

ROGERS LABS, INC.

4405 West 259th Terrace
Louisburg, KS 66053
Phone / Fax (913) 837-3214

Engineering Test Report for Grant of Certification Application 47CFR, Part 15B 15.109, 15.111, & 15.121 Industry Canada RSS-135 Issue 2

Model: RT-800
Scanning Receiver 118-470 MHz

FCC ID: 2ASLJRT800
IC: 24836-RT800

RHOTHETA International Inc.
8201 Peters Road, Suite 1000
Fort Lauderdale, FL 33324

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

Test Report Number: 190211B

Test Date: February 11, 2019

Authorized Signatory: *Scot D. Rogers*

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

This report shall not be reproduced except in full, without the written approval of the laboratory.
This report must not be used by the client to claim product certification, approval, or
endorsement by NVLAP, NIST, or any agency of the U.S. Government.

Rogers Labs, Inc.	RHOTHETA International Inc.	S/N: 00781
4405 W. 259th Terrace	Model: RT-800	FCC ID: 2ASLJRT800
Louisburg, KS 66053	Test: 190211AB	IC: 24836-RT800
Phone/Fax: (913) 837-3214	Test to: 47CFR, 15(b), RSS-135	Date: January 30, 2020
Revision 1	File: Rhotheta RT800 TstRpt 190211B	Page 1 of 24

Table of Contents

TABLE OF CONTENTS.....	2
REVISIONS.....	3
FOREWORD.....	4
OPINION / INTERPRETATION OF RESULTS	4
EQUIPMENT TESTED, FUNCTION, AND CONFIGURATION	4
Equipment Tested	4
Equipment Function	5
Equipment Configuration.....	6
APPLICANT COMPANY INFORMATION	7
EQUIPMENT INFORMATION.....	7
Product Details	7
APPLICATION FOR CERTIFICATION, 47CFR 2.1033 (B).....	8
APPLICABLE STANDARDS & TEST PROCEDURES	9
STATEMENT OF MODIFICATIONS AND DEVIATIONS	9
EQUIPMENT TESTING PROCEDURES	9
AC Line Conducted Emission Test Procedure	9
Radiated Emission Test Procedure.....	9
Diagram 1 Test arrangement for Radiated emissions	10
Diagram 2 Test arrangement for Radiated emissions tested on Open Area Test Site (OATS).....	11
TEST SITE LOCATIONS	12
UNITS OF MEASUREMENTS	12
ENVIRONMENTAL CONDITIONS.....	12
LIST OF TEST EQUIPMENT	13

Rogers Labs, Inc.	RHOTHETA International Inc.	S/N: 00781
4405 W. 259th Terrace	Model: RT-800	FCC ID: 2ASLJRT800
Louisburg, KS 66053	Test: 190211AB	IC: 24836-RT800
Phone/Fax: (913) 837-3214	Test to: 47CFR, 15(b), RSS-135	Date: January 30, 2020
Revision 1	File: Rhotheta RT800 TstRpt 190211B	Page 2 of 24

EMISSION MEASUREMENTS	14
AC Line Conducted EMI Procedure	14
Radiated EMI Procedure.....	14
Figure 1 Radiated Emissions Plot emissions Taken in Screen Room.....	15
Figure 2 Radiated Emissions Plot emissions Taken in Screen Room.....	16
Figure 3 Radiated Emissions Plot emissions Taken in Screen Room.....	17
Figure 4 Radiated Emissions Plot emissions Taken in Screen Room.....	18
Emissions Test Data	19
Table 1 Radiated Emissions Data from EUT test configuration.....	19
SUMMARY OF RESULTS	19
AC Line Conducted Emissions Results	19
Radiated Emissions Results.....	19
ANNEX.....	20
Annex A Measurement Uncertainty Calculations.....	21
Annex B Additional Test Equipment List	22
Annex C Rogers Qualifications	23
Annex D Rogers Labs Certificate of Accreditation.....	24

Revisions

Revision 1 Issued January 30, 2020

Foreword

The following information is submitted for consideration in obtaining Equipment Grant of Certification for Scanning Receiver operating under 47CFR Paragraph 15B (15.121) and Industry Canada RSS-135 Issue 2, and RSS-GEN Issue 5. The receiver provides operational capability in segmented and defined frequency bands between 118-470 MHz.

Name of Applicant: RHOTHETA International Inc.
 8201 Peters Road, Suite 1000
 Fort Lauderdale, FL 33324

FRN: 0028275022

Model: RT-800

FCC ID: 2ASLJRT800

IC: 24836-RT800

Frequency Range: 118-470 MHz

Opinion / Interpretation of Results

Tests Performed	Margin (dB)	Results
AC Line Emissions 15.107 and RSS-GEN 7.2	N/A	Complies
Radiated Emissions 15.109 and RSS-GEN 7.3	-17.8	Complies

Equipment Tested, Function, and Configuration

Equipment Tested

<u>Equipment</u>	<u>Model</u>	<u>Serial Number</u>
Antenna Unit EUT	RT-800	00781
Display Control Unit	DCU	00781

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

System Revision 03.05, DCU Revision: 03.01

Equipment Function

The RT-800 is a radio direction finder for stationary coast surveillance and identification of ships that are transmitting on the VHF radio band. The bearing information from transmitters can be correlated with the corresponding radar target and AIS-position (Automatic Identification System) information at a VTS (Vessel Traffic Service) center. Two or more RT-800 Systems on different locations can be used to locate a ship's exact position by triangulation. The RT-800 can easily be integrated in a VTS environment. Fully automatic bearing of emergency signals in the monitoring and standby mode additionally guarantees a permanent emergency surveillance and an auto alert function. The AU receives a signal from a quadrant in a commutator antenna providing a Doppler modulated signal, which is processed in the Antenna Unit to determine the directivity to the source of a signal. The AU provides calculating bearing of received radio signals in the following VHF and UHF ranges:

