



FCC 47 CFR PART 15 SUBPART C

CERTIFICATION TEST REPORT

FOR

TABLET DEVICE

MODEL NUMBER: A1566

FCC ID: BCGA1566

REPORT NUMBER: 14U18207-E3, Revision C

ISSUE DATE: SEPTEMBER 25, 2014

Prepared for

APPLE, INC.

1 INFINITE LOOP

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	09/02/14	Initial Issue	F. de Anda
A	09/13/14	Update EUT description	F. de Anda
B	09/13/14	Updated sec. 5.5	F. de Anda
C	09/25/14	Updated sec. 5.5 and 7	F. de Anda

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS.....	5
2. TEST METHODOLOGY.....	6
3. FACILITIES AND ACCREDITATION.....	6
4. CALIBRATION AND UNCERTAINTY	6
4.1. MEASURING INSTRUMENT CALIBRATION.....	6
4.2. SAMPLE CALCULATION.....	6
4.3. MEASUREMENT UNCERTAINTY	7
5. EQUIPMENT UNDER TEST	8
5.1. DESCRIPTION OF EUT.....	8
5.2. MAXIMUM OUTPUT POWER.....	8
5.3. DESCRIPTION OF AVAILABLE ANTENNAS	8
5.4. SOFTWARE AND FIRMWARE.....	8
5.5. WORST-CASE CONFIGURATION AND MODE.....	9
5.6. DESCRIPTION OF TEST SETUP	10
6. TEST AND MEASUREMENT EQUIPMENT	14
7. MEASUREMENT METHODS	15
8. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS.....	16
8.1. ON TIME AND DUTY CYCLE RESULTS.....	16
8.2. DUTY CYCLE PLOTS.....	17
9. ANTENNA PORT TEST RESULTS	19
9.1. 802.11b MODE IN THE 2.4 GHz BAND	19
9.1.1. 6 dB BANDWIDTH	19
9.1.2. 99% BANDWIDTH	23
9.1.3. AVERAGE POWER	27
9.1.4. OUTPUT POWER.....	28
9.1.5. PSD	30
9.1.6. OUT-OF-BAND EMISSIONS	34
9.2. 802.11g 1Tx MODE IN THE 2.4 GHz BAND	41
9.2.1. 6 dB BANDWIDTH	41
9.2.2. 99% BANDWIDTH	45
9.2.3. AVERAGE POWER	49
9.2.4. OUTPUT POWER.....	50
9.2.5. PSD	52
9.2.6. OUT-OF-BAND EMISSIONS	56
9.3. 802.11n HT20 2Tx MODE IN THE 2.4 GHz BAND.....	62
9.3.1. 6 dB BANDWIDTH	62
9.3.2. 99% BANDWIDTH	68

9.3.3.	AVERAGE POWER	74
9.3.4.	OUTPUT POWER.....	75
9.3.5.	PSD	77
9.3.6.	OUT-OF-BAND EMISSIONS	83
10.	RADIATED TEST RESULTS	95
10.1.	LIMITS AND PROCEDURE.....	95
10.2.	TX RADIATED ABOVE 1 GHz.....	96
10.2.1.	802.11b 1Tx SISO MODE IN THE 2.4 GHz BAND	96
10.2.2.	802.11g 1Tx SISO MODE IN THE 2.4 GHz BAND	114
10.2.3.	802.11n HT20 2Tx MODE IN THE 2.4 GHz BAND	132
10.3.	WORST-CASE BELOW 1 GHz	150
10.4.	WORST-CASE ABOVE 18 to 26GHz	152
11.	AC POWER LINE CONDUCTED EMISSIONS.....	154
12.	SETUP PHOTOS	159

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: APPLE
1 INFINITE LOOP
CUPERTINO, CA 95014, U.S.A.

EUT DESCRIPTION: TABLET DEVICE

MODEL: A1566

SERIAL NUMBER: DLXMX010G4LV, DLXMX00JG4LV, DLXMX00DG4LV

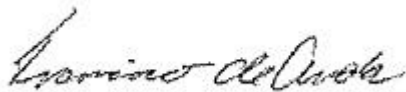
DATE TESTED: JULY 8, 2014 – AUGUST 15, 2014

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	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:



FRANCISCO DE ANDA
PROJECT LEAD
UL VERIFICATION SERVICES INC.

Tested By:



TRI PHAM
EMC 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, KDB558074 and ANSI C63.10-2009.

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
<input type="checkbox"/> Chamber A	<input checked="" type="checkbox"/> Chamber D
<input type="checkbox"/> Chamber B	<input type="checkbox"/> Chamber E
<input type="checkbox"/> Chamber C	<input checked="" type="checkbox"/> Chamber F
	<input checked="" type="checkbox"/> Chamber G
	<input checked="" type="checkbox"/> Chamber H

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:

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

4.3. MEASUREMENT UNCERTAINTY

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

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

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a tablet with multimedia functions (music, application support, and video), IEEE 802.11a/b/g/n/ac radio, Bluetooth and BLE radio. The rechargeable battery is not user accessible.

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 - 2472	802.11b	19.51	89.33
2412 - 2472	802.11g	23.35	216.27
2412 - 2472	802.11g 2TX CDD	Covered by 802.11n HT20 2TX CDD	
2412 - 2472	802.11n HT20 1TX	Covered by 802.11g	
2412 - 2472	802.11n HT20 2Tx CDD	26.82	480.84
2412 - 2472	802.11n HT20 2TX STBC/SDM	Covered by 802.11n HT20 2TX CDD	

Note: The output power on covered modes is equal to or less than one referenced.

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PiFA antenna, with a maximum gain :

Antenna Gains		
Band	Antenna A	Antenna B
2.4	+1.005	+2.016

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was 12B331

5.5. WORST-CASE CONFIGURATION AND MODE

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

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

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

802.11b mode: 1 Mbps

802.11g mode: 6 Mbps

802.11n HT20mode: MCS0

The target power for 802.11g and 802.11n HT20 1TX are the same and use the same modulation (OFDM).

On SISO modes, conducted power is same for both ports. Only antenna port B was tested due to higher antenna gain.

There are two vendors of the WiFi/Bluetooth radio modules: variant 1 and variant 2. The Wi-Fi/Bluetooth radio modules have the same mechanical outline (e.g., the same package dimension and pin-out layout), use the same on-board antenna matching circuit, have an identical antenna structure, and are built and tested to conform to the same specifications and to operate within the same tolerances.

Baseline testing was performed on the two variants to determine the worst case on all conducted power and radiated emissions.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC/DC adapter	Apple	A1357	N/A	NA
Earphone	Apple	NA	NA	NA
Laptop	Apple	A1278	C02HJ0A7DTY4	NA
DC power supply	Sorensen	XT 15-4	1319A02780	NA

I/O CABLES (CONDUCTED TEST)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	Antenna	1	SMA	Un-Shielded	0.2	To spectrum Analyzer
2	USB	1	USB	Shielded	1	N/A
3	DC	1	DC	Un-shielded	0.8	N/A

I/O CABLES (RADIATED ABOVE 1 GHZ)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
None used						

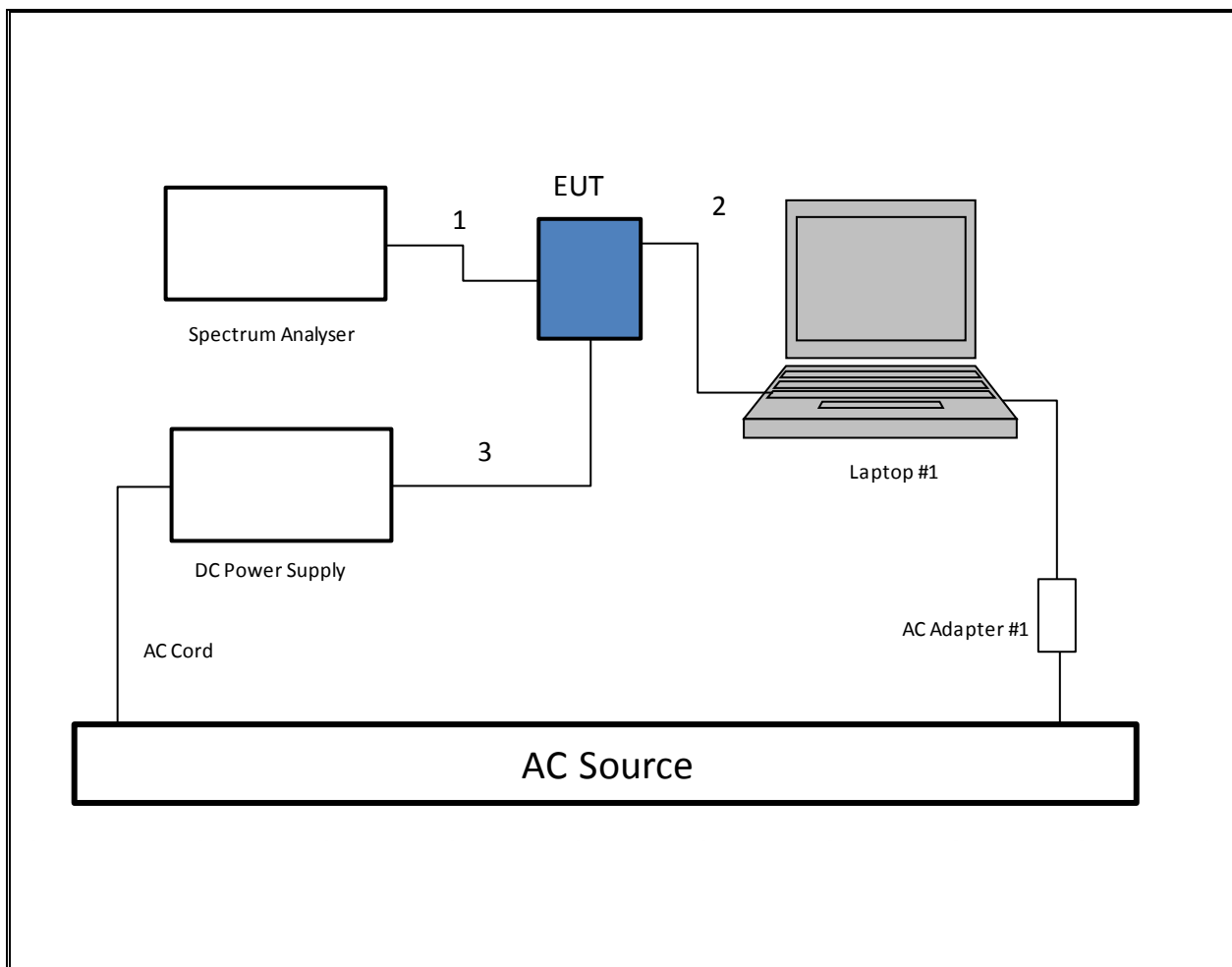
I/O CABLES (AC POWER CONDUCTED TEST and below 1 GHZ)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	US115	Un-Shielded	0.8	NA
2	DC	1	lightning	Un-Shielded	1	NA
3	Audio	1	Jack	Un-Shielded	0.5	NA

TEST SETUP- CONDUCTED PORT

The EUT was tested connected to a host Laptop via USB cable adapter and spectrum analyzer to antenna port. Test software exercised the EUT.

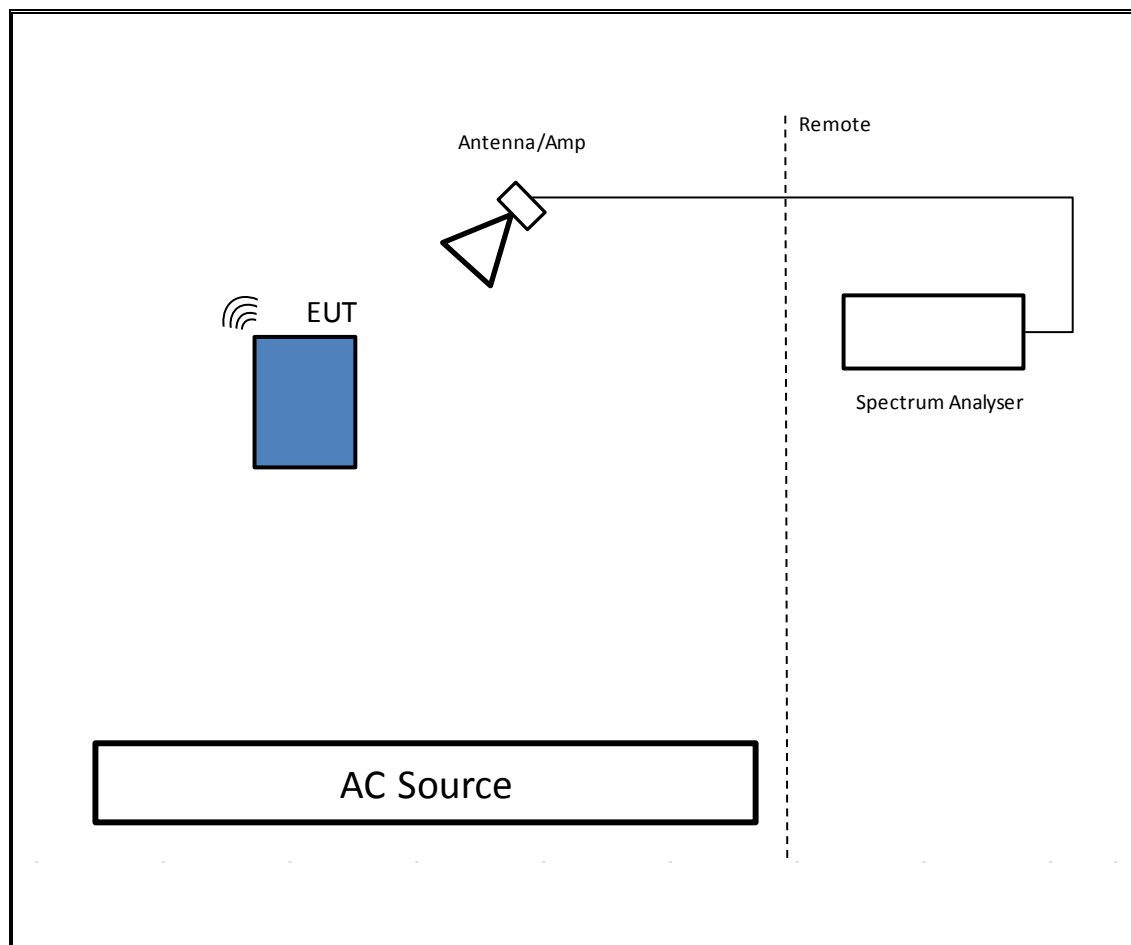
SETUP DIAGRAM



TEST SETUP- RADIATED-ABOVE 1 GHZ

The EUT was tested battery powered. Test software exercised the EUT.

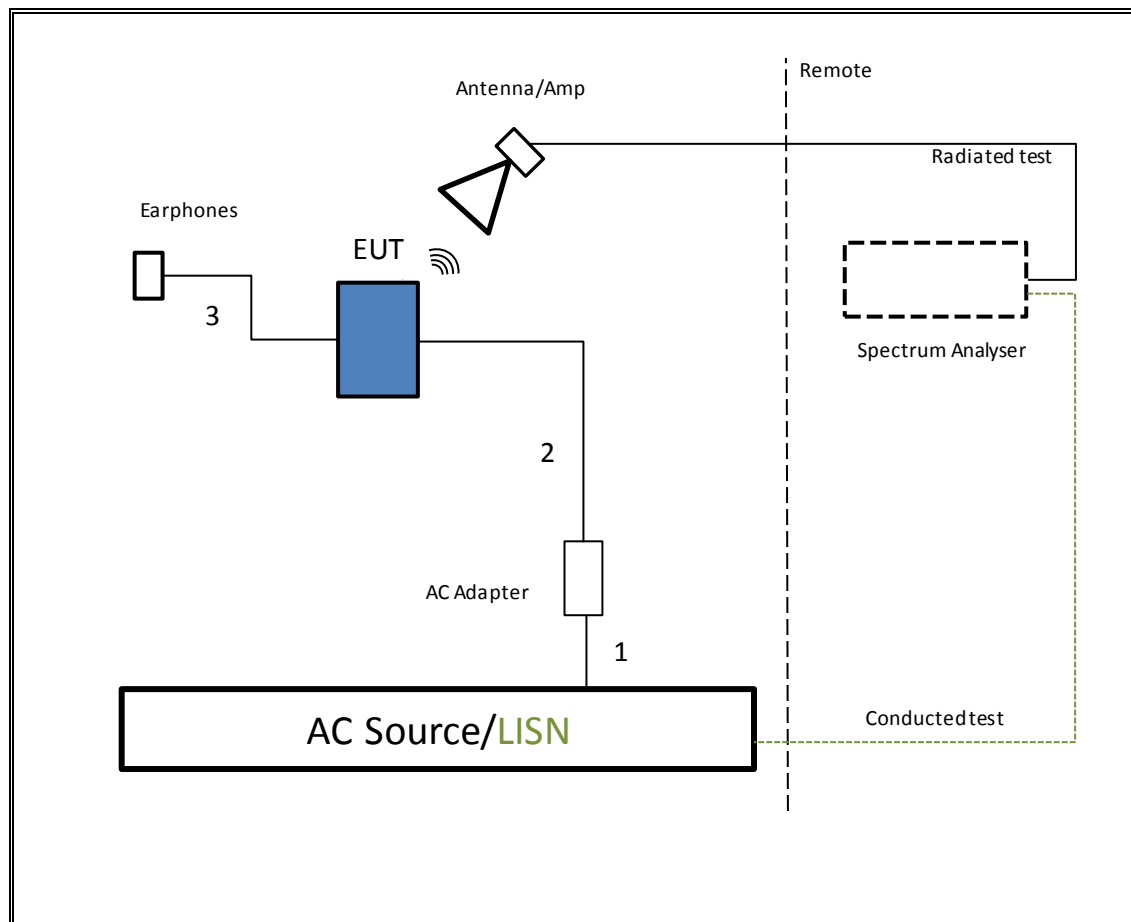
SETUP DIAGRAM



TEST SETUP- BELOW 1GHZ & AC LINE CONDUCTED TESTS

The EUT was tested with earphones connected and powered by AC adapter. Test software exercised the EUT.

SETUP DIAGRAM



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	ETS Lindgren	3117	F00131	2/18/2015
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00589	11/28/2014
Peak / Average Power Sensor	Agilent / HP	N1911A	F00153	3/6/2015
Wideband Power Sensor	Agilent	N1921A	F00361	10/2/2014
Peak Power Meter	Agilent / HP	E9323A	F00025	4/3/2015
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	F00129	2/22/2015
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	F00168	3/28/2015
Preamplifier, 1300 MHz	Sonoma	310	F00008	5/27/2015
Preamplifier, 26.5 GHz	Agilent / HP	8449B	F00165	3/25/2015
EMI Test Receiver, 9 kHz-7 GHz	R & S	ESCI 7	F00092	9/5/2014
LISN, 30 MHz	FCC	LISN-50/250-25-2	C00626	1/14/2015

7. MEASUREMENT METHODS

6 dB BW: KDB 558074 D01 v03r02, Section 8.1.

Output Power: KDB 558074 D01 v03r02, Section 9.1.2.

Power Spectral Density: KDB 558074 D01 v03r02, Section 10.2.

Out-of-band emissions in non-restricted bands: KDB 558074 D01 v03r02, Section 11.0.

Out-of-band emissions in restricted bands: KDB 558074 D01 v03r02, Section 12.0.

Note: CDD implementation uses long delay which results in uncorrelated transmission.

8. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

LIMITS

None; for reporting purposes only.

PROCEDURE

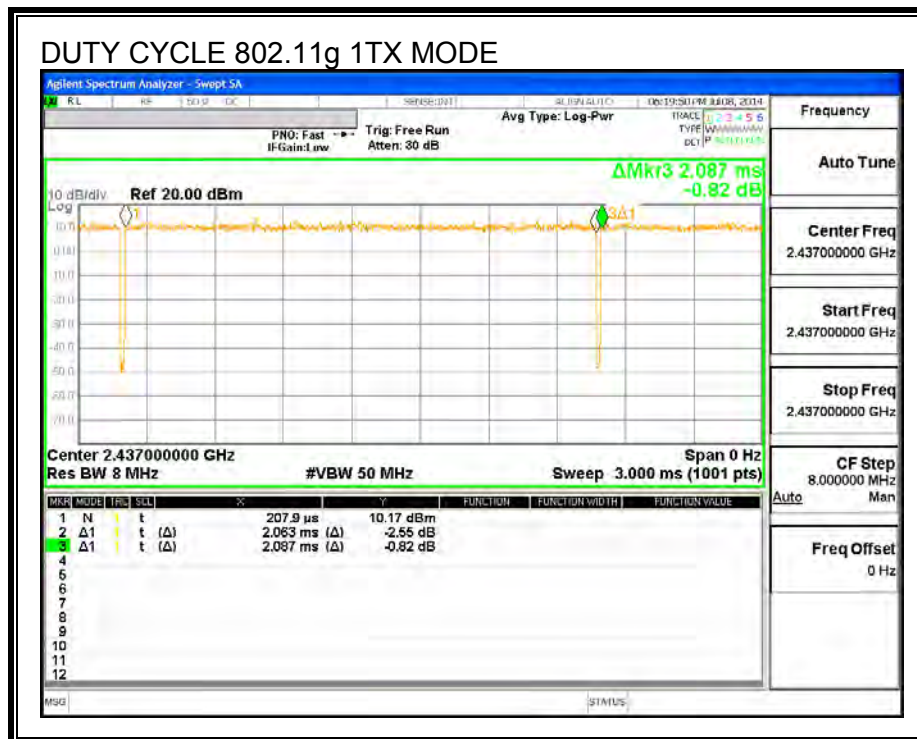
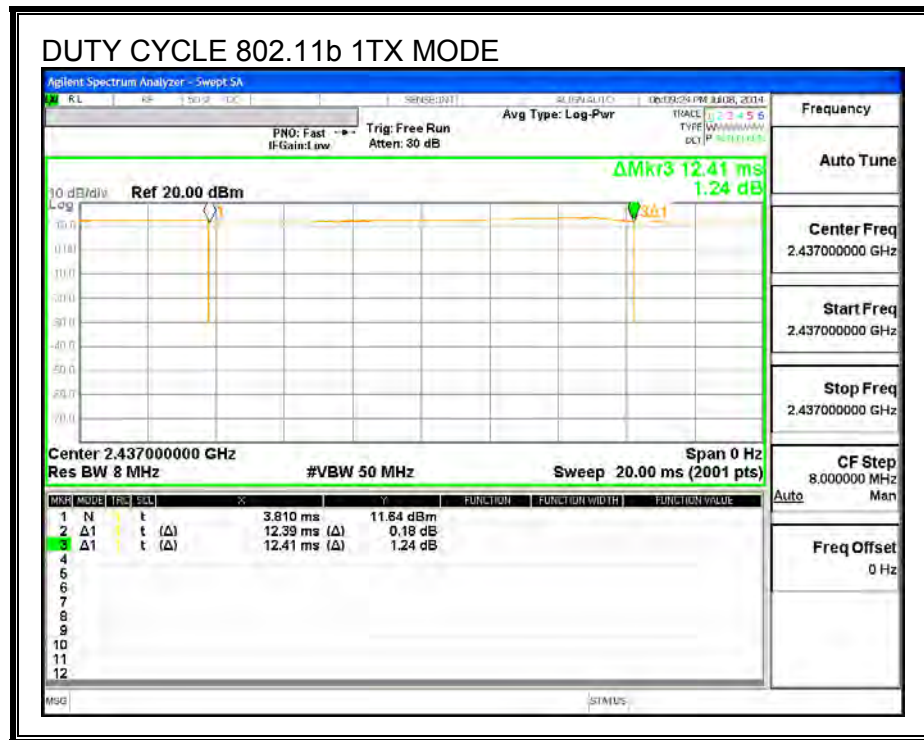
KDB 558074 Zero-Span Spectrum Analyzer Method.

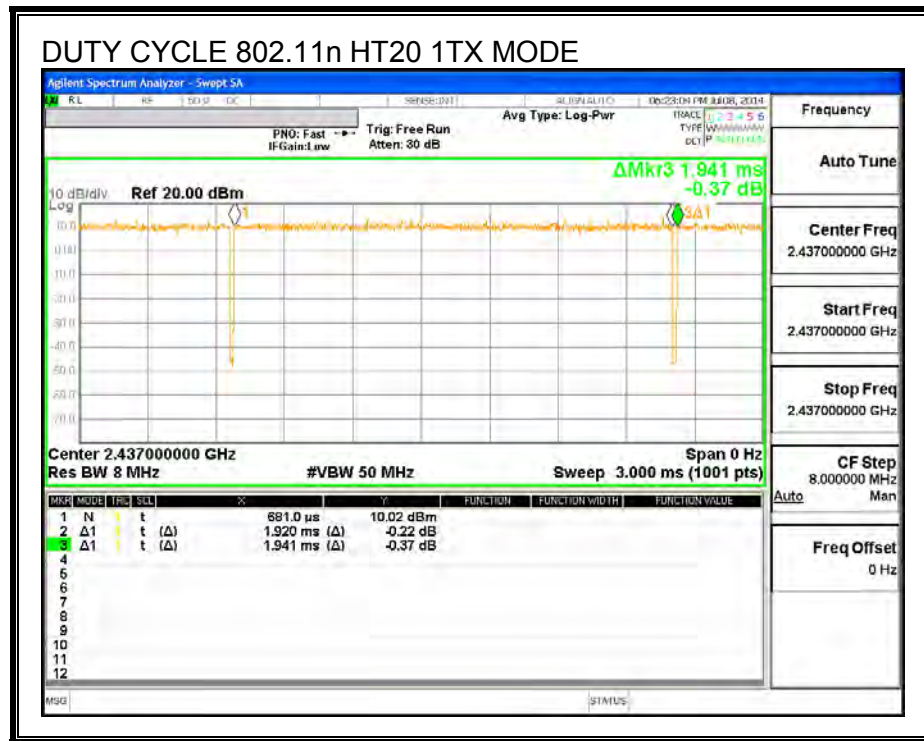
8.1. ON TIME AND DUTY CYCLE RESULTS

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 1TX	12.390	12.410	0.998	99.84%	0.00	0.010
802.11g 1TX	2.063	2.087	0.989	98.85%	0.00	0.010
802.11n HT20 1TX	1.920	1.941	0.989	98.92%	0.00	0.010

8.2. DUTY CYCLE PLOTS

2.4 GHz BAND





9. ANTENNA PORT TEST RESULTS

9.1. 802.11b MODE IN THE 2.4 GHz BAND

9.1.1. 6 dB BANDWIDTH

LIMITS

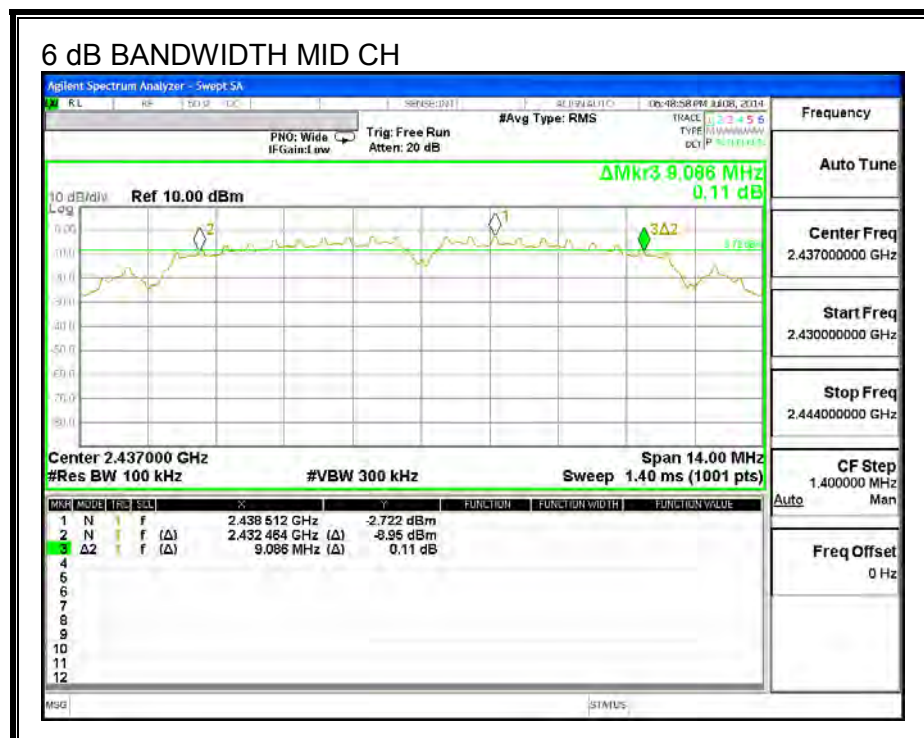
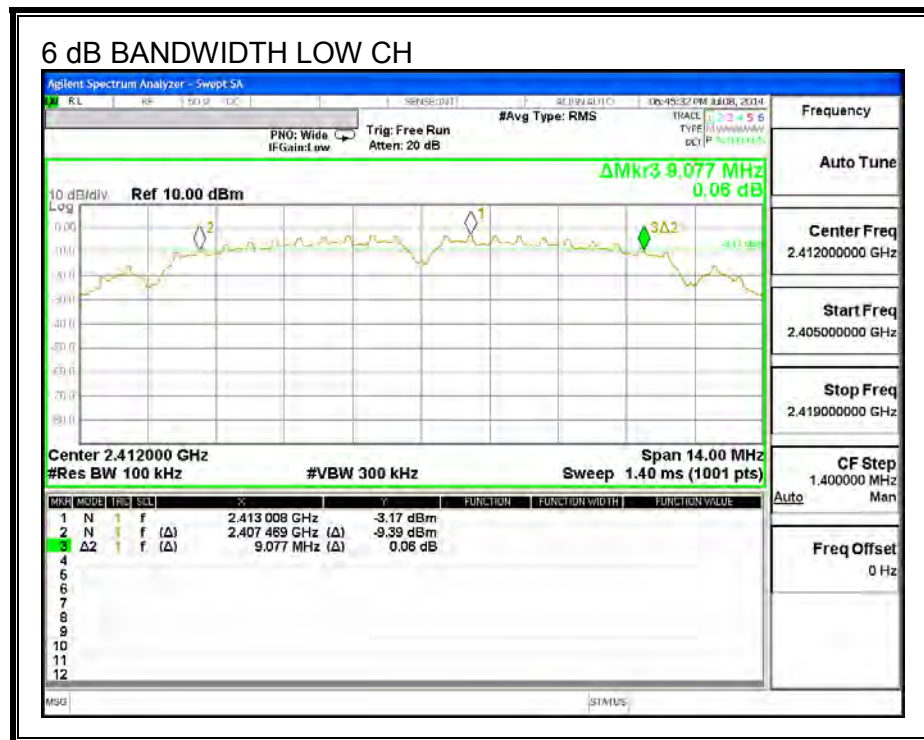
FCC §15.247 (a) (2)

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

RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	9.077	0.5
Mid	2437	9.086	0.5
High	2462	9.086	0.5
High	2467	9.084	0.5
High	2472	9.100	0.5

6 dB BANDWIDTH

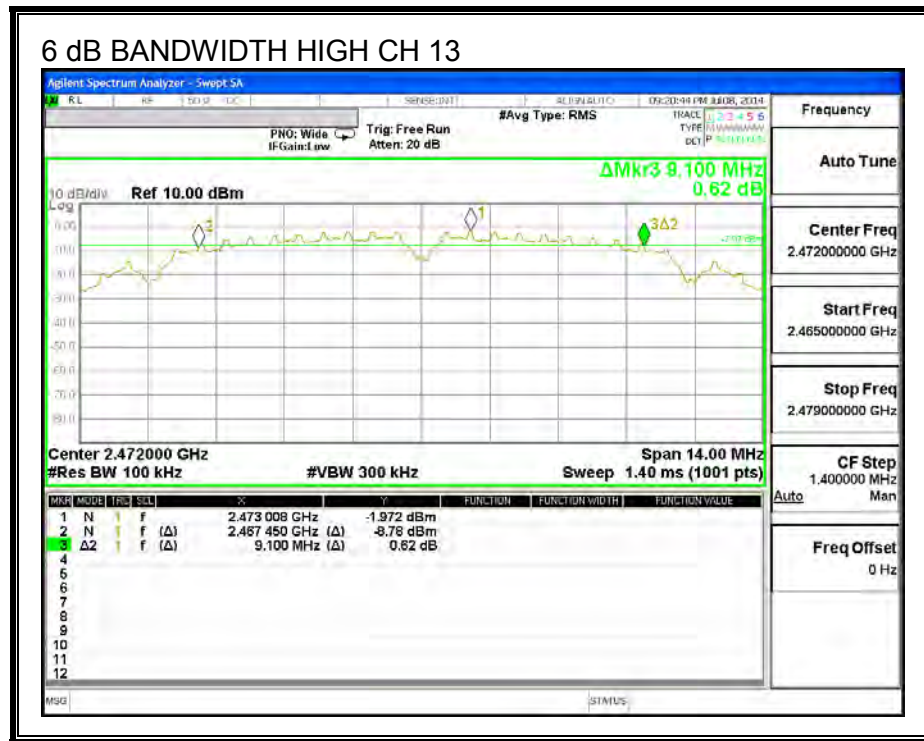


6 dB BANDWIDTH HIGH CH 11



6 dB BANDWIDTH HIGH CH 12





9.1.2. 99% BANDWIDTH

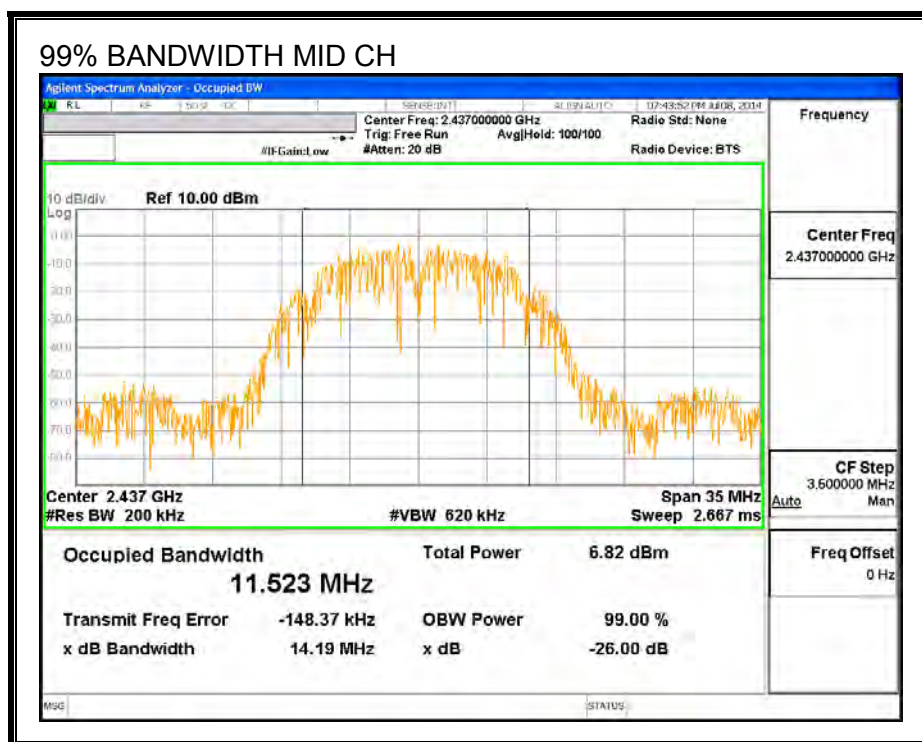
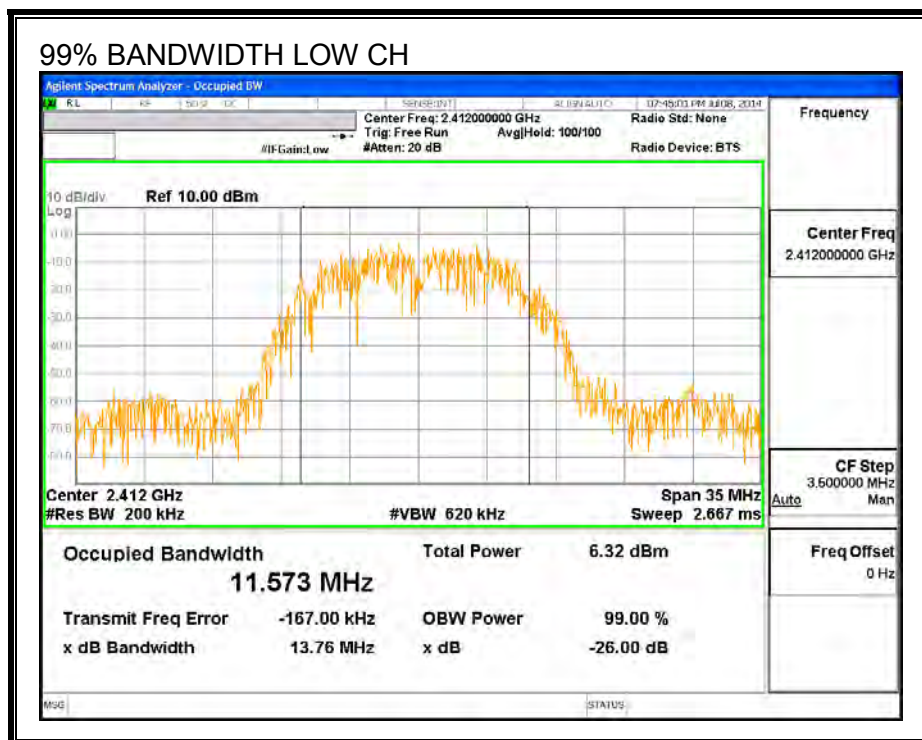
LIMITS

None; for reporting purposes only.

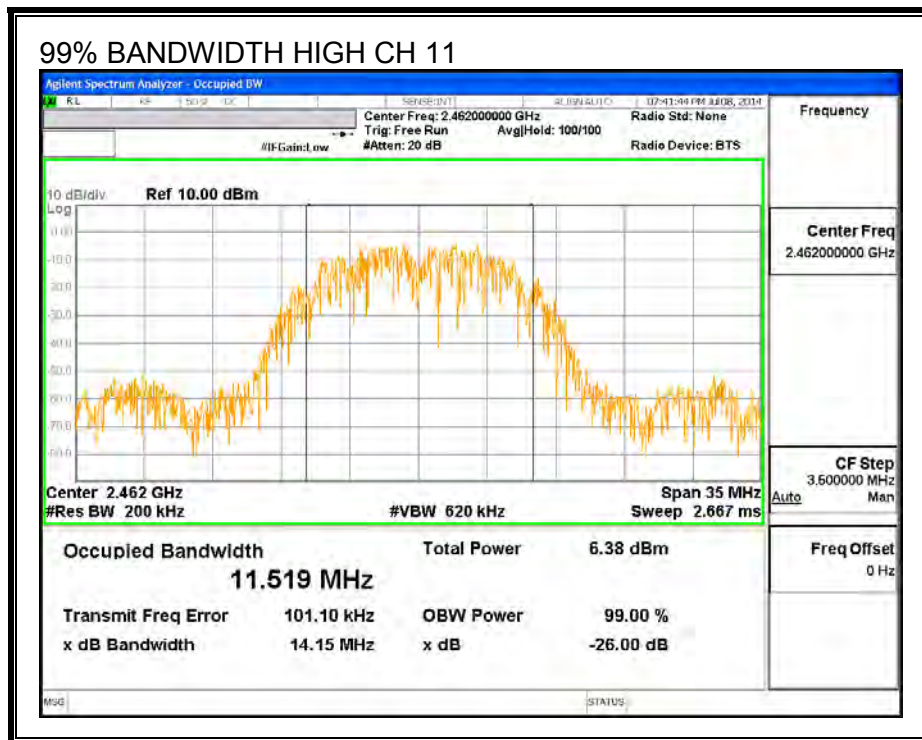
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	11.573
Mid	2437	11.523
High	2462	11.519
High	2467	11.582
High	2472	11.572

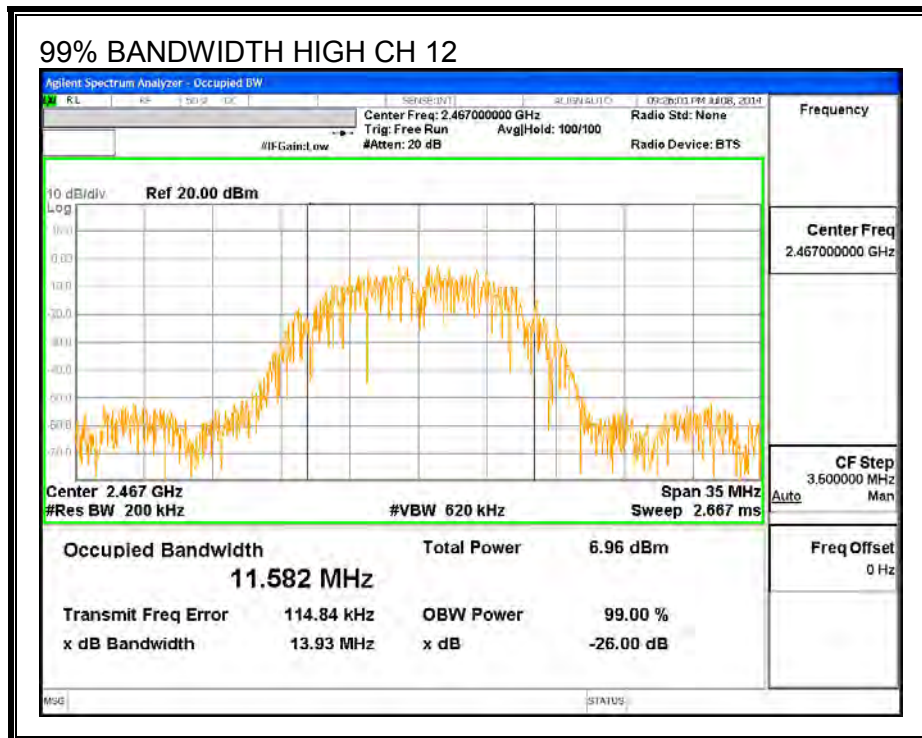
99% BANDWIDTH

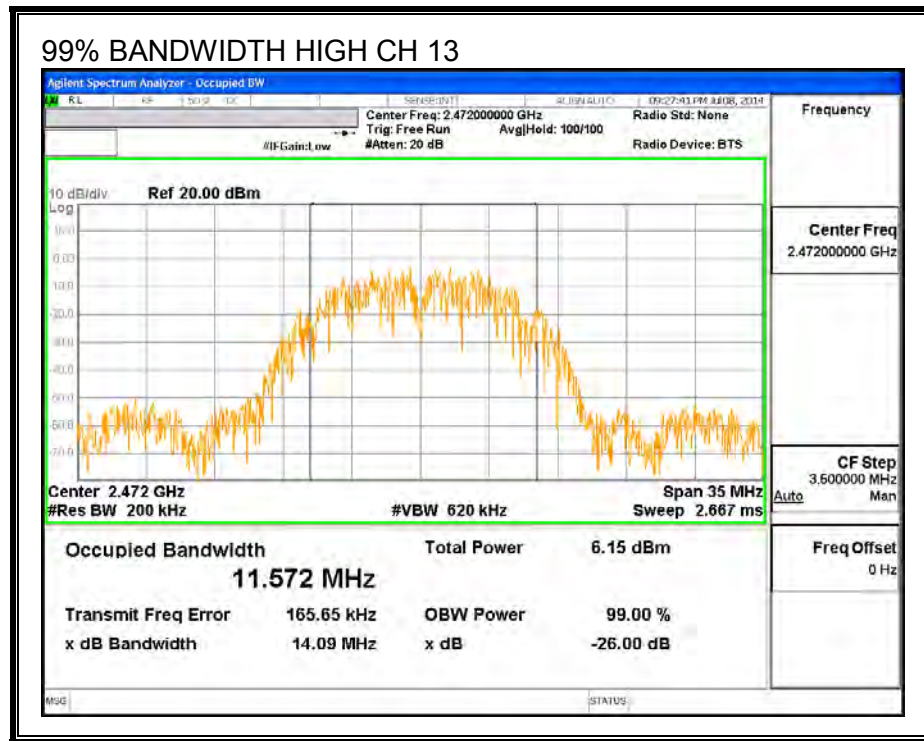


99% BANDWIDTH HIGH CH 11



99% BANDWIDTH HIGH CH 12





9.1.3. 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 11.0 dB (including 10 dB pad and 1.0 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	2412	15.47
Mid	2437	15.43
High	2462	15.40
High	2467	15.47
High	2472	12.90

9.1.4. OUTPUT POWER

LIMITS

FCC §15.247

For systems using digital modulation in the 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)	Max Power (dBm)
Low	2412	2.016	30.00	30.00
Mid	2437	2.016	30.00	30.00
High	2462	2.016	30.00	30.00
High	2467	2.016	30.00	30.00
High	2472	2.016	30.00	30.00

Results

Channel	Frequency (MHz)	Antenna B Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	19.51	19.51	30.00	-10.49
Mid	2437	19.14	19.14	30.00	-10.86
High	2462	19.13	19.13	30.00	-10.87
High	2467	19.13	19.13	30.00	-10.87
High	2472	16.26	16.26	30.00	-13.74

9.1.5. PSD

LIMITS

FCC §15.247 (e)

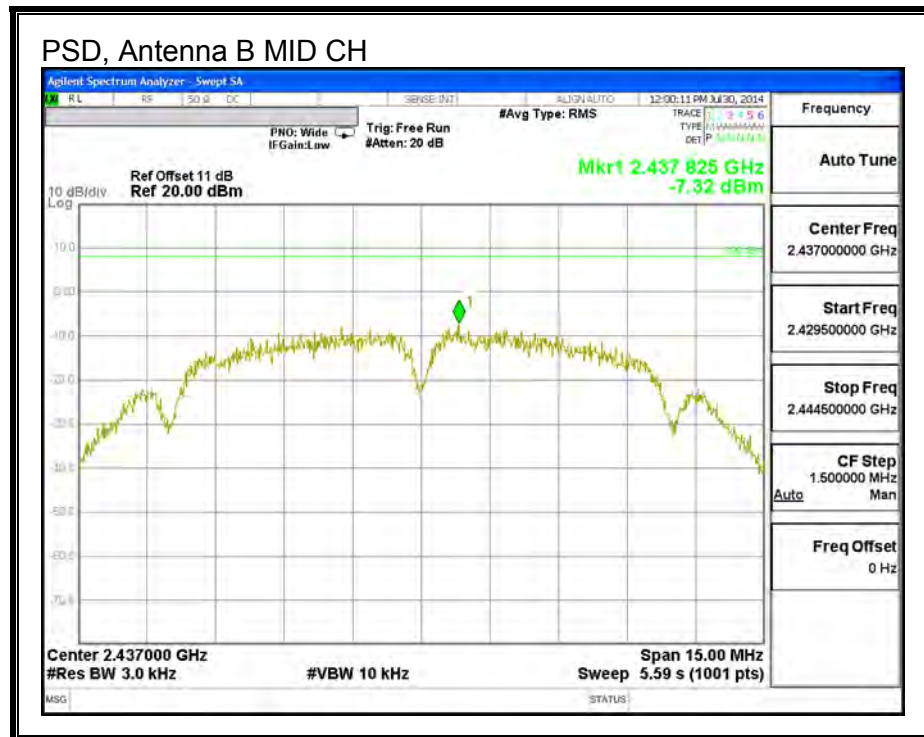
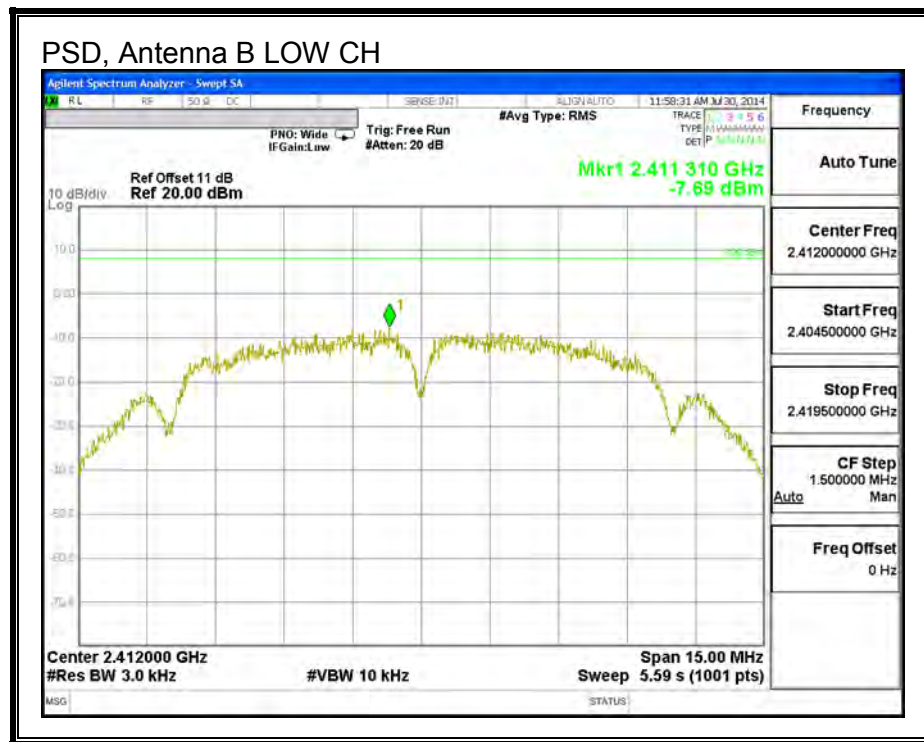
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

RESULTS

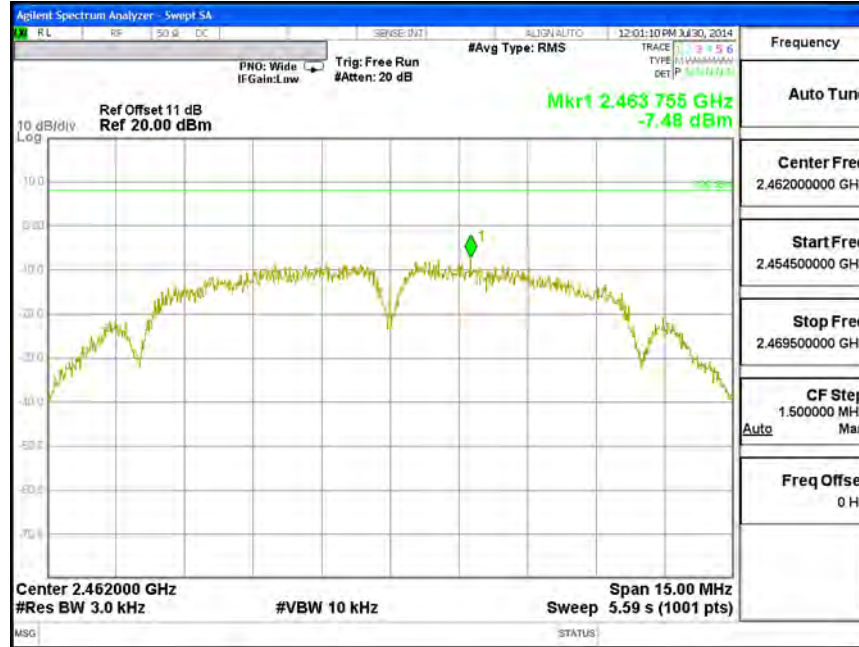
PSD Results

Channel	Frequency (MHz)	Antenna B Meas (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-7.690	8.0	-15.7
Mid	2437	-7.320	8.0	-15.3
High	2462	-7.480	8.0	-15.5
High	2467	-7.800	8.0	-15.8
High	2472	-9.940	8.0	-17.9

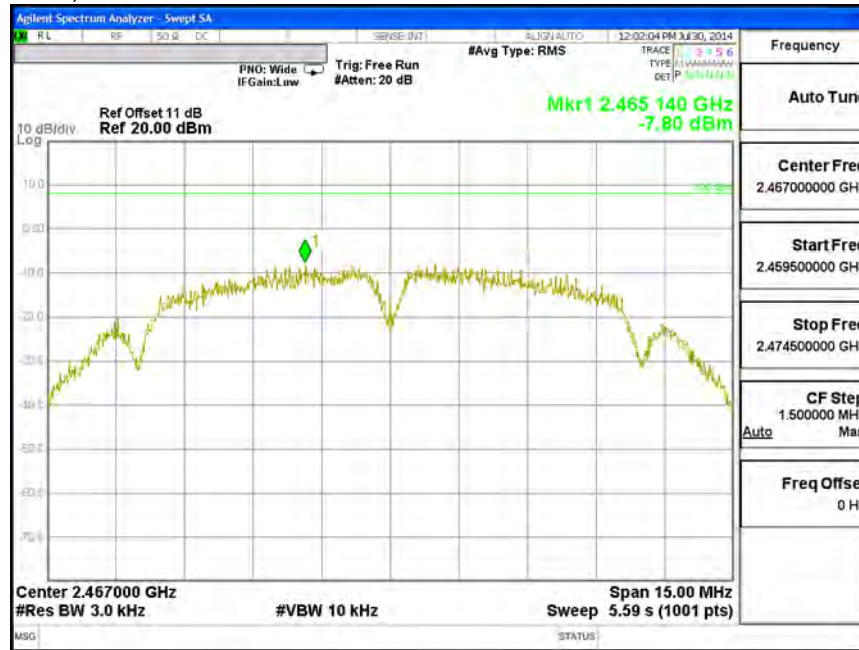
PSD, Antenna B

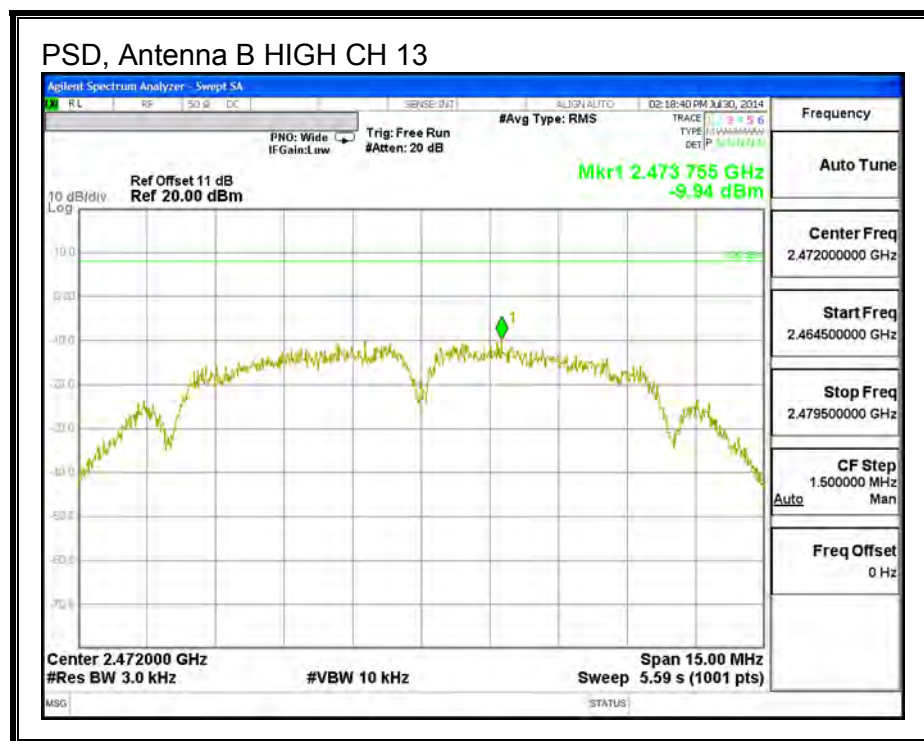


PSD, Antenna B HIGH CH 11



PSD, Antenna B HIGH CH 12





9.1.6. OUT-OF-BAND EMISSIONS

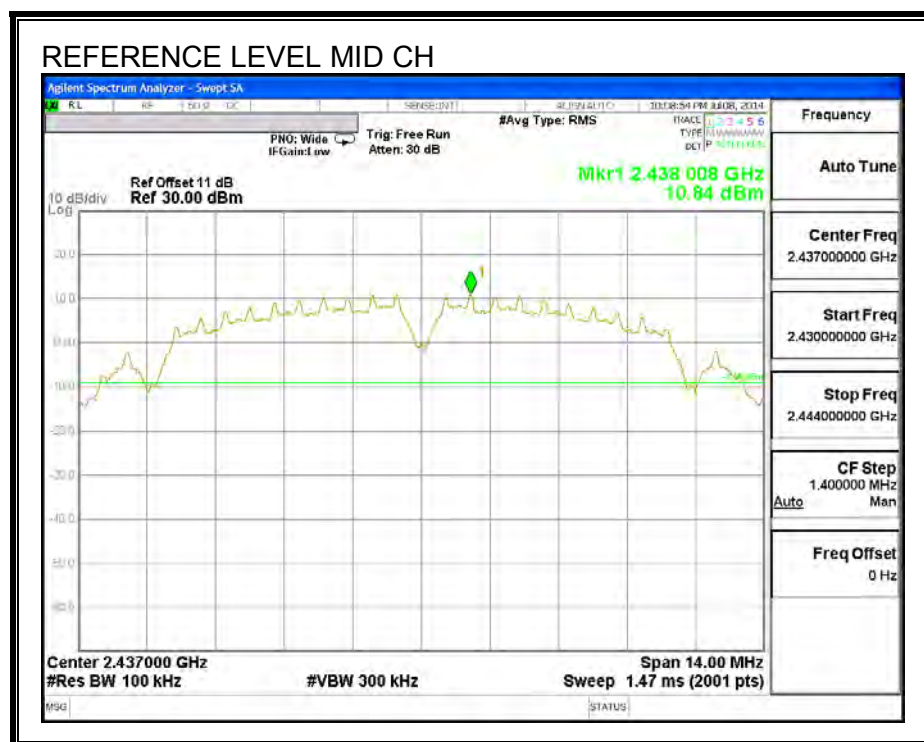
LIMITS

FCC §15.247 (d)

