TEST REPORT

Report Number : 15126863-E1V2

Applicant	:	Sonos Inc. 301 Coromar Dr. Goleta, CA 93117 USA
Model	:	S55
Brand	:	Sonos
FCC ID	:	SBVRM055
IC	:	5373A-RM055
EUT Description	:	Wireless Smart Speaker
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART C ISED RSS-247 ISSUE 3 ISED RSS-GEN ISSUE 5 + A1 + A2

Date Of Issue:
2024-06-21

Prepared by:
UL VERIFICATION SERVICES
47173 Benicia Street
Fremont, CA 94538 U.S.A.
TEL: (510) 319-4000
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ACCREDITED
CERT #0751.05

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	2024-05-30	Initial Issue	---
V2	2024-06-21	Section 6.1 and 6.2 updated	Henry Lau

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Sonos Inc.
301 Coromar Dr.
Goleta, CA 93117 USA.

EUT DESCRIPTION: Wireless Smart Speaker

MODEL: S55

BRAND: Sonos

SERIAL NUMBER: Radiated: 000E58BF9FD11
Conducted: 000E58661EF23

SAMPLE RECEIPT DATE: 2024-04-01

DATE TESTED: 2024-04-03 TO 2024-05-09

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC 47 CFR Part 15 Subpart C	Complies
ISED RSS-247 Issue 3	Complies
ISED RSS-GEN Issue 5 + A1 + A2	Complies

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document.

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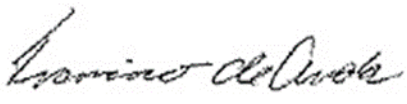
Approved & Released For
UL Verification Services Inc. By:



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Staff Engineer
Consumer Technology Division
UL Verification Services Inc.

Prepared By:

Gerardo Abrego
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Consumer Technology Division
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2. TEST RESULTS SUMMARY

This report contains data provided by the customer which can impact the validity of results. UL Verification Services Inc. is only responsible for correctly integrating customer-provided data with measurements performed by UL Verification Services Inc.

Below is a list of the data provided by the customer:
1) Antenna gain and type (see section 6.3)

FCC Clause	ISED Clause	Requirement	Result	Comment
See Comment		Duty Cycle	Reporting purposes only	ANSI C63.10 Section 11.6.
-	RSS-GEN 6.7	99% OBW	Reporting purposes only	ANSI C63.10 Section 6.9.3.
15.247 (a) (2)	RSS-247 5.2 (a)	6dB BW	Compliant	None.
15.247 (b) (3)	RSS-247 5.4 (d)	Output Power	Compliant	None.
See Comment		Average power	Reporting purposes only	Per ANSI C63.10, Section 11.9.2.3.2.
15.247 (e)	RSS-247 5.2 (b)	PSD	Compliant	None.
15.247 (d)	RSS-247 5.5	Conducted Spurious Emissions	Compliant	None.
15.209, 15.205	RSS-GEN 8.9, 8.10	Radiated Emissions	Compliant	None.
15.207	RSS-Gen 8.8	AC Mains Conducted Emissions	Compliant	None.

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3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC 47 CFR Part 2, FCC 47 CFR Part 15, ANSI C63.10-2013, KDB 558074 D01 15.247 Meas Guidance v05r02, KDB 414788 D01 Radiated Test Site v01r01, RSS-GEN Issue 5 + A1 + A2, and RSS-247 Issue 3.

4. FACILITIES AND ACCREDITATION

UL Verification Services Inc. is accredited by A2LA, Certificate Number 0751.05, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
☒	Building 1: 47173 Benicia Street, Fremont, CA 94538, USA	US0104	2324A	550739
☐	Building 2: 47266 Benicia Street, Fremont, CA 94538, USA			
☐	Building 3: 843 Auburn Court, Fremont, CA 94538, USA			
☒	Building 4: 47658 Kato Rd, Fremont, CA 94538, USA			
☐	Building 5: 47670 Kato Rd, Fremont, CA 94538, USA			

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5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

5.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

5.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	U_{Lab}
Radio Frequency (Spectrum Analyzer)	141.16 Hz
Occupied Bandwidth	1.22%
Power Spectral Density	2.47 dB
RF Power Measurement Direct Method Using Power Meter	1.3 dB (PK) / 0.45 dB (AV)
Unwanted Emissions, Conducted	1.94 dB
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.78 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.40 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	2.87 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	6.01 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.73 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.51 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.29 dB
Time Domain Measurements	3.39%
Temperature	0.57˚C
Humidity	3.39%
DC Supply Voltages	0.57%

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

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5.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:
Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:
Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.
36.5 dBuV + 0 dB +10.1 dB+ 0 dB = 46.6 dBuV

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6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The EUT is a Wireless Smart Speaker.

6.2. MAXIMUM OUTPUT POWER

The transmitter has maximum peak conducted output powers as follows:

Frequency Range (MHz)	Mode	Peak	
		Output Power (dBm)	Output Power (mW)
2402 - 2480	BLE(1Mbps)	9.04	8.02
	BLE(2Mbps)	9.07	8.07

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The antenna(s) gain and type, as provided by the manufacturer' are as follows:

The radio utilizes a PCB, with a maximum gain of 3.6 dBi.

6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was 78.1-48130-diag-jaws-dev-woosung-202312211600.

The test utility software installed during testing was SONOSCOMPLAINCEGUI_V1.0.5

6.5. WORST-CASE CONFIGURATIONS

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

Band edge and radiated emissions between 1GHz and 18GHz were performed with the EUT set to transmit at the highest power on low, middle, and high channels.

The 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:

BLE (1Mbps): 1Mbps
BLE (2Mbps): 2 Mbps

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6.6. DESCRIPTION OF TEST SETUP

SUPPORT TEST EQUIPMENT				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID/ DoC**
Laptop	Lenovo	X1 Carbon	R90HKAXZ	Doc
Laptop AC/DC AC/DC Adapter	Lenovo	ADLX90NLC2A	11S45N0247Z1ZS9B54B8EJ	Doc
USB-A to Ethernet Adapter	Plugable	USB2-E100	8CAE4CEBE0D9	Doc

I/O CABLES (CONDUCTED TEST)						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	AC	3	AC	Un-shielded	1.25	AC Mains to Spectrum Analyzer/AC/DC Adapter
2	DC	1	DC	Un-shielded	1	AC/DC Adapter to Laptop
3	USB-A to Ethernet Adapter	1	USB-A	Shielded	0.5	Laptop to EUT
4	Ethernet	1	RJ45	Un-shielded	1	Laptop to USB Ethernet Adapter
5	SMA Cable	1	SMA	Un-Shielded	1.0	EUT to Spectrum Analyzer

I/O CABLES (RADIATED TEST)						
Cable No.	**Port**	**# Of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	AC	3	AC	Un-shielded	1.25	AC Mains to Spectrum Analyzer/AC/DC Adapter
2	DC	1	DC	Un-shielded	1	AC/DC Adapter to Laptop
3	USB-A to Ethernet Adapter	1	USB-A	-Shielded	0.5	Laptop to EUT
4	Ethernet	1	RJ45	Un-shielded	1	Laptop to USB Ethernet Adapter
5	SMA Cable	1	SMA	Un-Shielded	10	EUT to Horn Antenna

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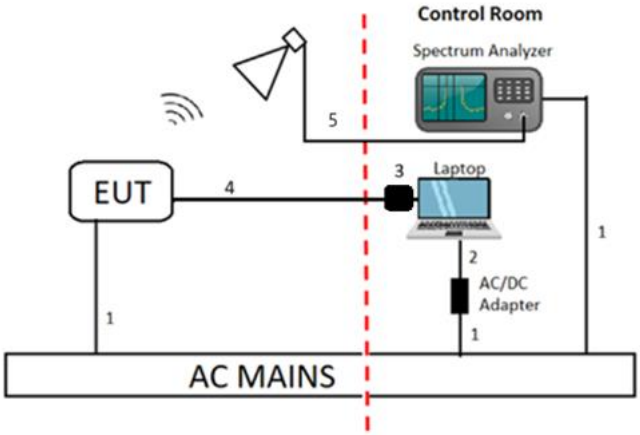
TEST SETUP

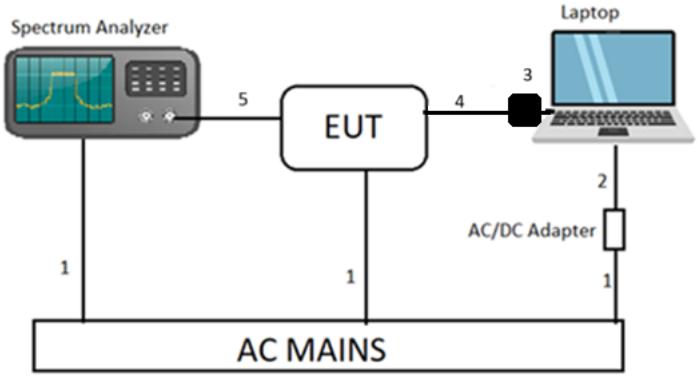
The EUT is a stand-alone unit, and the radio is exercised remotely by Sonos Compliance GUI test utility software via ethernet.

SETUP DIAGRAM

Radiated Configuration



Conducted/AC Line Configuration



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7. MEASUREMENT METHOD

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

6 dB BW: ANSI C63.10 Subclause -11.8.1 RBW ≥ DTS BW

Occupied BW (99%): ANSI C63.10-2013 Section 6.9.3

Output Power: ANSI C63.10 Subclause -11.9.1.3 Method PKPM1 Peak-reading power meter
Output Power: ANSI C63.10 Subclause -11.9.2.3.2 Method AVGPM-G (Measurement using a gated RF average-reading power meter)

PSD: ANSI C63.10 Subclause -11.10.2 Method PKPSD (peak PSD)

Radiated emissions non-restricted frequency bands: ANSI C63.10 Subclause -11.11

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

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

Band-edge: ANSI C63.10 Subclause -11.13.3.2 Integration method -Peak detection

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.

Radiated Spurious Emissions Below 30MHz: ANSI C63.10-2013 Section 6.4

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8. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST					
Description	**Manufacturer**	**Model**	**ID Num**	**Cal Due**	**Last Cal**
Antenna, Broadband Hybrid, 30MHz to 2GHz	Sunol Sciences Corp.	JB1	80293	2025-04-30	2023-04-11
Amplifier, 9KHz to 1GHz, 32dB	SONOMA INSTRUMENT	310	213877	2025-03-31	2024-03-25
Antenna, Horn 1-18GHz	ETS-Lindgren (Cedar Park, Texas)	3117	206805	2024-07-31	2023-07-11
RF Filter Box, 1-18GHz	FREMONT	6 Port Silver box	171013	2025-12-02	2024-02-02
RF Filter Box, 1-18GHz	FREMONT	n/a	171875	2025-03-31	2024-03-23
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	191429	2025-02-28	2024-02-11
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	230547	2025-02-28	2024-02-11
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	225688	2025-02-11	2024-02-11
Antenna, Horn 18 to 26.5GHz	ARA	MWH-1826/B	199659	2024-12-31	2022-12-06
Amplifier 18-26.5GHz, +5Vdc, 60dB min	AMPLICAL	AMP18G26.5-60	234683	2025-05-31	2024-05-13
Antenna, Passive Loop 30Hz - 1MHz	ELECTRO METRICS	EM-6871	219908	2024-09-30	2023-09-13
Antenna, Passive Loop 100KHz - 30MHz	ELECTRO METRICS	EM-6872	219910	2024-05-31	2023-05-31
Spectrum Analyzer, PXA, 2Hz to 26.5GHz	Keysight Technologies Inc	N9030B	245121	2025-02-07	2024-02-07
Power Meter, P-series single channel	Keysight Technologies Inc	N1911A	90718	2025-01-31	2024-01-25
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Keysight Technologies Inc	N1921A	90388	2024-06-30	2023-06-23
AC Line Conducted					
LISN	Fischer Custom Communications, Inc`	FCC-LISN-50/250-25-2-01-480V	175765	2025-01-31	2024-01-26
EMI TEST RECEIVER	Rohde & Schwarz	ESR	171646	2025-02-28	2024-02-27
Transient Limiter	TE	TBFL1	127455	2025-02-28	2024-02-27
UL TEST SOFTWARE LIST					
Radiated Software	UL	UL EMC	Ver 2023-01-18, 2023-03-03, 2023-05-01		
Antenna Port Software	UL	UL RF	Ver 2022-08-16		
AC Line Conducted Software	UL	UL EMC	Rev 9.5, 2022-03-23		

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9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

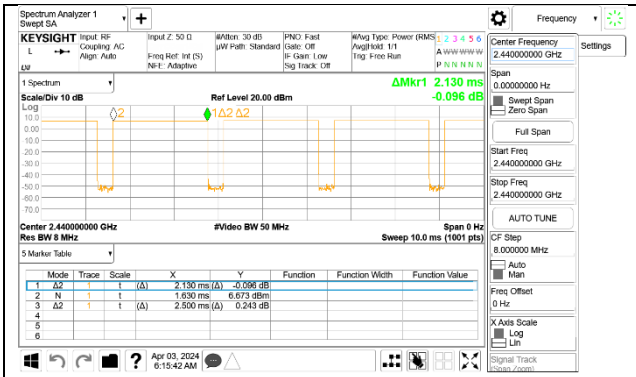
KDB 558074 Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

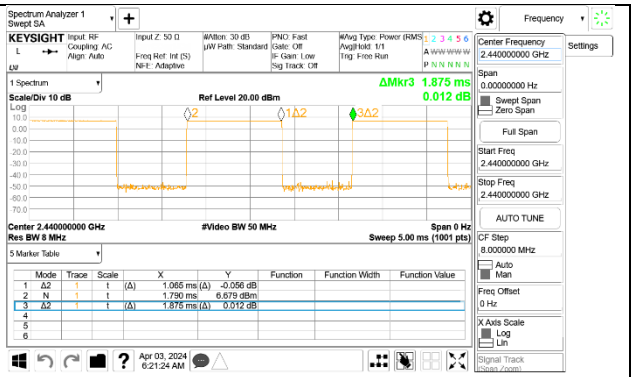
Test By:	**16080 ZS**
Date :	**2024-04-03**

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 (1Mbps)	2.130	2.500	0.852	85.20	0.70	0.469
BLE (2Mbps)	1.065	1.875	0.568	56.80	2.46	0.939

DUTY CYCLE PLOTS



BLE (1Mbps)



BLE (2Mbps)

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9.2. 99% BANDWIDTH

LIMITS

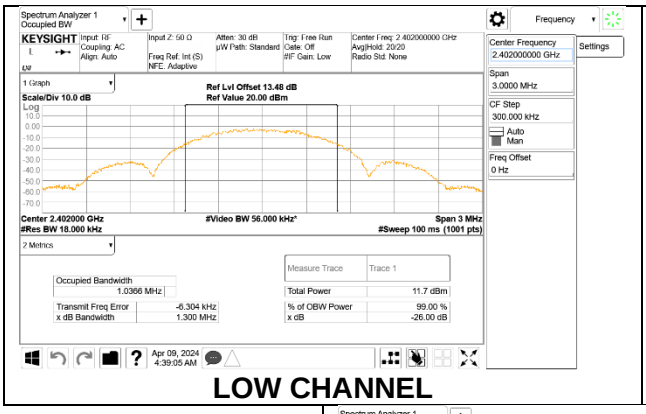
None; for reporting purposes only.

