TEST REPORT

Report Number: R14896020-E1

Applicant	:	Sonos 301 Coromar Dr Goleta, CA 93117 USA
Model	:	S45
Brand	:	Sonos
FCC ID	:	SBVRM045
IC	:	5373A-RM045
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:
2024-05-02

Prepared by:
UL LLC
12 Laboratory Dr.
Research Triangle Park, NC 27709, USA
TEL: (919) 549-1400

ACCREDITED
CERT #0751.06

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	2024-05-02	Initial Issue	B. Kiewra

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	Sonos 301 Coromar Dr Goleta, CA 93117 USA
EUT DESCRIPTION:	Wireless Smart Speaker
MODEL:	S45
BRAND:	Sonos
SERIAL NUMBER:	00E5828D66C8, 000E58E7E7FB2, 000E58A36F038
SAMPLE RECEIPT DATE:	2024-02-20
DATE TESTED:	2024-02-20 to 2024-03-27

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C ISED RSS-247 Issue 3 ISED RSS-GEN Issue 5 + A1 + A2	Refer to Section 2

UL LLC 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 LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document.

Approved & Released
For UL LLC By:

Michael Antola
Staff Engineer
Consumer, Medical and IT Segment
UL LLC

Prepared By:

Brian Kiewra
Project Engineer
Consumer, Medical and IT Segment
UL LLC

2. TEST RESULTS SUMMARY

This report contains info provided by the customer which can impact the validity of results. UL LLC is only responsible for the validity of results after the integration of the data provided by the customer.
Below is a list of the data/info provided by the customer:

1) Antenna gain and type (see section 6.3)
2) Worst-case data rates (see section 6.5)

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		
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		
15.209, 15.205	RSS-GEN 8.9, 8.10	Radiated Emissions		
15.207	RSS-Gen 8.8	AC Mains Conducted Emissions		

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 C63.10-2020, 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 LLC is accredited by A2LA, certification # 0751.06, 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: 12 Laboratory Dr RTP, NC 27709, U.S.A	US0067	2180C	825374
☒	Building: 2800 Perimeter Park Dr. Suite B Morrisville, NC 27560, U.S.A		27265	

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	UNCERTAINTY
Radio Frequency (Spectrum Analyzer)	141.2 Hz
Occupied Channel Bandwidth	1.22%
RF output power, conducted	1.3 dB (PK) 0.45 dB (AV)
Power Spectral Density, conducted	2.47 dB
Unwanted Emissions, conducted	1.94 dB
All emissions, radiated	6.01 dB
Conducted Emissions (0.150-30MHz) - LISN	3.40 dB
Temperature	0.57°C
Humidity	3.39%
DC Supply voltages	1.70%
Time	3.39%

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

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 that contains Radio0 and Radio1. Radio0 transmits BT, BLE, 2.4GHz WLAN, 5GHz WLAN, 6GHz WLAN. Radio1 transmits 5GHz and 6GHz WLAN. This report covers testing on Radio0 BLE.

6.2. MAXIMUM OUTPUT POWER

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

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402 - 2480	BLE - 1Mbps	14.32	27.04
2402 - 2480	BLE - 2Mbps	14.32	27.04

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The antenna(s) gain and type, as provided by the manufacturer' are as follows:
The radio utilizes a Tri-band Dipole antenna, with a maximum gain of 3.1 dBi.

6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was 78.1-45200-diag-lasso-rel-202312282317.

6.5. WORST-CASE CONFIGURATION AND MODE

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. Radiated emissions performed on the mode with the highest power and PSD.

The EUT is intended to operate in one orientation. Therefore all testing was performed with the EUT is this intended orientation of operation.

EUT supports both 1Mbps and 2Mbps data rates.

6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop	Lenovo	T450s	NA	NA
Laptop	Lenovo	T470s	NA	NA
Ethernet Switch	Netgear	GS305v3	5U81385JA2EE6	NA
Switch PSU	Netgear	AD2015F20	332-10727-02	NA

I/O CABLES

I/O Cable List						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	Mains	1	Hardwired	Non-Shielded	>3m	Connects to AC Mains
2	Ethernet	1	Ethernet	Non-Shielded	>3m	Connects to ENET switch

TEST SETUP

The EUT is connected to a test laptop during the tests.

SETUP DIAGRAMS

Please refer to R14896020-EP1 for setup diagrams

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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 Used - Radiated Disturbance Emissions Test Equipment (Morrisville – Chamber 4)

Equipment ID	Description	Manufacturer/Brand	Model Number	Last Cal.	Next Cal.
0.009-30MHz					
135144	Active Loop Antenna	ETS-Lindgren	6502	2024-01-24	2025-01-24
30-1000 MHz					
90628	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2024-01-02	2026-01-02
1-18 GHz					
89509	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2023-05-23	2025-05-23
Gain-Loss Chains					
207638	Gain-loss string: 0.009-30MHz	Various	Various	2023-09-18	2024-09-18
207639	Gain-loss string: 25-1000MHz	Various	Various	2023-09-18	2024-09-18
207640	Gain-loss string: 1-18GHz	Various	Various	2023-05-17	2024-05-17
Receiver & Software					
197955	Spectrum Analyzer	Rohde & Schwarz	ESW44	2023-04-10	2024-04-10
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
Additional Equipment used					
241204	Environmental Meter	Fisher Scientific	15-077-963	2023-09-05	2025-09-05

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville – Chamber 1)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
18-40 GHz					
204704	Horn Antenna, 18-26.5GHz	Com-Power	AH-826	2023-07-20	2025-07-20
Gain-Loss Chains					
135999	Gain-loss string: 18-40GHz	Various	Various	2023-05-16	2024-05-16
Receiver & Software					
81018	Spectrum Analyzer	Agilent	E4446A	2023-08-01	2024-08-01
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
Additional Equipment used					
241205	Environmental Meter	Fisher Scientific	15-077-963	2023-09-05	2025-09-05

Test Equipment Used - Wireless Conducted Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
90410	Spectrum Analyzer	Keysight Technologies	N9030A	2023-06-14	2024-06-14
90416	Spectrum Analyzer	Keysight Technologies	N9030A	2023-06-09	2024-06-30
238710	Environmental Meter	Fisher Scientific	15-077-963	2023-06-27	2024-06-27
SOFTEMI	Antenna Port Software	UL	Version 2021.5.28	NA	NA
SOFTEMI	Antenna Port Software	UL	Version 2022.8.16	NA	NA
SOFTEMI	Antenna Port Software	UL	Version 2023.2.16	NA	NA
SOFTEMI	Antenna Port Software	UL	Version 2024.2.23	NA	NA
Power Software	Boonton Power Analyzer	Boonton	Version 3.0.13.0	NA	NA
245262	Conducted Switch Box	UL	CSB	2024-02-20	2025-02-20
211056	Real-Time Peak Power Sensor 50MHz to 8GHz	Boonton	RTP5000	2023-08-01	2024-08-01
211055	Real-Time Peak Power Sensor 50MHz to 8GHz	Boonton	RTP5000	2023-08-01	2024-08-01
211057	Real-Time Peak Power Sensor 50MHz to 8GHz	Boonton	RTP5000	2023-08-01	2024-08-01
211058	Real-Time Peak Power Sensor 50MHz to 8GHz	Boonton	RTP5000	2023-08-01	2024-08-01

Test Equipment Used - Wireless Conducted Attenuators, Cables, and Couplers

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
Attenuators					
226561	SMA Coaxial 10dB Attenuator 25MHz-18GHz	CentricRF	C18S2-10	2023-02-29	2024-02-29
226563	SMA Coaxial 10dB Attenuator 25MHz-18GHz	CentricRF	C18S2-10	2023-02-29	2024-02-29
226561	SMA Coaxial 10dB Attenuator 25MHz-18GHz	CentricRF	C18S2-10	2024-02-29	2025-02-29
226563	SMA Coaxial 10dB Attenuator 25MHz-18GHz	CentricRF	C18S2-10	2024-02-29	2025-02-29
Cables					
CBL030	SMA Male to SMA Male Cable Using PE-P141 Coax - 12"	Pasternack	Sucoflex 104PEA	2023-06-27	2024-06-27
CBL031	SMA Male to SMA Male Cable Using PE-P141 Coax - 12"	Pasternack	Sucoflex 104PEA	2023-06-27	2024-06-27

Test Equipment Used - Line-Conducted Emissions – Voltage (Morrisville – Conducted 1)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
CBL087	Coax cable, RG223, N-male to BNC-male, 20-ft.	Pasternack	PE3W06143-240	2023-04-04	2024-04-04
179892	Environmental Meter	Fisher Scientific	15-077-963	2023-07-26	2024-06-31
80391	LISN, 50-ohm/50-uH, 250uH 2-conductor, 25A	Fischer Custom Com.	FCC-LISN-50/250-25-2-01	2023-07-31	2024-07-31
75141	EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESCI 7	2023-08-01	2024-08-01
52859	Transient Limiter, 0.009-100MHz	Electro-Metrics	EM-7600	2023-04-04	2024-04-04
PS214	AC Power Source	Elgar	CW2501M	NA	NA
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
91432	LISN, 50-ohm/50-uH, 2-conductor, 25A (For support gear only.)	Solar Electronics	8012-50-R-24-BNC	NA	NA

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8. MEASUREMENT METHOD

On Time and Duty Cycle: ANSI C63.10-2020 Section 11.6

6 dB BW: ANSI C63.10-2020 Subclause -11.8.2

Occupied BW (99%): ANSI C63.10-2020 Section 6.9.3

Output Power: ANSI C63.10-2020 Subclause -11.9.1.2 Method PKPM1 Peak-reading power meter
ANSI C63.10-2020 Subclause -11.9.2.3.2 Method AVGPM-G (Measurement using a gated RF average-reading power meter)

PSD: ANSI C63.10-2020 Subclause -11.10.2 Method PKPSD (peak PSD)

Conducted emissions non-restricted frequency bands: ANSI C63.10-2020 Subclause -11.11 and 6.10.4

Radiated emissions restricted frequency bands: ANSI C63.10-2020 Subclause -11.12.1 and 6.10.5, 6.3 to 6.6.

AC Power-line conducted emissions: ANSI C63.10-2020, Section 6.2.

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9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

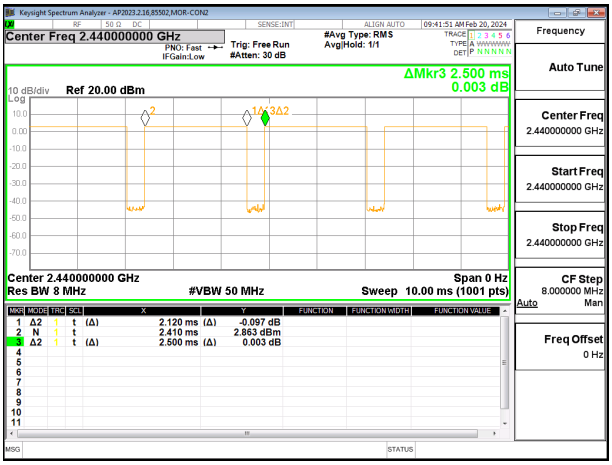
LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

Mode	ON Time B (ms)	Period (ms)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
1Mbps	2.120	2.500	0.848	84.80	1.43
2Mbps	1.070	1.875	0.571	57.07	4.87



1Mbps DUTY CYCLE

2Mbps DUTY CYCLE

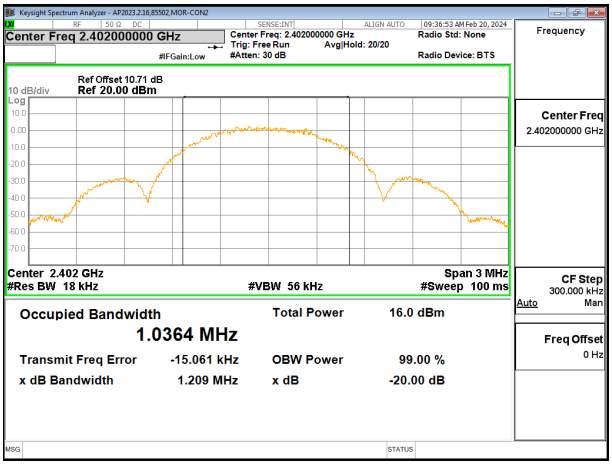
9.2. 99% BANDWIDTH

LIMITS

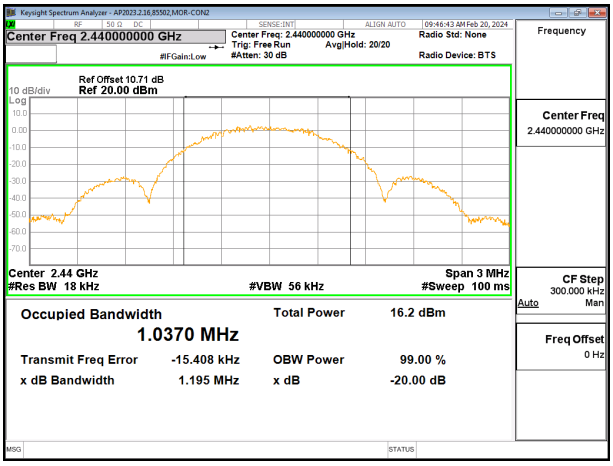
None; for reporting purposes only.

