



CERTIFICATION TEST REPORT

Report Number : 11395475-E2V5

Applicant : SRAM LLC.
1000 W Fulton Market, 4th Floor
Chicago, IL. 60607, U.S.A

Model : 0824

FCC ID : C90-KILO2

IC ID : 10161A-KILO2

EUT Description : QUARQ KILO BICYCLE POWER METER

Test Standard(s) : FCC 47 CFR PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 8

Date of Issue:
9/13/2016

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

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	08/23/16	Initial Issue	
V2	09/6/16	Updated Section 3.6, 4.2 & 4.3	Kiya Kedida
V3	09/8/16	Updated Section 4.3 add 15.215(c) test table data & 5.2	D. Coronia
V4	09/11/16	Updated Section 4.3	D. Coronia
V5	09/13/16	Updated Section 3.5	D. Coronia

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS.....	4
2. SUMMARY OF TESTING.....	5
2.1. FACILITIES AND ACCREDITATION	5
2.2. TEST METHODOLOGY	5
2.3. CALIBRATION AND UNCERTAINTY.....	6
2.4. TEST AND MEASUREMENT EQUIPMENT.....	7
3. EQUIPMENT UNDER TEST	8
3.1. DESCRIPTION OF EUT.....	8
3.2. MAXIMUM OUTPUT POWER.....	8
3.3. DESCRIPTION OF AVAILABLE ANTENNAS.....	8
3.4. SOFTWARE AND FIRMWARE.....	8
3.5. WORST-CASE CONFIGURATION AND MODE.....	8
3.6. DESCRIPTION OF TEST SETUP.....	9
4. ANTENNA PORT TEST RESULTS	11
4.1. ON TIME AND DUTY CYCLE	11
4.2. 99% BANDWIDTH.....	12
4.3. 20dB BANDWIDTH	15
5. RADIATED TEST RESULTS	18
5.1. LIMITS AND PROCEDURE	18
5.2. TRANSMITTER ABOVE 1 GHz	20
5.2.1. FUNDAMENTAL FREQUENCY RADIATED EMISSION	24
5.3. WORST-CASE BELOW 1 GHz.....	31
5.4. RADIATED EMISSION BELOW 30MHz	33
6. SETUP PHOTOS.....	34

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SRAM LLC.
1000 W Fulton Market, 4th Floor
Chicago, IL. 60607, U.S.A

EUT DESCRIPTION: QUARQ KILO BICYCLE POWER METER

MODEL: 0824

SERIAL NUMBER: AFS61570

DATE TESTED: AUGUST 11 - 22, 2016

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-210 Issue 8	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 OOI
CONSUMER TECHNOLOGY DIVISION
PROJECT LEAD
UL Verification Services Inc.

Prepared By:



JEFFREY WU
CONSUMER TECHNOLOGY DIVISION
TEST ENGINEER
UL Verification Services Inc.

2. SUMMARY OF TESTING

2.1. 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(IC: 2324B-1)	<input type="checkbox"/> Chamber D(IC: 2324B-4)
<input checked="" type="checkbox"/> Chamber B(IC: 2324B-2)	<input type="checkbox"/> Chamber E(IC: 2324B-5)
<input checked="" type="checkbox"/> Chamber C(IC: 2324B-3)	<input type="checkbox"/> Chamber F(IC: 2324B-6)
	<input type="checkbox"/> Chamber G(IC: 2324B-7)
	<input type="checkbox"/> Chamber H(IC: 2324B-8)

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>.

2.2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2013, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 4, and RSS-210 Issue 8.

2.3. CALIBRATION AND UNCERTAINTY

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.

SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

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	3.84 dB
Radiated Disturbance, 9KHz to 30 MHz	2.14 dB
Radiated Disturbance, 30 to 1000 MHz	4.98 dB
Radiated Disturbance, 1000 to 6000 MHz	3.86 dB
Radiated Disturbance, 6000 to 18000 MHz	4.23 dB
Radiated Disturbance, 18000 to 26000 MHz	5.30 dB
Radiated Disturbance, 26000 to 40000 MHz	5.23 dB

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

2.4. 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
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight	N9030A	1450	12/12/15	12/12/16
PSA Spectrum Analyzer 40GHz	Agilent	E4446A	146	07/13/16	07/13/17
Spectrum Analyzer, PXA 3Hz to 44Ghz	Keysight	N9030A	908	04/13/16	04/13/17
Amplifier, 1 to 7 GHz, 10dB Gain minimum, 6dB NF	Amplical	AMP1G7-10-27	1370	04/15/16	04/15/17
Amplifier, 10KHz to 1GHz, 32dB	Sonoma	310N	300	11/05/15	11/05/16
Antenna, Broadband Hybrid 30MHz to 2000MHz	Sunol Science	JB3	899	05/26/16	05/26/17
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	346	02/22/16	02/22/17
Loop Antenna, 10KHz-30MHz	EMCO	6502	35	03/24/16	03/24/17
Power Meter, P-series single channel	Keysight	N1911A	1262	07/08/16	07/08/17
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Agilent	N1921A	750	09/17/25	09/17/16
Spectrum Analyzer, PXA 3Hz to 44Ghz	Keysight	N9030A	908	04/13/16	04/13/17
Antenna, Broadband Hybrid 30MHz to 2000MHz	Sunol Sciences	JB3	899	05/26/16	05/26/17
Antenna, Horn 1-18GHz	ETS Lindgren	3117	346	02/22/16	02/22/17
Amplifier, 10KHz to 1GHz, 32dB	Sonoma	310N	300	11/05/15	11/05/16
Filter, HPF 6.0 HPF	Micro-Tronics	HPS17542	484	07/20/16	07/20/17
Filter, HPF 3.0 GHz	Micro-Tronics	HPM17543	486	07/20/16	07/20/17
Filter, LPF 5 GHz	Micro-Tronics	LPS17541	481	07/20/16	07/20/17
Spectrum Analyzer, PXA 3Hz to 44GHz	Keysight	N9030A	907	01/06/16	01/06/17
Antenna, Horn 1-18GHz	ETS Lindgren	3117	345	03/07/16	03/07/17
Antenna, Active Loop 9KHz to 30MHz	Emco	6502	35	03/24/16	03/24/17
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences	JB1	130	09/01/15	09/01/16
Amplifier, 10KHz to 1GHz, 32dB	Keysight	8447D	10	02/01/16	02/01/17
Amplifier, 1 to 8 GHz, 35dB	Miteq	-4D-01000800-30	1156	03/09/16	03/09/17
Filter, HPF 3GHz	Micro-Tronics	HPM17543	485	03/09/16	03/09/17
Filter, LPF 5GHz	Micro-Tronics	LPS17541	482	03/09/16	03/09/17

Test Software List			
Description	Manufacturer	Model	Version
Radiated Software	UL	UL EMC	Ver 9.5, Apr 26, 2016
Conducted Software	UL	UL EMC	Ver 9.5, May 26, 2015
Antenna Port Software	UL	UL RF	Ver 5.1.1, July 15, 2016

3. EQUIPMENT UNDER TEST

3.1. DESCRIPTION OF EUT

The EUT is a Quarq Kilo Bicycle Power Meter with ANT+ & BLE, which is powered by 3VDC coin cell battery.

3.2. MAXIMUM OUTPUT POWER

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

Frequency Range (MHz)	Mode	Peak E-field Strength (dBuV/m)	Avg E-field Strength (dBuV/m)	Distance (m)
2410 - 2480	ANT +	93.31	92.69	3.00

3.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a 2.4 GHz Surface Mount Device (SMD) on-ground Antenna with 3 dBi (peak) gain.

3.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was 10531.

The test utility software used during testing was 10328.

3.5. WORST-CASE CONFIGURATION AND MODE

Above 1GHz Low/Middle/High channel were tested for radiated emissions and the below 1GHz, above 18GHz the channel with the highest output power was tested.

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

3.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Lenovo	SL510	LR-LNCPB	N/A
AC Adapter	Lenovo	42T4418	PA-1650-53I	N/A
DC Power Supply	AMETEK	XT15-4	T464	N/A

