



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

FOR

802.11 B/G/N (3X3) 2.4GHZ WIRELESS ROUTER

MODEL NUMBER: BOOST

FCC ID: SBVRM008

IC: 5373A-RM008

REPORT NUMBER: 13U16720-1, REVISION A

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Prepared for

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NVLAP LAB CODE 200065-0

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SONOS, INC.
223 E. DE LA GUERRA STREET
SANTA BARBARA, CA, 93101, U.S.A.

EUT DESCRIPTION: 802.11 B/G/N (3X3) 2.4GHZ WIRELESS ROUTER

MODEL: BOOST

SERIAL NUMBER: B8E937000C4A5-CONDUCTED, B8E937000C5E8-RADIATED

DATE TESTED: FEBRUARY 10 – MARCH 12, 2014

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

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

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

Approved & Released For
UL Verification Services Inc. By:

Tested By:



Thu Chan
Operations Manager
UL Verification Services Inc.



Francisco Guarnero
Lab Technician
UL Verification Services Inc.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2009, RSS-GEN Issue 3, and RSS-210 Issue 8.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street
☐ Chamber A	☒ Chamber D
☐ Chamber B	☒ Chamber E
☐ Chamber C	☐ Chamber F

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://ts.nist.gov/standards/scopes/2000650.htm>.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

4.3. MEASUREMENT UNCERTAINTY

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

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

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is an 802.11 b/g/n (3x3) 2.4GHz Wireless Router that is manufactured by Sonos Inc. RF Chipset Atheros AR9558 used.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2412 - 2462	802.11b	22.63	183.23
2412 - 2462	802.11g	27.27	533.33
2412 - 2462	802.11n HT20	27.17	521.19

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The EUT is using 3 antennas as follow:

Antenna	Ant. Gain (dBi)
Chain 0	2.21
Chain 1	3.59
Chain 2	4.34

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was Atheros Radio Test 2 (ART2-GUI).

5.5. WORST-CASE CONFIGURATION AND MODE

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

The EUT is for desktop applications; all radiated testing was performed with EUT laid out in desktop configuration.

Per the manufacturer, only the following data rates are used for the EUT, and these are the data rates used for the testing:

802.11b mode: 11 Mbps

802.11g mode: 24 Mbps (16 QAM)

802.11n HT20 mode in the 2.4 GHz band: 26 Mbps (QPSK, MCS9)

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Lenovo	W510	R9-BK0RH 11/02	DOC
AC-DC Adapter-1	Lenovo	PA-1650-531	11S42T4418Z1ZF3B9CFHH1	DOC
AC-DC Adapter-2	Sonos	PSM10A-050SN	N/A	DOC

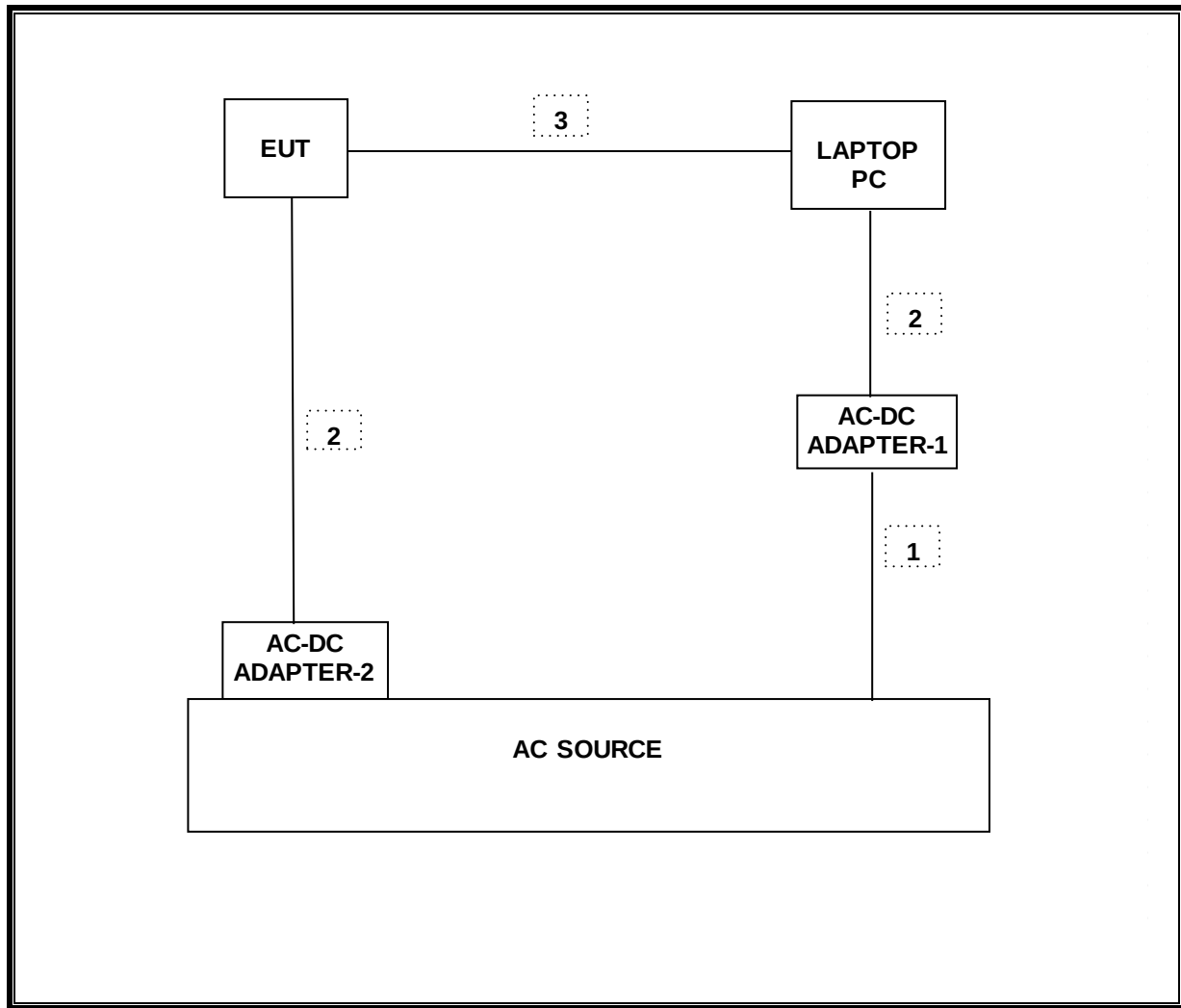
I/O CABLES

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	1.8m	N/A
2	DC	2	DC	Un-shielded	1.8m	N/A
3	Ethernet	1	RJ45	Un-shielded	1.5m	N/A

TEST SETUP

The EUT and the support laptop were connected to the Access Point during the tests. A command prompt was used to select channels and power settings from a list of commands to exercise 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 Due
Antenna, Horn, 18 GHz	EMCO	3115	C00783	10/24/13
Preamplifier, 1000 MHz	Sonoma	310N	N02891	12/30/14
Antenna, Horn, 26.5 GHz	ARA	SWH-28	C01015	05/06/14
Antenna, Biconolog, 30MHz-1 GHz	Sunol Sciences	JB3	F00027	03/07/14
Peak / Average Power Sensor	Agilent / HP	E9323A	F00163	04/03/14
P-Series single channel Power Meter	Agilent / HP	N1911A	F00164	04/03/14
Spectrum Analyzer, PXA, 3Hz to 50GHz	Agilent	N9030A	F00121	01/21/15
Spectrum Analyzer, 40 GHz	Agilent / HP	8564E	C00951	07/29/14
RF PreAmplifier, 1-18GHz	Miteq	AFS42-00101800 -25-S-42	F00353	08/24/14
Antenna, Horn, 40 GHz	ARA	MWH-2640/B	F00194	05/14/14
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	08/15/14
LISN 30MHz	FCC	50/250-25-2	C00626	01/17/15
Preamplifier, 40 GHz	Miteq	NSP4000-SP2	C00990	08/20/14

7. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

7.1. ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
2.4GHz Band						
802.11b	1.284	1.328	0.967	96.69%	0.15	0.779
802.11g	0.523	0.576	0.908	90.80%	0.42	1.912
802.11nHT20	0.502	0.553	0.908	90.78%	0.42	1.992

7.2. MEASUREMENT METHODS

6 dB BW: KDB 558074 D01 v03r01, Section 8.1.

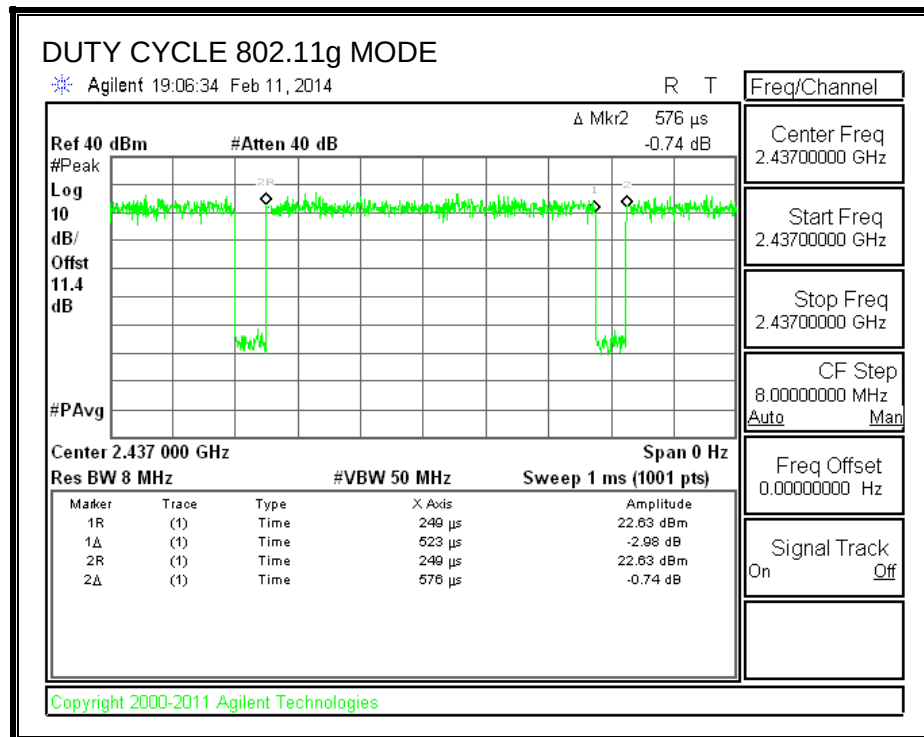
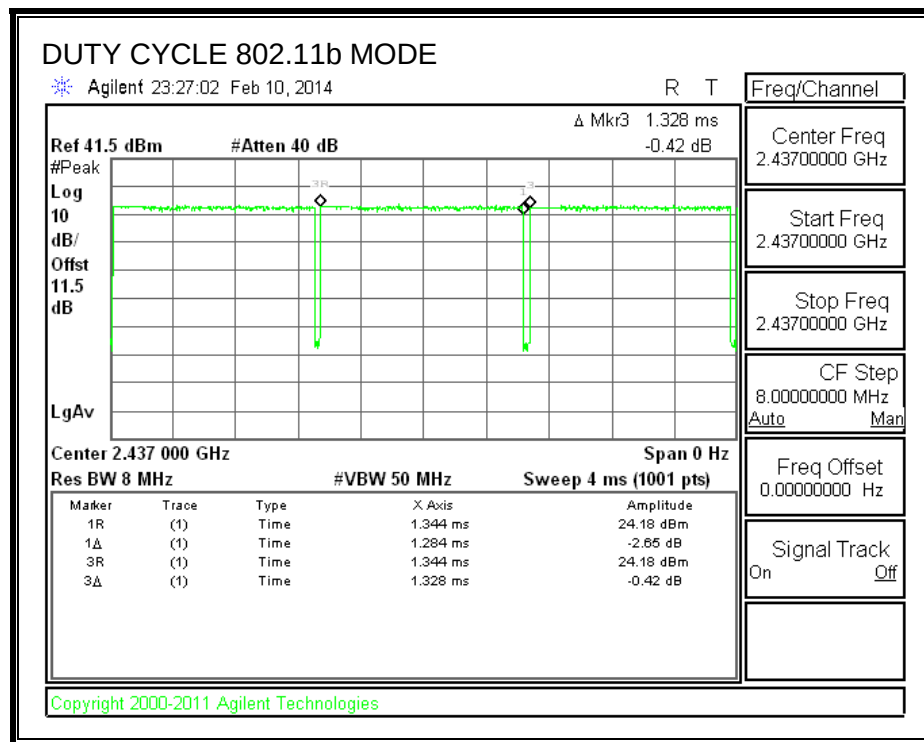
Output Power: KDB 558074 D01 v03r01, Section 9.1.2.

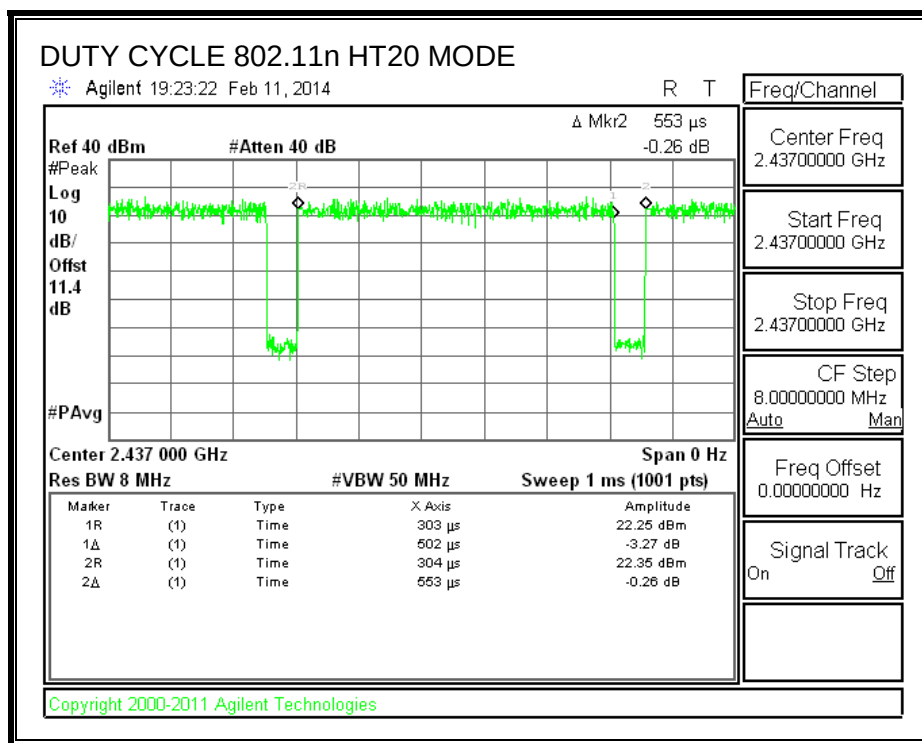
Power Spectral Density: KDB 558074 D01 v03r01, Section 10.2.

Out-of-band emissions in non-restricted bands: KDB 558074 D01 v03r01, Section 11.0

Out-of-band emissions in restricted bands: KDB 558074 D01 v03r01, Section 12.2.

7.3. DUTY CYCLE PLOTS





8. ANTENNA PORT TEST RESULTS

8.1. 802.11b MODE IN THE 2.4 GHz BAND

8.1.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

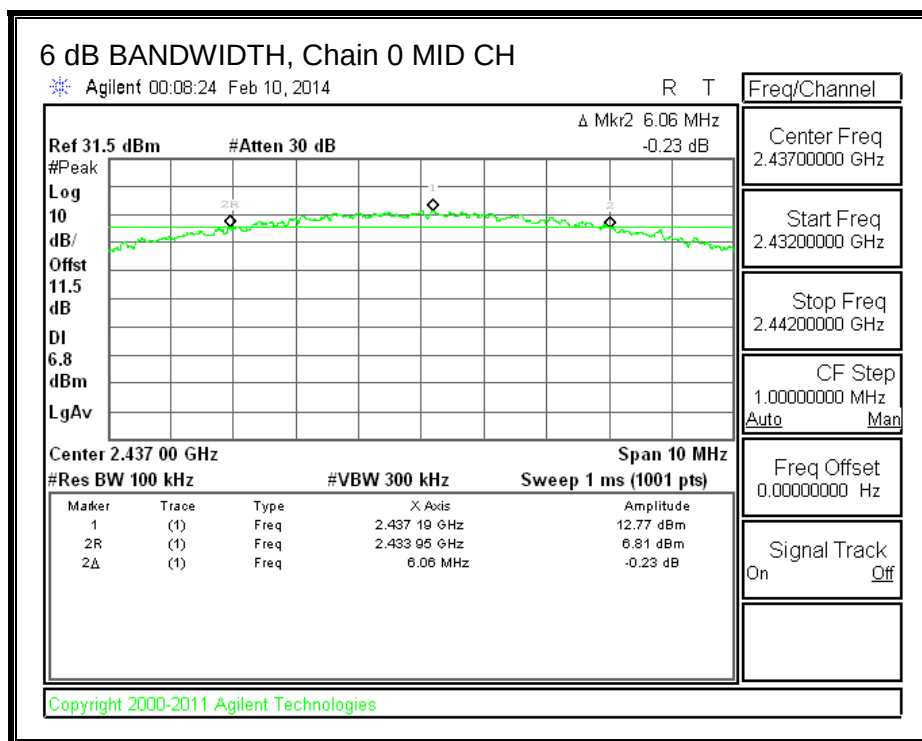
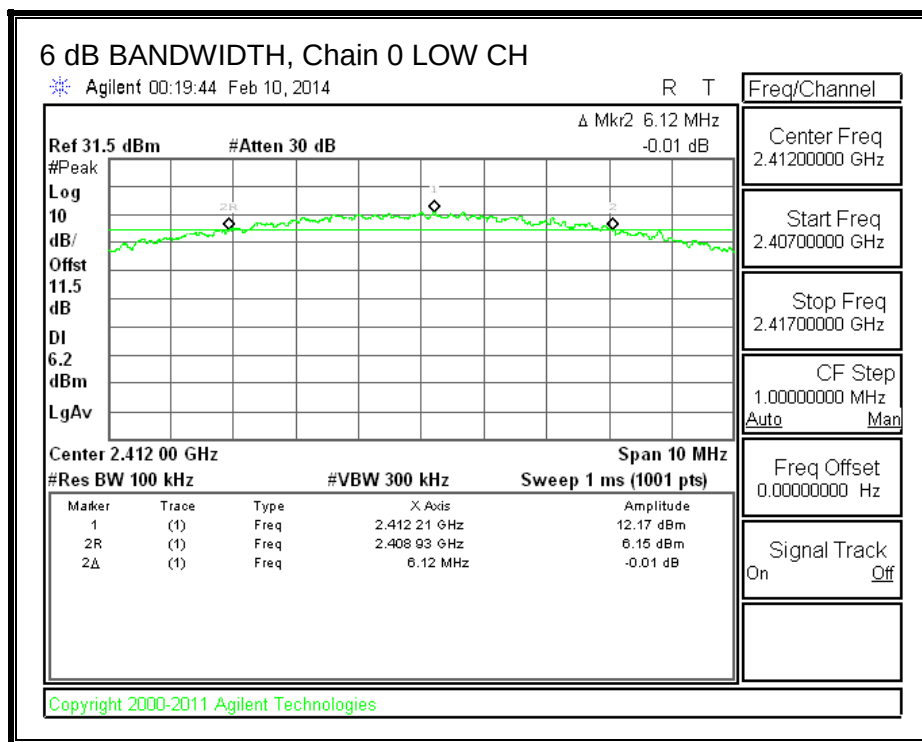
IC RSS-210 A8.2 (a)

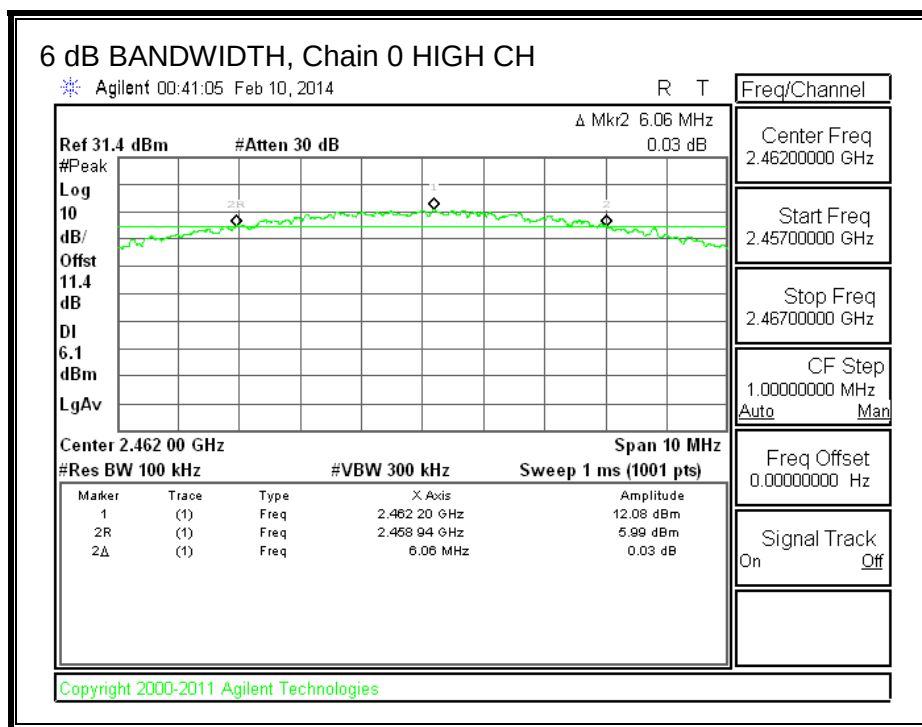
The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

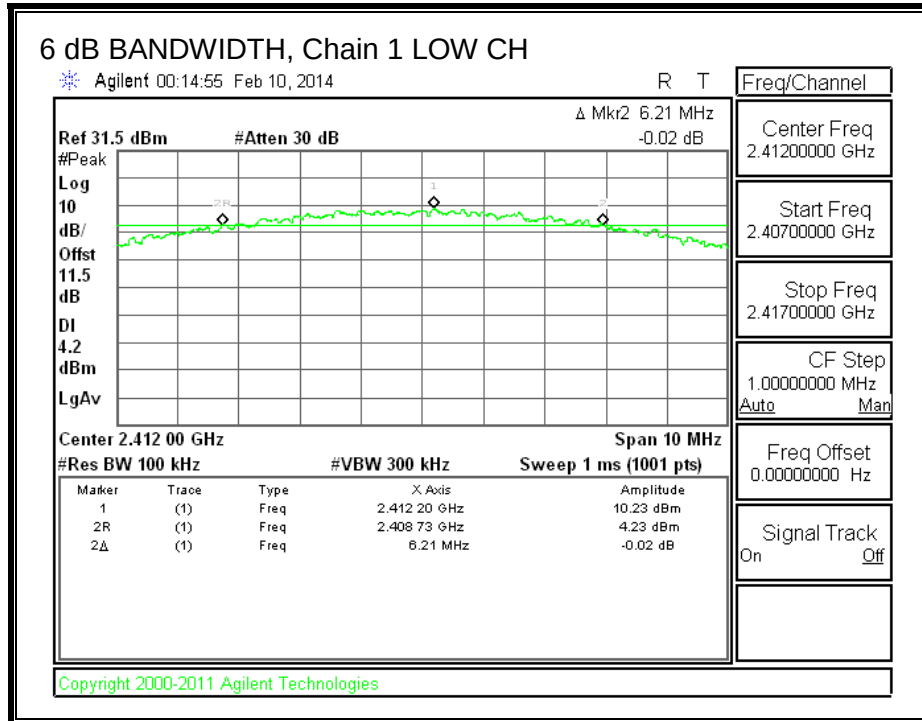
Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	6 dB BW Chain 2 (MHz)	Minimum Limit (MHz)
Low	2412	6.120	6.210	6.060	0.5
Mid	2437	6.060	5.800	6.240	0.5
High	2462	6.060	6.130	7.080	0.5

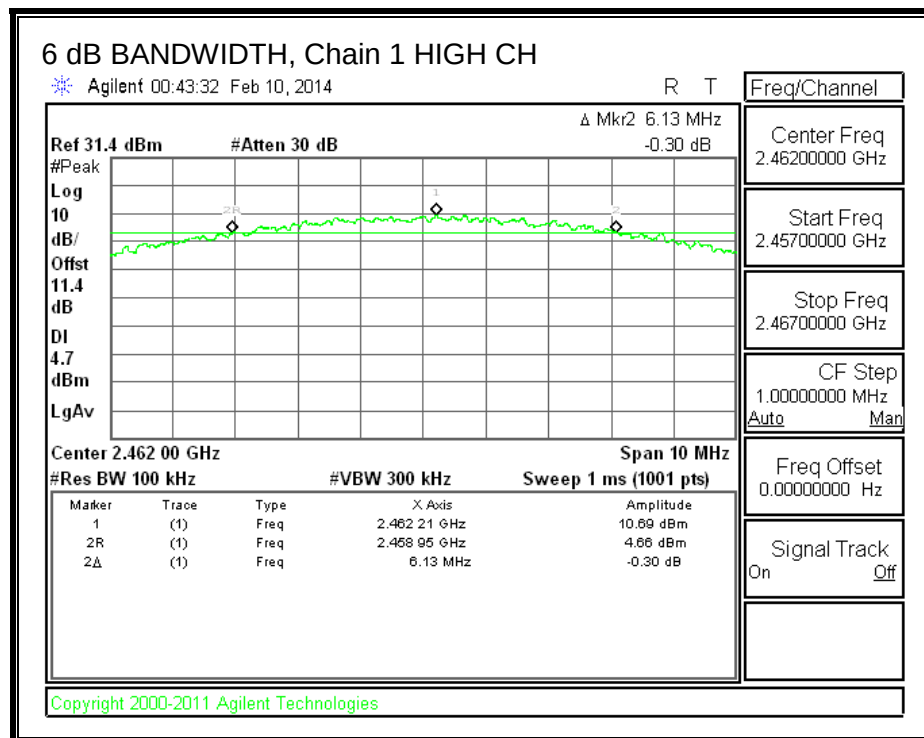
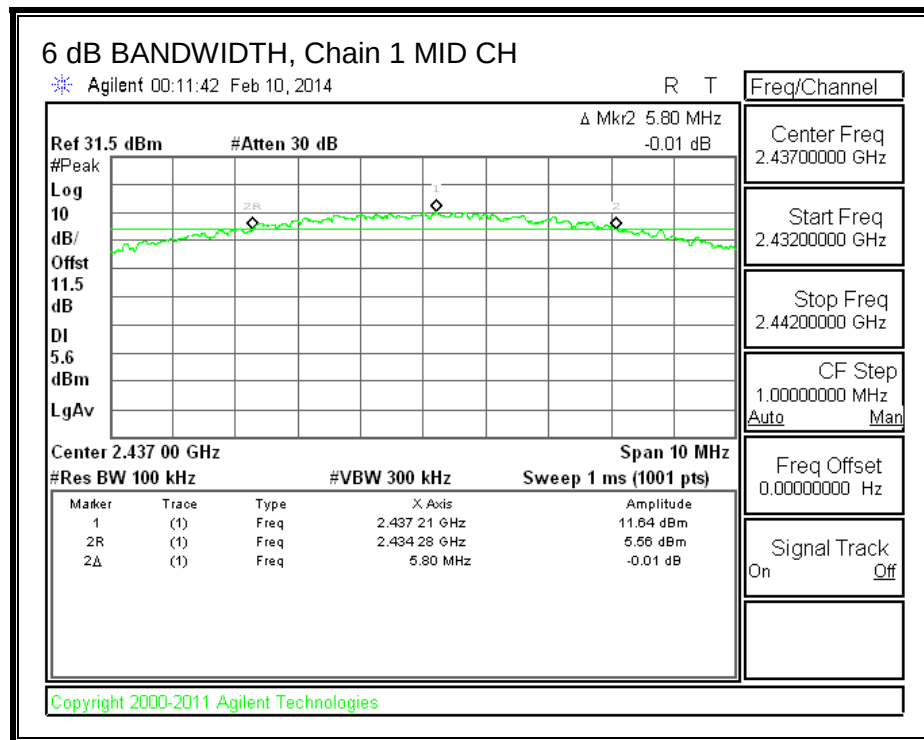
6 dB BANDWIDTH, Chain 0



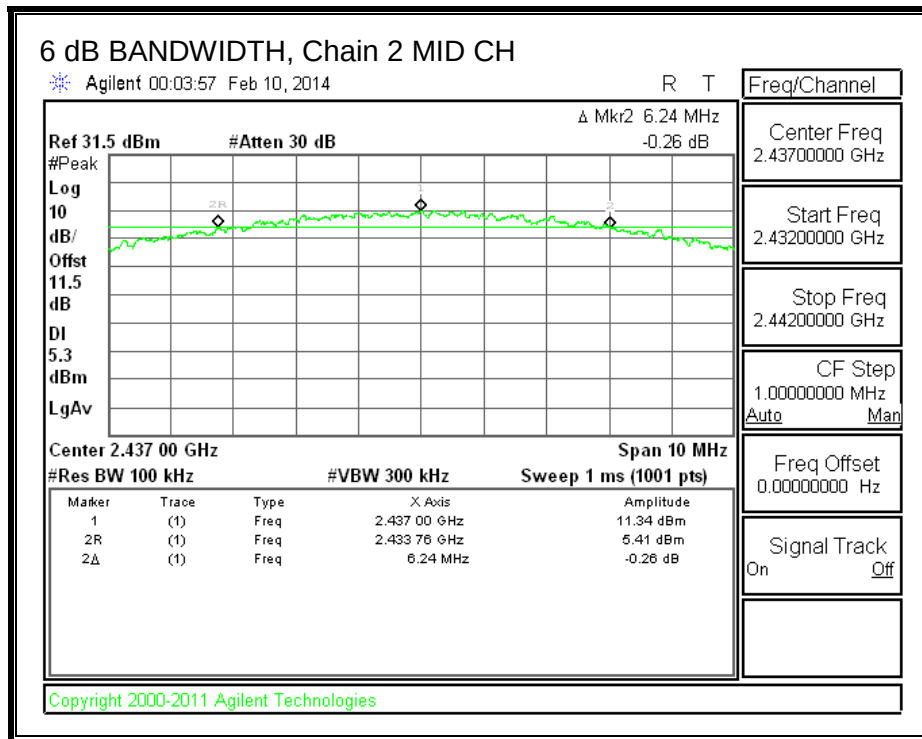
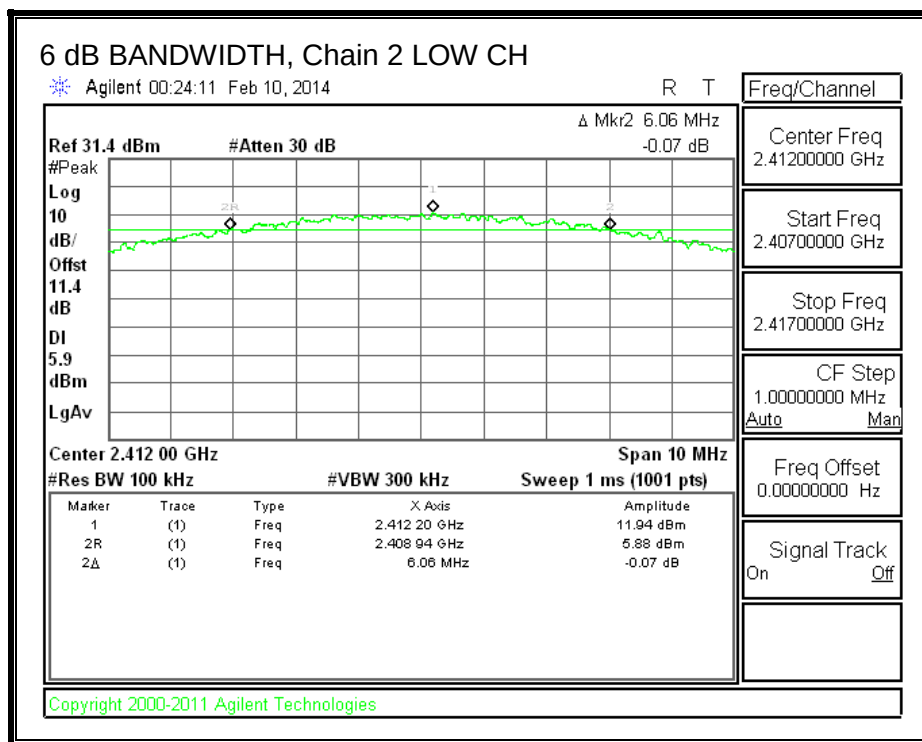


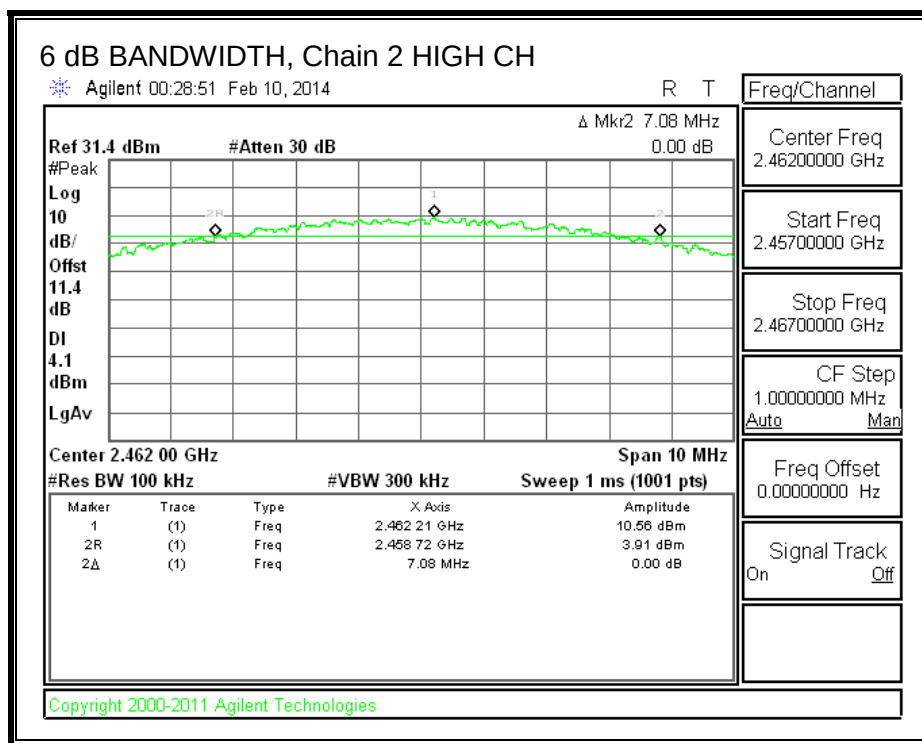
6 dB BANDWIDTH, Chain 1





6 dB BANDWIDTH, Chain 2





8.1.2. 99% BANDWIDTH

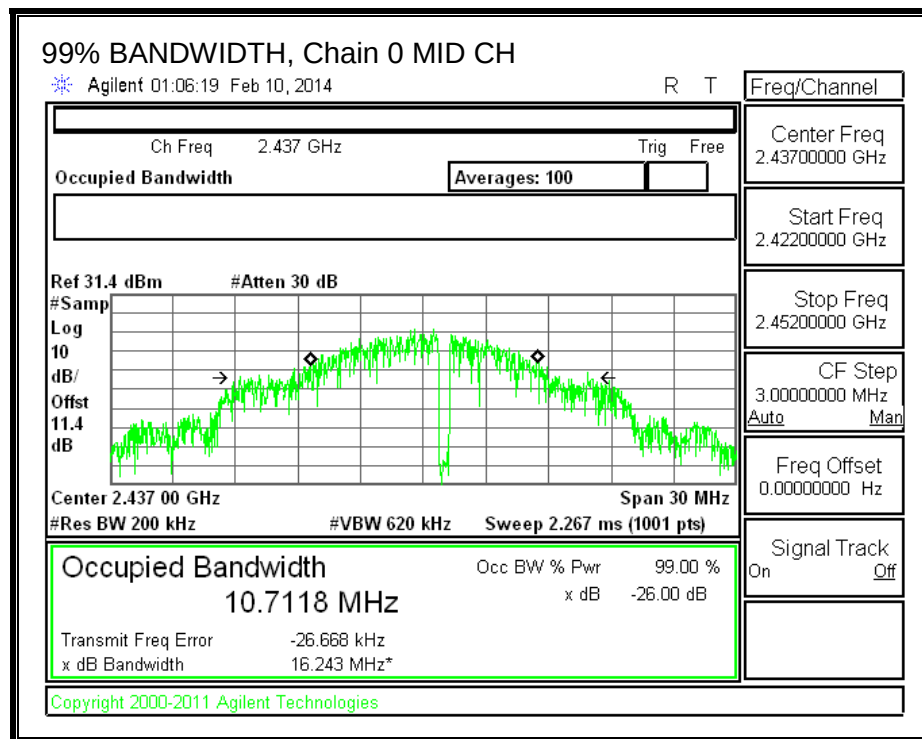
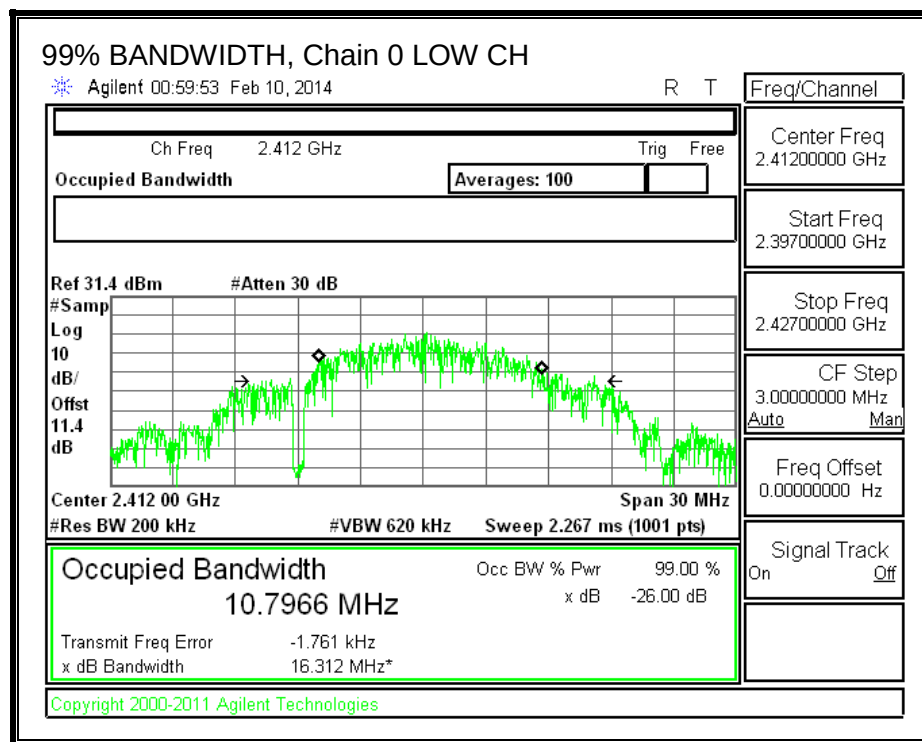
LIMITS

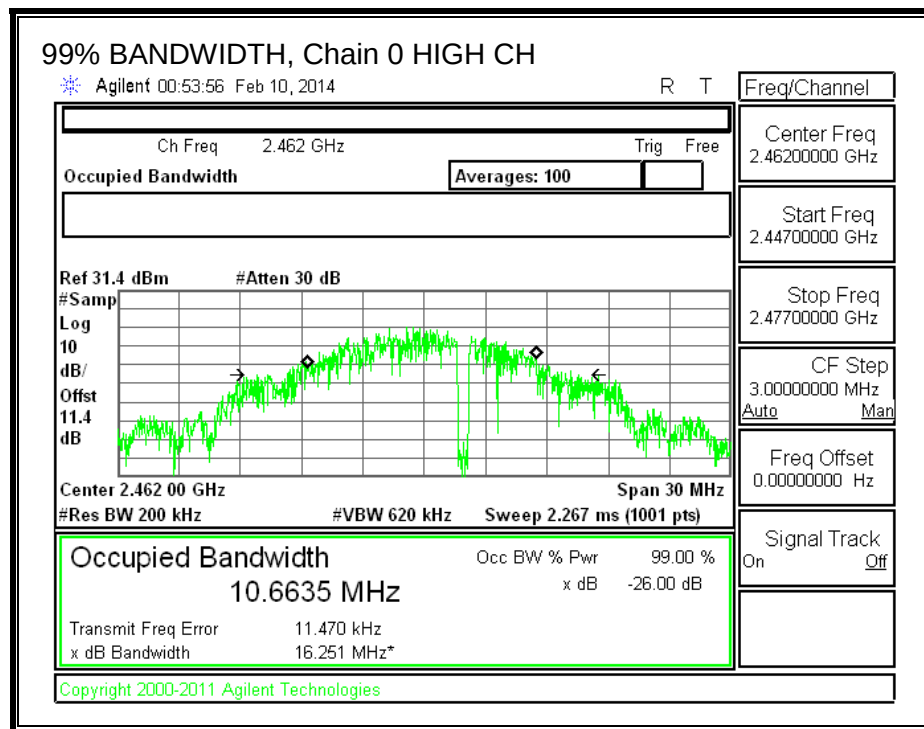
None; for reporting purposes only.

RESULTS

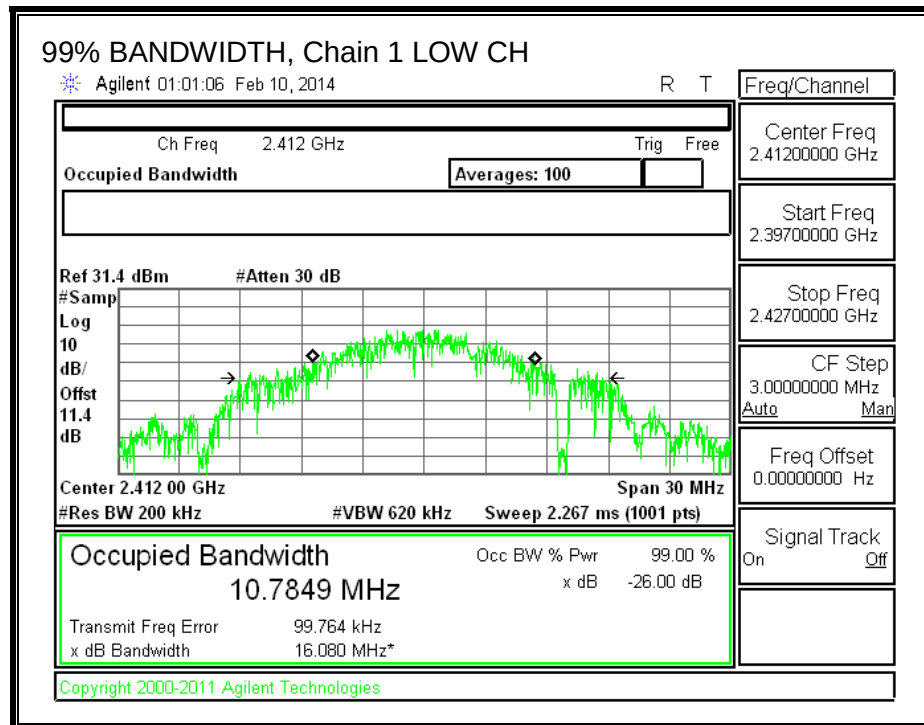
Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)	99% BW Chain 2 (MHz)
Low	2412	10.7966	10.7849	10.7675
Mid	2437	10.7118	10.7686	10.8263
High	2462	10.6635	10.8675	10.8079

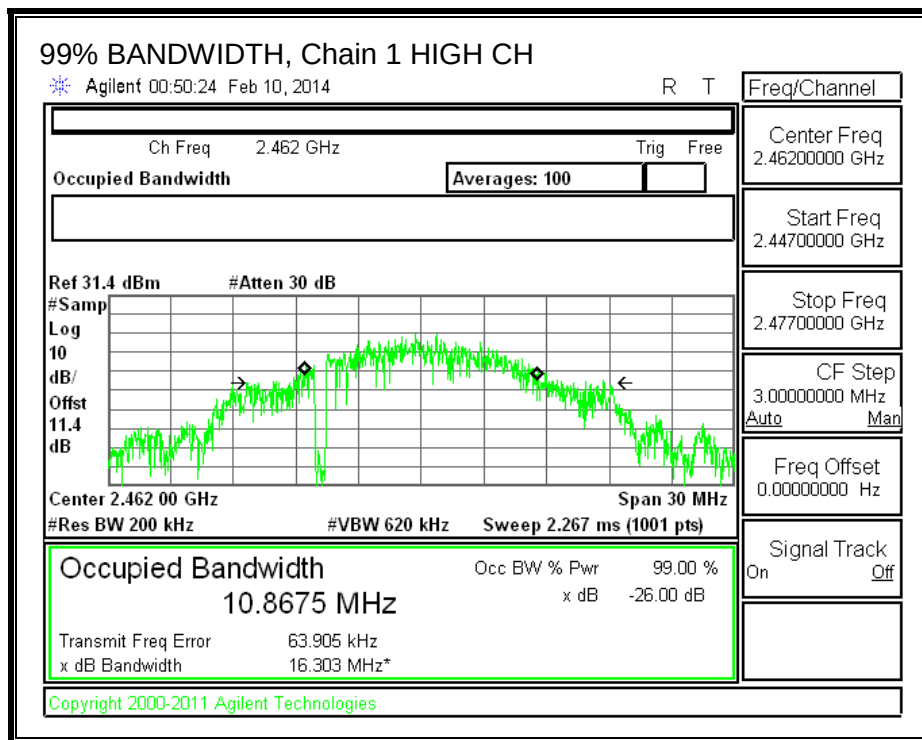
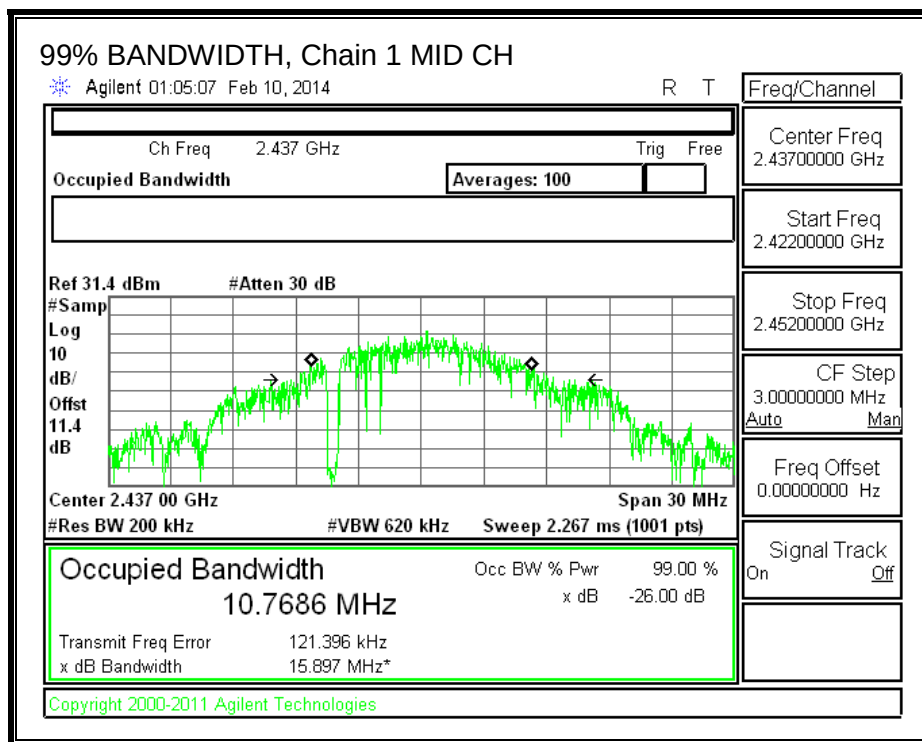
99% BANDWIDTH, Chain 0



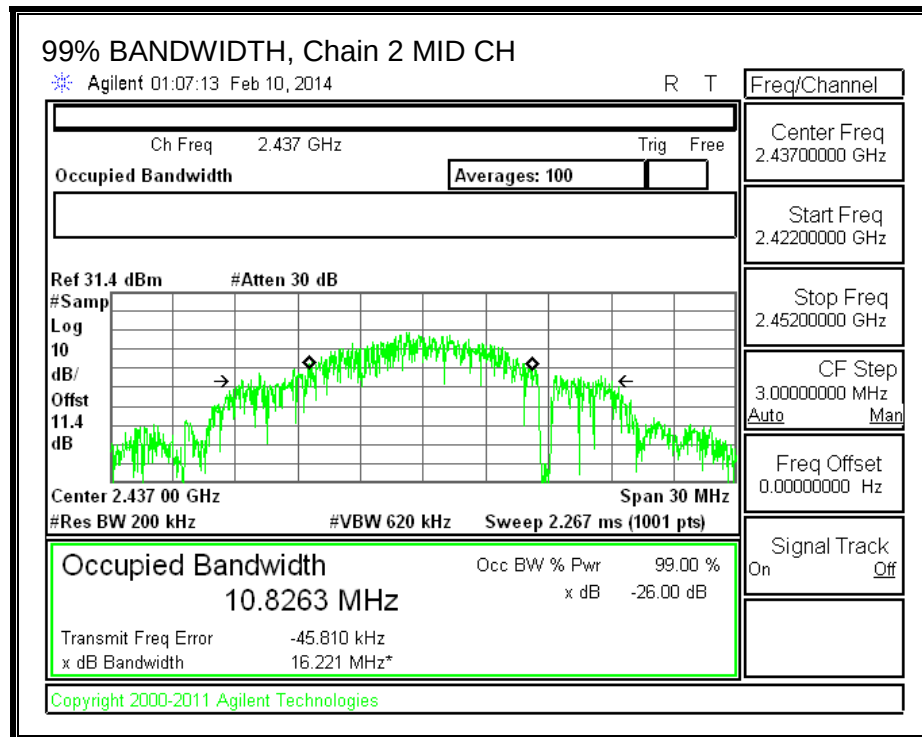
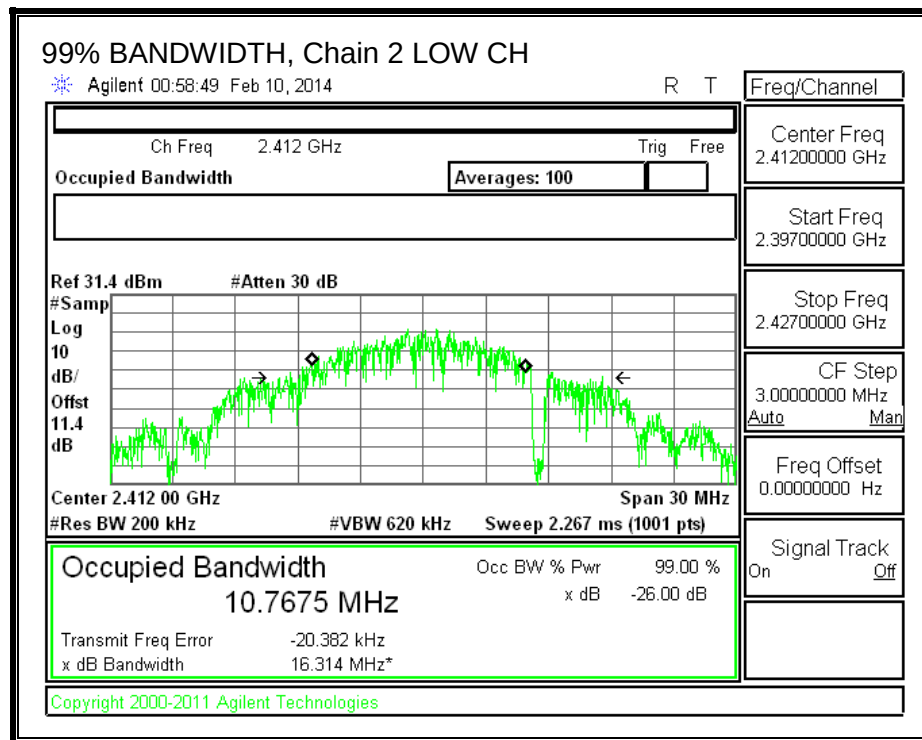


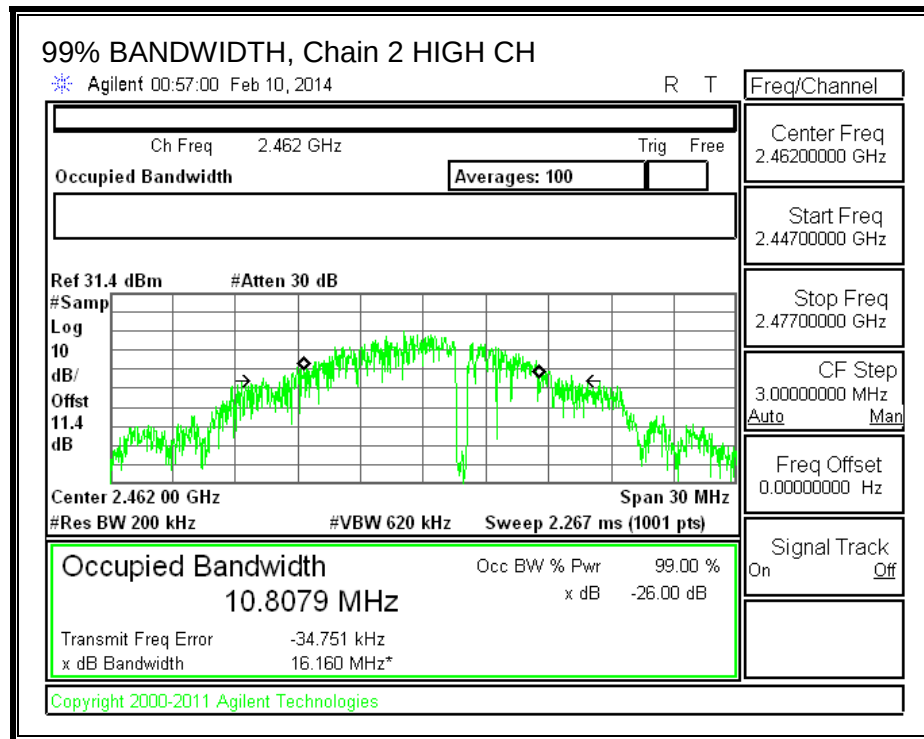
99% BANDWIDTH, Chain 1





99% BANDWIDTH, Chain 2





8.1.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11.4 dB (including 10 dB pad and 1.4 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

CALCULATION

Total Power (P) = $10 * \text{LOG}(10^{(P0/10)} + 10^{(P1/10)} + 10^{(P2/10)})$

RESULTS

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)
Low	2412	17.26	17.00	17.45	22.01
Mid	2437	17.31	17.08	16.92	21.88
High	2462	17.30	17.29	16.87	21.93

8.1.4. OUTPUT POWER

LIMITS

FCC §15.247

IC RSS-210 A8.4

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

CALCULATION

Directional Gain (G) = $10 * \text{LOG}((10^{(G0/10)} + 10^{(G1/10)} + 10^{(G2/10)})/3)$

Output Power (P) = $10 * \text{LOG}(10^{(P0/10)} + 10^{(P1/10)} + 10^{(P2/10)})$

DIRECTIONAL ANTENNA GAIN

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

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Chain 2 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
2.21	3.59	4.34	3.47

RESULTS

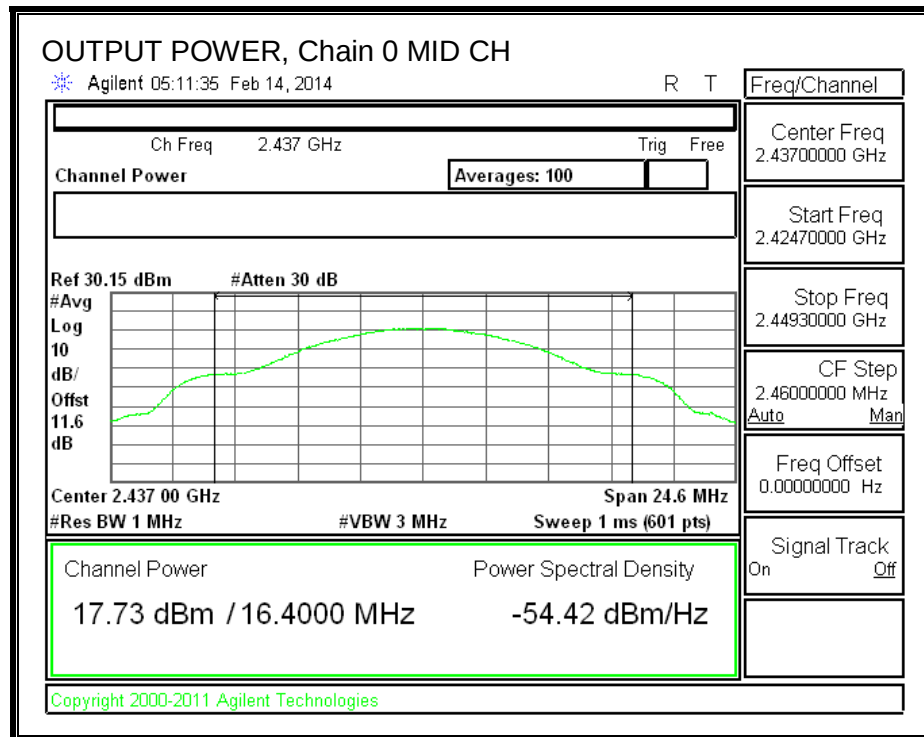
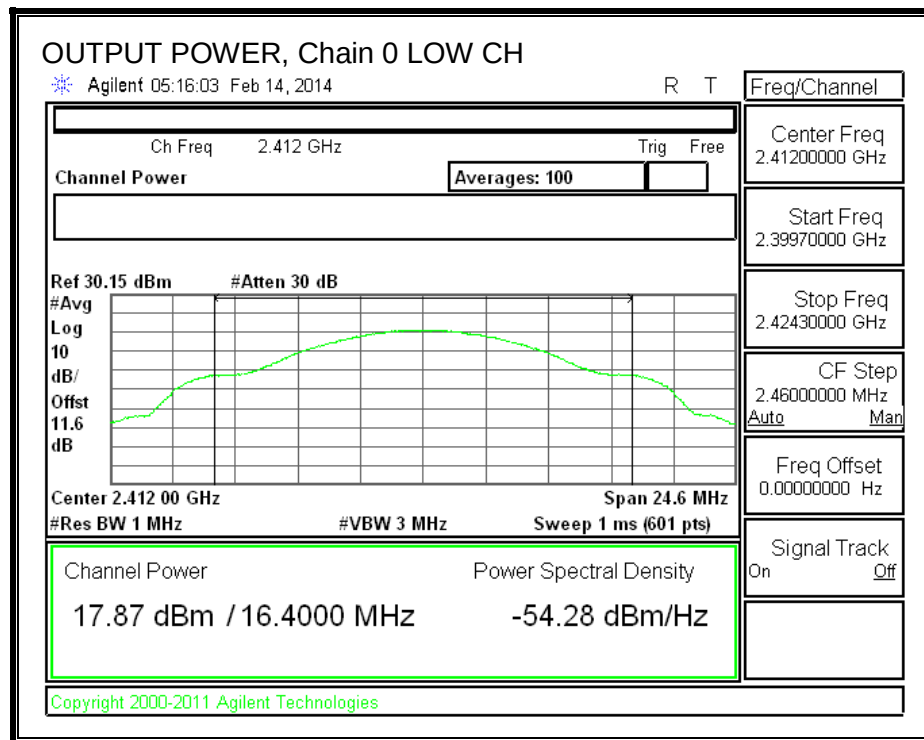
Limits

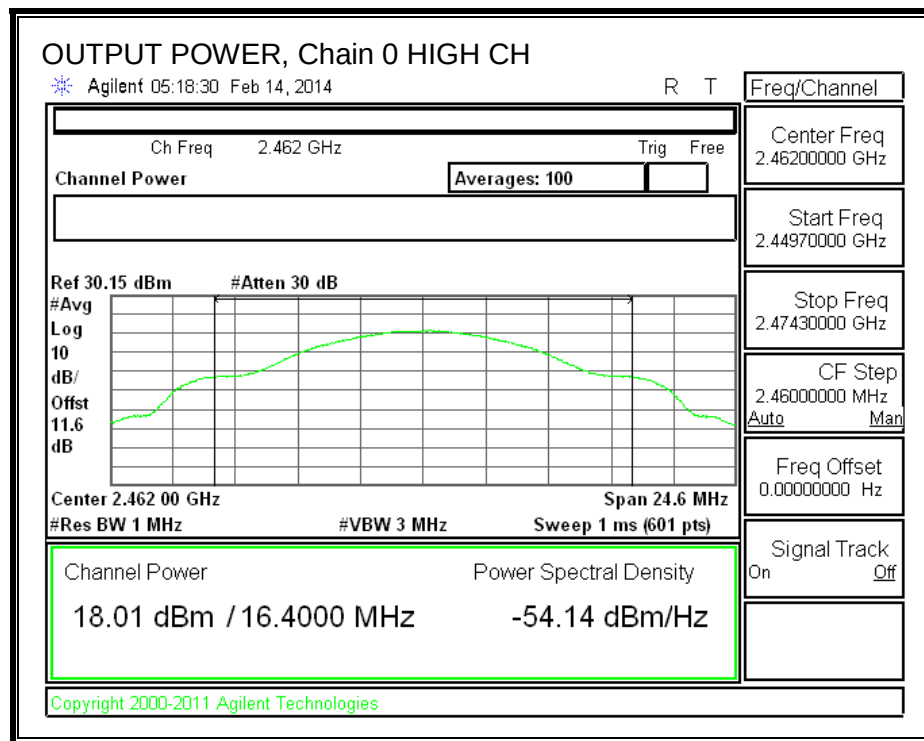
Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	3.47	30.00	30	36	30.00
Mid	2437	3.47	30.00	30	36	30.00
High	2462	3.47	30.00	30	36	30.00

Results

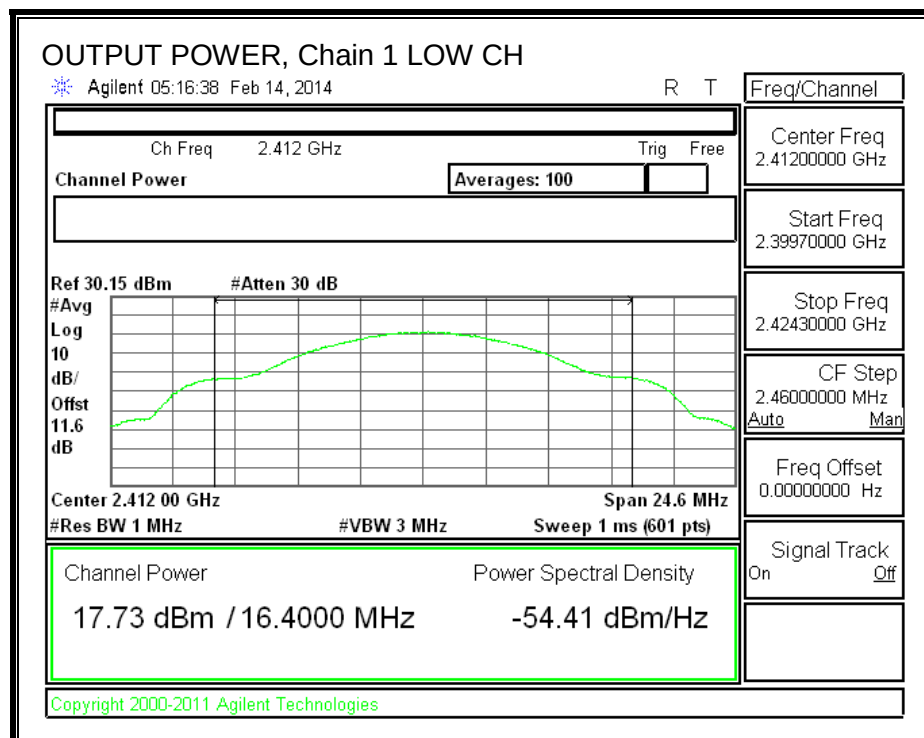
Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Chain 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	17.87	17.73	17.97	22.63	30.00	-7.37
Mid	2437	17.73	17.36	17.77	22.40	30.00	-7.60
High	2462	18.01	17.53	17.05	22.32	30.00	-7.68