RESULTS

Test By:	**16080 ZS**
Date Tested:	**2024-04-03**

9.2.1. BLE (1Mbps)

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.0366
Middle	2440	1.0405
High	2480	1.0378



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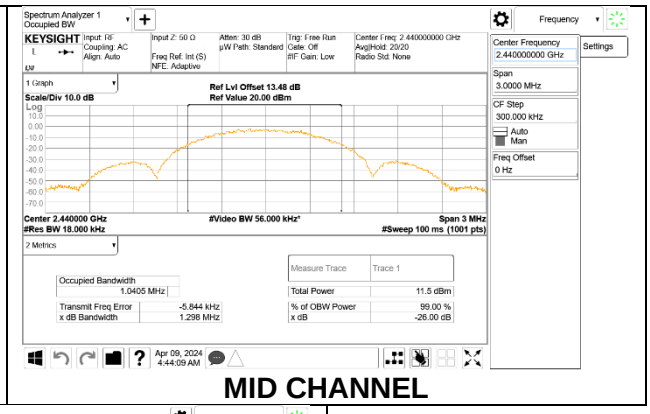
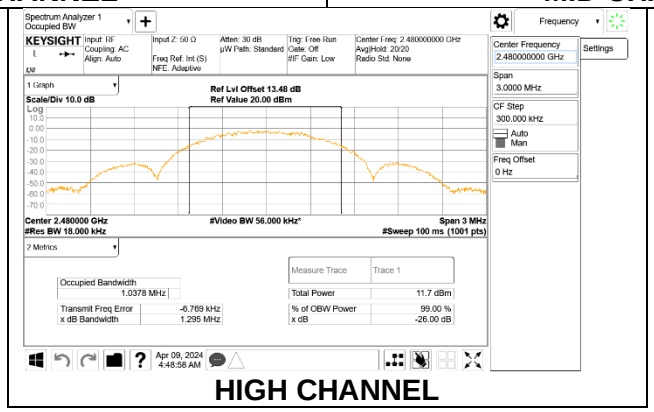


MID CHANNEL



HIGH CHANNEL

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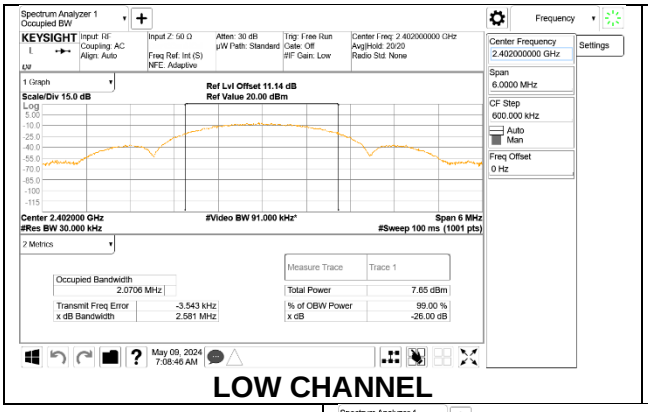
9.2.2. BLE (2Mbps)

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	2.0706
Middle	2440	2.0730
High	2480	2.0719



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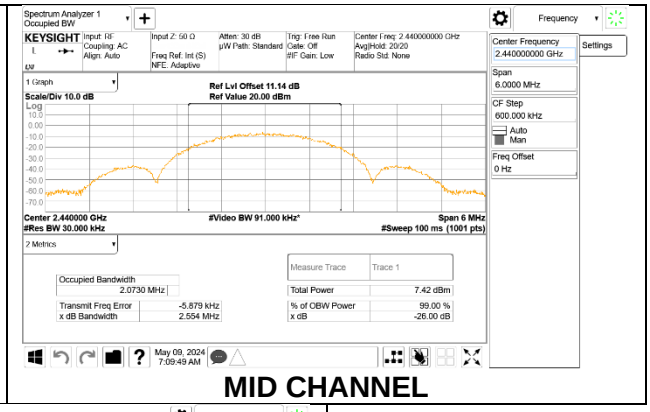

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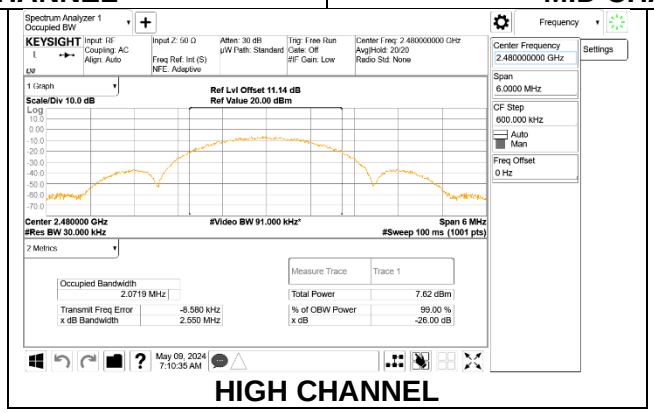

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9.3. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

RSS-247 5.2 (a)

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

RESULTS

Test By:	**16080 ZS**
Date Tested:	**2024-04-09**

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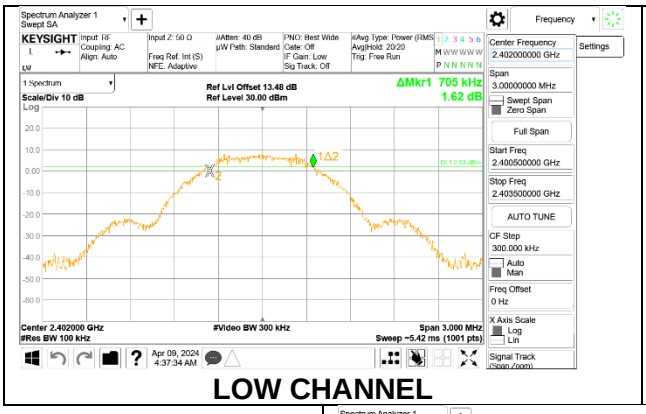
9.3.1. BLE (1Mbps)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.705	0.5
Middle	2440	0.666	0.5
High	2480	0.645	0.5



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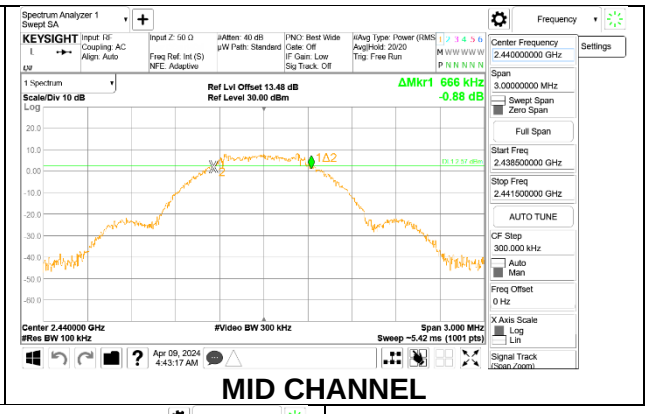

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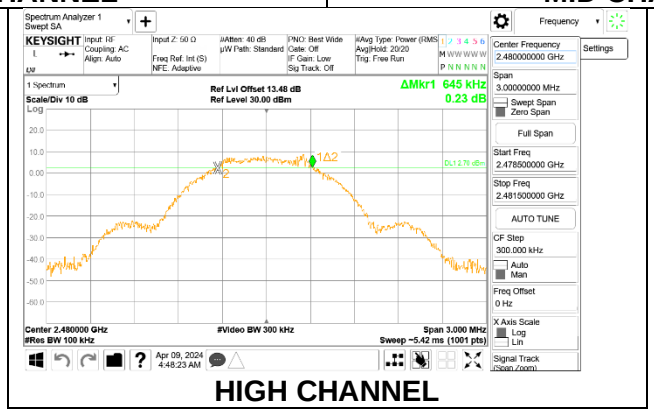

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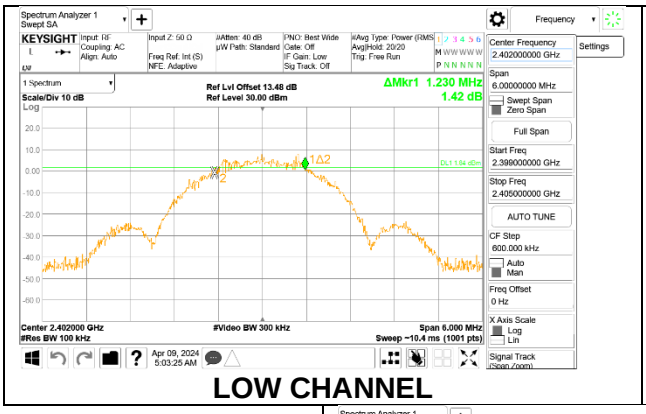
9.3.2. BLE (2Mbps)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	1.230	0.5
Middle	2440	1.146	0.5
High	2480	1.236	0.5



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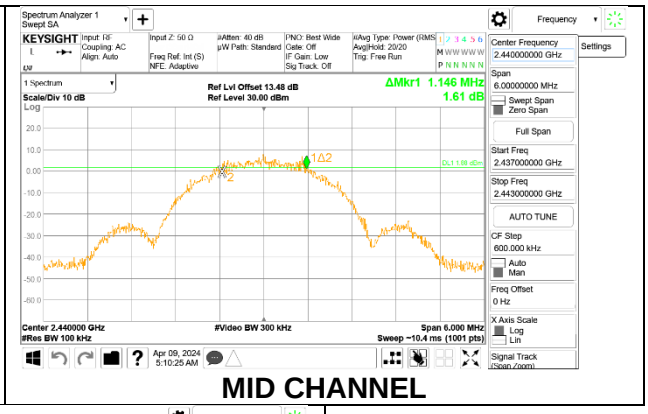

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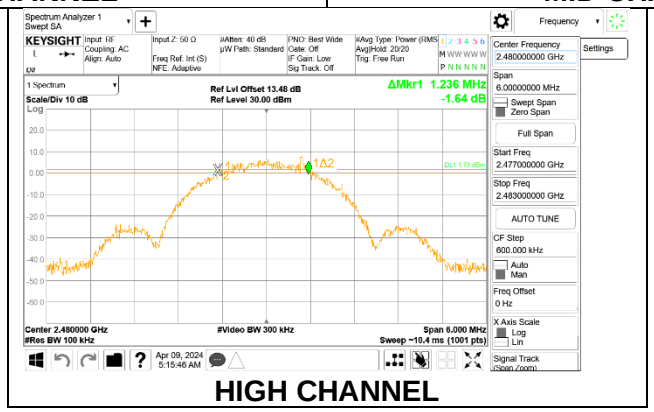

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9.4. OUTPUT POWER

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 power output was measured on the EUT antenna port using SMA cable with 10dB attenuator connected to a power meter via wideband power sensor. Peak output power was read directly from power meter.

RESULTS

9.4.1. BLE (1Mbps)

Tested By:	ZS 16080
Date:	2024-04-19

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	9.04	30	-20.960
Middle	2440	8.91	30	-21.090
High	2480	8.97	30	-21.030

9.4.2. BLE (2Mbps)

Tested By:	ZS 16080
Date:	2024-04-19

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	8.94	30	-21.060
Middle	2440	9.02	30	-20.980
High	2480	9.07	30	-20.930

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9.5. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The power output was measured on the EUT antenna port using SMA cable with 10dB attenuator connected to a power meter via wideband power sensor. Gated average output power was read directly from power meter.

RESULTS

9.5.1. BLE (1Mbps)

Tested By:	ZS 16080
Date:	2024-04-19

Channel	Frequency (MHz)	AV power (dBm)
Low	2402	8.93
Middle	2440	8.79
High	2480	8.84

9.5.2. BLE (2Mbps)

Tested By:	ZS 16080
Date:	2024-04-19

Channel	Frequency (MHz)	AV power (dBm)
Low	2402	8.79
Middle	2440	8.88
High	2480	8.94

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9.6. 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

Test By:	**16080 ZS**
Date Tested:	**2024-04-09**

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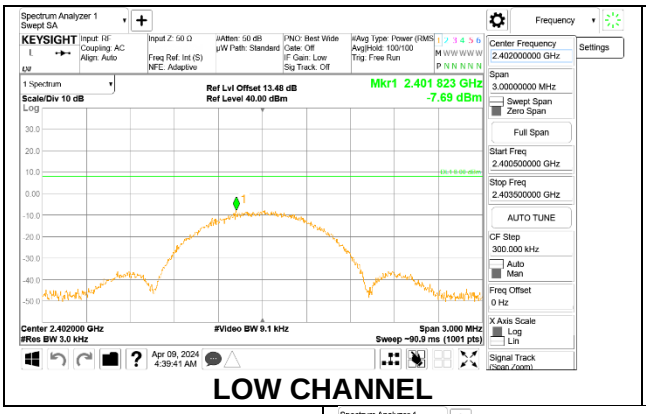
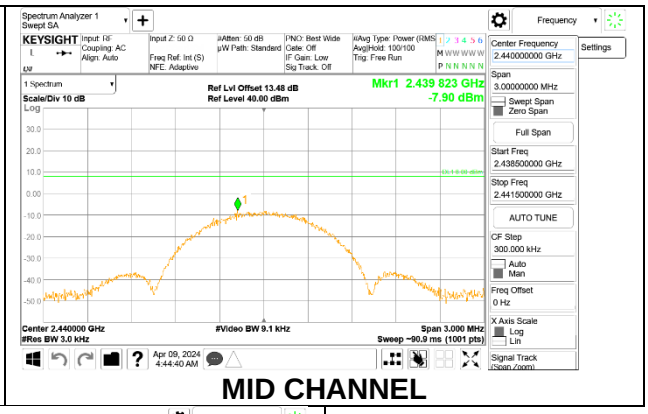
9.6.1. BLE (1Mbps)

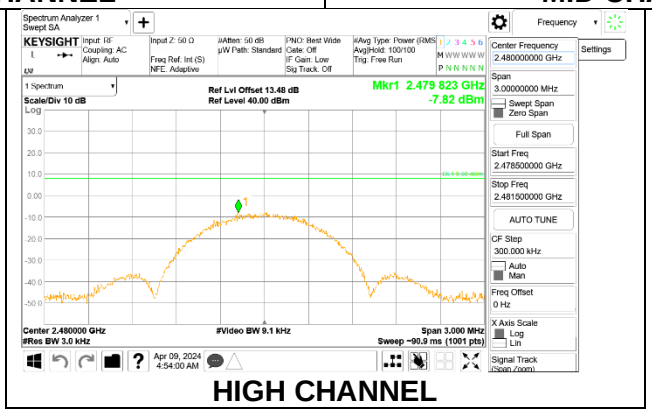
Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low	2402	-7.690	8	-15.69
Middle	2440	-7.900	8	-15.90
High	2480	-7.820	8	-15.82



LOW CHANNEL



MID CHANNEL



HIGH CHANNEL

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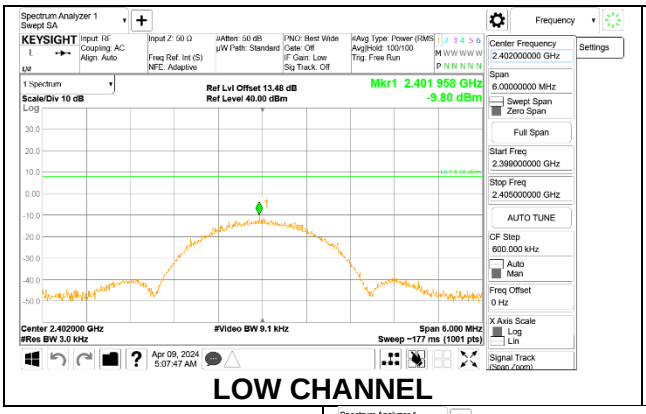
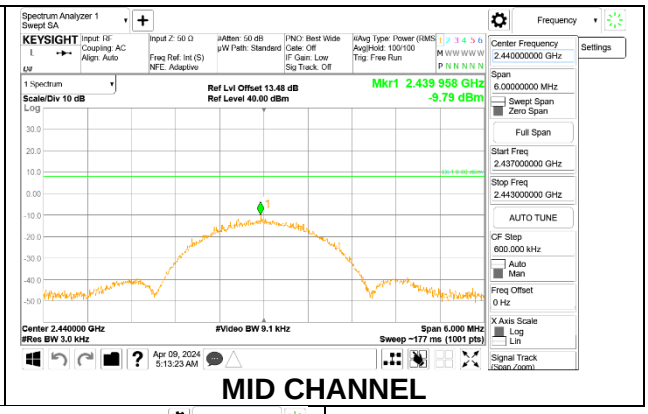
9.6.2. BLE (2Mbps)

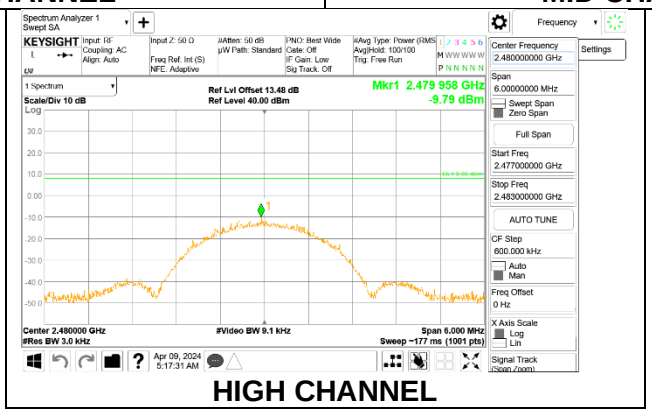
Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low	2402	-9.800	8	-17.80
Middle	2440	-9.790	8	-17.79
High	2480	-9.790	8	-17.79



LOW CHANNEL



MID CHANNEL



HIGH CHANNEL

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9.7. 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

Test By:	**16080 ZS**
Date Tested:	**2024-04-09**

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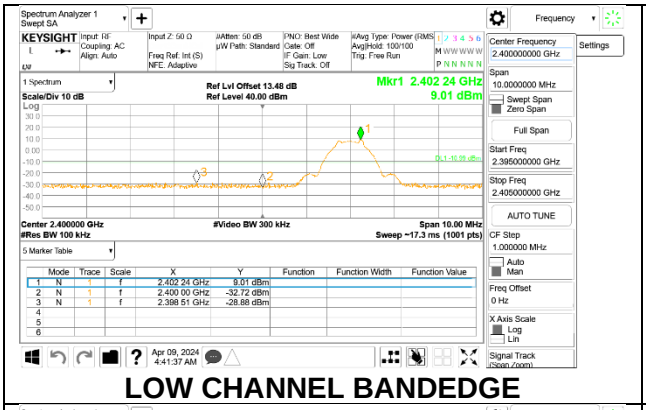
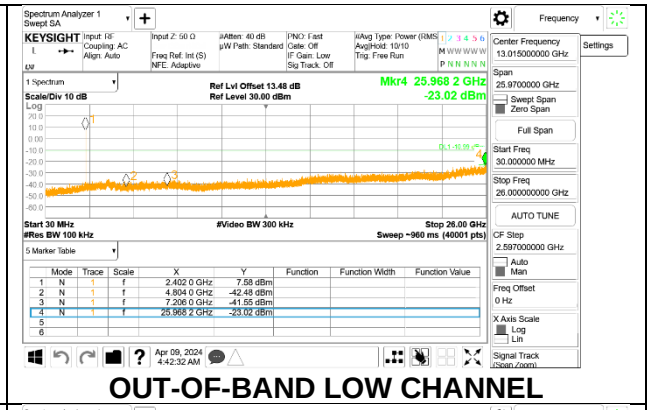
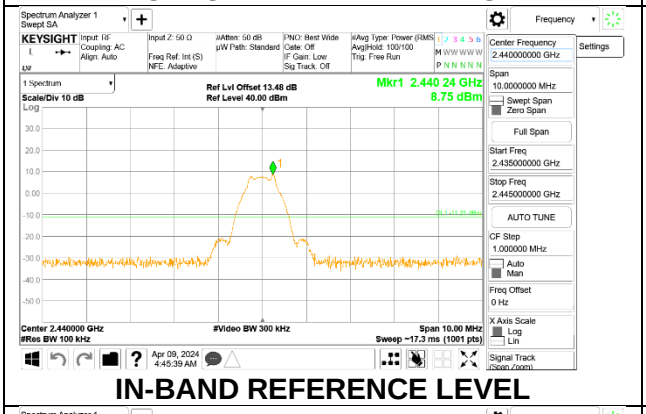
9.7.1. BLE (1Mbps)