I/O CABLES

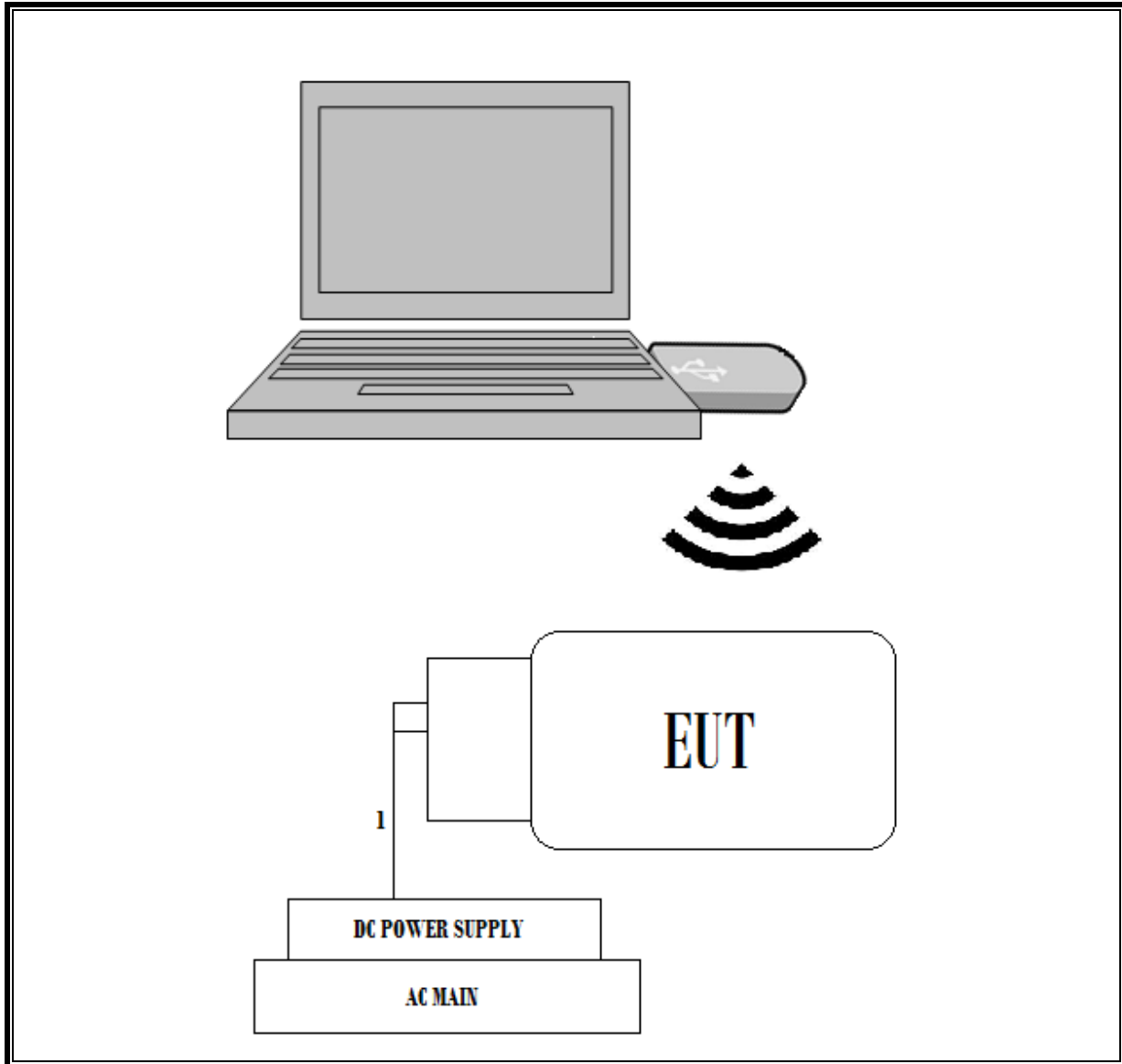
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power	1	Banand Plug	Un-shielded	0.4m	N/A

TEST SETUP

The firmware installed in the EUT during testing was 10531 provided by SRAM.

The EUT is a stand-alone unit during the tests. Python Script exercised the radio card and the radio card will communicate with the EUT.

SETUP DIAGRAM FOR TESTS



4. ANTENNA PORT TEST RESULTS

4.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

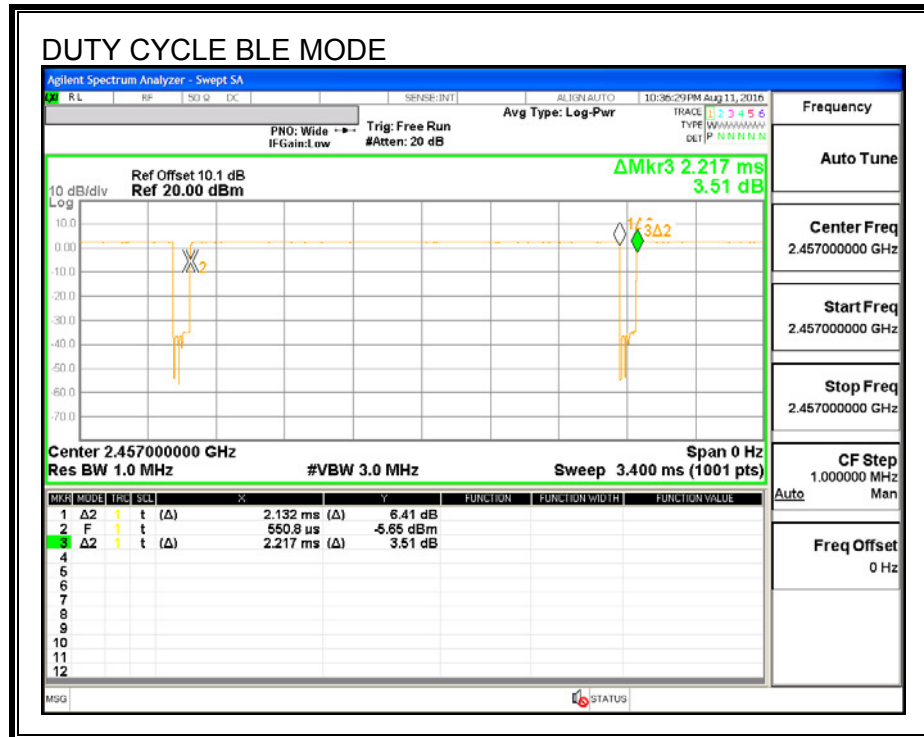
PROCEDURE

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)
2.4GHz Band						
ANT+	2.132	2.217	0.962	96.17%	0.17	0.469

DUTY CYCLE PLOTS



ID:	37290	Date:	08/11/16
-----	-------	-------	----------

4.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

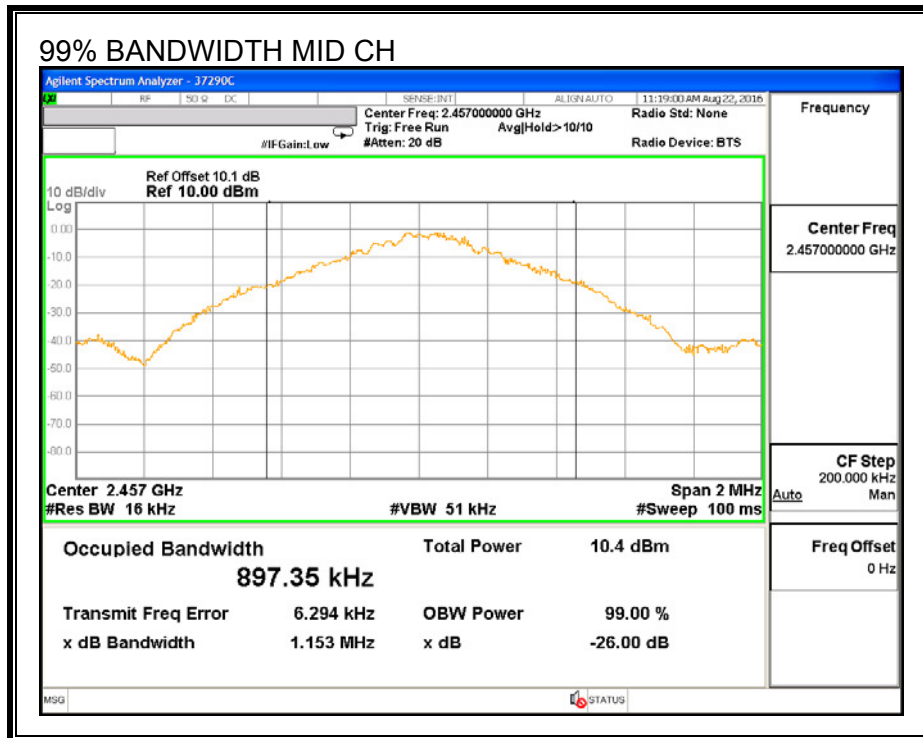
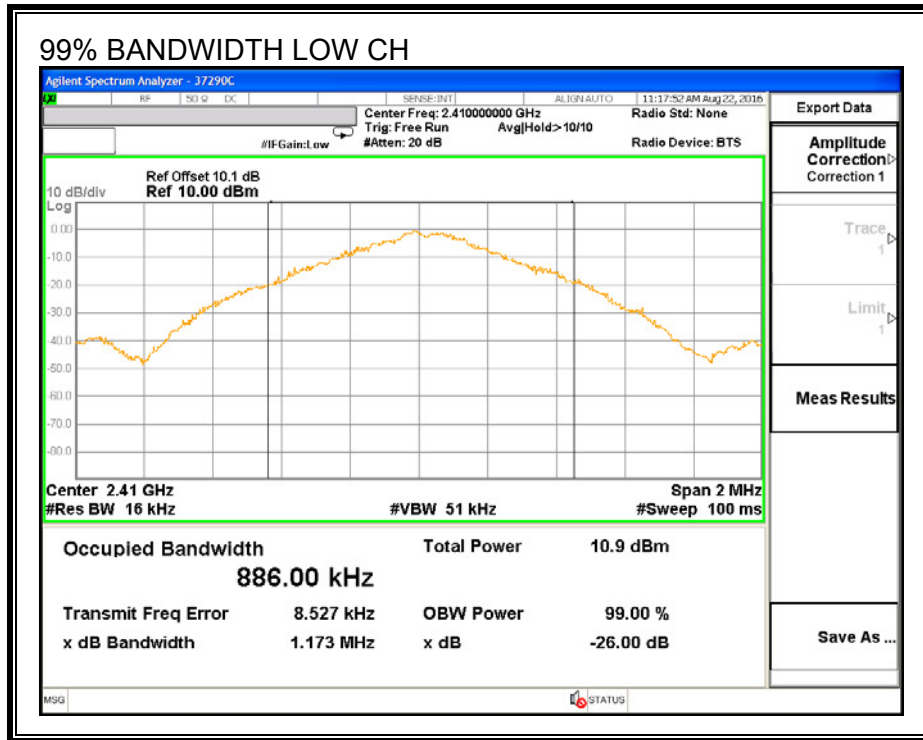
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

