



CERTIFICATION TEST REPORT

Report Number. : 12166253-E1V3

Applicant : SONOS INC.
614 CHAPALA STREET
SANTA BARBARA, CA 93101, U.S.A

Model : S18

FCC ID : SBVRM016

IC : 5373A-RM016

EUT Description : 802.11 a/b/g/n HT20 CLIENT DEVICE

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

Date Of Issue:

October 10, 2018

Prepared by:

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NVLAP Lab code: 200065-0

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	9/13/2018	Initial Issue	-
V2	10/1/2018	Updated Section 2 & 6	K.Kedida
V3	10/10/2018	Updated Section 9.3	K.Kedida

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SONOS INC.
614 CHAPALA STREET
SANTA BARBARA, CA 93101, U.S.A

EUT DESCRIPTION: 802.11a/b/g/n HT20 CLIENT DEVICE

MODEL: S18

SERIAL NUMBER: 78-28-CA-F0-00-2E-C (Radiated Sample)
78-28-CA-F0-00-14 (Conducted Sample)

DATE TESTED: July 23 – 30, 2018

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. 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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Reviewed By:



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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, KDB 558074 D01 v5, ANSI C63.10-2013, RSS-GEN Issue 5, and RSS-247 Issue 2.

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 (ISED:2324B-1)	<input type="checkbox"/> Chamber D (ISED:22541-1)	<input type="checkbox"/> Chamber K (ISED: 2324A-1)
<input checked="" type="checkbox"/> Chamber B (ISED:2324B-2)	<input type="checkbox"/> Chamber E (ISED:22541-2)	<input type="checkbox"/> Chamber L (ISED: 2324A-3)
<input type="checkbox"/> Chamber C (ISED:2324B-3)	<input type="checkbox"/> Chamber F (ISED:22541-3)	
	<input type="checkbox"/> Chamber G (ISED:22541-4)	
	<input type="checkbox"/> Chamber H (ISED:22541-5)	

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. Chambers K and L are covered under ISED company address code 2324A with site numbers 2324A-1 and 2324A-3, respectively.

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:

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

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 802.11a/b/g/n HT20 CLIENT DEVICE.

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)
2402 - 2480	BLE	-0.96	0.80

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes Printed Circuit Board (PCB) antenna, with a maximum gain of 3.9 dBi.

5.4. SOFTWARE AND FIRMWARE

The EUT software were installed during testing was 44.2-53220-RF-Complianc_20180523.

The test utility software used during testing was Sonos Compliance GUI V2.2.

5.5. WORST-CASE CONFIGURATION AND MODE

Radiated bandage, harmonics, and spurious emissions from 1 GHz to 18GHz were performed. The EUT was set to transmit at the Low/Middle/High channels with designed (target) output powers.

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

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

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Lenovo	X201	SON-00000964	N/A
AC Adapter	Lenovo	ADLX65NLT2A	11S36200291ZZ200315AJU	N/A
Charging Base	Lenovo	X200	1S43R8781R934HPB	N/A

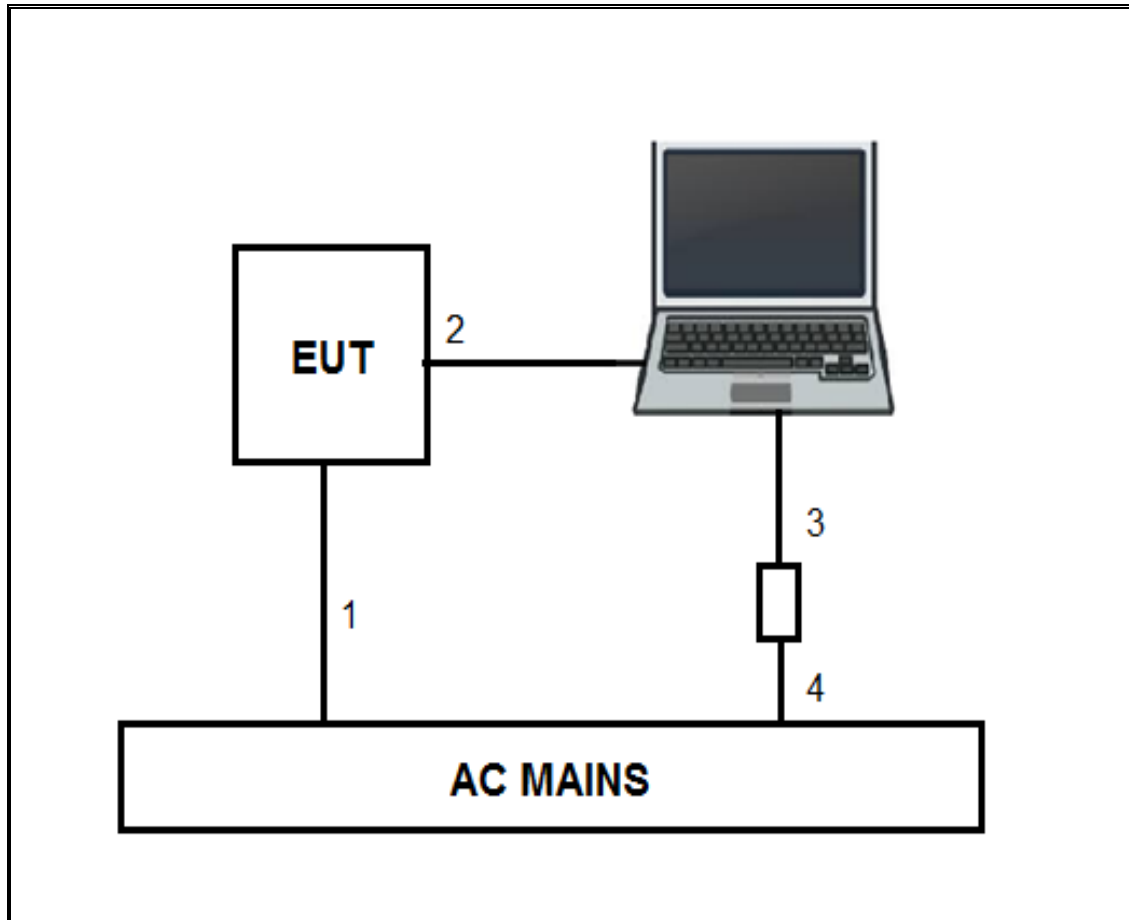
I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC Power	1	AC	Unshielded	2	AC Mains to EUT
2	Ethernet	1	RJ45	Unshielded	10	EUT to Laptop
3	DC Power	1	DC	Shielded	1.2	AC/DC Adapter to Laptop
4	AC Power	1	AC	Unshielded	1	AC Mains to AC/DC Adapter

TEST SETUP

The EUT is a stand-alone unit, and the radio is exercised by Sonos Compliance GUI V2.2 test utility software via Ethernet.

SETUP DIAGRAM



6. MEASUREMENT METHOD

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

6 dB BW: ANSI C63.10 Section 11.8.1. Option 1

Output Power: ANSI C63.10 Section 11.9.2.3.2 Method AVGPM-G (Measurement using a gated RF average-reading power meter)

Power Spectral Density: ANSI C63.10 Section 11.10.3 Method AVGPS-1.

Radiated emissions non-restricted frequency bands: ANSI C63.10 Section 11.12.1

Radiated emissions restricted frequency bands: ANSI C63.10 Section 11.12.1.

Conducted emissions in restricted frequency bands: ANSI C63.10 Section 11.12.2.

Band-edge: ANSI C63.10 Subclause -11.13.3.4 Integration method -Trace averaging across ON and OFF times DC correction

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

7. 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
Amplifier, 100kHz to 1GHz, 32dB	Hewlett Packard	8447D	T15	08/14/2018
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences Corp.	JB1	T407	05/10/2019
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T863	06/21/2019
RF Amplifier	MITEQ	AFS42-00101800-25-S-42	T1165	04/23/2019
Amplifier, 1 to 8GHz, 35dB	Miteq Inc.	AMF-4D-01000800-30-29P	T1573	04/03/2019
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T1450	02/05/2019
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T1113	12/21/2018
Spectrum Analyzer, PSA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T1466	04/16/2019
Power Meter, P-series single channel	Agilent (Keysight) Technologies	N1911A	T1271	07/17/2019
Power Sensor, P-series, 50MHz to 18GHz, Wideband	Agilent (Keysight) Technologies	N1921A	T1225	04/10/2019
Antenna, Active Loop 9kHz-30MHz	Com-Power Corp.	AL-130R	T1866	10/10/2018
18 - 26.5 GHz Horn Antenna	Seavey Division	MWH-1826/B	T89	01/18/2019
Pre-Amp 1-26.5 GHz	Agilent	8449B	T404	03/09/2019
EMI Receiver	Rohde & Schwarz	ESR	T1436	02/21/2019
L.I.S.N.	FCC INC.	FCC LISN 50/250	T1310	06/15/2019

Test Software List			
Description	Manufacturer	Model	Version
Radiated Software	UL	UL EMC	Ver 9.5, June 22, 2018
Antenna Port Software	UL	UL RF	Ver 8.4, June 12, 2018

8. ANTENNA PORT TEST RESULTS

8.1. ON TIME AND DUTY CYCLE

LIMITS

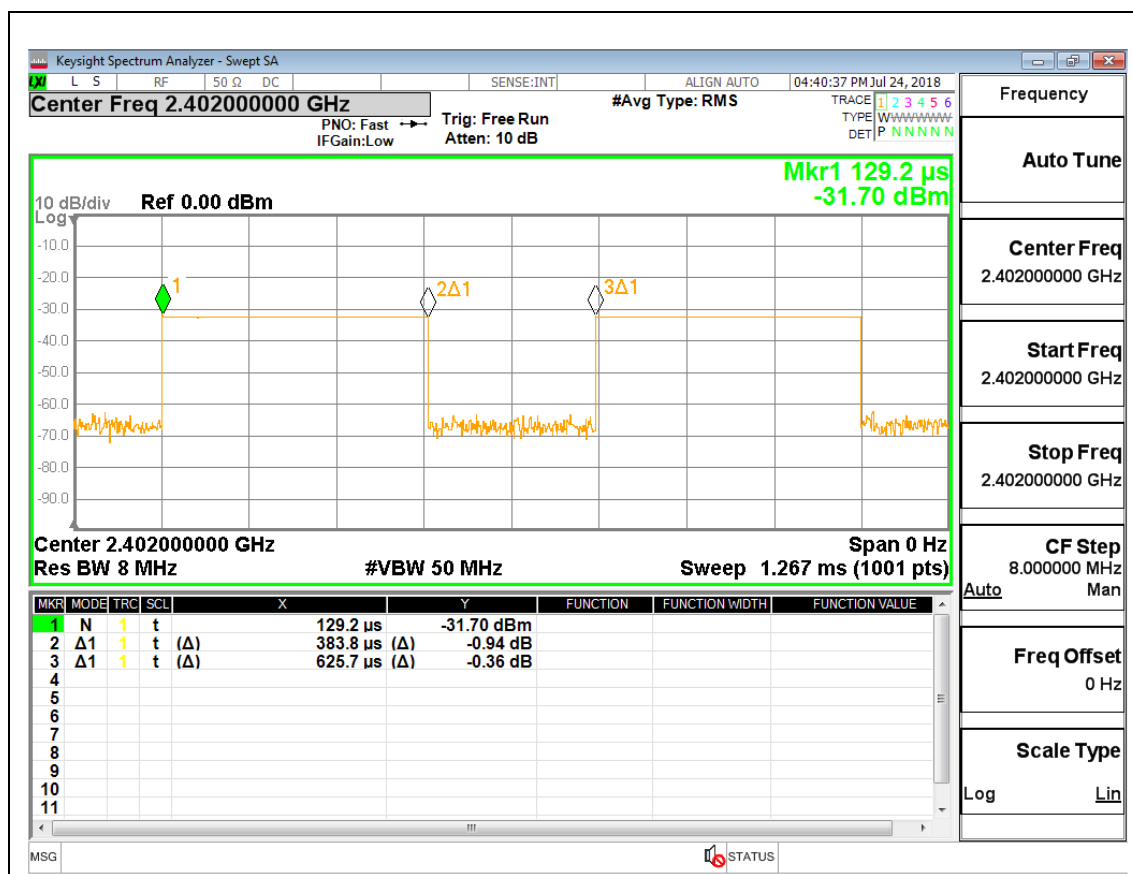
None; for reporting purposes only.

