

TEST REPORT

Report Number: 14954500-E6V1

Applicant : SRAM LLC
1000 W Fulton Market 4th Floor
Chicago, IL 60607, United States

Model : 12300

Brand : SRAM

FCC ID : C9O-HKB1

IC : 10161A-HKB1

EUT Description : BICYCLE HEAD UNIT

Test Standard(s) : FCC 47 CFR PART 15 SUBPART C
FCC 47 CFR PART 15 SUBPART E
ISED RSS-247 ISSUE 3
ISED RSS-GEN ISSUE 5 + A1 + A2

Date of Issue:
2023-11-15

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



REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	2023-11-15	Initial Issue	---

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SRAM LLC
1000 W Fulton Market 4th Floor
Chicago, IL 60607, United States

EUT DESCRIPTION: BICYCLE HEAD UNIT

MODEL: 12300

BRAND: SRAM

SERIAL NUMBER: Radiated: 00416GA23270005 and 00416GA23270009

DATE TESTED: 2023-11-06 to 2023-11-07

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Complies
CFR 47 Part 15 Subpart E	Complies
ISED RSS-247 Issue 3	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.

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 A2LA, NIST, any agency of the Federal Government, or any agency of the U.S. government.

Approved & Released For
UL Verification Services Inc. By:

Prepared By:



Dan Corona
Operations Leader
Consumer Technology Division
UL Verification Services Inc.

Gerardo Abrego
Senior Test Engineer
Consumer Technology Division
UL Verification Services Inc.

Reviewed By:



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

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 the validity of results after the integration of the data provided by the customer.

FCC Clause	ISED Clause	Requirement	Result	Comment
See Comment		Duty Cycle	Reporting purposes only	Per ANSI C63.10, Section 12.2.
15.209, 15.205, 15.407 (b) (1-4)	RSS-GEN 8.9, 8.10, RSS-247 6.2	Radiated Emissions	Complies	For colocation testing

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with:

- FCC CFR 47 Part 2
- FCC CFR 47 Part 15
- FCC KDB 662911 D01 v02r01
- FCC KDB 905462 D02 v02/D03 v01r02/D06 v02
- KDB 558074 D01 15.247 Meas Guidance v05r02
- FCC KDB 789033 D02 v02r01
- KDB 414788 D01 Radiated Test Site v01r01
- ANSI C63.10-2013
- RSS-GEN Issue 5 + A1 + A2
- RSS-247 Issue 3

The scope of this report covers the co-location modes in the 2.4GHz and 5Ghz band.

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
<input type="checkbox"/>	Building 1: 47173 Benicia Street Fremont, CA 94538, U.S.A	US0104	2324A	550739
<input type="checkbox"/>	Building 2: 47266 Benicia Street Fremont, CA 94538, U.S.A	US0104	22541	550739
<input checked="" type="checkbox"/>	Building 4: 47658 Kato Rd Fremont, CA 94538, U.S.A	US0104	2324B	550739

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 on a regular basis, 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
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	1.22%
Power Spectral Density	2.47 dB
RF Power Measurement Direct Method Using Power Meter	1.3 dB (PK) / 0.45 dB (AV)
Unwanted Emissions, Conducted	1.94dB
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.78 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.40 dB
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
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.29 dB
Time Domain Measurements	3.39%
Temperature	0.57
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.

6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The EUT is a Bicycle Head Unit.

6.2. MAXIMUM OUTPUT POWER & DESCRIPTION OF AVAILABLE ANTENNAS

Refer to reports 14954500-E1, -E2, -E3, -E4, -E8 and -E9 for output power and antenna gain and type information.

6.3. SOFTWARE AND FIRMWARE

The EUT firmware installed, and the test utility software used during testing was FVIN: H-2.0.

6.4. WORST-CASE CONFIGURATION AND MODE

For BT

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

Worst-case data rates as provided by the client were:

GFSK mode: DH5
8PSK mode: 3-DH5

For BLE

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

The worst-case data rate provided by the client were:

Qualcomm Radio:

- BLE: 1Mbps

Left / Right Nordic Radio:

- BLE: 1Mbps
- BLE: 2Mbps
- BLE: 125kbps
- BLE: 500kbps

For AIREA

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

Right Nordic Radio:

The worst-case data rate provided by the client was 250kbps.

For ANT+

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

Left Nordic Radio:

- ANT + : 1Mbps
- ANT + : 2Mbps
- ANT + : 250kbps

For 2.4 DTS

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

802.11b mode: 1 Mbps
802.11g mode: 6 Mbps
802.11n HT20 mode: MCS0
802.11n HT40 mode: MCS0

For 5GHz UNII

The worst-case data rates were determined to be as follows, based on input from the manufacturer of the radio.

802.11a mode: 6 Mbps
802.11n HT20mode: MCS0
802.11n HT40mode: MCS0
802.11ac VHT80 mode: MCS0

6.5. SIMULTANEOUS TRANSMISSION CONFIGURATIONS

Simultaneous transmission of the following was investigated:

- 1_ Qualcomm BLE/ Nordic right radio BLE
- 2_ Qualcomm BLE/ Nordic Left radio ANT +
- 3_ Qualcomm BT /Nordic right radio BLE
- 4_ Qualcomm BT /Nordic Left radio ANT +
- 5_ Qualcomm 2.4GHz / Nordic right radio BLE
- 6_ Qualcomm 2.4GHz / Nordic Left radio ANT +
- 7_ Qualcomm 5GHz + / Nordic right radio BLE
- 8_ Qualcomm 5GHz +/- Nordic Left radio ANT +

Per the manufacturer, no other radios transmit simultaneously. See section 9.2 for modes tested. All test cases were identified based on the the highest power in the band.

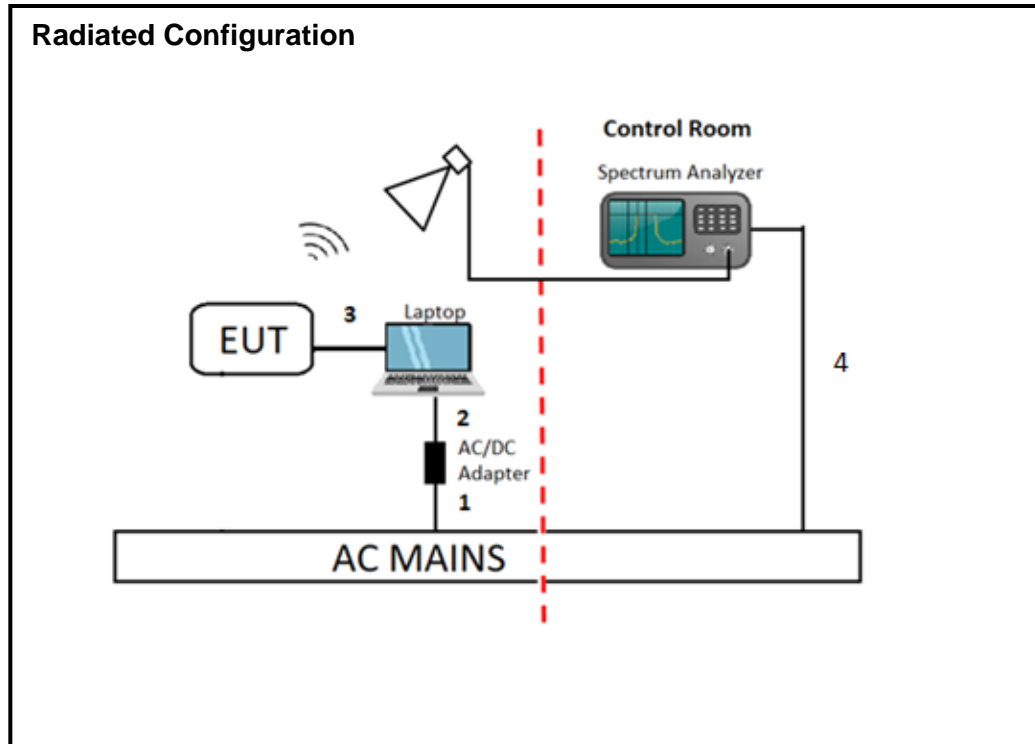
6.6. DESCRIPTION OF TEST SETUP

SUPPORT TEST EQUIPMENT						
Description	Manufacturer	Model	Serial Number	FCC ID/ DoC		
Laptop	Lenovo	ThinkPad P15s	F53D168E-F6F2-4FE5-92C6-008E22EB6B88	-		
Laptop AC/DC Adapter	Lenovo	ADLX65YCC2D	8SSA10R16875C2TJ	-		
I/O CABLES (CONDUCTED TEST)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	2-Prong	Un-shielded	1	AC Mains to LT AC/DC Adapter
2	DC	1	DC	Un-shielded	1.5	AC/DC Adapter to Laptop
3	USB	1	USB A to USB C	Un-shielded	1	Laptop to EUT
4	SMA	1	SMA	Un-shielded	0.1	EUT to Spectrum Analyzer
5	AC	1	3-Prong	Un-shielded	1.5	AC Mains to Spectrum Analyzer
I/O CABLES (RADIATED TEST EMISSIONS)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	2-Prong	Un-shielded	1	AC Mains to LT AC/DC Adapter
2	DC	1	DC	Un-shielded	1.5	AC/DC Adapter to Laptop
3	USB	1	USB A to USB C	Un-shielded	1	Laptop to EUT
4	AC	1	3-Prong	Un-shielded	1.5	AC Mains to Spectrum Analyzer

TEST SETUP

For the purposes of testing, the EUT is connected to a laptop via USB A to USB C for radiated emissions above 1GHz. The EUT is normally powered by a Li-Ion battery at 3.85V. The laptop is used for setting up purposes and was used during testing.