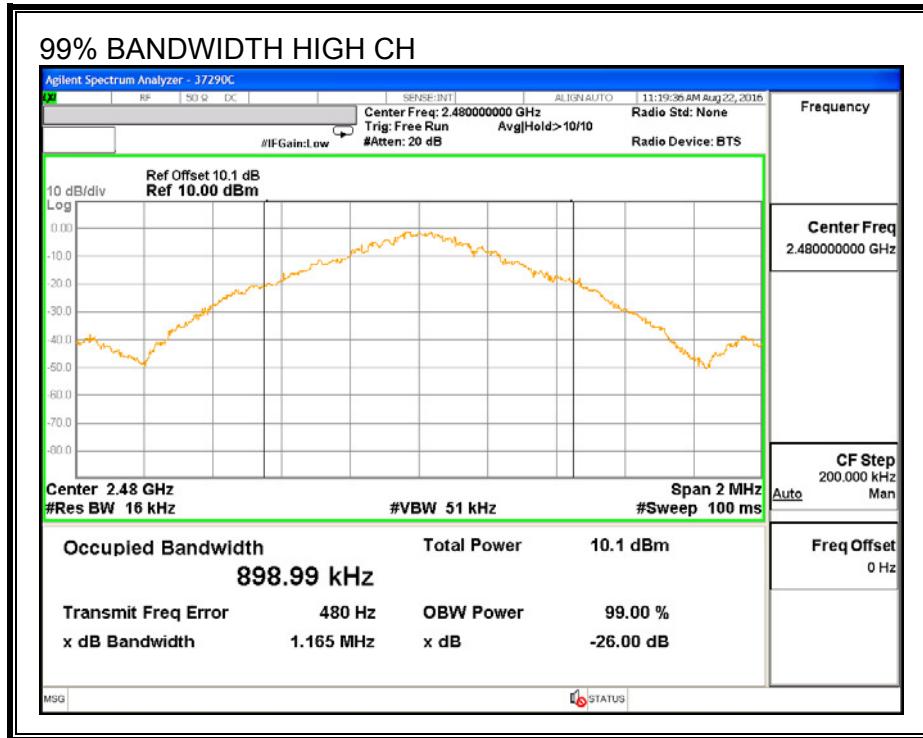
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)	20dB Bandwidth (KHz)
Low	2410	0.8860	918.3
Middle	2457	0.8974	978.1
High	2480	0.8990	930.2

ID:	37290	Date:	08/22/16
------------	-------	--------------	----------

99% BANDWIDTH





4.3. 20dB BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to $\geq 1\%$ of the 20 dB bandwidth. The VBW is set to \geq RBW. The sweep time is coupled

RESULTS

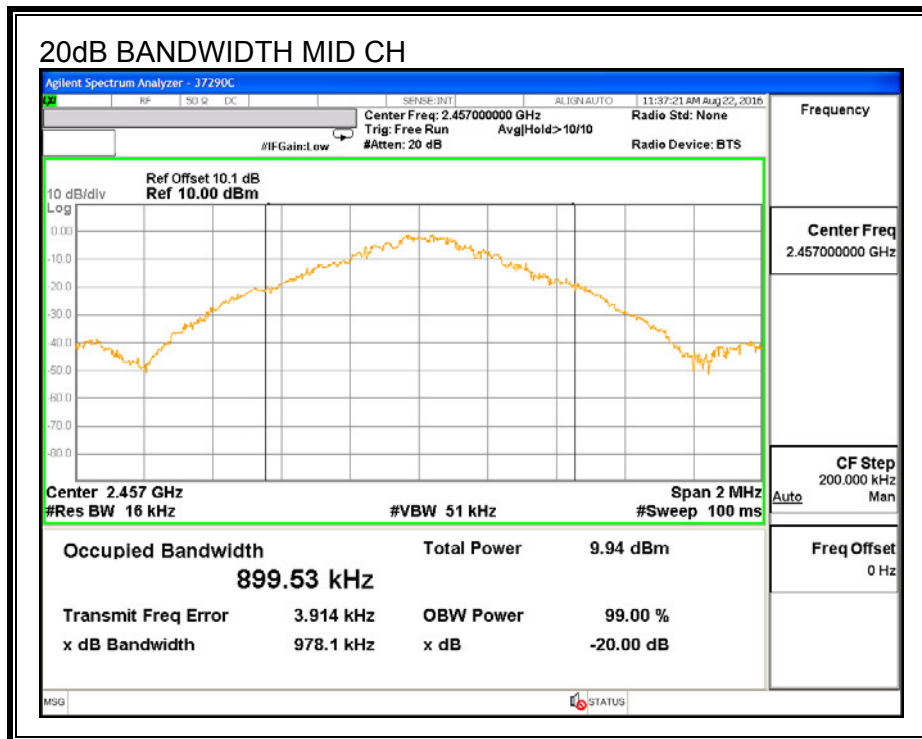
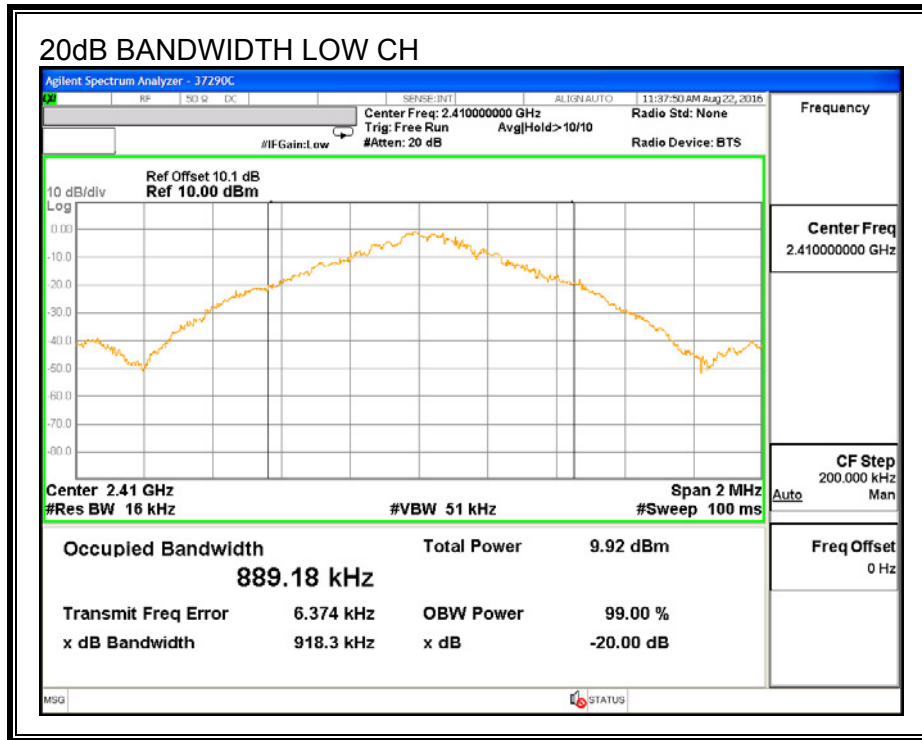
Channel	Frequency (MHz)	20dB Bandwidth (KHz)
Low	2410	918.3
Middle	2457	978.1
High	2480	930.2

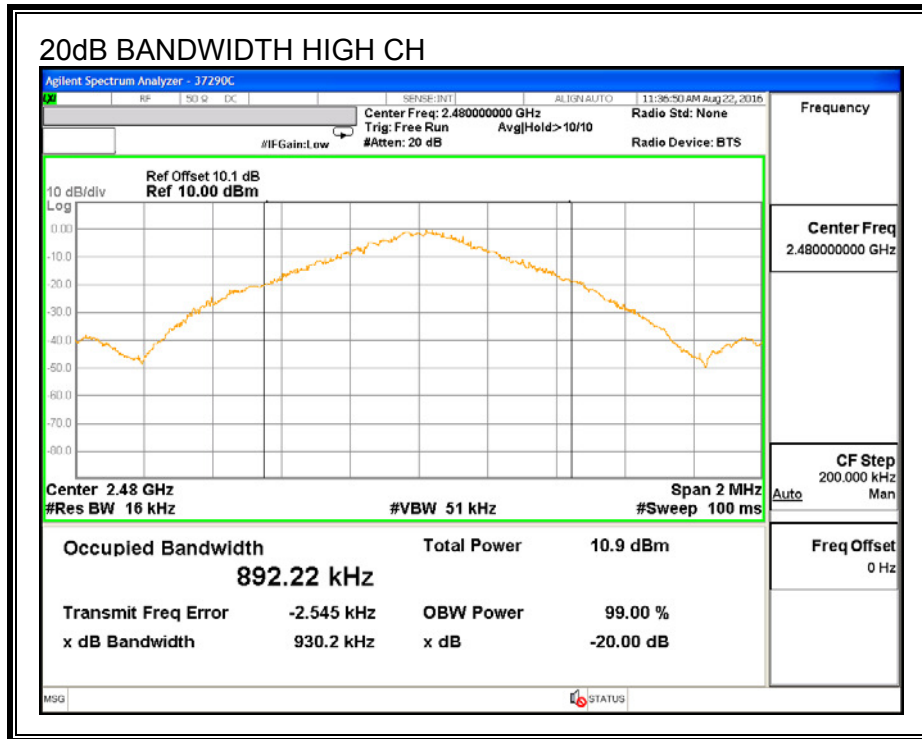
Test table results for FCC Rule Part15.215(c): Compliant

