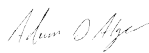


Test Report 3768-180-5G-UNII3

Equipment Under Test:	SONA NX611
Requirement(s):	eCFR 47 Part 15.407 RSS-247
Test Date(s):	02/12/2024-07/10/2024, 12/04/2024-01/17/2025
Prepared for:	Ezurio Attn: Brian Petted W66 N220 Commerce Ct. Cedarburg, WI 53012

Report Issued by: Dylan Rosenfeldt, EMC Engineer	
Signature: 	Date: 02/14/2025
Report Reviewed by: Adam Alger, Manager EMC Laboratory	
Signature: 	Date: 02/12/2025
Report Constructed by: Dylan Rosenfeldt, EMC Engineer	
Signature: 	Date: 02/12/2025

This test report may not be reproduced, except in full, without approval of Ezurio

Company: Ezurio	Page 1 of 39	Name: SONA NX611
Report: TR3768-180-5G-UNII3		Model: SONA NX611C
Quote: C-3768		Serial: 00026 00028 00042

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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 39	Name: SONA NX611
Report: TR3768-180-5G-UNII3		Model: SONA NX611C
Quote: C-3768		Serial: 00026 00028 00042

1 TEST REPORT SUMMARY

During **02/15/2024-07/10/2024, 12/04/2024-01/17/2025** the Equipment Under Test (EUT), **SONA NX611**, as provided by Ezurio was tested to the following requirements:

Operation in the 5.725-5.85 GHz bands

Requirements	Description	Method	Compliant
15.407(b)(4) & (9) 15.209 RSS-247 Clause 6.2.4 RSS-GEN	Spurious Radiated Emissions in Restricted Bands 30-40000 MHz	ANSI C63.10 12.7	Yes
15.407(e) RSS-247 Clause 6.2.4	6dB Bandwidth	ANSI C63.10 12.5	Yes
15.407(a)(3) RSS-247 Clause 6.2.4	RF Output Power	ANSI C63.10 12.4	Yes
15.407(b)(4) RSS-247 Clause 6.2.4	Conducted Out-of-band Emissions	ANSI C63.10 12.7	Yes
15.407(a)(3) RSS-247 Clause 6.2.4	Power Spectral Density	ANSI C63.10 12.6	Yes
15.407(b)(9) 15.207 RSS-GEN	AC Conducted Emissions	ANSI C63.10 6.2	Yes
15.407(g)	Frequency Stability	ANSI C63.10 6.8	Reported

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

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	SONA NX611
Part Number	453-00180
Serial Number	00026 00028 00042
FCC ID	SQG-SONANX611C
IC ID	3147A-SONANX611C

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 39	Name: SONA NX611
Report: TR3768-180-5G-UNII3		Model: SONA NX611C
Quote: C-3768		Serial: 00026 00028 00042

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)	
					2400-2480 MHz	5150-5850 MHz
TDK	Multilayer Antenna	ANT162442DT-2001A2	1.6mm x 0.8mm x 0.4mm	Chip	3.3	4.2

2.8 Test Channels

Channel	Frequency (MHz)	Bandwidth (MHz)	Data Rates
149	5745	20	802.11a – 6 and 54 Mbps 802.11n – MCS0 and MCS7 802.11ac – MCS0 and MCS9 802.11ax – MCS0 and MCS11
157	5785	20	
165	5825	20	
151	5755	40	
159	5795	40	
155	5775	80	

2.9 Power Table and Reduced Video Bandwidth for Average Measurements

802.11	Channel BW (MHz)	Data Rate	Minimum Average VBW (Hz)	Power Setting
a	20	6 Mbps	698	16
a	20	54 Mbps	5565	16
n	20	MCS0	746	14
n	20	MCS7	5959	14
ac	20	MCS0	742	14
ac	20	MCS8	6361	14
ax	20	MCS0	956	12
ax	20	MCS11	8628	12
n	40	MCS0	1506	13
n	40	MCS7	9980	13
ac	40	MCS0	1489	12
ac	40	MCS9	10870	12
ax	40	MCS0	1815	12
ax	40	MCS11	11737	10
ac	80	MCS0	3013	12
ac	80	MCS9	15601	12
ax	80	MCS0	3414	10
ax	80	MCS11	13280	10

802.11	Channel BW (MHz)	Data Rate	Minimum Average VBW (Hz)	Power Setting
ax RU26	20	MCS0	736	14
ax RU52	20	MCS0	736	14
ax RU106	20	MCS0	736	14
ax RU26	40	MCS0	736	11
ax RU52	40	MCS0	736	11
ax RU106	40	MCS0	736	11
ax RU242	40	MCS0	736	11
ax RU26	80	MCS0	736	8
ax RU52	80	MCS0	736	8
ax RU106	80	MCS0	736	8
ax RU242	80	MCS0	736	8
ax RU484	80	MCS0	736	8

3 WORST CASE TEST RESULTS SUMMARY

UNII-3

Requirement	Radio	Channel and Data Rate	Frequency	Measurement	Limit	Margin
15.407(e) RSS-247 Clause 6.2.4 6dB Bandwidth	802.11a	149 6 Mbps	-	16.3 MHz	at least 500 kHz	-
15.407(a)(3) RSS-247 Clause 6.2.4 Output Power	802.11a	149 54 Mbps	-	17.1 dBm	30.0 dBm	12.9 dB
15.407(a)(3) RSS-247 Clause 6.2.4 PSD	80211ax40	151 MCS0 RU26	-	13.3 dBm/500 kHz	30.0 dBm/500 kHz	16.7 dB
15.407(b)(4) RSS-247 Clause 6.2.4 Restricted Band	802.11ax80	155 MCS0 RU26	5661.0 MHz	-22.8 dBm	-20.6 dBm	2.2 dB
15.407(b)(9) RSS-GEN Spurious Below 1 GHz	-	-	-	-	-	-
15.407(b)(4) RSS-247 Clause 6.2.4 Radiated Emissions in the Restricted Band	802.11ax80	155 MCS0 RU26	5659.1 MHz	74.0 dBμV/m	74.9 dBμV/m	0.9 dB
15.407(b)(9) RSS-GEN AC Conducted	802.11a	149 6 Mbps	0.150 MHz	59.1 dBμV	66.0 dBμV	6.9 dB

4 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
KDB 558074 D01	-	2019	-	-
KDB 789033 D02	-	2017	-	-

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

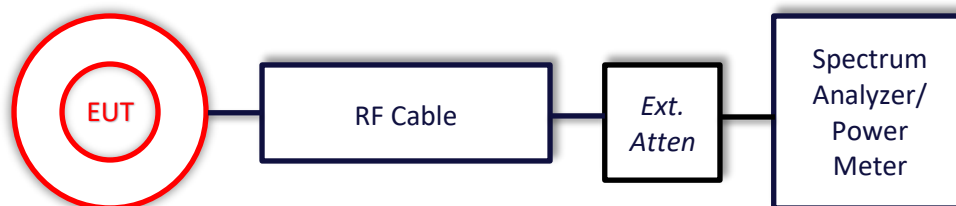
Parameter	ETSI U.C. $\pm$	U.C. $\pm$
Radio Frequency, from F0	1×10^{-7}	0.55×10^{-7}
Occupied Channel Bandwidth	5 %	2 %
RF conducted Power (Power Meter)	1.5 dB	1.2 dB
RF conducted emissions (Spectrum Analyzer)	3.0 dB	1.7 dB
All emissions, radiated	6.0 dB	5.3 dB
Temperature	1° C	0.65° C
Humidity	5 %	2.9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

6 TEST DATA

6.1 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



6.1.1 6dB and 99% Occupied Bandwidth

Operator	Anthony Smith	QA	Adam Hauke
Temperature	21.9°C 22.4°C	R.H. %	27.50% 25.70%
Test Date	02/15/2024 03/28/2024	Location	Conducted RF Bench
Requirement	15.407 (e) RSS-247 Clause 6.2.4	Method	ANSI C63.10 12.5

Limits: For equipment operating in the band 5725-5850 MHz, the minimum 6 dB bandwidth shall be at least 500 kHz.

Test Parameters

Frequency	5725-5850 MHz		
RBW	20 MHz BW – 200 kHz 40 MHz BW – 420 kHz 80 MHz BW – 1 MHz	VBW	20 MHz BW – 620 kHz 40 MHz BW – 1.5 MHz 80 MHz BW – 3 MHz
Detector(s)	Peak	Settings	Max Hold

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 960088	Analyzer - EMI Receiver	Agilent	N9038A	MY51210138	4/10/2023	4/10/2024	Active Calibration

EUT Parameters

Input Power	120 VAC @ 60 Hz	Mode	5 GHz WLAN Tx
Frequency	5745-5825 MHz	Channel	See 2.8

