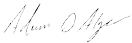

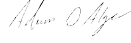


# Test Report TR3768-166-ETSI-300-328-BLE

<b>Equipment Under Test:</b>	SONA NX611 M.2 2230, 1 MHF
<b>Requirement(s):</b>	ETSI EN 300 328 AS/NZS 4268
<b>Test Date(s):</b>	04/30/2024-06/04/2024
<b>Prepared for:</b>	Ezurio Attn: Brian Petted W66 N220 Commerce Ct. Cedarburg, WI 53012

<b>Report Issued by:</b> Adam Alger, Manager EMC Laboratory	
Signature: 	Date: 2/13/2025
<b>Report Reviewed by:</b> Dylan Rosenfeldt, EMC Engineer	
Signature: 	Date: 01/15/2025
<b>Report Constructed by:</b> Adam Alger, Manager EMC Laboratory	
Signature: 	Date: 01/14/2025

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Company: Ezurio	Page <b>1</b> of <b>42</b>	Name: SONA NX611 M.2 2230, 1 MHF
Report: TR3768-166-ETSI-300-328-BLE		Model: SONA NX611M
Job: C-3768		Serial: 00047

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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 42	Name: SONA NX611 M.2 2230, 1 MHF
Report: TR3768-166-ETSI-300-328-BLE		Model:SONA NX611M
Job: C-3768		Serial:00047

# 1 TEST REPORT SUMMARY

During **04/30/2024-06/04/2024** the Equipment Under Test (EUT), **SONA NX611 M.2 2230, 1 MHF**, as provided by **Ezurio** was tested to the following requirements:

## ETSI EN 300 328 | AS/NZS 4268 – DTS - BLE

Requirements	Description	Method	Specification	Compliant
4.3.2.2	RF Output Power	5.4.2.2.1.2	≤20 dBm	Yes
4.3.2.3	Power Spectral Density	5.4.3	10 dBm per MHz	Yes
4.3.2.7	Occupied Channel Bandwidth	5.4.7	2400-2483.5 MHz	Yes
4.3.2.8	Transmitter Unwanted Emissions in the Out-Of-Band Domain	5.4.8	2400 MHz - 2BW – 2483.5 MHz +2BW	Yes
4.3.2.9	Transmitter Unwanted Emissions in the Spurious Domain	5.4.9	30-12750 MHz	Yes
4.3.2.10	Receiver Spurious Emissions	5.4.10	30-12750 MHz	Yes
4.3.2.11	Receiver Blocking (Category 2)	5.4.11	PER ≤ 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	0.5 dB below specified limit
Emissions – Frequency	1% less than the specification
Immunity	Tested at specified level

## 2 CLIENT INFORMATION

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

### 2.1 Equipment Under Test (EUT) Information

*The following information has been supplied by the client*

<b>Product Name</b>	SONA NX611 M.2 2230, 1 MHF
<b>Part Number</b>	453-00166
<b>Serial Number</b>	00047
<b>FCC ID</b>	SQG-SONANX611M
<b>IC ID</b>	3147A-SONANX611M

### 2.2 Product Description

The NX611 is based upon NXP IW611 Wi-Fi 6 chipset. Feature-set includes 802.11 a/b/g/n/ac/ax Wi-Fi 6 and Dual-Mode Bluetooth v5.3 (BDR + EDR + BLE).

### 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 – INPUT:100-240VAC 50/60 Hz 0.3A

OUTPUT: 5VDC 2A

Firmware - sduart\_nw61x\_v1.bin.se

Sduart\_nw61x\_v1\_mfg.bin.se

Company: Ezurio	Page 5 of 42	Name: SONA NX611 M.2 2230, 1 MHF
Report: TR3768-166-ETSI-300-328-BLE		Model:SONA NX611M
Job: C-3768		Serial:00047

## 2.6 Ancillary Equipment

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

Development Kit, SU60-SOMC 6.0

P/N: 463-00138-K1 Rev 1

Power Supply: INPUT: 100-240 VAC 50/60Hz 0.7A

OUTPUT: 12VDC 2A

HP Elitebook 840G1

Labtool Version: 1.0.0.45.6

## 2.7 Antenna Information

Manufacturer	Model	Part Number	Dimension	Type	Peak Gain (dBi)	
					2400-2500 MHz	4900-5925 MHz
Laird Connectivity	FlexMIMO 6E	EFD2471A3S-10MH4L	39.5mm X 39.5mm X 4.7mm	PIFA	2.2	3.8
Laird Connectivity	FlexPIFA 6E	EFB2471A3S-10MH4L	16mm X 36mm X 2.5mm	PIFA	2.2	3.9
Laird Connectivity	Mini NanoBlade Flex 6E	EMF2471A3S-10MH4L	36mm X 12mm X 0.3mm	PCB Dipole	2.4	4.4
Joymax Electronics	N/A	TWX-100BRS3B	137mm X 13mm	Dipole	2.0	4.0
Laird Connectivity	FlexPIFA	EFB2455A3S-16MHF1	38.5mm X 12.7 mm X 2.5mm	PIFA	2.5	3.0

## 2.8 Test Channels

Channel	Frequency (MHz)	Data Rates
0	2402	125k, 500k, 1M and 2M
19	2440	
39	2480	

## 2.9 EUT Power Setting

Data Rate	Power Setting
125 kbps	6
500 kbps	6
1 Mbps	6
2 Mbps	6

### 3 WORST CASE TEST RESULTS SUMMARY

Requirement	Radio	Channel and Data Rate	Frequency (MHz)	Measurement	Limit	Margin
4.3.2.2 RF Output Power	BLE	19   1 Mbps	-	9.6 dBm	20.0 dBm	10.4 dB
4.3.2.3 PSD	BLE	19   1 Mbps	-	9.5 dBm	10.0 dBm	0.5 dB
4.3.2.7 OCBW	BLE	39   2 Mbps	-	2067 kHz	20 MHz	-
4.3.2.8 Tx OOB Emission	BLE	0   1 Mbps	2399.5	-53.6 dBm	-10 dBm	41.4 dB
	BLE	39   500 kbps	2484.0	-59.8 dBm	-10.0	47.3 dB
4.3.2.9 Tx Spurious	BLE	0   1 Mbps	2398.0	-58.0	-30.0	28.0
4.3.2.10 Rx Spurious	No emission present					



## 4 REFERENCES

Publication	Edition	Date	AMD 1
ETSI EN 300 328	2.2.2	2019	-
AS/NZS 4268	-	2017	2021

## 5 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

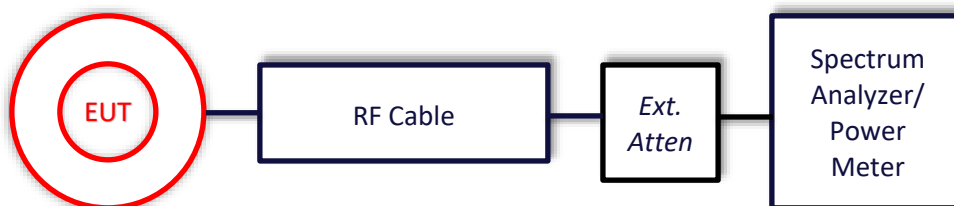
Parameter	ETSI U.C. $\pm$	U.C. $\pm$
Radio Frequency, from F0	$1 \times 10^{-7}$	$0.55 \times 10^{-7}$
Occupied Channel Bandwidth	5 %	2 %
RF conducted Power (Power Meter)	1.5 dB	1.2 dB
RF conducted emissions (Spectrum Analyzer)	3.0 dB	1.7 dB
All emissions, radiated	6.0 dB	5.3 dB
Temperature	1° C	0.65°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

## 6 TEST DATA

### 6.1 Antenna Port Conducted Emissions

<b>Description of Measurement</b>	<p>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.</p> <p>The cable and attenuator factors are loaded into the analyzer or power meter allowing for direct measurement readings without the need for further corrections.</p>
<b>Example Calculations</b>	<p>Measurement (dBm) + Cable factor (dB) + External Attenuator (dB) = Corrected Reading (dBm)</p> <p>Margin (dB) = Limit (dBm) – Corrected Reading (dBm)</p>

#### Block Diagram



### 6.1.1 RF Output Power

<b>Operator</b>	Dylan Rosenfeldt	<b>QA</b>	Adam Hauke
<b>Temperature</b>	21.7°C	<b>R.H. %</b>	48.80%
<b>Test Date</b>	05/13/2024	<b>Location</b>	Conducted RF Bench
<b>Requirement</b>	4.3.2.2	<b>Method</b>	5.4.2.2.1.2

**Limits:** The RF output power for non-FHSS equipment shall be equal to or less than 20 dBm.

### Test Parameters

<b>Frequency</b>	2400-2483.5 MHz	<b>Setup</b>	Antenna Port
<b>Operating Temperature</b>	-40.0°C to +85.0°C	<b>Sample Speed</b>	1 MS/s

