

# Application Submittal Report For Grant of Certification

FOR

Model: A03185  
2402-2480 MHz  
FHSS Transmission System

**FCC ID: IPH-03185**

**IC: 1792A-03185**

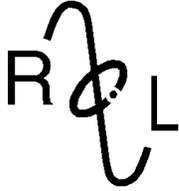
FOR

**Garmin International, Inc.**

1200 East 151st Street  
Olathe, KS 66062

Test Report Number: 161010  
IC Test Site Registration: 3041A-1

Authorized Signatory: *Scot D. Rogers*  
Scot D. Rogers



# **ROGERS LABS, INC.**

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

## Engineering Test Report For Grant of Certification Application

FOR  
47CFR, PART 15C - Paragraph 15.247,  
Industry Canada RSS-247  
License Exempt FHSS Intentional Radiator

For

## **Garmin International, Inc.**

1200 East 151st Street  
Olathe, KS 66062

Model: A03185  
FHSS Transmission System  
Frequency Range 2402-2480 MHz  
FCC ID#: IPH-03185  
IC: 1792A-03185

Test Date: October 10, 2016

Certifying Engineer: *Scot D. Rogers*  
Scot D. Rogers  
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4405 West 259<sup>th</sup> Terrace  
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Rogers Labs, Inc.  
4405 W. 259th Terrace  
Louisburg, KS 66053  
Phone/Fax: (913) 837-3214  
Revision 3

Garmin International, Inc.  
Model: A03185  
Test #: 161010  
Test to: 47CFR (15.247), RSS-247  
File: A03185 FHSS TstRpt 161010 r3

FCC ID: IPH-03185  
IC: 1792A-03185  
SN: M1248Q/M123W5  
Date: January 5, 2017  
Page 2 of 42



NVLAP Lab Code 200087-0

# Table Of Contents

**TABLE OF CONTENTS..... 3**

**REVISIONS..... 5**

**FORWARD ..... 6**

**OPINION / INTERPRETATION OF RESULTS ..... 6**

**EQUIPMENT TESTED..... 6**

**EQUIPMENT FUNCTION AND CONFIGURATION..... 7**

**Equipment Configuration.....8**

**APPLICATION FOR CERTIFICATION..... 9**

**APPLICABLE STANDARDS & TEST PROCEDURES ..... 10**

**EQUIPMENT TESTING PROCEDURES ..... 10**

**Radiated Emission Test Procedure.....10**

        Diagram 1 Test arrangement for Conducted emissions .....11

        Diagram 2 Test arrangement for radiated emissions of tabletop equipment.....12

        Diagram 3 Test arrangement for radiated emissions tested on Open Area Test Site (OATS).....13

**TEST SITE LOCATIONS ..... 13**

**LIST OF TEST EQUIPMENT ..... 14**

**UNITS OF MEASUREMENTS ..... 15**

**ENVIRONMENTAL CONDITIONS..... 15**

**STATEMENT OF MODIFICATIONS AND DEVIATIONS ..... 15**

**INTENTIONAL RADIATORS..... 15**

**Antenna Requirements .....15**

**Restricted Bands of Operation.....16**

        Table 1 Harmonic Radiated Emissions in Restricted Bands Data (GFSK Worst-case).....16

        Table 2 Harmonic Radiated Emissions in Restricted Bands Data (2EDR Worst-case).....17

Rogers Labs, Inc.  
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IC: 1792A-03185  
SN: M1248Q/M123W5  
Date: January 5, 2017  
Page 3 of 42

**Summary of Results for Radiated Emissions in Restricted Bands .....17**

**AC Line Conducted EMI Procedure .....18**

Figure 1 AC Line Conducted emissions of EUT line 1 (#2, EUT – CPU).....19

Figure 2 AC Line Conducted emissions of EUT line 2 (#2, EUT – CPU).....19

Figure 3 AC Line Conducted emissions of EUT line 1 (#3, EUT – AC Adapter).....20

Figure 4 AC Line Conducted emissions of EUT line 2 (#3, EUT – AC Adapter).....20

Table 3 AC Line Conducted Emissions Data L1 (#2, EUT, CPU).....21

Table 4 AC Line Conducted Emissions Data L2 (#2, EUT, CPU).....21

Table 5 AC Line Conducted Emissions Data L1 (#3, EUT – AC Adapter) .....22

Table 6 AC Line Conducted Emissions Data L2 (#3, EUT – AC Adapter) .....22

**Summary of Results for AC Line Conducted Emissions Results .....22**

**General Radiated EMI Testing Procedure .....23**

Table 7 General Radiated Emissions Data (worst-case).....24

**Summary of Results for General Radiated Emissions .....24**

**Operation in the Band 2402-2480 MHz.....25**

Figure 5 Plot of Operation across Frequency band.....26

Figure 6 Plot of Operation across Frequency band.....26

Figure 7 Plot of Operation across Frequency band.....27

Figure 8 Plot of Channel Separation.....27

Figure 9 Plot of Dwell Time on Channel.....28

Figure 10 Plot of 34 Times on Channel over 10 second period.....28

Figure 11 Plot of 20-dB down Occupied Bandwidth GFSK .....29

Figure 12 Plot of 20-dB down Occupied Bandwidth 2EDR.....29

Figure 13 Plot of 20-dB down Occupied Bandwidth 3EDR.....30

Figure 14 Plot of 99% Occupied Bandwidth GFSK .....30

Figure 15 Plot of 99% Occupied Bandwidth 2EDR .....31

Figure 16 Plot of 99% Occupied Bandwidth 3EDR .....31

Figure 17 Plot of Low Band Edge Emissions (Single Channel Operation band edge).....32

Figure 18 of Plot of Low Band Edge Emissions (Hopping Channels Operation band edge) .....32

Figure 19 of Plot of High Band Edge Emissions (Single Channel Operation band edge).....33

Figure 20 of Plots of High Band Edge Emissions (Hopping Channels Operation band edge) .....33

**Transmitter Emissions Data.....34**

Table 8 Transmitter Radiated Emission Data GFSK.....34

Table 9 Transmitter Radiated Emission Data EDR (worst case).....35

Table 10 Transmitter Antenna Conducted Emissions Data .....36

**Summary of Results for Radiated Emissions of Intentional Radiator .....36**

**ANNEX..... 37**

**Annex A Measurement Uncertainty Calculations.....38**

**Annex B Rogers Labs Test Equipment List.....39**

**Annex C Rogers Qualifications .....40**  
**Annex D FCC Site Registration Letter.....41**  
**Annex E Industry Canada Site Registration Letter .....42**

**Revisions**

Revision 3 Issued January 5, 2017 – corrected plot 14 page 30, to display widest 99% OBW  
Revision 2 Issued January 4, 2017 – corrected in correct reference to KDB  
Revision 1 Issued December 28, 2016

## Forward

The following information is submitted for consideration in obtaining Grant of Certification for License Exempt FHSS Intentional Radiator operating under 47CFR Paragraph 15.247 and Industry Canada RSS-247 operations in the 2402-2480 MHz frequency band.

