



CERTIFICATION TEST REPORT

Report Number. : 12220680-E2V2

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

Model : 55501

FCC ID : C9O-PMB1

IC : 10161A-PMB1

EUT Description : TIRE PRESSURE MONITOR

Test Standard(s) : FCC 47 CFR PART 15 SUBPART C
ISED RSS-210 ISSUE 9
ISED RSS-GEN ISSUE 5

Date Of Issue:

June 27, 2018

Prepared by:

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NVLAP Lab code: 200065-0

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	06/05/2018	Initial Issue	--
V2	06/27/2018	Updated cover page, Sections 1, 5.2, 9, 9.1, and 9.2.	Steven Tran

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1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: Tire Pressure Monitor

MODEL: 55501

SERIAL NUMBER: AGG10127 (Conducted), AGG10292 (Radiated)

DATE TESTED: May 11, 2018 – June 27, 2018

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Complies
ISED RSS-210 Issue 9	Complies
ISED RSS-GEN Issue 5	Complies

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 the U.S. government.

Approved & Released For
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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013, RSS-GEN Issue 5, and RSS-210 Issue 9.

3. FACILITIES AND ACCREDITATION

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

47173 Benicia Street	47266 Benicia Street
☒ Chamber A (ISED:2324B-1)	☐ Chamber D (ISED:22541-1)
☒ Chamber B (ISED:2324B-2)	☐ Chamber E (ISED:22541-2)
☐ Chamber C (ISED:2324B-3)	☐ Chamber F (ISED:22541-3)
47685 Kato Road	☐ Chamber G (ISED:22541-4)
☒ Chamber K*	☐ Chamber H (ISED:22541-5)

*Note: Chamber K does not currently have an ISED number.

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers A through C are covered under ISED company address code 2324B with site numbers 2324B -1 through 2324B-3, respectively. Chambers D through H are covered under ISED company address code 22541 with site numbers 22541 -1 through 22541-5, respectively.

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

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

4.3. MEASUREMENT UNCERTAINTY

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

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

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

5. EQUIPMENT UNDER TEST

5.1. EUT DESCRIPTION

The EUT is a Tire Pressure Monitor which is using BLE and ANT+ technologies, powered by CR1632, a coin cell battery.

5.2. MAXIMUM FUNDAMENTAL FIELD STRENGTH

The transmitter has a maximum peak fundamental field strength as follows:

Frequency Range (MHz)	Mode	Peak E-field Strength (dBuV/m)	Avg E-field Strength (dBuV/m)	Distance (m)
2405 - 2475	ANT +	87.75	87.13	3.00

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a chip antenna, with a maximum gain of -2 dBi.

5.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was A-1.0.

The test utility software used during testing was Lightblue v2.6.4

5.5. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 1GHz and above 18GHz were performed with the EUT set to transmit at the channel with highest output power as 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 Y orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y orientation.

5.6. DESCRIPTION OF TEST SETUP

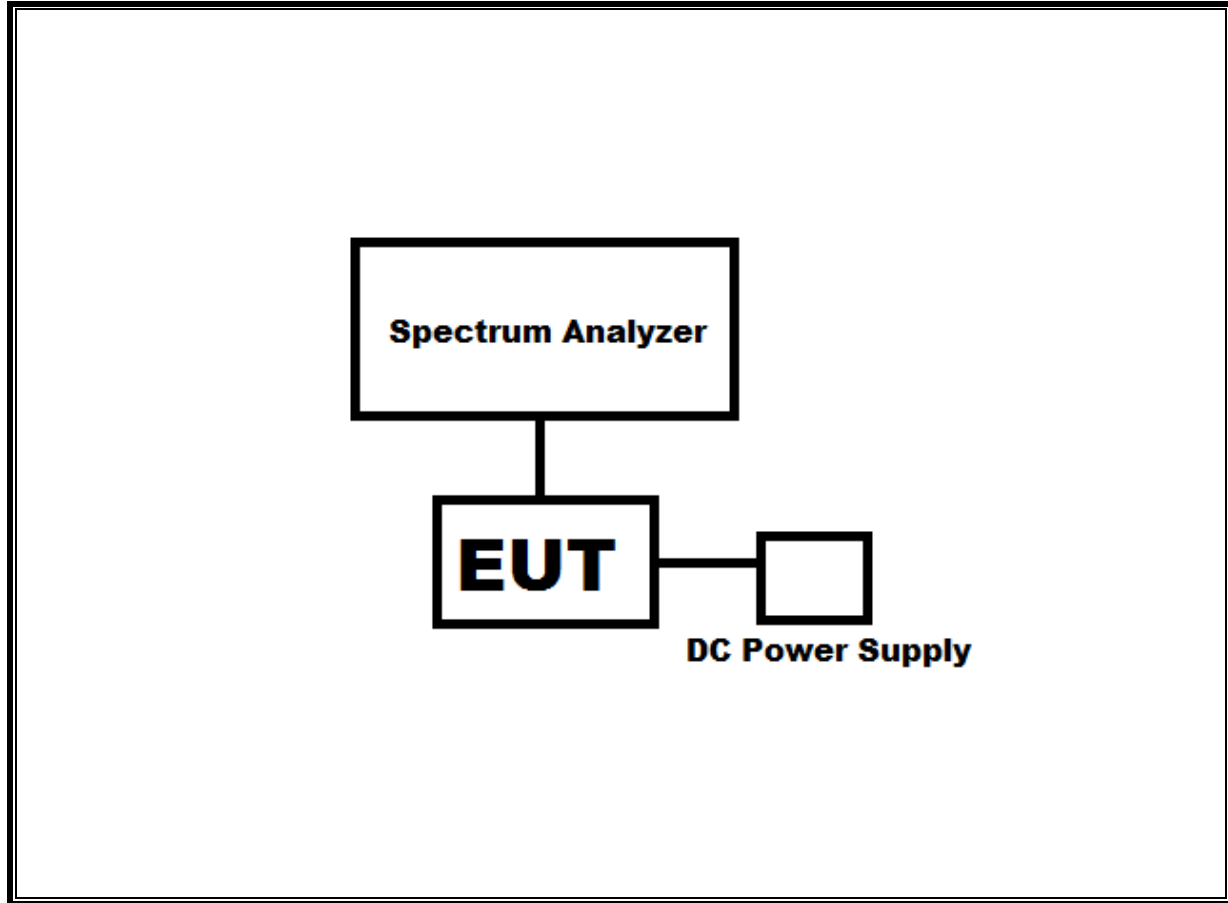
SUPPORT EQUIPMENT

Support Equipment List			
Description	Manufacturer	Model	Serial Number
Ipod Touch	Apple	MKJ02LL/A	CCQVRHY2GGNL

TEST SETUP

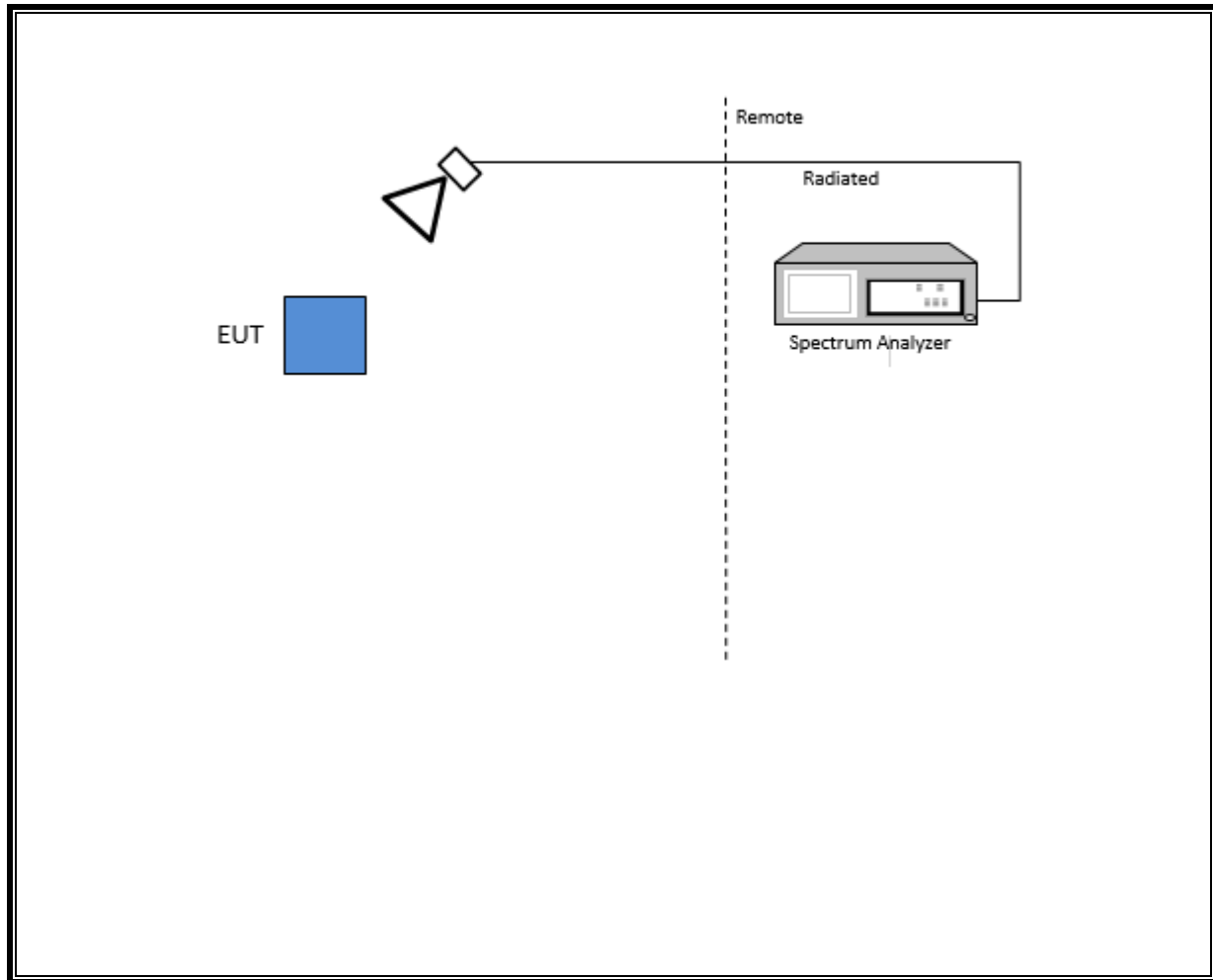
The EUT is powered by a coin cell battery. The iPod Touch wirelessly sends commands to the EUT.