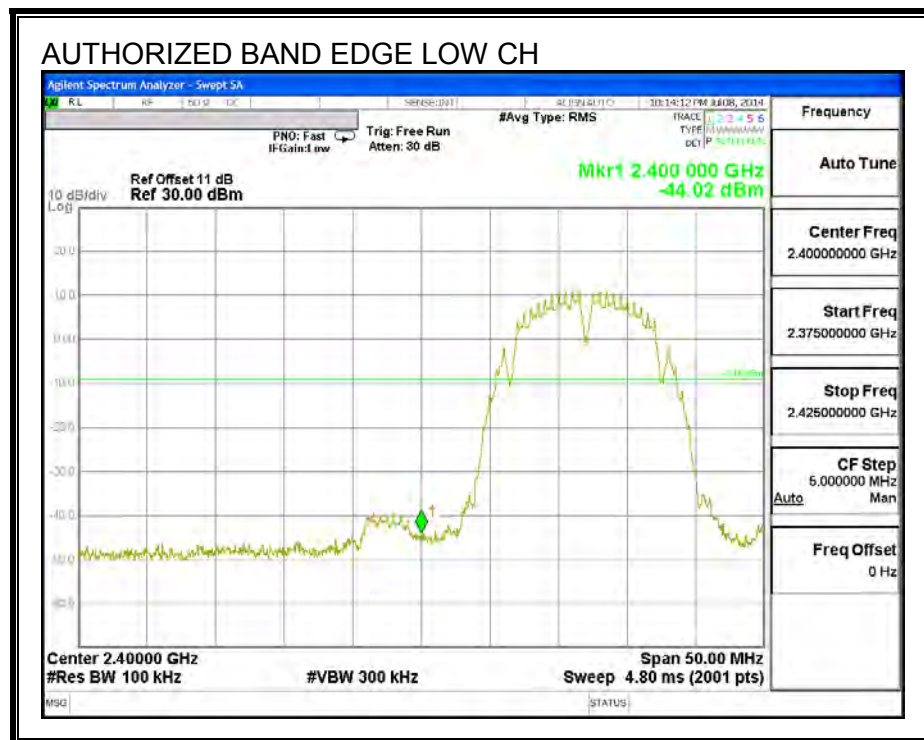
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the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

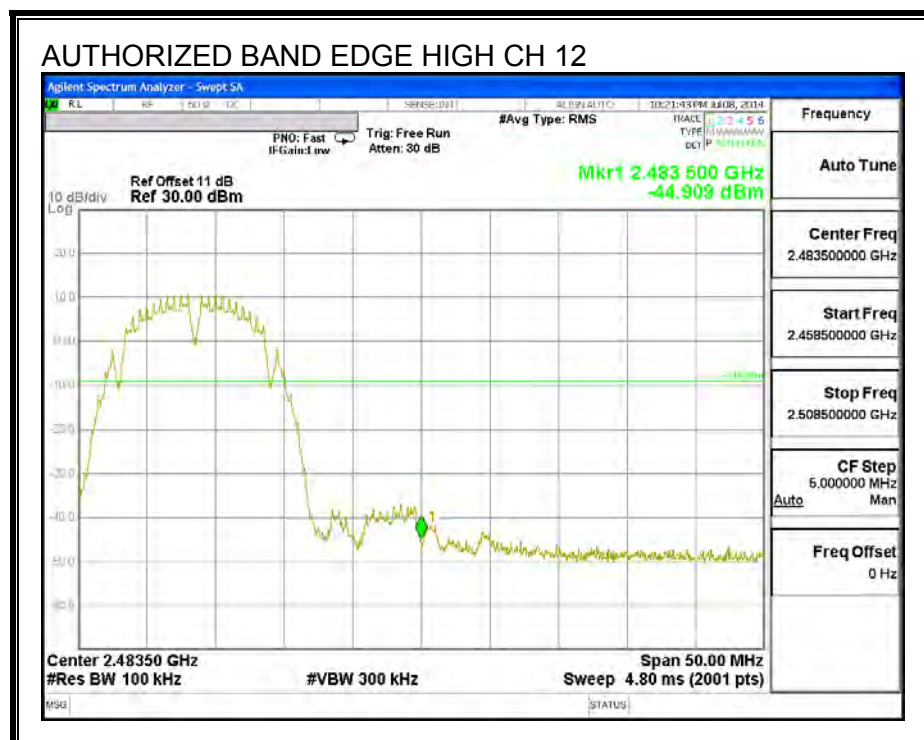
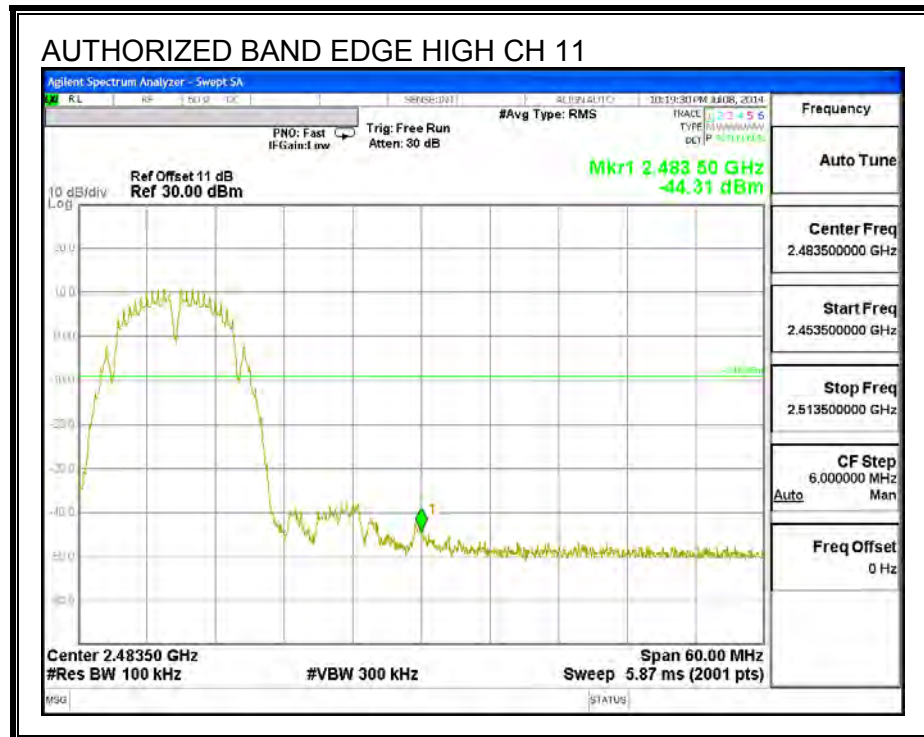
IN-BAND REFERENCE LEVEL

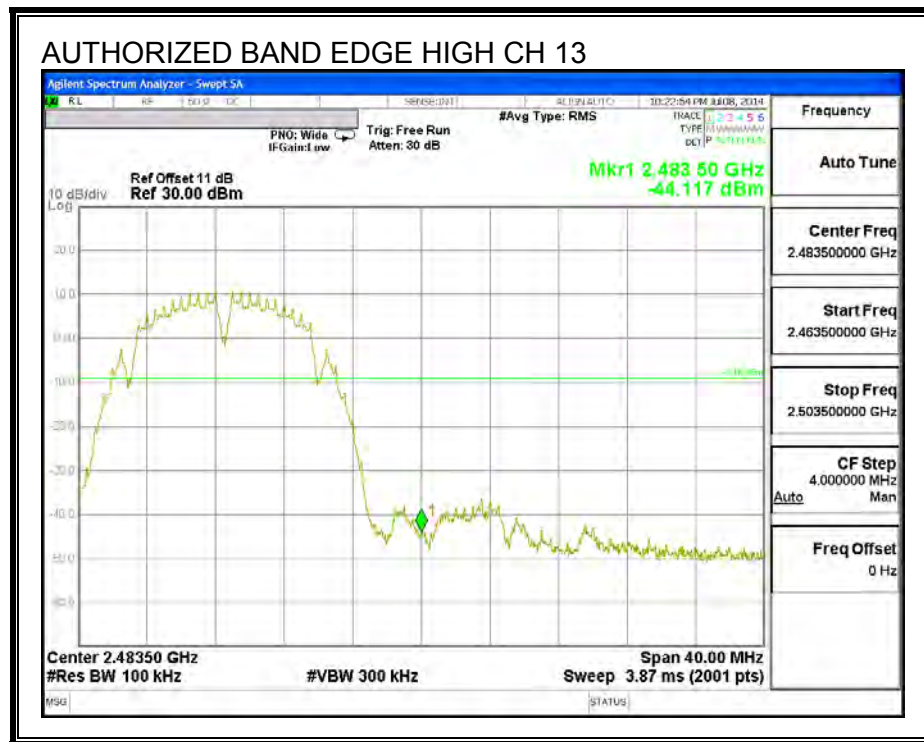


LOW CHANNEL BANDEDGE

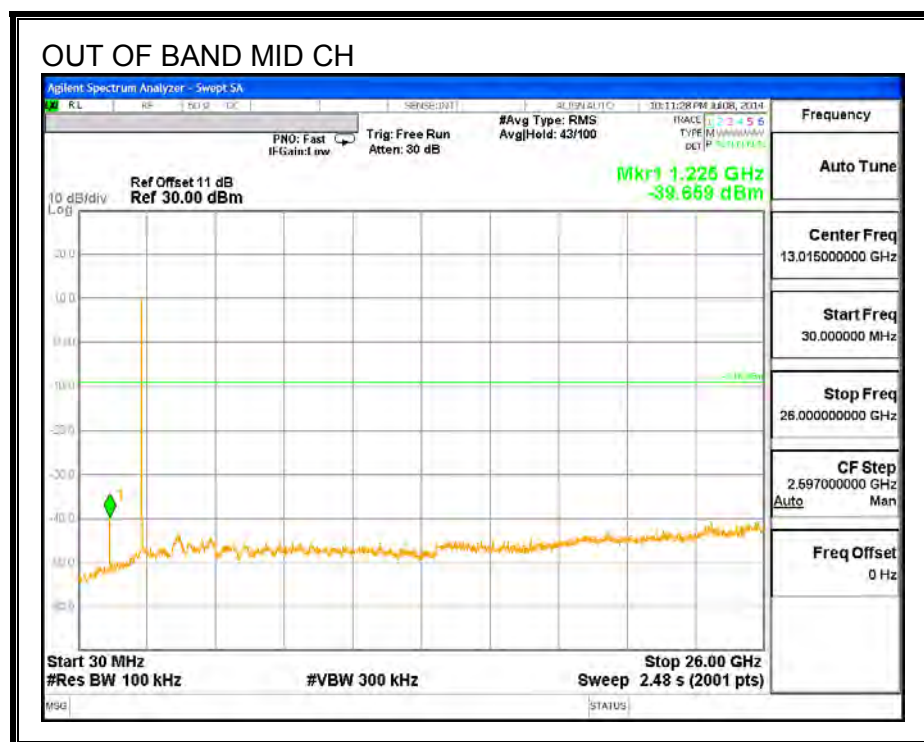
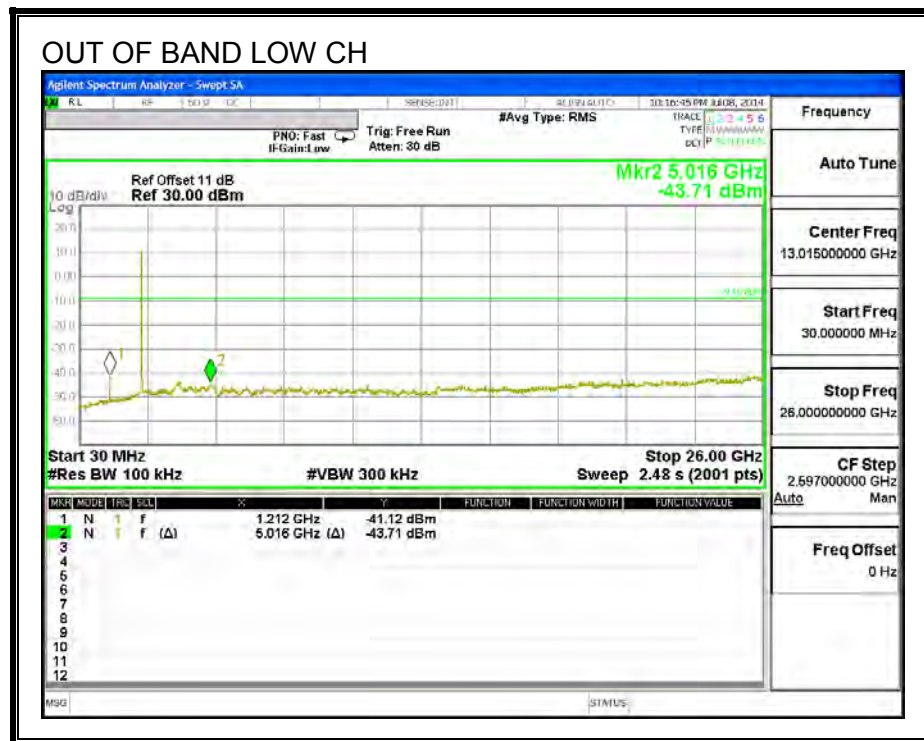


HIGH CHANNEL BANDEDGE

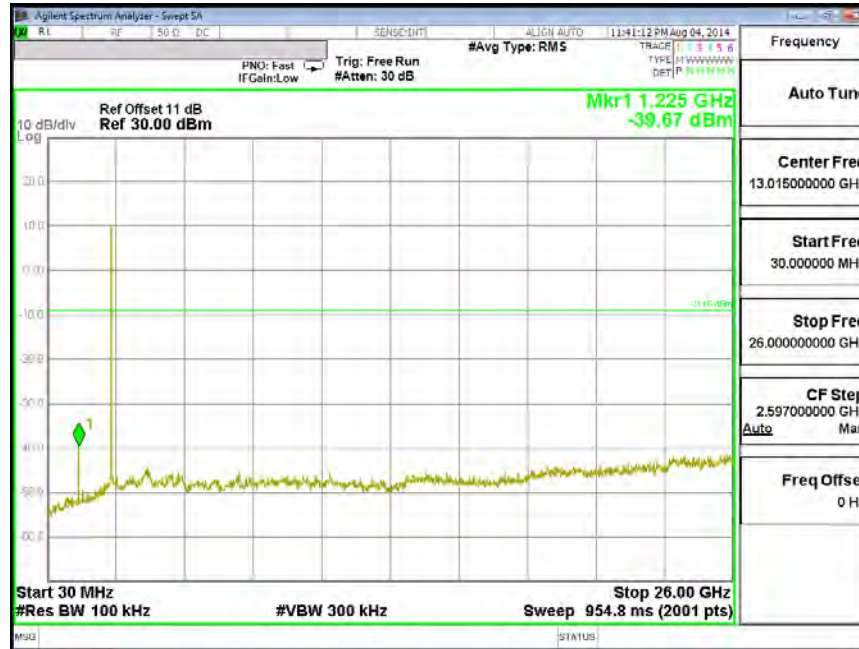




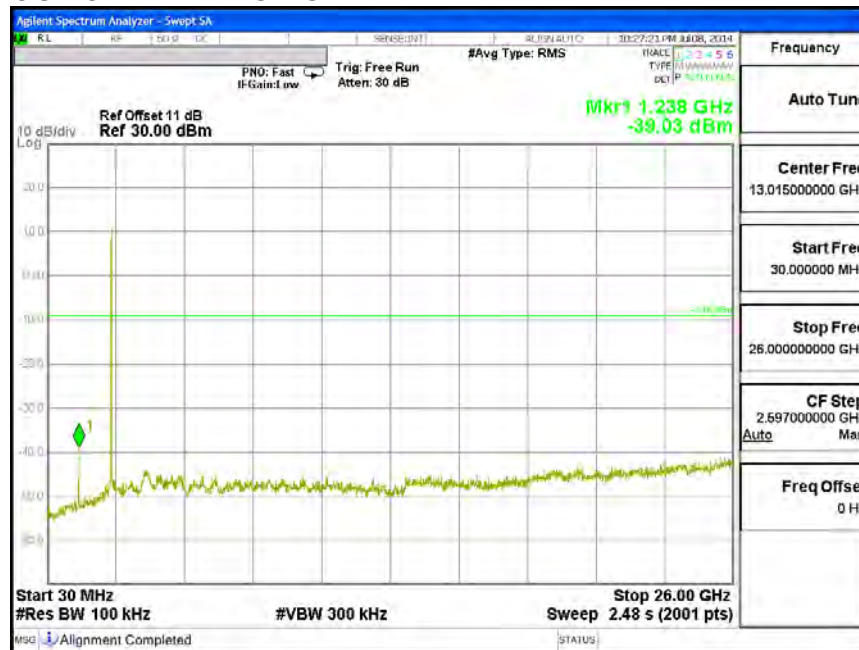
OUT-OF-BAND EMISSIONS

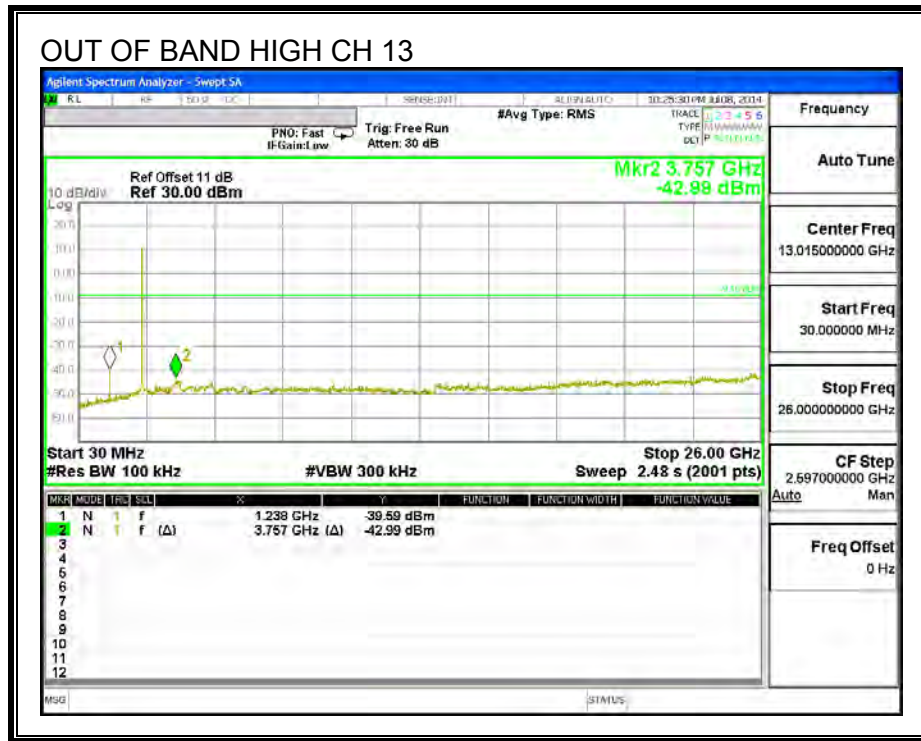


OUT OF BAND HIGH CH 11



OUT OF BAND HIGH CH 12





9.2. 802.11g 1Tx MODE IN THE 2.4 GHz BAND

9.2.1. 6 dB BANDWIDTH

LIMITS

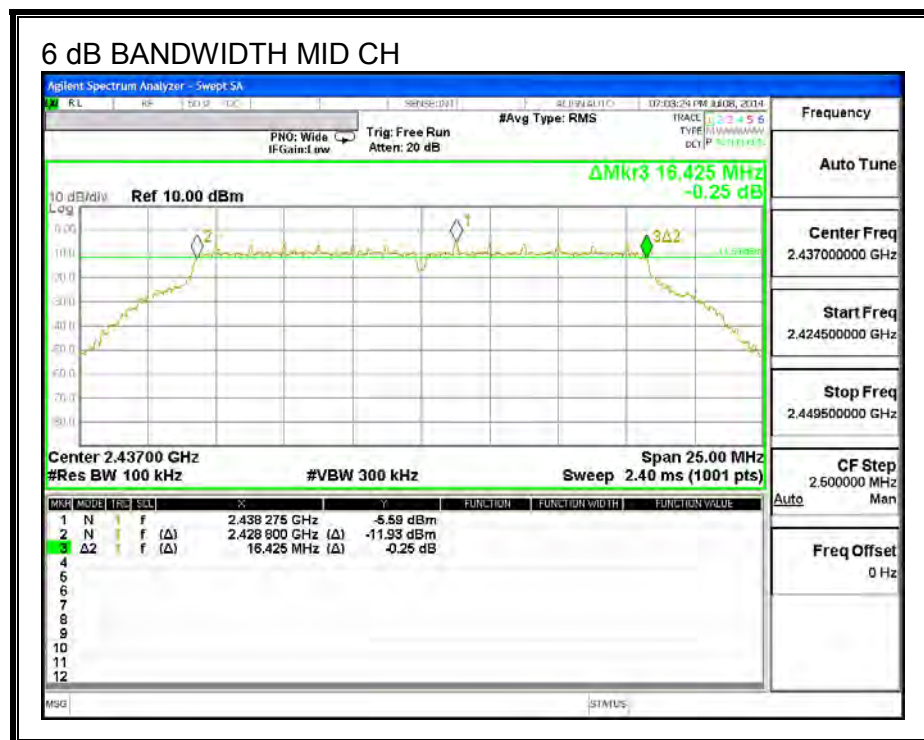
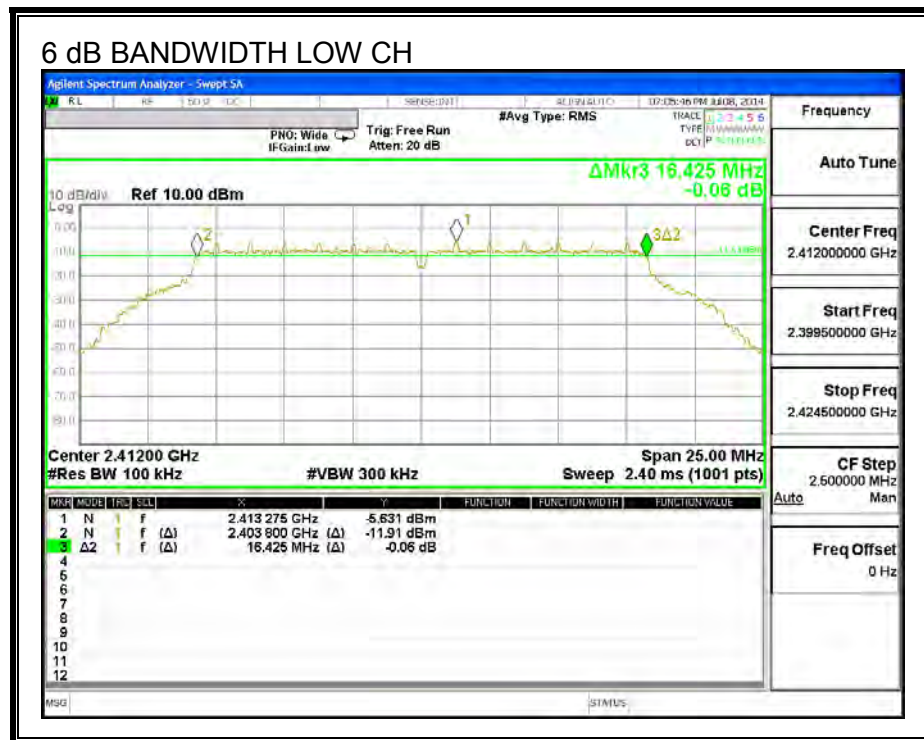
FCC §15.247 (a) (2)

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

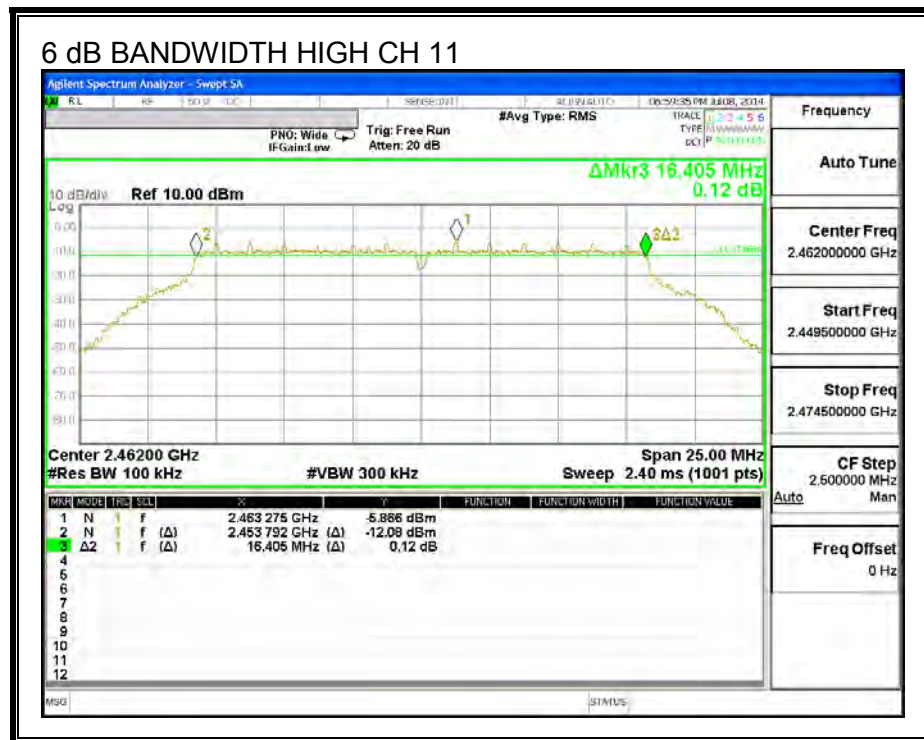
RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	16.425	0.5
Mid	2437	16.425	0.5
High	2462	16.405	0.5
High	2467	16.408	0.5
High	2472	16.429	0.5

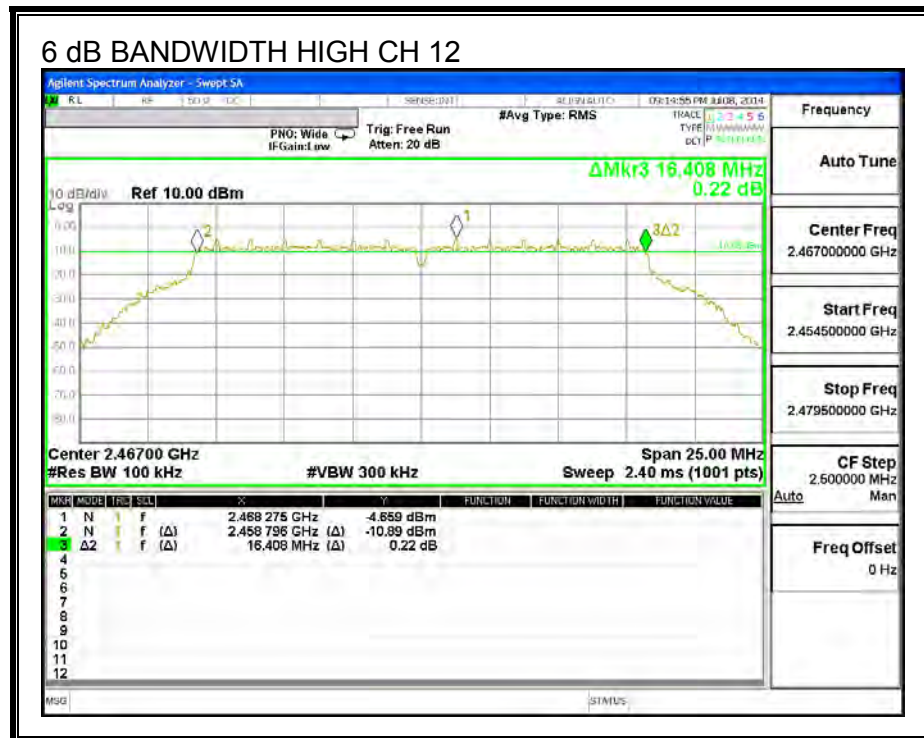
6 dB BANDWIDTH

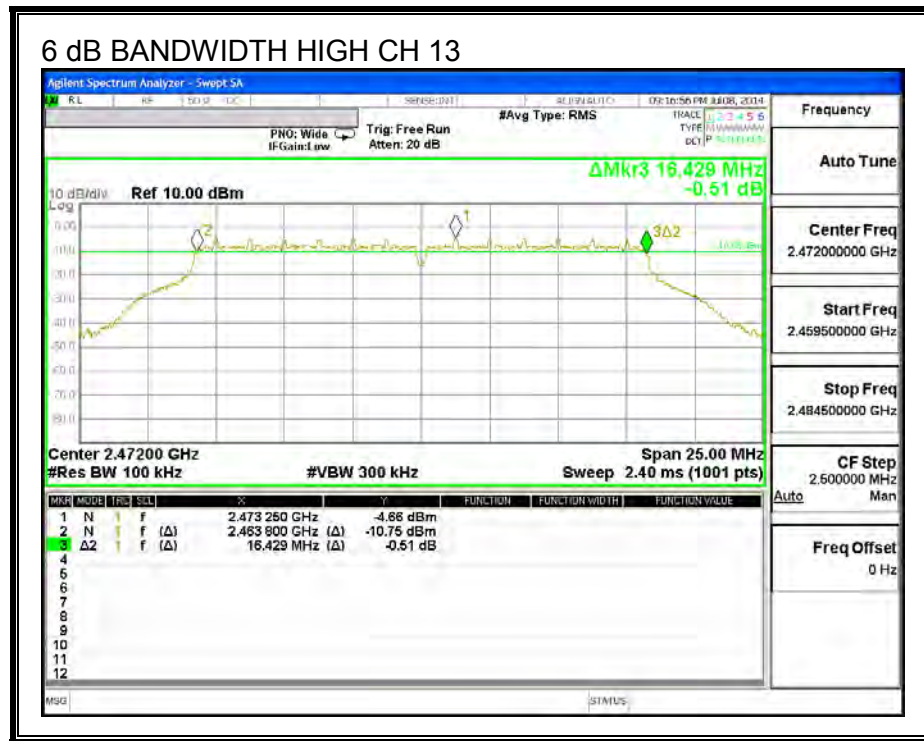


6 dB BANDWIDTH HIGH CH 11



6 dB BANDWIDTH HIGH CH 12





9.2.2. 99% BANDWIDTH

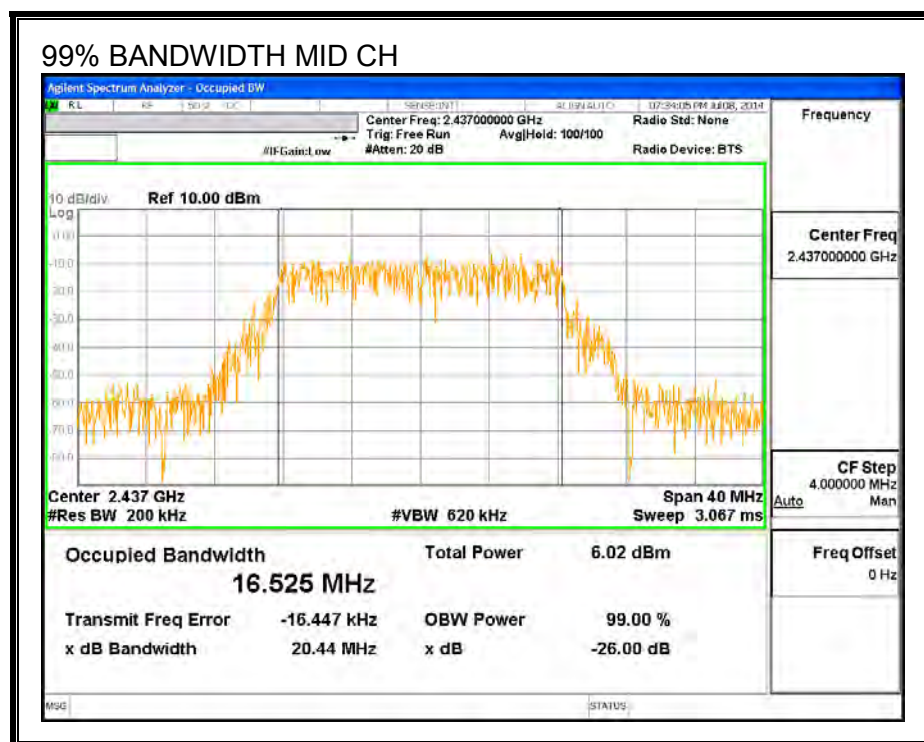
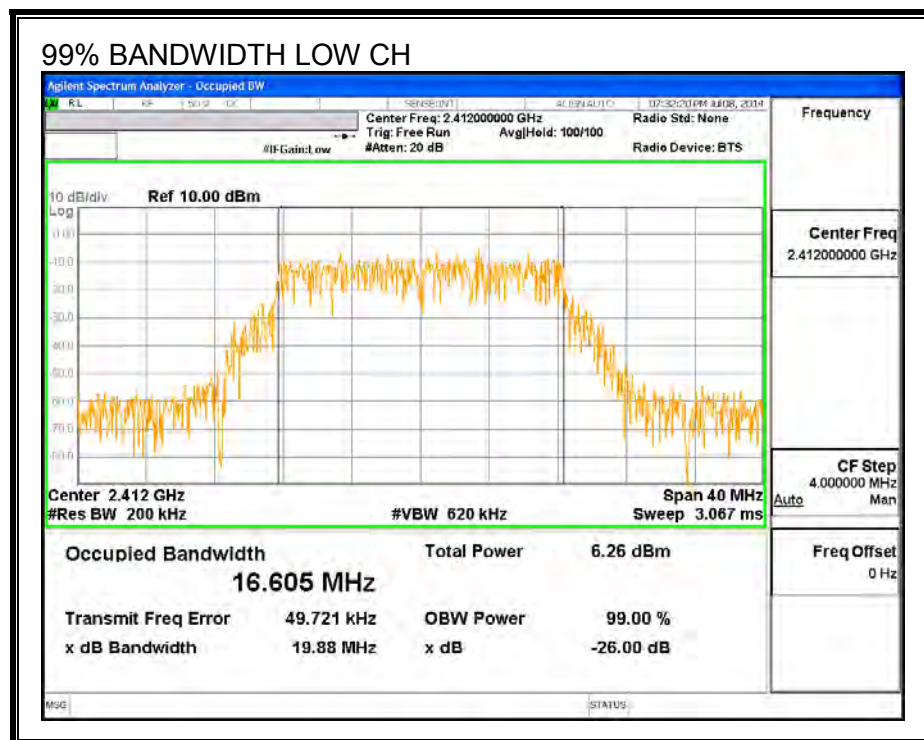
LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	16.605
Mid	2437	16.525
High	2462	16.500
High	2467	16.516
High	2472	16.523

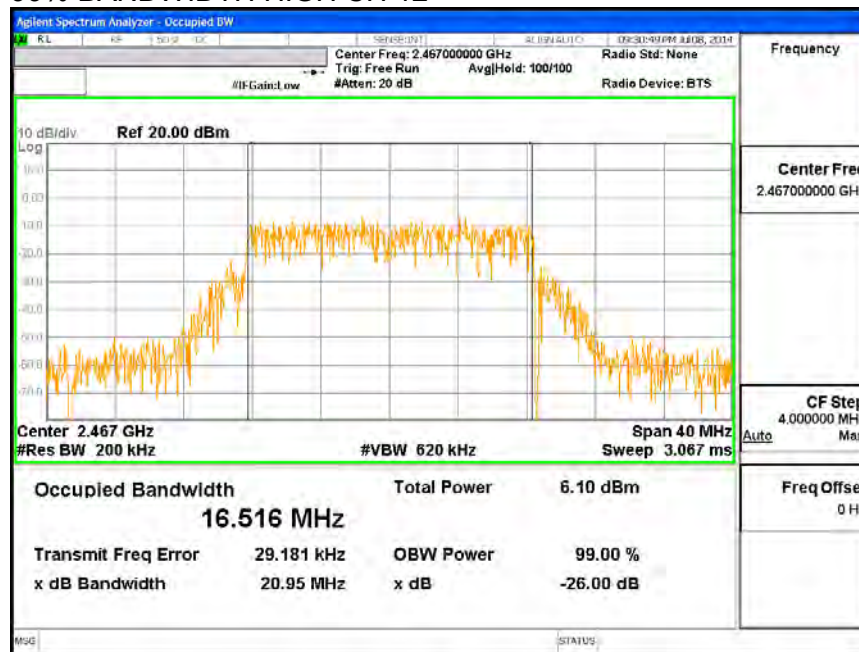
99% BANDWIDTH

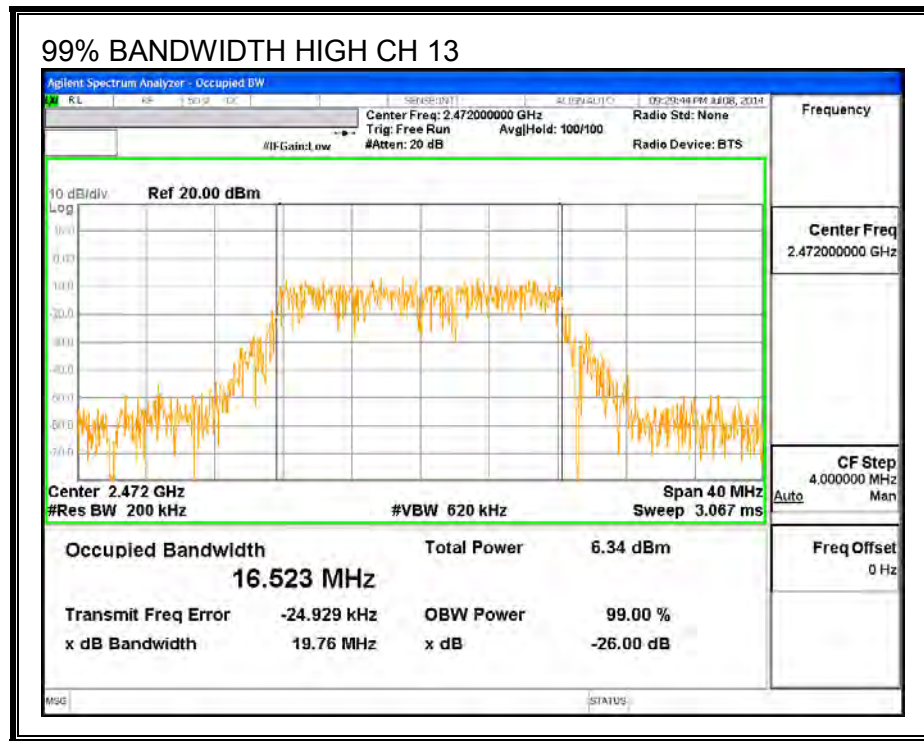


99% BANDWIDTH HIGH CH 11



99% BANDWIDTH HIGH CH 12





9.2.3. 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 11.0 dB (including 10 dB pad and 1.0 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	2412	14.74
Mid	2437	15.48
High	2462	13.73
High	2467	9.87
High	2472	1.46

9.2.4. OUTPUT POWER

LIMITS

FCC §15.247

For systems using digital modulation in the 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)	Max Power (dBm)
Low	2412	2.016	30.00	30.00
Mid	2437	2.016	30.00	30.00
High	2462	2.016	30.00	30.00
High	2467	2.016	30.00	30.00
High	2472	2.016	30.00	30.00

Results

Channel	Frequency (MHz)	Antenna B Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	22.86	22.86	30.00	-7.14
Mid	2437	23.35	23.35	30.00	-6.65
High	2462	22.18	22.18	30.00	-7.82
High	2467	18.02	18.02	30.00	-11.98
High	2472	14.21	14.21	30.00	-15.79

9.2.5. PSD

LIMITS

FCC §15.247 (e)

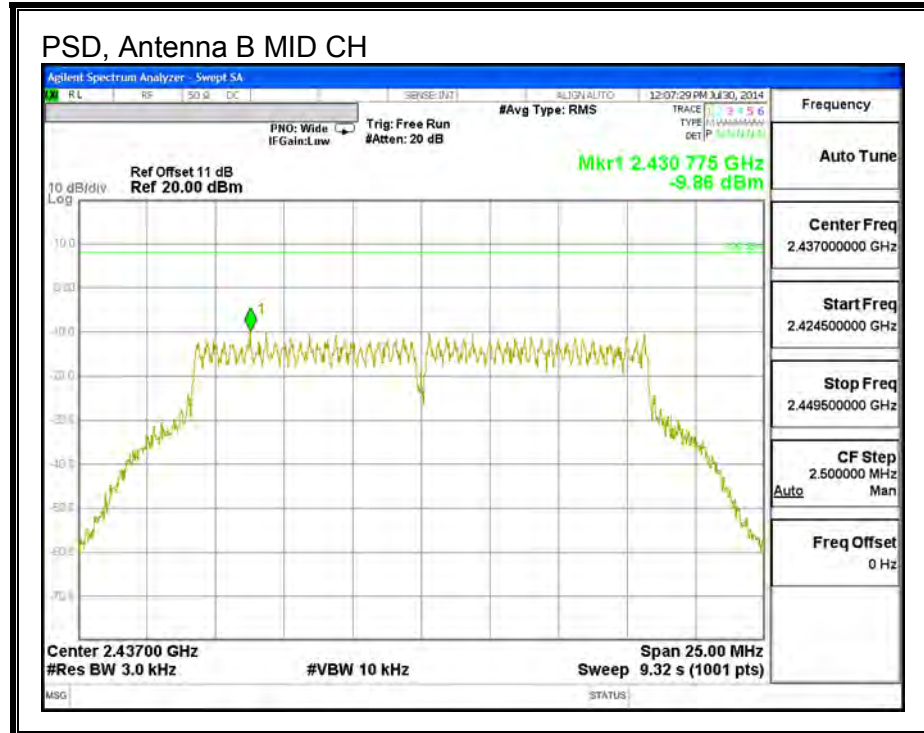
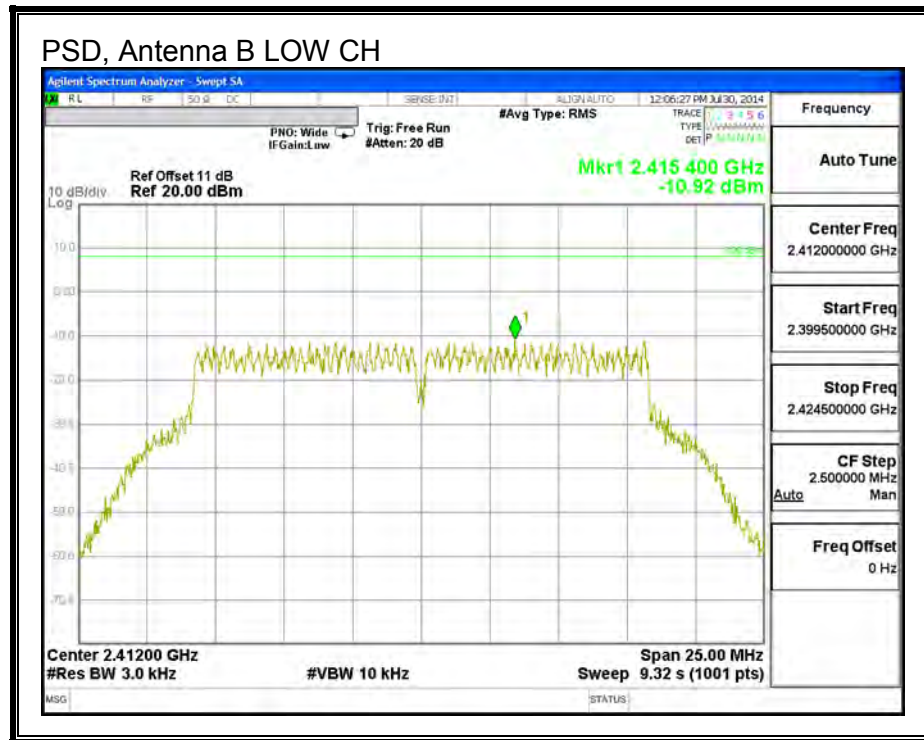
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

RESULTS

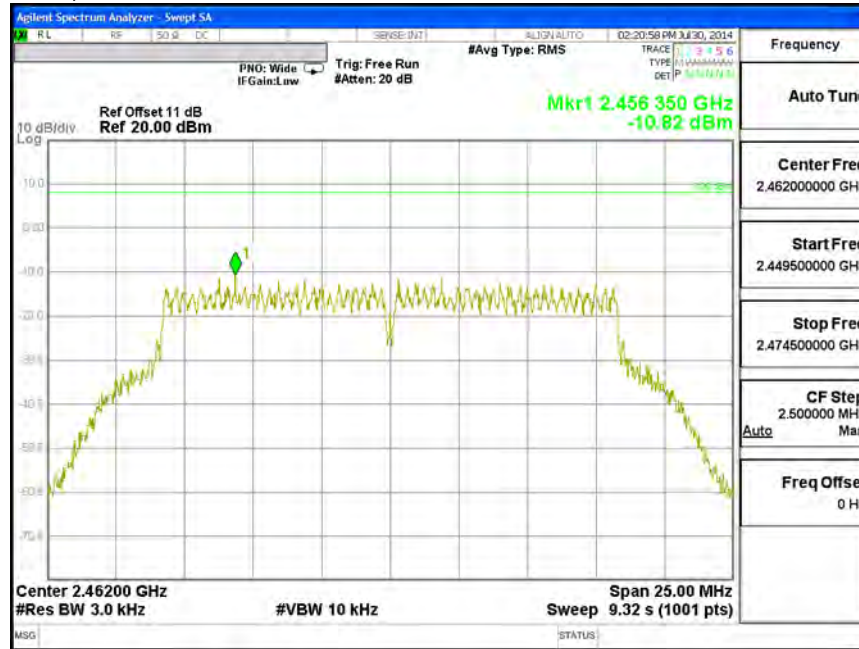
PSD Results

Channel	Frequency (MHz)	Antenna B Meas (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-10.92	8.0	-18.9
Mid	2437	-9.86	8.0	-17.9
High	2462	-10.82	8.0	-18.8
High	2467	-15.48	8.0	-23.5
High	2472	-23.52	8.0	-31.5

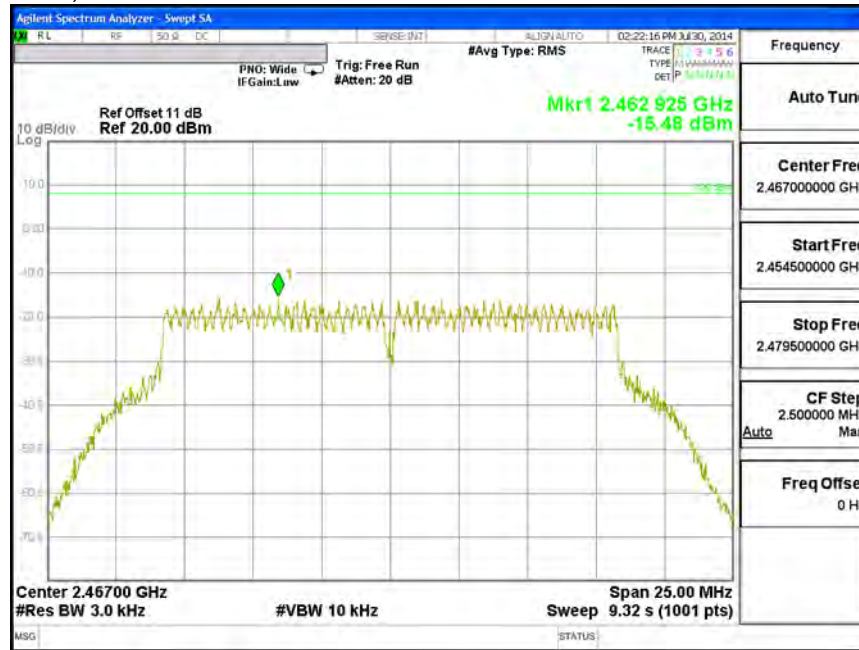
PSD, Antenna B

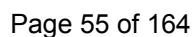


PSD, Antenna B HIGH CH 11



PSD, Antenna B HIGH CH 12





9.2.6. OUT-OF-BAND EMISSIONS

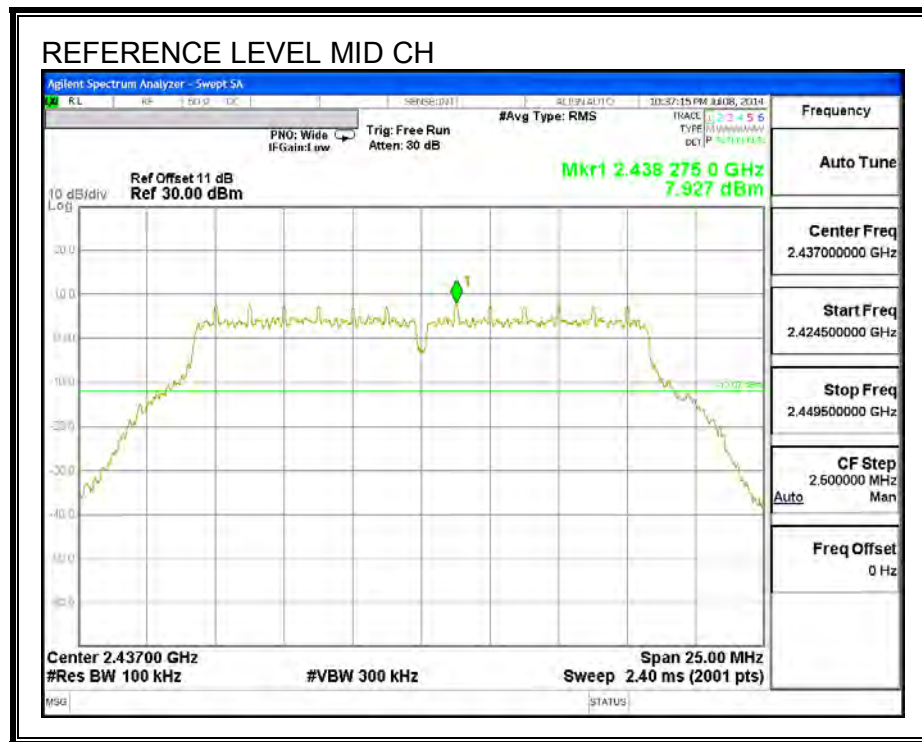
LIMITS

FCC §15.247 (d)

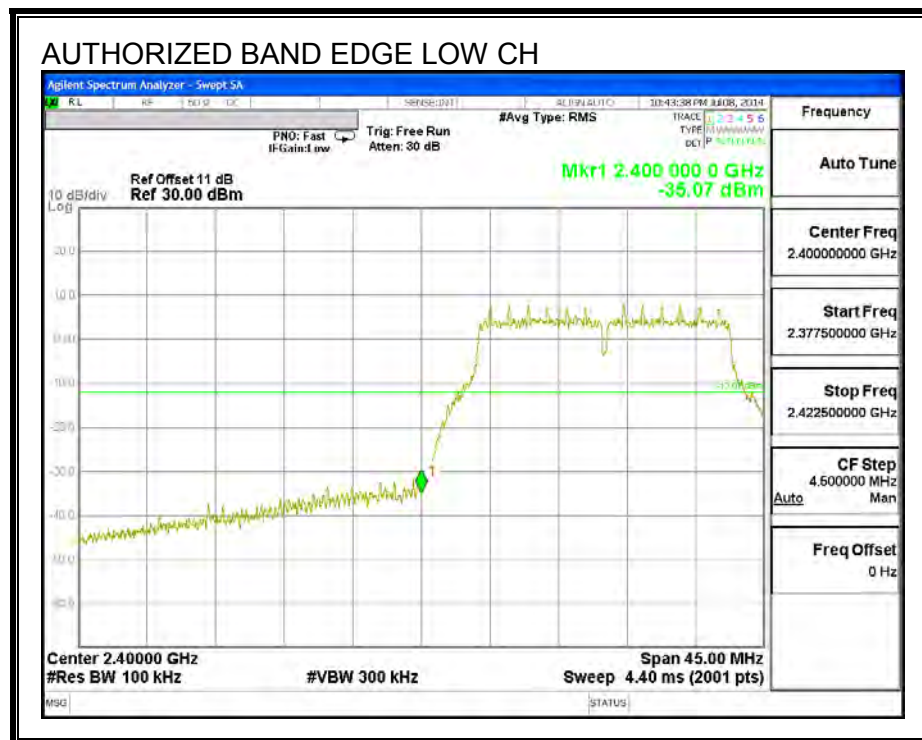
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the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

