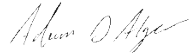


TR3874-BLE

Equipment Under Test:	Veda SL917
Requirement(s):	eCFR 47 Part 15.247 RSS-247
Test Date(s):	3/24/2025-4/14/2025, 6/25/2025-7/25/2025
Prepared for:	Ezurio Attn: Brian Petted W66 N220 Commerce Ct. Cedarburg, WI 53012

Report Issued by: Dylan Rosenfeldt, EMC Engineer	
Signature: 	Date: 08/06/2025
Report Reviewed by: Adam Alger, Sr. Manager, EMC Laboratory	
Signature: 	Date: 08/06/2025
Report Constructed by: Dylan Rosenfeldt, EMC Engineer	
Signature: 	Date: 08/06/2025

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Ezurio Test Services in Review

The Ezurio laboratory located at W66 N220 Commerce Court Cedarburg, Wisconsin, 53012 USA is recognized through the following organizations:



A2LA – American Association for Laboratory Accreditation

Accreditation based on ISO/IEC 17025:2017 with Electrical (EMC) Scope

A2LA Certificate Number: 1255.01

Scope of accreditation includes all test methods listed herein unless otherwise noted



Federal Communications Commission (FCC) – USA

Accredited Test Firm Registration Number: 953492

Recognition of two 3 meter Semi-Anechoic Chambers



Innovation, Science and Economic Development Canada

Accredited U.S. Identification Number: US0218

Recognition of two 3 meter Semi-Anechoic Chambers

Company: Ezurio	Page 3 of 37	Name: Veda SL917
Report: TR3874-BLE		Model: 453-00219, 453-00220
Job: C-3874		Serial: Engineering Sample

1 TEST REPORT SUMMARY

During **3/24/2025-4/14/2025, 6/25/2025-7/25/2025** the Equipment Under Test (EUT), **Veda SL917**, as provided by **Ezurio** was tested to the following requirements for the purpose of a Class 2 permissive change to add antennas:

FCC 15.247 | RSS-247 – DTS Bluetooth Low Energy

Requirements	Description	Method	Compliant
15.247(d) 15.209 RSS-247 Clause 5.5 RSS-GEN Clause 8.10	Spurious Radiated Emissions in Restricted Bands 30-25000 MHz	ANSI C63.10	Yes
15.247(a)(2) RSS-247 Clause 5.2 (a)	6dB and 99% Occupied Bandwidth	ANSI C63.10	Yes
15.247(b)(3) RSS-247 Clause 5.4 (d)	RF Output Power	ANSI C63.10	Yes
15.247(d) RSS-247 Clause 5.5 RSS-GEN A1 Clause 8.9	Out-of-band Emissions	ANSI C63.10	Yes
15.247(e) RSS-247 Clause 5.2 (b)	Power Spectral Density	ANSI C63.10	Yes
2.1055(d) RSS-GEN 6.11	Frequency Stability	ANSI C63.10	Reported
15.207 RSS-GEN 8.8	AC Conducted Emissions	ANSI C63.10	Yes

Notice:

The results relate only to the item tested as configured and described in this report. Any additional configurations, modes of operation, or modifications made to the equipment under test after the specified test date(s) are at the decision of the client and may not apply to the data seen in this test report.

The decision rule for Pass / Fail assessment to the specification or standard listed in this test report has been agreed upon by the client and laboratory to be as follows:

Measurement Type	Rule
Emissions – Amplitude	1 dB below specified limit
Emissions – Frequency	1% less than the specification
Immunity	Tested at specified level

Company: Ezurio	Page 4 of 37	Name: Veda SL917
Report: TR3874-BLE		Model: 453-00219, 453-00220
Job: C-3874		Serial: Engineering Sample

2 CLIENT INFORMATION

Company Name	Ezurio
Contact Person	Brian Petted
Address	W66 N220 Commerce Ct. Cedarburg, WI 53012

2.1 Equipment Under Test (EUT) Information

The following information has been supplied by the client

Product Name	Veda SL917
Model Number	453-00219, 453-00220
Serial Number	Engineering Sample
FCC ID	SQG-SL917
IC ID	3147A-SL917

2.2 Product Description

The Veda SL917 is based upon Silicon Labs SiWx917 chipset. Feature-set includes 802.11 b/g/n/ax Wi-Fi 6 and Bluetooth Low Energy v5.4.

2.3 Modifications Incorporated for Compliance

None noted at time of test

2.4 Deviations and Exclusions from Test Specifications

None noted at time of test

2.5 EUT Information

Power Supply – OUTPUT: 5VDC 0.5A (supplied by laptop USB port)

Programming – STM32CubeIDE Version 1.17.0, TeraTerm Version 4.106

2.6 Ancillary Equipment

Equipment used for EUT programming (not part of the EUT)

- STM32 NUCLEO-F411RE development board
- Nucleo 64 click shield board
- HP Elitebook 840G1

2.7 Antenna Information

Manufacturer	Model	Part Number	Dimension	Type	Peak Gain (dBi) 2400-2480 MHz
Ezurio	FlexNotch	001-0023	32mm X 21.1mm	Notch	2.0
Ezurio	i-FlexPIFA Mini	EFG2401A3S- 10MH4L	35.9mm X 11mm X 2.9mm	PIFA	2.0
Ezurio	FlexPIFA	001-0022	40.1mm X 11.0mm X 2.5mm	PIFA	2.0
Ezurio	NanoBlue	EBL2400A1- 10MH4L	44.5mm X 12.7mm X 0.8mm	Dipole	2.0
Ezurio	i-FlexPIFA	EFG2400A3S- 10MH4L	40.9mm X 11mm X 2.9mm	PIFA	3.1
Ezurio	mFlexPIFA	EFA2400A3S- 10MH4L	25.4mm x 23.4mm x 2.5mm	PIFA	2.0

2.8 Test Channels

Channel	Frequency (MHz)	Power Setting	Data Rates
0	2402	13	1M
19	2440	14	
39	2480	14	
0	2402	13	2M
19	2440	14	
38	2478	14	
0	2402	7	500k, 125k
19	2440	8	
39	2480	8	

2.9 Power Table and Reduced Video Bandwidth for Average Measurements

Data Rate	Minimum Average VBW (Hz)
125 kbps	10
500 kbps	10
1 Mbps	10
2 Mbps	10

3 REFERENCES

Publication	Edition	Date	AMD 1	AMD 2
FCC eCFR 47 Part 15	-	2025	-	-
ANSI C63.10	-	2020	2024	-
RSS-247	3	2023	-	-
RSS-GEN	5	2018	2019	2021

4 UNCERTAINTY SUMMARY

Using the guidance of the following publications the calculated measurement uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level, using a coverage factor of $k = 2$.

References
CISPR 16-4-1
CISPR 16-4-2
CISPR 32
ANSI C63.23
A2LA P103
A2LA P103c
ETSI TR 100-028

Measurement Type	Configuration	Uncertainty $\pm$
Radiated Emissions	Biconical Antenna	5.0 dB
Radiated Emissions	Log Periodic Antenna	5.3 dB
Radiated Emissions	Horn Antenna	4.7 dB
AC Line Conducted Emissions	Artificial Mains Network	3.4 dB
Telecom Conducted Emissions	Asymmetric Artificial Network	4.9 dB
Disturbance Power Emissions	Absorbing Clamp	4.1 dB
Radiated Immunity	3 Volts/meter	2.2 dB
Conducted Immunity	CDN/EM/BCI	2.4/3.5/3.4 dB
EFT Burst/Surge	Peak pulse voltage	164 volts
ESD Immunity	15 kV level	1377 Volts

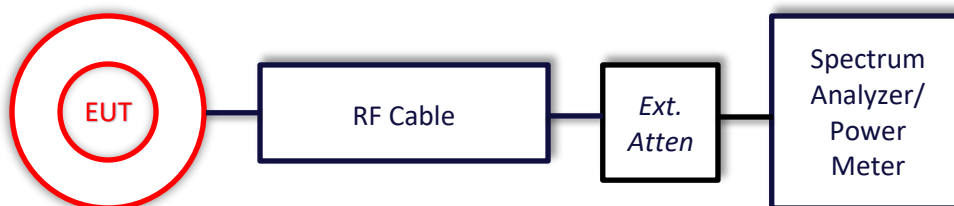
Parameter	ETSI U.C. $\pm$	U.C. $\pm$
Radio Frequency, from F0	1×10^{-7}	0.55×10^{-7}
Occupied Channel Bandwidth	5 %	2 %
RF conducted Power (Power Meter)	1.5 dB	1.2 dB
RF conducted emissions (Spectrum Analyzer)	3.0 dB	1.7 dB
All emissions, radiated	6.0 dB	5.3 dB
Temperature	1° C	0.65° C
Humidity	5 %	2.9 %
Supply voltages	3 %	1 %