SETUP DIAGRAM FOR CONDUCTED TESTS



Note – The DC power supply is used only during testing. During normal operation the EUT is powered by a supplied CR1632, coin cell battery.

SETUP DIAGRAM FOR RADIATED TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST					
Description	Manufacturer	Model	ID Num	Cal Due	Last Cal
Amplifier, 10KHz to 1GHz, 32dB	Agilent (Keysight) Technologies	8447D	T10	02/14/2019	02/14/2018
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences Corp.	JB1	T130	10/16/2018	10/16/2017
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T345	04/25/2019	04/25/2018
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	EMC4294	04/30/2019	04/17/2018
Antenna, Horn, 18-26GHz	ARA	MWH-1826G	T89	01/18/2019	01/18/2018
Bluetooth Tester	Rohde & Schwarz (Koeln) GmbH & Co. KG	CBT	T258	02/23/2019	02/23/2018
RF Amplifier, 1-18GHz	MITEQ	AFS42-00101800-25-S-42	T1165	06/12/2019	06/12/2018
RF Preamplifier, 1-26GHz	Agilent	8449B	T404	03/09/2019	03/09/2018
Semi anechoic Chamber A	TDK RF SOLUTIONS INC.	N/A	T1199	02/19/2020	02/19/2018
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T1466	04/16/2019	04/16/2018
ESW EMI Test Receiver	Rohde & Schwarz	ESR44	PRE0179522	05/11/2019	05/11/2018
Thermo-Hygrometer	Extech Instruments Corporation	445703	T916	06/23/2018	06/23/2017
Thermometer - Digital	Control Company	14-650-118	PRE0177862	02/22/2019	02/22/2018
Thermometer - Digital	Control Company	14-650-118	PRE0177861	02/26/2019	02/26/2018

Test Software List			
Description	Manufacturer	Model	Version
Antenna Port Software	UL	UL RF	Ver 7.9, Jan 24, 2018
Radiated Software	UL	UL EMC	Ver 9.5, Dec 01, 2016

7. MEASUREMENT METHODS

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

8. ANTENNA PORT TEST RESULTS

8.1. ON TIME AND DUTY CYCLE

LIMITS

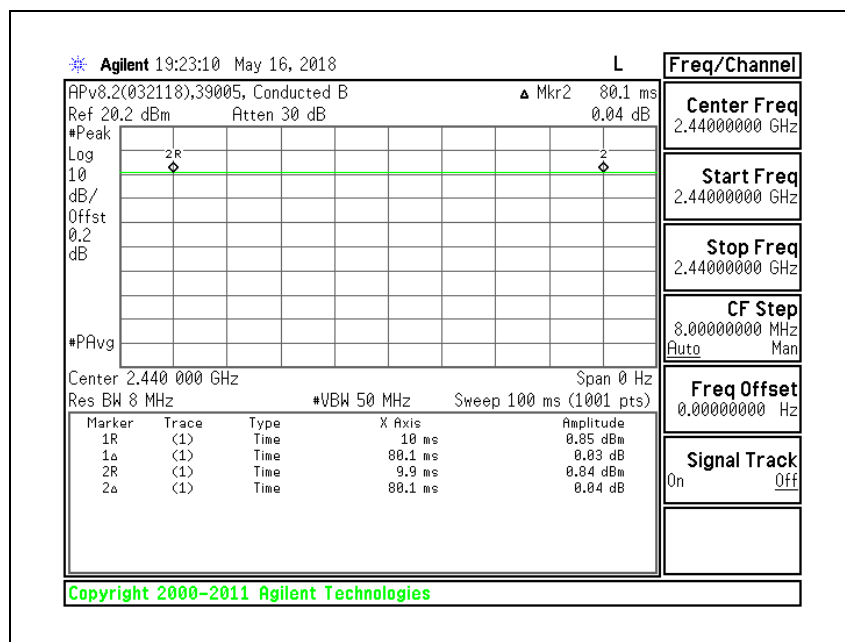
None; for reporting purposes only.

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/T Minimum VBW (kHz)
ANT+	1.00	1.00	1.000	100.0%	0.00	0.010



8.2. 99% BANDWIDTH

LIMITS

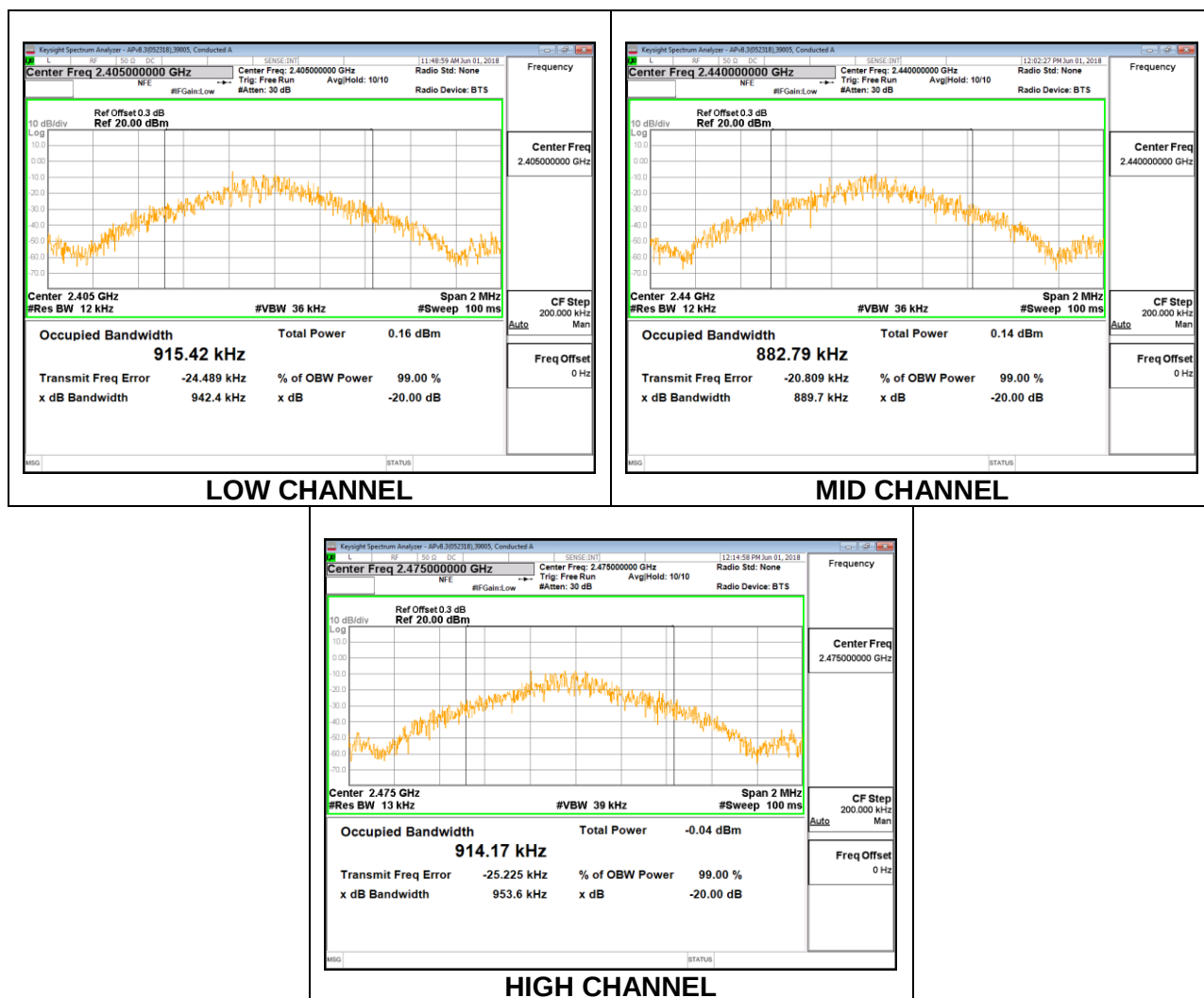
None; for reporting purposes only.