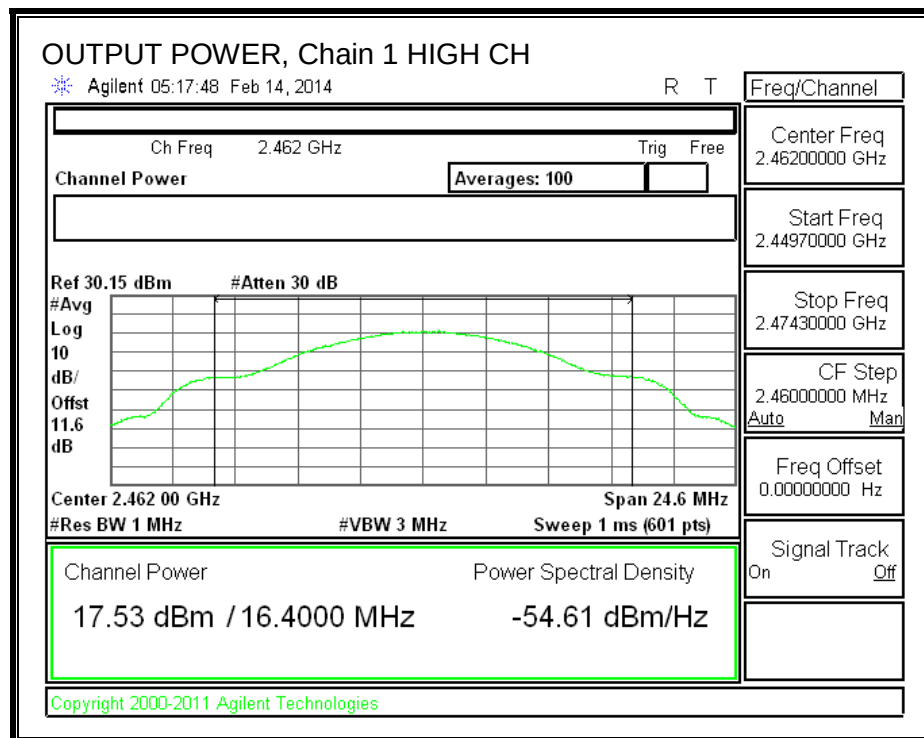
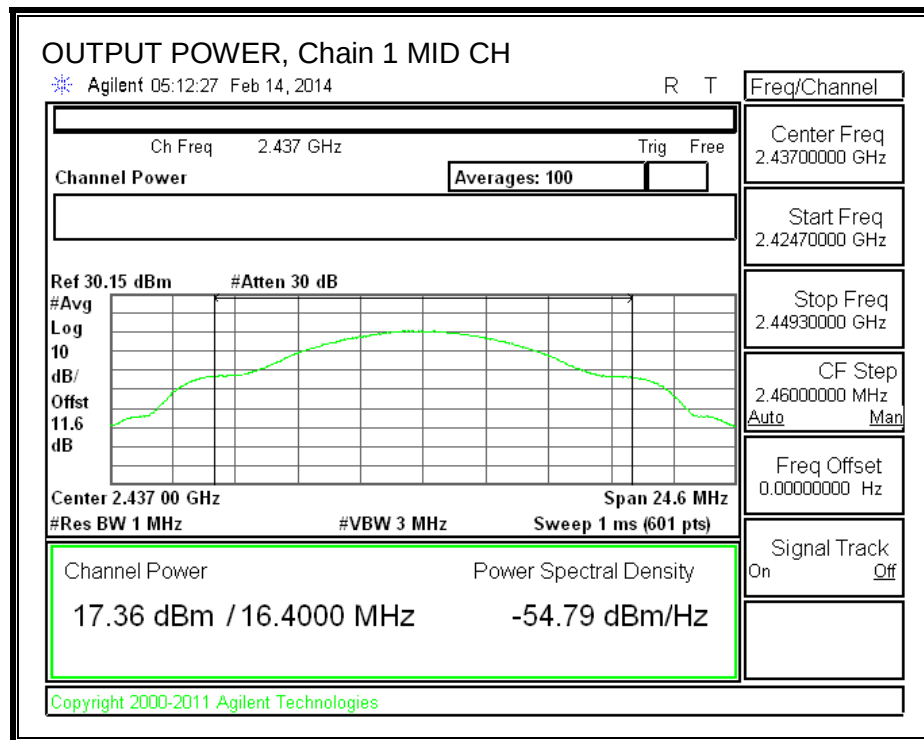
OUTPUT POWER, Chain 0



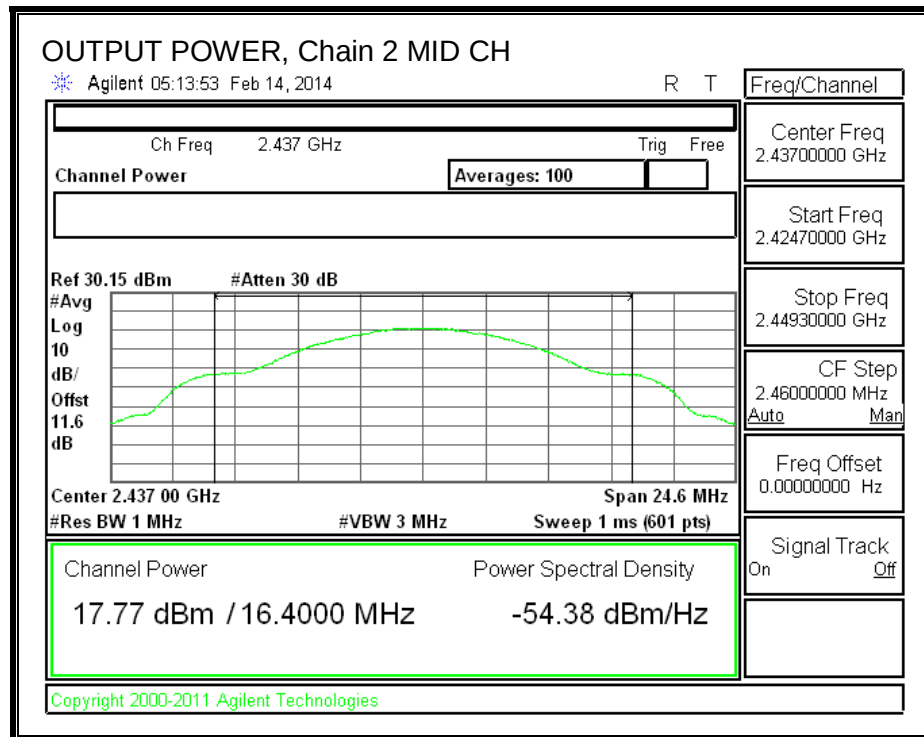
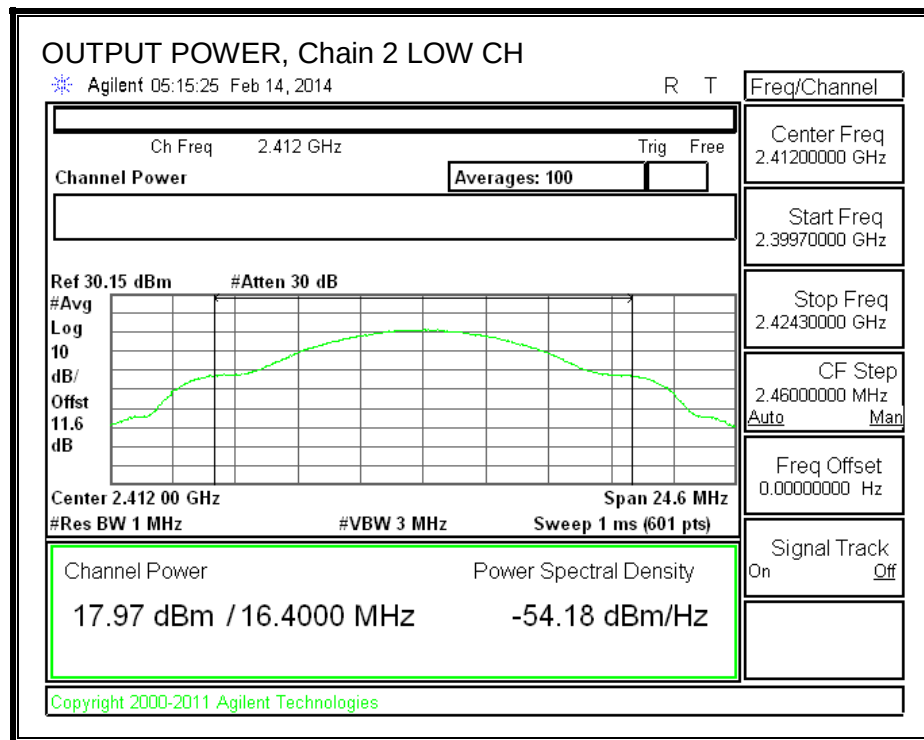


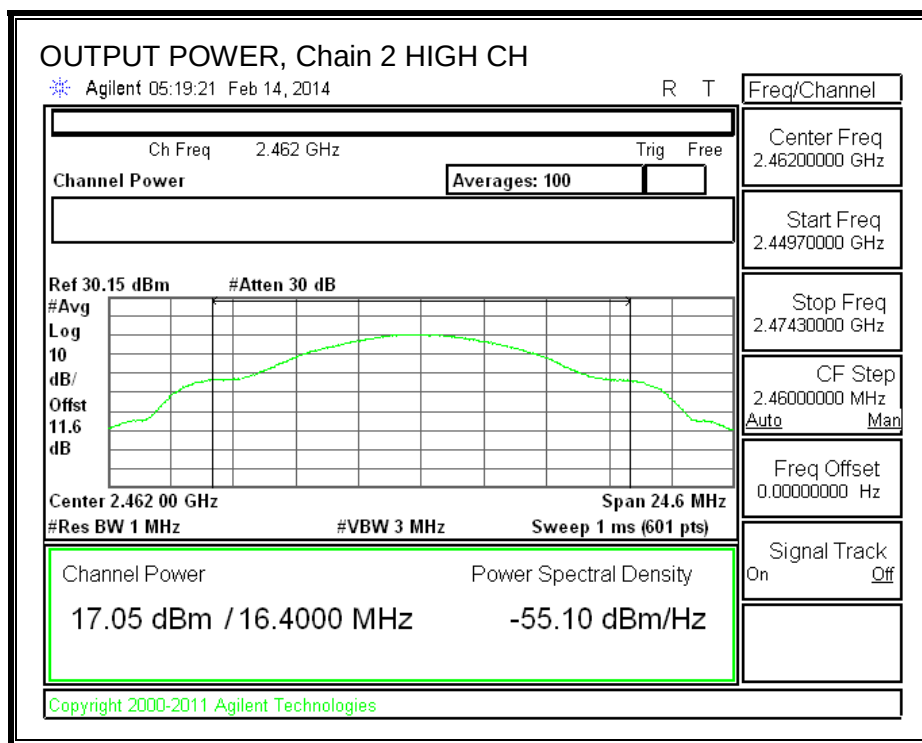
OUTPUT POWER, Chain 1





OUTPUT POWER, Chain 2





8.1.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247

IC RSS-210 A8.2

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

CALCULATION

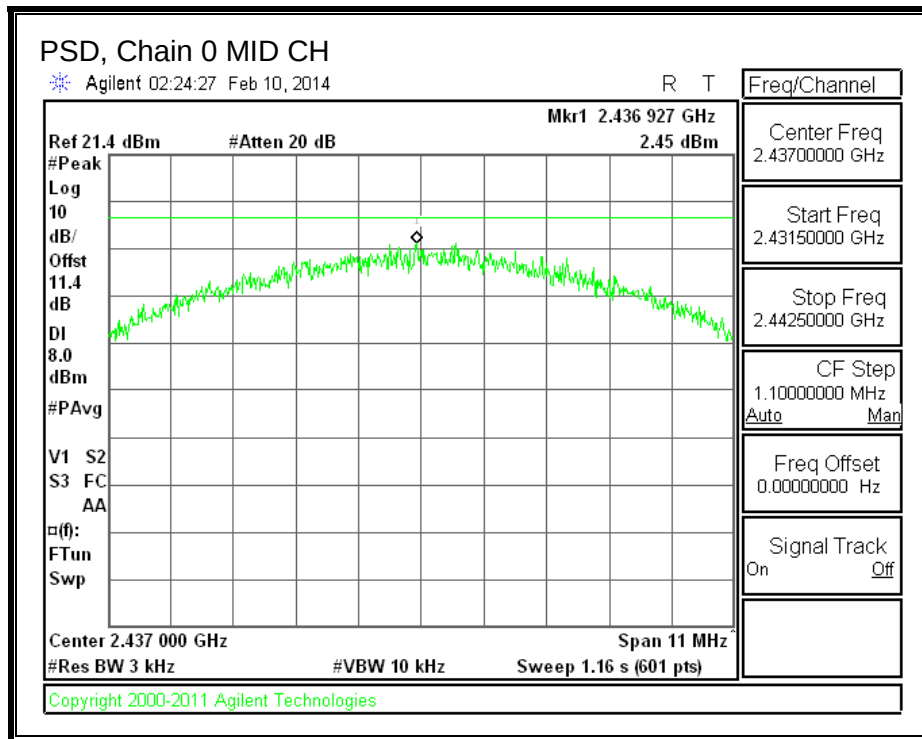
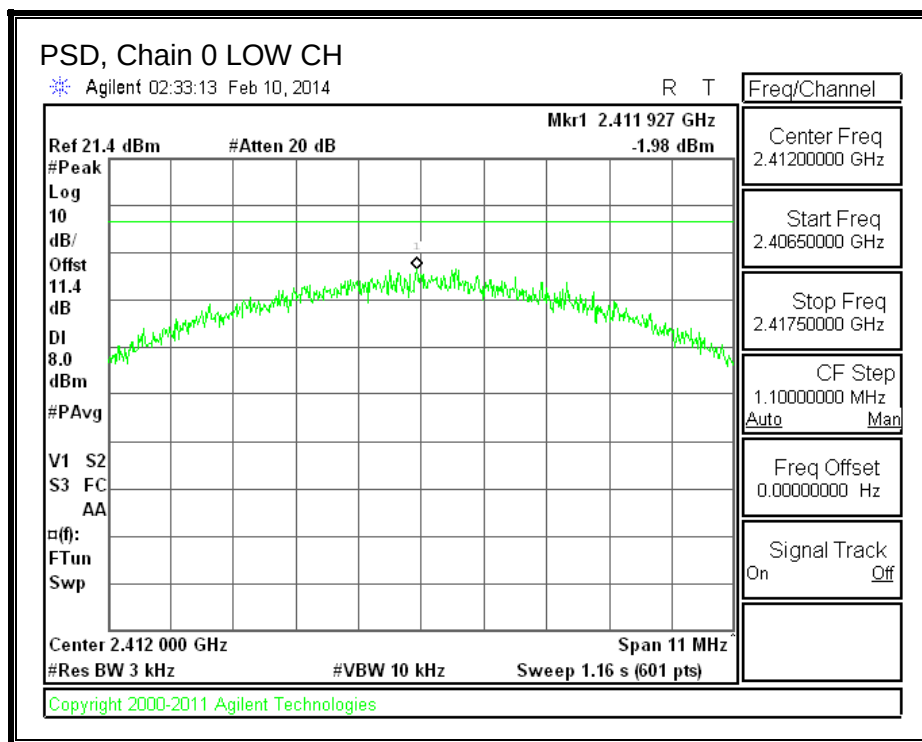
Power Spectral Density = $10 * \text{LOG}(10^{(\text{PSD0}/10)} + 10^{(\text{PSD1}/10)} + 10^{(\text{PSD2}/10)})$

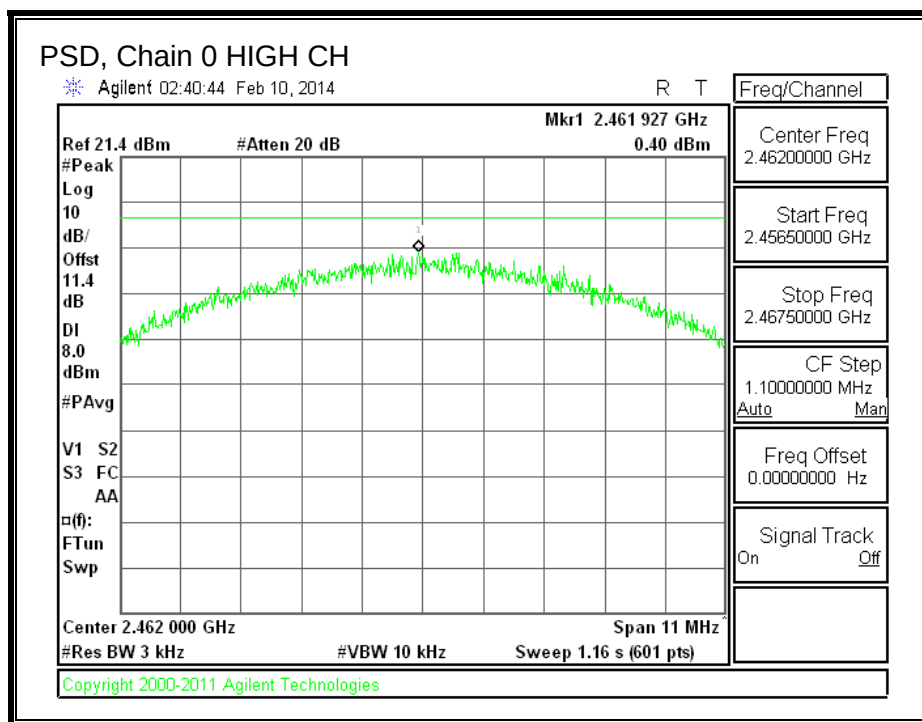
RESULTS

PSD Results

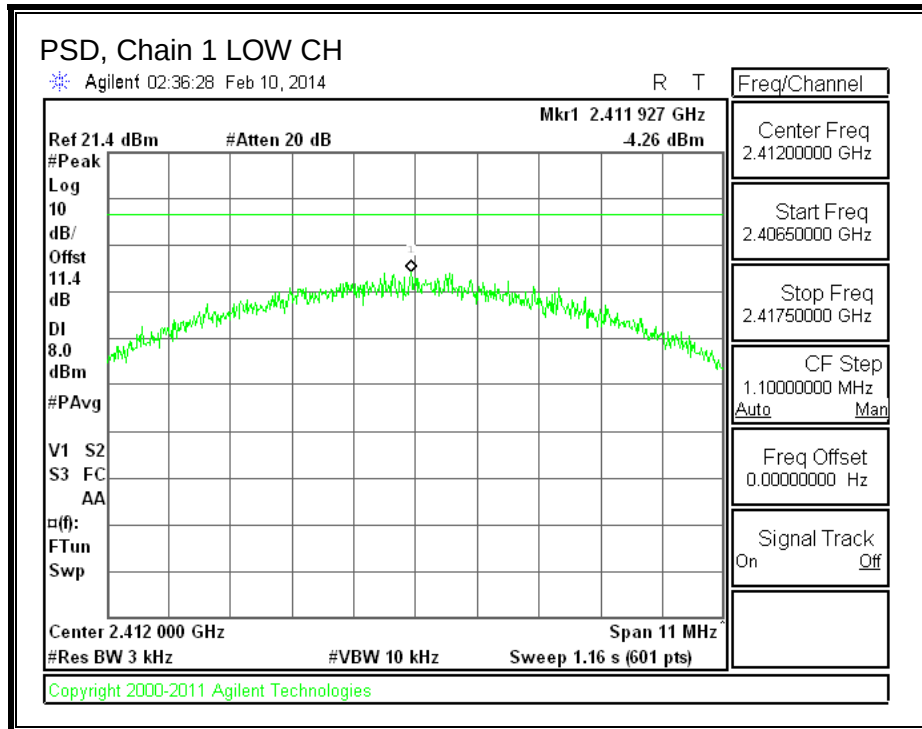
Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Chain 1 Meas (dBm)	Chain 2 Meas (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-1.98	-4.26	-2.08	2.12	8.0	-5.9
Mid	2437	2.45	1.21	1.48	6.52	8.0	-1.5
High	2462	0.40	-1.36	-0.95	4.20	8.0	-3.8

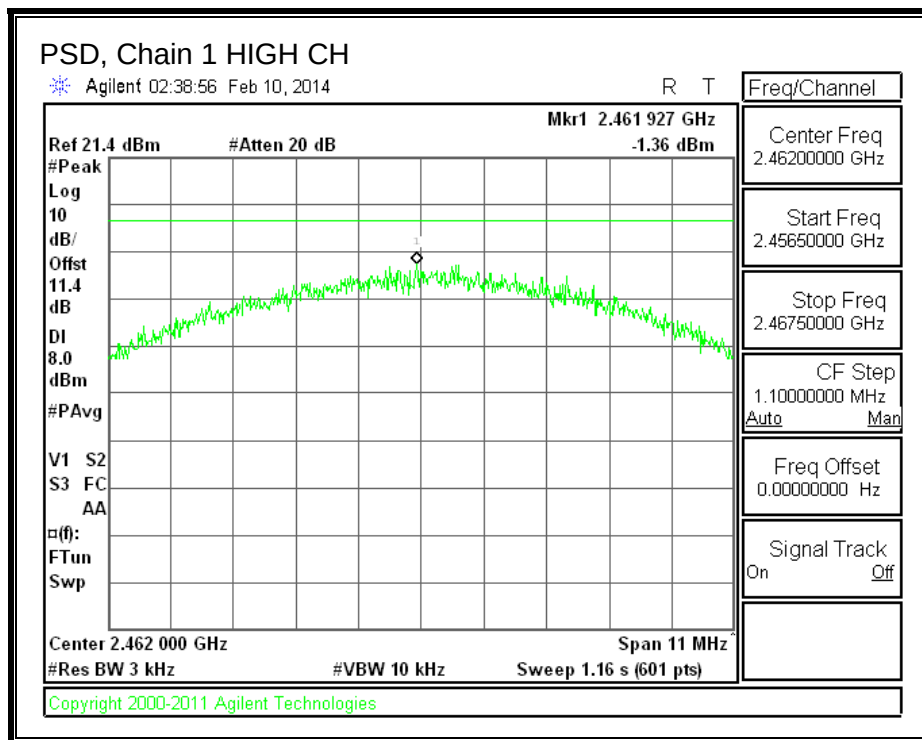
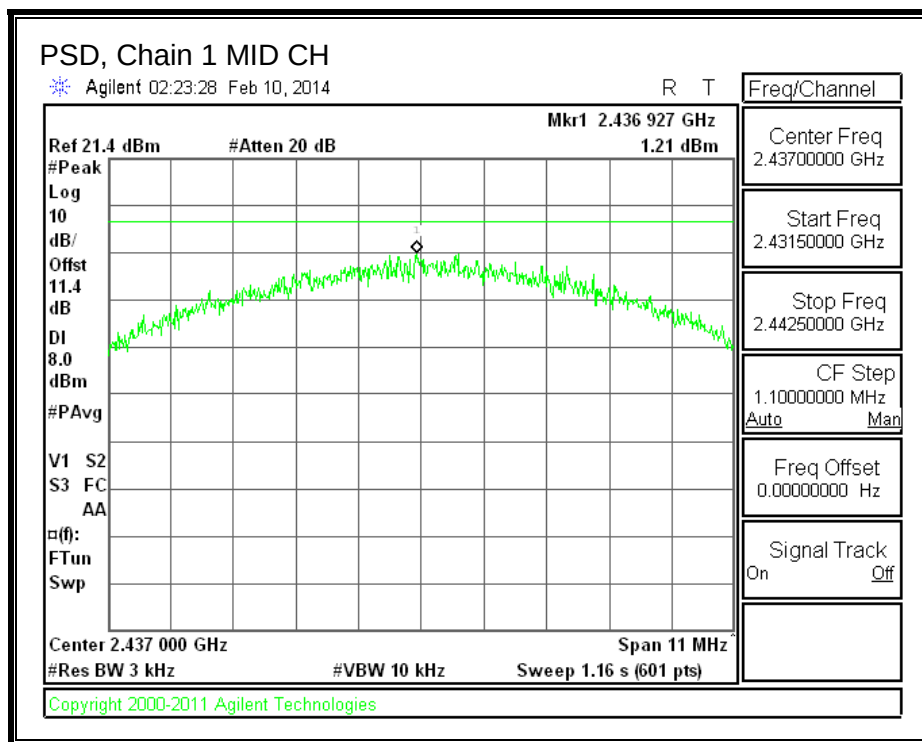
PSD, Chain 0



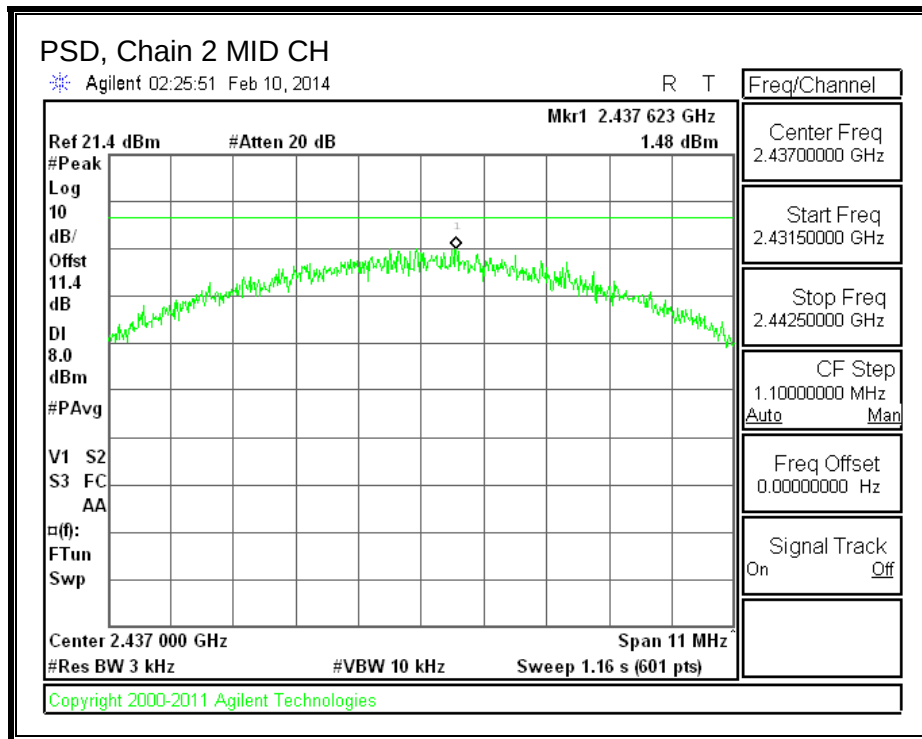
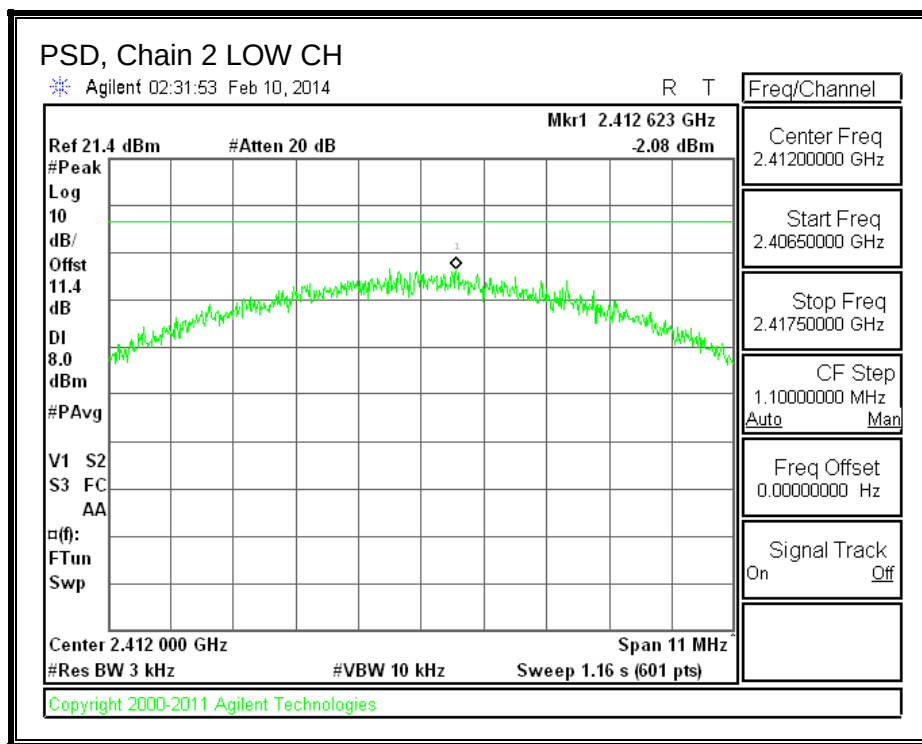


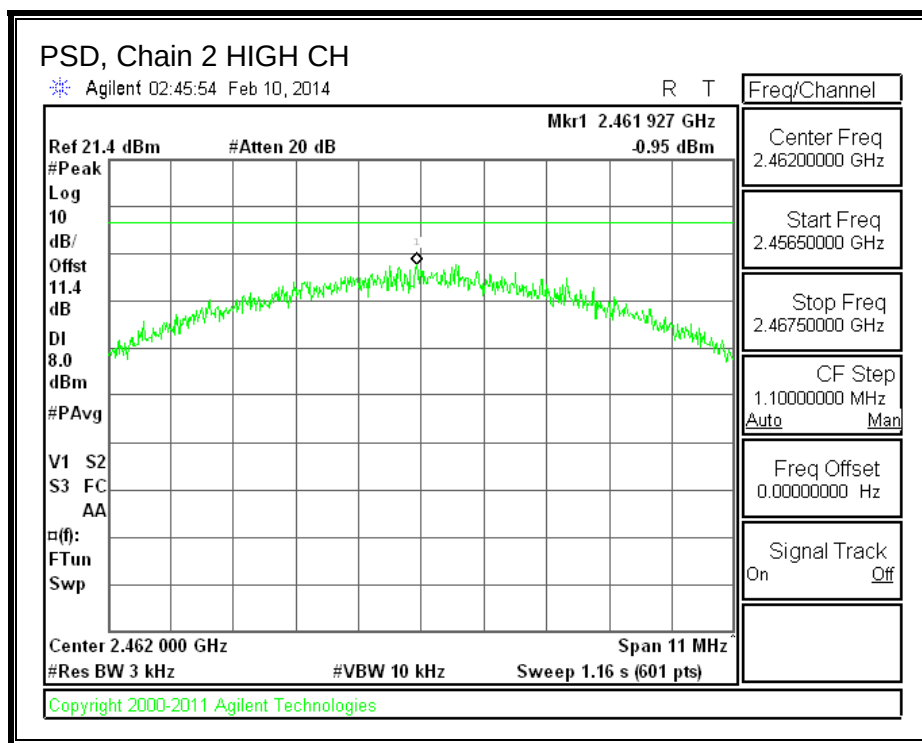
PSD, Chain 1





PSD, Chain 2





8.1.6. OUT-OF-BAND EMISSIONS

LIMITS

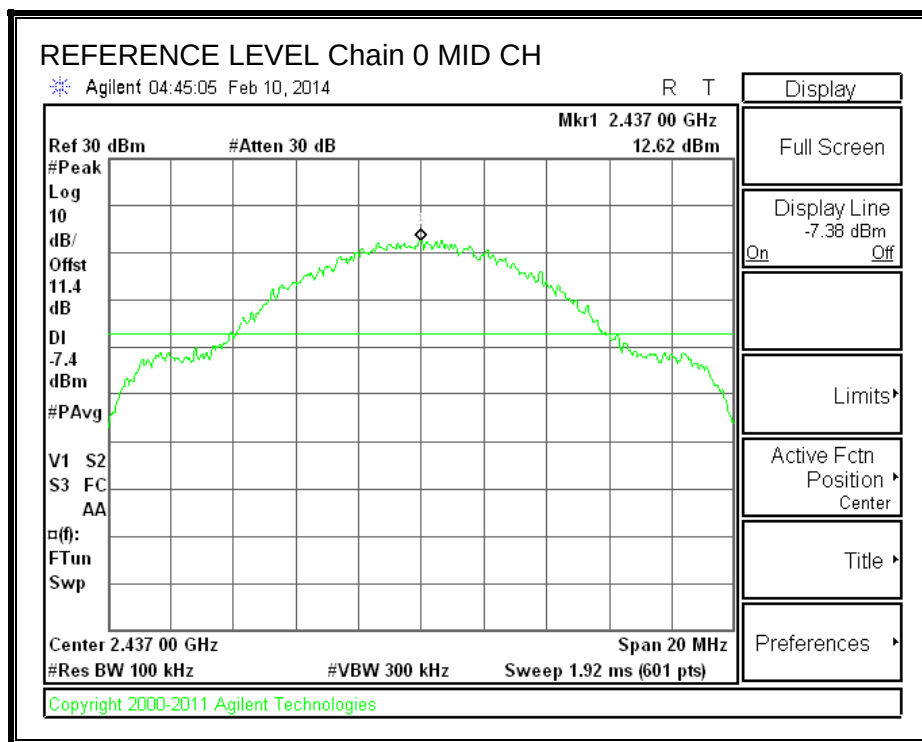
FCC §15.247 (d)

IC RSS-210 A8.5

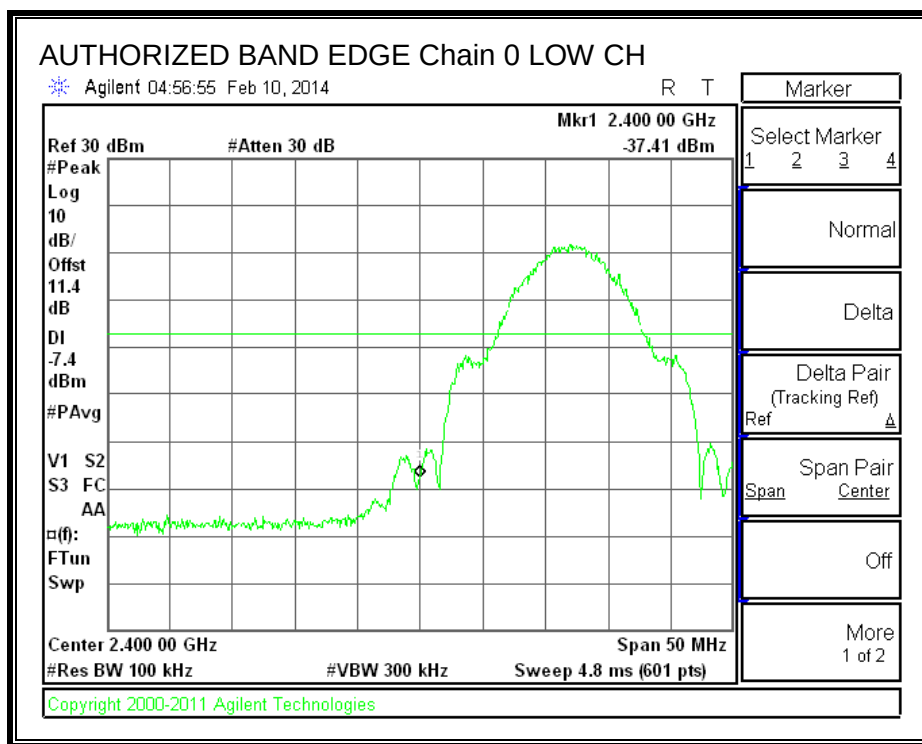
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the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

RESULTS

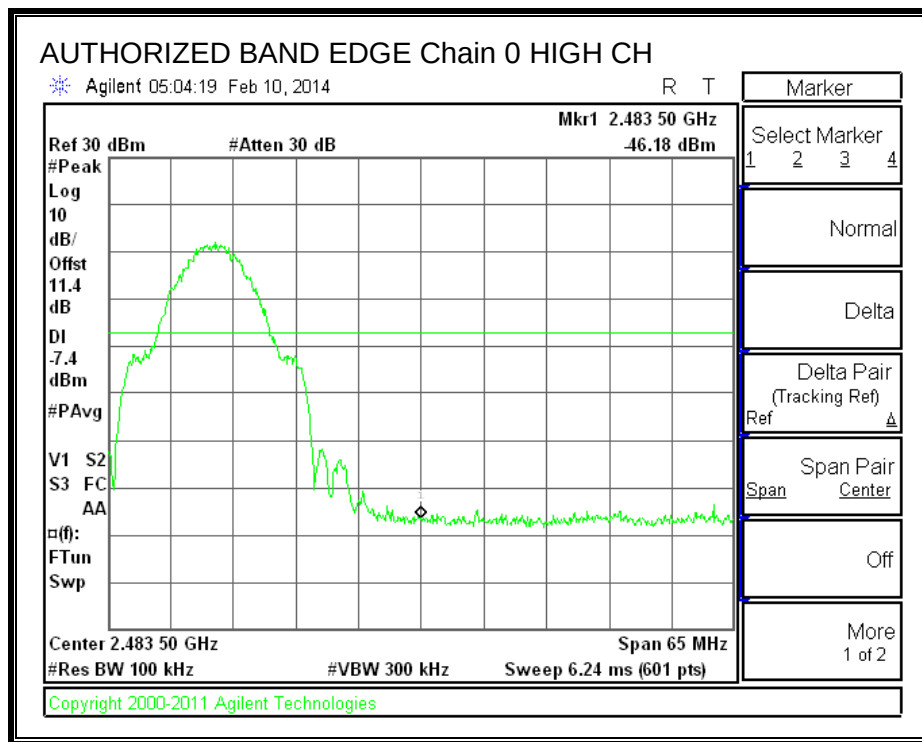
IN-BAND REFERENCE LEVEL, Chain 0



LOW CHANNEL BANDEDGE, Chain 0

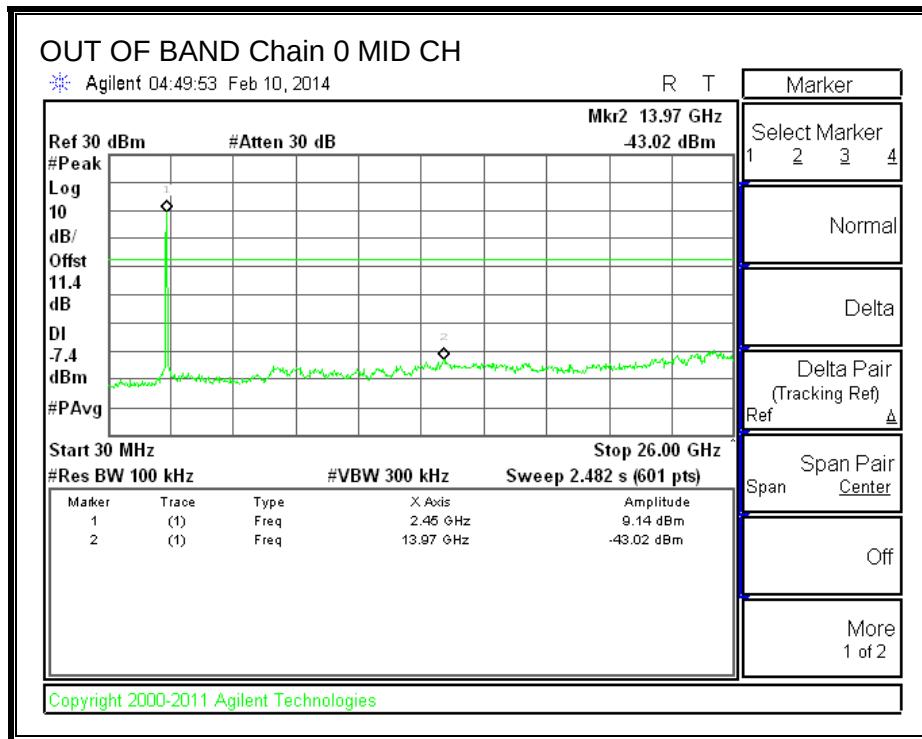
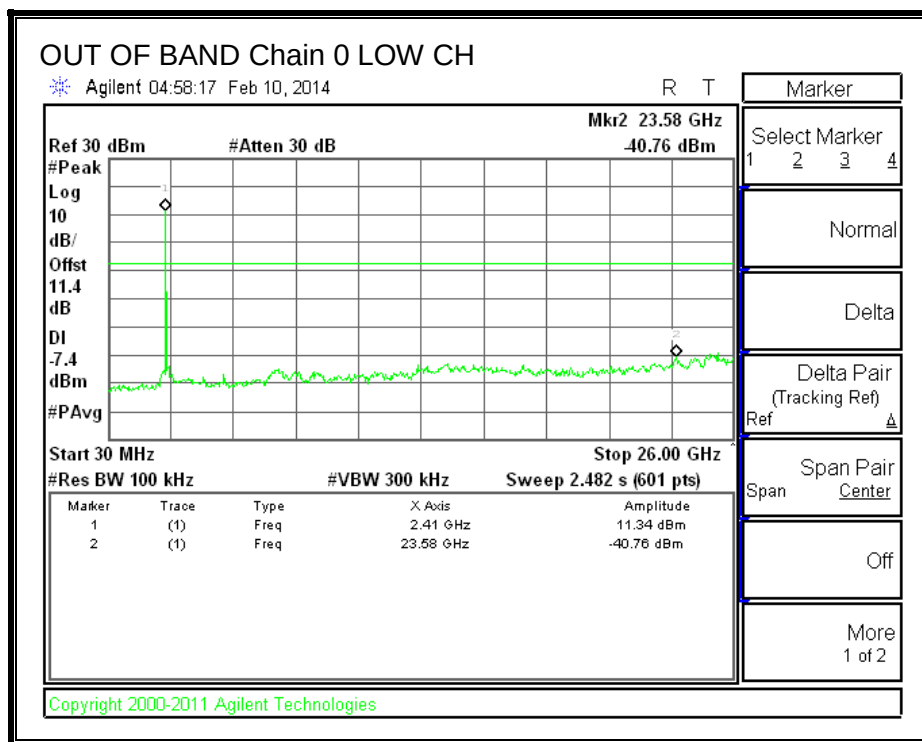


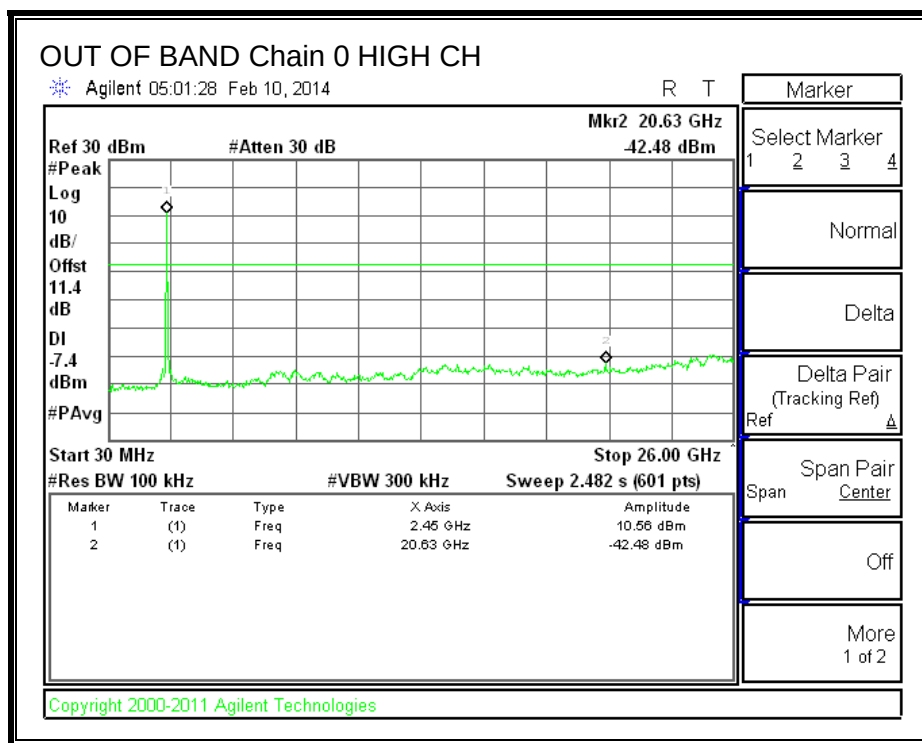
HIGH CHANNEL BANDEDGE, Chain 0



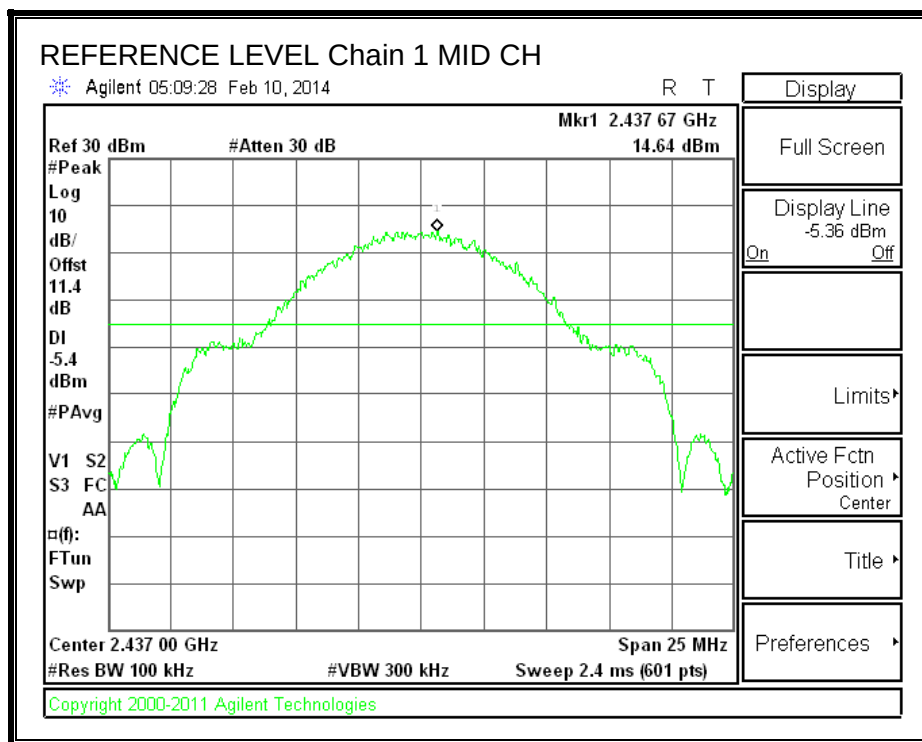
b mode Chain 0			
Limit is Based on 20dBc Peak Power			
Frequency (GHz)	Corrected (dBm)	Peak Limit (dBm)	PK Margin (dB)
2.4000	-37.41	-7.4	-30.01
2.4835	-46.18	-7.4	-38.78

OUT-OF-BAND EMISSIONS, Chain 0

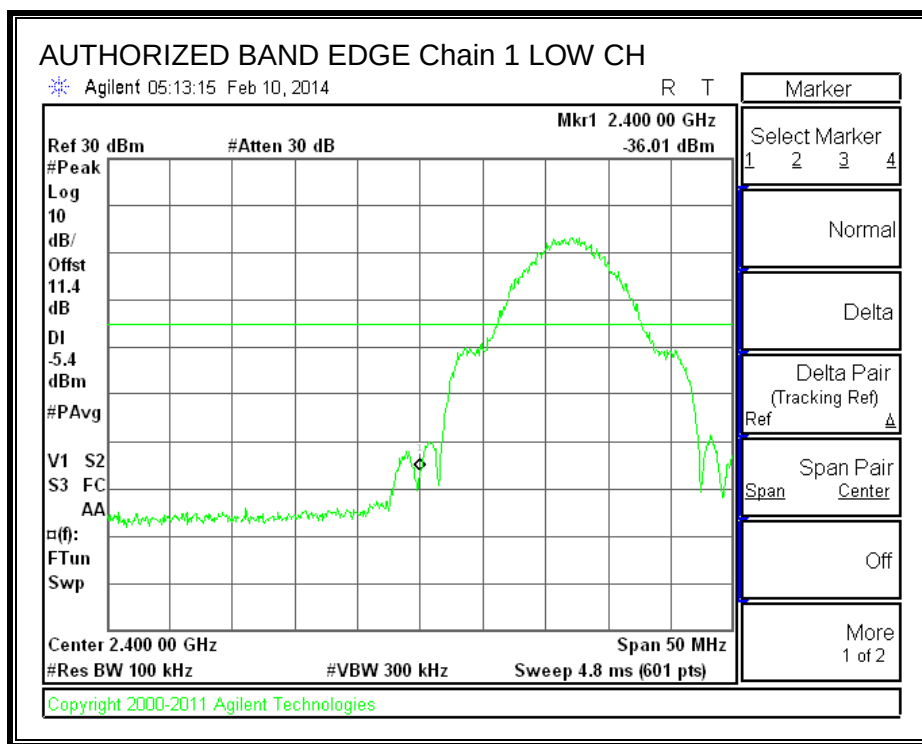




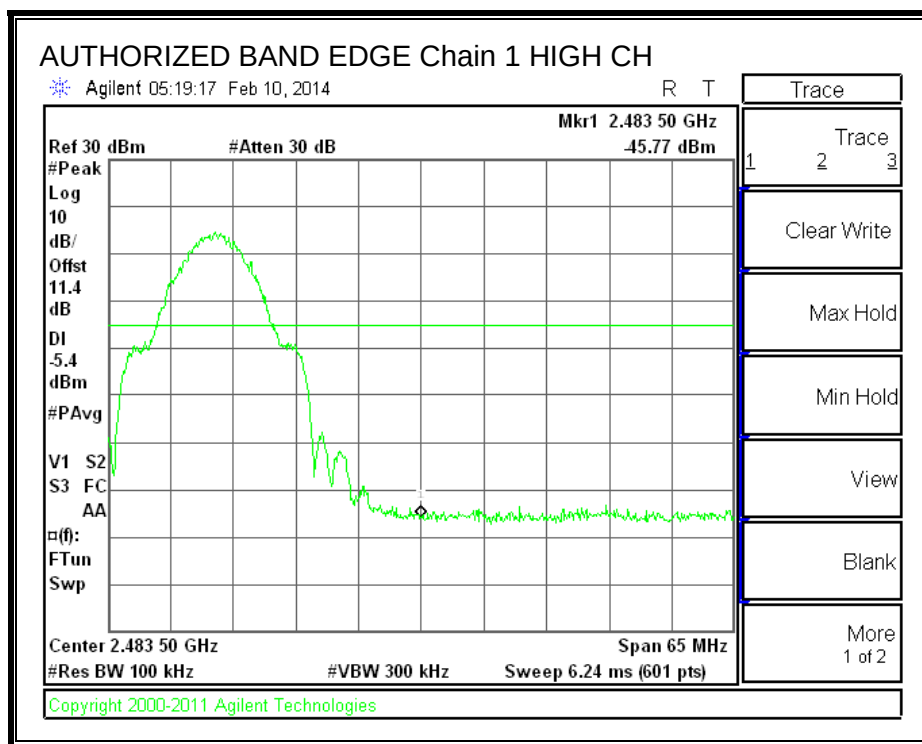
IN-BAND REFERENCE LEVEL, Chain 1



LOW CHANNEL BANDEDGE, Chain 1

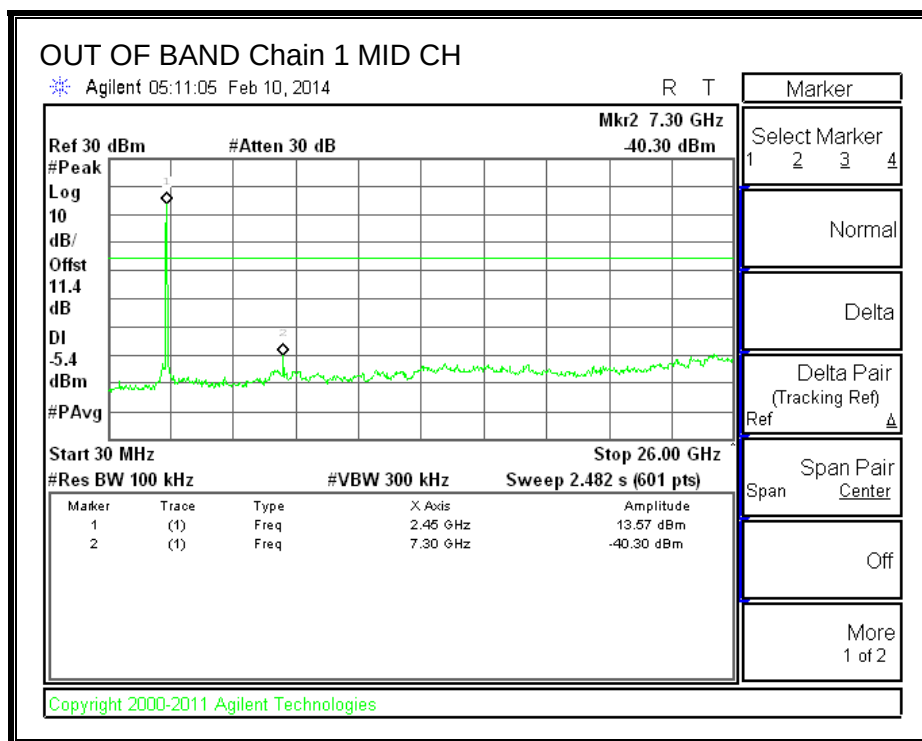
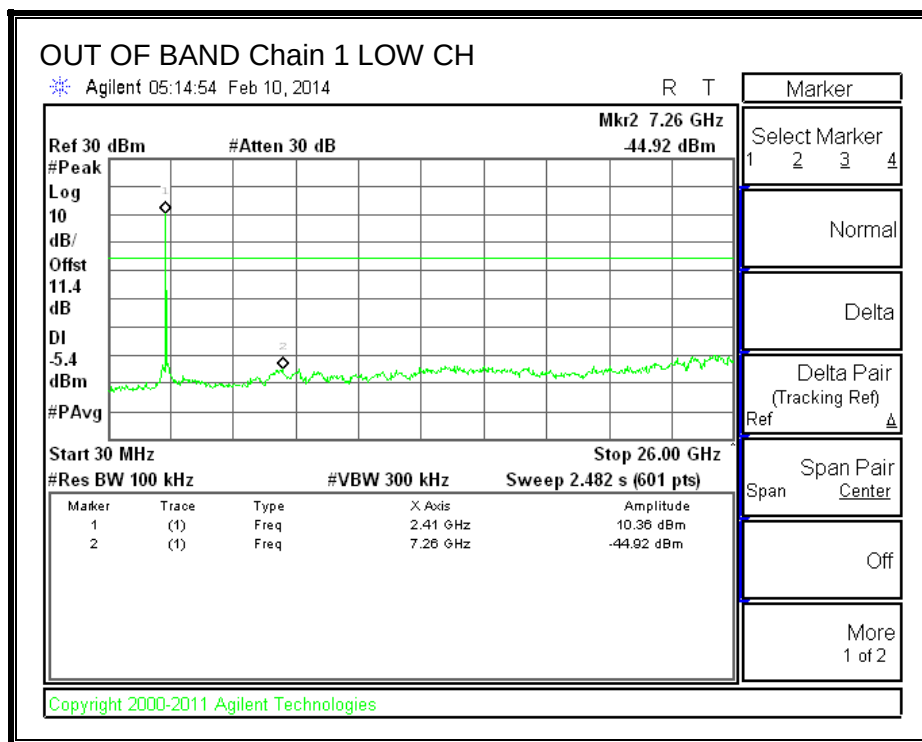


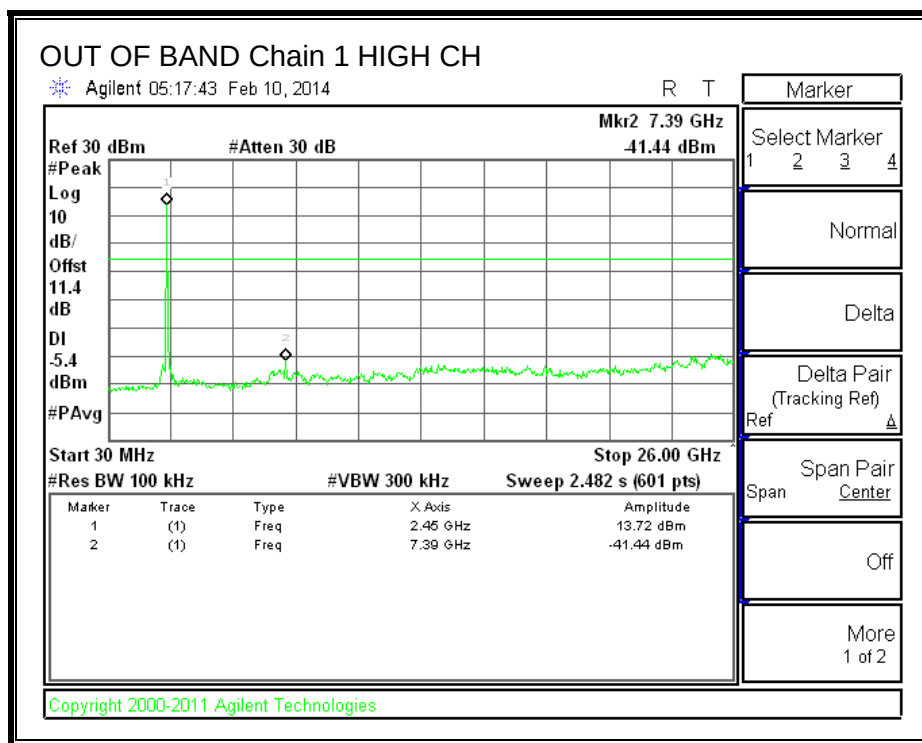
HIGH CHANNEL BANDEDGE, Chain 1



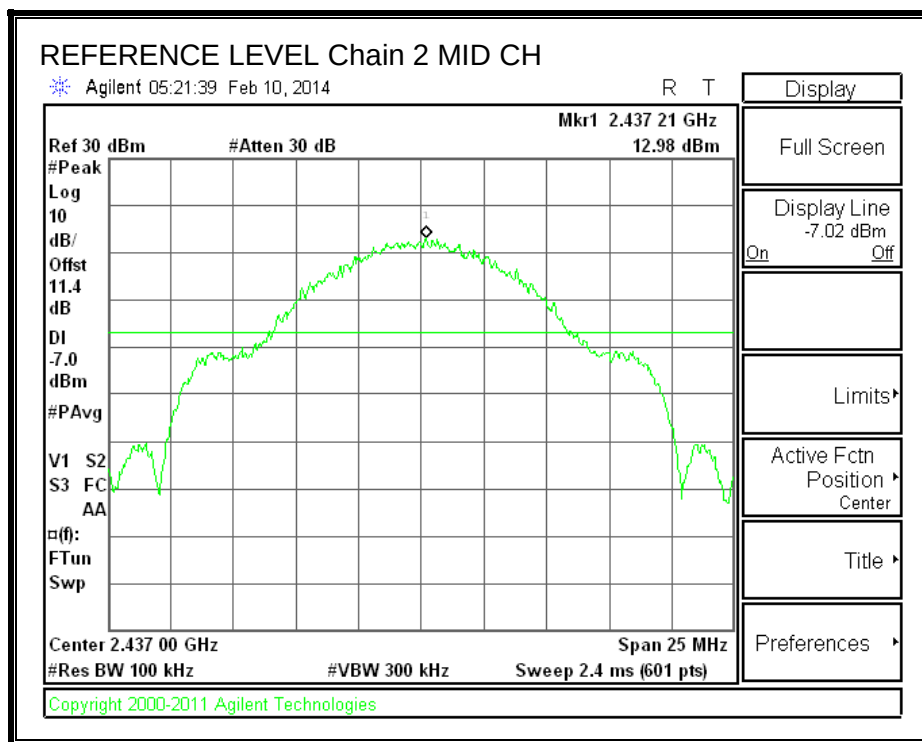
b mode Chain 1			
Limit is Based on 20dBc Peak Power			
Frequency (GHz)	Corrected (dBm)	Peak Limit (dBm)	PK Margin (dB)
2.4000	-36.01	-5.4	-30.61
2.4835	-45.77	-5.4	-40.37

OUT-OF-BAND EMISSIONS, Chain 1

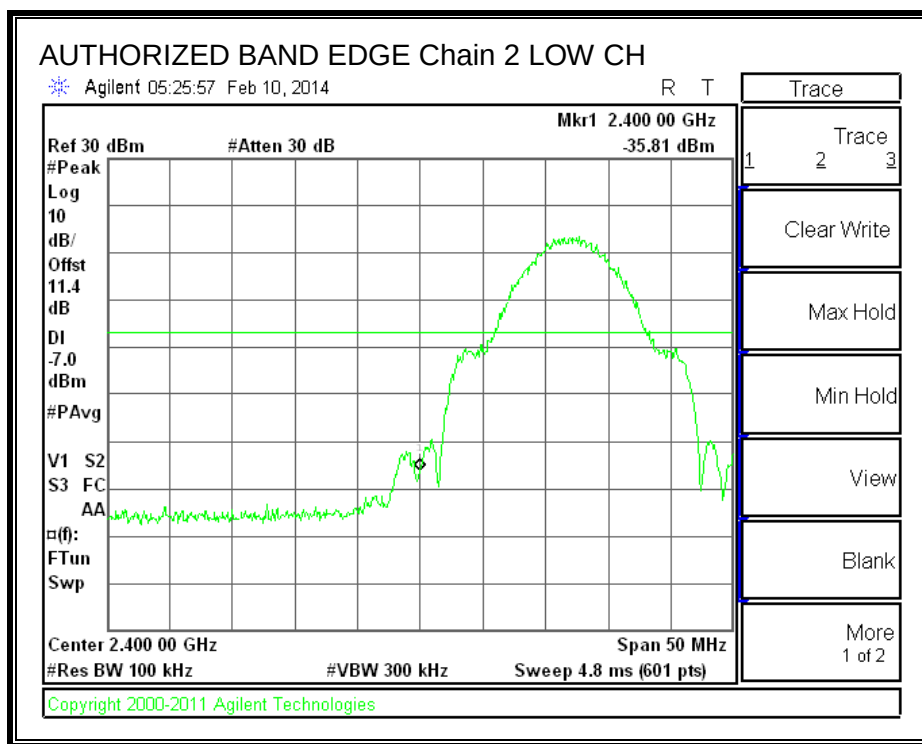




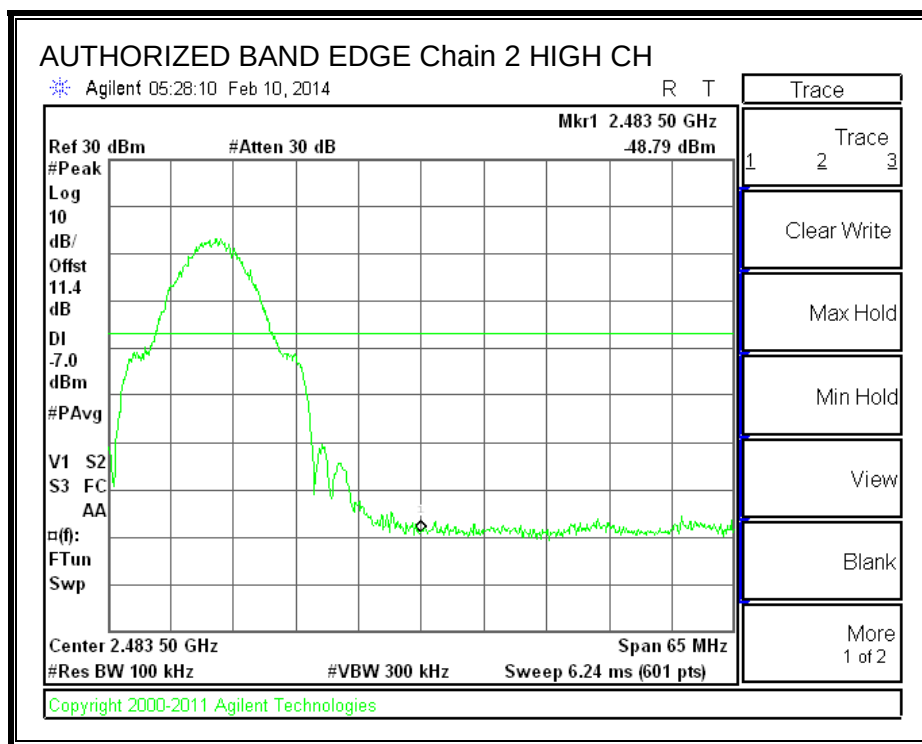
IN-BAND REFERENCE LEVEL, Chain 2



LOW CHANNEL BANDEDGE, Chain 2

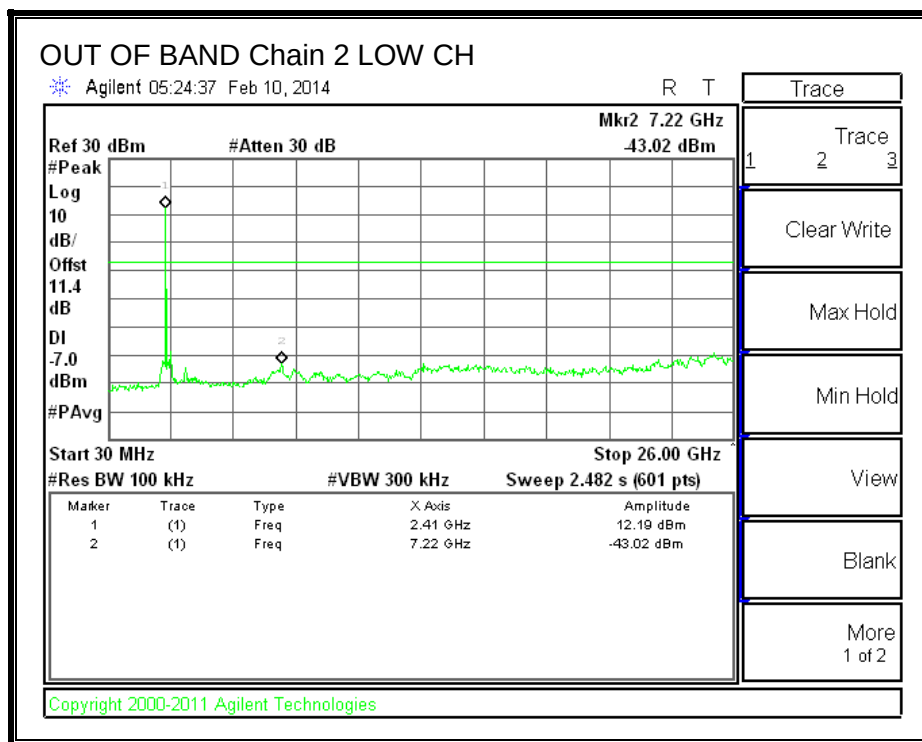


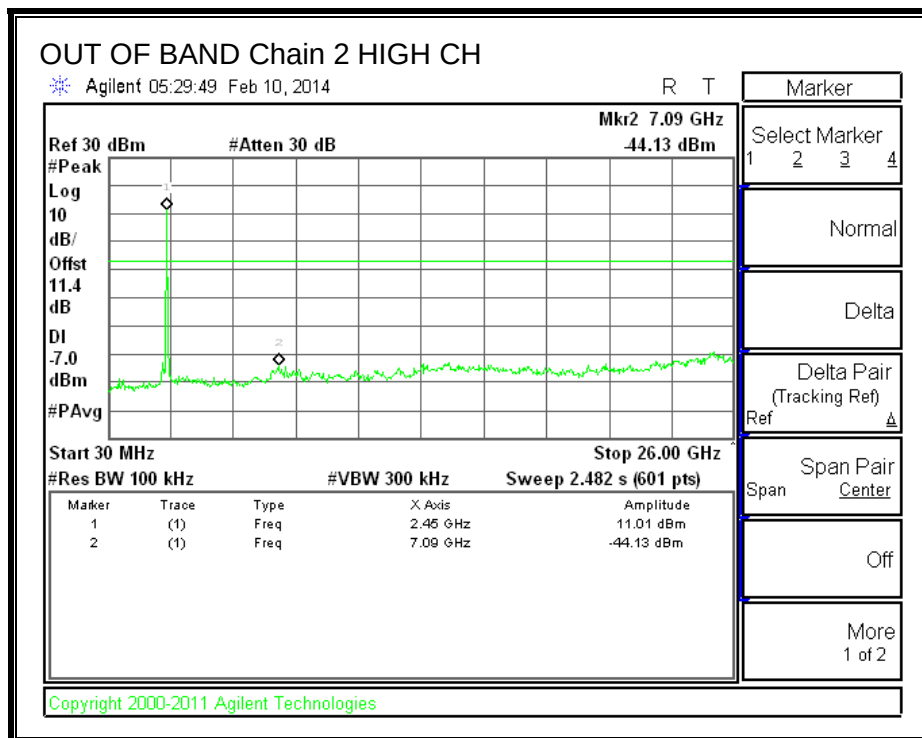
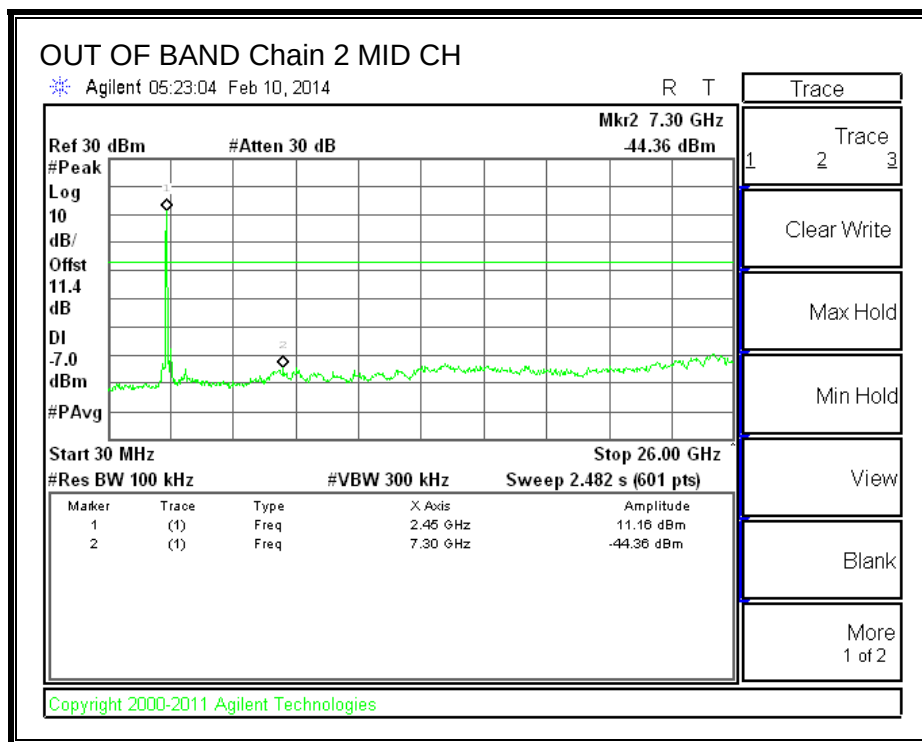
HIGH CHANNEL BANDEDGE, Chain 2



b mode Chain 2			
Limit is Based on 20dBc Peak Power			
Frequency (GHz)	Corrected (dBm)	Peak Limit (dBm)	PK Margin (dB)
2.4000	-35.81	-7.0	-28.81
2.4835	-48.79	-7.0	-41.79