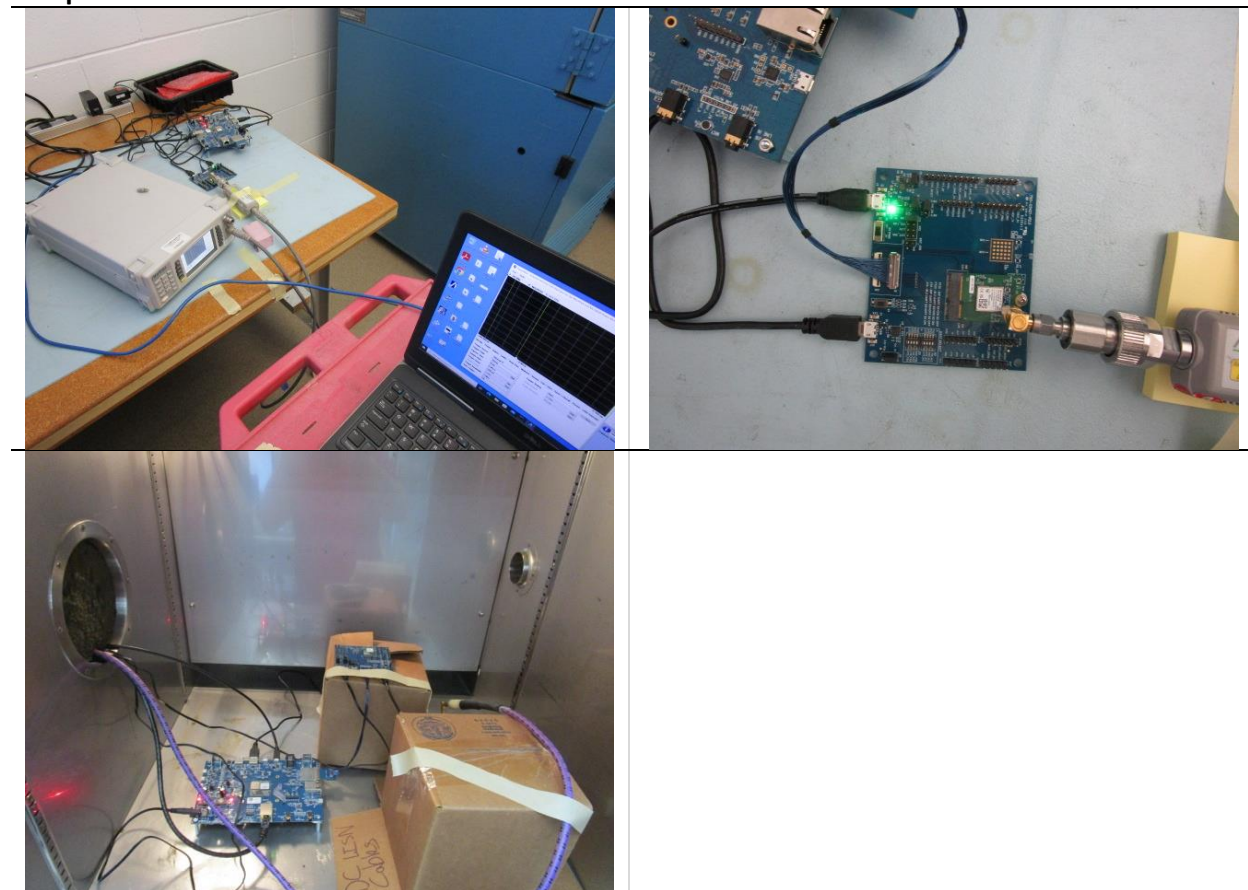
### Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
EE 960090	Meter - RF Power	Anritsu	ML2495A	1335006	4/13/2024	4/13/2025	Active Calibration
EE 960091	Sensor - RF Power	Anritsu	MA2491A	1249277	4/13/2024	4/13/2025	Active Calibration

### EUT Parameters

<b>Input Power</b>	120 VAC @ 60 Hz	<b>Mode</b>	BLE Tx
<b>Frequency</b>	2400-2483.5 MHz	<b>Channel</b>	See 2.8

## Setup Photos



## Normal Operating Temperature

Rate	Channel	Avg Output Power (dBm)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1 Mbps	0	6.9	9.4	20.0	10.6
	19	7.1	9.6	20.0	10.4
	39	7.0	9.5	20.0	10.5
2 Mbps	0	6.9	9.4	20.0	10.6
	19	7.1	9.6	20.0	10.4
	39	7.1	9.6	20.0	10.4
500 kbps	0	6.9	9.4	20.0	10.6
	19	7.1	9.6	20.0	10.4
	39	7.1	9.6	20.0	10.4
125 kbps	0	6.9	9.4	20.0	10.6
	19	7.1	9.6	20.0	10.4
	39	7.1	9.6	20.0	10.4

### +85°C Temperature

Rate	Channel	Avg Output Power (dBm)	EIRP (dbm)	Limit (dBm)	Margin (dB)
1 Mbps	0	6.3	8.8	20.0	11.2
	19	6.5	9.0	20.0	11.0
	39	6.2	8.7	20.0	11.3
2 Mbps	0	6.4	8.9	20.0	11.1
	19	6.5	9.0	20.0	11.0
	39	6.2	8.7	20.0	11.3
500 kbps	0	6.3	8.8	20.0	11.2
	19	6.4	8.9	20.0	11.1
	39	6.2	8.7	20.0	11.3
125 kbps	0	6.4	8.9	20.0	11.1
	19	6.5	9.0	20.0	11.0
	39	6.2	8.7	20.0	11.3

### -40°C Temperature

Rate	Channel	Avg Output Power (dBm)	EIRP (dbm)	Limit (dBm)	Margin (dB)
1 Mbps	0	8.2	10.7	20.0	9.3
	19	8.5	11.0	20.0	9.0
	39	8.3	10.8	20.0	9.2
2 Mbps	0	8.2	10.7	20.0	9.3
	19	8.4	10.9	20.0	9.1
	39	8.3	10.8	20.0	9.2
500 kbps	0	8.2	10.7	20.0	9.3
	19	8.5	11.0	20.0	9.0
	39	8.3	10.8	20.0	9.2
125 kbps	0	8.2	10.7	20.0	9.3
	19	8.5	11.0	20.0	9.0
	39	8.3	10.8	20.0	9.2

## 6.1.2 Power Spectral Density

<b>Operator</b>	Dylan Rosenfeldt	<b>QA</b>	Adam Hauke
<b>Temperature</b>	22.3°C	<b>R.H. %</b>	58.80%
<b>Test Date</b>	06/04/2024	<b>Location</b>	Conducted RF Bench
<b>Requirement</b>	4.3.2.3	<b>Method</b>	5.4.3.2.1

**Limit:** The maximum Power Spectral Density for non-FHSS equipment is 10 dBm per MHz

### Test Parameters

<b>Frequency</b>	2400-2483.5 MHz	<b>Setup</b>	Antenna Port
<b>RBW</b>	10 kHz	<b>VBW</b>	30 kHz
<b>Detector(s)</b>	RMS	<b>Settings</b>	Max Hold
<b>Sweep Points</b>	10000		

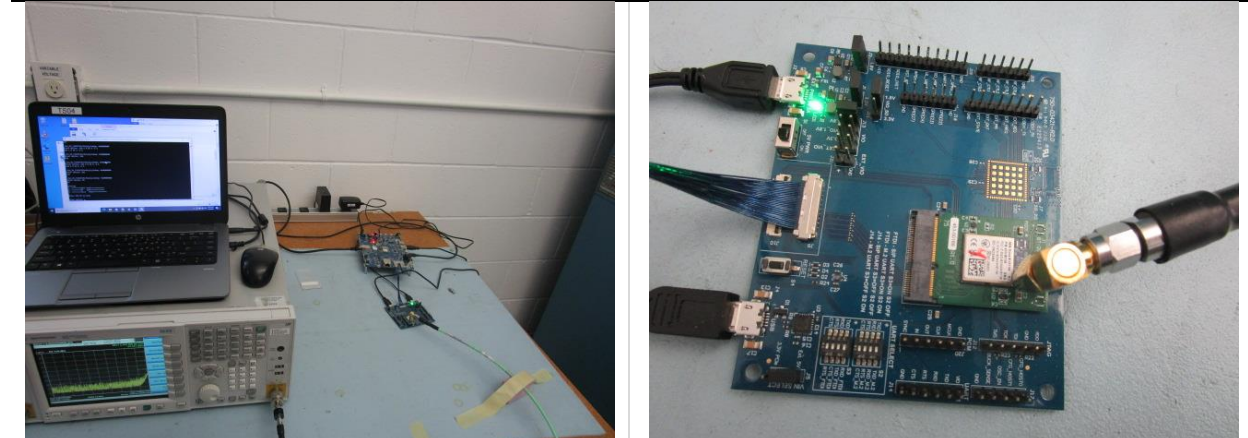
### Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960173	Cable	A.H. Systems, Inc.	SAC-26G-1	388	6/13/2023	6/12/2024	Active Verification
EE 960087	Analyzer - Spectrum	Agilent	N9010A	MY53400296	4/11/2024	4/11/2025	Active Calibration

### EUT Parameters

<b>Input Power</b>	120 VAC @ 60 Hz	<b>Mode</b>	BLE Tx
<b>Frequency</b>	2400-2483.5 MHz	<b>Channel</b>	See 2.8

## Setup Photos



## Measurements

Rate	Channel	PSD (dBm / MHz) EIRP	Limit (dBm/ MHz) EIRP	Margin (dB)
1 Mbps	0	9.3	10.0	0.7
	19	9.5	10.0	0.5
	39	9.4	10.0	0.6
2 Mbps	0	8.2	10.0	1.8
	19	8.4	10.0	1.6
	39	8.4	10.0	1.6
500 kbps	0	9.3	10.0	0.7
	19	9.5	10.0	0.5
	39	9.5	10.0	0.5
125 kbps	0	9.3	10.0	0.7
	19	9.5	10.0	0.5
	39	9.5	10.0	0.5



### 6.1.3 Occupied Channel Bandwidth

<b>Operator</b>	Dylan Rosenfeldt	<b>QA</b>	Adam Hauke
<b>Temperature</b>	21.8°C	<b>R.H. %</b>	44.80%
<b>Test Date</b>	05/02/2024	<b>Location</b>	Conducted RF Bench
<b>Requirement</b>	4.3.2.7	<b>Method</b>	5.4.7

**Limits:** The Occupied Channel Bandwidth shall be within the band 2400 MHz – 2483.5 MHz

#### Test Parameters

<b>Frequency</b>	2400-2483.5 MHz	<b>Detector(s)</b>	RMS
<b>RBW</b>	43 kHz	<b>VBW</b>	130 kHz