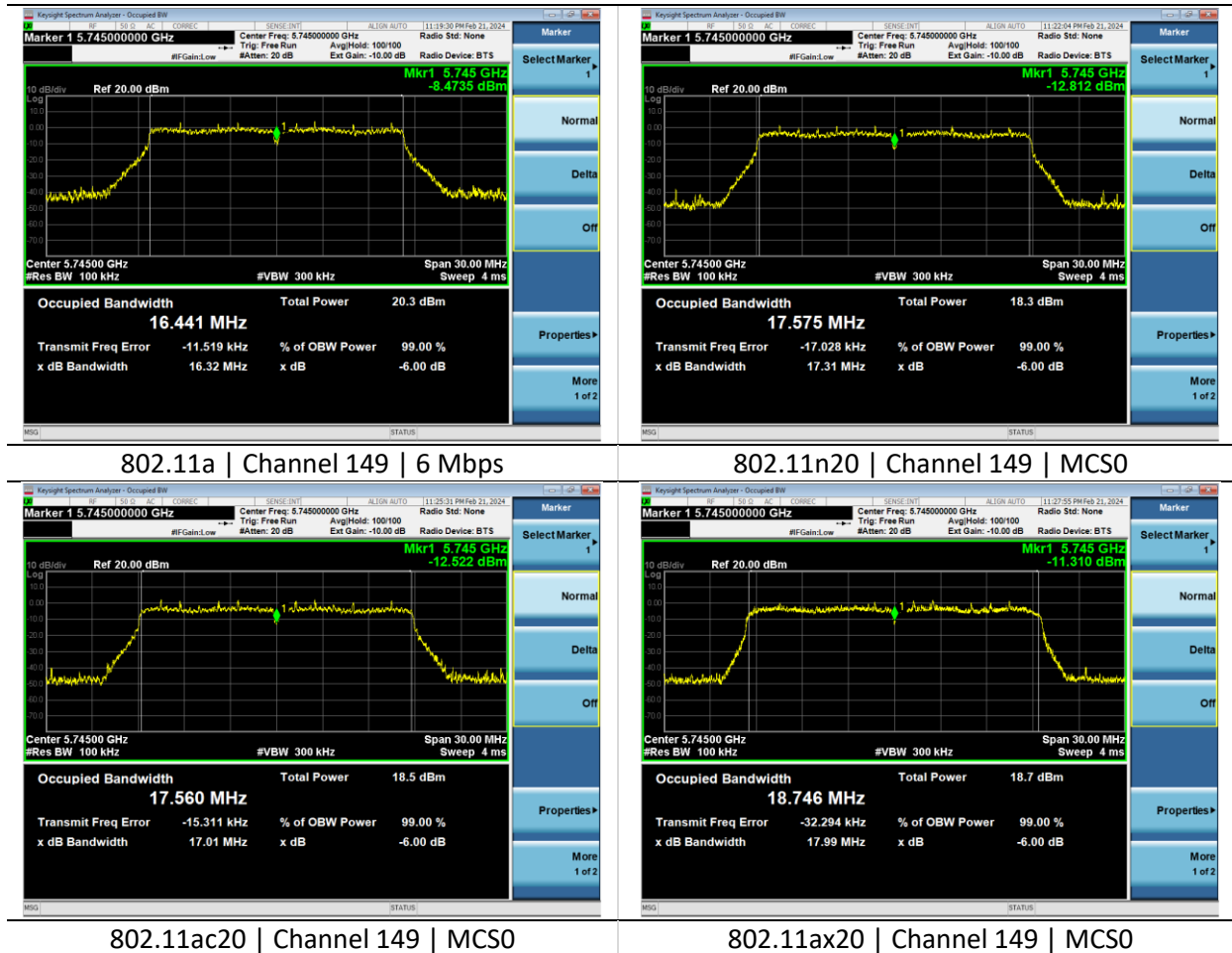
Measurements

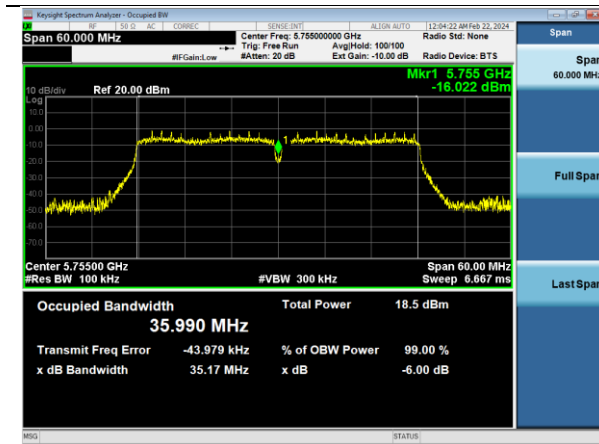
Mode	Rate	Channel	6 dB BW (MHz)	99% BW (MHz)
802.11a	6 Mbps	149	16.3	16.4
		157	16.4	16.4
		165	16.3	16.4
	54 Mbps	149	16.4	16.4
		157	16.5	16.4
		165	16.5	16.4
802.11n20	MCS0	149	17.3	17.6
		157	17.3	17.6
		165	17.5	17.6
	MCS7	149	17.6	17.6
		157	17.7	17.6
		165	17.6	17.6
802.11ac20	MCS0	149	17.0	17.6
		157	17.5	17.6
		165	17.5	17.6
	MCS8	149	17.5	17.6
		157	17.6	17.6
		165	17.7	17.6
802.11ax20	MCS0	149	18.0	18.7
		157	18.1	18.7
		165	18.2	18.7
	MCS11	149	18.0	18.7
		157	18.2	18.7
		165	18.2	18.7

Mode	Rate	Channel	6 dB BW (MHz)	99% BW (MHz)
802.11n40	MCS0	151	35.2	36.0
		159	35.7	36.0
	MCS7	151	35.7	36.0
		159	36.3	36.0
802.11ac40	MCS0	151	35.5	36.0
		159	35.7	36.0
	MCS9	151	35.9	36.1
		159	36.0	36.0
802.11ax40	MCS0	151	36.5	37.5
		159	36.8	37.5
	MCS11	151	36.2	37.4
		159	37.0	37.5
802.11ac80	MCS0	155	76.3	75.8
	MCS9	155	76.4	75.8
802.11ax80	MCS0	155	77.9	77.5
	MCS11	155	77.9	77.4

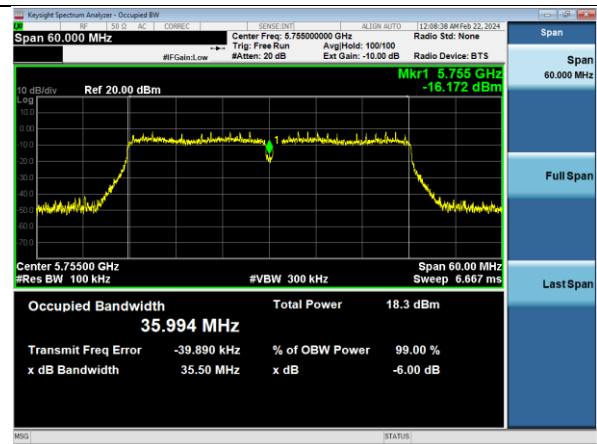
Mode	Rate	Channel	RU Tone / Index	6 dB BW (MHz)	99% BW (MHz)
802.11ax20	MCS0	149	26 / 0	19.0	18.0
			52 / 37	19.1	17.9
			106 / 63	19.1	17.9
802.11ax40	MCS0	151	242 / 61	36.1	20.0
		159	242 / 62	38.1	20.4
802.11ax80	MCS0	155	484 / 65	80.3	43.0
		155	484 / 66	80.1	55.2

U-NII-3 Plots

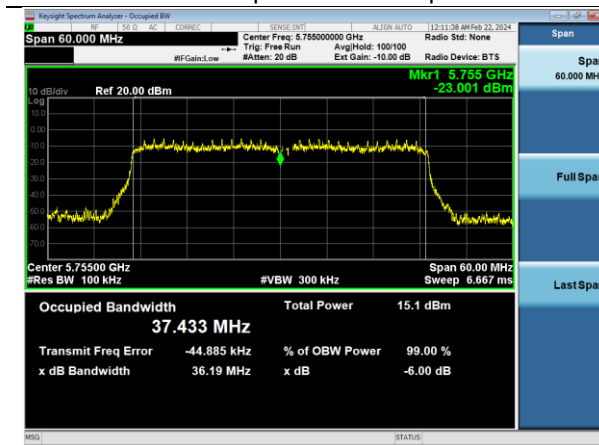




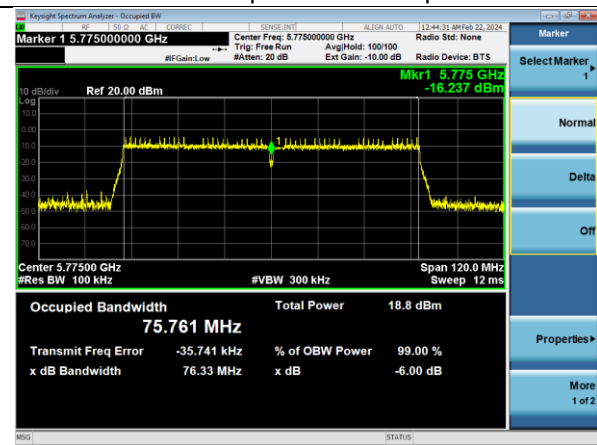
802.11n40 | Channel 151 | MCS0



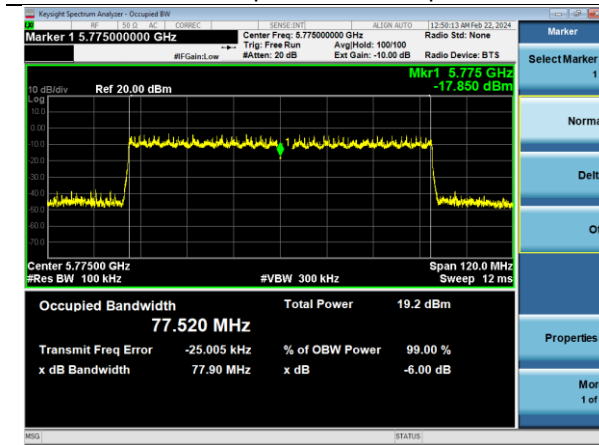
802.11ac40 | Channel 151 | MCS0



802.11ax40 | Channel 151 | MCS11



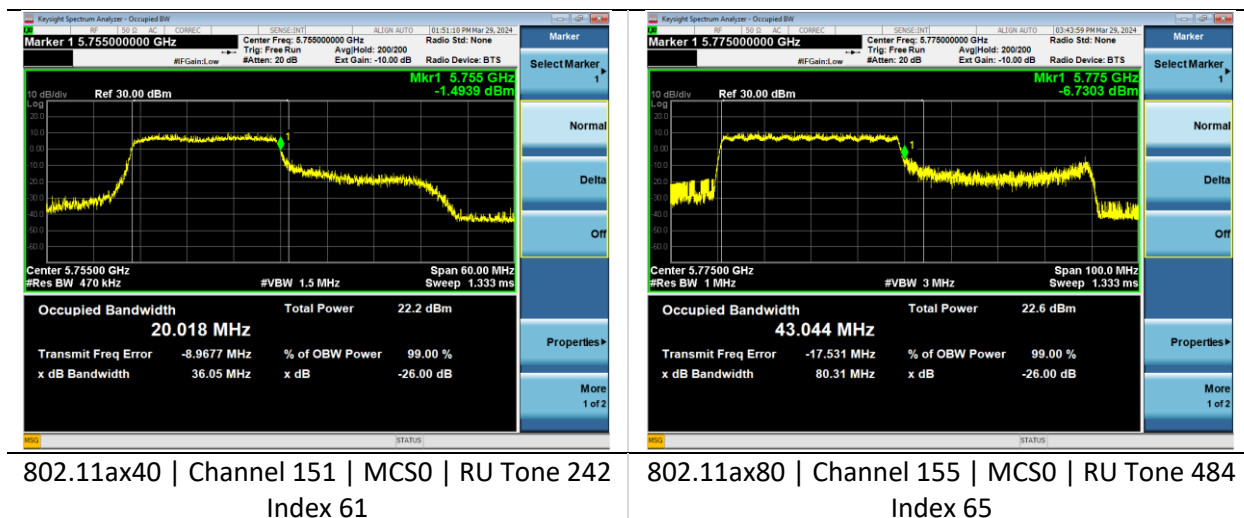
802.11ac80 | Channel 155 | MCS0



802.11ax80 | Channel 155 | MCS0



802.11ax20 | Channel 149 | MCS0 | RU Tone 26 Index 0



6.1.2 RF Output Power

Operator	Dylan Rosenfeldt	QA	Anthony Smith
Temperature	21.6°C 22.1°C 21.8°C 21.6°C 20.1°C 21.5°C	R.H. %	25.90% 29.30% 53.50% 44.40% 18.40% 32.50%
Test Date	02/26/2024-02/27/2024 04/29/2024-04/30/2024 01/13/2025-01/16/2025	Location	Conducted RF Bench
Requirement	15.407 (a)(3) RSS-247 Clause 6.2.4	Method	ANSI C63.10 12.4 AVGSA-2