SETUP DIAGRAMS



7. MEASUREMENT METHOD

Unwanted emissions in restricted bands: KDB 789033 D02 v02r01, Sections G.3, G.4, G.5, and G.6.

Unwanted emissions in non-restricted bands: KDB 789033 D02 v02r01, Sections G.3, G.4, and G.5.

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, Horn 1-18GHz	ETS-Lindgren	3117	80404	2024-08-31	2023-08-08
RF Filter Box, 1-18GHz, 8 Port	UL-FR1	SAC 8 port rf box 1	197920	2024-05-31	2023-05-17
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	225688	2024-02-29	2023-02-14
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent Technologies	N9030A	80396	2024-01-31	2023-01-27
10dB Fixed Attenuator	Pasternack Enterprises	PE7087-10	N/A	Verified	Verified
UL TEST SOFTWARE LIST					
Radiated Software	UL	UL EMC	Version 9.5, 01 May 2023-01-05		

NOTES:

1. Equipment listed above that 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 equipment expiration date.

9. SIMULTANEOUS TRANSMISSION TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

Refer to reports 14954500-E1, -E2, -E3, -E4, -E8, and -E9 for duty cycle data

9.2. LIMITS AND PROCEDURE

FCC §15.205 and §15.209

FCC §15.407(b)(1-4) -

RSS-GEN, Section 8.9 and 8.10

RSS 247 Issue 3 Sections

6.2.1.2 (for 5150-5250 MHz band)

6.2.2.2 (for 5250-5350 MHz band)

6.2.3.2 (for 5470-5600 MHz and 5650-5725 MHz bands)

6.2.4.2 (for 5725-5850 MHz band)

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

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

The spectrum from 1 GHz to 18 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

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

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.

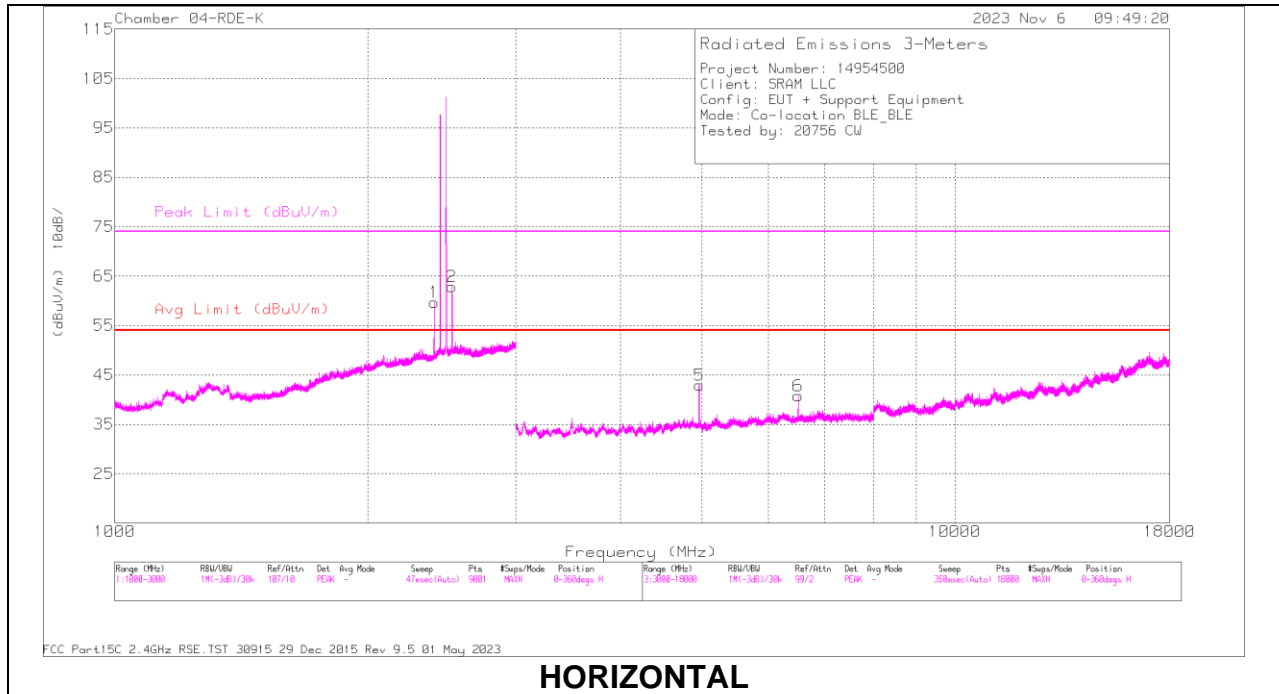
KDB 558074 D01 15.247 Meas Guidance v05r02

Use of a duty cycle correction factor (DCCF) is permitted for calculating average radiated field strength emission levels for an FHSS device in 15.247. This DCCF can be applied when the field strength limit (e.g., within a Government Restricted band) and the conditions specified in Section 15.35(c) can be satisfied. The average radiated field strength is calculated by subtracting the DCCF from the maximum radiated field strength level as determined through measurement. The maximum radiated field strength level represents the worst-case (maximum amplitude) RMS measurement of the emission(s) during continuous transmission (i.e., not including any time intervals during which the transmitter is off or is transmitting at a reduced power level). It is also acceptable to apply the DCCF to a measurement performed with a peak detector instead of the specified RMS power averaging detector. Note that Section 15.35(c) specifies that the DCCF shall represent the worst-case (greatest duty cycle) over any 100 msec transmission period.

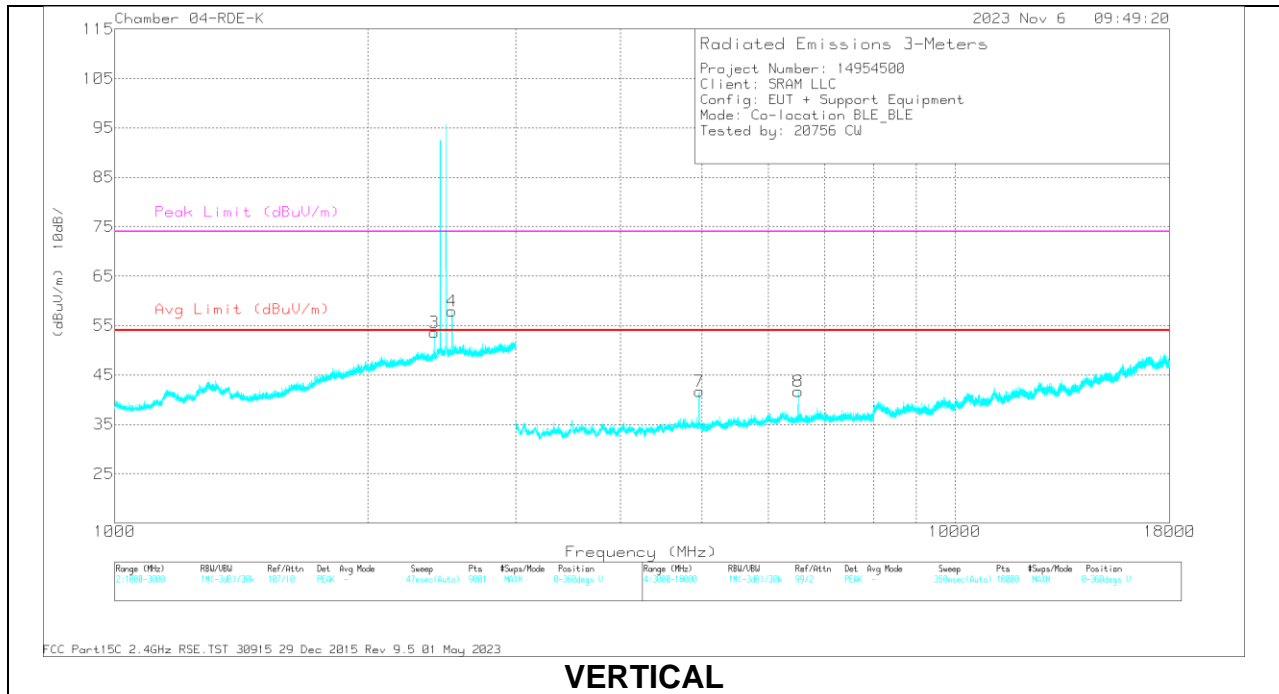
Note - For this test program, Peak detection was used. The DCCF was then subtracted from the peak value. The DCCF was calculated based on the worst case on-time when the device transmits DH5 packets and operates on 20 channels (5/1600 s per hop = 3.125 ms per channel). In this mode, the device will have a maximum of 2 hops on a channel in 100ms or $2 \times 3.125 \text{ ms} = 6.25 \text{ ms}$ on any channel. Therefore, $\text{DCCF} = 20 \log (6.25 / 100) = -24 \text{ dB}$.

