CERTIFICATION TEST REPORT

Report Number. : 11631998-E3V3

Applicant	:	VERIFONE, INC. 1400 WEST STANFORD RANCH ROAD SUITE 200 ROCKLIN, CA 95765, USA
Model	:	V240m Plus 3GBW
FCC ID	:	B32V240MPLUS
IC	:	787C-V240MPLUS
EUT Description	:	MOBILE POINT OF SALE TERMINAL
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART C INDUSTRY CANADA RSS - 247 ISSUE 2 INDUSTRY CANADA RSS-GEN ISSUE 4

Date Of Issue:
December 19, 2017

Prepared by:
UL Verification Services Inc.
47173 Benicia Street
Fremont, CA 94538, U.S.A.
TEL: (510) 771-1000
FAX: (510) 661-0888

NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	08/16/17	Initial Issue	D. Coronia
V2	09/07/17	Updated Section 5.2	D. Coronia
V3	12/19/17	Updated Section 5.2, Output Power Sections 9.1.3, 9.2.3 & 9.3.3 and Conducted Spurious Emissions 9.1.5, 9.2.5 & 9.3.5	D. Coronia

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Verifone, Inc.
1400 West Stanford Ranch Road Suite 200
Rocklin, CA 95765, USA

EUT DESCRIPTION: Mobile Point of Sale Terminal

MODEL: V240m Plus 3GBW

SERIAL NUMBER: 313-855-592, 313-855-662

DATE TESTED: April 25 to 28, 2017

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-247 ISSUE 2	Pass
INDUSTRY CANADA RSS-GEN Issue 4	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:

DAN CORONIA
OPERATIONS LEADER
UL VERIFICATION SERVICES INC.

Prepared By:

GLENN ESCANO
TEST 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, KDB 558074 D01 v04, ANSI C63.10-2013, RSS-GEN Issue 4, and RSS-247 ISSUE 2.

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:22541-1)
☒ Chamber B (IC:2324B-2)	☐ Chamber E (IC:22541-2)
☐ Chamber C (IC:2324B-3)	☐ Chamber F (IC:22541-3)
	☐ Chamber G (IC:22541-4)
	☐ Chamber H (IC:22541-5)

The above test sites and facilities are covered under FCC Test Firm Registration # 208313.

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
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.84 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.65 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	3.15 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	5.36 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.32 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.45 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.24 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is the Mobile Point of Sale Terminal which contains an 11a/b/g/n/ac W-LAN + Bluetooth 4.1 combo module.

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 1TX	16.15	41.21
2412 - 2462	802.11g 1TX	13.68	23.33
2412 - 2462	802.11n HT20 1TX	12.84	19.23

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a WiFi antenna with a maximum gain of 1.90 dBi across the frequencies in 2.4GHz band.

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was VOS2 – 30640xxx.

5.5. WORST-CASE CONFIGURATION AND MODE

Radiated bandedge, harmonics, and spurious emissions from 1 GHz to 18GHz were performed. The EUT was set to transmit at the Low/Middle/High channels.

Radiated emission below 1GHz, above 18GHz, and power line conducted emission were performed with the EUT was 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.

Worst-case data rates as provided by the client 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
Laptop	Lenovo	20B7S0A200	PC015REW	NA
AC Adapter	Verifone	SC1402	1708200053701	NA
AC Adapter	Verifone	AM11A-050A	1650A1P	NA

I/O CABLES (CONDUCTED TEST)

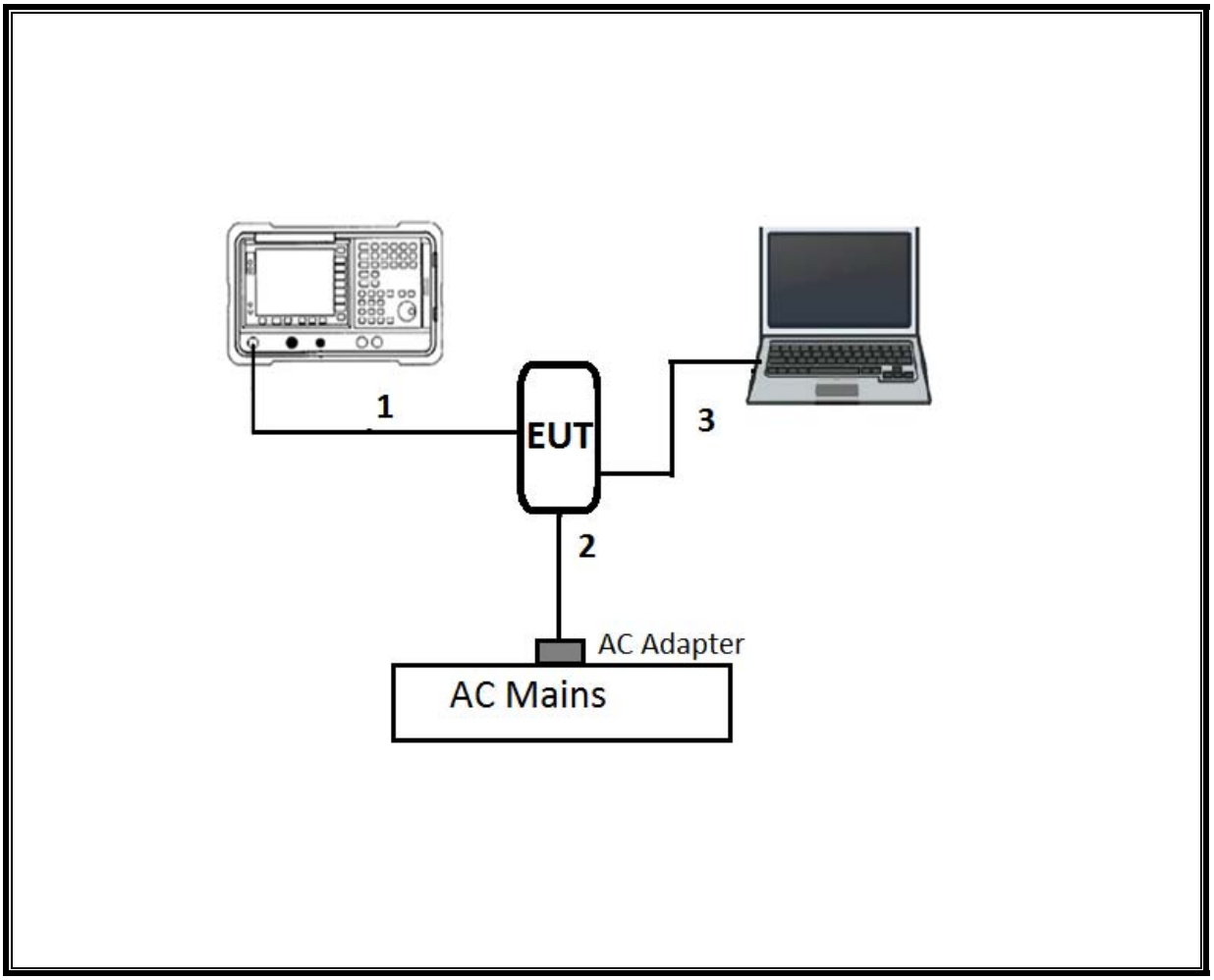
I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	Antenna	1	SMA	Un-Shielded	0.1	To spectrum Analyzer
2	DC	1	AC	Un-shielded	2	N/A
3	USB	1	USB	Shielded	2	N/A

I/O CABLES (RADIATED AND CONDUCTED EMISSIONS)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC	1	AC	Un-shielded	2	N/A

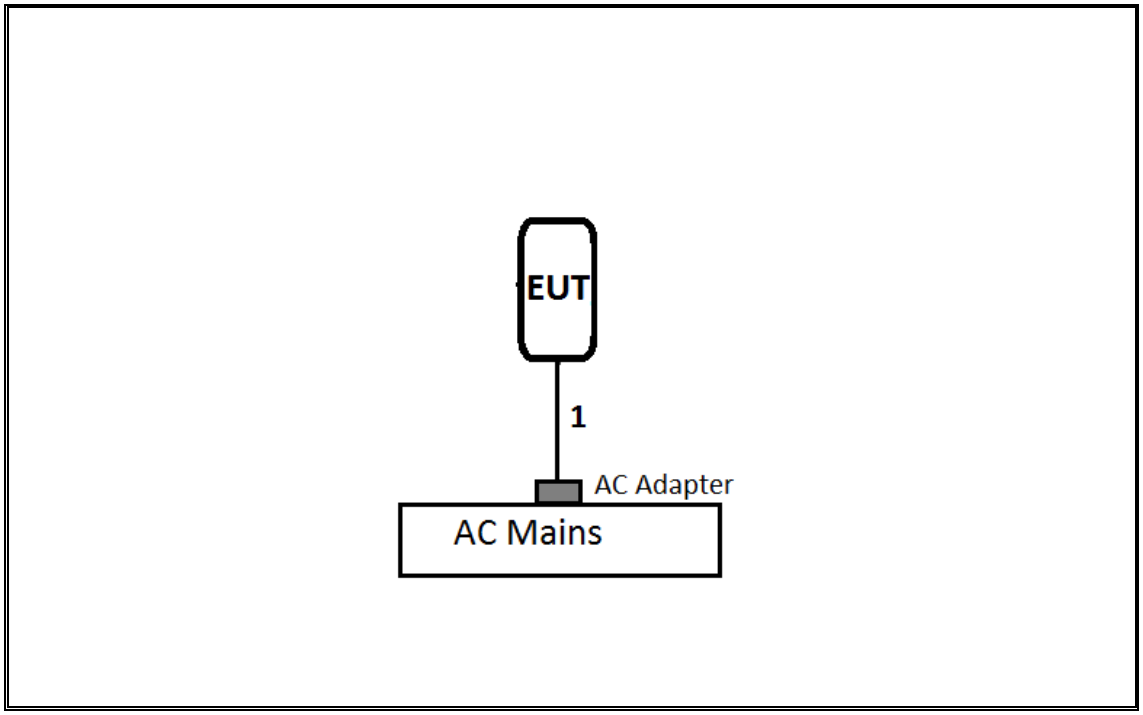
TEST SETUP

CONDUCTED TEST SETUP DIAGRAM



TEST SETUP

RADIATED AND AC LINE CONDUCTED EMISSIONS SETUP DIAGRAM



6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Asset**	**Cal Due**
Antenna, Broadband Hybrid, 30MHz to 2000MHz w/4dB Pad	Sunol Sciences Corp.	JB3	T477	06/22/2017
Antenna, Active Loop 9kHz-30MHz	ETS-Lindgren	6502	T1683	02/17/2018
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T712	01/30/2018
Antenna, Horn 18-26.5GHz	ARA	MWH-1826/B	T449	05/26/2017
Power Meter, P-series single channel	Agilent (Keysight) Technologies	N1911A	T1264	07/08/2017
Power Sensor, P – series, 50MHz to 18GHz, Wideband	Agilent (Keysight) Technologies	N1921A	T413	06/20/2017
Amplifier, 1-26.5GHz	MITEQ	AFS42-00101800-25-S-42	T1165	08/01/2017
Amplifier, 1-26.5GHz	Agilent (Keysight) Technologies	8449B	T404	07/05/2017
Amplifier, 10kHz-1GHz	Agilent (Keysight) Technologies	8447D	T15	08/26/2017
Amplifier, 1-8 GHz	MITEQ	AFS42-00101800-25-S-42	T931	08/26/2017
Spectrum Analyzer, PSA, 3Hz to 26.5GHz	Agilent (Keysight) Technologies	E4440A	T199	07/22/2017
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T907	01/23/2018
Spectrum Analyzer, PSA, 3Hz to 26.5GHz	Agilent (Keysight) Technologies	E9030A	T905	01/11/2018
LISN	FISCHER	FCC-LISN-50/250-25-2-01	T1310	06/08/2017

Test Software List			
Description	**Manufacturer**	**Model**	**Version**
Radiated Software	UL	UL EMC	Ver 9.5, Apr 26, 2016
Antenna Port Software	UL	UL RF	Ver 5.1.1, July 15, 2016

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

NOTE: *testing is completed before equipment calibration expiration date.

7. MEASUREMENT METHODS

On Time and Duty Cycle: KDB 558074 D01 v04, Section 6.

6 dB BW: KDB 558074 D01 v04, Section 8.1.

99% BW: ANSI C63.10-2013, Section 6.9.3.

Output Power: KDB 558074 D01 v04, Section 9.2.3.2.

Power Spectral Density: KDB 558074 D01 v04, Section 10.3.

Out-of-band emissions in non-restricted bands: KDB 558074 D01 v04, Section 11.0 (b).

Out-of-band emissions in restricted bands: KDB 558074 D01 v04, Section 12.1.

Band-edge: KDB 558074 D01 v04, Section 12.1.

AC Power Line Conducted Emissions: ANSI C63.10-2013, Section 6.2.

8. SUMMARY TABLE

FCC Part Section	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result
15.247 (a)(2)	RSS-247 5.2 (a)	Occupied Band width (6dB)	>500KHz	Conducted	Pass
2.1051, 15.247 (d)	RSS-247 5.5	Band Edge / Conducted Spurious Emission	-30dBc		Pass
15.247 (b) (3)	RSS-247 5.4 (d)	TX conducted output power	<30dBm		Pass
15.247 (e)	RSS-247 5.2 (b)	PSD	<8dBm		Pass
15.207 (a)	RSS-GEN 8.8	AC Power Line conducted emissions	Section 10		Pass
15.205, 15.209, 15.247(d)	RSS-GEN 8.9/7	Radiated Spurious Emission	< 54dBuV/m	Radiated	Pass

9. ANTENNA PORT TEST RESULTS

ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

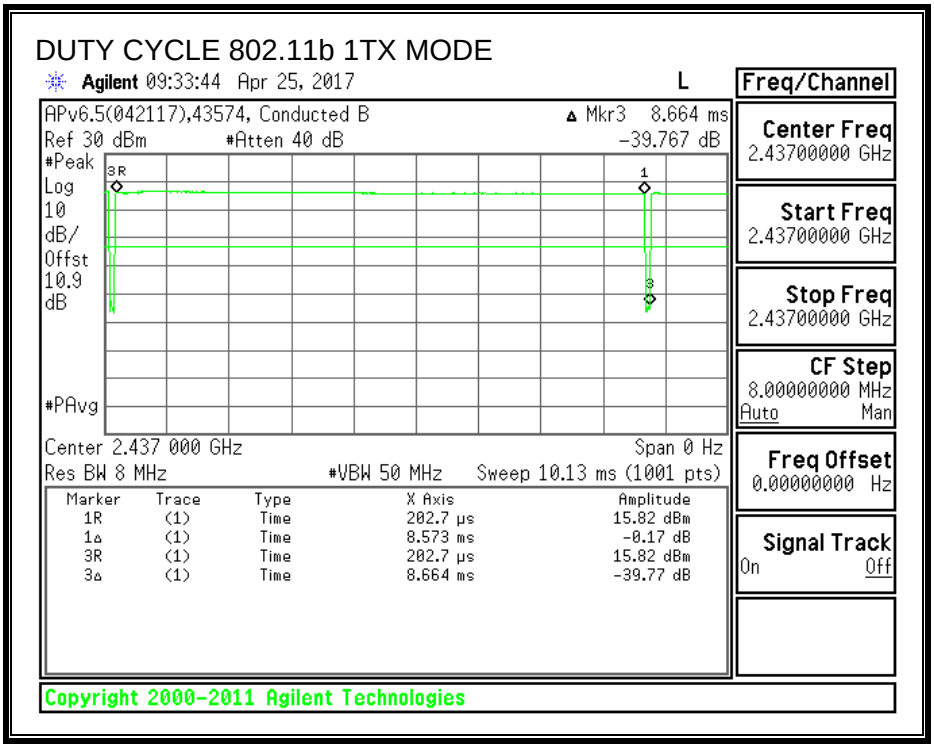
PROCEDURE

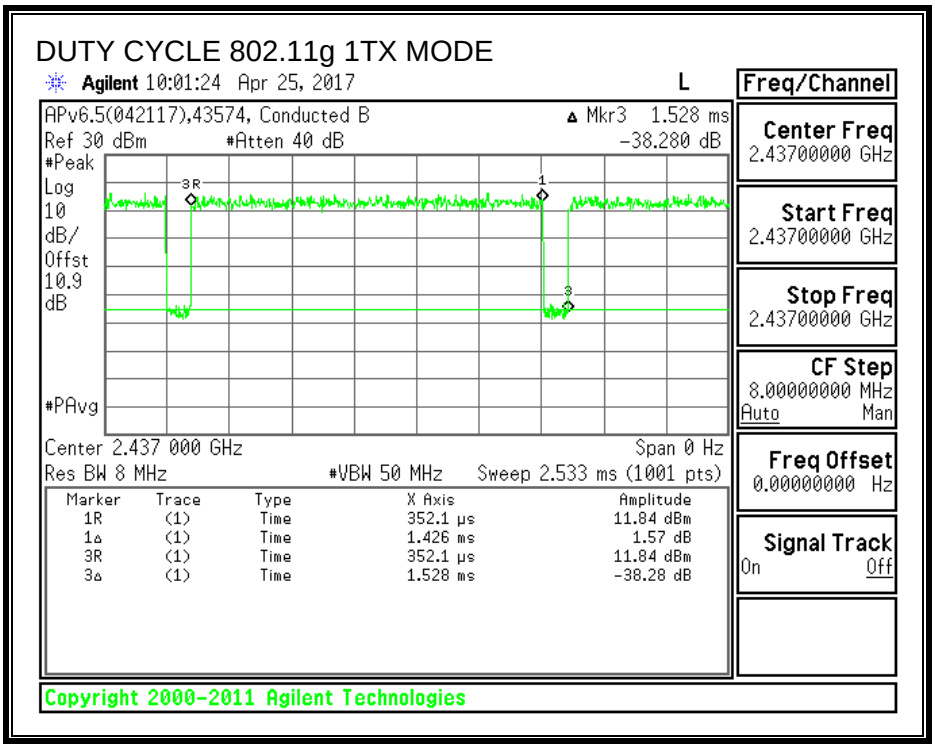
KDB 558074 Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

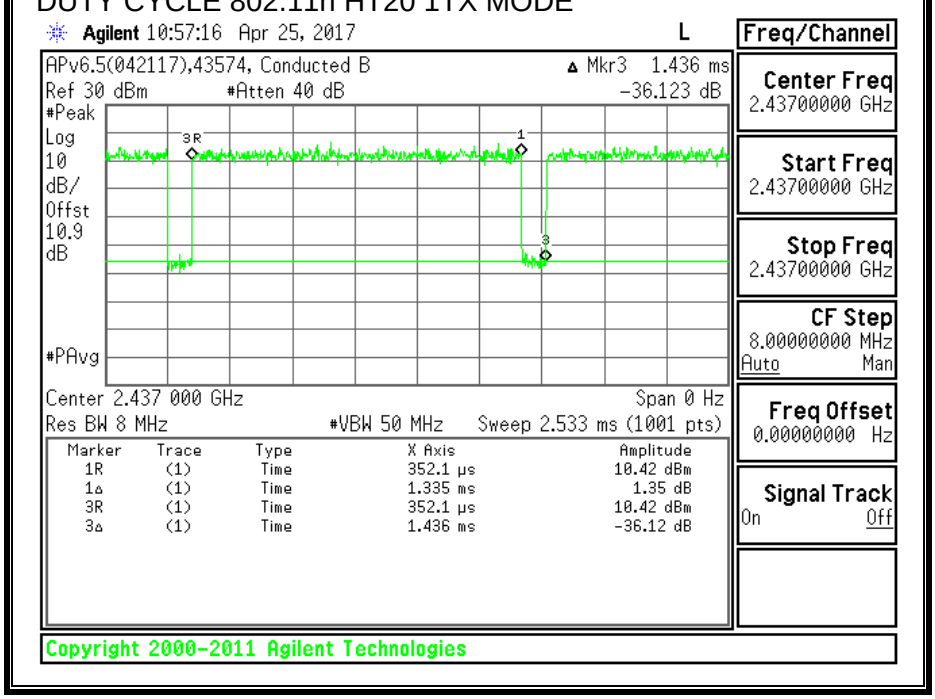
Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (khz)
11b 1TX	8.573	8.664	0.989	98.949	0	0.01
11g 1TX	1.426	1.528	0.933	93.324	0.3	0.701
11n HT20 1TX	1.335	1.436	0.929	92.966	0.316	0.749

DUTY CYCLE PLOTS





DUTY CYCLE 802.11n HT20 1TX MODE



9.1. 11b SISO MODE IN THE 2.4GHz BAND

9.1.1. 6 dB BANDWIDTH

LIMITS

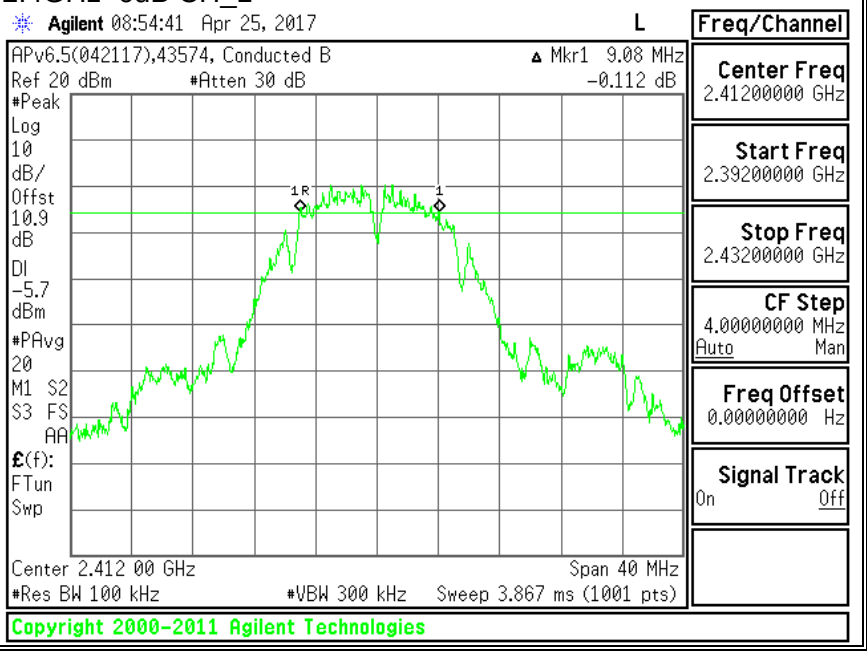
FCC §15.247 (a) (2)
IC RSS-247 (5.2) (a)

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

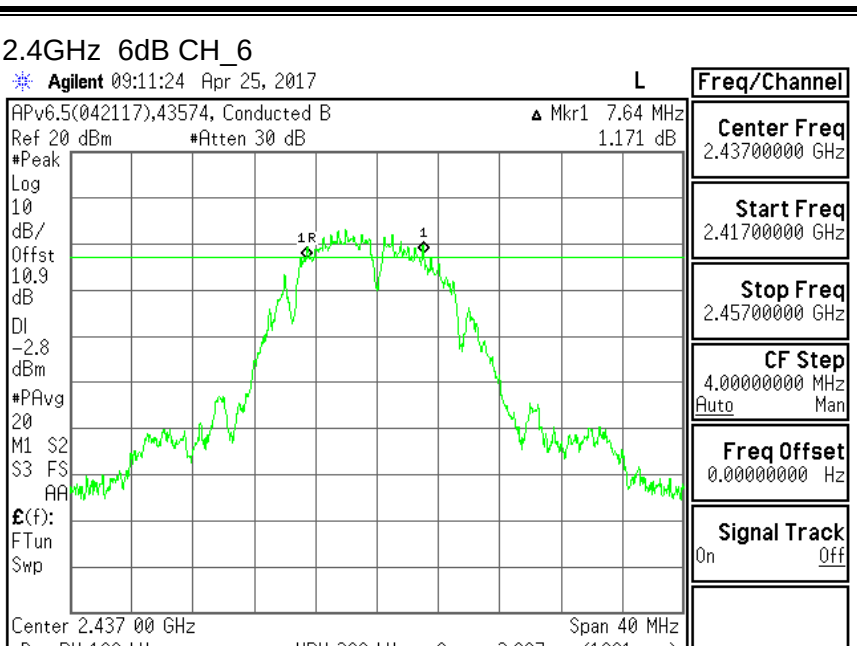
RESULTS

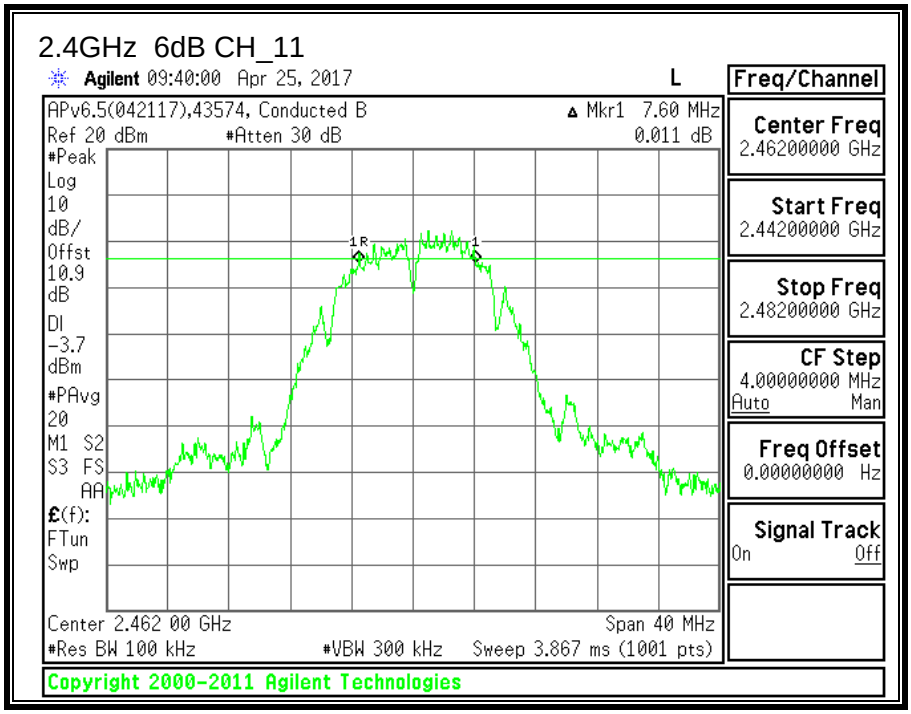
Channel	Frequency (MHz)	6 dB BW (MHz)	Minimum Limit (MHz)
Low_1	2412	9.08	0.5
Middle_6	2437	7.64	0.5
High_11	2462	7.60	0.5

2.4GHz 6dB CH_1



2.4GHz 6dB CH_6





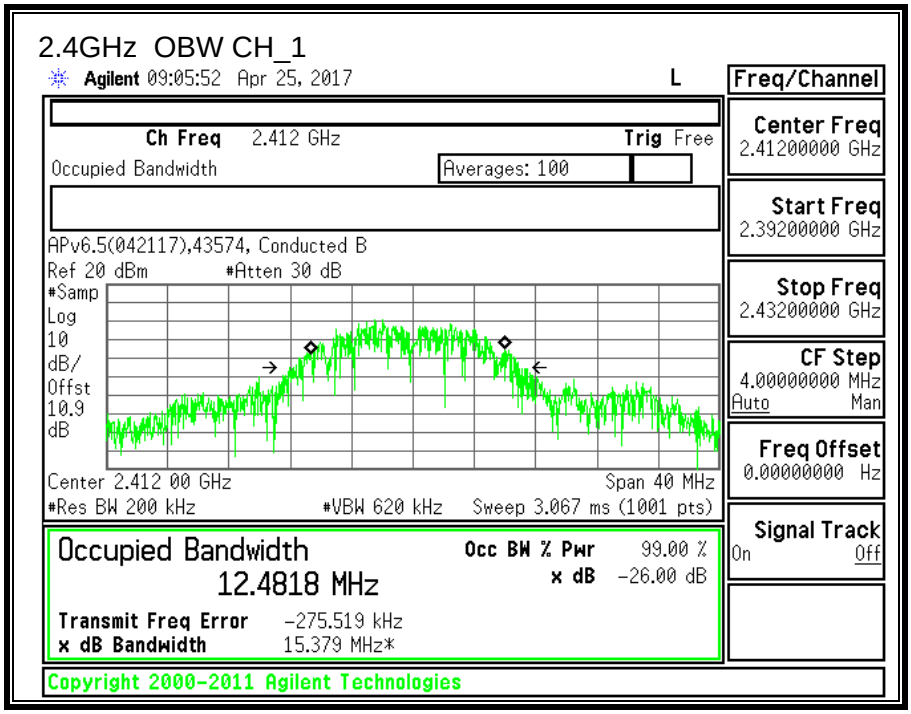
9.1.2. 99% BANDWIDTH

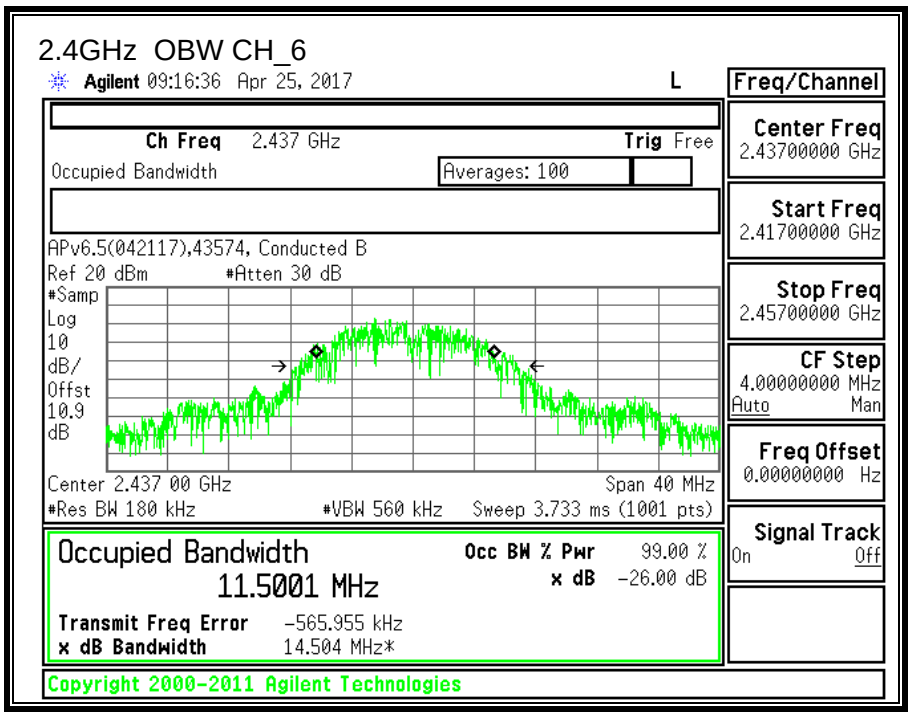
LIMITS

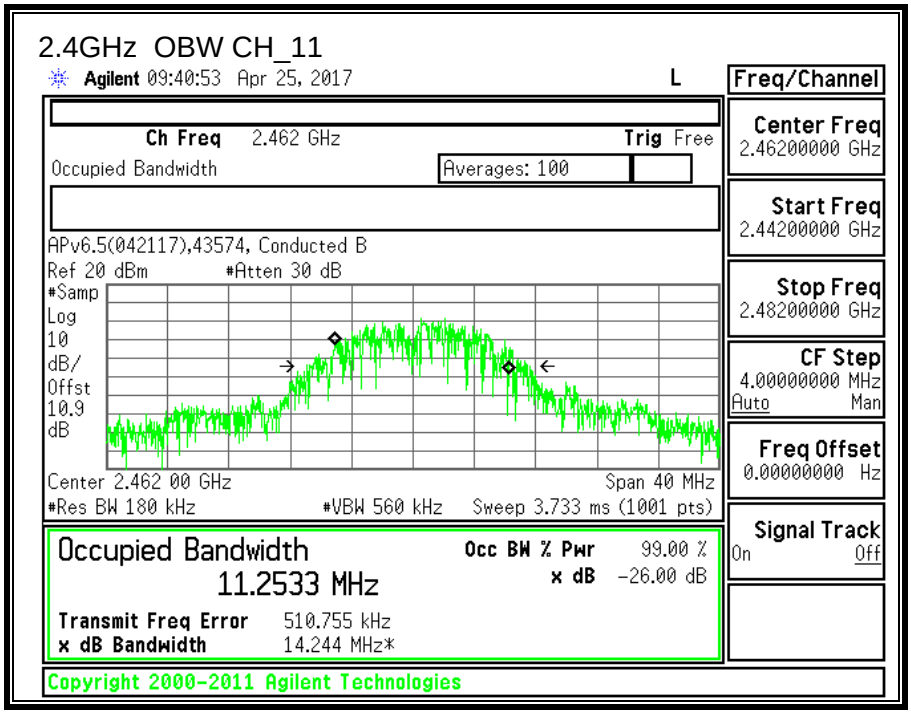
None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low_1	2412	12.48
Middle_6	2437	11.50
High_11	2462	11.25







9.1.3. OUTPUT POWER

LIMITS

FCC §15.247
IC RSS-247 (5.4) (d)

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

DIRECTIONAL ANTENNA GAIN

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

RESULTS

ID:	45250	Date:	4/26/17

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	1.90	30.00	30	36	30.00
Mid	2437	1.90	30.00	30	36	30.00
High	2462	1.90	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	15.82	15.82	30.00	-14.18
Mid	2437	16.05	16.05	30.00	-13.95
High	2462	16.15	16.15	30.00	-13.85

9.1.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247
IC RSS-247 (5.2) (b)

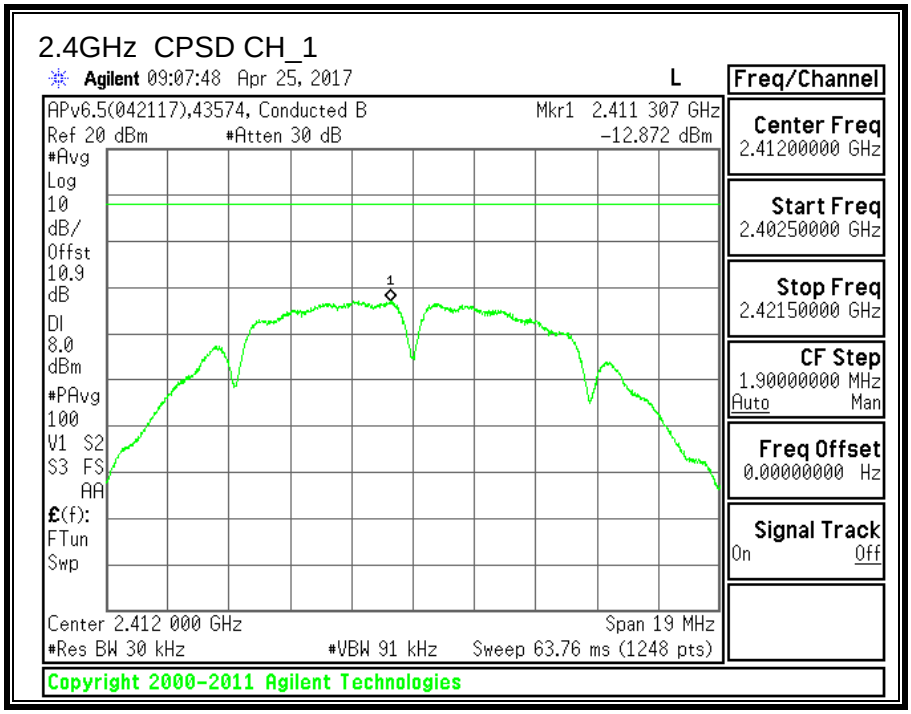
For digitally modulated systems, the power spectral density conducted form the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 KHz band during any time interval of continuous transmissions.