Limit: For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

Test Parameters

Frequency	5725-5850 MHz	Setup	Antenna Port
RBW	1 MHz	VBW	3 MHz
Detector(s)	Average (RMS)	Settings	Trace Average Span: 30 MHz 60 MHz 120 MHz
Example Calculations	Average Output Power = Measured Power + 10*log(1/D) where D is the duty cycle.		

Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960172	Cable	A.H. Systems, Inc.	SAC-26G-1	387	06/13/2023	06/12/2024	Active Verification
EE 960087	Analyzer – Spectrum	Agilent	N9010A	MY53400296	04/11/2023	04/11/2024	Active Calibration

EUT Parameters

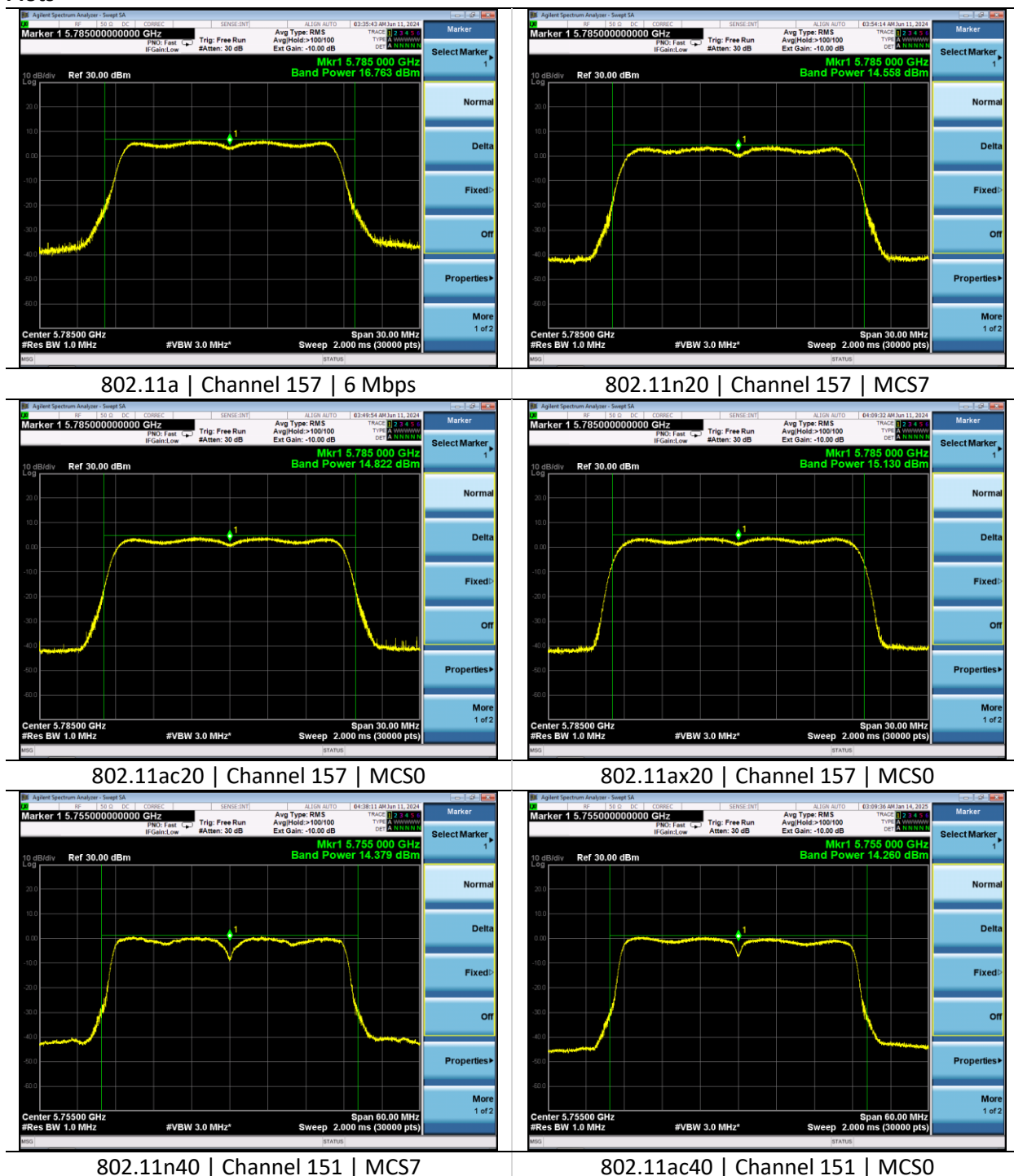
Input Power	120 VAC @ 60 Hz	Mode	5 GHz WLAN Tx
Frequency	5745-5825 MHz	Channel	See 2.8

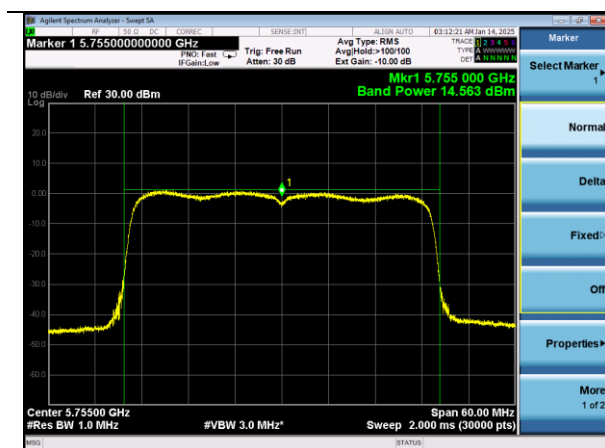
Measurements

Mode	Rate	Channel	Average Output Power (dBm)	Duty Cycle Correction (dB)	Corrected Output Power (dBm)	Limit (dBm)	Margin (dB)
802.11a	6 Mbps	149	16.8	-	16.8	30.0	13.2
		157	16.8	-	16.8	30.0	13.2
		165	16.4	-	16.4	30.0	13.6
	54 Mbps	149	16.7	0.4	17.1	30.0	12.9
		157	16.4	0.4	16.8	30.0	13.2
		165	16.1	0.4	16.5	30.0	13.5
802.11n20	MCS0	149	14.8	-	14.8	30.0	15.2
		157	14.8	-	14.8	30.0	15.2
		165	14.3	-	14.3	30.0	15.7
	MCS7	149	14.4	0.4	14.8	30.0	15.2
		157	14.6	0.4	15.0	30.0	15.0
		165	14.0	0.4	14.4	30.0	15.6
802.11ac20	MCS0	149	14.8	-	14.8	30.0	15.2
		157	14.8	-	14.8	30.0	15.2
		165	14.4	-	14.4	30.0	15.6
	MCS8	149	14.5	0.4	14.9	30.0	15.1
		157	14.5	0.4	14.9	30.0	15.1
		165	14.0	0.4	14.4	30.0	15.6
802.11ax20	MCS0	149	15.1	-	15.1	30.0	14.9
		157	15.1	-	15.1	30.0	14.9
		165	14.6	-	14.6	30.0	15.4
	MCS11	149	10.4	0.5	10.9	30.0	19.1
		157	10.4	0.5	10.9	30.0	19.1
		165	9.9	0.5	10.4	30.0	19.6
802.11n40	MCS0	151	14.9	0.1	15.0	30.0	15.0
		159	14.9	0.1	15.0	30.0	15.0
	MCS7	151	14.4	0.6	15.0	30.0	15.0
		159	14.3	0.6	14.9	30.0	15.1
802.11ac40	MCS0	151	14.3	0.1	14.4	30.0	15.6
		159	13.2	0.1	13.3	30.0	16.7
	MCS9	151	12.4	0.7	13.1	30.0	16.9
		159	12.2	0.7	12.9	30.0	17.1
802.11ax40	MCS0	151	14.6	0.1	14.7	30.0	15.3
		159	13.5	0.1	13.6	30.0	16.4
	MCS11	151	10.4	0.7	11.1	30.0	18.9
		159	10.3	0.7	11.0	30.0	19.0
802.11ac80	MCS0	155	15.3	0.2	15.5	30.0	14.5
	MCS9	155	13.6	1.0	14.6	30.0	15.4
802.11ax80	MCS0	155	12.5	0.2	12.7	30.0	17.3
	MCS11	155	10.8	0.8	11.6	30.0	18.4

