



CERTIFICATION TEST REPORT

Report Number. : 12584419-E1V4

Applicant : Semiconductor Components Industries LLC
5005 E McDowell Rd.
Phoenix, AZ 85008 UNITED STATES

Model : SPSPRDR1-8NA

FCC ID : 2AQW8SPSPRDR1-8

IC ID : 24422-SPSPRDR18

EUT Description : UHF RFID Reader

Test Standard(s) : FCC 47 CFR PART 15 SUBPART C
ISED RSS-247 ISSUE 2
ISED RSS-GEN ISSUE 5

Date Of Issue:
February 01, 2019

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NVLAP Lab code: 200065-0

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	01/16/19	Initial Issue	--
V2	01/28/19	Revised Company name and FCC grantee code	S. Kuwatani
V3	01/29/19	Updated Power	T. Pham
V4	02/01/19	Addressed TCB comments	T. Pham

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SEMICONDUCTOR COMPONENTS INDUSTRIES LLC
5005 E MCDOWELL RD
PHOENIX, AZ 85008 USA

EUT DESCRIPTION: UHF RFID Reader

MODEL: SPSPRDR1-8NA

SERIAL NUMBER: 3218527017590P1+

DATE TESTED: 11-8-18 to 12-3-18

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Complies
ISED RSS-247 Issue 2	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. 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 NVLAP, NIST, any agency of the Federal Government, or any agency of the U.S. government.

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UL Verification Services Inc.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 5, RSS-247, and ANSI C63.10-2013.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, and 47658 Kato Road, 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	47658 Kato Rd.
<input type="checkbox"/> Chamber A (IC:2324B-1)	<input type="checkbox"/> Chamber D (IC:22541-1)	<input type="checkbox"/> Chamber I (IC: 2324A-5)
<input type="checkbox"/> Chamber B (IC:2324B-2)	<input type="checkbox"/> Chamber E (IC:22541-2)	<input type="checkbox"/> Chamber J (IC: 2324A-6)
<input type="checkbox"/> Chamber C (IC:2324B-3)	<input type="checkbox"/> Chamber F (IC:22541-3)	<input type="checkbox"/> Chamber K (IC: 2324A-1)
	<input type="checkbox"/> Chamber G (IC:22541-4)	<input checked="" type="checkbox"/> Chamber L (IC: 2324A-3)
	<input type="checkbox"/> Chamber H (IC:22541-5)	

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers above are covered under Industry Canada company address and respective code.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
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 control node transmitter module that operates in the 902-928 MHz band. Device uses hopping technology and is categorized as a Frequency Hopping System(FHS).

5.2. MAXIMUM OUTPUT POWER

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

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
902-928	Normal	28.26	669.88

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a MTI antenna, with a maximum gain of 7.5 dBi.

5.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was 20181018001.

Software installed during test was as follows:

CertificationApp Version 20181018_001
TagReader Version 20180928_001

5.5. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 30MHz and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

Radiated emissions from 30MHz to 1GHz were performed with the EUT set to transmit at low middle and high channels.

Band edge and radiated emissions between 30MHz and 18GHz were performed with the EUT set to transmit at the highest power on low, middle and high channels.

The EUT can only be setup in desktop orientation, therefor all radiated testing was performed with the EUT in desktop orientation.

Preliminary testing (power measurement and radiated spurious and harmonics) was performed on the 8 antenna ports and port 2 was found to be worst case. Therefore, all testing was done using port 2. Preliminary testing on three antennas were conducted to determine worst case and the MTI antenna was found to be worst case. Therefore all testing was done using the MTI antenna.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Lenovo	TYPE 4243-5UU	R9-PKF4Z	-
Laptop Adapter	Lenovo	42T4438	36200150	-
AC adapter	CUI INC	SMI18-12	SMI18-12-V-P6	-

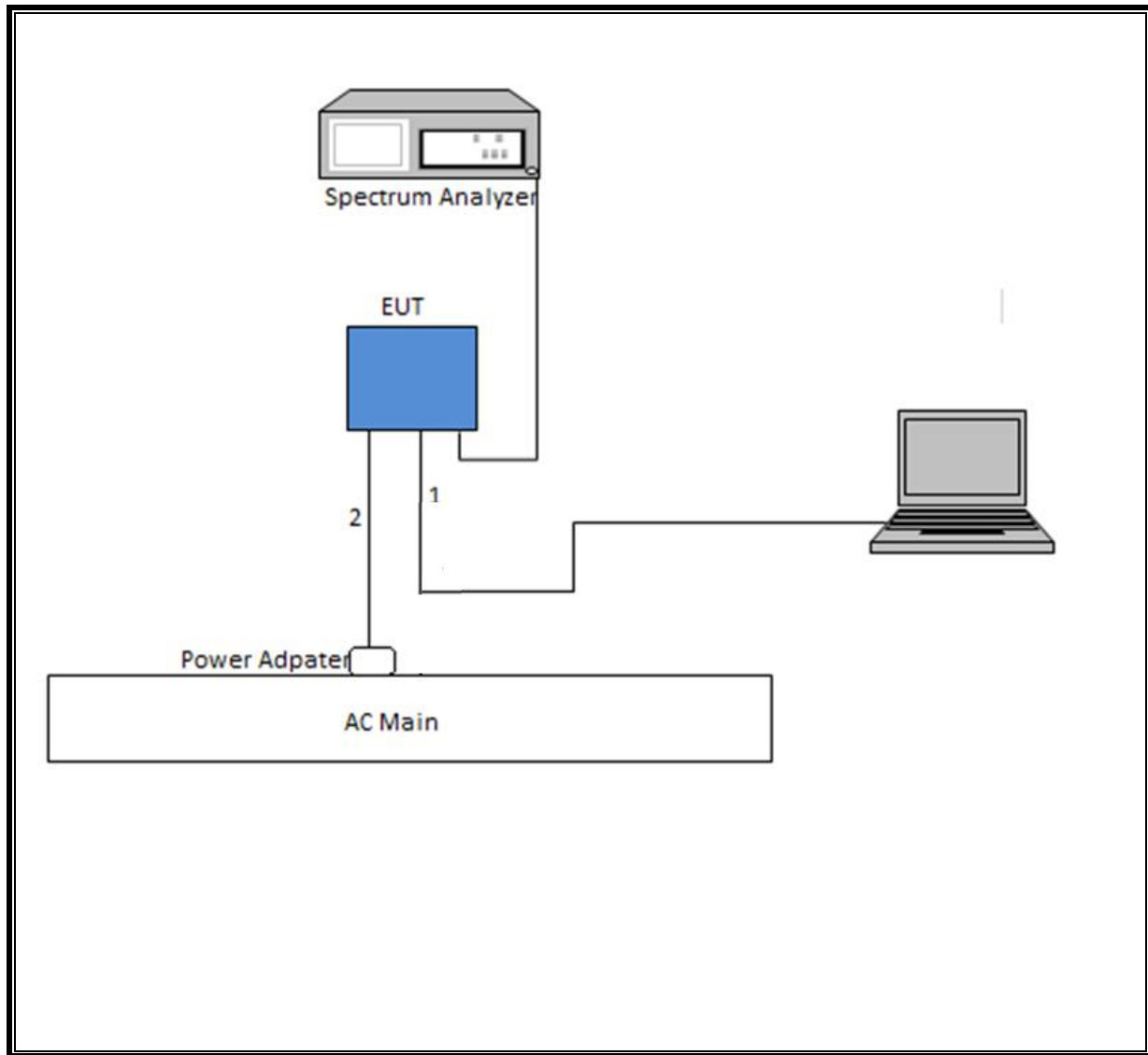
I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	Ethernet	1	Ethernet	Unshielded	>3	
2	DC	1	DC	Shielded	1	

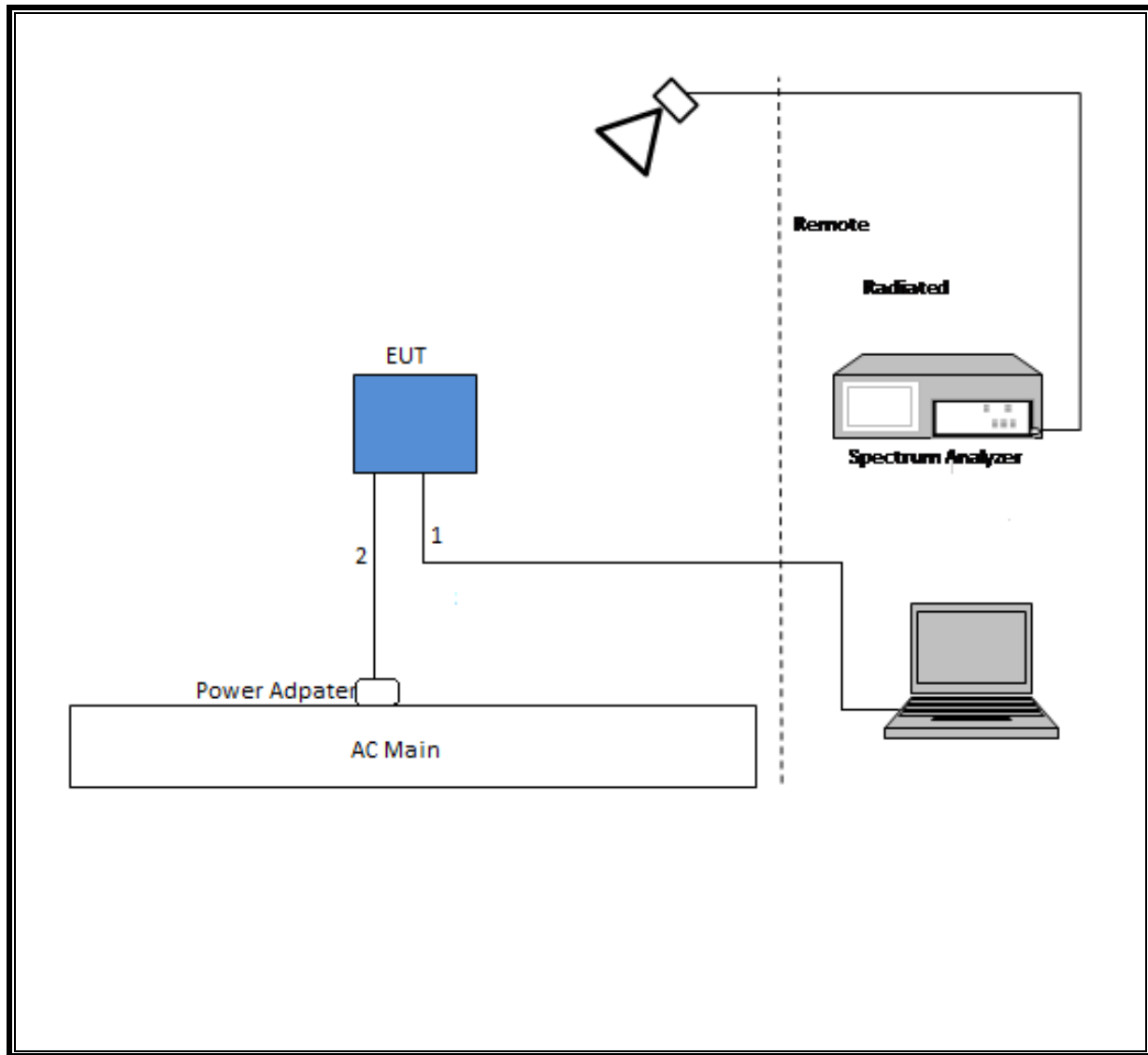
TEST SETUP

The EUT is connected to a support laptop. The customer provided test software to exercise the EUT during test.

SETUP DIAGRAM FOR CONDUCTED TESTS



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
EMI Test Receiver	Rohde&Schwarz	ESR	1436	02/23/2019	02/23/2018
Transient Limiter	COM-POWER	LIT-930	1457	03/01/2019	03/01/2018
L.I.S.N	FCC INC.	FCC LISN 50/250	24	03/06/2019	03/06/2018
Antenna, Broadband Hybrid, 30MHz to 2000MHz	SunAR rf motion	JB3	PRE0184970	11/13/2019	11/13/2018
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T1466	04/16/2019	04/16/2018
EMI Test Receiver	Rohde & Schwarz	ESW44	PRE0179522	5/11/2019	5/11/2018
Antenna, Active Loop 9KHz to 30MHz	ETS-Lindgren	6502	T1616	10/18/2019	10/18/2018
RF Filter box 1-18GHz	--	--		6/21/2019	6/21/2018
Horn Antenna	ETS-Lindgren	3117	PRE0100034	4/30/2019	4/17/2018
Power Meter	Agilent	N1912A	T1245	5/18/2019	5/18/2018
Power Sensor	Agilent	N1912A	T1227	10/30/2019	10/30/2018

Test Software List			
Description	Manufacturer	Model	Version
Radiated Software	UL	UL EMC	Ver 9.5, December 1, 2016
Antenna Port Software	UL	UL RF	Ver 9.1, January 25, 2018

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

Number of Hopping Frequencies: ANSI C63.10-2013 Section 7.8.3

Time of Occupancy (Dwell Time): ANSI C63.10-2013 Section 7.8.4

Peak Output Power: ANSI C63.10-2013 Section 7.8.5

Conducted Spurious Emissions: ANSI C63.10-2013 Section 7.8.8

Conducted Band-Edge: ANSI C63.10-2013 Section 6.10.4

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

AC Power-line conducted emissions: ANSI C63.10-2013, Section 6.2.