OUT-OF-BAND EMISSIONS, Chain 2





8.2. 802.11g MODE IN THE 2.4 GHz BAND

8.2.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

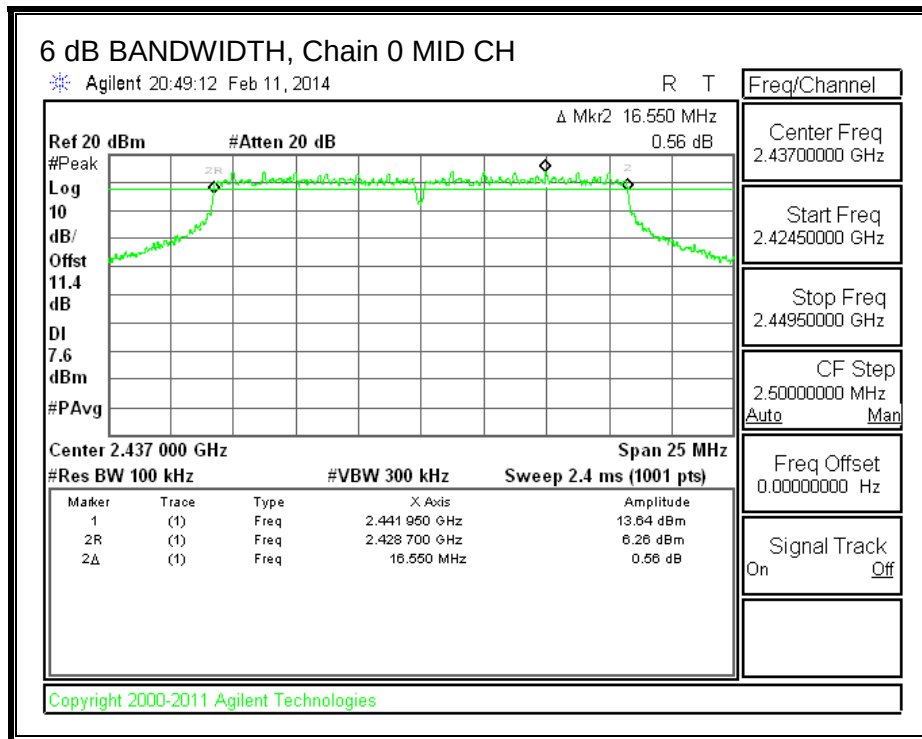
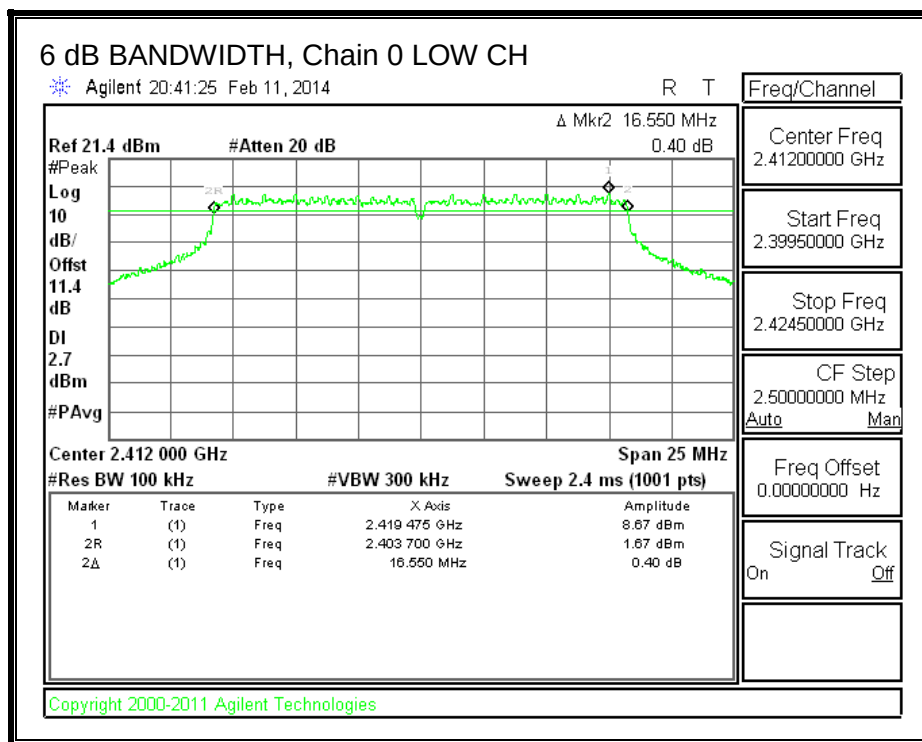
IC RSS-210 A8.2 (a)

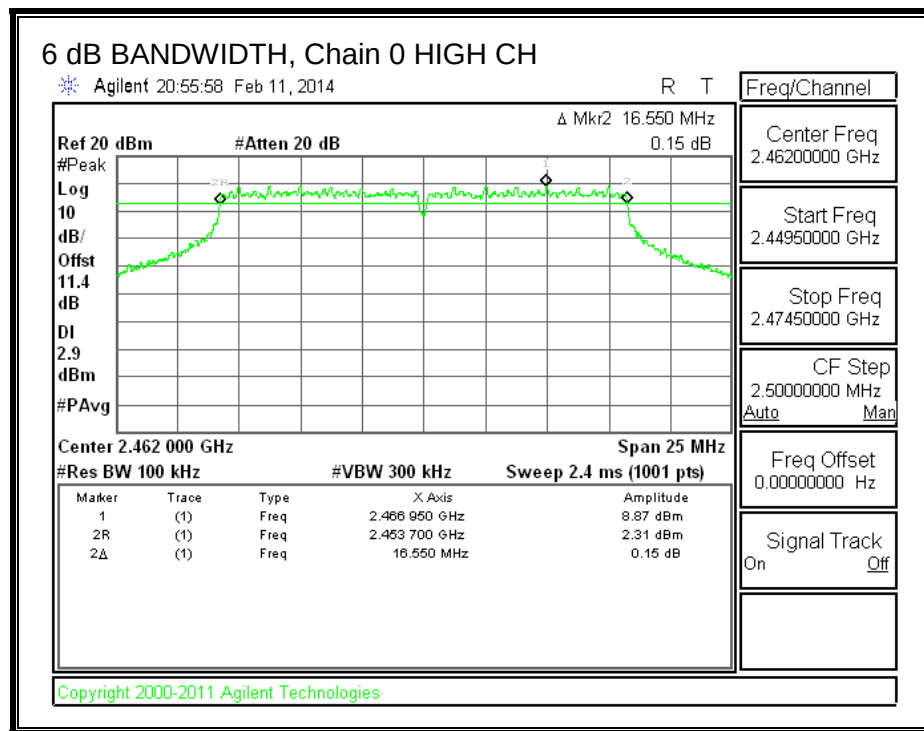
The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

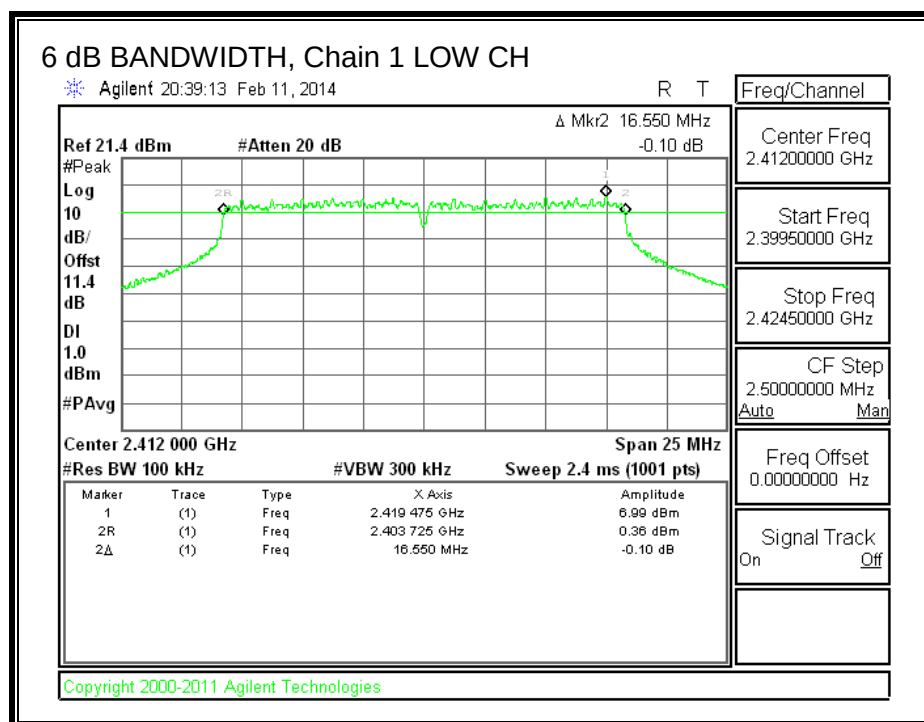
Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	6 dB BW Chain 2 (MHz)	Minimum Limit (MHz)
Low	2412	16.550	16.550	16.550	0.5
Mid	2437	16.550	16.450	16.500	0.5
High	2462	16.550	16.550	16.525	0.5

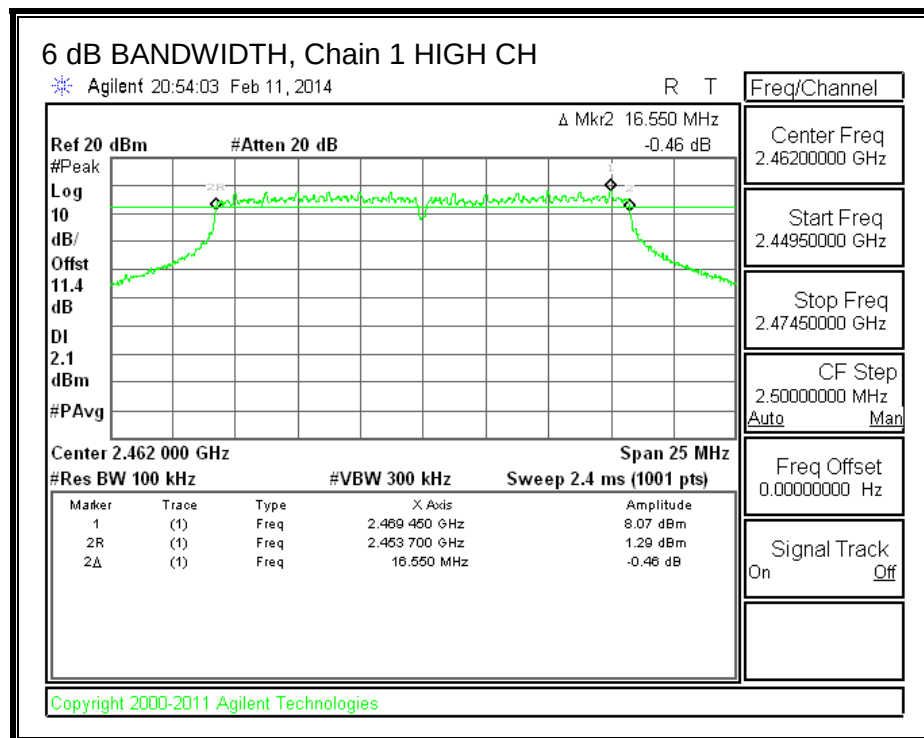
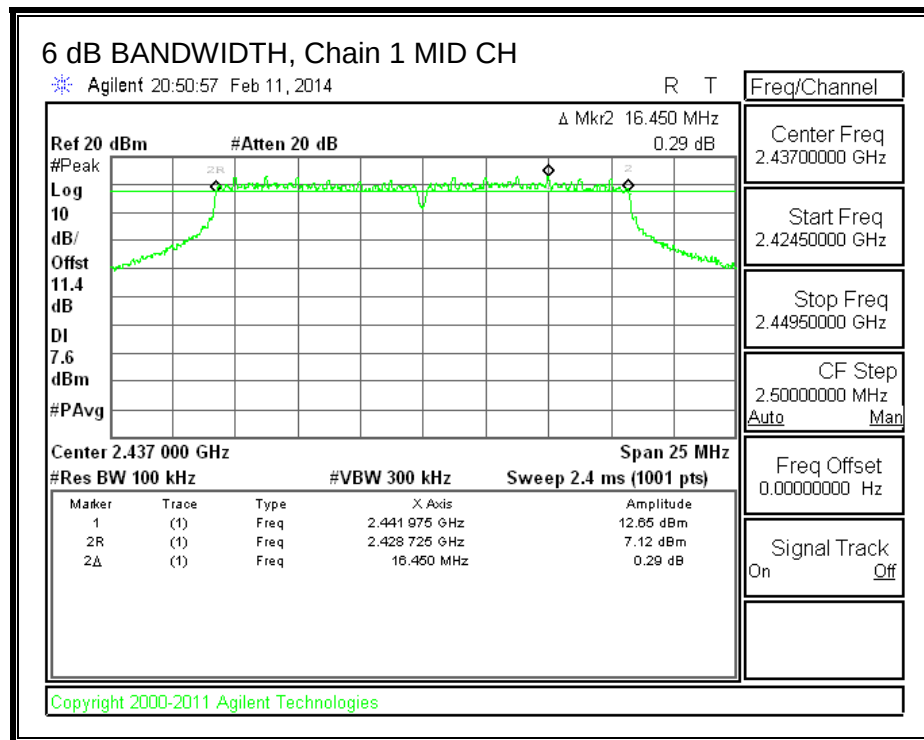
6 dB BANDWIDTH, Chain 0



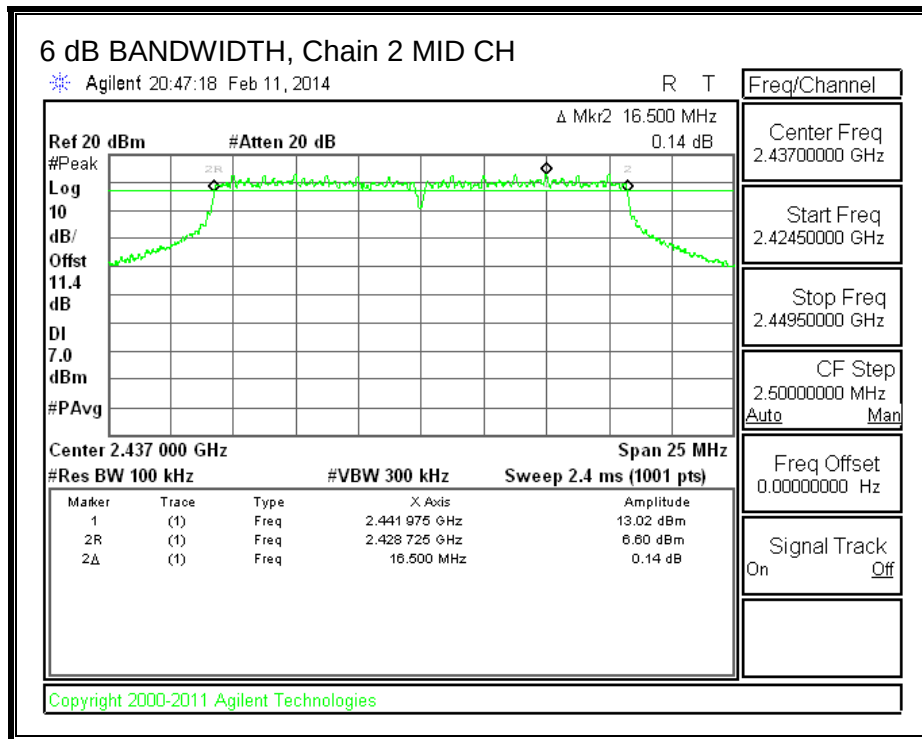
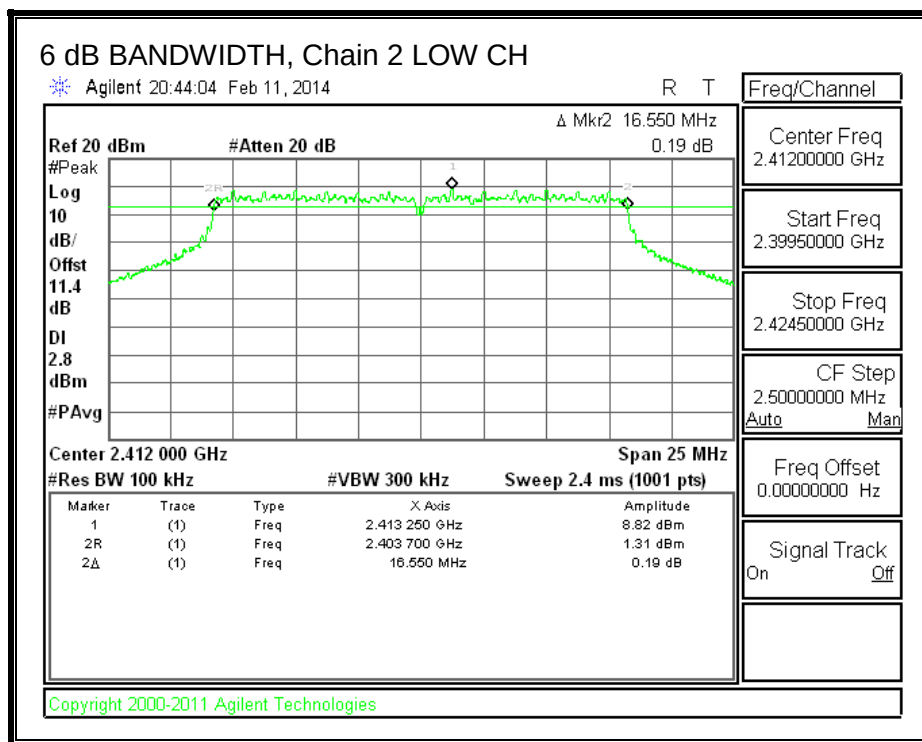


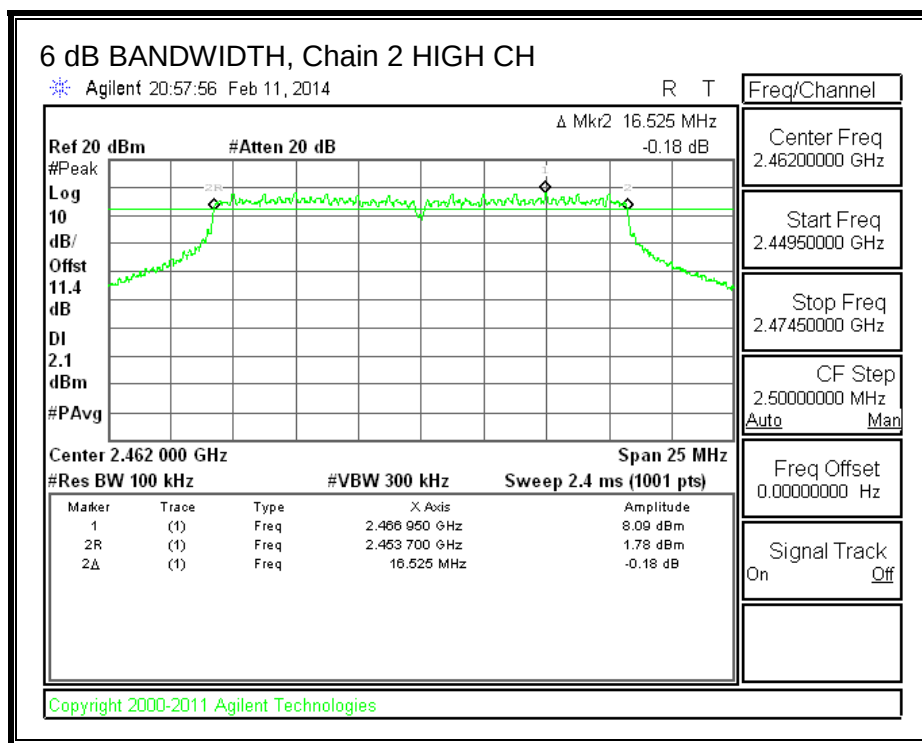
6 dB BANDWIDTH, Chain 1





6 dB BANDWIDTH, Chain 2





8.2.2. 99% BANDWIDTH

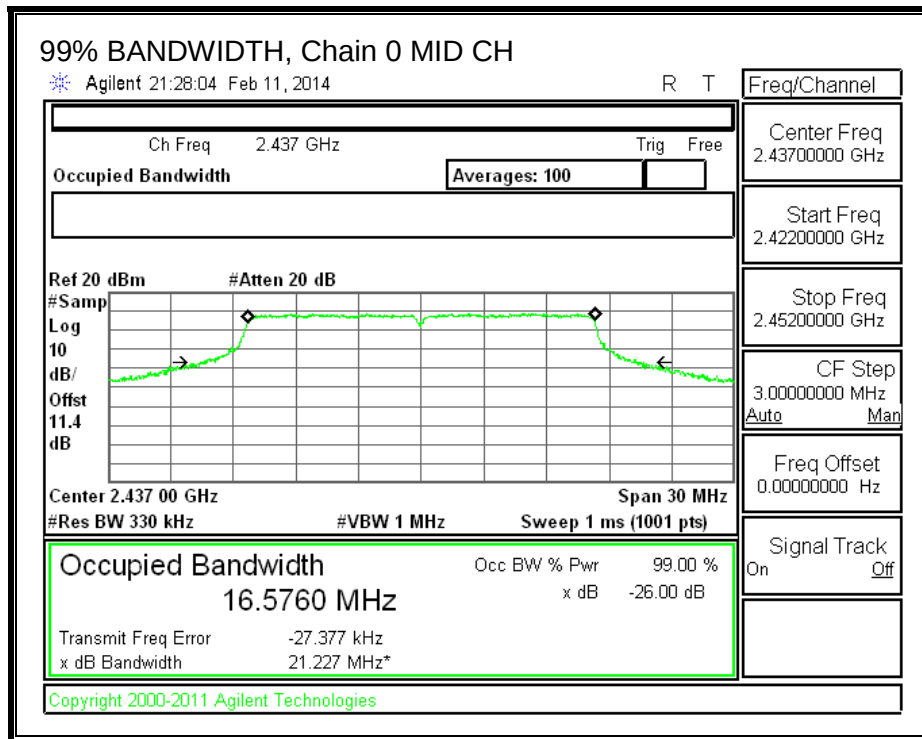
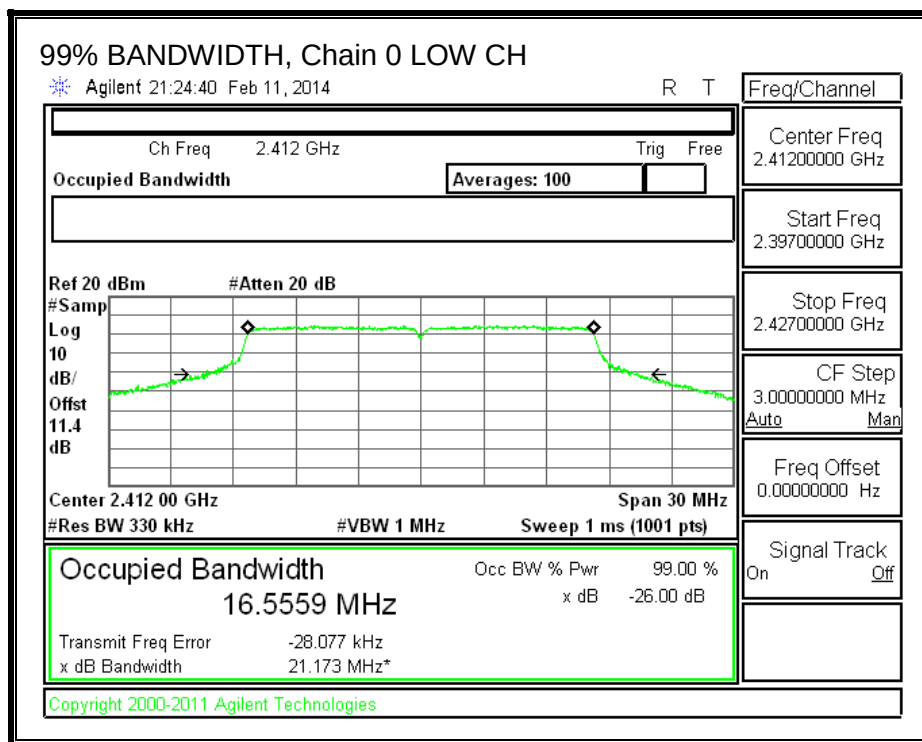
LIMITS

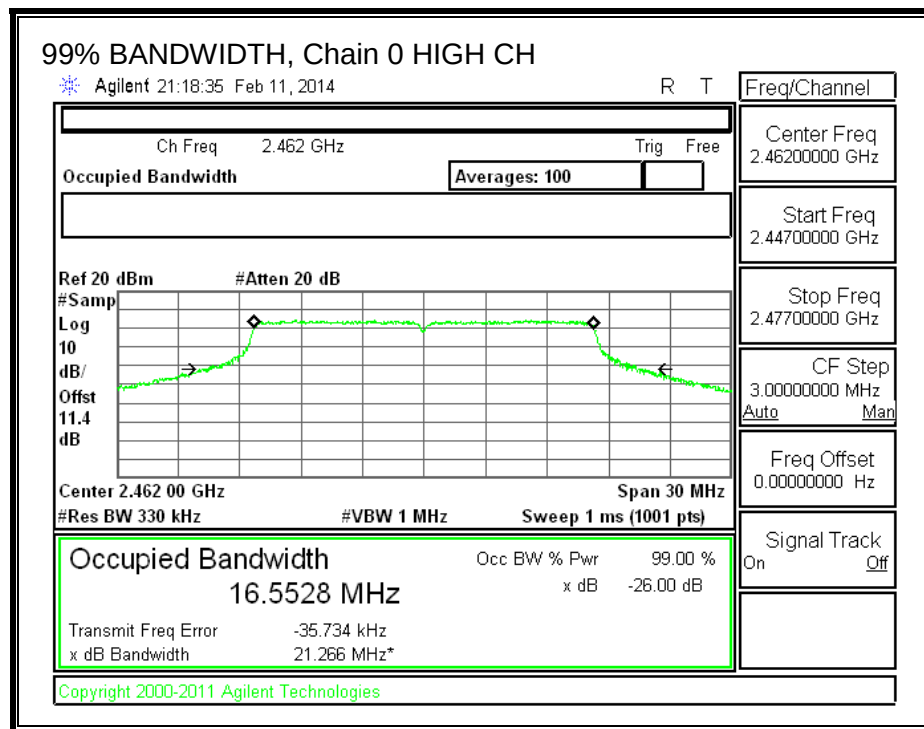
None; for reporting purposes only.

RESULTS

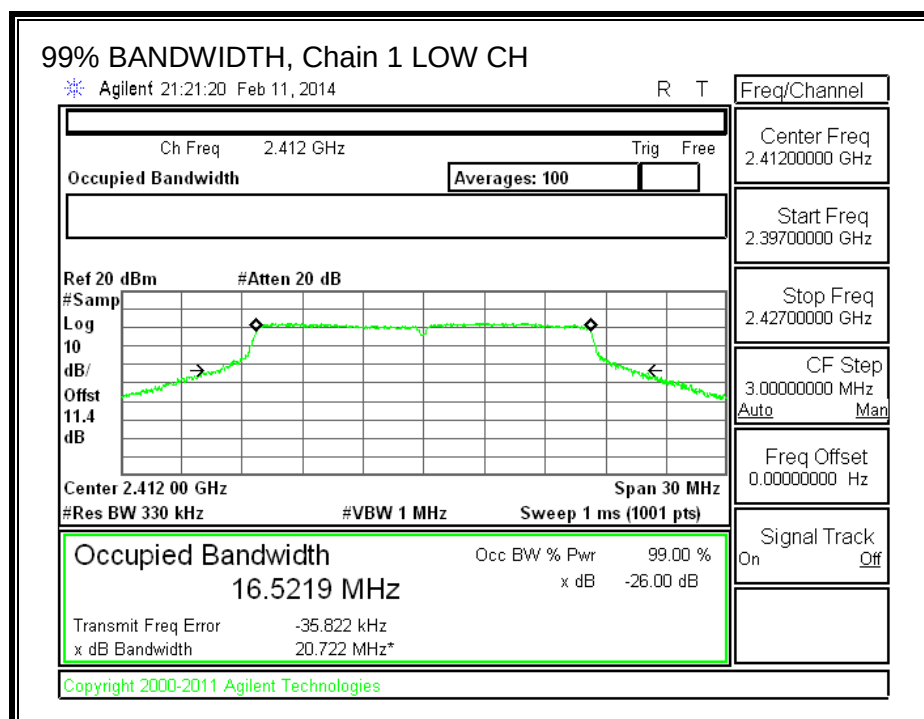
Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)	99% BW Chain 2 (MHz)
Low	2412	16.5559	16.5219	16.5336
Mid	2437	16.5760	16.5342	16.5260
High	2462	16.5528	16.5437	16.5371

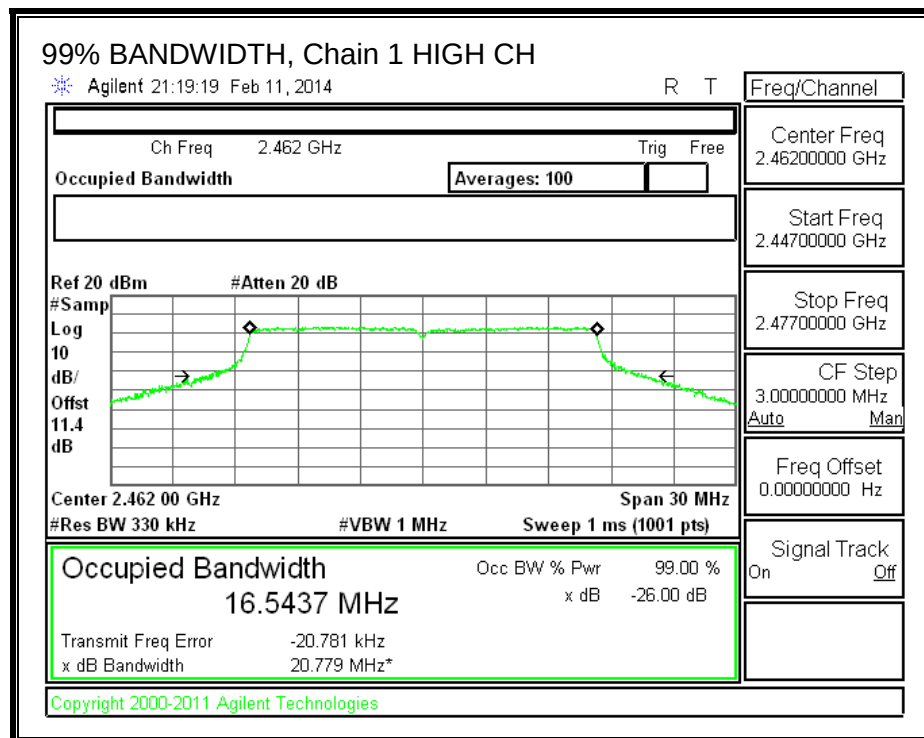
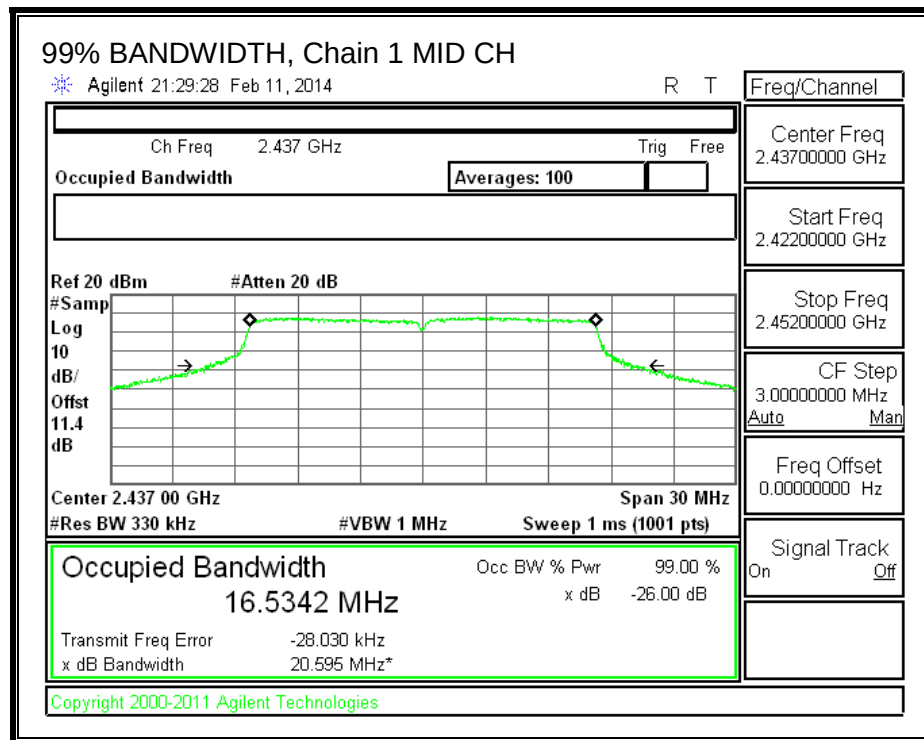
99% BANDWIDTH, Chain 0



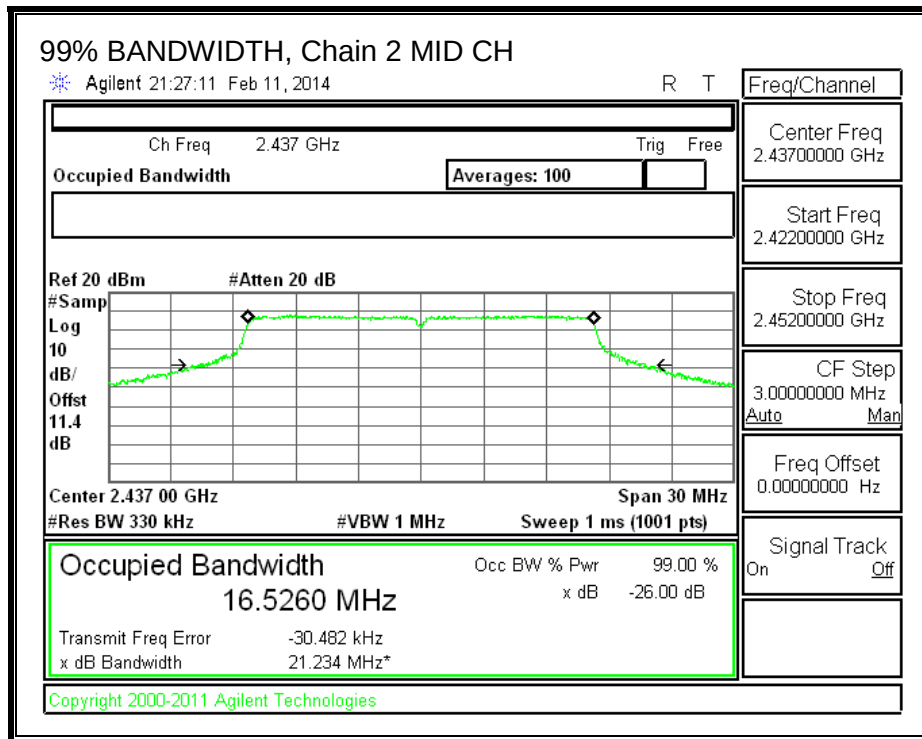
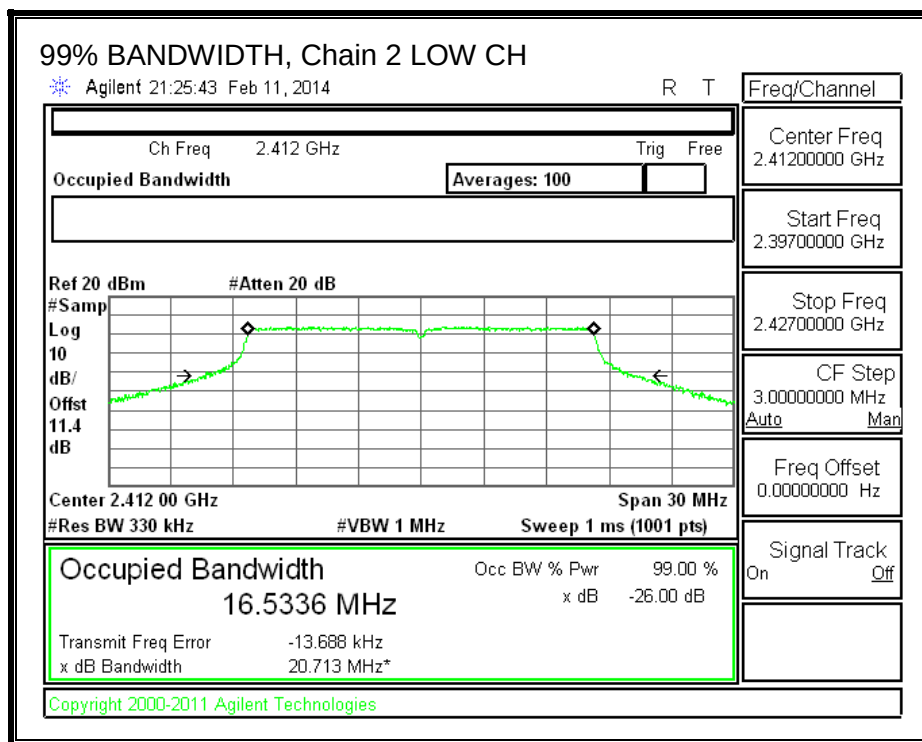


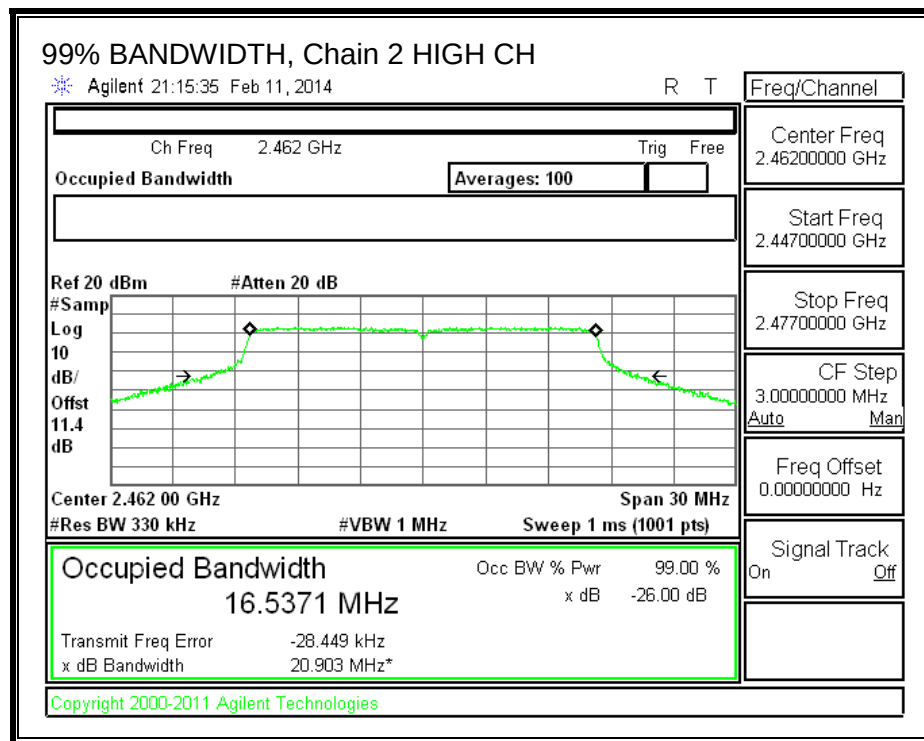
99% BANDWIDTH, Chain 1





99% BANDWIDTH, Chain 2





8.2.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11.4dB (including 10 dB pad and 1.4 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

CALCULATION

Total Power (P) = $10 * \text{LOG}(10^{(P0/10)} + 10^{(P1/10)} + 10^{(P2/10)})$

RESULTS

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)
Low	2412	17.74	17.46	17.52	22.35
Mid	2437	22.20	21.30	21.44	26.44
High	2462	17.99	17.88	18.25	22.81

8.2.4. OUTPUT POWER

LIMITS

FCC §15.247

IC RSS-210 A8.4

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

CALCULATION

Directional Gain (G) = $10 * \text{LOG}((10^{(G0/10)} + 10^{(G1/10)} + 10^{(G2/10)})/3)$

Output Power (P) = $10 * \text{LOG}(10^{(P0/10)} + 10^{(P1/10)} + 10^{(P2/10)})$

DIRECTIONAL ANTENNA GAIN

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

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Chain 2 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
2.21	3.59	4.34	3.47

RESULTS

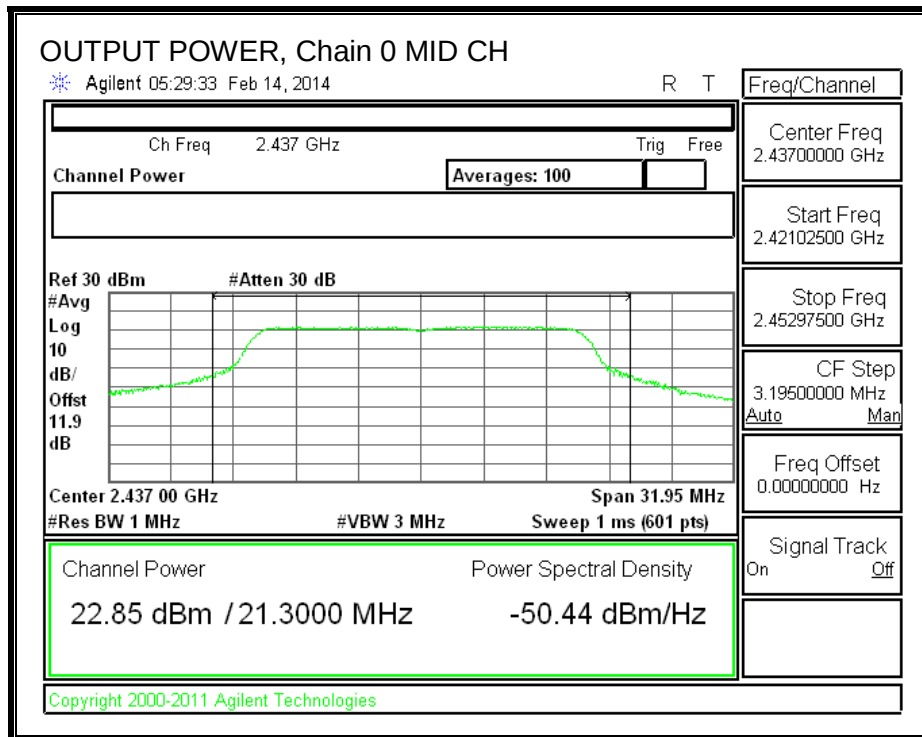
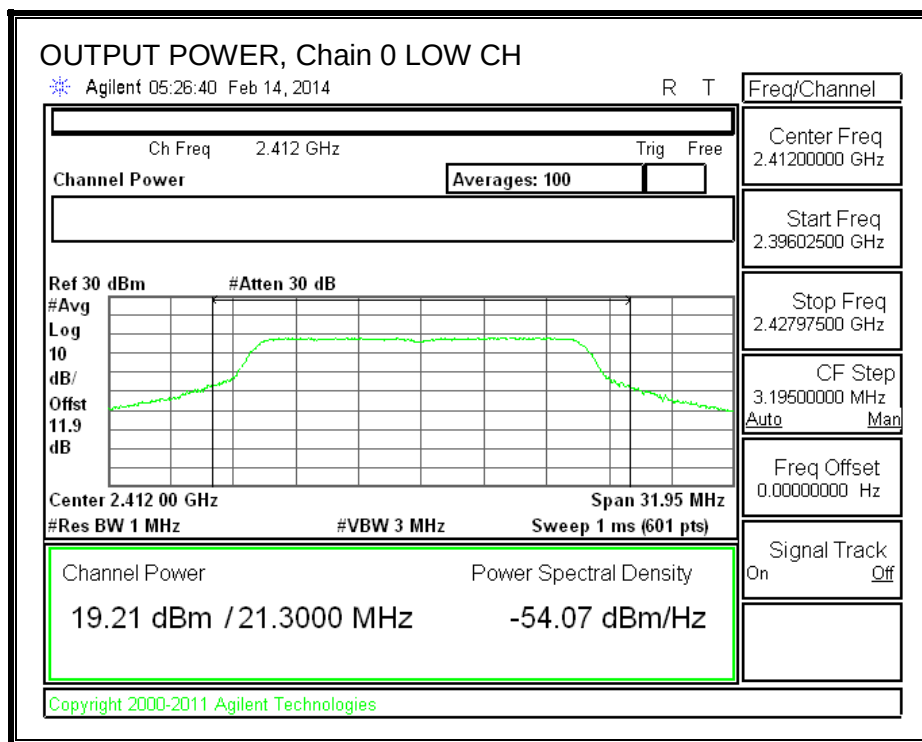
Limits

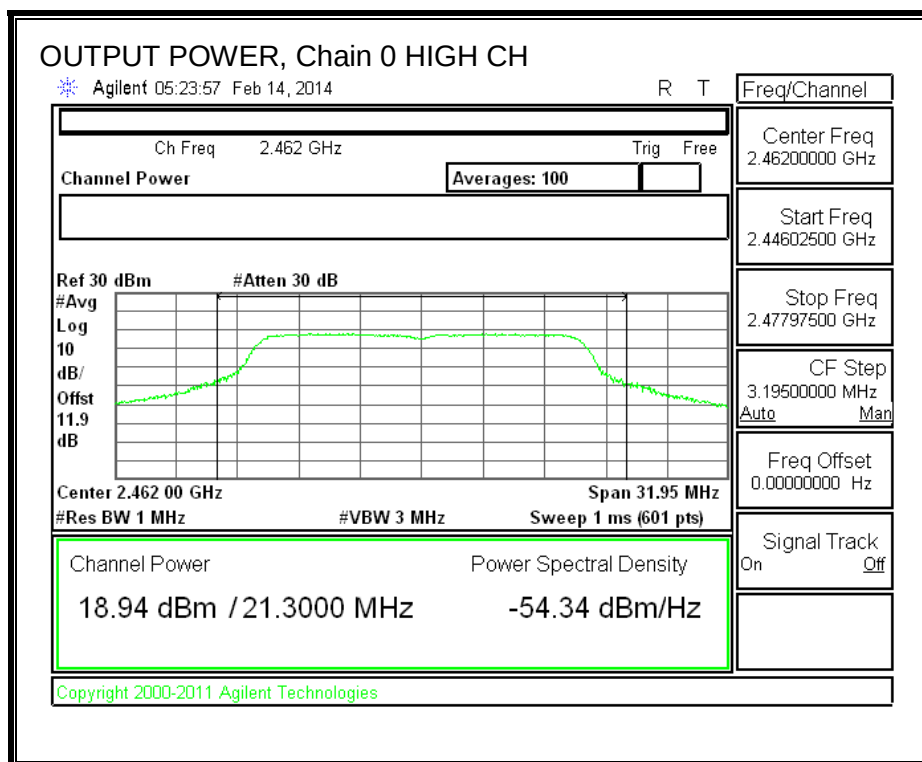
Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	3.47	30.00	30	36	30.00
Mid	2437	3.47	30.00	30	36	30.00
High	2462	3.47	30.00	30	36	30.00

Results

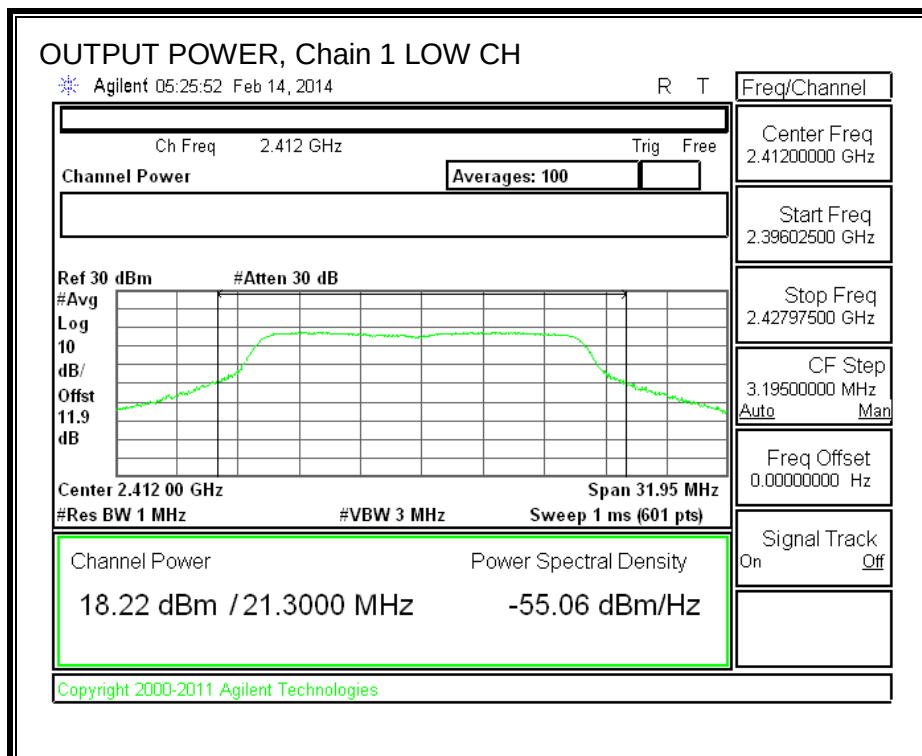
Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Chain 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	19.21	18.22	18.77	23.52	30.00	-6.48
Mid	2437	22.85	22.37	22.25	27.27	30.00	-2.73
High	2462	18.94	18.07	18.20	23.19	30.00	-6.81

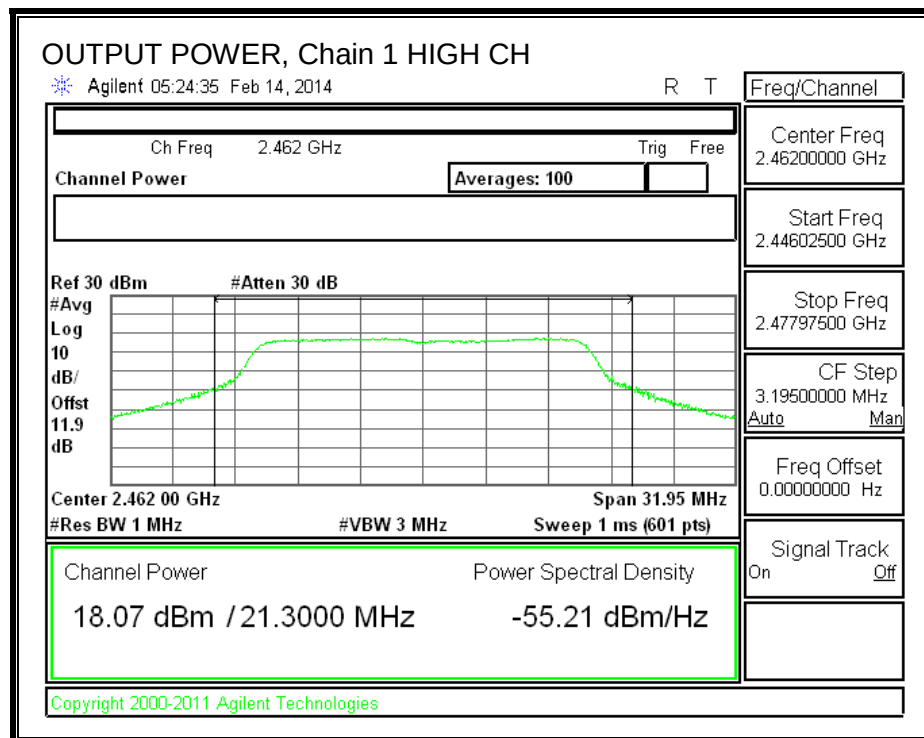
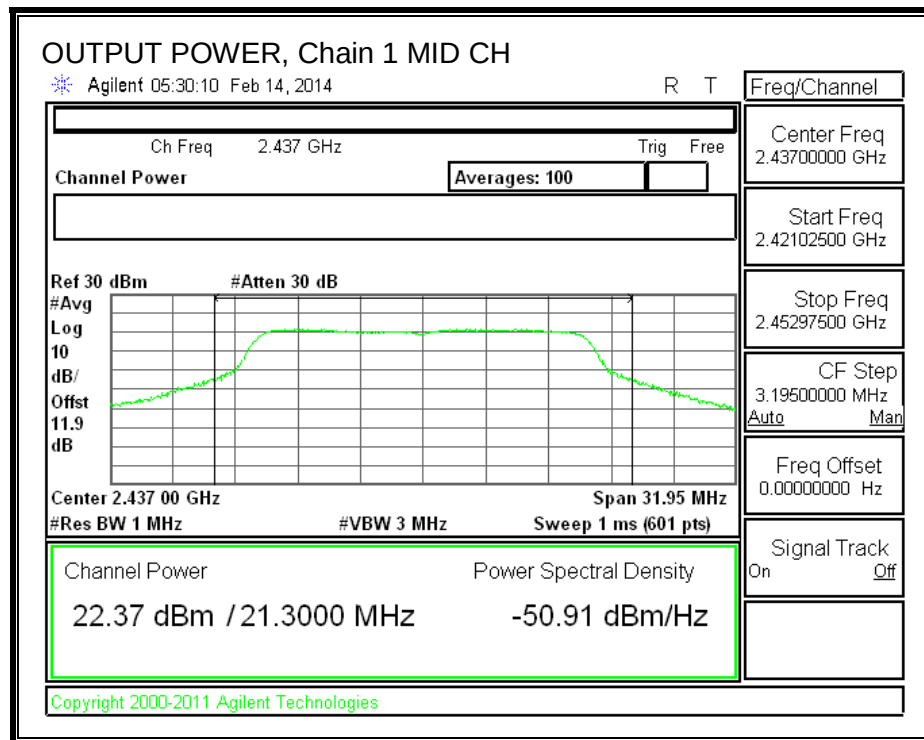
OUTPUT POWER, Chain 0



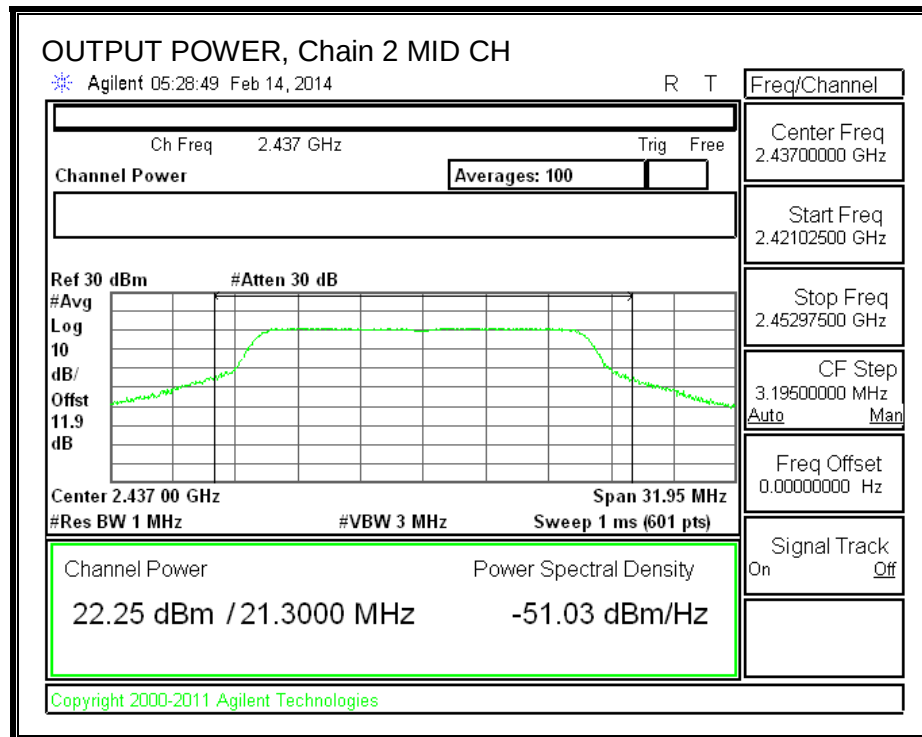
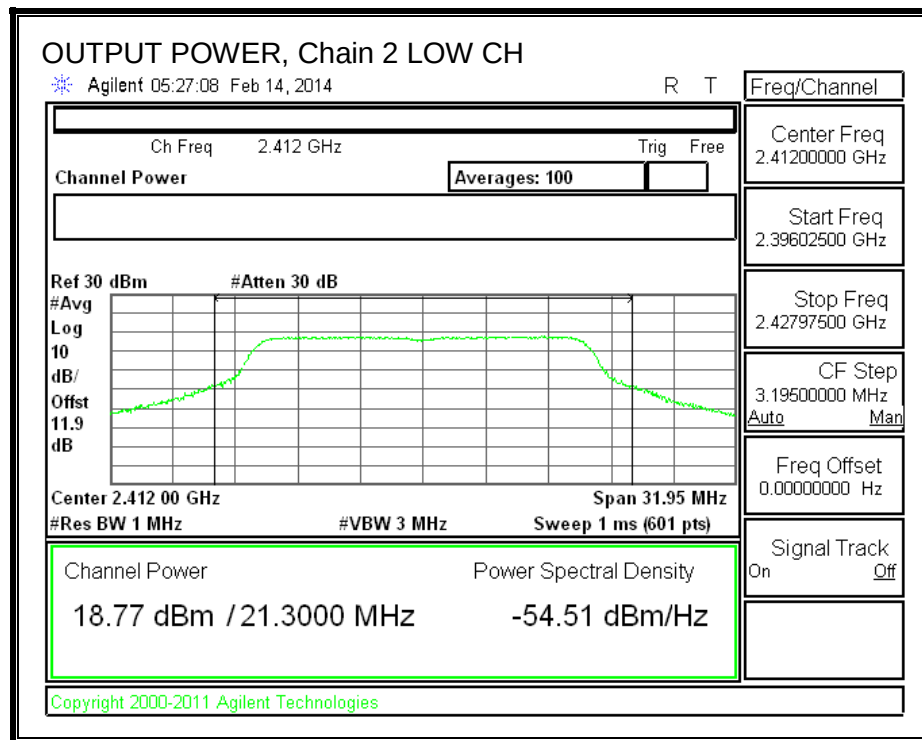


