FCC CFR47 PART 15 SUBPART C

CERTIFICATION TEST REPORT

FOR

GSM/WCDMA/LTE + BLUETOOTH, DTS/UNII a/b/g/n/ac, ANT+ and NFC

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Prepared for
SONY MOBILE COMMUNICATIONS, INC.
1-8-15 KONAN, MINATO-KU
TOKYO, 108-0075 JAPAN

Prepared by
UL VERIFICATION SERVICES INC.
47173 BENICIA STREET
FREMONT, CA 94538, U.S.A.
TEL: (510) 771-1000
FAX: (510) 661-0888

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	SONY MOBILE COMMUNICATIONS, INC.
EUT DESCRIPTION:	GSM/WCDMA/LTE + BLUETOOTH, DTS/UNII a/b/g/n/ac, ANT+ and NFC
SERIAL NUMBER:	159243-6 (Conducted), 153033-5 (Radiated)
DATE TESTED:	MARCH 9-27, 2015

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:

CHOON OOI
CONSUMER TECHNOLOGY DIVISION
WiSE PROJECT LEAD
UL Verification Services Inc.

Tested By:

STEVEN TRAN
CONSUMER TECHNOLOGY DIVISION
WiSE LAB ENGINEER
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, and ANSI C63.4-2009.

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
☒ Chamber A(IC: 2324B-1)	☐ Chamber D(IC: 2324B-4)
☐ Chamber B(IC: 2324B-2)	☐ Chamber E(IC: 2324B-5)
☒ Chamber C(IC: 2324B-3)	☐ Chamber F(IC: 2324B-6)
	☒ Chamber G(IC: 2324B-7)
	☐ Chamber H(IC: 2324B-8)

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:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 18000 MHz	4.94 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

This EUT is a GSM/WCDMA/LTE + BLUETOOTH, DTS/UNII a/b/g/n/ac , ANT+ and NFC.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum total conducted output power as follows:

Frequency Range (MHz)	Mode	Total Output Power (dBm)	Total Output Power (mW)
2412 - 2467	802.11b	12.3	16.98
2472	802.11b	11.7	14.79
2412 - 2467	802.11g	13.8	23.99
2472	802.11g	10.7	11.69
2412 - 2467	802.11n HT20	14.3	26.79
2472	802.11n HT20	10.7	11.69

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antenna, with a maximum gain of -4.9dBi.

5.4. LIST OF TEST REDUCTION AND MODES

2400 - 2483.5 MHz Authorized Frequency Band (Antenna Port & Radiated Testing)		
Frequency Range (MHz)	**Mode**	**Covered by**
2412 - 2472	802.11b Legacy 1TX	802.11b Legacy 1TX
2412 - 2472	802.11g Legacy 1TX	802.11g CDD 2TX
2412 - 2472	802.11n 1TX	802.11n HT20 CDD 2TX
2412 - 2472	802.11n STBC 2TX	802.11n HT20 CDD 2TX
2412 - 2472	802.11n HT40 1TX	802.11n HT40 CDD 2TX
2412 - 2472	802.11n HT40 STBC 2TX	802.11n HT40 CDD 2TX

5.5. WORST-CASE CONFIGURATION AND MODE

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

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

Based on the baseline scan, the worst-case data rates were:

802.11b mode: 1 Mbps

802.11g mode: 6 Mbps

802.11n HT20mode: MCS0

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
AC Adapter	SONY	EP880	3514W 01 S08328	N/A
Earphone	SONY	MH410C	N/A	N/A

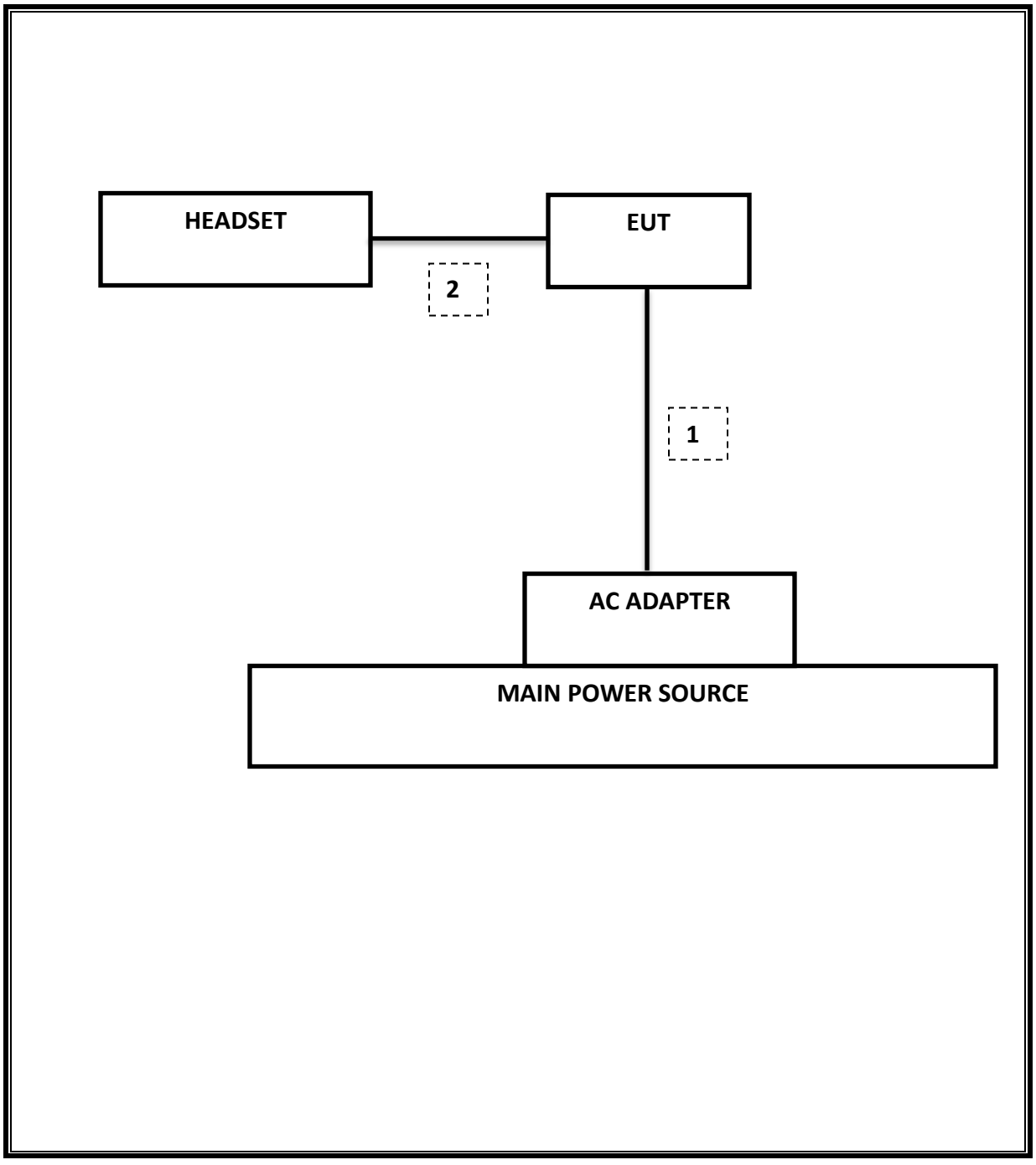
I/O CABLES

I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	DC Power	1	Mini-USB	Shielded	1.2m	N/A
2	Audio	1	Mini-Jack	Unshielded	1m	N/A

TEST SETUP

The EUT is a stand-alone unit during the tests. Test software exercised the radio card.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List				
Description	**Manufacturer**	**Model**	**Asset**	**Cal Due**
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	12/20/15
Spectrum Analyzer,9KHz-40GHz	HP	8564E	C00986	04/01/15
EMI Test Receiver, 9 kHz-7 GHz	R & S	ESCI 7	100773	08/15/15
Peak Power Meter	Agilent / HP	E4416A	C00963	12/13/15
Peak / Average Power Sensor	Agilent / HP	E9327A	C00964	12/13/15
Antenna, Horn, 18GHz	EMCO	3115	C00783	10/25/15
Antenna, Horn,18- 26 GHz	ARA	MWH-1826/B	C00946	11/12/15
Antenna, Horn, 26-40 GHz	ARA	MWH-2640	C00891	06/28/15
Antenna, Bilog, 30MHz-1 GHz	Sunol Sciences	JB1	T243	12/08/15
RF Preamplifier, 100KHz -> 1300MHz	HP	TBD	C00825	06/01/15
RF Preamplifier, 1GHz - 18GHz	Miteq	NSP4000-SP2	924343	09/03/15
RF Preamplifier, 1GHz - 26.5GHz	HP	8449B	F00351	06/27/15
AC Power Supply, 2,500VA 45-500Hz	Elgar-Ametek	CW2501M	F00013	CNR
RF Preamplifier, 1GHz - 18GHz	Miteq	AFS42-00101800-25-S-42	1818466	05/09/15
Attenuator / Switch driver	HP	11713A	F00204	CNR
Low Pass Filter 3GHz	Micro-Tronics	LPS17541	F00219	05/23/15
High Pass Filter 5GHz	Micro-Tronics	HPS17542	F00222	05/22/15
High Pass Filter 6GHz	Micro-Tronics	HPM17543	F00224	05/22/15

Test Software List			
Description	**Manufacturer**	**Model**	**Version**
Radiated Software	UL	UL EMC	Version 9.5, 07/22/14
Conducted Software	UL	UL EMC	Version 9.5, 05/17/14
CLT Software	UL	UL RF	Version 1.0, 02/02/15
Antenna Port Software	UL	UL RF	Version 2.1.1.1, 1/20/15

7. MEASUREMENT METHODS

KDB 558074 D01 DTS Meas Guidance v03r02:Measurement Procedure AVGPM-G is used for power and AVGPSD-3 is used for power spectral density.

Unwanted emissions within Restricted Bands are measured using traditional radiated procedures.

Band edge emissions within Restricted Bands are measured using RMS with duty cycle factor offset method.

MIMO Device: KDB 662911 v02r01

8. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 789033 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	4.410	4.418	0.998	99.82%	0.00	0.010
802.11g CDD	3.130	3.151	0.993	99.33%	0.00	0.010
802.11n HT20 CDD	2.904	2.924	0.993	99.32%	0.00	0.010

9. SUMMARY TABLE

FCC Part Section	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Worst Case
15.247 (a)(2)	RSS-210 A8.2(a)	Occupied Band width (6dB)	>500KHz	Conducted	Pass	8.06 MHz
2.1051, 15.247 (d)	RSS-210 A8.5	Band Edge / Conducted Spurious Emission	-20dBc		Pass	-35.4 dBm
15.247	RSS-210 A8.4	TX conducted output power	<30dBm		Pass	16.9 dBm
15.247	RSS-210 A8.2	PSD	<8dBm		Pass	-8.04 dBm
15.207 (a)	RSS-GEN 7.2.2	AC Power Line conducted emissions	Section 10	Radiated	Pass	44.8 dBuV (AV)
15.205, 15.209	RSS-210 Clause 2.6, RSS-210 Clause 6	Radiated Spurious Emission	< 54dBuV/m		Pass	43.24 dBuV/m

10. ANTENNA PORT TEST RESULTS

10.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

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

TEST PROCEDURE

Reference to KDB 558074 D01 DTS Meas Guidance v03r01: The transmitter output is connected to a spectrum analyzer with the RBW set to100KHz, the VBW >= 3 x RBW, peak detector and max hold.

RESULTS

10.1.1. 802.11b MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	Minimum Limit (MHz)
1	2412	8.064	0.5
7	2442	8.090	0.5
13	2472	8.094	0.5

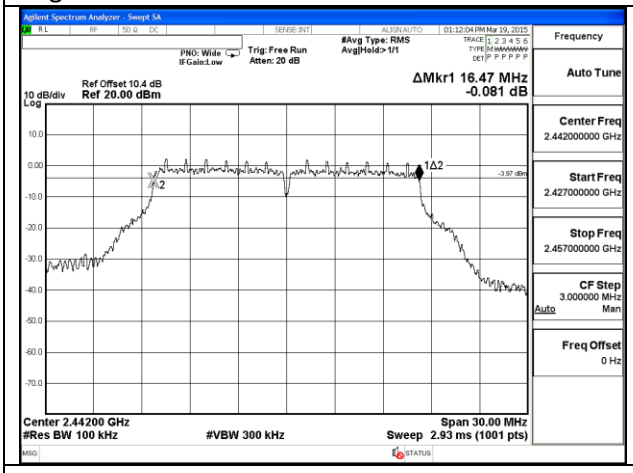
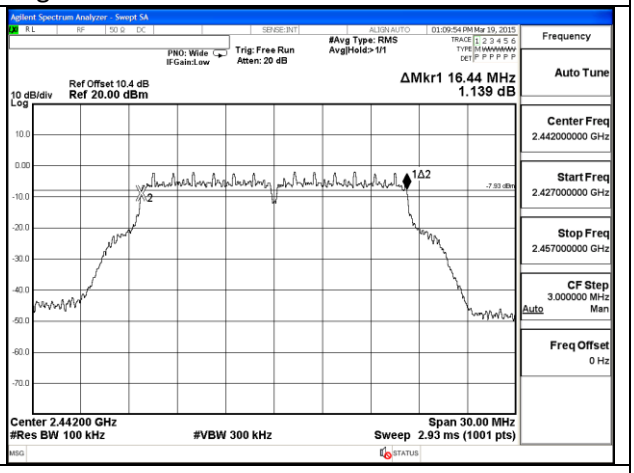
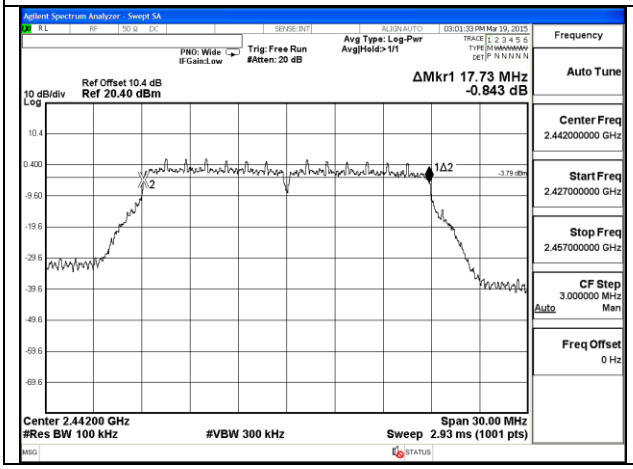
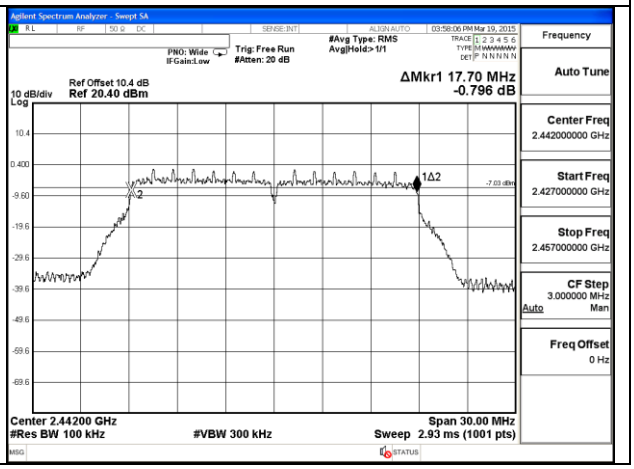
10.1.2. 802.11g MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
1	2412	16.47	16.47	0.5
7	2442	16.47	16.44	0.5
13	2472	16.47	16.47	0.5

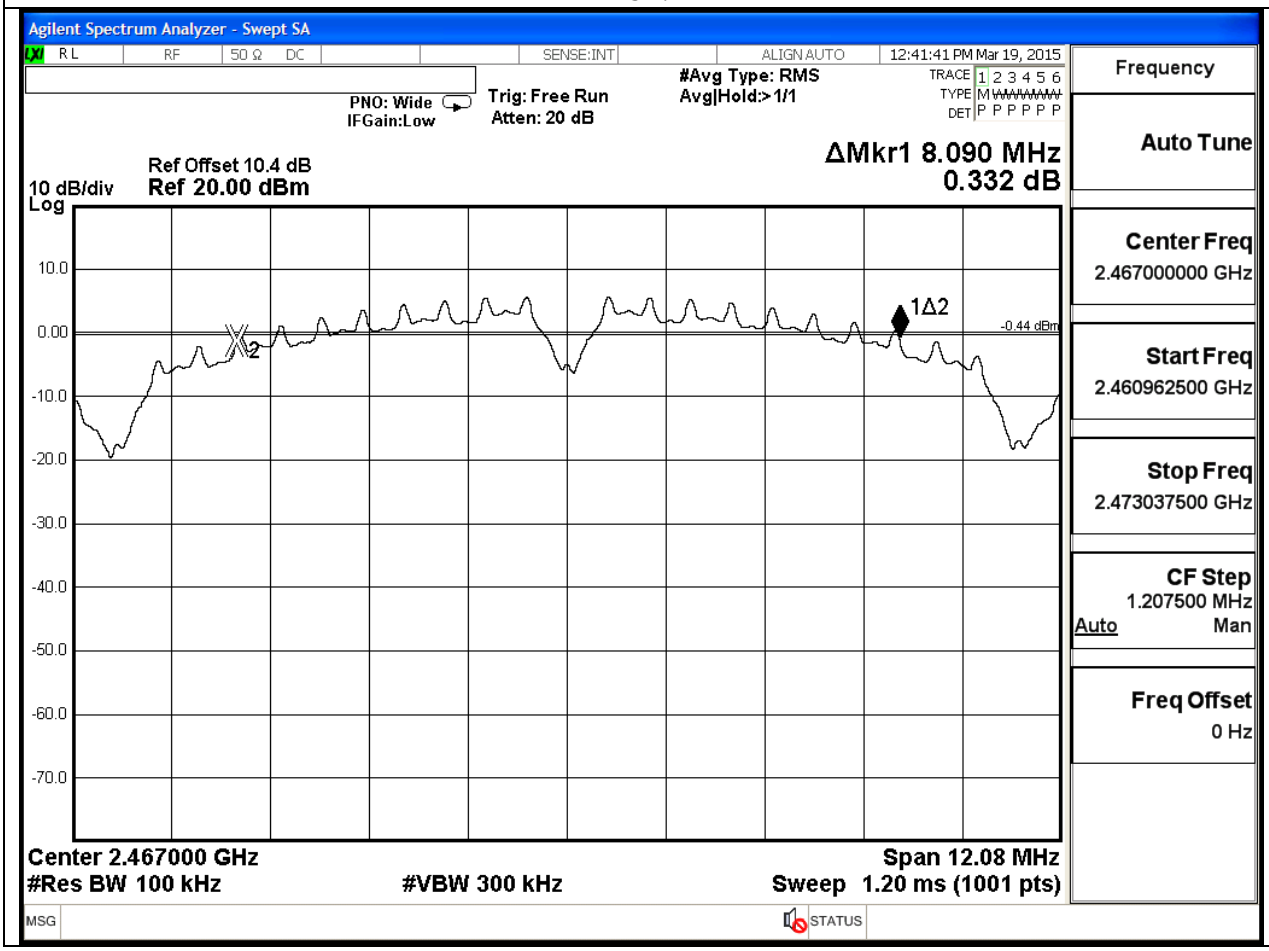
10.1.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
1	2412	17.70	17.67	0.5
7	2442	17.73	17.70	0.5
13	2472	17.70	17.67	0.5

10.1.1. 6 dB BANDWIDTH MID CH PLOTS

11g HT20 2.4 Chain 0	11g HT20 2.4 Chain 1
	
11n HT20 2.4 Chain 0	**11n HT20 2.4 Chain 1**
	

11b 2.4



10.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

10.2.1. 802.11b MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	99% BW Chain 0 (MHz)
1	2412	10.5580
7	2442	10.2630
13	2472	10.4110

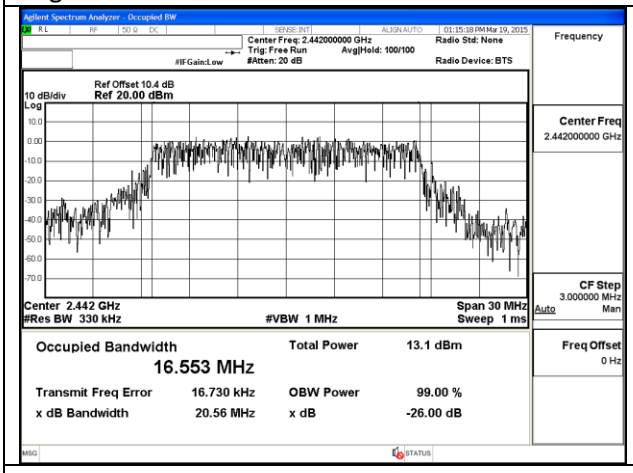
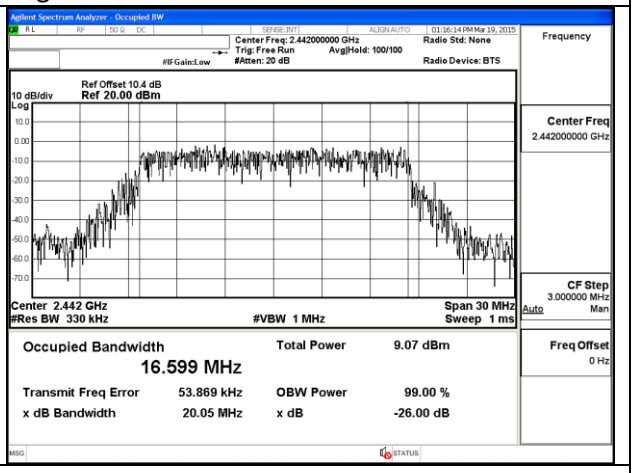
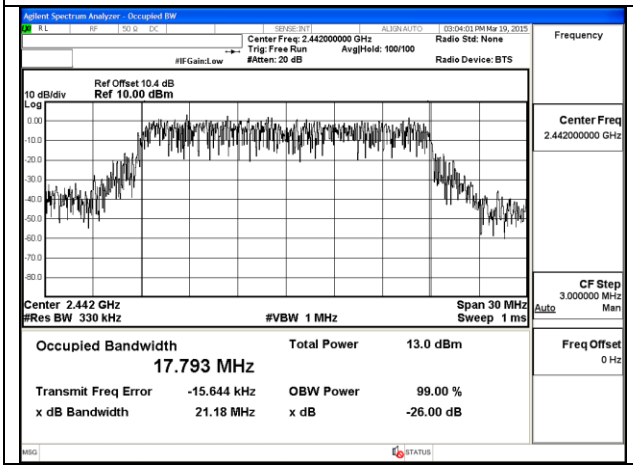
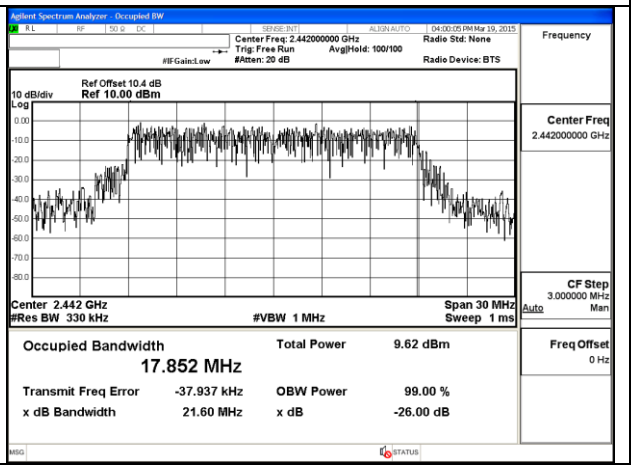
10.2.2. 802.11g MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)
1	2412	16.590	16.530
7	2442	16.553	16.599
13	2472	16.609	16.617

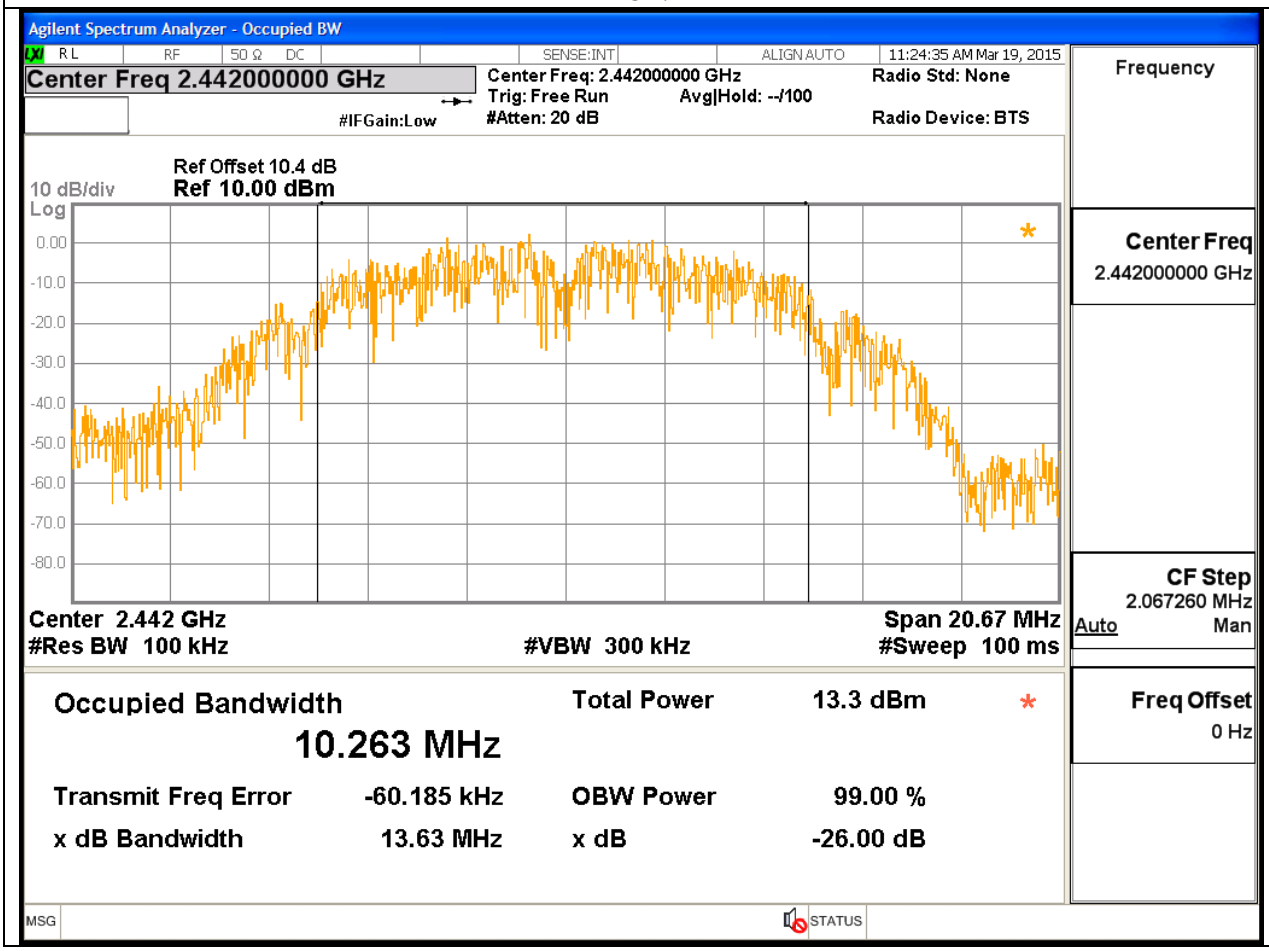
10.2.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)
1	2412	17.769	17.775
7	2442	17.793	17.852
13	2472	17.772	17.749

10.2.1. 99% BANDWIDTH MID CH PLOTS

11g HT20 2.4 Chain 0	11g HT20 2.4 Chain 1
	
11n HT20 2.4 Chain 0	**11n HT20 2.4 Chain 1**
	

11b 2.4



10.3. OUTPUT POWER

LIMITS

FCC §15.247

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

DIRECTIONAL ANTENNA GAIN

The TX chains are correlated and the antenna gain is the same for each chain. The directional gain is:

Use this table for correlated chains and equal antenna gain

Antenna Gain (dBi)	10 * Log (2 chains) (dB)	Correlated Chains Directional Gain (dBi)
-4.90	3.01	-1.89

RESULTS

10.3.1. 802.11b MODE IN THE 2.4 GHz BAND

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
1	2412	-4.90	30.00	30	36	30.00
7	2442	-4.90	30.00	30	36	30.00
12	2467	-4.90	30.00	30	36	30.00
13	2472	-4.90	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Power Limit (dBm)	Margin (dB)
1	2412	12.30	30.00	-17.70
7	2442	12.00	30.00	-18.00
12	2467	12.10	30.00	-17.90
13	2472	11.70	30.00	-18.30

10.3.2. 802.11g MODE IN THE 2.4 GHz BAND

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
1	2412	-1.89	30.00	30	36	30.00
7	2442	-1.89	30.00	30	36	30.00
12	2467	-1.89	30.00	30	36	30.00
13	2472	-1.89	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margi (dB)
1	2412	12.10	8.90	13.80	30.00	-16.20
7	2442	12.00	9.00	13.76	30.00	-16.24
12	2467	11.55	9.86	13.80	30.00	-16.20
13	2472	7.51	7.82	10.68	30.00	-19.32

10.3.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
1	2412	-1.89	30.00	30	36	30.00
7	2442	-1.89	30.00	30	36	30.00
12	2467	-1.89	30.00	30	36	30.00
13	2472	-1.89	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margi (dB)
1	2412	12.10	9.00	13.83	30.00	-16.17
7	2442	12.10	8.70	13.73	30.00	-16.27
12	2467	12.33	9.86	14.28	30.00	-15.72
13	2472	7.51	7.82	10.68	30.00	-19.32

10.4. PSD

LIMITS

FCC §15.247

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

RESULTS

10.4.1. 802.11b MODE IN THE 2.4 GHz BAND

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Limit (dBm)	Margin (dB)
1	2412	-8.04	8.0	-16.0
7	2442	-14.24	8.0	-22.2
13	2472	-17.03	8.0	-25.0

10.4.2. 802.11g MODE IN THE 2.4 GHz BAND

PSD Results

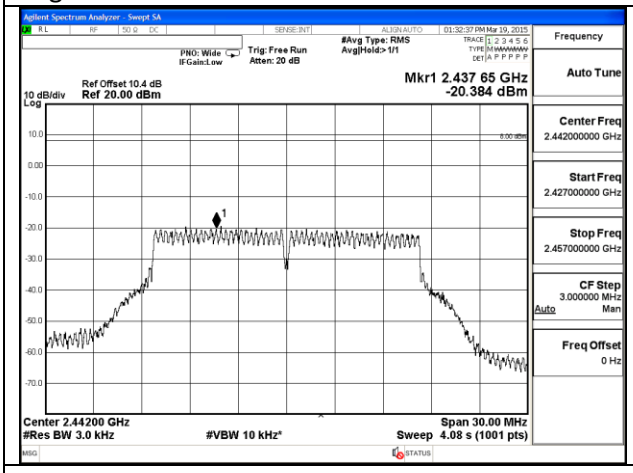
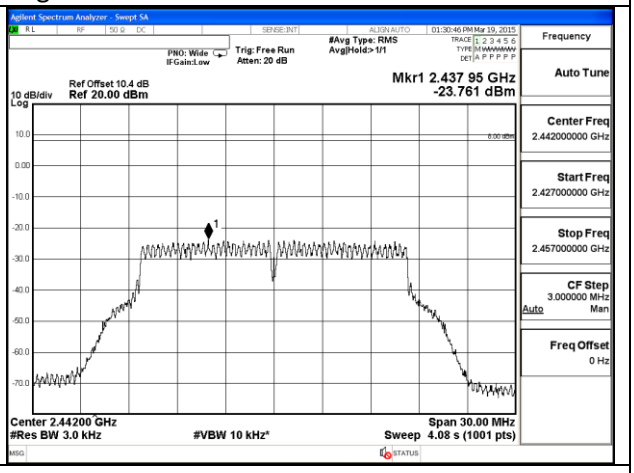
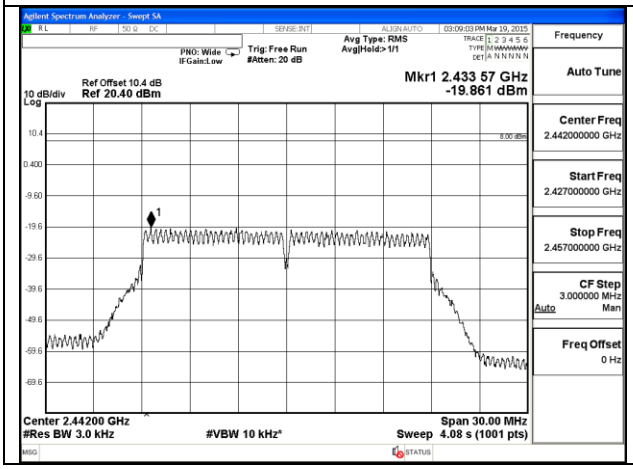
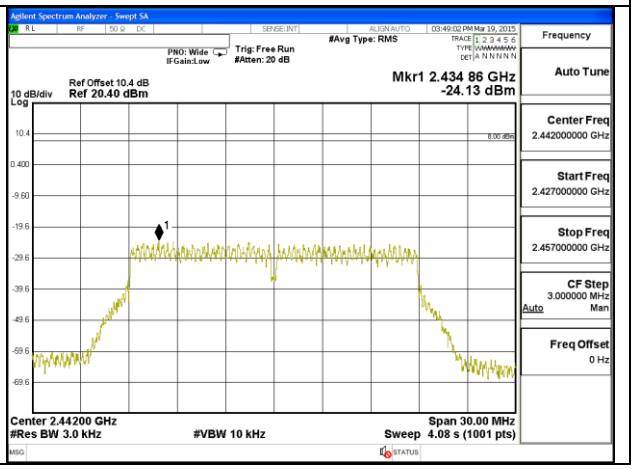
Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Chain 1 Meas (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
1	2412	-20.09	-20.78	-17.41	8.0	-25.4
7	2442	-20.38	-23.76	-18.74	8.0	-26.7
13	2472	-27.49	-28.24	-24.84	9.0	-33.8

10.4.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

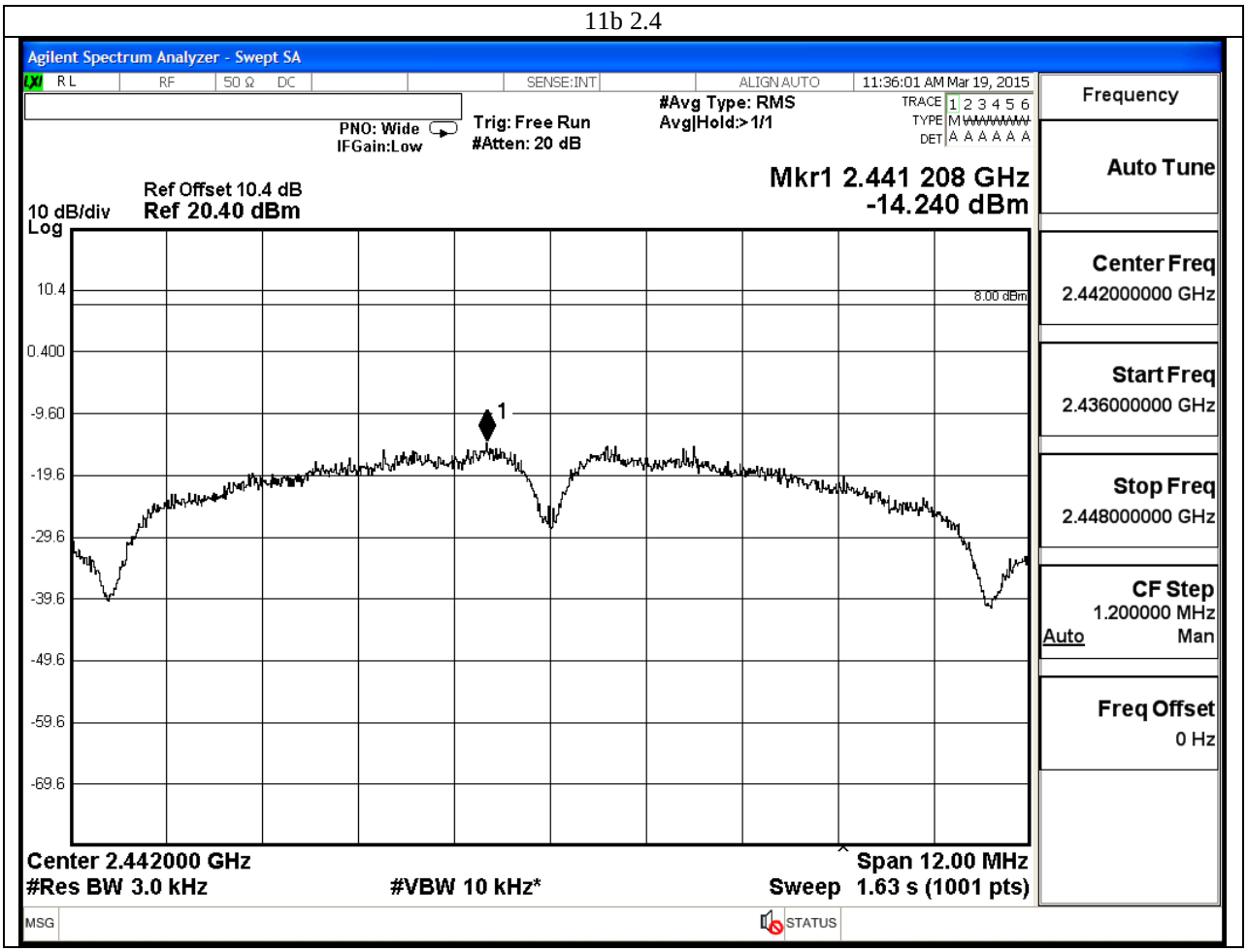
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Chain 1 Meas (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
1	2412	-20.25	-23.52	-18.57	8.0	-26.6
7	2442	-19.86	-24.13	-18.48	8.0	-26.5
13	2472	-23.59	-34.22	-23.23	9.0	-32.2

10.4.1. PSD MID CH PLOTS

11g HT20 2.4 Chain 0	11g HT20 2.4 Chain 1
	
11n HT20 2.4 Chain 0	**11n HT20 2.4 Chain 1**
	

11b 2.4



10.5. 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.

TEST PROCEDURE

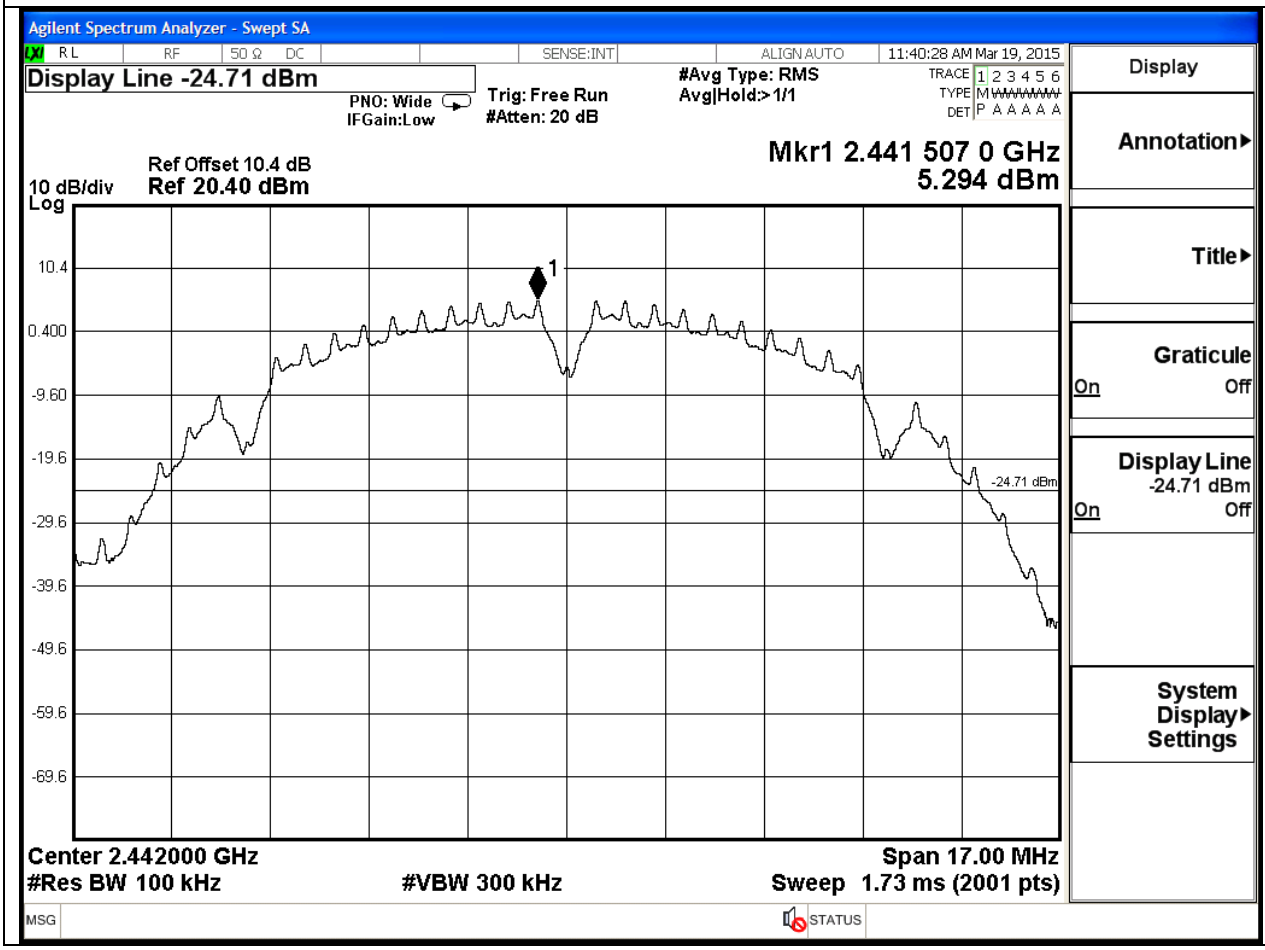
The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the in-band reference level, bandedge (where measurements to the general radiated limits will not be made) and out-of-band emissions.