9.2.1. BLE (1Mbps)

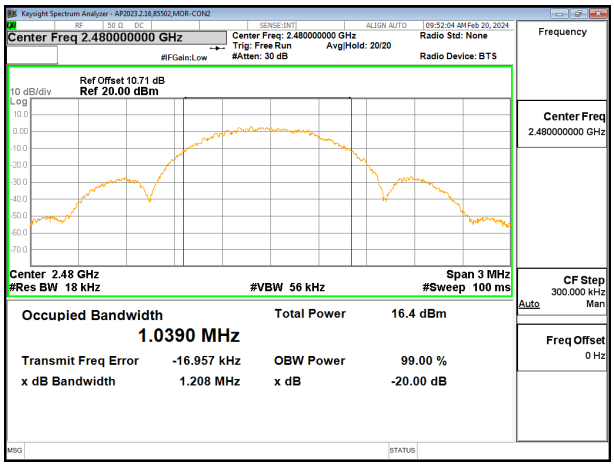
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.036
Middle	2440	1.037
High	2480	1.039



LOW CHANNEL



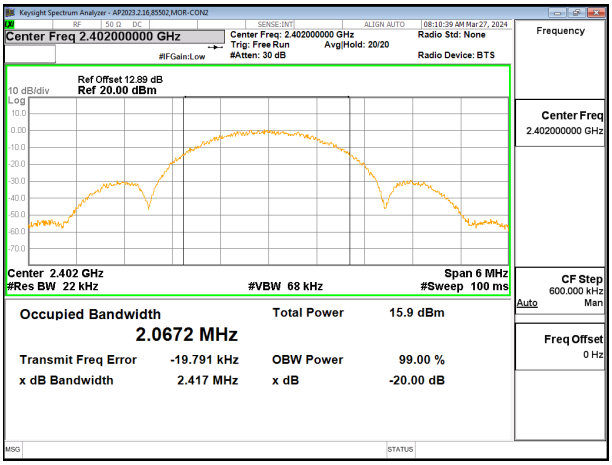
MID CHANNEL



HIGH CHANNEL

9.2.2. BLE (2Mbps)

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	2.067
Middle	2440	2.069
High	2480	2.074



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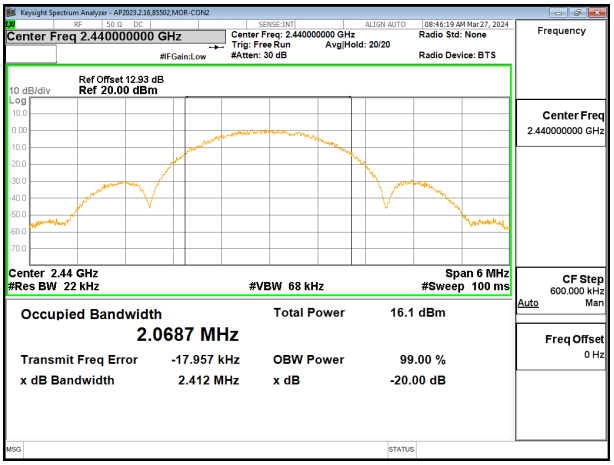
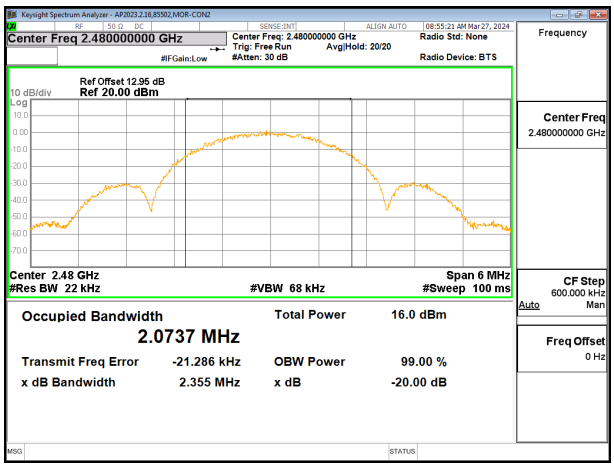


MID CHANNEL



HIGH CHANNEL

9.3. 6 dB BANDWIDTH

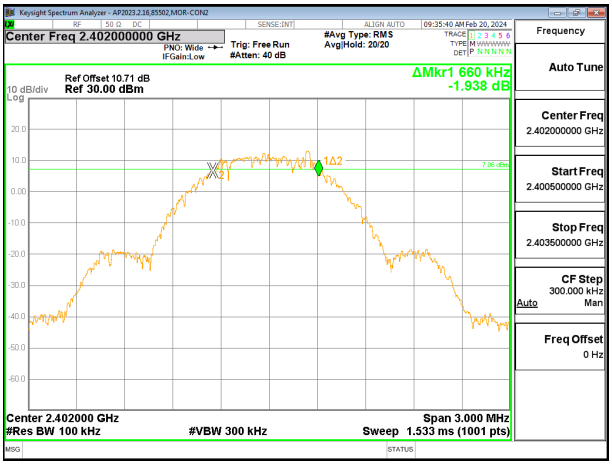
LIMITS

FCC §15.247 (a) (2)
RSS-247 5.2 (a)

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

9.3.1. BLE (1Mbps)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.660	0.5
Middle	2440	0.669	0.5
High	2480	0.684	0.5



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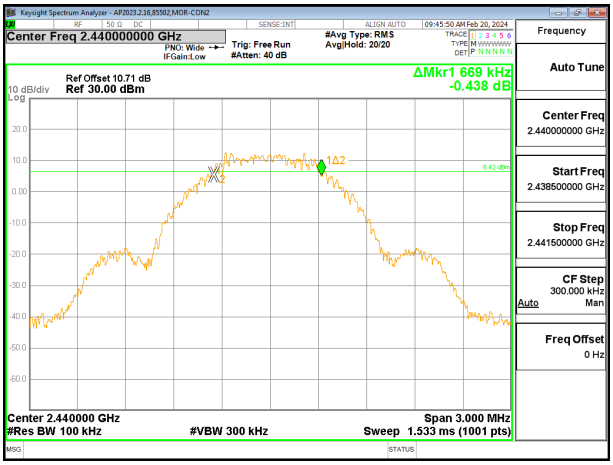

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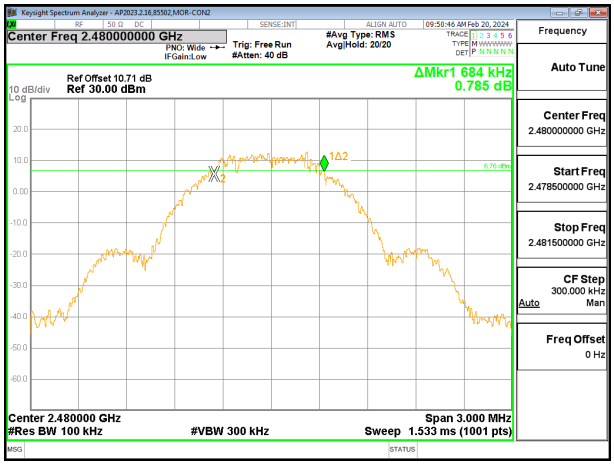
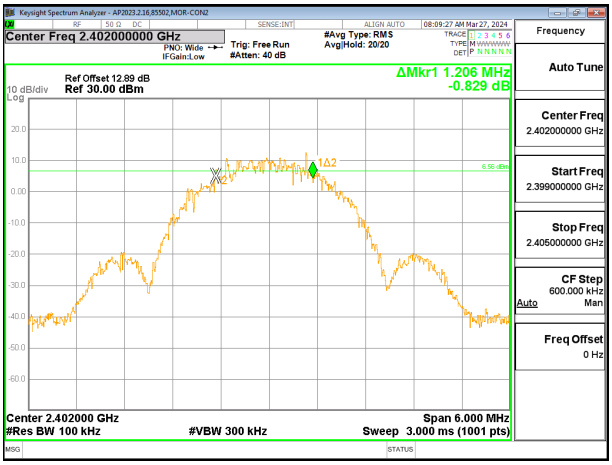


HIGH CHANNEL

9.3.2. BLE (2Mbps)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	1.206	0.5
Middle	2440	1.302	0.5
High	2480	1.332	0.5



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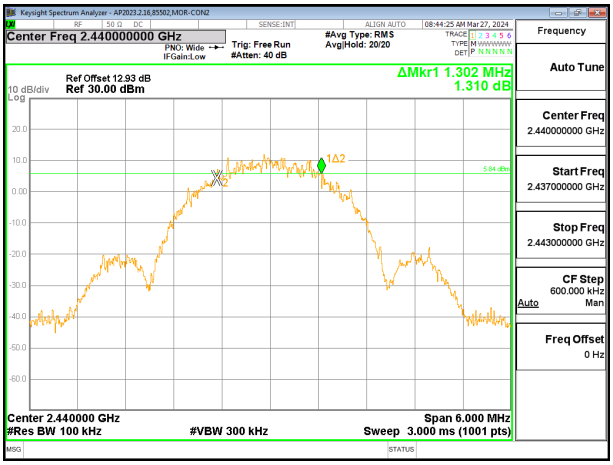
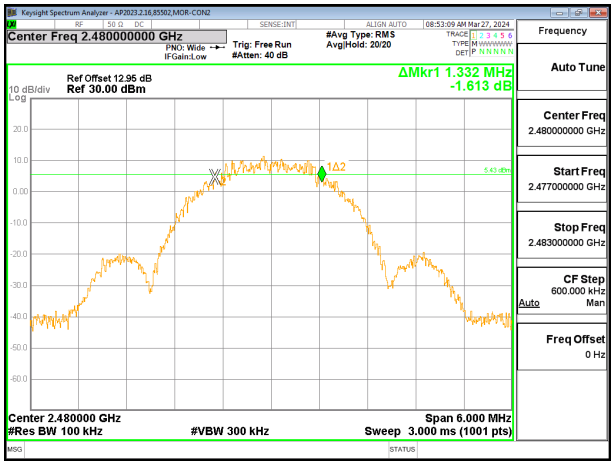


MID CHANNEL



HIGH CHANNEL

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 cable assembly insertion loss of 10.41 dB (including 9.71 dB pad and 0.70 dB cable) was entered as an offset in the 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.

9.4.1. BLE (1Mbps)

Tested By:	85502
Date:	2024-02-20

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	14.27	30	-15.73
Middle	2441	14.32	30	-15.68
High	2480	14.28	30	-15.72

9.4.2. BLE (2Mbps)

Tested By:	85502
Date:	2024-02-20

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	14.25	30	-15.75
Middle	2441	14.12	30	-15.88
High	2480	14.32	30	-15.68

9.5. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.41 dB (including 9.71 dB pad and 0.70 dB cable) was entered as an offset in the 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.

9.5.1. BLE (1Mbps)

Tested By:	85502
Date	2024-02-20

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	13.99
Middle	2441	14.03
High	2480	13.97

9.5.2. BLE (2Mbps)

Tested By:	85502
Date	2024-02-20

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	13.81
Middle	2441	14.06
High	2480	14.05

9.6. POWER SPECTRAL DENSITY

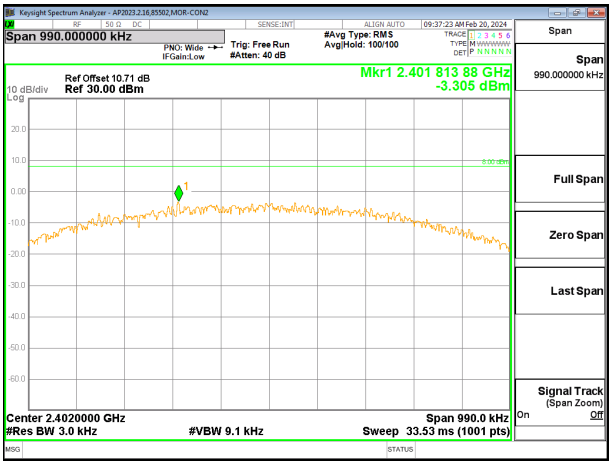
LIMITS
FCC §15.247 (e)
RSS-247 (5.2) (b)

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.

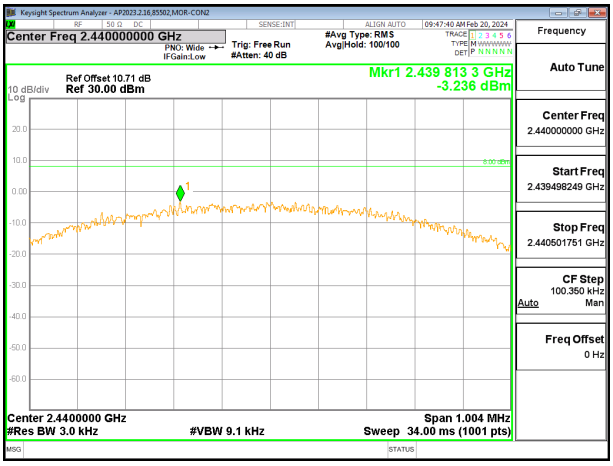
9.6.1. BLE (1Mbps)

PSD Results

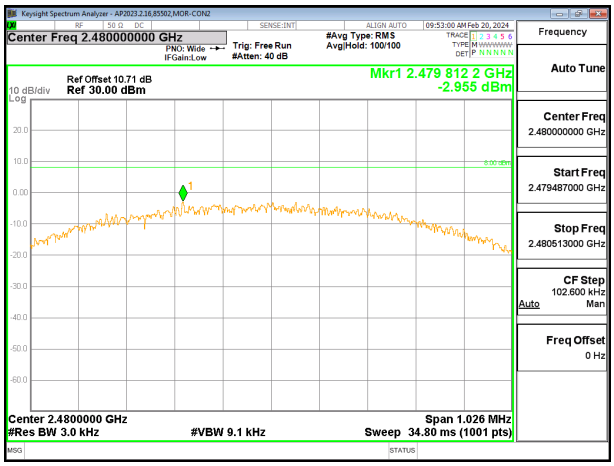
Channel	Frequency (MHz)	Measured PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low	2402	-3.31	8.0	-11.3
Mid	2440	-3.24	8.0	-11.2
High	2480	-2.96	8.0	-11.0



LOW CHANNEL



MID CHANNEL

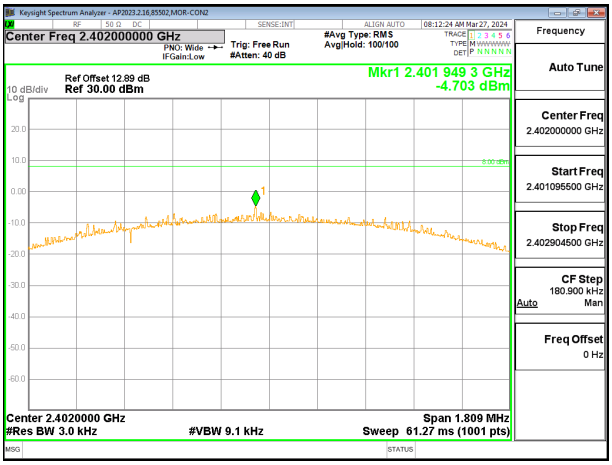


HIGH CHANNEL

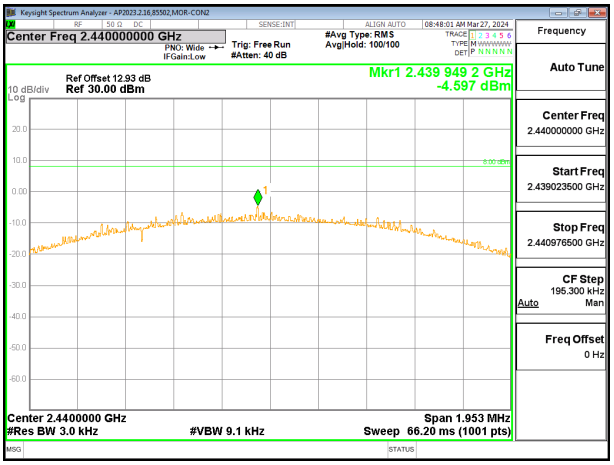
9.6.2. BLE (2Mbps)

PSD Results

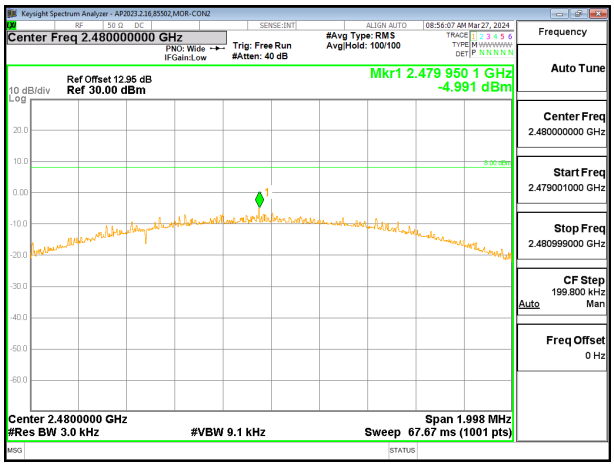
Channel	Frequency (MHz)	Measured PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low	2402	-4.70	8.0	-12.7
Mid	2440	-4.60	8.0	-12.6
High	2480	-4.99	8.0	-13.0



LOW CHANNEL



MID CHANNEL



HIGH CHANNEL

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 dBc.

