



**FCC 47 CFR PART 15 SUBPART C  
INDUSTRY CANADA RSS-247 ISSUE 1**

**CERTIFICATION TEST REPORT**

**FOR**

**eTap System, Front Derailleur**

**MODEL NUMBER: 12801**

**FCC ID: C90-FDED  
IC: 10161A-FDED**

**REPORT NUMBER: 15U21452-E1V4**

**ISSUE DATE: OCTOBER 16, 2015**

*Prepared for*  
**SRAM LLC**  
**1000 W FULTON MARKET 4<sup>TH</sup> FLOOR**  
**CHICAGO, IL 60607, U.S.A.**

*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	09/24/15	Initial Issue	C.S.OOI
V2	10/07/15	Revised radiated emission notes Revised section 5.5 Revised FCC ID Added radiated emission below 30MHz data. Revised section 8.2.5 test data.	C.S.OOI
V3	10/09/15	Revised radiated emission below 30MHz data.	C.S.OOI
V4	10/16/15	Revised calibration date of test equipment	C.S.OOI

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## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** SRAM LLC

**EUT DESCRIPTION:** eTap Front Deraillleur

**MODEL:** 12801

**SERIAL NUMBER:** Radiated: 9902; Conducted: 10902

**DATE TESTED:** SEPTEMBER 9 – OCTOBER 9, 2015

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-247 Issue 1	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:



CHOON SIAN OOI  
PROJECT LEAD  
UL Verification Services Inc.

Tested By:



JEFFREY WU  
EMC 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, ANSI C63.10-2013, RSS-GEN Issue 4, RSS-247 Issue 1.

## 3. FACILITIES AND ACCREDITATION

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

47173 Benicia Street	47266 Benicia Street
<input checked="" type="checkbox"/> Chamber A	<input type="checkbox"/> Chamber D
<input type="checkbox"/> Chamber B	<input type="checkbox"/> Chamber E
<input type="checkbox"/> Chamber C	<input type="checkbox"/> Chamber F
	<input type="checkbox"/> Chamber G
	<input type="checkbox"/> Chamber H

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers A through H are covered under Industry Canada company address code 2324B with site numbers 2324B -1 through 2324B-8, respectively.

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

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

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

### 4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

### 4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	± 3.52 dB
Radiated Disturbance, 30 to 1000 MHz	± 4.94 dB
Radiated Disturbance, 1 to 6 GHz	± 3.86 dB
Radiated Disturbance, 6 to 18 GHz	± 4.23 dB
Radiated Disturbance, 18 to 26 GHz	± 5.30 dB
Radiated Disturbance, 26 to 40 GHz	± 5.23 dB

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

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is an eTap System, Front Derailleur with 802.15.4 SRAMLink technology

### 5.2. MAXIMUM OUTPUT POWER

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

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2405 - 2480	802.15.4 SRAMLink	-2.4	0.58

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a ceramic antenna (P/N 2450AT42A100) by Johanson Technology, with a maximum gain of 0 dBi.

### 5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was 1.0.0.

The test utility software used during testing was Bootloader, Rev. 0.7.0.0; Bootstick, Rev. 0.7.0.0

### 5.5. WORST-CASE CONFIGURATION AND MODE

Radiated emission was 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.

## 5.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Lenovo	T410S	R8-0BWT6	N/A
AC Adapter	Lenovo	45N0054	N/A	N/A
Laptop	ACER	P1EV6	LUSFT02292260C8E83400	N/A
AC Adapter	ACER	W10-040N1A	F13061332048621	N/A
Regulated DC Power Supply	Kenwood	PA36-3A	7060074	N/A

### I/O CABLES

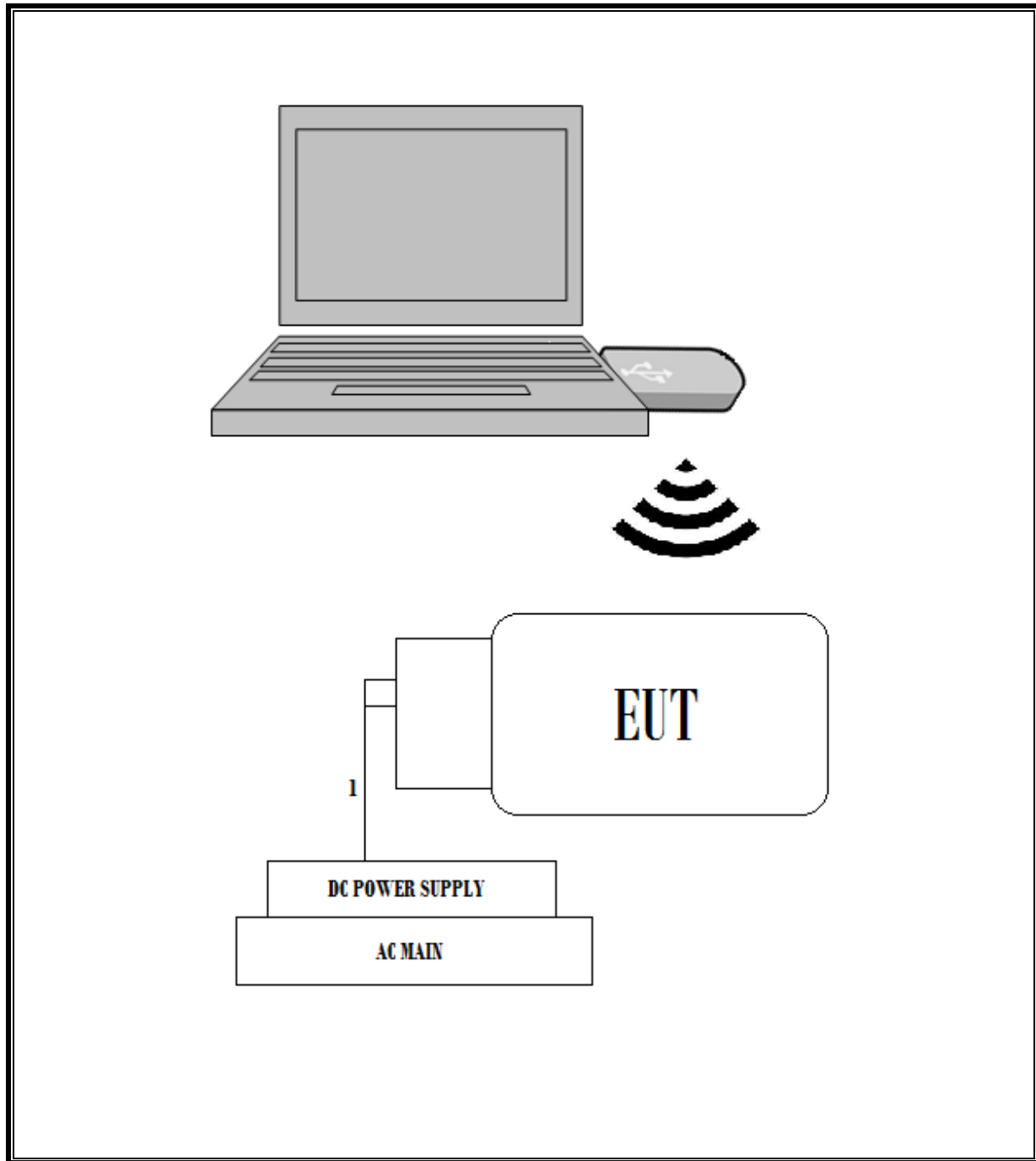
I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power	1	Banand Plug	Shielded	0.5m	N/A

### 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	T No.	Cal Date	Cal Due
Radiated Software	UL	UL EMC	Ver 9.5, July 22, 2014		
Line Conducted Software	UL	UL EMC	Ver 9.5, May 26, 2015		
Bilog Antenna 30-1000MHz	Sunol	JB1	477	06/10/15	06/10/16
Bilog Antenna 30-1000MHz	Sunol	JB1	185	02/18/15	02/18/16
Horn Antenna 1-18GHz	ETS	3117	119	01/15/15	01/15/16
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	39	01/29/15	01/29/16
Horn Antenna 1-18GHz	ETS	3117	136	03/03/15	03/03/16
Preamp 10kHz-1000MHz	Sonoma	310	300	11/01/14	11/18/15
Preamp 1-8GHz	Miteq	AMF-4D-01000800-30-29P	782	11/18/14	11/17/15
Preamp 1-18GHz	Miteq	AFS42-00101800-25-2-42	493	01/16/15	01/16/16
Preamp 1-26.5GHz	Agilent	8449B	404	04/06/15	05/26/16
Coaxial Switchbox	Agilent	SP6T	927	03/03/15	03/03/16
Spectrum Analyzer 3Hz to 44GHz	Agilent	E4446A	99	06/10/15	06/10/16
3GHz HPF	Micro-Tronics	HPM17543	486	11/18/14	11/18/15
5GHz LPF	Micro-Tronics	LPS17541	481	11/18/14	11/18/15
6GHz HPF	Micro-Tronics	HPS17542	484	11/18/14	09/16/16
EMI Test Receiver	Rohde & Schwarz	ECSI 7	284	09/16/15	11/01/16
Power Meter	Agilent	N1911A	1264	11/01/15	03/09/16
Power Sensor	Agilent	E9327A	117	03/09/15	01/16/16
LISN for Conducted Emissions	FCC	50/250-25-2	24	01/16/15	01/16/16
Antenna, Loop, 30 MHz	EMCO	6502	C00593	02/20/15	02/21/16

## 7. MEASUREMENT METHODS

On Time and Duty Cycle: KDB 558074 D01 v03r03, Section 6.0.

6 dB BW: KDB 558074 D01 v03r03, Section 8.1.

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

Output Power: KDB 558074 D01 v03r03, Section 9.2.3.2.

Power Spectral Density: KDB 558074 D01 v03r03, Section 10.

Out-of-band emissions in non-restricted bands: KDB 558074 D01 v03r03, Section 11.0.

Out-of-band emissions in restricted bands: KDB 558074 D01 v03r03, Section 12.1.

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

## 8. ANTENNA PORT TEST RESULTS

### 8.1.1. ON TIME AND DUTY CYCLE

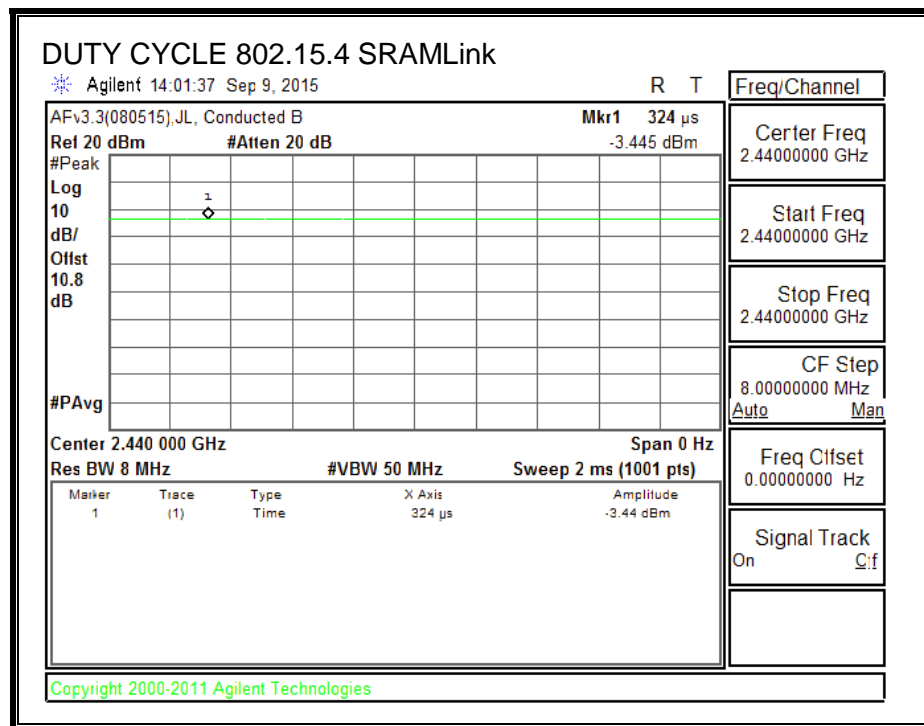
#### LIMITS

None; for reporting purposes only.

