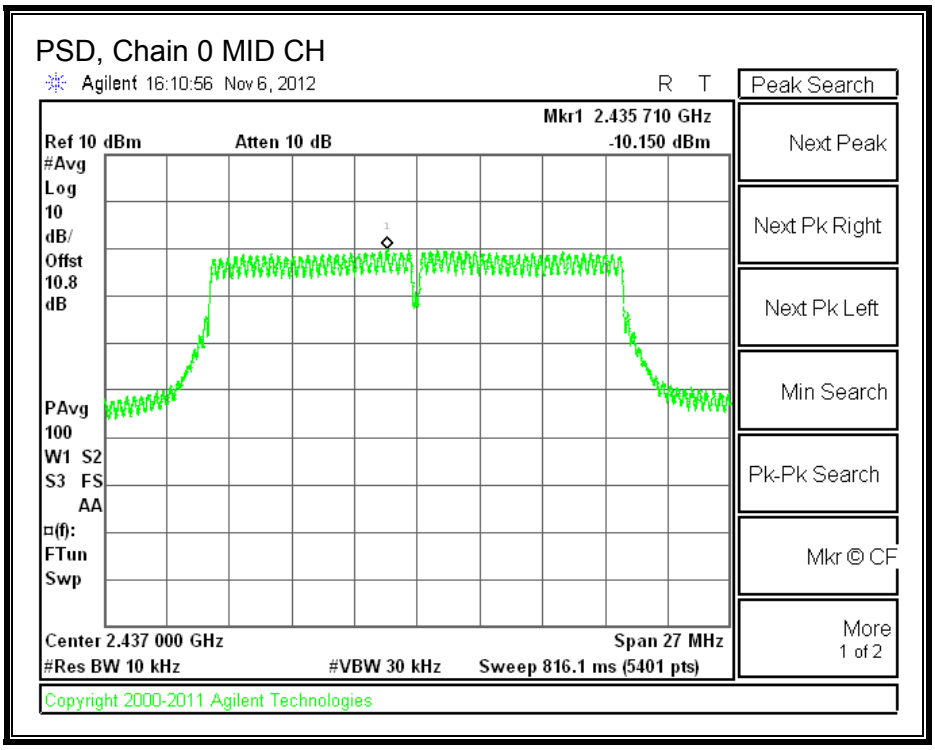
Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Chain 1 Meas (dBm)	Chain 2 Meas (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low 1	2412	-17.162	-17.647	-17.364	-12.615	8.0	-20.615
Low 2	2417	-12.715	-12.623	-12.959	-7.992	8.0	-15.992
Mid	2437	-10.150	-10.263	-10.601	-5.563	8.0	-13.563
High 2	2457	-11.190	-10.864	-10.750	-6.159	8.0	-14.159
High 1	2462	-14.066	-14.534	-14.179	-9.484	8.0	-17.484

PSD, Chain 0

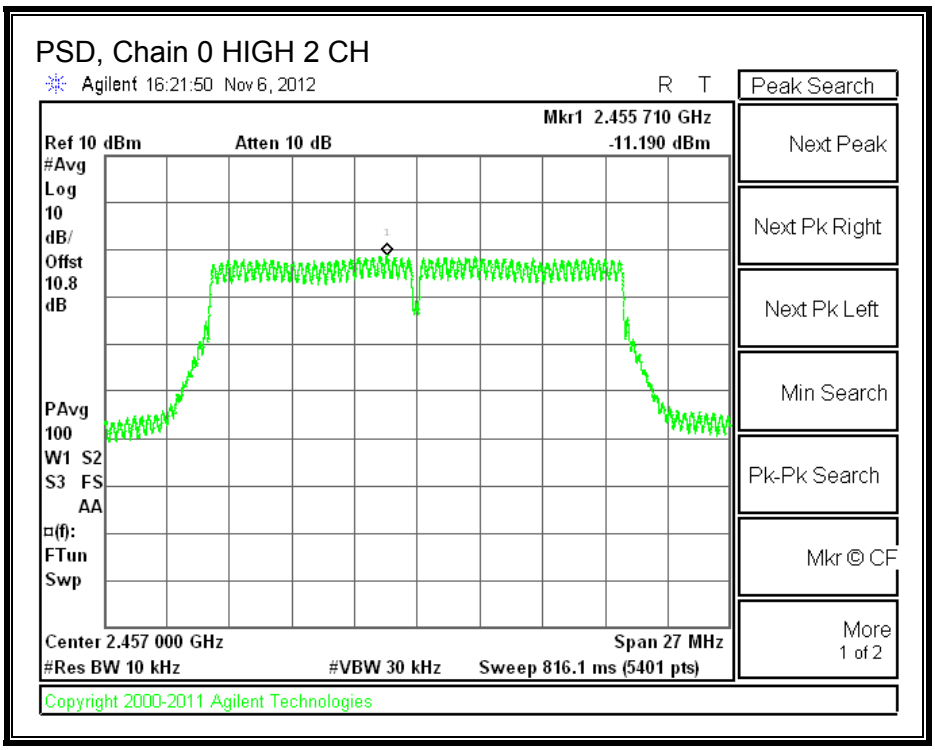


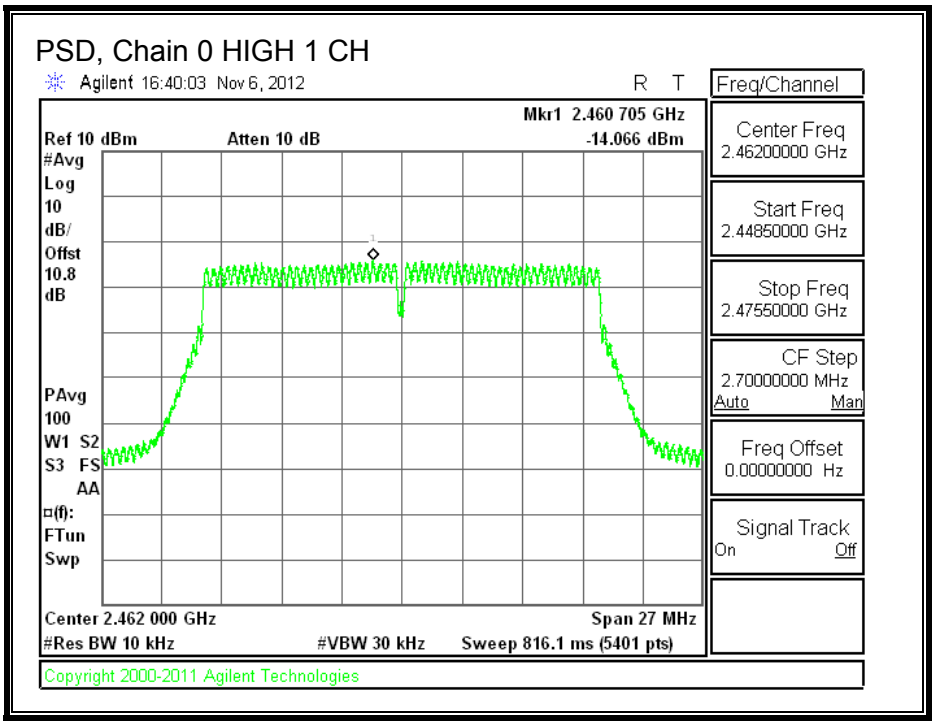


PSD, Chain 0 MID CH

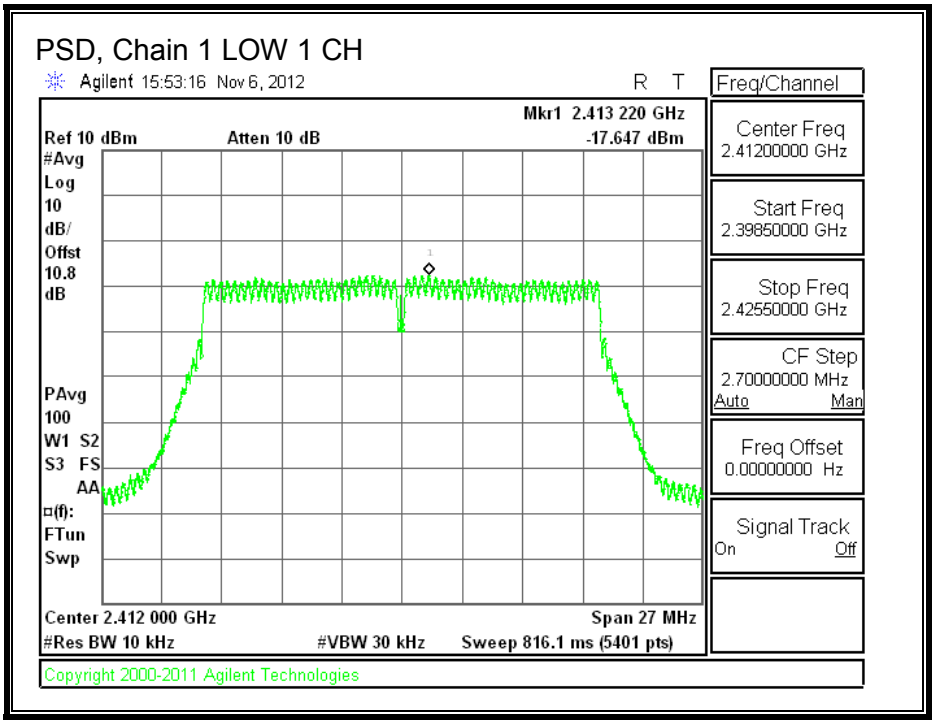


PSD, Chain 0 HIGH 2 CH

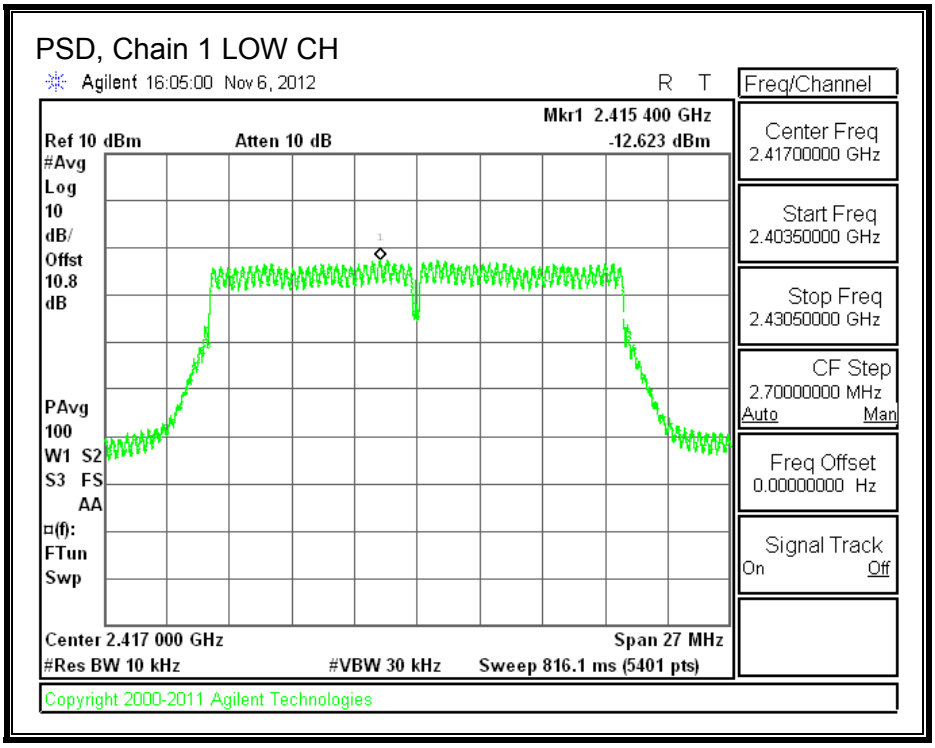




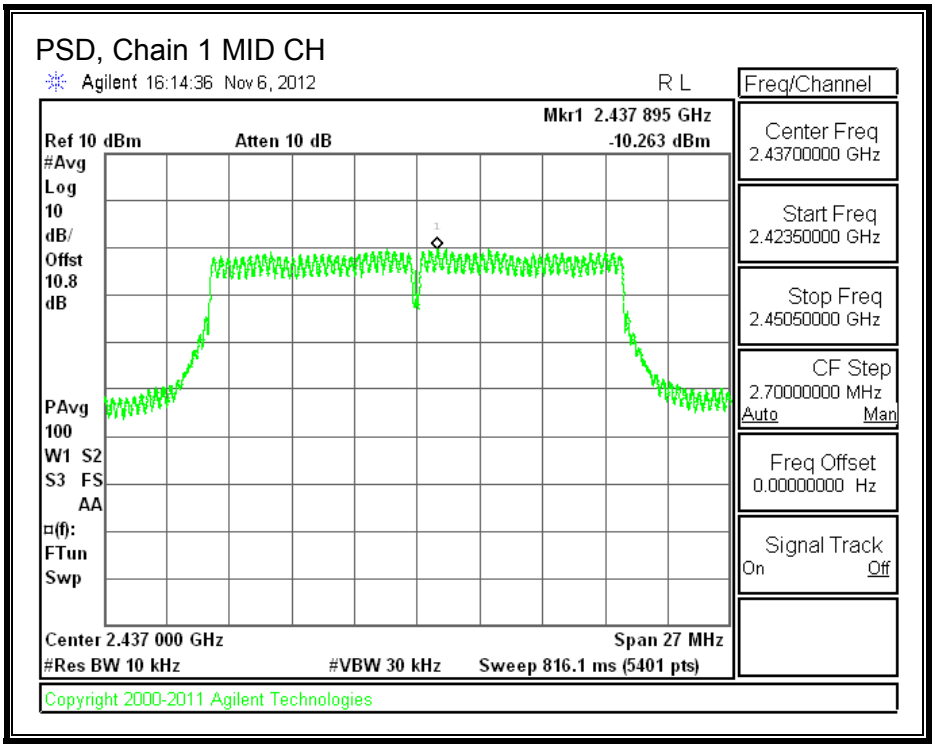
PSD, Chain 1



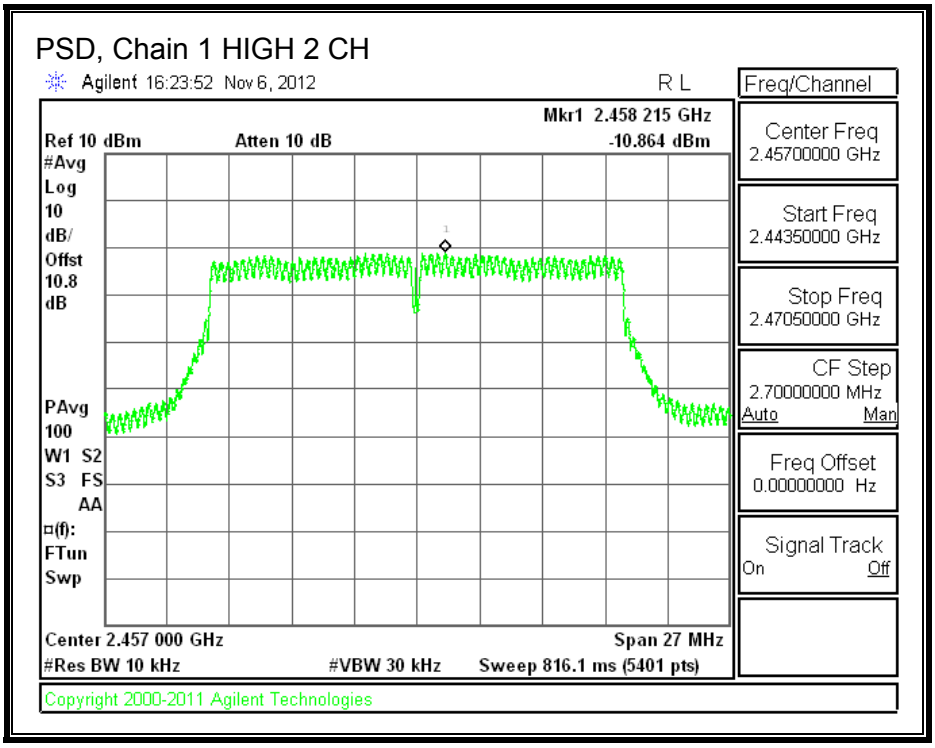
PSD, Chain 1 LOW CH



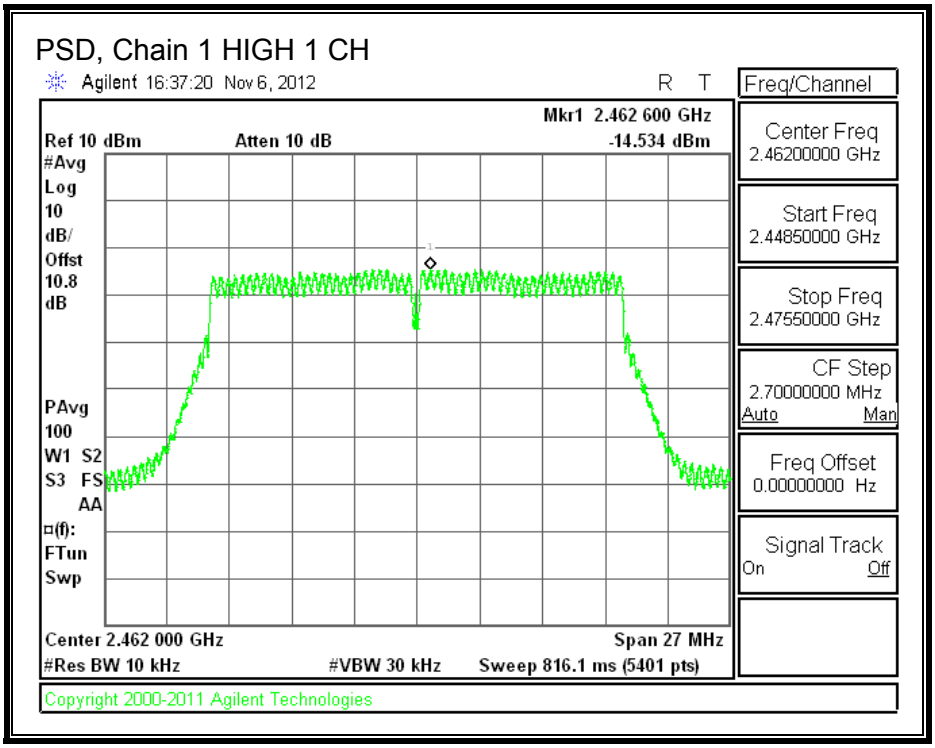
PSD, Chain 1 MID CH



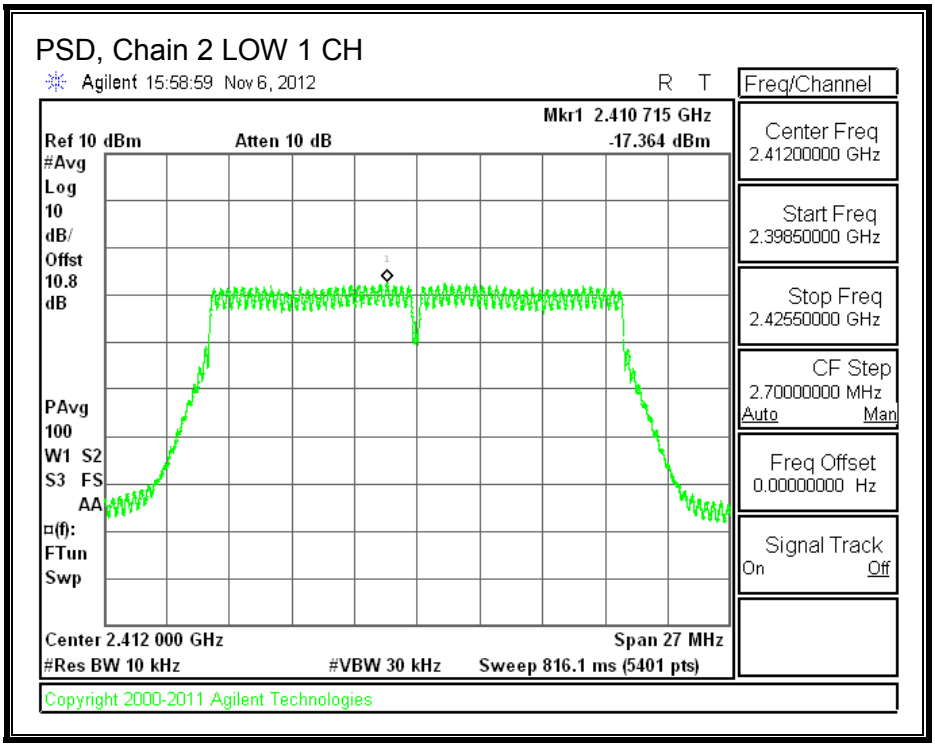
PSD, Chain 1 HIGH 2 CH

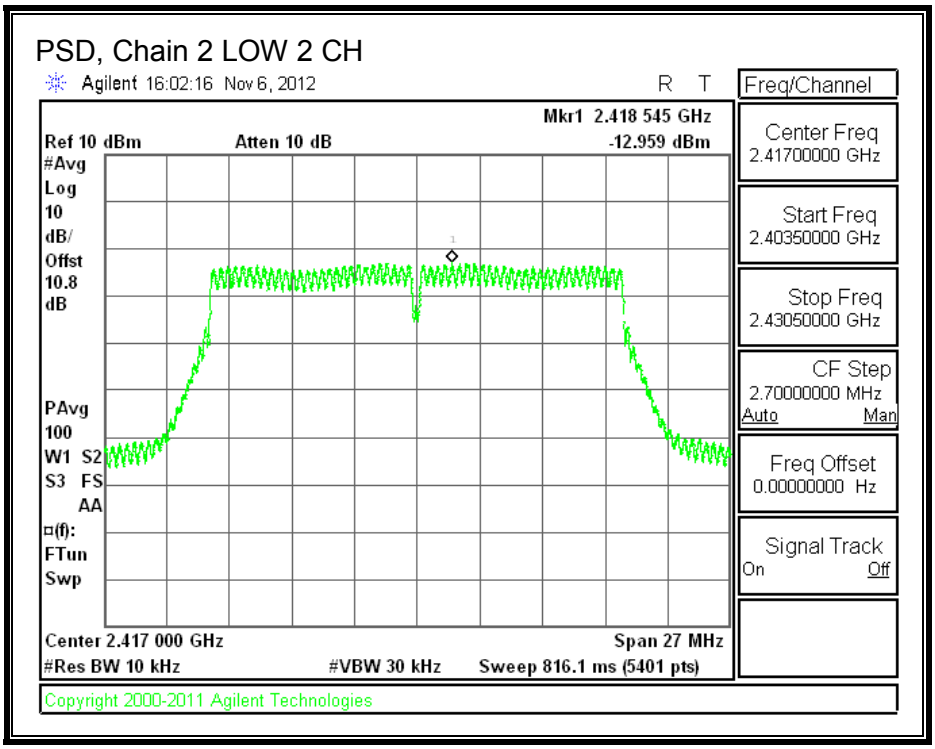


PSD, Chain 1 HIGH 1 CH

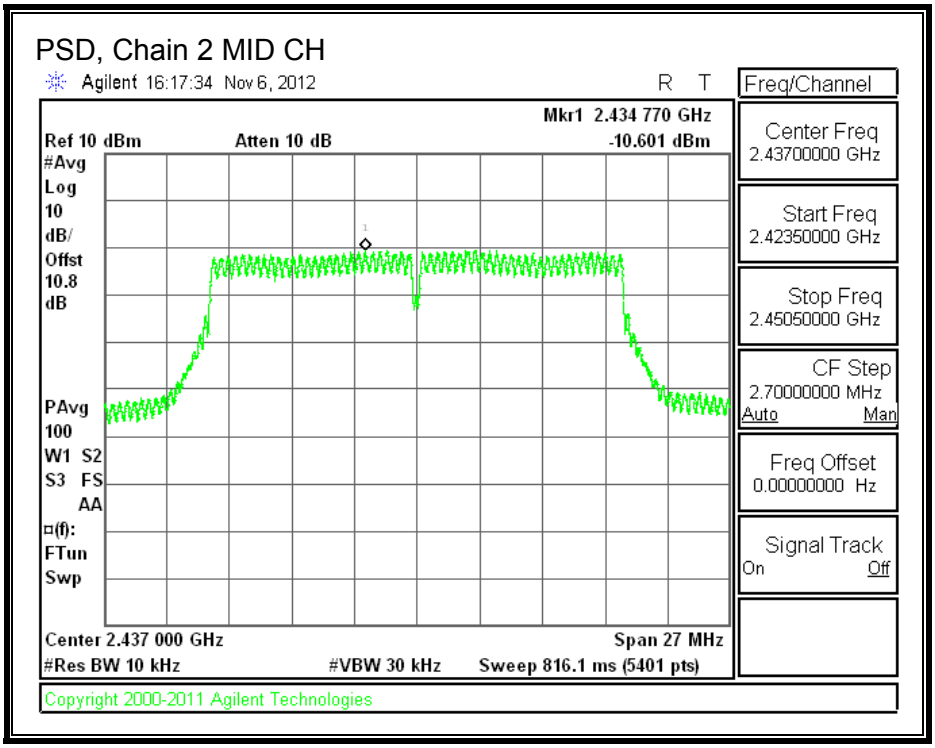


PSD, Chain 2

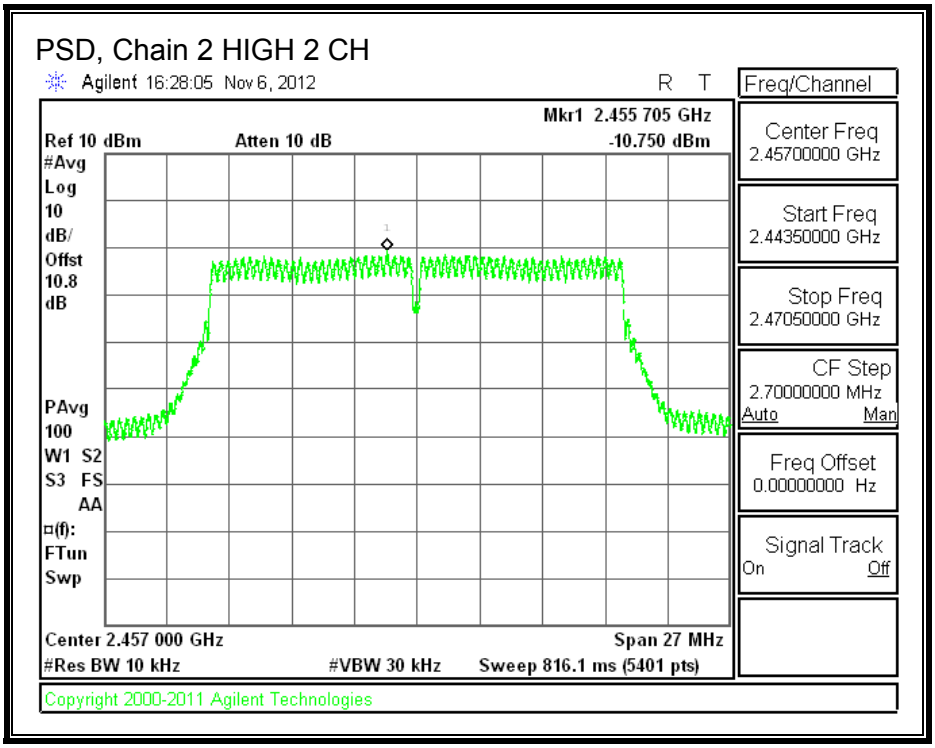


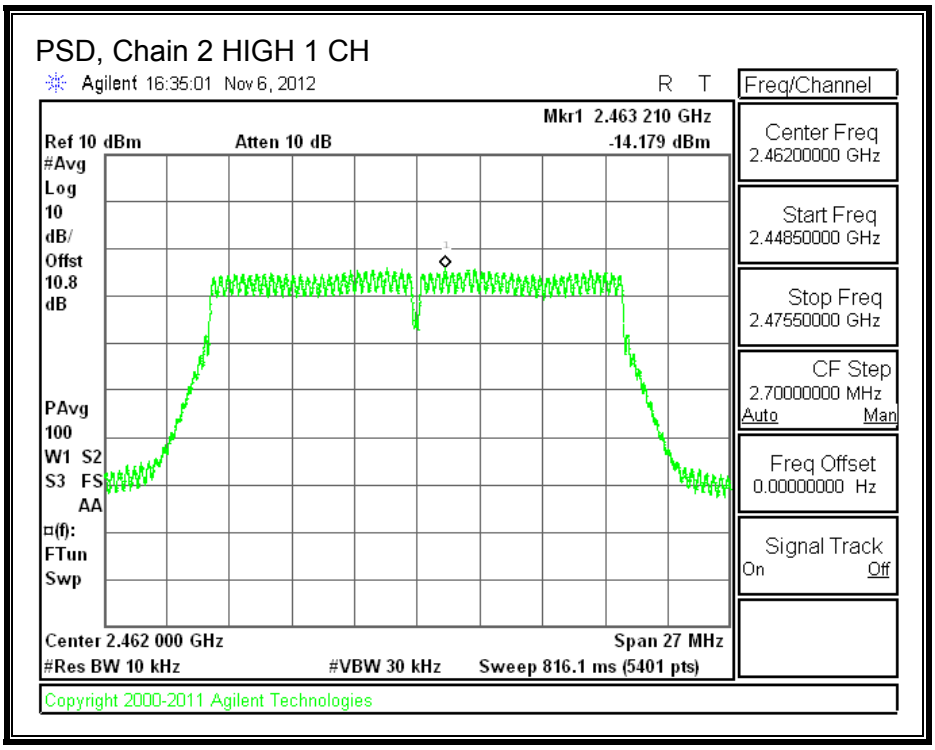


PSD, Chain 2 MID CH



PSD, Chain 2 HIGH 2 CH





8.13.5. OUT-OF-BAND EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

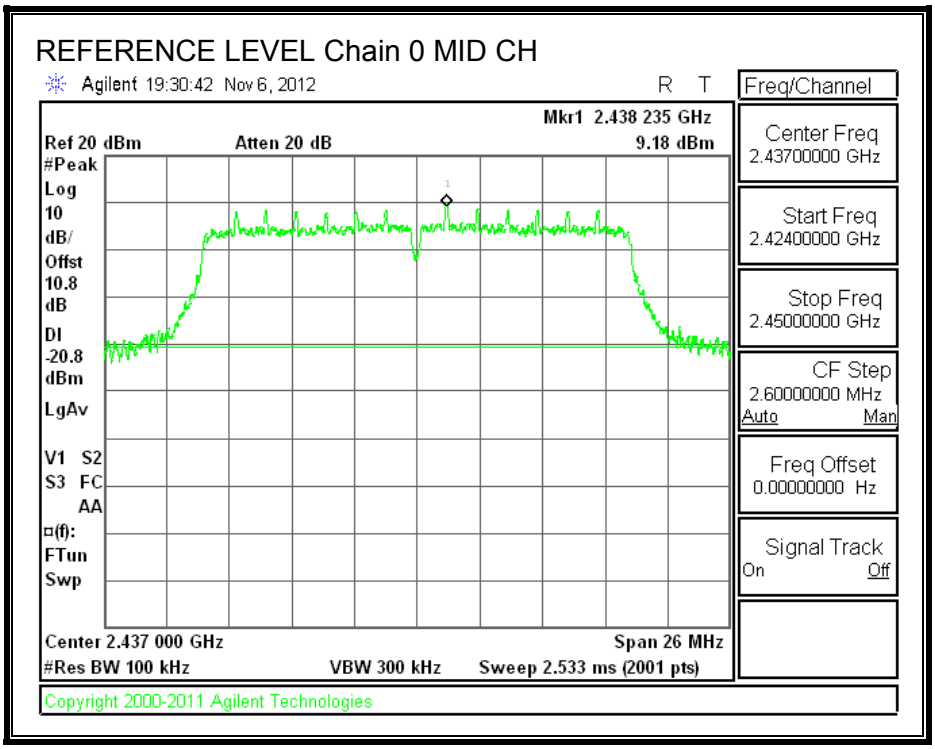
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the 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

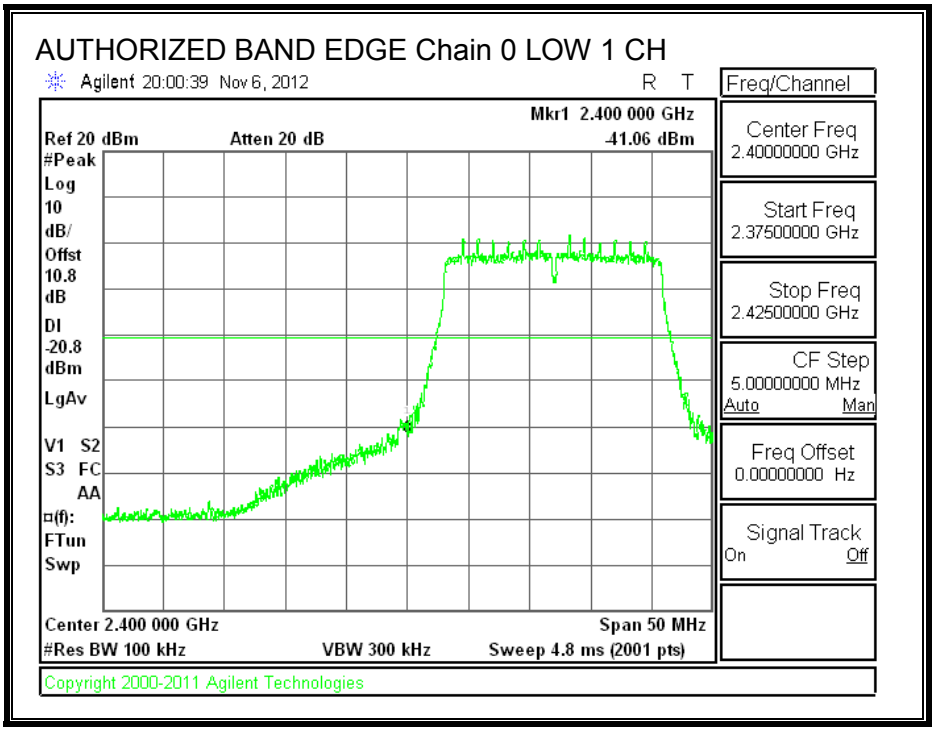
The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the in-band reference level, bandedge (where measurements to the general radiated limits will not be made) and out-of-band emissions.