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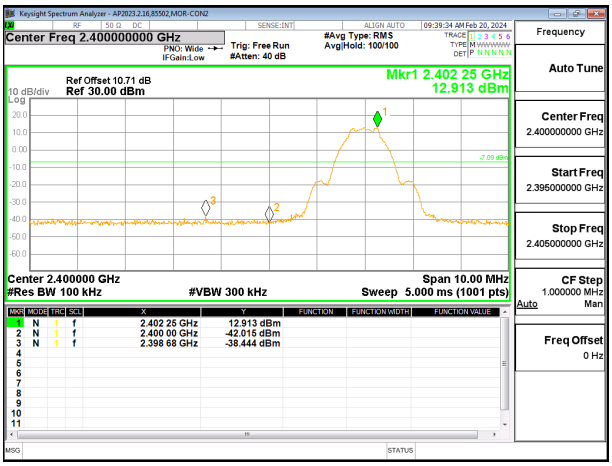
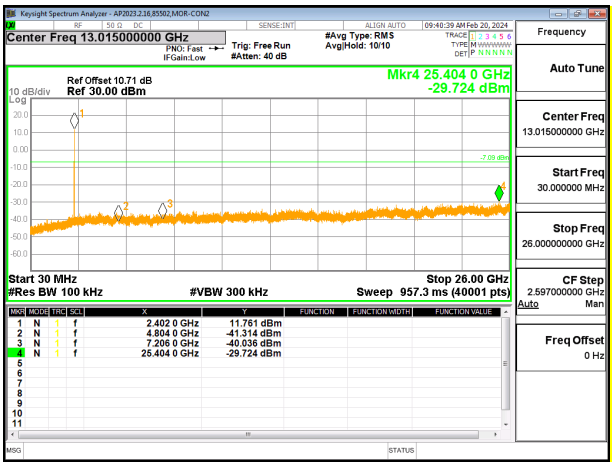
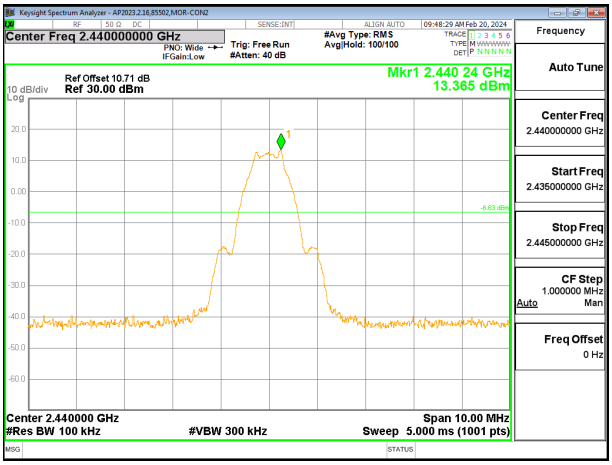
9.7.1. BLE (1Mbps)



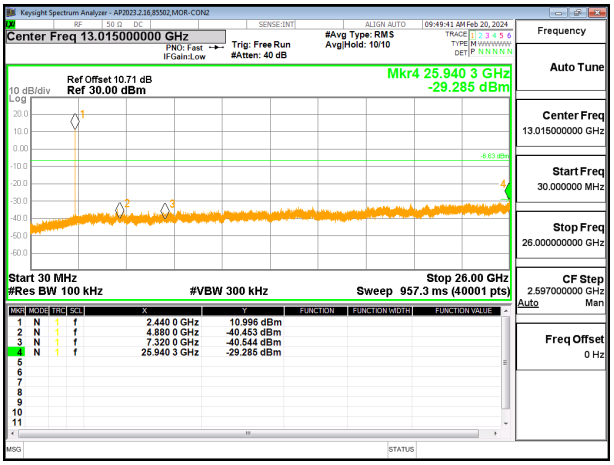
LOW CHANNEL BANDEDGE



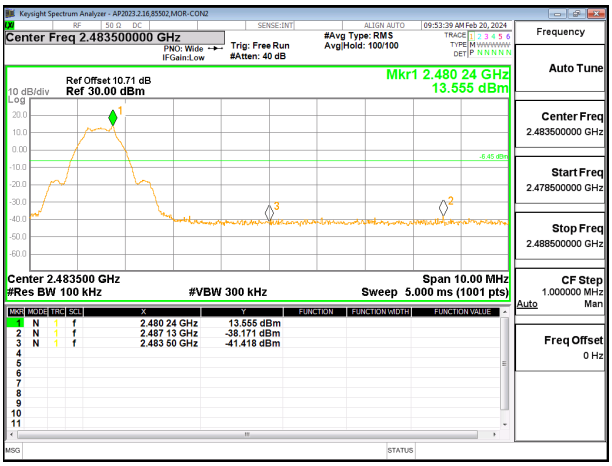
OUT-OF-BAND LOW CHANNEL



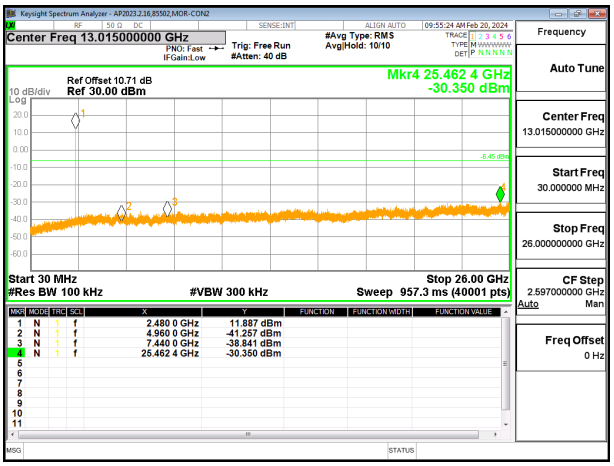
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL

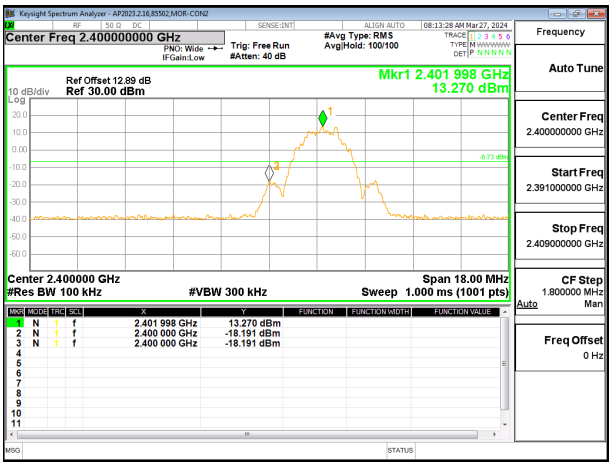


HIGH CHANNEL BANDEDGE

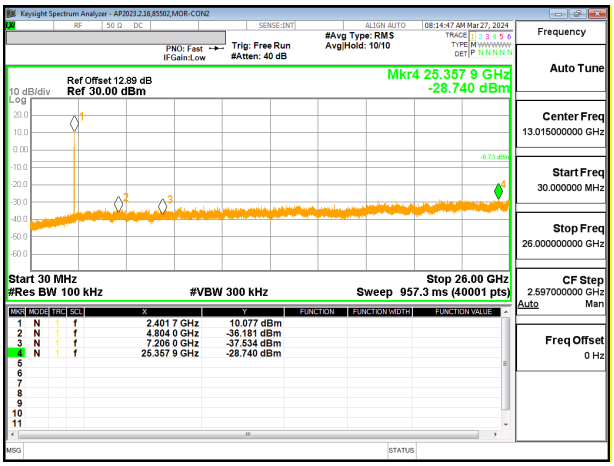


OUT-OF-BAND HIGH CHANNEL

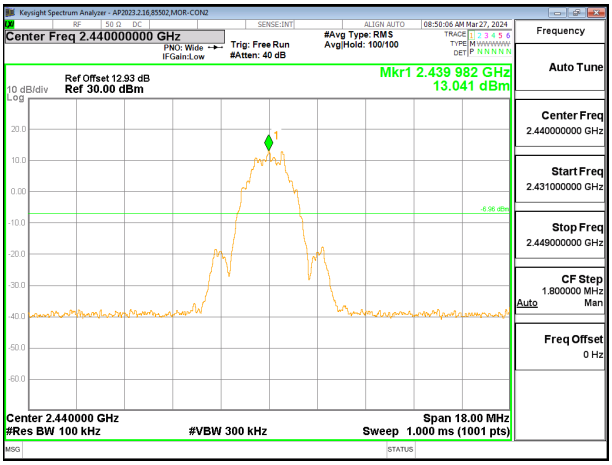
9.7.2. BLE (2Mbps)



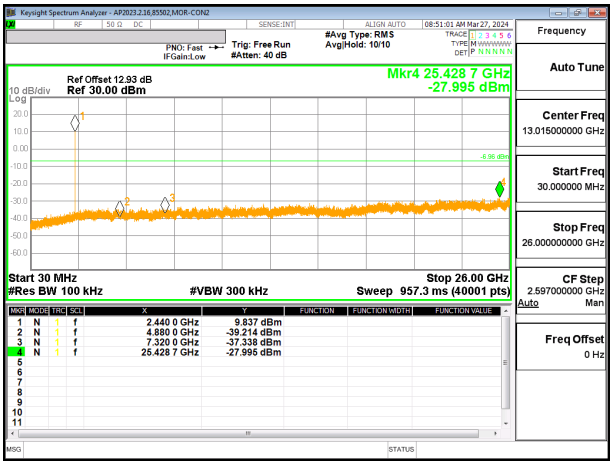
LOW CHANNEL BANDEDGE



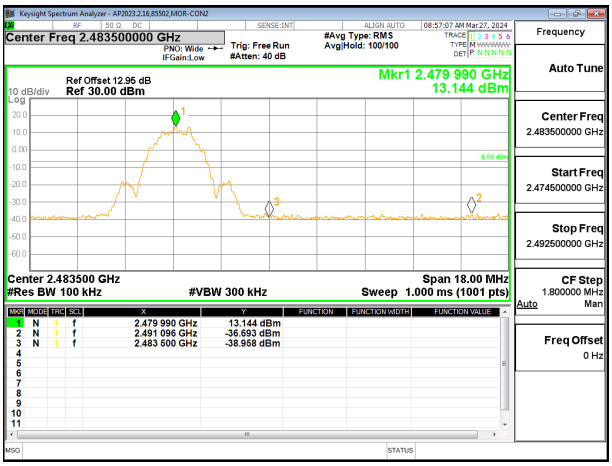
OUT-OF-BAND LOW CHANNEL



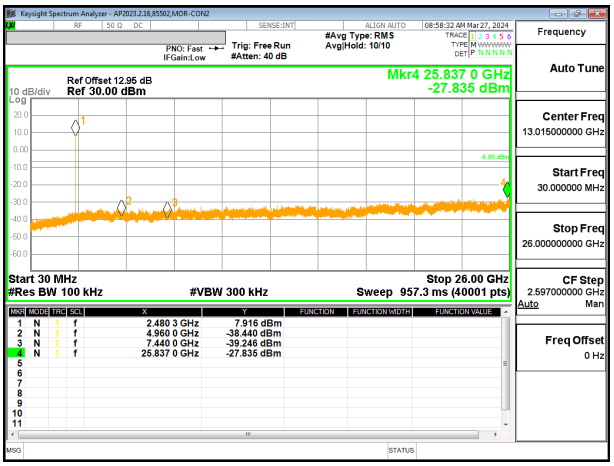
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL



HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL

10. RADIATED TEST RESULTS

10.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

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

IC RSS-GEN Clause 8.9 and 8.10

Frequency Range (kHz)	Field Strength Limit (uA/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
0.009-0.490	6.37/F(kHz) @ 300 m	-
0.490-1.705	63.7/F(kHz) @ 30 m	-
1.705 - 30	0.08 @ 30m	-
Frequency Range (MHz)	**Field Strength Limit (uV/m) at 3 m**	**Field Strength Limit (dBuV/m) at 3 m**
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 3MHz 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 voltage 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.

3D antenna use - For below 30MHz testing, investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel).

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

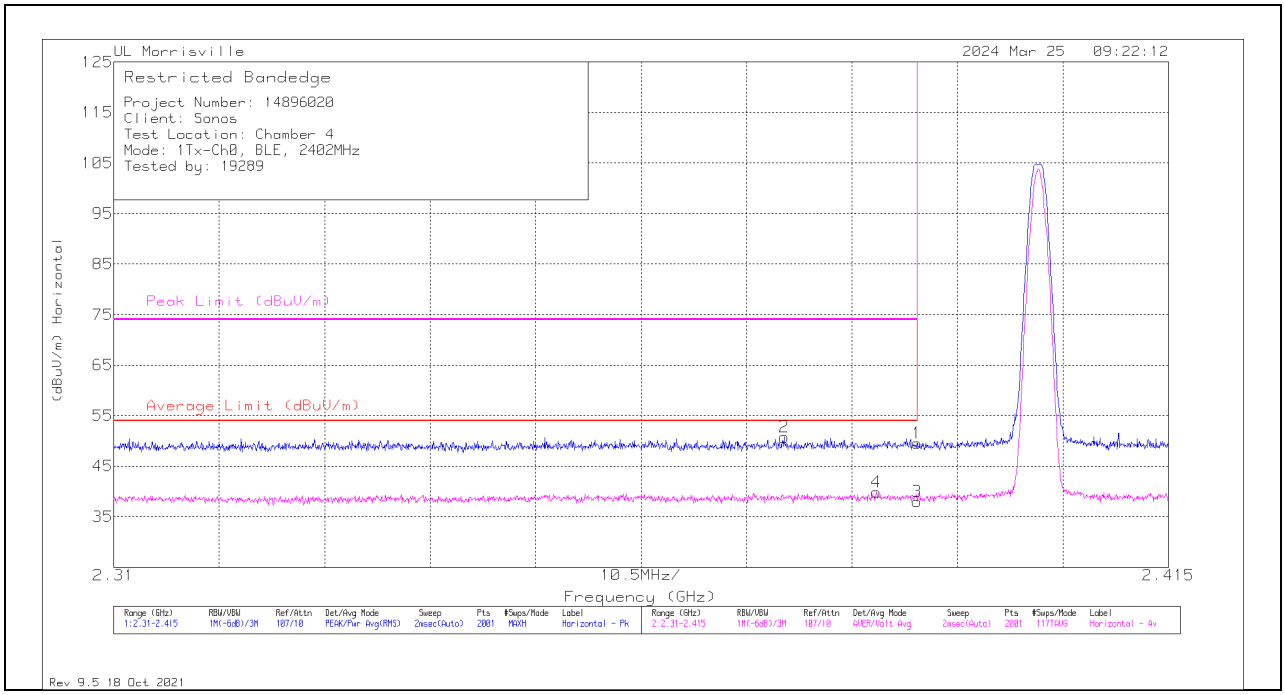
OFS and chamber correlation testing had been performed and chamber measured test result is the worst-case test result.