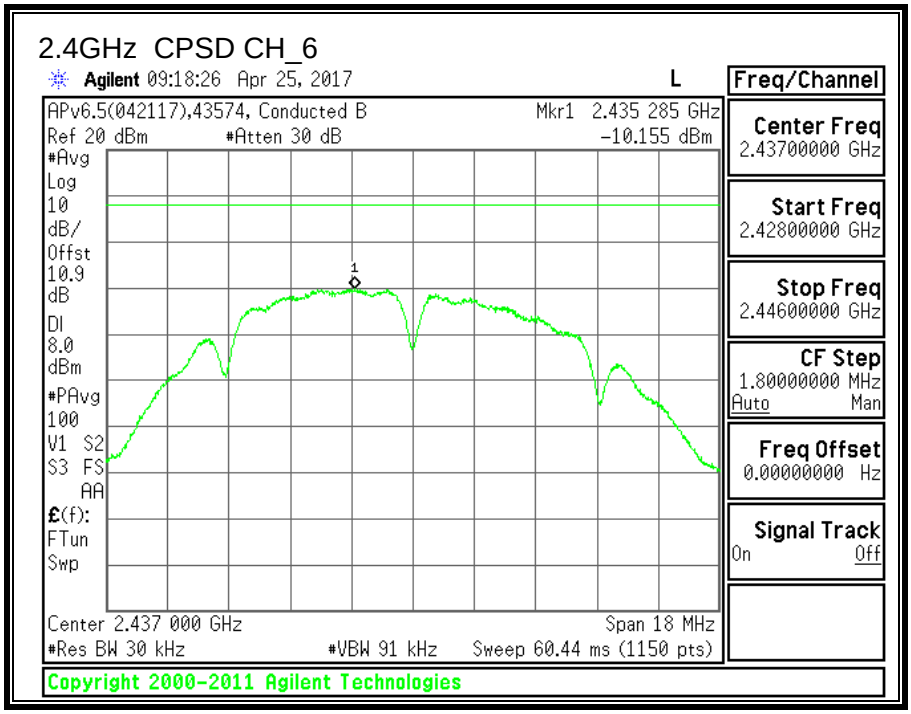
RESULTS

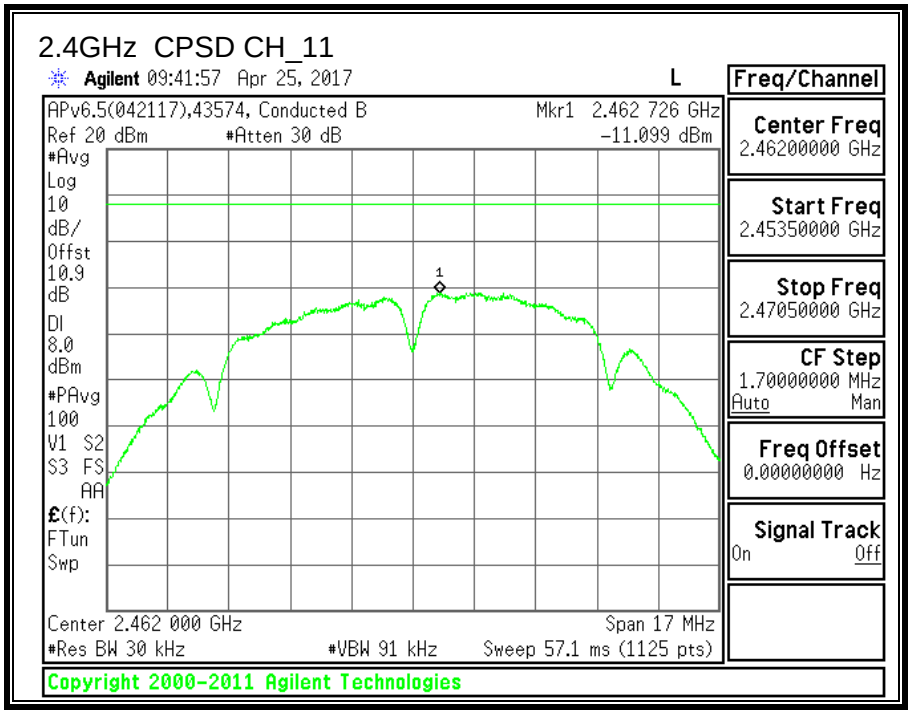
Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

PSD Results

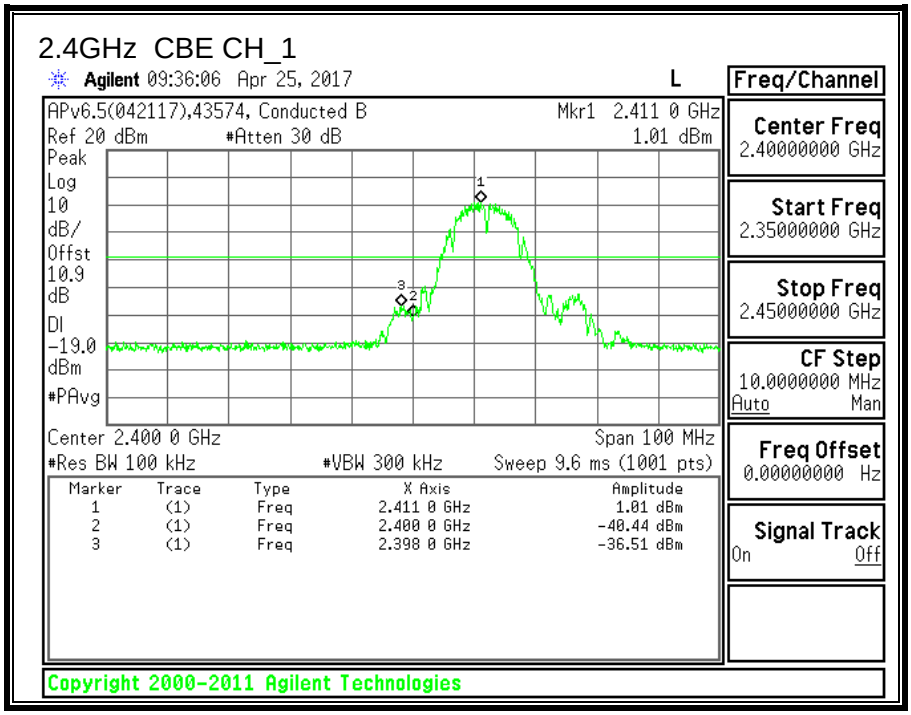
Channel	Frequency (MHz)	Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-12.87	-12.87	8.0	-20.9
Mid	2437	-10.16	-10.16	8.0	-18.2
High	2462	-11.10	-11.10	8.0	-19.1

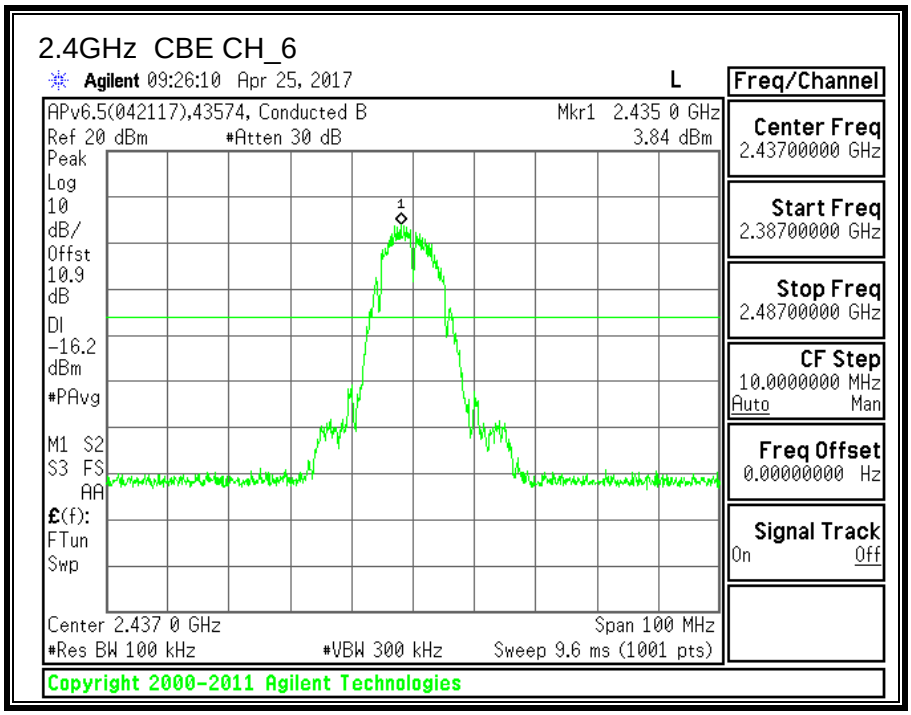


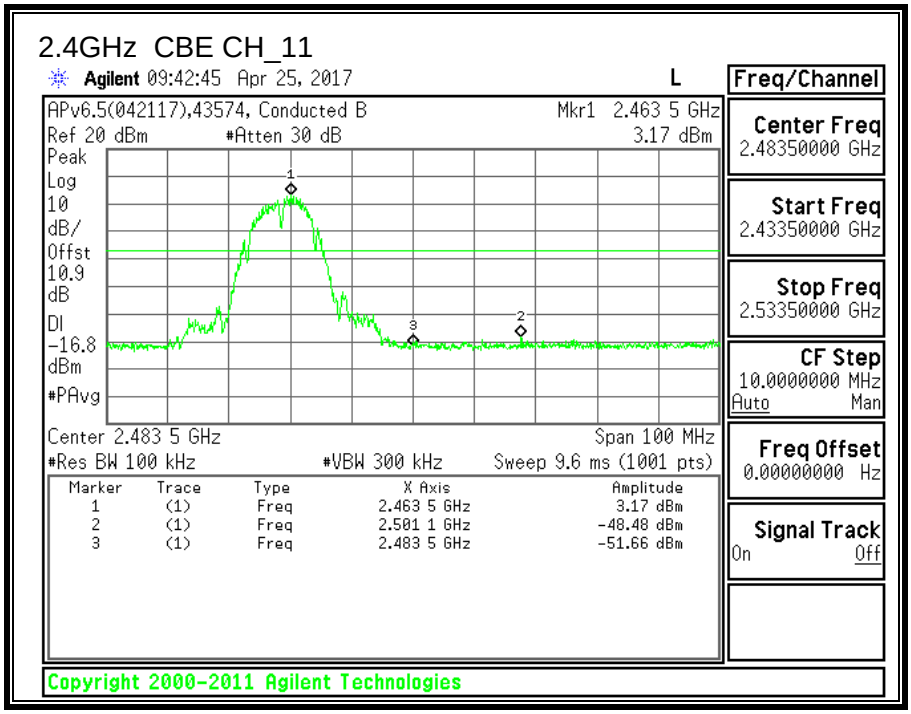


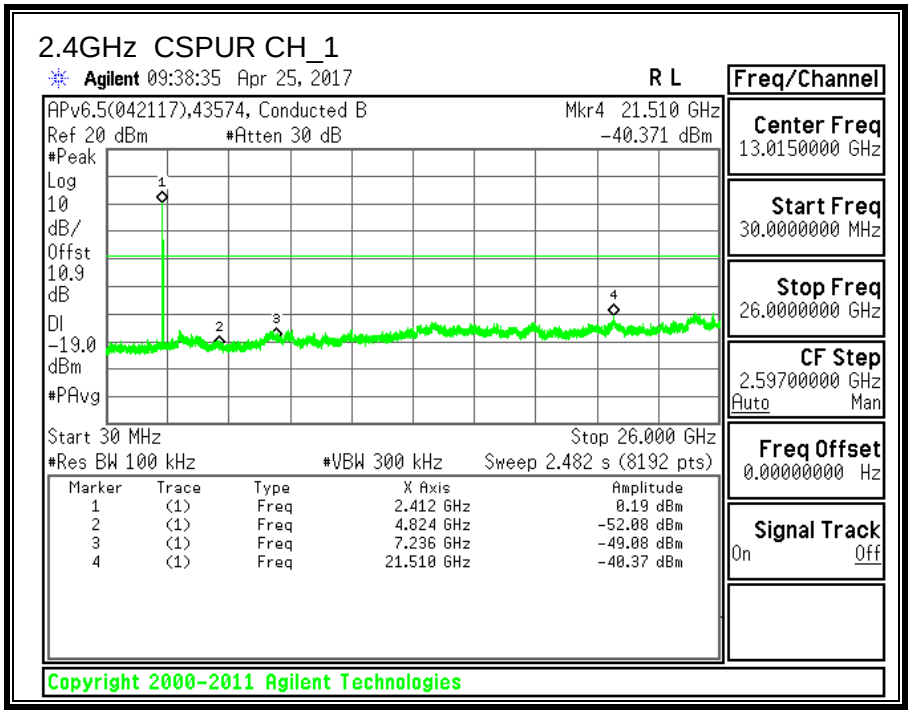


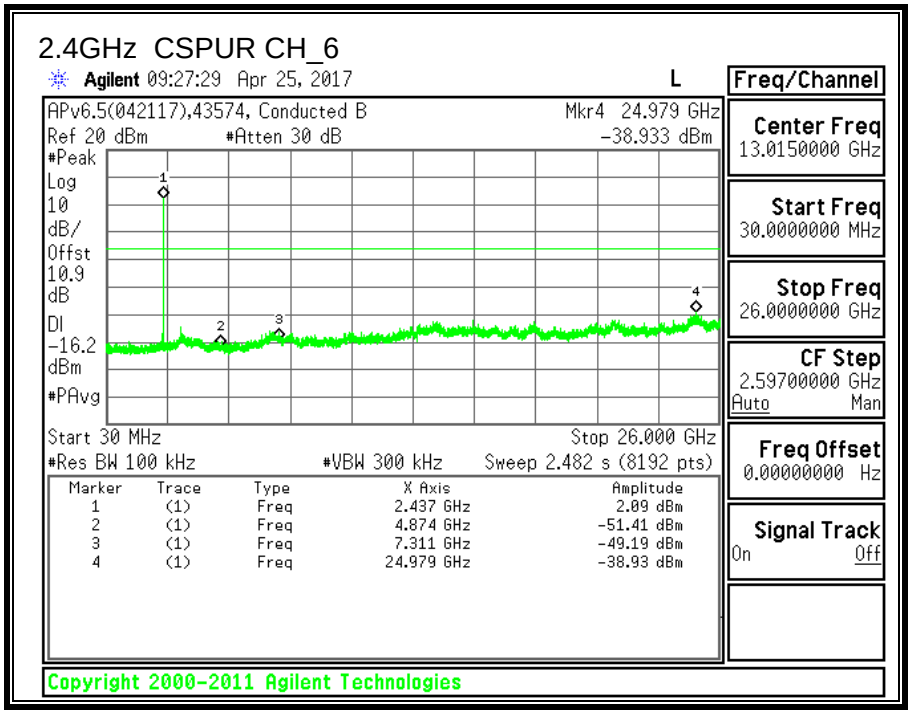
9.1.5. CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS

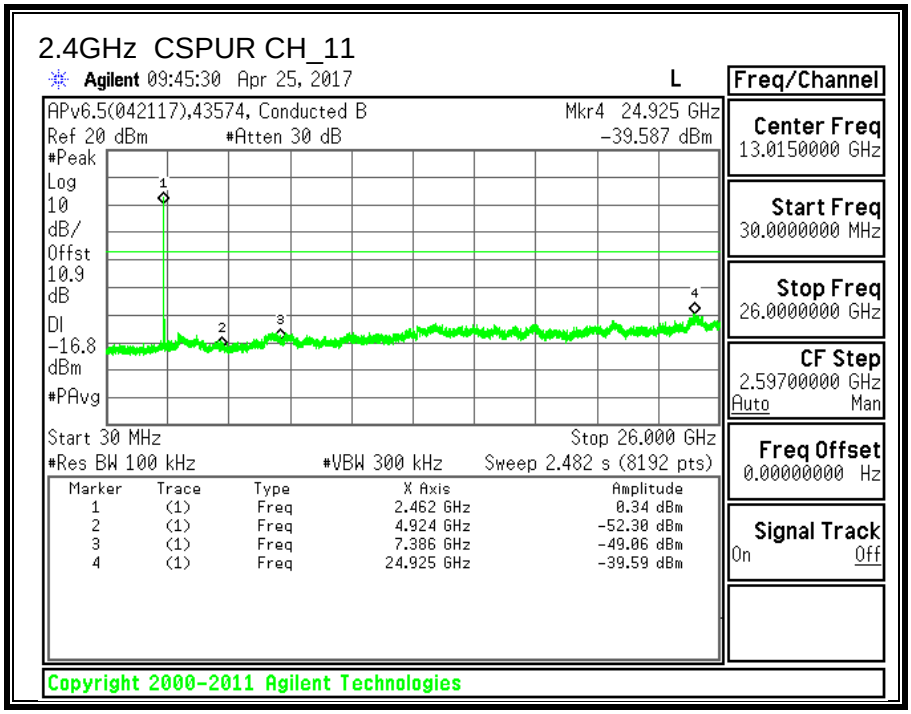












NOTE: The device complies with -30dBc limit over the tested frequency range. See below table.

802.11b mode CBE data (dBm)	-20dBc limit (dBm)	-30dBc limit (dBm)
Channel 1	Ch1: -19.0	Ch1: -28.99
-53.08		
-49-08		
-40.37		
Channel 6	Ch6: -16.2	Ch6: -26.16
-51.41		
-49.19		
-38.93		
Channel 11	Ch11: -16.8	Ch11: -26.83
-52.30		
-49.06		
-35.59		

9.2. 11g SISO MODE IN THE 2.4GHz BAND

9.2.1. 6 dB BANDWIDTH

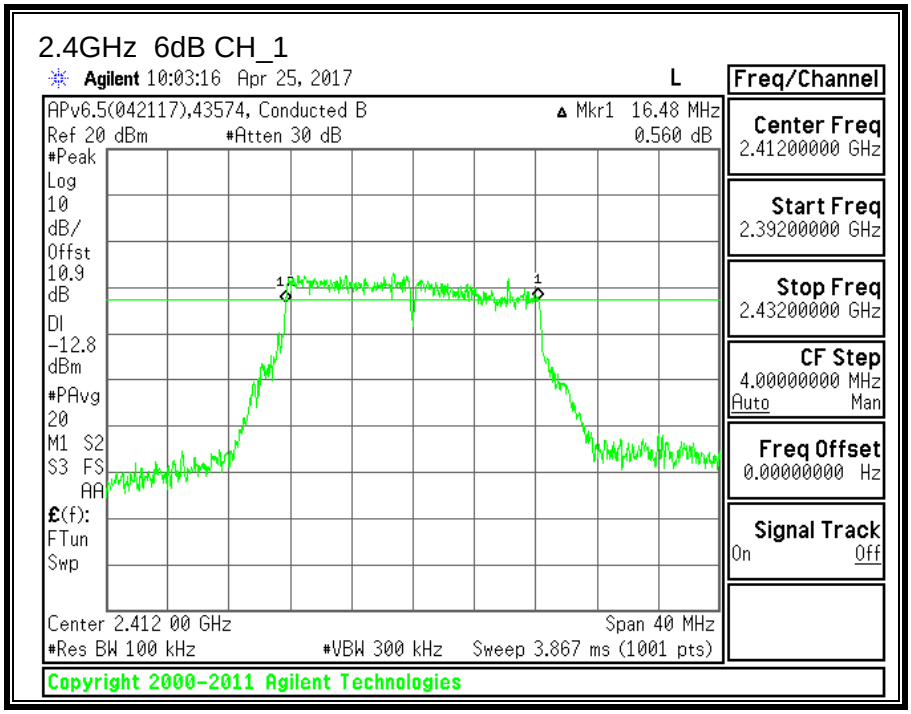
LIMITS

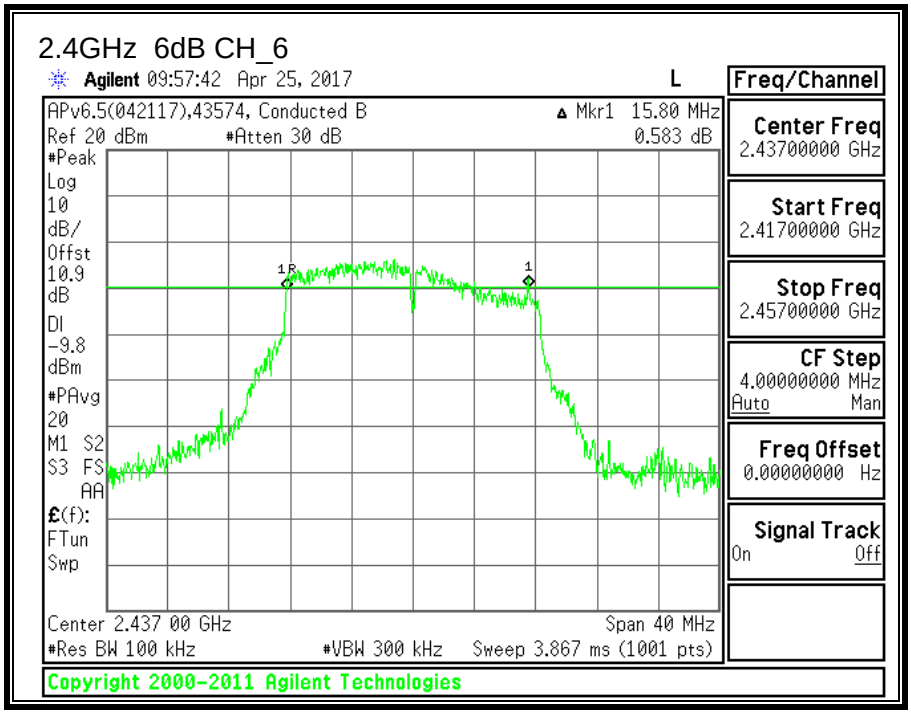
FCC §15.247 (a) (2)
IC RSS-247 (5.2) (a)

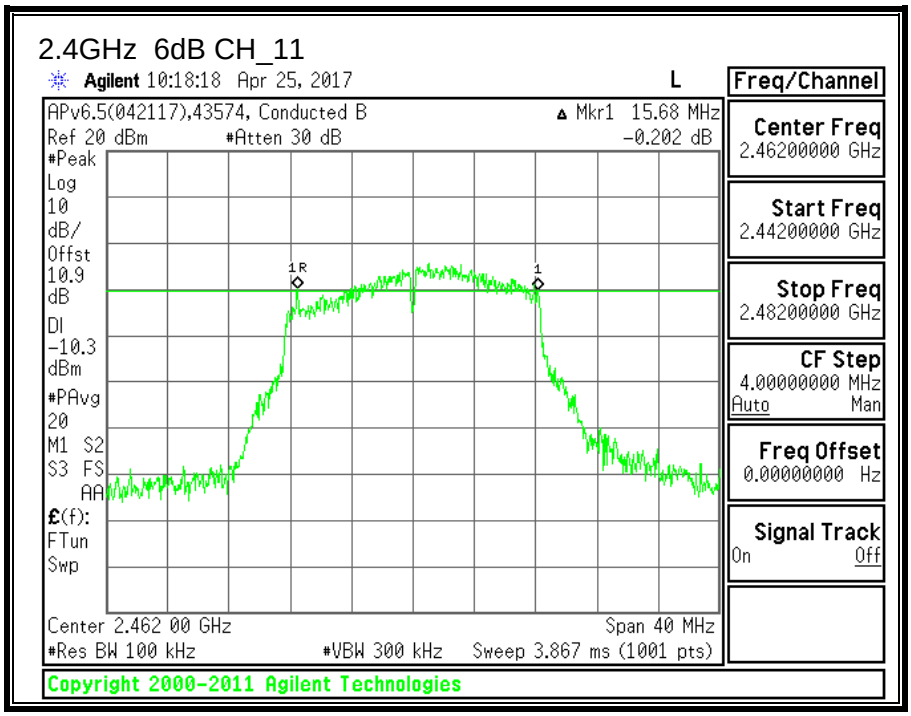
The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

Channel	Frequency	6 dB BW (MHz)	Minimum Limit (MHz)
Low_1	2412	16.48	0.5
Middle_6	2437	15.80	0.5
High_11	2462	15.68	0.5