RESULTS

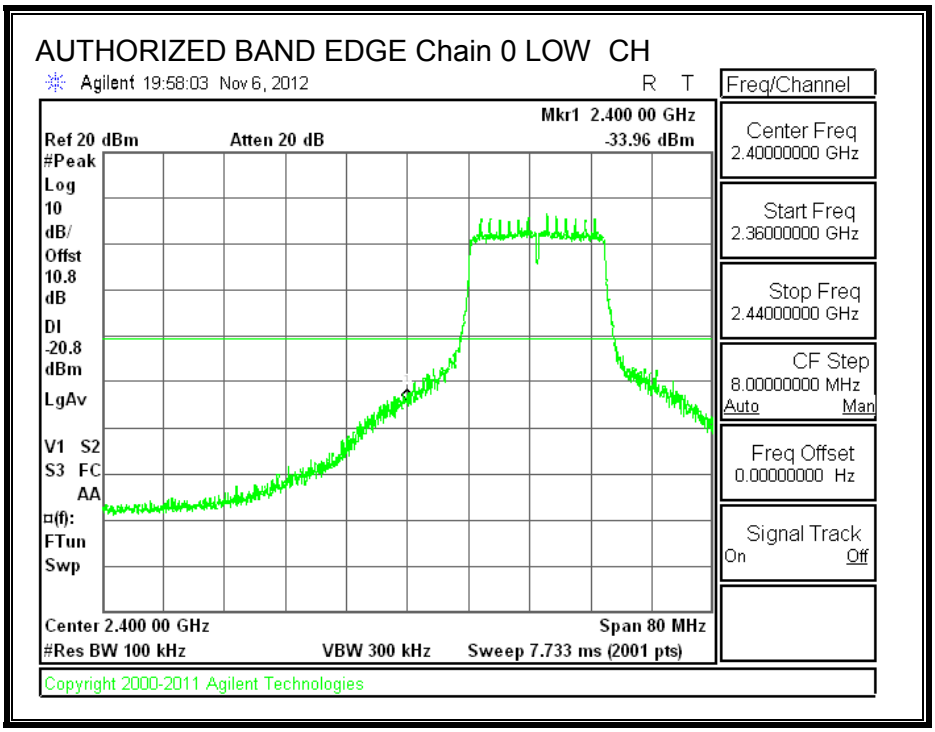
IN-BAND REFERENCE LEVEL, Chain 0



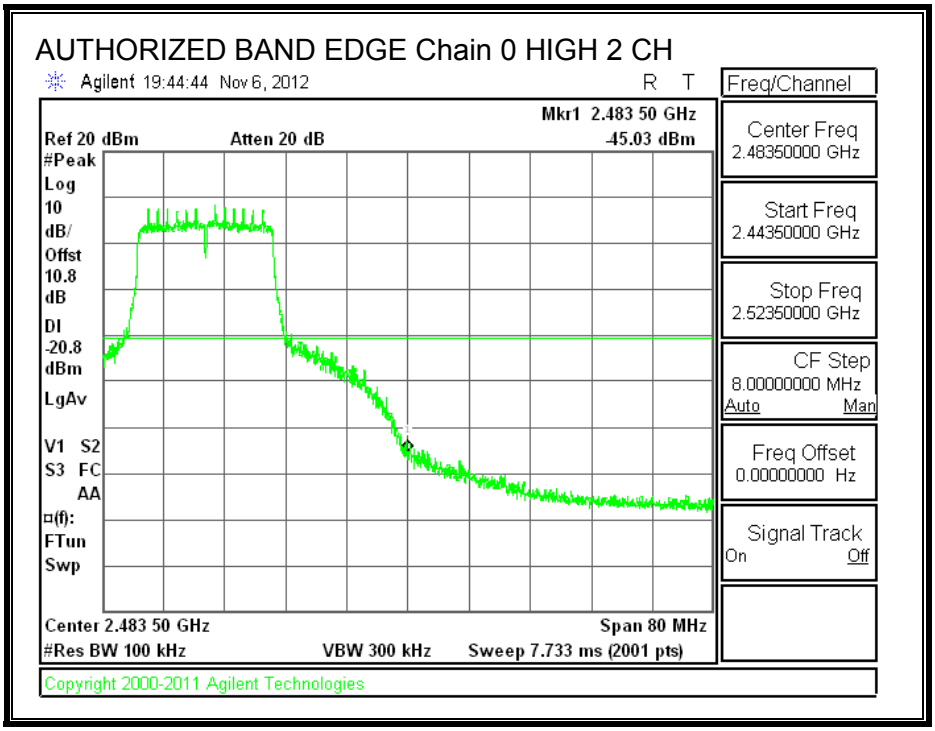
LOW CHANNEL BANDEDGE, Chain 0



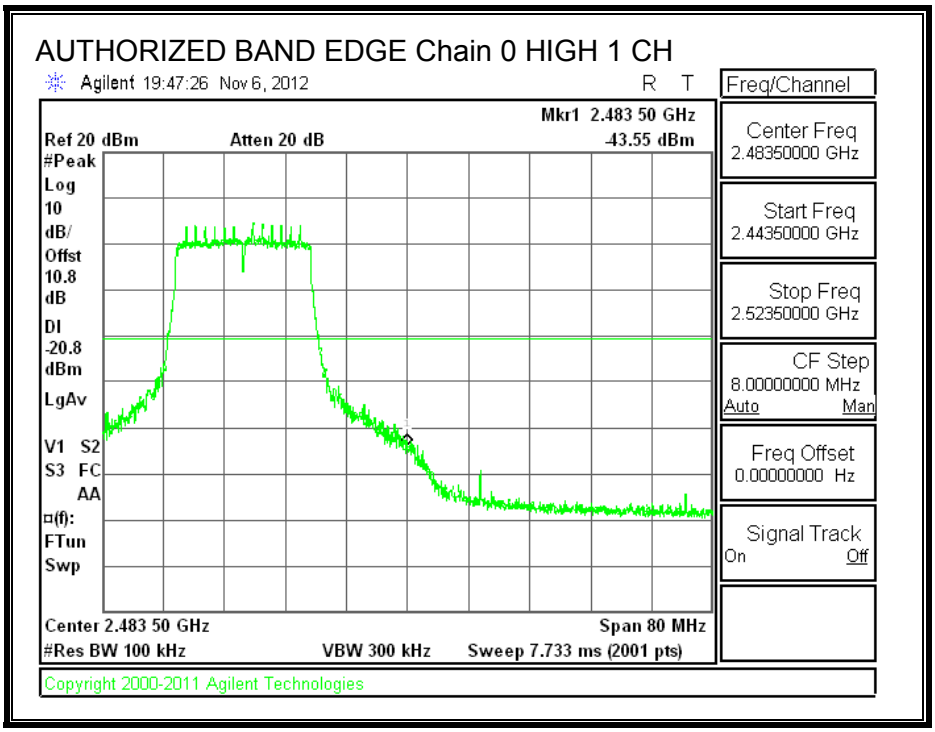
LOW CHANNEL BANDEDGE, Chain 0



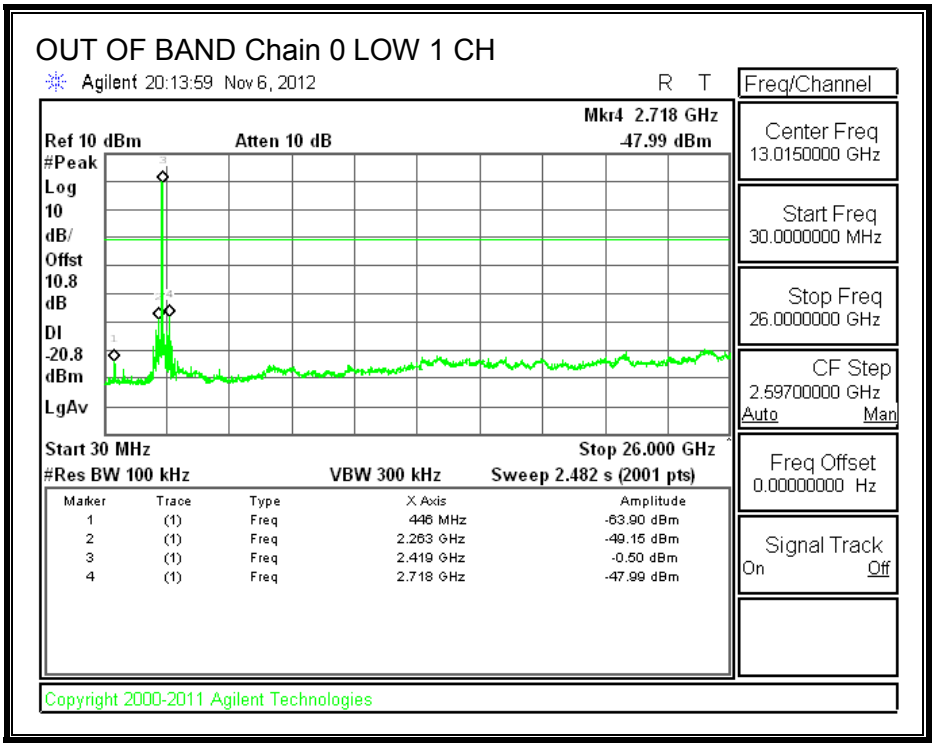
HIGH CHANNEL BANDEDGE, Chain 0

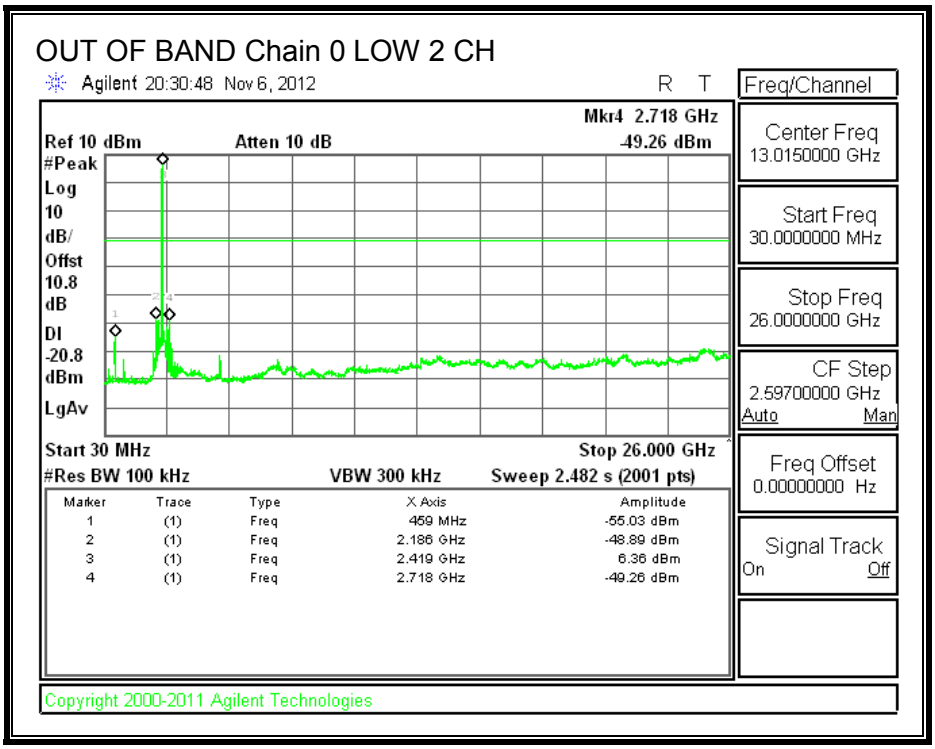


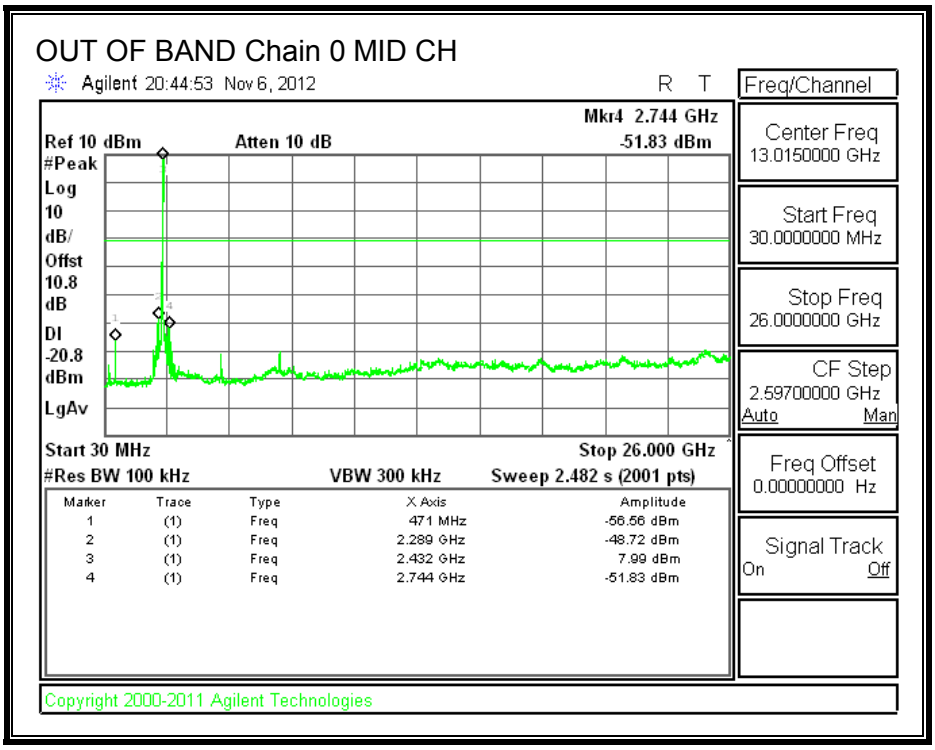
HIGH CHANNEL BANDEDGE, Chain 0

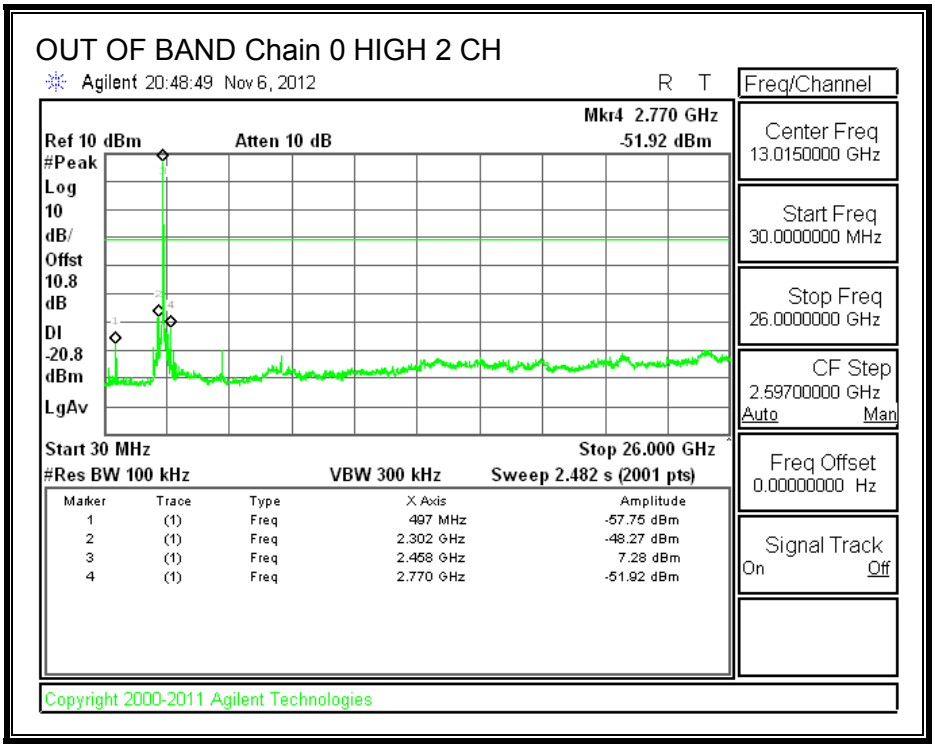


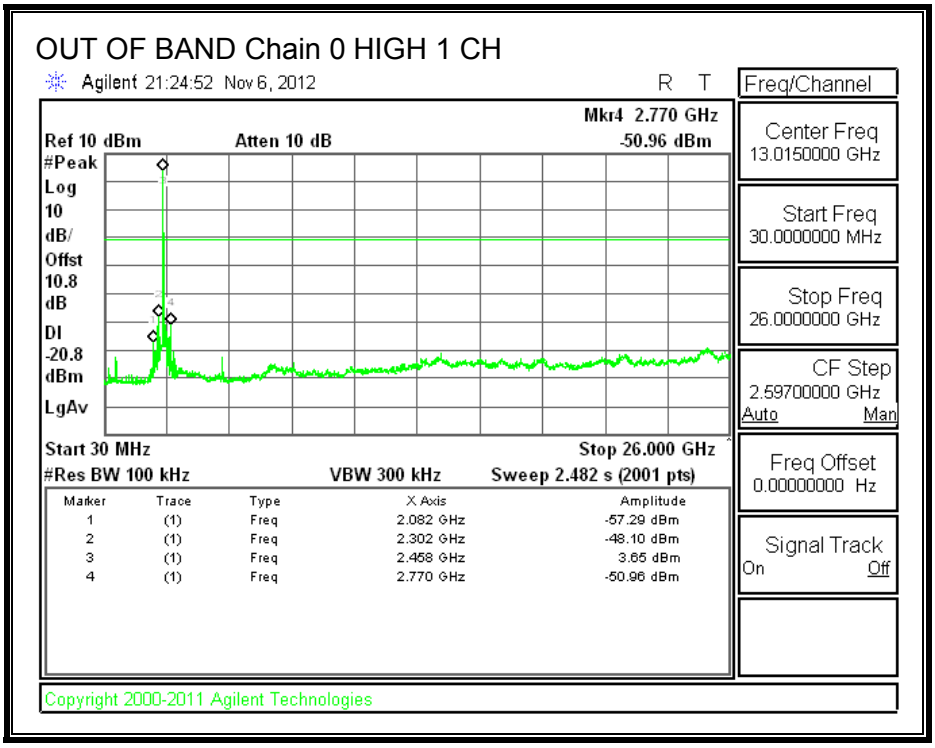
OUT-OF-BAND EMISSIONS, Chain 0



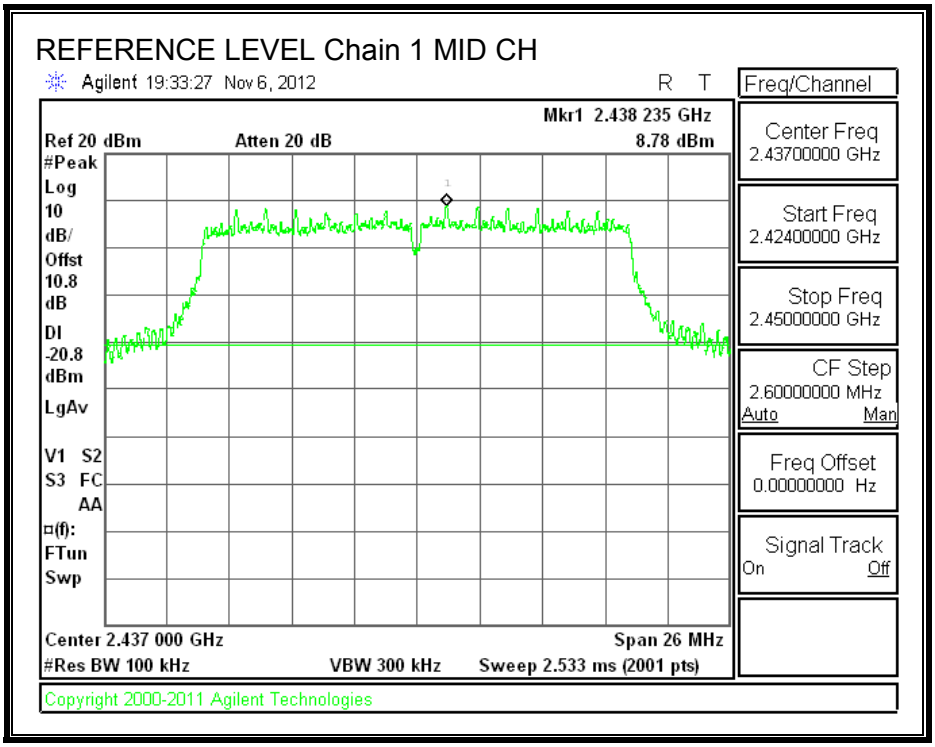




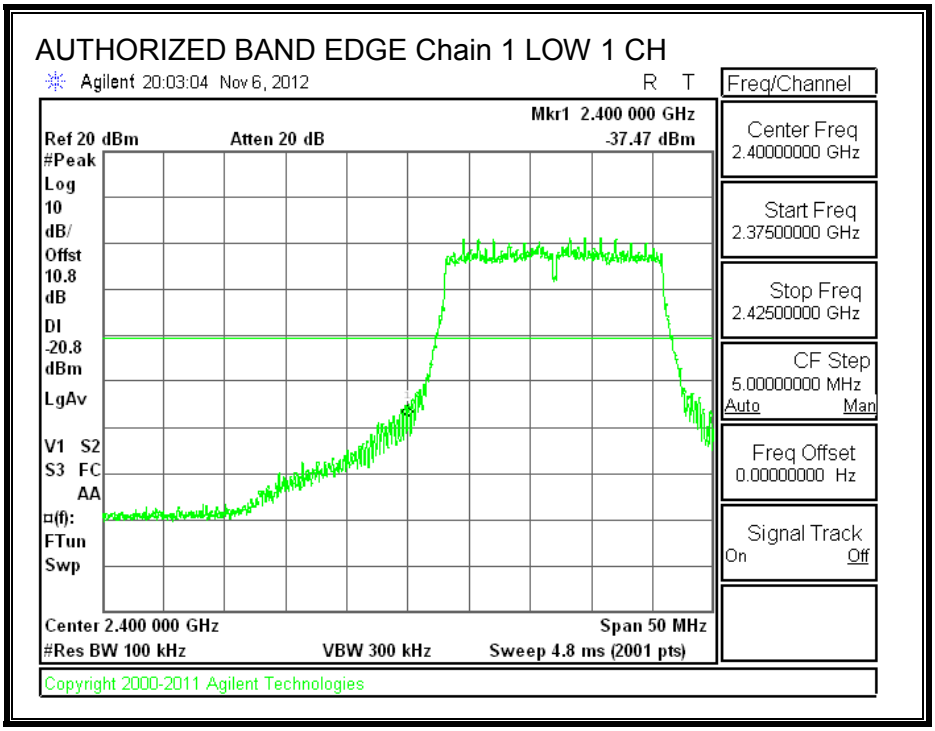




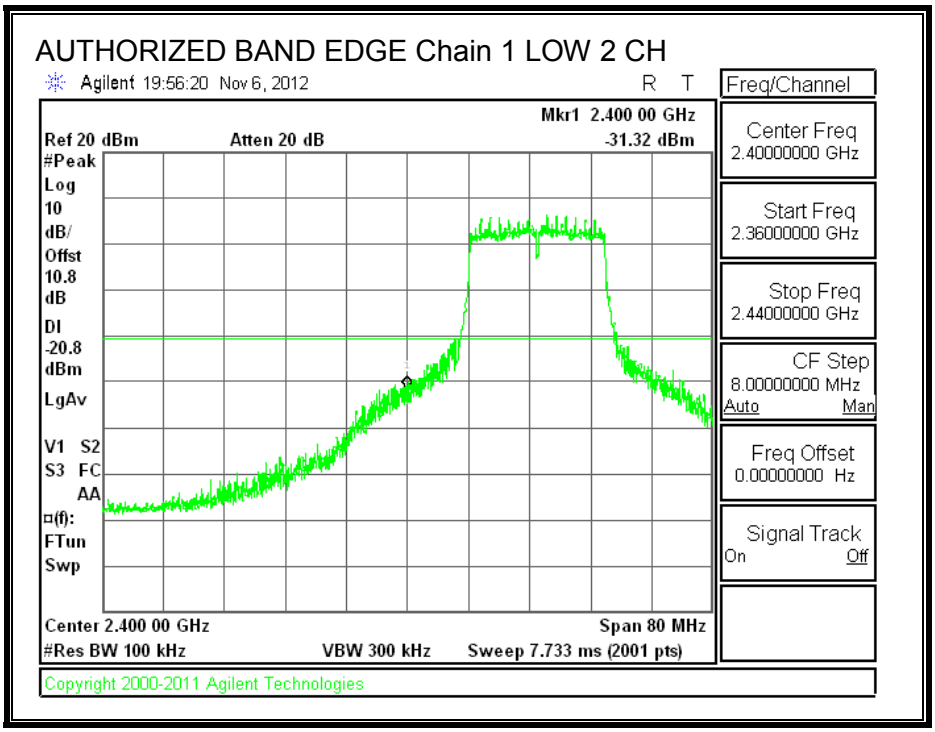
IN-BAND REFERENCE LEVEL, Chain 1



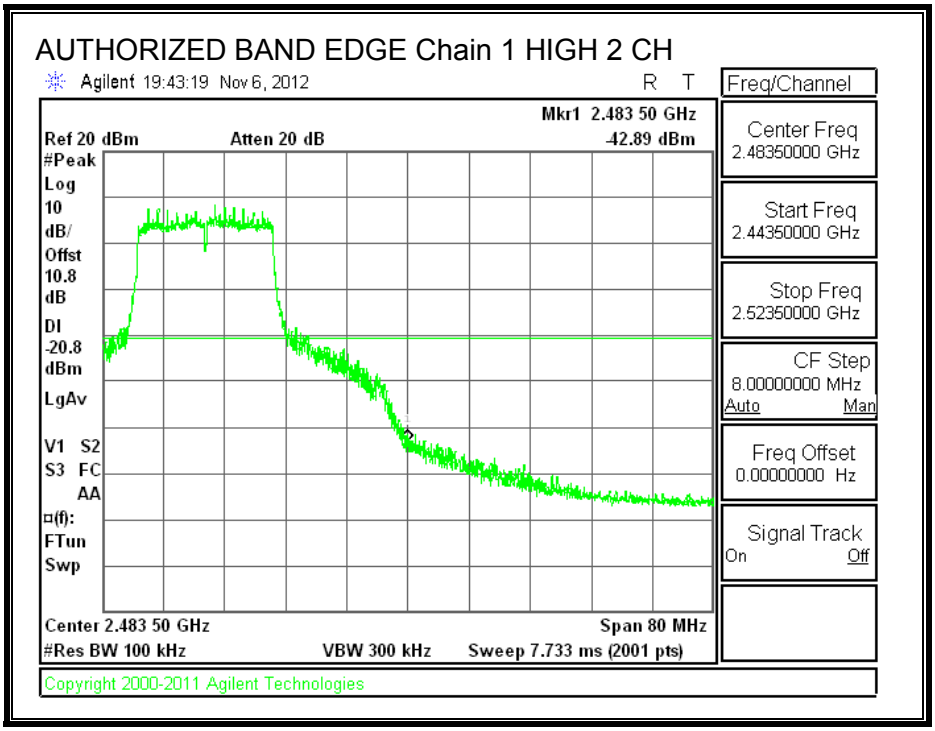
LOW CHANNEL BANDEDGE, Chain 1



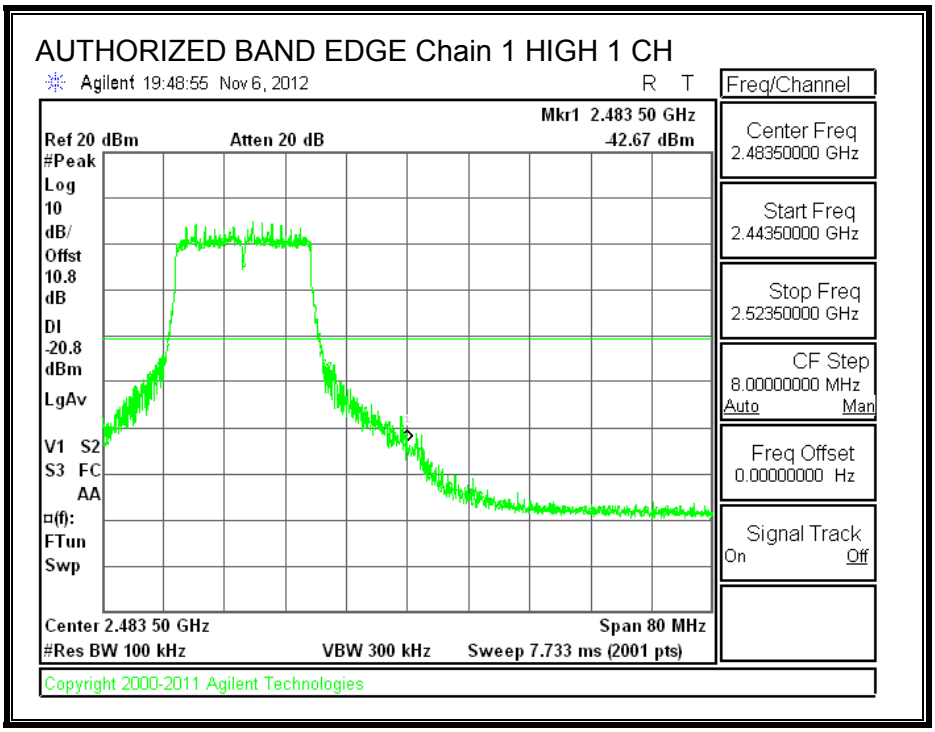
LOW CHANNEL BANDEDGE, Chain 1



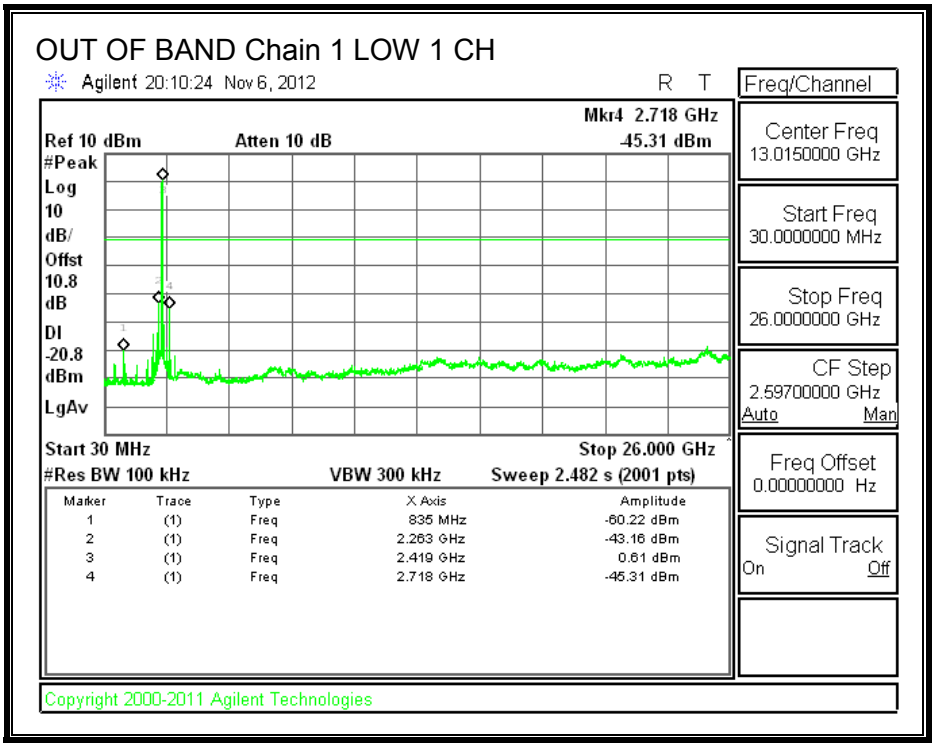
HIGH CHANNEL BANDEDGE, Chain 1

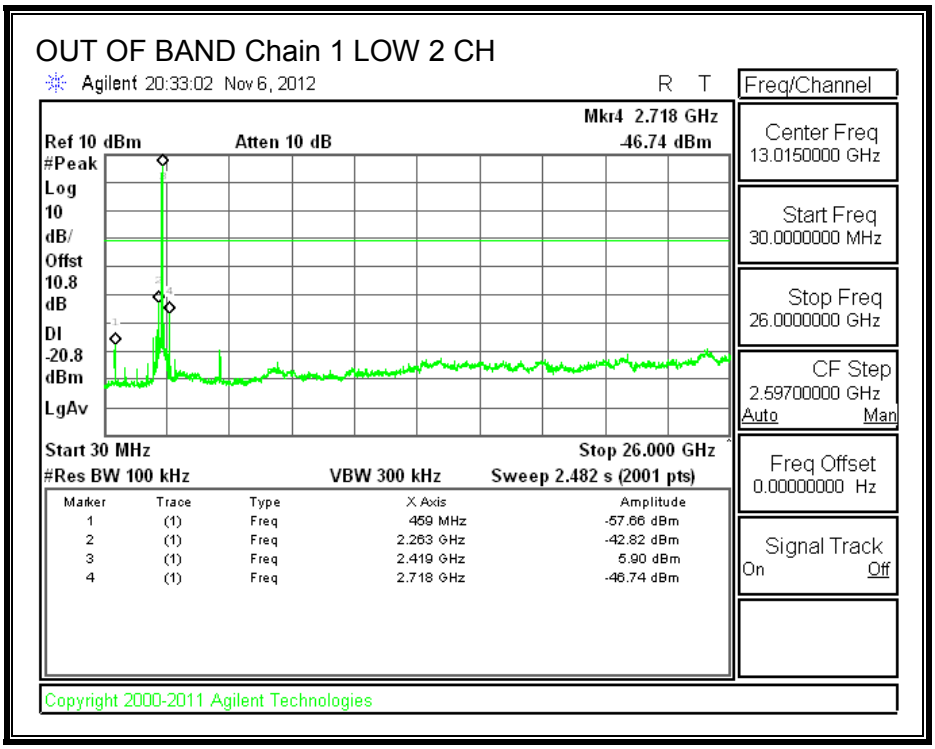


HIGH CHANNEL BANDEDGE, Chain 1

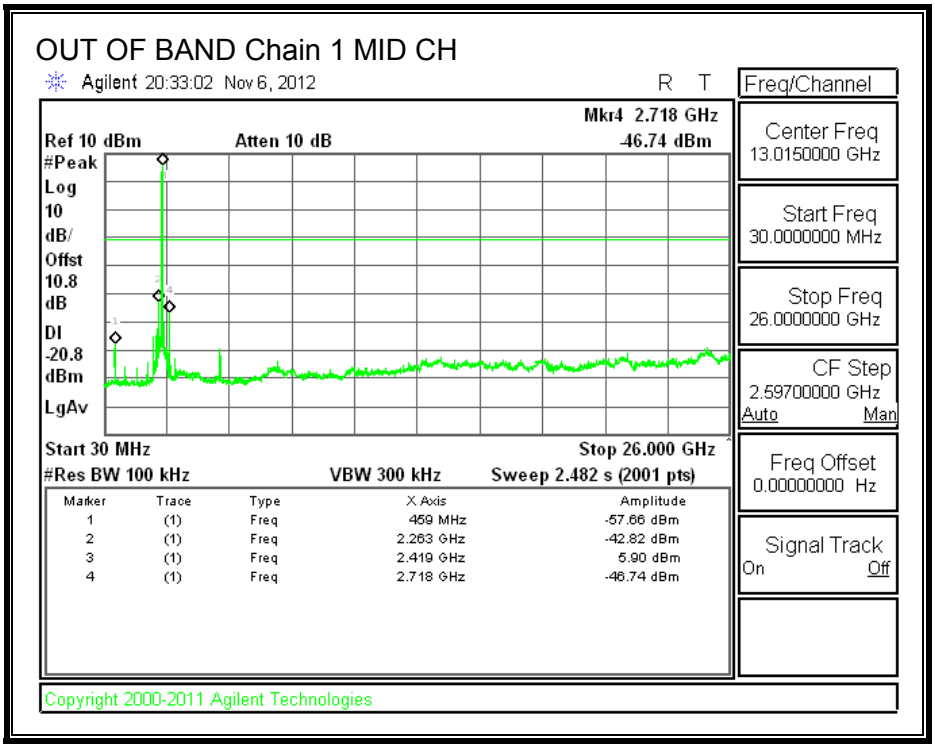


OUT-OF-BAND EMISSIONS, Chain 1

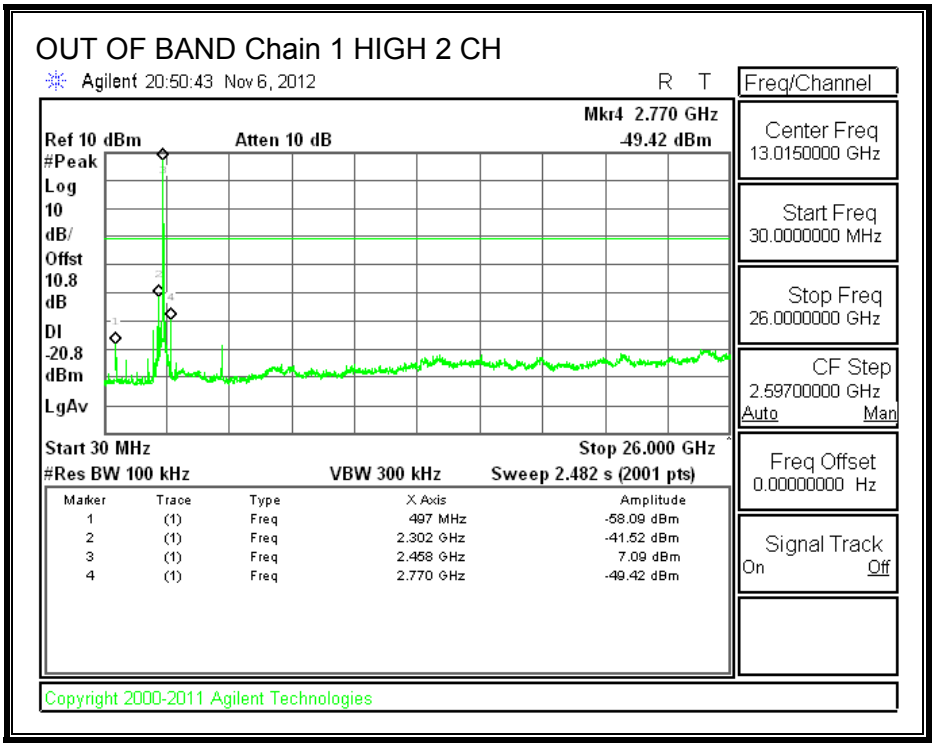


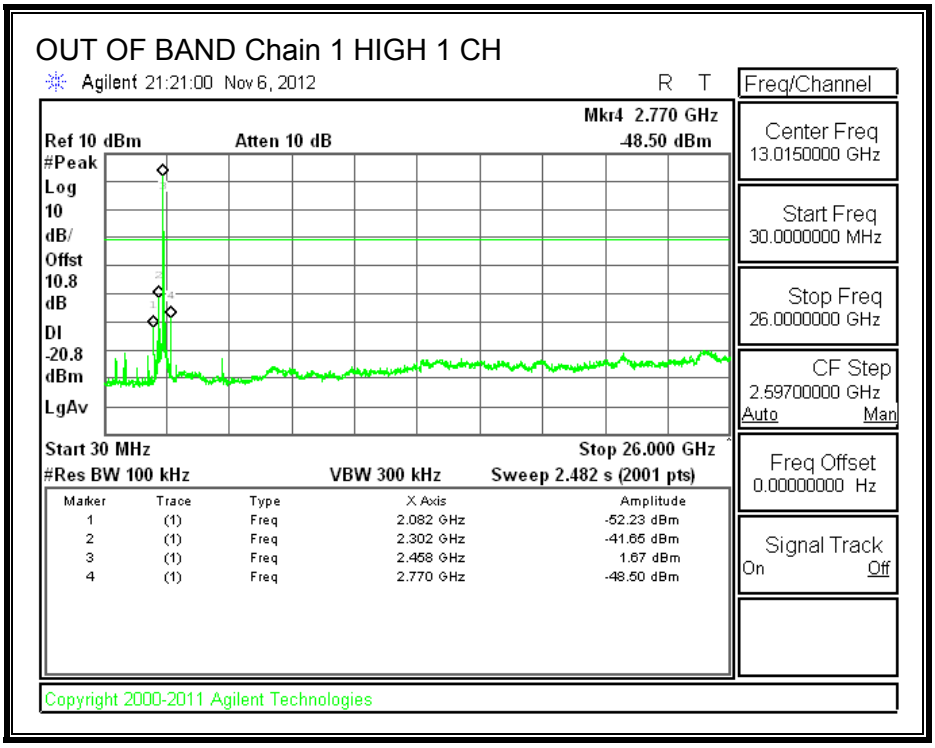


OUT OF BAND Chain 1 MID CH

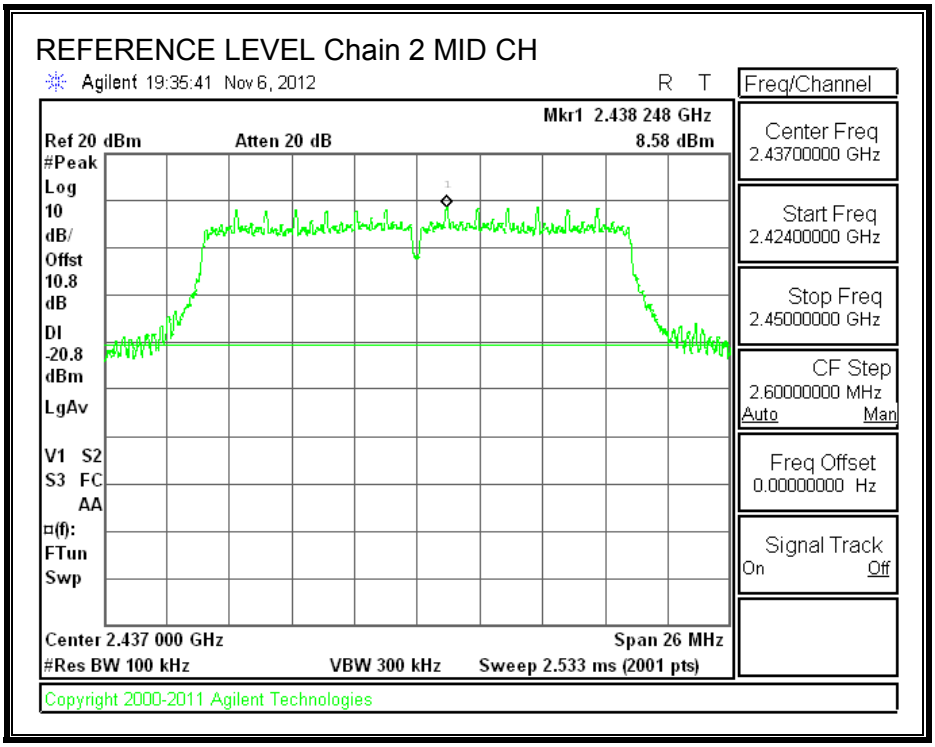


OUT OF BAND Chain 1 HIGH 2 CH

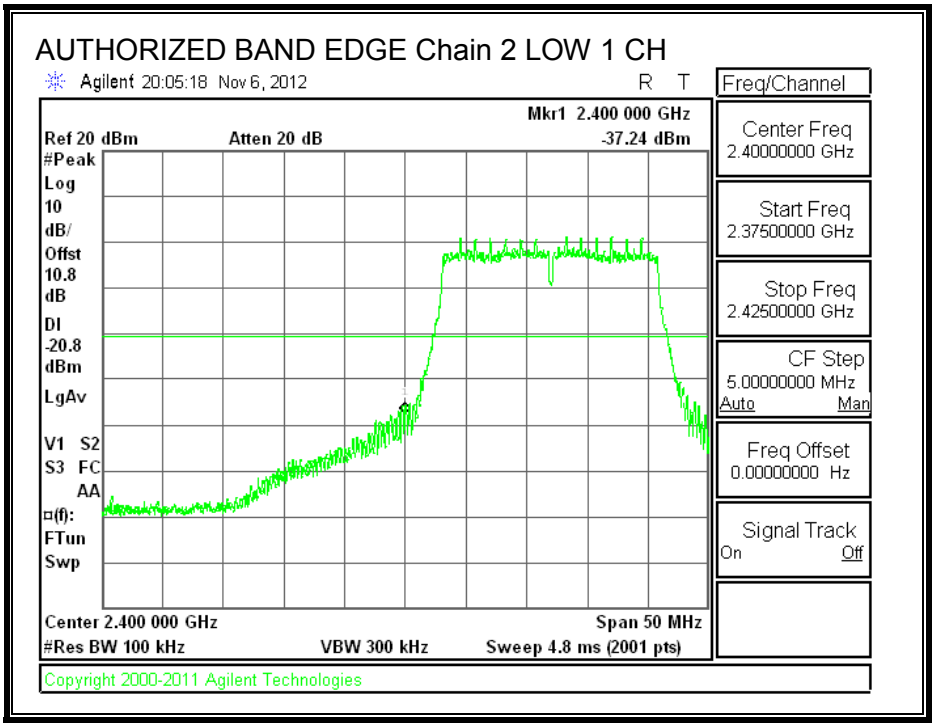




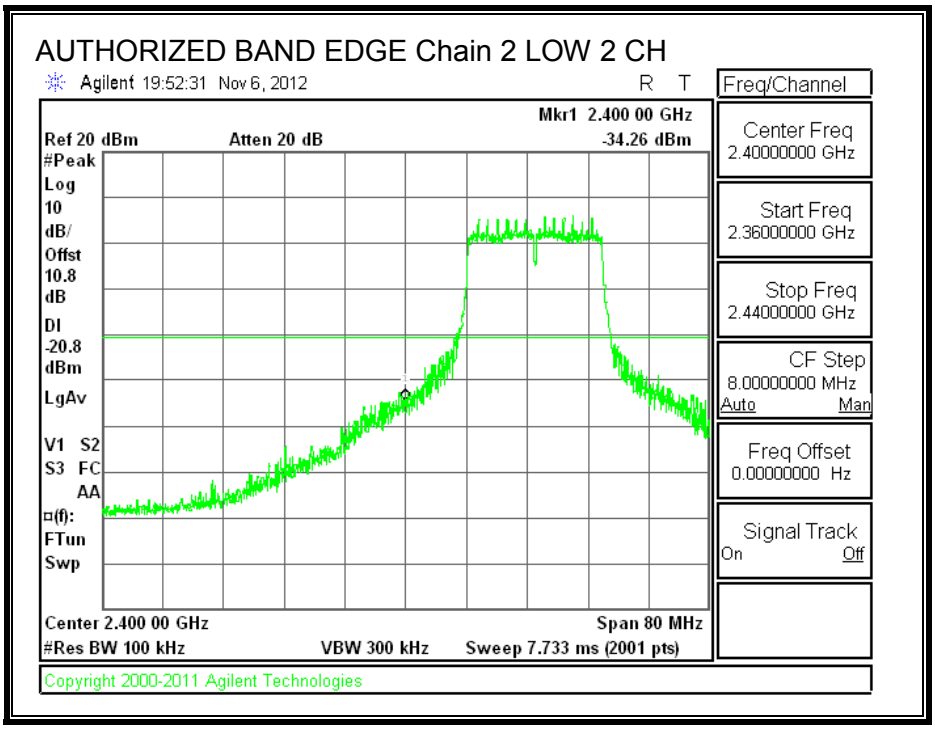
IN-BAND REFERENCE LEVEL, Chain 2



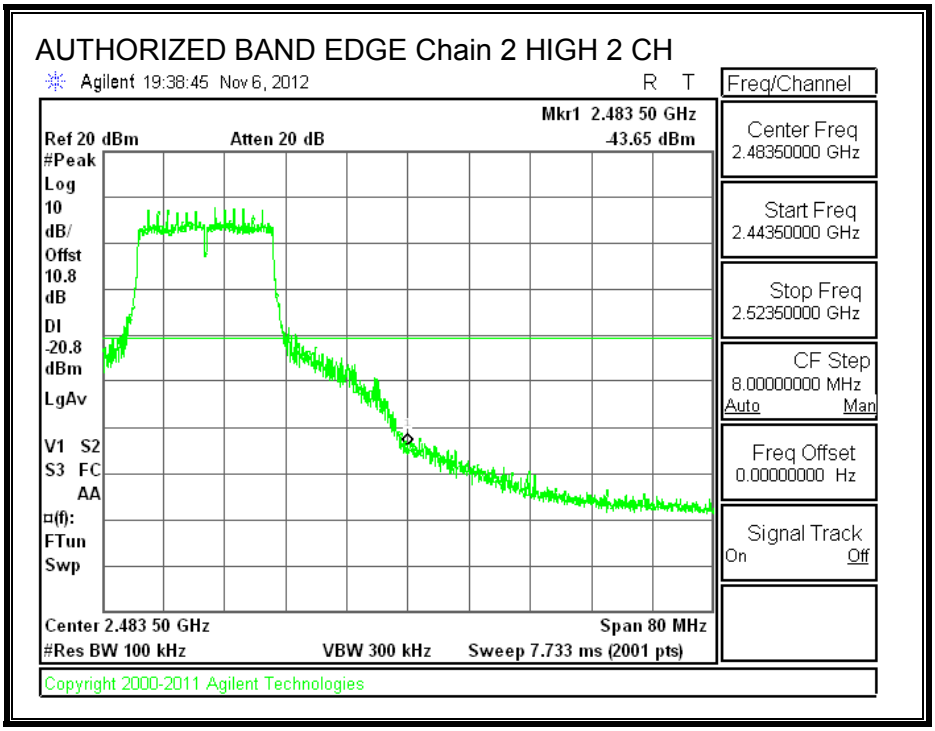
LOW CHANNEL BANDEDGE, Chain 2



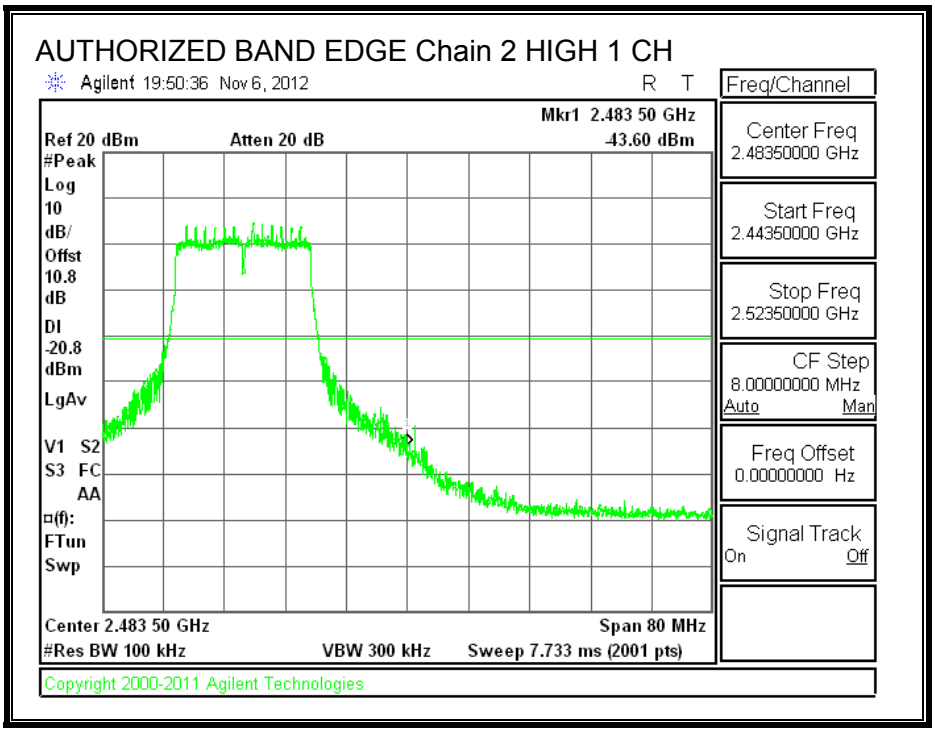
LOW CHANNEL BANDEDGE, Chain 2



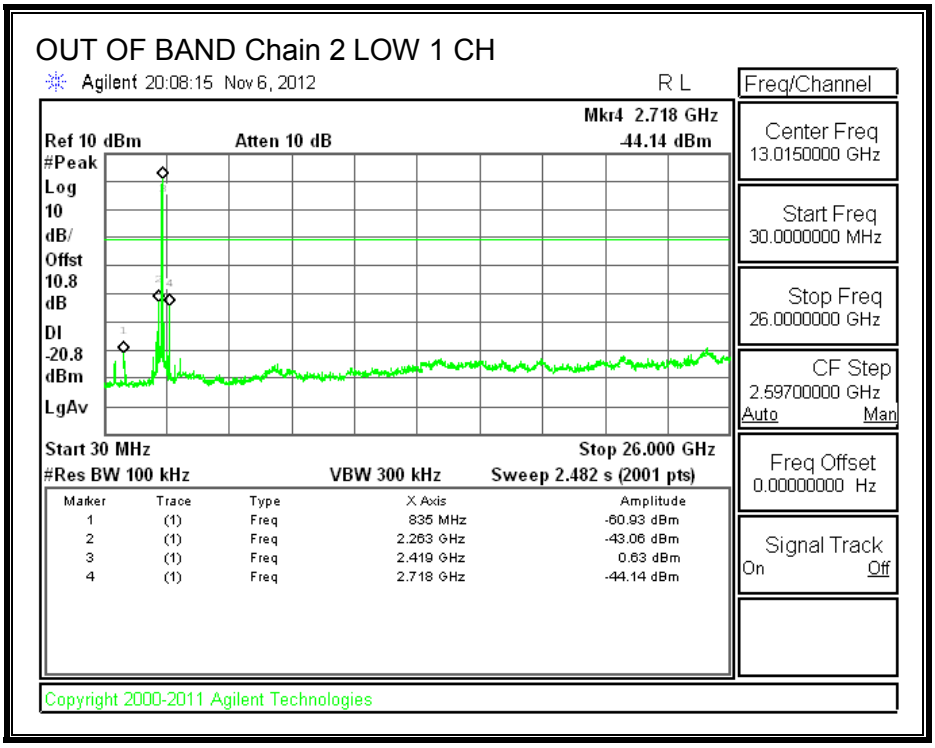
HIGH CHANNEL BANDEDGE, Chain 2

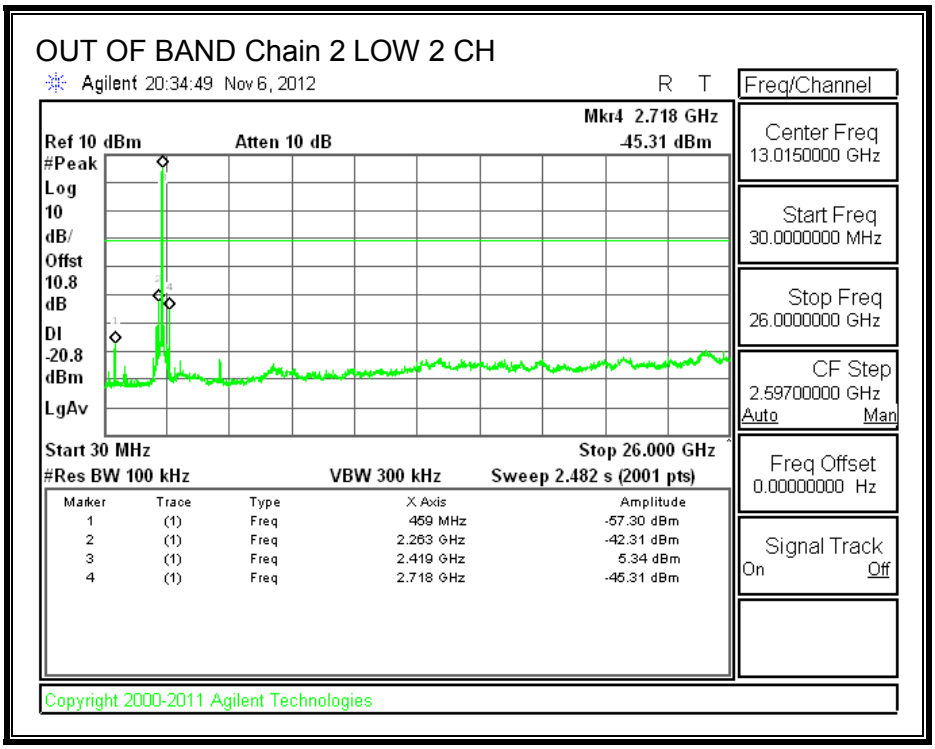


HIGH CHANNEL BANDEDGE, Chain 2

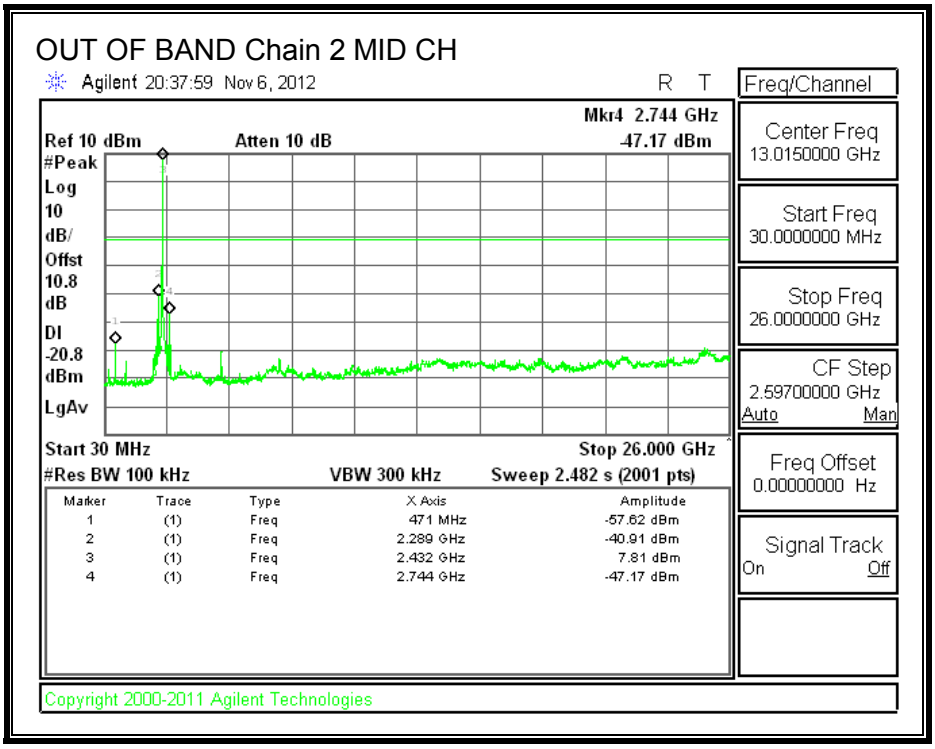


OUT-OF-BAND EMISSIONS, Chain 2

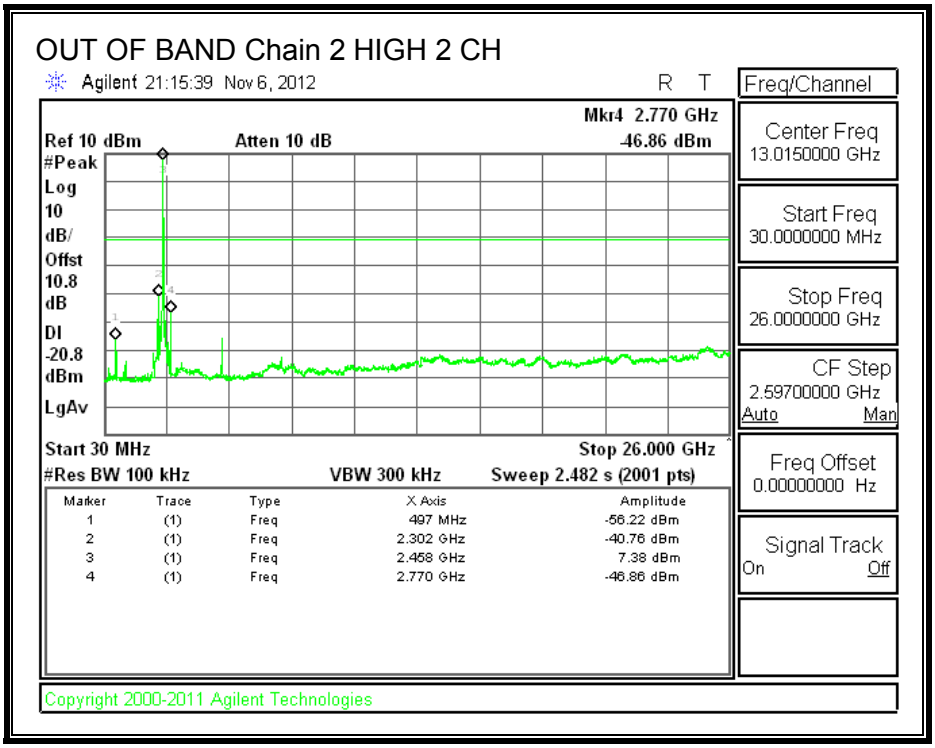


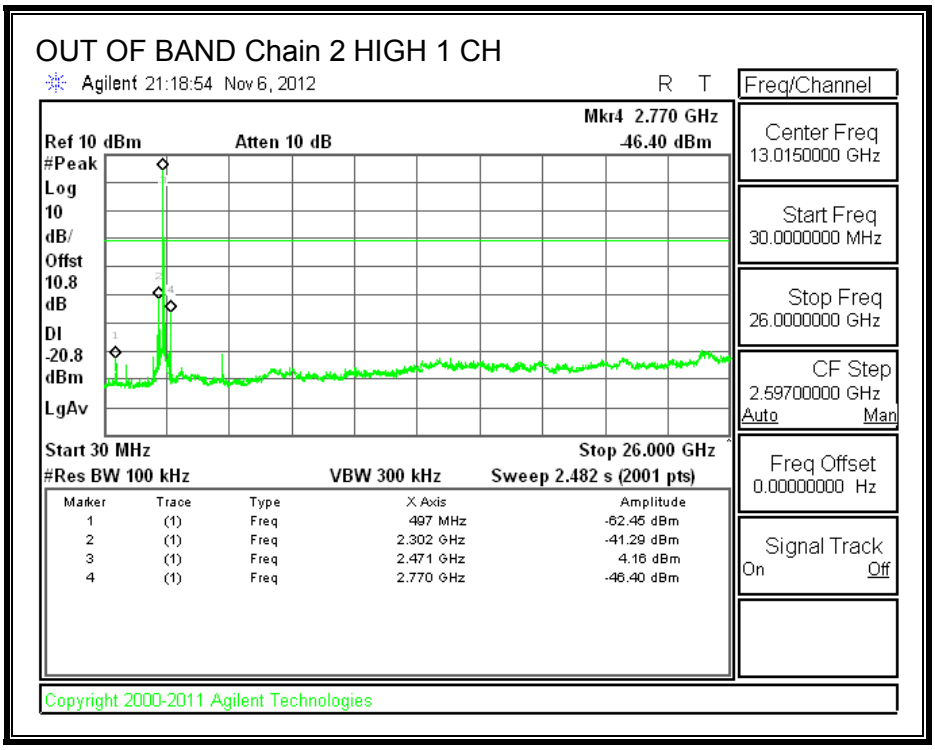


OUT OF BAND Chain 2 MID CH



OUT OF BAND Chain 2 HIGH 2 CH





8.14. 802.11a 1TX MODE IN THE 5.8 GHz BAND

Covered by testing HT20 CDD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

8.15. 802.11a 2TX MODE IN THE 5.8 GHz BAND

Covered by testing HT20 CDD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

8.16. 802.11a 3TX MODE IN THE 5.8 GHz BAND

Covered by testing HT20 CDD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

8.17. 802.11a BF 2TX MODE IN THE 5.8 GHz BAND

Covered by testing HT20 CDD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

8.18. 802.11a BF 3TX MODE IN THE 5.8 GHz BAND

Covered by testing HT20 CDD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

8.19. 802.11n HT20 1TX MODE IN THE 5.8 GHz BAND

Covered by testing HT20 CDD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

8.20. 802.11n HT20 CDD MCS0 2TX MODE IN THE 5.8 GHz BAND

Covered by testing HT20 CDD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

8.21. 802.11n HT20 BF 2TX MODE IN THE 5.8 GHz BAND

Covered by testing HT20 CDD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

8.22. 802.11n AC20 BF 3TX MODE IN THE 5.8 GHz BAND

Covered by testing HT20 CDD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

8.23. 802.11n HT20 CDD MCS0 3TX MODE IN THE 5.8 GHz BAND

8.23.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

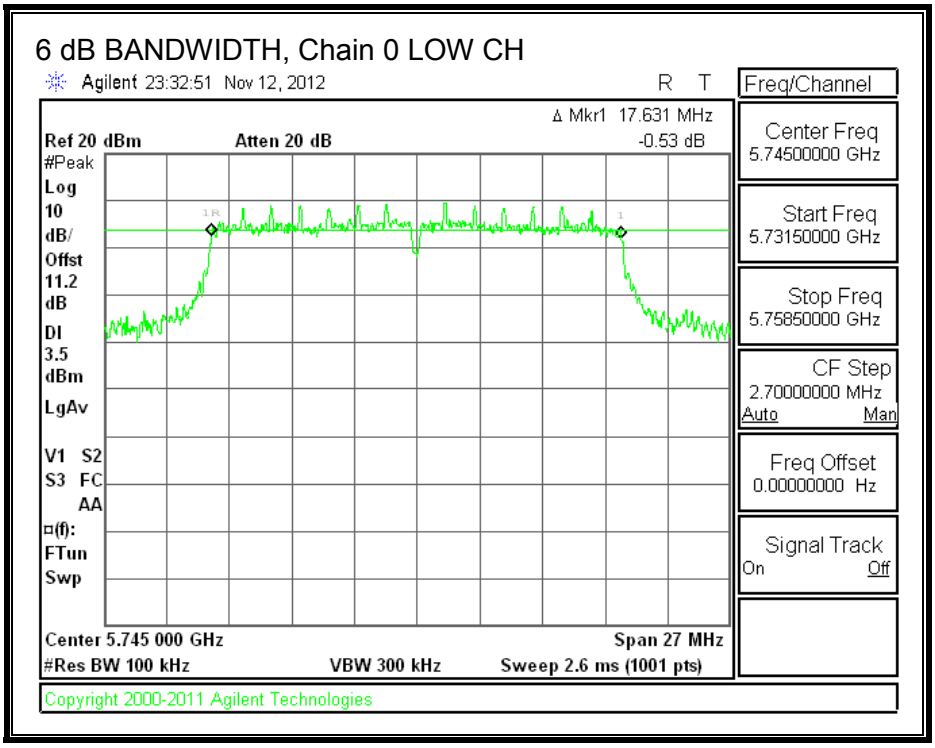
IC RSS-210 A8.2 (a)

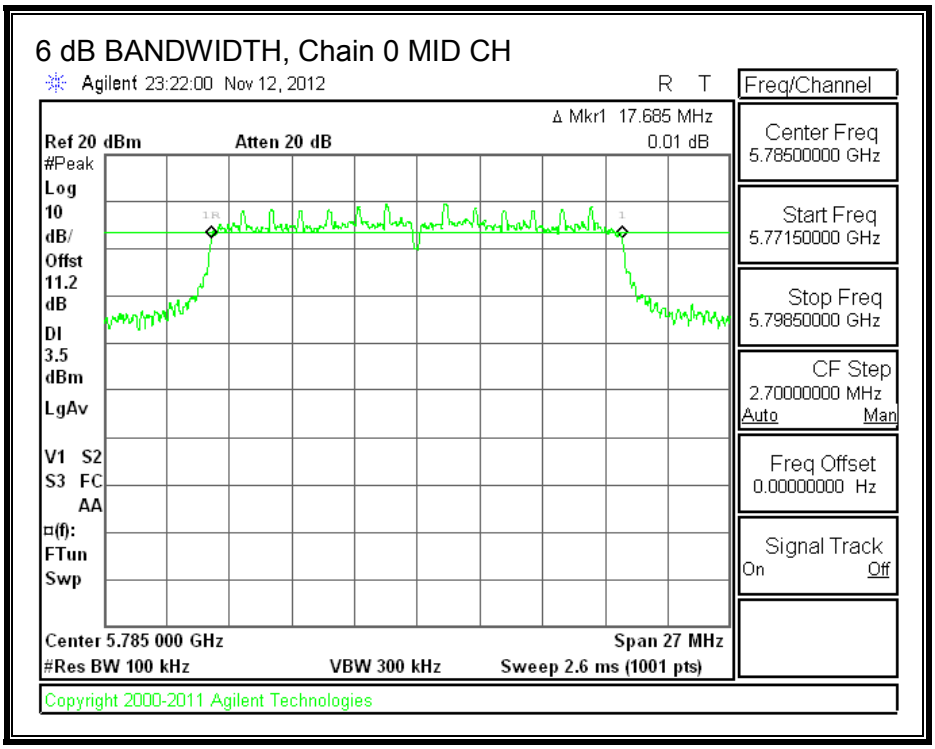
The minimum 6 dB bandwidth shall be at least 500 kHz.