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)	99% Bandwidth (KHz)
Low	2405	915.42
Mid	2440	882.79
High	2475	914.17



8.3. 20dB BANDWIDTH

LIMITS

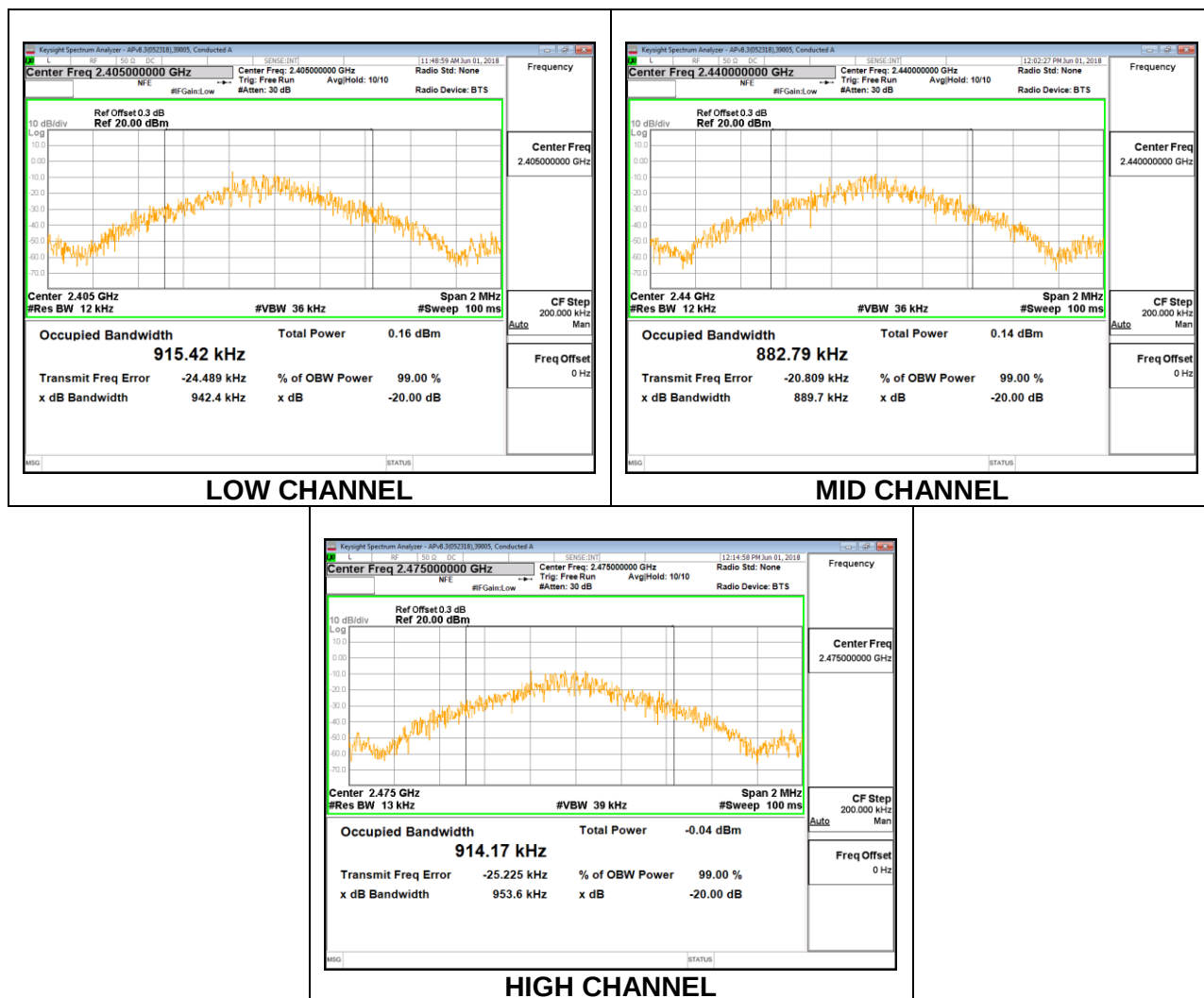
None; for reporting purposes only.

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	2405	942.4
Middle	2440	889.7
High	2475	953.6



9. RADIATED TEST RESULTS

LIMITS

FCC 15.249

FCC §15.205 and §15.209

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.

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.

TEST PROCEDURE

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

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

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

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T (10 Hz) video bandwidth with peak detector for average measurements.

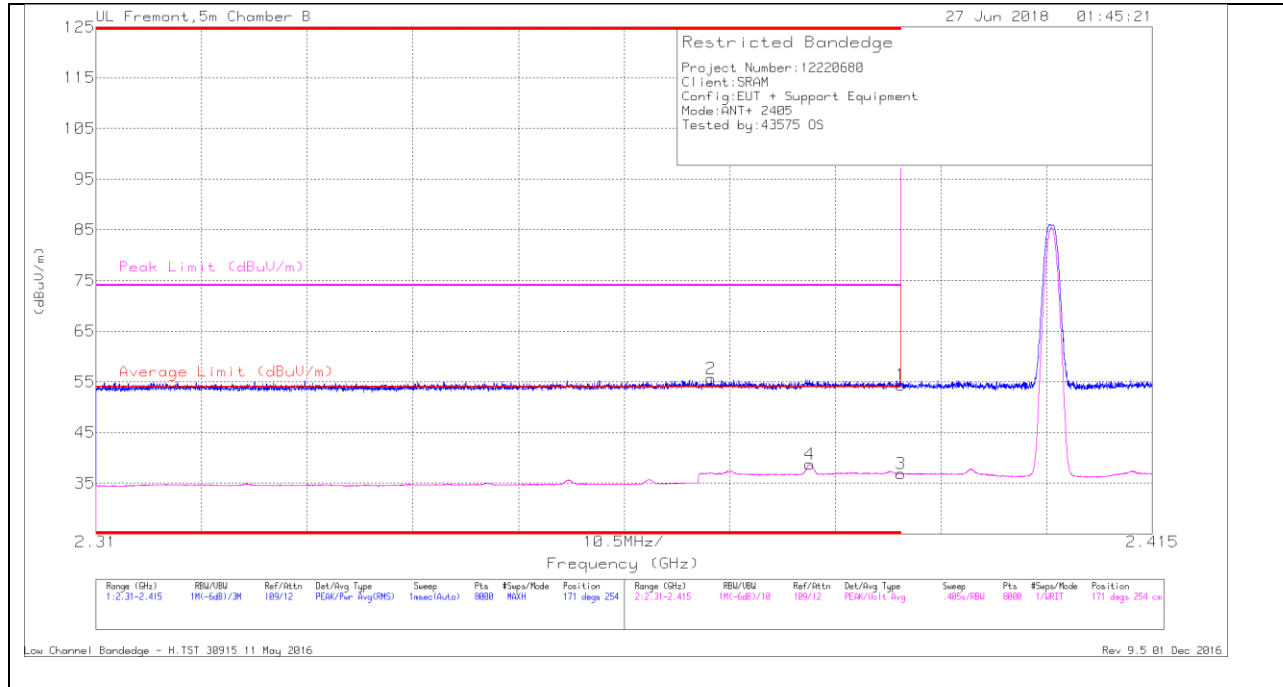
The spectrum from 1 GHz to 18 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band. Below 1GHz and above 18GHz emissions, the channel with the highest output power was tested.

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

9.1. TRANSMITTER ABOVE 1 GHz

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Trace Markers

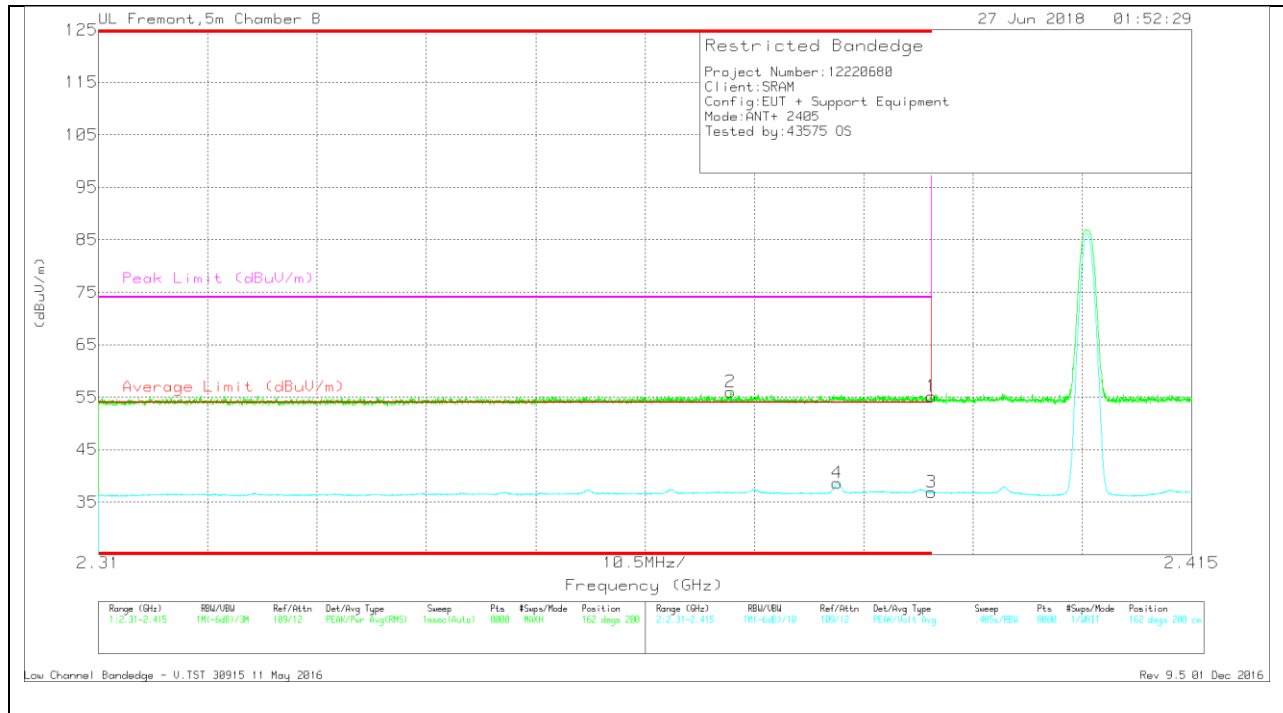
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T407 (dB)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	44.13	Pk	31.8	-21.5	54.43	-	-	74	-19.57	171	254	H
2	* 2.371	45.24	Pk	31.7	-21.3	55.64	-	-	74	-18.36	171	254	H
3	* 2.39	26.6	VA1T	31.8	-21.5	36.9	54	-17.1	-	-	171	254	H
4	* 2.381	28.5	VA1T	31.7	-21.5	38.7	54	-15.3	-	-	171	254	H