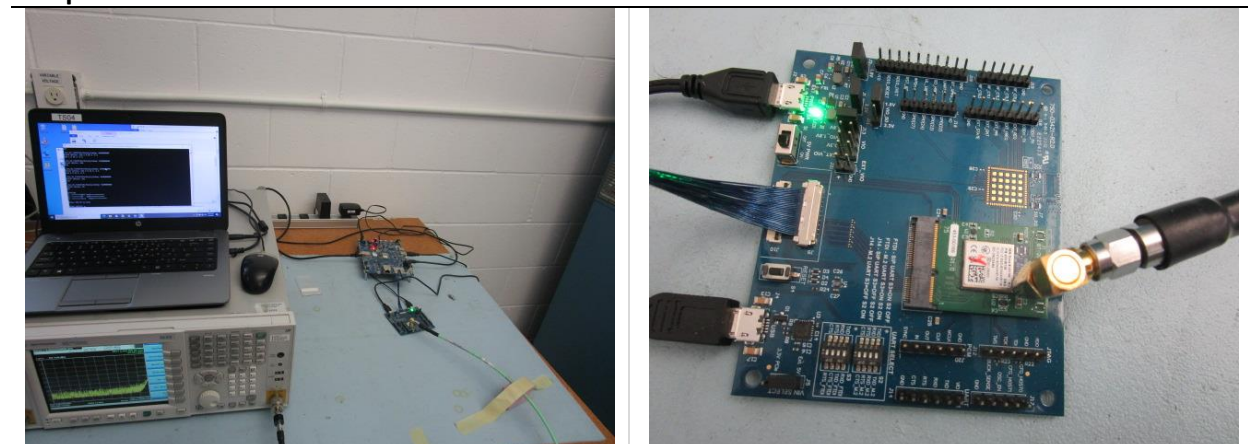
#### Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960173	Cable	A.H. Systems, Inc.	SAC-26G-1	388	6/13/2023	6/12/2024	Active Verification
EE 960085	Analyzer - EMI Receiver	Agilent	N9038A	MY51210148	4/27/2024	4/27/2025	Active Calibration

#### EUT Parameters

<b>Input Power</b>	120 VAC @ 60 Hz	<b>Mode</b>	BLE Tx
<b>Frequency</b>	2400-2483.5 MHz	<b>Channel</b>	See 2.8

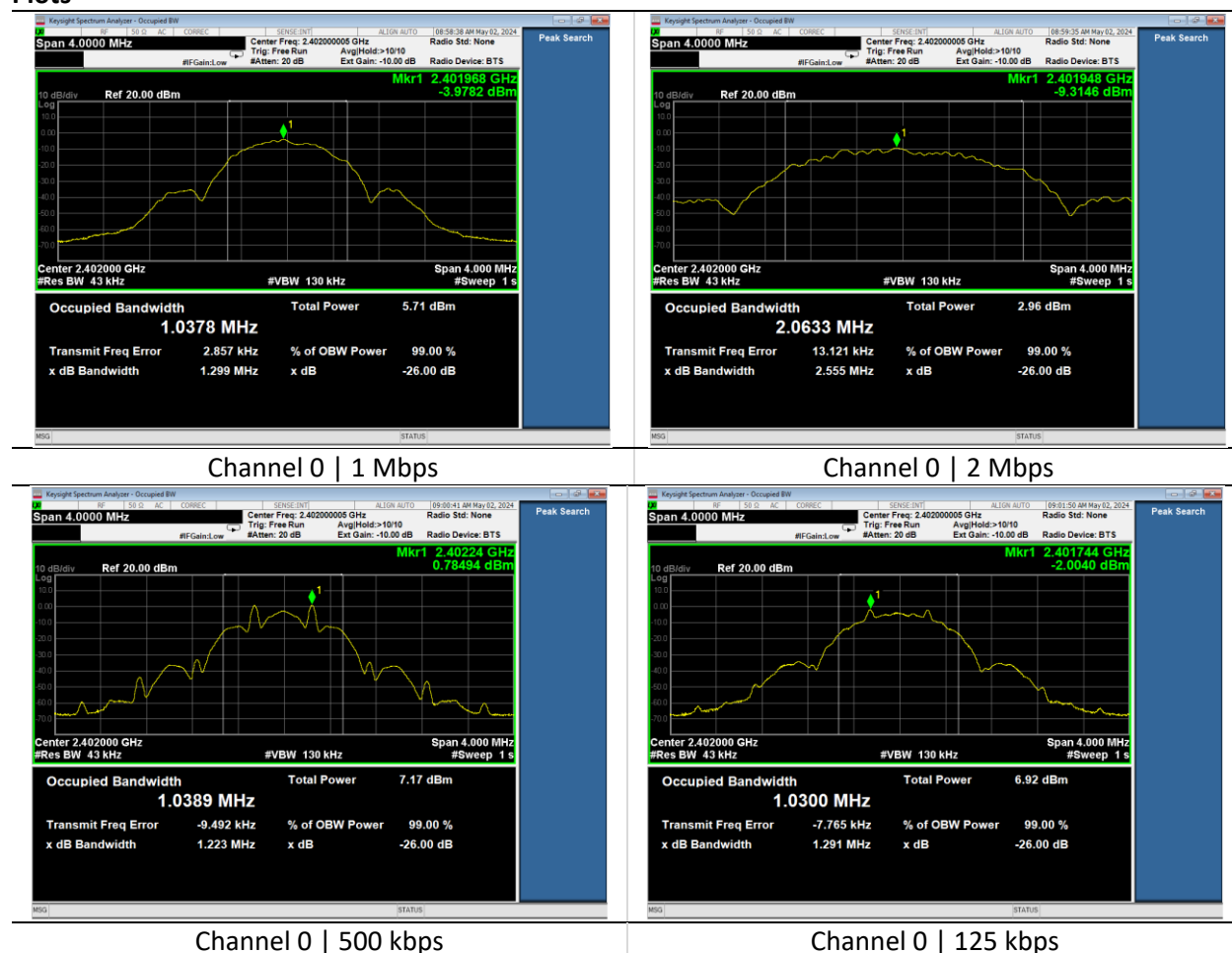
## Setup Photos

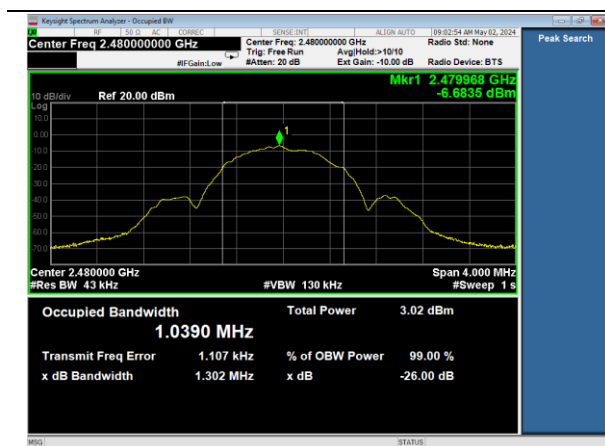


Table

Channel	Rate	Occupied Channel Bandwidth (kHz)
0	1 Mbps	1038
	2 Mbps	2063
	500 kbps	1039
	125 kbps	1030
39	1 Mbps	1039
	2 Mbps	2067
	500 kbps	1041
	125 kbps	1034

## Plots





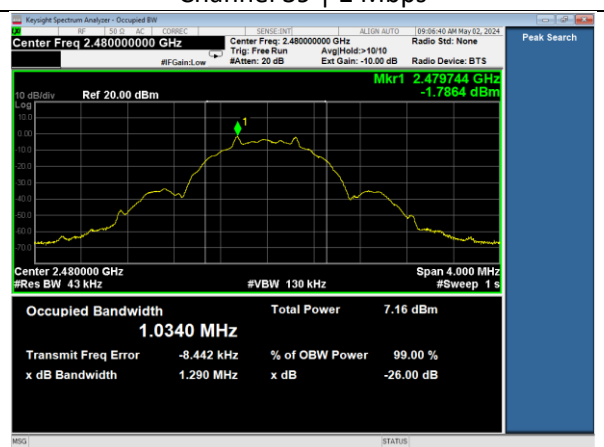
Channel 39 | 1 Mbps



Channel 39 | 2 Mbps



Channel 39 | 500 kbps



Channel 39 | 125 kbps

#### 6.1.4 Transmitter unwanted emissions in the out of band domain

<b>Operator</b>	Dylan Rosenfeldt	<b>QA</b>	Adam Hauke
<b>Temperature</b>	21.8°C	<b>R.H. %</b>	44.80%
<b>Test Date</b>	05/02/2024	<b>Location</b>	Conducted RF Bench
<b>Requirement</b>	4.3.2.8	<b>Method</b>	5.4.8

#### Limits:

Frequency (MHz)	Limit
2400 MHz - 2BW – 2400 MHz - BW	-20 dBm/ MHz e.i.r.p.
2400 MHz - BW – 2400 MHz	-10 dBm/ MHz e.i.r.p.
2400 MHz + BW – 2400 MHz	-10 dBm/ MHz e.i.r.p.
2400 MHz + 2BW – 2400 MHz + BW	-20 dBm/ MHz e.i.r.p.

#### Test Parameters

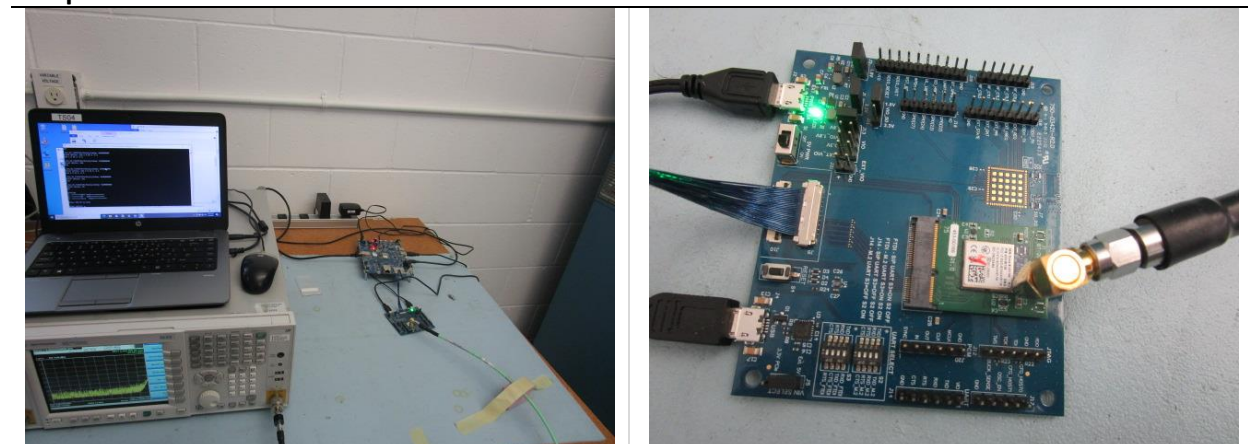
<b>Frequency</b>	2395-2488.5 MHz	<b>Setup</b>	Antenna Port
<b>RBW</b>	1 MHz	<b>VBW</b>	3 MHz
<b>Measurement Mode</b>	Time Domain Power		

#### Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960173	Cable	A.H. Systems, Inc.	SAC-26G-1	388	6/13/2023	6/12/2024	Active Verification
EE 960085	Analyzer - EMI Receiver	Agilent	N9038A	MY51210148	4/27/2024	4/27/2025	Active Calibration

<b>Input Power</b>	120 VAC @ 60 Hz	<b>Mode</b>	BLE Tx
<b>Frequency</b>	2400-2483.5 MHz	<b>Channel</b>	See 2.8

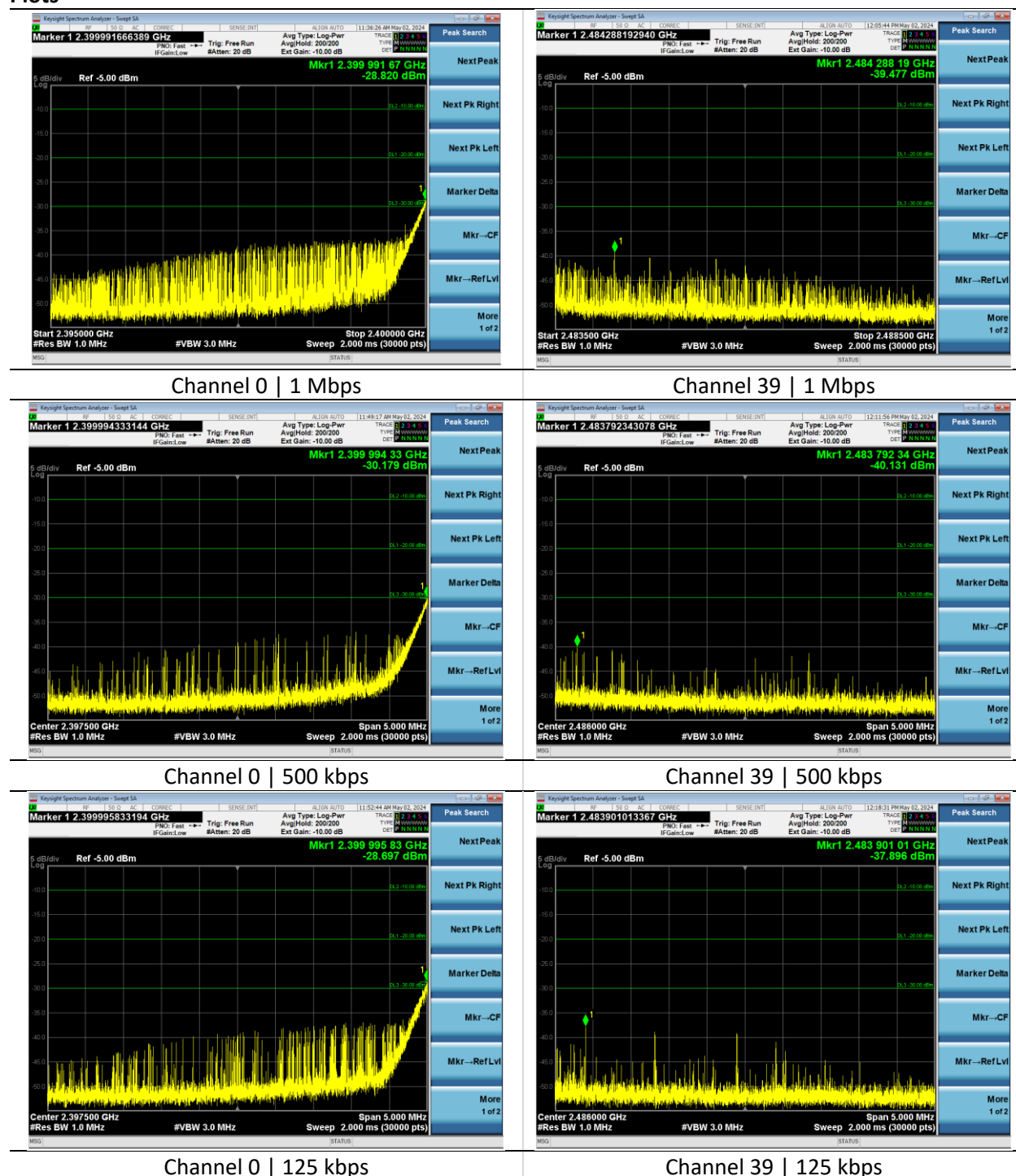
## Setup Photos



## Measurements

Rate	Channel	Frequency (MHz)	Measurement (dBm)	Limit (dBm)	Margin (dB)
1 Mbps	0	2399.5	-53.6	-10.0	41.1
	39	2484.0	-60.3	-10.0	47.8
500 kbps	0	2399.5	-54.5	-10.0	42.0
	39	2484.0	-59.8	-10.0	47.3
125 kbps	0	2399.5	-53.8	-10.0	41.3
	39	2484.0	-60.2	-10.0	47.7

## Plots



Company: Ezurio		Name: SONA NX611 M.2 2230, 1 MHF
Report: TR3768-166-ETSI-300-328-BLE	Page 23 of 42	Model:SONA NX611M
Job: C-3768		Serial:00047

### 6.1.5 Transmitter unwanted emissions in the spurious domain

<b>Operator</b>	Dylan Rosenfeldt	<b>QA</b>	Anthony Smith
<b>Temperature</b>	21.6°C	<b>R.H. %</b>	45.80%
<b>Test Date</b>	05/07/2024	<b>Location</b>	Conducted RF Bench
<b>Requirement</b>	4.3.2.9	<b>Method</b>	5.4.9

#### Limits:

Frequency (MHz)	Maximum Power	Bandwidth
30-47	-36 dBm	100 kHz
47-74	-54 dBm	100 kHz
74-87.5	-36 dBm	100 kHz
87.5-118	-54 dBm	100 kHz
118-174	-36 dBm	100 kHz
174-230	-54 dBm	100 kHz
230-470	-36 dBm	100 kHz
470-694	-54 dBm	100 kHz
694-1000	-36 dBm	100 kHz
1000-12750	-30 dBm	1 MHz

#### Test Parameters

<b>Frequency</b>	30-12750 MHz	<b>Setup</b>	Antenna Port
<b>RBW</b>	<1000 MHz – 100 kHz >1000 MHz – 1 MHz	<b>VBW</b>	<1000 MHz – 300 kHz >1000 MHz – 3 MHz
<b>Measurement Mode</b>	Time Domain Power		

#### Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960173	Cable	A.H. Systems, Inc.	SAC-26G-1	388	6/13/2023	6/12/2024	Active Verification
EE 960085	Analyzer - EMI Receiver	Agilent	N9038A	MY51210148	4/27/2024	4/27/2025	Active Calibration



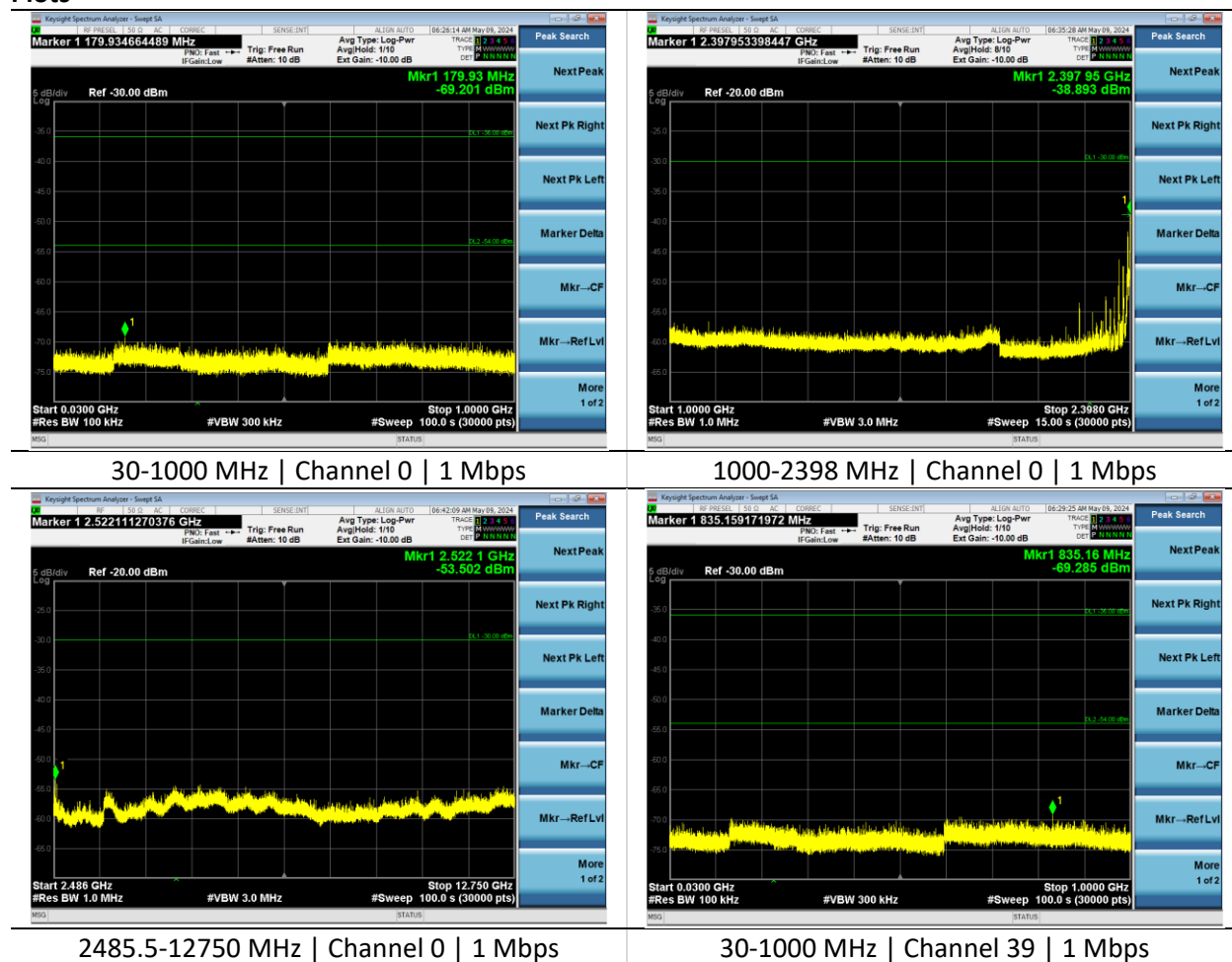
## EUT Parameters

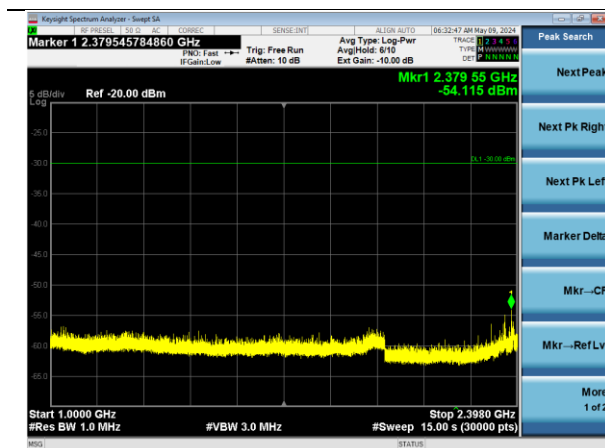
Input Power	120 VAC @ 60 Hz	Mode	BLE Tx
Frequency	2402-2480 MHz	Channel	0, 39

