TEST REPORT

Report Number: 15387930-E3V2

Applicant	:	SRAM LLC 1000 W Fulton Market 4th Floor Chicago, IL 60607, United States
Model	:	13300
Brand	:	SRAM
FCC ID	:	C9O-SPMB3
IC	:	10161A-SPMB3
EUT Description	:	Electronic Seatpost
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART C ISED RSS-210 ISSUE 11 ISED RSS-GEN ISSUE 5 + A1 + A2

Date Of Issue:
2024-10-11

Prepared by:
UL VERIFICATION SERVICES
47173 Benicia Street
Fremont, CA 94538 U.S.A.
TEL: (510) 319-4000
FAX: (510) 661-0888

ACCREDITED
CERT #0751.05

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	2024-08-19	Initial Issue	---
V2	2024-10-11	Updated Section 10.2	Kiya Kedida

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

TABLE OF CONTENTS

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	SRAM LLC 1000 W Fulton Market 4th Floor Chicago, IL 60607, United States
EUT DESCRIPTION:	Electronic Bicycle Seatpost with BLE, AIREA and ANT+
MODEL:	13300
BRAND:	SRAM
SERIAL NUMBER:	Conducted: 1804731234 Radiated: 1804731248
SAMPLE RECEIPT DATE:	2024-07-19
DATE TESTED:	2024-07-24 to 2024-07-26, & 2024-07-30

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
47 CFR Part 15 Subpart C	Complies
ISED RSS-210 Issue 11	Complies
ISED RSS-GEN Issue 5 + A1 + A2	Complies

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

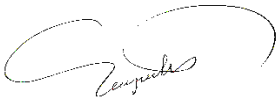
Approved & Released For
UL Verification Services Inc. By:

Richard Lee
Staff Engineer
Consumer Technology Division
UL Verification Services Inc.

Prepared By:

Glenn Escano
Senior Test Engineer
Consumer Technology Division
UL Verification Services Inc.

1st Reviewed By:



Vien Tran
Senior Laboratory Engineer
Consumer Technology Division
UL Verification Services Inc.

2nd Reviewed By:

Kiya Kedida
Senior Project Engineer
Consumer Technology Division
UL Verification Services Inc.

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

2. TEST RESULTS SUMMARY

This report contains data provided by the customer which can impact the validity of results. UL Verification Services Inc. is only responsible for correctly integrating customer-provided data with measurements performed by UL Verification Services Inc.

Below is a list of the data provided by the customer:
1) Antenna gain and type (see section 6.3)

FCC Clause	ISED Clause	Requirement	Result	Comment
See Comment		Duty Cycle	Reporting purposes only	ANSI C63.10 Section 11.6.
See Comment	RSS-GEN 6.7	20dB BW / 99% OBW	Reporting purposes only	ANSI C63.10 Sections 6.9.2 and 6.9.3.
15.249 (a) (c)	RSS-GEN 8.9, 8.10 and RSS-210 Annex B.10(a)	Radiated Emissions	Compliant	None.
15.207	RSS-Gen 8.8	AC Mains Conducted Emissions	NA	A.C. line conducted was not evaluated because the E.U.T. uses the battery

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

3. 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
- KDB 414788 D01 Radiated Test Site
- RSS-GEN Issue 5 + A1 + A2.
- RSS-210 Issue 11.

4. FACILITIES AND ACCREDITATION

UL Verification Services Inc. is accredited by A2LA, Certificate Number 0751.05, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
☒	Building 1: 47173 Benicia Street Fremont, CA 94538, U.S.A.	US0104	2324A	550739
☐	Building 2: 47266 Benicia Street Fremont, CA 94538, U.S.A.			
☒	Building 4: 47658 Kato Rd Fremont, CA 94538, U.S.A.			

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated regularly, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

5.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

5.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	U_{Lab}
Radio Frequency (Spectrum Analyzer)	141.16 Hz
Occupied Bandwidth	1.22%
Worst Case Radiated Disturbance, 9KHz to 30 MHz	2.87 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	6.01 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.73 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.51 dB
Time Domain Measurements	3.39%
Temperature	0.57˚C
Humidity	3.39%
DC Supply Voltages	0.57%

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

5.4. SAMPLE CALCULATION

RADIATED EMISSIONS

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

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The EUT is an Electronic Bicycle Seatpost with BLE, AIREA and ANT+.

6.2. MAXIMUM FUNDAMENTAL FIELD STRENGTH

The transmitter has maximum fundamental peak and average E-field strength output powers as follows:

Frequency Range (MHz)	Mode	Peak E-field Strength (dBuV/m)	Avg E-field Strength (dBuV/m)	Distance (m)
2405 - 2475	ANT+	97.42	83.44	3.00

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The antenna gain and type, as provided by the manufacturer, are as follows:

The radio utilizes a ceramic chip antenna, with a maximum gain of 1.1 dBi.

6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was version B-1.0.

The test utility software used during testing was nRF Connect version 4.28.1.

6.5. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 1GHz and above 18GHz were performed with the EUT set to transmit at the channel with the highest output power as the worst-case scenario.

Band edge and radiated emissions between 1GHz and 18GHz were performed with the EUT set to transmit at the highest power on low, middle, and high channels.

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

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List			
Description	**Manufacturer**	**Model**	**Serial Number**
Phone	Apple	MT3K2LL/A	F71Z4FB4KXKN
DC Power Supply	TDK-Lambda	ZUP20-10	DoC

I/O CABLES (CONDUCTED EMISSIONS)

I/O CABLE LIST						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	AC	1	AC	Un-shielded	1.5	AC Main to DC Supply, to Analyzer/ Power Meter
2	DC	1	DC	Shielded	0.5	Power Supply to EUT
3	Antenna Port	1	SMA	Un-shielded	0.1	EUT to Analyzer

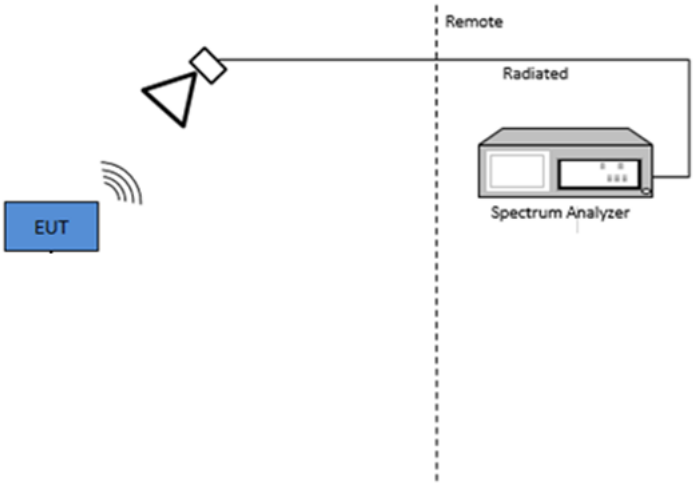
TEST SETUP

The EUT is normally powered by a Li-Ion battery at 7.4V. The phone is used for setting up purposes and was removed during testing.

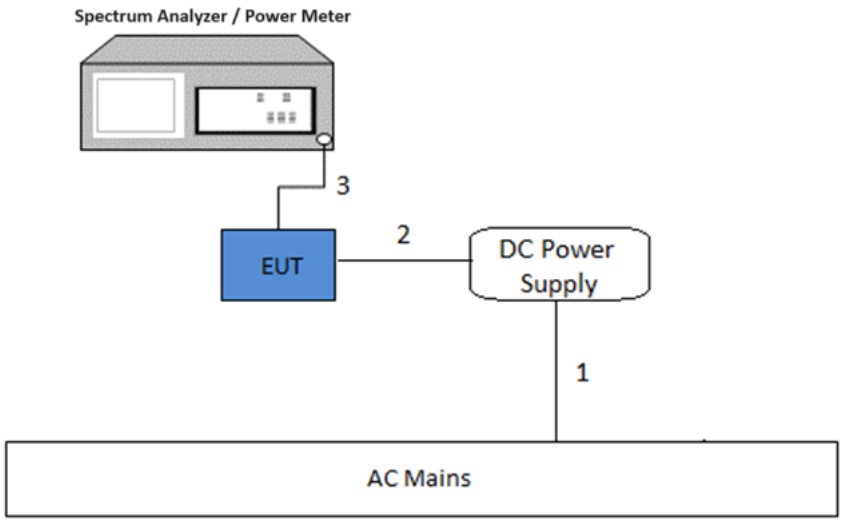
UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