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

Pk - Peak detector

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T407 (dB)	Amp/Cb/Filt/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 2.371	45.61	Pk	31.7	-21.3	56.01	-	-	74	-17.99	162	200	V
4	* 2.381	28.39	VA1T	31.7	-21.5	38.59	54	-15.41	-	-	162	200	V
1	* 2.39	44.83	Pk	31.8	-21.5	55.13	-	-	74	-18.87	162	200	V
3	* 2.39	26.58	VA1T	31.8	-21.5	36.88	54	-17.12	-	-	162	200	V

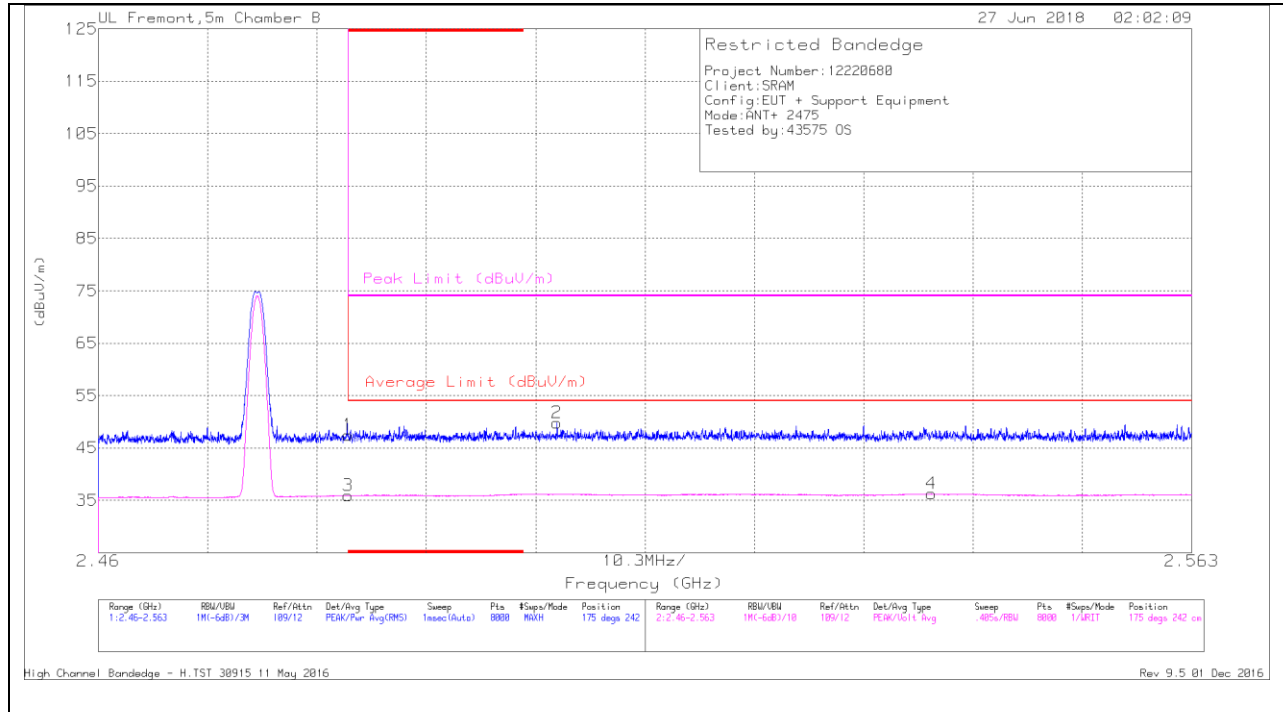
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Trace Markers

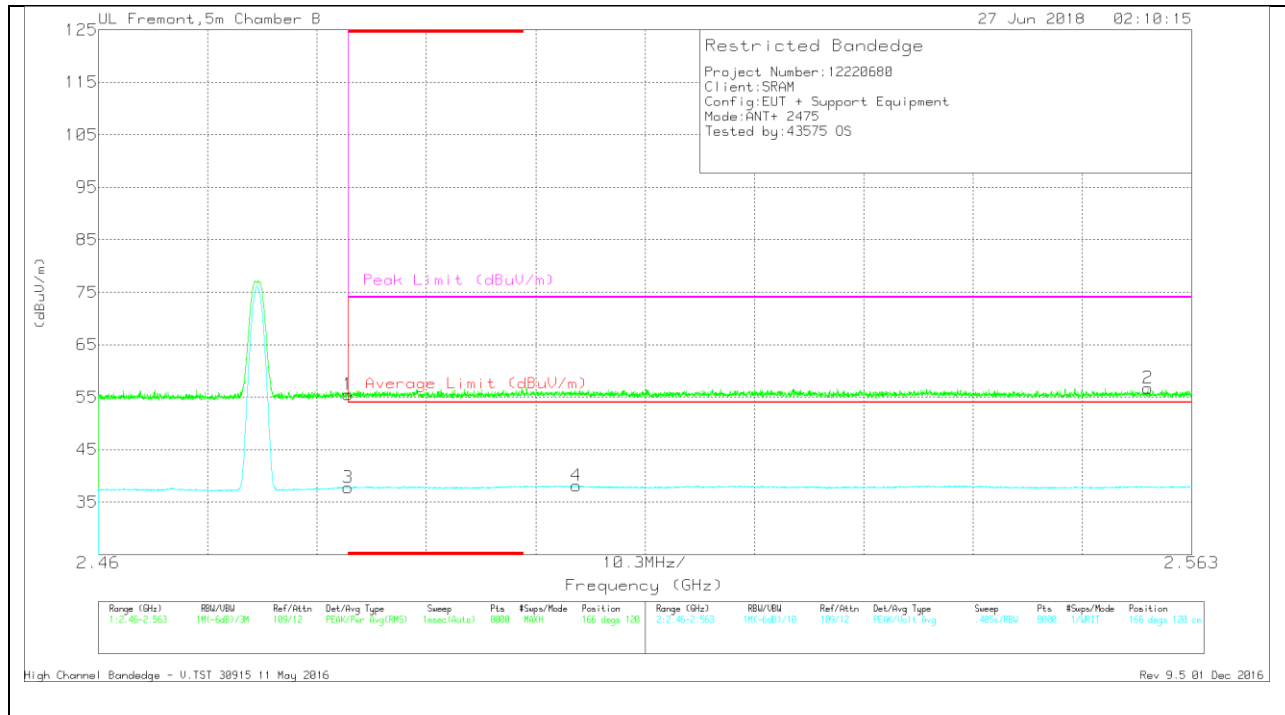
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T407 (dB)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	36.57	Pk	32.4	-21.5	47.47	-	-	74	-26.53	175	242	H
3	* 2.484	24.99	VA1T	32.4	-21.5	35.89	54	-18.11	-	-	175	242	H
2	2.503	38.73	Pk	32.5	-21.4	49.83	-	-	74	-24.17	175	242	H
4	2.538	25.11	VA1T	32.3	-21.2	36.21	54	-17.79	-	-	175	242	H

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

Pk - Peak detector

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T407 (dB)	Amp/Cb/Filt/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	44.57	Pk	32.4	-21.5	55.47	-	-	74	-18.53	166	120	V
3	* 2.484	26.9	VA1T	32.4	-21.5	37.8	54	-16.2	-	-	166	120	V
4	2.505	26.99	VA1T	32.5	-21.4	38.09	54	-15.91	-	-	166	120	V
2	2.559	45.68	Pk	32.4	-21.3	56.78	-	-	74	-17.22	166	120	V

