



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

CLASS II PERMISSIVE CHANGE

CERTIFICATION TEST REPORT

FOR

802.11a/b/g/n FLOOR STANDING PRODUCT

MODEL NUMBER: SUB

FCC ID: SBVRM005

IC: 5373A-RM005

REPORT NUMBER: 13U16284-1

ISSUE DATE: FEBRUARY 13, 2013

Prepared for

SONOS, INC.

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	02/13/14	Initial Issue	

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
5.1. DESCRIPTION OF CLASS II PERMISSIVE CHANGE	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.....	9
6. TEST AND MEASUREMENT EQUIPMENT	11
7. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS	12
7.1. ON TIME AND DUTY CYCLE RESULTS.....	12
7.2. MEASUREMENT METHODS	13
7.3. DUTY CYCLE PLOTS	14
8. ANTENNA PORT TEST RESULTS	15
8.1. 802.11b MODE IN THE 2.4 GHz BAND.....	15
8.1.1. 6 dB BANDWIDTH.....	15
8.1.2. 99% BANDWIDTH.....	18
8.1.3. AVERAGE POWER.....	21
8.1.4. OUTPUT POWER	22
8.1.5. PSD	26
8.1.6. OUT-OF-BAND EMISSIONS	29
9. RADIATED TEST RESULTS.....	34
9.1. LIMITS AND PROCEDURE	34
9.2. TX ABOVE 1 GHz 802.11b MODE IN THE 2.4 GHz BAND	35
9.3. WORST-CASE ABOVE 18 GHz	45
9.4. WORST-CASE BELOW 1 GHz.....	47

10.	AC POWER LINE CONDUCTED EMISSIONS	50
11.	POWER SETTINGS	54
12.	SETUP PHOTOS	55

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SONOS, INC.
223 E. De La Guerra ST.
SANTA BARBARA, CA 93101, U.S.A.

EUT DESCRIPTION: 802.11a/b/g/n FLOOR STANDING PRODUCT

MODEL: SUB

SERIAL NUMBER: 1205000E589813480

DATE TESTED: NOVEMBER 22 – FEBRUARY 13, 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
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WISE PROJECT LEADER
UL Verification Services Inc.

Tested By:



TINA CHU
WISE LABORATORY 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 www.UL.com.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

4.3. MEASUREMENT UNCERTAINTY

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

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

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

This is a Class II permissive change project. The original report was issued by UL, report reference no: 11U14084-1. EUT is a floor standing product with 802.11a/b/g/n 2x2 MIMO.

5.1. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

This is a Class II permissive change project, change of scope is to add 802.11b 1x1.

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	22.42	174.58

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes two dipole antennas on PCB, the antennas gains are as follows:

Frequency	Antenna-01(dB)		Antenna-02 (dB)	
	Peak Gain (dBi)	Efficiency (%)	Peak Gain (dBi)	Efficiency (%)
2400MHz	3.86	49.82	2.79	49.82
2450MHz	3.97	48.91	2.71	50.04
2500MHz	3.81	44.56	3.17	47.93
4900MHz	4.27	53.64	3.17	55.06
5150MHz	4.98	56.08	3.00	57.87
5250MHz	4.10	51.39	3.92	59.00
5350MHz	4.03	56.90	3.55	53.41
5725MHz	4.09	50.56	4.27	54.51
5825MHz	3.55	54.82	4.38	59.36
5850MHz	3.42	54.97	4.38	57.25

According to client's declaration, only Antenna 01 is used for 802.11b mode.

5.4. SOFTWARE AND FIRMWARE

The Sonos software version is V4.6

Atheros Radio Test 2(ART2-GUI) V 2.3

5.5. WORST-CASE CONFIGURATION AND MODE

For Radiated Emissions below 1 GHz and Power line Conducted Emissions, the channel with the highest conducted output power was selected as worst-case scenario.

Worst-case data rates as provided by the manufacturer are:

For 11b 20MHz mode: 24Mbps

To determine the worst orientation of the EUT for highest emissions, the EUT's antenna was investigated for X and Y orientations; the worst orientation was Y orientation; therefore, all final radiated emissions were performed with the EUT's antenna laid in the Y orientation.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Dell	Latitude E4310	186076533286	DoC
Laptop AC Adapter	Dell	LA65NS2-01	16F1-A00	DoC
Router	Linksys	BEFSR81	C2220E202195	DoC
Router AC adapter	Linksys	AM-1201000D41	N/A	N/A

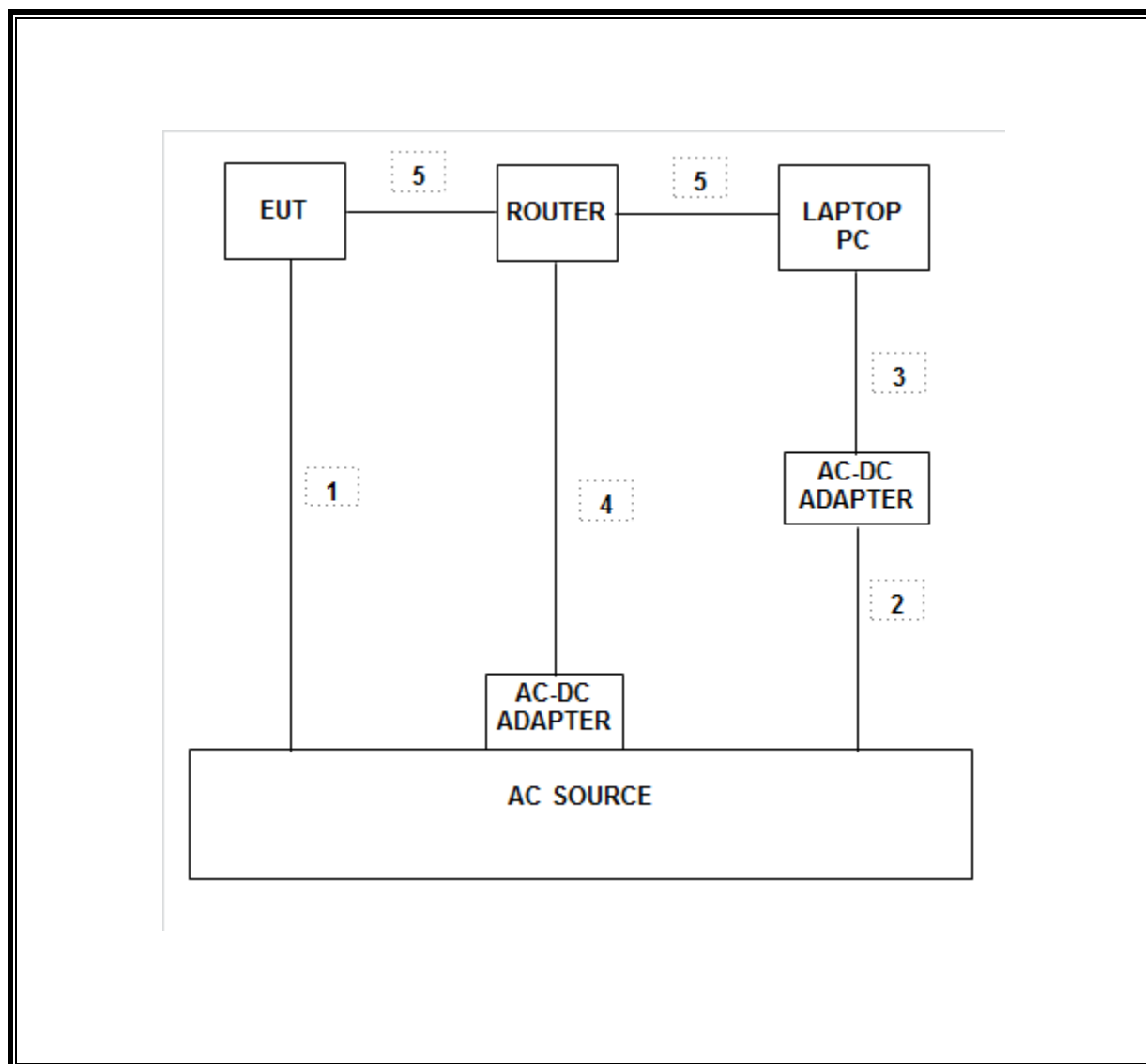
I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	US 115V	Un-shielded	1.8m	N/A
2	AC	1	US 115V	Un-shielded	1m	N/A
3	DC	1	DC	Un-shielded	1.8m	N/A
4	DC	1	DC	Un-shielded	1.8m	N/A
5	Ethnet	2	RJ45	Un-shielded	2m	N/A

TEST SETUP

Test software exercised the radio card.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List				
Description	Manufacturer	Model	Asset	Cal Due
Horn Antenna 1-18GHz	ETS Lindgren	3117	F00131	02/19/14
Preamplifier, 1300 MHz	Sonoma	310	F00008	05/27/14
Antenna, Biconolog, 30MHz-1 GHz	Sunol Sciences	JB3	F00027	03/07/14
Preamplifier, 1-18GHz	Miteq	-	F00133	02/19/14
Spectrum Analyzer, 3Hz-44GHz	Agilent	N9030A	F00128	02/22/14
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, 44GHz	Agilent	E4446A	C01012	10/21/14
Spectrum Analyzer, 40GHz	HP	8564E	C00951	07/29/14
Antenna, Horn, 26GHz	ARA	MWH-1826/B	81140	05/17/14
Preamplifier, 26.5 GHz	Agilent	8449B	F100167	03/23/14

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 1TX	8.382	8.546	0.981	98.08%	0.00	0.010

7.2. MEASUREMENT METHODS

6 dB BW: KDB 558074 D01

Output Power: KDB 558074 D01

Power Spectral Density: KDB 558074

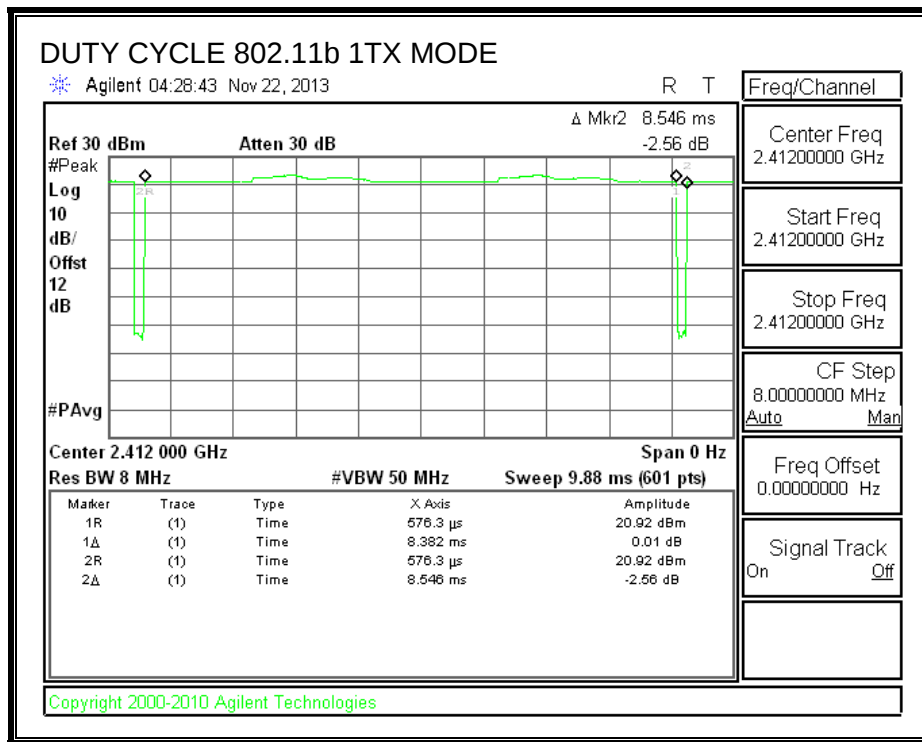
Out-of-band emissions in non-restricted bands: KDB 558074 D01

Out-of-band emissions in restricted bands: KDB

Band-edge: KDB 558074 D01 v03r01

7.3. DUTY CYCLE PLOTS

2.4 GHz BAND



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)

