Nalloy, LLC

REVISED TEST REPORT TO 109749-30

FH7K2H*

***(Appendix A: Manufacturer Declaration)**

Tested to The Following Standards:

FCC Part 15 Subpart C Section(s)

15.207 & 15.249

Report No.: 109749-30A

Date of issue: February 26, 2025

This test report bears the accreditation symbol indicating that the testing performed herein meets the test and reporting requirements of ISO/IEC 17025 under the applicable scope of testing for CKC Laboratories, Inc.

We strive to create long-term, trust based relationships by providing sound, adaptive, customer first testing services. We embrace each of our customers' unique EMC challenges, not as an interruption to set processes, but rather as the reason we are in business.

Test Certificate # 803.01

This report contains a total of 40 pages and may be reproduced in full only. Partial reproduction may only be done with the written consent of CKC Laboratories, Inc.

Testing the Future

CKC LABORATORIES, INC.

TABLE OF CONTENTS

Administrative Information 3

Test Report Information 3

Revision History 3

Report Authorization 3

Test Facility Information 4

Software Versions 4

Site Registration & Accreditation Information 4

Summary of Results 5

Standard / Specification: FCC Part 15 Subpart C – 15.207 & 15.249 5

Modifications During Testing 5

Conditions During Testing 5

Equipment Under Test (EUT) 6

General Product Information: 6

15.215(c) Occupied Bandwidth (20dB BW) 9

15.249(a) Field Strength of Fundamental 13

15.249(a) Radiated Emissions and Band Edge 20

15.207 AC Conducted Emissions 31

Appendix A: Manufacturer Declaration 38

Supplemental Information 39

Measurement Uncertainty 39

Emissions Test Details 39

Administrative Information

Test Report Information

REPORT PREPARED FOR:

Nalloy, LLC
2301 5th Avenue
Seattle, WA 98108

Representative: Chris Yao
Customer Reference Number: 2D-13570203

REPORT PREPARED BY:

Lisa Bevington
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 109749

DATE OF EQUIPMENT RECEIPT: July 16, 2024
DATE(S) OF TESTING: July 16-19, 2024 & February 25, 2025

Revision History

Original: Testing of the FH7K2H to FCC Part 15 Subpart C Section(s) 15.207 & 15.249.
Revision A: To update the Occupied Bandwidth and Field Strength of Fundamental test data.

Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the equipment provided by the client, tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.

Steve Behm
Director of Quality Assurance & Engineering Services
CKC Laboratories, Inc.

Test Facility Information

Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable and affordable test results.

TEST LOCATION(S):
CKC Laboratories, Inc.
22116 23rd Drive SE, Suite A
Bothell, WA 98021

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.03.20

Site Registration & Accreditation Information

Location	*NIST CB #	FCC	Canada	Japan
Canyon Park, Bothell, WA	US0103	US1024	3082C	A-0136
Brea, CA	US0103	US1024	3082D	A-0136
Fremont, CA	US0103	US1024	3082B	A-0136
Mariposa, CA	US0103	US1024	3082A	A-0136

*CKC's list of NIST designated countries can be found at: https://standards.gov/cabs/designations.html

Summary of Results

Standard / Specification: FCC Part 15 Subpart C – 15.207 & 15.249

Test Procedure	Description	Modifications	Results
15.215(c)	Occupied Bandwidth	NA	Pass
15.249(a)	Field Strength of Fundamental	NA	Pass
15.249(a)	Field Strength of Spurious Emissions	NA	Pass
15.207	AC Conducted Emissions	NA	Pass

NA = Not Applicable

ISO/IEC 17025 Decision Rule
The equipment sample utilized for testing is selected by the manufacturer. The declaration of pass or fail herein is a binary statement for simple acceptance rule (ILAC G8) based upon assessment to the specification(s) listed above, without consideration of measurement uncertainties. For performance related tests, equipment was monitored for specified criteria identified in that section of testing.

Modifications During Testing

This list is a summary of the modifications made to the equipment during testing.

Summary of Conditions
No modifications were made during testing.

Modifications listed above must be incorporated into all production units.

Conditions During Testing

This list is a summary of the conditions noted to the equipment during testing.

Summary of Conditions
None

Equipment Under Test (EUT)

During testing, numerous configurations may have been utilized. The configurations listed below support compliance to the standard(s) listed in the Summary of Results section.

Configuration 1 = Configuration A

Device	Manufacturer	Model #	S/N
NA	Nalloy	DCP175	NA

*The above configuration is representative of the DCPXX and DCRXXX. See Appendix A: Manufacturer Declaration

Support Equipment:

Device	Manufacturer	Model #	S/N
Laptop	HP	EliteBook 840 G6	5CG9370K8F

General Product Information:

Description of EUT
Radar detector installed in a smart grocery cart.

Product Information	Manufacturer-Provided Details
Operating Frequencies Tested:	24.15GHz
Equipment Type:	Stand-Alone Equipment
Output Power:	4.0dBm EIRP
Maximum Duty Cycle:	2%
Modulation Type(s):	FMCW
Antenna Type(s) and Gain:	Patch Antenna 2dBi
Antenna Connection Type:	Integral
Nominal Input Voltage:	15Vdc
Firmware / Software Version(s):	1.0.1782.0
Firmware / Software Description:	Normal operation mode, continuous transmit and detect
Firmware / Software Setting(s):	hexdump /dev/sc1233ar3:spi1.0
Tune-up or Adjustment(s):	None
The validity of results is dependent on the stated product details, the accuracy of which the manufacturer assumes full responsibility.	

EUT and Accessory Photo(s)

EUT

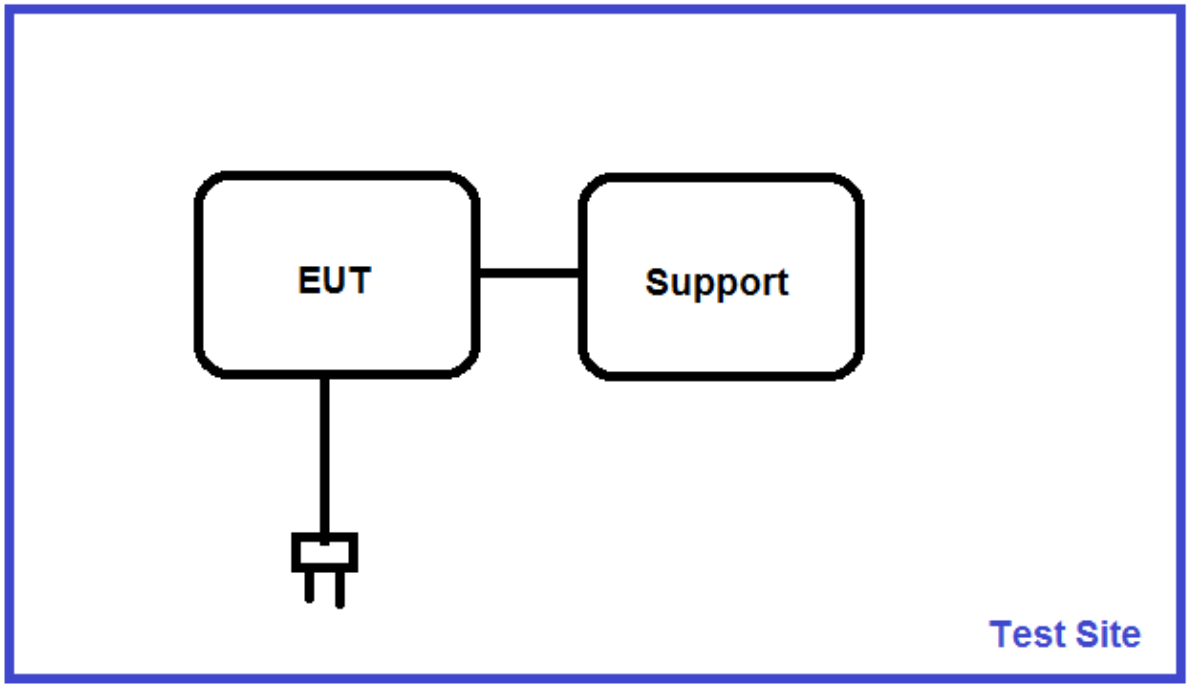
Support Equipment Photo(s)

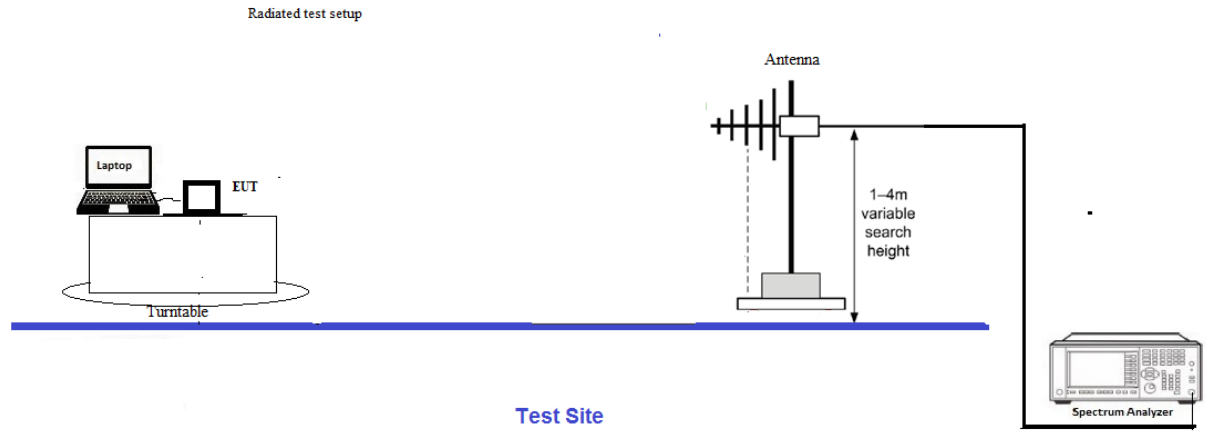
Support Laptop

Block Diagram of Test Setup(s)

Config#	Setup Description of Block Diagram
1	The grocery cart's electronics deck is connected to a support laptop to turn on the transmitters.