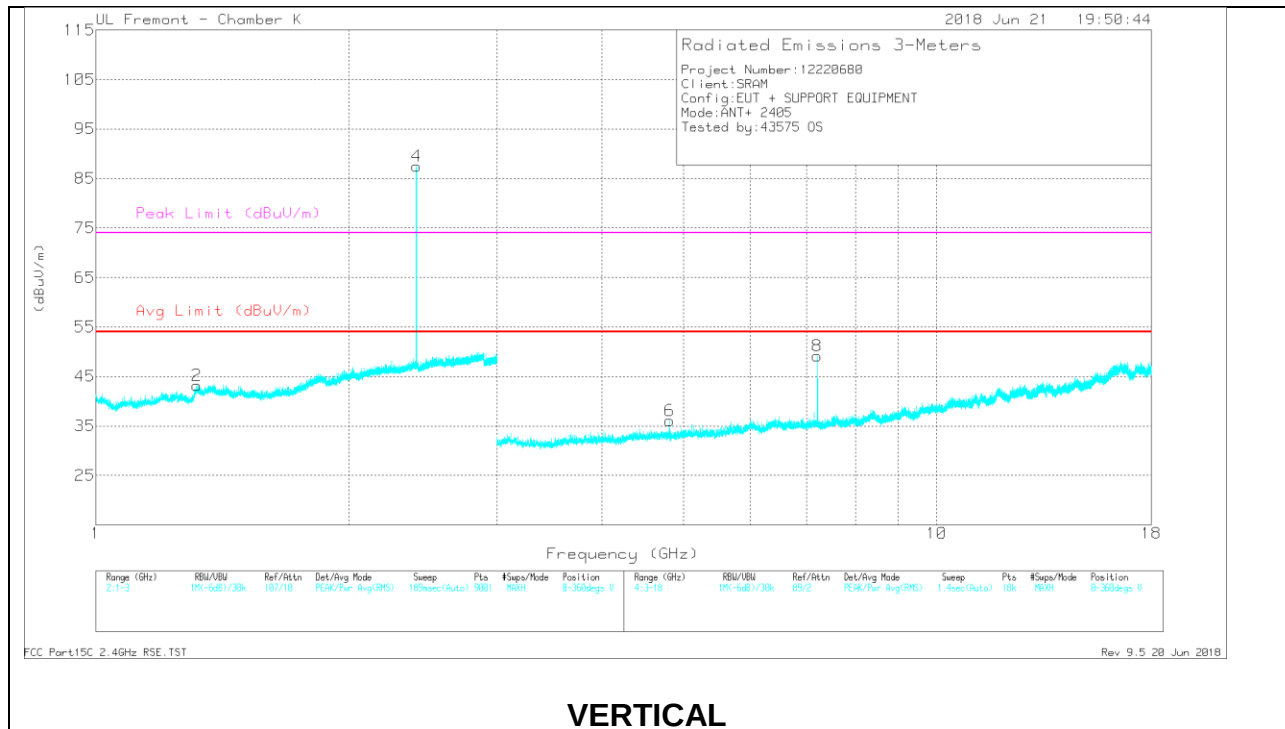
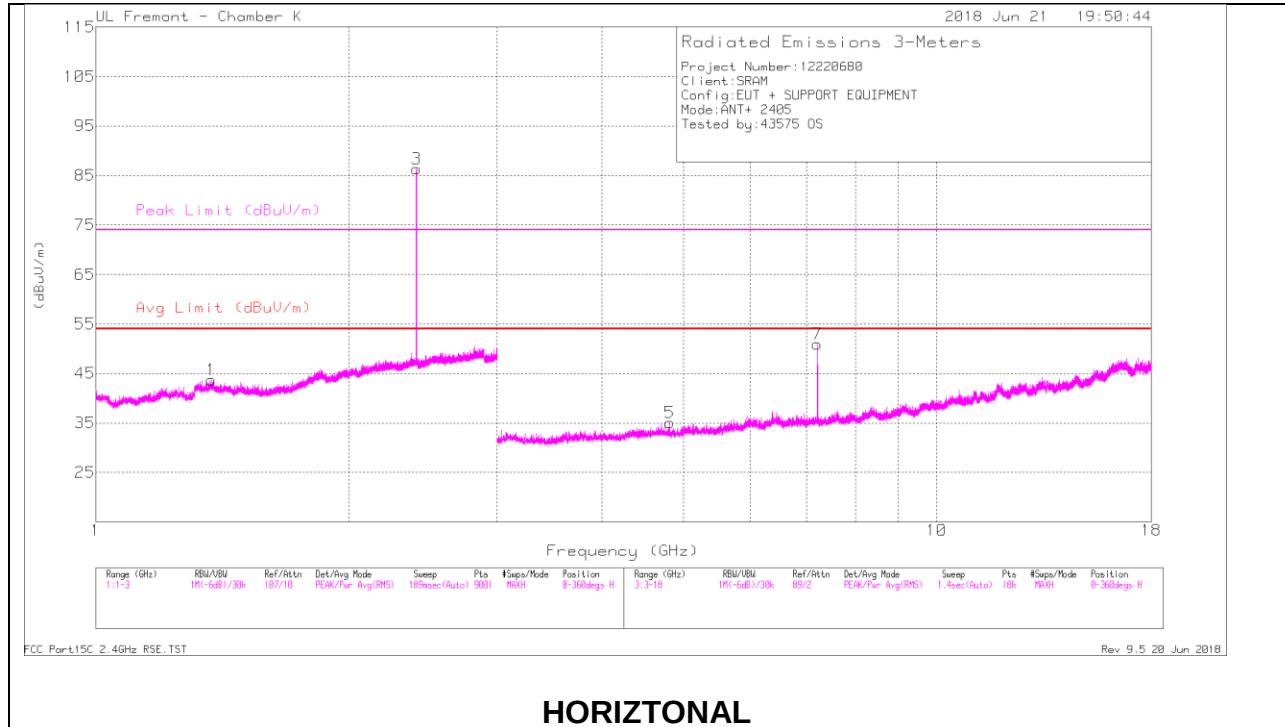
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



RADIATED EMISSIONS

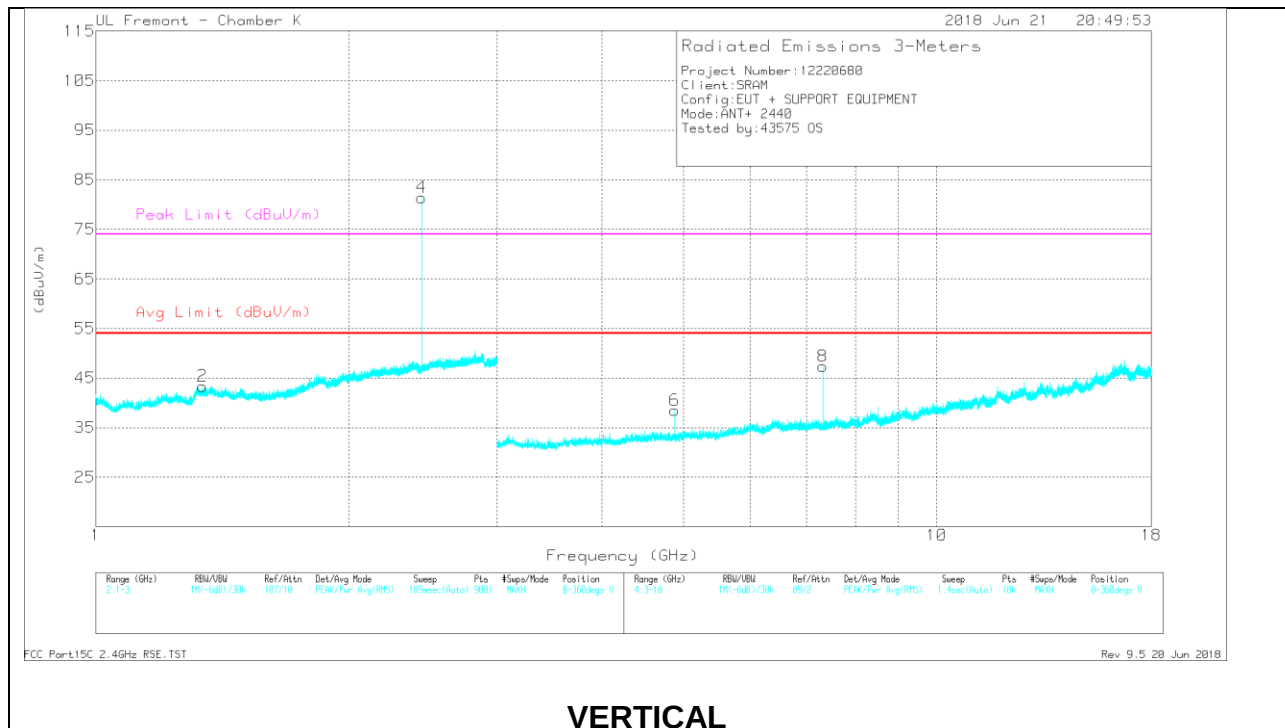
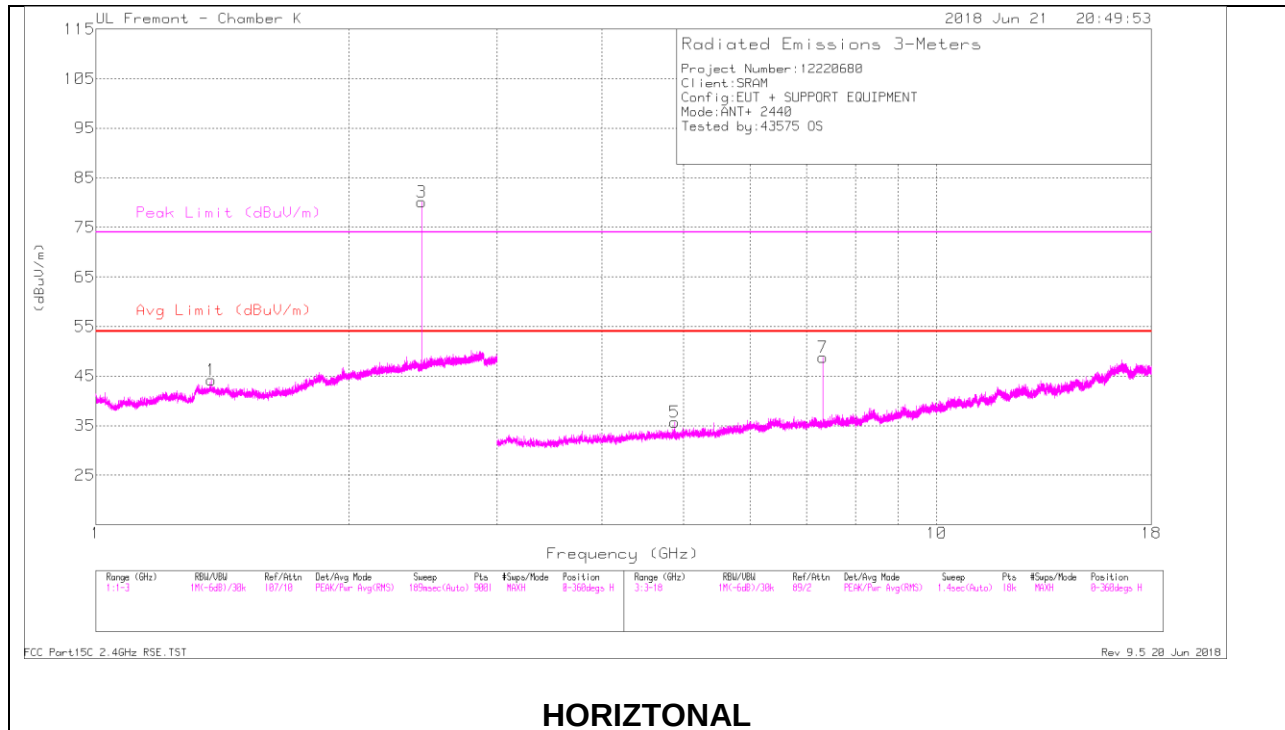
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T407 (dB)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.373	31.88	PKFH	29.2	-9.8	51.28	-	-	74	-22.72	141	200	H
* 1.373	18.27	VA1T	29.2	-9.8	37.67	54	-16.33	-	-	141	200	H
* 1.32	31.65	PKFH	29	-9.9	50.75	-	-	74	-23.25	123	102	V
* 1.32	18.56	VA1T	29	-9.9	37.66	54	-16.34	-	-	123	102	V
* 4.81	40.9	PKFH	34.2	-31	44.1	-	-	74	-29.9	336	180	H
* 4.81	30.79	VA1T	34.2	-31	33.99	54	-20.01	-	-	336	180	H
7.215	46.19	PKFH	35.5	-26.8	54.89	-	-	74	-19.11	152	185	H
7.215	40.74	VA1T	35.5	-26.8	49.44	54	-4.56	-	-	152	185	H
* 4.81	41.33	PKFH	34.2	-31	44.53	-	-	74	-29.47	69	105	V
* 4.81	31.35	VA1T	34.2	-31	34.55	54	-19.45	-	-	69	105	V
7.214	44.7	PKFH	35.5	-26.8	53.4	-	-	74	-20.6	130	123	V
7.215	38.82	VA1T	35.5	-26.8	47.52	54	-6.48	-	-	130	123	V