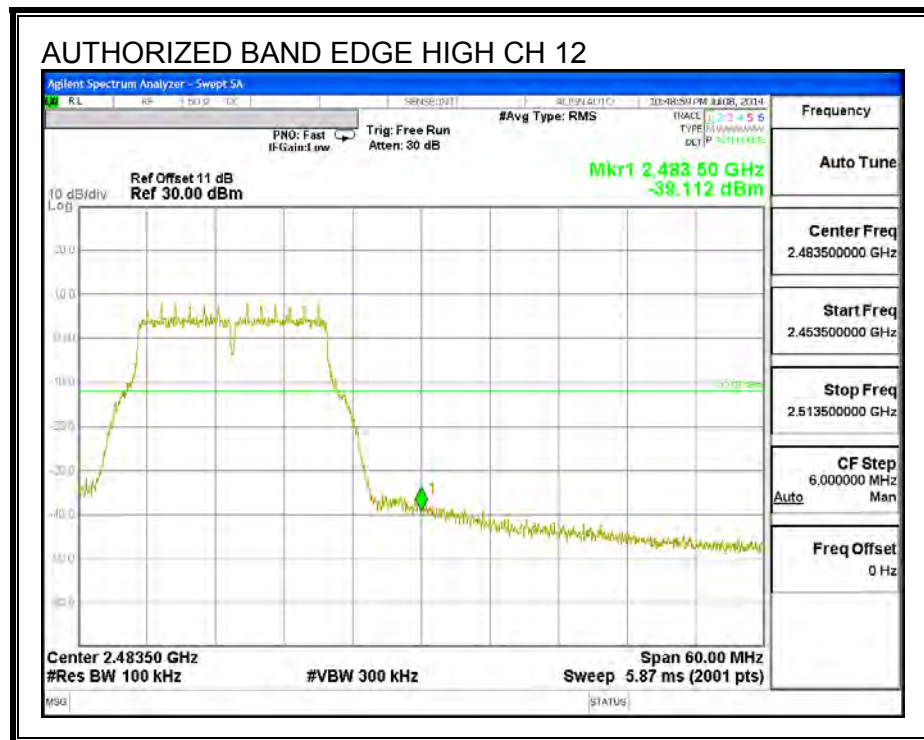
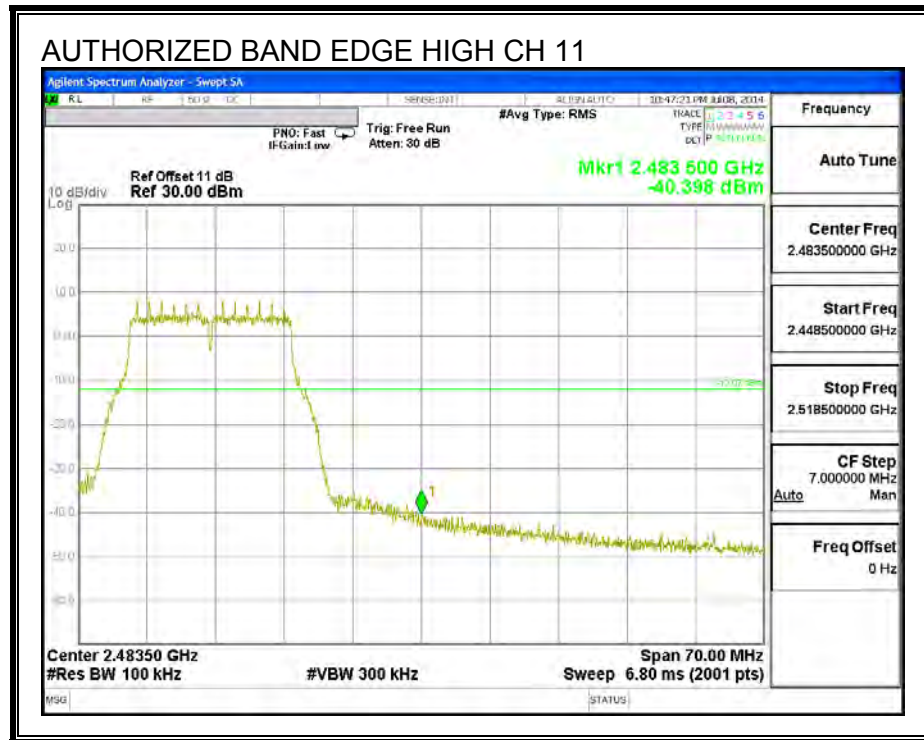
IN-BAND REFERENCE LEVEL

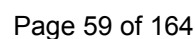


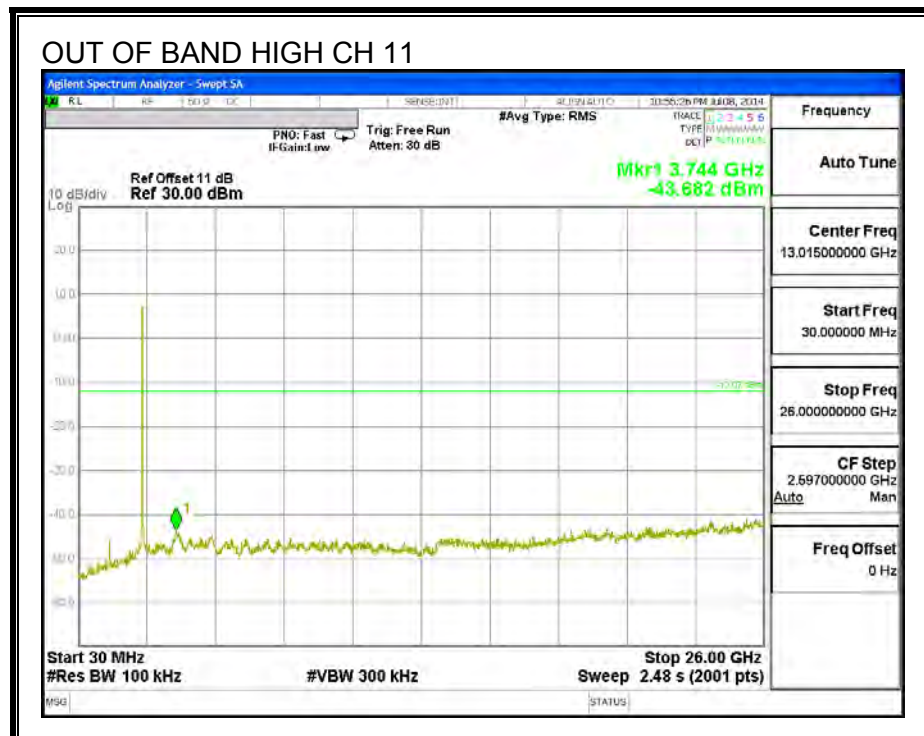
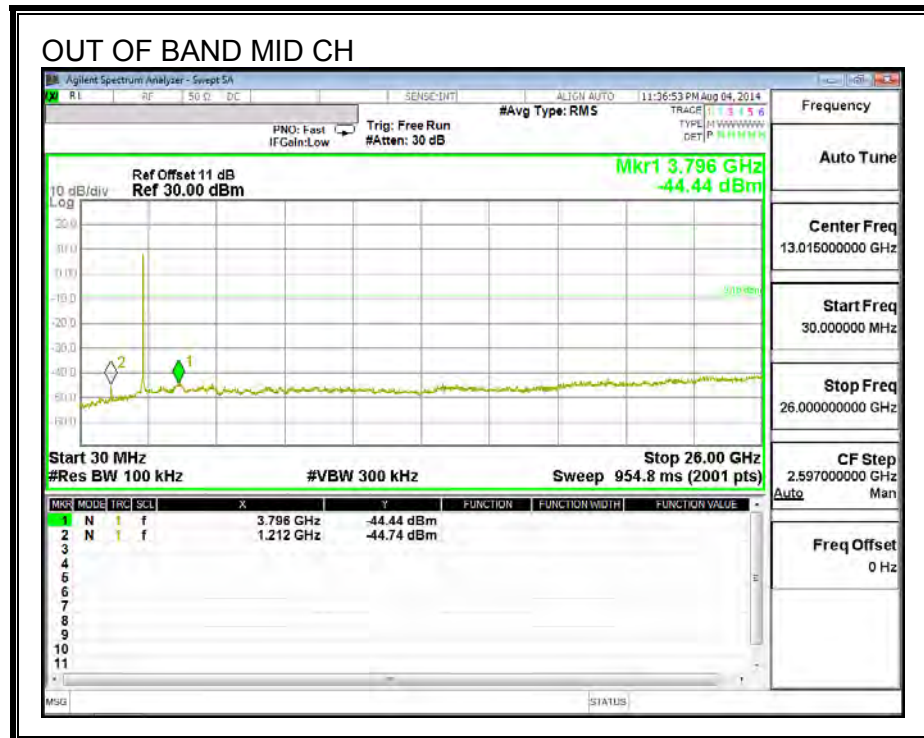
LOW CHANNEL BANDEDGE

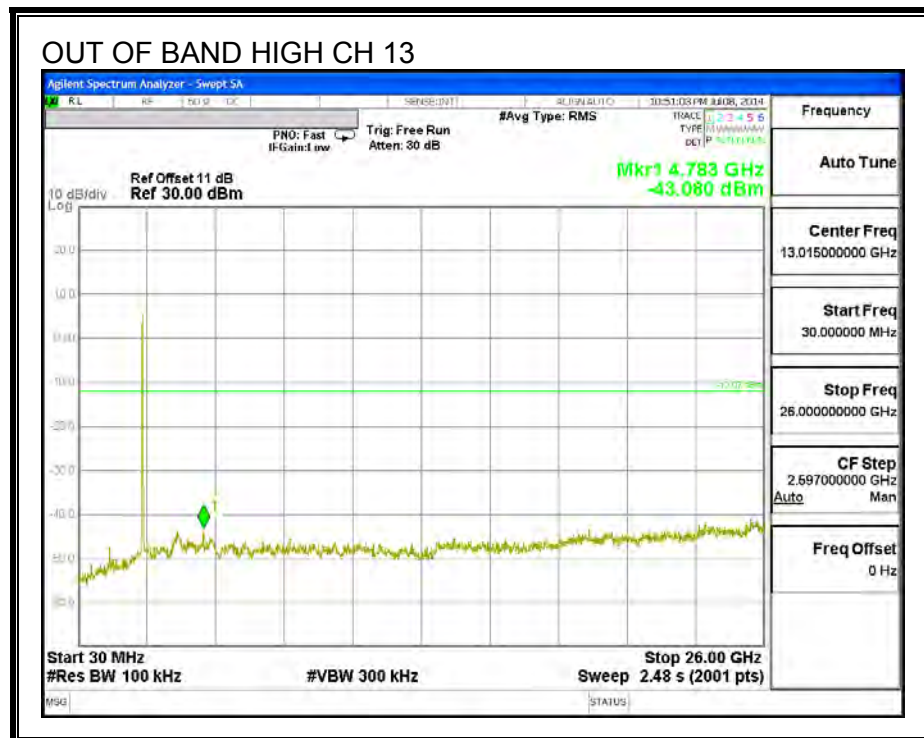
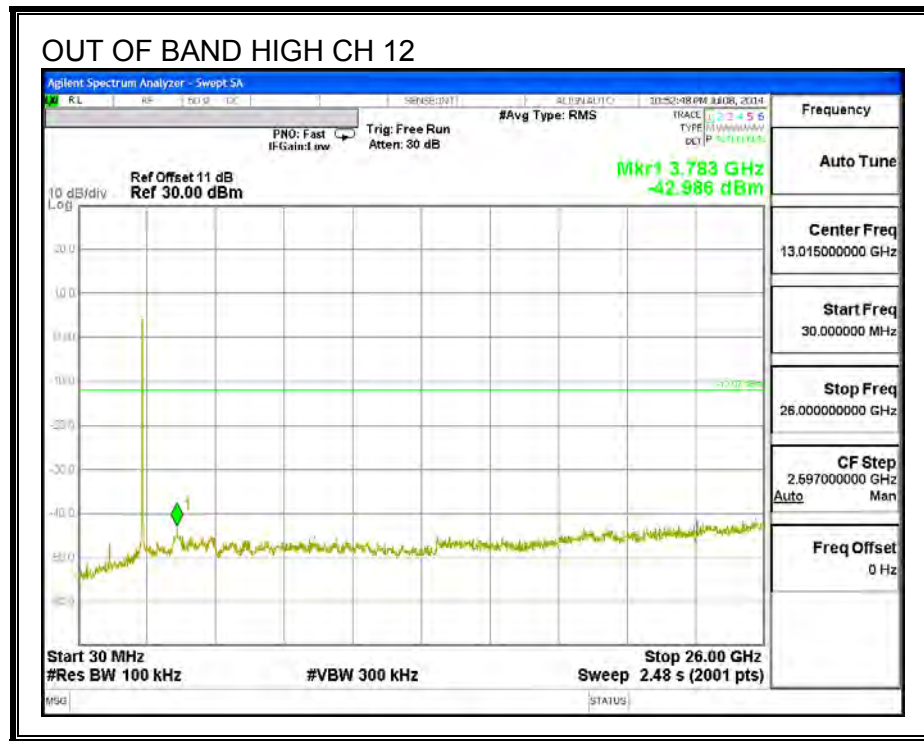


HIGH CHANNEL BANDEDGE









9.3. 802.11n HT20 2Tx MODE IN THE 2.4 GHz BAND

9.3.1. 6 dB BANDWIDTH

LIMITS

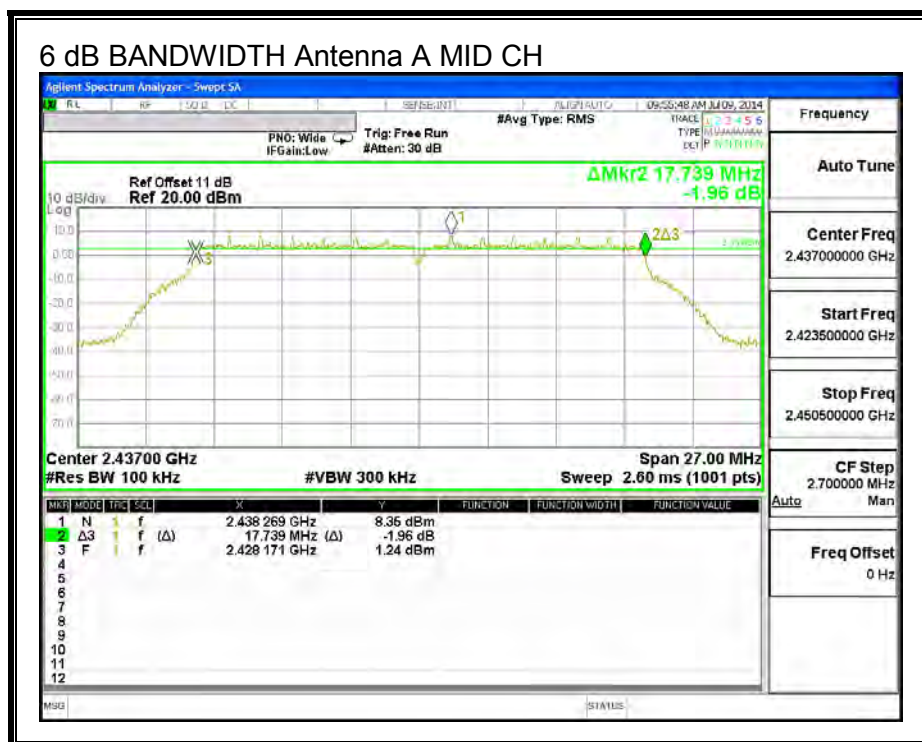
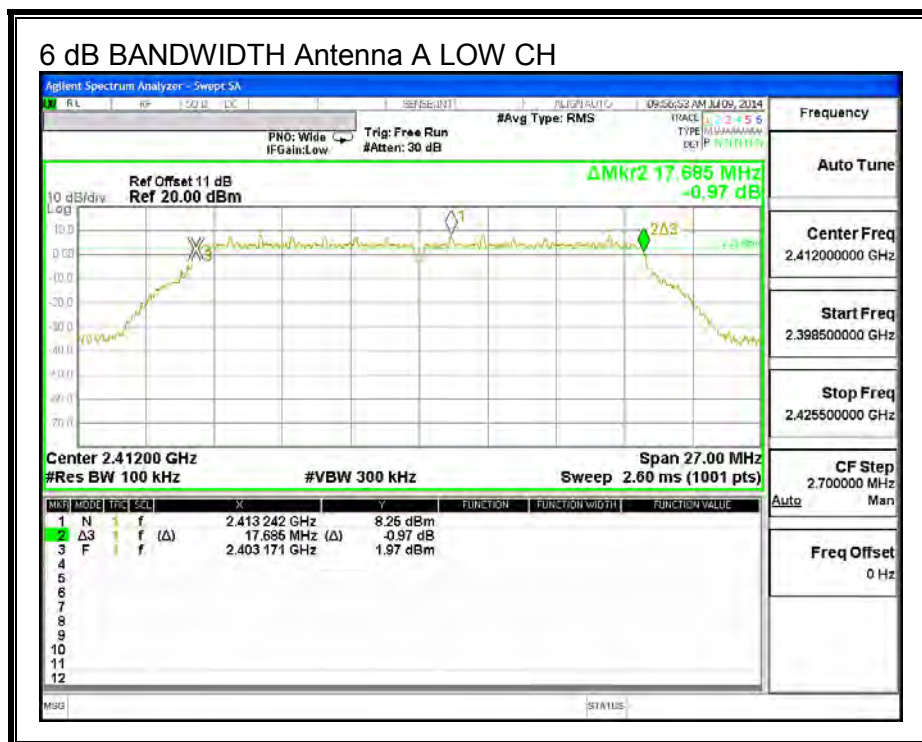
FCC §15.247 (a) (2)

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

RESULTS

Channel	Frequency (MHz)	6 dB BW Antenna A (MHz)	6 dB BW Antenna B (MHz)	Minimum Limit (MHz)
Low	2412	17.685	17.685	0.5
Mid	2437	17.739	17.712	0.5
High	2462	17.739	17.685	0.5
High	2467	17.685	17.712	0.5
High	2472	17.739	17.685	0.5

6 dB BANDWIDTH, Antenna A

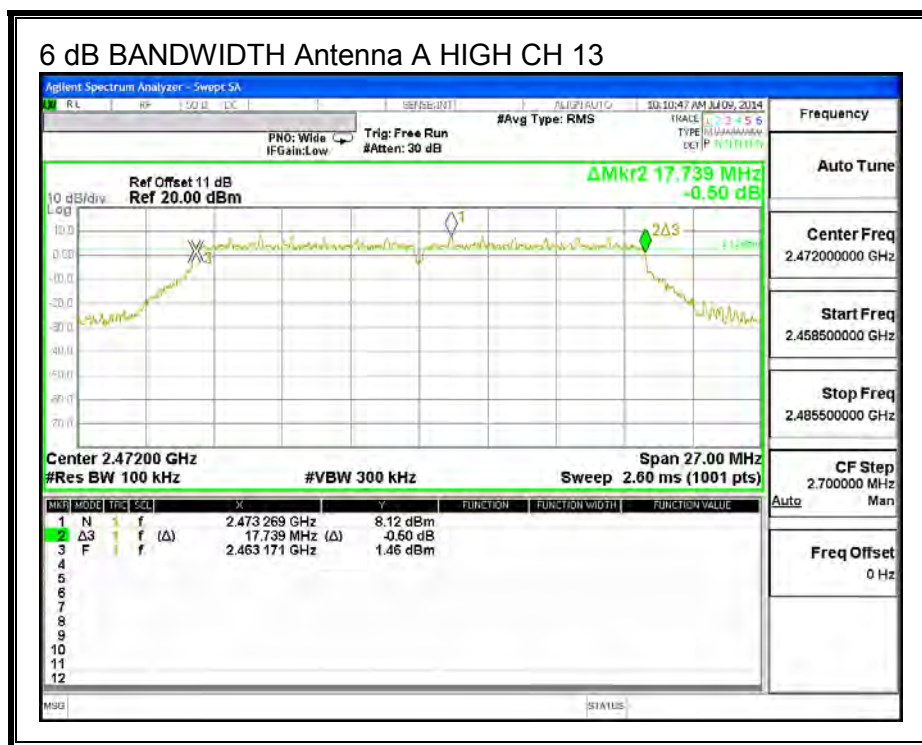


6 dB BANDWIDTH Antenna A HIGH CH 11

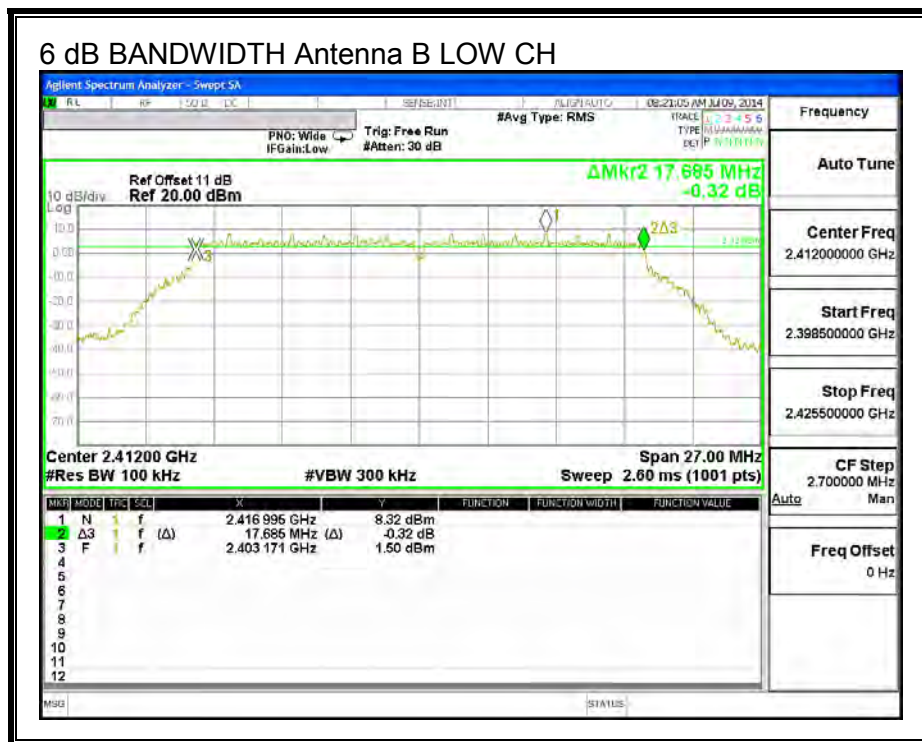


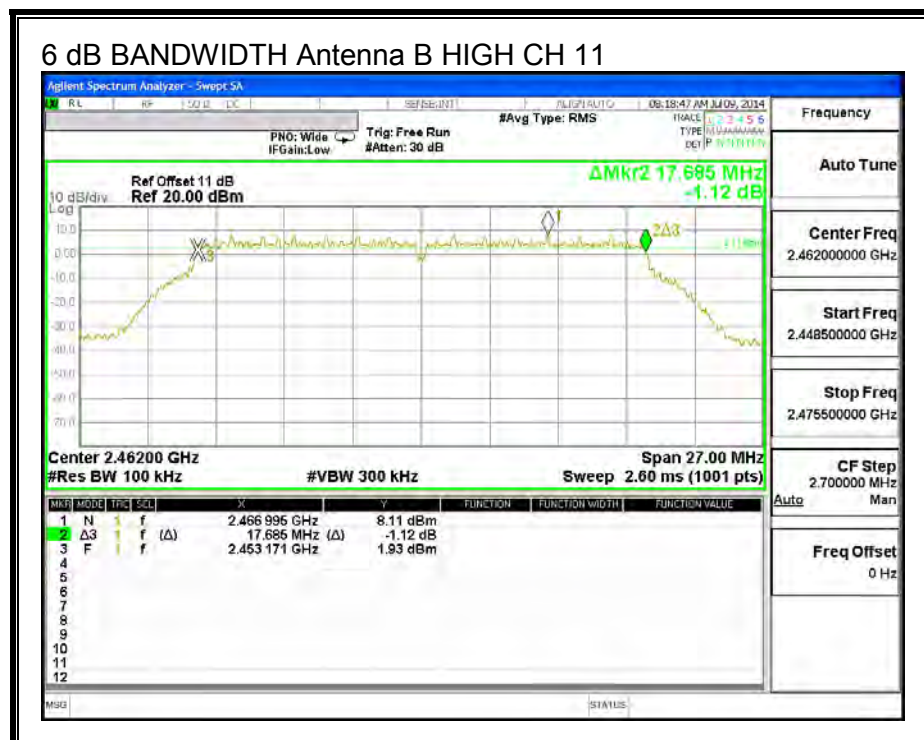
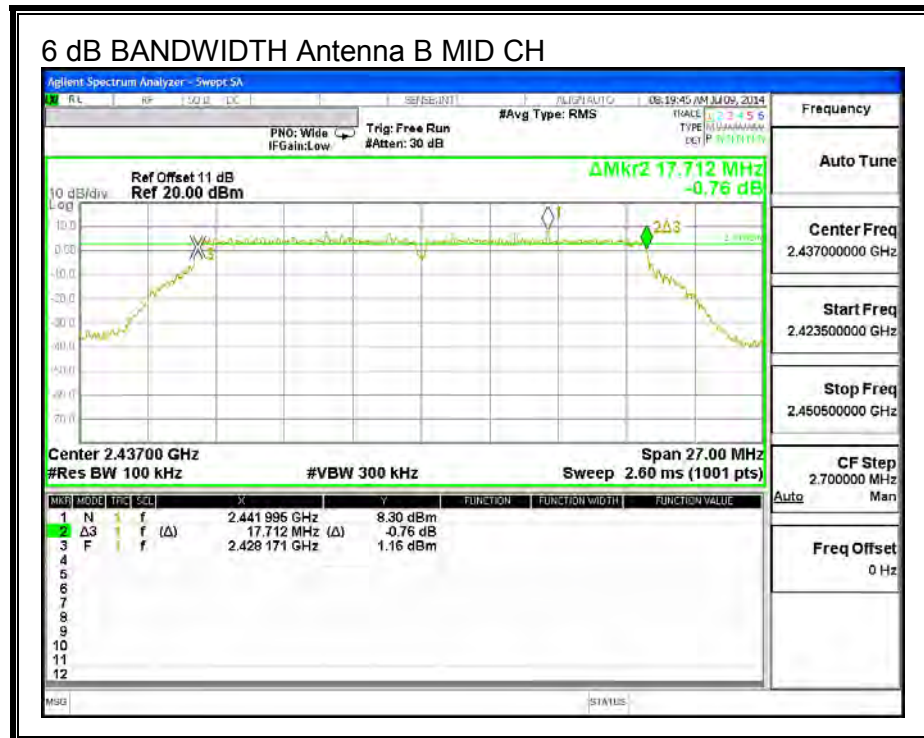
6 dB BANDWIDTH Antenna A HIGH CH 12

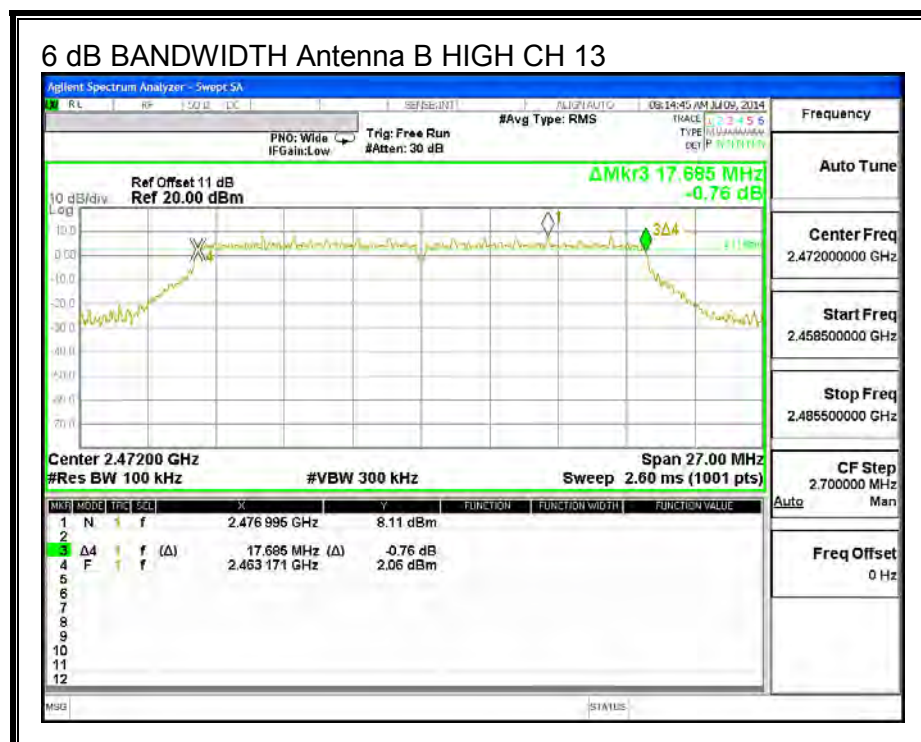
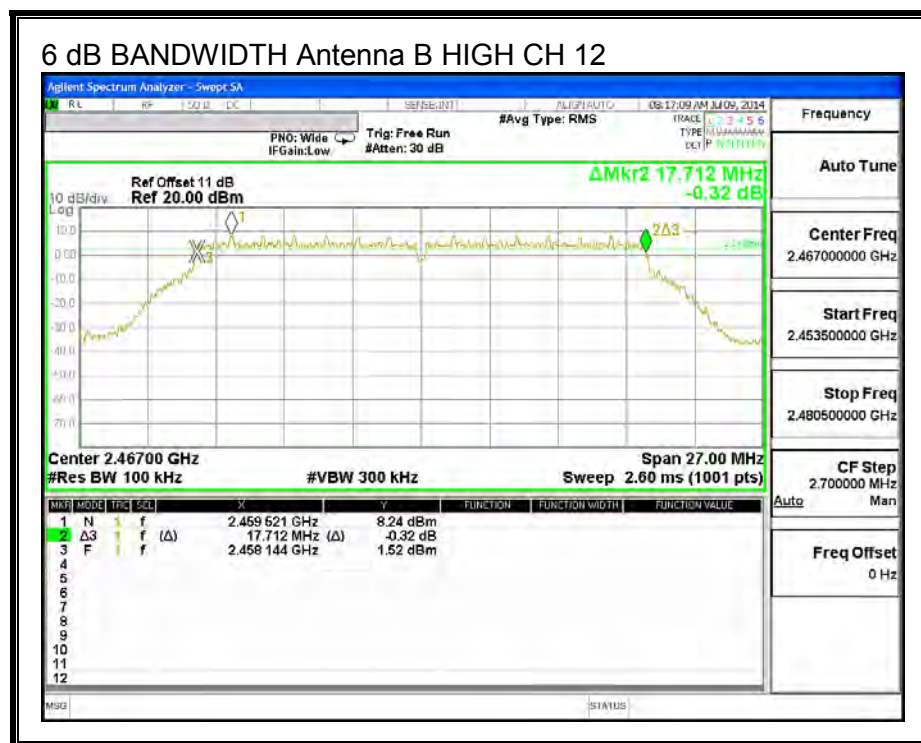




6 dB BANDWIDTH, Antenna B







9.3.2. 99% BANDWIDTH

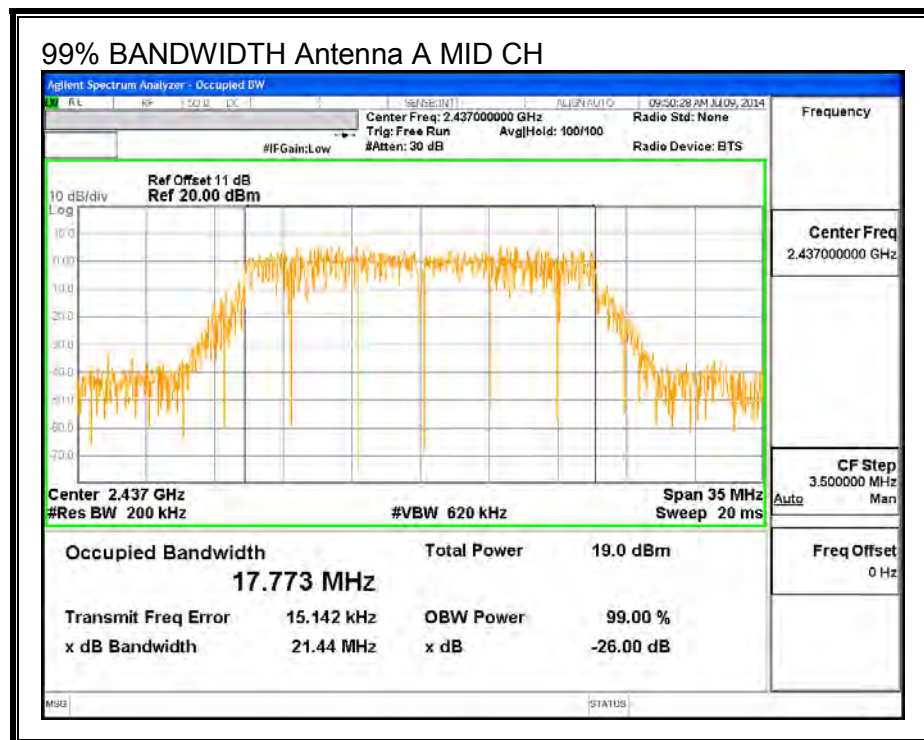
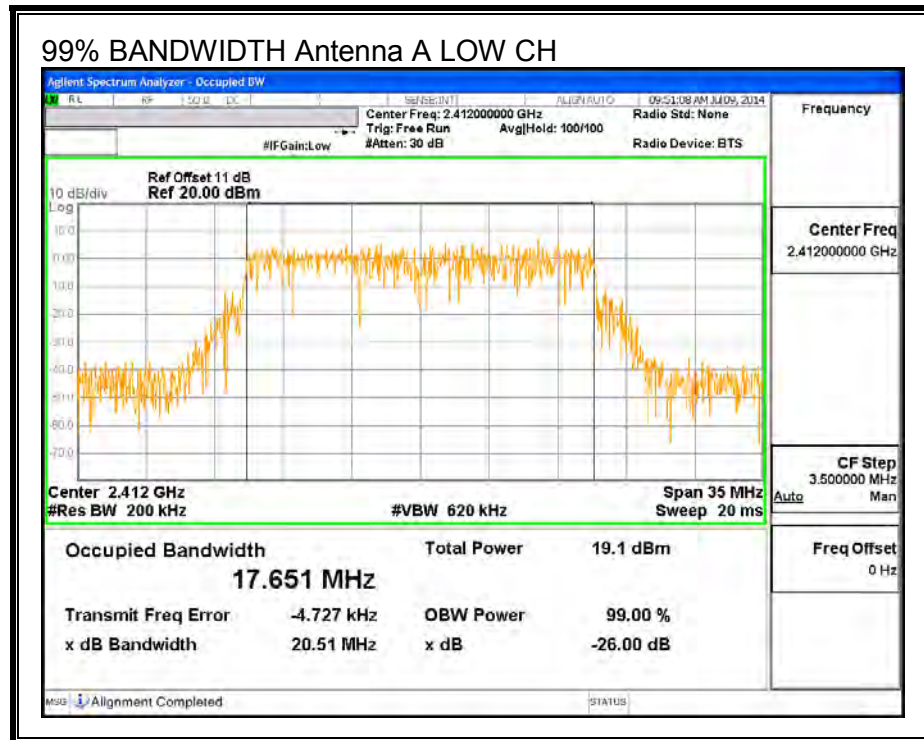
LIMITS

None; for reporting purposes only.

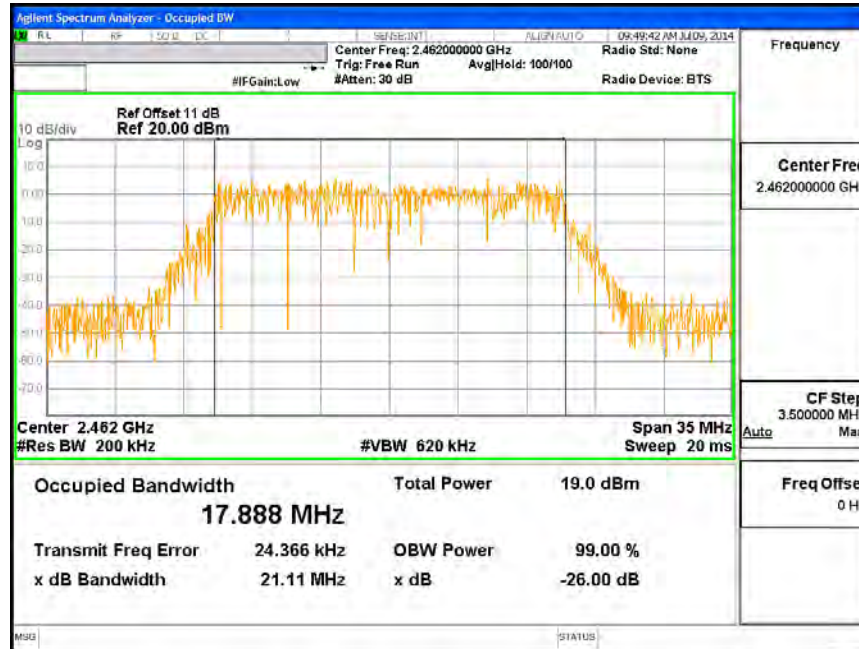
RESULTS

Channel	Frequency (MHz)	99% BW Antenna A (MHz)	99% BW Antenna B (MHz)
Low	2412	17.651	17.724
Mid	2437	17.773	17.540
High	2462	17.888	17.832
High	2467	17.653	17.692
High	2472	17.741	17.846

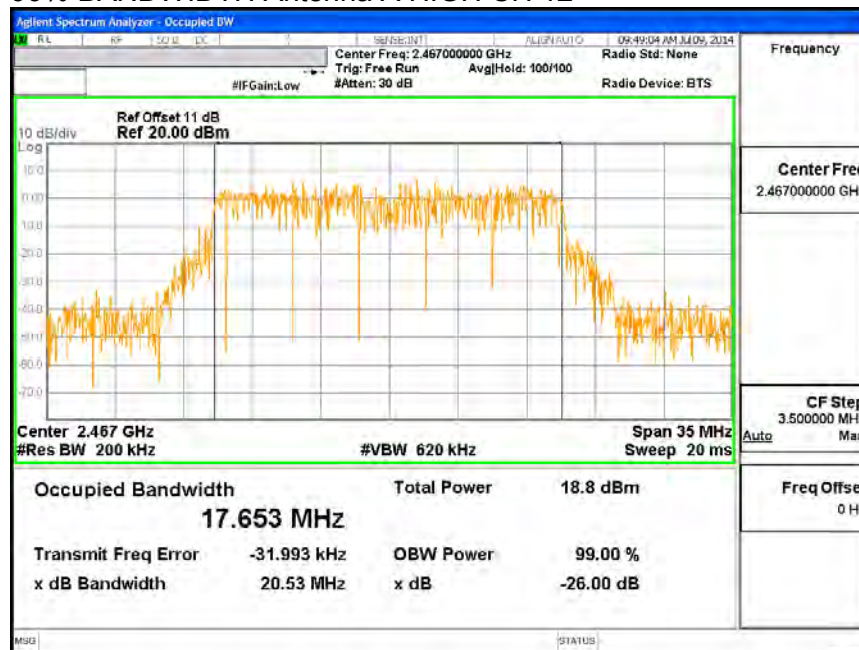
99% BANDWIDTH, Antenna A

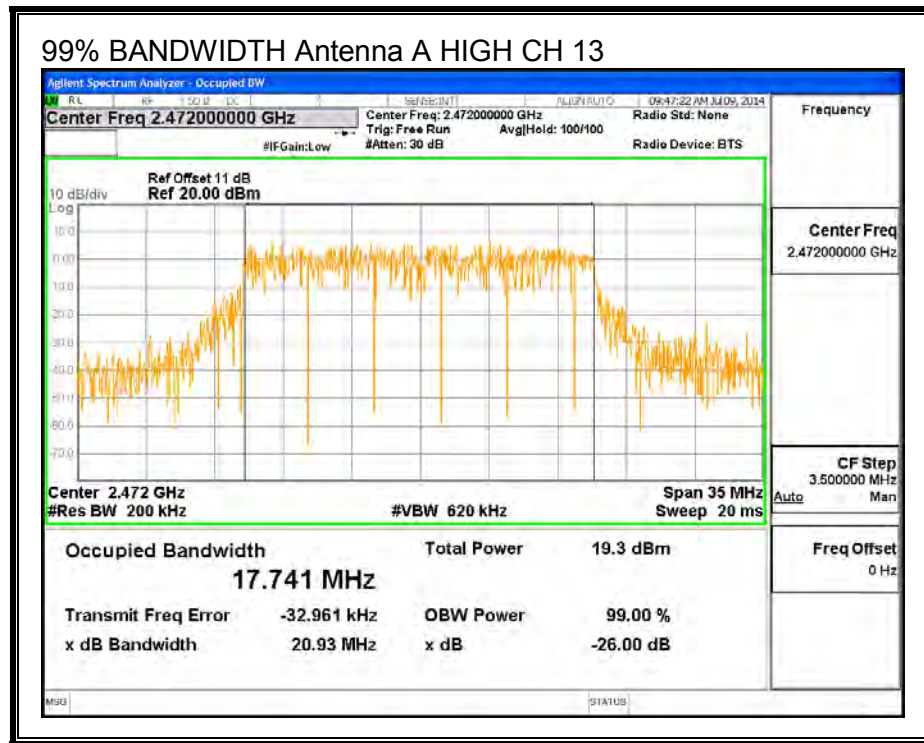


99% BANDWIDTH Antenna A HIGH CH 11

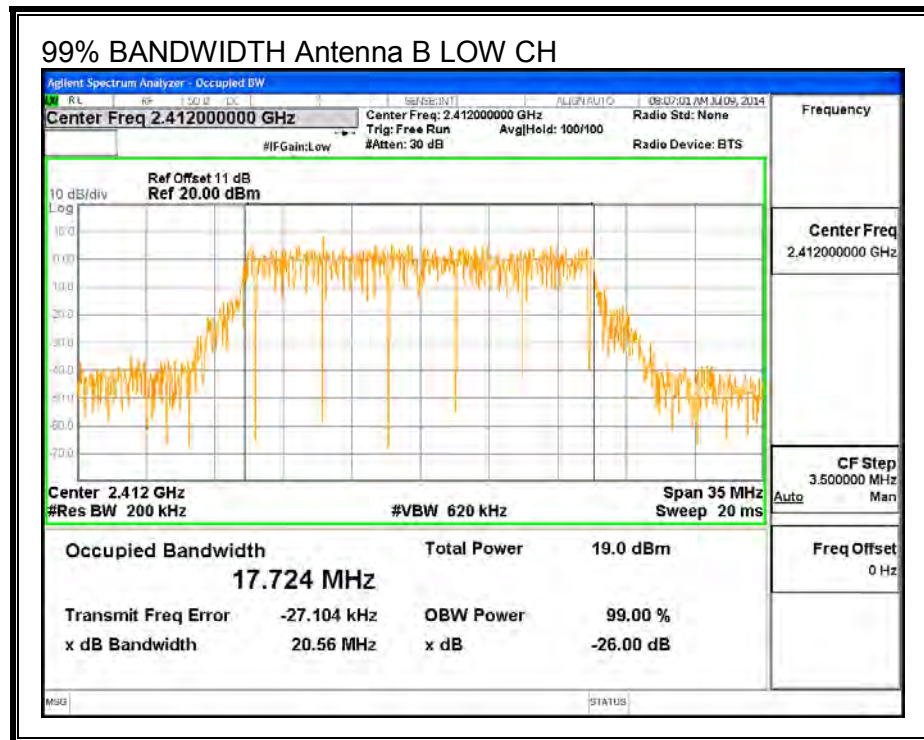


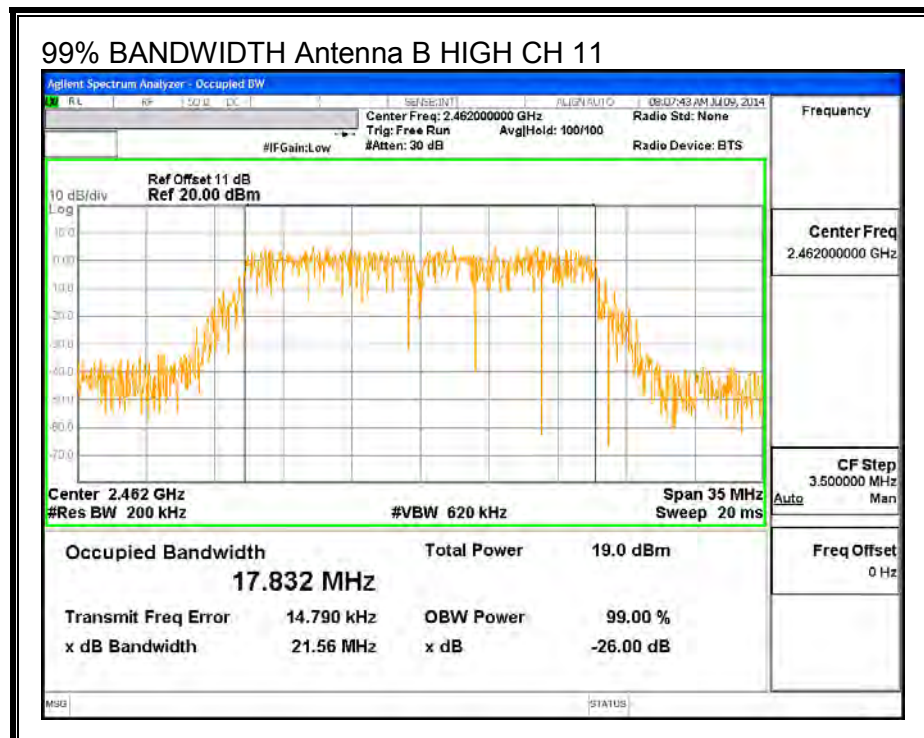
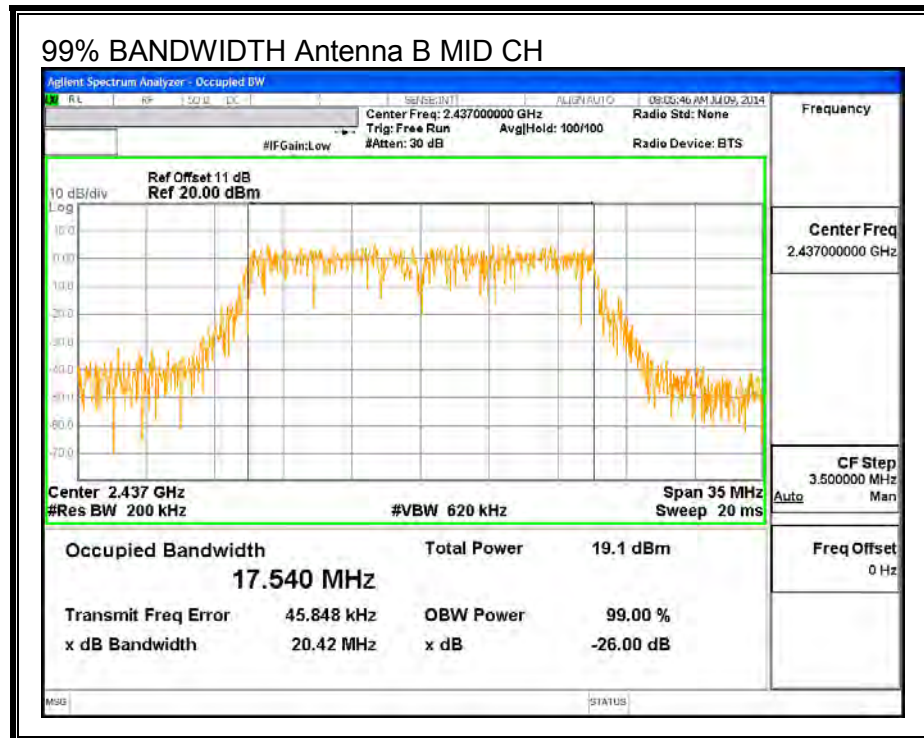
99% BANDWIDTH Antenna A HIGH CH 12

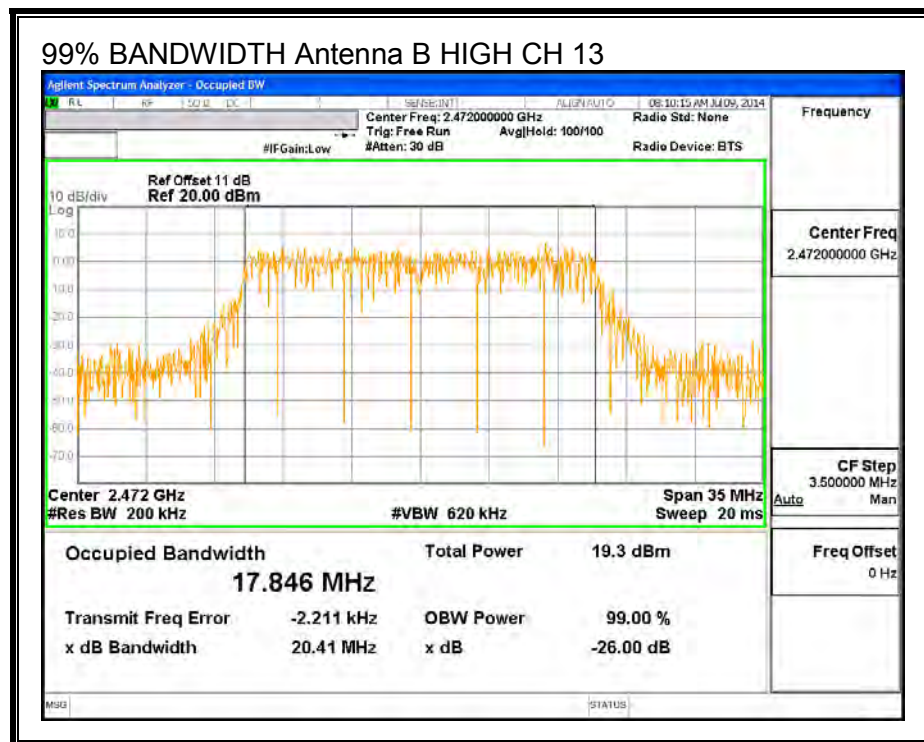
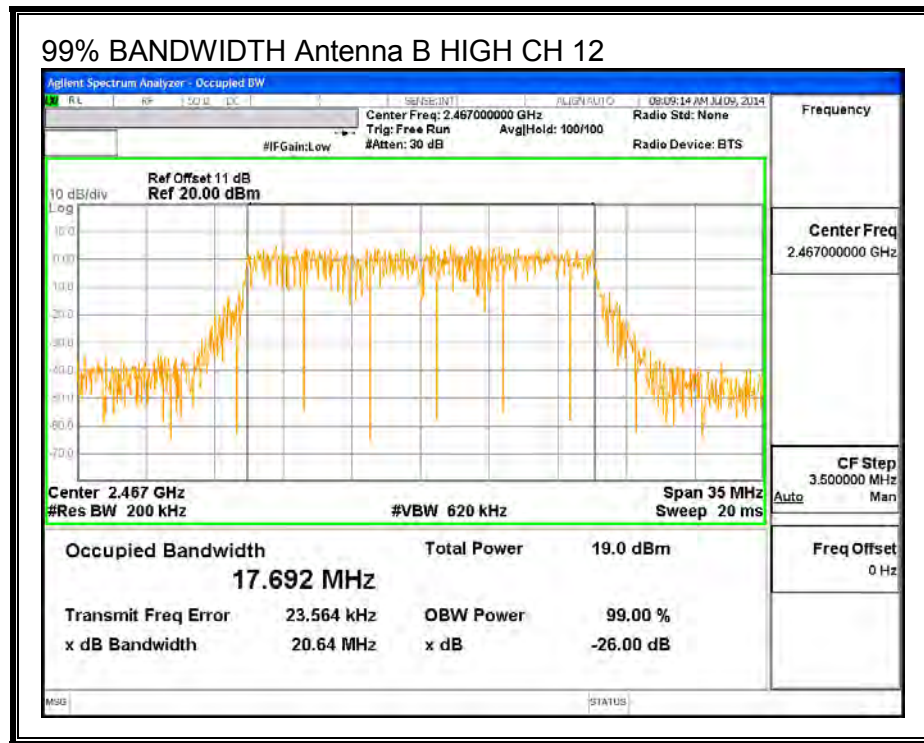




99% BANDWIDTH, Antenna B







9.3.3. 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 11.0 dB (including 10 dB pad and 1.0 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency (MHz)	Antenna A Power (dBm)	Antenna B Power (dBm)	Total Power (dBm)
Low	2412	11.94	11.77	14.87
Mid	2437	15.49	15.49	18.50
High	2462	10.96	10.77	13.88
High	2467	8.91	8.71	11.82
High	2472	0.00	0.00	3.01

9.3.4. OUTPUT POWER

LIMITS

FCC §15.247

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

DIRECTIONAL ANTENNA GAIN

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

Antenna C	Antenna A	Uncorrelated Chains
Gain (dBi)	Gain (dBi)	Directional Gain (dBi)
1.01	2.02	1.54

RESULTS

RESULTS

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)
Low	2412	1.54	30.00
Mid	2437	1.54	30.00
High	2462	1.54	30.00
High	2467	1.54	30.00
High	2472	1.54	30.00

Results

Channel	Frequency (MHz)	Antenna A Meas Power (dBm)	Antenna B Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	21.02	20.80	23.92	30.00	-6.08
Mid	2437	23.70	23.92	26.82	30.00	-3.18
High	2462	18.64	18.24	21.45	30.00	-8.55
High	2467	17.06	16.97	20.03	30.00	-9.97
High	2472	12.60	12.25	15.44	30.00	-14.56

9.3.5. PSD

LIMITS

FCC §15.247 (e)

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

DIRECTIONAL ANTENNA GAIN

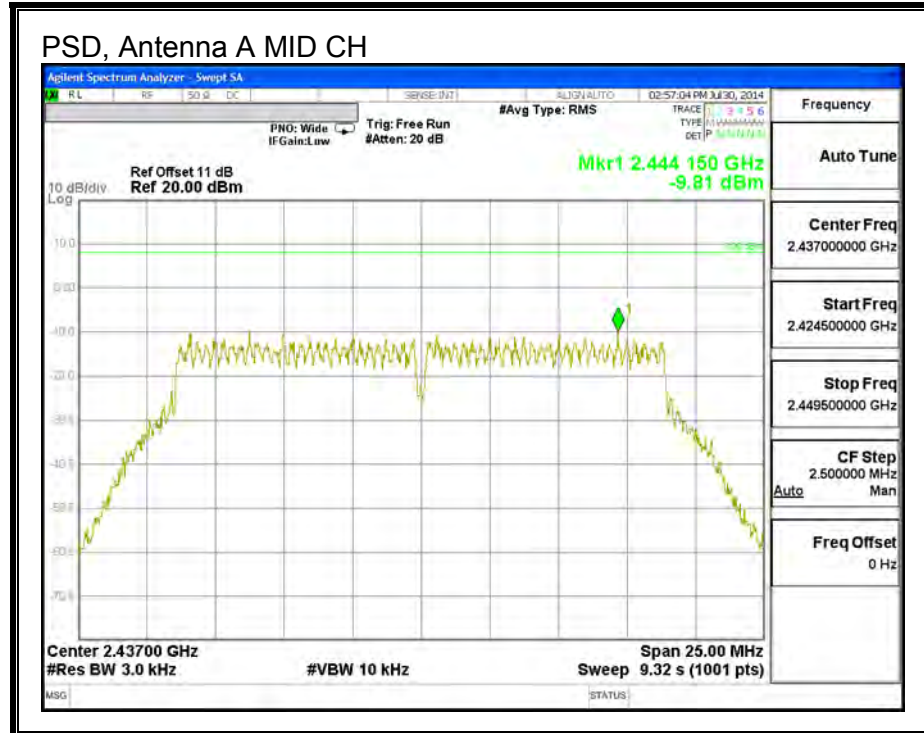
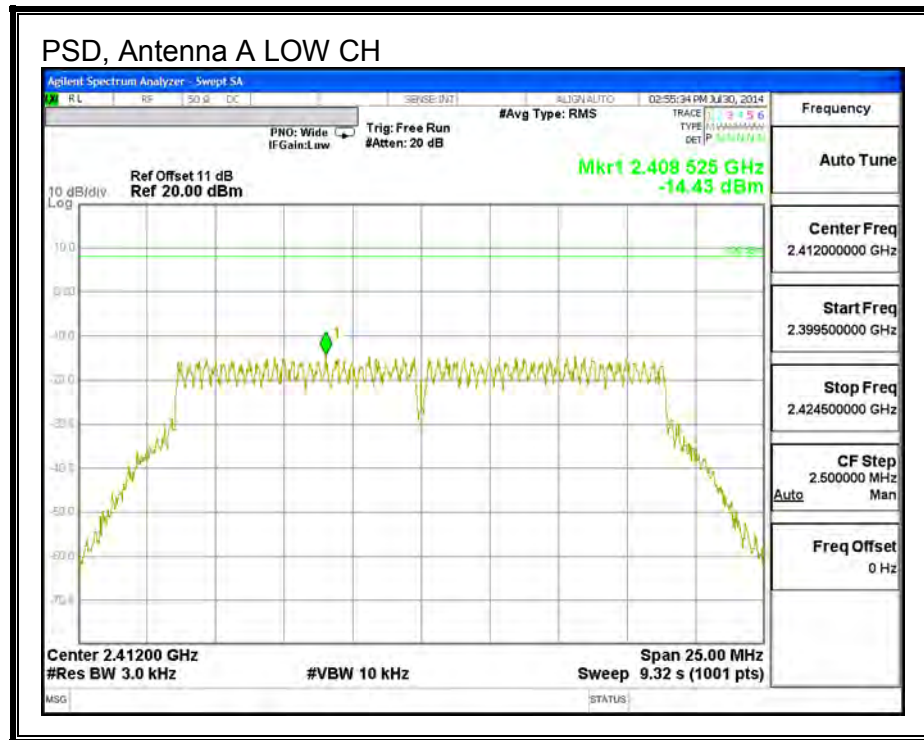
A Antenna Gain (dBi)	B Antenna Gain (dBi)	Correlated Chains Directional Gain (dBi)
1.01	2.02	4.54