Test Setup Block Diagram





FCC Part 15 Subpart C

15.215(c) Occupied Bandwidth (20dB BW)

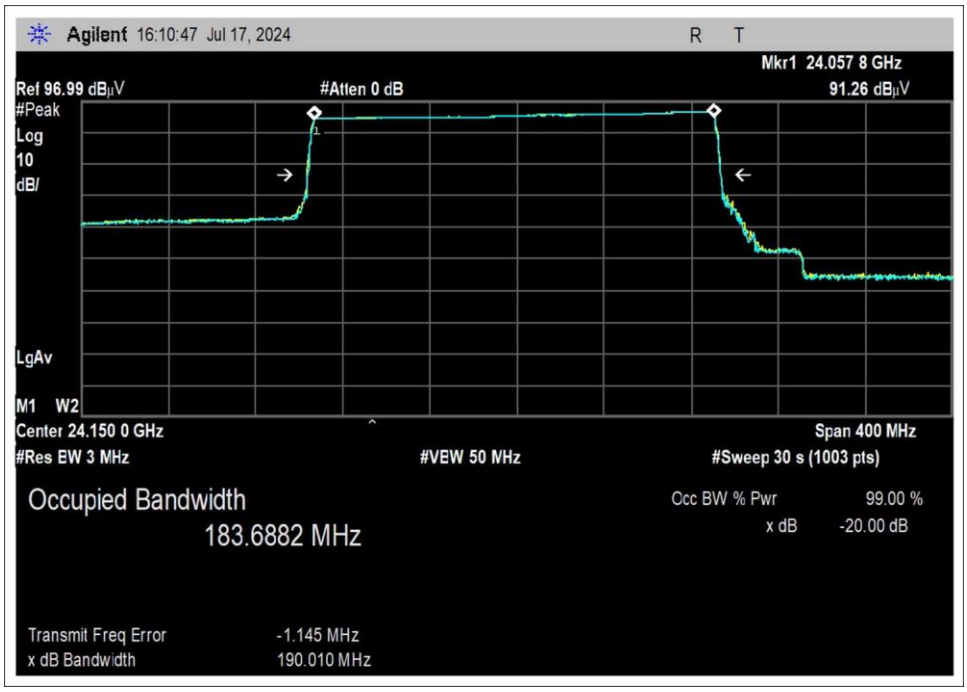
Test Setup/Conditions			
Test Location:	Canyon Park Lab C3	Test Engineer:	S. Pittsford
Test Method:	ANSI C63.10 (2020)	Test Date(s):	7/17/2024 & 2/25/2025
Configuration:	1		

Environmental Conditions			
Temperature (ºC)	23-25	Relative Humidity (%):	35-43

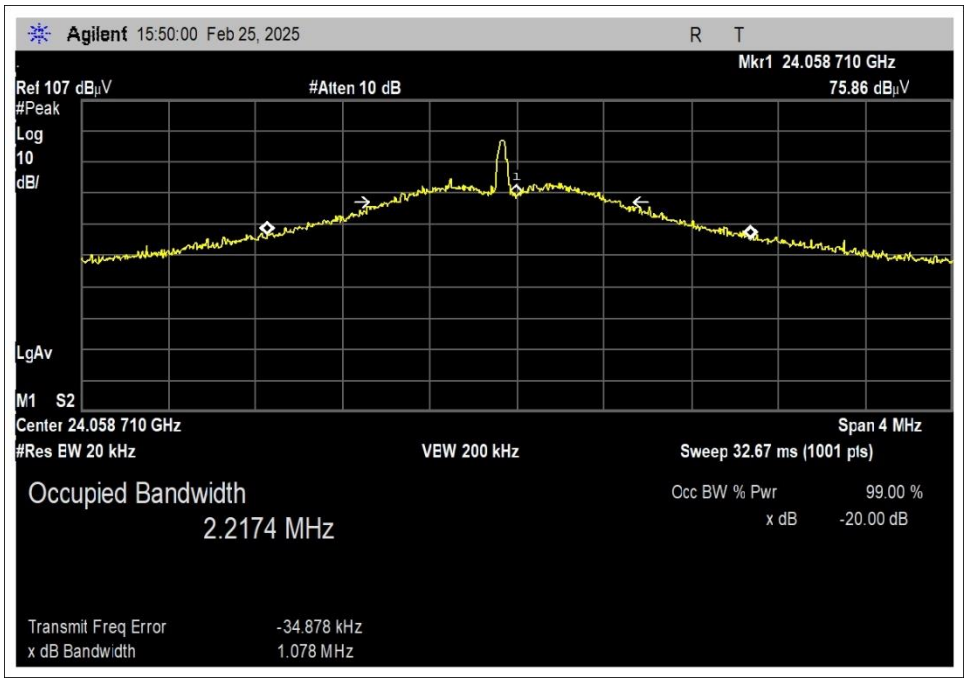
Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
02763-69	Waveguide	Andrew	Multiple	1/9/2024	1/9/2026
P07212	Cable	H & S	32026-29801-29801-18	5/1/2023	5/1/2025
P07505	Cable	TMS	CLU40-KMKM-02.00F	1/19/2024	1/19/2026
P07900	Cable	Times Microwave	CLU40-KMKM-10.00F	8/8/2023	8/8/2025
P07901	Cable	Times Microwave	CLU40-KMKM-10.00F	8/8/2023	8/8/2025
02673	Spectrum Analyzer	Agilent	E4446A	3/8/2024	3/8/2026
02742	Active Horn Antenna	Miteq	AMFW-5F-18002650-20-10P	11/18/2022	11/18/2024

Test Data Summary					
Frequency (GHz)	Antenna Port	Modulation	Measured (MHz)	Limit (MHz)	Results
24.15	1	FMCW sweeping	190.01	None	N/A
24.059	1	FMCW sweeping stopped	1.078	None	N/A
24.149	1	FMCW sweeping stopped	1.087	None	N/A
24.239	1	FMCW sweeping stopped	1.037	None	N/A

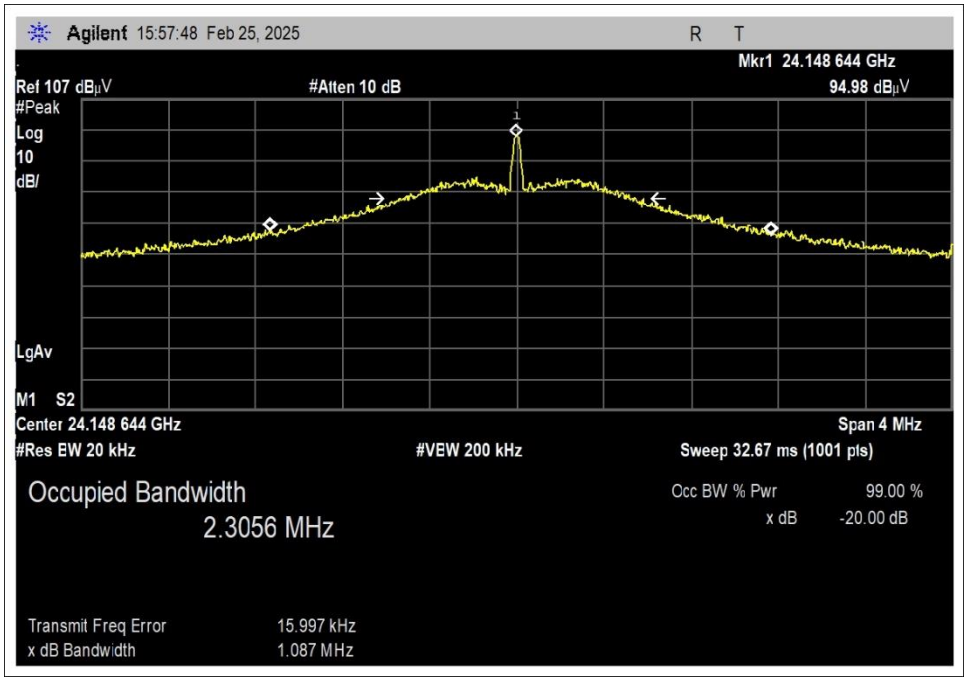
Plot(s)