10.2. TRANSMITTER ABOVE 1 GHz

10.2.1. BLE (1Mbps)

BANDEDGE (LOW CHANNEL)

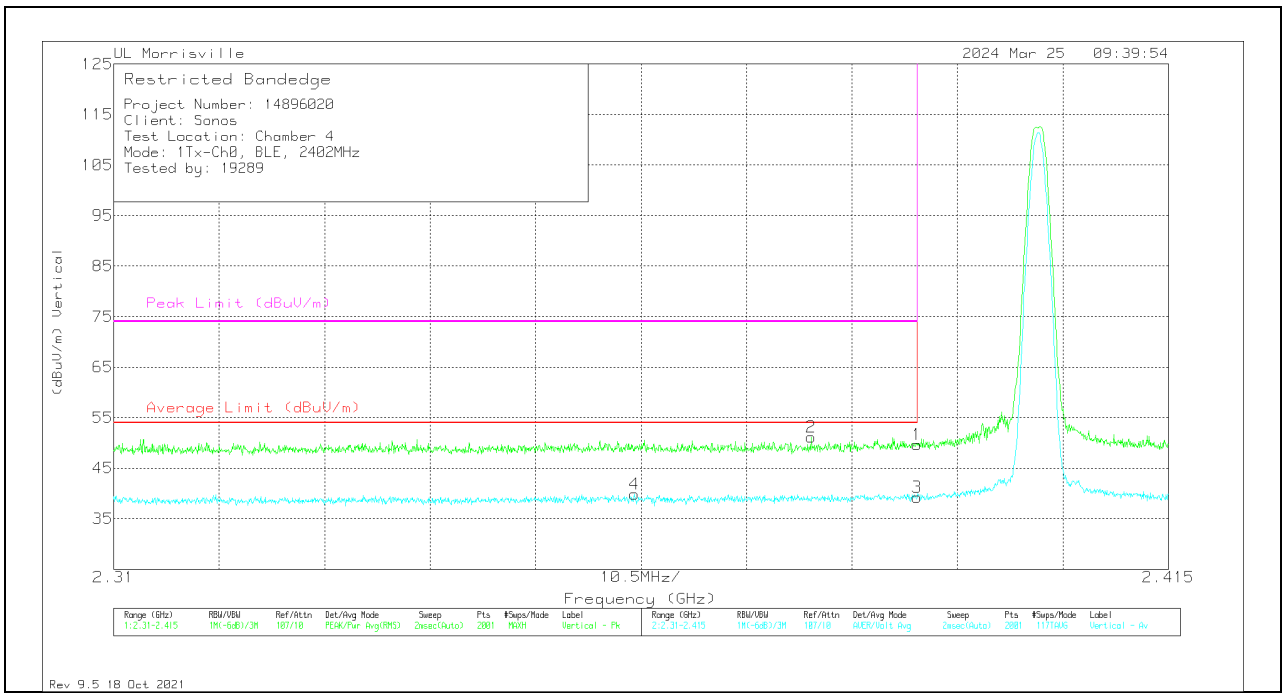
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	89509 ACF (dB/m)	Gain/Loss (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	* ** 2.38996	30.69	Pk	32	-13.2	0	49.49	-	-	74	-24.51	106	101	H
2	* ** 2.37673	31.93	Pk	32	-13.2	0	50.73	-	-	74	-23.27	106	101	H
3	* ** 2.38996	17.8	ADV	32	-13.2	1.43	38.03	54	-15.97	-	-	106	100	H
4	* ** 2.38592	19.6	ADV	32	-13.2	1.43	39.83	54	-14.17	-	-	106	100	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk - Peak detector
ADV - Linear Voltage Average

VERTICAL RESULT

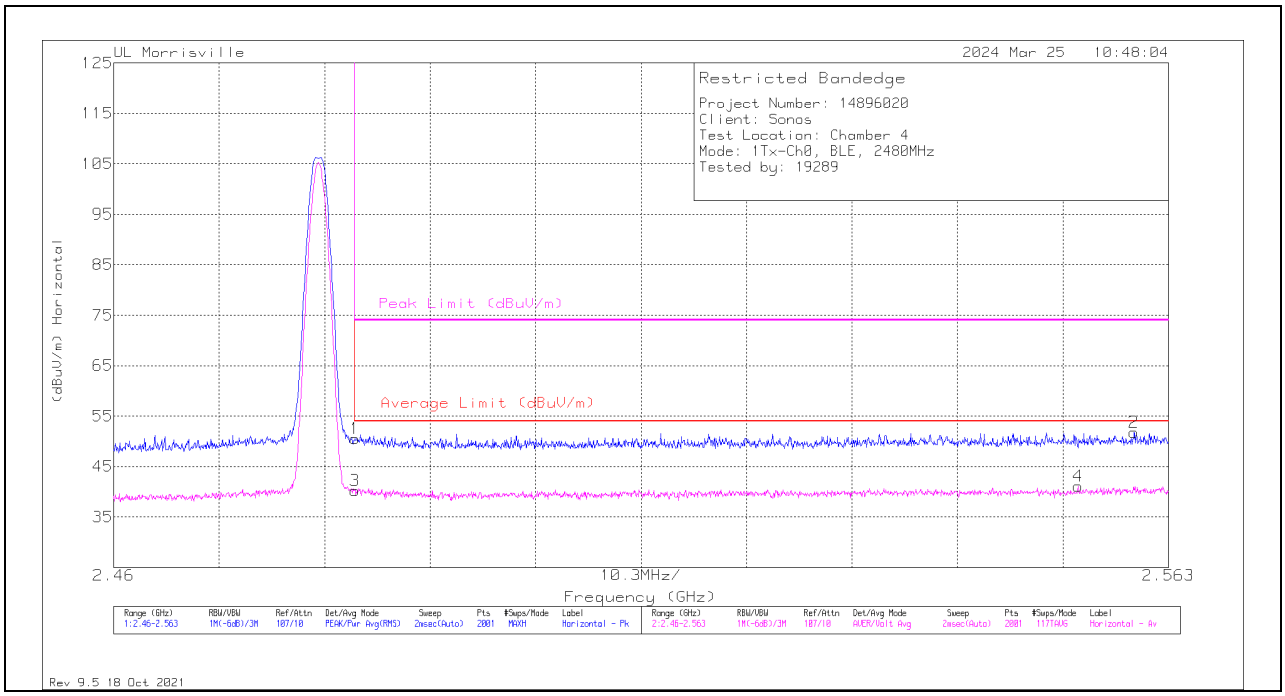


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	89509 ACF (dB/m)	Gain/Loss (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.38996	30.92	Pk	32	-13.2	0	49.72	-	-	74	-24.28	21	120	V
2	* ** 2.37946	32.31	Pk	32	-13.2	0	51.11	-	-	74	-22.89	21	120	V
3	* ** 2.38996	19.01	ADV	32	-13.2	1.43	39.24	54	-14.76	-	-	21	120	V
4	* ** 2.36182	19.55	ADV	31.9	-13	1.43	39.88	54	-14.12	-	-	21	120	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk - Peak detector
ADV - Linear Voltage Average

BANDEDGE (HIGH CHANNEL)

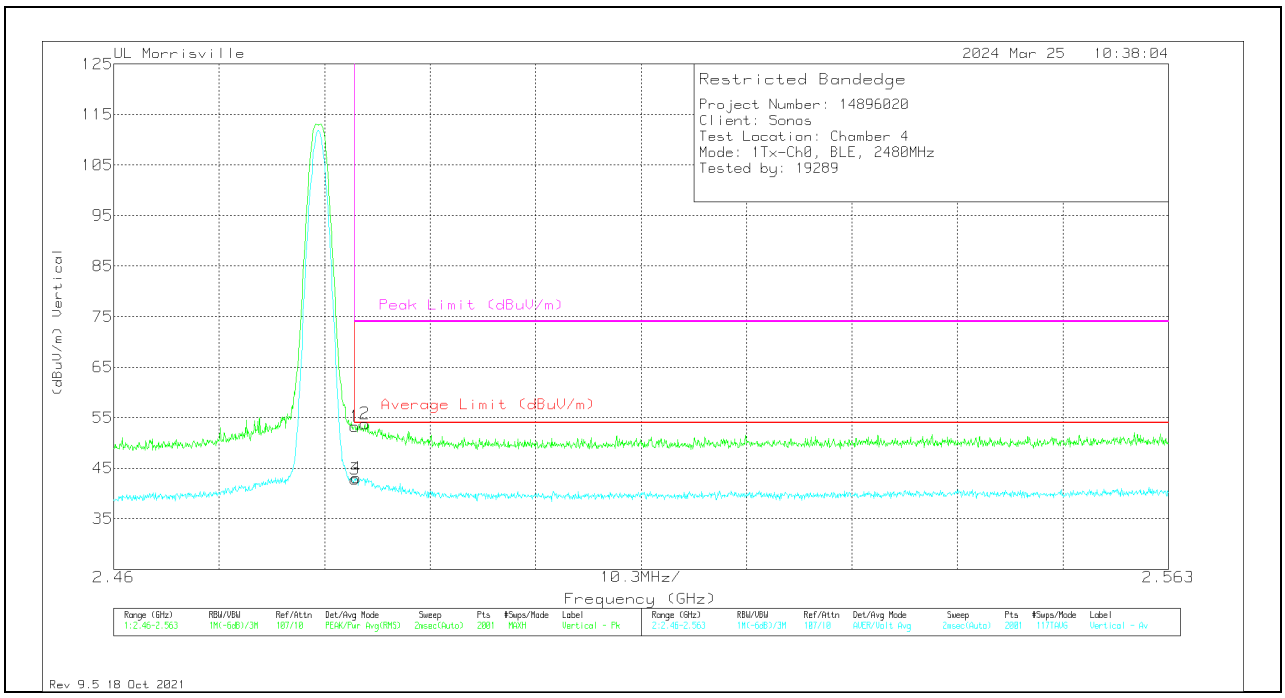
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	89509 ACF (dB/m)	Gain/Loss (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	* ** 2.48354	31.12	Pk	32.3	-12.9	0	50.52	-	-	74	-23.48	98	108	H
2	** 2.55965	32.06	Pk	32.5	-12.8	0	51.76	-	-	74	-22.24	98	108	H
3	* ** 2.48354	19.39	ADV	32.3	-12.9	1.43	40.22	54	-13.78	-	-	98	108	H
4	** 2.55419	20.14	ADV	32.4	-12.9	1.43	41.07	54	-12.93	-	-	98	108	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk - Peak detector
ADV - Linear Voltage Average

VERTICAL RESULT

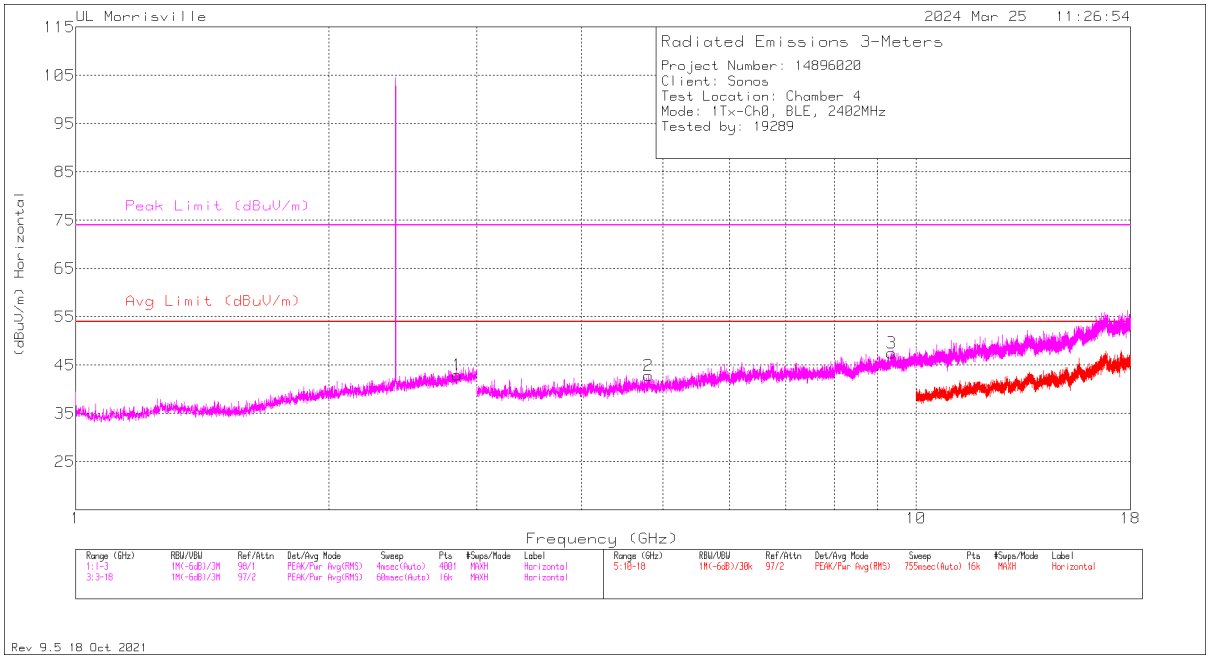


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	89509 ACF (dB/m)	Gain/Loss (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.48354	33.82	Pk	32.3	-12.9	0	53.22	-	-	74	-20.78	12	112	V
2	* ** 2.48451	34.43	Pk	32.3	-12.9	0	53.83	-	-	74	-20.17	12	112	V
3	* ** 2.48354	22.05	ADV	32.3	-12.9	1.43	42.88	54	-11.12	-	-	12	112	V
4	* ** 2.48369	22.25	ADV	32.3	-12.9	1.43	43.08	54	-10.92	-	-	12	112	V

