NVLAP Lab Code 200087-0

ROGERS LABS, INC.

4405 West 259th Terrace
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Phone / Fax (913) 837-3214

Class 2 Permissive Change
And ISED C4PC Application Report
For
Model: SAL2

FCC ID: 2A9CG-SAL2
IC: 29750-SAL2

FOR

Examinetics, Inc.

10561 Barkley Place, Suite 400
Overland Park, KS 66212

FCC Designation: US5305
IC Test Site Registration: 3041A-1

Test Report Number: 230308

Test Date: March 8, 2023

Authorized Signatory: Scot D Rogers

Scot D. Rogers
Rogers Labs, Inc.
4405 West 259th Terrace
Louisburg, KS 66053
Telephone/Facsimile: (913) 837-3214

Revisions

Revision 2 Issued April 3, 2023 – added reference to ISED Class 4 Permissive Change (C4PC) (pages 1, 4, 6) and updated reference to Grant date page 4

Revision 1 Issued March 29, 2023

Foreword

The following information is submitted for consideration in processing Class 2 Permissive Change (C2PC), and ISED Class 4 Permissive Change (C4PC), of authorized equipment to address Multi-transmitter operation. The product model: SAL2, was granted an authorization (FCC ID: 2A9CG-SAL2 Issued 3/10/2023, and IC: 29750-SAL2 Issued 3/14/2023) operating as Digital Transmission System (DTS) under 47CFR 15C in the 2402-2480 MHz frequency band. The original module Grants prohibit use with other transmitters in multi-transmitter configuration. This report provides documentation supporting the use of this product in a multi-transmitter configuration including the transceiver module (FCC ID: 2AMWO-FSCBT1026, and IC: 23872-FSCBT1026).

Name of Applicant: Examinetics, Inc.
10561 Barkley Place, Suite 400
Overland Park, KS 66212

Model: SAL2
FCC ID: 2A9CG-SAL2
IC: 29750-SAL2

Opinion / Interpretation of Results

Test Performed per 47CFR	Minimum Margin (dB)	Results
Radiated Emissions	-5.7	Complies

Change to Equipment

The change to the equipment from original design addresses multi-transmitter operation. The original equipment module model: SAL2, was granted single modular authorization with restriction for use in co-located applications. The original module Grants prohibit use with other transmitters in multi-transmitter configurations. The modules, Tx 1 and Tx 2, configured on development board demonstrated compliance in this multi-transmitter configuration. This report

documents co-location and use with modules Tx 1 (model: SAL2) and Tx 2 (model: FSC-BT1) (FCC ID: 2AMWO-FSCBT1026, IC: 23872-FSCBT1026).

Equipment Tested

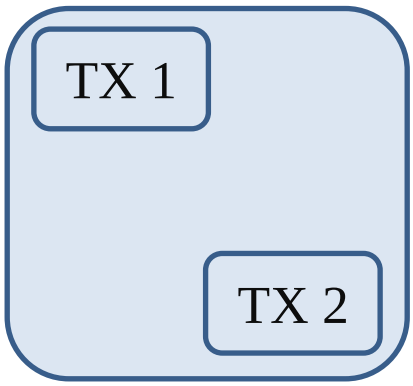
Equipment	Model / PN	FCC Identifier	IC Identifier
EUT	SAL2	2A9CG-SAL2	29750-SAL2

Test results in this report relate only to the items tested.

Equipment Function and Configuration

The EUT is a Digital Transmission System module providing wireless communications with other digital equipment. The module configuration also incorporates the Feasycom module model: FSC-BT1026, FCC ID: 2AMWO-FSCBT1026, IC: 23872-FSCBT1026. The design operates from direct current power only. The design provides no other interfacing options than those presented in this report. For testing purposes, the SAL2 test sample was configured as directed by the manufacturer with all transmitters active. As requested by the manufacturer the equipment was tested for emissions compliance using the available configurations with the worst-case data presented. Test results in this report relate only to the products described in this report.

Equipment Configuration



Applicable Standards & Test Procedures

The following information is submitted in accordance with the 47CFR, dated March 8, 2023, Part 2, Subpart J, Paragraph 2.932 and applicable parts of paragraph 15C, Industry Canada RSS-247 Issue 2, and RSS-GEN Issue 5. The applications and information are submitted for processing Class 2 Permissive Change (C2PC), and ISED Class 4 Permissive Change (C4PC) to allow multi-transmitter operation. Test procedures used are the established Methods of Measurement of Radio-Noise Emissions as described in ANSI C63.10-2013.