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

PKFH - FHSS: RB=100k/1MHz VB=3 x RB, Peak

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

MID CHANNEL RESULTS



RADIATED EMISSIONS

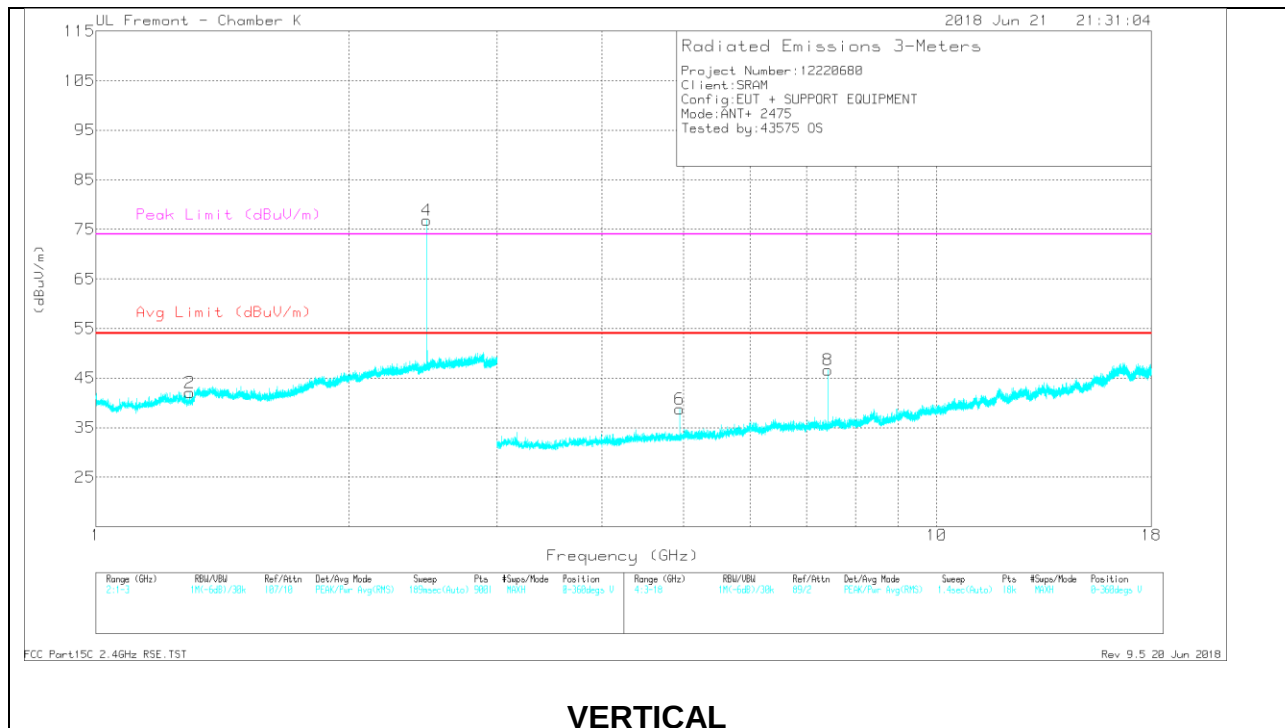
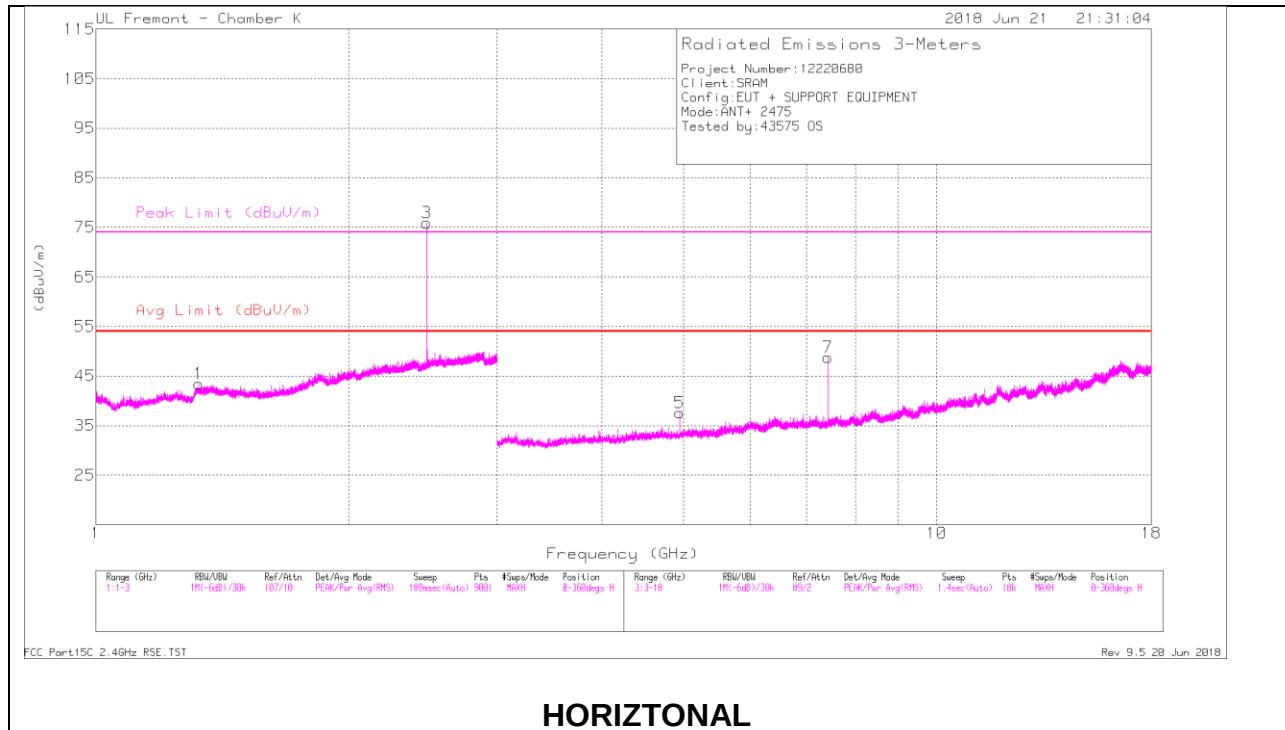
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T407 (dB)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.374	31.42	PKFH	29.2	-9.8	50.82	-	-	74	-23.18	173	103	H
* 1.375	18.28	VA1T	29.2	-9.8	37.68	54	-16.32	-	-	173	103	H
* 1.34	31.48	PKFH	29.3	-9.8	50.98	-	-	74	-23.02	240	102	V
* 1.342	17.7	VA1T	29.3	-9.8	37.2	54	-16.8	-	-	240	102	V
* 4.88	41.09	PKFH	34.1	-31	44.19	-	-	74	-29.81	54	108	H
* 4.88	31.87	VA1T	34.1	-31	34.97	54	-19.03	-	-	54	108	H
* 7.32	44.51	PKFH	35.5	-26.9	53.11	-	-	74	-20.89	166	210	H
* 7.32	38.34	VA1T	35.5	-26.9	46.94	54	-7.06	-	-	166	210	H
* 4.881	39.29	PKFH	34.1	-31	42.39	-	-	74	-31.61	359	275	V
* 4.88	28.18	VA1T	34.1	-31	31.28	54	-22.72	-	-	359	275	V
* 7.32	43.81	PKFH	35.5	-26.9	52.41	-	-	74	-21.59	142	104	V
* 7.32	37.08	VA1T	35.5	-26.9	45.68	54	-8.32	-	-	142	104	V

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

PKFH - FHSS: RB=100k/1MHz VB=3 x RB, Peak

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

HIGH CHANNEL RESULTS



RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T407 (dB)	Amp/Cb/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.326	31.72	PKFH	29.1	-10	50.82	-	-	74	-23.18	194	200	H
* 1.326	18.38	VA1T	29.1	-10	37.48	54	-16.52	-	-	194	200	H
* 1.293	30.8	PKFH	28.7	-10	49.5	-	-	74	-24.5	266	201	V
* 1.295	16.99	VA1T	28.7	-10	35.69	54	-18.31	-	-	266	201	V
* 4.95	41.55	PKFH	34.2	-31.1	44.65	-	-	74	-29.35	35	107	H
* 4.95	32.83	VA1T	34.2	-31.1	35.93	54	-18.07	-	-	35	107	H
* 7.424	43.39	PKFH	35.5	-26.9	51.99	-	-	74	-22.01	165	166	H
* 7.425	36.36	VA1T	35.5	-26.9	44.96	54	-9.04	-	-	165	166	H
* 4.95	42.52	PKFH	34.2	-31.1	45.62	-	-	74	-28.38	355	143	V
* 4.95	34.75	VA1T	34.2	-31.1	37.85	54	-16.15	-	-	355	143	V
* 7.424	42.29	PKFH	35.5	-26.9	50.89	-	-	74	-23.11	142	105	V
* 7.425	35.51	VA1T	35.5	-26.9	44.11	54	-9.89	-	-	142	105	V