PROCEDURE

ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
2.4GHz Band						
BLE	0.384	0.626	0.613	61.34%	2.12	2.606

DUTY CYCLE PLOTS



8.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.036
Middle	2440	1.036
High	2480	1.036



8.3. 6 dB BANDWIDTH

LIMITS

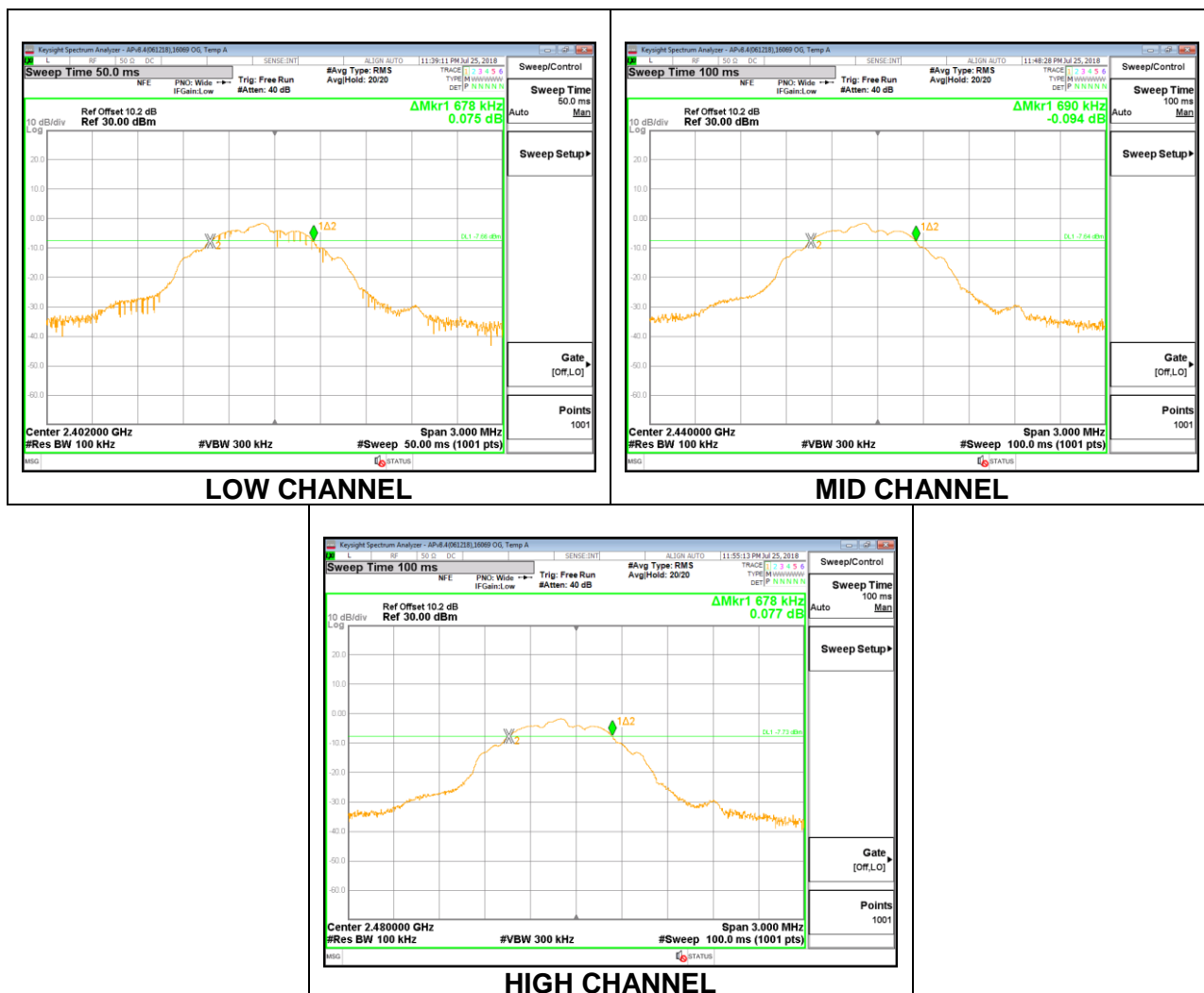
FCC §15.407 (e)

RSS-247 5.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.678	0.5
Middle	2440	0.690	0.5
High	2480	0.678	0.5



8.4. OUTPUT POWER

LIMITS

FCC §15.247 (b) (3)

RSS-247 5.4 (d)

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for a gated peak reading of power.

RESULTS

Tested By:	16069_OG
Date:	7/25/2018

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	-1.020	30	-31.020
Middle	2440	-0.964	30	-30.964
High	2480	-1.107	30	-31.107

8.5. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for a gated peak reading of power.

RESULTS

Tested By:	16069_OG
Date:	7/25/2018

Channel	Frequency (MHz)	AV power (dBm)
Low	2402	-1.370
Middle	2440	-1.390
High	2480	-1.460

8.6. POWER SPECTRAL DENSITY

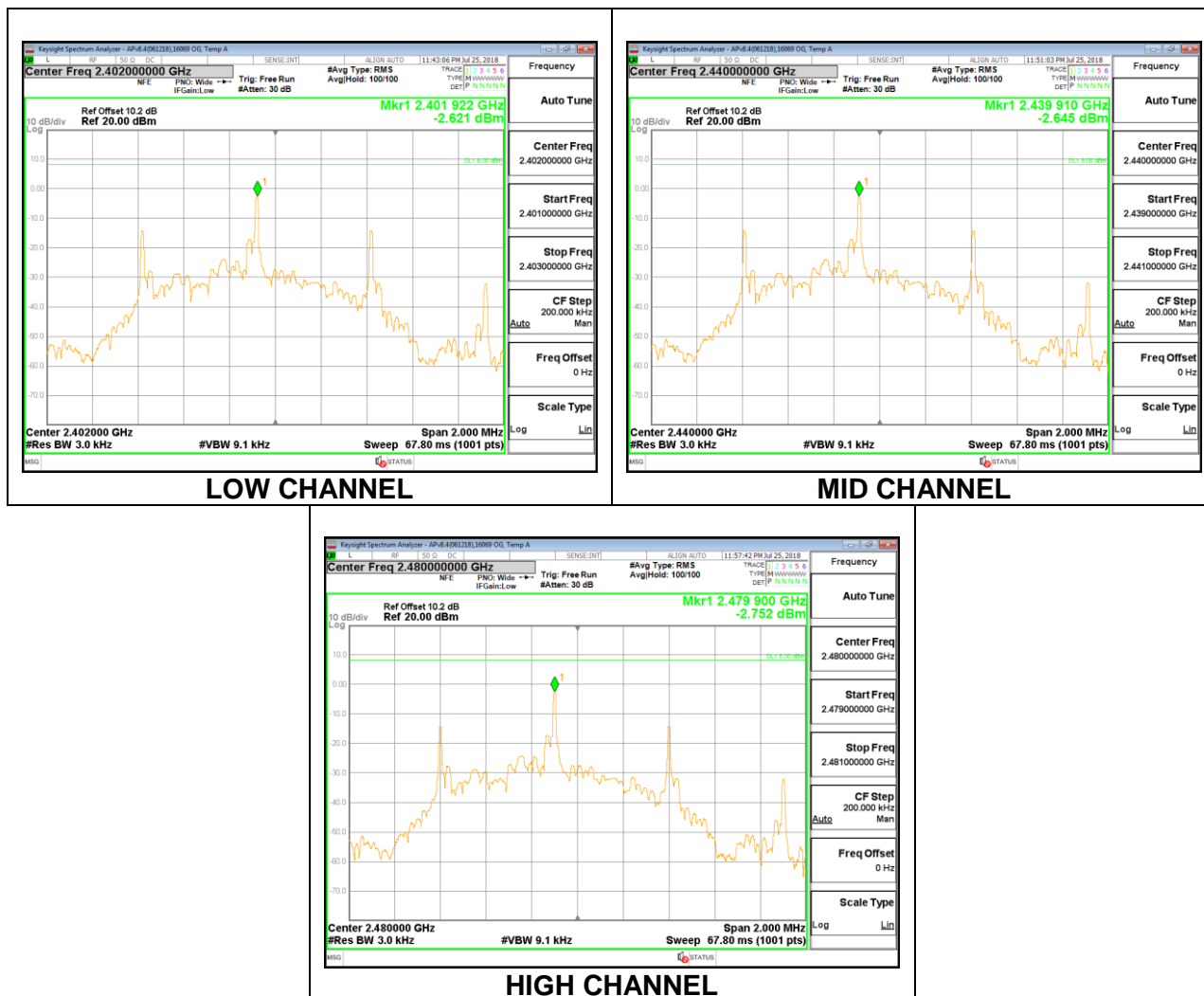
LIMITS

FCC §15.247 (e)
RSS-247 (5.2) (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

RESULTS

Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low	2402	-2.62	8	-10.62
Middle	2440	-2.65	8	-10.65
High	2480	-2.75	8	-10.75



8.7. CONDUCTED SPURIOUS EMISSIONS

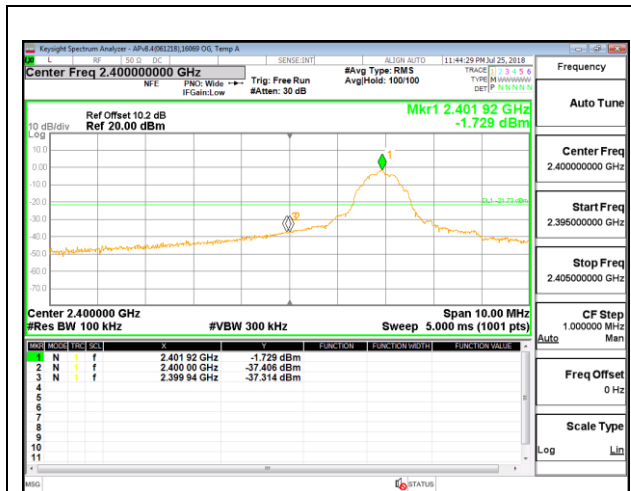
LIMITS

FCC §15.247 (d)