8. ANTENNA PORT TEST RESULTS

8.1. ON TIME AND DUTY CYCLE

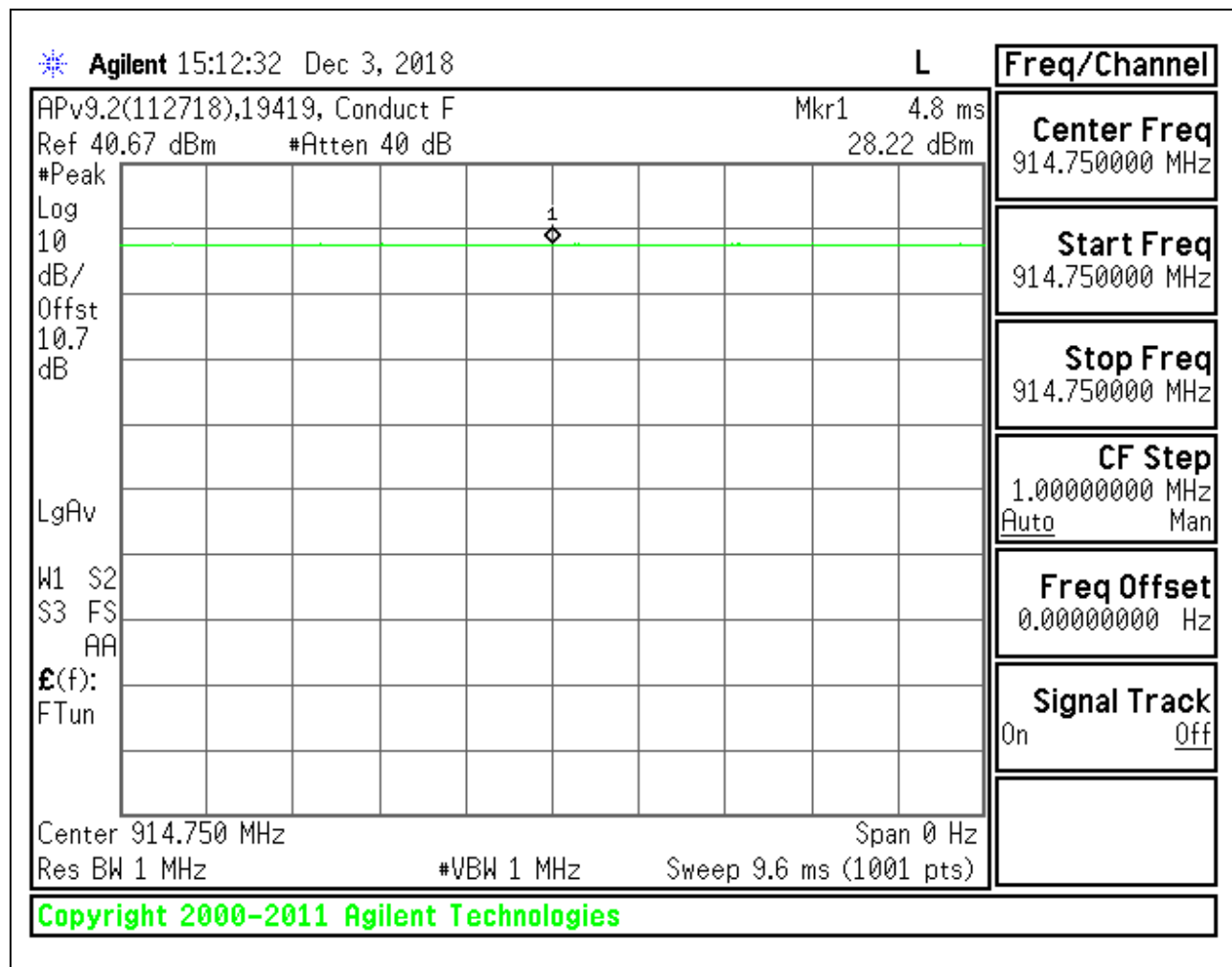
LIMITS

None; for reporting purposes only.

ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
TX	4.800	4.800	1.000	100.00%	0.00

DUTY CYCLE PLOTS



8.2. 20 dB AND 99% BANDWIDTH

LIMITS

FCC §15.247 (a) (1)(i)
RSS-247 (5.1) (c)

(i) For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (kHz)	20dB Bandwidth (kHz)	20dB Bandwidth Limit (kHz)
Low	902.75	2.427	2.852	500
Mid	915.25	2.429	2.859	500
High	927.25	2.426	2.85	500



8.3. HOPPING FREQUENCY SEPARATION

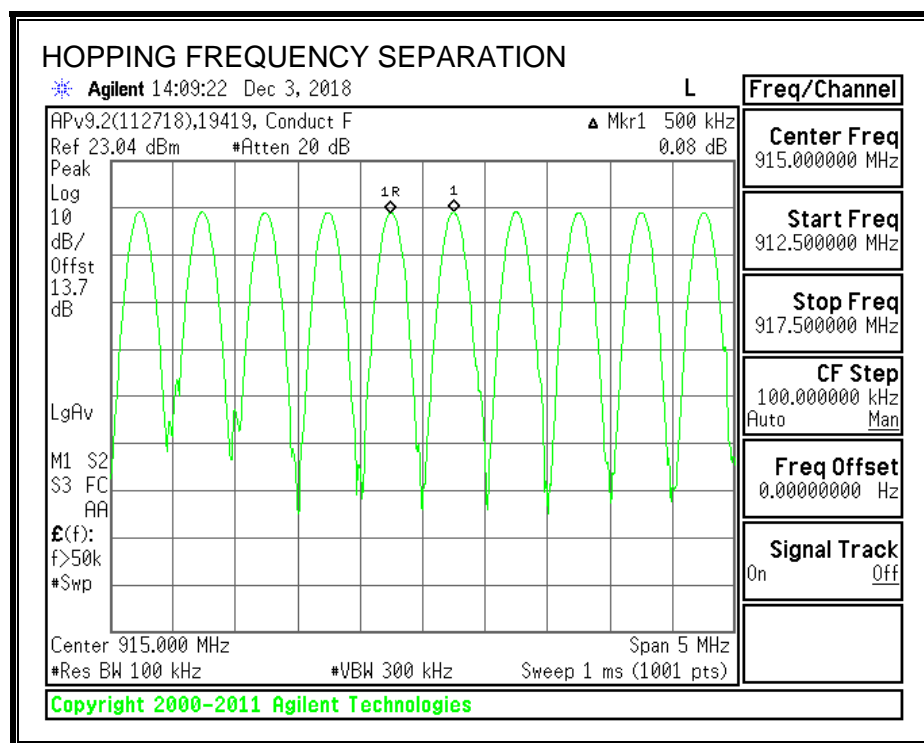
LIMIT

FCC §15.247 (a) (1)
RSS-247 (5.1) (c)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

RESULTS

HOPPING FREQUENCY SEPARATION



8.4. NUMBER OF HOPPING CHANNELS

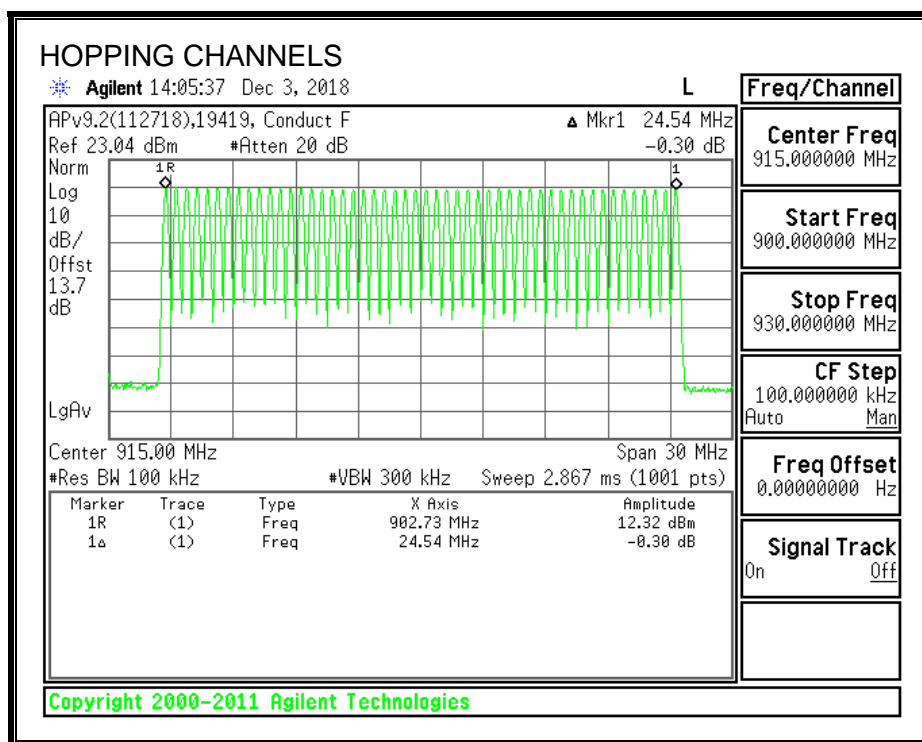
LIMITS

FCC §15.247 (a) (1) (i)
RSS-247 (5.1) (c)

For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period.

RESULTS

Normal Mode: 50 Channels observed.



8.5. AVERAGE TIME OF OCCUPANCY

LIMITS

FCC §15.247 (a) (1) (i)
RSS-247 (5.1) (c)

For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period.

RESULTS

DH Packet	Pulse 1 Width (msec)	Pulse 2 Width (msec)	Pulse 3 Width (msec)	Pulse 4 Width (msec)	Number of Pulses in 20 seconds	Average Time of Occupancy in 20 seconds (sec)	Limit (sec)	Margin (sec)
Normal	93.75	93.75	82.12	93.38	4	0.3630	0.4	-0.0370



8.6. OUTPUT POWER

LIMITS

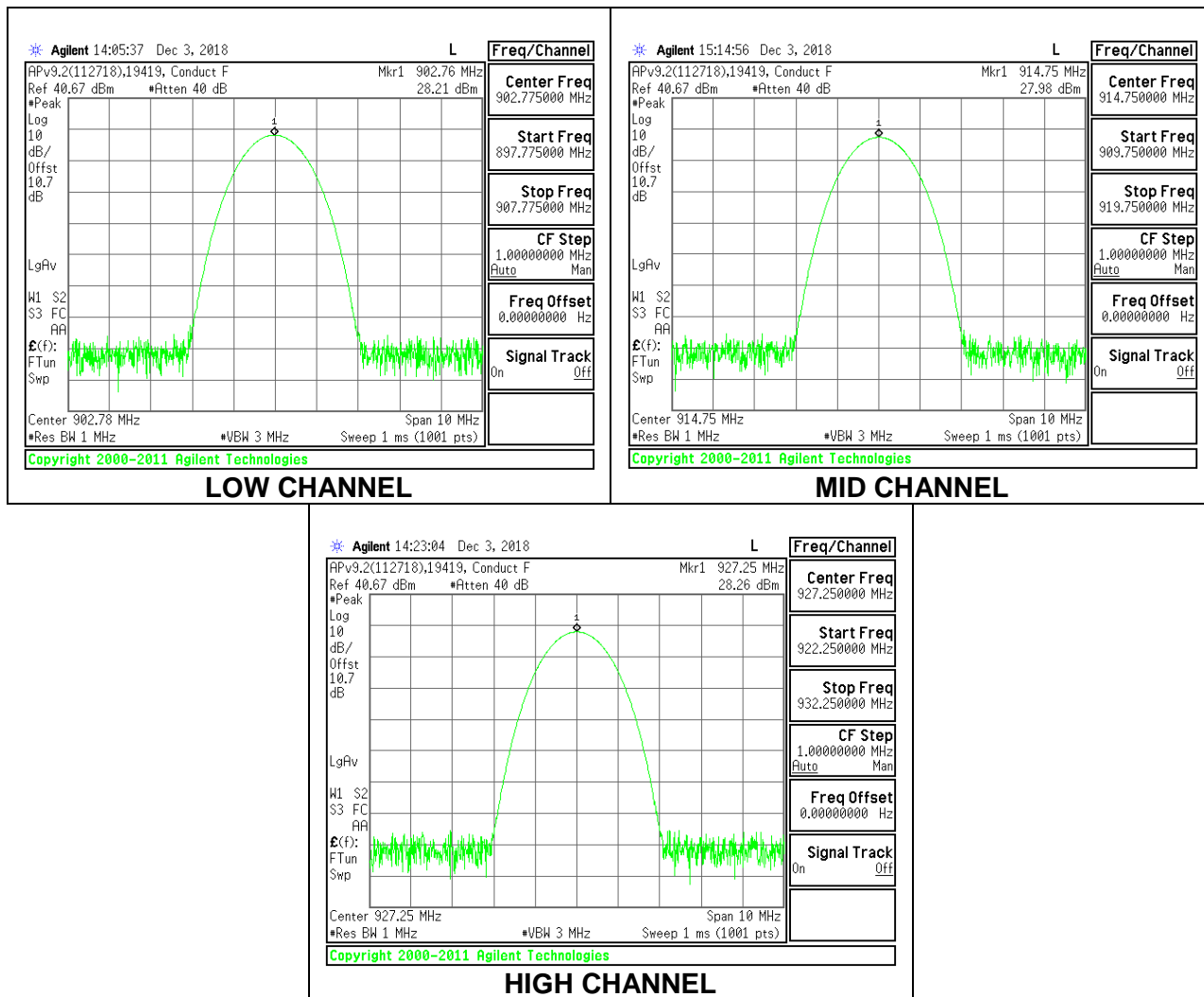
§15.247 (b) (2)
RSS-247 (5.4) (a)

(2) For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels as permitted under paragraph (a)(1)(i) of this section.