Low Channel		
Center Frequency (CF):	2410	MHz
Measured 20 dB BW:	0.918	MHz
CF- 20dB/2 BW:	0.459	MHz
Results:	2409.541	MHz
High Channel		
Center Frequency (CF):	2480	MHz
Measured 20 dB BW:	0.930	MHz
CF- 20dB/2 BW:	0.465	MHz
Results:	2479.535	MHz

ID:	37290	Date:	08/22/16
------------	-------	--------------	----------

20dB BANDWIDTH





5. TRANSMITTER RADIATED EMISSIONS

5.1. LIMITS AND PROCEDURE

LIMITS

LIMITS

FCC 15.249

Operation within the bands 902–928 MHz, 2400–2483.5 MHz, 5725–5875 MHz, and 24.0–24.25 GHz.

(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.

(e) As shown in Sec. 15.35(b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100 **	3
88-216	150 **	3
216-960	200 **	3
Above 960	500	3

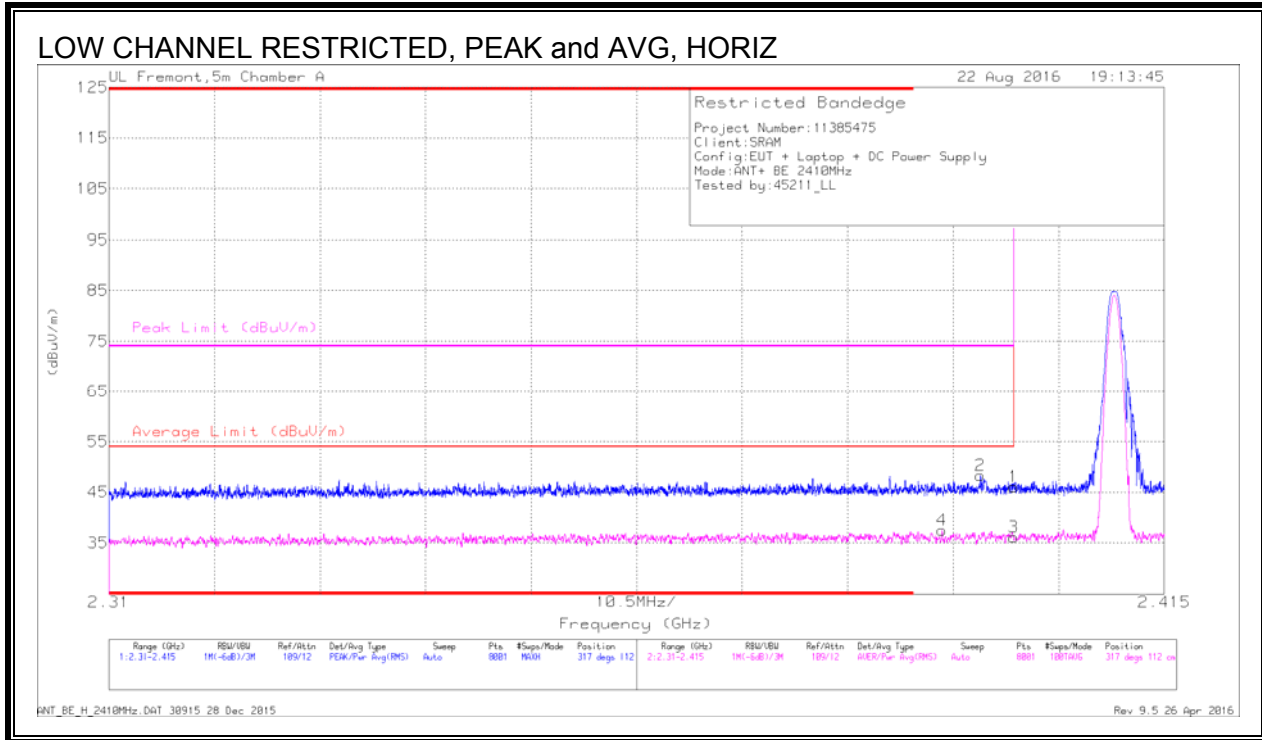
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§15.231 and 15.241.

KDB 937606 OATS and Chamber Correlation Justification

- Device is a small bicycle power meter.
- Base 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.

5.2. TRANSMITTER ABOVE 1 GHz

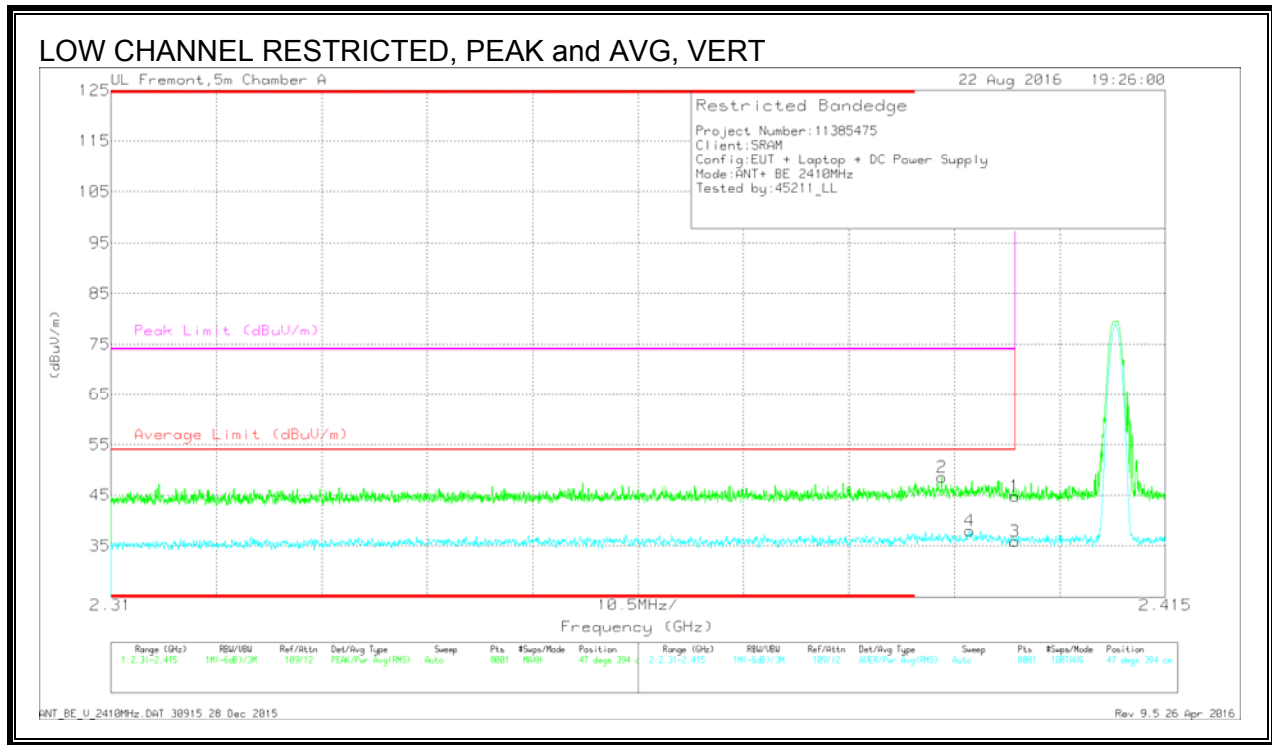
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cb/Fix/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
4	2.393	27.48	RMS	32.2	-22.4	.17	37.45	54	-16.55	-	-	317	112	H
2	2.397	38.54	PK	32.2	-22.4	0	48.34	-	-	74	-25.66	317	112	H
1	2.4	36.12	PK	32.2	-22.3	0	46.02	-	-	74	-27.98	317	112	H
3	2.4	26.02	RMS	32.2	-22.3	.17	36.09	54	-17.91	-	-	317	112	H

