CERTIFICATION TEST REPORT

Report Number. : 12552285-E2V1

Applicant	:	SONOS INC. 614 CHAPALA STREET SANTA BARBARA, CA 93101, U.S.A
Model	:	S22
FCC ID	:	SBVRM016
IC	:	5373A-RM016
EUT Description	:	802.11a/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:
April 12, 2019

Prepared by:
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REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	4/12/2019	Initial Issue	-

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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: S22

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

DATE TESTED: January 14 to 23, 2019

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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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 v05, KDB 662911 D01 v02r01, 662911 D02 MIMO v01, 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
☒ Chamber A (ISED:2324B-1)	☐ Chamber D (ISED:22541-1)	☒ Chamber I (ISED:2324A-5)
☒ Chamber B (ISED:2324B-2)	☐ Chamber E (ISED:22541-2)	☐ Chamber J (ISED:2324A-6)
☐ Chamber C (ISED:2324B-3)	☐ Chamber F (ISED:22541-3)	☐ Chamber K (ISED:2324A-1)
	☐ Chamber G (ISED:22541-4)	☐ Chamber L (ISED:2324A-3)
	☐ Chamber H (ISED: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

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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:

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

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%.

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5. EQUIPMENT UNDER TEST

5.1. EUT DESCRIPTION

The EUT is 802.11a/b/g/n HT20 CLIENT DEVICE.

5.2. MAXIMUM OUTPUT POWER

2.4GHz BAND

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2412 - 2462	802.11b 2TX	22.12	162.93
2412 - 2462	802.11g 2TX	20.99	125.60
2412 - 2462	802.11n HT20 2TX	20.62	115.35

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes the antennas with maximums gain per chain as follows:

Frequency (MHz)	Peak Antenna Gain (dBi)	
	Chain 0 (Vertica Polarization)	Chain 1 (Vertica Polarization)
2400 – 2483.5	1.4	0.1

5.4. SOFTWARE AND FIRMWARE

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

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

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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.

Worst-case data rates as provided by the client were:
802.11b mode: 11 Mbps
802.11g mode: 24 Mbps
802.11n HT20mode: MCS9

5.6. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

This is to request a class II permissive change for FCC ID: SBVRM016 original grated on 12/31/2018.

The major change filed under this application is:

Change#1: The S18 and S22 share the same MediaTek MT7615 radio board. The 18 is 3x3 where as the S22 is a 2x2, both models use the same Chain 0 and 1 antennas.

Change#2 Antenna gain has changed as shown below:

S18 Max Antenna Gain dBi				
Frequency	**Chain 0**	**Chain 1**	**Chain 2**	**Type**
2412 - 2472	2.1	1.4	1.17	WLAN
5180 - 5859	0.6	2.6	NA	
2412 - 2472	3.9	NA	NA	BLE

S22 Max Antenna Gain dBi				
Frequency	**Chain 0**	**Chain 1**		**Type**
2412 - 2472	1.4	0.1		WLAN
5180 - 5859	1.65	1.7		
2412 - 2472	4.1	NA		BLE

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5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop	Lenovo	X230	SON-00001034	N/A
AC Adapter	Lenovo	ADLX65NCT2A	11S36200293ZZ10034A2ZK	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

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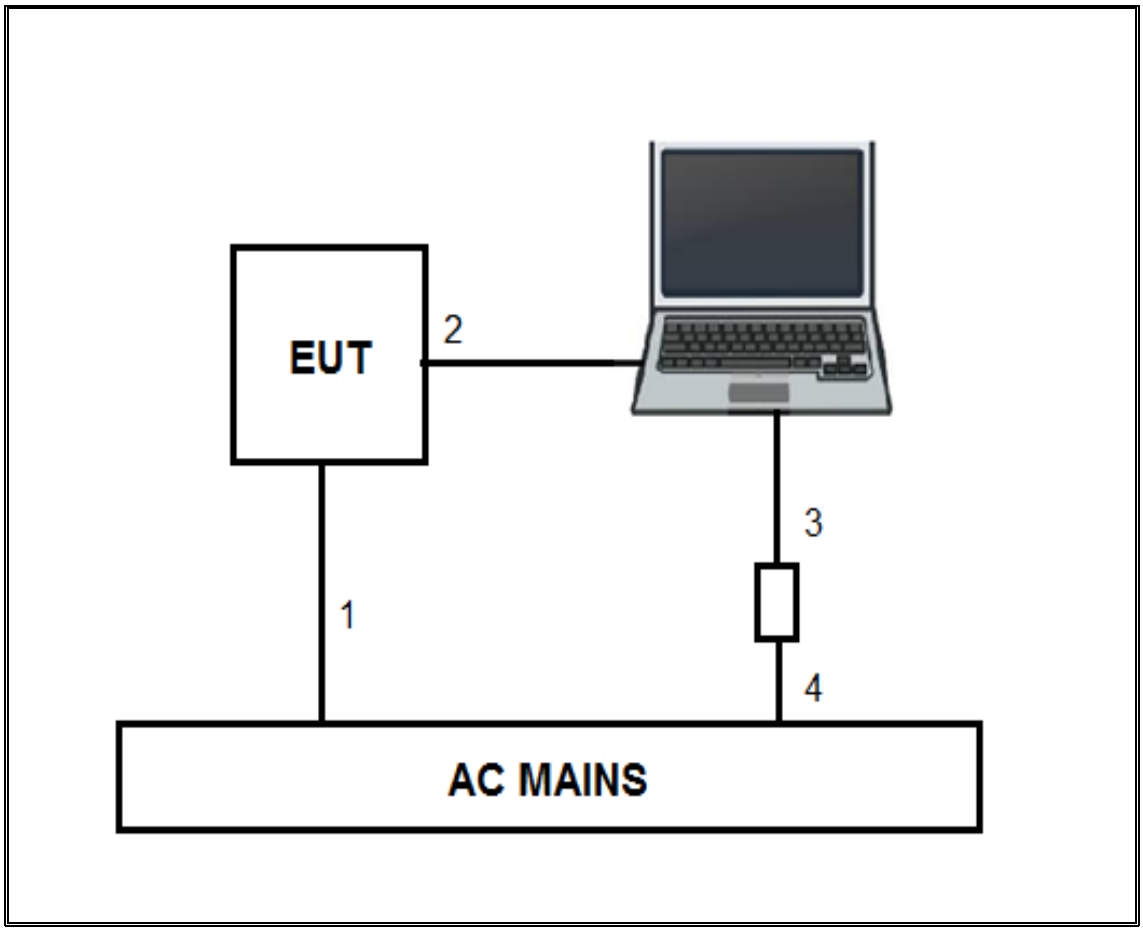
TEST SETUP

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

SETUP DIAGRAM



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6. MEASUREMENT METHOD

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

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

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.

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

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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**
Power Meter, P-series single channel	Agilent (Keysight) Technologies	N1911A	T1271	07/26/2019
Amplifier, 9KHz to 1GHz, 32dB	SONOMA INSTRUMENT	310	PRE0180175	07/09/2019
Hybrid Antenna, 30MHz to 3GHz	SunAR rf motion	JB3	PRE0184971	11/13/2019
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T863	06/21/2019
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T862	05/24/2019
RF Amplifier	MITEQ	AFS42-00101800-25-S-42	T1165	12/01/2019
RF Amplifier	MITEQ	AFS42-00101800-25-S-42	T171460	08/01/2019
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, PSA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T1466	04/16/2019
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	PRE0180917	4/25/2019
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	PRE0165308	01/08/2020
18 - 26.5 GHz Horn Antenna	Seavey Division	MWH-1826/B	T447	06/16/2019
Pre-Amp 1-26.5 GHz	ARA	8449B	T404	03/09/2019
EMI Reciever	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

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8. ANTENNA PORT TEST RESULTS

8.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 789033 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/B Minimum VBW (kHz)
2.4GHz Band						
802.11b	0.820	0.842	0.974	97.39%	0.11	1.220
802.11g	0.443	0.471	0.941	94.08%	0.27	2.256
802.11n HT20	0.352	0.380	0.926	92.63%	0.33	2.841

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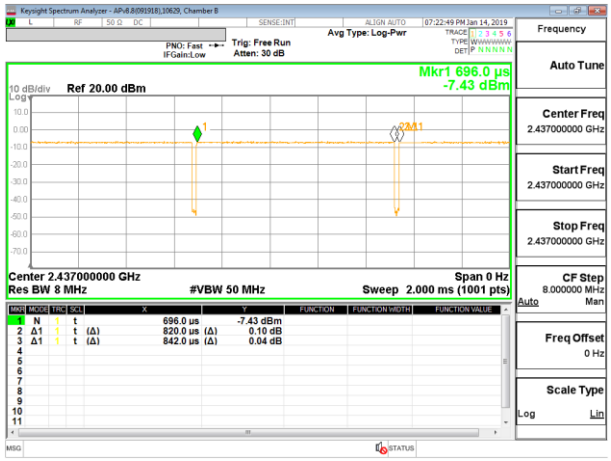
DUTY CYCLE PLOTS



DUTY CYCLE 802.11b MODE

DUTY CYCLE 802.11g MODE

DUTY CYCLE 802.11n HT20 MODE

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8.2. OUTPUT POWER

LIMITS

FCC §15.247 (b) (3)

RSS-247 5.4 (d)

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The transmitter output is connected to a power meter.The cable assembly insertion loss was entered as an offset in the power meter to allow for a gated Average reading of power.

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DIRECTIONAL ANTENNA GAIN

For 2 TX the directional gains are as follows:

Vertial Polarizaton

Band (GHz)	Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)	Correlated Chains Directional Gain (dBi)
2.4	1.40	0.10	0.80	3.78

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RESULTS

8.2.1. 802.11b MODE

2TX CDD MODE

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC/ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	0.80	30.00	36	30.00
Mid 6	2437	0.80	30.00	36	30.00
High 11	2462	0.80	30.00	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	19.35	18.85	22.12	30.00	-7.88
Mid 6	2437	19.24	18.67	21.97	30.00	-8.03
High 11	2462	19.19	18.79	22.00	30.00	-8.00

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8.2.2. 802.11g MODE

2TX CDD MODE

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC/ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	0.80	30.00	36	30.00
Low 2	2417	0.80	30.00	36	30.00
Mid 6	2437	0.80	30.00	36	30.00
High 10	2457	0.80	30.00	36	30.00
High 11	2462	0.80	30.00	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	15.74	15.56	18.66	30.00	-11.34
Low 2	2417	17.38	17.15	20.28	30.00	-9.72
Mid 6	2437	17.85	17.59	20.73	30.00	-9.27
High 10	2457	18.12	17.84	20.99	30.00	-9.01
High 11	2462	16.90	16.77	19.85	30.00	-10.15

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8.2.3. 802.11n HT20 MODE

2TX CDD MODE

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC/ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	0.80	30.00	36	30.00
Low 2	2417	0.80	30.00	36	30.00
Mid 6	2437	0.80	30.00	36	30.00
High 10	2457	0.80	30.00	36	30.00
High 11	2462	0.80	30.00	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	14.00	14.00	17.01	30.00	-12.99
Low 2	2417	17.48	17.20	20.35	30.00	-9.65
Mid 6	2437	17.92	17.28	20.62	30.00	-9.38
High 10	2457	17.33	17.20	20.28	30.00	-9.72
High 11	2462	14.11	13.94	17.04	30.00	-12.96

***Note**: Please refer to UL 12166253-E2 report for the rest of conducted test items (99% bandwidth, 6dB bandwidth,Power Density, Conducted Spurious Emissions & AC Power Line Conducted Emissions)*

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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

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.

2D antenna use - For below 30MHz testing, investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel), parallel and perpendicular are the worst orientations, therefore testing was performed on these two orientations only.

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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.

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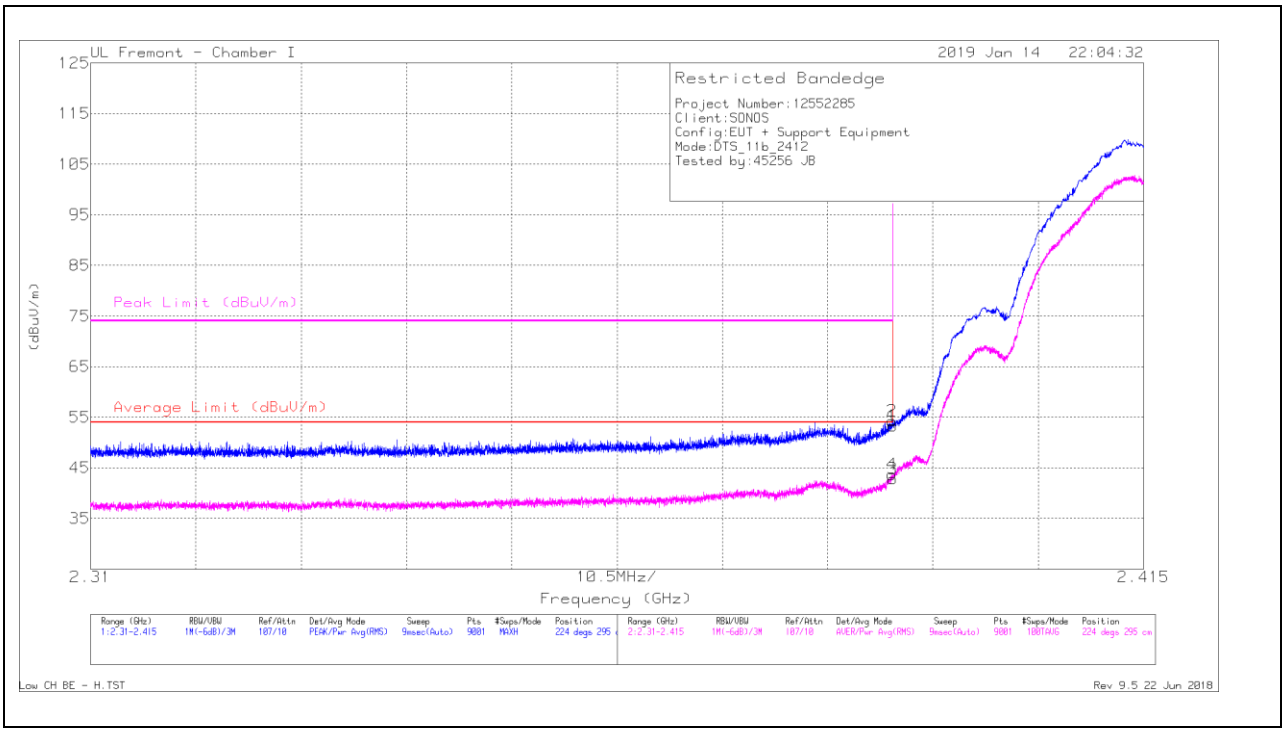
9.1. TRANSMITTER ABOVE 1 GHz

9.1.1. TX ABOVE 1 GHz 802.11b MODE IN THE 2.4 GHz BAND

2TX CDD MODE

BANDEDGE (LOW CHANNEL, CH 1)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fltr/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	43.11	Pk	31.8	-21.6	0	53.31	-	-	74	-20.69	224	295	H
2	* 2.39	44.11	Pk	31.8	-21.6	0	54.31	-	-	74	-19.69	224	295	H
3	* 2.39	32.62	RMS	31.8	-21.6	.11	42.93	54	-11.07	-	-	224	295	H
4	* 2.39	33.47	RMS	31.8	-21.6	.11	43.78	54	-10.22	-	-	224	295	H

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

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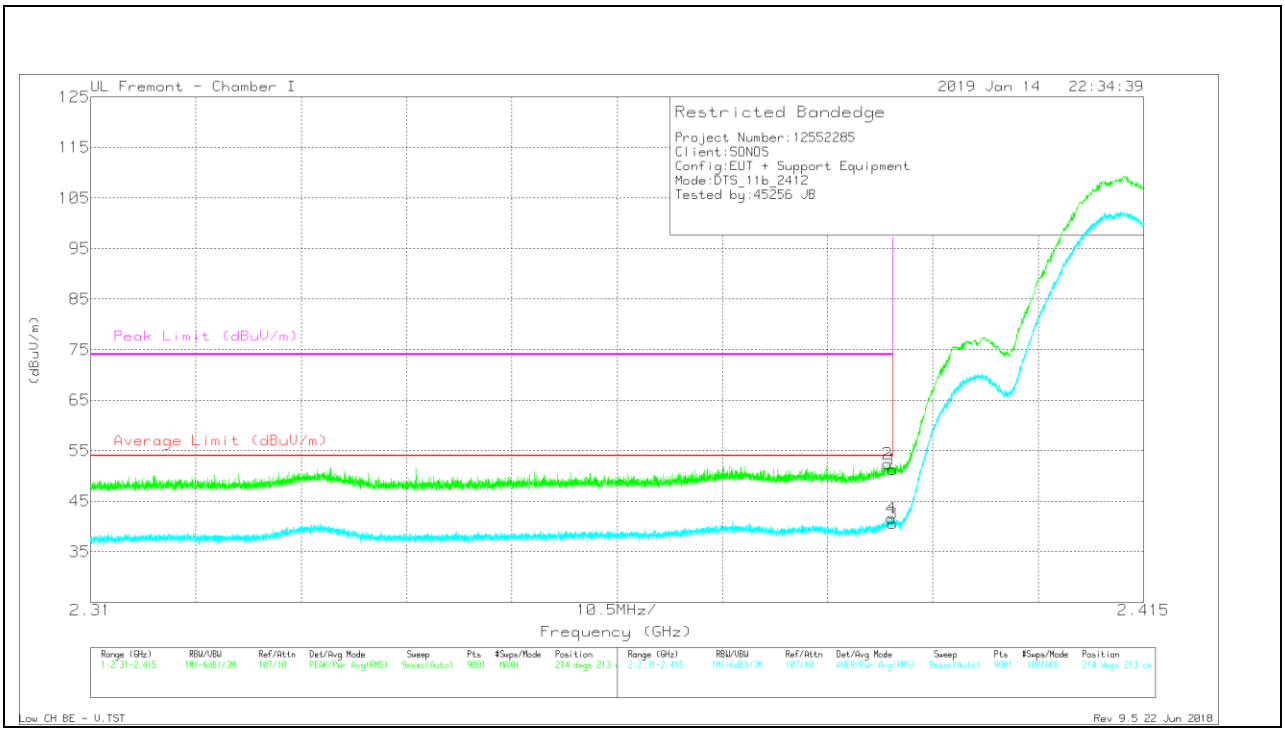
VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fltr/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	41.04	Pk	31.8	-21.6	0	51.24	-	-	74	-22.76	214	213	V
2	* 2.389	42.16	Pk	31.8	-21.6	0	52.36	-	-	74	-21.64	214	213	V
3	* 2.39	30.33	RMS	31.8	-21.6	.11	40.64	54	-13.36	-	-	214	213	V
4	* 2.39	31.26	RMS	31.8	-21.6	.11	41.57	54	-12.43	-	-	214	213	V