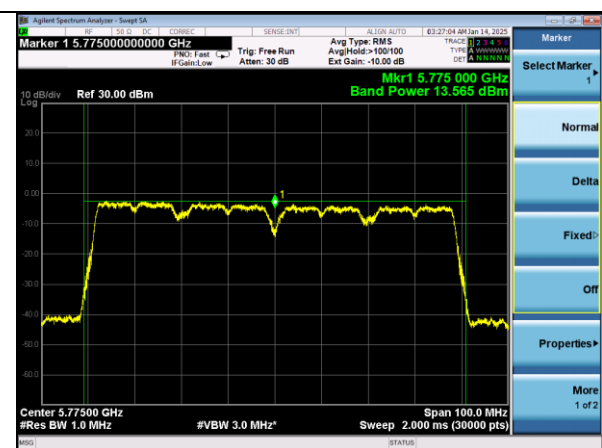
Mode	Rate RU	Channel	Average Output Power (dBm)	Duty Cycle Correction (dB)	Corrected Output Power (dBm)	Limit (dBm)	Margin (dB)
802.11ax20	MCS0 RU26	149	13.1	0.2	13.3	30.0	16.7
		157	11.8	0.2	12.0	30.0	18.0
		165	12.5	0.2	12.7	30.0	17.3
	MCS0 RU52	149	14.7	0.2	14.9	30.0	15.1
		157	13.4	0.2	13.6	30.0	16.4
		165	14.2	0.2	14.4	30.0	15.6
	MCS0 RU106	149	16.2	0.2	16.4	30.0	13.6
		157	15.1	0.2	15.3	30.0	14.7
		165	16.0	0.2	16.2	30.0	13.8
802.11ax40	MCS0 RU26	151	12.1	0.2	12.3	30.0	17.7
	MCS0 RU26	159	11.1	0.2	11.3	30.0	18.7
	MCS0 RU52	151	13.4	0.2	13.6	30.0	16.4
	MCS0 RU52	159	12.4	0.2	12.6	30.0	17.4
	MCS0 RU106	151	13.6	0.2	13.8	30.0	16.2
	MCS0 RU106	159	12.4	0.2	12.6	30.0	17.4
	MCS0 RU242	151	12.7	0.2	12.9	30.0	17.1
802.11ax80	MCS0 RU26	155	10.3	0.2	10.5	30.0	19.5
	MCS0 RU52	155	10.3	0.2	10.5	30.0	19.5
	MCS0 RU106	155	10.4	0.2	10.6	30.0	19.4
	MCS0 RU242	155	10.5	0.2	10.7	30.0	19.3
	MCS0 RU484	155	9.8	0.2	10.0	30.0	20.0

Plots

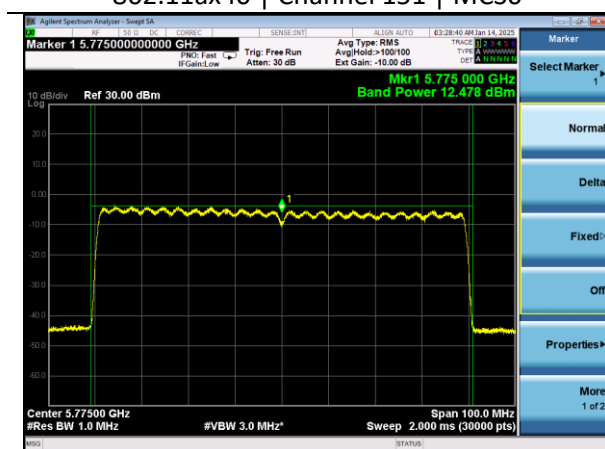




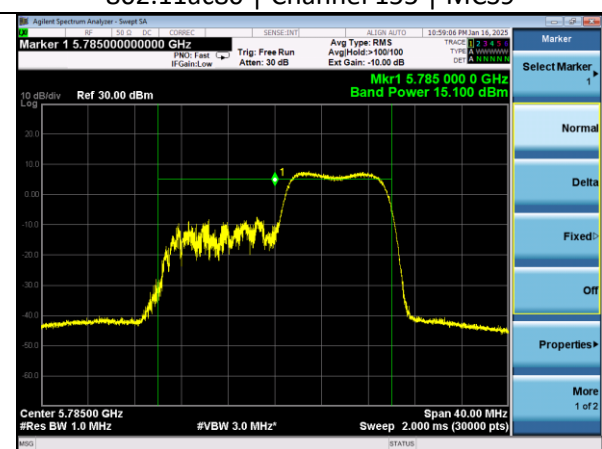
802.11ax40 | Channel 151 | MCS0



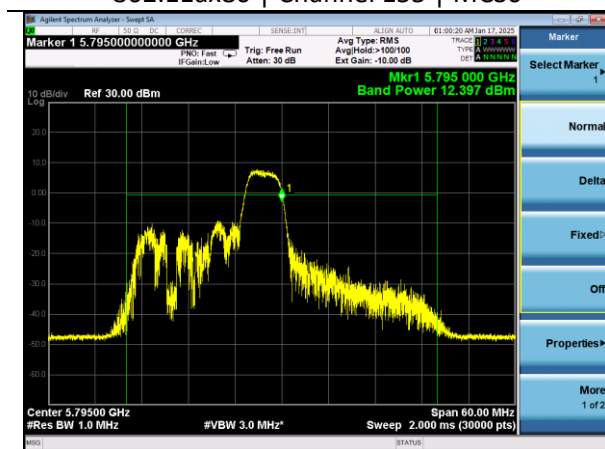
802.11ac80 | Channel 155 | MCS9



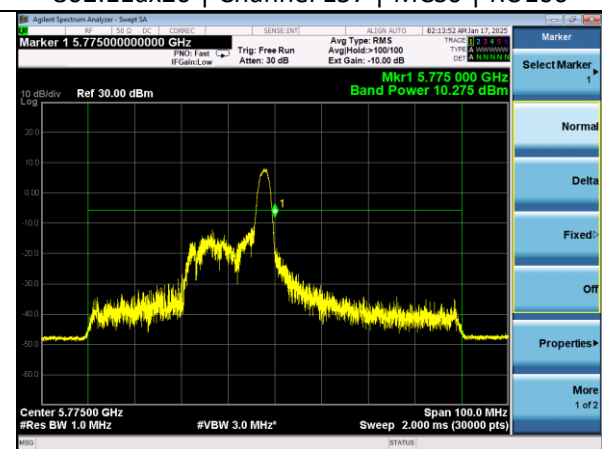
802.11ax80 | Channel 155 | MCS0



802.11ax20 | Channel 157 | MCS0 | RU106



802.11ax40 | Channel 159 | MCS0 | RU 52



802.11ax80 | Channel 155 | MCS0 | RU26

6.1.3 Power Spectral Density

Operator	Dylan Rosenfeldt Anthony Smith	QA	Anthony Smith Adam Hauke
Temperature	21.6°C 22.1°C 21.8°C 21.6°C 20.1°C 21.5°C	R.H. %	25.90% 29.30% 53.50% 44.40% 18.40% 32.50%
Test Date	02/26/2024-02/27/2024 04/29/2024-04/30/2024 01/13/2025-01/16/2025	Location	Conducted RF Bench
Requirement	15.407 (a)(3) RSS-247 Clause 6.2.4	Method	ANSI C63.10 12.6 AVGPSD-2 KDB 789033 D02

Limits: For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.

Test Parameters

Frequency	5725-5850 MHz	Detector(s)	Average (RMS)
RBW	100 kHz	VBW	300 kHz
Notes	The same method of determining the conducted output power shall be used to determine the power spectral density		
Example Calculations	Average PSD = Measured PSD + 10*log(1/D) where D is the duty cycle.		

Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960173	Cable	A.H. Systems, Inc.	SAC-26G-1	388	6/13/2024	6/12/2025	Active Verification
EE 960087	Analyzer - Spectrum	Agilent	N9010A	MY53400296	4/10/2024	4/10/2025	Active Calibration