Name of Applicant: Garmin International, Inc.  
1200 East 151st Street  
Olathe, KS 66062

Model: A03185

FCC I.D.: IPH-03185 IC: 1792A-03185

Frequency Range: 2402-2480 MHz

Operating Power: 0.003 Watts, Occupied Bandwidth 20-dB 1357.5 kHz, 99% 1230.0 kHz  
IPH9603N, 1792A-9603N module information, 1.479W, 1616-1625 MHz, 41K7Q7D

## Opinion / Interpretation of Results

Test Performed per 47CFR	Minimum Margin (dB)	Results
Antenna requirement per 47CFR 15.203	N/A	Complies
Radiated Emissions Restricted Bands (Tx)	-16.2	Complies
AC Line Conducted Emissions	-10.7	Complies
Radiated Emissions (General Out-of-Band)	-10.3	Complies
Radiated Emissions per (harmonics)	-9.5	Complies

## Equipment Tested

<u>Equipment</u>	<u>Model / PN</u>	<u>Serial Number</u>	<u>FCC Identifier</u>	<u>IC Identifier</u>
EUT	A03185	M1248Q	IPH-03185	1792A-03185
EUT (#2)	A03185	M123W5	IPH-03185	1792A-03185
AC Adapter	362-00086-01	D4326oY196A1	N/A	N/A
Computer	studio XPS (PP35L)	921LBN1	N/A	N/A
Printer	Dell 0N5819	5D1SL61	N/A	N/A

Test results in this report relate only to the items tested

Rogers Labs, Inc.  
4405 W. 259th Terrace  
Louisburg, KS 66053  
Phone/Fax: (913) 837-3214  
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Model: A03185  
Test #: 161010  
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File: A03185 FHSS TstRpt 161010 r3

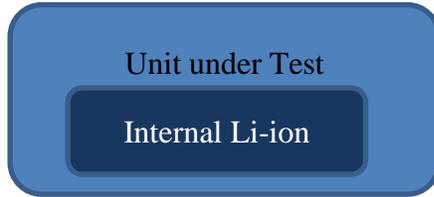
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IC: 1792A-03185  
SN: M1248Q/M123W5  
Date: January 5, 2017  
Page 6 of 42

## Equipment Function and Configuration

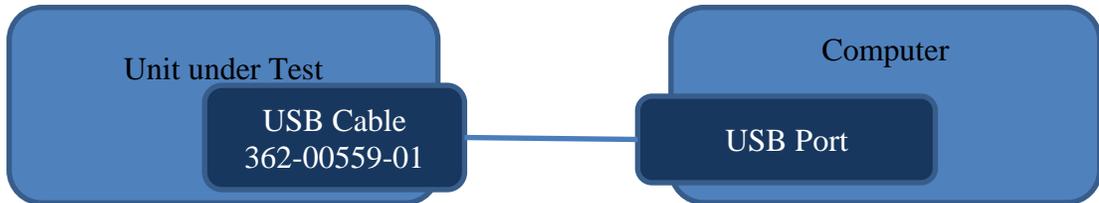
The EUT is a hand held transceiver with operation capability in the 2402-2480 MHz frequency band and 1600 MHz Data communications band. The design provides 2.4 GHz wireless communications capabilities with compatible wireless equipment as well as incorporating the IPH9603N (IC: 1792A-9603N) wireless module providing the ability to send data using the 1616-1626 MHz data link. The product operates from internal rechargeable battery only and provides micro USB interface connection port for use with AC adapter or computer equipment. Recharge of internal battery is accomplished with the use of the USB interface cable which may be connected to compliant USB interface port, AC adapter or DC adapter for battery recharge. The design utilizes internal fixed antenna system and offers no provision for antenna replacement or modification. Two samples were provided for testing, one representative of production design and the other modified for testing purposes replacing integral antenna with RF connection port. Test samples were provided with test software enabling testing personnel ability to enable transmitter function on defined channels and operational modes. The antenna modification offered testing facility ability to connect test equipment to the temporary antenna port for antenna port conducted emission testing. The EUT was arranged as described by the manufacturer for testing purposes. The EUT offers no other interface connections than those in the configuration options shown below as described by the manufacturer. For testing purposes, the EUT received power from freshly charged internal battery and configured to operate in available modes. As requested by the manufacturer and required by regulations, 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

- 1) Unit operating off internal battery



- 2) Unit connected to (and powered by) computer through USB cable (GPN: 320-00559-01)



- 3) Unit connected to (and powered by) AC Adapter (GPN: 362-00086-01)



- 4) Unit Transmitting data through 2.4 GHz wireless communications



- 5) Unit Transmitting data through 1.6 GHz wireless communications



## Application for Certification

- (1) Manufacturer: Garmin International, Inc.  
 1200 East 151st Street  
 Olathe, KS 66062
- (2) Identification: Model: A03185  
 FCC ID: IPH-03185 IC: 1792A-03185
- (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 internal battery power. The battery may be recharged through the provided interface options as documented in this report. The design provides USB interface port for use with compatible equipment as presented in this documentation. The EUT offers no other connection ports than those presented in this filing.
- (9) Transition Provisions of CFR47 15.37 are not requested.
- (10) Not Applicable. The unit is not a scanning receiver.
- (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) Applications for certification of U-NII devices in the 5.15-5.35 GHz and the 5.47-5.85 GHz bands must include a high-level operational description of the security procedures that control the radio frequency operating parameters and ensure that unauthorized modifications cannot be made. This requirement is not applicable to his DTS 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 provide in this report and Test Setup Exhibits provided with the application filing.

## **Applicable Standards & Test Procedures**

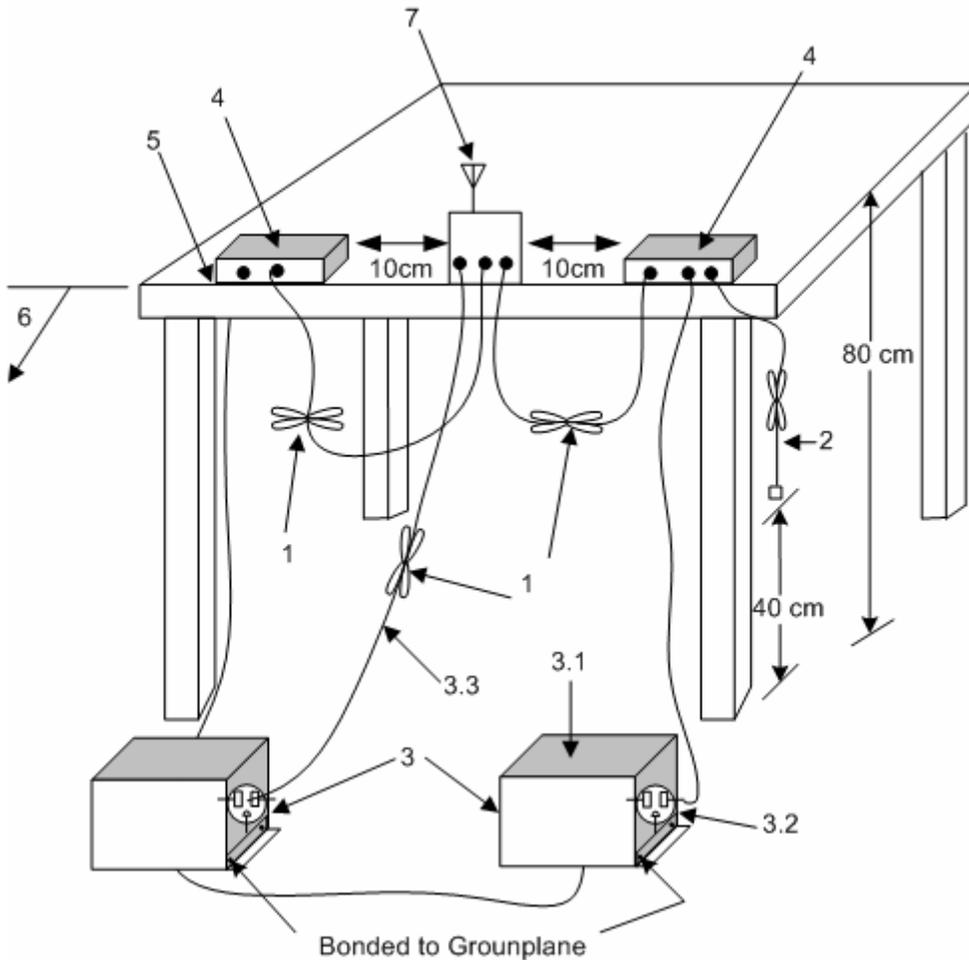
In accordance with the 47CFR, dated October 1, 2016, Part 2, Subpart J, Paragraphs 2.907, 2.911, 2.913, 2.925, 2.926, 2.1031 through 2.1057, and applicable parts of paragraph 15, Part 15C Paragraph 15.247 and Industry Canada standards RSS-GEN Issue 4, and RSS-247 Issue 1 the following information is submitted. Test procedures used are the established Methods of Measurement of Radio-Noise Emissions as described in the ANSI C63.10-2013.