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

PKFH - FHSS: RB=100k/1MHz VB=3 x RB, Peak

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

9.2. FUNDAMENTAL FREQUENCY RADIATED EMISSION

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T407 (dB)	Amp/Cbl/FI tr/Pad (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	62.69	PKFH	32	-7.8	86.89	-	-	114	-27.11	359	190	H
	62.06	VA1T	32	-7.8	86.26	94	-7.74	-	-	359	190	H
	63.55	PKFH	32	-7.8	87.75	-	-	114	-26.25	347	109	V
	62.93	VA1T	32	-7.8	87.13	94	-6.87	-	-	347	109	V
2440	56.65	PKFH	32.2	-7.6	81.25	-	-	114	-32.75	355	321	H
	55.98	VA1T	32.2	-7.6	80.58	94	-13.42	-	-	355	321	H
	57.58	PKFH	32.2	-7.6	82.18	-	-	114	-31.82	331	100	V
	56.91	VA1T	32.2	-7.6	81.51	94	-12.49	-	-	331	100	V
2475	52.6	PKFH	32.3	-7.7	77.2	-	-	114	-36.8	356	280	H
	51.77	VA1T	32.3	-7.7	76.37	94	-17.63	-	-	356	280	H
	53.25	PKFH	32.3	-7.7	77.85	-	-	114	-36.15	349	136	V
	52.28	VA1T	32.3	-7.7	76.88	94	-17.12	-	-	349	136	V

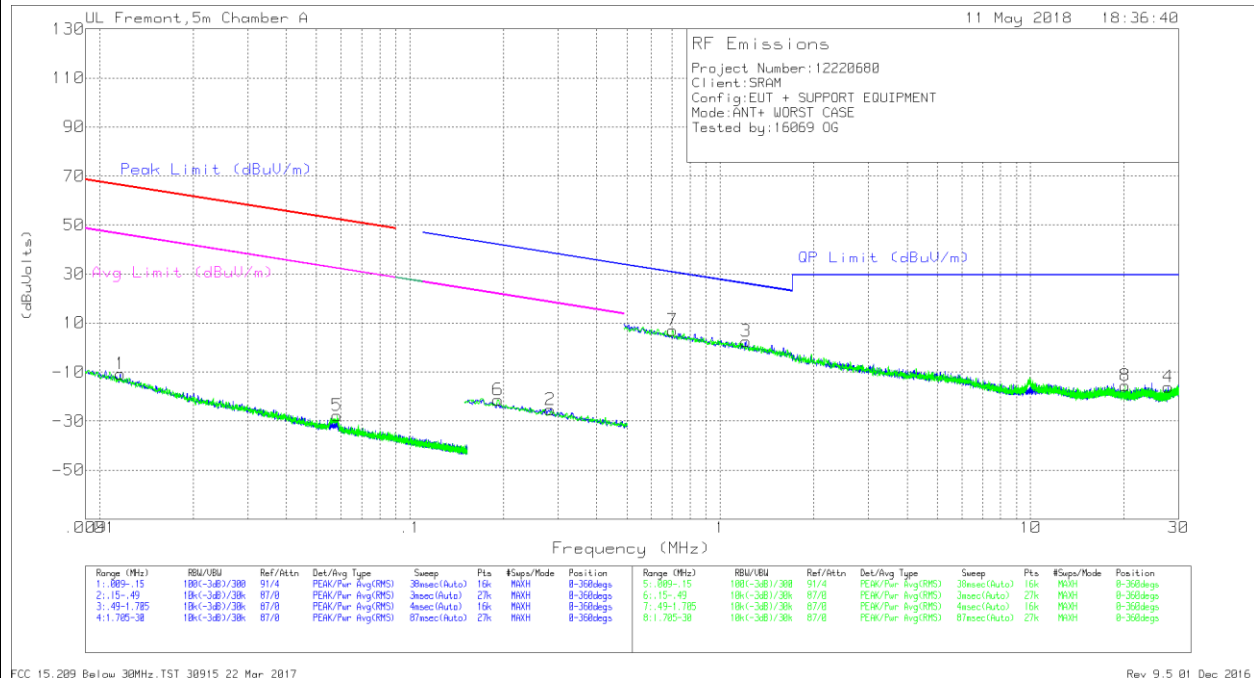
PKFH - FHSS: RB=1MHz VB=3 x RB, Peak

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

9.3. WORSE CASE BELOW 30MHz

SPURIOUS EMISSIONS BELOW 30 MHz (WORST-CASE CONFIGURATION)

FACE ON AND FACE OFF PLOTS



NOTE: KDB 414788 OATS and Chamber Correlation Justification

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

Below 30MHz DATA

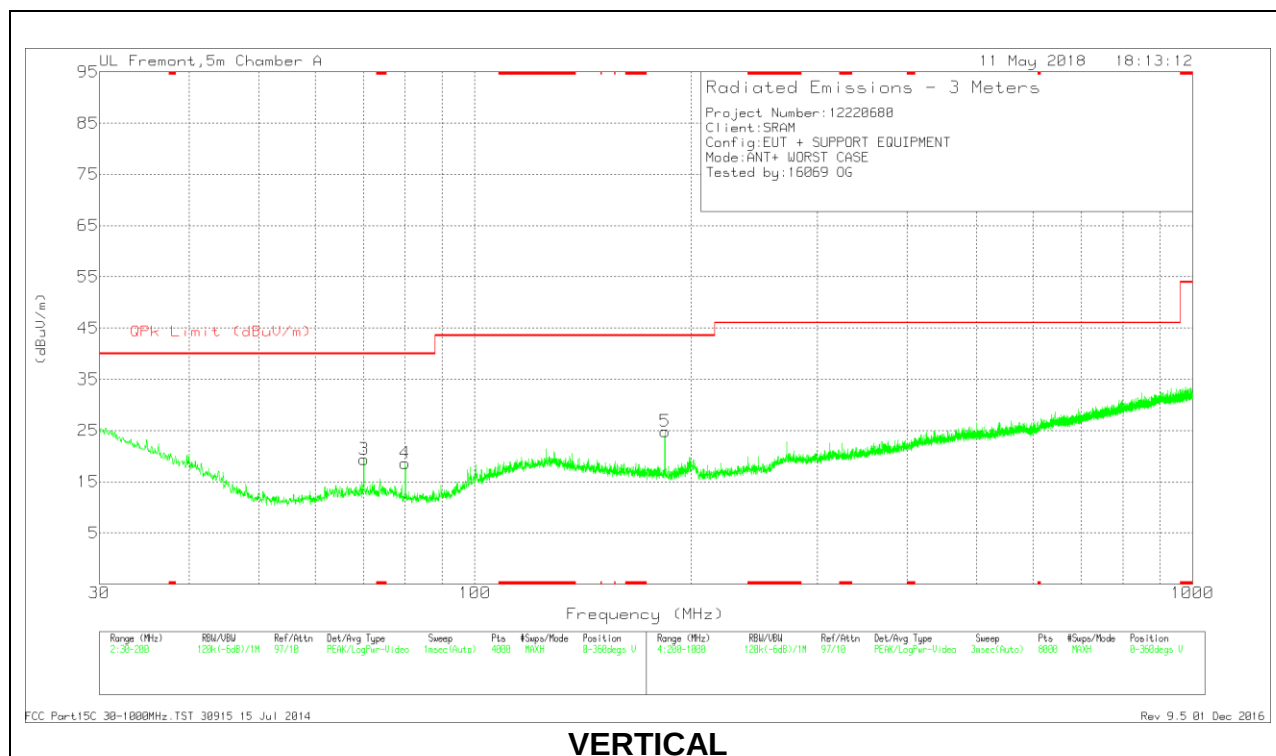
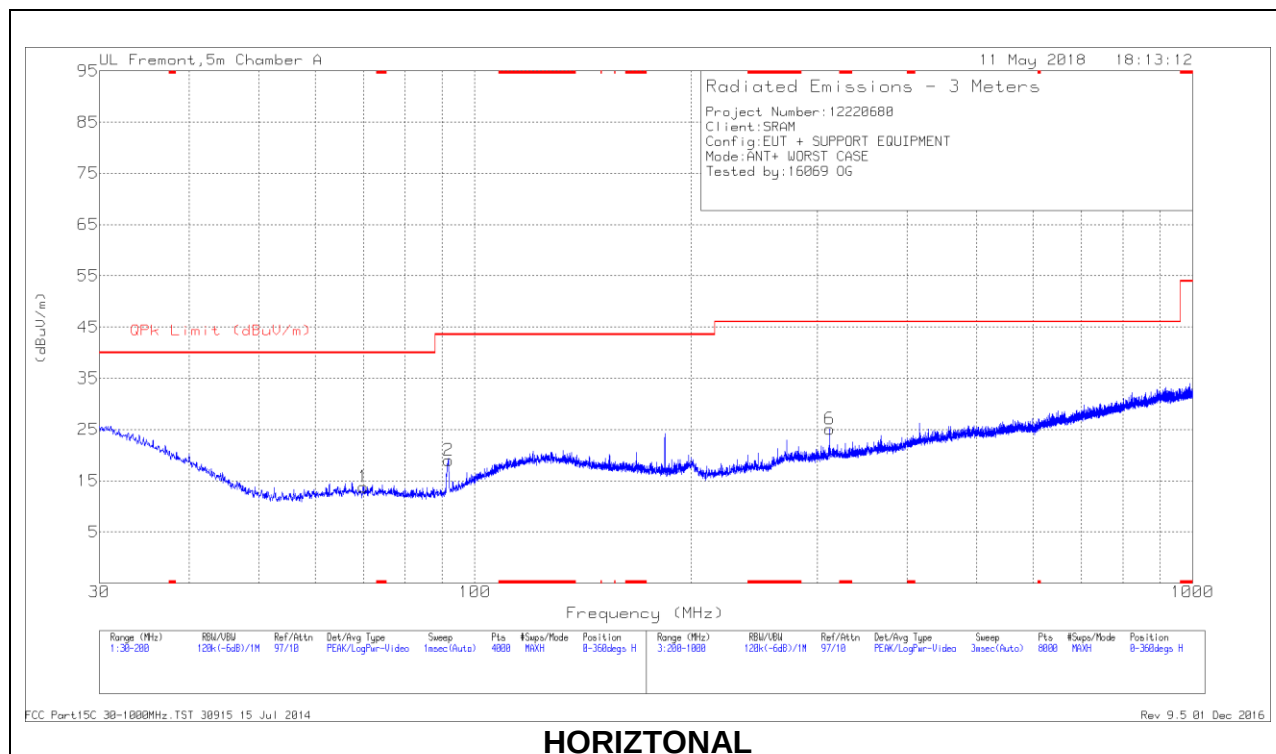
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cbl (dB)	Dist Corr 300m	Corrected Reading (dBuVolts)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	.01166	51.14	Pk	18	.1	-80	-10.76	66.25	-77.01	46.25	-57.01	-	-	-	-	0-360
5	.05821	40.42	Pk	11.8	.1	-80	-27.68	52.28	-79.96	32.28	-59.96	-	-	-	-	0-360
6	.19217	47.47	Pk	11	.1	-80	-21.43	-	-	-	-	41.95	-63.38	21.95	-43.38	0-360
2	.28307	43.5	Pk	10.9	.1	-80	-25.5	-	-	-	-	38.57	-64.07	18.57	-44.07	0-360