EUT Parameters

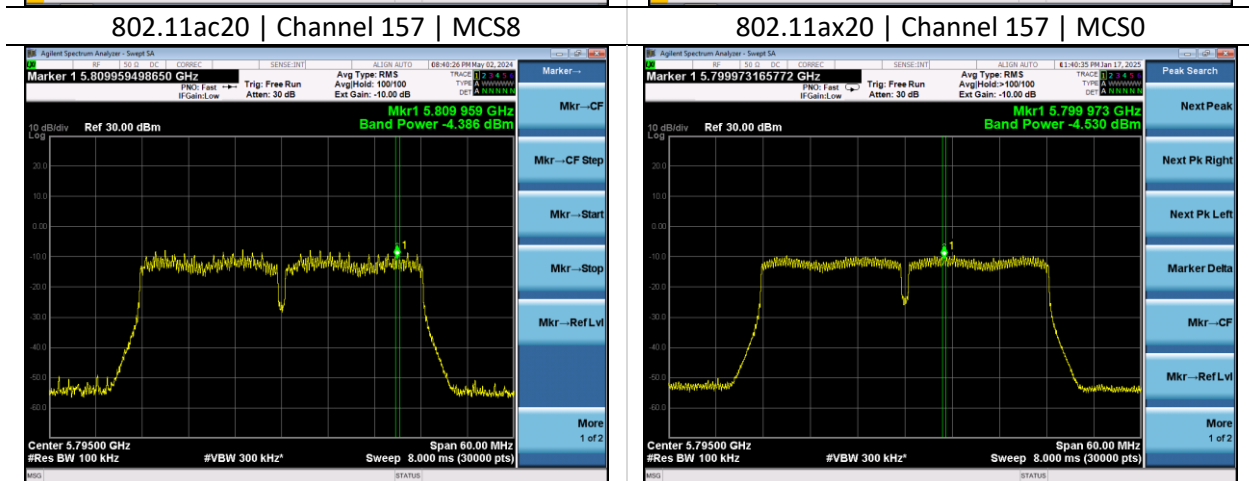
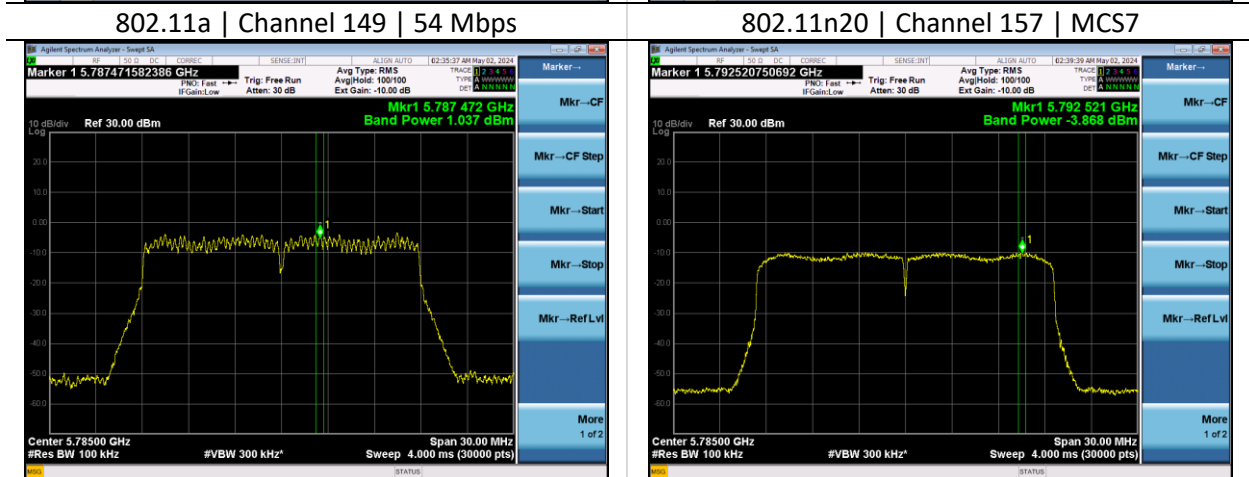
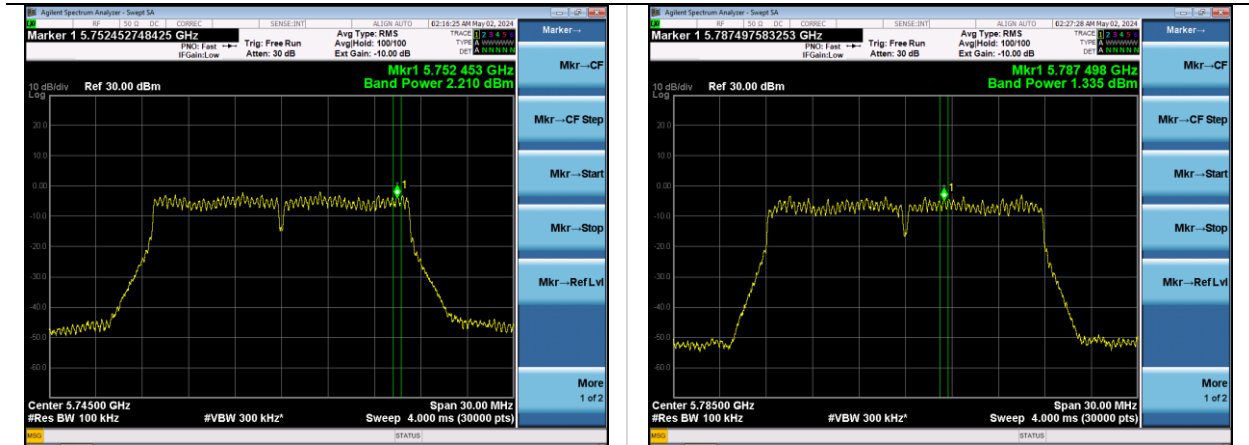
Input Power	120 VAC @ 60 Hz	Mode	5 GHz WLAN Tx
Frequency	5745-5825 MHz	Channel	See 2.8

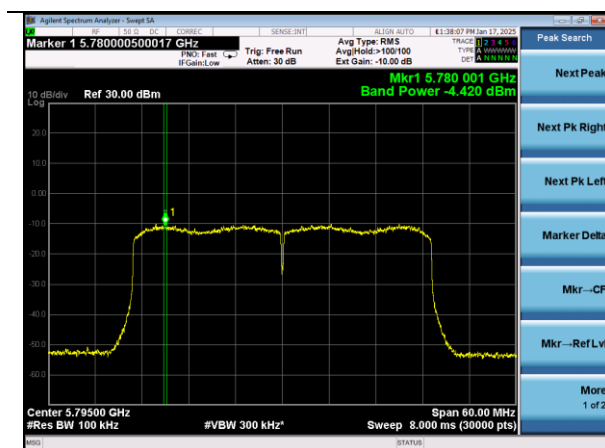
Measurements

Mode	Rate	Channel	Maximum Average PSD (dBm/500 kHz)	Duty Cycle and RBW Correction (dB)	Corrected Output Value (dBm/500 kHz)	Limit (dBm/500 kHz)	Margin (dB)
802.11a	6 Mbps	149	2.3	7.0	9.3	30.0	20.7
		157	2.2	7.0	9.2	30.0	20.8
		165	1.5	7.0	8.5	30.0	21.5
	54 Mbps	149	2.2	7.4	9.6	30.0	20.4
		157	2.2	7.4	9.6	30.0	20.4
		165	1.0	7.4	8.4	30.0	21.6
802.11n20	MCS0	149	0.8	7.0	7.8	30.0	22.2
		157	1.1	7.0	8.1	30.0	21.9
		165	0.5	7.0	7.5	30.0	22.5
	MCS7	149	0.6	7.4	8.0	30.0	22.0
		157	1.3	7.4	8.7	30.0	21.3
		165	0.0	7.4	7.4	30.0	22.6
802.11ac20	MCS0	149	0.8	7.0	7.8	30.0	22.2
		157	0.9	7.0	7.9	30.0	22.2
		165	0.5	7.0	7.5	30.0	22.5
	MCS8	149	1.3	7.4	8.7	30.0	21.3
		157	1.0	7.4	8.4	30.0	21.6
		165	-0.1	7.4	7.3	30.0	22.7
802.11ax20	MCS0	149	-4.6	7.0	2.4	30.0	27.6
		157	-3.9	7.0	3.1	30.0	26.9
		165	-5.2	7.0	1.8	30.0	28.2
	MCS11	149	-4.2	7.5	3.3	30.0	26.7
		157	-3.8	7.5	3.7	30.0	26.3
		165	-4.9	7.5	2.6	30.0	27.4
802.11n40	MCS0	151	-4.2	7.1	2.9	30.0	27.1
		159	-3.9	7.1	3.2	30.0	26.8
	MCS7	151	-3.9	7.6	3.8	30.0	26.3
		159	-4.4	7.6	3.2	30.0	26.8
802.11ac40	MCS0	151	-3.7	7.1	3.4	30.0	26.6
		159	-4.5	7.1	2.6	30.0	27.4
	MCS9	151	-4.6	7.7	3.1	30.0	26.9
		159	-4.7	7.7	3.0	30.0	27.0
802.11ax40	MCS0	151	-3.3	7.1	3.8	30.0	26.2
		159	-4.4	7.1	2.7	30.0	27.3
	MCS11	151	-5.7	7.7	2.0	30.0	28.0
		159	-5.7	7.7	2.0	30.0	28.0
802.11ac80	MCS0	155	-8.3	7.2	-1.1	30.0	31.1
	MCS9	155	-6.5	8.0	1.5	30.0	28.5
802.11ax80	MCS0	155	-8.3	7.2	-1.1	30.0	31.1
	MCS11	155	-10.4	7.8	-2.6	30.0	32.6

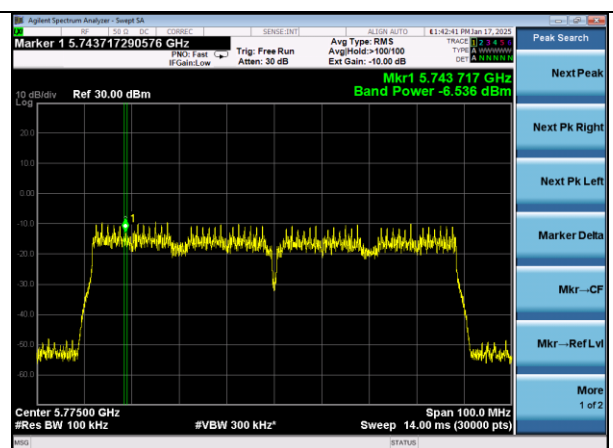
Mode	Rate RU	Channel	Maximum Average PSD (dBm/500 kHz)	Duty Cycle and RBW Correction (dB)	Corrected Output Value (dBm/500 kHz)	Limit (dBm/500 kHz)	Margin (dB)
802.11ax20	MCS0 RU26	149	7.0	7.2	14.2	30.0	15.8
		157	5.4	7.2	12.6	30.0	17.4
		165	6.7	7.2	13.9	30.0	16.1
	MCS0 RU52	149	6.1	7.2	13.3	30.0	16.7
		157	5.0	7.2	12.2	30.0	17.8
		165	5.6	7.2	12.8	30.0	17.2
	MCS0 RU106	149	4.7	7.2	11.9	30.0	18.1
		157	3.7	7.2	10.9	30.0	19.1
		165	4.7	7.2	11.9	30.0	18.1
802.11ax40	MCS0 RU26	151	5.2	7.2	12.4	30.0	17.6
	MCS0 RU52	159	5.0	7.2	12.2	30.0	17.8
	MCS0 RU52	151	4.4	7.2	11.6	30.0	18.4
	MCS0 RU106	159	3.7	7.2	10.9	30.0	19.1
	MCS0 RU106	151	1.6	7.2	8.8	30.0	21.2
	MCS0 RU242	159	0.5	7.2	7.7	30.0	22.3
	MCS0 RU242	151	-2.2	7.2	5.0	30.0	25.0
	MCS0 RU242	159	-2.6	7.2	4.6	30.0	25.4
802.11ax80	MCS0 RU26	155	4.1	7.2	11.3	30.0	18.7
	MCS0 RU52	155	1.2	7.2	8.4	30.0	21.6
	MCS0 RU106	155	-1.5	7.2	5.7	30.0	24.3
	MCS0 RU242	155	-5.1	7.2	2.1	30.0	27.9
	MCS0 RU484	155	-8.4	7.2	-1.2	30.0	31.2