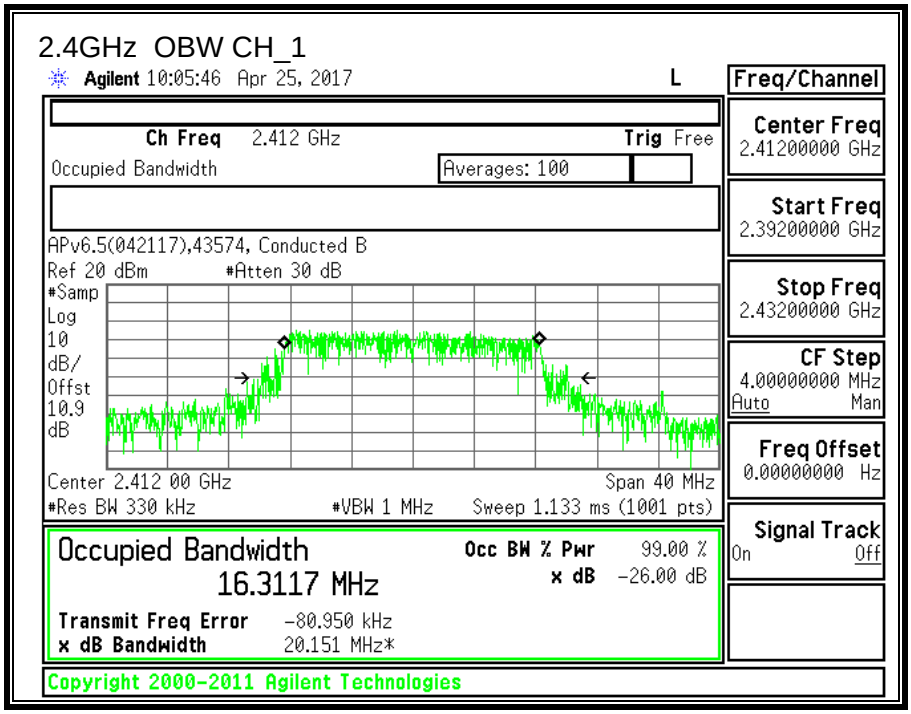
9.2.2. 99% BANDWIDTH

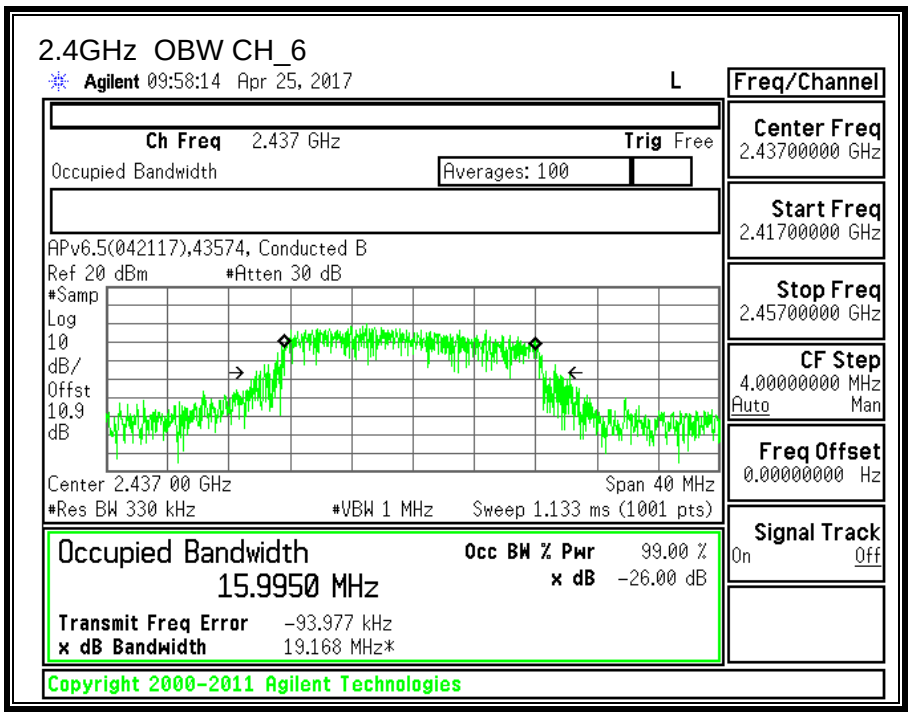
LIMITS

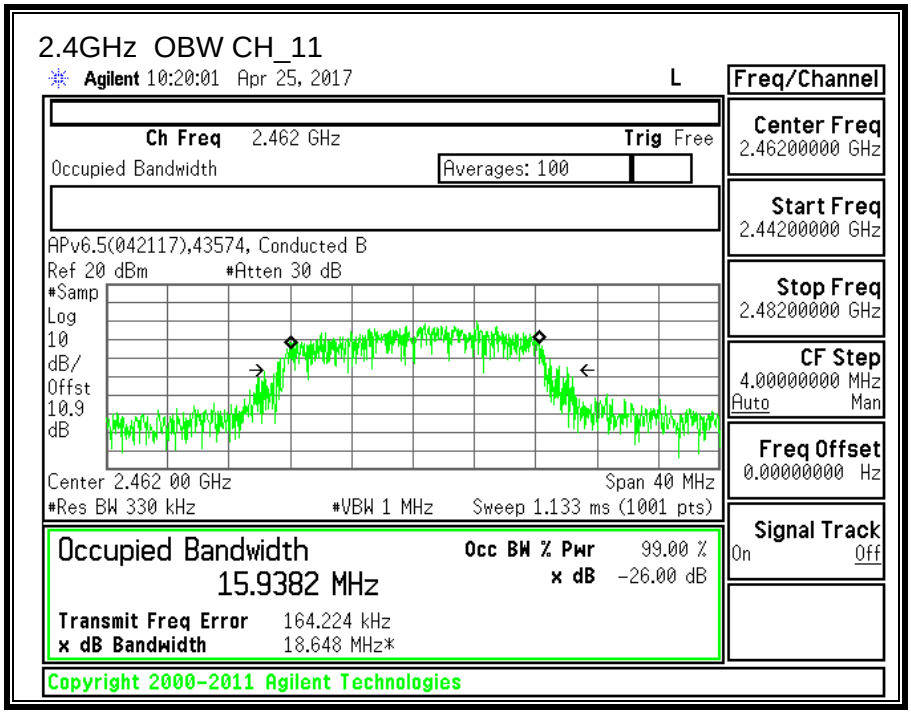
None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low_1	2412	16.312
Middle_6	2437	15.995
High_11	2462	15.938







9.2.3. OUTPUT POWER

LIMITS

FCC §15.247
IC RSS-247 (5.4) (d)

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

DIRECTIONAL ANTENNA GAIN

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

RESULTS

ID:	45250	Date:	4/26/17

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	1.90	30.00	30	36	30.00
Mid	2437	1.90	30.00	30	36	30.00
High	2462	1.90	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	12.70	12.70	30.00	-17.30
Mid	2437	13.17	13.17	30.00	-16.83
High	2462	13.68	13.68	30.00	-16.32

9.2.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247
IC RSS-247 (5.2) (b)

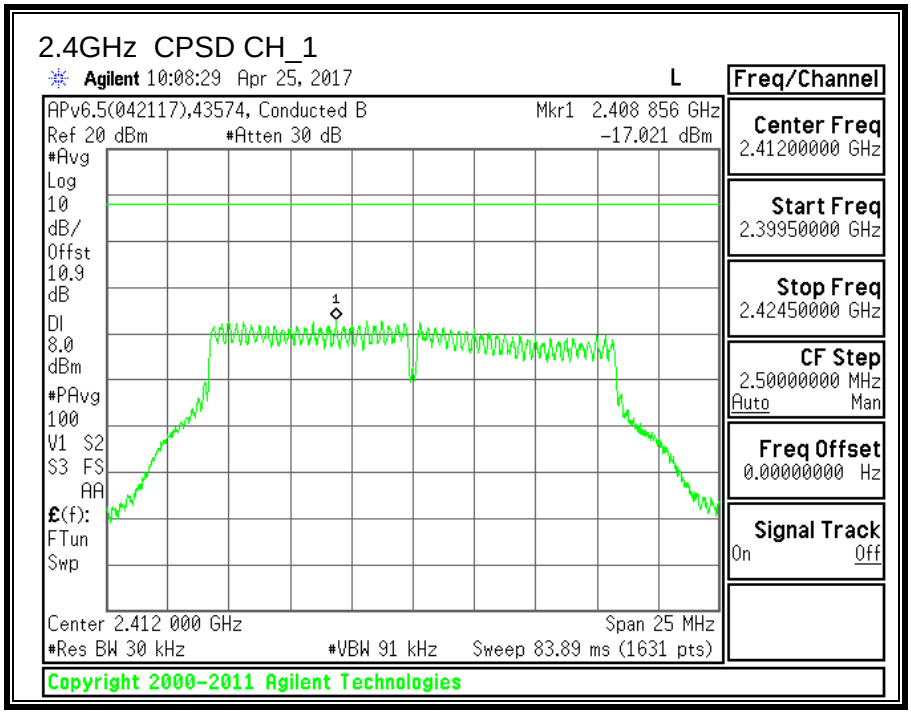
For digitally modulated systems, the power spectral density conducted form the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 KHz band during any time interval of continuous transmissions.

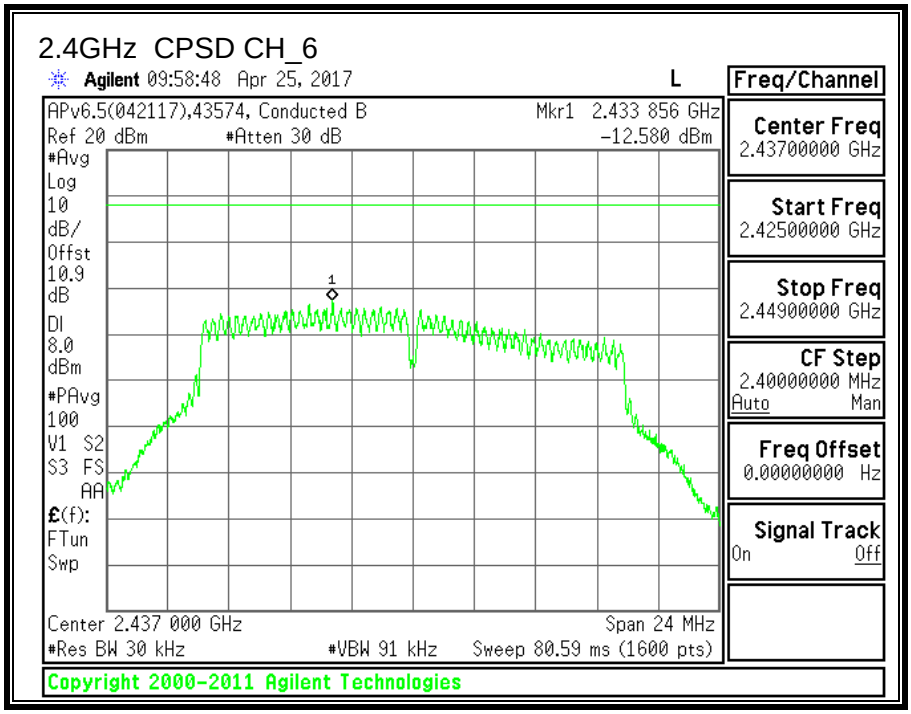
RESULTS

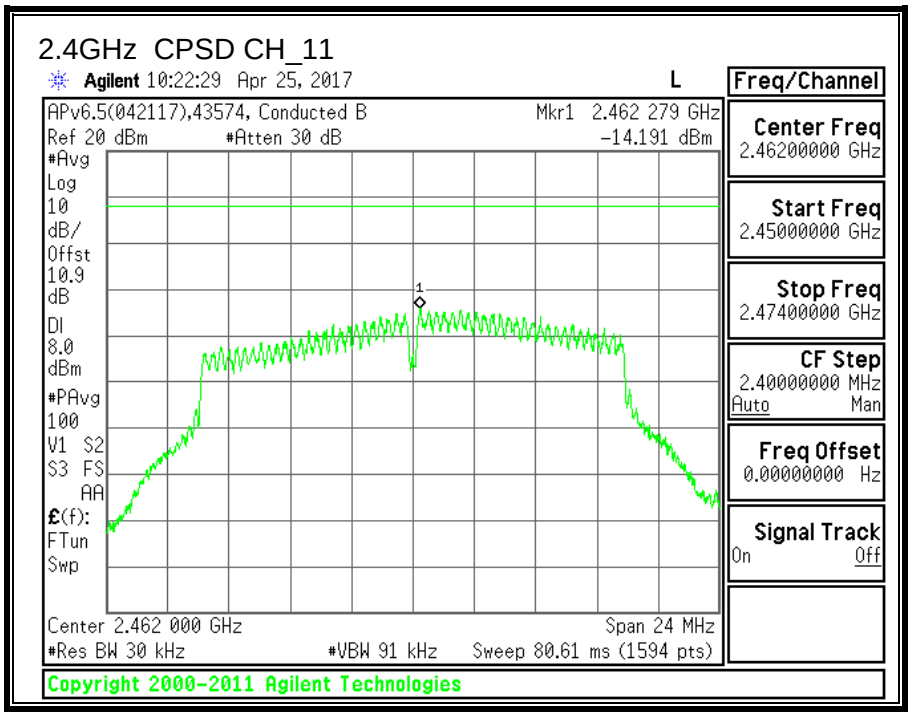
Duty Cycle CF (dB)	0.30	Included in Calculations of Corr'd PSD

PSD Results

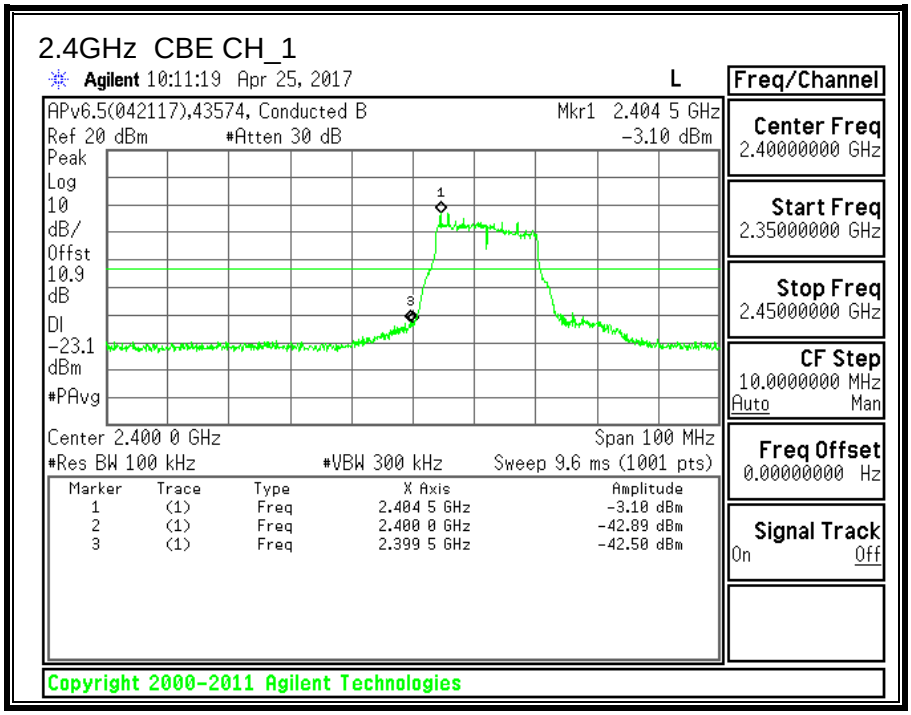
Channel	Frequency (MHz)	Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-17.02	-16.72	8.0	-24.7
Mid	2437	-12.58	-12.28	8.0	-20.3
High	2462	-14.19	-13.89	8.0	-21.9

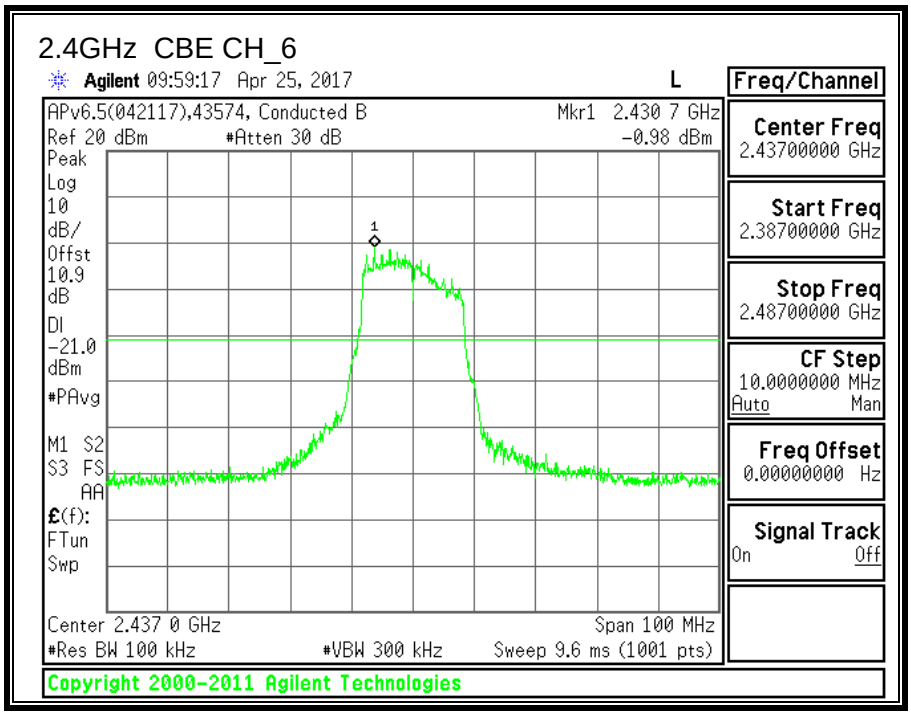


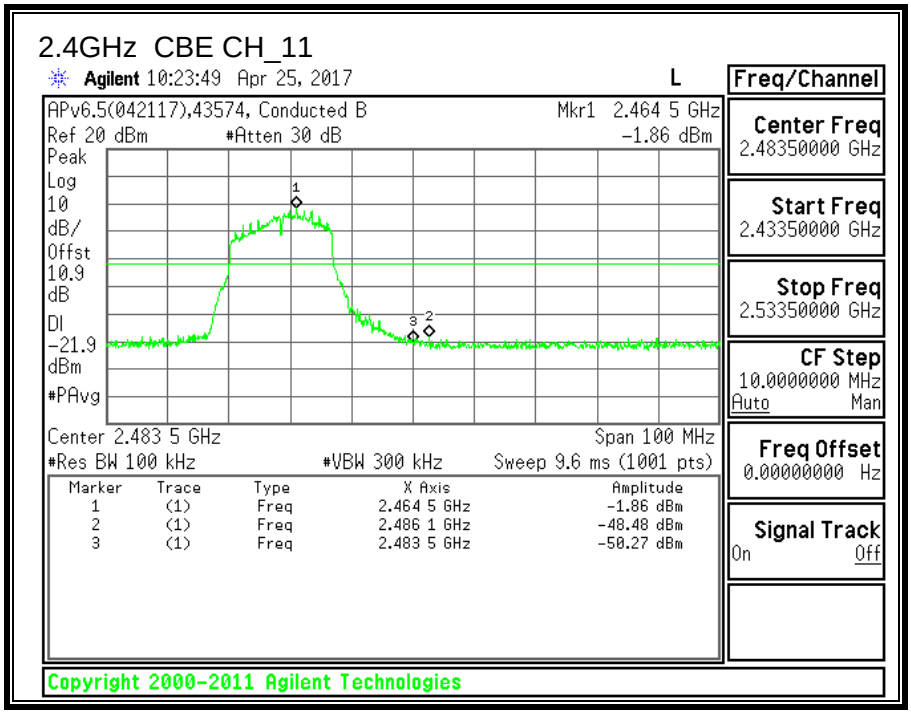


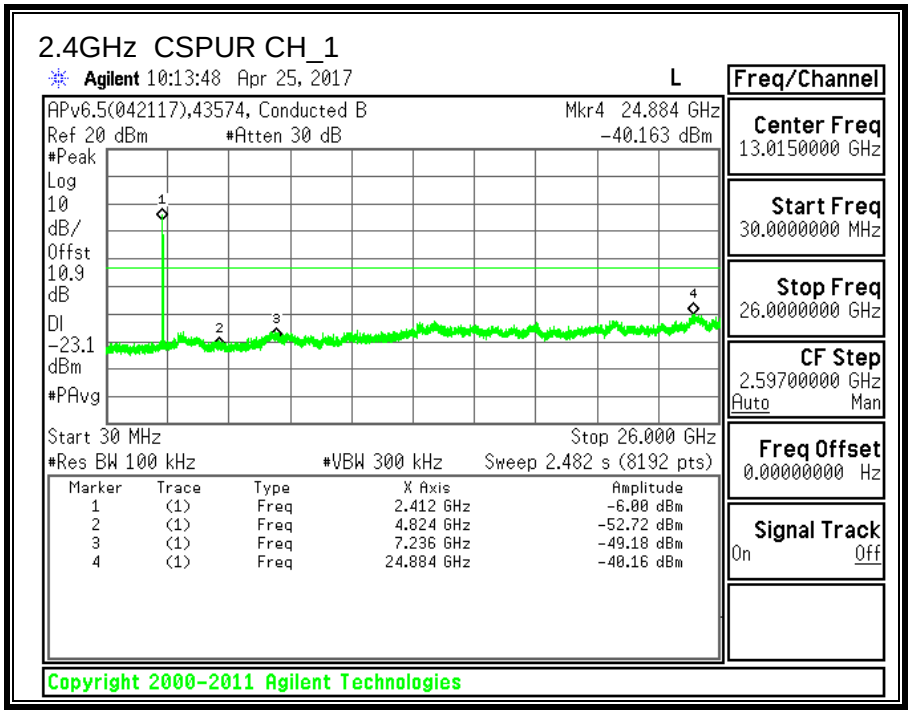


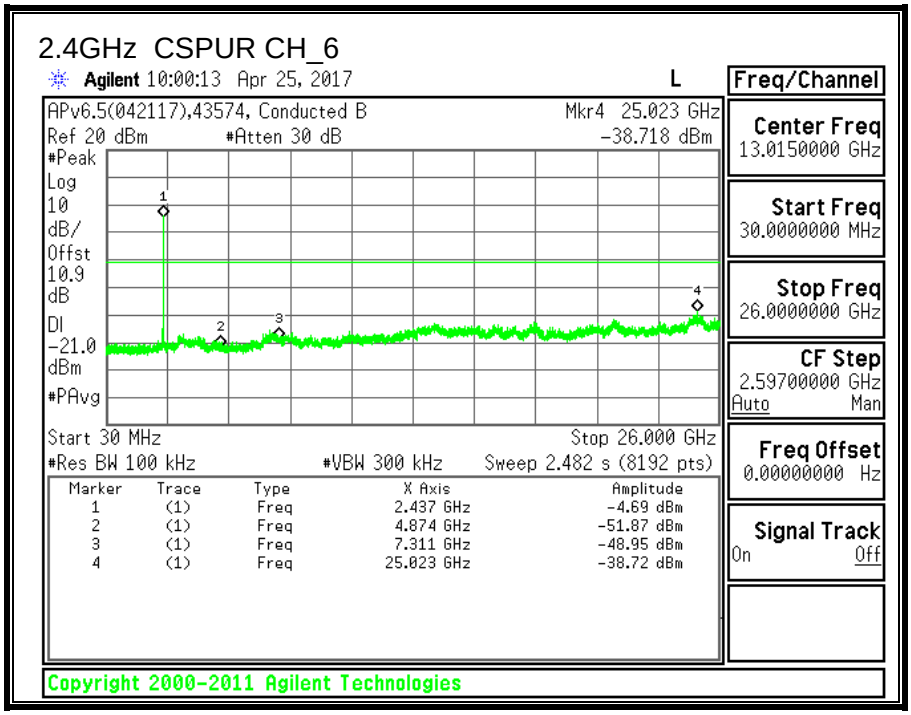
9.2.5. CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS

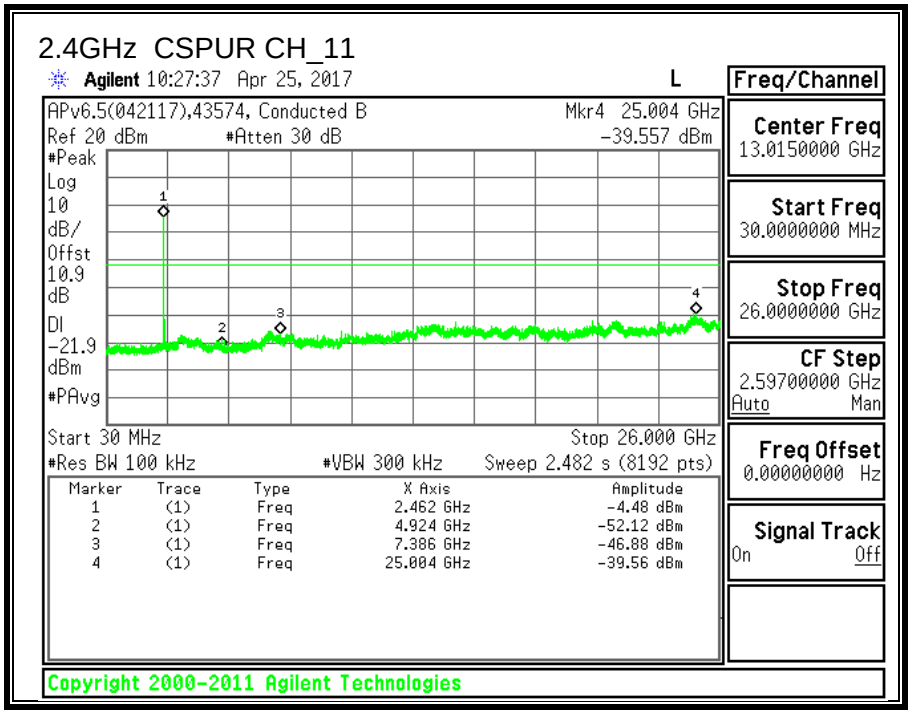












NOTE: The device complies with -30dBc limit over the tested frequency range. See below table.

802.11g mode CBE data (dBm)	-20dBc limit (dBm)	-30dBc limit (dBm)
Channel 1	Ch1: -23.1	Ch1: -33.10
-52.72		
-49.18		
-40.16		
Channel 6	Ch6: -21.0	Ch6: -30.98
-51.87		
-48.95		
-38.72		
Channel 11	Ch11: -21.9	Ch11: -31.86
-52.12		
-46.88		
-39.56		

9.3. 11n HT20 SISO MODE IN THE 2.4GHz BAND

9.3.1. 6 dB BANDWIDTH

LIMITS

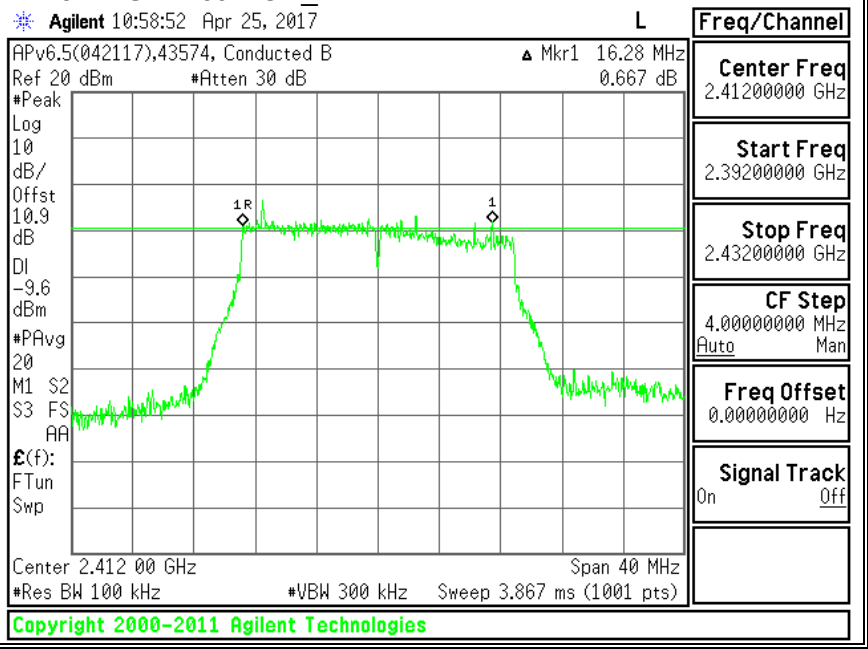
FCC §15.247 (a) (2)
IC RSS-247 (5.2) (a)

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

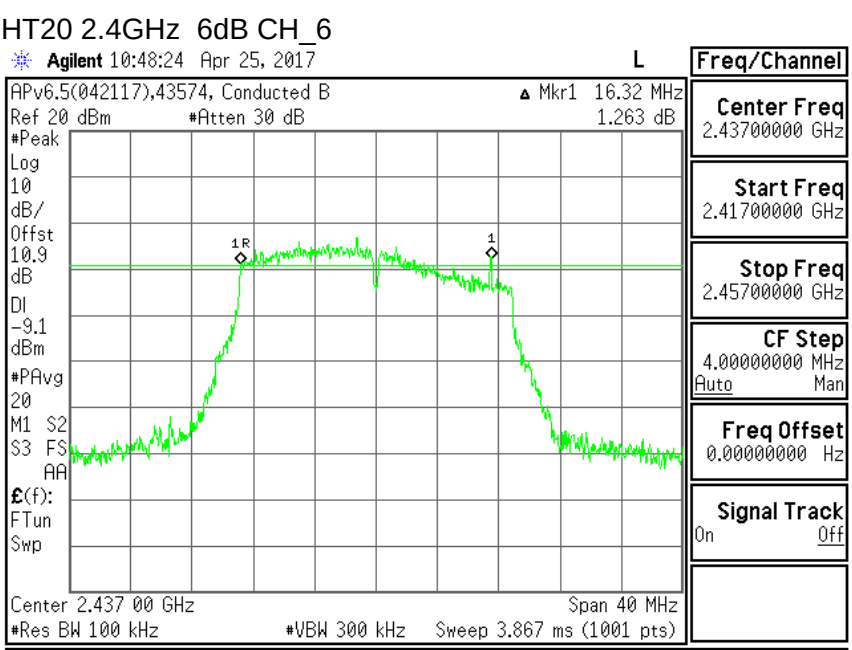
RESULTS

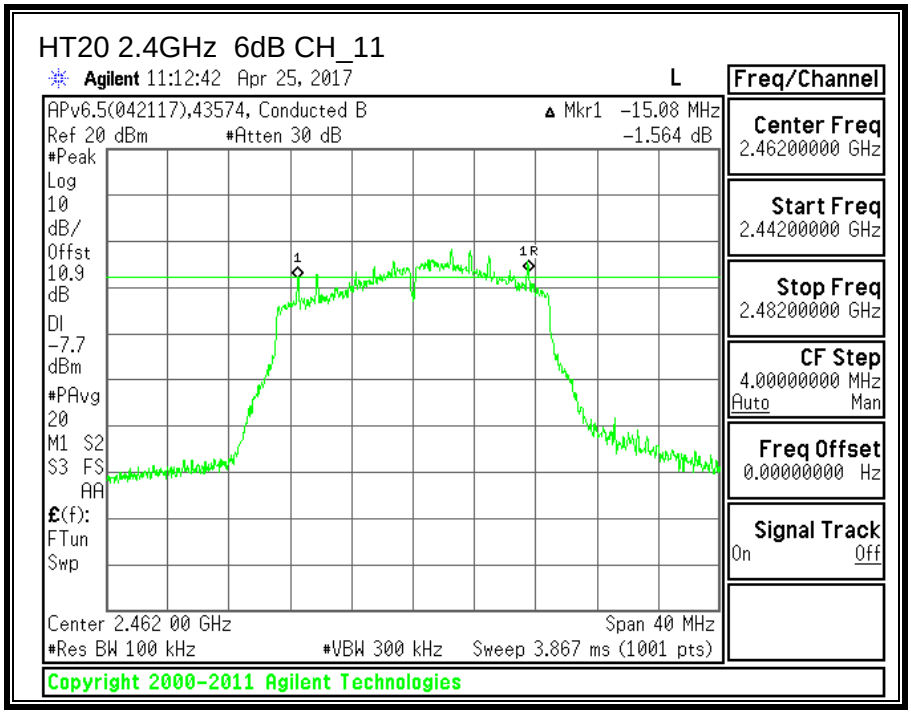
Channel	Frequency	6 dB BW (MHz)	Minimum Limit (MHz)
Low_1	2412	16.28	0.5
Middle_6	2437	16.32	0.5
High_11	2462	15.08	0.5