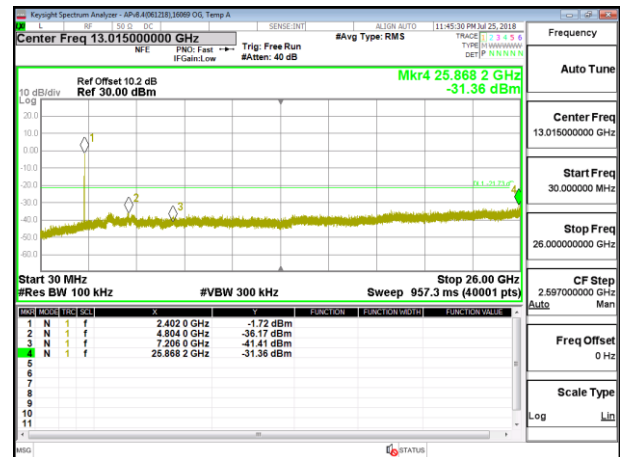
RSS-247 5.5

Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

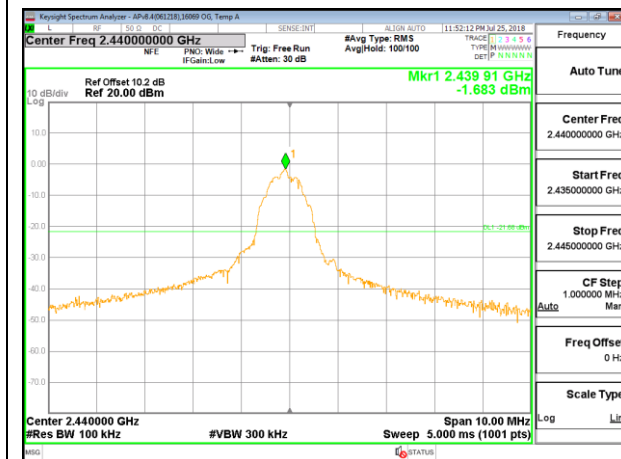
RESULTS



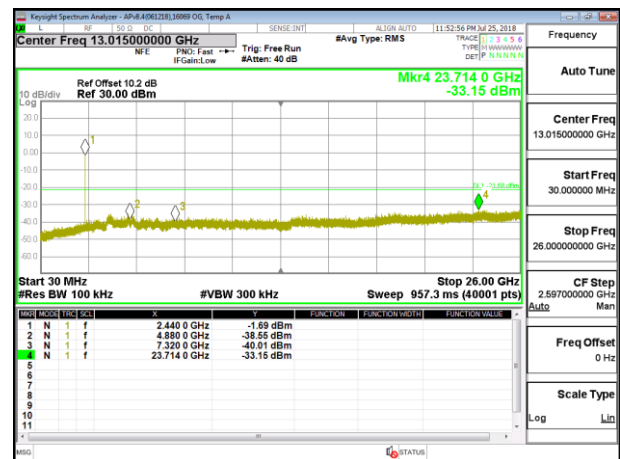
LOW CHANNEL BANDEDGE



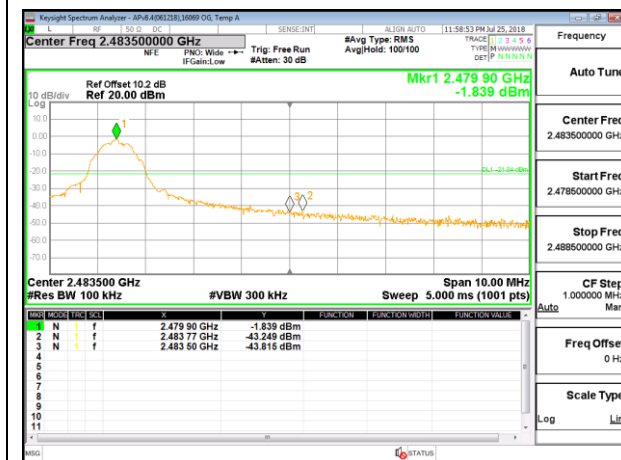
OUT-OF-BAND LOW CHANNEL



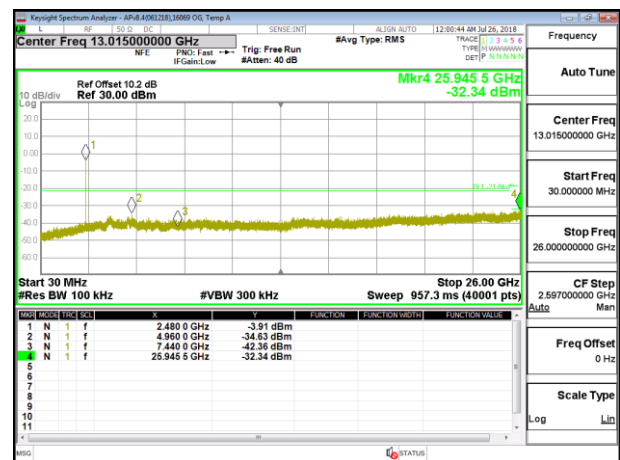
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL



HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL

9. RADIATED TEST RESULTS

9.1. LIMITS AND PROCEDURE

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

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 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.

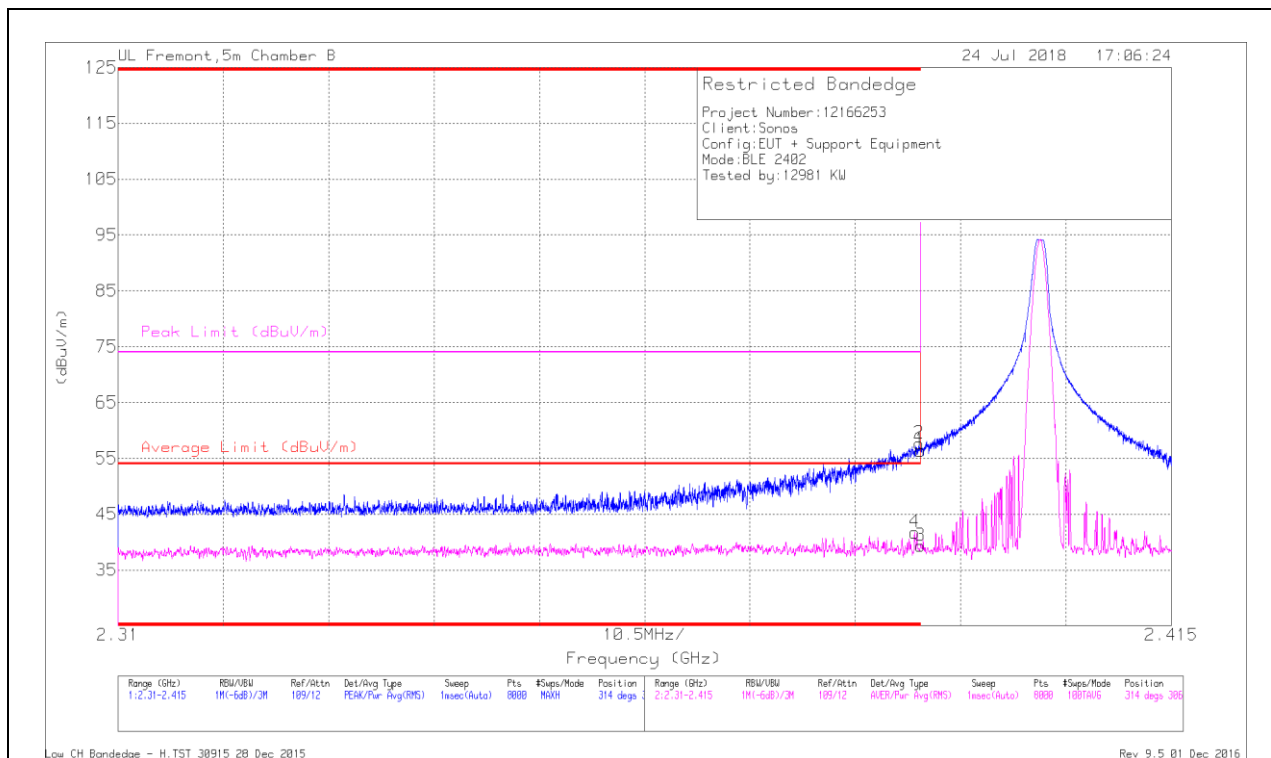
The spectrum from 1 GHz to 18 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band. Below 1GHz and above 18GHz emissions, the channel with the highest output power was tested.

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.

9.2. TRANSMITTER ABOVE 1 GHz

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



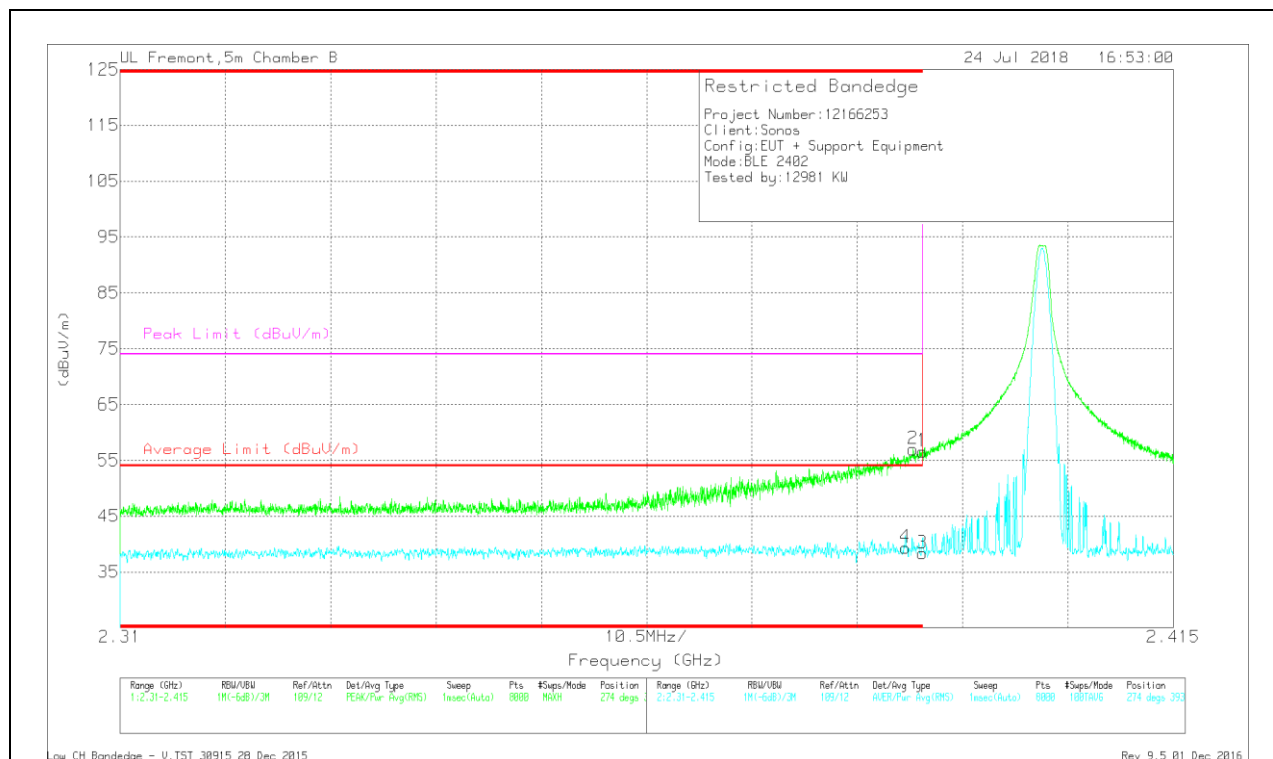
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cb/Filt/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 2.389	28.81	RMS	32.3	-21.5	2.12	41.73	54	-12.27	-	-	314	306	H
1	* 2.39	45.59	Pk	32.3	-21.5	0	56.39	-	-	74	-17.61	314	306	H
2	* 2.39	46.84	Pk	32.3	-21.5	0	57.64	-	-	74	-16.36	314	306	H
3	* 2.39	26.38	RMS	32.3	-21.5	2.12	39.3	54	-14.7	-	-	314	306	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dBm)	Amp/Ch/Filt/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	45.79	Pk	32.3	-21.5	0	56.59	-	-	74	-17.41	274	393	V
2	* 2.389	46.2	Pk	32.3	-21.5	0	57	-	-	74	-17	274	393	V
3	* 2.39	27.56	RMS	32.3	-21.5	2.12	40.48	54	-13.52	-	-	274	393	V
4	* 2.388	28.57	RMS	32.3	-21.5	2.12	41.49	54	-12.51	-	-	274	393	V