## **Equipment Testing Procedures**

Testing for the AC line-conducted emissions was performed as required in CFR47 15C, RSS-210 and specified in ANSI C63.10-2013. The test setup, including the EUT, was arranged in the test configurations as presented during testing. The test configuration was placed on a 1 x 1.5-meter bench, 0.8 meters high located in a screen room. The power lines of the system were isolated from the power source using a standard LISN with a 50- $\mu$ Hy choke. EMI was coupled to the spectrum analyzer through a 0.1  $\mu$ F capacitor internal to the LISN. The LISN was positioned on the floor beneath the wooden bench supporting the EUT. The power lines and cables were draped over the back edge of the table. Refer to diagram one showing typical test arrangement and photographs in exhibits for EUT placement used during testing.

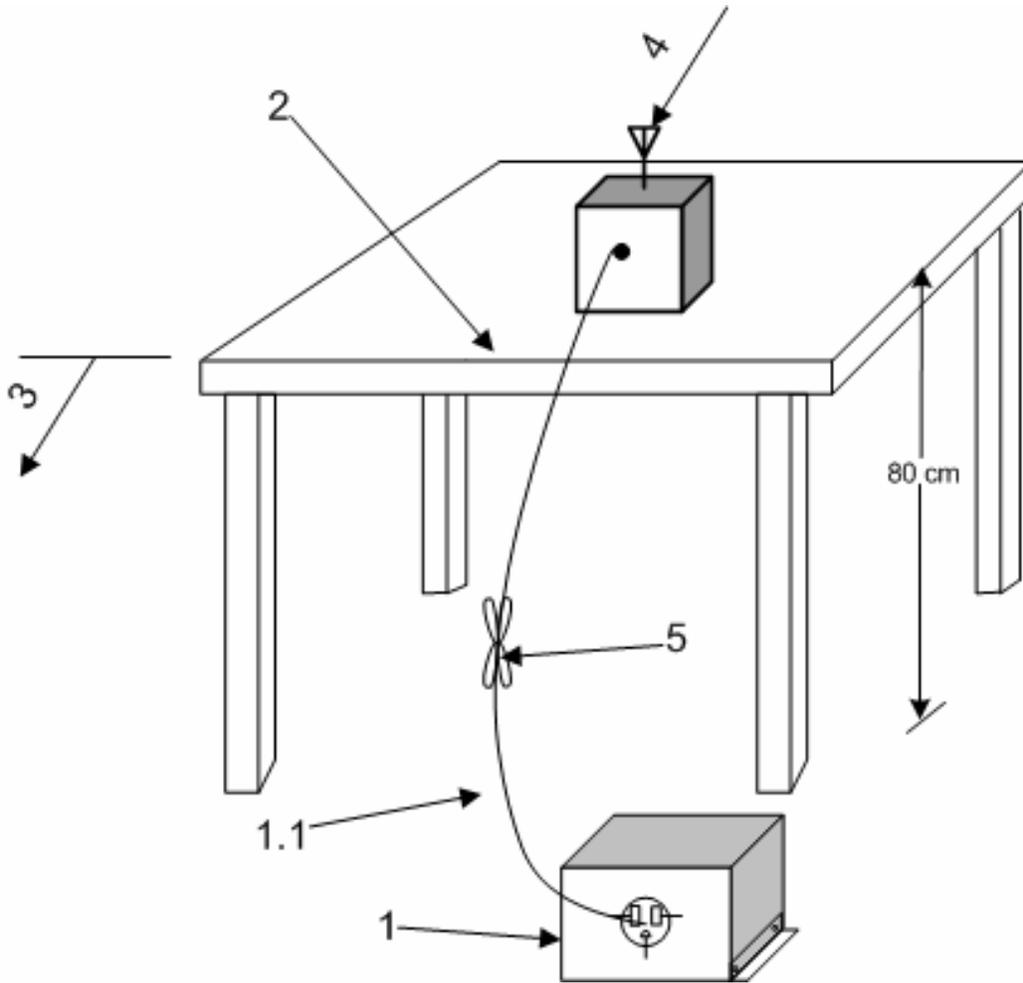
## ***Radiated Emission Test Procedure***

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. Radiated emissions testing were performed as specified in ANSI C63.10-2013. 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 10,000 MHz was searched for during preliminary investigation. Refer to diagrams 1 and 2 showing typical test arrangement. The EUT was tested while oriented in each of three orthogonal axis positions. The test setup exhibit provides detailed orientation (EUT in vertical plane) once worst case emissions were determined.



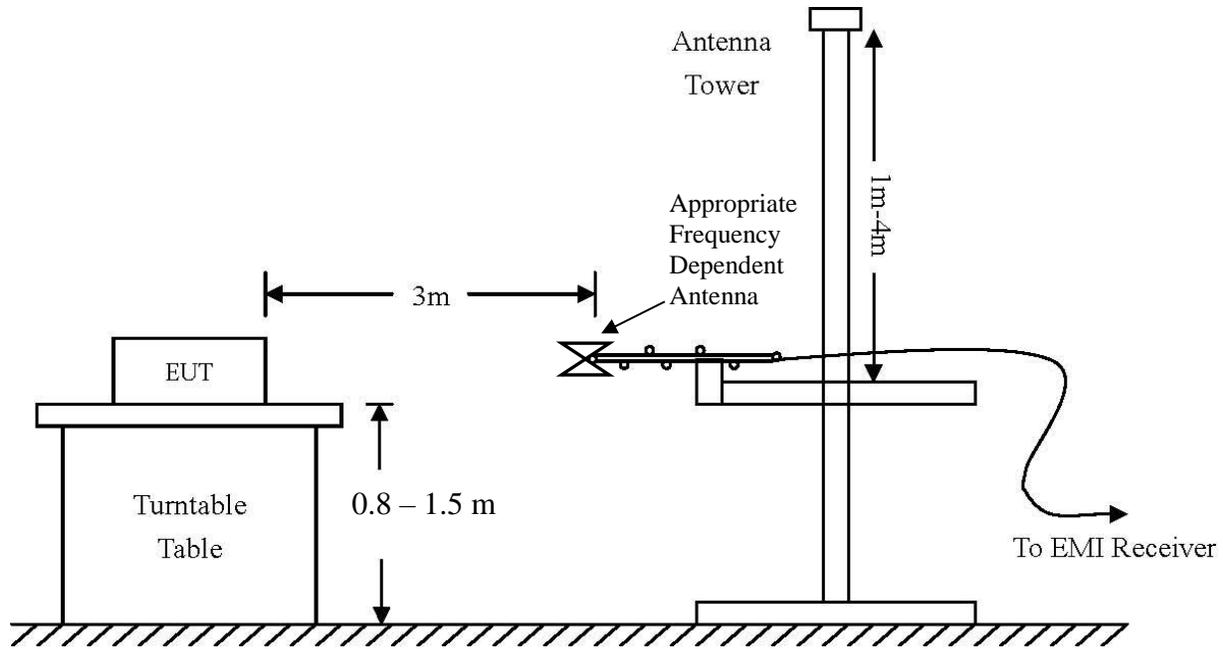
1. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 cm to 40 cm long see (see 6.2.3.1).
2. I/O cables that are not connected to an accessory shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m (see 6.2.2).
3. EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50  $\Omega$  loads. LISN can be placed on top of, or immediately beneath, reference ground plane (see 6.2.2 and 6.2.3).
  - 3.1 All other equipment powered from additional LISN(s).
  - 3.2 Multiple-outlet strip can be used for multiple power cords of non-EUT equipment.
  - 3.3 LISN at least 80 cm from nearest part of EUT chassis.
4. Non-EUT components of EUT system being tested.
5. Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop (see 6.2.3.1).
6. Edge of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane (see 6.2.2 for options).
7. Antenna may be integral or detachable. If detachable, the antenna shall be attached for this test.