Pk - Peak detector

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cbl (dB)	Dist Corr 30m	Corrected Reading (dBuVolts)	QP Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
7	.70196	35.97	Pk	11	.1	-40	7.07	30.69	-23.62	-	-	-	-	0-360
3	1.21075	30.94	Pk	11.3	.2	-40	2.44	25.97	-23.53	-	-	-	-	0-360
8	20.17076	12.74	Pk	10.9	.7	-40	-15.66	29.5	-45.16	-	-	-	-	0-360
4	27.77505	13.18	Pk	9.9	.8	-40	-16.12	29.5	-45.62	-	-	-	-	0-360

Pk - Peak detector

9.4. WORST CASE BELOW 1GHz

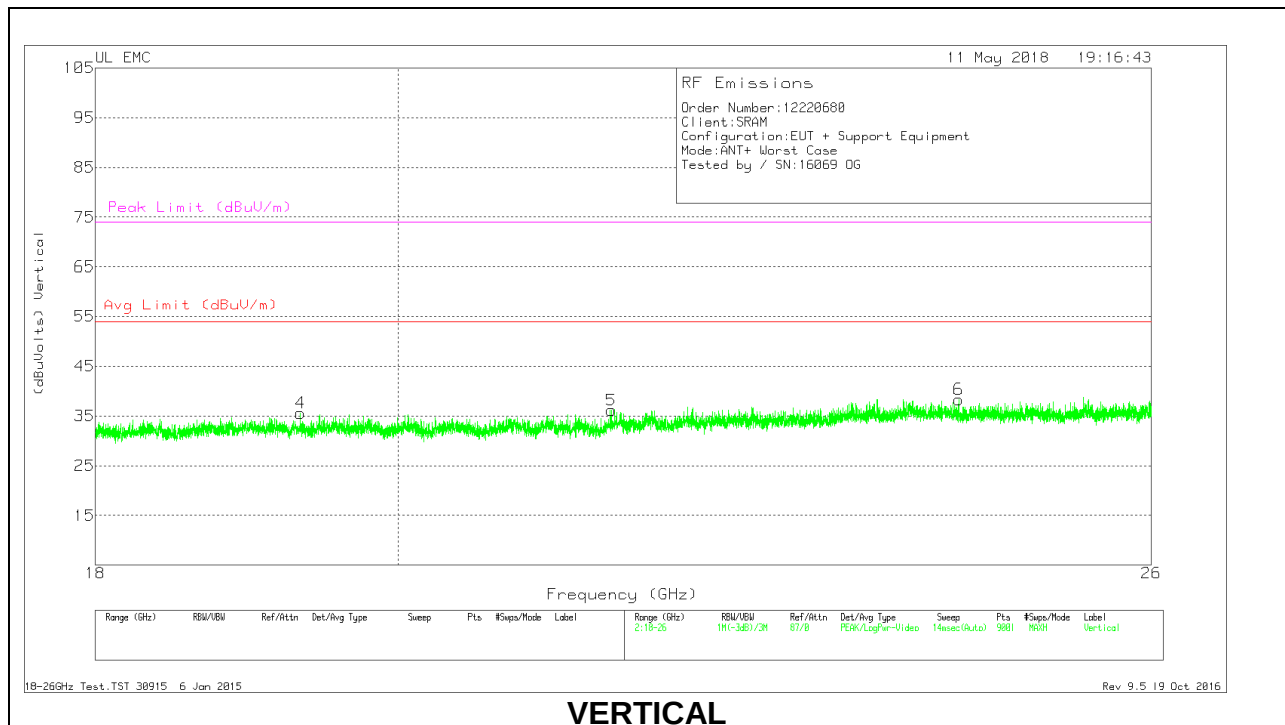
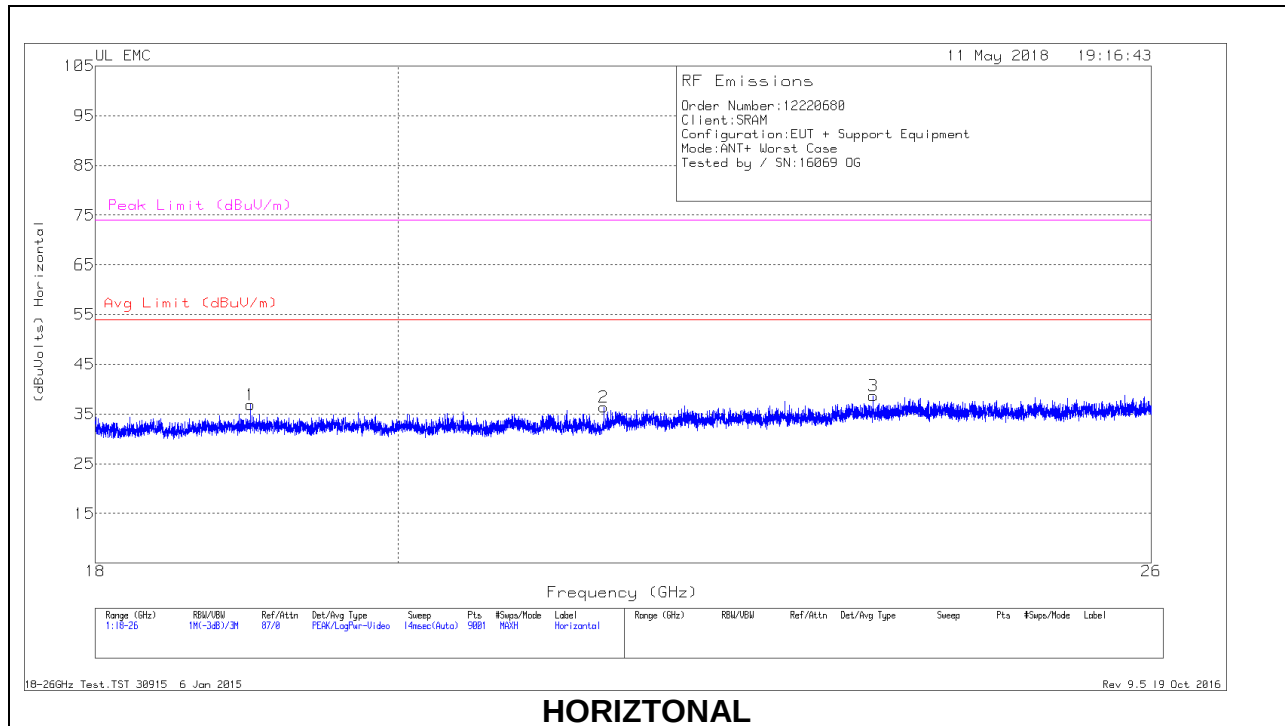


Below 1GHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T130 (dB/m)	Amp/Cbl (dB/m)	DC Corr (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	69.9178	28.43	Pk	12.1	-26.7	0	13.83	40	-26.17	0-360	200	H
3	70.0454	34	Pk	12.1	-26.7	0	19.4	40	-20.6	0-360	100	V
4	79.9929	33.69	Pk	11.5	-26.6	0	18.59	40	-21.41	0-360	100	V
2	91.9385	33.41	Pk	12.1	-26.5	0	19.01	43.52	-24.51	0-360	300	H
5	184.0174	35.26	Pk	15.1	-25.5	0	24.86	43.52	-18.66	0-360	100	V
6	312.0146	31.92	Pk	17.8	-24.6	0	25.12	46.02	-20.9	0-360	101	H

Pk - Peak detector

9.5. WORST CASE 18-26 GHz



18 – 26GHz DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T449 AF (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	18.999	38.7	Pk	32.5	-24.8	-9.5	36.9	54	-17.1	74	-37.1
2	21.485	38	Pk	33.2	-25.3	-9.5	36.4	54	-17.6	74	-37.6
3	23.6	38.24	Pk	33.9	-24	-9.5	38.64	54	-15.36	74	-35.36
4	19.332	37.37	Pk	32.6	-24.9	-9.5	35.57	54	-18.43	74	-38.43
5	21.543	37.76	Pk	33.2	-25.3	-9.5	36.16	54	-17.84	74	-37.84
6	24.312	38.3	Pk	33.9	-24.4	-9.5	38.3	54	-15.7	74	-35.7

Pk - Peak detector