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

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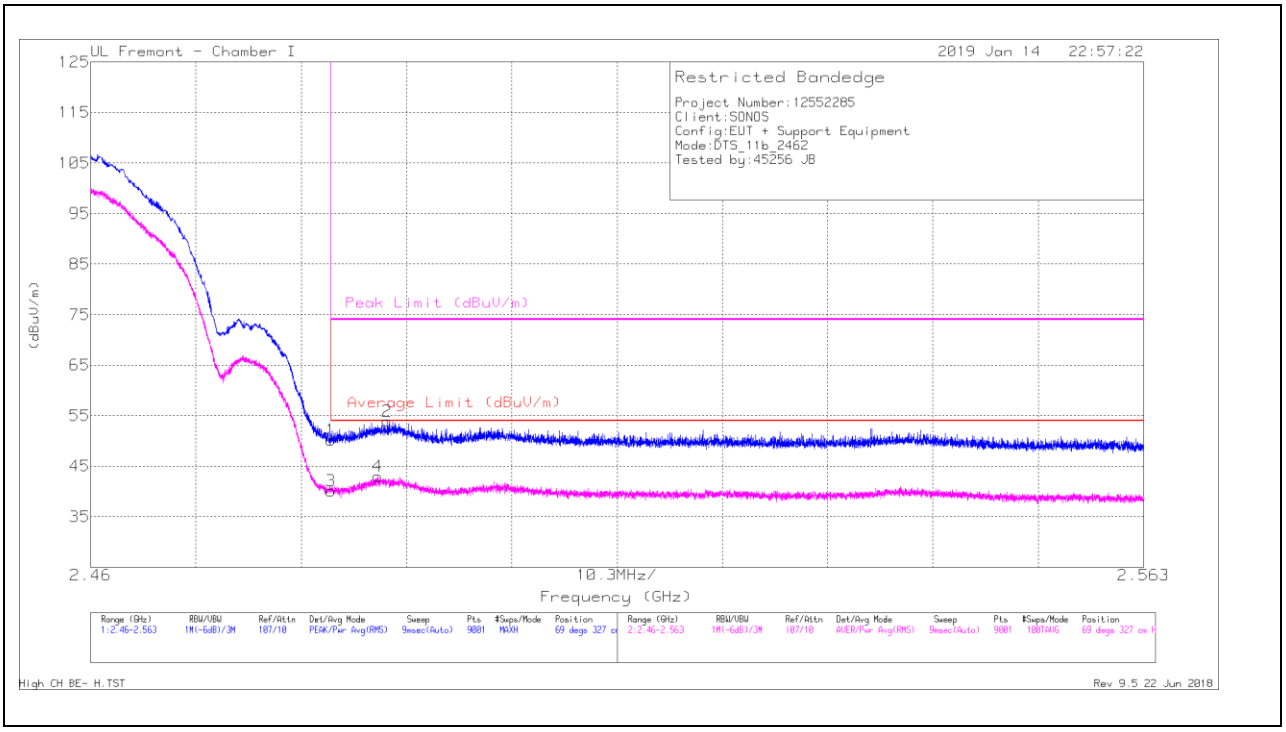
BANDEDGE (HIGH CHANNEL, CH 11)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fltr/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	39.45	Pk	32.4	-21.7	0	50.15	-	-	74	-23.85	69	327	H
2	* 2.489	43.22	Pk	32.4	-21.7	0	53.92	-	-	74	-20.08	69	327	H
3	* 2.484	29.31	RMS	32.4	-21.7	.11	40.12	54	-13.88	-	-	69	327	H
4	* 2.488	32.13	RMS	32.4	-21.7	.11	42.94	54	-11.06	-	-	69	327	H

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

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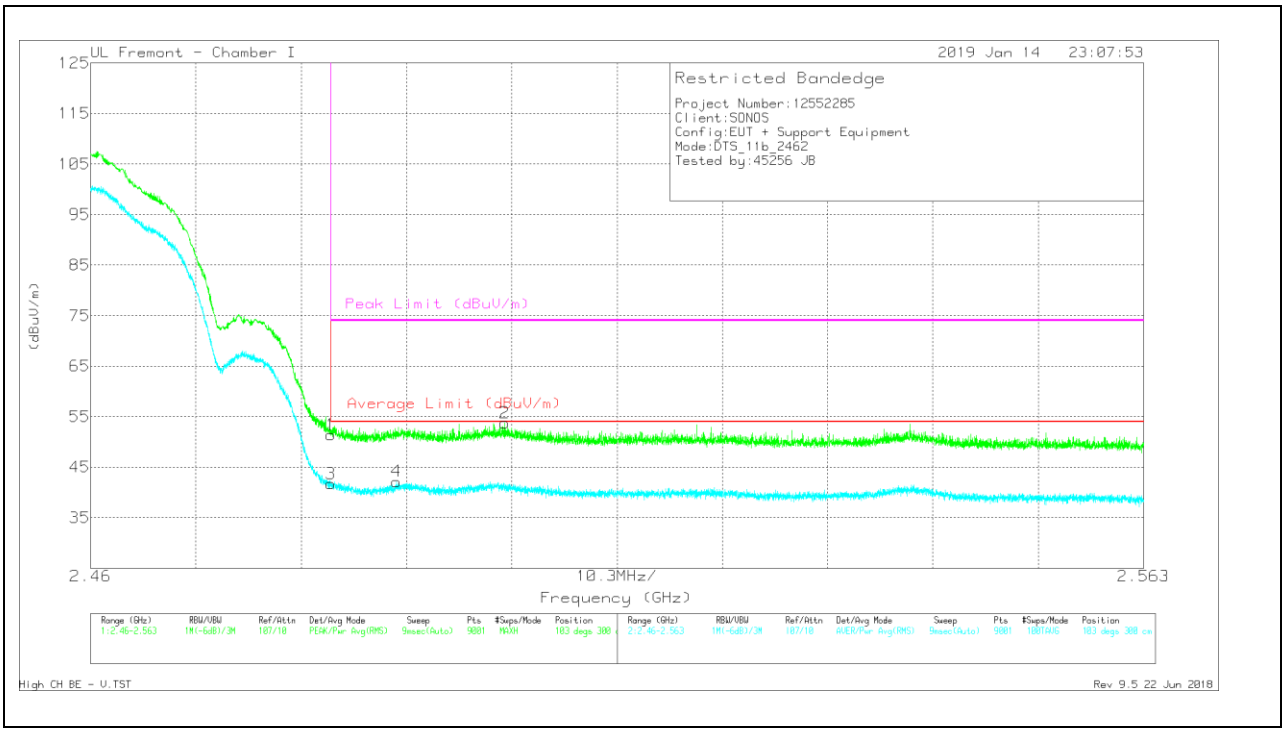
VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fltr/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	40.73	Pk	32.4	-21.7	0	51.43	-	-	74	-22.57	103	300	V
2	2.501	43	Pk	32.5	-21.7	0	53.8	-	-	74	-20.2	103	300	V
3	* 2.484	30.97	RMS	32.4	-21.7	.11	41.78	54	-12.22	-	-	103	300	V
4	* 2.49	31.25	RMS	32.5	-21.7	.11	42.16	54	-11.84	-	-	103	300	V

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

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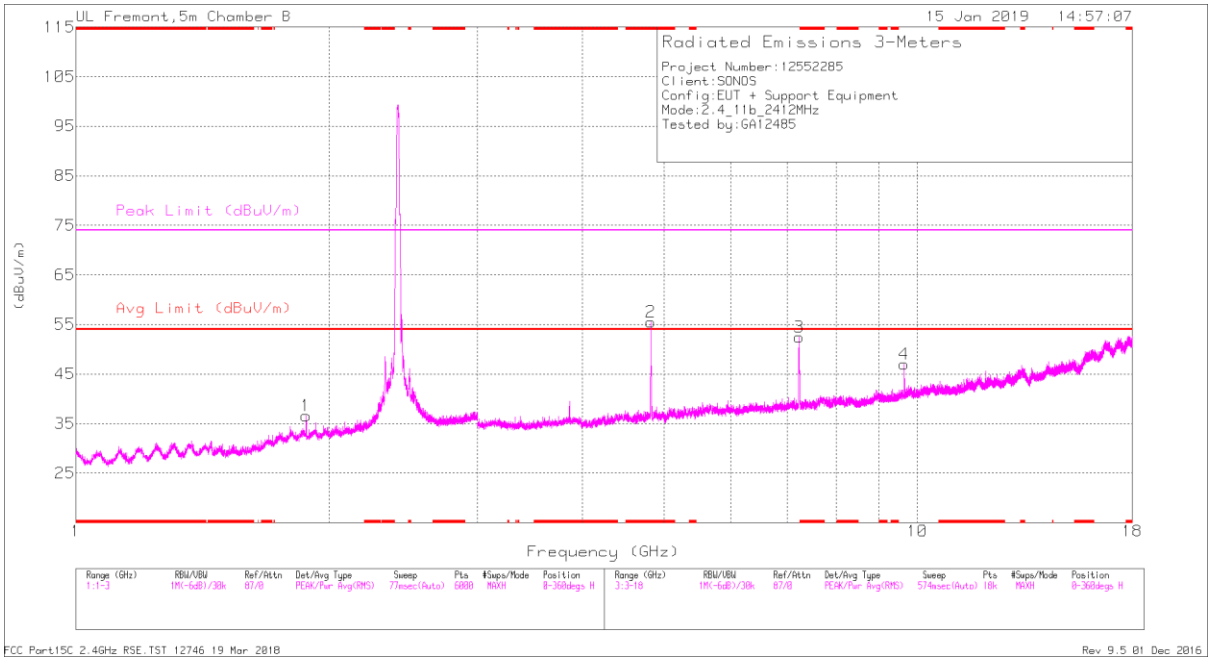
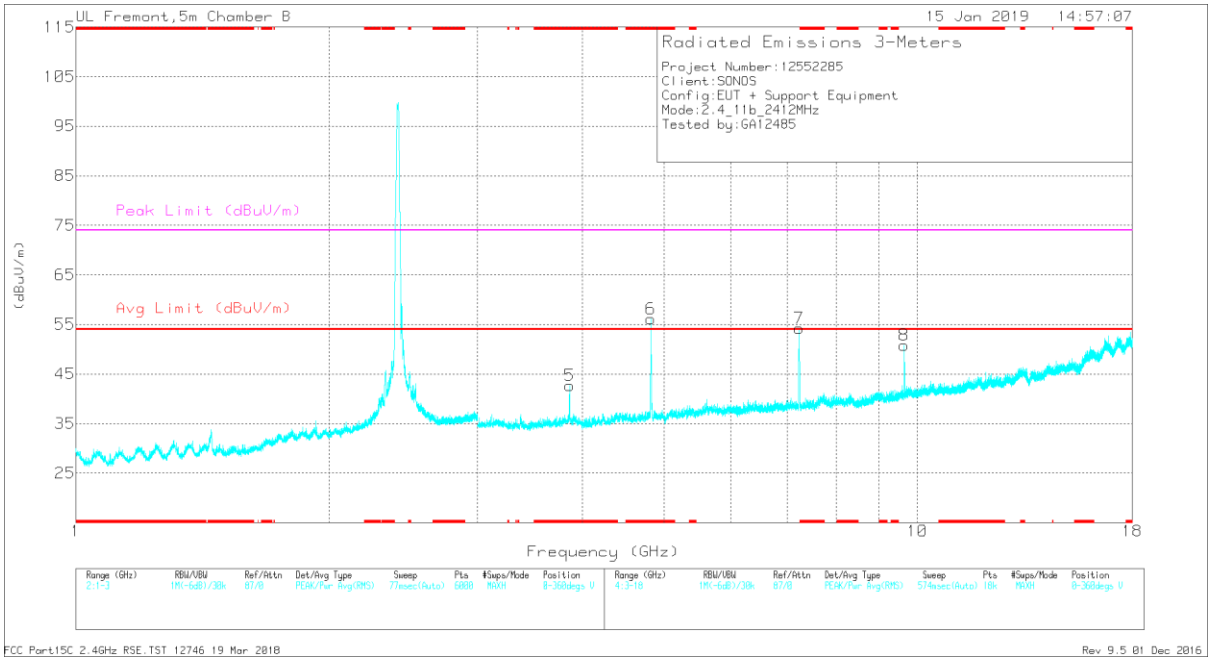
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL, CH 1 RESULTS



HORIZONTAL



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RADIATED EMISSIONS

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 4.824	50.55	Pk	34.1	-29.2	0	55.45	-	-	74	-18.55	0-360	199	H
5	* 3.859	39.22	Pk	33.4	-29.9	0	42.72	-	-	74	-31.28	0-360	200	V
6	* 4.824	51.25	Pk	34.1	-29.2	0	56.15	-	-	74	-17.85	0-360	200	V
1	1.877	26.33	Pk	31	-20.7	0	36.63	-	-	-	-	0-360	102	H
7	7.231	45.6	Pk	35.9	-27.3	0	54.2	-	-	-	-	0-360	102	V
3	7.237	43.87	Pk	35.9	-27.3	0	52.47	-	-	-	-	0-360	199	H
4	9.648	33.58	Pk	37.1	-23.7	0	46.98	-	-	-	-	0-360	102	H
8	9.648	37.46	Pk	37.1	-23.7	0	50.86	-	-	-	-	0-360	102	V

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

Radiated Emissions

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/ Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 4.824	52.65	PK2	34.1	-29.2	0	57.55	-	-	74	-16.45	265	224	H
	* 4.824	38.73	MAv1	34.1	-29.2	.11	43.74	54	-10.26	-	-	265	224	H
5	* 3.859	45.14	PK2	33.4	-29.9	0	48.64	-	-	74	-25.36	195	200	V
	* 3.859	40.42	MAv1	33.4	-29.9	.11	44.03	54	-9.97	-	-	195	200	V
6	* 4.824	52.37	PK2	34.1	-29.2	0	57.27	-	-	74	-16.73	333	227	V
	* 4.824	43.21	MAv1	34.1	-29.2	.11	48.22	54	-5.78	-	-	333	227	V
1	1.877	15.12	Av	31	-20.7	.11	25.53	-	-	-	-	280	209	H
7	7.232	51.11	PK2	35.9	-27.3	0	59.71	-	-	-	-	41	188	V
3	7.237	37.5	PK2	35.9	-27.3	0	46.1	-	-	-	-	327	186	H
4	9.647	33.59	PK2	37.1	-23.7	0	46.99	-	-	-	-	35	185	H
8	9.648	40.71	PK2	37.1	-23.7	0	54.11	-	-	-	-	298	120	V