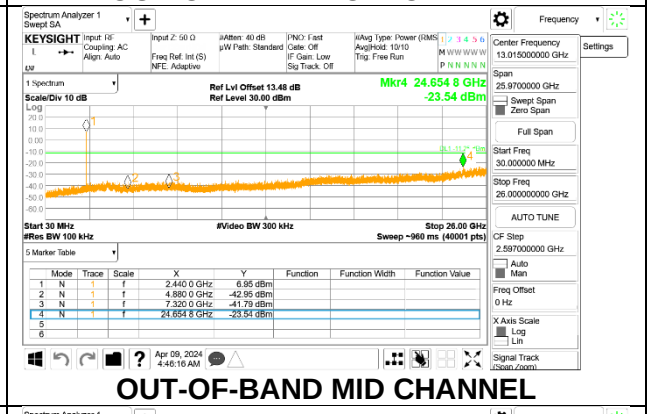
LOW CHANNEL BANDEDGE



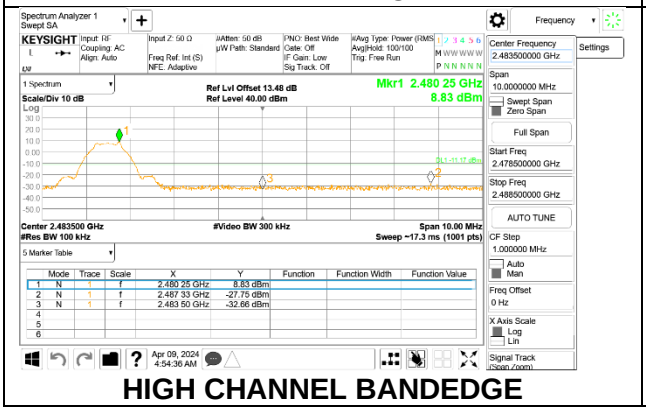
OUT-OF-BAND LOW CHANNEL



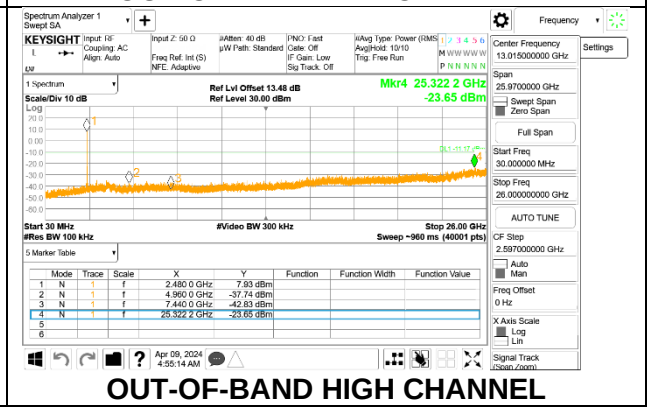
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL



HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL

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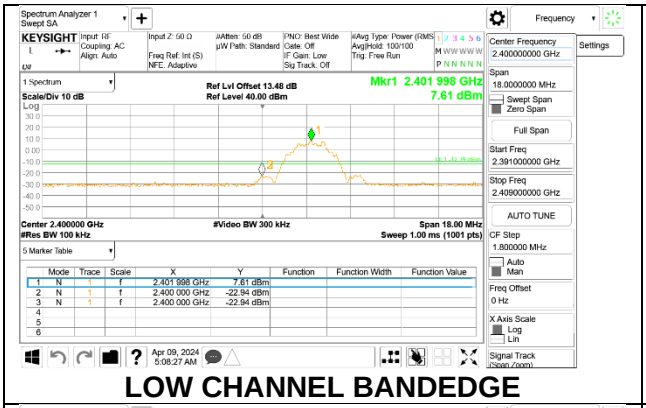
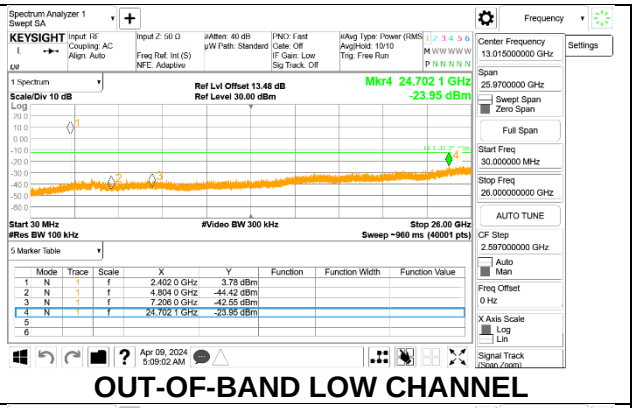
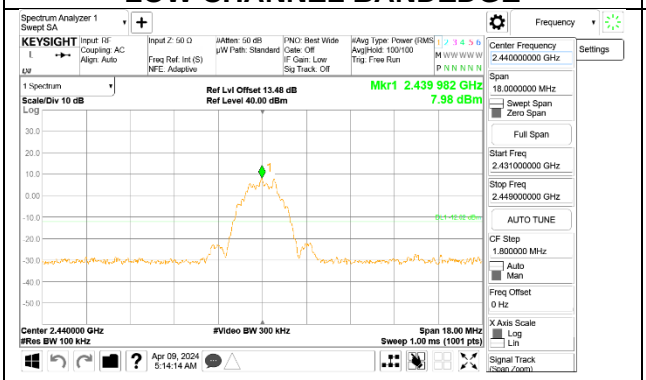
9.7.2. BLE (2Mbps)



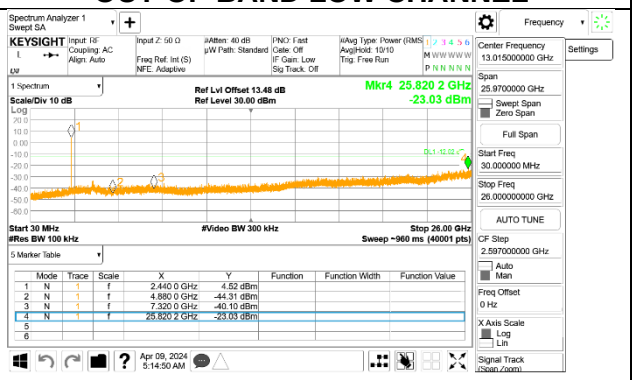
LOW CHANNEL BANDEDGE



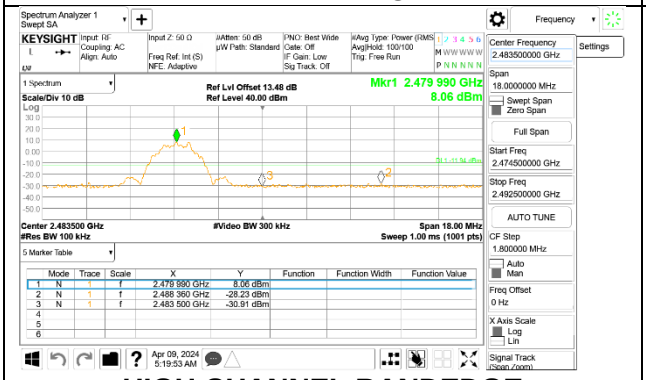
OUT-OF-BAND LOW CHANNEL



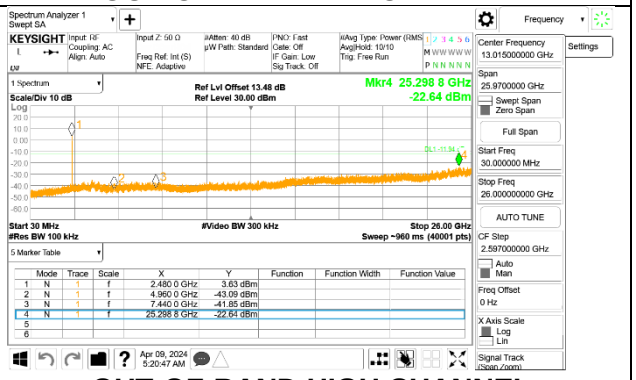
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL



HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL

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10. RADIATED TEST RESULTS

10.1. 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 in the 30-1000MHz range, 9kHz for peak and/or quasi-peak detection measurements in the 0.15-30MHz range and 200Hz for peak and/or quasi-peak detection measurements in the 9 to 150kHz range. Peak detection is used unless otherwise noted as quasi-peak or average (9-90kHz and 110-490kHz).

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.

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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. Blue color trace on plots: Parallel orientation. Green color trace on plots: Perpendicular orientation.

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.

KDB 414788 Open Field Site (OFS) and Chamber Correlation Justification

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

NOTE: The limits in FCC 47 CFR, Part 15, Subpart C, paragraph 15.209(a), are identical to those in RSS-Gen section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table), using the free space impedance of 377 Ohms. For example, the measurement at frequency X kHz resulted in a level of Y dBuV/m, which is equivalent to Y – 51.5 = Z dBuA/m, which has the same margin, W dB, to the corresponding RSS-Gen Table 6 limit as it has 15.209(a) limit.

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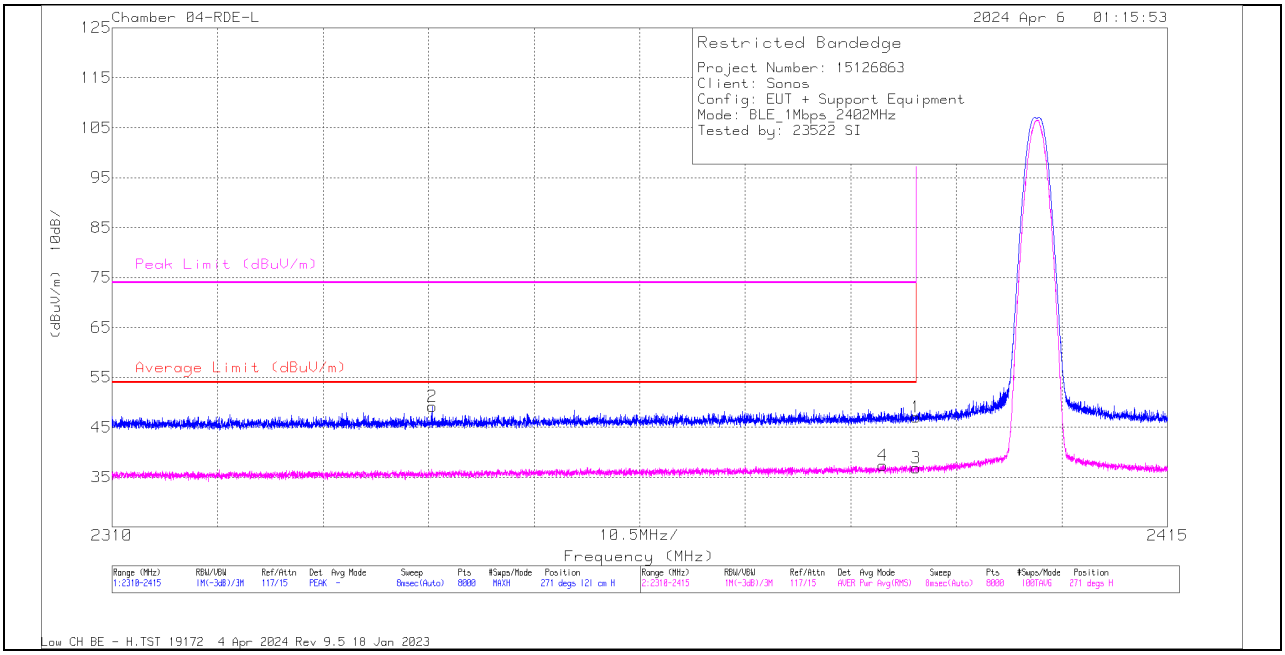
10.2. TRANSMITTER ABOVE 1 GHz

10.2.1. BLE (1Mbps)

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	206805 ACF (dB/m)	Amp/Cbl (dB)	DCCF (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2390	39.29	Pk	32.1	-24.3	0	47.09	-	-	74	-26.91	271	121	H
2	* 2341.859	41.82	Pk	31.8	-24.4	0	49.22	-	-	74	-24.78	271	121	H
3	* 2390	28.37	RMS	32.1	-24.3	.7	36.87	54	-17.13	-	-	271	121	H
4	* 2386.701	28.93	RMS	32.1	-24.3	.7	37.43	54	-16.57	-	-	271	121	H

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

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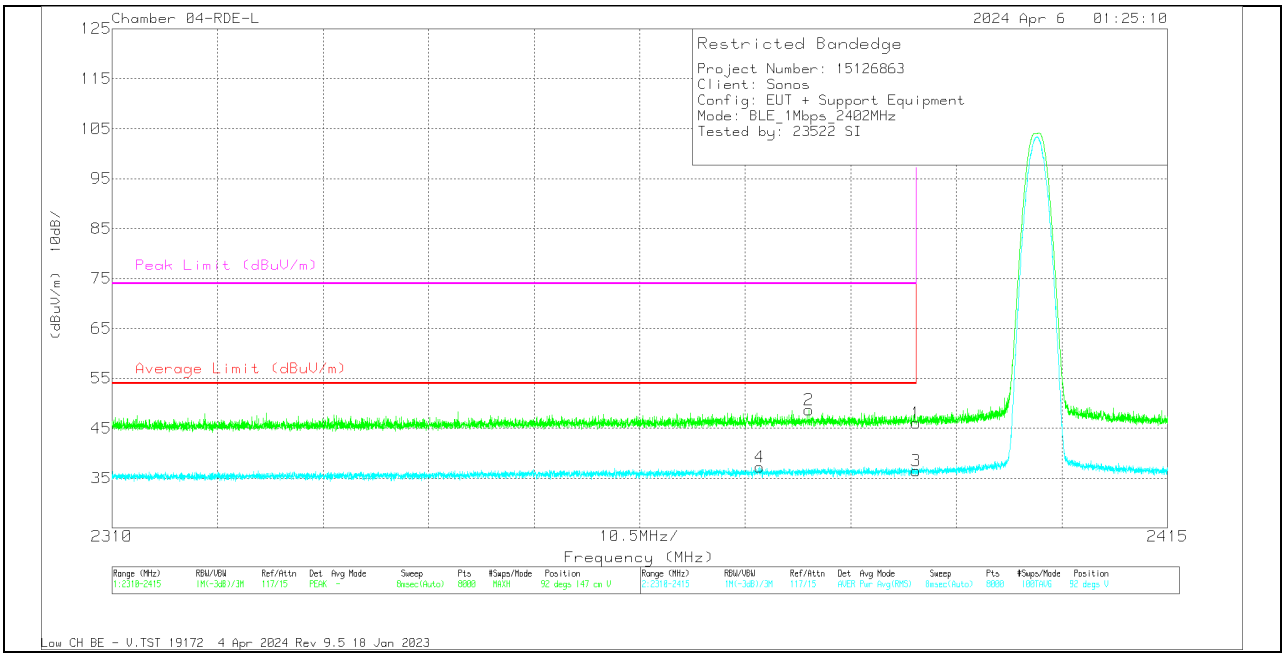
VERTICAL RESULT



Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	206805 ACF (dB)	Amp/Cbl (dB)	DCCF (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2390	38.26	Pk	32.1	-24.3	0	46.06	-	-	74	-27.94	92	147	V
2	* 2379.35	41	Pk	32	-24.3	0	48.7	-	-	74	-25.3	92	147	V
3	* 2390	28.01	RMS	32.1	-24.3	.7	36.51	54	-17.49	-	-	92	147	V
4	* 2374.44	28.95	RMS	32	-24.4	.7	37.25	54	-16.75	-	-	92	147	V

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

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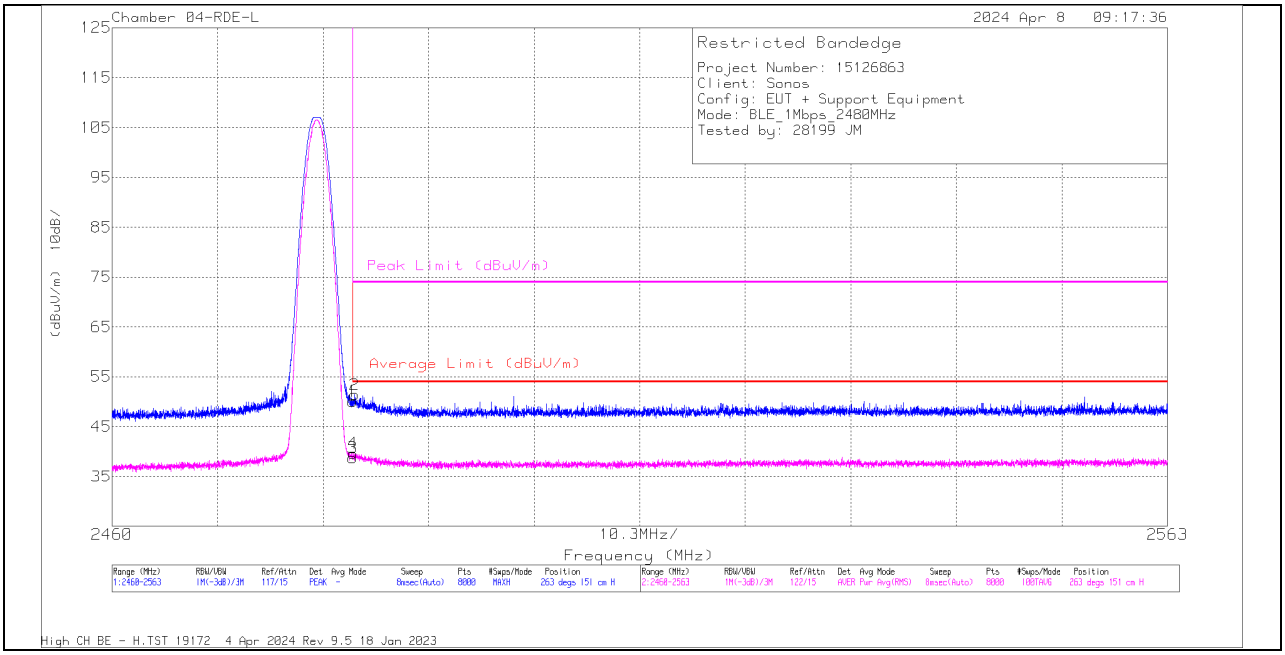
BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	206805 ACF (dB)	Amp/Cbl (dB)	DCCF (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2483.5	41.9	Pk	32.4	-24.2	0	50.1	-	-	74	-23.9	263	151	H
2	* 2483.655	43.21	Pk	32.4	-24.2	0	51.41	-	-	74	-22.59	263	151	H
3	* 2483.5	29.88	RMS	32.4	-24.2	.7	38.78	54	-15.22	-	-	263	151	H
4	* 2483.526	30.71	RMS	32.4	-24.2	.7	39.61	54	-14.39	-	-	263	151	H