SETUP DIAGRAM

Radiated Configuration



Conducted Configuration



UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

7. MEASUREMENT METHOD

On Time and Duty Cycle: ANSI C63.10-2013 Section 11.6

Occupied BW (20dB): ANSI C63.10-2013 Section 6.9.2

Occupied BW (99%): ANSI C63.10-2013 Section 6.9.3

Radiated Spurious Emissions 30-1000MHz: ANSI C63.10-2013 Section 6.3 and 6.5

Radiated Spurious Emissions above 1GHz: ANSI C63.10-2013 Section 6.3 and 6.6

Radiated Spurious Emissions Below 30MHz: ANSI C63.10-2013 Section 6.4

Radiated Band-edge: ANSI C63.10-2013 Section 6.10.5

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

** The A.C line conducted was not evaluated because a Li-Ion 7.4VDC battery powers the EUT*

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

8. 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**	**ID Num**	**Cal Due**	**Last Cal**
Antenna, Broadband Hybrid, 30MHz to 3GHz	SunAR RF Motion	JB3	203089	2025-04-30	2023-04-09
Amplifier, 9KHz to 1GHz, 32dB	SONOMA INSTRUMENT	310	175953	2025-03-31	2024-03-25
Antenna, Horn 1-18GHz	ETS-Lindgren (Cedar Park, Texas)	3117	80404	2024-08-31	2023-08-08
RF Filter Box, 1-18GHz	FREMONT	n/a	197920	2025-03-31	2024-03-30
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	225688	2025-02-11	2024-02-11
Antenna, Horn 18 to 26.5GHz	ARA	MWH-1826/B	199659	2024-12-31	2022-12-06
Amplifier 18-26.5GHz, +5Vdc, 60dB min	AMPLICAL	AMP18G26.5-60	234683	2025-05-31	2024-05-13
Antenna, Passive Loop 30Hz - 1MHz	ELECTRO METRICS	EM-6871	170013	2024-07-31	2023-07-28
Antenna, Passive Loop 100KHz - 30MHz	ELECTRO METRICS	EM-6872	170015	2024-07-31	2023-07-28
Spectrum Analyzer, PXA, 2Hz to 26.5GHz	Keysight Technologies Inc	N9030B	245121	2025-02-07	2024-02-07
Power Meter, P-series single channel	Keysight Technologies Inc	N1911A	90733	2025-01-31	2024-01-25
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Keysight Technologies Inc	N1921A	90391	2025-06-30	2024-06-17
UL TEST SOFTWARE LIST					
Radiated Software	UL	UL EMC	Ver 2023-01-18, 2023-03-03, 2023-05-01		
Antenna Port Software	UL	UL RF	Ver 2022-08-16		

NOTES:

1. The equipment listed above that was calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before the equipment expiration date.

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

9. ANTENNA PORT TEST RESULTS

9.1. 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

Note: DCCF based on manufacturer's declared duty cycle of 20%, 20log(0.2) = -13.98dB.

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

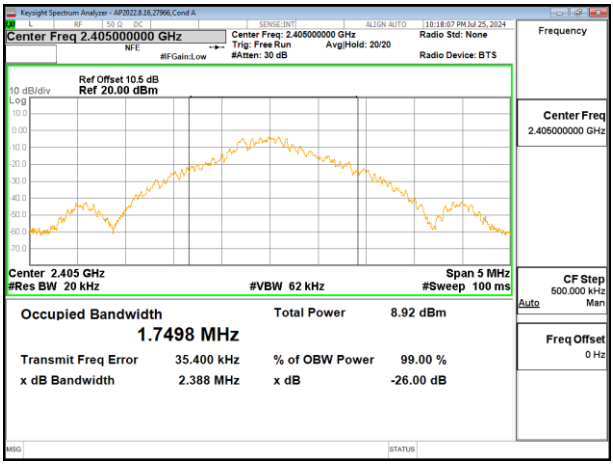
9.2. 99% BANDWIDTH

LIMITS

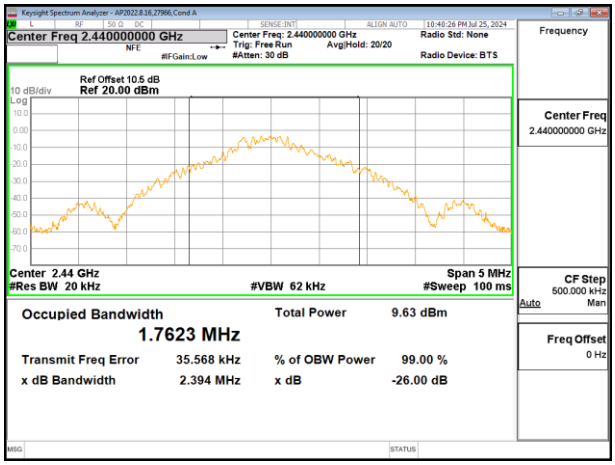
None; for reporting purposes only.

RESULTS

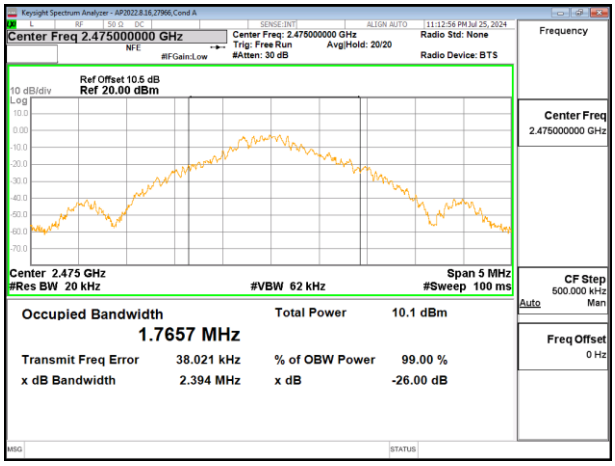
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2405	1.7498
Middle	2440	1.7623
High	2475	1.7657



LOW CHANNEL



MID CHANNEL



HIGH CHANNEL

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

9.3. 20 dB BANDWIDTH

LIMITS

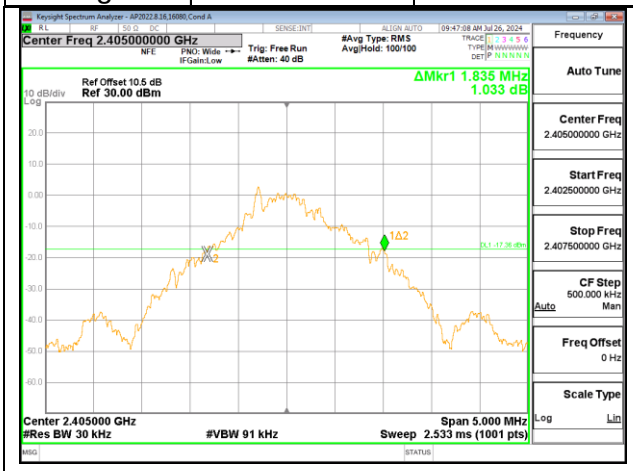
None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 1% to 5% of the 20 dB bandwidth. The VBW is set to approximately three times RBW. The sweep time is coupled

RESULTS

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	Frequency Edge (MHz)	Limit (MHz)	Margin (MHz)
Low	2405	1.835	2404.083	2400	-4.082
Middle	2440	1.835	N/A	N/A	N/A
High	2475	1.830	2475.915	2483.5	-7.585



LOW CHANNEL

MID CHANNEL

HIGH CHANNEL

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

10. RADIATED TEST RESULTS

10.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.249

FCC §15.205 and §15.209

RSS-210 Annex B.10.

ISED RSS-GEN, Section 8.9 and 8.10

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.

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

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	-
0.490-1.705	24000/F(kHz) @ 30 m	-
1.705 - 30	30 @ 30m	-
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz: and 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 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements in the 30-1000MHz range, 9kHz for peak and/or quasi-peak detection measurements in the 0.15-30MHz range, and 200Hz for peak and/or quasi-peak detection measurements in the 9 to 150kHz range. Peak detection is used unless otherwise noted as quasi-peak or average (9-90kHz and 110-490kHz).

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 average measurements were calculated: AVG = Peak Reading + Duty Cycle Correction Factor

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 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.

For below 30MHz testing, the investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel), parallel and perpendicular are the worst orientations, therefore testing was performed on these two orientations only.

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.

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

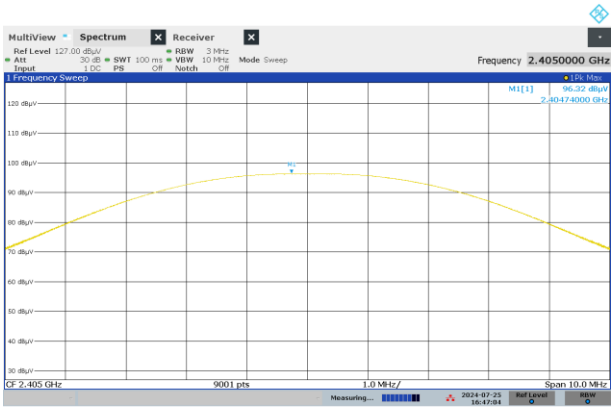
KDB 414788 Open Field Site (OFS) and Chamber Correlation Justification

OFS and chamber correlation testing had been performed and chamber measured test result is the worst-case test result.

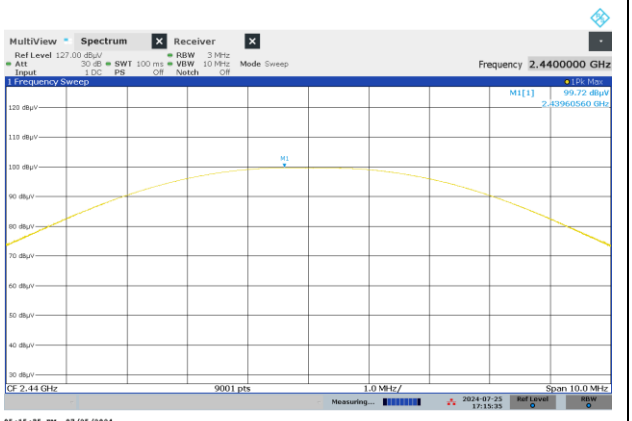
NOTE: The limits in CFR 47, Part 15, Subpart C, paragraph 15.209(a), are identical to those in RSS-Gen section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table), using the free space impedance of 377 Ohms. For example, the measurement at frequency X kHz resulted in a level of Y dBuV/m, which is equivalent to Y – 51.5 = Z dBuA/m, which has the same margin, W dB, to the corresponding RSS-Gen Table 6 limit as it has to 15.209(a) limit.