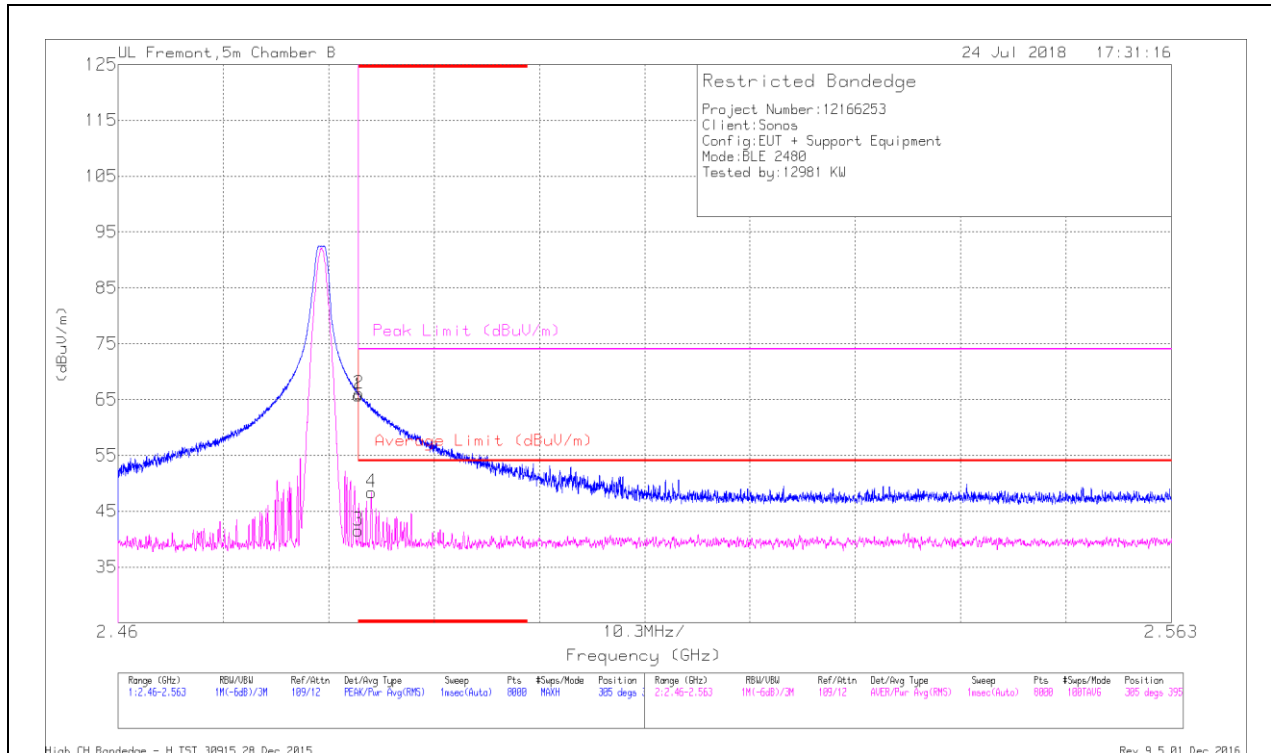
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



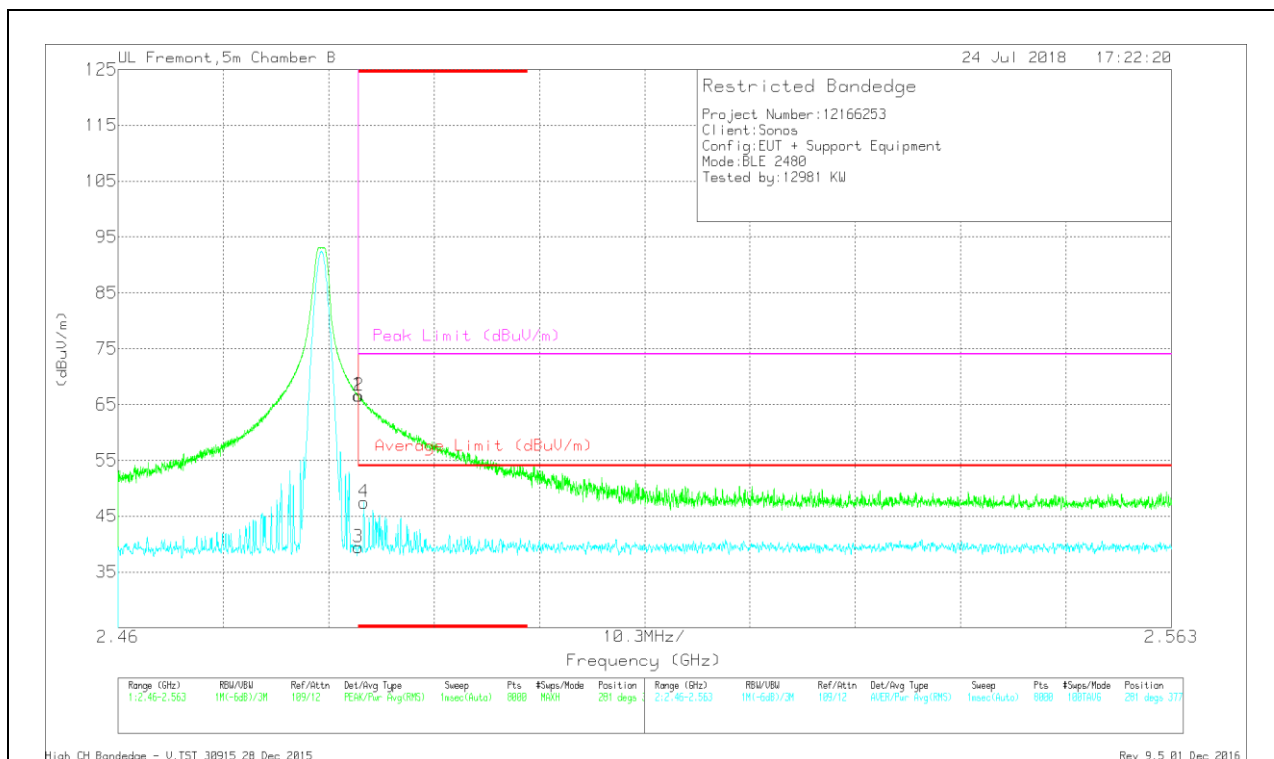
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dBm)	Amp/Cbl/Filt/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	54.63	Pk	32.6	-21.5	0	65.73	-	-	74	-8.27	305	395	H
2	* 2.484	54.99	Pk	32.6	-21.5	0	66.09	-	-	74	-7.91	305	395	H
3	* 2.484	28.35	RMS	32.6	-21.5	2.12	41.57	54	-12.43	-	-	305	395	H
4	* 2.485	35.17	RMS	32.6	-21.5	2.12	48.39	54	-5.61	-	-	305	395	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Ch/Filter/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	55.53	Pk	32.6	-21.5	0	66.63	-	-	74	-7.37	281	377	V
2	* 2.484	55.46	Pk	32.6	-21.5	0	66.56	-	-	74	-7.44	281	377	V
3	* 2.484	26.22	RMS	32.6	-21.5	2.12	39.44	54	-14.56	-	-	281	377	V
4	* 2.484	34.26	RMS	32.6	-21.5	2.12	47.48	54	-6.52	-	-	281	377	V