**Diagram 1 Test arrangement for Conducted emissions**



1. A LISN is optional for radiated measurements between 30 MHz to 1000 MHz, but not allowed for measurements below 30 MHz and above 1000 MHz. (See 6.4.3, 6.5.1, and 6.6.3.) If used, connect EUT to one LISN. Unused LISN measuring port connectors shall be terminated in 50Ω. LISN can be placed on top of, or immediately beneath, reference ground plane (see 6.2.2 and 6.2.3.1).
  - 1.1 LISN spaced at least 80 cm from nearest part of EUT chassis.
2. The EUT shall be placed in the center of the table to the extent possible. (See 6.2.3.1 and 6.3.4).
3. A vertical conducting plane, if used for conducted tests per 6.2.2, shall be removed for radiated emission tests.
4. Antenna may be integral or detachable, depending on the EUT.
5. 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.

**Diagram 2 Test arrangement for radiated emissions of tabletop equipment**



**Diagram 3 Test arrangement for radiated emissions tested on Open Area Test Site (OATS)**

### Test Site Locations

**Conducted EMI**      The AC power line conducted emissions testing performed in a shielded screen room located at Rogers Labs, Inc., 4405 West 259<sup>th</sup> 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 259<sup>th</sup> Terrace, Louisburg, KS

**Site Registration**      Refer to Annex for Site Registration Letters

**NVLAP Accreditation**      Lab code 200087-0

## List of Test Equipment

A Rohde and Schwarz ESU40 and/or Hewlett Packard 8591EM was used as the measuring device for the emissions testing of frequencies below 1 GHz. A Rohde and Schwarz ESU40 and/or Hewlett Packard 8562A Spectrum Analyzer was used as the measuring device for testing the emissions at frequencies above 1 GHz. The analyzer settings used are described in the following table. Refer to the appendix for a complete list of test equipment.

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

<u>Equipment</u>	<u>Manufacturer</u>	<u>Model (SN)</u>	<u>Band</u>	<u>Cal Date</u>	<u>Due</u>
<input checked="" type="checkbox"/> LISN	FCC	FCC-LISN-50-2-10(1PA) (160611)	.15-30MHz	5/16	5/17
<input checked="" type="checkbox"/> Cable	Time Microwave	750HF290-750 (L10M)	9kHz-40 GHz	10/16	10/17
<input checked="" type="checkbox"/> Cable	Belden	RG-58 (L1-CAT3-11509)	9kHz-30 MHz	10/16	10/17
<input checked="" type="checkbox"/> Cable	Belden	RG-58 (L2-CAT3-11509)	9kHz-30 MHz	10/16	10/17
<input type="checkbox"/> Antenna	ARA	BCD-235-B (169)	20-350MHz	10/16	10/17
<input type="checkbox"/> Antenna	EMCO	3147 (40582)	200-1000MHz	10/16	10/17
<input checked="" type="checkbox"/> Antenna	ETS-Lindgren	3117 (200389)	1-18 GHz	5/16	5/18
<input type="checkbox"/> Antenna	Com Power	AH-118 (10110)	1-18 GHz	10/15	10/17
<input checked="" type="checkbox"/> Antenna	Com Power	AH-840 (101046)	18-40 GHz	5/16	5/18
<input checked="" type="checkbox"/> Antenna	Com Power	AL-130 (121055)	.001-30 MHz	10/16	10/17
<input checked="" type="checkbox"/> Antenna	Sunol	JB-6 (A100709)	30-1000 MHz	10/16	10/17
<input type="checkbox"/> Antenna	EMCO	3143 (9607-1277)	20-1200 MHz	5/16	5/17
<input type="checkbox"/> Analyzer	HP	8591EM (3628A00871)	9kHz-1.8GHz	5/16	5/17
<input type="checkbox"/> Analyzer	HP	8562A (3051A05950)	9kHz-110GHz	5/16	5/17
<input type="checkbox"/> Analyzer	HP External Mixers	11571, 11970	25GHz-110GHz	5/16	5/17
<input checked="" type="checkbox"/> Analyzer	Rohde & Schwarz	ESU40 (100108)	20Hz-40GHz	5/16	5/17
<input checked="" type="checkbox"/> Amplifier	Com-Power	PA-010 (171003)	100Hz-30MHz	10/16	10/17
<input checked="" type="checkbox"/> Amplifier	Com-Power	CPPA-102 (01254)	1-1000 MHz	10/16	10/17
<input checked="" type="checkbox"/> Amplifier	Com-Power	PAM-118A (551014)	0.5-18 GHz	10/16	10/17

## Units of Measurements

Conducted EMI            Data is in dB $\mu$ V; dB referenced to one microvolt

Radiated EMI            Data is in dB $\mu$ V/m; dB/m referenced to one microvolt per meter

Sample Calculation:

RFS = Radiated Field Strength, FSM = Field Strength Measured

A.F. = Receive antenna factor, Gain = amplification gains and/or cable losses

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

## Environmental Conditions

Ambient Temperature	24.6° C
Relative Humidity	43%
Atmospheric Pressure	1021.1 mb

## Statement of Modifications and Deviations

No modifications to the EUT were required for the unit to demonstrate compliance with the CFR47 Part 15C, RSS-GEN, and RSS-247 emission requirements. There were no deviations to the specifications.

## Intentional Radiators

As per CFR47, Subpart C, paragraph 15.247 and Industry Canada RSS-247 and RSS-Gen the following information is submitted.

### *Antenna Requirements*

The EUT incorporates integral antenna system and offers no provision for connection to alternate antenna system. The antenna connection point complies with the unique antenna connection requirements. There are no deviations or exceptions to the specification.

### 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 antenna port as well as on 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 paragraph 6 were used during testing. No other significant emission was observed which fell into the restricted bands of operation.

**Table 1 Harmonic Radiated Emissions in Restricted Bands Data (GFSK Worst-case)**

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)
2390.0	41.0	N/A	27.2	45.6	N/A	32.6	54.0
2483.5	45.5	N/A	32.9	45.6	N/A	32.1	54.0
4804.0	43.9	N/A	30.4	43.2	N/A	30.5	54.0
4882.0	43.4	N/A	30.6	43.2	N/A	29.3	54.0
4960.0	43.6	N/A	30.5	43.4	N/A	30.6	54.0
7206.0	45.4	N/A	33.0	46.5	N/A	33.0	54.0
7323.0	47.2	N/A	33.5	45.5	N/A	32.7	54.0
7440.0	46.2	N/A	33.2	45.8	N/A	32.4	54.0
12010.0	51.4	N/A	37.8	51.0	N/A	37.8	54.0
12205.0	50.1	N/A	37.5	50.5	N/A	37.4	54.0
12400.0	49.5	N/A	36.7	49.5	N/A	36.7	54.0

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.