9.2.1. TEST CASE 1

BLE 2440MHz + BLE 2M 2480MHz



HORIZONTAL



VERTICAL

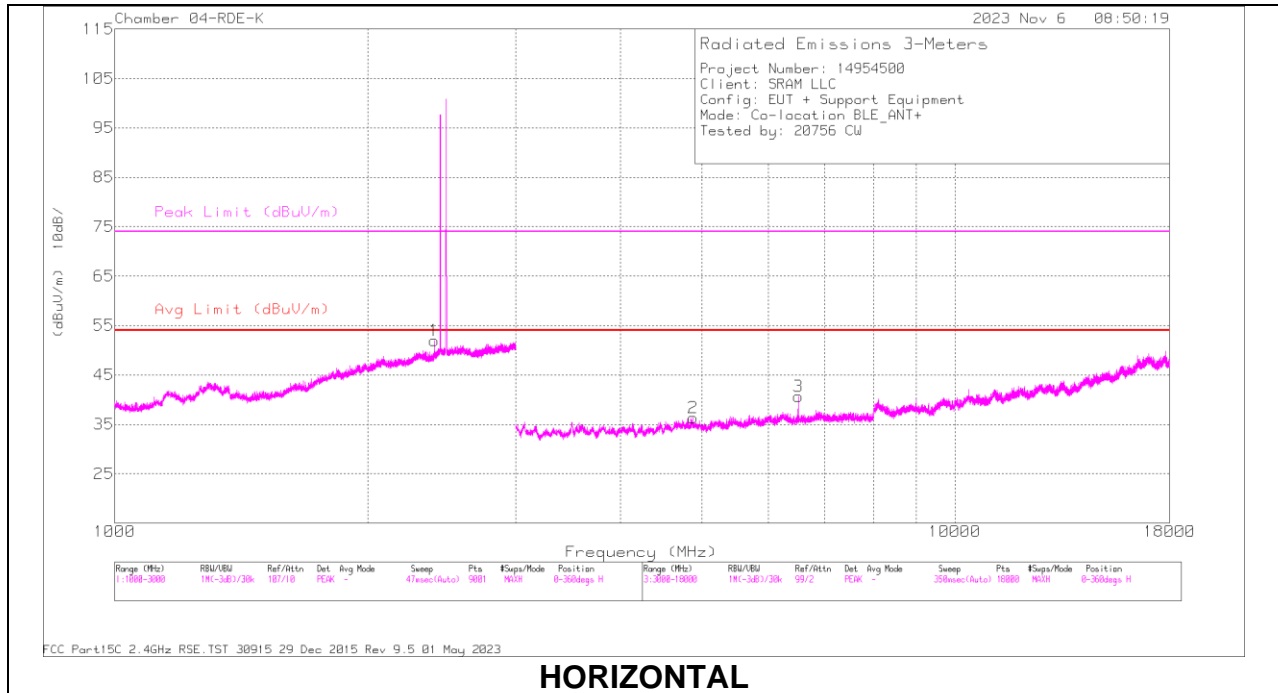
Radiated Emissions

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80404_ACF(dB) - 3mH	Cbl/Amp (dB)	DCCF (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2399.565	44.14	PK2	32.4	-11.3	0	65.24	-	-	-	-	173	164	H
2	2520.687	46.75	PK2	32.2	-10.9	0	68.05	-	-	-	-	25	132	H
3	2400.061	41.57	PK2	32.4	-11.3	0	62.67	-	-	-	-	324	173	V
4	2519.329	42.86	PK2	32.2	-10.9	0	64.16	-	-	-	-	168	260	V
5	* 4959.034	57.1	PK2	34.1	-39.9	0	51.3	-	-	74	-22.7	38	125	H
	* 4959.022	49.11	MAv1	34.1	-39.9	2.06	45.37	54	-8.63	-	-	38	125	H
6	6506.411	51.32	PK2	35.6	-38	0	48.92	-	-	-	-	166	115	H
7	* 4961.119	55.86	PK2	34.1	-39.8	0	50.16	-	-	74	-23.84	5	224	V
	* 4959.124	47.1	MAv1	34.1	-39.9	2.06	43.36	54	-10.64	-	-	5	224	V
8	6506.701	51.61	PK2	35.6	-38.1	0	49.11	-	-	-	-	13	130	V

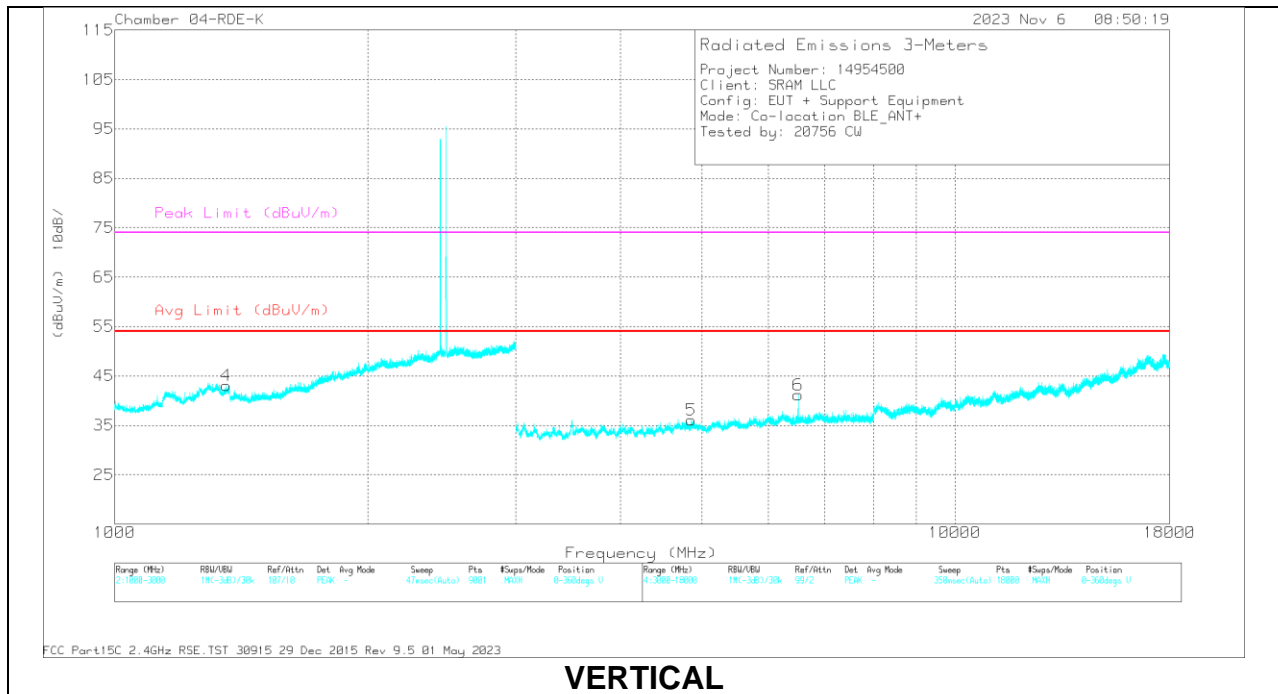
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK2 - KDB558074 Method: Maximum Peak
 MAv1 - KDB558074 Option 1 Maximum RMS Average