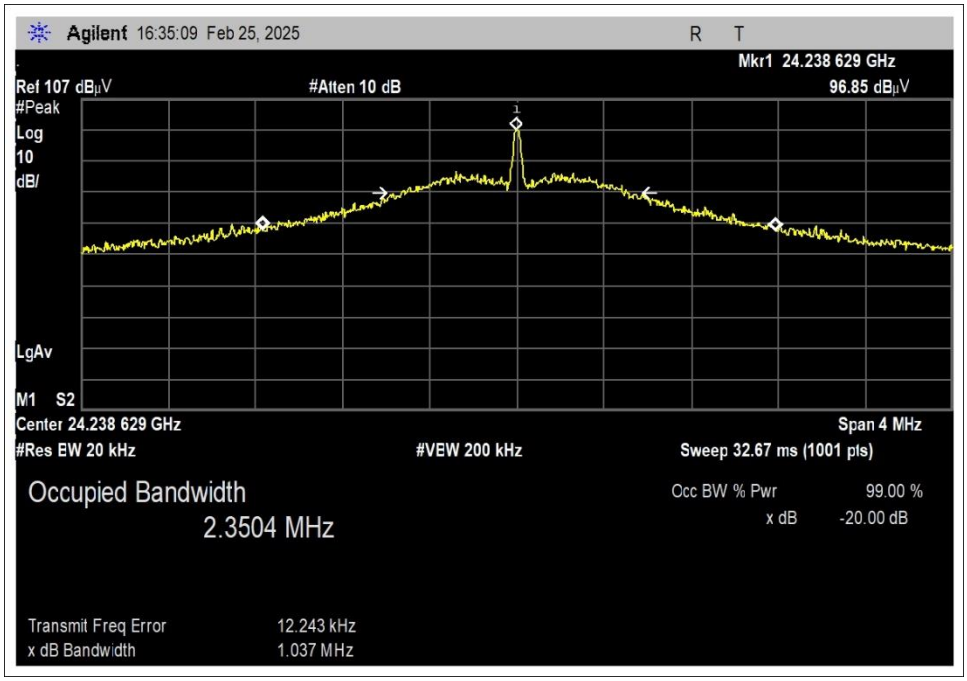
Occupied Bandwidth



Low Channel

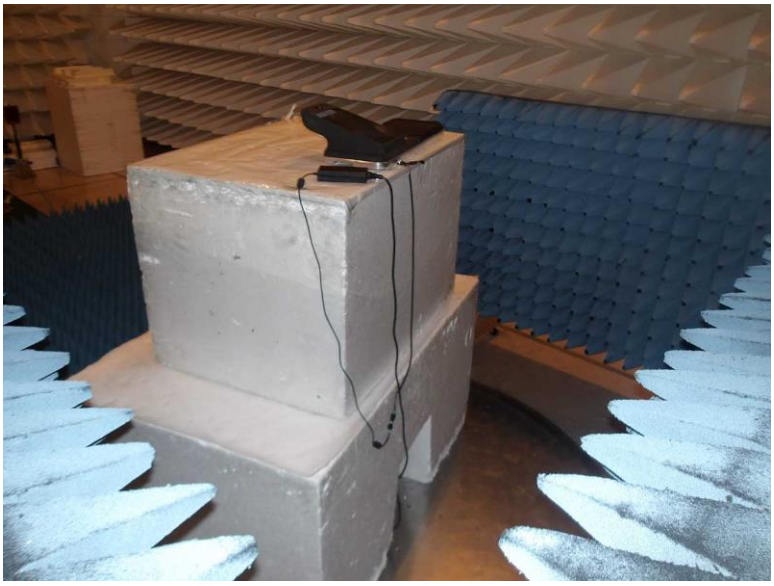


Middle Channel



High Channel

Test Setup Photo(s)



Occupied Bandwidth, Above 1GHz

15.249(a) Field Strength of Fundamental

Test Setup/Conditions			
Test Location:	Canyon Park Lab C3	Test Engineer:	S. Pittsford
Test Method:	ANSI C63.10 (2020)	Test Date(s):	2/25/2025
Configuration:	1		

Environmental Conditions			
Temperature (ºC)	23	Relative Humidity (%):	35

Test Data Summary - Voltage Variations					
Frequency (GHz)	Modulation / Ant Port	$V_{Minimum}$ (dBuV/m)	$V_{Nominal}$ (dBuV/m)	$V_{Maximum}$ (dBuV/m)	Max Deviation from $V_{Nominal}$ (dB)
24.150	FMCW	99.7	99.7	99.7	0.0

Test performed using operational mode with the highest output power, representing worst case.

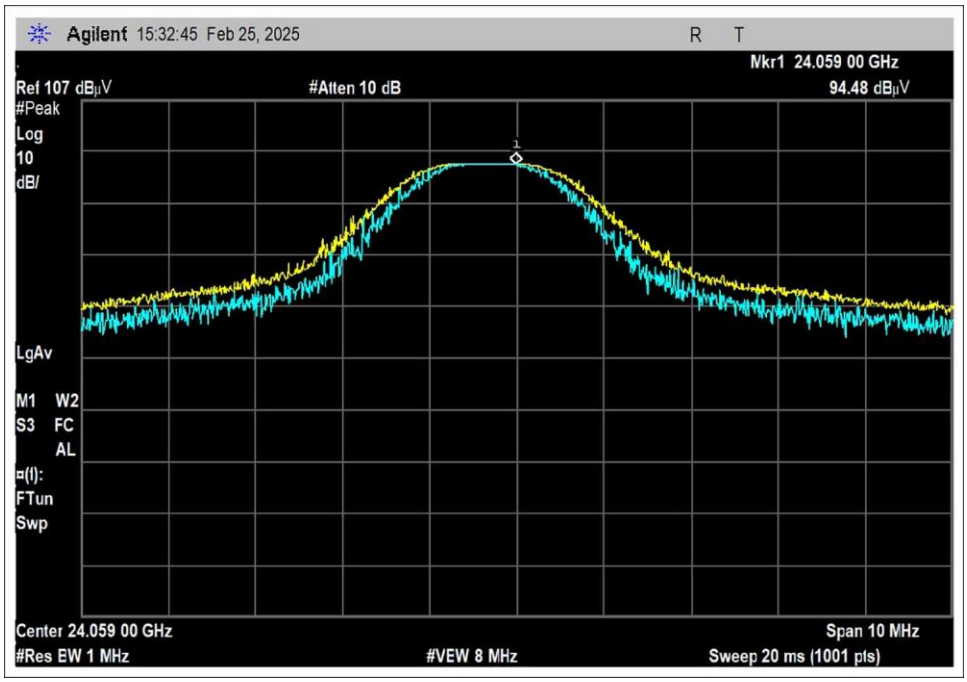
Parameter Definitions:

Measurements performed at input voltage according to manufacturer specification.

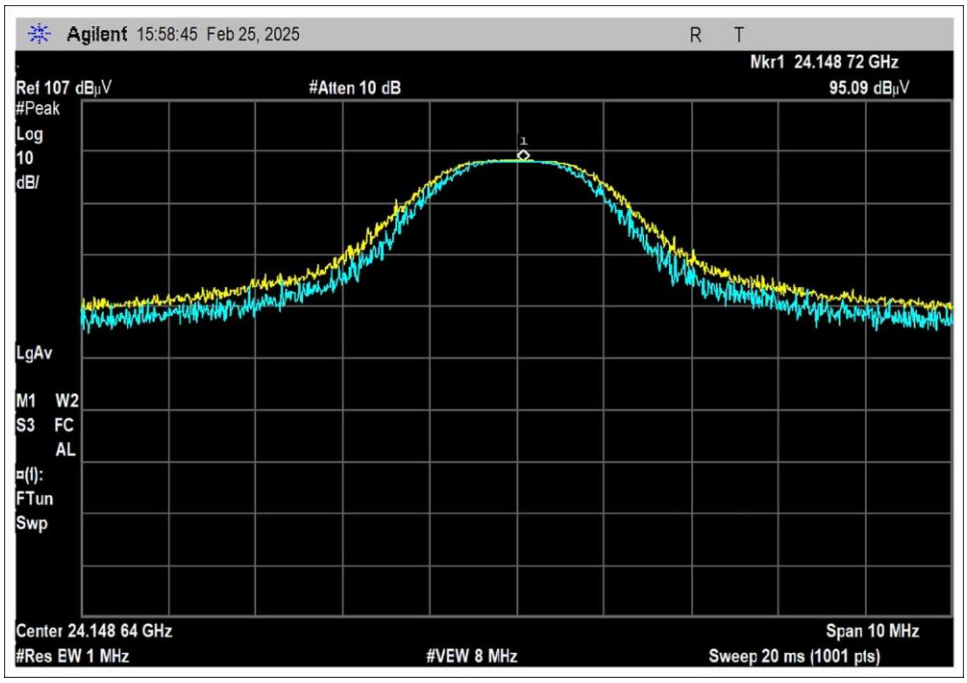
Parameter	Value
$V_{Nominal}$:	120 VAC
$V_{Minimum}$:	102.00 VAC
$V_{Maximum}$:	138.00 VAC

Test Data Summary – Radiated Field Strength Measurement					
Frequency (GHz)	Modulation	Ant. Type	Measured (dBuV/m @ 3m)	Limit (dBuV/m @ 3m)	Results
24.059	FMCW Sweeping stopped	Patch	98.5 (84.1 mV/m)	≤108 (250mV/m)	Pass
24.149	FMCW Sweeping stopped	Patch	99.5 (94.4 mV/m)	≤108 (250mV/m)	Pass
24.239	FMCW Sweeping stopped	Patch	102.0 (125.9 mV/m)	≤108 (250mV/m)	Pass