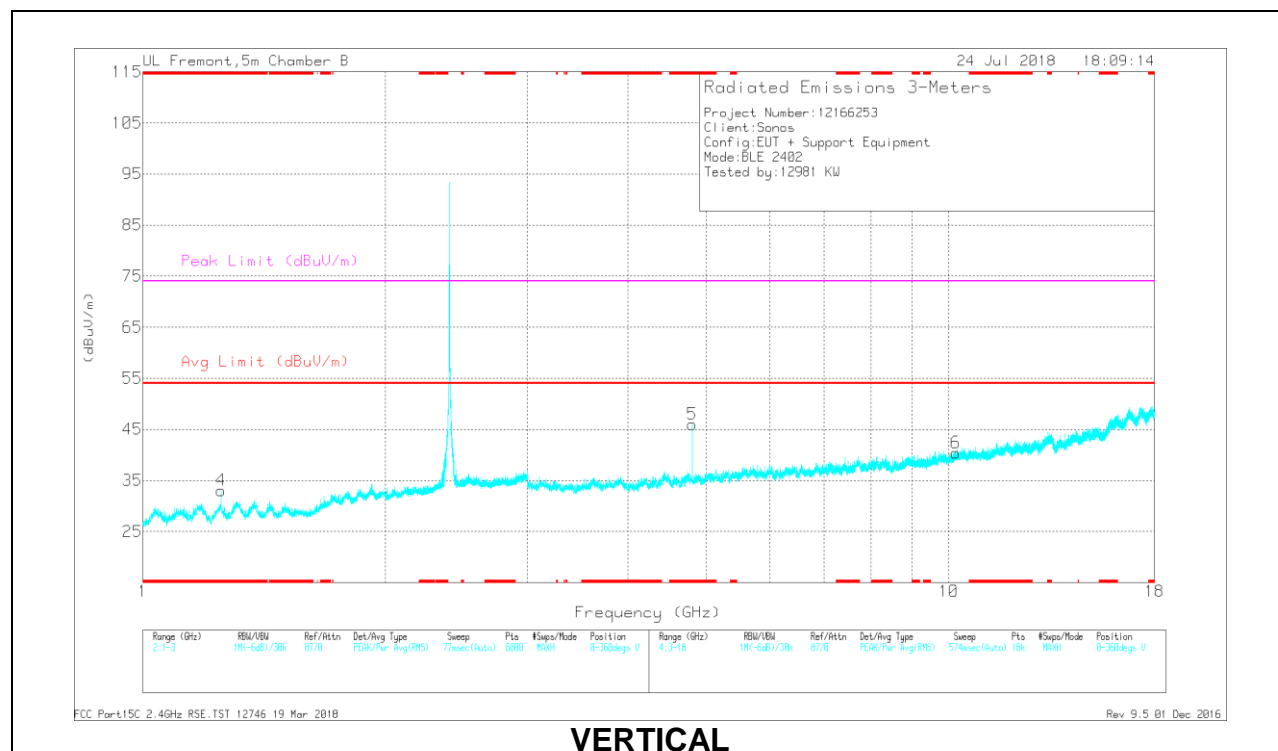
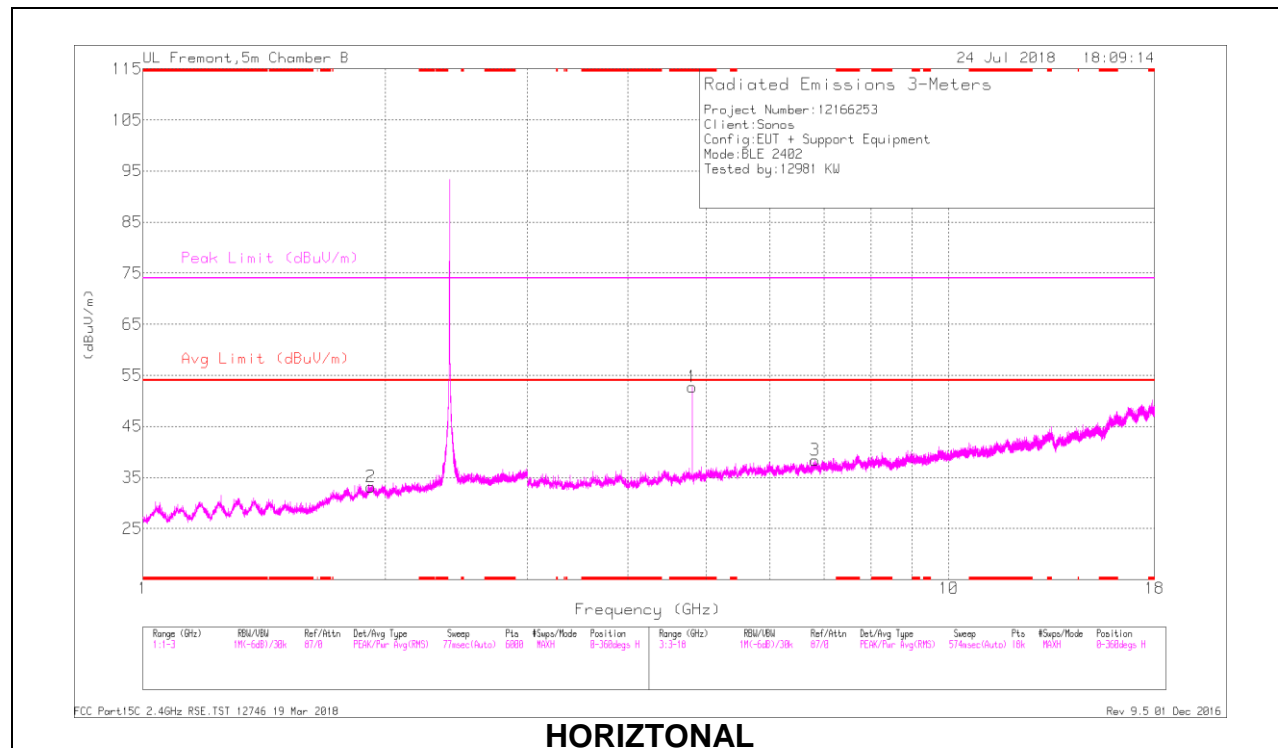
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



RADIATED EMISSIONS

Radiated Emissions

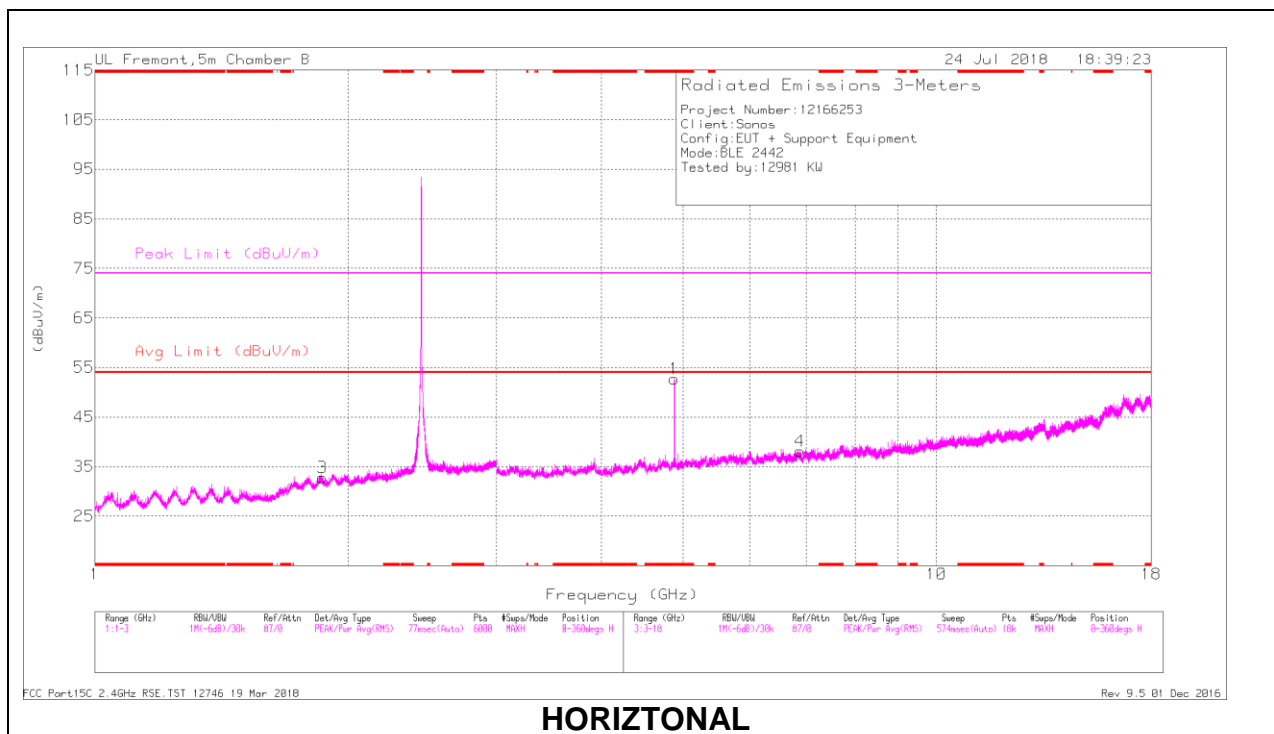
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/ Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.25	32.41	PK2	28.3	-22.4	0	38.31	-	-	74	-35.69	183	105	V
* 1.25	22.78	MAv1	28.3	-22.4	2.12	30.8	54	-23.2	-	-	183	105	V
* 4.803	51.8	PK2	34	-30.1	0	55.7	-	-	74	-18.3	147	307	H
* 4.804	46.66	MAv1	34	-30.1	2.12	52.68	54	-1.32	-	-	147	307	H
* 4.803	46.99	PK2	34	-30.1	0	50.89	-	-	74	-23.11	301	227	V
* 4.804	40.06	MAv1	34	-30.1	2.12	46.08	54	-7.92	-	-	301	227	V

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

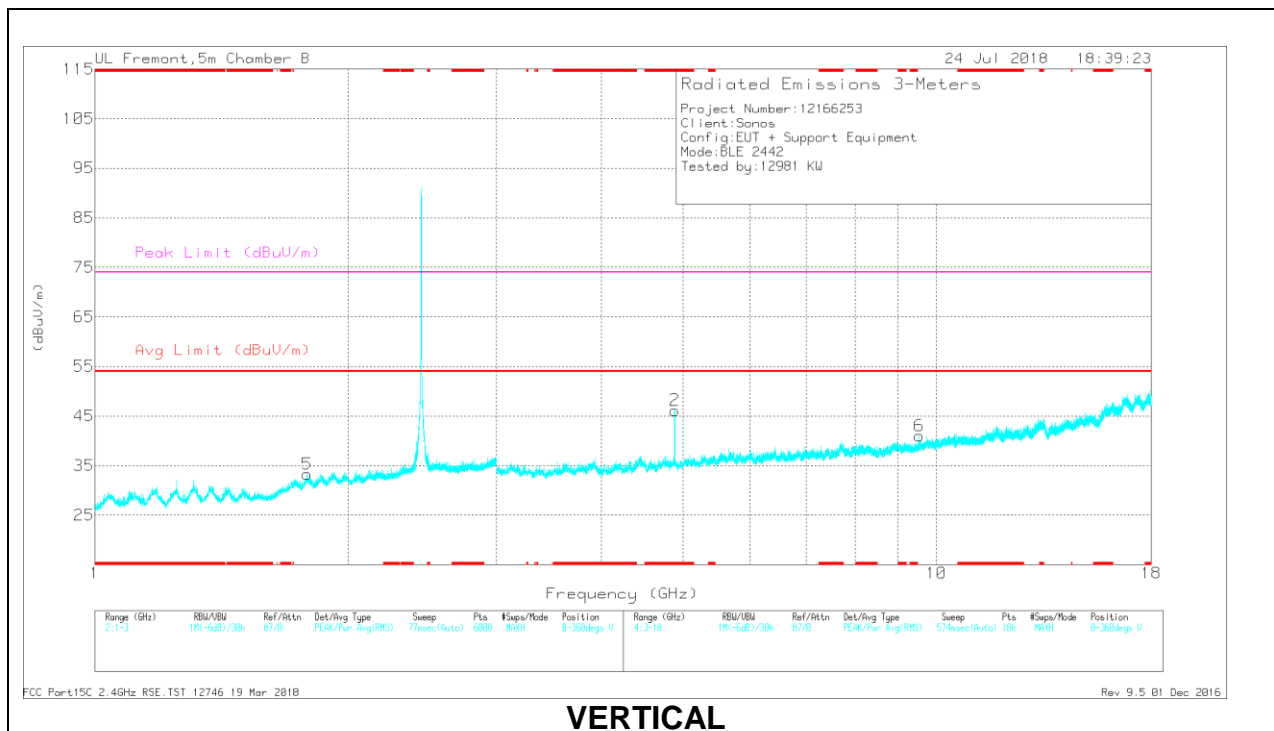
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