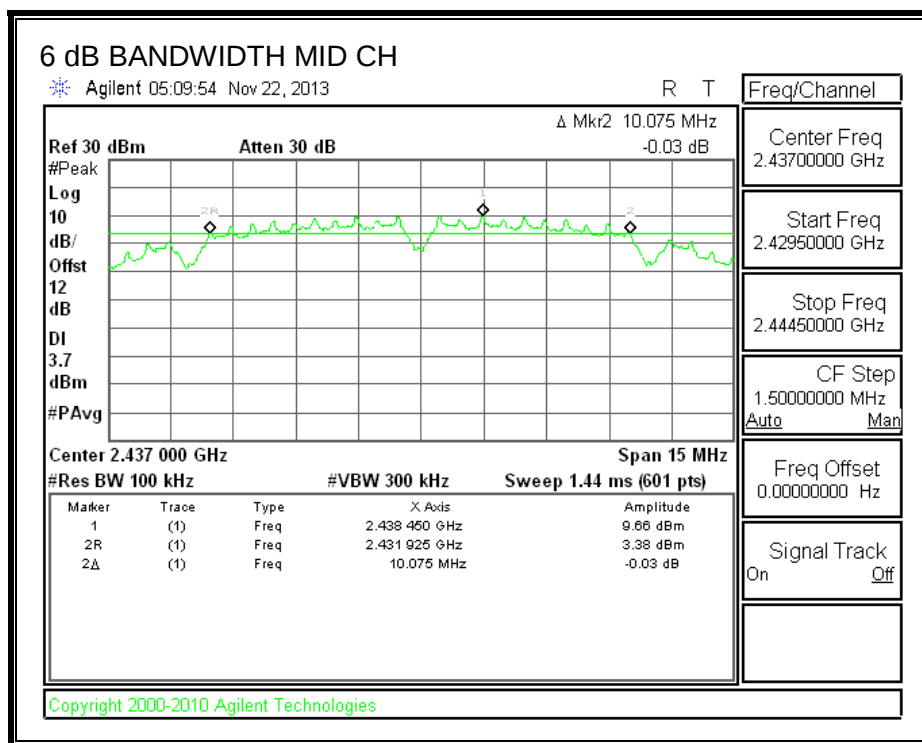
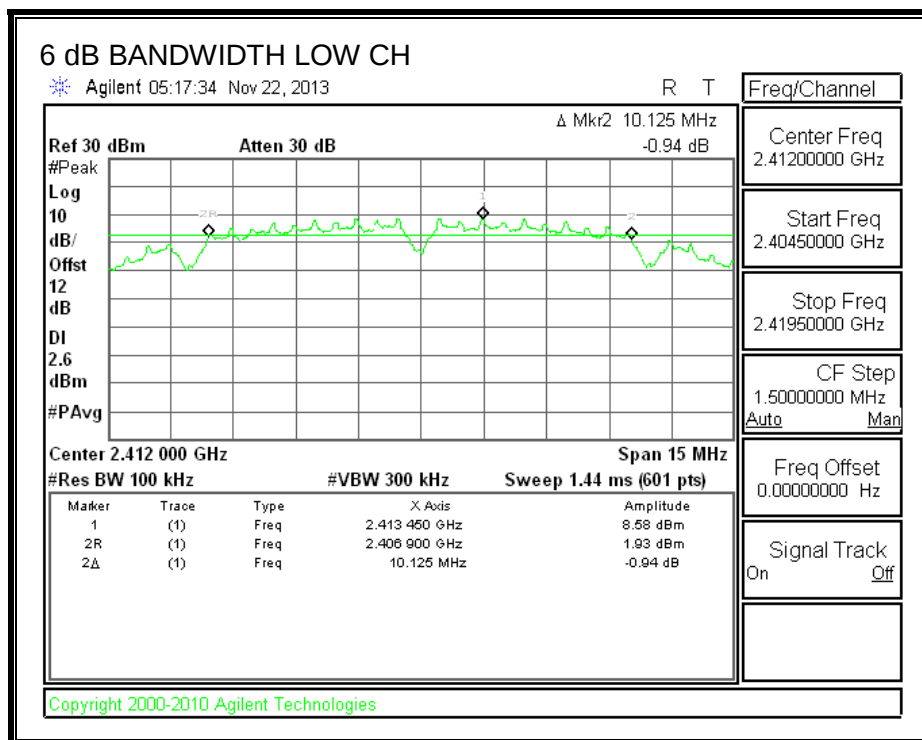
IC RSS-210 A8.2 (a)

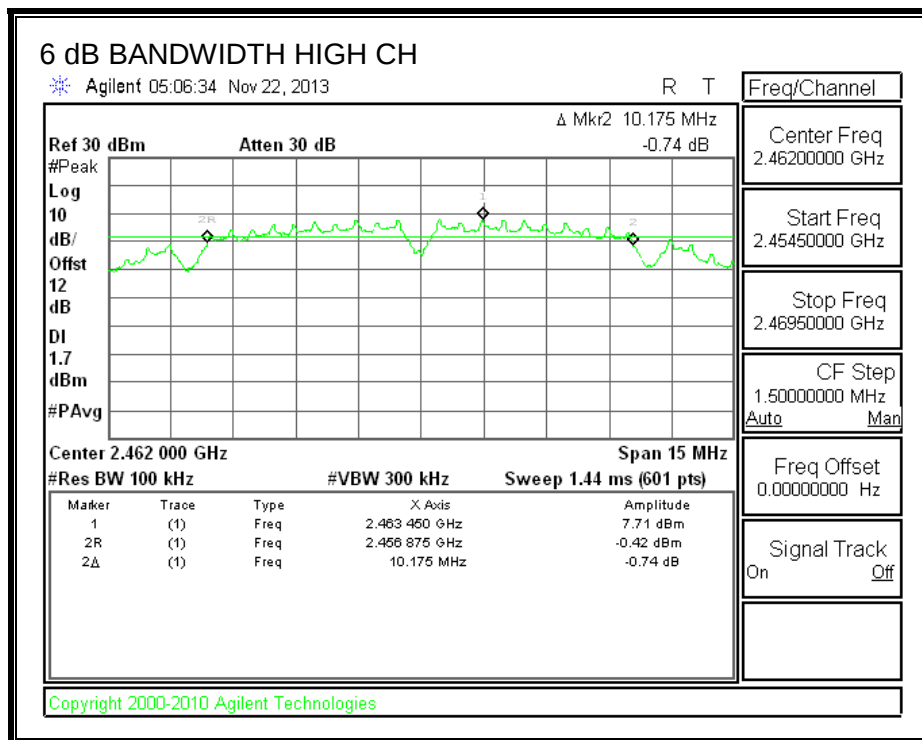
The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	10.125	0.5
Mid	2437	10.075	0.5
High	2462	10.175	0.5

6 dB BANDWIDTH





8.1.2. 99% BANDWIDTH

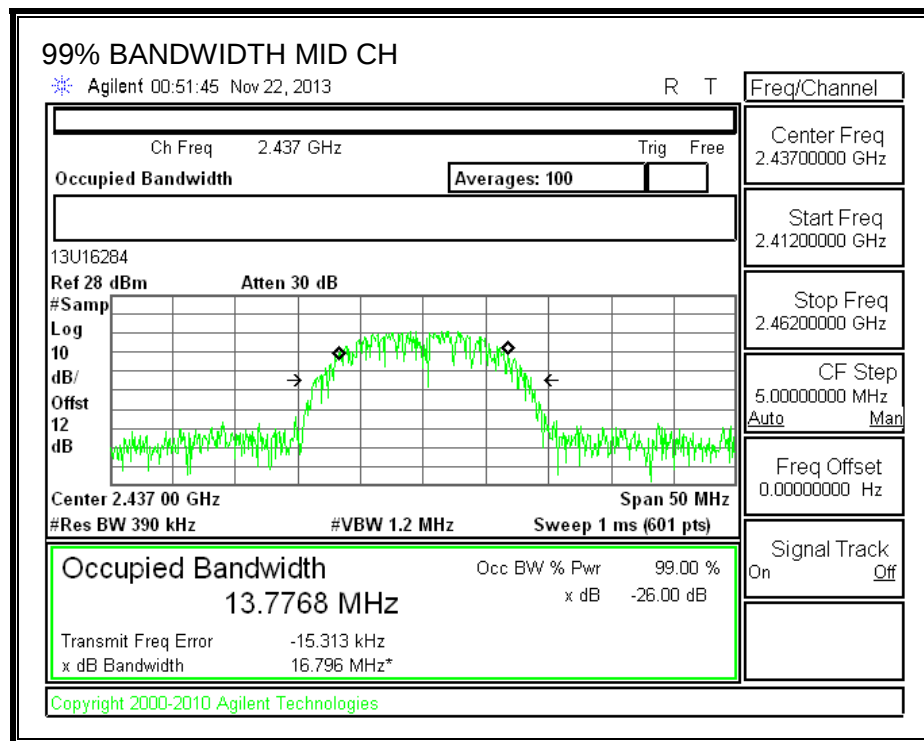
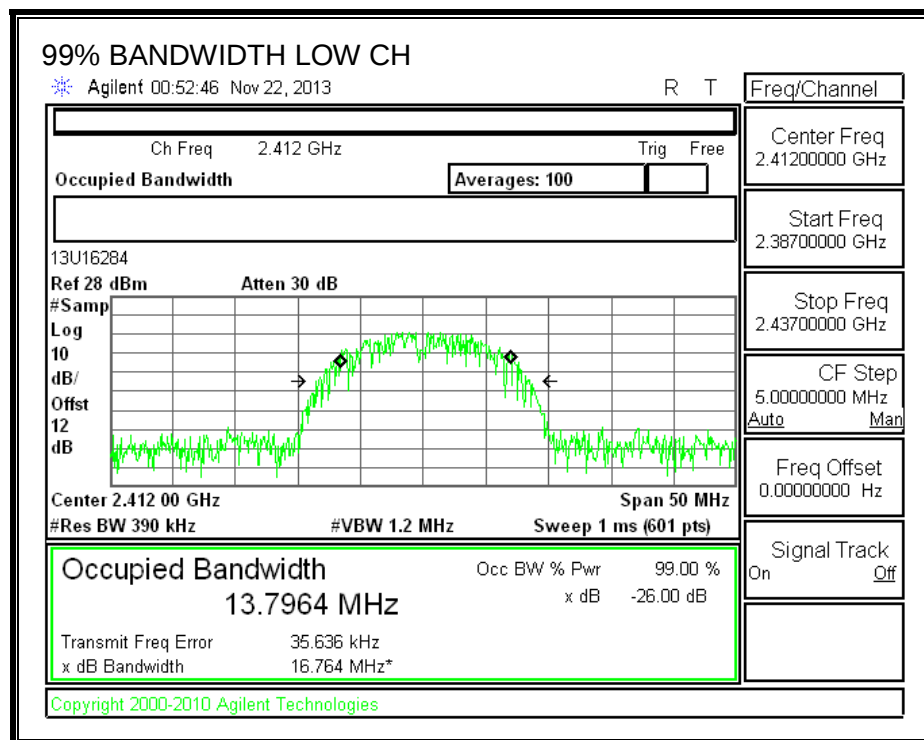
LIMITS

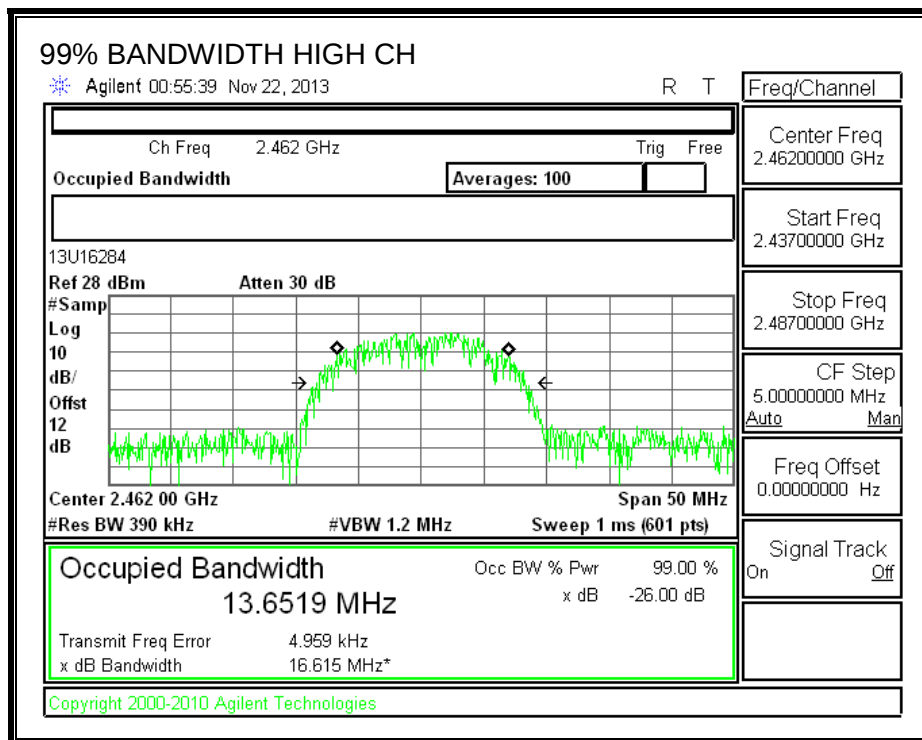
None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	13.7964
Mid	2437	13.7768
High	2462	13.6519

99% BANDWIDTH





8.1.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	2412	19.97
Mid	2437	19.96
High	2462	19.90

8.1.4. OUTPUT POWER

LIMITS

FCC §15.247

IC RSS-210 A8.4

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

DIRECTIONAL ANTENNA GAIN

Peak power is measured using the Channel bandwidth Alternative peak output power procedure specified in "TCB Training for Devices covered under Scopes A1 - A4" by Joe Dichoso, May 2003.