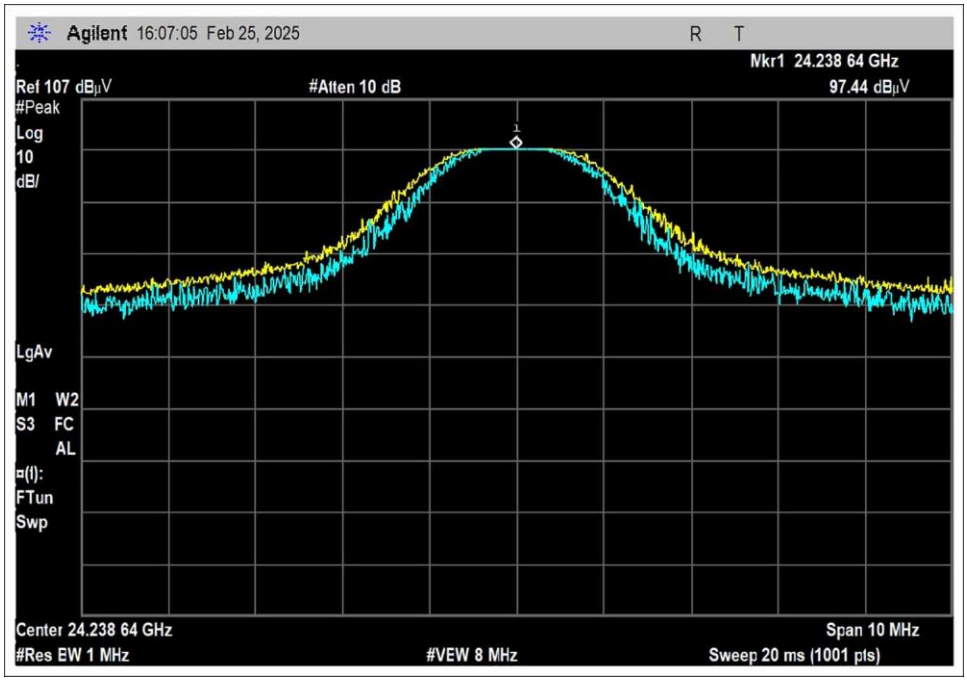
Plot(s)



Low Channel



Middle Channel



High Channel

Test Setup / Conditions / Data

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive S.E., Suite A • Bothell WA 98021 •		
Customer:	**Nalloy, LLV**		
Specification:	**15.249/15.209 Radiated Emissions (24-24.25GHz)**		
Work Order #:	**109749**	Date:	2/25/2025
Test Type:	**Maximized Emissions**	Time:	16:06:44
Tested By:	Steven Pittsford	Sequence#:	9
Software:	EMITest 5.03.20		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

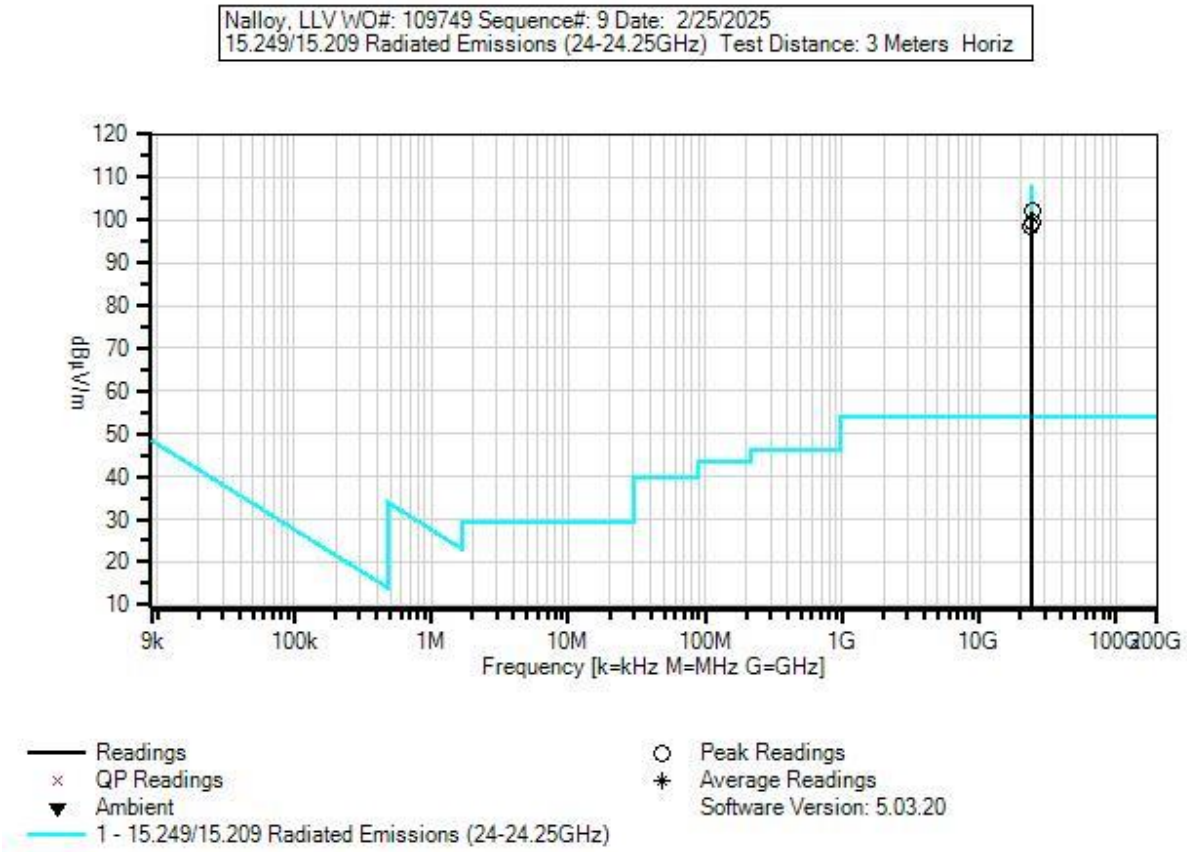
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Setup:
EUT is transmitting.

Frequency: 24-24.25GHZz



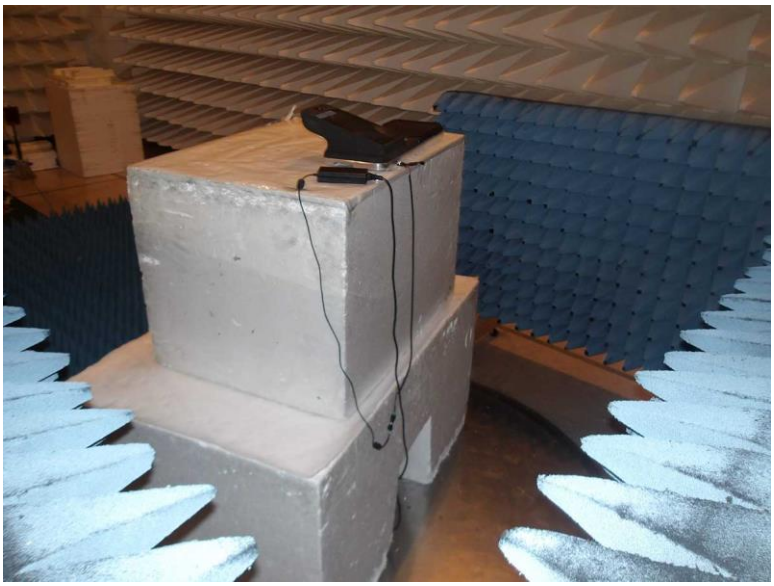
Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02763-69	Waveguide	Multiple	1/9/2024	1/9/2026
T2	ANP07212	Cable	32026-29801-29801-18	5/1/2023	5/1/2025
T3	ANP07505	Cable	CLU40-KMKM-02.00F	1/19/2024	1/19/2026
T4	ANP07900	Cable	CLU40-KMKM-10.00F	8/8/2023	8/8/2025
T5	ANP07901	Cable	CLU40-KMKM-10.00F	8/8/2023	8/8/2025
	AN02673	Spectrum Analyzer	E4446A	3/8/2024	3/8/2026
T6	AN02742	Active Horn Antenna	AMFW-5F-18002650-20-10P	12/2/2024	12/2/2026

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dBµV	T1 T5 dB	T2 T6 dB	T3 dB	T4 dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	24238.640 M	97.4	+2.5 +5.8	+1.8 -12.9	+1.5	+5.9	+0.0	102.0	108.0	-6.0	Horiz
2	24148.720 M	95.1	+2.5 +5.8	+1.8 -13.1	+1.5	+5.9	+0.0	99.5	108.0	-8.5	Horiz
3	24059.000 M	94.5	+2.5 +5.7	+1.7 -13.3	+1.5	+5.9	+0.0	98.5	108.0	-9.5	Horiz

Test Setup Photo(s)



Above 1GHz

15.249(a) Radiated Emissions and Band Edge

Test Setup/Conditions			
Test Location:	Canyon Park Lab C3	Test Engineer:	S. Pittsford
Test Method:	ANSI C63.10 (2020)	Test Date(s):	7/16/2024 to 7/19/2024
Configuration:	1		

Environmental Conditions			
Temperature (ºC)	24-25	Relative Humidity (%):	40-45

Test Data

Test Location: CKC Laboratories, Inc. • 22116 23rd Drive S.E., Suite A • Bothell WA 98021 • (425) 402-1717
Customer: **Nalloy, LLC**
Specification: **15.249/15.209 Radiated Emissions (24-24.25GHz)**
Work Order #: **109749** Date: 7/18/2024
Test Type: **Maximized Emissions** Time: 10:37:08
Tested By: Steven Pittsford Sequence#: 11
Software: EMITest 5.03.21