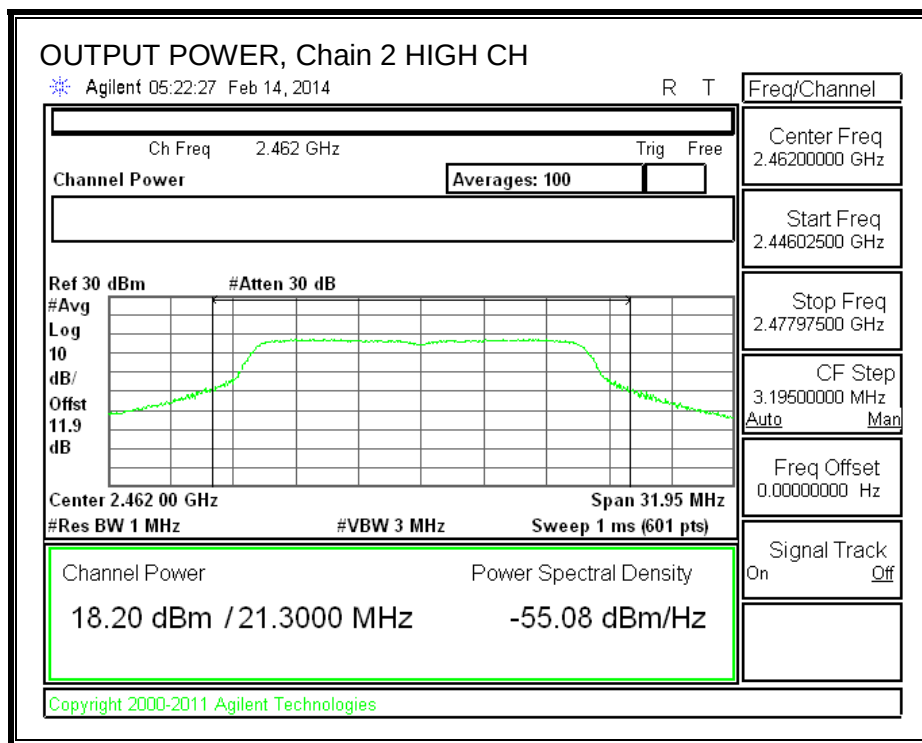
OUTPUT POWER, Chain 1





OUTPUT POWER, Chain 2





8.2.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247

IC RSS-210 A8.2

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

CALCULATION

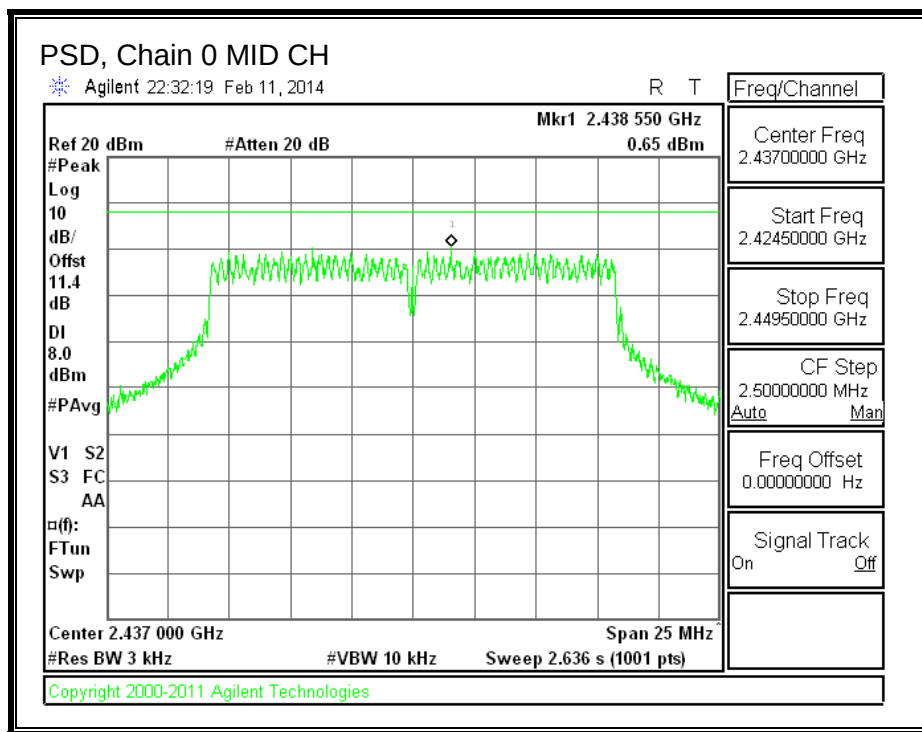
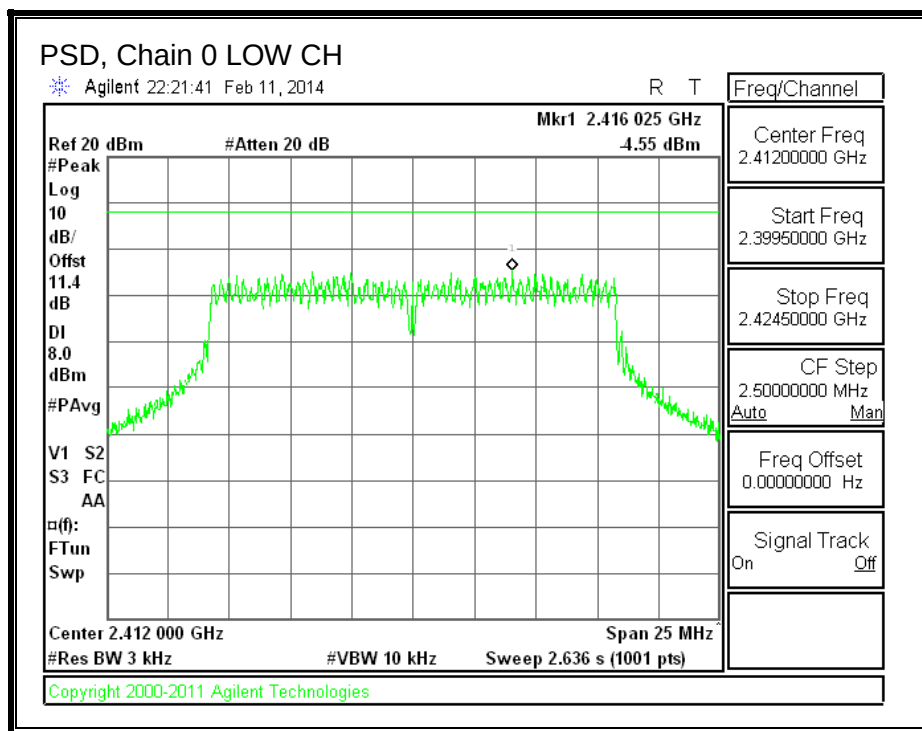
Power Spectral Density = $10 * \text{LOG}(10^{(\text{PSD0}/10)} + 10^{(\text{PSD1}/10)} + 10^{(\text{PSD2}/10)})$

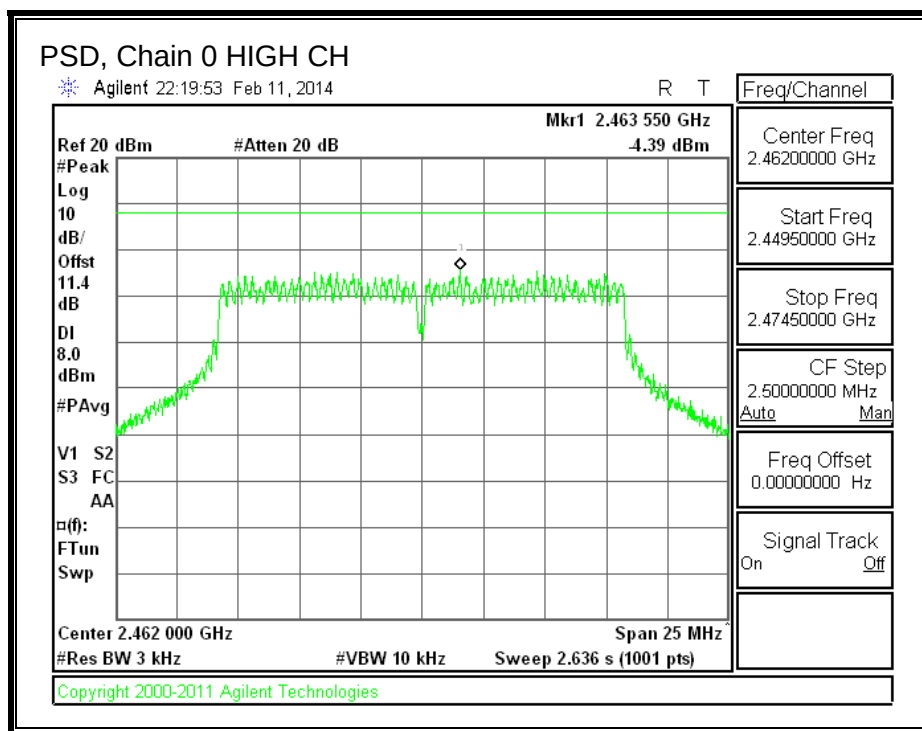
RESULTS

PSD Results

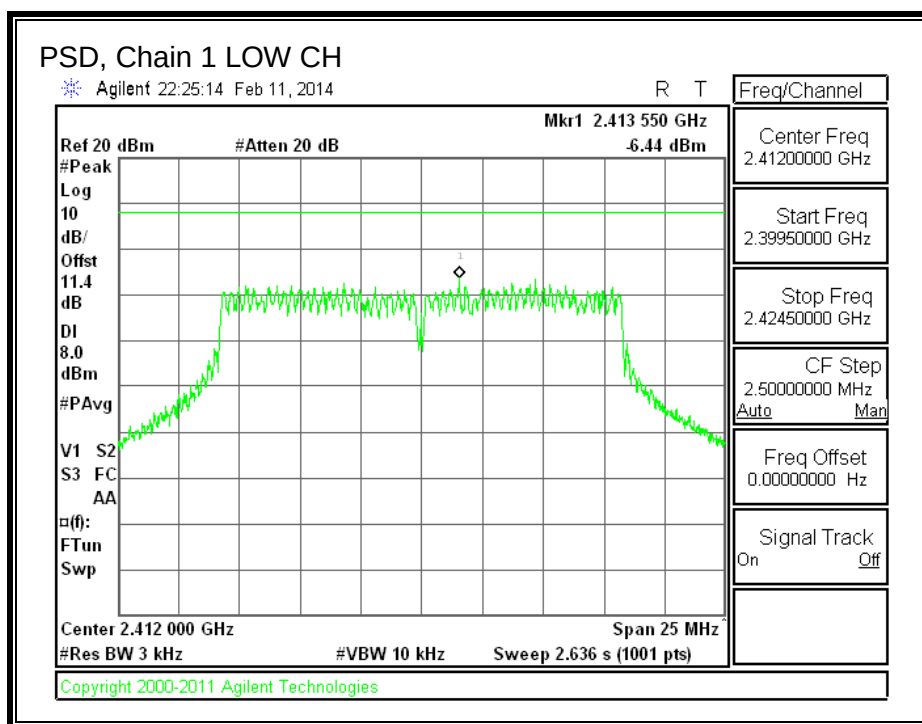
Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Chain 1 Meas (dBm)	Chain 2 Meas (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-4.55	-6.44	-5.12	-0.53	8.0	-8.5
Mid	2437	0.65	-1.67	-0.93	4.23	8.0	-3.8
High	2462	-4.39	-5.08	-6.14	-0.37	8.0	-8.4

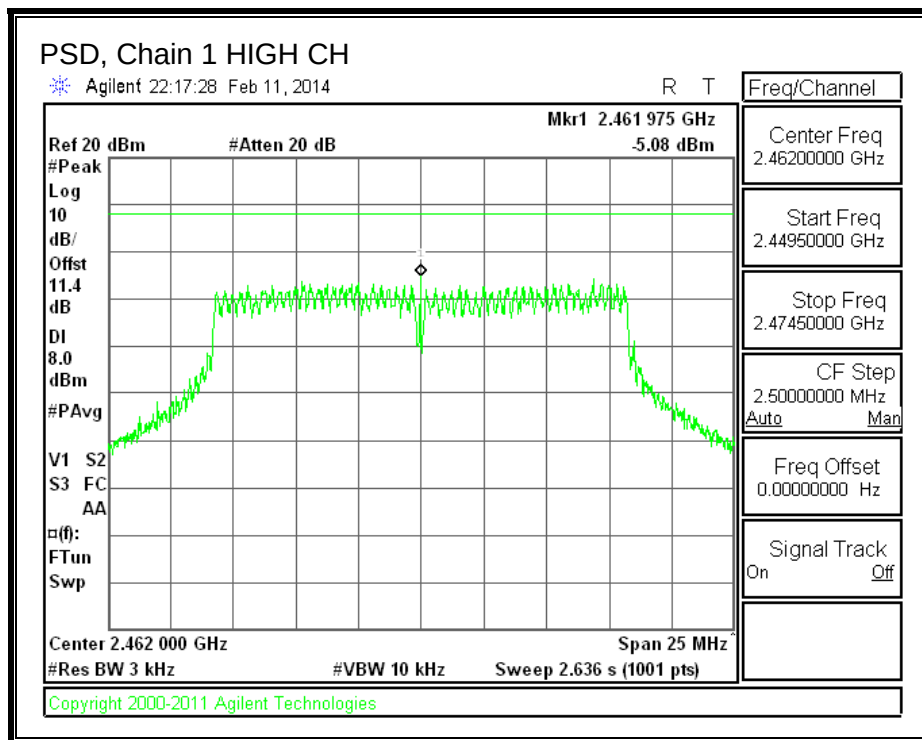
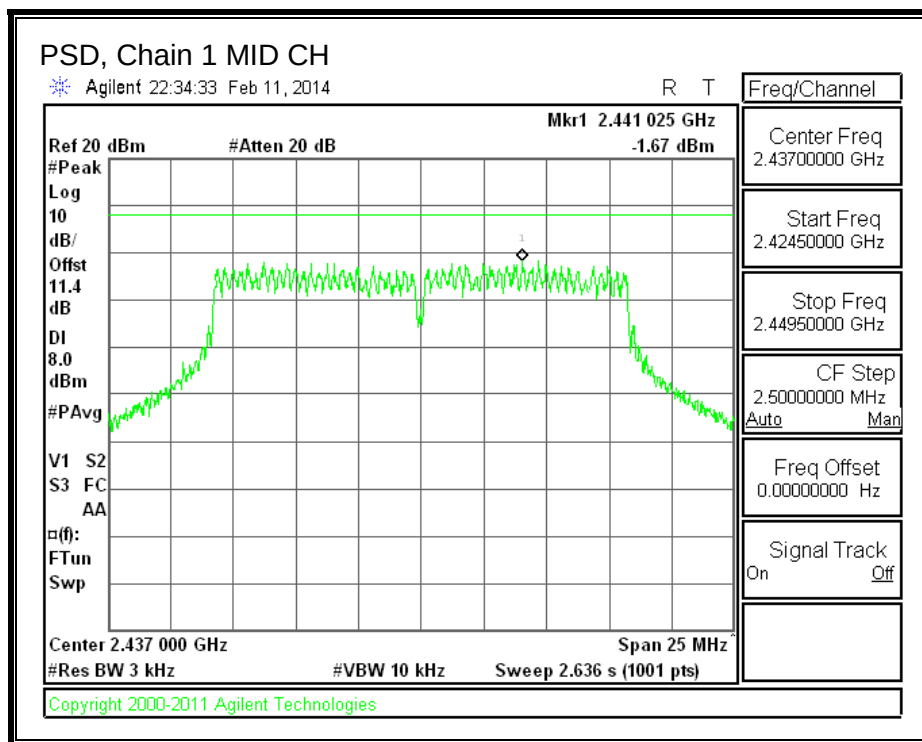
PSD, Chain 0



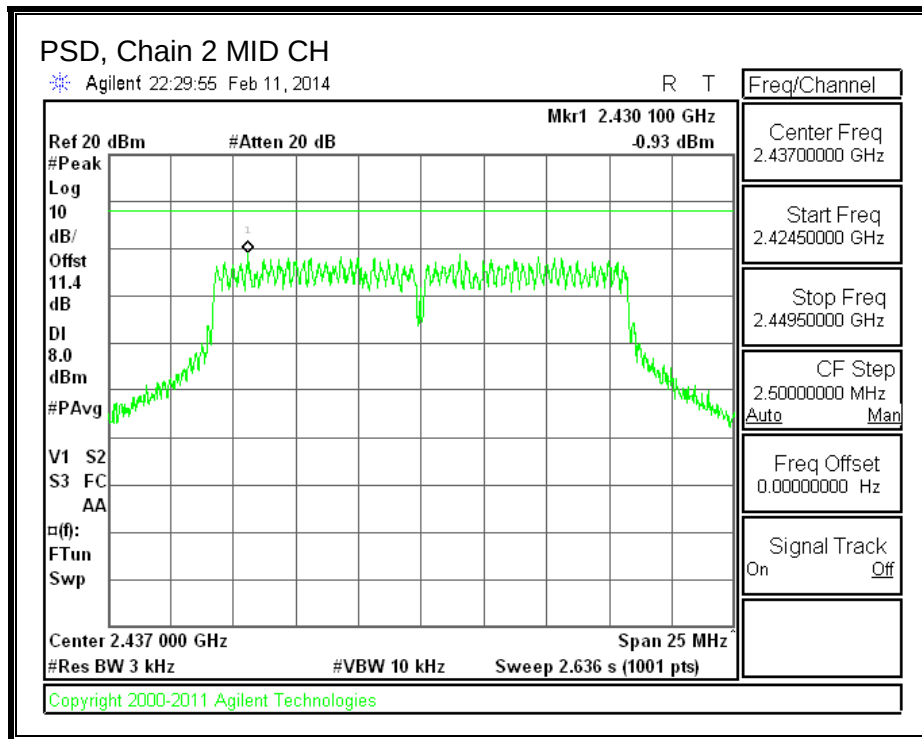
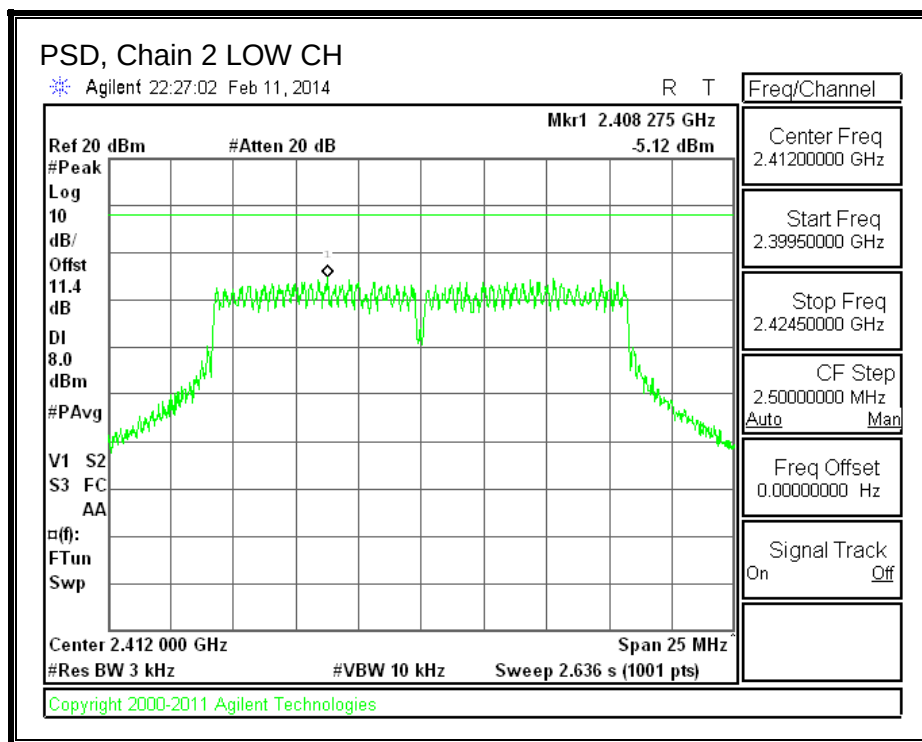


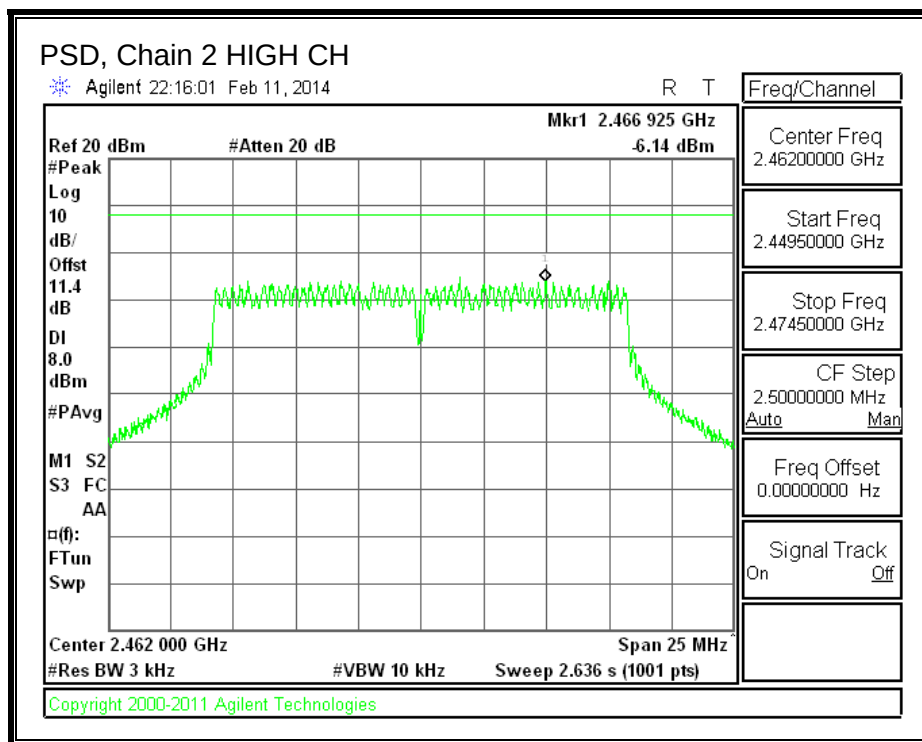
PSD, Chain 1





PSD, Chain 2





8.2.6. OUT-OF-BAND EMISSIONS

LIMITS

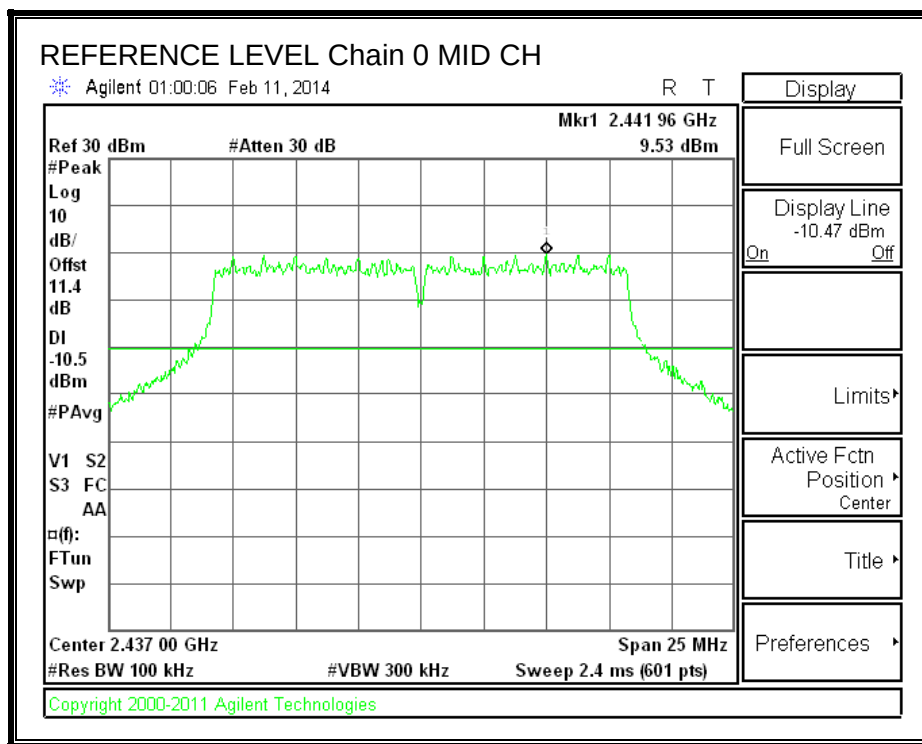
FCC §15.247 (d)

IC RSS-210 A8.5

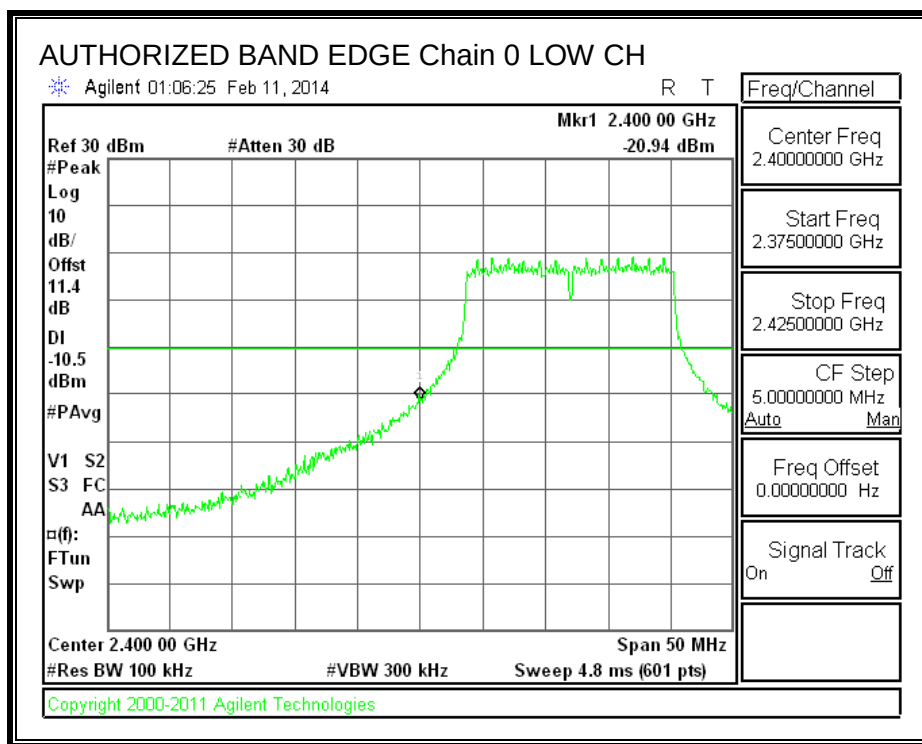
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the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

RESULTS

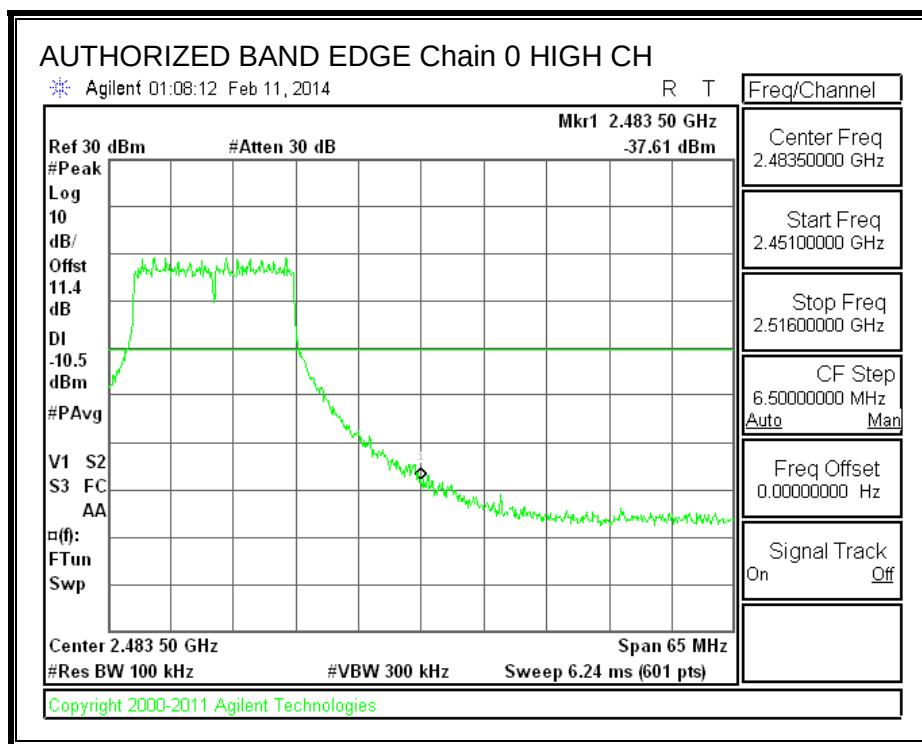
IN-BAND REFERENCE LEVEL, Chain 0



LOW CHANNEL BANDEDGE, Chain 0

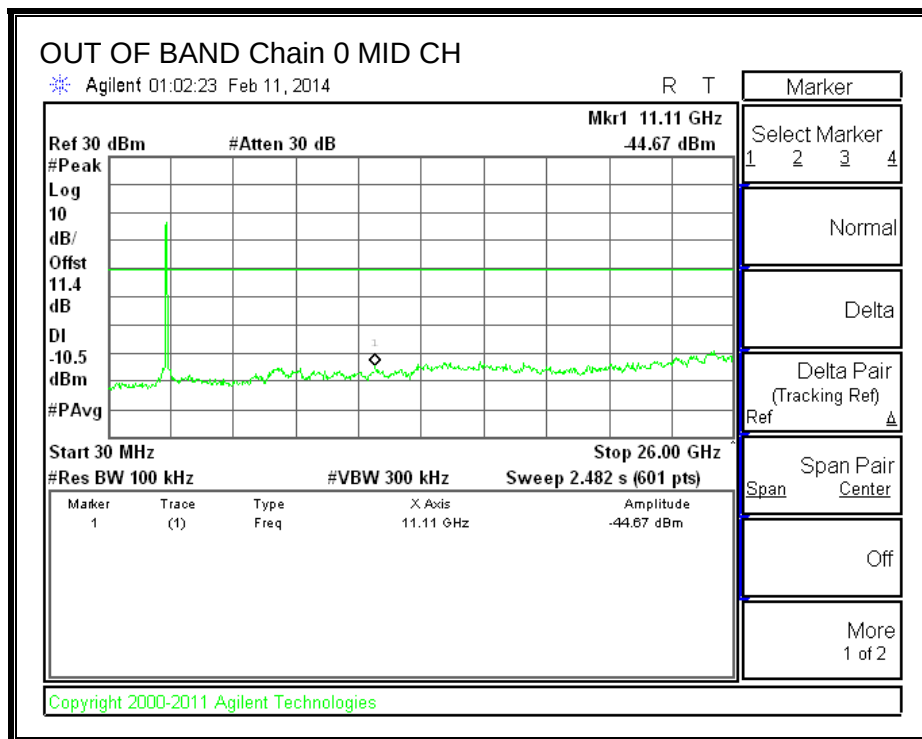
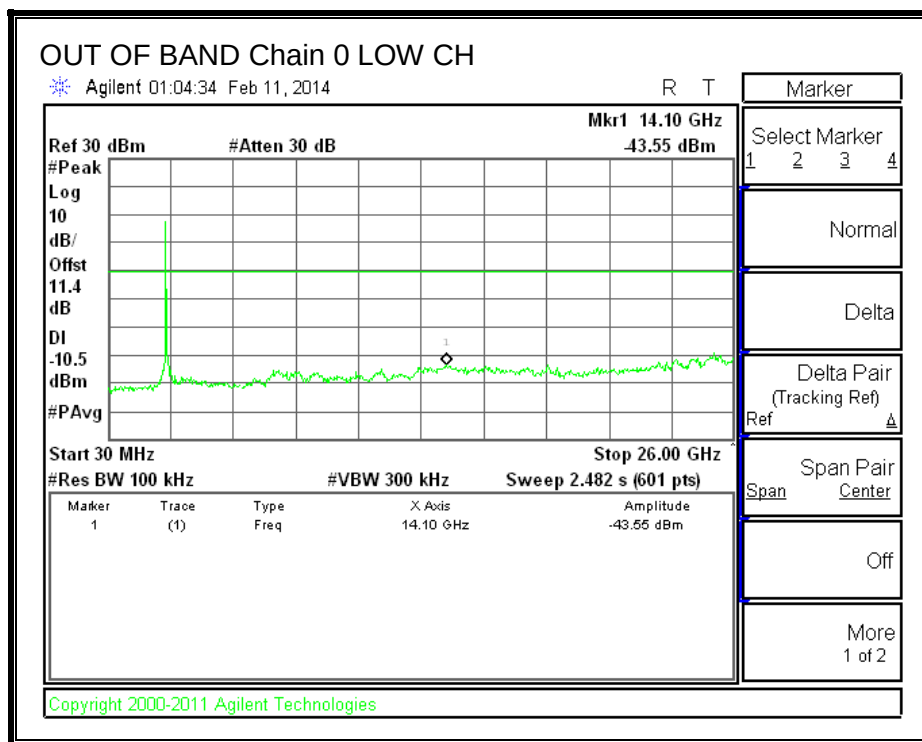


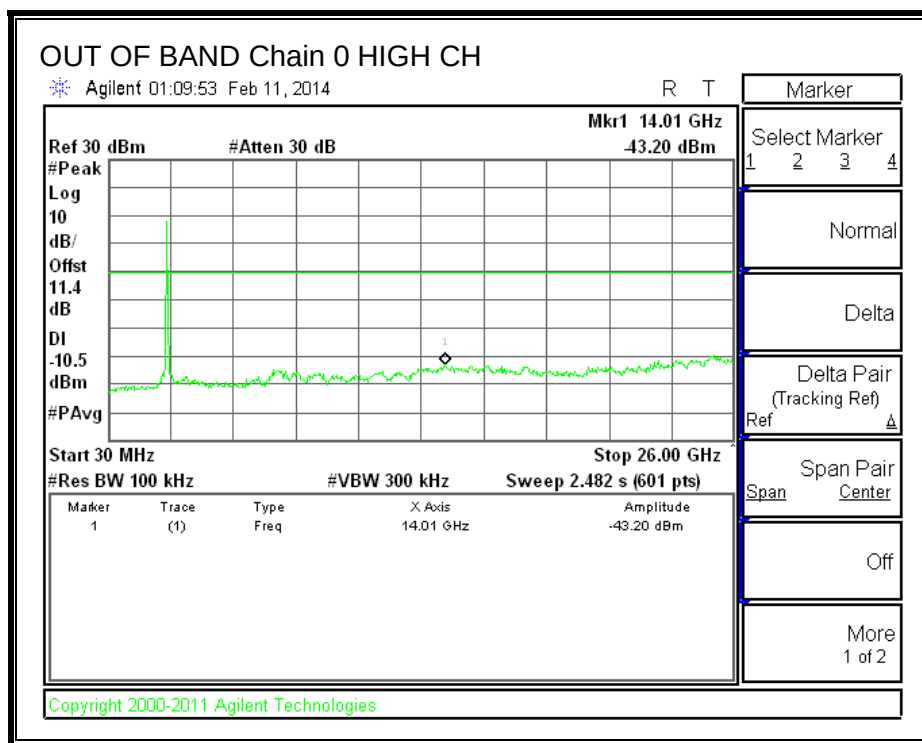
HIGH CHANNEL BANDEDGE, Chain 0



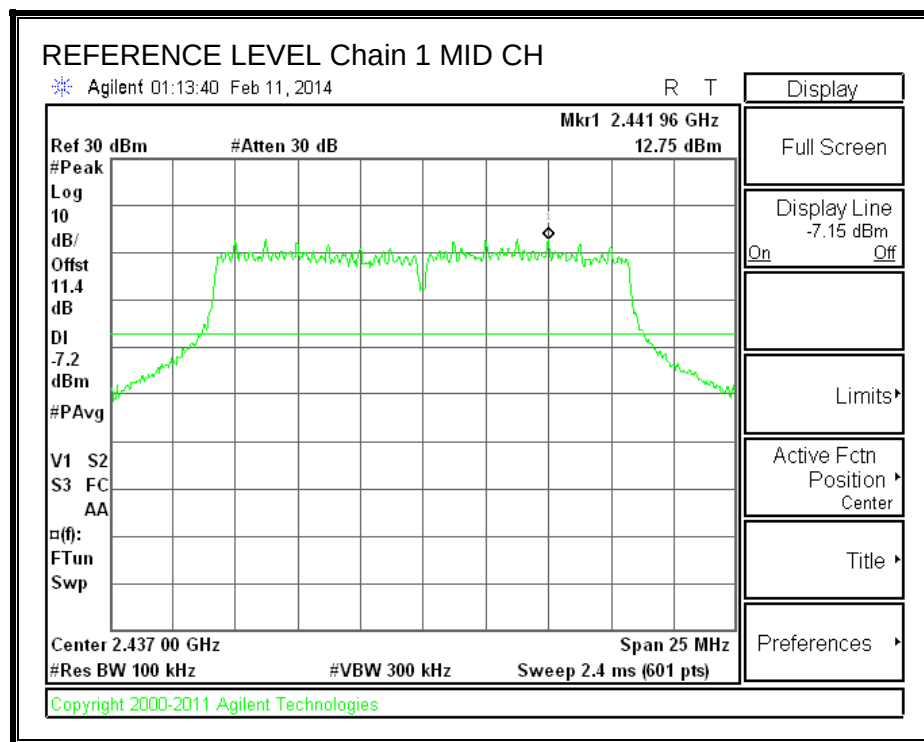
g mode Chain 0			
Limit is Based on 20dBc Peak Power			
Frequency (GHz)	Corrected (dBm)	Peak Limit (dBm)	PK Margin (dB)
2.4000	-20.94	-10.5	-10.44
2.4835	-37.61	-10.5	-27.11

OUT-OF-BAND EMISSIONS, Chain 0

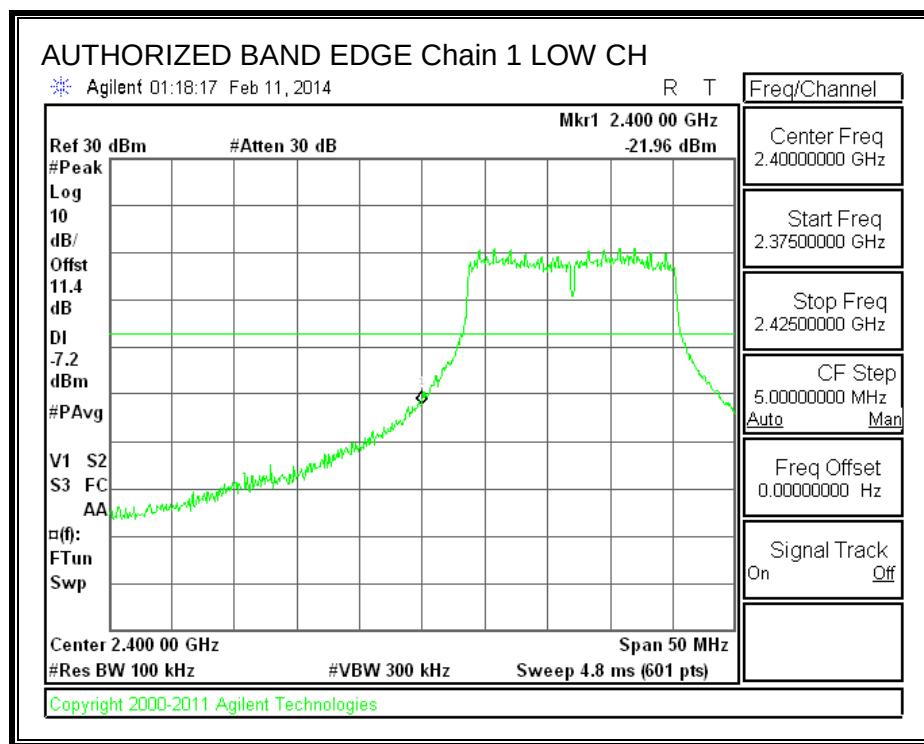




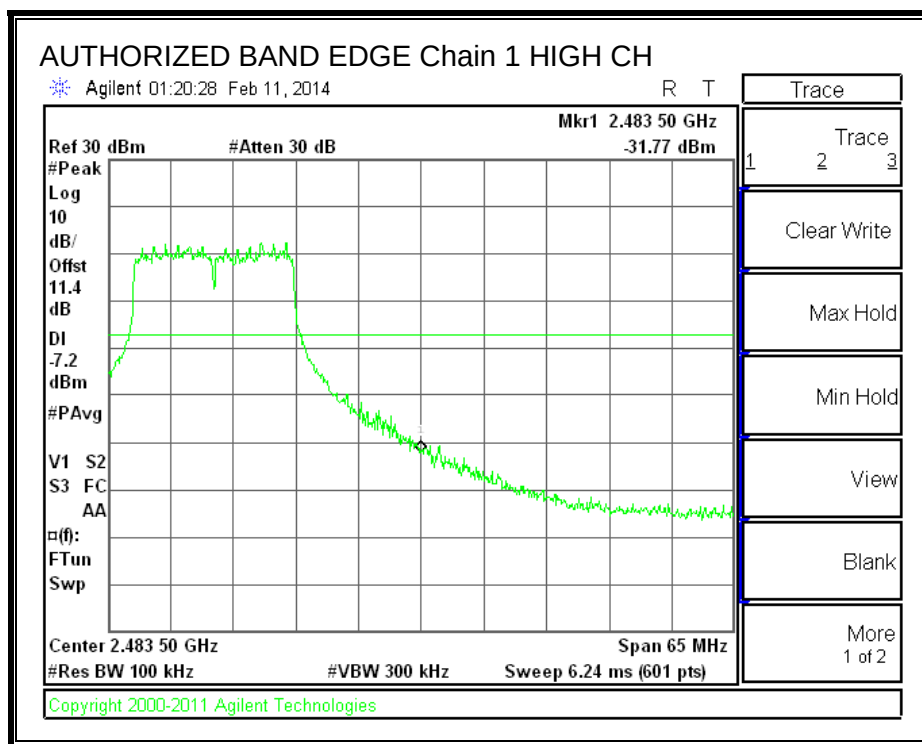
IN-BAND REFERENCE LEVEL, Chain 1



LOW CHANNEL BANDEDGE, Chain 1

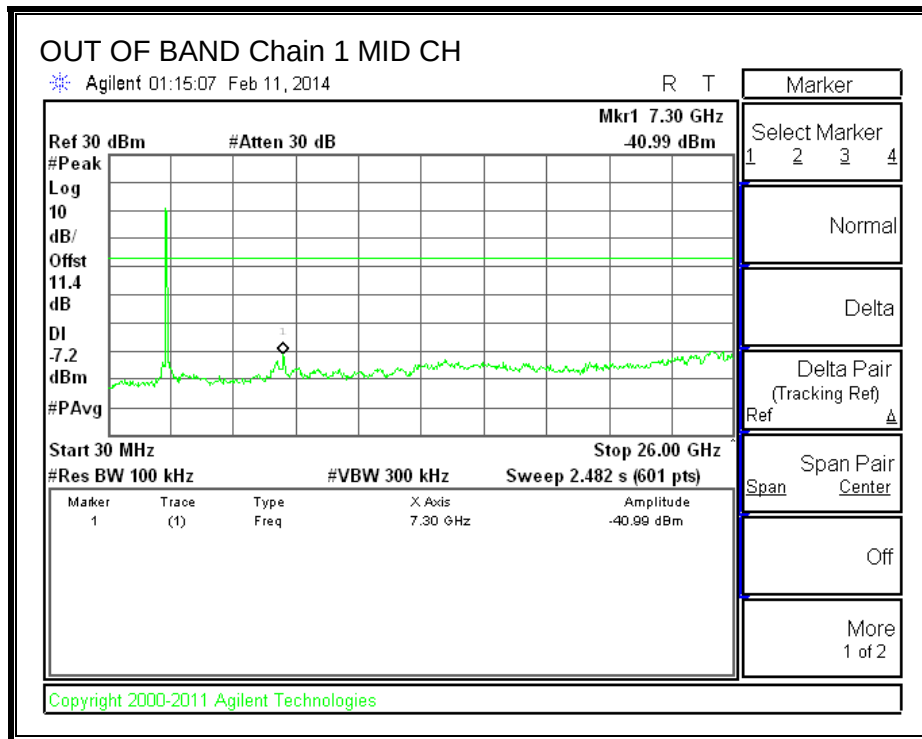
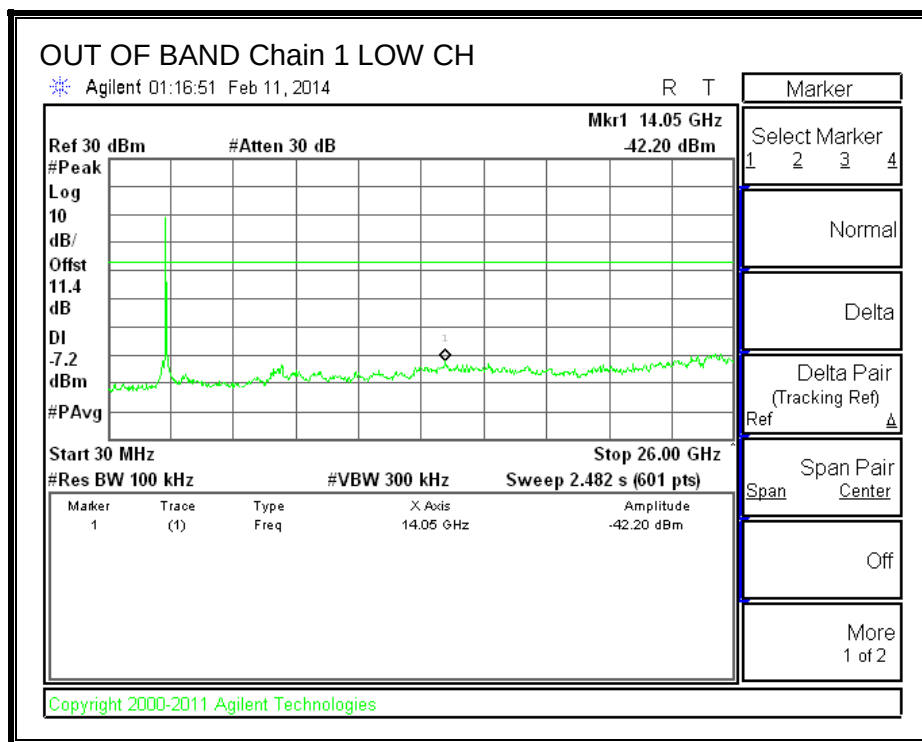


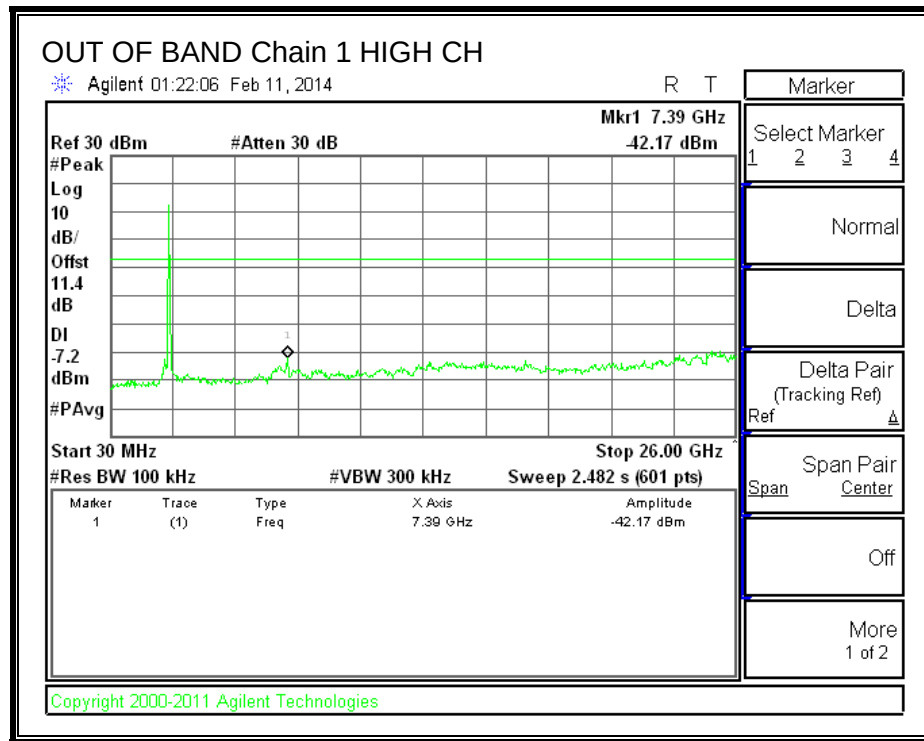
HIGH CHANNEL BANDEDGE, Chain 1



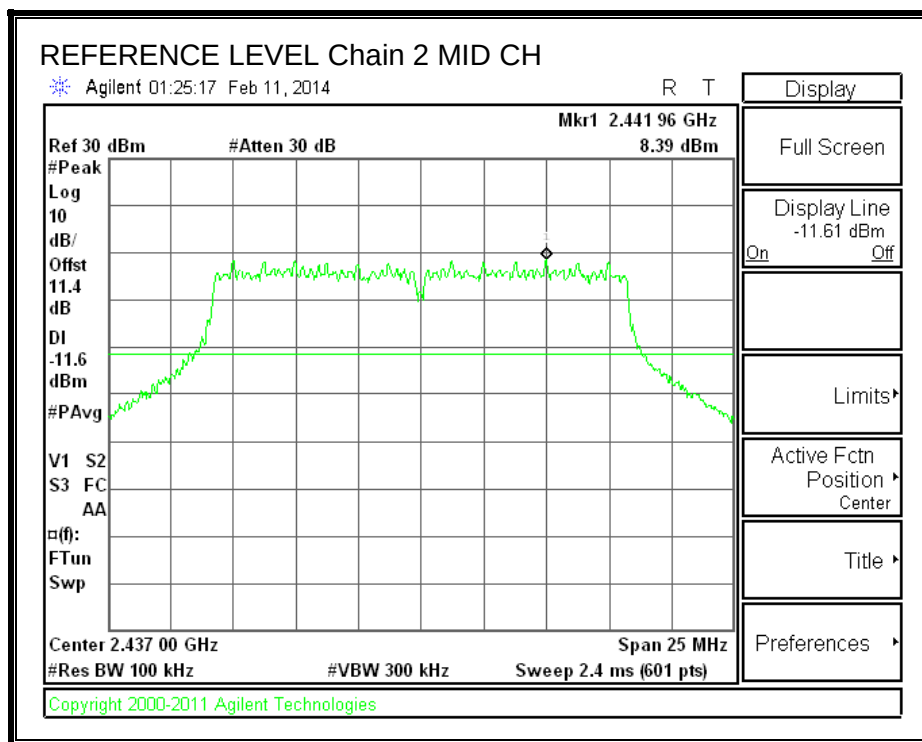
g mode Chain 1			
Limit is Based on 20dBc Peak Power			
Frequency (GHz)	Corrected (dBm)	Peak Limit (dBm)	PK Margin (dB)
2.4000	-21.96	-7.2	-14.76
2.4835	-31.77	-7.2	-24.57

OUT-OF-BAND EMISSIONS, Chain 1

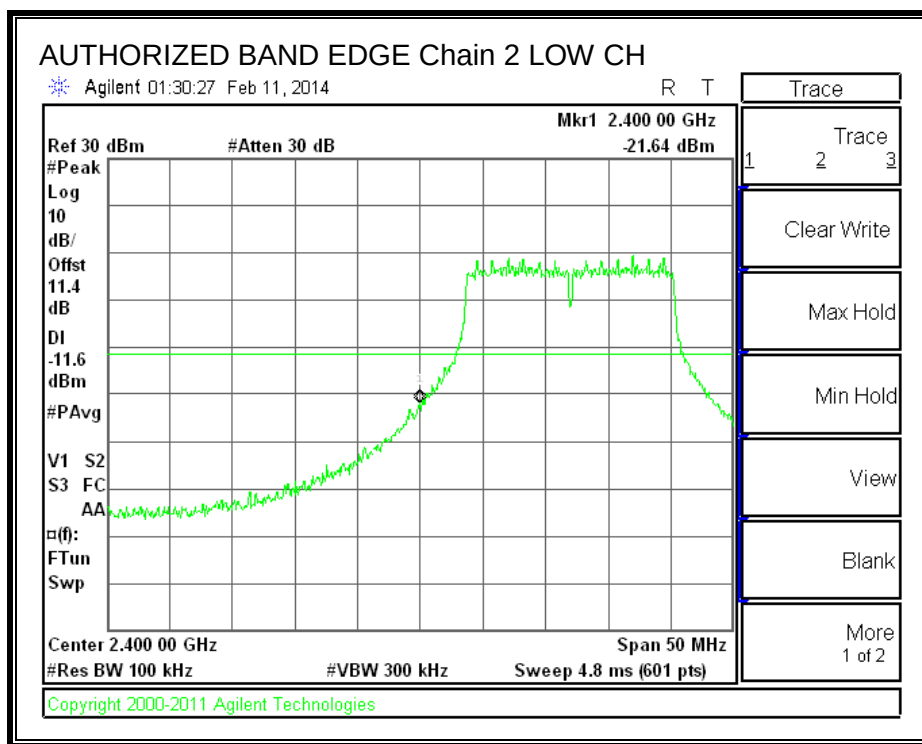




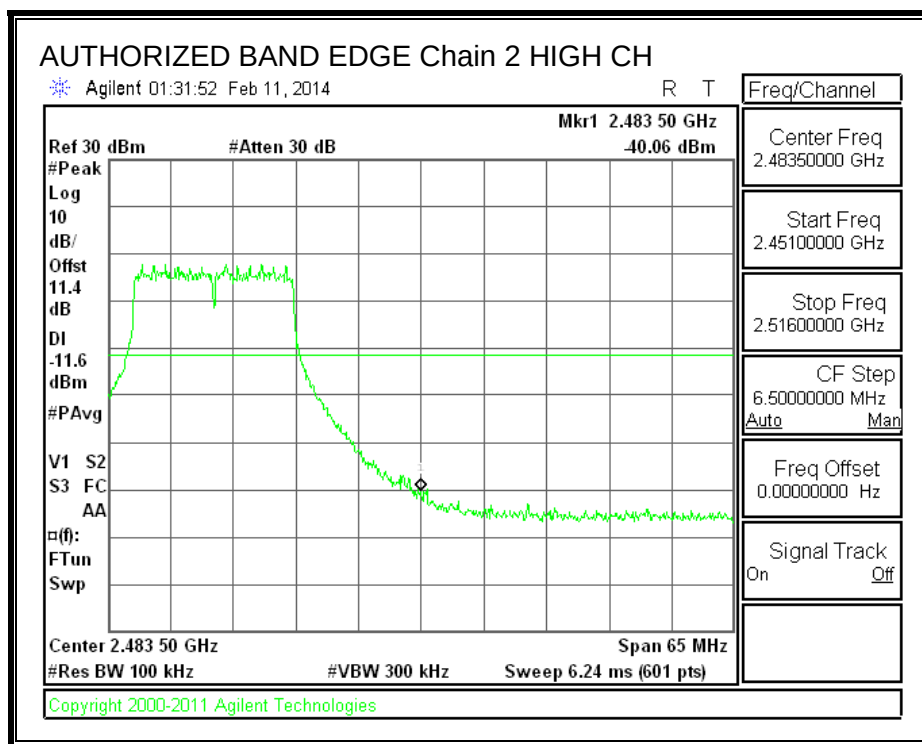
IN-BAND REFERENCE LEVEL, Chain 2



LOW CHANNEL BANDEDGE, Chain 2

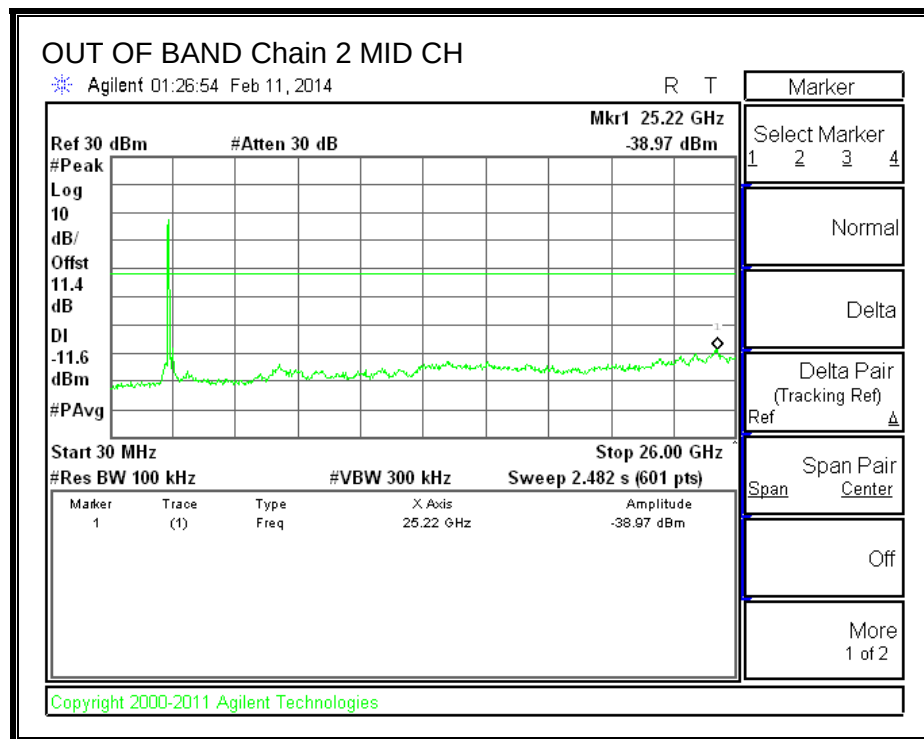
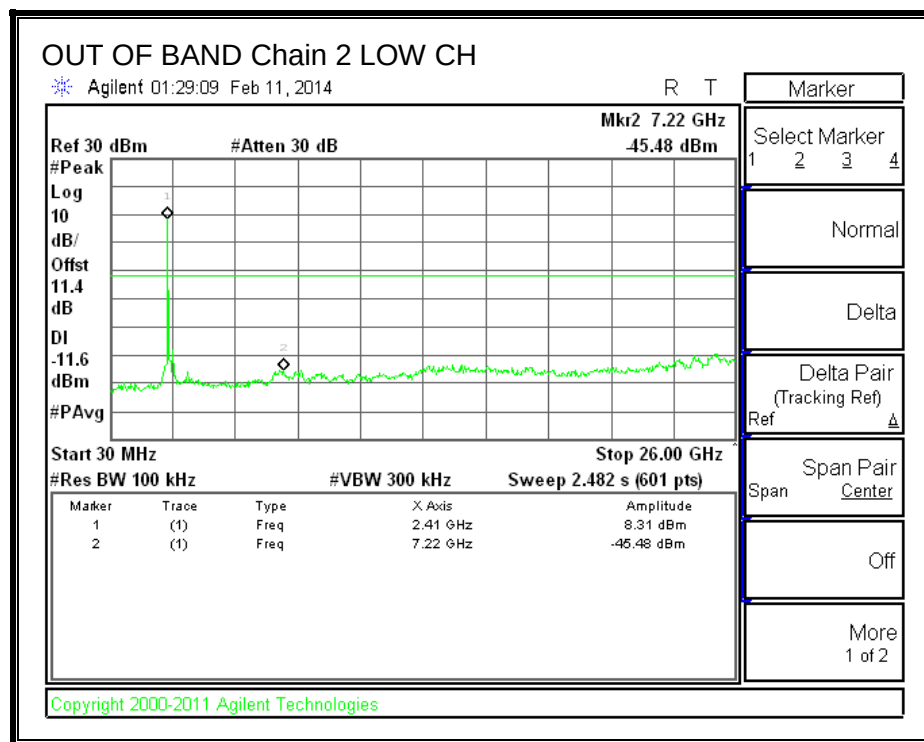


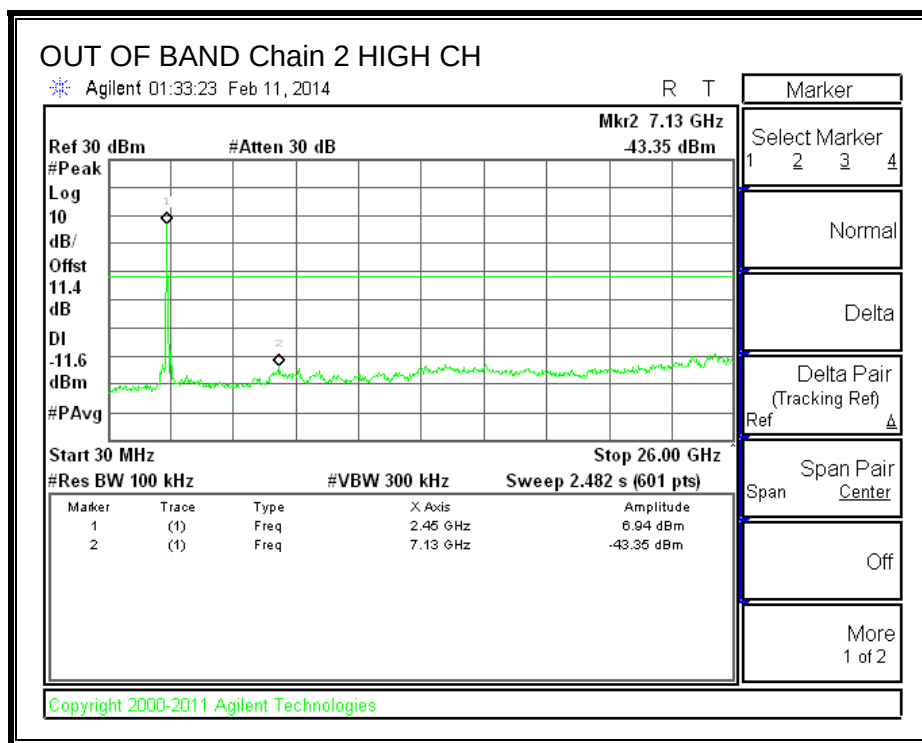
HIGH CHANNEL BANDEDGE, Chain 2



g mode Chain 2			
Limit is Based on 20dBc Peak Power			
Frequency (GHz)	Corrected (dBm)	Peak Limit (dBm)	PK Margin (dB)
2.4000	-21.64	-11.6	-10.04
2.4835	-40.06	-11.6	-28.46

OUT-OF-BAND EMISSIONS, Chain 2





8.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

8.3.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

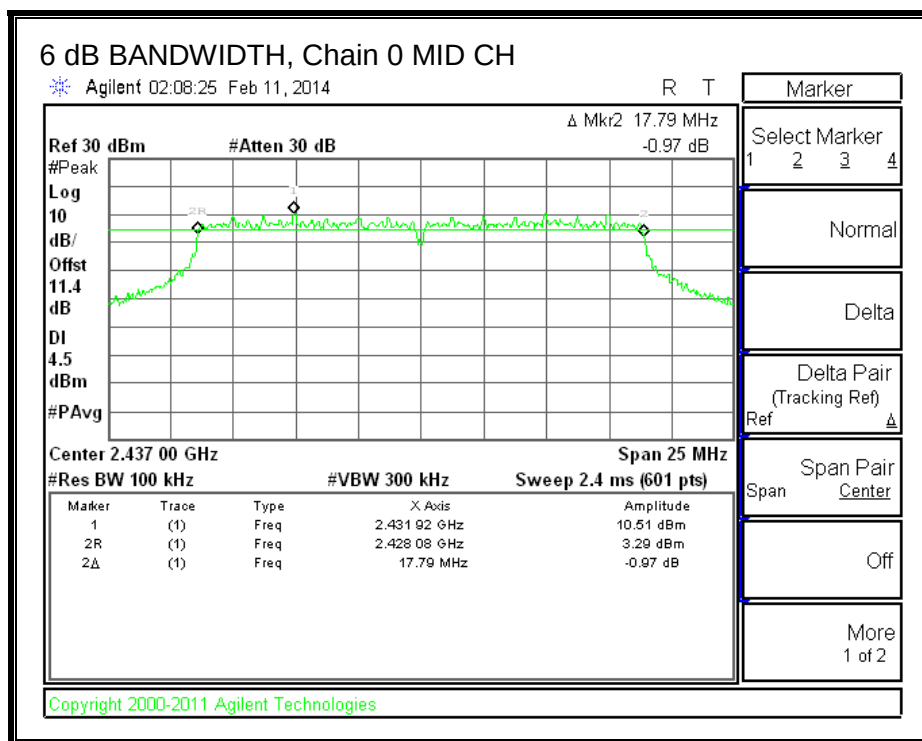
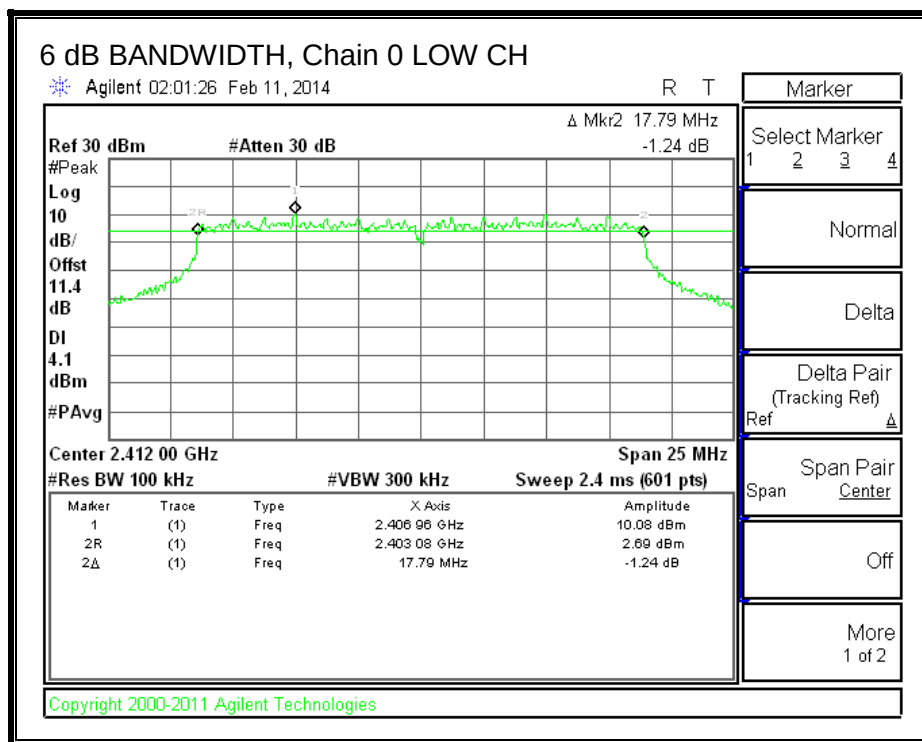
IC RSS-210 A8.2 (a)