HT20 2.4GHz 6dB CH_1



HT20 2.4GHz 6dB CH_6





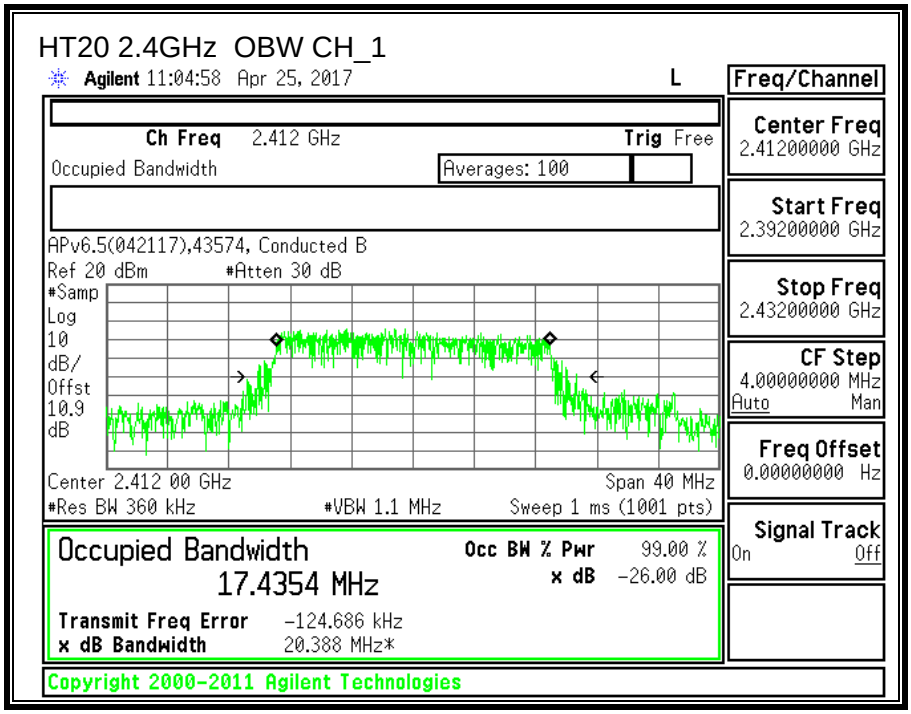
9.3.2. 99% BANDWIDTH

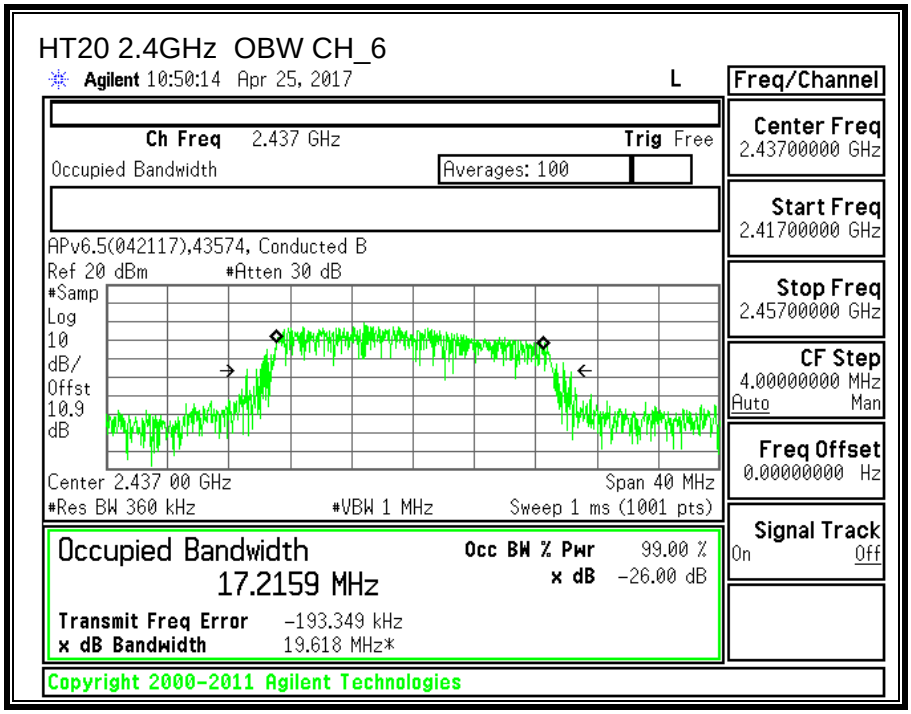
LIMITS

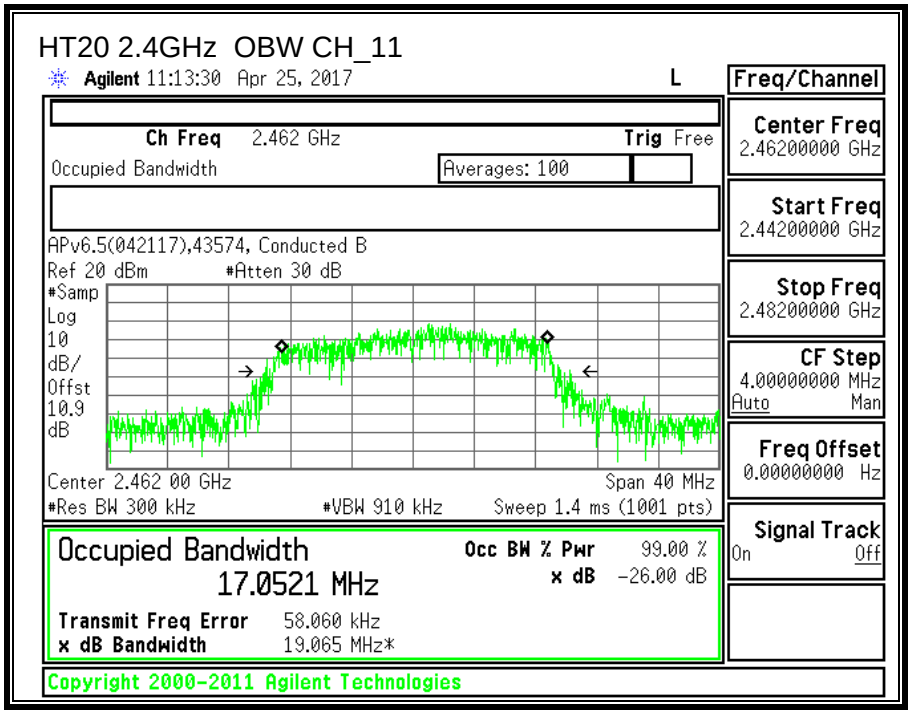
None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low_1	2412	17.435
Middle_6	2437	17.216
High_11	2462	17.052







9.3.3. OUTPUT POWER

LIMITS

FCC §15.247
IC RSS-247 (5.4) (d)

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

DIRECTIONAL ANTENNA GAIN

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

RESULTS

ID:	45250	Date:	4/26/17

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	1.90	30.00	30	36	30.00
Mid	2437	1.90	30.00	30	36	30.00
High	2462	1.90	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	12.40	12.40	30.00	-17.60
Mid	2437	12.84	12.84	30.00	-17.16
High	2462	12.80	12.80	30.00	-17.20

9.3.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247
IC RSS-247 (5.2) (b)

For digitally modulated systems, the power spectral density conducted form the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 KHz band during any time interval of continuous transmissions.

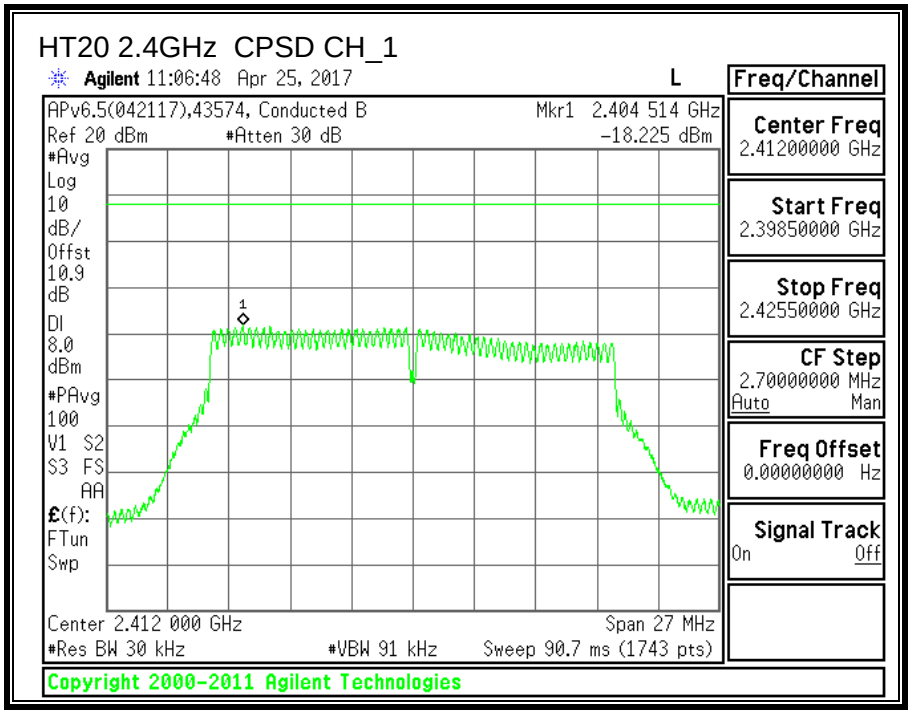
RESULTS

Duty Cycle CF (dB)	0.32	Included in Calculations of Corr'd PSD

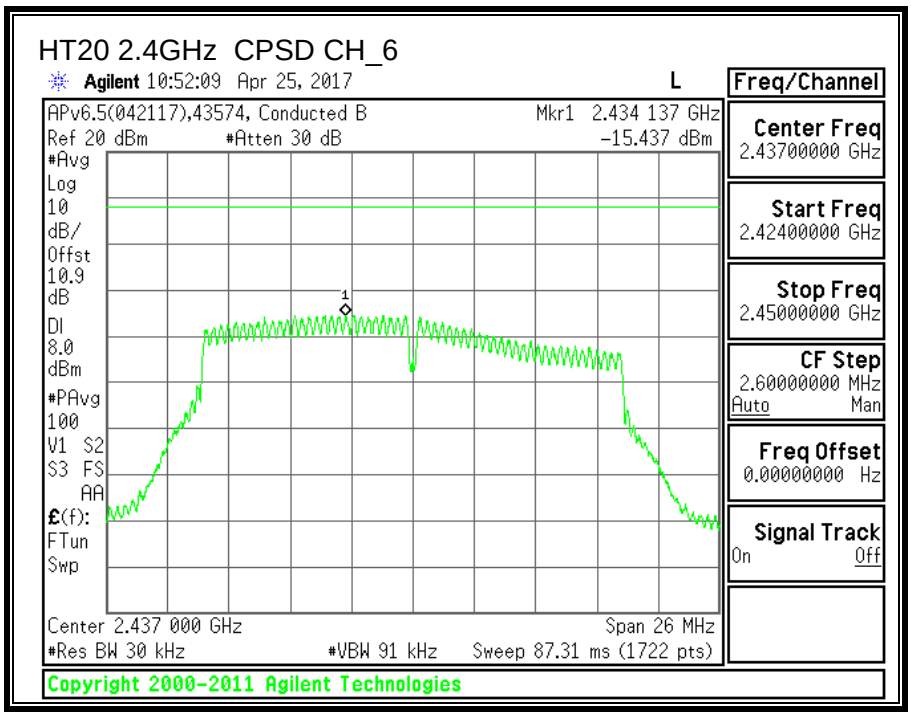
PSD Results

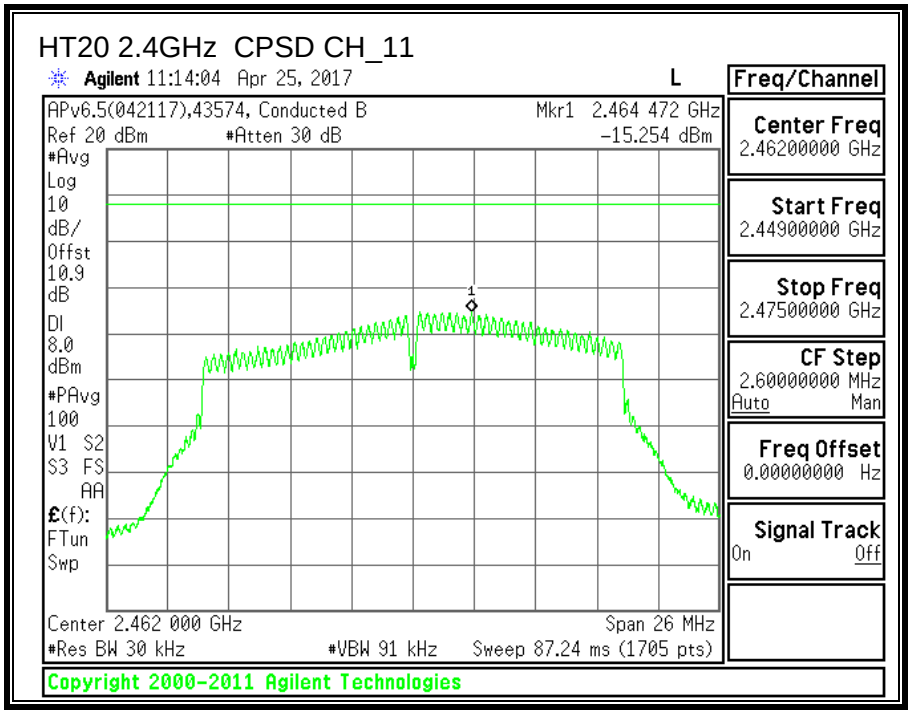
Channel	Frequency (MHz)	Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-18.23	-17.91	8.0	-25.9
Mid	2437	-15.44	-15.12	8.0	-23.1
High	2462	-15.25	-14.93	8.0	-22.9

HT20 2.4GHz CPSD CH_1

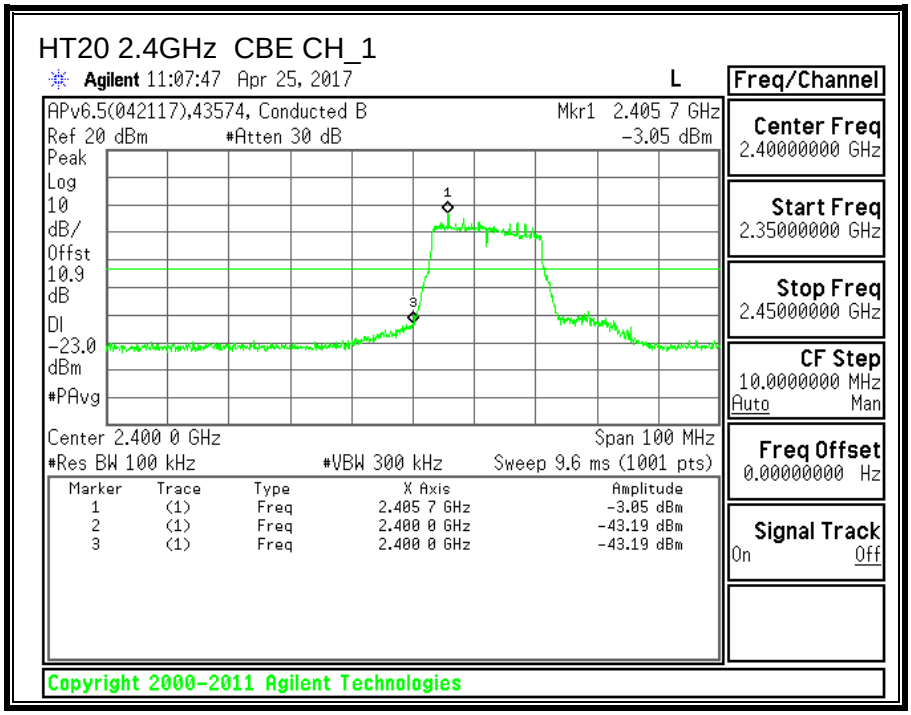


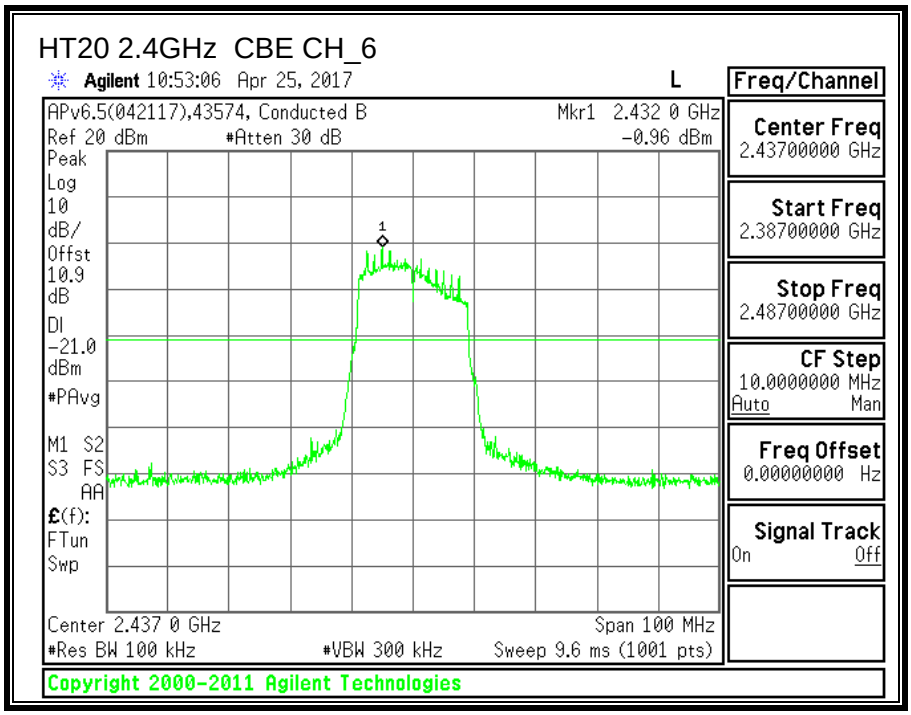
HT20 2.4GHz CPSD CH_6

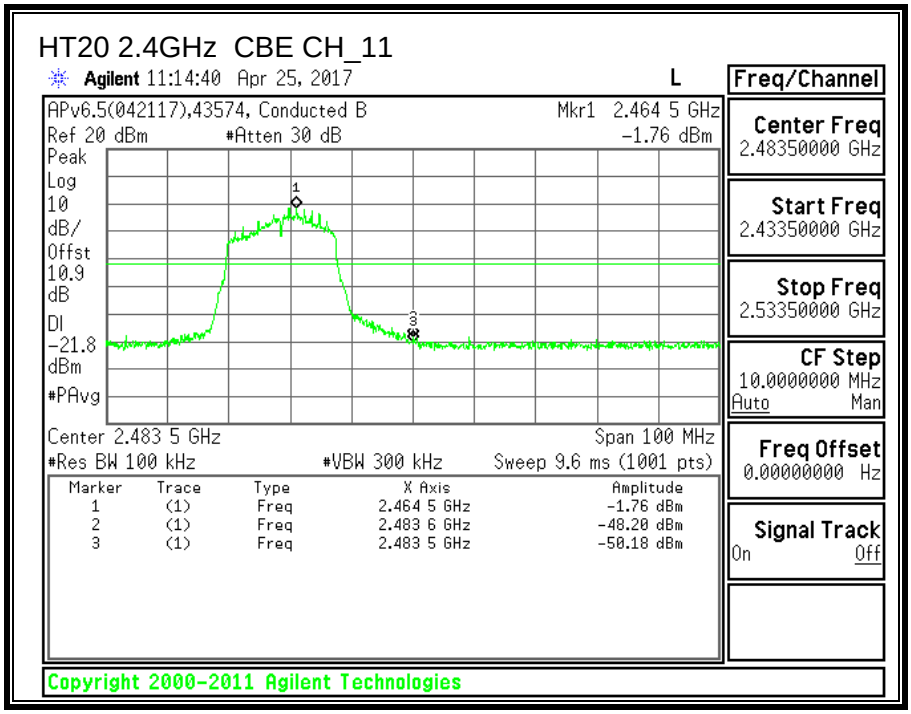




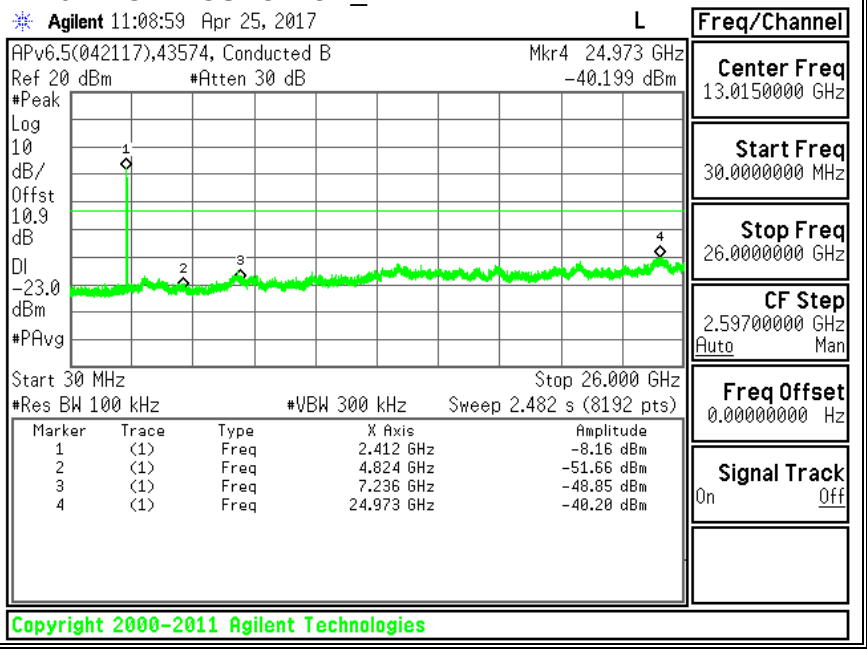
9.3.5. CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS



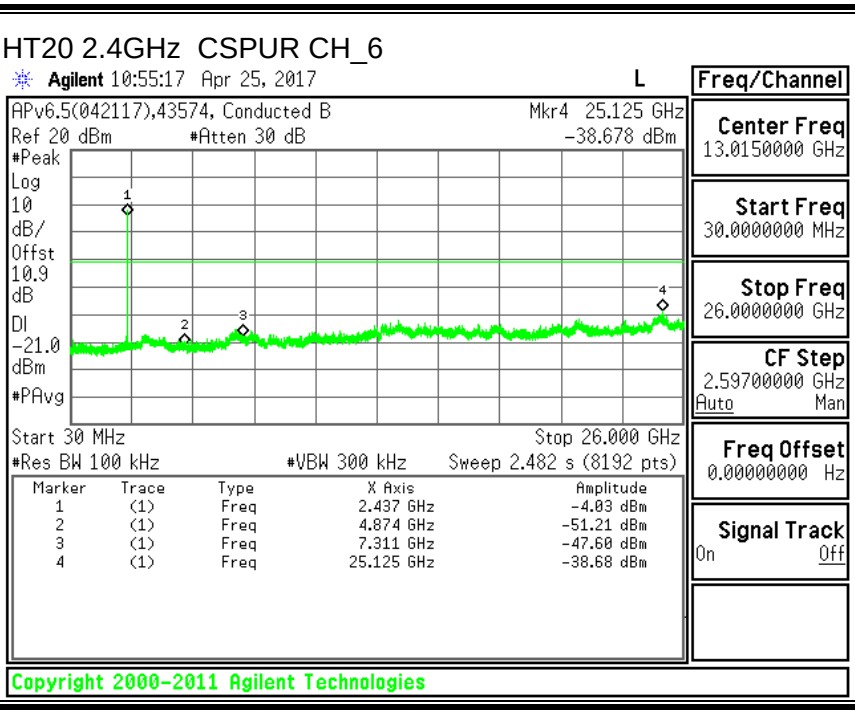


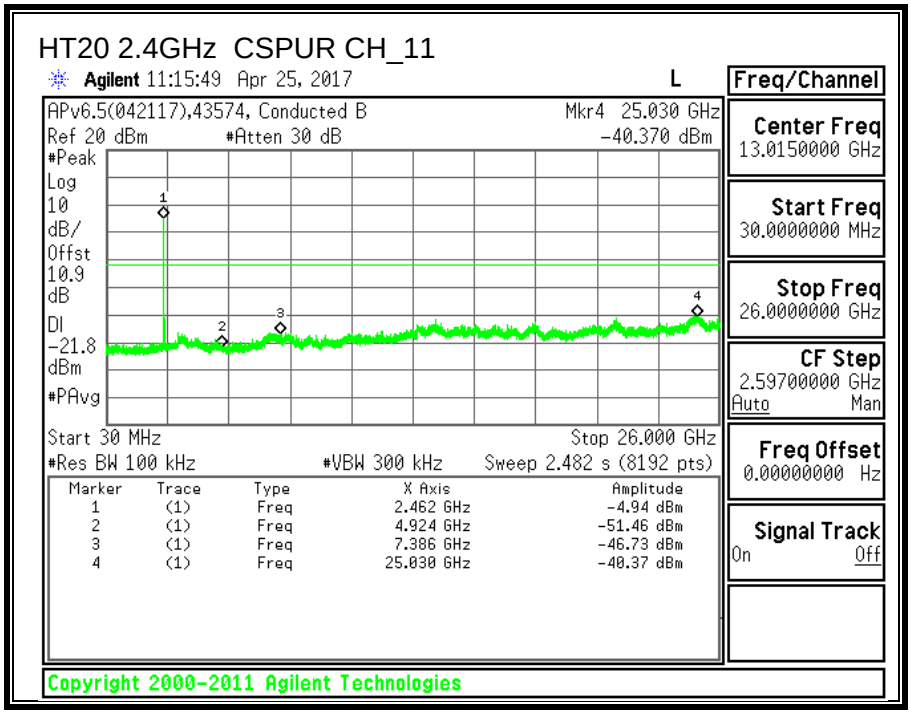


HT20 2.4GHz CSPUR CH_1



HT20 2.4GHz CSPUR CH_6





NOTE: The device complies with -30dBc limit over the tested frequency range. See below table.

802.11 HT20 mode CBE data (dBm)	-20dBc limit (dBm)	-30dBc limit (dBm)
Channel 1	Ch1: -23.0	Ch1: -33.05
-51.66		
-48.85		
-40.20		
Channel 6	Ch6: -21.0	Ch6: -30.96
-51.21		
-47.60		
-38.68		
Channel 11	Ch11: -21.8	Ch11: -31.76
-51.46		
-46.73		
-40.37		

10. RADIATED TEST RESULTS

10.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209
IC RSS-GEN, Section 8.9 and 8.10.

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
0.009-0.490	2400/F(kHz) @ 300 m	2400/F(kHz) @ 300m
0.490-1.705	24000/F(kHz) @ 30 m	24000/F(kHz) @ 30m
1.705 - 30	30 @ 30m	30 @ 30m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

NOTE: KDB 414788 D01 OATS and Chamber Correlation Justification

- Based on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.
- OATs and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz; 1.5 m above the ground plane for measurement above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 120 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements for the 30-1000 MHz range, 9 kHz for peak detection measurements or 9 kHz for quasi-peak detection measurements for the 0.15-30 MHz range and 200 Hz for peak detection measurements or 200 Hz for quasi-peak detection measurements for the 9 to 150 kHz range. Peak detection is used unless otherwise noted as quasi-peak.

For pre-scans above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 KHz for peak measurements.

For final measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and as applicable for average measurements.

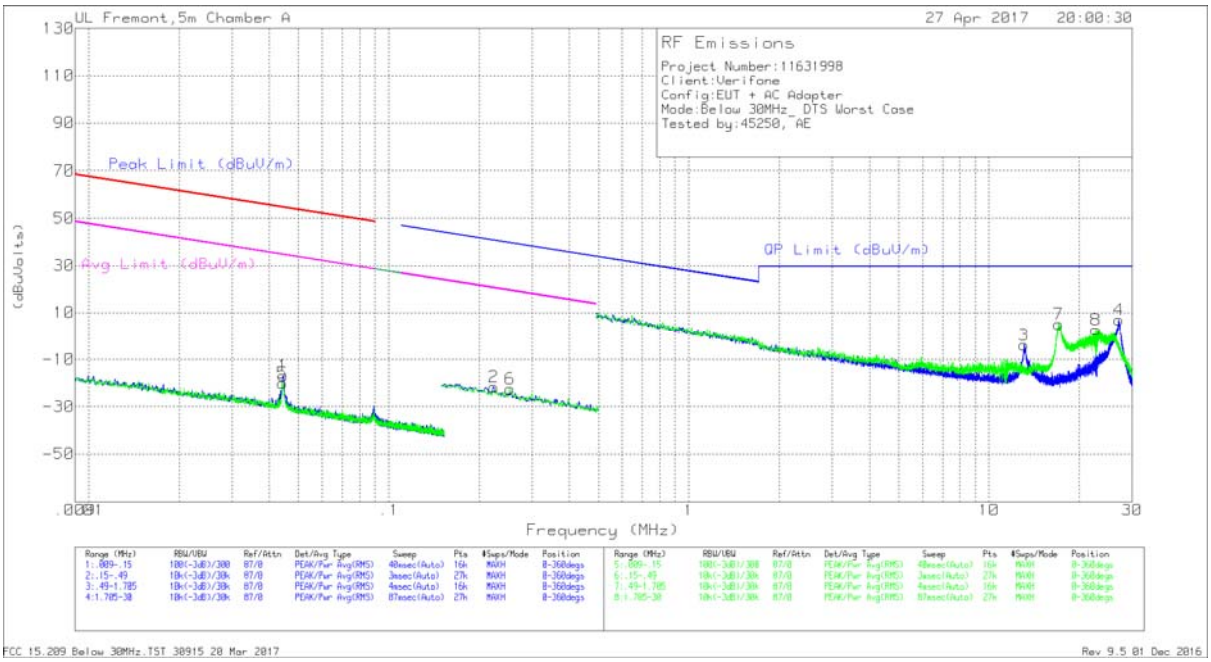
The spectrum from 1 GHz to 18 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band. Below 1GHz and above 18GHz emissions, the channel with the highest output power was tested.