RESULTS

Tested By:	19419
Date:	12/3/2018

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	902.78	28.21	28.5	-0.29
Middle	914.75	27.98	28.5	-0.52
High	927.25	28.26	28.5	-0.24



8.7. CONDUCTED SPURIOUS EMISSIONS

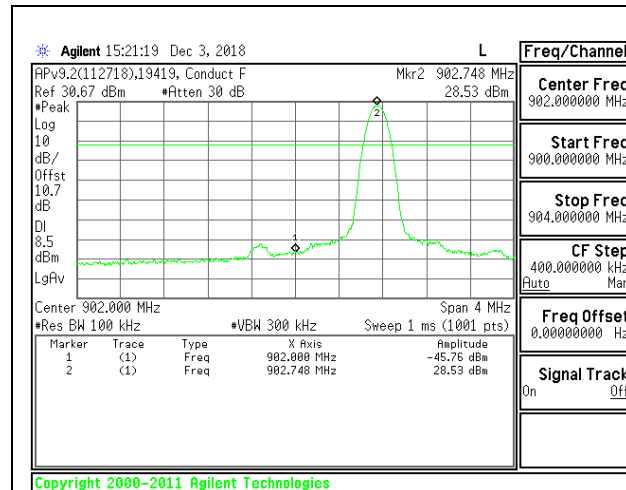
LIMITS

FCC §15.247 (d)
RSS-247 5.5

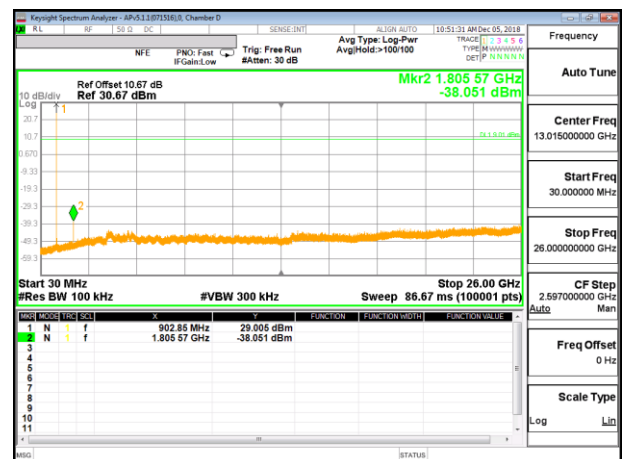
Limit = -20 dBc

RESULTS

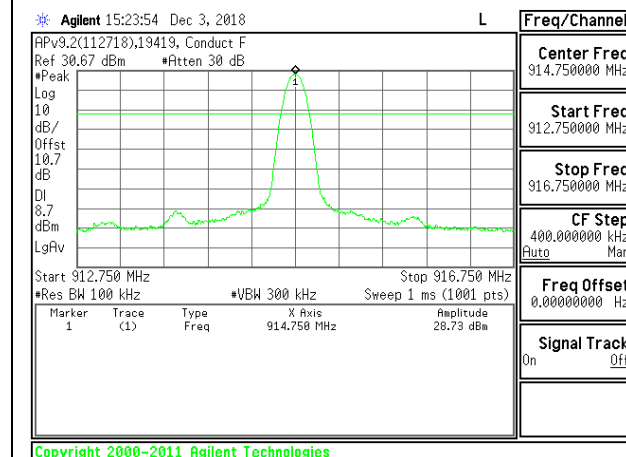
SPURIOUS EMISSIONS, NON-HOPPING



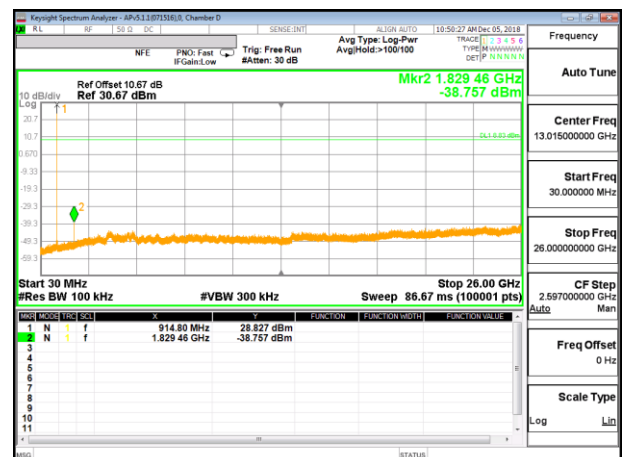
LOW CHANNEL BANDEDGE



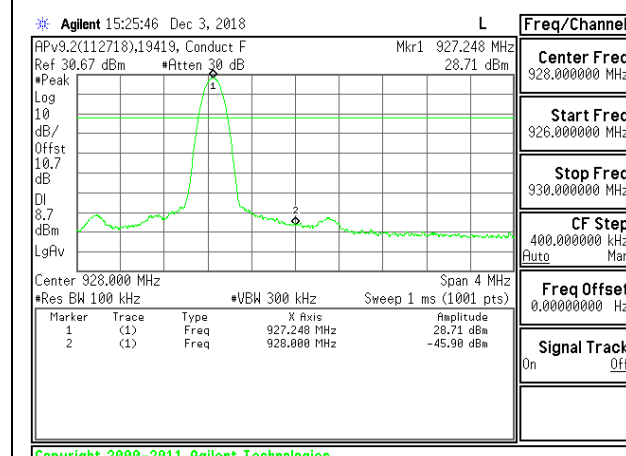
LOW CHANNEL SPURIOUS



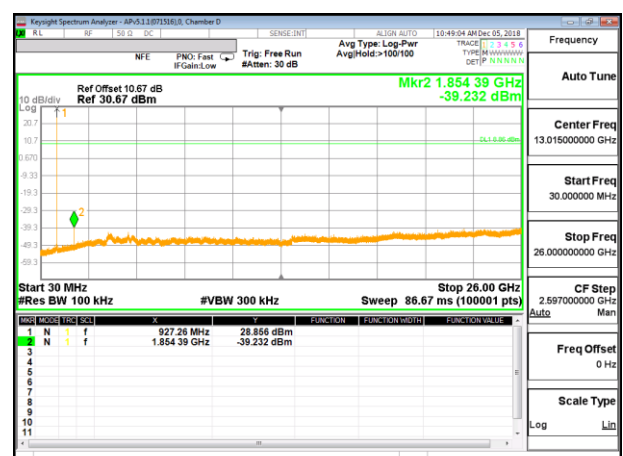
IN-BAND REFERENCE LEVEL



MID CHANNEL SPURIOUS

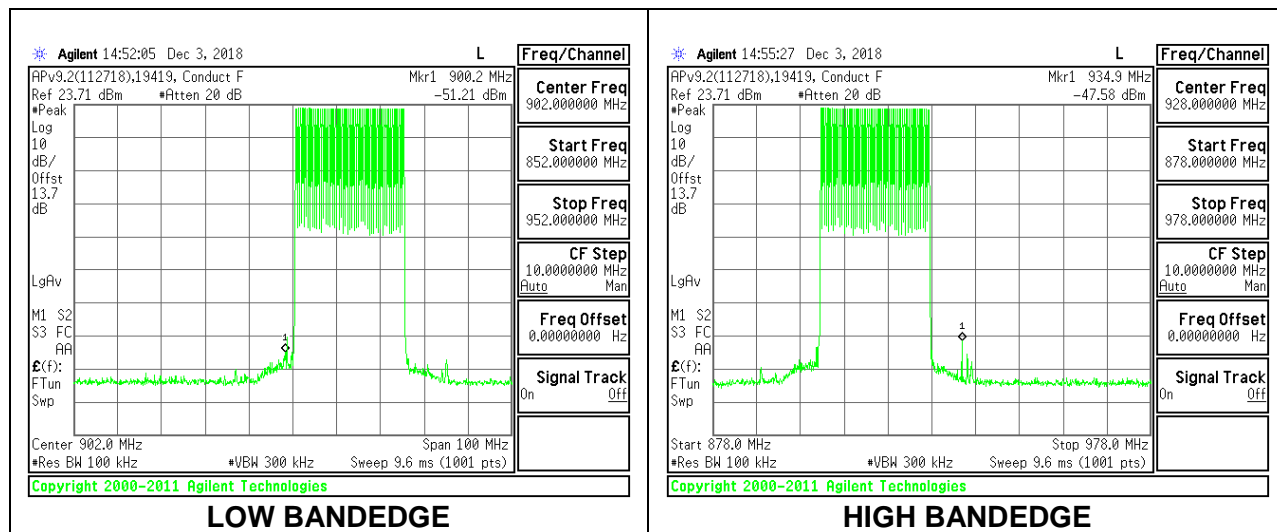


HIGH CHANNEL BANDEDGE



HIGH CHANNEL SPURIOUS

SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



9. RADIATED TEST RESULTS

LIMITS

FCC §15.205 and §15.209

RSS-GEN, Section 8.9 and 8.10.

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

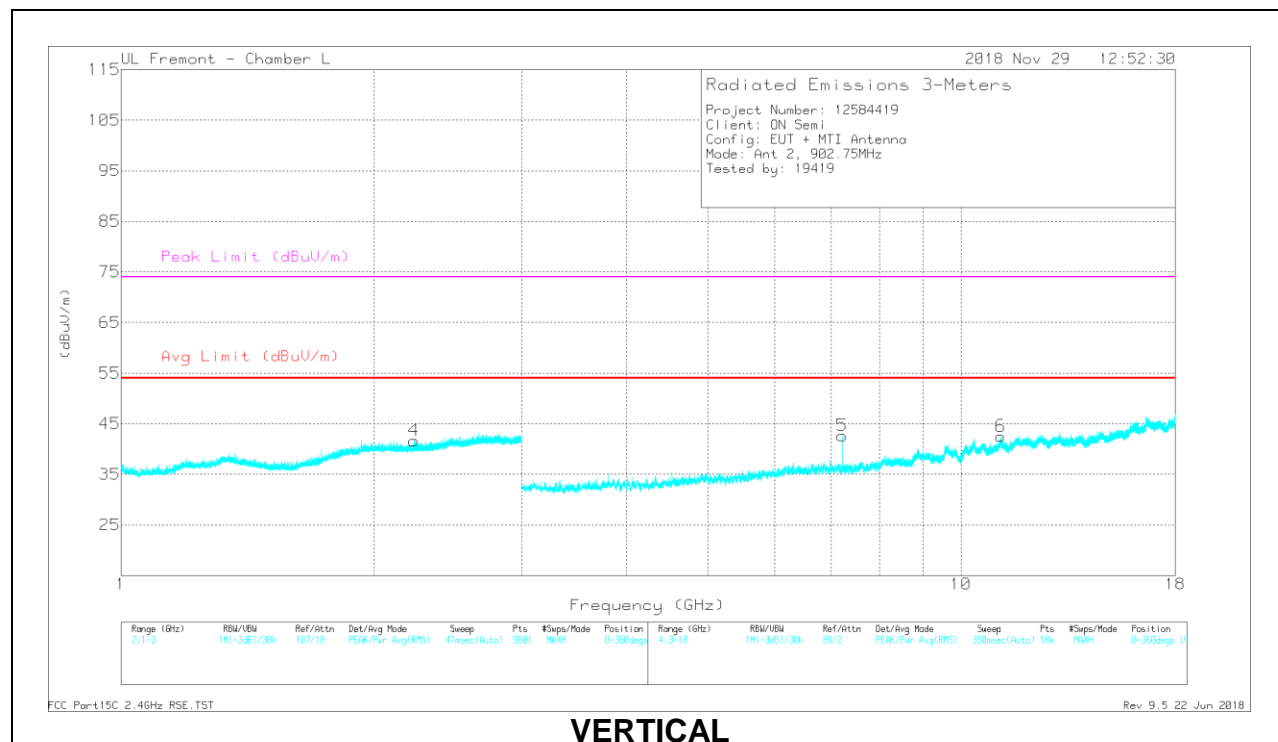
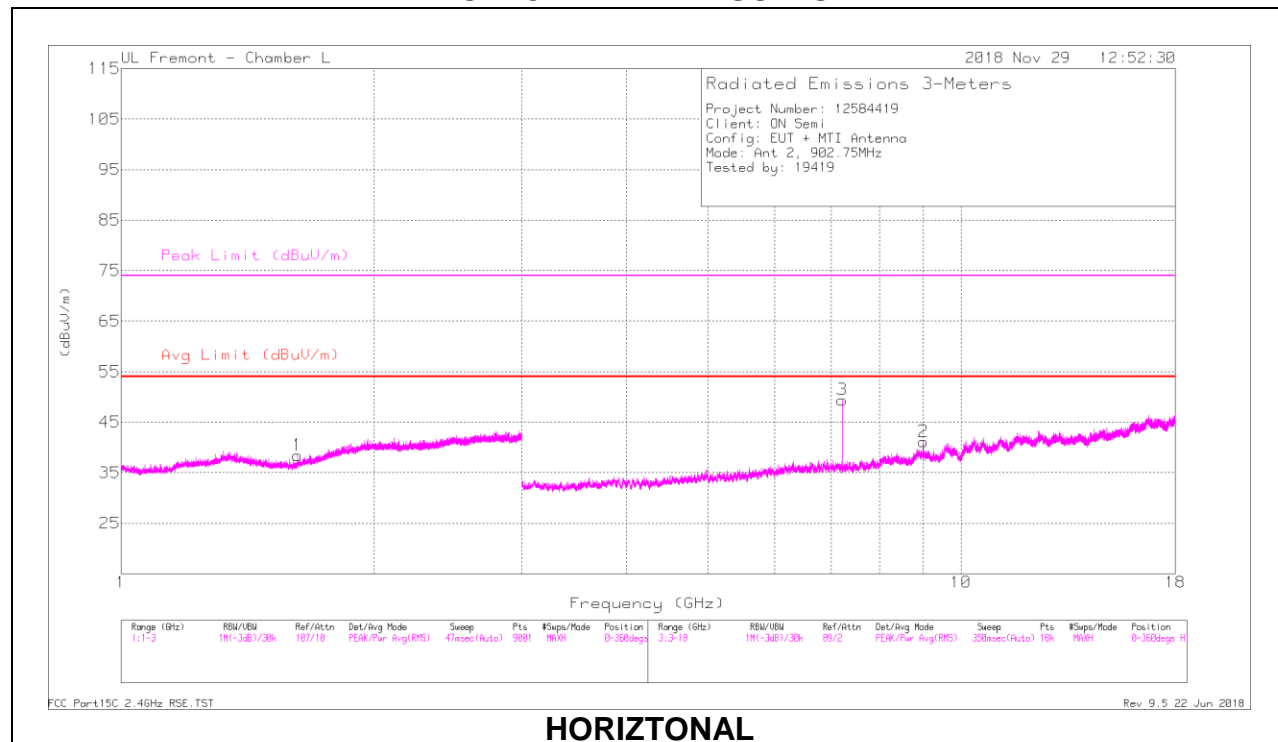
KDB 414788 OATS and Chamber Correlation Justification