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

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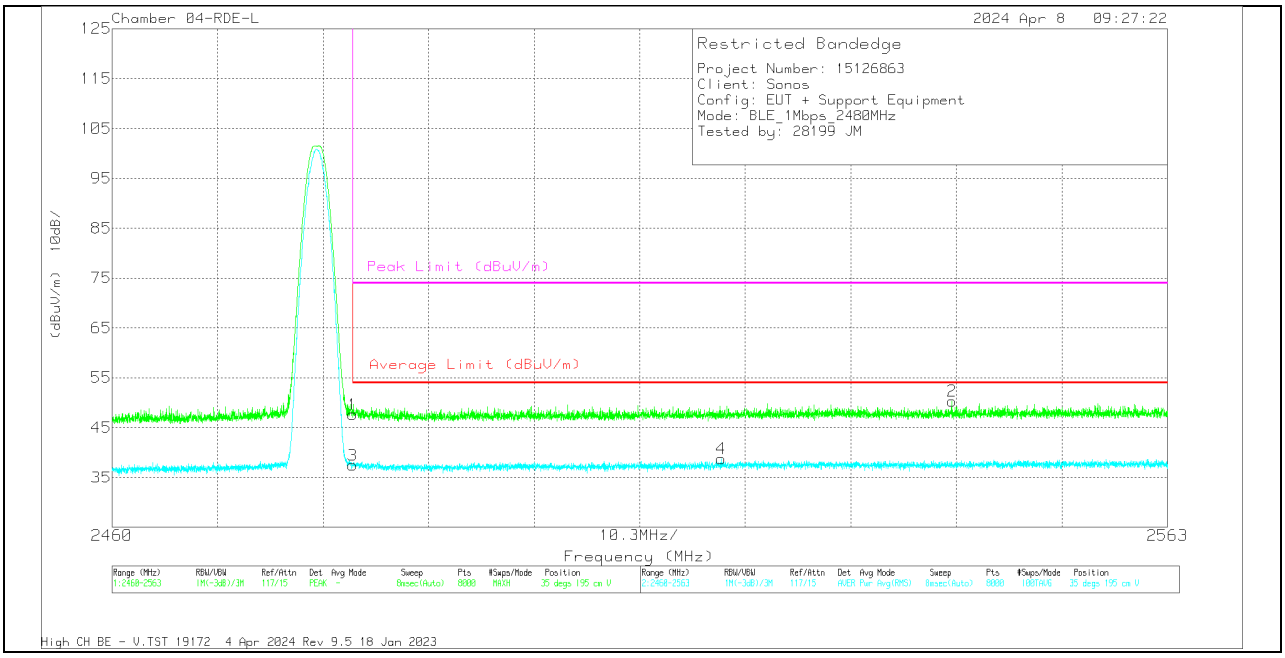
VERTICAL RESULT



Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	206805 ACF (dB)	Amp/Cbl (dB)	DCCF (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2483.5	39.44	Pk	32.4	-24.2	0	47.64	-	-	74	-26.36	35	195	V
2	2541.988	42.02	Pk	32.3	-24	0	50.32	-	-	74	-23.68	35	195	V
3	* 2483.5	28.55	RMS	32.4	-24.2	.7	37.45	54	-16.55	-	-	35	195	V
4	2519.479	29.78	RMS	32.4	-24.1	.7	38.78	54	-15.22	-	-	35	195	V

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

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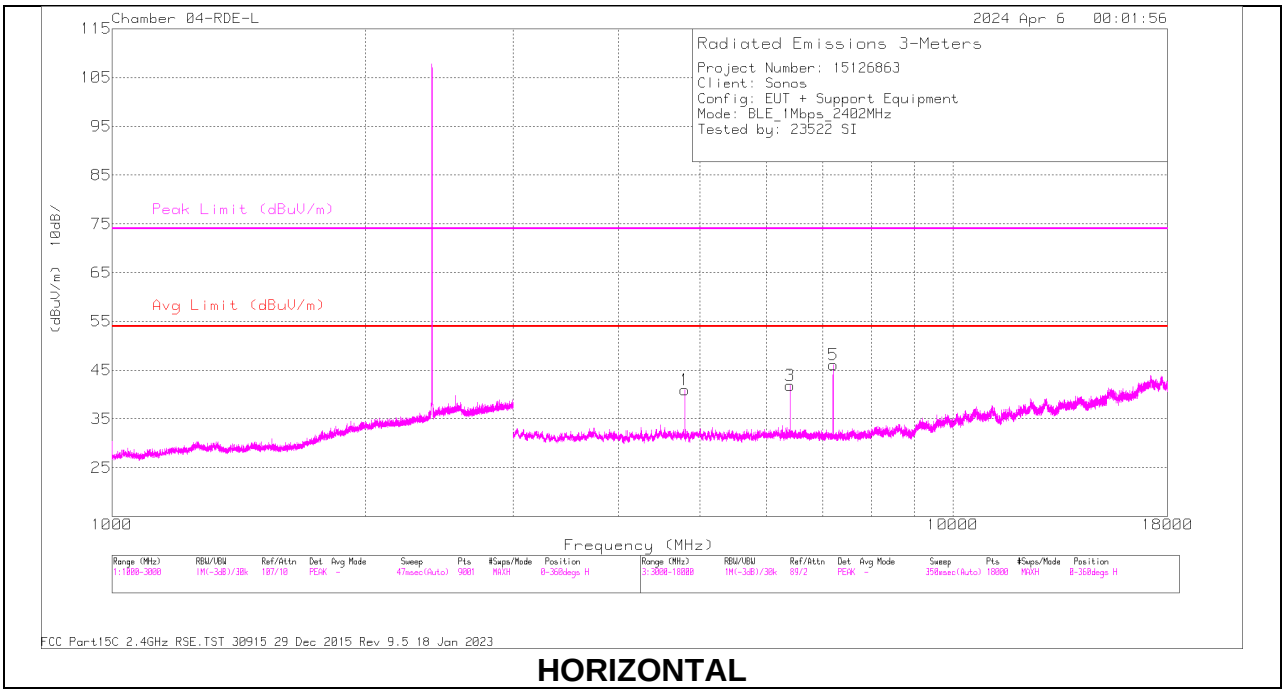
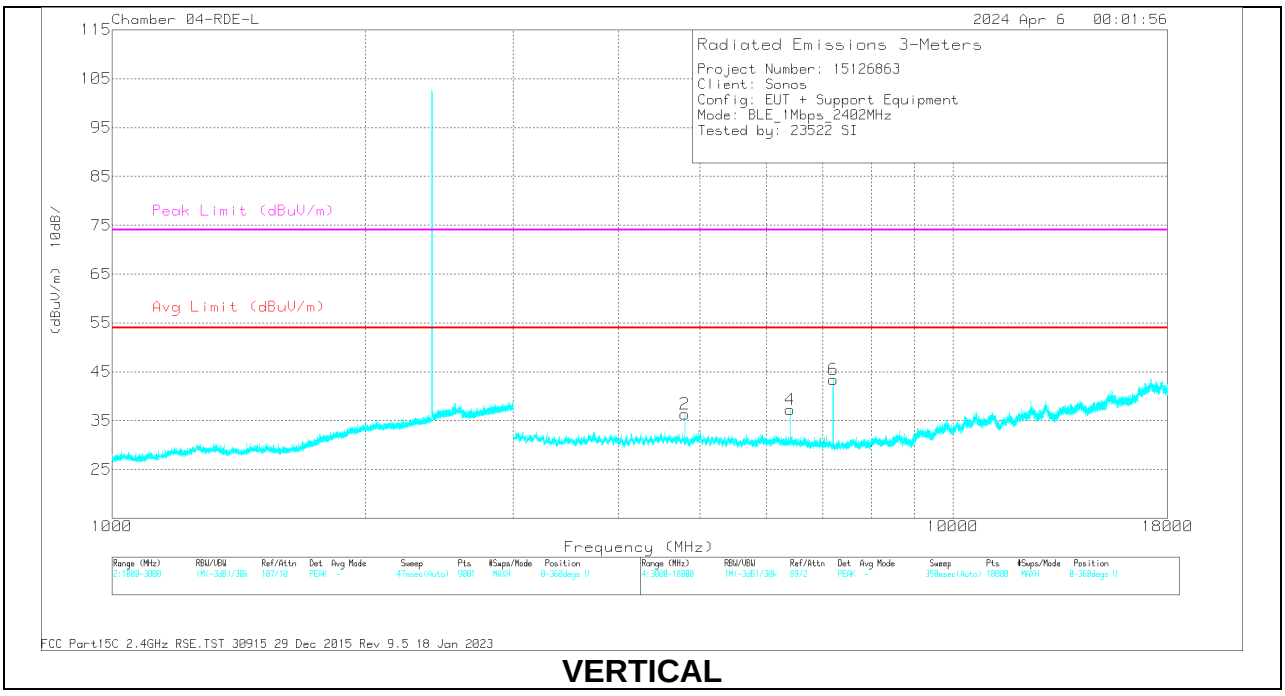
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



VERTICAL

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RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	Horn 1mH (dB/m)	Amp/Cbl/Fltr (dB)	DCCF (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4804.304	62.5	PK2	34.1	-48	0	48.6	-	-	74	-25.4	345	359	H
	* 4803.905	54.92	MAv1	34.1	-48	.7	41.72	54	-12.28	-	-	345	359	H
3	6405.392	55.18	PK2	35.7	-42.6	0	48.28	-	-	-	-	346	310	H
	6405.259	49.43	MAv1	35.7	-42.6	.7	43.23	-	-	-	-	346	310	H
5	7205.209	61.53	PK2	35.6	-43.6	0	53.53	-	-	-	-	17	251	H
	7206.637	55.92	MAv1	35.6	-43.6	.7	48.62	-	-	-	-	17	251	H
2	* 4804.07	57.97	PK2	34.1	-48	0	44.07	-	-	74	-29.93	51	149	V
	* 4804.134	48.1	MAv1	34.1	-48	.7	34.9	54	-19.1	-	-	51	149	V
4	6405.306	54.94	PK2	35.7	-42.6	0	48.04	-	-	-	-	335	388	V
	6405.287	47.54	MAv1	35.7	-42.6	.7	41.34	-	-	-	-	335	388	V
6	7206.634	57.94	PK2	35.6	-43.6	0	49.94	-	-	-	-	359	367	V
	7205.494	50.25	MAv1	35.6	-43.6	.7	42.95	-	-	-	-	359	367	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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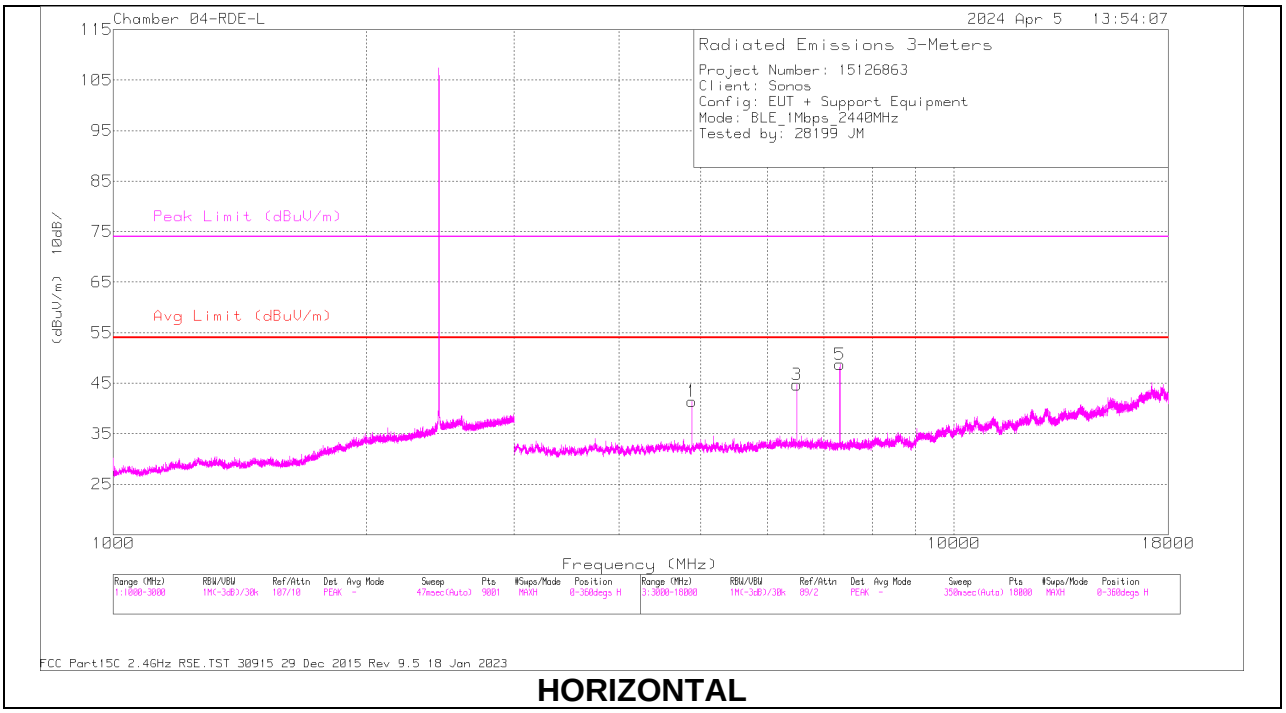
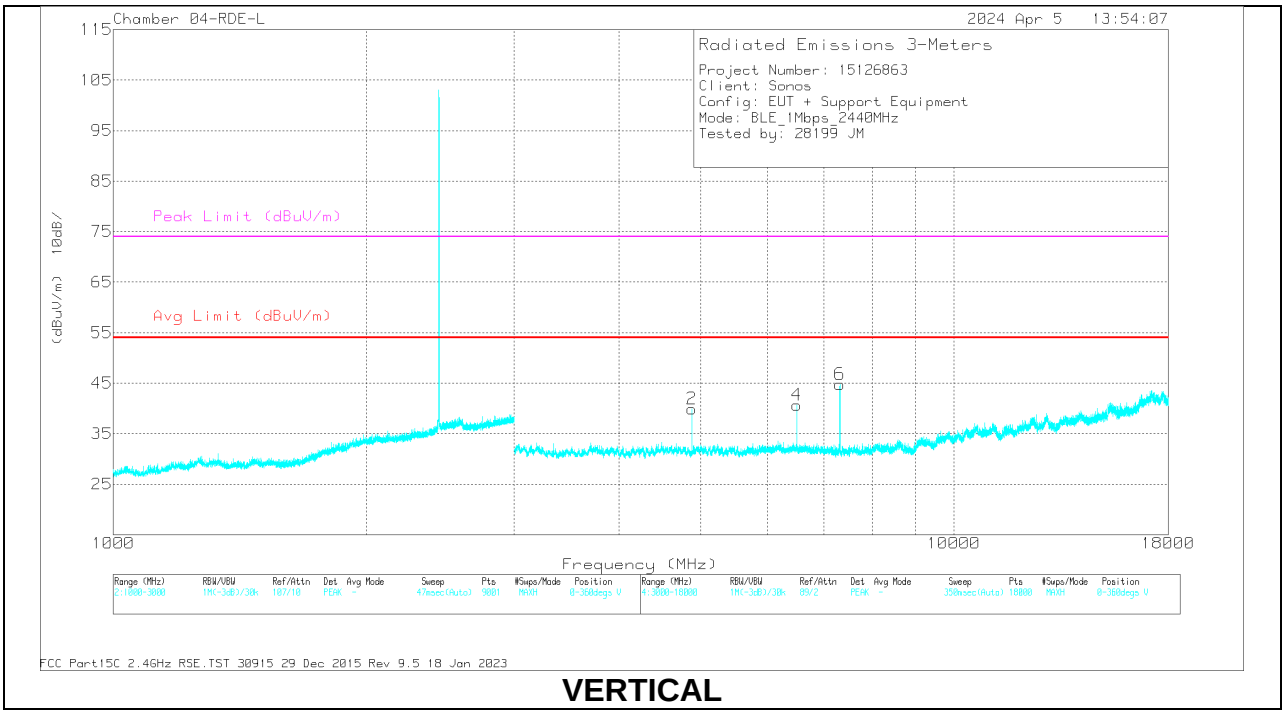
MID CHANNEL RESULTS