**Table 2 Harmonic Radiated Emissions in Restricted Bands Data (2EDR Worst-case)**

Frequency in MHz	Horizontal Peak (dB $\mu$ V/m)	Horizontal Quasi-Peak (dB $\mu$ V/m)	Horizontal Average (dB $\mu$ V/m)	Vertical Peak (dB $\mu$ V/m)	Vertical Quasi-Peak (dB $\mu$ V/m)	Vertical Average (dB $\mu$ V/m)	Limit @ 3m (dB $\mu$ V/m)
2390.0	45.8	N/A	32.5	45.8	N/A	32.9	54.0
2483.5	46.2	N/A	33.7	48.0	N/A	34.9	54.0
4804.0	45.6	N/A	32.3	45.2	N/A	32.4	54.0
4882.0	45.3	N/A	32.3	46.2	N/A	32.6	54.0
4960.0	45.3	N/A	32.7	45.0	N/A	32.6	54.0
7206.0	44.9	N/A	31.2	43.6	N/A	31.3	54.0
7323.0	44.4	N/A	31.4	44.5	N/A	31.6	54.0
7440.0	43.4	N/A	30.7	43.4	N/A	30.7	54.0
12010.0	40.9	N/A	27.9	41.8	N/A	28.5	54.0
12205.0	41.2	N/A	28.0	40.6	N/A	28.0	54.0
12400.0	40.3	N/A	27.1	40.2	N/A	27.1	54.0

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.

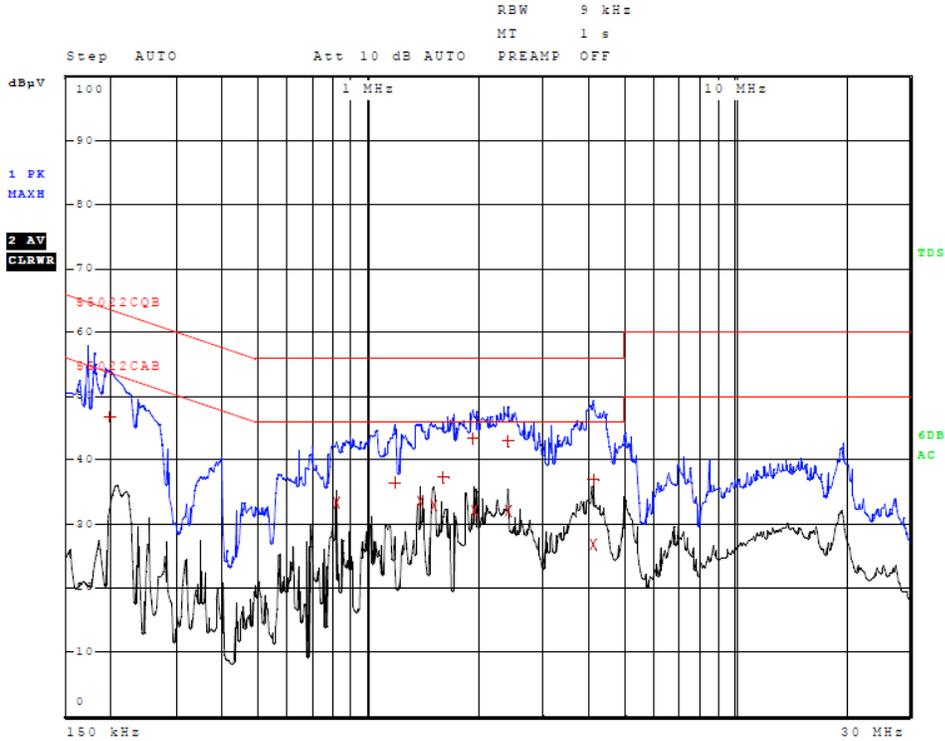
**Summary of Results for Radiated Emissions in Restricted Bands**

The EUT demonstrated compliance with the radiated emissions requirements of 47CFR Part 15C Intentional Radiators. The EUT transmitter demonstrated a minimum margin of –16.2 dB below the requirements. 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.

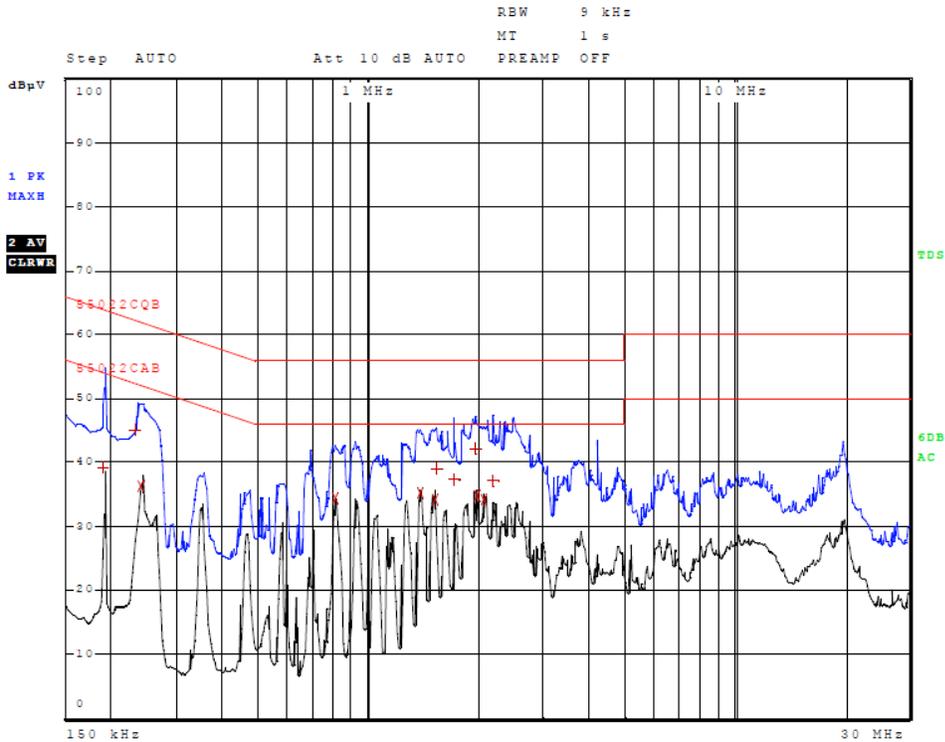
## **AC Line Conducted EMI Procedure**

The EUT was arranged in typical equipment configurations operating from AC power adapter. Testing was performed with the EUT placed on a 1 x 1.5-meter wooden bench 80 cm above the conducting ground plane, floor of a screen room. The bench was positioned 40 cm away from the wall of the screen room. The LISN was positioned on the floor of the screen room 80-cm from the rear of the EUT. Testing for the line-conducted emissions were the procedures of ANSI C63.10-2013 paragraph 6. The AC adapter for the EUT was connected to the LISN for line-conducted emissions testing. A second LISN was positioned on the floor of the screen room 80-cm from the rear of the supporting equipment of the EUT. All power cords except the EUT were then powered from the second LISN. EMI was coupled to the spectrum analyzer through a 0.1  $\mu$ F capacitor, internal to the LISN. Power line conducted emissions testing was carried out individually for each current carrying conductor of the EUT. The excess length of lead between the system and the LISN receptacle was folded back and forth to form a bundle not exceeding 40 cm in length. The screen room, conducting ground plane, analyzer, and LISN were bonded together to the protective earth ground. Preliminary testing was performed to identify the frequencies of each of the emissions, which demonstrated the highest amplitudes. The cables were repositioned to obtain maximum amplitude of measured EMI level. Once the worst-case configuration was identified, plots were made of the EMI from 0.15 MHz to 30 MHz then data was recorded with maximum conducted emissions levels.

Refer to figures one through four showing plots of the AC Line conducted emissions of the AC adapter or computer configuration while charging the EUT.