RESULTS

10.5.1. 802.11b MODE IN THE 2.4 GHz BAND

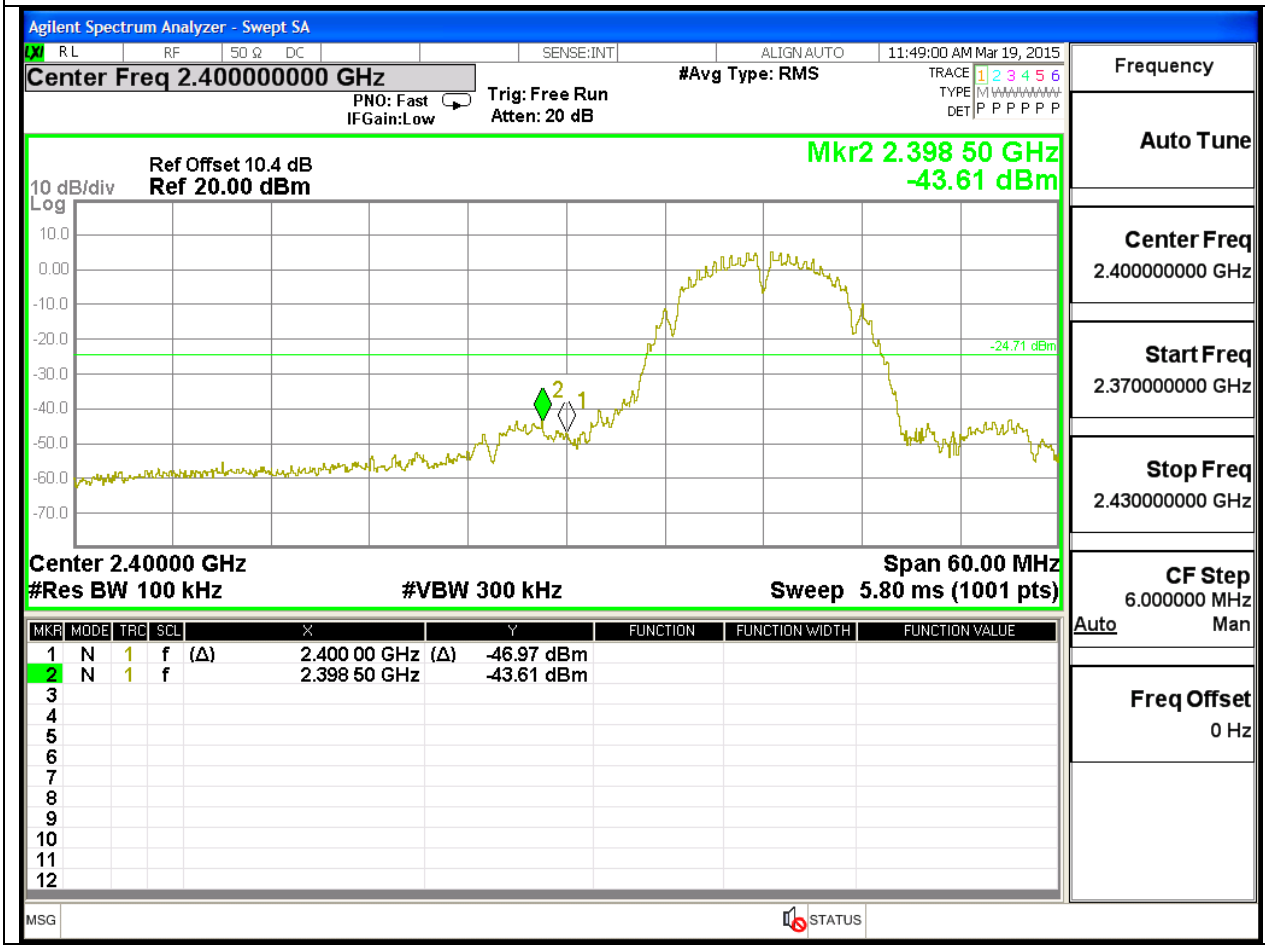
IN-BAND REFERENCE LEVEL

REFERENCE LEVEL MID CH



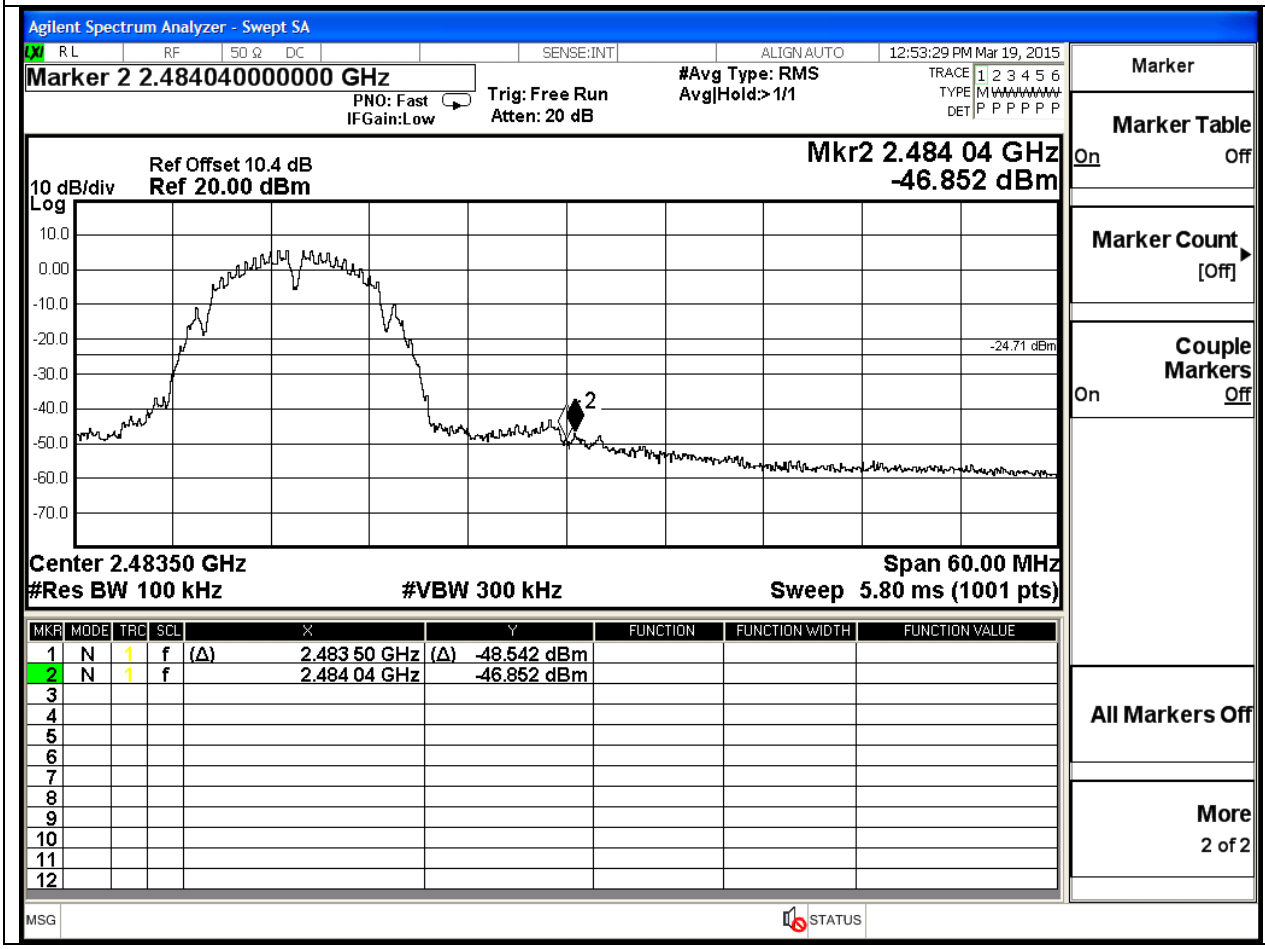
LOW CHANNEL BANDEDGE

AUTHORIZED BAND EDGE LOW CH



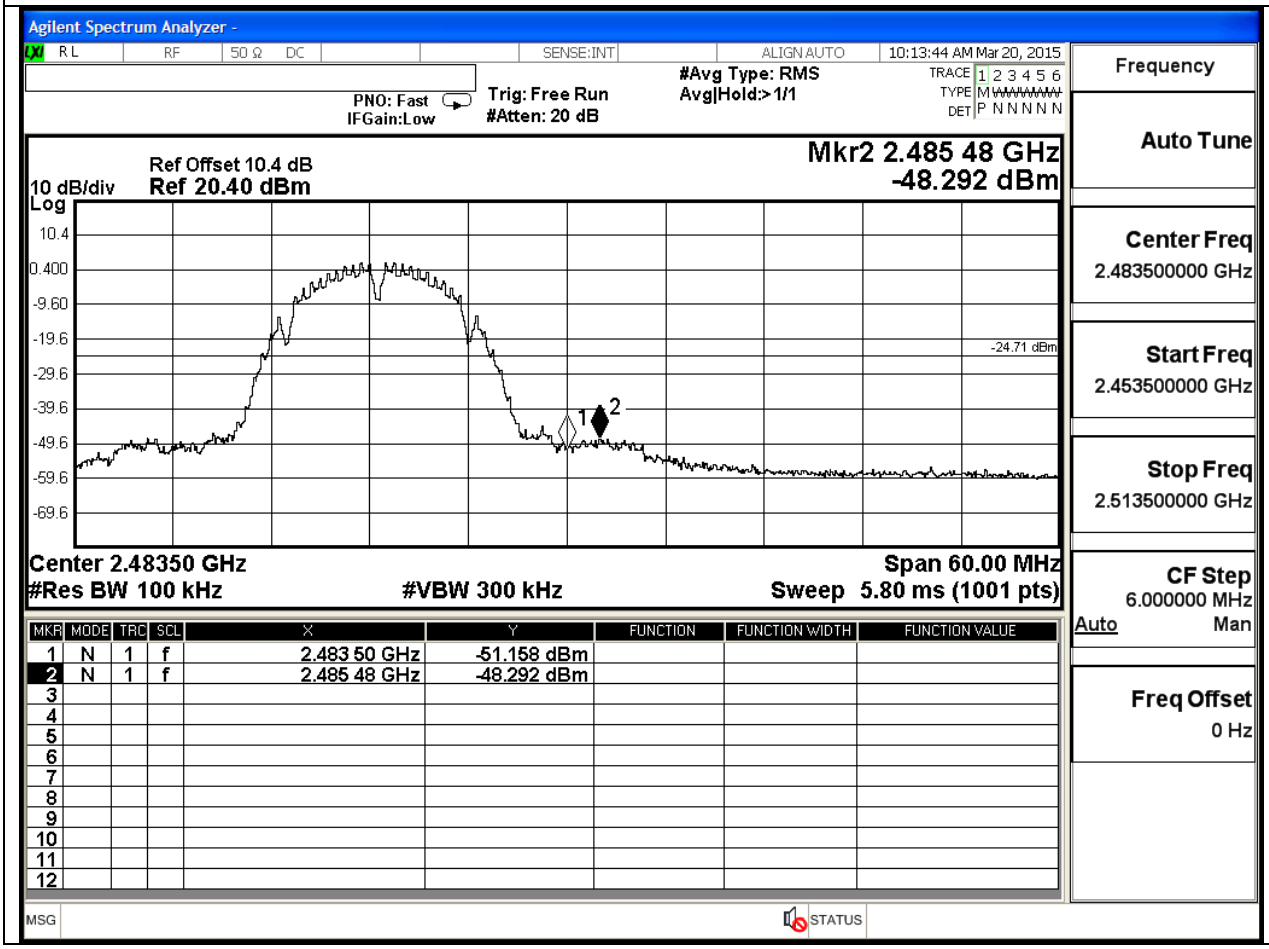
HIGH CHANNEL BANDEDGE

AUTHORIZED BAND EDGE HIGH CH



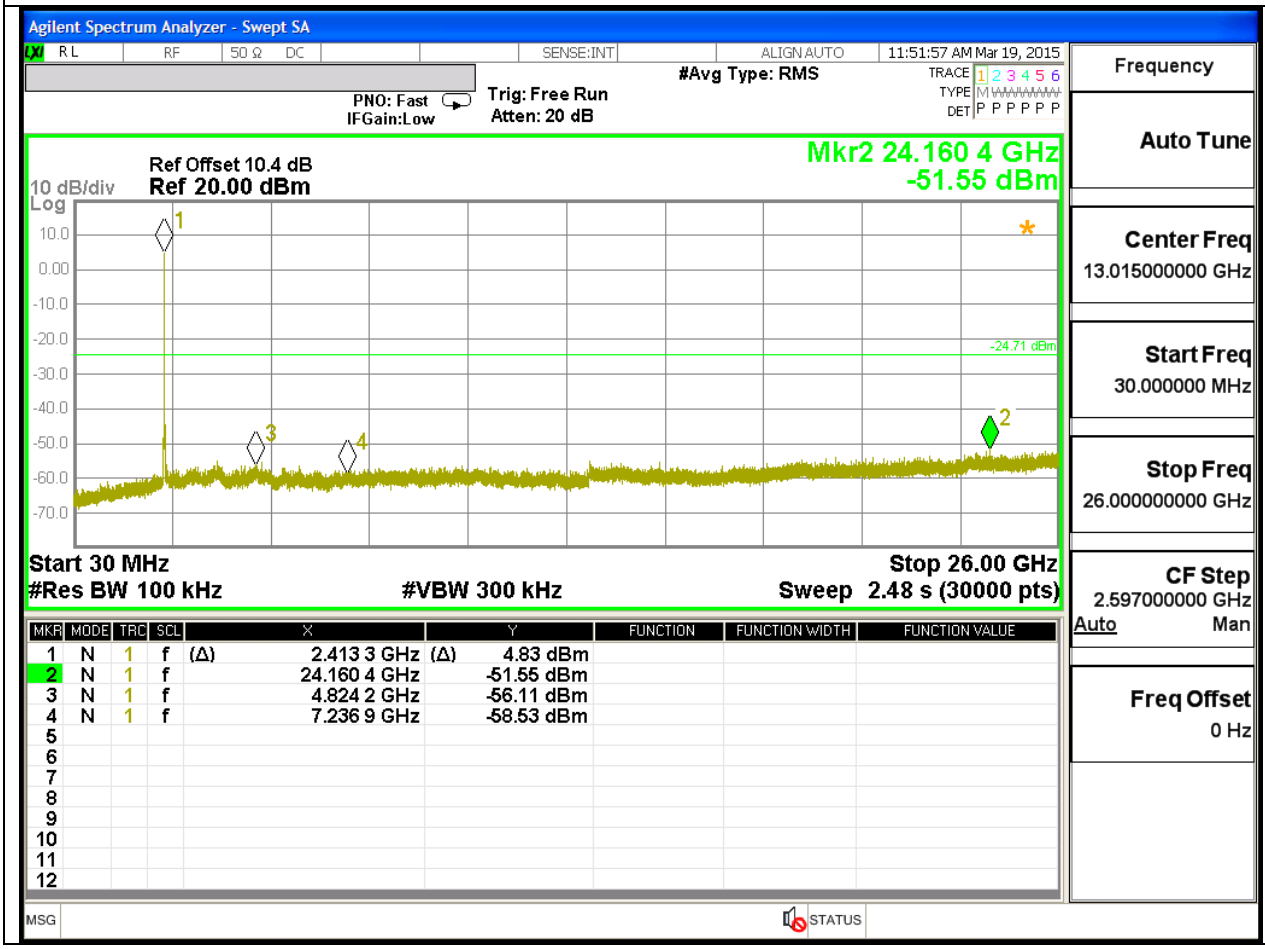
HIGH CHANNEL BANDEDGE (2472 MHz)