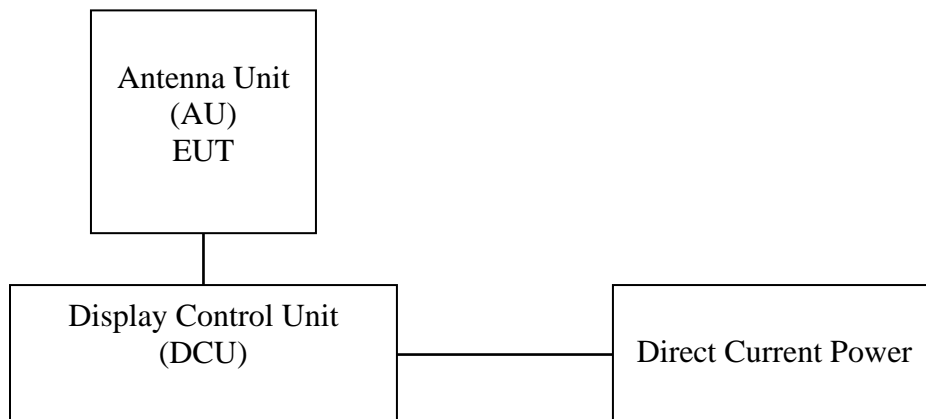
Frequency Ranges:	Standard-Version		Optional extended Frequency Range	
VHF air band	118,000 MHz	- 124,000 MHz	118,000 MHz	- 136,992 MHz
VHF marine band	154,000 MHz	- 163,000 MHz	137,000 MHz	- 224,995 MHz
Maritime channels	Channel 00 (Ship / Coast)	- Channel 88 (Ship / Coast)		
UHF air band	240,000 MHz	- 246,000 MHz	225,000 MHz	- 399,975 MHz
Cospas-Sarsat	400,000 MHz	- 406,092 MHz		
UHF FM band	406,100 MHz	- 410,000 MHz	406,100 MHz	- 470,000 MHz

The design offers operation as single frequency or multiple frequency (scanning mode) receiver to locate the source of a signal (e.g. ship voice communication transmitter or distress beacon).

The single frequency operation is useful when the frequency to be received is known by the operator of the DF. The scanning operation is useful when specific frequencies are unknown or if several frequencies or the whole marine band shall be monitored. The RT-800 works using the Doppler principle and achieves highest precision through the high clockwise/counterclockwise rotation of the receiving antenna and compensating for delay time errors. The antenna unit is watertight (protection IP67) and may be used under extreme and rough conditions. The antenna unit operates from direct current power only and offers no provision to interface with utility power system. The AU interfaces with the Display Control Unit (DCU) which is supplied from direct current power or the utility power system and which presents the bearing signals and allows operating and controlling of the bearing antenna (AU). The Direction-Finding system is suitable for stationary surveillance of coastal ship traffic. As requested by the manufacturer and

required by regulations, the receiver system was tested for emissions compliance investigating 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



Applicant Company information

Applicants Company	RHOTHETA International Inc.
Applicants Address	8201 Peters Road, Suite 1000, Fort Lauderdale, FL 33324
FCC Identifier	2ASLJRT800
Industry Canada Identifier	24836-RT800

Equipment information

Product Marketing Name (PMN): The PMN is the name or model number under which the product will be marketed/offered for sale in Canada. If the product has PMN, it must be provided.	RT-800
Unique Product Number (UPN): The applicant made up of a maximum of 11 alphanumeric characters (A-Z, 0-9), assigns the UPN.	RT-800
Hardware Version Identification Number (HVIN): The HVIN identifies hardware specifications of a product version. The HVIN replaces the ISED Model Number in the legacy E-filing System. An HVIN is required for all products for certification applications.	RT-800
Host Marketing Name (HMN) (if applicable): The HMN is the name or model number of a final product, which contains a certified radio module.	
Test Rule Part(s)	47CFR 15B, 15.109, 15.121, RSS-135, RSS-GEN
Test Frequency Range	118-470 MHz
Project Number	190211B
Submission Type	FCC and ISED Certification

Product Details

Items	Description
Product Type	Scanning Receiver
Radio Type	Receiver
Power Type	Direct current
Antenna	Commutated Integral Dipole

Application for Certification, 47CFR 2.1033 (b)

- (1) Manufacturer: RHOTHETA International Inc.
8201 Peters Road, Suite 1000
Fort Lauderdale, FL 33324
- (2) Identification: Model: RT-800
FCC ID: 2ASLJRT800 IC: 24836-RT800
- (3) Instruction Book: Refer to Exhibit for Instruction Manual.
- (4) Description of Circuit Functions: Refer to Exhibit of Operational Description.
- (5) Block Diagram with Frequencies: Refer to Exhibit of Operational Description.
- (6) Report of Measurements: Report of measurements follows in this Report.
- (7) Photographs: Construction, Component Placement, etc.: Refer to Exhibit for photographs of equipment.
- (8) List of Peripheral Equipment Necessary for operation. The equipment operates from direct current power. The EUT provides serial interface for proprietary communications with Display Control Unit (DCU). During testing, the EUT was powered from direct current power source.
- (9) Transition Provisions of 47CFR 15.37 are not requested
- (10) Applications for the certification of scanning receivers shall include a statement describing the methods used to comply with the design requirements of all parts of §15.121 of this chapter. The application must specifically include a statement assessing the vulnerability of the equipment to possible modification and describing the design features that prevent the modification of the equipment by the user to receive transmissions from the Cellular Radiotelephone Service. The application must also demonstrate compliance with the signal rejection requirement of §15.121 of this chapter, including details on the measurement procedures used to demonstrate compliance. The required attestation statements are provided in other exhibits.
- (11) Not Applicable. The EUT does not operate in the 59 – 64 GHz frequency band.
- (12) The equipment is not software defined and this section is not applicable.
- (13) Not Applicable. The equipment does not operate as U-NII device.
- (14) Contain at least one drawing or photograph showing the test set-up for each of the required types of tests applicable to the device for which certification is requested. These drawings or photographs must show enough detail to confirm other information contained in the test report. Any photographs used must be focused originals without glare or dark spots and must clearly show the test configuration used. This information is provided in this report and Test Setup Exhibits provided with the application filing.

Applicable Standards & Test Procedures

The following information is submitted in accordance with e-CFR dated February 11, 2019, Part 2, Subpart J, Part 15, Subpart 15B, Industry Canada RSS-GEN Issue 5, and RSS-135 Issue 2. Test procedures used are the established Methods of Measurement of Radio-Noise Emissions as described in ANSI C63.4-2014, 47CFR 15.31, 15.33, 15.35, RSS-135 Issue 2, and RSS-GEN Issue 5.

Statement of Modifications and Deviations

No modifications to the EUT were required for the unit to demonstrate compliance with the 47CFR Part 15B, Industry Canada RSS-135 Issue 2, and RSS-Gen Issue 5 emissions requirements. There were no deviations or modifications to the specifications.