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

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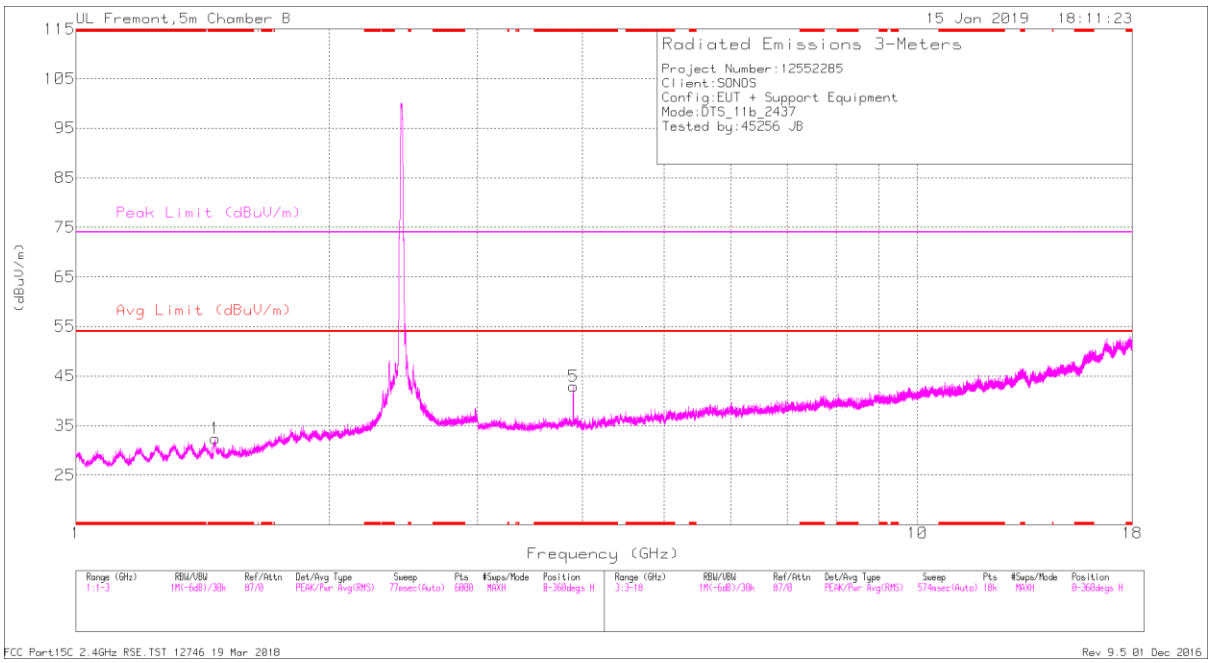
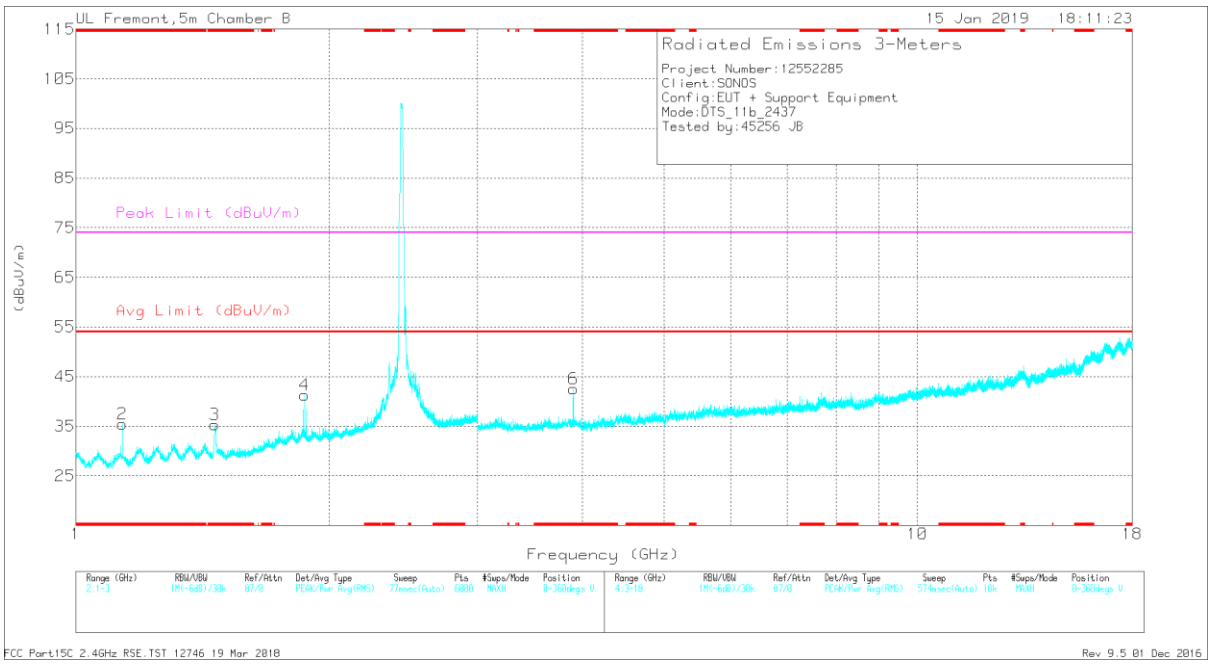
MID CHANNEL, CH 6 RESULTS



HORIZONTAL



VERTICAL

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RADIATED EMISSIONS

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.463	25.51	Pk	28	-21.1	0	32.41	-	-	74	-41.59	0-360	199	H
2	* 1.135	30.3	Pk	27.6	-22.4	0	35.5	-	-	74	-38.5	0-360	102	V
3	* 1.463	28.43	Pk	28	-21.1	0	35.33	-	-	74	-38.67	0-360	102	V
5	* 3.899	39.19	Pk	33.4	-29.6	0	42.99	-	-	74	-31.01	0-360	102	H
6	* 3.899	38.77	Pk	33.4	-29.6	0	42.57	-	-	74	-31.43	0-360	199	V
4	1.869	31.1	Pk	31	-20.8	0	41.3	-	-	-	-	0-360	200	V

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

Radiated Emissions

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.464	29.01	PK2	28	-21.2	0	35.81	-	-	74	-38.19	2	356	H
	* 1.465	17.36	MAv1	28	-21.1	.11	24.37	54	-29.63	-	-	2	356	H
2	* 1.134	30.78	PK2	27.6	-22.5	0	35.88	-	-	74	-38.12	192	126	V
	* 1.133	18.98	MAv1	27.6	-22.5	.11	24.19	54	-29.81	-	-	192	126	V
3	* 1.463	29.95	PK2	28	-21.1	0	36.85	-	-	74	-37.15	177	353	V
	* 1.463	17.25	MAv1	28	-21.1	.11	24.26	54	-29.74	-	-	177	353	V
5	* 3.899	43.24	PK2	33.4	-29.6	0	47.04	-	-	74	-26.96	39	126	H
	* 3.899	37	MAv1	33.4	-29.6	.11	40.91	54	-13.09	-	-	39	126	H
6	* 3.899	44.35	PK2	33.4	-29.6	0	48.15	-	-	74	-25.85	105	184	V
	* 3.899	39.78	MAv1	33.4	-29.6	.11	43.69	54	-10.31	-	-	105	184	V

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

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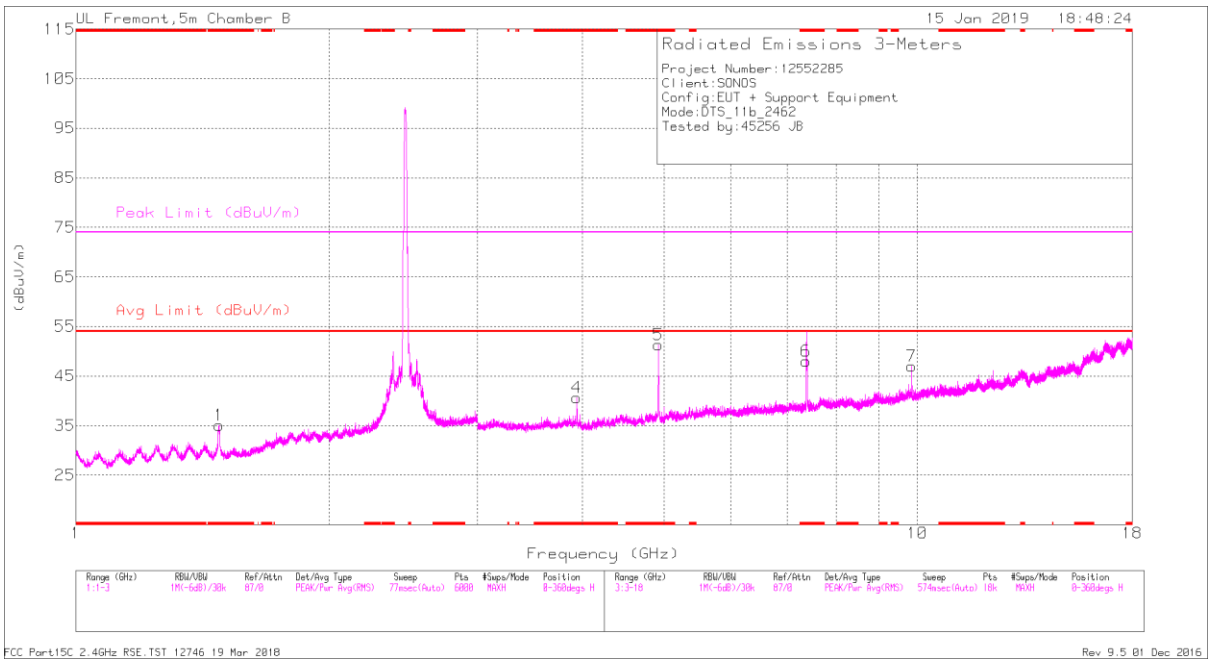
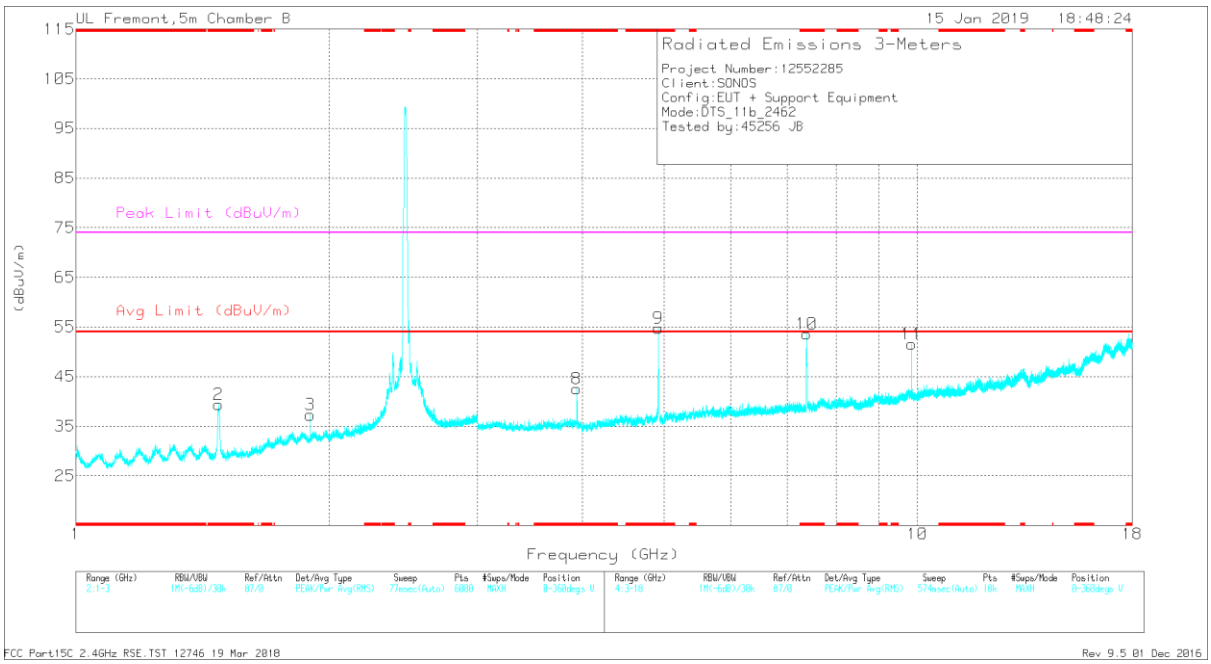
HIGH CHANNEL, CH 11 RESULTS



HORIZONTAL



VERTICAL

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RADIATED EMISSIONS

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.479	28.22	Pk	27.9	-21	0	35.12	-	-	74	-38.88	0-360	103	H
2	* 1.478	32.57	Pk	27.9	-21.1	0	39.37	-	-	74	-34.63	0-360	102	V
4	* 3.939	37.18	Pk	33.4	-29.9	0	40.68	-	-	74	-33.32	0-360	103	H
5	* 4.924	47.04	Pk	34.4	-30.1	0	51.34	-	-	74	-22.66	0-360	199	H
6	* 7.377	38.47	Pk	36.1	-26.6	0	47.97	-	-	74	-26.03	0-360	199	H
8	* 3.939	39.06	Pk	33.4	-29.9	0	42.56	-	-	74	-31.44	0-360	102	V
9	* 4.923	50.5	Pk	34.4	-30.2	0	54.7	-	-	74	-19.3	0-360	200	V
10	* 7.384	44.14	Pk	36.1	-26.7	0	53.54	-	-	74	-20.46	0-360	200	V
3	1.899	26.79	Pk	31.1	-20.6	0	37.29	-	-	-	-	0-360	199	V
7	9.848	33.24	Pk	37.3	-23.6	0	46.94	-	-	-	-	0-360	103	H
11	9.848	37.84	Pk	37.3	-23.6	0	51.54	-	-	-	-	0-360	200	V

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

Radiated Emissions

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.48	29.71	PK2	27.9	-21.1	0	36.51	-	-	74	-37.49	205	288	H
	* 1.48	18.19	MAv1	27.9	-21.1	.11	25.1	54	-28.9	-	-	205	288	H
2	* 1.478	30.89	PK2	27.9	-21.1	0	37.69	-	-	74	-36.31	101	274	V
	* 1.479	18.15	MAv1	27.9	-21.1	.11	25.06	54	-28.94	-	-	101	274	V
4	* 3.939	44.25	PK2	33.4	-29.9	0	47.75	-	-	74	-26.25	39	118	H
	* 3.939	39.27	MAv1	33.4	-29.9	.11	42.88	54	-11.12	-	-	39	118	H
5	* 4.922	39.24	PK2	34.4	-30.3	0	43.34	-	-	74	-30.66	39	335	H
	* 4.924	27.88	MAv1	34.4	-30.1	.11	32.29	54	-21.71	-	-	39	335	H
6	* 7.378	36.2	PK2	36.1	-26.6	0	45.7	-	-	74	-28.3	145	338	H
	* 7.379	24.55	MAv1	36.1	-26.6	.11	34.16	54	-19.84	-	-	145	338	H
8	* 3.939	44.14	PK2	33.4	-29.9	0	47.64	-	-	74	-26.36	301	106	V
	* 3.939	39.06	MAv1	33.4	-29.9	.11	42.67	54	-11.33	-	-	301	106	V
9	* 4.922	39.4	PK2	34.4	-30.3	0	43.5	-	-	74	-30.5	22	400	V
	* 4.924	27.82	MAv1	34.4	-30.2	.11	32.13	54	-21.87	-	-	22	400	V
10	* 7.384	36.34	PK2	36.1	-26.7	0	45.74	-	-	74	-28.26	308	211	V
	* 7.385	24.77	MAv1	36.1	-26.7	.11	34.28	54	-19.72	-	-	308	211	V

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

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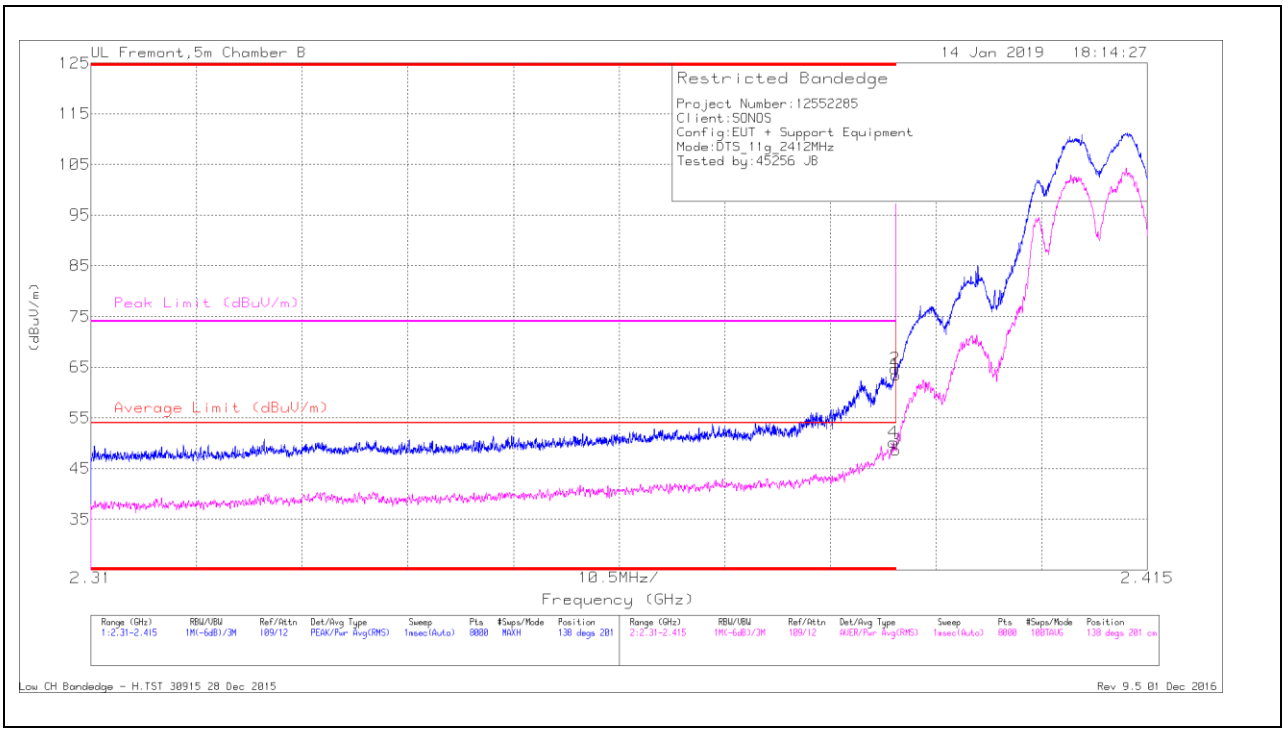
9.1.2. TX ABOVE 1 GHz 802.11g MODE IN THE 2.4 GHz BAND