MID CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Radiated Emissions

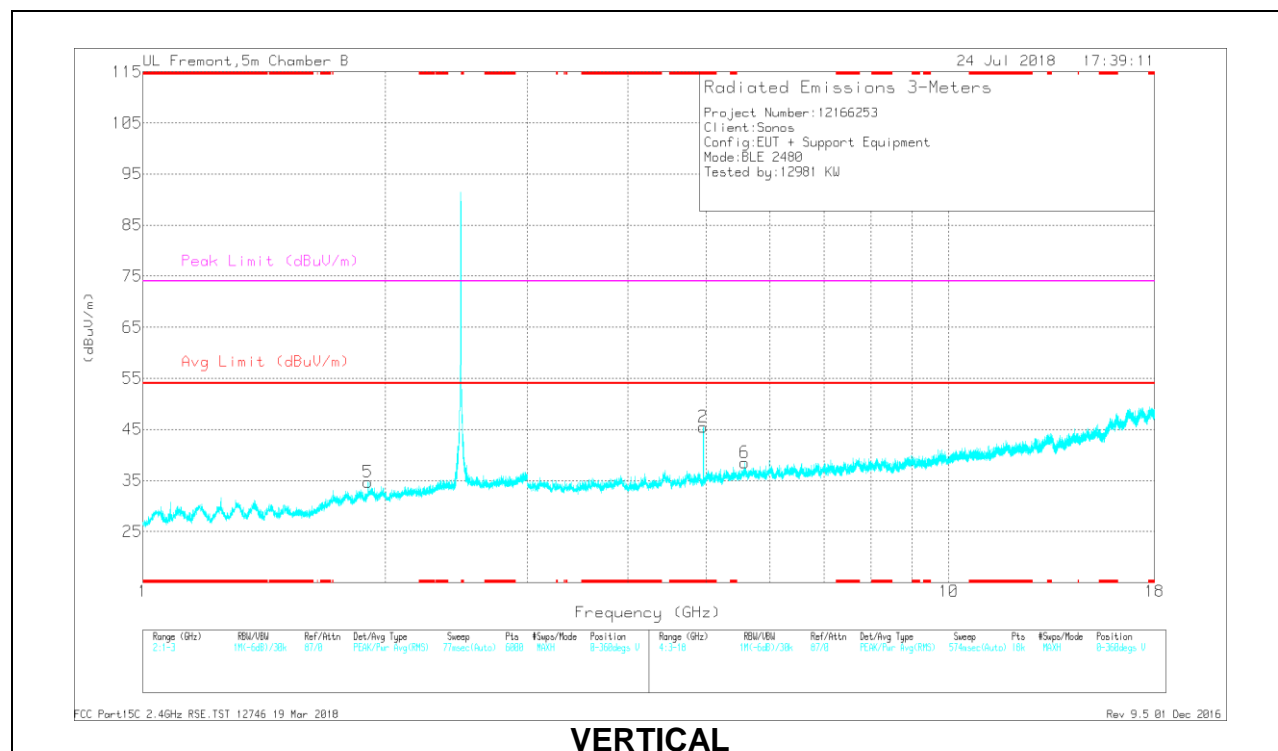
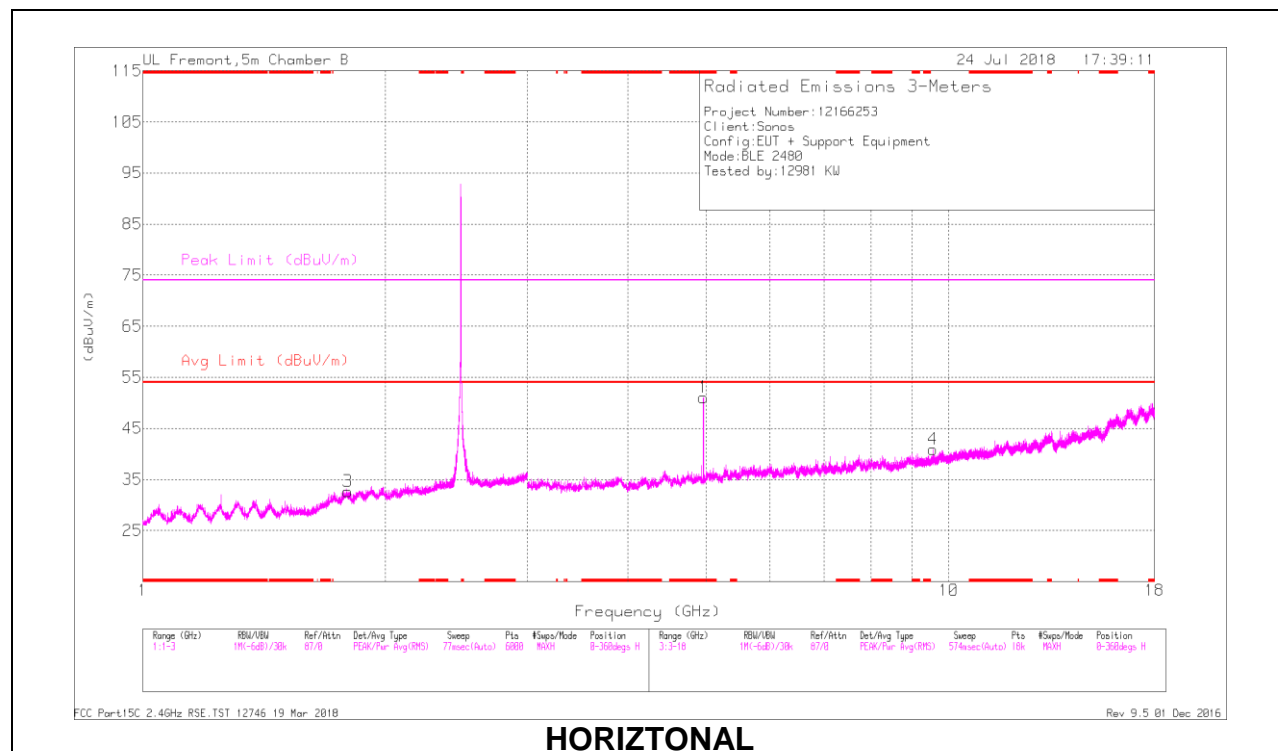
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/ Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.883	52.3	PK2	34.3	-31.4	0	55.2	-	-	74	-18.8	138	256	H
* 4.884	47.28	MAv1	34.3	-31.4	2.12	52.3	54	-1.7	-	-	138	256	H
* 4.883	49.61	PK2	34.3	-31.4	0	52.51	-	-	74	-21.49	282	335	V
* 4.884	44.06	MAv1	34.3	-31.4	2.12	49.08	54	-4.92	-	-	282	335	V

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

HIGH CHANNEL RESULTS



RADIATED EMISSIONS

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/ Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.96	52.45	PK2	34.5	-30.9	0	56.05	-	-	74	-17.95	135	279	H
* 4.96	47.68	MAv1	34.5	-30.9	2.12	53.4	54	-.6	-	-	135	279	H
* 4.959	48.4	PK2	34.5	-30.9	0	52	-	-	74	-22	285	321	V
* 4.96	42.92	MAv1	34.5	-30.9	2.12	48.64	54	-5.36	-	-	285	321	V

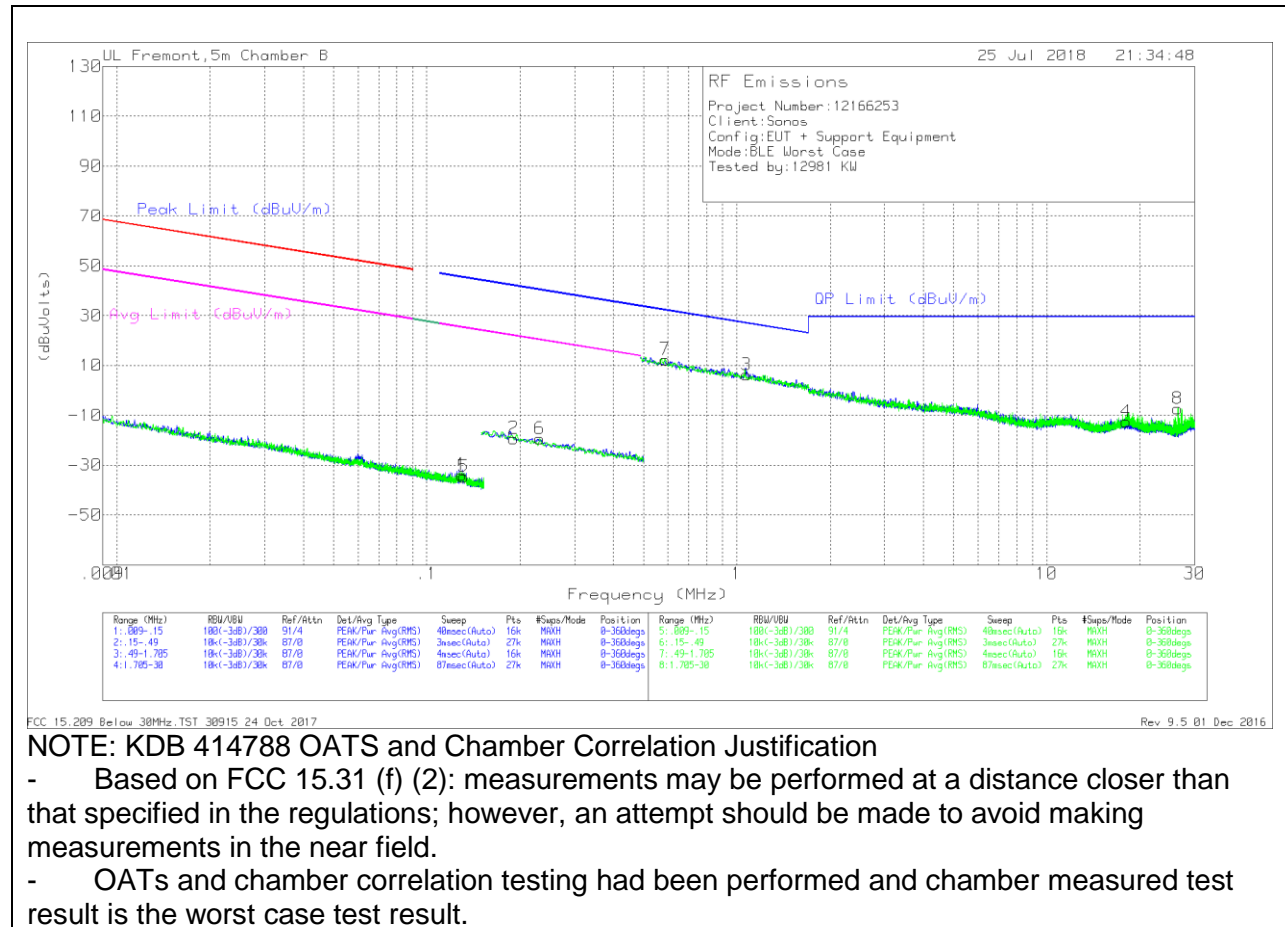
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

9.3. Worst Case Below 30 MHz

SPURIOUS EMISSIONS 9 kHz TO 30 MHz (WORST-CASE CONFIGURATION)



Below 30 MHz Data

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cbl (dB)	Dist Corr 300m	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	.1296	30.64	Pk	14	1.4	-80	-33.96	45.37	-79.33	25.37	-59.33	0-360
5	.13154	29.97	Pk	14	1.4	-80	-34.63	45.24	-79.87	25.24	-59.87	0-360
2	.19066	45.29	Pk	13.9	1.5	-80	-19.31	42.01	-61.32	22.01	-41.32	0-360
6	.23144	45.17	Pk	13.9	1.5	-80	-19.43	40.33	-59.76	20.33	-39.76	0-360