AUTHORIZED BAND EDGE HIGH CH

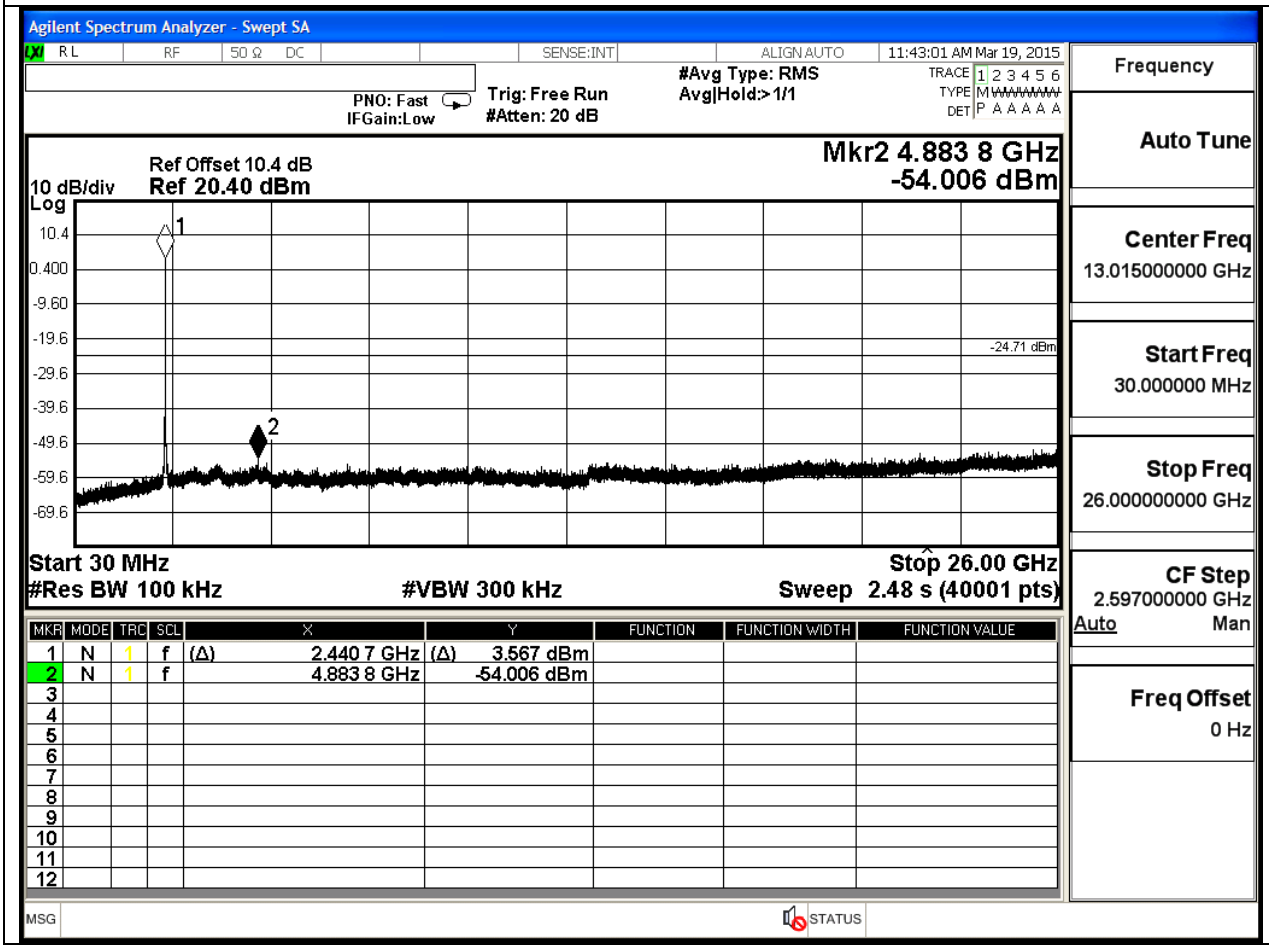


OUT-OF-BAND EMISSIONS

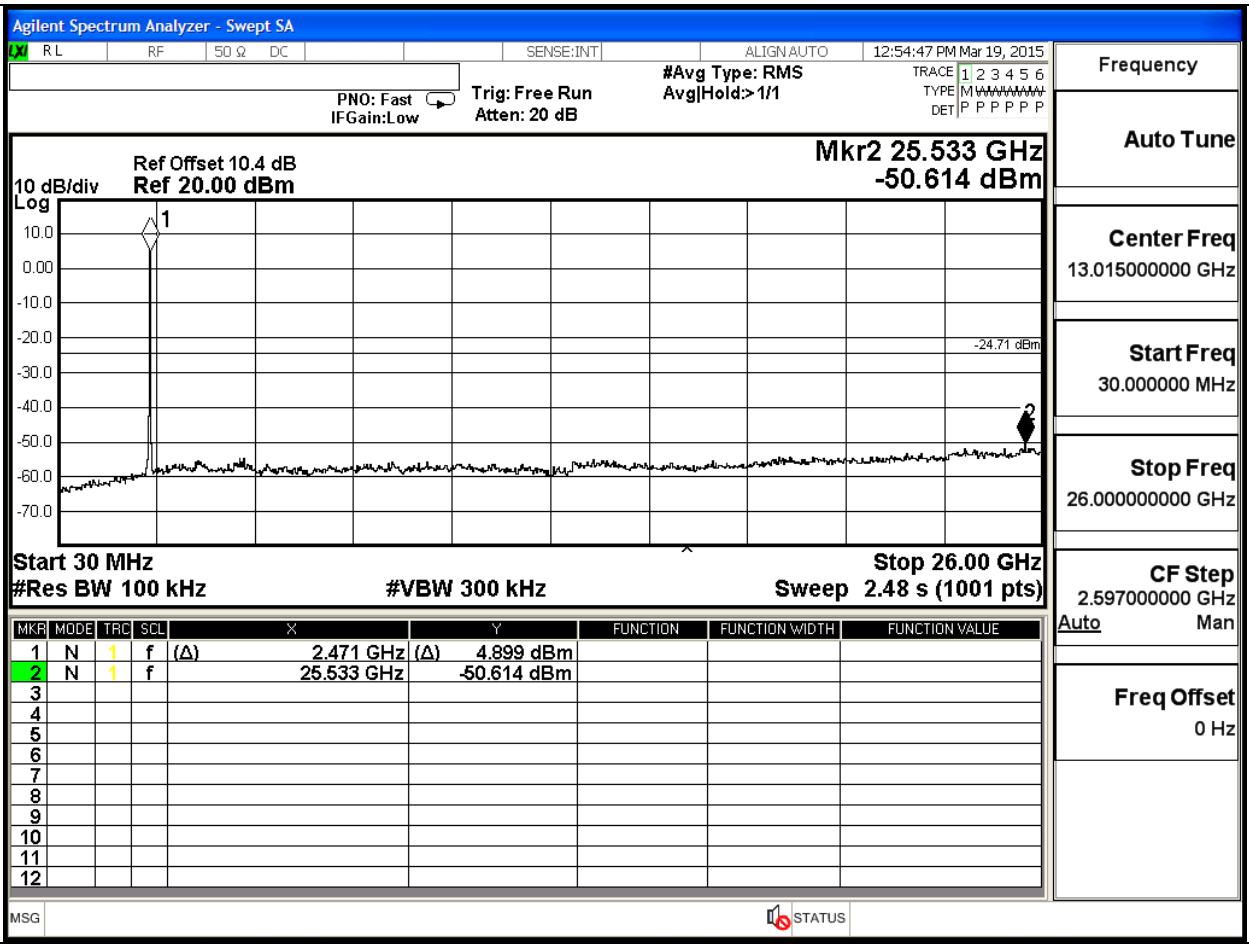
OUT OF BAND LOW CH



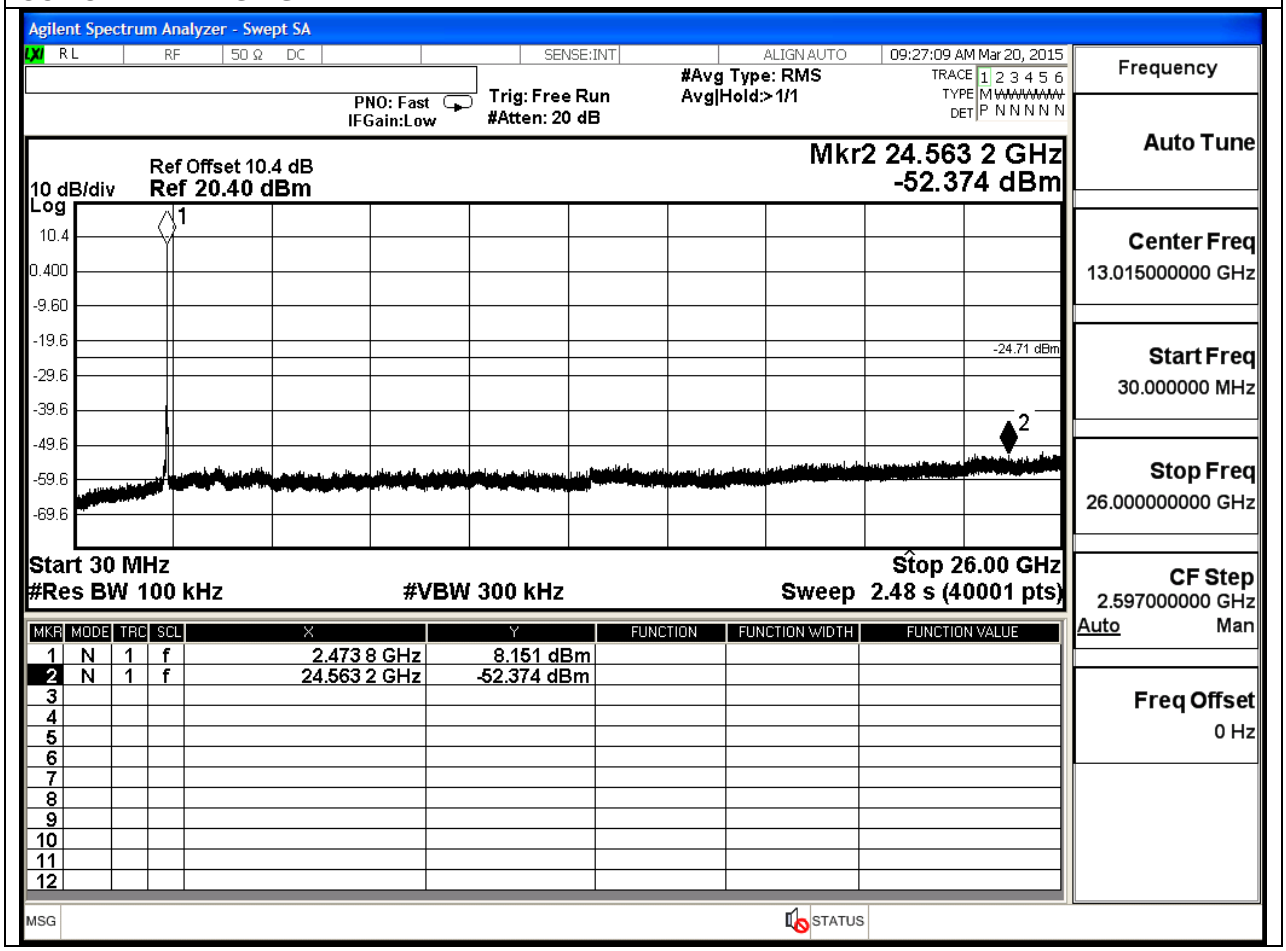
OUT OF BAND MID CH



OUT OF BAND HIGH CH



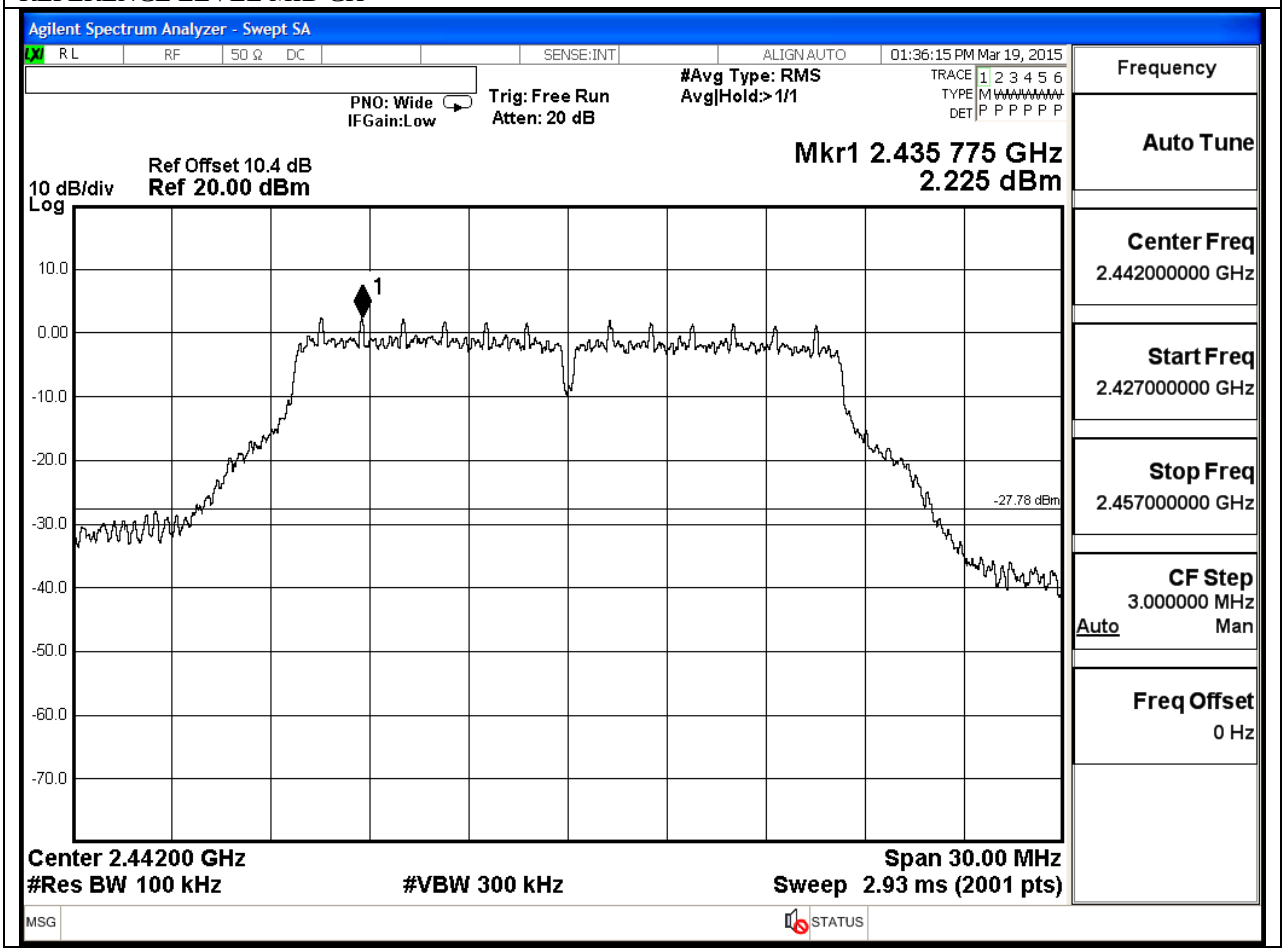
OUT OF BAND HIGH CH



10.5.3. 802.11g MODE IN THE 2.4 GHz BAND CHAIN 0

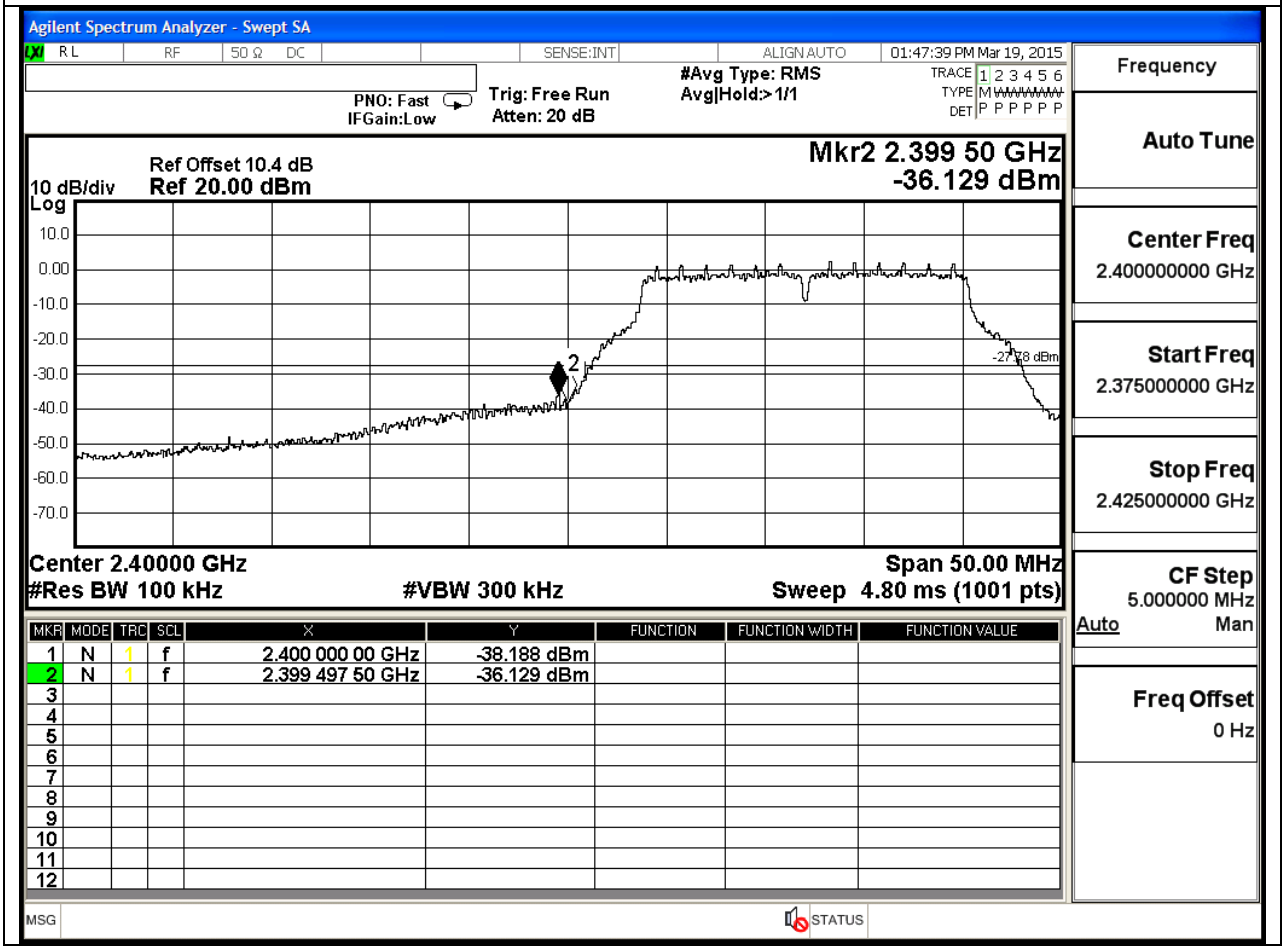
IN-BAND REFERENCE LEVEL

REFERENCE LEVEL MID CH



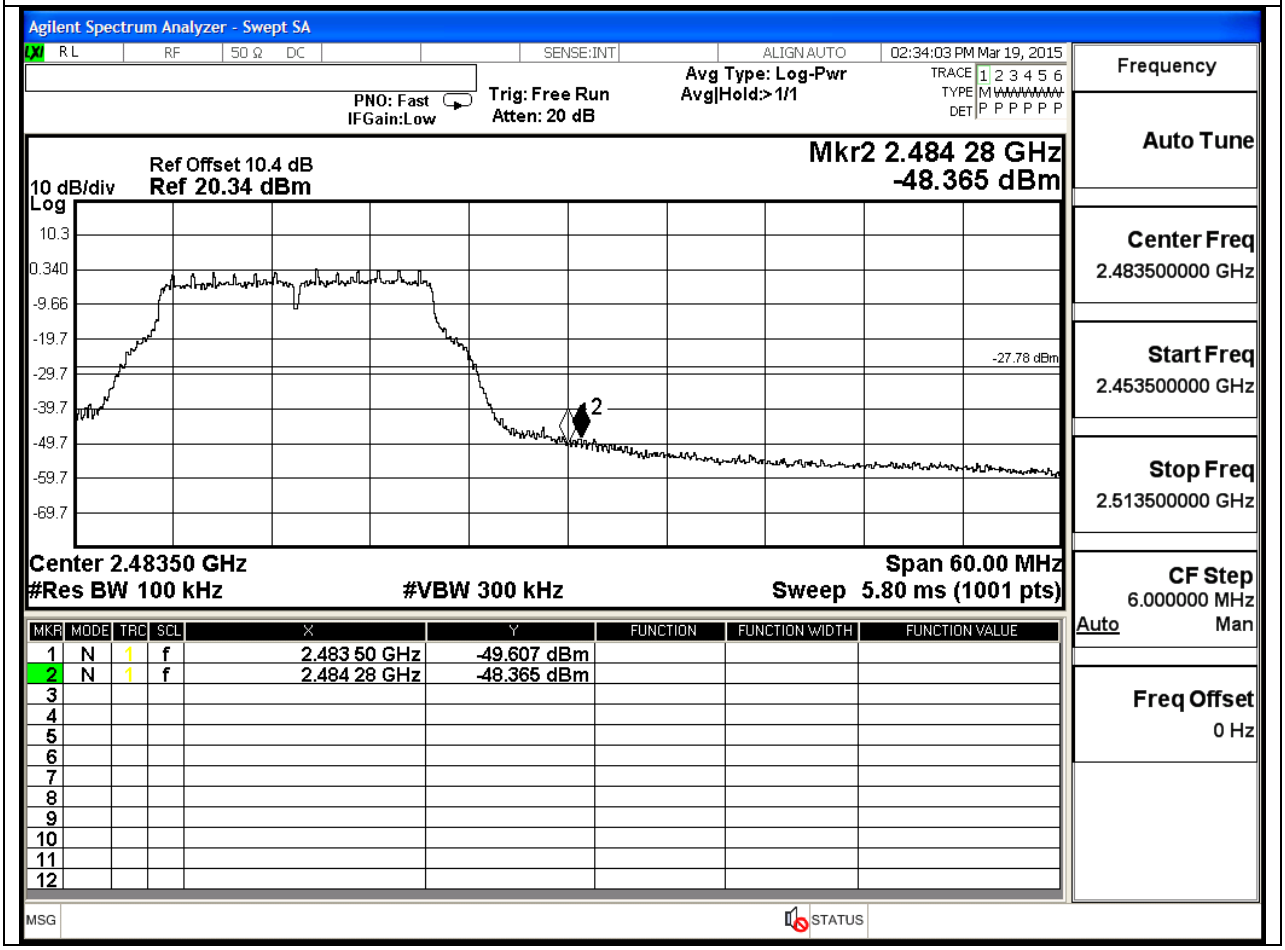
LOW CHANNEL BANDEDGE

AUTHORIZED BAND EDGE LOW CH



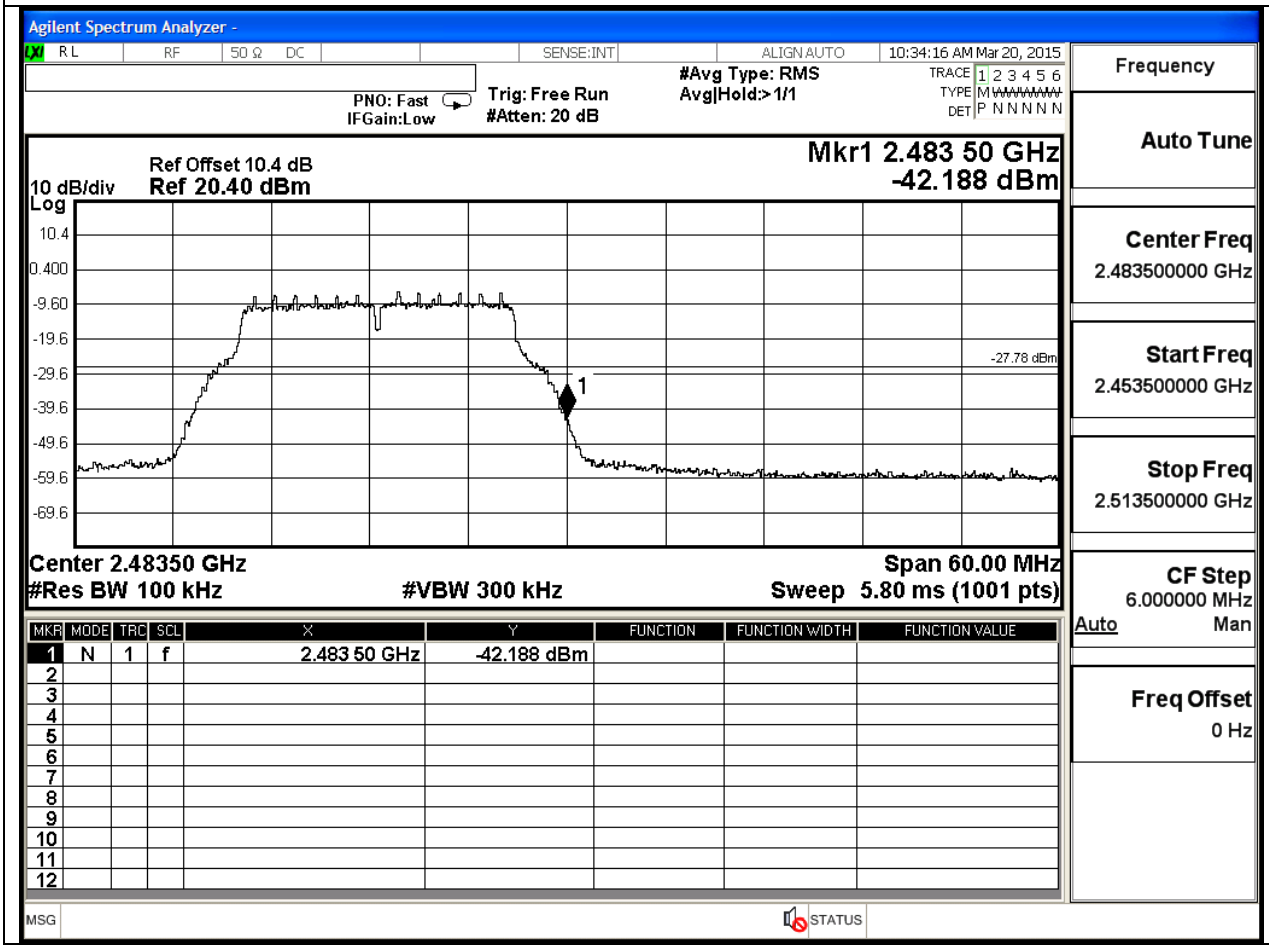
HIGH CHANNEL BANDEDGE

AUTHORIZED BAND EDGE HIGH CH



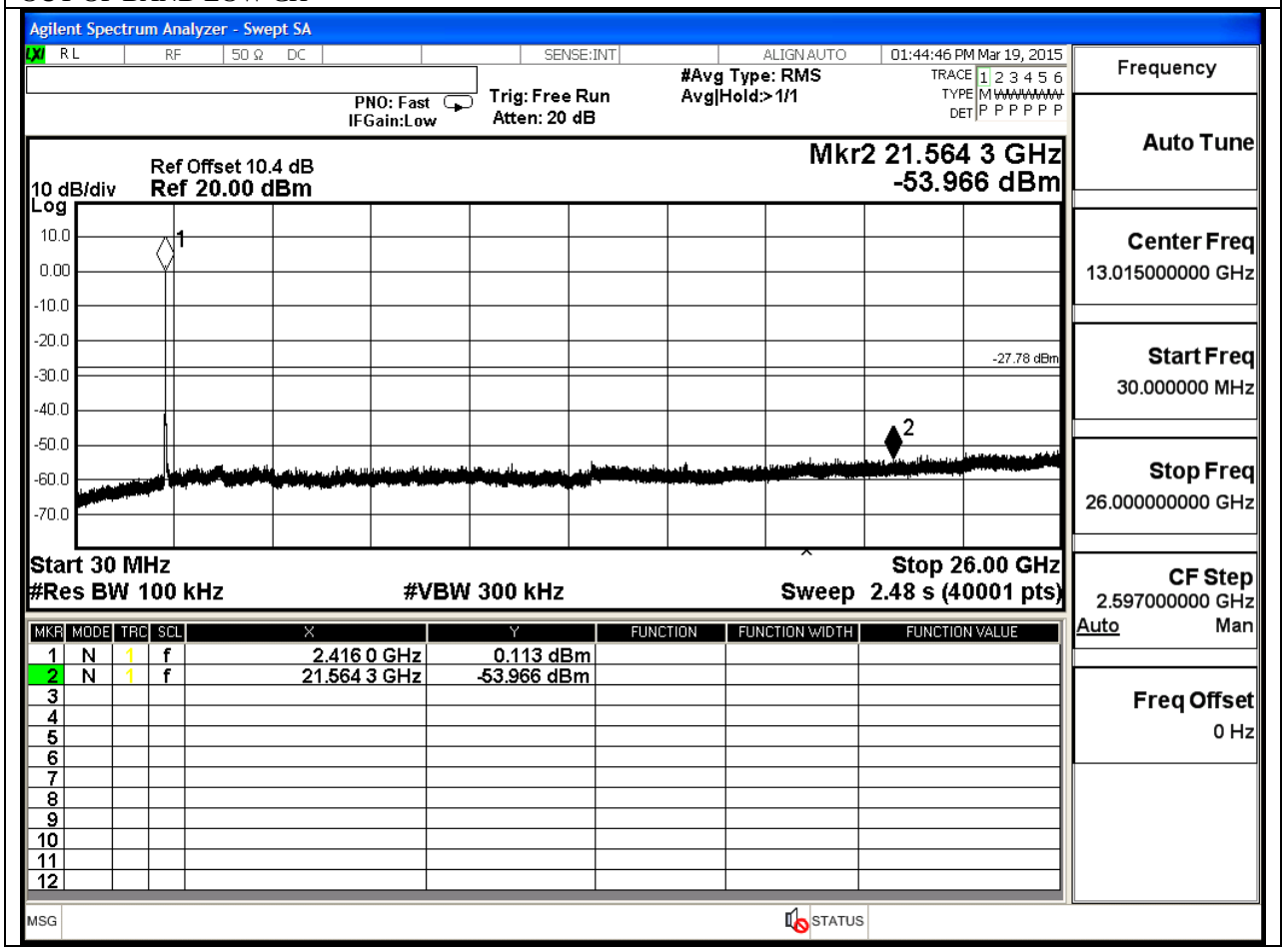
HIGH CHANNEL BANDEDGE (2472 MHz)

AUTHORIZED BAND EDGE HIGH CH

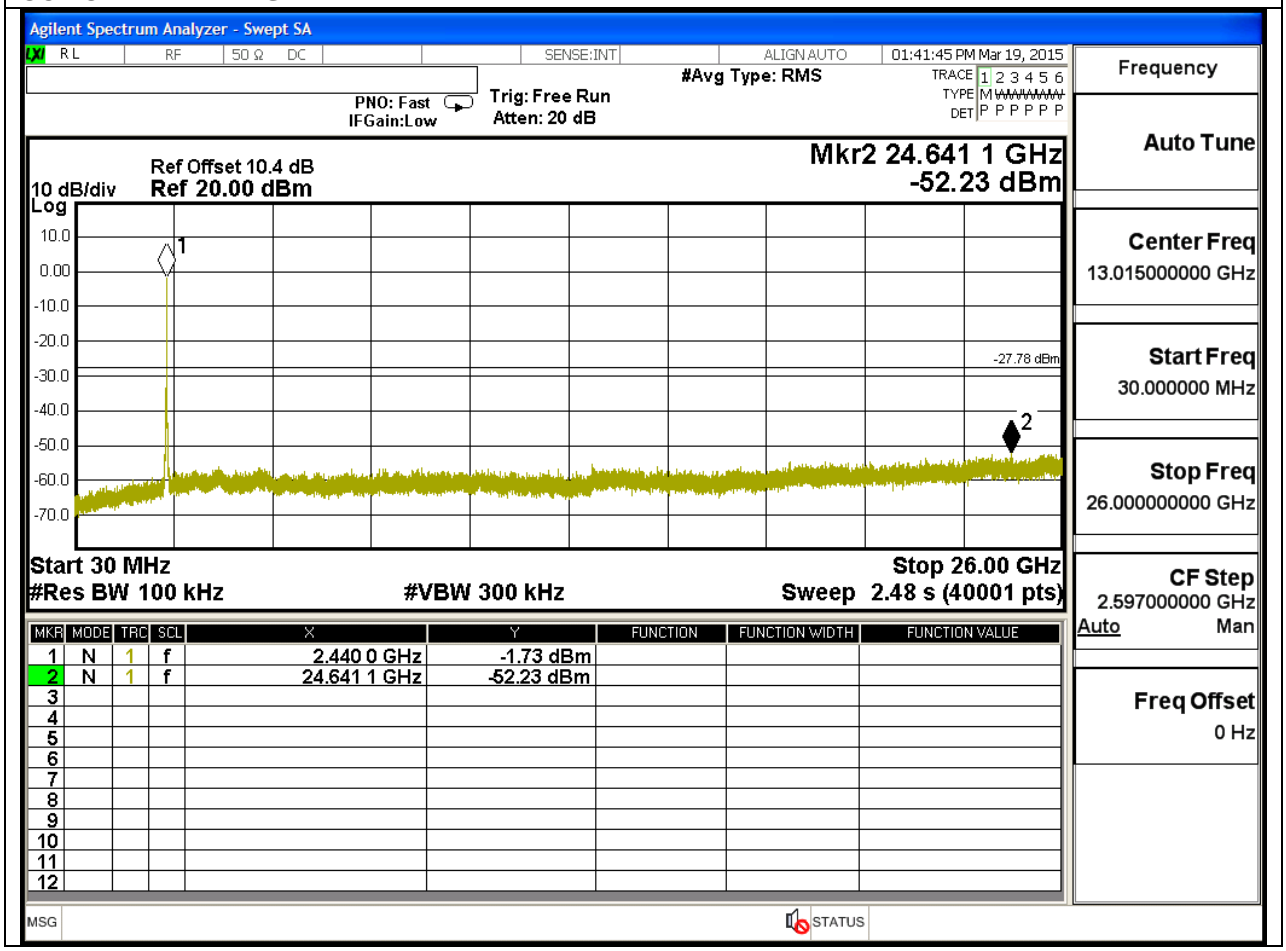


OUT-OF-BAND EMISSIONS

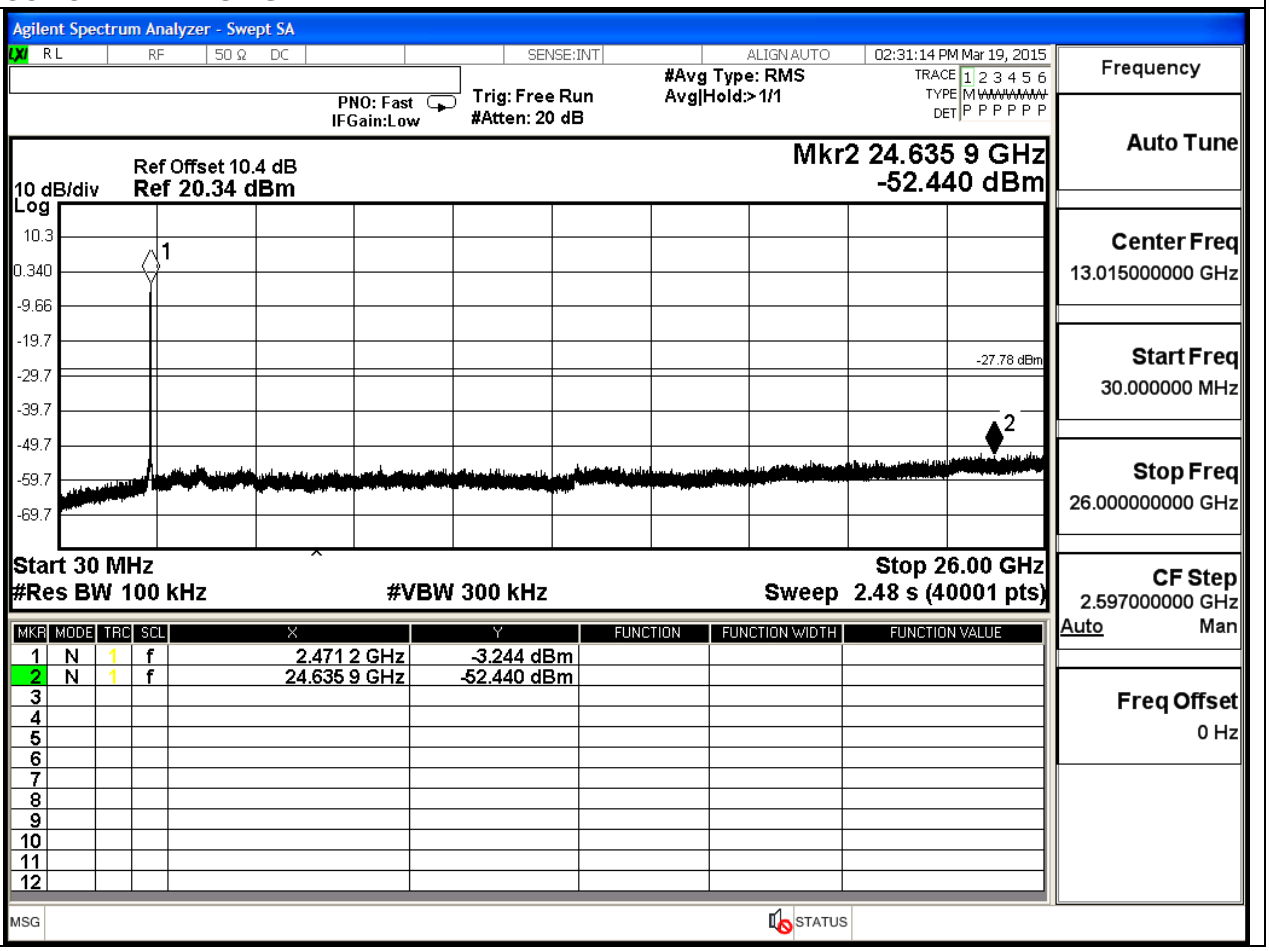
OUT OF BAND LOW CH



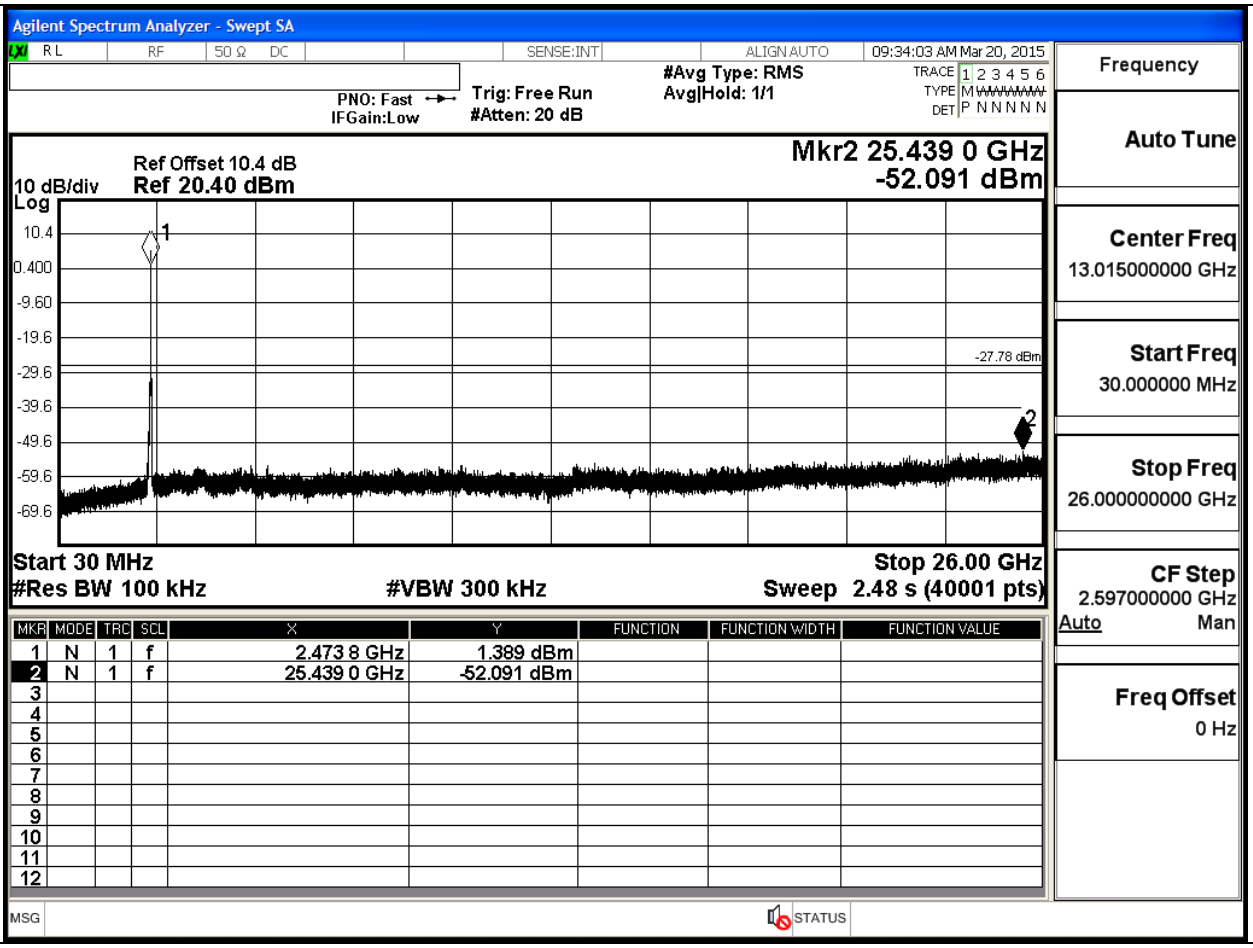
OUT OF BAND MID CH



OUT OF BAND HIGH CH



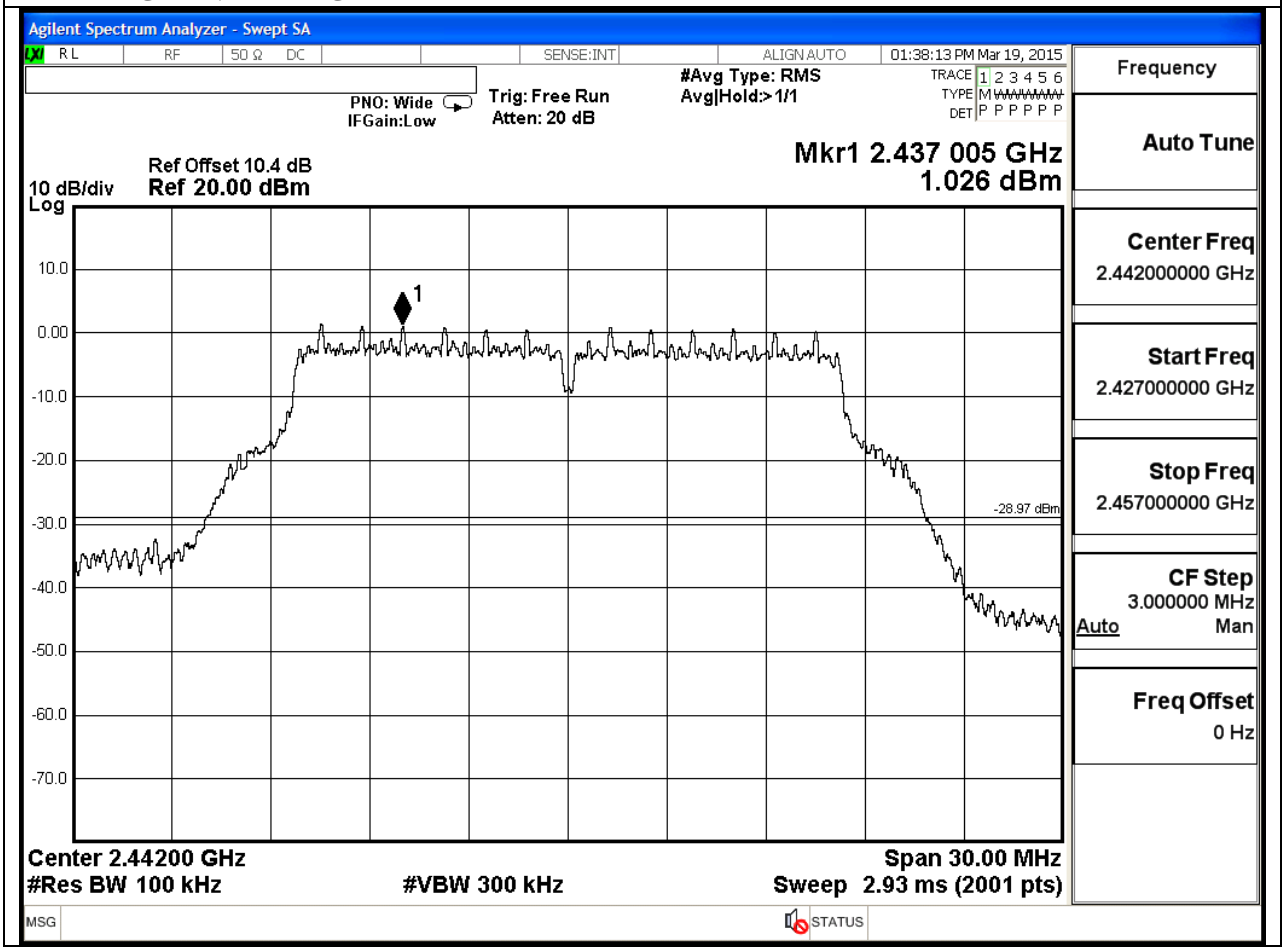
OUT OF BAND HIGH CH



10.5.4. 802.11g MODE IN THE 2.4 GHz BAND CHAIN 1

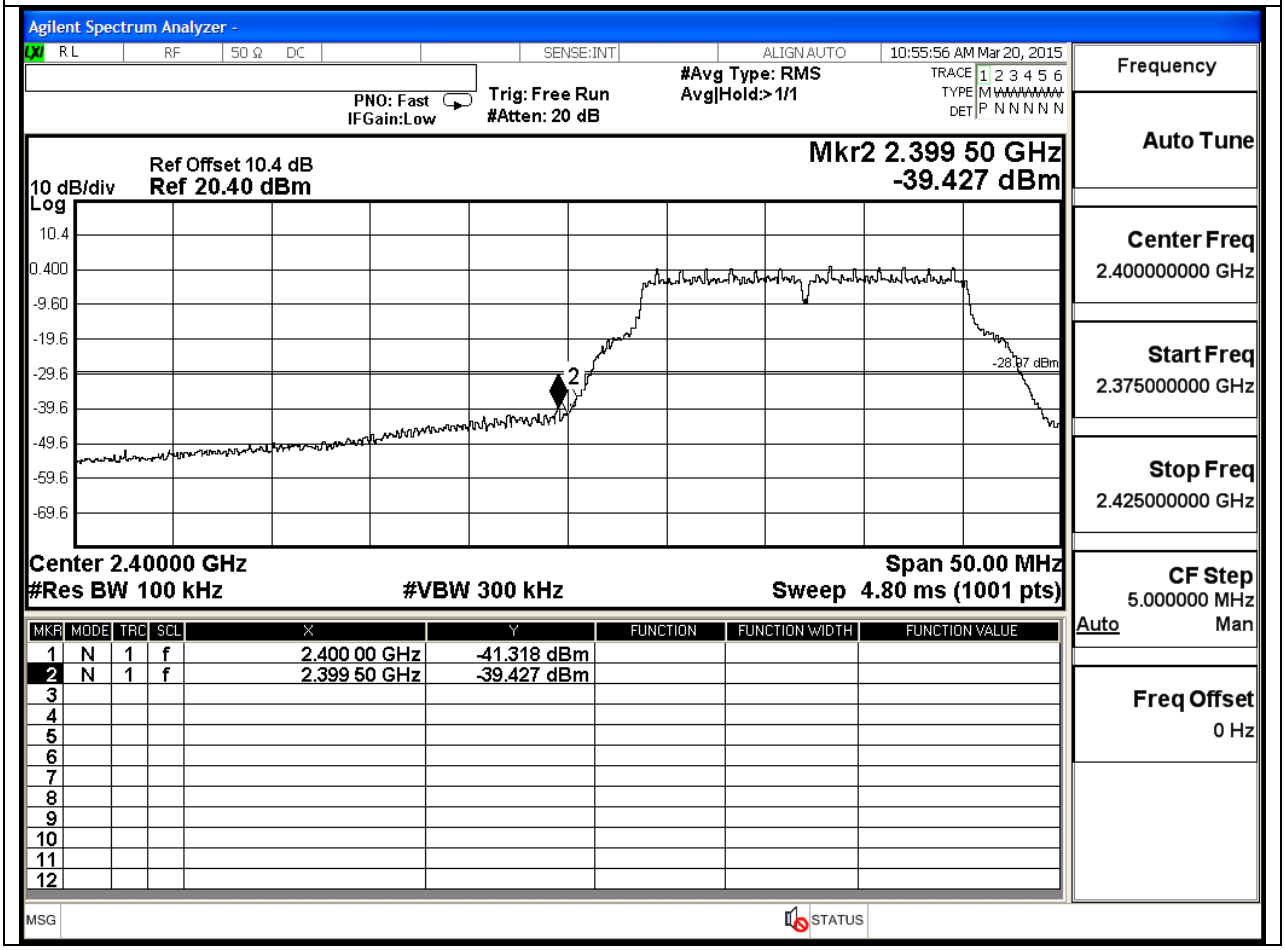
IN-BAND REFERENCE LEVEL

REFERENCE LEVEL MID CH



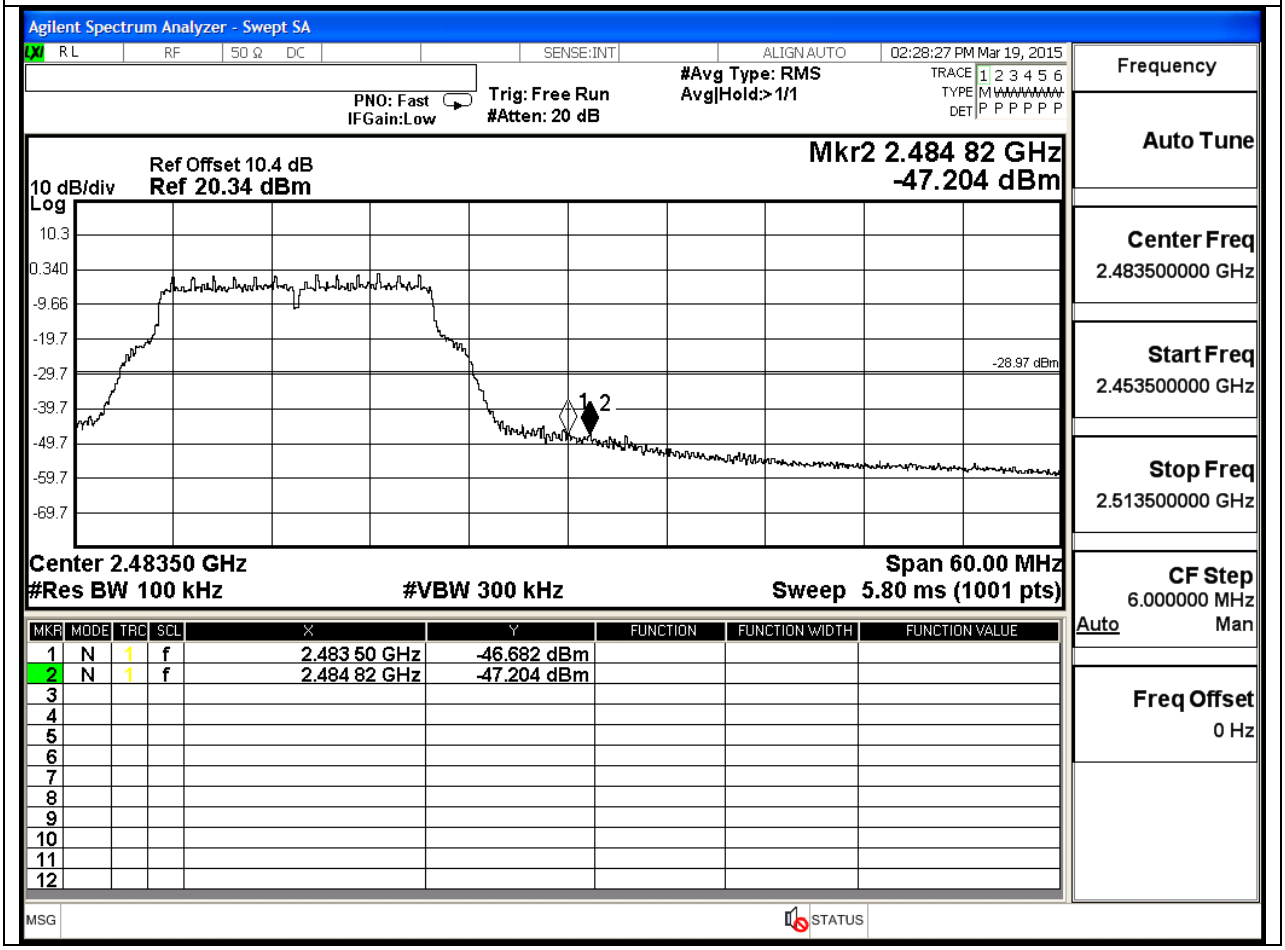
LOW CHANNEL BANDEDGE

AUTHORIZED BAND EDGE LOW CH



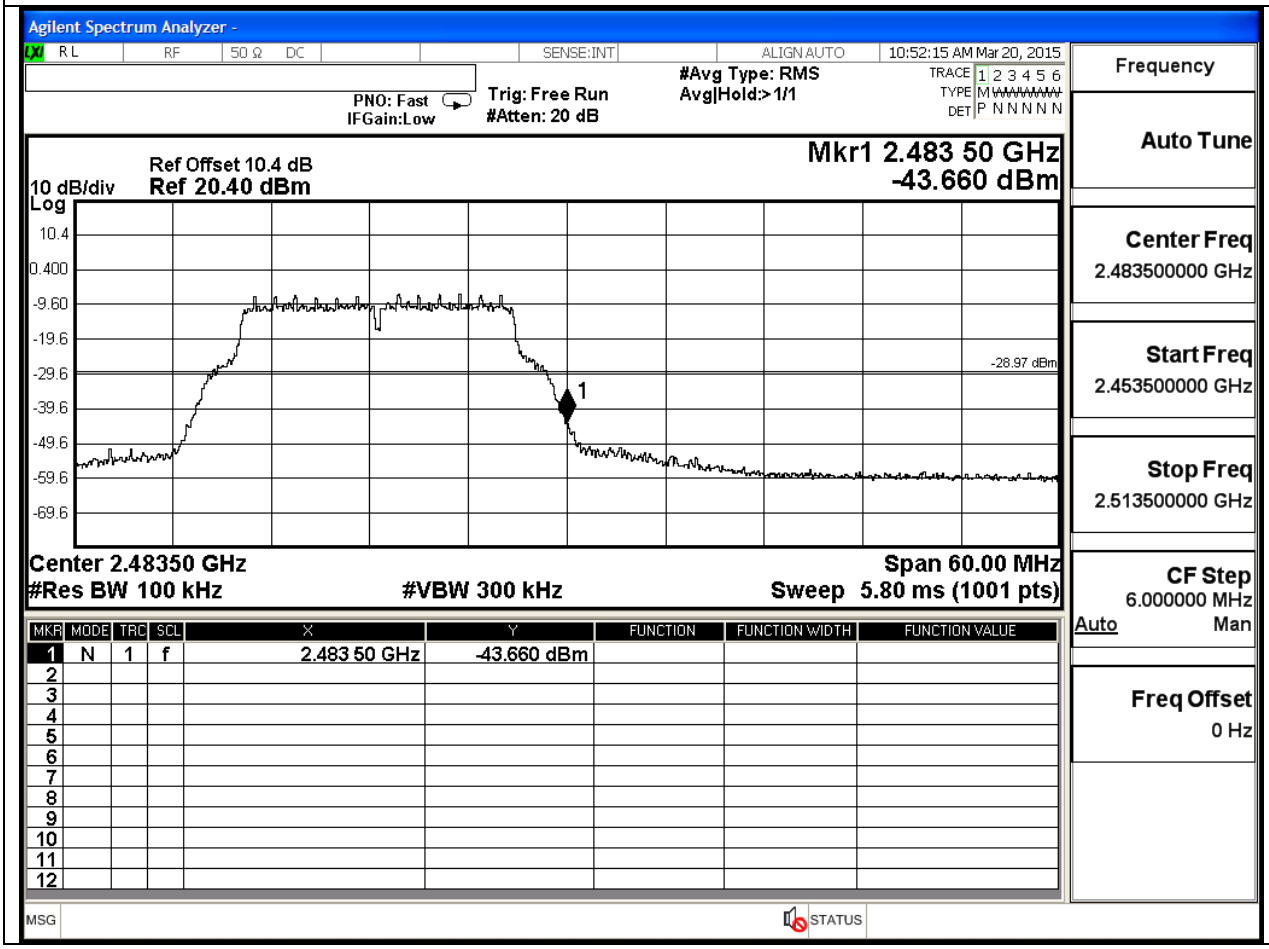
HIGH CHANNEL BANDEDGE

AUTHORIZED BAND EDGE HIGH CH



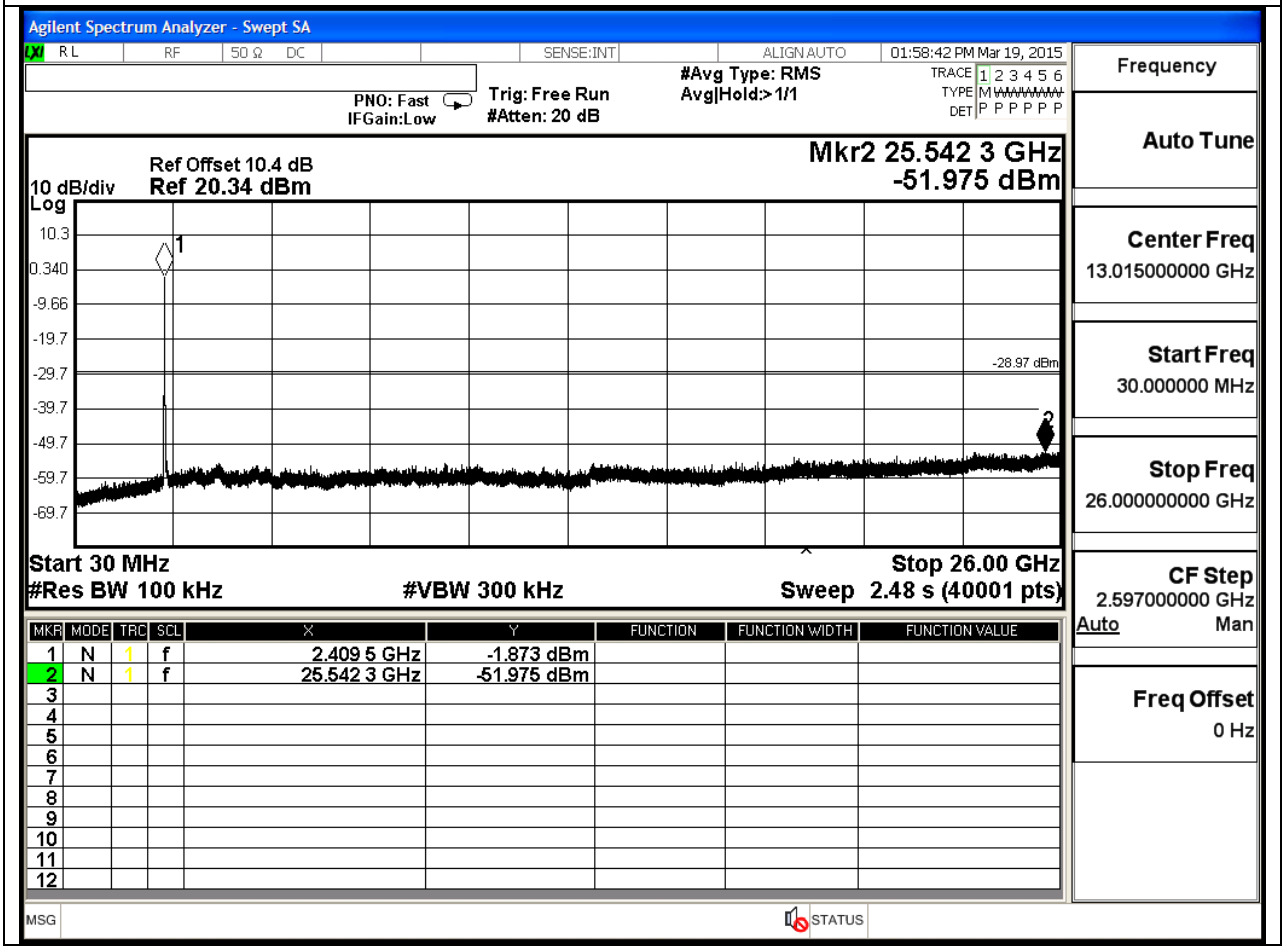
HIGH CHANNEL BANDEDGE (2472 MHz)