9.2.2. TEST CASE 2

BLE 2440MHz + ANT+ 2M 2480MHz



HORIZONTAL



VERTICAL

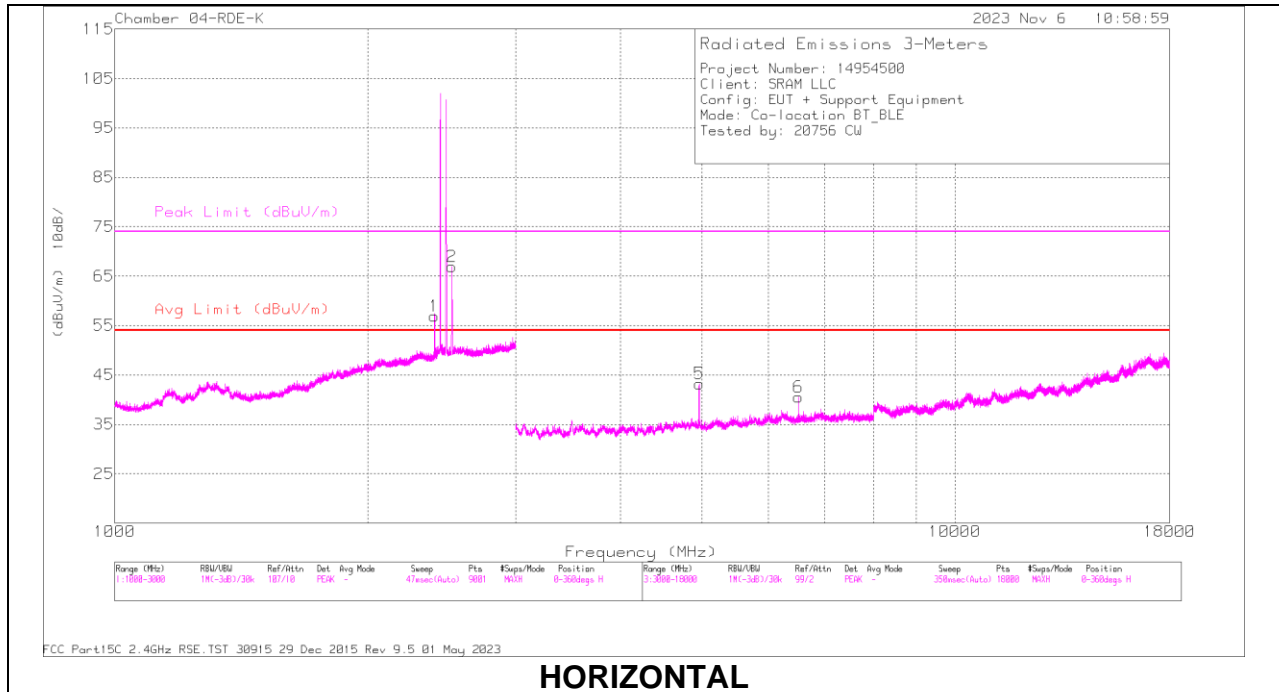
Radiated Emissions

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80404_ACF(dB) - 3mH	Cbl/Amp (dB)	DCCF (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2399.982	40.26	PK2	32.4	-11.3	0	61.36	-	-	-	-	177	223	H
4	* 1356.456	36.1	PK2	28.6	-13.3	0	51.4	-	-	74	-22.6	278	139	V
	* 1359.679	24.72	MAv1	28.7	-13.2	2.06	42.28	54	-11.72	-	-	278	139	V
2	* 4879.521	52.35	PK2	34.4	-39.9	0	46.85	-	-	74	-27.15	327	109	H
	* 4879.995	40.99	MAv1	34.4	-39.9	2.06	37.55	54	-16.45	-	-	327	109	H
3	6506.312	52.15	PK2	35.6	-38	0	49.75	-	-	-	-	320	228	H
5	* 4853.761	51.82	PK2	34.7	-39.9	0	46.62	-	-	74	-27.38	7	341	V
	* 4854.098	39.46	MAv1	34.7	-39.9	2.06	36.32	54	-17.68	-	-	7	341	V
6	6506.404	51.3	PK2	35.6	-38	0	48.9	-	-	-	-	204	208	V

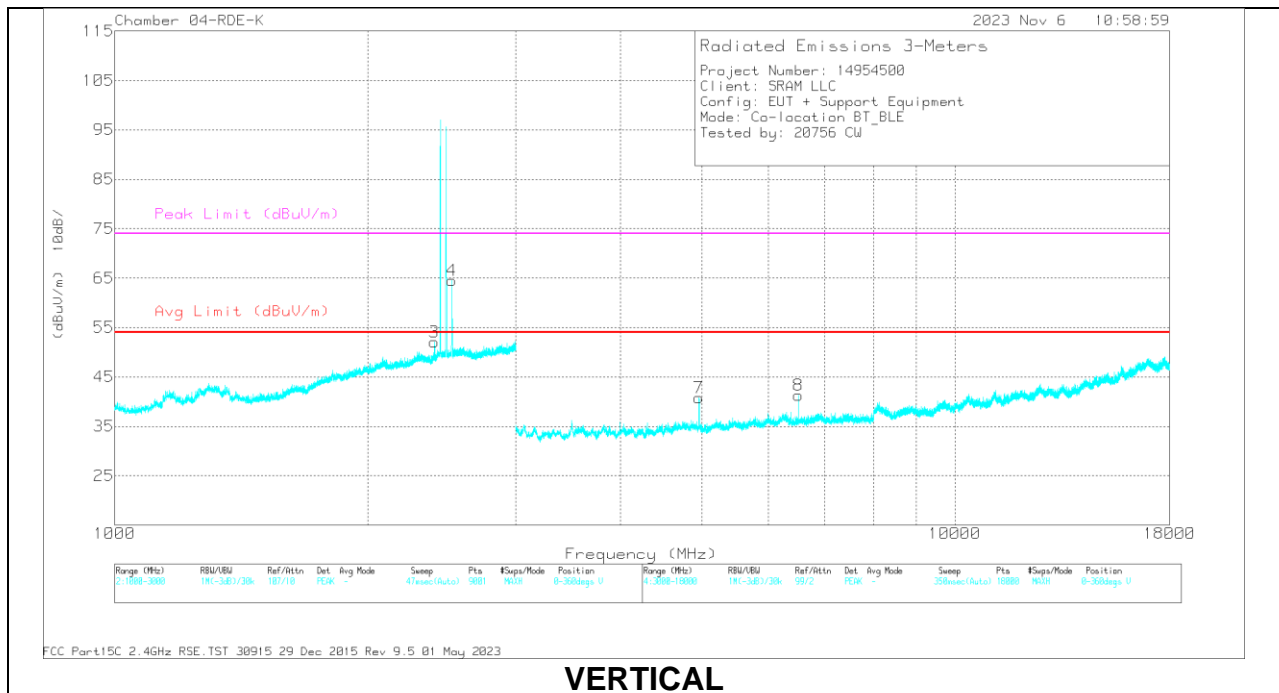
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK2 - KDB558074 Method: Maximum Peak
 MAv1 - KDB558074 Option 1 Maximum RMS Average