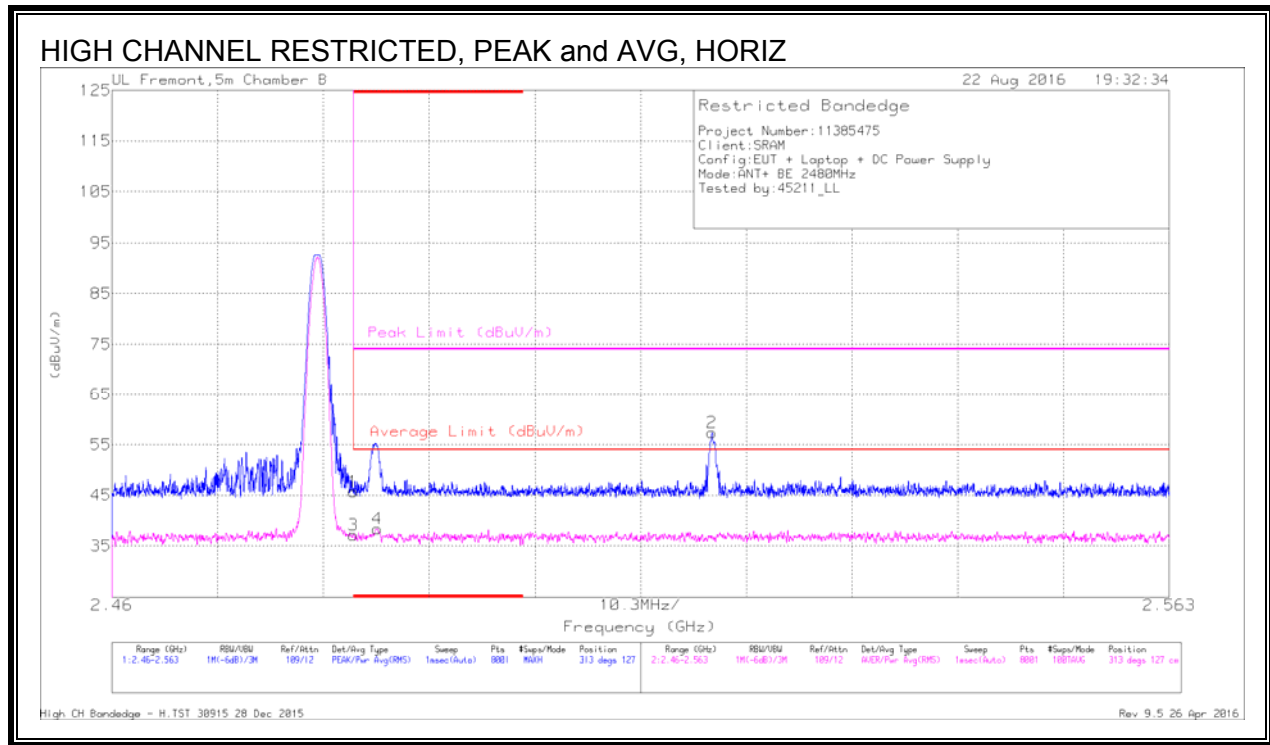
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Filt/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	2.393	38.83	Pk	32.1	-22.4	0	48.53	-	-	74	-25.47	47	394	V
4	2.395	27.9	RMS	32.2	-22.3	.17	37.97	54	-16.03	-	-	47	394	V
1	2.4	34.93	Pk	32.2	-22.3	0	44.83	-	-	74	-29.17	47	394	V
3	2.4	25.86	RMS	32.2	-22.3	.17	35.93	54	-18.07	-	-	47	394	V

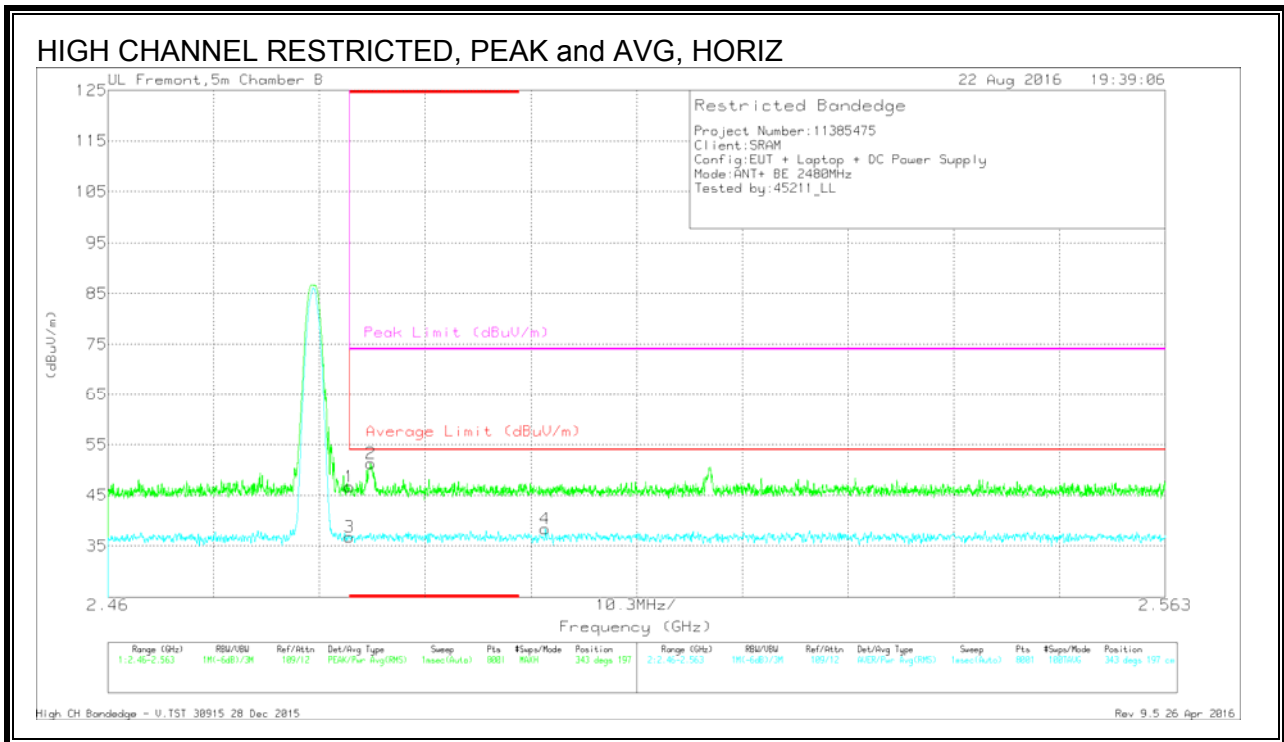
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	Af T345 (dB/m)	Amp/Cb/Flt/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	35.71	Pk	32.3	-22.3	0	45.71	-	-	74	-28.29	313	127	H
3	* 2.484	27	RMS	32.3	-22.3	.17	37.17	54	-16.83	-	-	313	127	H
4	* 2.486	28.25	RMS	32.3	-22.3	.17	38.42	54	-15.58	-	-	313	127	H
2	2.518	47.33	Pk	32.3	-22.3	0	57.33	-	-	74	-16.67	313	127	H


RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



DATA

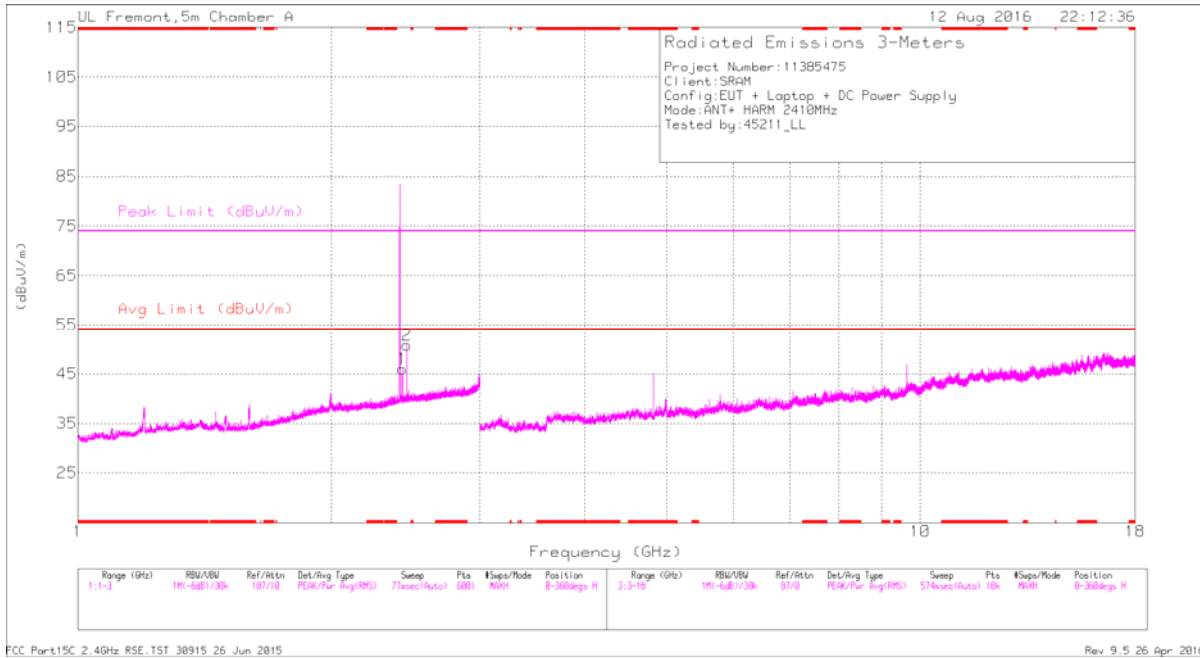
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cb/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	36.7	Pk	32.3	-22.3	0	46.7	-	-	74	-27.3	343	197	V
2	* 2.486	41.33	Pk	32.3	-22.3	0	51.33	-	-	74	-22.67	343	197	V
3	* 2.484	26.57	RMS	32.3	-22.3	.17	36.74	54	-17.26	-	-	343	197	V
4	2.503	28.17	RMS	32.3	-22.3	.17	38.34	54	-15.66	-	-	343	197	V