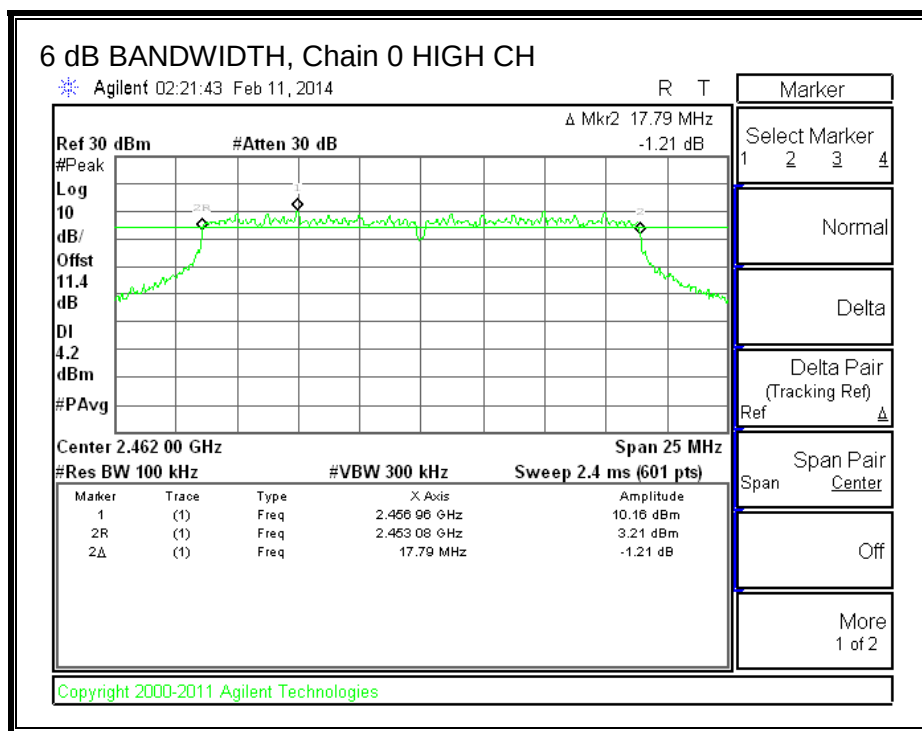
The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

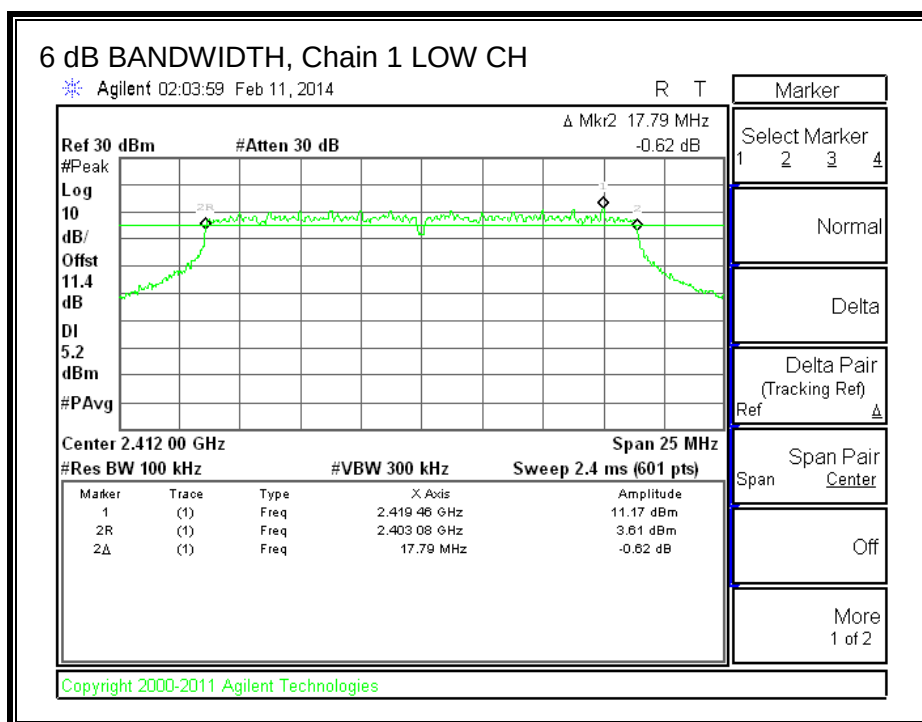
Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	6 dB BW Chain 2 (MHz)	Minimum Limit (MHz)
Low	2412	17.79	17.79	17.79	0.5
Mid	2437	17.79	17.79	17.79	0.5
High	2462	17.79	17.79	17.79	0.5

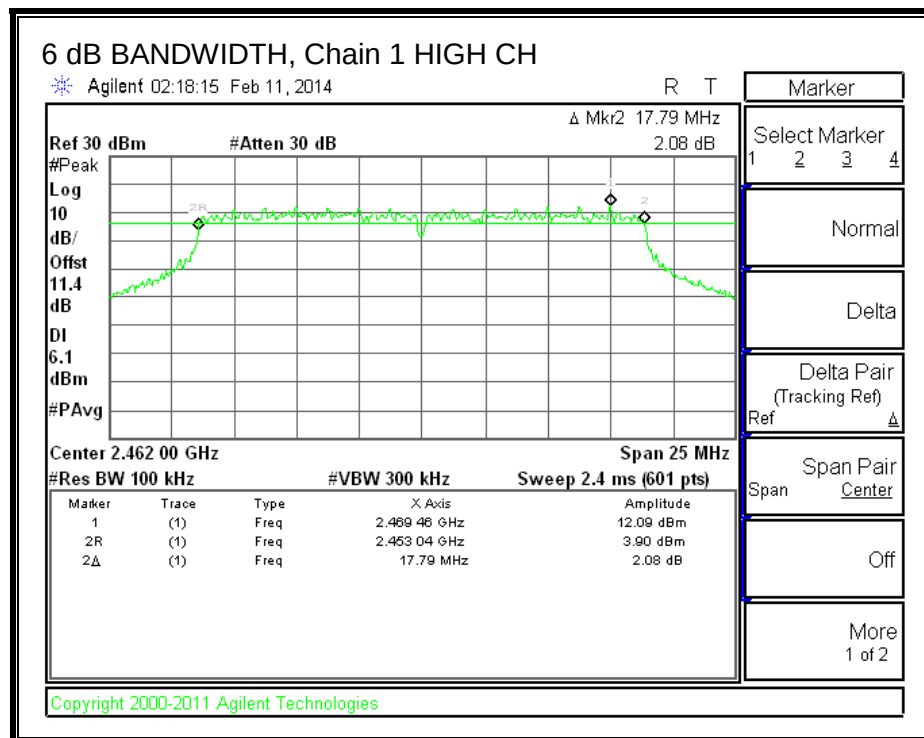
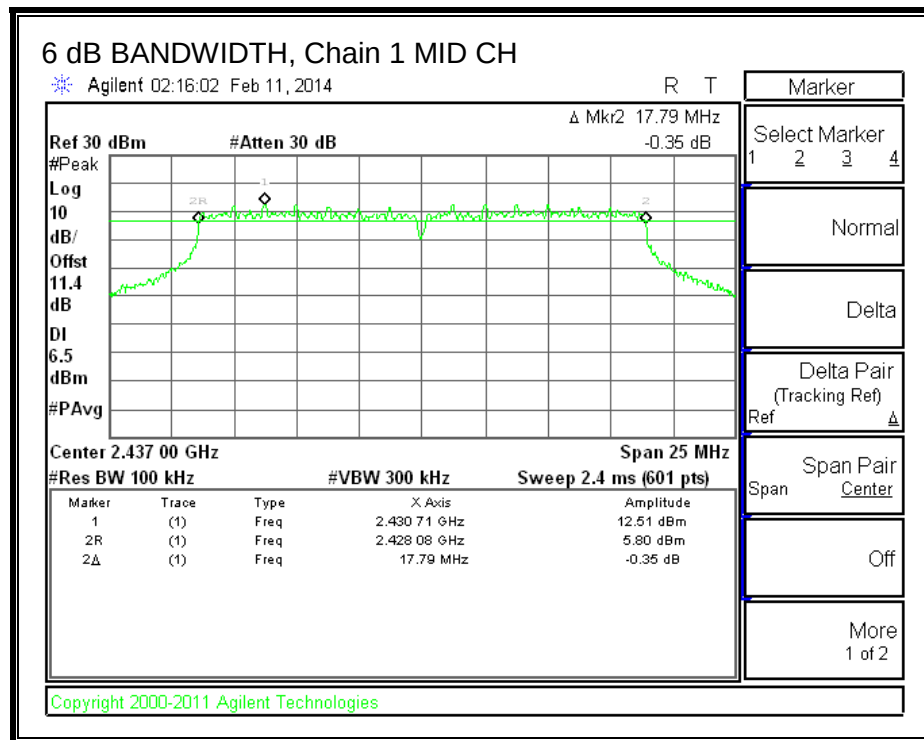
6 dB BANDWIDTH, Chain 0



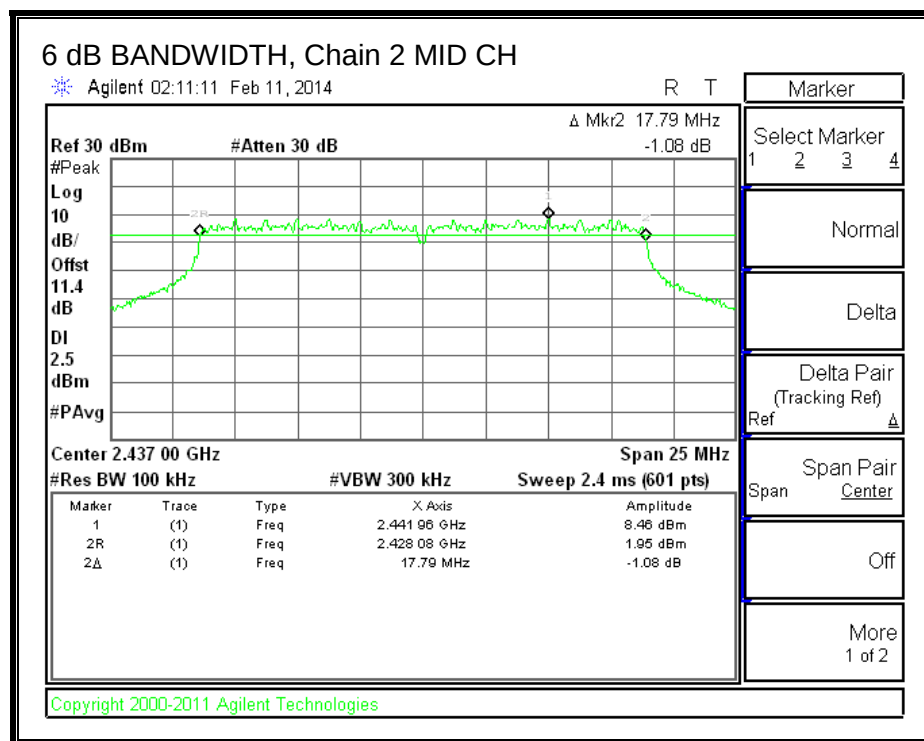
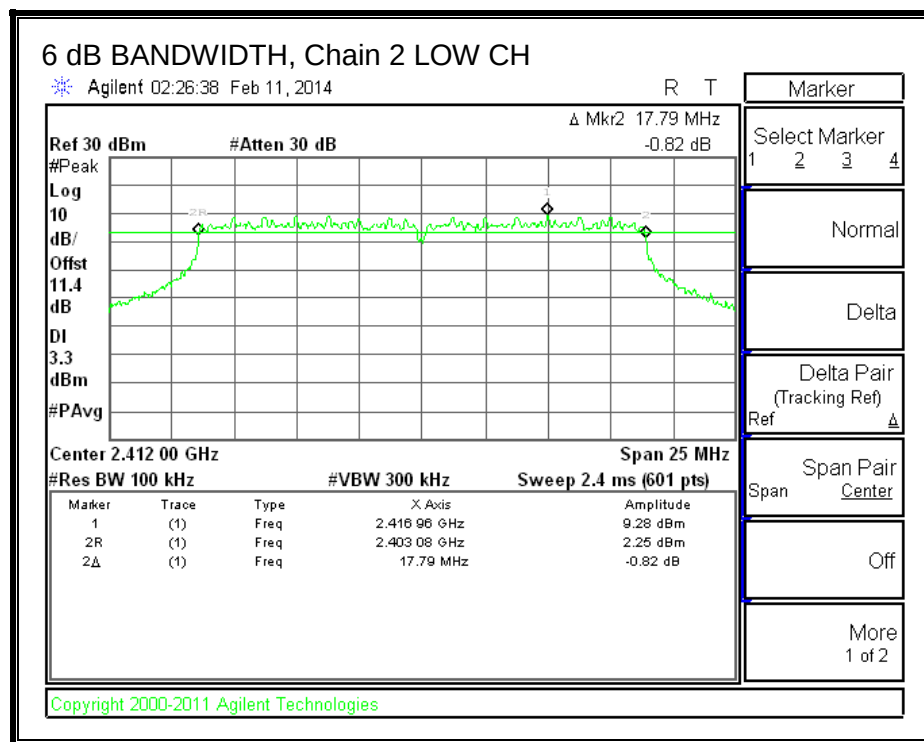


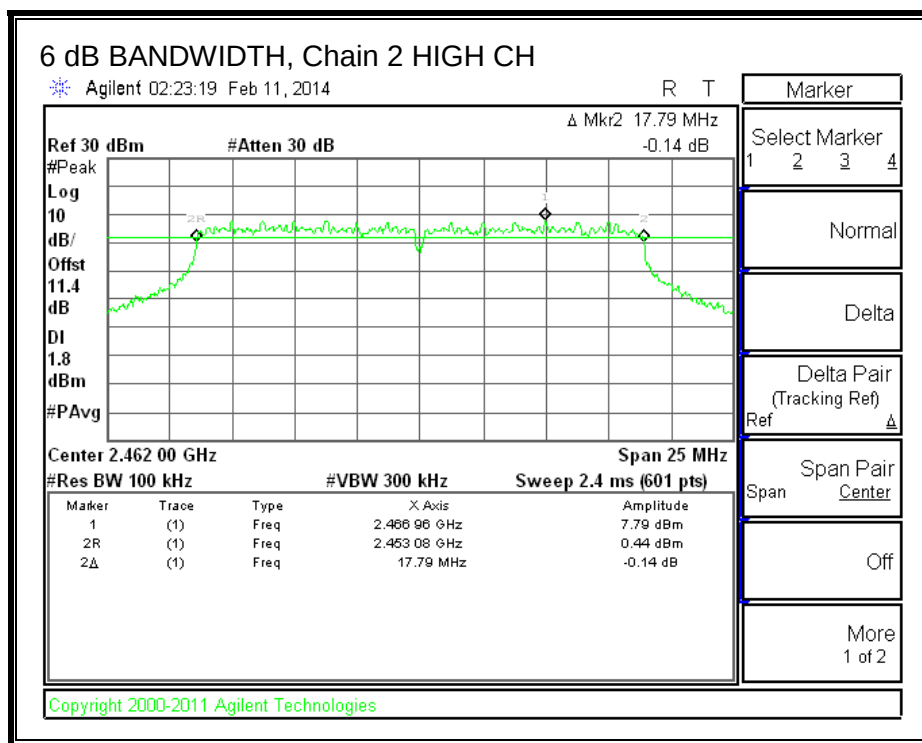
6 dB BANDWIDTH, Chain 1





6 dB BANDWIDTH, Chain 2





8.3.2. 99% BANDWIDTH

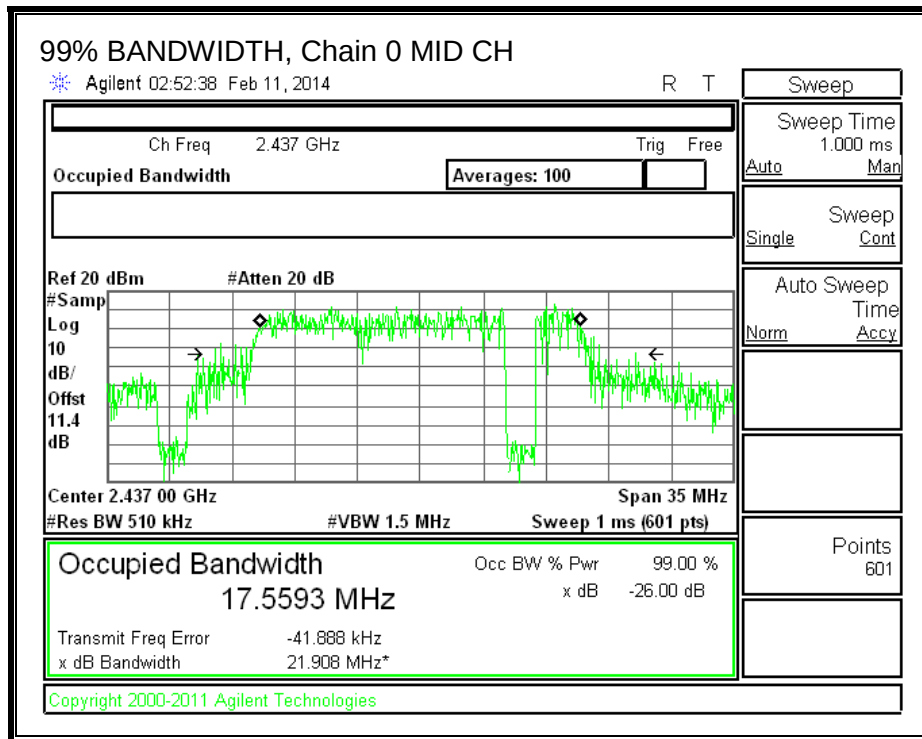
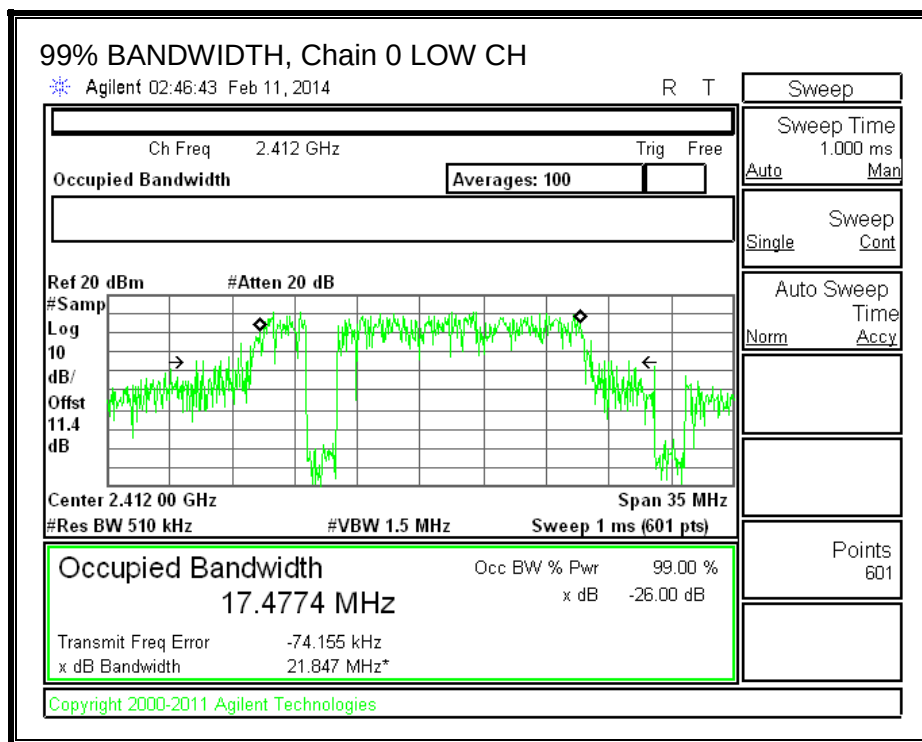
LIMITS

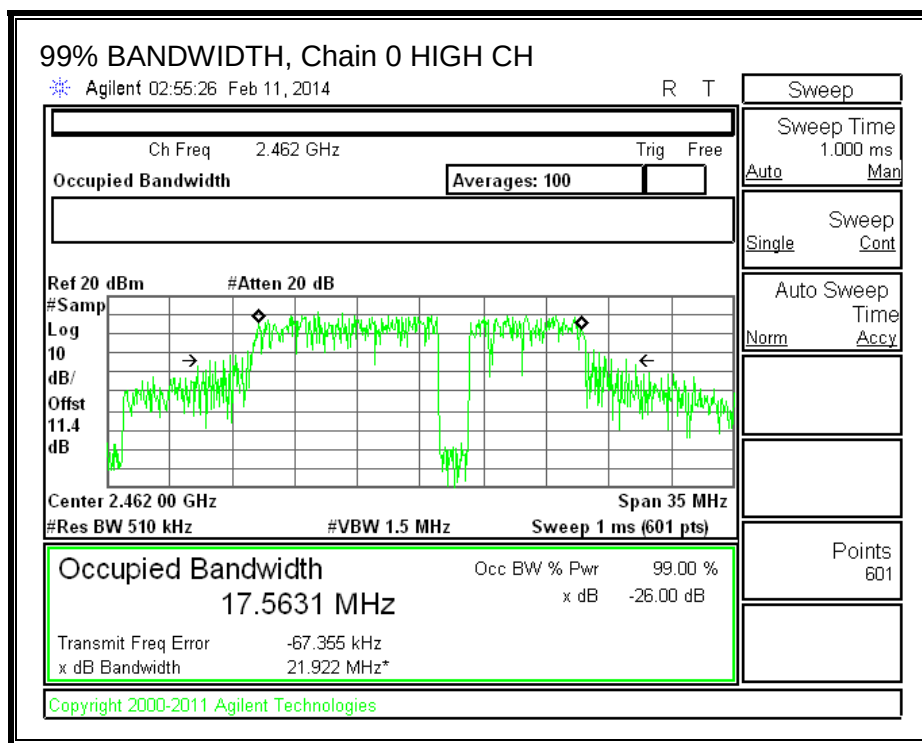
None; for reporting purposes only.

RESULTS

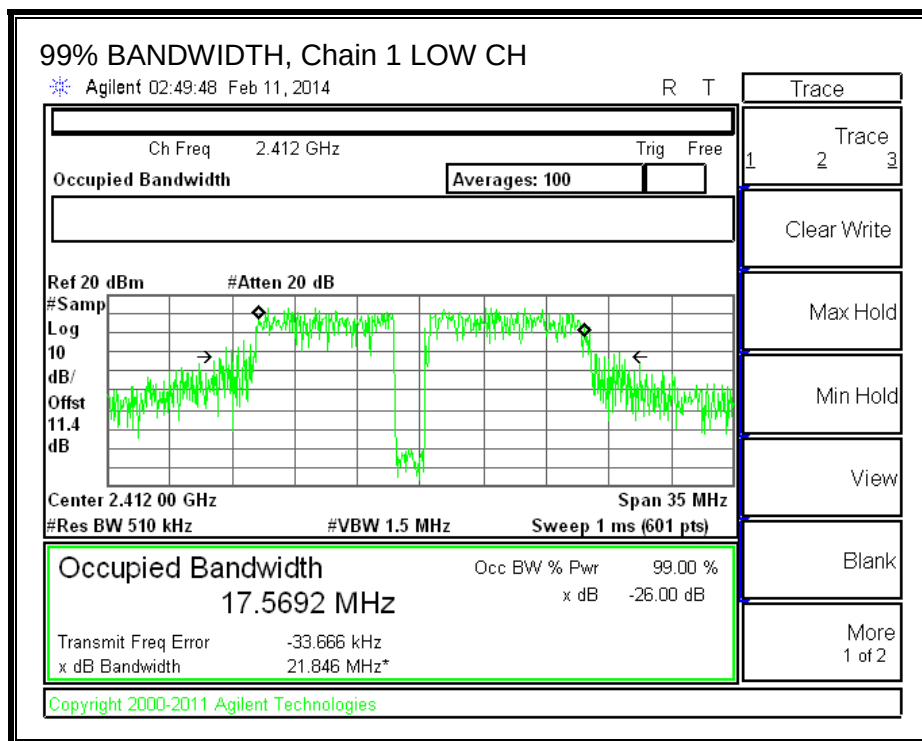
Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)	99% BW Chain 2 (MHz)
Low	2412	17.4774	17.5692	17.5863
Mid	2437	17.5593	17.6159	17.5815
High	2462	17.5631	17.5838	17.5366

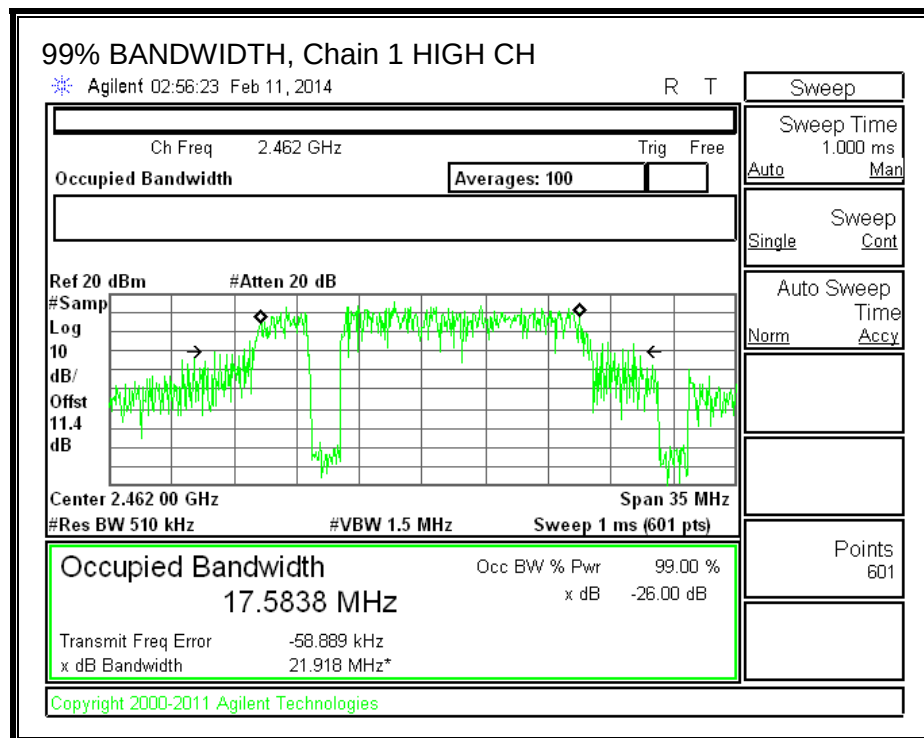
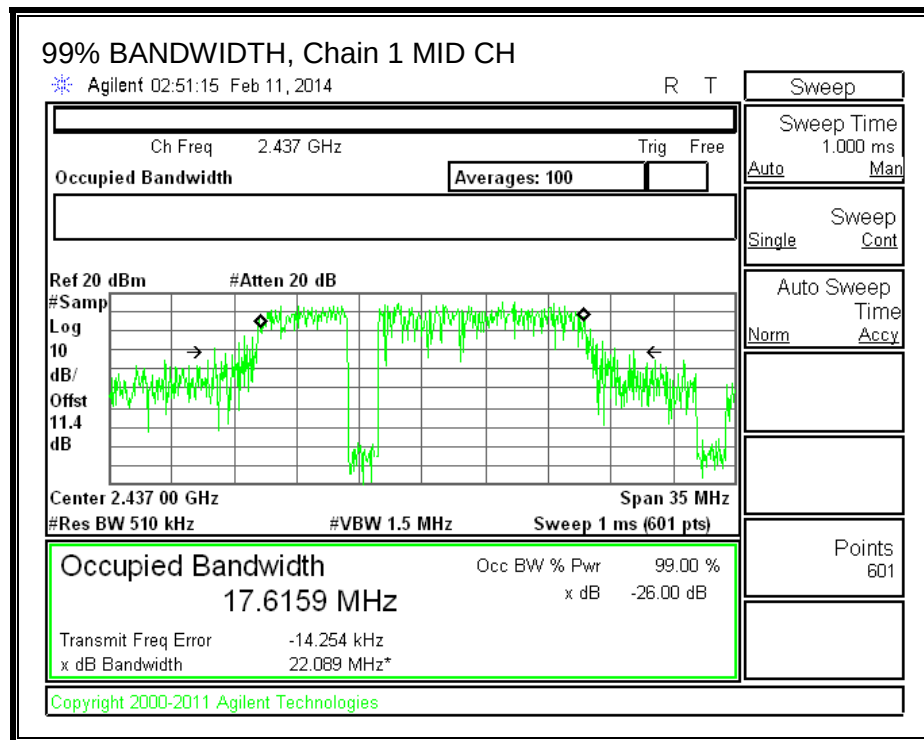
99% BANDWIDTH, Chain 0



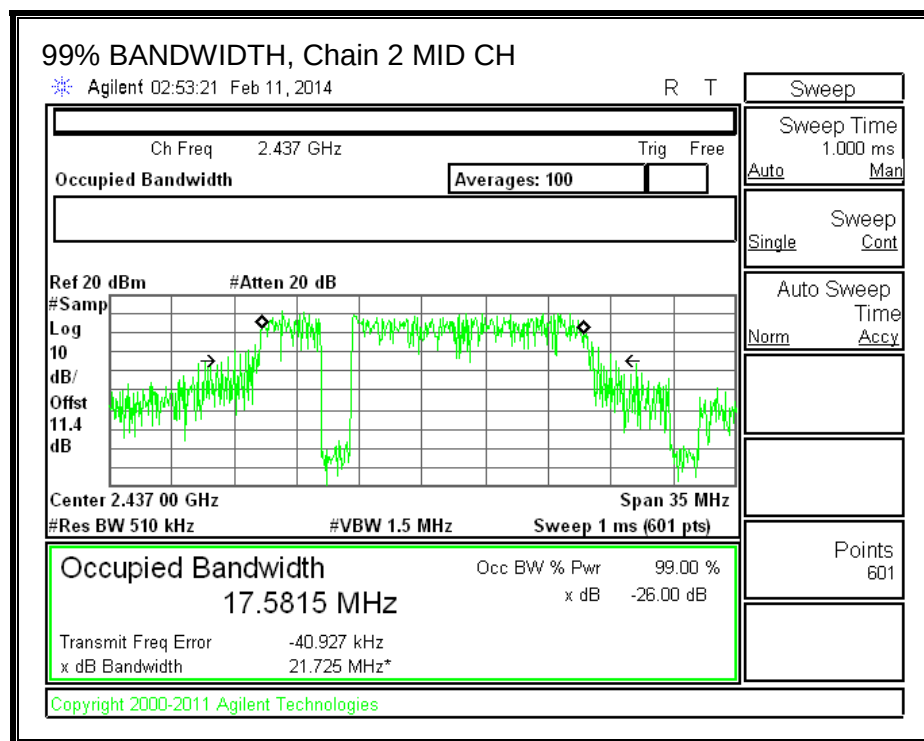
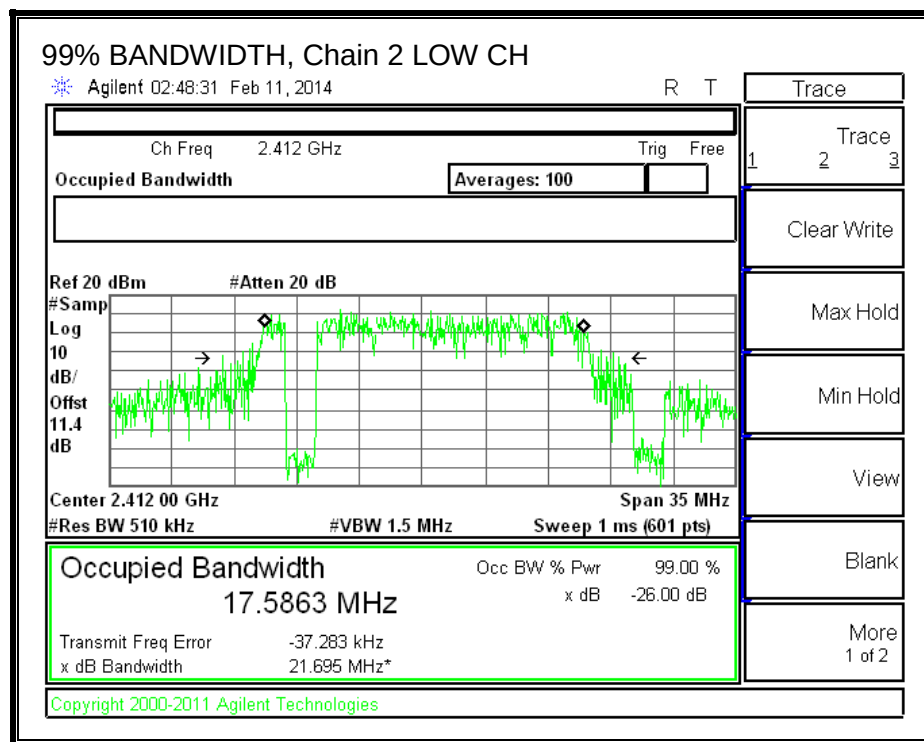


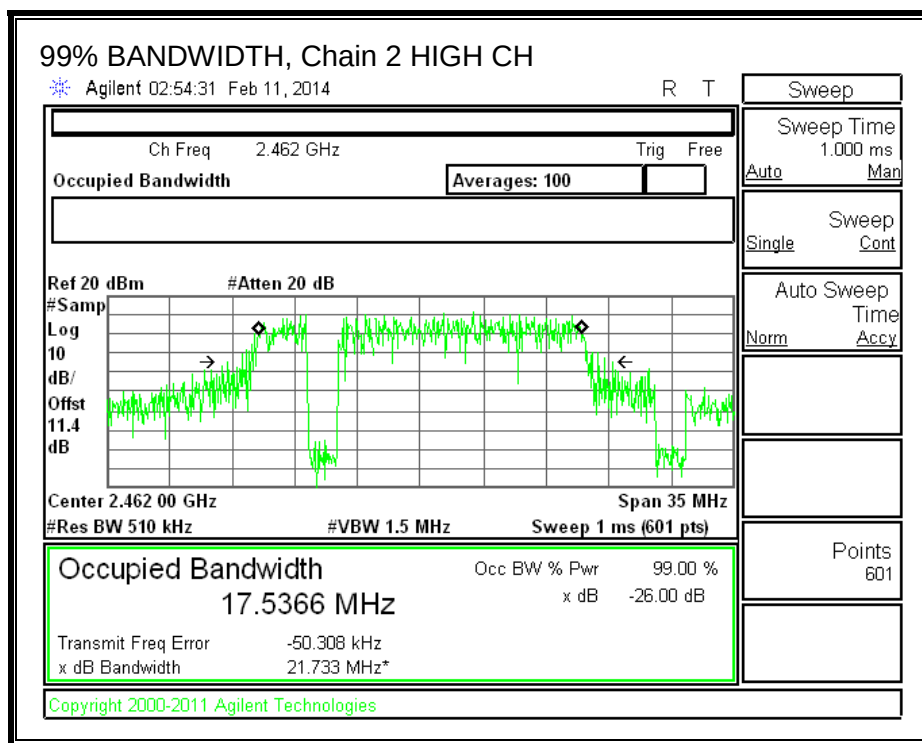
99% BANDWIDTH, Chain 1





99% BANDWIDTH, Chain 2





8.3.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11.4 dB (including 10 dB pad and 1.4 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

CALCULATION

Total Power (P) = $10 * \text{LOG}(10^{(P0/10)} + 10^{(P1/10)} + 10^{(P2/10)})$

RESULTS

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)
Low	2412	17.45	17.45	17.30	22.17
Mid	2437	22.20	21.40	21.20	26.39
High	2462	17.77	17.70	18.24	22.68

8.3.4. OUTPUT POWER

LIMITS

FCC §15.247

IC RSS-210 A8.4

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

CALCULATION

Directional Gain (G) = $10 * \text{LOG}((10^{(G0/10)} + 10^{(G1/10)} + 10^{(G2/10)})/3)$

Output Power (P) = $10 * \text{LOG}(10^{(P0/10)} + 10^{(P1/10)} + 10^{(P2/10)})$

DIRECTIONAL ANTENNA GAIN

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

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Chain 2 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
2.21	3.59	4.34	3.47

RESULTS

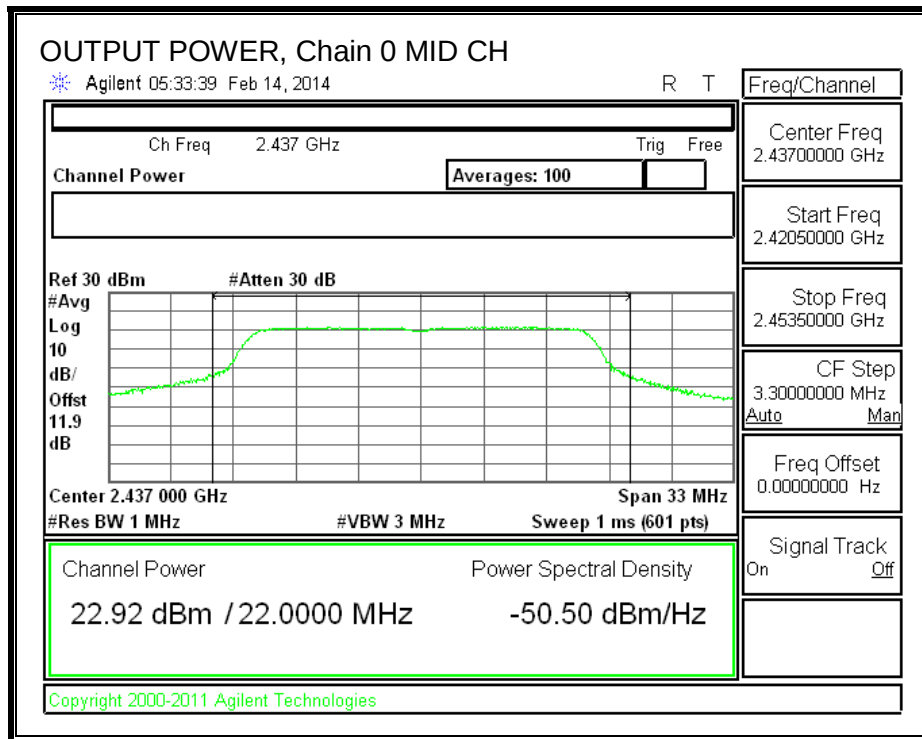
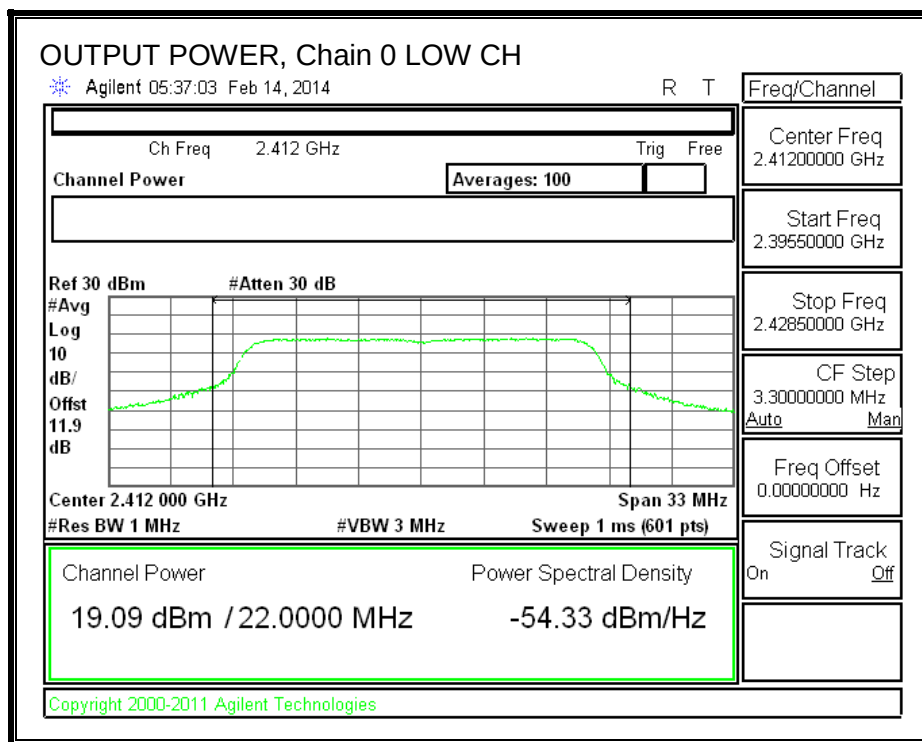
Limits

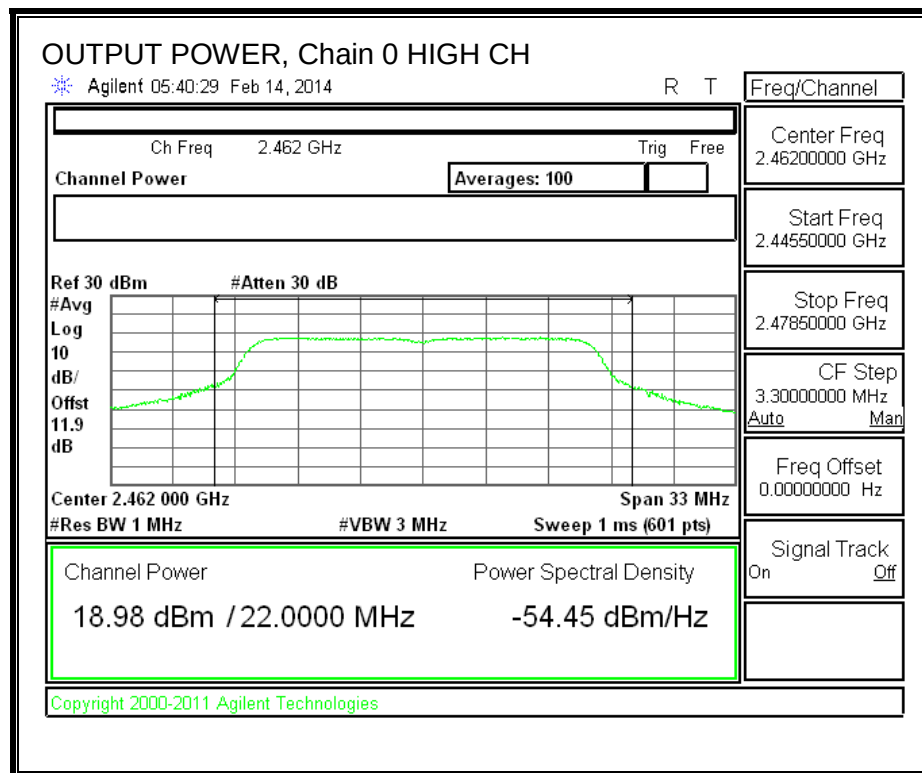
Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	3.47	30.00	30	36	30.00
Mid	2437	3.47	30.00	30	36	30.00
High	2462	3.47	30.00	30	36	30.00

Results

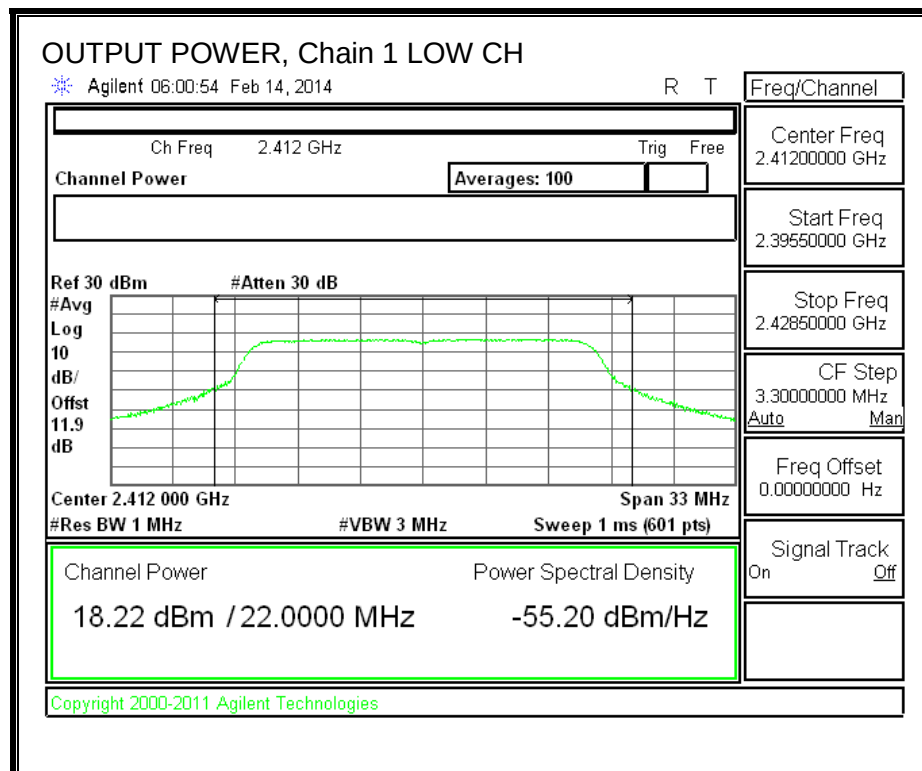
Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Chain 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	19.09	18.22	18.70	23.46	30.00	-6.54
Mid	2437	22.92	22.20	22.02	27.17	30.00	-2.83
High	2462	18.98	18.48	18.30	23.37	30.00	-6.63

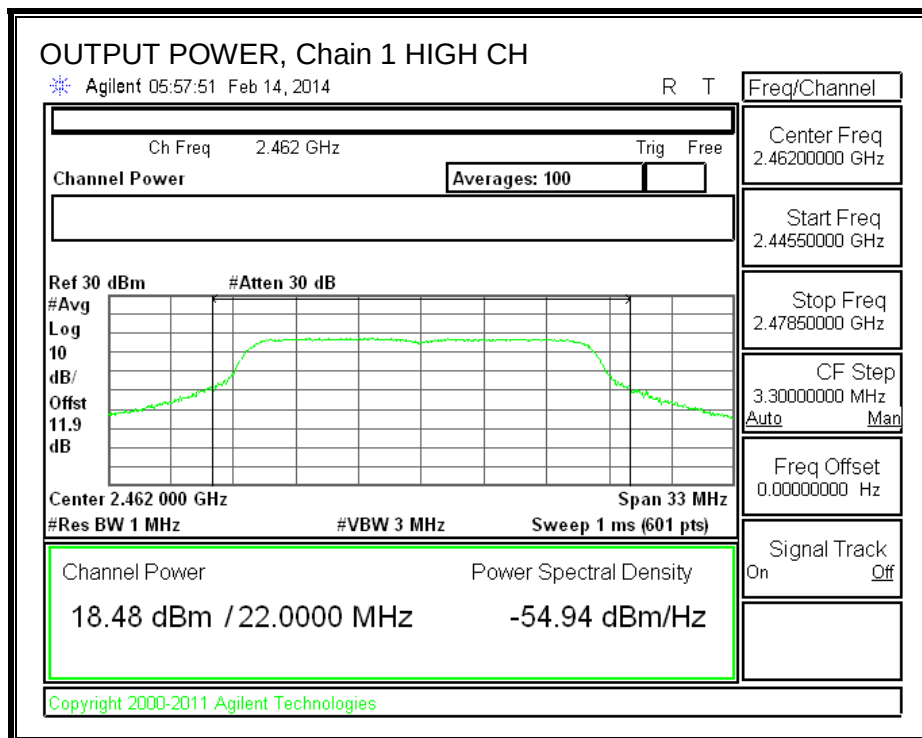
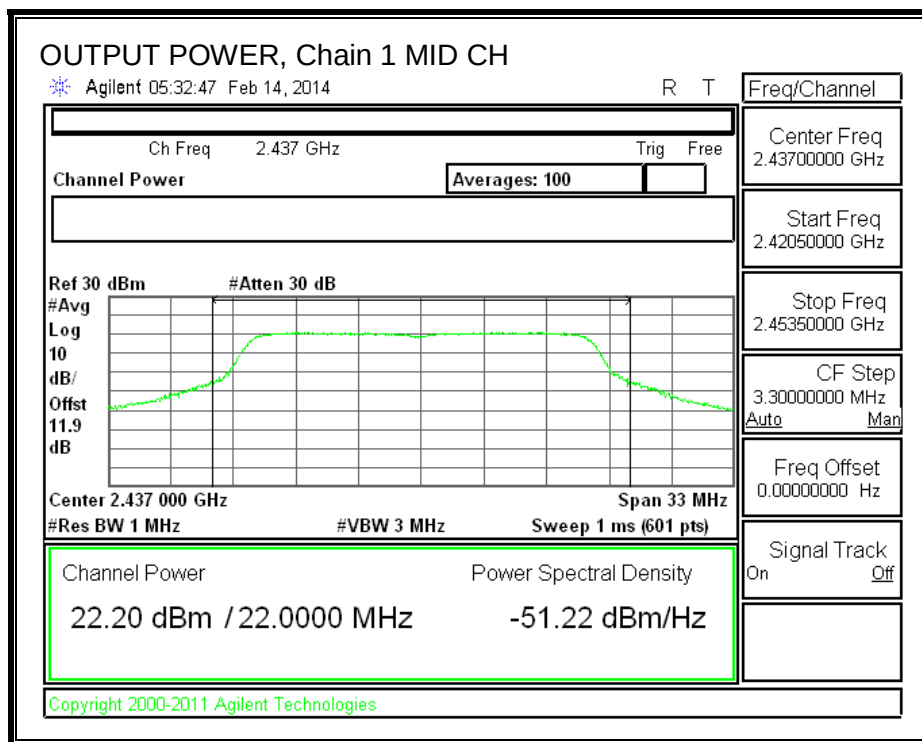
OUTPUT POWER, Chain 0



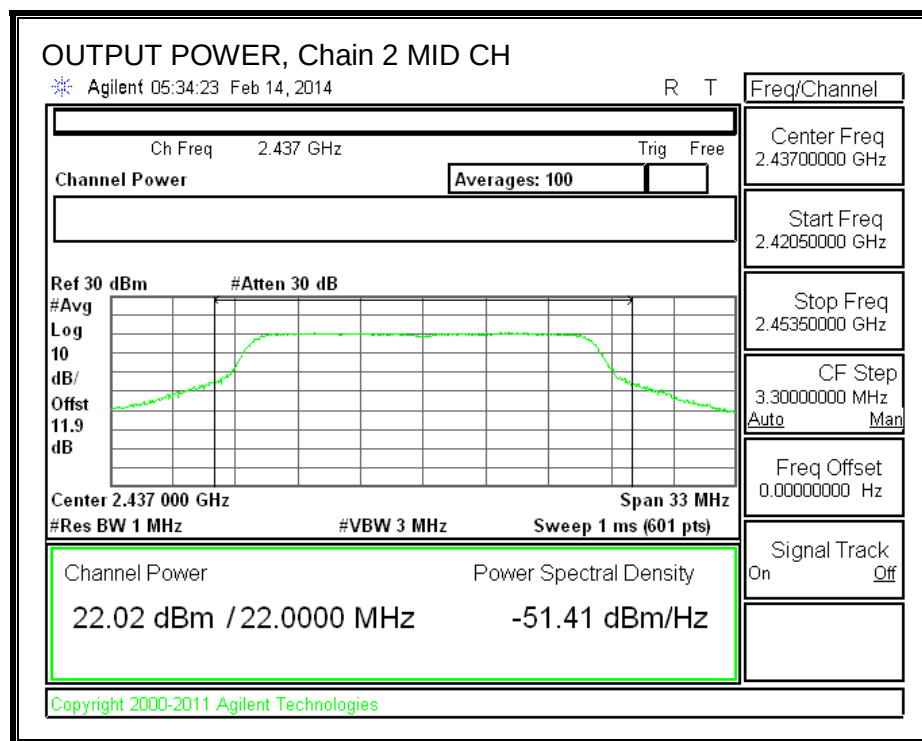
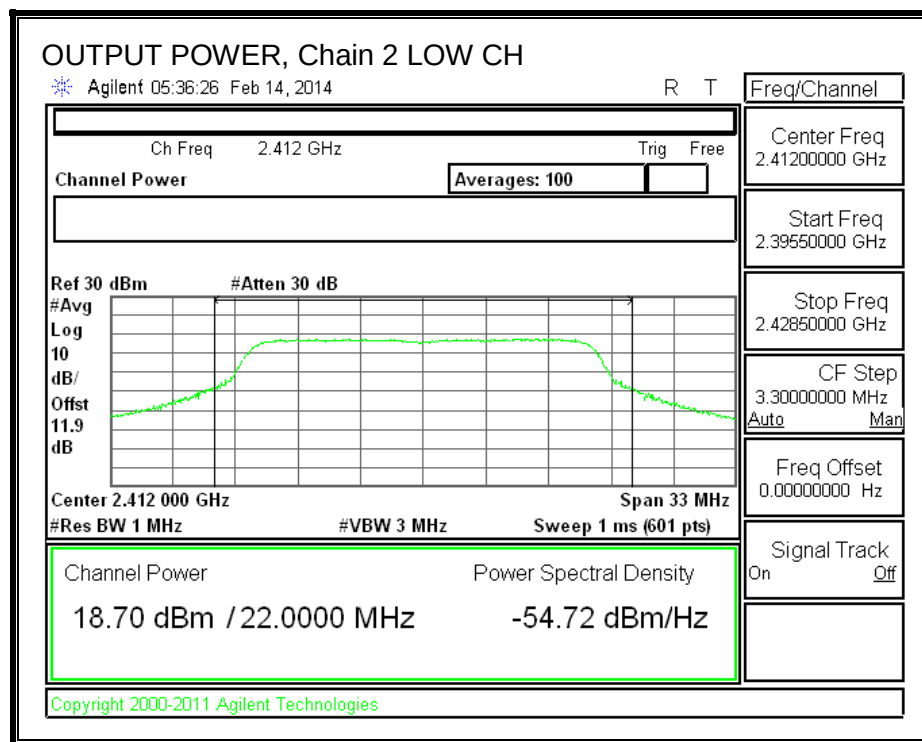


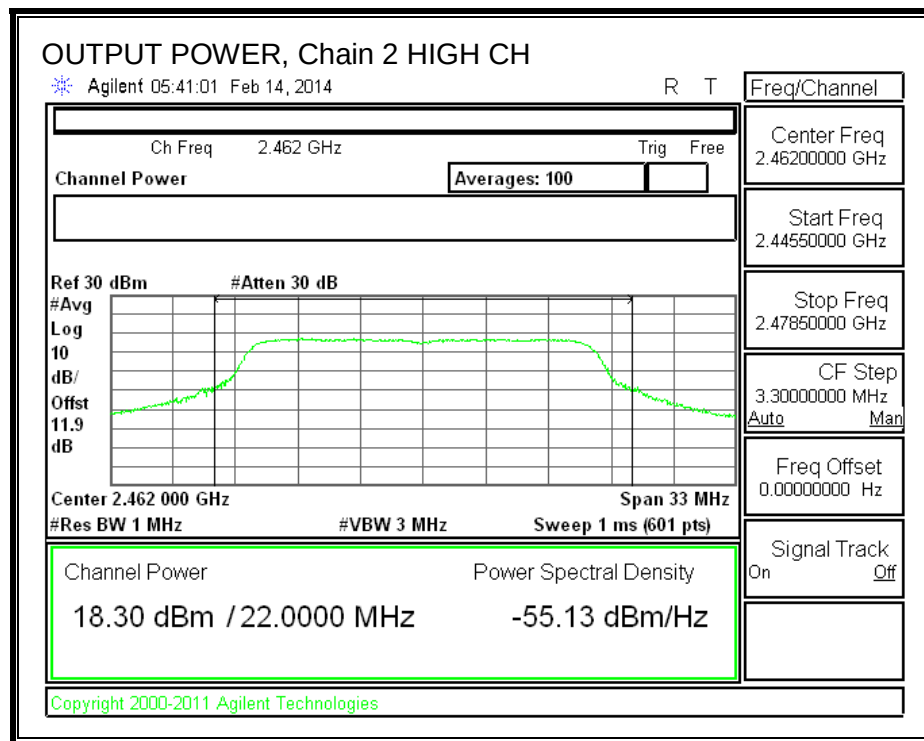
OUTPUT POWER, Chain 1





OUTPUT POWER, Chain 2





8.3.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247

IC RSS-210 A8.2

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

CALCULATION

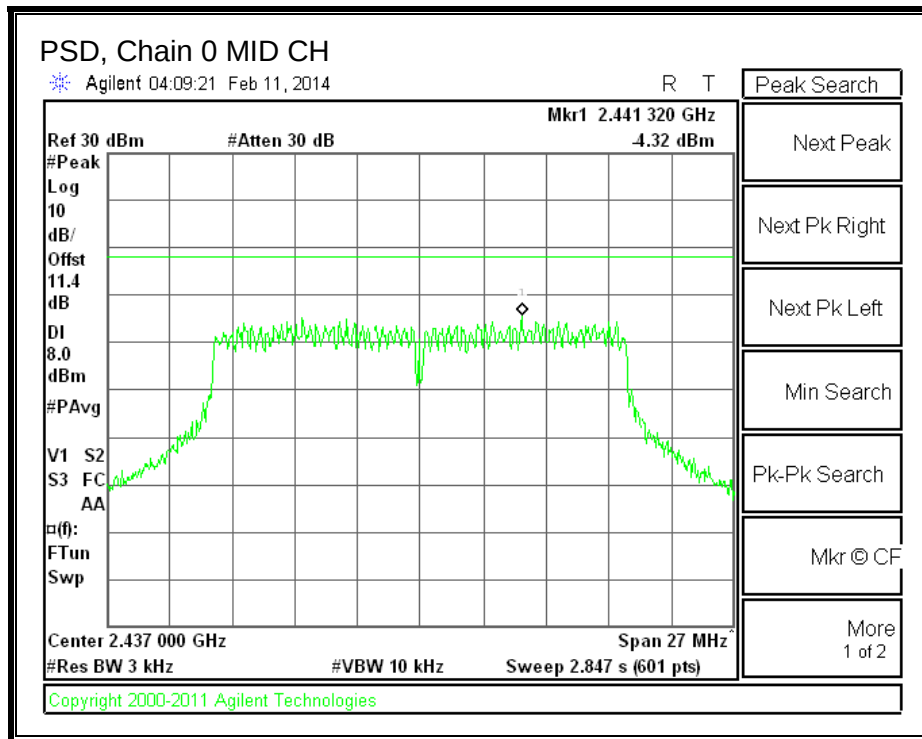
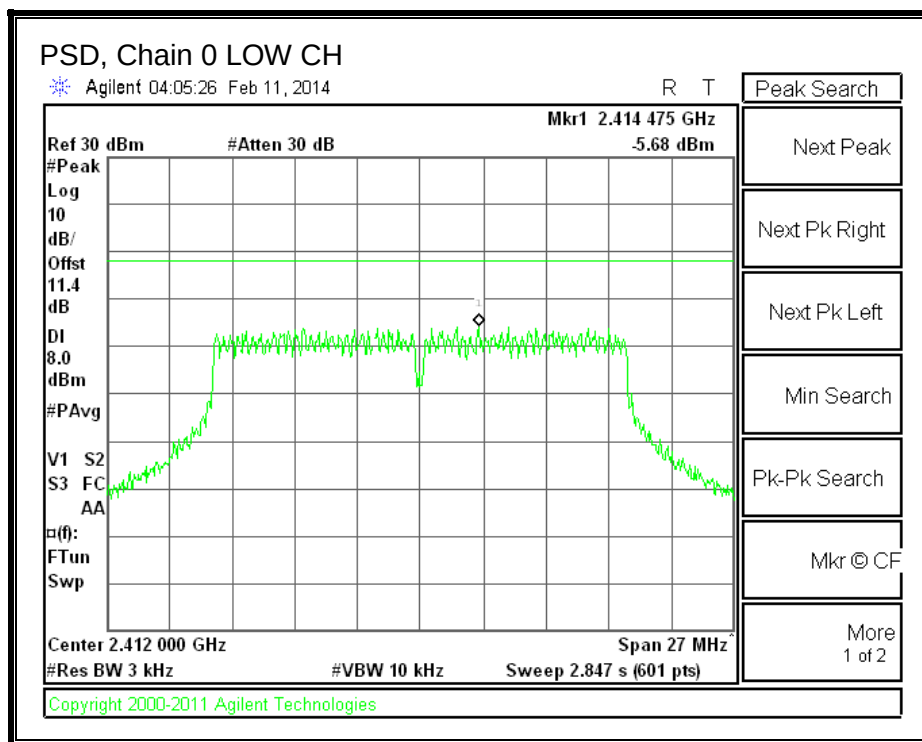
Power Spectral Density = $10 * \text{LOG}(10^{(\text{PSD0}/10)} + 10^{(\text{PSD1}/10)} + 10^{(\text{PSD2}/10)})$

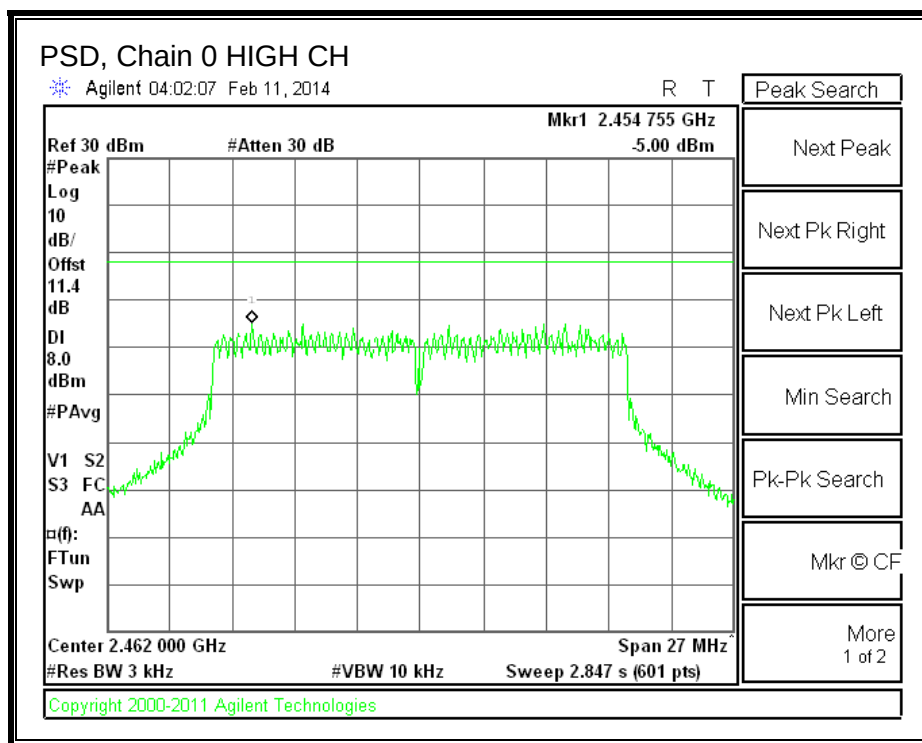
RESULTS

PSD Results

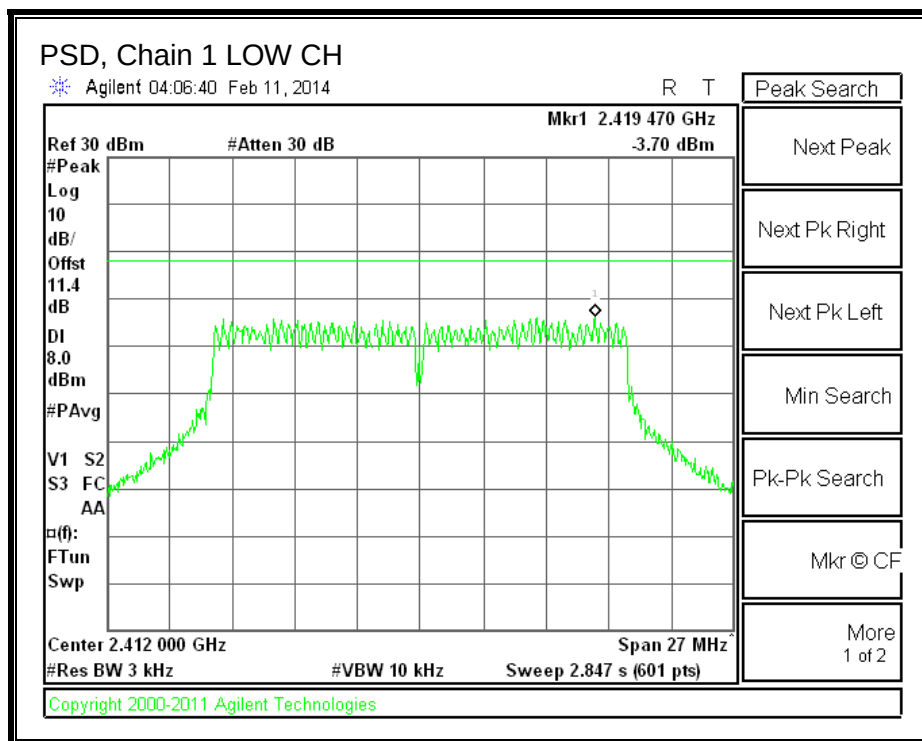
Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Chain 1 Meas (dBm)	Chain 2 Meas (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-5.68	-3.70	-4.84	0.11	8.0	-7.9
Mid	2437	-4.32	-2.74	-6.43	0.53	8.0	-7.5
High	2462	-5.00	-2.98	-6.61	0.16	8.0	-7.8