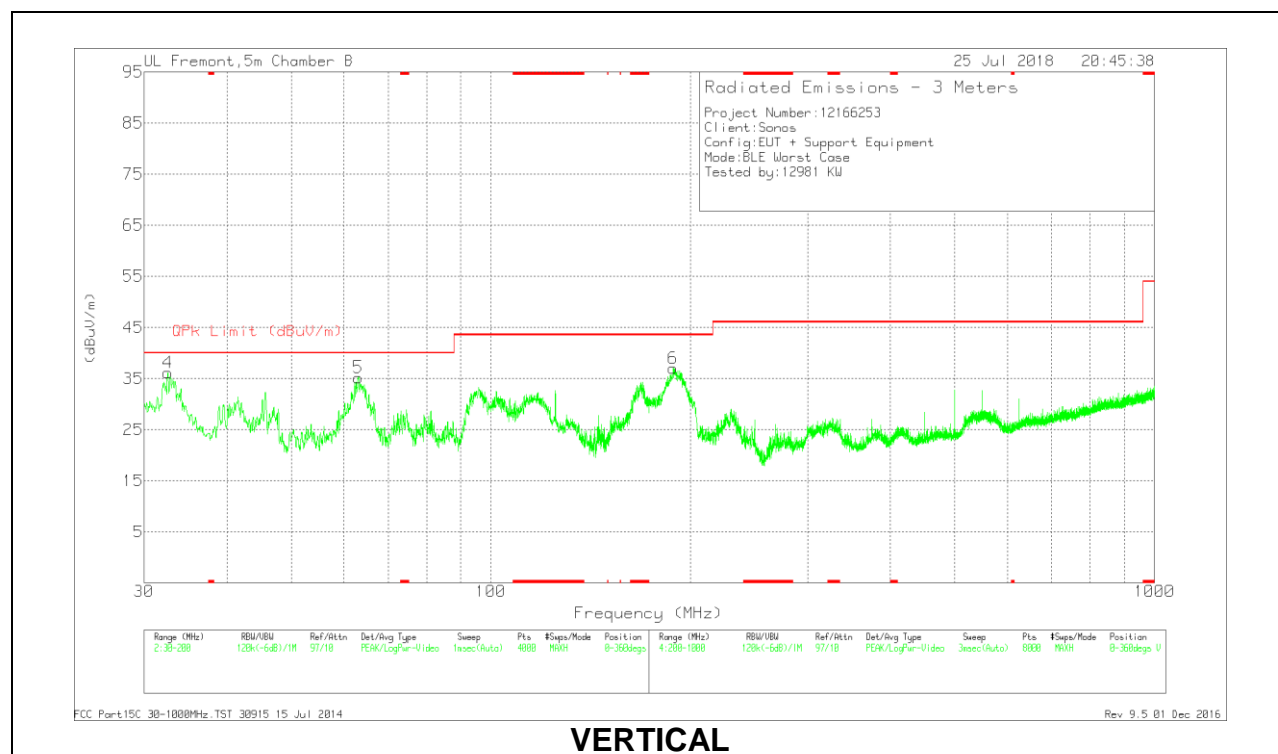
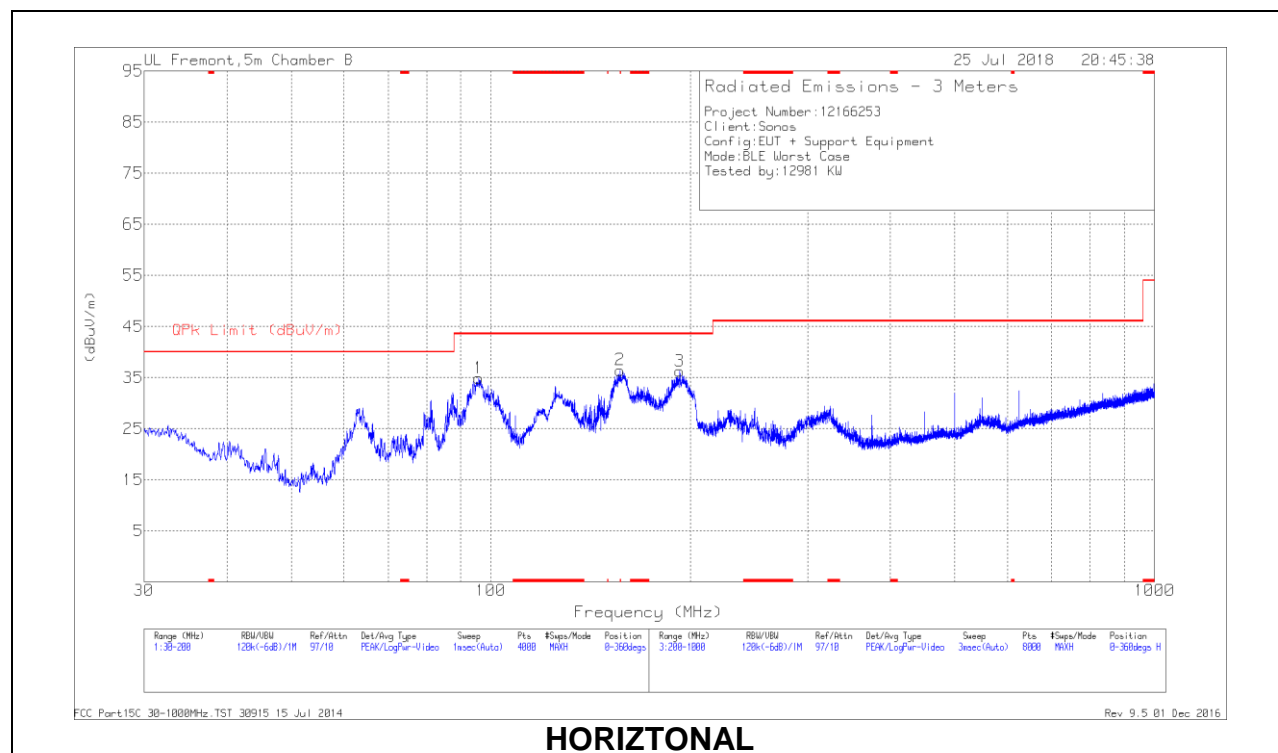
Pk - Peak detector

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cbl (dB)	Dist Corr (dB) 40Log	Corrected Reading (dBuV/m)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
7	.58736	36.86	Pk	14	1.5	-40	12.36	32.23	-19.87	0-360
3	1.07543	30.42	Pk	14.3	1.5	-40	6.22	26.99	-20.77	0-360
4	18.04856	11.16	Pk	14.6	1.6	-40	-12.64	29.5	-42.14	0-360
8	26.48706	18.03	Pk	12.9	1.7	-40	-7.37	29.5	-36.87	0-360

Pk - Peak detector

9.4. Worst Case Below 1 GHz

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

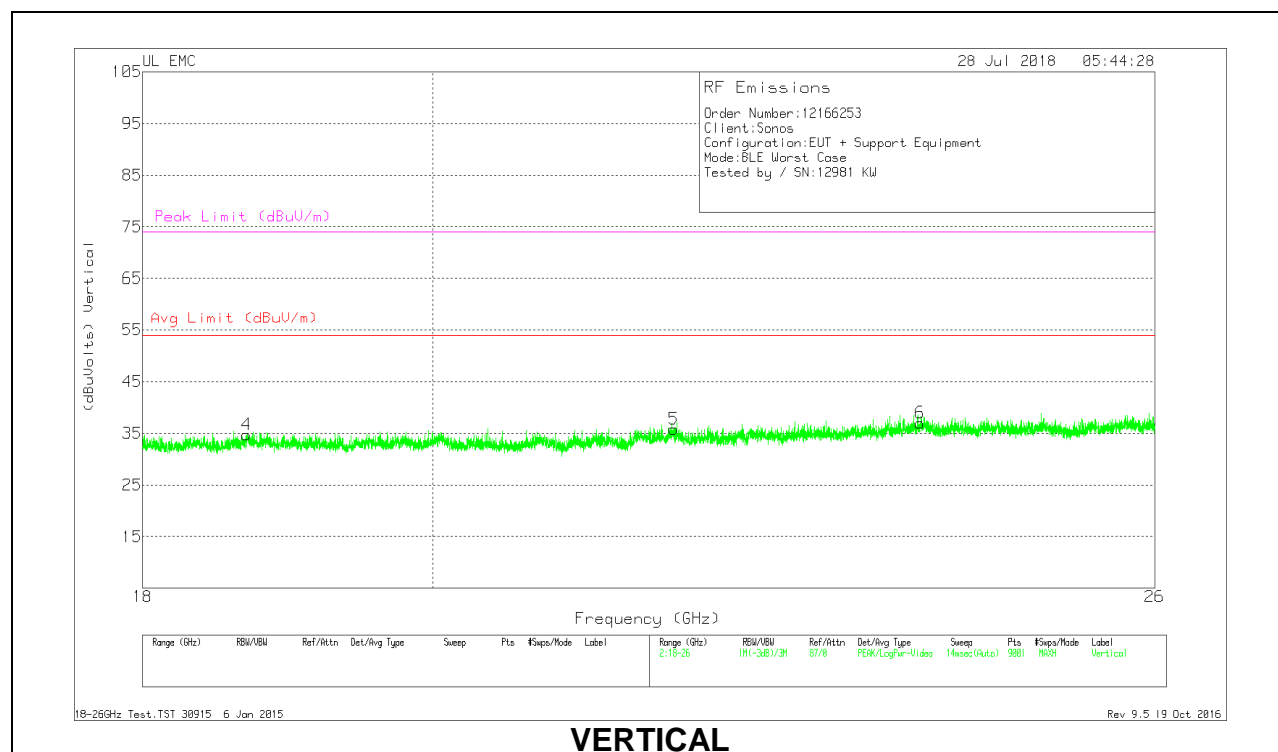
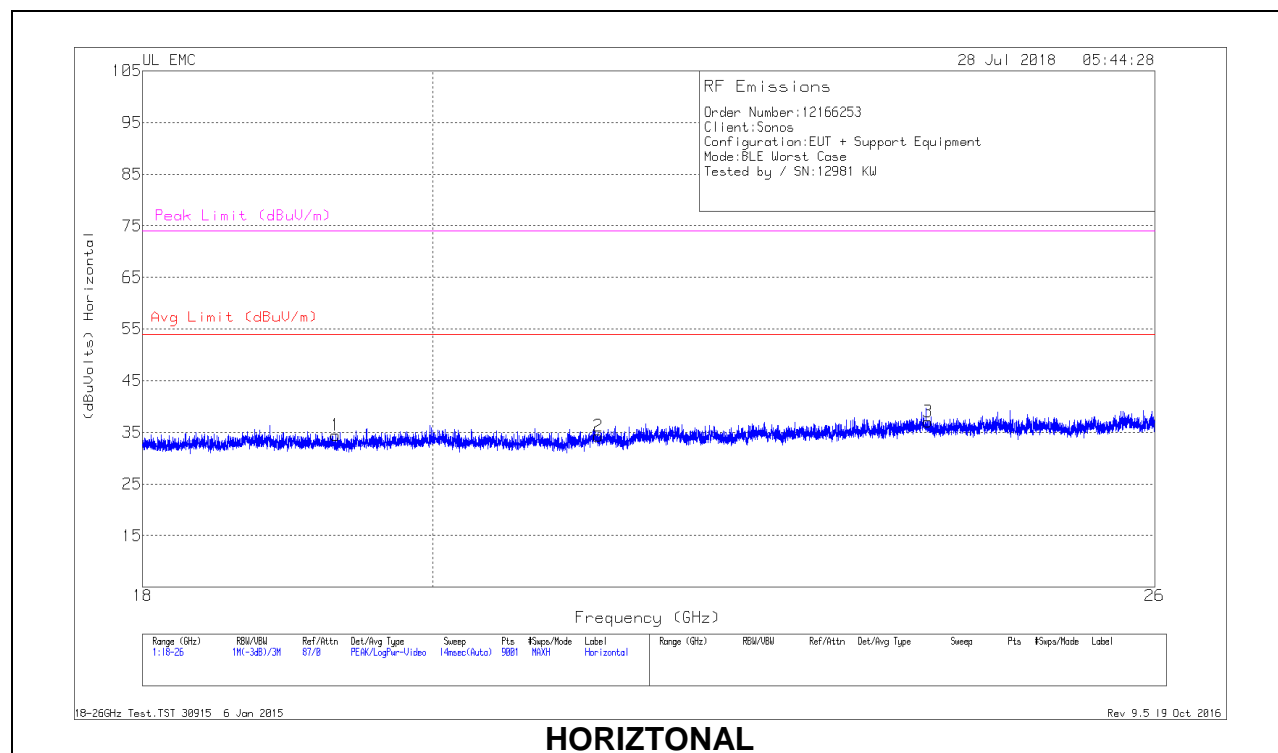