5 TEST DATA

5.1 Antenna Port Conducted Emissions

Description of Measurement	The direct measurement of emissions at the antenna port of the EUT is achieved by use of a RF connection to a spectrum analyzer or power meter. The cable and attenuator factors are loaded into the analyzer or power meter allowing for direct measurement readings without the need for further corrections.
Example Calculations	Measurement (dBm) + Cable factor (dB) + External Attenuator (dB) = Corrected Reading (dBm) Margin (dB) = Limit (dBm) – Corrected Reading (dBm)

Block Diagram



5.1.1 6dB and 99% Occupied Bandwidth

Operator	Dylan Rosenfeldt	QA	Anthony Smith
Temperature	21.2°C	R.H. %	25.0%
Test Date	3/25/2025	Location	RF conducted bench
Requirement	15.247 (a)(2) RSS-247 Clause 5.2 (a)	Method	ANSI C63.10 6.9.3, 11.8

Limits: The minimum 6 dB bandwidth shall be at least 500 kHz

Test Parameters

Frequency	2400-2483.5 MHz	Setup	Antenna Port
RBW	99% OBW - 27 kHz 6dB DTS - 100 kHz	VBW	99% OBW - 270 kHz 6dB DTS - 300 kHz
Detector(s)	Peak	Settings	Max Hold

Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960172	Cable	A.H. Systems, Inc.	SAC-26G-1	387	1/28/2025	1/28/2026	Active Verification
EE 960087	Analyzer - Spectrum	Agilent	N9010A	MY53400296	4/10/2024	4/10/2025	Active Calibration

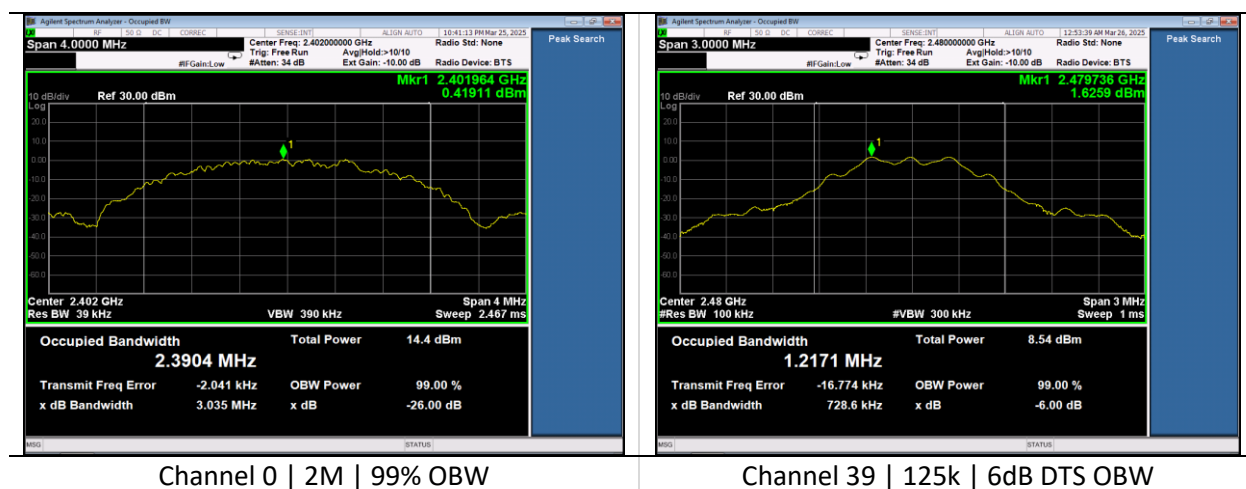
EUT Parameters

Input Power	5VDC	Mode	BLE Tx
Frequency	2400-2483.5 MHz	Channel	See 2.8

Table

Data Rate	Channel	99% BW (kHz)	6dB DTS BW (kHz)
1M	0	1212	717
	19	1202	718
	39	1202	719
2M	0	2390	1326
	19	2384	1330
	39	2386	1331
125k	0	1207	727
	19	1195	732
	39	1197	729
500k	0	1201	721
	19	1195	723
	39	1198	722

Plots



5.1.2 RF Output Power

Operator	Dylan Rosenfeldt	QA	Anthony Smith
Temperature	22.9°C	R.H. %	51.10%
Test Date	6/25/2025	Location	RF Conducted Bench
Requirement	15.247 (b)(3) RSS-247 Clause 5.4 (d)	Method	ANSI C63.10 11.9.1.2 PKPM1

Limit: The maximum conducted peak output power of the intentional radiator shall not exceed 1 Watt.

Test Parameters

Frequency	2400-2483.5 MHz	Setup	Antenna Port
RBW	20 MHz	Sampling Rate	16 MS/s

Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
EE 960090	Meter - RF Power	Anritsu	ML2495A	1335006	4/3/2025	4/3/2026	Active Calibration
EE 960091	Sensor - RF Power	Anritsu	MA2491A	1249277	4/3/2025	4/3/2026	Active Calibration

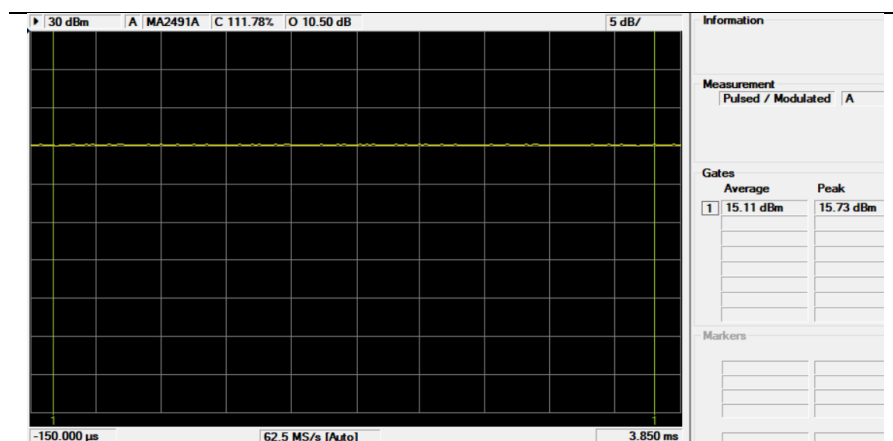
EUT Parameters

Input Power	5VDC	Mode	BLE Tx
Frequency	2400-2483.5 MHz	Channel	See 2.8

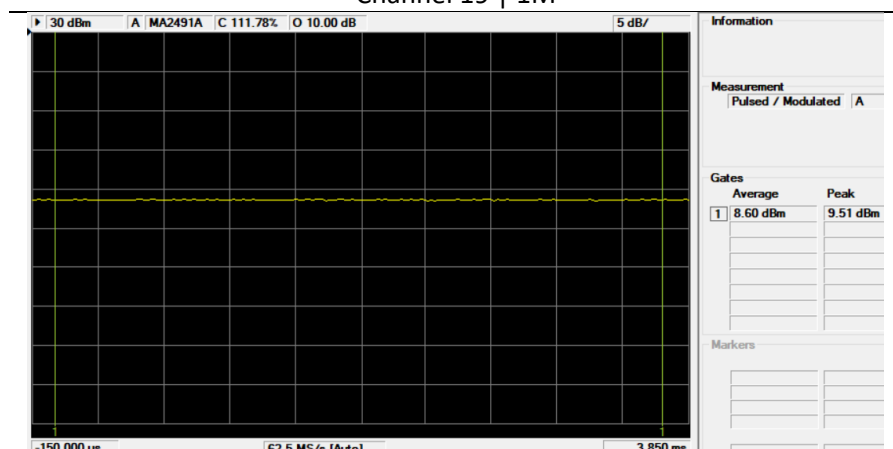
Table

Rate	Channel	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)	Power Setting
1 Mbps	0	14.2	30	15.8	13
	19	15.7	30	14.3	14
	39	15.2	30	14.8	14
2 Mbps	0	14.4	30	15.6	13
	19	15.3	30	14.7	14
	38	15.2	30	14.8	14
125 kbps	0	9.5	30	20.5	7
	19	10.3	30	19.7	8
	39	9.5	30	20.5	8
500 kbps	0	9.7	30	20.3	7
	19	10.5	30	19.5	8
	39	9.8	30	20.2	8

Plots



Channel 19 | 1M



Channel 0 | 125k

5.1.3 Power Spectral Density

Operator	Dylan Rosenfeldt	QA	Anthony Smith
Temperature	22.9°C	R.H. %	51.10%
Test Date	6/25/2025	Location	RF Conducted Bench
Requirement	15.247 (e) RSS-247 Clause 5.2 (b)	Method	ANSI C63.10 11.10.2 PKPSD

Limits: Power spectral density shall not be greater than 8 dBm in any 3 kHz band.