HORIZONTAL



VERTICAL

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

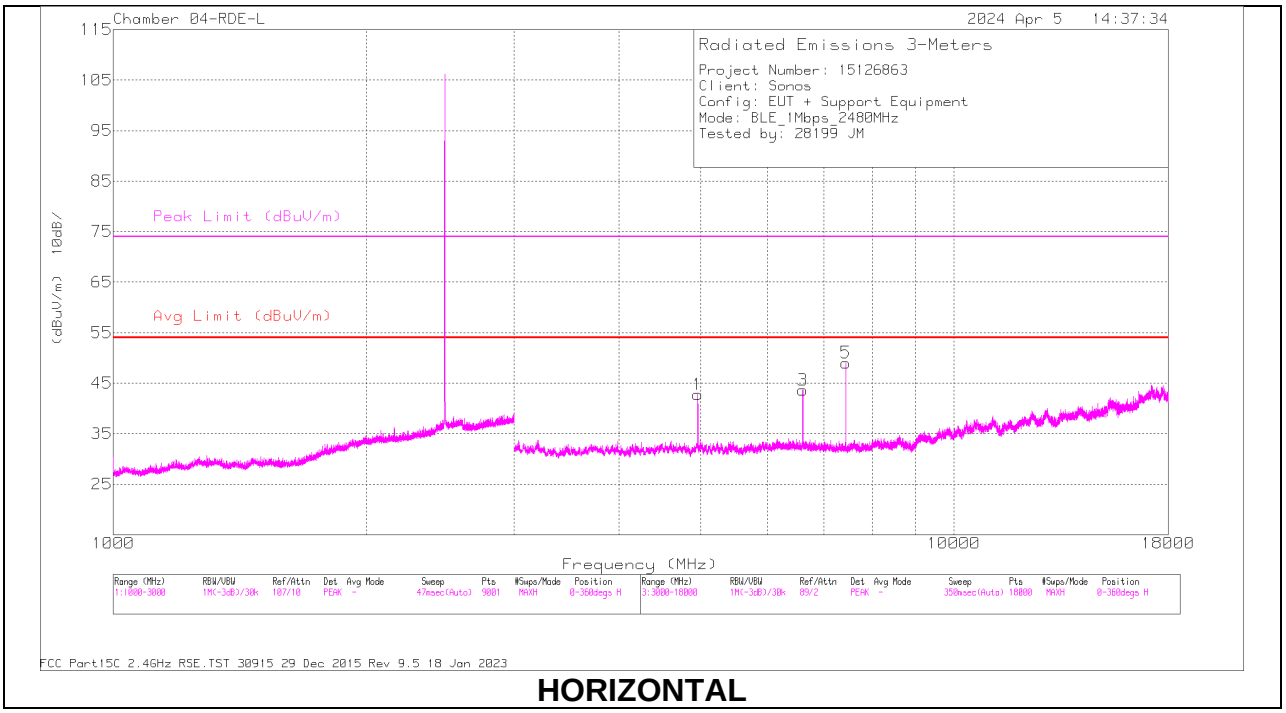
RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	Horn 1mH (dB/m)	Amp/Cbl/Fltr (dB)	DCCF (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4879.655	60.16	PK2	34.1	-47.6	0	46.66	-	-	74	-27.34	8	282	H
	* 4880.104	51.78	MAv1	34.1	-47.5	.7	39.08	54	-14.92	-	-	8	282	H
2	* 4880.512	62.05	PK2	34.1	-47.5	0	48.65	-	-	74	-25.35	271	392	V
	* 4879.82	54.64	MAv1	34.1	-47.5	.7	41.94	54	-12.06	-	-	271	392	V
3	6506.738	56.27	PK2	35.8	-42.8	0	49.27	-	-	-	-	347	214	H
	6506.639	52.05	MAv1	35.8	-42.8	.7	45.75	-	-	-	-	347	214	H
4	6506.557	53.11	PK2	35.8	-42.8	0	46.11	-	-	-	-	253	101	V
	6506.518	45.68	MAv1	35.8	-42.8	.7	39.38	-	-	-	-	253	101	V
5	* 7319.938	64.19	PK2	35.6	-43	0	56.79	-	-	74	-17.21	341	265	H
	* 7319.46	59	MAv1	35.6	-43	.7	52.30	54	-1.70	-	-	341	265	H
6	* 7320.633	59.65	PK2	35.6	-43	0	52.25	-	-	74	-21.75	45	165	V
	* 7319.48	53.27	MAv1	35.6	-43	.7	46.57	54	-7.43	-	-	45	165	V

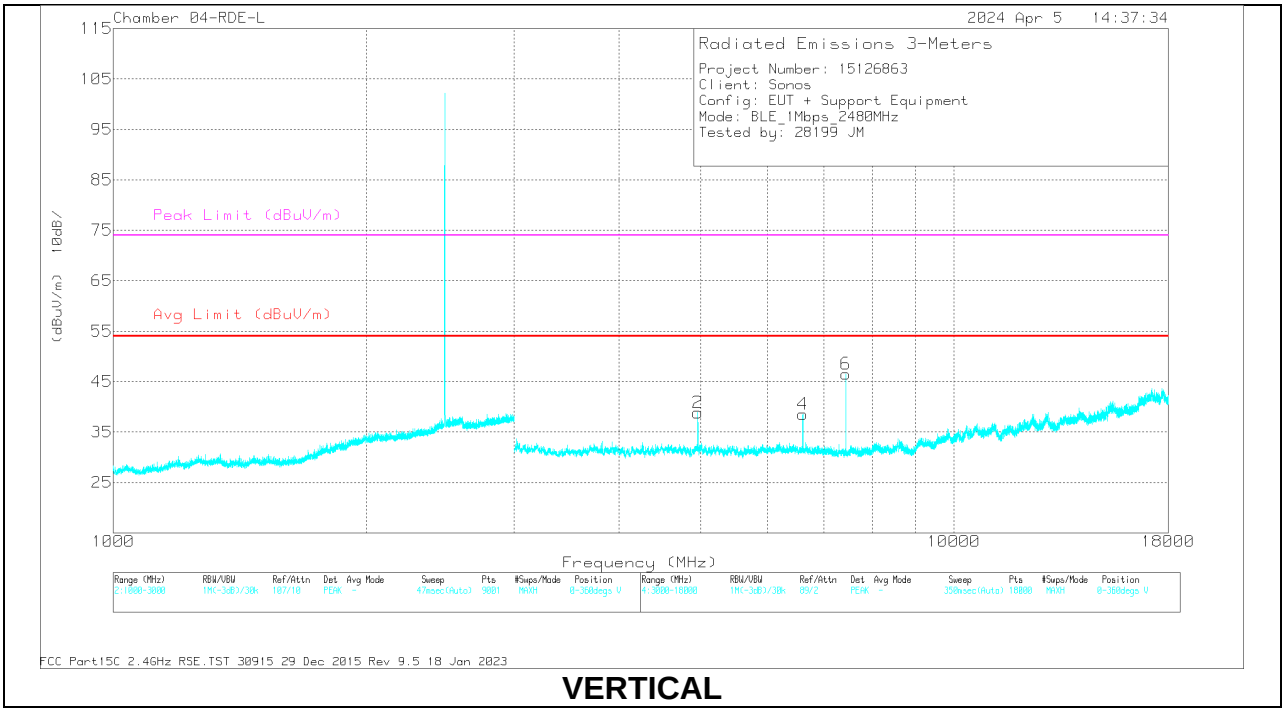
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAv1 - KDB558074 Option 1 Maximum RMS Average

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	Horn 1mH (dB/m)	Amp/Cbl/Fltr (dB)	DCCF (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4959.572	62.62	PK2	34.2	-47.9	0	48.92	-	-	74	-25.08	359	352	H
	* 4959.936	54.95	MAv1	34.2	-47.9	.7	41.95	54	-12.05	-	-	359	352	H
2	* 4960.52	61.82	PK2	34.2	-47.9	0	48.12	-	-	74	-25.88	285	364	V
	* 4959.853	53.17	MAv1	34.2	-47.9	.7	40.17	54	-13.83	-	-	285	364	V
3	6613.157	57.35	PK2	35.8	-42.8	0	50.35	-	-	-	-	340	347	H
	6613.387	52.09	MAv1	35.8	-42.7	.7	45.89	-	-	-	-	340	347	H
4	6613.272	52.76	PK2	35.8	-42.8	0	45.76	-	-	-	-	254	102	V
	6613.229	46.27	MAv1	35.8	-42.8	.7	39.97	-	-	-	-	254	102	V
5	* 7439.837	62.72	PK2	35.6	-43	0	55.32	-	-	74	-18.68	336	155	H
	* 7440.426	57.15	MAv1	35.6	-43	.7	50.45	54	-3.55	-	-	336	155	H
6	* 7440.489	58.32	PK2	35.6	-43	0	50.92	-	-	74	-23.08	46	399	V
	* 7440.406	50.74	MAv1	35.6	-43	.7	44.04	54	-9.96	-	-	46	399	V

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

UL VERIFICATION SERVICES
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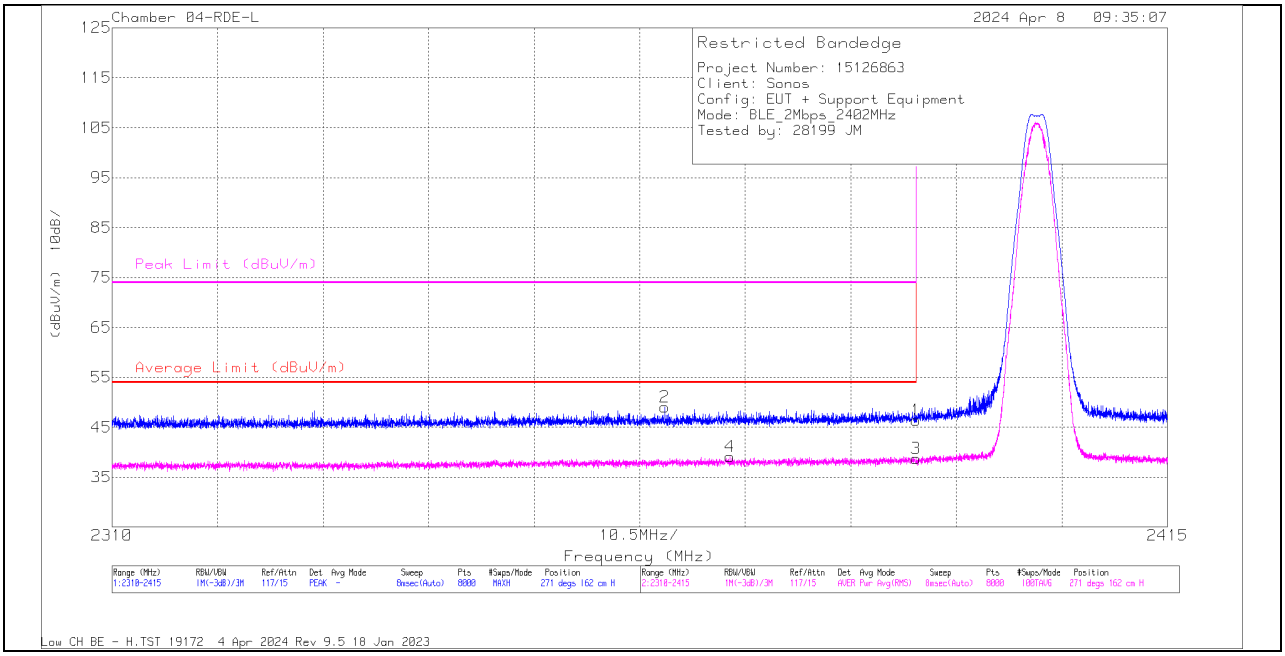
10.2.2. BLE (2Mbps)

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	206805 ACF (dB/m)	Amp/Cbl (dB)	DCCF (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2390	38.6	Pk	32.1	-24.3	0	46.4	-	-	74	-27.6	271	162	H
2	* 2365.002	41.61	Pk	31.9	-24.4	0	49.11	-	-	74	-24.89	271	162	H
3	* 2390	28.56	RMS	32.1	-24.3	2.46	38.82	54	-15.18	-	-	271	162	H
4	* 2371.474	29.09	RMS	32	-24.4	2.46	39.15	54	-14.85	-	-	271	162	H

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

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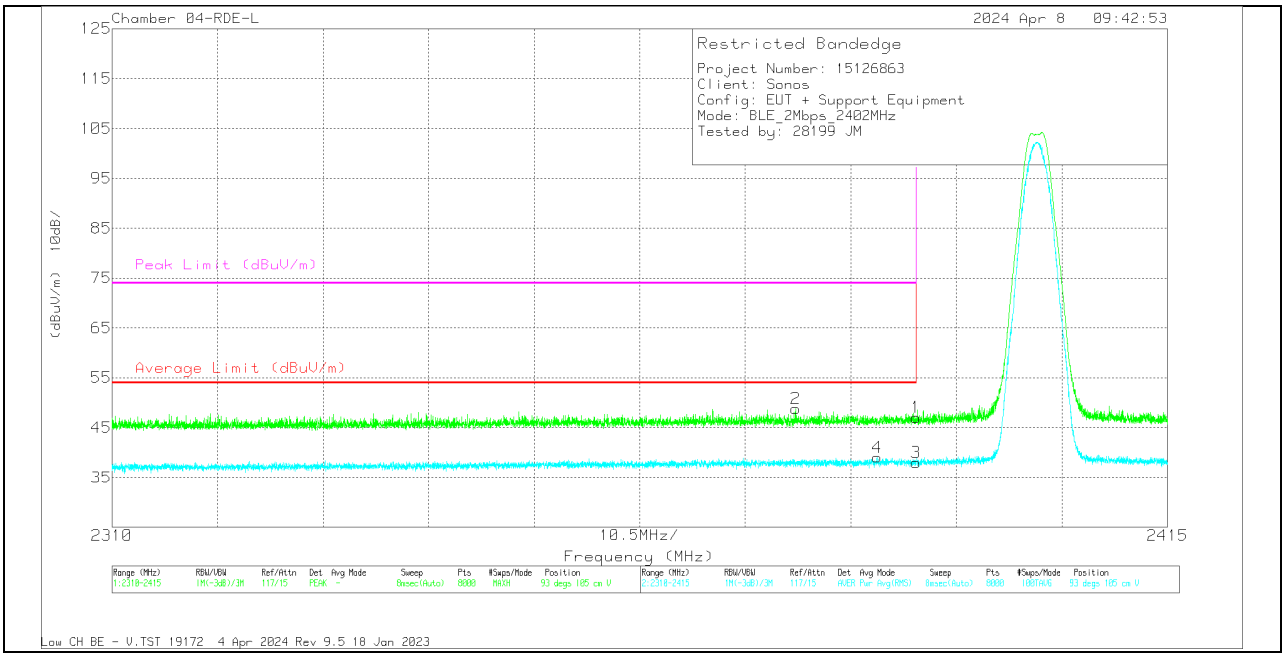
VERTICAL RESULT



Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	206805 ACF (dB/m)	Amp/Cbl (dB)	DCCF (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2390	39.27	Pk	32.1	-24.3	0	47.07	-	-	74	-26.93	93	105	V
2	* 2378.011	41.09	Pk	32	-24.3	0	48.79	-	-	74	-25.21	93	105	V
3	* 2390	27.8	RMS	32.1	-24.3	2.46	38.06	54	-15.94	-	-	93	105	V
4	* 2386.123	28.93	RMS	32	-24.3	2.46	39.09	54	-14.91	-	-	93	105	V

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

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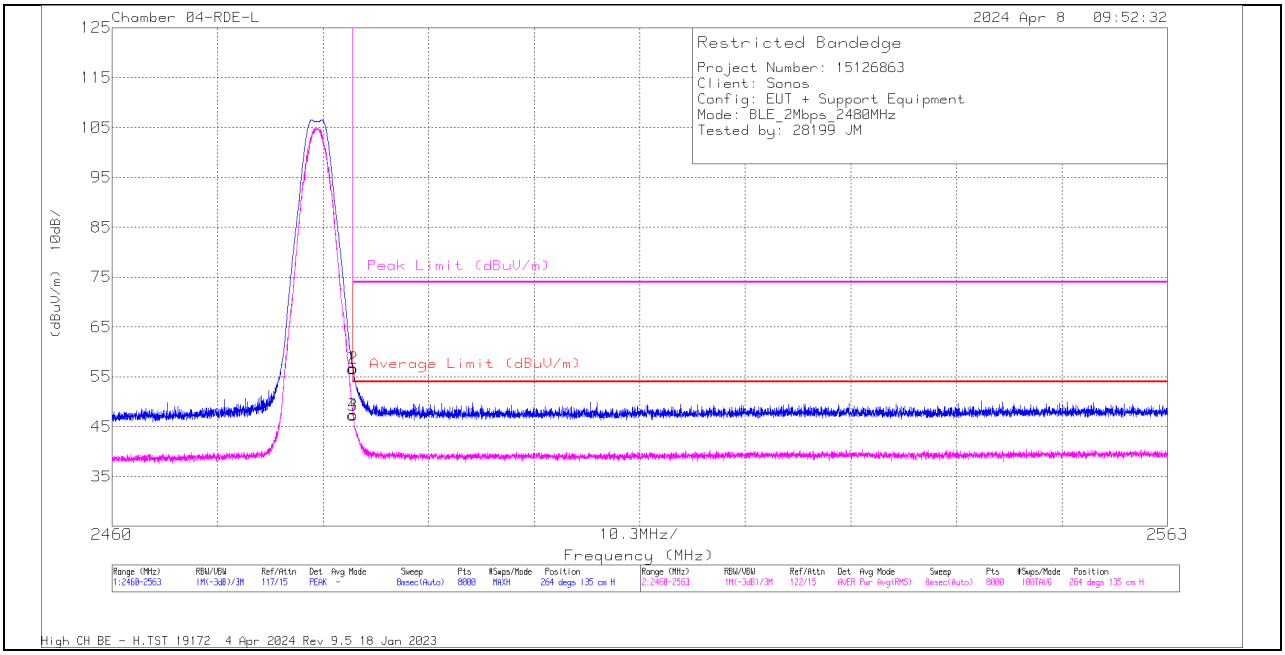
BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