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.

9.1. TRANSMITTER ABOVE 1 GHz

HARMONICS AND SPURIOUS EMISSIONS LOW CHANNEL RESULTS



RADIATED EMISSIONS

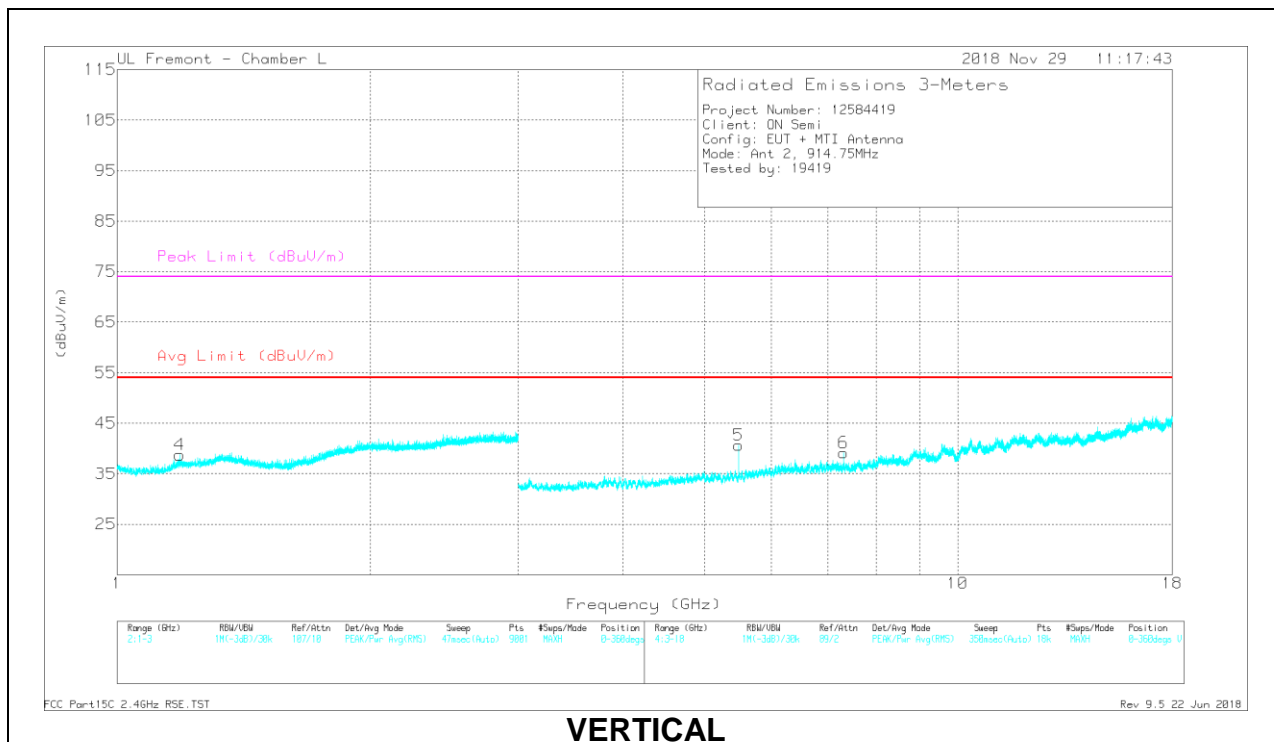
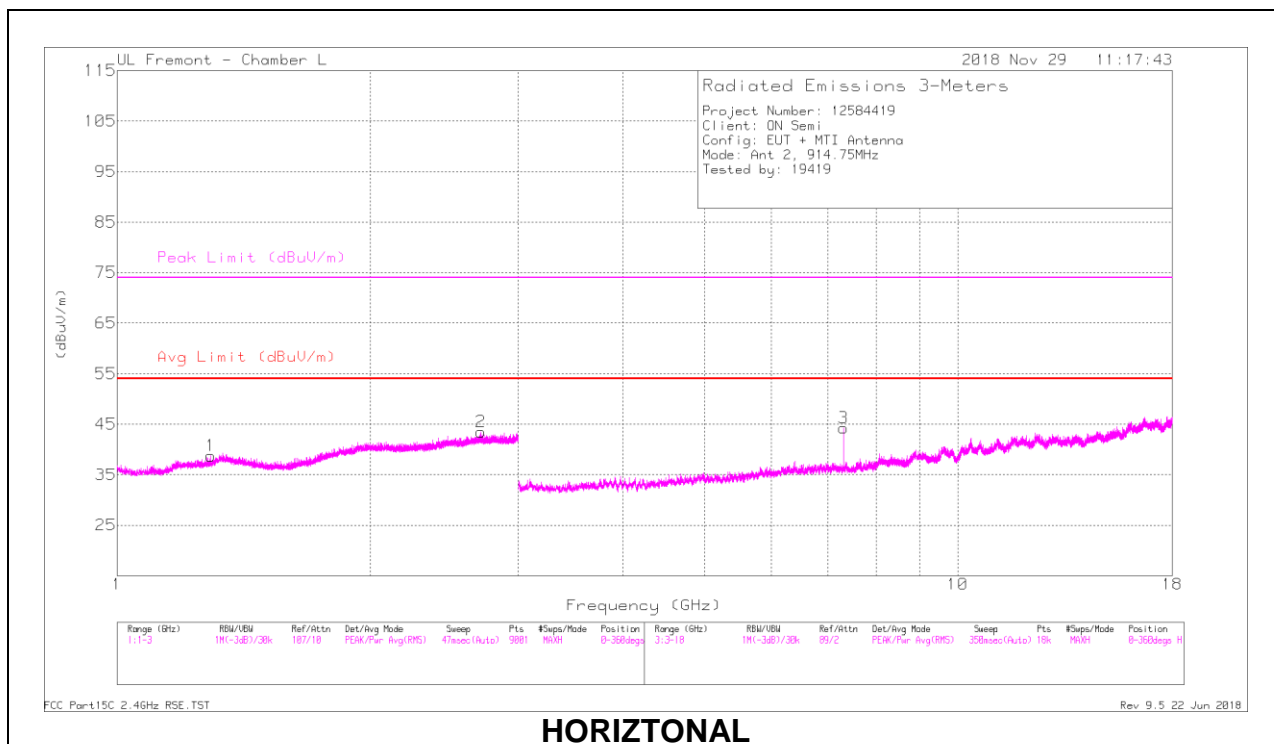
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF EMC4294 (dB/m)	Amp/Cbl/Filtr/ Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.622	41.52	PK2	28.2	-24.2	45.52	-	-	74	-28.48	217	333	H
4	* 2.231	40.53	PK2	31.5	-23.2	48.83	-	-	74	-25.17	46	260	V
2	* 9.028	34.23	PK2	36.3	-22.3	48.23	-	-	74	-25.77	201	142	H
3	7.222	36.77	PK2	35.7	-25.4	47.07	-	-	-	-	169	140	H
5	7.224	34.8	PK2	35.7	-25.4	45.1	-	-	-	-	81	158	V
6	* 11.152	30.9	PK2	37.9	-18.9	49.9	-	-	74	-24.1	78	261	V

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

PK2 – Peak Detector

Peak measurements meet the average limit. Therefore, average readings were not necessary to measure.