#### 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)
<b>2.4GHz Band</b>						
802.15.4 Zigbee	10.000	10.000	1.000	100.00%	0.00	0.010

### 8.1.2. DUTY CYCLE PLOT



## **8.2. 802.15.4 MODE IN THE 2.4 GHz BAND**

### **8.2.1. 6 dB BANDWIDTH**

#### **LIMITS**

FCC §15.247 (a) (2)

IC RSS-247 Clause 5.2.1

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

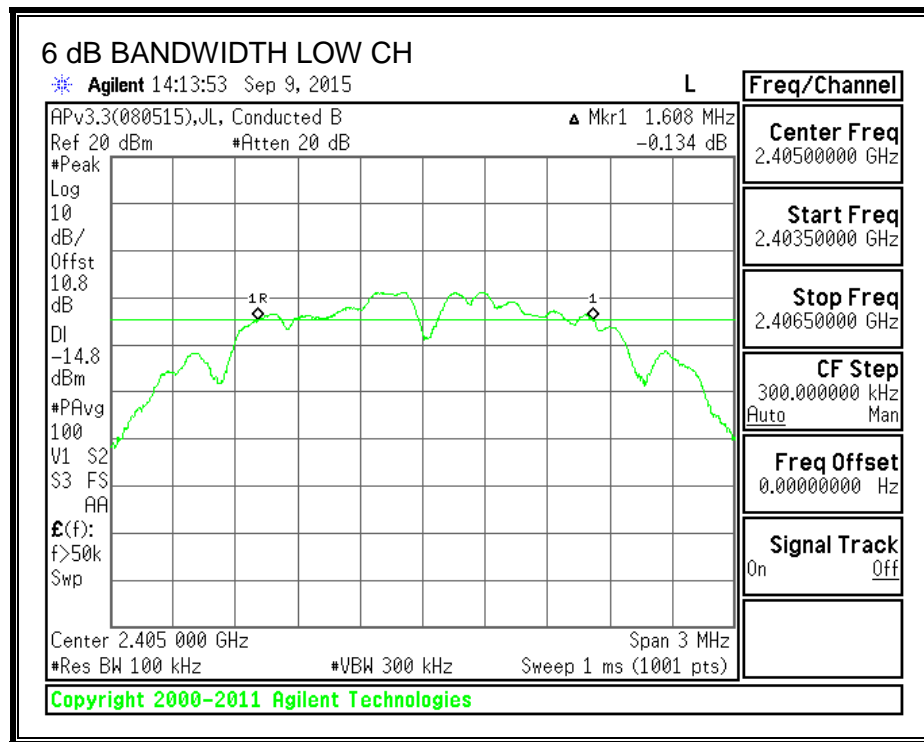
#### **TEST PROCEDURE**

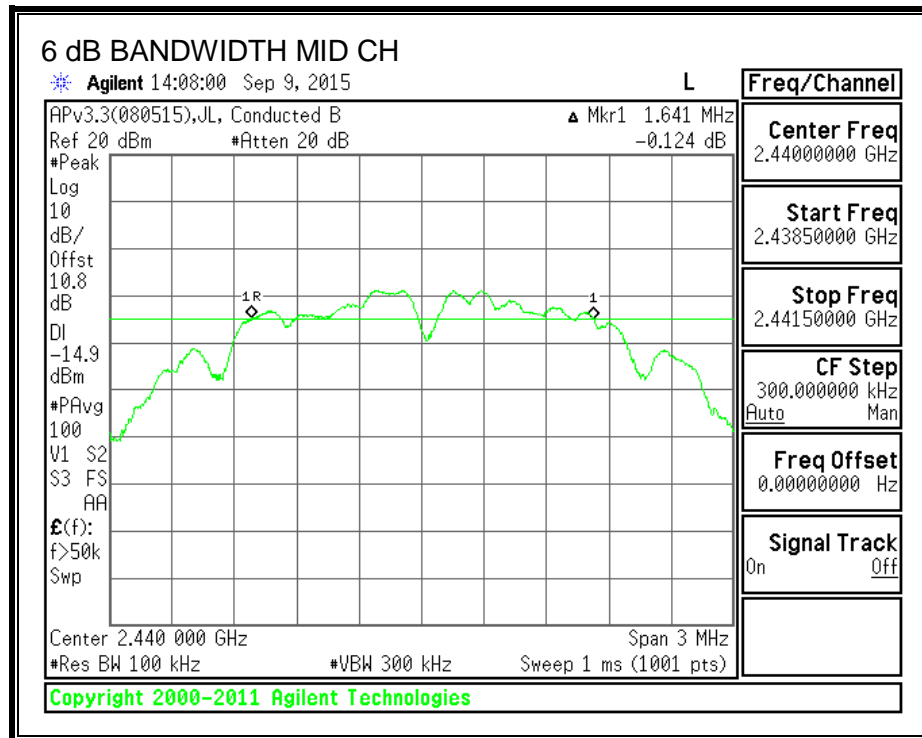
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

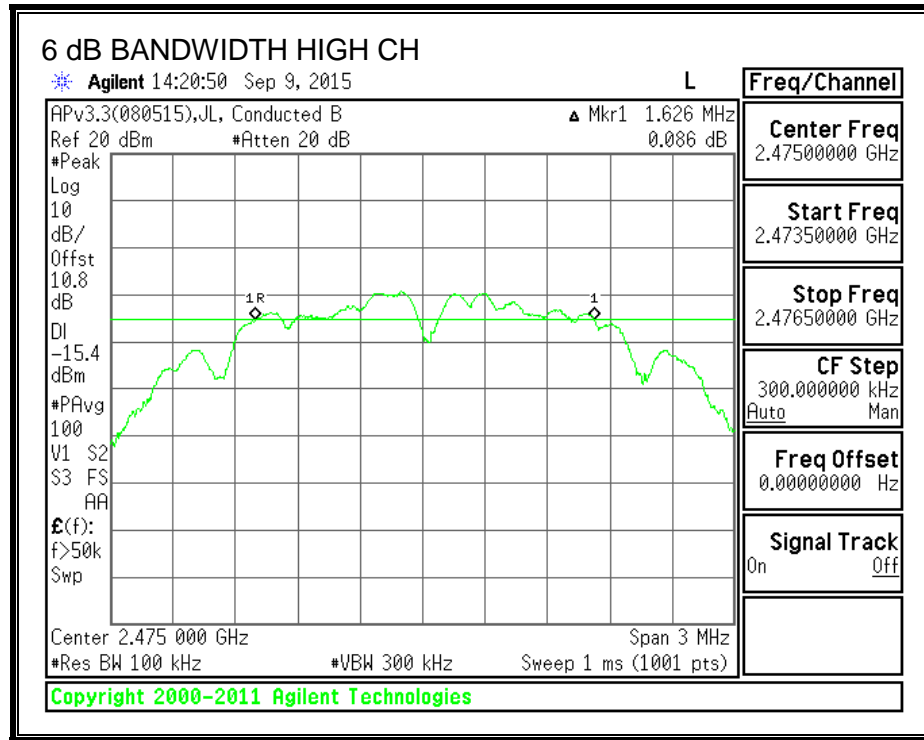
#### **RESULTS**

<b>Channel</b>	<b>Frequency (MHz)</b>	<b>6 dB Bandwidth (MHz)</b>	<b>Minimum Limit (MHz)</b>
Low	2405	1.608	0.5
Middle	2440	1.641	0.5
High	2475	1.626	0.5

## 6 dB BANDWIDTH









## 8.2.2. 99% BANDWIDTH

### LIMITS

None; for reporting purposes only.

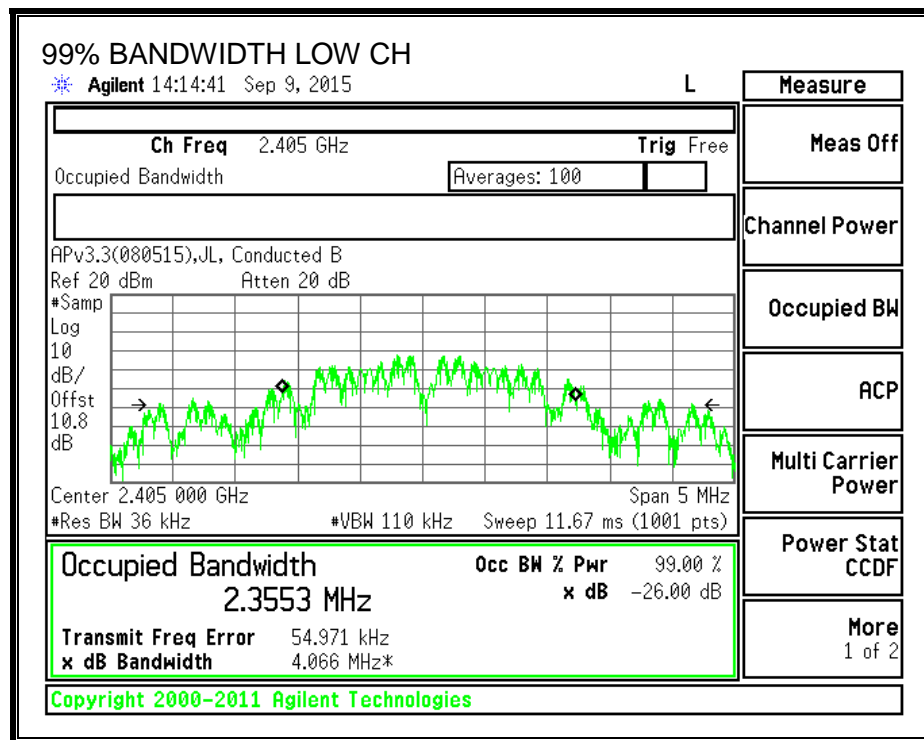
### TEST PROCEDURE

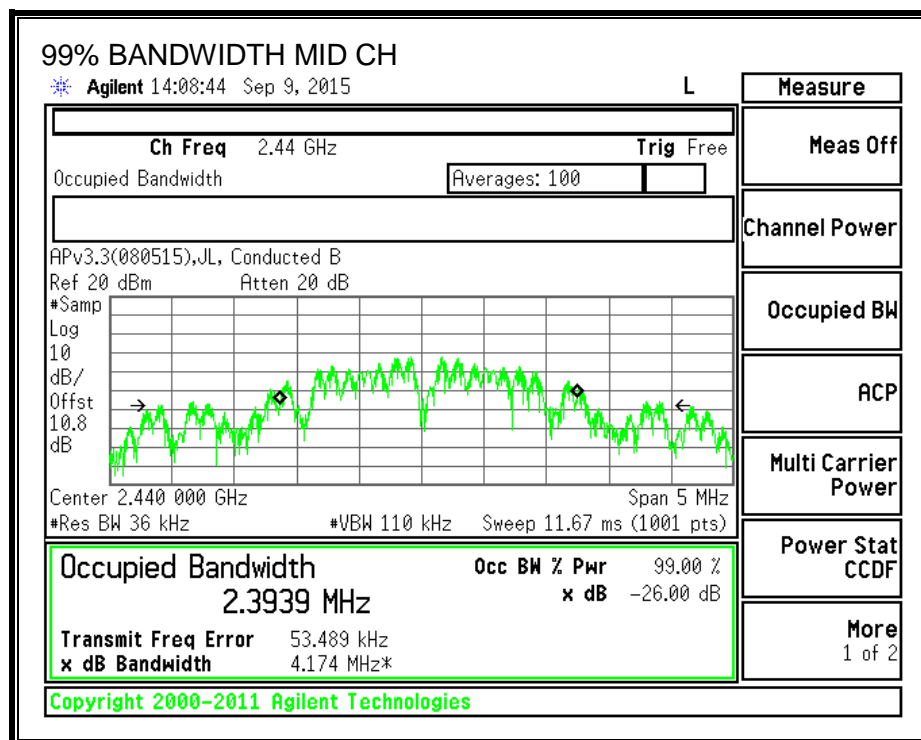
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