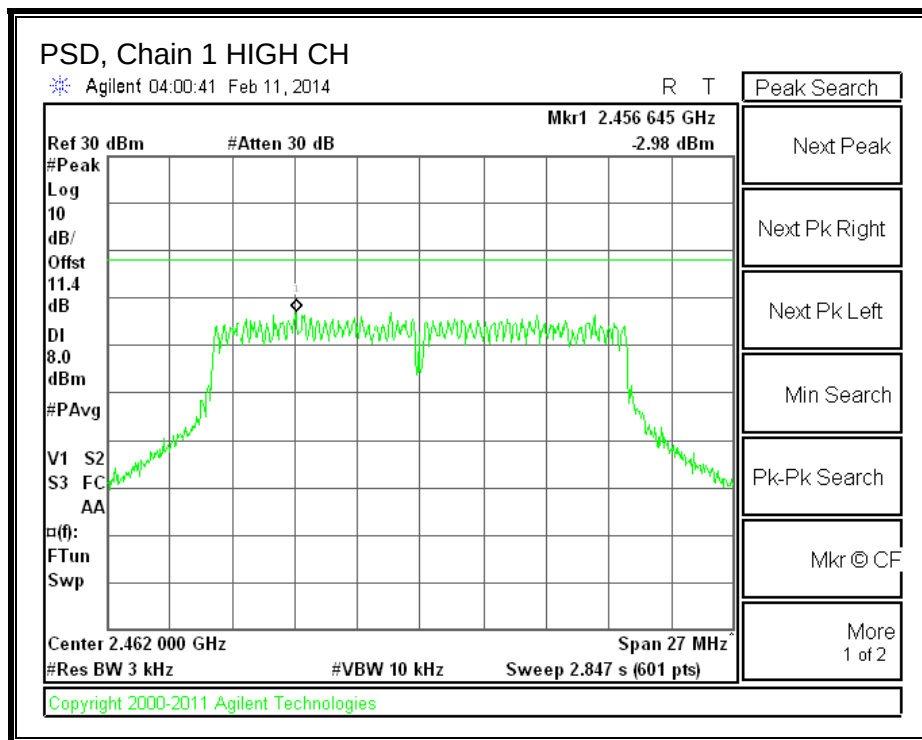
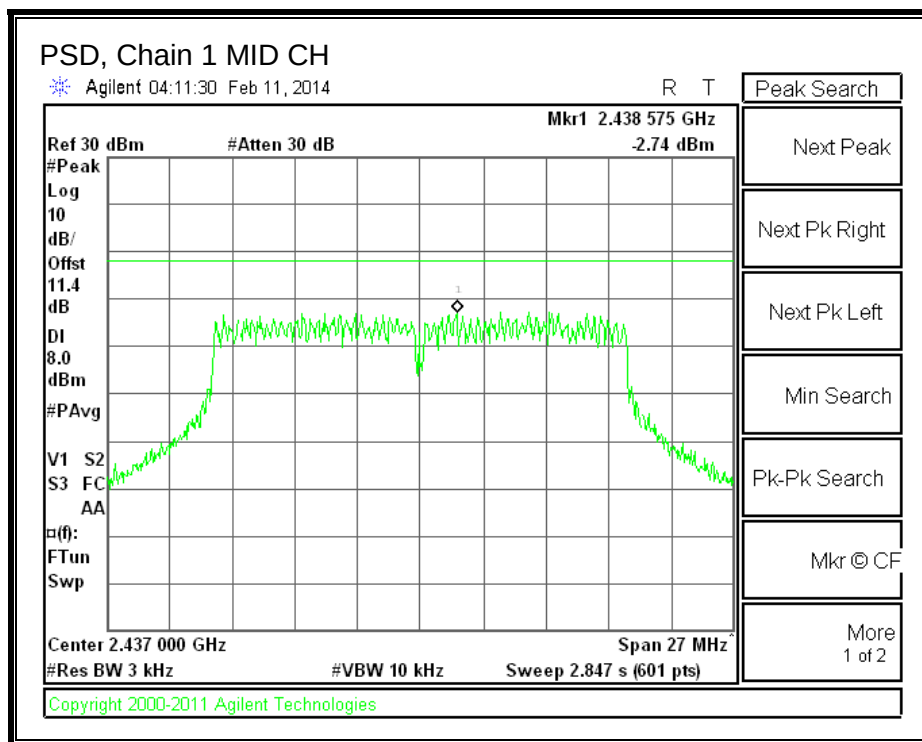
PSD, Chain 0



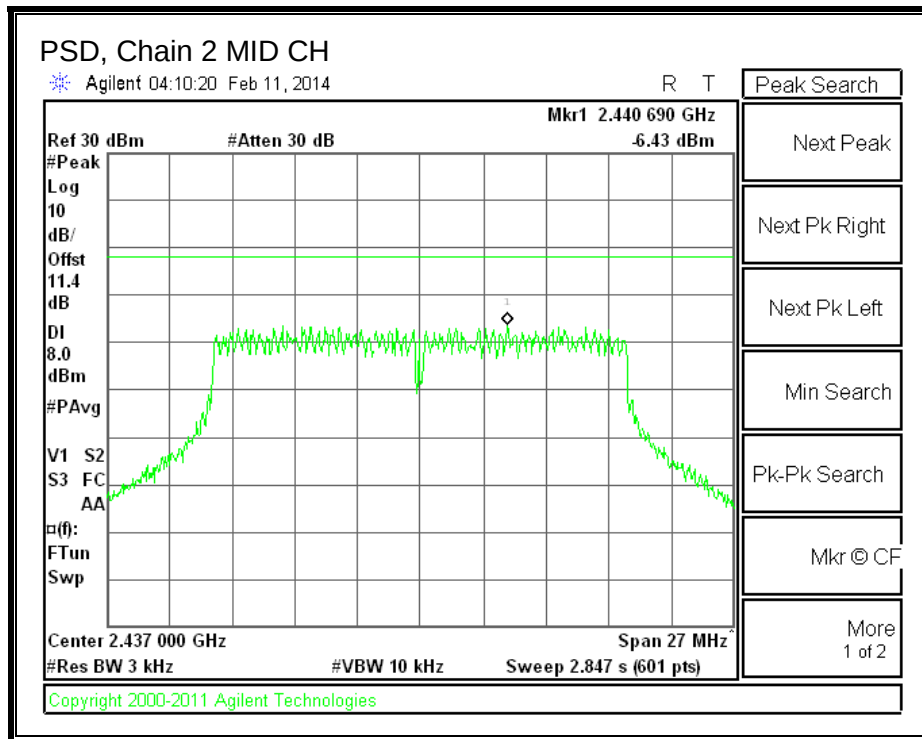
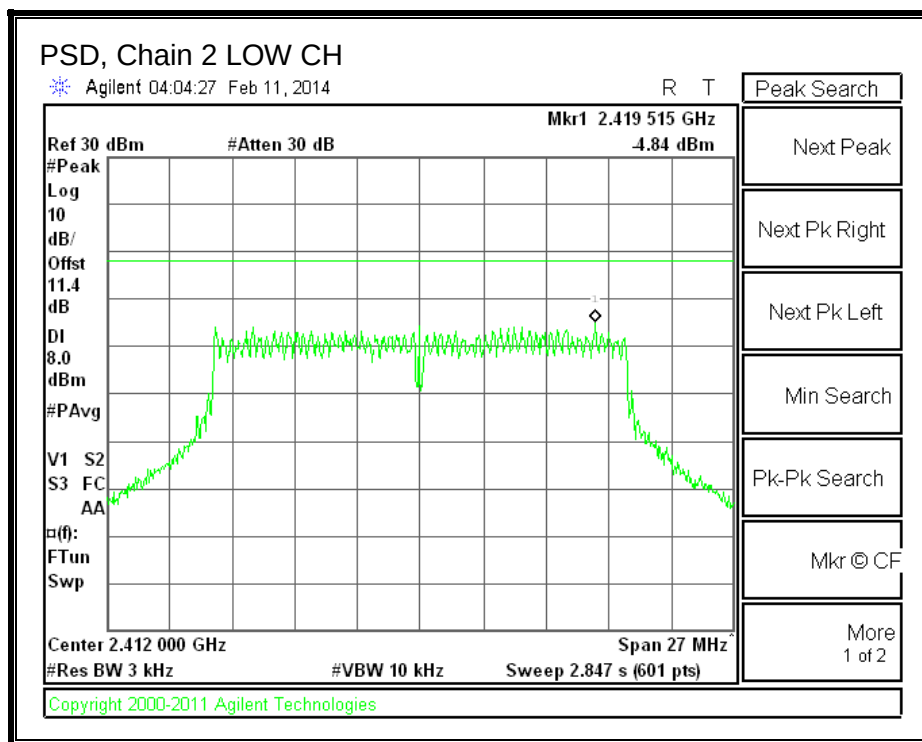


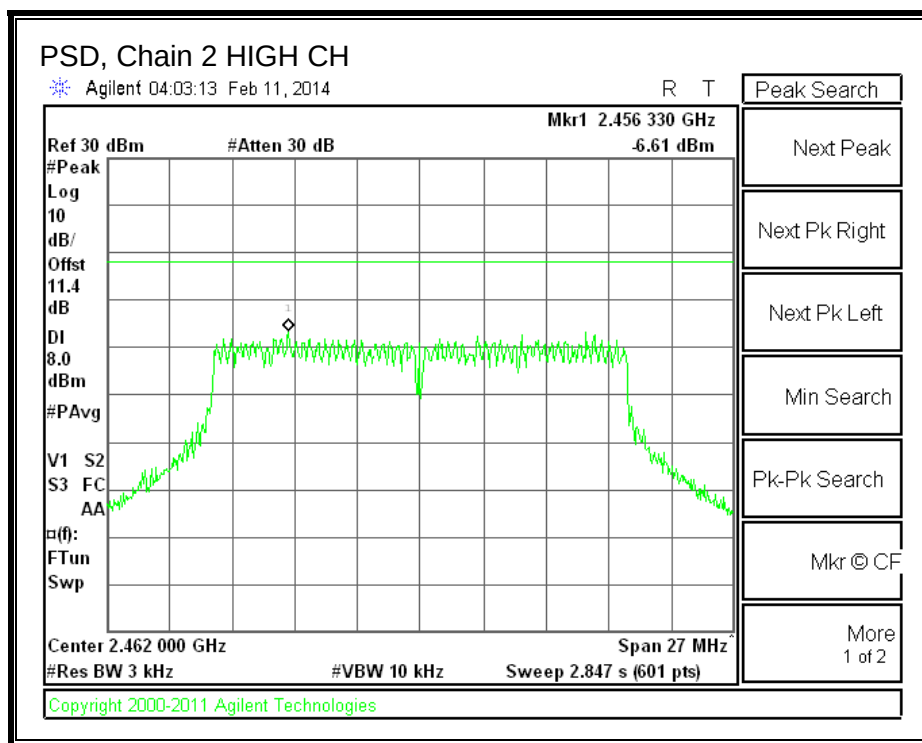
PSD, Chain 1





PSD, Chain 2





8.3.6. OUT-OF-BAND EMISSIONS

LIMITS

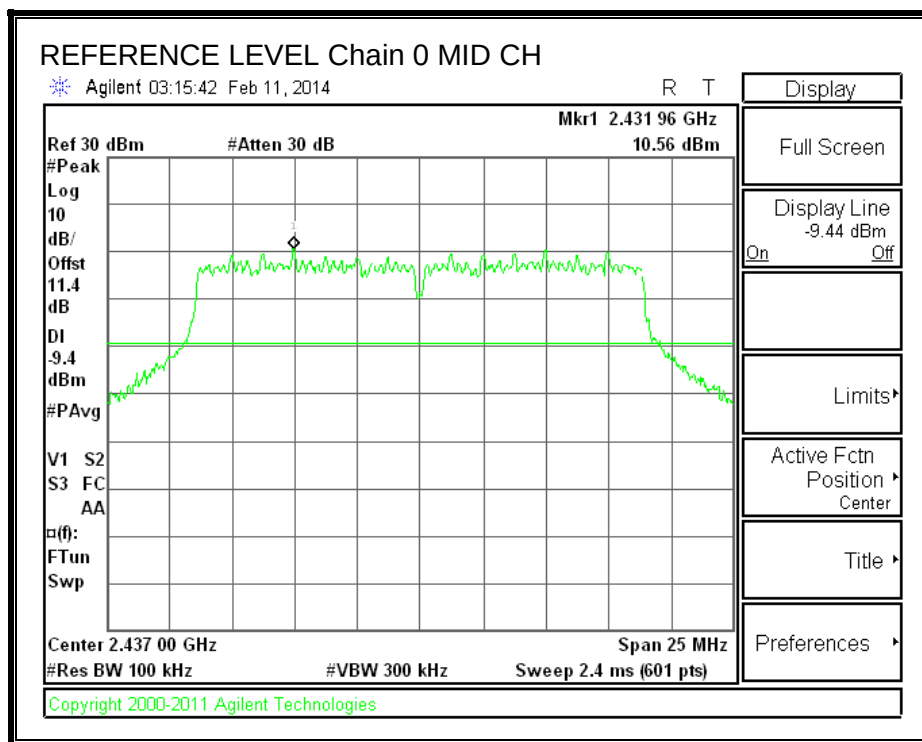
FCC §15.247 (d)

IC RSS-210 A8.5

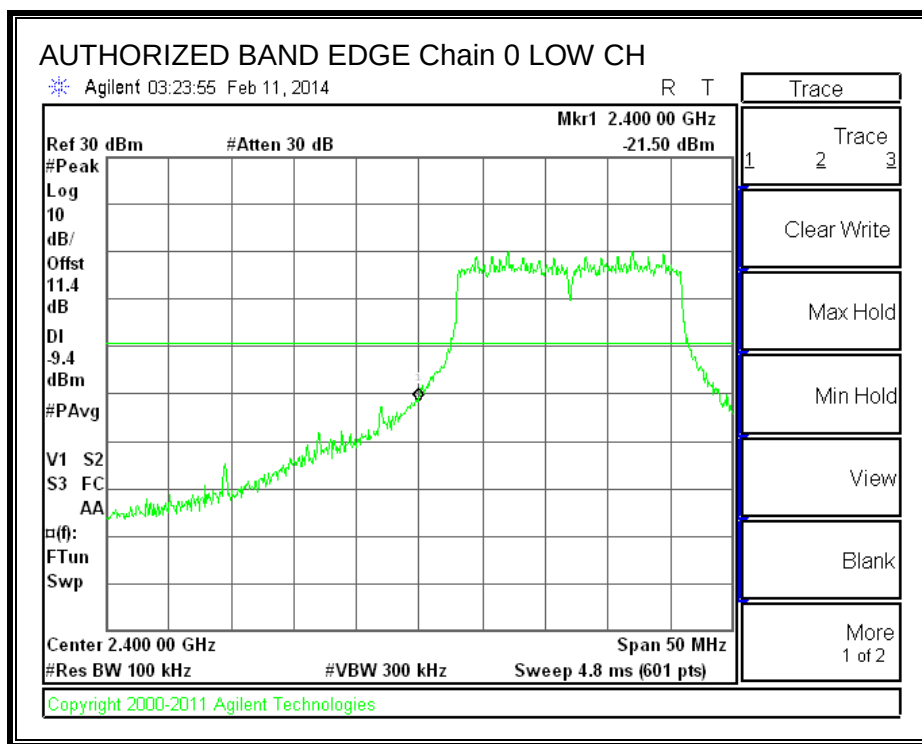
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the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

RESULTS

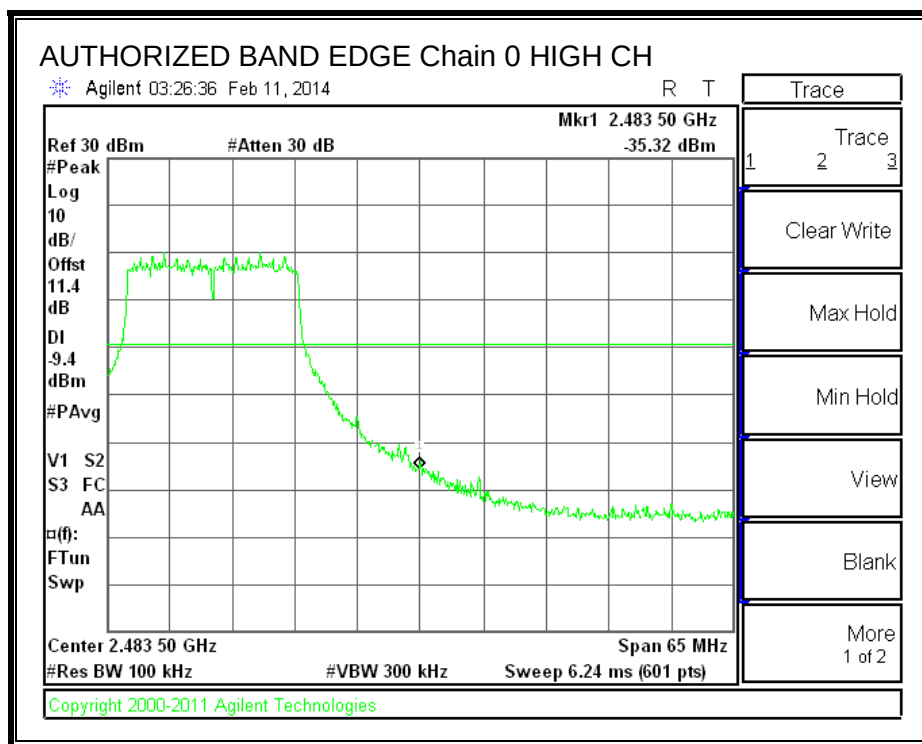
IN-BAND REFERENCE LEVEL, Chain 0



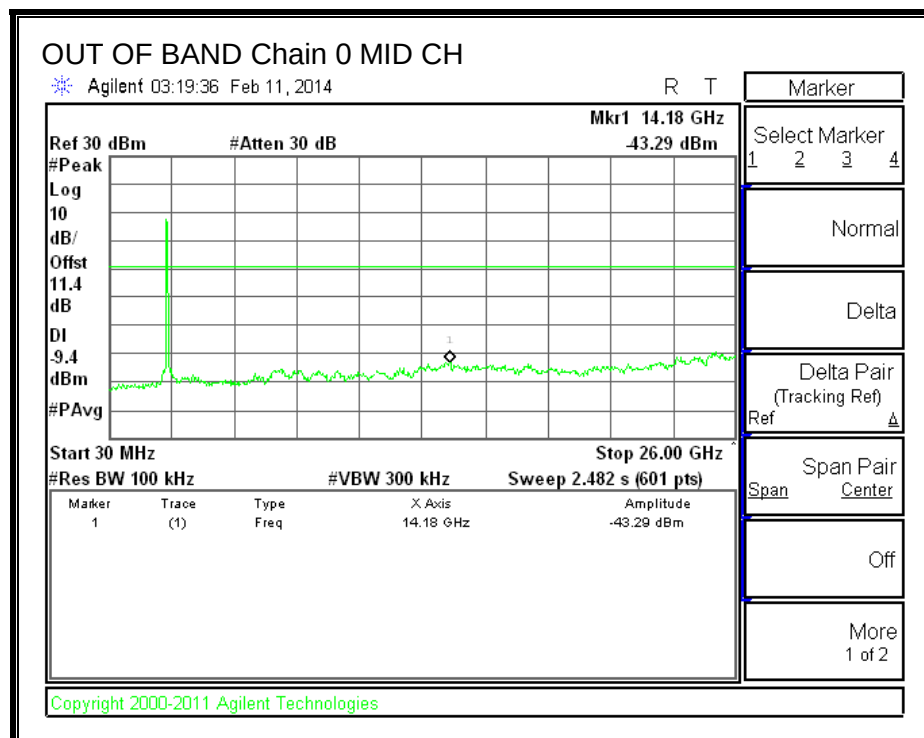
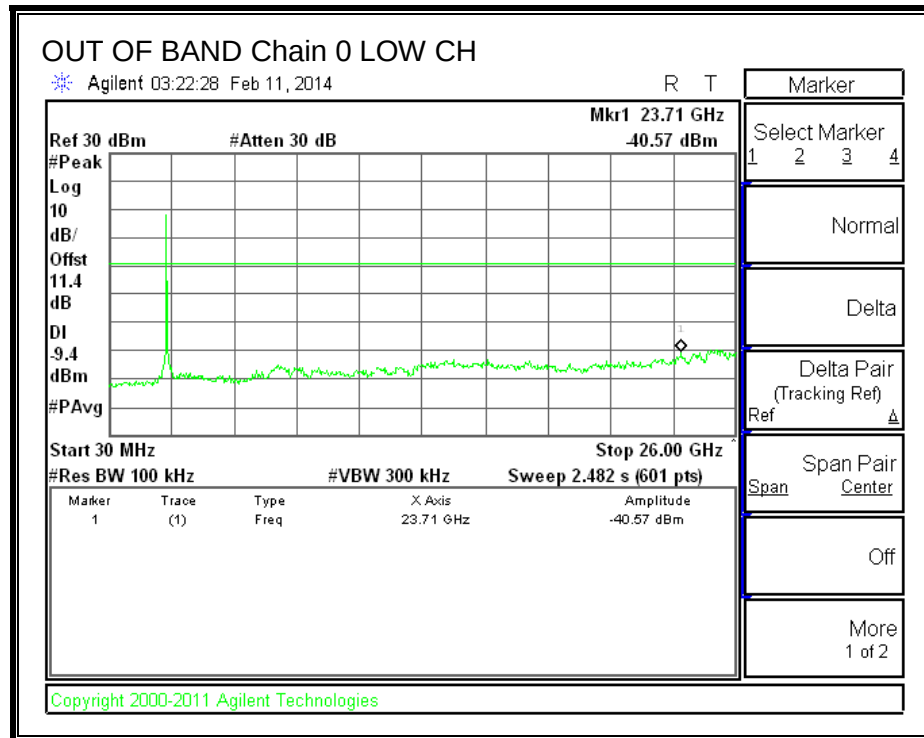
LOW CHANNEL BANDEDGE, Chain 0

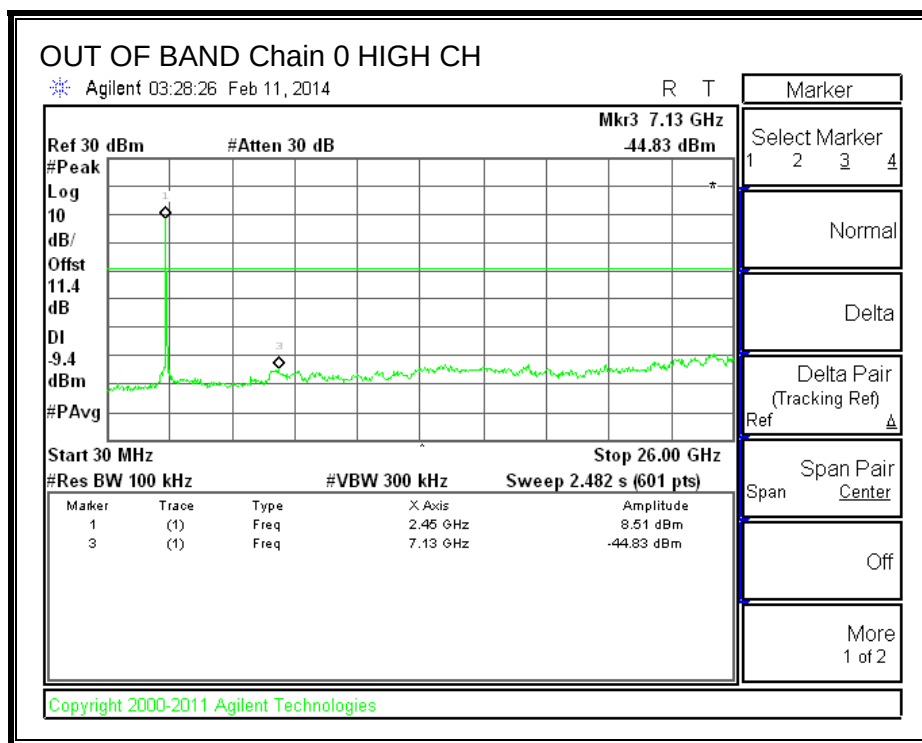


HIGH CHANNEL BANDEDGE, Chain 0

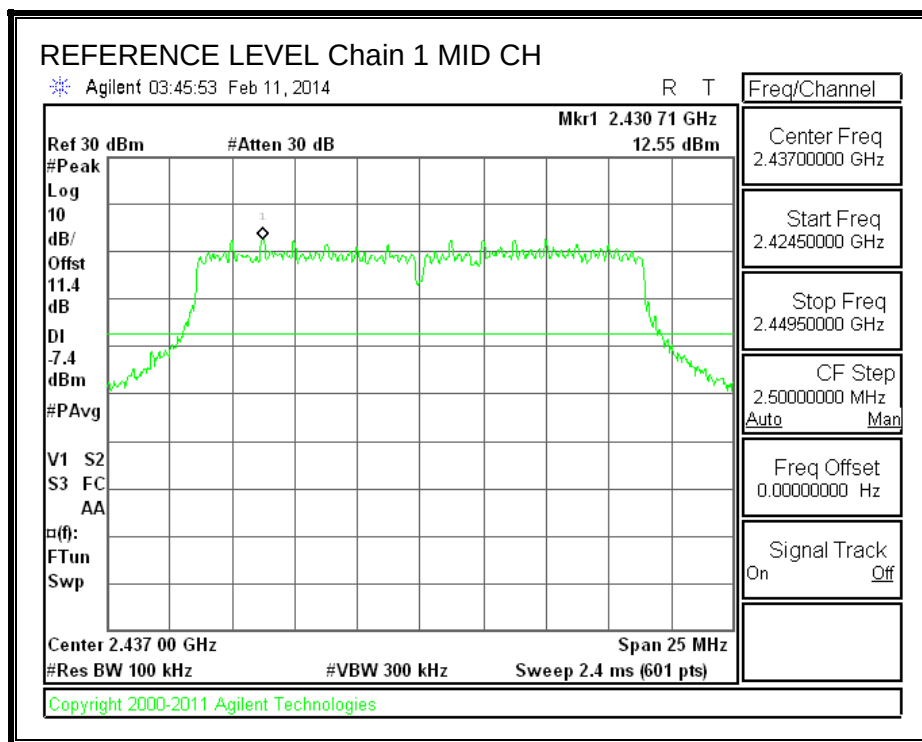


HT20 mode Chain 0			
Limit is Based on 20dBc Peak Power			
Frequency (GHz)	Corrected (dBm)	Peak Limit (dBm)	PK Margin (dB)
2.4000	-21.50	-9.4	-12.1
2.4835	-35.32	-9.4	-25.92

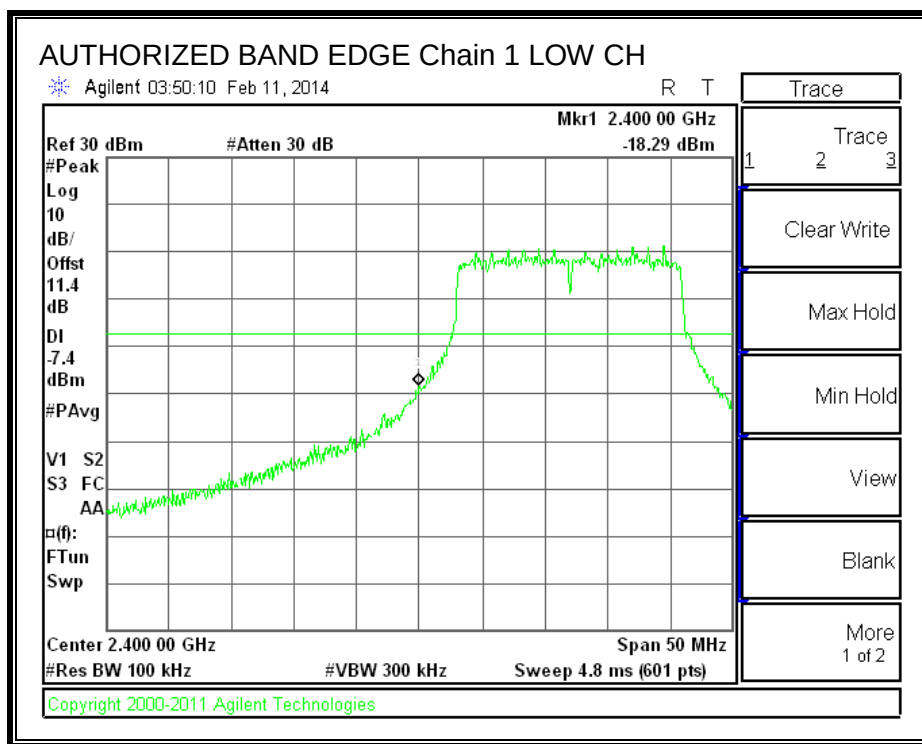
OUT-OF-BAND EMISSIONS, Chain 0



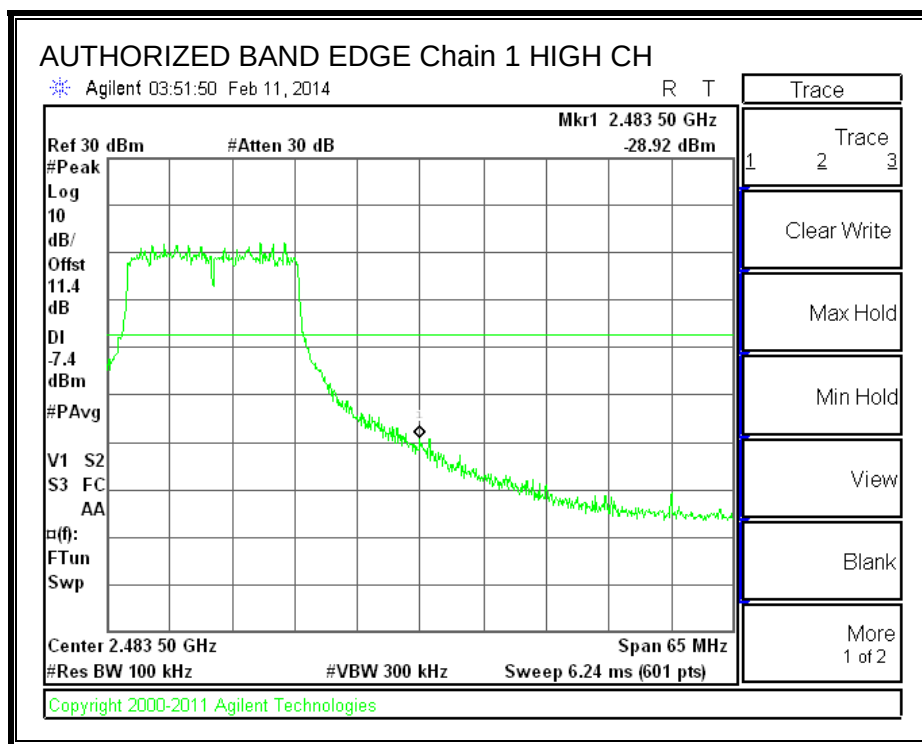
IN-BAND REFERENCE LEVEL, Chain 1



LOW CHANNEL BANDEDGE, Chain 1

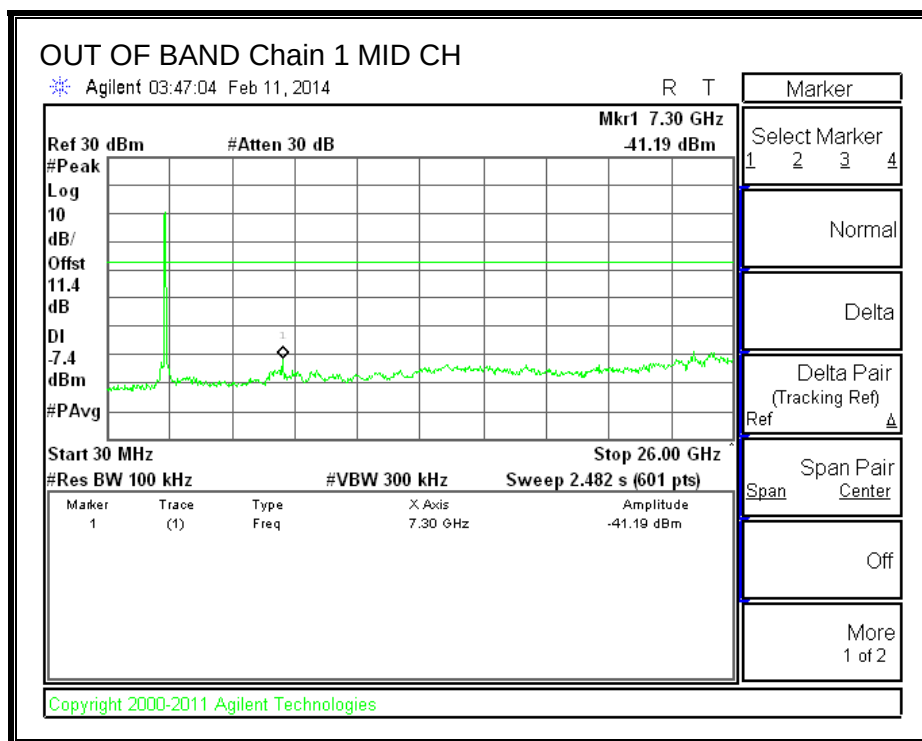
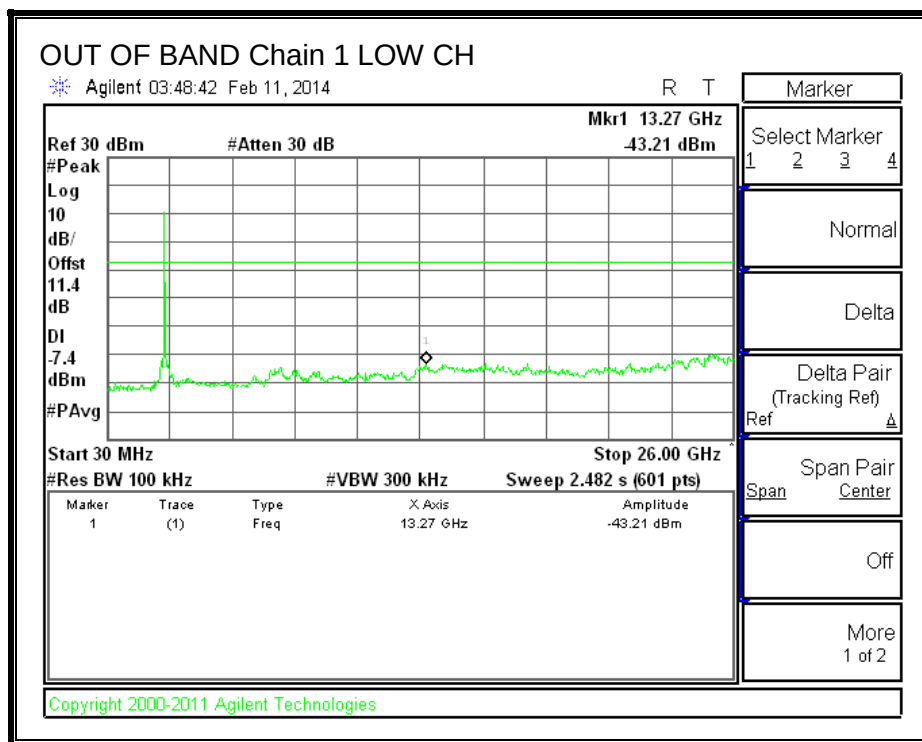


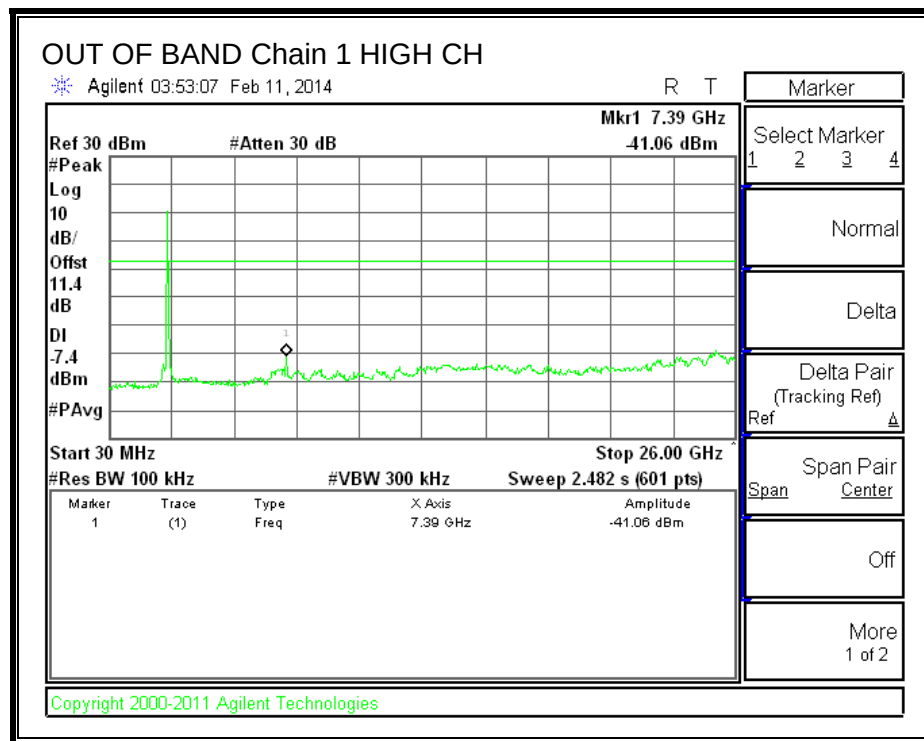
HIGH CHANNEL BANDEDGE, Chain 1



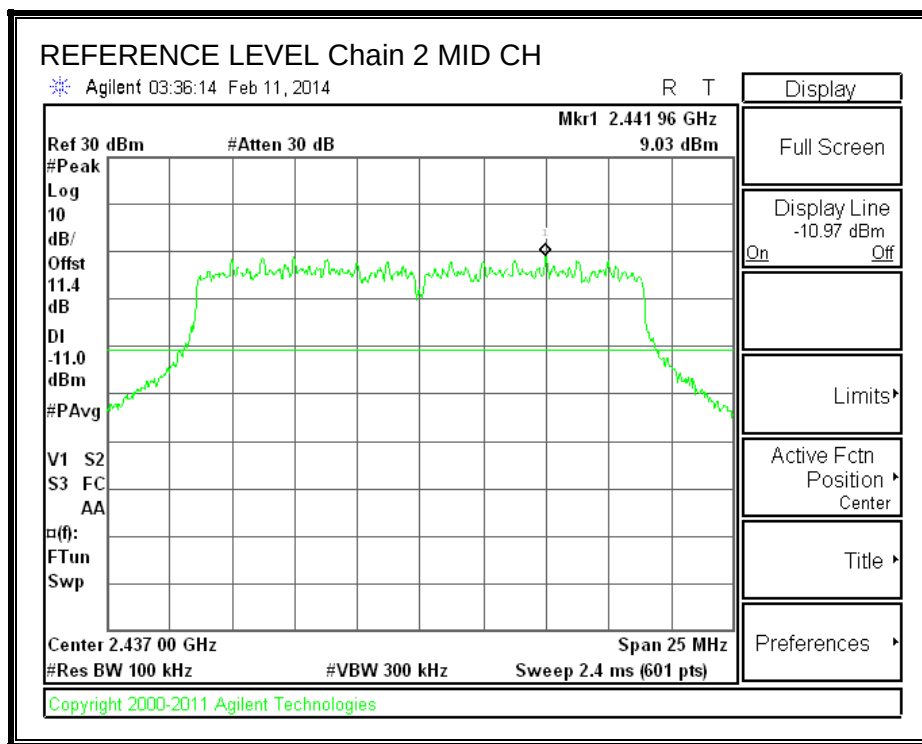
HT20 mode Chain 1			
Limit is Based on 20dBc Peak Power			
Frequency (GHz)	Corrected (dBm)	Peak Limit (dBm)	PK Margin (dB)
2.4000	-18.29	-7.4	-10.89
2.4835	-28.92	-7.4	-21.52

OUT-OF-BAND EMISSIONS, Chain 1

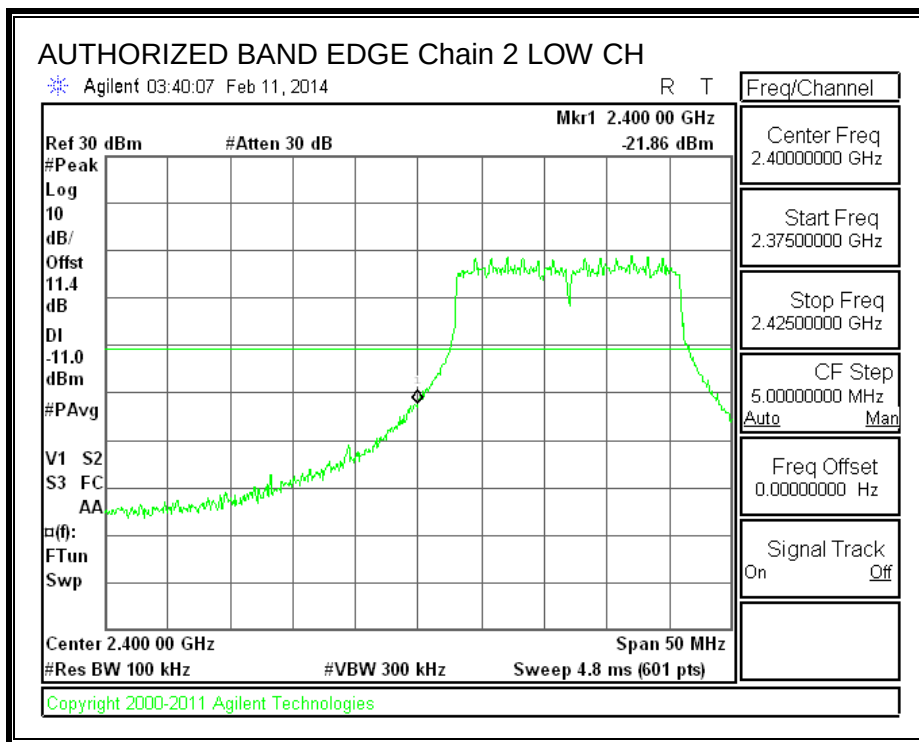




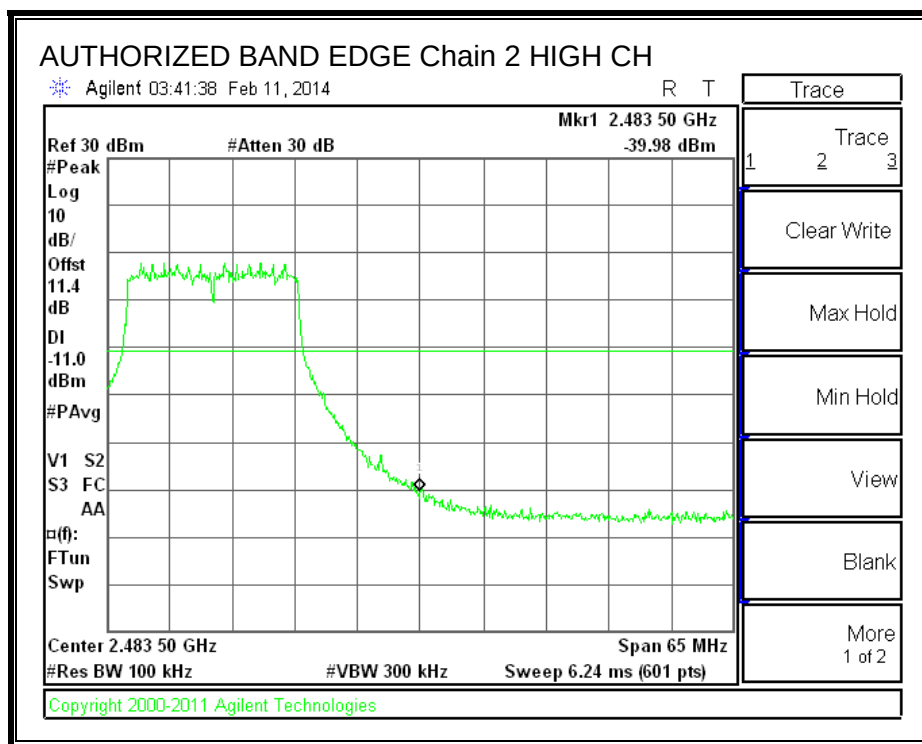
IN-BAND REFERENCE LEVEL, Chain 2



LOW CHANNEL BANDEDGE, Chain 2

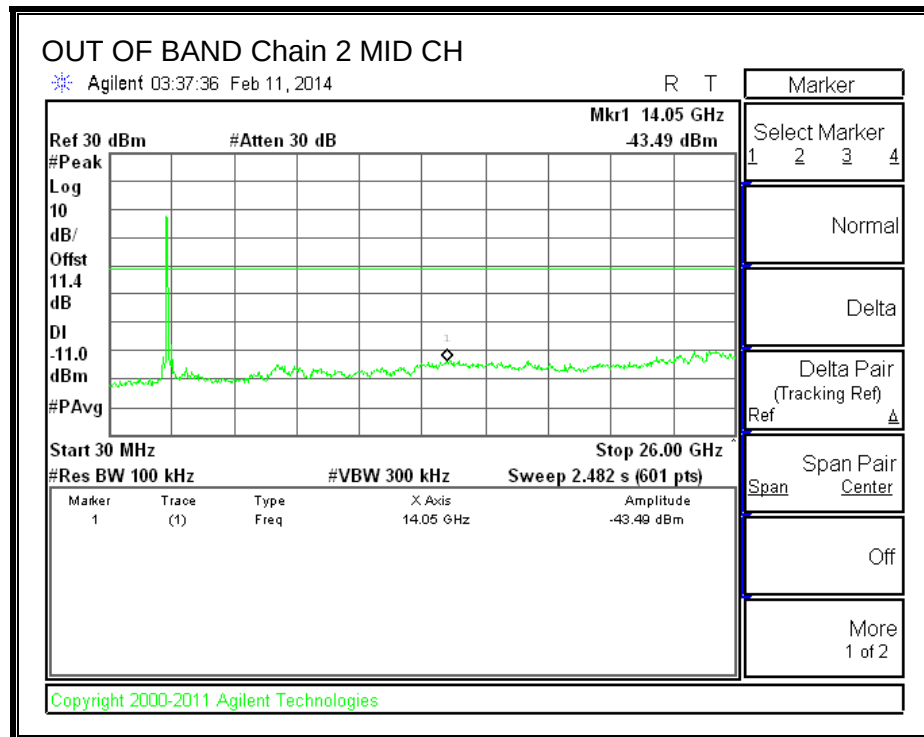
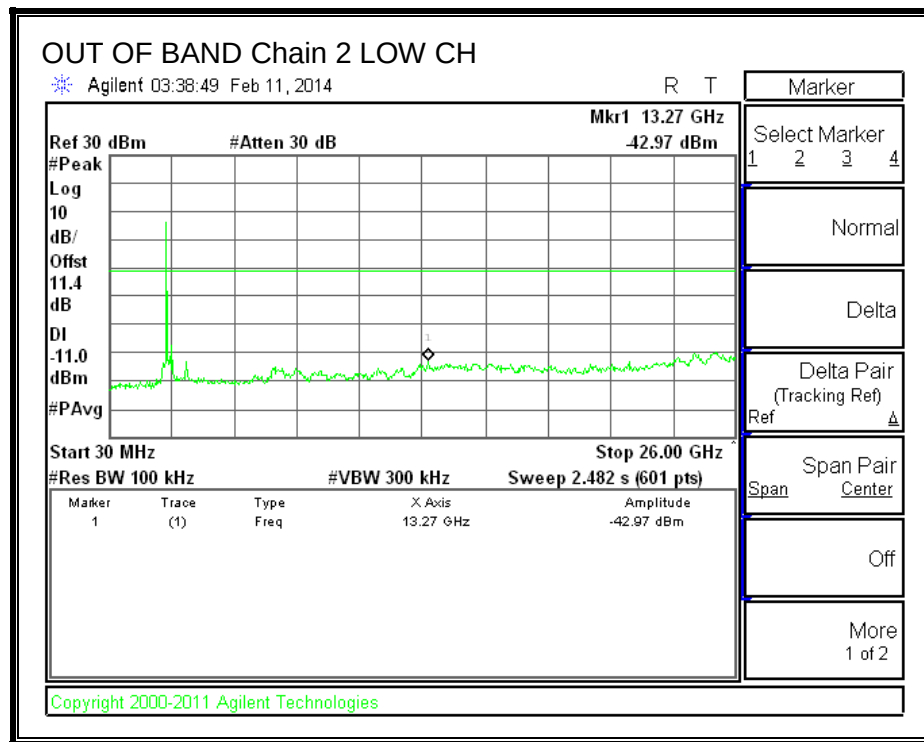


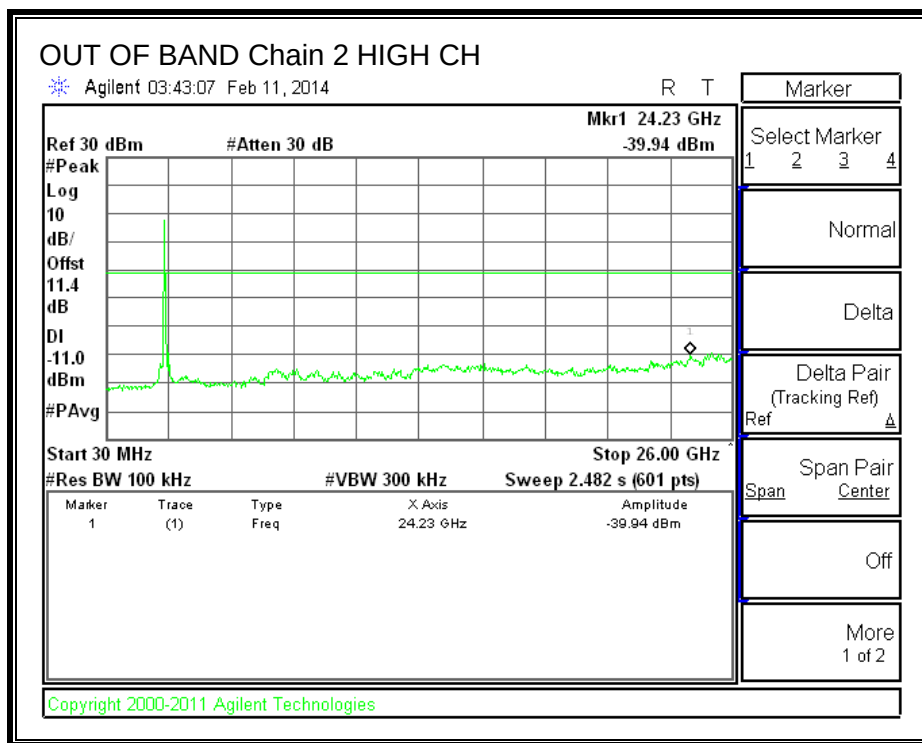
HIGH CHANNEL BANDEDGE, Chain 2



HT20 mode Chain 2			
Limit is Based on 20dBc Peak Power			
Frequency (GHz)	Corrected (dBm)	Peak Limit (dBm)	PK Margin (dB)
2.4000	-21.86	-11.0	-10.86
2.4835	-39.98	-11.0	-28.98

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.

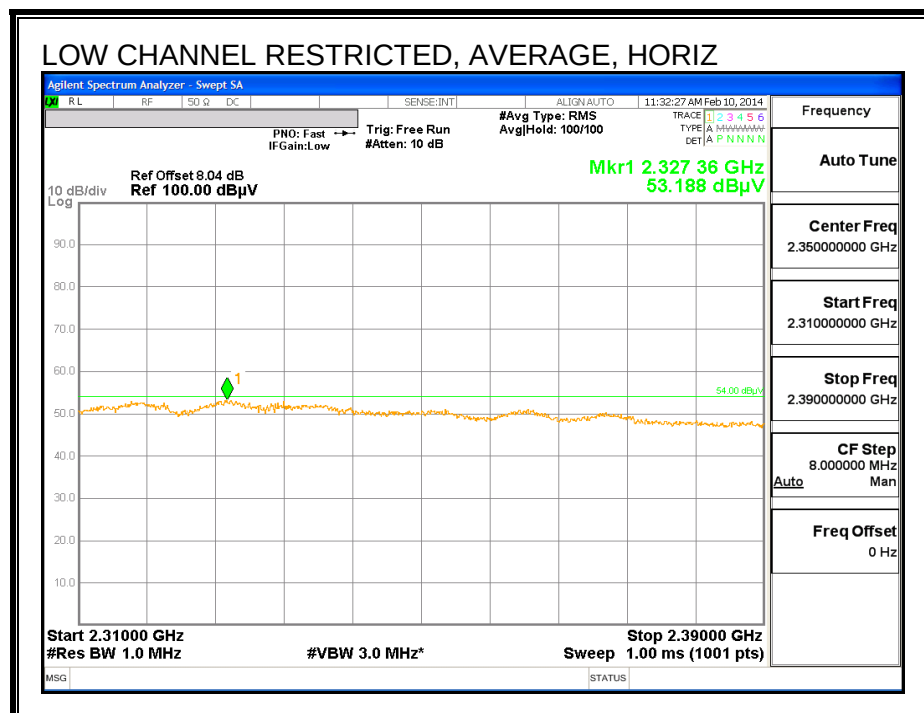
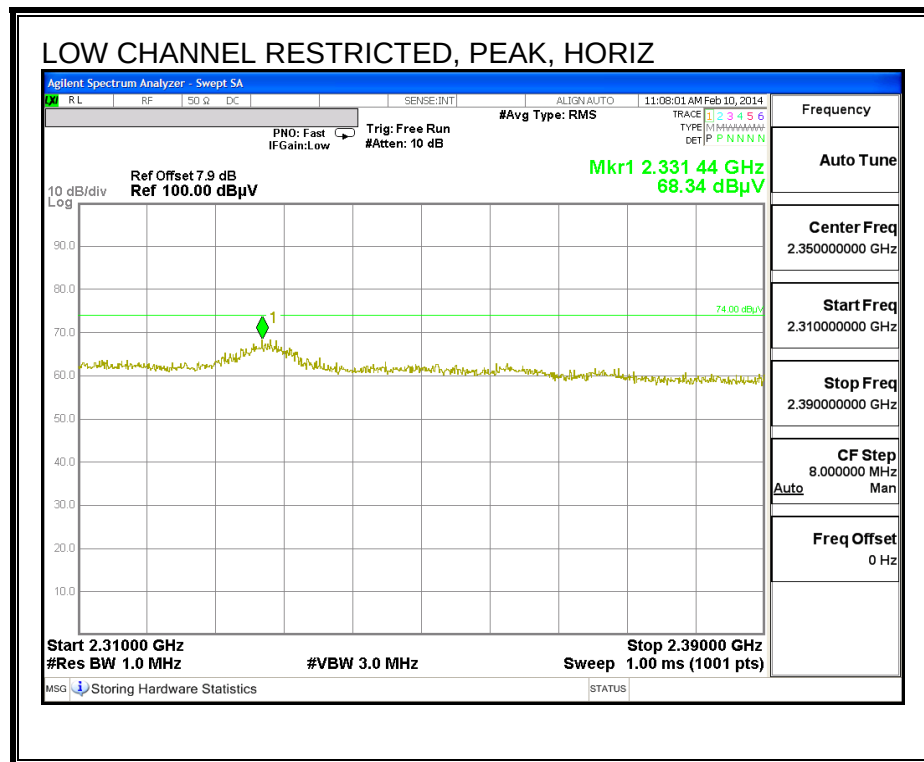
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

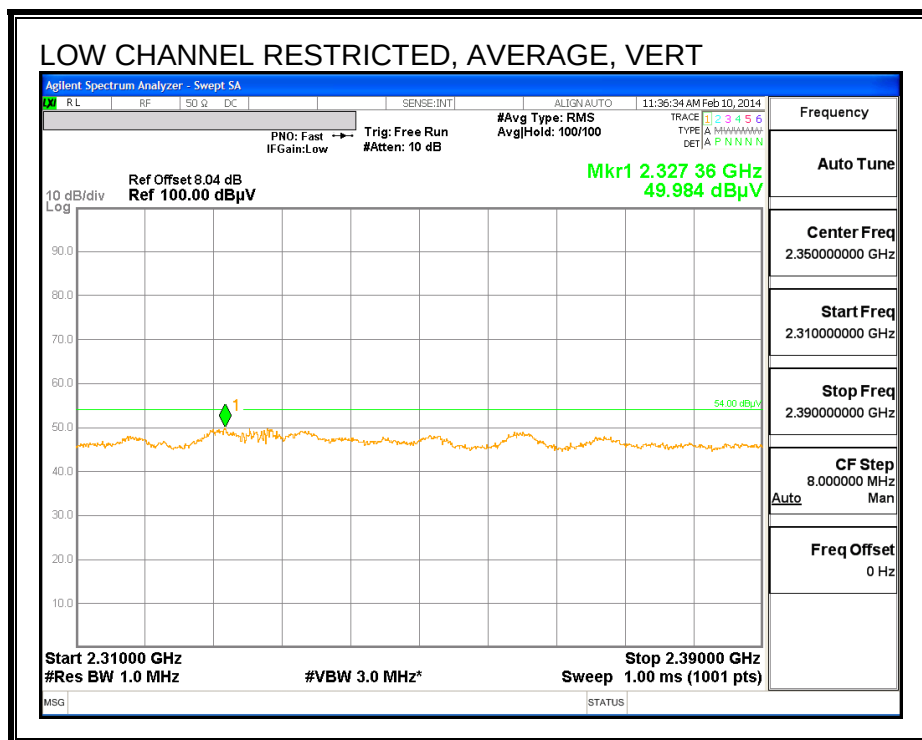
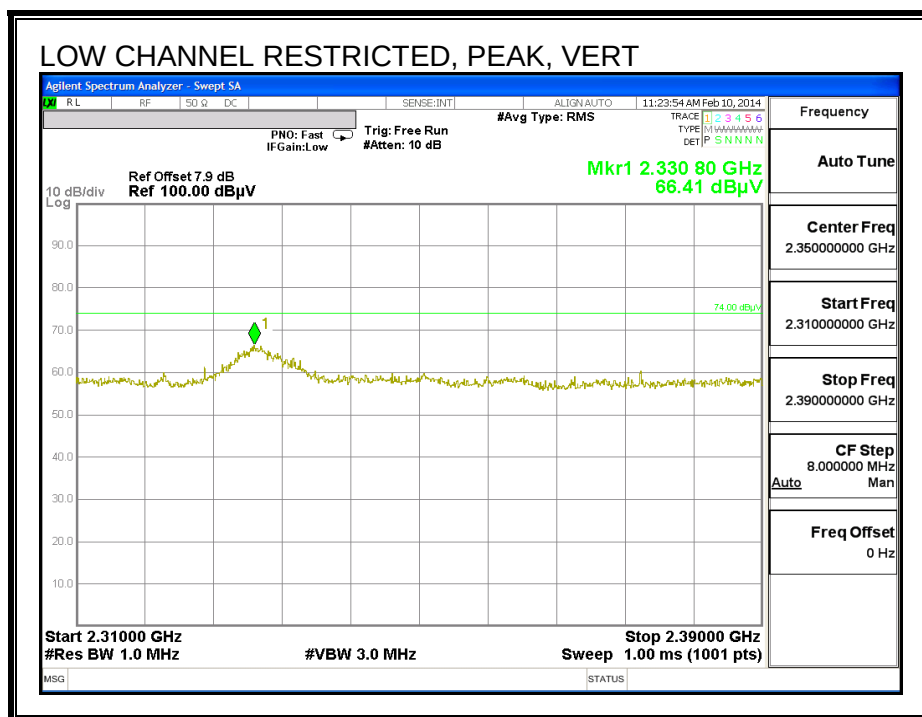
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

9.2. TRANSMITTER ABOVE 1 GHz

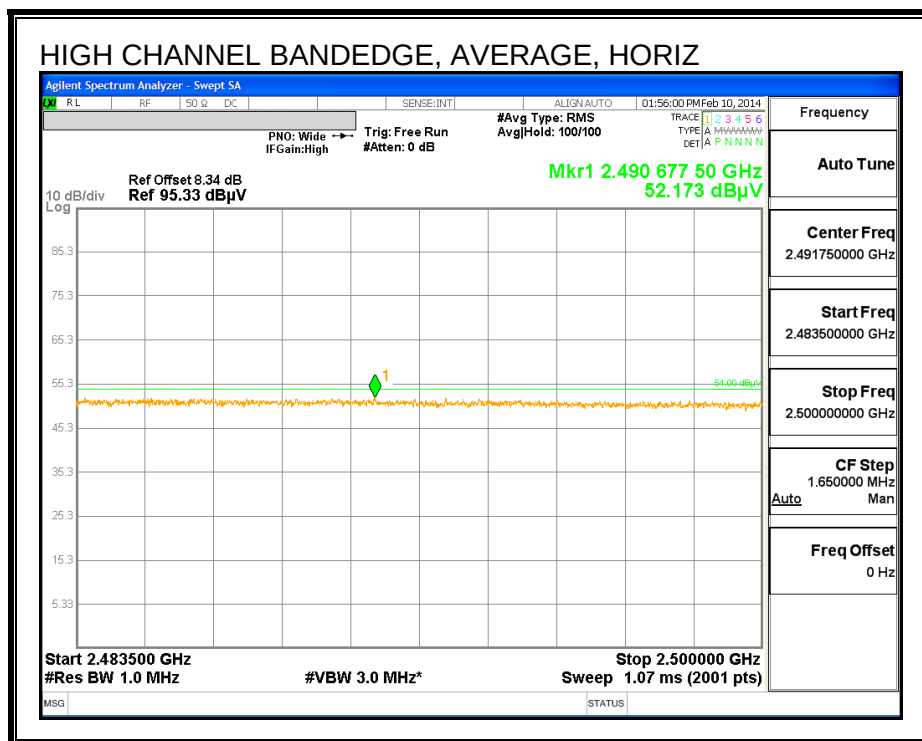
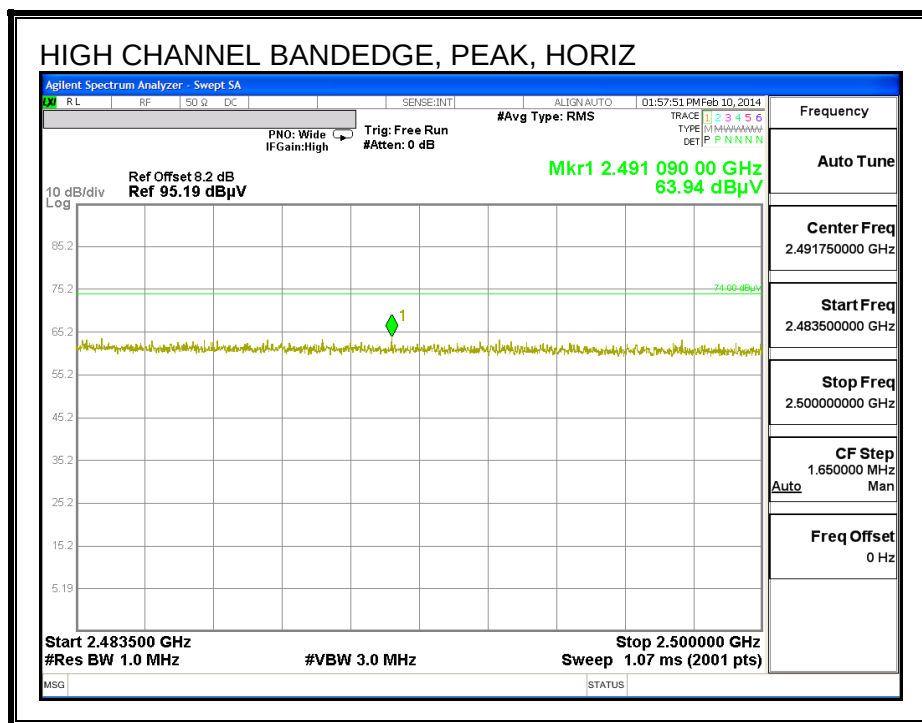
9.2.1. 802.11b MODE IN THE 2.4 GHz BAND