AUTHORIZED BAND EDGE HIGH CH

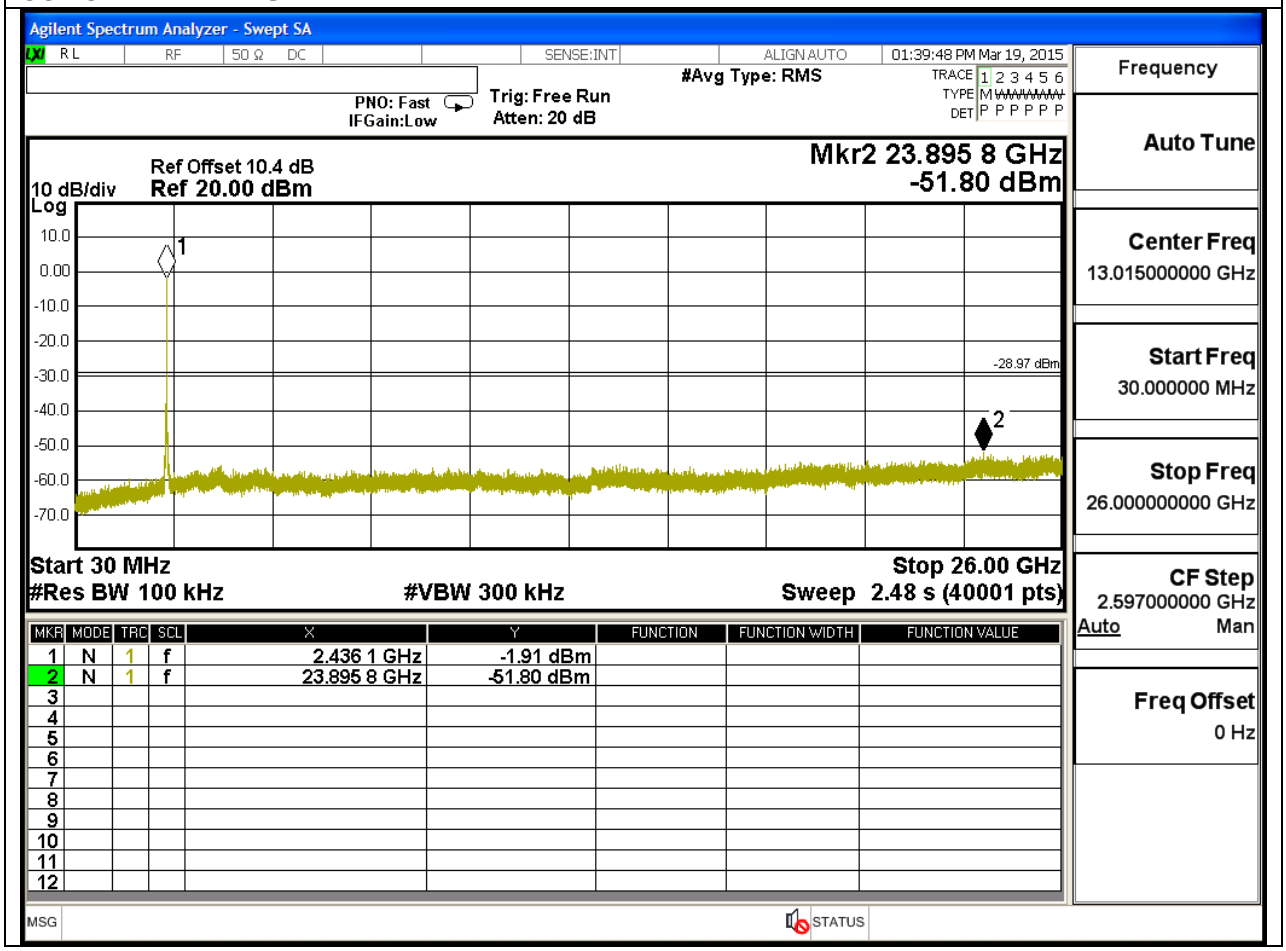


OUT-OF-BAND EMISSIONS

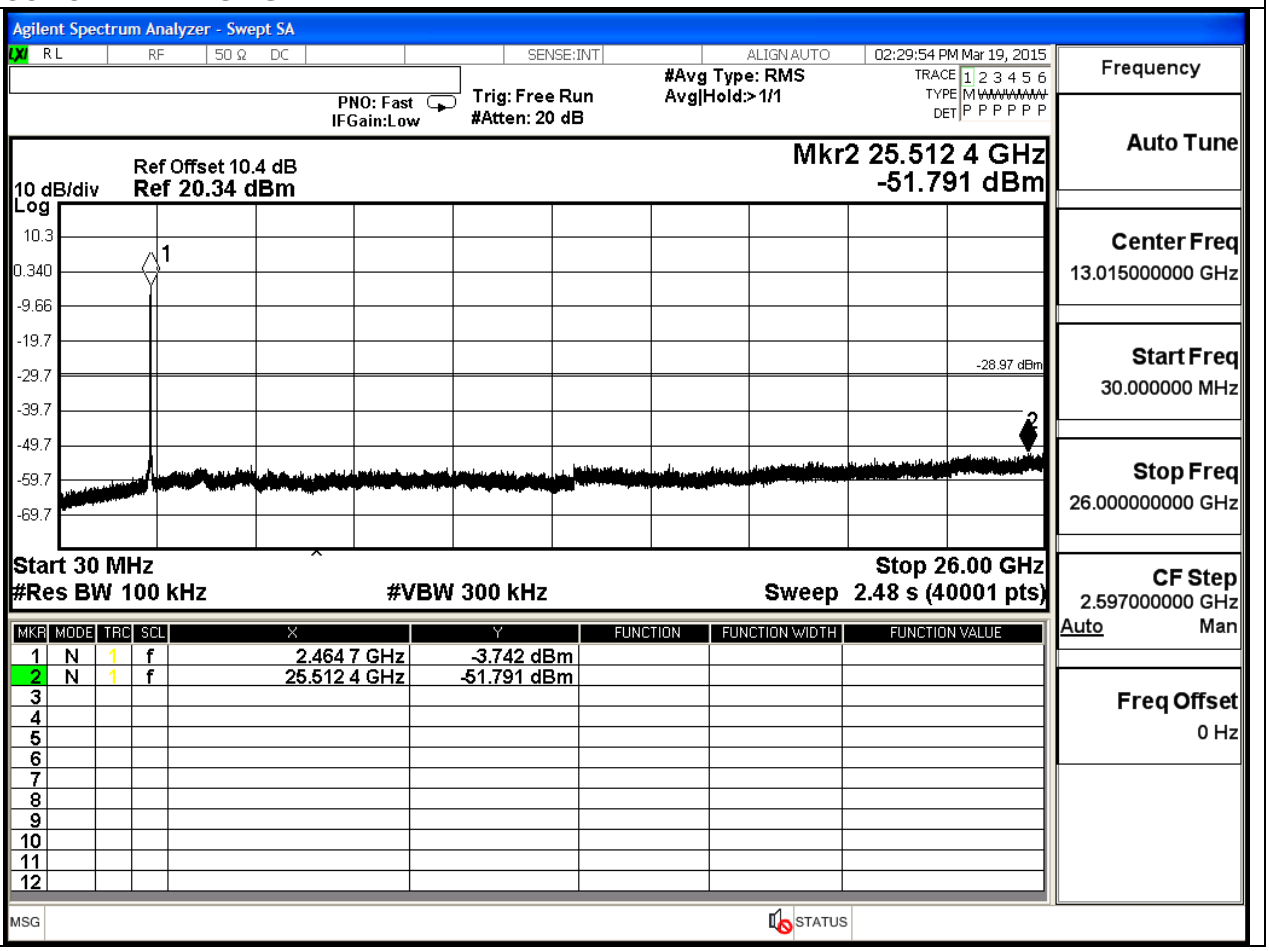
OUT OF BAND LOW CH



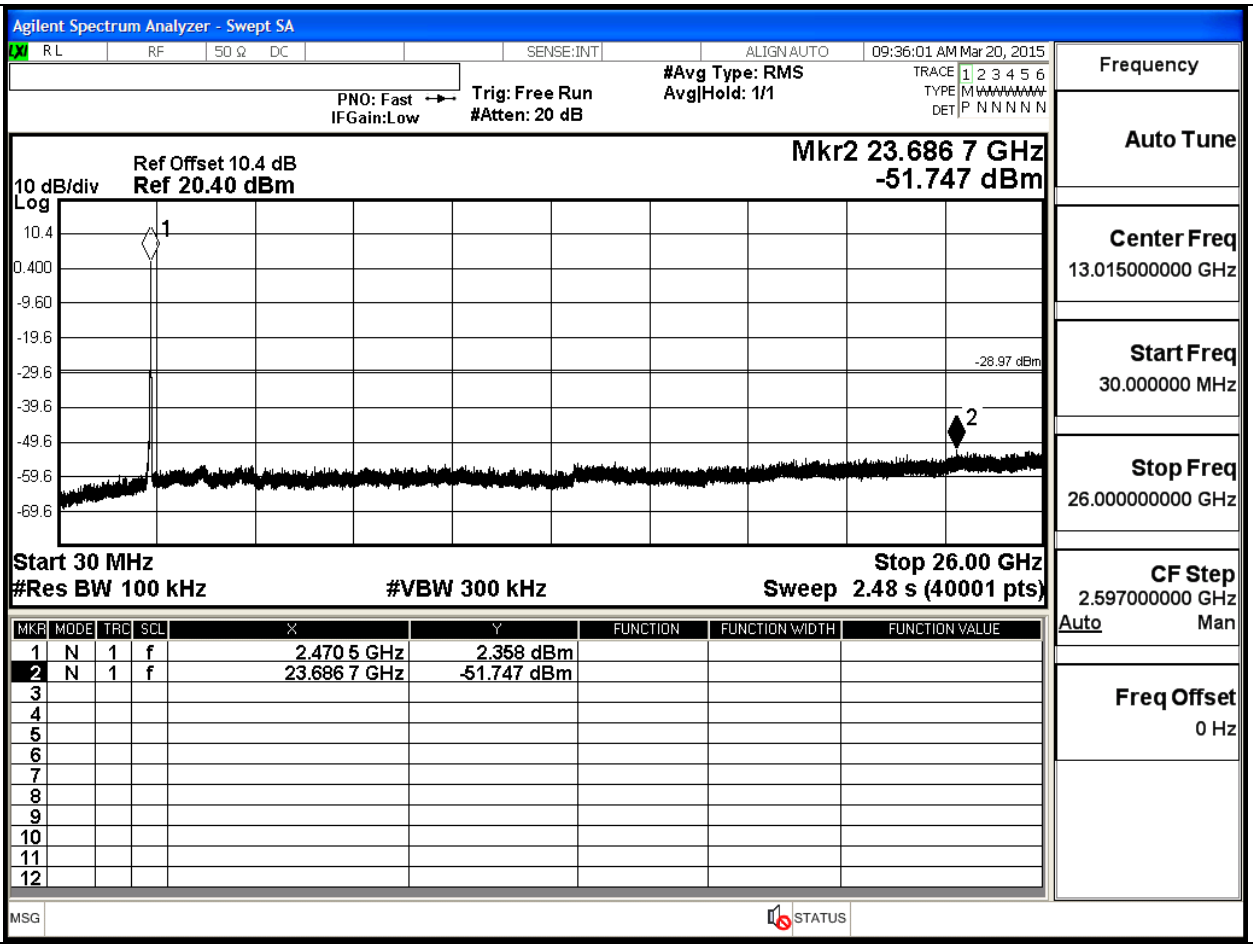
OUT OF BAND MID CH



OUT OF BAND HIGH CH



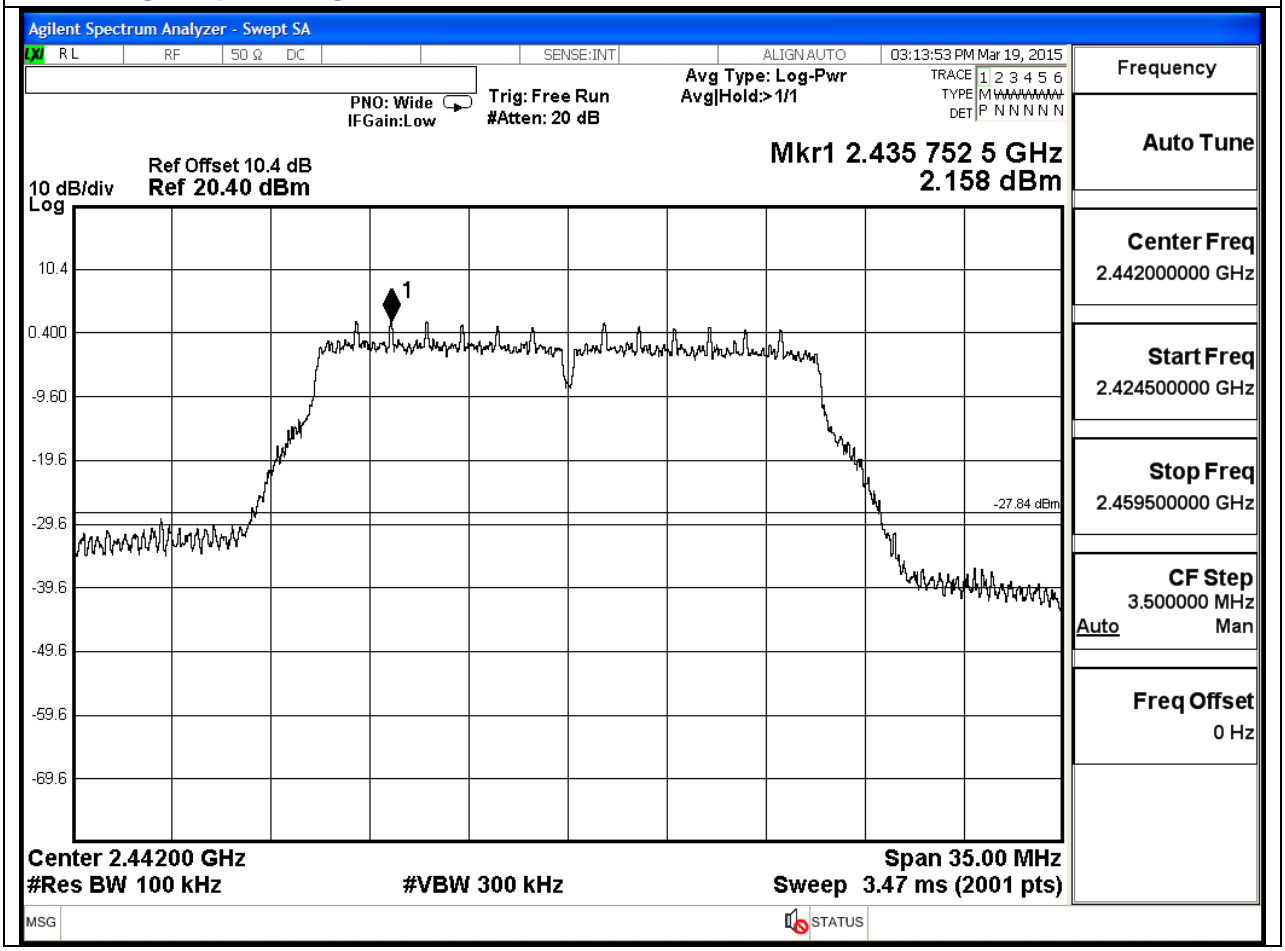
OUT OF BAND HIGH CH



10.5.5. 802.11n HT20 MODE IN THE 2.4 GHz BAND CHAIN 0

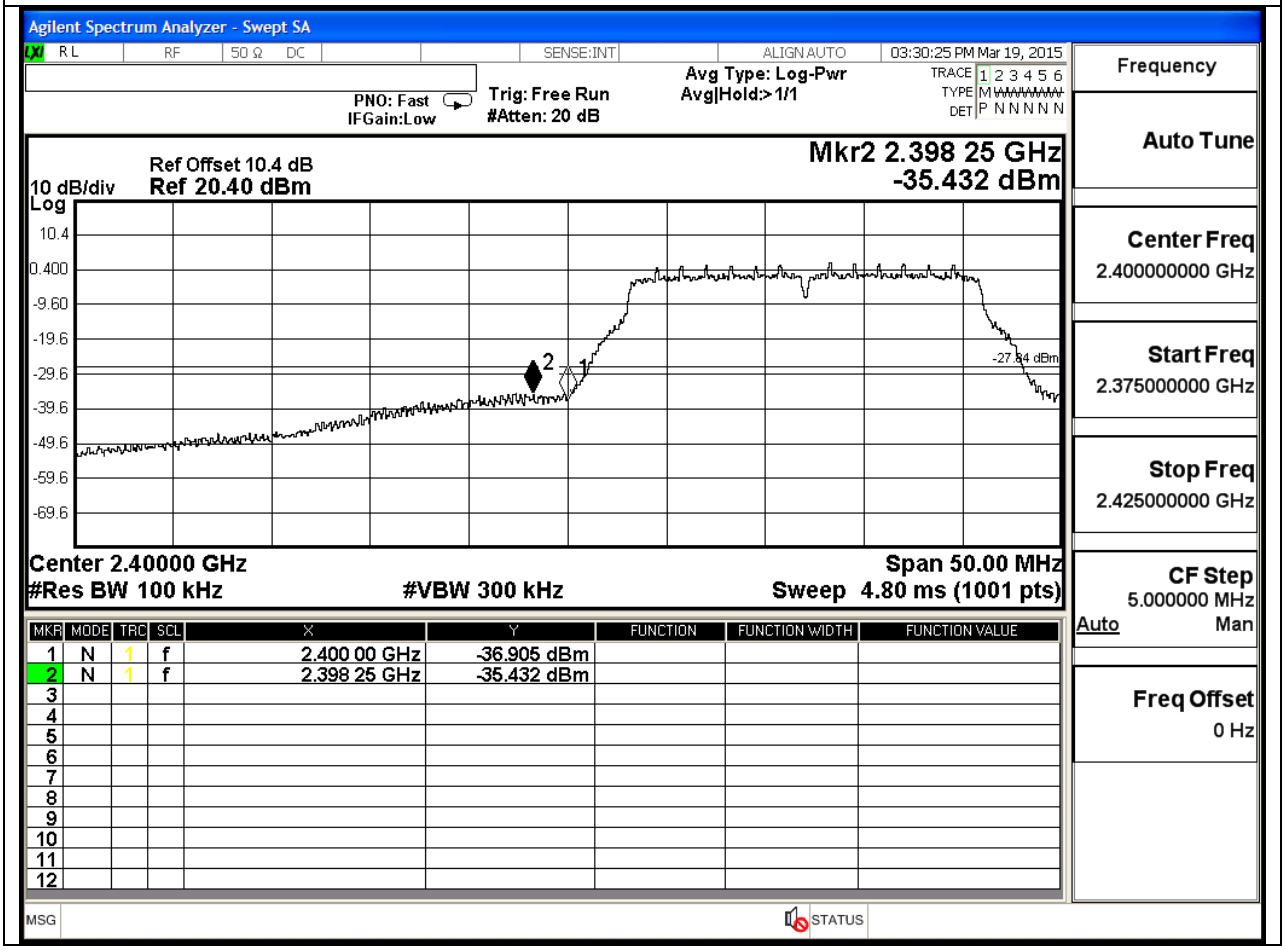
IN-BAND REFERENCE LEVEL

REFERENCE LEVEL MID CH



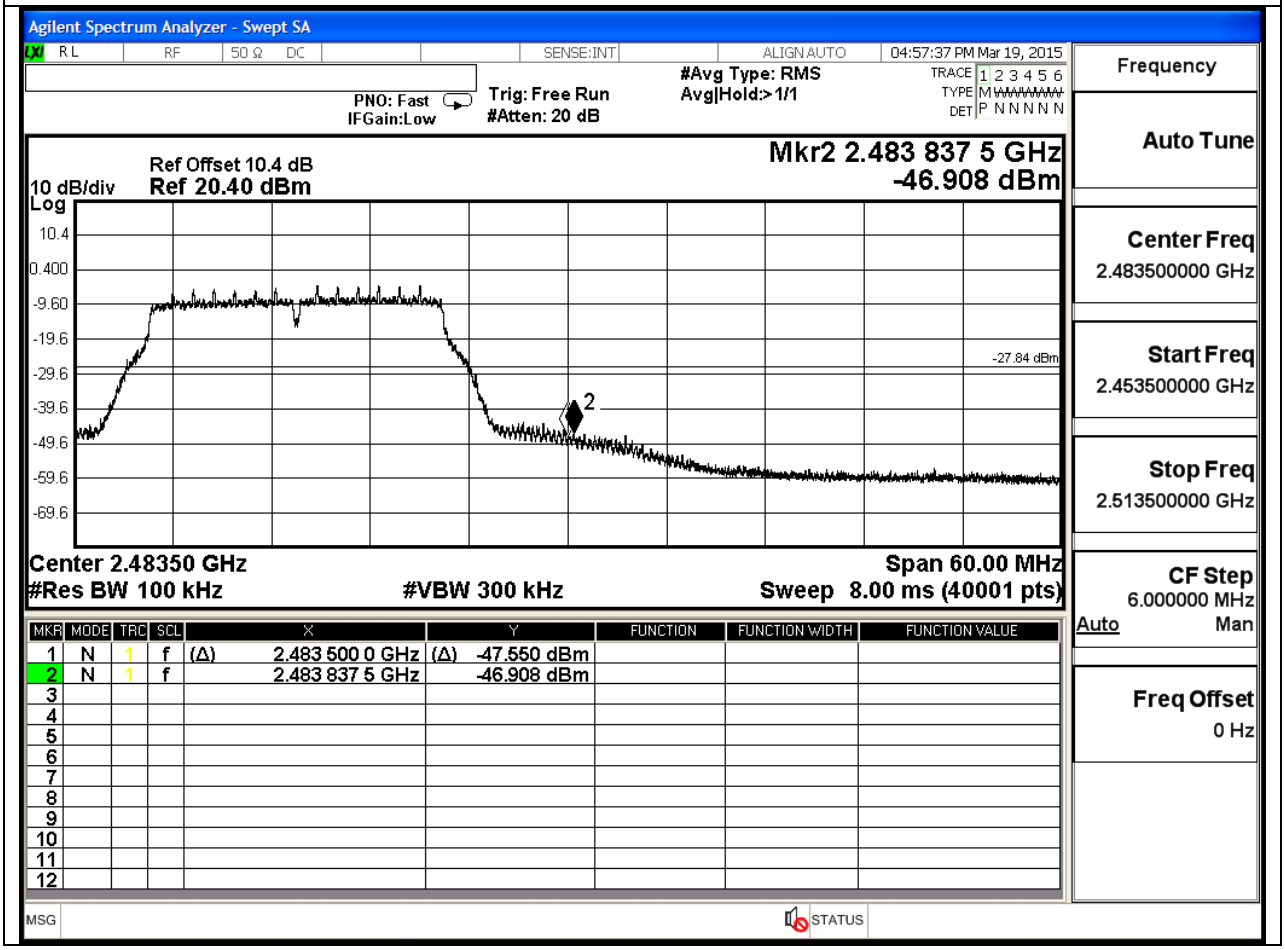
LOW CHANNEL BANDEDGE

AUTHORIZED BAND EDGE LOW CH



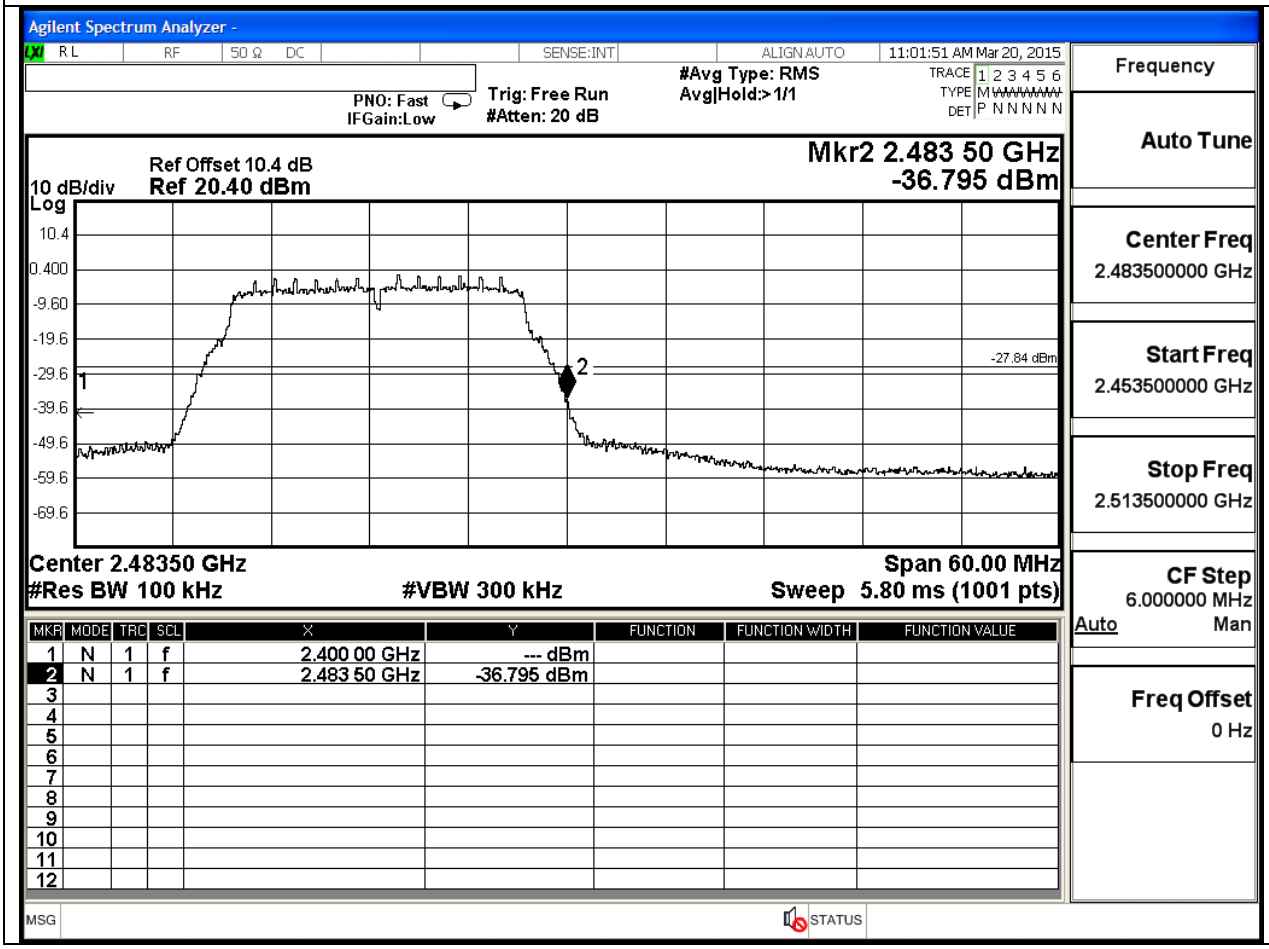
HIGH CHANNEL BANDEDGE

AUTHORIZED BAND EDGE HIGH CH



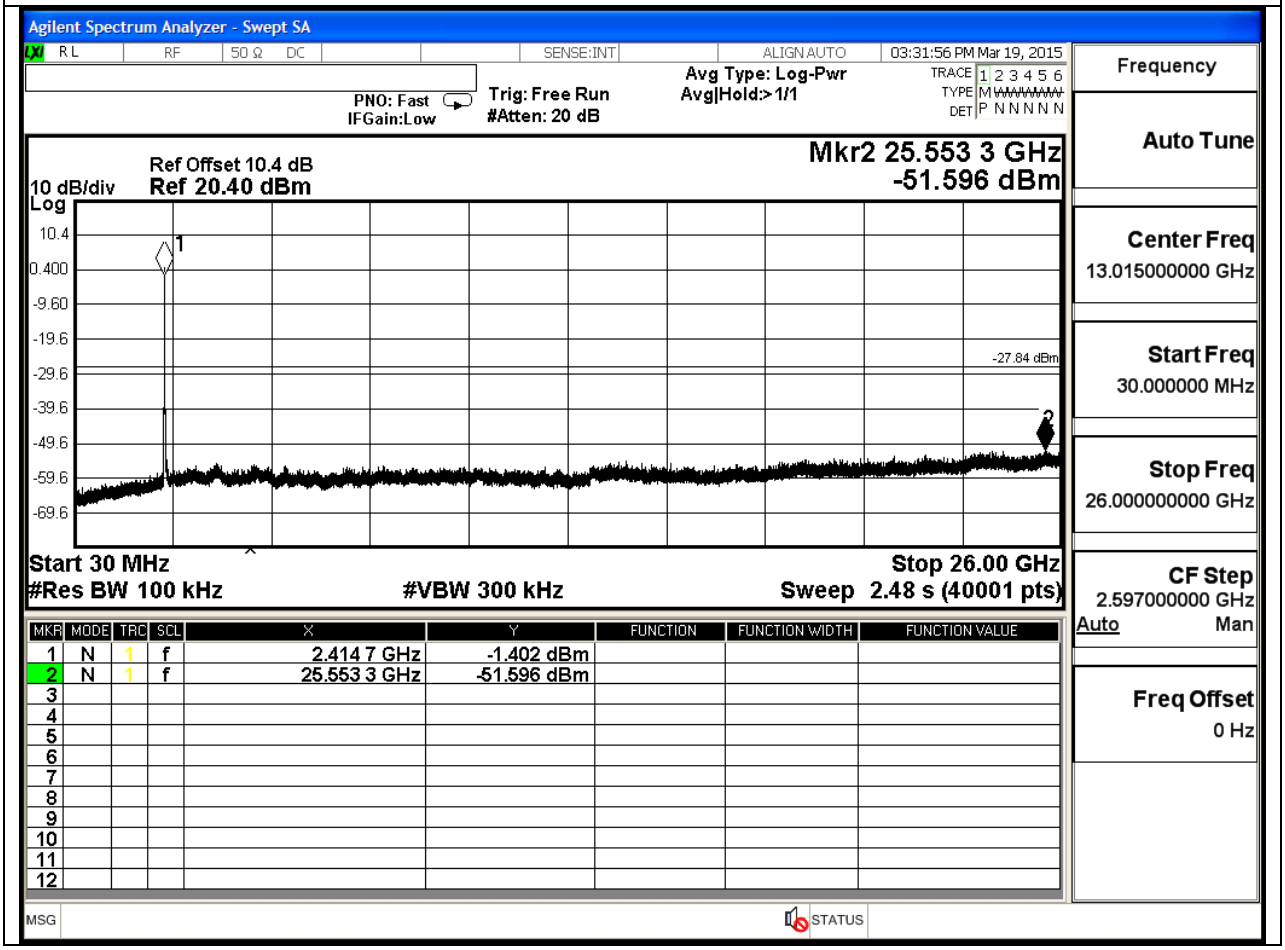
HIGH CHANNEL BANDEDGE (2472 MHz)