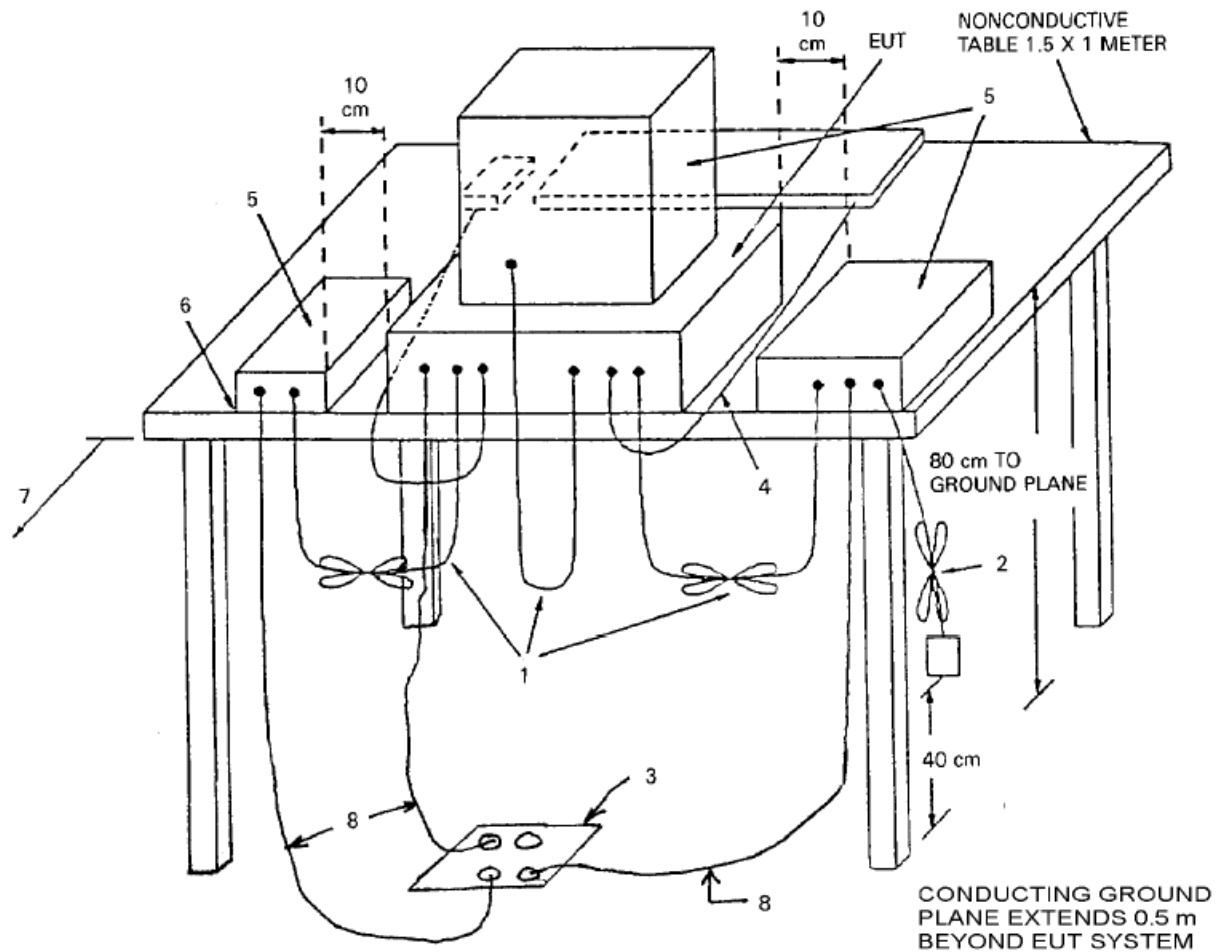
Equipment Testing Procedures

AC Line Conducted Emission Test Procedure

The EUT operates on direct current power only. Therefore, no AC line conducted emission testing was required or performed.