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

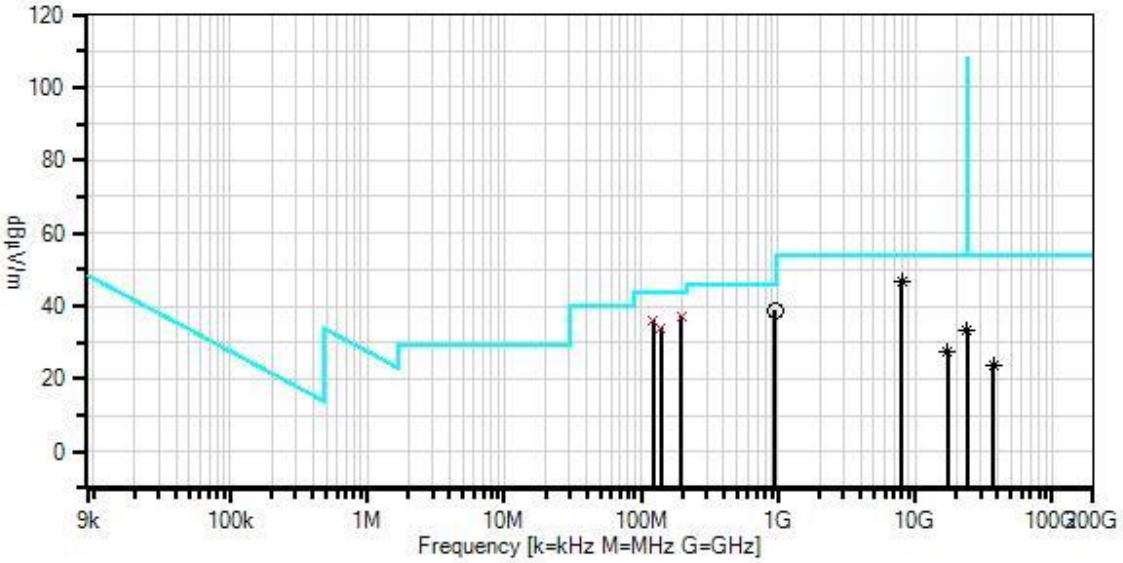
Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Setup:
EUT is transmitting.

Frequency: 9k-100GHz
No emissions observed 40-100GHz

Nalloy, LLC WO#: 109749 Sequence#: 11 Date: 7/18/2024
15.249/15.209 Radiated Emissions (24-24.25GHz) Test Distance: 3 Meters Horiz



Readings
QP Readings
Ambient
1 - 15.249/15.209 Radiated Emissions (24-24.25GHz)
Peak Readings
Average Readings
Software Version: 5.03.21

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02763-69	Waveguide	Multiple	1/9/2024	1/9/2026
T2	ANP07212	Cable	32026-29801-29801-18	5/1/2023	5/1/2025
T3	ANP07505	Cable	CLU40-KMKM-02.00F	1/19/2024	1/19/2026
T4	ANP07900	Cable	CLU40-KMKM-10.00F	8/8/2023	8/8/2025
T5	ANP07901	Cable	CLU40-KMKM-10.00F	8/8/2023	8/8/2025
T6	AN02673	Spectrum Analyzer	E4446A	3/8/2024	3/8/2026
T7	AN02742	Active Horn Antenna	AMFW-5F-18002650-20-10P	11/18/2022	11/18/2024
T8	AN02741	Active Horn Antenna	AMFW-5F-12001800-20-10P	5/26/2023	5/26/2025
T9	ANP06011	Cable	Heliax	11/16/2023	11/16/2025
T10	ANP06515	Cable	Heliax	2/28/2024	2/28/2026
T11	AN03540	Preamp	83017A	3/24/2023	3/24/2025
T12	AN02374ANSI	Horn Antenna	RGA-60	5/26/2023	5/26/2025
T13	ANP07504	Cable	CLU40-KMKM-02.00F	1/19/2024	1/19/2026
T14	AN02743	Active Horn Antenna	AMFW-5F-260400-33-8P	5/30/2023	5/30/2025
T15	AN02764-70	Waveguide	Multiple	1/9/2024	1/9/2026
T16	AN02307	Preamp	8447D	8/9/2023	8/9/2025
T17	AN03824	Biconilog Antenna	3142E	5/9/2023	5/9/2025
T18	ANP05333	Cable	Heliax	8/8/2023	8/8/2025
T19	ANP05360	Cable	RG214	8/8/2023	8/8/2025
T20	AN00052	Loop Antenna	6502	4/19/2024	4/19/2026
	AN02347	Horn Antenna	M19HWA	2/14/2023	2/14/2025
	AN02348	Horn Antenna	M12HWA	2/14/2023	2/14/2025
	AN02349	Horn Antenna	M08HWA	2/14/2023	2/14/2025

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5 T9 T13 T17	T2 T6 T10 T14 T18	T3 T7 T11 T15 T19	T4 T8 T12 T16 T20	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	197.570M	46.7	-27.1	+15.7	+0.7	+1.0	+0.0	37.2	43.5	-6.3	Horiz
	QP		+0.2	+0.0	+0.0	+0.0	360				130
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0	+0.0					
^	197.570M	52.7	-27.1	+15.7	+0.7	+1.0	+0.0	43.2	43.5	-0.3	Horiz
			+0.2	+0.0	+0.0	+0.0	360				130
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0	+0.0					
3	7957.700M	35.5	+0.0	+0.0	+0.0	+0.0	+0.0	46.9	54.0	-7.1	Horiz
	Ave		+0.0	+0.0	+0.0	+0.0					151
			+1.7	+5.2	-35.5	+39.2					
			+0.8	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0	+0.0					
^	7957.700M	50.6	+0.0	+0.0	+0.0	+0.0	+0.0	62.0	54.0	+8.0	Horiz
			+0.0	+0.0	+0.0	+0.0	360				151
			+1.7	+5.2	-35.5	+39.2					
			+0.8	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0	+0.0					
5	943.087M	29.7	-27.1	+31.7	+1.5	+2.6	+0.0	38.8	46.0	-7.2	Vert
			+0.4	+0.0	+0.0	+0.0	360				130
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0	+0.0					
6	122.375M	48.9	-27.5	+13.3	+0.5	+0.8	+0.0	36.1	43.5	-7.4	Vert
	QP		+0.1	+0.0	+0.0	+0.0	239				99
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0	+0.0					
^	122.375M	52.9	-27.5	+13.3	+0.5	+0.8	+0.0	40.1	43.5	-3.4	Vert
			+0.1	+0.0	+0.0	+0.0	360				130
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0	+0.0					
8	138.231M	45.9	-27.4	+14.0	+0.5	+0.8	+0.0	33.9	43.5	-9.6	Vert
	QP		+0.1	+0.0	+0.0	+0.0	360				99
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0	+0.0					
^	138.231M	55.6	-27.4	+14.0	+0.5	+0.8	+0.0	43.6	43.5	+0.1	Vert
			+0.1	+0.0	+0.0	+0.0	360				130
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0	+0.0					

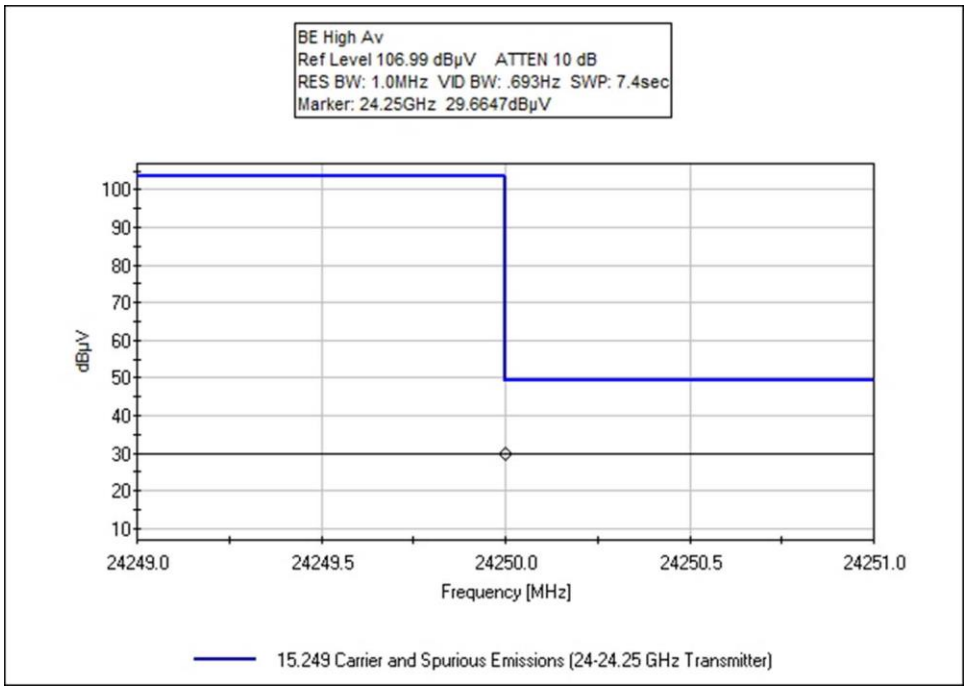
10	23979.000	29.8	+2.5	+1.7	+1.5	+5.9	+0.0	33.6	54.0	-20.4	Horiz
	M		+5.7	+0.0	-13.5	+0.0					
	Ave		+0.0	+0.0	+0.0	+0.0	360				210
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0	+0.0					
^	23979.000	52.0	+2.5	+1.7	+1.5	+5.9	+0.0	55.8	54.0	+1.8	Horiz
	M		+5.7	+0.0	-13.5	+0.0					
			+0.0	+0.0	+0.0	+0.0	360				210
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0	+0.0					
12	17304.000	29.7	+0.0	+0.0	+0.0	+0.0	+0.0	27.5	54.0	-26.5	Horiz
	M		+0.0	+0.0	+0.0	-12.1					
	Ave		+2.1	+7.8	+0.0	+0.0	360				151
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0	+0.0					
^	17304.000	44.5	+0.0	+0.0	+0.0	+0.0	+0.0	42.3	54.0	-11.7	Horiz
	M		+0.0	+0.0	+0.0	-12.1					
			+2.1	+7.8	+0.0	+0.0	360				151
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0	+0.0					
14	37394.500	33.4	+0.0	+2.3	+1.6	+7.2	-9.5	23.9	54.0	-30.1	Horiz
	M		+0.0	+0.0	+0.0	+0.0					
	Ave		+0.0	+0.0	+0.0	+0.0					155
			+0.0	+3.9	+3.7	+0.0					
			+0.0	+0.0	+0.0	+0.0					
^	37394.500	48.3	+0.0	+2.3	+1.6	+7.2	-9.5	57.5	54.0	+3.5	Horiz
	M		+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0	+0.0					150
			+0.0	+3.9	+3.7	+0.0					
			+0.0	+0.0	+0.0	+0.0					
16	20.350M	20.7	+7.0	+0.0	+0.2	+0.0	-40.0	-12.1	29.5	-41.6	Perp,
			+0.0	+0.0	+0.0	+0.0					104
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0	+0.0					