Test Parameters

Frequency	2400-2483.5 MHz	Detector(s)	Peak
RBW	3 kHz	VBW	9.1 kHz

Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960172	Cable	A.H. Systems, Inc.	SAC-26G-1	387	1/28/2025	1/28/2026	Active Verification
EE 960087	Analyzer - Spectrum	Agilent	N9010A	MY53400296	6/1/2025	6/1/2026	Active Calibration

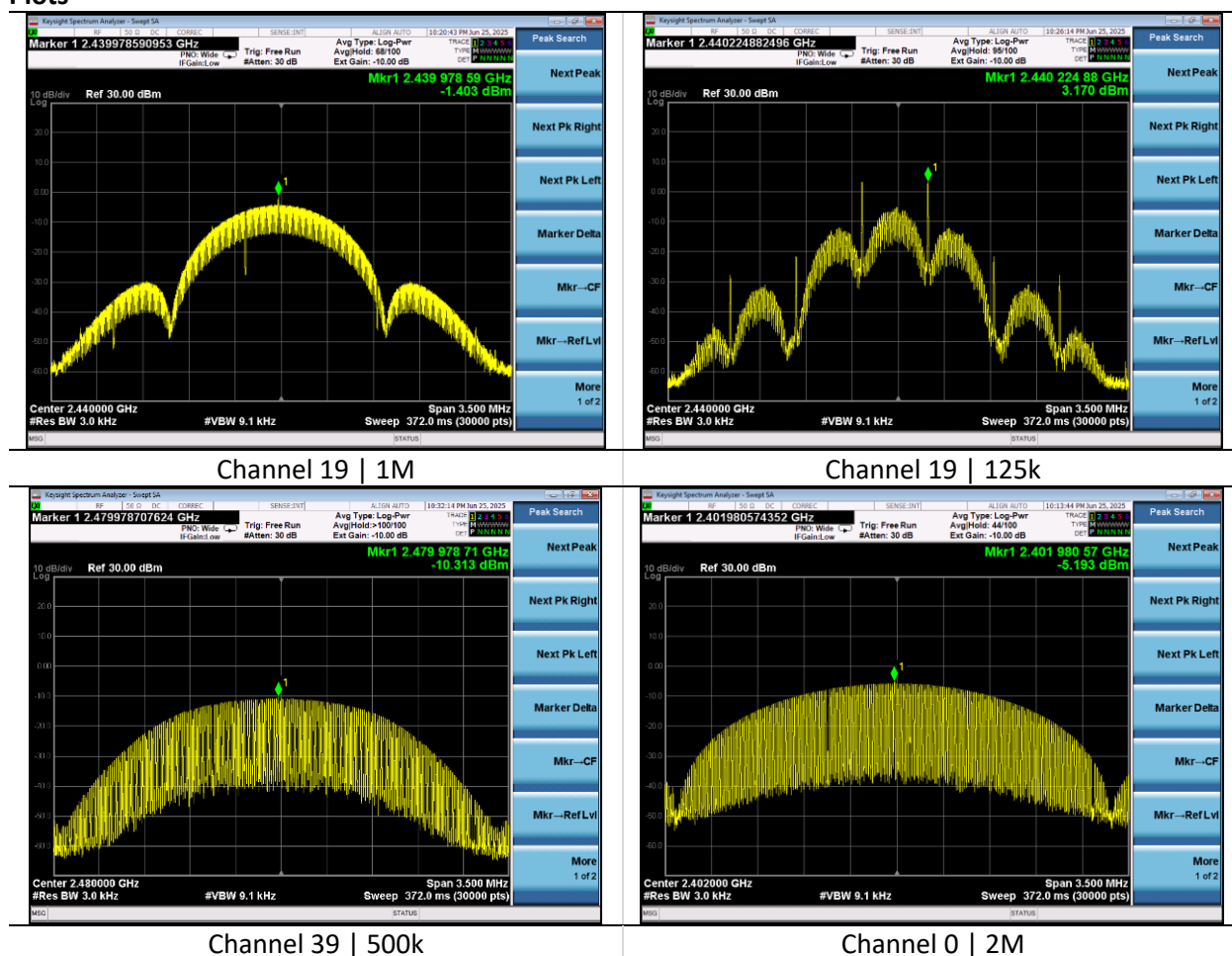
EUT Parameters

Input Power	5VDC	Mode	BLE Tx
Frequency	2400-2483.5 MHz	Channel	See 2.8

Table

Rate	Channel	Peak PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Margin (dB)	Power Setting
1 Mbps	0	-3.1	8	11.1	13
	19	-1.4	8	9.4	14
	39	-2.2	8	10.2	14
2 Mbps	0	-5.2	8	13.2	13
	19	-3.9	8	11.9	14
	39	-4.9	8	12.9	14
500 kbps	0	-10.1	8	18.1	7
	19	-9.5	8	17.5	8
	39	-10.3	8	18.3	8
125 kbps	0	2.6	8	5.4	7
	19	3.2	8	4.8	8
	39	2.2	8	5.8	8

Plots



5.1.4 Emissions in Non-Restricted Frequency Bands

Operator	Dylan Rosenfeldt	QA	Anthony Smith
Temperature	23.1°C	R.H. %	48.60%
Test Date	7/25/2025	Location	RF Conducted Bench
Requirement	15.247(d) RSS-247 Clause 5.5	Method	ANSI C63.10 11.11

Limits: In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement provided the transmitter demonstrates compliance with the peak conducted power limits.

Reference Level (Worst Case PSD)

Channel 19, 125 kbps: 5.8 dBm/100kHz

5.8 dBm-20 dB = -14.2 dBm Limit

Test Parameters

Frequency	30-25000 MHz	Setup	Antenna Port
RBW	100 kHz	VBW	300 kHz
Detector(s)	Peak		

Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960172	Cable	A.H. Systems, Inc.	SAC-26G-1	387	1/28/2025	1/28/2026	Active Verification
EE 960087	Analyzer - Spectrum	Agilent	N9010A	MY53400296	6/1/2025	6/1/2026	Active Calibration