RESULTS

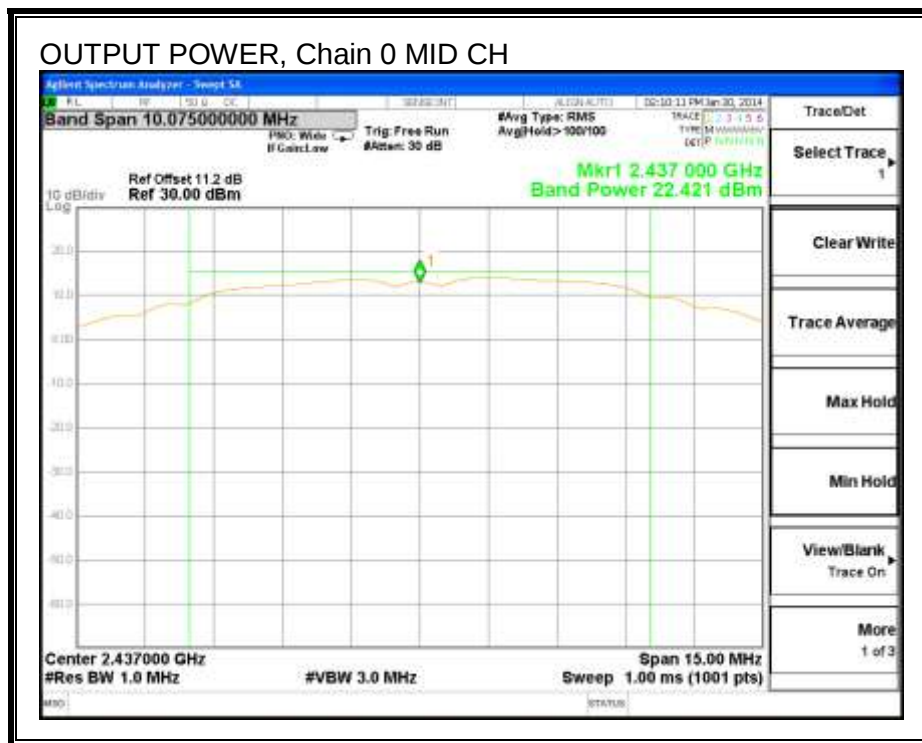
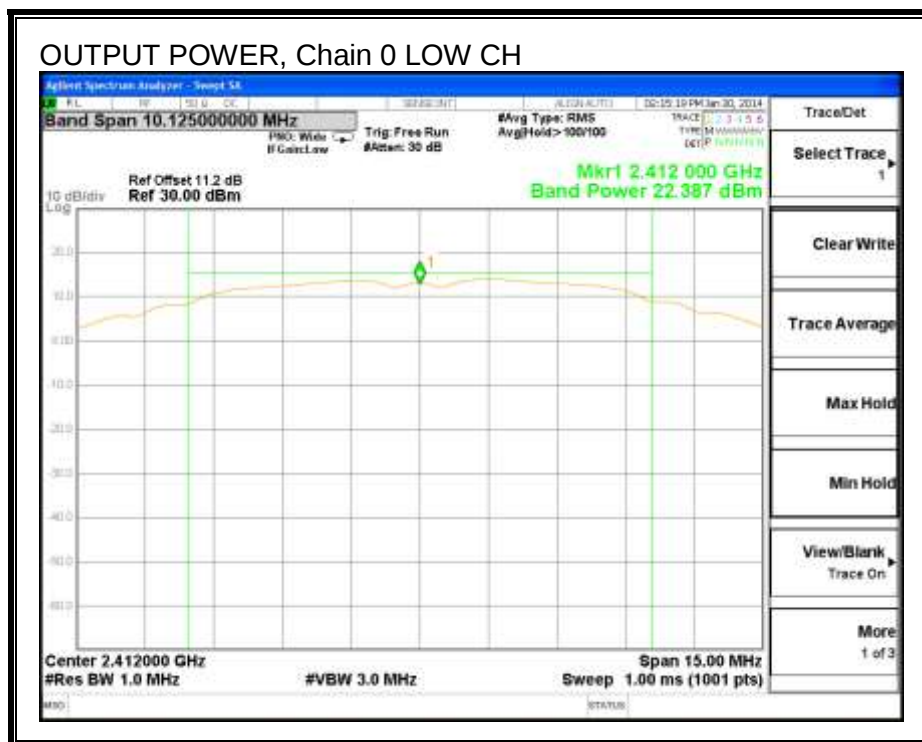
Limits

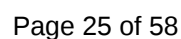
Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	3.97	30.00	30	36	30.00
Mid	2437	3.97	30.00	30	36	30.00
High	2462	3.97	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	22.39	22.39	30.00	-7.61
Mid	2437	22.42	22.42	30.00	-7.58
High	2462	22.20	22.20	30.00	-7.80

OUTPUT POWER, Chain 0





8.1.5. PSD

LIMITS

FCC §15.247

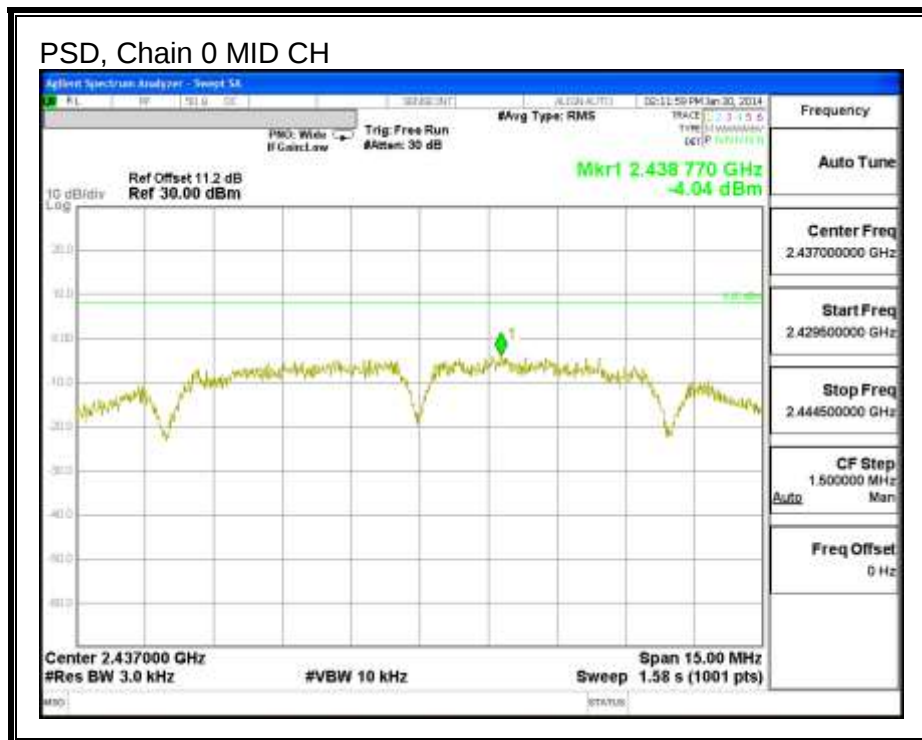
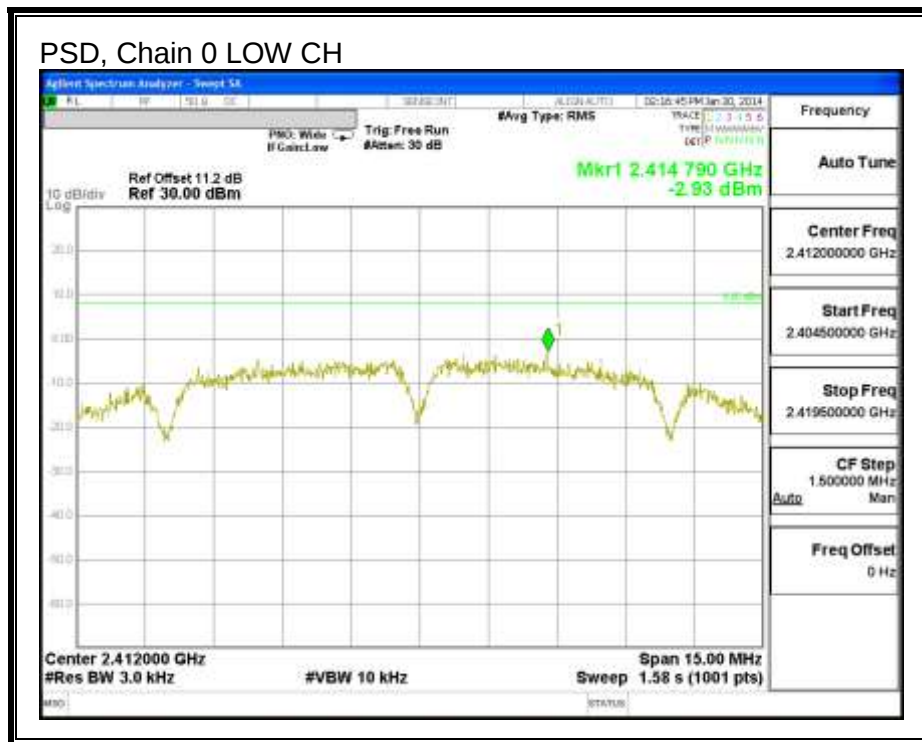
IC RSS-210 A8.2

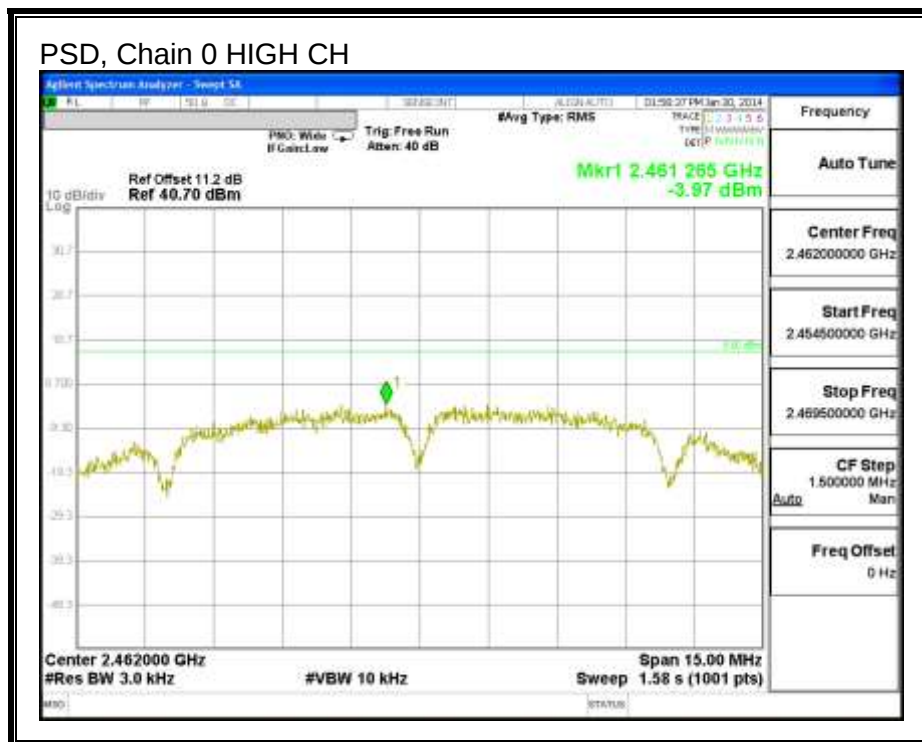
RESULTS

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-2.93	8.0	-10.9
Mid	2437	-4.04	8.0	-12.0
High	2462	-3.97	8.0	-12.0

PSD, Chain 0





8.1.6. OUT-OF-BAND EMISSIONS

LIMITS

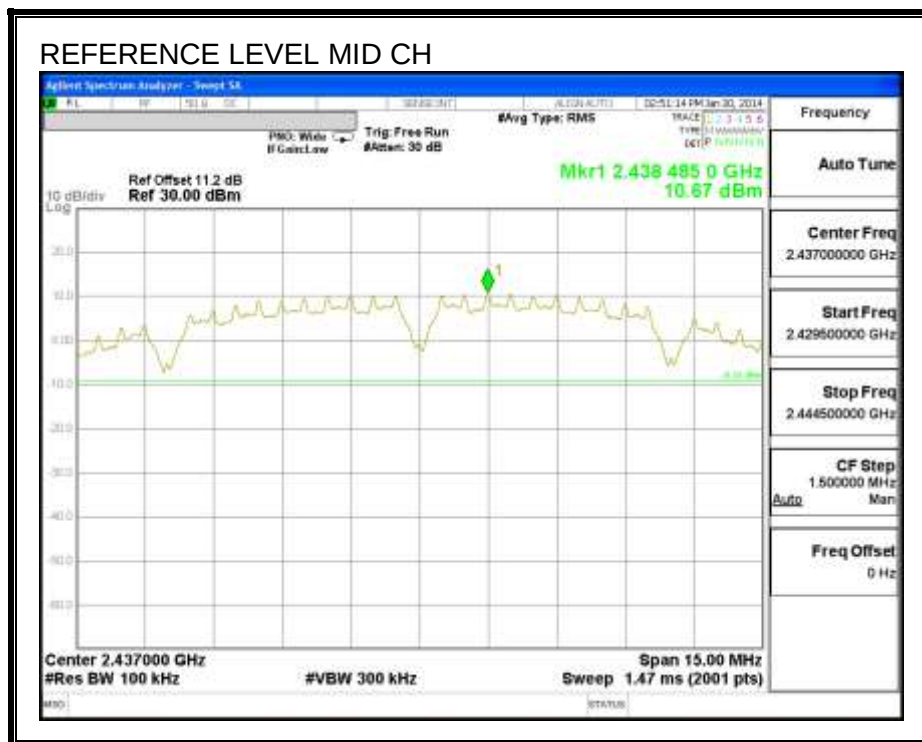
FCC §15.247 (d)