Band Edge

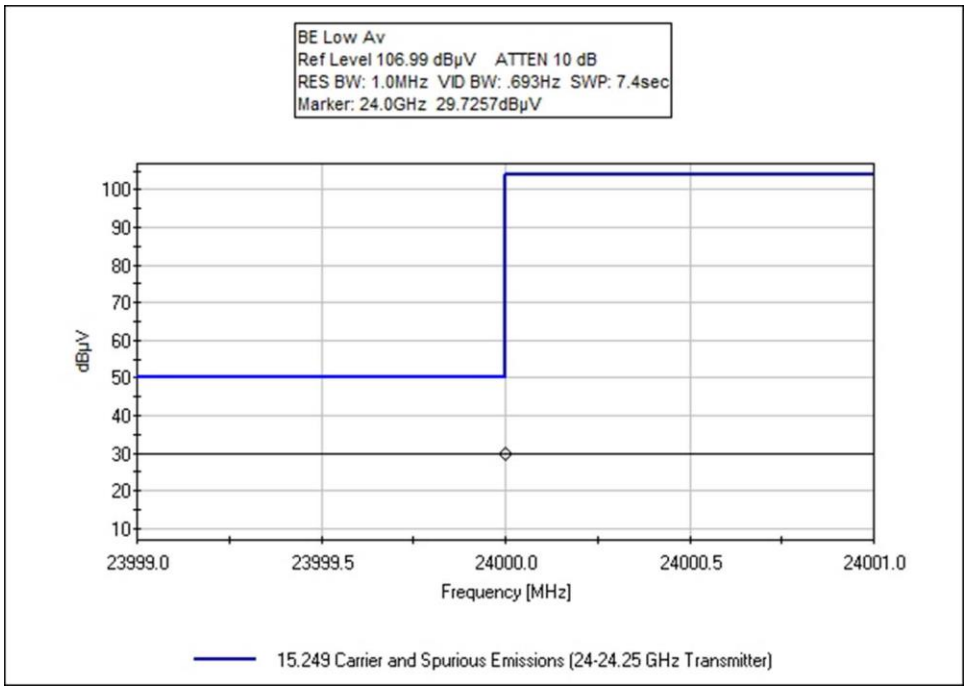
Band Edge Summary					
Frequency (GHz)	**Modulation**	**Ant. Type**	**Field Strength (dBuV/m @3m)**	**Limit (dBuV/m @3m)**	**Results**
24.00	FMCW	Patch	33.5	<54 Ave	Pass
24.00	FMCW	Patch	54.0	<74 Peak	Pass
24.25	FMCW	Patch	34.2	<54 Ave	Pass
24.25	FMCW	Patch	63.1	<74 Peak	Pass

Test performed using operational mode with the highest output power, representing worst case

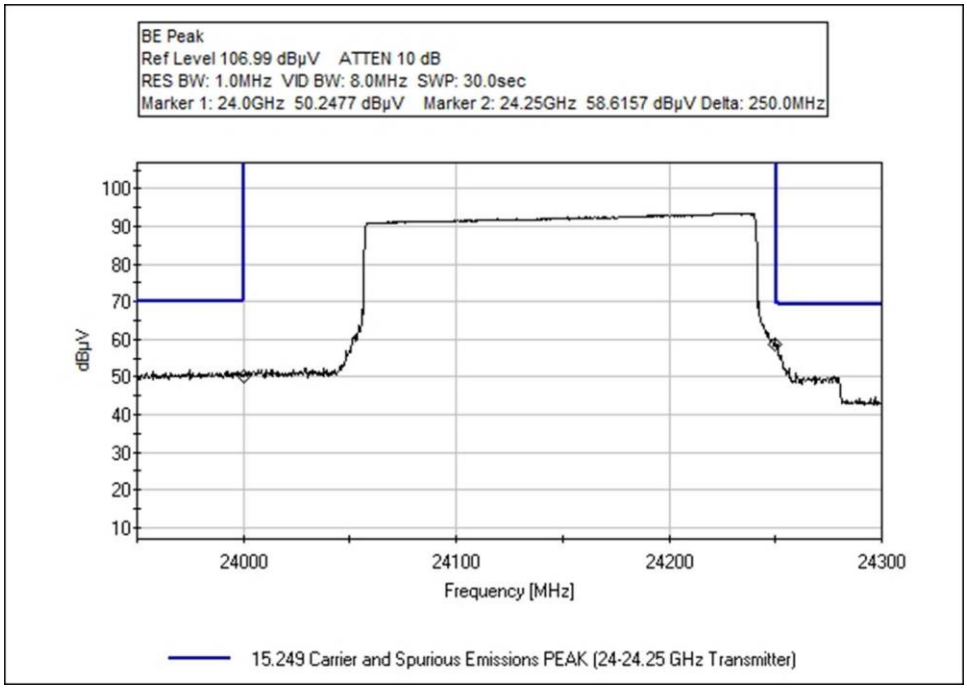
Band Edge Plots



Average High



Average Low



Peak

Test Setup / Conditions / Data

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive S.E., Suite A • Bothell WA 98021 • (425) 402-1717		
Customer:	**Nalloy, LLC**		
Specification:	**15.249/15.209 Radiated Emissions (24-24.25GHz)**		
Work Order #:	**109749**	Date:	7/17/2024
Test Type:	**Maximized Emissions**	Time:	15:48:29
Tested By:	Steven Pittsford	Sequence#:	10
Software:	EMITest 5.03.21		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

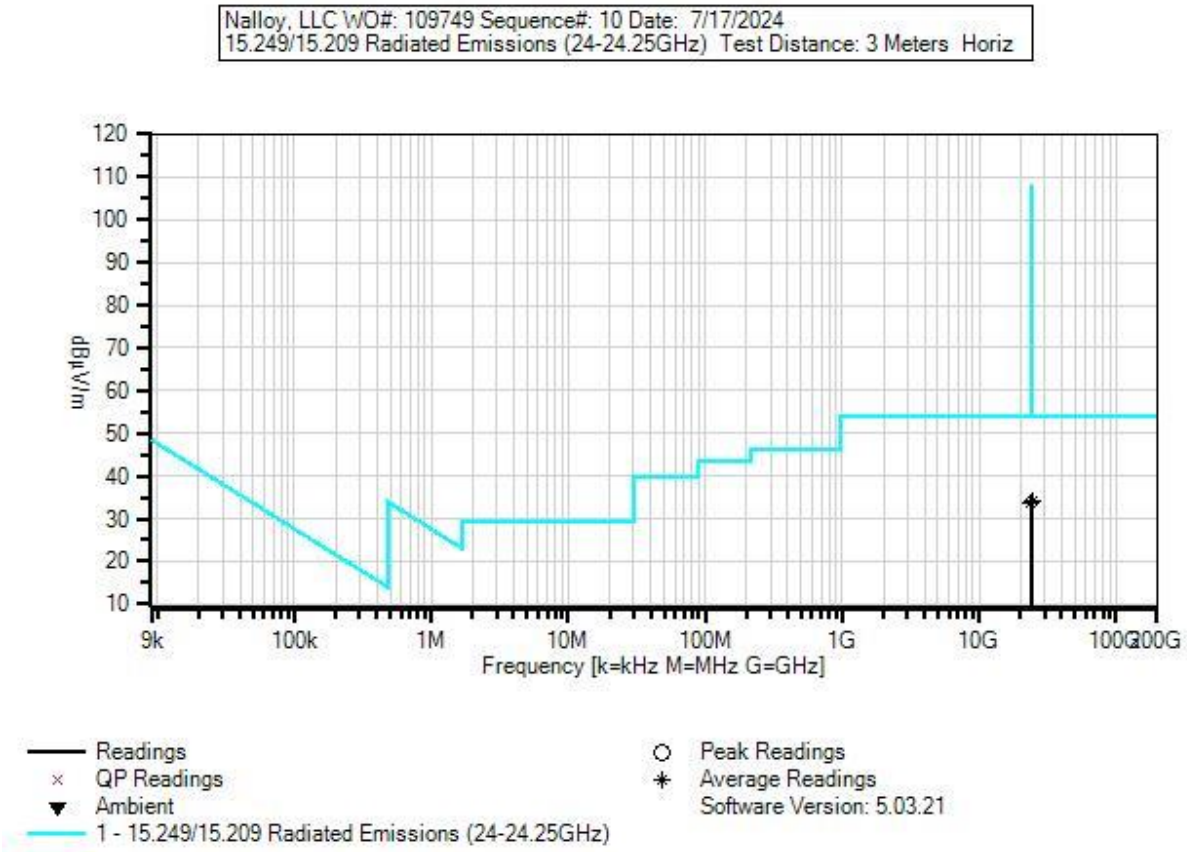
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Setup:
EUT is transmitting.