Statement of Modifications and Deviations

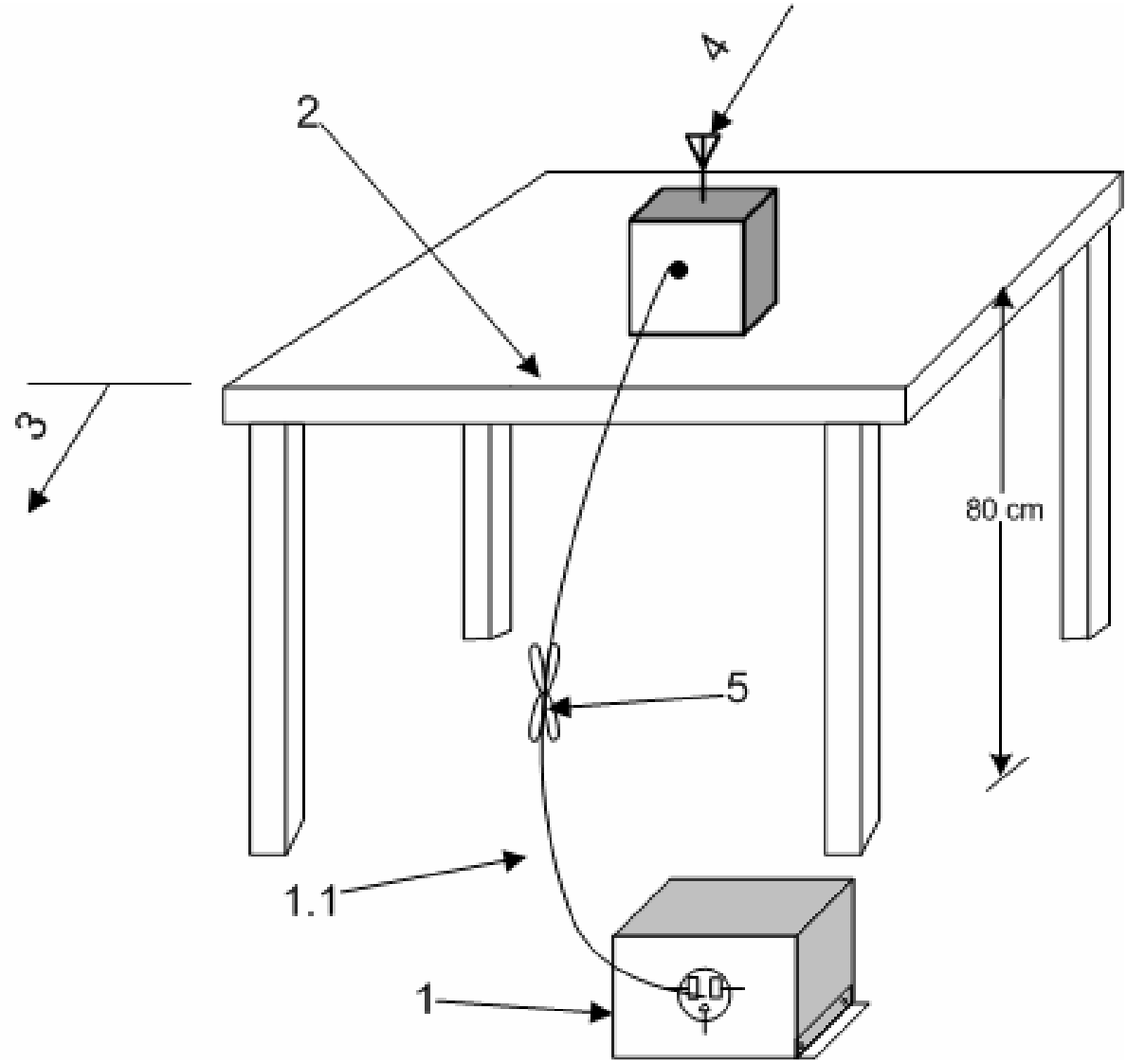
No modifications to the EUT were required for the unit to demonstrate compliance with 47CFR Part 15C, RSS-247 Issue 2, and RSS-GEN Issue 5 emission requirements. There were no deviations to the specifications.