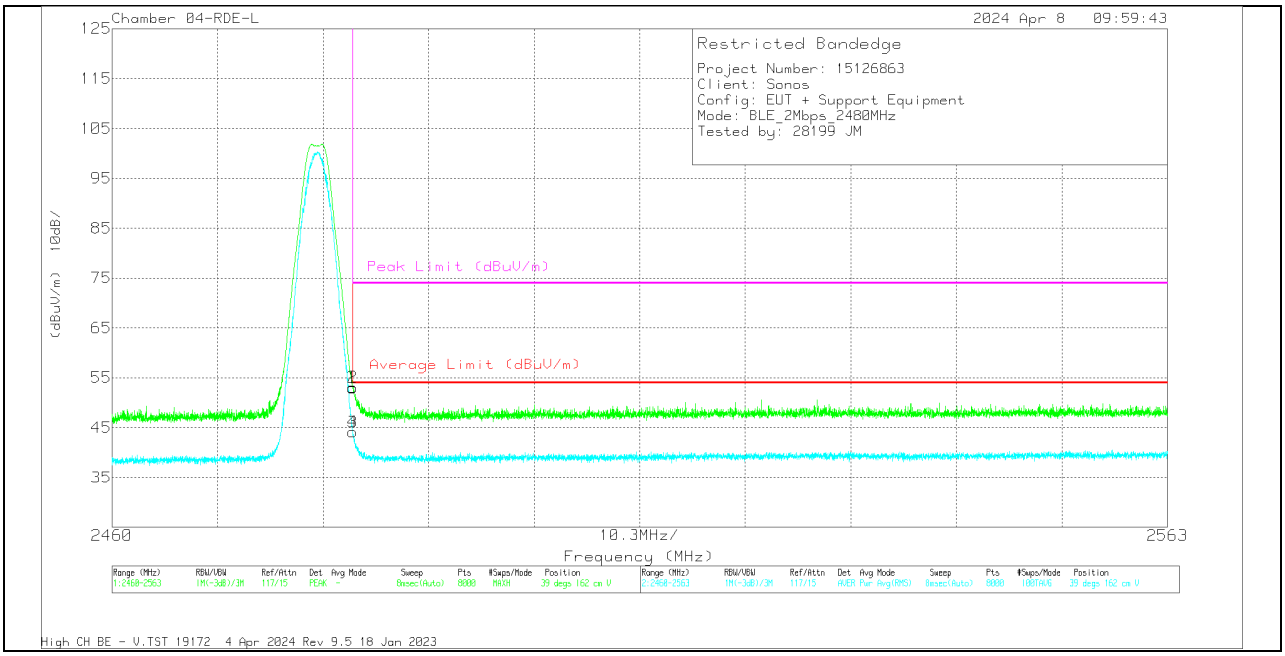
Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	206805 ACF (dB/m)	Amp/Cbl (dB)	DCCF (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2483.5	48.39	Pk	32.4	-24.2	0	56.59	-	-	74	-17.41	264	135	H
2	* 2483.539	48.54	Pk	32.4	-24.2	0	56.74	-	-	74	-17.26	264	135	H
3	* 2483.5	36.67	RMS	32.4	-24.2	2.46	47.33	54	-6.67	-	-	264	135	H
4	* 2483.526	36.82	RMS	32.4	-24.2	2.46	47.48	54	-6.52	-	-	264	135	H

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

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

VERTICAL RESULT



Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	206805 ACF (dB/m)	Amp/Cbl (dB)	DCCF (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2483.5	44.76	Pk	32.4	-24.2	0	52.96	-	-	74	-21.04	39	162	V
2	* 2483.513	44.91	Pk	32.4	-24.2	0	53.11	-	-	74	-20.89	39	162	V
3	* 2483.5	33.49	RMS	32.4	-24.2	2.46	44.15	54	-9.85	-	-	39	162	V
4	* 2483.501	33.5	RMS	32.4	-24.2	2.46	44.16	54	-9.84	-	-	39	162	V

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

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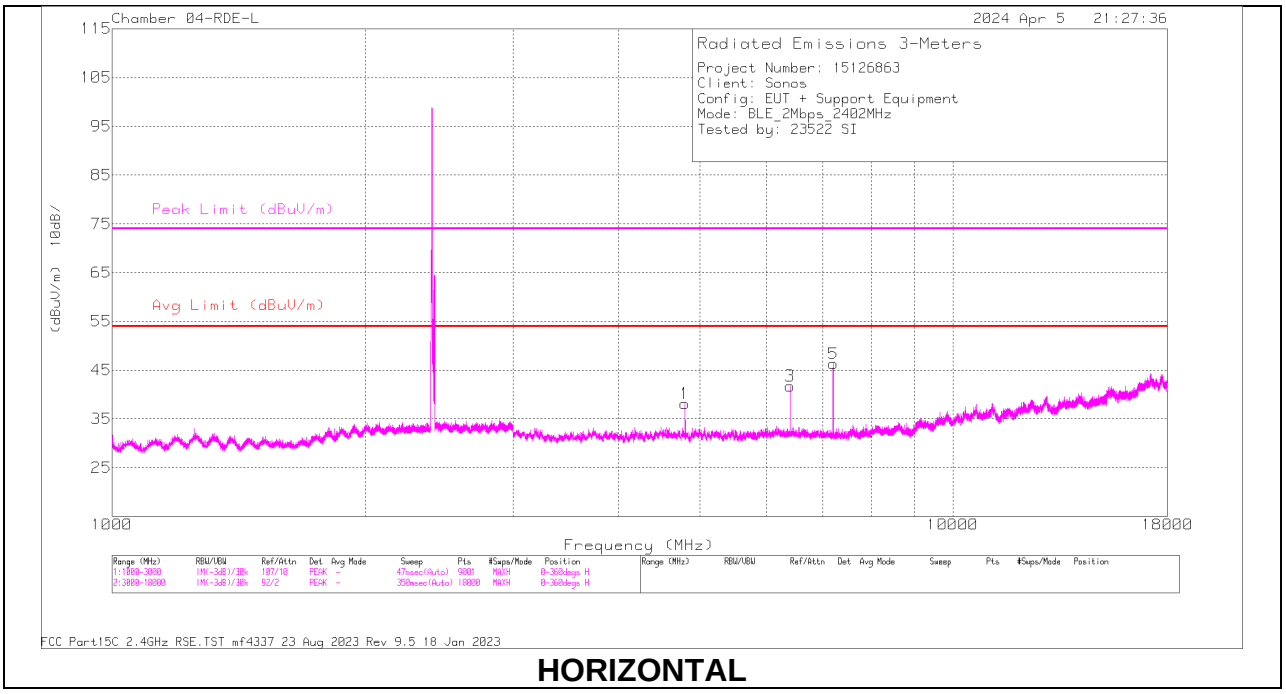
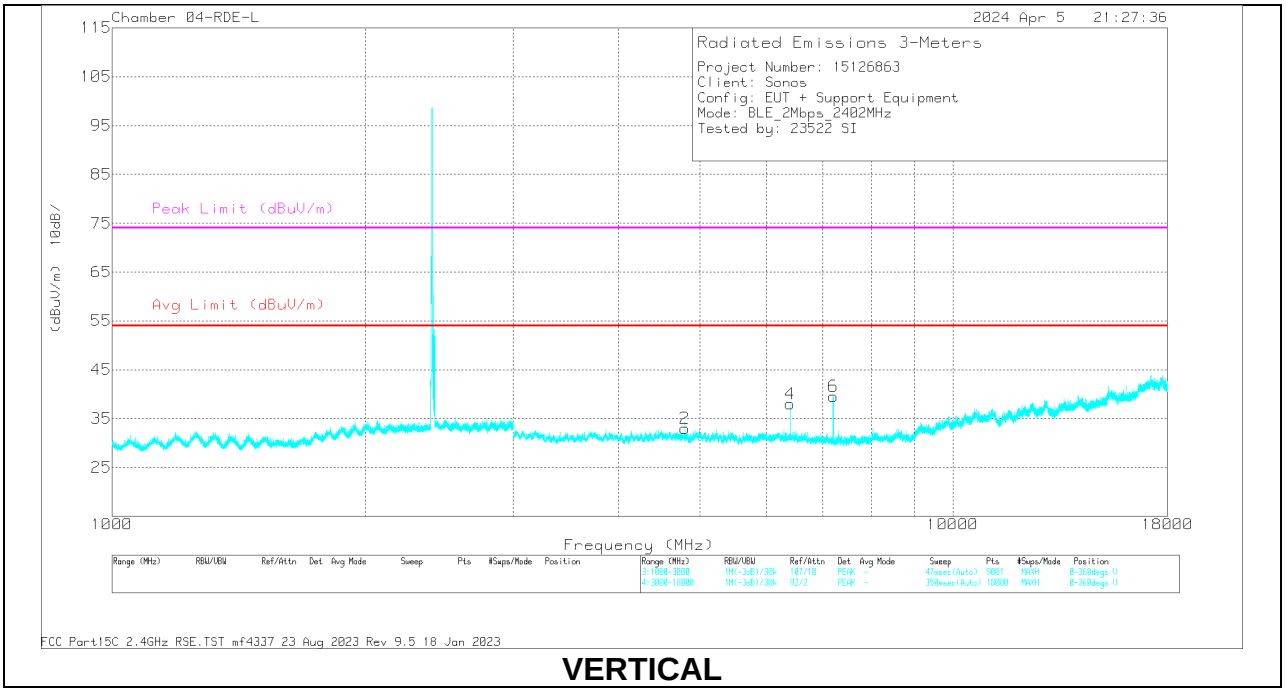
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



VERTICAL

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

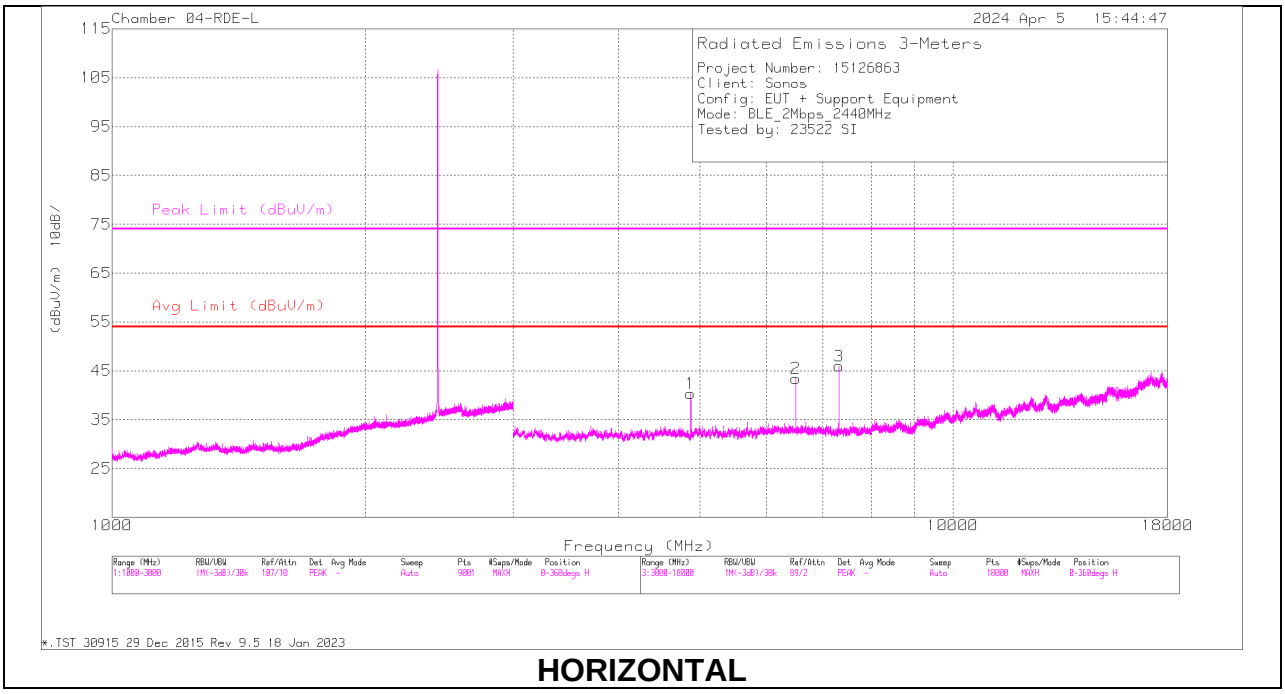
RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	Horn 1mH (dB/m)	Amp/Cbl/Fltr (dB)	DCCF (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	*4803.037	60.91	PK2	34.1	-48	0	47.01	-	-	74	-26.99	5	101	H
	*4804.484	51.66	MAv1	34.1	-48	2.46	40.22	54	-13.78	-	-	5	101	H
3	6405.057	55.71	PK2	35.7	-42.6	0	48.81	-	-	-	-	347	388	H
	6405.184	48.42	MAv1	35.7	-42.6	2.46	43.98	-	-	-	-	347	388	H
5	7207.403	60.9	PK2	35.6	-43.6	0	52.9	-	-	-	-	17	326	H
	7207.252	53.73	MAv1	35.6	-43.6	2.46	48.19	-	-	-	-	17	326	H
2	*4802.943	59.78	PK2	34.1	-48	0	45.88	-	-	74	-28.12	67	322	V
	*4804.326	49.52	MAv1	34.1	-48	2.46	38.08	54	-15.92	-	-	67	322	V
4	6405.34	53.82	PK2	35.7	-42.6	0	46.92	-	-	-	-	257	337	V
	6405.163	44.26	MAv1	35.7	-42.6	2.46	39.82	-	-	-	-	257	337	V
6	7207.294	57.51	PK2	35.6	-43.6	0	49.51	-	-	-	-	360	364	V
	7207.375	48.57	MAv1	35.6	-43.6	2.46	43.03	-	-	-	-	360	364	V

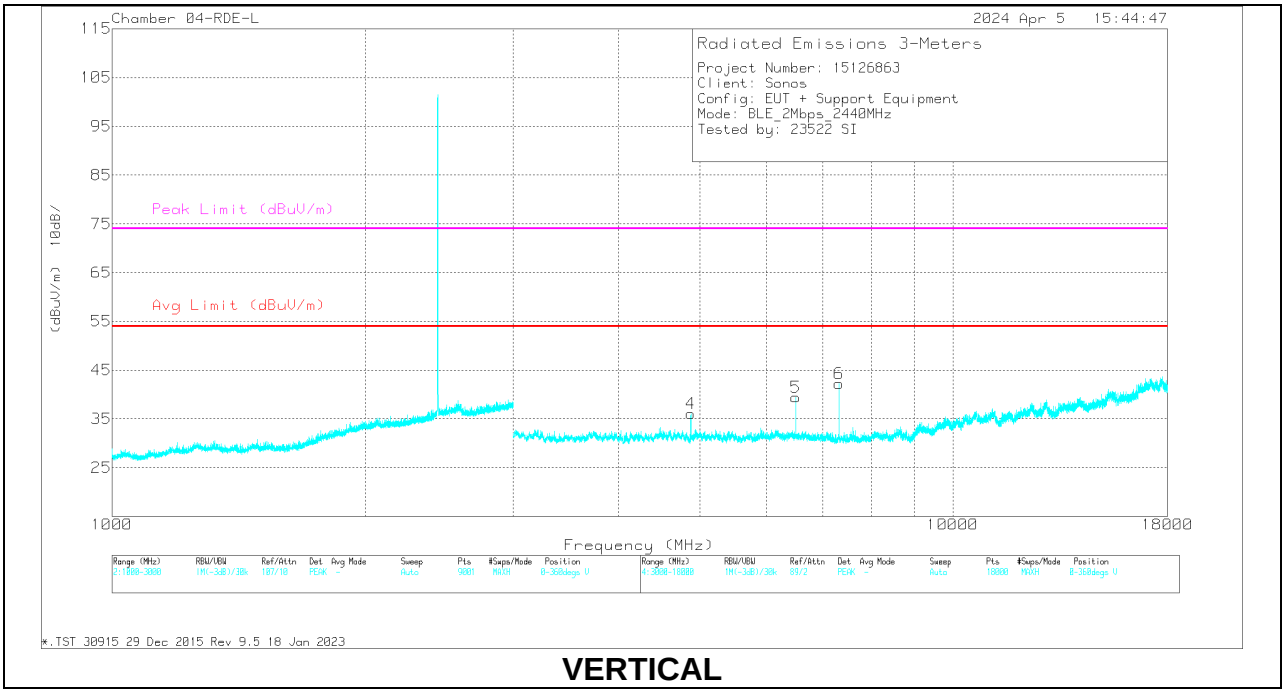
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAv1 - KDB558074 Option 1 Maximum RMS Average

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

MID CHANNEL RESULTS



HORIZONTAL



VERTICAL

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	Horn 1mH (dB/m)	Amp/Cbl/Fltr (dB)	DCCF (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4880.966	60.86	PK2	34.1	-47.5	0	47.46	-	-	74	-26.54	8	159	H
	* 4879.207	51.28	MAv1	34.1	-47.6	2.46	40.24	54	-13.76	-	-	8	159	H
2	6506.62	56.07	PK2	35.8	-42.8	0	49.07	-	-	-	-	344	350	H
	6506.411	48.45	MAv1	35.8	-42.8	2.46	43.91	-	-	-	-	344	350	H
3	* 7321.43	63.08	PK2	35.6	-43	0	55.68	-	-	74	-18.32	14	326	H
	* 7321.495	55.58	MAv1	35.6	-43	2.46	50.64	54	-3.36	-	-	14	326	H
4	* 4878.98	59.6	PK2	34.1	-47.6	0	46.1	-	-	74	-27.9	350	146	V
	* 4880.802	50.03	MAv1	34.1	-47.5	2.46	39.09	54	-14.91	-	-	350	146	V
5	6506.58	51.87	PK2	35.8	-42.8	0	44.87	-	-	-	-	257	103	V
	6506.525	44.58	MAv1	35.8	-42.8	2.46	40.04	-	-	-	-	257	103	V
6	* 7318.324	61.48	PK2	35.6	-42.9	0	54.18	-	-	74	-19.82	170	360	V
	* 7318.552	53.98	MAv1	35.6	-42.9	2.46	49.14	54	-4.86	-	-	170	360	V