Frequency: 24-24.25GHZz



Test Equipment:

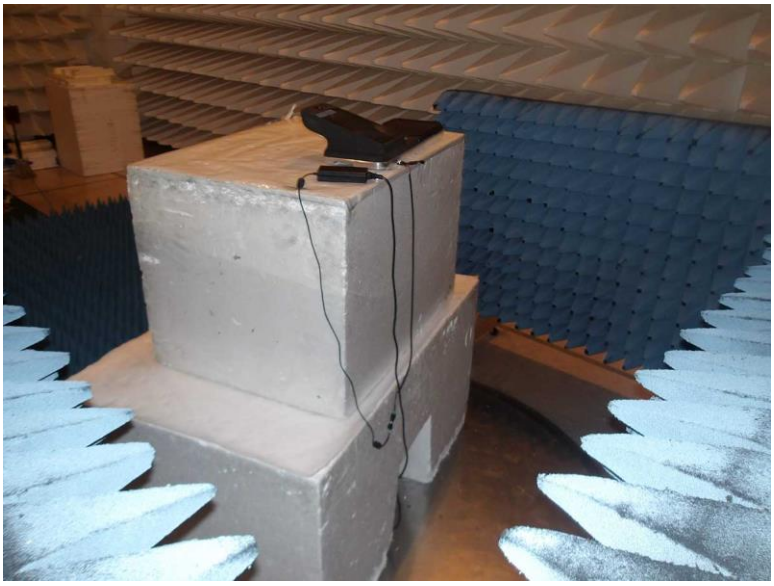
ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02763-69	Waveguide	Multiple	1/9/2024	1/9/2026
T2	ANP07212	Cable	32026-29801-29801-18	5/1/2023	5/1/2025
T3	ANP07505	Cable	CLU40-KMKM-02.00F	1/19/2024	1/19/2026
T4	ANP07900	Cable	CLU40-KMKM-10.00F	8/8/2023	8/8/2025
T5	ANP07901	Cable	CLU40-KMKM-10.00F	8/8/2023	8/8/2025
T6	AN02673	Spectrum Analyzer	E4446A	3/8/2024	3/8/2026
T7	AN02742	Active Horn Antenna	AMFW-5F-18002650-20-10P	11/18/2022	11/18/2024

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2 T6	T3 T7	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	24250.000	29.7	+2.5	+1.8	+1.5	+5.8	+0.0	34.2	54.0	-19.8	Horiz
	M		+5.8	+0.0	-12.9						
	Ave						350				210
^	24250.000	58.6	+2.5	+1.8	+1.5	+5.8	+0.0	63.1	54.0	+9.1	Horiz
	M		+5.8	+0.0	-12.9						
							350				210
3	24000.000	29.7	+2.5	+1.7	+1.5	+5.9	+0.0	33.5	54.0	-20.5	Horiz
	M		+5.7	+0.0	-13.5						
	Ave						350				210
^	24000.000	50.2	+2.5	+1.7	+1.5	+5.9	+0.0	54.0	54.0	+0.0	Horiz
	M		+5.7	+0.0	-13.5						
							350				210

Test Setup Photo(s)

Below 1GHz



Above 1GHz

15.207 AC Conducted Emissions

Test Setup/Conditions			
Test Location:	Canyon Park Lab C3	Test Engineer:	S. Pittsford
Test Method:	ANSI C63.10 (2020)	Test Date(s):	7/19/2024
Configuration:	1		

Environmental Conditions			
Temperature (ºC)	24	Relative Humidity (%):	43

Test Setup / Conditions / Data

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive S.E., Suite A • Bothell WA 98021 • (425) 402-1717		
Customer:	**Nalloy, LLV**		
Specification:	**15.207 AC Mains - Average**		
Work Order #:	**109749**	Date:	7/16/2024
Test Type:	**Conducted Emissions**	Time:	11:17:31
Tested By:	Steven Pittsford	Sequence#:	1
Software:	EMITest 5.03.20		115V 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

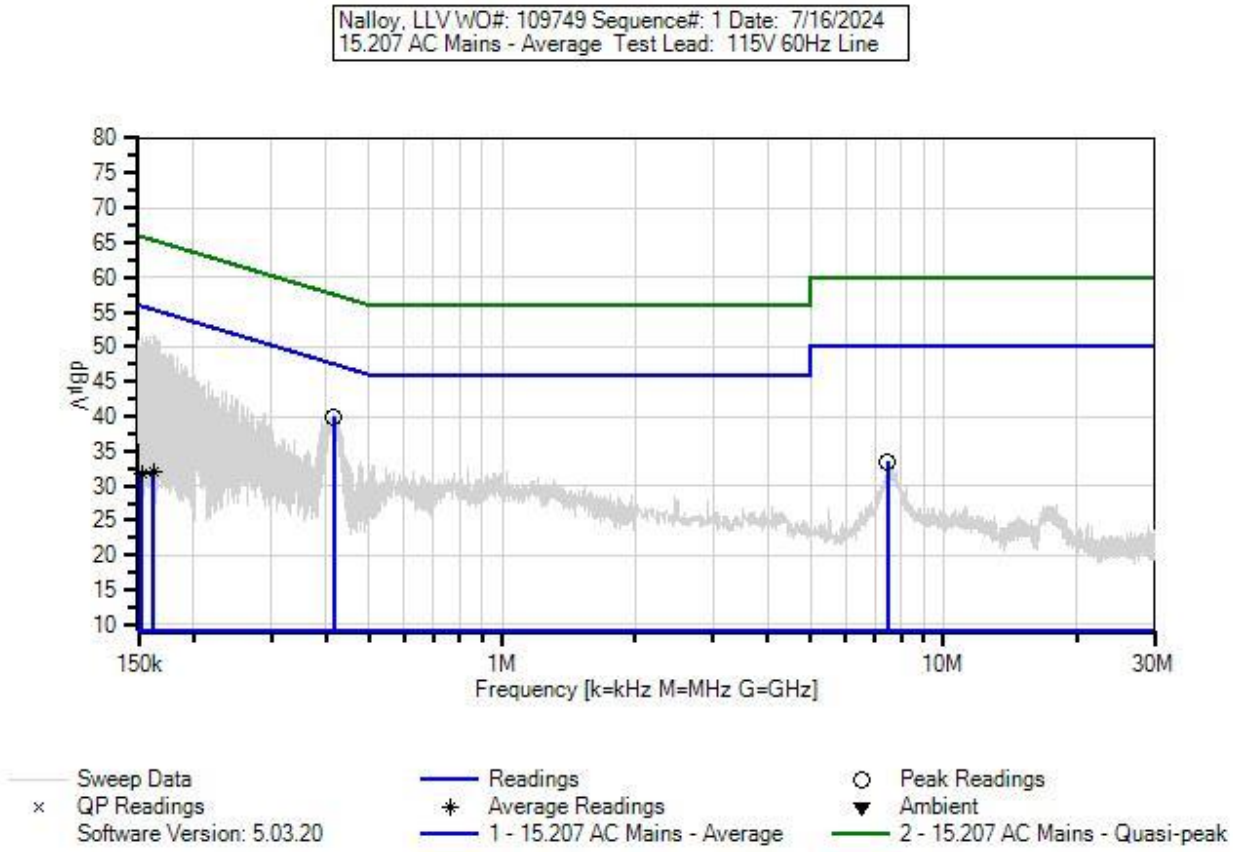
Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Setup:
EUT is transmitting.
EUT is connected to support laptop inside the chamber.

Test Environment Conditions:
Temperature: 24°C
Pressure: 101kPa
Humidity: 43%
Frequency: 150k-30MHz

Test Method: ANSI C63.10 (2020)



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06011	Cable	Heliax	11/16/2023	11/16/2025
T2	ANP06515	Cable	Heliax	2/28/2024	2/28/2026
T3	AN01311	50uH LISN-Line1 (L)	3816/2	2/9/2024	2/9/2026
	AN01311	50uH LISN-Line2 (N)	3816/2	2/9/2024	2/9/2026
T4	AN03807	Spectrum Analyzer	E4440A	10/10/2023	10/10/2025
T5	AN02611	High Pass Filter	HE9615-150K-50-720B	11/27/2023	11/27/2025
T6	ANP06219	Attenuator	768-10	3/25/2024	3/25/2026

Measurement Data: Reading listed by margin. Test Lead: Line

#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	416.000k	30.8	+0.0 +0.1	+0.1 +9.0	+0.0	+0.0	+0.0	40.0	47.5	-7.5	Line
2	7.485M	24.2	+0.0 +0.0	+0.2 +9.1	+0.0	+0.0	+0.0	33.5	50.0	-16.5	Line
3	162.150k Ave	22.5	+0.0 +0.6	+0.0 +9.0	+0.0	+0.0	+0.0	32.1	55.4	-23.3	Line
^	162.150k	42.2	+0.0 +0.6	+0.0 +9.0	+0.0	+0.0	+0.0	51.8	55.4	-3.6	Line
5	152.750k Ave	22.0	+0.0 +0.8	+0.0 +9.0	+0.0	+0.0	+0.0	31.8	55.8	-24.0	Line
^	152.750k	41.6	+0.0 +0.8	+0.0 +9.0	+0.0	+0.0	+0.0	51.4	55.8	-4.4	Line