Testing Procedures

Radiated Emission Test Procedure

Radiated emissions testing was performed as required in 47CFR 15C, RSS-247 Issue 2, RSS-GEN and specified in ANSI C63.10-2013. The EUT was placed on a rotating 0.9 x 1.2-meter platform, elevated as required above the ground plane at a distance of 3 meters from the FSM antenna. EMI energy was maximized by equipment placement permitting orientation in three orthogonal axes, raising, and lowering the FSM antenna, changing the antenna polarization, and by rotating the turntable. Each emission was maximized before data was taken and recorded. The frequency spectrum from 9 kHz to 25,000 MHz was searched for emissions during preliminary investigation. Refer to diagrams one and two showing typical test setup. Refer to photographs in the test setup exhibits for specific EUT placement during testing.

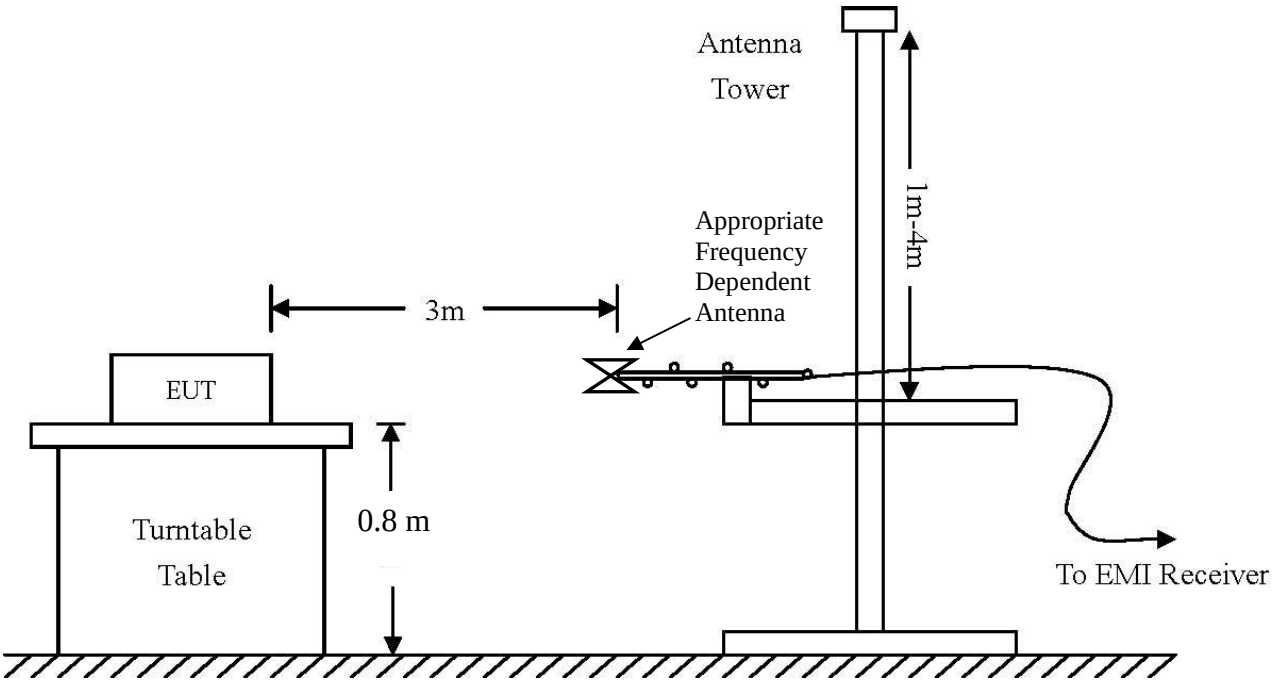
Diagram 1 Test arrangement for radiated emissions of tabletop equipment.