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

10.2. WORST-CASE BELOW 30MHz

SPURIOUS EMISSIONS BELOW 30 MHz (WORST-CASE CONFIGURATION)

HORIZONTAL AND VERTICAL PLOTS



NOTE: KDB 414788 D01 OATS and Chamber Correlation Justification

- Based on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.
- OATs and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cbl (dB)	Dist Corr 300m	Corrected Reading (dBuVolts)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	QP Limit (dBuV/m)	Margin (dB)	QP Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
5	0.04432	46.82	Pk	12.9	0.1	-80	-20.18	54.65	-74.83	34.65	-54.83	-	-	-	-	-	-	-	-	0-360
1	0.04433	50.18	Pk	12.9	0.1	-80	-16.82	54.65	-71.47	34.65	-51.47	-	-	-	-	-	-	-	-	0-360
2	0.22333	46.73	Pk	11.5	0.1	-80	-21.67	-	-	-	-	-	-	-	-	40.64	-62.31	20.64	-42.31	0-360
6	0.25371	45.95	Pk	11.5	0.1	-80	-22.45	-	-	-	-	-	-	-	-	39.53	-61.98	19.53	-41.98	0-360

Pk - Peak detector

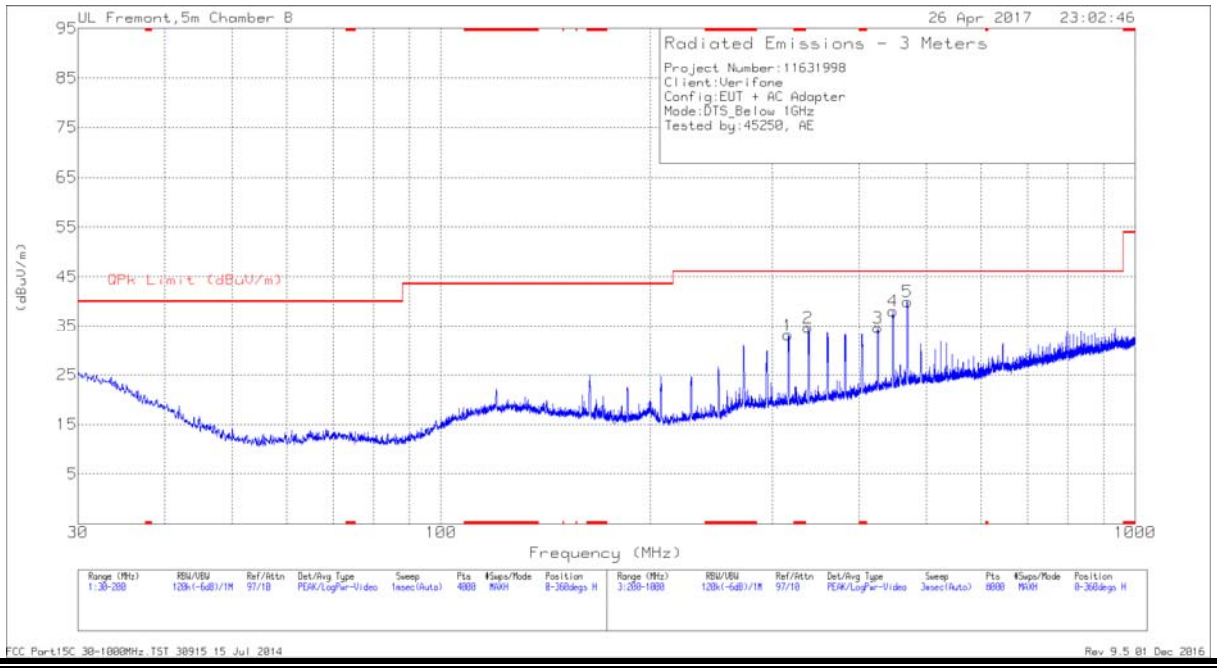
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cbl (dB)	Dist Corr 30m	Corrected Reading (dBuVolts)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	QP Limit (dBuV/m)	Margin (dB)	QP Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
3	13.102	25.01	Pk	10.4	0.6	-40	-3.99	-	-	-	-	-	-	29.5	-33.49	-	-	-	-	0-360
7	17.04824	34.66	Pk	10	0.6	-40	5.26	-	-	-	-	-	-	29.5	-24.24	-	-	-	-	0-360
8	22.71216	32.72	Pk	9.3	0.7	-40	2.72	-	-	-	-	-	-	29.5	-26.78	-	-	-	-	0-360
4	27.14258	37.61	Pk	8.5	0.8	-40	6.91	-	-	-	-	-	-	29.5	-22.59	-	-	-	-	0-360

Pk - Peak detector

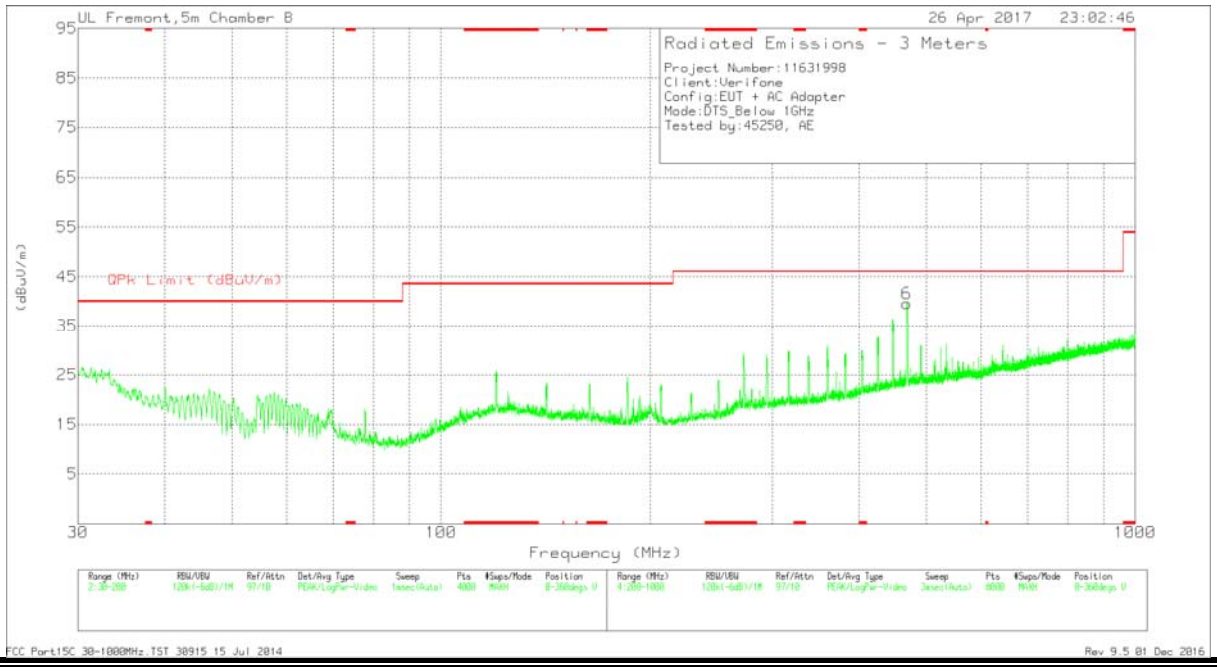
10.3. WORST-CASE BELOW 1 GHz

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

HORIZONTAL PLOT



VERTICAL PLOT



Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T477 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	316.3151	41.09	Pk	17.8	-25.8	33.09	46.02	-12.93	0-360	100	H
2	338.118	42.45	Pk	18	-25.8	34.65	46.02	-11.37	0-360	100	H
3	425.6293	40.16	Pk	20.4	-25.9	34.66	46.02	-11.36	0-360	200	H
4	447.9322	43.39	Pk	20.7	-26.1	37.99	46.02	-8.03	0-360	100	H
6	469.035	44.18	Pk	21.3	-25.9	39.58	46.02	-6.44	0-360	100	V
5	469.435	44.56	Pk	21.3	-25.9	39.96	46.02	-6.06	0-360	200	H

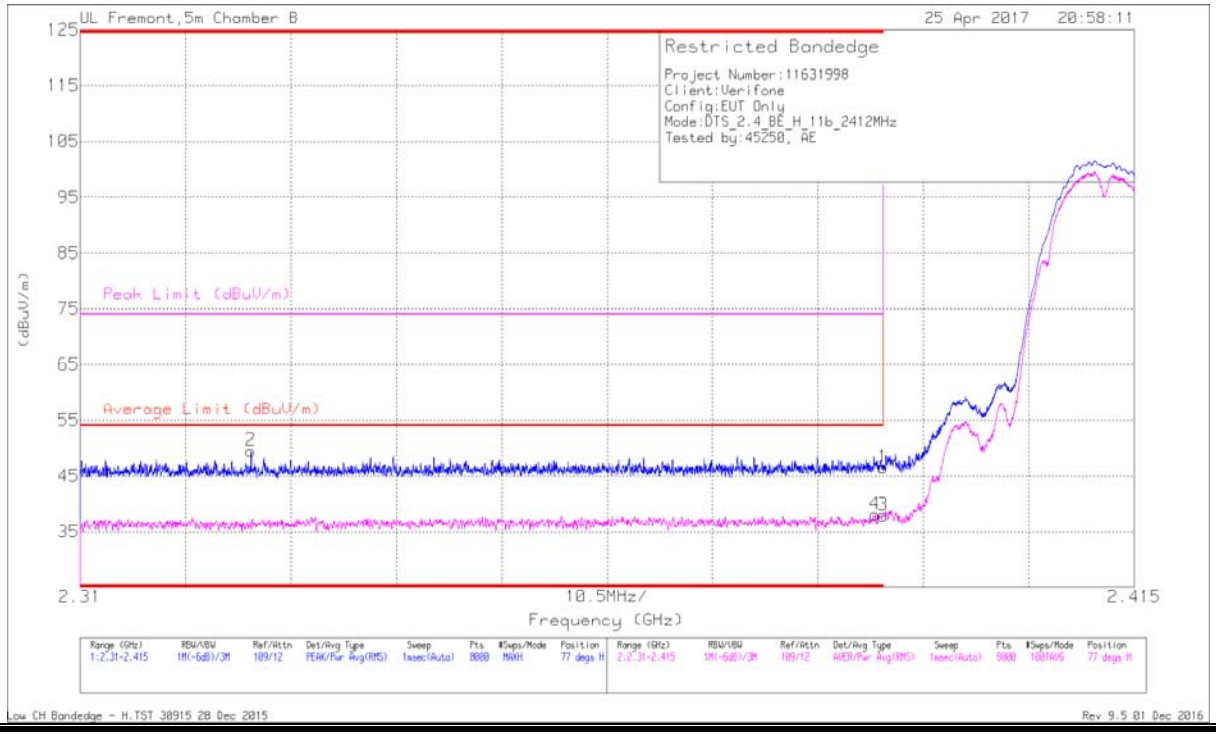
Pk - Peak detector

10.4. TRANSMITTER ABOVE 1 GHz

10.4.1. 11b SISO MODE IN THE 2.4GHz BAND

BANDEDGE (LOW CHANNEL, CH 1)

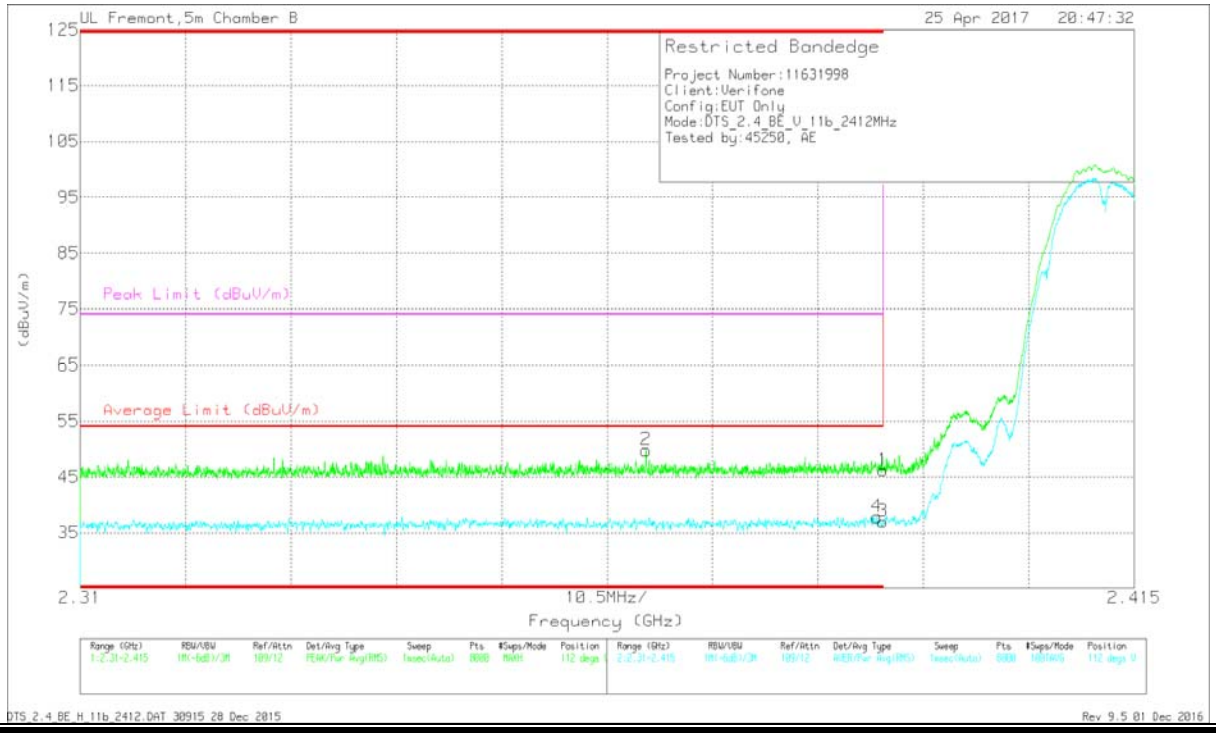
LOW CHANNEL HORIZONTAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	* 2.327	39.1	Pk	31.8	-21.4	0	49.5	-	-	74	-24.5	77	154	H
4	* 2.389	27.49	RMS	31.9	-21.3	0	38.09	54	-15.91	-	-	77	154	H
1	* 2.39	35.82	Pk	32	-21.3	0	46.52	-	-	74	-27.48	77	154	H
3	* 2.39	27.25	RMS	32	-21.3	0	37.95	54	-16.05	-	-	77	154	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
RMS - RMS detection

LOW CHANNEL VERTICAL

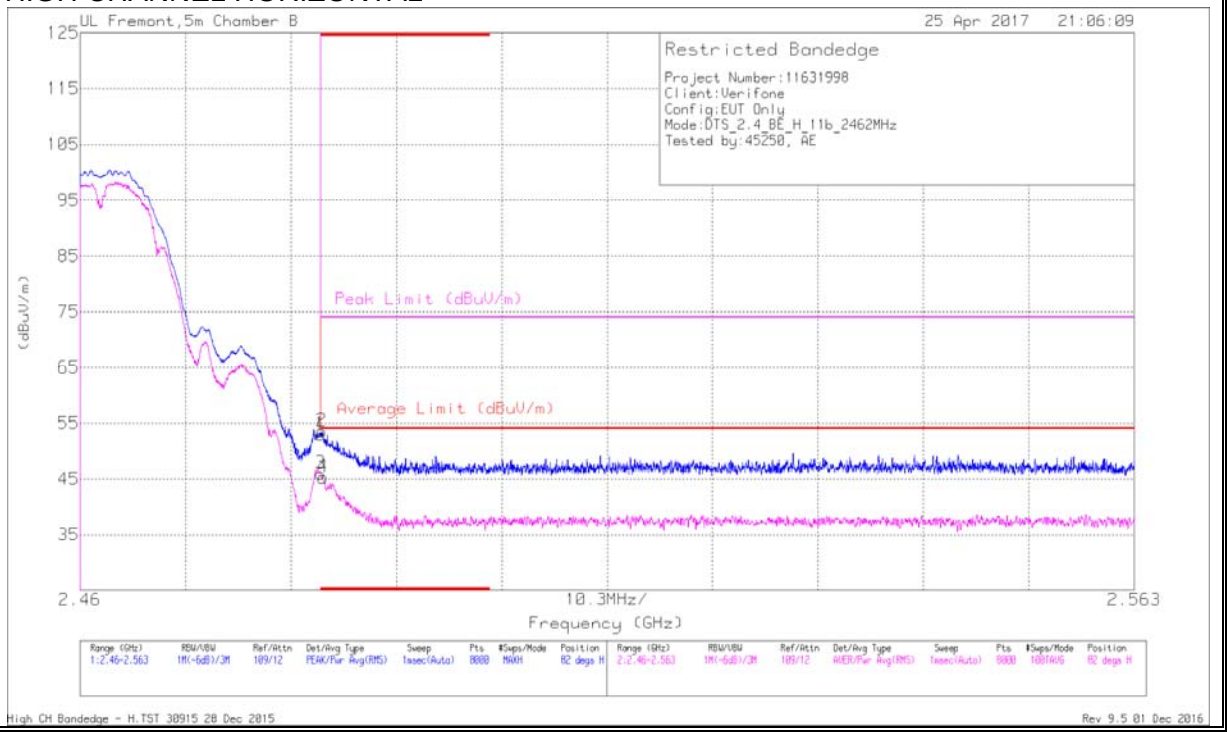


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	35.46	Pk	32	-21.3	0	46.16	-	-	74	-27.84	112	104	V
2	* 2.366	39.09	Pk	31.9	-21.2	0	49.79	-	-	74	-24.21	112	104	V
3	* 2.39	26.32	RMS	32	-21.3	0	37.02	54	-16.98	-	-	112	104	V
4	* 2.389	27.12	RMS	32	-21.3	0	37.82	54	-16.18	-	-	112	104	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
RMS - RMS detection

BANDEDGE (HIGH CHANNEL, CH 11)

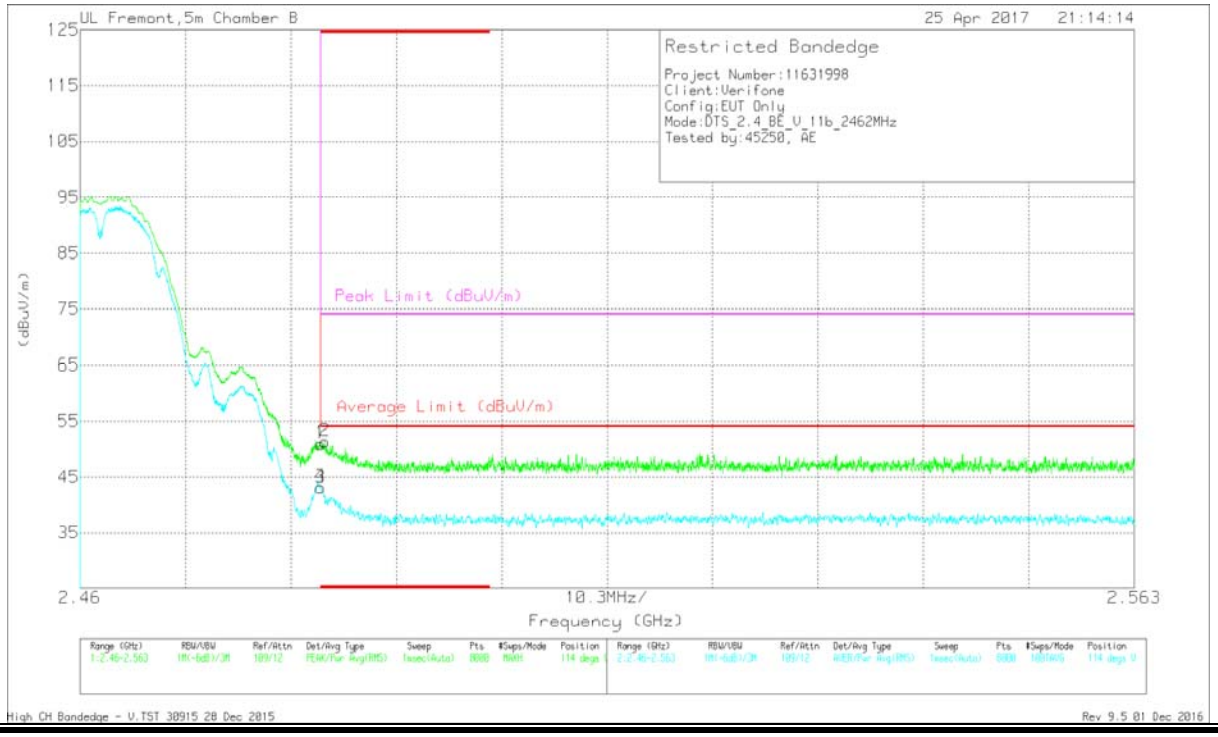
HIGH CHANNEL HORIZONTAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	* 2.484	42.03	Pk	32.1	-21.2	0	52.93	-	-	74	-21.07	82	119	H
2	* 2.484	42.65	Pk	32.1	-21.2	0	53.55	-	-	74	-20.45	82	119	H
3	* 2.484	35.05	RMS	32.1	-21.2	0	45.95	54	-8.05	-	-	82	119	H
4	* 2.484	34.37	RMS	32.1	-21.2	0	45.27	54	-8.73	-	-	82	119	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
RMS - RMS detection

HIGH CHANNEL VERTICAL

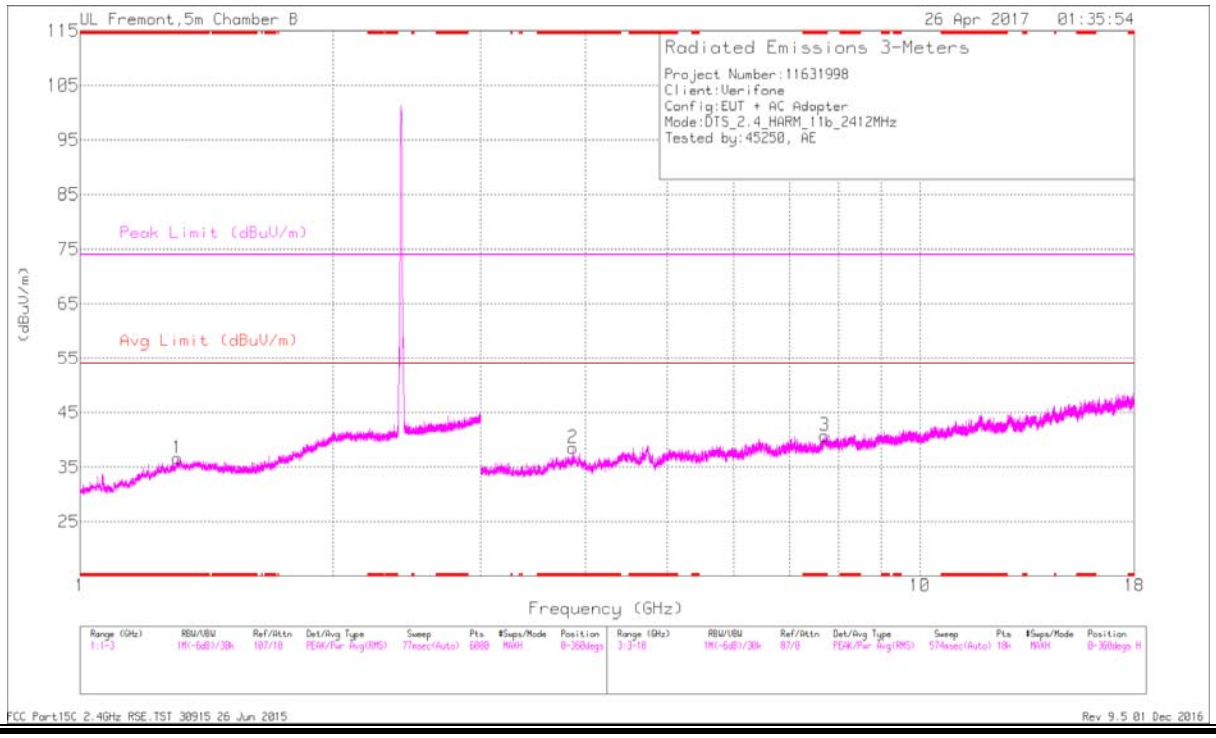


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	40.06	Pk	32.1	-21.2	0	50.96	-	-	74	-23.04	114	144	V
2	* 2.484	40.46	Pk	32.1	-21.2	0	51.36	-	-	74	-22.64	114	144	V
3	* 2.484	32.22	RMS	32.1	-21.2	0	43.12	54	-10.88	-	-	114	144	V
4	* 2.484	32.26	RMS	32.1	-21.2	0	43.16	54	-10.84	-	-	114	144	V

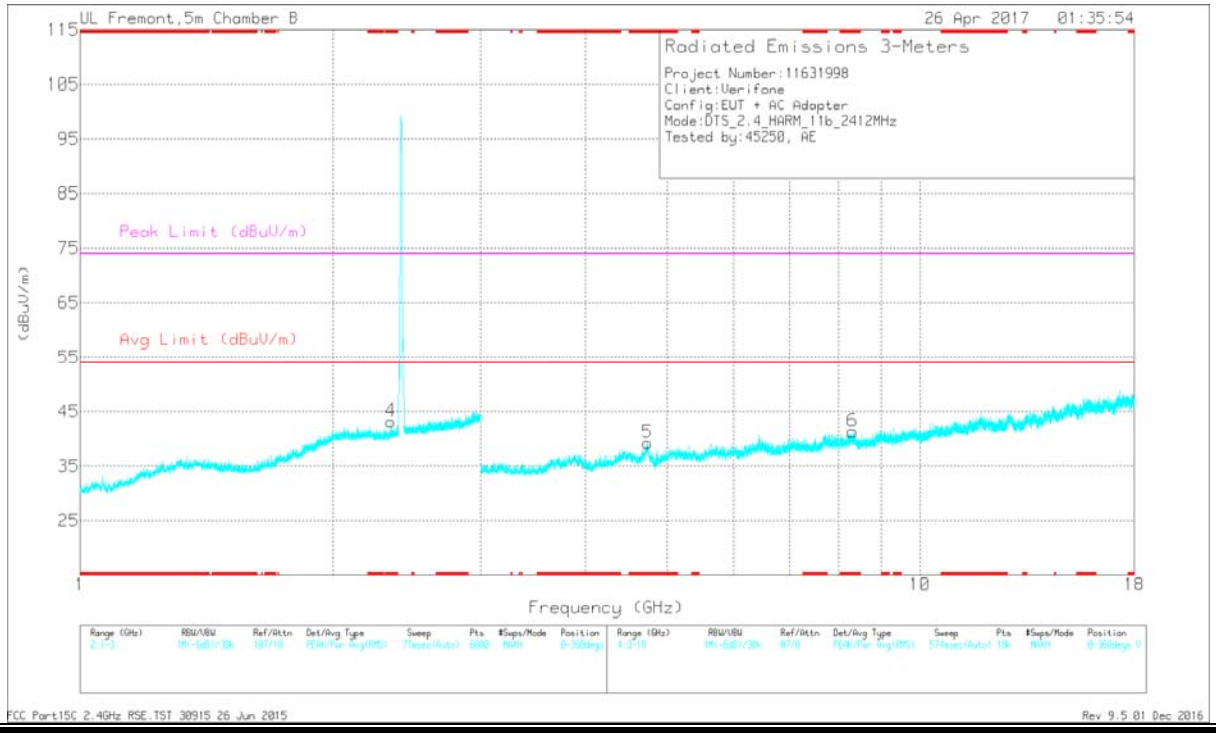
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS LOW CHANNEL, CH 1)

LOW CHANNEL HORIZONTAL



LOW CHANNEL VERTICAL



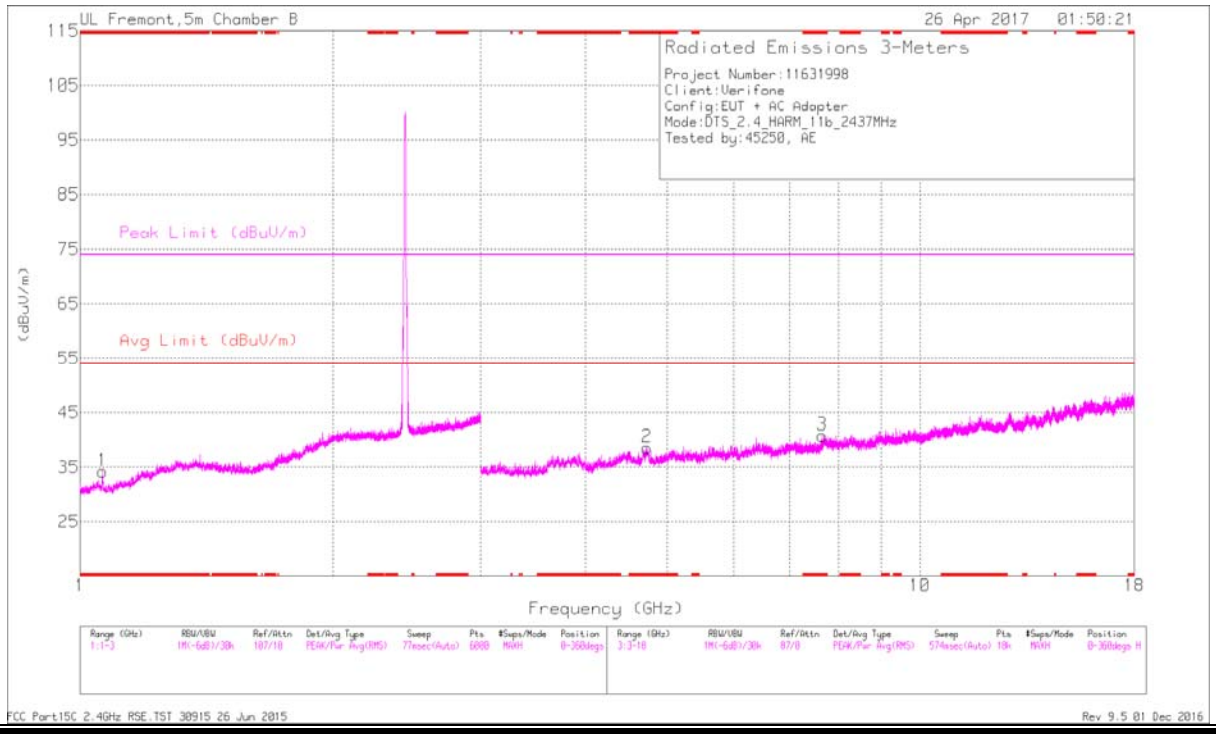
Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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
* 1.308	35.16	PK2	28.9	-22	0	42.06	-	-	74	-31.94	50	199	H
* 1.308	23.91	MAv1	28.9	-22	0	30.81	54	-23.19	-	-	50	199	H
* 2.345	36.45	PK2	31.8	-21.3	0	46.95	-	-	74	-27.05	88	231	V
* 2.342	25.13	MAv1	31.8	-21.4	0	35.53	54	-18.47	-	-	88	231	V
* 3.867	39.82	PK2	33.7	-29.6	0	43.92	-	-	74	-30.08	184	317	H
* 3.865	28.61	MAv1	33.7	-29.7	0	32.61	54	-21.39	-	-	184	317	H
* 7.706	36.02	PK2	36.5	-25.9	0	46.62	-	-	74	-27.38	247	274	H
* 7.703	25.22	MAv1	36.5	-25.9	0	35.82	54	-18.18	-	-	247	274	H
* 4.743	39.61	PK2	34.4	-28.6	0	45.41	-	-	74	-28.59	317	177	V
* 4.745	28.65	MAv1	34.4	-28.6	0	34.45	54	-19.55	-	-	317	177	V
* 8.319	36.84	PK2	36.5	-25.8	0	47.54	-	-	74	-26.46	360	197	V
* 8.316	24.68	MAv1	36.5	-25.8	0	35.38	54	-18.62	-	-	360	197	V

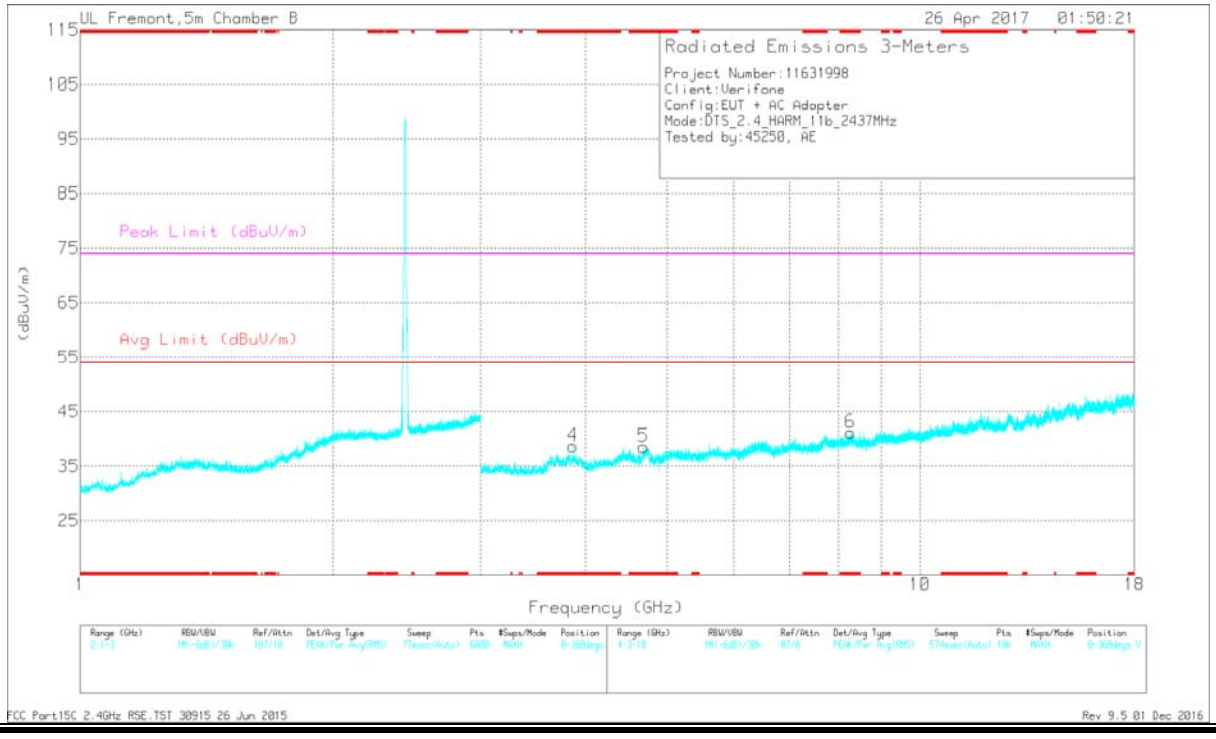
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAv1 - KDB558074 Option 1 Maximum RMS Average