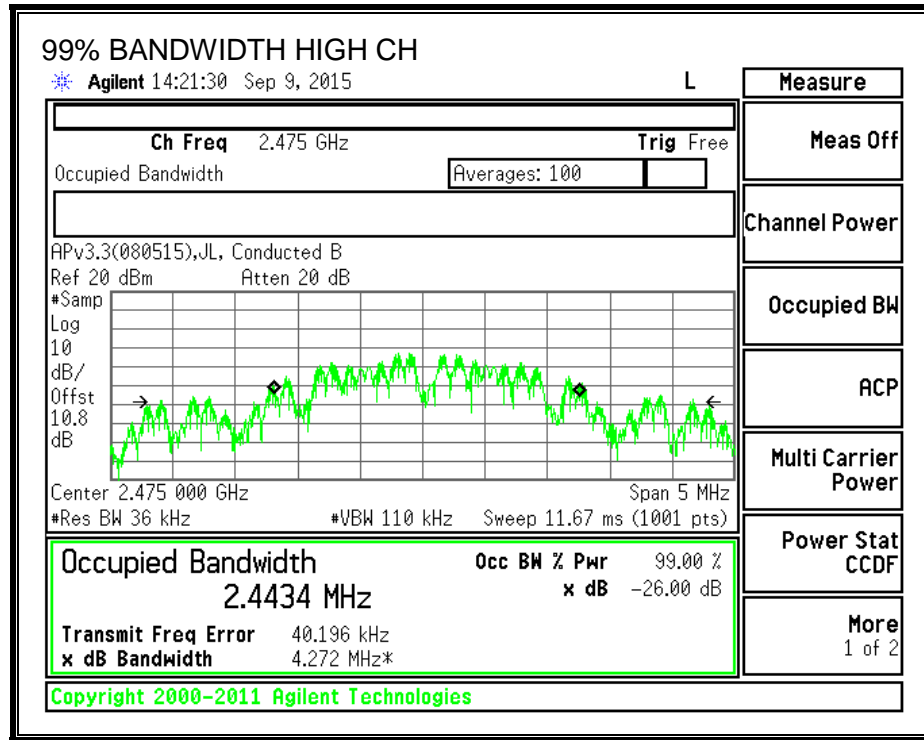
### RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2405	2.3553
Middle	2440	2.3939
High	2475	2.4434

## 99% BANDWIDTH







### 8.2.3. AVERAGE POWER

#### LIMITS

FCC §15.247

IC RSS-247 Clause 5.4(4)

For systems employing digital modulation techniques operating in the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz, the maximum peak conducted output power shall not exceed 1 W. Except as provided in Section 5.4 (5), the e.i.r.p. shall not exceed 4 W.

As an alternative to a peak power measurement, compliance can be based on a measurement of the maximum conducted output power. The maximum conducted output power is the total transmit power delivered to all antennas and antenna elements, averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or transmitting at a reduced power level. If multiple modes of operation are implemented, the maximum conducted output power is the highest total transmit power occurring in any mode.

#### TEST PROCEDURE

The transmitter output is connected to a power meter.

#### RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	2405	-2.40
Middle	2440	-2.83
High	2475	-3.19

## 8.2.4. POWER SPECTRAL DENSITY

### LIMITS

FCC §15.247 (e)

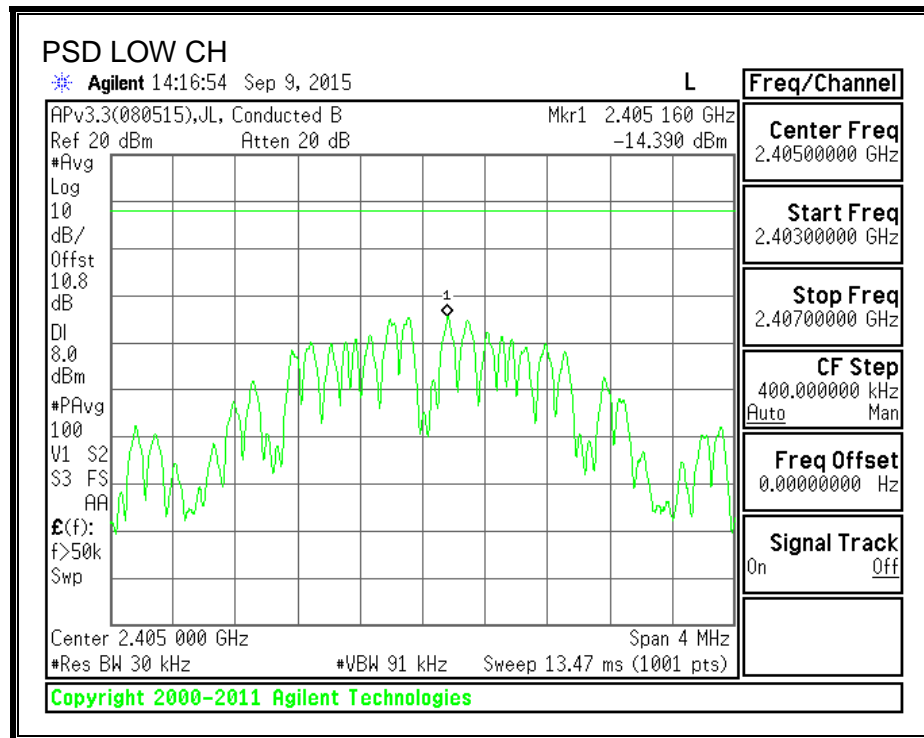
IC RSS-247 Clause 5.2.2

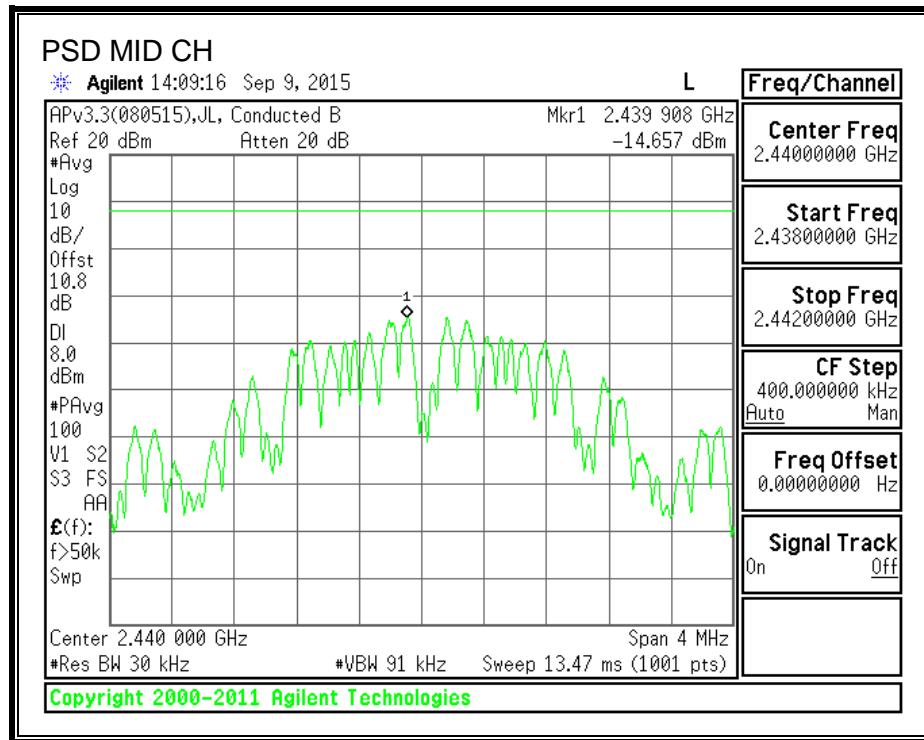
The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

### RESULTS

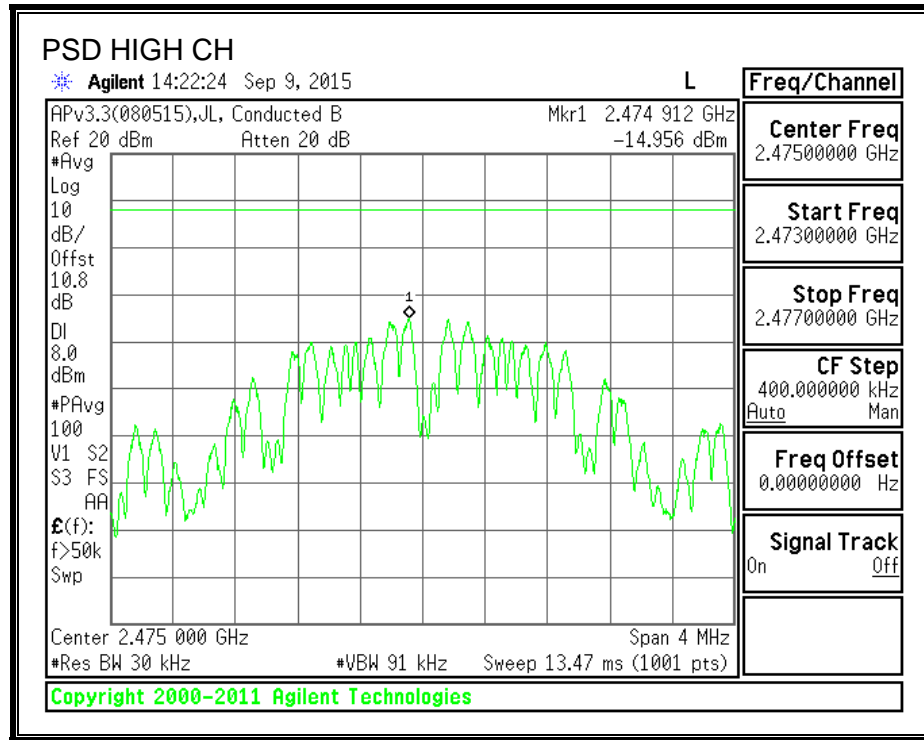
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2405	-14.39	8	-22.39
Middle	2440	-14.66	8	-22.66
High	2475	-14.96	8	-22.96