9.2.3. TEST CASE 3

8PSK 2441MHz + BLE 2M 2480MHz



HORIZONTAL



VERTICAL

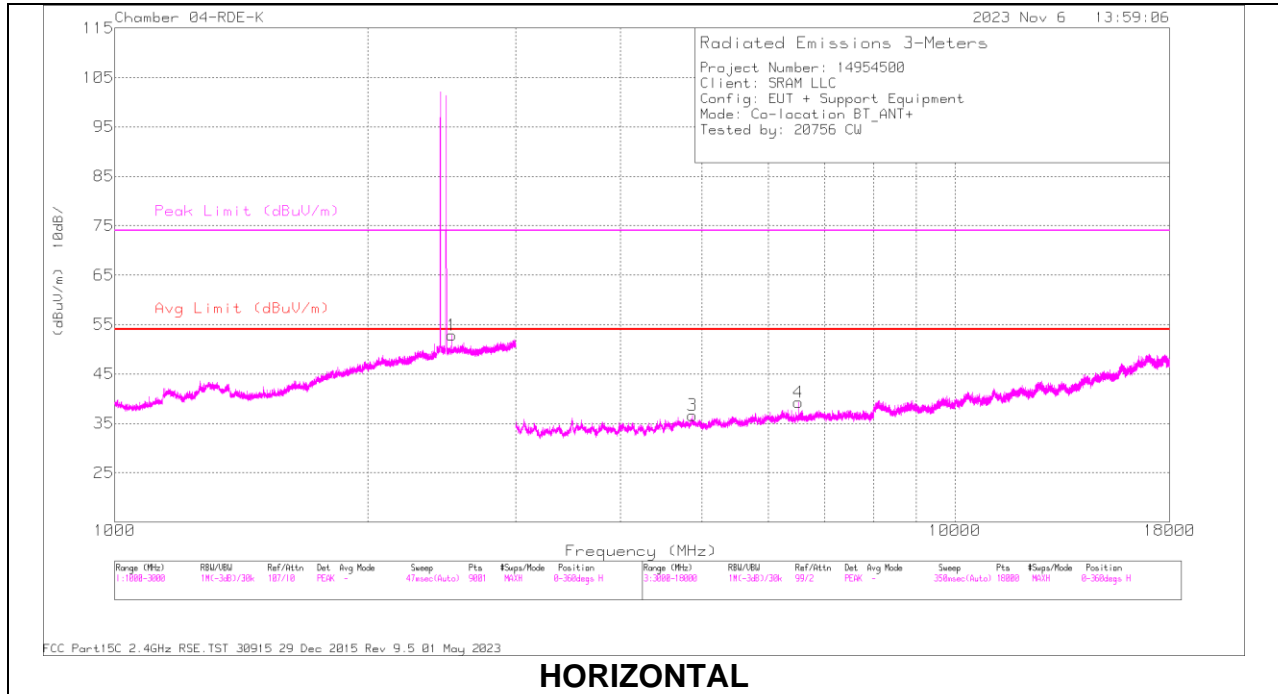
Radiated Emissions

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80404 ACF(d B) - 3mH	Cbl/Amp (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	2518.221	51.21	PKFH	32.2	-10.9	72.51	-	-	-	-	26	282	H
4	2517.895	48.66	PKFH	32.2	-10.9	69.96	-	-	-	-	309	101	V
5	* 4959.212	55.7	PKFH	34.1	-39.9	49.9	-	-	74	-24.1	36	138	H
	* 4959.817	45.49	VA1T	34.1	-39.8	39.79	54	-14.21	-	-	36	138	H
6	6509.407	49.47	PKFH	35.7	-38.2	46.97	-	-	-	-	171	125	H
7	* 4959.043	55.08	PKFH	34.1	-39.9	49.28	-	-	74	-24.72	9	289	V
	* 4959.726	44.6	VA1T	34.1	-39.8	38.9	54	-15.1	-	-	9	289	V
8	6509.186	50.78	PKFH	35.6	-38.2	48.18	-	-	-	-	13	210	V

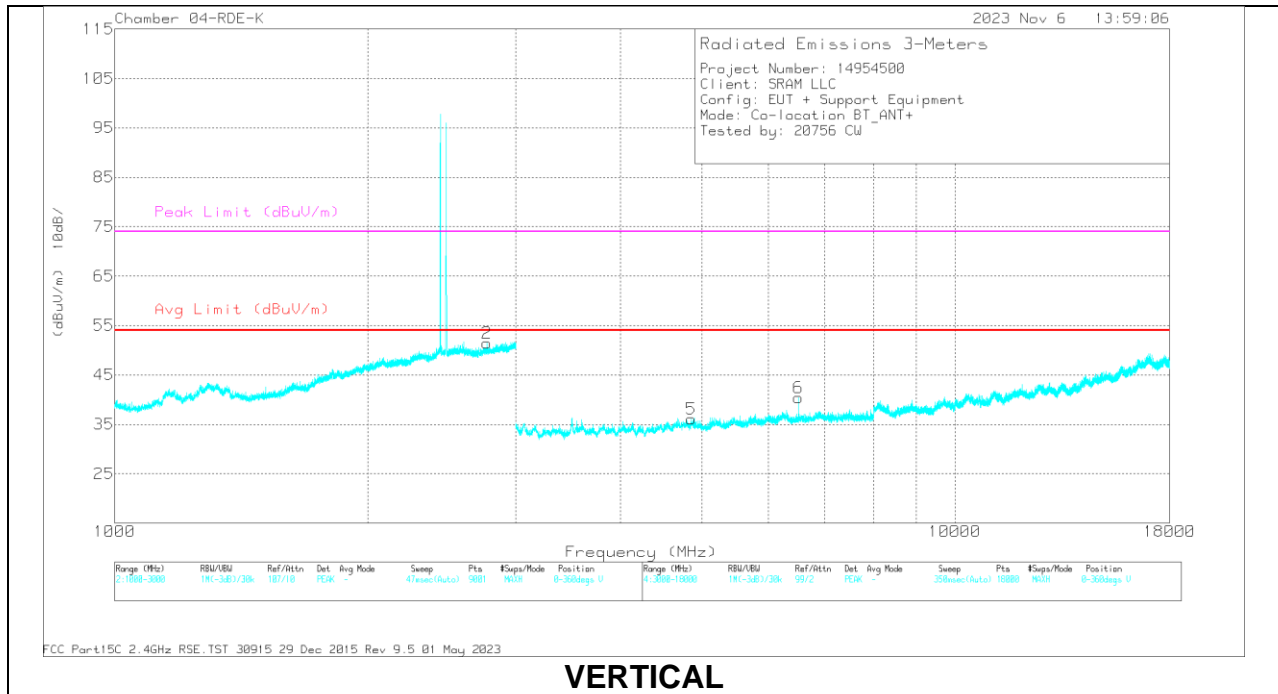
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak
 VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

9.2.4. TEST CASE 4

8PSK 2441MHz + ANT+ 2M 2480MHz



HORIZONTAL



VERTICAL

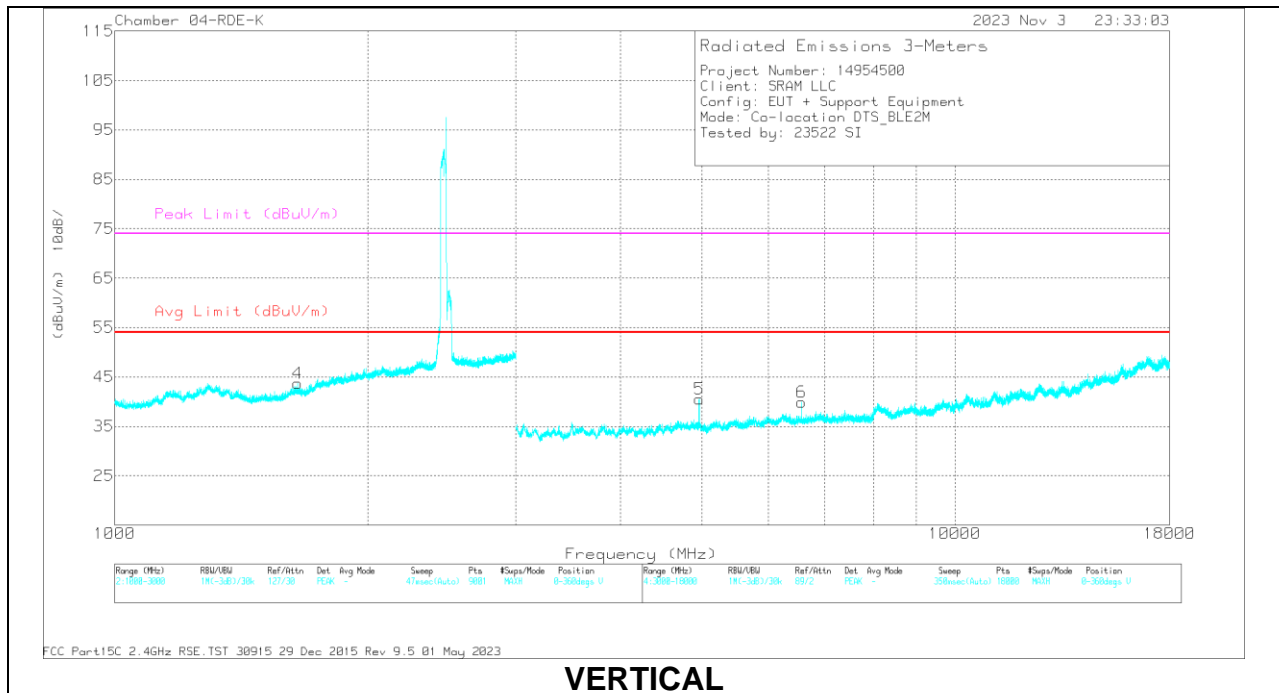
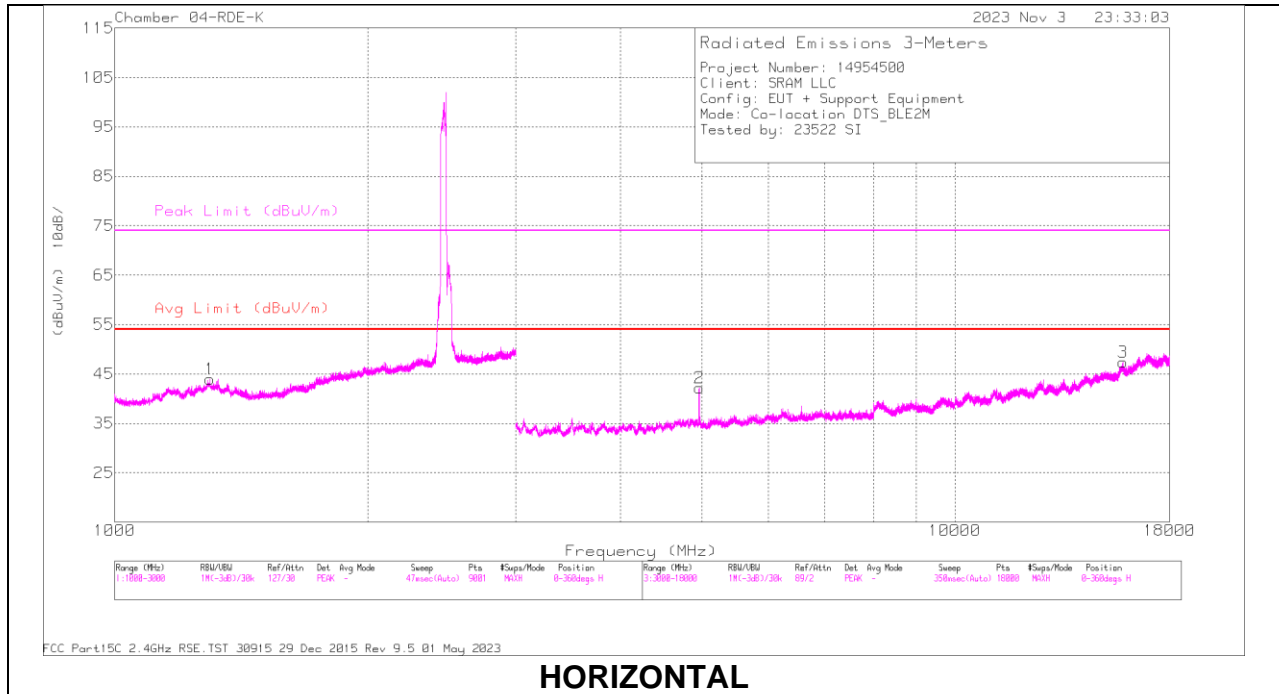
Radiated Emissions