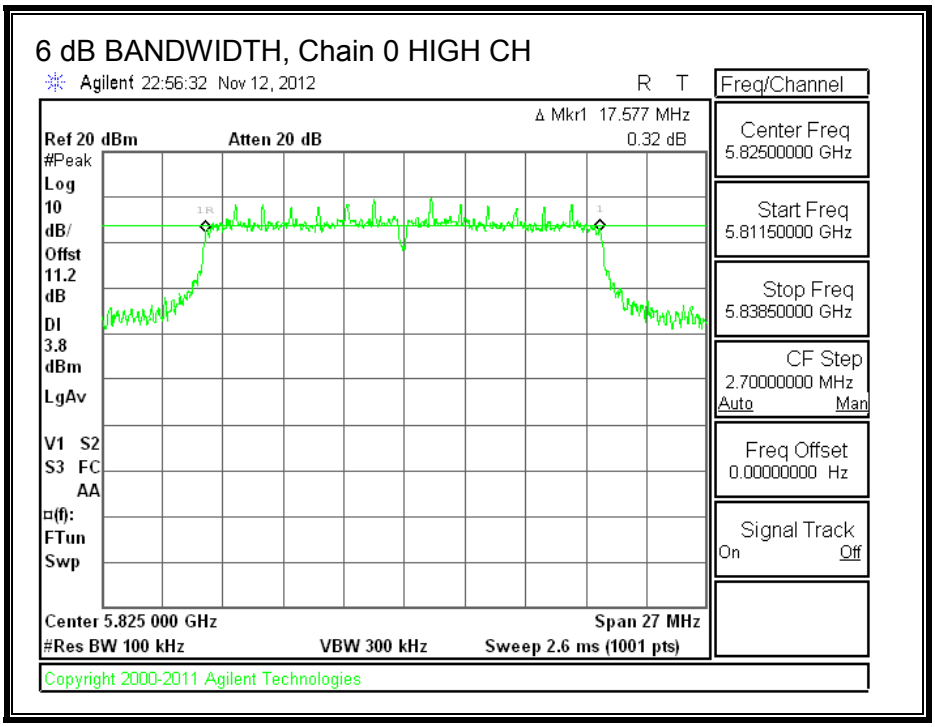
RESULTS

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	6 dB BW Chain 2 (MHz)	Minimum Limit (MHz)
Low	5745	17.631	17.685	17.631	0.5
Mid	5785	17.685	17.631	17.658	0.5
High	5825	17.577	17.658	17.577	0.5

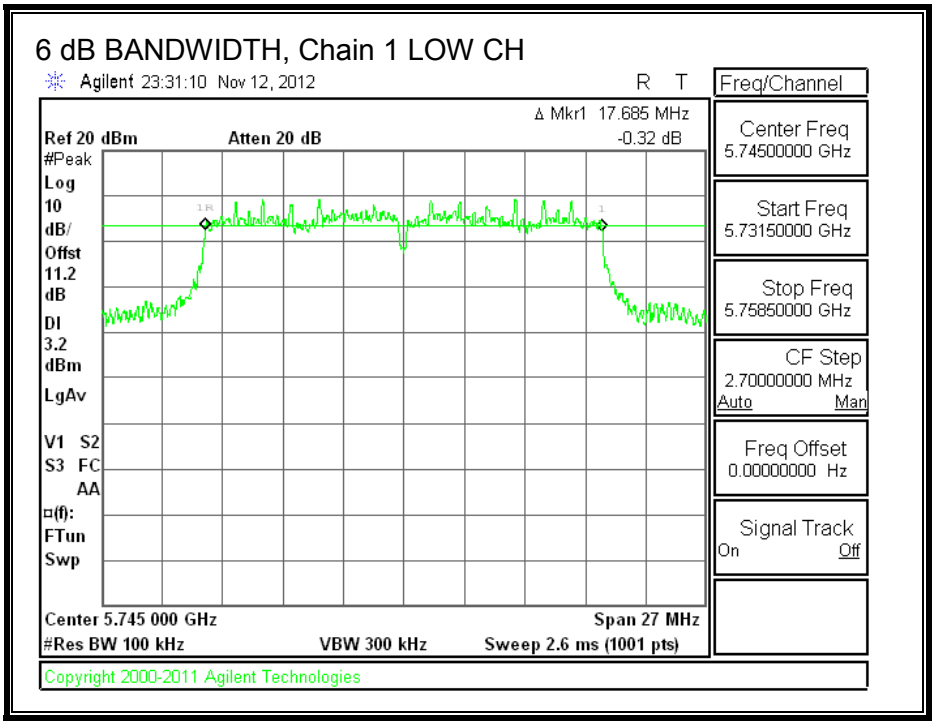
6 dB BANDWIDTH, Chain 0



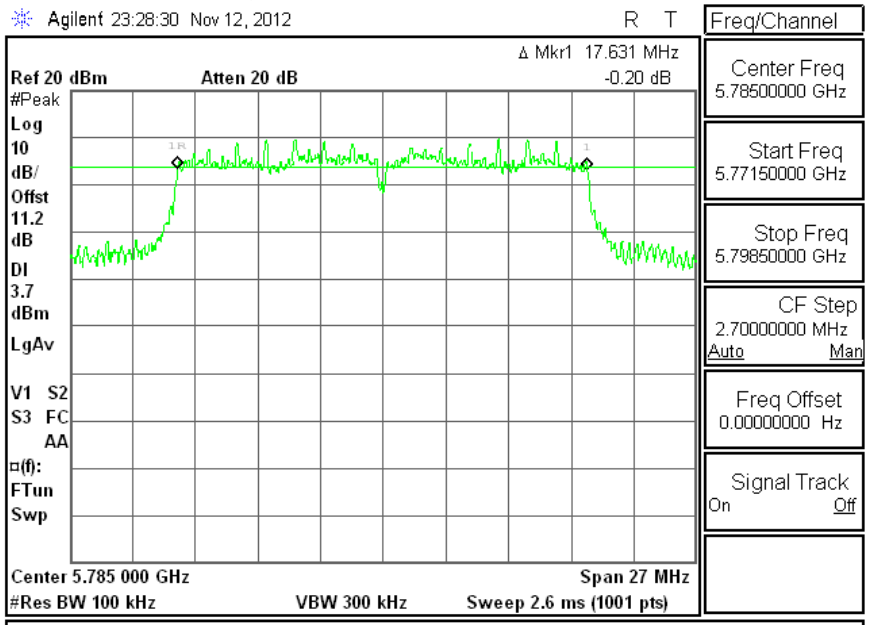




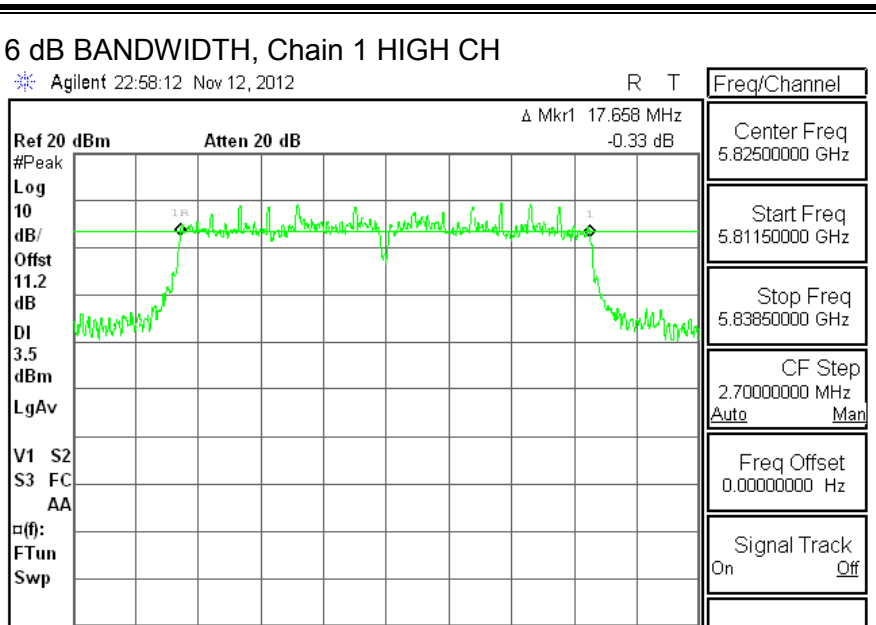
6 dB BANDWIDTH, Chain 1



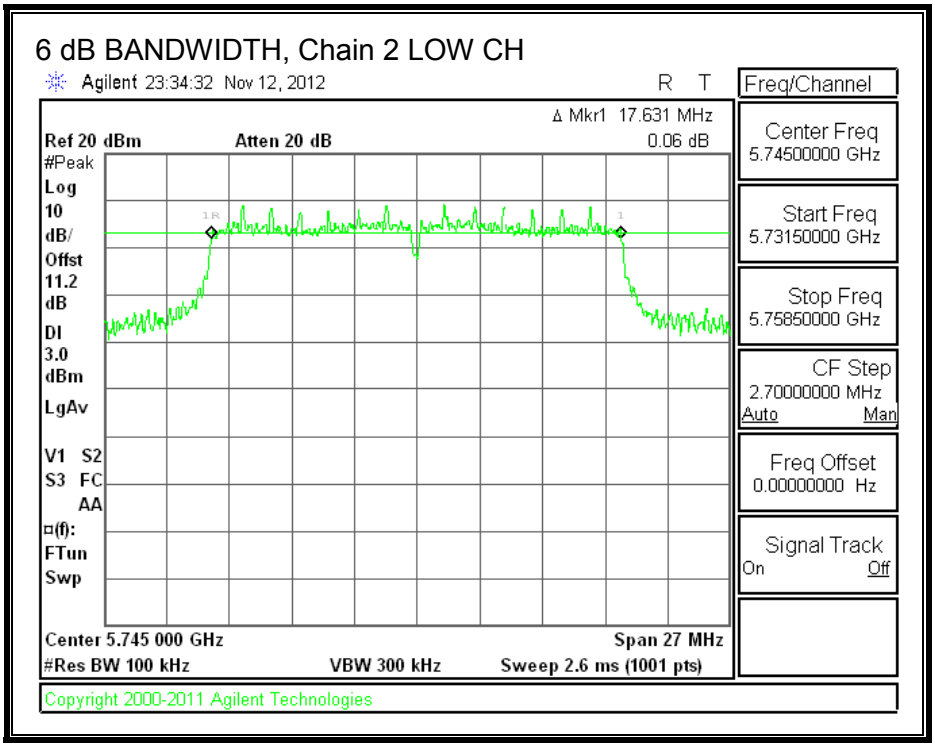
6 dB BANDWIDTH, Chain 1 MID CH

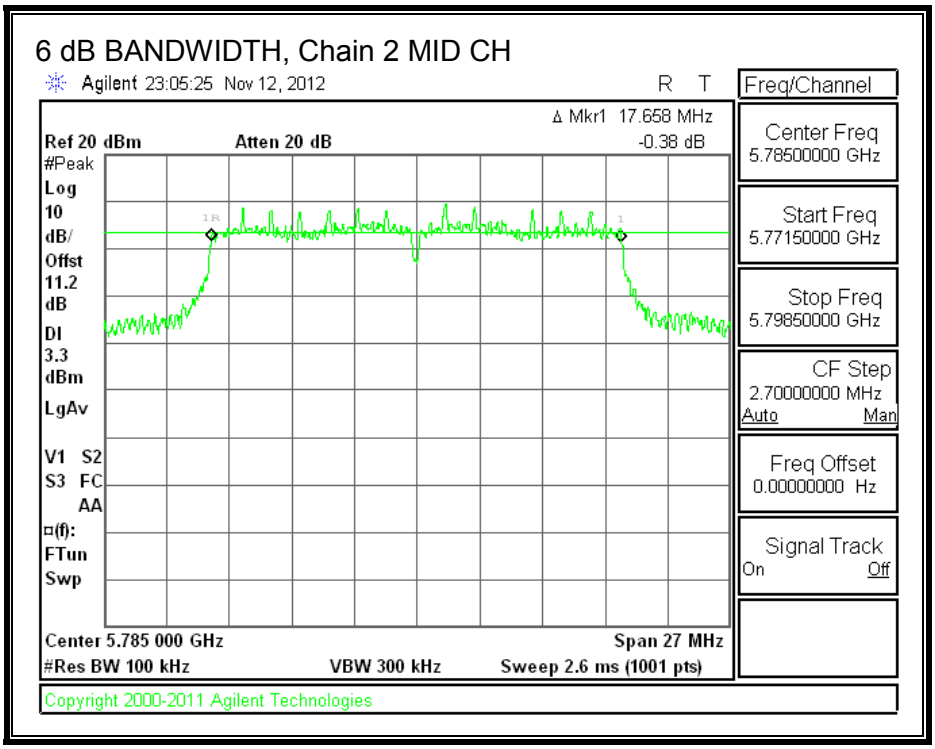


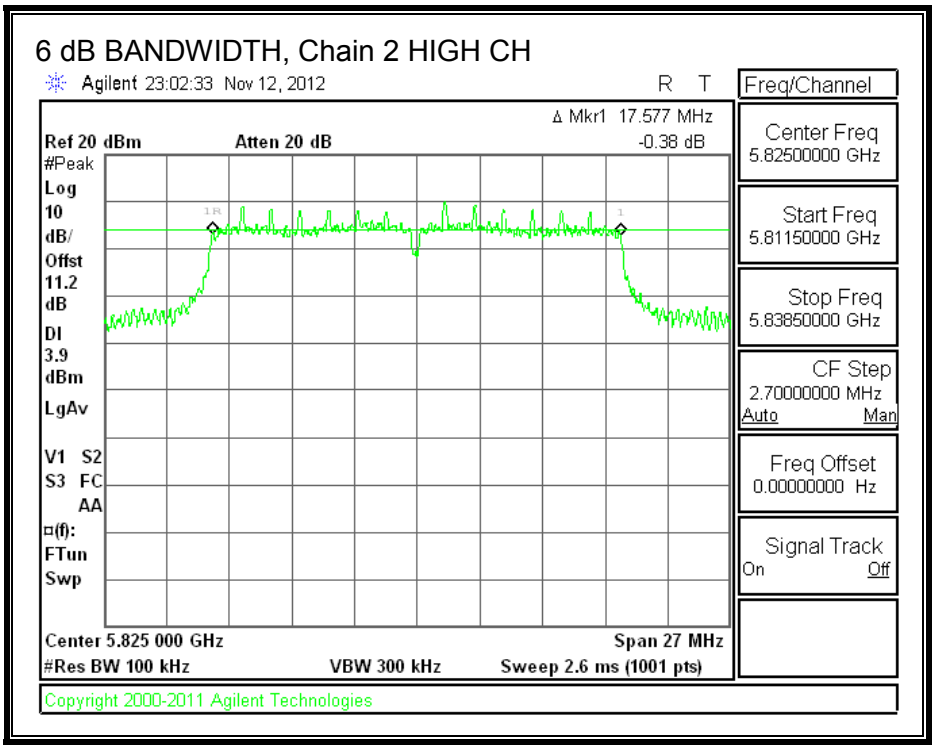
6 dB BANDWIDTH, Chain 1 HIGH CH



6 dB BANDWIDTH, Chain 2







8.23.2. 99% BANDWIDTH

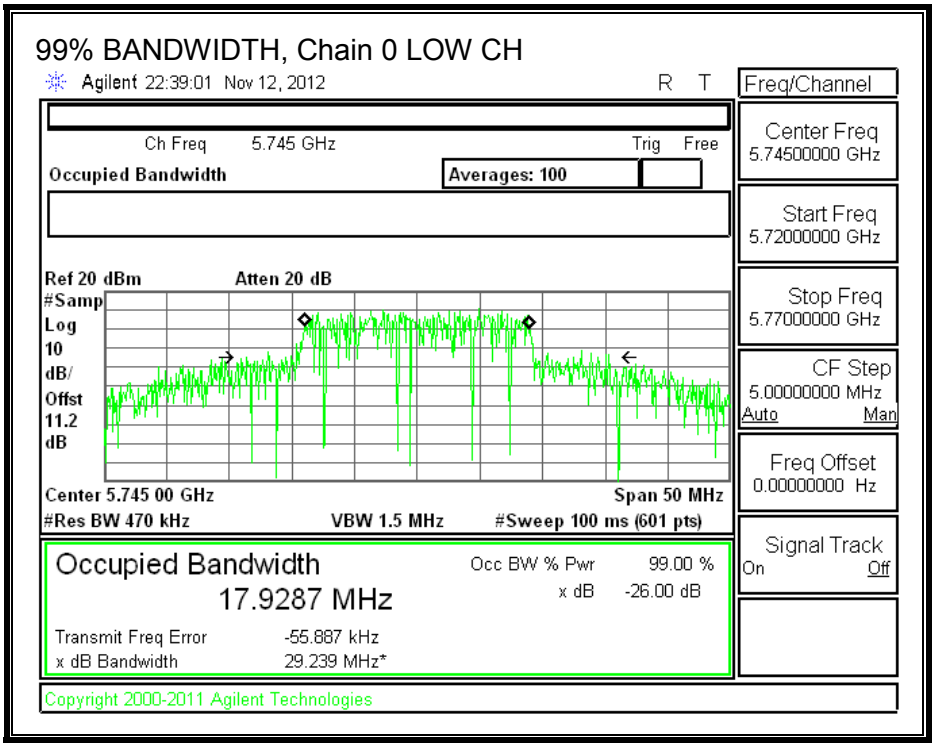
LIMITS

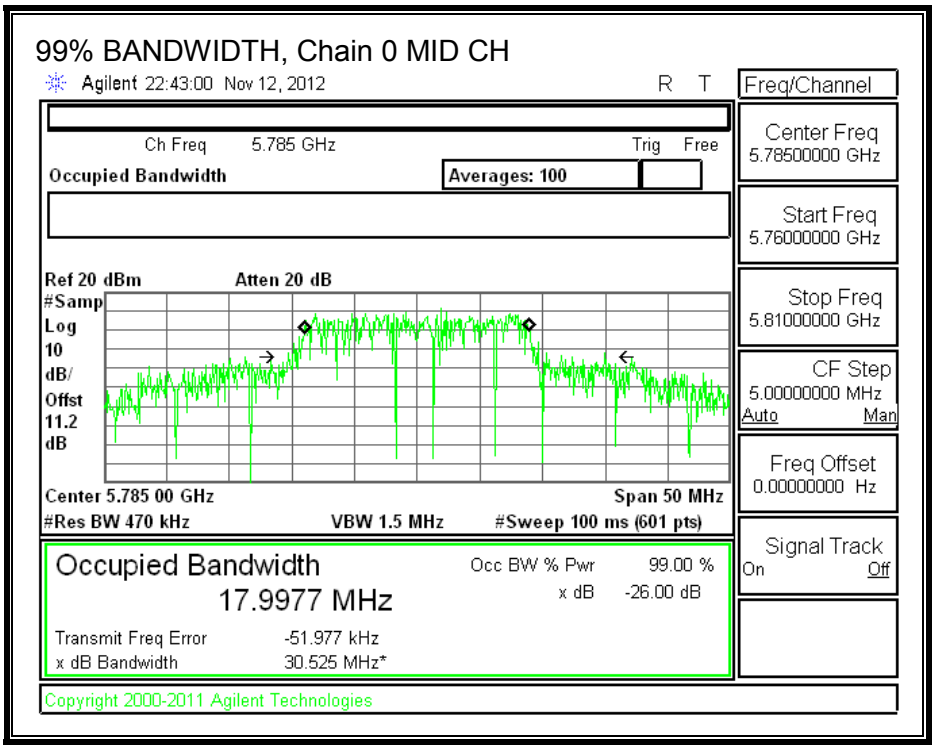
None; for reporting purposes only.

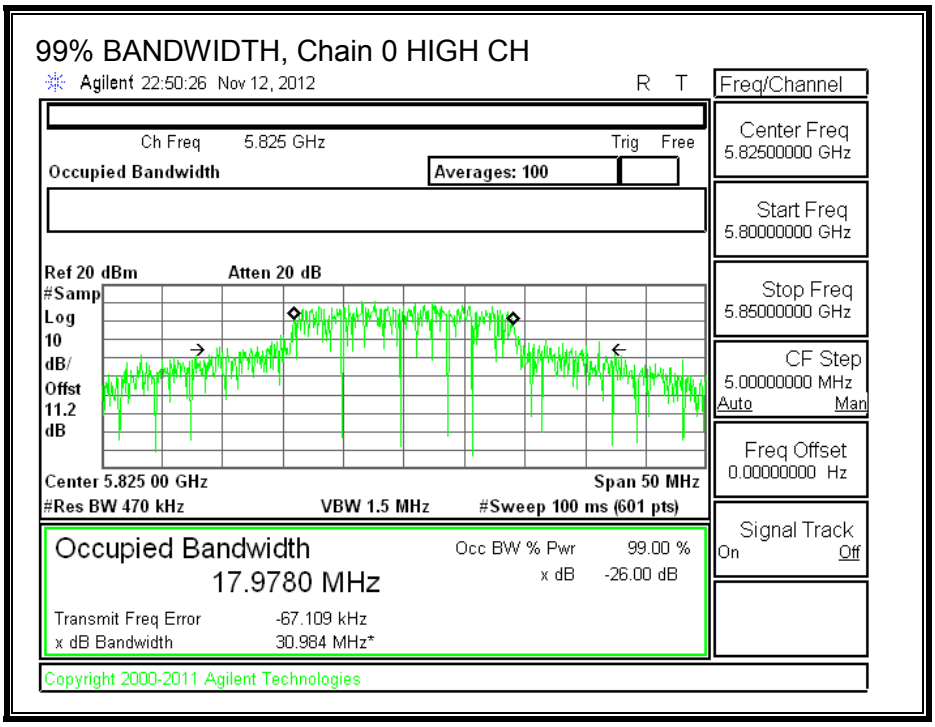
RESULTS

Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)	99% BW Chain 2 (MHz)
Low	5745	17.9287	17.9335	17.9840
Mid	5785	17.9977	17.9738	18.0218
High	5825	17.9780	18.0068	18.0193

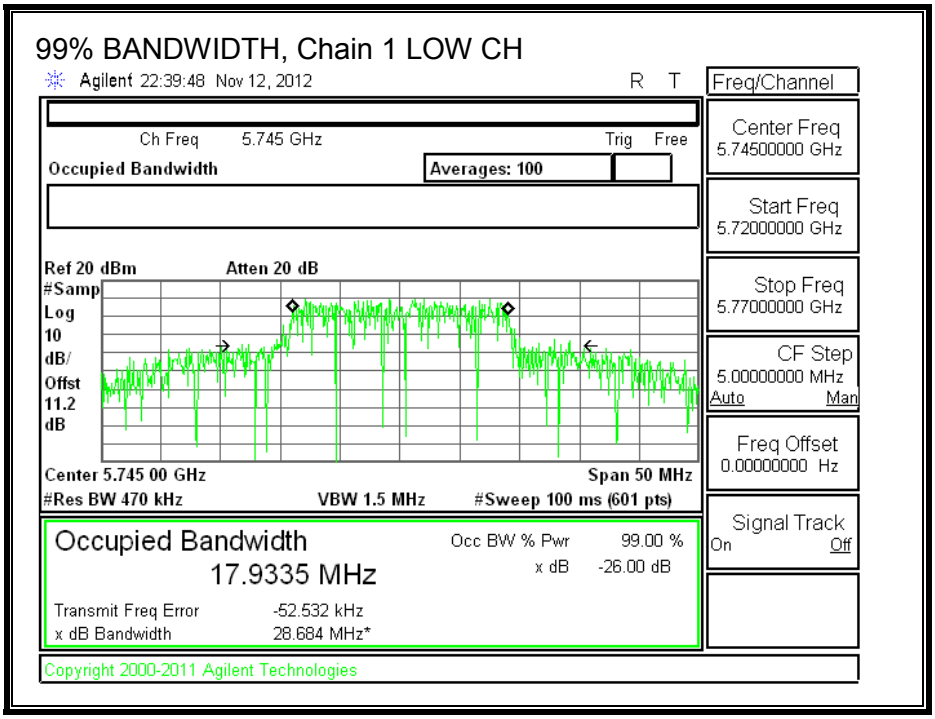
99% BANDWIDTH, Chain 0

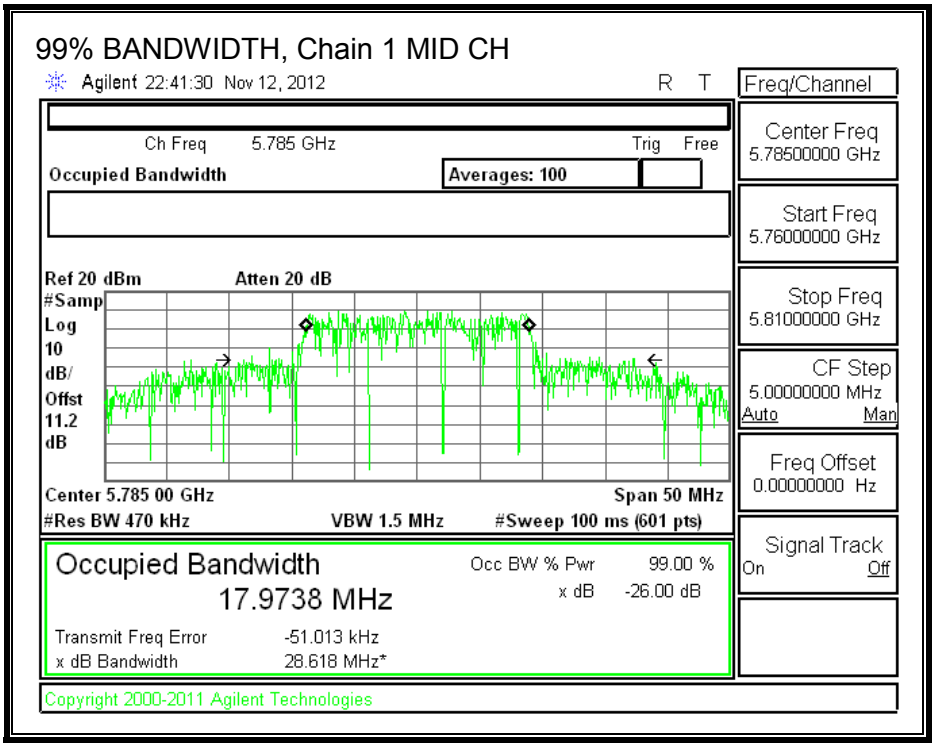


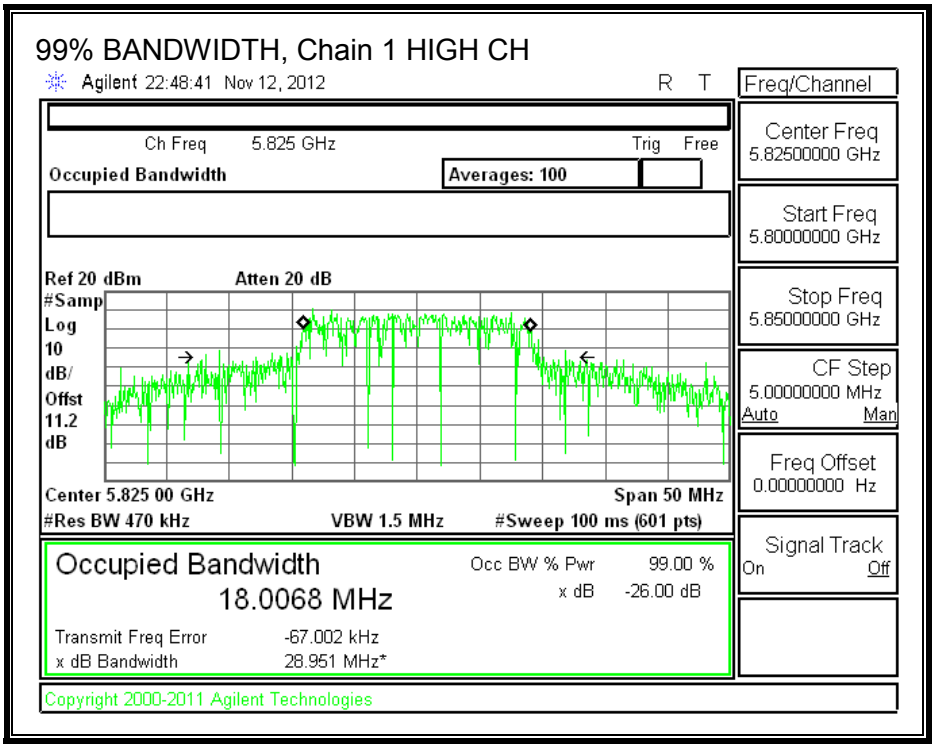




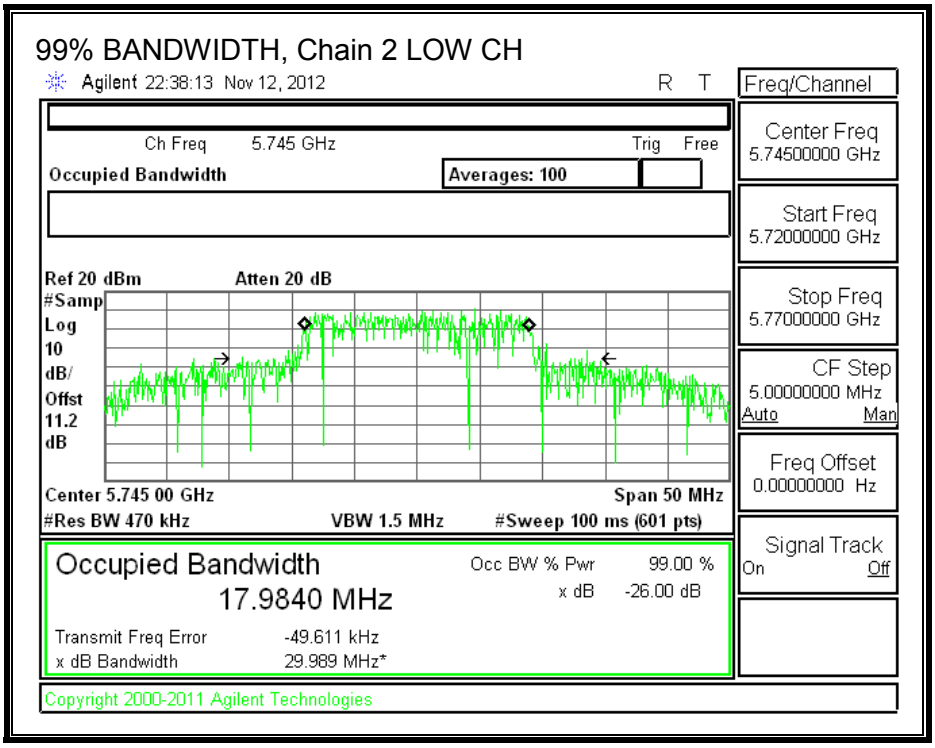
99% BANDWIDTH, Chain 1

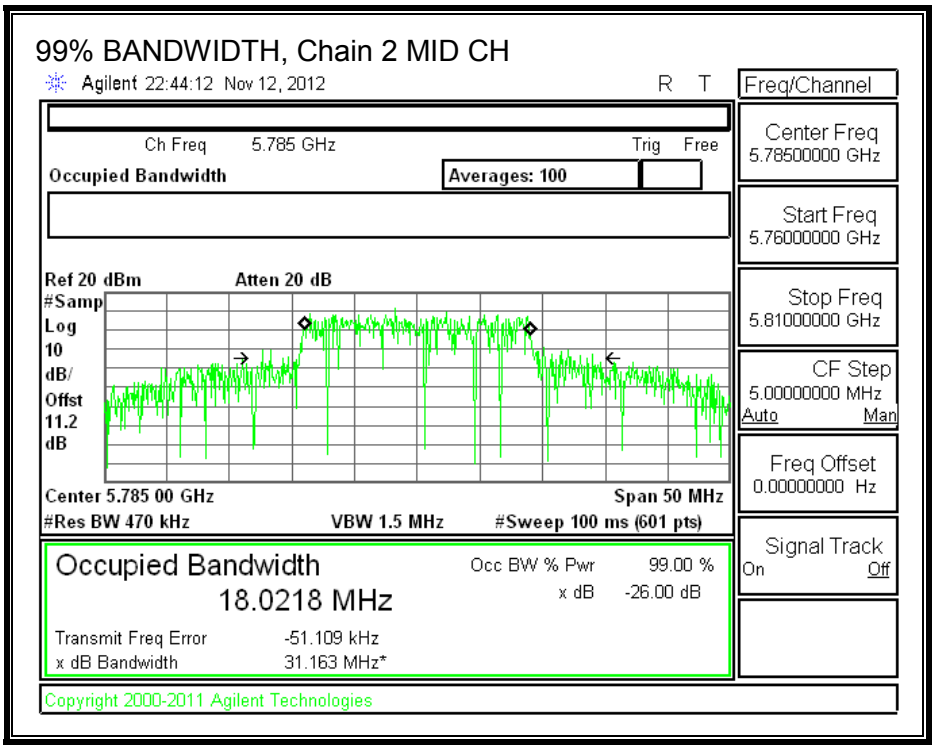


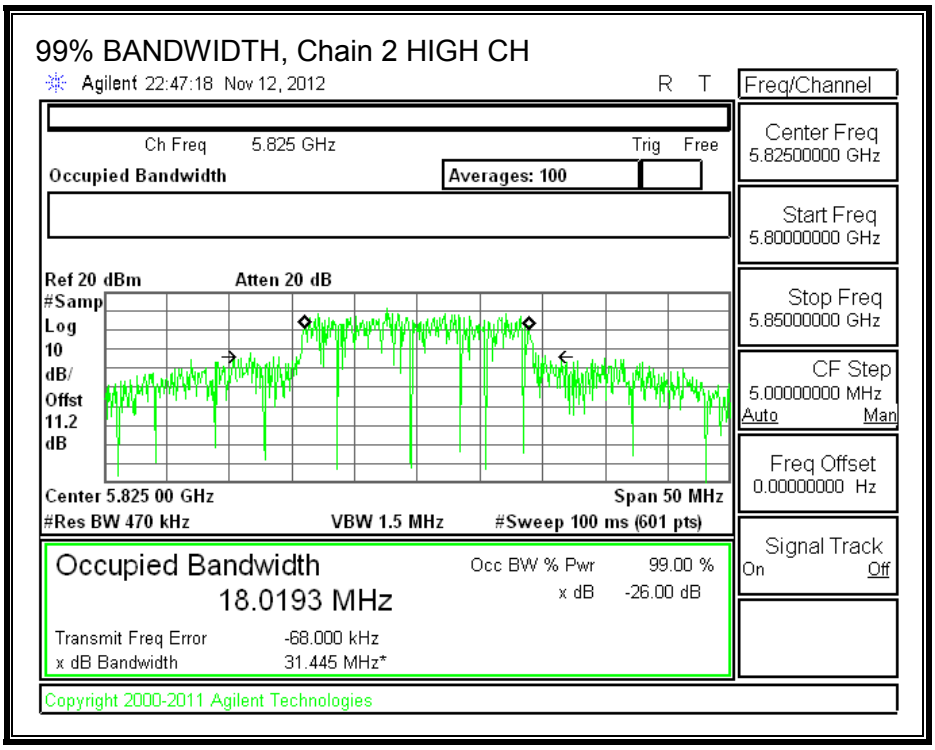




99% BANDWIDTH, Chain 2







8.23.3. 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 for output power consideration, and the antenna gain is unequal among the chains. The directional gain is:

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Chain 2 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
4.86	1.95	3.09	3.47

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	3.47	30.00	30	36	30.00
Mid	5785	3.47	30.00	30	36	30.00
High	5825	3.47	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Chain 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	5745	22.89	22.84	22.89	27.64	30.00	-2.36
Mid	5785	22.91	22.78	22.74	27.58	30.00	-2.42
High	5825	22.84	22.56	22.45	27.39	30.00	-2.61

8.23.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247

IC RSS-210 A8.2

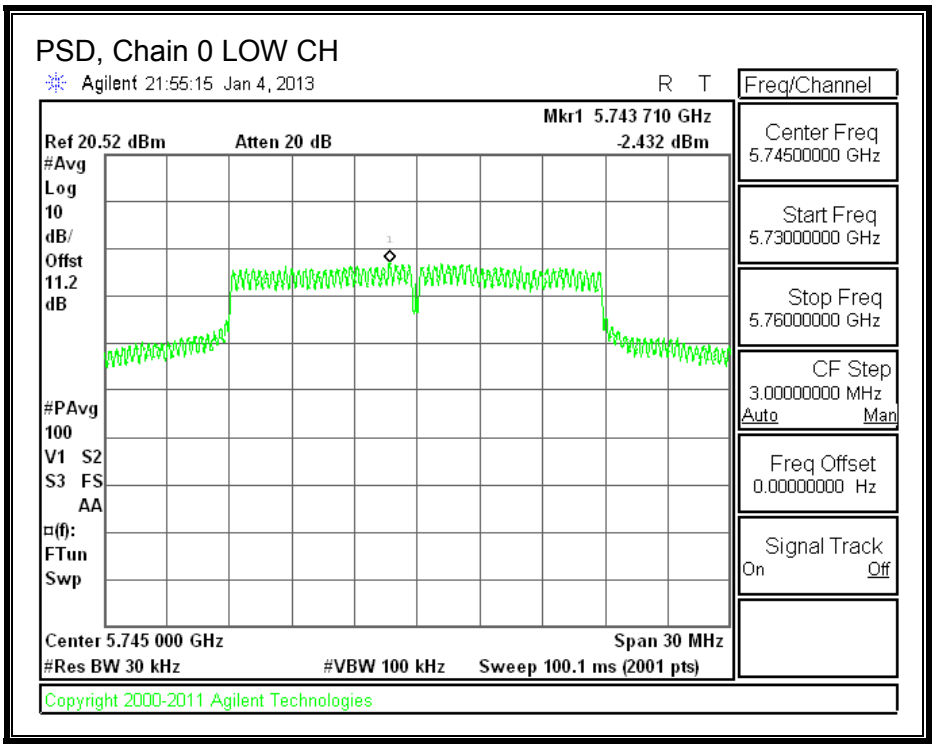
The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

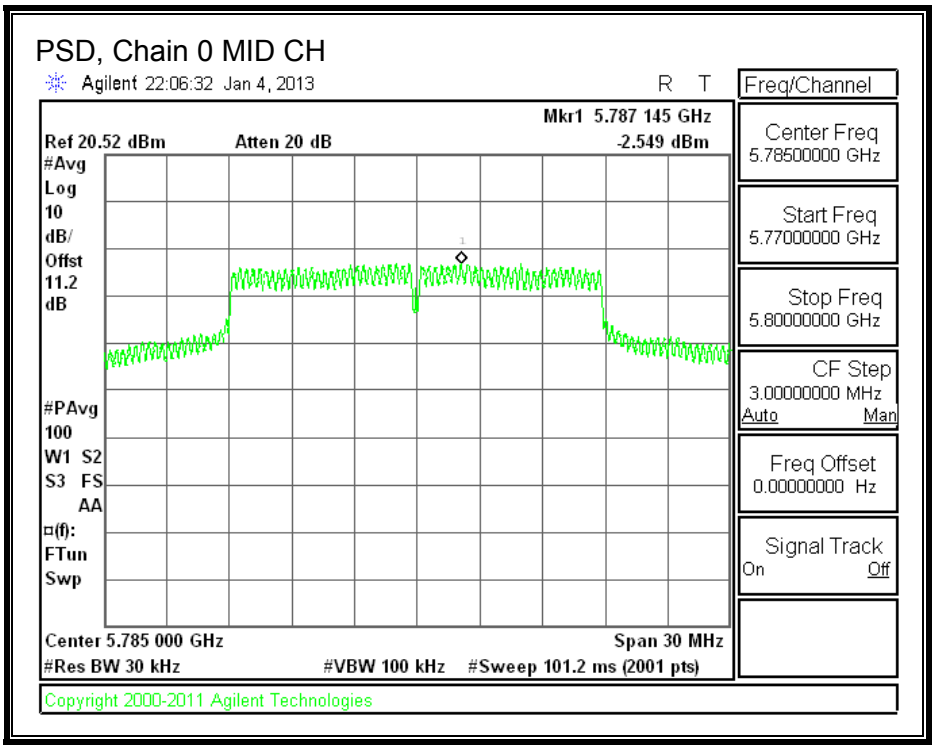
RESULTS

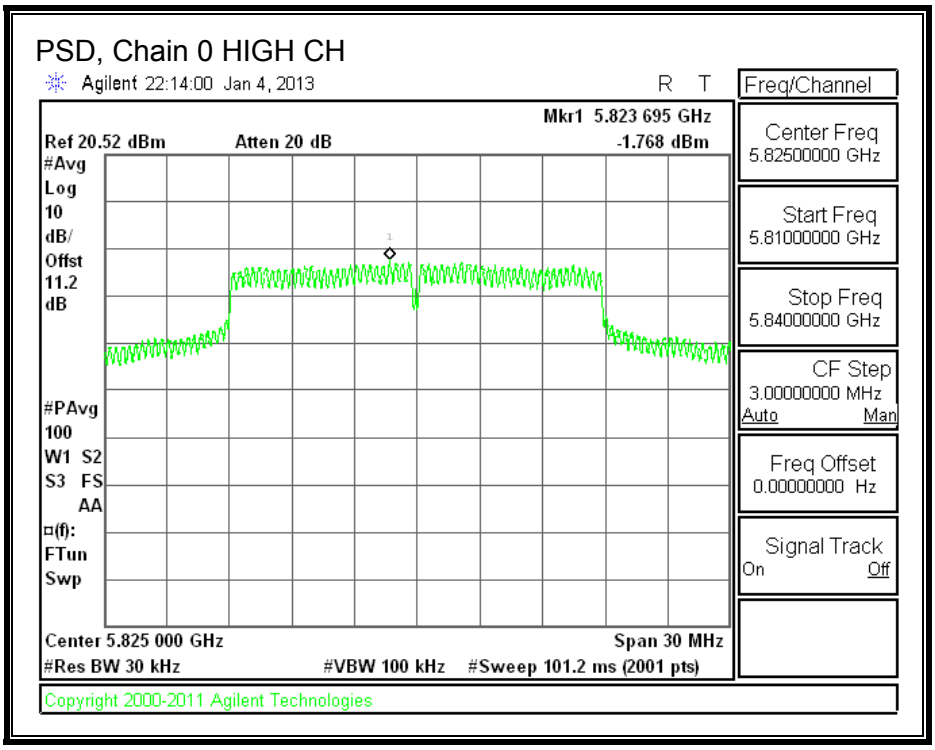
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Chain 1 Meas (dBm)	Chain 2 Meas (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	5745	-2.432	-3.406	-3.004	1.842	8.0	-6.158
Mid	5785	-2.549	-3.352	-3.509	1.655	8.0	-6.345
High	5825	-1.768	-2.763	-2.640	2.404	8.0	-5.596