IC RSS-210 A8.5

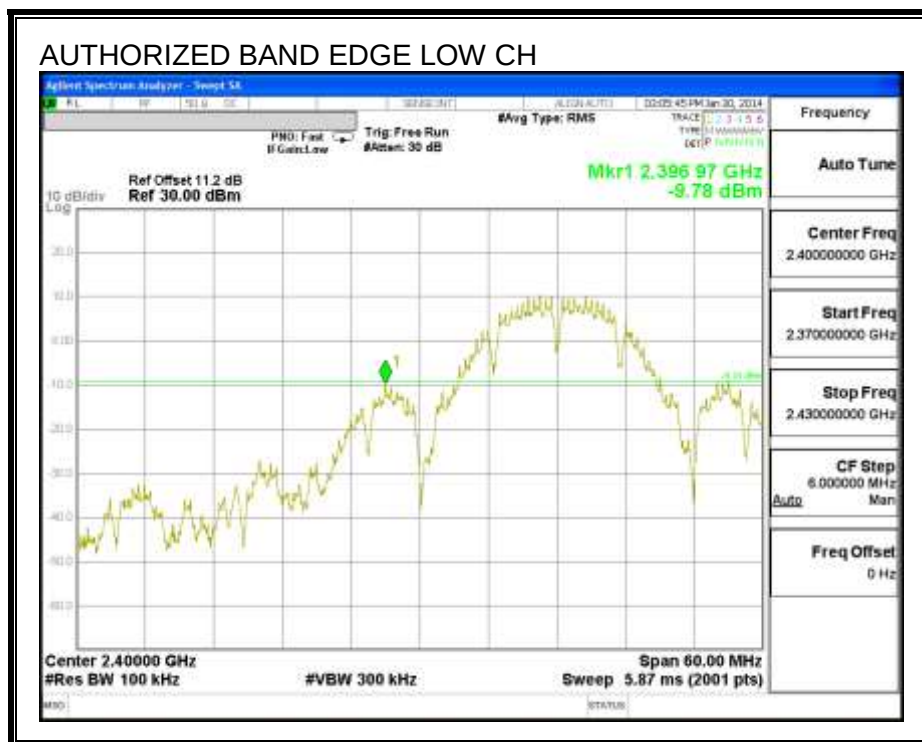
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the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

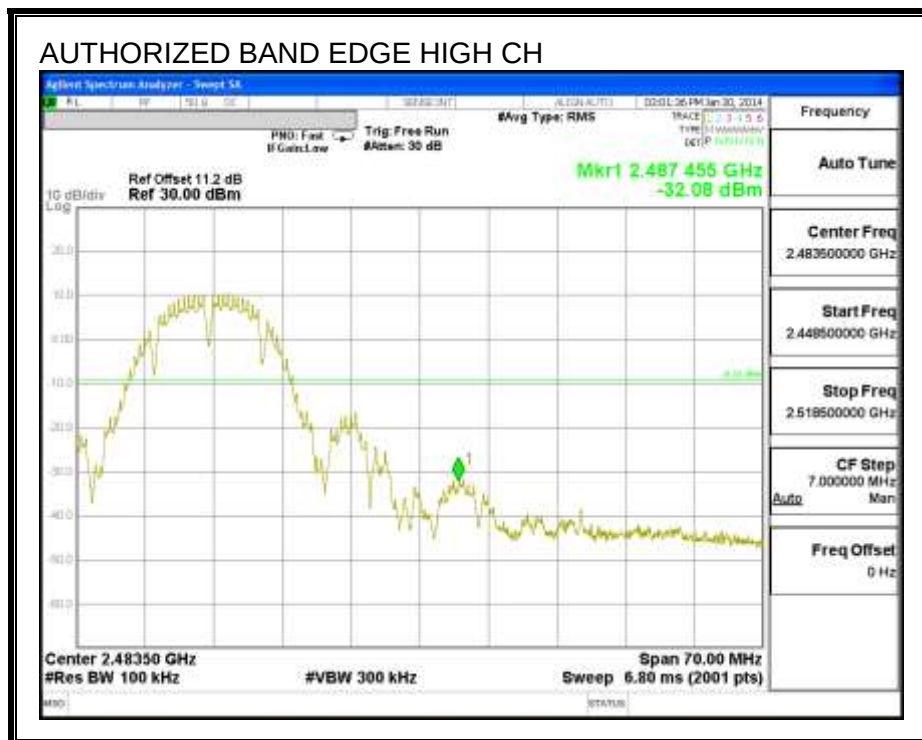
IN-BAND REFERENCE LEVEL



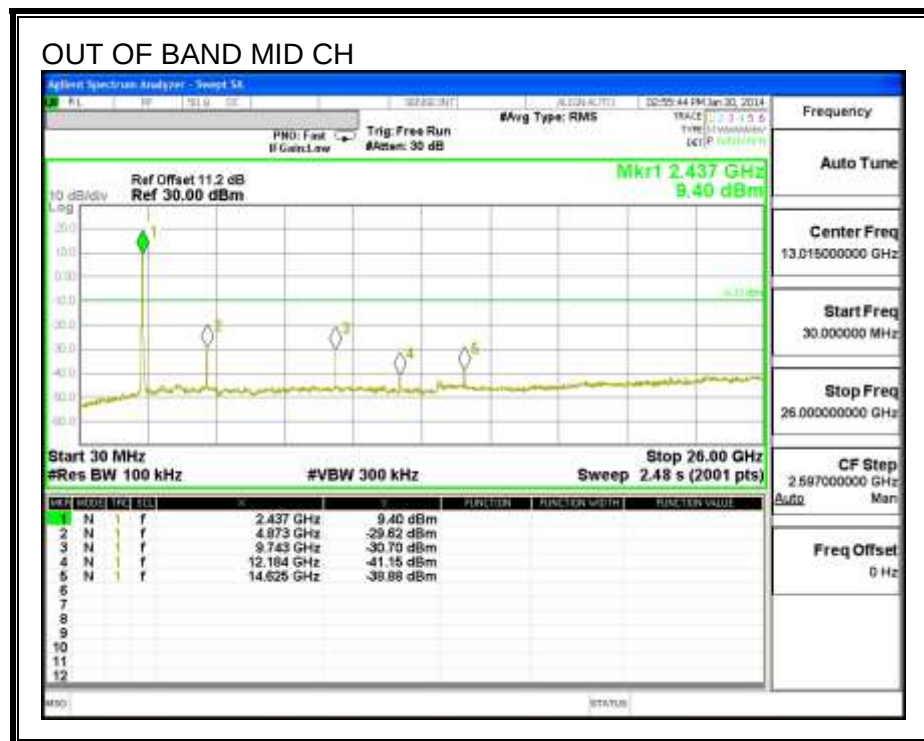
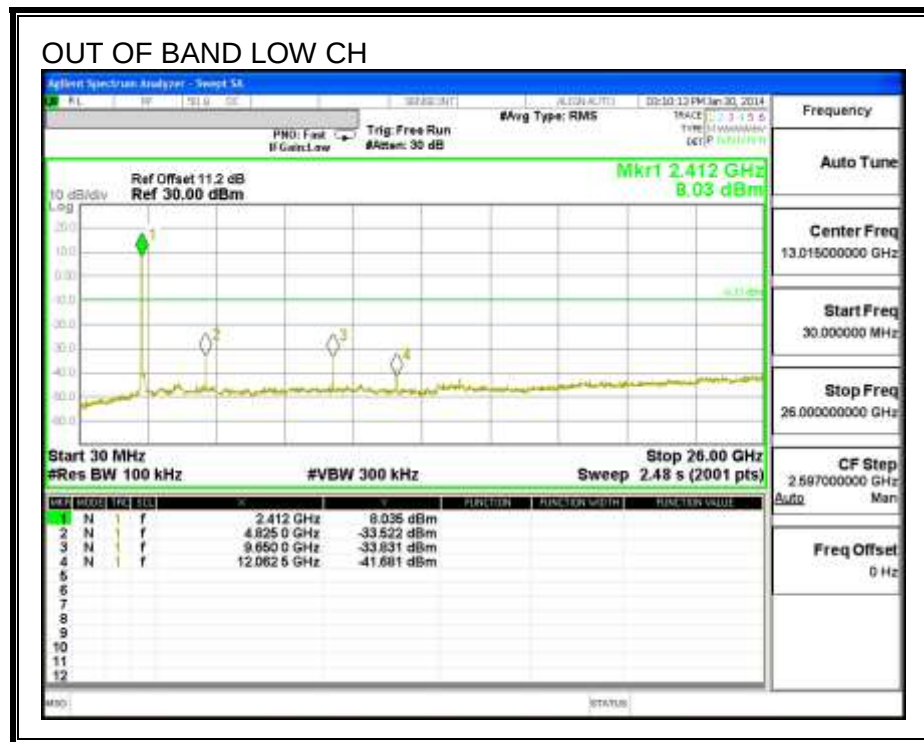
LOW CHANNEL BANDEDGE

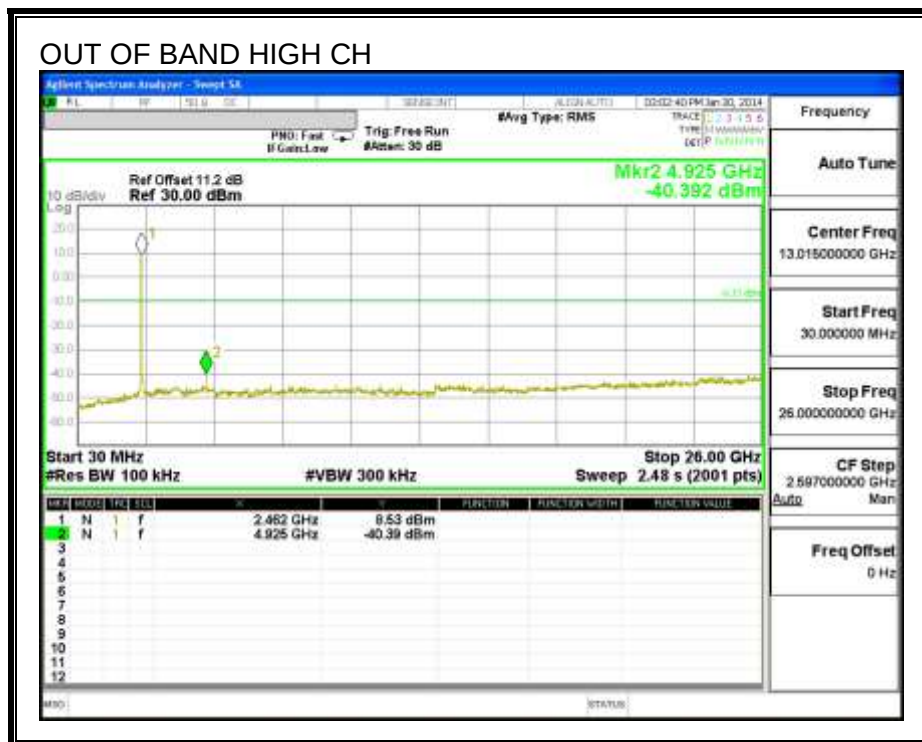


HIGH CHANNEL BANDEDGE



OUT-OF-BAND EMISSIONS





9. RADIATED TEST RESULTS

9.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

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.