# **POWER SPECTRAL DENSITY**









## 8.2.5. CONDUCTED SPURIOUS EMISSIONS

### LIMITS

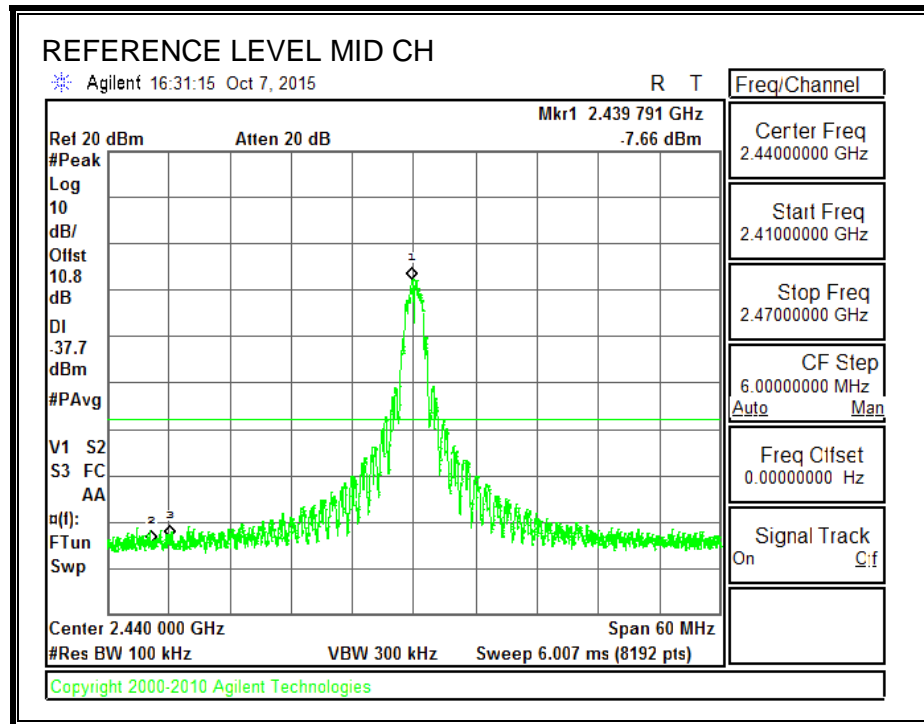
FCC §15.247 (d)

IC RSS-247 Clause 5.5

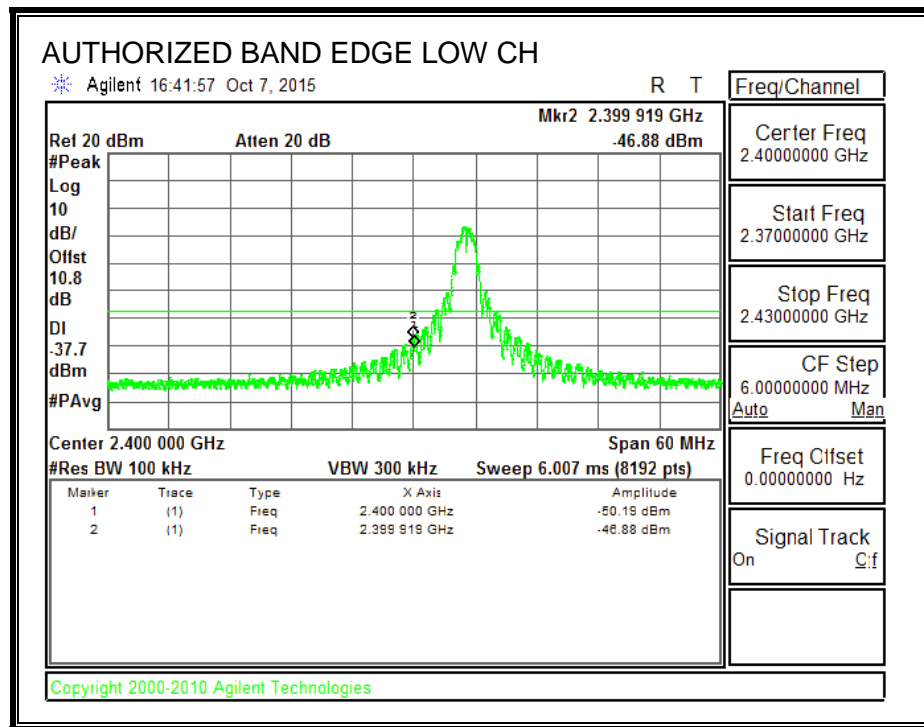
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the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

## RESULTS

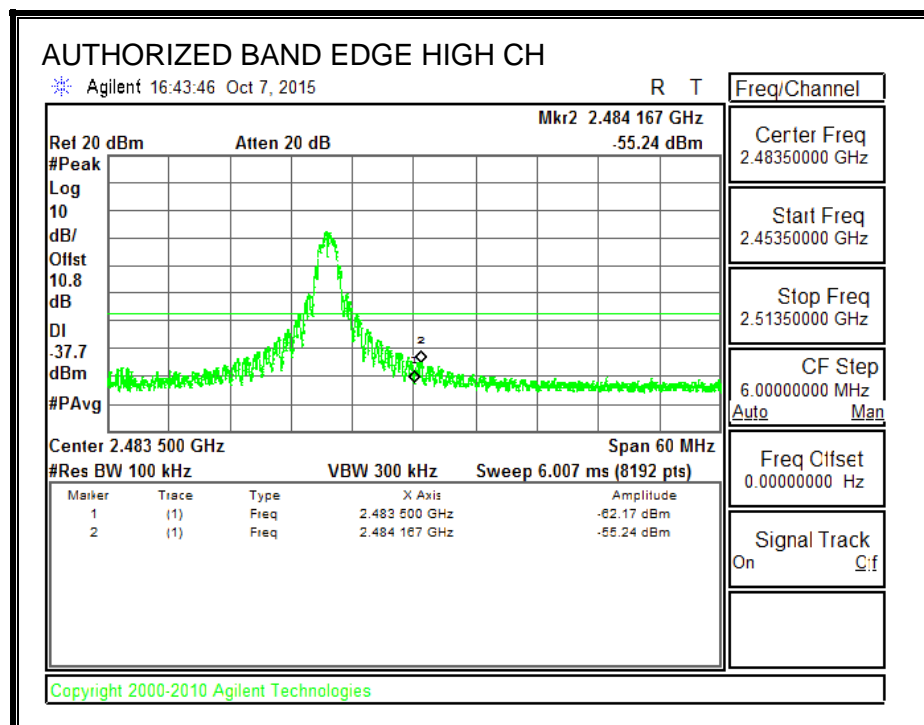
### IN-BAND REFERENCE LEVEL



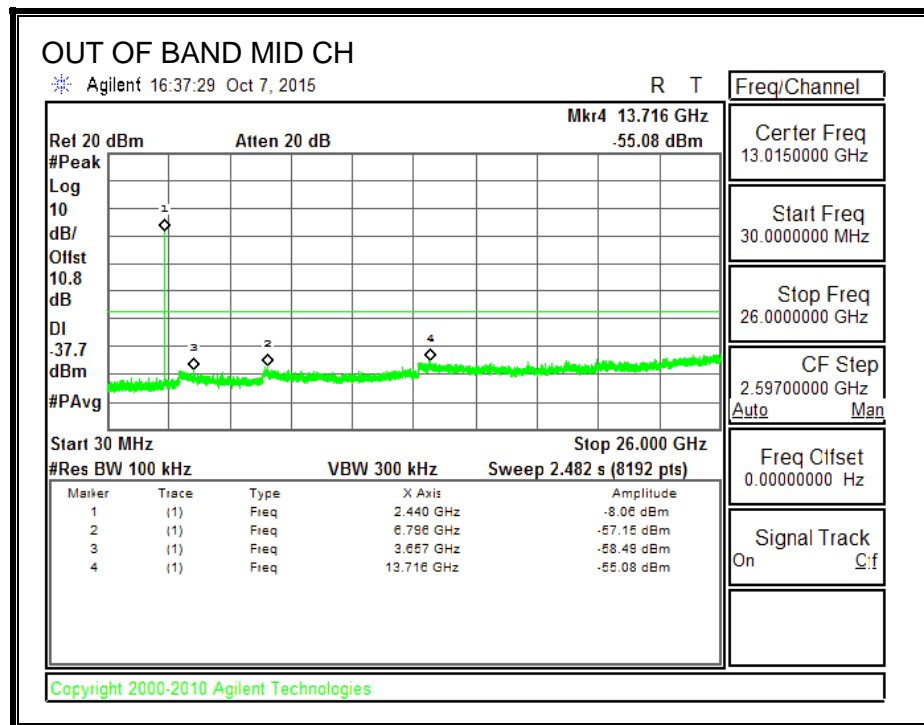
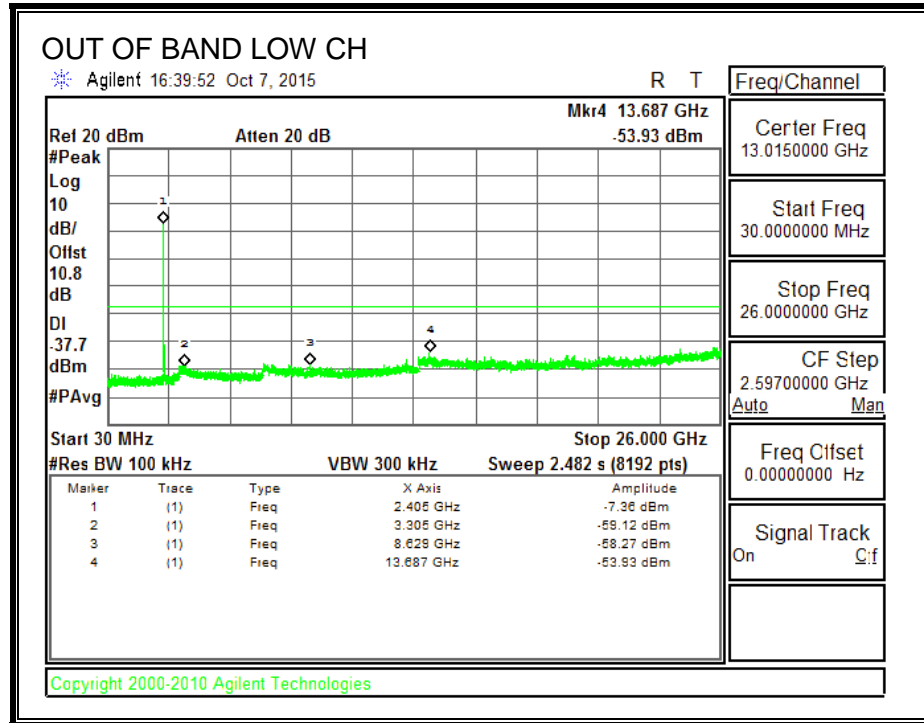
## LOW CHANNEL BANDEDGE