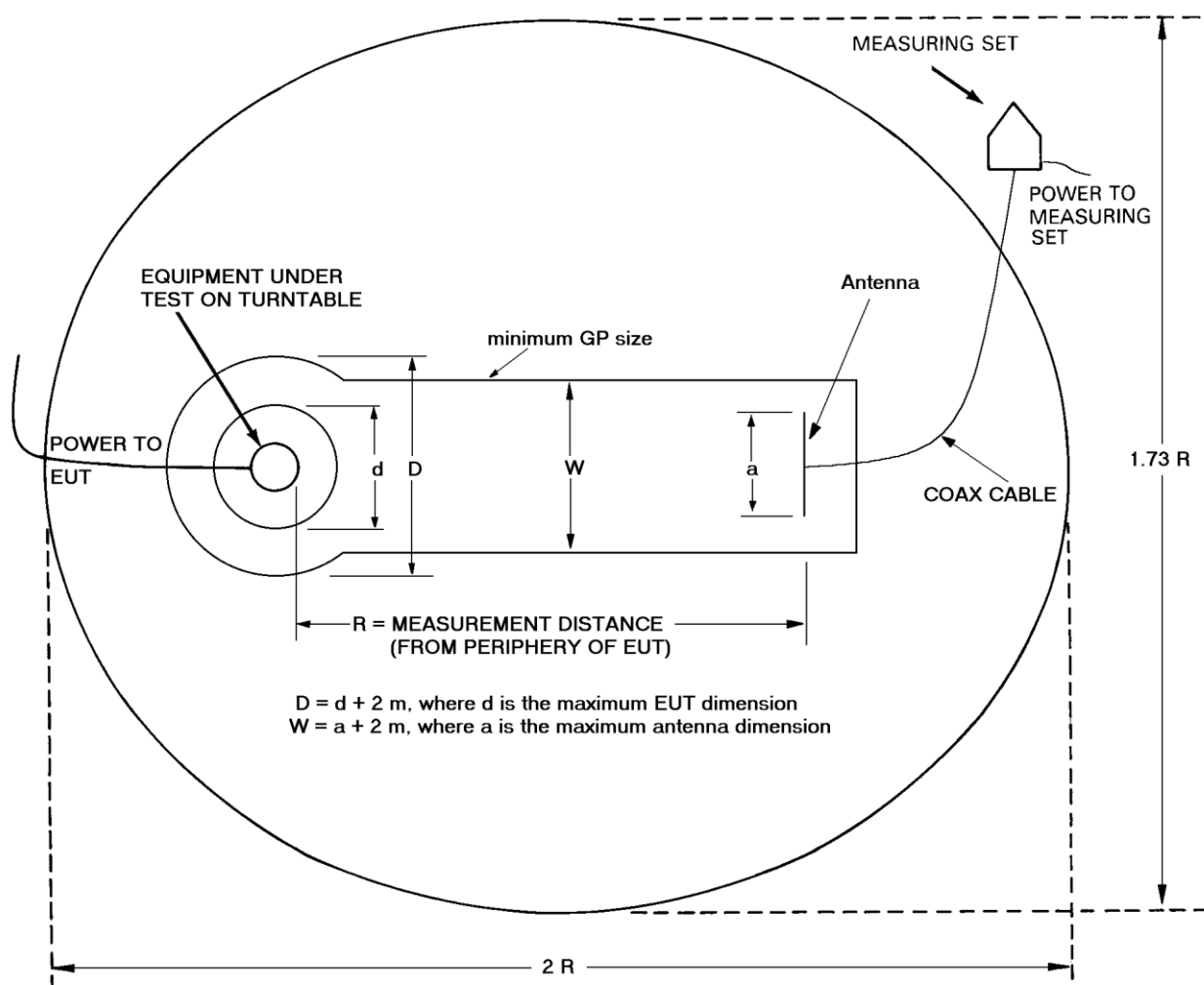
Radiated Emission Test Procedure

Radiated emission testing was performed as required on a CISPR 16-1-4 compliant OATS and as specified in ANSI C63.4-2014. The EUT was placed on a rotating 0.9 x 1.2-meter platform, elevated as required above the ground plane at a 3 meters distance from the FSM antenna. The table permitted orientation of the EUT in each of three orthogonal axis positions as necessary. EMI energy was maximized by equipment placement, raising and lowering the FSM antenna, changing the antenna polarization, and by rotating the turntable. Each emission was maximized before data was taken using a spectrum analyzer. The frequency spectrum from 9 kHz to 5,000 MHz was searched for during preliminary investigation. Refer to diagrams one and two showing typical test arrangement and photographs in the test setup exhibits for specific EUT placement during testing.



1. 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.
2. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated if required using the correct terminating impedance. The total length shall not exceed 1 m.
3. If LISNs are kept in the test setup for radiated emissions, it is preferred that they be installed under the ground plane with the receptacle flush with the ground plane.
4. Cables of hand-operated devices, such as keyboards, mice, and so on, shall be placed as for normal use.
5. Non-EUT components of EUT system being tested.
6. Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop (possibly center of table for transmitter equipment).
7. No vertical conducting plane used.
8. Power cords drape to the floor and are routed over to receptacle.

Diagram 1 Test arrangement for Radiated emissions



AREA DIMENSIONS =

R = 3m	R = 10 m	R = 30 m
6 m x 5.2 m	20 m x 17.3 m	60 m x 52 m

AC Line Conducted Emissions (0.150 -30 MHz)		
RBW	AVG. BW	Detector Function
9 kHz	30 kHz	Peak / Quasi Peak
Emissions (30-1000 MHz)		
RBW	AVG. BW	Detector Function
120 kHz	300 kHz	Peak / Quasi Peak
Emissions (Above 1000 MHz)		
RBW	Video BW	Detector Function
100 kHz	100 kHz	Peak
1 MHz	1 MHz	Peak / Average

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

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

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

Radiated EMI Data presented in dBμV/m; dB referenced to one microvolt per meter

Note: The limit is expressed for a 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 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

$RFS (dB\mu V/m @ 3m) = FSM (dB\mu V) + A.F. (dB/m) + Losses (dB) - Gain (dB)$

Environmental Conditions

Ambient Temperature 20.8° C

Relative Humidity 34%

Atmospheric Pressure 1016.8 mb

Rogers Labs, Inc.	RHOTHETA International Inc.	S/N: 00781
4405 W. 259th Terrace	Model: RT-800	FCC ID: 2ASLJRT800
Louisburg, KS 66053	Test: 190211AB	IC: 24836-RT800
Phone/Fax: (913) 837-3214	Test to: 47CFR, 15(b), RSS-135	Date: January 30, 2020
Revision 1	File: Rhotheta RT800 TstRpt 190211B	Page 12 of 24

List of Test Equipment

<u>Equipment</u>	<u>Manufacturer</u>	<u>Model (SN)</u>	<u>Band</u>	<u>Cal Date(m/d/y)</u>	<u>Due</u>
<input type="checkbox"/> LISN	FCC	FCC-LISN-50-25-10(1PA) (160611)	.15-30MHz	5/2/2018	5/2/2019
<input type="checkbox"/> LISN	Compliance Design	FCC-LISN-2.Mod.cd,(126)	.15-30MHz	10/16/2018	10/16/2019
<input checked="" type="checkbox"/> Cable	Huber & Suhner Inc.	Sucoflex102ea(L10M)(303073)	9kHz-40 GHz	10/16/2018	10/16/2019
<input checked="" type="checkbox"/> Cable	Huber & Suhner Inc.	Sucoflex102ea(1.5M)(303069)	9kHz-40 GHz	10/16/2018	10/16/2019
<input checked="" type="checkbox"/> Cable	Huber & Suhner Inc.	Sucoflex102ea(1.5M)(303071)	9kHz-40 GHz	10/16/2018	10/16/2019
<input type="checkbox"/> Cable	Belden	RG-58 (L1-CAT3-11509)	9kHz-30 MHz	10/16/2018	10/16/2019
<input type="checkbox"/> Cable	Belden	RG-58 (L2-CAT3-11509)	9kHz-30 MHz	10/16/2018	10/16/2019
<input type="checkbox"/> Antenna	ARA	BCD-235-B (169)	20-350MHz	10/16/2018	10/16/2019
<input type="checkbox"/> Antenna	EMCO	3147 (40582)	200-1000MHz	10/16/2018	10/16/2019
<input checked="" type="checkbox"/> Antenna	ETS-Lindgren	3117 (200389)	1-18 GHz	5/2/2018	5/2/2020
<input type="checkbox"/> Antenna	Com Power	AH-118 (10110)	1-18 GHz	10/16/2018	10/24/2019
<input type="checkbox"/> Antenna	Com Power	AH-840 (101046)	18-40 GHz	5/15/2017	5/15/2019
<input checked="" type="checkbox"/> Antenna	Com Power	AL-130 (121055)	.001-30 MHz	10/16/2018	10/16/2019
<input checked="" type="checkbox"/> Antenna	Sunol	JB-6 (A100709)	30-1000 MHz	10/16/2018	10/16/2019
<input checked="" type="checkbox"/> Analyzer	Rohde & Schwarz	ESU40 (100108)	20Hz-40GHz	5/2/2018	5/2/2019
<input checked="" type="checkbox"/> Analyzer	Rohde & Schwarz	ESW44 (101534)	20Hz-44GHz	1/31/2019	1/31/2020
<input type="checkbox"/> Analyzer	Rohde & Schwarz	FS-Z60, 90, 140, and 220	40GHz-220GHz	12/22/2017	12/22/2019
<input checked="" type="checkbox"/> Amplifier	Com-Power	PA-010 (171003)	100Hz-30MHz	10/16/2018	10/16/2019
<input checked="" type="checkbox"/> Amplifier	Com-Power	CPPA-102 (01254)	1-1000 MHz	10/16/2018	10/16/2019
<input checked="" type="checkbox"/> Amplifier	Com-Power	PAM-118A (551014)	0.5-18 GHz	10/16/2018	10/16/2019
<input type="checkbox"/> Amplifier	Com-Power	PAM-840A (461328)	18-40 GHz	10/16/2018	10/16/2019
<input type="checkbox"/> Power Meter	Agilent	N1911A with N1921A	0.05-40 GHz	5/2/2018	5/2/2019
<input type="checkbox"/> Generator	Rohde & Schwarz	SMB100A6 (100150)	20Hz-6 GHz	5/2/2018	5/2/2019
<input type="checkbox"/> Generator	Rohde & Schwarz	SMBV100A6 (260771)	20Hz-6 GHz	5/2/2018	5/2/2019
<input type="checkbox"/> RF Filter	Micro-Tronics	BRC50722 (009).9G notch	30-1800 MHz	5/2/2018	5/2/2019
<input type="checkbox"/> RF Filter	Micro-Tronics	HPM50114 (017)1.5G HPF	30-18000 MHz	5/2/2018	5/2/2019
<input type="checkbox"/> RF Filter	Micro-Tronics	HPM50117 (063) 3G HPF	30-18000 MHz	5/2/2018	5/2/2019
<input type="checkbox"/> RF Filter	Micro-Tronics	HPM50105 (059) 6G HPF	30-18000 MHz	5/2/2018	5/2/2019
<input type="checkbox"/> RF Filter	Micro-Tronics	BRM50702 (172) 2G notch	30-1800 MHz	5/2/2018	5/2/2019
<input type="checkbox"/> RF Filter	Micro-Tronics	BRC50703 (G102) 5G notch	30-1800 MHz	5/2/2018	5/2/2019
<input type="checkbox"/> RF Filter	Micro-Tronics	BRC50705 (024) 5G notch	30-1800 MHz	5/2/2018	5/2/2019
<input type="checkbox"/> Attenuator	Fairview	SA6NFN100W-14 (1625)	30-1800 MHz	5/2/2018	5/2/2019
<input type="checkbox"/> Attenuator	Mini-Circuits	VAT-3W2+ (1735)	30-6000 MHz	5/2/2018	5/2/2019
<input type="checkbox"/> Attenuator	Mini-Circuits	VAT-3W2+ (1436)	30-6000 MHz	5/2/2018	5/2/2019
<input type="checkbox"/> Attenuator	Mini-Circuits	VAT-3W2+ (14362)	30-6000 MHz	5/2/2018	5/2/2019
<input type="checkbox"/> Attenuator	Mini-Circuits	VAT-3W2+ (1445)	30-6000 MHz	5/2/2018	5/2/2019
<input type="checkbox"/> Attenuator	Mini-Circuits	VAT-3W2+ (14452)	30-6000 MHz	5/2/2018	5/2/2019
<input type="checkbox"/> Attenuator	Mini-Circuits	VAT-6W2+ (1438)	30-6000 MHz	5/2/2018	5/2/2019
<input type="checkbox"/> Attenuator	Mini-Circuits	VAT-6W2+ (1736)	30-6000 MHz	5/2/2018	5/2/2019
<input type="checkbox"/> Attenuator	JFW Industries	50FH-010-10 (1)	30-18000 MHz	5/2/2018	5/2/2019
<input checked="" type="checkbox"/> Weather station	Davis	6312 (A81120N075)		10/26/2018	10/26/2019