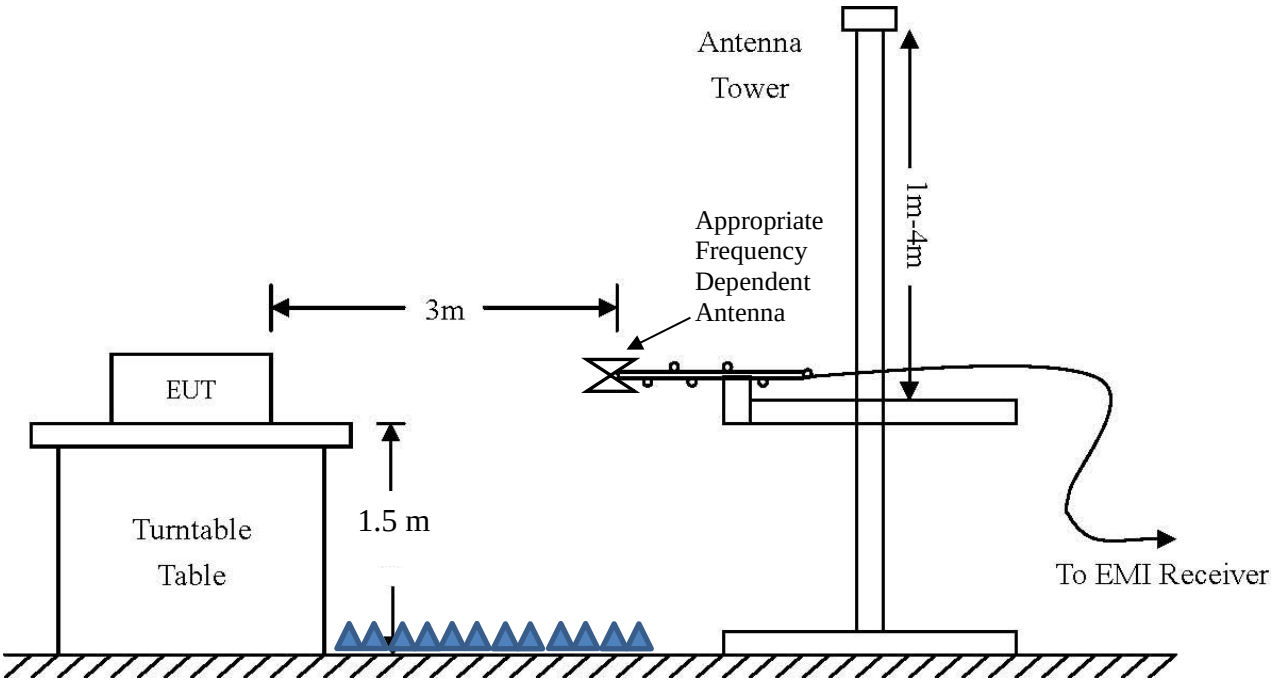
1—A LISN is optional for radiated measurements between 30 MHz and 1000 MHz but not allowed for measurements below 30 MHz and above 1000 MHz (see 6.3.1). If used, then connect EUT to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω loads. The LISN may be placed on top of, or immediately beneath, the reference ground plane (see 6.2.2 and 6.2.3.2).
1.1—LISN spaced at least 80 cm from the nearest part of the EUT chassis.
2—Antenna can be integral or detachable, depending on the EUT (see 6.3.1).
3—Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 cm to 40 cm long (see 6.3.1).
4—For emission measurements at or below 1 GHz, the table height shall be 80 cm. For emission measurements above 1 GHz, the table height shall be 1.5 m for measurements, except as otherwise specified (see 6.3.1 and 6.6.3.1).

Diagram 2 Test arrangement for radiated emissions tested on Open Area Test Site (OATS)

Below 1 GHz



Above 1 GHz



Test Site Locations

Conducted EMI	AC line conducted emissions testing performed in a shielded screen room located at Rogers Labs, Inc., 4405 West 259th Terrace, Louisburg, KS
Antenna port	Antenna port conducted emissions testing was performed in a shielded screen room located at Rogers Labs, Inc., 4405 West 259th Terrace, Louisburg, KS
Radiated EMI	The radiated emissions tests were performed at the 3 meters, Open Area Test Site (OATS) located at Rogers Labs, Inc., 4405 West 259th Terrace, Louisburg, KS
Registered Site information:	FCC Site: US5305, ISED: 3041A, CAB Identifier: US0096
NVLAP Accreditation	Lab code 200087-0

Units of Measurements

Conducted EMI	Data presented in dBµV; dB referenced to one microvolt.
Antenna port Conducted	Data is in dBm; dB referenced to one milliwatt.
Radiated EMI	Data presented in dBµV/m; dB referenced to one microvolt per meter.