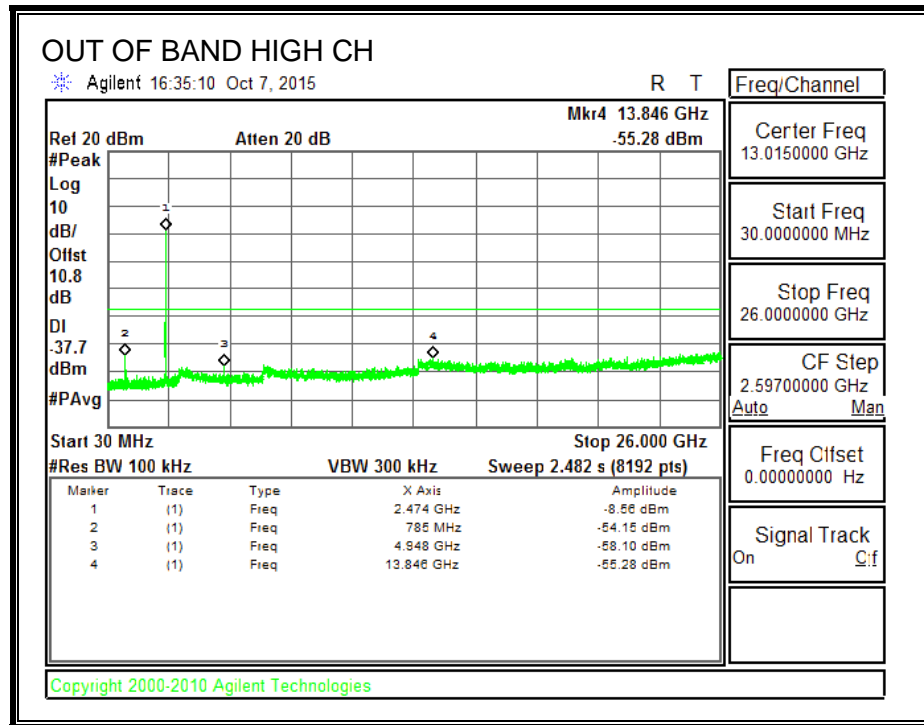


## HIGH CHANNEL BANDEDGE



## OUT-OF-BAND EMISSIONS





## 9. RADIATED TEST RESULTS

### 9.1. LIMITS AND PROCEDURE

#### LIMITS

FCC §15.205 and §15.209

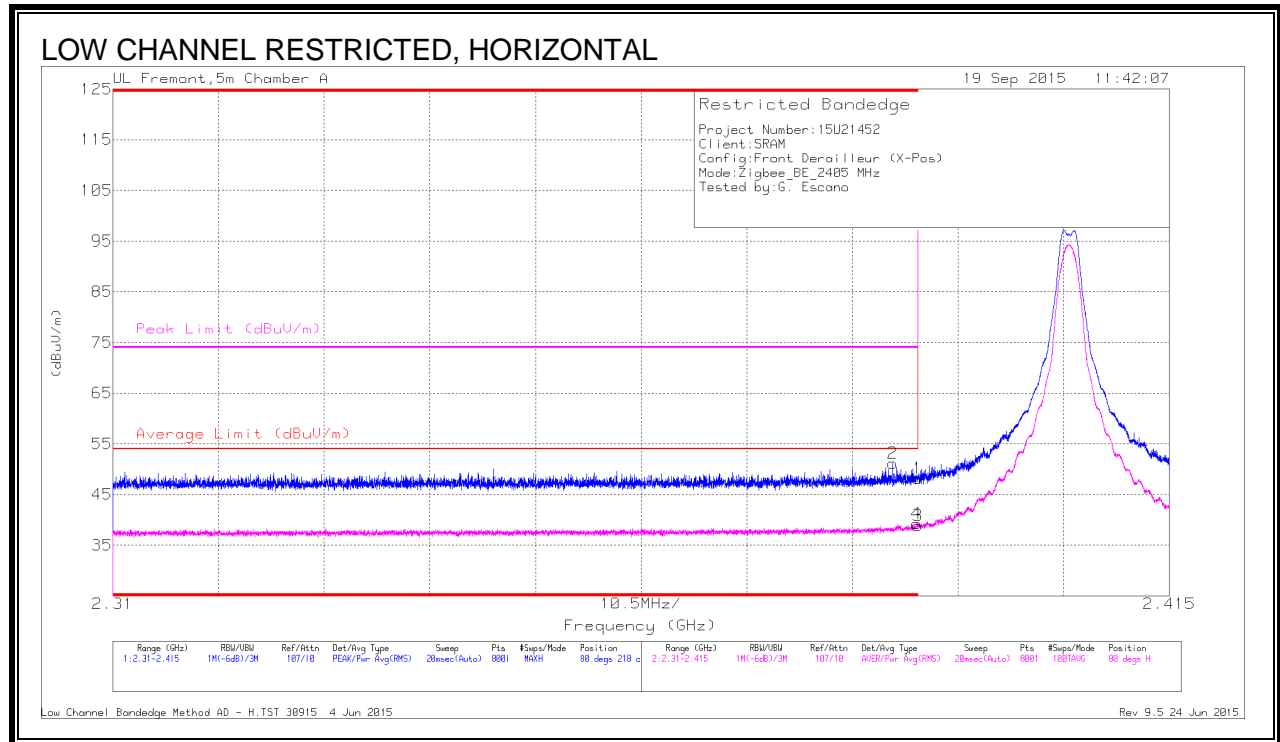
IC RSS-GEN Clause 8.9 (Transmitter)

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

## 9.2. TRANSMITTER ABOVE 1 GHz

### 9.2.1. TX ABOVE 1 GHz FOR 802.15.4 MODE IN THE 2.4 GHz BAND

#### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



#### Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Fit 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	40.81	Pk	32	-24.6	0	48.21	-	-	74	-25.79	80	218	H
2	* 2.388	43.76	Pk	32	-24.6	0	51.16	-	-	74	-22.84	80	218	H
3	* 2.39	31.51	RMS	32	-24.6	0	38.91	54	-15.09	-	-	80	218	H
4	* 2.39	31.82	RMS	32	-24.6	0	39.22	54	-14.78	-	-	80	218	H

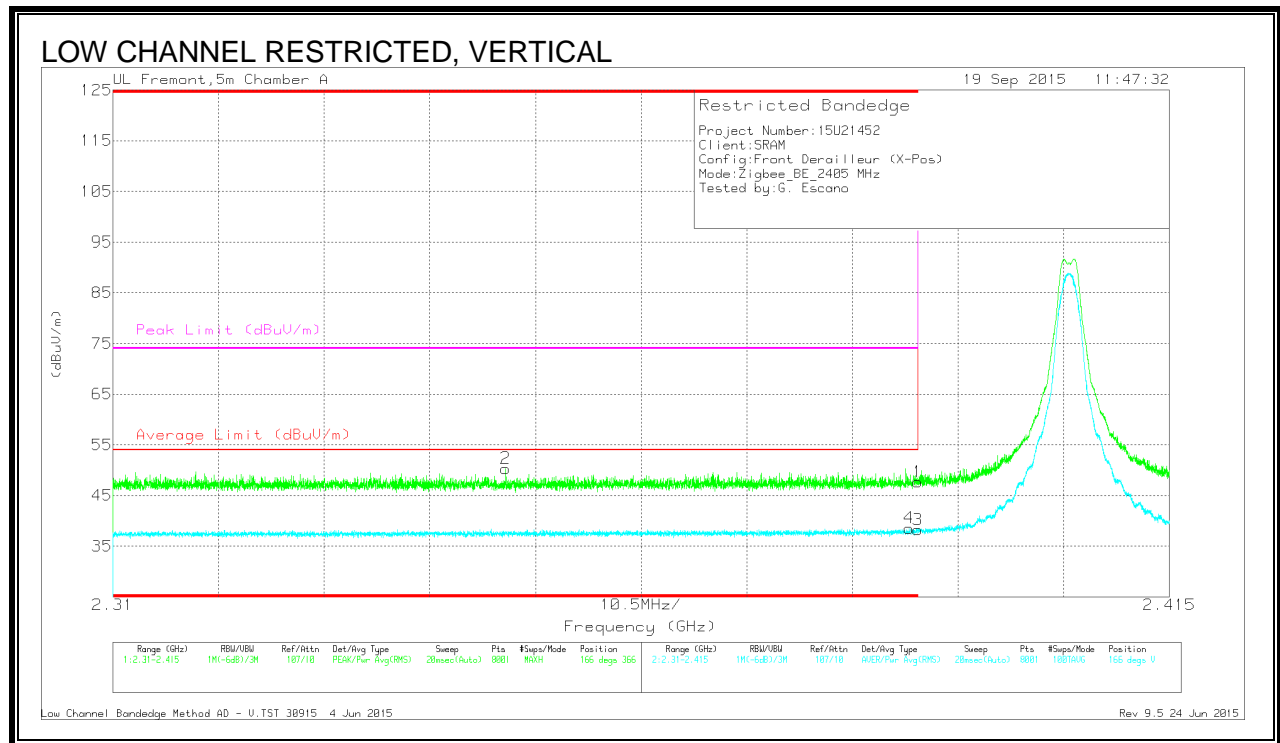
\* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

RMS - RMS detection



# **RESTRICTED BANDEGE (LOW CHANNEL, VERTICAL)**



## **Trace Markers**

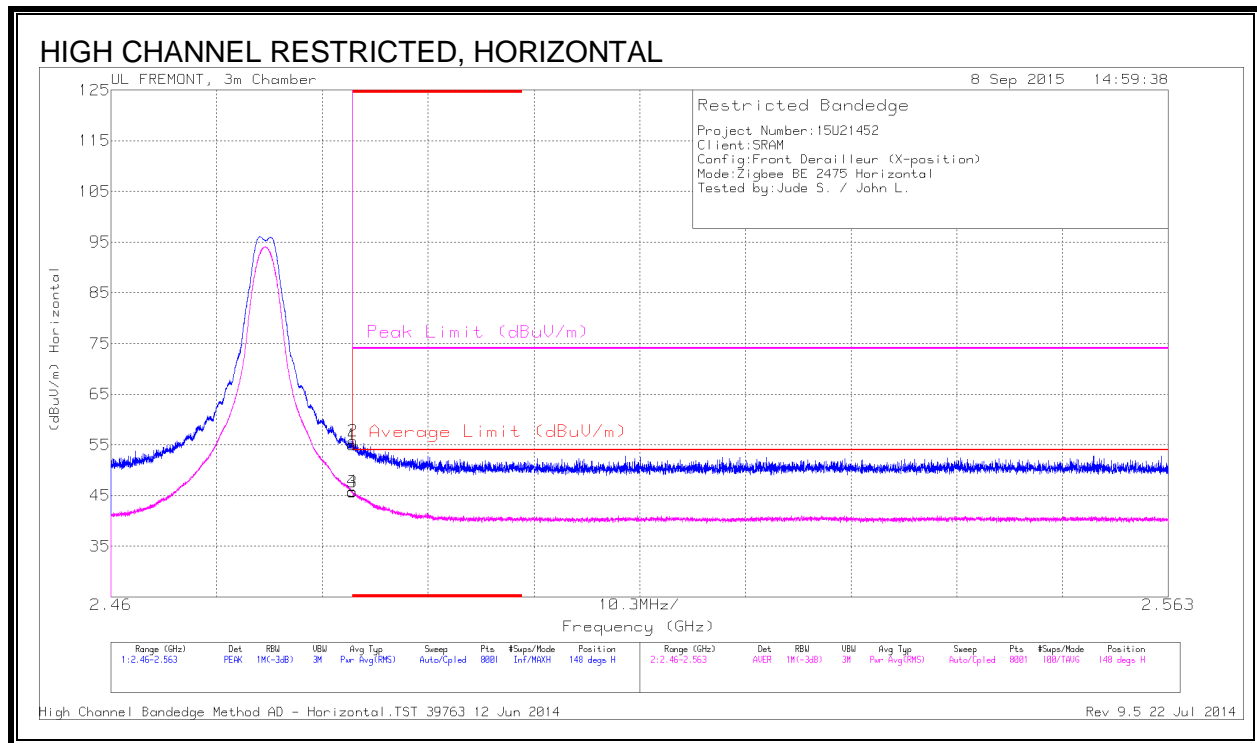
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Fit r/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 2.349	43.15	Pk	31.9	-24.7	0	50.35	-	-	74	-23.65	166	366	V
4	* 2.389	31.16	RMS	32	-24.6	0	38.56	54	-15.44	-	-	166	366	V
1	* 2.39	40.24	Pk	32	-24.6	0	47.64	-	-	74	-26.36	166	366	V
3	* 2.39	30.88	RMS	32	-24.6	0	38.28	54	-15.72	-	-	166	366	V