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

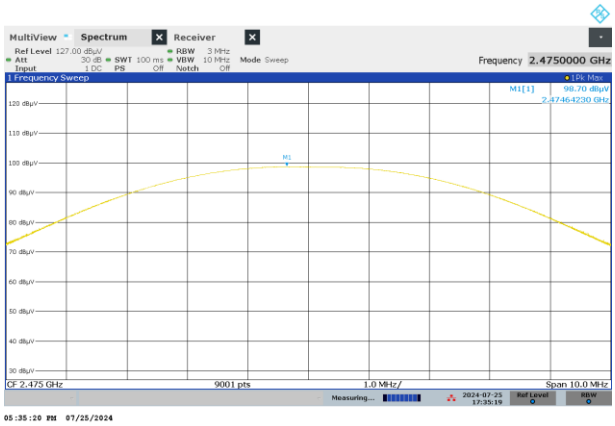
10.2. FUNDAMENTAL FREQUENCY RADIATED EMISSION



LOW CHANNEL HORIZONTAL RESULT



MID CHANNEL HORIZONTAL RESULT



HIGH CHANNEL HORIZONTAL RESULT

Frequency (GHz)	Measured Meter Reading (dBuV)	Det	804043m ACF (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
2.405	96.32	PK	32.4	-35.1		93.62	-		114	-20.38	292	163	H
	96.32	AVG	32.4	-35.1	-13.98	79.64	94	-14.36	-		292	163	H
	92.25	PK	32.4	-35.1		89.55	-		114	-24.45	28	114	V
	92.25	AVG	32.4	-35.1	-13.98	75.57	94	-18.43	-	-	28	114	V
2.440	99.72	PK	32.6	-34.9		**97.42**	-		114	-16.58	290	160	H
	99.72	AVG	32.6	-34.9	-13.98	**83.44**	94	-10.56	-		290	160	H
	95.49	PK	32.6	-34.9		93.19	-		114	-20.81	260	105	V
	95.49	AVG	32.6	-34.9	-13.98	79.21	94	-14.79	-		260	105	V
2.475	98.7	PK	32.3	-34.8		96.2	-		114	-17.8	290	152	H
	98.7	AVG	32.3	-34.8	-13.98	82.22	94	-11.78	-		290	152	H
	94.21	PK	32.3	-34.8		91.71	-		114	-22.29	260	101	V
	94.21	AVG	32.3	-34.8	-13.98	77.73	94	-16.27	-		260	101	V

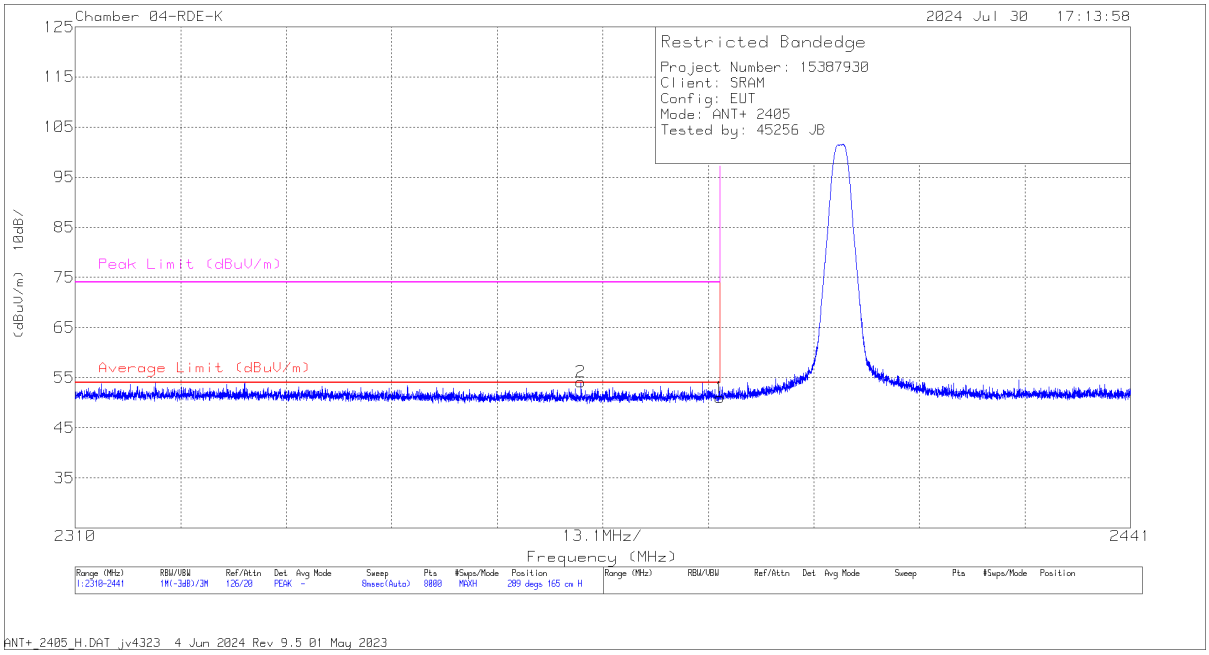
PK - Peak detector
AVG = Measured Peak Reading + Duty Cycle Correction Factor
Duty Cycle Correction Factor = -13.98 dB

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

10.3. TRANSMITTER ABOVE 1 GHz

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



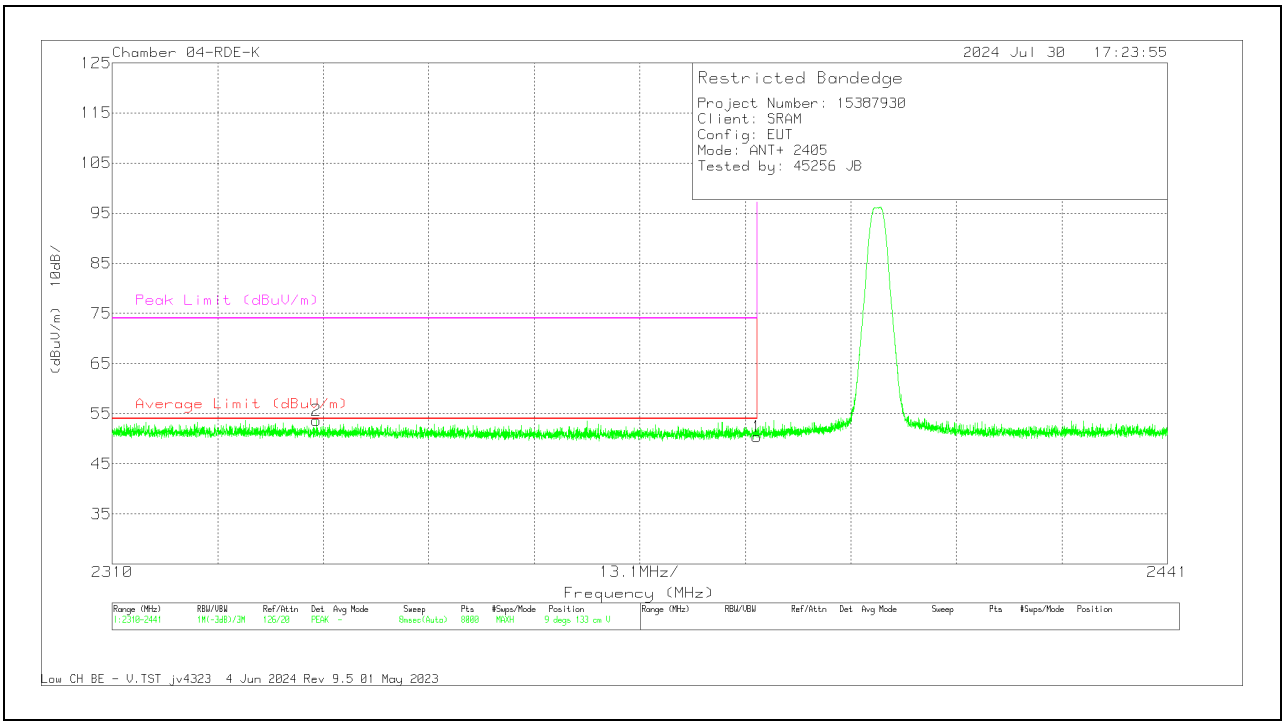
Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80404 3m ACF(dB/m	Amp/Cbl/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	* 2390	53.98	Pk	32.2	-35.2		50.98	-	-	74	-23.02	289	165	H
	* 2390	53.98	AVG	32.2	-35.2	-13.98	37	54	-17	-	-	289	165	H
2	* 2372.789	57.13	Pk	32.2	-35.2		54.13	-	-	74	-19.87	289	165	H
	* 2372.789	57.13	AVG	32.2	-35.2	-13.98	40.15	54	-13.85	-	-	289	165	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK - RB=1MHz VB=3 x RB, Peak
AVG = Peak Reading + Duty Cycle Correction Factor
Duty Cycle Correction Factor = -13.98 dB