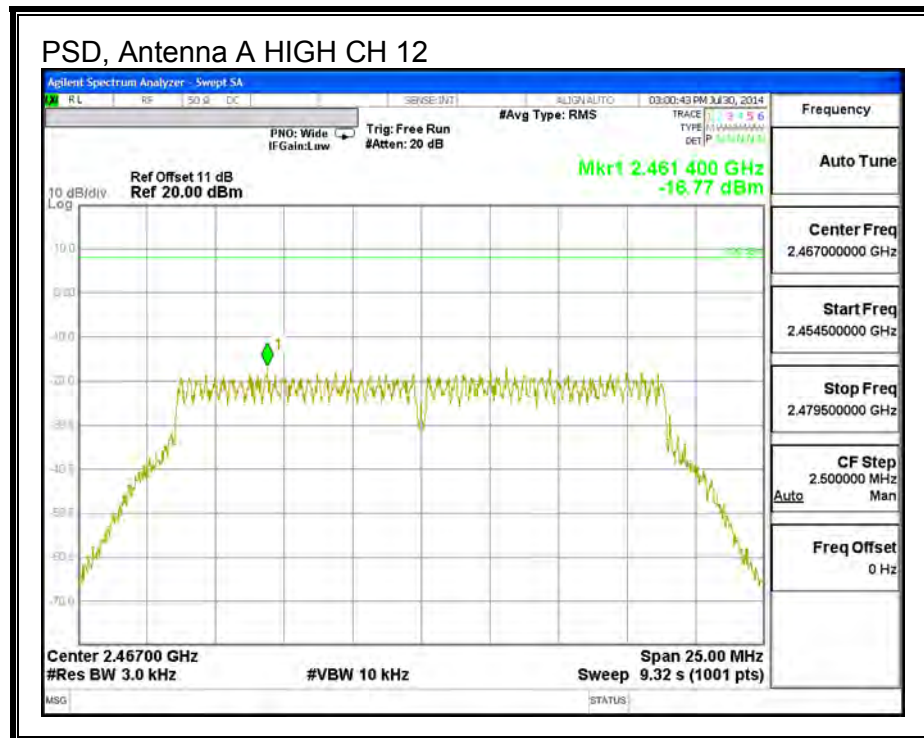
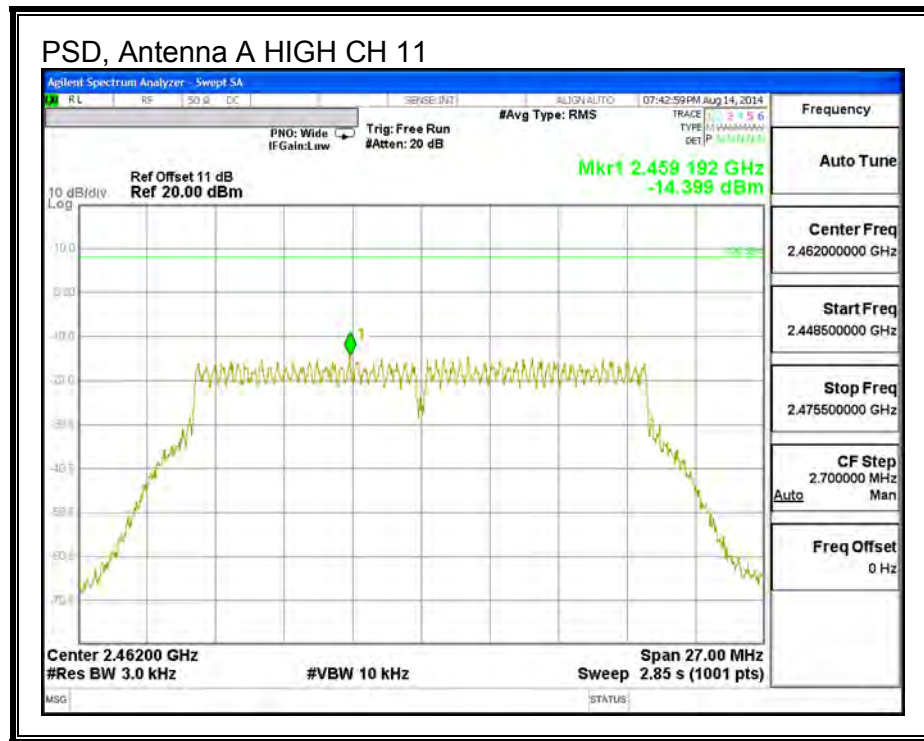
RESULTS

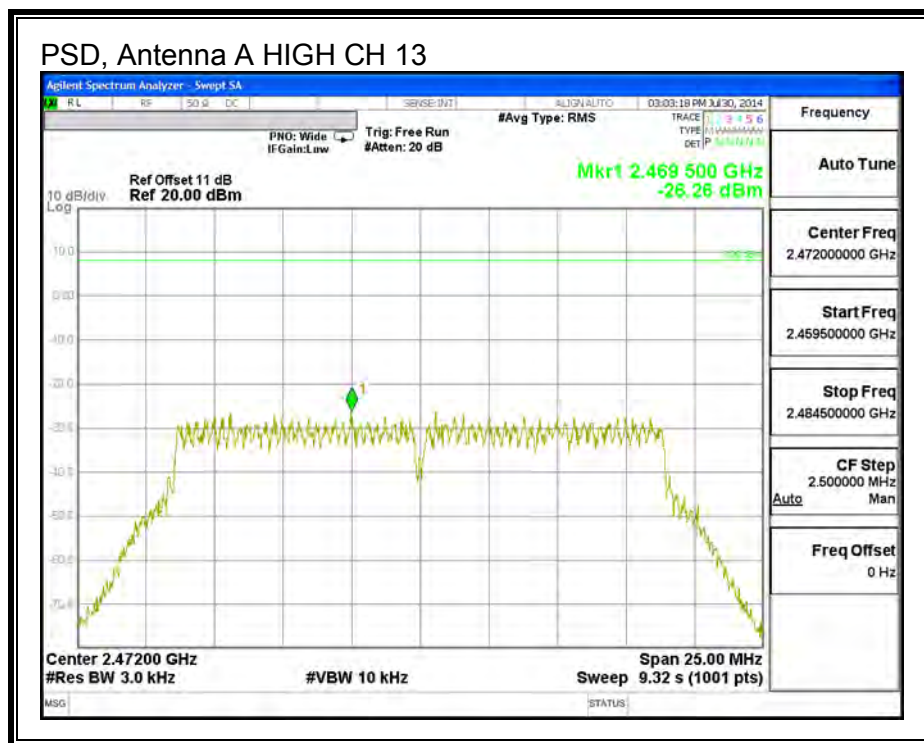
PSD Results

Channel	Frequency (MHz)	Antenna A Meas (dBm)	Antenna B Meas (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-14.43	-11.81	-9.92	8.0	-17.9
Mid	2437	-9.81	-10.42	-7.09	8.0	-15.1
High	2462	-14.40	-13.40	-10.86	8.0	-18.9
High	2467	-16.77	-16.95	-13.85	8.0	-21.8
High	2472	-26.26	-27.81	-23.96	8.0	-32.0

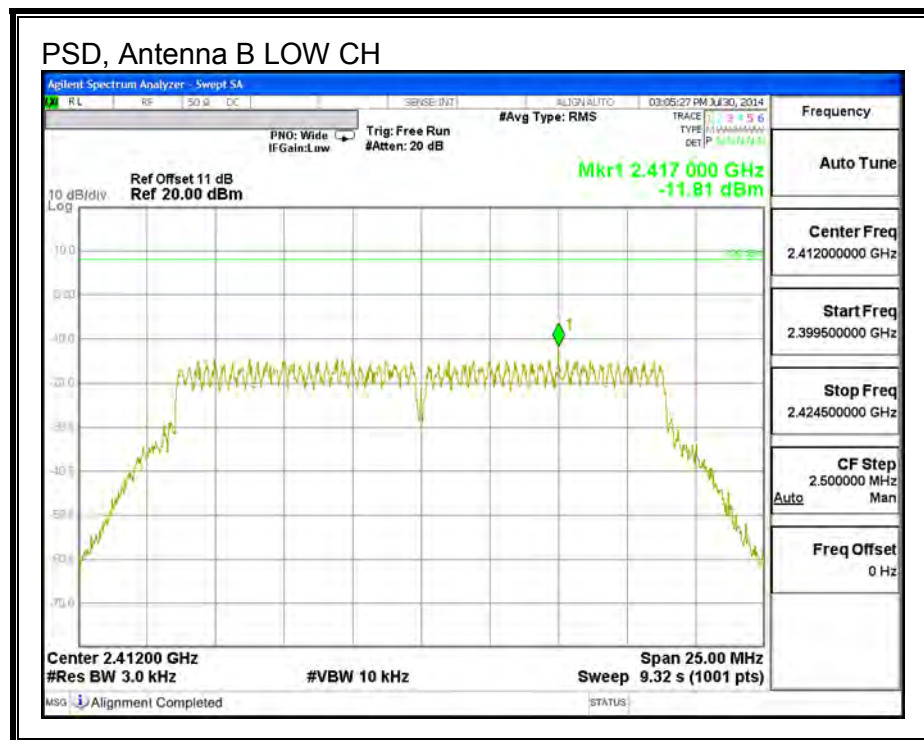
PSD, Antenna A

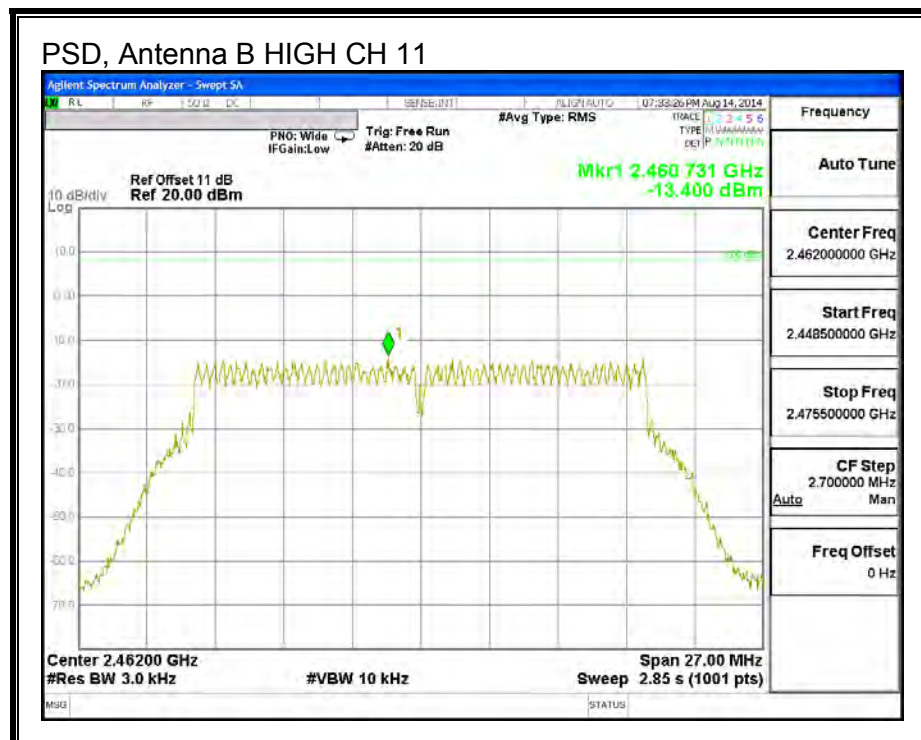
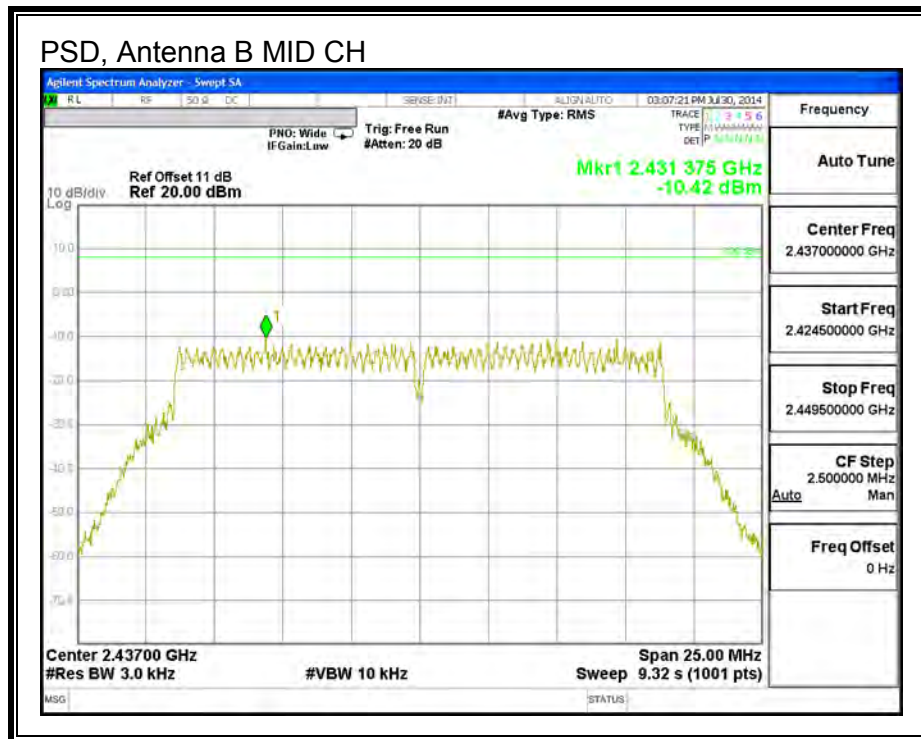


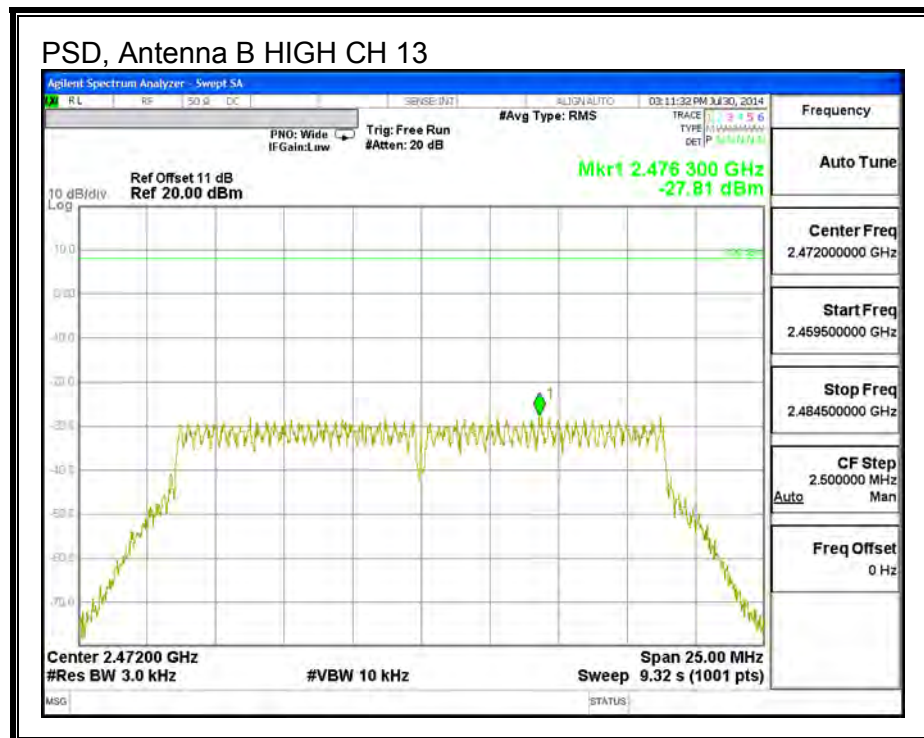
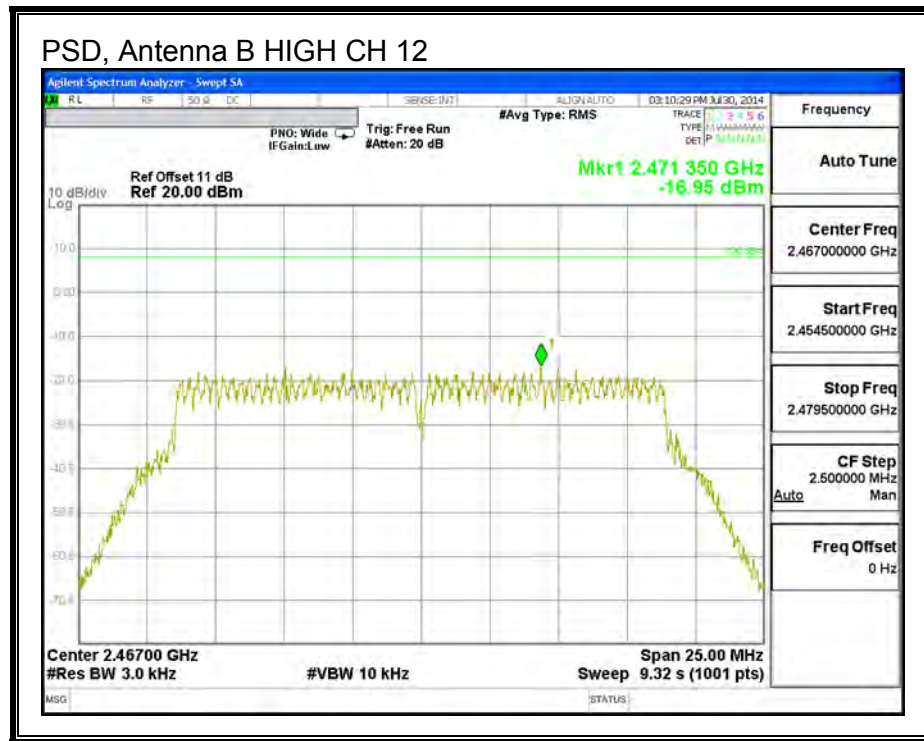




PSD, Antenna B







9.3.6. OUT-OF-BAND EMISSIONS

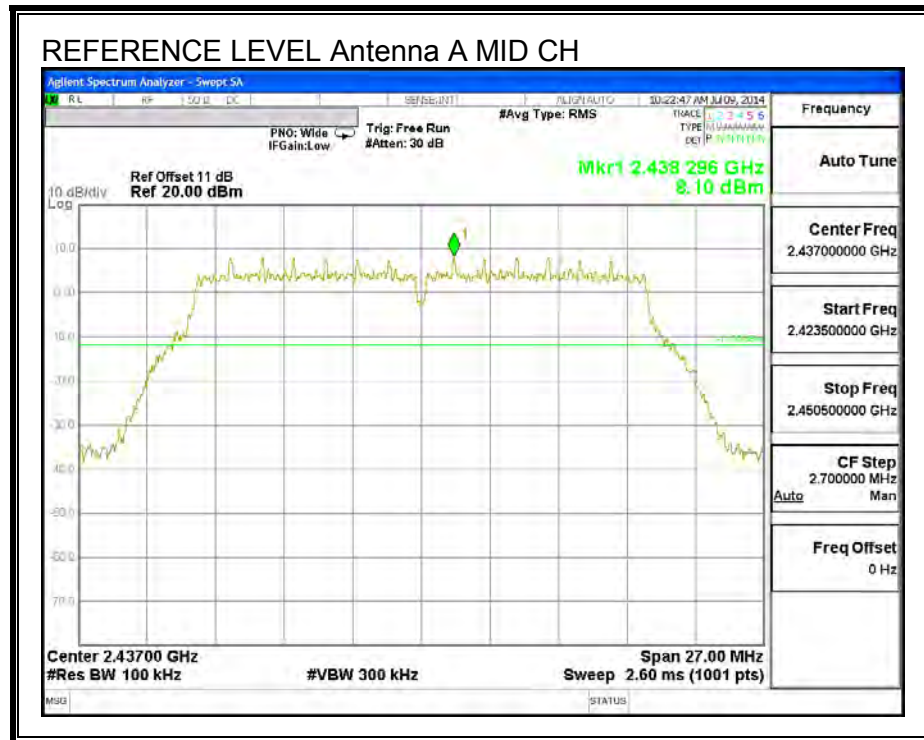
LIMITS

FCC §15.247 (d)

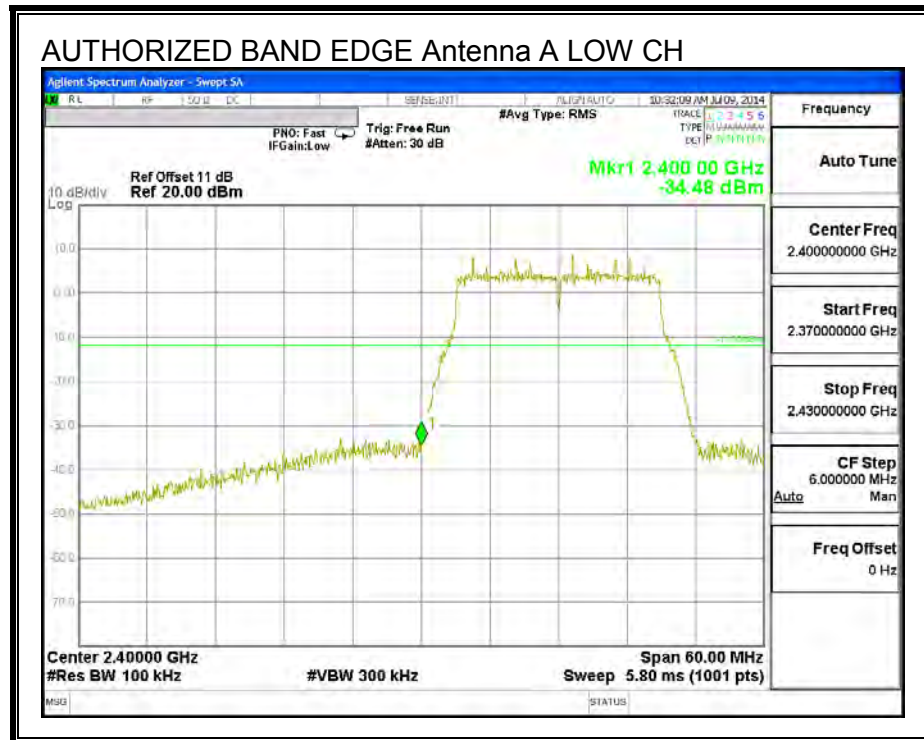
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the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

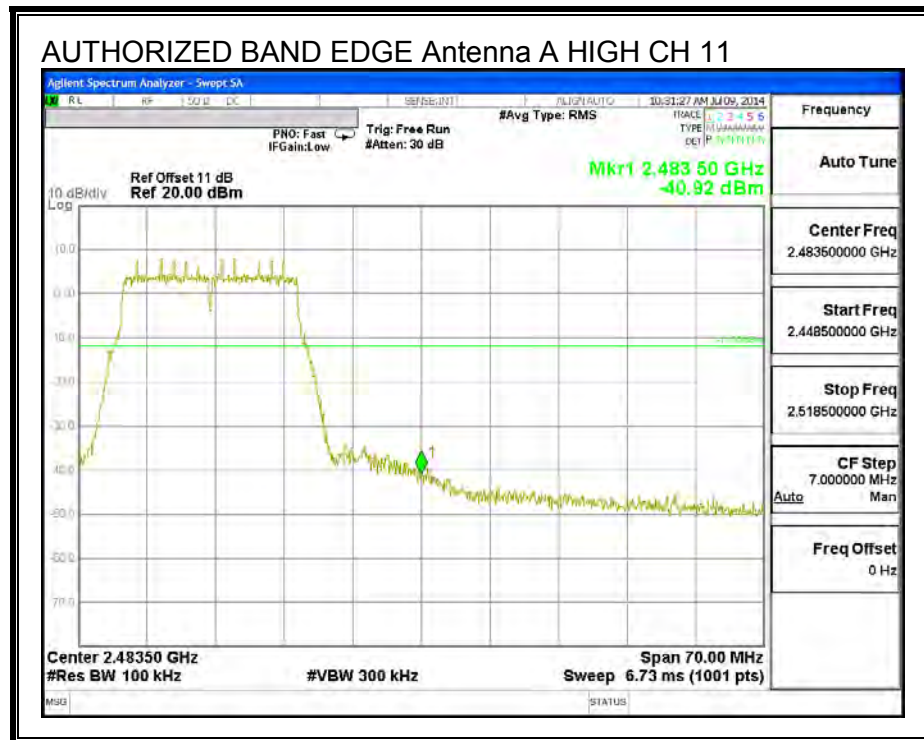
IN-BAND REFERENCE LEVEL, Antenna A

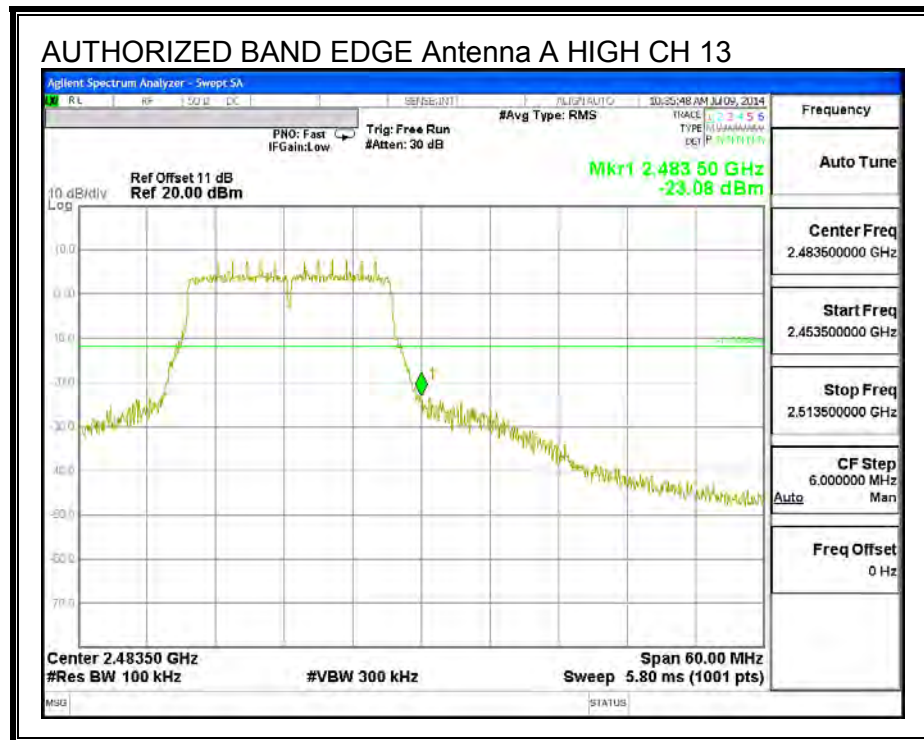
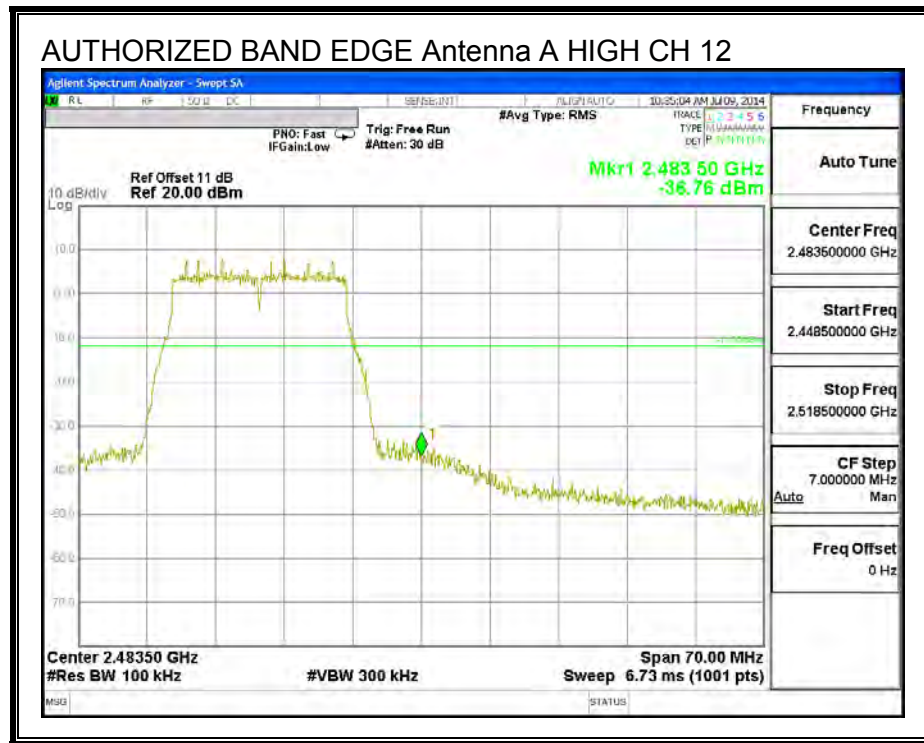


LOW CHANNEL BANDEDGE, Antenna A

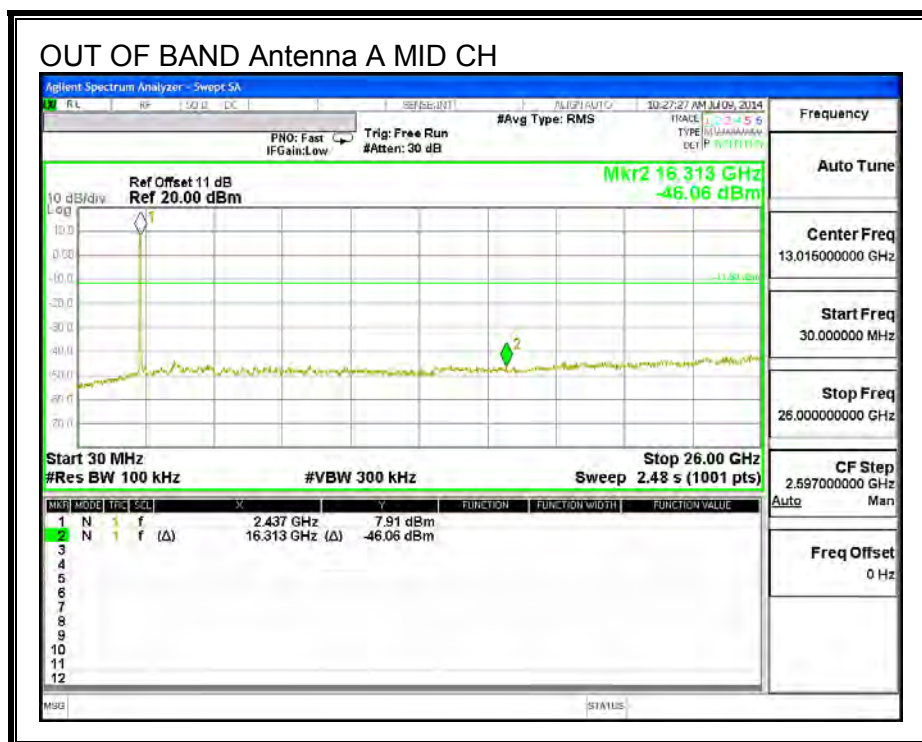
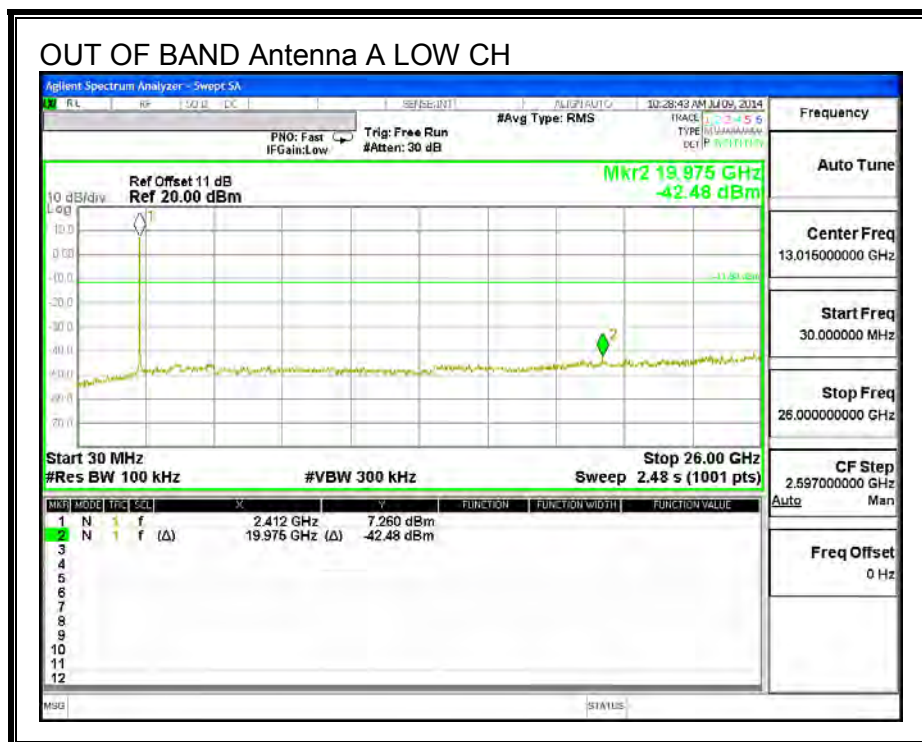


HIGH CHANNEL BANDEDGE, Antenna A

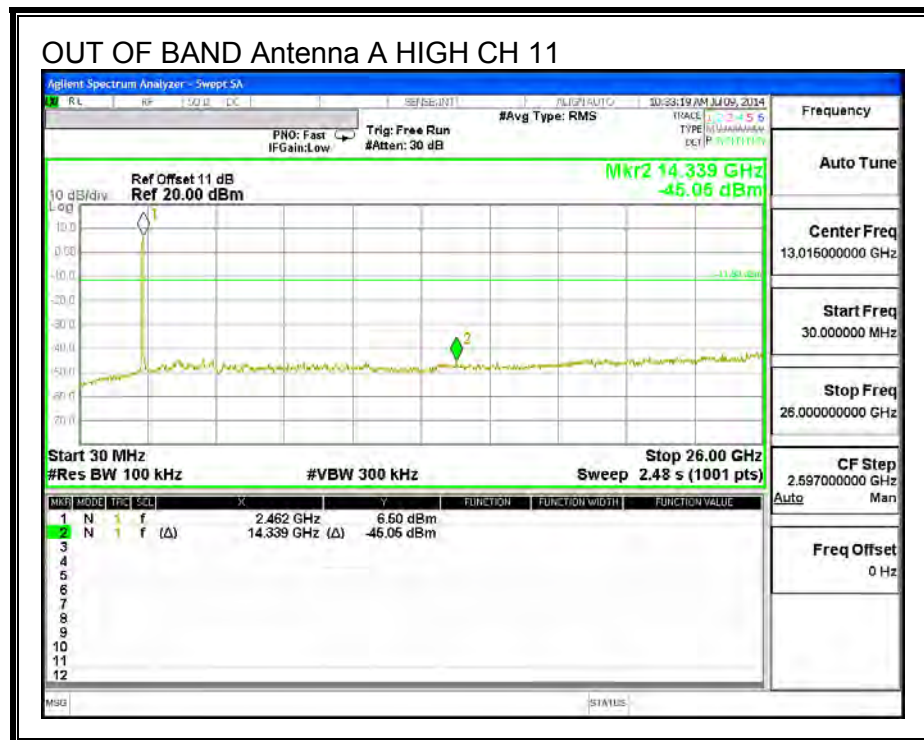




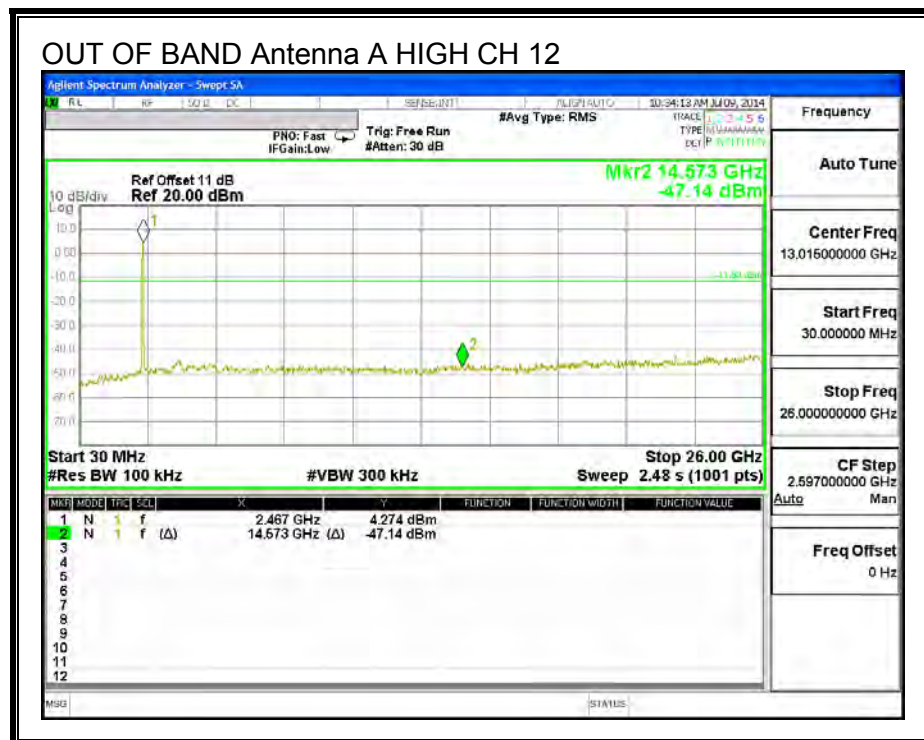
OUT-OF-BAND EMISSIONS, Antenna A

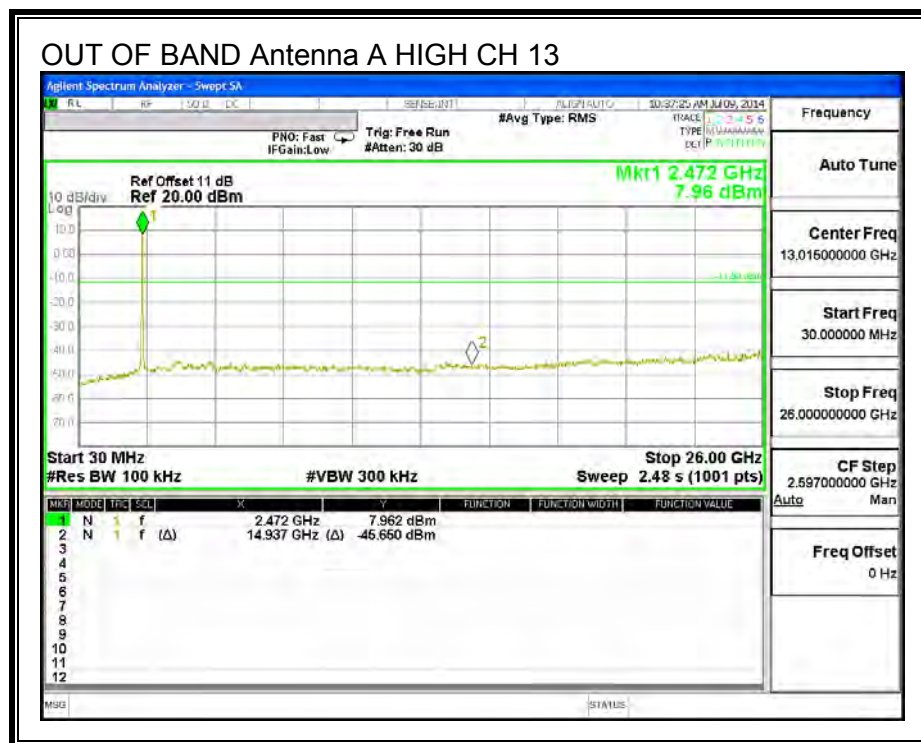


OUT OF BAND Antenna A HIGH CH 11

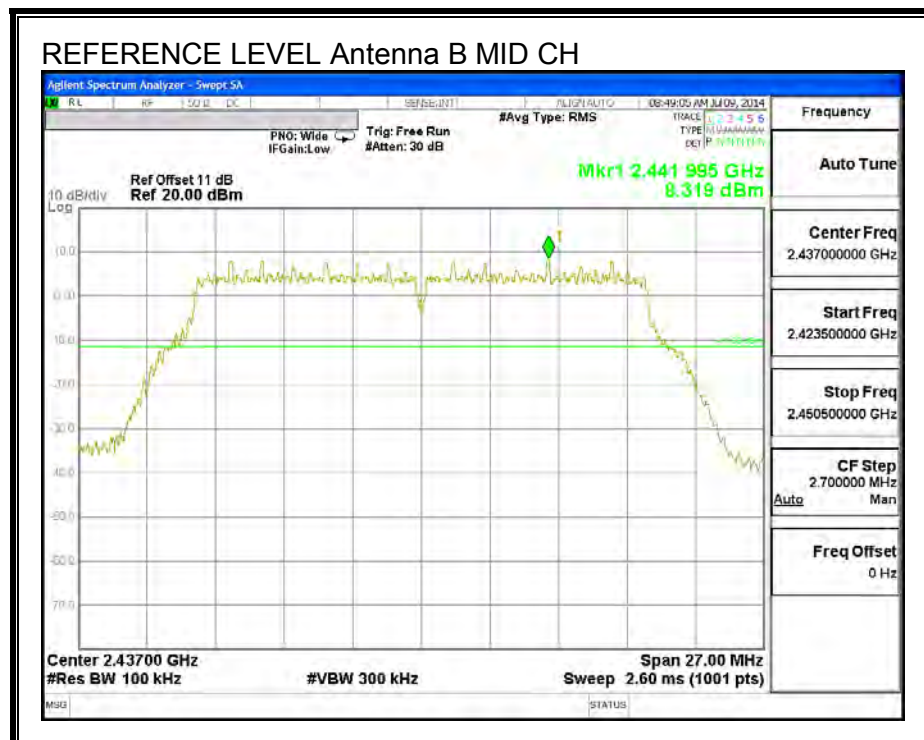


OUT OF BAND Antenna A HIGH CH 12

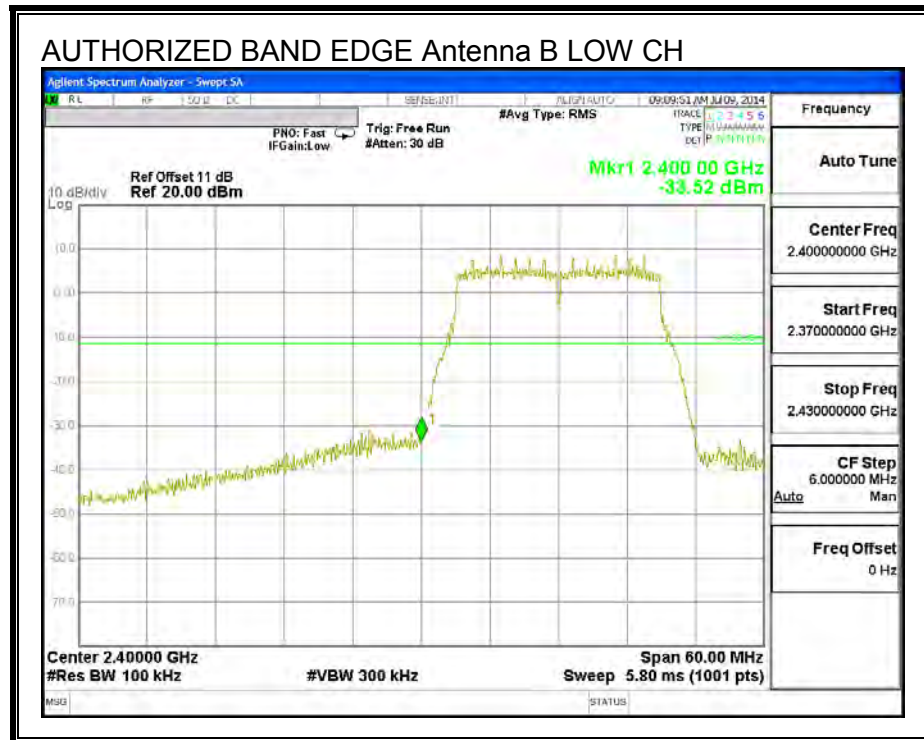




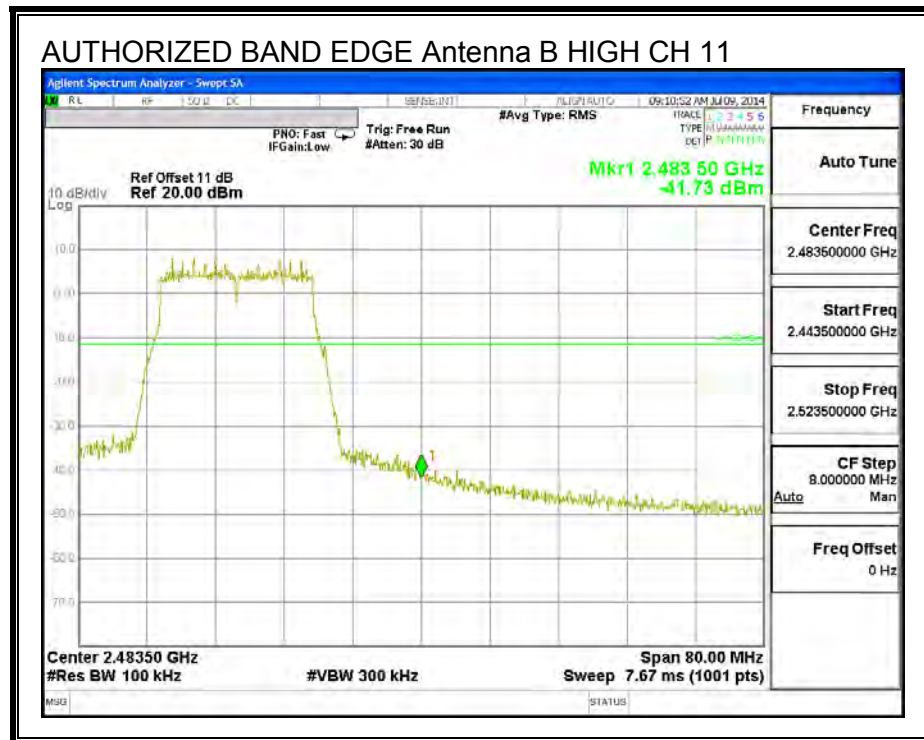
IN-BAND REFERENCE LEVEL, Antenna B

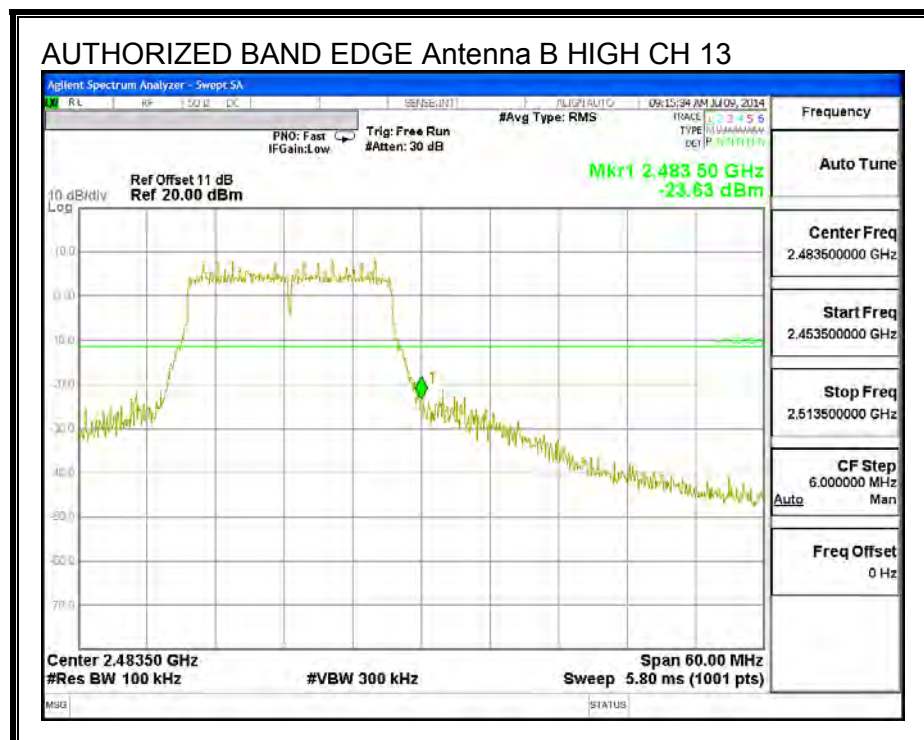
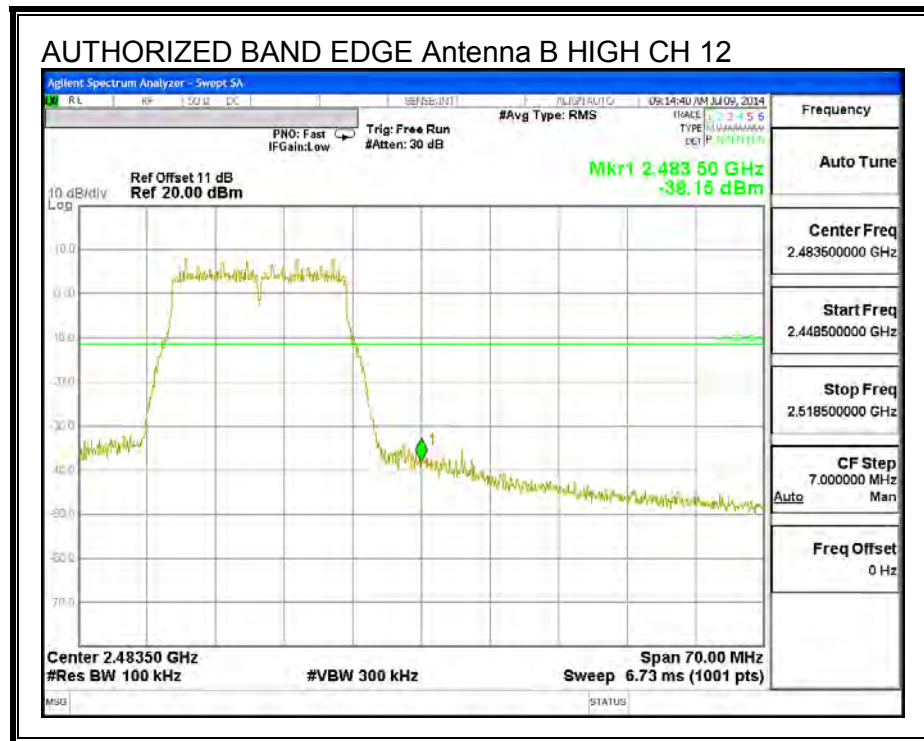


LOW CHANNEL BANDEDGE, Antenna B

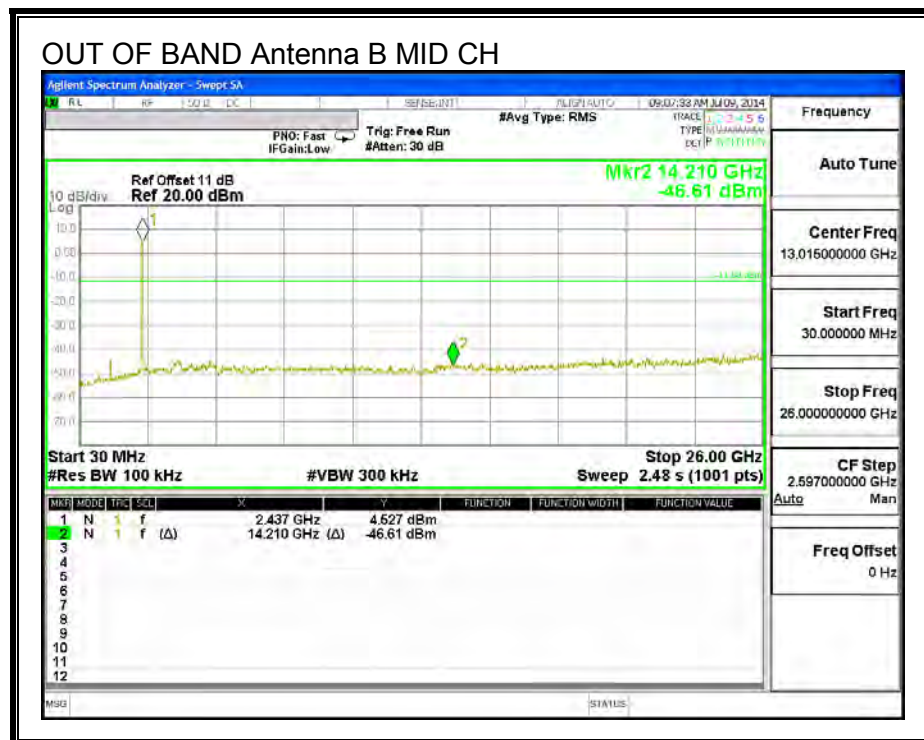
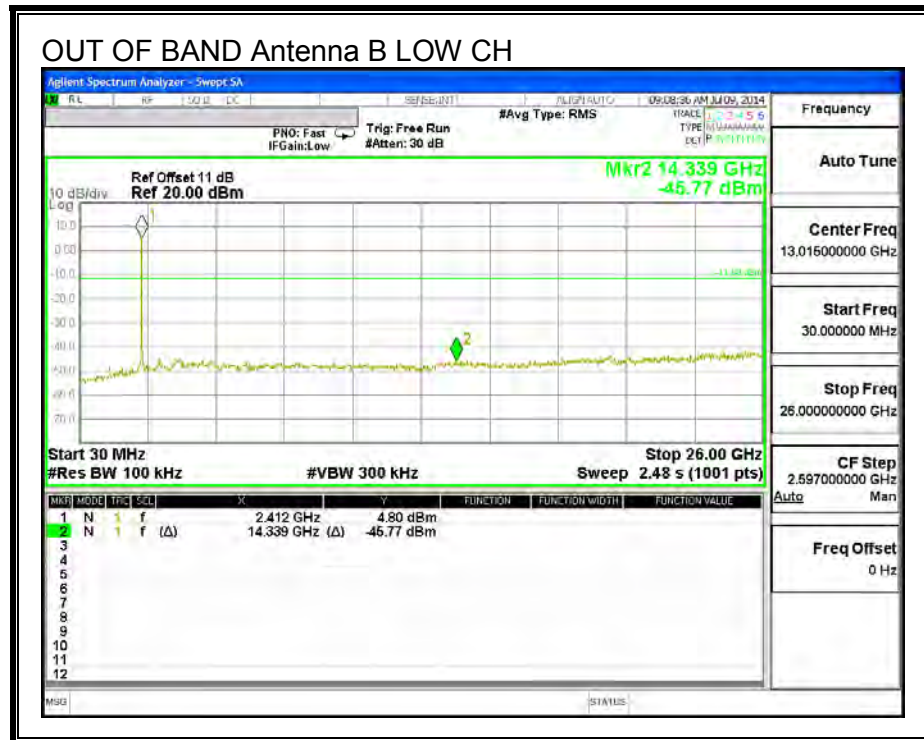