## Measurements

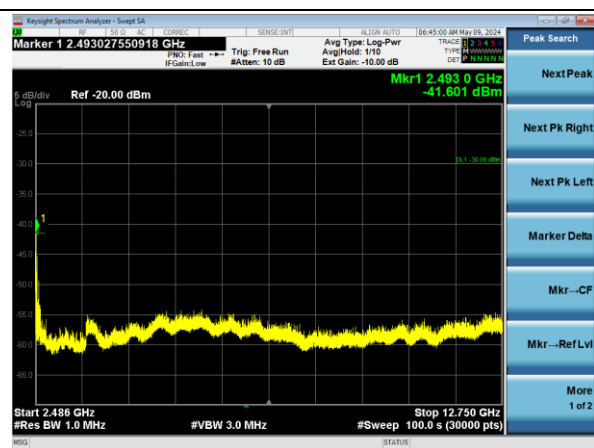
Channel	Rate	Frequency (MHz)	Measurement (dBm)	EIRP (dBm)	Limit (dBm)	Margin (dB)
0	1 Mbps	2398.0	-60.5	-58.0	-30.0	28.0

## Plots





1000-2398 MHz | Channel 39 | 1 Mbps



2485.5-12750 MHz | Channel 39 | 1 Mbps

Company: Ezurio	Page 26 of 42	Name: SONA NX611 M.2 2230, 1 MHF
Report: TR3768-166-ETSI-300-328-BLE		Model:SONA NX611M
Job: C-3768		Serial:00047

## 6.1.6 Receiver Spurious Domain

<b>Operator</b>	Dylan Rosenfeldt	<b>QA</b>	Anthony Smith
<b>Temperature</b>	21.8°C	<b>R.H. %</b>	31.40%
<b>Test Date</b>	04/25/2024	<b>Location</b>	Conducted RF Bench
<b>Requirement</b>	4.3.2.10	<b>Method</b>	5.4.10

### Limits:

Frequency (MHz)	Maximum Power	Bandwidth
30-1000	-57 dBm	100 kHz
1000-12750	-47 dBm	1 MHz

### Test Parameters

<b>Frequency</b>	30-12750 MHz	<b>Setup</b>	Antenna Port
<b>RBW</b>	<1000 MHz – 100 kHz >1000 MHz – 1 MHz	<b>VBW</b>	<1000 MHz – 300 kHz >1000 MHz – 3 MHz
<b>Measurement Mode</b>	Time Domain Power		

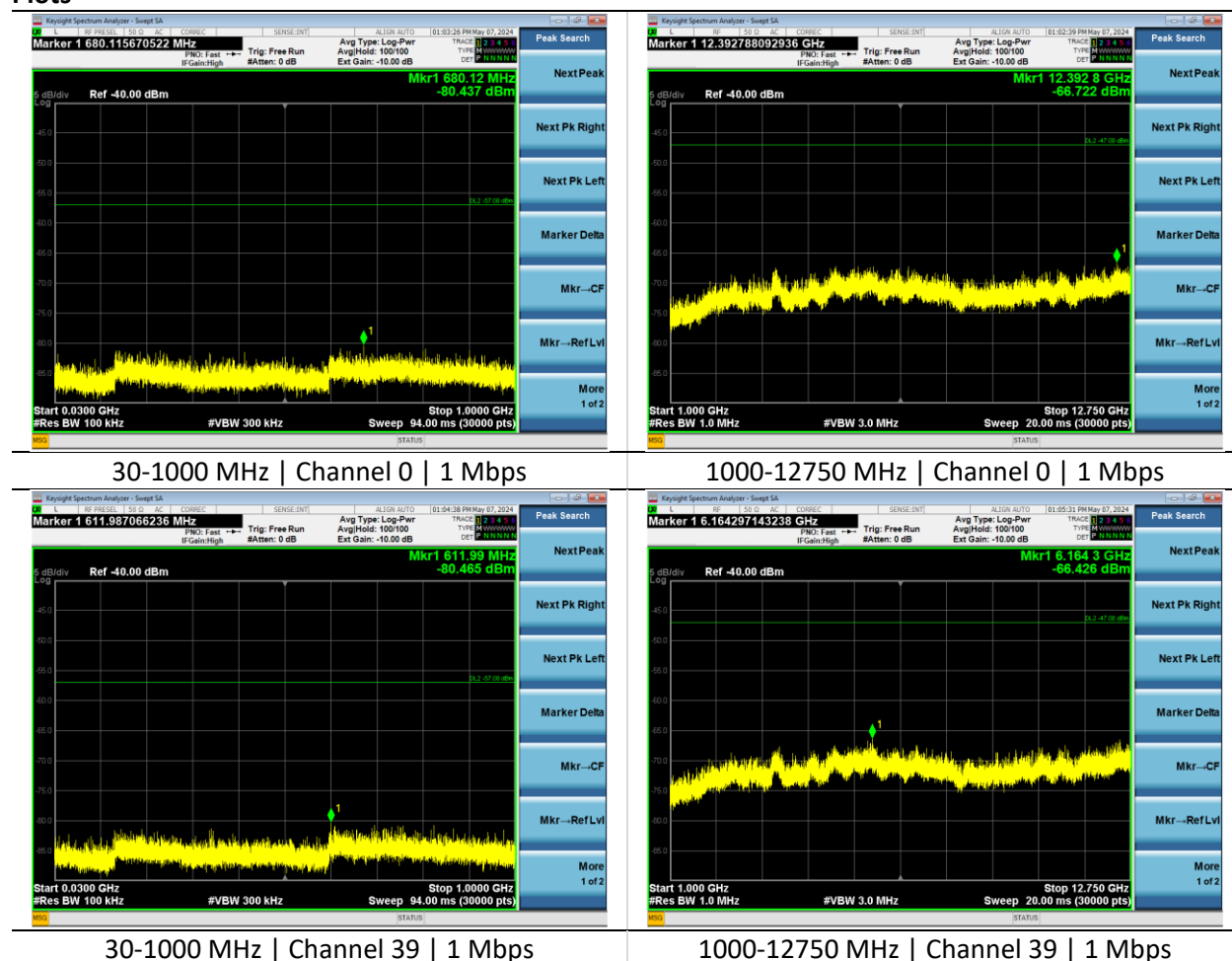
### Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960173	Cable	A.H. Systems, Inc.	SAC-26G-1	388	6/13/2023	6/12/2024	Active Verification
EE 960085	Analyzer - EMI Receiver	Agilent	N9038A	MY51210148	4/27/2024	4/27/2025	Active Calibration

### EUT Parameters

<b>Input Power</b>	120 VAC @ 60 Hz	<b>Mode</b>	BLE Rx
<b>Frequency</b>	2402-2480 MHz	<b>Channel</b>	0, 39

## Plots



### 6.1.7 Receiver Blocking

<b>Operator</b>	Anthony Smith	<b>QA</b>	Adam Alger
<b>Temperature</b>	21.8°C	<b>R.H. %</b>	54.0%
<b>Test Date</b>	05/29/2024	<b>Location</b>	Conducted RF Bench
<b>Requirement</b>	4.3.2.11	<b>Method</b>	5.4.11

**Table 15: Receiver Blocking parameters receiver Category 2 equipment**

Wanted signal mean power from companion device (dBm) (see notes 1 and 3)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 3)	Type of blocking signal
(-139 dBm + $10 \times \log_{10}(\text{OCBW}) + 10 \text{ dB}$ ) or (-74 dBm + 10 dB) whichever is less (see note 2)	2 380 2 504 2 300 2 584	-34	CW
<p>NOTE 1: OCBW is in Hz.</p> <p>NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to <math>P_{\min} + 26 \text{ dB}</math> where <math>P_{\min}</math> is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.</p> <p>NOTE 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.</p>			

### Test Parameters

<b>Receiver Level</b>	2	<b>Performance Criteria</b>	10% PER
<b>Signal Value</b>	-68.9 dBm	<b>Signal Power Companion Device</b>	-71.4 dBm
<b>Blocking Signal Frequencies</b>	2380, 2504, 2300, 2584 MHz		

### Instrumentation

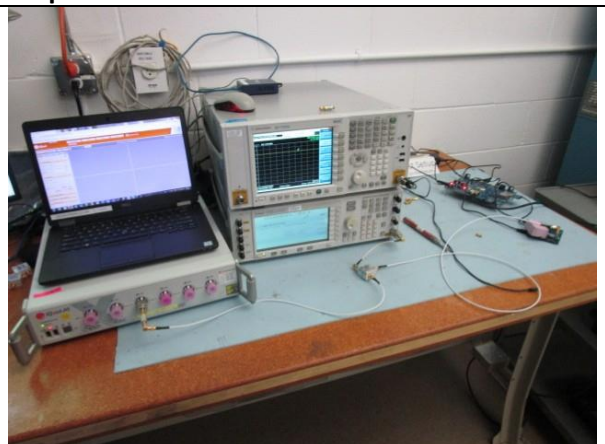
Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
EE 960087	Analyzer - Spectrum	Agilent	N9010A	MY53400296	4/11/2024	4/11/2025	Active Calibration
EE 960184	RF Splitter/Combiner	mini-circuits	ZFSC-2-10G +	S F707601702	12/12/2023	12/12/2024	Active Verification
CC 000314C	Vector Signal Generator	Agilent	E4438C	US 41469143	9/21/2022	9/20/2024	Active Calibration