AUTHORIZED BAND EDGE HIGH CH

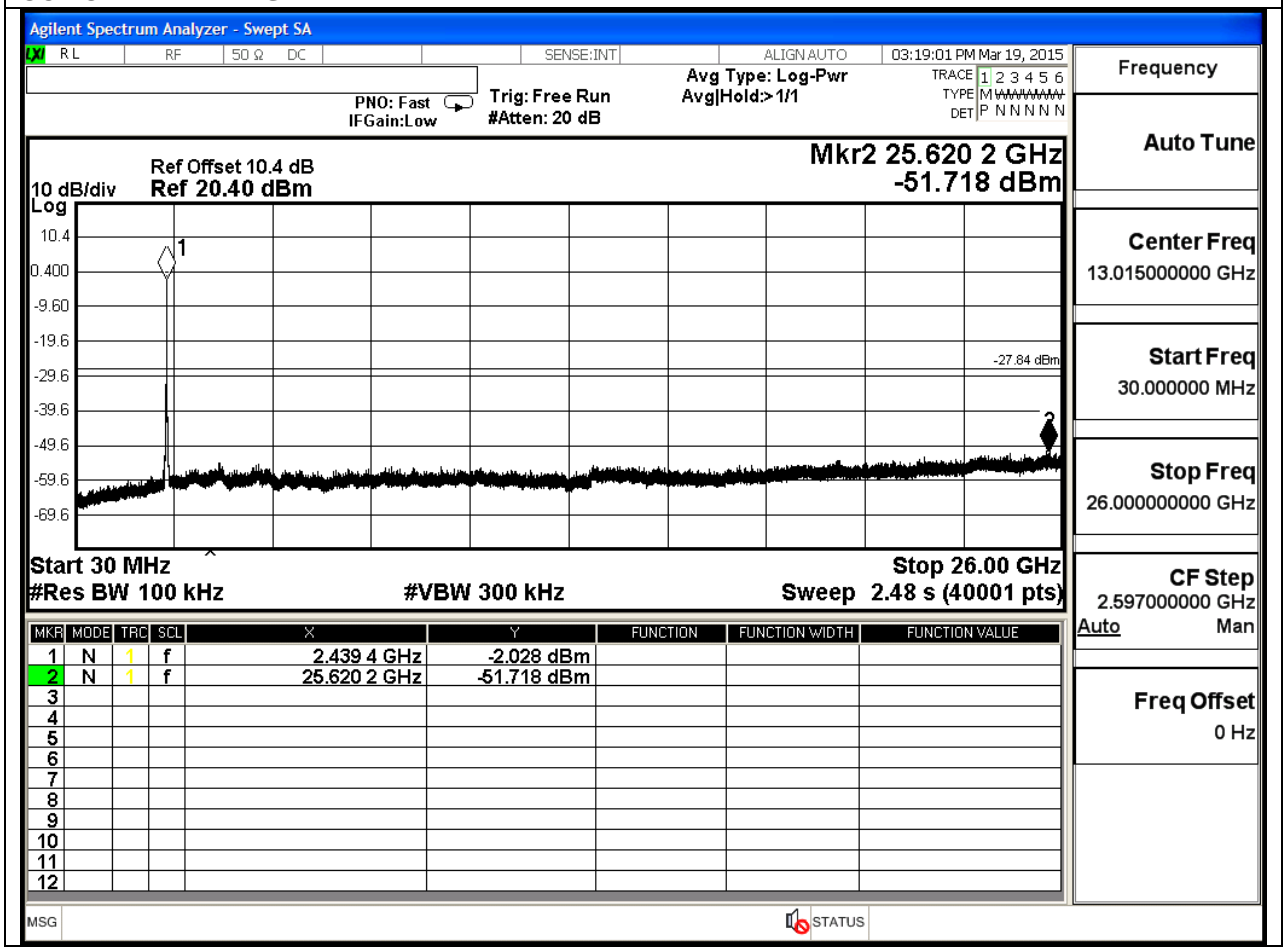


OUT-OF-BAND EMISSIONS

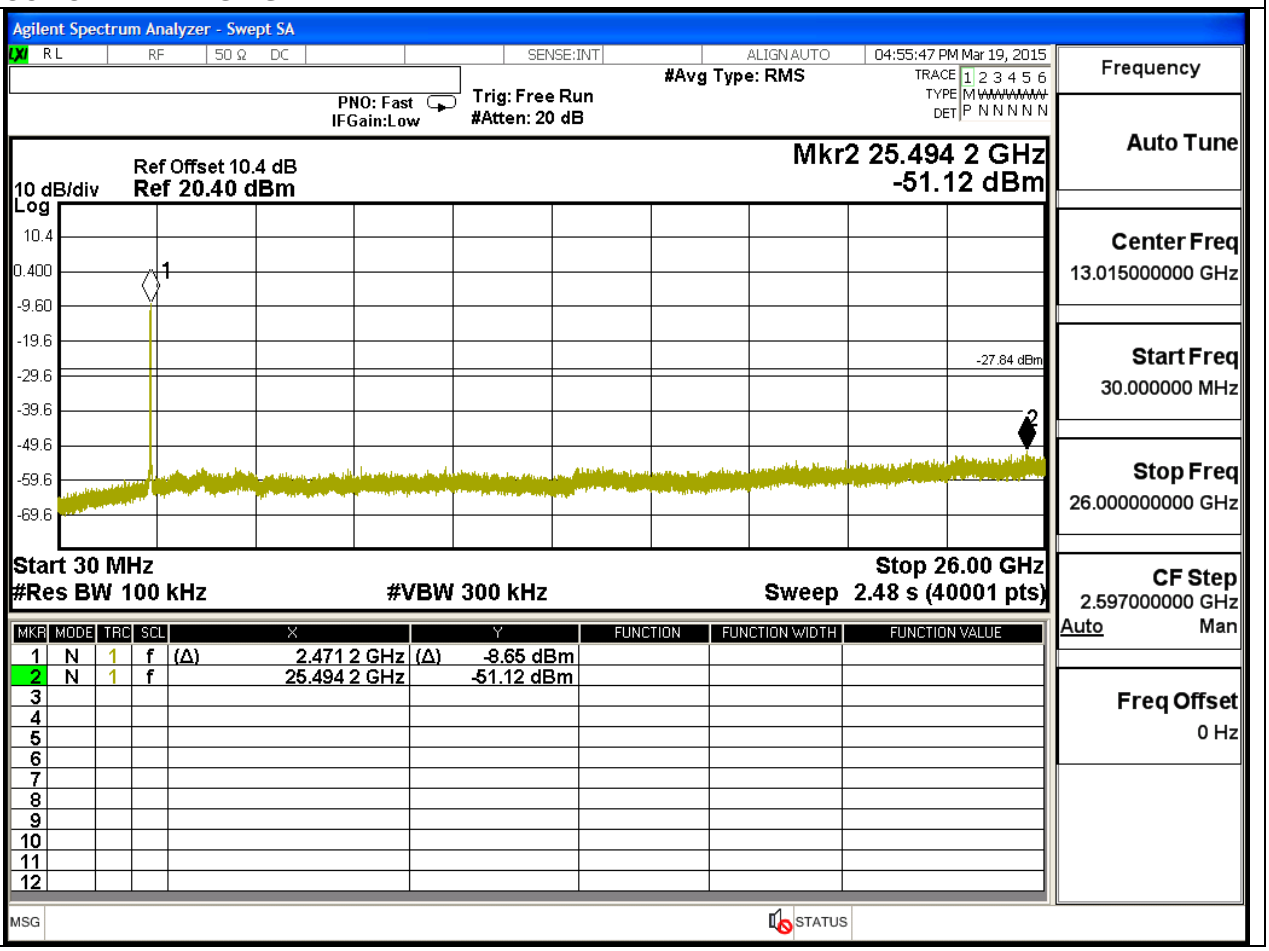
OUT OF BAND LOW CH



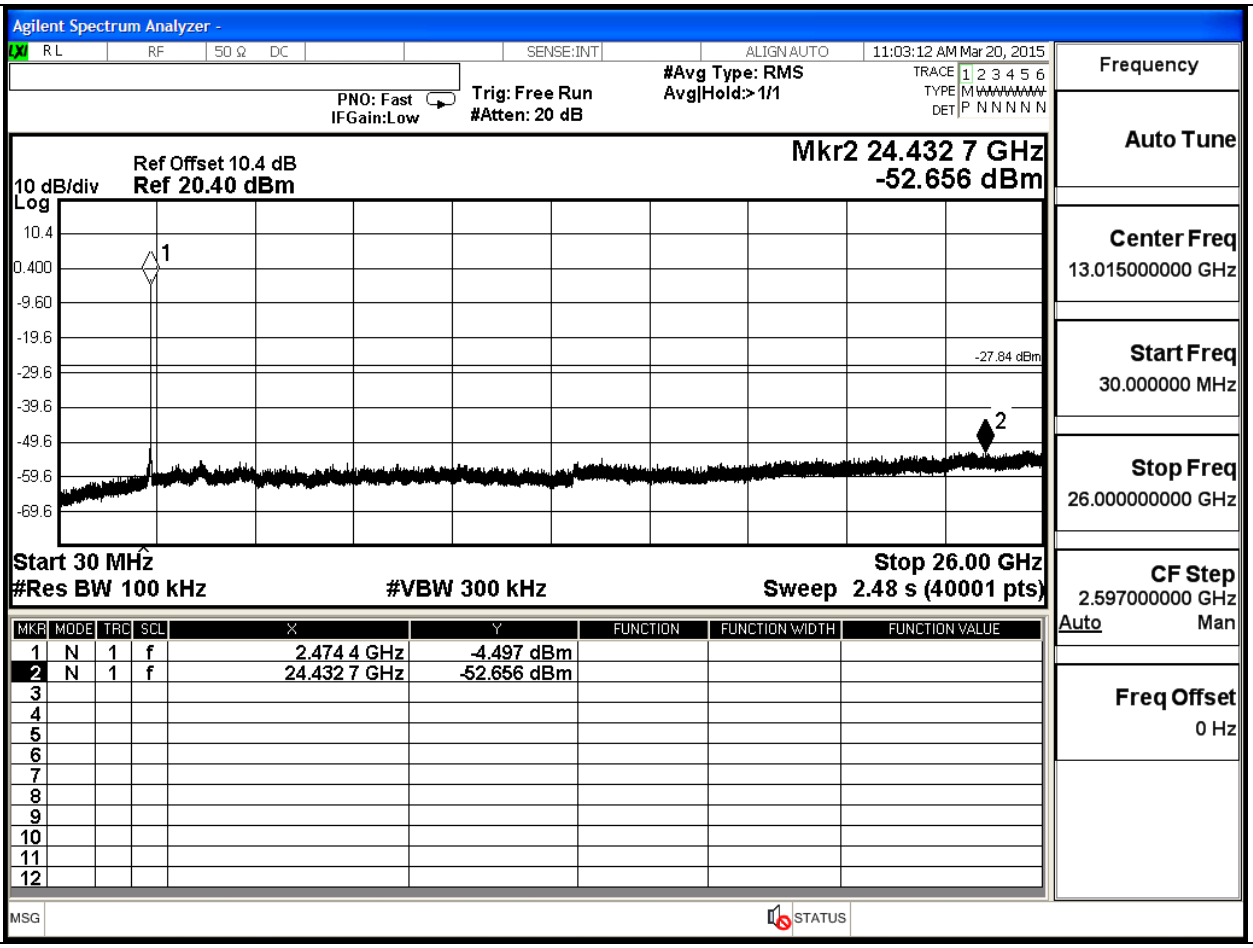
OUT OF BAND MID CH



OUT OF BAND HIGH CH



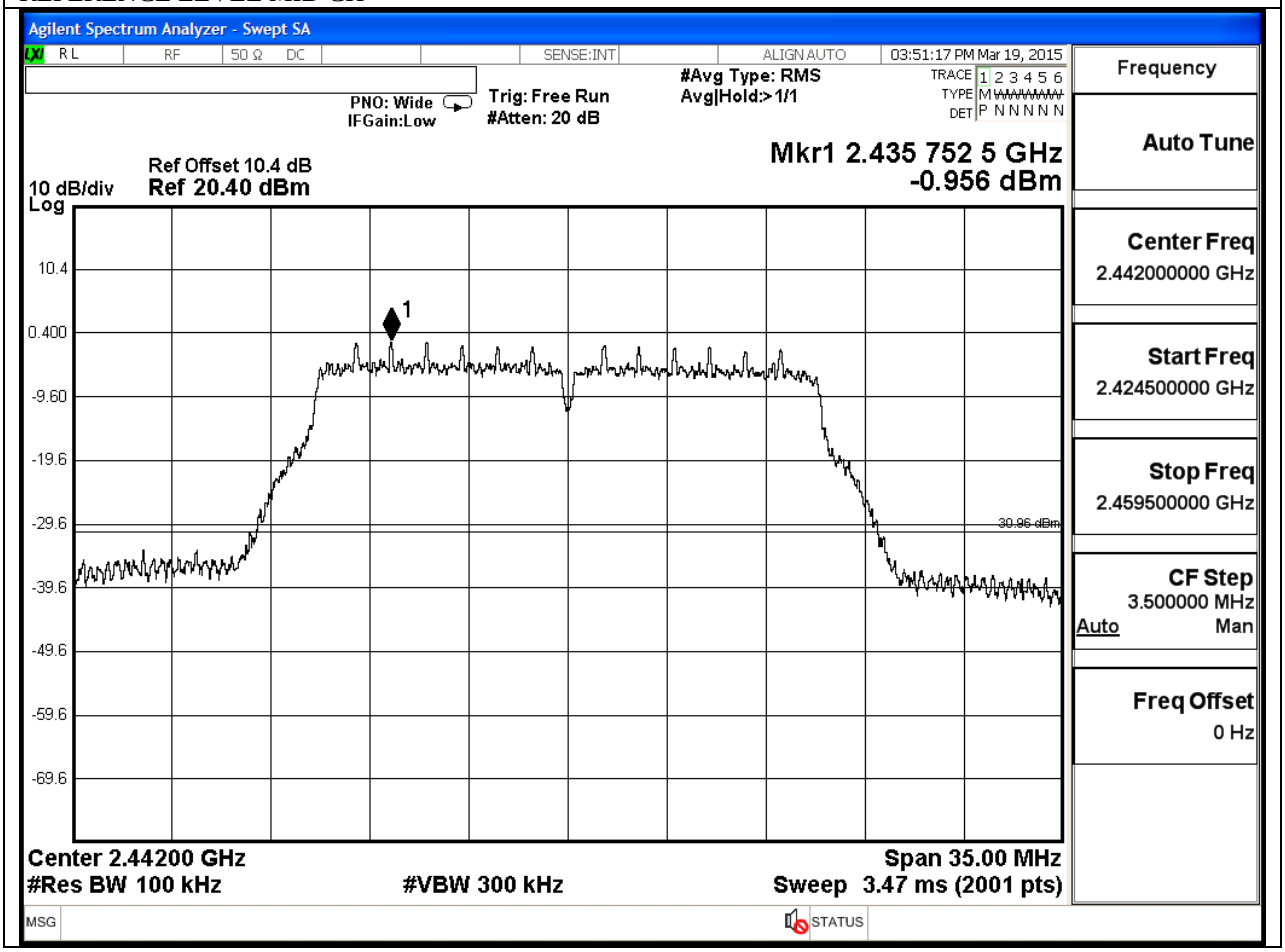
OUT OF BAND HIGH CH



10.5.6. 802.11n HT20 MODE IN THE 2.4 GHz BAND CHAIN 1

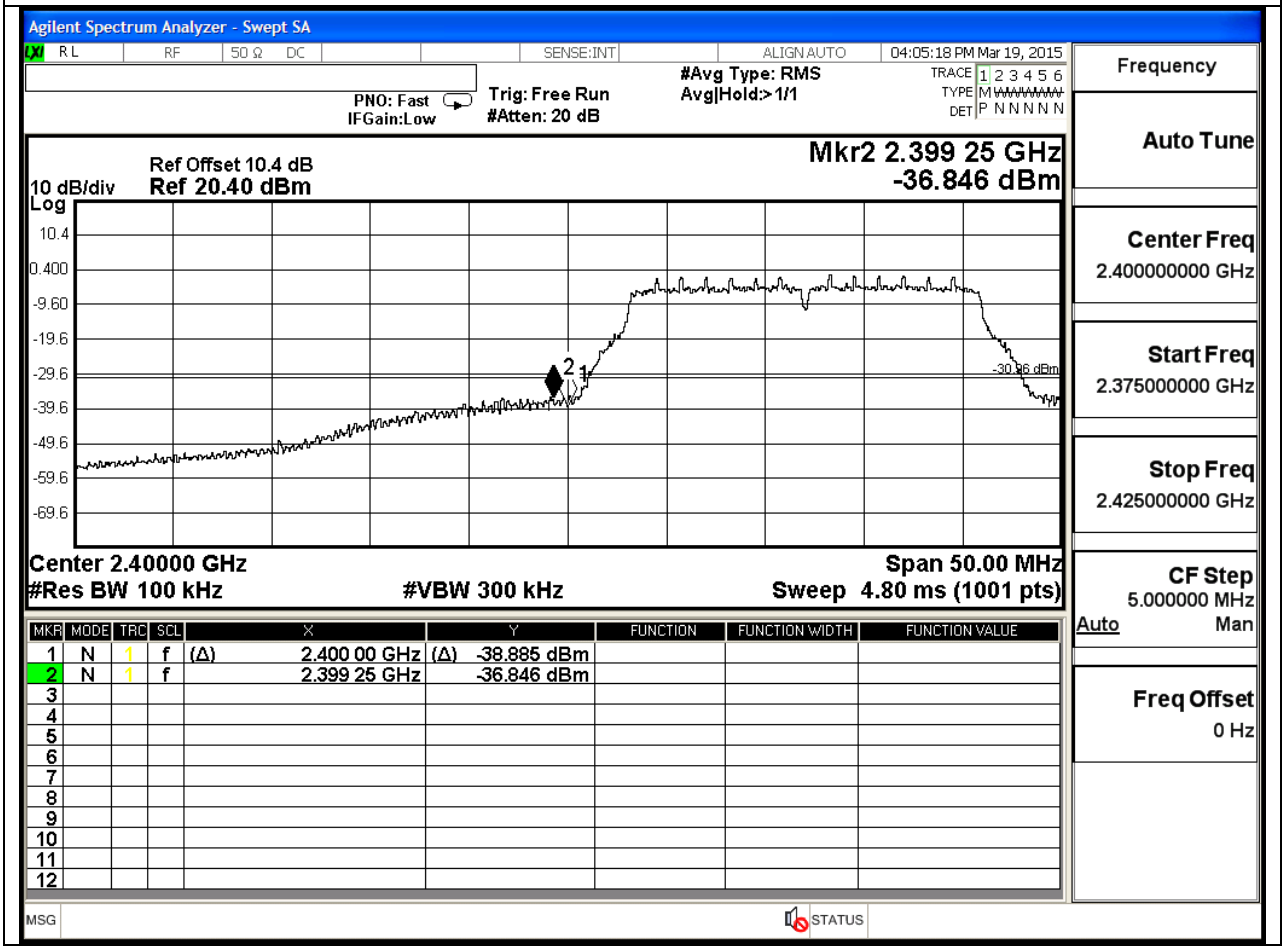
IN-BAND REFERENCE LEVEL

REFERENCE LEVEL MID CH



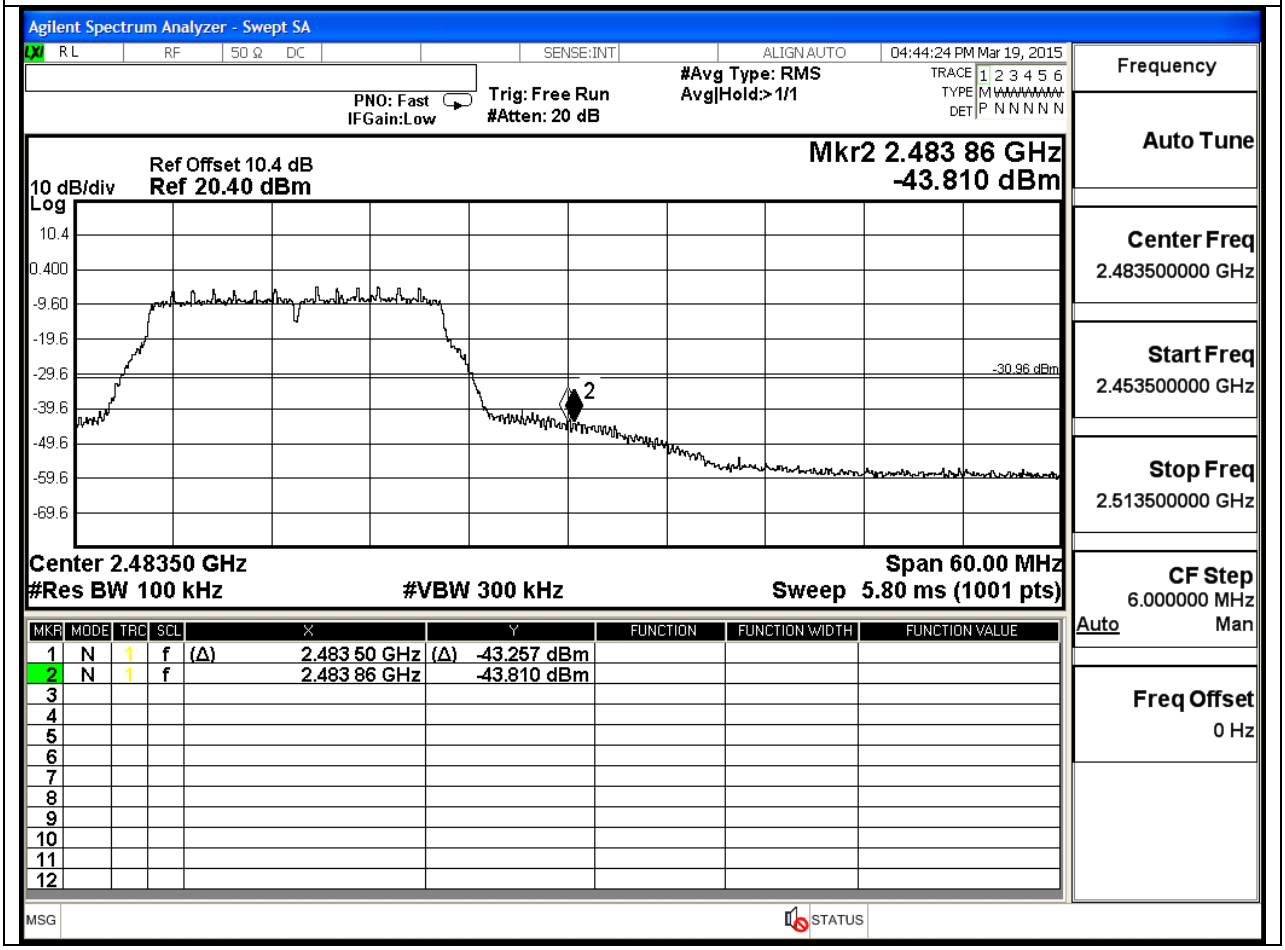
LOW CHANNEL BANDEDGE

AUTHORIZED BAND EDGE LOW CH



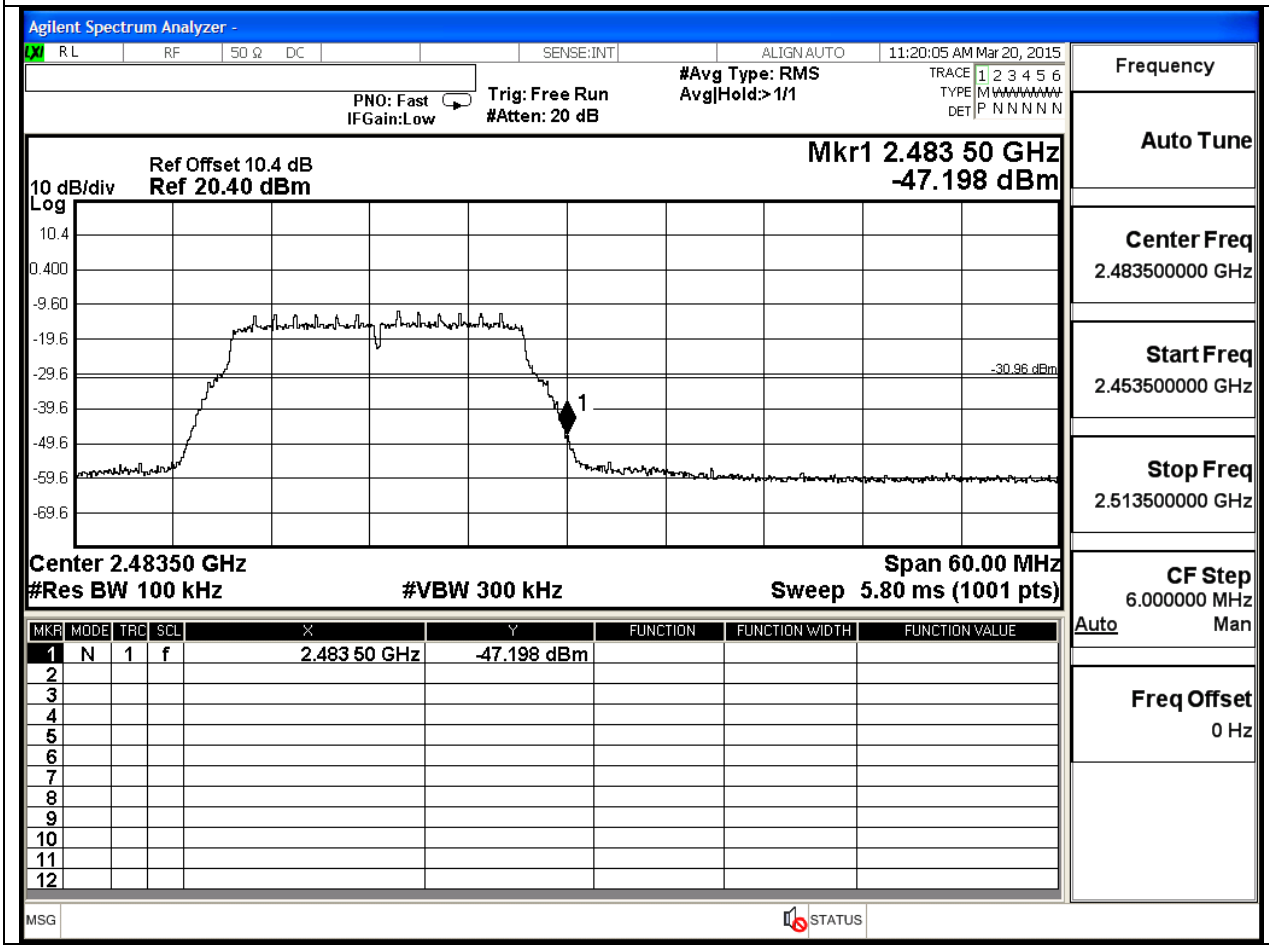
HIGH CHANNEL BANDEDGE

AUTHORIZED BAND EDGE HIGH CH



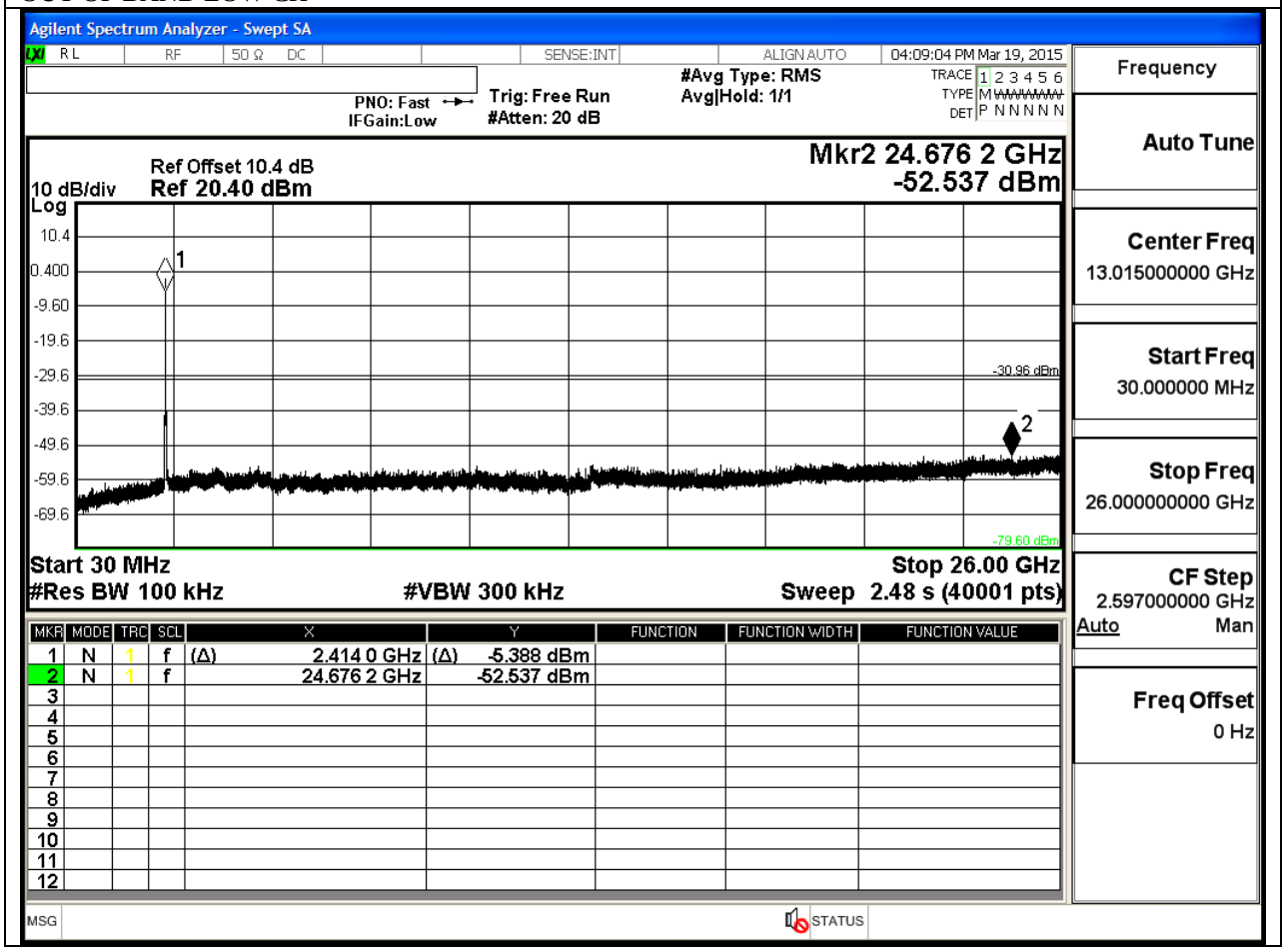
HIGH CHANNEL BANDEDGE (2472 MHz)

AUTHORIZED BAND EDGE HIGH CH

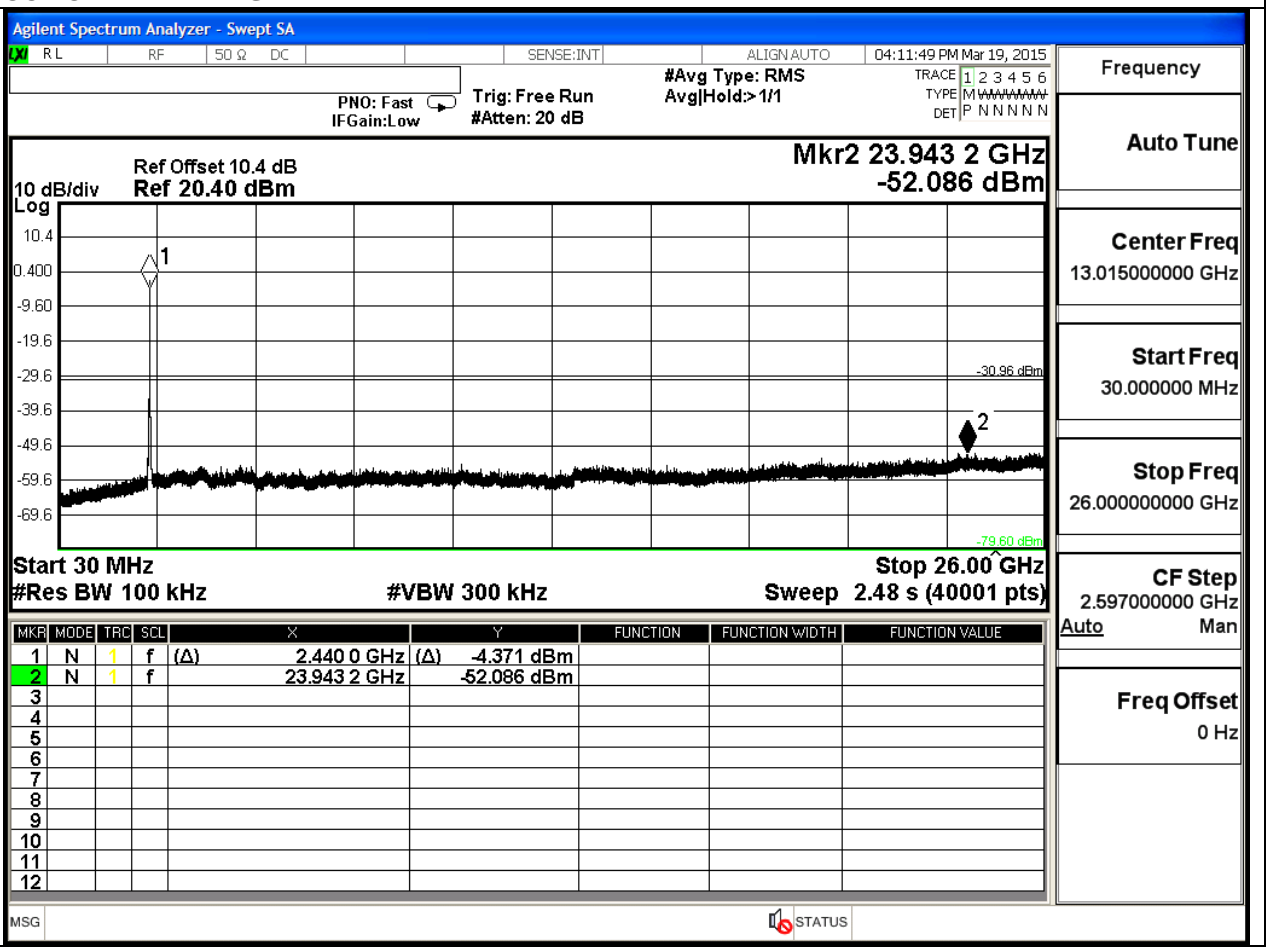


OUT-OF-BAND EMISSIONS

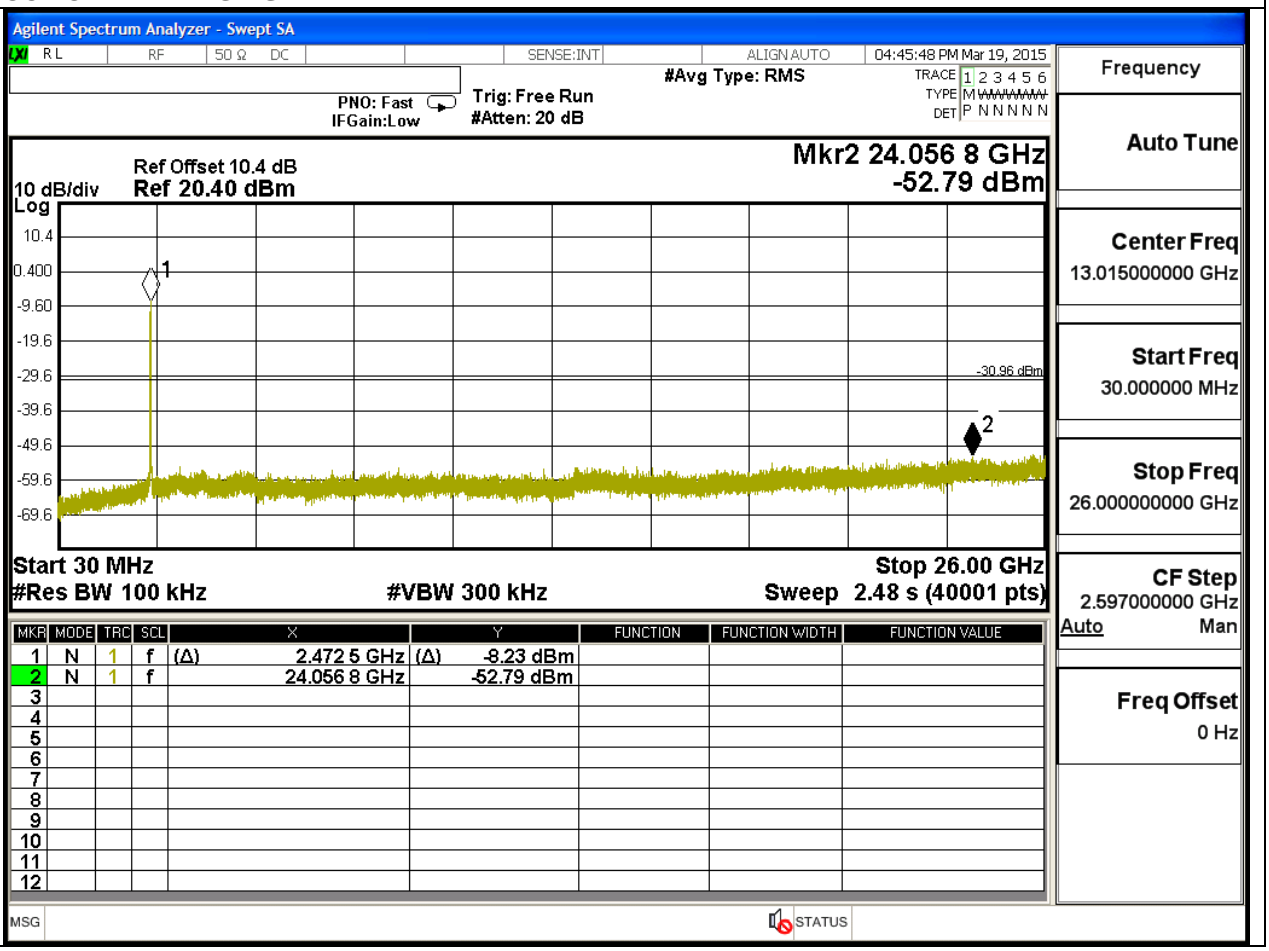
OUT OF BAND LOW CH



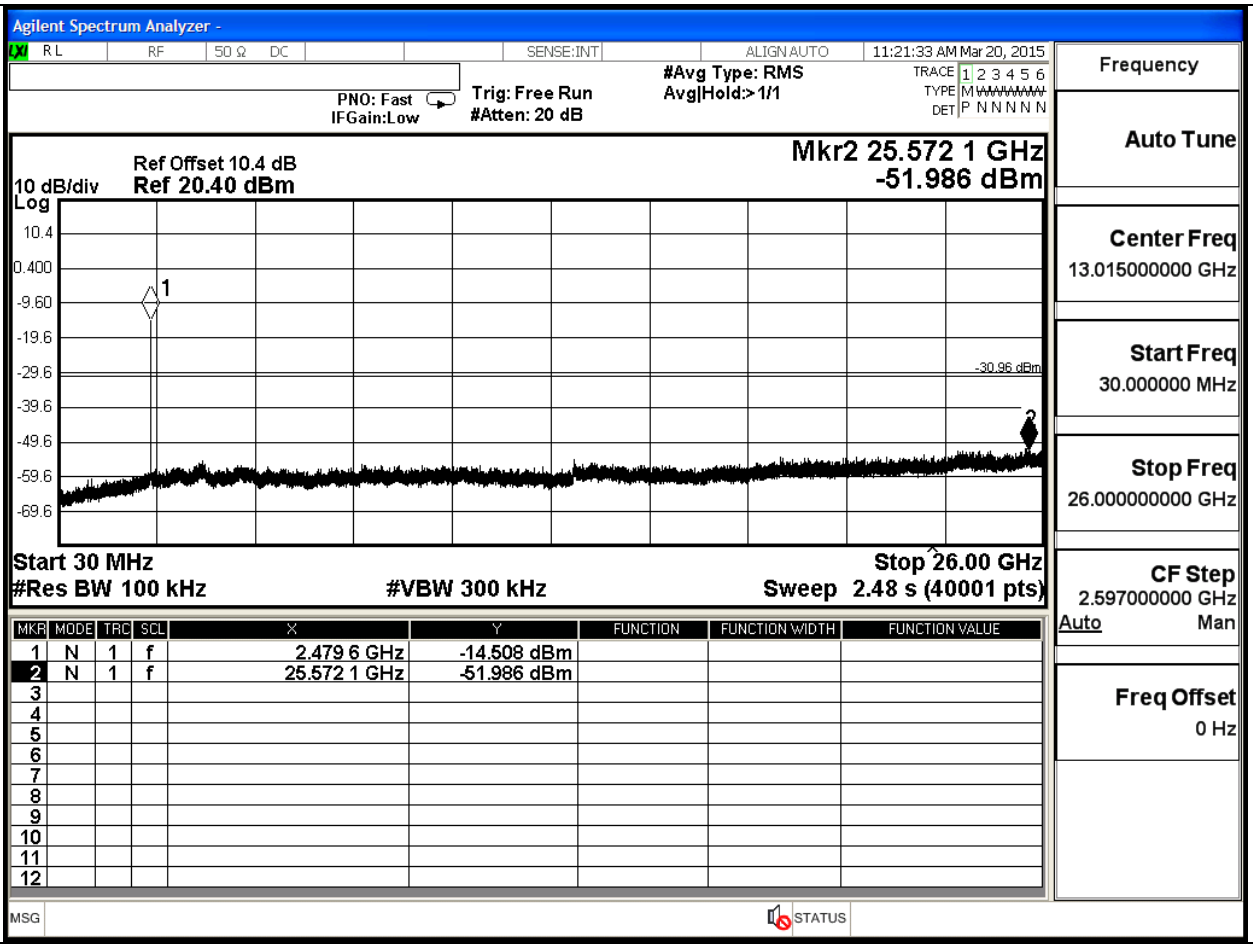
OUT OF BAND MID CH



OUT OF BAND HIGH CH



OUT OF BAND HIGH CH



11. RADIATED TEST RESULTS

11.1. 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 add duty cycle factor for average measurements. Duty cycle factor= 10log (1/x) For this sample B mode = 0dB (duty cycle >98%); G mode = 0.3dB; N mode = 0.32dB.

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.

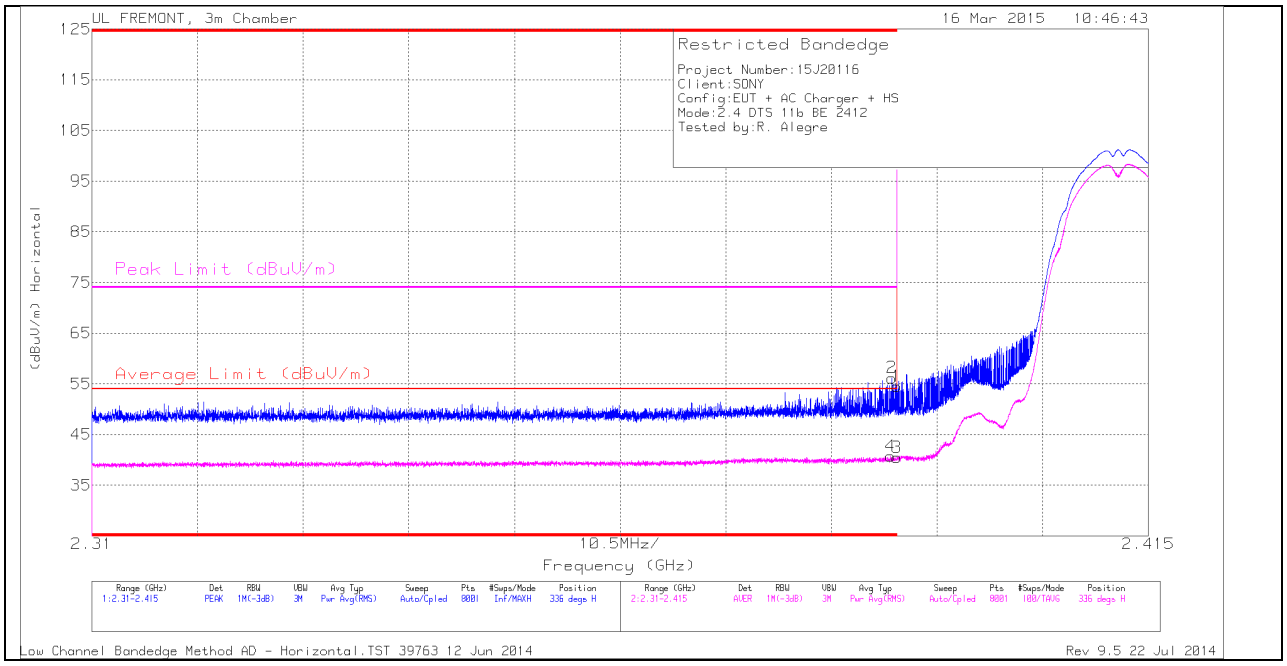
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

11.2. TRANSMITTER ABOVE 1 GHz

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

RESTRICTED BANDEDGE (LOW CHANNEL)

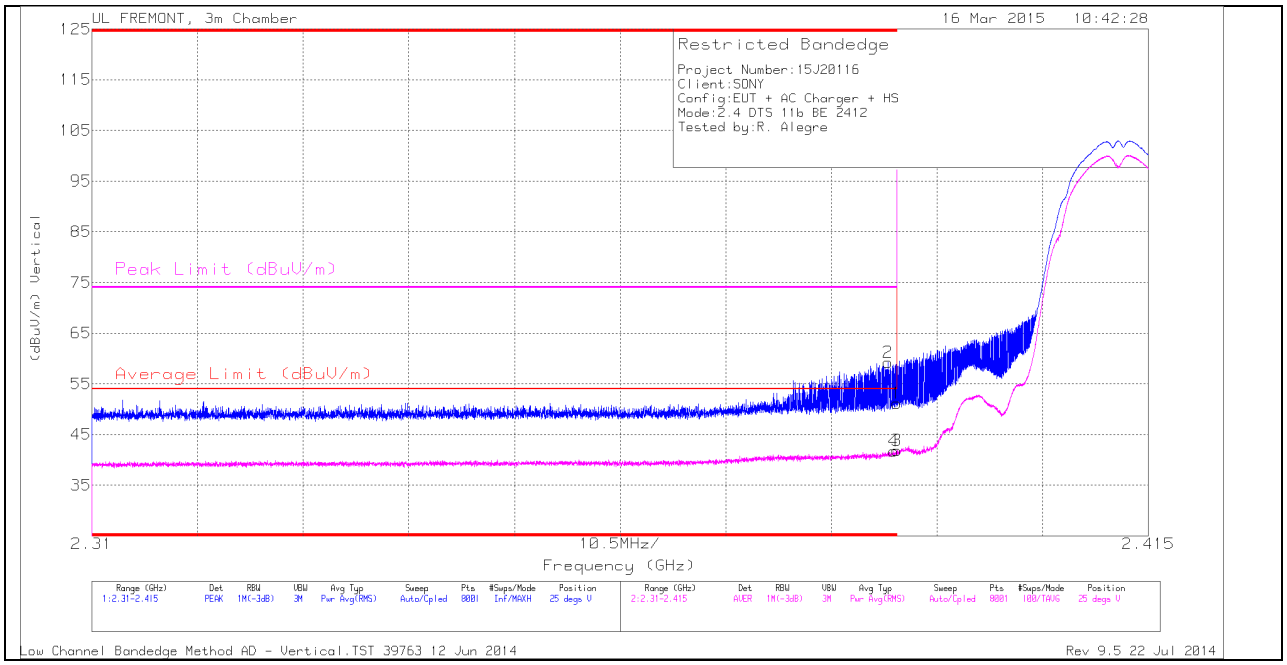
HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Flt r/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	45.56	PK	32	-23.1	0	54.46	-	-	74	-19.54	336	300	H
2	* 2.389	47.29	PK	32	-23.1	0	56.19	-	-	74	-17.81	336	300	H
3	* 2.39	31.57	RMS	32	-23.1	0	40.47	54	-13.53	-	-	336	300	H
4	* 2.389	31.83	RMS	32	-23.1	0	40.73	54	-13.27	-	-	336	300	H

VERTICAL PEAK AND AVERAGE PLOT

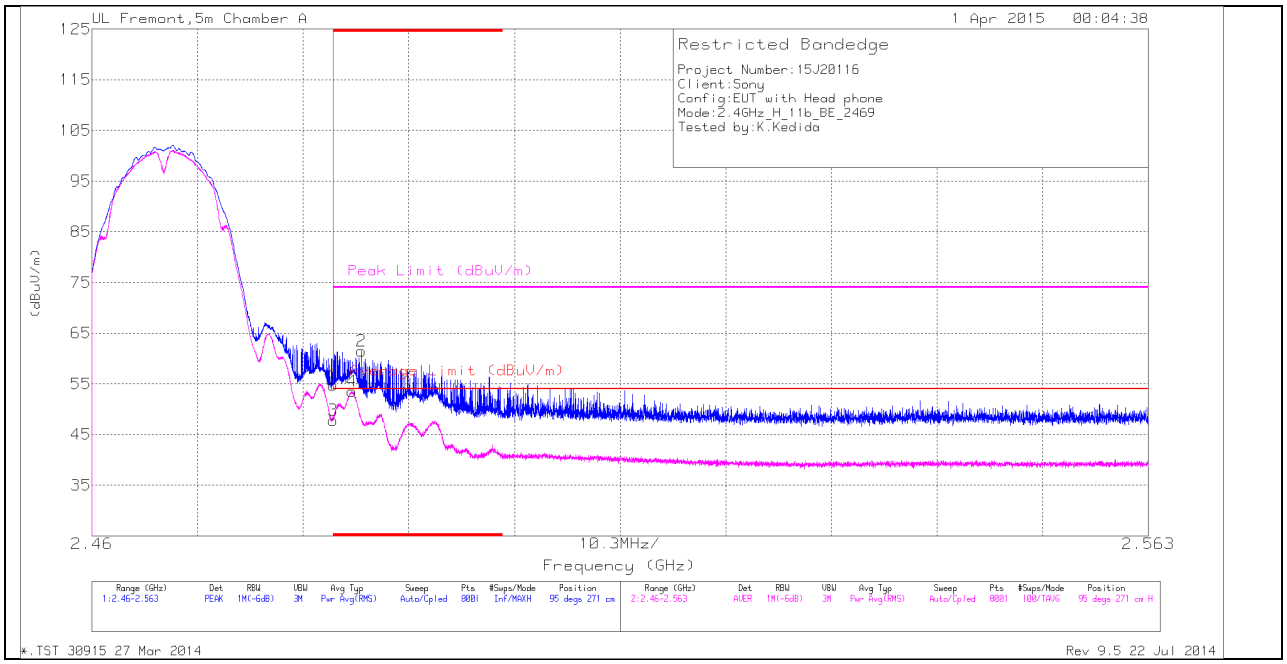


VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Flt r/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	42.31	PK	32	-23.1	0	51.21	-	-	74	-22.79	25	373	V
2	* 2.389	50.29	PK	32	-23.1	0	59.19	-	-	74	-14.81	25	373	V
3	* 2.39	32.92	RMS	32	-23.1	0	41.82	54	-12.18	-	-	25	373	V
4	* 2.39	32.87	RMS	32	-23.1	0	41.77	54	-12.23	-	-	25	373	V

AUTHORIZED BANDEDGE (2467 MHz)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

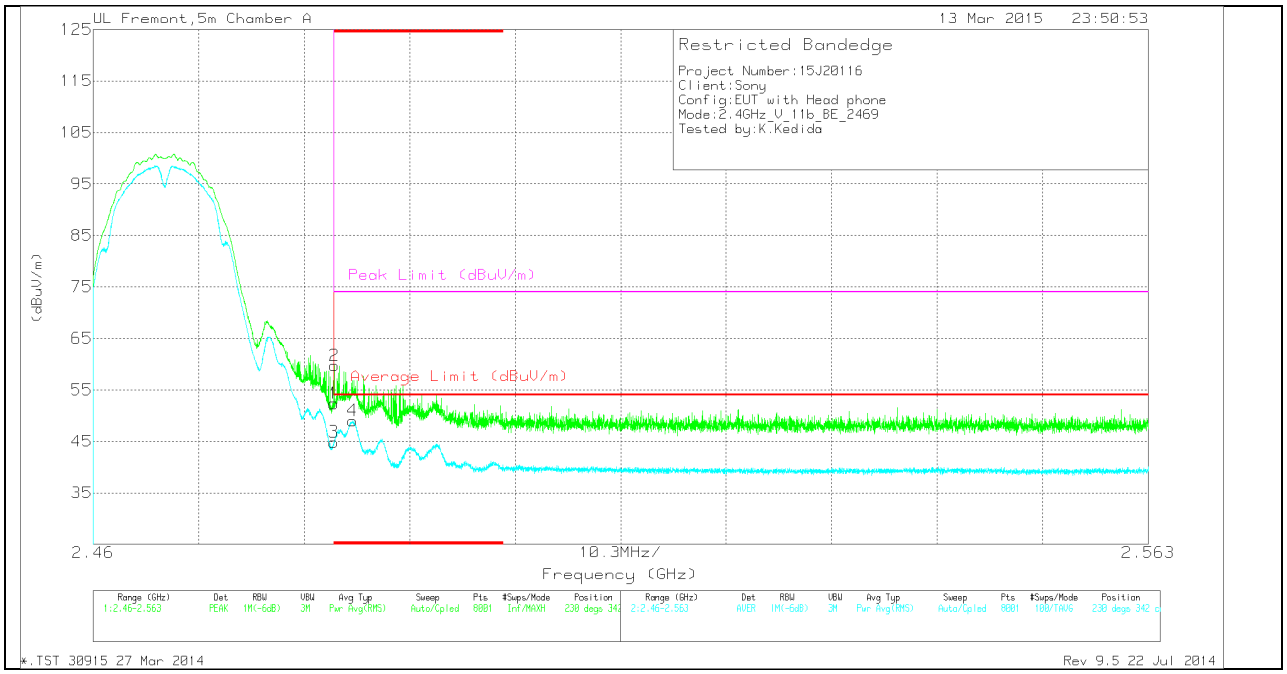
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	44.53	PK	32.1	-21.9	54.73	-	-	74	-19.27	95	271	H
2	* 2.486	51.29	PK	32.1	-21.9	61.49	-	-	74	-12.51	95	271	H
3	* 2.484	37.56	RMS	32.1	-21.9	47.76	54	-6.24	-	-	95	271	H
4	* 2.485	43.28	RMS	32.1	-21.9	53.48	54	-.52	-	-	95	271	H

* - indicates frequency in CFR 47, Part 15 and Industry Canada RSS-Restricted Band.