Note: Radiated limit may be expressed for measurement in dBµV/m when the measurement is taken at a distance of 3 or 10 meters. Data taken for this report was taken at distance of 3 meters. Sample calculation demonstrates corrected field strength reading for Open Area Test Site using the measurement reading and correcting for receive antenna factor, cable and test system losses, and amplifier gains.

Sample Calculation:

RFS = Radiated Field Strength, FSM = Field Strength Measured

A.F. = Receive antenna factor, Losses = attenuators/cable losses, Gain = amplification gains

RFS (dBµV/m @ 3m) = FSM (dBµV) + A.F. (dB/m) + Losses (dB) - Gain (dB)

Environmental Conditions

Ambient Temperature	19.5° C
Relative Humidity	25%
Atmospheric Pressure	1033.0 mb

General Radiated Emissions Procedure

The EUT was arranged in a typical equipment configuration and operated through all available mode during testing. Preliminary testing was performed in a screen room with the EUT positioned 1 meter from the FSM. Radiated emissions measurements were performed to identify the frequencies, which produced the highest emissions. Each radiated emission was then maximized at the OATS location before final radiated measurements were performed. Final data was taken with the EUT located on the OATS at 3 meters distance between the EUT and the receiving antenna. The frequency spectrum from 9 kHz to 25,000 MHz was searched for general radiated emissions. Measured emission levels were maximized by EUT placement on the table, rotating the turntable through 360 degrees, varying the antenna height between 1 and 4 meters above the ground plane and changing antenna position between horizontal and vertical polarization. Antennas used were Loop from 9 kHz to 30 MHz, Broadband Biconical from 30 to 200 MHz, Biconilog from 30 to 1000 MHz, Log Periodic from 200 MHz to 1 GHz and or double Ridge or pyramidal horns and mixers above 1 GHz, notch filters and appropriate amplifiers and external mixers were utilized.

Table 1 General Radiated Emissions Data

Frequency (MHz)	Horizontal Peak (dBµV/m)	Horizontal Quasi-Peak (dBµV/m)	Vertical Peak (dBµV/m)	Vertical Quasi-Peak (dBµV/m)	Limit @ 3m (dBµV/m)	Horizontal Margin (dB)	Vertical Margin (dB)
159.7	32.6	23.6	30.2	25.0	40.0	-16.4	-15.0
181.3	32.0	27.9	24.9	21.4	40.0	-12.1	-18.6
184.3	29.6	23.8	28.8	26.6	40.0	-16.2	-13.4
187.4	34.7	33.9	28.5	27.0	40.0	-6.1	-13.0
193.6	34.8	33.4	28.8	27.3	40.0	-9.6	-15.7
199.6	33.2	32.0	28.1	26.4	40.0	-8.0	-13.6
205.8	29.7	28.3	22.5	19.9	40.0	-11.7	-20.1
208.9	27.6	24.7	27.2	21.4	40.0	-15.3	-18.6

Other emissions present had amplitudes at least 20 dB below the limit. Peak and Quasi-Peak amplitude emissions are recorded for frequency range below 1000 MHz. Peak and Average amplitude emissions are recorded for frequency range above 1000 MHz.

Summary of Results for General Radiated Emissions

The EUT demonstrated compliance with the radiated emissions requirements of 47CFR Paragraph 15.209, RSS-247 Issue 2 and RSS-GEN Issue 5 emission requirements. The EUT demonstrated a minimum margin of -6.1 dB below the requirements. Other emissions were present with amplitudes at least 20 dB below the Limits.

Restricted Bands of Operation

Spurious emissions falling in the restricted frequency bands of operation were measured at the OATS. The EUT utilizes frequency, determining circuitry, which generates harmonics falling in the restricted bands. Emissions were investigated at the OATS, using appropriate antennas or pyramidal horns, amplification stages, and a spectrum analyzer. Peak and average amplitudes of frequencies above 1000 MHz were compared to the required limits with worst-case data presented below. Test procedures of ANSI C63.10-2013 were used during testing. No other significant emission was observed which fell into the restricted bands of operation. Computed emission values consider the received radiated field strength, receive antenna correction factor, amplifier gain stage, and test system cable losses.