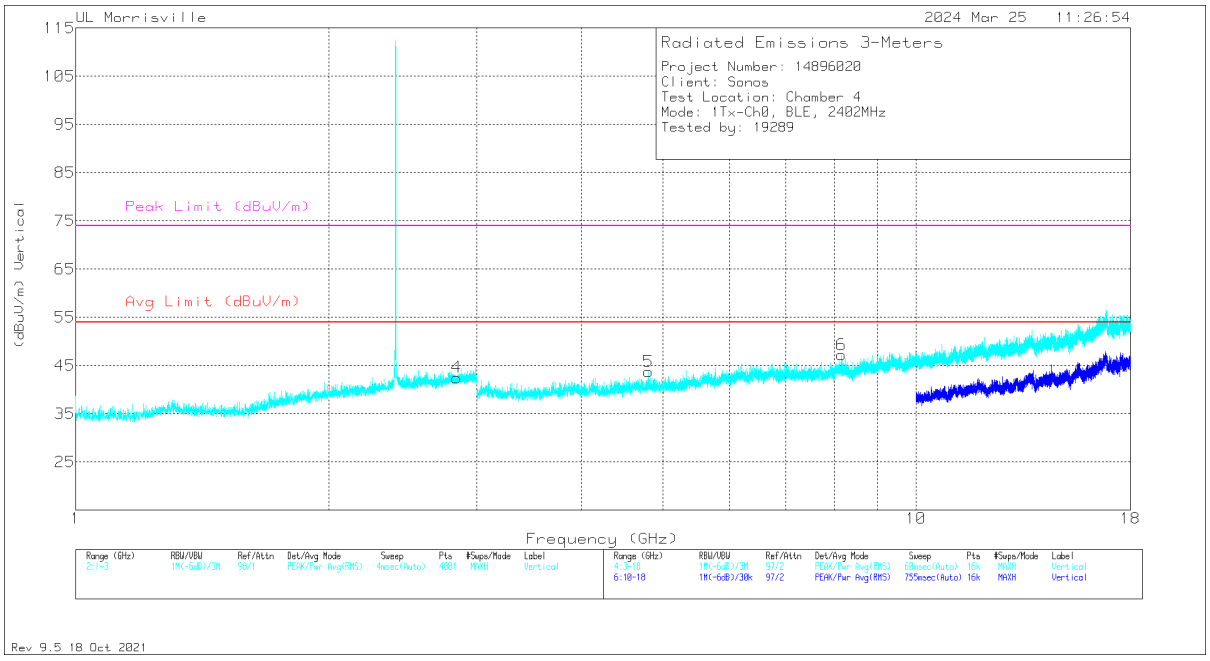
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk - Peak detector
ADV - Linear Voltage Average

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	89509 ACF (dB/m)	Gain/Loss (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	* ** 2.8455	22.8	Pk	32.4	-12.2	0	43	54	-11	74	-31	0-360	100	H
4	* ** 2.841	22.42	Pk	32.3	-12.2	0	42.52	54	-11.48	74	-31.48	0-360	200	V
2	* ** 4.80375	40.42	Pk	34.1	-31.7	0	42.82	54	-11.18	74	-31.18	0-360	100	H
3	* ** 9.3525	36	Pk	36.5	-25	0	47.5	54	-6.5	74	-26.5	0-360	100	H
5	* ** 4.80375	41.39	Pk	34.1	-31.7	0	43.79	54	-10.21	74	-30.21	0-360	200	V
6	* ** 8.14781	38.75	Pk	35.8	-27.3	0	47.25	54	-6.75	74	-26.75	0-360	200	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk - Peak detector

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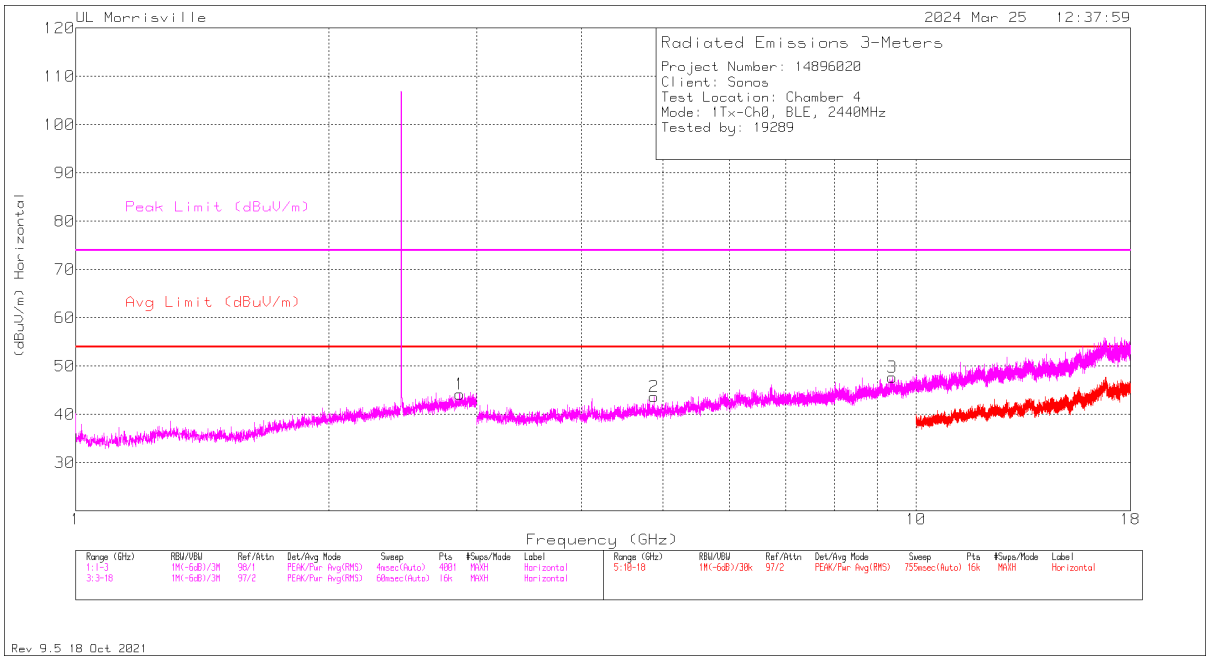
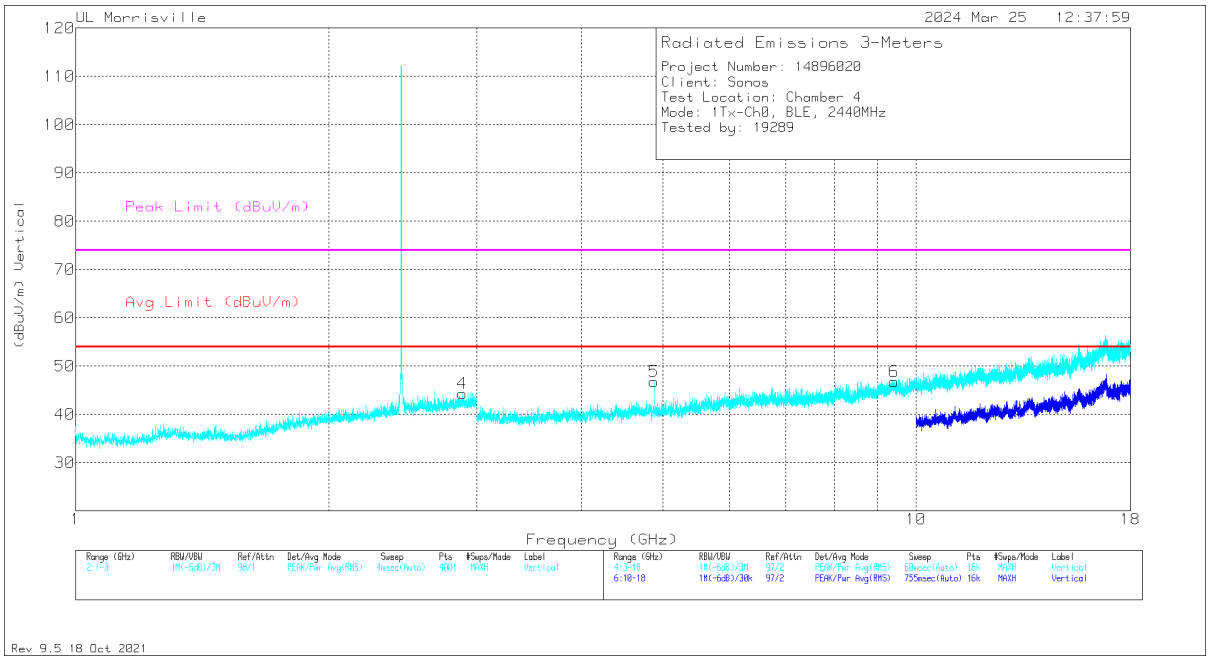
MID CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	89509 ACF (dB/m)	Gain/Loss (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	* ** 2.863	24.06	Pk	32.4	-12.2	0	44.26	54	-9.74	74	-29.74	0-360	100	H
4	* ** 2.8855	23.88	Pk	32.5	-12.1	0	44.28	54	-9.72	74	-29.72	0-360	200	V
2	* ** 4.87969	41.09	Pk	34	-31.4	0	43.69	54	-10.31	74	-30.31	0-360	100	H
3	* ** 9.37594	36.11	Pk	36.6	-25	0	47.71	54	-6.29	74	-26.29	0-360	100	H
5	* ** 4.88063	44.24	Pk	34	-31.4	0	46.84	54	-7.16	74	-27.16	0-360	200	V
6	* ** 9.42	35.95	Pk	36.6	-25.7	0	46.85	54	-7.15	74	-27.15	0-360	200	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk - Peak detector

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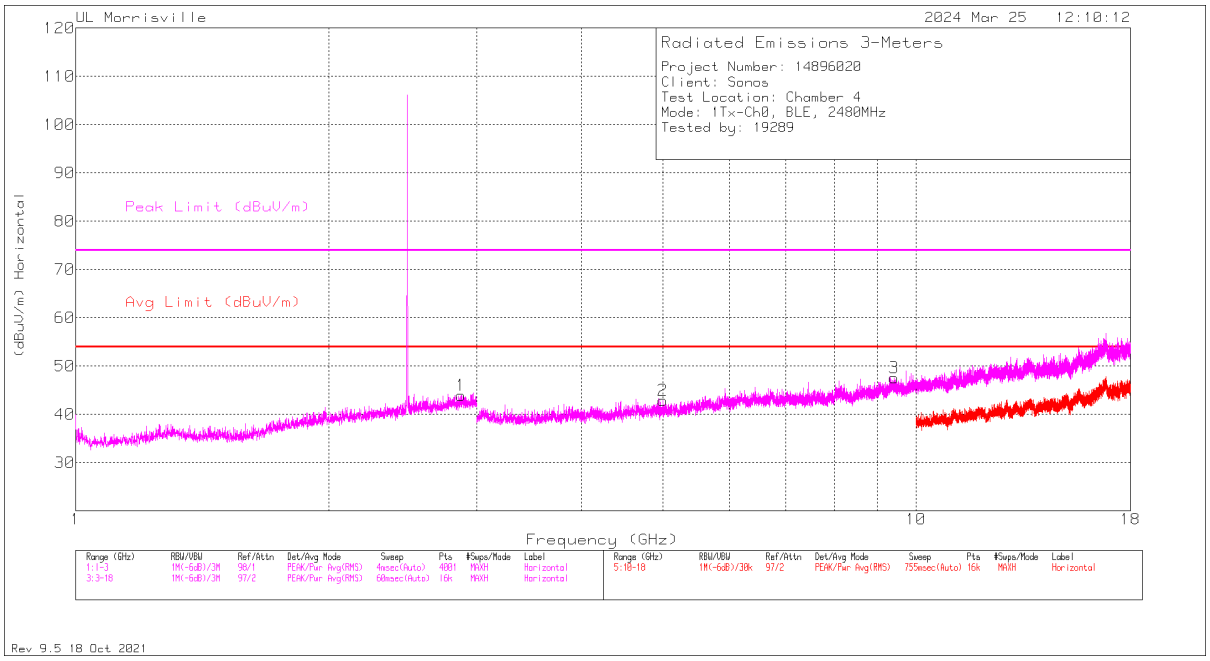
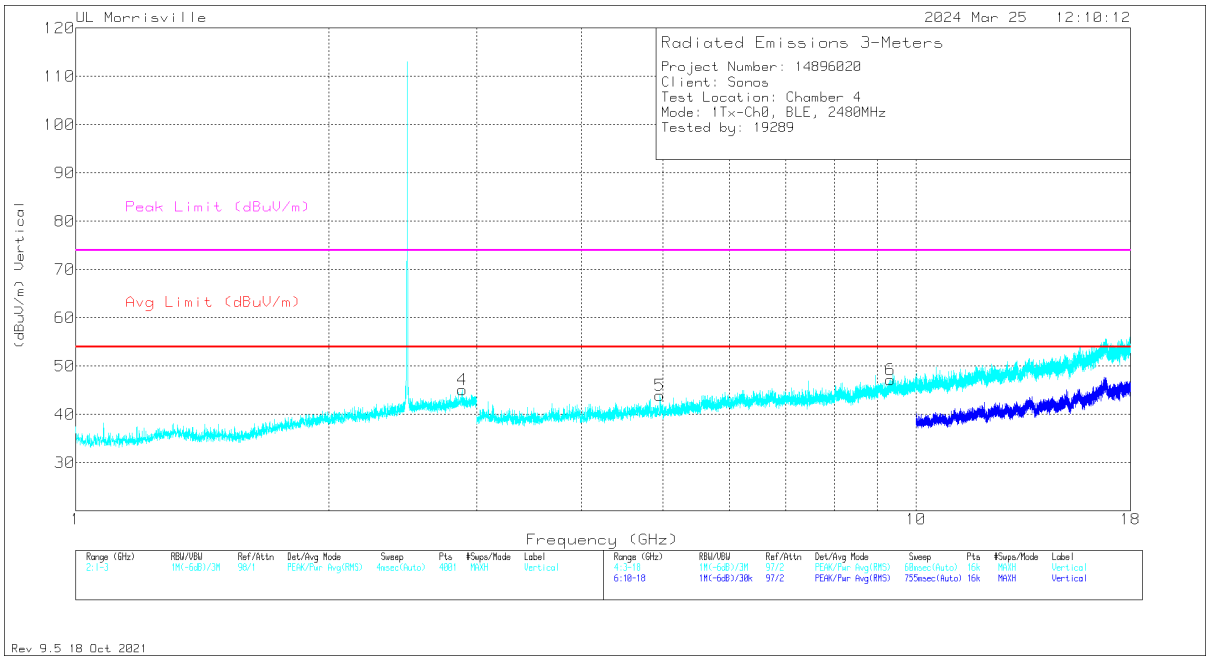
HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	89509 ACF (dB/m)	Gain/Loss (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	* ** 2.877	23.54	Pk	32.4	-12	0	43.94	54	-10.06	74	-30.06	0-360	100	H
4	* ** 2.8865	24.69	Pk	32.5	-12.1	0	45.09	54	-8.91	74	-28.91	0-360	200	V
2	* ** 4.99406	40.45	Pk	34.1	-31.6	0	42.95	54	-11.05	74	-31.05	0-360	100	H
3	* ** 9.42188	36.73	Pk	36.6	-25.7	0	47.63	54	-6.37	74	-26.37	0-360	100	H
5	* ** 4.95938	41.4	Pk	33.9	-31.4	0	43.9	54	-10.1	74	-30.1	0-360	200	V
6	* ** 9.33	35.6	Pk	36.5	-24.9	0	47.2	54	-6.8	74	-26.8	0-360	200	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk - Peak detector