2TX CDD MODE

BANDEDGE (LOW CHANNEL, CH 1)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/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	51.8	Pk	32.3	-20.7	0	63.4	-	-	74	-10.6	138	201	H
2	* 2.39	53.14	Pk	32.3	-20.7	0	64.74	-	-	74	-9.26	138	201	H
3	* 2.39	36.82	RMS	32.3	-20.7	.27	48.69	54	-5.31	-	-	138	201	H
4	* 2.39	38.28	RMS	32.3	-20.7	.27	50.15	54	-3.85	-	-	138	201	H

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

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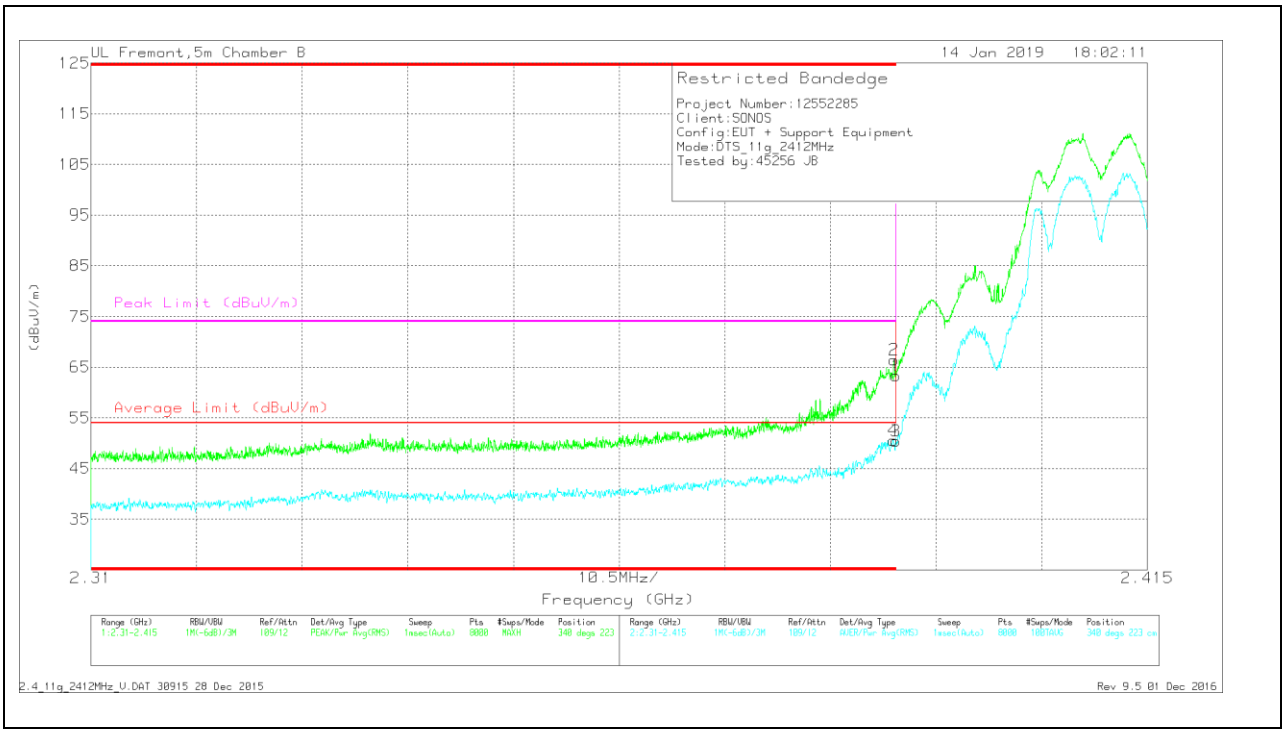
VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/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	51.74	Pk	32.3	-20.7	0	63.34	-	-	74	-10.66	340	223	V
2	* 2.39	54.84	Pk	32.3	-20.7	0	66.44	-	-	74	-7.56	340	223	V
3	* 2.39	38.87	RMS	32.3	-20.7	.27	50.74	54	-3.26	-	-	340	223	V
4	* 2.39	38.93	RMS	32.3	-20.7	.27	50.8	54	-3.2	-	-	340	223	V

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

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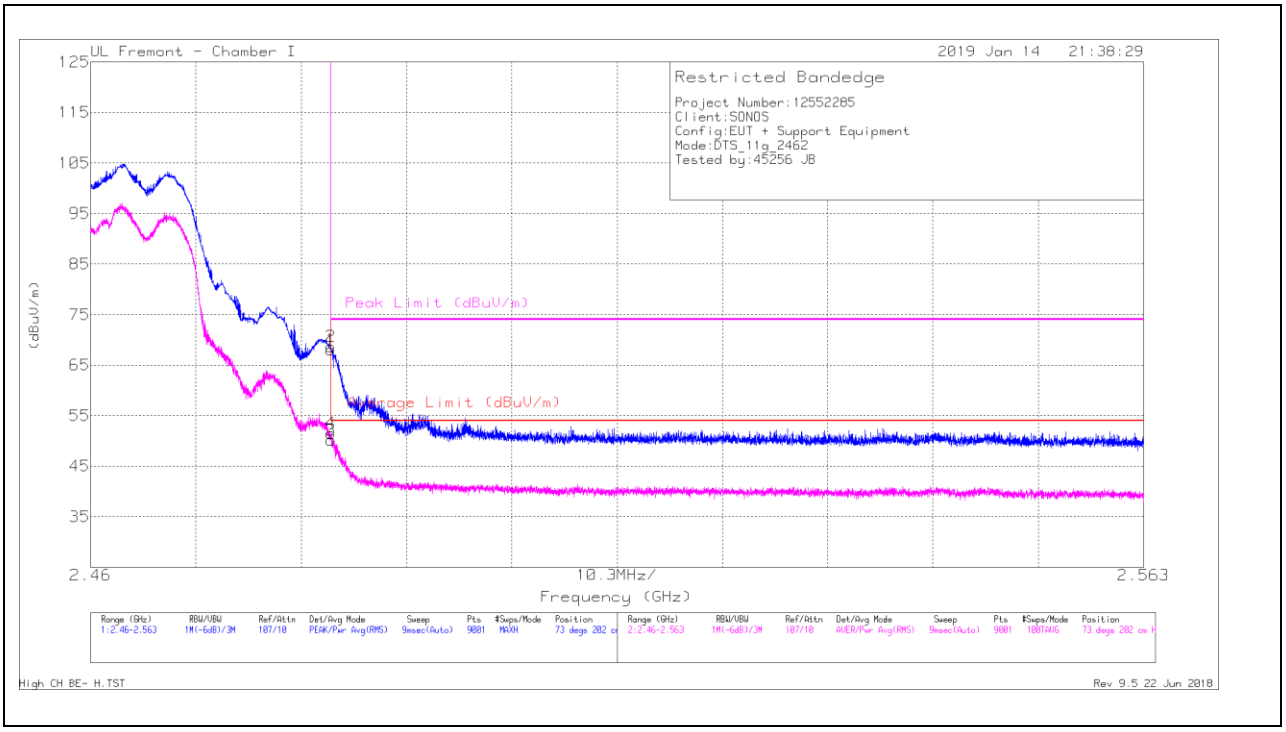
BANDEDGE (HIGH CHANNEL, CH 11)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fltr/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	57.34	Pk	32.4	-21.7	0	68.04	-	-	74	-5.96	73	202	H
2	* 2.484	58.02	Pk	32.4	-21.7	0	68.72	-	-	74	-5.28	73	202	H
3	* 2.484	39.18	RMS	32.4	-21.7	.27	50.15	54	-3.85	-	-	73	202	H
4	* 2.484	40.52	RMS	32.4	-21.7	.27	51.49	54	-2.51	-	-	73	202	H

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

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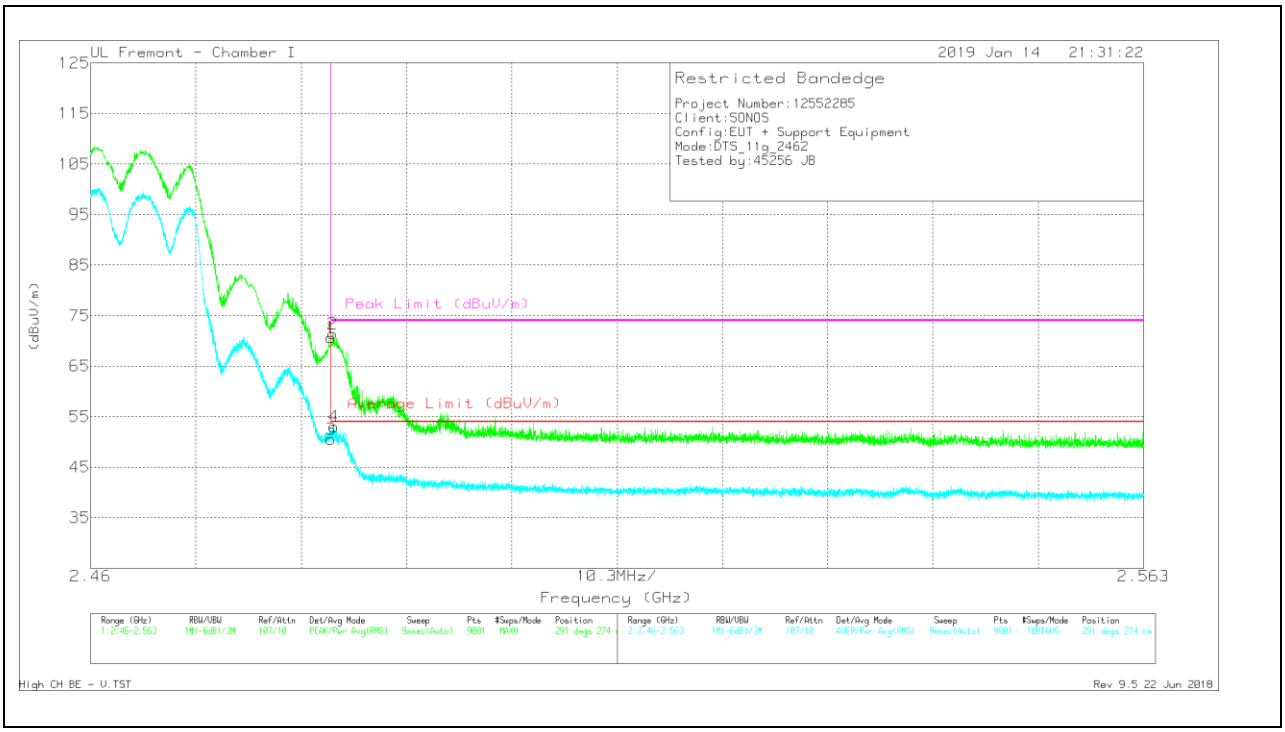
VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fltr/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	59.94	Pk	32.4	-21.7	0	70.64	-	-	74	-3.36	291	274	V
2	* 2.484	60.7	Pk	32.4	-21.7	0	71.4	-	-	74	-2.6	291	274	V
3	* 2.484	39.54	RMS	32.4	-21.7	.27	50.51	54	-3.49	-	-	291	274	V
4	* 2.484	42.01	RMS	32.4	-21.7	.27	52.98	54	-1.02	-	-	291	274	V

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

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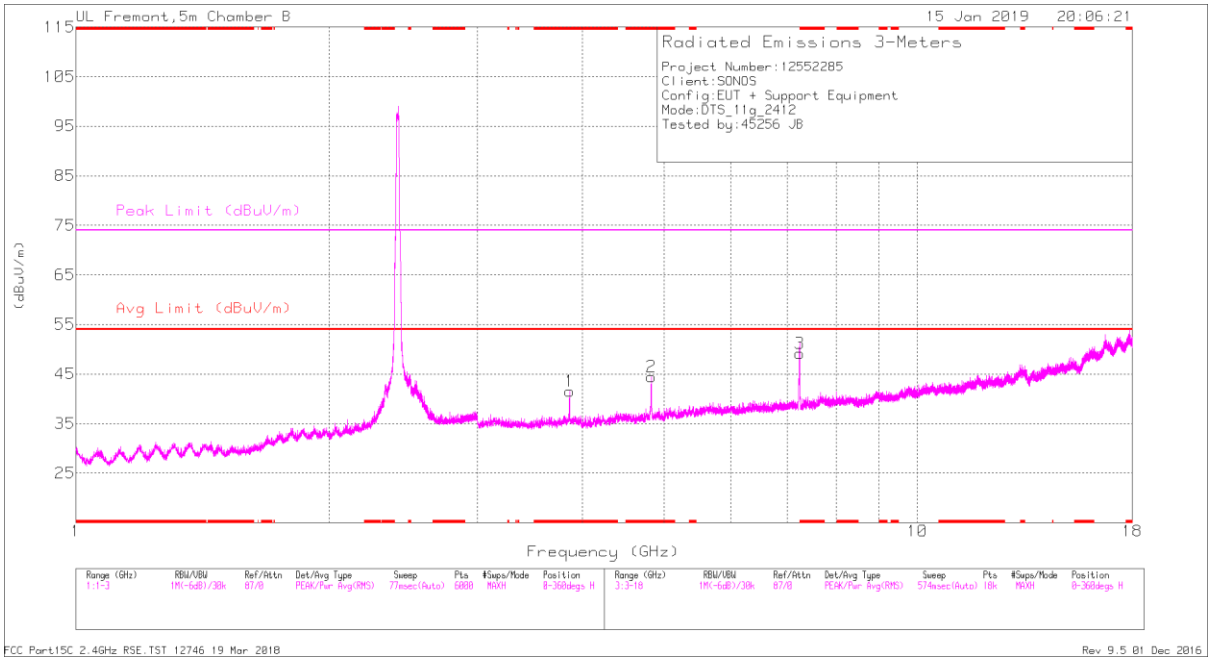
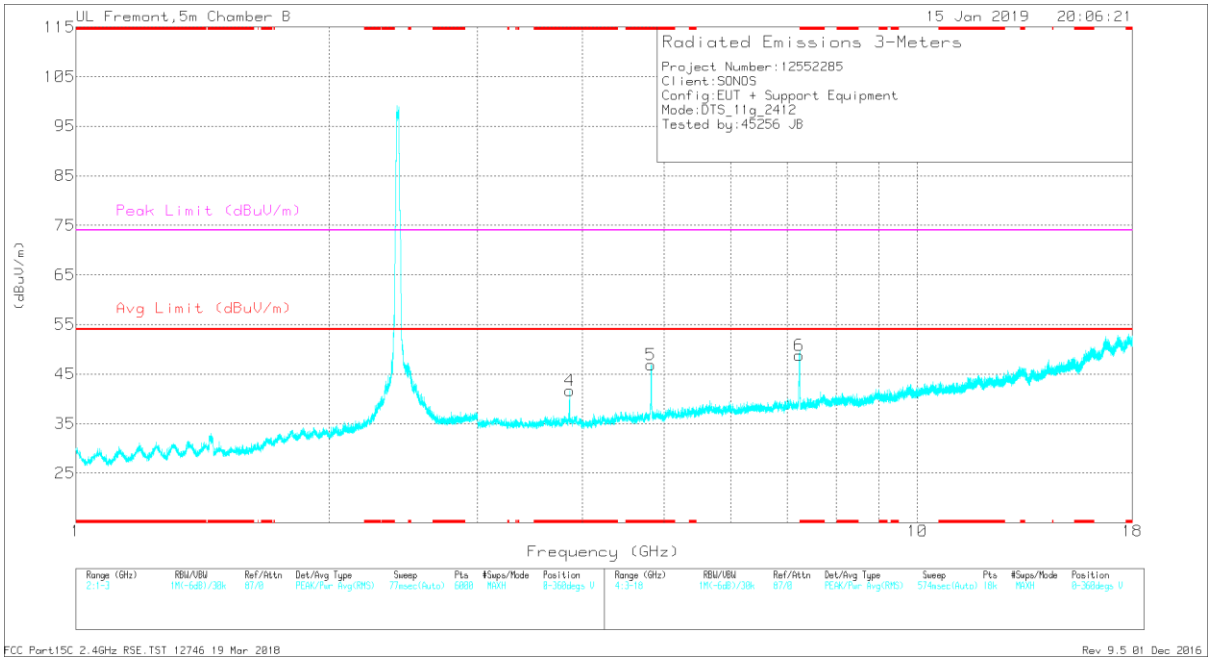
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL, CH 1 RESULTS



HORIZONTAL



VERTICAL

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RADIATED EMISSIONS

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 3.859	38.06	Pk	33.4	-29.9	0	41.56	-	-	74	-32.44	0-360	102	H
2	* 4.828	39.74	Pk	34.1	-29.4	0	44.44	-	-	74	-29.56	0-360	199	H
4	* 3.859	38.2	Pk	33.4	-29.9	0	41.7	-	-	74	-32.3	0-360	199	V
5	* 4.824	41.92	Pk	34.1	-29.2	0	46.82	-	-	74	-27.18	0-360	199	V
6	7.237	40.23	Pk	35.9	-27.3	0	48.83	-	-	-	-	0-360	102	V
3	7.243	40.55	Pk	35.9	-27.3	0	49.15	-	-	-	-	0-360	199	H