**Figure 1 AC Line Conducted emissions of EUT line 1 (#2, EUT – CPU)**



**Figure 2 AC Line Conducted emissions of EUT line 2 (#2, EUT – CPU)**

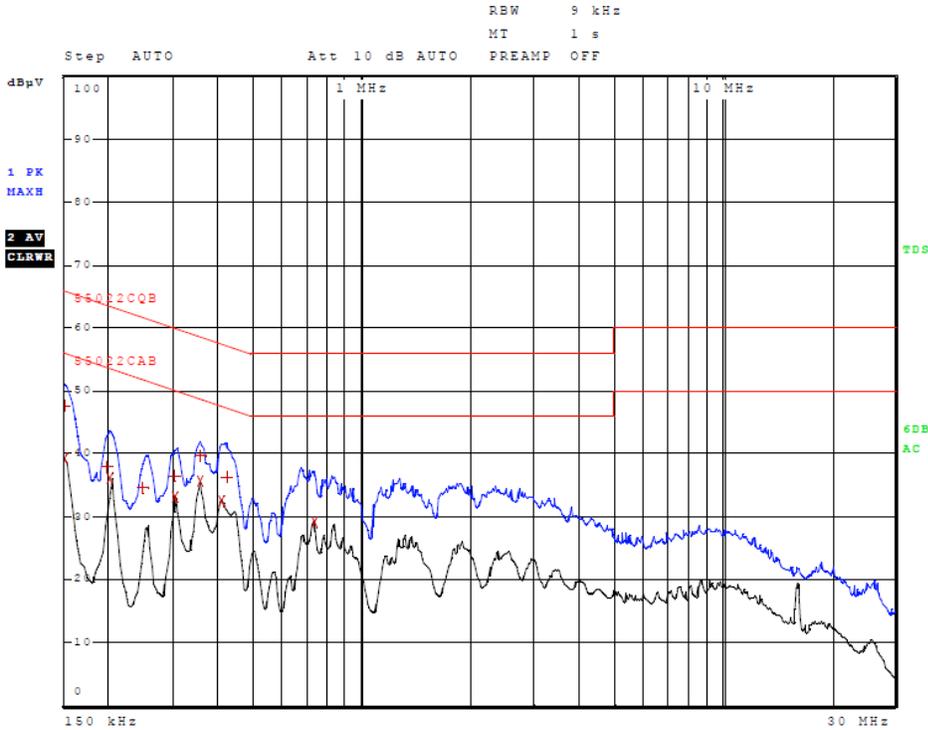


Figure 3 AC Line Conducted emissions of EUT line 1 (#3, EUT – AC Adapter)

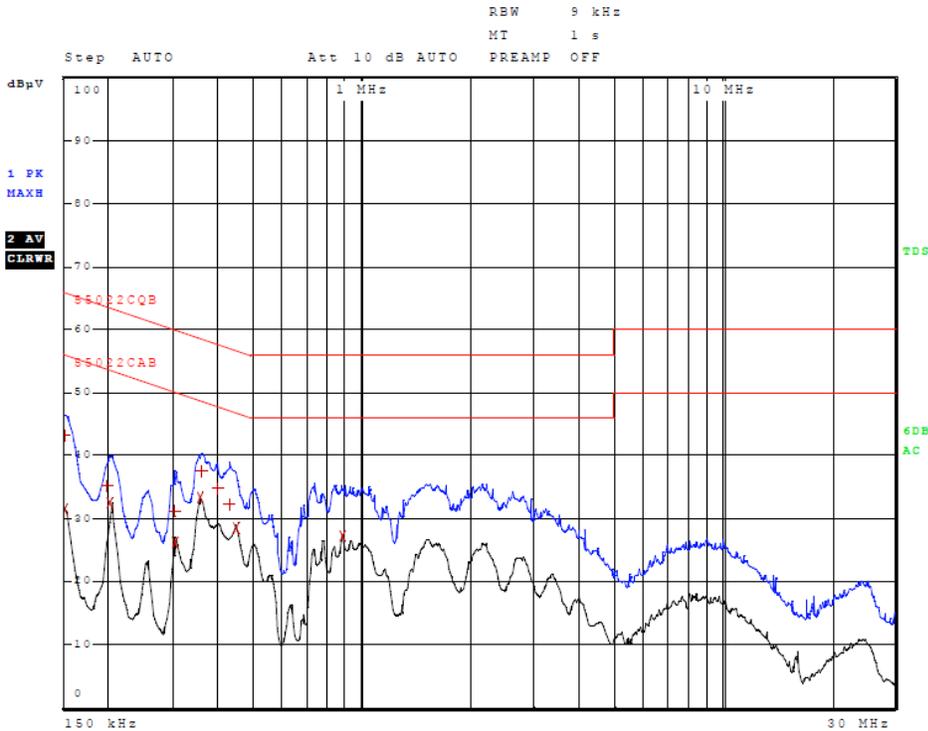


Figure 4 AC Line Conducted emissions of EUT line 2 (#3, EUT – AC Adapter)

**Table 3 AC Line Conducted Emissions Data L1 (#2, EUT, CPU)**

Trace	Frequency	Level (dBµV)	Detector	Delta Limit/dB
1	198.000000000 kHz	46.77	Quasi Peak	-16.93
2	814.000000000 kHz	33.40	Average	-12.60
1	1.174000000 MHz	36.50	Quasi Peak	-19.50
2	1.382000000 MHz	33.60	Average	-12.40
2	1.506000000 MHz	32.98	Average	-13.02
1	1.602000000 MHz	37.20	Quasi Peak	-18.80
1	1.926000000 MHz	43.34	Quasi Peak	-12.66
2	1.950000000 MHz	32.08	Average	-13.92
1	2.414000000 MHz	42.92	Quasi Peak	-13.08
2	2.414000000 MHz	32.06	Average	-13.94
2	4.110000000 MHz	26.86	Average	-19.14
1	4.126000000 MHz	36.87	Quasi Peak	-19.13

Other emissions present had amplitudes at least 20 dB below the limit.

**Table 4 AC Line Conducted Emissions Data L2 (#2, EUT, CPU)**

Trace	Frequency	Level (dBµV)	Detector	Delta Limit/dB
1	190.000000000 kHz	39.10	Quasi Peak	-24.93
1	234.000000000 kHz	45.09	Quasi Peak	-17.21
2	242.000000000 kHz	36.24	Average	-15.79
2	806.000000000 kHz	34.24	Average	-11.76
2	1.378000000 MHz	35.27	Average	-10.73
2	1.518000000 MHz	34.07	Average	-11.93
1	1.538000000 MHz	38.97	Quasi Peak	-17.03
1	1.718000000 MHz	37.30	Quasi Peak	-18.70
1	1.954000000 MHz	42.20	Quasi Peak	-13.80
2	1.978000000 MHz	34.85	Average	-11.15
2	2.070000000 MHz	34.20	Average	-11.80
1	2.190000000 MHz	36.98	Quasi Peak	-19.02

Other emissions present had amplitudes at least 20 dB below the limit.

**Table 5 AC Line Conducted Emissions Data L1 (#3, EUT – AC Adapter)**

Trace	Frequency	Level (dBµV)	Detector	Delta Limit/dB
2	150.000000000 kHz	39.11	Average	-16.89
1	150.000000000 kHz	47.68	Quasi Peak	-18.32
1	198.000000000 kHz	37.93	Quasi Peak	-25.77
2	202.000000000 kHz	36.06	Average	-17.46
1	250.000000000 kHz	34.58	Quasi Peak	-27.18
2	302.000000000 kHz	33.03	Average	-17.15
1	306.000000000 kHz	36.52	Quasi Peak	-23.56
2	354.000000000 kHz	35.53	Average	-13.34
1	354.000000000 kHz	39.58	Quasi Peak	-19.29
2	406.000000000 kHz	32.44	Average	-15.29
1	418.000000000 kHz	36.17	Quasi Peak	-21.31
2	734.000000000 kHz	29.08	Average	-16.92

Other emissions present had amplitudes at least 20 dB below the limit.