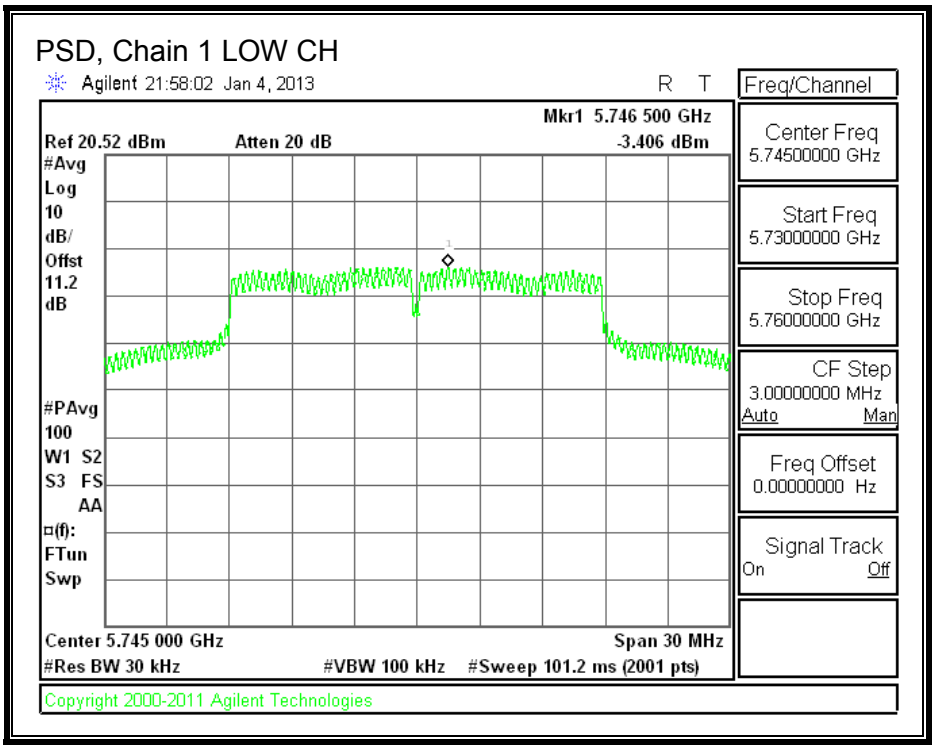
PSD, Chain 0



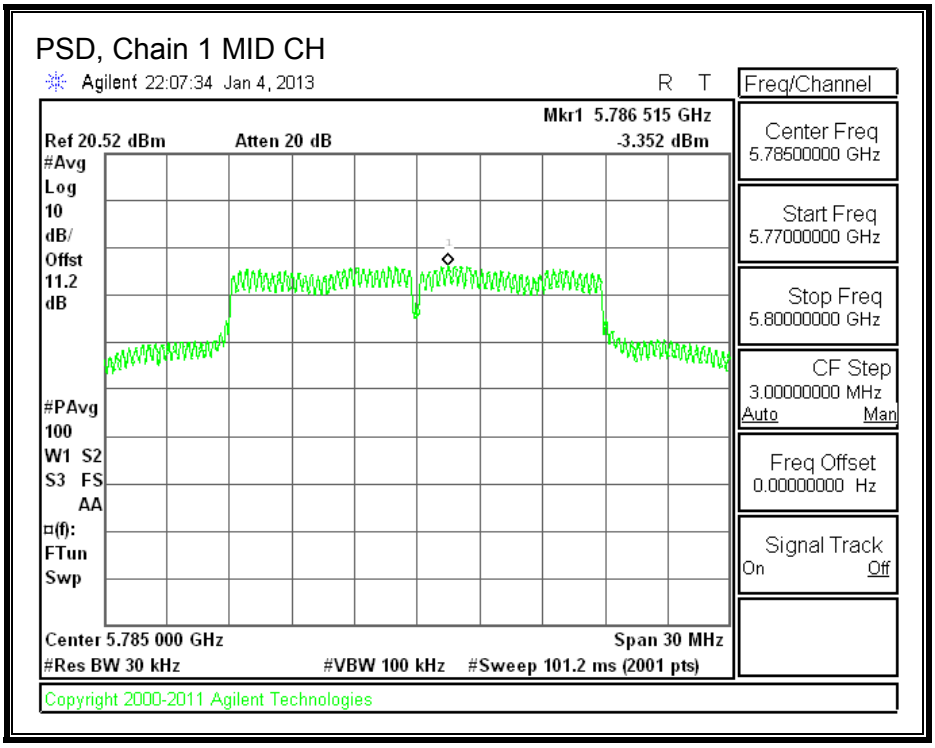




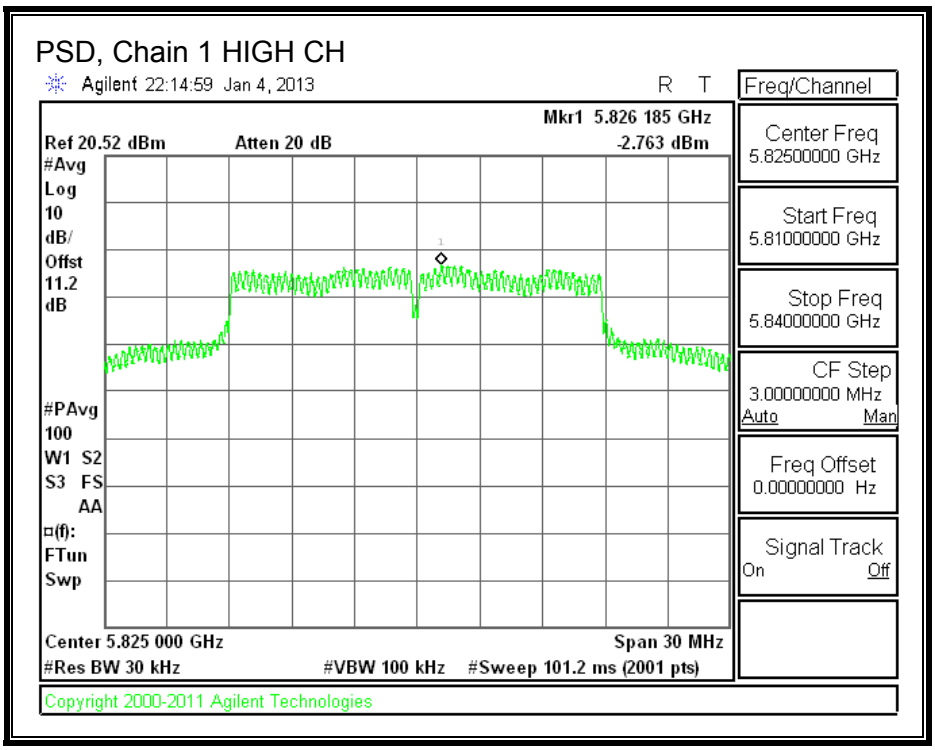
PSD, Chain 1



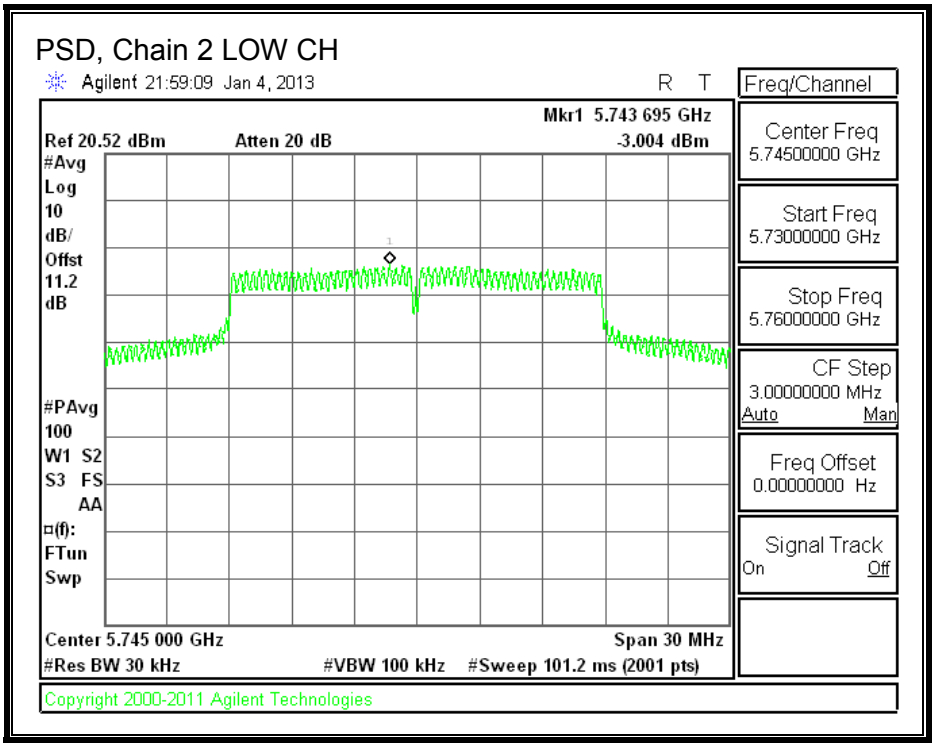
PSD, Chain 1 MID CH

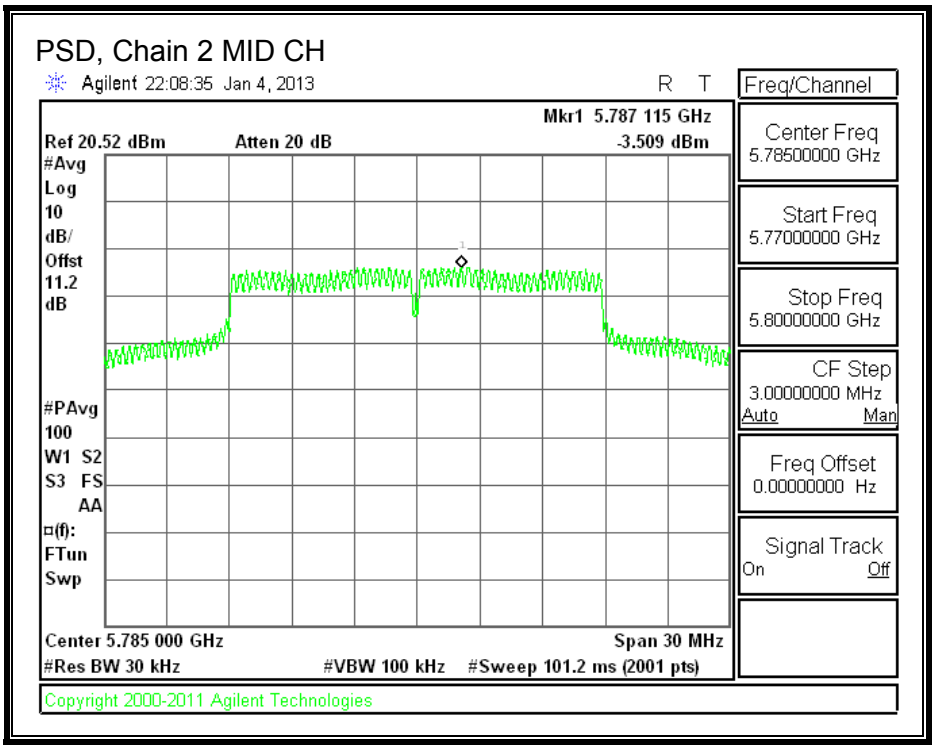


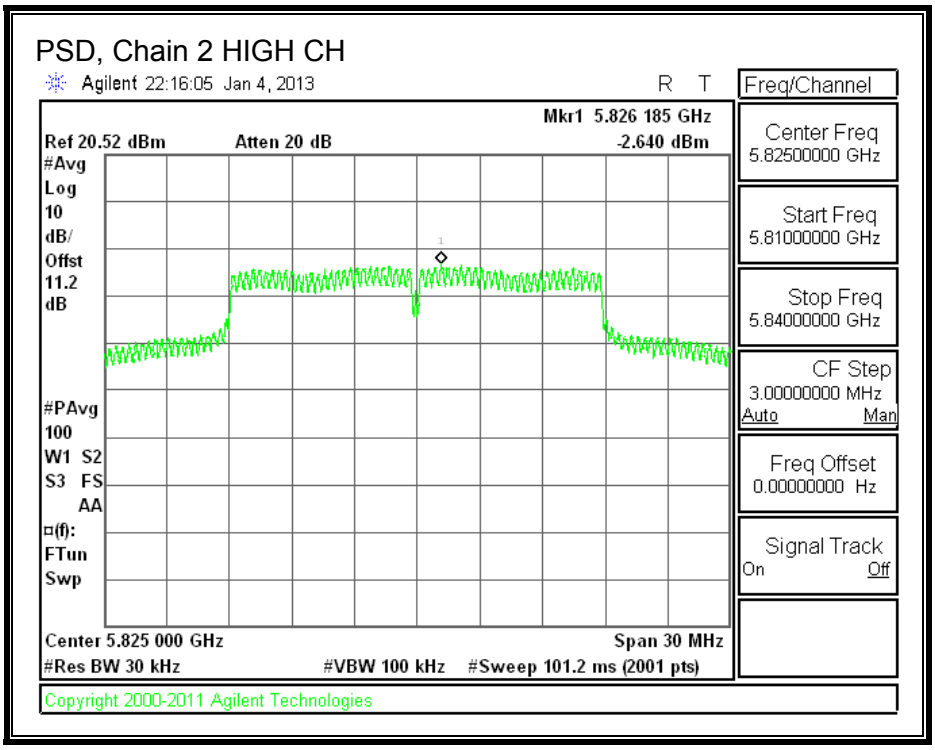
PSD, Chain 1 HIGH CH



PSD, Chain 2







8.23.5. OUT-OF-BAND EMISSIONS

LIMITS

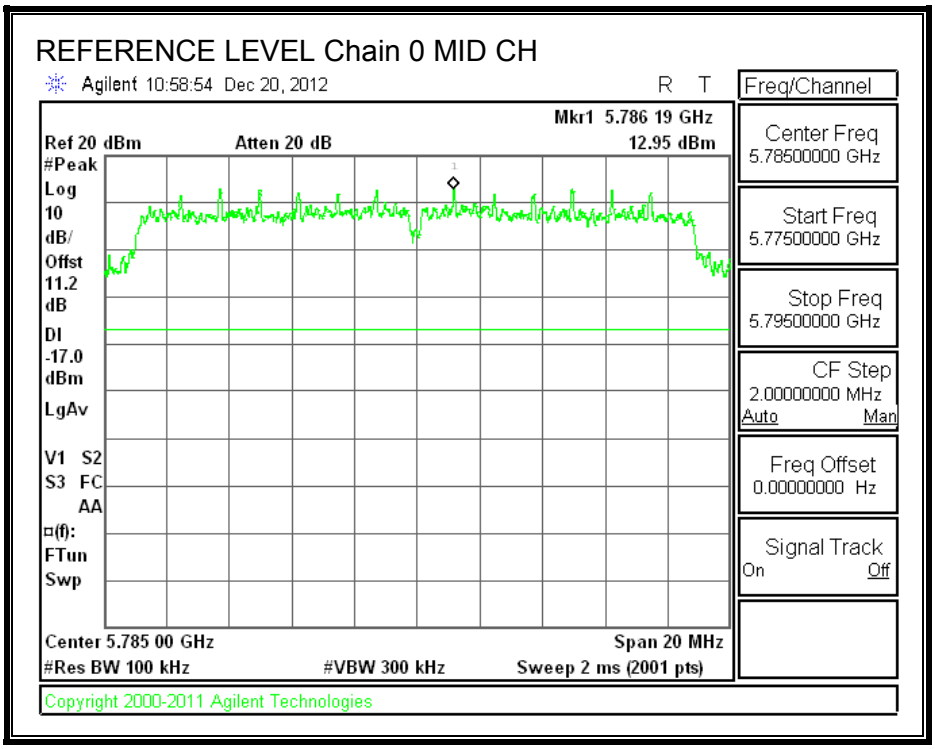
FCC §15.247 (d)

IC RSS-210 A8.5

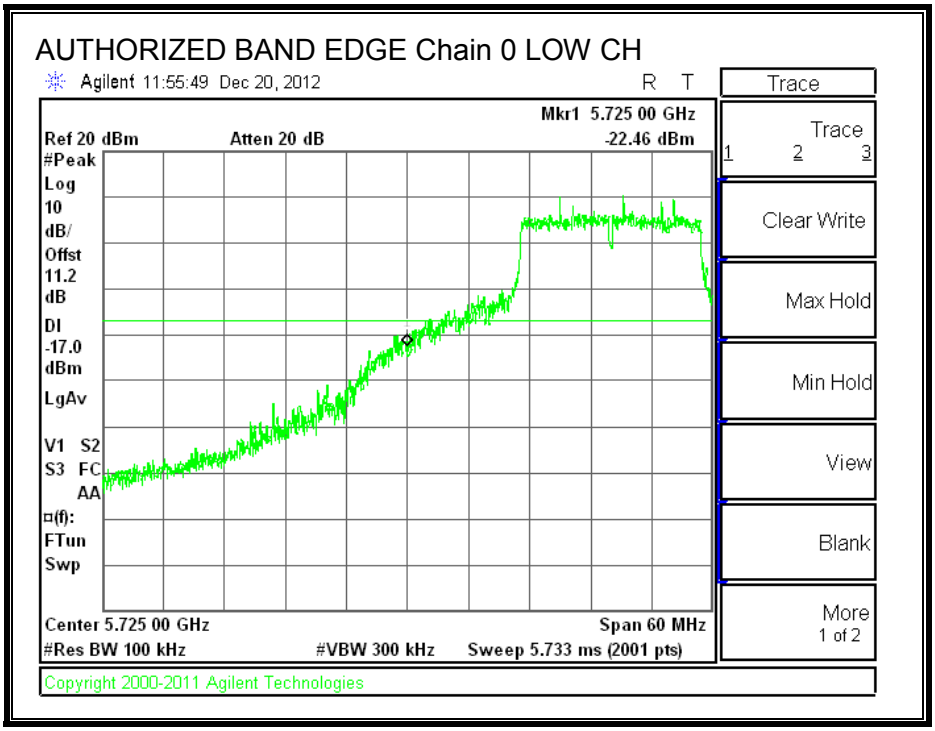
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the 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.

RESULTS

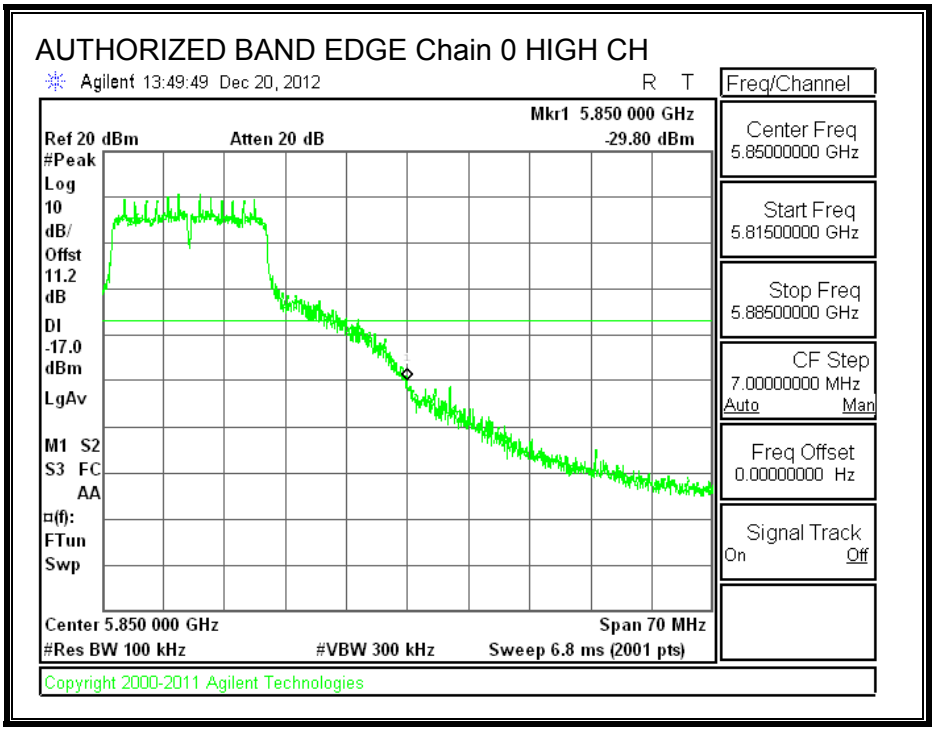
IN-BAND REFERENCE LEVEL, Chain 0



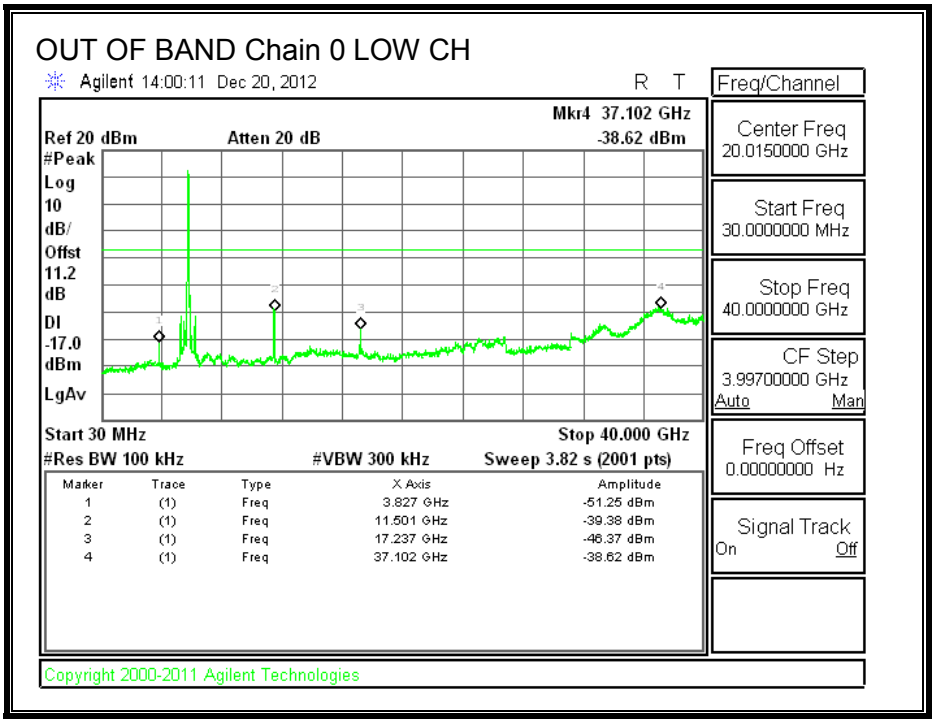
LOW CHANNEL BANDEDGE, Chain 0

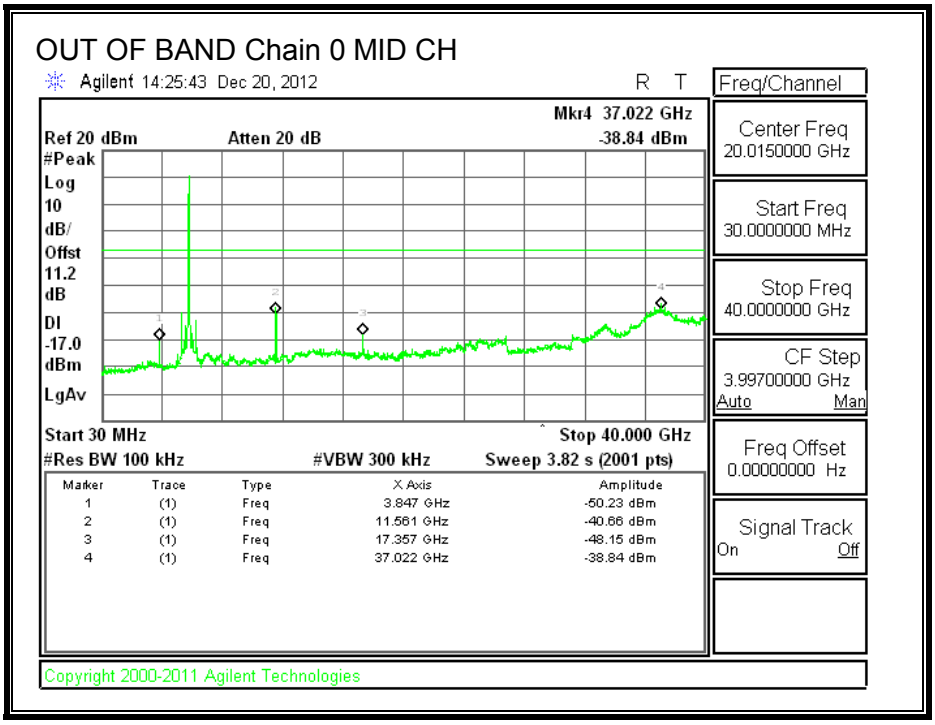


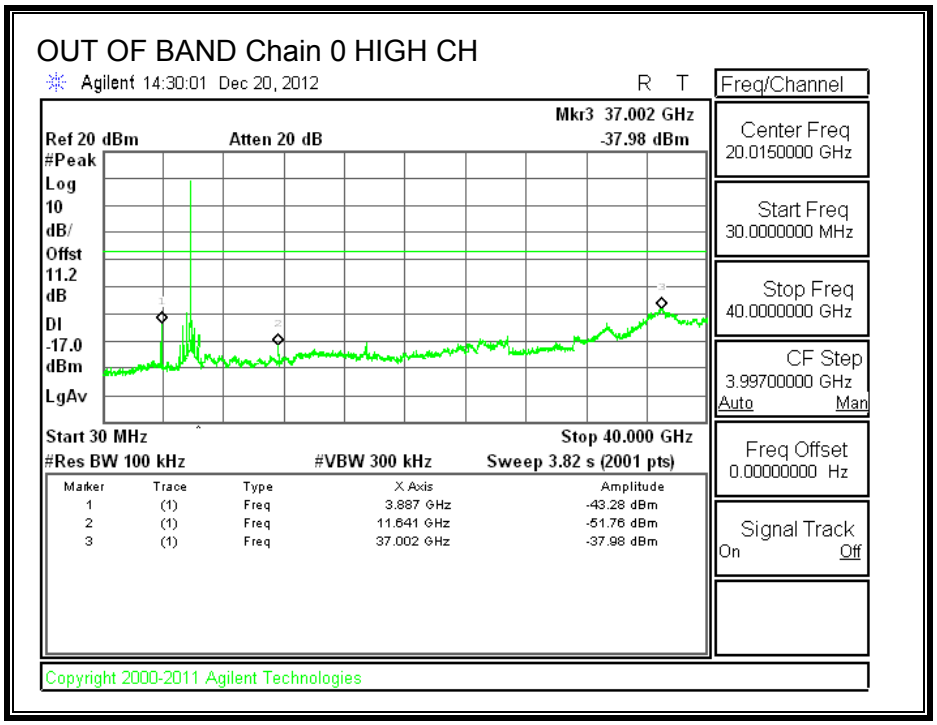
HIGH CHANNEL BANDEDGE, Chain 0



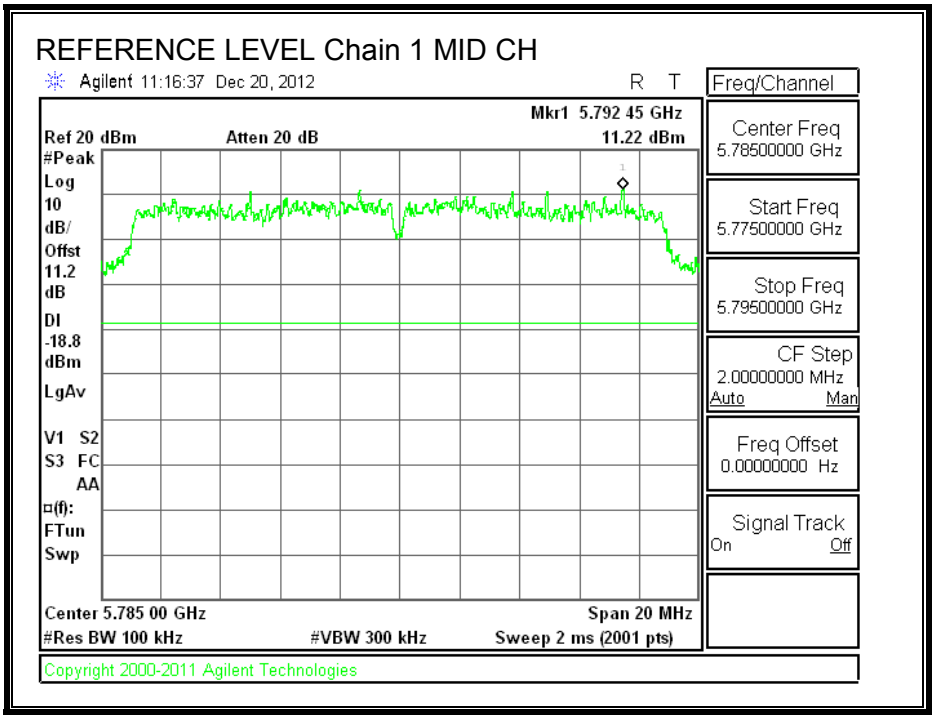
OUT-OF-BAND EMISSIONS, Chain 0



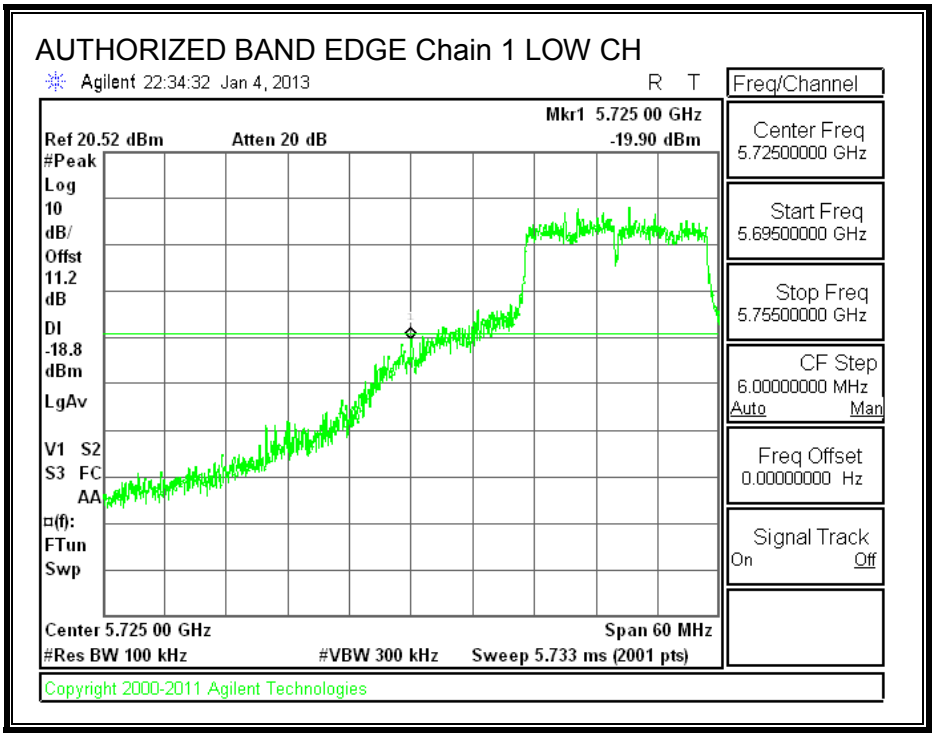




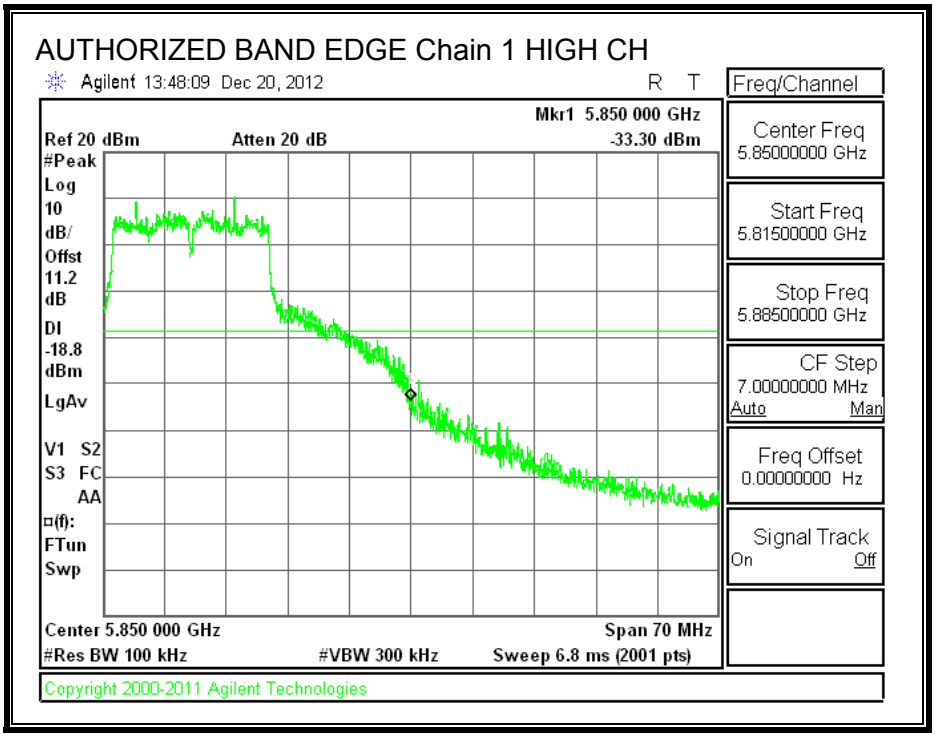
IN-BAND REFERENCE LEVEL, Chain 1



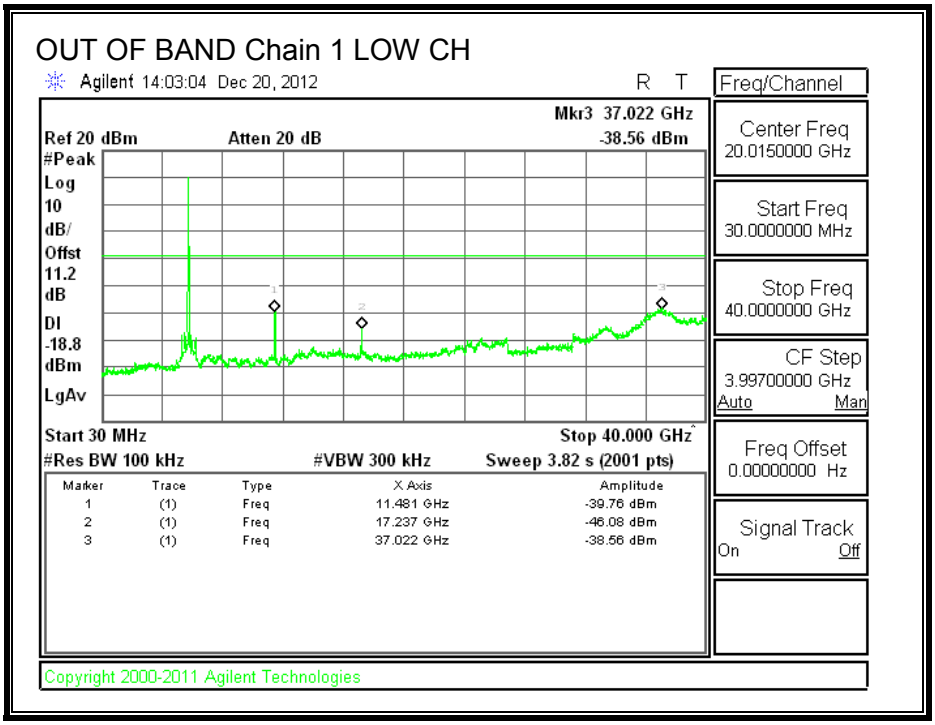
LOW CHANNEL BANDEDGE, Chain 1

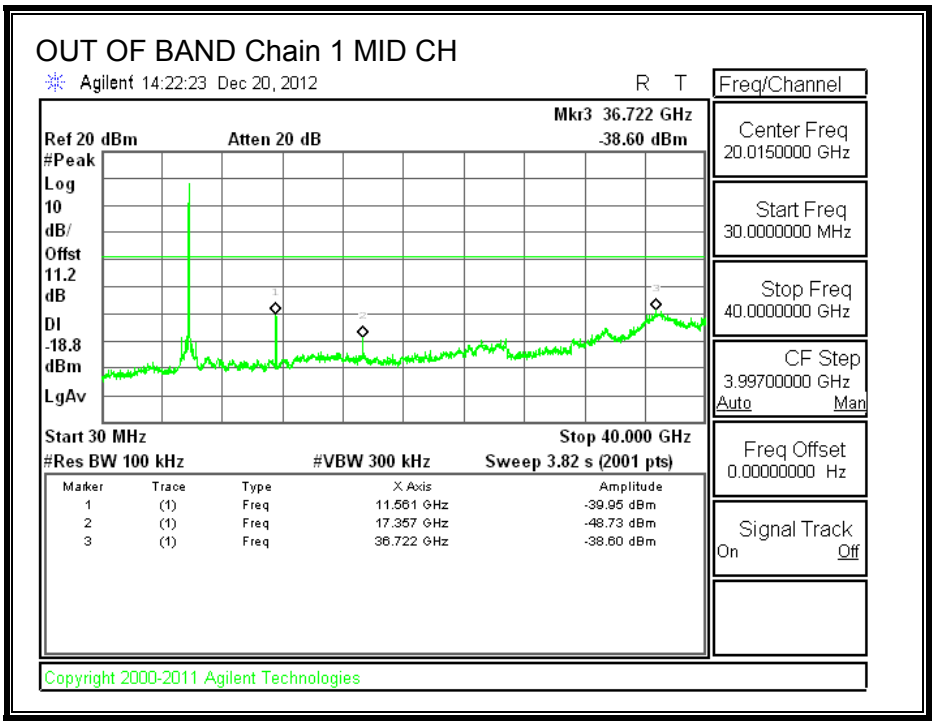


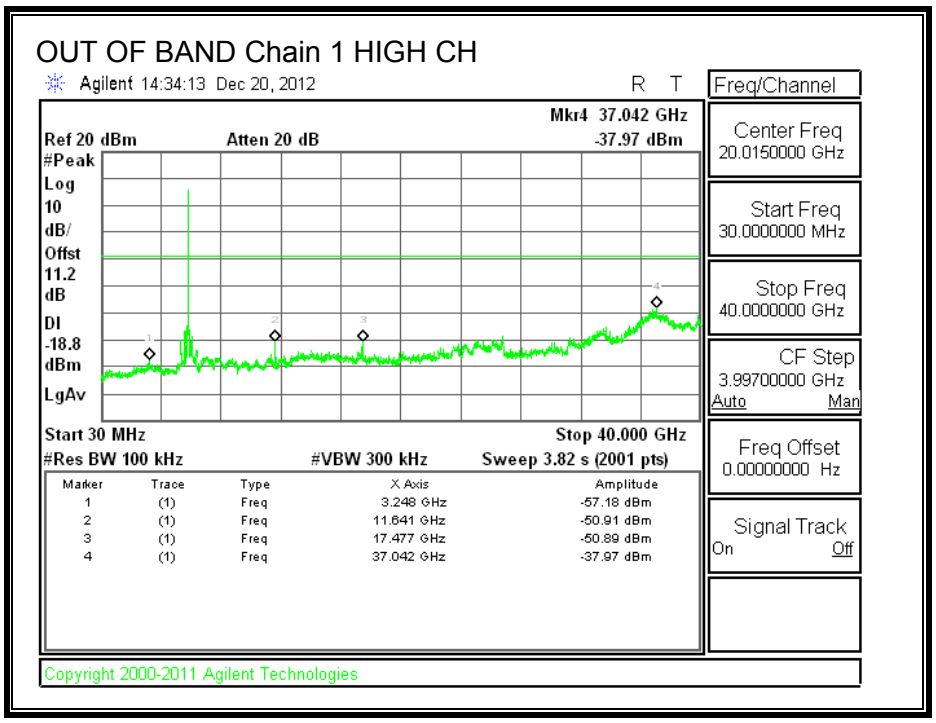
HIGH CHANNEL BANDEDGE, Chain 1



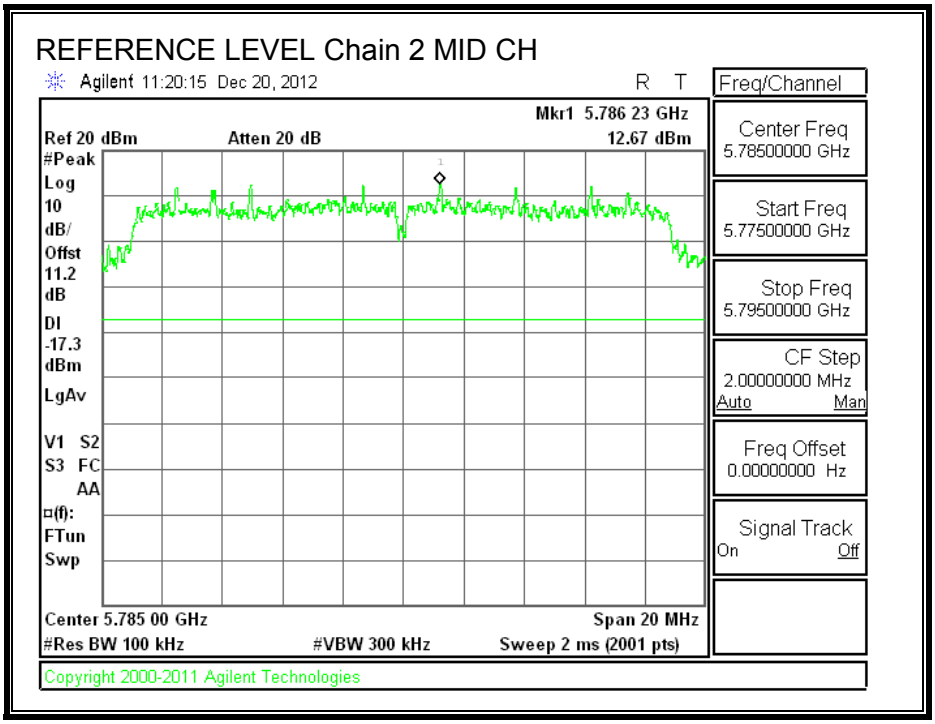
OUT-OF-BAND EMISSIONS, Chain 1



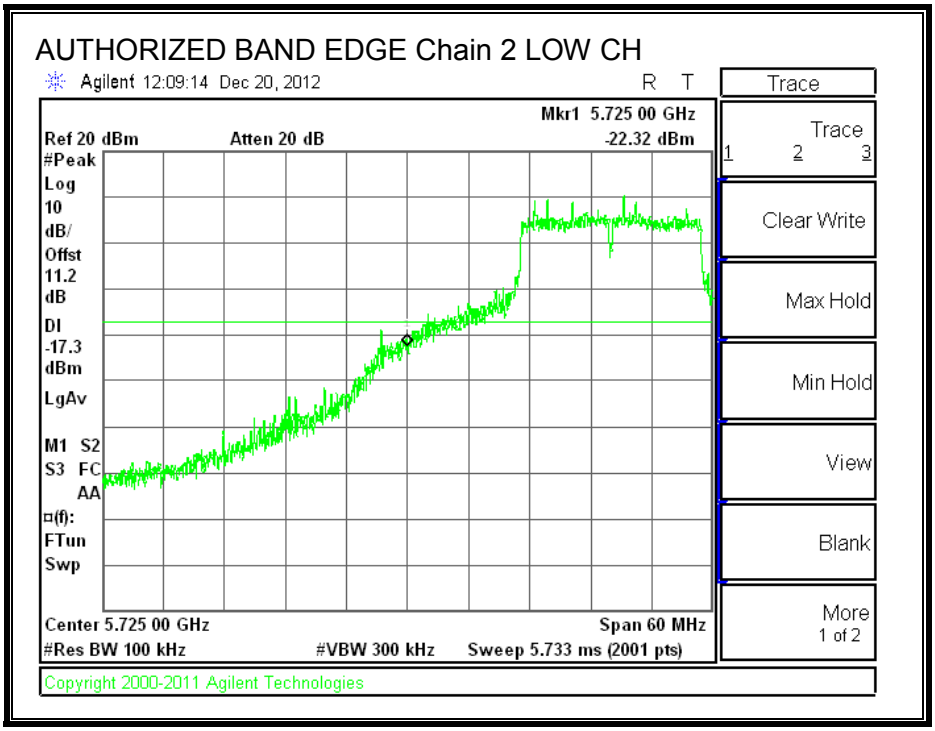




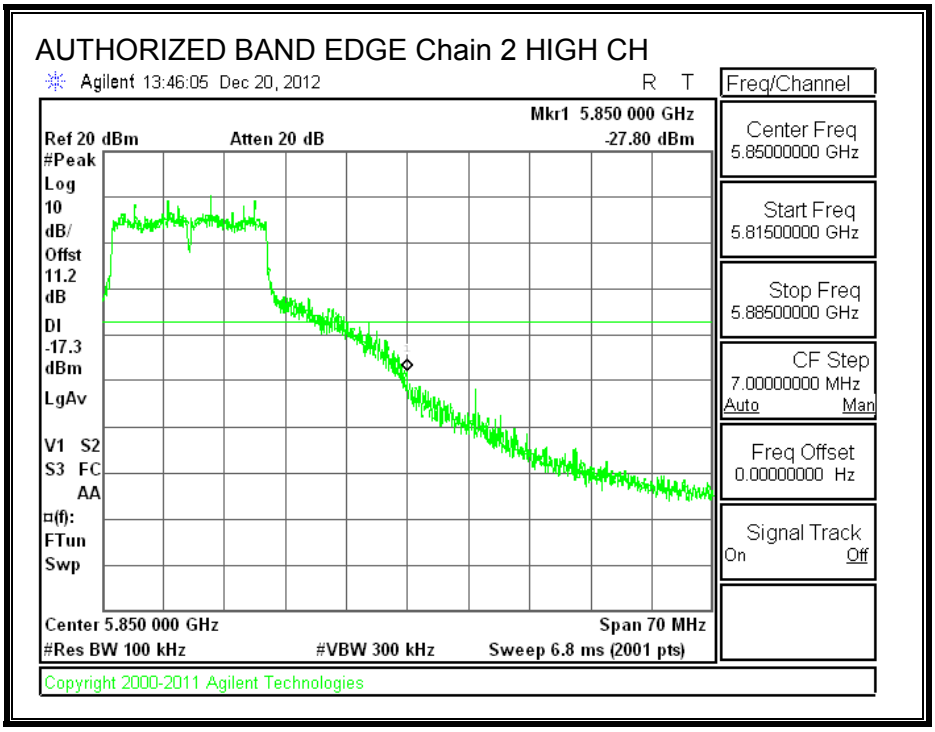
IN-BAND REFERENCE LEVEL, Chain 2



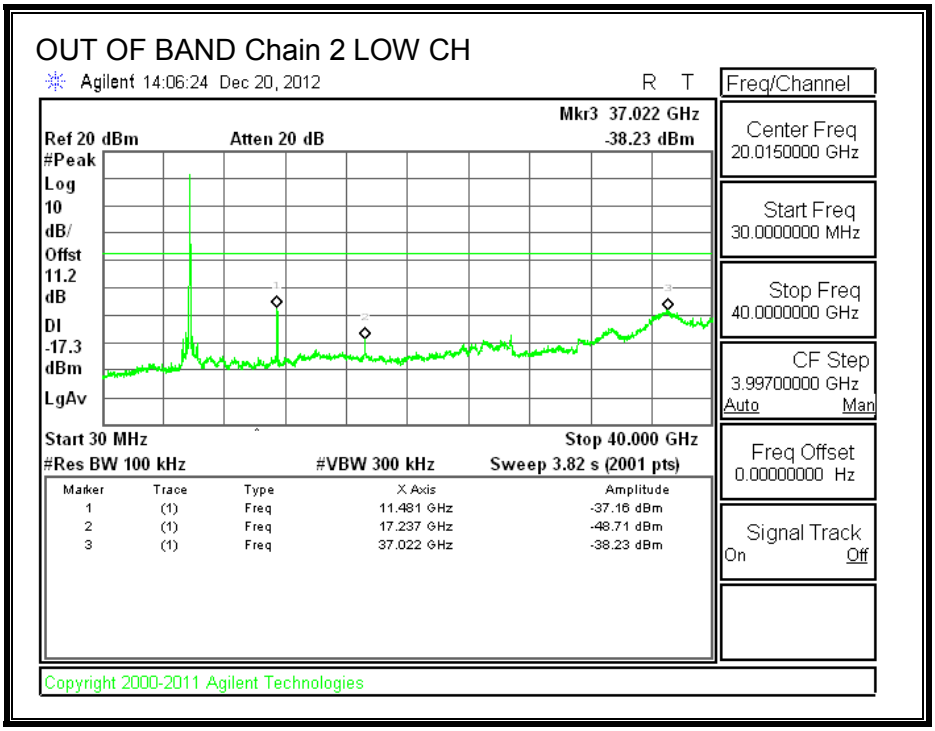
LOW CHANNEL BANDEDGE, Chain 2

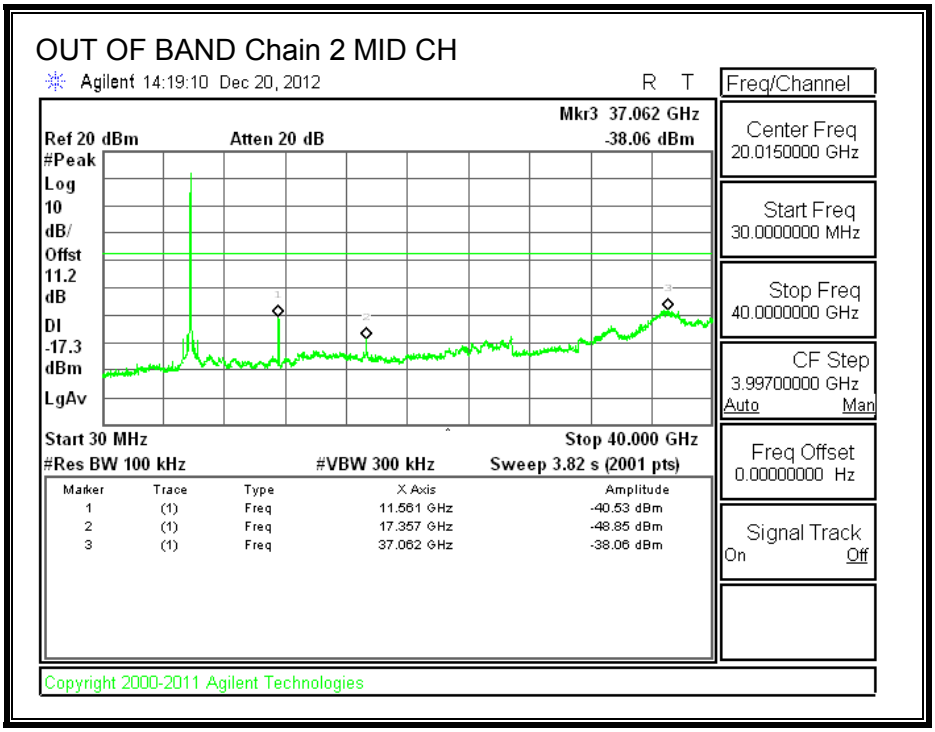


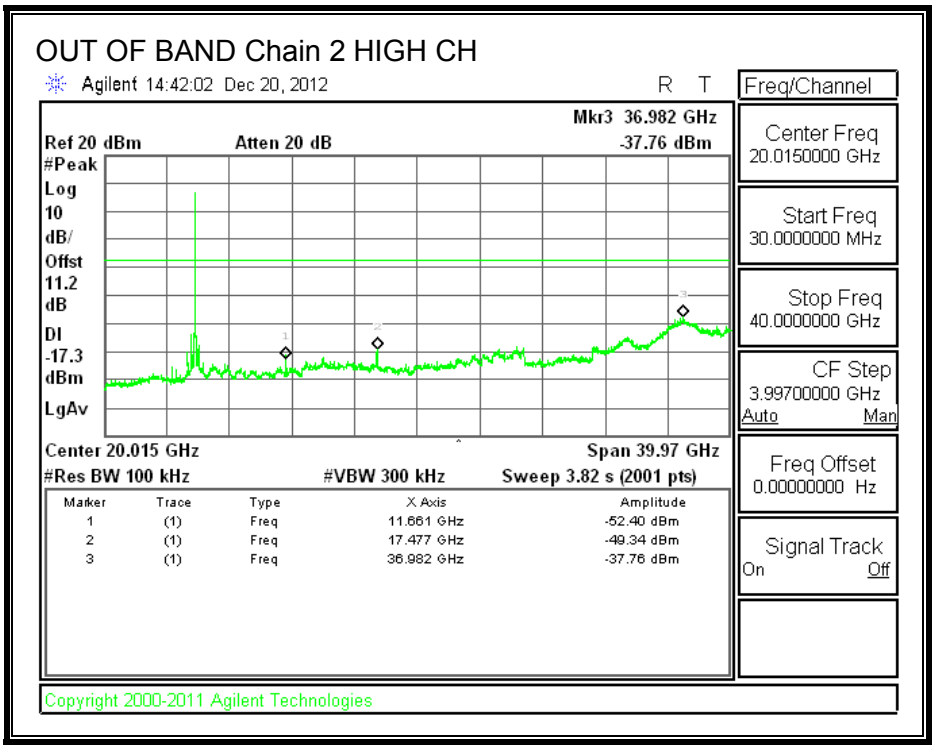
HIGH CHANNEL BANDEDGE, Chain 2



OUT-OF-BAND EMISSIONS, Chain 2







8.24. 802.11n HT40 1TX MODE IN THE 5.8 GHz BAND

Covered by testing HT40 CDD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

8.25. 802.11n HT40 CDD MCS0 2TX MODE IN THE 5.8 GHz BAND

Covered by testing HT40 CDD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

8.26. 802.11n HT40 BF 2TX MODE IN THE 5.8 GHz BAND

Covered by testing HT40 CDD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

8.27. 802.11n AC40 BF 3TX MODE IN THE 5.8 GHz BAND

Covered by testing HT40 CDD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

8.28. 802.11n HT40 CDD MCS0 3TX MODE IN THE 5.8 GHz BAND

8.28.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

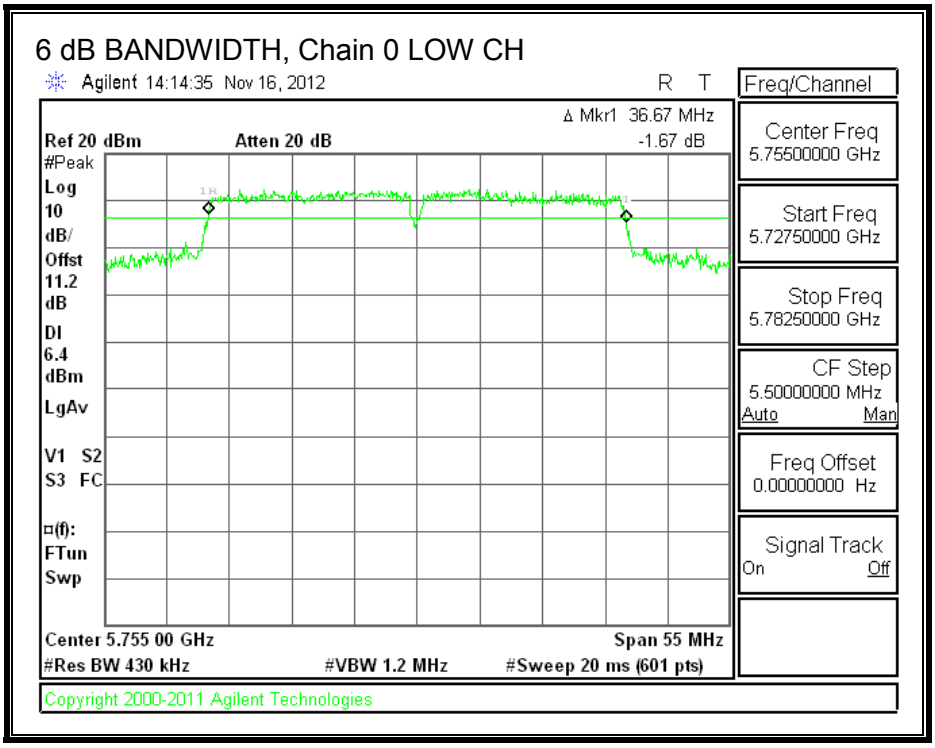
IC RSS-210 A8.2 (a)