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

Radiated Emissions

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 3.859	42.83	PK2	33.4	-29.9	0	46.33	-	-	74	-27.67	40	119	H
	* 3.859	35.36	MAv1	33.4	-29.9	.27	39.13	54	-14.87	-	-	40	119	H
2	* 4.828	48.35	PK2	34.1	-29.4	0	53.05	-	-	74	-20.95	259	218	H
	* 4.828	34.49	MAv1	34.1	-29.4	.27	39.46	54	-14.54	-	-	259	218	H
4	* 3.859	43.31	PK2	33.4	-29.9	0	46.81	-	-	74	-27.19	106	189	V
	* 3.859	37.65	MAv1	33.4	-29.9	.27	41.42	54	-12.58	-	-	106	189	V
5	* 4.826	50.74	PK2	34.1	-29.2	0	55.64	-	-	74	-18.36	152	157	V
	* 4.826	38.27	MAv1	34.1	-29.2	.27	43.44	54	-10.56	-	-	152	157	V

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

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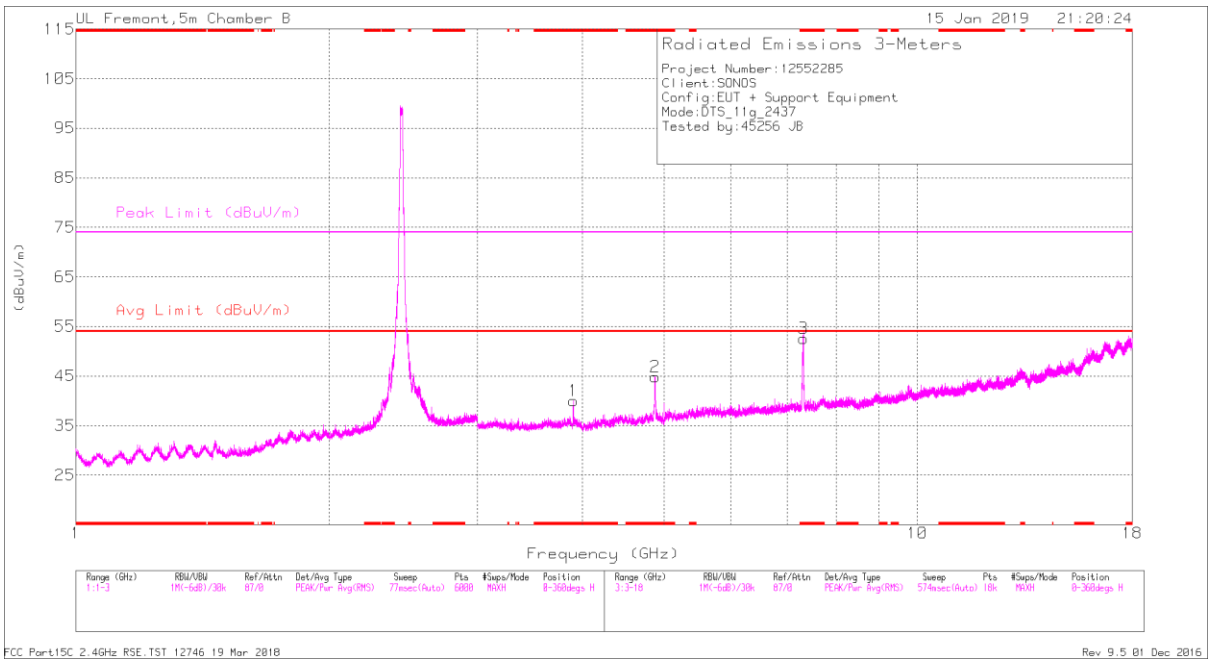
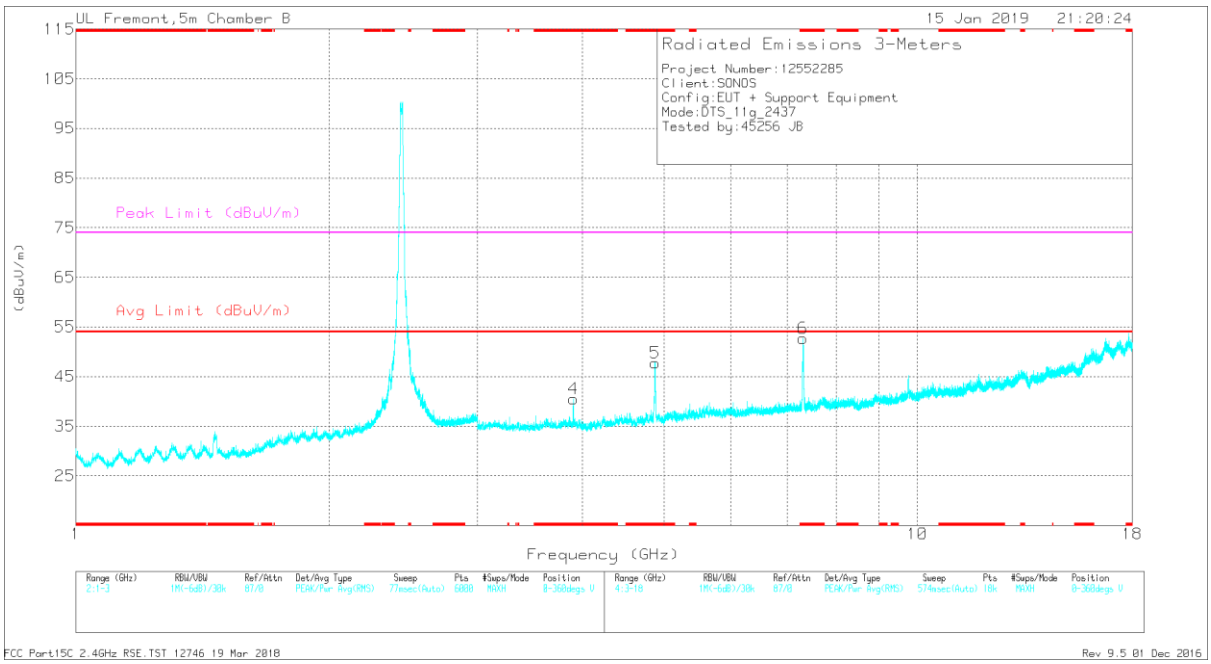
MID CHANNEL, CH 6 RESULTS



HORIZONTAL



VERTICAL

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RADIATED EMISSIONS

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 3.899	36.27	Pk	33.4	-29.6	0	40.07	-	-	74	-33.93	0-360	103	H
2	* 4.878	40.88	Pk	34.3	-30.3	0	44.88	-	-	74	-29.12	0-360	103	H
3	* 7.318	44.33	Pk	35.9	-27.6	0	52.63	-	-	74	-21.37	0-360	199	H
4	* 3.899	36.7	Pk	33.4	-29.6	0	40.5	-	-	74	-33.5	0-360	102	V
5	* 4.877	43.67	Pk	34.3	-30.2	0	47.77	-	-	74	-26.23	0-360	102	V
6	* 7.309	44.37	Pk	35.9	-27.6	0	52.67	-	-	74	-21.33	0-360	102	V

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

Radiated Emissions

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 3.899	40.87	PK2	33.4	-29.6	0	44.67	-	-	74	-29.33	263	396	H
	* 3.899	32.9	MAv1	33.4	-29.6	.27	36.97	54	-17.03	-	-	263	396	H
2	* 4.878	50.12	PK2	34.3	-30.3	0	54.12	-	-	74	-19.88	47	135	H
	* 4.876	38.99	MAv1	34.3	-30.2	.27	43.36	54	-10.64	-	-	47	135	H
3	* 7.316	54.18	PK2	35.9	-27.6	0	62.48	-	-	74	-11.52	145	192	H
	* 7.316	42.33	MAv1	35.9	-27.6	.27	50.9	54	-3.1	-	-	145	192	H
4	* 3.899	42.38	PK2	33.4	-29.6	0	46.18	-	-	74	-27.82	147	242	V
	* 3.899	35.81	MAv1	33.4	-29.6	.27	39.88	54	-14.12	-	-	147	242	V
5	* 4.878	51.63	PK2	34.3	-30.3	0	55.63	-	-	74	-18.37	176	103	V
	* 4.876	40.74	MAv1	34.3	-30.2	.27	45.11	54	-8.89	-	-	176	103	V
6	* 7.31	52.47	PK2	35.9	-27.6	0	60.77	-	-	74	-13.23	86	103	V
	* 7.311	40.7	MAv1	35.9	-27.6	.27	49.27	54	-4.73	-	-	86	103	V

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

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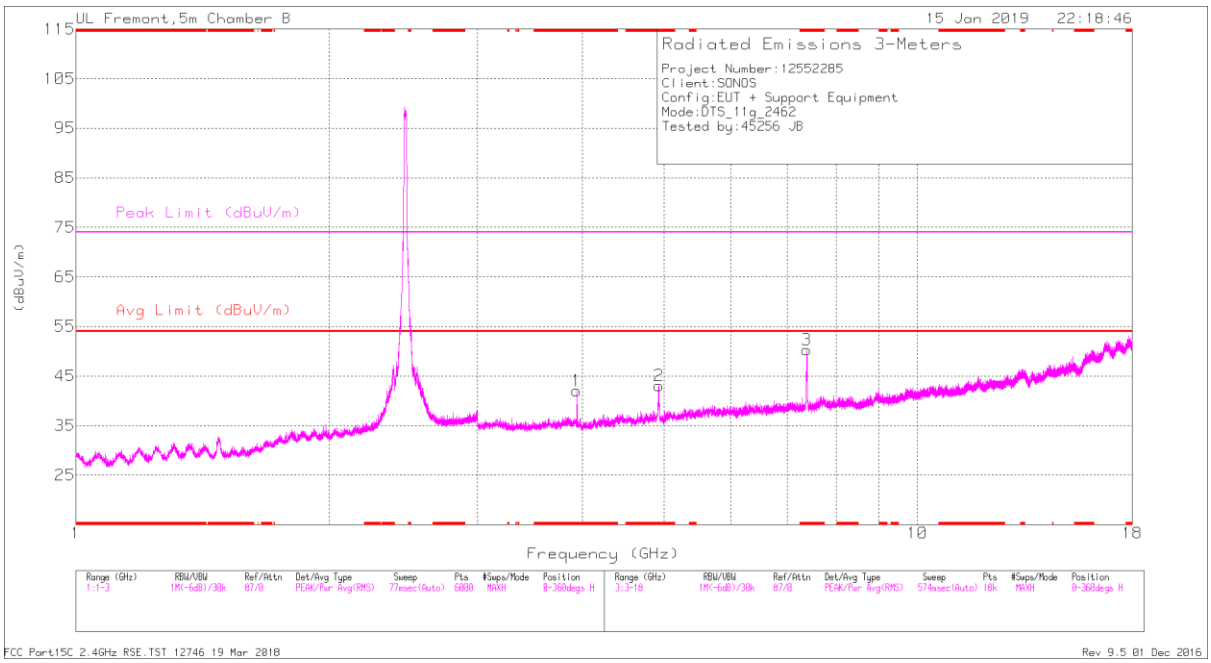
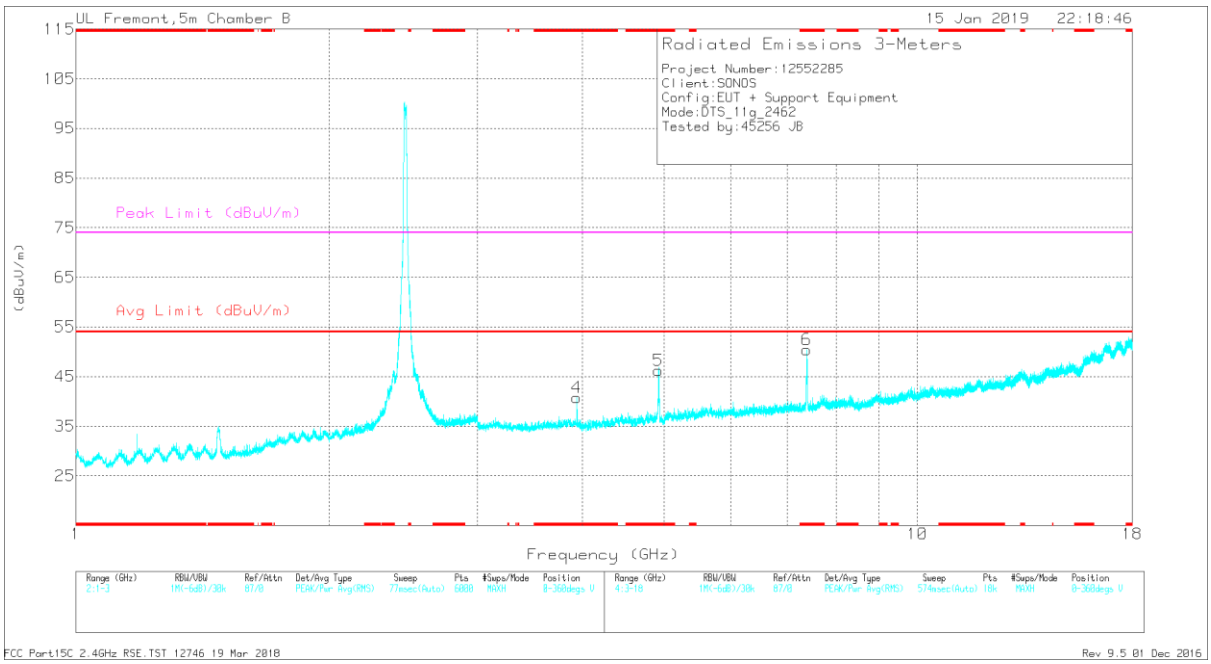
HIGH CHANNEL, CH 11 RESULTS



HORIZONTAL



VERTICAL

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RADIATED EMISSIONS

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 3.939	38.56	Pk	33.4	-29.9	0	42.06	-	-	74	-31.94	0-360	102	H
2	* 4.927	38.72	Pk	34.4	-30	0	43.12	-	-	74	-30.88	0-360	102	H
3	* 7.389	40.81	Pk	36.1	-26.6	0	50.31	-	-	74	-23.69	0-360	102	H
4	* 3.939	37.23	Pk	33.4	-29.9	0	40.73	-	-	74	-33.27	0-360	102	V
5	* 4.925	41.79	Pk	34.4	-30	0	46.19	-	-	74	-27.81	0-360	199	V
6	* 7.387	40.92	Pk	36.1	-26.6	0	50.42	-	-	74	-23.58	0-360	102	V

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

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 3.939	42.88	PK2	33.4	-29.9	0	46.38	-	-	74	-27.62	37	116	H
	* 3.939	36.92	MAv1	33.4	-29.9	.27	40.69	54	-13.31	-	-	37	116	H
2	* 4.928	49.07	PK2	34.4	-30	0	53.47	-	-	74	-20.53	254	129	H
	* 4.927	36.17	MAv1	34.4	-30	.27	40.84	54	-13.16	-	-	254	129	H
3	* 7.39	49.84	PK2	36.1	-26.5	0	59.44	-	-	74	-14.56	141	114	H
	* 7.389	37.46	MAv1	36.1	-26.6	.27	47.23	54	-6.77	-	-	141	114	H
4	* 3.939	42.67	PK2	33.4	-29.9	0	46.17	-	-	74	-27.83	302	103	V
	* 3.939	36.78	MAv1	33.4	-29.9	.27	40.55	54	-13.45	-	-	302	103	V
5	* 4.927	50.71	PK2	34.4	-30	0	55.11	-	-	74	-18.89	153	156	V
	* 4.927	39.49	MAv1	34.4	-29.9	.27	44.26	54	-9.74	-	-	153	156	V
6	* 7.387	48.65	PK2	36.1	-26.6	0	58.15	-	-	74	-15.85	88	108	V
	* 7.387	35.88	MAv1	36.1	-26.6	.27	45.65	54	-8.35	-	-	88	108	V