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive S.E., Suite A • Bothell WA 98021 • (425) 402-1717		
Customer:	**Nalloy, LLV**		
Specification:	**15.207 AC Mains - Average**		
Work Order #:	**109749**	Date:	7/16/2024
Test Type:	**Conducted Emissions**	Time:	11:26:10 AM
Tested By:	Steven Pittsford	Sequence#:	2
Software:	EMITest 5.03.20		115V 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

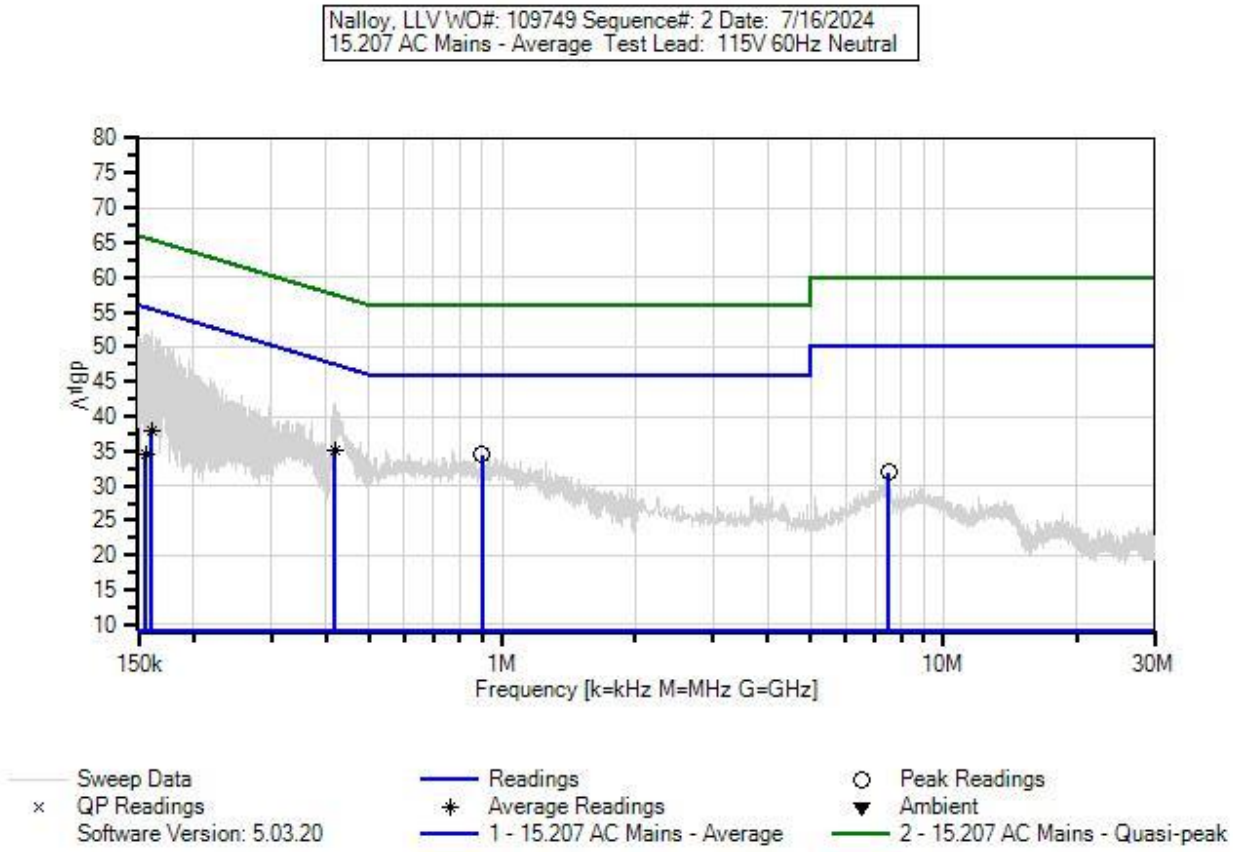
Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Setup:
EUT is transmitting.
EUT is connected to support laptop inside the chamber.

Test Environment Conditions:
Temperature: 24°C
Pressure: 101kPa
Humidity: 43%
Frequency: 150k-30MHz

Test Method: ANSI C63.10 (2020)



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06011	Cable	Heliax	11/16/2023	11/16/2025
T2	ANP06515	Cable	Heliax	2/28/2024	2/28/2026
	AN01311	50uH LISN-Line1 (L)	3816/2	2/9/2024	2/9/2026
T3	AN01311	50uH LISN-Line2 (N)	3816/2	2/9/2024	2/9/2026
T4	AN03807	Spectrum Analyzer	E4440A	10/10/2023	10/10/2025
T5	AN02611	High Pass Filter	HE9615-150K-50-720B	11/27/2023	11/27/2025
T6	ANP06219	Attenuator	768-10	3/25/2024	3/25/2026

Measurement Data: Reading listed by margin. Test Lead: Neutral

#	Freq MHz	Rdng dBµV	T1 T5 dB	T2 T6 dB	T3 dB	T4 dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	900.000k	25.2	+0.0 +0.1	+0.1 +9.1	+0.0	+0.0	+0.0	34.5	46.0	-11.5	Neutr
2	417.400k Ave	25.8	+0.0 +0.1	+0.1 +9.0	+0.0	+0.0	+0.0	35.0	47.5	-12.5	Neutr
^	417.400k	32.8	+0.0 +0.1	+0.1 +9.0	+0.0	+0.0	+0.0	42.0	47.5	-5.5	Neutr
4	160.950k Ave	28.3	+0.0 +0.6	+0.0 +9.0	+0.0	+0.0	+0.0	37.9	55.4	-17.5	Neutr
^	160.950k	42.6	+0.0 +0.6	+0.0 +9.0	+0.0	+0.0	+0.0	52.2	55.4	-3.2	Neutr
^	165.100k	42.0	+0.0 +0.5	+0.0 +9.0	+0.0	+0.0	+0.0	51.5	55.2	-3.7	Neutr
7	7.521M	22.5	+0.0 +0.0	+0.2 +9.1	+0.1	+0.0	+0.0	31.9	50.0	-18.1	Neutr
8	155.850k Ave	24.7	+0.0 +0.7	+0.0 +9.0	+0.0	+0.0	+0.0	34.4	55.7	-21.3	Neutr
^	155.850k	42.2	+0.0 +0.7	+0.0 +9.0	+0.0	+0.0	+0.0	51.9	55.7	-3.8	Neutr

Test Setup Photo(s)

View 1

View 2

Appendix A: Manufacturer Declaration

The following device has been tested by CKC Laboratories:
Device: FH7K2H

The manufacturer declares that the following additional devices are identical electrically or any differences between them do not affect their EMC characteristics, and therefore meets the level of testing equivalent to the tested model:
DCPXXX
DCRXXX

Supplemental Information

Measurement Uncertainty

Uncertainty Value	Parameter
5.77 dB	Radiated Emissions
0.673 dB	RF Conducted Measurements
5.77×10^{-10}	Frequency Deviation
0.00005 s	Time Deviation
3.18 dB	Mains Conducted Emissions

Uncertainties reported are worst case for all CKC Laboratories' sites and represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k=2. Compliance is deemed to occur provided measurements are below the specified limits.

Emissions Test Details

TESTING PARAMETERS

Unless otherwise indicated, the following configuration parameters are used for equipment setup: The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. Cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the setup photographs. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables.

The emissions data was taken with a spectrum analyzer or receiver. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the table below. The corrected data was then compared to the applicable emission limits. Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dBµV/m, the spectrum analyzer reading in dBµV was corrected by using the following formula. This reading was then compared to the applicable specification limit. Individual measurements were compared with the displayed limit value in the margin column. The margin was calculated based on subtracting the limit value from the corrected measurement value; a positive margin represents a measurement exceeding the limit, while a negative margin represents a measurement less than the limit.

SAMPLE CALCULATIONS		
	Meter reading	(dBµV)
+	Antenna Factor	(dB/m)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dBµV/m)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed were used to collect the emissions data. A spectrum analyzer or receiver was used for all measurements. Unless otherwise specified, the following table shows the measuring equipment bandwidth settings that were used in designated frequency bands. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used.

MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	9 kHz	150 kHz	200 Hz
RADIATED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	>1 GHz	1 MHz

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "positive peak" detector mode. Whenever a "quasi-peak" or "average" reading was recorded, the measurement was annotated with a "QP" or an "Ave" on the appropriate rows of the data sheets. In cases where quasi-peak or average limits were employed and data exists for multiple measurement types for the same frequency then the peak measurement was retained in the report for reference, however the numbering for the affected row was removed and an arrow or caret ("^") was placed in the far left-hand column indicating that the row above takes precedence for comparison to the limit. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

Peak

In this mode, the spectrum analyzer or receiver recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature called "peak hold," the measurement device had the ability to measure intermittent or low duty cycle transient emission peak levels. In this mode the measuring device made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

Quasi-peak measurements were taken using the quasi-peak detector when the true peak values exceeded or were within 2 dB of a quasi-peak specification limit. Additional QP measurements may have been taken at the discretion of the operator.

Average

Average measurements were taken using the average detector when the true peak values exceeded or were within 2 dB of an average specification limit. Additional average measurements may have been taken at the discretion of the operator. If the specification or test procedure requires trace averaging, then the averaging was performed using 100 samples or as required by the specification. All other average measurements are performed using video bandwidth averaging. To make these measurements, the test engineer reduces the video bandwidth on the measuring device until the modulation of the signal is filtered out. At this point the measuring device is set into the linear mode and the scan time is reduced.

End of Report