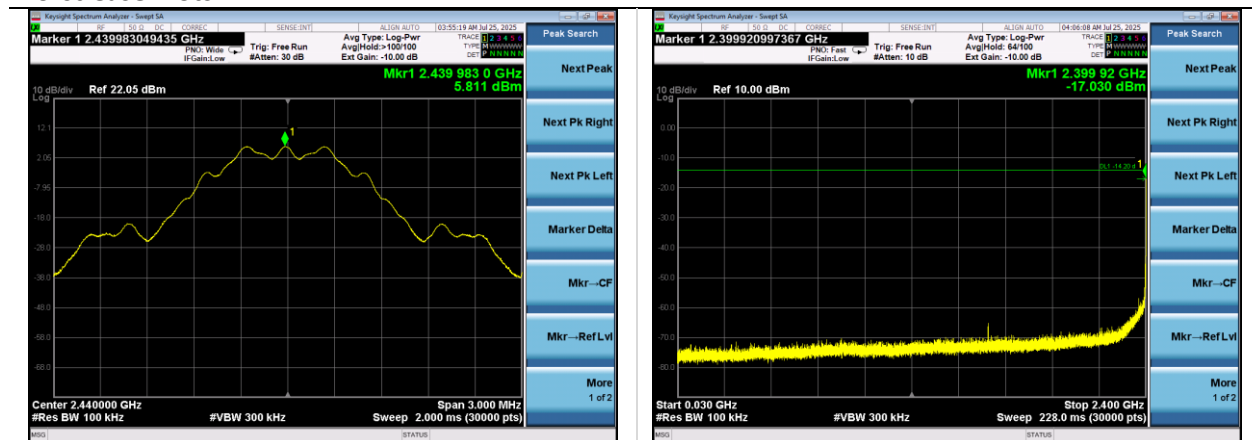
EUT Parameters

Input Power	5VDC	Mode	BLE Tx
Frequency	2400-2483.5 MHz	Channel	See 2.8

Measurements

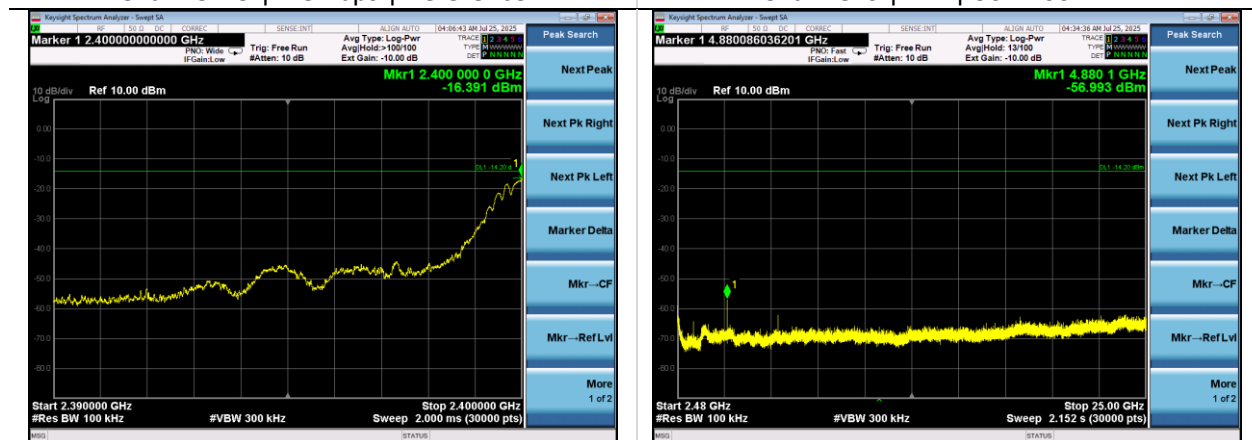
Channel	Mode	Frequency (MHz)	Measurement (dBm)	Limit (dBm)	Margin (dB)	Power Setting
0	1M	2400.0	-32.8	-14.2	18.6	13
0	2M	2400.0	-16.4	-14.2	2.2	13
0	500k	2400.0	-32.9	-14.2	18.7	7
0	125k	2400.0	-41.0	-14.2	26.8	7
39	1M	2483.6	-44.2	-14.2	30.0	14
38	2M	2483.5	-44.5	-14.2	30.3	14
39	500k	2483.8	-54.6	-14.2	40.4	8
39	125k	2483.6	-50.8	-14.2	36.6	8

Worst Case Plots



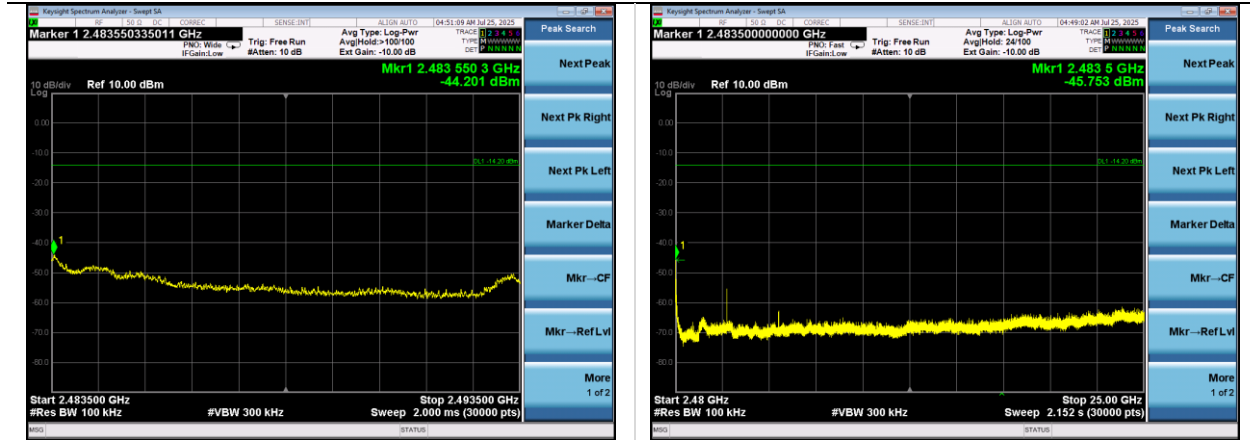
Channel 19 | 125 kbps | Reference

Channel 0 | 2M | 30-2400 MHz



Channel 0 | 2M | 2390-2400 MHz

Channel 19 | 1M | 2483.5-25000 MHz



5.1.5 Spurious Emissions in Restricted Bands

Operator	Dylan Rosenfeldt	QA	Adam Alger
Temperature	22.9°C	R.H. %	51.10%
Test Date	6/25/2025	Location	RF Conducted Bench
Requirement	15.247(d) RSS-247 Clause 5.5	Method	ANSI C63.10 11.12.2

15.209 Limits:

Frequency (MHz)	Quasi-Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Peak Limit (dBμV/m)
30-88	40.0	-	-
88-216	43.5	-	-
216-960	46.0	-	-
960-1000	54.0	-	-
1000-40000	-	54.0	74.0

Test Parameters

Frequency	30-25000 MHz	Setup	Antenna Port
RBW	1 MHz	VBW	3 MHz Peak See 2.9 for Average
Detector(s)	Peak	Method	RF Conducted
Antenna	Declared antenna gain 3.1 dBi		
Example Calculations	EIRP = Measurement + Antenna Gain + Correction Factor E-Field = EIRP – 20log3 + 104.8		

Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960172	Cable	A.H. Systems, Inc.	SAC-26G-1	387	1/28/2025	1/28/2026	Active Verification
EE 960087	Analyzer - Spectrum	Agilent	N9010A	MY53400296	4/10/2024	4/10/2025	Active Calibration

EUT Parameters

Input Power	5VDC	Mode	BLE Tx
Frequency	2402-2480 MHz	Channel	See 2.8

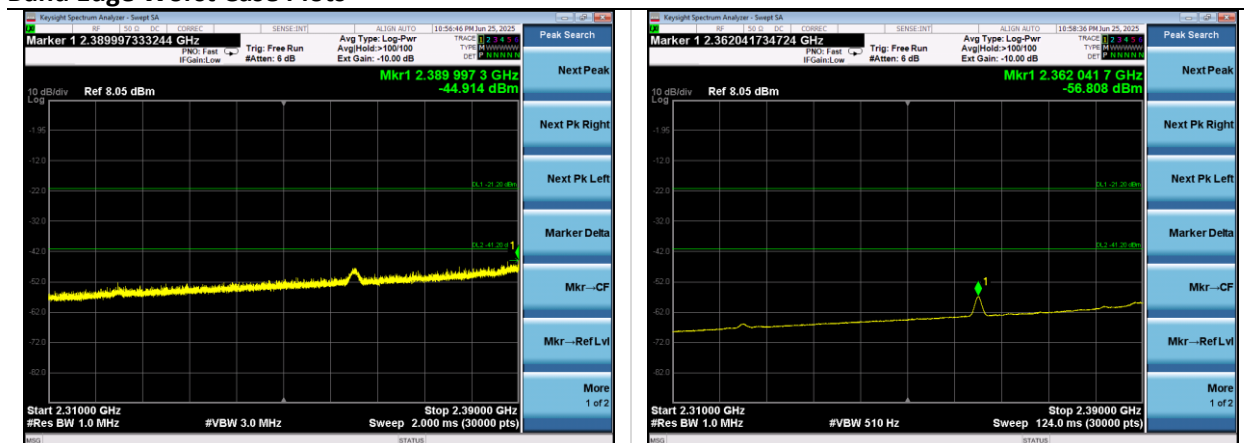
Measurements – Lower Band Edge

Rate	Channel	Measurement Type	Frequency (MHz)	Measurement (dBm)	EIRP (dBm)	E-Field (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1	0	Pk	2390.0	-44.9	-41.8	53.5	74.0	20.5
Mbps	0	Avg	2362.0	-56.8	-53.7	41.6	54.0	12.4
2	0	Pk	2389.2	-46.9	-43.8	51.5	74.0	22.5
Mbps	0	Avg	2361.9	-57.5	-54.4	40.9	54.0	13.1
500	0	Pk	2388.2	-51.4	-48.3	47.0	74.0	27.0
kbps	0	Avg	2362.0	-61.6	-58.5	36.8	54.0	17.2
125	0	Pk	2389.7	-50.9	-47.8	47.5	74.0	26.5
kbps	0	Avg	2362.0	-60.2	-57.1	38.2	54.0	15.8