Below 1GHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T407 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	32.5932	41.61	Pk	23.3	-28.8	36.11	40	-3.89	0-360	100	V
5	63.0736	51.66	Pk	11.9	-28.4	35.16	40	-4.84	0-360	100	V
1	95.8708	49.67	Pk	13.2	-28	34.87	43.52	-8.65	0-360	300	H
2	156.6403	47.45	Pk	16.3	-27.3	36.45	43.52	-7.07	0-360	200	H
6	188.2259	48.8	Pk	15.2	-27	37	43.52	-6.52	0-360	100	V
3	192.5408	47.68	Pk	15.5	-26.9	36.28	43.52	-7.24	0-360	100	H

9.5. Worst Case 18-26 GHz

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



18 – 26GHz DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T89 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	19.309	36.64	Pk	32.4	-25.1	-9.5	34.44	54	-19.56	74	-39.56
2	21.241	35.87	Pk	33.2	-25.3	-9.5	34.27	54	-19.73	74	-39.73
3	23.945	37.36	Pk	33.4	-24.2	-9.5	37.06	54	-16.94	74	-36.94
4	18.693	35.88	Pk	32.5	-24.2	-9.5	34.68	54	-19.32	74	-39.32
5	21.832	36.91	Pk	33.3	-24.9	-9.5	35.81	54	-18.19	74	-38.19
6	23.878	37.07	Pk	33.5	-24.1	-9.5	36.97	54	-17.03	74	-37.03

10. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

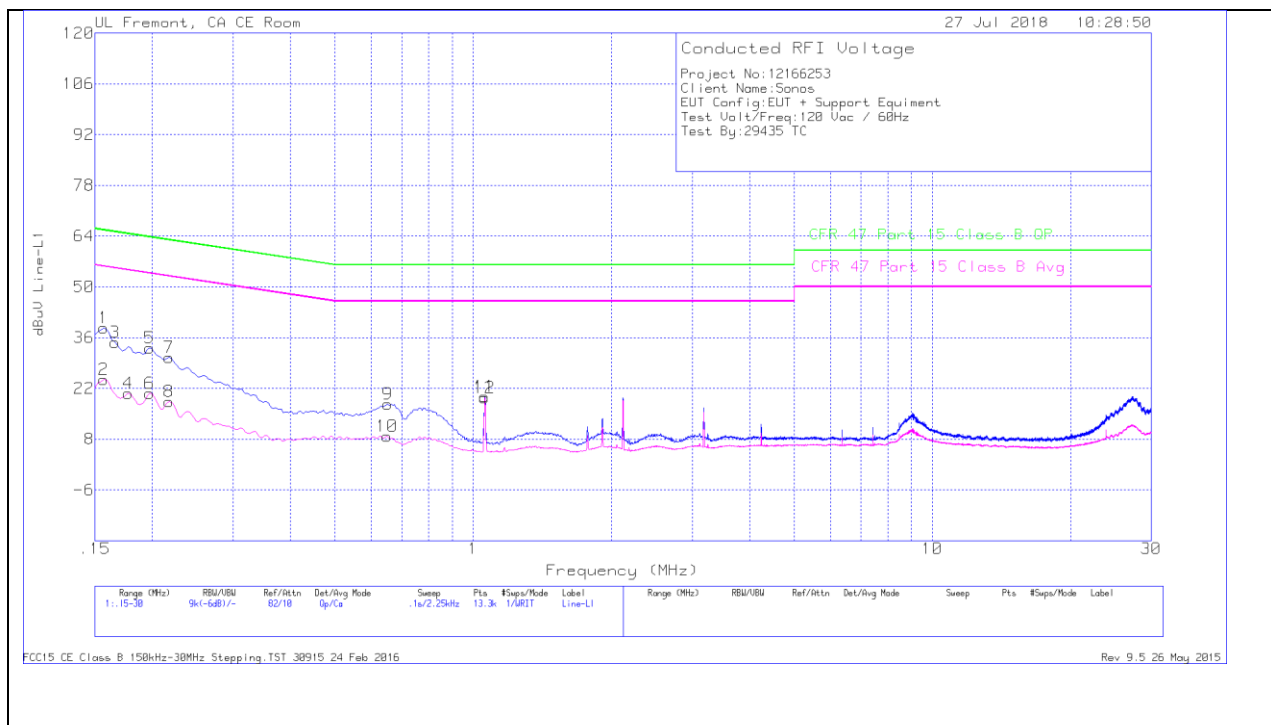
RSS-Gen 8.8

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	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

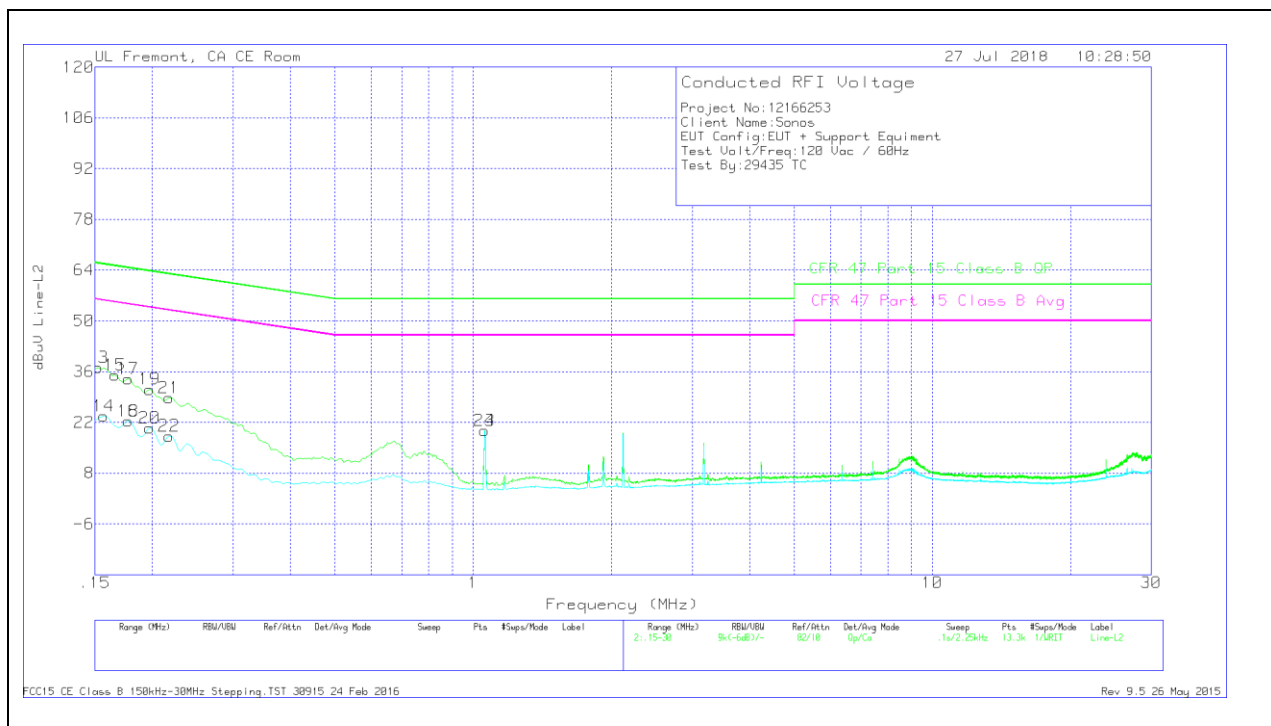


Trace Markers

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	.15675	28.5	Qp	.1	0	10.1	38.7	65.63	-26.93	-	-
2	.15675	14.19	Ca	.1	0	10.1	24.39	-	-	55.63	-31.24
3	.16575	24.48	Qp	.1	0	10.1	34.68	65.17	-30.49	-	-
4	.177	10.56	Ca	0	0	10.1	20.66	-	-	54.63	-33.97
5	.19725	22.99	Qp	0	0	10.1	33.09	63.73	-30.64	-	-
6	.19725	10.55	Ca	0	0	10.1	20.65	-	-	53.73	-33.08
7	.2175	20.46	Qp	0	0	10.1	30.56	62.91	-32.35	-	-
8	.2175	8.22	Ca	0	0	10.1	18.32	-	-	52.91	-34.59
9	.65175	7.58	Qp	0	0	10.1	17.68	56	-38.32	-	-
10	.6495	-1.32	Ca	0	0	10.1	8.78	-	-	46	-37.22
11	1.059	9.63	Qp	0	.1	10.1	19.83	56	-36.17	-	-
12	1.059	9.21	Ca	0	.1	10.1	19.41	-	-	46	-26.59

Qp - Quasi-Peak detector
Ca - CISPR average detection

LINE 2 RESULTS



Trace Markers

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	26.88	Qp	.1	0	10.1	37.08	65.88	-28.8	-	-
14	.15675	13.56	Ca	.1	0	10.1	23.76	-	-	55.63	-31.87
15	.16575	24.79	Qp	.1	0	10.1	34.99	65.17	-30.18	-	-
16	.177	12.31	Ca	0	0	10.1	22.41	-	-	54.63	-32.22
17	.177	23.93	Qp	0	0	10.1	34.03	64.63	-30.6	-	-
18	.177	12.31	Ca	0	0	10.1	22.41	-	-	54.63	-32.22
19	.19725	21.04	Qp	0	0	10.1	31.14	63.73	-32.59	-	-
20	.19725	10.39	Ca	0	0	10.1	20.49	-	-	53.73	-33.24
21	.2175	18.77	Qp	0	0	10.1	28.87	62.91	-34.04	-	-
22	.2175	8.17	Ca	0	0	10.1	18.27	-	-	52.91	-34.64
23	1.059	9.63	Qp	0	.1	10.1	19.83	56	-36.17	-	-
24	1.059	9.51	Ca	0	.1	10.1	19.71	-	-	46	-26.29

Qp - Quasi-Peak detector

Ca - CISPR average detection