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

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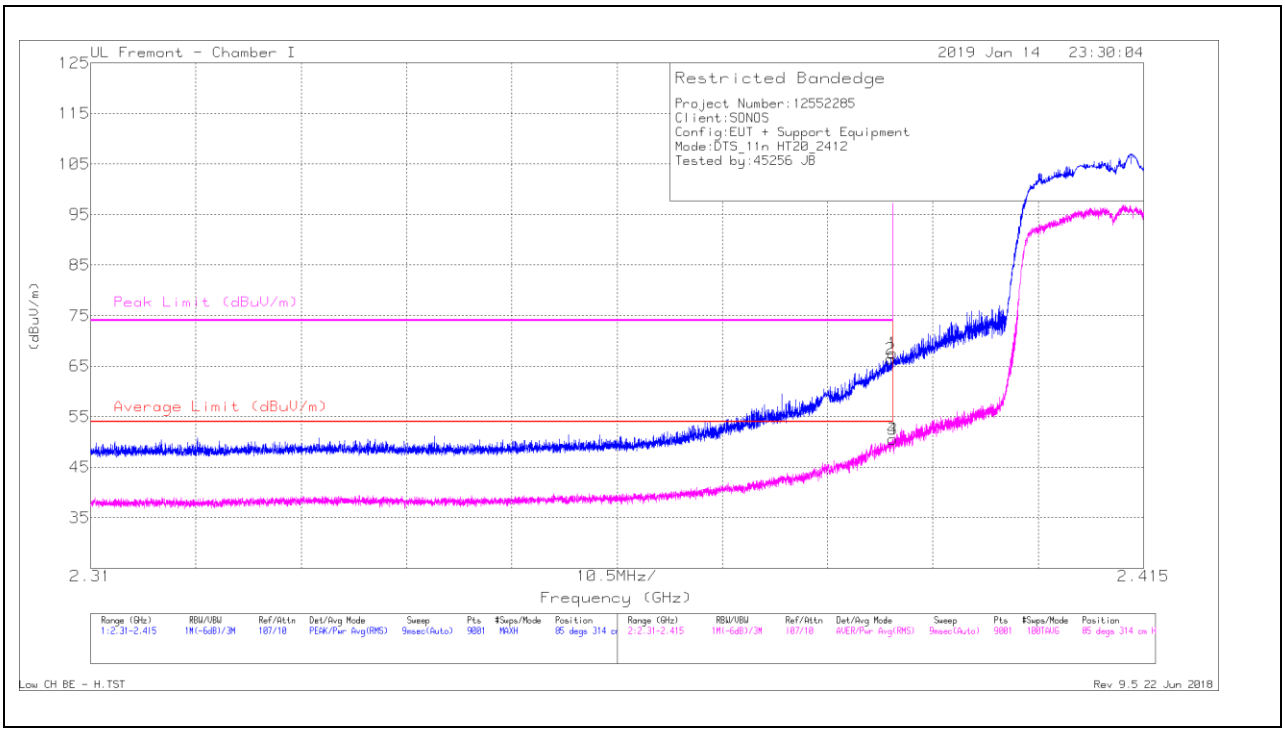
9.1.3. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 2.4 GHz BAND

2TX CDD MODE

BANDEDGE (LOW CHANNEL, CH 1)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fltr/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	57.32	Pk	31.8	-21.6	0	67.52	-	-	74	-6.48	85	314	H
2	* 2.39	56.26	Pk	31.8	-21.6	0	66.46	-	-	74	-7.54	85	314	H
3	* 2.39	39.97	RMS	31.8	-21.6	.33	50.5	54	-3.5	-	-	85	314	H
4	* 2.39	40.05	RMS	31.8	-21.6	.33	50.58	54	-3.42	-	-	85	314	H

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

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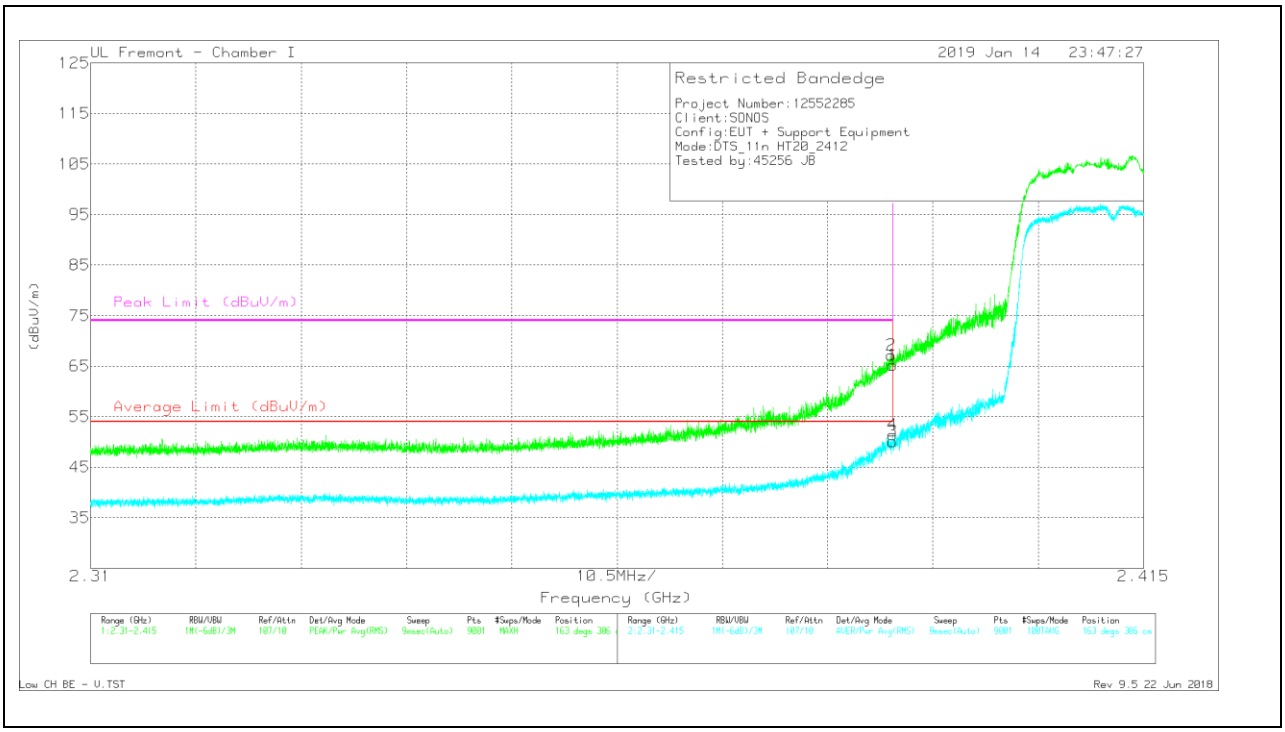
VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fltr/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	54.98	Pk	31.8	-21.6	0	65.18	-	-	74	-8.82	163	306	V
2	* 2.39	57	Pk	31.8	-21.6	0	67.2	-	-	74	-6.8	163	306	V
3	* 2.39	39.58	RMS	31.8	-21.6	.33	50.11	54	-3.89	-	-	163	306	V
4	* 2.39	40.83	RMS	31.8	-21.6	.33	51.36	54	-2.64	-	-	163	306	V

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

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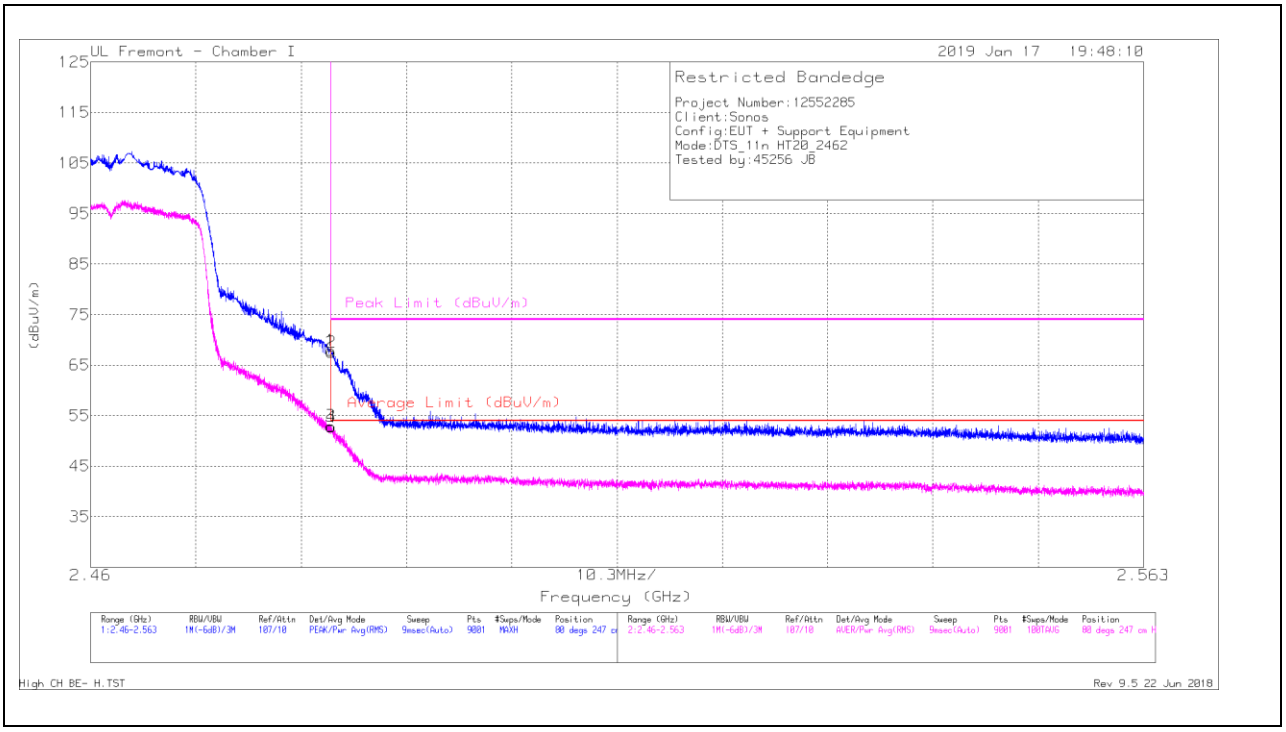
BANDEDGE (HIGH CHANNEL, CH 11)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fltr/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	57.24	Pk	32.4	-21.7	0	67.94	-	-	74	-6.06	80	247	H
2	* 2.484	56.87	Pk	32.4	-21.7	0	67.57	-	-	74	-6.43	80	247	H
3	* 2.484	41.93	RMS	32.4	-21.7	.33	52.96	54	-1.04	-	-	80	247	H
4	* 2.484	41.77	RMS	32.4	-21.7	.33	52.8	54	-1.2	-	-	80	247	H

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

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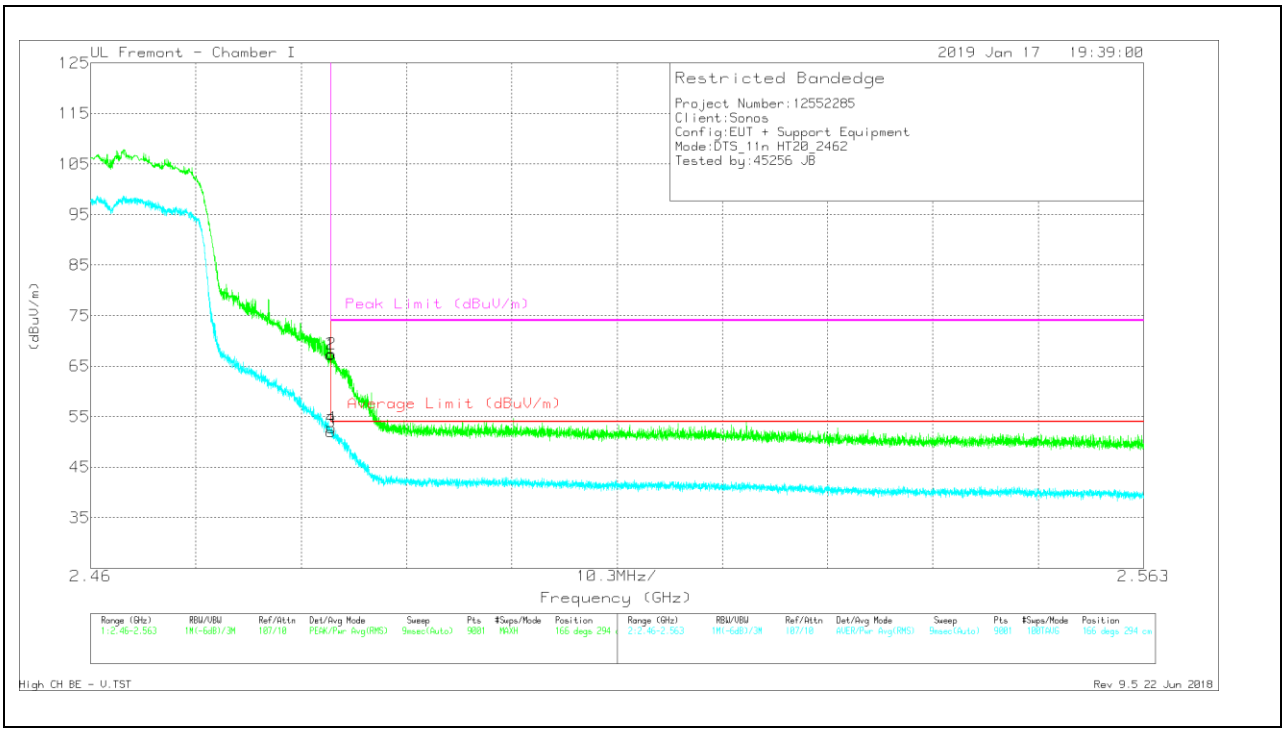
VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fltr/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	56.59	Pk	32.4	-21.7	0	67.29	-	-	74	-6.71	166	294	V
2	* 2.484	56.7	Pk	32.4	-21.7	0	67.4	-	-	74	-6.6	166	294	V
3	* 2.484	41.06	RMS	32.4	-21.7	.33	52.09	54	-1.91	-	-	166	294	V
4	* 2.484	41.77	RMS	32.4	-21.7	.33	52.8	54	-1.2	-	-	166	294	V

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

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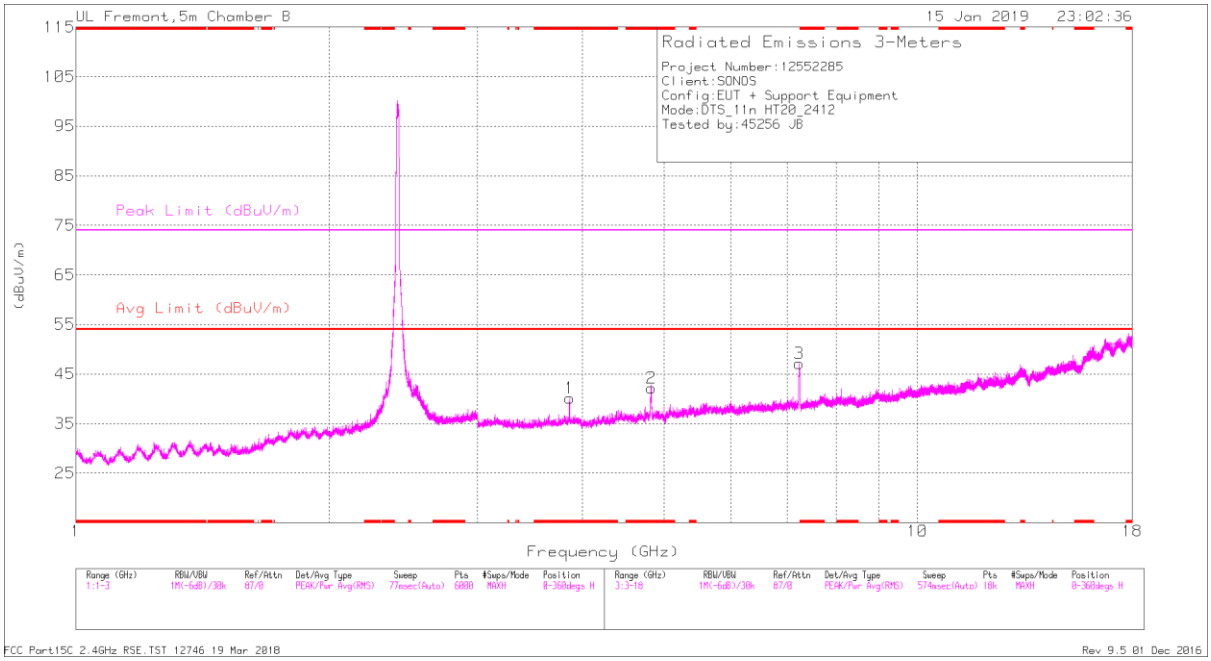
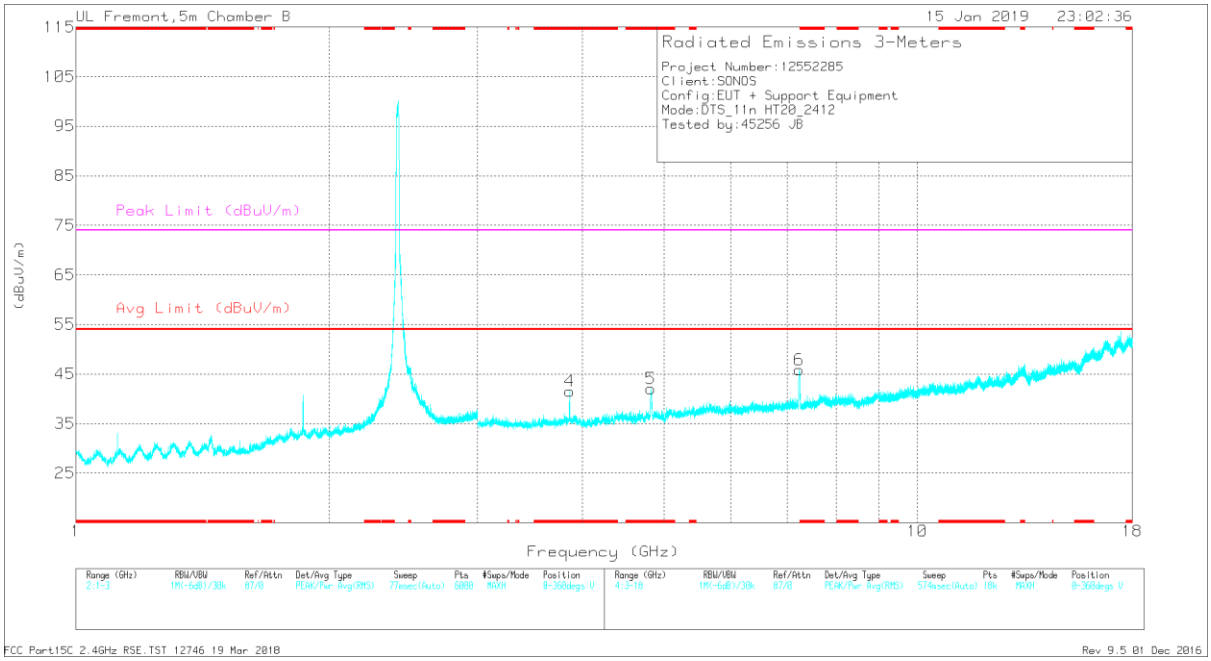
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL, CH 1 RESULTS