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

UL VERIFICATION SERVICES
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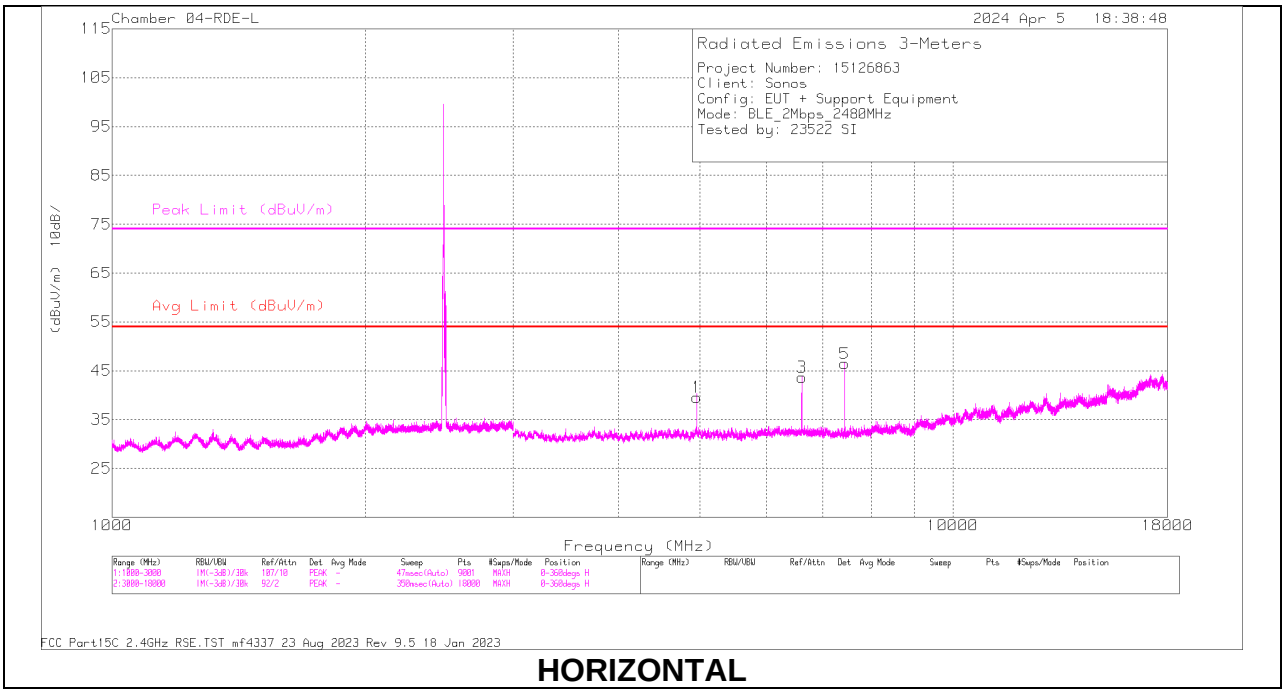
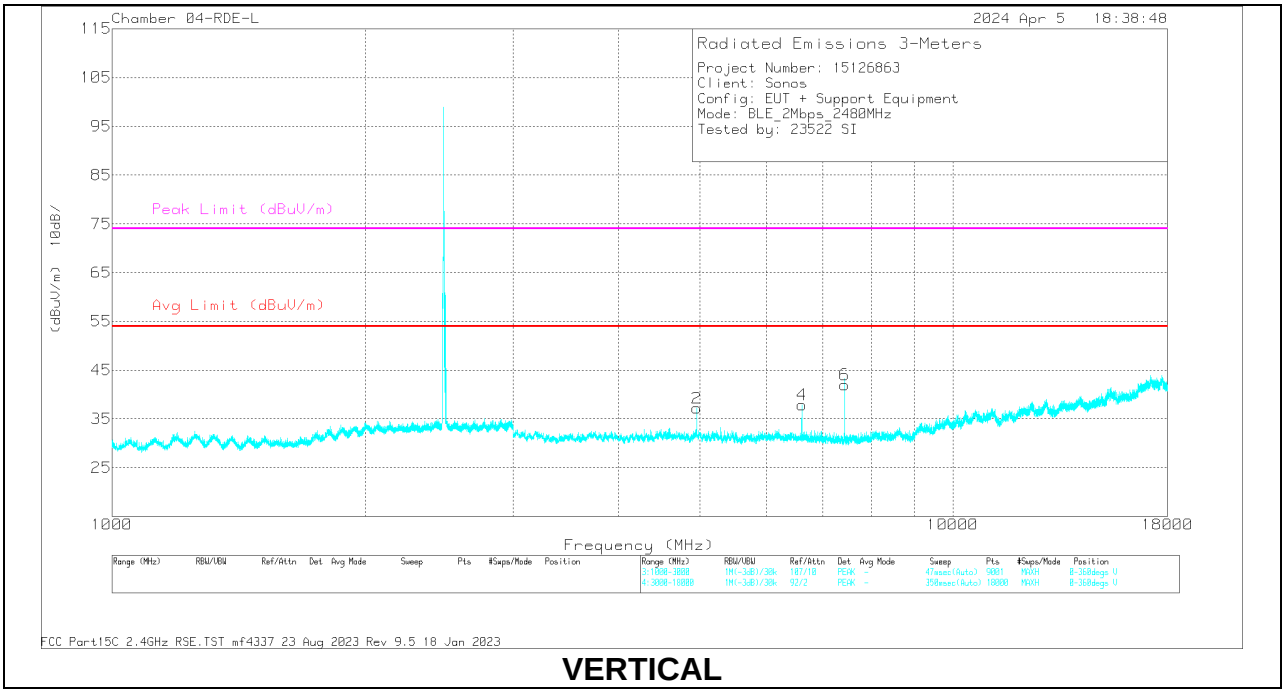
HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	Horn 1mH (dB/m)	Amp/Cbl/Fltr (dB)	DCCF (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4960.097	61.53	PK2	34.2	-47.9	0	47.83	-	-	74	-26.17	0	349	H
	* 4958.831	51.91	MAv1	34.2	-47.9	2.46	40.67	54	-13.33	-	-	0	349	H
3	6613.113	57.78	PK2	35.8	-42.8	0	50.78	-	-	-	-	334	322	H
	6613.485	52.71	MAv1	35.8	-42.7	2.46	48.27	-	-	-	-	334	322	H
5	* 7438.559	61.73	PK2	35.6	-43	0	54.33	-	-	74	-19.67	344	270	H
	* 7438.628	54.99	MAv1	35.6	-43	2.46	50.05	54	-3.95	-	-	344	270	H
2	* 4960.29	60.89	PK2	34.2	-47.9	0	47.19	-	-	74	-26.81	290	386	V
	* 4959.346	50.01	MAv1	34.2	-47.9	2.46	38.77	54	-15.23	-	-	290	386	V
4	6613.316	53.42	PK2	35.8	-42.8	0	46.42	-	-	-	-	255	101	V
	6613.469	45.94	MAv1	35.8	-42.7	2.46	41.5	-	-	-	-	255	101	V
6	* 7438.523	61.34	PK2	35.6	-43	0	53.94	-	-	74	-20.06	170	394	V
	* 7438.42	53.6	MAv1	35.6	-43	2.46	48.66	54	-5.34	-	-	170	394	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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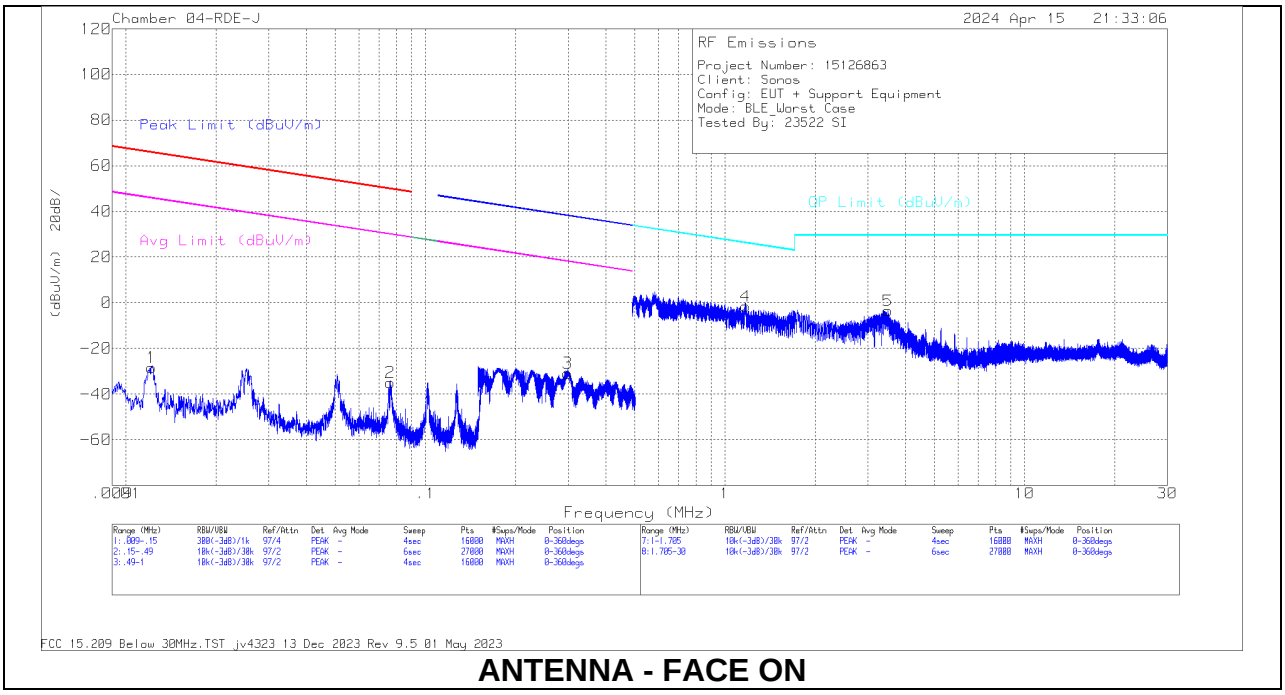
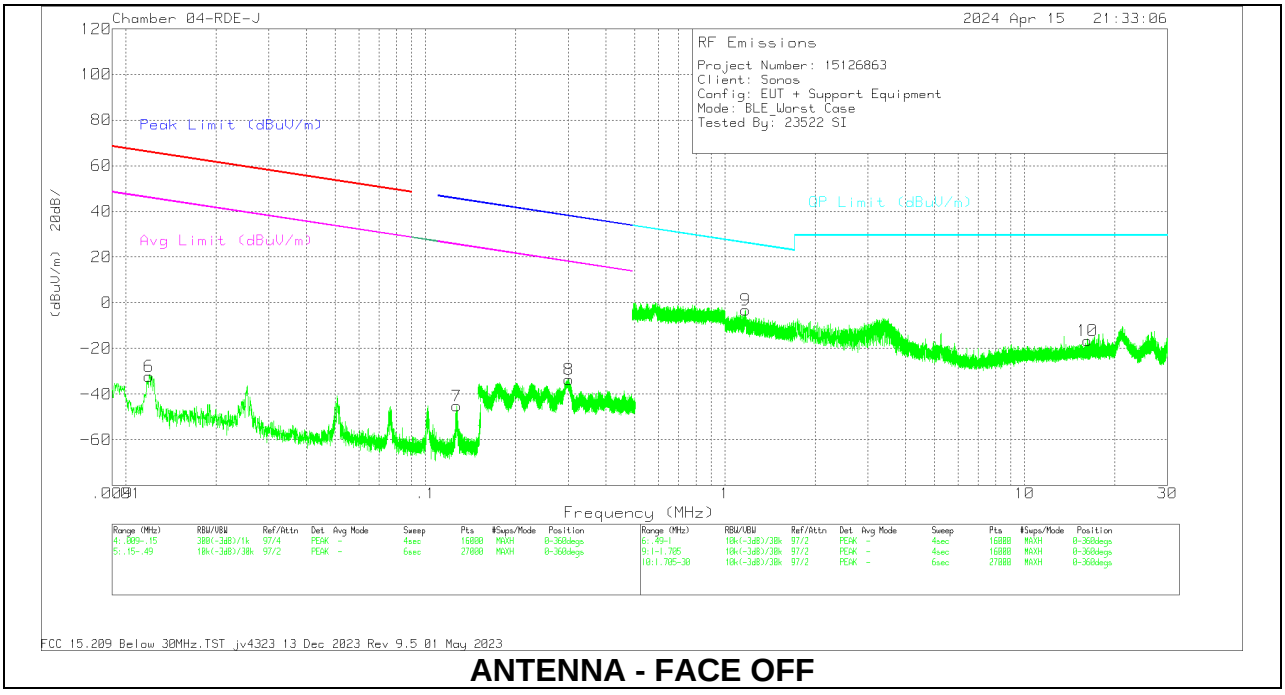
10.3. WORST CASE BELOW 30MHz

SPURIOUS EMISSIONS BELOW 30 MHz (WORST-CASE CONFIGURATION)



ANTENNA - FACE ON



ANTENNA - FACE OFF

UL VERIFICATION SERVICES
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

Below 30MHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna E (ACF) (dB/m)	CBL/AMP (dB)	Dist Corr 300m	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Margin (dB)	Azimuth (Degs)	Polarity (Degs)
6	.012	18.23	Pk	60	-30.4	-80	-32.17	66.04	-98.21	46.04	-78.21	-	0-360	90-degs
1	.0122	21.98	Pk	60	-30.4	-80	-28.42	65.86	-94.28	45.86	-74.28	-	0-360	0-deg
2	.0762	21.85	Pk	55.7	-32.6	-80	-35.05	49.94	-84.99	29.94	-64.99	-	0-360	0-deg
7	.1271	11.52	Pk	55.7	-32.5	-80	-45.28	45.54	-90.82	25.54	-70.82	-70.82	0-360	90-degs
3	.2984	25.02	Pk	56.1	-32.1	-80	-30.98	38.12	-69.1	18.12	-49.1	-49.1	0-360	0-deg
8	.3012	22.4	Pk	56.1	-32.1	-80	-33.6	38.03	-71.63	18.03	-51.63	-51.63	0-360	90-degs

Pk - Peak detector

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna E (ACF) (dB/m)	CBL/AMP (dB)	Dist Corr 30m (dB) 40Log	Corrected Reading (dBuV/m)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Polarity (Degs)
4	1.1704	24.74	Pk	45.7	-32.1	-40	-1.66	26.26	-27.92	0-360	0-deg
9	1.1709	23.32	Pk	45.7	-32.1	-40	-3.08	26.26	-29.34	0-360	90-degs
5	3.5044	30.51	Pk	37.9	-32	-40	-3.59	29.5	-33.09	0-360	0-deg
10	16.2261	21.25	Pk	34.2	-32	-40	-16.55	29.5	-46.05	0-360	90-degs

Pk - Peak detector

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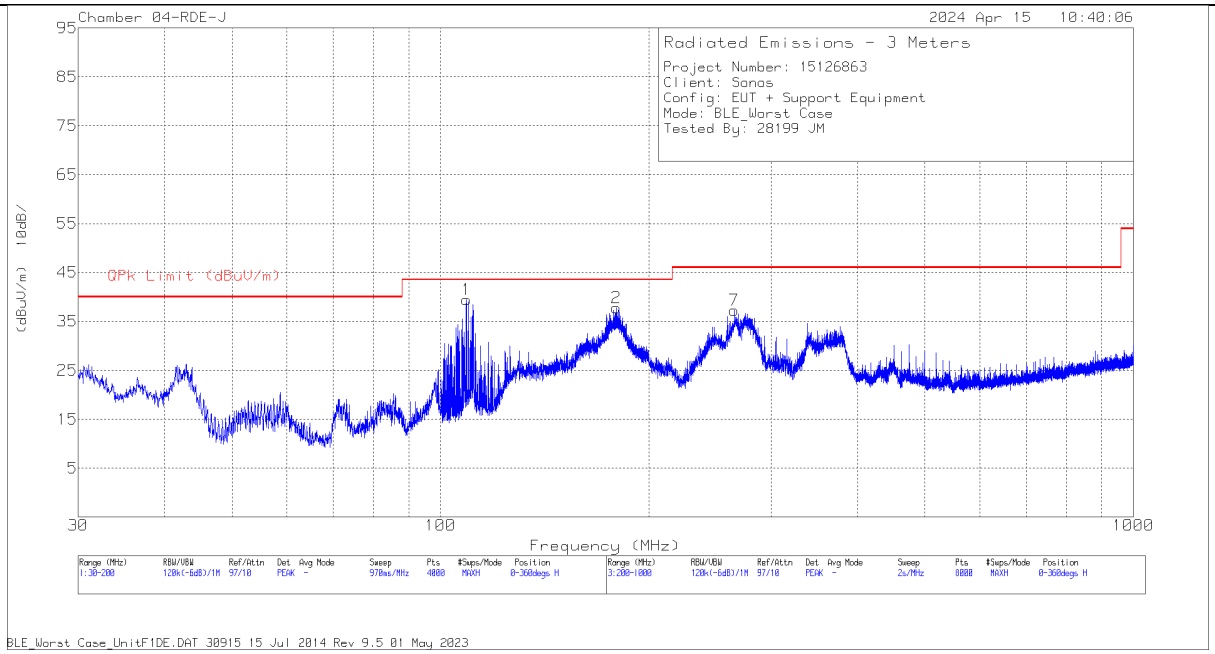
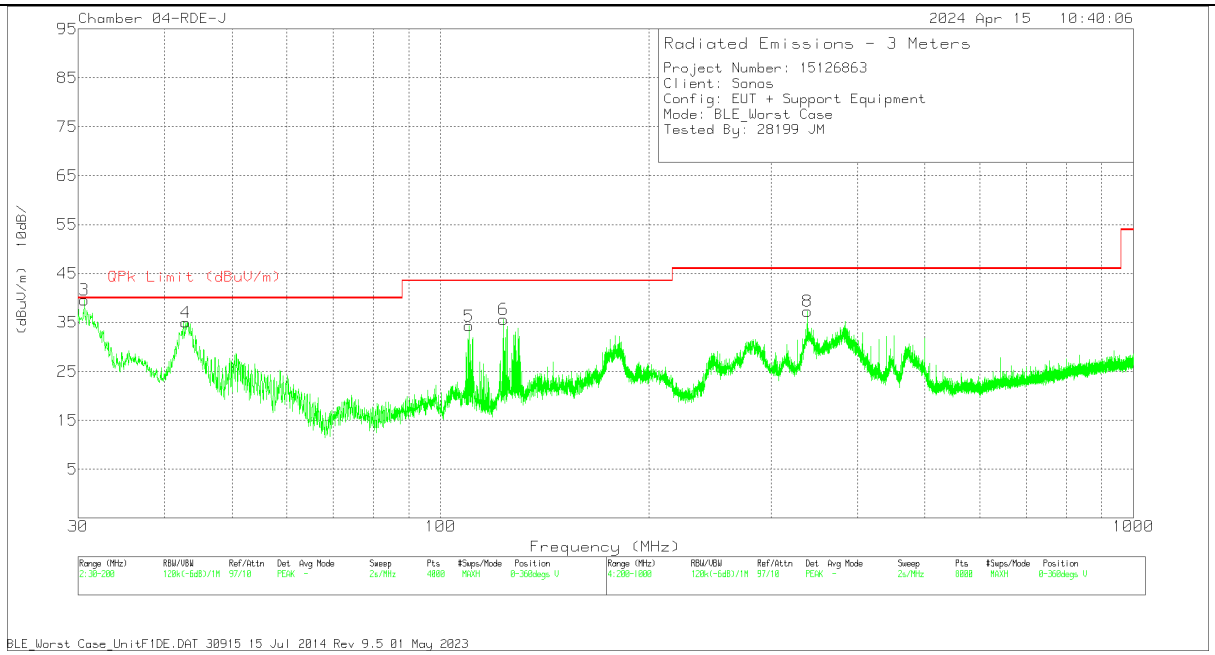
10.4. WORST CASE BELOW 1 GHz