Rogers Labs, Inc.
4405 W. 259th Terrace
Louisburg, KS 66053
Phone/Fax: (913) 837-3214
Revision 1

RHOTHETA International Inc.
Model: RT-800
Test: 190211AB
Test to: 47CFR, 15(b), RSS-135
File: Rhotheta RT800 TstRpt 190211B

S/N: 00781
FCC ID: 2ASLJRT800
IC: 24836-RT800
Date: January 30, 2020
Page 13 of 24

Emission Measurements

AC Line Conducted EMI Procedure

The EUT operates on direct current power. Therefore, no AC line conducted emission testing was required or performed.

Radiated EMI Procedure

Test procedures of ANSI C63.4-2014 were used during radiated emissions testing. For testing purposes, the EUT was arranged as presented in the applicable configurations as diagramed above and operated through manufacturer defined modes as presented. 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. Plots were made of the frequency spectrum during preliminary testing. The EUT and cable locations were noted and reconfigured at the Open Area Test Site (OATS). The radiated emissions were then maximized at the OATS location before final radiated emission measurements were performed. Final data was taken with the EUT located at the OATS at distance of 3 meters between the EUT and the receiving antenna. The frequency spectrum from 9 kHz to 5,000 MHz was searched for radiated emissions. Measured emission levels were maximized by EUT placement on the table, changing cable location, 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, Biconical, Broadband Biconilog, Log Periodic, and Double Ridge or Pyramidal Horns and mixers above 1 GHz.

Refer to figures one through four showing plots of Equipment Under Test radiated emissions taken in the screen room.