HORIZONTAL



VERTICAL

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RADIATED EMISSIONS

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 3.859	36.7	Pk	33.4	-29.9	0	40.2	-	-	74	-33.8	0-360	103	H
2	* 4.827	37.33	Pk	34.1	-29.3	0	42.13	-	-	74	-31.87	0-360	199	H
4	* 3.859	37.99	Pk	33.4	-29.9	0	41.49	-	-	74	-32.51	0-360	200	V
5	* 4.825	37.11	Pk	34.1	-29.2	0	42.01	-	-	74	-31.99	0-360	102	V
3	7.236	38.57	Pk	35.9	-27.3	0	47.17	-	-	-	-	0-360	199	H
6	7.237	37.25	Pk	35.9	-27.3	0	45.85	-	-	-	-	0-360	200	V

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

Radiated Emissions

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 3.859	43.94	PK2	33.4	-29.9	0	47.44	-	-	74	-26.56	34	107	H
	* 3.859	37.28	MAv1	33.4	-29.9	.33	41.11	54	-12.89	-	-	34	107	H
2	* 4.825	44.26	PK2	34.1	-29.2	0	49.16	-	-	74	-24.84	264	184	H
	* 4.825	32.87	MAv1	34.1	-29.2	.33	38.1	54	-15.9	-	-	264	184	H
4	* 3.859	43.26	PK2	33.4	-29.9	0	46.76	-	-	74	-27.24	109	193	V
	* 3.859	37.02	MAv1	33.4	-29.9	.33	40.85	54	-13.15	-	-	109	193	V
5	* 4.824	46.02	PK2	34.1	-29.2	0	50.92	-	-	74	-23.08	105	272	V
	* 4.825	34.01	MAv1	34.1	-29.2	.33	39.24	54	-14.76	-	-	105	272	V
3	7.237	47.68	PK2	35.9	-27.3	0	56.28	-	-	-	-	145	204	H

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

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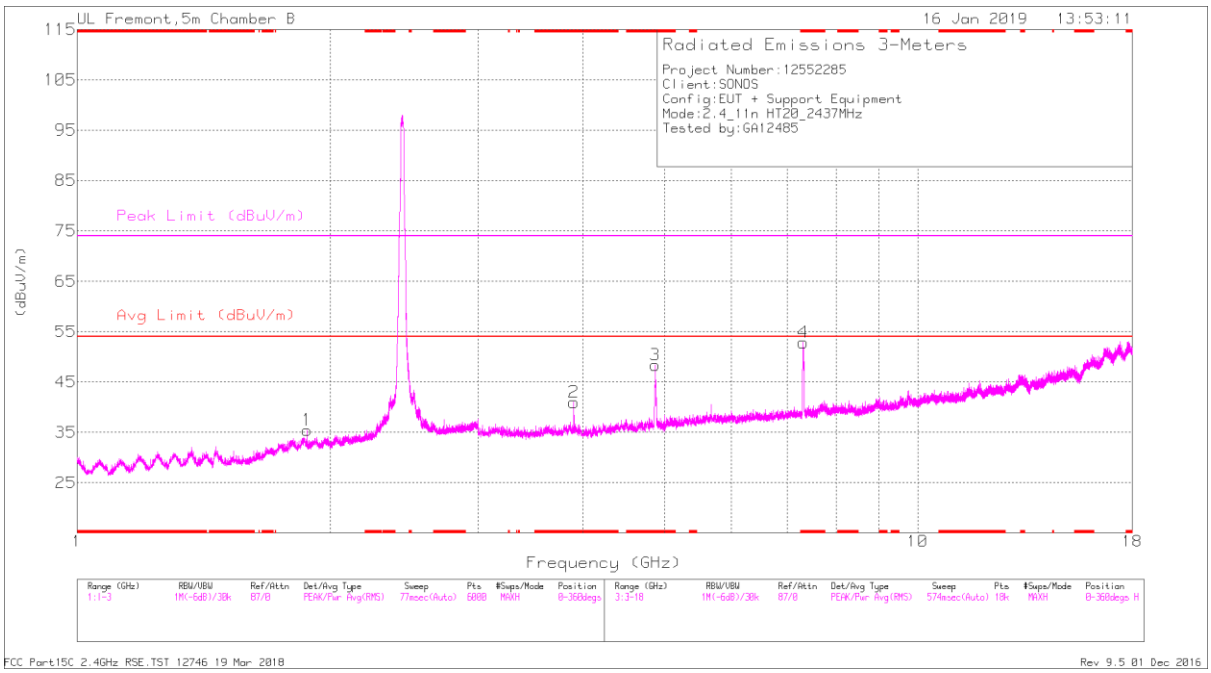
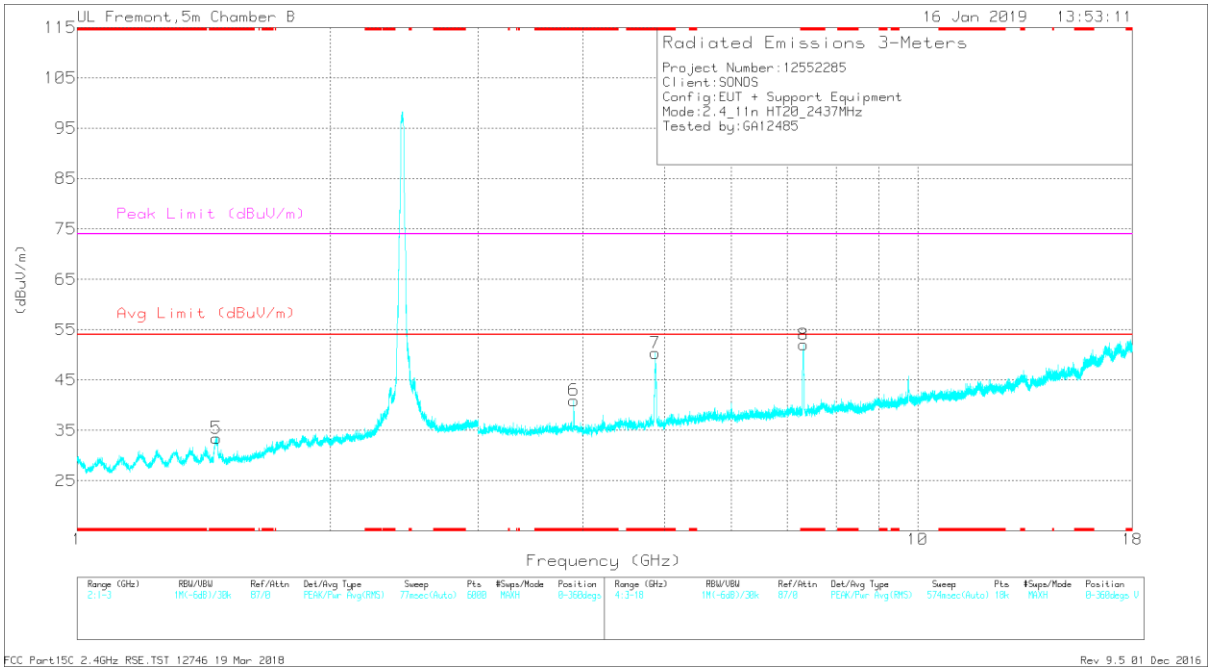
MID CHANNEL, CH 6 RESULTS



HORIZONTAL



VERTICAL

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RADIATED EMISSIONS

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	* 1.465	26.54	Pk	28	-21.1	0	33.44	-	-	74	-40.56	0-360	102	V
2	* 3.899	37.18	Pk	33.4	-29.6	0	40.98	-	-	74	-33.02	0-360	102	H
3	* 4.875	44.16	Pk	34.3	-30.1	0	48.36	-	-	74	-25.64	0-360	102	H
4	* 7.309	44.56	Pk	35.9	-27.6	0	52.86	-	-	74	-21.14	0-360	199	H
6	* 3.899	37.16	Pk	33.4	-29.6	0	40.96	-	-	74	-33.04	0-360	199	V
7	* 4.875	46.16	Pk	34.3	-30.1	0	50.36	-	-	74	-23.64	0-360	102	V
8	* 7.311	43.71	Pk	35.9	-27.6	0	52.01	-	-	74	-21.99	0-360	199	V
1	1.877	25.15	Pk	31	-20.7	0	35.45	-	-	-	-	0-360	102	H

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

Radiated Emissions

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	* 1.465	33.78	PK2	28	-21.1	0	40.68	-	-	74	-33.32	111	103	V
	* 1.463	22.99	MAv1	28	-21.1	0.33	30.22	54	-23.78	-	-	111	103	V
2	* 3.899	43.27	PK2	33.4	-29.6	0	47.07	-	-	74	-26.93	182	109	H
	* 3.899	36.78	MAv1	33.4	-29.6	0.33	40.91	54	-13.09	-	-	182	109	H
3	* 4.875	50.86	PK2	34.3	-30.1	0	55.06	-	-	74	-18.94	171	132	H
	* 4.875	40.75	MAv1	34.3	-30.1	0.33	45.28	54	-8.72	-	-	171	132	H
4	* 7.31	51.35	PK2	35.9	-27.6	0	59.65	-	-	74	-14.35	148	211	H
	* 7.31	39.78	MAv1	35.9	-27.6	0.33	48.41	54	-5.59	-	-	148	211	H
6	* 3.899	41.66	PK2	33.4	-29.6	0	45.46	-	-	74	-28.54	28	304	V
	* 3.899	34.69	MAv1	33.4	-29.6	0.33	38.82	54	-15.18	-	-	28	304	V
7	* 4.875	50.82	PK2	34.3	-30.1	0	55.02	-	-	74	-18.98	86	124	V
	* 4.875	39.94	MAv1	34.3	-30.1	0.33	44.47	54	-9.53	-	-	86	124	V
8	* 7.311	50.49	PK2	35.9	-27.6	0	58.79	-	-	74	-15.21	319	222	V
	* 7.311	39.7	MAv1	35.9	-27.6	0.33	48.33	54	-5.67	-	-	319	222	V
1	1.879	29.15	PK2	31	-20.7	0	39.45	-	-	-	-	281	235	H

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

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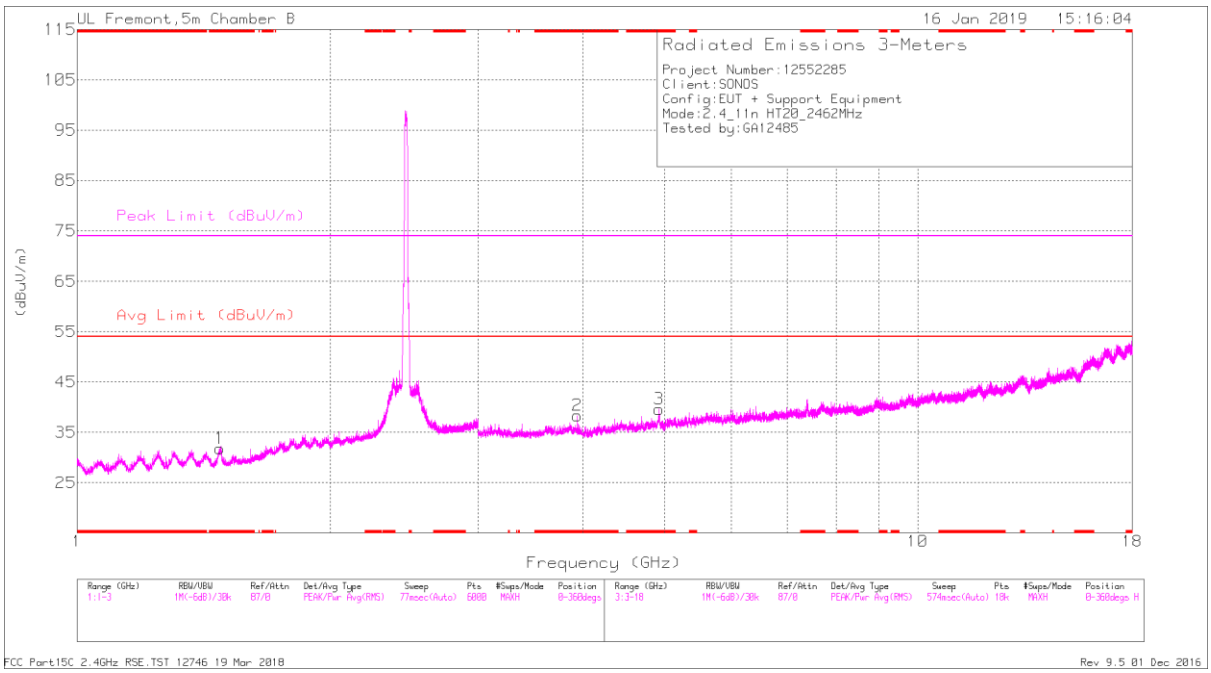
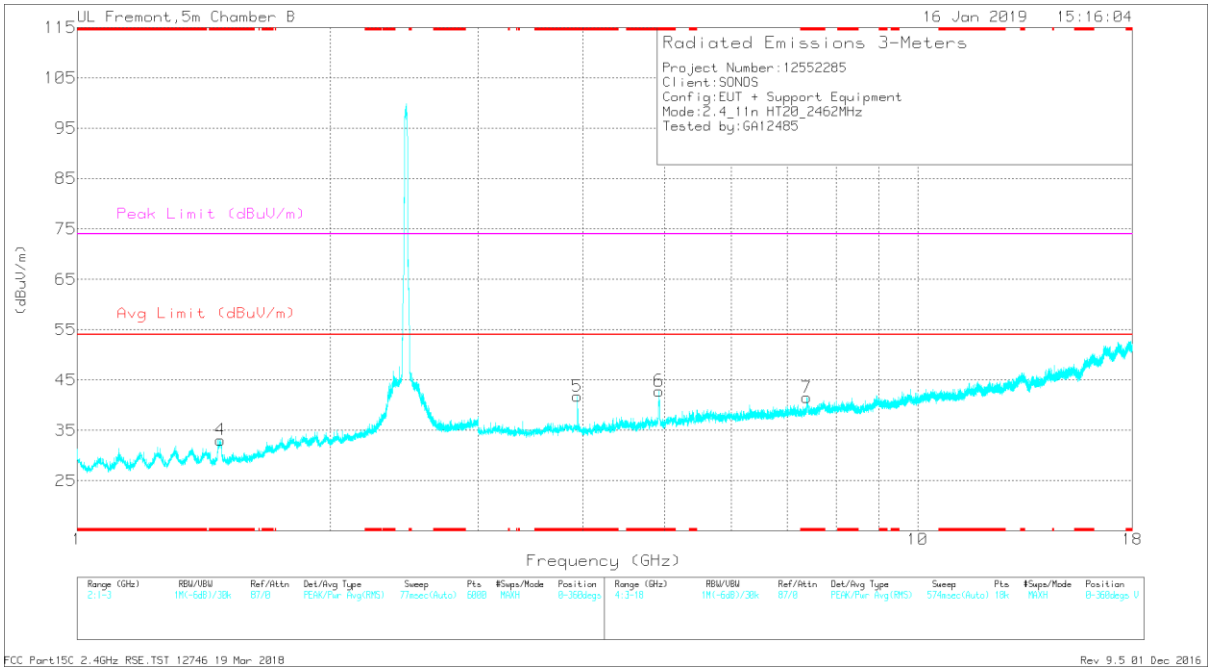
HIGH CHANNEL, CH 11 RESULTS



HORIZONTAL



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RADIATED EMISSIONS

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/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	* 1.479	25.01	Pk	27.9	-21.1	31.81	-	-	74	-42.19	0-360	102	H
4	* 1.481	26.29	Pk	27.9	-21.1	33.09	-	-	74	-40.91	0-360	102	V
2	* 3.939	34.85	Pk	33.4	-29.9	38.35	-	-	74	-35.65	0-360	199	H
3	* 4.925	35.21	Pk	34.4	-30	39.61	-	-	74	-34.39	0-360	102	H
5	* 3.939	38.29	Pk	33.4	-29.9	41.79	-	-	74	-32.21	0-360	199	V
6	* 4.924	38.51	Pk	34.4	-30.1	42.81	-	-	74	-31.19	0-360	199	V
7	* 7.382	32.12	Pk	36.1	-26.7	41.52	-	-	74	-32.48	0-360	199	V