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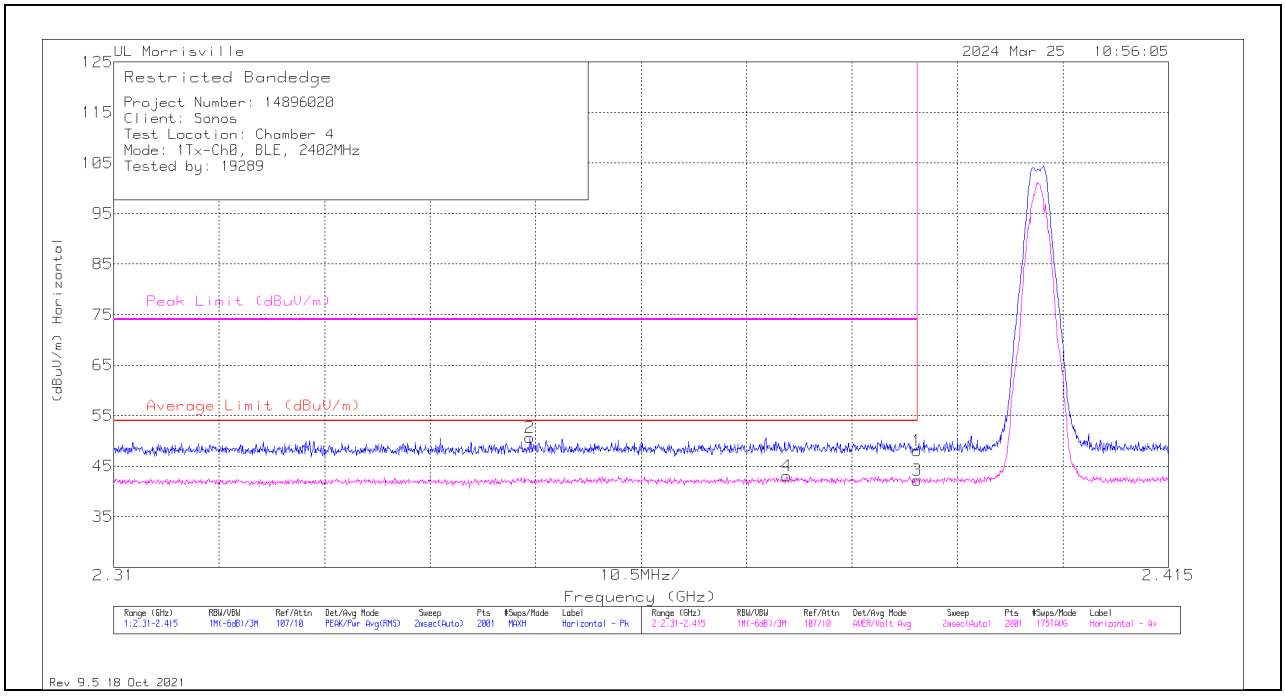
10.2.2. BLE (2Mbps)

BANDEDGE (LOW CHANNEL)

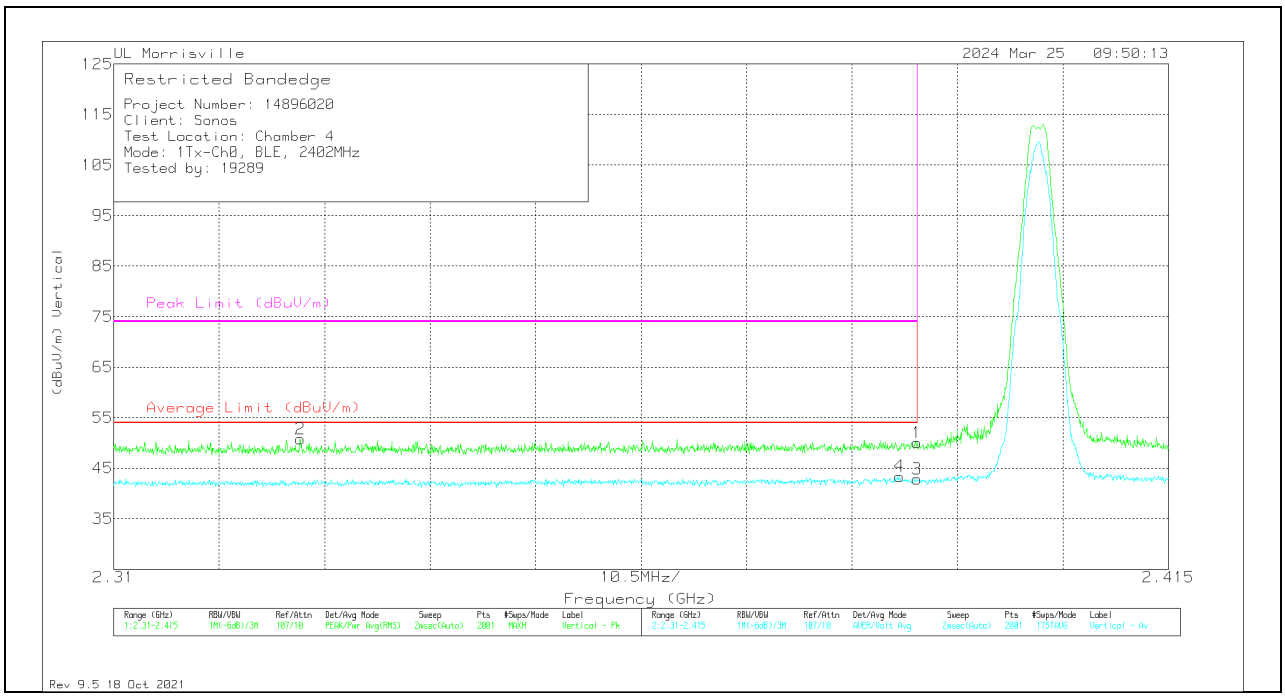
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	89509 ACF (dB/m)	Gain/Loss (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	* ** 2.38996	29.23	Pk	32	-13.2	0	48.03	-	-	74	-25.97	106	102	H
2	* ** 2.35142	31.89	Pk	31.8	-13	0	50.69	-	-	74	-23.31	106	102	H
3	* ** 2.38996	18.51	ADV	32	-13.2	4.87	42.18	54	-11.82	-	-	106	102	H
4	* ** 2.37699	19.36	ADV	32	-13.2	4.87	43.03	54	-10.97	-	-	106	102	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk - Peak detector
ADV - Linear Voltage Average

VERTICAL RESULT

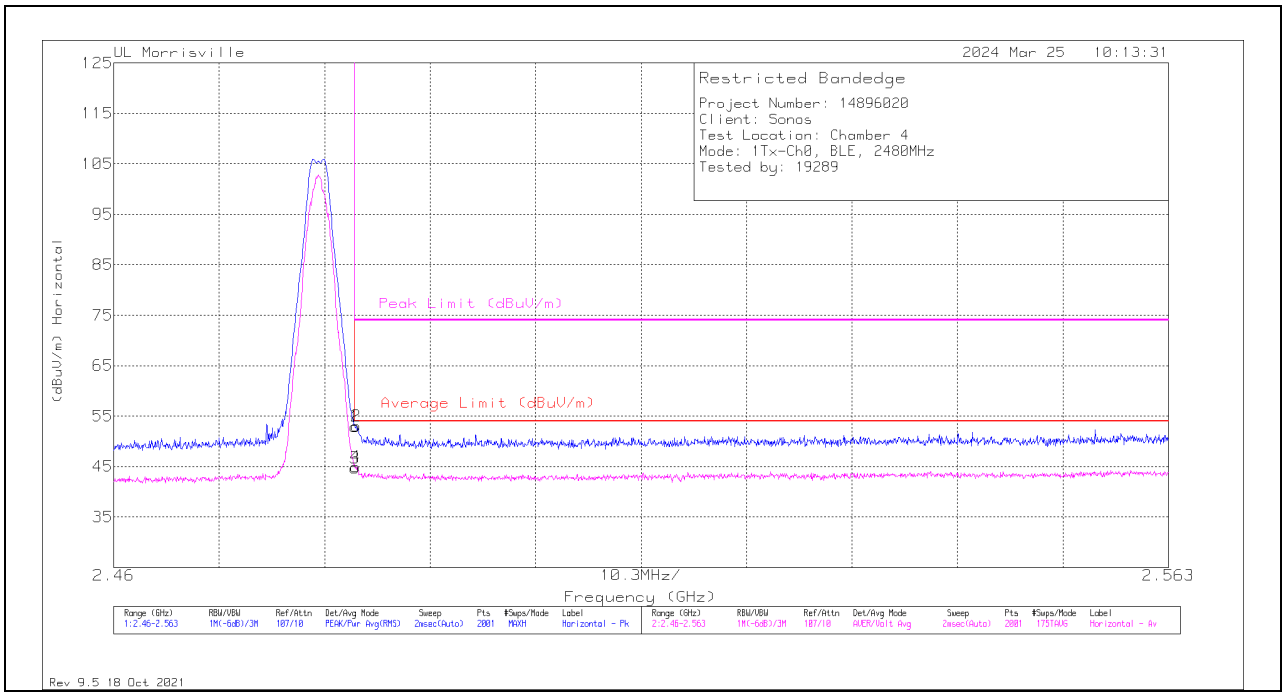


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	89509 ACF (dB/m)	Gain/Loss (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.38996	31.25	Pk	32	-13.2	0	50.05	-	-	74	-23.95	51	123	V
2	* ** 2.32859	32.08	Pk	31.9	-13.2	0	50.78	-	-	74	-23.22	51	123	V
3	* ** 2.38996	19.17	ADV	32	-13.2	4.87	42.84	54	-11.16	-	-	51	123	V
4	* ** 2.38823	19.72	ADV	32	-13.2	4.87	43.39	54	-10.61	-	-	51	123	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk - Peak detector
ADV - Linear Voltage Average

BANDEDGE (HIGH CHANNEL)

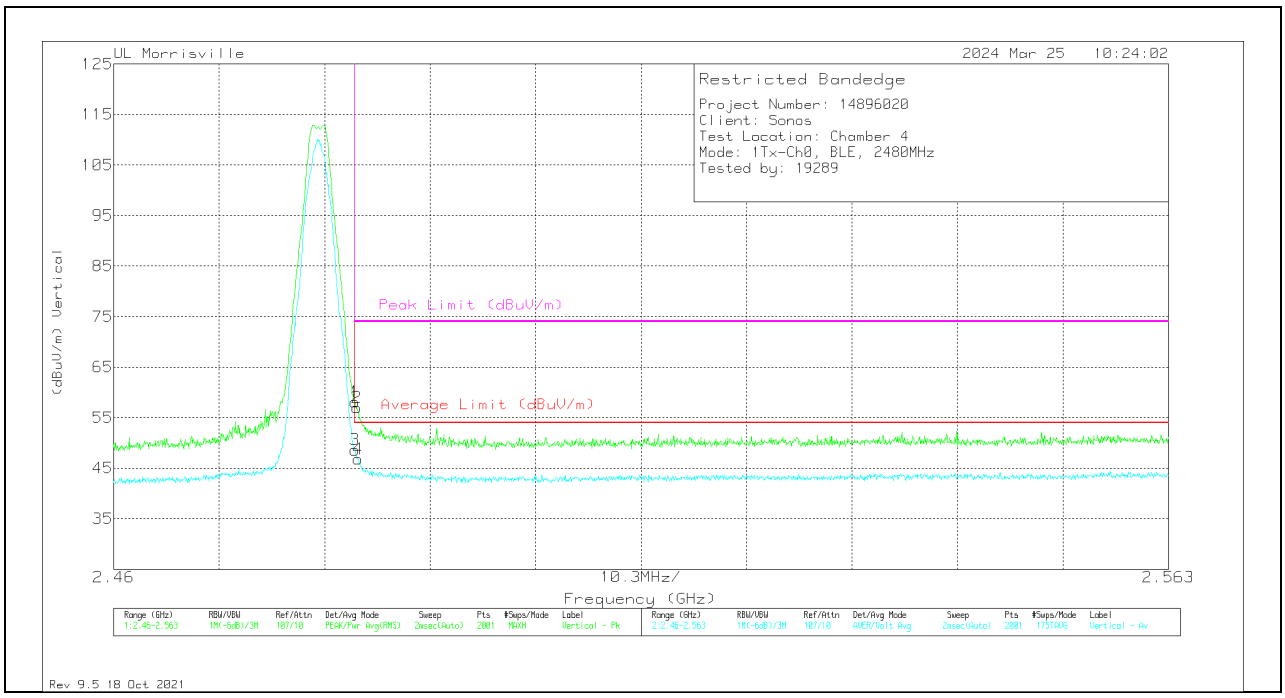
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	89509 ACF (dB/m)	Gain/Loss (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	* ** 2.48354	33.47	Pk	32.3	-12.9	0	52.87	-	-	74	-21.13	102	108	H
2	* ** 2.48369	33.59	Pk	32.3	-12.9	0	52.99	-	-	74	-21.01	102	108	H
3	* ** 2.48354	20.45	ADV	32.3	-12.9	4.87	44.72	54	-9.28	-	-	102	108	H
4	* ** 2.48364	20.67	ADV	32.3	-12.9	4.87	44.94	54	-9.06	-	-	102	108	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk - Peak detector
ADV - Linear Voltage Average

VERTICAL RESULT

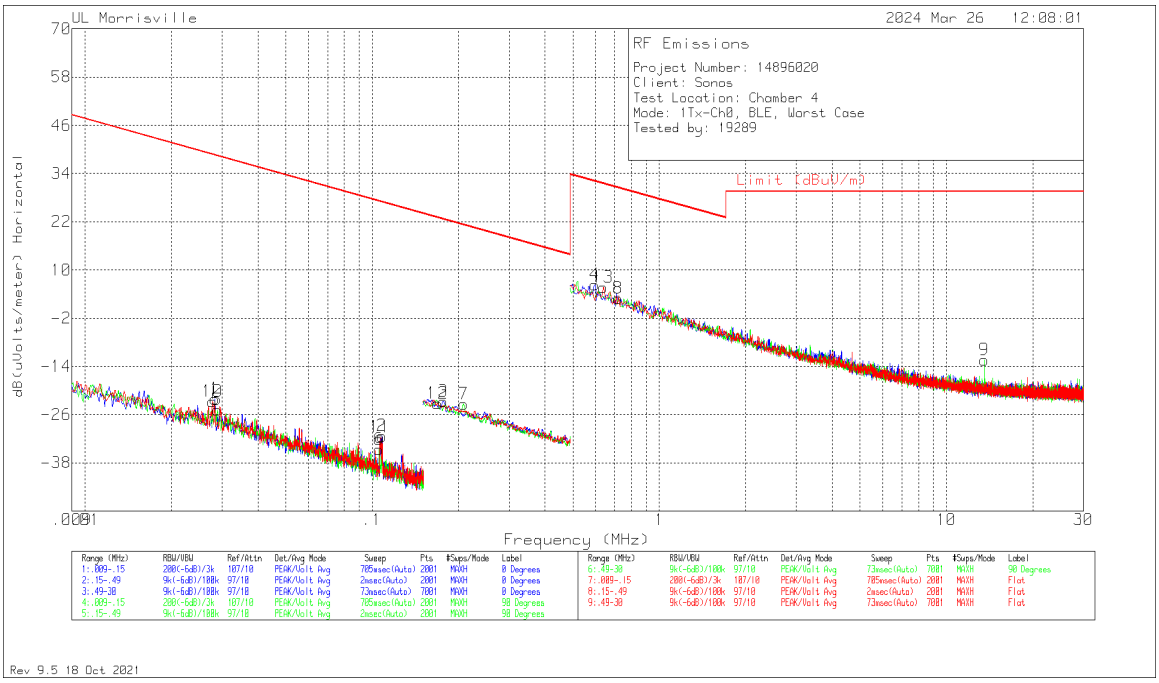


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	89509 ACF (dB/m)	Gain/Loss (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.48354	38.69	Pk	32.3	-12.9	0	58.09	-	-	74	-15.91	48	111	V
2	* ** 2.48374	37.55	Pk	32.3	-12.9	0	56.95	-	-	74	-17.05	48	111	V
3	* ** 2.48354	24.34	ADV	32.3	-12.9	4.87	48.61	54	-5.39	-	-	48	111	V
4	* ** 2.48384	22.59	ADV	32.3	-12.9	4.87	46.86	54	-7.14	-	-	48	111	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk - Peak detector
ADV - Linear Voltage Average