**Table 6 AC Line Conducted Emissions Data L2 (#3, EUT – AC Adapter)**

Trace	Frequency	Level (dBµV)	Detector	Delta Limit/dB
1	150.000000000 kHz	43.22	Quasi Peak	-22.78
2	150.000000000 kHz	31.48	Average	-24.52
1	198.000000000 kHz	35.14	Quasi Peak	-28.55
2	202.000000000 kHz	32.41	Average	-21.12
1	302.000000000 kHz	31.16	Quasi Peak	-29.02
2	302.000000000 kHz	26.21	Average	-23.98
2	354.000000000 kHz	33.33	Average	-15.54
1	358.000000000 kHz	37.41	Quasi Peak	-21.37
1	394.000000000 kHz	34.71	Quasi Peak	-23.27
1	426.000000000 kHz	32.28	Quasi Peak	-25.05
2	446.000000000 kHz	28.41	Average	-18.54
2	882.000000000 kHz	27.12	Average	-18.88

Other emissions present had amplitudes at least 20 dB below the limit.

**Summary of Results for AC Line Conducted Emissions Results**

The EUT demonstrated compliance with the AC Line Conducted Emissions requirements of 47CFR Part 15B and other applicable Class B emissions requirements. The worst-case EUT AC powered configuration demonstrated a minimum margin of -13.3 dB below the FCC/IC requirements. The worst-case EUT CPU configuration demonstrated a minimum margin of -10.7 dB below the FCC/IC requirements. Other emissions were present with amplitudes at least 20 dB below the limit and worst-case amplitudes recorded.

**General Radiated EMI Testing Procedure**

The EUT was arranged in the test configuration emulating worst-case equipment configuration and operated through available modes. Preliminary testing was performed in a screen room with the EUT positioned 1 meter from the FSM. Investigations were performed to identify the frequencies, which produced the highest radiated emissions. Radiated emission investigations were performed from 9 kHz to 10,000 MHz with the EUT oriented in the manufacturer defined orientation. Frequencies of interest were recorded for use during testing on the OATS. Each investigated emission was then maximized at the OATS site before final radiated emissions measurements were performed. Final data was taken with the EUT located at the open area test site at a distance of 3 meters between the EUT and the receiving antenna. Peak and average amplitudes of frequencies above 1000 MHz were compared to the required limits with worst-case data presented below. 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 polarization between horizontal and vertical. Antennas used were Loop from 0.009 to 30 MHz, Broadband Biconical from 30 MHz to 200 MHz, Log Periodic from 200 MHz to 1 GHz, and/or Biconilog from 30 MHz to 1000 MHz, and above 1 GHz, Double Ridge or Pyramidal Horns, notch filters and appropriate amplifiers and mixers were utilized.

**Table 7 General Radiated Emissions Data (worst-case)**

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)
49.3	34.1	29.7	N/A	34.7	27.5	N/A	40.0
52.0	28.4	22.0	N/A	30.4	21.6	N/A	40.0
120.0	28.0	22.9	N/A	26.8	22.1	N/A	43.5
150.0	25.8	20.3	N/A	22.2	17.5	N/A	43.5
166.3	23.5	16.7	N/A	23.3	17.7	N/A	43.5
181.6	21.4	13.3	N/A	20.5	13.5	N/A	43.5
300.0	19.2	14.3	N/A	19.7	15.6	N/A	46.0
2034.3	38.9	N/A	25.8	38.7	N/A	25.8	54.0
2848.0	40.7	N/A	28.1	42.2	N/A	28.1	54.0

Other emissions present had amplitudes at least 20 dB below the limit.  
 Quasi-Peak amplitude emissions are recorded above for frequency range of 30-1000 MHz.  
 Average amplitude emissions are recorded above for frequency range above 1000 MHz.

**Summary of Results for General Radiated Emissions**

The EUT demonstrated compliance with the general radiated emissions requirements of 47CFR Part 15C. The EUT demonstrated a minimum margin of -10.3 dB below general radiated emissions requirements. There are no other significantly measurable emissions in the restricted bands other than those recorded in this report. Other emissions were present with amplitudes at least 20 dB below the requirements.

### **Operation in the Band 2402-2480 MHz**

Test procedures of ANSI C63.10-2013 were used during transmitter testing. The transmitter peak power was measured at the antenna port as described in ANSI C63.10-2013. The 20-dB and 99% emission bandwidth was measured as described in C63.10-2013. Transmitter harmonic and general radiated emissions were measured on an open area test site @ 3 meters separation distance using sample #1. The EUT was positioned on supporting turntable elevated as required above the ground plane, at a distance of 3 meters from the FSM antenna. Radiated emission investigations were performed from 9 kHz to 25,000 MHz. Each radiated emission was maximized by varying the FSM antenna height and polarization, and by rotating the turntable. The worst-case amplitude of each emission was then recorded from the analyzer display. The peak and quasi-peak amplitude of frequencies below 1000 MHz were measured using a spectrum analyzer. The peak and average amplitude of frequencies above 1000 MHz were measured using a spectrum analyzer. A Loop antenna was used for measuring emissions from 0.009 to 30 MHz, Biconilog Antenna for 30 to 1000 MHz, Double-Ridge, and/or Pyramidal Horn Antennas from 1 GHz to 25 GHz. Radiated Emissions were measured in dB $\mu$ V/m @ 3 meters. Test sample #2 provided testing antenna port conducted emissions. This sample was modified by replacing the internal antenna with a 50-ohm antenna port connector for testing purposes. Plots were taken of transmitter performance (using sample #2) for reference in this and other documentation.

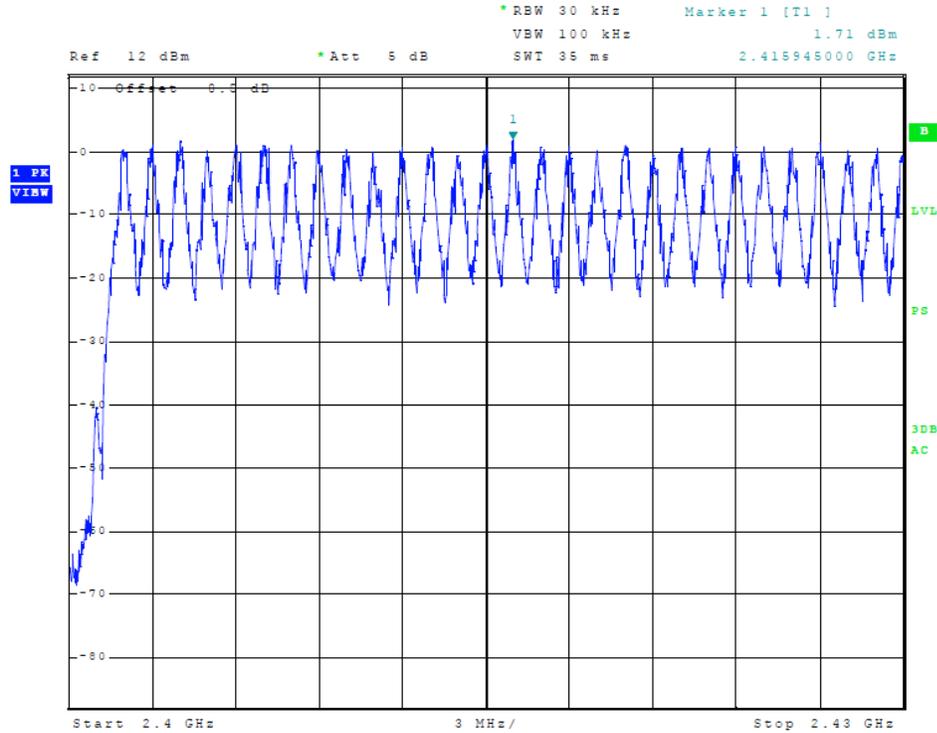
#### Average occupancy time Requirement:

Average time of occupancy on any channel shall not be greater than 400 mS (0.4 seconds) within a 31.6 second period (0.4 times the number of hopping channels of 79).