Plots

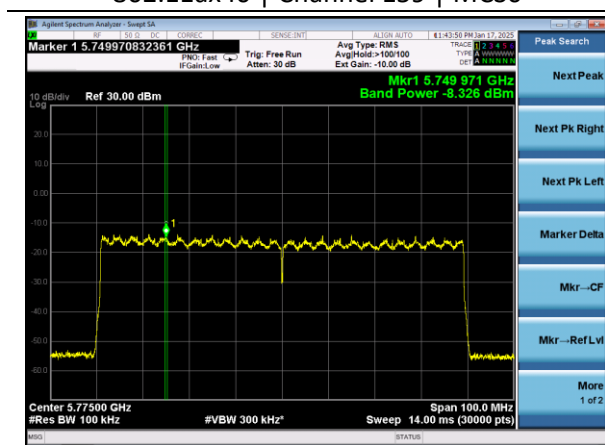




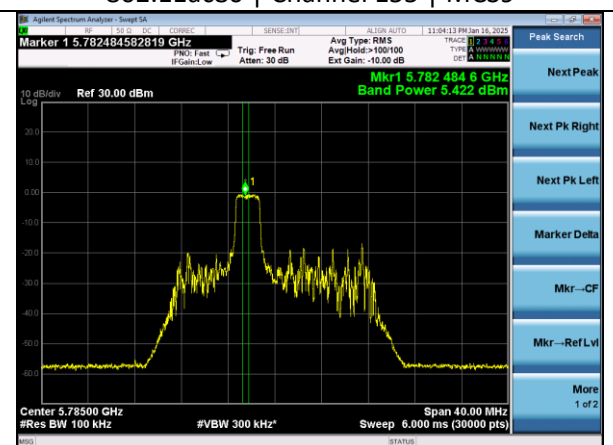
802.11ax40 | Channel 159 | MCS0



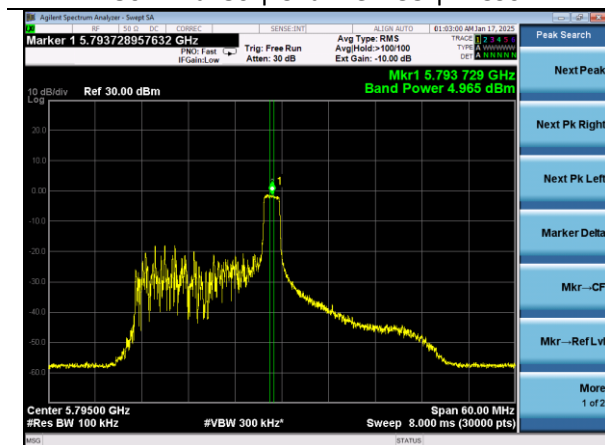
802.11ac80 | Channel 155 | MCS9



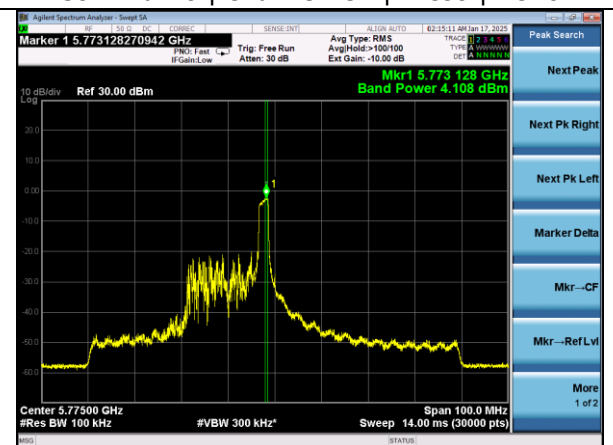
802.11ax80 | Channel 155 | MCS0



802.11ax20 | Channel 157 | MCS0 | RU26



802.11ax40 | Channel 159 | MCS0 | RU26



802.11ax80 | Channel 155 | MCS0 | RU26

6.1.4 Frequency Stability

Operator	Dylan Rosenfeldt	QA	Anthony Smith
Temperature	21.8°C	R.H. %	31.90%
Test Date	04/25/2024	Location	Conducted RF Bench
Requirement	15.407(g) RSS-GEN Clause 6.11	Method	ANSI C63.10 6.8

Test Parameters

Frequency	5725-5850 MHz	Voltage	4.3 VDC, 5 VDC, and 5.8 VDC
Detector(s)	Peak	Settings	Max Hold

Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960173	Cable	A.H. Systems, Inc.	SAC-26G-1	387	06/13/2023	06/12/2024	Active Verification
EE 960088	Analyzer - EMI Receiver	Agilent	N9038A	MY51210138	4/10/2023	4/10/2024	Active Calibration

Table

Channel	Voltage (VDC)	Center Frequency (Hz)
149	5	5744959060
	4.3	5744958779
	5.8	5744960344
157	5	5784959613
	4.3	5784960790
	5.8	5784959291
165	5	5824959957
	4.3	5824959699
	5.8	5824961213

6.2 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



6.2.1 Undesirable Radiated Emissions

Operator	Jon Dille Dylan Rosenfeldt	QA	Dylan Rosenfeldt Anthony Smith
Temperature	23.5°C-24.1°C	R.H. %	18.20%-26.10%
Test Date	12/10/2024-01/06/2025	Location	Chamber 5
Requirement	15.247 (b)(4) & (9) RSS-247 Clause 6.2.4 RSS-GEN Clause 8.9	Method	ANSI C63.10 12.7

15.407 Limits:

For transmitters operating in the 5.725-5.850 GHz Band:

All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

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	30-40000 MHz	Distance	3 m
Detector(s)	Peak	Table height	150 cm
RBW	<1000 MHz – 120 kHz >1000 – 1 MHz	VBW	<1000 – 1.2 MHz >1000 – See 2.9

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 960081	Antenna - Double Ridge Horn	EMCO	3115	6907	1/11/2024	1/11/2025	Active Calibration
AA 960158	Antenna - Double Ridge Horn	ETS Lindgren	3117	109300	2/7/2024	2/7/2025	Active Calibration
AA 960161	Filter - Highpass 5 GHz	K&L Microwave	11SH10-8000	2	4/11/2023	4/11/2024	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 960220	Cable	A.H. Systems, Inc.	SAC-26G-6	552	2/16/2023	2/16/2025	Active Verification
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	4/27/2023	4/27/2024	Active Calibration
EE 960203	Analyzer - EMI Receiver	Keysight	N9038A	MY56400072	4/11/2023	4/11/2024	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

Input Power	120 VAC @ 60 Hz	Mode	5 GHz WLAN Tx
EUT	X, Y, Z Plane Orientations	AE	HP Elitebook 840G1 Ezurio – SOM60 Development Kit
Notes	6000 MHz Emission from auxiliary equipment. Not a function of the EUT. Only worst case EUT orientation reported.		

Radiated Spurious – 30-1000 MHz

No Emissions measured in 30-1000 MHz frequency range

Measurements – UNII 3 Mask

Company: Ezurio	Page 30 of 39	Name: SONA NX611
Report: TR3768-180-5G-UNII3		Model: SONA NX611C
Quote: C-3768		Serial: 00026 00028 00042

Mode	Rate	Channel	Measurement Type	Frequency (MHz)	Measurement (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Power Setting
802.11a	6 Mbps	149	Peak	5724.9	73.8	122.0	48.2	16
802.11n20	MCS0	149	Peak	5724.8	72.4	121.7	49.3	14
802.11ac20	MCS0	149	Peak	5724.8	72.1	121.7	49.6	14
802.11ax20	MCS0	149	Peak	5723.5	73.1	118.8	45.7	14
802.11n40	MCS0	151	Peak	5720.4	76.2	111.7	35.5	14
802.11ac40	MCS0	151	Peak	5721.0	74.3	113.1	38.8	14
802.11ax40	MCS0	151	Peak	5724.8	75.7	121.7	46.0	14
802.11ac80	MCS0	155	Peak	5651.1	67.3	69.0	1.7	14
802.11ax80	MCS0	155	Peak	5651.5	68.0	69.3	1.3	14

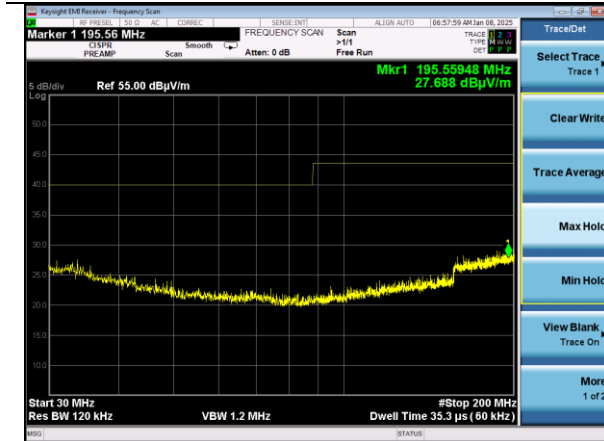
Mode	Rate	Channel	Measurement Type	Frequency (MHz)	Measurement (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Power Setting
802.11ax20	MCS0 RU26	149	Peak	5724.5	74.7	121.1	46.4	14
802.11ax20	MCS0 RU52	149	Peak	5724.1	71.3	120.1	48.8	14
802.11ax20	MCS0 RU106	149	Peak	5723.4	70.1	118.6	48.5	14
802.11ax40	MCS0 RU26	149	Peak	5702.5	69.0	105.9	36.9	13
802.11ax40	MCS0 RU52	151	Peak	5723.3	72.8	118.3	45.5	13
802.11ax40	MCS0 RU106	151	Peak	5725.0	67.5	122.2	54.7	13
802.11ax40	MCS0 RU242	151	Peak	5724.6	73.2	121.3	48.1	13
802.11ax80	MCS0 RU26	155	Peak	5659.1	74.0	74.9	0.9	10
802.11ax80	MCS0 RU52	155	Peak	5659.9	73.4	75.5	2.1	10
802.11ax80	MCS0 RU106	155	Peak	5665.6	69.0	79.7	10.7	10
802.11ax80	MCS0 RU242	155	Peak	5673.3	65.2	85.4	20.2	10
802.11ax80	MCS0 RU484	155	Peak	5723.8	62.8	119.5	56.7	10

Mode	Rate	Channel	Measurement Type	Frequency (MHz)	Measurement (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Power Setting
802.11a	6 Mbps	165	Peak	5851.8	66.0	118.1	52.1	16
802.11n20	MCS0	165	Peak	5852.0	63.4	117.6	54.2	14
802.11ac20	MCS0	165	Peak	5853.9	61.3	113.3	52.0	14
802.11ax20	MCS0	165	Peak	5850.6	65.4	120.8	55.4	14
802.11n40	MCS0	159	Peak	5851.1	64.2	119.7	55.5	14
802.11ac40	MCS0	159	Peak	5860.2	61.2	109.3	48.1	14
802.11ax40	MCS0	159	Peak	5853.6	61.3	114.0	52.7	14
802.11ac80	MCS0	155	Peak	5858.1	68.4	109.9	41.5	14
802.11ax80	MCS0	155	Peak	5862.9	70.5	108.6	38.1	14