Measurements – Upper Band Edge

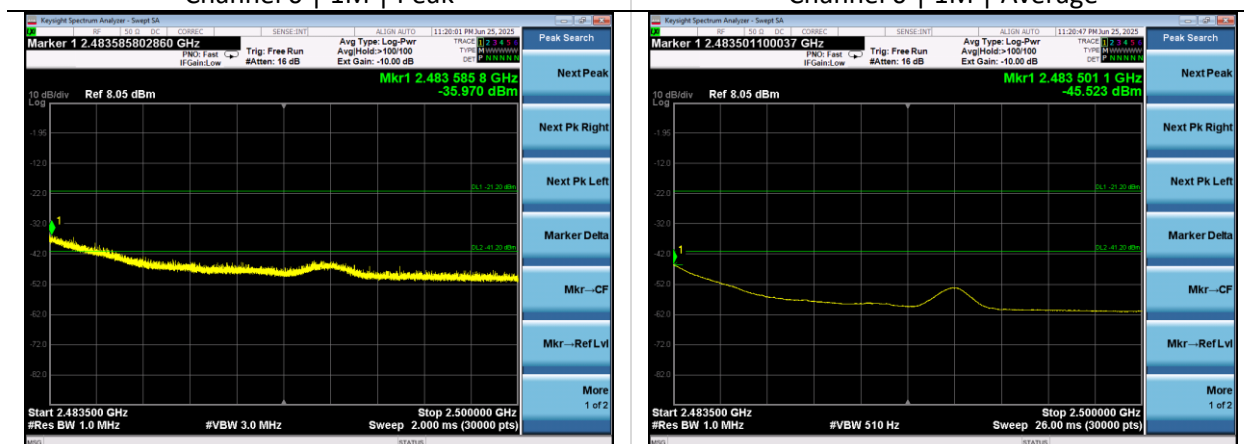
Rate	Channel	Measurement Type	Frequency (MHz)	Measurement (dBm)	EIRP (dBm)	E-Field (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1	39	Pk	2483.6	-36.0	-32.9	62.4	74.0	11.6
Mbps	39	Avg	2483.5	-45.5	-42.4	52.9	54.0	1.1
2	38	Pk	2483.6	-38.1	-35.0	60.3	74.0	13.7
Mbps	38	Avg	2485.1	-46.2	-43.1	52.2	54.0	1.8
500	39	Pk	2483.6	-39.6	-36.5	58.8	74.0	15.2
kbps	39	Avg	2483.5	-50.2	-47.1	48.2	54.0	5.8
125	39	Pk	2483.8	-39.7	-36.6	58.7	74.0	15.3
kbps	39	Avg	2483.5	-50.9	-47.8	47.5	54.0	6.5

Band Edge Worst Case Plots



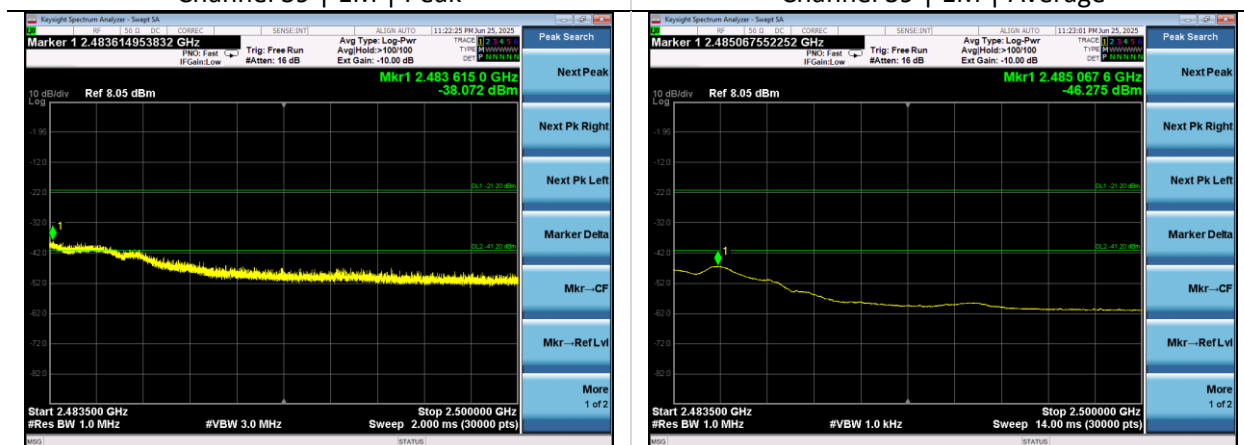
Channel 0 | 1M | Peak

Channel 0 | 1M | Average



Channel 39 | 1M | Peak

Channel 39 | 1M | Average



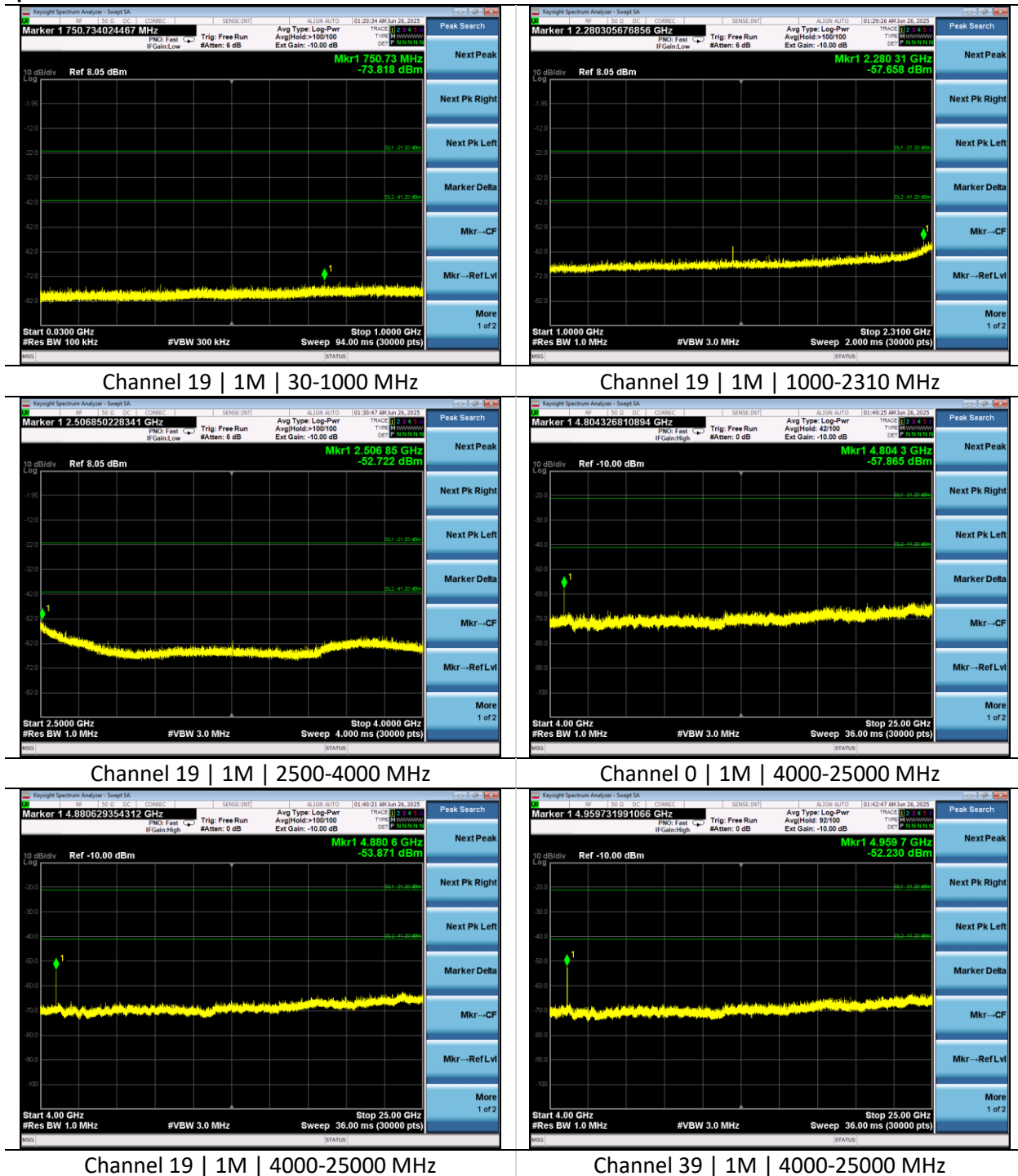
Channel 39 | 2M | Peak

Channel 39 | 2M | Average

Measurements – Spurious Emissions

Rate	Channel	Measurement Type	Frequency (MHz)	Measurement (dBm)	EIRP (dBm)	E-Field (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2 Mbps	19	Pk	4880.8	-53.2	-50.1	45.2	74.0	28.8
	19	Avg	4881.0	-60.9	-57.8	37.5	54.0	16.5
1 Mbps	19	Pk	4880.4	-53.1	-50.0	45.3	74.0	28.7
	19	Avg	4880.0	-57.2	-54.1	41.2	54.0	12.8
1 Mbps	39	Pk	4960.3	-52.2	-49.1	46.2	74.0	27.8
	39	Avg	4960.0	-56.7	-53.6	41.7	54.0	12.3
2 Mbps	39	Pk	4955.0	-52.8	-49.7	45.6	74.0	28.4
	39	Avg	4957.0	-60.4	-57.3	38.0	54.0	16.0
1 Mbps	0	Pk	4803.4	-57.6	-54.5	40.8	74.0	33.2
	0	Avg	4804.0	-62.4	-59.3	36.0	54.0	18.0

Spurious Plots



5.1.6 Frequency Stability

Operator	Dylan Rosenfeldt	QA	Anthony Smith
Temperature	21.3°C	R.H. %	29.50%
Test Date	3/31/2025	Location	RF Conducted Bench
Requirement	2.1055(d) RSS-GEN Clause 6.11	Method	ANSI C63.10 6.8