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80404_ACF(dB) - 3mH	Cbl/Amp (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2518.427	38.19	PKFH	32.2	-10.9	59.49	-	-	-	-	309	102	H
2	* 2771.903	36.09	PKFH	32.5	-10.5	58.09	-	-	74	-15.91	93	242	V
	* 2772.517	23.04	VA1T	32.6	-10.4	45.24	54	-8.76	-	-	93	242	V
3	* 4867.344	49.62	PKFH	34.5	-39.7	44.42	-	-	74	-29.58	256	228	H
	* 4867.619	36.09	VA1T	34.5	-39.8	30.79	54	-23.21	-	-	256	228	H
4	6508.21	47.84	PKFH	35.7	-38.2	45.34	-	-	-	-	299	208	H
5	* 4852.367	49.3	PKFH	34.7	-39.9	44.1	-	-	74	-29.9	330	249	V
	* 4855.331	35.87	VA1T	34.7	-39.8	30.77	54	-23.23	-	-	330	249	V
6	6508.617	47.56	PKFH	35.6	-38.2	44.96	-	-	-	-	57	131	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak
 VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

9.2.5. TEST CASE 5

11n HT40 2452MHz + BLE 2M 2480MHz



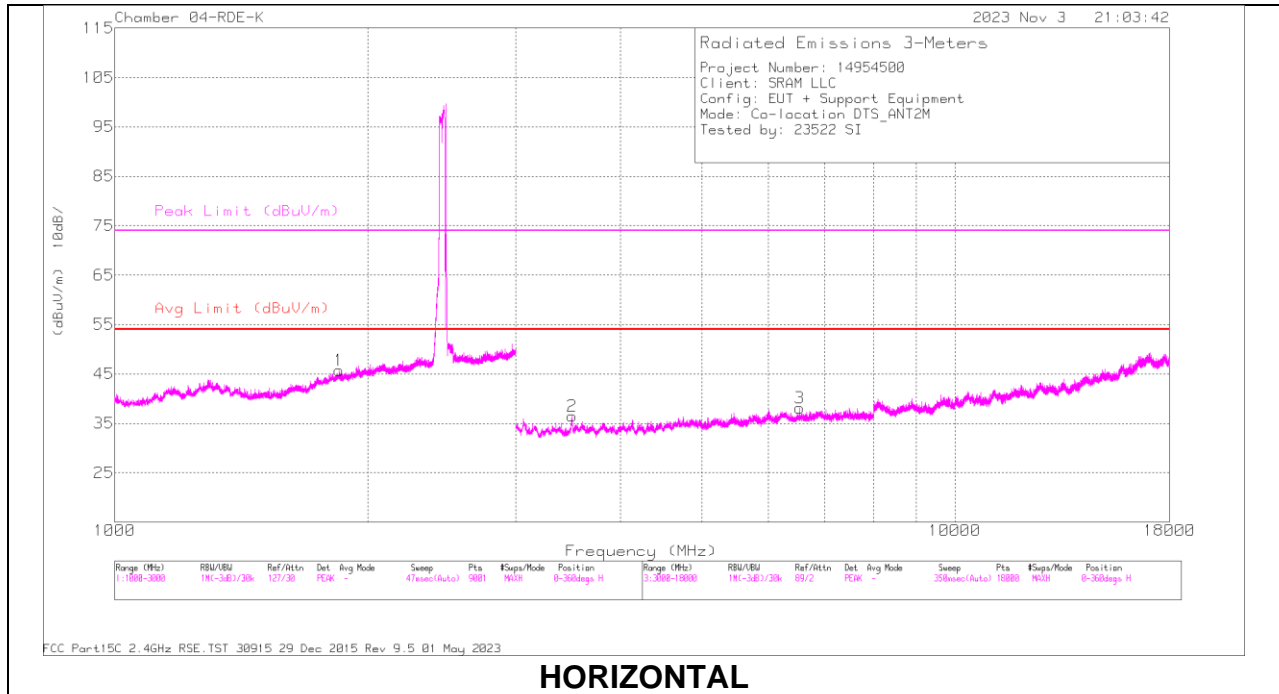
Radiated Emissions

Frequency (MHz)	Meter Reading (dBuV)	Det	80404_ACF(dB) - 3mH	Cbl/Amp (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1298.982	60.23	PK2	29.3	-36.2	53.33	-	-	74	-20.67	326	209	H
* 1298.748	48.17	MAv1	29.3	-36.2	41.27	54	-12.73	-	-	326	209	H
1650.003	60.11	PK2	29	-36.2	52.91	-	-	-	-	9	241	V
1649.636	48.34	MAv1	29	-36.2	41.14	-	-	-	-	9	241	V
* 4959.222	55	PK2	34.1	-39.9	49.2	-	-	74	-24.8	157	178	H
* 4959.011	46.15	MAv1	34.1	-39.9	40.35	54	-13.65	-	-	157	178	H
* 15849.222	47.15	PK2	40.9	-31.7	56.35	-	-	74	-17.65	122	317	H
* 15850.252	35.55	MAv1	40.9	-31.8	44.65	54	-9.35	-	-	122	317	H
* 4959.436	54.58	PK2	34.1	-39.9	48.78	-	-	74	-25.22	203	101	V
* 4960.879	45.68	MAv1	34.1	-39.8	39.98	54	-14.02	-	-	203	101	V
6565.281	51.26	PK2	35.9	-38.2	48.96	-	-	-	-	295	233	V
6565.291	42.25	MAv1	35.9	-38.2	39.95	-	-	-	-	295	233	V

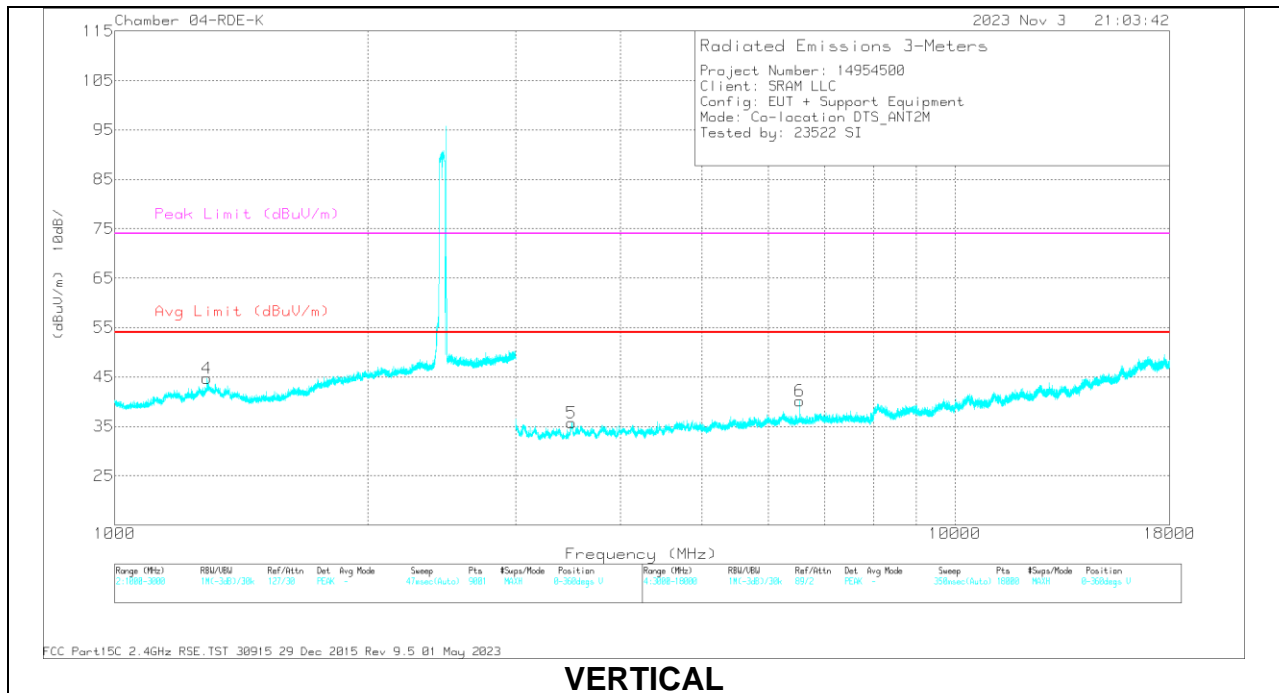
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK2 - KDB558074 Method: Maximum Peak
 MAv1 - KDB558074 Option 1 Maximum RMS Average