HARMONICS AND SPURIOUS EMISSIONS MID CHANNEL, CH 6)

MID CHANNEL HORIZONTAL



MID CHANNEL VERTICAL



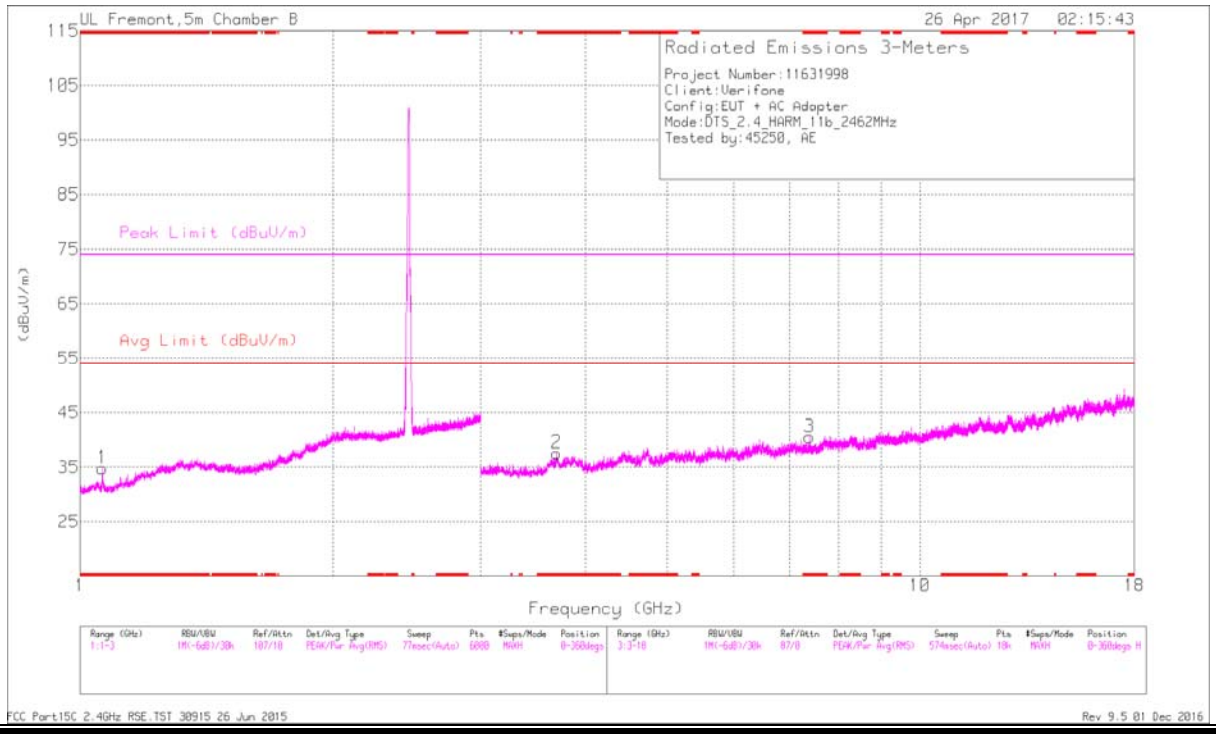
Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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
* 1.065	35.61	PK2	26.4	-22.9	0	39.11	-	-	74	-34.89	319	148	H
* 1.063	23.67	MAv1	26.4	-23	0	27.07	54	-26.93	-	-	319	148	H
* 4.734	40.12	PK2	34.4	-28.6	0	45.92	-	-	74	-28.08	211	193	H
* 4.733	28.48	MAv1	34.4	-28.6	0	34.28	54	-19.72	-	-	211	193	H
* 7.653	36.33	PK2	36.4	-26.7	0	46.03	-	-	74	-27.97	158	197	H
* 7.653	25.38	MAv1	36.4	-26.7	0	35.08	54	-18.92	-	-	158	197	H
* 3.863	39.86	PK2	33.7	-29.7	0	43.86	-	-	74	-30.14	81	132	V
* 3.861	28.64	MAv1	33.7	-29.8	0	32.54	54	-21.46	-	-	81	132	V
* 4.689	40.31	PK2	34.4	-29.8	0	44.91	-	-	74	-29.09	201	309	V
* 4.687	28.89	MAv1	34.4	-29.8	0	33.49	54	-20.51	-	-	201	309	V
* 8.269	36.12	PK2	36.5	-25.6	0	47.02	-	-	74	-26.98	36	110	V
* 8.268	25.38	MAv1	36.5	-25.7	0	36.18	54	-17.82	-	-	36	110	V

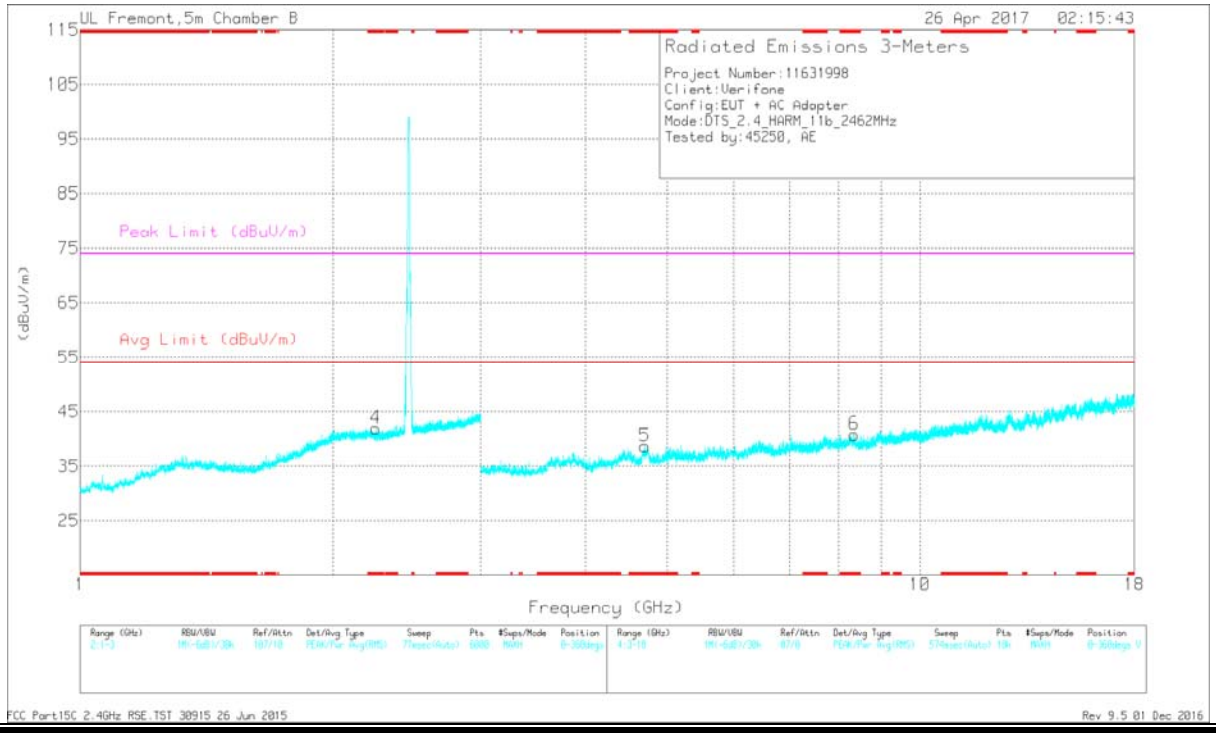
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAv1 - KDB558074 Option 1 Maximum RMS Average

HARMONICS AND SPURIOUS EMISSIONS HIGH CHANNEL, CH 11)

HIGH CHANNEL HORIZONTAL



HIGH CHANNEL VERTICAL



Radiated Emissions

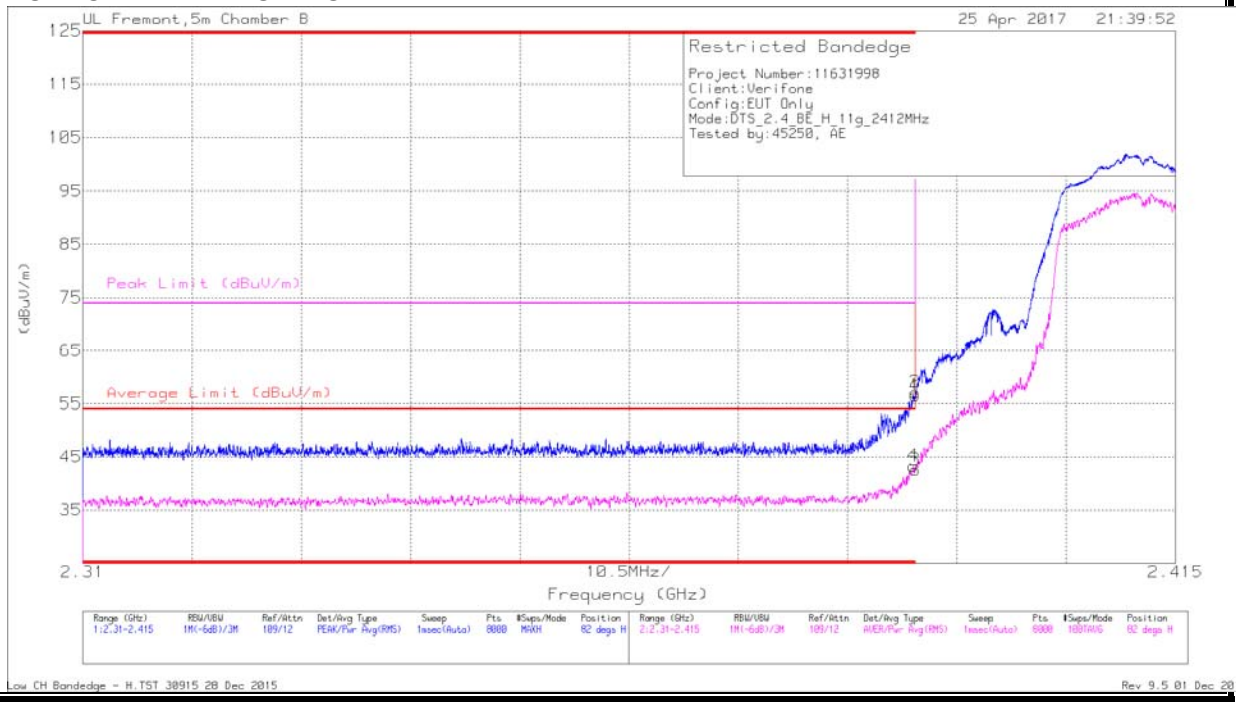
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.064	35.47	PK2	26.4	-22.9	0	38.97	-	-	74	-35.03	120	170	H
* 1.064	24.25	MAv1	26.4	-22.9	0	27.75	54	-26.25	-	-	120	170	H
* 2.249	36.46	PK2	31.9	-21.2	0	47.16	-	-	74	-26.84	172	202	V
* 2.251	24.81	MAv1	31.9	-21.2	0	35.51	54	-18.49	-	-	172	202	V
* 3.694	40.64	PK2	33.5	-30.6	0	43.54	-	-	74	-30.46	68	179	H
* 3.692	29	MAv1	33.5	-30.6	0	31.9	54	-22.1	-	-	68	179	H
* 7.386	36.46	PK2	36	-26.9	0	45.56	-	-	74	-28.44	225	253	H
* 7.386	26.19	MAv1	36	-26.9	0	35.29	54	-18.71	-	-	225	253	H
* 4.706	39.46	PK2	34.4	-29.4	0	44.46	-	-	74	-29.54	203	206	V
* 4.705	28.11	MAv1	34.4	-29.5	0	33.01	54	-20.99	-	-	203	206	V
* 8.345	35.91	PK2	36.5	-25.1	0	47.31	-	-	74	-26.69	5	104	V
* 8.347	24.71	MAv1	36.5	-25.1	0	36.11	54	-17.89	-	-	5	104	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAv1 - KDB558074 Option 1 Maximum RMS Average

10.4.2. 11g SISO MODE IN THE 2.4GHz BAND

BANDEDGE (LOW CHANNEL, CH 1)

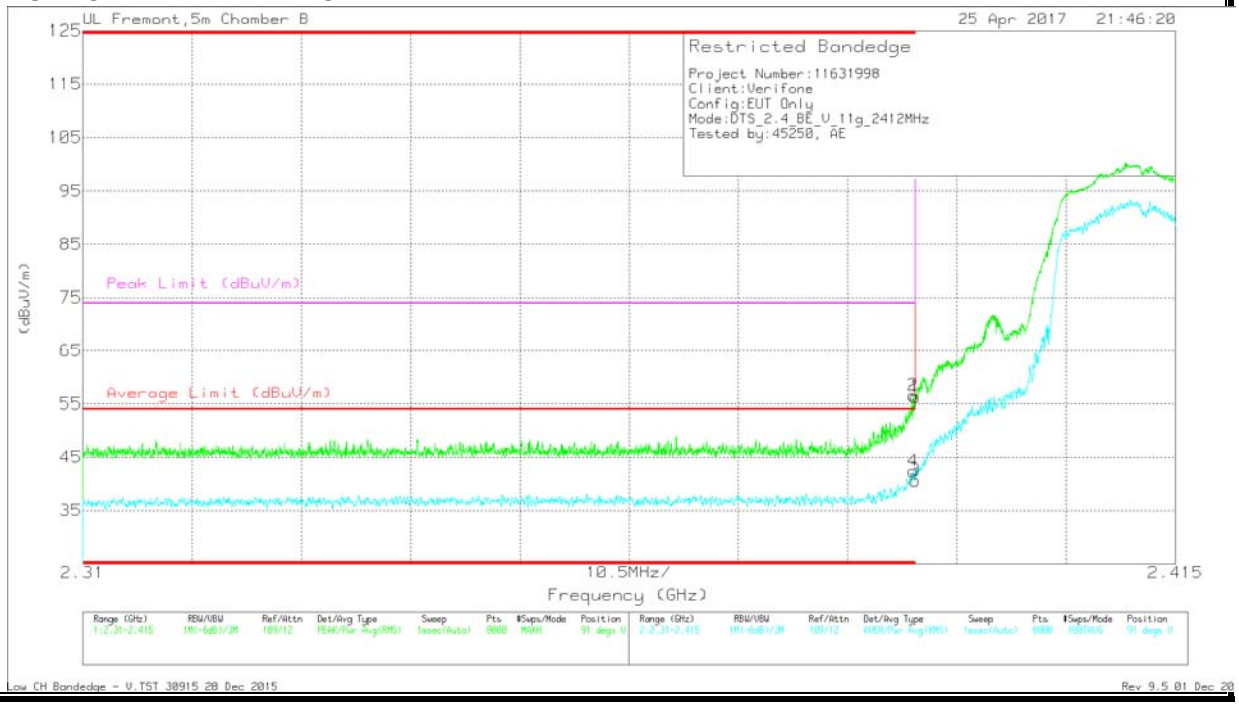
LOW CHANNEL HORIZONTAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	45.82	Pk	32	-21.3	0	56.52	-	-	74	-17.48	82	112	H
2	* 2.39	46.4	Pk	32	-21.3	0	57.1	-	-	74	-16.9	82	112	H
3	* 2.39	31.55	RMS	32	-21.3	.3	42.55	54	-11.45	-	-	82	112	H
4	* 2.39	32.29	RMS	32	-21.3	.3	43.29	54	-10.71	-	-	82	112	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
RMS - RMS detection

LOW CHANNEL VERTICAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	45.57	Pk	32	-21.3	0	56.27	-	-	74	-17.73	91	109	V
2	* 2.39	45.83	Pk	32	-21.3	0	56.53	-	-	74	-17.47	91	109	V
3	* 2.39	29.48	RMS	32	-21.3	.3	40.48	54	-13.52	-	-	91	109	V
4	* 2.39	31.19	RMS	32	-21.3	.3	42.19	54	-11.81	-	-	91	109	V

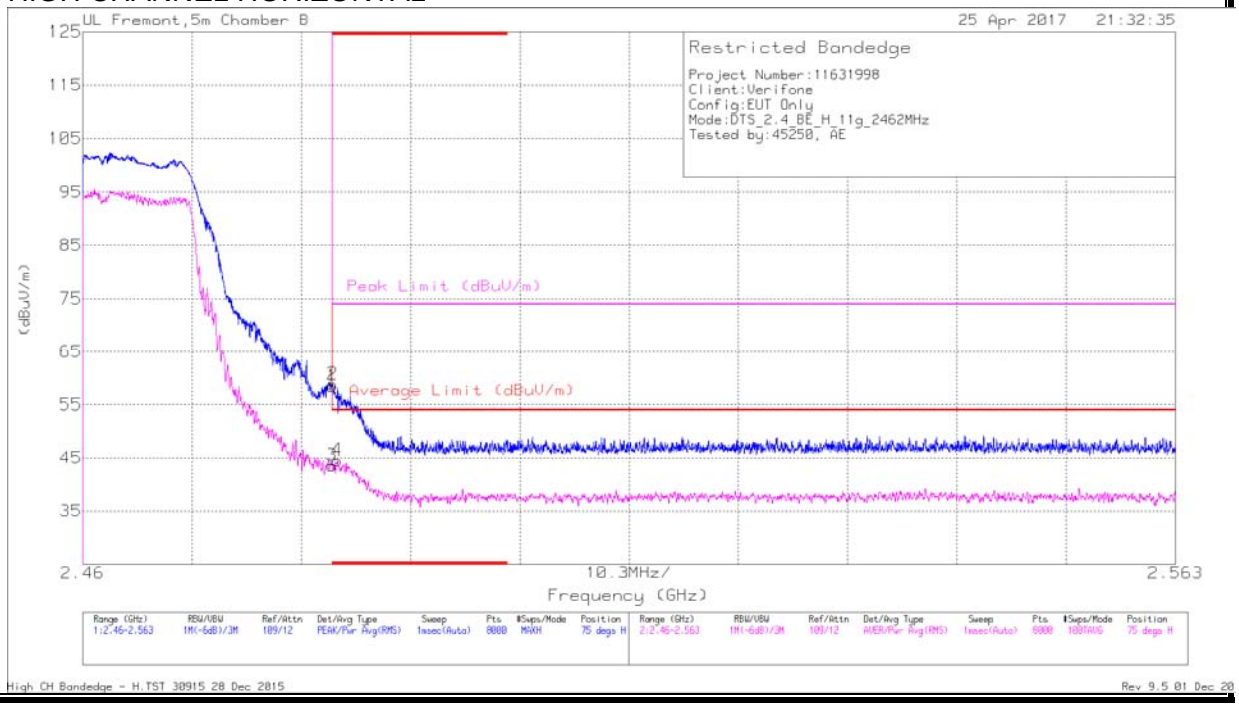
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

BANDEDGE (HIGH CHANNEL, CH 11)

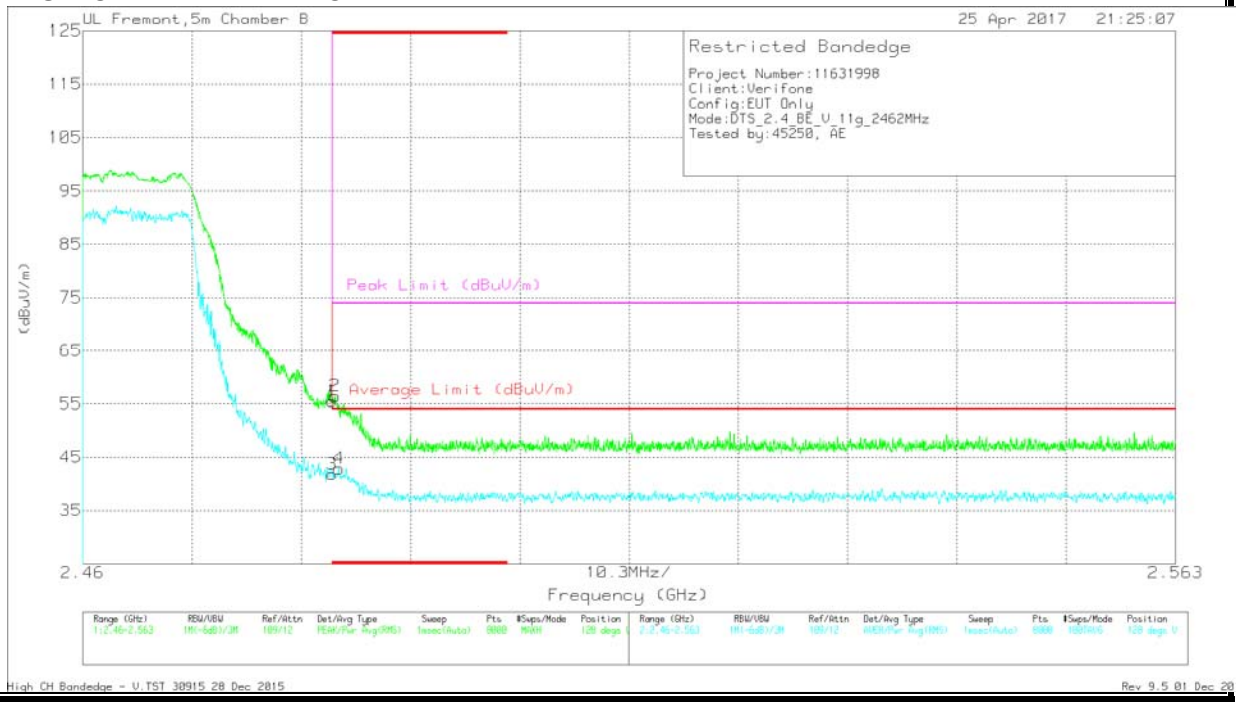
HIGH CHANNEL HORIZONTAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	* 2.484	47.53	Pk	32.1	-21.2	0	58.43	-	-	74	-15.57	75	249	H
2	* 2.484	47.89	Pk	32.1	-21.2	0	58.79	-	-	74	-15.21	75	249	H
3	* 2.484	32.34	RMS	32.1	-21.2	.3	43.54	54	-10.46	-	-	75	249	H
4	* 2.484	33.29	RMS	32.1	-21.2	.3	44.49	54	-9.51	-	-	75	249	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
RMS - RMS detection

HIGH CHANNEL VERTICAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	* 2.484	44.57	Pk	32.1	-21.2	0	55.47	-	-	74	-18.53	128	150	V
2	* 2.484	45.49	Pk	32.1	-21.2	0	56.39	-	-	74	-17.61	128	150	V
3	* 2.484	30.54	RMS	32.1	-21.2	.3	41.74	54	-12.26	-	-	128	150	V
4	* 2.484	31.63	RMS	32.1	-21.2	.3	42.83	54	-11.17	-	-	128	150	V

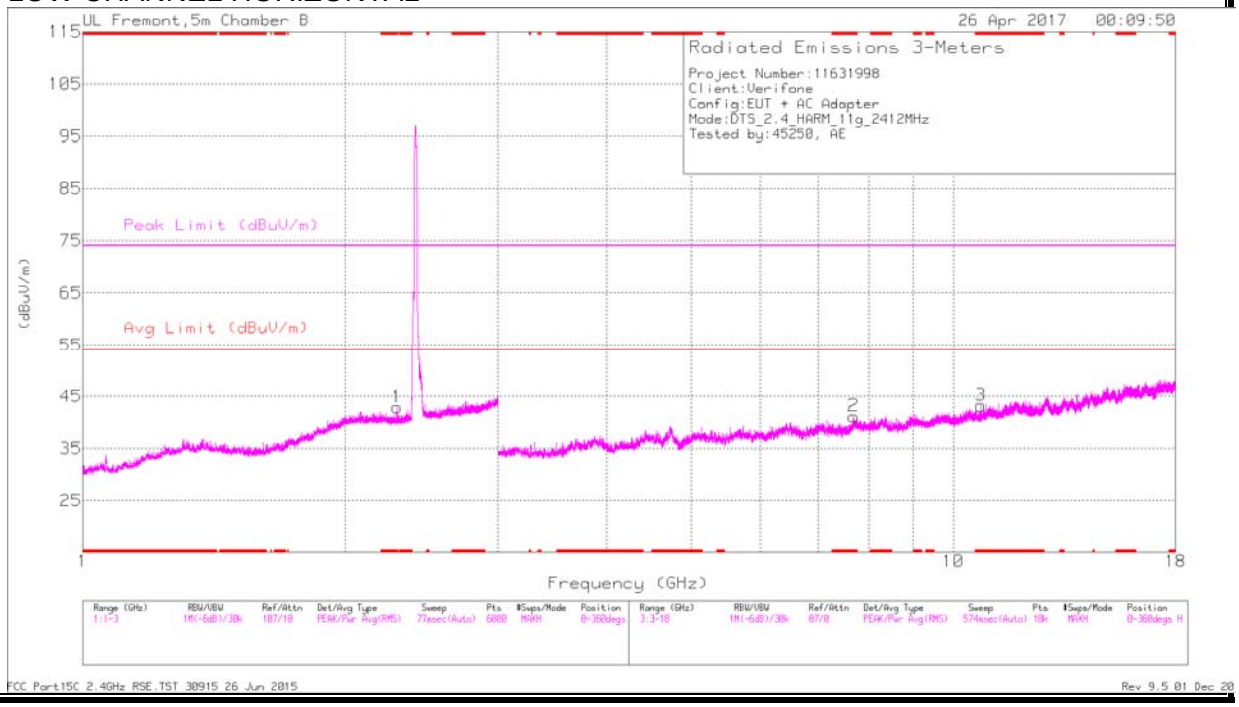
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

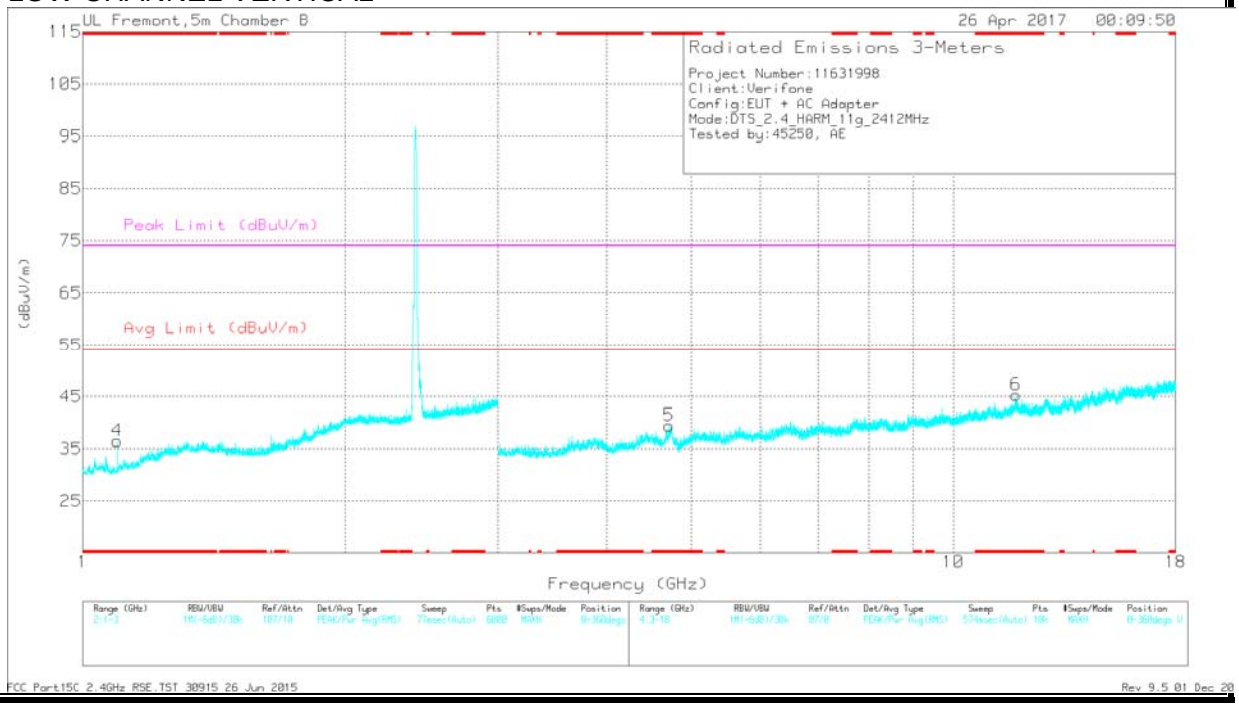
RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS LOW CHANNEL, CH 1)

LOW CHANNEL HORIZONTAL



LOW CHANNEL VERTICAL



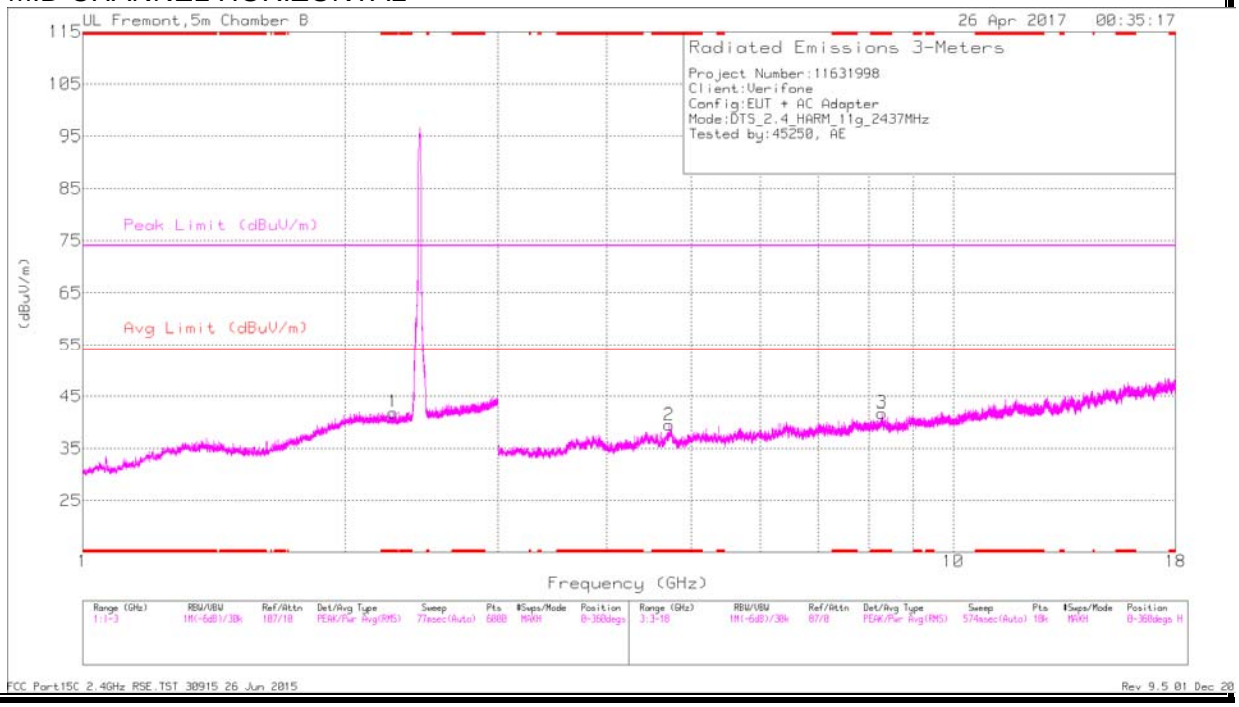
Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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
* 2.298	36.47	PK2	31.7	-21.1	0	47.07	-	-	74	-26.93	272	219	H
* 2.295	24.79	MAv1	31.7	-21.2	.3	35.59	54	-18.41	-	-	272	219	H
* 1.095	34.76	PK2	26.3	-23.2	0	37.86	-	-	74	-36.14	240	282	V
* 1.098	23.4	MAv1	26.3	-23	.3	27	54	-27	-	-	240	282	V
* 7.683	36.51	PK2	36.5	-25.8	0	47.21	-	-	74	-26.79	78	110	H
* 7.682	25.3	MAv1	36.5	-25.9	.3	36.2	54	-17.8	-	-	78	110	H
* 10.754	33.67	PK2	38.1	-23.6	0	48.17	-	-	74	-25.83	148	159	H
* 10.756	22.8	MAv1	38.1	-23.6	.3	37.6	54	-16.4	-	-	148	159	H
* 4.718	39.47	PK2	34.4	-29	0	44.87	-	-	74	-29.13	99	124	V
* 4.717	28.23	MAv1	34.4	-29.1	.3	33.83	54	-20.17	-	-	99	124	V
* 11.807	32.37	PK2	39.5	-22.1	0	49.77	-	-	74	-24.23	41	113	V
* 11.807	21.87	MAv1	39.5	-22.1	.3	39.57	54	-14.43	-	-	41	113	V