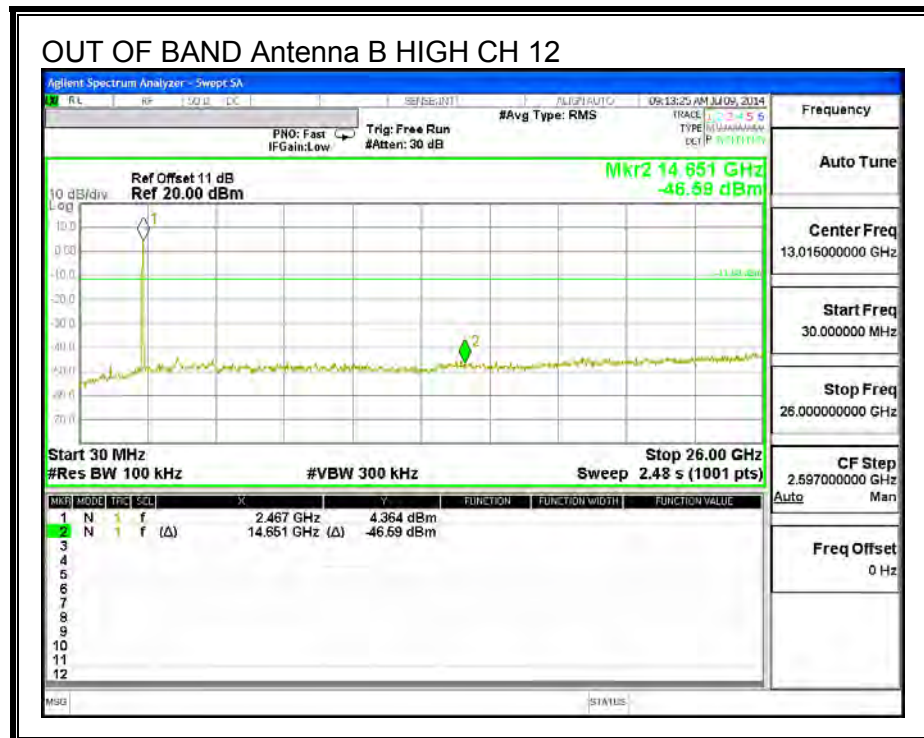
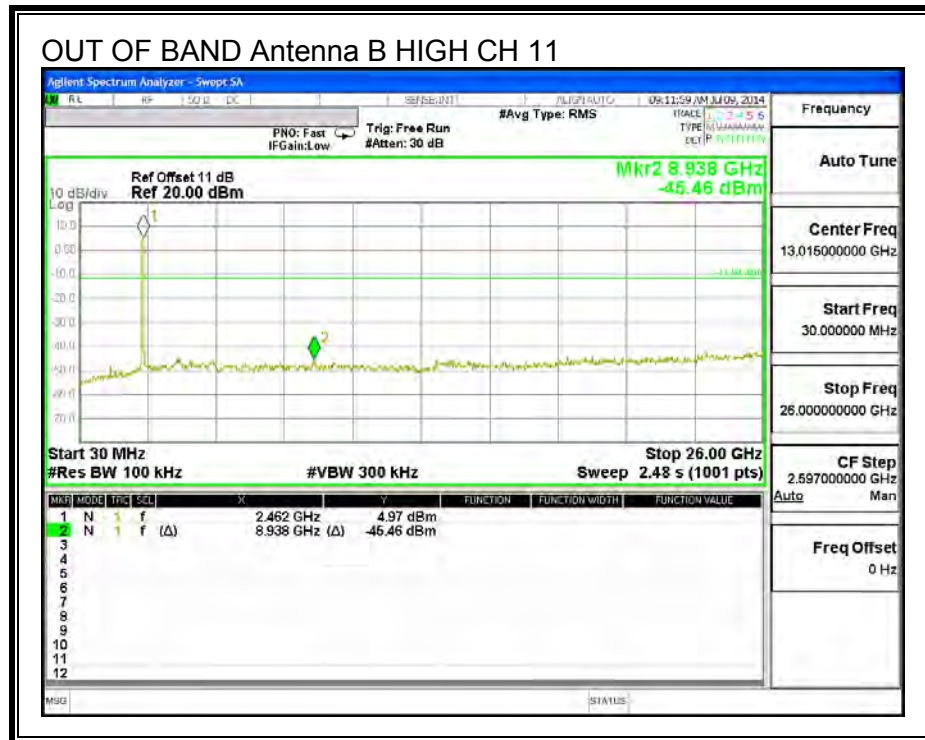
HIGH CHANNEL BANDEDGE, Antenna B

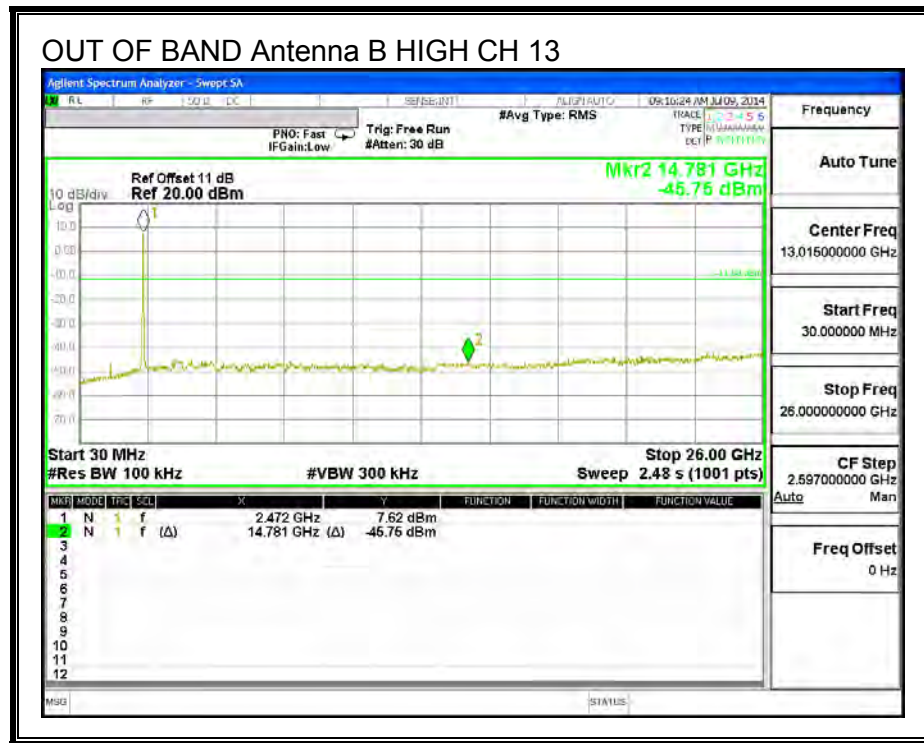




OUT-OF-BAND EMISSIONS, Antenna B







10. RADIATED TEST RESULTS

10.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

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 3 MHz for peak measurements and as applicable for average measurements.

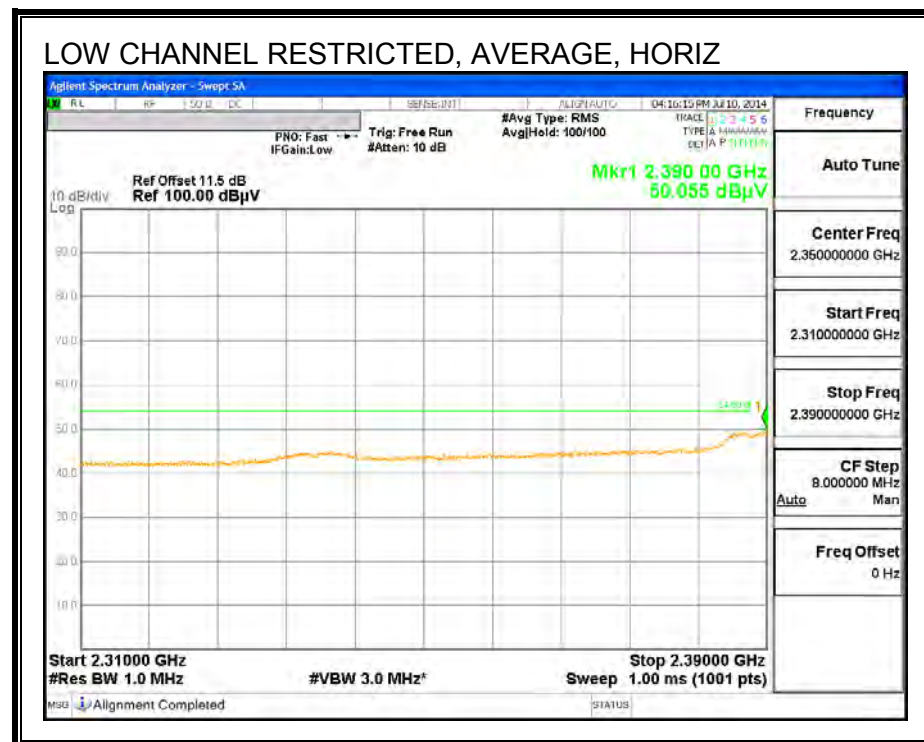
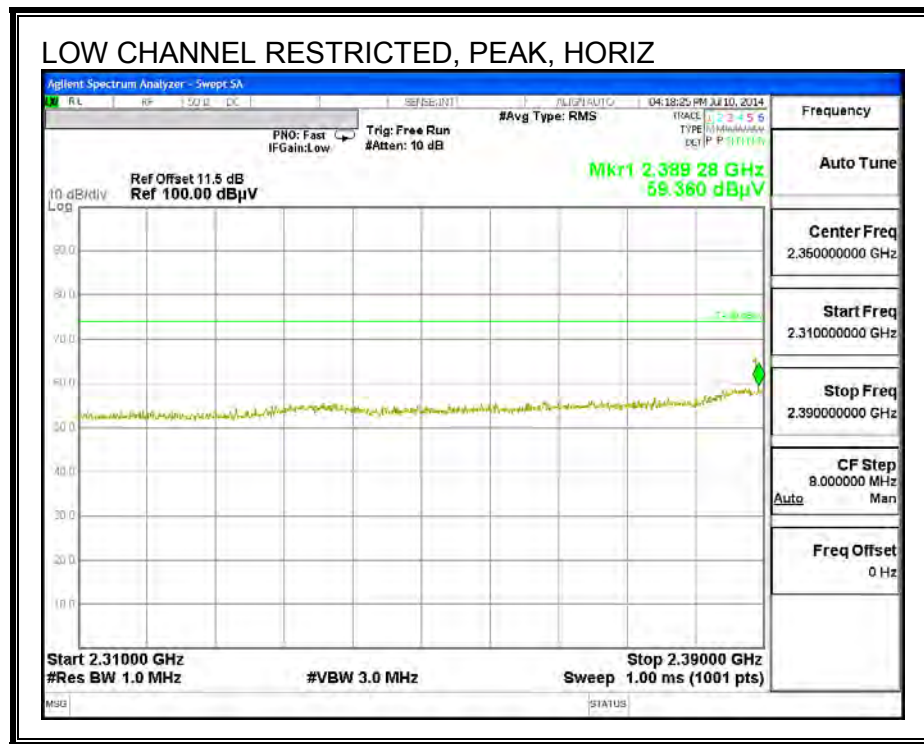
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

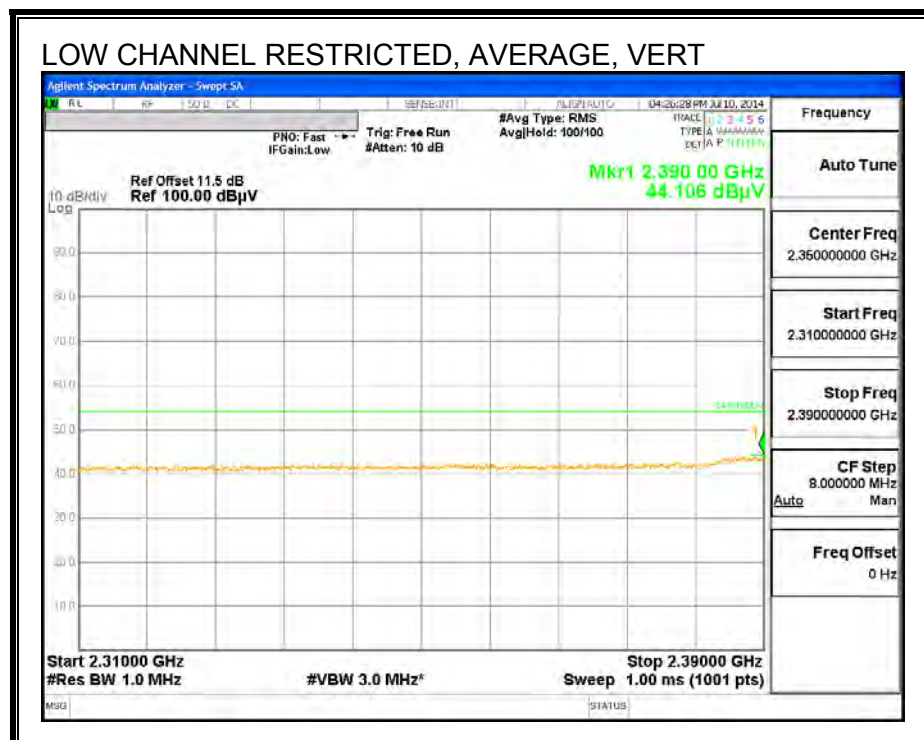
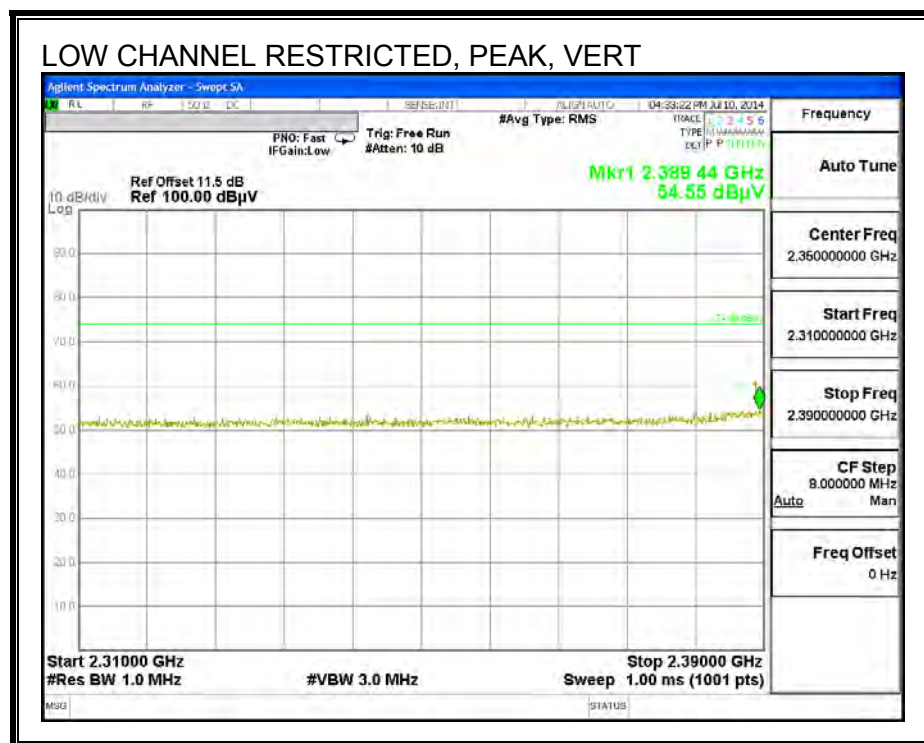
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

10.2. TX RADIATED ABOVE 1 GHz

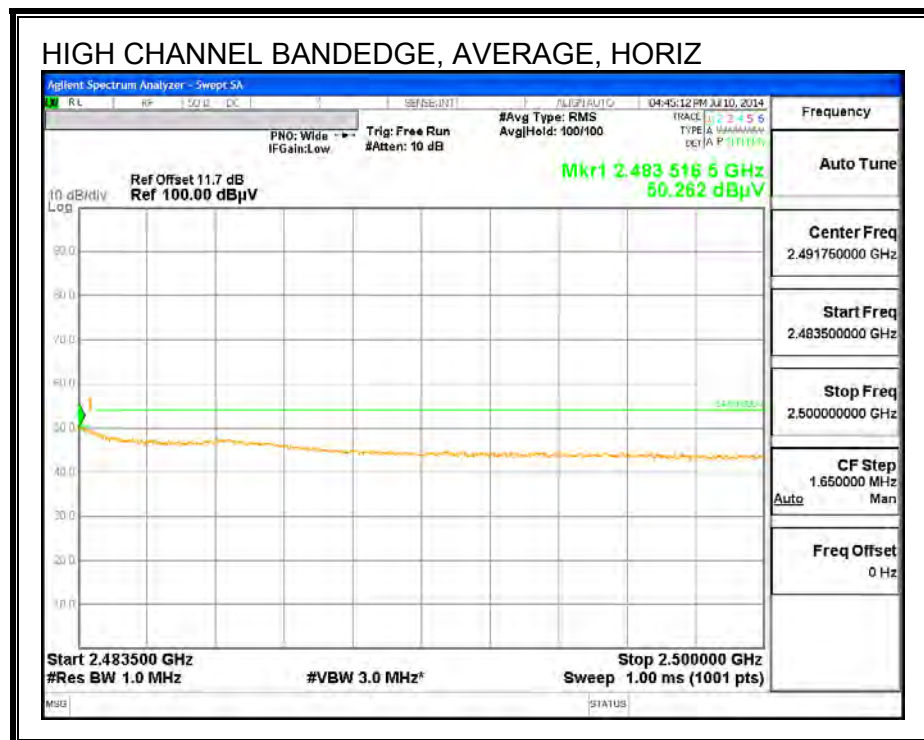
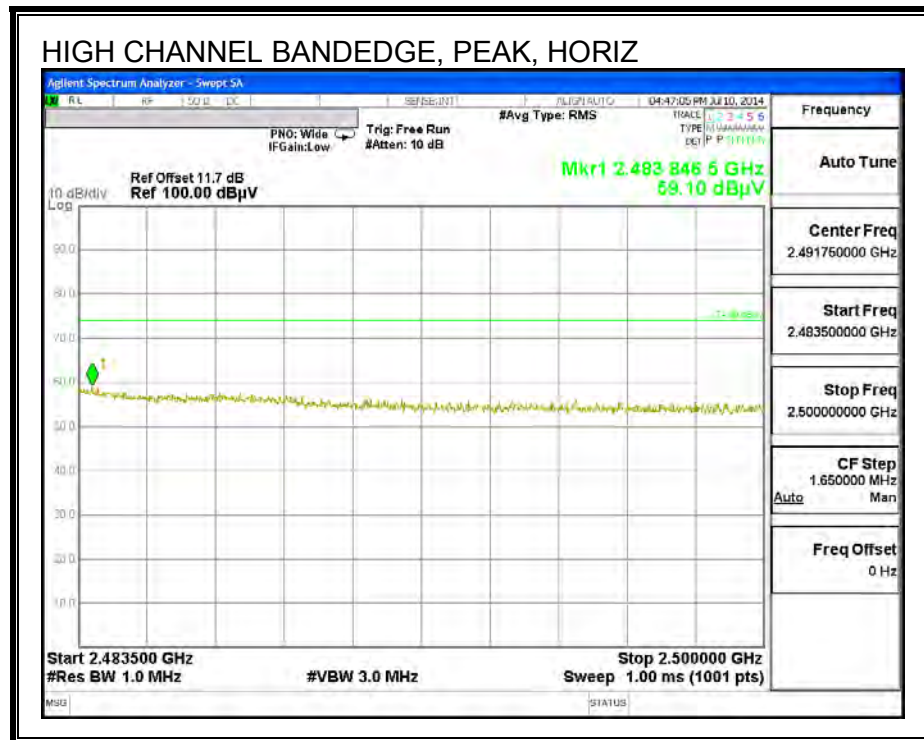
10.2.1.802.11b 1Tx SISO MODE IN THE 2.4 GHz BAND

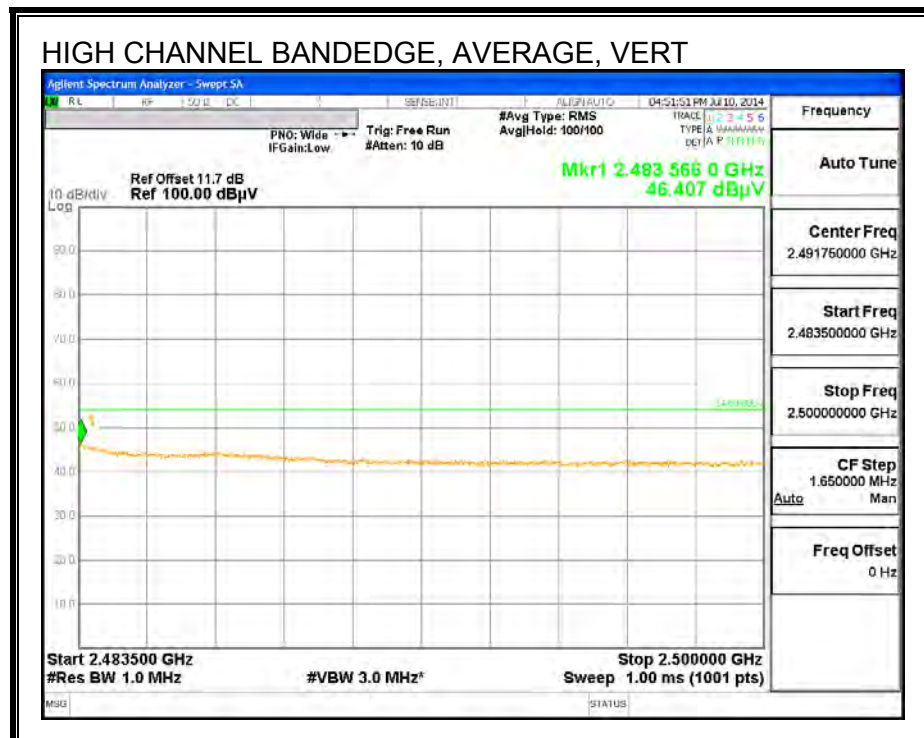
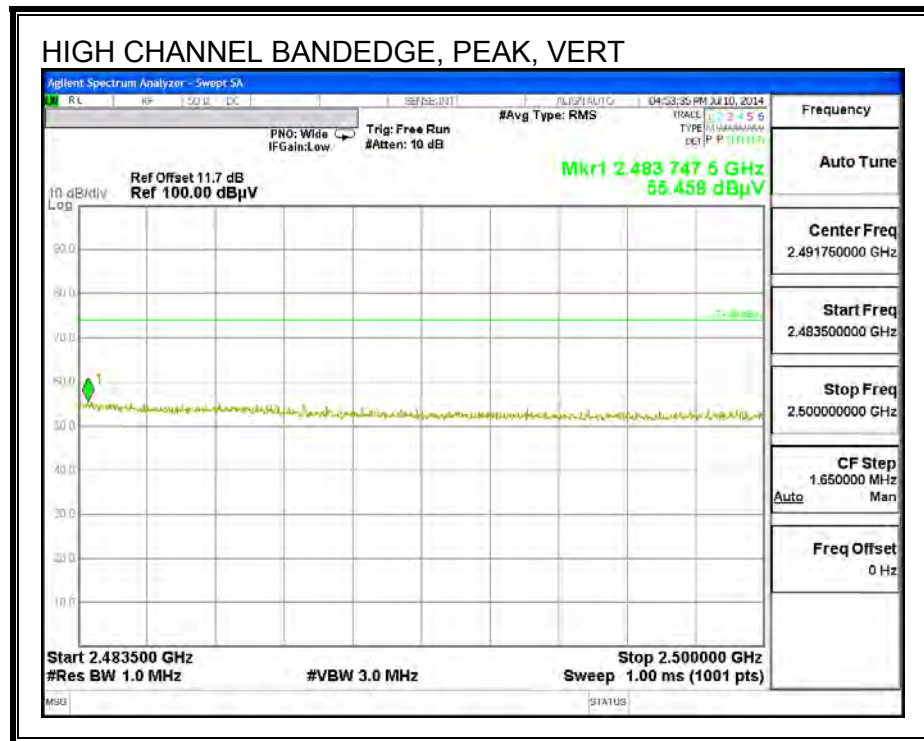
RESTRICTED BANDEDGE (LOW CHANNEL, CHANNEL 1)



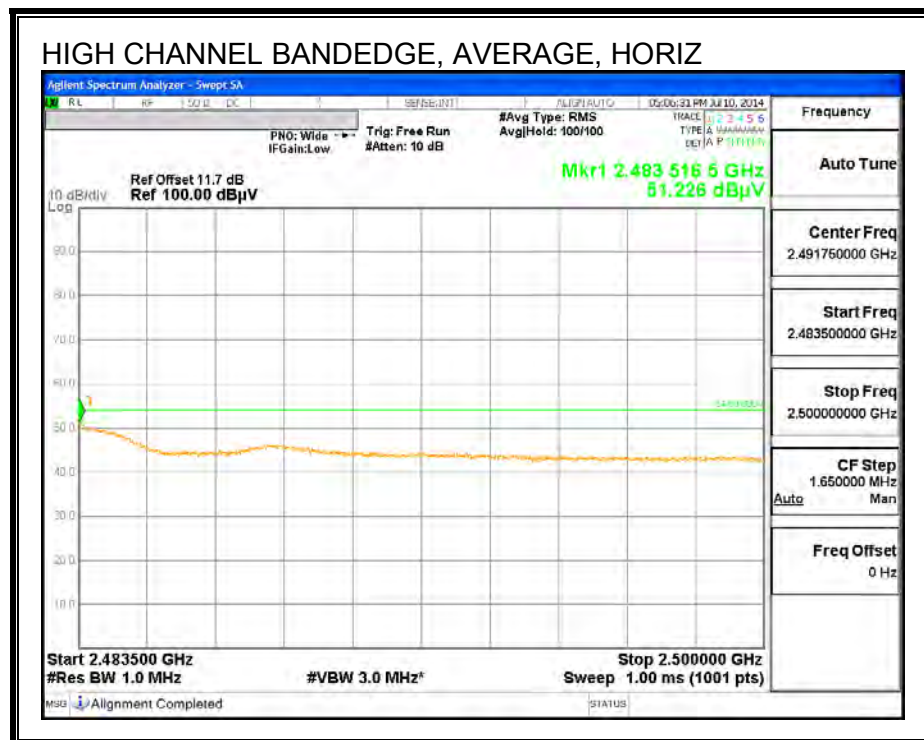
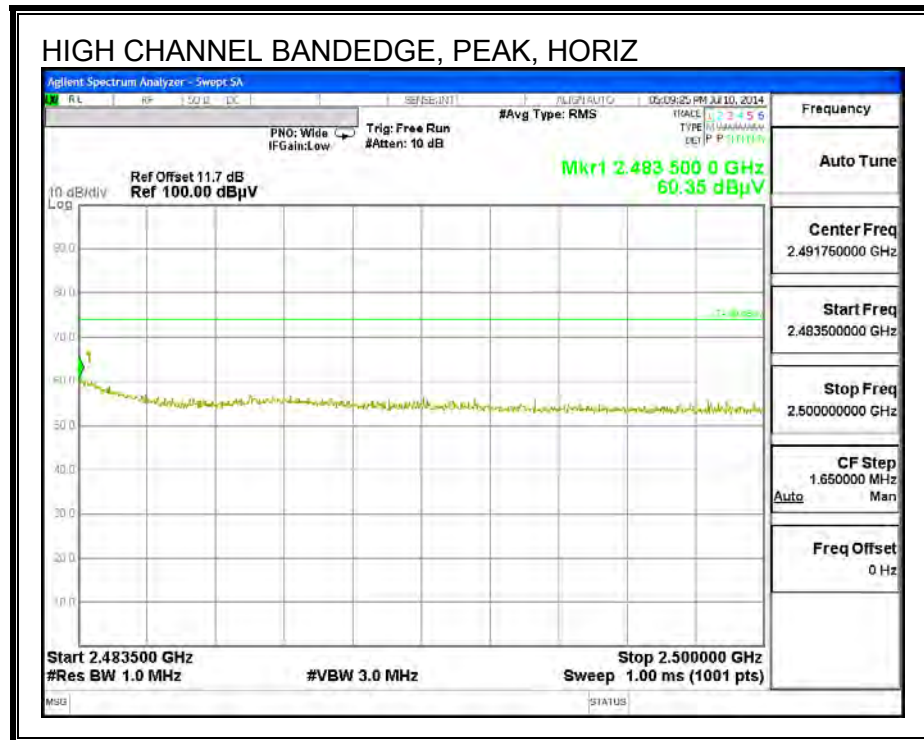


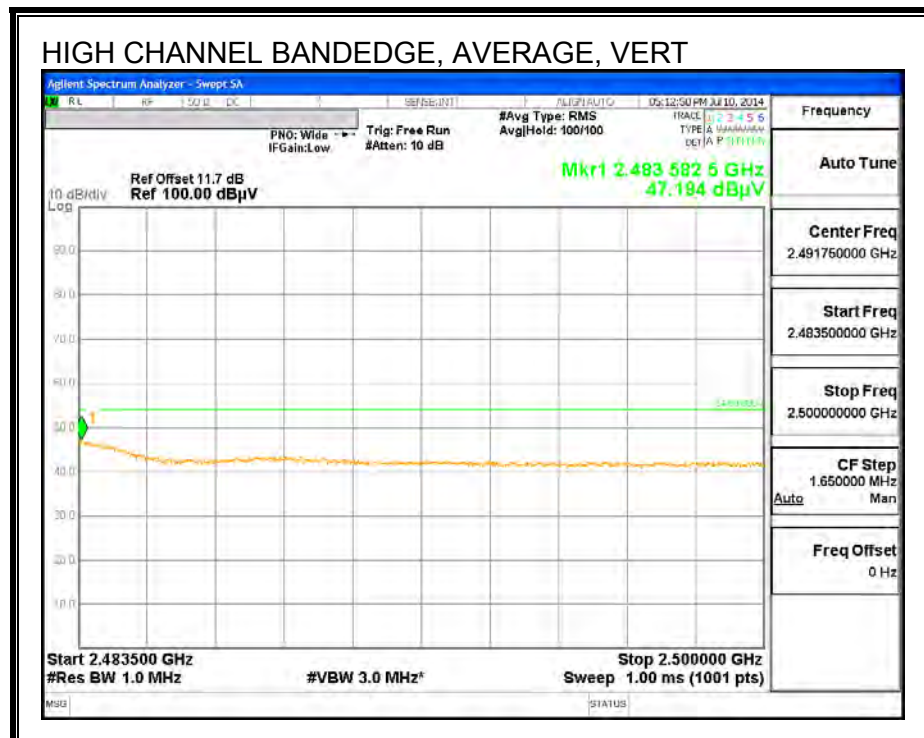
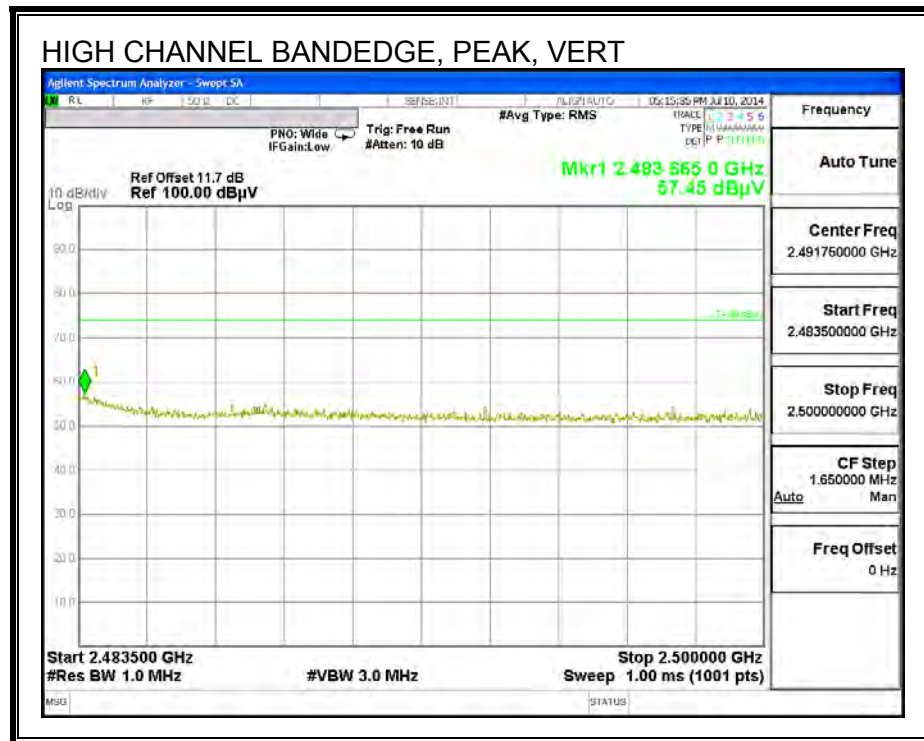
RESTRICTED BANDEDGE (HIGH CHANNEL, CHANNEL 11)



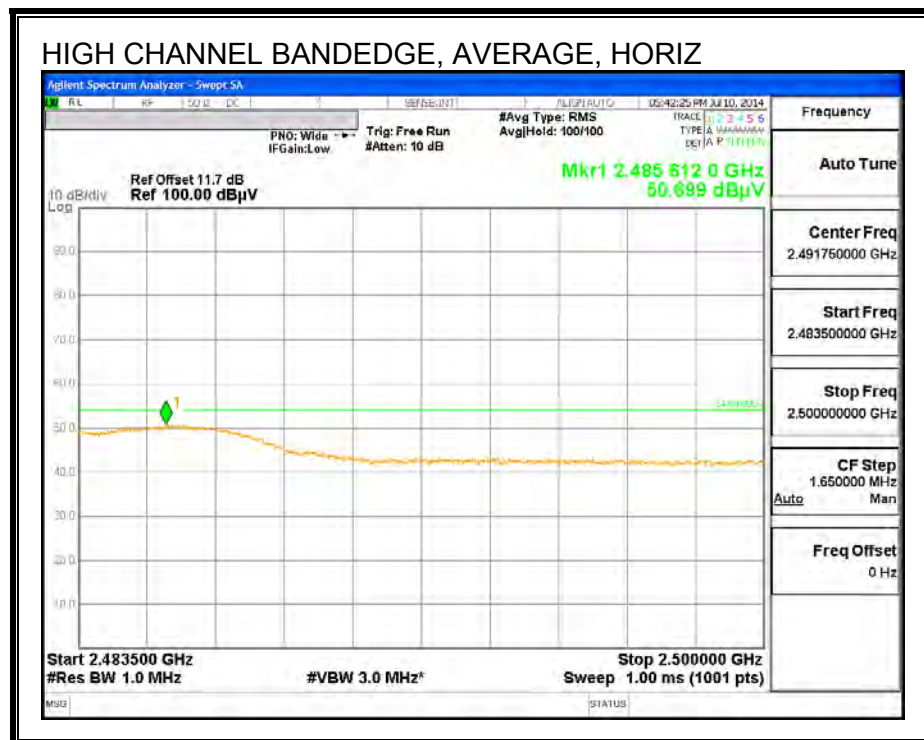
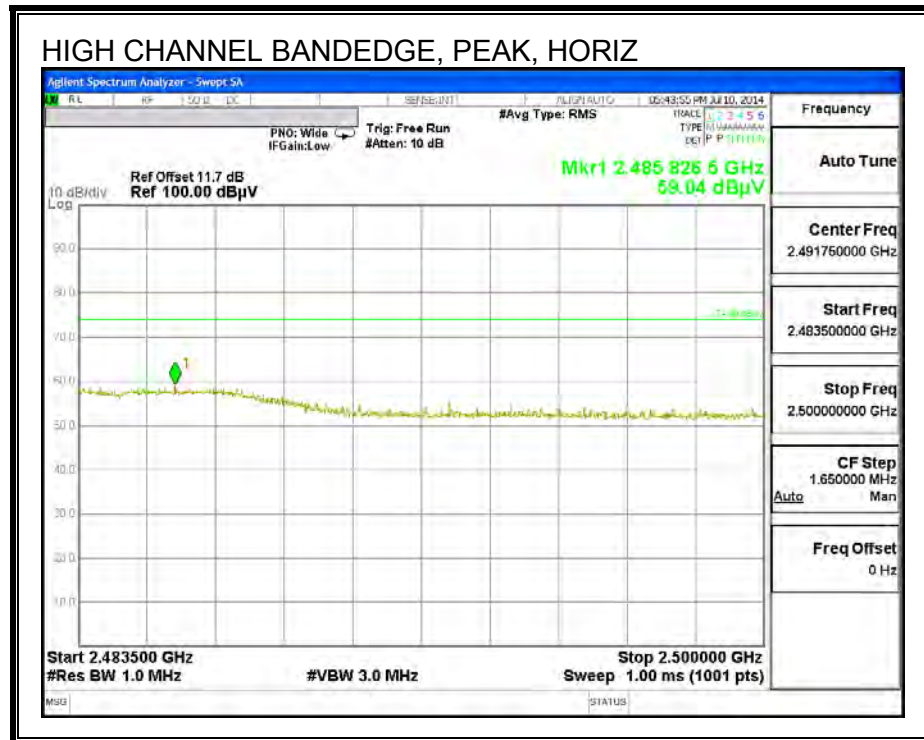


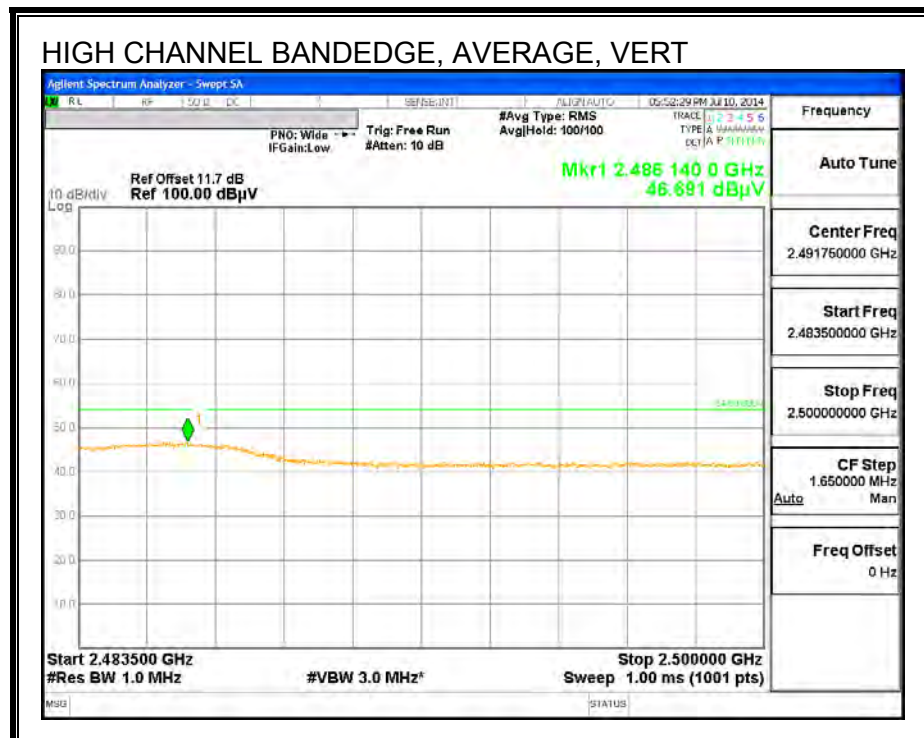
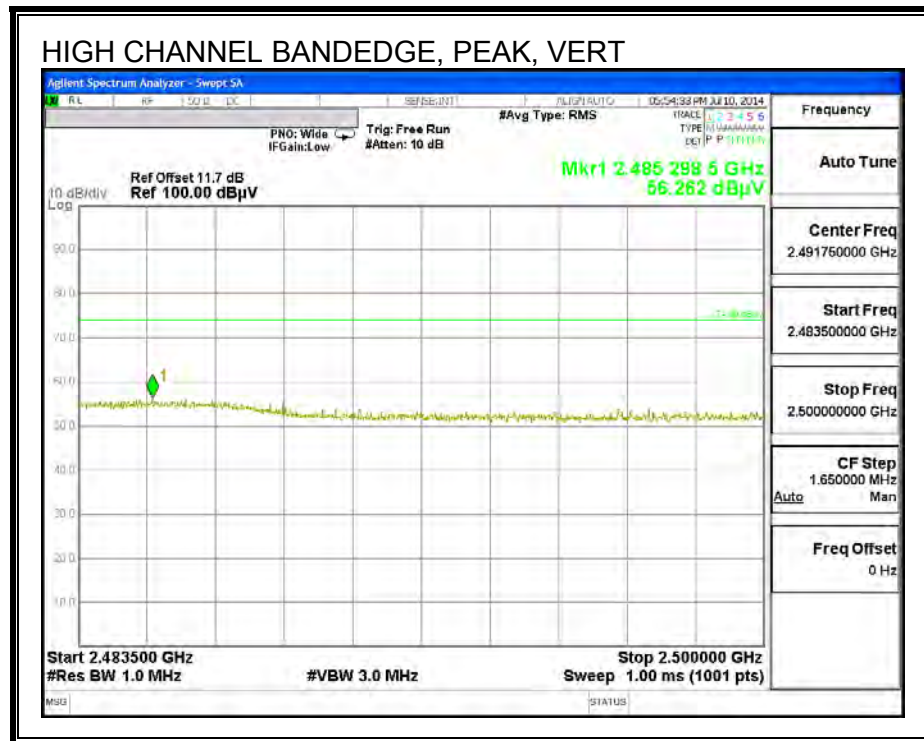
RESTRICTED BANDEDGE (HIGH CHANNEL, CHANNEL 12)





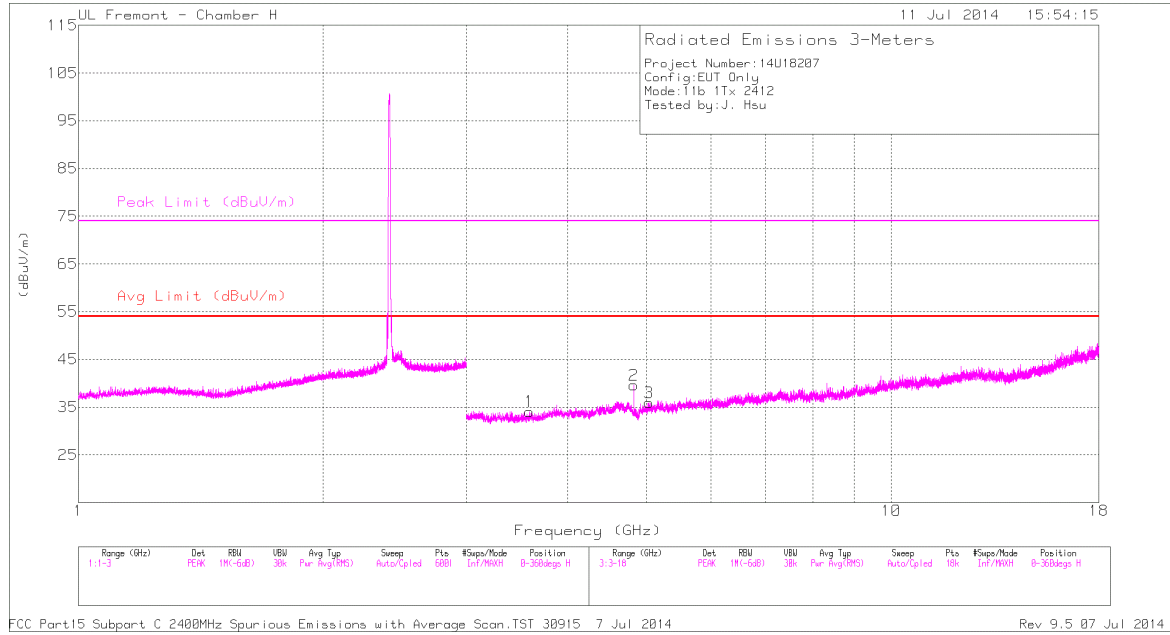
RESTRICTED BANEDGE (HIGH CHANNEL, CHANNEL 13)



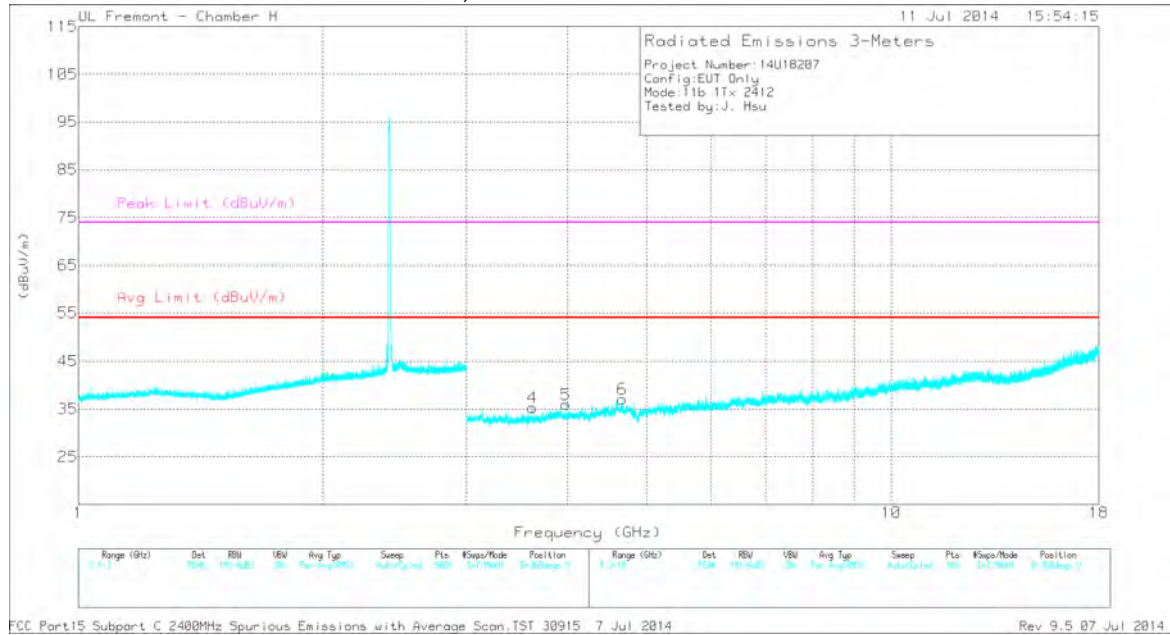


LOW CHANNEL HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL PLOT, CH 1



LOW CHANNEL VERTICAL PLOT, CH 1



DATA

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 3.589	42.04	PK2	32.9	-32.6	42.34	-	-	74	-31.66	324	112	H
* 3.588	30.22	MAv1	32.9	-32.5	30.62	54	-23.38	-	-	324	112	H
* 4.824	44.11	PK2	34.3	-32.3	46.11	-	-	74	-27.89	356	221	H
* 4.824	36.15	MAv1	34.3	-32.3	38.15	54	-15.85	-	-	356	221	H
* 5.029	41.75	PK2	34.3	-32.1	43.95	-	-	74	-30.05	261	196	H
* 5.031	30.49	MAv1	34.3	-32.2	32.59	54	-21.41	-	-	261	196	H
* 3.618	41.42	PK2	33	-33	41.42	-	-	74	-32.58	267	206	V
* 3.618	31	MAv1	33	-33	31	54	-23	-	-	267	206	V
* 3.977	42.35	PK2	33.5	-33.1	42.75	-	-	74	-31.25	318	192	V
* 3.975	31.33	MAv1	33.5	-33.2	31.63	54	-22.37	-	-	318	192	V
* 4.67	41.49	PK2	34.2	-31.9	43.79	-	-	74	-30.21	261	221	V
* 4.672	30.83	MAv1	34.2	-31.9	33.13	54	-20.87	-	-	261	221	V

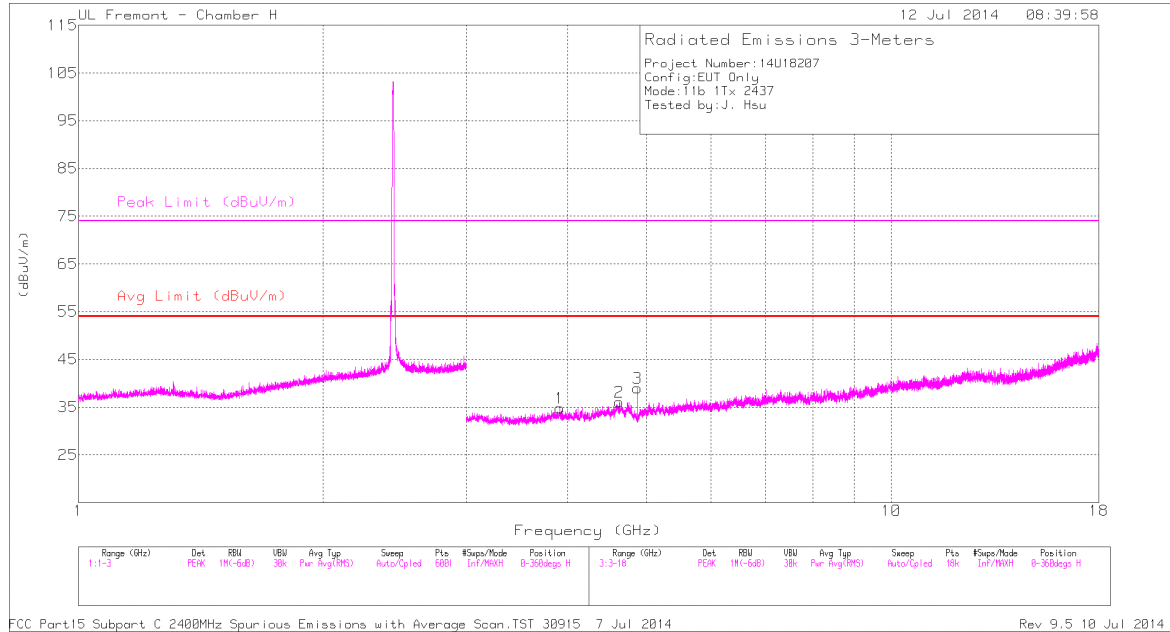
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK2 - KDB558074 Method: Maximum Peak

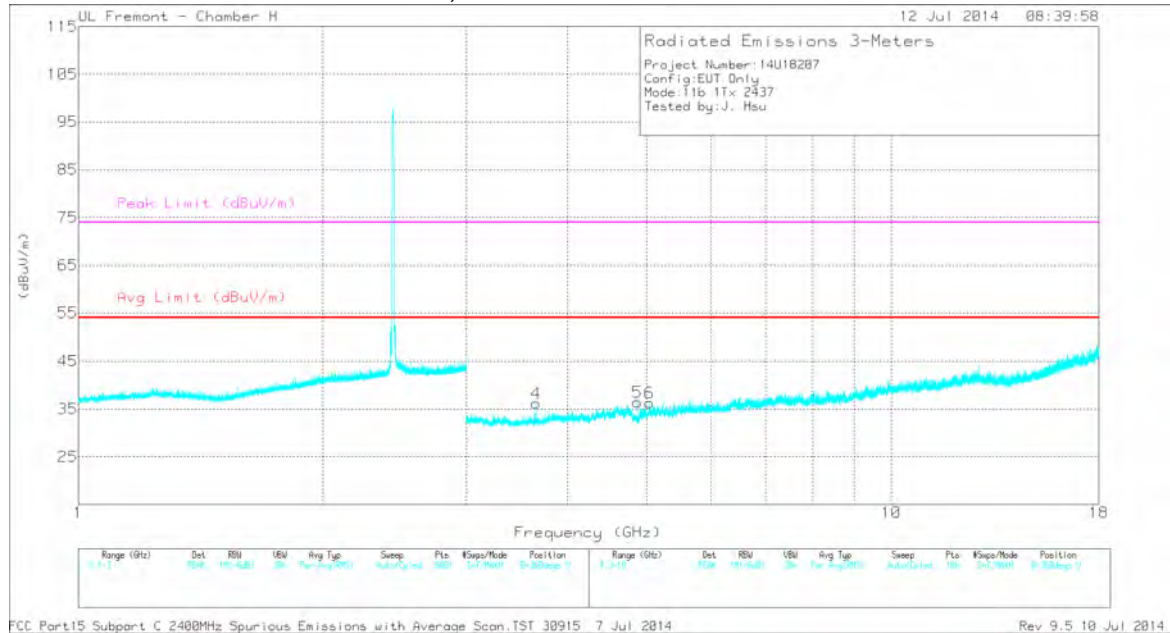
MAv1 - KDB558074 Option 1 Maximum RMS Average

MID CHANNEL HARMONICS AND SPURIOUS EMISSIONS

MID CHANNEL HORIZONTAL PLOT, CH 6



MID CHANNEL VERTICAL PLOT, CH 6



DATA

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 3.913	41.54	PK2	33.4	-33	41.94	-	-	74	-32.06	67	114	H
* 3.911	30.9	MAv1	33.4	-33	31.3	54	-22.7	-	-	67	114	H
* 4.629	41.53	PK2	34.2	-32.1	43.63	-	-	74	-30.37	106	148	H
* 4.629	29.94	MAv1	34.2	-32.1	32.04	54	-21.96	-	-	106	148	H
* 4.874	42.63	PK2	34.3	-32.2	44.73	-	-	74	-29.27	305	197	H
* 4.874	36.36	MAv1	34.3	-32.2	38.46	54	-15.54	-	-	305	197	H
* 3.655	44.22	PK2	33	-32.9	44.32	-	-	74	-29.68	11	290	V
* 3.655	36.17	MAv1	33	-32.9	36.27	54	-17.73	-	-	11	290	V
* 4.874	41.68	PK2	34.3	-32.2	43.78	-	-	74	-30.22	33	117	V
* 4.874	33.86	MAv1	34.3	-32.2	35.96	54	-18.04	-	-	33	117	V
* 5.042	41.01	PK2	34.4	-32.2	43.21	-	-	74	-30.79	86	138	V
* 5.041	30.35	MAv1	34.4	-32.2	32.55	54	-21.45	-	-	86	138	V