Company: Ezurio	Page 29 of 42	Name: SONA NX611 M.2 2230, 1 MHF
Report: TR3768-166-ETSI-300-328-BLE		Model:SONA NX611M
Job: C-3768		Serial:00047

## EUT Parameters

<b>Input Power</b>	120 VAC @ 60 Hz	<b>Mode</b>	BLE Tx
<b>Frequency</b>	2402-2480 MHz	<b>Channel</b>	0, 39

## Setup Photos



Channel	Rate	2380 MHz	2504 MHz	2300 MHz	2584 MHz	Packets
		PER %				
0	125 kbps	0.0	-	-	-	1000
39	125 kbps	-	0.1	-	-	999
0	125 kbps	-	-	0.0	-	1000
39	125 kbps	-	-	-	0.0	1000

## 6.2 Radiated Emissions

<b>Description of Measurement</b>	<p>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.</p> <p>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.</p> <p>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.</p>
<b>Example Calculations</b>	<p>Measurement (dBμV) + Cable factor (dB) + Other (dB) + Antenna Factor (dB/m) = Corrected Reading (dBμV/m)</p> <p>Margin (dB) = Limit (dBμV/m) - Corrected Reading (dBμV/m)</p> <p>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</p>

### Block Diagram



## 6.2.1 Transmitter unwanted emissions in the spurious domain

<b>Operator</b>	Mitchell Freund   Nicole Sedmak Jon Dilley   Zachary Brown	<b>QA</b>	Anthony Smith   Adam Alger Adam Hauke   Dylan Rosenfeldt
<b>Temperature</b>	23.3°C-25.5°C	<b>R.H. %</b>	36.10%-42.90%
<b>Test Date</b>	04/30/2024-05/10/2024	<b>Location</b>	Chamber 3   Chamber 5
<b>Requirement</b>	4.3.2.9	<b>Method</b>	5.4.9

### Limits:

Frequency (MHz)	Maximum Power	Bandwidth
30-47	-36 dBm	100 kHz
47-74	-54 dBm	100 kHz
74-87.5	-36 dBm	100 kHz
87.5-118	-54 dBm	100 kHz
118-174	-36 dBm	100 kHz
174-230	-54 dBm	100 kHz
230-470	-36 dBm	100 kHz
470-694	-54 dBm	100 kHz
694-1000	-36 dBm	100 kHz
1000-12750	-30 dBm	1 MHz

### Test Parameters

<b>Frequency</b>	30-12750 MHz	<b>Distance</b>	3 m
<b>Detector(s)</b>	Peak	<b>Table Height</b>	150 cm
<b>RBW</b>	<1000 MHz – 100 kHz >1000 MHz – 1 MHz	<b>VBW</b>	<1000 MHz – 300 kHz >1000 MHz – 3 MHz
<b>Measurement Mode</b>	Time Domain Power		
<b>Note</b>	No emissions within 6 dB of the limit.		



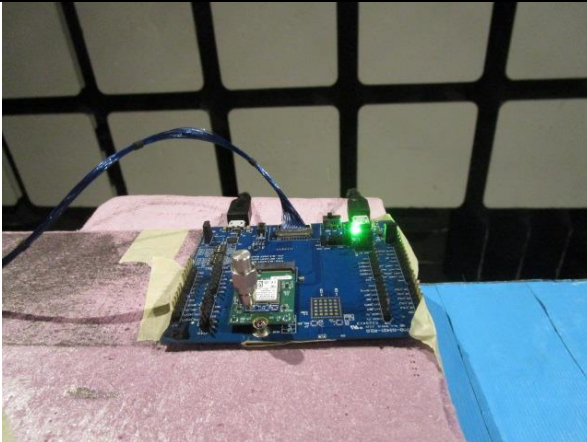
## Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960007	Antenna - Double Ridge Horn	EMCO	3115	9311-4138	8/10/2023	8/10/2024	Active Calibration
AA 960154	Filter - High Pass 2.4 GHz	KWM	HPF-L-14186	7272-02	4/11/2024	4/11/2025	Active Calibration
AA 960163	Antenna - Log Periodic	A.H. Systems, Inc.	SAS-512-2	500	8/10/2023	8/10/2024	Active Calibration
AA 960217	Antenna - Biconical	A.H. Systems, Inc.	SAS-540	852	7/17/2023	7/17/2024	Active Calibration
AA 960221	Cable	A.H. Systems, Inc.	SAC-26G-6	524	6/13/2023	6/13/2024	Active Verification
EE 960085	Analyzer - EMI Receiver	Agilent	N9038A	MY51210148	4/27/2024	4/27/2025	Active Calibration
EE 960203	Analyzer - EMI Receiver	Keysight	N9038A	MY56400072	4/11/2024	4/11/2025	Active Calibration
LSC-300	Cable	Chamber 3 Emissions	-	-	1/5/2024	1/5/2025	Active Verification
LSC-500	Cable	Chamber 5 Emissions	-	-	1/8/2024	1/8/2025	Active Verification

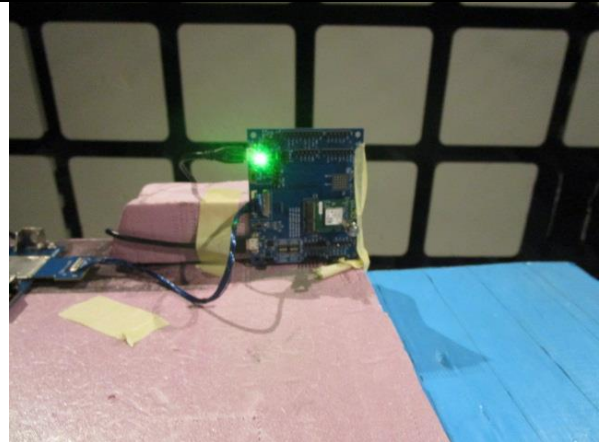
## EUT Parameters

<b>Input Power</b>	120 VAC @ 60 Hz	<b>Mode</b>	BLE Tx
<b>EUT</b>	X, Y, Z Plane Orientations Antenna ports terminated with 50 $\Omega$ SMA terminators	<b>AE</b>	HP Elitebook 840G1 Ezurio – SOM60 Development Kit
<b>Notes</b>	6000 MHz Emission from auxiliary equipment. Not a function of the EUT.		