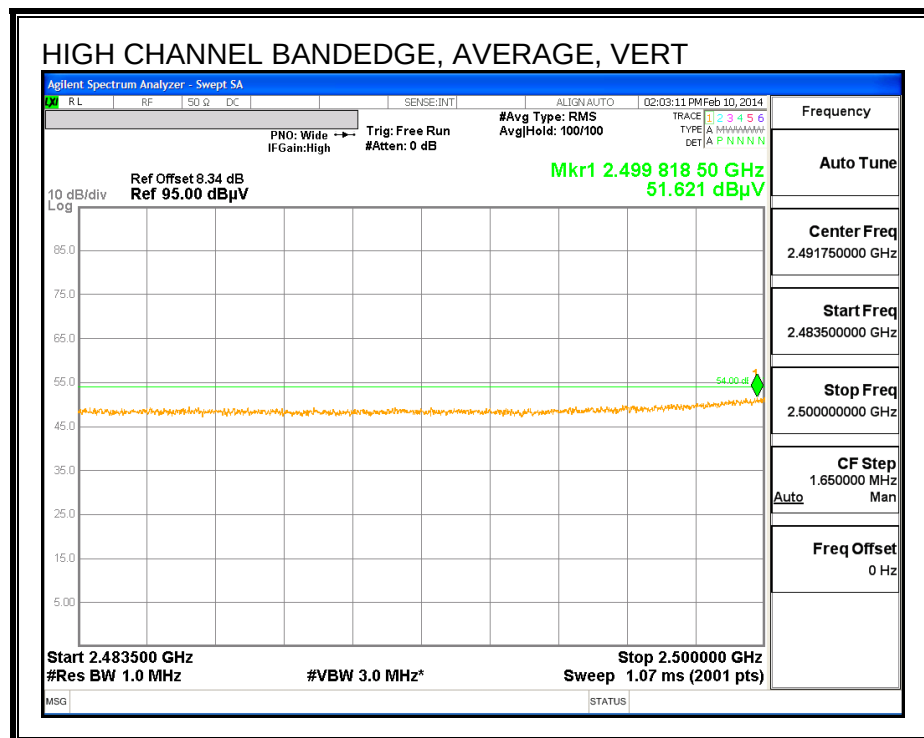
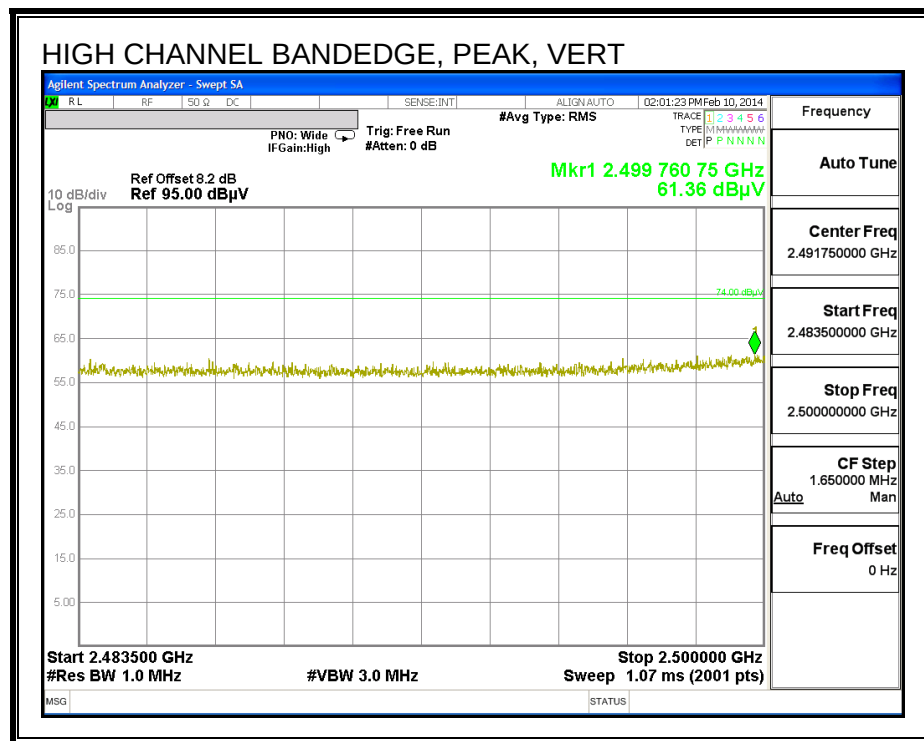
RESTRICTED BANDEDGE (LOW CHANNEL)





AUTHORIZED BANDEDGE (HIGH CHANNEL)





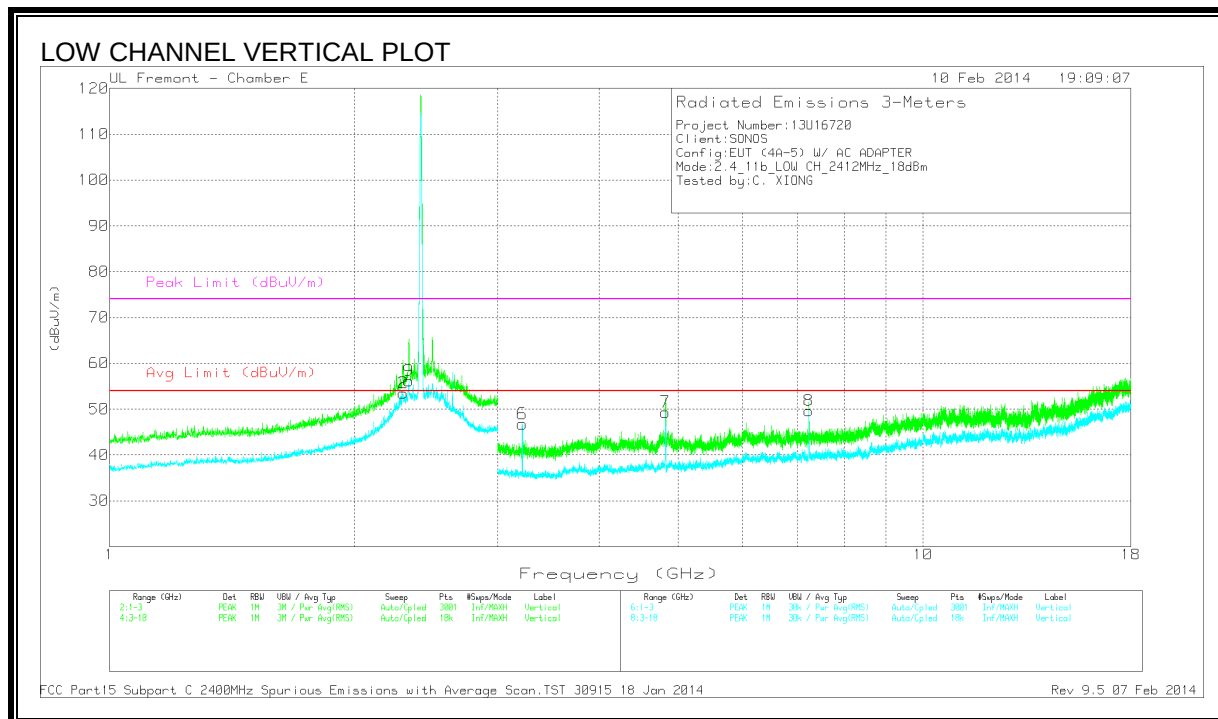
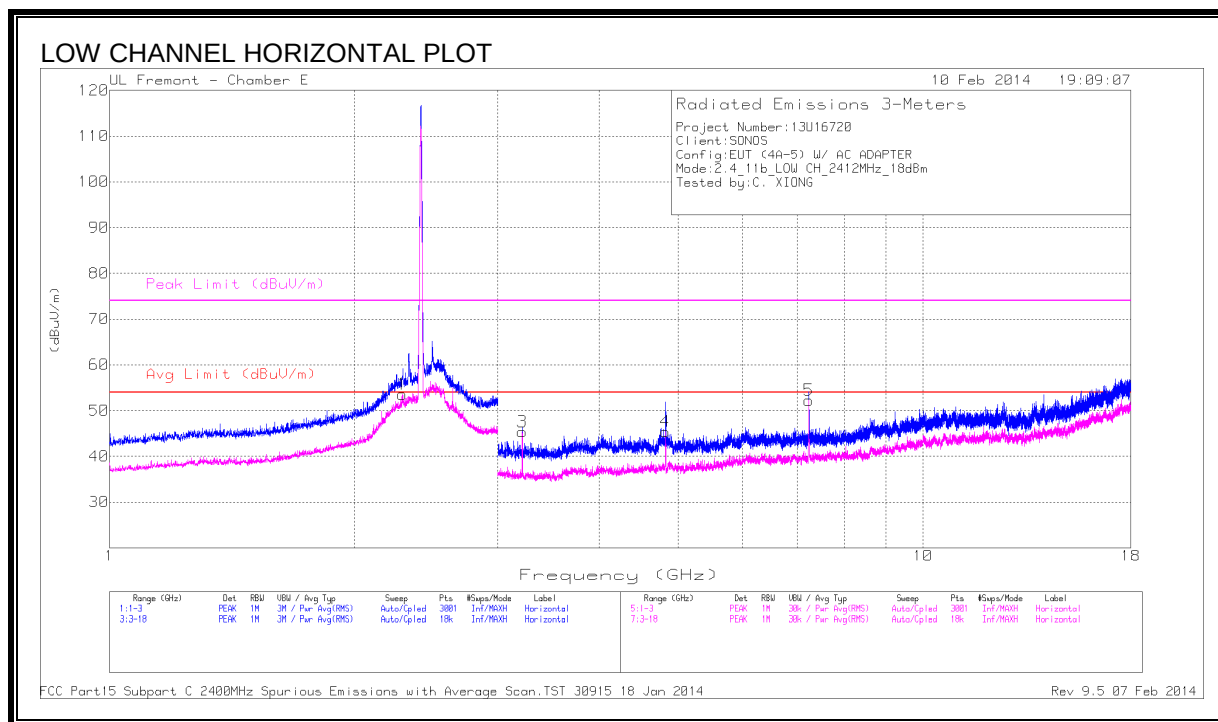
AUTHORIZED BANDEDGE (LOW CHANNEL)

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	DC Corr	AF T712 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Polarity
1	2.331	60.44	PK	0	32.03	-24.13	68.34	-	-	74	-5.66	H
2	2.327	45.148	RMS	.14	32.03	-24.13	53.188	54	-0.81	-		H
3	2.330	58.51	PK	0	32.03	-24.13	66.41	-	-	74	-7.59	V
4	2.327	41.944	RMS	.14	32.03	-24.13	49.984	54	-4.02	-		V

AUTHORIZED BANDEDGE (HIGH CHANNEL)

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	DC Corr	AF T712 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Polarity
1	2.491	55.74	PK	0	32.03	-23.83	63.94	-	-	74	-10.06	H
2	2.490	43.833	RMS	.14	32.03	-23.83	52.173	54	-1.83	-		H
3	2.499	53.16	PK	0	32.03	-23.83	61.36	-	-	74	-12.64	V
4	2.499	43.281	RMS	.14	32.03	-23.83	51.621	54	-2.38	-		V

HARMONICS AND SPURIOUS EMISSIONS



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cb/Ftr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	* 2.288	53.92	PK2	32.4	-25.1	0	61.22	-	-	74	-12.78	21	370	H
1	* 2.288	44.61	MAv1	32.4	-25.1	.1	52.01	53.97	-1.96	-	-	21	370	H
	* 2.292	57.73	PK2	32.4	-25.1	0	65.03	-	-	74	-8.97	248	372	V
2	* 2.292	45.05	MAv1	32.5	-25.1	.1	52.55	53.97	-1.42	-	-	248	372	V
	* 2.332	55.93	PK2	32.5	-25.2	0	63.23	-	-	74	-10.77	323	193	V
9	* 2.328	40.08	MAv1	32.5	-25.2	.1	47.48	53.97	-6.49	-	-	323	193	V
4	* 4.824	42.21	Avg	34.4	-31.2	0	45.41	53.97	-8.56	-	-	0-360	200	H
	* 4.824	52.56	PK2	34.4	-31.2	0	55.76	-	-	74	-18.24	192	292	V
7	* 4.824	42.4	MAv1	34.4	-31.2	.1	45.7	53.97	-8.27	-	-	192	292	V
3	3.216	44.18	Avg	33.4	-32.2	0	45.38	53.97	-8.59	-	-	0-360	101	H
6	3.216	45.57	Avg	33.4	-32.2	0	46.77	53.97	-7.2	-	-	0-360	200	V
	7.235	46.11	PK2	36	-28.8	0	53.31	-	-	74	-20.69	316	273	H
5	7.235	37.22	MAv1	36	-28.8	.1	44.52	53.97	-9.45	-	-	316	273	H
	7.237	45.06	PK2	36	-28.8	0	52.26	-	-	74	-21.74	307	162	V
8	7.238	36.23	MAv1	36	-28.8	.1	43.53	53.97	-10.44	-	-	307	162	V

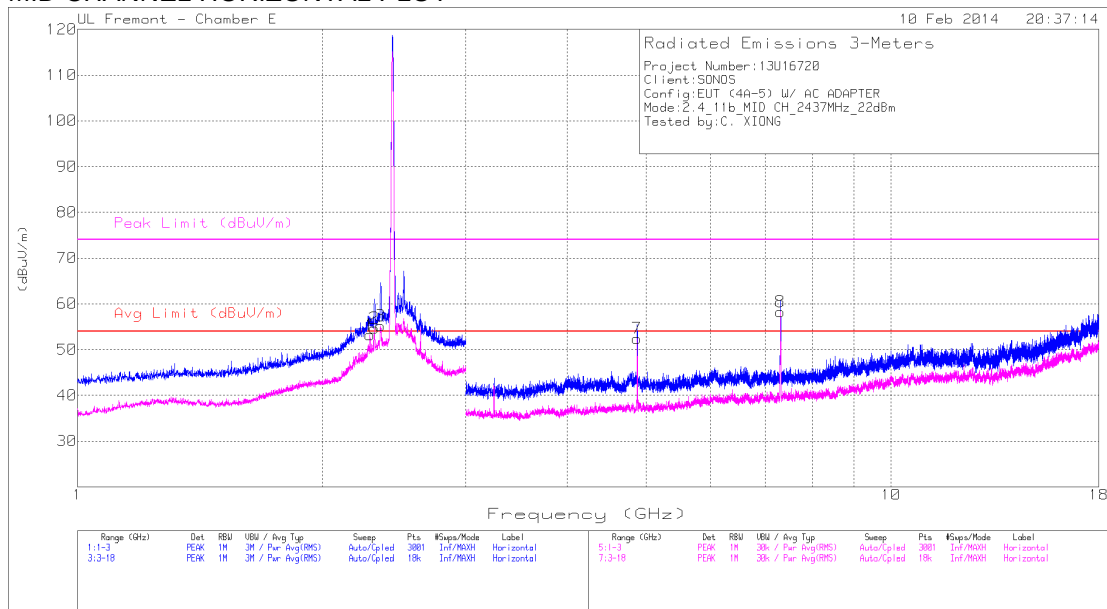
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Avg - Video bandwidth < Resolution bandwidth

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

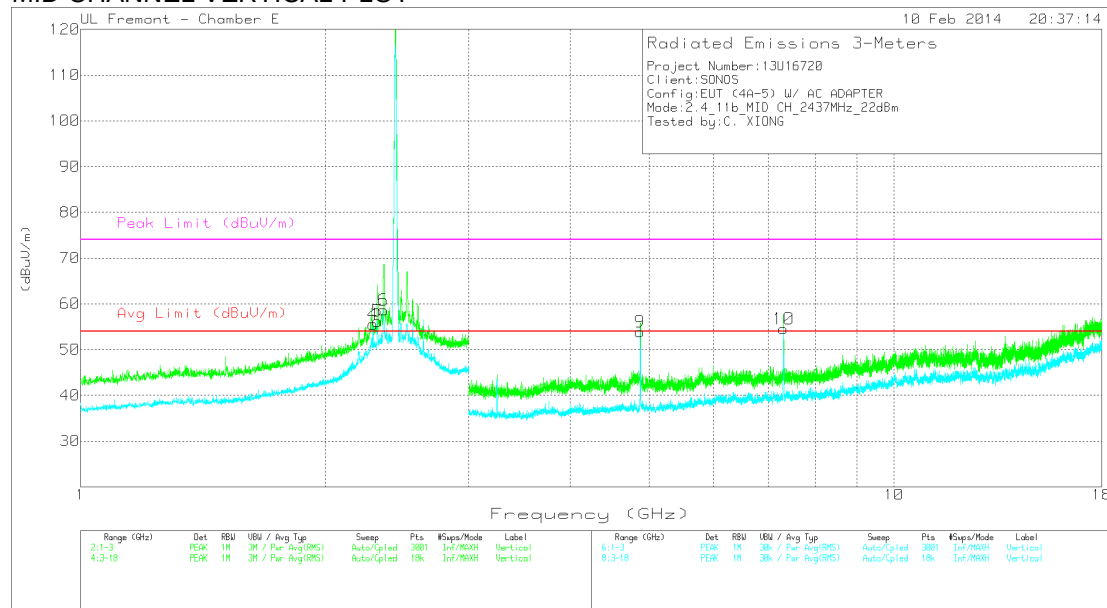
MID CHANNEL HORIZONTAL PLOT



FCC Part15 Subpart C 2400MHz Spurious Emissions with Average Scan.TST 30915 18 Jan 2014

Rev 9.5 07 Feb 2014

MID CHANNEL VERTICAL PLOT



FCC Part15 Subpart C 2400MHz Spurious Emissions with Average Scan.TST 30915 18 Jan 2014

Rev 9.5 07 Feb 2014

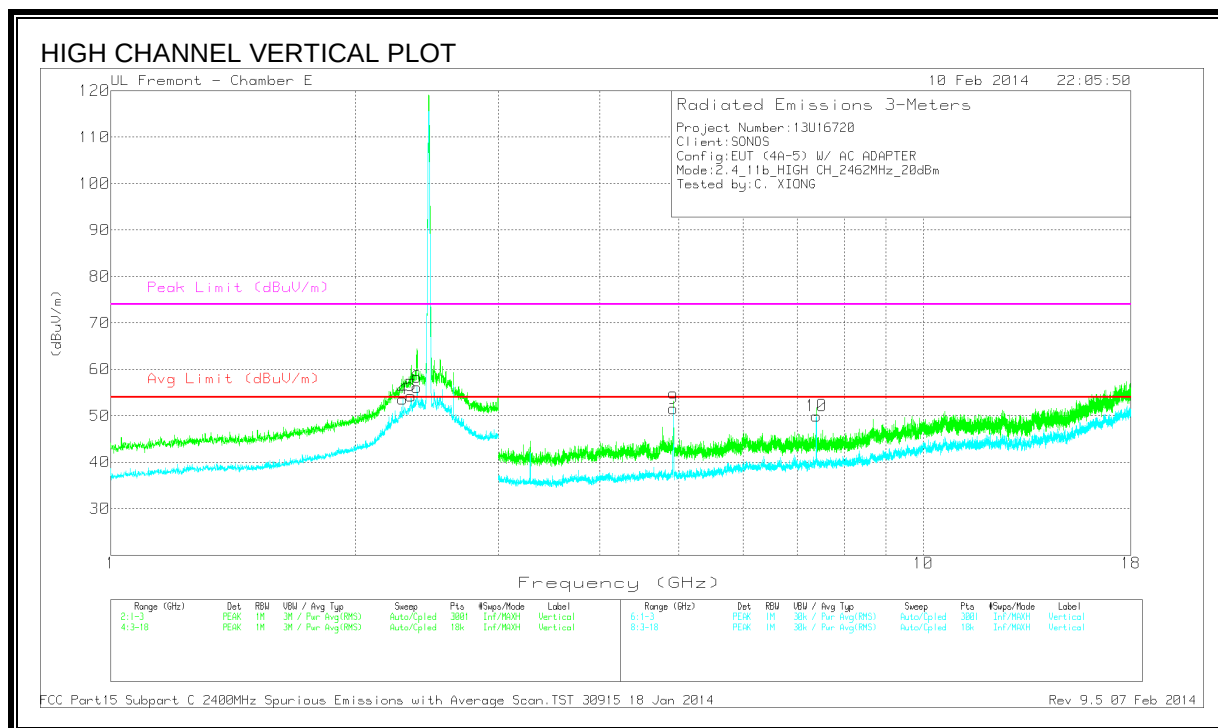
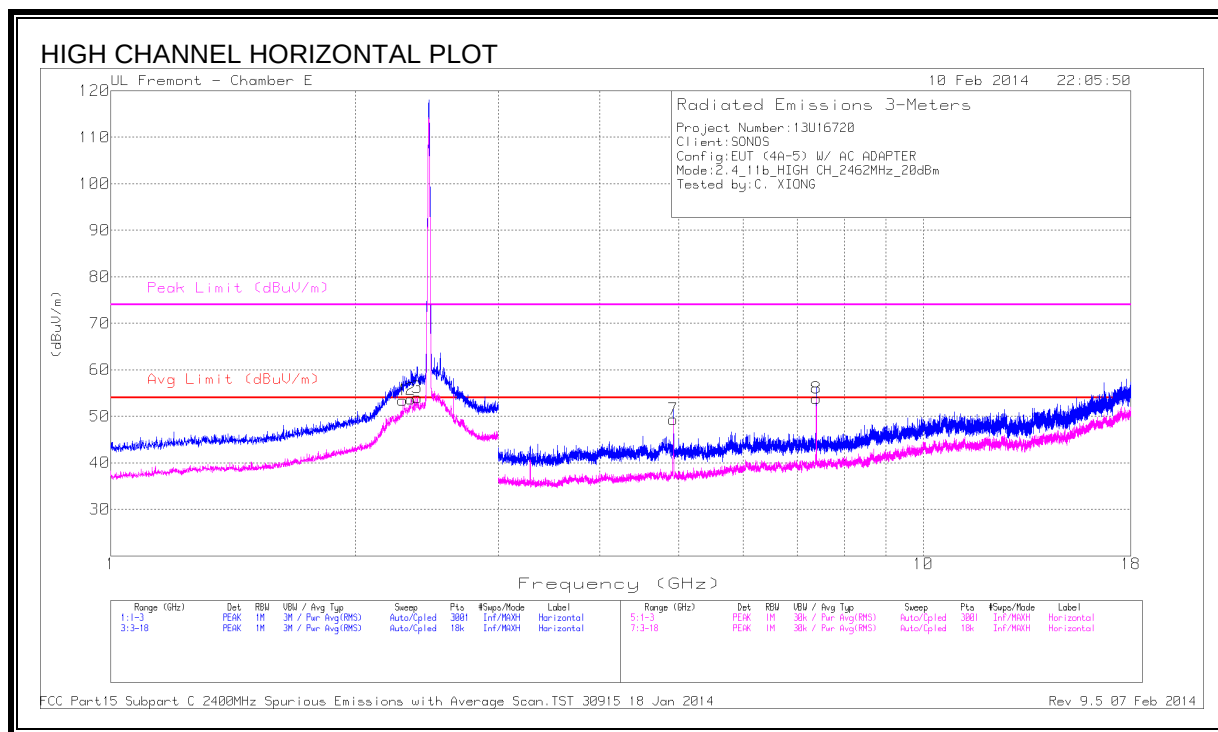
DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cb/Ftr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	* 2.288	54.84	PK2	32.4	-25.1	0	62.14	-	-	74	-11.86	360	376	H
1	* 2.288	46.06	MAv1	32.4	-25.1	.1	53.46	53.97	-.51	-	-	360	376	H
	* 2.317	56.42	PK2	32.5	-25.3	0	63.62	-	-	74	-10.38	271	349	H
2	* 2.317	44.53	MAv1	32.5	-25.3	.1	51.83	53.97	-2.14	-	-	271	349	H
	* 2.359	56.9	PK2	32.5	-24.7	0	64.7	-	-	74	-9.3	2	335	H
3	* 2.359	43.34	MAv1	32.5	-24.7	.1	51.24	53.97	-2.73	-	-	2	335	H
	* 2.288	54.29	PK2	32.4	-25.1	0	61.59	-	-	74	-12.41	342	231	V
4	* 2.288	45.59	MAv1	32.4	-25.1	.1	52.99	53.97	-.98	-	-	342	231	V
	* 2.317	57.45	PK2	32.5	-25.3	0	64.65	-	-	74	-9.35	297	363	V
5	* 2.317	46.16	MAv1	32.5	-25.3	.1	53.46	53.97	-.51	-	-	297	363	V
	* 2.358	56.6	PK2	32.5	-24.7	0	64.4	-	-	74	-9.6	335	207	V
6	* 2.358	41.49	MAv1	32.5	-24.9	.1	49.19	53.97	-4.78	-	-	335	207	V
	* 4.874	54.19	PK2	34.4	-31	0	57.59	-	-	74	-16.41	338	354	H
7	* 4.874	42.3	MAv1	34.4	-31	.1	45.8	53.97	-8.17	-	-	338	354	H
	* 7.311	54.66	PK2	36	-28	0	62.66	-	-	74	-11.34	108	215	H
8	* 7.311	45.95	MAv1	36	-28.1	.1	53.95	53.97	-.02	-	-	108	215	H
	* 4.874	53.94	PK2	34.4	-31	0	57.34	-	-	74	-16.66	201	292	V
9	* 4.874	42.69	MAv1	34.4	-31	.1	46.19	53.97	-7.78	-	-	201	292	V
	* 7.311	50.43	PK2	36	-28	0	58.43	-	-	74	-15.57	121	300	V
10	* 7.311	41.95	MAv1	36	-28.1	.1	49.95	53.97	-4.02	-	-	121	300	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cb/Ftr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	* 2.288	54.44	PK2	32.4	-25.1	0	61.74	-	-	74	-12.26	0	379	H
1	* 2.288	45.71	MAv1	32.4	-25.1	.1	53.11	53.97	-0.86	-	-	0	379	H
	* 2.344	55.55	PK2	32.5	-25	0	63.05	-	-	74	-10.95	8	361	H
2	* 2.344	44.48	MAv1	32.5	-25	.1	52.08	53.97	-1.89	-	-	8	361	H
	* 2.384	56.8	PK2	32.6	-25	0	64.4	-	-	74	-9.6	352	341	H
3	* 2.384	43.51	MAv1	32.6	-25	.1	51.21	53.97	-2.76	-	-	352	341	H
	* 2.288	53.27	PK2	32.4	-25.1	0	60.57	-	-	74	-13.43	327	287	V
4	* 2.288	44.26	MAv1	32.4	-25.1	.1	51.66	53.97	-2.31	-	-	327	287	V
	* 2.342	55.03	PK2	32.5	-25	0	62.53	-	-	74	-11.47	255	203	V
5	* 2.342	43.58	MAv1	32.5	-25	.1	51.18	53.97	-2.79	-	-	255	203	V
	* 2.381	57.76	PK2	32.6	-25	0	65.36	-	-	74	-8.64	225	260	V
6	* 2.381	42.44	MAv1	32.6	-25	.1	50.14	53.97	-3.83	-	-	225	260	V
	* 4.924	49.71	PK2	34.4	-30.6	0	53.51	-	-	74	-20.49	115	168	H
7	* 4.924	38.32	MAv1	34.4	-30.6	.1	42.22	53.97	-11.75	-	-	115	168	H
	* 7.385	50.78	PK2	36.1	-27.2	0	59.68	-	-	74	-14.32	140	163	H
8	* 7.385	42.05	MAv1	36.1	-27.2	.1	51.05	53.97	-2.92	-	-	140	163	H
	* 4.924	48.28	PK2	34.4	-30.6	0	52.08	-	-	74	-21.92	298	175	V
9	* 4.924	36.49	MAv1	34.4	-30.6	.1	40.39	53.97	-13.58	-	-	298	175	V
	* 7.386	45.62	PK2	36.1	-27.2	0	54.52	-	-	74	-19.48	138	333	V
10	* 7.387	35.76	MAv1	36.1	-27.2	.1	44.76	53.97	-9.21	-	-	138	333	V

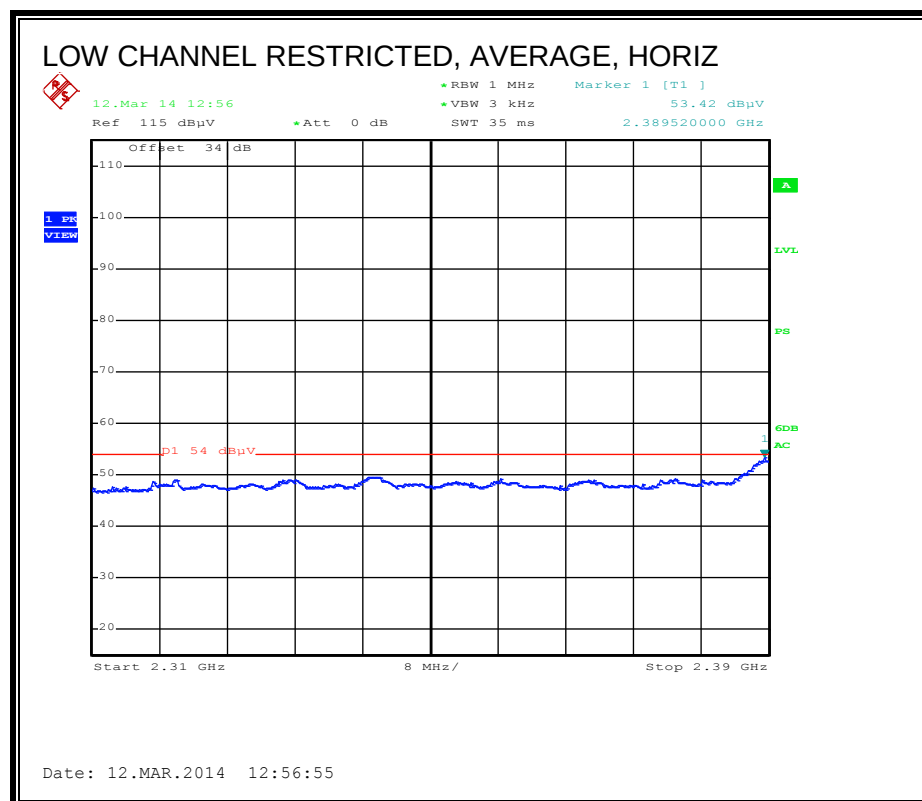
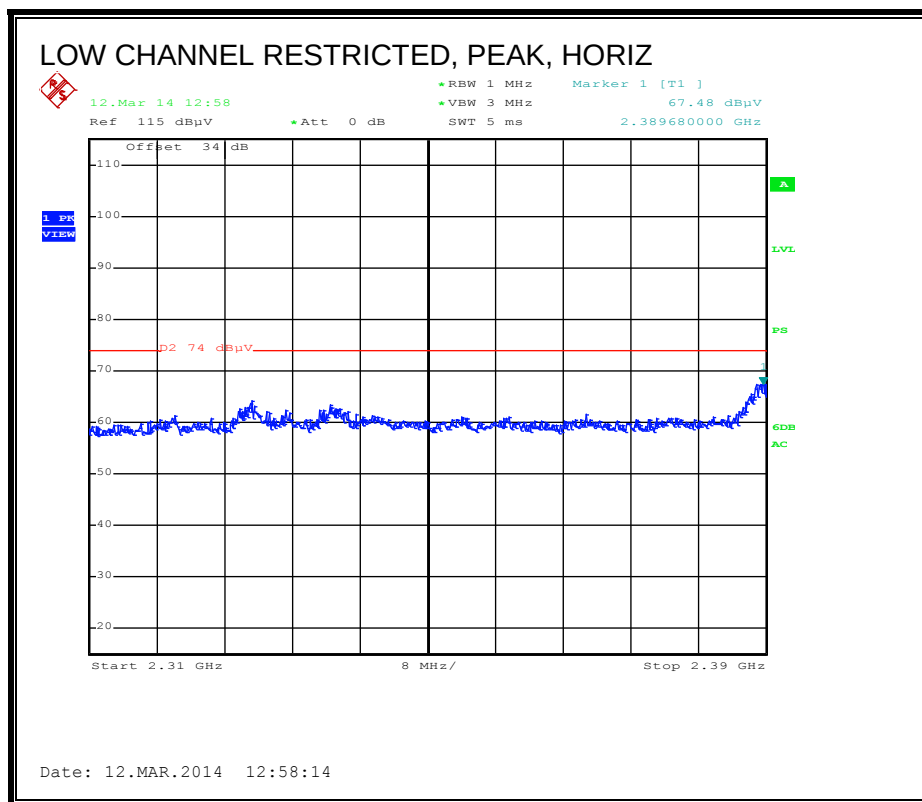
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

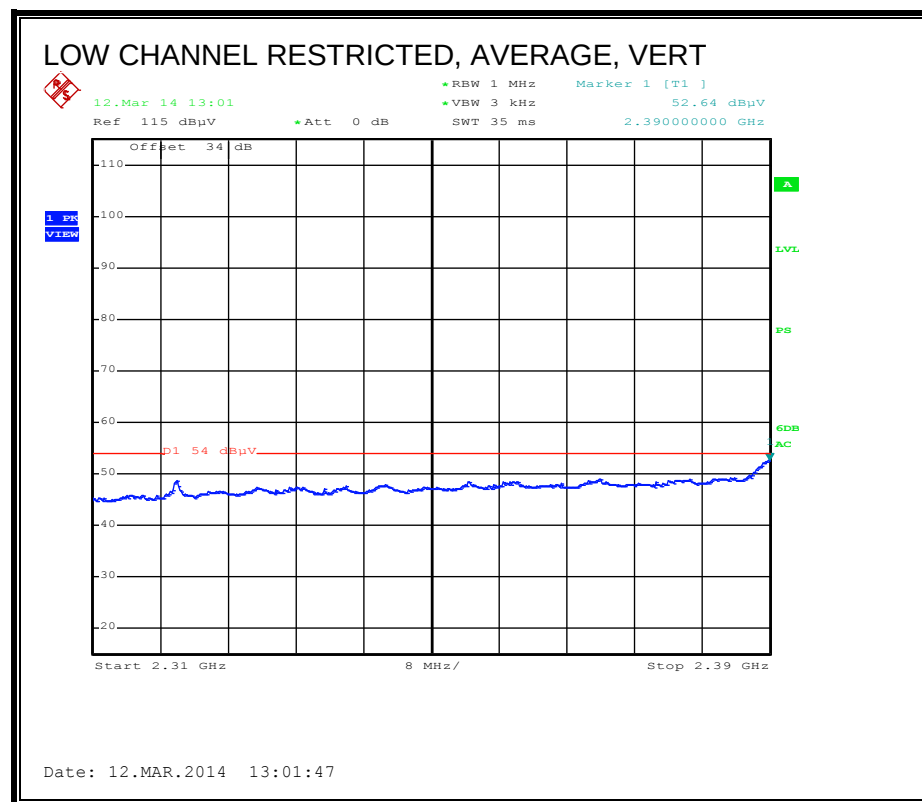
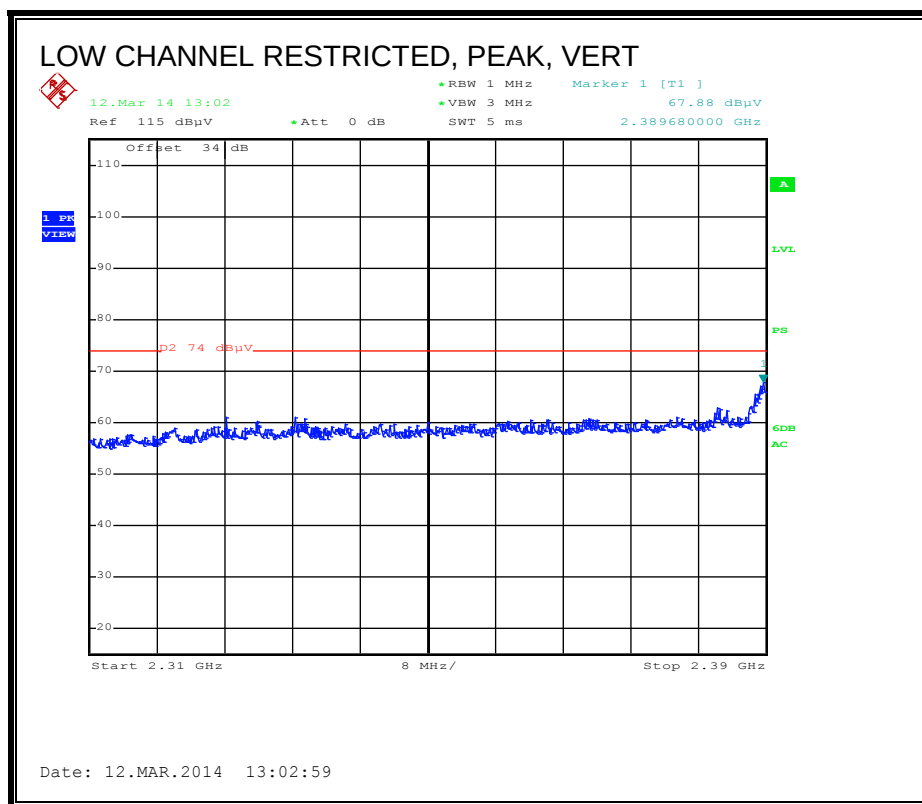
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

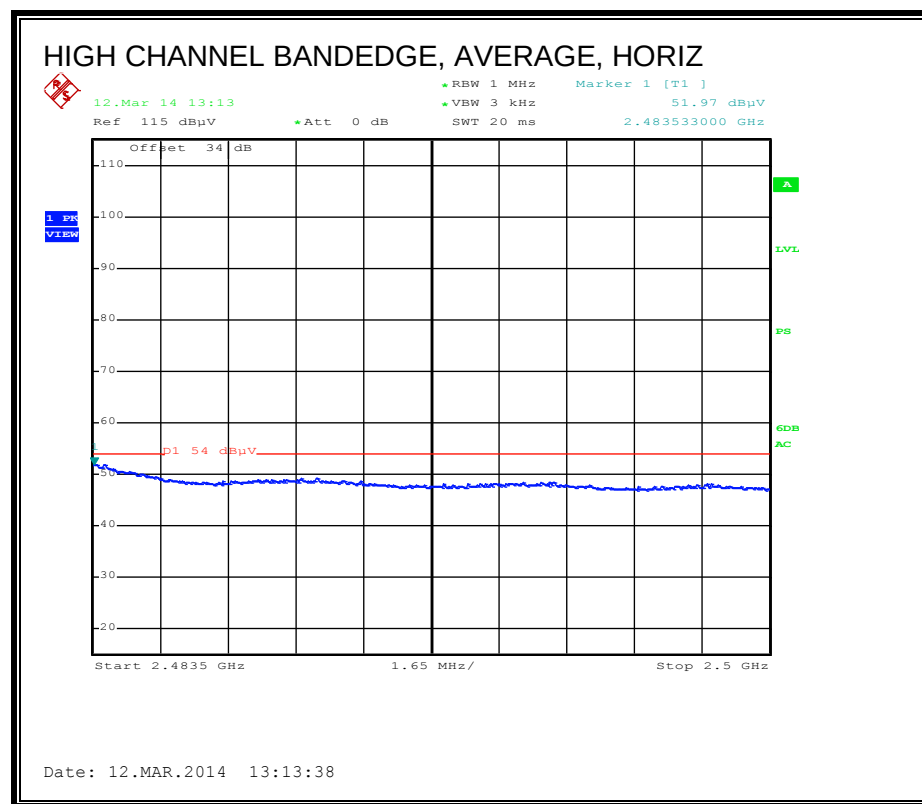
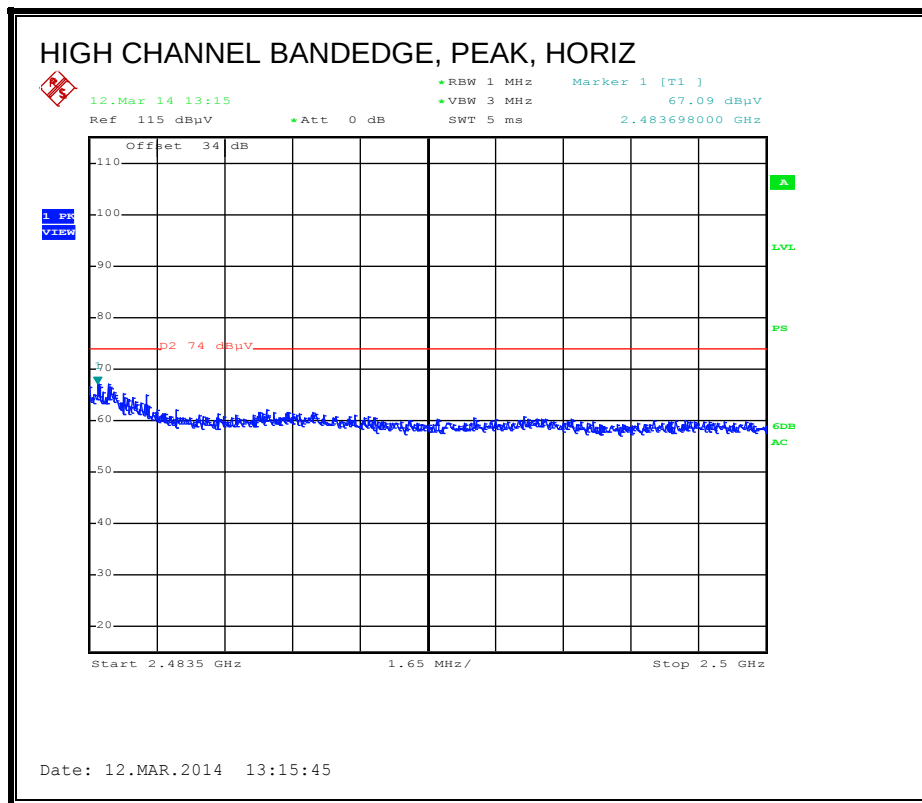
9.2.2. 802.11g MODE IN THE 2.4 GHz BAND

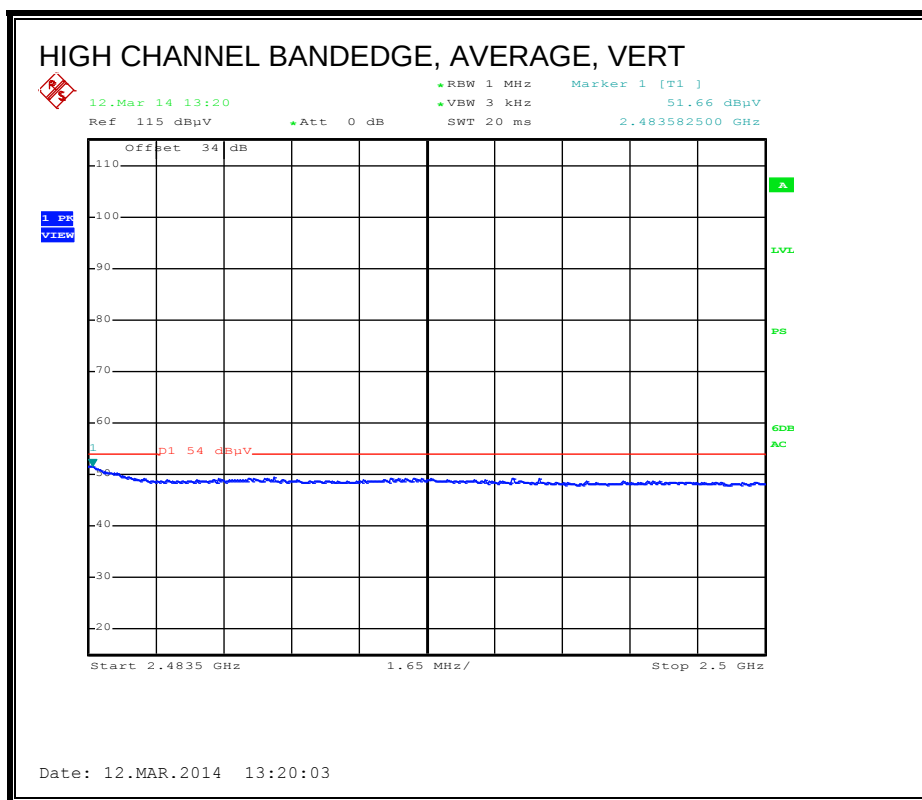
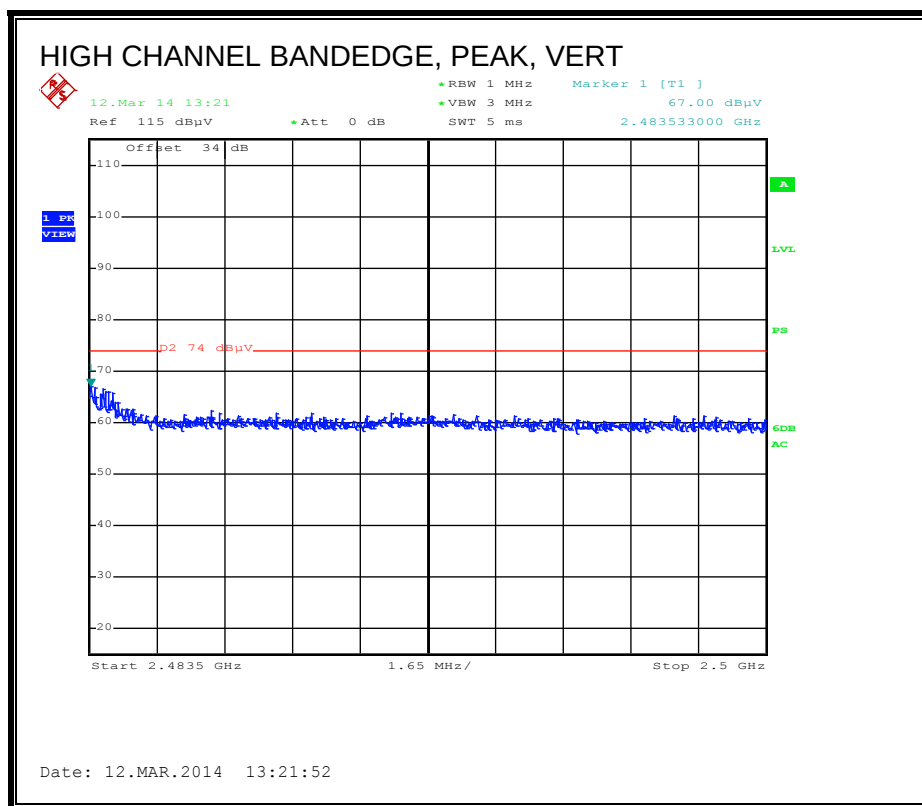
RESTRICTED BANDEDGE (LOW CHANNEL)





AUTHORIZED BANDEDGE (HIGH CHANNEL)





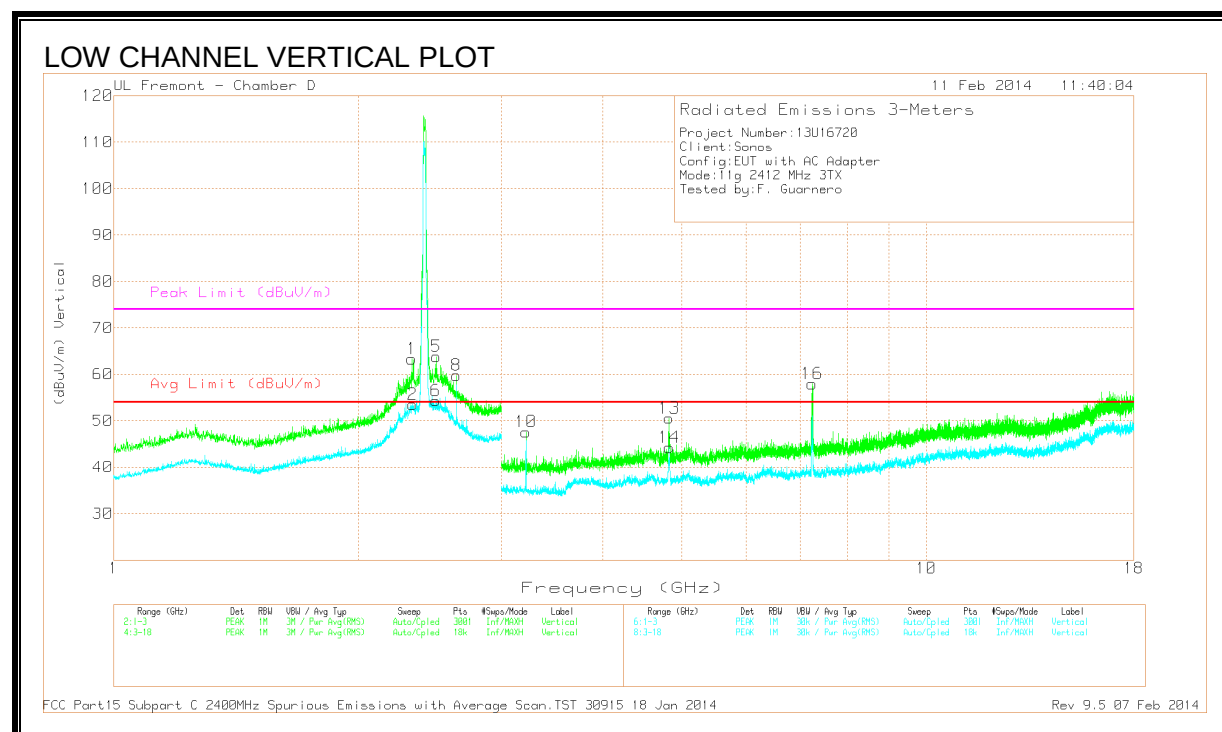
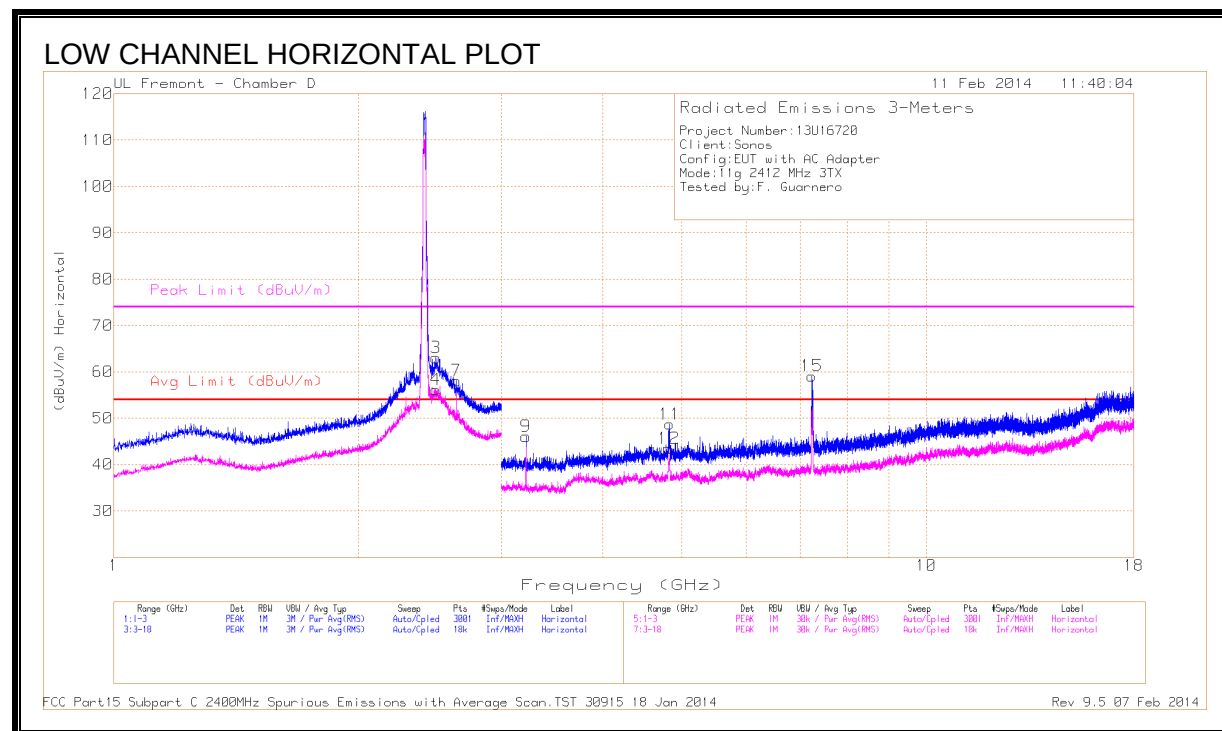
AUTHORIZED BANDEDGE (LOW CHANNEL)

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T712 (dB/m)	Cables (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Polarity
1	2.389	33.48	PK	28.61	5.39	67.48	-	-	74	-6.52	H
2	2.389	19.42	Pk	28.61	5.39	53.42	54	-0.58	-		H
3	2.389	33.88	PK	28.61	5.39	67.88	-	-	74	-6.12	V
4	2.390	18.64	Pk	28.61	5.39	52.64	54	-1.36	-		V

AUTHORIZED BANDEDGE (HIGH CHANNEL)

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T712 (dB/m)	Cables (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Polarity
1	2.484	33.09	PK	28.61	5.39	67.09	-	-	74	-6.91	H
2	2.484	17.97	Pk	28.61	5.39	51.97	54	-2.03	-		H
3	2.484	33.00	PK	28.61	5.39	67.00	-	-	74	-7	V
4	2.484	17.66	Pk	28.61	5.39	51.66	54	-2.34	-		V

HARMONICS AND SPURIOUS EMISSIONS



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T712 (dB/m)	Amp/Cb/Ftr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.328	52.95	PK	31.1	-20.7	0	63.35	-	-	74	-10.65	0-360	201	V
2	* 2.328	38.82	MAv1	31.1	-20.7	.5	49.72	53.97	-4.25	-	-	62	112	V
3	* 2.492	51.64	PK	32.1	-20.7	0	63.04	-	-	74	-10.96	0-360	201	H
4	* 2.492	39.35	MAv1	32.2	-20.8	.5	51.25	53.97	-2.72	-	-	357	245	H
5	* 2.495	52.41	PK	32.2	-20.8	0	63.81	-	-	74	-10.19	0-360	201	V
6	* 2.495	38.47	MAv1	32.1	-20.7	.5	50.37	53.97	-3.6	-	-	359	253	V
7	2.641	46.61	PK	31.8	-20.3	0	58.11	-	-	-	-	0-360	100	H
8	2.641	48.26	PK	31.8	-20.3	0	59.76	-	-	-	-	0-360	201	V
9	3.217	42.17	PK	32.5	-28.6	0	46.07	-	-	-	-	0-360	201	H
10	3.217	43.68	PK	32.5	-28.6	0	47.58	-	-	-	-	0-360	201	V
11	* 4.833	42.02	PK	33.5	-26.8	0	48.72	-	-	74	-25.28	0-360	201	H
12	* 4.833	36.7	Avg	33.5	-26.7	0	43.5	53.97	-10.47	-	-	0-360	201	H
13	* 4.825	43.76	PK	33.5	-26.7	0	50.56	-	-	74	-23.44	0-360	201	V
14	* 4.825	37.46	Avg	33.5	-26.7	0	44.26	53.97	-9.71	-	-	0-360	100	V
15	7.228	48.88	PK	35.1	-24.9	0	59.08	-	-	-	-	0-360	201	H
16	7.234	47.96	PK	35.1	-25.1	0	57.96	-	-	-	-16.04	0-360	201	V

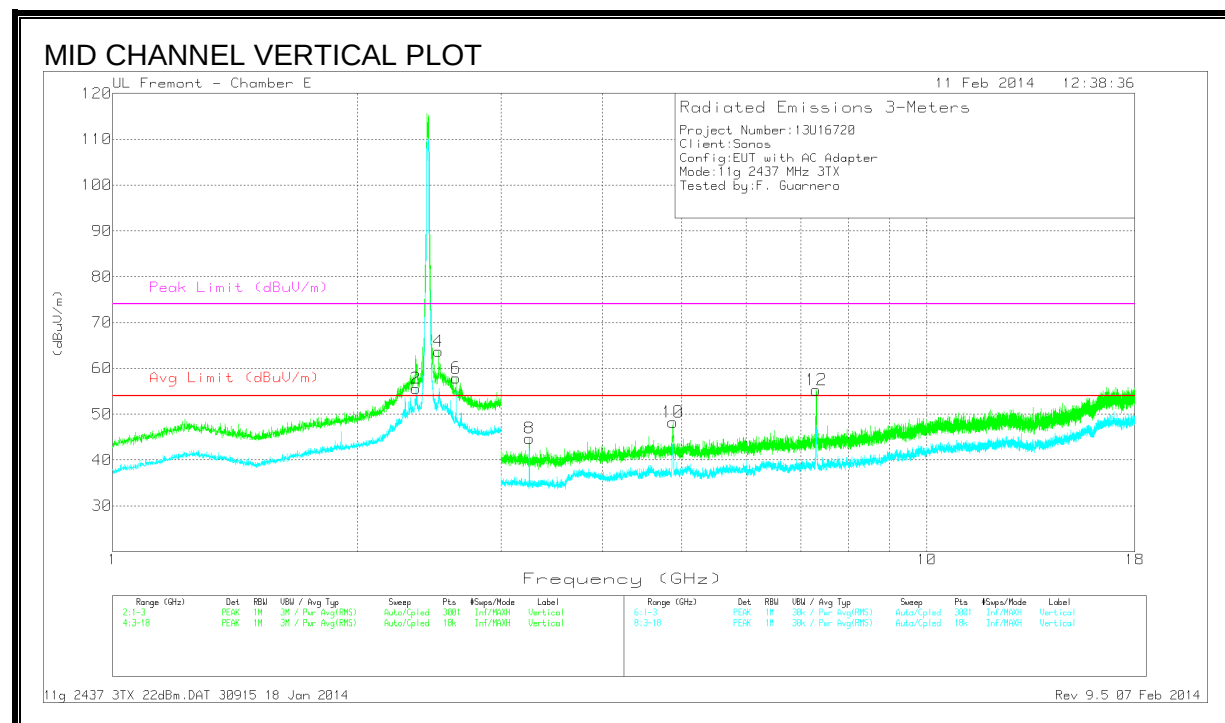
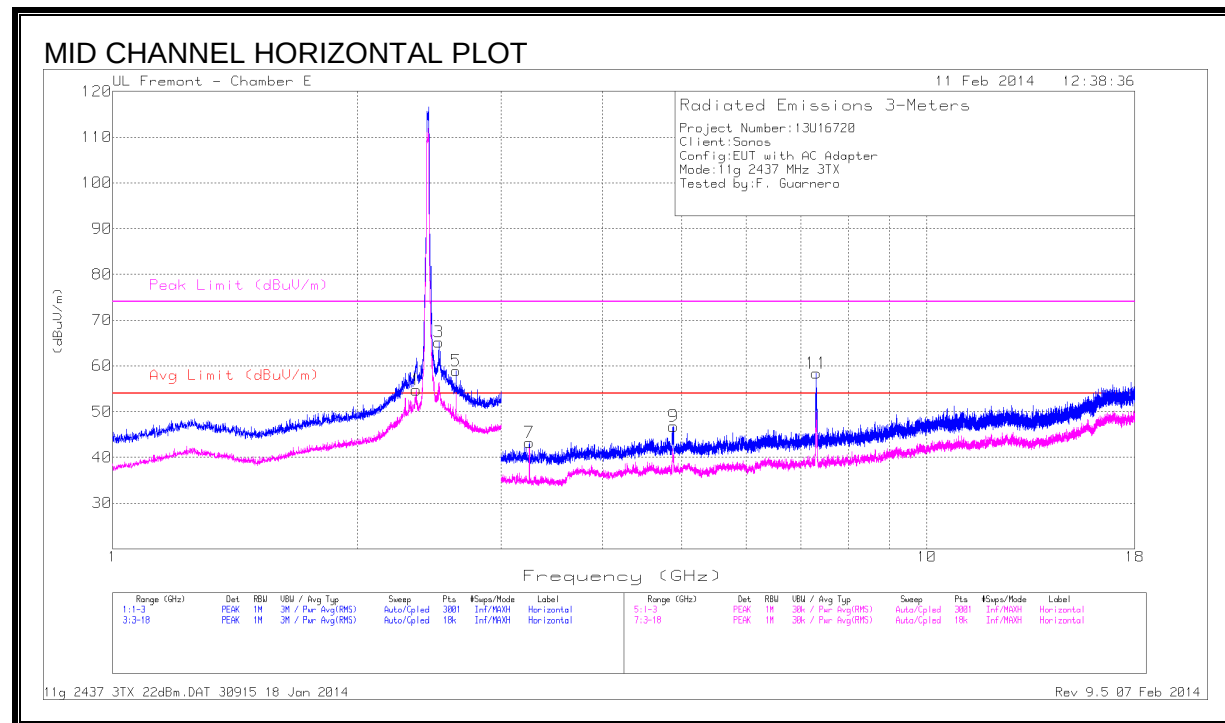
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

Avg - Video bandwidth < Resolution bandwidth

MAv1 - KDB558074 Option 1 Maximum RMS Average

HARMONICS AND SPURIOUS EMISSIONS



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T712 (dB/m)	Amp/Cb/Ftr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	* 2.35	56.18	PK2	31.2	-20.8	0	66.58	-	-	74	-7.42	242	359	H
1	* 2.35	41.24	MAv1	31.2	-20.8	.5	52.14	53.97	-1.83	-	-	242	359	H
	* 2.356	56.33	PK2	31.3	-20.8	0	66.83	-	-	74	-7.17	278	363	V
2	* 2.356	39.64	MAv1	31.3	-20.8	.5	50.64	53.97	-3.33	-	-	278	363	V
3	2.516	53.5	PK	32.2	-20.5	0	65.2	-	-	-	-	0-360	201	H
4	2.517	52.11	PK	32.2	-20.5	0	63.71	-	-	-	-	0-360	201	V
5	2.64	47.4	PK	31.8	-20.3	0	58.9	-	-	-	-	0-360	100	H
6	2.64	46.35	PK	31.8	-20.3	0	57.85	-	-	-	-	0-360	201	V
7	3.249	39.56	PK	32.5	-28.8	0	43.26	-	-	-	-	0-360	100	H
8	3.249	41.04	PK	32.5	-28.8	0	44.74	-	-	-	-	0-360	201	V
9	* 4.875	41.64	PK	33.5	-26.9	0	46.76	53.97	-7.21	74	-27.24	0-360	201	H
10	* 4.877	41.64	PK	33.5	-26.9	0	48.24	53.97	-5.73	74	-25.76	0-360	201	V
	* 7.309	54.19	PK2	35.1	-24.8	0	64.49	-	-	74	-9.51	18	203	H
11	* 7.309	41.52	MAv1	35.1	-24.9	.5	52.22	53.97	-1.75	-	-	18	203	H
12	* 7.313	44.97	PK	35.1	-24.8	0	55.27	-	-	74	-18.73	0-360	201	V

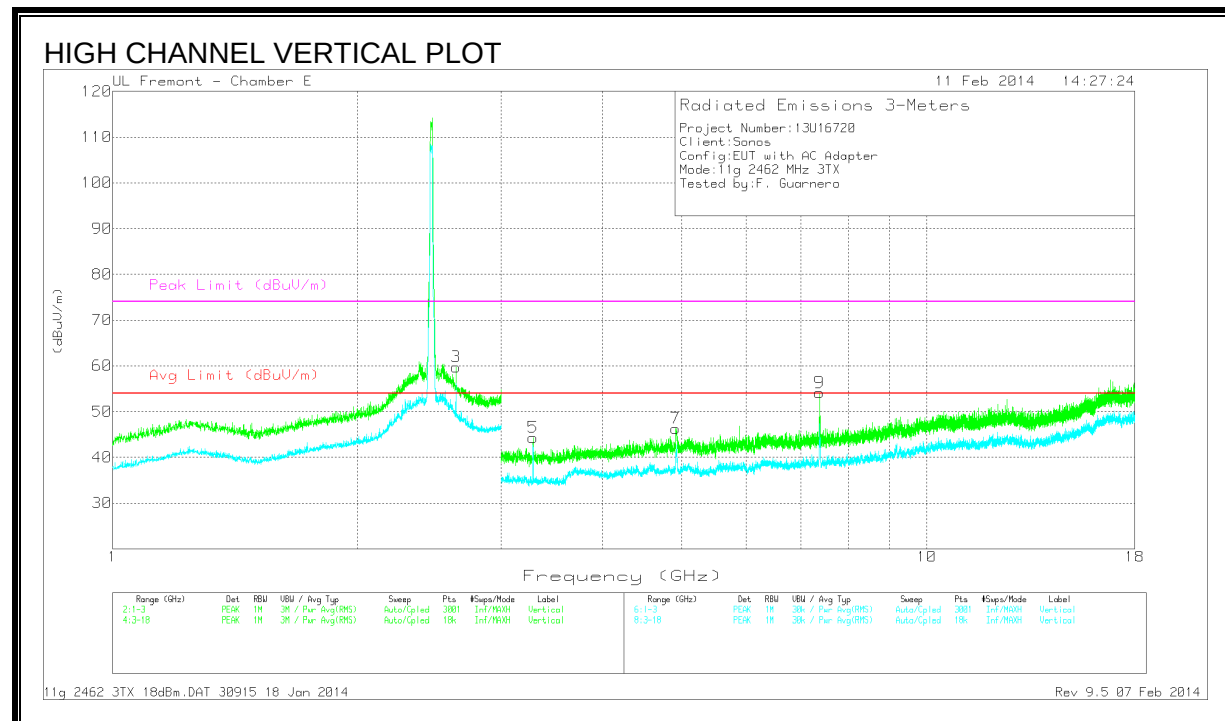
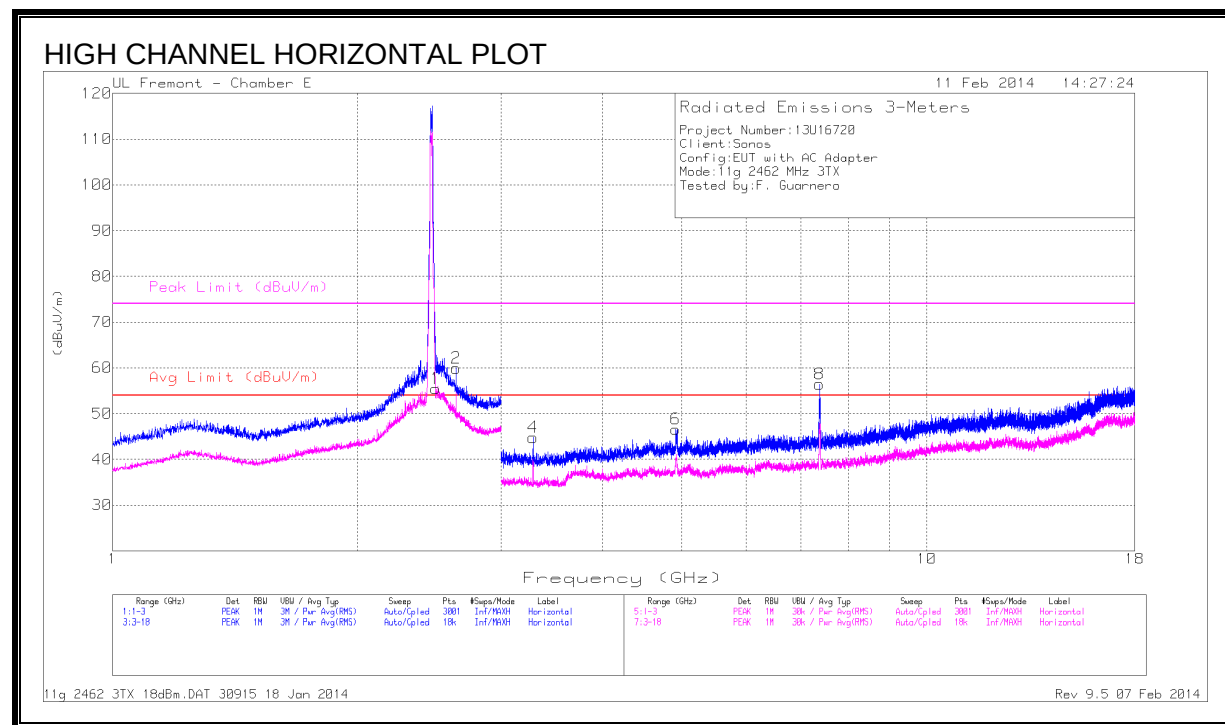
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Avg - Video bandwidth < Resolution bandwidth