MID CHANNEL RESULTS



RADIATED EMISSIONS

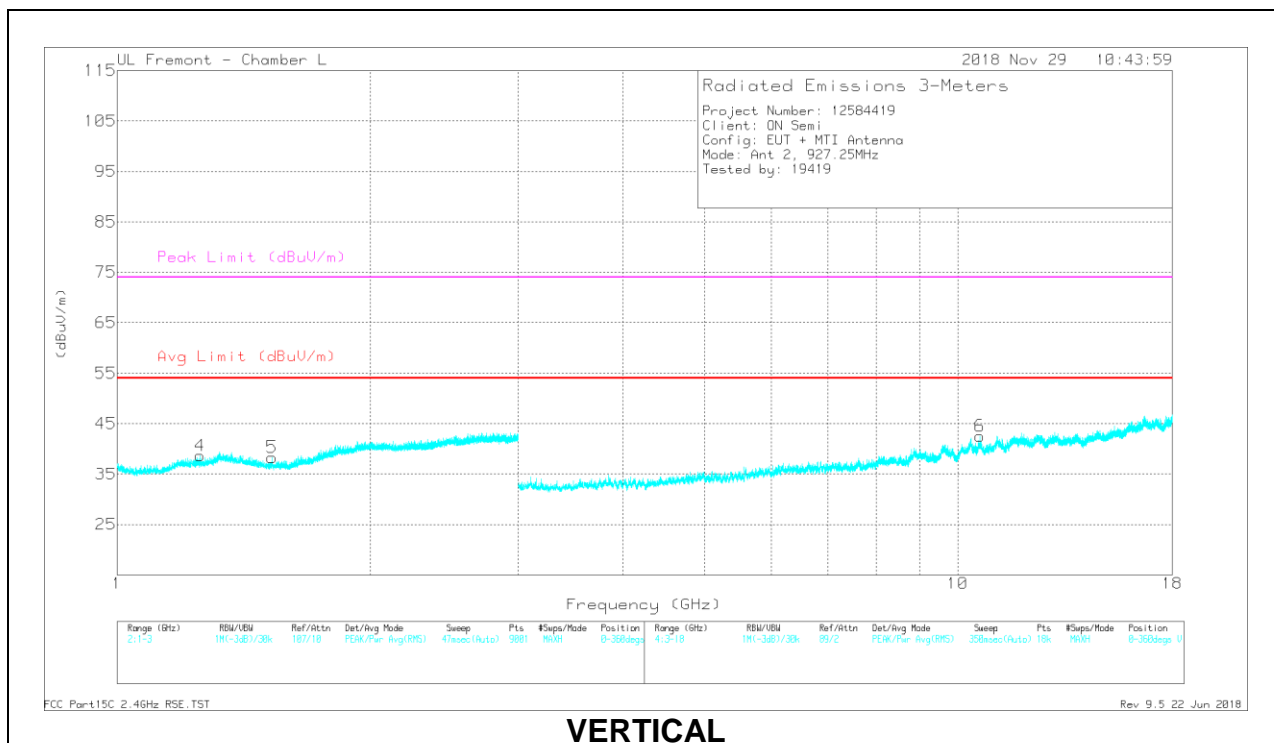
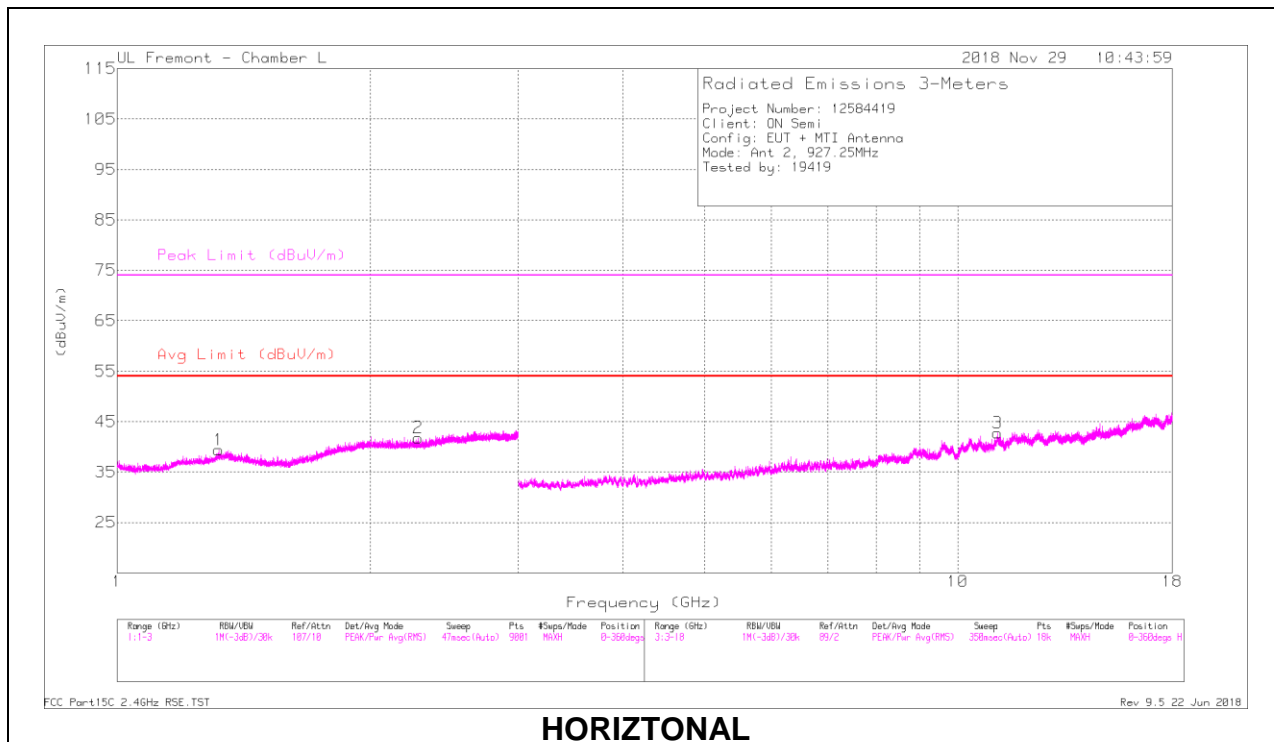
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF EMC4294 (dB/m)	Amp/Cbl/Filtr/ Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.292	41.64	PK2	29	-24.9	45.74	-	-	74	-28.26	242	158	H
2	* 2.708	39.75	PK2	32.6	-22.3	50.05	-	-	74	-23.95	316	342	H
4	* 1.188	42.68	PK2	28.2	-25.1	45.78	-	-	74	-28.22	41	254	V
3	* 7.318	39.08	PK2	35.7	-25	49.78	-	-	74	-24.22	225	132	H
5	5.489	39.62	PK2	34.5	-27.6	46.52	-	-	-	-	193	102	V
6	* 7.318	35.86	PK2	35.7	-25	46.56	-	-	74	-27.44	240	110	V

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

PK2 – Peak Detector

Peak measurements meet the average limit. Therefore, average readings were not necessary to measure.

HIGH CHANNEL RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF EMC4294 (dB/m)	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	* 1.322	42.73	PK2	29.3	-24.8	47.23	-	-	74	-26.77	155	247	H
2	* 2.279	41.53	PK2	31.5	-23.1	49.93	-	-	74	-24.07	134	252	H
4	* 1.257	42.27	PK2	28.8	-25	46.07	-	-	74	-27.93	219	318	V
5	* 1.527	41.68	PK2	28.1	-24.4	45.38	-	-	74	-28.62	20	226	V
3	* 11.154	31.45	PK2	37.9	-18.9	50.45	-	-	74	-23.55	53	138	H
6	* 10.634	30.65	PK2	37.6	-19	49.25	-	-	74	-24.75	231	392	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 – Peak Detector

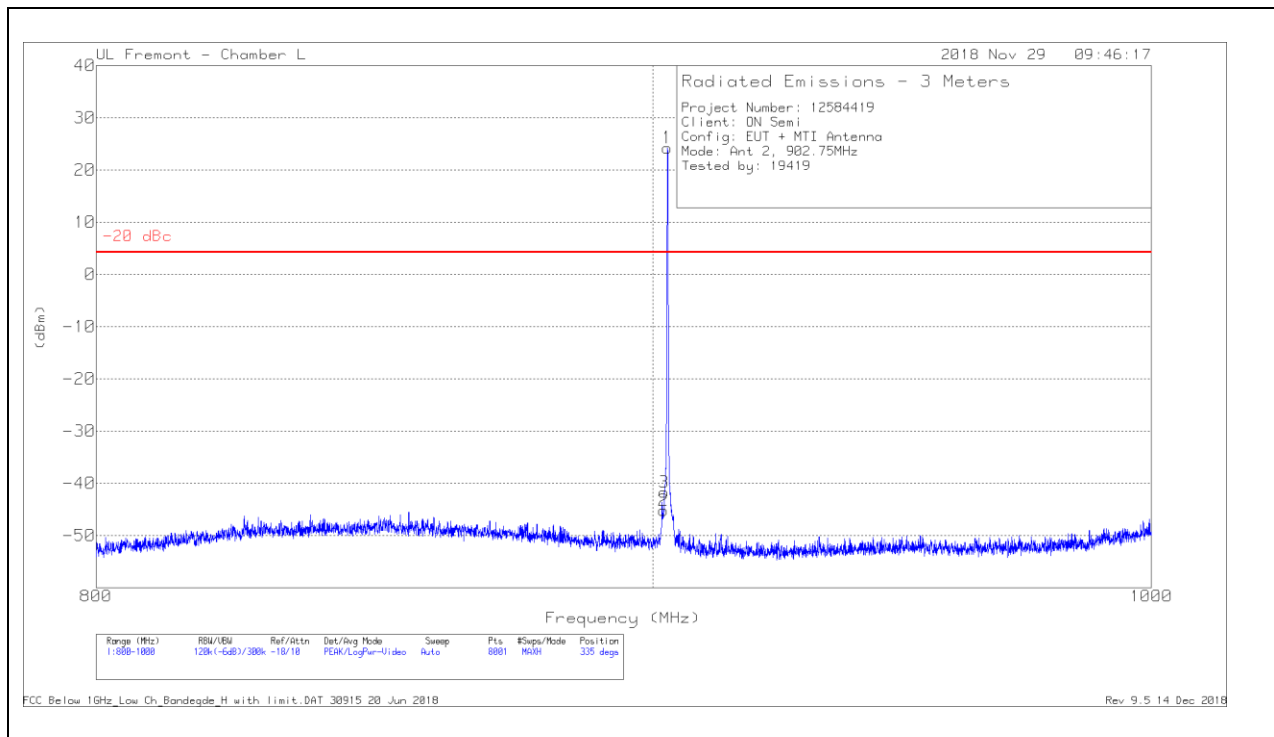
Peak measurements meet the average limit. Therefore, average readings were not necessary to measure.

9.2. TRANSMITTER BELOW 1 GHz

9.2.1. -20 dBc BANDEGE WITHOUT NOTCH FILTER AND PRE-AMPLIFIER

LOW CHANNEL

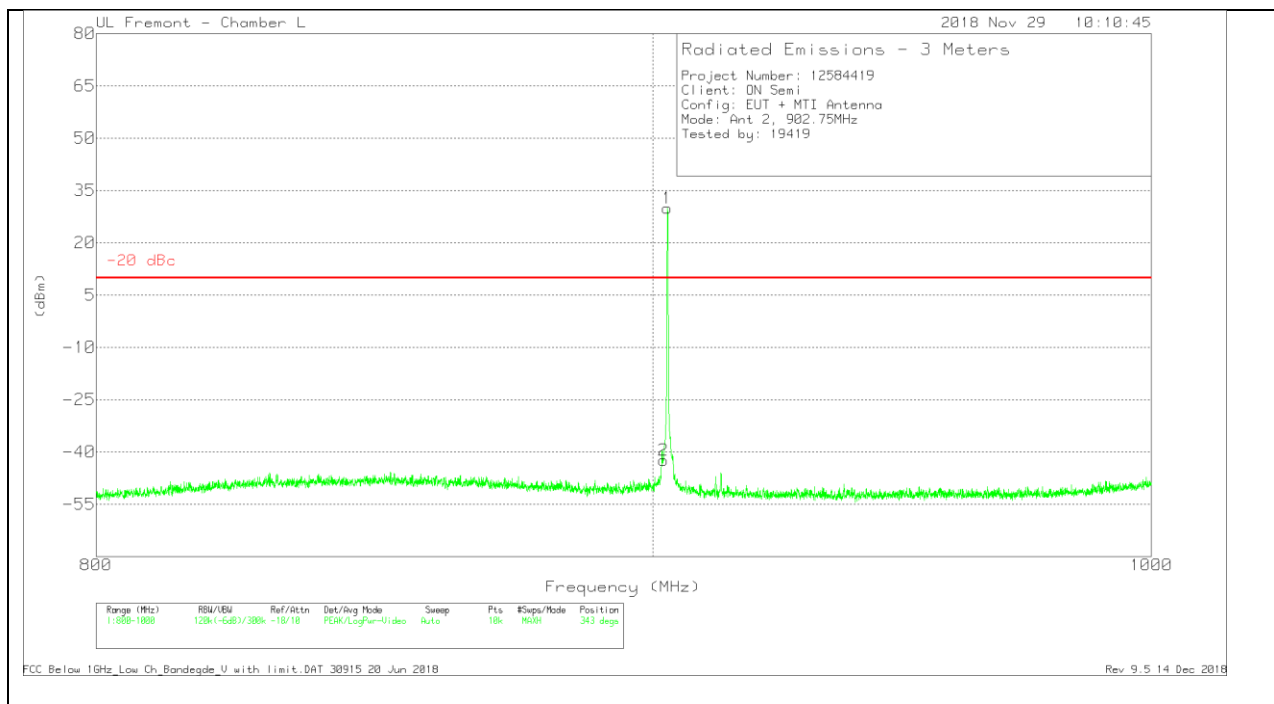
HORIZONTAL RESULT



Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AF PRE0184970 (dB/m)	Bypass (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	-20 dBc	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	902.75	-13.46	Pk	28	3.9	5.8	24.24	-	-	335	100	H
2	902	-82.92	Pk	28	3.8	5.9	-45.22	4.24	-49.46	335	100	H
3	902.15	-79.31	Pk	28	3.8	5.8	-41.71	4.24	-45.95	335	100	H