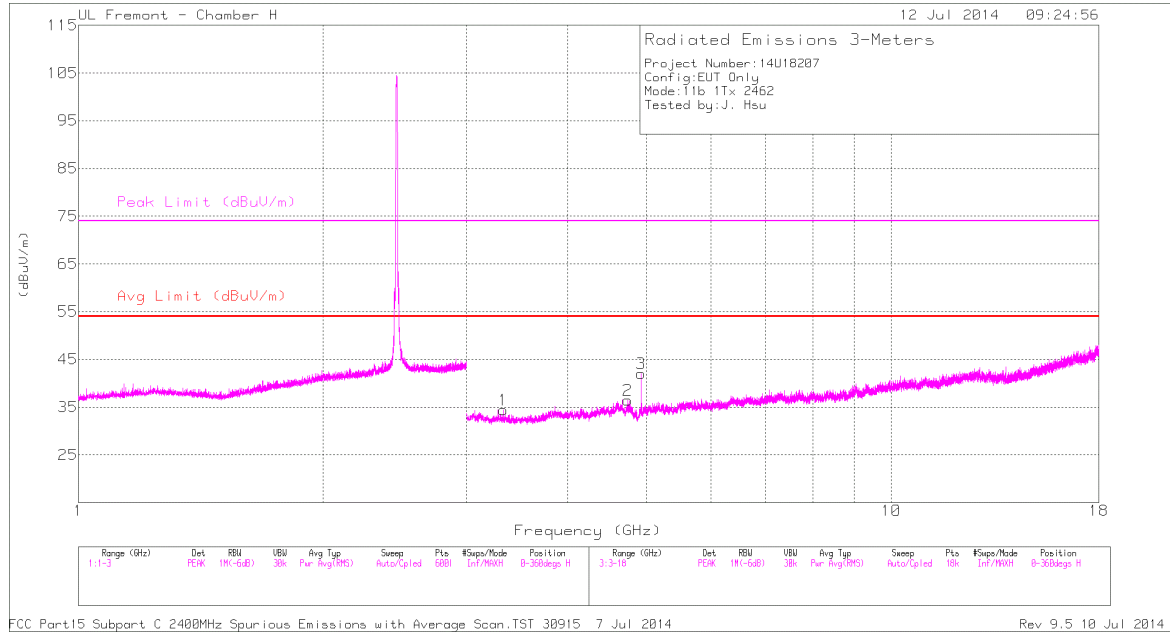
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK2 - KDB558074 Method: Maximum Peak

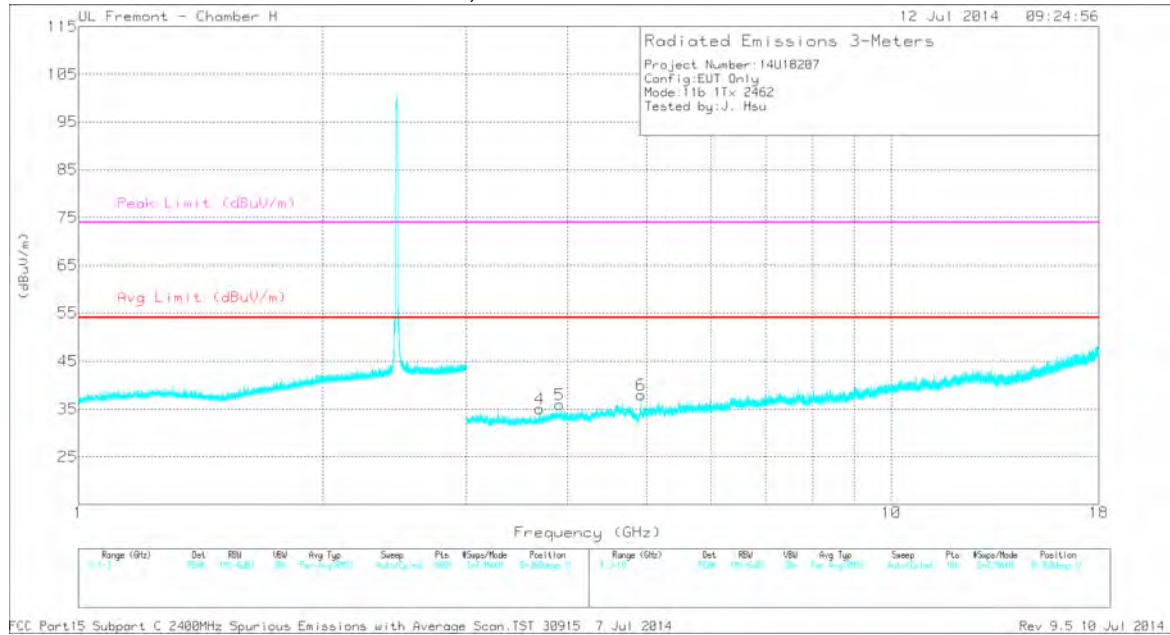
MAv1 - KDB558074 Option 1 Maximum RMS Average

HIGH CHANNEL, CH11 2462MHZ, HARMONICS AND SPURIOUS EMISSIONS

HIGH CHANNEL HORIZONTAL PLOT, CH 11



HIGH CHANNEL VERTICAL PLOT, CH 11



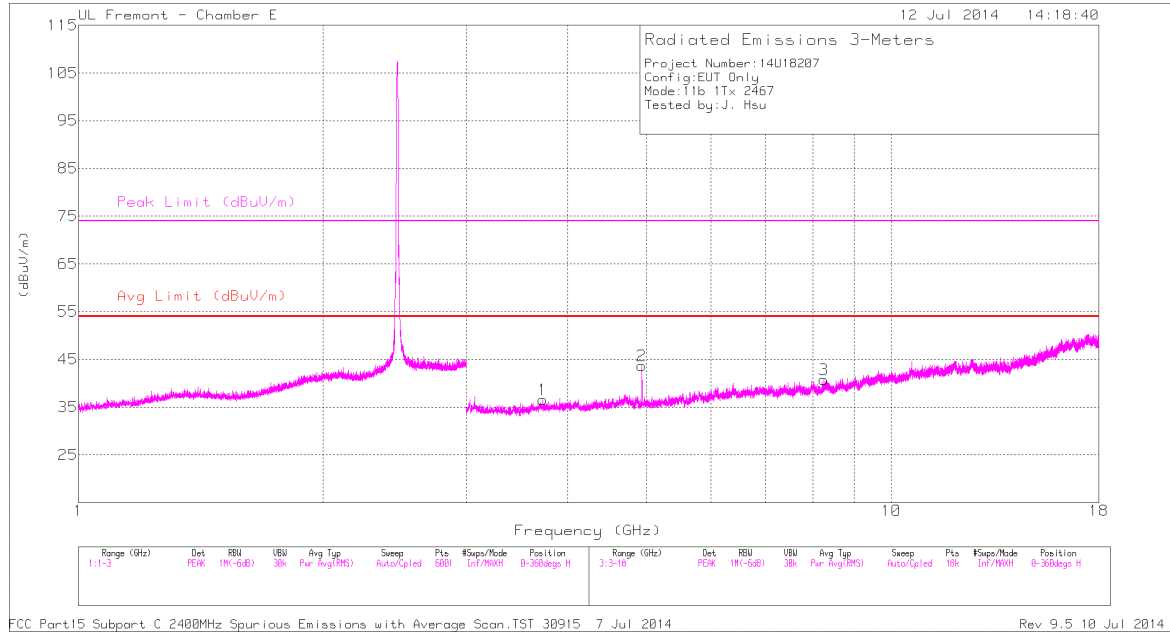
DATA

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 3.332	41.63	PK2	32.9	-32.4	42.13	-	-	74	-31.87	97	154	H
* 3.332	29.92	MAv1	32.9	-32.4	30.42	54	-23.58	-	-	97	154	H
* 4.742	40.66	PK2	34.3	-32.1	42.86	-	-	74	-31.14	131	140	H
* 4.742	30.13	MAv1	34.3	-32.1	32.33	54	-21.67	-	-	131	140	H
* 4.924	45.1	PK2	34.3	-32.1	47.3	-	-	74	-26.7	32	246	H
* 4.924	39.06	MAv1	34.3	-32.1	41.26	54	-12.74	-	-	32	246	H
* 3.693	42.3	PK2	33.1	-32.7	42.7	-	-	74	-31.3	103	204	V
* 3.693	31.5	MAv1	33.1	-32.7	31.9	54	-22.1	-	-	103	204	V
* 3.905	41.8	PK2	33.4	-32.8	42.4	-	-	74	-31.6	156	227	V
* 3.906	31.26	MAv1	33.4	-32.8	31.86	54	-22.14	-	-	156	227	V
* 4.924	43.67	PK2	34.3	-32.1	45.87	-	-	74	-28.13	353	122	V
* 4.924	36.29	MAv1	34.3	-32.1	38.49	54	-15.51	-	-	353	122	V

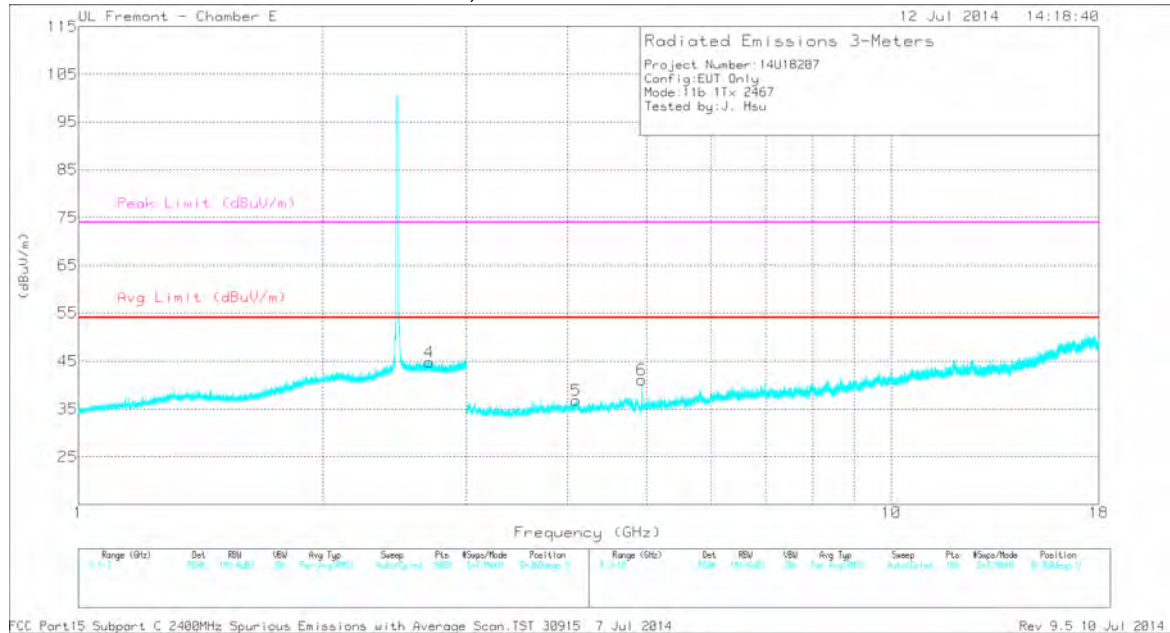
PK2 - KDB558074 Method: Maximum Peak
MAv1 - KDB558074 Option 1 Maximum RMS Average

HIGH CHANNEL, CH12 2467MHz, HARMONICS AND SPURIOUS EMISSIONS

HIGH CHANNEL HORIZONTAL PLOT, CH 12



HIGH CHANNEL VERTICAL PLOT, CH 12



DATA

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 2.704	43.42	PK2	32.5	-23.9	52.02	-	-	74	-21.98	11	124	V
* 2.705	32.14	MAv1	32.5	-23.9	40.74	54	-13.26	-	-	11	124	V
* 3.727	41.26	PK2	33.4	-30.8	43.86	-	-	74	-30.14	119	156	H
* 3.725	30.56	MAv1	33.4	-30.8	33.16	54	-20.84	-	-	119	156	H
* 4.934	44.51	PK2	34.1	-30.4	48.21	-	-	74	-25.79	41	186	H
* 4.934	38.73	MAv1	34.1	-30.4	42.43	54	-11.57	-	-	41	186	H
* 8.262	38.2	PK2	35.9	-26.5	47.6	-	-	74	-26.4	150	216	H
* 8.261	27.33	MAv1	35.9	-26.5	36.73	54	-17.27	-	-	150	216	H
* 4.093	41.46	PK2	33.5	-30.6	44.36	-	-	74	-29.64	199	199	V
* 4.09	30.24	MAv1	33.5	-30.6	33.14	54	-20.86	-	-	199	199	V
* 4.093	40.91	PK2	33.5	-30.6	43.81	-	-	74	-30.19	176	209	V
* 4.092	29.7	MAv1	33.5	-30.6	32.6	54	-21.4	-	-	176	209	V
* 4.933	39.17	PK2	34.1	-30.4	42.87	-	-	74	-31.13	218	192	V
* 4.934	28.97	MAv1	34.1	-30.4	32.67	54	-21.33	-	-	218	192	V

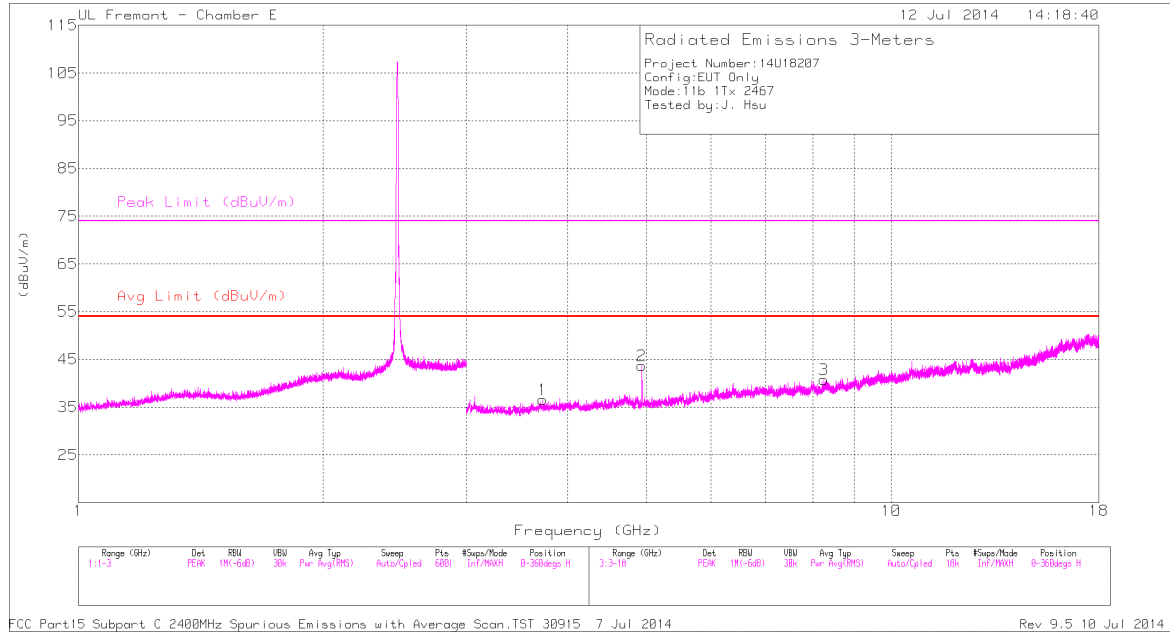
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK2 - KDB558074 Method: Maximum Peak

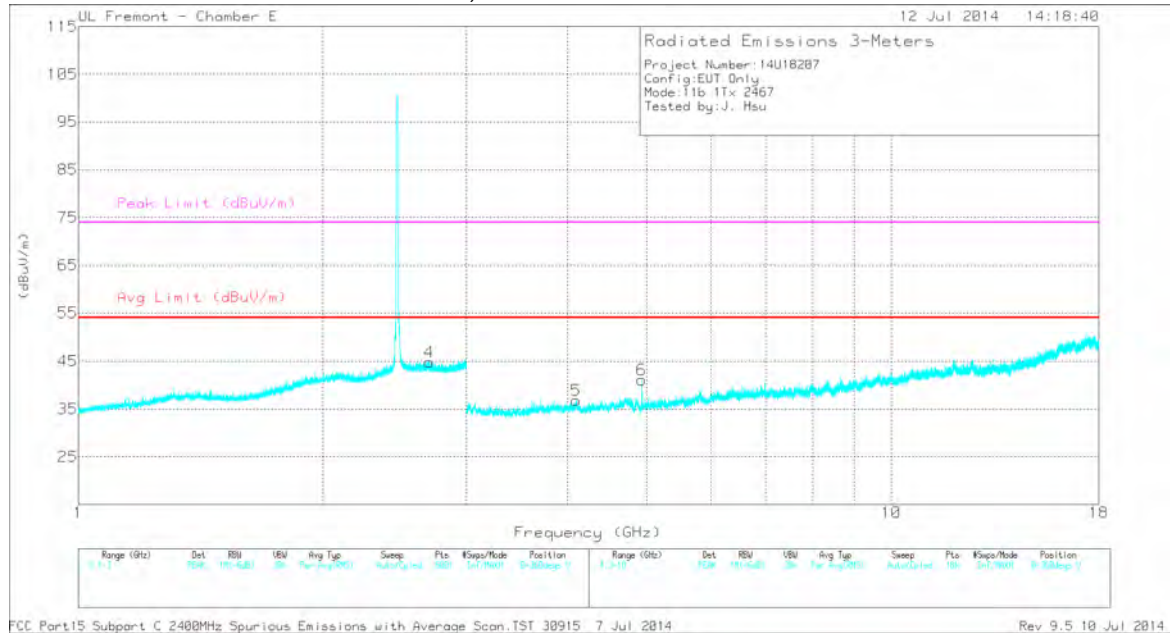
MAv1 - KDB558074 Option 1 Maximum RMS Average

HIGH CHANNEL, CH13 2472MHZ, HARMONICS AND SPURIOUS EMISSIONS

HIGH CHANNEL HORIZONTAL PLOT, CH 13



HIGH CHANNEL VERTICAL PLOT, CH 13



DATA

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 2.704	43.42	PK2	32.5	-23.9	52.02	-	-	74	-21.98	11	124	V
* 2.705	32.14	MAv1	32.5	-23.9	40.74	54	-13.26	-	-	11	124	V
* 3.727	41.26	PK2	33.4	-30.8	43.86	-	-	74	-30.14	119	156	H
* 3.725	30.56	MAv1	33.4	-30.8	33.16	54	-20.84	-	-	119	156	H
* 4.934	44.51	PK2	34.1	-30.4	48.21	-	-	74	-25.79	41	186	H
* 4.934	38.73	MAv1	34.1	-30.4	42.43	54	-11.57	-	-	41	186	H
* 8.262	38.2	PK2	35.9	-26.5	47.6	-	-	74	-26.4	150	216	H
* 8.261	27.33	MAv1	35.9	-26.5	36.73	54	-17.27	-	-	150	216	H
* 4.093	41.46	PK2	33.5	-30.6	44.36	-	-	74	-29.64	199	199	V
* 4.09	30.24	MAv1	33.5	-30.6	33.14	54	-20.86	-	-	199	199	V
* 4.093	40.91	PK2	33.5	-30.6	43.81	-	-	74	-30.19	176	209	V
* 4.092	29.7	MAv1	33.5	-30.6	32.6	54	-21.4	-	-	176	209	V
* 4.933	39.17	PK2	34.1	-30.4	42.87	-	-	74	-31.13	218	192	V
* 4.934	28.97	MAv1	34.1	-30.4	32.67	54	-21.33	-	-	218	192	V

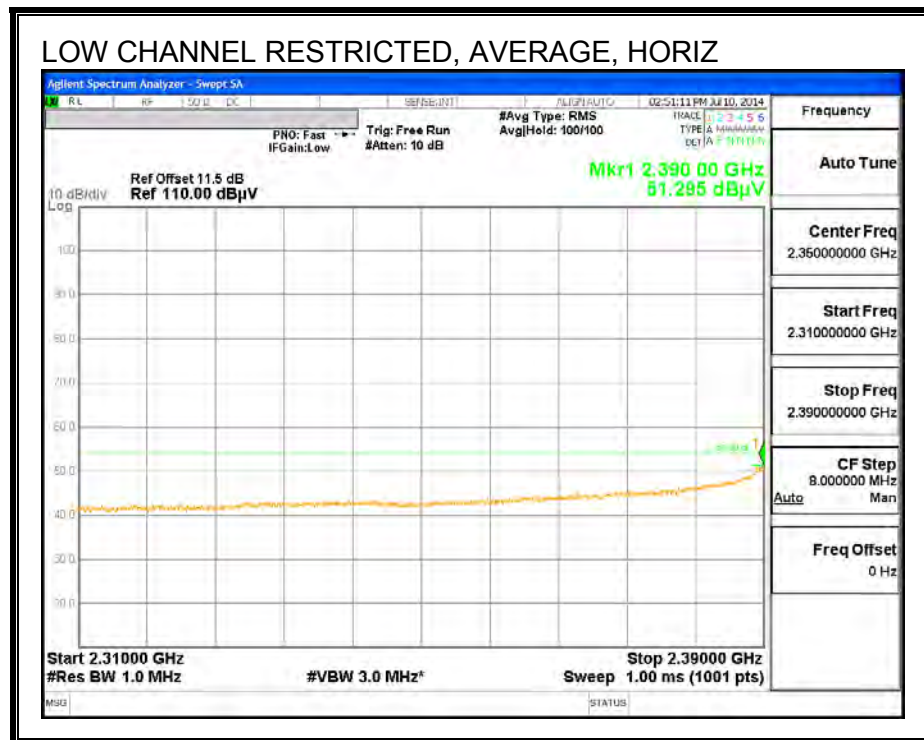
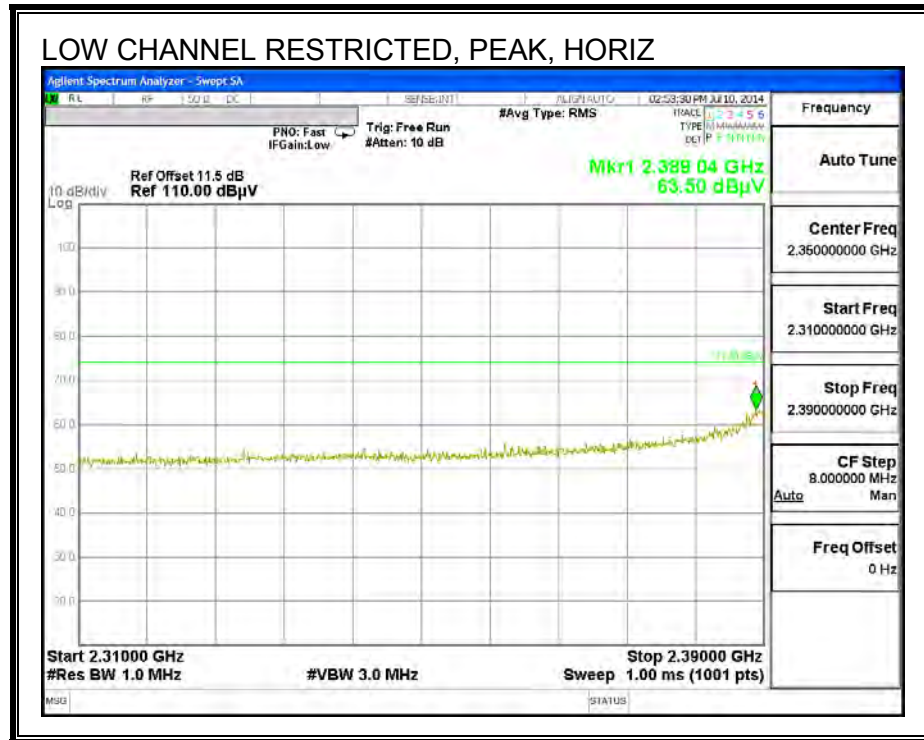
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

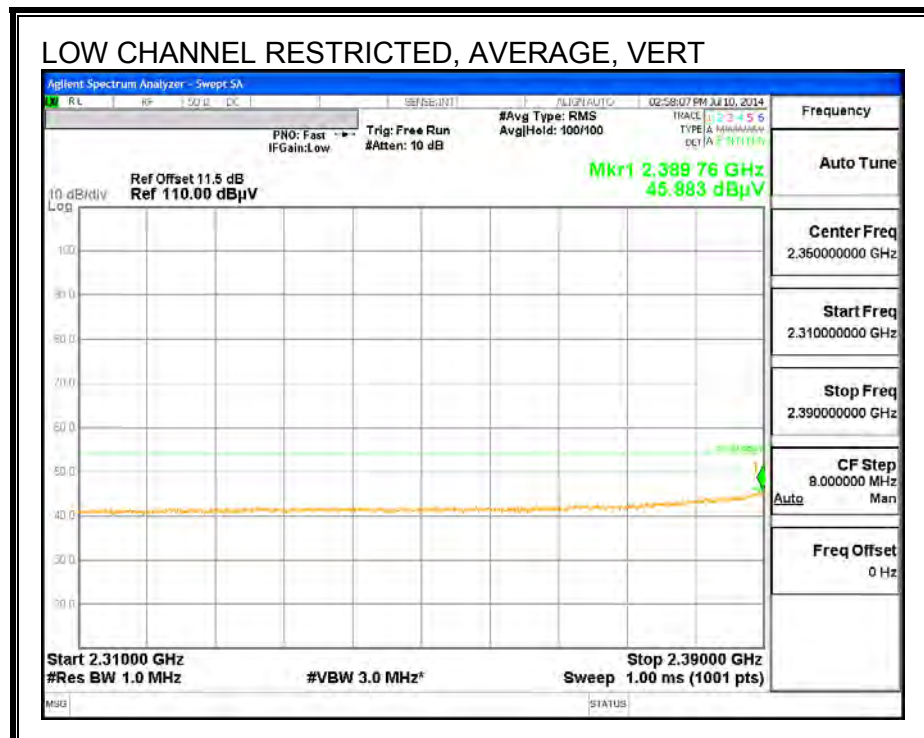
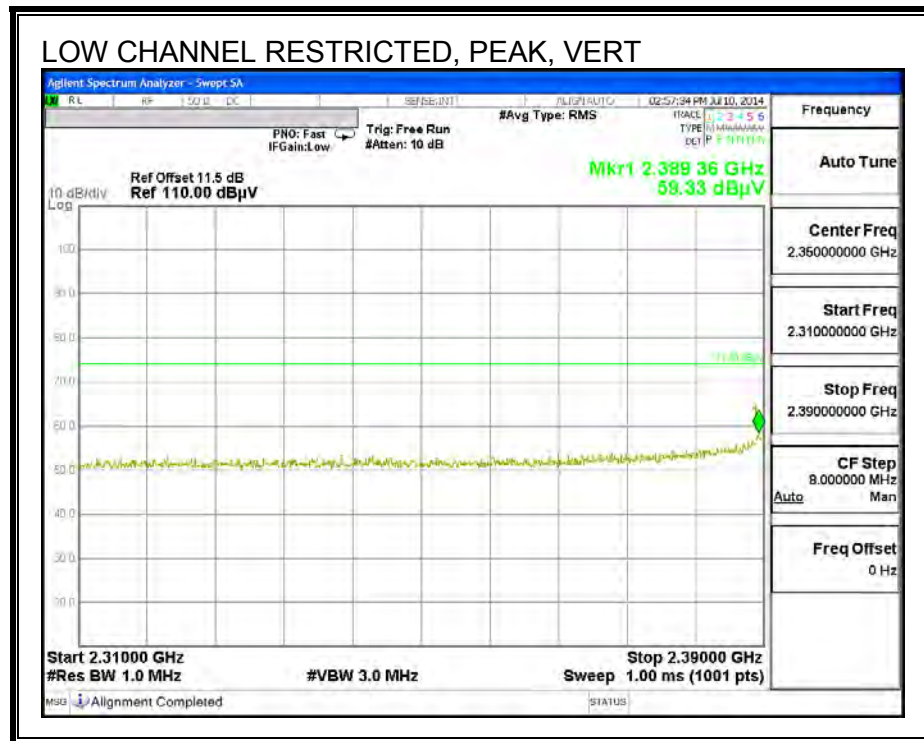
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

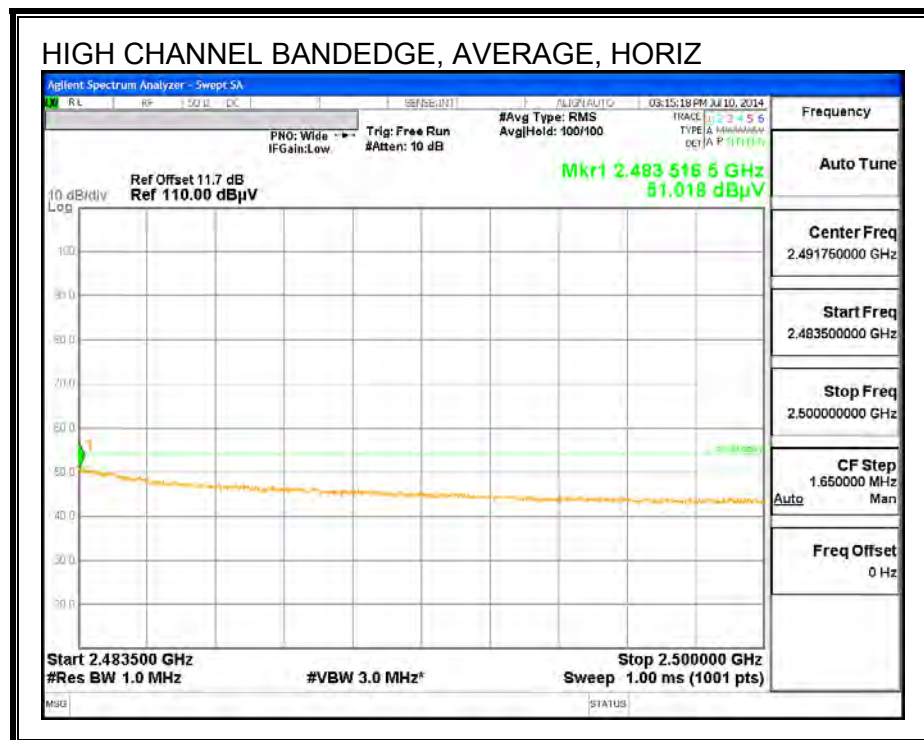
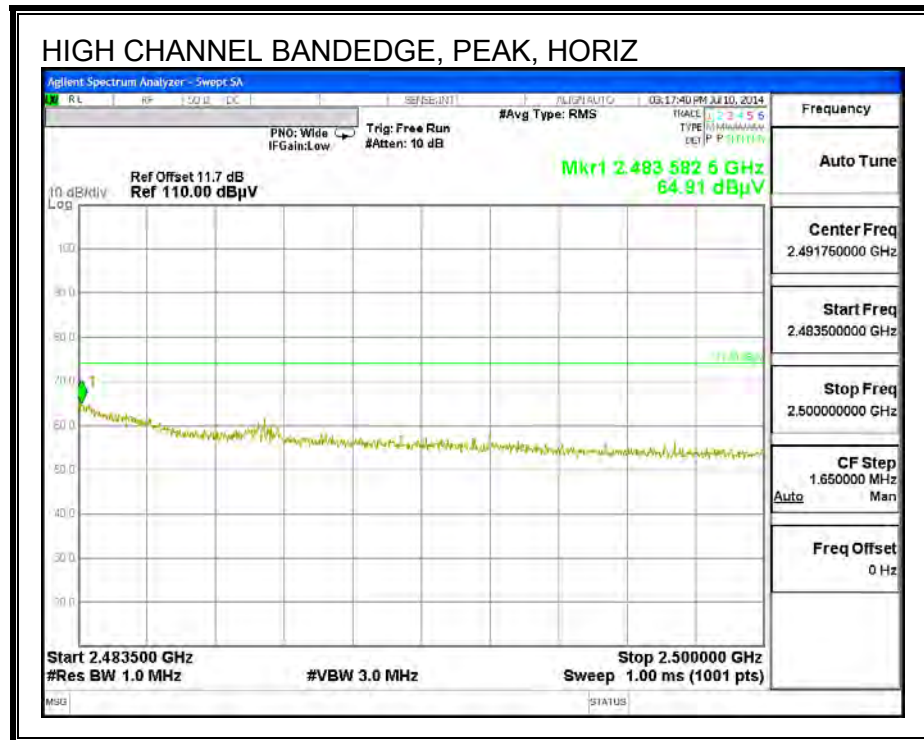
10.2.2. 802.11g 1Tx SISO MODE IN THE 2.4 GHz BAND

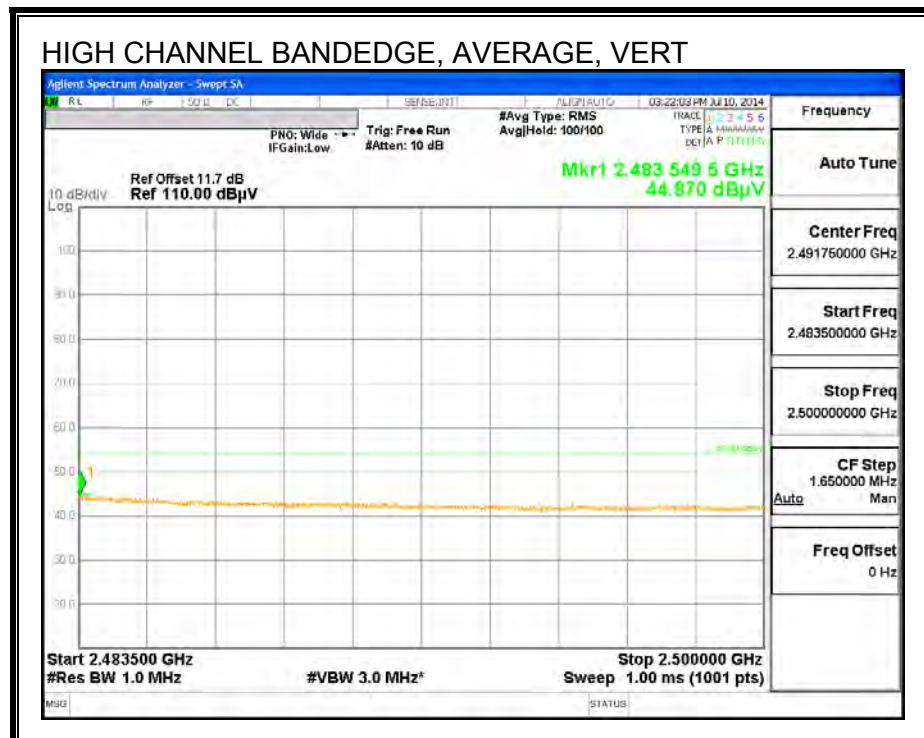
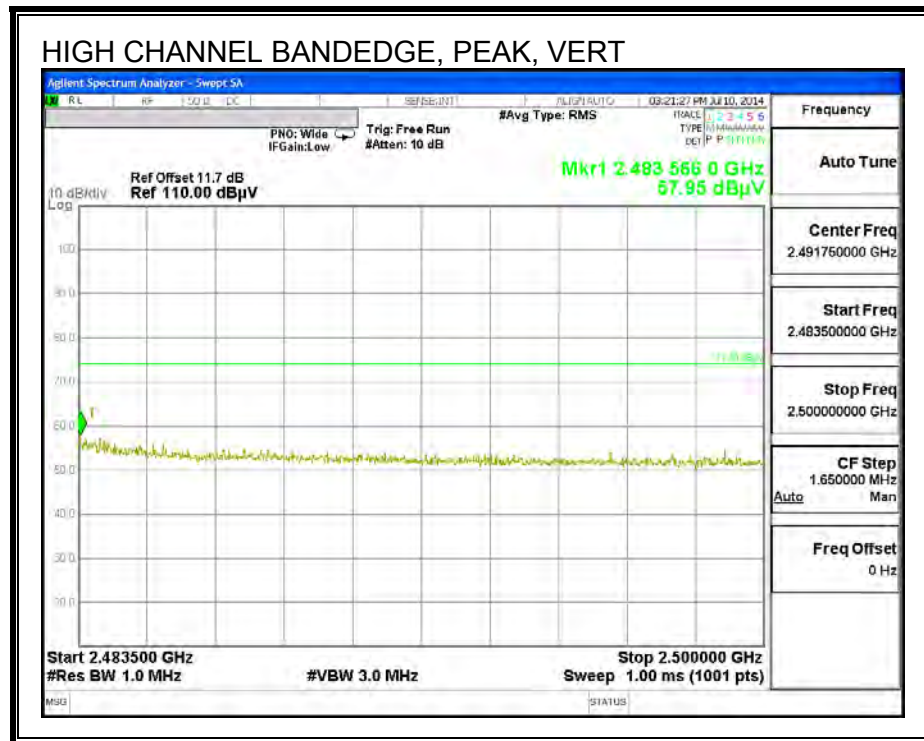
RESTRICTED BANDEDGE (LOW CHANNEL, CHANNEL 1)



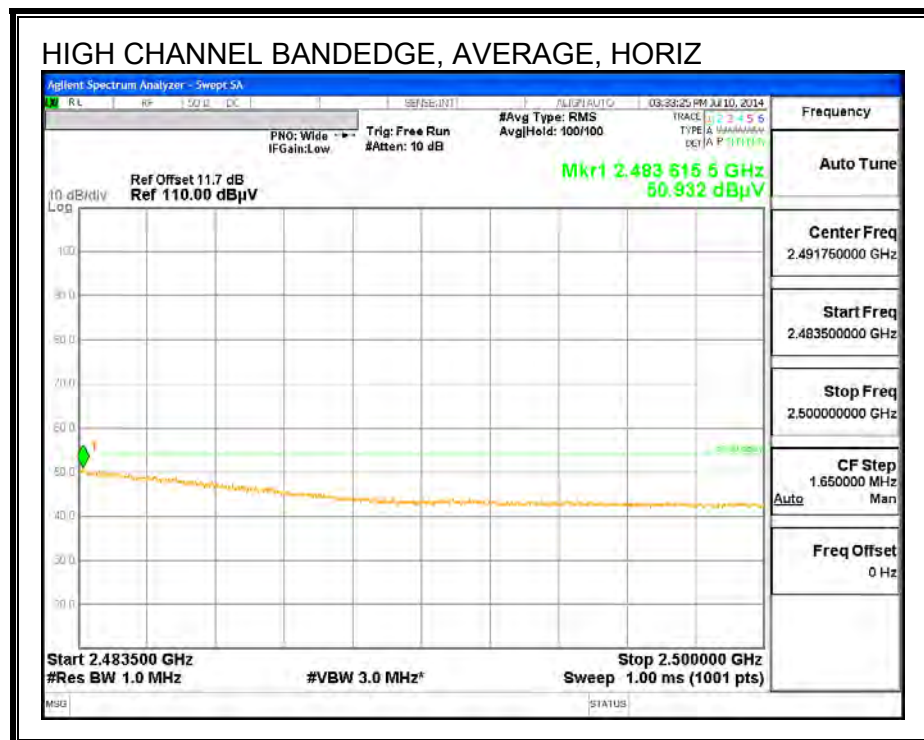
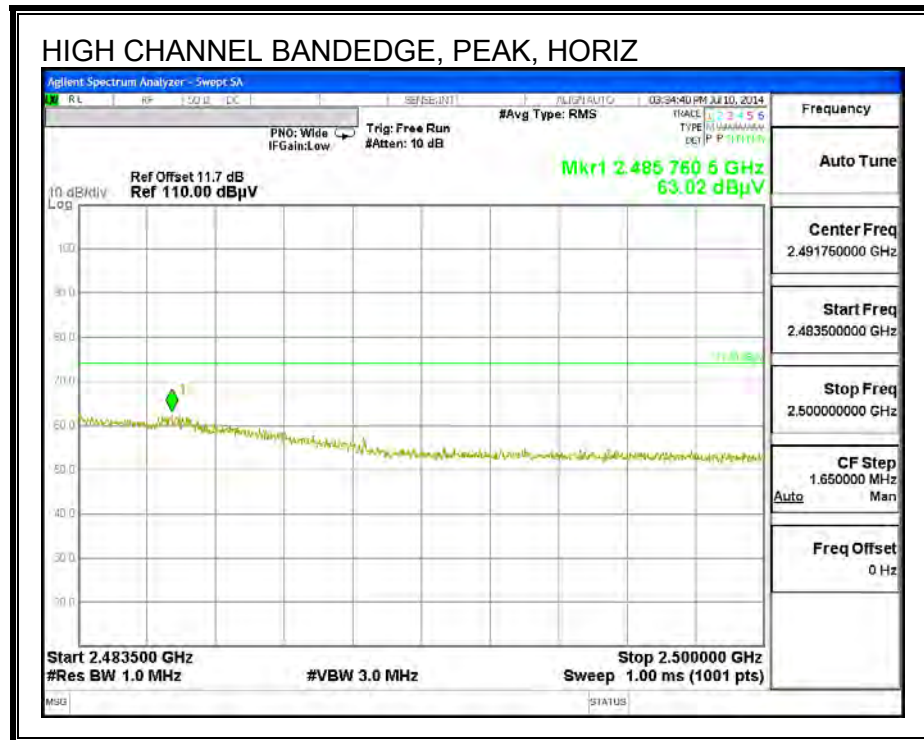


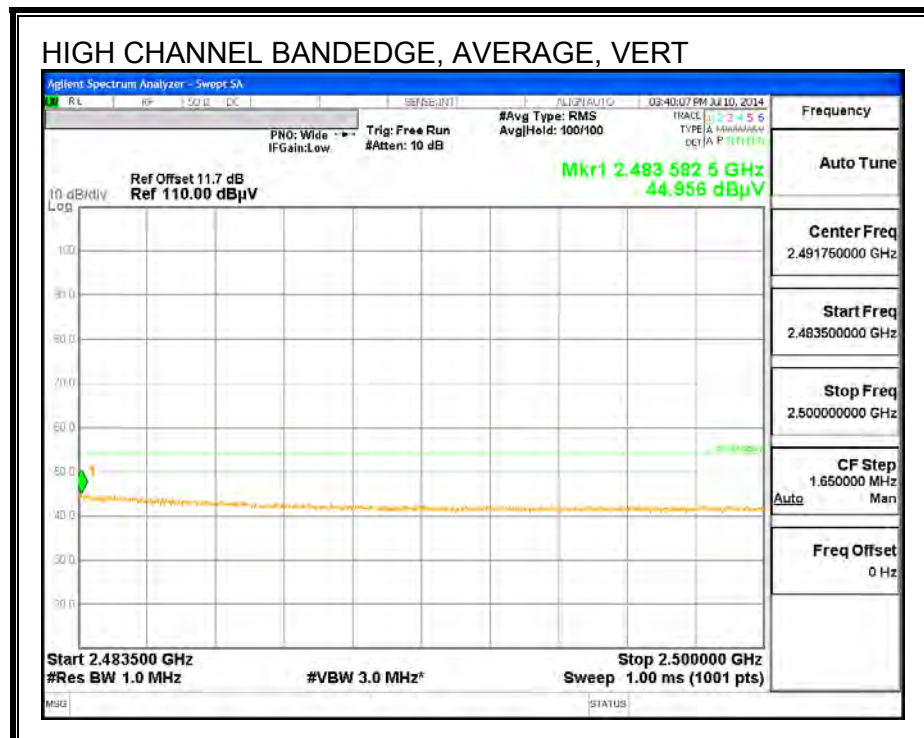
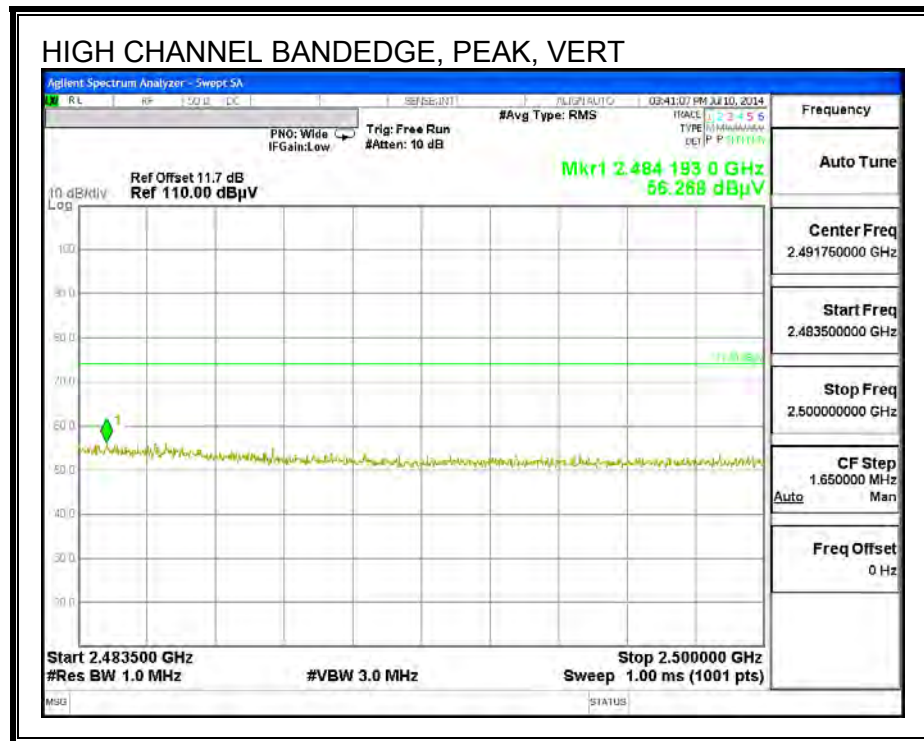
RESTRICTED BANDEDGE (HIGH CHANNEL, CHANNEL 11)



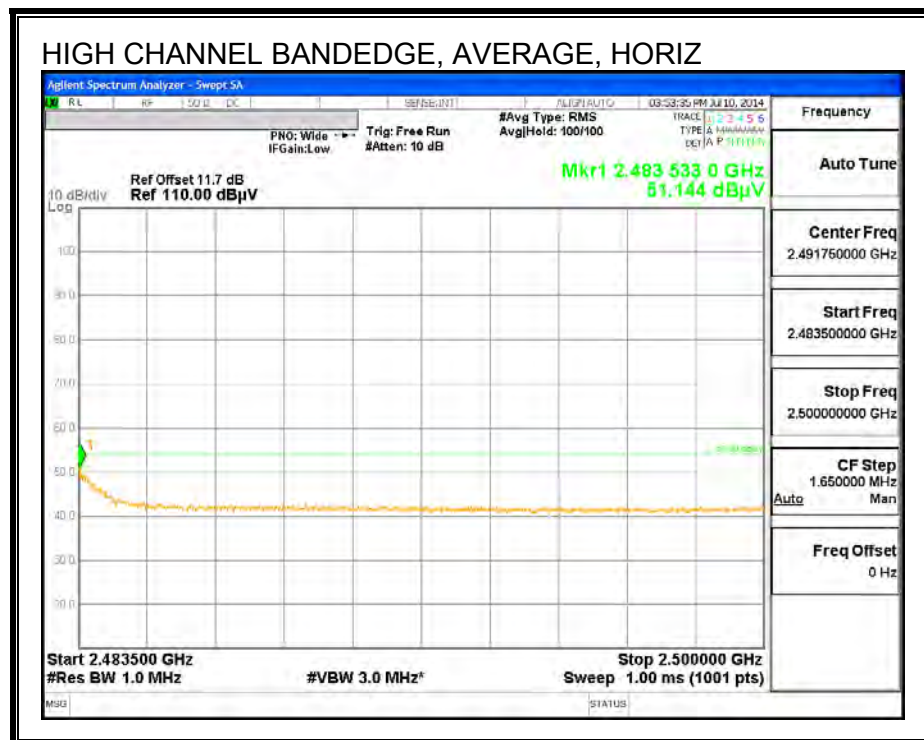
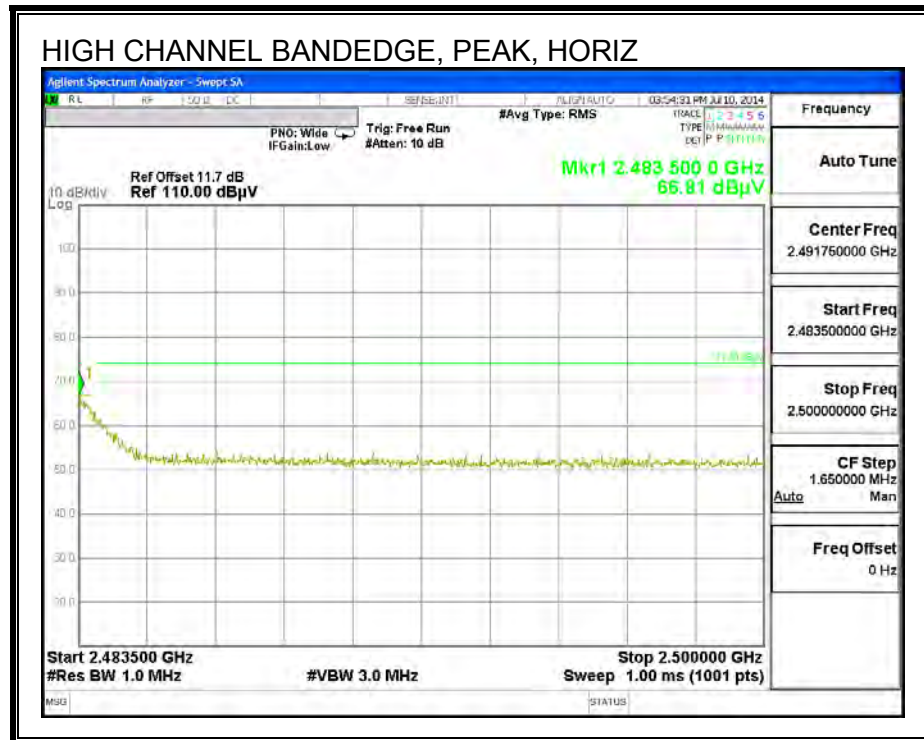


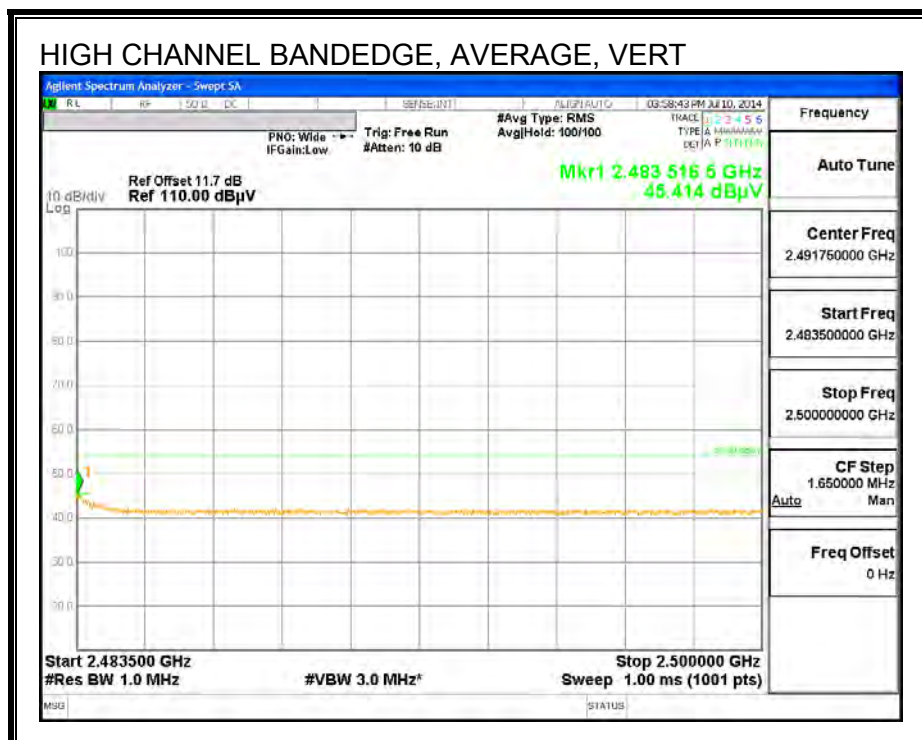
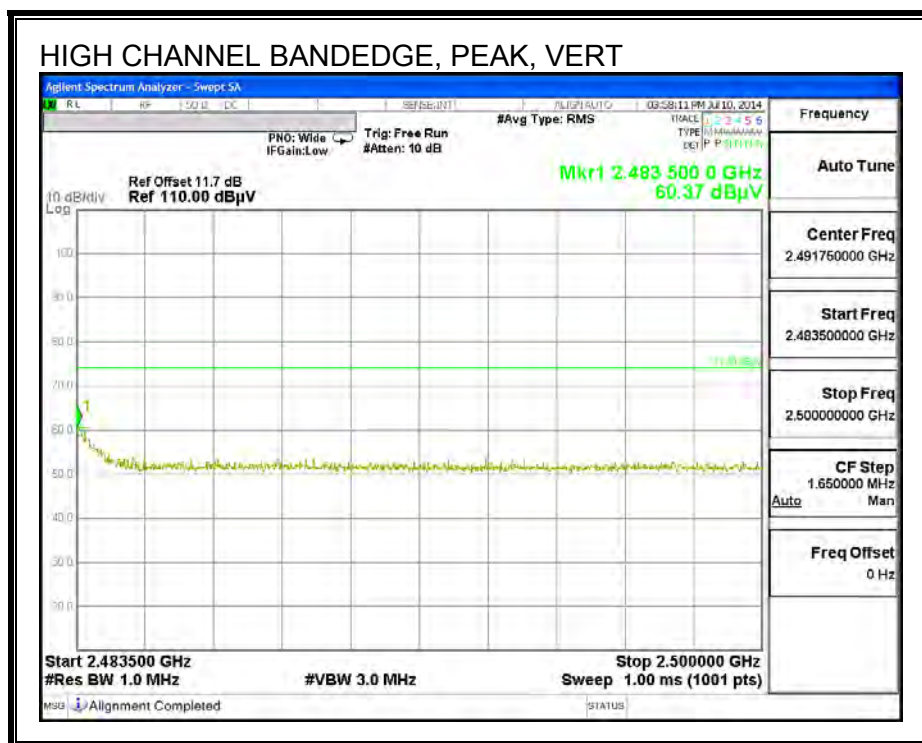
RESTRICTED BANDEDGE (HIGH CHANNEL, CHANNEL 12)