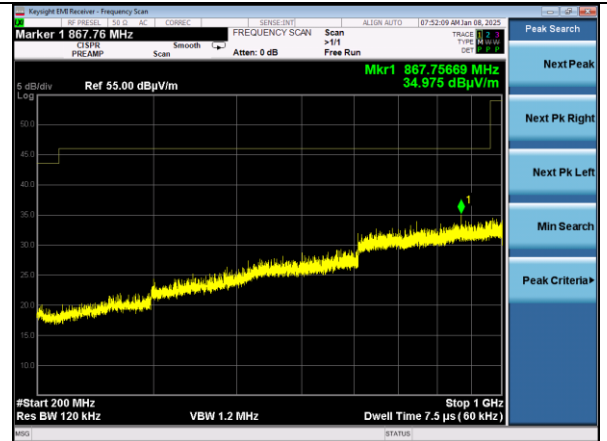
Mode	Rate	Channel	Measurement Type	Frequency (MHz)	Measurement (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Power Setting
802.11ax20	MCS0 RU26	165	Peak	5851.2	67.4	119.5	52.1	14
802.11ax20	MCS0 RU52	165	Peak	5860.1	64.4	109.4	45.0	14
802.11ax20	MCS0 RU106	165	Peak	5850.4	65.5	121.3	55.8	14
802.11ax40	MCS0 RU26	159	Peak	5850.7	66.1	120.6	54.5	13
802.11ax40	MCS0 RU52	159	Peak	5852.4	63.6	116.7	53.1	13
802.11ax40	MCS0 RU106	159	Peak	5851.0	61.3	119.9	58.6	13
802.11ax40	MCS0 RU242	159	Peak	5851.4	59.6	119.0	59.4	13
802.11ax80	MCS0 RU26	155	Peak	5889.7	68.7	94.3	25.6	10
802.11ax80	MCS0 RU52	155	Peak	5888.9	68.1	94.9	26.8	10
802.11ax80	MCS0 RU106	155	Peak	5887.6	64.5	95.9	31.4	10
802.11ax80	MCS0 RU242	155	Peak	5876.8	60.9	103.9	43.0	10
802.11ax80	MCS0 RU484	155	Peak	5862.6	59.3	108.7	49.4	10

Worst Case Plots

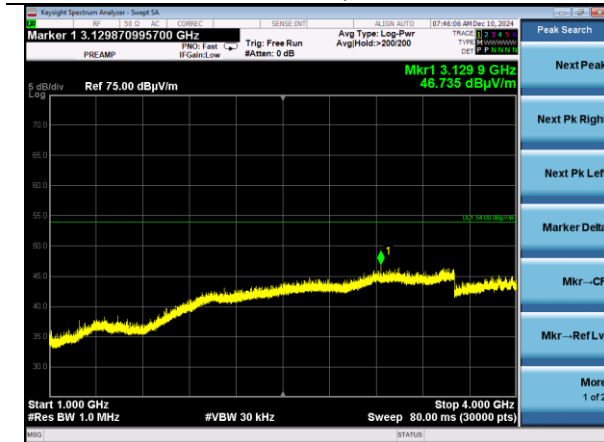
Company: Ezurio	Page 32 of 39	Name: SONA NX611
Report: TR3768-180-5G-UNII3		Model: SONA NX611C
Quote: C-3768		Serial: 00026 00028 00042



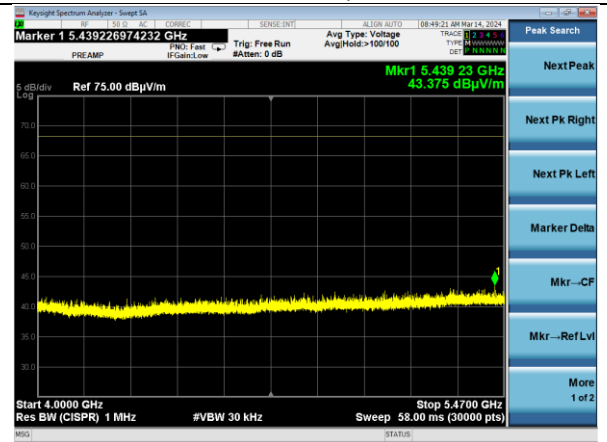
802.11a | Channel 157 | 6 Mbps | X Plane
30-200 MHz | Vertical



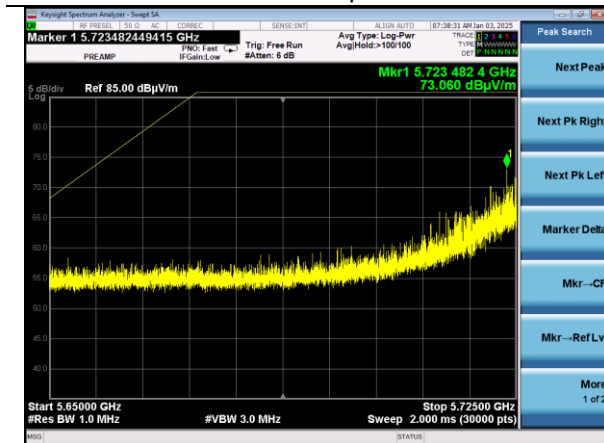
802.11a | Channel 157 | 6 Mbps | X Plane
200-1000 MHz | Vertical



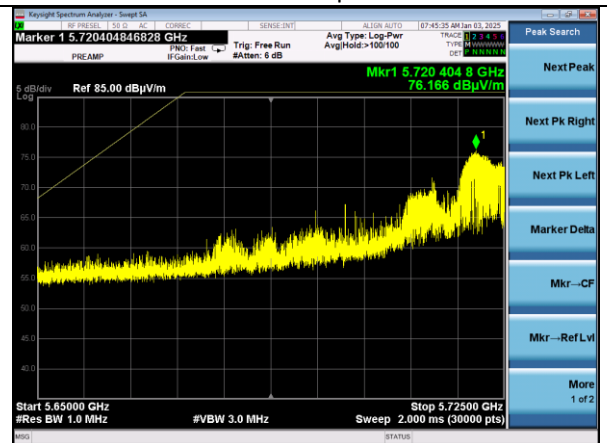
802.11a | Channel 157 | 6 Mbps | X Plane
1000-4000 MHz | Horizontal



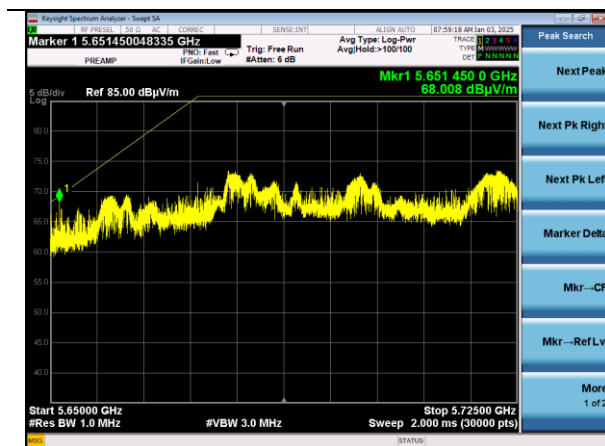
802.11a | Channel 149 | 6 Mbps | X Plane
4000-5470 MHz | Horizontal



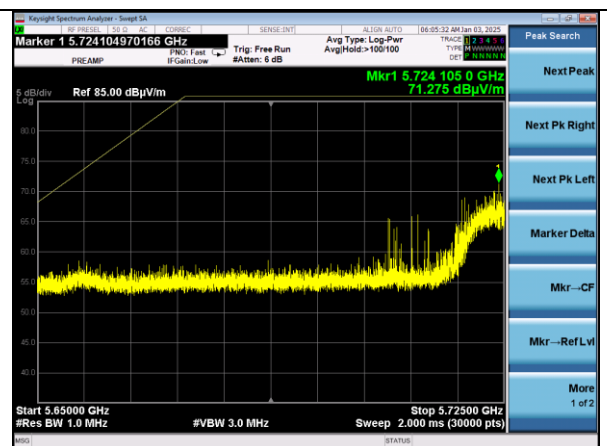
802.11ax20 | Channel 149 | MCS0 | X Plane
5650-5725 MHz | Horizontal



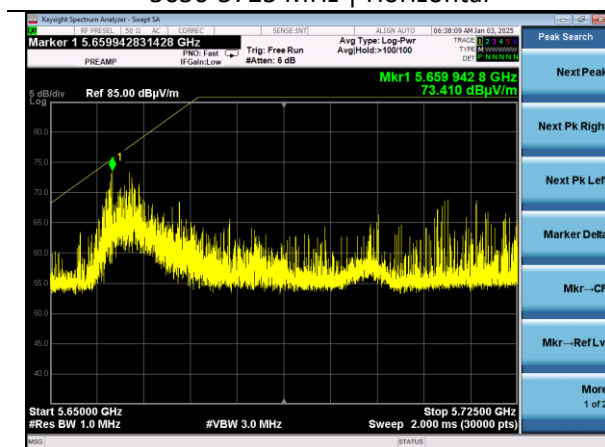
802.11n40 | Channel 151 | MCS0 | X Plane
5650-5725 MHz | Horizontal



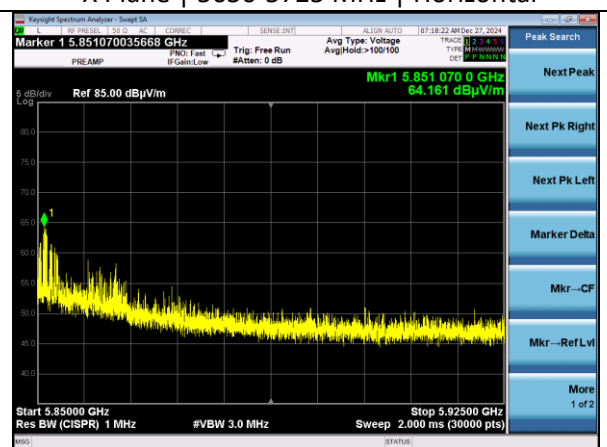
802.11ax80 | Channel 155 | MCS0 | X Plane
5650-5725 MHz | Horizontal