PK - Peak detector

RMS - RMS detection

VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	42.16	PK	32.1	-21.9	52.36	-	-	74	-21.64	230	342	V
2	* 2.484	49.52	PK	32.1	-21.9	59.72	-	-	74	-14.28	230	342	V
3	* 2.484	34.66	RMS	32.1	-21.9	44.86	54	-9.14	-	-	230	342	V
4	* 2.485	38.82	RMS	32.1	-21.9	49.02	54	-4.98	-	-	230	342	V

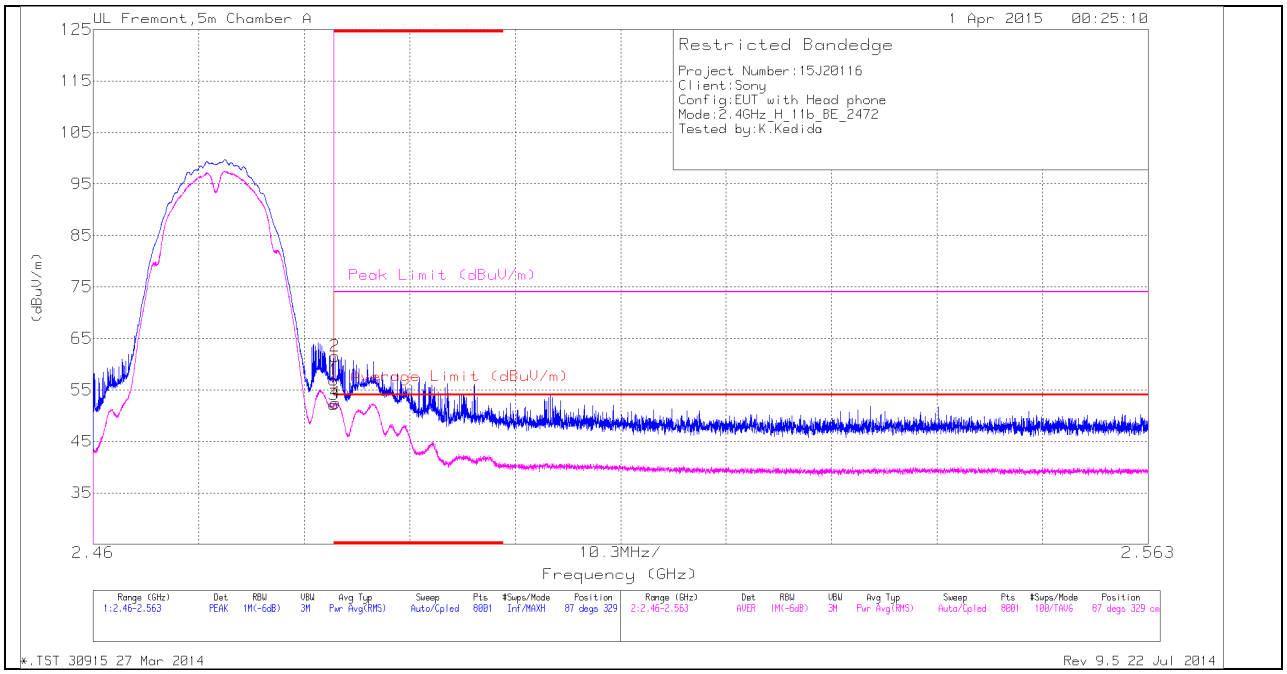
* - indicates frequency in CFR 47, Part 15 and Industry Canada RSS-Restricted Band.

PK - Peak detector

RMS - RMS detection

AUTHORIZED BANDEDGE (2472 MHz)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

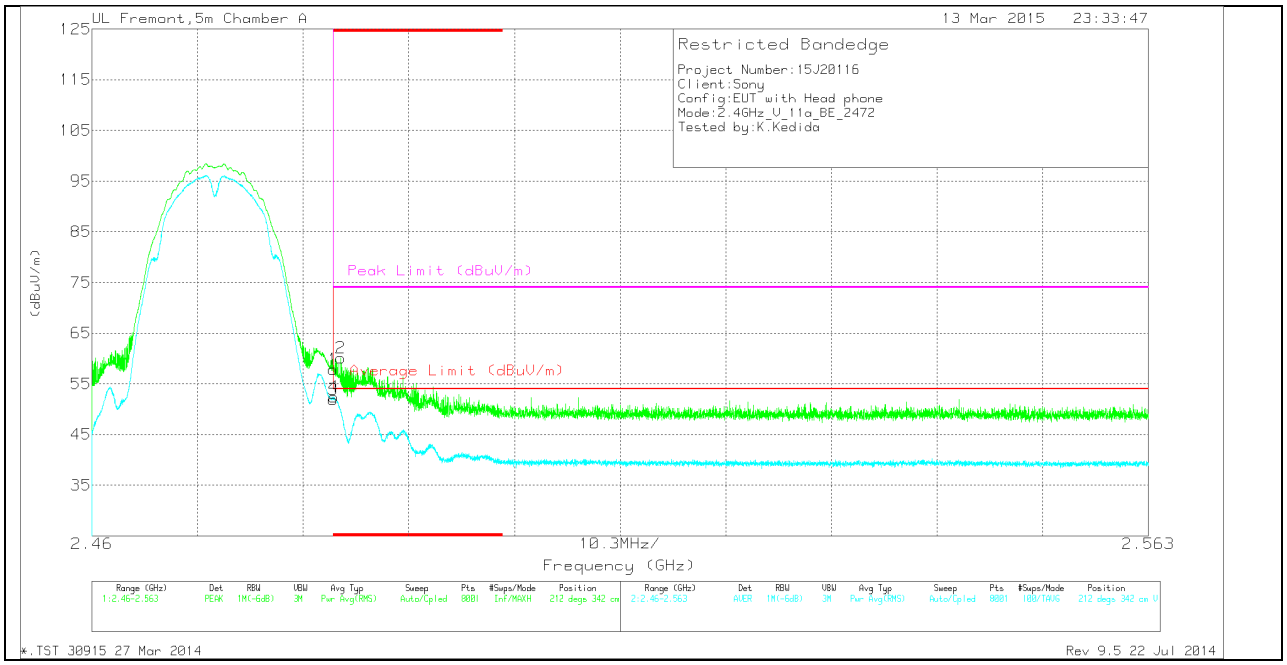
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	46.74	PK	32.1	-21.9	56.94	-	-	74	-17.06	87	329	H
2	* 2.484	51.33	PK	32.1	-21.9	61.53	-	-	74	-12.47	87	329	H
3	* 2.484	41.94	RMS	32.1	-21.9	52.14	54	-1.86	-	-	87	329	H
4	* 2.484	42.29	RMS	32.1	-21.9	52.49	54	-1.51	-	-	87	329	H

* - indicates frequency in CFR 47, Part 15 and Industry Canada RSS-Restricted Band.

PK - Peak detector

RMS - RMS detection

VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	47.65	PK	32.1	-21.9	57.85	-	-	74	-16.15	212	342	V
2	* 2.484	49.87	PK	32.1	-21.9	60.07	-	-	74	-13.93	212	342	V
3	* 2.484	41.68	RMS	32.1	-21.9	51.88	54	-2.12	-	-	212	342	V
4	* 2.484	42.19	RMS	32.1	-21.9	52.39	54	-1.61	-	-	212	342	V

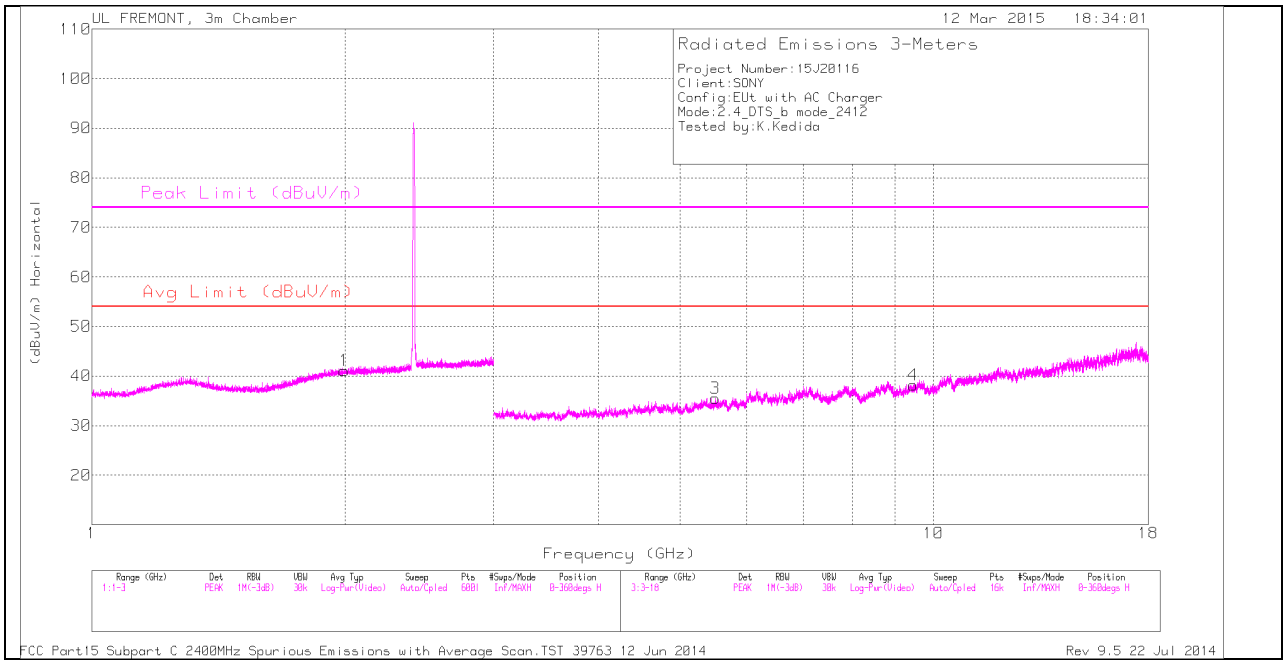
* - indicates frequency in CFR 47, Part 15 and Industry Canada RSS-Restricted Band.

PK - Peak detector

RMS - RMS detection

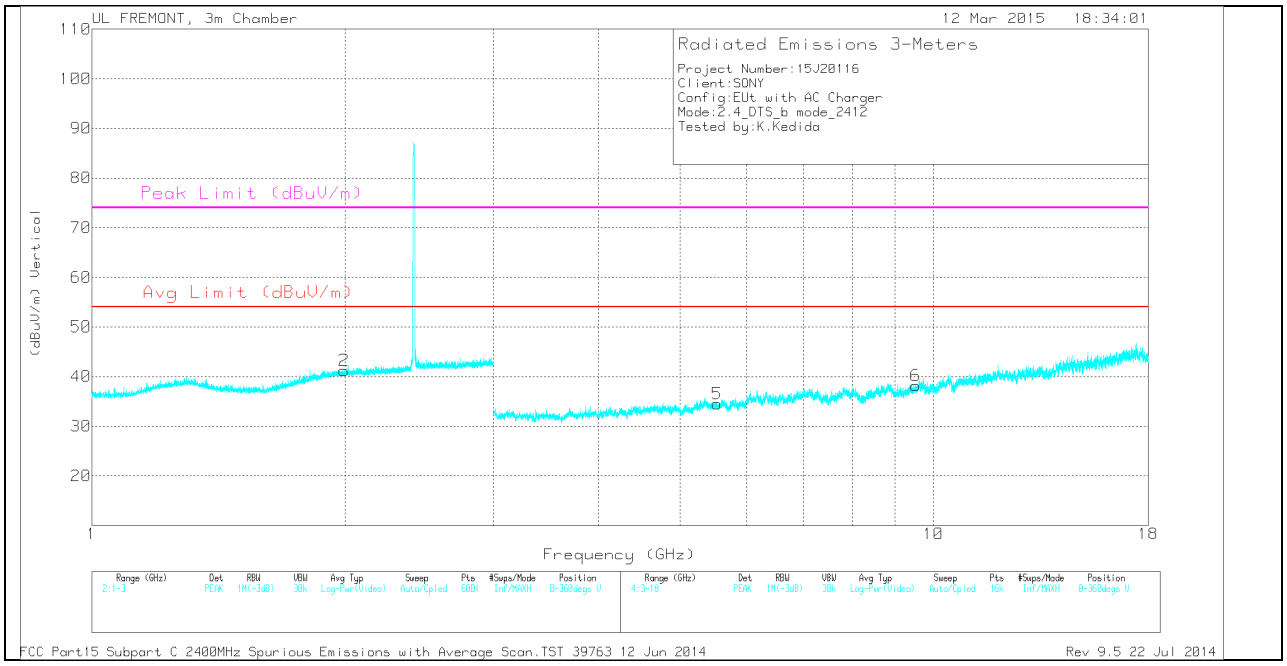
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

LOW CHANNEL VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

LOW CHANNEL DATA

TRACE MARKERS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Fltr/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	1.994	32.96	PK	31.5	-23.3	41.16	-	-	-	-	0-360	200	H
2	1.994	33.06	PK	31.5	-23.3	41.26	-	-	-	-	0-360	200	V
3	5.508	31.49	PK	34.6	-30.6	35.49	-	-	-	-	0-360	100	H
5	5.531	29.96	PK	34.6	-30	34.56	-	-	-	-	0-360	200	V
4	9.457	27.57	PK	36.5	-25.9	38.17	-	-	74	-35.83	0-360	200	H
6	9.527	28.2	PK	36.6	-26.6	38.2	-	-	-	-	0-360	200	V

PK - Peak detector

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5.506	40.58	PK2	34.6	-30.7	44.48	-	-	-	-	360	100	H
5.509	29.22	MAv1	34.6	-30.6	33.22	-	-	-	-	360	100	H

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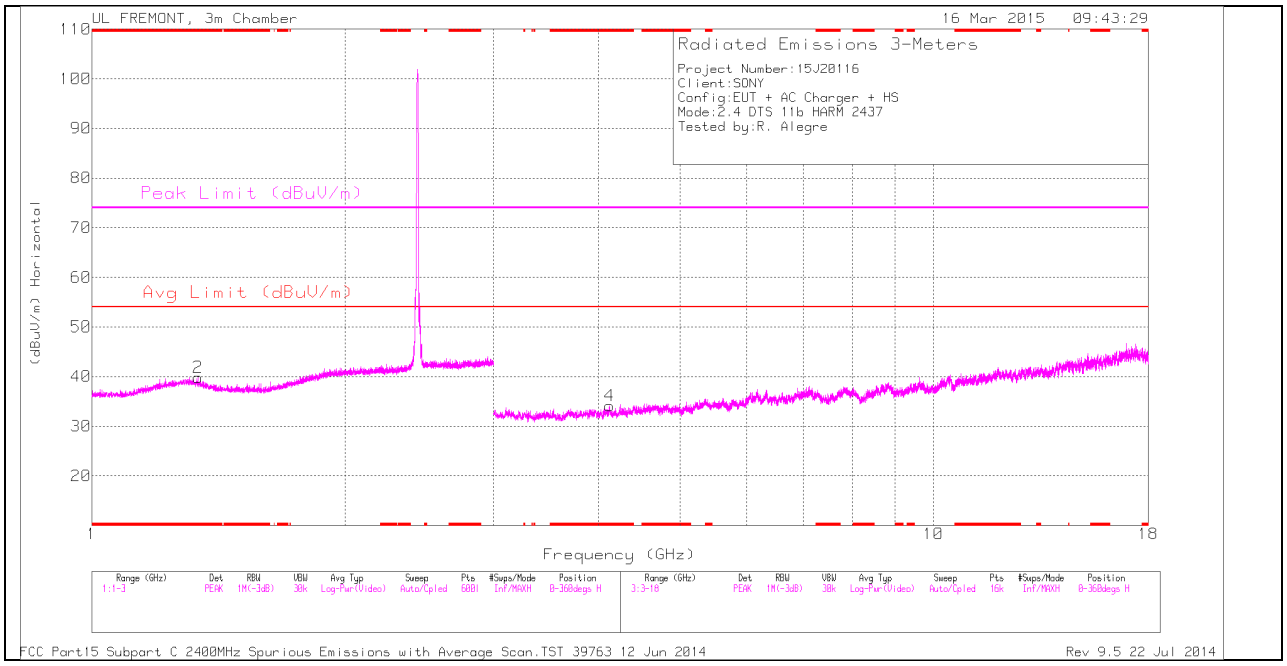
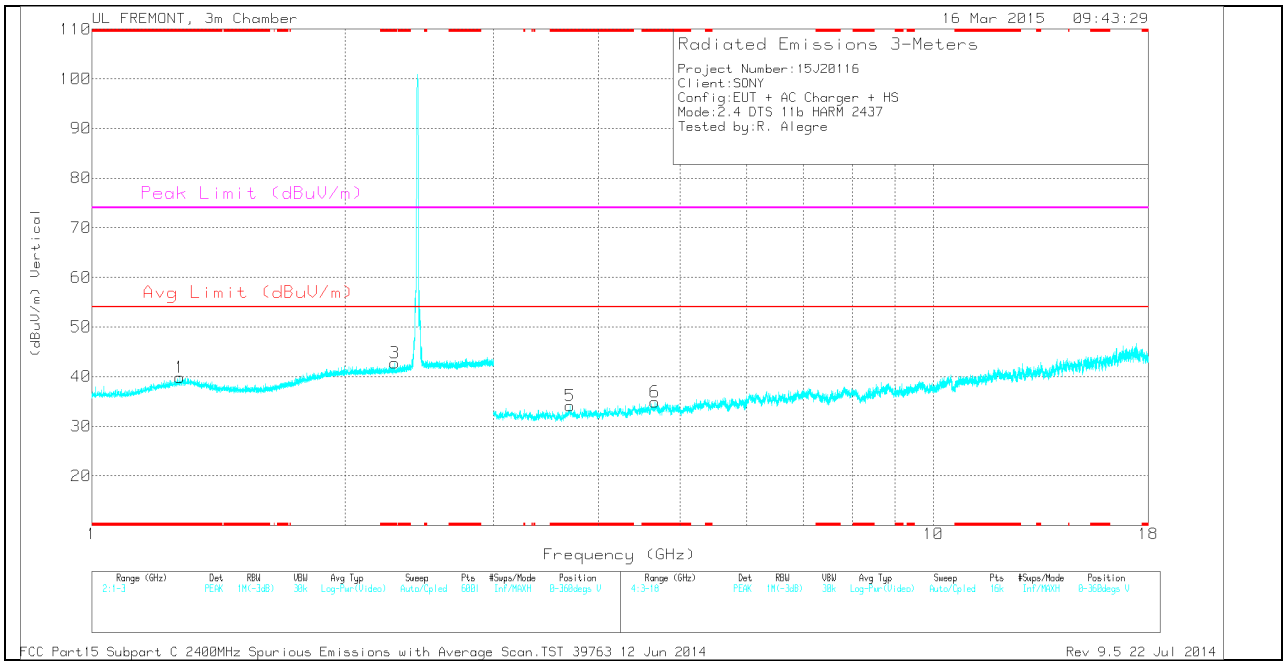
MID CHANNEL HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

MID CHANNEL VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

MID CHANNEL DATA

TRACE MARKERS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Fltr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 1.336	34.2	PK	29.4	-23.8	0	39.8	-	-	74	-34.2	0-360	100	H
1	* 1.272	34.03	PK	29.6	-23.8	0	39.83	-	-	74	-34.17	0-360	100	V
3	* 2.289	34.21	PK	31.6	-23.1	0	42.71	-	-	74	-31.29	0-360	100	V
4	* 4.12	31.84	PK	33.3	-31	0	34.14	-	-	74	-39.86	0-360	200	H
5	* 3.7	31.89	PK	33	-30.8	0	34.09	-	-	74	-39.91	0-360	200	V
6	* 4.665	31.78	PK	34	-30.9	0	34.88	-	-	74	-39.12	0-360	100	V

PK - Peak detector

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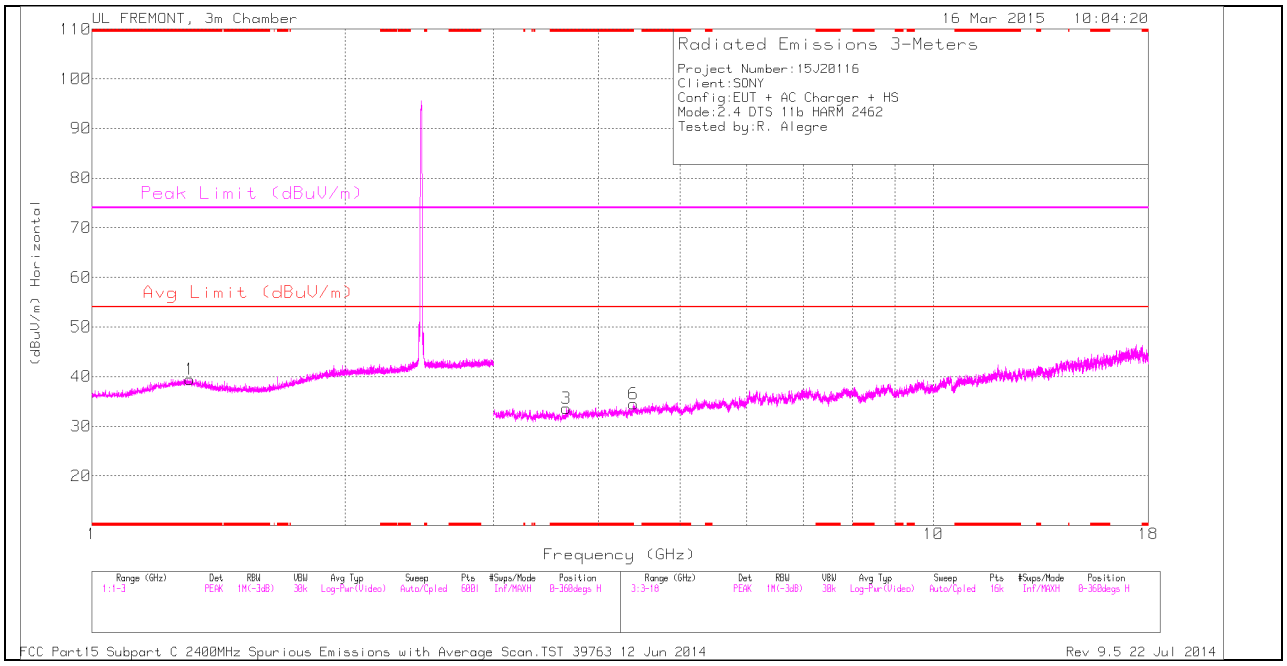
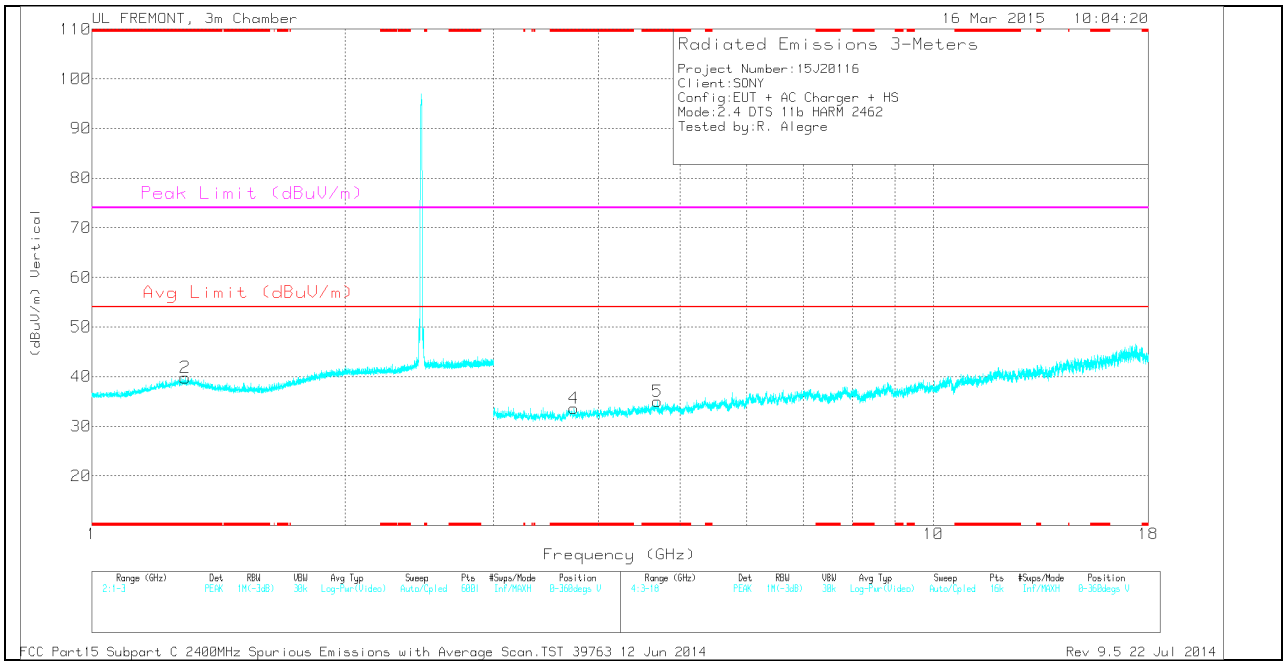
HIGH CHANNEL HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

HIGH CHANNEL VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

HIGH CHANNEL DATA

TRACE MARKERS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Fltr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.308	33.49	PK	29.8	-23.8	0	39.49	-	-	74	-34.51	0-360	200	H
2	* 1.291	33.68	PK	29.8	-23.7	0	39.78	-	-	74	-34.22	0-360	200	V
3	* 3.664	31.6	PK	32.9	-30.9	0	33.6	-	-	74	-40.4	0-360	100	H
4	* 3.741	31.62	PK	33	-31	0	33.62	-	-	74	-40.38	0-360	200	V
5	* 4.702	31.79	PK	34.1	-30.9	0	34.99	-	-	74	-39.01	0-360	100	V
6	4.402	30.85	PK	33.6	-30	0	34.45	-	-	-	-	0-360	200	H

PK - Peak detector

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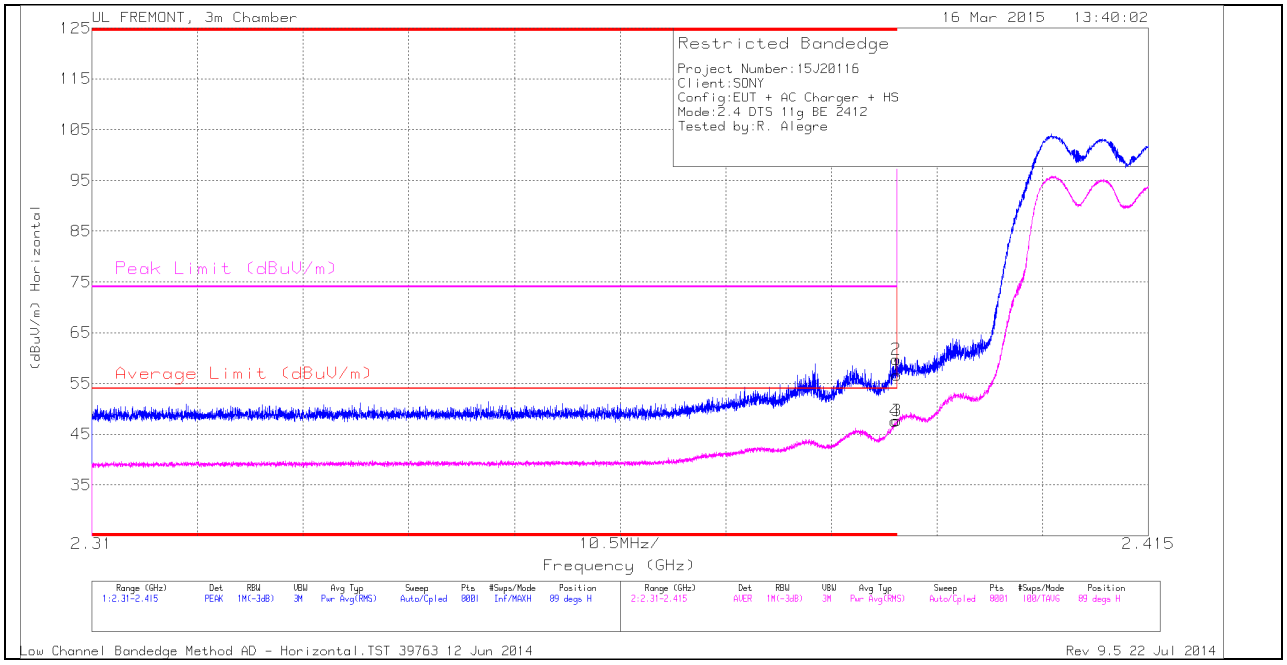
11.2.2. TX ABOVE 1 GHz 802.11g MODE IN THE 2.4 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)

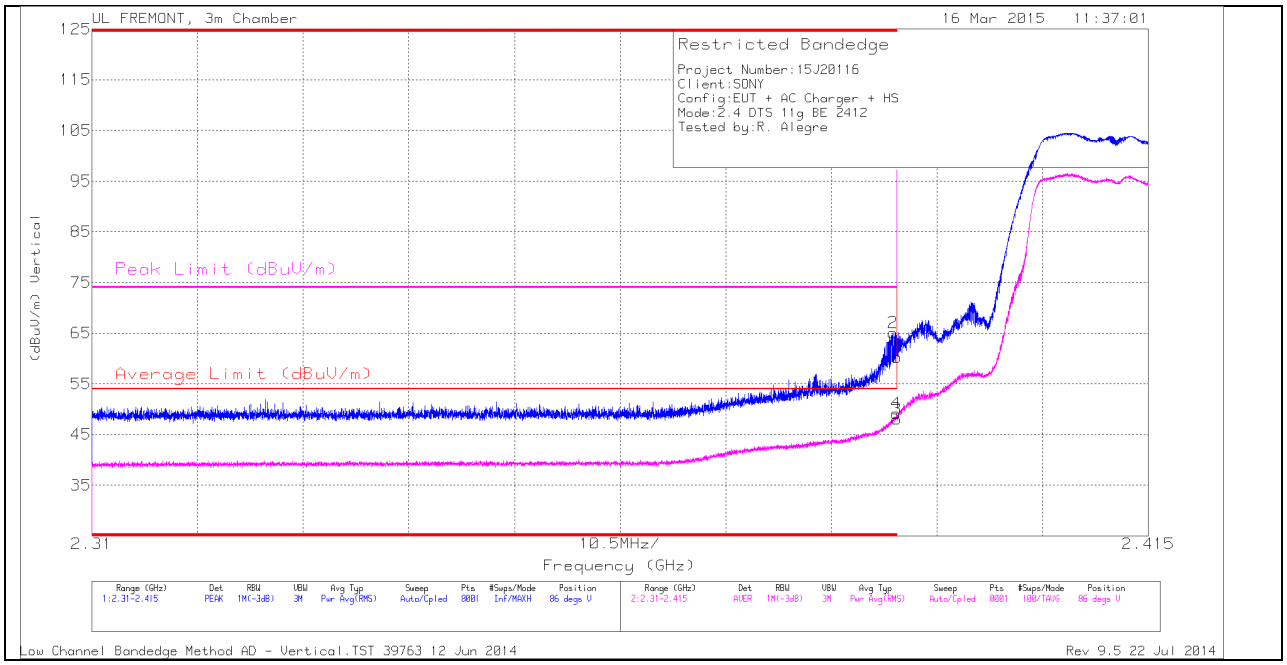
HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Flt r/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	47.73	PK	32	-23.1	0	56.63	-	-	74	-17.37	89	312	H
2	* 2.39	50.78	PK	32	-23.1	0	59.68	-	-	74	-14.32	89	312	H
3	* 2.39	38.76	RMS	32	-23.1	0	47.66	54	-6.34	-	-	89	312	H
4	* 2.39	38.61	RMS	32	-23.1	0	47.51	54	-6.49	-	-	89	312	H

VERTICAL PEAK AND AVERAGE PLOT

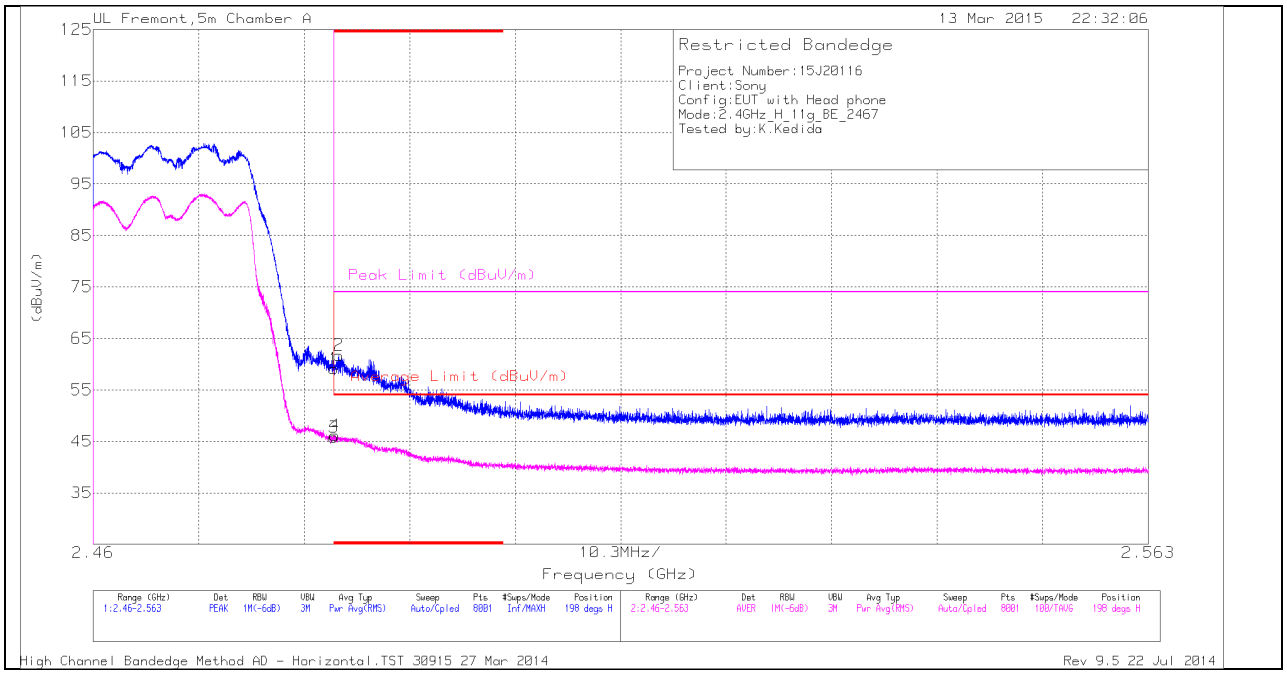


VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	51.39	PK	32	-23.1	0	60.29	-	-	74	-13.71	86	383	V
2	* 2.39	56.16	PK	32	-23.1	0	65.06	-	-	74	-8.94	86	383	V
3	* 2.39	39.16	RMS	32	-23.1	0	48.06	54	-5.94	-	-	86	383	V
4	* 2.39	40.32	RMS	32	-23.1	0	49.22	54	-4.78	-	-	86	383	V

AUTHORIZED BANDEDGE (2467 MHz)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

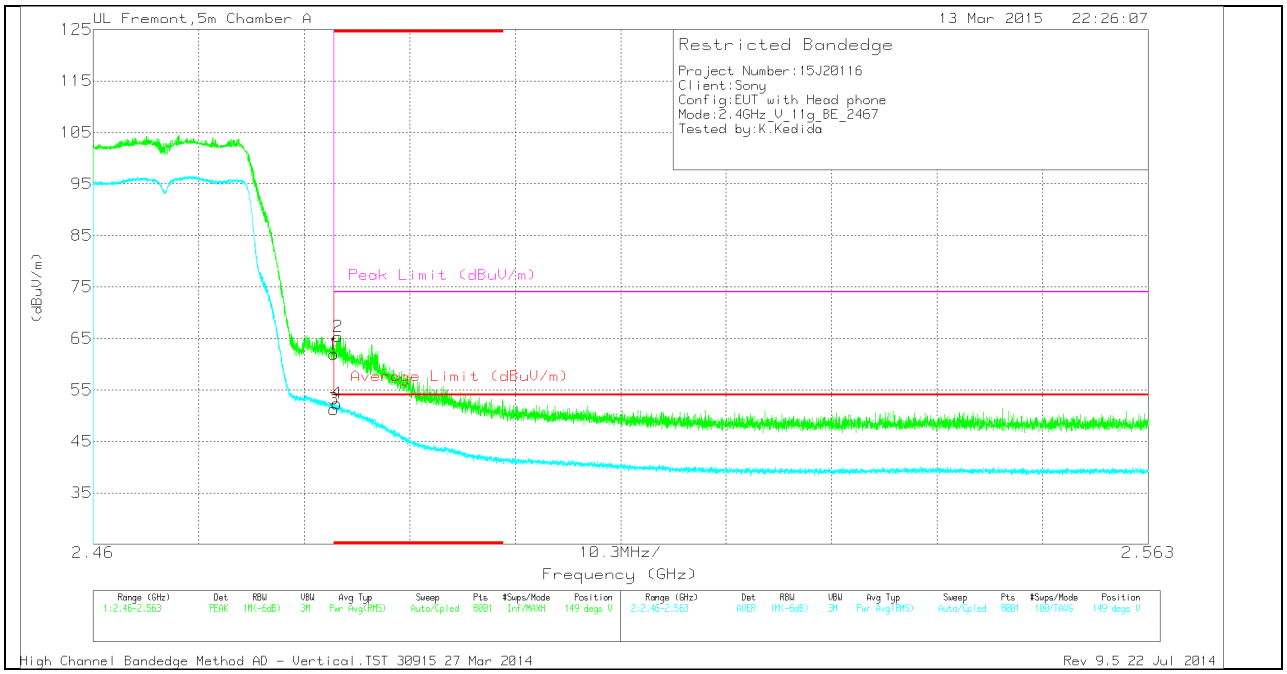
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	48.89	PK	32.1	-21.9	59.09	-	-	74	-14.91	198	360	H
2	* 2.484	51.54	PK	32.1	-21.9	61.74	-	-	74	-12.26	198	360	H
3	* 2.484	35.59	RMS	32.1	-21.9	45.79	54	-8.21	-	-	198	360	H
4	* 2.484	35.96	RMS	32.1	-21.9	46.16	54	-7.84	-	-	198	360	H

* - indicates frequency in CFR 47, Part 15 and Industry Canada RSS-Restricted Band.