10.3. WORST CASE SPURIOUS BELOW 30MHZ

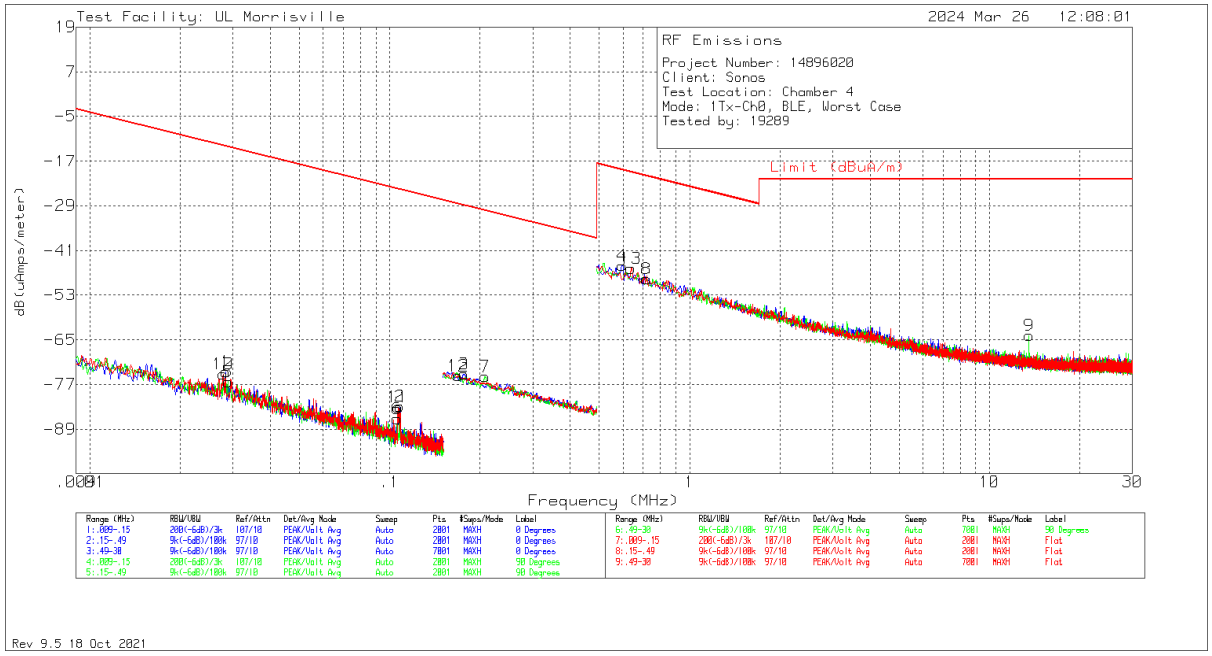
Note: All measurements were made at a test distance of 3 m. The measured data was extrapolated from the test distance (3m) to the specification distance (300 m from 9-490 kHz and 30 m from 490 kHz – 30 MHz) to clearly show the relative levels of fundamental and spurious emissions and demonstrate compliance with the requirement that the level of any spurious emissions be below the level of the intentionally transmitted signal. The extrapolation factor for the limits were 40*Log (test distance / specification distance).



ANTENNA- THREE ORIENTATIONS (E-FIELD)

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	135144 (dBuV/m)	Gain/Loss (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uVolts/meter)	QP/AV Limit (dBuV/m)	PK Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Loop Angle
10	.02782	43.72	Pk	13.6	0	-80	-22.68	38.72	58.72	-61.4	0-360	Flat
1	.02838	44.27	Pk	13.6	0	-80	-22.13	38.54	58.54	-60.67	0-360	0 degs
5	.02888	41.74	Pk	13.5	0	-80	-24.76	38.39	58.39	-63.15	0-360	90 degs
6	.10584	34.23	Pk	11.1	0	-80	-34.67	27.11	-	-61.78	0-360	90 degs
11	.10655	37.33	Pk	11.1	0	-80	-31.57	27.05	-	-58.62	0-360	Flat
2	.10797	37.54	Pk	11.1	0	-80	-31.36	26.94	-	-58.3	0-360	0 degs
12	.16896	45.69	Pk	11.1	0	-80	-23.21	23.05	43.05	-46.26	0-360	Flat
3	.17695	46.17	Pk	11.1	0	-80	-22.73	22.65	42.65	-45.38	0-360	0 degs
7	.20806	45.37	Pk	11.1	.1	-80	-23.43	21.24	41.24	-44.67	0-360	90 degs
4	.5954	35.07	Pk	11.2	.1	-40	6.37	32.11	-	-25.74	0-360	0 degs
13	.63756	34.41	Pk	11.2	.1	-40	5.71	31.51	-	-25.8	0-360	Flat
8	.71766	31.55	Pk	11.2	.1	-40	2.85	30.49	-	-27.64	0-360	90 degs
9	13.5596	16.55	Pk	10.7	.4	-40	-12.35	29.54	-	-41.89	0-360	90 degs

Pk - Peak detector

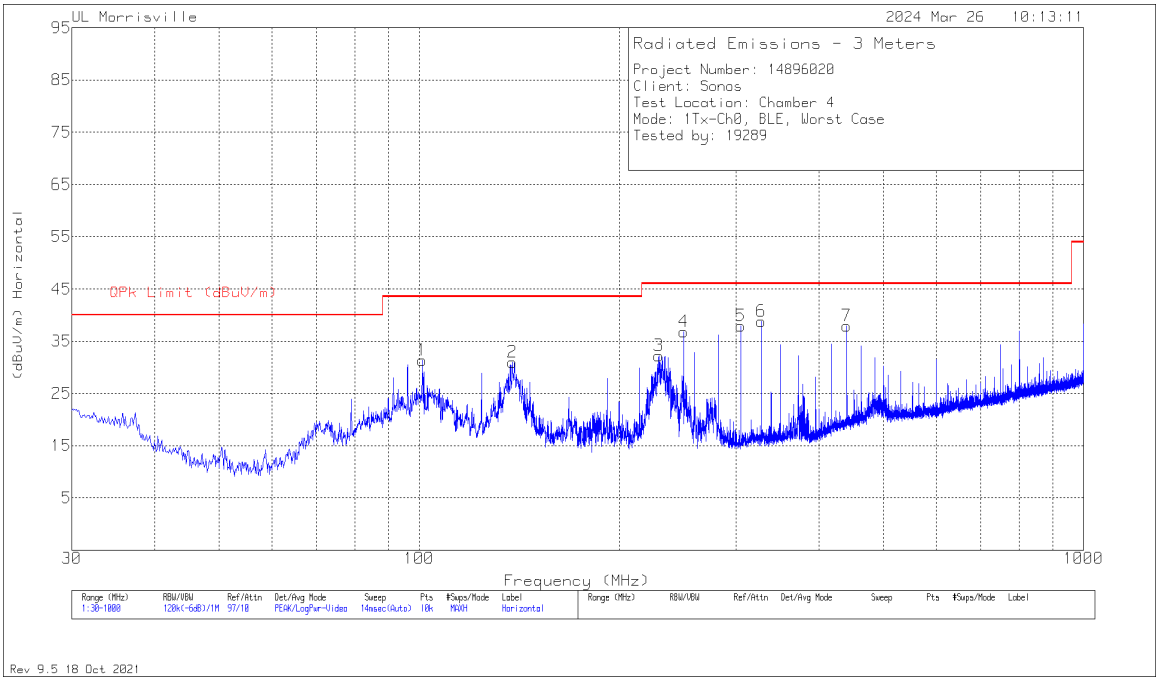


ANTENNA- THREE ORIENTATIONS (H-FIELD)

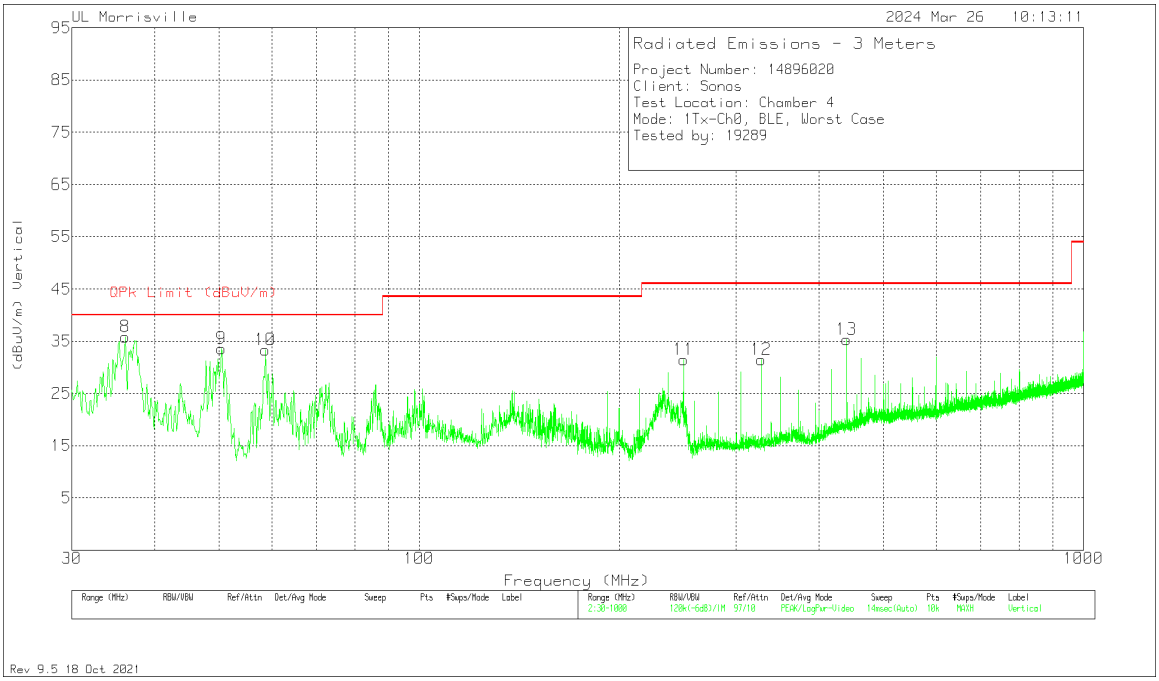
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	135144 (dBuV/m)	Gain/Loss (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uAmps/meter)	QP/AV Limit (dBuA/m)	PK Limit (dBuA/m)	Margin (dB)	Azimuth (Degs)	Loop Angle
10	.02782	43.72	Pk	-37.9	0	-80	-74.18	-12.78	7.22	-61.4	0-360	Flat
1	.02838	44.27	Pk	-37.9	0	-80	-73.63	-12.96	7.04	-60.67	0-360	0 degs
5	.02888	41.74	Pk	-38	0	-80	-76.26	-13.11	6.89	-63.15	0-360	90 degs
6	.10584	34.23	Pk	-40.4	0	-80	-86.17	-24.39	-	-61.78	0-360	90 degs
11	.10655	37.33	Pk	-40.4	0	-80	-83.07	-24.45	-	-58.62	0-360	Flat
2	.10797	37.54	Pk	-40.4	0	-80	-82.86	-24.56	-	-58.3	0-360	0 degs
12	.16896	45.69	Pk	-40.4	0	-80	-74.71	-28.45	-8.45	-46.26	0-360	Flat
3	.17695	46.17	Pk	-40.4	0	-80	-74.23	-28.85	-8.85	-45.38	0-360	0 degs
7	.20806	45.37	Pk	-40.4	.1	-80	-74.93	-30.26	-10.26	-44.67	0-360	90 degs
4	.5954	35.07	Pk	-40.3	.1	-40	-45.13	-19.39	-	-25.74	0-360	0 degs
13	.63756	34.41	Pk	-40.3	.1	-40	-45.79	-19.99	-	-25.8	0-360	Flat
8	.71766	31.55	Pk	-40.3	.1	-40	-48.65	-21.01	-	-27.64	0-360	90 degs
9	13.5596	16.55	Pk	-40.8	.4	-40	-63.85	-21.96	-	-41.89	0-360	90 degs