Table 2 Radiated Emissions in Restricted Bands

Frequency in MHz	Horizontal Peak (dBµV/m)	Horizontal Average (dBµV/m)	Vertical Peak (dBµV/m)	Vertical Average (dBµV/m)	Limit @ 3m (dBµV/m)	Horizontal Margin (dB)	Vertical Margin (dB)
2390.0	44.2	30.3	43.8	305.0	54.0	-23.7	251.0
2483.5	46.4	32.5	45.2	31.9	54.0	-21.5	-22.1
4804.0	50.4	36.3	51.0	37.9	54.0	-17.7	-16.1
4880.0	49.5	36.6	50.3	37.2	54.0	-17.4	-16.8
4960.0	49.9	36.6	50.2	36.8	54.0	-17.4	-17.2
7206.0	54.1	40.4	53.7	40.3	54.0	-13.6	-13.7
7320.0	53.7	40.5	53.3	40.7	54.0	-13.5	-13.3
7440.0	53.8	40.4	53.4	40.8	54.0	-13.6	-13.2
12010.0	60.2	46.8	58.4	45.5	54.0	-7.2	-8.5
12200.0	61.2	48.3	61.5	48.4	54.0	-5.7	-5.6
12400.0	60.1	47.0	60.1	47.0	54.0	-7.0	-7.0

Other emissions present had amplitudes at least 20 dB below the limit. Peak and Quasi-Peak amplitude emissions are recorded for frequency below 1000 MHz. Peak and Average amplitude emissions are recorded for frequency range above 1000 MHz.

Summary of Results for Radiated Emissions in Restricted Bands

The EUT demonstrated compliance with the radiated emissions requirements of 47CFR Paragraph 15, Subpart 15C, RSS-247 Issue 2, and RSS-GEN Issue 5 emission requirements. The EUT demonstrated a minimum radiated emission margin of -5.7 dB below the requirements in restricted frequency bands. Peak, Quasi-peak, and average amplitudes were checked for compliance with the regulations. Worst-case emissions are reported with other emissions found in the restricted frequency bands at least 20 dB below the requirements.

Annex

- Annex A Measurement Uncertainty Calculations
- Annex B Test Equipment List
- Annex C Rogers Qualifications
- Annex D Laboratory Certificate of Accreditation

Annex A Measurement Uncertainty Calculations

The measurement uncertainty was calculated for all measurements listed in this test report according To CISPR 16–4. Result of measurement uncertainty calculations are recorded below. Component and process variability of production devices similar to those tested may result in additional deviations. The manufacturer has the sole responsibility of continued compliance.

Measurement	Expanded Measurement Uncertainty $U_{(lab)}$
3 Meter Horizontal 0.009-1000 MHz Measurements	4.16
3 Meter Vertical 0.009-1000 MHz Measurements	4.33
3 Meter Measurements 1-18 GHz	5.14
3 Meter Measurements 18-40 GHz	5.16
10 Meter Horizontal Measurements 0.009-1000 MHz	4.15
10 Meter Vertical Measurements 0.009-1000 MHz	4.32
AC Line Conducted	1.75
Antenna Port Conducted power	1.17
Frequency Stability	1.00E-11
Temperature	1.6˚C
Humidity	3%