PK - Peak detector

RMS - RMS detection

VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	51.73	PK	32.1	-21.9	61.93	-	-	74	-12.07	149	361	V
2	* 2.484	55.15	PK	32.1	-21.9	65.35	-	-	74	-8.65	149	361	V
3	* 2.484	41.05	RMS	32.1	-21.9	51.25	54	-2.75	-	-	149	361	V
4	* 2.484	42.15	RMS	32.1	-21.9	52.35	54	-1.65	-	-	149	361	V

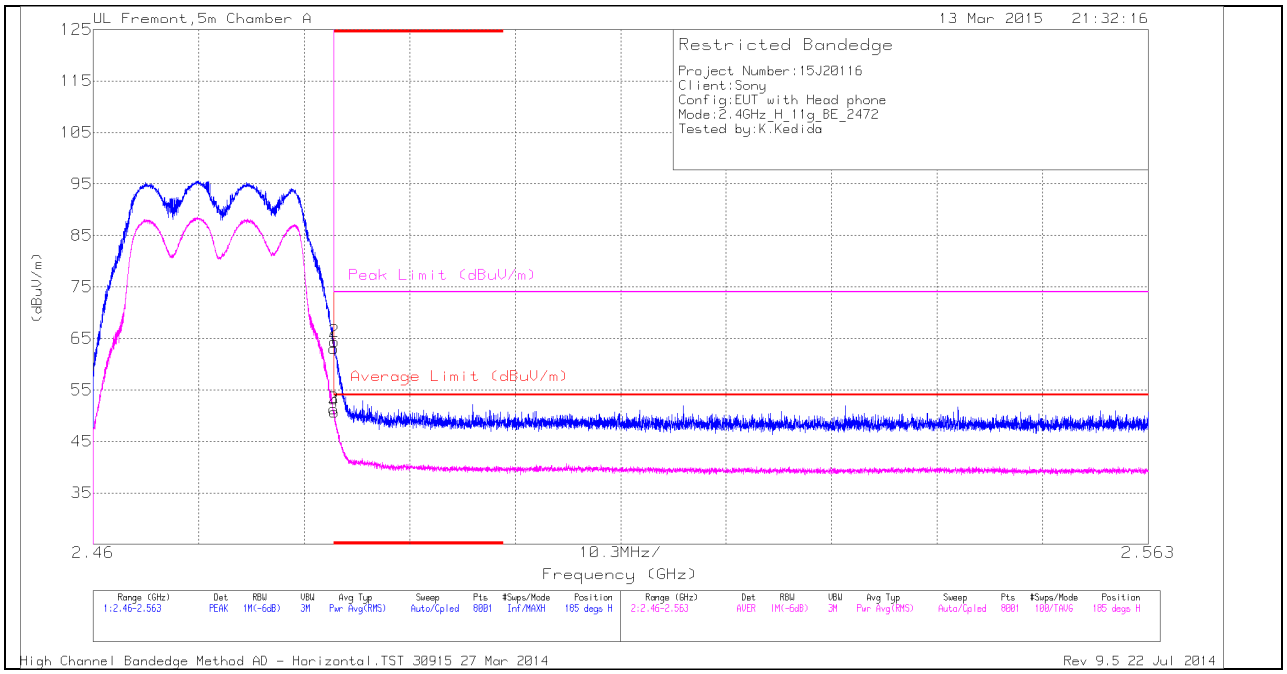
* - indicates frequency in CFR 47, Part 15 and Industry Canada RSS-Restricted Band.

PK - Peak detector

RMS - RMS detection

AUTHORIZED BANDEDGE (2472 MHz)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

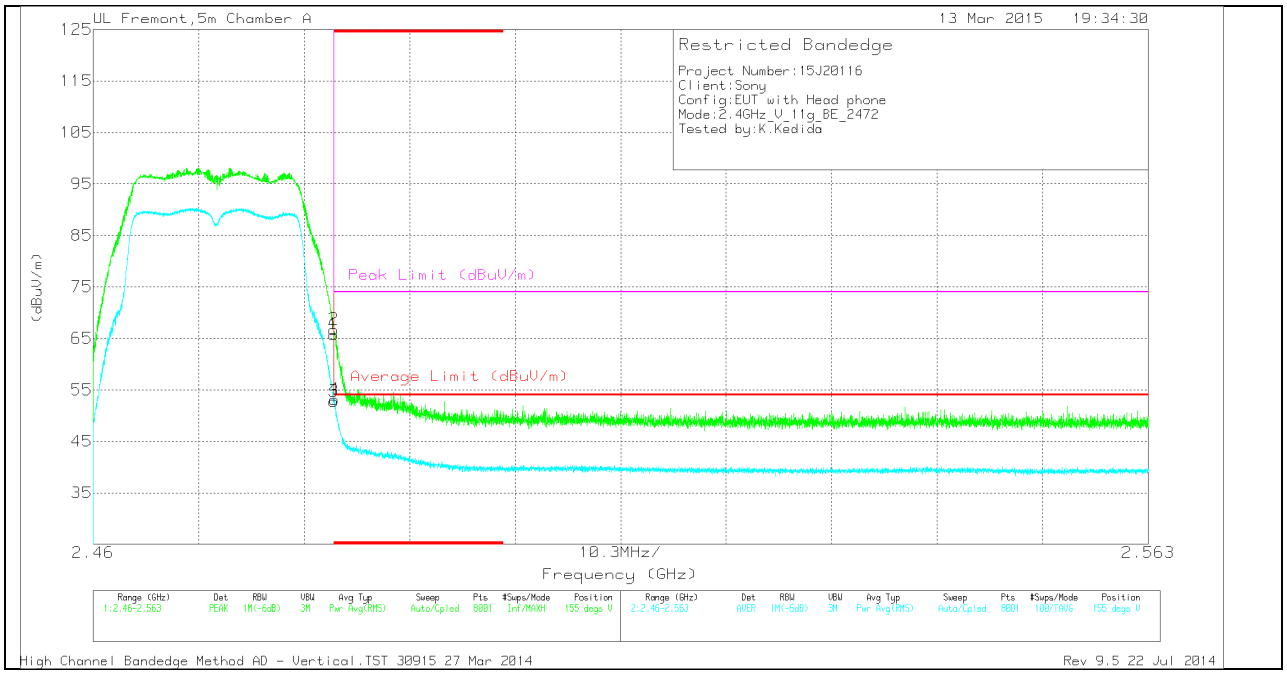
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	52.8	PK	32.1	-21.9	63	-	-	74	-11	185	286	H
2	* 2.484	54.21	PK	32.1	-21.9	64.41	-	-	74	-9.59	185	286	H
3	* 2.484	41.13	RMS	32.1	-21.9	51.33	54	-2.67	-	-	185	286	H
4	* 2.484	40.55	RMS	32.1	-21.9	50.75	54	-3.25	-	-	185	286	H

* - indicates frequency in CFR 47, Part 15 and Industry Canada RSS-Restricted Band.

PK - Peak detector

RMS - RMS detection

VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	55.58	PK	32.1	-21.9	65.78	-	-	74	-8.22	155	363	V
2	* 2.484	56.54	PK	32.1	-21.9	66.74	-	-	74	-7.26	155	363	V
3	* 2.484	42.62	RMS	32.1	-21.9	52.82	54	-1.18	-	-	155	363	V
4	* 2.484	43	RMS	32.1	-21.9	53.2	54	-.8	-	-	155	363	V

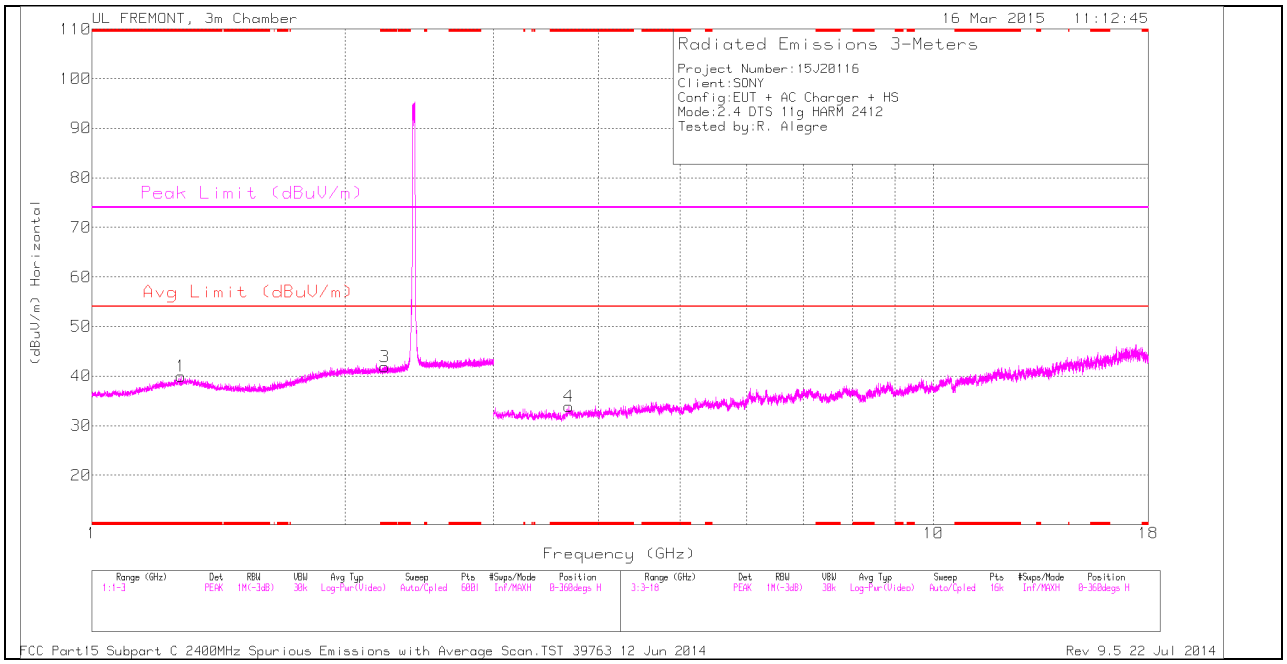
* - indicates frequency in CFR 47, Part 15 and Industry Canada RSS-Restricted Band.

PK - Peak detector

RMS - RMS detection

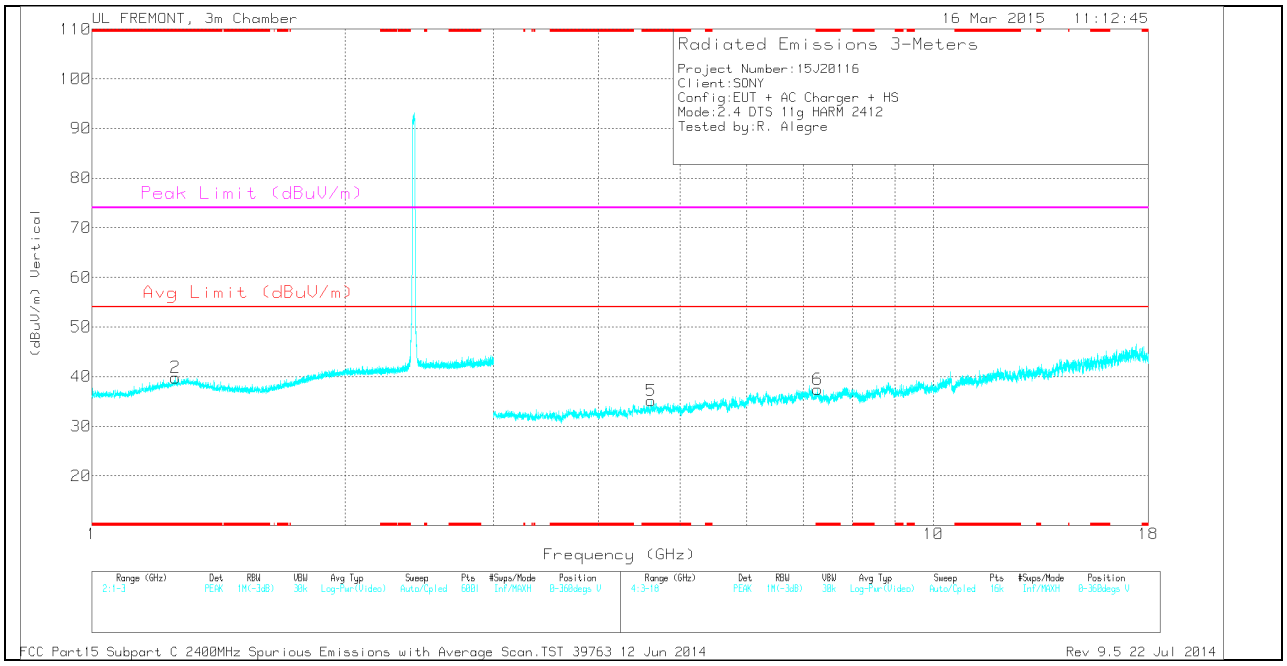
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

LOW CHANNEL VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

LOW CHANNEL DATA

TRACE MARKERS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Fltr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.277	34.05	PK	29.7	-23.8	0	39.95	-	-	74	-34.05	0-360	100	H
3	* 2.229	33.37	PK	31.5	-23	0	41.87	-	-	74	-32.13	0-360	100	H
2	* 1.256	34.08	PK	29.5	-23.8	0	39.78	-	-	74	-34.22	0-360	100	V
4	* 3.685	31.57	PK	33	-30.7	0	33.87	-	-	74	-40.13	0-360	100	H
5	* 4.615	31.92	PK	33.9	-30.7	0	35.12	-	-	74	-38.88	0-360	100	V
6	* 7.282	30.97	PK	35.6	-29.1	0	37.47	-	-	74	-36.53	0-360	200	V

PK - Peak detector

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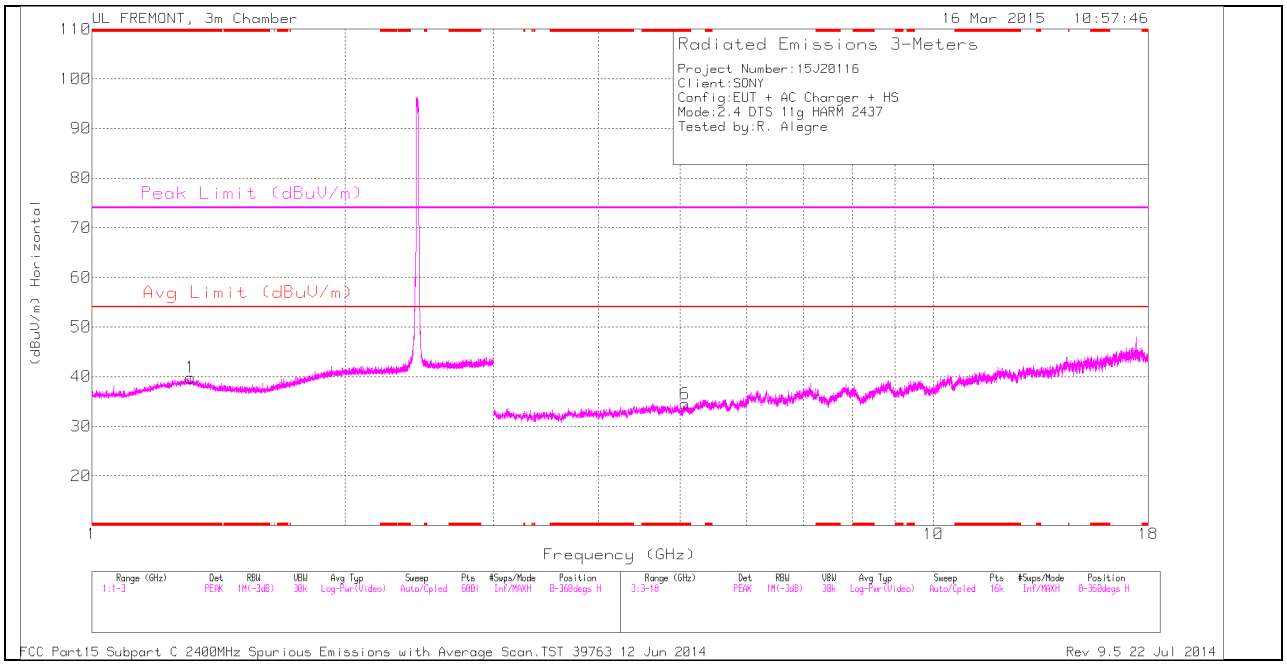
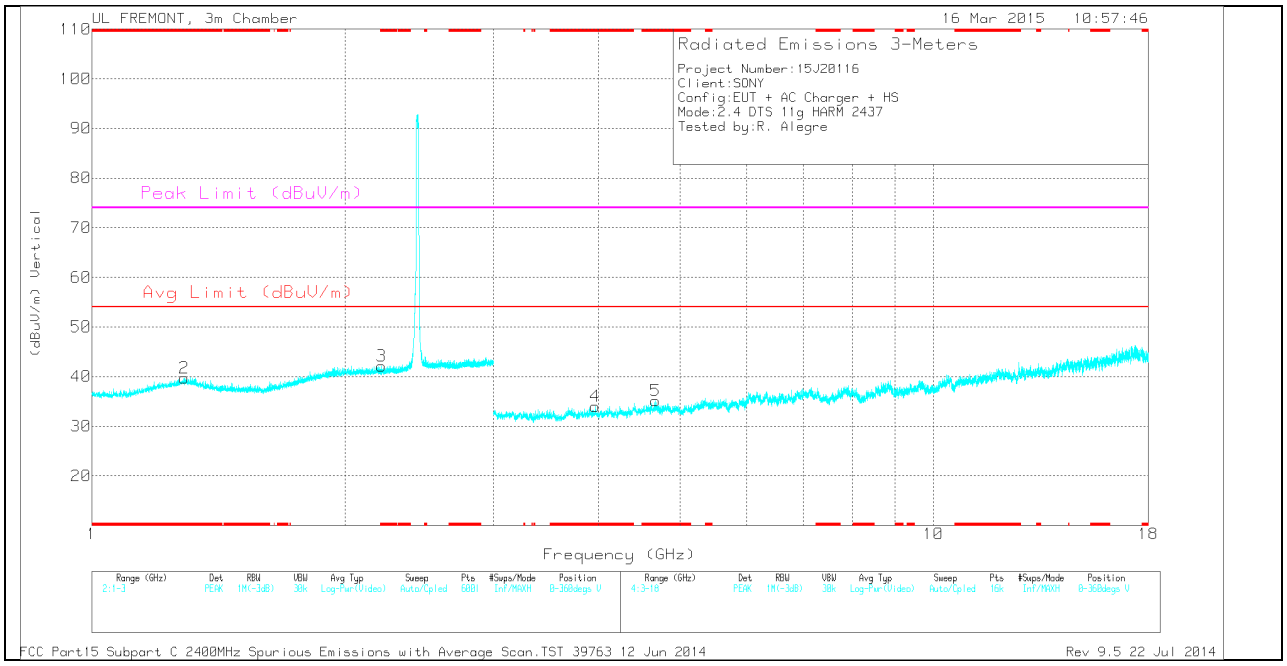
MID CHANNEL HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

MID CHANNEL VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

MID CHANNEL DATA

TRACE MARKERS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Fltr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.31	33.78	PK	29.8	-23.8	0	39.78	-	-	74	-34.22	0-360	100	H
2	* 1.286	33.56	PK	29.8	-23.7	0	39.66	-	-	74	-34.34	0-360	200	V
3	* 2.208	33.68	PK	31.4	-22.9	0	42.18	-	-	74	-31.82	0-360	200	V
6	* 5.072	30.36	PK	34.1	-29.9	0	34.56	-	-	74	-39.44	0-360	200	H
4	* 3.966	31.8	PK	33.2	-31	0	34	-	-	74	-40	0-360	200	V
5	* 4.674	31.9	PK	34	-30.7	0	35.2	-	-	74	-38.8	0-360	100	V

PK - Peak detector

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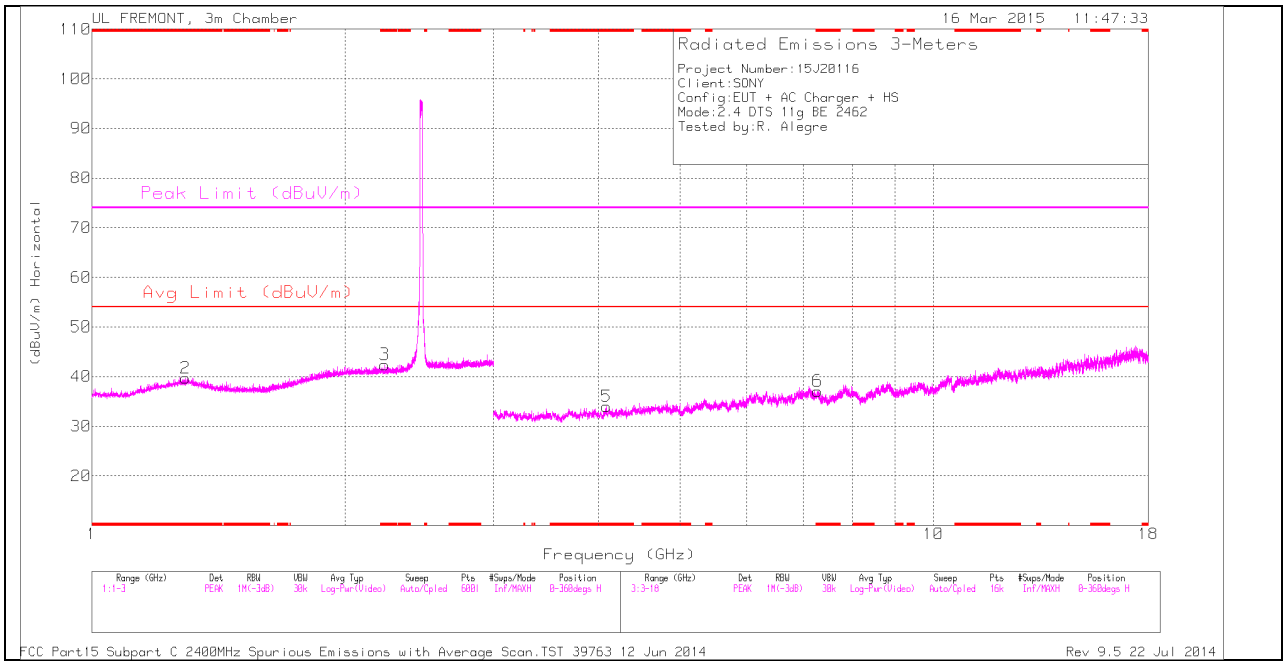
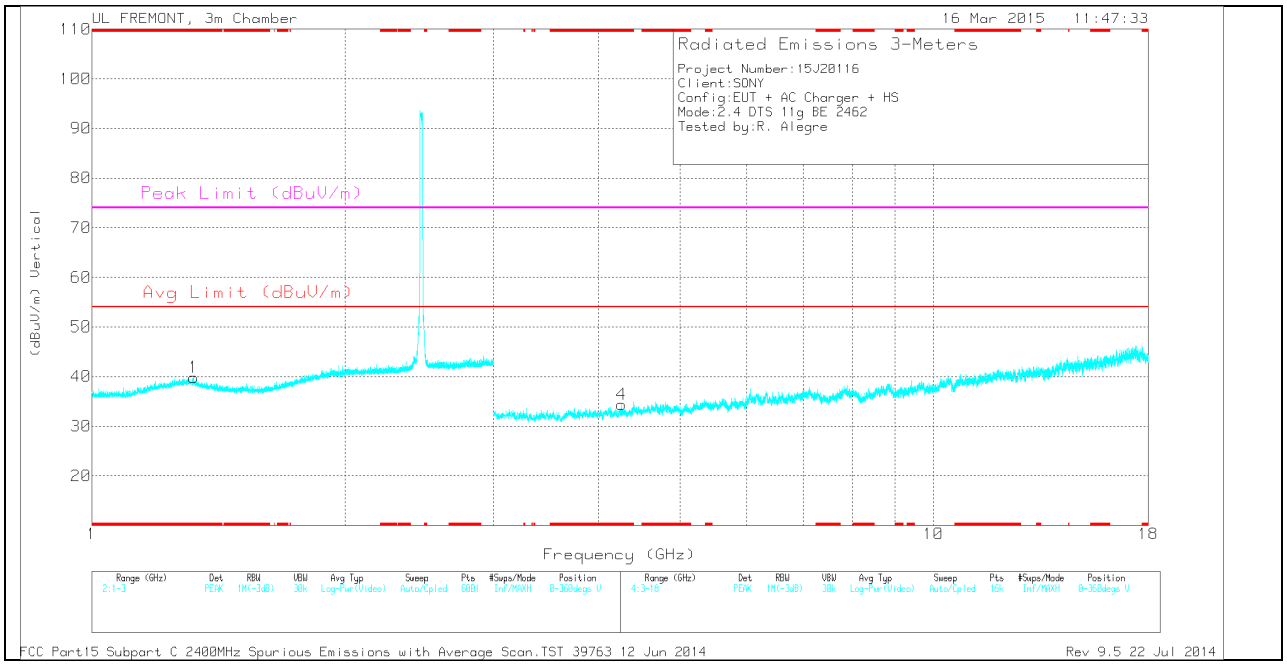
HIGH CHANNEL HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

HIGH CHANNEL VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

HIGH CHANNEL DATA

TRACE MARKERS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Fltr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 1.292	33.69	PK	29.8	-23.8	0	39.69	-	-	74	-34.31	0-360	100	H
3	* 2.227	33.84	PK	31.5	-22.9	0	42.44	-	-	74	-31.56	0-360	100	H
1	* 1.32	34.01	PK	29.6	-23.8	0	39.81	-	-	74	-34.19	0-360	100	V
5	* 4.086	32.19	PK	33.3	-31.5	0	33.99	-	-	74	-40.01	0-360	100	H
6	* 7.29	30.41	PK	35.6	-28.9	0	37.11	-	-	74	-36.89	0-360	100	H
4	* 4.262	32.38	PK	33.4	-31.4	0	34.38	-	-	74	-39.62	0-360	100	V

PK - Peak detector

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.263	40.76	PK2	33.4	-31.4	0	42.76	-	-	74	-31.24	0	100	V
* 4.262	29.48	MAv1	33.4	-31.4	0	31.48	54	-22.52	-	-	0	100	V

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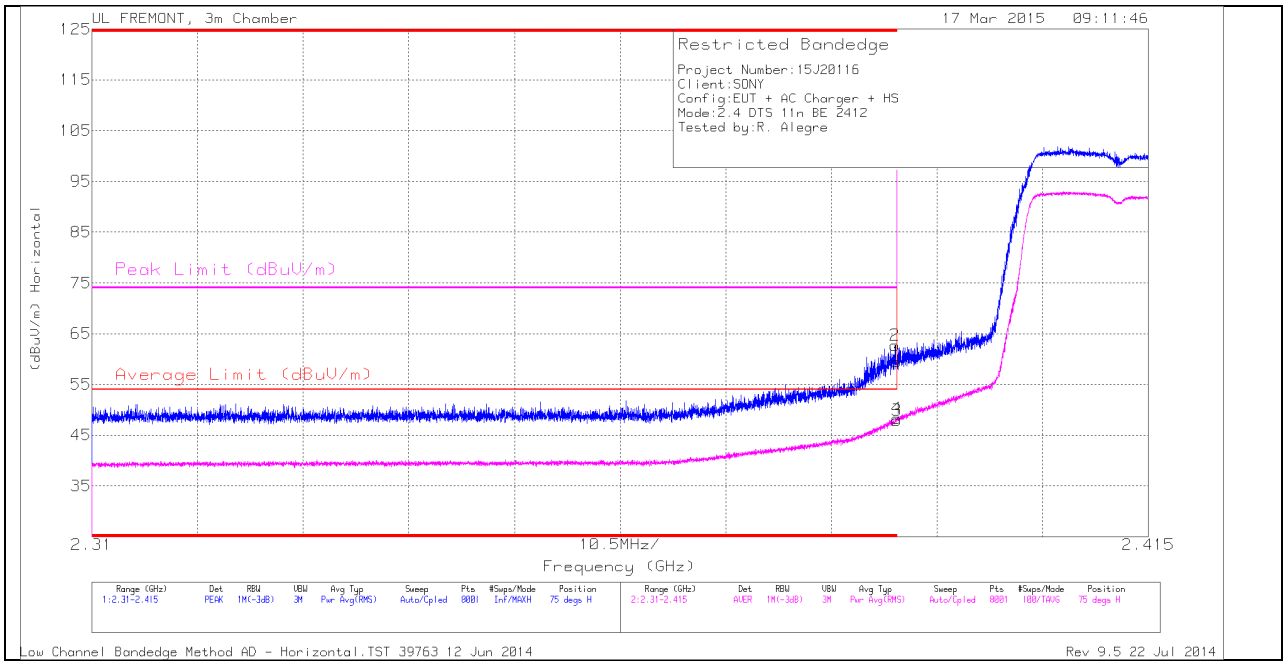
11.2.3. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 2.4 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)

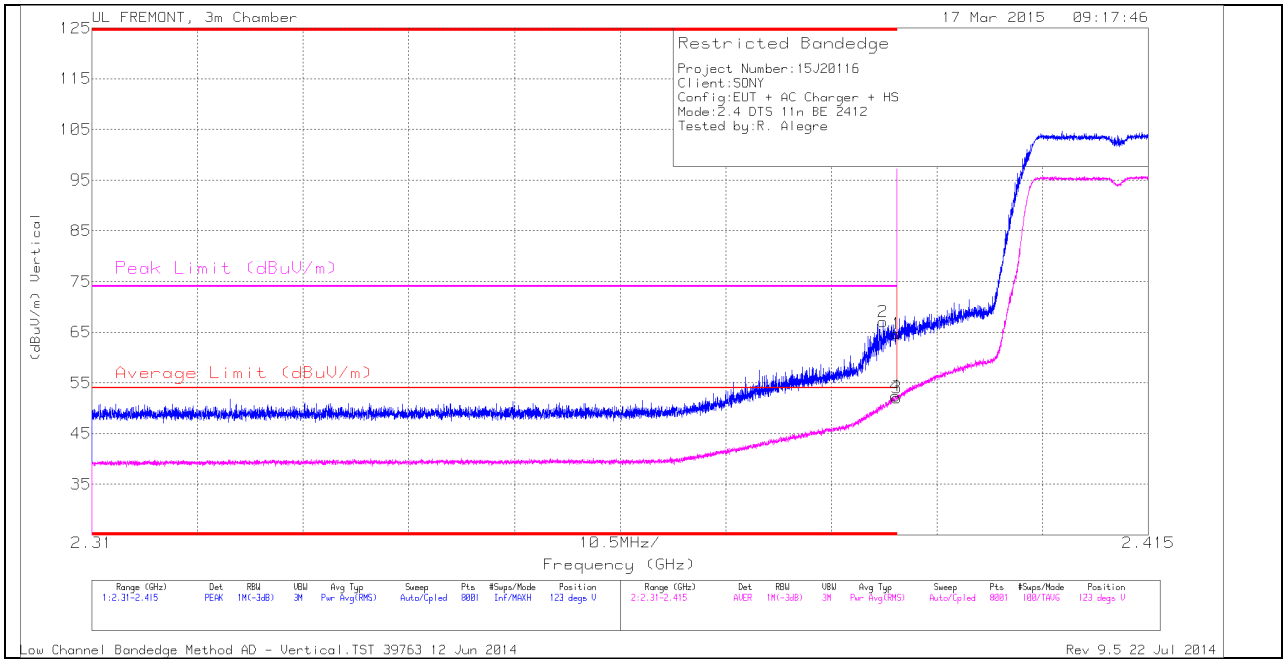
HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	50.6	PK	32	-23.1	0	59.5	-	-	74	-14.5	75	381	H
2	* 2.39	53.82	PK	32	-23.1	0	62.72	-	-	74	-11.28	75	381	H
3	* 2.39	39.05	RMS	32	-23.1	0	47.95	54	-6.05	-	-	75	381	H
4	* 2.39	39.42	RMS	32	-23.1	0	48.32	54	-5.68	-	-	75	381	H

VERTICAL PEAK AND AVERAGE PLOT

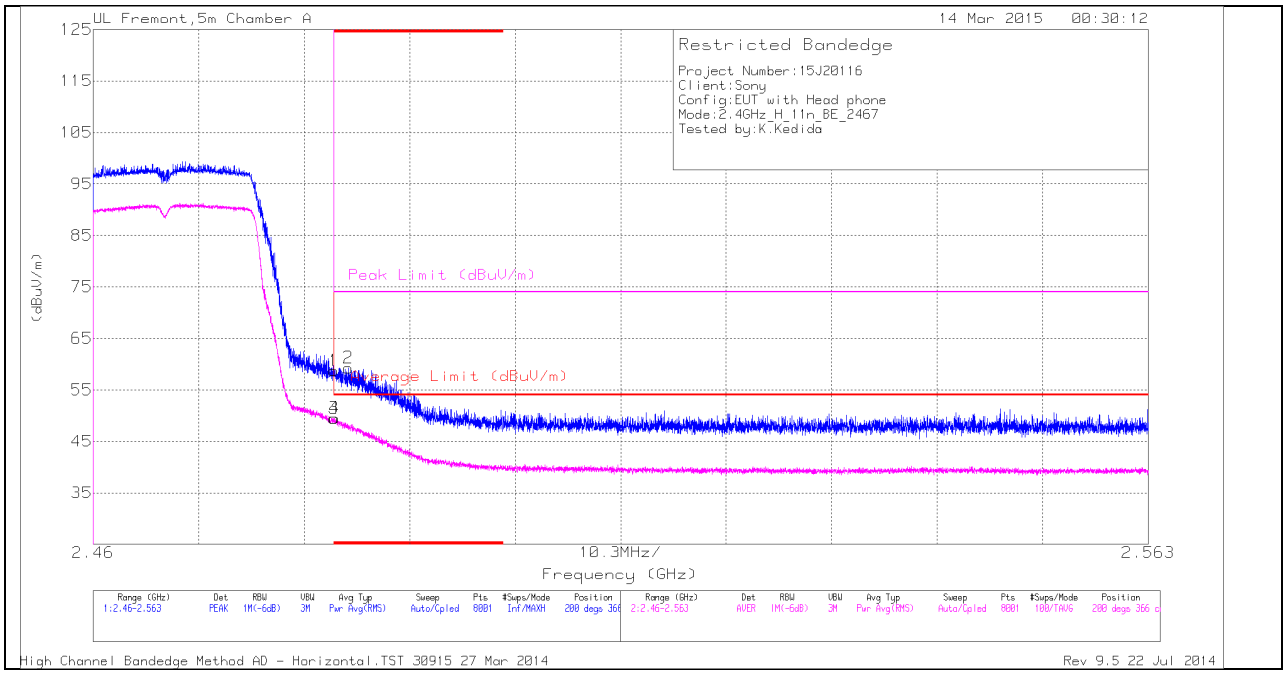


VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 2.389	58.18	PK	32	-23.1	0	67.08	-	-	74	-6.92	123	375	V
1	* 2.39	55.82	PK	32	-23.1	0	64.72	-	-	74	-9.28	123	375	V
3	* 2.39	43.19	RMS	32	-23.1	0	52.09	54	-1.91	-	-	123	375	V
4	* 2.39	43.45	RMS	32	-23.1	0	52.35	54	-1.65	-	-	123	375	V

AUTHORIZED BANDEDGE (2467 MHz)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

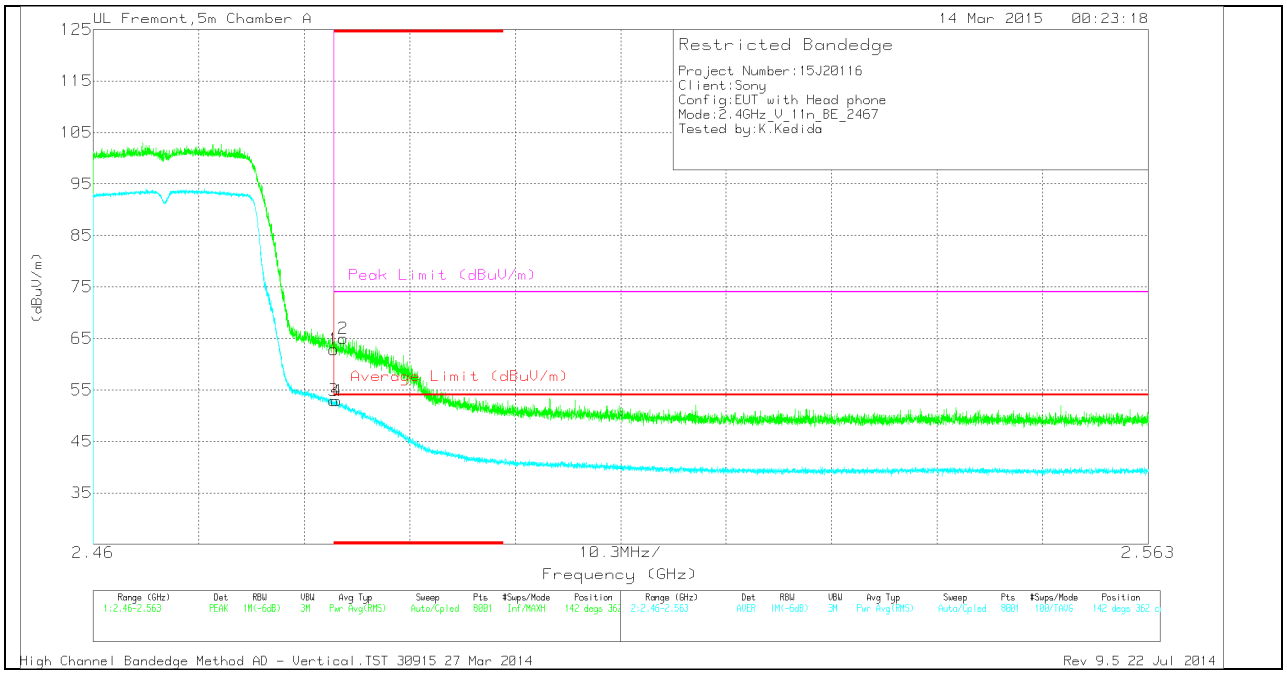
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	48.53	PK	32.1	-21.9	58.73	-	-	74	-15.27	200	366	H
3	* 2.484	39.32	RMS	32.1	-21.9	49.52	54	-4.48	-	-	200	366	H
4	* 2.484	39.29	RMS	32.1	-21.9	49.49	54	-4.51	-	-	200	366	H
2	* 2.485	49.07	PK	32.1	-21.9	59.27	-	-	74	-14.73	200	366	H

* - indicates frequency in CFR 47, Part 15 and Industry Canada RSS-Restricted Band.

PK - Peak detector

RMS - RMS detection

VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	52.66	PK	32.1	-21.9	62.86	-	-	74	-11.14	142	362	V
2	* 2.484	54.77	PK	32.1	-21.9	64.97	-	-	74	-9.03	142	362	V
3	* 2.484	42.71	RMS	32.1	-21.9	52.91	54	-1.09	-	-	142	362	V
4	* 2.484	42.67	RMS	32.1	-21.9	52.87	54	-1.13	-	-	142	362	V

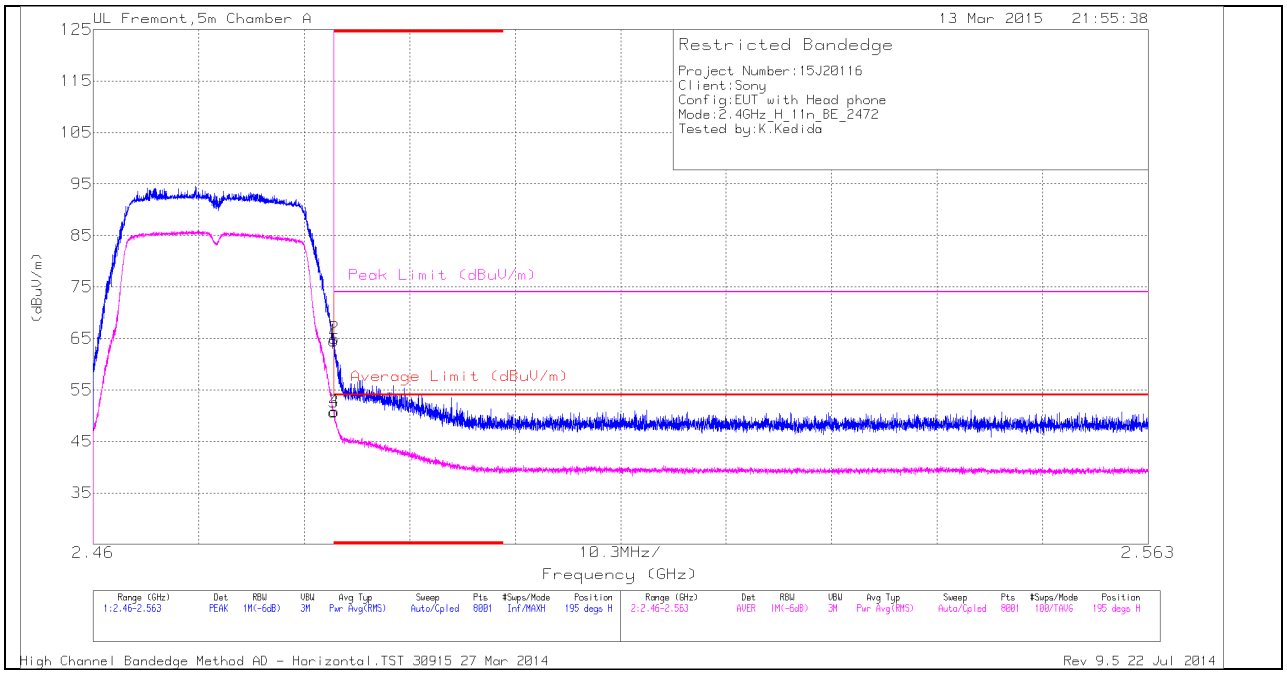
* - indicates frequency in CFR 47, Part 15 and Industry Canada RSS-Restricted Band.