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

VERTICAL RESULT



Trace Markers

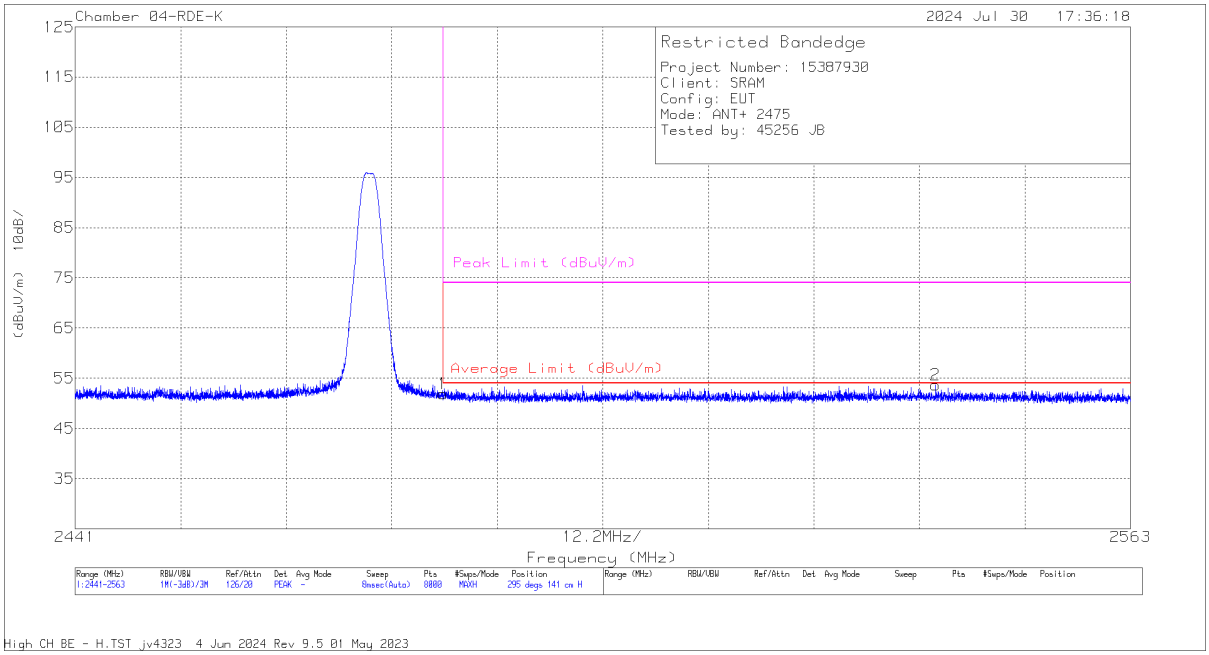
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80404 3m ACF(dB/m)	Amp/Cbl/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2390	53.39	Pk	32.2	-35.2		50.39	-	-	74	-23.61	9	133	V
	* 2390	53.39	AVG	32.2	-35.2	-13.98	36.41	54	-17.59	-	-	9	133	V
2	* 2335.368	56.54	Pk	32.5	-35.4		53.64	-	-	74	-20.36	9	133	V
	* 2335.368	56.54	AVG	32.5	-35.4	-13.98	39.66	54	-14.34	-	-	9	133	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK - RB=1MHz VB=3 x RB, Peak
AVG = Peak Reading + Duty Cycle Correction Factor
Duty Cycle Correction Factor = -13.98 dB

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



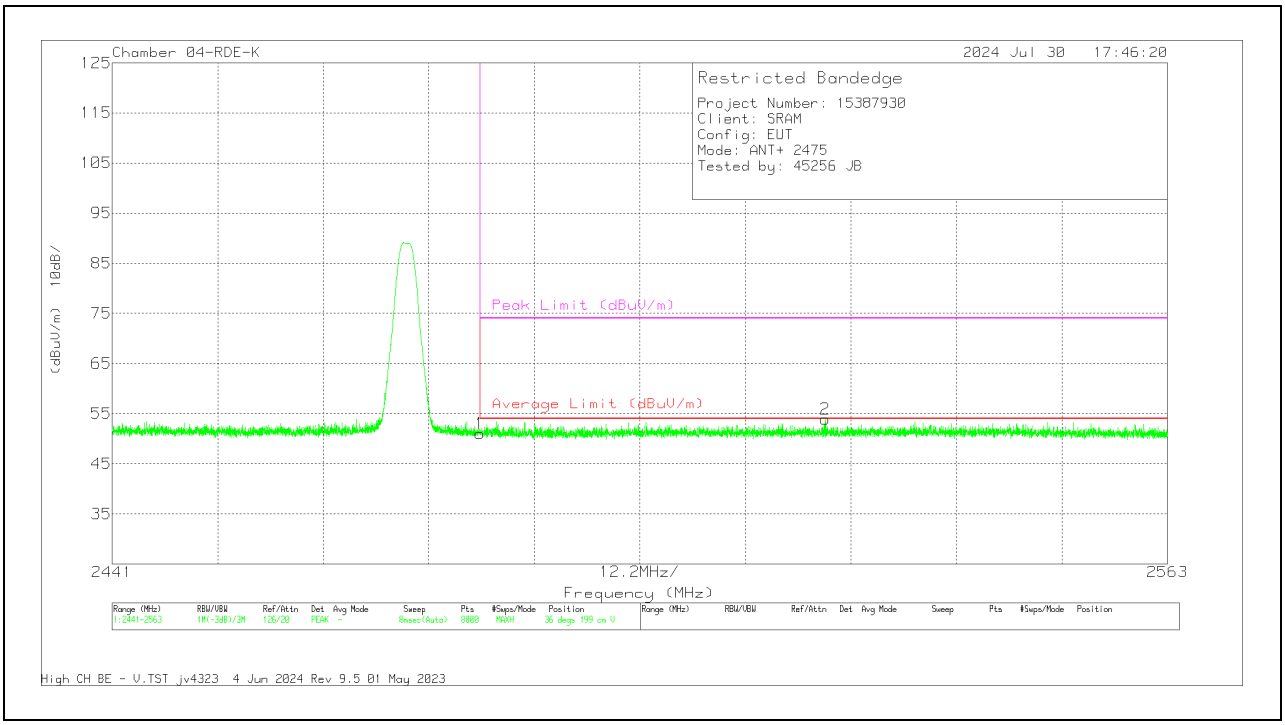
Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80404 3m ACF(dB/m)	Amp/Cbl/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	* 2483.5	54.51	Pk	32.2	-34.8		51.91	-	-	74	-22.09	295	141	H
	* 2483.5	54.51	AVG	32.2	-34.8	-13.98	37.93	54	-16.07	-	-	295	141	H
2	* 2540.474	55.84	Pk	32.4	-34.6		53.64	-	-	74	-20.36	295	141	H
	* 2540.474	55.84	AVG	32.4	-34.6	-13.98	39.66	54	-14.34	-	-	295	141	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK - RB=1MHz VB=3 x RB, Peak
AVG = Peak Reading + Duty Cycle Correction Factor
Duty Cycle Correction Factor = -13.98 dB

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

VERTICAL RESULT



Trace Markers

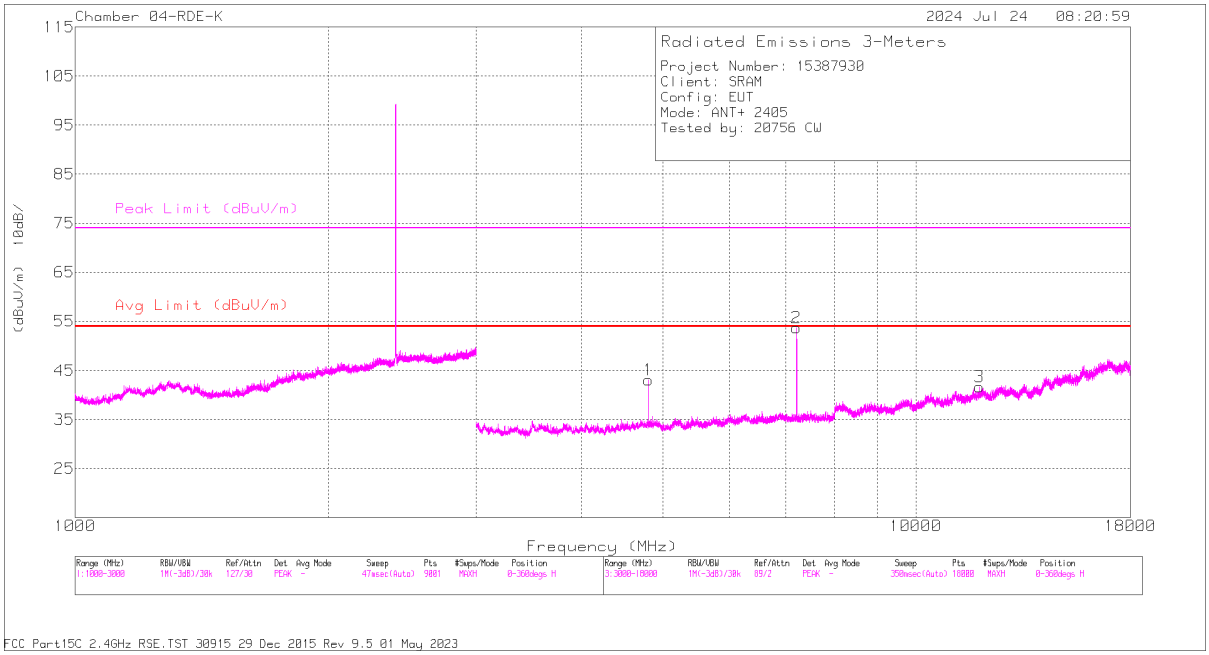
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80404 3m ACF(dB/m)	Amp/Cbl/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2483.5	53.63	Pk	32.2	-34.8		51.03	-	-	74	-22.97	36	199	V
	* 2483.5	53.63	AVG	32.2	-34.8	-13.98	37.05	54	-16.95	-	-	36	199	V
2	* 2523.407	56.4	Pk	32.2	-34.7		53.9	-	-	74	-20.1	36	199	V
	* 2523.407	56.4	AVG	32.2	-34.7	-13.98	39.92	54	-14.08	-	-	36	199	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK - RB=1MHz VB=3 x RB, Peak
AVG = Peak Reading + Duty Cycle Correction Factor
Duty Cycle Correction Factor = -13.98 dB