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

Pk - Peak detector

RMS - RMS detection

# **RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**



## **Trace Markers**

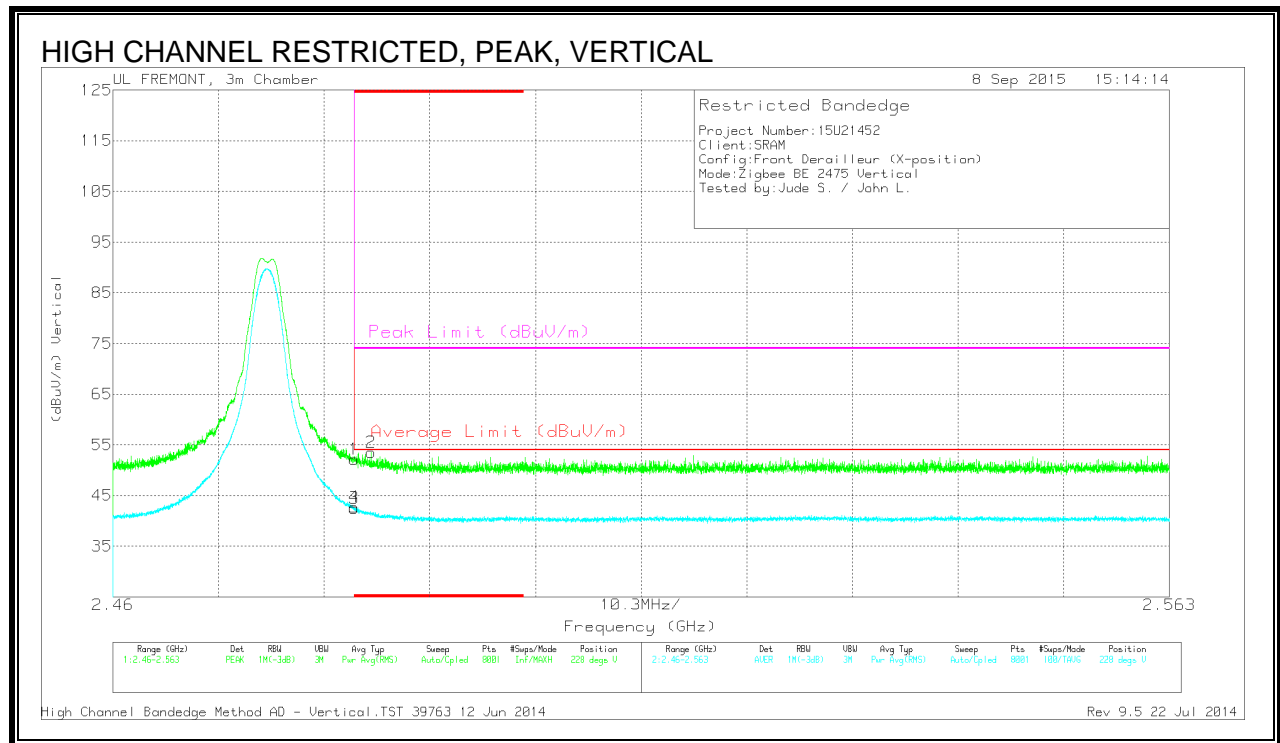
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/ Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	44.8	PK	32.3	-22.1	55	-	-	74	-19	148	262	H
2	* 2.484	45.6	PK	32.3	-22.1	55.8	-	-	74	-18.2	148	262	H
3	* 2.484	35.53	RMS	32.3	-22.1	45.73	54	-8.27	-	-	148	262	H
4	* 2.484	35.65	RMS	32.3	-22.1	45.85	54	-8.15	-	-	148	262	H

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

PK - Peak detector

RMS - RMS detection

# **RESTRICTED BANDEGE (HIGH CHANNEL, VERTICAL)**



## **Trace Markers**

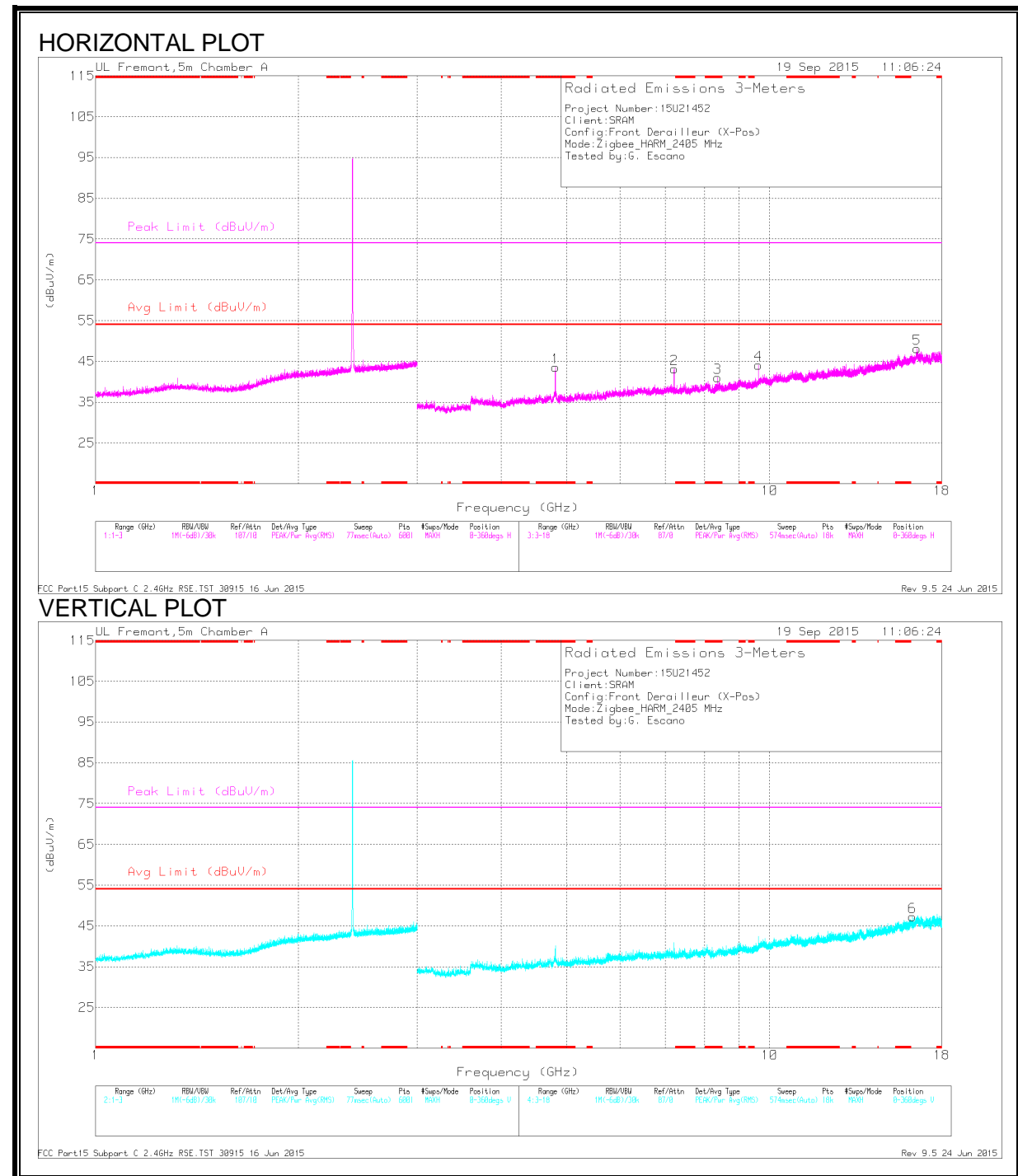
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/ Filt/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	41.96	PK	32.3	-22.1	52.16	-	-	74	-21.84	228	399	V
2	* 2.485	43.28	PK	32.3	-22.1	53.48	-	-	74	-20.52	228	399	V
3	* 2.484	32.33	RMS	32.3	-22.1	42.53	54	-11.47	-	-	228	399	V
4	* 2.484	32.52	RMS	32.3	-22.1	42.72	54	-11.28	-	-	228	399	V

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

PK - Peak detector

RMS - RMS detection

## HARMONICS AND SPURIOUS EMISSIONS



## Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Filtr /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	* 4.809	46.31	PK2	34	-29.8	0	50.51	-	-	74	-23.49	277	124	H
	* 4.809	37.88	MAv1	34	-29.8	0	42.08	54	-11.92	-	-	277	124	H
3	* 8.371	37.01	PK2	35.7	-24.7	0	48.01	-	-	74	-25.99	99	100	H
	* 8.37	24.44	MAv1	35.7	-24.7	0	35.44	54	-18.56	-	-	99	100	H
2	7.216	33.98	Pk	35.5	-26.3	0	43.18	-	-	-	-	0-360	100	H
4	9.622	31.14	Pk	36.7	-23.7	0	44.14	-	-	-	-	0-360	100	H
6	16.296	28.34	Pk	41.2	-22.3	0	47.24	-	-	-	-	0-360	100	V
5	16.53	28.18	Pk	41.6	-21.6	0	48.18	-	-	-	-	0-360	201	H

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

-Compliance for emissions in non-restricted bands is shown in conducted out of band testing