Pk - Peak detector

VERTICAL RESULT

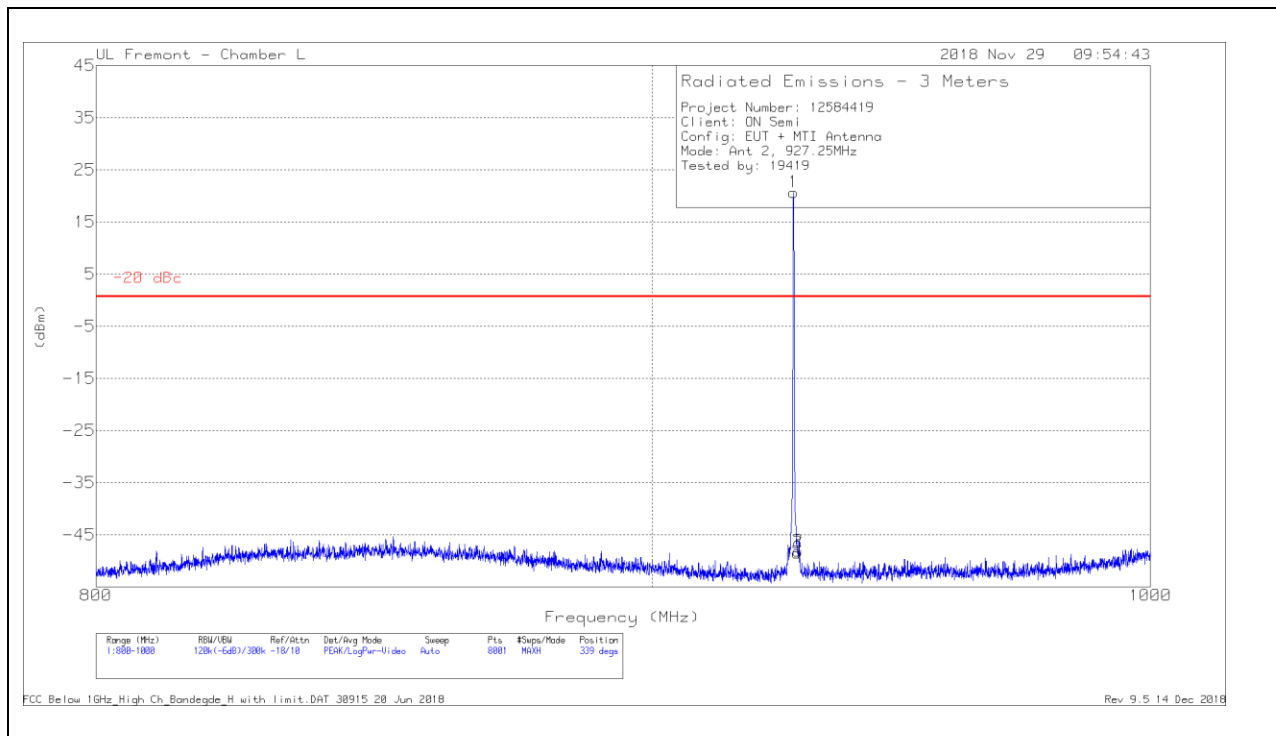


Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AF PRE0184970 (dB/m)	Bypass (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	-20 dBc	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	902.74	-7.79	Pk	28	3.9	5.8	29.91	-	-	343	100	V
2	902	-80.09	Pk	28	3.8	5.9	-42.39	9.91	-52.3	343	100	V

Pk - Peak detector

HIGH CHANNEL

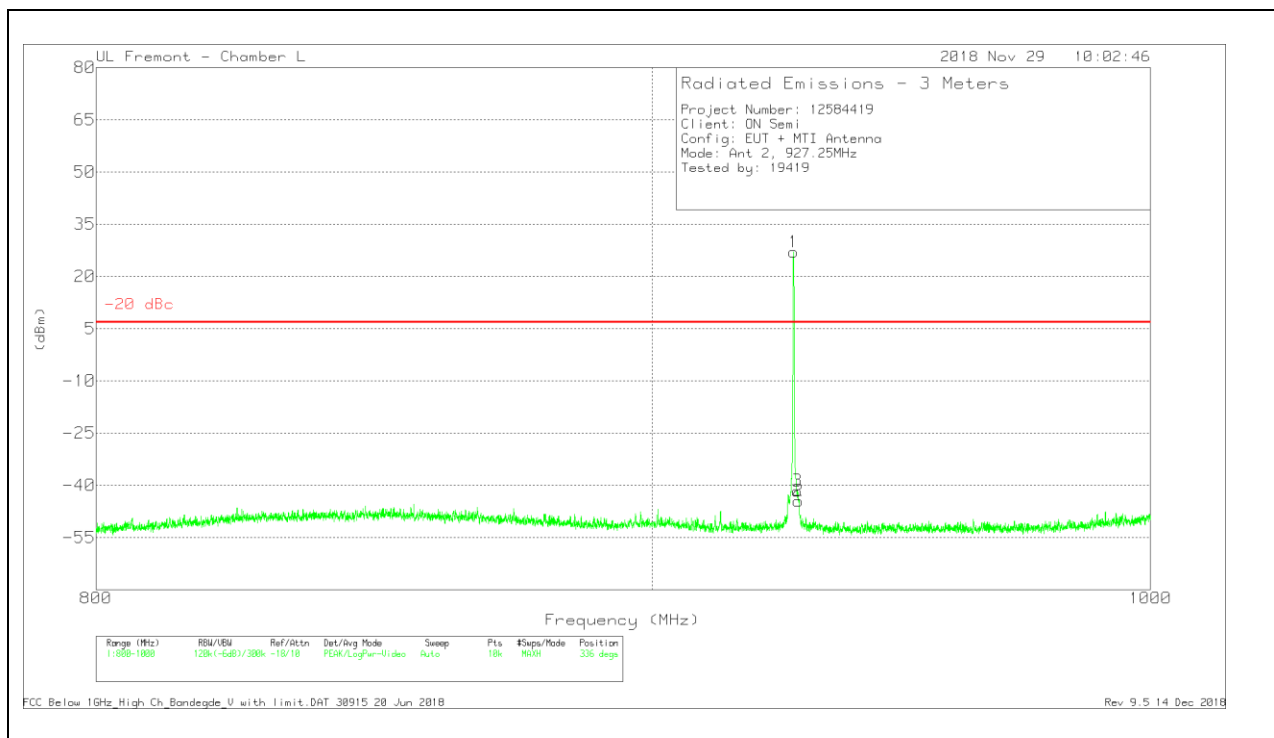
HORIZONTAL RESULT



Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AF PRE0184970 (dBm)	Bypass (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	-20 dBc	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	927.25	-15.69	Pk	28.3	4	4.1	20.71	-	-	339	100	H
2	928.175	-84.51	Pk	28.3	4	4.1	-48.11	.71	-48.82	339	100	H
3	928.05	-84.87	Pk	28.3	4	4.1	-48.47	.71	-49.18	339	100	H

Pk - Peak detector

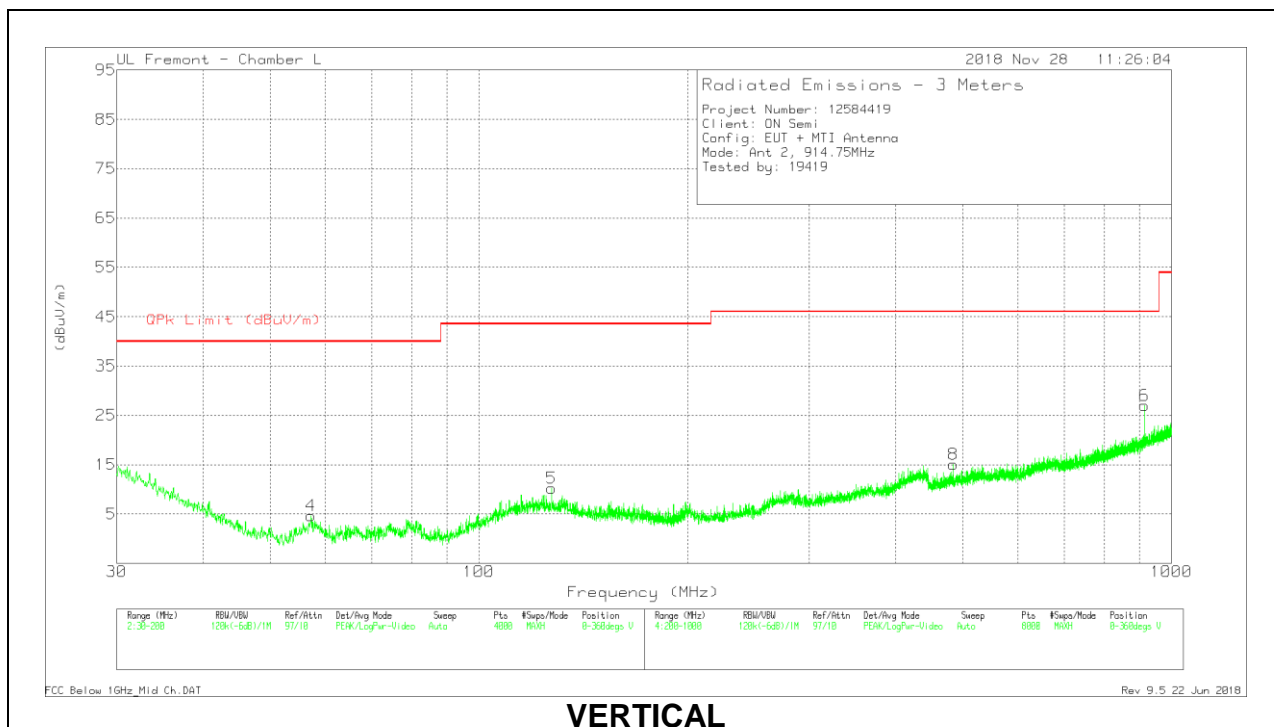
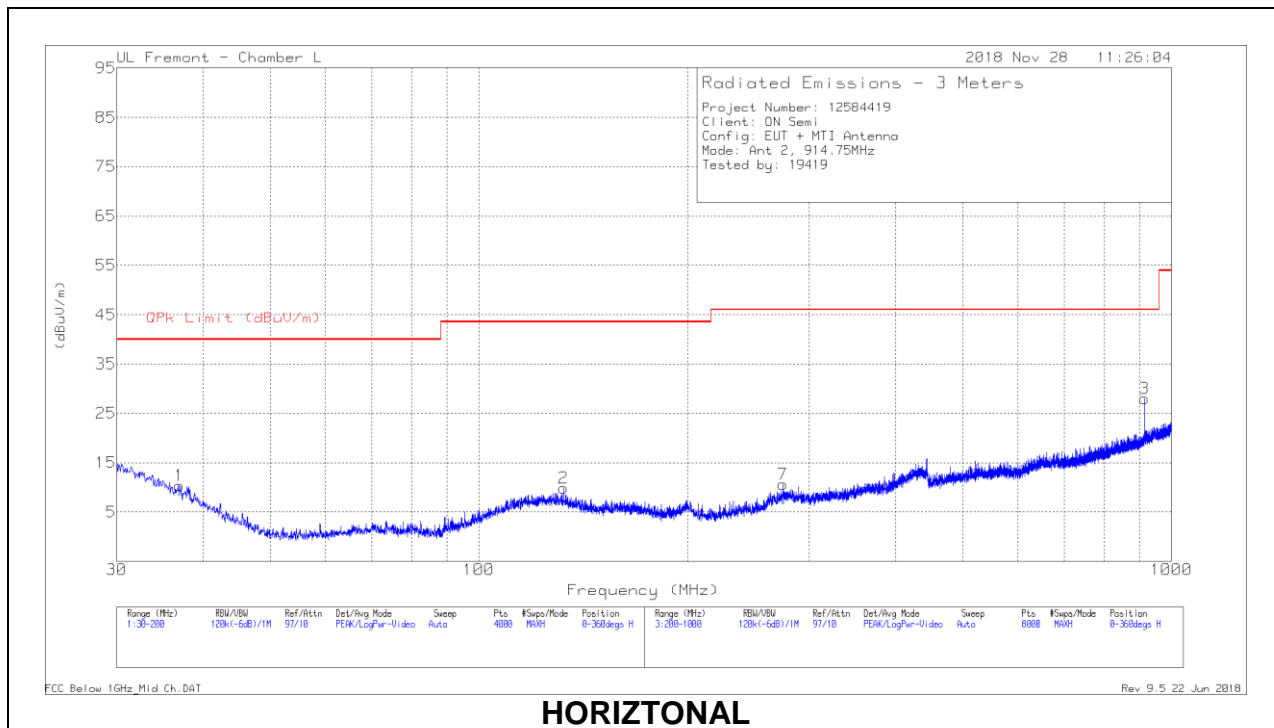
VERTICAL RESULT



Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AF PRE0184970 (dBm)	Bypass (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	-20 dBc	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	927.24	-9.42	Pk	28.3	4	4.1	26.98	-	-	336	98	V
2	928.2	-80.86	Pk	28.3	4	4.1	-44.46	6.8	-51.26	336	98	V
3	927.98	-77.99	Pk	28.3	4	4.1	-41.59	6.8	-48.39	336	98	V