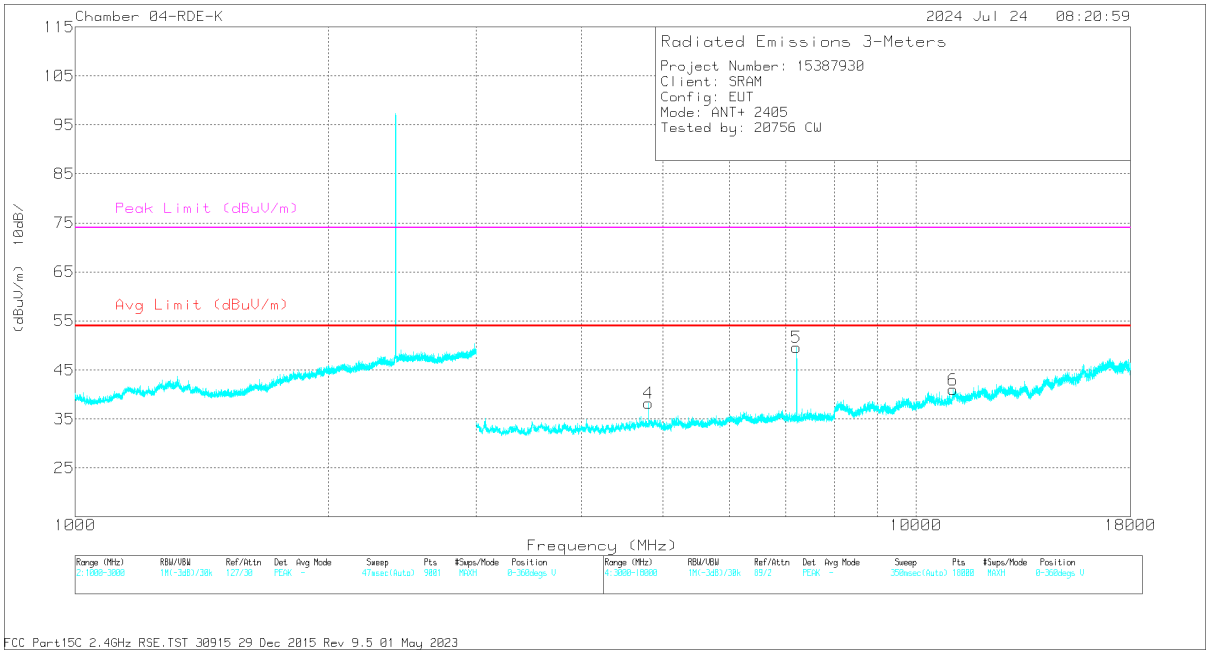
UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



VERTICAL

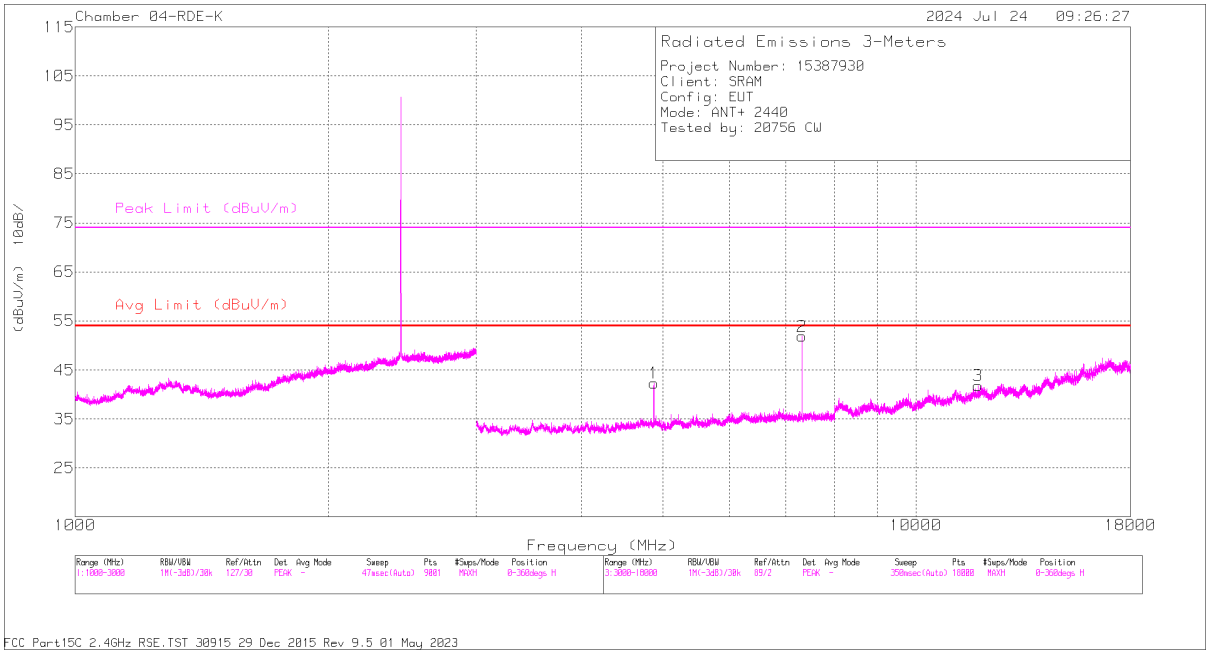
RADIATED EMISSIONS

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80404 3m ACF(dB/m)	Amp/Cbl/Fltr (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	* 4809.384	55.58	PK	34.9	-40.9		49.58	-	-	74	-24.42	344	233	H
	* 4809.384	55.58	AVG	34.9	-40.9	-13.98	35.6	54	-18.4	-	-	344	233	H
3	* 11904.924	47.21	PK	38.8	-35.4		50.61	-	-	74	-23.39	270	266	H
	* 11904.924	47.21	AVG	38.8	-35.4	-13.98	36.63	54	-17.37	-	-	270	266	H
4	* 4809.407	53.09	PK	34.9	-40.9		47.09	-	-	74	-26.91	149	391	V
	* 4809.407	53.09	AVG	34.9	-40.9	-13.98	33.11	54	-20.89	-	-	149	391	V
6	* 11069.685	49.67	PK	37.9	-36.7		50.87	-	-	74	-23.13	20	362	V
	* 11069.685	49.67	AVG	37.9	-36.7	-13.98	36.89	54	-17.11	-	-	20	362	V
2	7214.021	59.62	PK	36.1	-39		56.72	-	-	74	-17.28	277	158	H
5	7214.06	58.03	PK	36.1	-39		55.13	-	-	74	-18.87	258	108	V