9.2.6. TEST CASE 6

11n HT40 2452MHz + ANT+ 2M 2480MHz



HORIZONTAL



VERTICAL

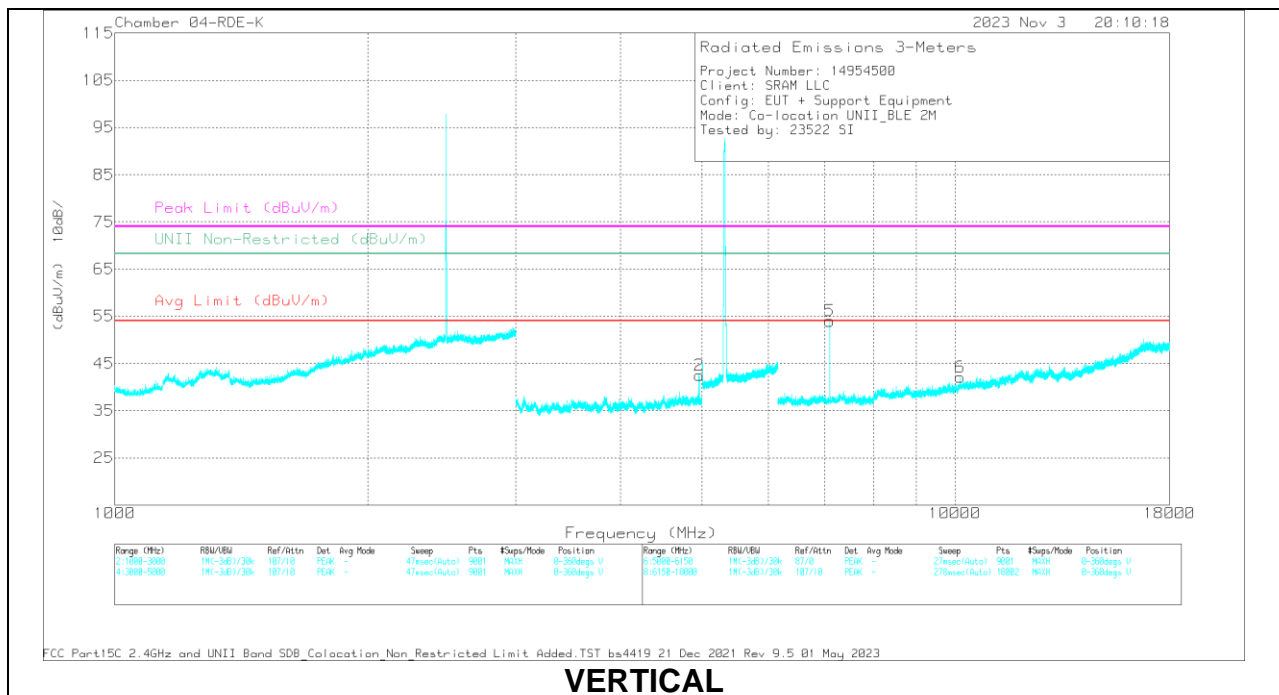
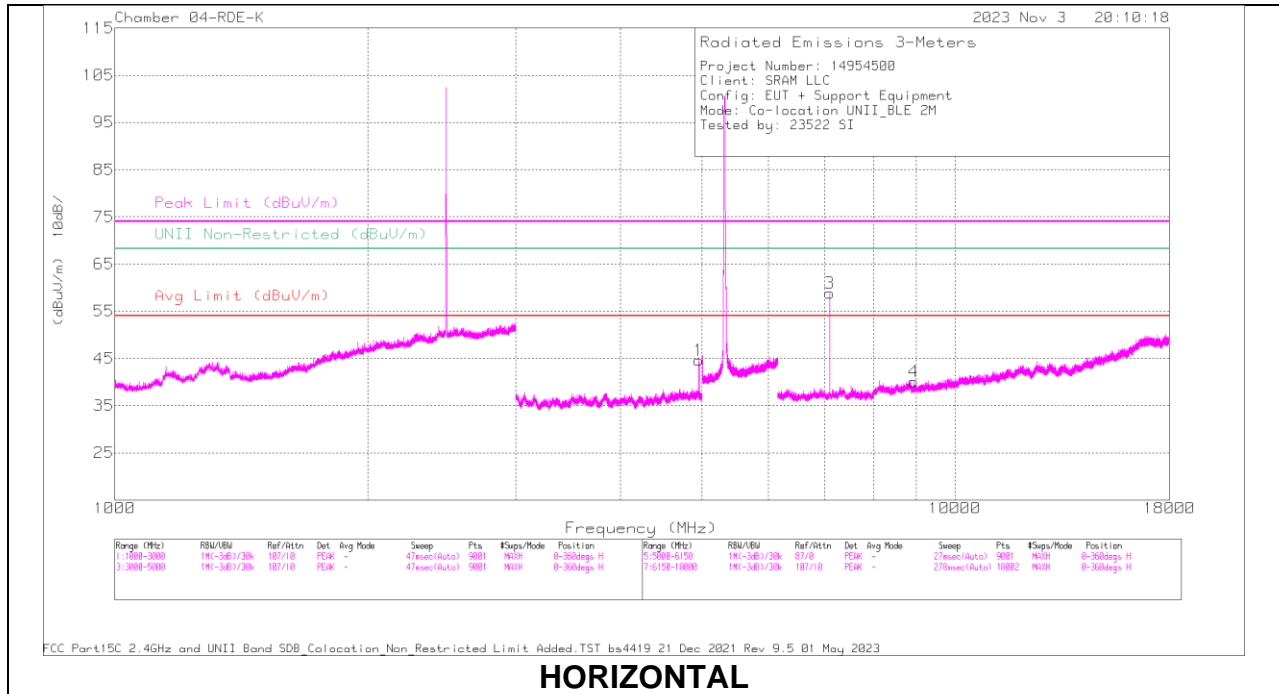
Radiated Emissions

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80404_ACF(dB) - 3mH	Cbl/Amp (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1848.27	60.04	PK2	31.2	-35.7	55.54	-	-	-	-	230	306	H
	1847.603	48.15	MAv1	31.2	-35.7	43.65	-	-	-	-	230	306	H
4	* 1286.457	60.38	PK2	29.2	-36.3	53.28	-	-	74	-20.72	53	375	V
	* 1289.189	48.22	MAv1	29.4	-36.3	41.32	54	-12.68	-	-	53	375	V
2	* 4026.313	51.9	PK2	33.7	-41.4	44.2	-	-	74	-29.8	14	159	H
	* 4031.771	40.83	MAv1	33.7	-41.3	33.23	54	-20.77	-	-	14	159	H
3	6538.838	50.02	PK2	35.7	-38.1	47.62	-	-	-	-	3	185	H
	6538.529	38.81	MAv1	35.7	-38.1	36.41	-	-	-	-	3	185	H
5	6538.233	50.95	PK2	35.7	-38.1	48.55	-	-	-	-	19	282	V
	6538.468	42.67	MAv1	35.7	-38.1	40.27	-	-	-	-	19	282	V
6	3495.91	52.83	PK2	34.4	-41.4	45.83	-	-	-	-	43	279	V
	3499.483	41.16	MAv1	34.9	-41.6	34.46	-	-	-	-	43	279	V