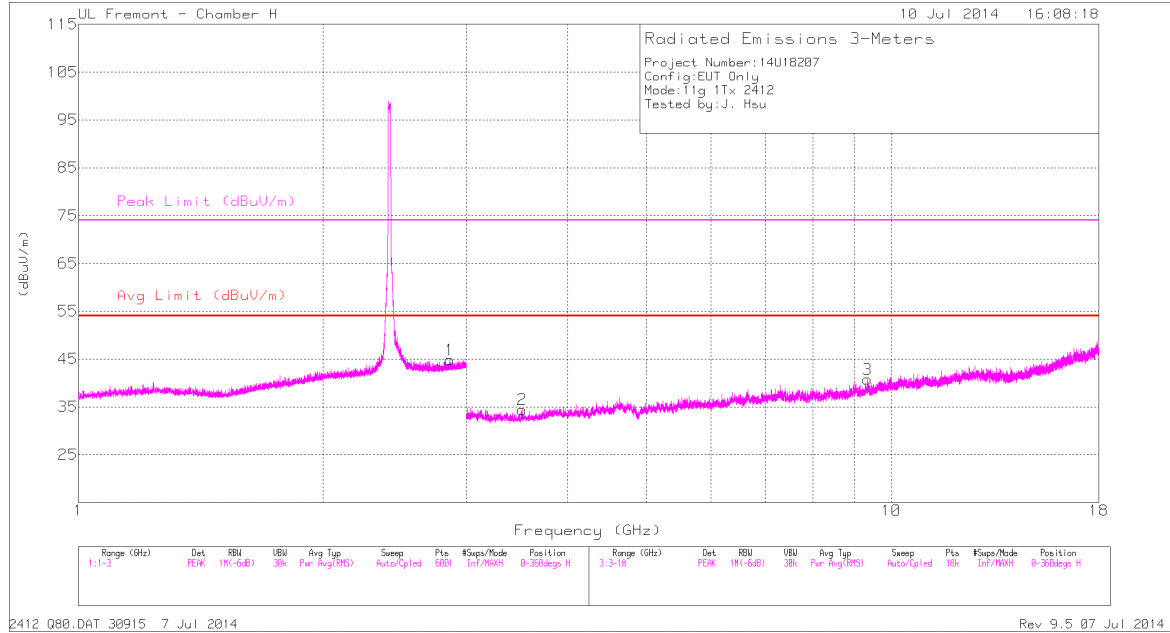
RESTRICTED BANDEDGE (HIGH CHANNEL, CHANNEL 13)



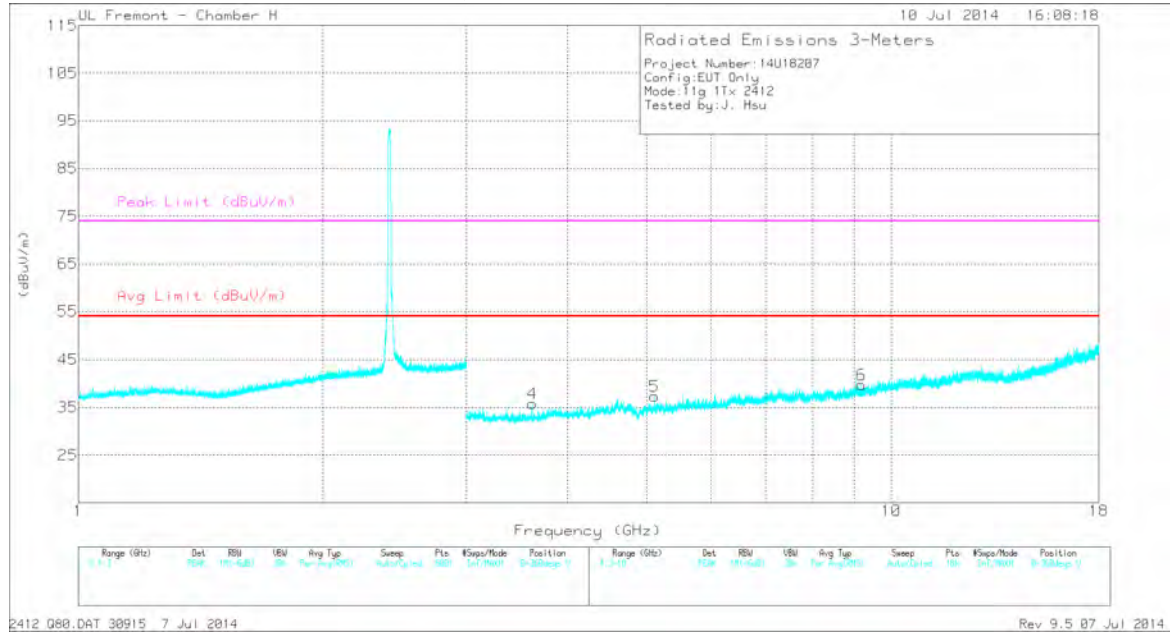


LOW CHANNEL, HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL PLOT, CH 1



LOW CHANNEL VERTICAL PLOT, CH 1



DATA

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 2.861	43.75	PK2	32.5	-24.2	52.05	-	-	74	-21.95	52	103	H
* 2.862	31.94	MAv1	32.5	-24.2	40.24	54	-13.76	-	-	52	103	H
* 3.511	41.45	PK2	32.8	-32.8	41.45	-	-	74	-32.55	99	120	H
* 3.51	30.26	MAv1	32.8	-32.8	30.26	54	-23.74	-	-	99	120	H
* 9.354	37.61	PK2	36.7	-26.5	47.81	-	-	74	-26.19	268	141	H
* 9.355	26.36	MAv1	36.7	-26.5	36.56	54	-17.44	-	-	268	141	H
* 3.618	42.17	PK2	33	-33	42.17	-	-	74	-31.83	337	134	V
* 3.618	33.24	MAv1	33	-33	33.24	54	-20.76	-	-	337	134	V
* 5.11	41.02	PK2	34.5	-32.4	43.12	-	-	74	-30.88	283	186	V
* 5.109	30.52	MAv1	34.5	-32.4	32.62	54	-21.38	-	-	283	186	V
* 9.191	37.6	PK2	36.6	-27.9	46.3	-	-	74	-27.7	245	171	V
* 9.19	27.24	MAv1	36.6	-27.9	35.94	54	-18.06	-	-	245	171	V

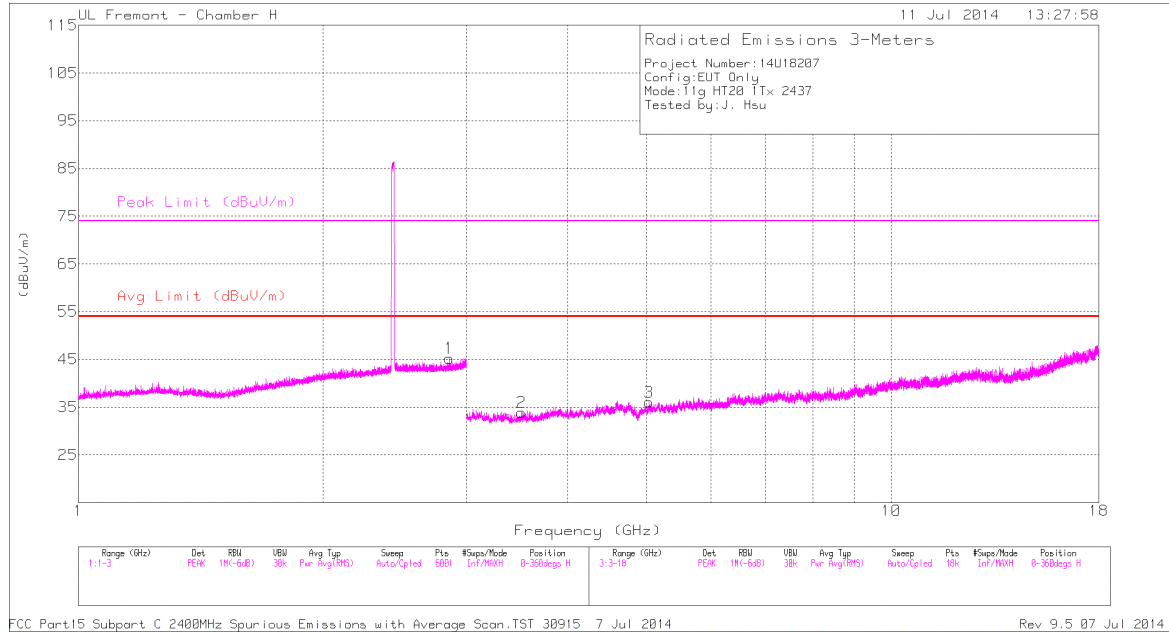
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK2 - KDB558074 Method: Maximum Peak

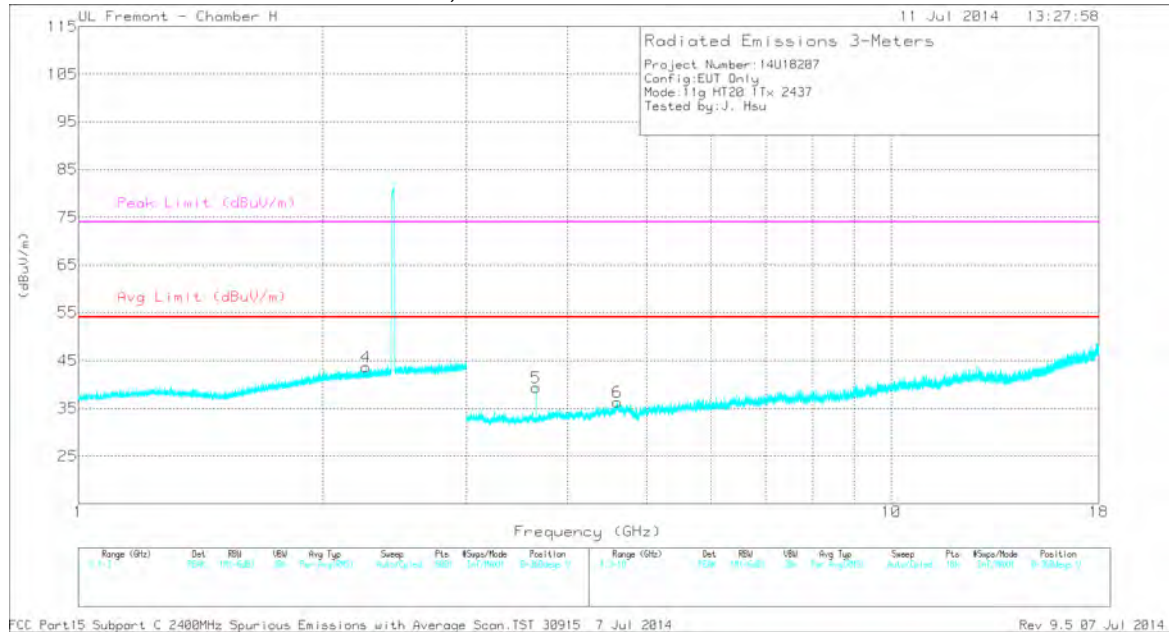
MAv1 - KDB558074 Option 1 Maximum RMS Average

MID CHANNEL, HARMONICS AND SPURIOUS EMISSIONS

MID CHANNEL HORIZONTAL PLOT, CH 6



MID CHANNEL VERTICAL PLOT, CH 6



DATA

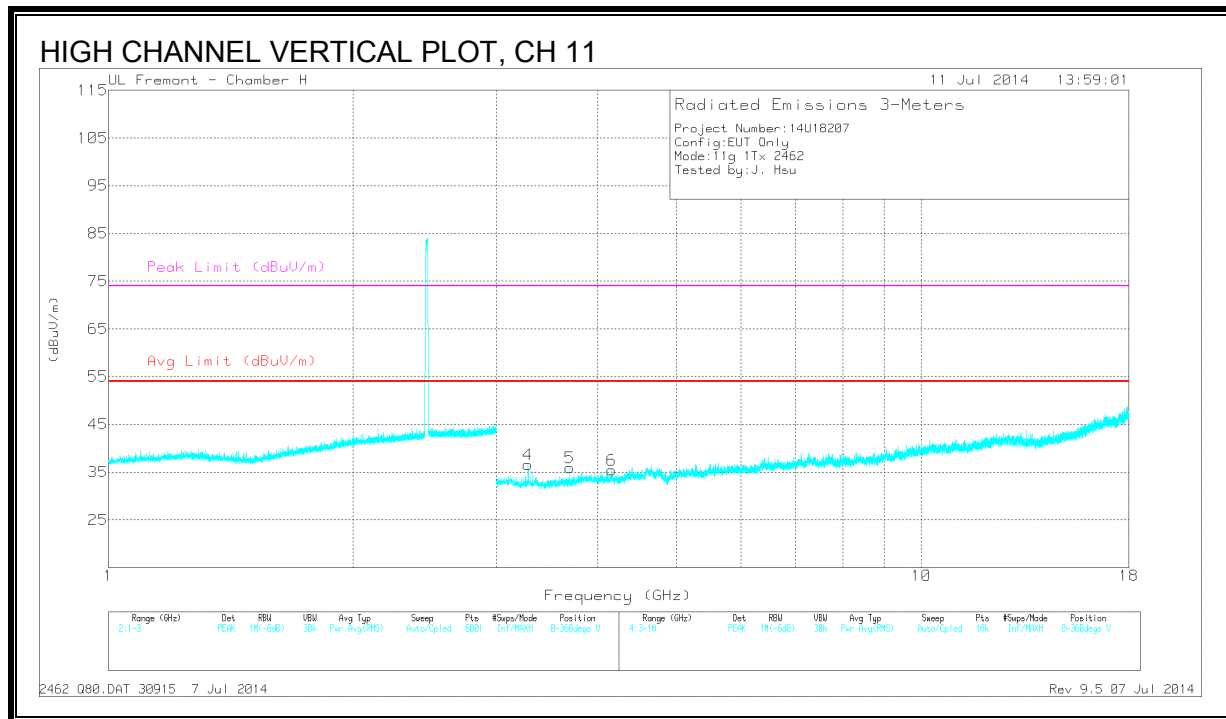
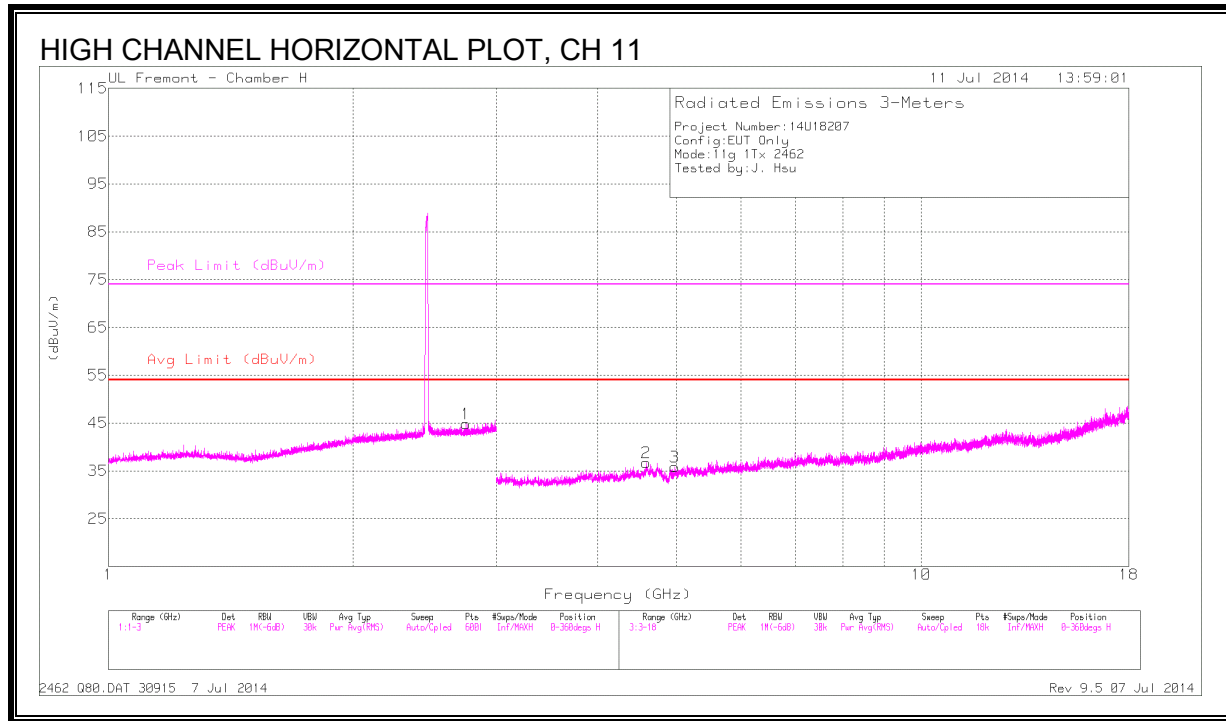
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 2.858	43.27	PK2	32.5	-24.2	51.57	-	-	74	-22.43	350	169	H
* 2.859	32.03	MAv1	32.5	-24.2	40.33	54	-13.67	-	-	350	169	H
* 2.26	43.18	PK2	31.7	-24.6	50.28	-	-	74	-23.72	289	216	V
* 2.258	32.14	MAv1	31.7	-24.6	39.24	54	-14.76	-	-	289	216	V
* 3.508	41.86	PK2	32.8	-32.8	41.86	-	-	74	-32.14	277	235	H
* 3.506	30.25	MAv1	32.8	-32.8	30.25	54	-23.75	-	-	277	235	H
* 5.034	42.35	PK2	34.4	-32.2	44.55	-	-	74	-29.45	310	259	H
* 5.035	30.71	MAv1	34.4	-32.2	32.91	54	-21.09	-	-	310	259	H
* 3.656	45.07	PK2	33	-32.9	45.17	-	-	74	-28.83	11	295	V
* 3.656	38.13	MAv1	33	-32.9	38.23	54	-15.77	-	-	11	295	V
* 4.601	42.43	PK2	34.1	-32.4	44.13	-	-	74	-29.87	48	268	V
* 4.604	31.54	MAv1	34.1	-32.4	33.24	54	-20.76	-	-	48	268	V

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

HIGH CHANNEL, CH11 2462MHZ, HARMONICS AND SPURIOUS EMISSIONS



DATA

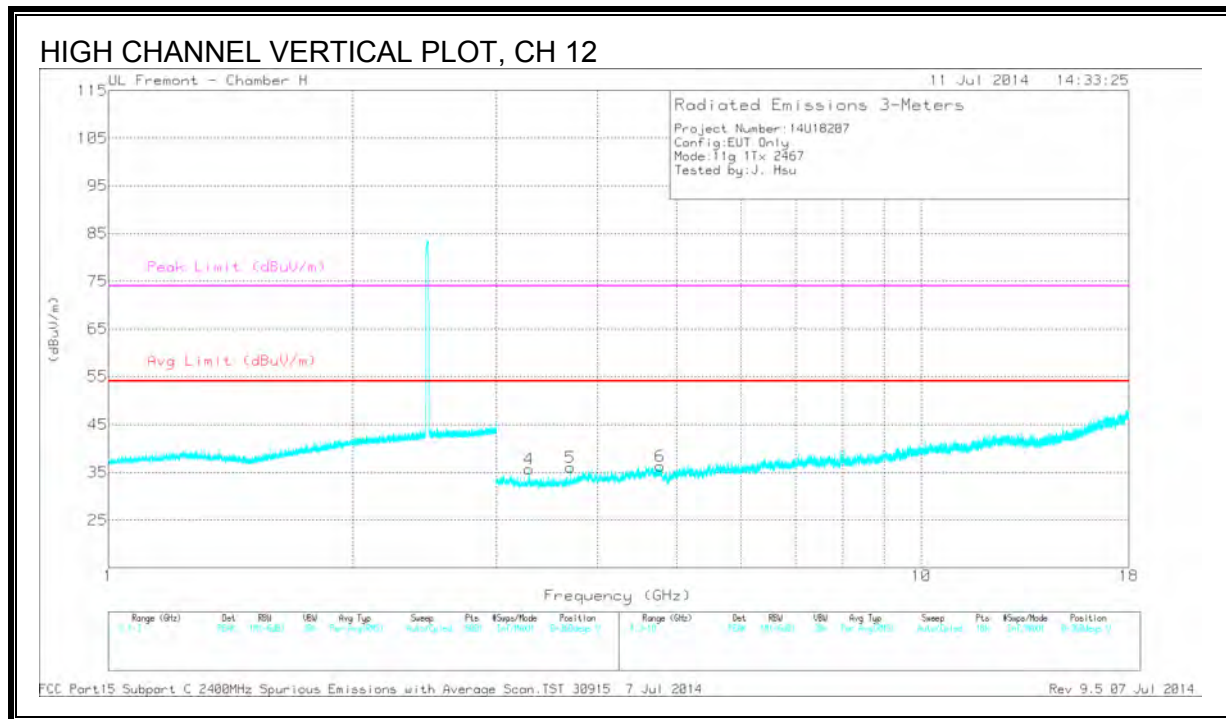
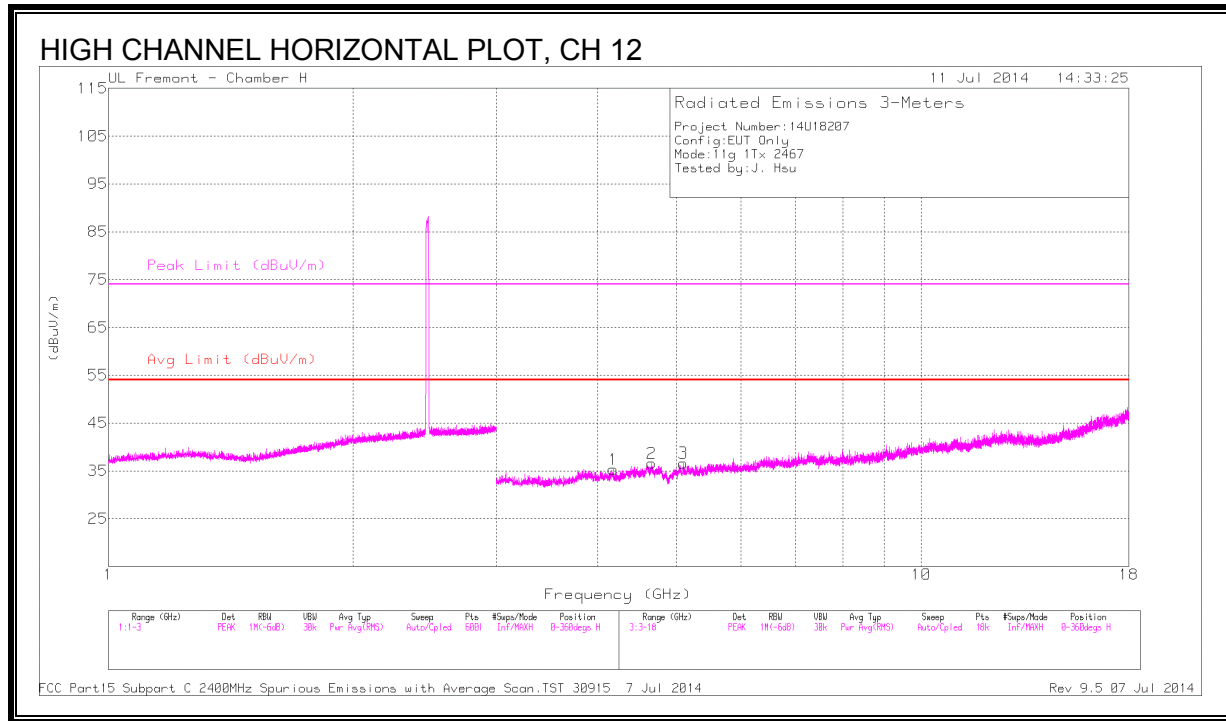
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 2.751	43.8	PK2	32.3	-24.3	51.8	-	-	74	-22.2	40	130	H
* 2.751	32.05	MAv1	32.3	-24.3	40.05	54	-13.95	-	-	40	130	H
* 4.587	43.07	PK2	34.1	-32.5	44.67	-	-	74	-29.33	79	169	H
* 4.584	31.31	MAv1	34.1	-32.5	32.91	54	-21.09	-	-	79	169	H
* 4.975	40.71	PK2	34.3	-31.9	43.11	-	-	74	-30.89	114	156	H
* 4.973	29.78	MAv1	34.3	-31.8	32.28	54	-21.72	-	-	114	156	H
* 3.693	43.09	PK2	33.1	-32.7	43.49	-	-	74	-30.51	342	172	V
* 3.693	34.04	MAv1	33.1	-32.7	34.44	54	-19.56	-	-	342	172	V
* 4.162	41.5	PK2	33.5	-32.3	42.7	-	-	74	-31.3	241	200	V
* 4.16	30.76	MAv1	33.5	-32.2	32.06	54	-21.94	-	-	241	200	V
3.283	43.09	PK2	32.9	-32.5	43.49	-	-	-	-	18	128	V
3.283	33.84	MAv1	32.9	-32.5	34.24	-	-	-	-	18	128	V

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

HIGH CHANNEL, CH 12 2467MHz, HARMONICS AND SPURIOUS EMISSIONS



DATA

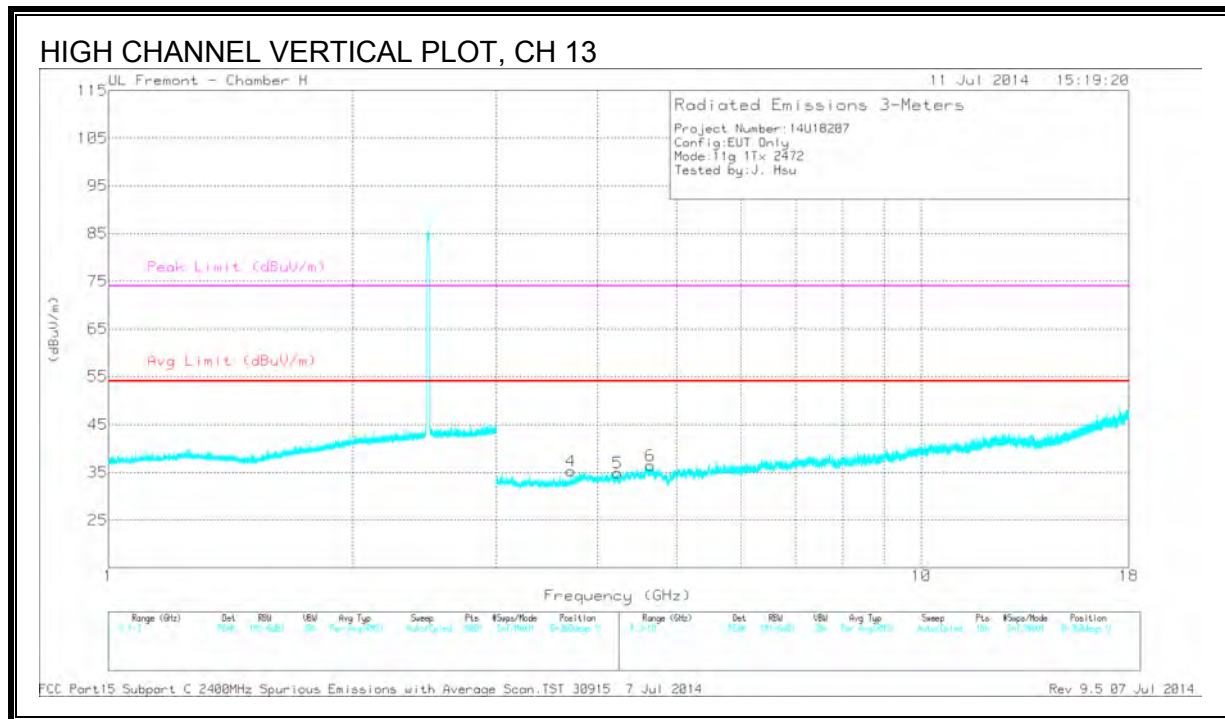
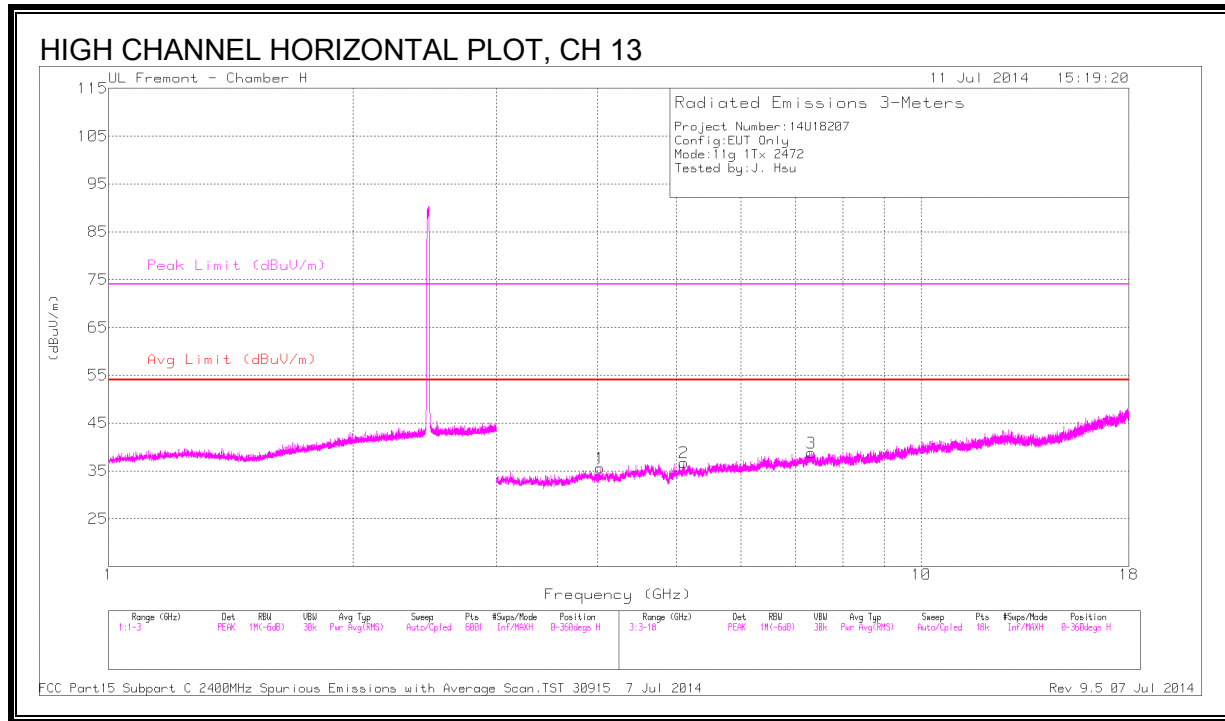
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.178	41.8	PK2	33.5	-32.7	42.6	-	-	74	-31.4	350	120	H
* 4.175	30.92	MAv1	33.5	-32.7	31.72	54	-22.28	-	-	350	120	H
* 4.656	42.64	PK2	34.2	-31.8	45.04	-	-	74	-28.96	326	140	H
* 4.657	31.01	MAv1	34.2	-31.8	33.41	54	-20.59	-	-	326	140	H
* 5.099	41.11	PK2	34.5	-32.2	43.41	-	-	74	-30.59	202	115	H
* 5.099	30.58	MAv1	34.5	-32.2	32.88	54	-21.12	-	-	202	115	H
* 3.701	43.36	PK2	33.1	-32.6	43.86	-	-	74	-30.14	3	199	V
* 3.701	34.38	MAv1	33.1	-32.6	34.88	54	-19.12	-	-	3	199	V
* 4.771	41.16	PK2	34.3	-32.2	43.26	-	-	74	-30.74	50	235	V
* 4.771	30.37	MAv1	34.3	-32.2	32.47	54	-21.53	-	-	50	235	V
3.289	42.66	PK2	32.9	-32.6	42.96	-	-	-	-	354	169	V
3.289	32.83	MAv1	32.9	-32.6	33.13	-	-	-	-	354	169	V

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

HIGH CHANNEL, CH13 2472MHZ, HARMONICS AND SPURIOUS EMISSIONS



DATA

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.029	42.52	PK2	33.5	-32.4	43.62	-	-	74	-30.38	40	392	H
* 4.027	30.71	MAv1	33.5	-32.4	31.81	54	-22.19	-	-	40	392	H
* 5.103	41.13	PK2	34.5	-32.3	43.33	-	-	74	-30.67	84	358	H
* 5.1	30.62	MAv1	34.5	-32.2	32.92	54	-21.08	-	-	84	358	H
* 7.326	38.62	PK2	36.2	-29	45.82	-	-	74	-28.18	133	299	H
* 7.325	27.96	MAv1	36.2	-29	35.16	54	-18.84	-	-	133	299	H
* 3.707	42.36	PK2	33.1	-32.7	42.76	-	-	74	-31.24	143	256	V
* 3.71	30.88	MAv1	33.1	-32.7	31.28	54	-22.72	-	-	143	256	V
* 4.23	42.19	PK2	33.5	-32.9	42.79	-	-	74	-31.21	220	205	V
* 4.231	31.19	MAv1	33.5	-33	31.69	54	-22.31	-	-	220	205	V
* 4.647	41.64	PK2	34.2	-31.7	44.14	-	-	74	-29.86	243	226	V
* 4.647	30.63	MAv1	34.2	-31.7	33.13	54	-20.87	-	-	243	226	V

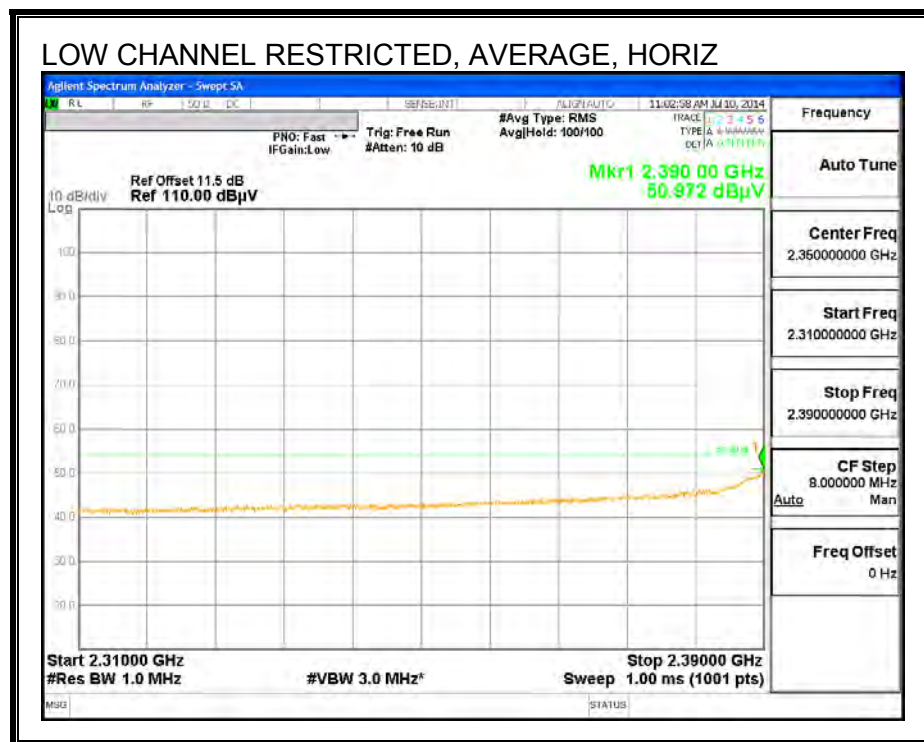
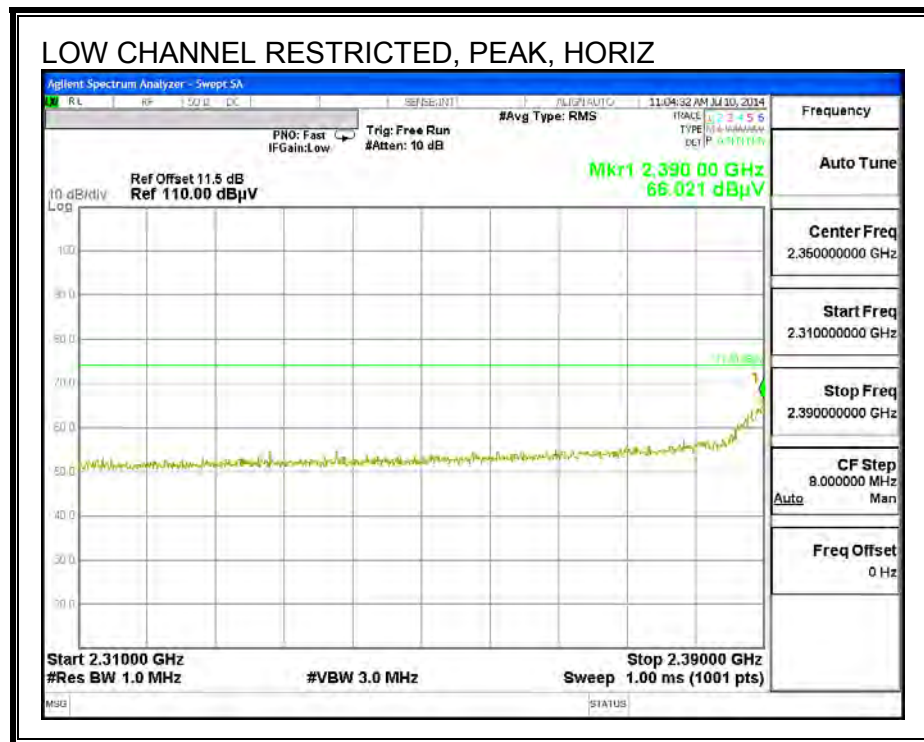
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

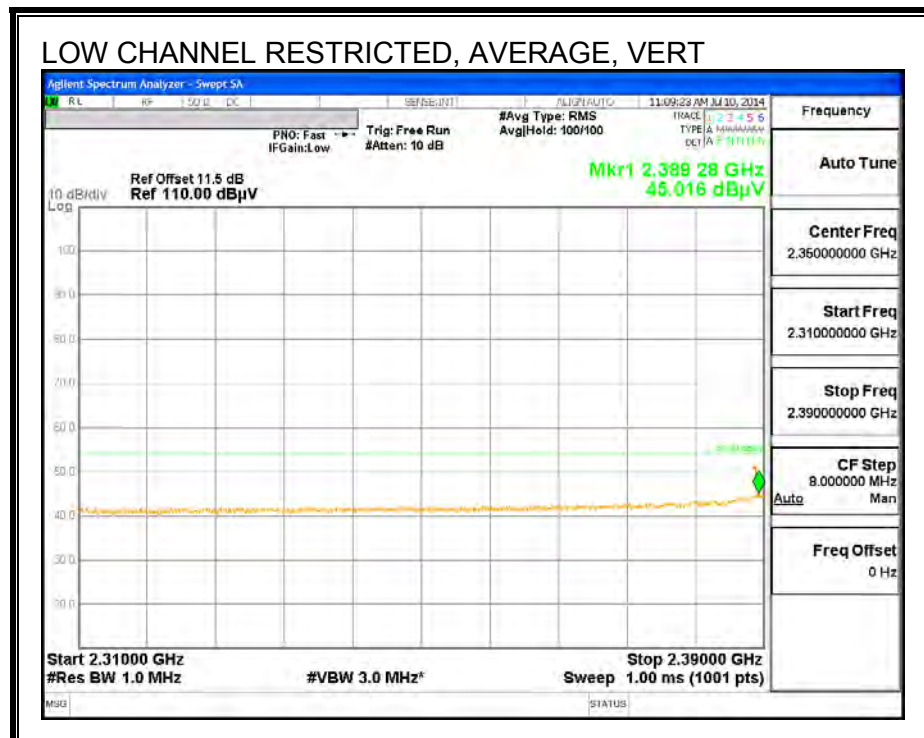
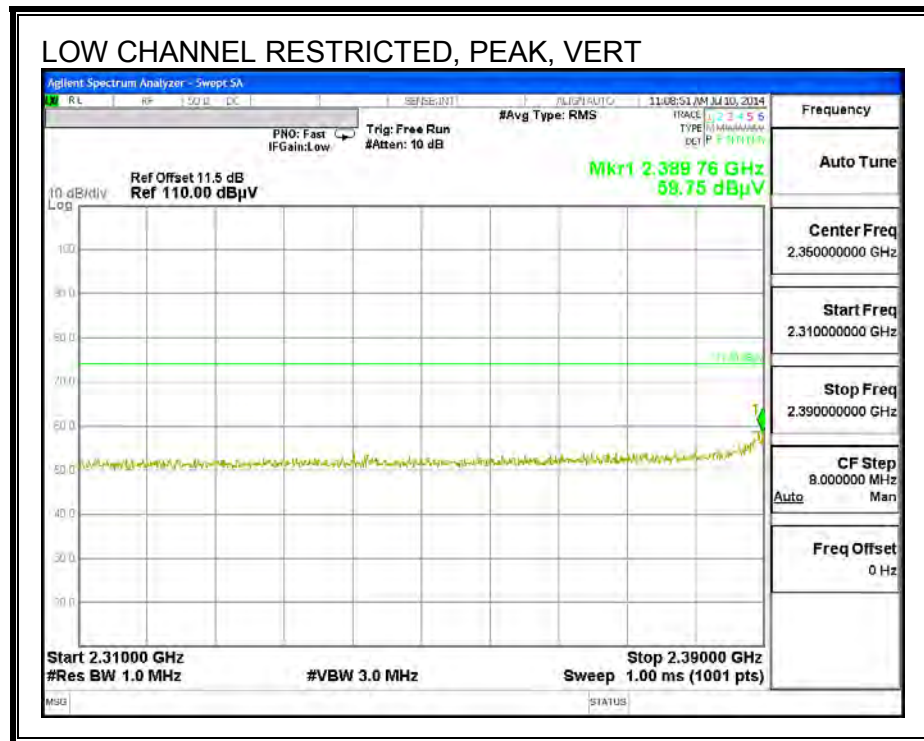
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

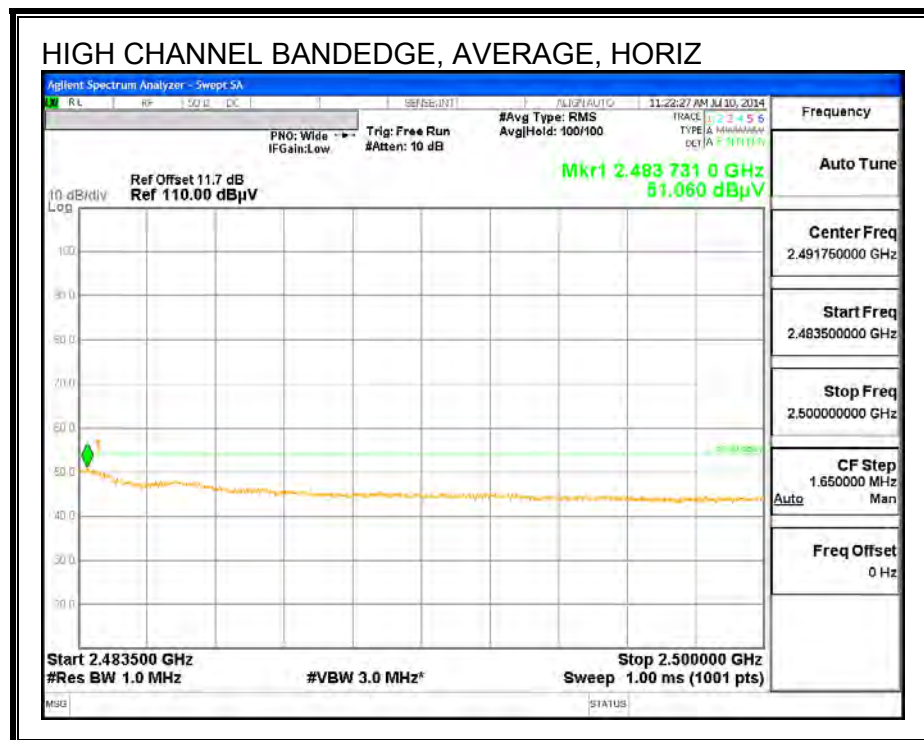
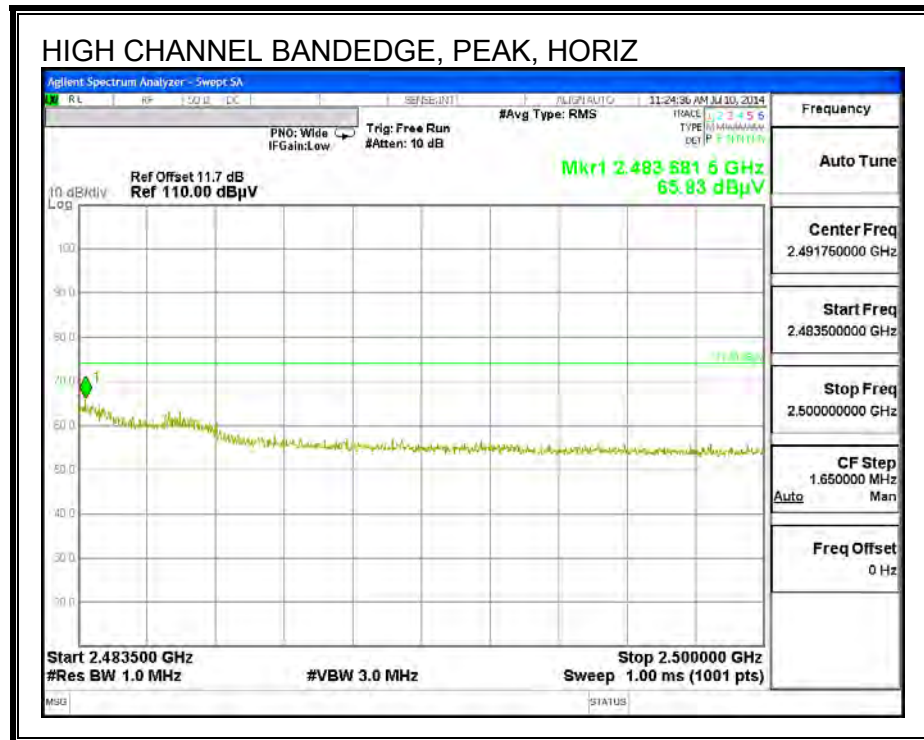
10.2.3.802.11n HT20 2Tx MODE IN THE 2.4 GHZ BAND

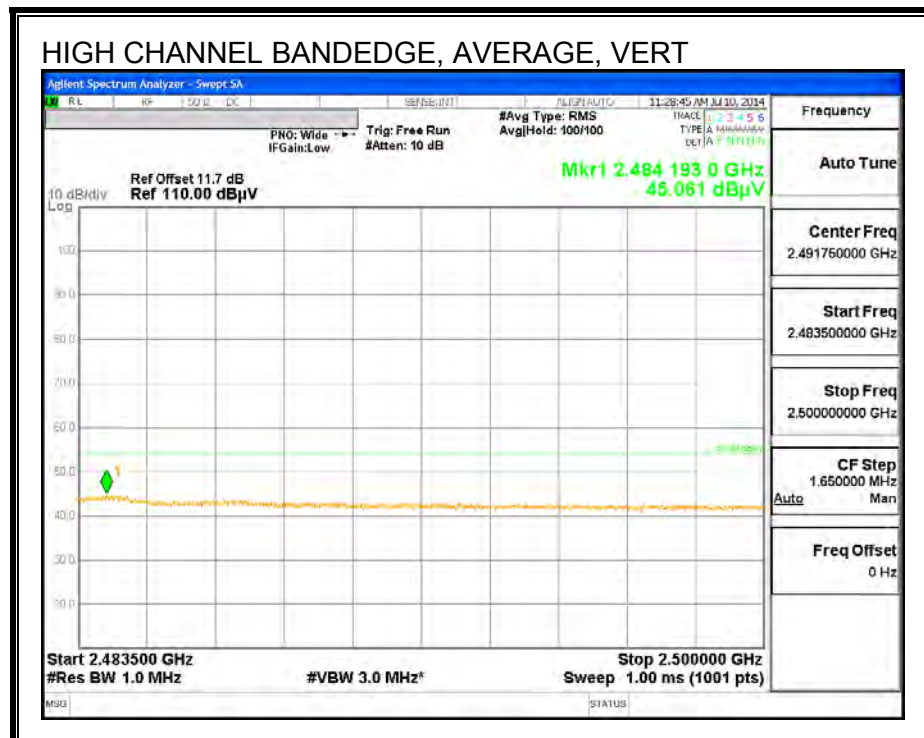
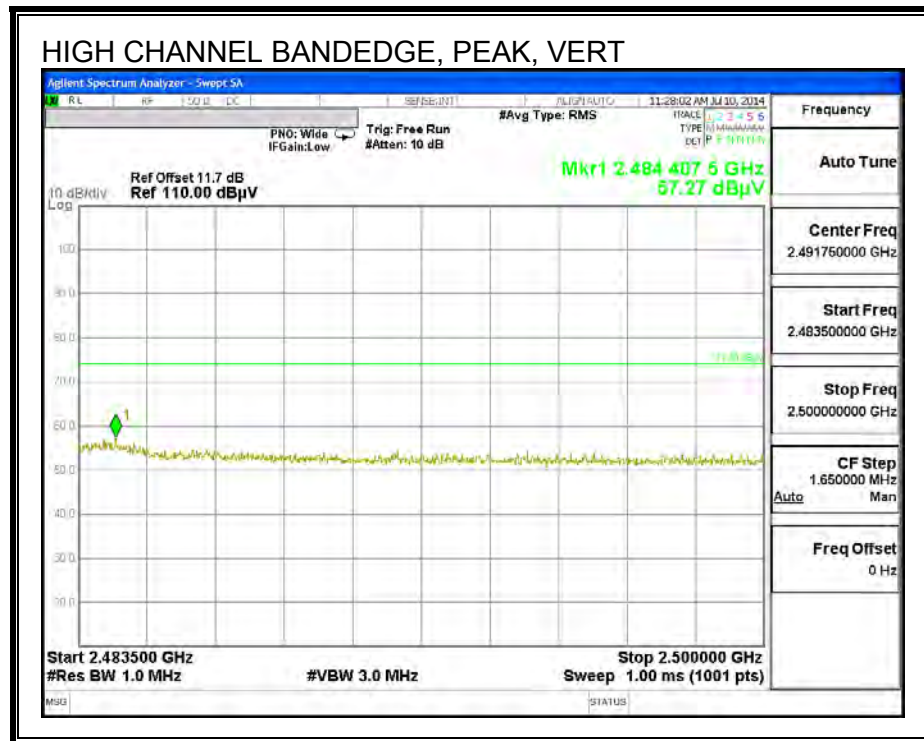
RESTRICTED BANDEDGE (LOW CHANNEL, CHANNEL 1)



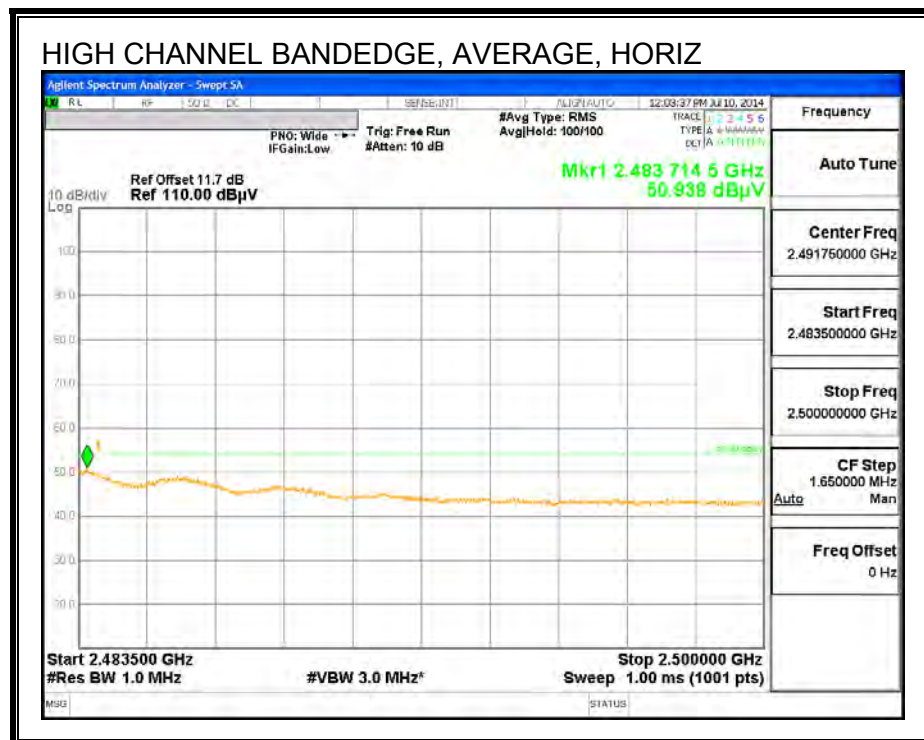
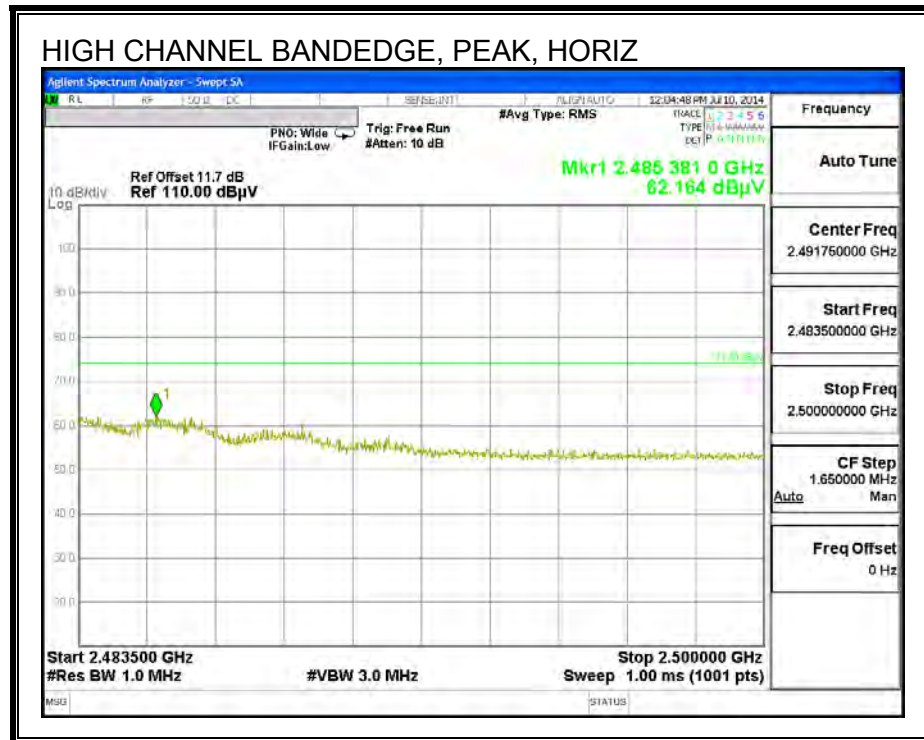