5.2.1. FUNDAMENTAL FREQUENCY RADIATED EMISSION

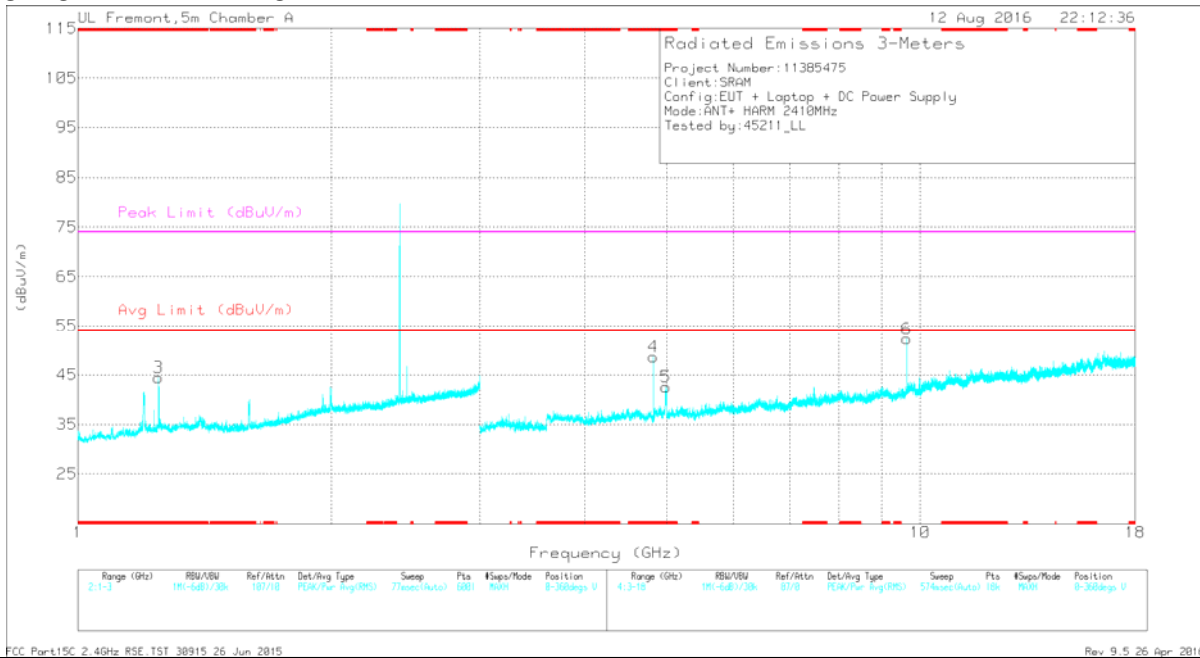
	FCC, VCCI, CISPR, CE, AUSTEL, NZ	<i>Project #:</i> 11385475												
	UL, CSA, TUV, BSMI, DHHS, NVLAP	<i>Report #:</i> _____												
47173 BENICIA STREET, FREMONT, CA 94538, USA		<i>Date & Time:</i> 08/22/16												
		<i>Test Engr:</i> 45211												
<p><i>Company:</i> SRAM LLC</p> <p><i>EUT Description:</i> ANT +</p> <p><i>Test Configuration:</i> EUT + PS (in Z position)</p> <p><i>Type of Test:</i> FCC</p> <p><i>Mode of Operation:</i> Transmitting : ANT+ mode</p>														
Freq. (MHz)	Pk Rdg (dBuV)	Av Rdg (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Pk Level (dBuV/m)	Av Level (dBuV/m)	Pk Limit FCC_B	Av Limit FCC_B	Pk Margin (dB)	Avg Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)
Low channel														
2410.00	74.75	74.14	32.30	-23.70	0.00	83.35	82.74	114.00	94.00	-30.65	-11.26	3mH	142.00	110.00
2410.00	75.94	75.38	32.30	-23.70	0.00	84.54	83.98	114.00	94.00	-29.46	-10.02	3mV	128.00	337.00
Mid channel														
2457.00	82.02	81.42	32.40	-23.70	0.00	90.72	90.12	114.00	94.00	-23.28	-3.88	3mH	4.00	122.00
2457.00	72.96	72.32	32.40	-23.70	0.00	81.66	81.02	114.00	94.00	-32.34	-12.98	3mV	128.00	238.00
High channel														
2480.00	83.55	82.95	32.40	-23.60	0.00	92.35	91.75	114.00	94.00	-21.65	-2.25	3mH	110.00	120.00
2480.00	84.51	83.89	32.40	-23.60	0.00	93.31	92.69	114.00	94.00	-20.69	-1.31	3mV	127.00	286.00

Harmonic Test Plot

LOW CHANNEL HORIZONTAL



LOW CHANNEL VERTICAL



Note1: The pre-scan measurements above 1GHz the VBW is set to 30 kHz.

Note2: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	Af T346 (db/m)	Amp/Cli/Ftu/Psd (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
3	* 1.248	39.69	PK2	28.6	-24	0	44.29	-	-	74	-29.71	317	175	V
	* 1.245	25.78	MAv1	28.6	-24	.17	30.55	54	-23.45	-	-	317	175	V
4	* 4.82	46.71	PK2	34.3	-28.3	0	52.71	-	-	74	-21.29	296	170	V
	* 4.82	42.76	MAv1	34.3	-28.3	.17	48.93	54	-5.07	-	-	296	170	V
5	* 4.994	44.65	PK2	34.3	-29	0	49.95	-	-	74	-24.05	109	196	V
	* 4.995	31.27	MAv1	34.3	-29	.17	36.74	54	-17.26	-	-	109	196	V
1	**2.426	37.31	Pk	32.4	-23.7	0	46.01	-	-	-	-	0-360	199	H
2	**2.457	42.02	Pk	32.4	-23.6	0	50.82	-	-	-	-	0-360	199	H
6	9.641	41.98	PK2	36.5	-22	0	56.48	-	-	-	-	308	101	V

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

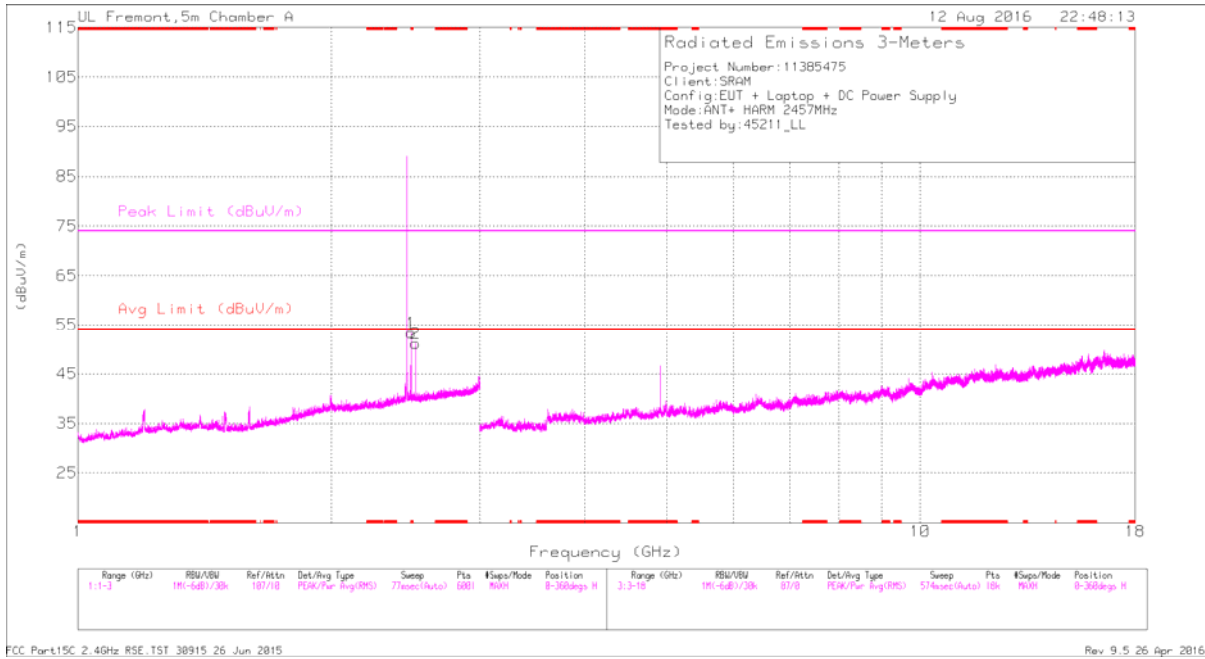
** - indicates frequency within the Operating Band