Annex B Test Equipment List

Equipment	Manufacturer	Model (SN)	Band	Cal Date(m/d/y)	Due
☐ LISN	FCC	FCC-LISN-50-25-10(1PA) (160611)	.15-30MHz	3/29/2022	3/29/2023
☐ LISN: Fischer Custom Communications Model: FCC-LISN-50-16-2-08				3/29/2022	3/29/2023
☒ Cable	Huber & Suhner Inc.	Sucoflex102ea(L10M)(303073)	9kHz-40 GHz	10/11/2022	10/11/2023
☐ Cable	Huber & Suhner Inc.	Sucoflex102ea(1.5M)(303069)	9kHz-40 GHz	10/11/2022	10/11/2023
☒ Cable	Huber & Suhner Inc.	Sucoflex102ea(1.5M)(303070)	9kHz-40 GHz	10/11/2022	10/11/2023
☐ Cable	Belden	RG-58 (L1-CAT3-11509)	9kHz-30 MHz	10/11/2022	10/11/2023
☐ Cable	Belden	RG-58 (L2-CAT3-11509)	9kHz-30 MHz	10/11/2022	10/11/2023
☒ Antenna	Com Power	AL-130 (121055)	.001-30 MHz	10/11/2022	10/11/2023
☐ Antenna:	EMCO	6509	.001-30 MHz	10/14/2020	10/11/2023
☐ Antenna	ARA	BCD-235-B (169)	20-350MHz	10/11/2022	10/11/2023
☒ Antenna	Sunol	JB-6 (A100709)	30-1000 MHz	10/11/2022	10/11/2023
☐ Antenna	ETS-Lindgren	3147 (40582)	200-1000MHz	10/11/2022	10/11/2024
☒ Antenna	ETS-Lindgren	3117 (200389)	1-18 GHz	3/29/2022	3/29/2024
☐ Antenna	Com Power	AH-118 (10110)	1-18 GHz	10/11/2022	10/11/2024
☒ Antenna	Com Power	AH-840 (101046)	18-40 GHz	4/6/2021	4/6/2023
☒ Analyzer	Rohde & Schwarz	ESU40 (100108)	20Hz-40GHz	3/9/2022	3/9/2023
☒ Analyzer	Rohde & Schwarz	ESW44 (101534)	20Hz-44GHz	1/25/2023	1/25/2024
☐ Analyzer	Rohde & Schwarz	FS-Z60, 90, 140, and 220	40GHz-220GHz	12/22/2017	12/22/2027
☒ Amplifier	Com-Power	PA-010 (171003)	100Hz-30MHz	10/11/2022	10/11/2023
☒ Amplifier	Com-Power	CPPA-102 (01254)	1-1000 MHz	10/11/2022	10/11/2023
☒ Amplifier	Com-Power	PAM-118A (551014)	0.5-18 GHz	10/11/2022	10/11/2023
☒ Amplifier	Com-Power	PAM-840A (461328)	18-40 GHz	10/11/2022	10/11/2023
☐ Pwr Sensor	Rohde & Schwarz	NRP33T	0.05-33 GHz	8/31/2022	8/31/2023
☐ Power Meter	Agilent	N1911A with N1921A	0.05-40 GHz	3/29/2022	3/29/2023
☐ Generator	Rohde & Schwarz	SMB100A6 (100150)	20Hz-6 GHz	3/29/2022	3/29/2023
☐ Generator	Rohde & Schwarz	SMBV100A6 (260771)	20Hz-6 GHz	3/29/2022	3/29/2023
☐ RF Filter	Micro-Tronics	HPM50114 (017)1.5G HPF	30-18000 MHz	4/6/2021	4/6/2023
☐ RF Filter	Micro-Tronics	HPM50117 (063) 3G HPF	30-18000 MHz	4/6/2021	4/6/2023
☐ RF Filter	Micro-Tronics	HPM50105 (059) 6G HPF	30-18000 MHz	4/6/2021	4/6/2023
☐ RF Filter	Micro-Tronics	BRM50702 (172) 2G notch	30-18000 MHz	4/6/2021	4/6/2023
☐ RF Filter	Micro-Tronics	BRC50703 (G102) 5G notch	30-18000 MHz	4/6/2021	4/6/2023
☐ RF Filter	Micro-Tronics	BRC50705 (024) 5G notch	30-18000 MHz	4/6/2021	4/6/2023
☐ Attenuator	Fairview	SA6NFNF100W-40 (1625)	30-18000 MHz	3/29/2022	3/29/2023
☐ Attenuator	Mini-Circuits	VAT-3W2+ (1436)	30-6000 MHz	3/29/2022	3/29/2023
☐ Attenuator	Mini-Circuits	VAT-3W2+ (1445)	30-6000 MHz	3/29/2022	3/29/2023
☐ Attenuator	Mini-Circuits	VAT-3W2+ (1735)	30-6000 MHz	3/29/2022	3/29/2023
☐ Attenuator	Mini-Circuits	VAT-6W2+ (1438)	30-6000 MHz	3/29/2022	3/29/2023
☐ Attenuator	Mini-Circuits	VAT-6W2+ (1736)	30-6000 MHz	3/29/2022	3/29/2023
☒ Weather station	Davis	6312 (A81120N075)		10/11/2022	10/11/2023