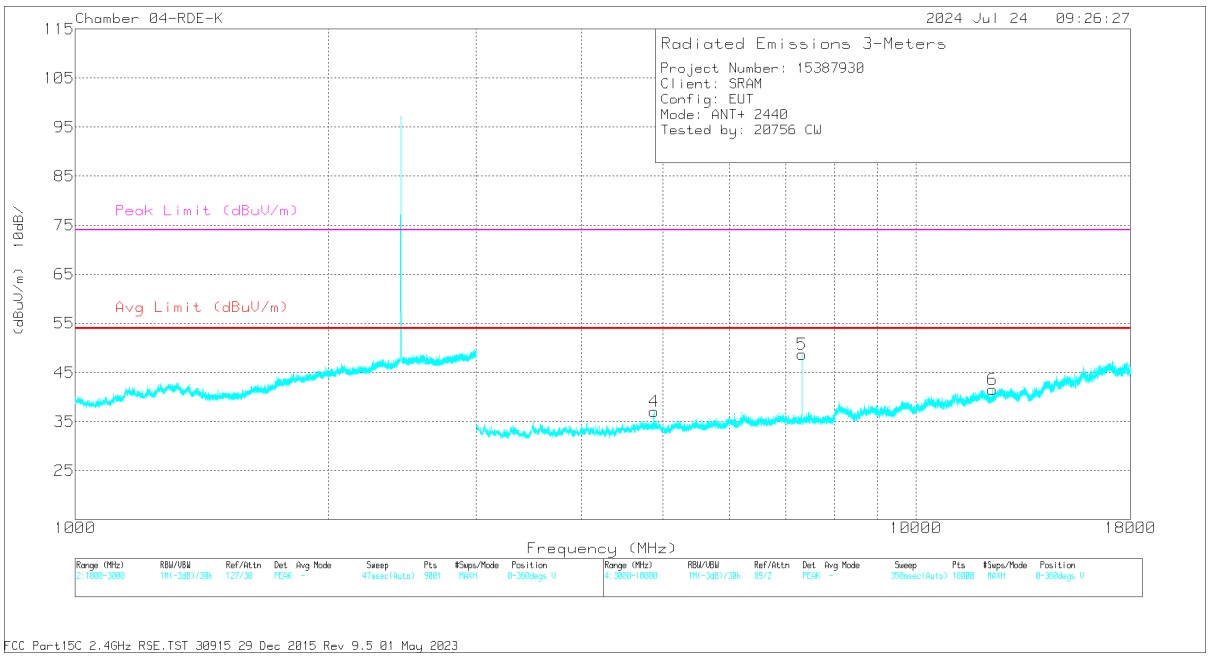
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK - RB=1MHz VB=3 x RB, Peak
AVG = Peak Reading + Duty Cycle Correction Factor
Duty Cycle Correction Factor = -13.98 dB

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

MID CHANNEL RESULTS



HORIZONTAL



VERTICAL

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

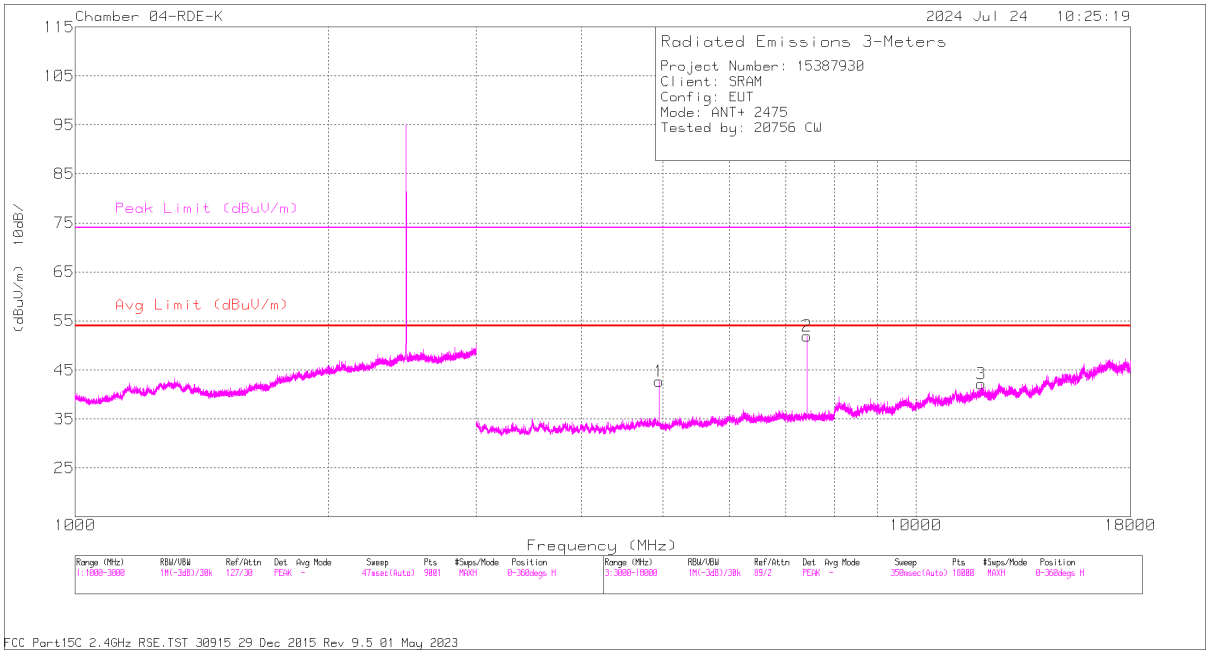
RADIATED EMISSIONS

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80404 3m ACF(dB/m)	Amp/Cbl/Fltr (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	* 4879.881	55.1	PK	34.4	-41		48.5	-	-	74	-25.5	357	261	H
	* 4879.891	55.1	AVG	34.4	-41	-13.98	34.52	54	-19.48	-	-	357	261	H
2	* 7318.935	58.7	PK	36	-38.5		56.2	-	-	74	-17.8	80	133	H
	* 7318.935	58.7	AVG	36	-38.5	-13.98	42.22	54	-11.78	-	-	80	133	H
3	* 11852.767	46.98	PK	38.6	-35.2		50.38	-	-	74	-23.62	336	192	H
	* 11852.767	46.98	AVG	38.6	-35.3	-13.98	36.4	54	-17.6	-	-	336	192	H
4	* 4879.697	53.19	PK	34.4	-41		46.59	-	-	74	-27.41	138	116	V
	* 4879.697	53.19	AVG	34.4	-41	-13.98	32.61	54	-21.39	-	-	138	116	V
5	* 7318.786	57.06	PK	36	-38.5		54.56	-	-	74	-19.44	256	104	V
	* 7318.786	57.06	AVG	36	-38.5	-13.98	40.58	54	-13.42	-	-	256	104	V
6	* 12332.634	45.46	PK	38.9	-34.5		49.86	-	-	74	-24.14	234	305	V
	* 12332.634	45.46	AVG	39	-34.5	-13.98	35.88	54	-18.12	-	-	234	305	V

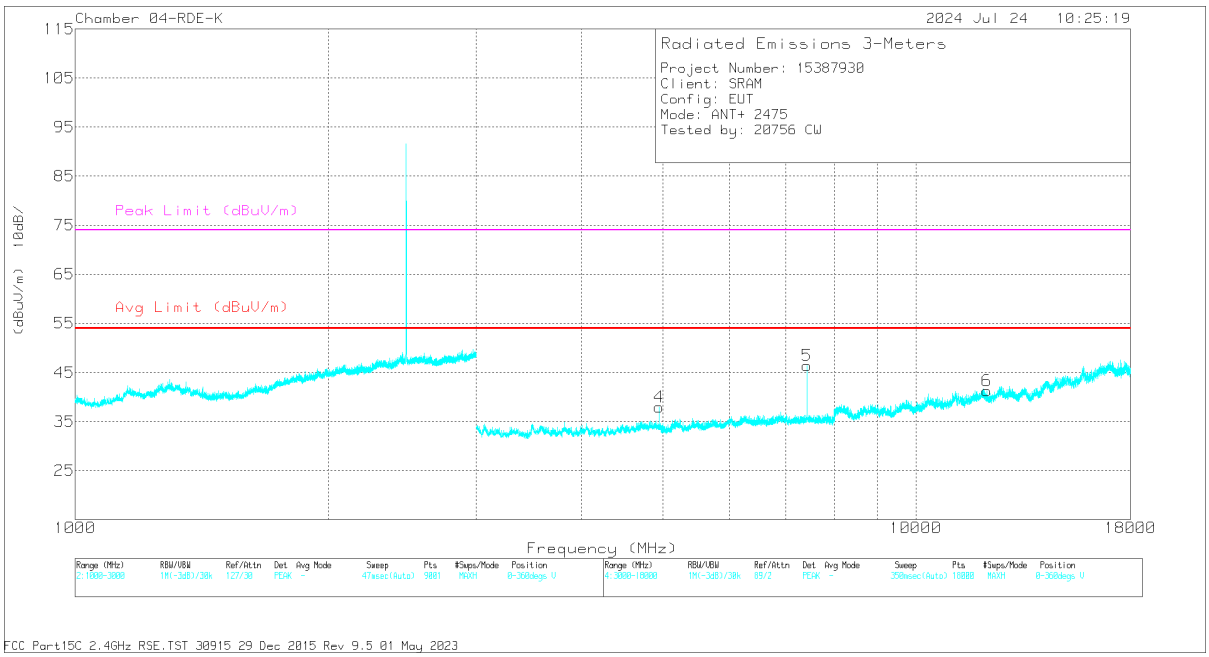
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK - RB=1MHz VB=3 x RB, Peak
AVG = Peak Reading + Duty Cycle Correction Factor
Duty Cycle Correction Factor = -13.98 dB