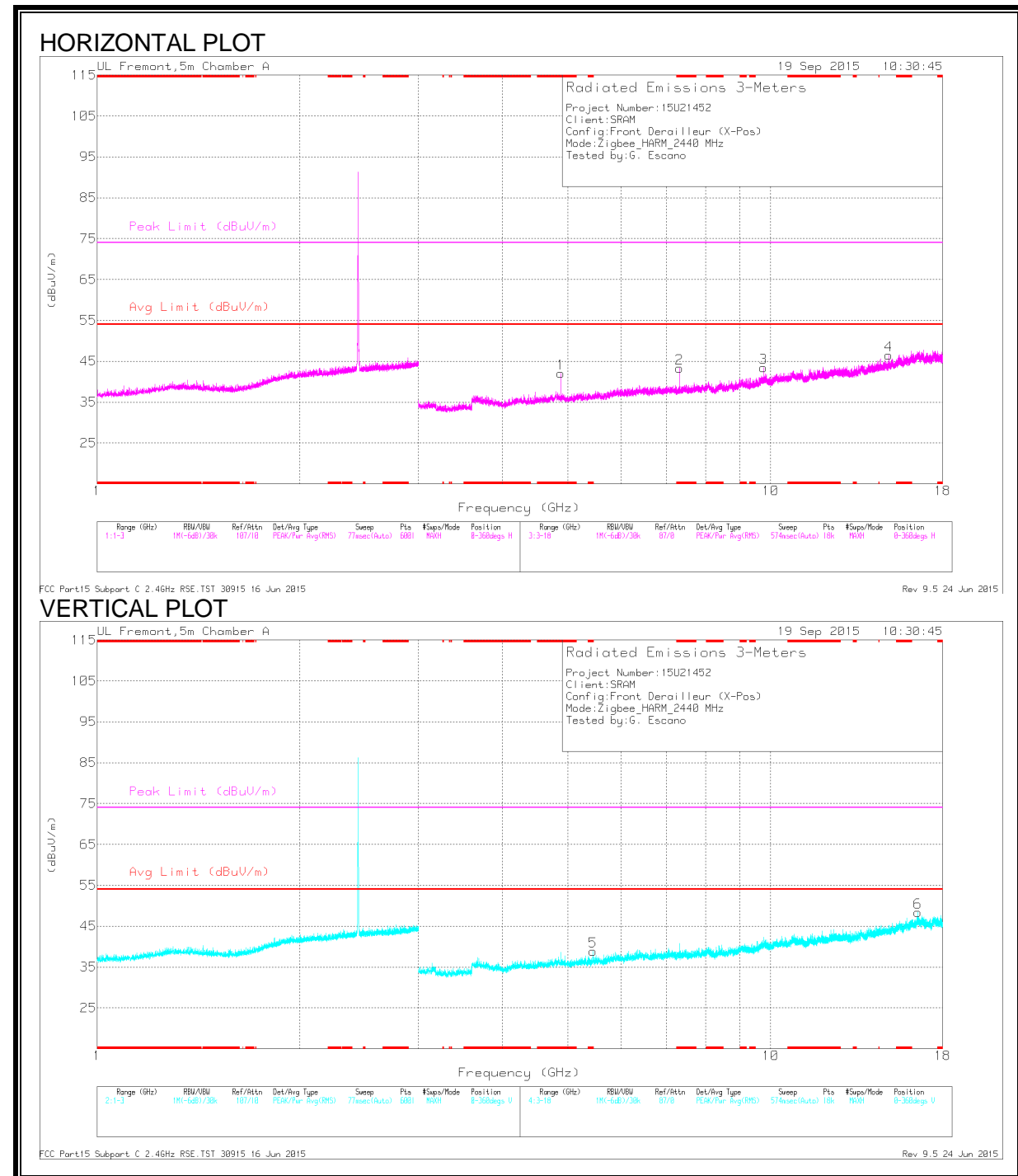
PK - Peak detector

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

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

## HARMONICS AND SPURIOUS EMISSIONS



## Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Filtr /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	* 4.881	43.34	PK2	33.9	-29.3	0	47.94	-	-	74	-26.06	3	267	H
	* 4.879	34.76	MAv1	33.9	-29.3	0	39.36	54	-14.64	-	-	3	267	H
2	* 7.322	41.78	PK2	35.5	-26.5	0	50.78	-	-	74	-23.22	355	100	H
	* 7.319	32.87	MAv1	35.5	-26.5	0	41.87	54	-12.13	-	-	355	100	H
5	* 5.448	39.98	PK2	34.5	-29	0	45.48	-	-	74	-28.52	349	101	V
	* 5.448	28.23	MAv1	34.5	-29	0	33.73	54	-20.27	-	-	349	101	V
3	9.761	29.43	Pk	36.9	-22.9	0	43.43	-	-	-	-	0-360	100	H
4	14.961	29.18	Pk	39.7	-22.4	0	46.48	-	-	-	-	0-360	100	H
6	16.545	27.97	Pk	41.6	-21.2	0	48.37	-	-	-	-	0-360	100	V

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

-Compliance for emissions in non-restricted bands is shown in conducted out of band testing

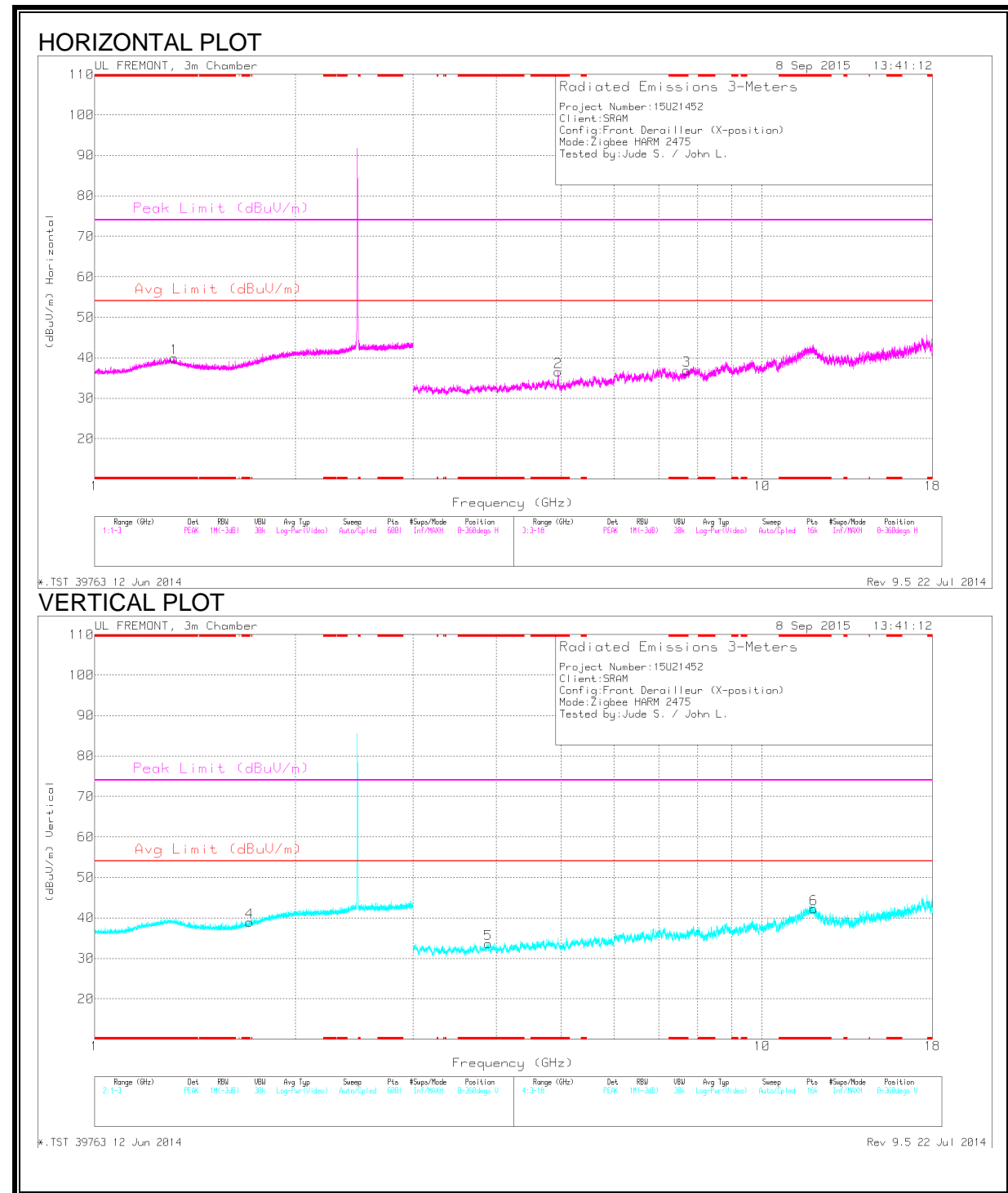
PK - Peak detector

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

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

## HARMONICS AND SPURIOUS EMISSIONS





## Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/F ltr/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	* 1.315	42.87	PK2	29.7	-23.2	49.37	-	-	74	-24.63	0	200	H
	* 1.316	30.87	MAv1	29.7	-23.1	37.47	54	-16.53	-	-	0	200	H
4	* 1.706	42.48	PK2	29.1	-22.7	48.88	-	-	74	-25.12	0	100	V
	* 1.707	30.82	MAv1	29.1	-22.7	37.22	54	-16.78	-	-	0	100	V
2	* 4.949	42.3	PK2	34	-30.1	46.2	-	-	74	-27.8	0	200	H
	* 4.949	32.51	MAv1	34	-30.1	36.41	54	-17.59	-	-	0	200	H
3	* 7.716	38.24	PK2	35.8	-28.1	45.94	-	-	74	-28.06	0	200	H
	* 7.714	27.16	MAv1	35.8	-28.1	34.86	54	-19.14	-	-	0	200	H
5	* 3.884	39.88	PK2	33.2	-30.2	42.88	-	-	74	-31.12	0	200	V
	* 3.886	28.8	MAv1	33.2	-30.3	31.7	54	-22.3	-	-	0	200	V
6	* 11.944	36.27	PK2	39.1	-23.1	52.27	-	-	74	-21.73	0	200	V
	* 11.946	24.42	MAv1	39.1	-23.1	40.42	54	-13.58	-	-	0	200	V

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

-Compliance for emissions in non-restricted bands is shown in conducted out of band testing

PK - Peak detector

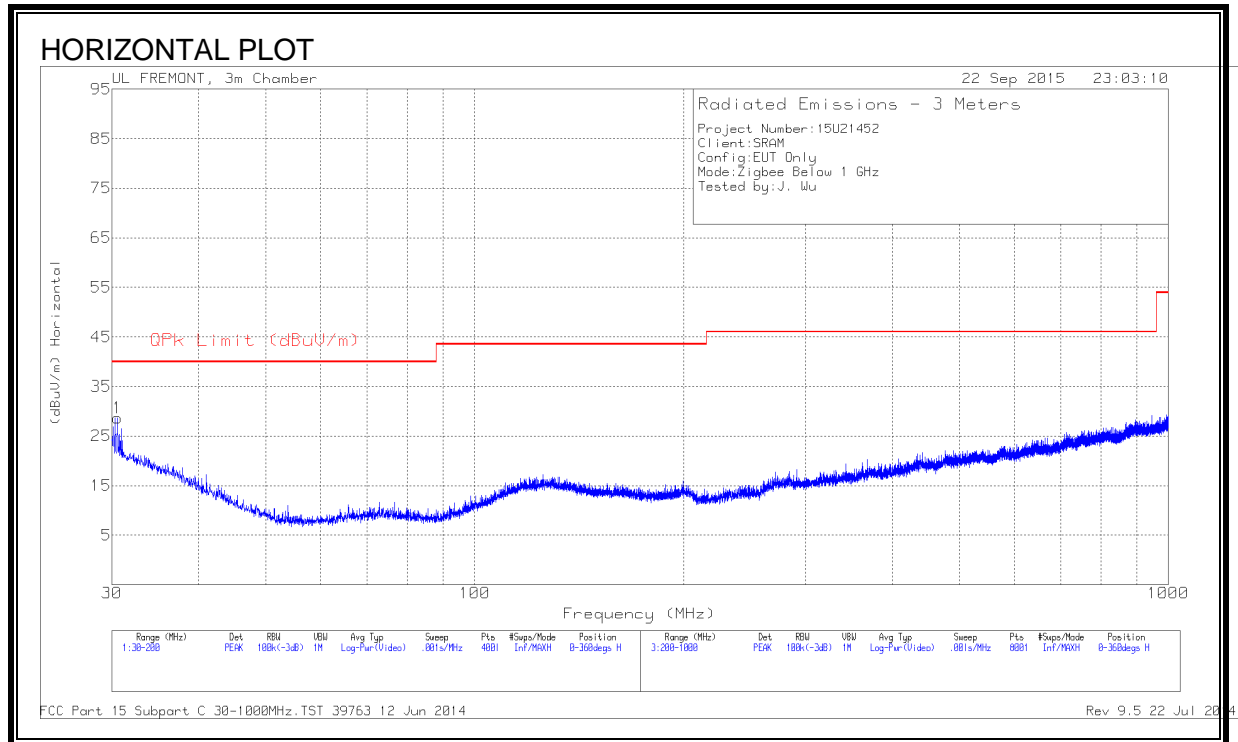
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