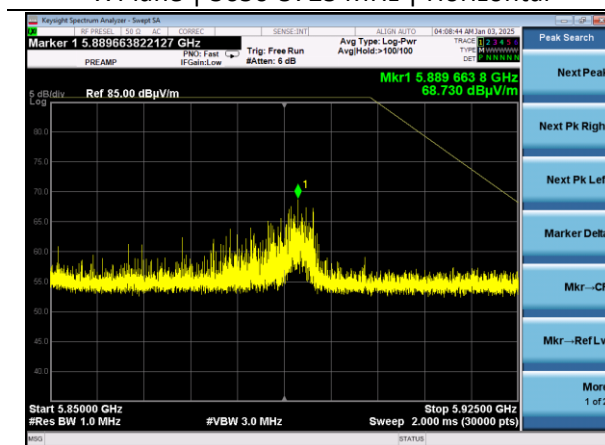
802.11ax20 | Channel 149 | MCS0 RU52
X Plane | 5650-5725 MHz | Horizontal



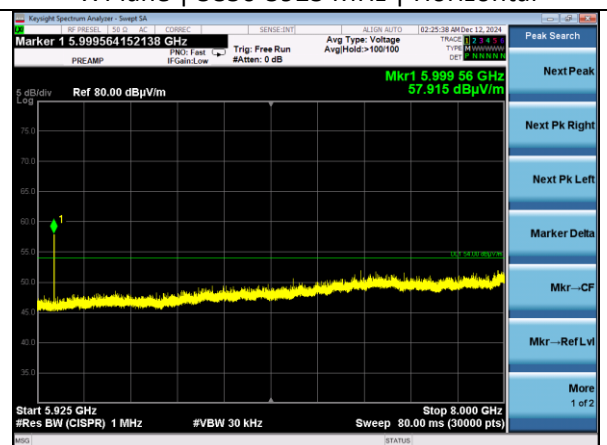
802.11ax80 | Channel 155 | MCS0 RU52
X Plane | 5650-5725 MHz | Horizontal



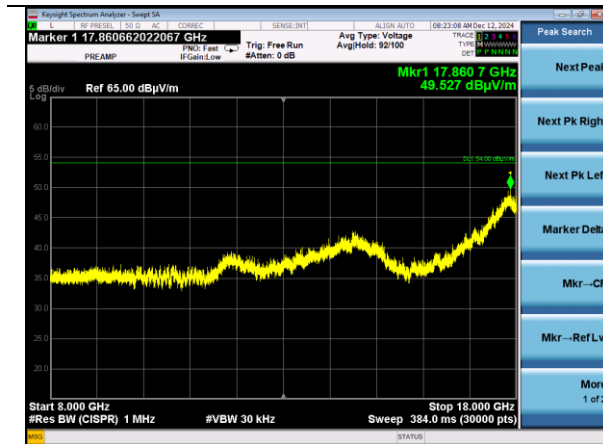
802.11n40 | Channel 159 | MCS0
X Plane | 5850-5925 MHz | Horizontal



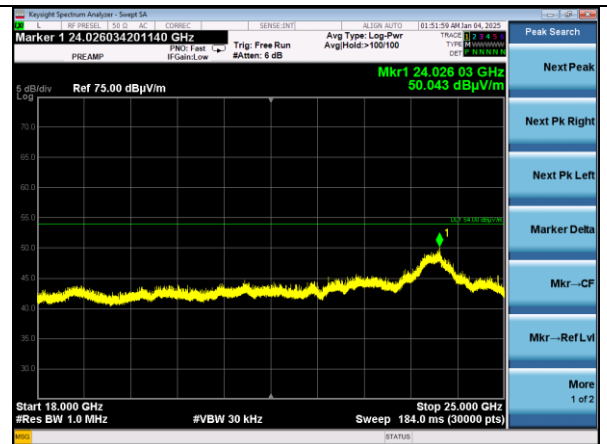
802.11ax80 | Channel 155 | MCS0 RU26
X Plane | 5850-5925 MHz | Horizontal



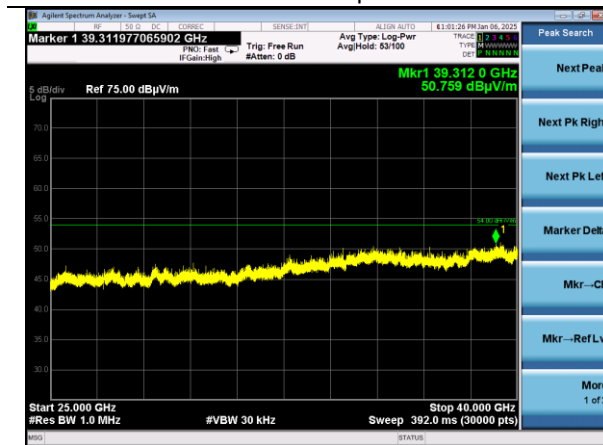
802.11a | Channel 157 | 6 Mbps | X Plane
5925-8000 MHz | Vertical



802.11a | Channel 157 | 6 Mbps | X Plane
8000-18000 MHz | Horizontal



802.11a | Channel 157 | 6 Mbps | X Plane
18000-25000 MHz | Vertical



802.11a | Channel 157 | 6 Mbps | X Plane
25000-40000 MHz | Horizontal

6.3 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.

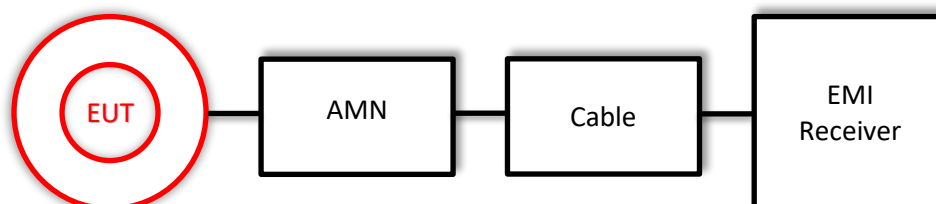
Maximum emissions are determined with a peak max hold trace then measurements at a selection of the highest points are made with quasi-peak and average detectors. Results are recorded and compared to limit for each line. (e.g. line and neutral)

Example Calculations

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

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

Block Diagram



6.3.1 AC Mains Conducted Emissions

Operator	Jon Dille	QA	Adam Hauke
Temperature	21.2°C	R.H. %	28.40%
Test Date	04/05/2024	Location	AC Conducted Bench
Requirement	15.407(b)(9) RSS-GEN	Method	ANSI C63.10 6.2

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	MY51210148	4/27/2023	4/27/2024	Active Calibration
EE 960089	LISN	COM-POWER	LI-215A	191943	4/10/2023	4/10/2024	Active Calibration
EE 960162	LISN	COM-POWER	LI-215A	191969	4/10/2023	4/10/2024	Active Calibration
LSC-212	Cable	Micro-Coax	UFB311A-0-1440-70U70U	64639 224071-001	1/8/2024	1/8/2025	Active Verification

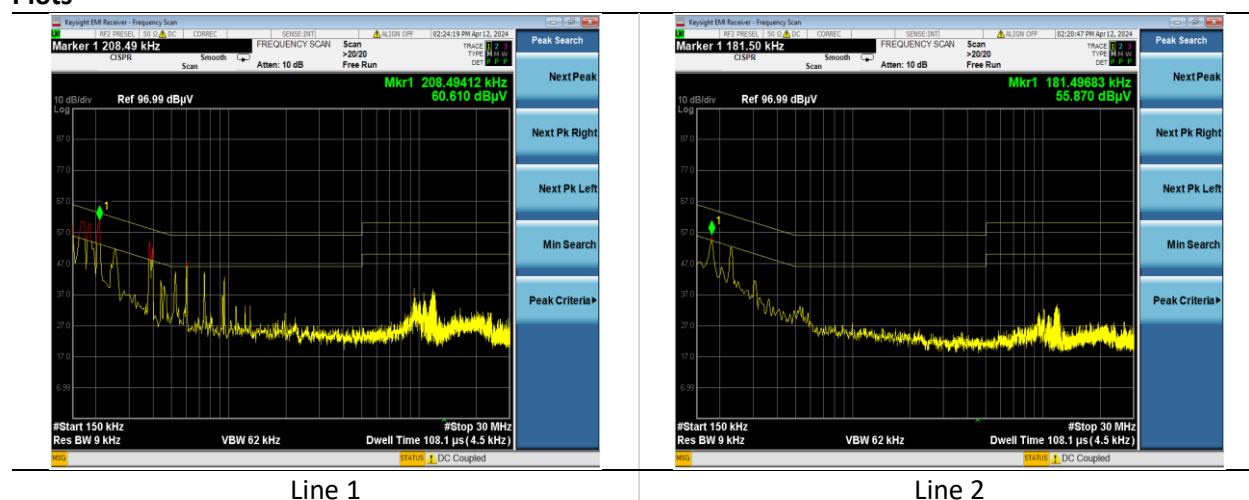
EUT Parameters

Input Power	120 VAC @ 60 Hz	Mode	5 GHz WLAN Tx Channel 64
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Measurements

Line	Frequency (MHz)	Quasi Peak Reading (dBμV)	Quasi-Peak Limit (dBμV)	Quasi Peak Margin (dB)	Average Reading (dBμV)	Average Limit (dBμV)	Average Margin (dB)
1	0.150	59.1	66.0	6.9	35.8	56.0	20.2
1	0.440	37.5	57.1	19.7	23.8	47.1	23.3
1	11.760	37.5	60.0	22.6	25.3	50.0	24.7
2	0.150	47.9	66.0	18.1	33.6	56.0	22.4
2	0.485	29.5	56.2	26.7	21.0	46.2	25.2
2	12.100	29.1	60.0	30.9	16.3	50.0	33.7

Plots



7 REVISION HISTORY

Version	Date	Notes	Person
0	01/27/2025	Initial Draft	Dylan Rosenfeldt
1	02/10/2025	Revised Draft	Dylan Rosenfeldt
2	02/12/2025	Final Draft	Dylan Rosenfeldt

END OF REPORT