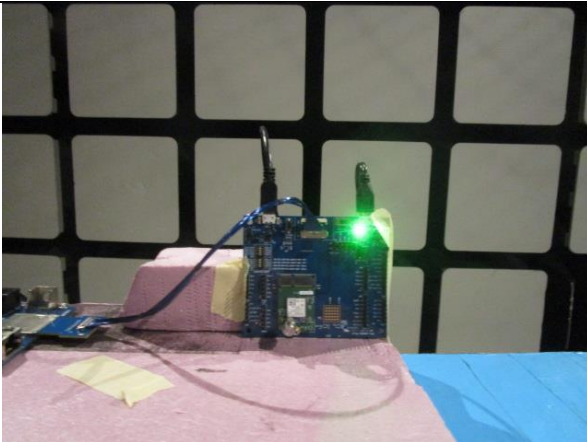
## Setup Photos



X Plane



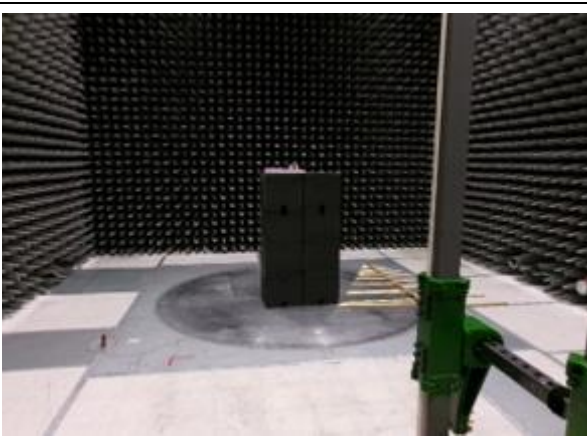
Y Plane



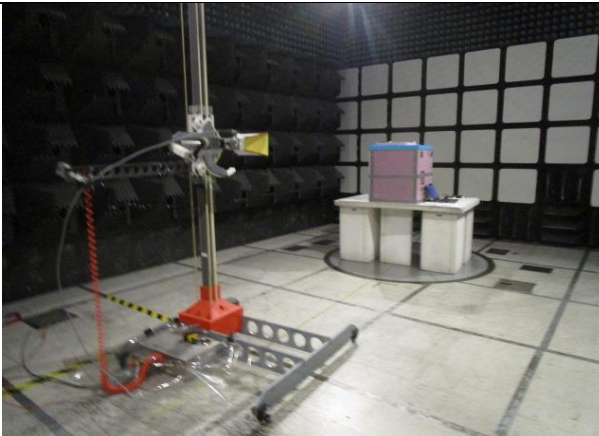
Z Plane



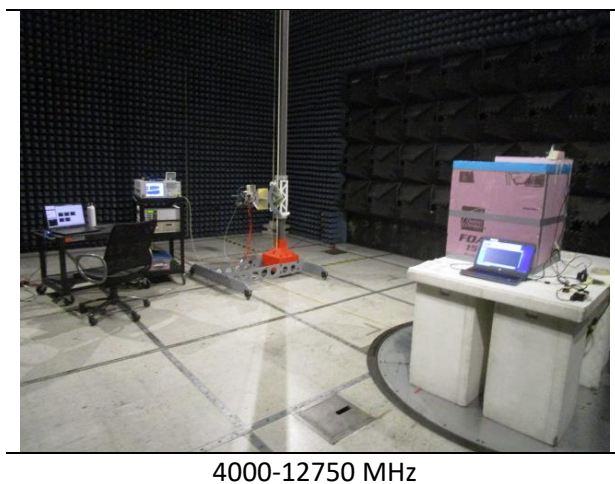
30-200 MHz



200-1000 MHz

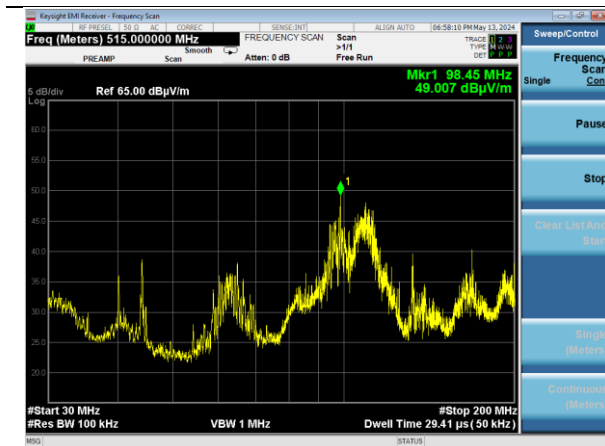


1000-4000 MHz

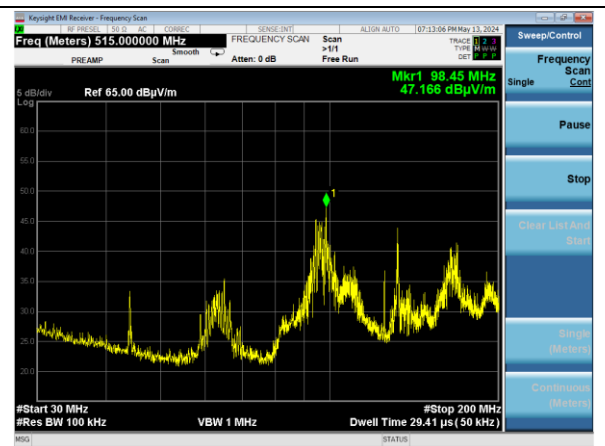


4000-12750 MHz

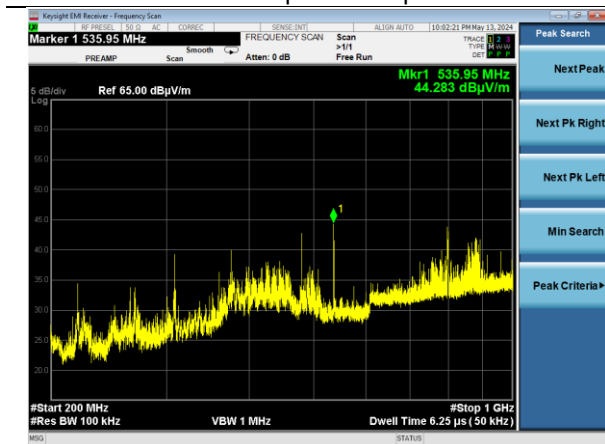
## Worst Case Plots



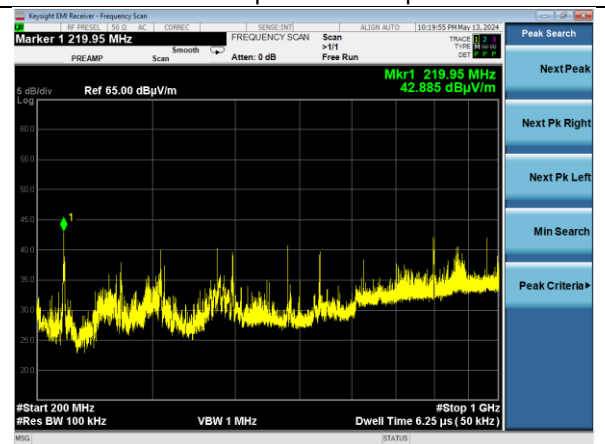
Channel 0 | 1 Mbps  
30-200 MHz | Vertical | Y Plane



Channel 39 | 1 Mbps  
30-200 MHz | Horizontal | Y Plane

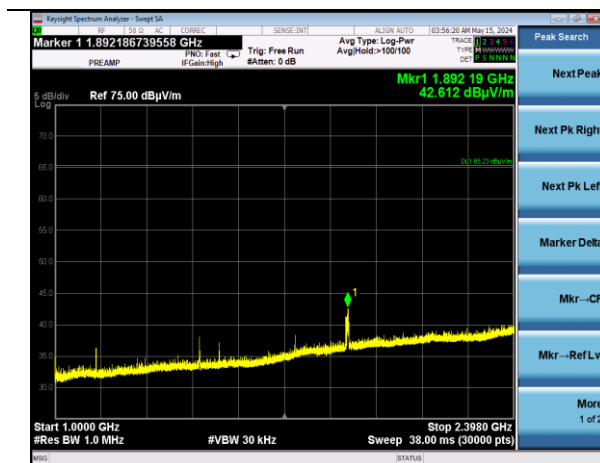


Channel 37 | 1 Mbps  
200-1000 MHz | Vertical | Y Plane



Channel 39 | 1 Mbps |  
200-1000 MHz | Horizontal | Y Plane

Company: Ezurio	Page 35 of 42	Name: SONA NX611 M.2 2230, 1 MHF
Report: TR3768-166-ETSI-300-328-BLE		Model:SONA NX611M
Job: C-3768		Serial:00047



Channel 37 | 125 kbps  
1000-2398 MHz | Horizontal | Z Plane



Channel 39 | 125 kbps  
2485.5-4000 MHz | Horizontal | Z Plane



Channel 37 | 1 Mbps  
4000-12750 MHz | Vertical | Y Plane



Channel 39 | 1 Mbps  
4000-12750 MHz | Horizontal | Y Plane

## 6.2.2 Receiver spurious

<b>Operator</b>	Mitchell Freund   Nicole Sedmak Jon Dilley   Zachary Brown	<b>QA</b>	Anthony Smith   Adam Alger Adam Hauke   Dylan Rosenfeldt
<b>Temperature</b>	23.3°C-25.5°C	<b>R.H. %</b>	36.10%-42.90%
<b>Test Date</b>	04/30/2024-05/10/2024	<b>Location</b>	Chamber 3   Chamber 5
<b>Requirement</b>	4.3.2.9	<b>Method</b>	5.4.9

### Limits:

Frequency (MHz)	Maximum Power	Bandwidth
30-1000	-57 dBm	100 kHz
1000-12750	-47 dBm	1 MHz

### Test Parameters

<b>Frequency</b>	30-12750 MHz	<b>Distance</b>	3 m
<b>Detector(s)</b>	Peak	<b>Table Height</b>	150 cm
<b>RBW</b>	<1000 MHz – 100 kHz >1000 MHz – 1 MHz	<b>VBW</b>	<1000 MHz – 300 kHz >1000 MHz – 3 MHz
<b>Note</b>	No emissions within 6 dB of the limit.		

## Instrumentation

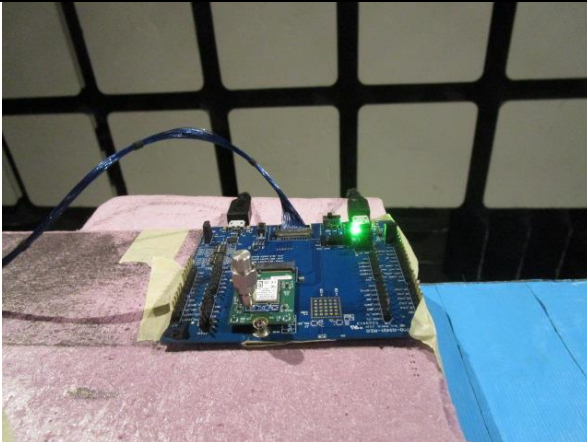
Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960007	Antenna - Double Ridge Horn	EMCO	3115	9311-4138	8/10/2023	8/10/2024	Active Calibration
AA 960154	Filter - High Pass 2.4 GHz	KWM	HPF-L-14186	7272-02	4/11/2024	4/11/2025	Active Calibration
AA 960163	Antenna - Log Periodic	A.H. Systems, Inc.	SAS-512-2	500	8/10/2023	8/10/2024	Active Calibration
AA 960217	Antenna - Biconical	A.H. Systems, Inc.	SAS-540	852	7/17/2023	7/17/2024	Active Calibration
AA 960221	Cable	A.H. Systems, Inc.	SAC-26G-6	524	6/13/2023	6/13/2024	Active Verification
EE 960085	Analyzer - EMI Receiver	Agilent	N9038A	MY51210148	4/27/2024	4/27/2025	Active Calibration
EE 960203	Analyzer - EMI Receiver	Keysight	N9038A	MY56400072	4/11/2024	4/11/2025	Active Calibration
LSC-300	Cable	Chamber 3 Emissions	-	-	1/5/2024	1/5/2025	Active Verification
LSC-500	Cable	Chamber 5 Emissions	-	-	1/8/2024	1/8/2025	Active Verification

## EUT Parameters

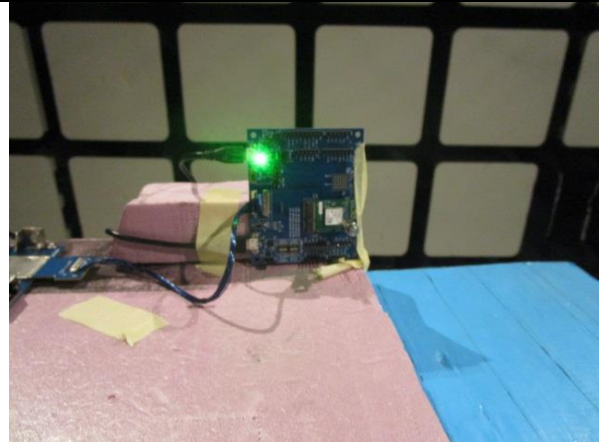
<b>Input Power</b>	120 VAC @ 60 Hz	<b>Mode</b>	BLE Rx
<b>EUT</b>	X, Y, Z Plane Orientations Antenna ports terminated with 50 $\Omega$ SMA terminators	<b>AE</b>	HP Elitebook 840G1 Ezurio – SOM60 Development Kit
<b>Notes</b>	6000 MHz Emission from auxiliary equipment. Not a function of the EUT.		