9.2.2. HARMONICS AND SPURIOUS EMISSIONS WITH A NOTCH FILTER

LOW CHANNEL RESULTS



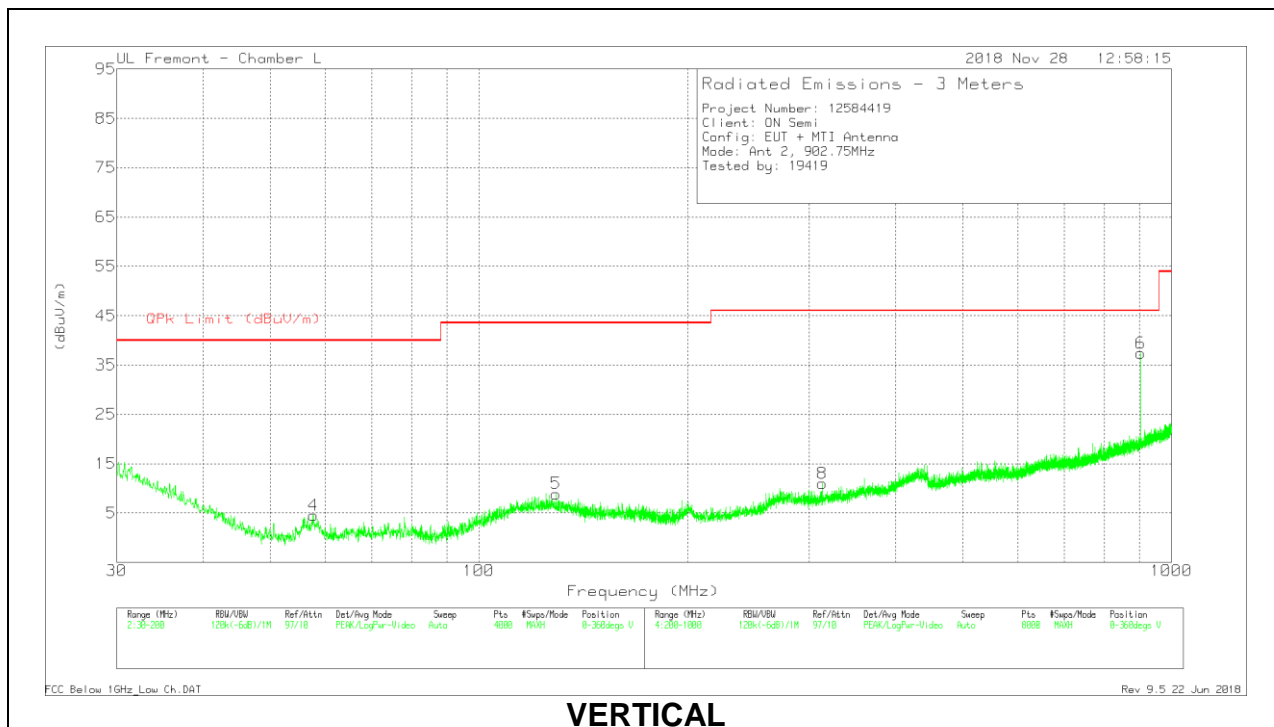
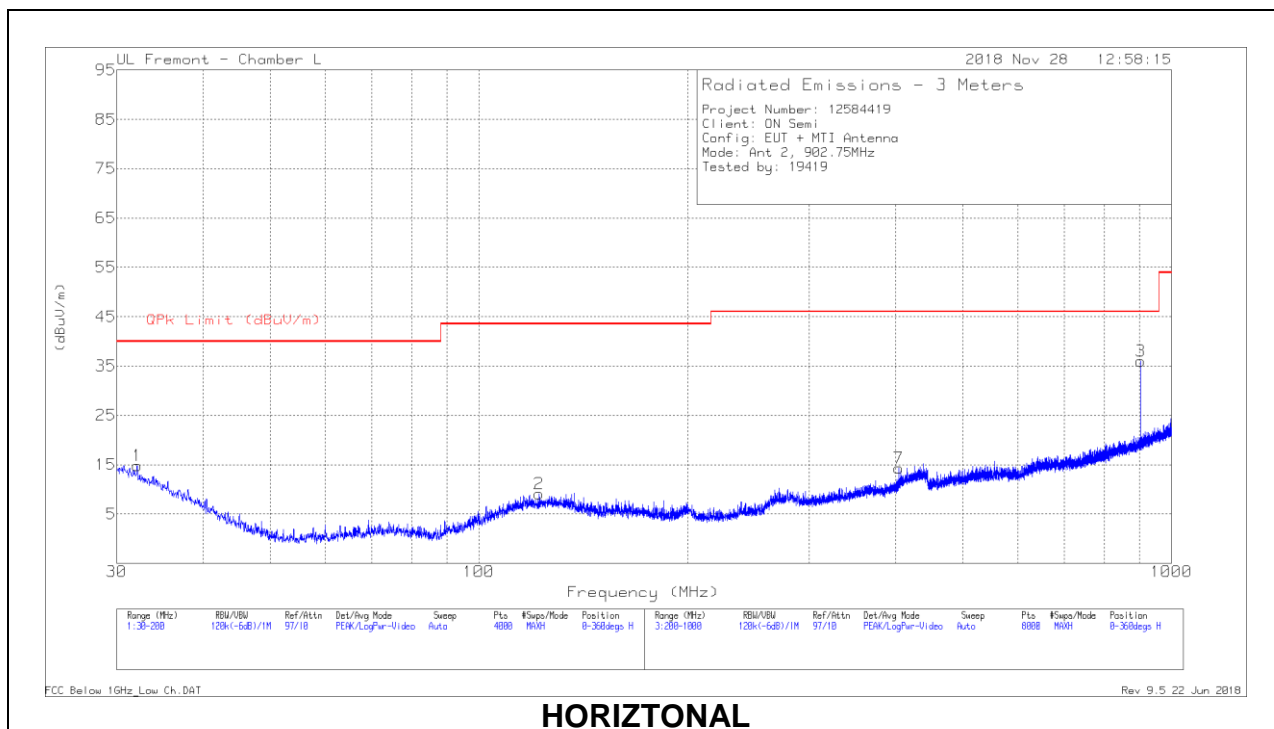
Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF PRE0184970 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	37.3464	20.63	Pk	21.3	-31.5	10.43	40	-29.57	140	391	H
2	* 132.0259	20.53	Pk	19.5	-30.8	9.23	43.52	-34.29	346	305	H
4	57.1657	23.52	Pk	13.1	-31.3	5.32	40	-34.68	150	125	V
5	* 127.4951	20.34	Pk	19.7	-30.8	9.24	43.52	-34.28	9	262	V
3	914.7459	28.48	Pk	28.3	-27.3	29.48	46.02	-16.54	4	394	H
7	* 274.8953	20.53	Pk	19.2	-29.8	9.93	46.02	-36.09	133	169	H
6	914.7488	28.18	Pk	28.3	-27.3	29.18	46.02	-16.84	354	108	V
8	484.6907	19.3	Pk	23.6	-29.6	13.3	46.02	-32.72	253	311	V

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

Pk - Peak detector

MID CHANNEL RESULTS



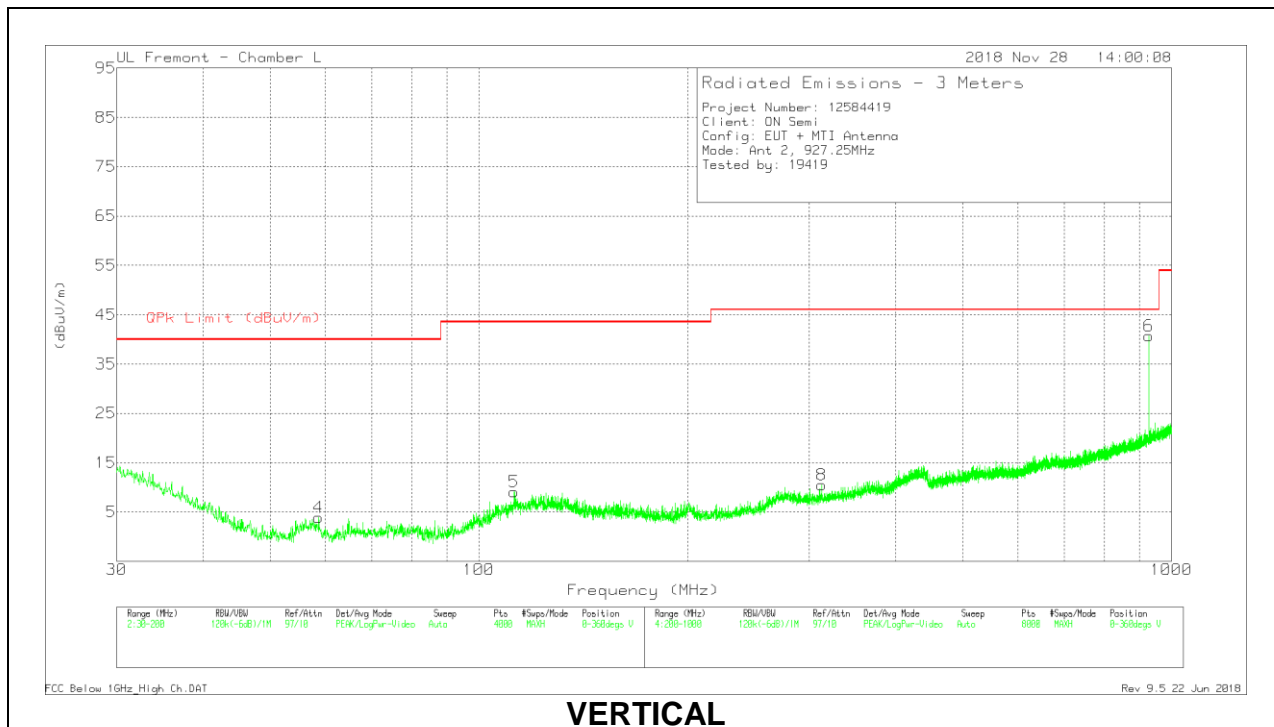
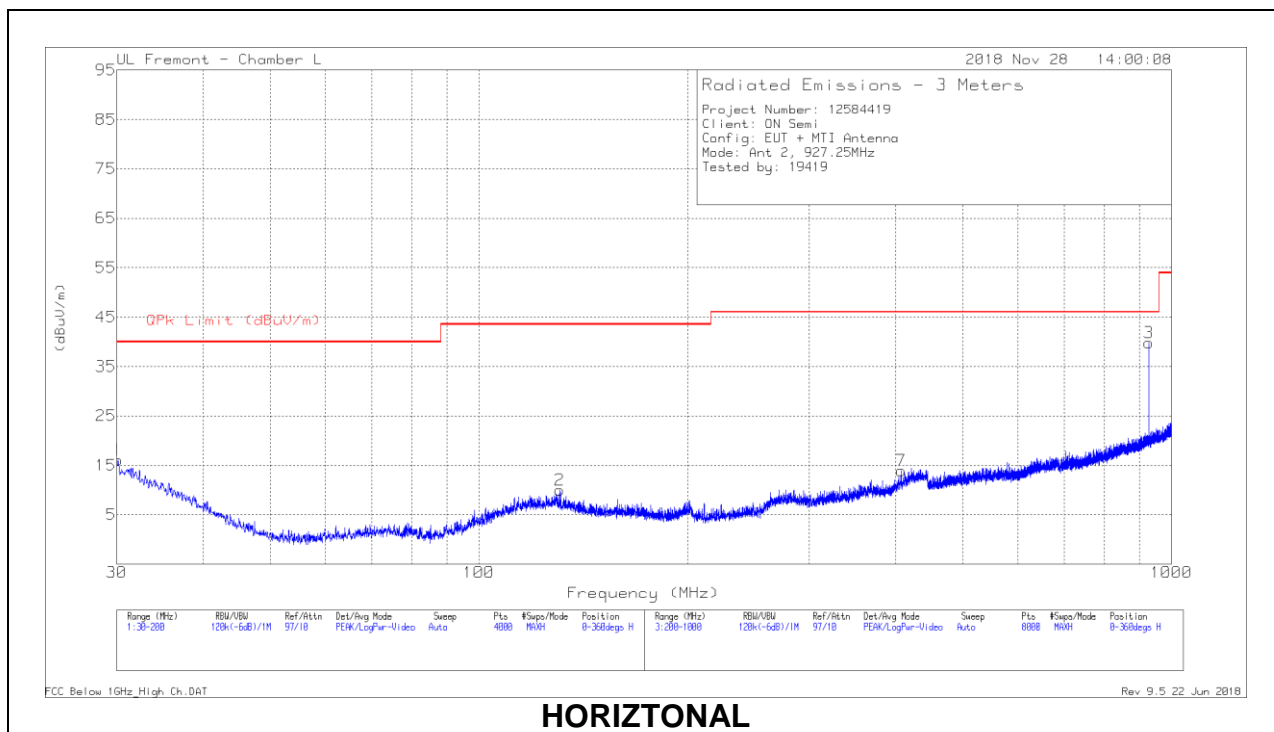
Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF PRE0184970 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	31.9808	21.14	Pk	25	-31.5	14.64	40	-25.36	235	133	H
2	* 122.2522	20.17	Pk	19.7	-30.8	9.07	43.52	-34.45	299	151	H
4	57.8006	23.99	Pk	13.1	-31.2	5.89	40	-34.11	167	117	V
5	* 129.087	19.89	Pk	19.6	-30.8	8.69	43.52	-34.83	162	162	V
3	902.7504	36.95	Pk	28	-27.4	37.55	46.02	-8.47	322	132	H
7	* 403.9821	23.32	Pk	21.7	-29.7	15.32	46.02	-30.7	198	101	H
6	902.7504	37.47	Pk	28	-27.4	38.07	46.02	-7.95	328	105	V
8	312.8579	19.95	Pk	19.7	-29.8	9.85	46.02	-36.17	157	170	V