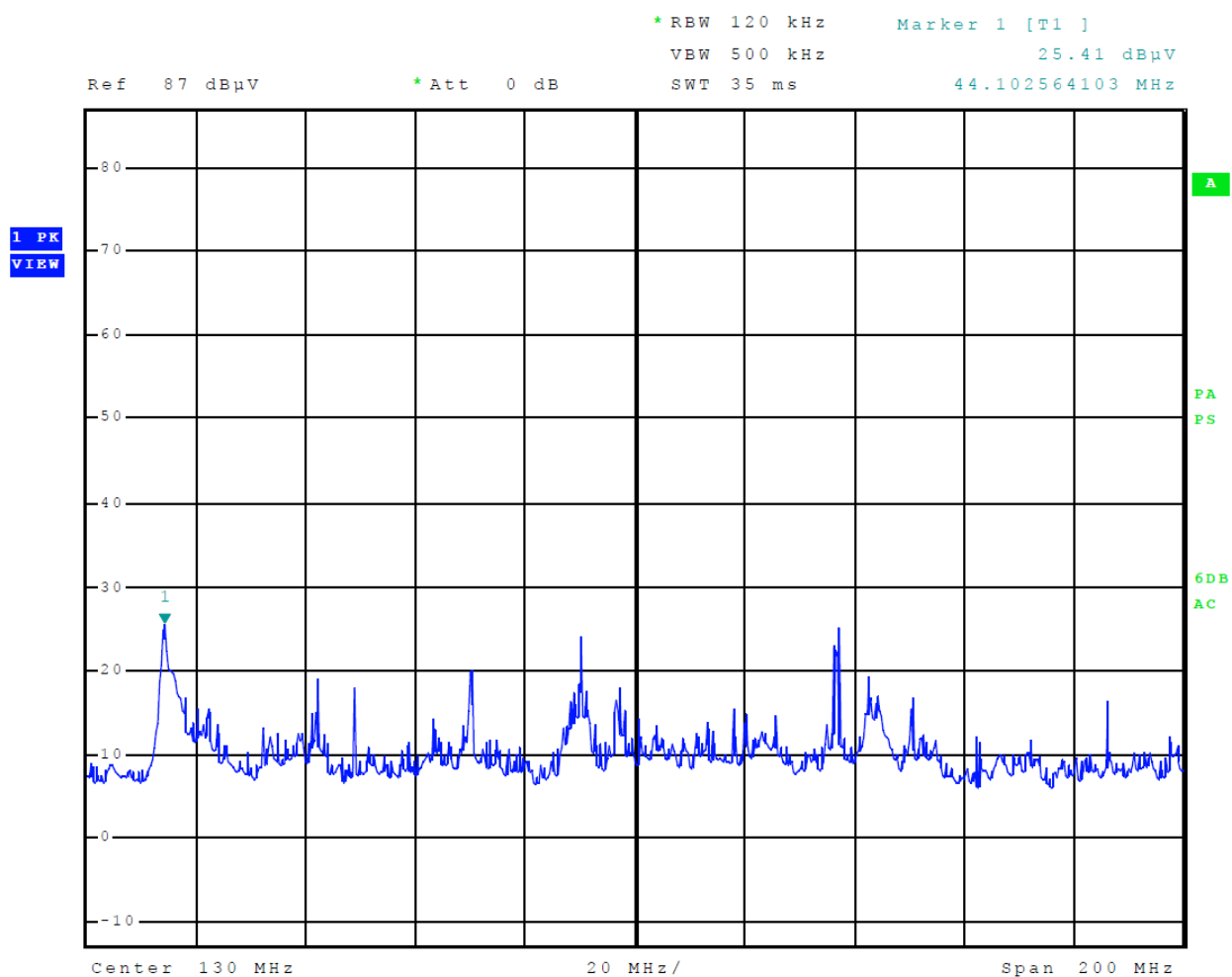


Figure 1 Radiated Emissions Plot emissions Taken in Screen Room

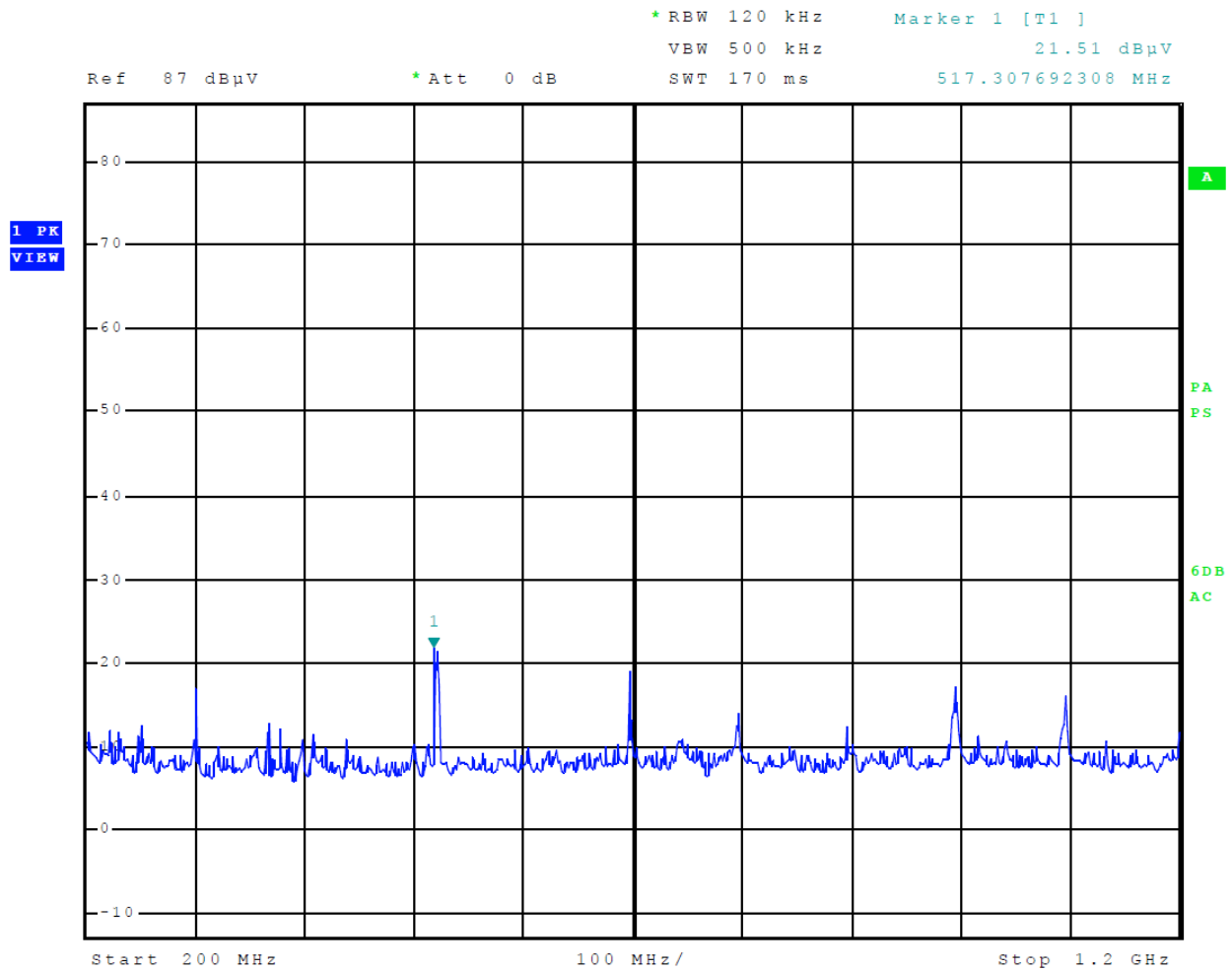


Figure 2 Radiated Emissions Plot emissions Taken in Screen Room

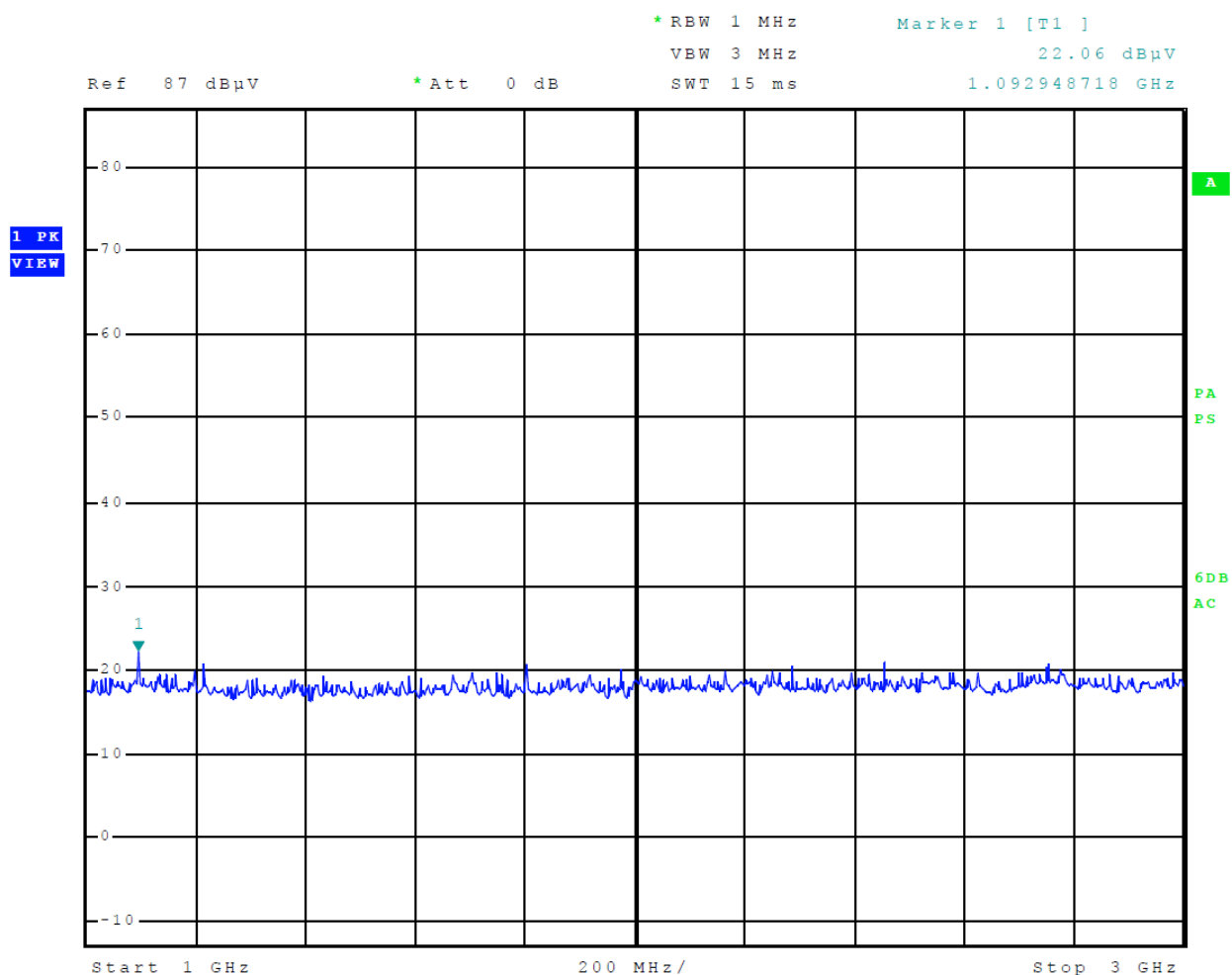


Figure 3 Radiated Emissions Plot emissions Taken in Screen Room

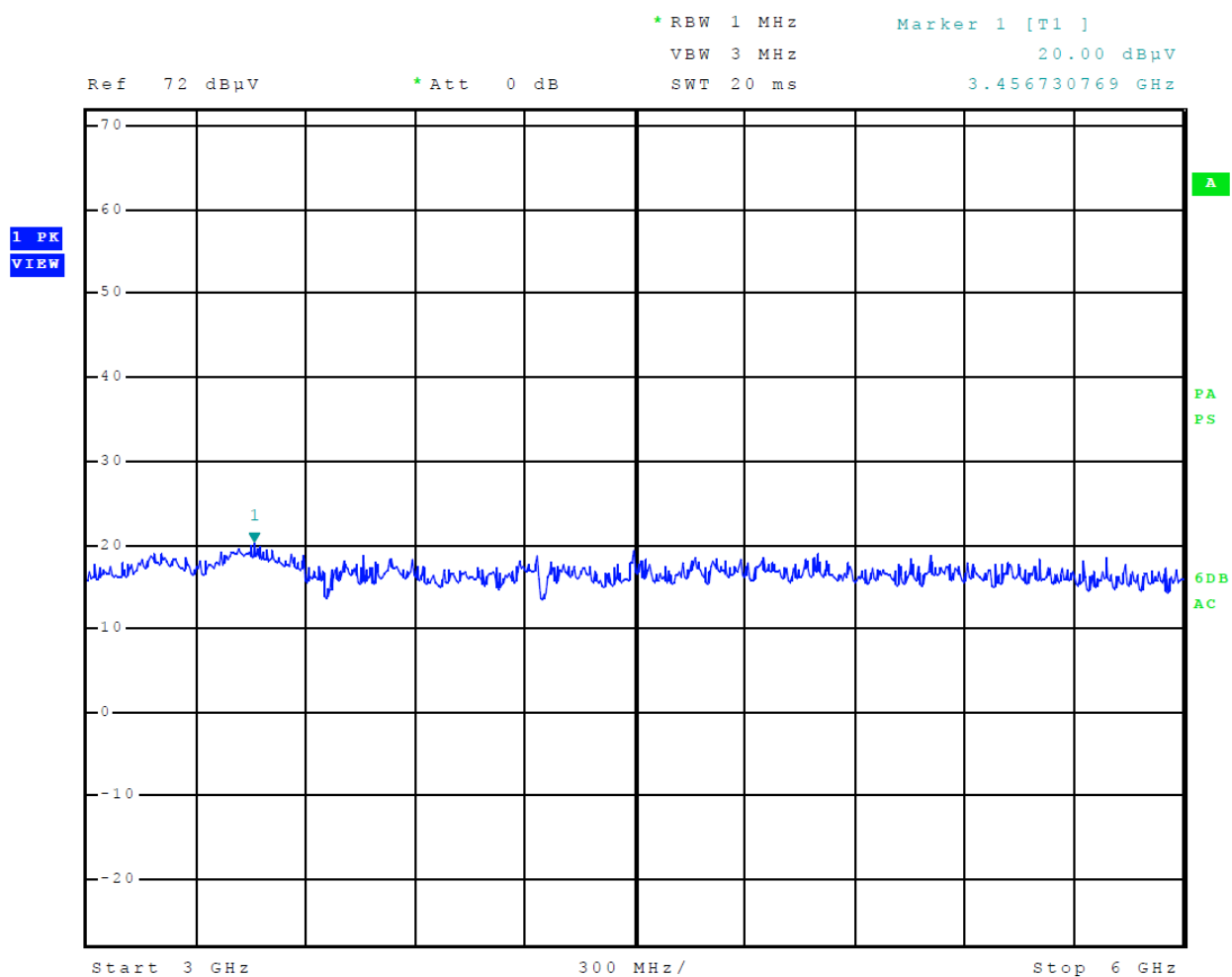


Figure 4 Radiated Emissions Plot emissions Taken in Screen Room

Emissions Test Data

Table 1 Radiated Emissions Data from EUT test configuration

Frequency in MHz	Horizontal Peak (dBμV/m)	Horizontal Quasi-Peak (dBμV/m)	Horizontal Average (dBμV/m)	Vertical Peak (dBμV/m)	Vertical Quasi-Peak (dBμV/m)	Vertical Average (dBμV/m)	Limit @ 3m (dBμV/m)
47.0	28.1	22.2	N/A	27.2	22.0	N/A	40.0
62.7	25.7	20.6	N/A	23.5	17.7	N/A	40.0
390.7	34.7	22.5	N/A	34.8	26.8	N/A	47.0
398.1	23.6	18.3	N/A	26.0	20.8	N/A	47.0
406.4	26.3	21.1	N/A	28.5	22.2	N/A	47.0
422.4	29.7	25.8	N/A	27.3	23.4	N/A	47.0

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

Summary of Results

AC Line Conducted Emissions Results

The EUT operates on direct current power only provided by installation craft. Therefore, no AC line conducted emission testing was required or performed.