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

RADIATED EMISSIONS

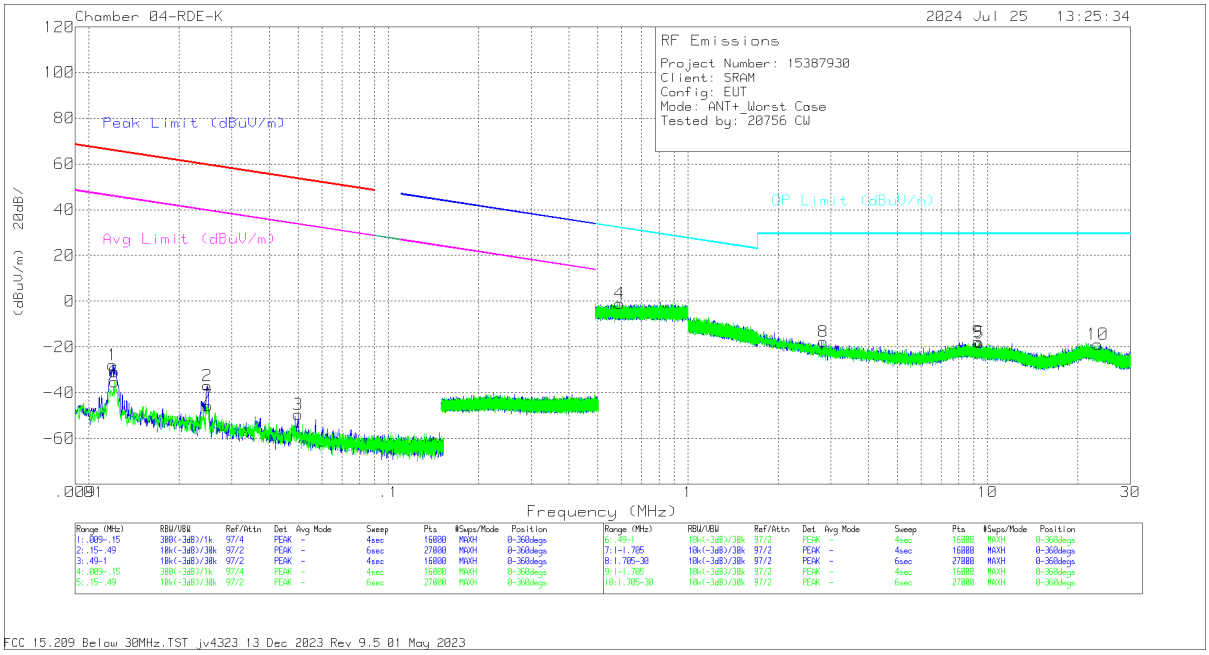
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80404 3m ACF(dB/m)	Amp/Cbl/Fltr (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4949.299	56.35	PK	34.1	-41	-	49.45	-	-	74	-24.55	346	256	H
	* 4949.299	56.35	AVG	34.1	-41	-13.98	35.47	54	-18.53	-	-	346	256	H
2	* 7423.919	58.22	PK	35.9	-38.4	-	55.72	-	-	74	-18.28	276	138	H
	* 7423.919	58.22	AVG	35.9	-38.4	-13.98	41.74	54	-12.26	-	-	276	138	H
3	* 11958.508	47.53	PK	38.8	-35.4	-	50.93	-	-	74	-23.07	136	255	H
	* 11958.508	47.53	AVG	38.8	-35.4	-13.98	36.95	54	-17.05	-	-	136	255	H
4	* 4950.203	53.72	PK	34.1	-41	-	46.82	-	-	74	-27.18	152	173	V
	* 4950.203	53.72	AVG	34.1	-41	-13.98	32.84	54	-21.16	-	-	152	173	V
5	* 7423.975	54.52	PK	35.9	-38.4	-	52.02	-	-	74	-21.98	261	220	V
	* 7423.975	54.52	AVG	36	-38.4	-13.98	38.04	54	-15.96	-	-	261	220	V
6	* 12140.155	46.64	PK	38.9	-35.2	-	50.34	-	-	74	-23.66	261	200	V
	* 12140.155	46.64	AVG	38.9	-35.2	-13.98	36.36	54	-17.64	-	-	261	200	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK - RB=1MHz VB=3 x RB, Peak
AVG = Peak Reading + Duty Cycle Correction Factor
Duty Cycle Correction Factor = -13.98 dB

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

10.4. WORST CASE BELOW 30 MHz

SPURIOUS EMISSIONS BELOW 30 MHz (WORST-CASE CONFIGURATION)



ANTENNA- TWO ORIENTATIONS FACE ON/FACE OFF

Below 30MHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna E(ACF)	Amp/Cbl (dB)	Dist Corr 300m	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Polarity
1	.012	23.11	Pk	60.1	-31.1	-80	-27.89	65.98	-93.87	45.98	-73.87	0-360	On
6	.0122	15.73	Pk	60.1	-31.1	-80	-35.27	65.85	-101.12	45.85	-81.12	0-360	Off
2	.0248	16.39	Pk	58.6	-31.8	-80	-36.81	59.68	-96.49	39.68	-76.49	0-360	On
7	.025	7.51	Pk	58.6	-31.8	-80	-45.69	59.63	-105.32	39.63	-85.32	0-360	Off
3	.0499	5.45	Pk	57.1	-32.1	-80	-49.55	53.63	-103.18	33.63	-83.18	0-360	On

Pk - Peak detector

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna E(ACF)	Amp/Cbl (dB)	Dist Corr 30m (dB) 40Log	Corrected Reading (dBuV/m)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Polarity
4	.5919	14.85	Pk	56.3	-32.2	-40	-1.05	32.16	-33.21	0-360	On
8	2.8347	14.88	Pk	39.2	-31.9	-40	-17.82	29.5	-47.32	0-360	Off
9	9.3219	19.32	Pk	34.7	-31.7	-40	-17.68	29.5	-47.18	0-360	Off
5	9.4141	18.95	Pk	34.7	-31.8	-40	-18.15	29.5	-47.65	0-360	On
10	23.3284	18.65	Pk	33.9	-31.4	-40	-18.85	29.5	-48.35	0-360	Off

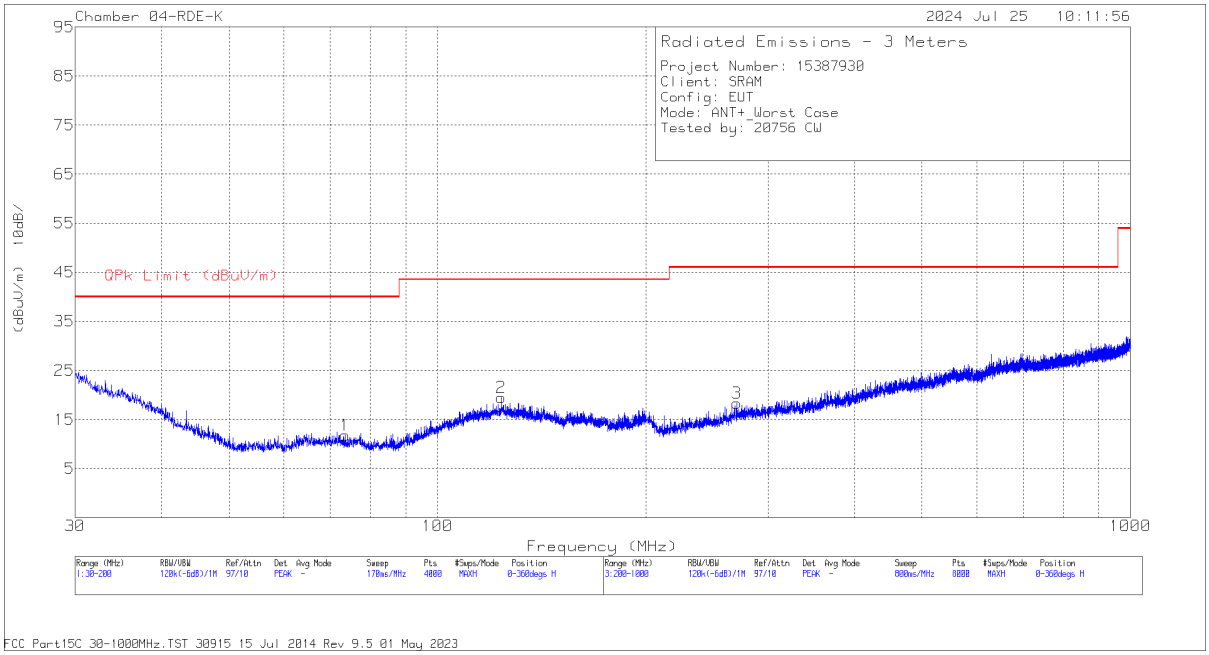
Pk - Peak detector

Note: The Limits in CRF 47, Part 15, Subpart C, Paragraph 15.209(a), are identical to those in RSS-Gen section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377 Ohms. For example, the measurement at frequency X kHz resulted in a level of Y dBuV/m, which is equivalent to Y -51.5 = Z dBuA/m, which has the same margin, W dB, to the corresponding RSS-Gen Table 6 limit as it has to 15.209(a) limit.