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

HARMONICS AND SPURIOUS EMISSIONS



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T712 (dB/m)	Amp/Cb/Fitr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.494	54.95	PK2	32.2	-20.7	0	66.45	-	-	74	-7.55	4	115	H
	* 2.494	39.35	MAV1	32.2	-20.8	.5	51.25	53.97	-2.72	-	-	4	115	H
2	2.641	48.42	PK	31.8	-20.3	0	59.92	-	-	-	-	0-360	100	H
3	2.641	48.25	PK	31.8	-20.3	0	59.75	-	-	-	-	0-360	201	V
4	3.284	41.37	PK	32.5	-29.1	0	44.77	-	-	-	-	0-360	100	H
5	3.284	40.95	PK	32.5	-29.1	0	44.35	-	-	-	-	0-360	201	V
6	* 4.915	40.91	PK	33.5	-27.8	0	46.61	53.97	-7.36	74	-27.39	0-360	100	H
7	* 4.914	40.64	PK	33.5	-27.8	0	46.34	53.97	-7.63	74	-27.66	0-360	201	V
8	* 7.39	35.1	PK2	35.2	-25.2	0	45.1	-	-	74	-28.9	328	375	H
	* 7.39	36.05	MAV1	35.2	-25.2	.5	46.55	53.97	-7.42	-	-	328	375	H
9	* 7.39	47.66	PK2	35.2	-25.2	0	57.66	-	-	74	-16.34	330	363	V
	* 7.39	33.14	MAV1	35.2	-25.3	.5	43.54	53.97	-10.43	-	-	330	363	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

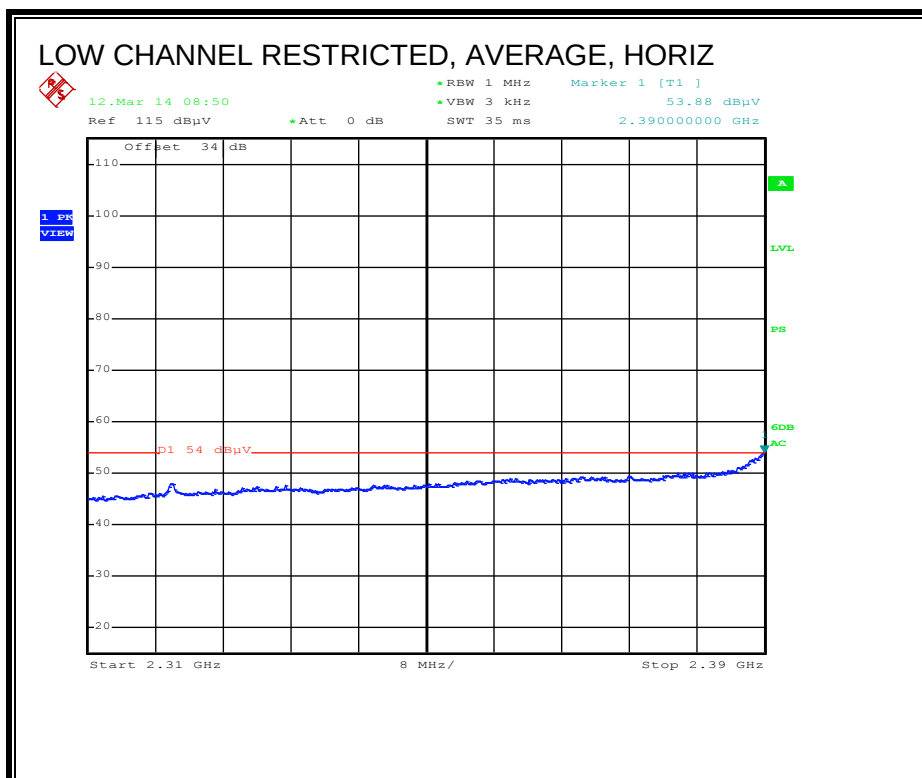
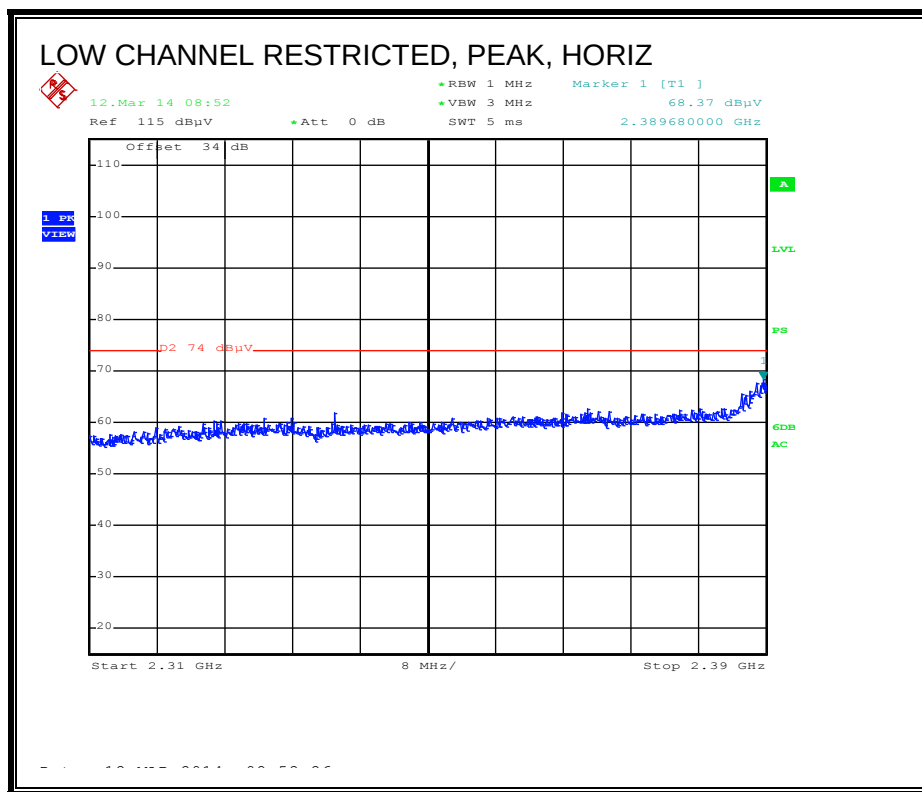
PK - Peak detector

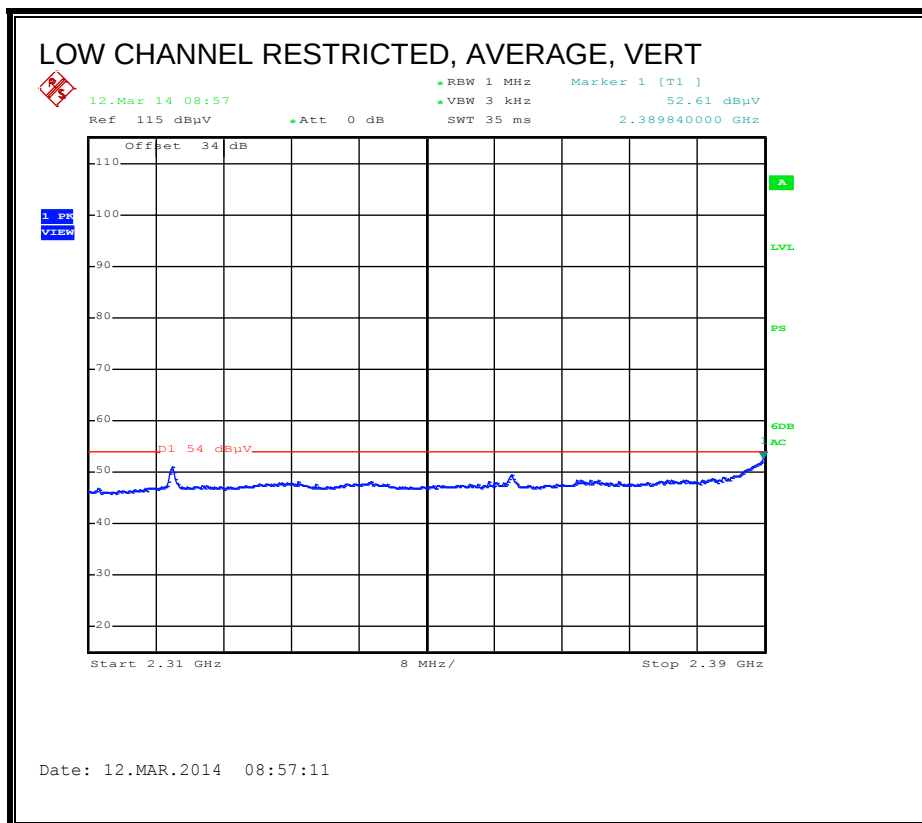
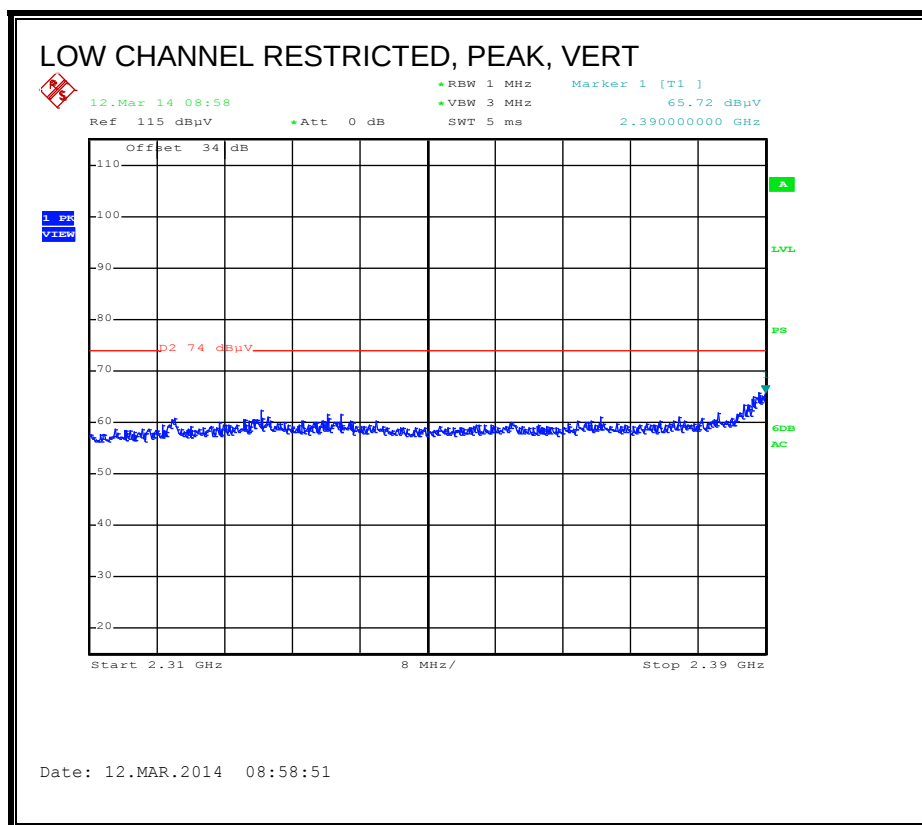
PK2 - KDB558074 Method: Maximum Peak

MAV1 - KDB558074 Option 1 Maximum RMS Average

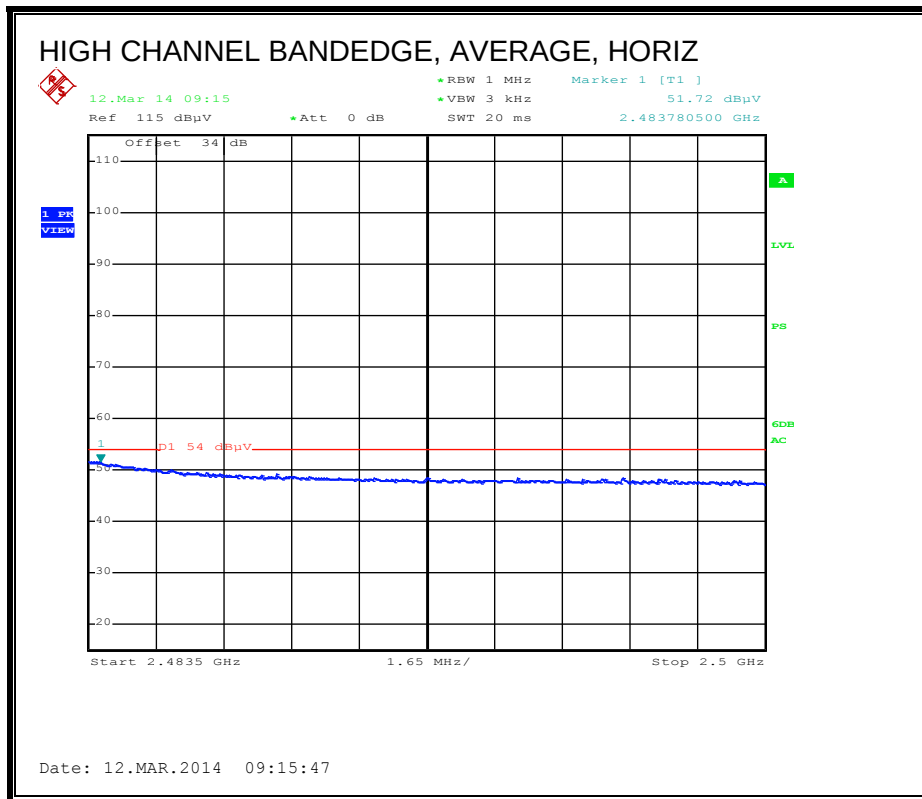
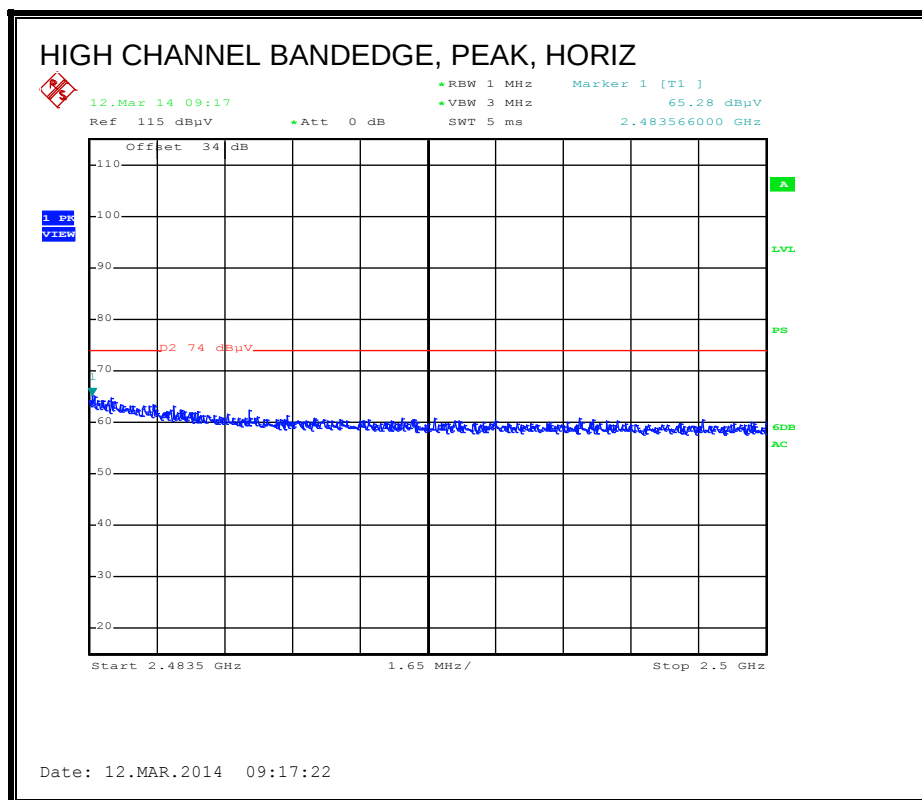
9.2.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

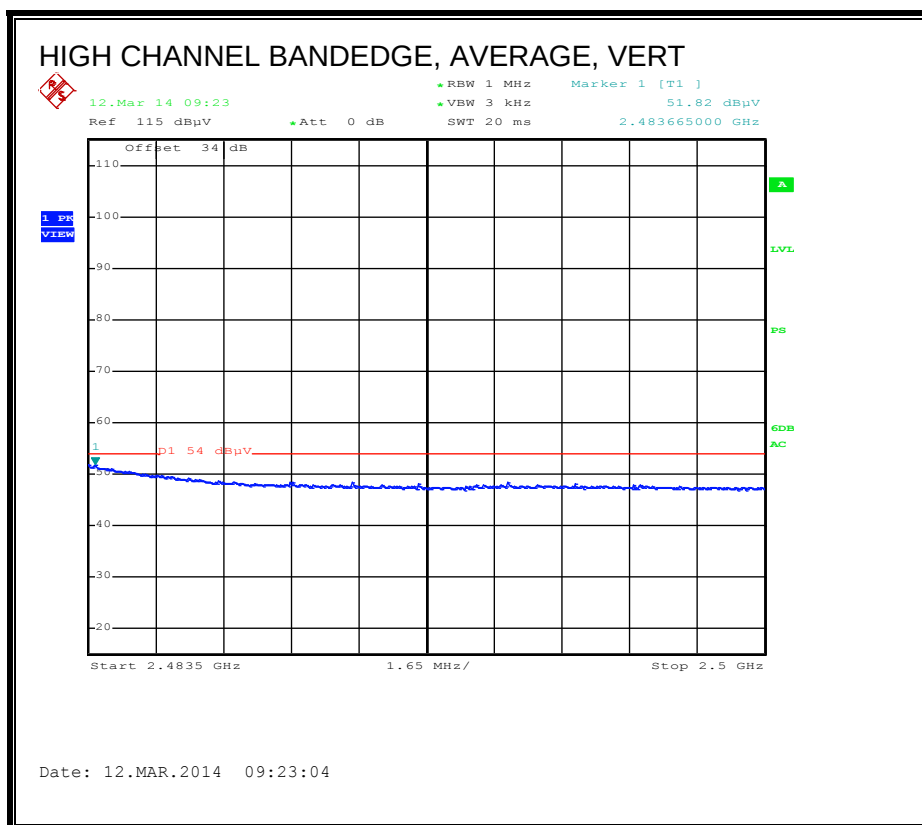
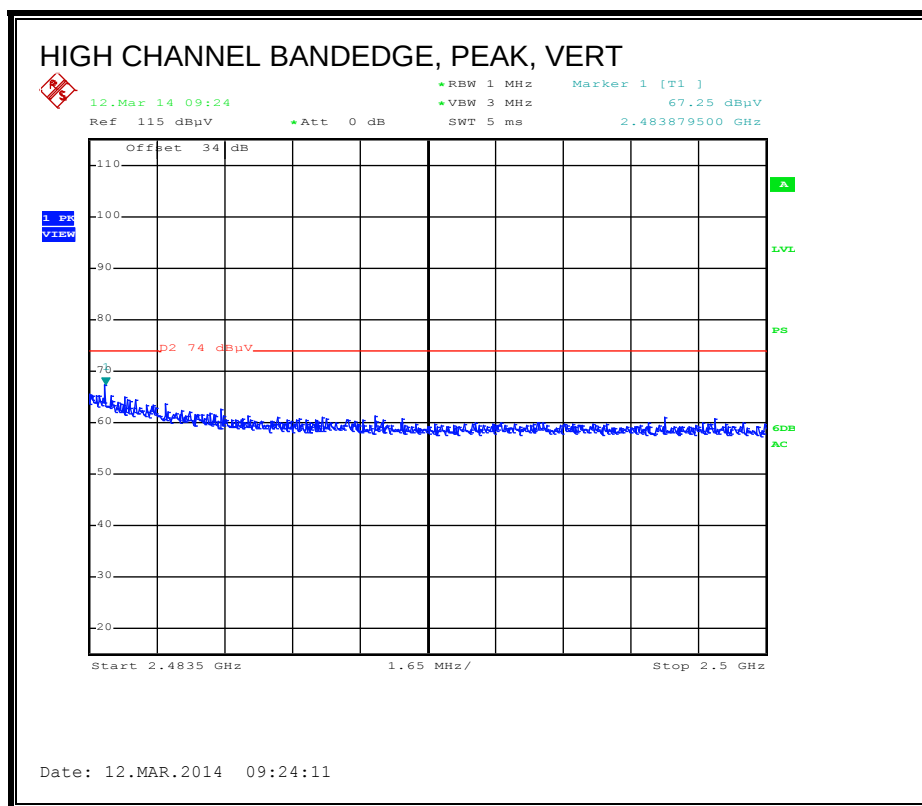
RESTRICTED BANDEDGE (LOW CHANNEL)





AUTHORIZED BANDEDGE (HIGH CHANNEL)





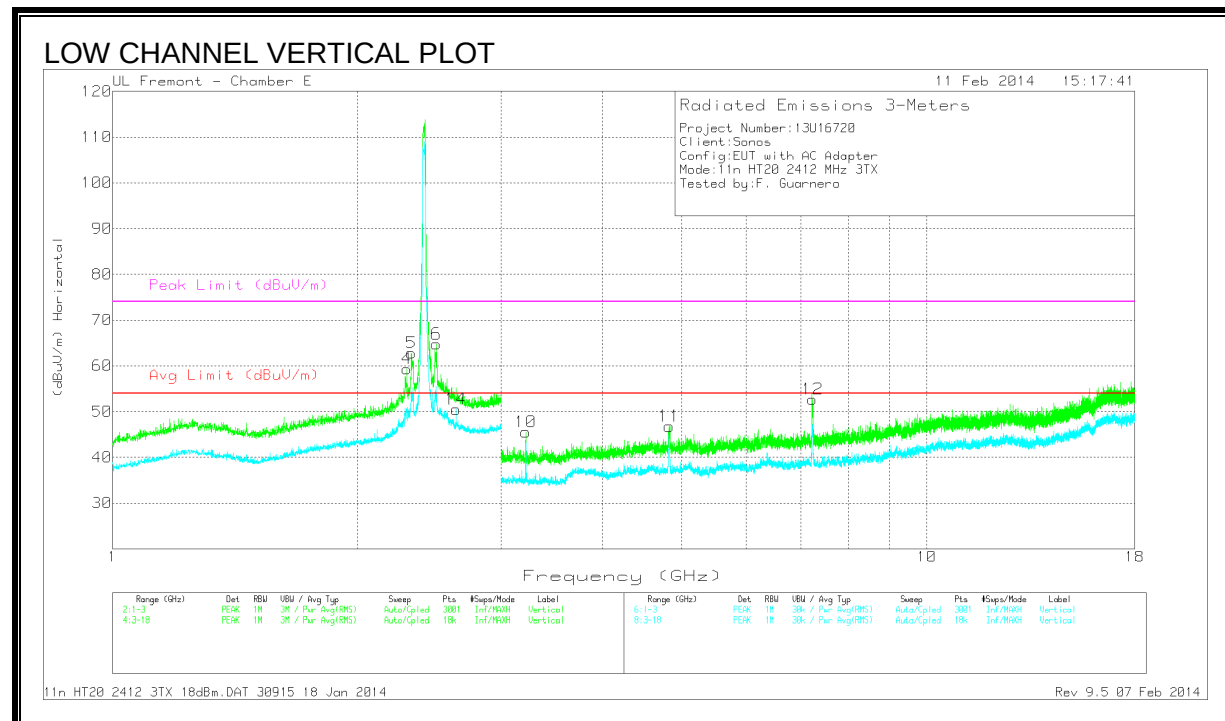
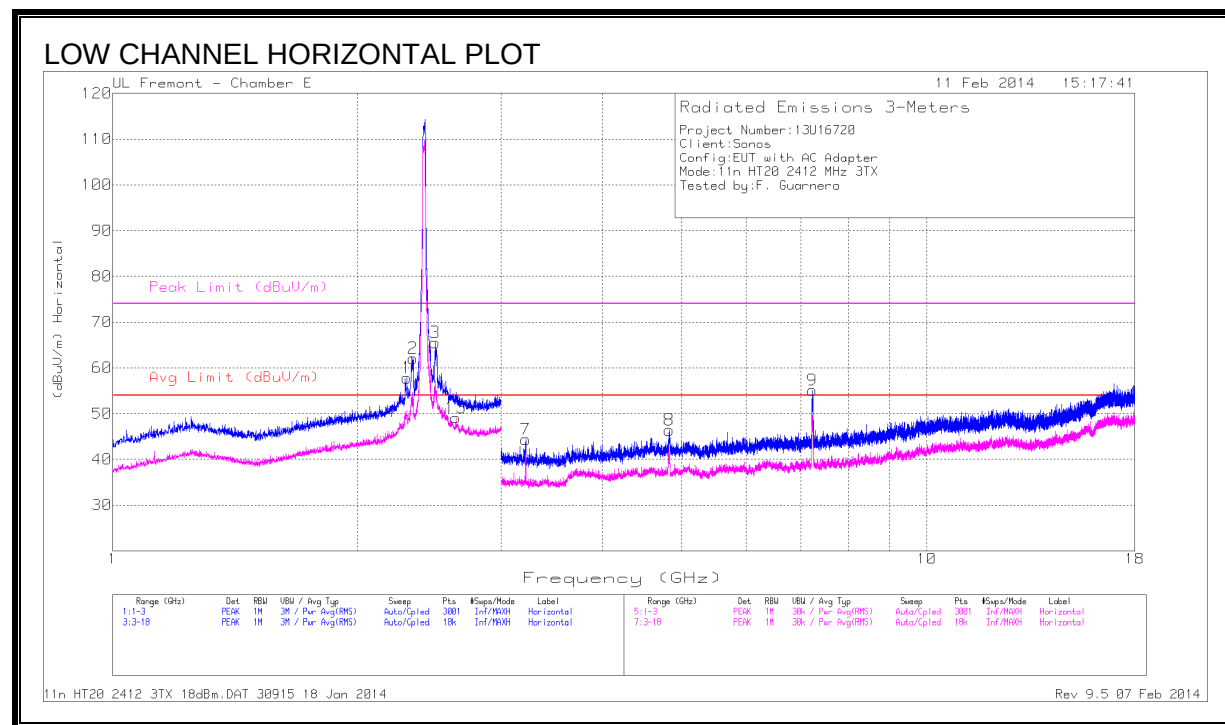
AUTHORIZED BANDEDGE (LOW CHANNEL)

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T712 (dB/m)	Cables (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Polarity
1	2.389	34.37	PK	28.61	5.39	68.37	-	-	74	-5.63	H
2	2.390	19.88	Pk	28.61	5.39	53.88	54	-0.12	-		H
3	2.390	31.72	PK	28.61	5.39	65.72	-	-	74	-8.28	V
4	2.389	18.61	Pk	28.61	5.39	52.61	54	-1.39	-		V

AUTHORIZED BANDEDGE (HIGH CHANNEL)

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T712 (dB/m)	Cables (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Polarity
1	2.484	31.28	PK	28.61	5.39	65.28	-	-	74	-8.72	H
2	2.484	17.72	Pk	28.61	5.39	51.72	54	-2.28	-		H
3	2.484	33.25	PK	28.61	5.39	67.25	-	-	74	-6.75	V
4	2.484	17.82	Pk	28.61	5.39	51.82	54	-2.18	-		V

HARMONICS AND SPURIOUS EMISSIONS



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T712 (dB/m)	Amp/Cb/Ftr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.299	51.31	PK2	30.9	-20.8	0	61.41	-	-	74	-12.59	250	373	H
	* 2.299	38.14	MAv1	30.9	-20.8	.4	48.64	53.97	-5.33	-	-	250	373	H
2	* 2.334	56.81	PK2	31.1	-20.7	0	67.21	-	-	74	-6.79	273	183	H
	* 2.334	38.97	MAv1	31.1	-20.7	.4	49.77	53.97	-4.2	-	-	273	183	H
3	* 2.493	56.17	PK2	32.2	-20.8	0	67.57	-	-	74	-6.43	293	191	H
	* 2.493	38.96	MAv1	32.1	-20.7	.4	50.76	53.97	-3.21	-	-	293	191	H
4	* 2.298	50.2	PK2	30.9	-20.8	0	60.3	-	-	74	-13.7	174	172	V
	* 2.298	36.53	MAv1	30.9	-20.8	.4	47.03	53.97	-6.94	-	-	174	172	V
5	* 2.337	54.8	PK2	31.2	-20.8	0	65.2	-	-	74	-8.8	202	353	V
	* 2.337	38.34	MAv1	31.1	-20.7	.4	49.14	53.97	-4.83	-	-	202	353	V
	* 2.498	52.71	PK2	32.2	-20.8	0	64.11	-	-	74	-9.89	268	221	V
6	* 2.498	36.54	MAv1	32.2	-20.8	.4	48.34	53.97	-5.63	-	-	268	221	V
7	3.217	40.46	PK	32.5	-28.6	0	44.36	-	-	-	-	0-360	201	H
8	* 4.827	39.59	PK	33.5	-26.7	0	46.39	53.97	-7.58	74	-27.61	0-360	201	H
9	7.235	45.12	PK	35.1	-25.1	0	55.12	-	-	-	-	0-360	201	H
10	3.217	41.65	PK	32.5	-28.6	0	45.55	-	-	-	-	0-360	201	V
11	* 4.826	39.96	PK	33.5	-26.7	0	46.76	53.97	-7.21	74	-27.24	0-360	100	V
12	7.236	42.72	PK	35.1	-25.1	0	52.72	-	-	-	-	0-360	201	V
13	2.64	37.6	Avg	31.8	-20.3	0	49.1	-	-	-	-	0-360	100	H
14	2.64	39	Avg	31.8	-20.3	0	50.5	-	-	-	-	0-360	201	V

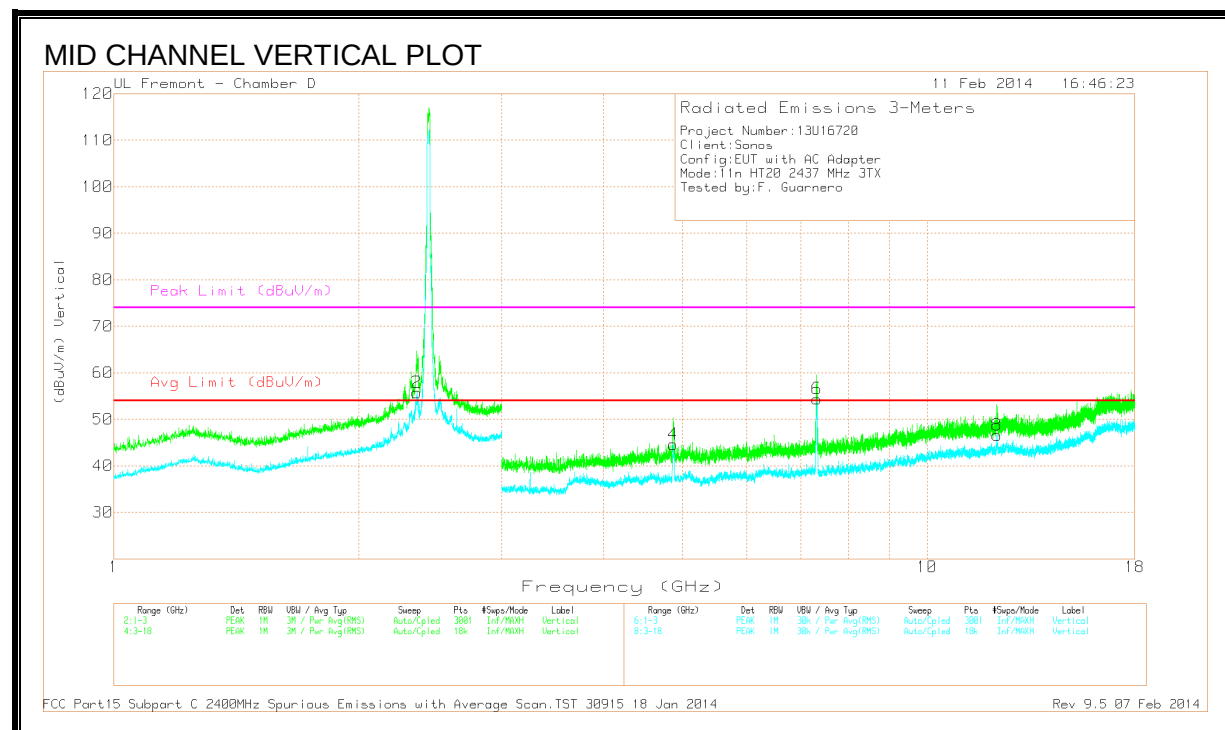
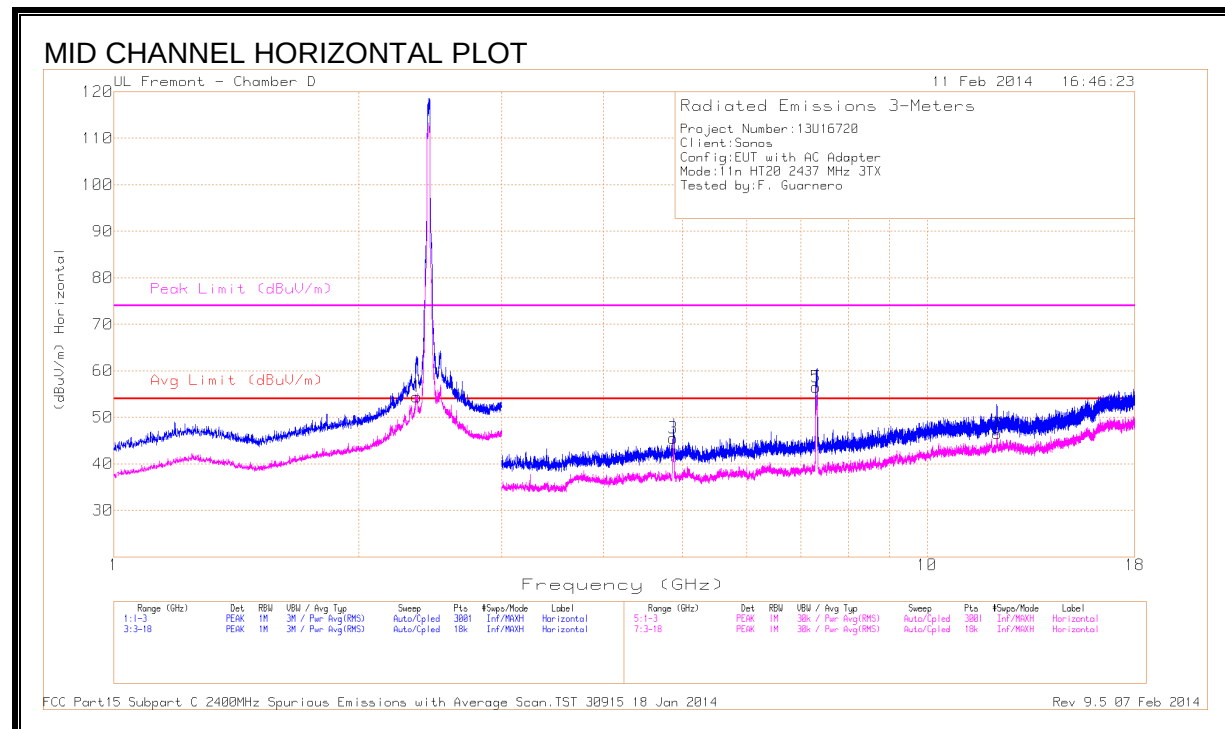
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Avg - Video bandwidth < Resolution bandwidth

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

HARMONICS AND SPURIOUS EMISSIONS



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T712 (dB/m)	Amp/Cb/Ftr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	* 2.36	55.36	PK2	31.3	-20.8	0	65.86	-	-	74	-8.14	290	338	H
1	* 2.36	40.8	MAv1	31.3	-20.8	.4	51.7	53.97	-2.27	-	-	290	338	H
	* 2.361	56.23	PK2	31.3	-20.8	0	66.73	-	-	74	-7.27	83	278	V
2	* 2.361	39.95	MAv1	31.3	-20.8	.4	50.85	53.97	-3.12	-	-	83	278	V
3	* 4.873	38.91	Avg	33.5	-26.9	0	45.51	53.97	-8.46	-	-	0-360	201	H
4	* 4.875	37.99	Avg	33.5	-26.9	0	44.59	53.97	-9.38	-	-	0-360	201	V
	* 7.317	54.24	PK2	35.1	-24.9	0	64.44	-	-	74	-9.56	322	316	H
5	* 7.317	39.09	MAv1	35.1	-24.8	.4	49.79	53.97	-4.18	-	-	322	316	H
	* 7.312	53.46	PK2	35.1	-24.8	0	63.76	-	-	74	-10.24	321	361	V
6	* 7.312	37.06	MAv1	35.1	-24.9	.4	47.66	53.97	-6.31	-	-	321	361	V
7	* 12.199	29.6	Avg	38.4	-21.5	0	46.5	53.97	-7.47	-	-	0-360	201	H
8	* 12.194	29.81	Avg	38.4	-21.6	0	46.61	53.97	-7.36	-	-	0-360	201	V

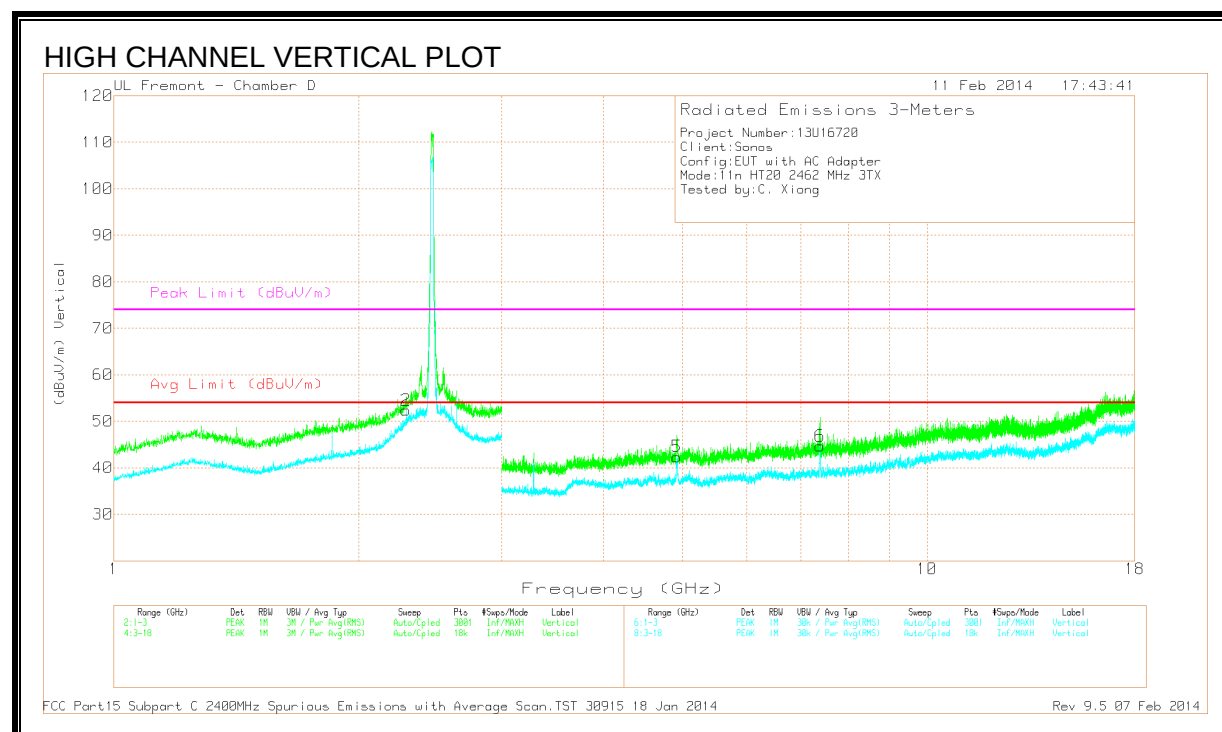
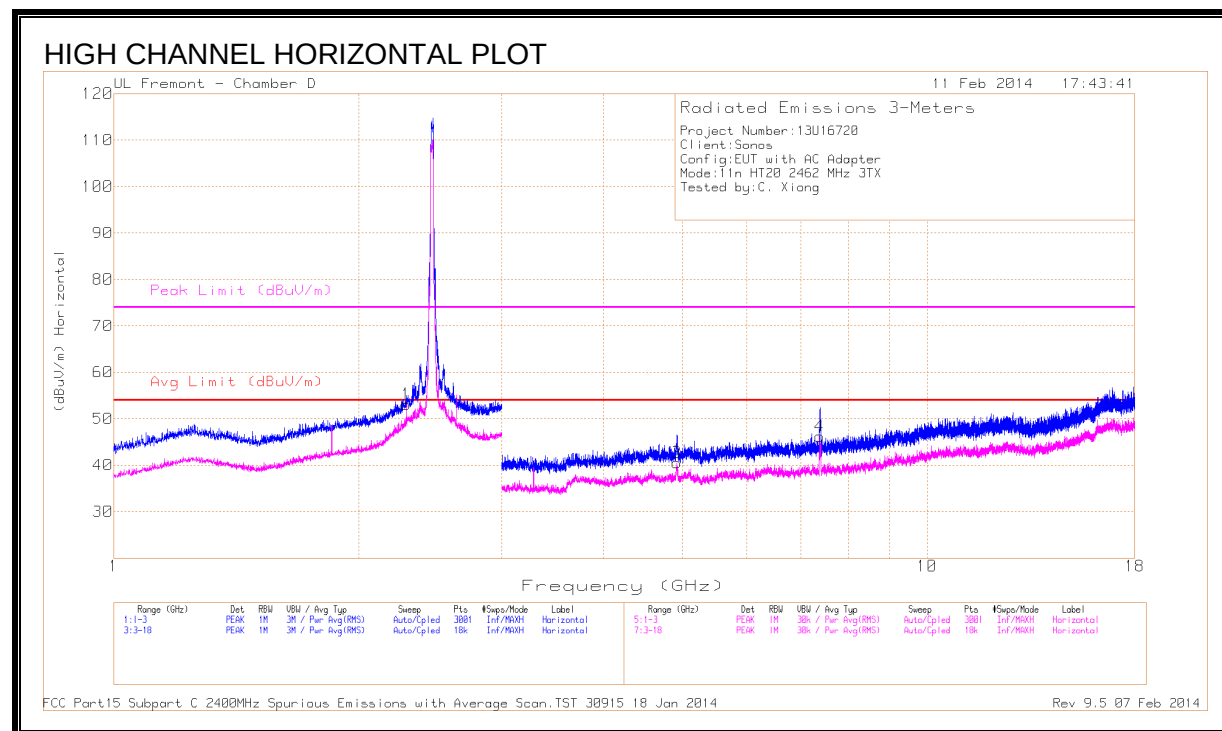
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Avg - Video bandwidth < Resolution bandwidth

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

HARMONICS AND SPURIOUS EMISSIONS



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T712 (dB/m)	Amp/Cb/Filt /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	* 2.288	50.09	PK2	30.8	-20.8	0	60.09	-	-	74	-13.91	256	371	H
1	* 2.288	41.89	MAv1	30.8	-20.8	.4	52.29	53.97	-1.68	-	-	256	371	H
	* 2.288	50.53	PK2	30.8	-20.8	0	60.53	-	-	74	-13.47	207	369	V
2	* 2.288	40.72	MAv1	30.8	-20.8	.4	51.12	53.97	-2.85	-	-	207	369	V
3	* 4.924	34.8	Avg	33.5	-27.8	0	40.5	53.97	-13.47	-	-	0-360	201	H
5	* 4.924	36.65	Avg	33.5	-27.8	0	42.35	53.97	-11.62	-	-	0-360	100	V
4	* 7.381	36.28	Avg	35.2	-25.3	0	46.18	53.97	-7.79	-	-	0-360	201	H
6	* 7.384	34.77	Avg	35.2	-25.3	0	44.67	53.97	-9.3	-	-	0-360	201	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

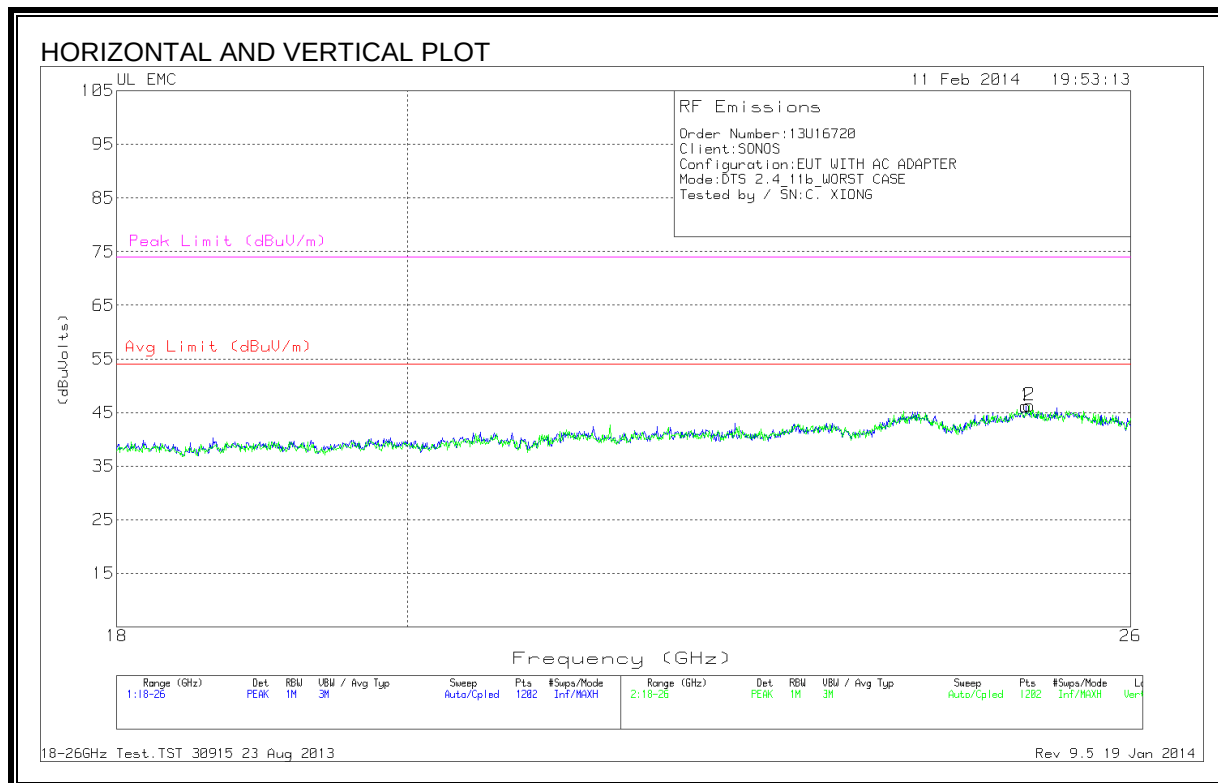
Avg - Video bandwidth < Resolution bandwidth

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

9.3. TRANSMITTER ABOVE 18 GHz

SPURIOUS EMISSIONS 18 TO 26 GHz (WORST-CASE CONFIGURATION)



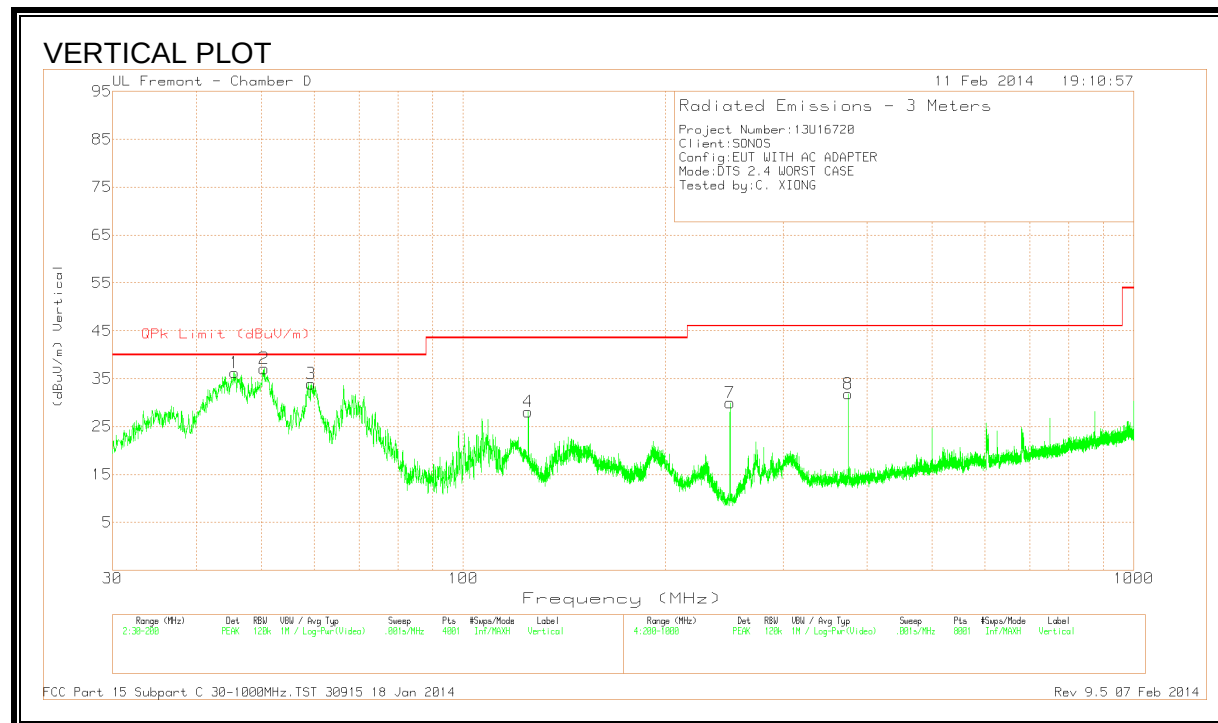
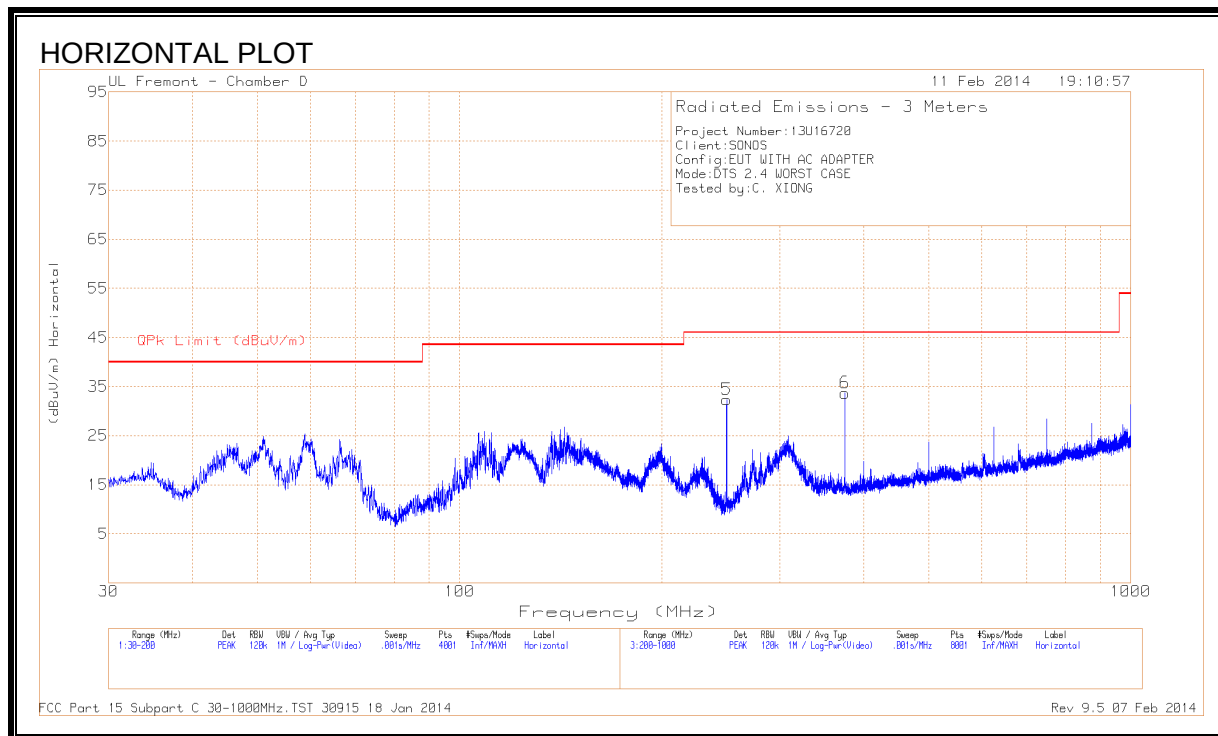
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T89 (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	25.027	44.57	PK	34	-22.9	-9.5	46.17	54	-7.83	74	-27.83
2	25.061	44.43	PK	34	-22.6	-9.5	46.33	54	-7.67	74	-27.67

PK - Peak detector

9.4. WORST-CASE BELOW 1 GHz

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



DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T407 dB/m	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	45.9384	54.91	QP	9.9	-31.8	33.01	40	-6.99	281	109	V
2	50.4825	57.13	QP	7.9	-31.6	33.43	40	-6.57	143	198	V
3	59.325	58.03	PK	7.4	-31.5	33.93	40	-6.07	0-360	100	V
4	124.9875	45.31	PK	13.9	-31.1	28.11	43.52	-15.41	0-360	100	V
5	250	51.25	PK	11.5	-30.4	32.35	46.02	-13.67	0-360	100	H
7	250	48.88	PK	11.5	-30.4	29.98	46.02	-16.04	0-360	100	V
6	375	48.78	PK	15.1	-30.2	33.68	46.02	-12.34	0-360	200	H
8	375	46.94	PK	15.1	-30.2	31.84	46.02	-14.18	0-360	100	V

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.

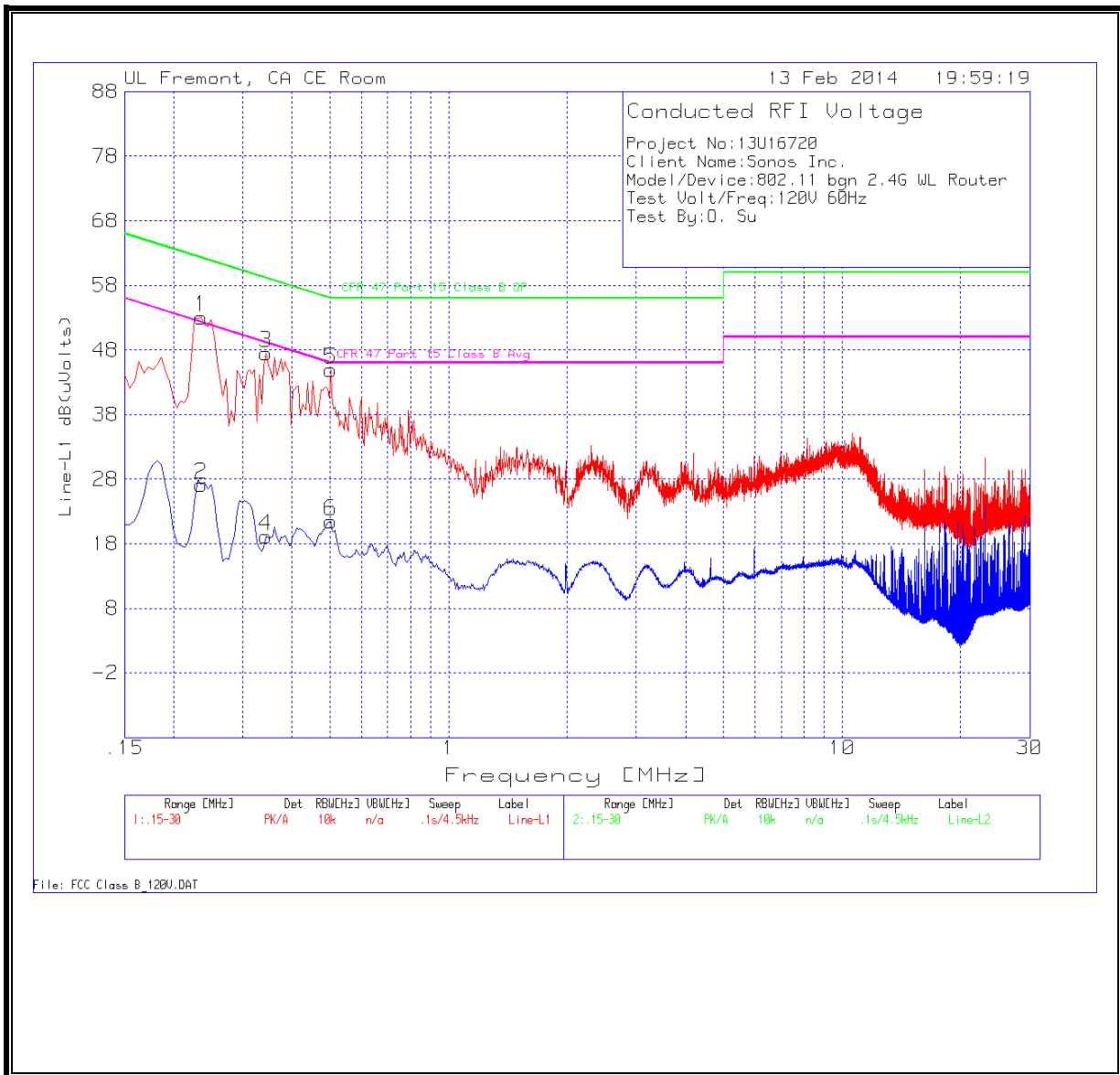
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

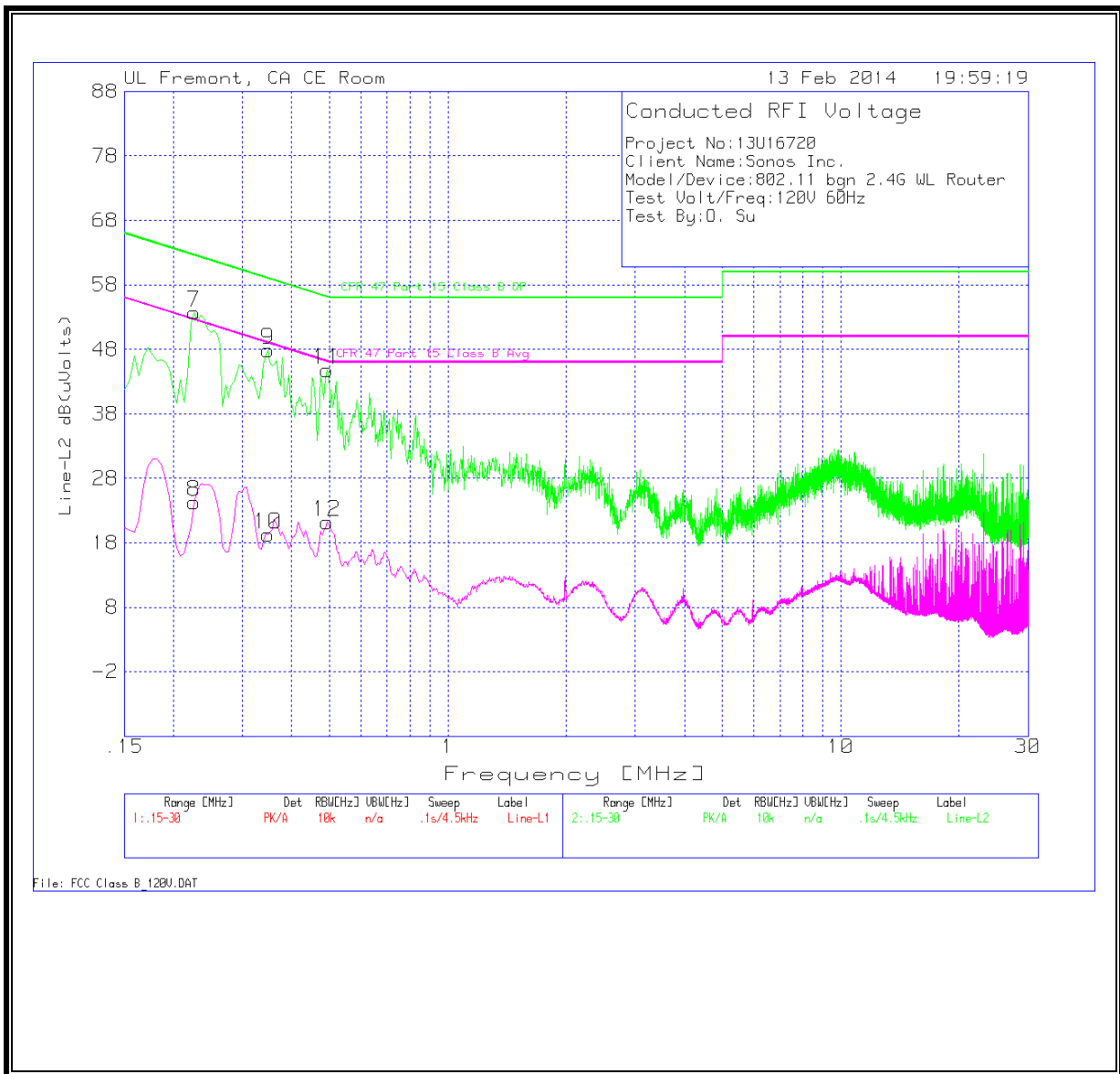
RESULTS

6 WORST EMISSIONS

LINE 1 RESULTS



LINE 2 RESULTS



DATA

Line-L1 .15 - 30MHz

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1 (dB)	LC Cables 1&3 (dB)	Corrected Reading dB(uVolts)	CFR 47 Part 15 Class B QP	Margin to Limit (dB)	CFR 47 Part 15 Class B Avg	Margin to Limit (dB)
1	.2355	52.31	PK	.8	0	53.11	62.3	-9.19	-	-
2	.2355	26.32	Av	.8	0	27.12	-	-	52.3	-25.18
3	.3435	47.07	PK	.5	0	47.57	59.1	-11.53	-	-
4	.3435	18.67	Av	.5	0	19.17	-	-	49.1	-29.93
5	.501	44.62	PK	.3	0	44.92	56	-11.08	-	-
6	.501	21.13	Av	.3	0	21.43	-	-	46	-24.57

Line-L2 .15 - 30MHz

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2 (dB)	LC Cables 2&3 (dB)	Corrected Reading dB(uVolts)	CFR 47 Part 15 Class B QP	Margin to Limit (dB)	CFR 47 Part 15 Class B Avg	Margin to Limit (dB)
7	.2265	52.86	PK	.9	0	53.76	62.6	-8.84	-	-
8	.2265	23.39	Av	.9	0	24.29	-	-	52.6	-28.31
9	.348	47.36	PK	.5	0	47.86	59	-11.14	-	-
10	.348	18.82	Av	.5	0	19.32	-	-	49	-29.68
11	.492	44.4	PK	.4	0	44.8	56.1	-11.3	-	-
12	.492	20.85	Av	.4	0	21.25	-	-	46.1	-24.85

PK - Peak detector

Av - average detection

11. PSD AND OUTPUT POWER Q VALUE SETTING

Q-Value Settings				
Channel	Frequency (MHz)	b mode	g mode	n Mode
Low	2412	18.0	17.5	17.5
Mid	2437	18.0	22.0	22.0
High	2462	18.0	18.0	18.0

Note: the Q-Values in the report per client requested are for future reference.