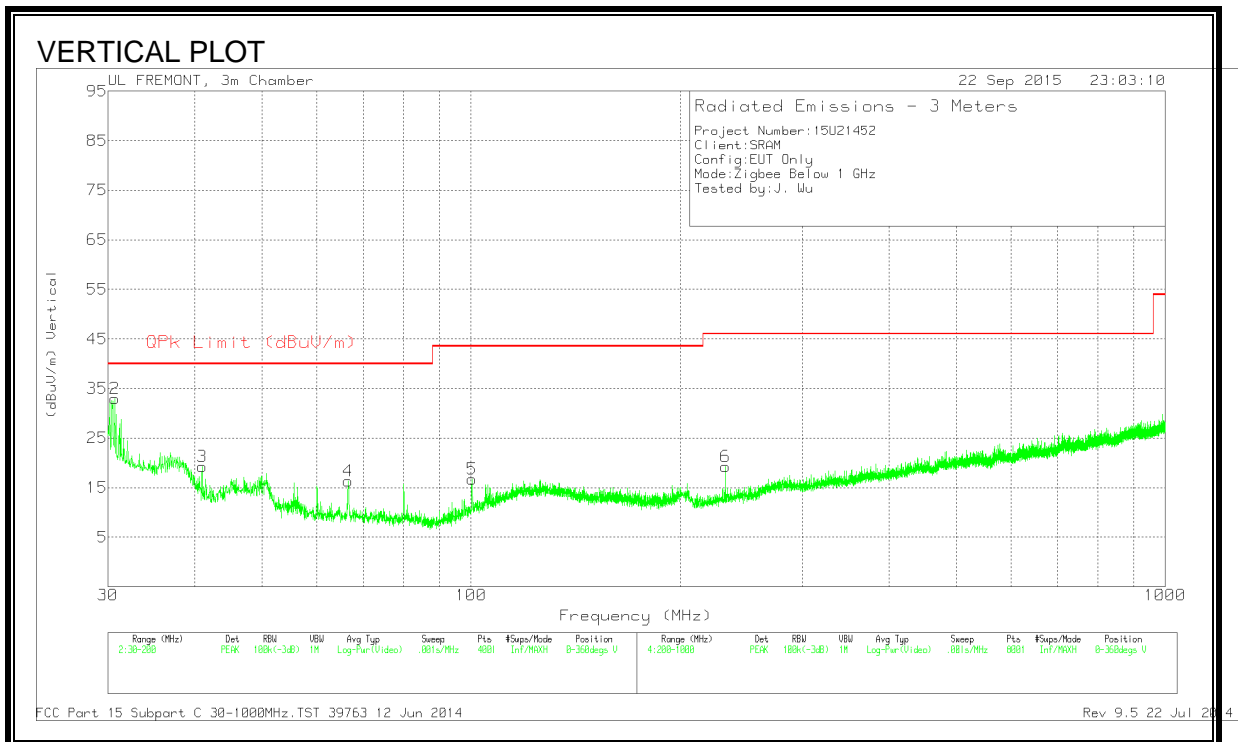
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

### 9.3. WORST-CASE BELOW 1 GHz

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

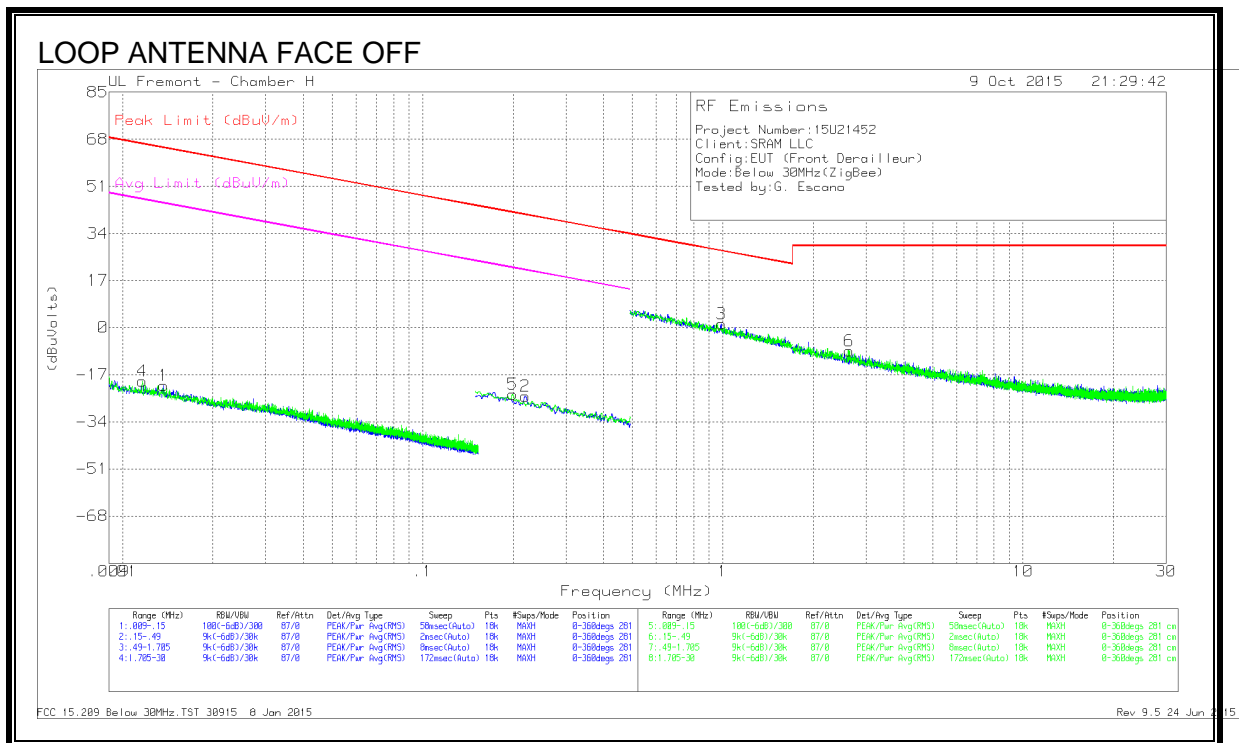
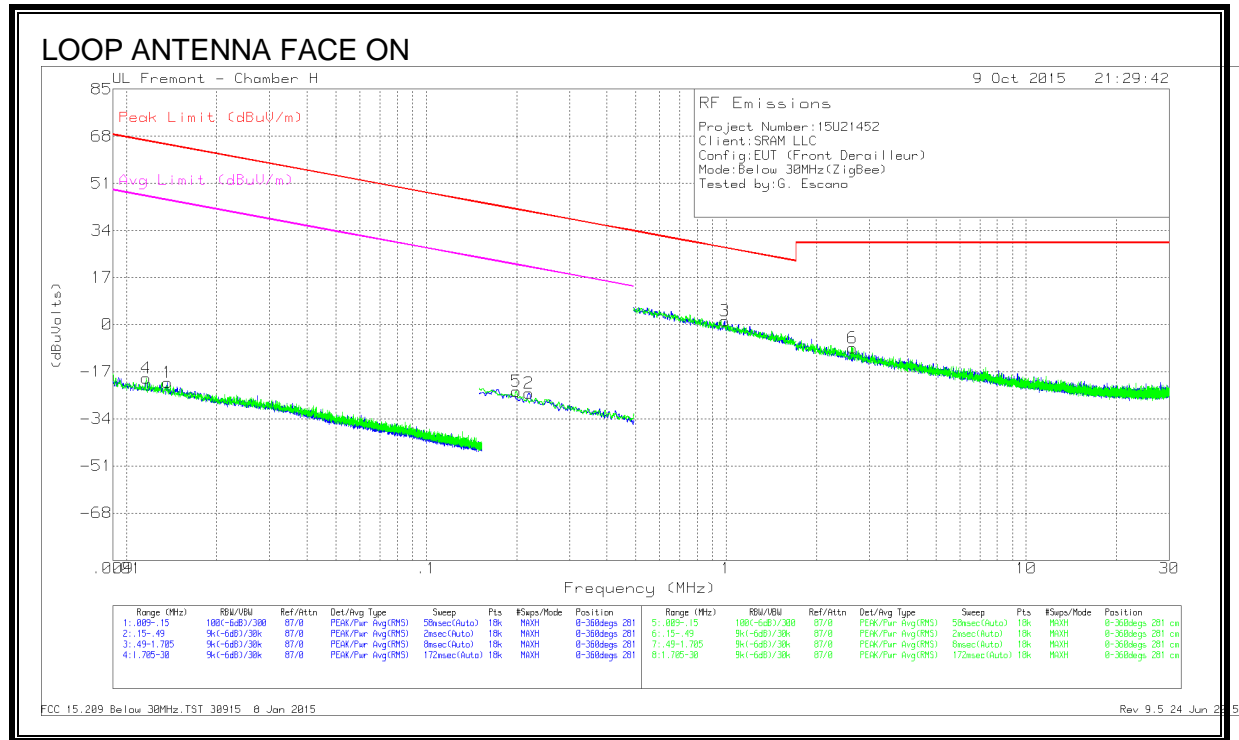


#### SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T185 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	30.5525	34.55	PK	21.3	-27.2	28.65	40	-11.35	0-360	100	H
2	30.68	38.93	PK	21.2	-27.2	32.93	40	-7.07	0-360	100	V
3	41.0075	32.72	PK	13.5	-27	19.22	40	-20.78	0-360	100	V
4	66.55	34.99	PK	8.1	-26.7	16.39	40	-23.61	0-360	100	V
5	100.295	33.17	PK	9.8	-26.3	16.67	43.52	-26.85	0-360	100	V
6	232.5	32.86	PK	11.2	-24.8	19.26	46.02	-26.76	0-360	200	V

## 9.4. RADIATED EMISSION BELOW 30MHz



### Trace Markers

Marker	Frequenc y (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cbl (dB)	Dist Corr 300m	Correcte d Reading (dBuVolt s)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
4	.01164	42.56	Pk	18.1	.1	-80	-19.24	66.28	-85.52	46.28	-65.52	0-360
1	.01371	41.73	Pk	17.3	.1	-80	-20.87	64.86	-85.73	44.86	-65.73	0-360
5	.19931	45.3	Pk	10.5	.1	-80	-24.1	41.61	-65.71	21.61	-45.71	0-360
2	.21985	44.72	Pk	10.4	.1	-80	-24.78	40.76	-65.54	20.76	-45.54	0-360

### Pk - Peak detector

Marker	Frequenc y (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cbl (dB)	Dist Corr (dB) 40Log	Correcte d Reading (dBuVolt s)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
3	.98825	30.66	Pk	10.4	.2	-40	1.26	27.71	-26.45	-	-	0-360
6	2.64113	20.88	Pk	10.4	.3	-40	-8.42	29.54	-37.96	-	-	0-360

### Pk - Peak detector

FCC 15.209 Below 30MHz.TST 30915 8 Jan 2015  
Rev 9.5 24 Jun 2015