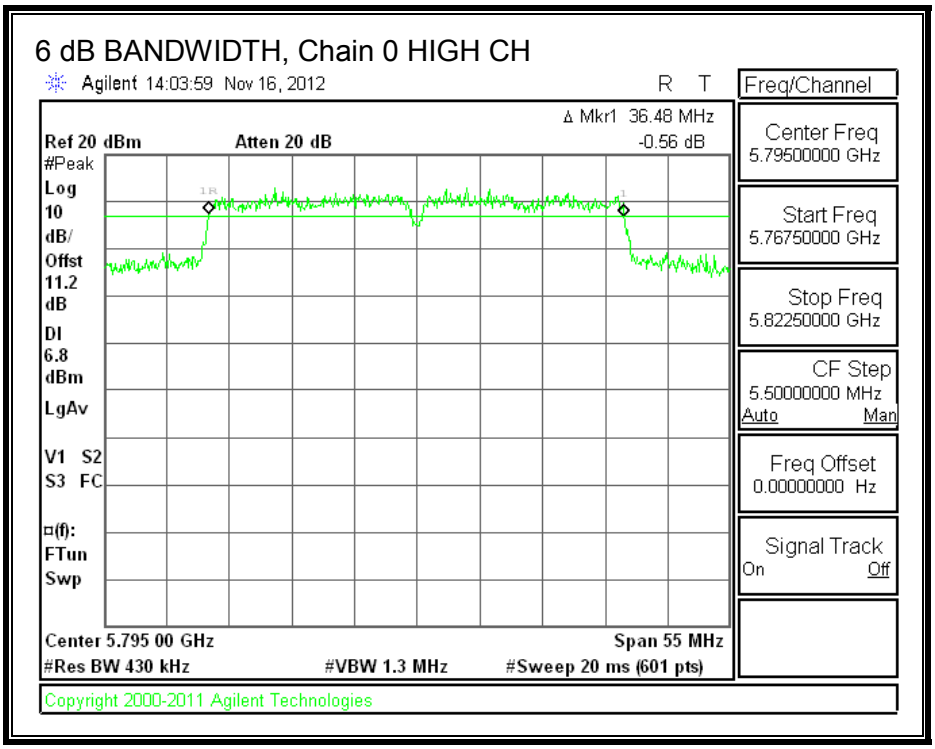
The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

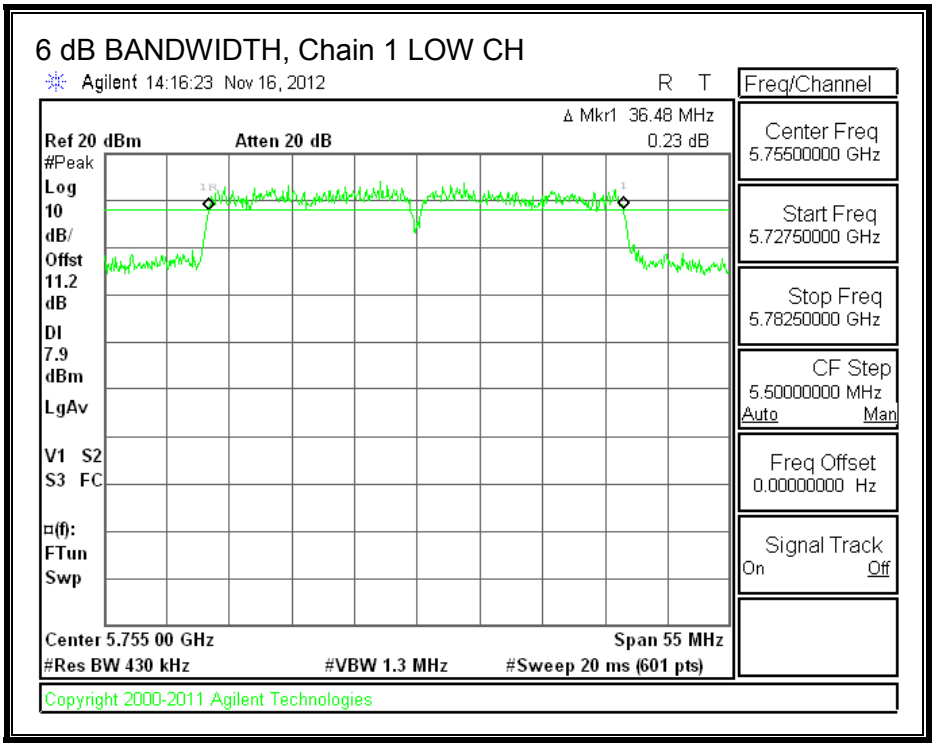
Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	6 dB BW Chain 2 (MHz)	Minimum Limit (MHz)
Low	5755	36.67	36.48	36.58	0.5
High	5795	36.48	36.39	36.48	0.5

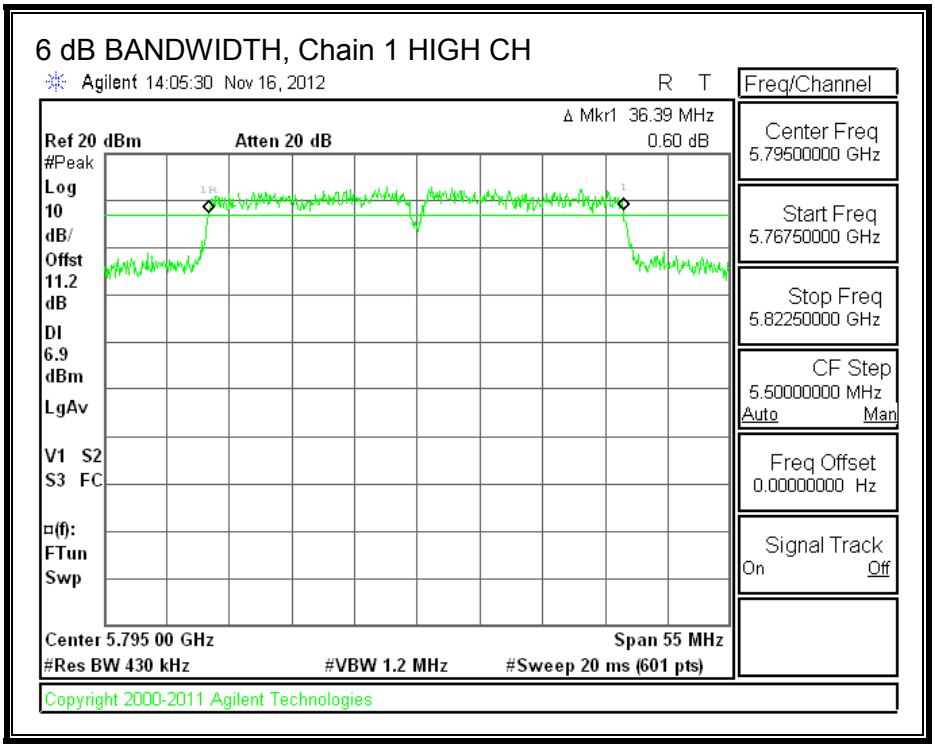
6 dB BANDWIDTH, Chain 0



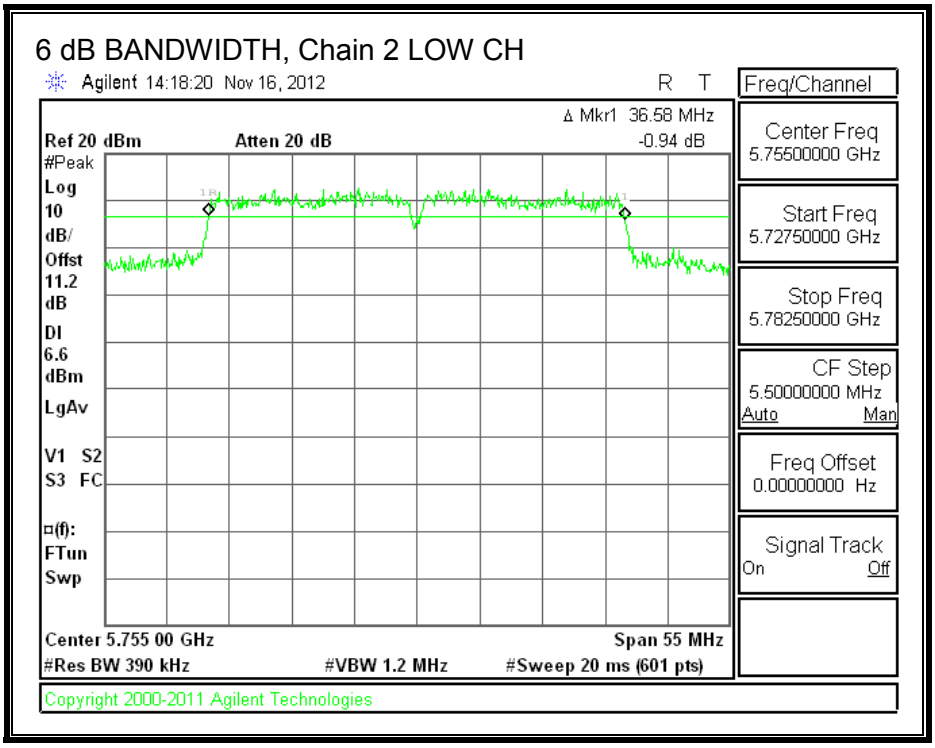


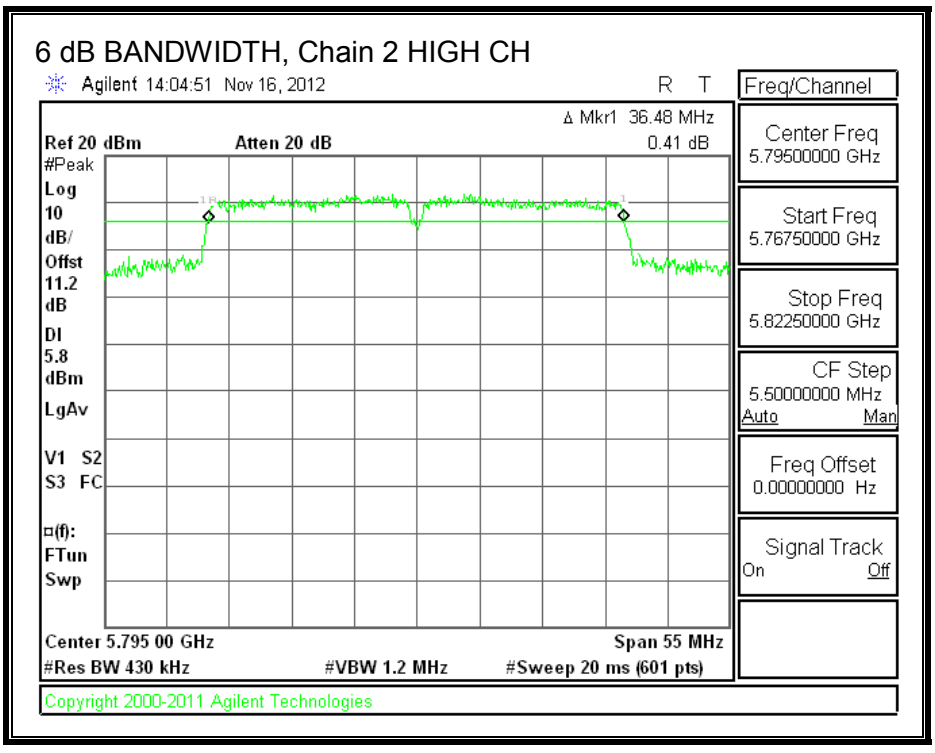
6 dB BANDWIDTH, Chain 1





6 dB BANDWIDTH, Chain 2





8.28.2. 99% BANDWIDTH

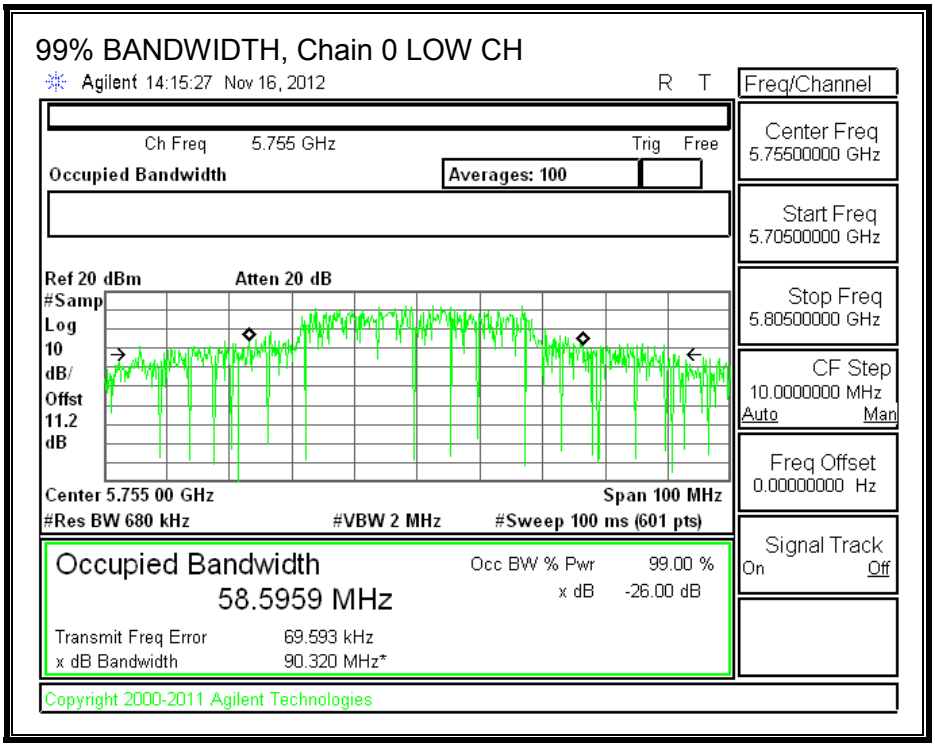
LIMITS

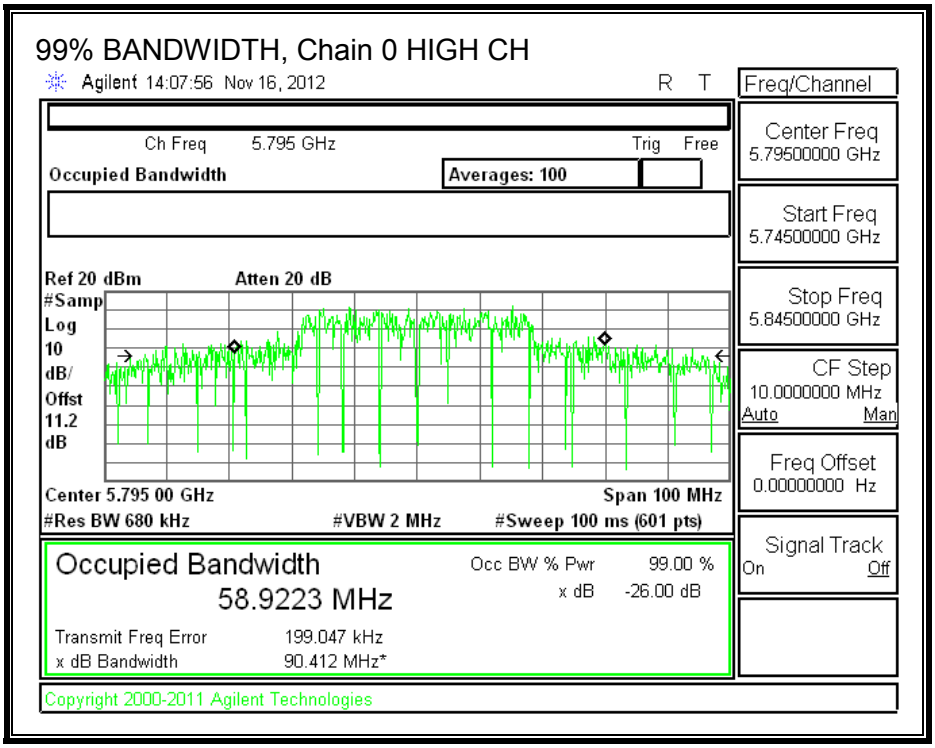
None; for reporting purposes only.

RESULTS

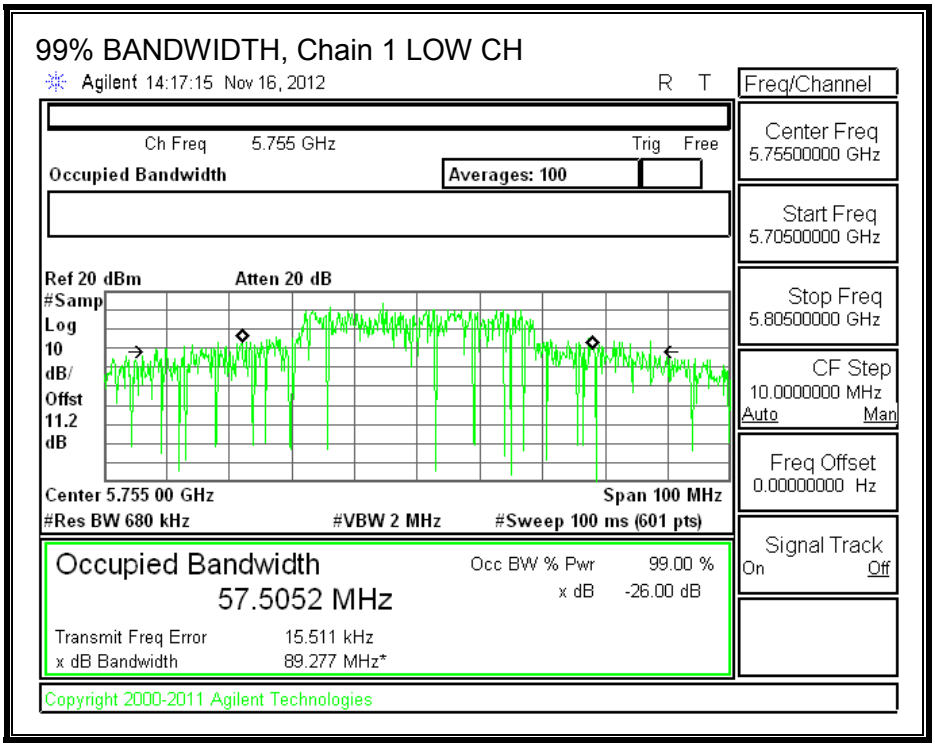
Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)	99% BW Chain 2 (MHz)
Low	5755	58.5959	57.5052	61.5757
High	5795	58.9223	57.3046	62.0472

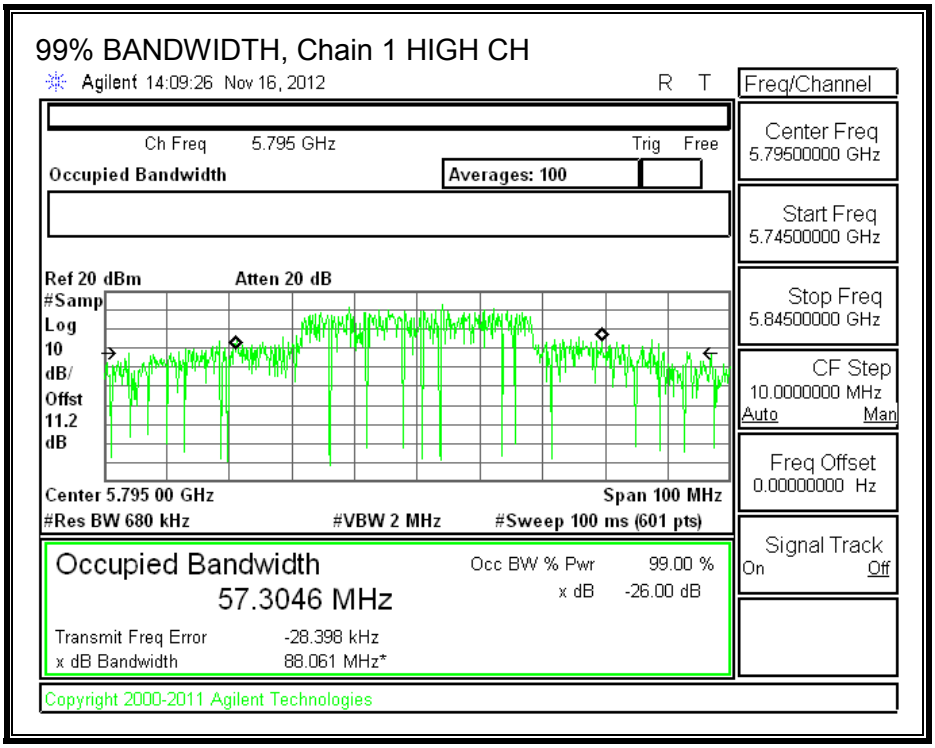
99% BANDWIDTH, Chain 0



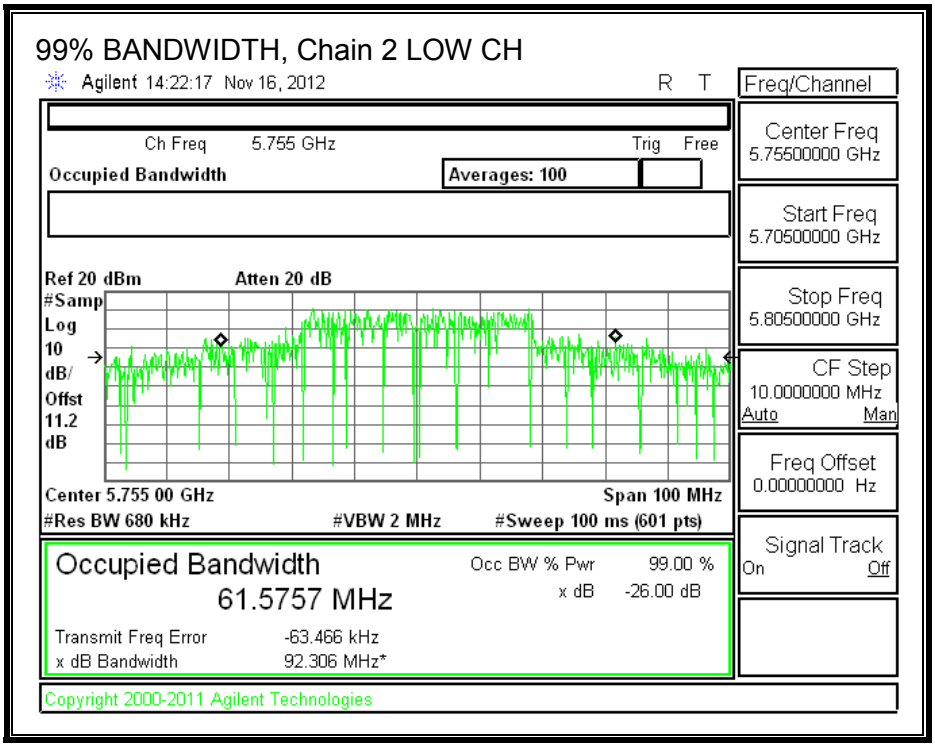


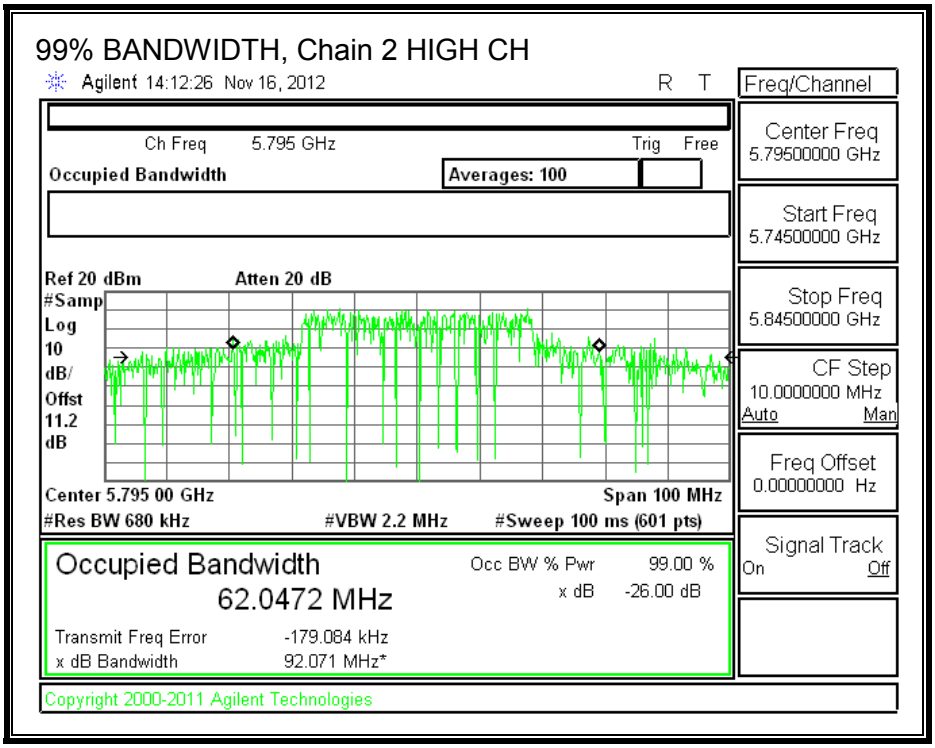
99% BANDWIDTH, Chain 1





99% BANDWIDTH, Chain 2





8.28.3. 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 for output power consideration, and the antenna gain is unequal among the chains. The directional gain is:

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Chain 2 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
4.86	1.95	3.09	3.47

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	3.47	30.00	30	36	30.00
High	5795	3.47	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Chain 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	5755	22.68	22.46	22.37	27.28	30.00	-2.72
High	5795	22.76	22.48	22.26	27.28	30.00	-2.72

8.28.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247

IC RSS-210 A8.2

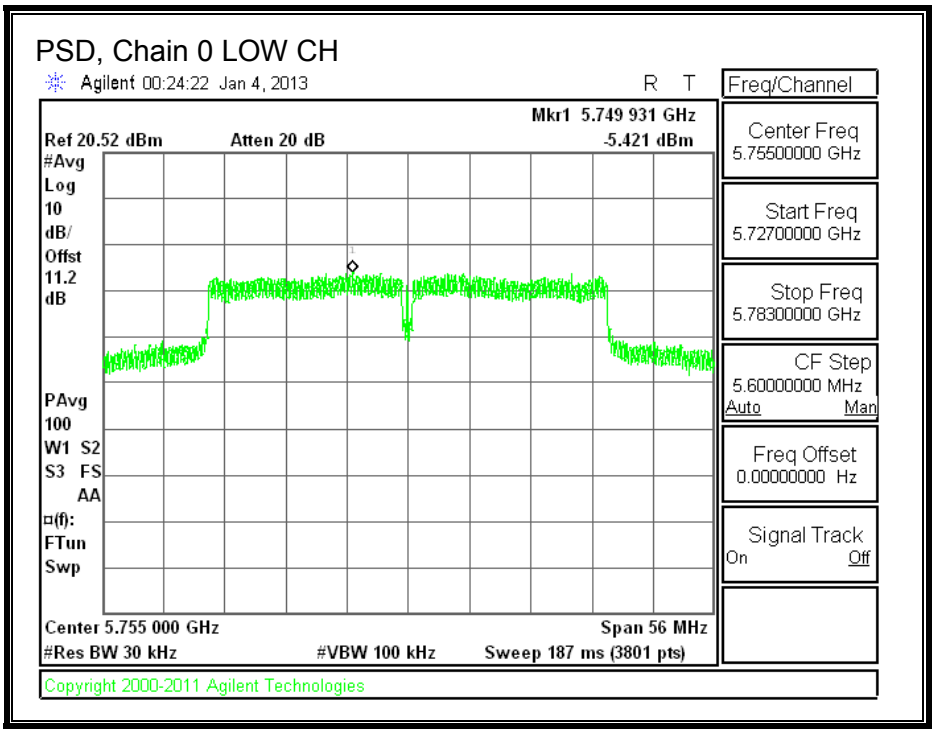
The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

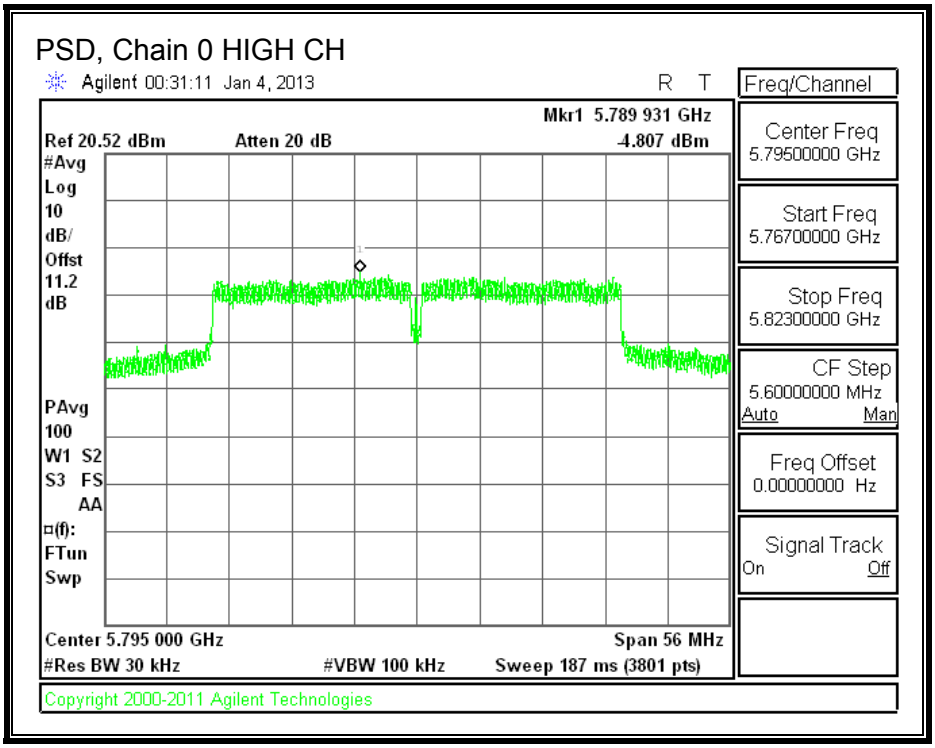
RESULTS

PSD Results

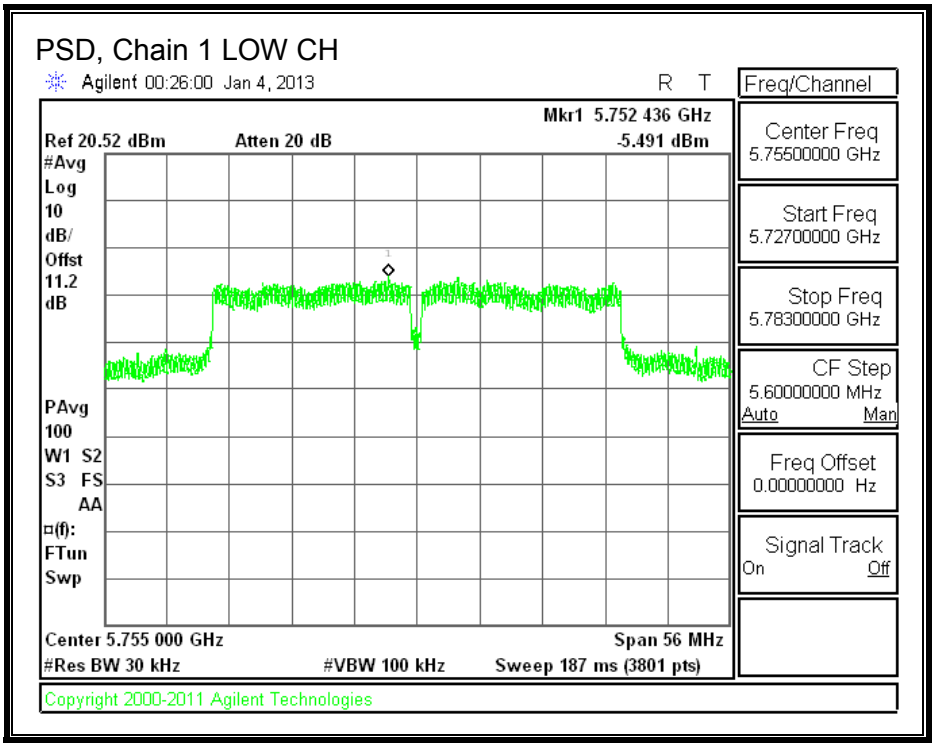
Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Chain 1 Meas (dBm)	Chain 2 Meas (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	5755	-5.421	-5.491	-5.750	-0.780	8.0	-8.780
High	5795	-4.807	-5.996	-5.783	-0.726	8.0	-8.726

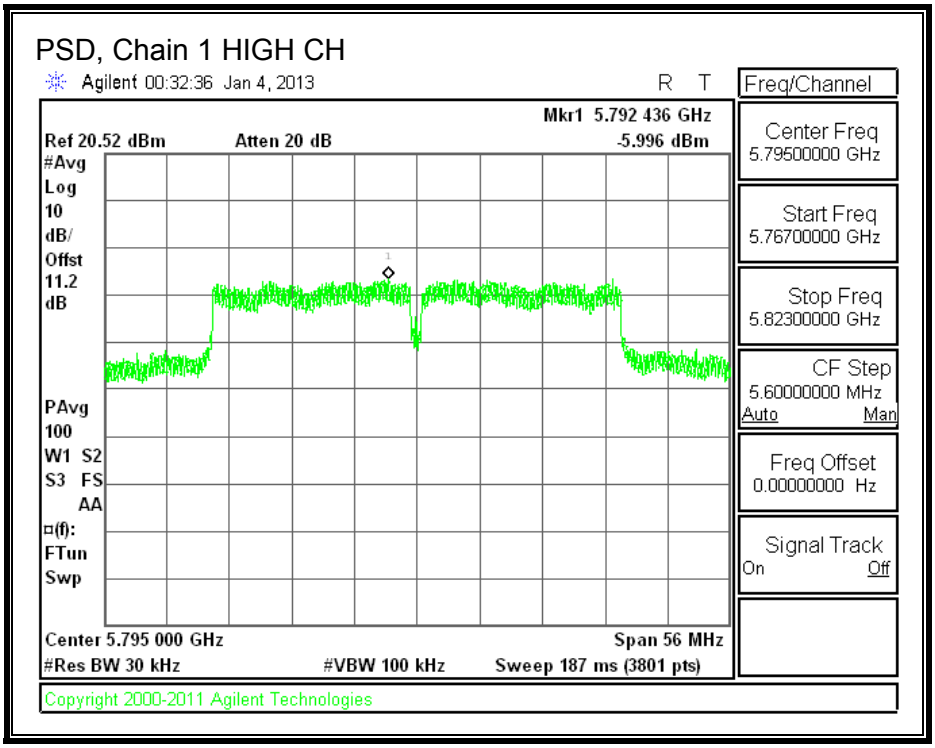
PSD, Chain 0



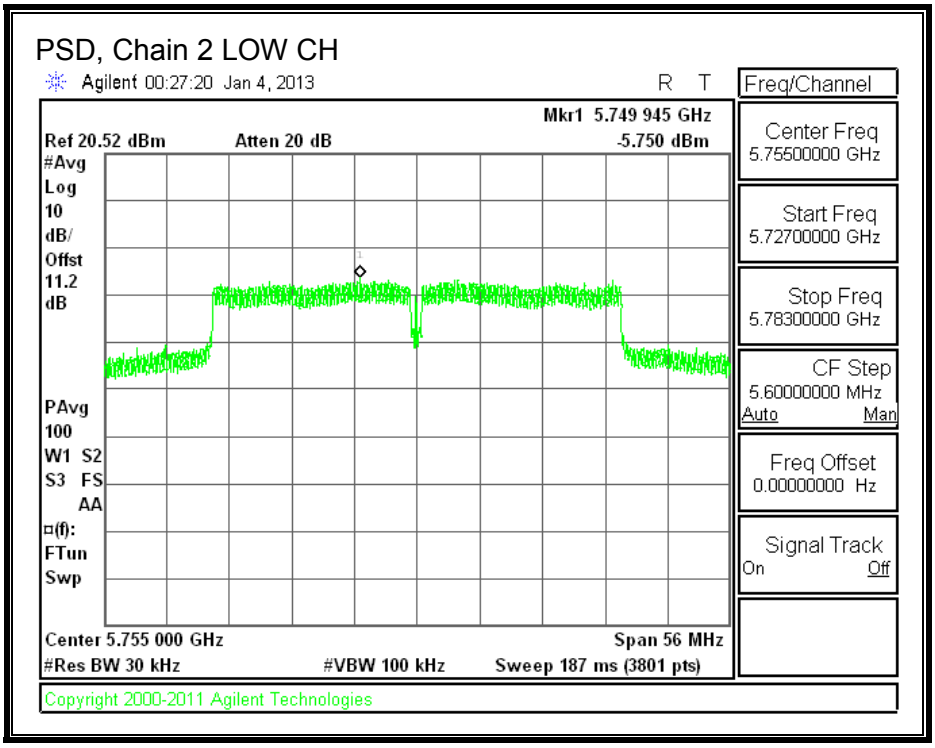


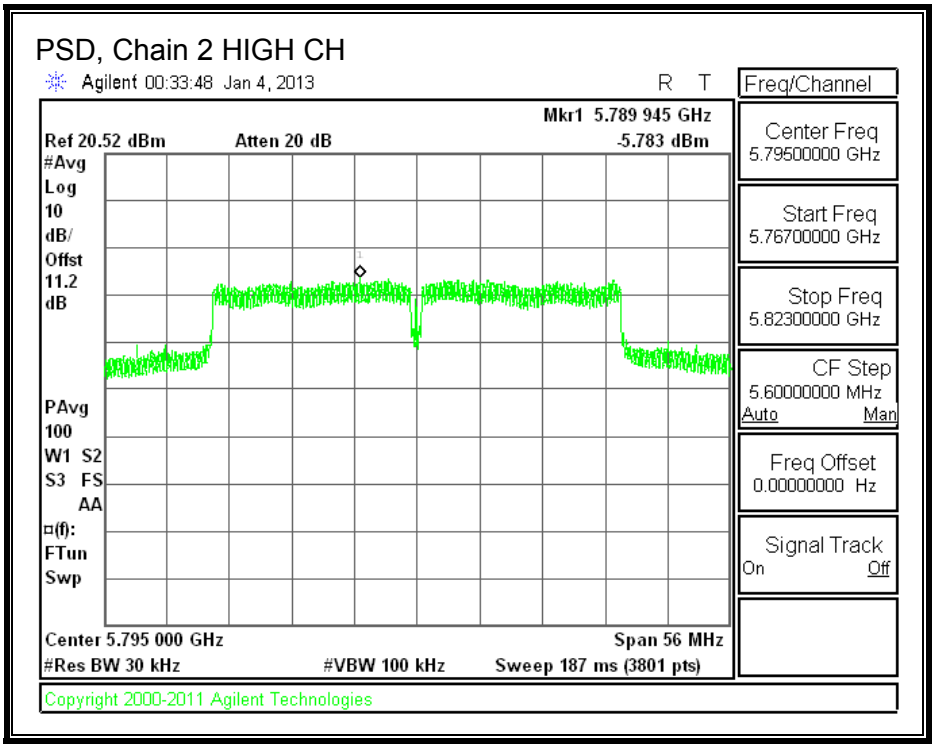
PSD, Chain 1





PSD, Chain 2





8.28.5. OUT-OF-BAND EMISSIONS

LIMITS

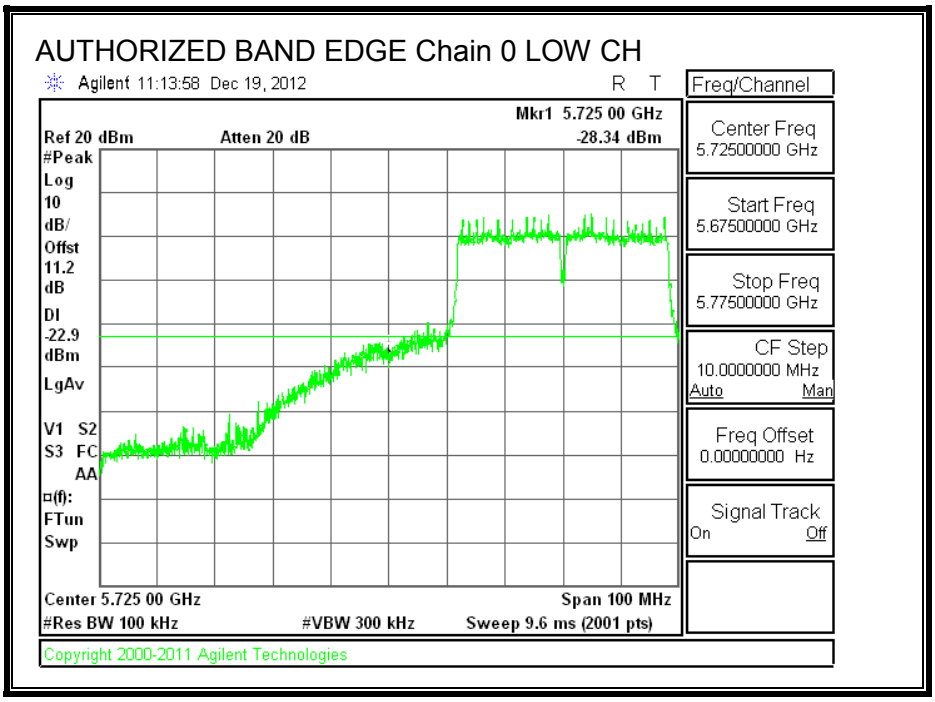
FCC §15.247 (d)

IC RSS-210 A8.5

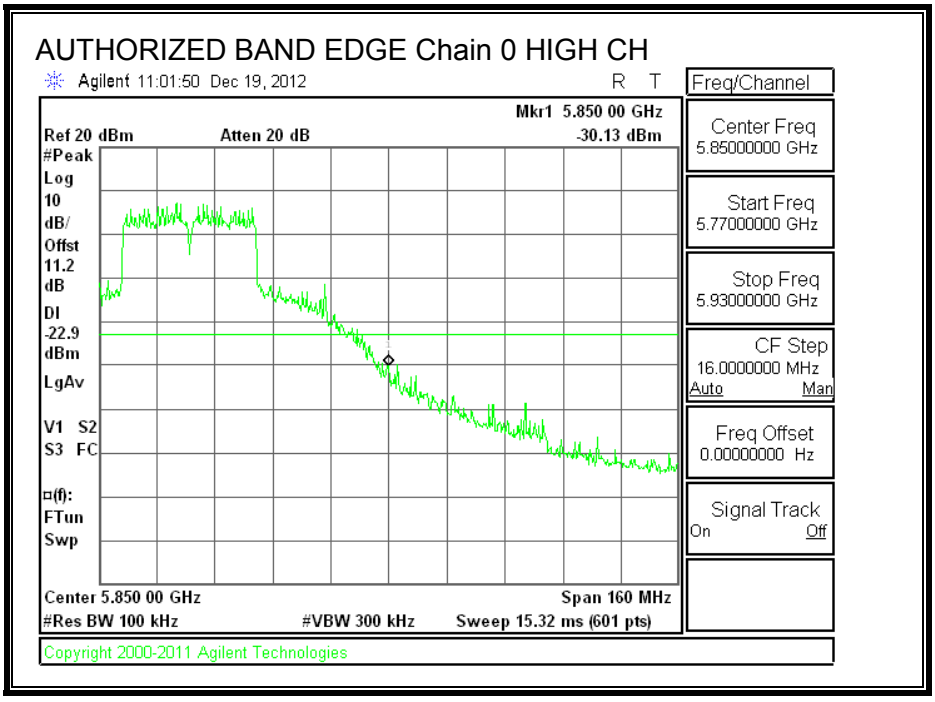
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the 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.