Radiated Emissions Results

The EUT demonstrated compliance with the radiated emissions requirements of 47CFR Part 15B, RSS-GEN Issue 5, and other applicable Class B emissions requirements. The worst-case EUT configuration demonstrated a minimum margin of -17.8 dB below the 47CFR Part 15B and RSS-GEN Issue 5 Class B requirements. Other emissions were present with amplitudes at least 20 dB below the limit and worst-case amplitudes recorded.

Annex

- Annex A Measurement Uncertainty Calculations
- Annex B Additional Test Equipment List
- Annex C Rogers Qualifications
- Annex D Rogers Labs 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 Additional Test Equipment List

List of Test Equipment	Calibration	<u>Date (m/d/y)</u>	<u>Due</u>
Antenna: Schwarzbeck Model: BBA 9106/VHBB 9124 (9124-627)		5/2/2018	5/2/2019
Antenna: Schwarzbeck Model: VULP 9118 A (VULP 9118 A-534)		5/2/2018	5/2/2019
Antenna: EMCO 6509		10/16/2018	10/16/2020
Antenna: EMCO 3143 (9607-1277) 20-1200 MHz		5/2/2018	5/2/2019
Antenna: EMCO Dipole Set 3121C		2/23/2018	2/23/2019
Antenna: C.D. B-101		2/23/2018	2/23/2019
Antenna: Solar 9229-1 & 9230-1		2/23/2018	2/23/2019
Cable: Belden 8268 (L3)		10/16/2018	10/16/2019
Cable: Time Microwave: 4M-750HF290-750		10/16/2018	10/16/2019
Frequency Counter: Leader LDC-825 (8060153)		5/2/2018	5/2/2019
Oscilloscope Scope: Tektronix 2230		2/23/2018	2/23/2019
Wattmeter: Bird 43 with Load Bird 8085		2/23/2018	2/23/2019
R.F. Generator: SMB100A6 s/n 100623		5/2/2018	5/2/2019
R.F. Generator: SBMBV100A s/n: 260771		5/2/2018	5/2/2019
R.F. Generators: HP 606A, HP 8614A, HP 8640B		2/23/2018	2/23/2019
R.F. Power Amp 65W Model: 470-A-1010		2/23/2018	2/23/2019
R.F. Power Amp 50W M185- 10-501		2/23/2018	2/23/2019
R.F. Power Amp A.R. Model: 10W 1010M7		2/23/2018	2/23/2019
R.F. Power Amp EIN Model: A301		2/23/2018	2/23/2019
LISN: Compliance Eng. Model 240/20		5/2/2018	5/2/2019
LISN: Fischer Custom Communications Model: FCC-LISN-50-16-2-08		5/2/2018	5/2/2019
Audio Oscillator: H.P. 201CD		2/23/2018	2/23/2019
ESD Test Set 2010i		2/23/2018	2/23/2019
Oscilloscope Scope: Tektronix MDO 4104		2/23/2018	2/23/2019
EMC Transient Generator HVT TR 3000		2/23/2018	2/23/2019
AC Power Source (Ametech, California Instruments)		2/23/2018	2/23/2019
Fast Transient Burst Generator Model: EFT/B-101		2/23/2018	2/23/2019
Field Intensity Meter: EFM-018		2/23/2018	2/23/2019
KEYTEK Ecat Surge Generator		2/23/2018	2/23/2019
ESD Simulator: MZ-15		2/23/2018	2/23/2019
Shielded Room not required			

Annex C Rogers Qualifications

Scot D. Rogers, Engineer

Rogers Labs, Inc.

Mr. Rogers has 32 years' experience in the field of electronics. Engineering experience includes six years in the automated controls industry and remaining years working with the design, development and testing of radio communications and electronic equipment.

Positions Held

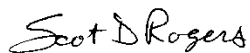
Systems Engineer: A/C Controls Mfg. Co., Inc. 6 Years

Electrical Engineer: Rogers Consulting Labs, Inc. 5 Years

Electrical Engineer: Rogers Labs, Inc. Current

Educational Background

- 1) Bachelor of Science Degree in Electrical Engineering from Kansas State University.
- 2) Bachelor of Science Degree in Business Administration Kansas State University.
- 3) Several Specialized Training courses and seminars pertaining to Microprocessors and Software programming.



Scot D. Rogers

Annex D Rogers Labs Certificate of Accreditation

<p>United States Department of Commerce National Institute of Standards and Technology</p> <p>NVLAP[®]</p> <hr/> <p>Certificate of Accreditation to ISO/IEC 17025:2005</p> <hr/> <p>NVLAP LAB CODE: 200087-0</p> <p>Rogers Labs, Inc. Louisburg, KS</p> <p><i>is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:</i></p> <p>Electromagnetic Compatibility & Telecommunications</p> <p><i>This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. 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).</i></p> <table><tr><td><p>2018-02-21 through 2019-03-31 <i>Effective Dates</i></p></td><td></td><td><p> <i>For the National Voluntary Laboratory Accreditation Program</i></p></td></tr></table>			<p>2018-02-21 through 2019-03-31 <i>Effective Dates</i></p>		<p> <i>For the National Voluntary Laboratory Accreditation Program</i></p>
<p>2018-02-21 through 2019-03-31 <i>Effective Dates</i></p>		<p> <i>For the National Voluntary Laboratory Accreditation Program</i></p>			

Rogers Labs, Inc.
4405 W. 259th Terrace
Louisburg, KS 66053
Phone/Fax: (913) 837-3214
Revision 1

RHOTHETA International Inc.
Model: RT-800
Test: 190211AB
Test to: 47CFR, 15(b), RSS-135
File: Rhotheta RT800 TstRpt 190211B

S/N: 00781
FCC ID: 2ASLJRT800
IC: 24836-RT800
Date: January 30, 2020
Page 24 of 24