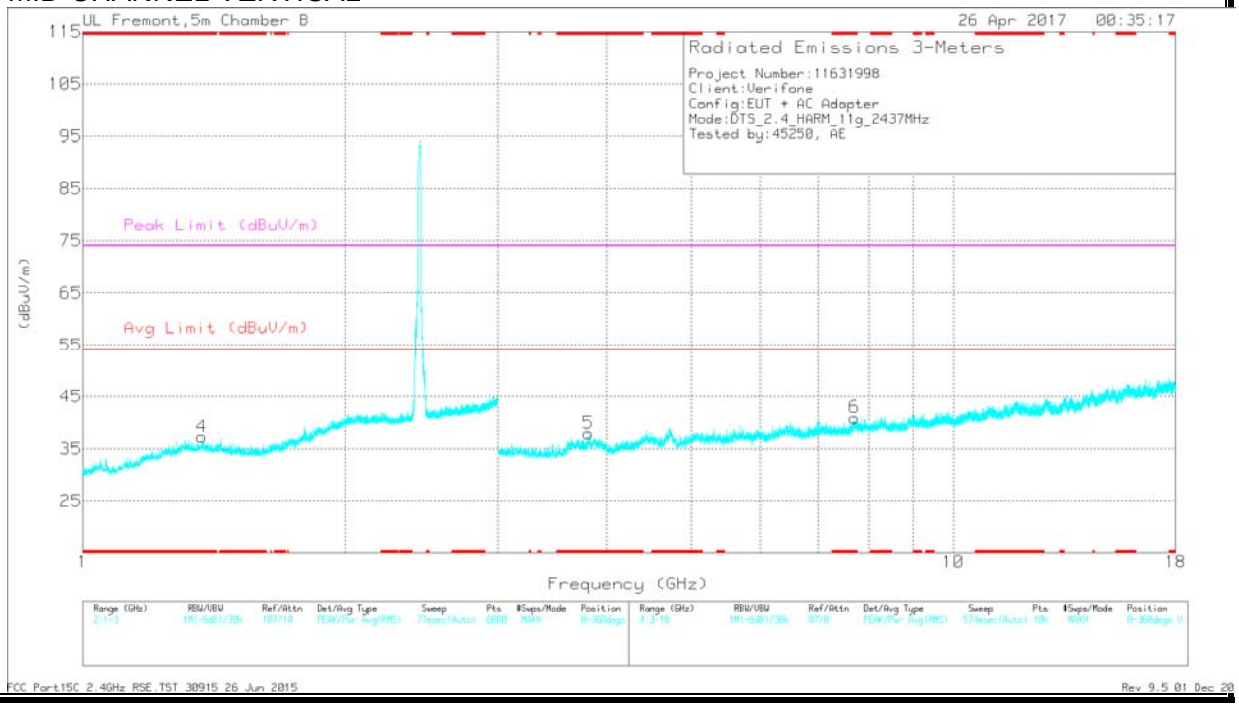
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAv1 - KDB558074 Option 1 Maximum RMS Average

HARMONICS AND SPURIOUS EMISSIONS MID CHANNEL, CH 6)

MID CHANNEL HORIZONTAL



MID CHANNEL VERTICAL



Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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
* 2.273	35.93	PK2	31.8	-21.2	0	46.53	-	-	74	-27.47	50	175	H
* 2.272	24.64	MAv1	31.8	-21.2	.3	35.54	54	-18.46	-	-	50	175	H
* 1.369	36.4	PK2	28.8	-21.7	0	43.5	-	-	74	-30.5	105	218	V
* 1.371	23.81	MAv1	28.8	-21.6	.3	31.31	54	-22.69	-	-	105	218	V
* 4.718	39.15	PK2	34.4	-29	0	44.55	-	-	74	-29.45	230	202	H
* 4.718	28.26	MAv1	34.4	-29	.3	33.96	54	-20.04	-	-	230	202	H
* 8.277	36.11	PK2	36.5	-25.4	0	47.21	-	-	74	-26.79	171	187	H
* 8.28	25.13	MAv1	36.5	-25.3	.3	36.63	54	-17.37	-	-	171	187	H
* 3.81	39.83	PK2	33.7	-30.2	0	43.33	-	-	74	-30.67	123	199	V
* 3.809	28.93	MAv1	33.7	-30.2	.3	32.73	54	-21.27	-	-	123	199	V
* 7.699	35.91	PK2	36.5	-25.8	0	46.61	-	-	74	-27.39	326	153	V
* 7.701	24.91	MAv1	36.5	-25.9	.3	35.81	54	-18.19	-	-	326	153	V

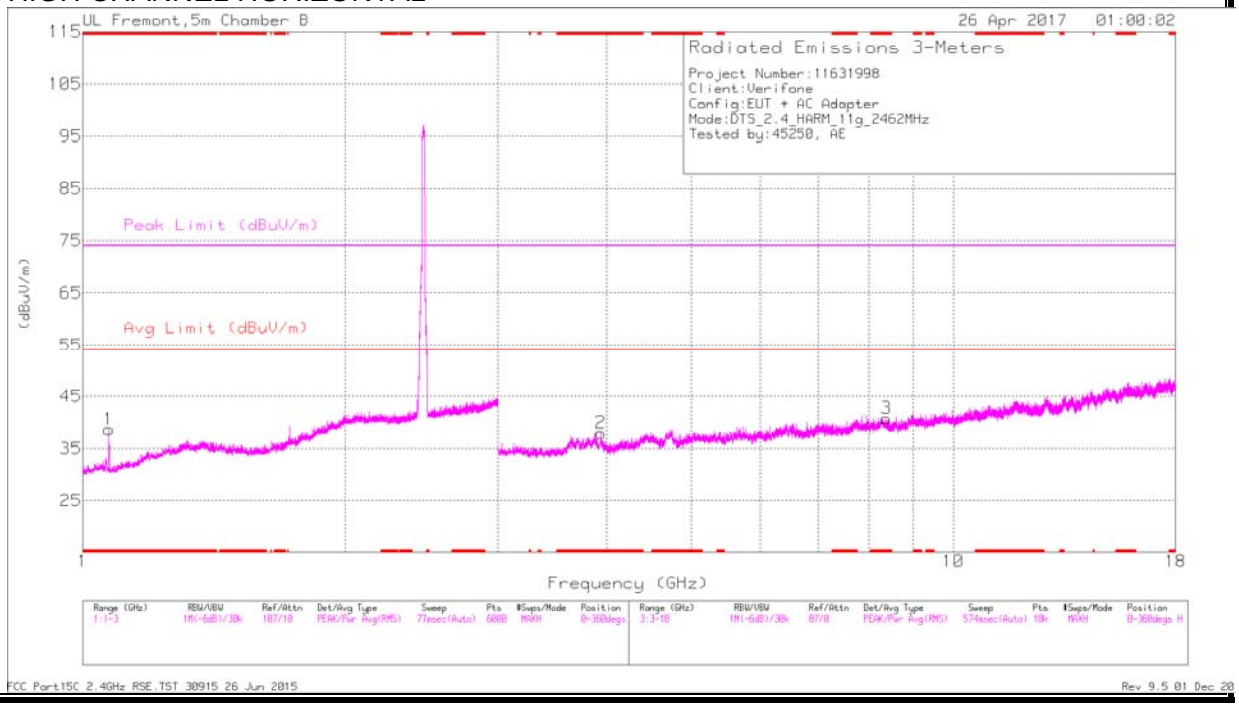
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

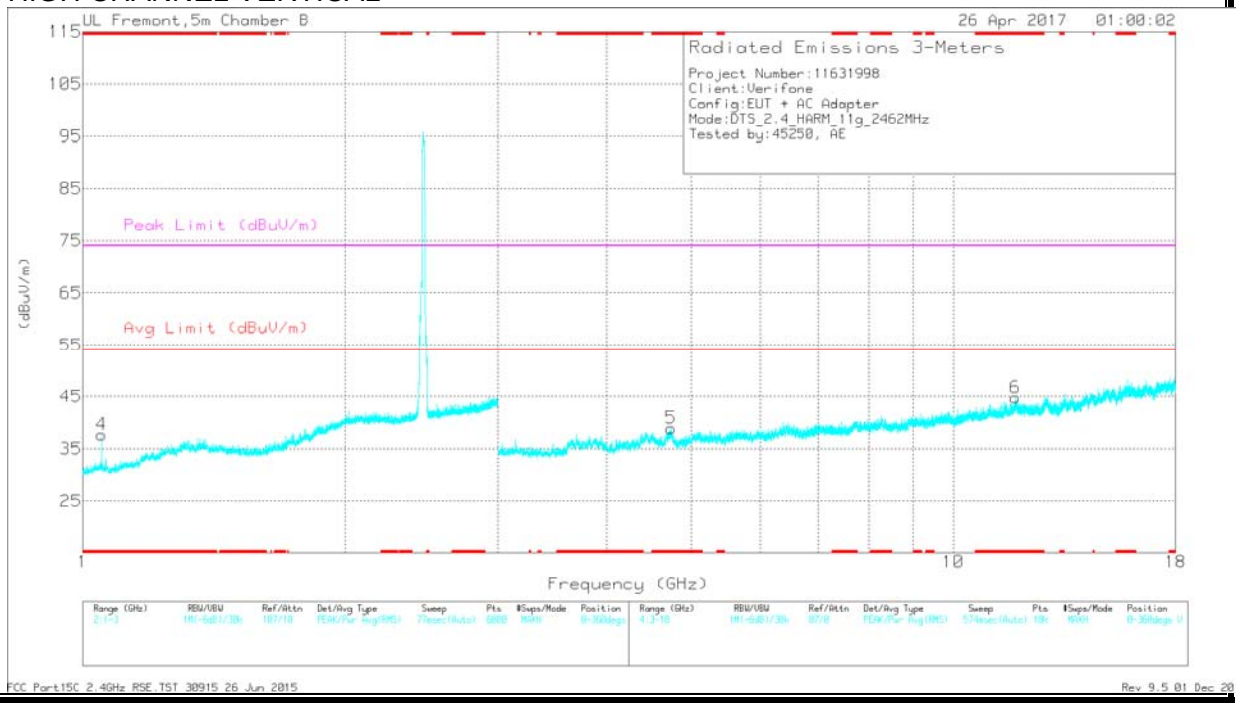
MAv1 - KDB558074 Option 1 Maximum RMS Average

HARMONICS AND SPURIOUS EMISSIONS HIGH CHANNEL, CH 11)

HIGH CHANNEL HORIZONTAL



HIGH CHANNEL VERTICAL



Radiated Emissions

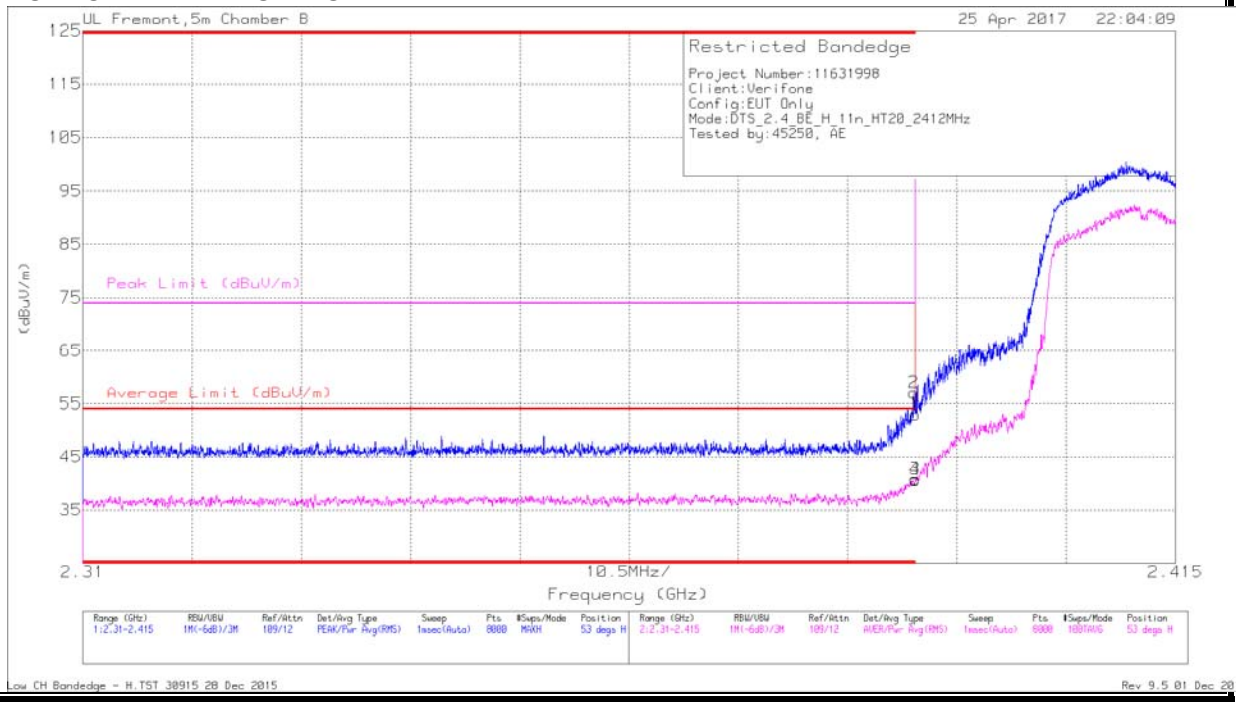
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.072	35.17	PK2	26.4	-23	0	38.57	-	-	74	-35.43	345	119	H
* 1.071	23.17	MAv1	26.4	-23	.3	26.87	54	-27.13	-	-	345	119	H
* 1.052	35.41	PK2	26.4	-23	0	38.81	-	-	74	-35.19	309	168	V
* 1.05	23.75	MAv1	26.4	-23	.3	27.45	54	-26.55	-	-	309	168	V
* 3.935	39.47	PK2	33.7	-29.9	0	43.27	-	-	74	-30.73	236	199	H
* 3.936	28.59	MAv1	33.7	-29.9	.3	32.69	54	-21.31	-	-	236	199	H
* 8.376	35.74	PK2	36.5	-26	0	46.24	-	-	74	-27.76	142	180	H
* 8.377	25.03	MAv1	36.5	-26	.3	35.83	54	-18.17	-	-	142	180	H
* 4.74	39.82	PK2	34.4	-28.6	0	45.62	-	-	74	-28.38	99	321	V
* 4.742	28.61	MAv1	34.4	-28.6	.3	34.71	54	-19.29	-	-	99	321	V
* 11.777	33.22	PK2	39.4	-22.5	0	50.12	-	-	74	-23.88	46	118	V
* 11.776	22.28	MAv1	39.4	-22.5	.3	39.48	54	-14.52	-	-	46	118	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAv1 - KDB558074 Option 1 Maximum RMS Average

10.4.3. 11n HT20 SISO MODE IN THE 2.4GHz BAND

BANDEDGE (LOW CHANNEL, CH 1)

LOW CHANNEL HORIZONTAL



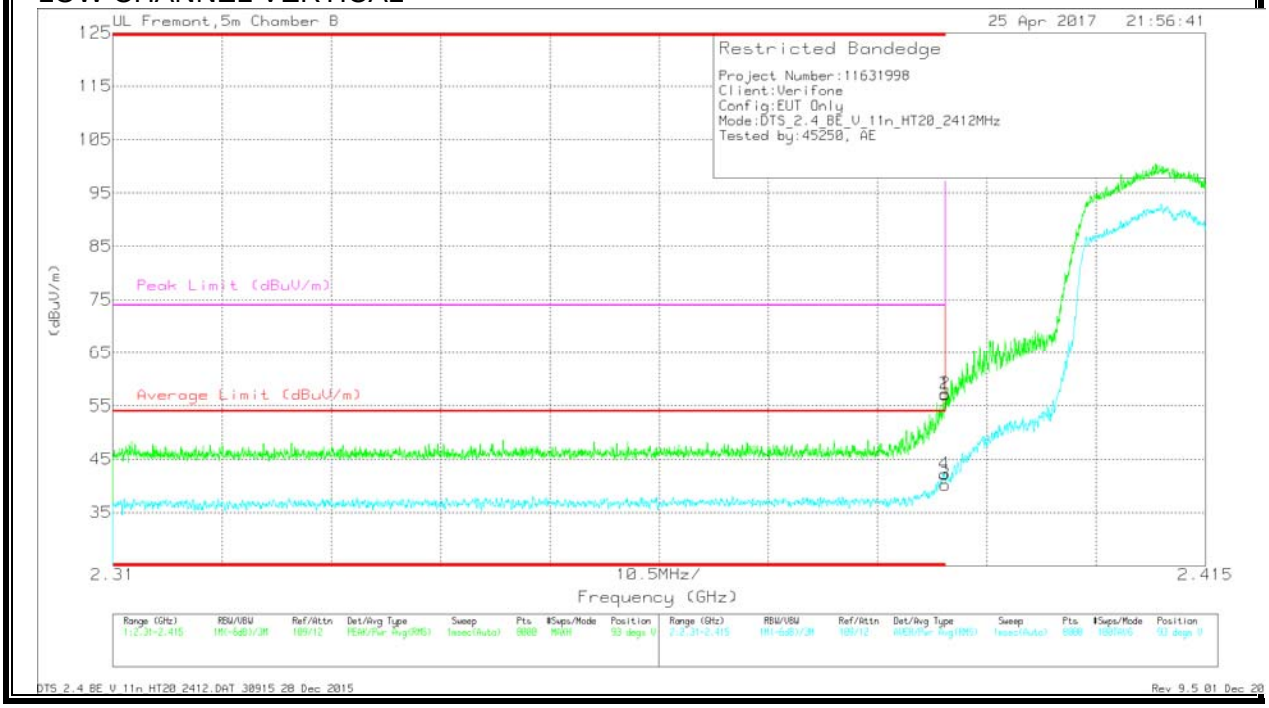
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	42.27	Pk	32	-21.3	0	52.97	-	-	74	-21.03	53	142	H
2	* 2.39	46.34	Pk	32	-21.3	0	57.04	-	-	74	-16.96	53	142	H
3	* 2.39	29.75	RMS	32	-21.3	.32	40.77	54	-13.23	-	-	53	142	H
4	* 2.39	29.67	RMS	32	-21.3	.32	40.69	54	-13.31	-	-	53	142	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

LOW CHANNEL VERTICAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	46.39	Pk	32	-21.3	0	57.09	-	-	74	-16.91	93	110	V
2	* 2.39	46.54	Pk	32	-21.3	0	57.24	-	-	74	-16.76	93	110	V
3	* 2.39	29.54	RMS	32	-21.3	.32	40.56	54	-13.44	-	-	93	110	V
4	* 2.39	31.48	RMS	32	-21.3	.32	42.5	54	-11.5	-	-	93	110	V

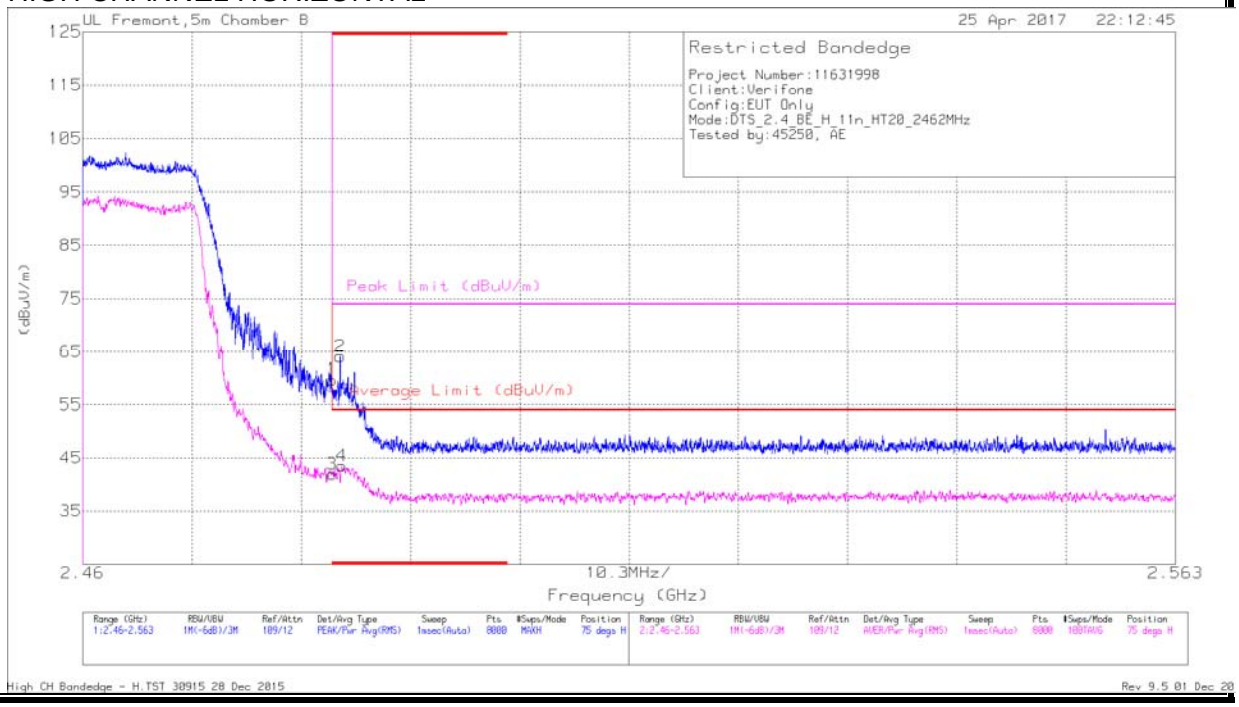
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

BANDEDGE (HIGH CHANNEL, CH 11)

HIGH CHANNEL HORIZONTAL



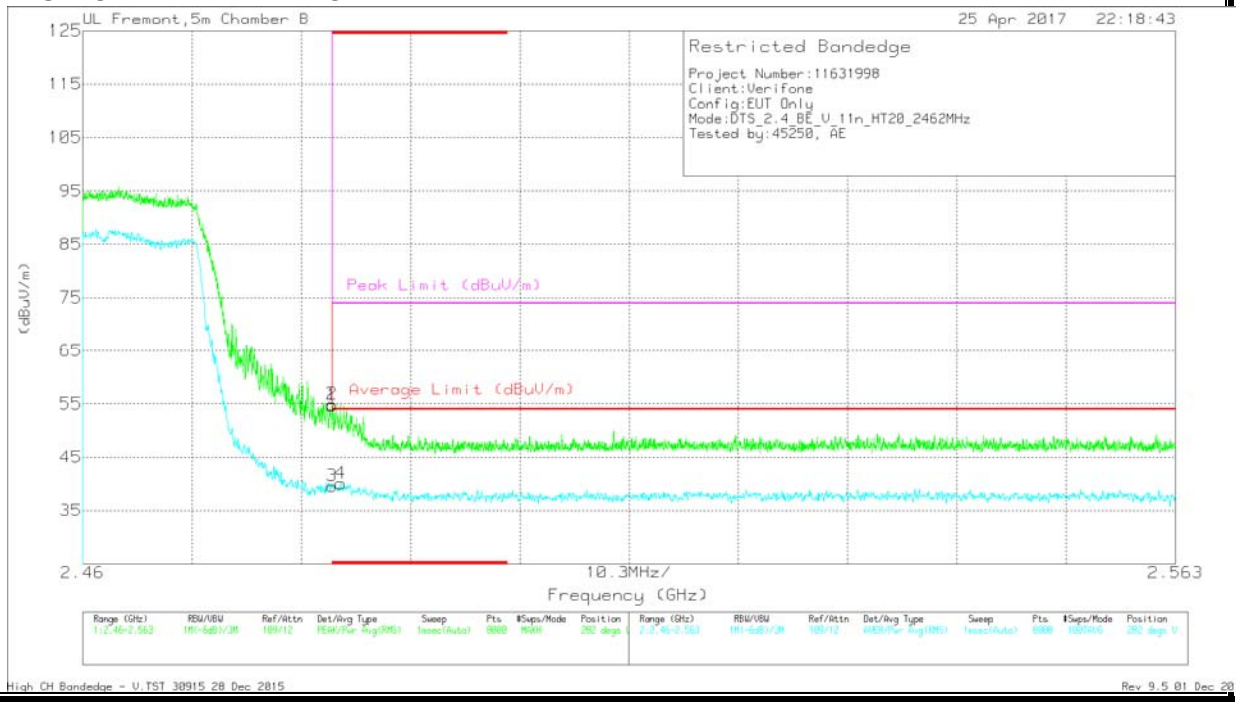
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	48.77	Pk	32.1	-21.2	0	59.67	-	-	74	-14.33	75	265	H
2	* 2.484	53.18	Pk	32.1	-21.2	0	64.08	-	-	74	-9.92	75	265	H
3	* 2.484	30.67	RMS	32.1	-21.2	.32	41.89	54	-12.11	-	-	75	265	H
4	* 2.484	32.25	RMS	32.1	-21.2	.32	43.47	54	-10.53	-	-	75	265	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

HIGH CHANNEL VERTICAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	* 2.484	43.77	Pk	32.1	-21.2	0	54.67	-	-	74	-19.33	282	268	V
2	* 2.484	43.98	Pk	32.1	-21.2	0	54.88	-	-	74	-19.12	282	268	V
3	* 2.484	28.35	RMS	32.1	-21.2	.32	39.57	54	-14.43	-	-	282	268	V
4	* 2.484	28.81	RMS	32.1	-21.2	.32	40.03	54	-13.97	-	-	282	268	V

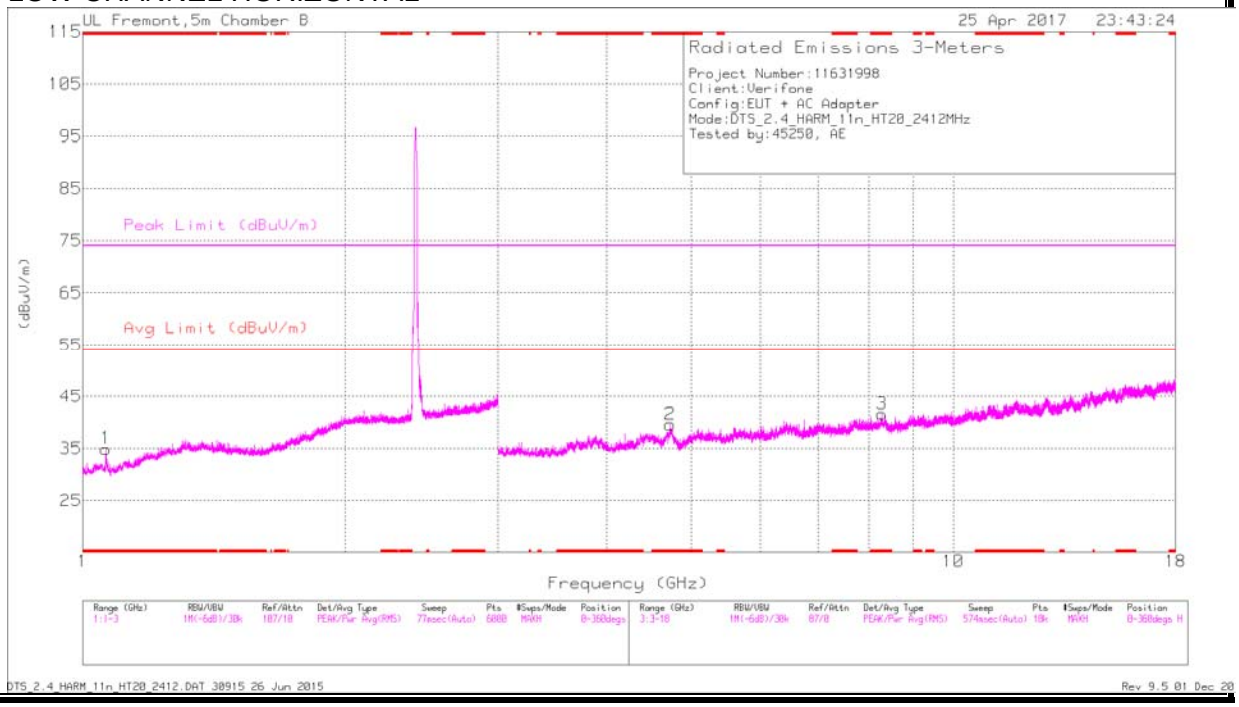
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