RESULTS

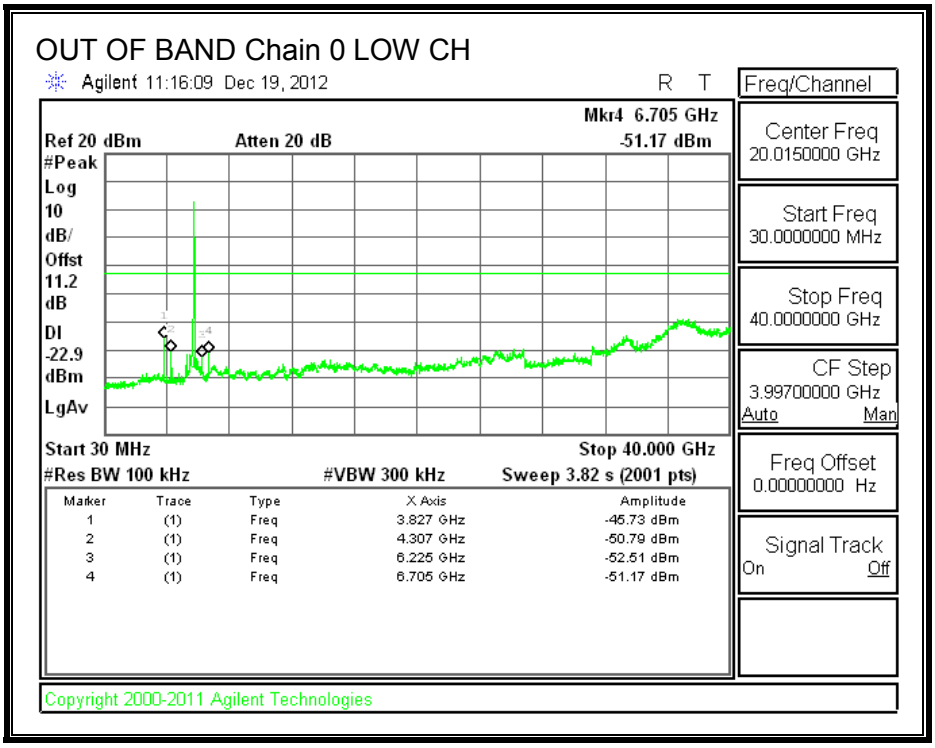
LOW CHANNEL BANDEDGE, Chain 0

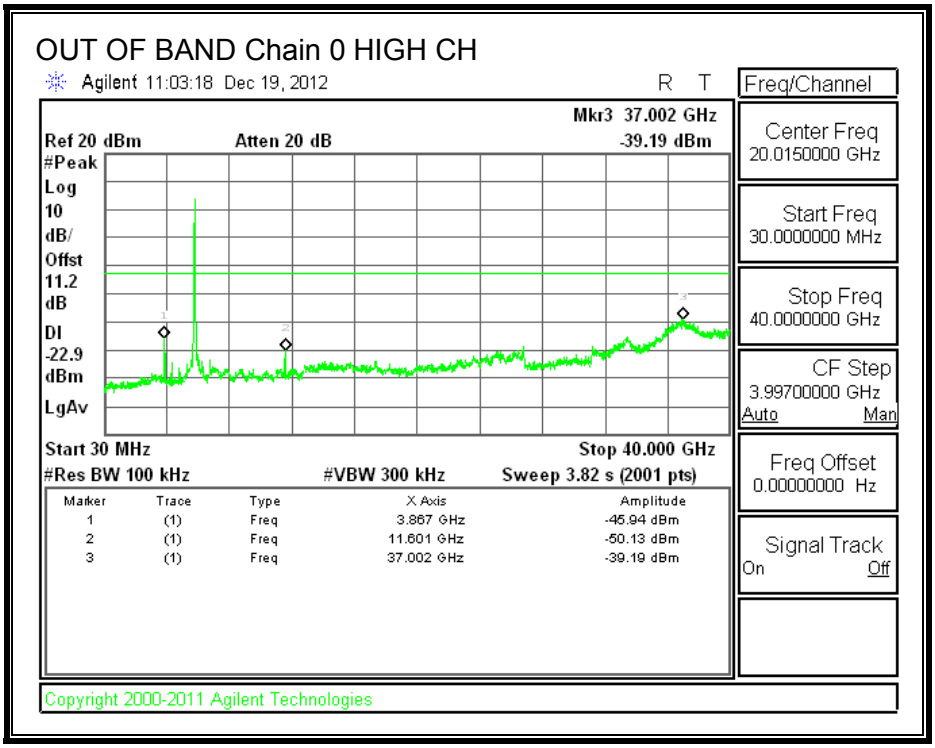


HIGH CHANNEL BANDEDGE, Chain 0

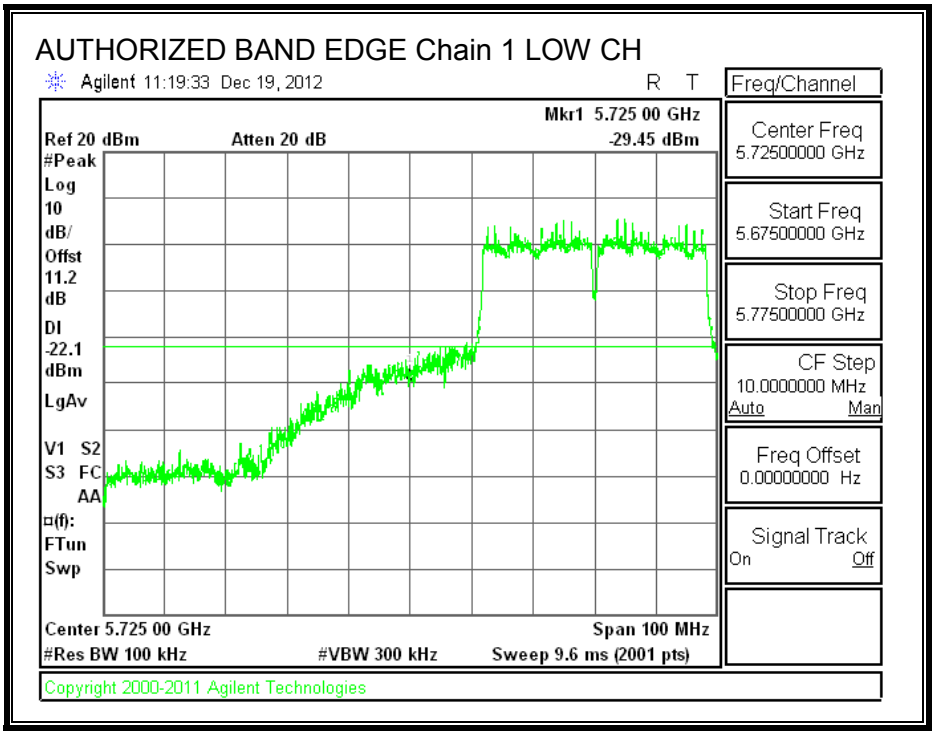


OUT-OF-BAND EMISSIONS, Chain 0

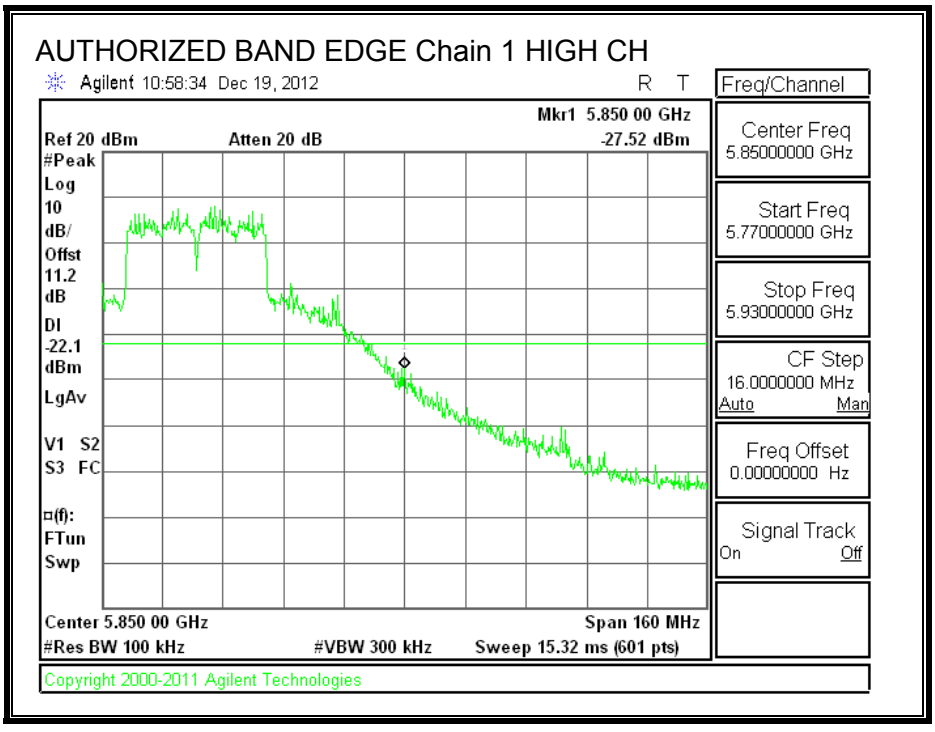




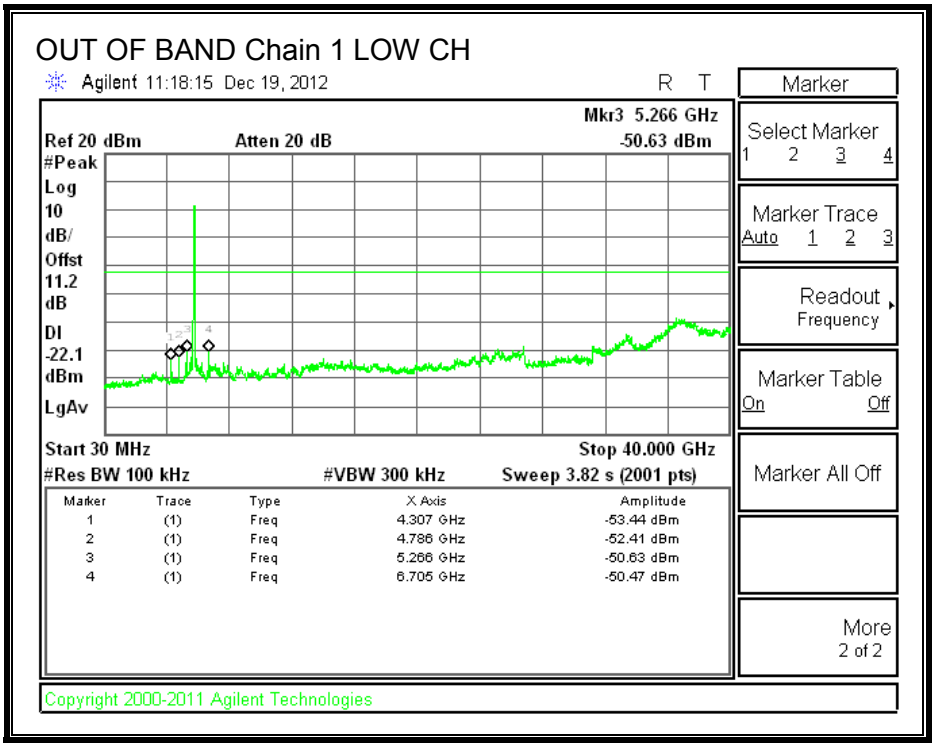
LOW CHANNEL BANDEDGE, Chain 1

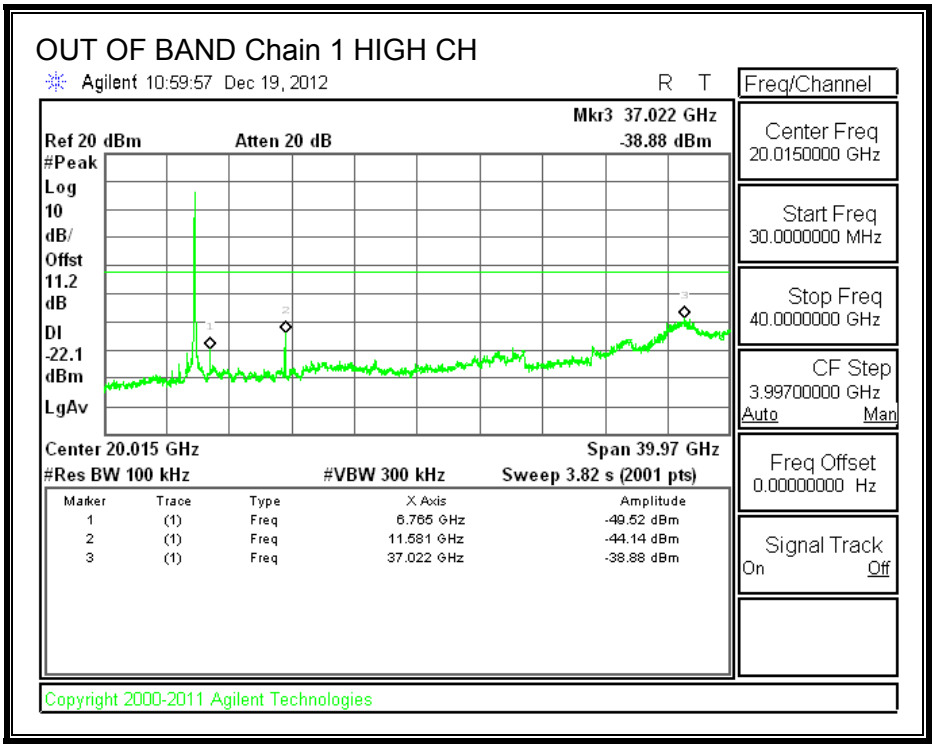


HIGH CHANNEL BANDEDGE, Chain 1

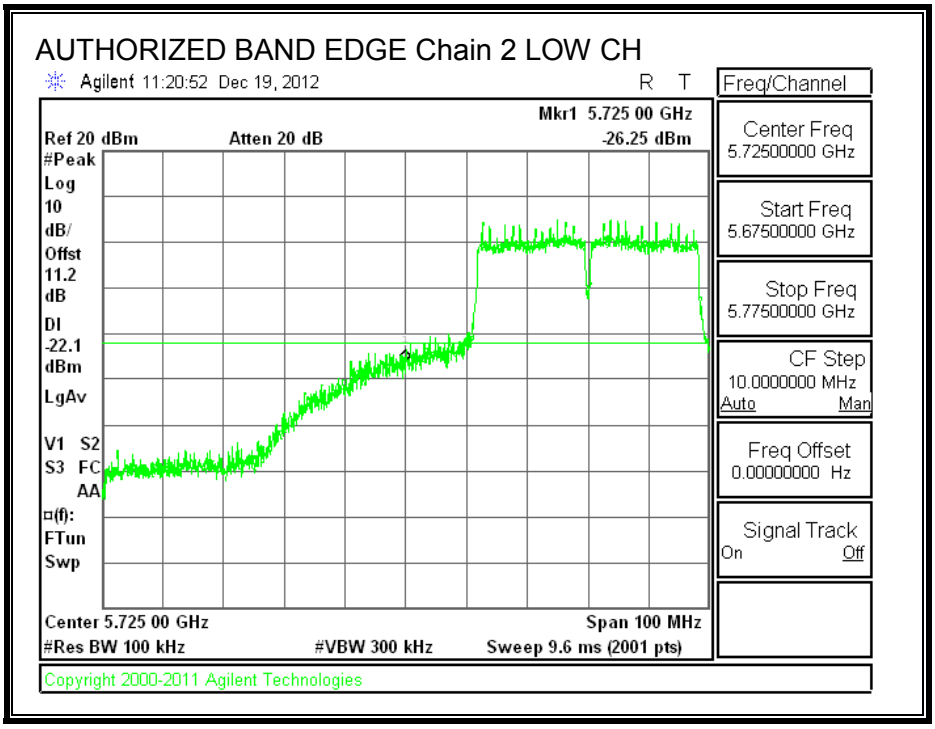


OUT-OF-BAND EMISSIONS, Chain 1

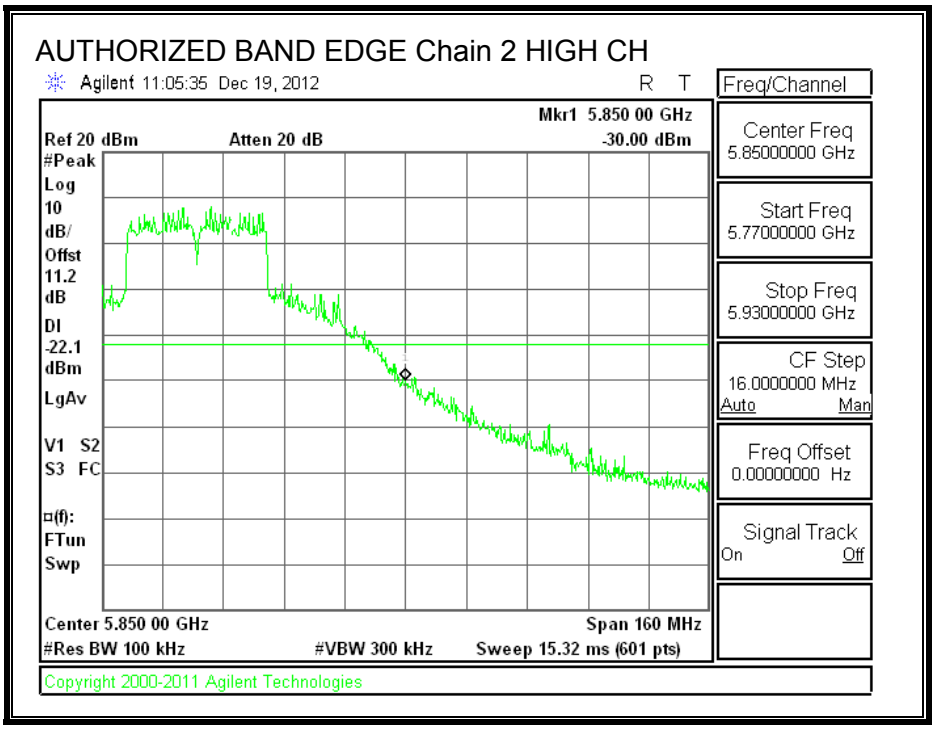




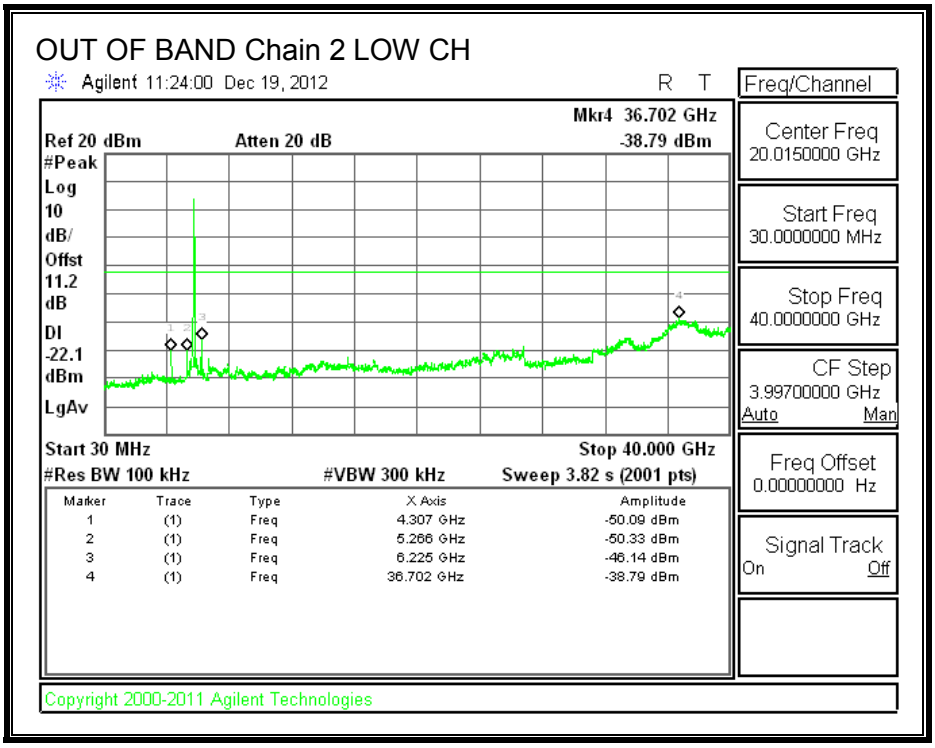
LOW CHANNEL BANDEDGE, Chain 2

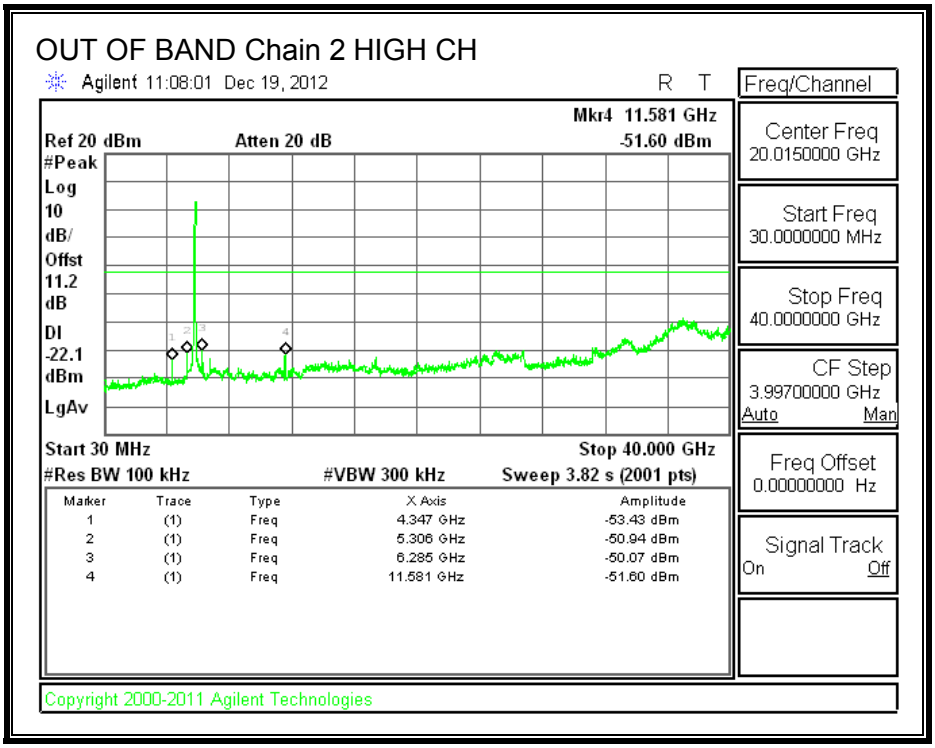


HIGH CHANNEL BANDEDGE, Chain 2



OUT-OF-BAND EMISSIONS, Chain 2





8.29. 802.11n AC80 1TX MODE IN THE 5.8 GHz BAND

Covered by testing HT80 CDD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

8.30. 802.11n AC80 CDD MCS0 2TX MODE IN THE 5.8 GHz BAND

Covered by testing HT80 CDD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

8.31. 802.11n AC80 BF 2TX MODE IN THE 5.8 GHz BAND

Covered by testing HT80 CDD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

8.32. 802.11n AC80 BF 3TX MODE IN THE 5.8 GHz BAND

Covered by testing HT80 CDD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

8.33. 802.11n AC80 3TX MODE IN THE 5.8 GHz BAND

8.33.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

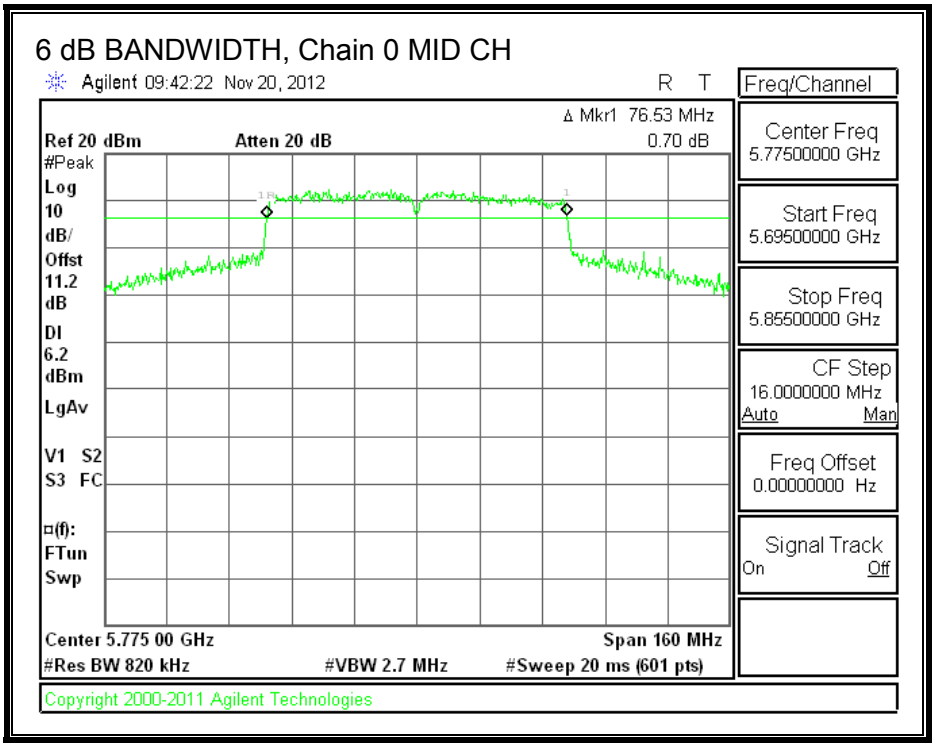
IC RSS-210 A8.2 (a)

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

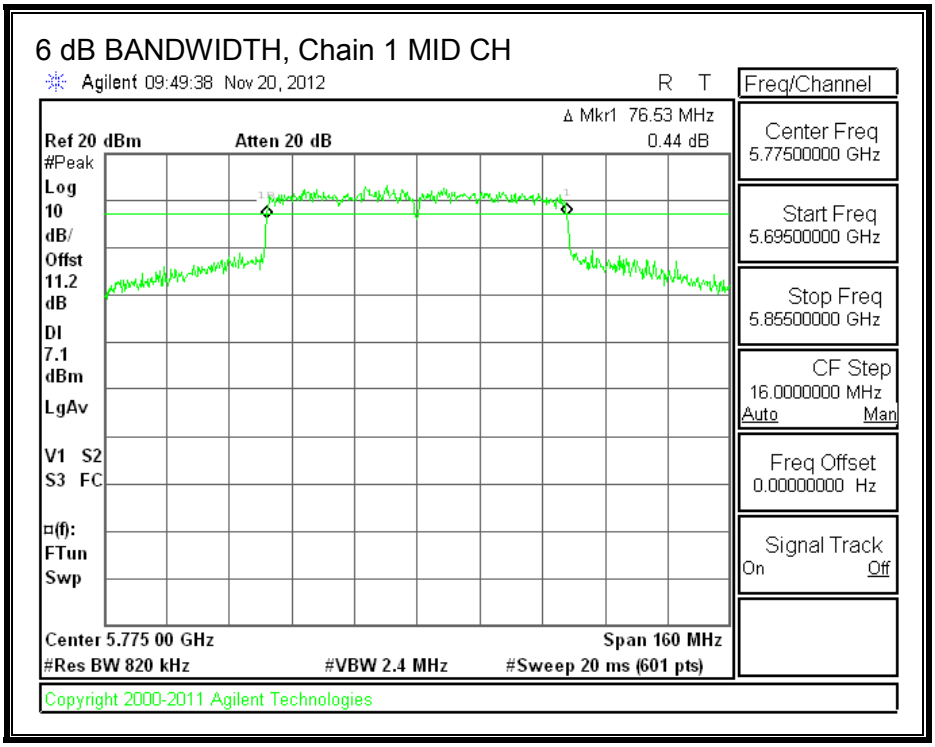
RESULTS

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	6 dB BW Chain 2 (MHz)	Minimum Limit (MHz)
Mid	5775	76.530	76.530	76.000	0.5

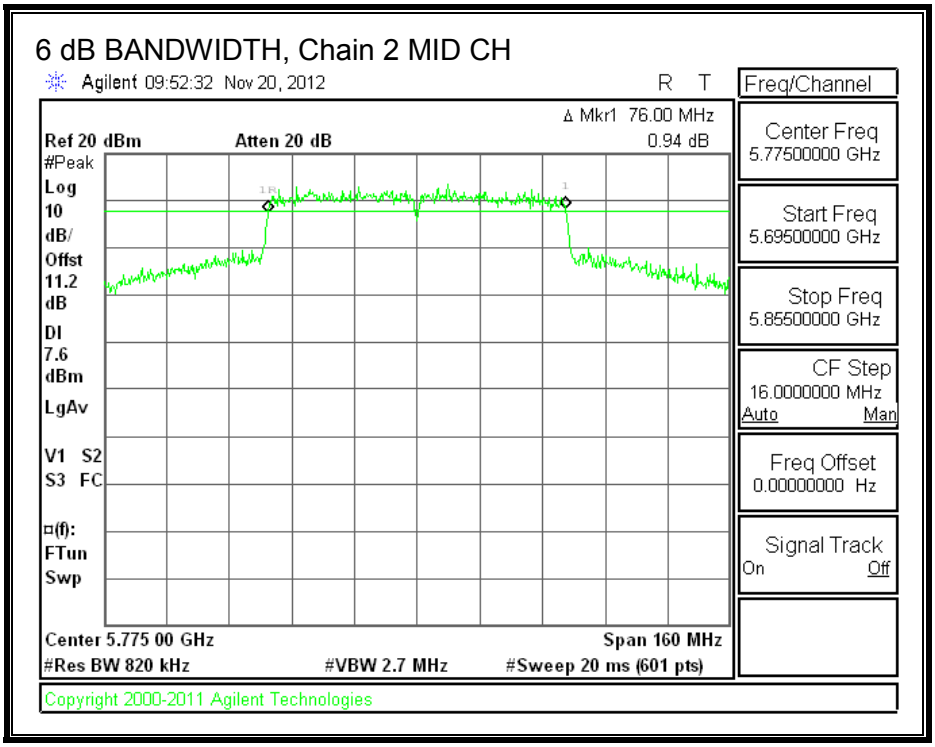
6 dB BANDWIDTH, Chain 0



6 dB BANDWIDTH, Chain 1



6 dB BANDWIDTH, Chain 2



8.33.2. 99% BANDWIDTH

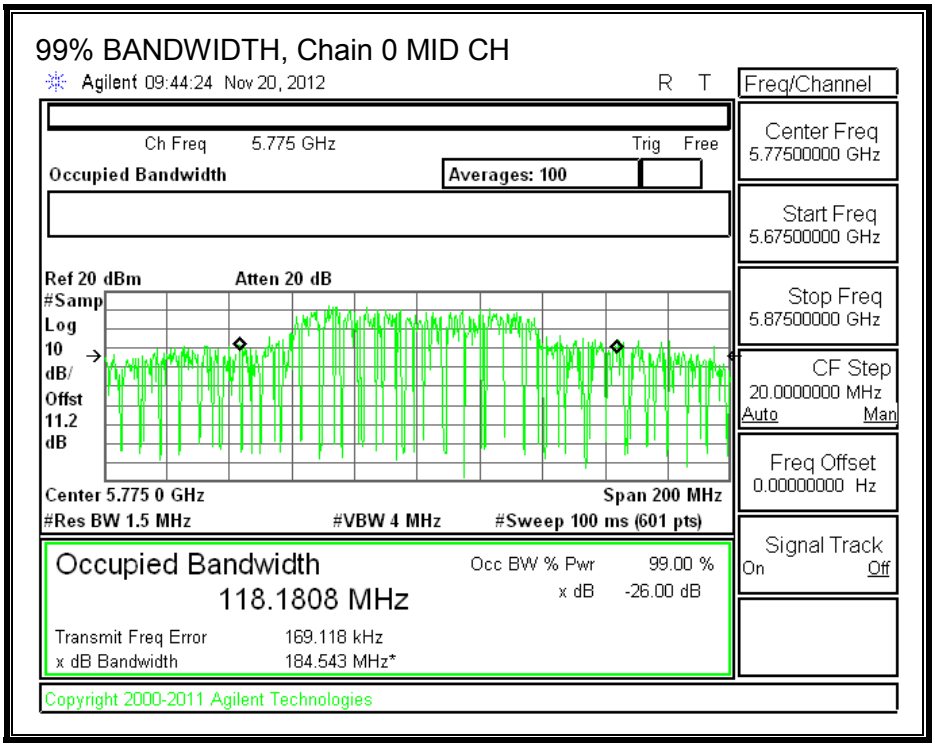
LIMITS

None; for reporting purposes only.

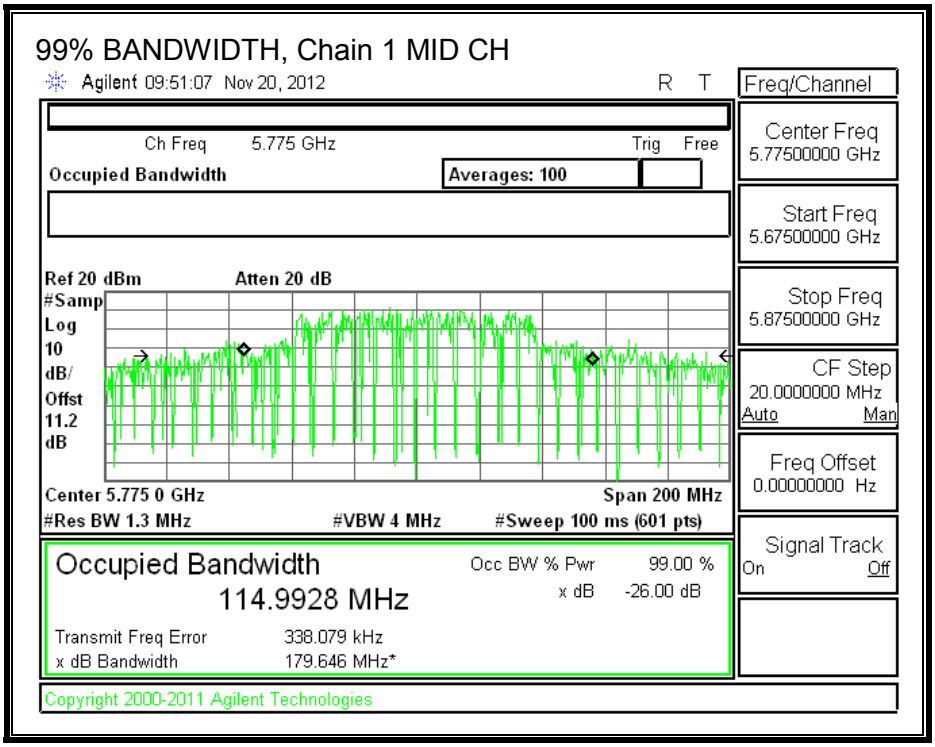
RESULTS

Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)	99% BW Chain 2 (MHz)
Mid	5775	118.1808	114.9928	123.9805

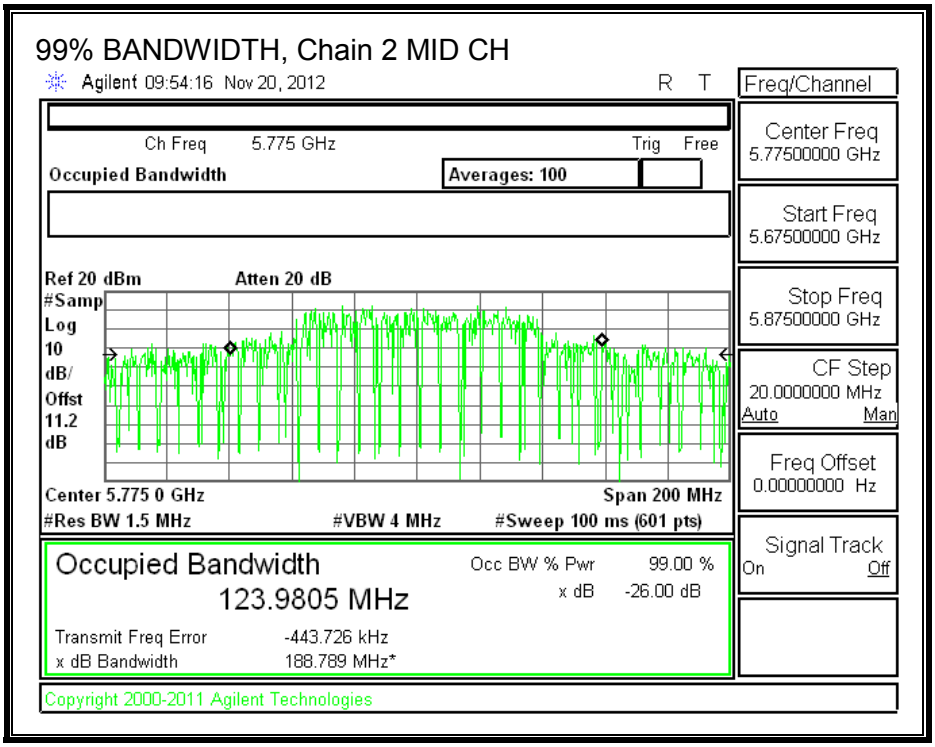
99% BANDWIDTH, Chain 0



99% BANDWIDTH, Chain 1



99% BANDWIDTH, Chain 2



8.33.3. 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 for output power consideration, and the antenna gain is unequal among the chains. The directional gain is:

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Chain 2 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
4.86	1.95	3.09	3.47

RESULTS

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Mid	5755	3.47	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Chain 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Mid	5755	17.43	16.78	17.04	21.86	30.00	-8.14

8.33.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247

IC RSS-210 A8.2

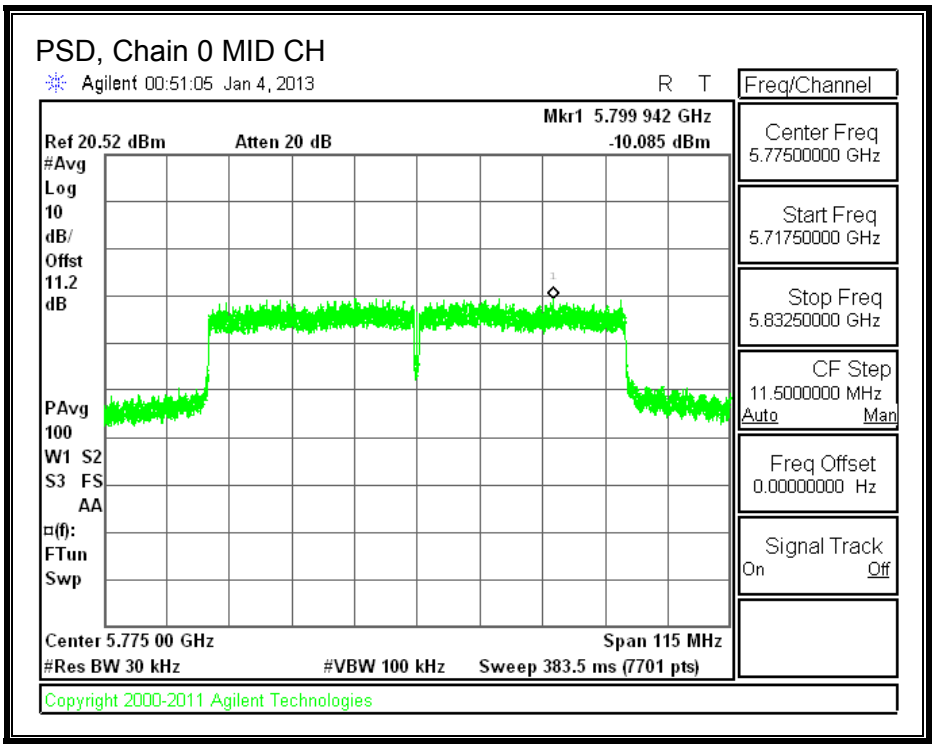
The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

RESULTS

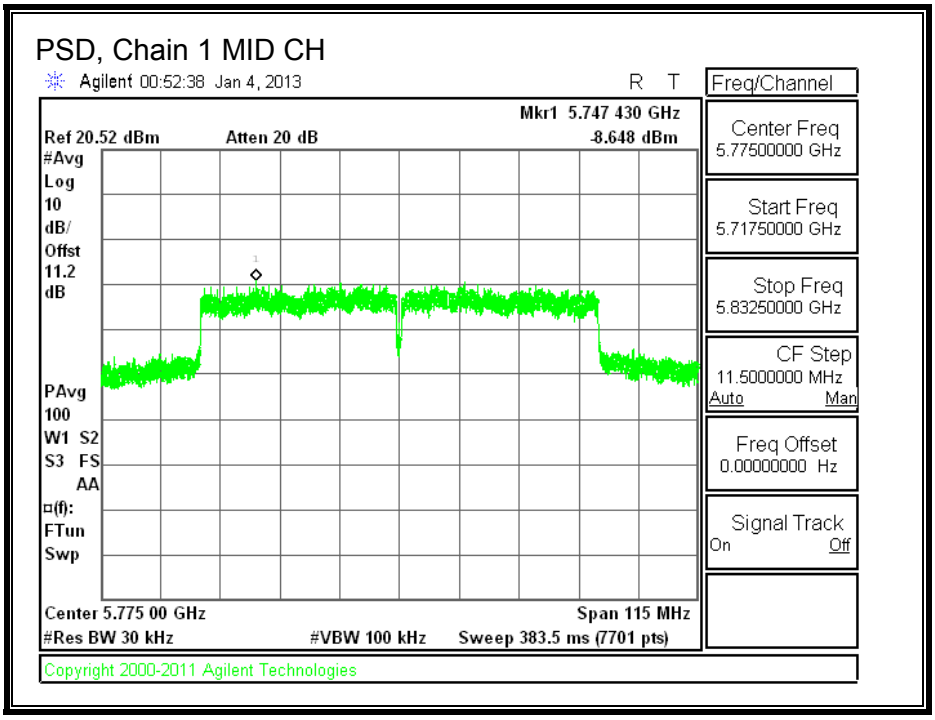
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Chain 1 Meas (dBm)	Chain 2 Meas (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Mid	5775	-10.085	-8.648	-8.431	-4.224	8.0	-12.224

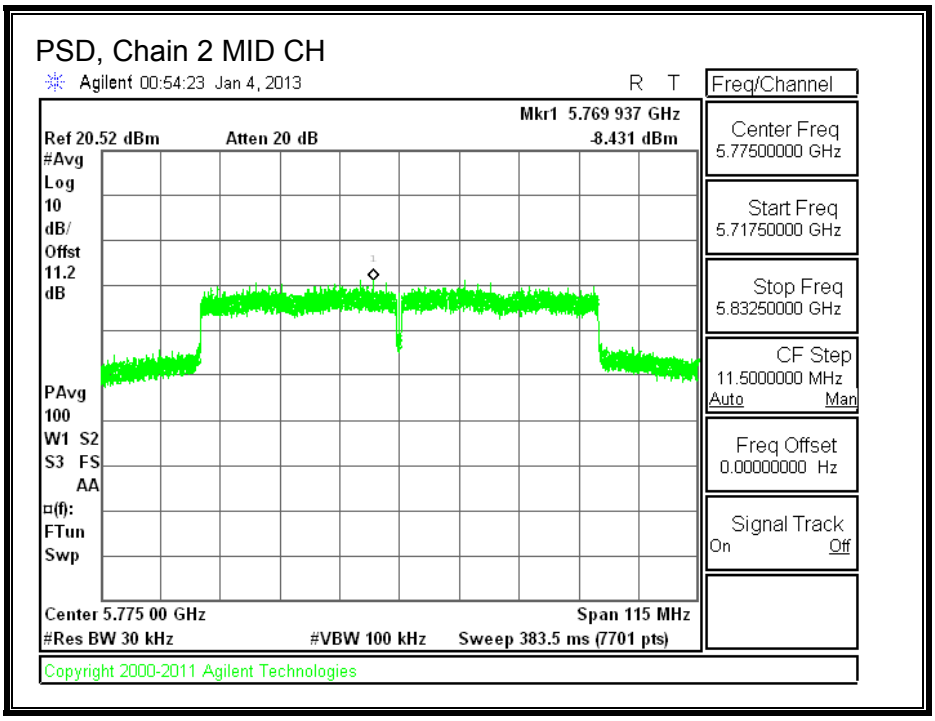
PSD, Chain 0



PSD, Chain 1



PSD, Chain 2



8.33.5. OUT-OF-BAND EMISSIONS

LIMITS

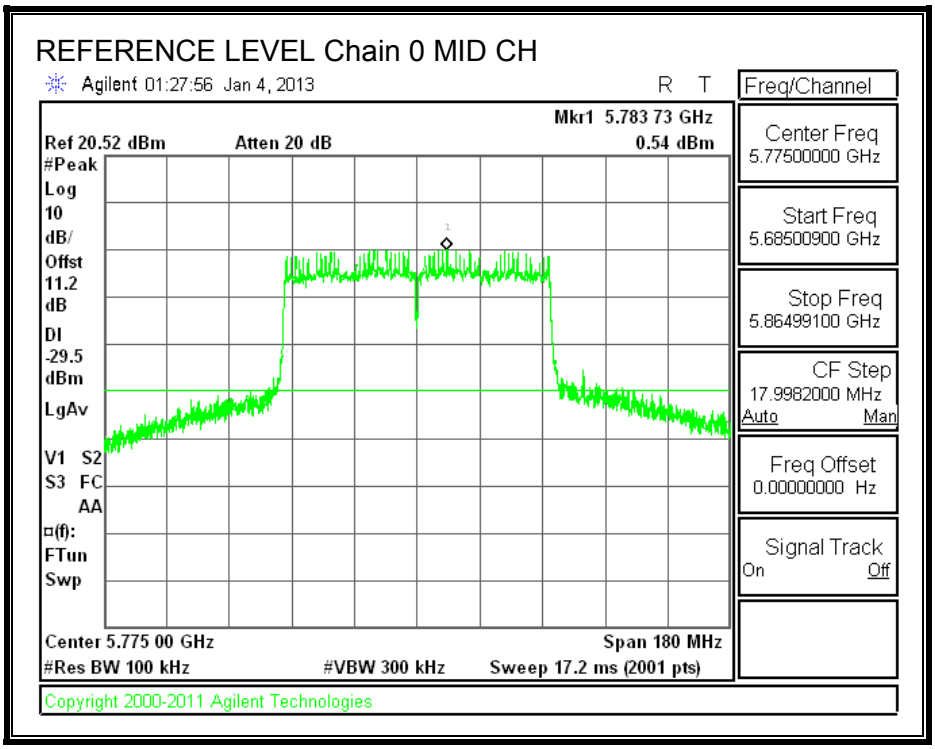
FCC §15.247 (d)

IC RSS-210 A8.5

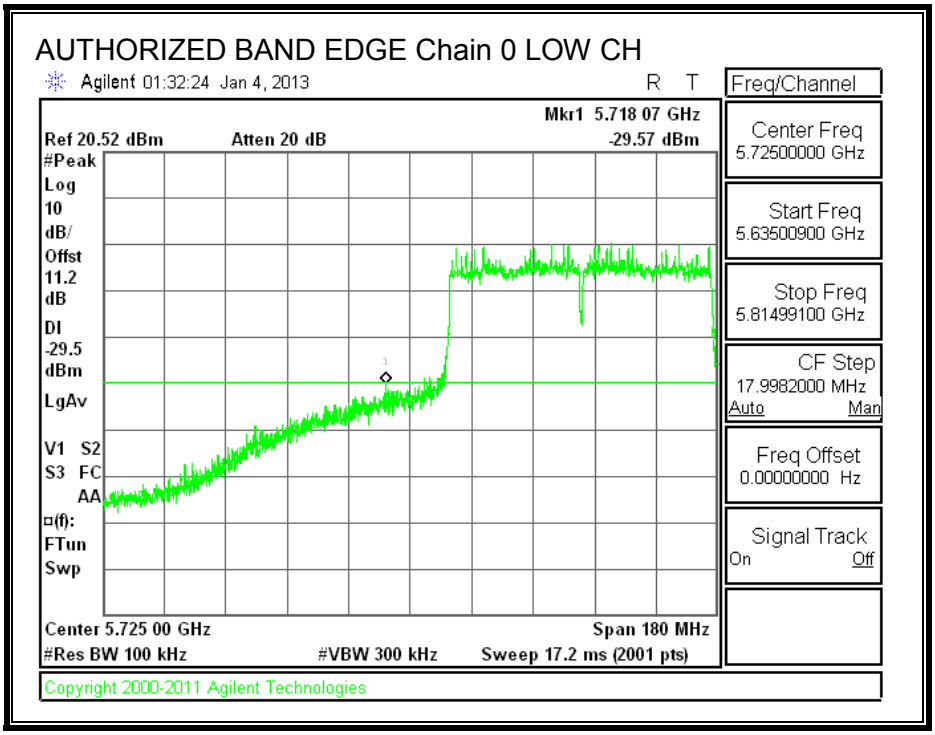
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the 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.