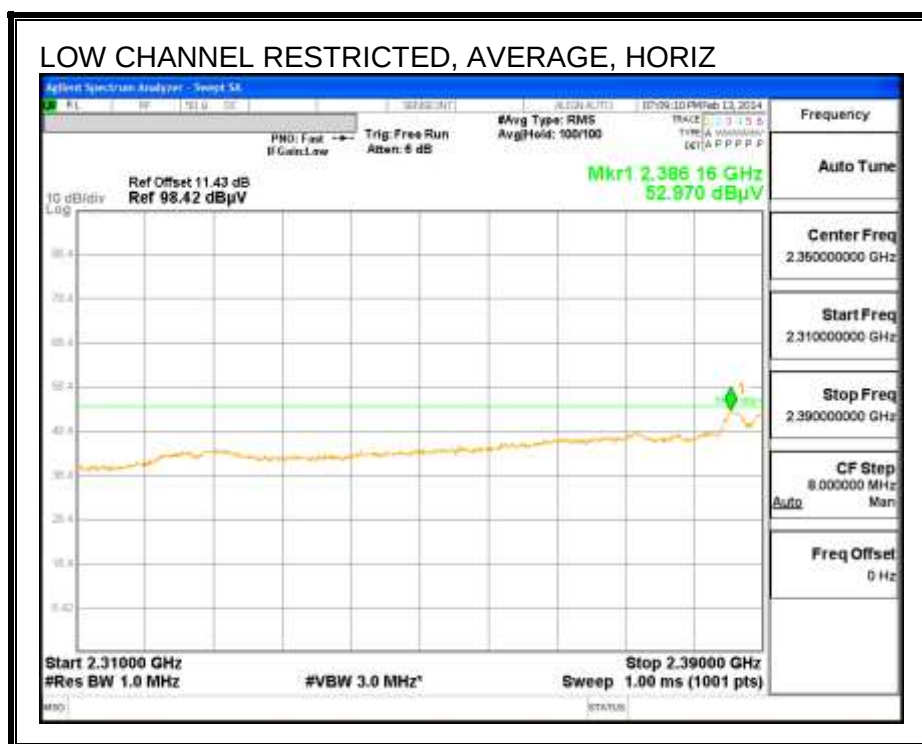
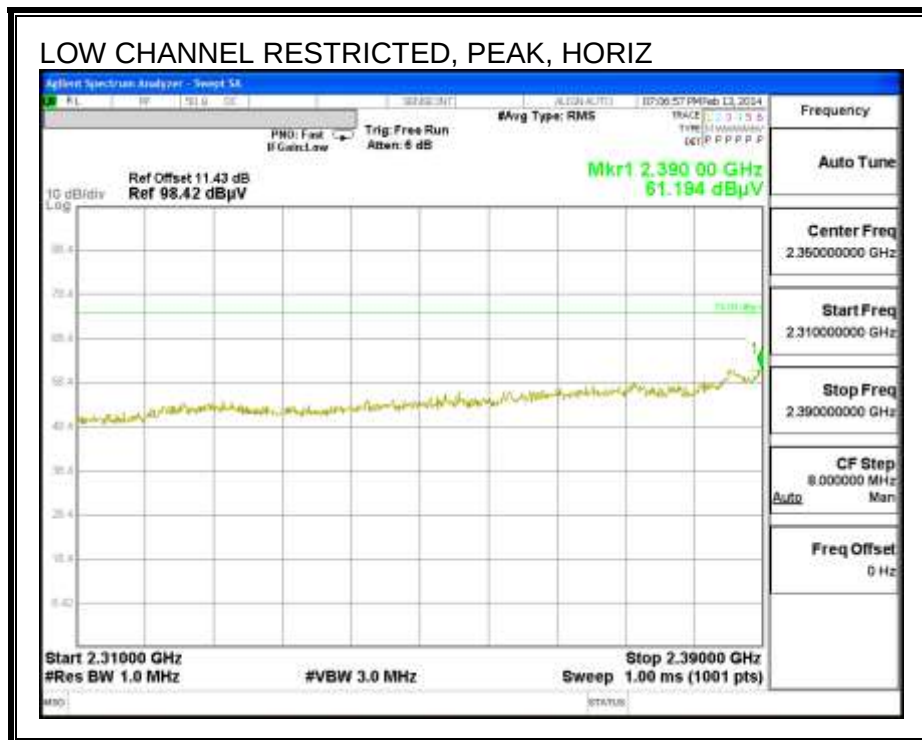
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 1 MHz for peak measurements and as applicable for average measurements.

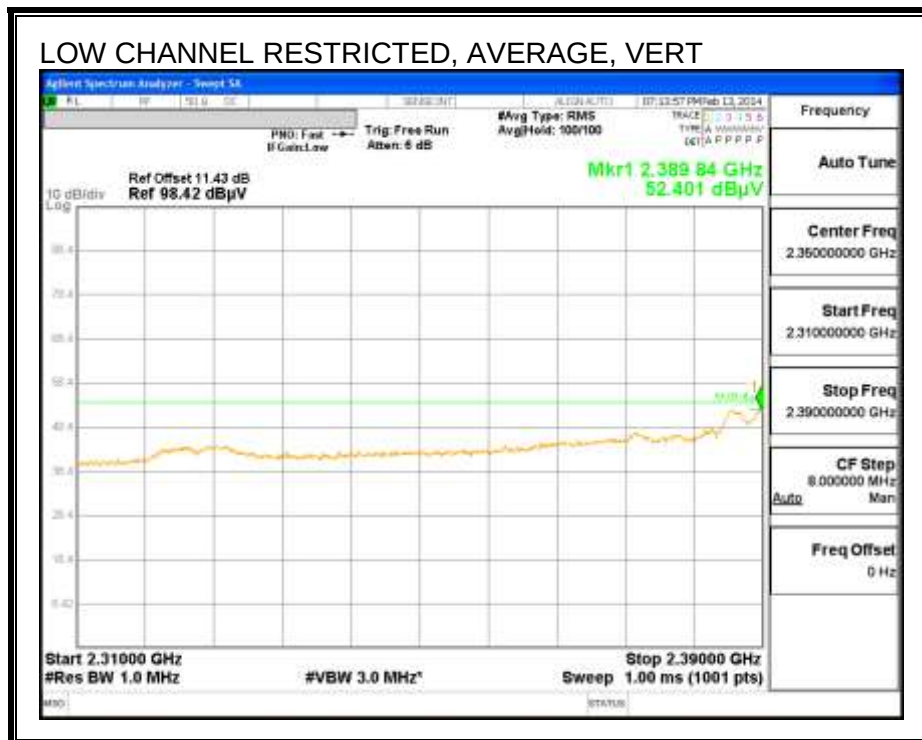
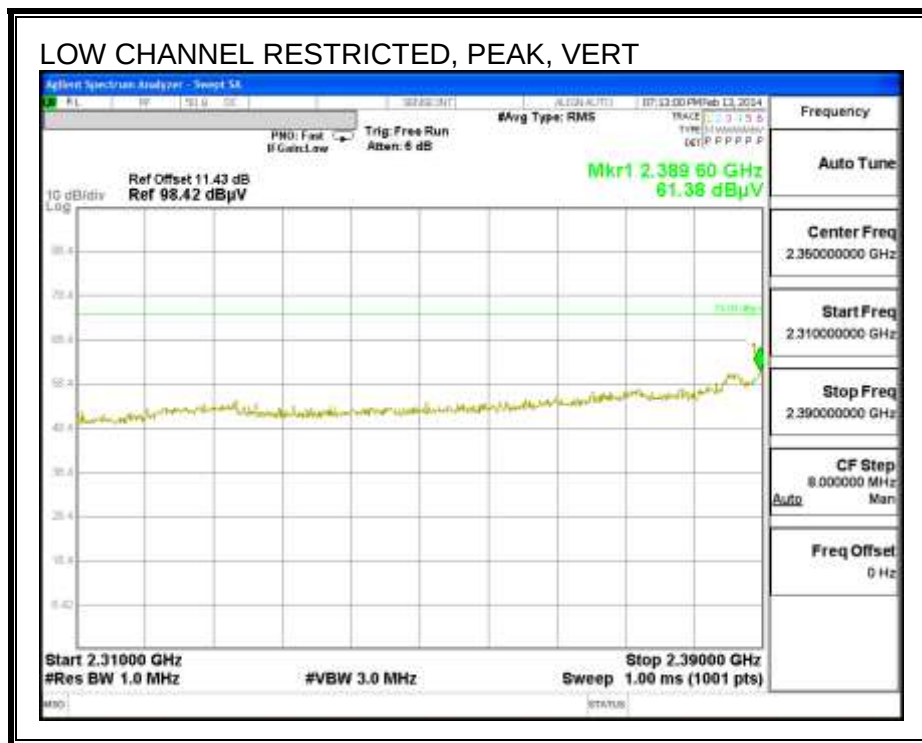
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

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.

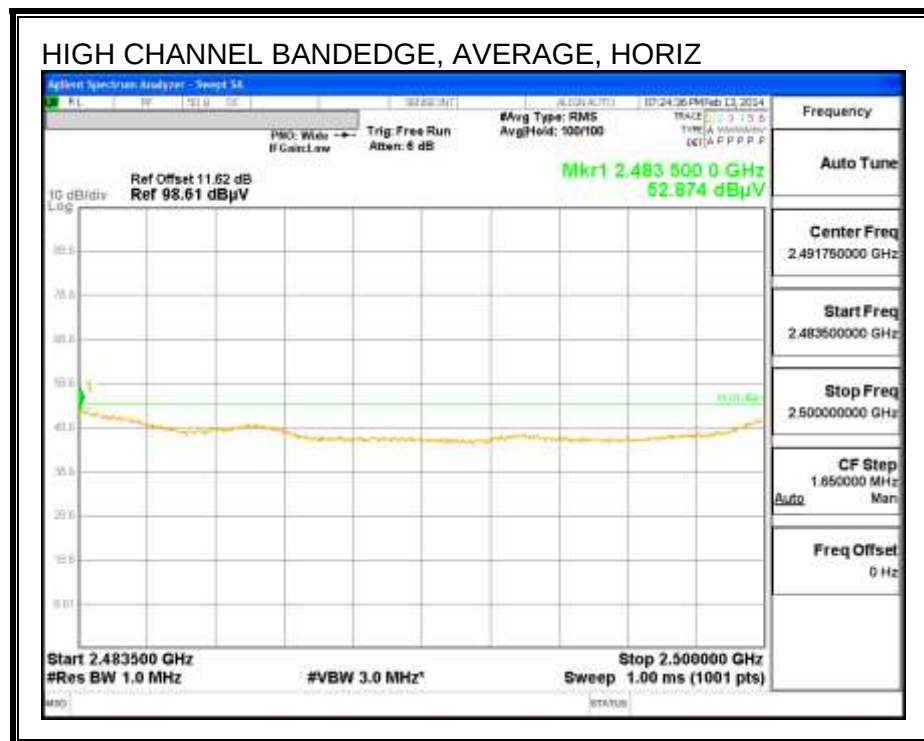
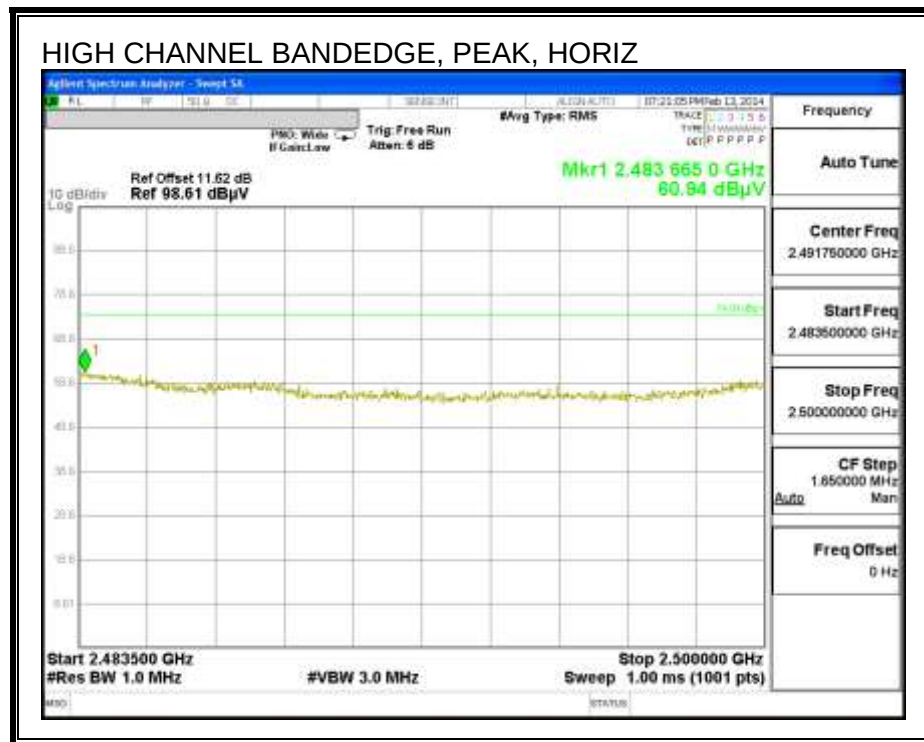
9.2. TX ABOVE 1 GHz 802.11b MODE IN THE 2.4 GHz BAND