Pk - Peak detector

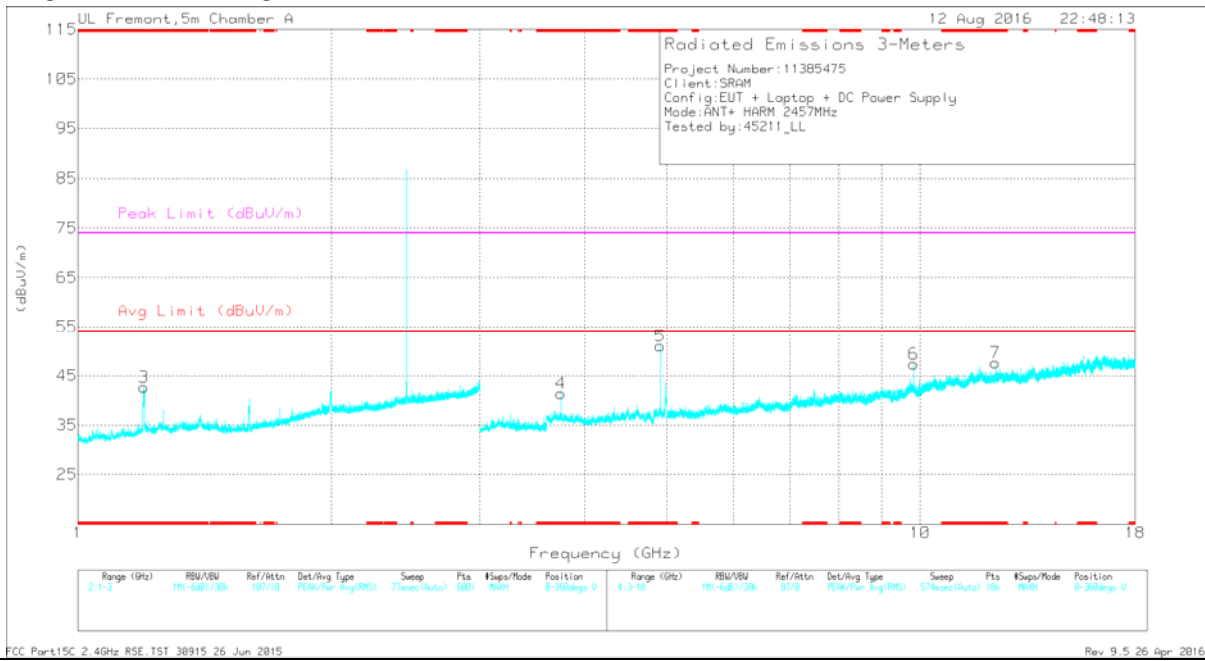
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

MID CHANNEL HORIZONTAL



MID CHANNEL VERTICAL



Note1: The pre-scan measurements above 1GHz the VBW is set to 30 kHz.

Note2: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	** 2.485	44.64	Pk	32.4	-23.7	0	53.34	-	-	74	-20.66	0-360	101	H
3	* 1.199	45.07	PK2	28.3	-24.1	0	49.27	-	-	74	-24.73	192	246	V
	* 1.2	30.97	MAv1	28.3	-24	.17	35.44	54	-18.56	-	-	192	246	V
4	* 3.744	40.6	PK2	33.6	-30.2	0	44	-	-	74	-30	297	275	V
	* 3.745	28.45	MAv1	33.6	-30.2	.17	32.02	54	-21.98	-	-	297	275	V
5	* 4.914	46.79	PK2	34.3	-27.7	0	53.39	-	-	74	-20.61	297	172	V
	* 4.914	42.29	MAv1	34.3	-27.7	.17	49.06	54	-4.94	-	-	297	172	V
7	* 12.284	33.98	PK2	39	-20.1	0	52.88	-	-	74	-21.12	329	145	V
	* 12.286	24.62	MAv1	39	-20.1	.17	43.69	54	-10.31	-	-	329	145	V
2	**2.518	42.35	Pk	32.4	-23.6	0	51.15	-	-	-	-	0-360	199	H
6	9.827	37.77	PK2	36.8	-21	0	53.57	-	-	-	-	308	104	V

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

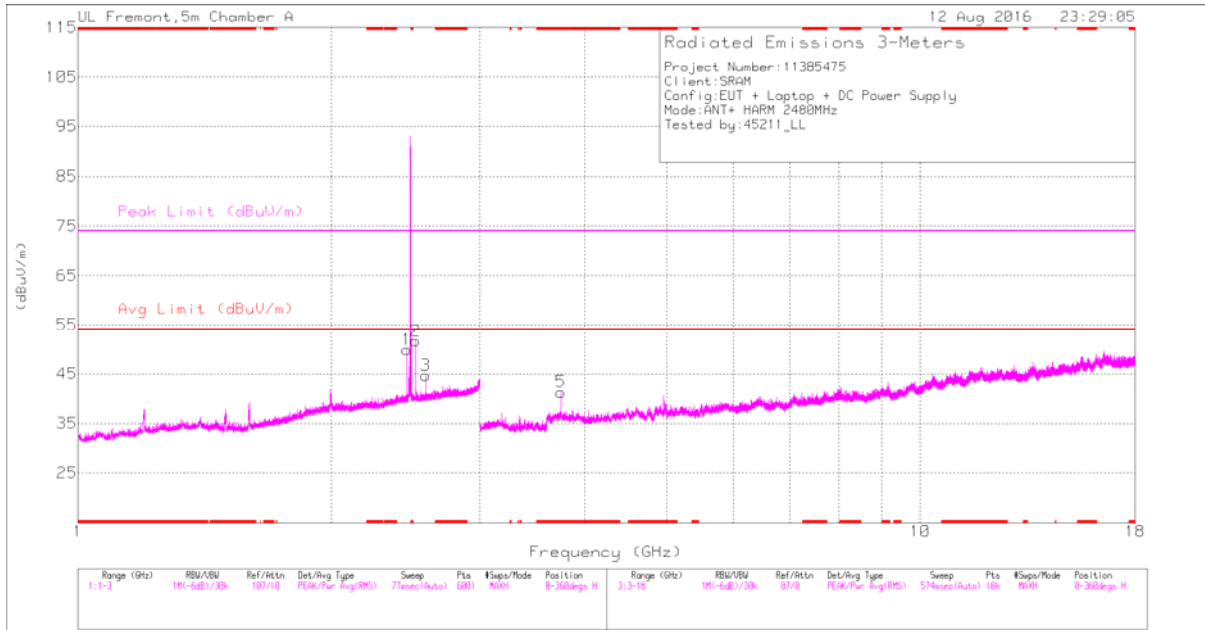
** - indicates frequency covered by the Radiated Band Edge test

Pk - Peak detector

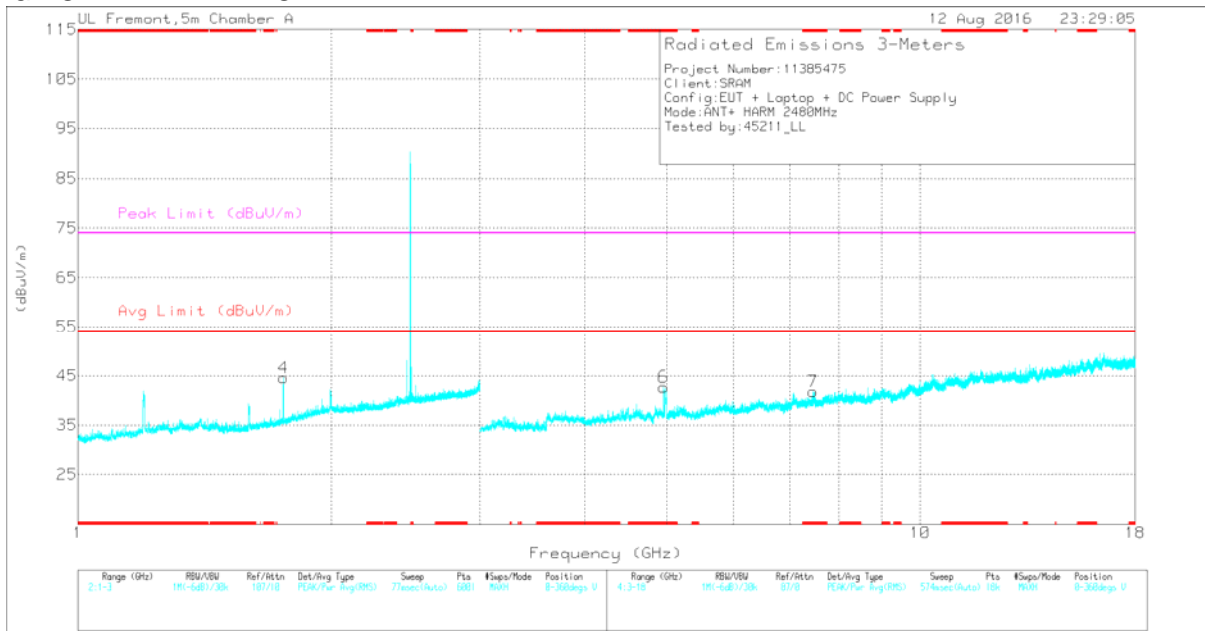
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

HIGH CHANNEL HORIZONTAL



HIGH CHANNEL VERTICAL



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

HIGH CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dbm)	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
5	* 3.743	40.13	PK2	33.6	-30.1	0	43.63	-	-	74	-30.37	228	244	H
	* 3.746	28.58	MAv1	33.6	-30.3	.17	32.05	54	-21.95	-	-	228	244	H
6	* 4.961	41.45	PK2	34.3	-28.2	0	47.55	-	-	74	-26.45	291	346	V
	* 4.96	34.28	MAv1	34.3	-28.2	.17	40.55	54	-13.45	-	-	291	346	V
7	* 7.463	33.62	PK2	35.8	-23.4	0	46.02	-	-	74	-27.98	142	175	V
	* 7.468	23.5	MAv1	35.8	-23.5	.17	35.97	54	-18.03	-	-	142	175	V
4	1.753	44.43	PK2	29.8	-23.7	0	50.53	-	-	-	-	115	103	V
1	**2.457	41.08	Pk	32.4	-23.6	0	49.88	-	-	-	-	0-360	199	H
2	2.518	46.01	PK2	32.4	-23.6	0	54.81	-	-	-	-	48	152	H
3	2.587	35.96	Pk	32.3	-23.5	0	44.76	-	-	-	-	0-360	102	H