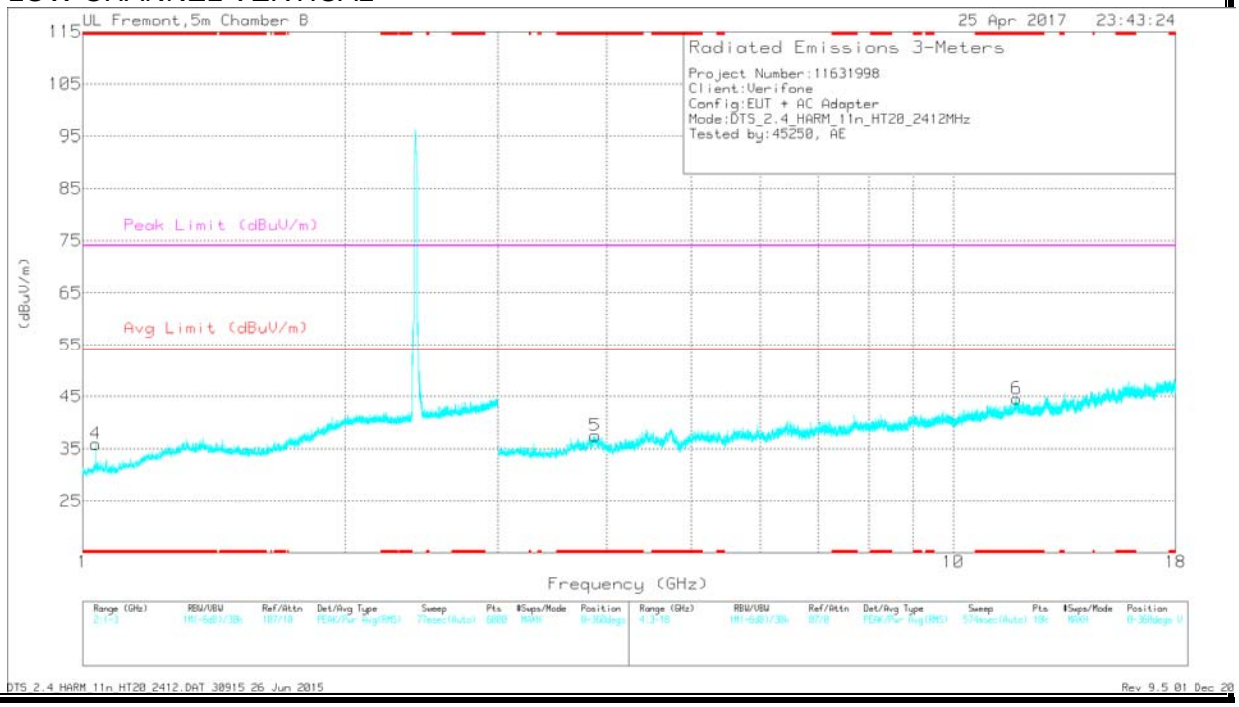
RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS LOW CHANNEL, CH 1)

LOW CHANNEL HORIZONTAL



LOW CHANNEL VERTICAL



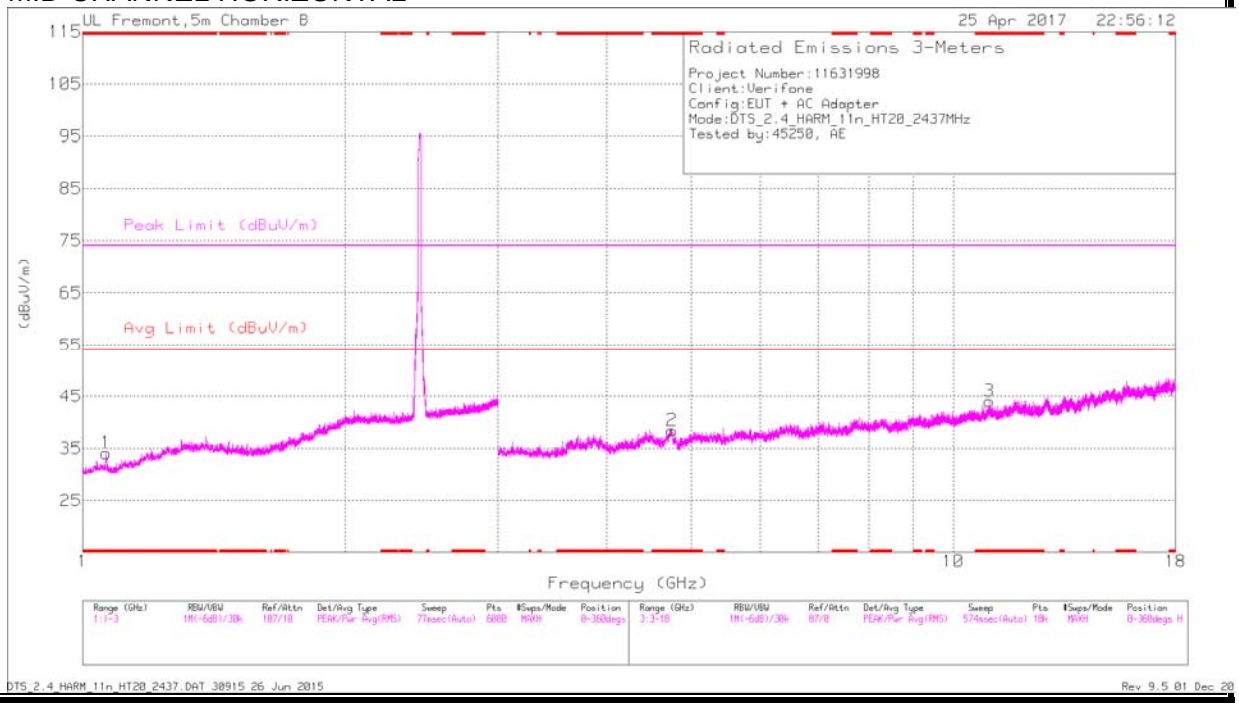
Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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
* 1.063	35.7	PK2	26.4	-23	0	39.1	-	-	74	-34.9	65	135	H
* 1.063	25.59	MAv1	26.4	-23	.32	29.31	54	-24.69	-	-	65	135	H
* 1.034	35.19	PK2	26.4	-23.4	0	38.19	-	-	74	-35.81	178	227	V
* 1.035	23.95	MAv1	26.4	-23.4	.32	27.27	54	-26.73	-	-	178	227	V
* 4.728	39.34	PK2	34.4	-28.8	0	44.94	-	-	74	-29.06	244	194	H
* 4.729	28.56	MAv1	34.4	-28.8	.32	34.48	54	-19.52	-	-	244	194	H
* 8.277	36.41	PK2	36.5	-25.4	0	47.51	-	-	74	-26.49	173	307	H
* 8.279	25.46	MAv1	36.5	-25.4	.32	36.88	54	-17.12	-	-	173	307	H
* 3.881	39.92	PK2	33.7	-29.3	0	44.32	-	-	74	-29.68	298	252	V
* 3.879	28.8	MAv1	33.7	-29.3	.32	33.52	54	-20.48	-	-	298	252	V
* 11.82	33.22	PK2	39.4	-22.2	0	50.42	-	-	74	-23.58	359	118	V
* 11.819	22.28	MAv1	39.4	-22.1	.32	39.9	54	-14.1	-	-	359	118	V

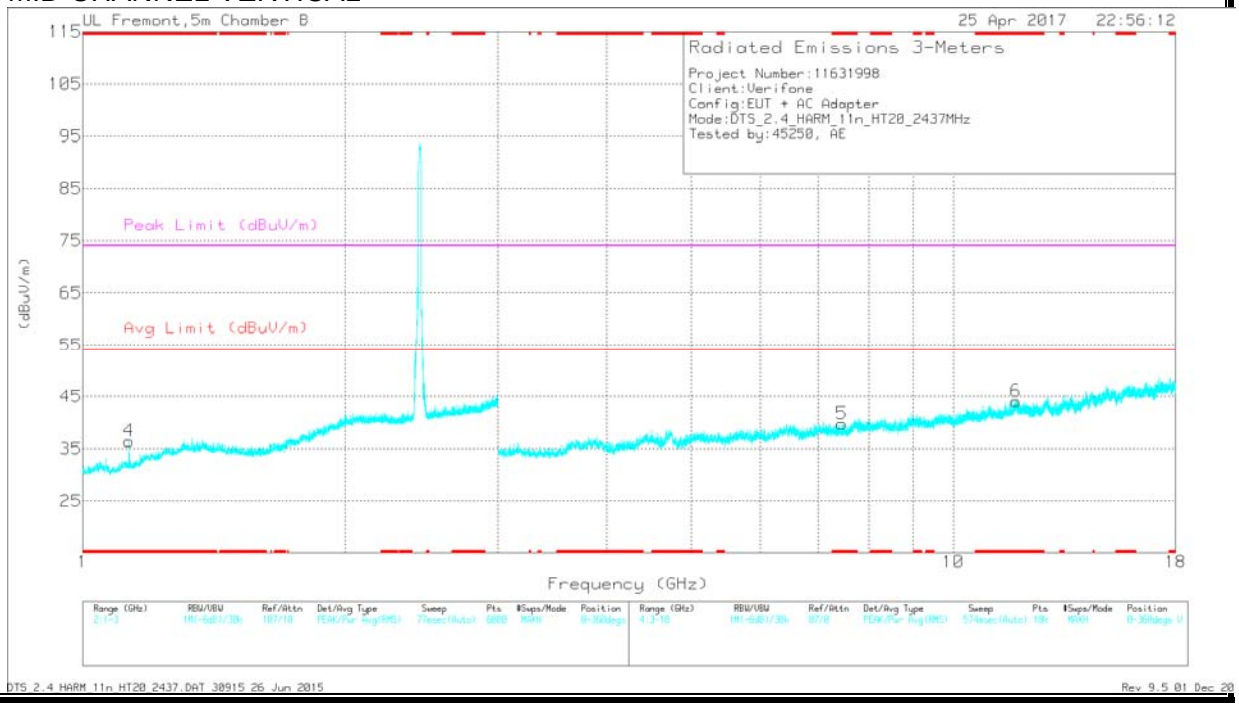
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAv1 - KDB558074 Option 1 Maximum RMS Average

HARMONICS AND SPURIOUS EMISSIONS MID CHANNEL, CH 6)

MID CHANNEL HORIZONTAL



MID CHANNEL VERTICAL



Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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
* 1.064	36.13	PK2	26.4	-22.9	0	39.63	-	-	74	-34.37	42	135	H
* 1.064	26.17	MAv1	26.4	-22.9	.32	29.99	54	-24.01	-	-	42	135	H
* 1.13	34.5	PK2	26.8	-22.8	0	38.5	-	-	74	-35.5	115	160	V
* 1.132	23.37	MAv1	26.8	-22.6	.32	27.89	54	-26.11	-	-	115	160	V
* 4.753	39.08	PK2	34.4	-28.5	0	44.98	-	-	74	-29.02	215	199	H
* 4.752	28.58	MAv1	34.4	-28.5	.32	34.8	54	-19.2	-	-	215	199	H
* 10.997	33.61	PK2	38.5	-22.8	0	49.31	-	-	74	-24.69	310	154	H
* 10.994	22.52	MAv1	38.5	-22.8	.32	38.54	54	-15.46	-	-	310	154	H
* 7.447	36.24	PK2	36.1	-26.8	0	45.54	-	-	74	-28.46	249	247	V
* 7.45	25.59	MAv1	36.1	-26.7	.32	35.31	54	-18.69	-	-	249	247	V
* 11.808	33.23	PK2	39.5	-22.1	0	50.63	-	-	74	-23.37	61	161	V
* 11.808	21.99	MAv1	39.5	-22.1	.32	39.71	54	-14.29	-	-	61	161	V

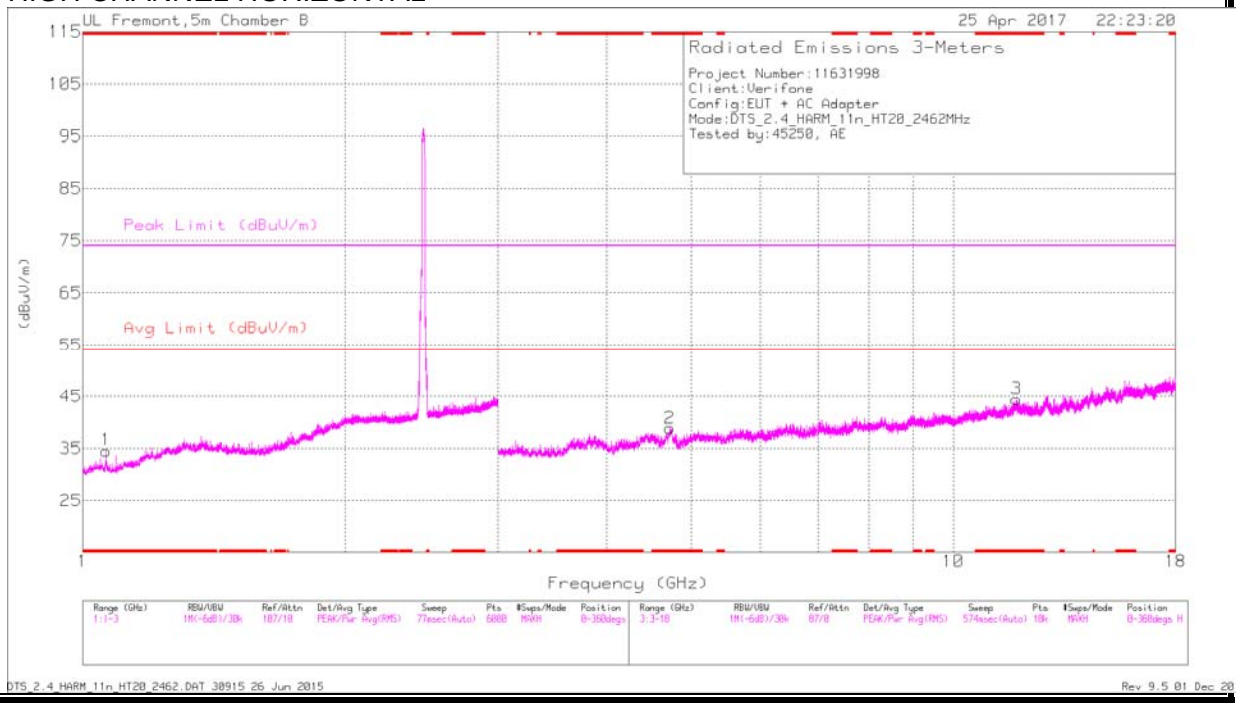
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

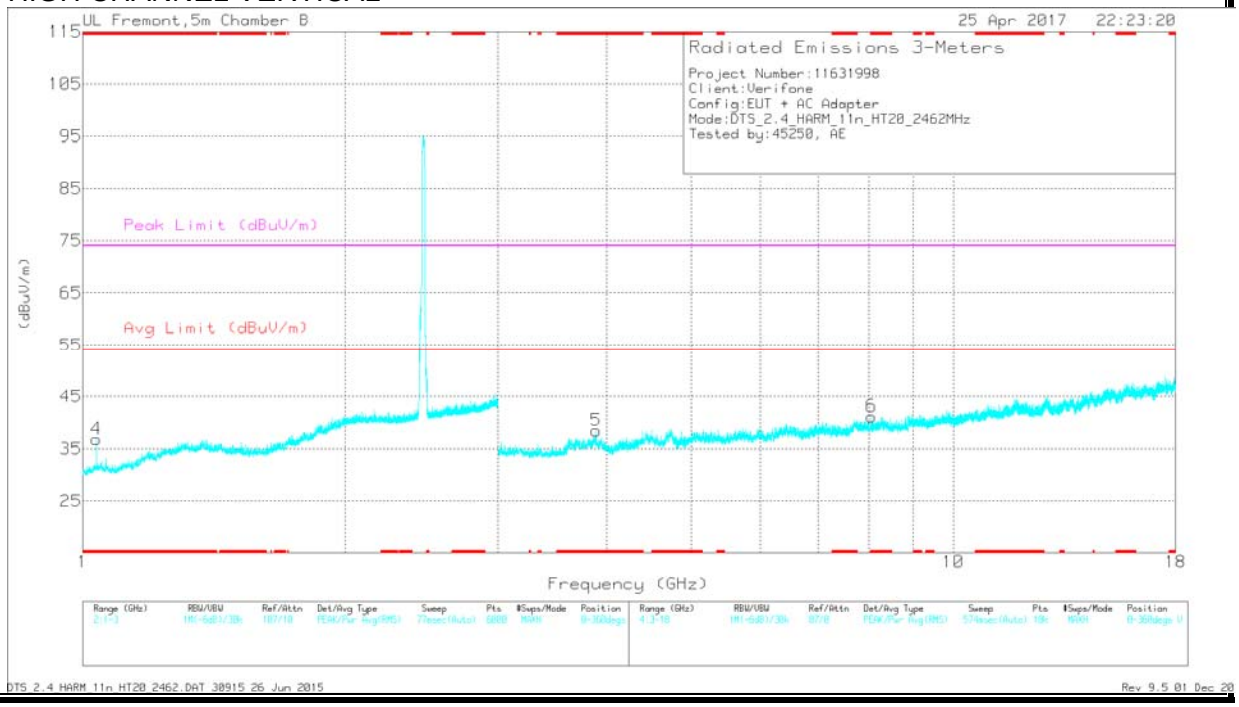
MAv1 - KDB558074 Option 1 Maximum RMS Average

HARMONICS AND SPURIOUS EMISSIONS HIGH CHANNEL, CH 11)

HIGH CHANNEL HORIZONTAL



HIGH CHANNEL VERTICAL



Radiated Emissions

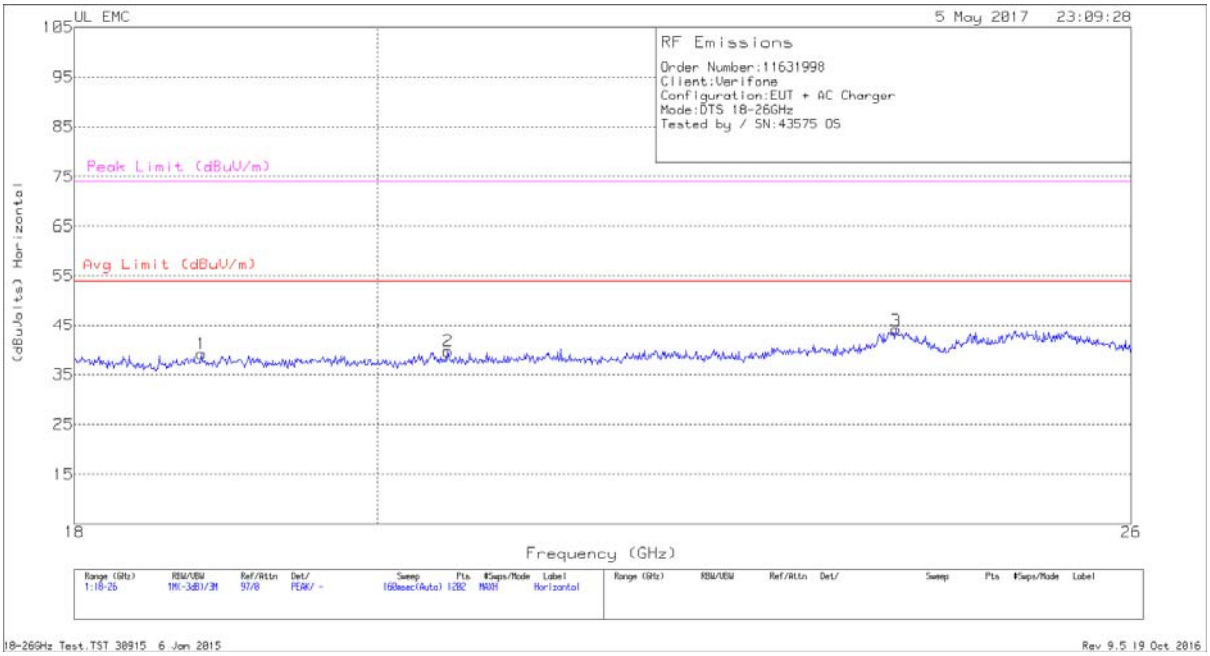
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.065	35.95	PK2	26.4	-22.9	0	39.45	-	-	74	-34.55	30	369	H
* 1.064	25.44	MAv1	26.4	-22.9	.32	29.26	54	-24.74	-	-	30	369	H
* 1.038	35.3	PK2	26.4	-23.4	0	38.3	-	-	74	-35.7	106	386	V
* 1.038	23.46	MAv1	26.4	-23.4	.32	26.78	54	-27.22	-	-	106	386	V
* 4.73	39.56	PK2	34.4	-28.8	0	45.16	-	-	74	-28.84	174	286	H
* 4.73	28.57	MAv1	34.4	-28.8	.32	34.49	54	-19.51	-	-	174	286	H
* 11.816	32.49	PK2	39.5	-22.1	0	49.89	-	-	74	-24.11	261	224	H
* 11.817	22.2	MAv1	39.5	-22.1	.32	39.92	54	-14.08	-	-	261	224	H
* 3.89	38.92	PK2	33.7	-29.5	0	43.12	-	-	74	-30.88	96	127	V
* 3.889	28.17	MAv1	33.7	-29.4	.32	32.79	54	-21.21	-	-	96	127	V
* 8.058	36.39	PK2	36.5	-26.2	0	46.69	-	-	74	-27.31	27	150	V
* 8.057	24.99	MAv1	36.5	-26.2	.32	35.61	54	-18.39	-	-	27	150	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAv1 - KDB558074 Option 1 Maximum RMS Average

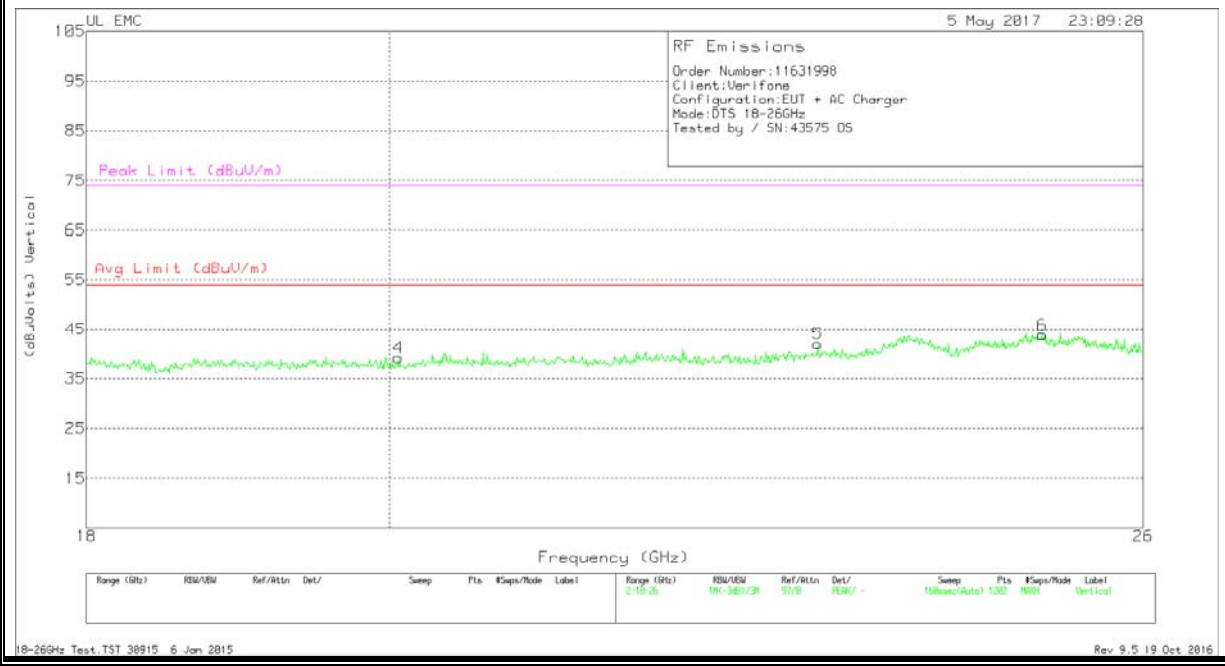
10.5. WORST-CASE 18 to 26 GHz

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

HORIZONTAL PLOT



VERTICAL PLOT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T449 (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	18.813	41.17	Pk	32.4	-24.9	-9.5	39.16	54	-14.83	74	-34.83
2	20.498	41.37	Pk	32.9	-25.1	-9.5	39.66	54	-14.33	74	-34.33
3	23.955	43.8	Pk	34	-24.3	-9.5	44	54	-10	74	-30
4	20.065	40.97	Pk	32.7	-25	-9.5	39.16	54	-14.83	74	-34.83
5	23.216	43	Pk	33.5	-25	-9.5	42	54	-12	74	-32
6	25.101	43.43	Pk	34.3	-24.4	-9.5	43.83	54	-10.16	74	-30.16

Pk - Peak detector

11. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)
RSS-Gen 8.8

Frequency of Emission (MHz)	Conducted Limit (dBµV)	
	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.

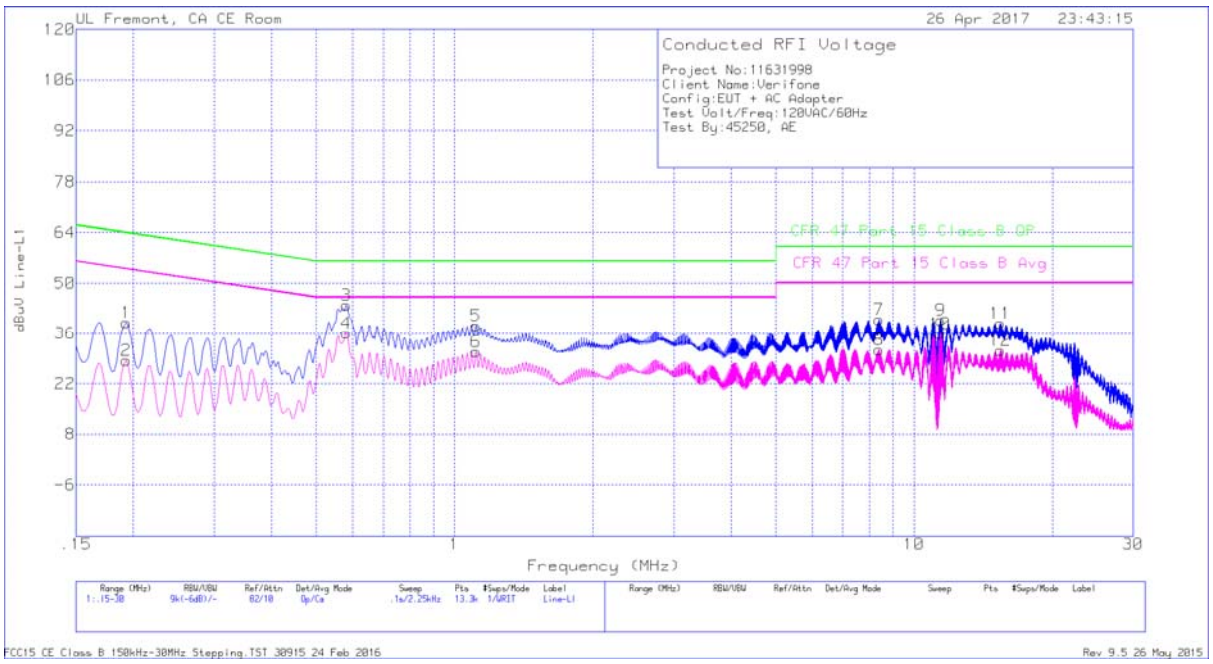
TEST PROCEDURE

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 C63.10.

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.

LINE 1 RESULTS

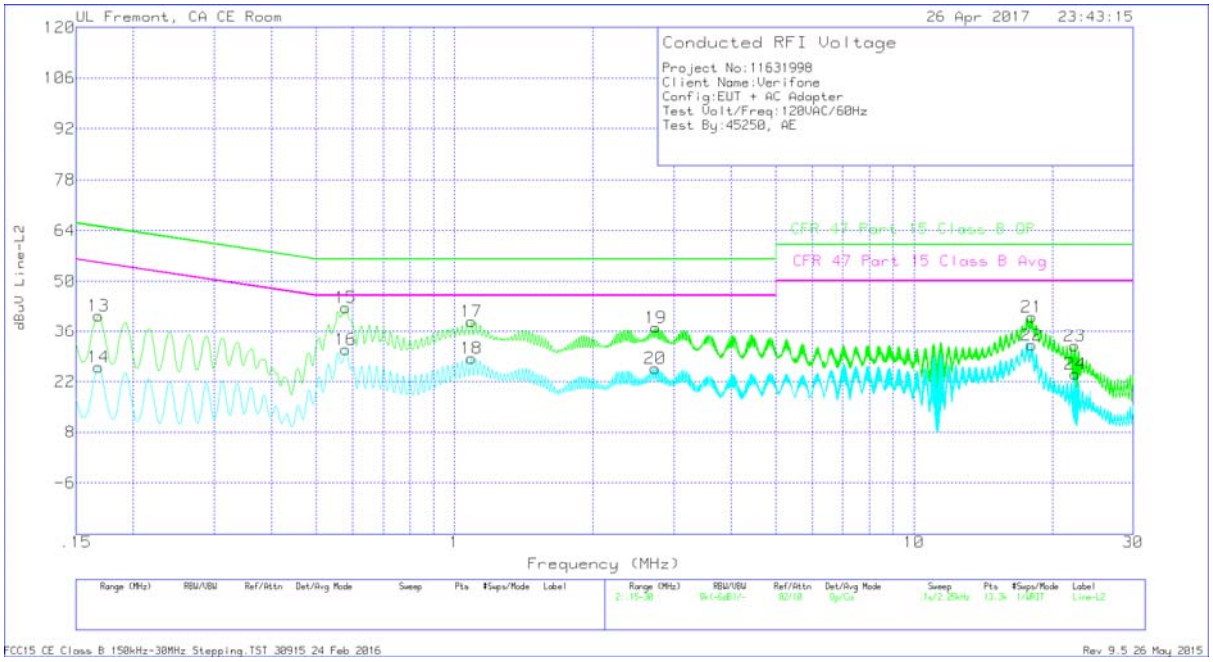


WORST EMISSIONS

Range 1: Line-L1 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables C1&C3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
1	.19275	28.77	Qp	0	.1	10.1	38.97	63.92	-24.95	-	-
2	.19275	18.25	Ca	0	.1	10.1	28.45	-	-	53.92	-25.47
3	.582	33.74	Qp	0	.1	10.1	43.94	56	-12.06	-	-
4	.582	25.97	Ca	0	.1	10.1	36.17	-	-	46	-9.83
5	1.113	28.03	Qp	0	.1	10.1	38.23	56	-17.77	-	-
6	1.113	20.71	Ca	0	.1	10.1	30.91	-	-	46	-15.09
7	8.40525	29.45	Qp	0	.2	10.2	39.85	60	-20.15	-	-
8	8.38275	21.08	Ca	0	.2	10.2	31.48	-	-	50	-18.52
9	11.43375	29.32	Qp	0	.2	10.2	39.72	60	-20.28	-	-
10	11.409	25.48	Ca	0	.2	10.2	35.88	-	-	50	-14.12
11	15.432	28.43	Qp	0	.2	10.2	38.83	60	-21.17	-	-
12	15.432	20.88	Ca	0	.2	10.2	31.28	-	-	50	-18.72

Qp - Quasi-Peak detector
Ca - CISPR average detection

LINE 2 RESULTS



WORST EMISSIONS

Range 2: Line-L2 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables C2&C3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
13	.168	30.28	Qp	0	0	10.1	40.38	65.06	-24.68	-	-
14	.168	15.89	Ca	0	0	10.1	25.99	-	-	55.06	-29.07
15	.57975	32.52	Qp	0	.1	10.1	42.72	56	-13.28	-	-
16	.57975	20.69	Ca	0	.1	10.1	30.89	-	-	46	-15.11
17	1.08825	28.62	Qp	0	.1	10.1	38.82	56	-17.18	-	-
18	1.08825	18.31	Ca	0	.1	10.1	28.51	-	-	46	-17.49
19	2.7375	26.86	Qp	0	.1	10.1	37.06	56	-18.94	-	-
20	2.73525	15.51	Ca	0	.1	10.1	25.71	-	-	46	-20.29
21	18.02625	29.56	Qp	0	.3	10.3	40.16	60	-19.84	-	-
22	18.051	21.5	Ca	0	.3	10.3	32.1	-	-	50	-17.9
23	22.389	21.25	Qp	0	.3	10.4	31.95	60	-28.05	-	-
24	22.4115	13.44	Ca	0	.3	10.4	24.14	-	-	50	-25.86

Qp - Quasi-Peak detector
Ca - CISPR average detection