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

Radiated Emissions

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/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	* 1.478	32.43	PK2	27.9	-21.1	0	39.23	-	-	74	-34.77	160	142	H
	* 1.478	21.02	MAv1	27.9	-21.1	0.33	28.15	54	-25.85	-	-	160	142	H
4	* 1.48	34.12	PK2	27.9	-21.1	0	40.92	-	-	74	-33.08	110	112	V
	* 1.48	23.06	MAv1	27.9	-21.1	0.33	30.19	54	-23.81	-	-	110	112	V
2	* 3.939	42.35	PK2	33.4	-29.9	0	45.85	-	-	74	-28.15	102	194	H
	* 3.939	34.73	MAv1	33.4	-29.9	0.33	38.56	54	-15.44	-	-	102	194	H
3	* 4.925	43.47	PK2	34.4	-30.1	0	47.77	-	-	74	-26.23	169	137	H
	* 4.925	31.87	MAv1	34.4	-30	0.33	36.6	54	-17.4	-	-	169	137	H
5	* 3.939	44.19	PK2	33.4	-29.9	0	47.69	-	-	74	-26.31	182	215	V
	* 3.939	38.18	MAv1	33.4	-29.9	0.33	42.01	54	-11.99	-	-	182	215	V
6	* 4.925	47.8	PK2	34.4	-30	0	52.2	-	-	74	-21.8	157	136	V
	* 4.925	35.2	MAv1	34.4	-30	0.33	39.93	54	-14.07	-	-	157	136	V
7	* 7.381	41.64	PK2	36.1	-26.7	0	51.04	-	-	74	-22.96	342	212	V
	* 7.383	28.16	MAv1	36.1	-26.7	0.33	37.89	54	-16.11	-	-	342	212	V

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

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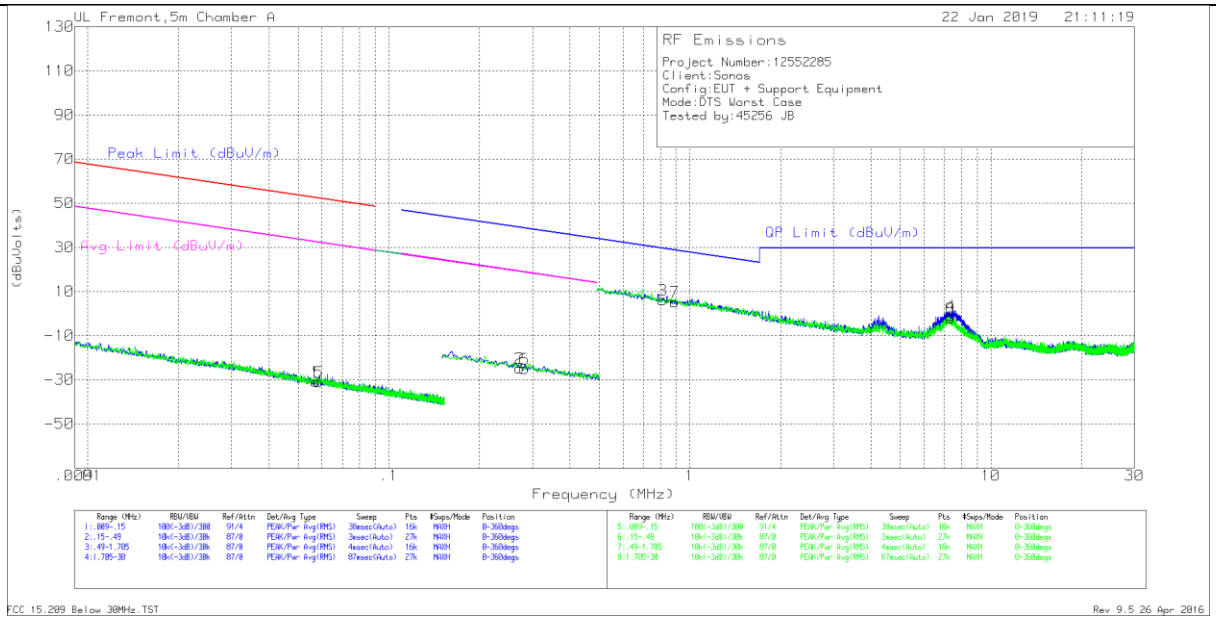
9.2. Worst Case Below 30 MHz

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



NOTE: KDB 414788 OFS 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.
- OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

Below 30 MHz Data

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cables (dB)	Dist Corr 300 m	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	.05711	34.62	Pk	14.4	0	-80	-30.98	52.45	-83.43	32.45	-63.43	-	-	-	-	0-360
5	.0584	34.49	Pk	14.5	0	-80	-31.01	52.26	-83.27	32.26	-63.27	-	-	-	-	0-360
2	.27177	41.19	Pk	13.8	.1	-80	-24.91	-	-	-	-	38.93	-63.84	18.93	-43.84	0-360
6	.28241	41.05	Pk	13.8	.1	-80	-25.05	-	-	-	-	38.6	-63.65	18.6	-43.65	0-360

Pk - Peak detector

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cbl (dB)	Dist Corr (dB) 40Log	Corrected Reading (dBuVolts)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
3	.81232	31.94	Pk	14	.1	-40	6.04	29.42	-23.38	0-360
7	.89067	30.91	Pk	14.1	.1	-40	5.11	28.62	-23.51	0-360
8	7.33381	23.02	Pk	14.4	.4	-40	-2.18	29.5	-31.68	0-360
4	7.36315	24.09	Pk	14.4	.4	-40	-1.11	29.5	-30.61	0-360

Pk - Peak detector

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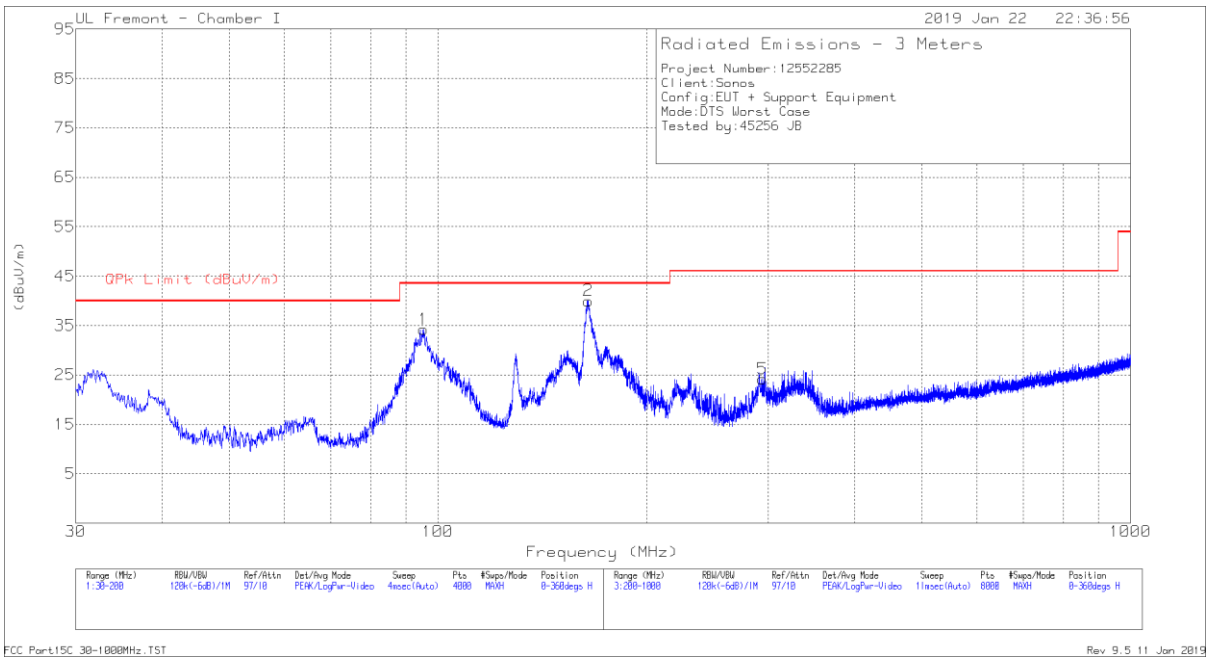
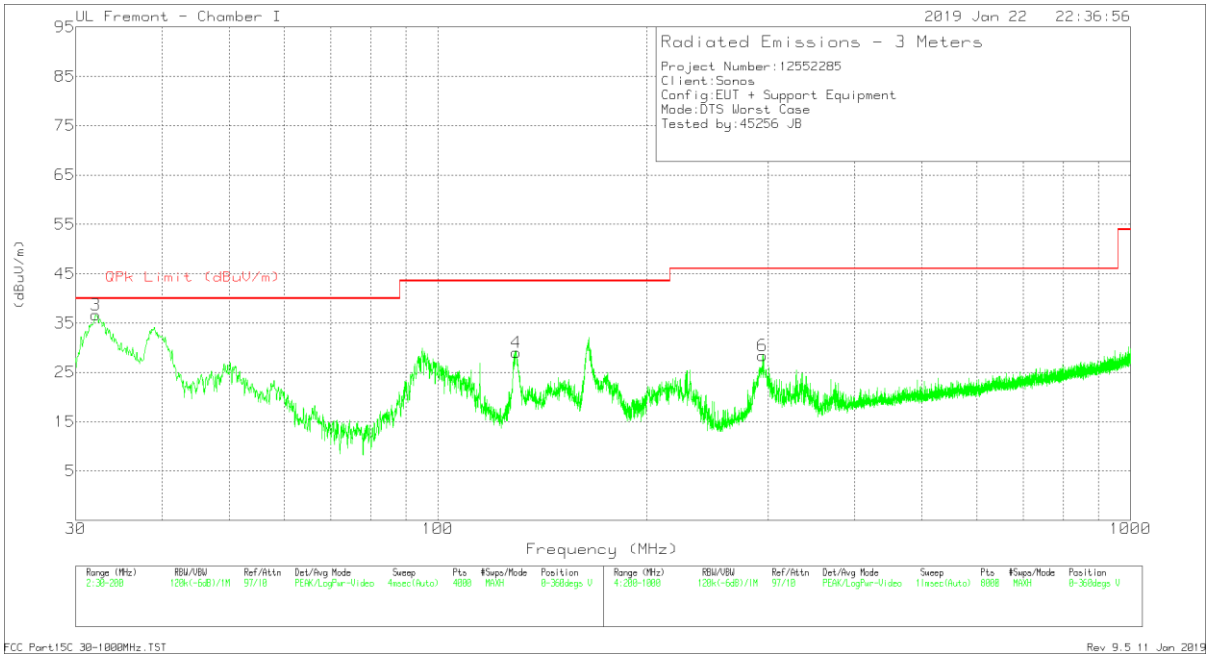
9.3. Worst Case Below 1 GHz



HORIZONTAL



VERTICAL

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Below 1GHz DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF PRE0184971 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	95.2544	50.18	Pk	14.8	-30.8	34.18	43.52	-9.34	0-360	199	H
2	* 164.9724	52.61	Pk	17.7	-30.3	40.01	43.52	-3.51	0-360	99	H
2	* 164.9724	50.65	Qp	17.7	-30.3	38.05	43.52	-5.47	151	106	H
3	32.0405	42.85	Pk	25.1	-31.3	36.65	40.00	-3.35	0-360	101	V
3	32.0405	39.22	Qp	25.0	-31.3	32.92	40.00	-7.08	234	101	V
4	* 129.8158	40.15	Pk	19.5	-30.6	29.05	43.52	-14.47	0-360	101	V
5	294.4123	34.81	Pk	19.2	-29.8	24.21	46.02	-21.81	0-360	199	H
6	294.3123	39.05	Pk	19.2	-29.8	28.45	46.02	-17.57	0-360	101	V

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

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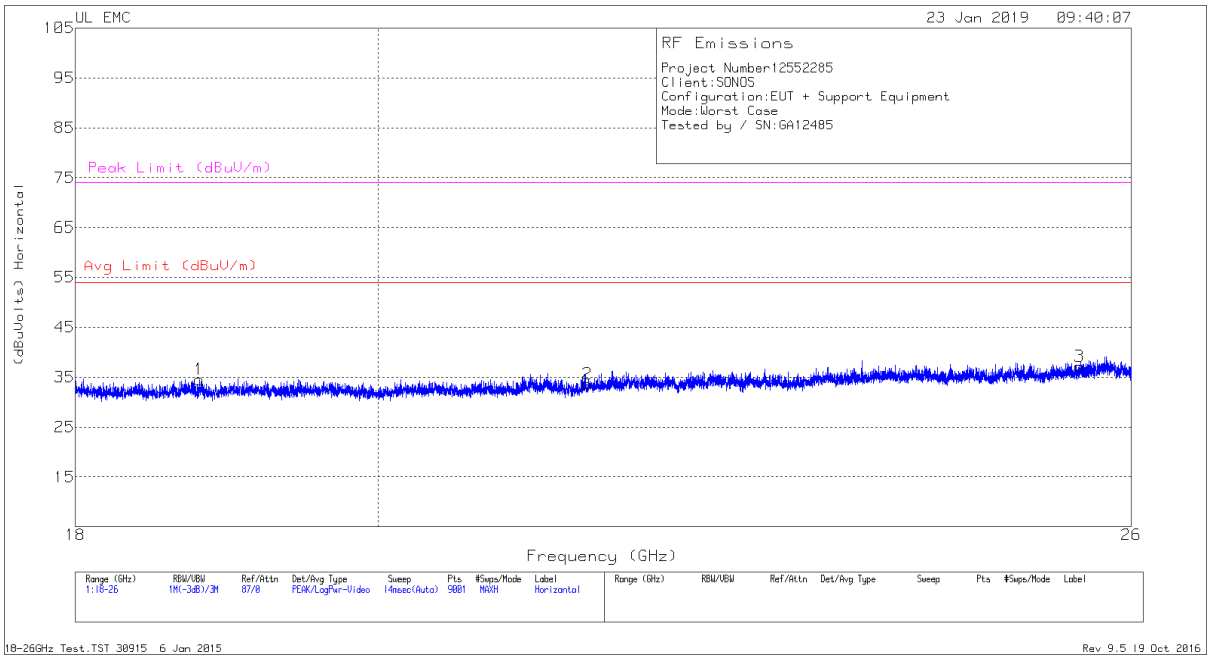
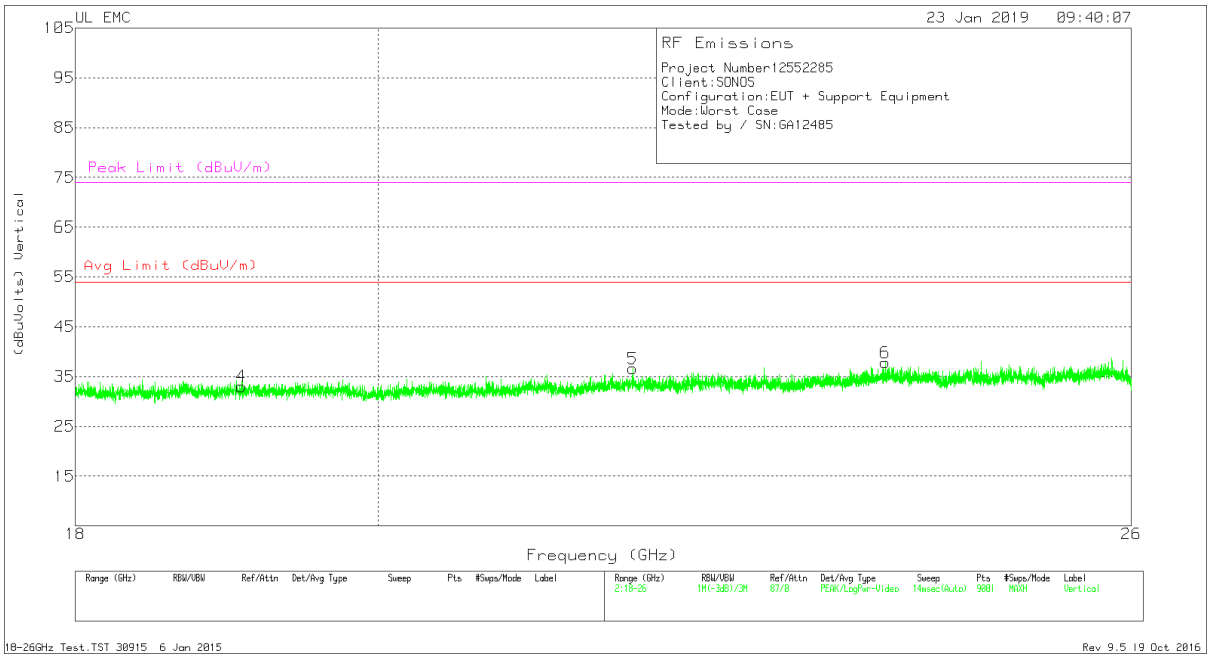
9.4. Worst Case 18-26 GHz



HORIZONTAL



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18 – 26GHz DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T447 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	18.794	36.5	Pk	32.4	-24.9	-9.5	34.5	54	-19.5	74	-39.5
2	21.513	35.44	Pk	33.1	-25.4	-9.5	33.64	54	-20.36	74	-40.36
3	25.534	37.28	Pk	34.5	-25.1	-9.5	37.18	54	-16.82	74	-36.82
4	19.07	34.78	Pk	32.6	-24.9	-9.5	32.98	54	-21.02	74	-41.02
5	21.855	37.51	Pk	33.2	-24.6	-9.5	36.61	54	-17.39	74	-37.39
6	23.864	37.22	Pk	34.2	-24.1	-9.5	37.82	54	-16.18	74	-36.18

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10. AC POWER LINE CONDUCTED EMISSIONS

Please refer to report, UL 12166253-E2.

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