Test Parameters

Frequency	2402-2480 MHz	Voltage	4.3 VDC, 5.0 VDC, and 5.8 VDC
Detector(s)	Peak	Settings	Max Hold

Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960172	Cable	A.H. Systems, Inc.	SAC-26G-1	387	1/28/2025	1/28/2026	Active Verification
EE 960087	Analyzer - Spectrum	Agilent	N9010A	MY53400296	4/10/2024	4/10/2025	Active Calibration

Table

Channel	Voltage (VDC)	Center Frequency (Hz)
0	5.0	2401972642
	4.3	2401976557
	5.8	2401985195
19	5.0	2439985300
	4.3	2439984352
	5.8	2439985894
39	5.0	2479984687
	4.3	2479984137
	5.8	2479991031

5.2 Radiated Emissions

Description of Measurement	The frequency spectrum is investigated for intentional and / or unintentional signals emanating from the EUT by use of a standardized test site and measurement antenna. The antenna, cable, pre-amp, and other necessary measurement system correction factors are loaded onto the EMI receiver / spectrum analyzer when the measurements are performed allowing the data to be gathered and reported as corrected values. The maximum emissions from the EUT are determined by turn-table azimuth rotation (360°) and scanning of the measurement antenna. Maximized levels are noted at degree values of azimuth, measurement antenna height, and measurement antenna polarity.
Example Calculations	Measurement (dBμV) + Cable factor (dB) + Other (dB) + Antenna Factor (dB/m) = Corrected Reading (dBμV/m) Margin (dB) = Limit (dBμV/m) - Corrected Reading (dBμV/m) Example at 4000 MHz: Reading = 40 dBμV + 3.4 dB + 0.9 dB + 6.5 dB/m = 50.8 dBμV/m Average Limit = 20 log (500) = 54 dBμV/m Margin = 54 dBμV/m - 50.8 dBμV/m = 3.2 dB

Block Diagram



5.2.1 Cabinet Spurious Radiated Emissions in Restricted Bands

Operator	Dylan Rosenfeldt, Anthony Smith, Mitchell Freund	QA	Jon Dilley, Mitchell Freund, Anthony Smith
Temperature	19.4°C – 21.5°C	R.H. %	62% – 71.5%
Test Date	7/1/2025-7/2/2025, 7/9/2025	Location	Chamber 3
Requirement	15.247 (d) 15.209 RSS-247 Clause 5.5 RSS-GEN Clause 8.10	Method	ANSI C63.10 11.12

15.209 Limits:

Frequency (MHz)	Quasi-Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Peak Limit (dBμV/m)
30-88	40.0	-	-
88-216	43.5	-	-
216-960	46.0	-	-
960-1000	54.0	-	-
1000-40000	-	54.0	74.0

Test Parameters

Frequency	30-25000 MHz	Distance	3 m
Detector(s)	Peak Trace Peak and Average Final	Table height	150 cm
RBW	<1000 MHz – 120 kHz >1000 MHz – 1 MHz	VBW	<1000 – 1.2 MHz >1000 MHz – 3MHz See 2.9

Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960007	Antenna - Double Ridge Horn	EMCO	3115	9311-4138	11/19/2024	11/19/2025	Active Calibration
AA 960209	Antenna - Low Noise Amplifier	Mini-Circuits	ZVA-213X-S+	037101808	11/19/2024	11/19/2025	Active Calibration
LSC-300	Cable	Chamber 3 Emissions	-	-	1/24/2025	1/24/2026	Active Verification
EE 960085	Analyzer - EMI Receiver	Agilent	N9038A	MY51210148	4/9/2025	4/9/2026	Active Calibration
EE 960203	Analyzer - EMI Receiver	Keysight	N9038A	MY56400072	4/10/2025	4/10/2026	Active Calibration
AA 960220	Cable	A.H. Systems, Inc.	SAC-26G-6	552	1/28/2025	1/28/2026	Active Verification
AA 960174	Antenna - Small Horn	ETS Lindgren	3116C-PA	00206880	12/2/2024	12/2/2025	Active Calibration
AA 960150	Antenna - Biconical	ETS Lindgren	3110B	0003-3346	12/9/2024	12/9/2025	Active Calibration
AA 960163	Antenna - Log Periodic	A.H. Systems, Inc.	SAS-512-2	500	12/11/2024	12/11/2025	Active Calibration
AA 960153	Filter - High Pass 2.4 GHz	KWM	HPF-L-14186	7272-04	4/10/2025	4/10/2026	Active Calibration

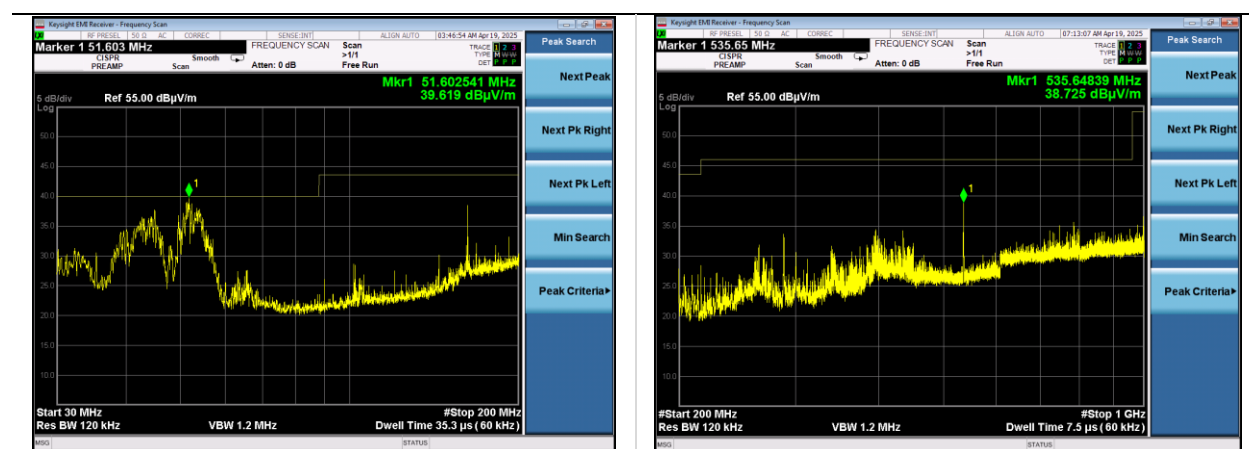
EUT Parameters

Input Power	5VDC	Mode	BLE Tx
Frequency	2402-2480 MHz	Channel	See 2.8
Note	Antenna port terminated with a 50Ω load		

Radiated Spurious Measurements – <1GHz

Frequency (MHz)	Antenna Polarity	Height (cm)	Azimuth (degree)	Quasi-Peak Reading (dBμV/m)	Quasi-Peak Limit (dBμV/m)	Margin (dB)	Channel
168.1	V	100	215	23.5	43.5	20.0	0
136.1	V	200	47	19.2	43.5	24.3	39
996.4	V	100	200	27.6	54.0	26.5	19
982.6	V	150	48	27.5	54.0	26.5	39

Spurious Emissions <1GHz Worst Case Plots



802.11b | Channel 19 | 1M |
30-200 MHz | Vertical

802.11b | Channel 0 | 1 Mbps |
200-1000 MHz | Vertical

Radiated Spurious Measurements – >1GHz

Measurements – Lower Band Edge

Mode/Rate	Orientation	Polarity	Channel	Measurement Type	Frequency (MHz)	Measurement (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1M	Y	H	0	Peak	2379.4	51.0	74.0	23.0
	Y	H	0	Average	2389.8	36.6	54.0	17.4
2M	Y	H	0	Peak	2354.6	50.5	74.0	23.5
	Y	H	0	Average	2389.6	36.6	54.0	17.4
500k	Y	H	0	Peak	2351.9	50.7	74.0	23.3
	Y	H	0	Average	2389.9	36.6	54.0	17.4
125k	Y	H	0	Peak	2369.3	50.9	74.0	23.1
	Y	H	0	Average	2389.8	36.6	54.0	17.4