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

** - indicates frequency within the Operating Band

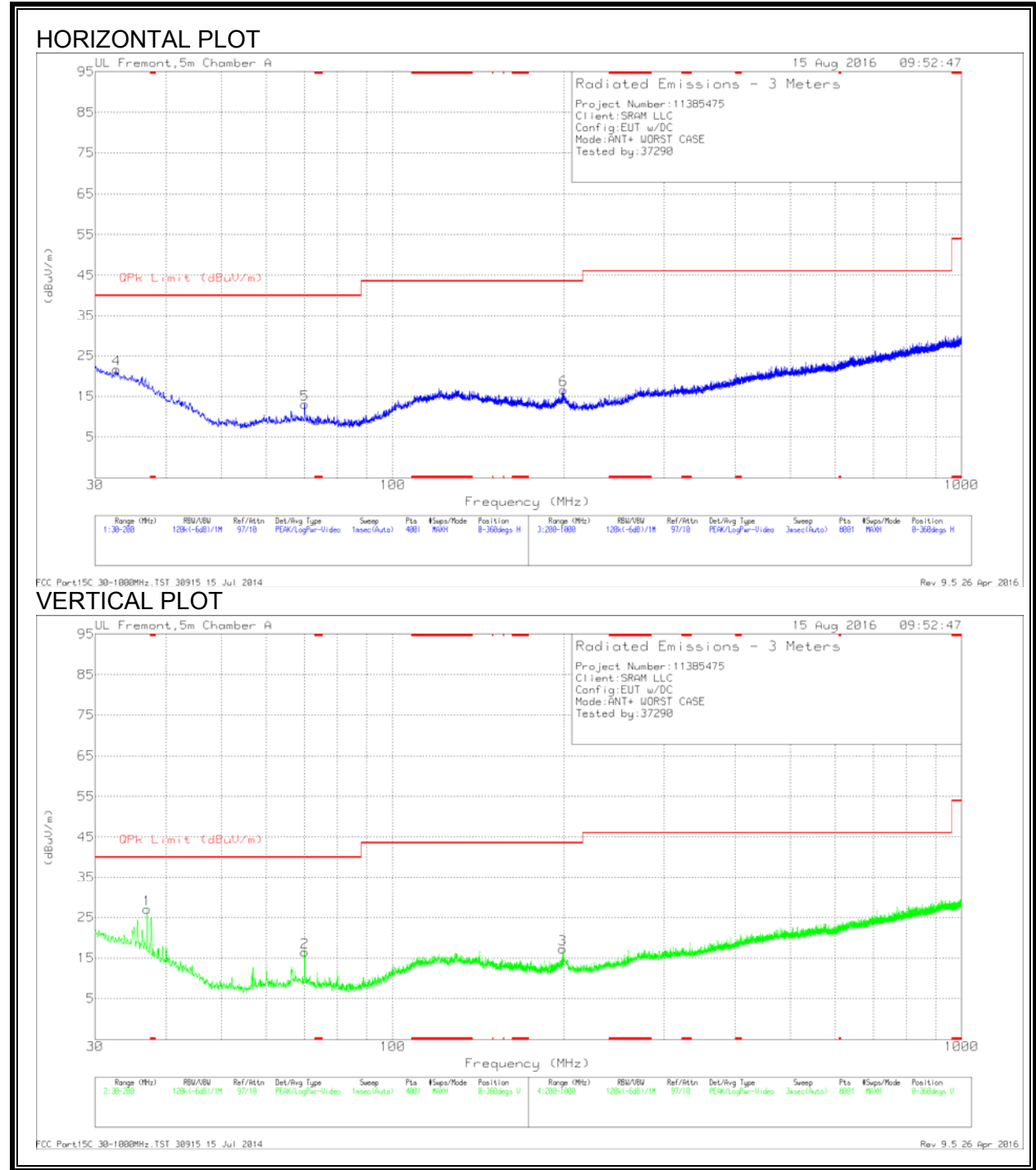
Pk - Peak detector

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

5.3. WORST-CASE BELOW 1 GHz

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

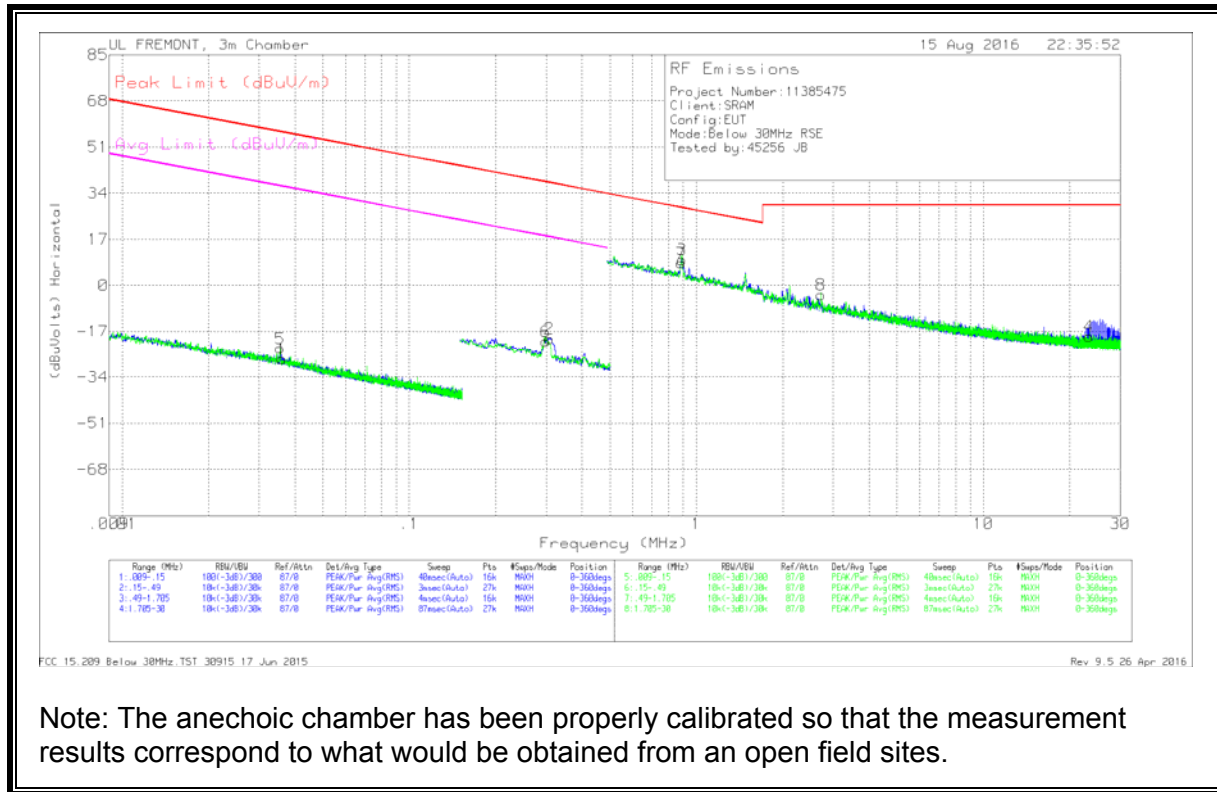


Below 1GHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T899 (dB/m)	Amp/Cbl (dB/m)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	32.72	29.41	Pk	23.5	-31.2	21.71	40	-18.29	0-360	100	H
1	37.0125	37.64	Pk	20.5	-31.1	27.04	40	-12.96	0-360	100	V
5	70.035	31.74	Pk	12.1	-30.8	13.04	40	-26.96	0-360	100	H
2	70.035	35.13	Pk	12.1	-30.8	16.43	40	-23.57	0-360	100	V
3	199.065	30.49	Pk	16.6	-29.9	17.19	43.52	-26.33	0-360	100	V
6	199.8725	29.84	Pk	16.6	-29.9	16.54	43.52	-26.98	0-360	100	H

Pk - Peak detector

5.4. RADIATED EMISSION BELOW 30MHz



Note: The anechoic chamber has been properly calibrated so that the measurement results correspond to what would be obtained from an open field sites.

Below 30MHz Data

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)	Azimuth (Degs)
5	.03547	42.75	Pk	12.5	1.4	-80	-23.35	56.61	-79.96	36.61	-59.96	0-360
1	.036	38.75	Pk	12.5	1.4	-80	-27.35	56.48	-83.83	36.48	-63.83	0-360
6	.29933	47.02	Pk	10.8	1.5	-80	-20.68	38.08	-58.76	18.08	-38.76	0-360
2	.30774	48.03	Pk	10.8	1.5	-80	-19.67	37.84	-57.51	17.84	-37.51	0-360
7	.88459	36.03	Pk	10.7	1.5	-40	8.23	28.67	-20.44	-	-	0-360
3	.89006	37.29	Pk	10.7	1.5	-40	9.49	28.62	-19.13	-	-	0-360
8	2.72156	24.25	Pk	10.8	1.5	-40	-3.45	29.54	-32.99	-	-	0-360
4	23.32629	10	Pk	9.5	1.7	-40	-18.8	29.54	-48.34	-	-	0-360

Pk - Peak detector