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

Pk - Peak detector

HIGH CHANNEL RESULTS



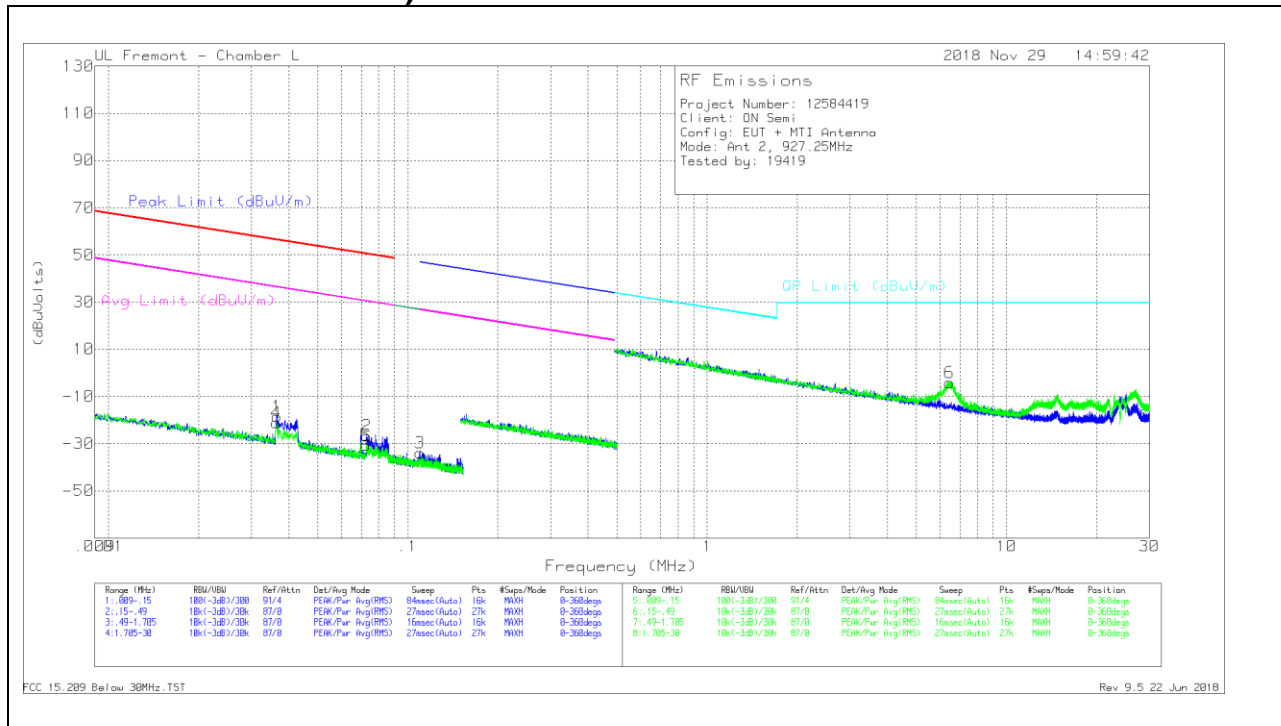
Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF PRE0184970 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	30.1779	20.98	Pk	25.9	-31.5	15.38	40	-24.62	326	159	H
	* 130.7832	19.19	Pk	19.5	-30.8	7.89	43.52	-35.63	92	327	H
	58.5391	23.42	Pk	13.2	-31.2	5.42	40	-34.58	153	127	V
	* 112.7044	19.88	Pk	18.9	-30.8	7.98	43.52	-35.54	338	305	V
	927.248	39.21	Pk	28.3	-27.2	40.31	46.02	-5.71	351	134	H
	* 407.5587	17.4	Pk	21.9	-29.7	9.6	46.02	-36.42	15	261	H
	927.2537	40.28	Pk	28.3	-27.2	41.38	46.02	-4.84	328	103	V
	312.3561	18.66	Pk	19.7	-29.8	8.56	46.02	-37.46	258	222	V

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

Pk - Peak detector

9.3. WORST CASE BELOW 30 MHz (WORST-CASE CONFIGURATION)



Below 30MHz Data

Marker	Frequency (MHz)	Measurement Reading (dBuV)	Det	Loop Antenna (dB/m)	Amp/Cbl (dB)	Dist Corr 300m	Corrected Reading (dBuVolts)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	.0365	46.99	Pk	13.8	.8	-80	-18.41	56.34	-74.75	36.34	-54.75	-	-	0-360
2	.07273	40.55	Pk	11.9	.8	-80	-26.75	50.35	-77.1	30.35	-57.1	-	-	0-360
3	.10982	33.68	Pk	11.7	.8	-80	-33.82	-	-	-	-	26.81	-60.63	0-360
4	.03642	44.23	Pk	13.8	.8	-80	-21.17	56.36	-77.53	36.36	-57.53	-	-	0-360
5	.07265	36.67	Pk	11.9	.8	-80	-30.63	50.36	-80.99	30.36	-60.99	-	-	0-360

Pk - Peak detector

Marker	Frequency (MHz)	Measurement Reading (dBuV)	Det	Loop Antenna (dB/m)	Amp/Cbl (dB)	Dist Corr 30m (dB) 40Log	Corrected Reading (dBuVolts)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
6	6.45663	24.06	Pk	11.1	.8	-40	-4.04	-	-	-	-	29.5	-33.54	0-360

Pk - Peak detector

10. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

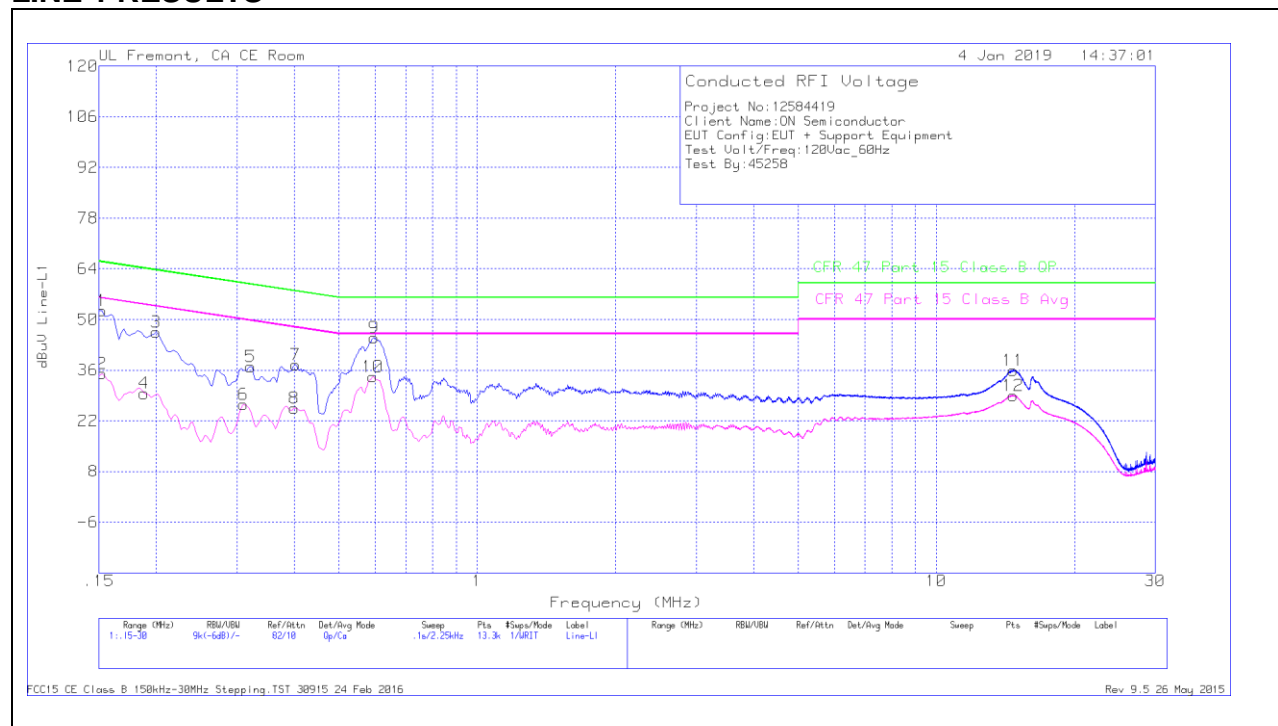
RSS-Gen 8.8

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

RESULTS

LINE 1 RESULTS

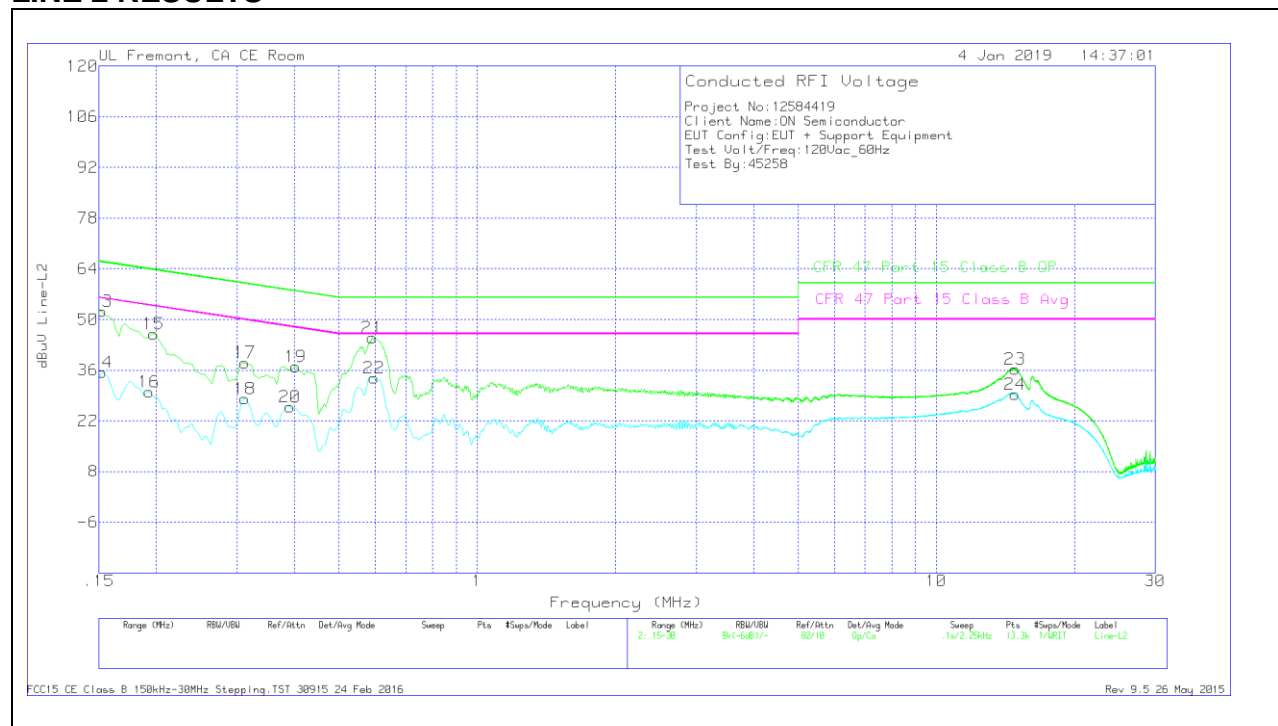


Range 1: Line-L1 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables C1&C3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
1	.15225	42.22	Qp	.1	0	10.1	52.42	65.88	-13.46	-	-
2	.15225	24.85	Ca	.1	0	10.1	35.05	-	-	55.88	-20.83
3	.1995	36.49	Qp	0	0	10.1	46.59	63.63	-17.04	-	-
4	.18825	19.48	Ca	0	0	10.1	29.58	-	-	54.11	-24.53
5	.321	26.92	Qp	0	0	10.1	37.02	59.68	-22.66	-	-
6	.30975	16.44	Ca	0	0	10.1	26.54	-	-	49.98	-23.44
7	.402	27.36	Qp	0	0	10.1	37.46	57.81	-20.35	-	-
8	.39975	15.43	Ca	0	0	10.1	25.53	-	-	47.86	-22.33
9	.5955	34.8	Qp	0	0	10.1	44.9	56	-11.1	-	-
10	.59325	24.02	Ca	0	0	10.1	34.12	-	-	46	-11.88
11	14.69625	25.24	Qp	.1	.3	10.2	35.84	60	-24.16	-	-
12	14.69625	18.42	Ca	.1	.3	10.2	29.02	-	-	50	-20.98

Qp - Quasi-Peak detector

Ca - CISPR average detection

LINE 2 RESULTS



Range 2: Line-L2 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables C2&C3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
13	.15225	42.13	Qp	.1	0	10.1	52.33	65.88	-13.55	-	-
14	.15225	25.18	Ca	.1	0	10.1	35.38	-	-	55.88	-20.5
15	.19725	35.87	Qp	0	0	10.1	45.97	63.73	-17.76	-	-
16	.19275	19.86	Ca	0	0	10.1	29.96	-	-	53.92	-23.96
17	.312	27.99	Qp	0	0	10.1	38.09	59.92	-21.83	-	-
18	.312	18.02	Ca	0	0	10.1	28.12	-	-	49.92	-21.8
19	.402	26.85	Qp	0	0	10.1	36.95	57.81	-20.86	-	-
20	.39075	15.67	Ca	0	0	10.1	25.77	-	-	48.05	-22.28
21	.591	34.81	Qp	0	0	10.1	44.91	56	-11.09	-	-
22	.5955	23.79	Ca	0	0	10.1	33.89	-	-	46	-12.11
23	14.85825	25.74	Qp	.1	.3	10.2	36.34	60	-23.66	-	-
24	14.85375	18.67	Ca	.1	.3	10.2	29.27	-	-	50	-20.73

Qp - Quasi-Peak detector

Ca - CISPR average detection