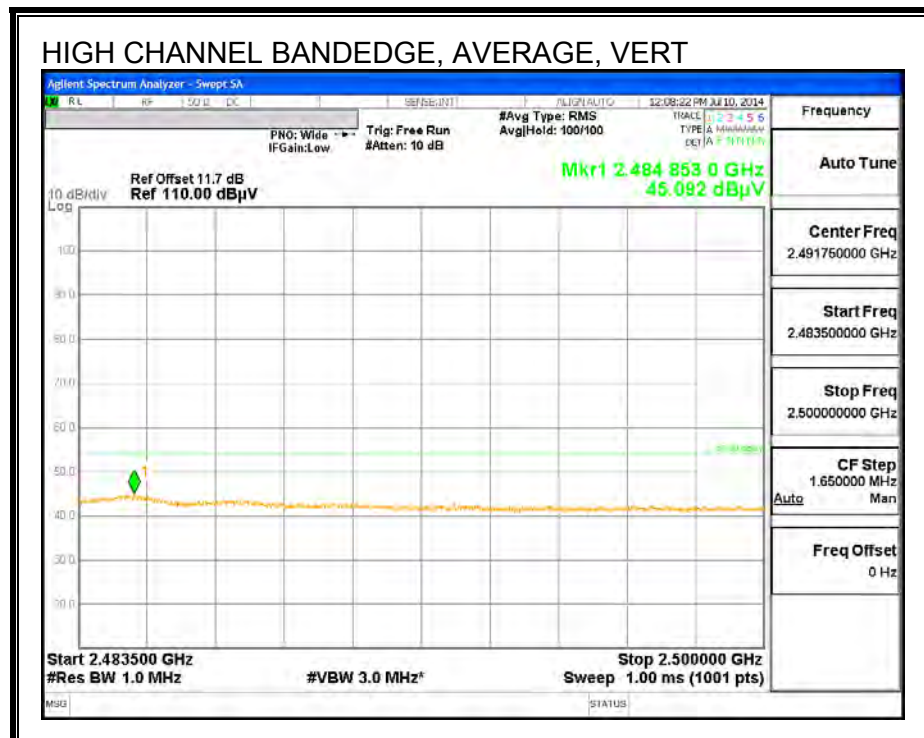
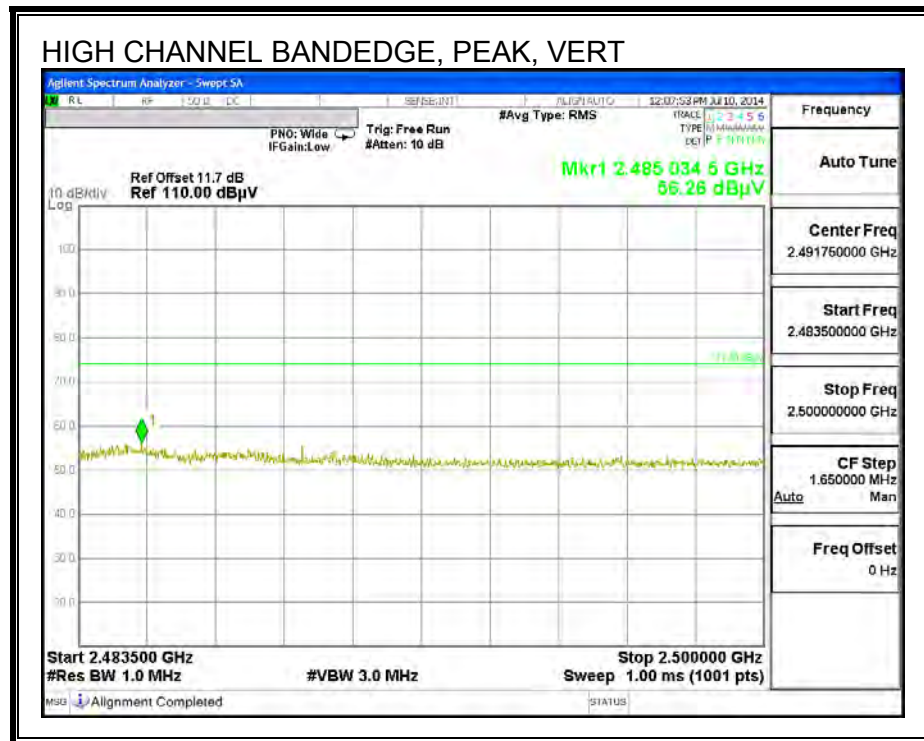
RESTRICTED BANDEDGE (HIGH CHANNEL, CHANNEL 11)



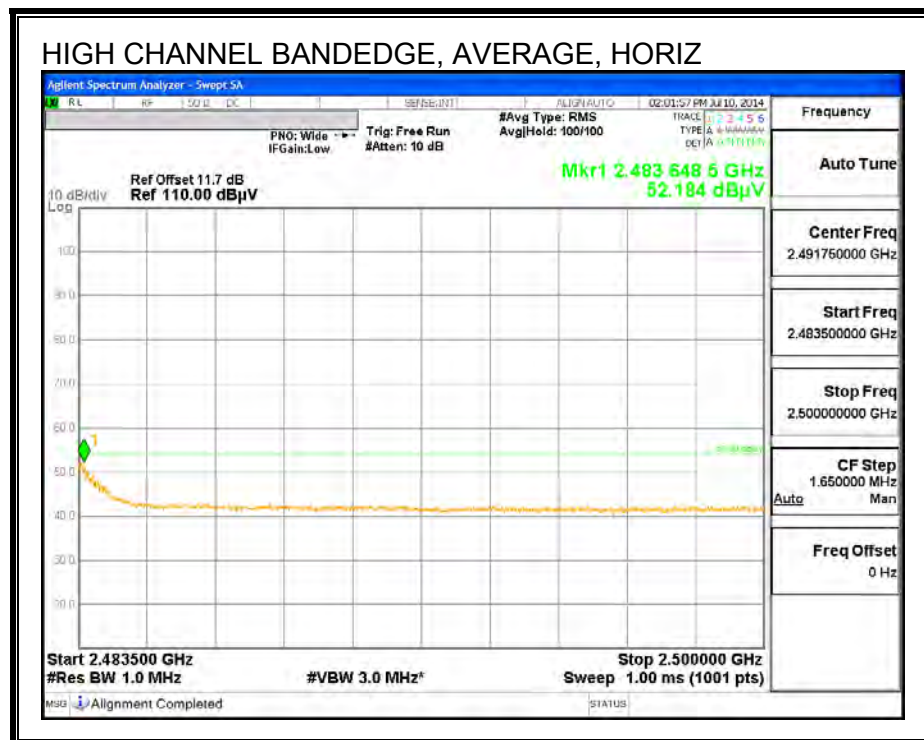
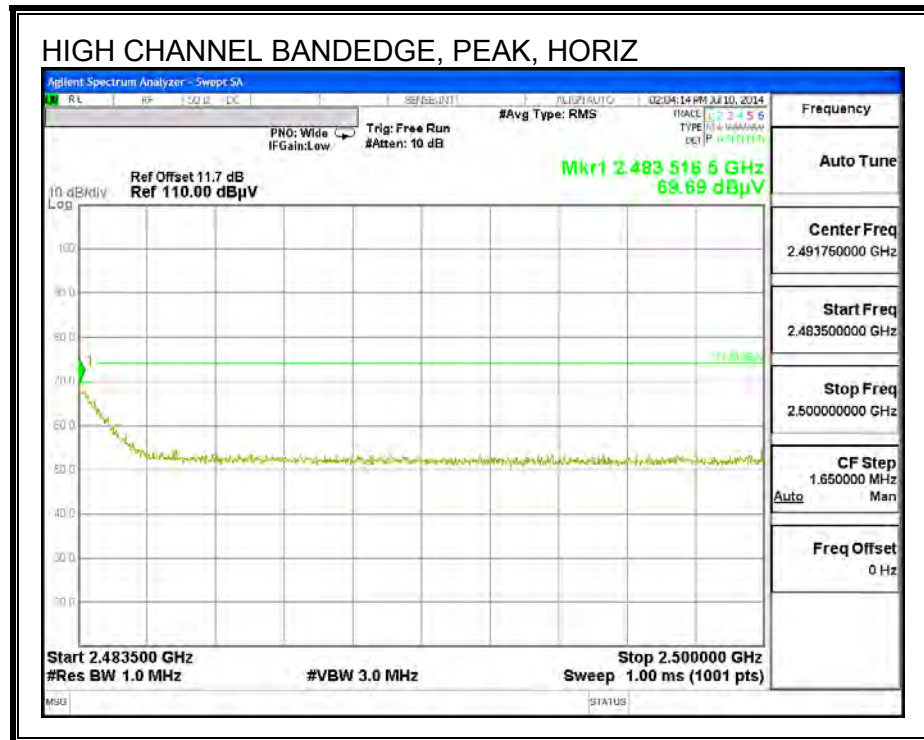


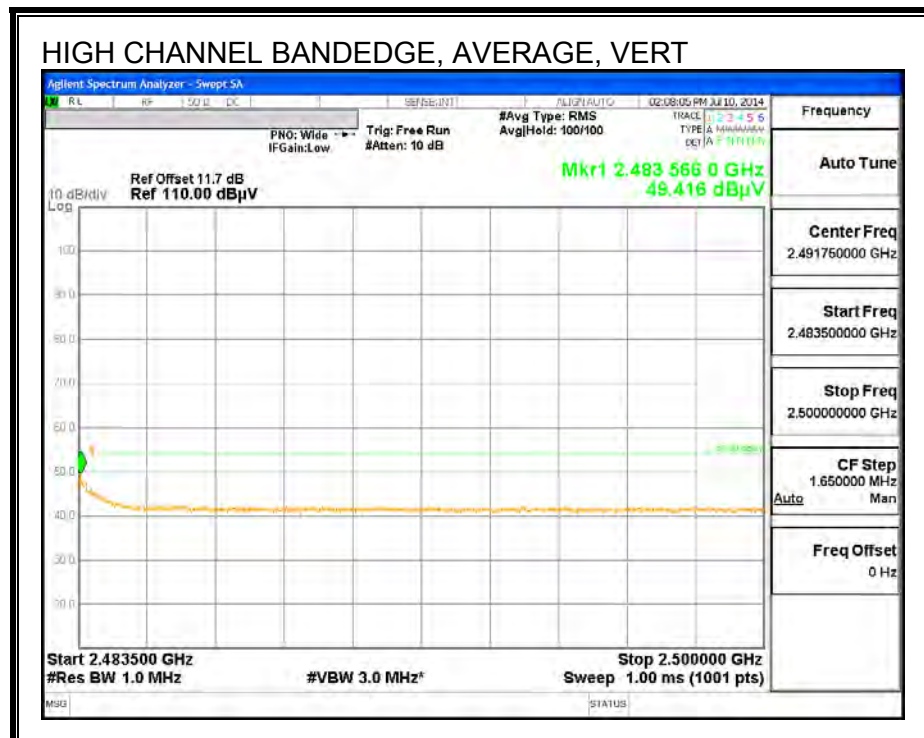
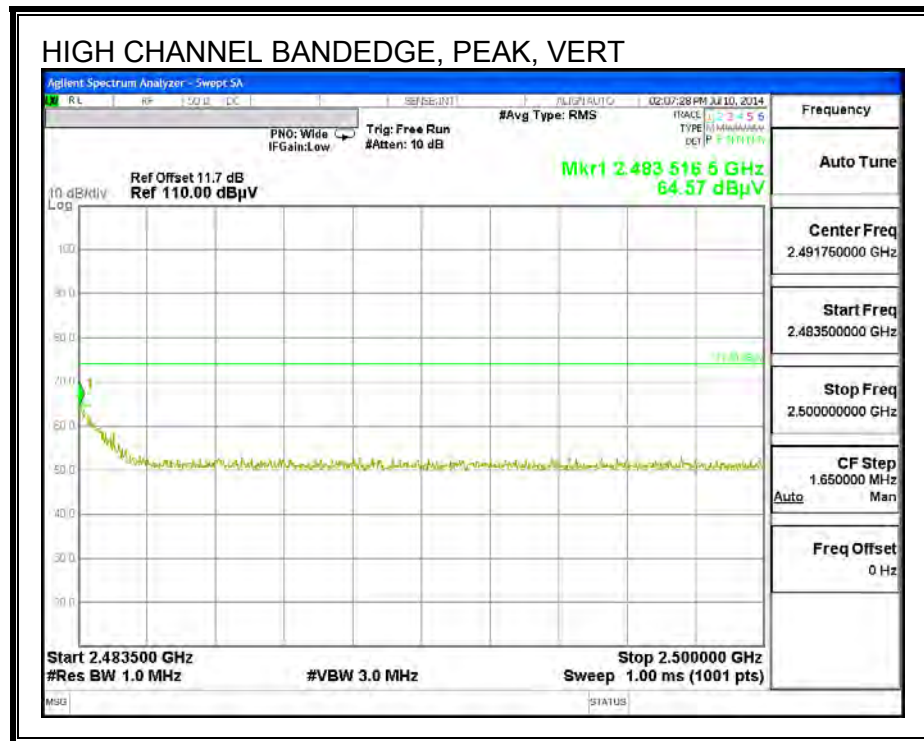
RESTRICTED BANDEDGE (HIGH CHANNEL, CHANNEL 12)



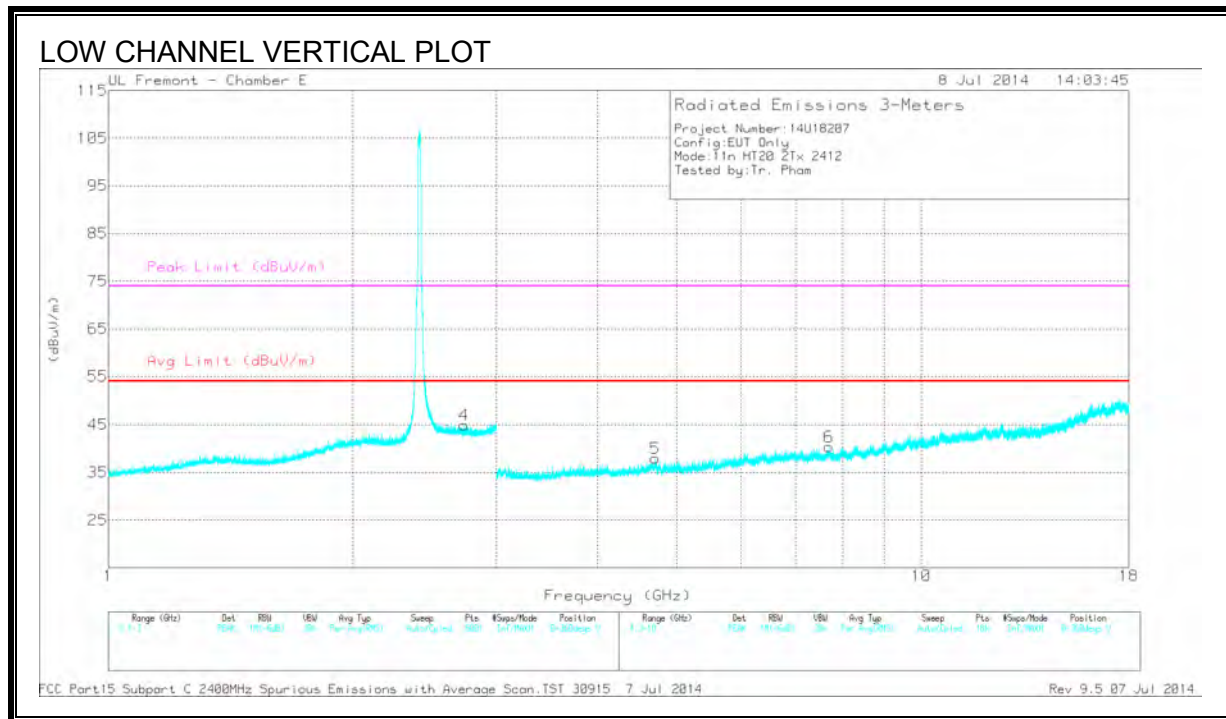
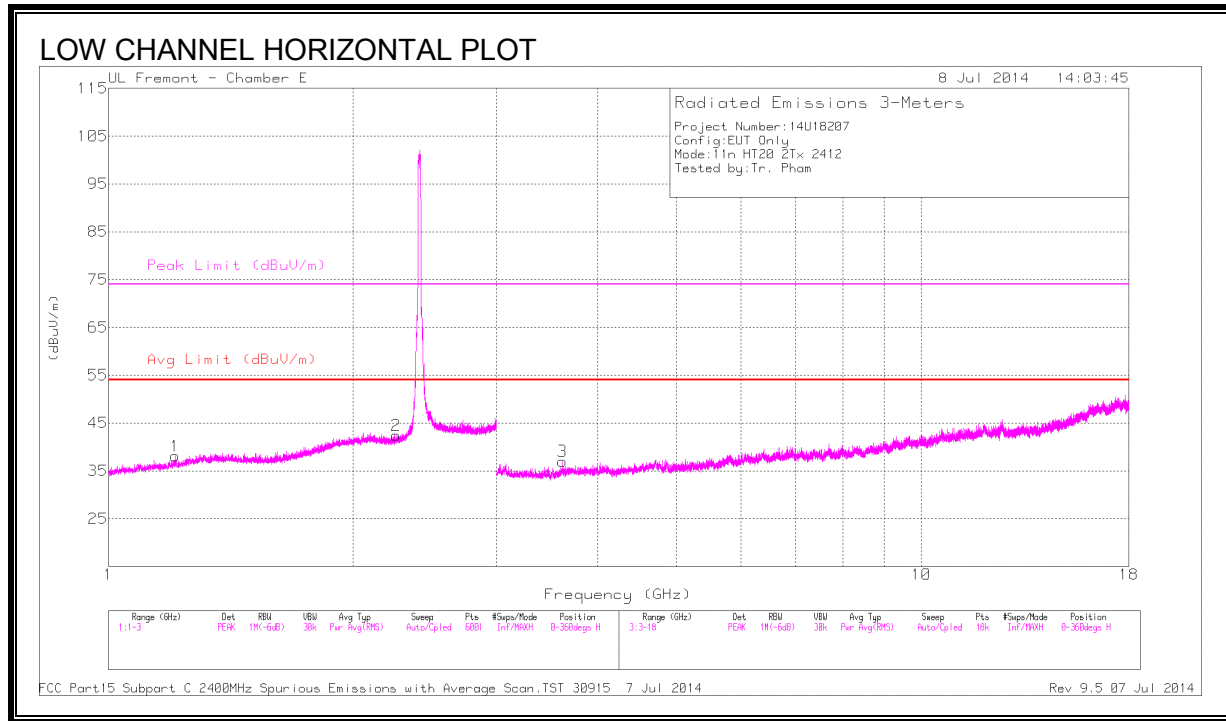


RESTRICTED BANDEDGE (HIGH CHANNEL, CHANNEL 13)





LOW CHANNEL HARMONICS AND SPURIOUS EMISSIONS



DATA

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.207	44.59	PK2	28.1	-27.4	45.29	-	-	74	-28.71	188	138	H
* 1.207	32.6	MAv1	28.1	-27.4	33.3	54	-20.7	-	-	188	138	H
* 2.26	44.19	PK2	31.4	-25.2	50.39	-	-	74	-23.61	240	175	H
* 2.259	32.4	MAv1	31.4	-25.2	38.6	54	-15.4	-	-	240	175	H
* 2.739	43.48	PK2	32.5	-23.9	52.08	-	-	74	-21.92	206	197	V
* 2.738	32.24	MAv1	32.5	-23.9	40.84	54	-13.16	-	-	206	197	V
* 3.618	42.53	PK2	33.2	-31.8	43.93	-	-	74	-30.07	173	100	H
* 3.618	31.29	MAv1	33.2	-31.8	32.69	54	-21.31	-	-	173	100	H
* 4.71	42.55	PK2	34.2	-30.5	46.25	-	-	74	-27.75	197	163	V
* 4.71	31.2	MAv1	34.2	-30.6	34.8	54	-19.2	-	-	197	163	V
* 7.694	39.01	PK2	35.9	-26.5	48.41	-	-	74	-25.59	166	149	V
* 7.693	27.44	MAv1	35.9	-26.5	36.84	54	-17.16	-	-	166	149	V

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

DATA

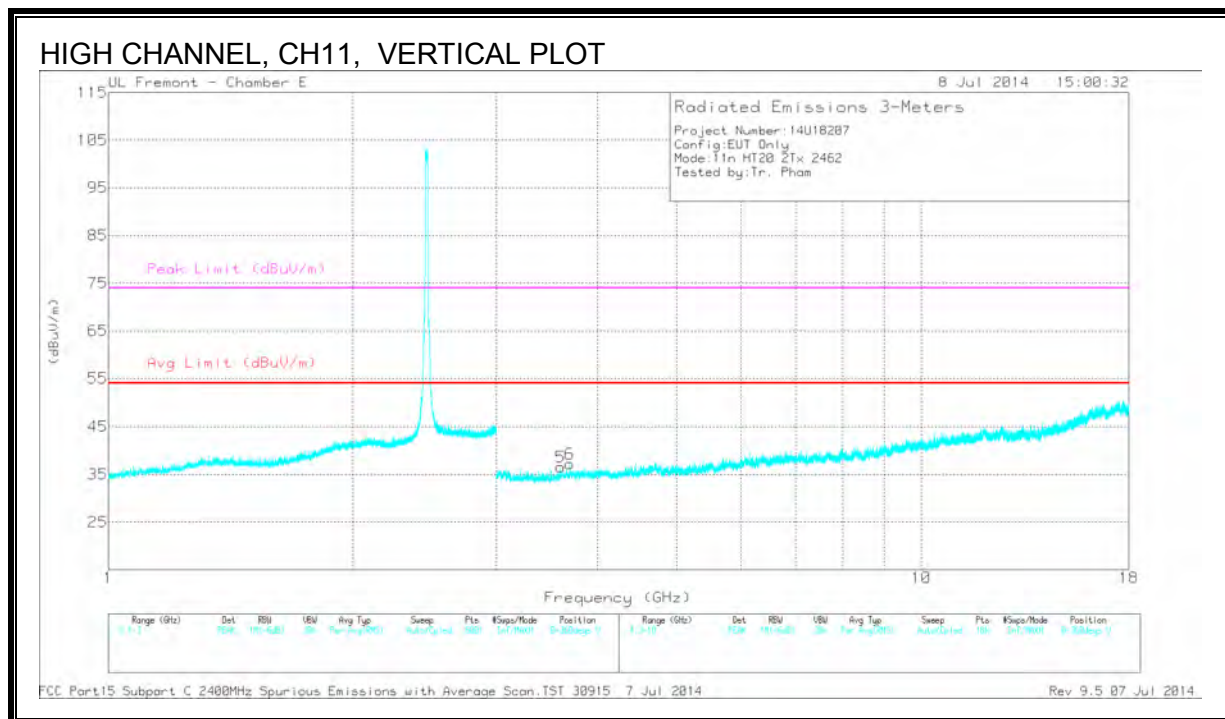
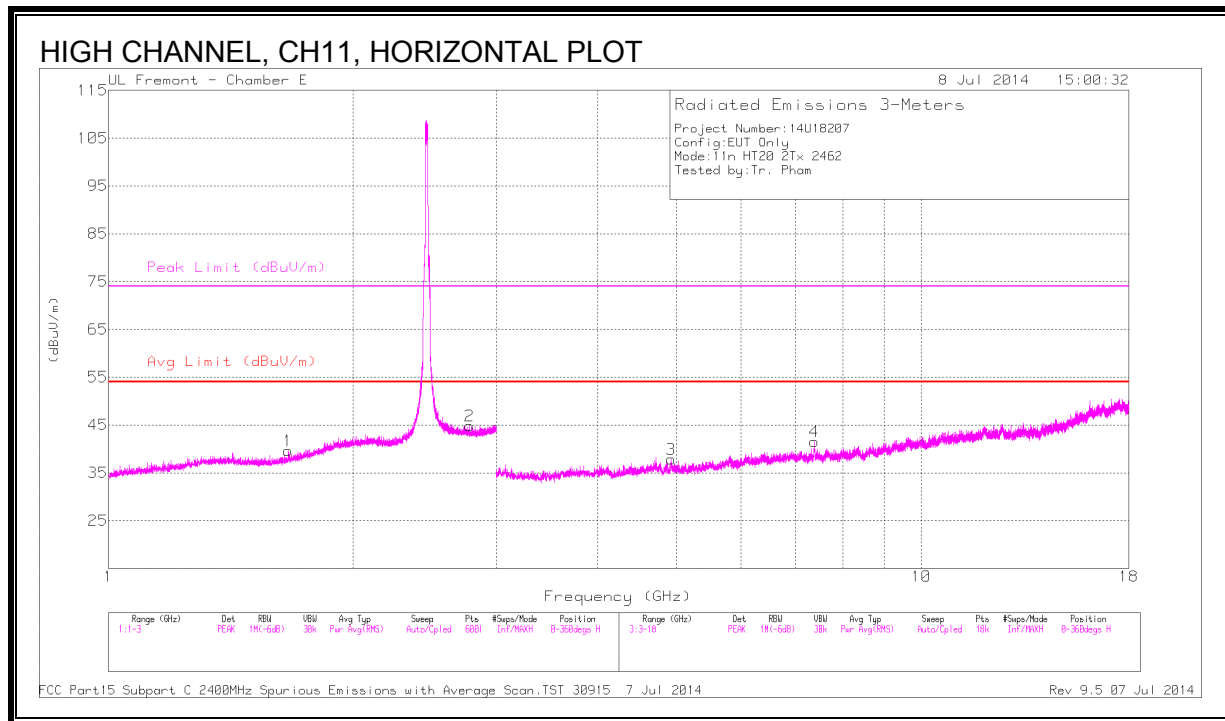
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.402	44.35	PK2	28.9	-26.4	46.85	-	-	74	-27.15	65	135	H
* 1.401	32.46	MAv1	28.9	-26.4	34.96	54	-19.04	-	-	65	135	H
* 2.207	43.53	PK2	31.2	-25.2	49.53	-	-	74	-24.47	116	149	H
* 2.206	32.22	MAv1	31.2	-25.2	38.22	54	-15.78	-	-	116	149	H
* 2.883	43.62	PK2	32.5	-24.1	52.02	-	-	74	-21.98	163	168	V
* 2.882	32.11	MAv1	32.5	-24.1	40.51	54	-13.49	-	-	163	168	V
* 12.524	37.27	PK2	39	-23.3	52.97	-	-	74	-21.03	163	168	H
* 12.525	26.05	MAv1	39	-23.3	41.75	54	-12.25	-	-	163	168	H
* 3.656	44.86	PK2	33.2	-31.5	46.56	-	-	74	-27.44	154	116	V
* 3.655	36.84	MAv1	33.2	-31.5	38.54	54	-15.46	-	-	154	116	V
* 4.766	43.25	PK2	34.1	-31.1	46.25	-	-	74	-27.75	274	154	V
* 4.767	31.73	MAv1	34.1	-31.1	34.73	54	-19.27	-	-	274	154	V

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

HIGH CHANNEL, CH 11 2462MHz, HARMONICS AND SPURIOUS EMISSIONS



DATA

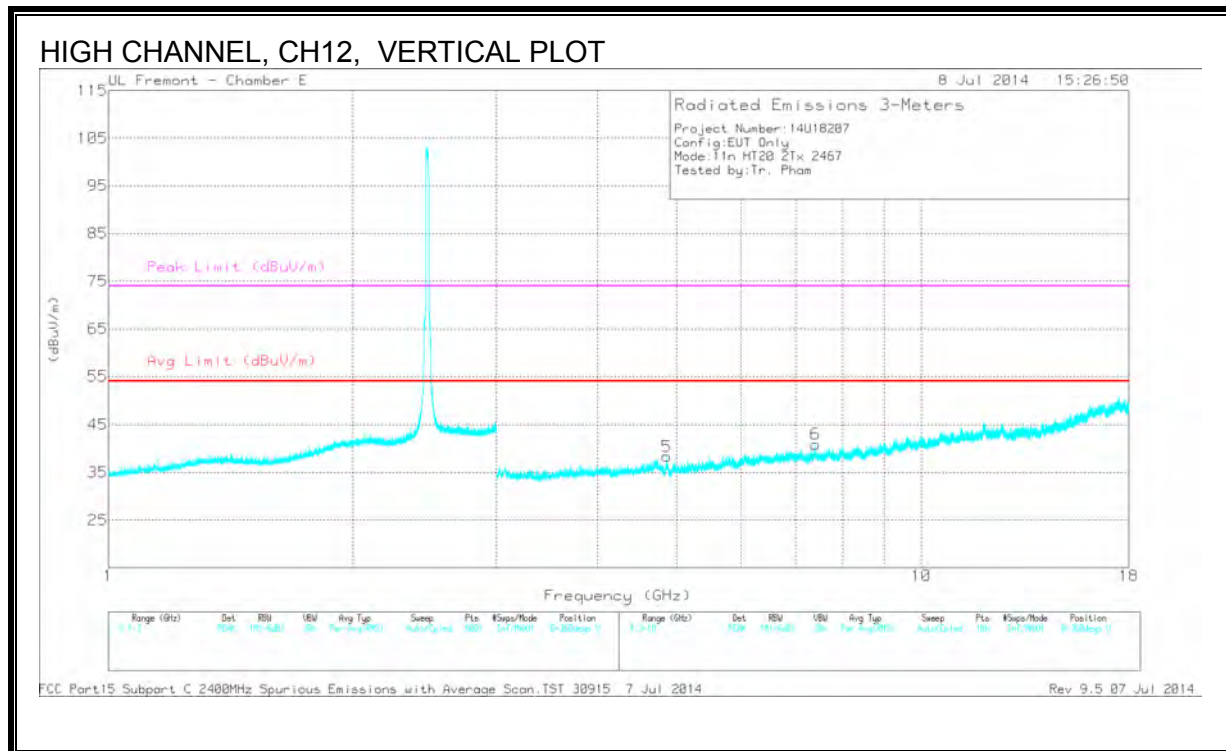
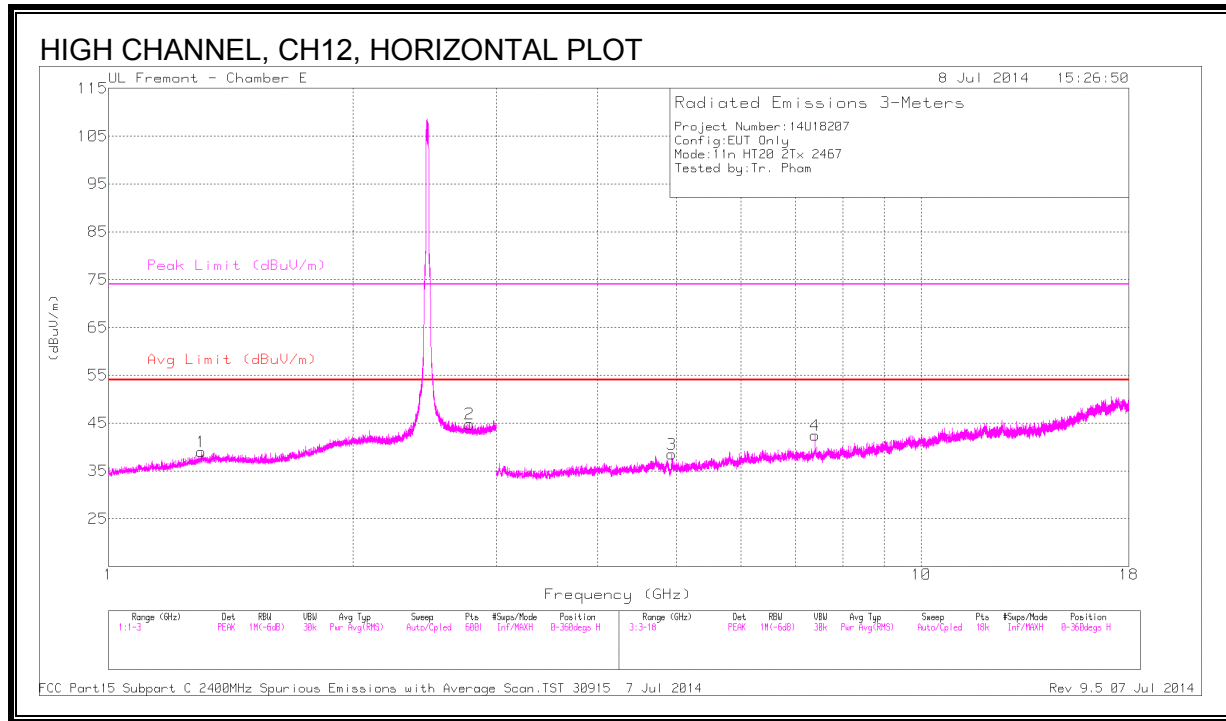
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.662	44.25	PK2	28.9	-26.4	46.75	-	-	74	-27.25	302	105	H
* 1.661	32.7	MAv1	28.9	-26.5	35.1	54	-18.9	-	-	302	105	H
* 2.781	44.04	PK2	32.4	-24	52.44	-	-	74	-21.56	333	132	H
* 2.78	32.19	MAv1	32.4	-24	40.59	54	-13.41	-	-	333	132	H
* 4.922	40.25	PK2	34.1	-30.5	43.85	-	-	74	-30.15	279	113	H
* 4.923	29.1	MAv1	34.1	-30.5	32.7	54	-21.3	-	-	279	113	H
* 7.386	41.52	PK2	35.7	-26.9	50.32	-	-	74	-23.68	226	220	H
* 7.386	29.72	MAv1	35.7	-26.9	38.52	54	-15.48	-	-	226	220	H
* 3.601	42.35	PK2	33.1	-31.7	43.75	-	-	74	-30.25	269	244	V
* 3.602	30.91	MAv1	33.1	-31.7	32.31	54	-21.69	-	-	269	244	V
* 3.692	40.76	PK2	33.3	-30.7	43.36	-	-	74	-30.64	218	264	V
* 3.693	30.29	MAv1	33.3	-30.7	32.89	54	-21.11	-	-	218	264	V

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

HIGH CHANNEL, CH 12 2467MHz, HARMONICS AND SPURIOUS EMISSIONS



DATA

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.299	44.7	PK2	29	-27	46.7	-	-	74	-27.3	265	132	H
* 1.3	32.78	MAv1	29	-27	34.78	54	-19.22	-	-	265	132	H
* 2.78	45.44	PK2	32.4	-24	53.84	-	-	74	-20.16	280	147	H
* 2.781	32.26	MAv1	32.4	-24	40.66	54	-13.34	-	-	280	147	H
* 4.934	41.7	PK2	34.1	-30.4	45.4	-	-	74	-28.6	244	166	H
* 4.934	29.84	MAv1	34.1	-30.4	33.54	54	-20.46	-	-	244	166	H
* 7.402	42.22	PK2	35.7	-27.2	50.72	-	-	74	-23.28	167	290	H
* 7.401	30.21	MAv1	35.7	-27.2	38.71	54	-15.29	-	-	167	290	H
* 4.861	42.75	PK2	34.1	-31.1	45.75	-	-	74	-28.25	176	324	V
* 4.861	30.53	MAv1	34.1	-31.1	33.53	54	-20.47	-	-	176	324	V
* 7.409	39.53	PK2	35.7	-27.5	47.73	-	-	74	-26.27	276	154	V
* 7.409	27.56	MAv1	35.7	-27.5	35.76	54	-18.24	-	-	276	154	V

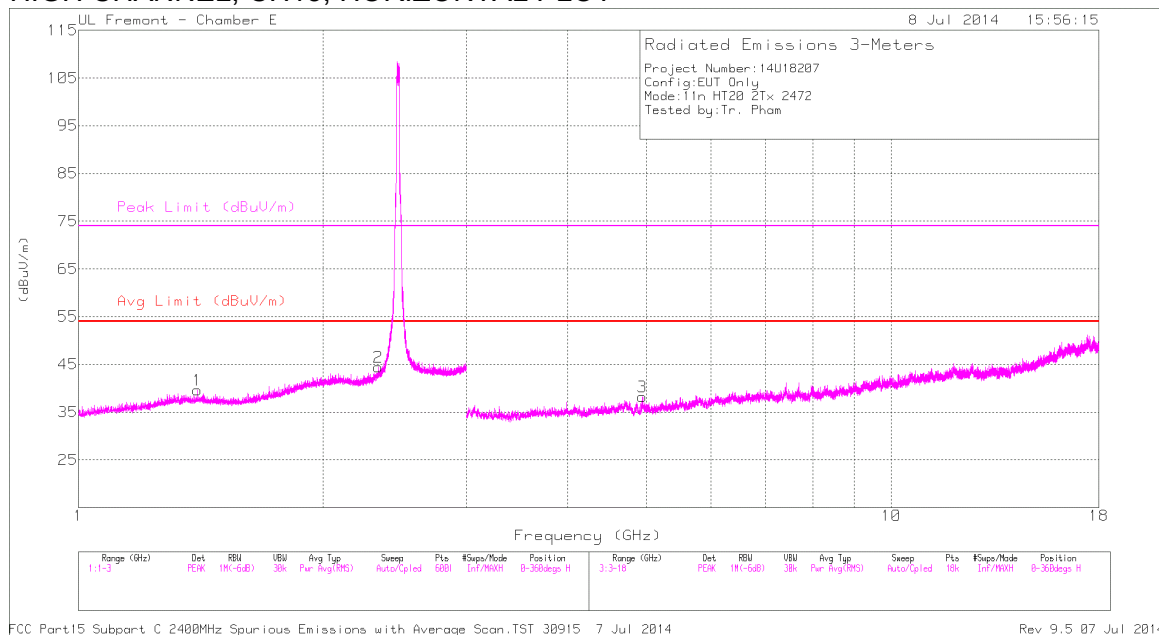
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK2 - KDB558074 Method: Maximum Peak

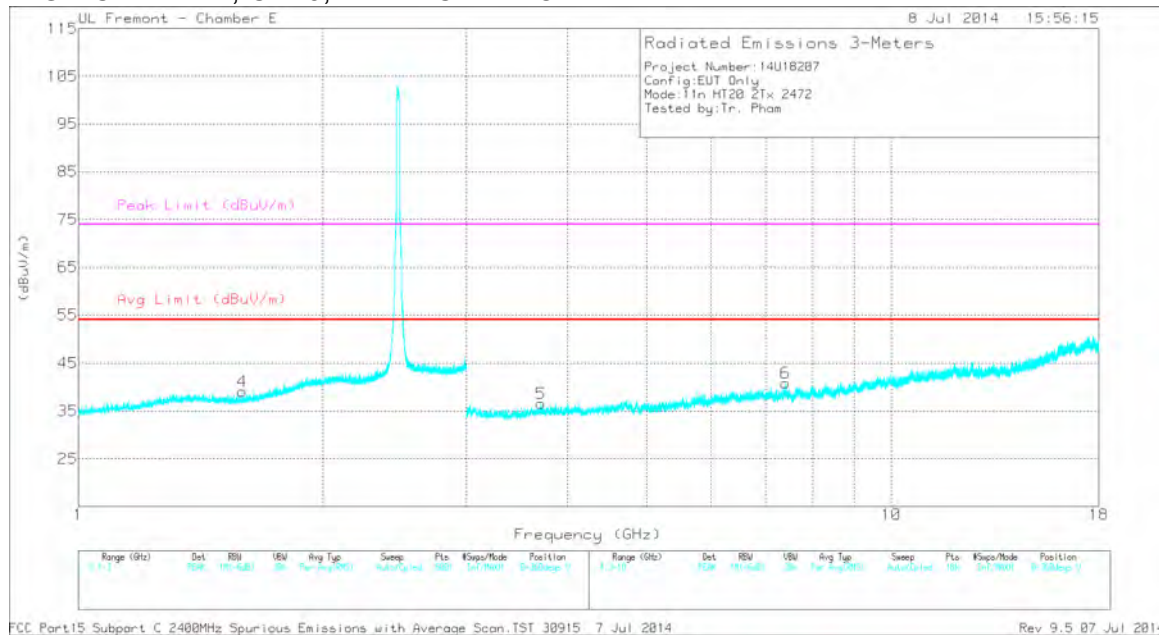
MAv1 - KDB558074 Option 1 Maximum RMS Average

HIGH CHANNEL, CH 13 2472MHZ, HARMONICS AND SPURIOUS EMISSIONS

HIGH CHANNEL, CH13, HORIZONTAL PLOT



HIGH CHANNEL, CH13, VERTICAL PLOT



DATA

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.399	43.52	PK2	28.9	-26.4	46.02	-	-	74	-27.98	265	142	H
* 1.401	32.71	MAv1	28.9	-26.4	35.21	54	-18.79	-	-	265	142	H
* 2.338	44.83	PK2	31.7	-24.7	51.83	-	-	74	-22.17	206	170	H
* 2.338	33.3	MAv1	31.7	-24.7	40.3	54	-13.7	-	-	206	170	H
* 1.59	45.25	PK2	28.4	-26.4	47.25	-	-	74	-26.75	130	157	V
* 1.591	32.56	MAv1	28.4	-26.4	34.56	54	-19.44	-	-	130	157	V
* 4.943	43.19	PK2	34.1	-30.2	47.09	-	-	74	-26.91	145	210	H
* 4.943	30.88	MAv1	34.1	-30.2	34.78	54	-19.22	-	-	145	210	H
* 3.705	41.54	PK2	33.3	-30.8	44.04	-	-	74	-29.96	276	150	V
* 3.706	29.66	MAv1	33.3	-30.8	32.16	54	-21.84	-	-	276	150	V

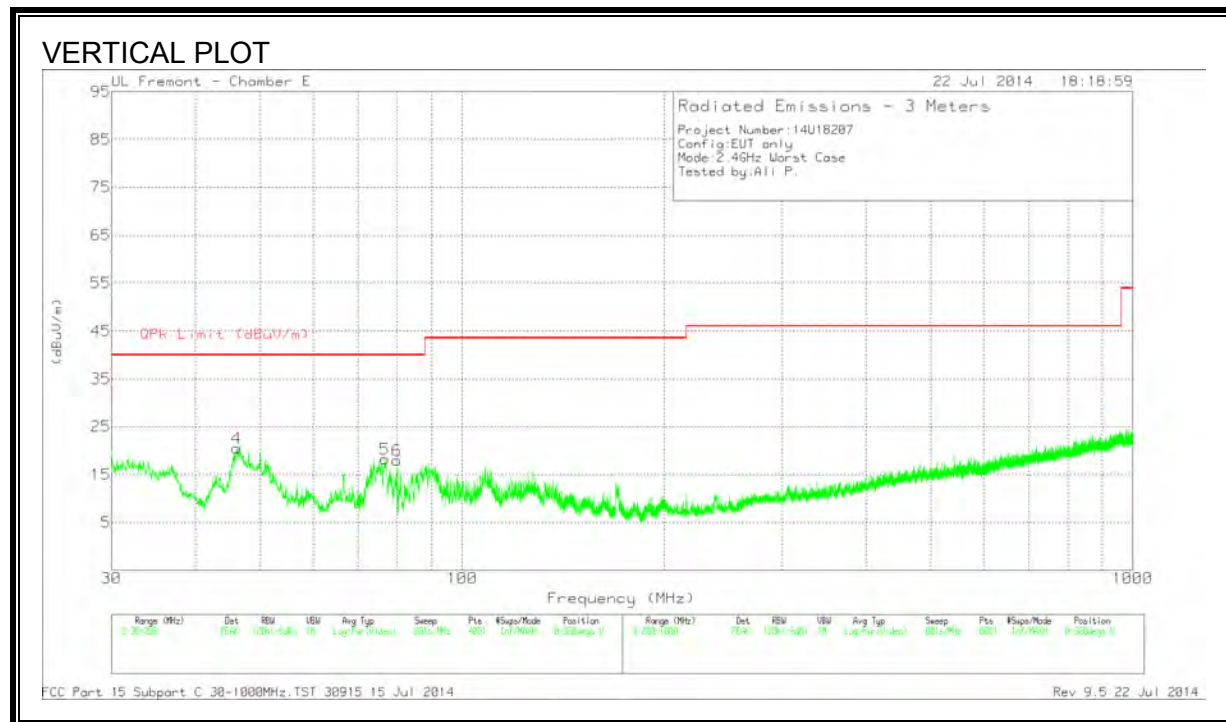
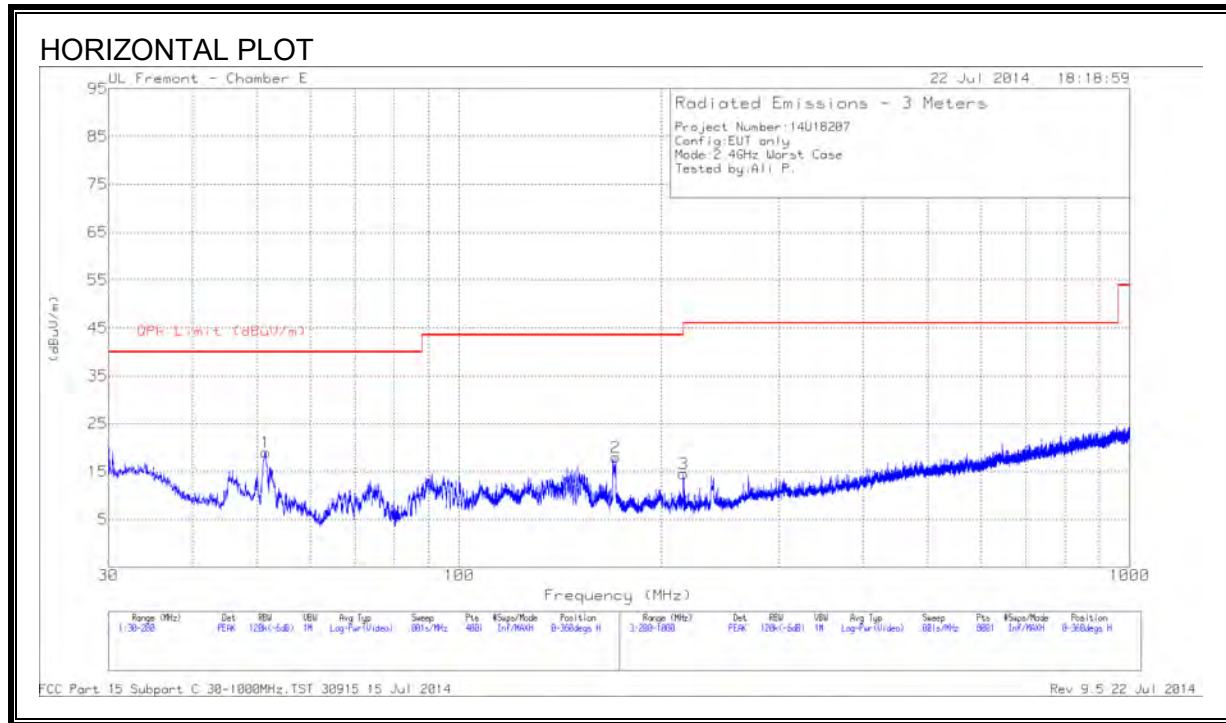
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

10.3. WORST-CASE BELOW 1 GHz

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



DATA

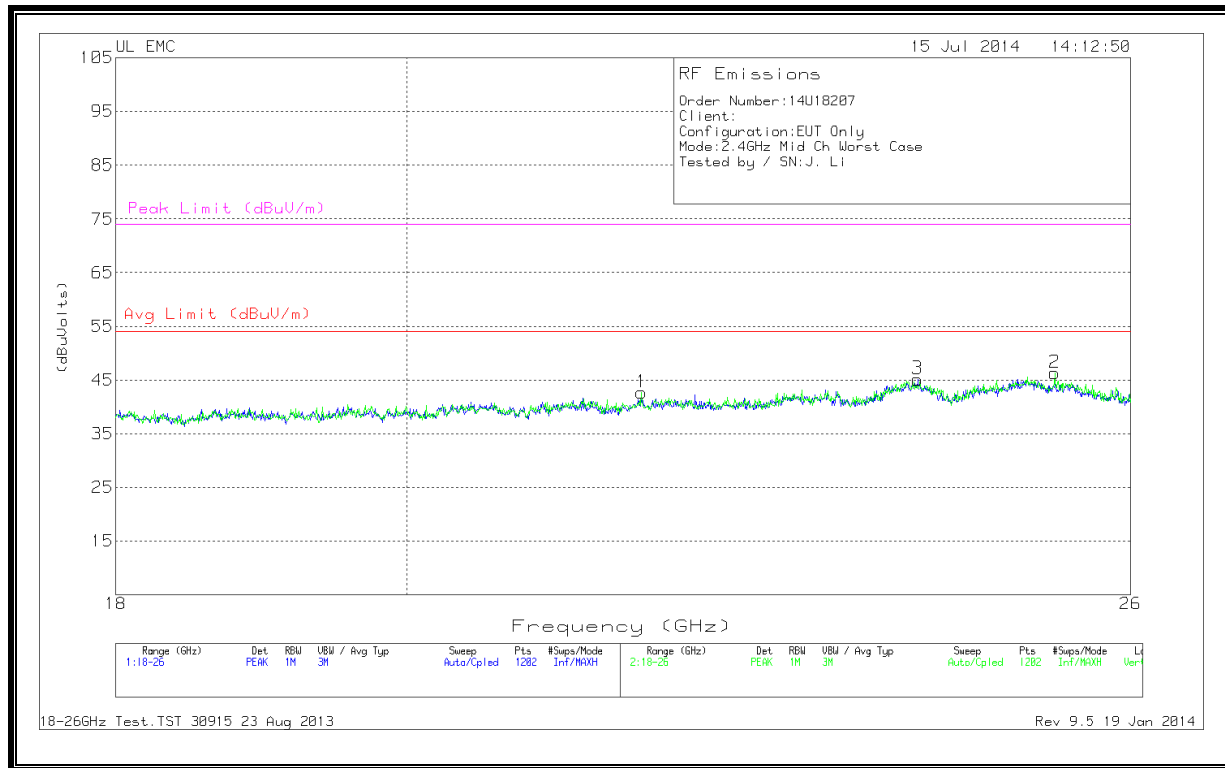
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Hybrid	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 171.0575	37.24	PK	11.7	-31	17.94	43.52	-25.58	0-360	98	H
4	46.1075	42.3	PK	9.8	-31.6	20.5	40	-19.5	0-360	100	V
1	51.4625	43.07	PK	7.5	-31.6	18.97	40	-21.03	0-360	401	H
5	76.6225	41.77	PK	7.9	-31.4	18.27	40	-21.73	0-360	100	V
6	80.0225	41.88	PK	7.6	-31.5	17.98	40	-22.02	0-360	100	V
3	216	34.76	PK	10.5	-30.7	14.56	43.52	-28.96	0-360	100	H

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

PK - Peak detector

10.4. WORST-CASE ABOVE 18 to 26GHz

SPURIOUS EMISSIONS 18 TO 26 GHz (WORST-CASE CONFIGURATION, HORIZONTAL & VERTICAL)



DATA

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)
3	24.068	43.67	PK	33.6	-22.6	-9.5	45.17	54	-8.83	74	-28.83
1	21.777	42.07	PK	33.3	-23.2	-9.5	42.67	54	-11.33	74	-31.33
2	25.294	44.33	PK	33.9	-22.4	-9.5	46.33	54	-7.67	74	-27.67

PK - Peak detector

11. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

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

WORST EMISSIONS

Line-L1 .15 - 30MHz

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1 (dB)	LC Cables 1&3 (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
1	.15	40.69	PK	1.4	0	42.09	66	-23.91	-	-
2	.15	30.75	Av	1.4	0	32.15	-	-	56	-23.85
3	.2535	40.88	PK	.7	0	41.58	61.6	-20.02	-	-
4	.2535	30.24	Av	.7	0	30.94	-	-	51.6	-20.66
5	.5865	44.84	PK	.3	0	45.14	56	-10.86	-	-
6	.5865	34.13	Av	.3	0	34.43	-	-	46	-11.57
7	1.698	35.3	PK	.2	.1	35.6	56	-20.4	-	-
8	1.698	24.8	Av	.2	.1	25.1	-	-	46	-20.9
9	8.0835	29.99	PK	.2	.1	30.29	60	-29.71	-	-
10	8.0835	19.21	Av	.2	.1	19.51	-	-	50	-30.49
11	28.5675	27.92	PK	.3	.3	28.52	60	-31.48	-	-
12	28.5675	19.95	Av	.3	.3	20.55	-	-	50	-29.45

PK - Peak detector

Av - average detection

Line-L2 .15 - 30MHz

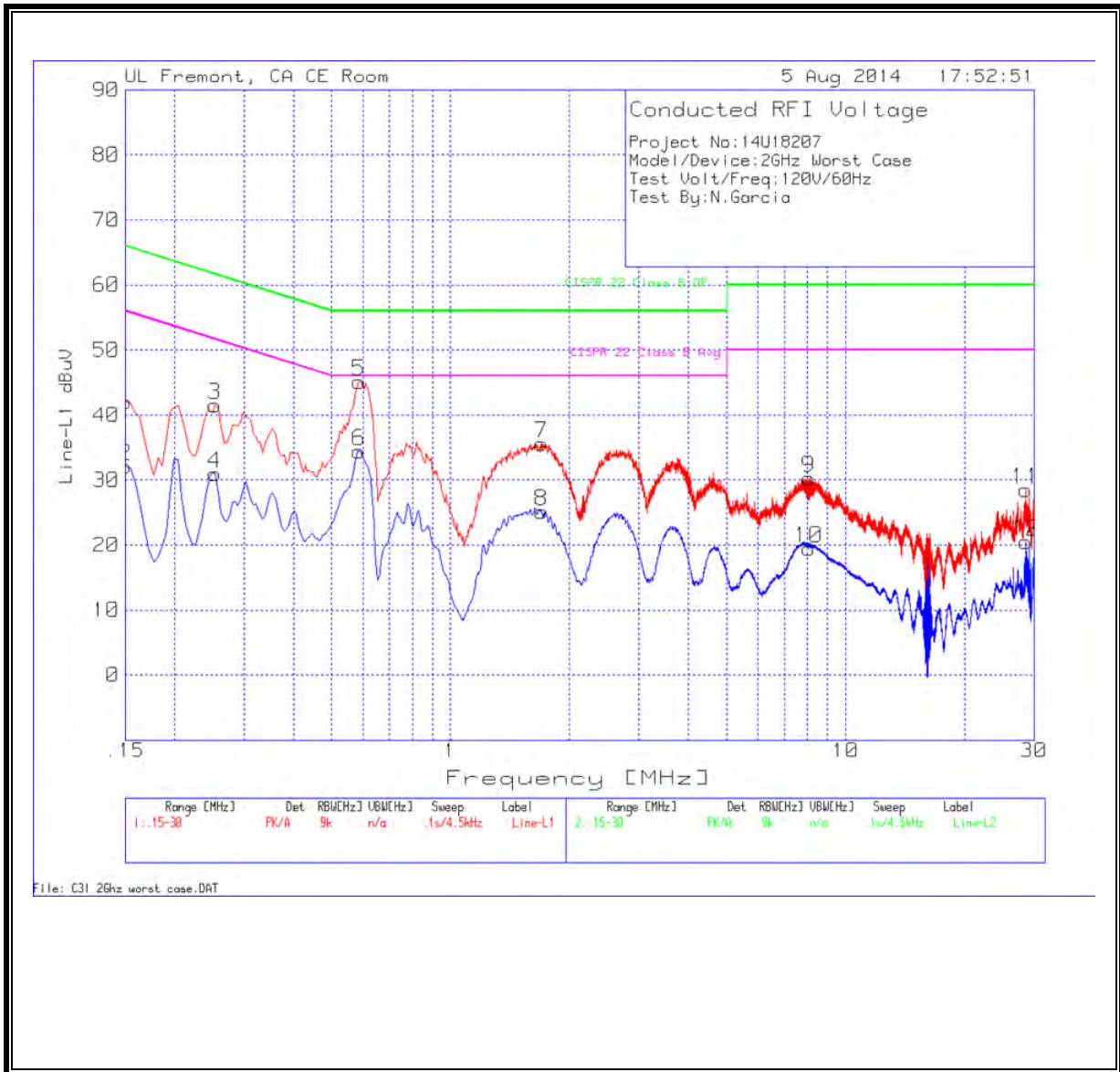
Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2 (dB)	LC Cables 2&3 (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
13	.204	41.56	PK	1	0	42.56	63.4	-20.84	-	-
14	.204	28.98	Av	1	0	29.98	-	-	53.4	-23.42
15	.5865	40.47	PK	.3	0	40.77	56	-15.23	-	-
16	.5865	24.83	Av	.3	0	25.13	-	-	46	-20.87
17	2.427	27.07	PK	.2	.1	27.37	56	-28.63	-	-
18	2.427	10.09	Av	.2	.1	10.39	-	-	46	-35.61
19	3.4485	24.37	PK	.2	.1	24.67	56	-31.33	-	-
20	3.4485	8.91	Av	.2	.1	9.21	-	-	46	-36.79
21	7.881	33.13	PK	.2	.1	33.43	60	-26.57	-	-
22	7.881	23.16	Av	.2	.1	23.46	-	-	50	-26.54
23	24.144	22.73	PK	.3	.2	23.23	60	-36.77	-	-
24	24.144	9.46	Av	.3	.2	9.96	-	-	50	-40.04

PK - Peak detector

Av - average detection

LINE 1 PLOT



LINE 2 PLOT