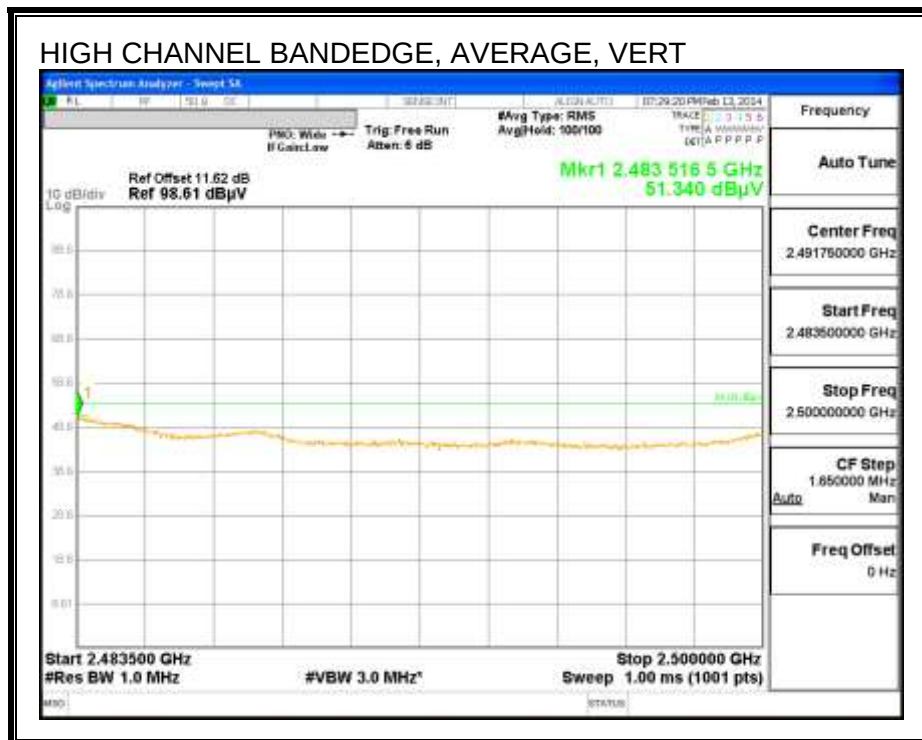
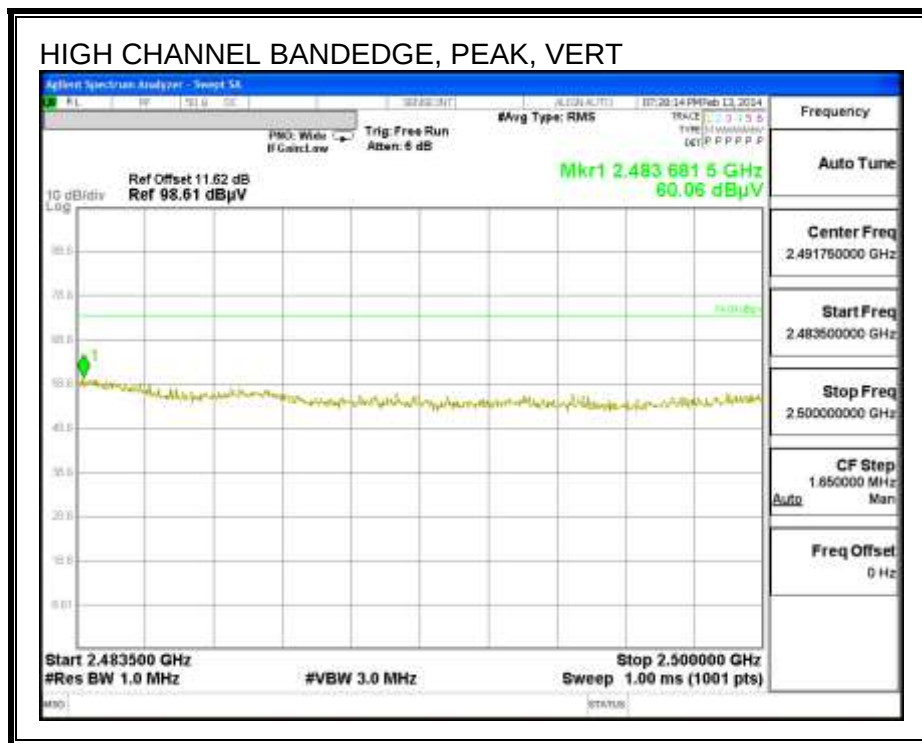
RESTRICTED BANDEDGE (LOW CHANNEL)





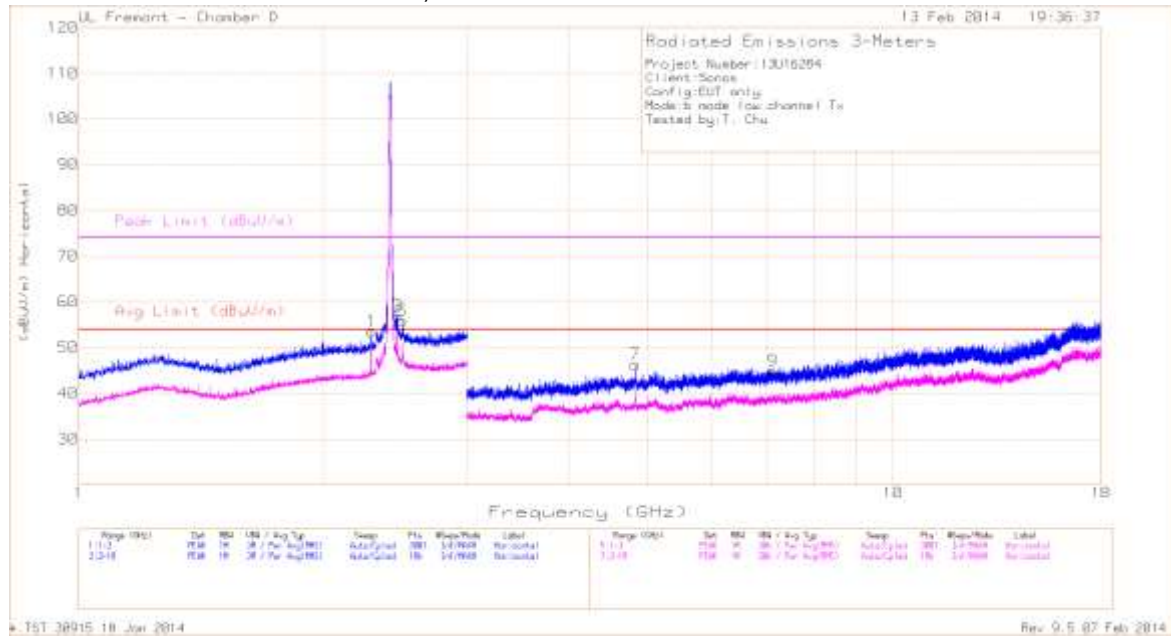
AUTHORIZED BANDEDGE (HIGH CHANNEL)



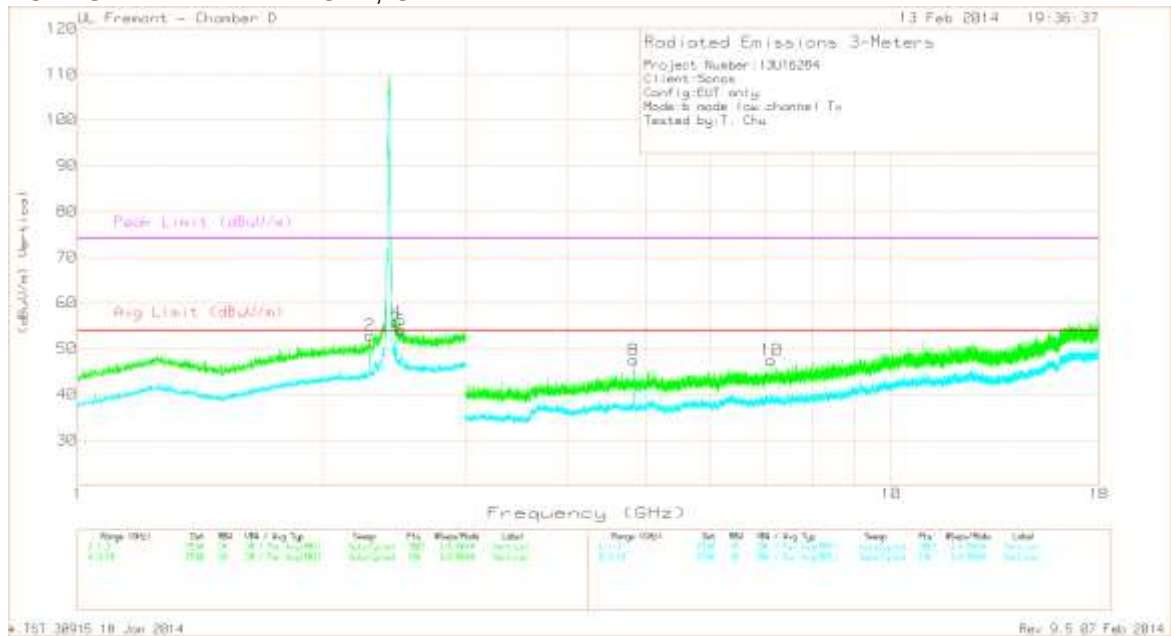


HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL, CH 1



LOW CHANNEL VERTICAL, CH 1



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T712 (dB/m)	Amp/Cbl/ Filt/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	* 2.288	45.15	PK2	30.8	-20.8	55.15	-	-	74	-18.85	350	272	H
	* 2.288	38.43	MAv1	30.8	-20.8	48.43	53.97	-5.54	-	-	350	272	H
2	* 2.288	45.17	PK2	30.8	-20.8	55.17	-	-	74	-18.83	9	392	V
	* 2.288	39.05	MAv1	30.8	-20.8	49.05	53.97	-4.92	-	-	9	392	V
3	2.465	45.53	PK	32	-20.6	56.93	-	-	74	-17.07	0-360	100	H
4	2.465	44.37	PK	32	-20.6	55.77	-	-	74	-18.23	0-360	100	V
5	2.501	44.33	PK	32.2	-20.7	55.83	-	-	74	-18.17	0-360	100	H
6	2.501	42.56	PK	32.2	-20.7	54.06	-	-	74	-19.94	0-360	100	V
7	* 4.825	39.49	PK	33.5	-26.7	46.29	-	-	74	-27.71	0-360	201	H
8	* 4.825	40.66	PK	33.5	-26.7	47.46	-	-	74	-26.54	0-360	201	V
9	7.125	34.87	PK	35.1	-25.1	44.87	-	-	74	-29.13	0-360	201	H
10	7.125	37.46	PK	35.1	-25.1	47.46	-	-	74	-26.54	0-360	100	V

PK - Peak detector

Avg - Video bandwidth < Resolution bandwidth

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

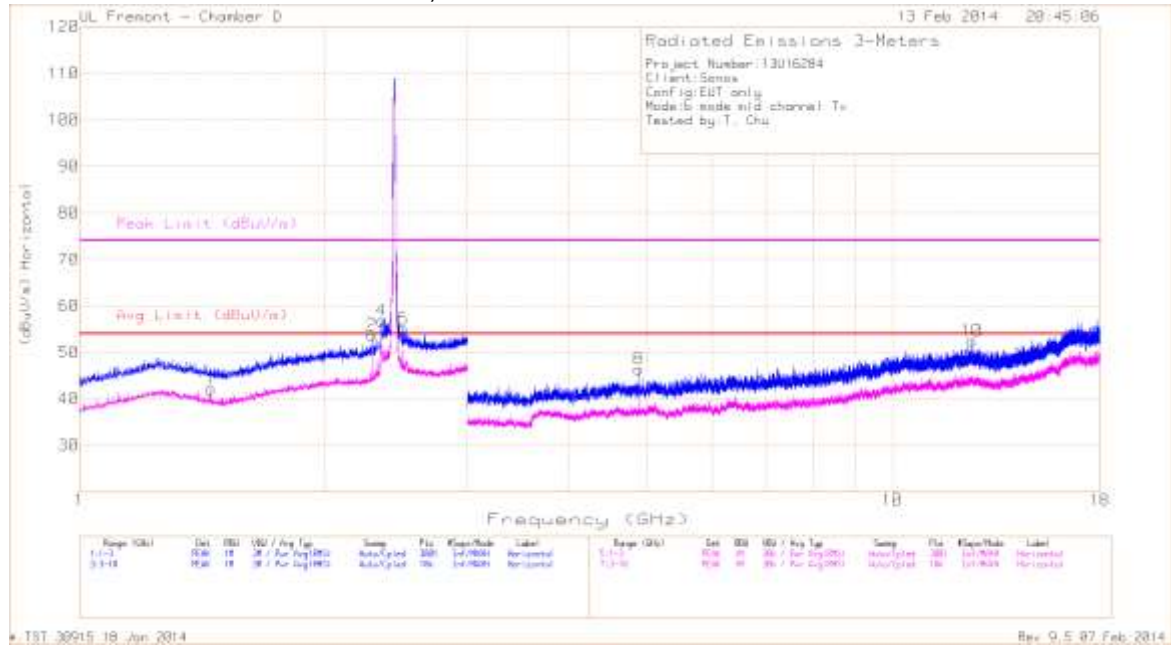
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