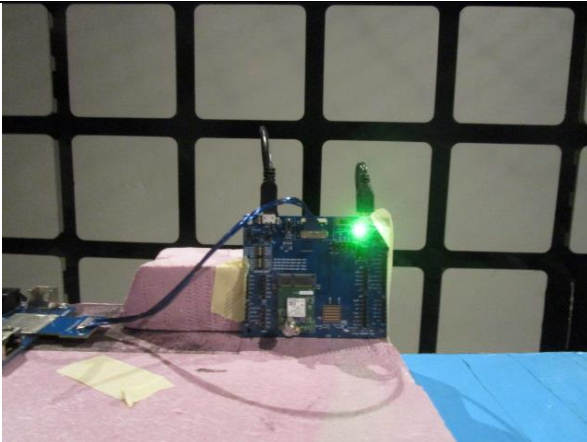
**Setup Photos**



X Plane



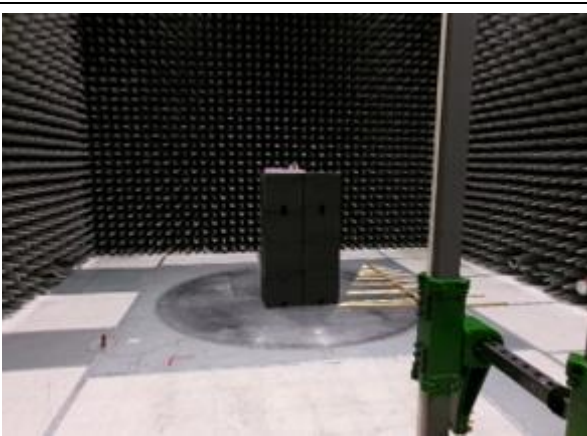
Y Plane



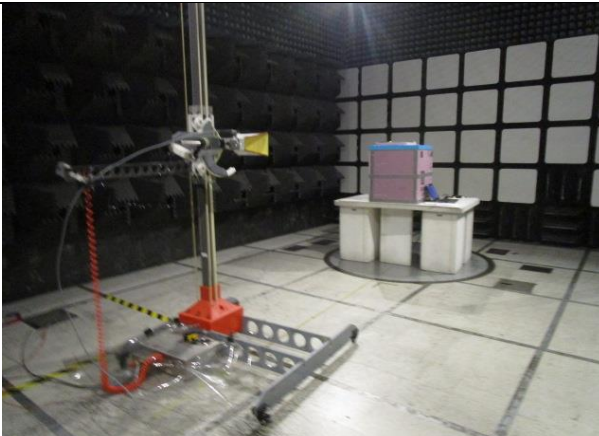
Z Plane



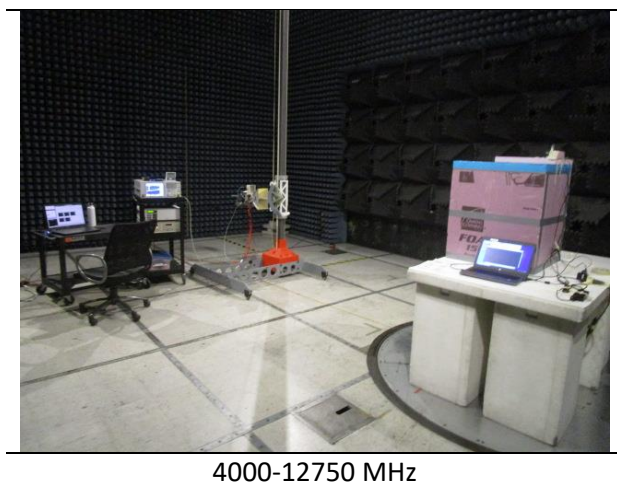
30-200 MHz



200-1000 MHz

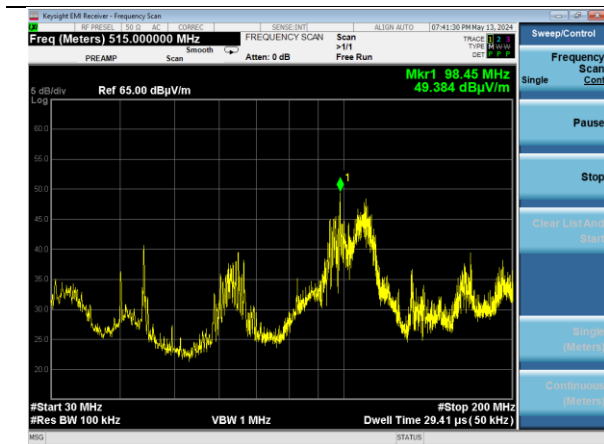


1000-4000 MHz



4000-12750 MHz

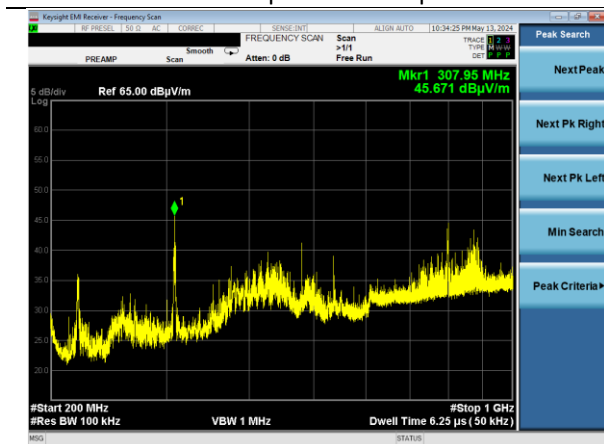
### Worst Case Plots



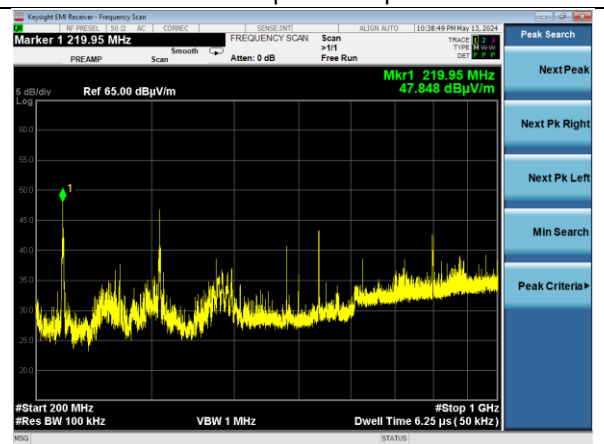
Channel 0 | 1 Mbps  
30-200 MHz | Horizontal | X Plane



Channel 39 | 1 Mbps  
30-200 MHz | Vertical | X Plane

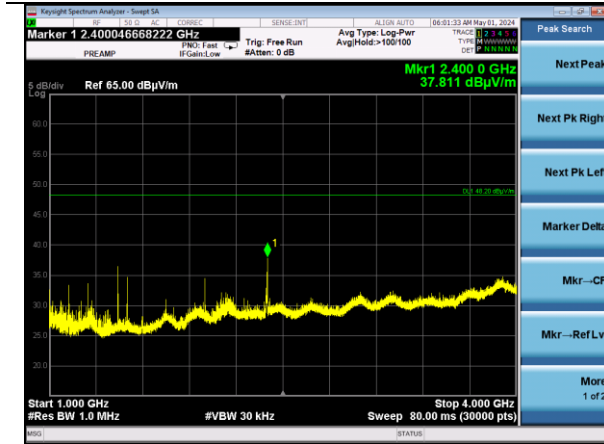


Channel 0 | 1 Mbps  
200-1000 MHz | Vertical | Z Plane

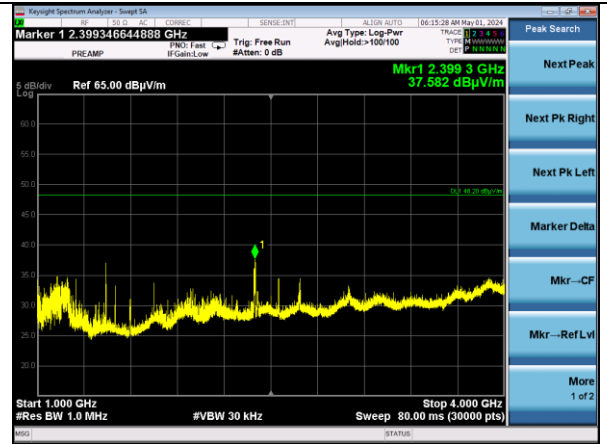


Channel 39 | 1 Mbps |  
200-1000 MHz | Horizontal | Z Plane

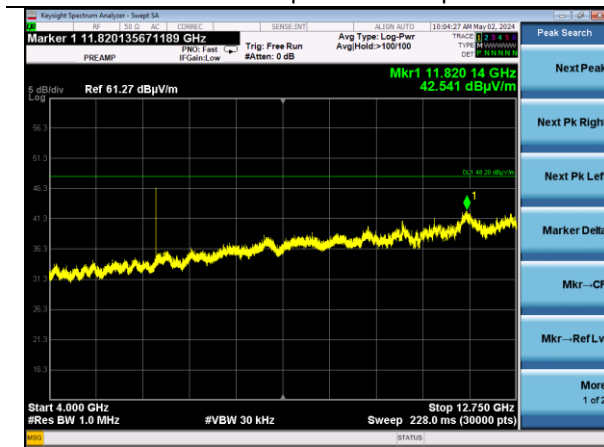




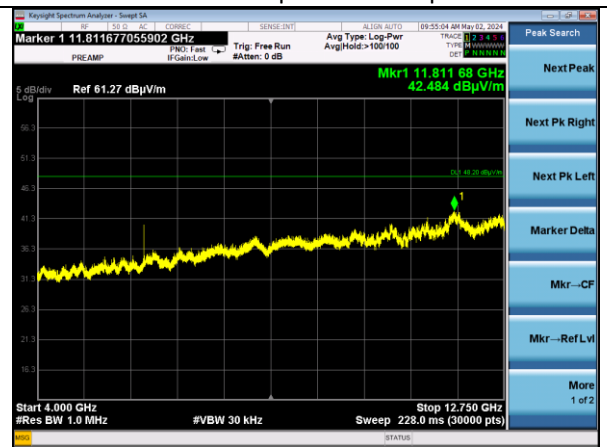
Channel 0 | 1 Mbps  
1000-4000 MHz | Horizontal | X Plane



Channel 39 | 1 Mbps  
1000-4000 MHz | Horizontal | X Plane



Channel 0 | 1 Mbps  
4000-12750 MHz | Vertical | Z Plane



Channel 39 | 1 Mbps  
4000-12750 MHz | Horizontal | Z Plane

## 7 REVISION HISTORY

Version	Date	Notes	Person
0.0	08/19/2024	Initial Draft	Adam Hauke
0.1	01/14/2025	Updated Draft	Adam Alger
1	2/13/2025	Final	Adam Alger

**END OF REPORT**