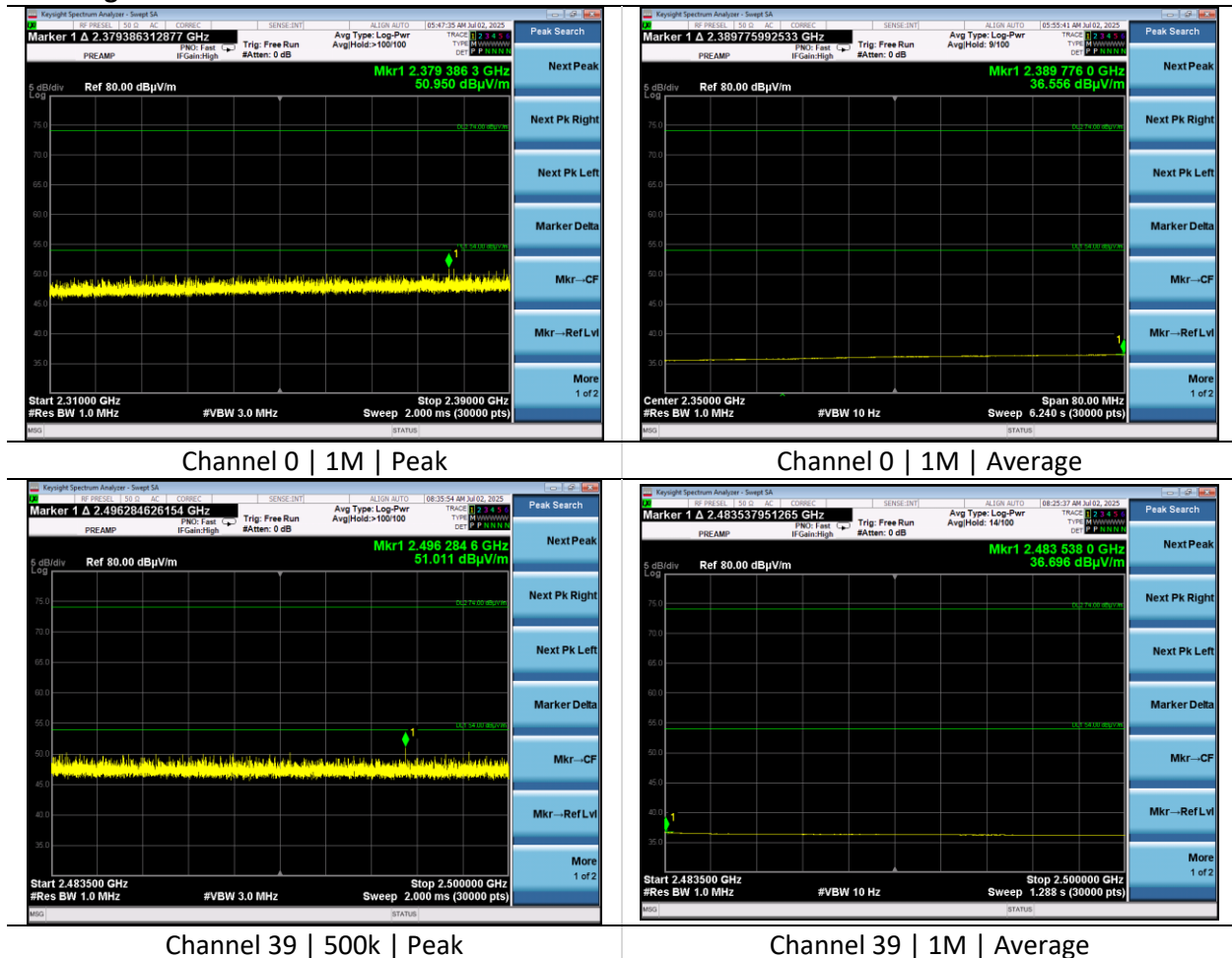
Measurements – Upper Band Edge

Mode/Rate	Orientation	Polarity	Channel	Measurement Type	Frequency (MHz)	Measurement (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1M	Y	H	39	Peak	2497.4	50.7	74.0	23.3
	Y	H	39	Average	2483.5	36.7	54.0	17.3
2M	Y	H	38	Peak	2485.5	50.5	74.0	23.5
	Y	H	38	Average	2485.1	36.6	54.0	17.4
500k	Y	H	39	Peak	2496.3	51.0	74.0	23.0
	Y	H	39	Average	2483.5	36.5	54.0	17.5
125k	Y	H	39	Peak	2496.1	50.6	74.0	23.4
	Y	H	39	Average	2483.6	36.5	54.0	17.5

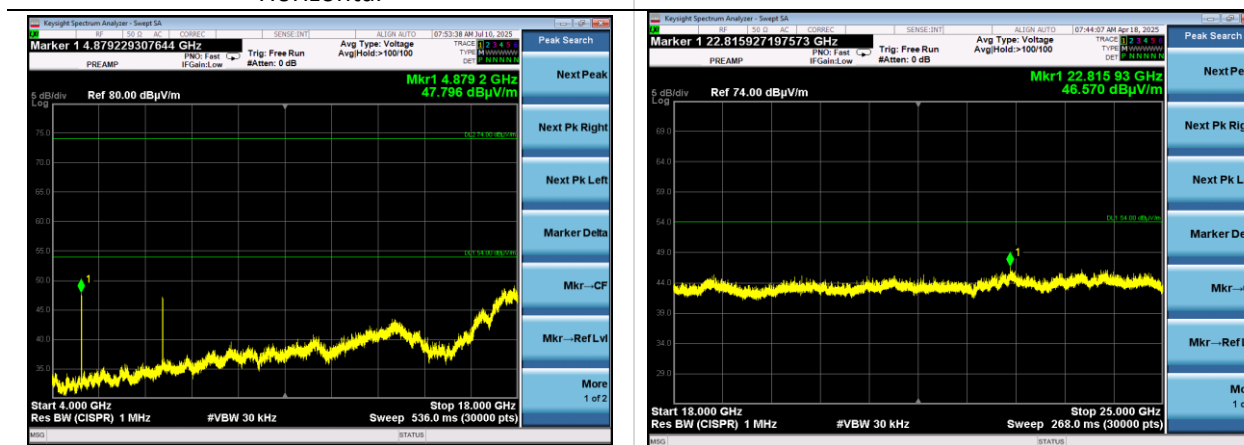
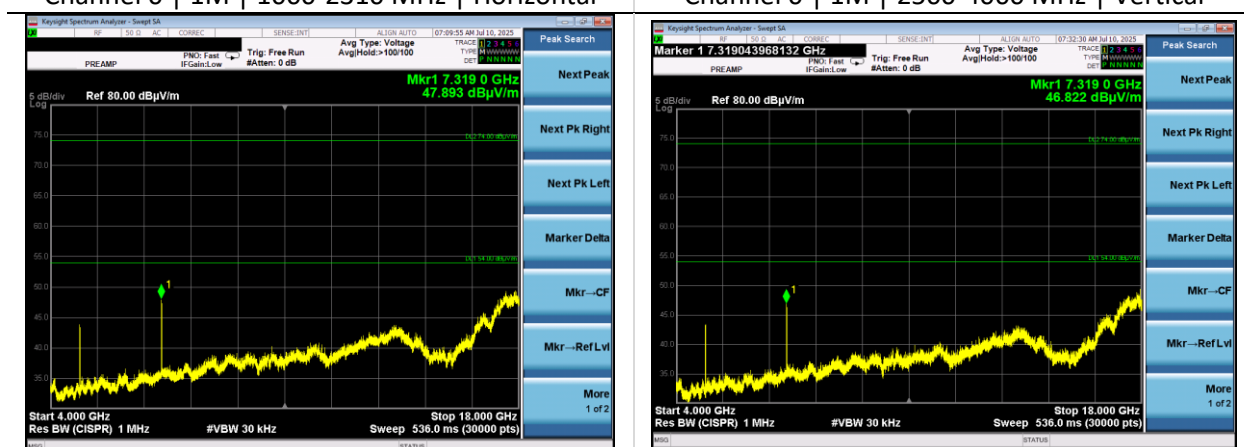
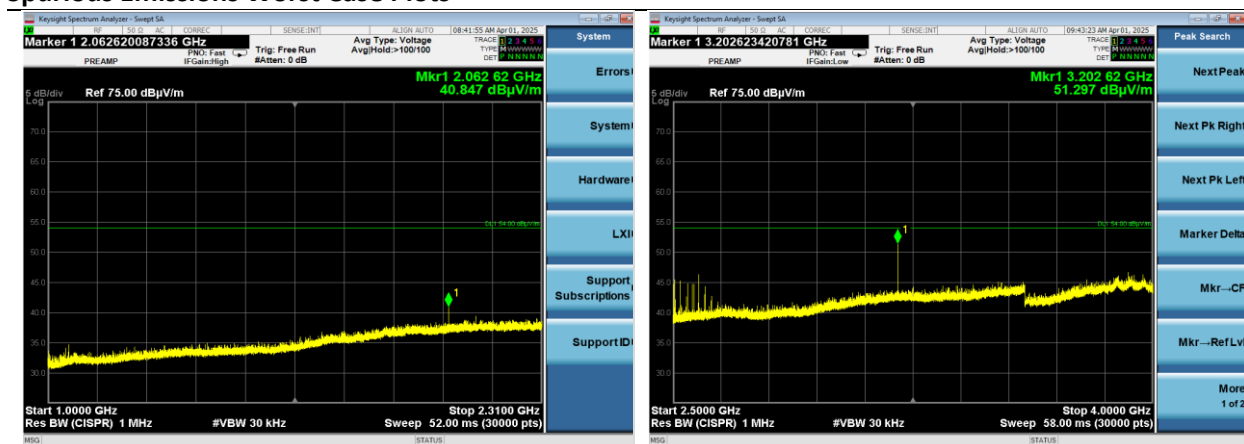
Measurements – Spurious Emissions