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

9.2.7. TEST CASE 7

11a 5320MHz + BLE 2M 2480MHz



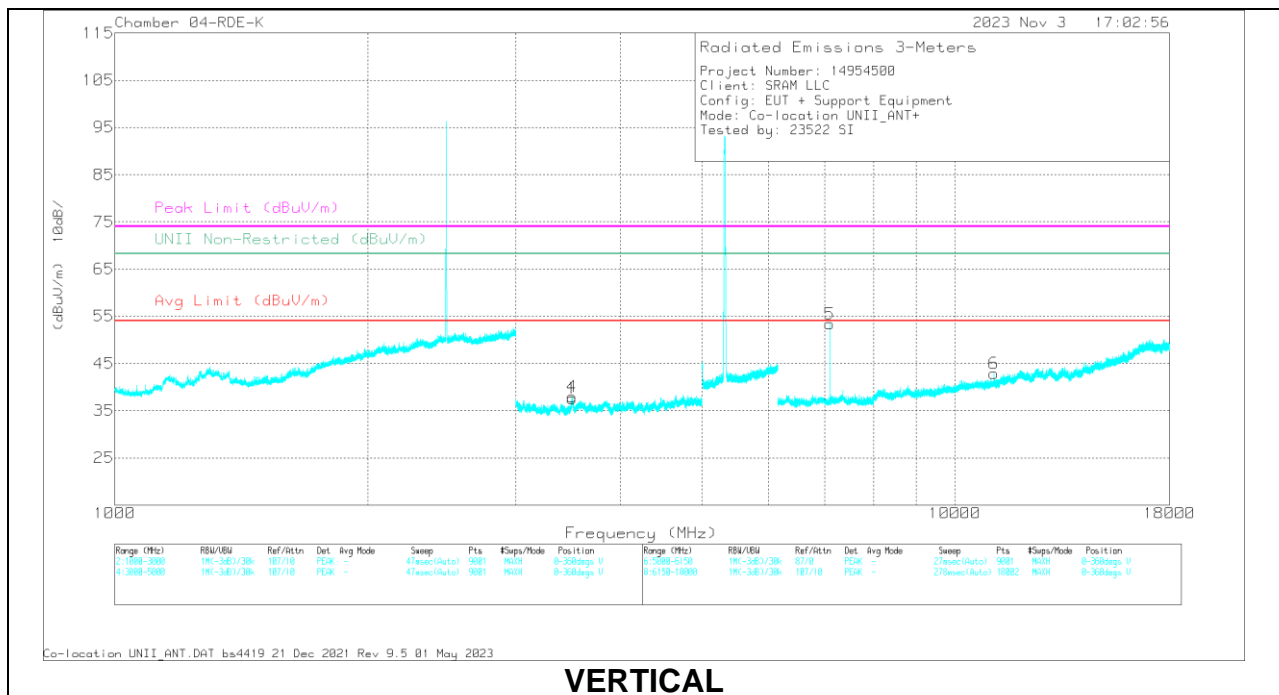
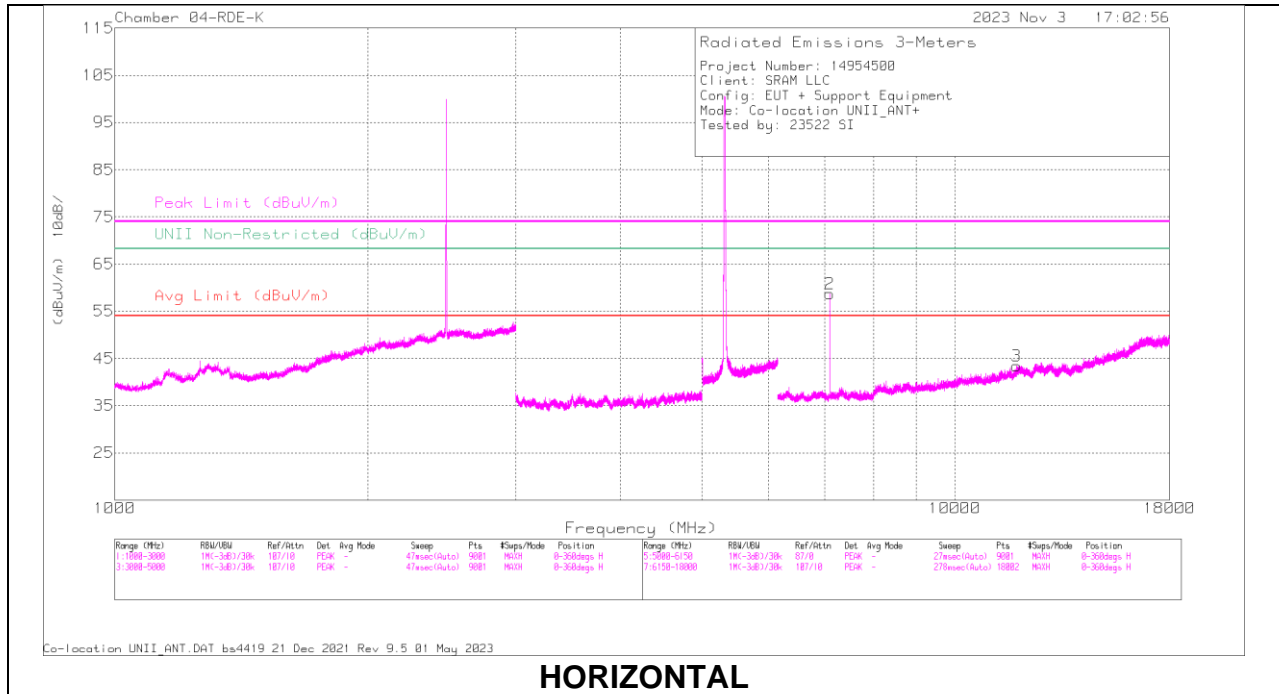
Radiated Emissions

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80404_ACF(dB) - 3mH	Cbl/Amp (dB)	Filter (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4959.08	56.08	PK-U	34.1	-39.9	2	52.28	-	-	74	-21.72	-	-	42	102	H
	* 4959.312	48.06	ADR	34.1	-39.9	2	44.26	54	-9.74	-	-	-	-	42	102	H
2	* 4960.97	54.84	PK-U	34.1	-39.8	2	51.14	-	-	74	-22.86	-	-	357	293	V
	* 4960.7	45.9	ADR	34.1	-39.8	2	42.2	54	-11.8	-	-	-	-	357	293	V
3	7093.272	63.34	PK-U	35.9	-37.5	.5	62.24	-	-	-	-	68.2	-5.96	173	114	H
	7093.299	59.82	ADR	35.9	-37.5	.5	58.72	-	-	-	-	-	-	173	114	H
4	8924.869	48.48	PK-U	36.1	-36.3	.5	48.78	-	-	-	-	68.2	-19.42	41	138	H
	8926.367	36.82	ADR	36.2	-36.3	.5	37.22	-	-	-	-	-	-	41	138	H
5	7093.318	60.29	PK-U	35.9	-37.5	.5	59.19	-	-	-	-	68.2	-9.01	214	232	V
	7093.222	56.48	ADR	35.9	-37.5	.5	55.38	-	-	-	-	-	-	214	232	V
6	10140.876	48.8	PK-U	37.5	-36.2	.5	50.6	-	-	-	-	68.2	-17.6	161	326	V
	10139.462	37.58	ADR	37.6	-36.2	.5	39.48	-	-	-	-	-	-	161	326	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK-U - U-NII: Maximum Peak
 ADR - U-NII AD primary method, RMS average

9.2.8. TEST CASE 8

11a 5320MHz + ANT+ 2M 2480MHz



Radiated Emissions

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80404_ACF(dB) - 3mH	Cbl/Amp (dB)	Filter (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 3503.386	52.21	PK-U	34.9	-41.5	2	47.61	-	-	74	-26.39	-	-	279	328	V
	* 3501.858	40.46	ADR	35	-41.4	2	36.06	54	-17.94	-	-	-	-	279	328	V
	* 3502.443	52.43	PK-U	35	-41.4	2	48.03	-	-	74	-25.97	-	-	285	192	V
4	* 3503.639	40.52	ADR	34.8	-41.5	2	35.82	54	-18.18	-	-	-	-	285	192	V
	7093.35	62.54	PK-U	35.9	-37.5	.5	61.44	-	-	-	-	68.2	-6.76	172	113	H
	7093.257	58.7	ADR	35.9	-37.5	.5	57.6	-	-	-	-	-	-	172	113	H
3	* 11834.667	47.18	PK-U	38.5	-34.4	.5	51.78	-	-	74	-22.22	-	-	154	332	H
	* 11833.563	35.71	ADR	38.5	-34.4	.5	40.31	54	-13.69	-	-	-	-	154	332	H
5	7093.443	59.15	PK-U	35.9	-37.5	.5	58.05	-	-	-	-	68.2	-10.15	215	231	V
	7093.266	55.2	ADR	35.9	-37.5	.5	54.1	-	-	-	-	-	-	215	231	V
6	* 11133.015	49.15	PK-U	38	-35.9	.5	51.75	-	-	74	-22.25	-	-	179	316	V
	* 11133.708	37.24	ADR	37.9	-35.9	.5	39.74	54	-14.26	-	-	-	-	179	316	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK-U - U-NII: Maximum Peak
 ADR - U-NII AD primary method, RMS average

10. SETUP PHOTOS

Refer to reports 14954500-E1, -E2, -E3, -E4, -E8, and -E9 for set-up photos.

END OF TEST REPORT