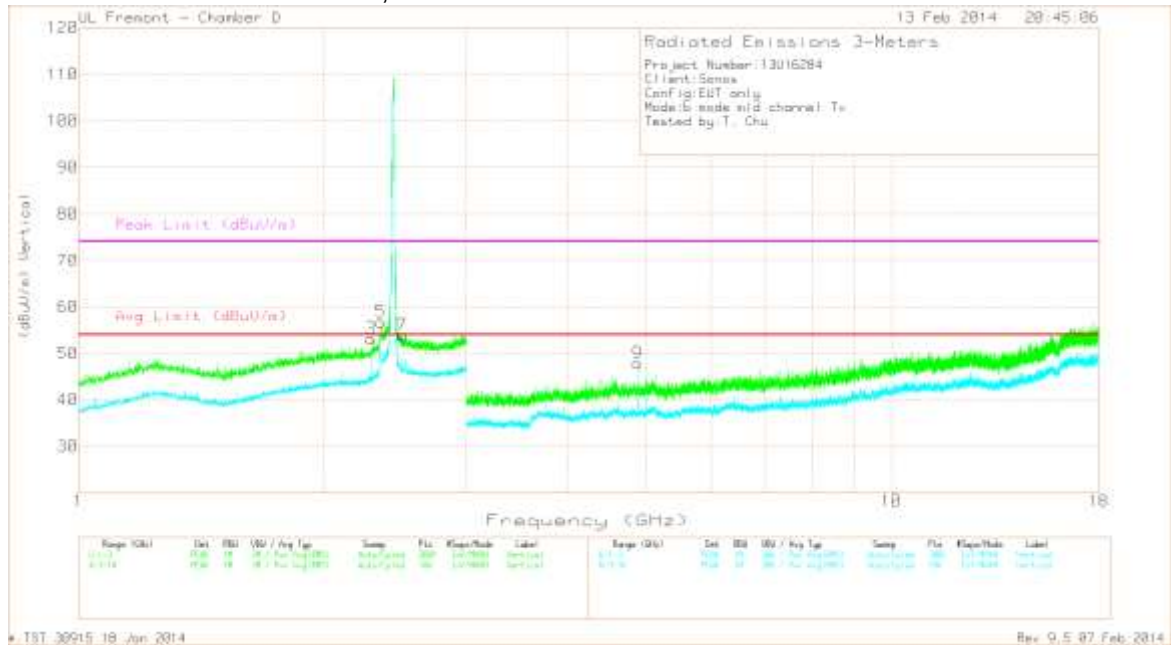
*,TST 30915 18 Jan 2014

Rev 9.5 07 Feb 2014

MIDE CHANNEL HORIZONTAL, CH 6



MIDE CHANNEL VERTICAL, CH 6



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T712 (dB/m)	Amp/Cbl/ Filt/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	* 1.45	36.54	Avg	27.4	-21.8	42.14	53.97	-11.83	-	-	0-360	201	H
2	* 2.288	41.24	PK2	30.8	-20.8	51.24	-	-	74	-22.76	188	329	H
	* 2.288	32.08	MAv1	30.8	-20.8	42.08	53.97	-11.89	-	-	188	329	H
3	* 2.288	44.45	PK2	30.8	-20.8	54.45	-	-	74	-19.55	62	279	V
	* 2.288	37.24	MAv1	30.8	-20.8	47.24	53.97	-6.73	-	-	62	279	V
4	*2.353	48.99	PK2	31.3	-20.8	59.49	-	-	74	-14.51	107	133	H
	* 2.351	39.53	MAv1	31.2	-20.8	49.93	53.97	-4.04	-	-	107	133	H
5	* 2.353	46.58	PK2	31.3	-20.8	57.08	-	-	74	-16.92	176	182	V
	* 2.351	36.67	MAv1	31.2	-20.8	47.07	53.97	-6.9	-	-	176	182	V
6	2.501	43.57	PK	32.2	-20.7	55.07	-	-	74	-18.93	0-360	100	H
7	2.501	42.41	PK	32.2	-20.7	53.91	-	-	74	-20.09	0-360	100	V
8	* 4.875	39.79	PK	33.5	-26.9	46.39	-	-	74	-27.61	0-360	201	H
9	* 4.875	41.23	PK	33.5	-26.9	47.83	-	-	74	-26.17	0-360	201	V
10	* 12.527	33.59	PK2	38.5	-20.8	51.29	-	-	74	-22.71	259	319	H
	* 12.521	23.68	MAv1	38.5	-20.8	41.38	53.97	-12.59	-	-	259	319	H

PK - Peak detector

Avg - Video bandwidth < Resolution bandwidth

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

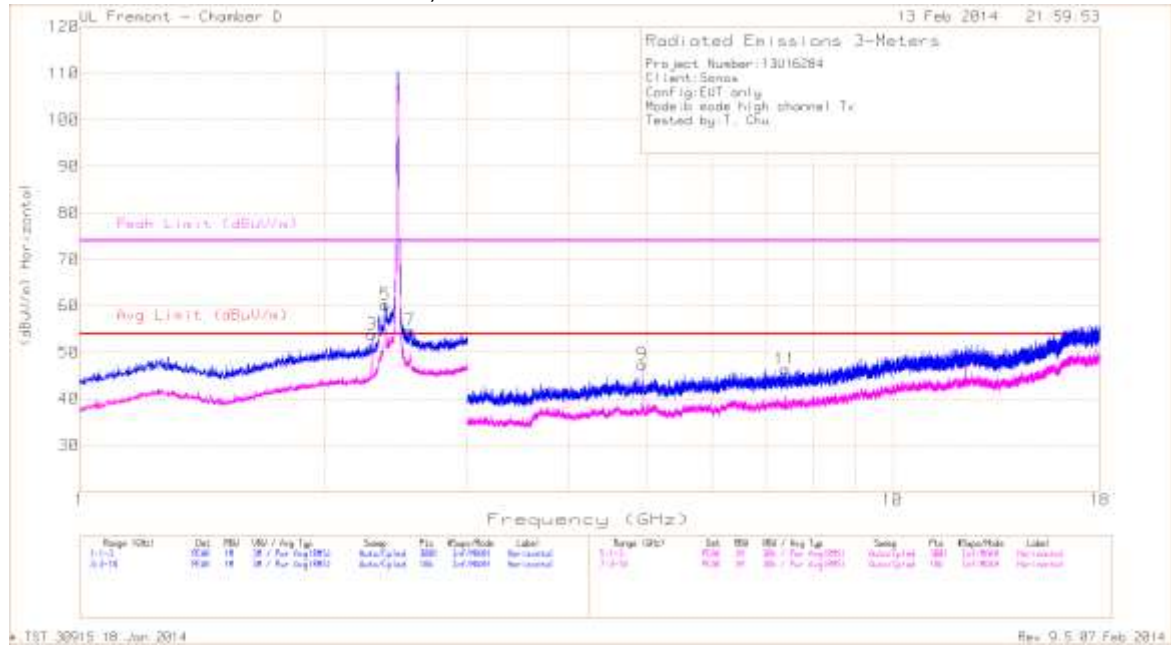
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

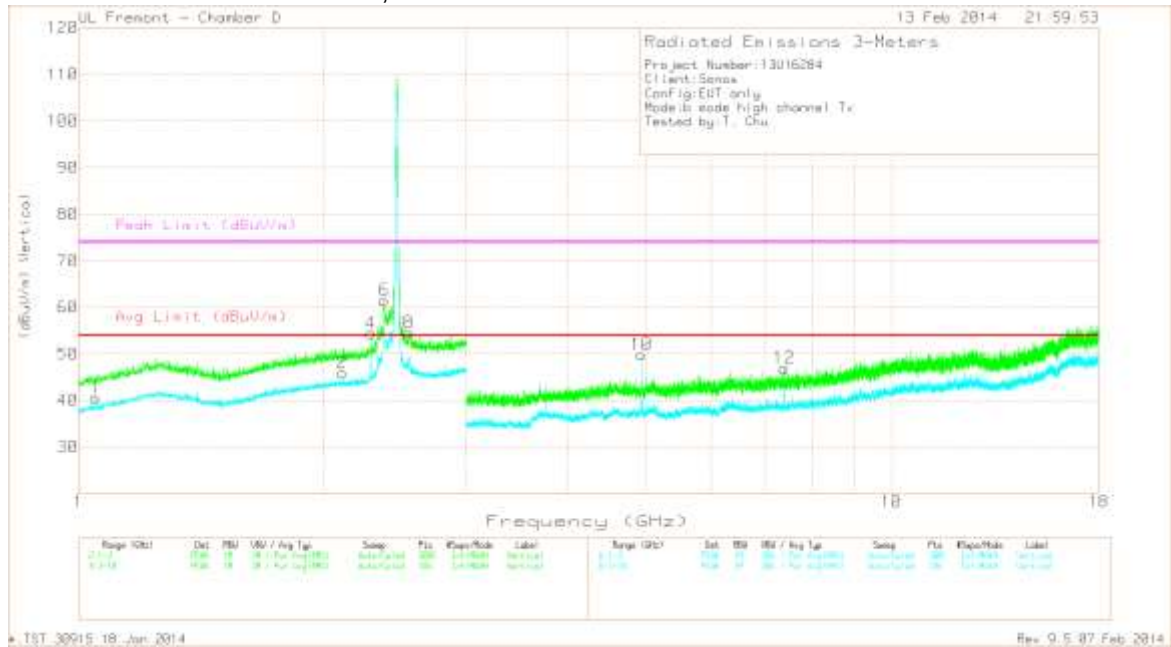
* TST 30915 18 Jan 2014

Rev 9.5 07 Feb 2014

HIGH CHANNEL HORIZONTAL, CH 11



HIGH CHANNEL VERTICAL, CH 11



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T712 (dB/m)	Amp/Cbl/F ttr/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	* 1.05	36.17	Avg	26.8	-22.4	40.57	53.97	-13.4	-	-	0-360	100	V
2	2.112	36.24	Avg	30.7	-21	45.94	53.97	-8.03	-	-	0-360	100	V
3	* 2.288	44.06	PK2	30.8	-20.8	54.06	-	-	74	-19.94	82	227	H
	* 2.288	37.25	MAv1	30.8	-20.8	47.25	53.97	-6.72	-	-	82	227	H
4	* 2.288	44.6	PK2	30.8	-20.8	54.6	-	-	74	-19.4	51	223	V
	* 2.288	37.39	MAv1	30.8	-20.8	47.39	53.97	-6.58	-	-	51	223	V
5	* 2.378	51.19	PK2	31.4	-20.7	61.89	-	-	74	-12.11	87	205	H
	* 2.376	42.02	MAv1	31.4	-20.7	52.72	53.97	-1.25	-	-	87	205	H
6	* 2.378	51.14	PK2	31.4	-20.7	61.84	-	-	74	-12.16	357	188	V
	* 2.376	42.98	MAv1	31.4	-20.7	53.68	53.97	-.29	-	-	357	188	V
7	2.551	42.81	PK	32.1	-20.2	54.71	-	-	74	-19.29	0-360	100	H
8	2.55	42.61	PK	32.1	-20.2	54.51	-	-	74	-19.49	0-360	201	V
9	* 4.925	41.89	PK	33.5	-27.9	47.49	-	-	74	-26.51	0-360	201	H
10	* 4.924	39.11	PK2	33.5	-27.8	44.81	-	-	74	-29.19	200	273	V
	* 4.924	32.65	MAv1	33.5	-27.8	38.35	53.97	-15.62	-	-	200	273	V
11	* 7.383	36.48	PK	35.2	-25.3	46.38	-	-	74	-27.62	0-360	100	H
12	* 7.385	37.05	PK	35.2	-25.3	46.95	-	-	74	-27.05	0-360	100	V