Pk - Peak detector

10.4. WORST CASE SPURIOUS 30-1000MHz



HORIZONTAL

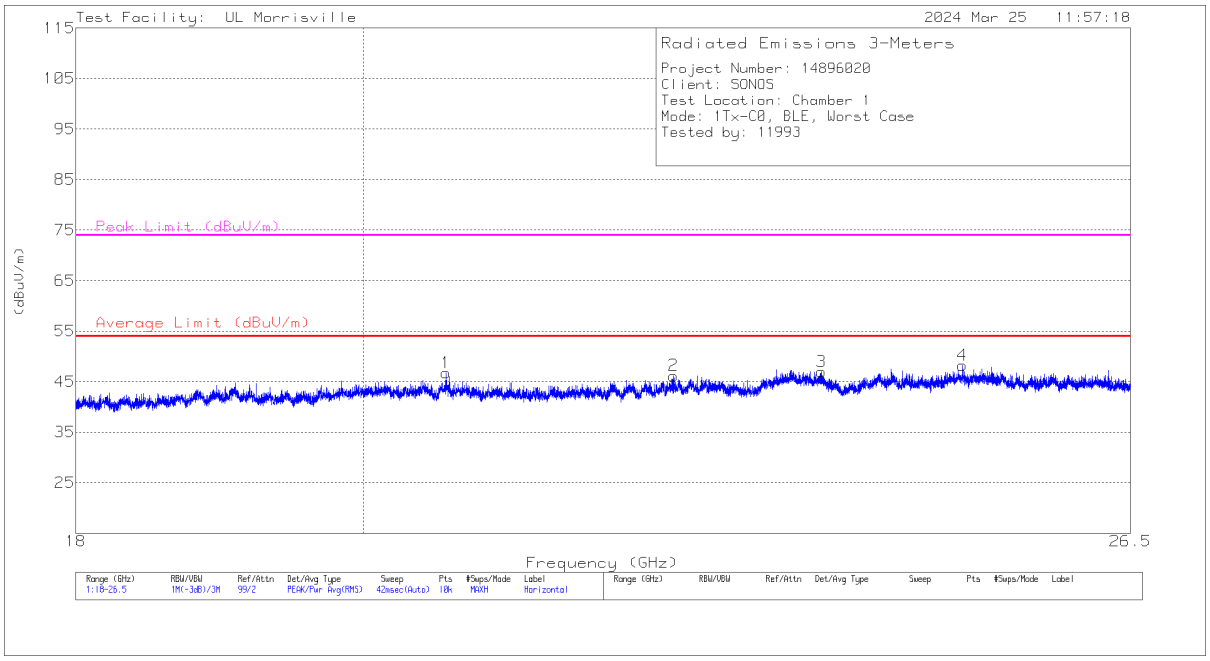


VERTICAL

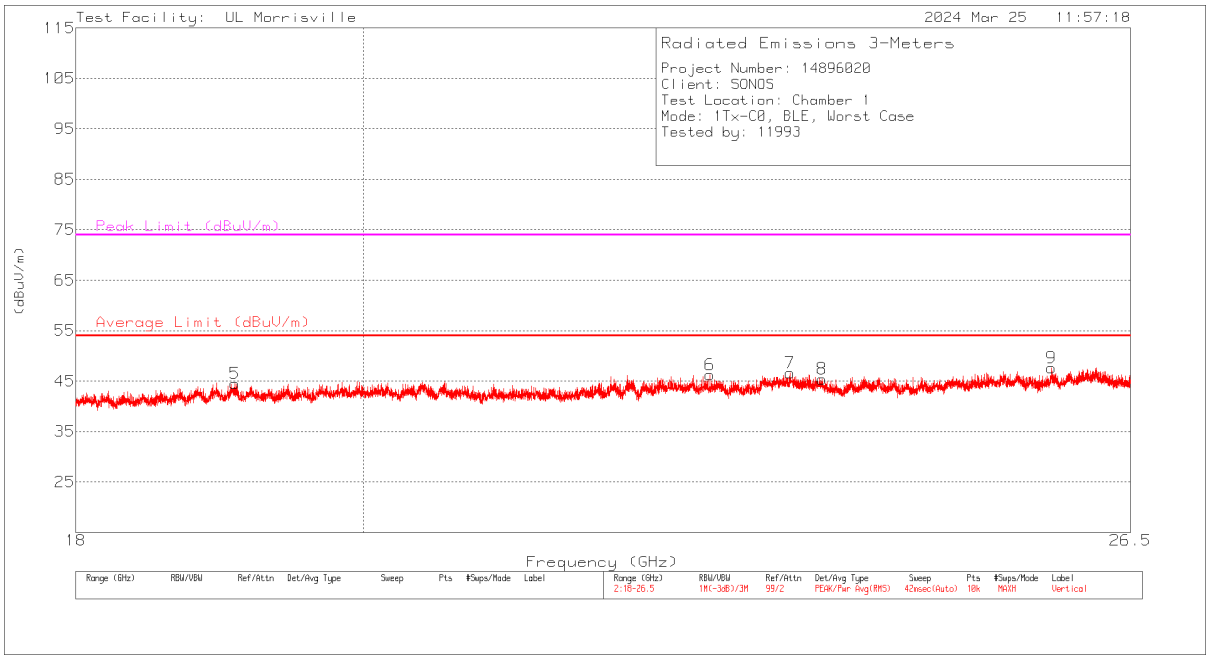
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	90628 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
8	36.151	43.72	Qp	22.8	-32.1	34.42	40	-5.58	1	104	V
9	50.37	51.41	Pk	14.1	-31.9	33.61	40	-6.39	0-360	100	V
10	58.712	51.44	Pk	13.7	-31.8	33.34	40	-6.66	0-360	100	V
1	101.101	46.02	Pk	16.8	-31.5	31.32	43.52	-12.2	0-360	200	H
2	138.058	42.81	Pk	19.4	-31.2	31.01	43.52	-12.51	0-360	100	H
3	229.432	45.81	Pk	17.1	-30.7	32.21	46.02	-13.81	0-360	100	H
4	249.996	49.8	Pk	17.5	-30.5	36.8	46.02	-9.22	0-360	100	H
11	249.996	44.45	Pk	17.5	-30.5	31.45	46.02	-14.57	0-360	100	V
5	304.801	48.51	Pk	19.7	-30.3	37.91	46.02	-8.11	0-360	100	H
6	327.402	48.94	Pk	20.1	-30.2	38.84	46.02	-7.18	0-360	100	H
12	327.402	41.55	Pk	20.1	-30.2	31.45	46.02	-14.57	0-360	100	V
7	440.31	45.04	Pk	22.7	-29.8	37.94	46.02	-8.08	0-360	100	H
13	440.31	42.39	Pk	22.7	-29.8	35.29	46.02	-10.73	0-360	100	V

Pk - Peak detector
Qp - Quasi Peak detector

10.5. WORST CASE SPURIOUS >18GHz



HORIZONTAL



VERTICAL

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	204704 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 20.62029	50.9	Pk	33.7	-37.8	46.8	54	-7.2	74	-27.2	0-360	200	H
2	* ** 22.41021	50.09	Pk	34.1	-38	46.19	54	-7.81	74	-27.81	0-360	150	H
3	* ** 23.66298	49.65	Pk	34.5	-37.1	47.05	54	-6.95	74	-26.95	0-360	101	H
5	* ** 19.08024	48.79	Pk	33.7	-38	44.49	54	-9.51	74	-29.51	0-360	250	V
6	* ** 22.71108	50.07	Pk	34.1	-37.9	46.27	54	-7.73	74	-27.73	0-360	299	V
8	* ** 23.66468	48.04	Pk	34.5	-37.1	45.44	54	-8.56	74	-28.56	0-360	150	V
7	23.38931	49.12	Pk	34.6	-37.1	46.62	-	-	-	-	0-360	299	V
4	24.91916	49.62	Pk	35.2	-36.6	48.22	-	-	-	-	0-360	101	H
9	25.74528	48.01	Pk	35.4	-35.8	47.61	-	-	-	-	0-360	101	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk - Peak detector

11. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)
RSS-Gen 8.8

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

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

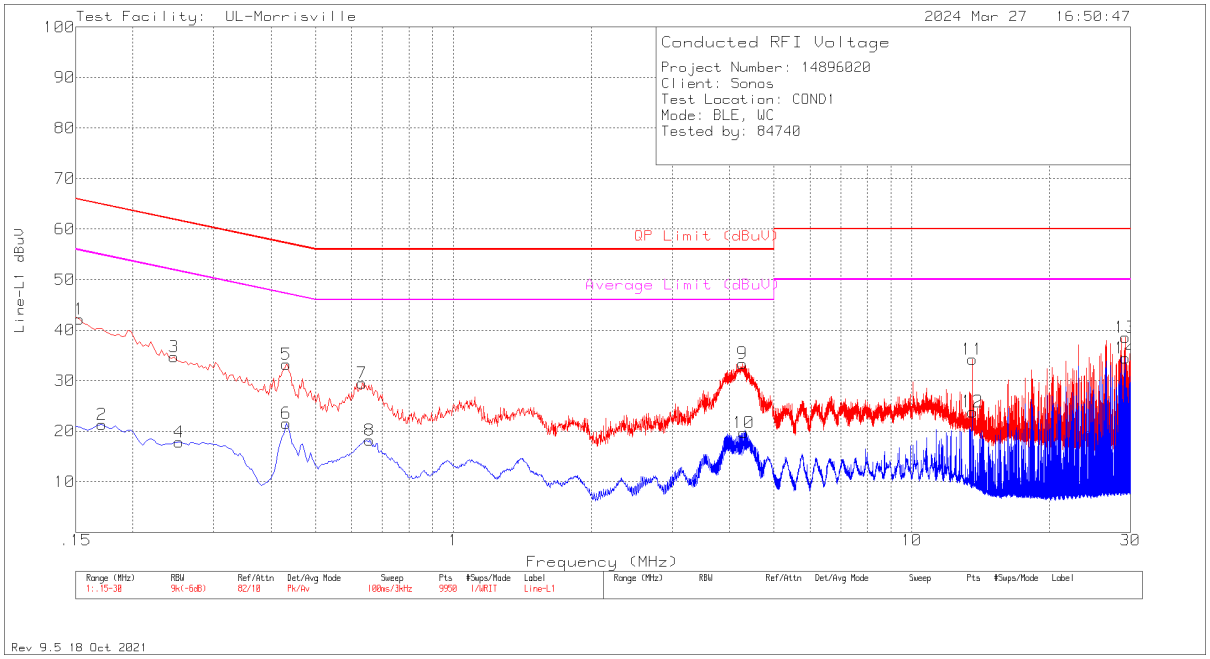
The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

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 lines.

11.1. AC POWER LINE

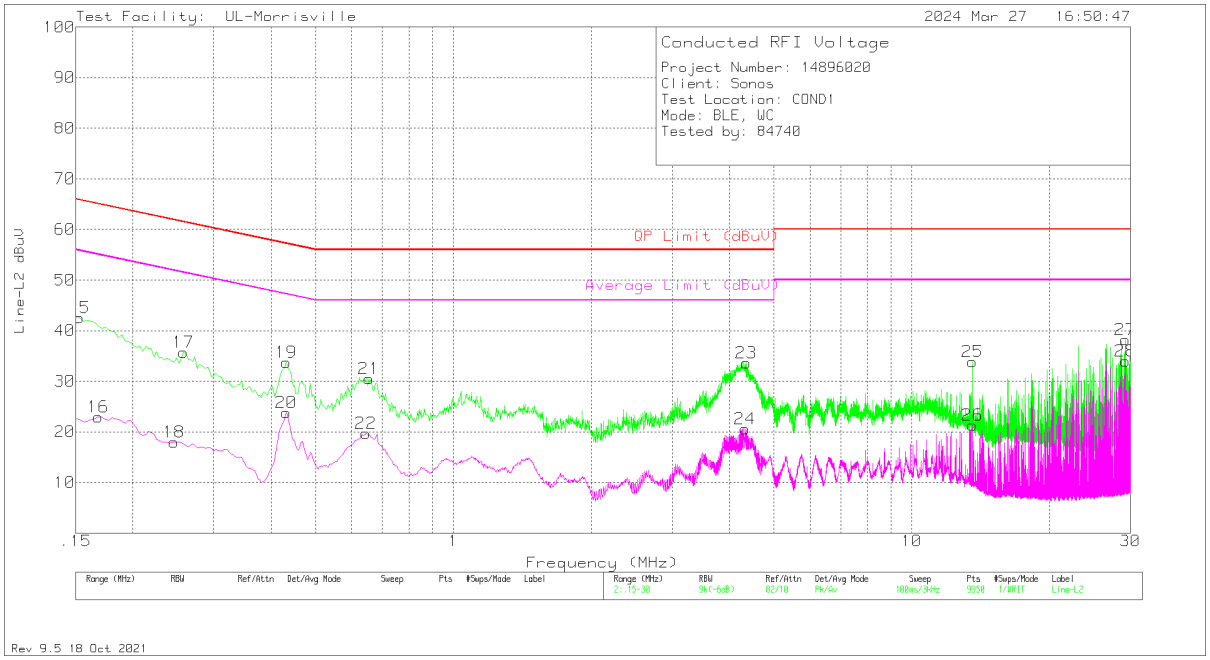
LINE 1 RESULTS



Range 1: Line-L1 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN VDF (dB)	Cbl/Limiter (dB)	Corrected Reading dBuV	QP Limit (dBuV)	Margin (dB)	Average Limit (dBuV)	Margin (dB)
1	.153	32.02	Pk	.3	9.8	42.12	65.84	-23.72	-	-
2	.171	11.27	Av	.3	9.8	21.37	-	-	54.91	-33.54
3	.246	24.69	Pk	.2	9.8	34.69	61.89	-27.2	-	-
4	.252	7.8	Av	.2	9.8	17.8	-	-	51.69	-33.89
5	.432	23.29	Pk	.1	9.8	33.19	57.21	-24.02	-	-
6	.432	11.64	Av	.1	9.8	21.54	-	-	47.21	-25.67
7	.633	19.61	Pk	.1	9.8	29.51	56	-26.49	-	-
8	.657	8.27	Av	.1	9.8	18.17	-	-	46	-27.83
9	4.269	23.42	Pk	.1	9.9	33.42	56	-22.58	-	-
10	4.299	9.74	Av	.1	9.9	19.74	-	-	46	-26.26
11	13.56	24.02	Pk	.2	10	34.22	60	-25.78	-	-
12	13.56	13.66	Av	.2	10	23.86	-	-	50	-26.14
13	29.235	28.07	Pk	.3	10.2	38.57	60	-21.43	-	-
14	29.238	23.96	Av	.3	10.2	34.46	-	-	50	-15.54

Pk - Peak detector
Av - Average detection

LINE 2 RESULTS



Range 2: Line-L2 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN VDF (dB)	Cbl/Limiter (dB)	Corrected Reading dBuV	QP Limit (dBuV)	Margin (dB)	Average Limit (dBuV)	Margin (dB)
15	.153	32.43	Pk	.3	9.8	42.53	65.84	-23.31	-	-
16	.168	12.88	Av	.3	9.8	22.98	-	-	55.06	-32.08
17	.258	25.77	Pk	.2	9.8	35.77	61.5	-25.73	-	-
18	.246	8	Av	.2	9.8	18	-	-	51.89	-33.89
19	.432	23.82	Pk	.1	9.8	33.72	57.21	-23.49	-	-
20	.432	13.89	Av	.1	9.8	23.79	-	-	47.21	-23.42
21	.654	20.6	Pk	.1	9.8	30.5	56	-25.5	-	-
22	.645	9.78	Av	.1	9.8	19.68	-	-	46	-26.32
23	4.35	23.62	Pk	.1	9.9	33.62	56	-22.38	-	-
24	4.326	10.61	Av	.1	9.9	20.61	-	-	46	-25.39
25	13.563	23.71	Pk	.2	10	33.91	60	-26.09	-	-
26	13.563	11.12	Av	.2	10	21.32	-	-	50	-28.68
27	29.238	27.68	Pk	.3	10.2	38.18	60	-21.82	-	-
28	29.235	23.53	Av	.3	10.2	34.03	-	-	50	-15.97

Pk - Peak detector
Av - Average detection

12. SETUP PHOTOS

Please refer to R14896020-EP1 for setup photos

END OF TEST REPORT