PK - Peak detector

RMS - RMS detection

AUTHORIZED BANDEDGE (2472 MHz)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

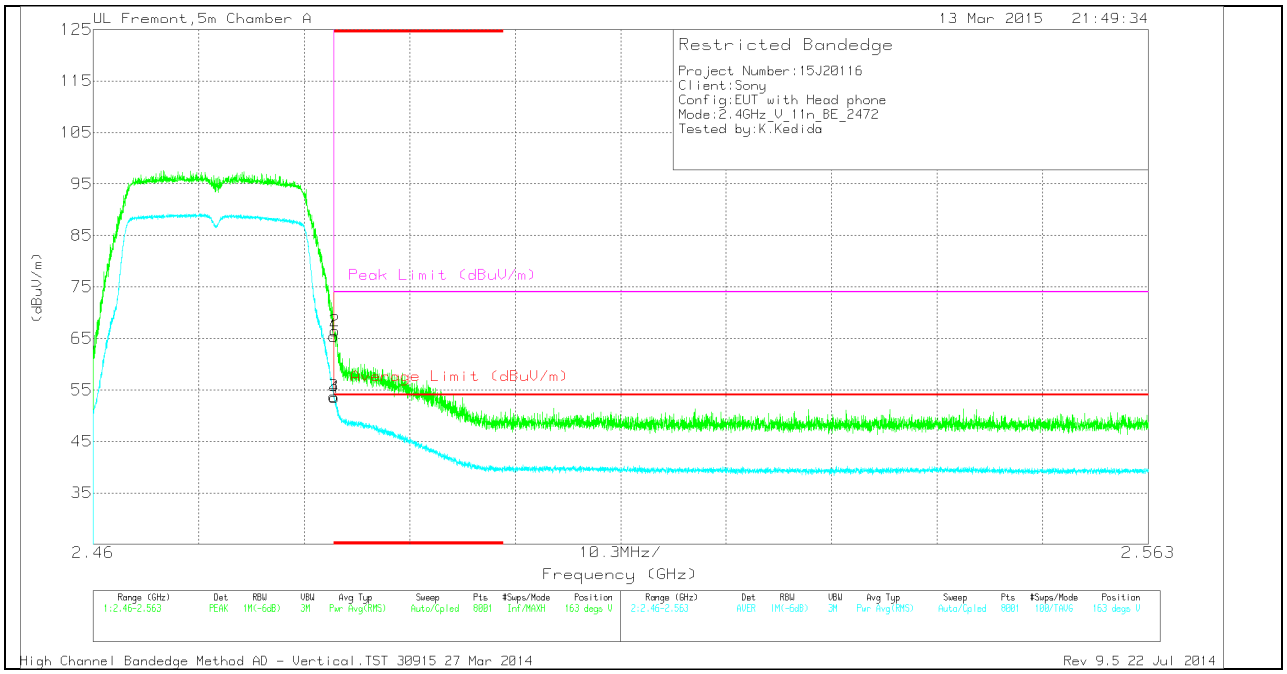
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	54.34	PK	32.1	-21.9	64.54	-	-	74	-9.46	195	363	H
2	* 2.484	54.82	PK	32.1	-21.9	65.02	-	-	74	-8.98	195	363	H
3	* 2.484	40.52	RMS	32.1	-21.9	50.72	54	-3.28	-	-	195	363	H
4	* 2.484	40.63	RMS	32.1	-21.9	50.83	54	-3.17	-	-	195	363	H

* - indicates frequency in CFR 47, Part 15 and Industry Canada RSS-Restricted Band.

PK - Peak detector

RMS - RMS detection

VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	55.24	PK	32.1	-21.9	65.44	-	-	74	-8.56	163	364	V
2	* 2.484	56.24	PK	32.1	-21.9	66.44	-	-	74	-7.56	163	364	V
3	* 2.484	43.6	RMS	32.1	-21.9	53.8	54	-.2	-	-	163	364	V
4	* 2.484	43.3	RMS	32.1	-21.9	53.5	54	-.5	-	-	163	364	V

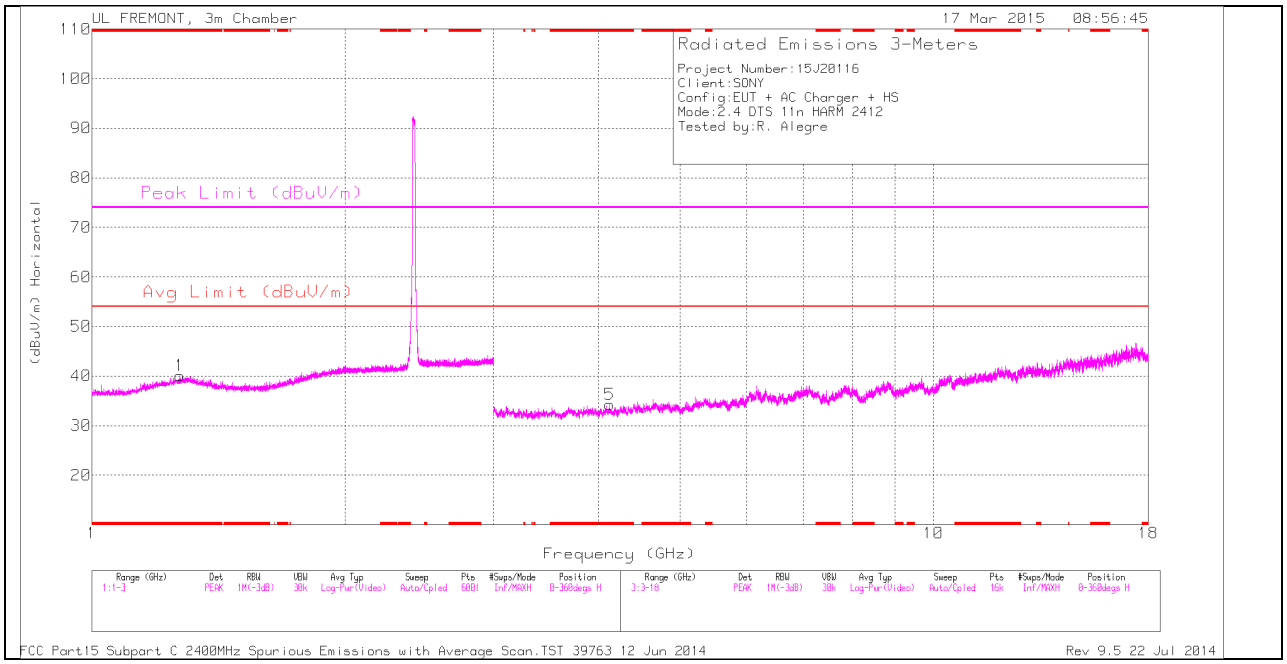
* - indicates frequency in CFR 47, Part 15 and Industry Canada RSS-Restricted Band.

PK - Peak detector

RMS - RMS detection

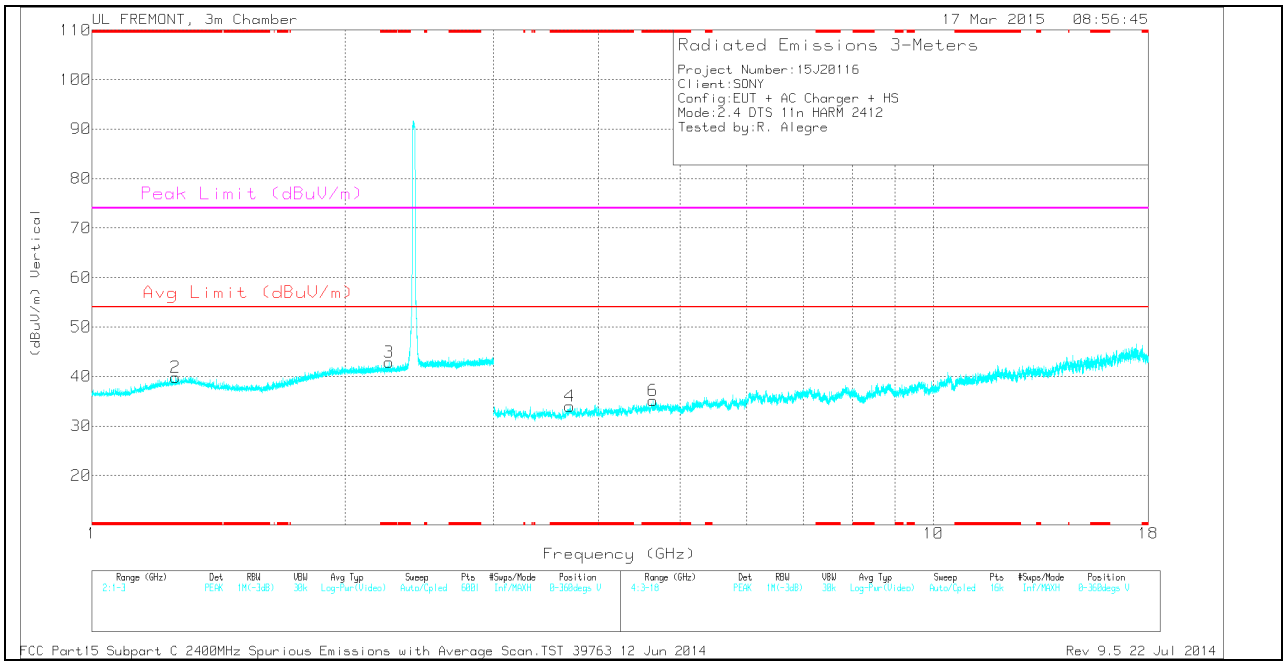
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

LOW CHANNEL VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

LOW CHANNEL DATA

TRACE MARKERS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Fltr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.272	34.26	PK	29.6	-23.8	0	40.06	-	-	74	-33.94	0-360	100	H
2	* 1.257	34.15	PK	29.5	-23.8	0	39.85	-	-	74	-34.15	0-360	100	V
3	* 2.254	34.3	PK	31.5	-22.9	0	42.9	-	-	74	-31.1	0-360	200	V
5	* 4.124	31.8	PK	33.3	-30.9	0	34.2	-	-	74	-39.8	0-360	100	H
4	* 3.697	31.77	PK	33	-30.8	0	33.97	-	-	74	-40.03	0-360	100	V
6	* 4.643	32.14	PK	33.9	-30.9	0	35.14	-	-	74	-38.86	0-360	200	V

PK - Peak detector

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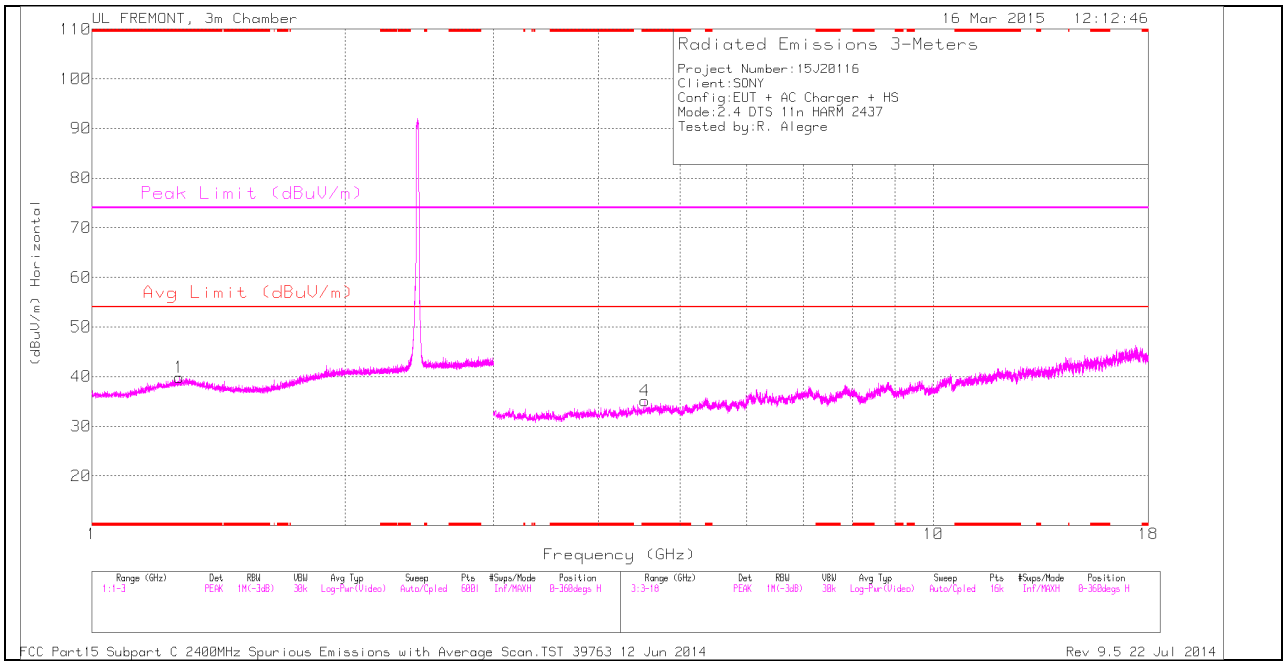
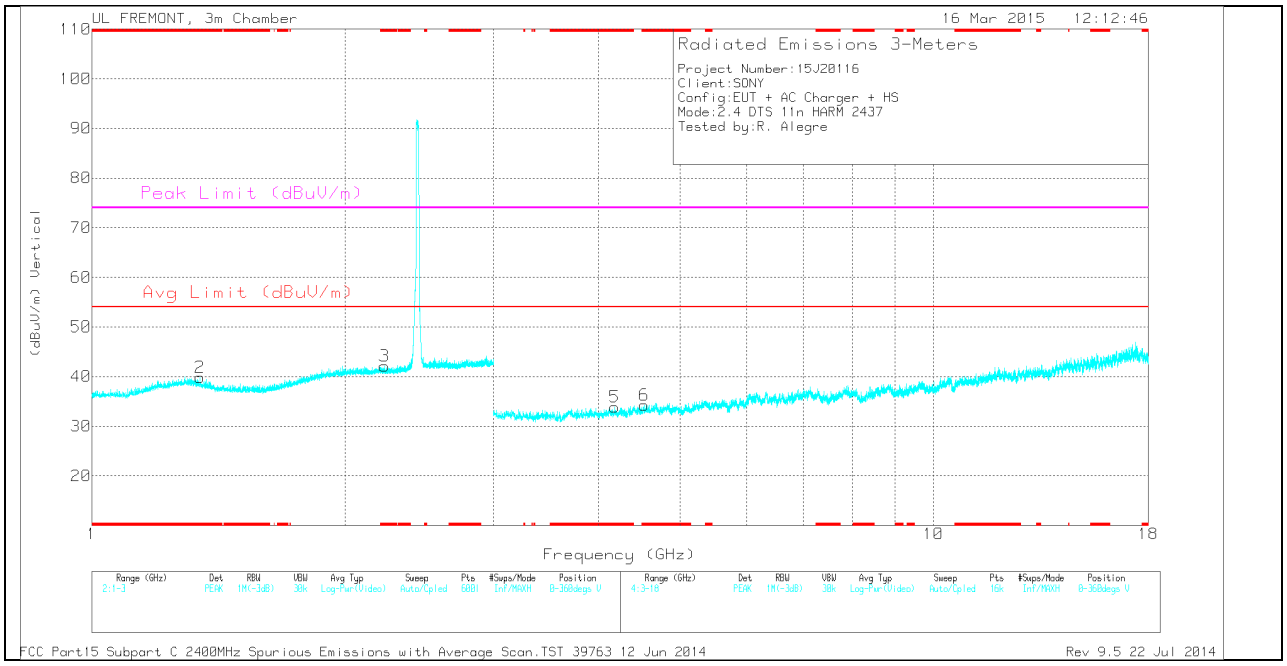
MID CHANNEL HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

MID CHANNEL VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

MID CHANNEL DATA

TRACE MARKERS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Fltr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.269	34.06	PK	29.6	-23.8	0	39.86	-	-	74	-34.14	0-360	100	H
2	* 1.344	34.31	PK	29.3	-23.8	0	39.81	-	-	74	-34.19	0-360	200	V
3	* 2.226	33.61	PK	31.5	-23	0	42.11	-	-	74	-31.89	0-360	100	V
4	* 4.537	32.74	PK	33.8	-31.4	0	35.14	-	-	74	-38.86	0-360	100	H
5	* 4.182	30.91	PK	33.3	-30.3	0	33.91	-	-	74	-40.09	0-360	200	V
6	* 4.529	31.99	PK	33.8	-31.5	0	34.29	-	-	74	-39.71	0-360	200	V

PK - Peak detector

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.539	41.23	PK2	33.8	-31.4	0	43.63	-	-	74	-30.37	3	100	H
* 4.536	29.5	MAv1	33.8	-31.5	0	31.8	54	-22.2	-	-	3	100	H

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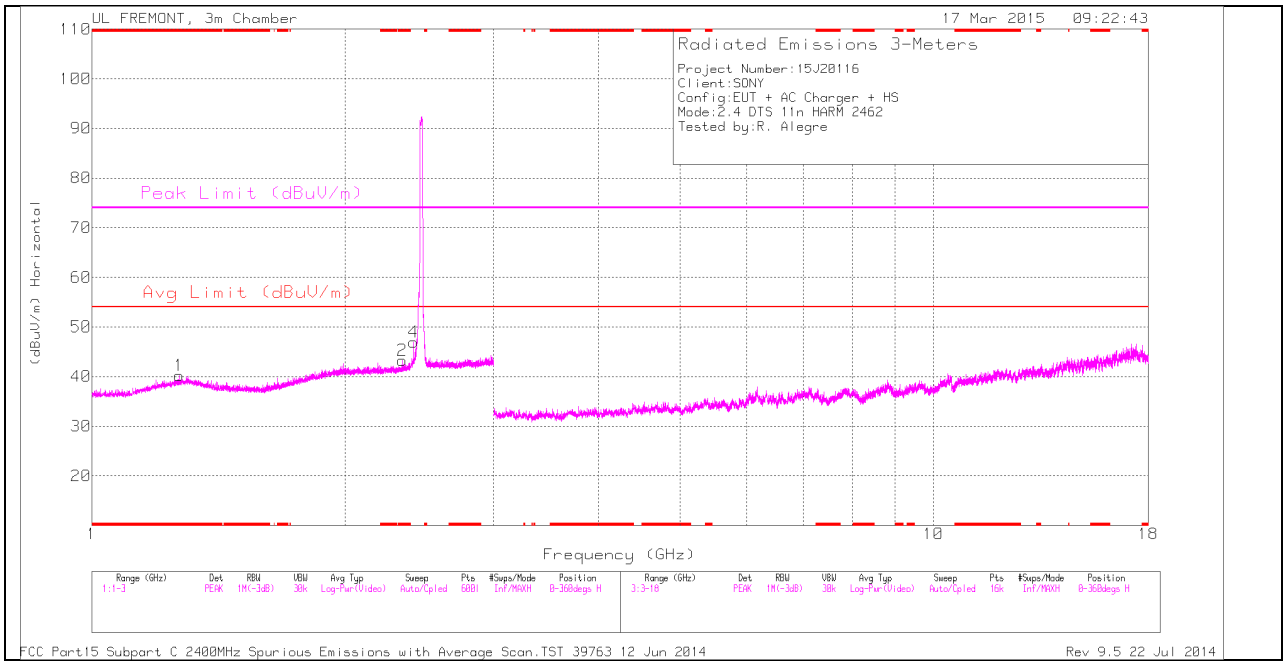
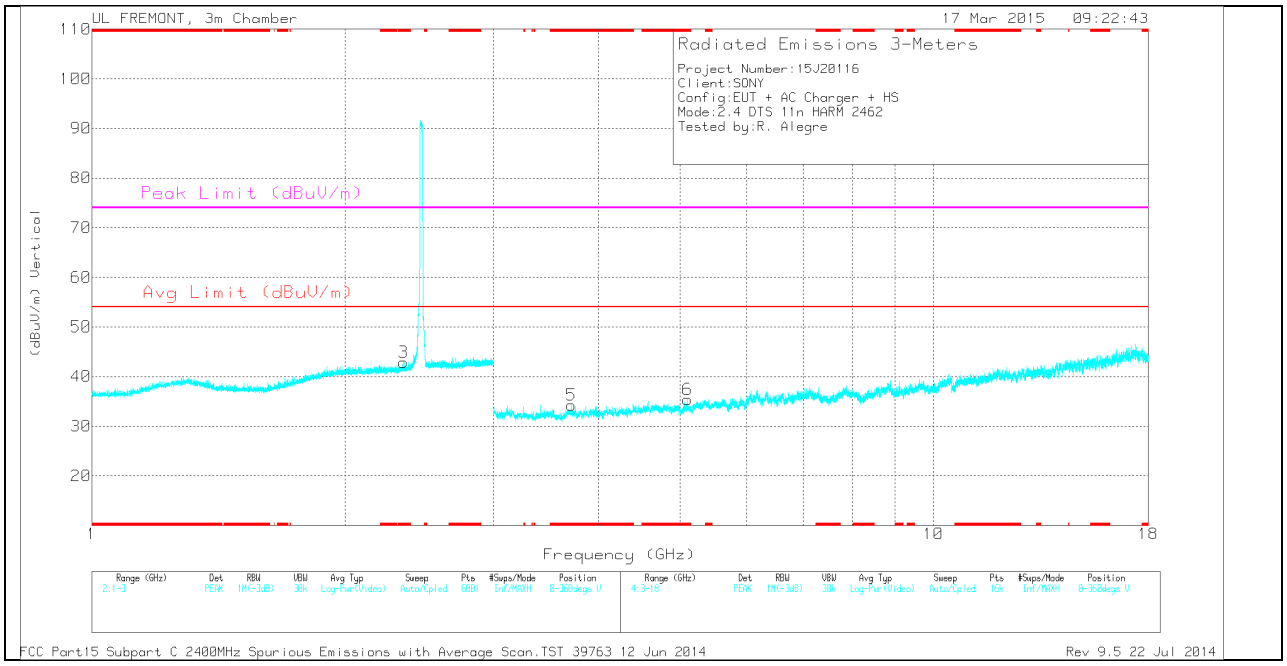
HIGH CHANNEL HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

HIGH CHANNEL VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

HIGH CHANNEL DATA

TRACE MARKERS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Fltr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.27	34.43	PK	29.6	-23.8	0	40.23	-	-	74	-33.77	0-360	100	H
2	* 2.337	34.54	PK	31.8	-23.1	0	43.24	-	-	74	-30.76	0-360	100	H
3	* 2.348	34.22	PK	31.8	-23.1	0	42.92	-	-	74	-31.08	0-360	200	V
5	* 3.711	32.06	PK	33	-30.8	0	34.26	-	-	74	-39.74	0-360	100	V
6	* 5.104	31.55	PK	34.1	-30.2	0	35.45	-	-	74	-38.55	0-360	100	V
4	2.411	37.8	PK	32.1	-23	0	46.9	-	-	-	-	0-360	200	H

PK - Peak detector

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2.41	47.01	PK2	32.1	-23	0	56.11	-	-	-	-	39	314	H
2.411	36.05	MAv1	32.1	-23	0	45.15	-	-	-	-	39	314	H

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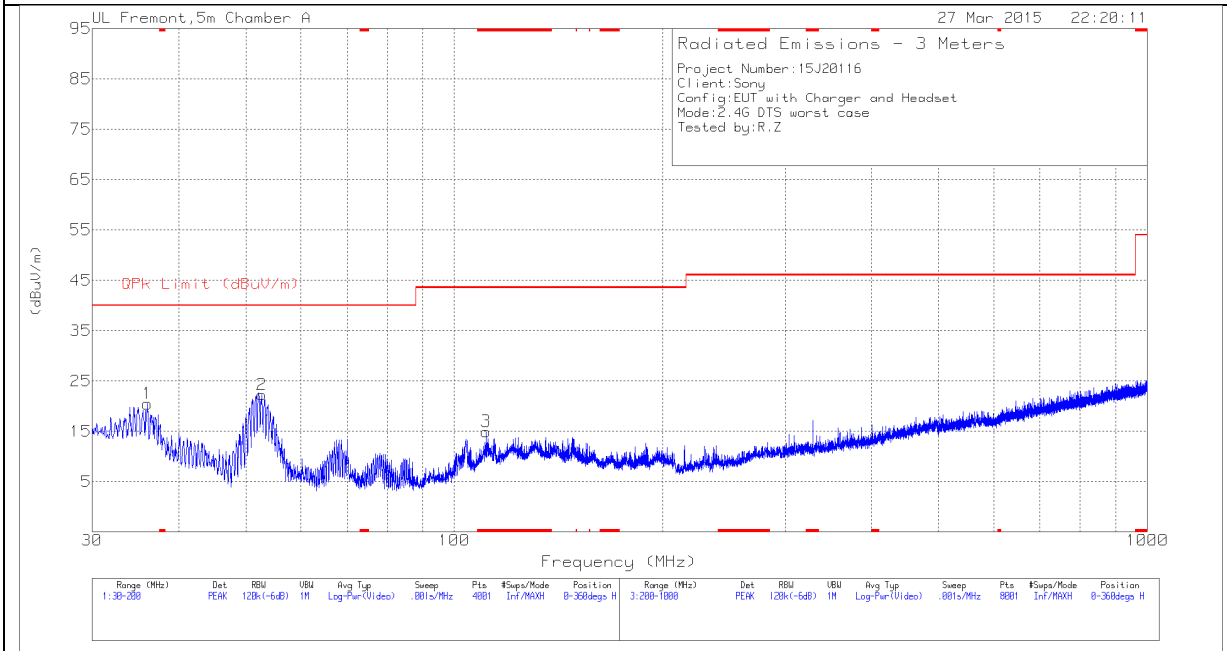
11.3. WORST-CASE BELOW 1 GHz

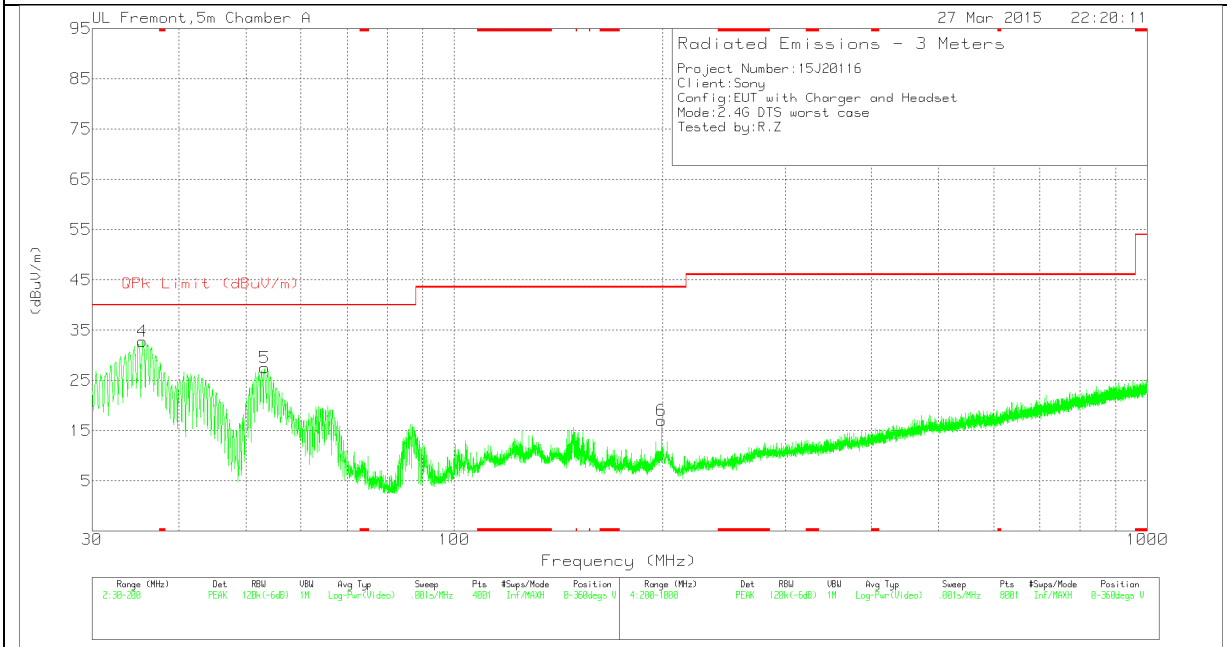
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

HORIZONTAL PLOT



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

VERTICAL PLOT



Below 1G Data

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T130 (dB/m)	Amp/Cbl (dB/m)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 111.175	32.56	PK	12.8	-30.4	14.96	43.52	-28.56	0-360	300	H
4	35.4825	46.55	PK	17.4	-31.2	32.75	40	-7.25	0-360	101	V
1	36.0775	34.69	PK	17	-31.2	20.49	40	-19.51	0-360	300	H
2	52.7375	45.88	PK	7.3	-30.9	22.28	40	-17.72	0-360	400	H
5	53.2475	51.22	PK	7.3	-31	27.52	40	-12.48	0-360	101	V
6	199.0225	34.4	PK	12.5	-29.9	17	43.52	-26.52	0-360	101	V

* - indicates frequency in CFR 47, Part 15 and Industry Canada RSS-Restricted Band.

PK - Peak detector

12. 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 2009.

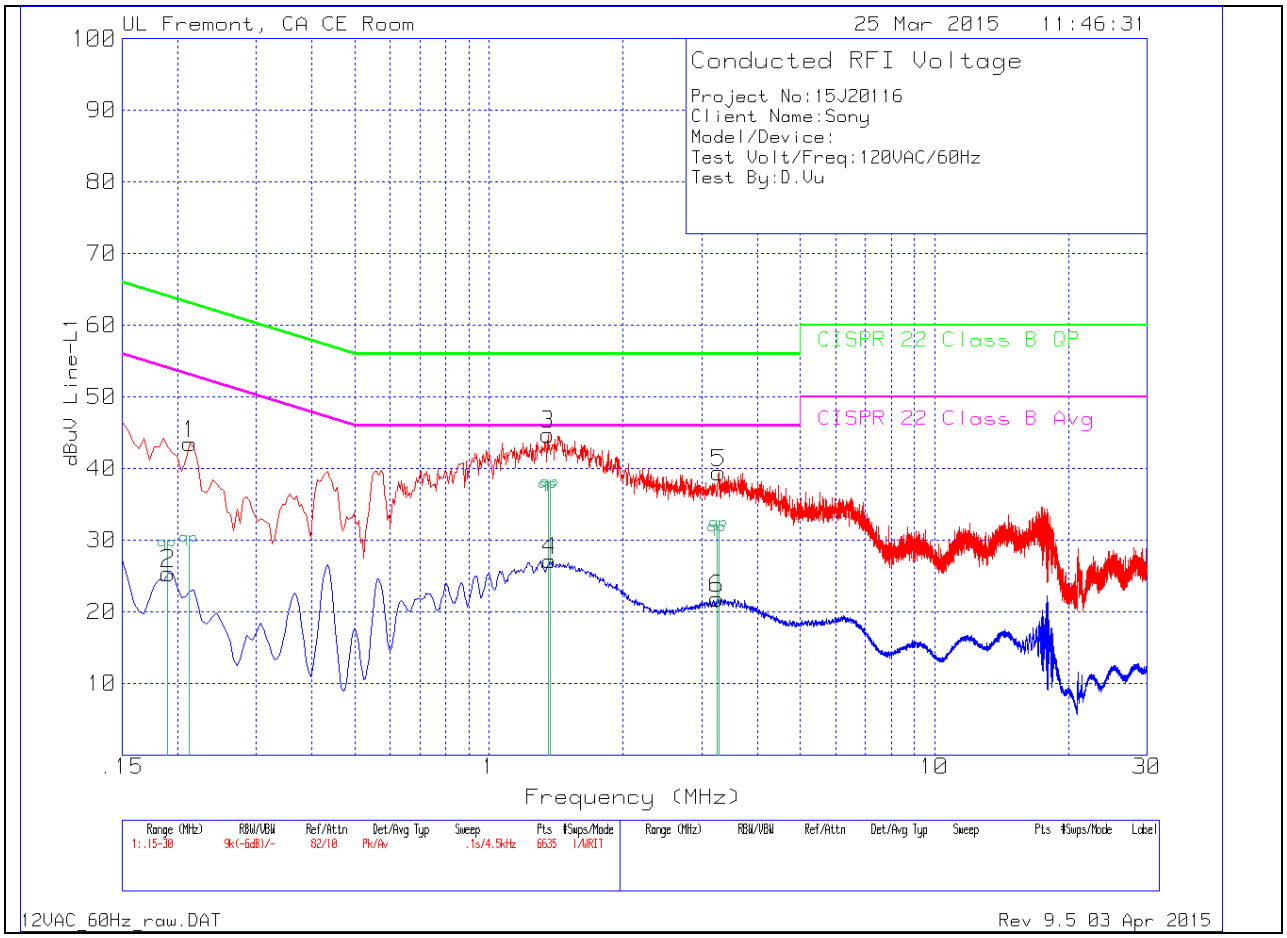
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

RESULTS

6 WORST EMISSIONS

LINE 1 PLOT

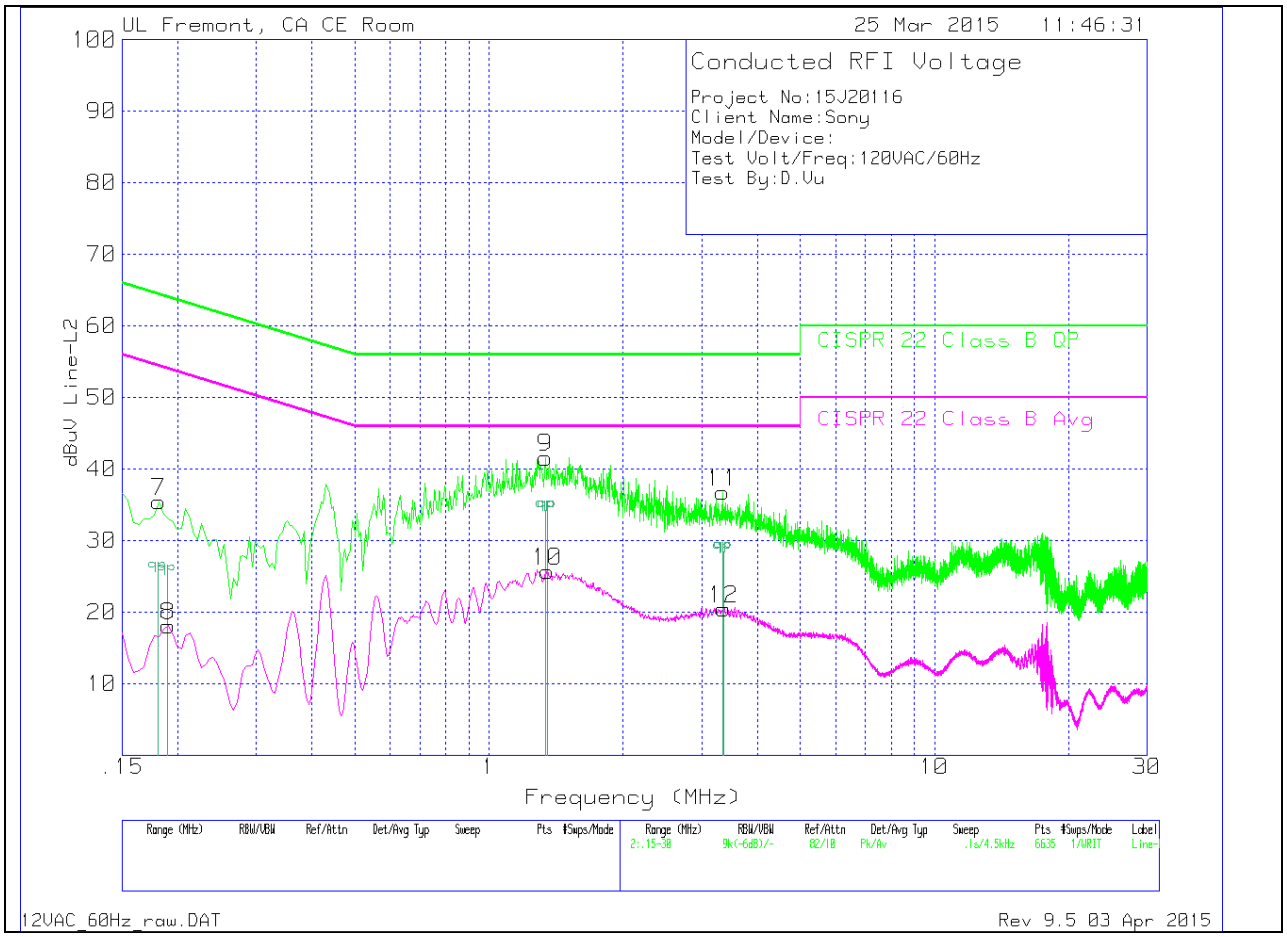


LINE 1 RESULTS

Range 1: Line-L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1	LC Cables 1&3	Corrected Reading dBuV	CISPR 22 Class B QP	Margin (dB)	CISPR 22 Class B Avg	Margin (dB)
1	.213	42.61	Pk	.9	0	43.51	63.09	-19.58	-	-
2	.1905	24.39	Av	1	0	25.39	-	-	54.01	-28.62
3	1.356	44.46	Pk	.2	.1	44.76	56	-11.24	-	-
4	1.3695	26.86	Av	.2	.1	27.16	-	-	46	-18.84
5	3.2775	39.14	Pk	.2	.1	39.44	56	-16.56	-	-
6	3.246	21.54	Av	.2	.1	21.84	-	-	46	-24.16

LINE 2 PLOT



LINE 2 RESULTS

Range 2: Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2	LC Cables 2&3	Corrected Reading dBuV	CISPR 22 Class B QP	Margin (dB)	CISPR 22 Class B Avg	Margin (dB)
7	.1815	34.24	Pk	1.2	0	35.44	64.42	-28.98	-	-
8	.1905	17	Av	1.1	0	18.1	-	-	54.01	-35.91
9	1.338	41.29	Pk	.2	.1	41.59	56	-14.41	-	-
10	1.3515	25.42	Av	.2	.1	25.72	-	-	46	-20.28
11	3.345	36.48	Pk	.2	.1	36.78	56	-19.22	-	-
12	3.363	20.17	Av	.2	.1	20.47	-	-	46	-25.53

13. GEOLOCATION MECHANISM TEST VALIDATION

Set up phone with wifi link in channel 13 and way to measure power (coupler or antenna).

Step1: Start with no cellular connection and check power.
Step2: Set cellular connection with EU country code.
Measure power (should be high)
Step3:Set country code to US
Measure power (should be low)
Step4:Set country code to Japan
Measure power (should be high)
Step5:Set country code to other
Measure power (should be low)

		C-code	No Sim	UK	US	JP	other(AR)
		MCC	-	234	310	440	722
Chain0	11b_1M	target [dBm]	9.00	16.50	9.00	16.50	11.25
		actual [dBm]	8.27	16.40	8.19	16.29	11.23
	11g_6M	target [dBm]	2.50	15.50	2.50	15.50	10.75
		actual [dBm]	2.03	15.06	2.18	15.02	10.94
Chain1	11b_1M	target [dBm]	8.20	15.70	7.45	15.70	7.45
		actual [dBm]	8.09	15.88	7.05	15.65	7.02
	11g_6M	target [dBm]	2.20	15.20	1.45	15.20	7.45
		actual [dBm]	1.34	14.32	0.59	14.25	5.96