Mode/Rate	Orientation	Polarity	Channel	Measurement Type	Frequency (MHz)	Measurement (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1M	Z	H	19	pk	7319.5	47.5	74.0	26.5
1M	Z	H	19	avg	7320.4	43.3	54.0	10.7
1M	Z	V	19	pk	4879.2	48.3	74.0	25.7
1M	Z	V	19	avg	4880.6	38.3	54.0	15.7
1M	Y	V	19	pk	7319.0	47.8	74.0	26.2
1M	Y	V	19	avg	7320.4	39.3	54.0	14.7
1M	Y	H	19	pk	4880.6	45.4	74.0	28.6
1M	Y	H	19	avg	4880.2	39.3	54.0	14.7
1M	X	H	19	pk	7319.0	48.3	74.0	25.7
1M	X	H	19	avg	7319.1	37.6	54.0	16.4
1M	X	V	19	pk	7319.0	47.2	74.0	26.8
1M	X	V	19	avg	7319.5	42.2	54.0	11.8
1M	X	H	0	pk	4803.2	46.9	74.0	27.1
1M	X	H	0	avg	4803.2	38.3	54.0	15.7
1M	Y	H	0	pk	4804.6	46.3	74.0	27.7
1M	Y	H	0	avg	4804.1	39.4	54.0	14.6
1M	X	H	39	pk	7440.5	49.1	74.0	24.9
1M	X	H	39	avg	7440.6	41.0	54.0	13.0
1M	X	V	39	pk	7440.6	54.0	74.0	20.0
1M	X	V	39	avg	7440.5	46.9	54.0	7.1
1M	Y	H	39	pk	7440.5	50.5	74.0	23.5
1M	Y	H	39	avg	7440.6	42.6	54.0	11.4
1M	Y	V	39	pk	7439.2	51.8	74.0	22.2
1M	Y	V	39	avg	7440.5	44.3	54.0	9.7
1M	Z	H	39	pk	7439.2	55.9	74.0	18.2
1M	Z	H	39	avg	7440.5	49.2	54.0	4.8
1M	Z	V	39	pk	7439.2	50.6	74.0	23.4
1M	Z	V	39	avg	7439.3	42.8	54.0	11.2

Band Edge Worst Case Plots



Spurious Emissions Worst Case Plots



5.3 AC Mains Conducted Emissions

A line impedance stabilization network (LISN) or artificial mains network (AMN) allows the emissions of the power supply conductors to be measured while isolating the EUT from the supply mains.

Description of Measurement

The AMN, cable, and other necessary measurement system correction factors are loaded onto the EMI receiver when the measurements are performed. The data is gathered and reported as the corrected values.

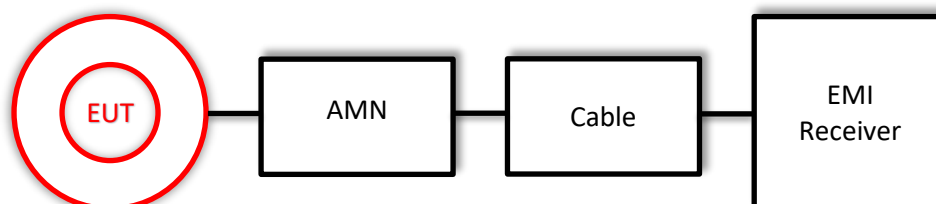
Maximum emissions are determined with a peak max hold trace then measurements at a selection of the highest points are made with quasi-peak and average detectors. Results are recorded and compared to limit for each line. (e.g. line and neutral)

Example Calculations

Measurement (dBμV) + Cable factor (dB) + Other (dB) = Corrected Reading (dBμV)

Margin (dB) = Limit (dBμV) - Corrected Reading (dBμV)

Block Diagram



5.3.1 AC Mains Conducted Emissions

Operator	Mitchell Freund	QA	Dylan Rosenfeldt
Temperature	21.6°C	R.H. %	31.0%
Test Date	4/2/2025	Location	AC Conducted Bench
Requirement	15.207 RSS-GEN 8.8	Method	ANSI C63.10

Limits:

Frequency (MHz)	Quasi-Peak Limit (dBμV)	Average Limit (dBμV)
0.15-0.5	66.0-56.0*	56.0-46.0*
0.5-5	56.0	46.0
5-30	60.0	50.0

*Decreases with the logarithm of the frequency

Test Parameters

Frequency	0.15-30 MHz	Distance	40 cm from wall 80 cm from LISN
Detector(s)	Peak Trace Quasi-Peak, Average Final	Table height	80 cm
RBW	9 kHz	VBW	62 kHz
Notes	Channel has no effect on emission		

Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
EE 960088	Analyzer - EMI Receiver	Agilent	N9038A	MY51210138	4/10/2025	4/10/2026	Active Calibration
EE 960089	LISN	COM-POWER	LI-215A	191943	4/8/2024	4/8/2025	Active Calibration
LSC-203	Cable	Micro-Coax	UFB311A-0- 1440- 70U70U	64639 224071-005	1/29/2025	1/29/2026	Active Verification

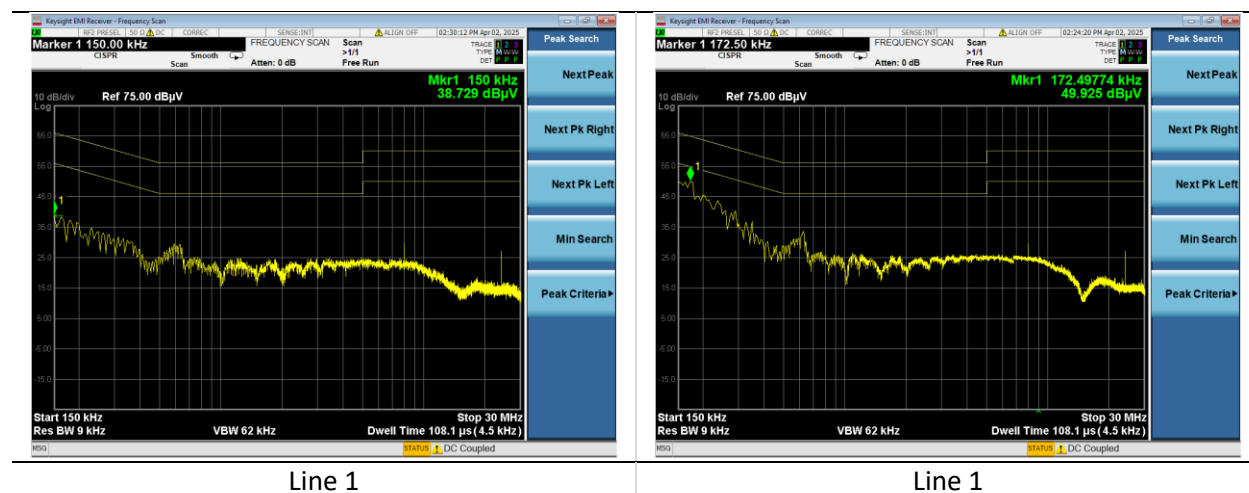
EUT Parameters

Input Power	5VDC via Power adapter	Mode	BLE Tx Channel 19
Note	Antenna port terminated with a 50Ω load		

Table

Line	Frequency (MHz)	Peak Reading (dBμV)	Average Reading (dBμV)	Average Limit (dBμV)	Average Margin (dB)	Quasi-Peak Reading (dBμV)	Quasi-Peak Limit (dBμV)	Quasi-Peak Margin (dB)
L2	0.172	49.9	43.7	54.8	11.2	44.3	64.8	20.5
L2	1.190	26.3	19.1	46.0	26.9	21.3	56.0	34.7
L2	24.0	27.3	19.7	50.0	30.3	20.1	60.0	39.9
L1	0.150	39.3	24.4	56.0	31.6	34.8	66.0	31.2
L1	7.997	29.7	21.8	50.0	28.2	25.5	60.0	34.5
L1	24.0	27.8	18.7	50.0	31.3	23.8	60.0	36.2

Plots



6 REVISION HISTORY

Version	Date	Notes	Person
0	4/29/2025	Initial Draft	Dylan Rosenfeldt
1	4/30/2025	Final Draft	Dylan Rosenfeldt
2	8/5/2025	Updated Power settings	Dylan Rosenfeldt
3	8/6/2025	Final Draft	Dylan Rosenfeldt

END OF REPORT