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List of Test Equipment			Calibration Date (m/d/y)	Due
☐ Frequency Counter: Leader LDC-825 (8060153			3/29/2022	3/29/2023
☐ ISN:	Com-Power Model ISN T-8		3/29/2022	3/29/2023
☐ LISN	Compliance Design	FCC-LISN-2.Mod.cd,(126) .15-30MHz	10/11/2022	10/11/2024
☐ LISN:	Com-Power Model LI-220A		3/29/2022	3/29/2024
☐ LISN:	Com-Power Model LI-550C		10/11/2022	10/11/2024
☐ Cable	Huber & Suhner Inc.	Sucoflex102ea(1.5M)(303072) 9kHz-40 GHz	10/11/2022	10/11/2023
☐ Cable	Huber & Suhner Inc.	Sucoflex102ea(L1M)(281183) 9kHz-40 GHz	10/11/2022	10/11/2023
☐ Cable	Huber & Suhner Inc.	Sucoflex102ea(L4M)(281184) 9kHz-40 GHz	10/11/2022	10/11/2023
☐ Cable	Huber & Suhner Inc.	Sucoflex102ea(L10M)(317546)9kHz-40 GHz	10/11/2022	10/11/2023
☐ Cable	Time Microwave	4M-750HF290-750 (4M) 9kHz-24 GHz	10/11/2022	10/11/2023
☐ RF Filter	Micro-Tronics	BRC17663 (001) 9.3-9.5 notch 30-1800 MHz	4/6/2021	4/6/2023
☐ RF Filter	Micro-Tronics	BRC19565 (001) 9.2-9.6 notch 30-1800 MHz	10/14/2021	10/14/2023
☐ Analyzer	HP	8562A (3051A05950) 9kHz-125GHz	3/29/2022	3/29/2023
☐ Wave Form Generator Keysight		33512B (MY57400128)	3/29/2022	3/29/2024
☐ Antenna:	Solar 9229-1 & 9230-1		2/18/2023	2/18/2024
☐ CDN:	Com-Power Model CDN325E		10/11/2022	10/11/2024
☐ Oscilloscope Scope: Tektronix MDO 4104			2/18/2023	2/18/2024
☐ EMC Transient Generator HVT TR 3000			2/18/2023	2/18/2024
☐ AC Power Source (Ametech, California Instruments)			2/18/2023	2/18/2024
☐ Field Intensity Meter: EFM-018			2/18/2023	2/18/2024
☐ ESD Simulator: MZ-15			2/18/2023	2/18/2024
☐ Injection Clamp Luthi Model EM101			not required	
☐ R.F. Power Amp ACS 230-50W			not required	
☐ R.F. Power Amp EIN Model: A301			not required	
☐ R.F. Power Amp A.R. Model: 10W 1010M7			not required	
☐ R.F. Power Amp A.R. Model: 50U1000			not required	
☐ Temperature Chamber			not required	
☒ Shielded Room			not required	

Annex C Rogers Qualifications

Scot D. Rogers, Engineer

Rogers Labs, Inc.

Mr. Rogers has approximately 36 years' experience in the field of electronics. Work experience includes six years working in the automated controls industry and remaining years working with the design, development and testing of radio communications and electronic equipment.

Positions Held:

Systems Engineer:	A/C Controls Mfg. Co., Inc.	6 Years
Electrical Engineer:	Rogers Consulting Labs, Inc.	5 Years
Electrical Engineer:	Rogers Labs, Inc.	Current

Educational Background:

Bachelor of Science Degree in Electrical Engineering from Kansas State University

Bachelor of Science Degree in Business Administration Kansas State University

Several Specialized Training courses and seminars pertaining to Microprocessors and Software programming

NVLAP Lab Code 200087-0

Annex D Laboratory Certificate of Accreditation

United States Department of Commerce
National Institute of Standards and Technology

Certificate of Accreditation to ISO/IEC 17025:2017

NVLAP LAB CODE: 200087-0

Rogers Labs, Inc.
Louisburg, KS

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

Electromagnetic Compatibility & Telecommunications

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2022-03-22 through 2023-03-31
Effective Dates

For the National Voluntary Laboratory Accreditation Program