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



HORIZONTAL



VERTICAL

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Below 1GHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80293 ACF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 111.561	35.2	Pk	18.8	-31.2	22.8	43.52	-20.72	0	346	H
	* 111.561	30.97	Qp	18.8	-31.2	18.57	43.52	-24.95	0	346	H
5	* 110.048	46.98	Pk	18.5	-31.2	34.28	43.52	-9.24	0-360	101	V
6	* 123.269	46.82	Pk	20	-31.2	35.62	43.52	-7.9	0-360	101	V
7	* 265.409	49.22	Pk	18.6	-30.5	37.32	46.02	-8.7	0-360	101	H
3	30.6956	44.26	Pk	26.3	-31.8	38.76	40	-1.24	341	103	V
	30.6956	39.38	Qp	26.3	-31.8	33.88	40	-6.12	341	103	V
4	43.8288	50.8	Pk	17	-31.7	36.1	40	-3.9	207	105	V
	43.8288	46.15	Qp	17	-31.7	31.45	40	-8.55	207	105	V
2	179.256	51.52	Pk	17.1	-30.8	37.82	43.52	-5.7	0-360	99	H
	180.232	45.82	Qp	17	-30.8	32.02	43.52	-11.5	100	105	H
8	338.618	47.7	Pk	19.9	-30.3	37.3	46.02	-8.72	0-360	99	V

Pk - Peak detector
Qp - Quasi-Peak detector

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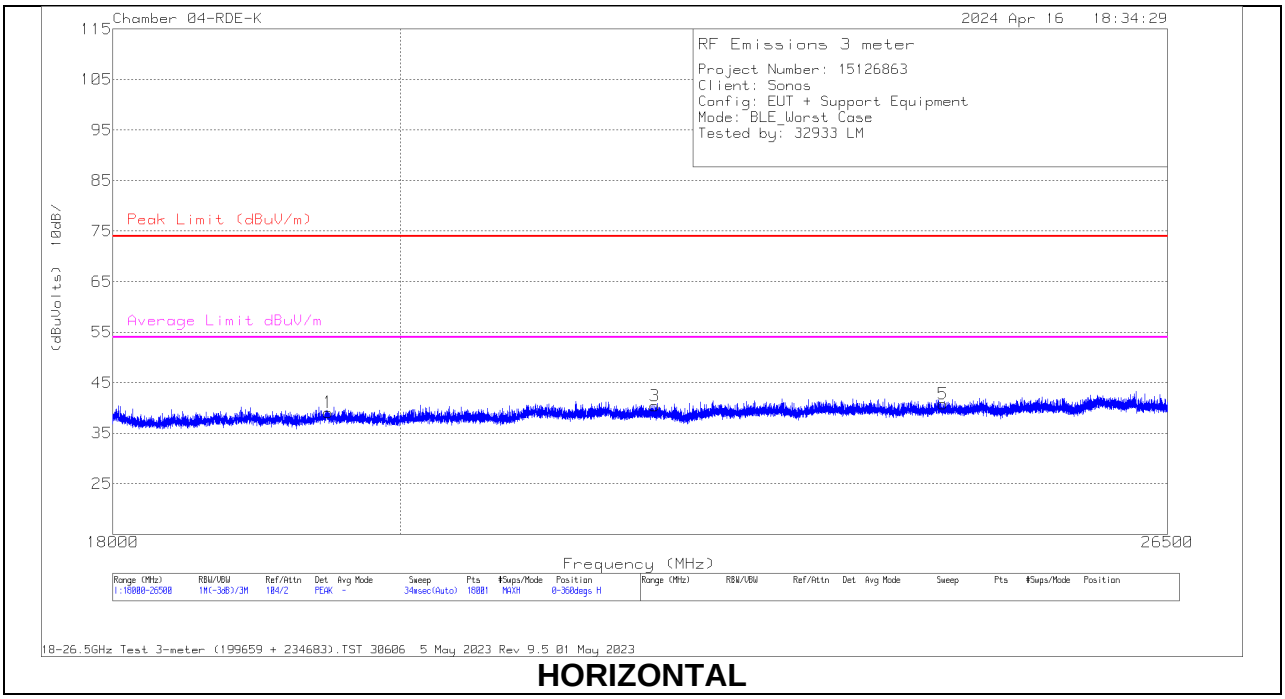
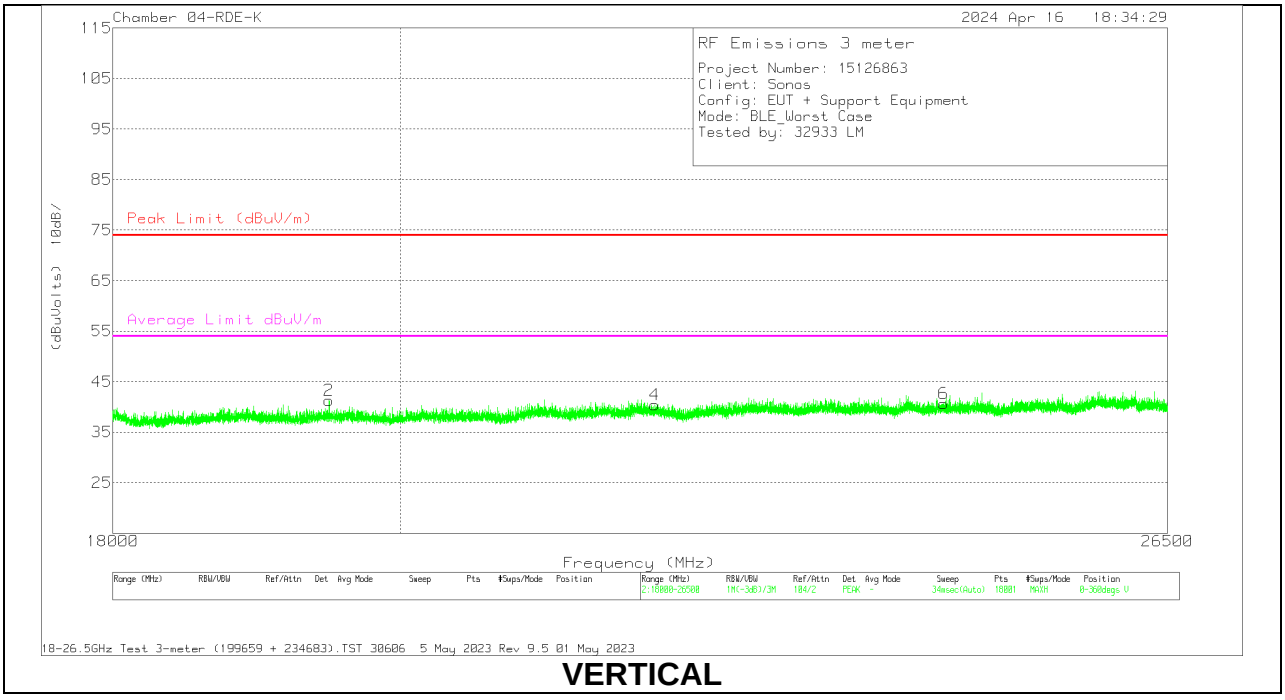
10.5. WORST CASE 18-26 GHz

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



HORIZONTAL



VERTICAL

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18 – 26GHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Horn ACF (dB/m)	234683 Amp/Cbl (dB)	Cables (dB)	Corrected Reading (dBuVolts)	Peak Limit (dBuV/m)	PK Margin (dB)	Average Limit dBuV/m	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	*19479.472	50.81	Pk	32.6	-62.8	18.5	39.11	74	-34.89	-	-	0-360	200	H
2	*19486.555	52.99	Pk	32.6	-62.8	18.5	41.29	74	-32.71	-	-	0-360	101	V
3	21958.637	50.25	Pk	33.2	-62.5	19.5	40.45	74	-33.55	-	-	0-360	200	H
4	21957.22	50.23	Pk	33.2	-62.5	19.5	40.43	74	-33.57	-	-	0-360	199	V
5	24405.691	48.65	Pk	33.9	-62.4	20.6	40.75	74	-33.25	-	-	0-360	101	H
6	24413.247	48.58	Pk	33.9	-62.4	20.6	40.68	74	-33.32	-	-	0-360	101	V

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

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11. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 8.8

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

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

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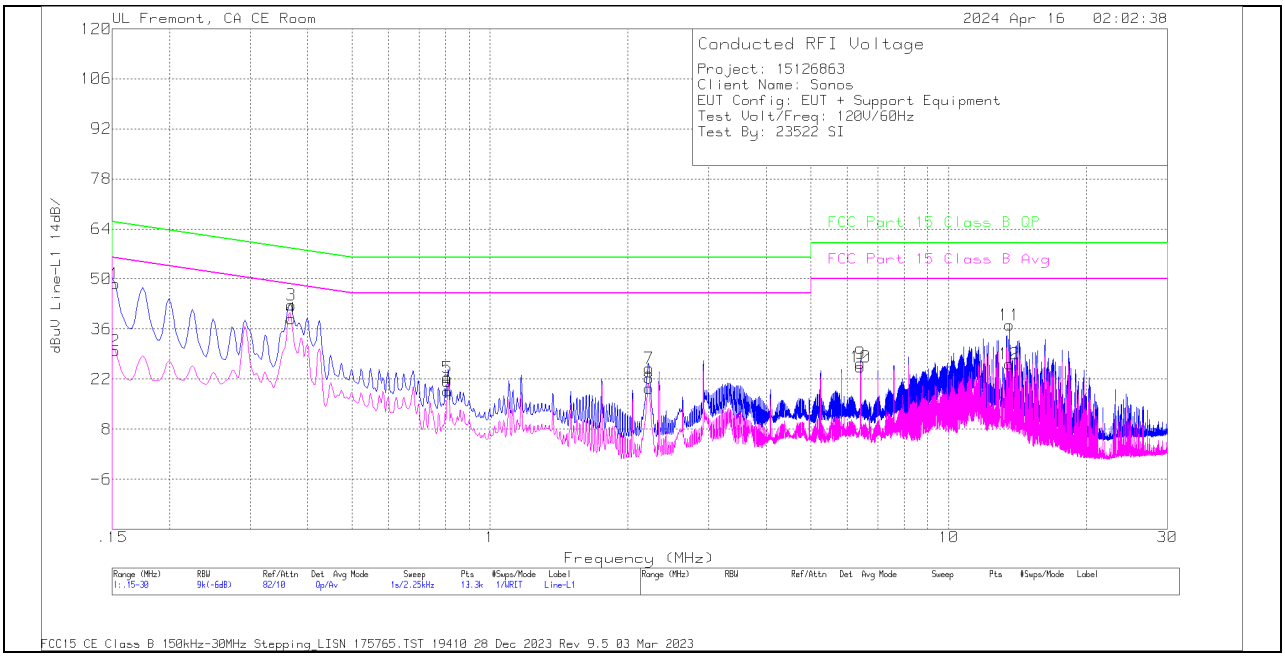
AC Power Line Norm

LINE 1 RESULTS



Trace Markers

Range 1: Line-L1 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN (dB)	Cbl (dB)	Trns Limiter (dB)	Corrected Reading dBuV	FCC Part 15 Class B QP	QP Margin (dB)	FCC Part 15 Class B Avg	Av Margin (dB)
2	.1523	20.28	Av	.1	0	9.5	29.88	-	-	55.88	-26
4	.3683	29.45	Av	0	0	9.4	38.85	-	-	48.54	-9.69
6	.807	9.22	Av	0	.1	9.3	18.62	-	-	46	-27.38
8	2.2223	9.89	Av	0	.1	9.4	19.39	-	-	46	-26.61
10	6.4275	15.86	Av	0	.1	9.4	25.36	-	-	50	-24.64
12	13.5623	16.4	Av	.1	.3	9.5	26.3	-	-	50	-23.7
1	.1523	39.09	Qp	.1	0	9.5	48.69	65.88	-17.19	-	-
3	.3683	33.28	Qp	0	0	9.4	42.68	58.54	-15.86	-	-
5	.807	13.03	Qp	0	.1	9.3	22.43	56	-33.57	-	-
7	2.2223	15.5	Qp	0	.1	9.4	25	56	-31	-	-
9	6.4275	16.97	Qp	0	.1	9.4	26.47	60	-33.53	-	-
11	13.5623	27.16	Qp	.1	.3	9.5	37.06	60	-22.94	-	-

Qp - Quasi-Peak detector
Ca - CISPR average detection

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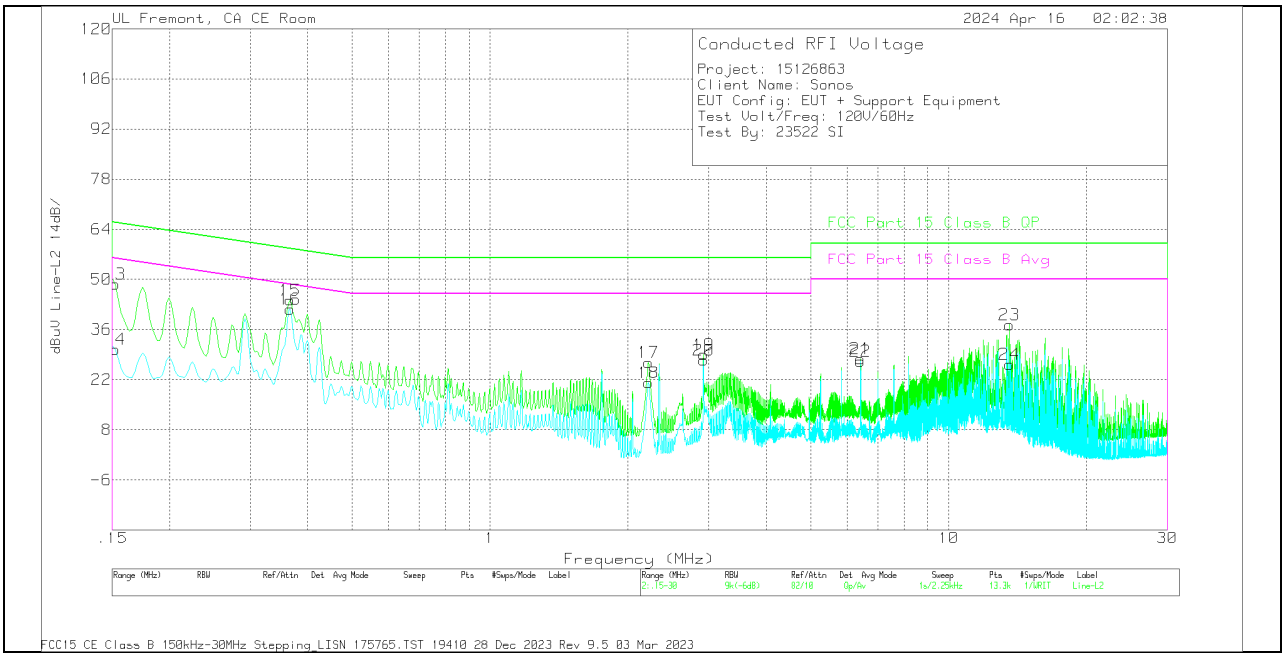
LINE 2 RESULTS



Trace Markers

Range 2: Line-L2 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN (dB)	Cbl (dB)	Trns Limiter (dB)	Corrected Reading dBuV	FCC Part 15 Class B QP	QP Margin (dB)	FCC Part 15 Class B Avg	Av Margin (dB)
14	.1523	20.92	Av	.1	0	9.5	30.52	-	-	55.88	-25.36
16	.366	32.21	Av	0	.1	9.4	41.71	-	-	48.59	-6.88
18	2.2144	11.6	Av	0	.1	9.4	21.1	-	-	46	-24.9
20	2.9198	17.91	Av	0	.2	9.3	27.41	-	-	46	-18.59
22	6.4253	17.56	Av	0	.2	9.4	27.16	-	-	50	-22.84
24	13.5623	16.51	Av	.1	.2	9.5	26.31	-	-	50	-23.69
13	.1523	39.14	Qp	.1	0	9.5	48.74	65.88	-17.14	-	-
15	.366	34.71	Qp	0	.1	9.4	44.21	58.59	-14.38	-	-
17	2.2155	17.26	Qp	0	.1	9.4	26.76	56	-29.24	-	-
19	2.9198	19.47	Qp	0	.2	9.3	28.97	56	-27.03	-	-
21	6.4253	18.19	Qp	0	.2	9.4	27.79	60	-32.21	-	-
23	13.5623	27.44	Qp	.1	.2	9.5	37.24	60	-22.76	-	-

Qp - Quasi-Peak detector
Ca - CISPR average detection

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12. SETUP PHOTOS

Refer to UL Verification Services Inc Report # 15126863-EP1V1.

END OF TEST REPORT

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