RESULTS

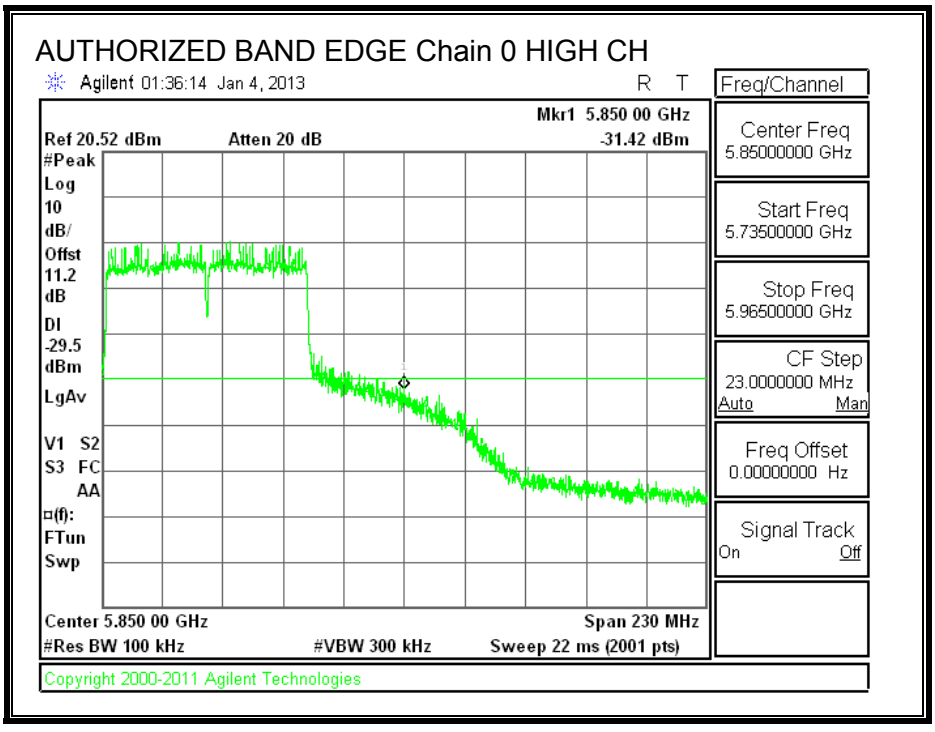
IN-BAND REFERENCE LEVEL, Chain 0



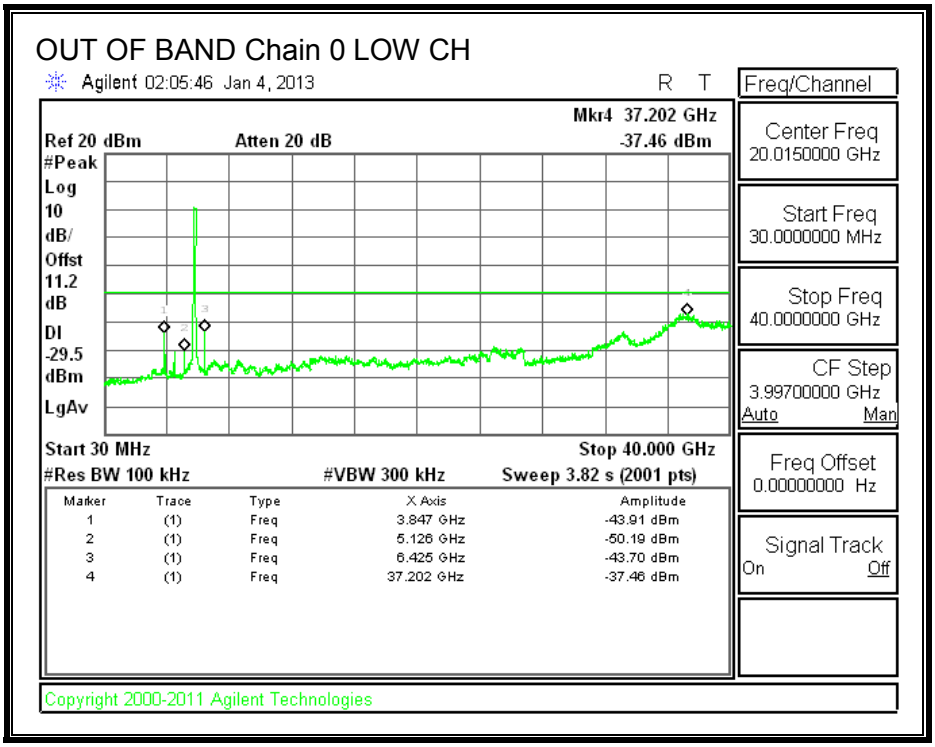
LOW CHANNEL BANDEDGE, Chain 0



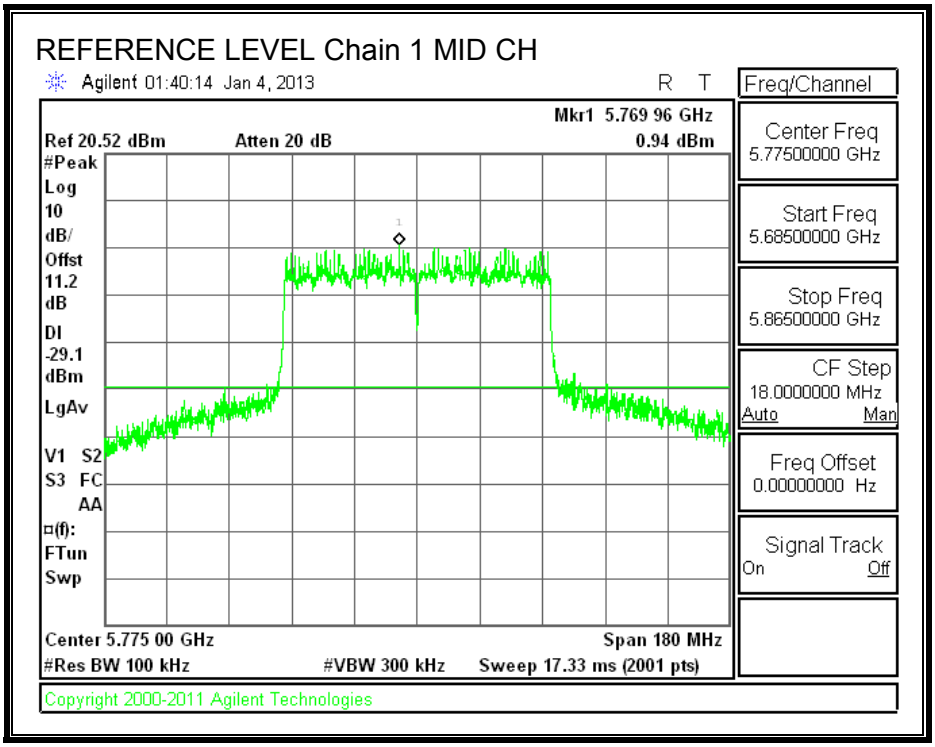
HIGH CHANNEL BANDEDGE, Chain 0



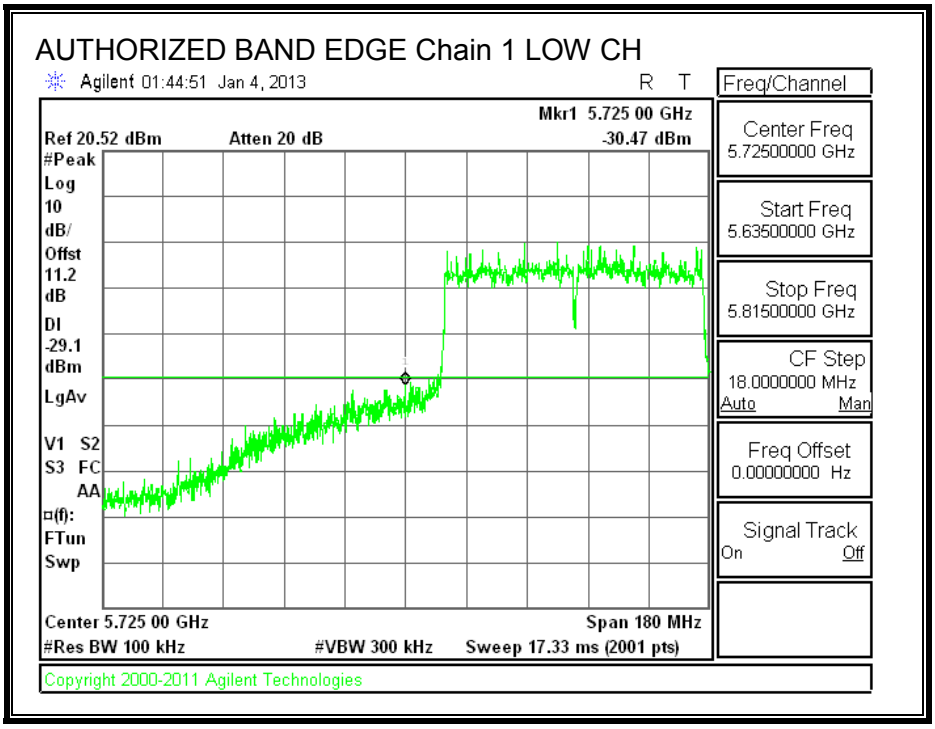
OUT-OF-BAND EMISSIONS, Chain 0



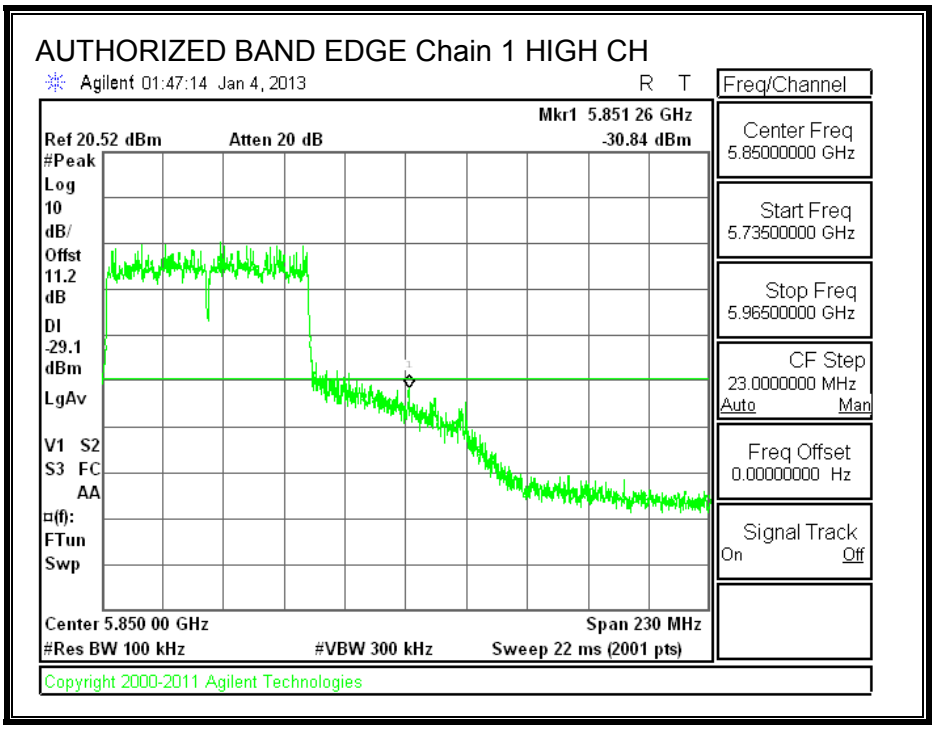
IN-BAND REFERENCE LEVEL, Chain 1



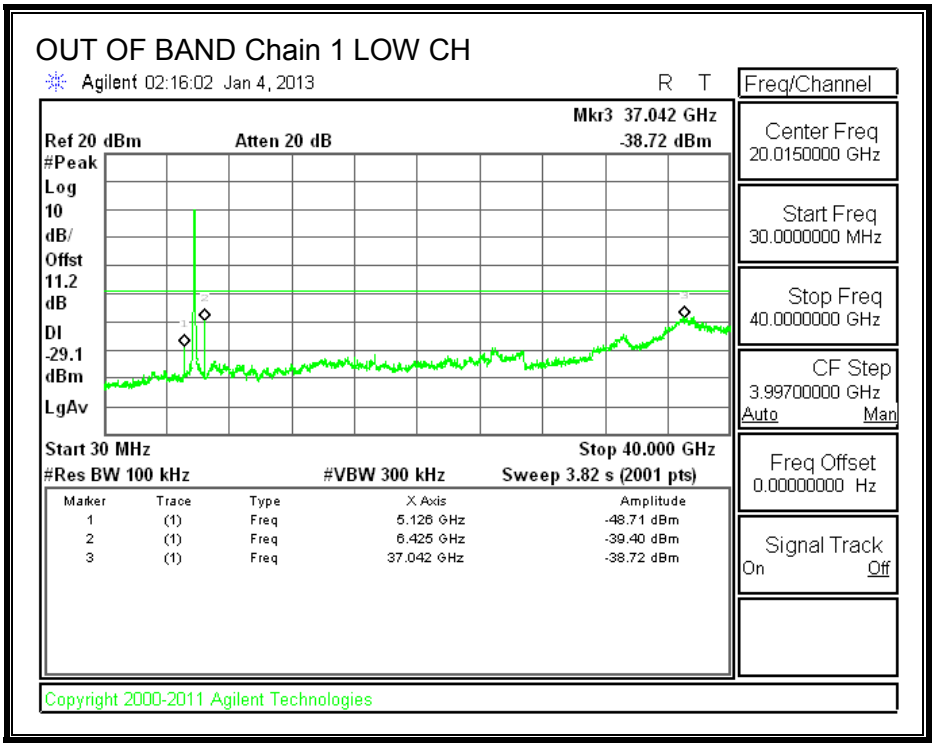
LOW CHANNEL BANDEDGE, Chain 1



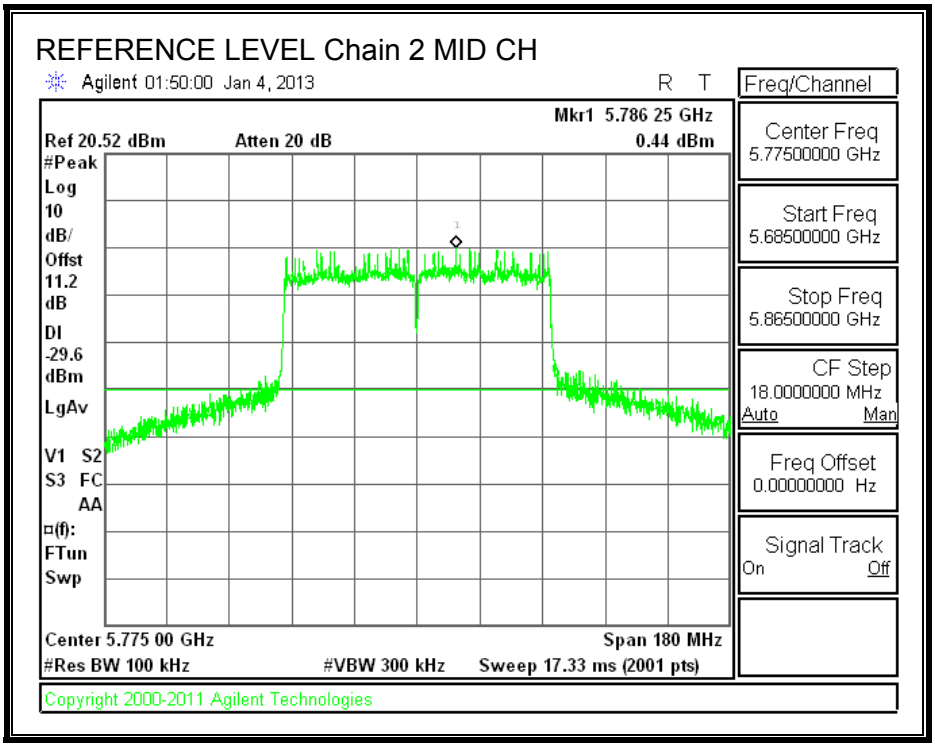
HIGH CHANNEL BANDEDGE, Chain 1



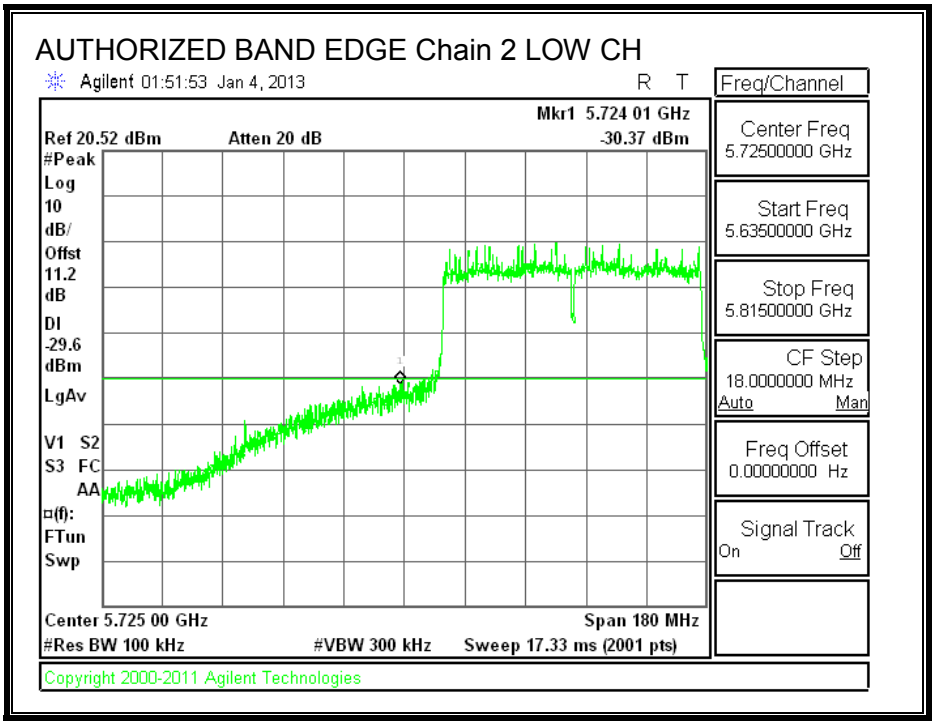
OUT-OF-BAND EMISSIONS, Chain 1



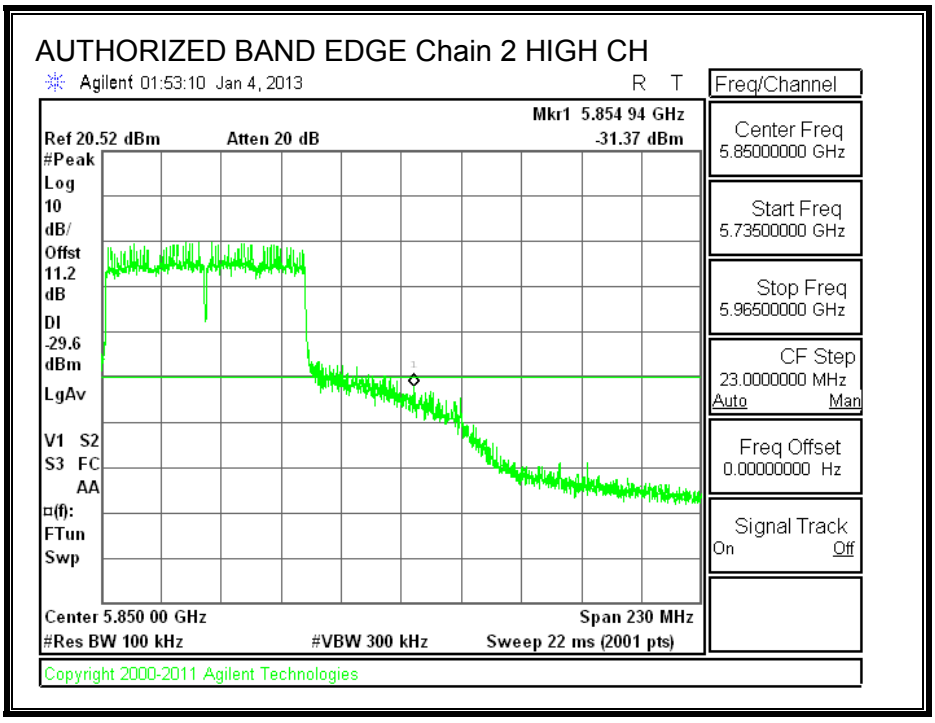
IN-BAND REFERENCE LEVEL, Chain 2



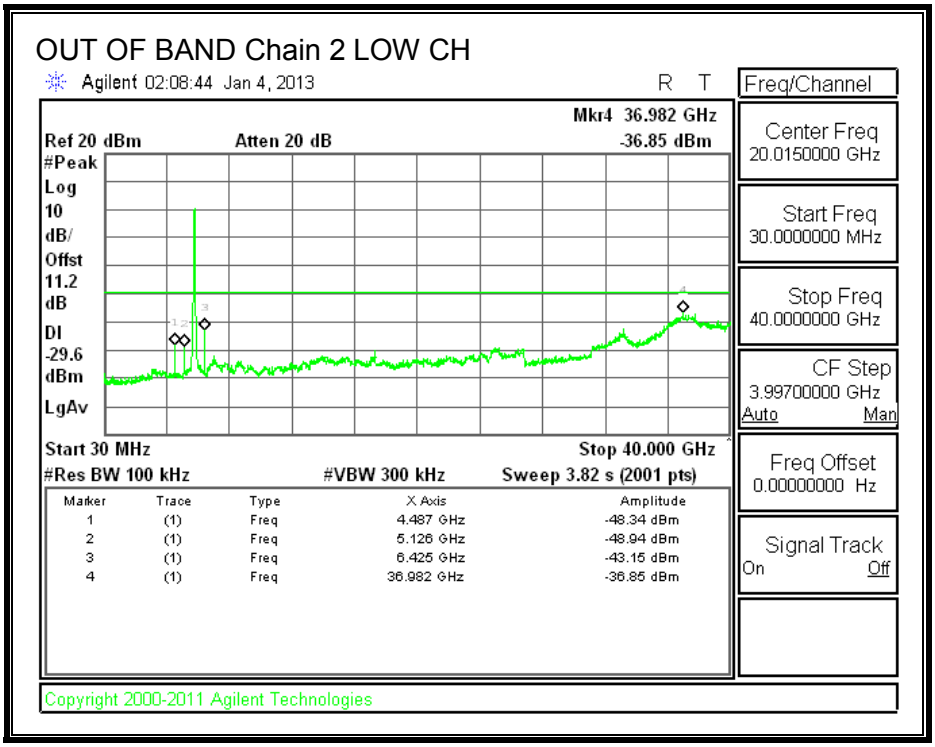
LOW CHANNEL BANDEDGE, Chain 2



HIGH CHANNEL BANDEDGE, Chain 2



OUT-OF-BAND EMISSIONS, Chain 2



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.

9.2. TRANSMITTER ABOVE 1 GHz

9.2.1. 802.11b 1TX MODE, 2.4 GHz BAND

Covered by testing 802.11b 3TX CDD mode, total power across all three chains is higher than the power level the device will operate at.

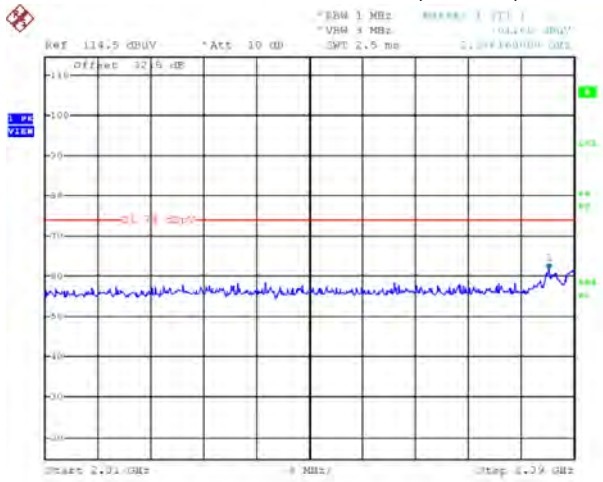
9.2.2. 802.11b 2TX CDD MODE, 2.4 GHz BAND

Covered by testing 802.11b 3TX CDD mode, total power across all three chains is higher than the power level the device will operate at.

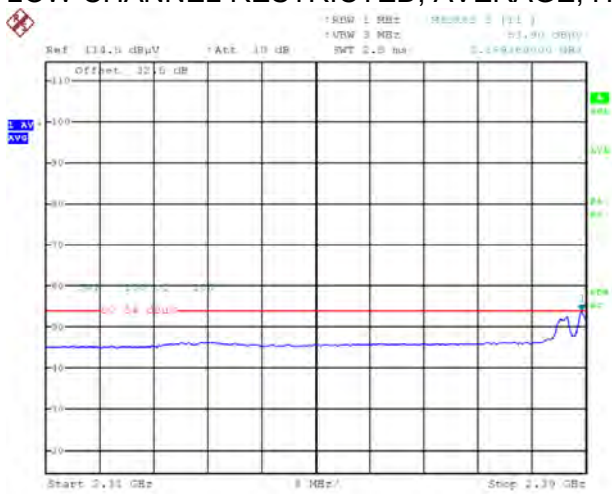
9.2.3. 802.11b 3TX CDD MODE, 2.4 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)

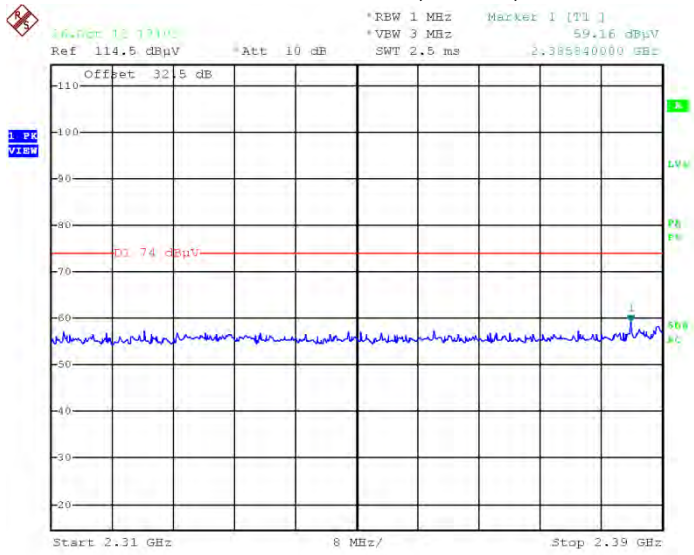
LOW CHANNEL RESTRICTED, PEAK, HORIZ



LOW CHANNEL RESTRICTED, AVERAGE, HORIZ

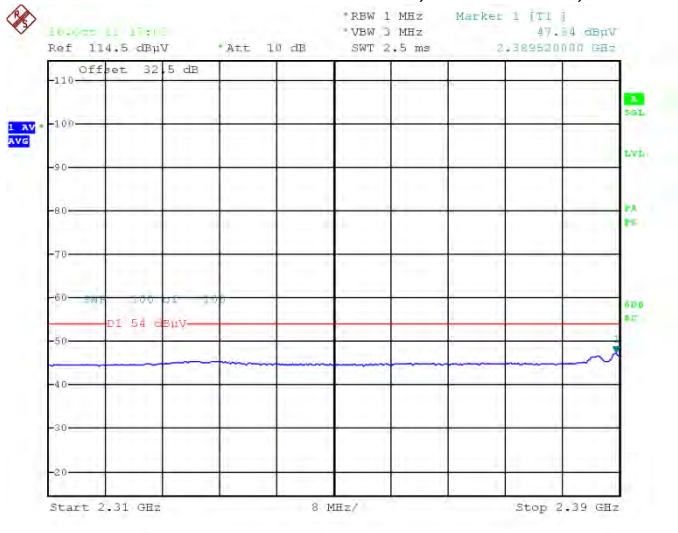


LOW CHANNEL RESTRICTED, PEAK, VERT



Date: 26.OCT.2012 17:03:15

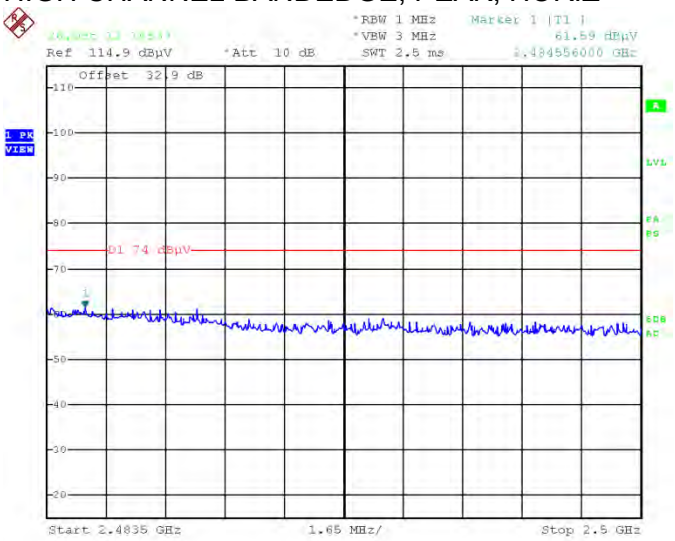
LOW CHANNEL RESTRICTED, AVERAGE, VERT



Date: 26.OCT.2012 17:03:49

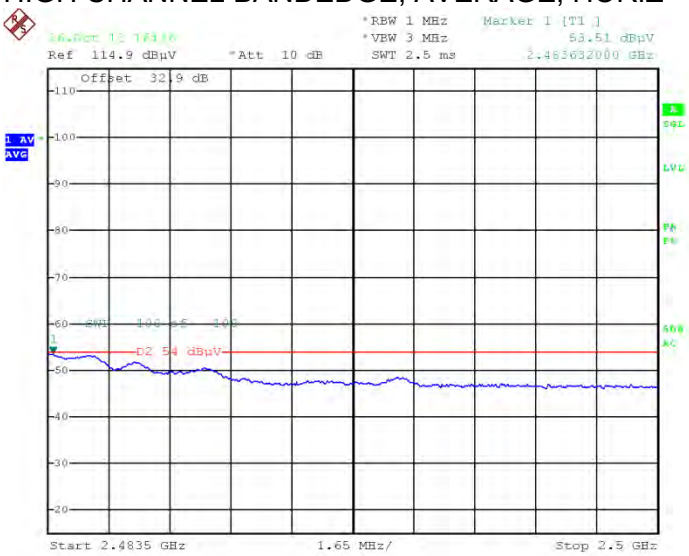
AUTHORIZED BANDEDGE (HIGH CHANNEL)

HIGH CHANNEL BANDEDGE, PEAK, HORIZ



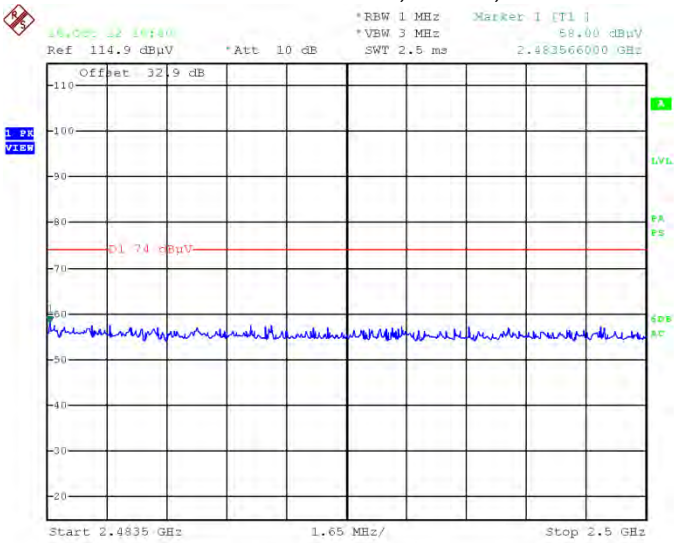
Date: 26.OCT.2012 16:37:23

HIGH CHANNEL BANDEDGE, AVERAGE, HORIZ

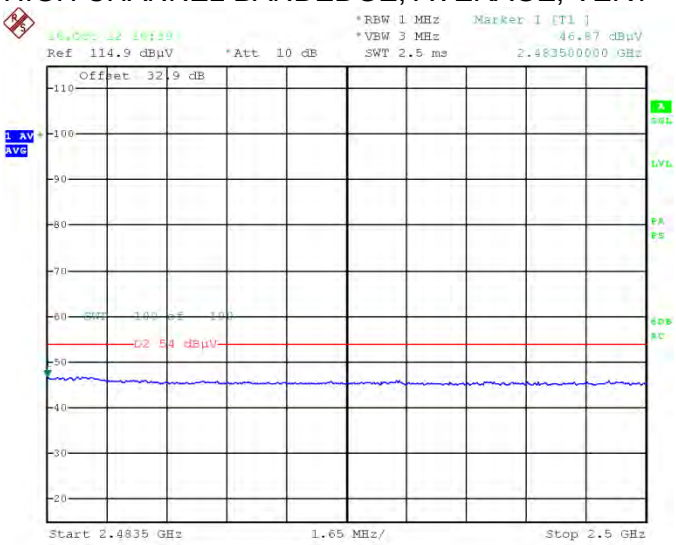


Date: 26.OCT.2012 16:36:14

HIGH CHANNEL BANDEDGE, PEAK, VERT



HIGH CHANNEL BANDEDGE, AVERAGE, VERT



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber-A

Company: Broadcom
Project #: 12U14669
Date: 12/4/2012
Test Engineer: D. Garcia
Configuration: EUT, Adapter Board, Antenna
Mode: 11b 3TX mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931		T39; ARA 18-26GHz; S/N:1013	FCC 15.205

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500		R_001

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Channel (2412.0 MHz)															
4.824	3.0	48.2	44.4	33.4	6.2	-35.5	0.0	0.0	52.4	48.5	74	54	-21.6	-5.5	H
4.824	3.0	47.2	42.1	33.4	6.2	-35.5	0.0	0.0	51.4	46.3	74	54	-22.6	-7.7	V
Mid Channel (2437.0 MHz)															
2.211	3.0	56.1	52.6	28.0	4.1	-37.2	0.0	0.0	51.0	47.5	74	54	-23.0	-6.5	H
4.874	3.0	50.4	48.8	33.5	6.2	-35.5	0.0	0.0	54.6	53.1	74	54	-19.4	-0.9	H
7.311	3.0	46.8	43.7	35.7	8.4	-35.4	0.0	0.0	55.5	52.3	74	54	-18.5	-1.7	H
12.185	3.0	41.5	37.8	39.3	11.3	-35.3	0.0	0.0	56.8	53.1	74	54	-17.2	-0.9	H
2.211	3.0	53.9	51.5	28.0	4.1	-37.2	0.0	0.0	48.9	46.4	74	54	-25.1	-7.6	V
4.874	3.0	48.1	46.9	33.5	6.2	-35.5	0.0	0.0	52.3	51.1	74	54	-21.7	-2.9	V
7.311	3.0	44.3	42.3	35.7	8.4	-35.4	0.0	0.0	52.9	51.0	74	54	-21.1	-3.0	V
12.185	3.0	41.5	37.9	39.3	11.3	-35.3	0.0	0.0	56.8	53.2	74	54	-17.2	-0.8	V
High Channel (2462 MHz)															
4.924	3.0	50.3	47.8	33.5	6.3	-35.5	0.0	0.0	54.7	52.1	74	54	-19.3	-1.9	H
7.386	3.0	45.7	42.9	35.8	8.4	-35.5	0.0	0.0	54.5	51.7	74	54	-19.5	-2.3	H
4.924	3.0	48.9	44.2	33.5	6.3	-35.5	0.0	0.0	53.2	48.6	74	54	-20.8	-5.4	V
7.386	3.0	44.2	42.0	35.8	8.4	-35.5	0.0	0.0	53.0	50.7	74	54	-21.0	-3.3	V

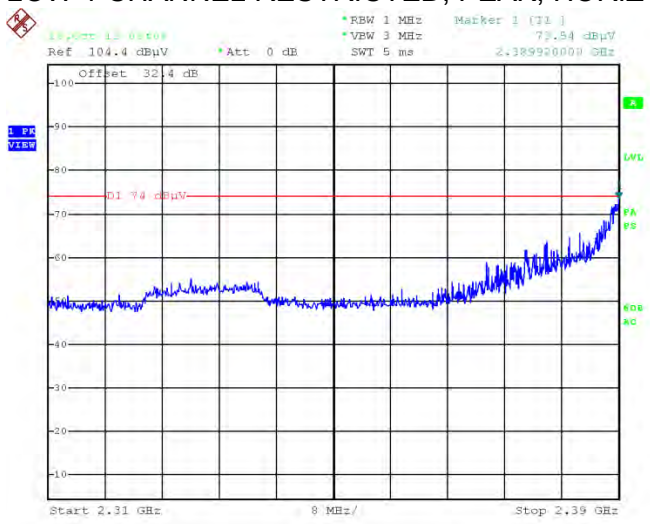
Rev. 11.10.11

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

9.2.4. 802.11g 1TX MODE, 2.4 GHz BAND

RESTRICTED BANDEDGE (LOW 1 CHANNEL)

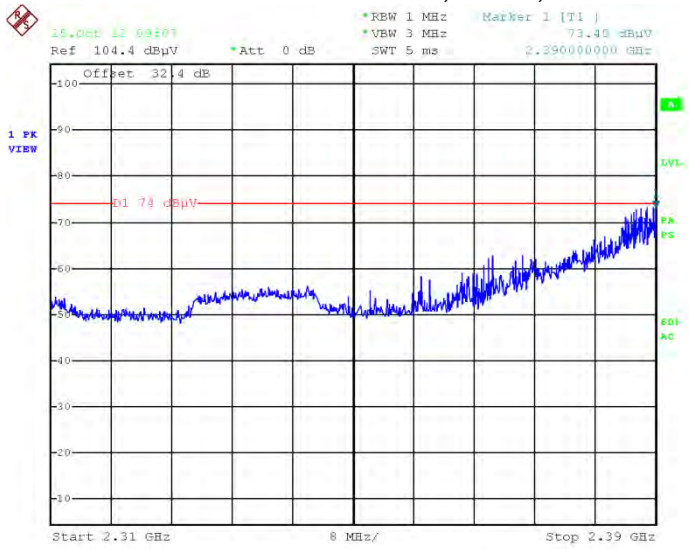
LOW 1 CHANNEL RESTRICTED, PEAK, HORIZ



LOW 1 CHANNEL RESTRICTED, AVERAGE, HORIZ

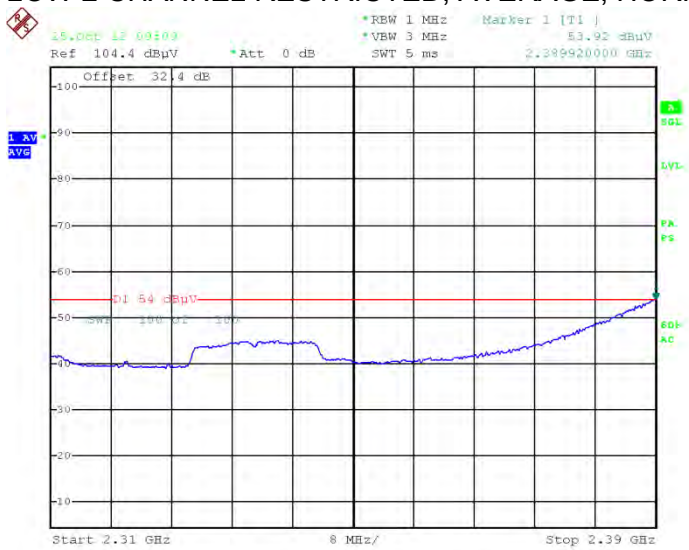
RESTRICTED BANDEDGE (LOW 2 CHANNEL)

LOW 2 CHANNEL RESTRICTED, PEAK, HORIZ



Date: 25.OCT.2012 09:07:20

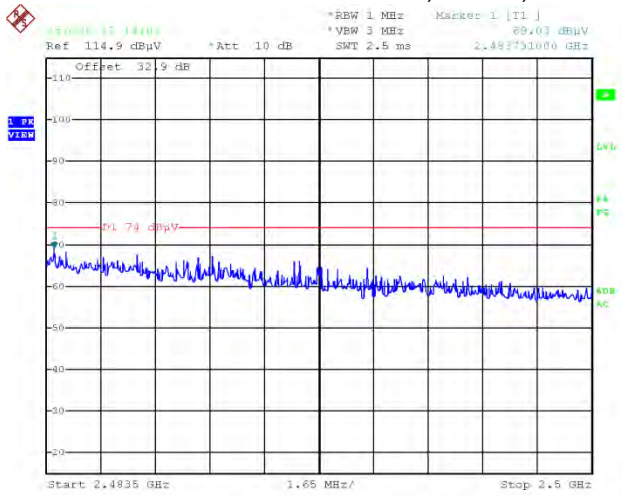
LOW 2 CHANNEL RESTRICTED, AVERAGE, HORIZ



Date: 25.OCT.2012 09:09:43

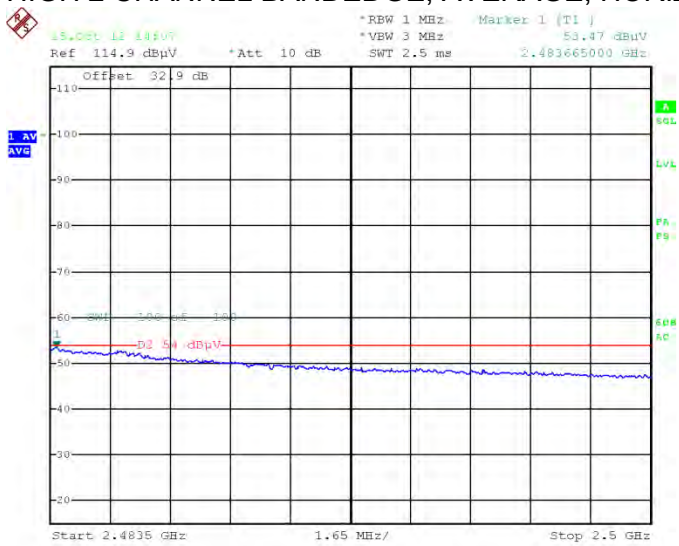
AUTHORIZED BANDEDGE (HIGH 2 CHANNEL)

HIGH 2 CHANNEL BANDEDGE, PEAK, HORIZ



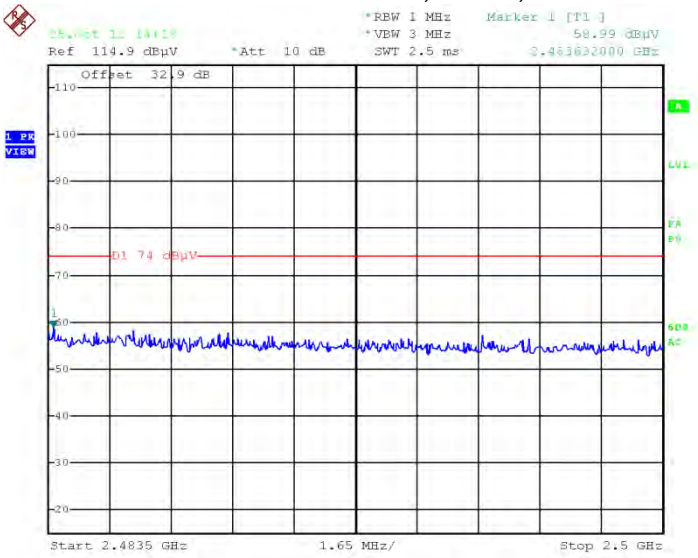
Date: 25.OCT.2012 14:09:25

HIGH 2 CHANNEL BANDEDGE, AVERAGE, HORIZ



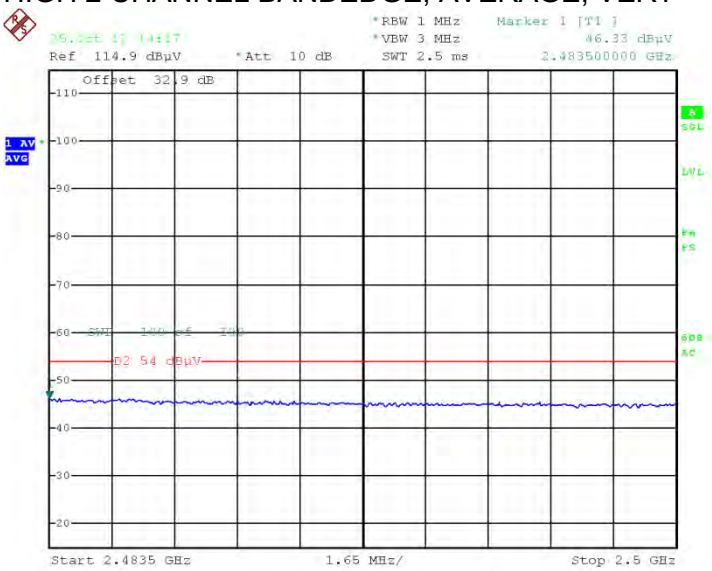
Date: 25.OCT.2012 14:07:52

HIGH 2 CHANNEL BANDEDGE, PEAK, VERT



Date: 25.OCT.2012 14:18:50

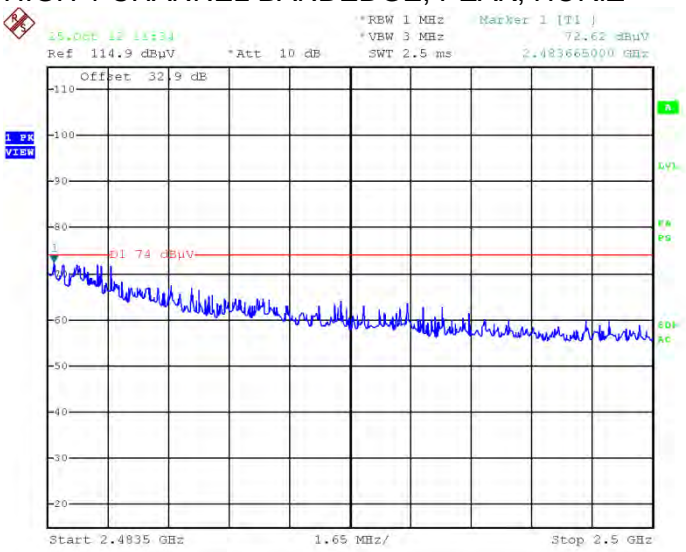
HIGH 2 CHANNEL BANDEDGE, AVERAGE, VERT



Date: 25.OCT.2012 14:17:15

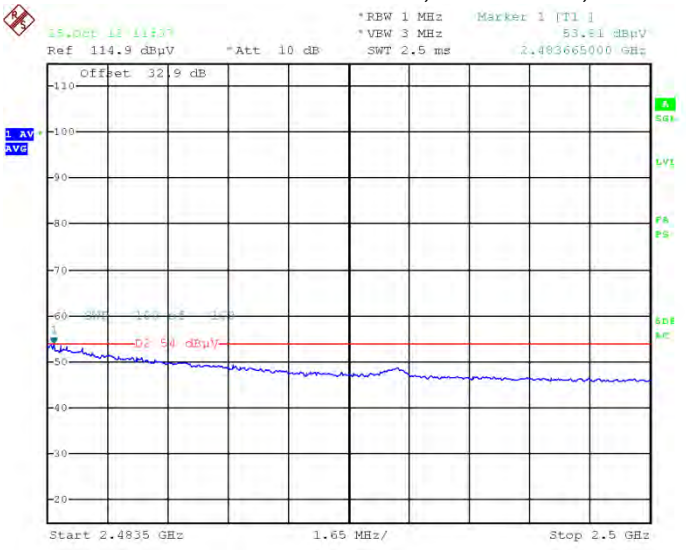
AUTHORIZED BANDEDGE (HIGH 1 CHANNEL)

HIGH 1 CHANNEL BANDEDGE, PEAK, HORIZ



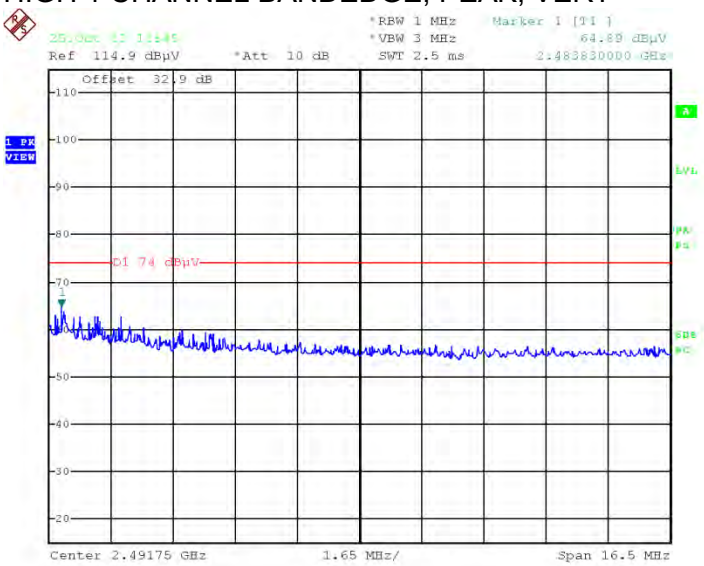
Date: 25.OCT.2012 11:34:35

HIGH 1 CHANNEL BANDEDGE, AVERAGE, HORIZ



Date: 25.OCT.2012 11:37:25

HIGH 1 CHANNEL BANDEDGE, PEAK, VERT



Date: 25.OCT.2012 13:45:19

HIGH 1 CHANNEL BANDEDGE, AVERAGE, VERT

Date: 25.OCT.2012 11:44:37

HARMONICS AND SPURIOUS EMISSIONS

Covered by testing to HT20 CDD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

9.2.5. 802.11g 2TX MODE, 2.4 GHz BAND

Covered by testing 11n HT20 CDD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

9.2.6. 802.11g 3TX MODE, 2.4 GHz BAND

Covered by testing 11n HT20 CCD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

9.2.7. 802.11g Beam-Forming 2TX MODE, 2.4 GHz BAND

Covered by testing 11n AC20 CCD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

9.2.8. 802.11g Beam-Forming 3TX MODE, 2.4 GHz BAND

Covered by testing 11n AC20 CCD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

9.2.9. 802.11n HT20 1TX MODE, 2.4 GHz BAND

Covered by testing 11n HT20 CCD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

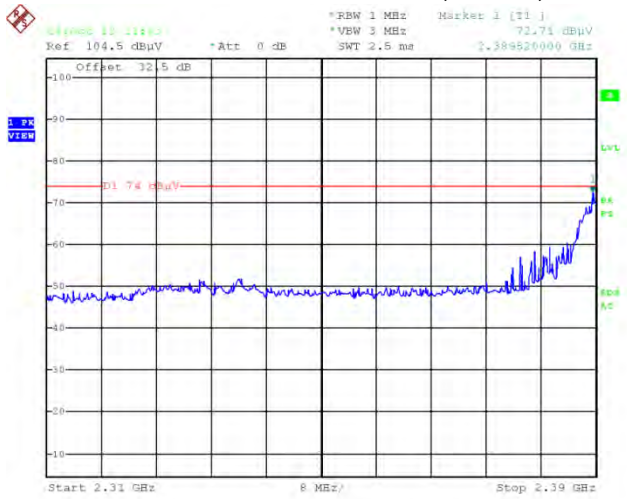
9.2.10. 802.11n HT20 2TX MODE, 2.4 GHz BAND

Covered by testing 11n HT20 CCD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

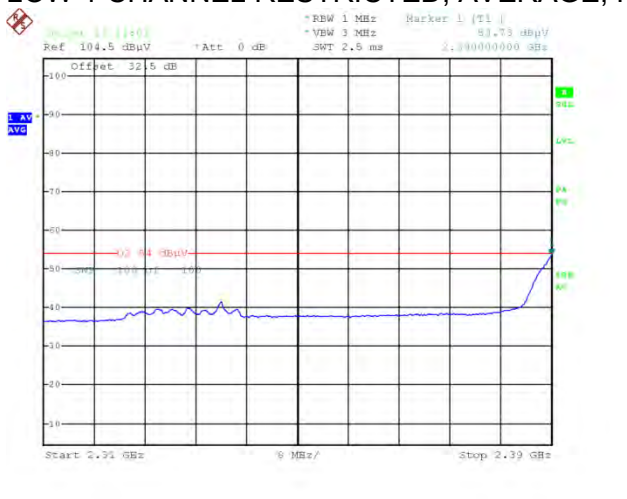
9.2.11. 802.11n HT20 CDD 3TX MODE, 2.4 GHz BAND

RESTRICTED BANDEDGE (LOW 1 CHANNEL)

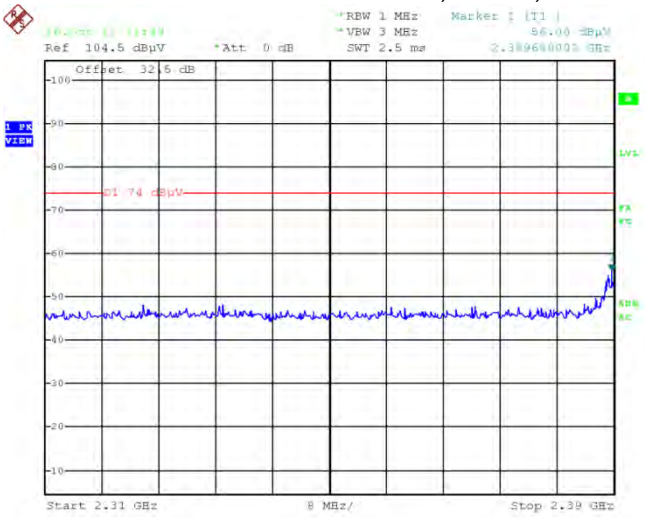
LOW 1 CHANNEL RESTRICTED, PEAK, HORIZ



LOW 1 CHANNEL RESTRICTED, AVERAGE, HORIZ

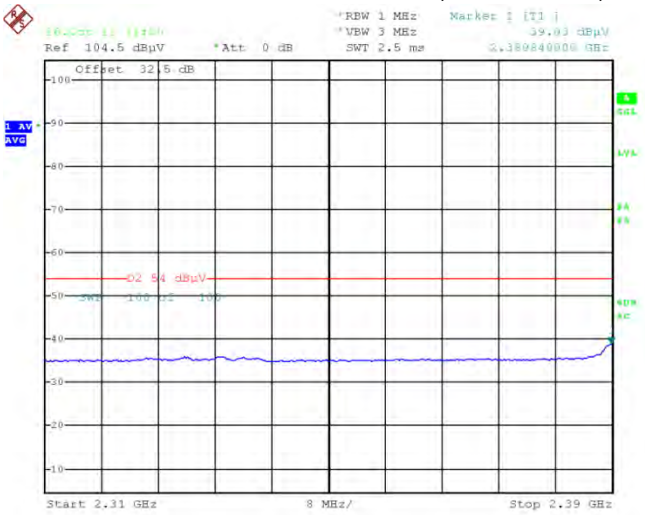


LOW 1 CHANNEL RESTRICTED, PEAK, VERT



Date: 26.OCT.2012 11:49:45

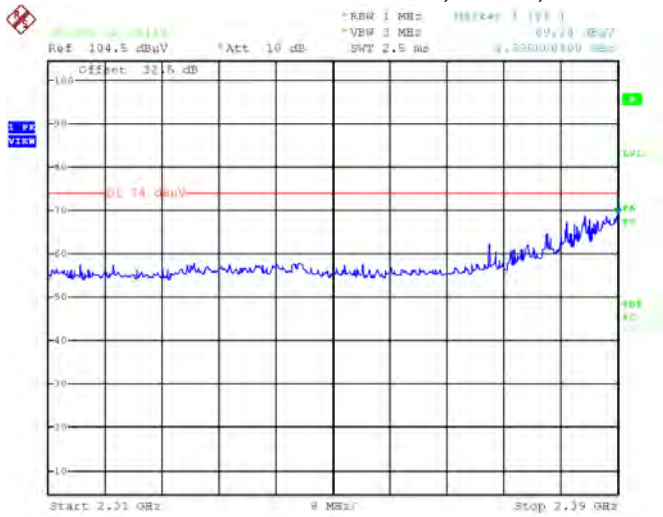
LOW 1 CHANNEL RESTRICTED, AVERAGE, VERT



Date: 26.OCT.2012 11:50:37

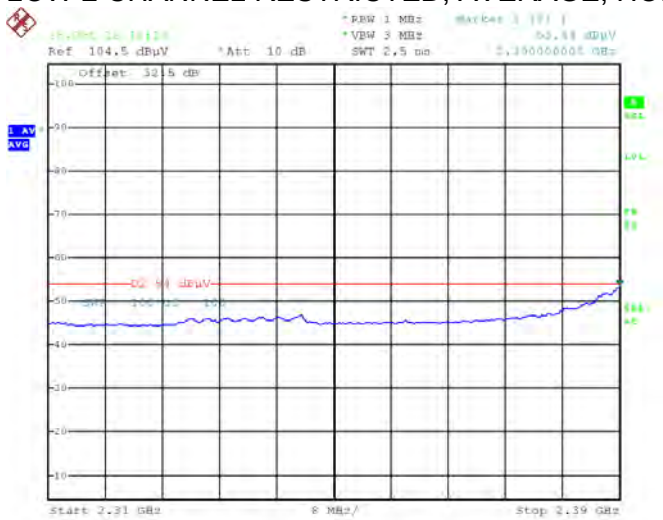
RESTRICTED BANDEDGE (LOW 2 CHANNEL)

LOW 2 CHANNEL RESTRICTED, PEAK, HORIZ



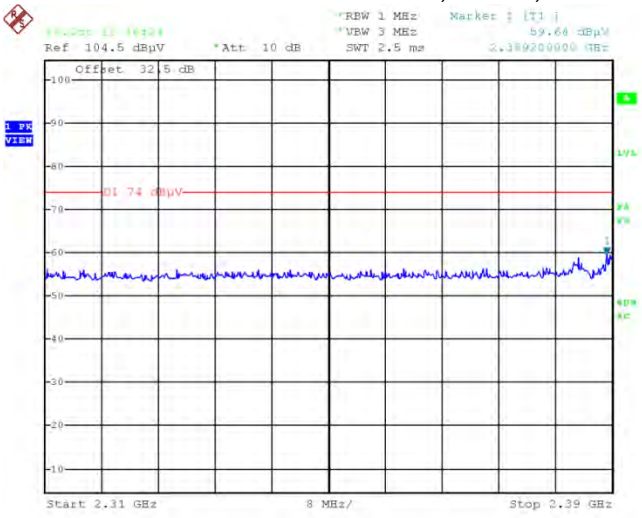
Date: 25.OCT.2012 16:20:00

LOW 2 CHANNEL RESTRICTED, AVERAGE, HORIZ



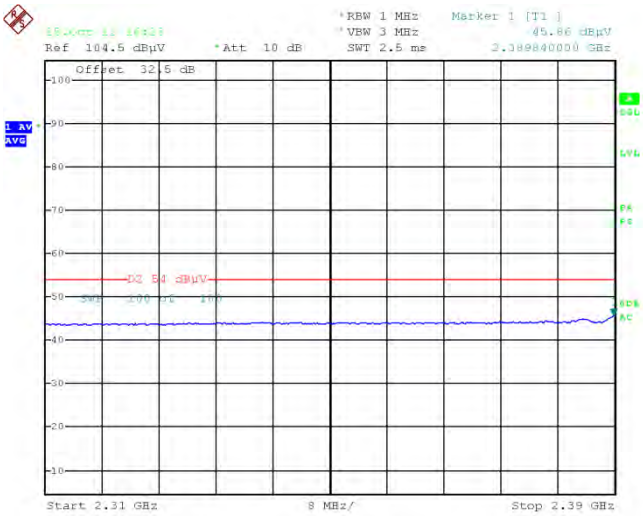
Date: 25.OCT.2012 16:18:53

LOW 2 CHANNEL RESTRICTED, PEAK, VERT



Date: 25.OCT.2012 16:24:59

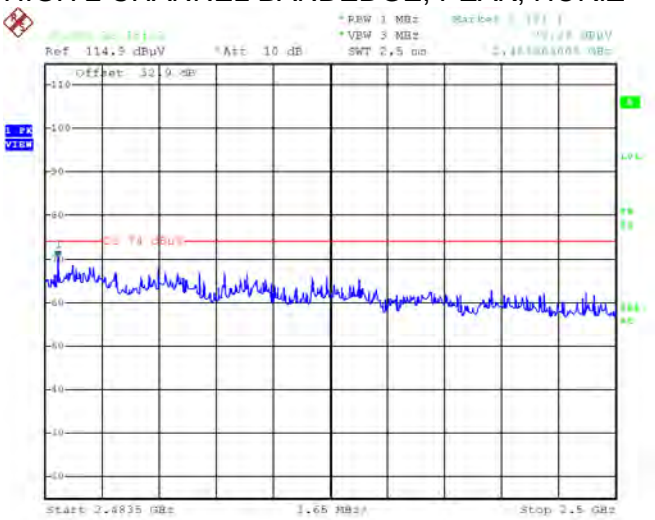
LOW 2 CHANNEL RESTRICTED, AVERAGE, VERT WRONG PLOT