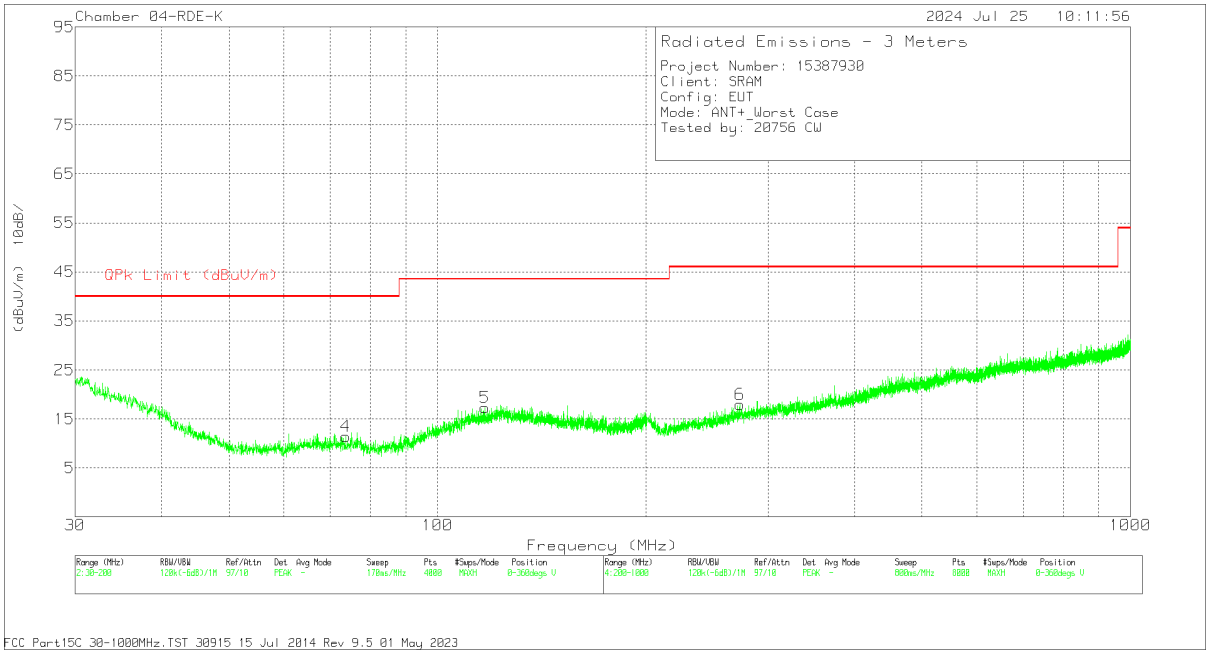
UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

10.5. WORST CASE BELOW 1 GHz

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



HORIZONTAL



VERTICAL

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

Below 1GHz Data

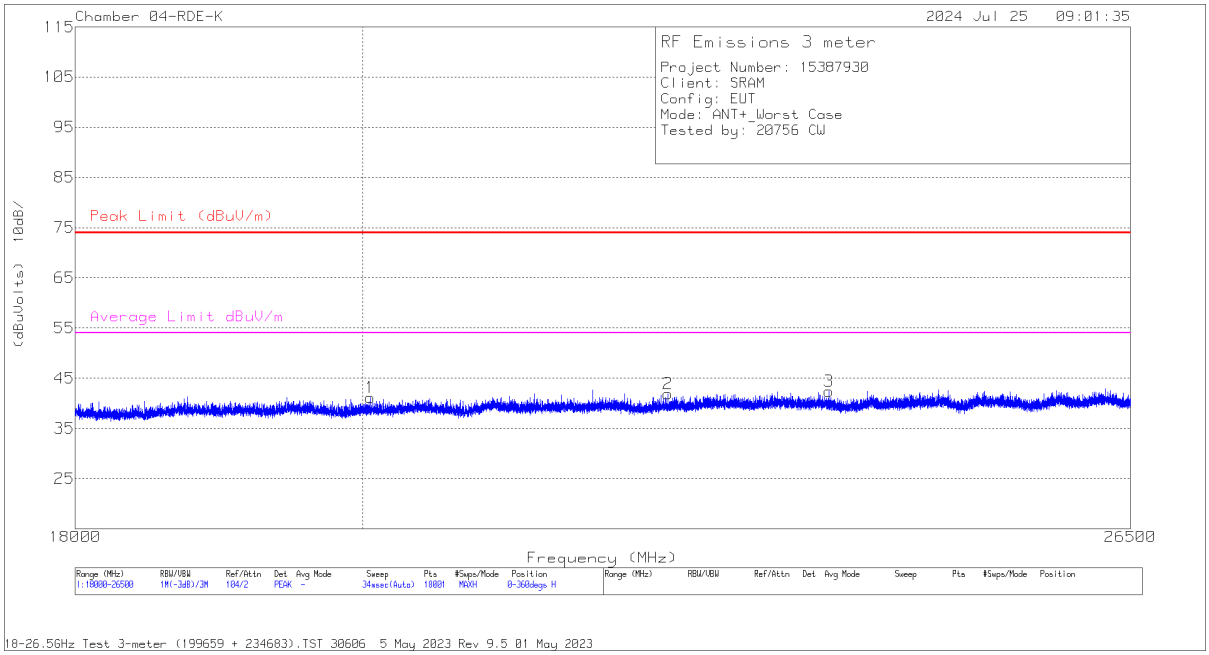
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	203089 ACF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 73.5738	28.93	Pk	14.1	-31.2	11.83	40	-28.17	0-360	299	H
2	* 123.371	29.97	Pk	20	-30.5	19.47	43.52	-24.05	94	298	H
	* 123.371	21.29	Qp	20	-30.5	10.79	43.52	-32.73	94	298	H
4	* 73.7438	28.51	Pk	14.1	-31.2	11.41	40	-28.59	0-360	100	V
5	* 117.02	28.27	Pk	19.5	-30.4	17.37	43.52	-26.15	0-360	100	V
3	* 270.109	28.91	Pk	18.9	-29.5	18.31	46.02	-27.71	0-360	299	H
6	* 273.009	28.54	Pk	19	-29.6	17.94	46.02	-28.08	0-360	299	V

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

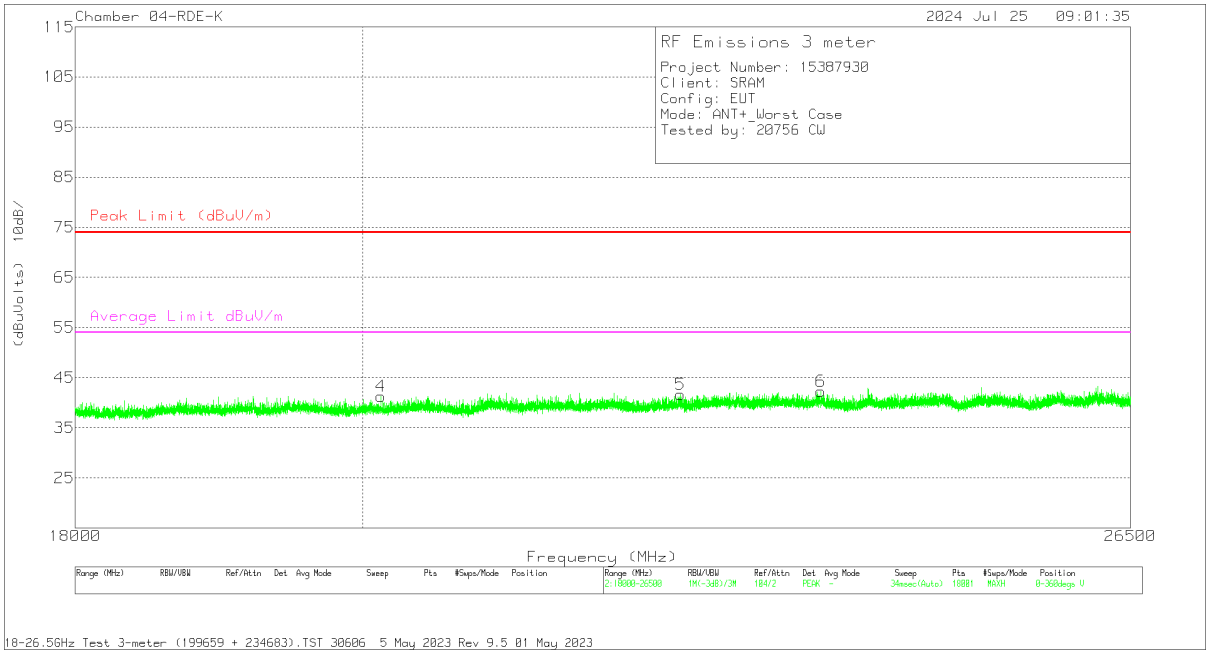
UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

10.6. WORST CASE 18-26 GHz

SPURIOUS EMISSIONS 18-26 GHz (WORST-CASE CONFIGURATION)



HORIZONTAL



VERTICAL

18 – 26GHz DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Horn ACF (dB/m)	234683 Amp/Cbl (dB)	Cable (dB)	Corrected Reading (dBuVolts)	Peak Limit (dBuV/m)	PK Margin (dB)	Average Limit dBuV/m	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 20054.166	51.66	Pk	32.7	-62.3	19.1	41.16	74	-32.84	54	-12.84	0-360	101	H
2	* 22366.165	51.07	Pk	33.3	-62.6	20.1	41.87	74	-32.13	54	-12.13	0-360	200	H
3	* 23727.108	50.79	Pk	33.6	-62.6	20.6	42.39	74	-31.61	54	-11.61	0-360	101	H
4	* 20133.027	51.68	Pk	32.7	-62.2	19.1	41.28	74	-32.72	54	-12.72	0-360	200	V
5	* 22470.526	50.88	Pk	33.3	-62.6	20.1	41.68	74	-32.32	54	-12.32	0-360	200	V
6	* 23658.636	50.74	Pk	33.6	-62.7	20.6	42.24	74	-31.76	54	-11.76	0-360	101	V

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

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888