PK - Peak detector

Avg - Video bandwidth < Resolution bandwidth

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

PK2 - KDB558074 Method: Maximum Peak

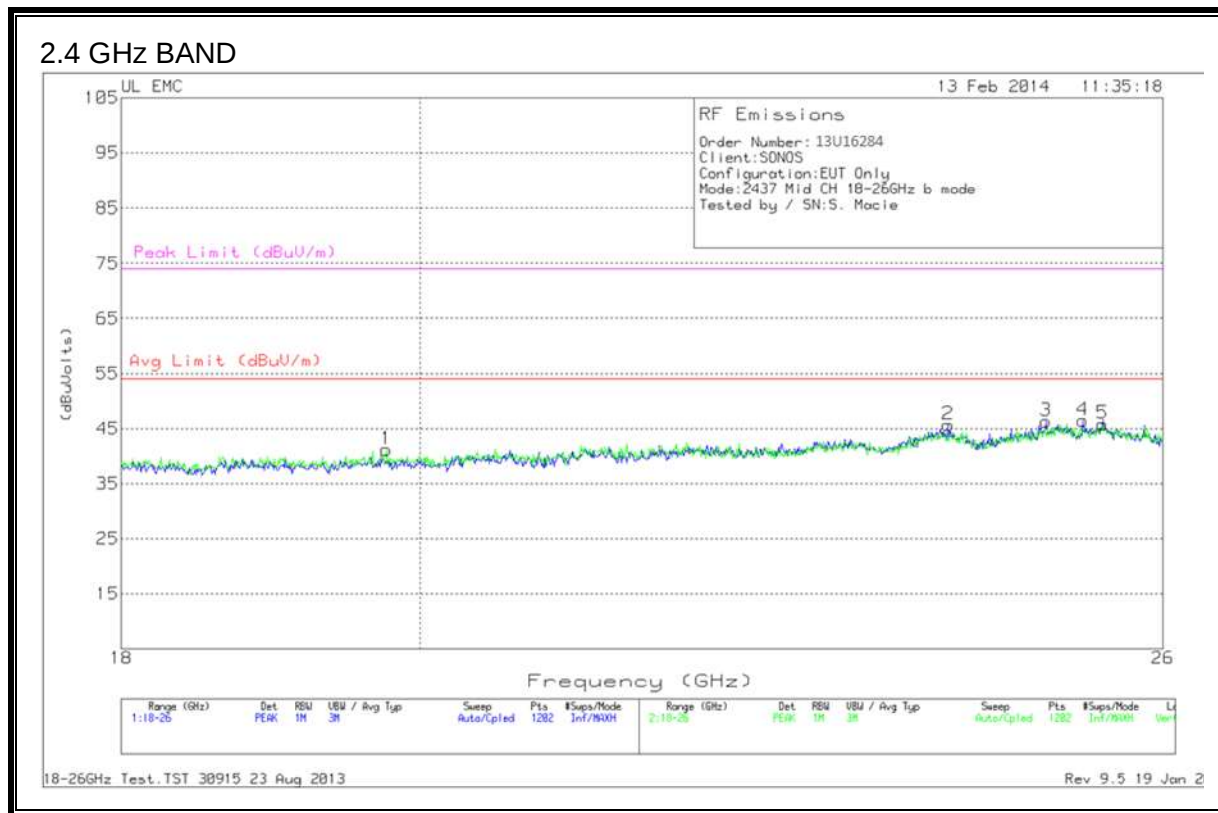
MAv1 - KDB558074 Option 1 Maximum RMS Average

*,TST 30915 18 Jan 2014

Rev 9.5 07 Feb 2014

9.3. WORST-CASE ABOVE 18 GHz

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)
1	19.77	42.17	PK	32.7	-24.2	-9.5	41.17	54	-12.83	74	-32.83
2	24.10	44.57	PK	33.6	-23	-9.5	45.67	54	-8.33	74	-28.33
3	24.95	44.43	PK	34	-22.6	-9.5	46.33	54	-7.67	74	-27.67
4	25.27	45	PK	33.9	-22.9	-9.5	46.50	54	-7.5	74	-27.5
5	25.45	43.73	PK	34.1	-22.5	-9.5	45.83	54	-8.17	74	-28.17

PK - Peak detector

VERTICAL



DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T122 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	78.28	54.45	PK	7.8	-31.4	30.85	40	-9.15	0-360	201	H
2	30.0425	48.16	PK	21.6	-32.4	37.36	40	-2.64	0-360	100	V
	32.6506	25.66	QP	19.4	-31.8	13.26	40	-26.74	241	137	V
3	76.155	56.66	PK	7.9	-31.2	33.36	40	-6.64	0-360	100	V
4	205.9	56.73	PK	10.8	-30.6	36.93	43.52	-6.59	0-360	100	H
5	675	49.4	PK	19.9	-29.7	39.6	46.02	-6.42	0-360	201	H
6	357.5	57.8	PK	14.6	-30.3	42.1	46.02	-3.92	0-360	101	V
	366.7511	52.13	QP	14.9	-30.3	36.73	46.02	-9.29	175	161	V

PK - Peak detector

FCC Part 15 Subpart C 30-1000MHz.TST 30915 18 Jan 2014

Rev 9.5 07 Feb 2014

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

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 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	.204	48.65	PK	.1	0	48.75	63.4	-14.65	-	-
2	.204	25.67	Av	.1	0	25.77	-	-	53.4	-27.63
3	.6045	45.12	PK	.1	0	45.22	56	-10.78	-	-
4	.6045	22.84	Av	.1	0	22.94	-	-	46	-23.06
5	4.056	30.27	PK	.1	.1	30.47	56	-25.53	-	-
6	4.056	22.05	Av	.1	.1	22.25	-	-	46	-23.75
7	5.307	29.48	PK	.1	.1	29.68	60	-30.32	-	-
8	5.307	21.14	Av	.1	.1	21.34	-	-	50	-28.66

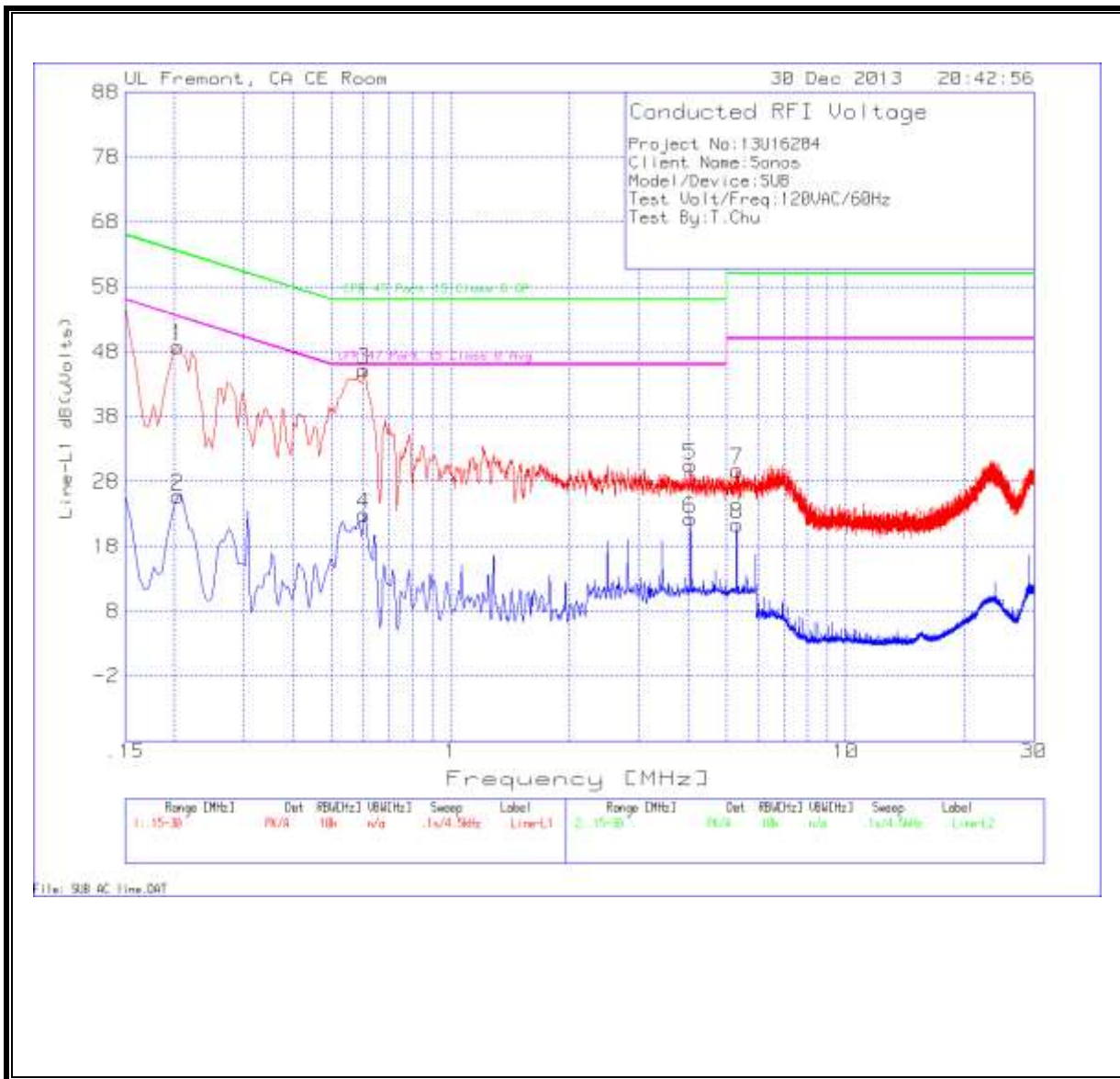
Line-L2 .15 - 30MHz

Trace Markers

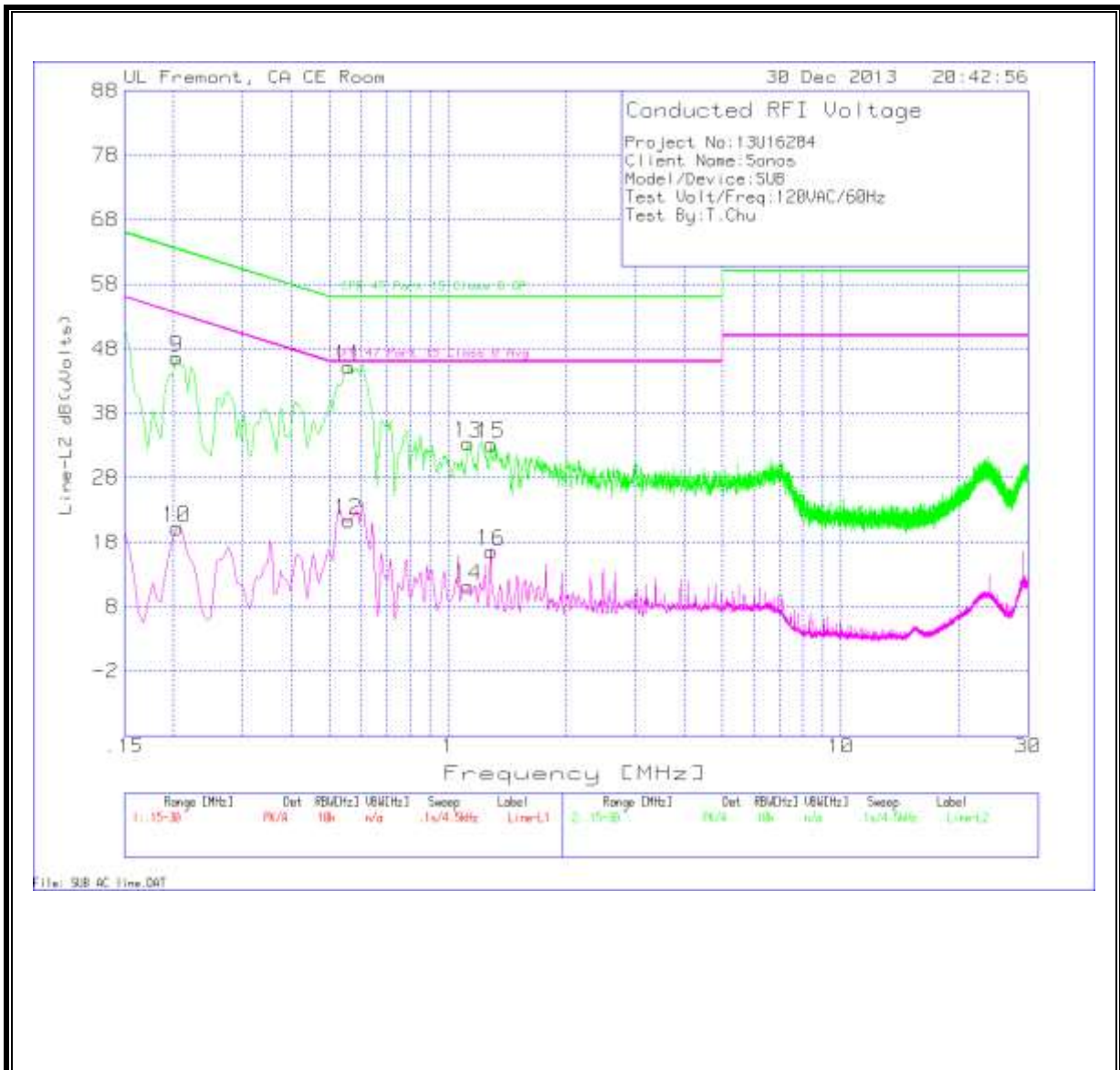
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2 (dB)	LC Cables 2&3 (dB)	Corrected Reading dB(uVolts)	CFR 47 Part 15 Class B QP	Margin to Limit (dB)	CFR 47 Part 15 Class B Avg	Margin to Limit (dB)
9	.204	46.48	PK	.1	0	46.58	63.4	-16.82	-	-
10	.204	20.09	Av	.1	0	20.19	-	-	53.4	-33.21
11	.5595	45.11	PK	.1	0	45.21	56	-10.79	-	-
12	.5595	21.24	Av	.1	0	21.34	-	-	46	-24.66
13	1.1265	33.17	PK	.1	.1	33.37	56	-22.63	-	-
14	1.1265	10.99	Av	.1	.1	11.19	-	-	46	-34.81
15	1.2885	32.95	PK	.1	.1	33.15	56	-22.85	-	-
16	1.2885	16.42	Av	.1	.1	16.62	-	-	46	-29.38

PK - Peak detector
Av - average detection

LINE 1 RESULTS



LINE 2 RESULTS



11. POWER SETTINGS

Frequency	Power Setting
2412	24.00
2437	26.50
2462	22.50