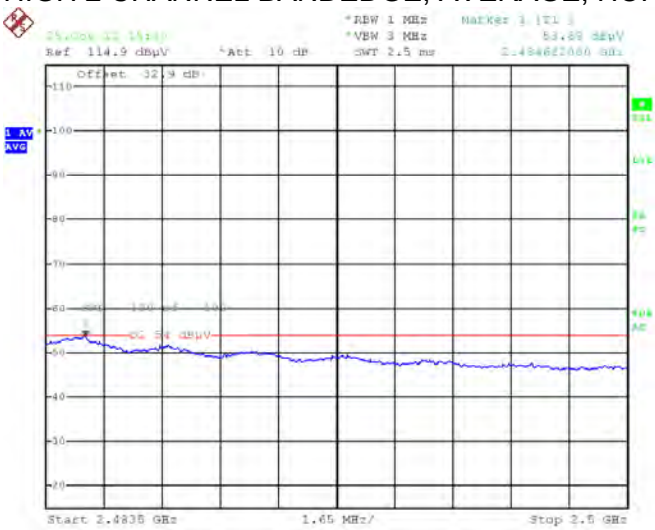
Date: 25.OCT.2012 16:25:51

AUTHORIZED BANDEDGE (HIGH 2 CHANNEL)

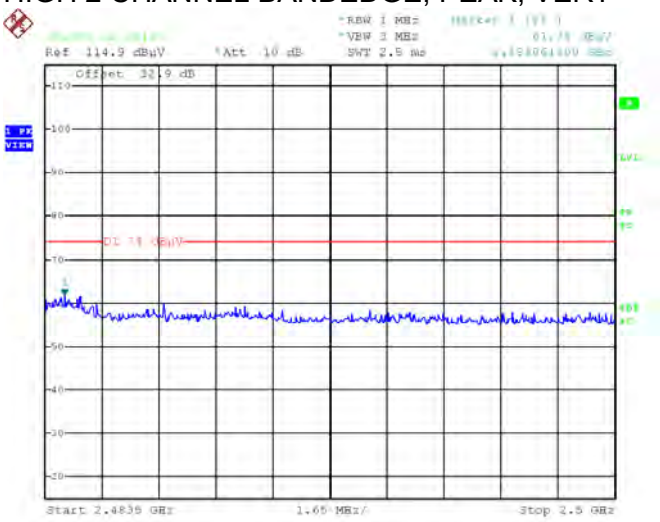
HIGH 2 CHANNEL BANDEDGE, PEAK, HORIZ



HIGH 2 CHANNEL BANDEDGE, AVERAGE, HORIZ

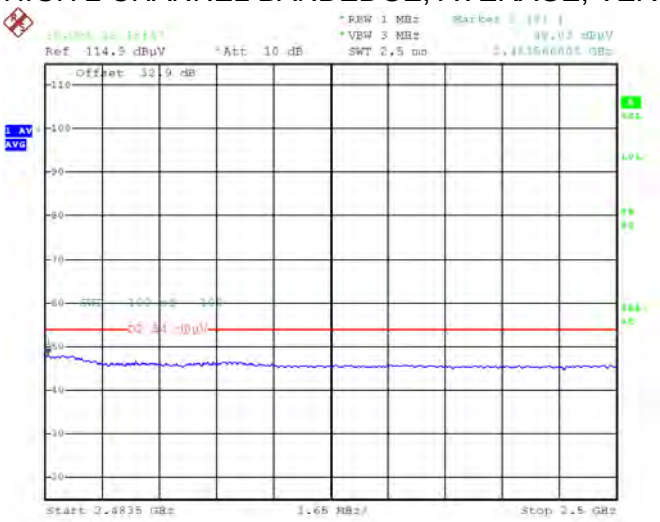


HIGH 2 CHANNEL BANDEDGE, PEAK, VERT



Date: 26.OCT.2012 15:47:13

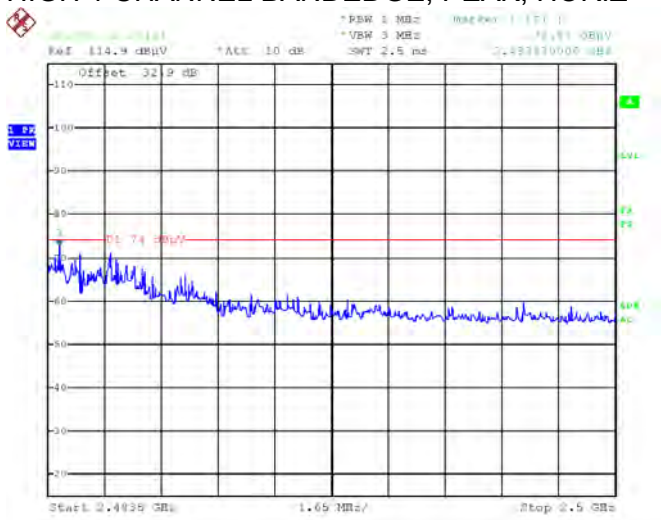
HIGH 2 CHANNEL BANDEDGE, AVERAGE, VERT



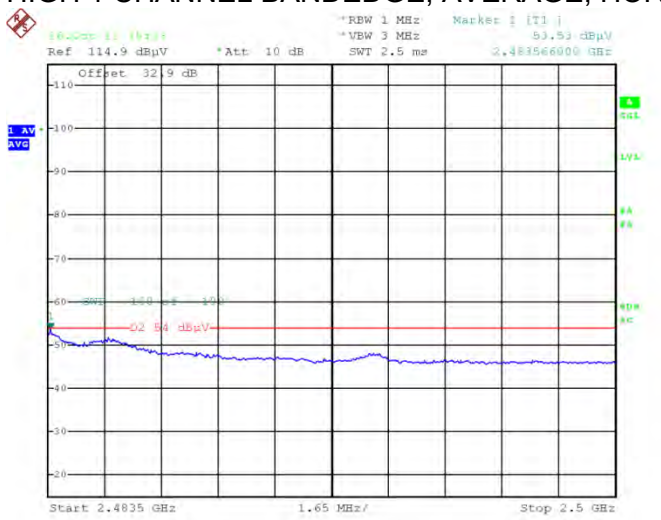
Date: 26.OCT.2012 15:47:57

AUTHORIZED BANDEDGE (HIGH 1 CHANNEL)

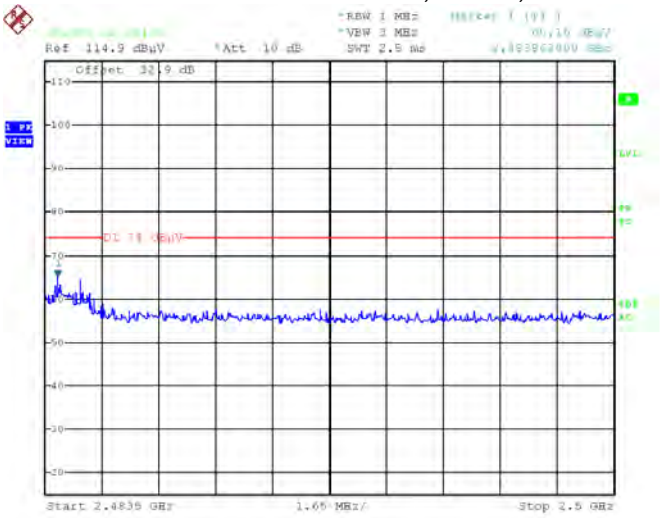
HIGH 1 CHANNEL BANDEDGE, PEAK, HORIZ



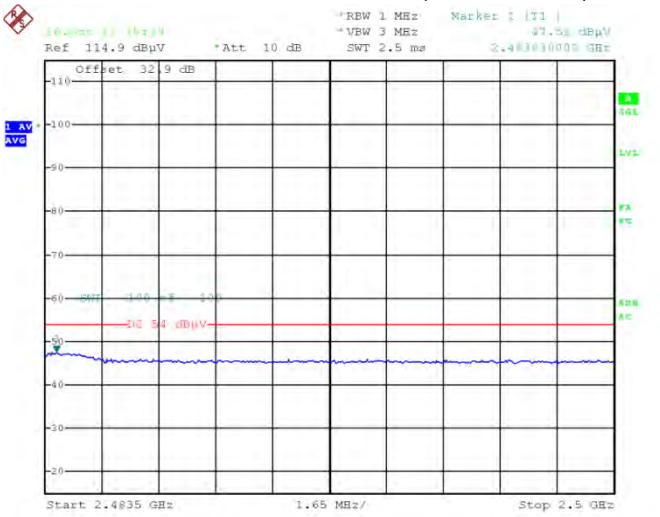
HIGH 1 CHANNEL BANDEDGE, AVERAGE, HORIZ



HIGH 1 CHANNEL BANDEDGE, PEAK, VERT



HIGH 1 CHANNEL BANDEDGE, AVERAGE, VERT



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 3m Chamber

Company: Broadcom
Project #: 12U14669
Date: 12/5/2012
Test Engineer: D. Garcia/Danny Vu
Configuration: EUT, Adapter Board, Antenna
Mode: 11n HT20 3TX mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T60; S/N: 2238 @3m	T34 HP 8449B		T39; ARA 18-26GHz; S/N:1013	FCC 15.205

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500		R_001

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Channel (2412.0 MHz)															
4.824	3.0	51.7	47.4	33.1	6.8	-34.1	0.0	0.0	57.5	53.3	74	54	-16.5	-0.7	H
4.824	3.0	49.7	46.2	33.1	6.8	-34.1	0.0	0.0	55.5	52.1	74	54	-18.5	-1.9	V
Mid Channel (2437 MHz)															
4.874	3.0	52.0	48.0	33.2	6.8	-34.0	0.0	0.0	58.0	53.9	74	54	-16.0	-0.1	H
7.311	3.0	43.9	40.4	36.3	9.1	-33.1	0.0	0.0	56.2	52.7	74	54	-17.8	-1.3	H
4.874	3.0	48.8	45.1	33.2	6.8	-34.0	0.0	0.0	54.7	51.0	74	54	-19.3	-3.0	V
7.311	3.0	42.1	38.5	36.3	9.1	-33.1	0.0	0.0	54.3	50.8	74	54	-19.7	-3.2	V
High Channel (2462 MHz)															
4.924	3.0	50.7	47.4	33.2	6.8	-34.0	0.0	0.0	56.8	53.5	74	54	-17.2	-0.5	V
7.386	3.0	43.8	40.8	36.4	9.1	-33.1	0.0	0.0	56.2	53.2	74	54	-17.8	-0.8	V
4.924	3.0	48.6	45.8	33.2	6.8	-34.0	0.0	0.0	54.6	51.8	74	54	-19.4	-2.2	H
7.386	3.0	41.7	38.9	36.4	9.1	-33.1	0.0	0.0	54.1	51.3	74	54	-19.9	-2.7	H

Rev. 11.10.11

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

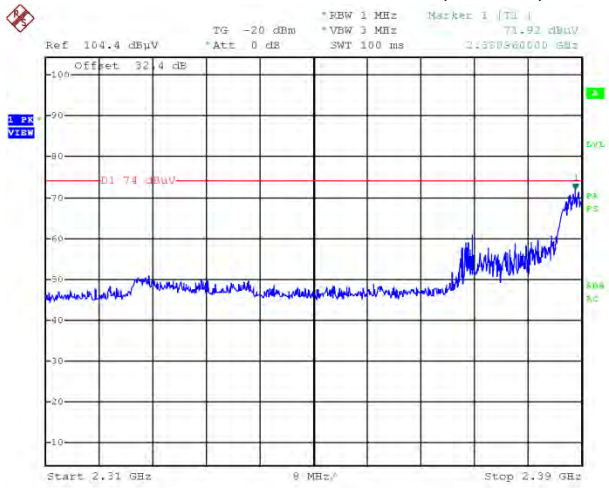
9.2.12. 802.11n HT20 2TX Beam-Forming MODE, 2.4 GHz BAND

Covered by testing 11n AC20 CCD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

9.2.13. 802.11n AC20 3TX Beam-Forming MODE, 2.4 GHz BAND

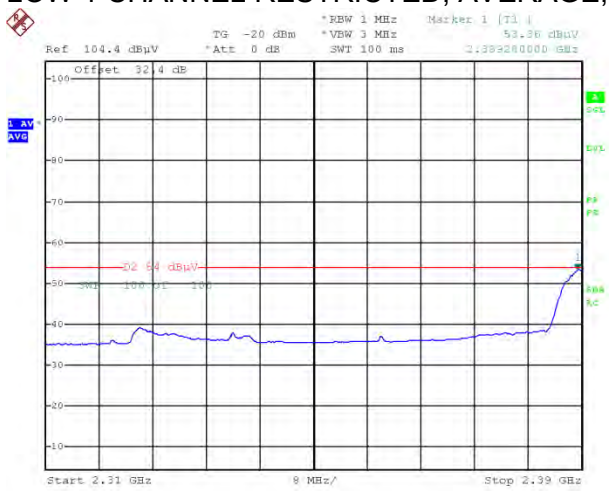
RESTRICTED BANDEDGE (LOW 1 CHANNEL)

LOW 1 CHANNEL RESTRICTED, PEAK, HORIZ



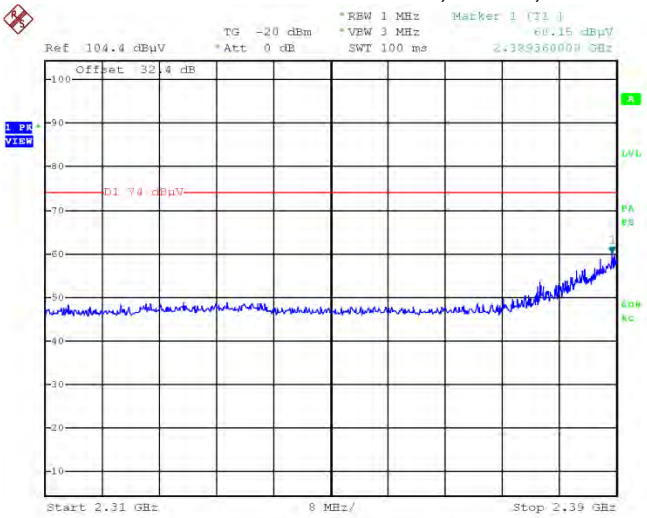
Date: 12.DEC.2012 10:27:45

LOW 1 CHANNEL RESTRICTED, AVERAGE, HORIZ



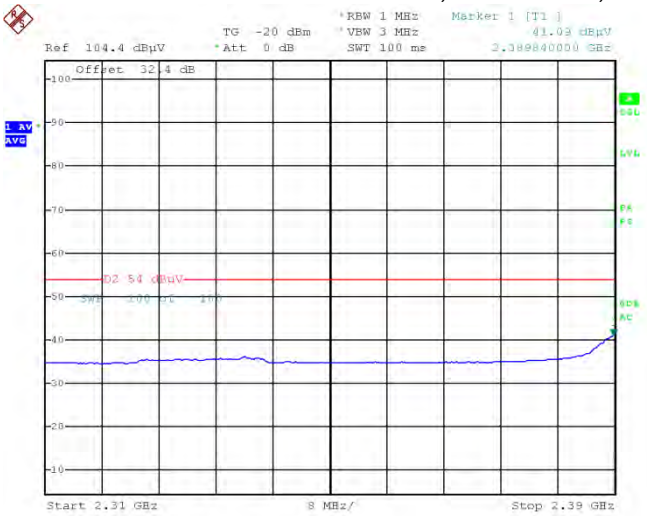
Date: 12.DEC.2012 10:26:09

LOW 1 CHANNEL RESTRICTED, PEAK, VERT



Date: 12.DEC.2012 10:37:30

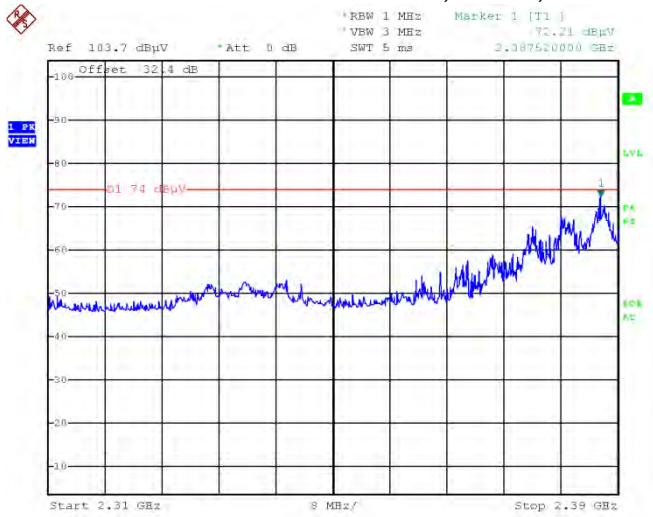
LOW 1 CHANNEL RESTRICTED, AVERAGE, VERT



Date: 12.DEC.2012 10:41:02

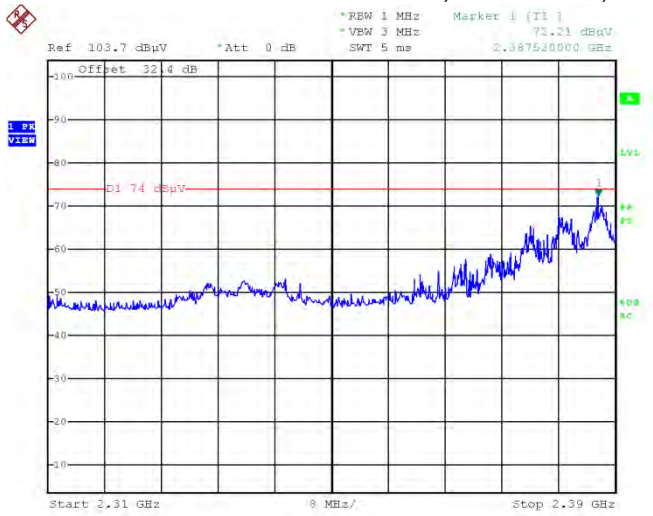
RESTRICTED BANDEDGE (LOW 2 CHANNEL)

LOW 2 CHANNEL RESTRICTED, PEAK, HORIZ



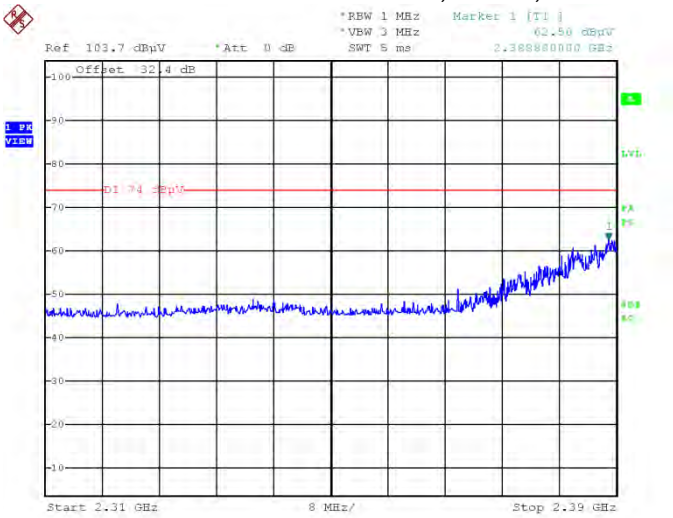
Date: 11.DEC.2012 23:41:54

LOW 2 CHANNEL RESTRICTED, AVERAGE, HORIZ



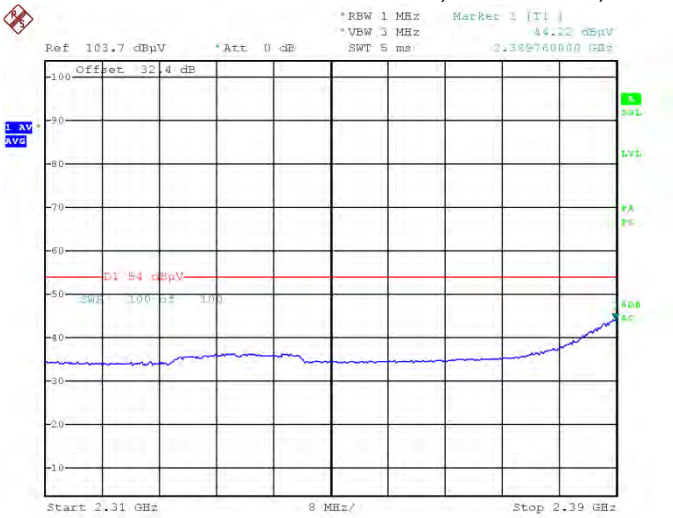
Date: 11.DEC.2012 23:41:54

LOW 2 CHANNEL RESTRICTED, PEAK, VERT



Date: 12.DEC.2012 00:07:06

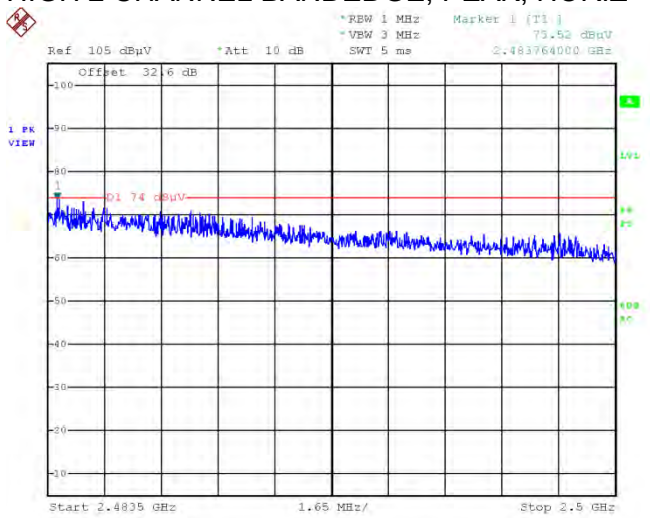
LOW 2 CHANNEL RESTRICTED, AVERAGE, VERT



Date: 12.DEC.2012 00:08:50

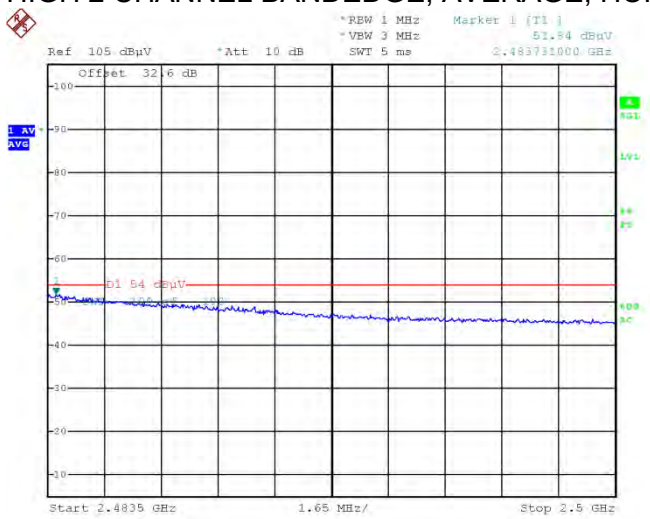
AUTHORIZED BANDEDGE (HIGH 2 CHANNEL)

HIGH 2 CHANNEL BANDEDGE, PEAK, HORIZ



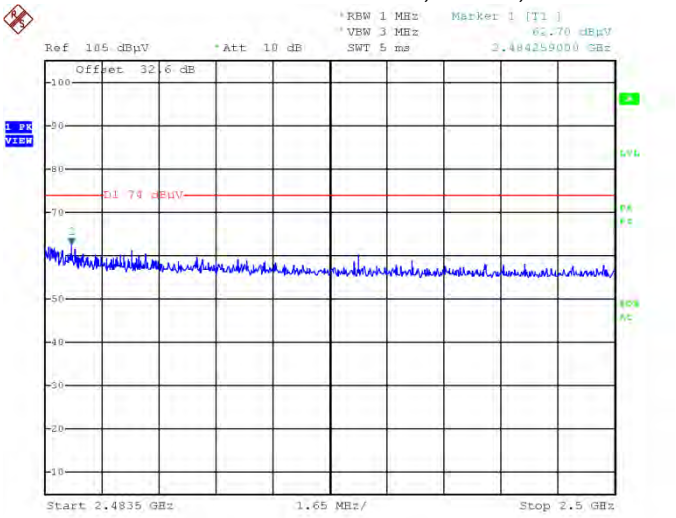
Date: 12.DEC.2012 01:07:31

HIGH 2 CHANNEL BANDEDGE, AVERAGE, HORIZ



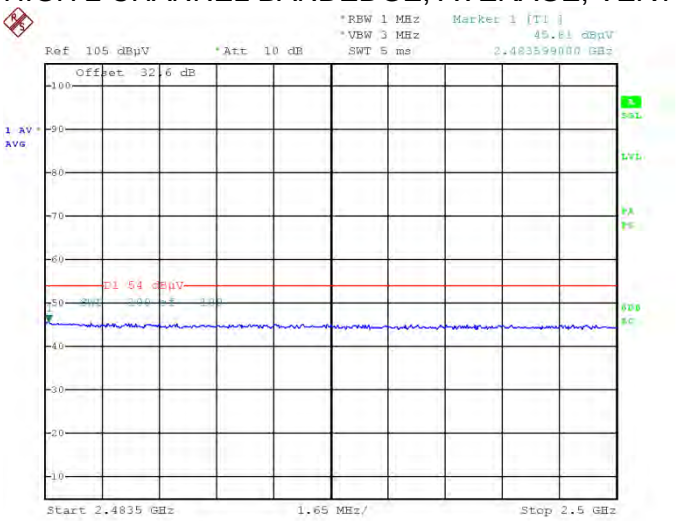
Date: 12.DEC.2012 00:50:28

HIGH 2 CHANNEL BANDEDGE, PEAK, VERT



Date: 12.DEC.2012 01:21:17

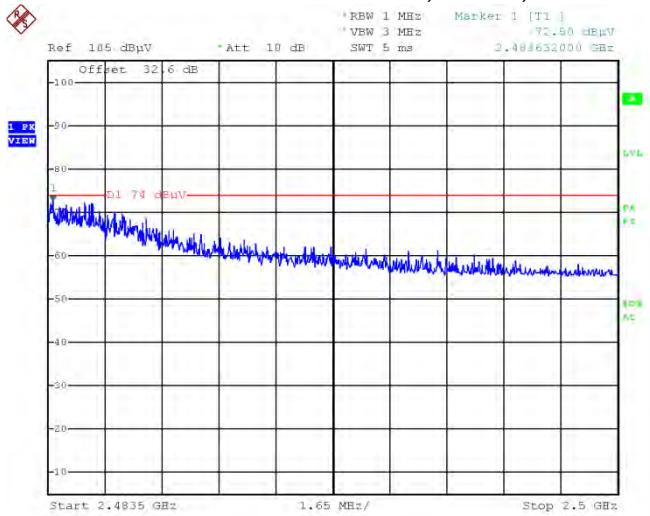
HIGH 2 CHANNEL BANDEDGE, AVERAGE, VERT



Date: 12.DEC.2012 01:36:15

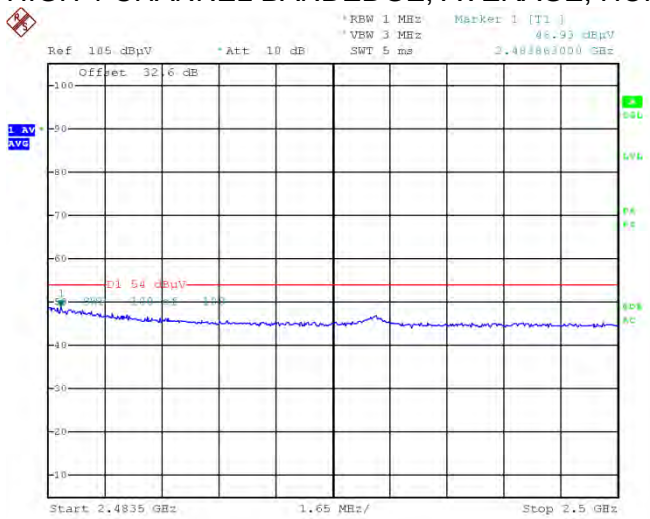
AUTHORIZED BANDEDGE (HIGH 1 CHANNEL)

HIGH 1 CHANNEL BANDEDGE, PEAK, HORIZ



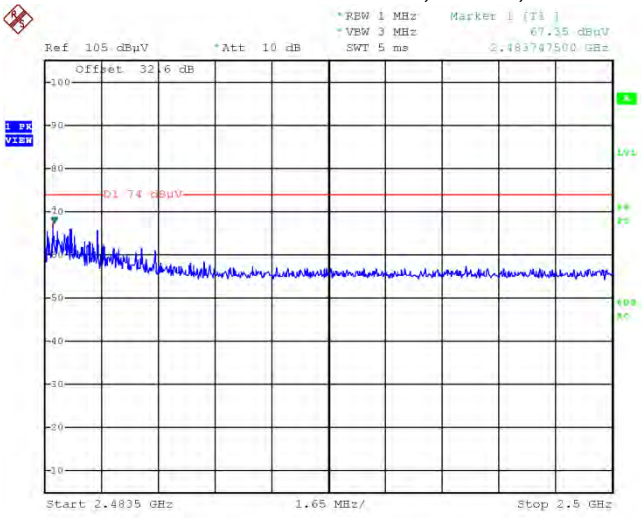
Date: 12.DEC.2012 00:43:00

HIGH 1 CHANNEL BANDEDGE, AVERAGE, HORIZ



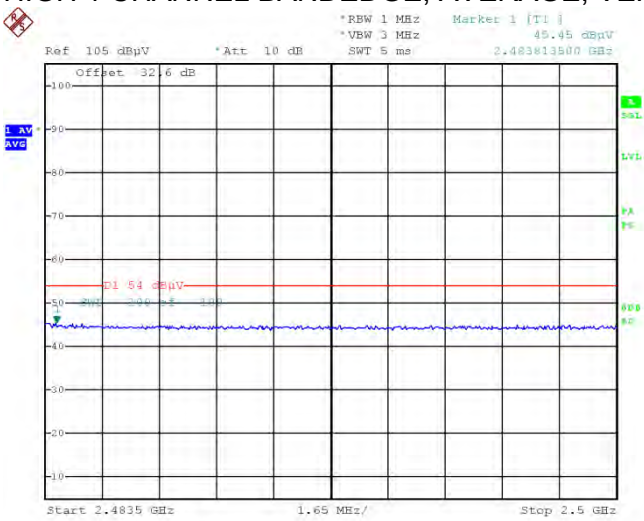
Date: 12.DEC.2012 00:48:22

HIGH 1 CHANNEL BANDEDGE, PEAK, VERT



Date: 12.DEC.2012 01:24:32

HIGH 1 CHANNEL BANDEDGE, AVERAGE, VERT



Date: 12.DEC.2012 01:26:51

HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber-A

Company: Broadcom
Project #: 12U14669
Date: 12/12/2012
Test Engineer: David Garcia/Danny Vu
Configuration: EUT,Adapter Board, Laptop, Beamformee laptop
Mode: 2.4 Ghz, HT20 3TX CDD, Beamforming

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931		T39; ARA 18-26GHz; S/N:1013	FCC 15.205

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500		R_001

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Channel, 2412 MHz															
4.824	3.0	60.8	46.2	33.4	6.2	-35.5	0.0	0.0	64.9	50.4	74	54	-9.1	-3.6	V, q90
12.060	3.0	49.3	37.4	39.3	11.3	-35.4	0.0	0.0	64.5	52.6	74	54	-9.5	-1.4	V, q90
4.824	3.0	62.6	49.7	33.4	6.2	-35.5	0.0	0.0	66.7	53.9	74	54	-7.3	-0.1	H, q89
12.060	3.0	49.6	36.5	39.3	11.3	-35.4	0.0	0.0	64.8	51.8	74	54	-9.2	-2.2	H, q89
Mid Channel, 2437 MHz															
4.874	3.0	64.1	49.5	33.5	6.2	-35.5	0.0	0.0	68.4	53.7	74	54	-5.6	-0.3	H, q85
7.311	3.0	48.9	37.1	35.7	8.4	-35.4	0.0	0.0	57.5	45.8	74	54	-16.5	-8.2	H, q85
12.185	3.0	45.8	31.3	39.3	11.3	-35.3	0.0	0.0	61.1	46.6	74	54	-12.9	-7.4	H, q85
4.874	3.0	58.7	47.7	33.5	6.2	-35.5	0.0	0.0	63.0	51.9	74	54	-11.0	-2.1	V, q85
7.311	3.0	51.1	39.0	35.7	8.4	-35.4	0.0	0.0	59.7	47.7	74	54	-14.3	-6.3	V, q85
12.185	3.0	46.9	33.5	39.3	11.3	-35.3	0.0	0.0	62.2	48.8	74	54	-11.8	-5.2	V, q85
High Channel, 2462 MHz															
4.874	3.0	62.4	49.2	33.5	6.2	-35.5	0.0	0.0	66.7	53.5	74	54	-7.3	-0.5	H, q82
7.386	3.0	51.9	38.3	35.8	8.4	-35.5	0.0	0.0	60.7	47.1	74	54	-13.3	-6.9	H, q82
12.310	3.0	42.7	30.0	39.3	11.4	-35.3	0.0	0.0	58.1	45.4	74	54	-15.9	-8.6	H, q82
4.874	3.0	61.2	46.5	33.5	6.2	-35.5	0.0	0.0	65.4	50.7	74	54	-8.6	-3.3	V, q82
7.386	3.0	49.1	37.7	35.8	8.4	-35.5	0.0	0.0	57.8	46.4	74	54	-16.2	-7.6	V, q82
12.310	3.0	43.4	31.0	39.3	11.4	-35.3	0.0	0.0	58.8	46.4	74	54	-15.2	-7.6	V, q82

Rev. 11.10.11

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

9.2.14. 802.11a 1TX MODE, 5.8 GHz BAND

Covered by testing HT20 CDD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

9.2.15. 802.11a 2TX MODE, 5.8 GHz BAND

Covered by testing HT20 CDD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

9.2.16. 802.11a 3TX MODE, 5.8 GHz BAND

Covered by testing HT20 CDD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

9.2.17. 802.11n HT20 1TX MODE, 5.8 GHz BAND

Covered by testing HT20 CDD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

9.2.18. 802.11n HT20 CDD MCS0 2TX MODE, 5.8 GHz BAND

Covered by testing HT20 CDD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

9.2.19. 802.11n HT20 CDD 3TX MODE, 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber-A

Company: Broadcom
Project #: 12U14669
Date: 12/7/2012
Test Engineer: D. Garcia/Danny Vu
Configuration: EUT, Adapter Board, Antenna
Mode: 11n HT20 3TX mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931	T88 Miteq 26-40GHz	T39; ARA 18-26GHz; S/N:1013	FCC 15.205

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500		R_001

Peak Measurements
RBW1MHz, BW=3MHz
Average Measurements
RBW=1MHz ; VBW=3MHz
Averag Detector

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Channel (5745.0 MHz)															
11.490	3.0	49.0	38.8	38.8	10.7	-35.5	0.0	0.0	63.0	52.8	74	54	-11.0	-1.2	H, q84
11.490	3.0	47.5	35.7	38.8	10.7	-35.5	0.0	0.0	61.5	49.7	74	54	-12.5	-4.3	V, q84
Mid Channel (5785 MHz)															
11.570	3.0	46.6	36.2	38.9	10.8	-35.5	0.0	0.0	60.8	50.4	74	54	-13.2	-3.6	H, q88
11.570	3.0	47.4	37.5	38.9	10.8	-35.5	0.0	0.0	61.6	51.7	74	54	-12.4	-2.3	V, q86
High Channel (5825 MHz)															
11.650	3.0		35.7	39.0	10.9	-35.5	0.0	0.0	14.4	50.1	74	54	-59.6	-3.9	V, q84
11.650	3.0	47.5	36.3	39.0	10.9	-35.5	0.0	0.0	61.9	50.7	74	54	-12.1	-3.3	V, q85

Rev. 11.10.11

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

9.2.20. 802.11a BF 2TX MODE, 5.8 GHz BAND

Covered by testing AC20 CDD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

9.2.21. 802.11a BF 3TX MODE, 5.8 GHz BAND

Covered by testing AC20 CDD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

9.2.22. 802.11n BF 2TX MODE, 5.8 GHz BAND

Covered by testing AC20 CDD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

9.2.23. 802.11n AC20 Beam-Forming 3TX MODE, 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 3m Chamber

Company: Broadcom
Project #: 12U14669
Date: 12/12/2012
Test Engineer: D. Garcia
Configuration: EUT, Adapter Board, Antenna
Mode: 11n HT20 3TX Beam Forming mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931	T88 Miteq 26-40GHz	T39; ARA 18-26GHz; S/N:1013	FCC 15.205

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500		R_001

Peak Measurements
RBW=1MHz ; VBW=3MHz
Average Measurements
RBW=1MHz ; VBW=3MHz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Channel (5745 MHz)															
11.490	3.0	50.0	37.1	38.8	11.2	-35.5	0.0	0.0	64.5	51.6	74	54	-9.5	-2.4	H, q84
11.490	3.0	50.2	38.5	38.8	11.2	-35.5	0.0	0.0	64.7	53.0	74	54	-9.3	-1.0	V, q84
Mid Channel (5785 MHz)															
11.570	3.0	53.0	38.7	38.9	11.3	-35.5	0.0	0.0	67.7	53.4	74	54	-6.3	-0.6	H, q81
11.570	3.0	50.2	37.2	38.9	11.3	-35.5	0.0	0.0	64.9	51.9	74	54	-9.1	-2.1	V, q81
High Channel (5825 MHz)															
11.650	3.0	49.6	38.6	39.0	11.4	-35.5	0.0	0.0	64.6	53.5	74	54	-9.4	-0.5	H, q80
11.650	3.0	47.2	36.1	39.0	11.4	-35.5	0.0	0.0	62.2	51.0	74	54	-11.8	-3.0	V, q80

Rev. 11.10.11

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

9.2.24. 802.11n HT40 1TX MODE, 5.8 GHz BAND

Covered by testing HT40 CDD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

9.2.25. 802.11n HT40 CDD MCS0 2TX MODE, 5.8 GHz BAND

Covered by testing HT40 CDD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

9.2.26. 802.11n HT40 CDD 3TX MODE, 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber-A

Company: Broadcom
Project #: 12U14669
Date: 12/7/2012
Test Engineer: Mengistu Mekuria
Configuration: EUT, Adapter Board, Antenna
Mode: 11n HT40 3TX mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931	T88 Miteq 26-40GHz	T39; ARA 18-26GHz; S/N:1013	FCC 15.205

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500		R_001

Peak Measurements
RBW1MHz, BW=3MHz
Average Measurements
RBW=1MHz ; VBW=3MHz
Averag Detector

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Channel (5755.0 MHz)															
11.510	3.0	51.6	39.8	38.8	10.7	-35.5	0.0	0.0	65.7	53.9	74	54	-8.3	-0.1	H, q89
11.570	3.0	49.7	38.2	38.9	10.8	-35.5	0.0	0.0	63.9	52.4	74	54	-10.1	-1.6	V, q89
High Channel (5825 MHz)															
11.590	3.0	49.2	38.6	38.9	10.8	-35.5	0.0	0.0	63.5	52.8	74	54	-10.5	-1.2	H, q89
															V, q87
11.590	3.0	49.6	39.0	38.9	10.8	-35.5	0.0	0.0	63.9	53.3	74	54	-10.1	-0.7	V, q89
11.590	3.0	51.0	39.3	38.9	10.8	-35.5	0.0	0.0	65.2	53.5	74	54	-8.8	-0.5	V, q90

Rev. 11.10.11

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

Note: Duty Cycle Correction Factor was added to the AVG reading above

9.2.27. 802.11n HT40 Beam-Forming 2TX MODE, 5.8 GHz BAND

Covered by testing AC40 CDD MCS0 3TX, total power across all three chains is higher than the power level the device will operate at.

9.2.28. 802.11n AC40 Beam-Forming 3TX MODE, 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 3m Chamber

Company: Broadcom
Project #: 12U14669
Date: 12/12/2012
Test Engineer: D. Garcia
Configuration: EUT, Adapter Board, Antenna
Mode: 11n HT40 3TX Beam Forming mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931	T88 Miteq 26-40GHz	T39; ARA 18-26GHz; S/N:1013	FCC 15.205

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500		R_001

Peak Measurements
RBW=1MHz ; VBW=3MHz
Average Measurements
RBW=1MHz ; VBW=3MHz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Channel (5755 MHz)															
11.510	3.0		36.8	38.8	11.2	-35.5	0.0	0.0	14.5	51.3	74	54	-59.5	-2.7	V, q88
11.510	3.0	48.3	37.9	38.8	11.2	-35.5	0.0	0.0	62.8	52.4	74	54	-11.2	-1.6	H, q88
High Channel (5795 MHz)															
11.590	3.0	48.6	38.4	38.9	11.3	-35.5	0.0	0.0	63.4	53.1	74	54	-10.6	-0.9	H, q88
11.590	3.0	49.1	38.1	38.9	11.3	-35.5	0.0	0.0	63.9	52.8	74	54	-10.1	-1.2	V, q88

Rev. 11.10.11

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

Note: Duty Cycle Correction Factor was added to the AVG reading above

9.2.29. 802.11n AC80 1TX MODE, 5.8 GHz BAND

Covered by testing AC80 3TX, total power across all three chains is higher than the power level the device will operate at.

9.2.30. 802.11n AC80 2TX MODE, 5.8 GHz BAND

Covered by testing AC80 3TX, total power across all three chains is higher than the power level the device will operate at.

9.2.31. 802.11n AC80 CDD 3TX MODE, 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber-A

Company: Broadcom
Project #: 12U14669
Date: 12/9/2012
Test Engineer: Mengistu Mekuria
Configuration: EUT, Adapter Board, Antenna
Mode: 11n HT80 3TX mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931	T88 Miteq 26-40GHz	T39; ARA 18-26GHz; S/N:1013	FCC 15.205

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500		R_001

Peak Measurements
RBW1MHz, BW=3MHz
Average Measurements
RBW=1MHz ; VBW=3MHz
Averag Detector

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Mid Channel (5775.0 MHz)															
11.550	3.0	49.9	38.5	38.9	10.8	-35.5	0.0	0.0	64.0	52.7	74	54	-10.0	-1.3	H, q90
11.550	3.0	47.2	36.3	38.9	10.8	-35.5	0.0	0.0	61.4	50.4	74	54	-12.6	-3.6	V, q90

Rev. 11.10.11

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

Note: Duty Cycle Correction Factor was added to the AVG reading above

9.2.32. 802.11n AC80 Beam-Forming 2TX MODE, 5.8 GHz BAND

Covered by testing AC80 BF 3TX, total power across all three chains is higher than the power level the device will operate at.

9.2.33. 802.11n AC80 Beam-Forming 3TX MODE, 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber-A

Company: Broadcom
Project #: 12U14669
Date: 12/13/2012
Test Engineer: Mengistu Mekuria
Configuration: EUT, Adapter Board, Antenna
Mode: 11n HT80 3TX Beam Forming mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931	T88 Miteq 26-40GHz	T39; ARA 18-26GHz; S/N:1013	FCC 15.205

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500		R_001

Peak Measurements
RBW1MHz, BW=3MHz
Average Measurements
RBW=1MHz ; VBW=3MHz
Averag Detector

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Mid Channel (5775.0 MHz)															
11.550	3.0	50.9	37.8	38.9	10.8	-35.5	0.0	0.0	65.1	51.9	74	54	-8.9	-2.1	H, q91
11.550	3.0	47.7	35.8	38.9	10.8	-35.5	0.0	0.0	61.8	49.9	74	54	-12.2	-4.1	V, q91

Rev. 11.10.11

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

Note: Duty Cycle Correction Factor was added to the AVG reading above.

9.3. WORST-CASE BELOW 1 GHz

HORIZONTAL AND VERTICAL DATA

Project No:12U14669
Client Name:Broadcom
Model / Device: BCM94360CD
Config / Other:EUT, Adapter Board, Antenna
Test By:John Nguyen

Test Frequency	Meter Reading	Detector	25MHz-1GHz ChmbrA Amplified.TX (dB)	T243 Sunol Bilog.TXT (dB)	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
Horizontal 30 - 1000MHz									
160.8453	52.8	PK	-26.5	12	38.3	43.5	-5.2	200	Horz
299.6383	55.19	PK	-25.8	13.2	42.59	46	-3.41	300	Horz
798.789	42.81	PK	-23.3	21	40.51	46	-5.49	100	Horz
Vertical 30 - 1000MHz									
47.0584	46.58	PK	-27.4	9.4	28.58	40	-11.42	100	Vert
66.249	46.38	PK	-27.2	7.8	26.98	40	-13.02	100	Vert
294.4045	44.64	PK	-25.8	13.3	32.14	46	-13.86	200	Vert

PK - Peak detector
QP - Quasi-Peak detector

10. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

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

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

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

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

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

RESULTS

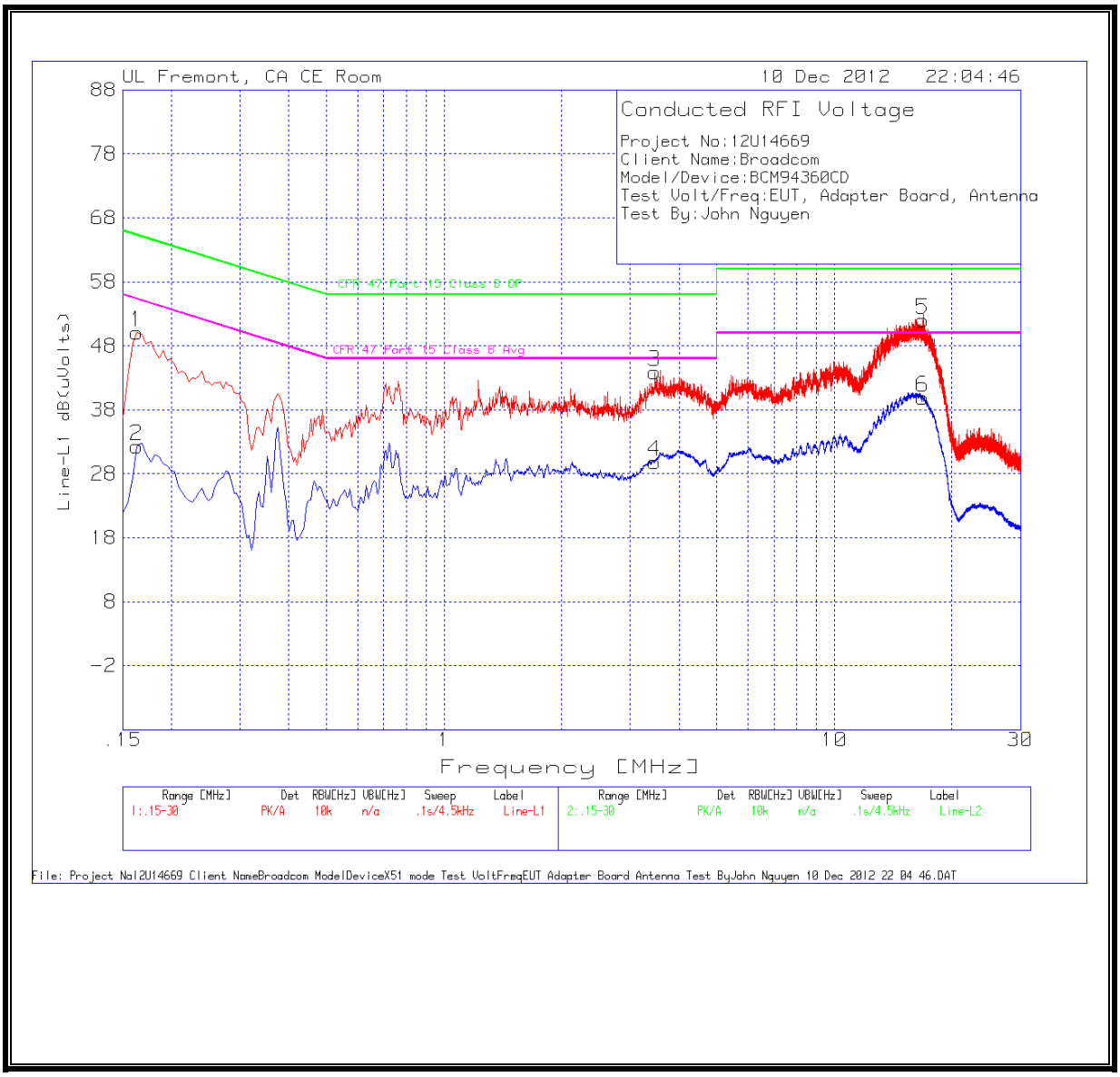
6 WORST EMISSIONS

Project No :12U14669
Client Name: Broadcom
Model/Device: BCM94360CD
Test Volt/Freq: EUT, Adapter Board, Antenna
Test By: John Nguyen

Test Frequency	Meter Reading	Detector	T24 IL L1.TXT (dB)	LC Cables 1&3.TXT (dB)	dB(uVolts)	CFR 47 Part 15 Class B QP	Margin	CFR 47 Part 15 Class B Avg	Margin
Line-L1 .15 - 30MHz									
0.1635	49.99	PK	0.1	0	50.09	65.3	-15.21	-	-
0.1635	32.23	Av	0.1	0	32.33	-	-	55.3	-22.97
3.579	43.91	PK	0.2	0.1	44.21	56	-11.79	-	-
3.579	30.95	Av	0.2	0.1	31.25	-	-	46	-14.75
16.9935	50.75	PK	0.2	0.2	51.15	60	-8.85	-	-
16.9935	39.3	Av	0.2	0.2	39.7	-	-	50	-10.3
Line-L2 .15 - 30MHz									
0.312	50.32	PK	0.1	0	50.42	59.9	-9.48	-	-
0.312	32.37	Av	0.1	0	32.47	-	-	49.9	-17.43
0.555	45.45	PK	0.1	0	45.55	56	-10.45	-	-
0.555	27.34	Av	0.1	0	27.44	-	-	46	-18.56
15.837	50.95	PK	0.2	0.2	51.35	60	-8.65	-	-
15.837	39.95	Av	0.2	0.2	40.35	-	-	50	-9.65

PK - Peak detector
QP - Quasi-Peak detector

LINE 1 RESULTS



LINE 2 RESULTS