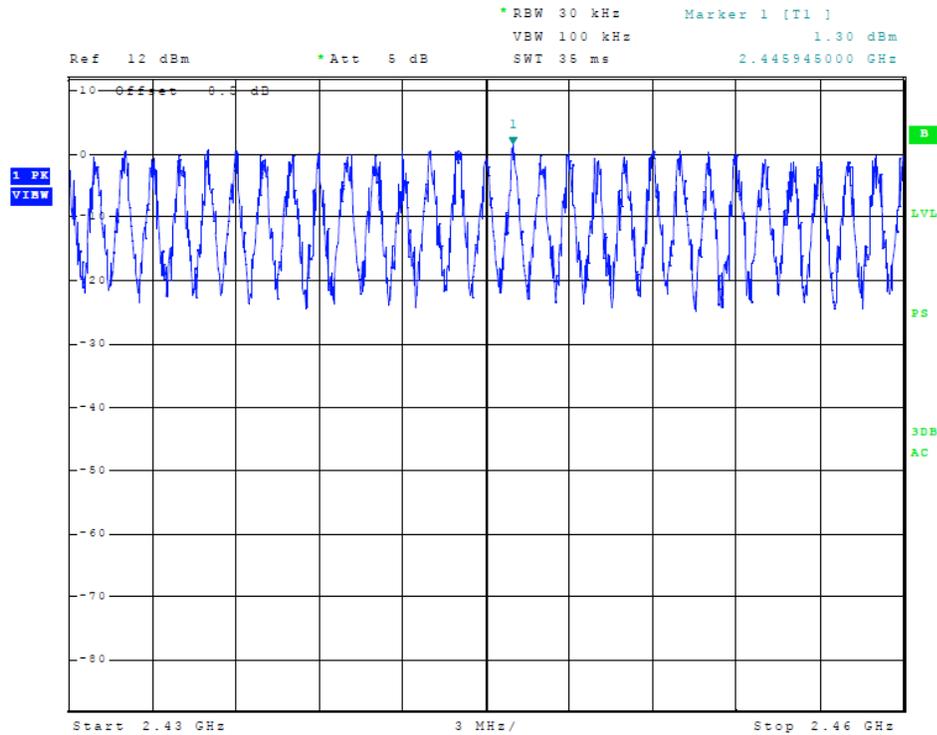
Dwell Time on channel: The units resides on channel 102 times over 30 seconds, each time transmitting for 2.9 mS which equates to average time of occupancy of 295.8 mS.

The 295.8 mS operational time demonstrates compliance with requirement of less than 400 mS in 31.6 second period.

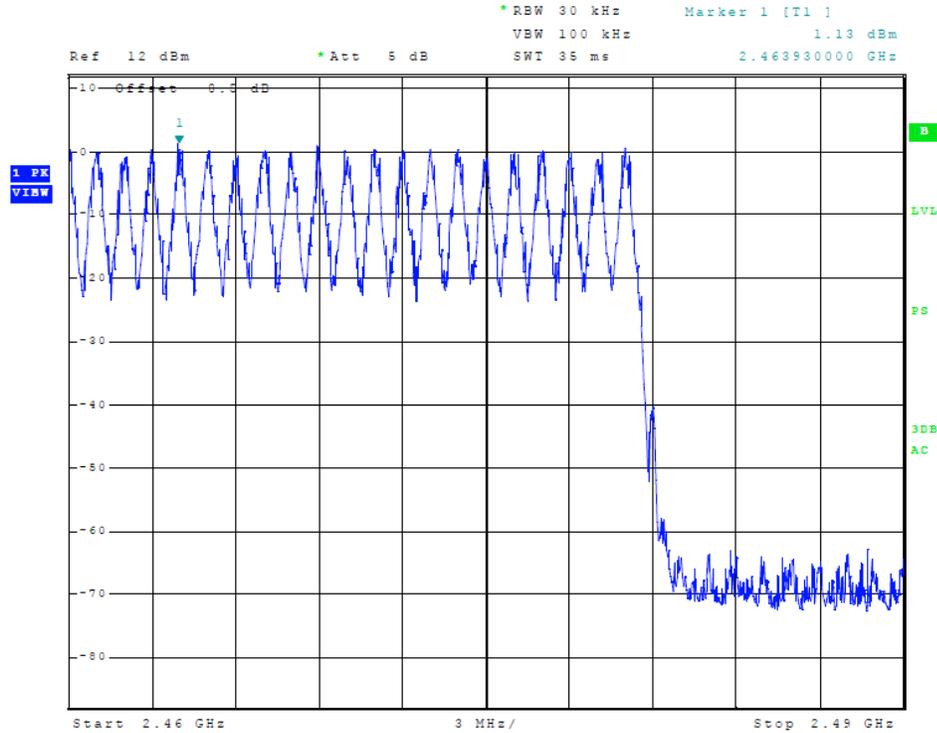
Additional Frequency Hopping detail may be found in the operational description exhibits.



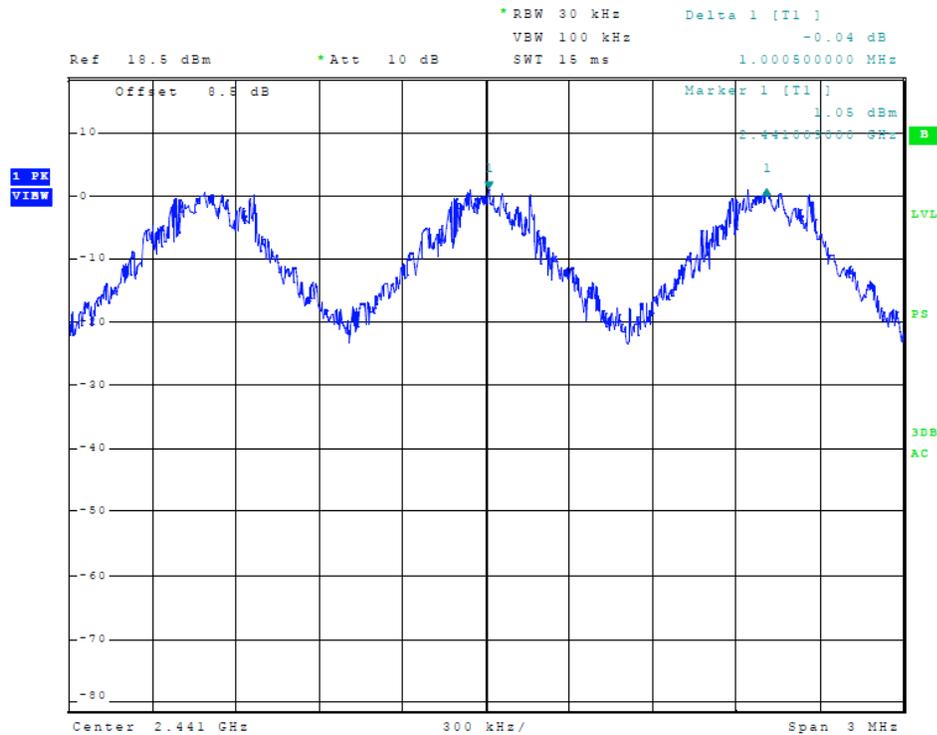
**Figure 5 Plot of Operation across Frequency band**



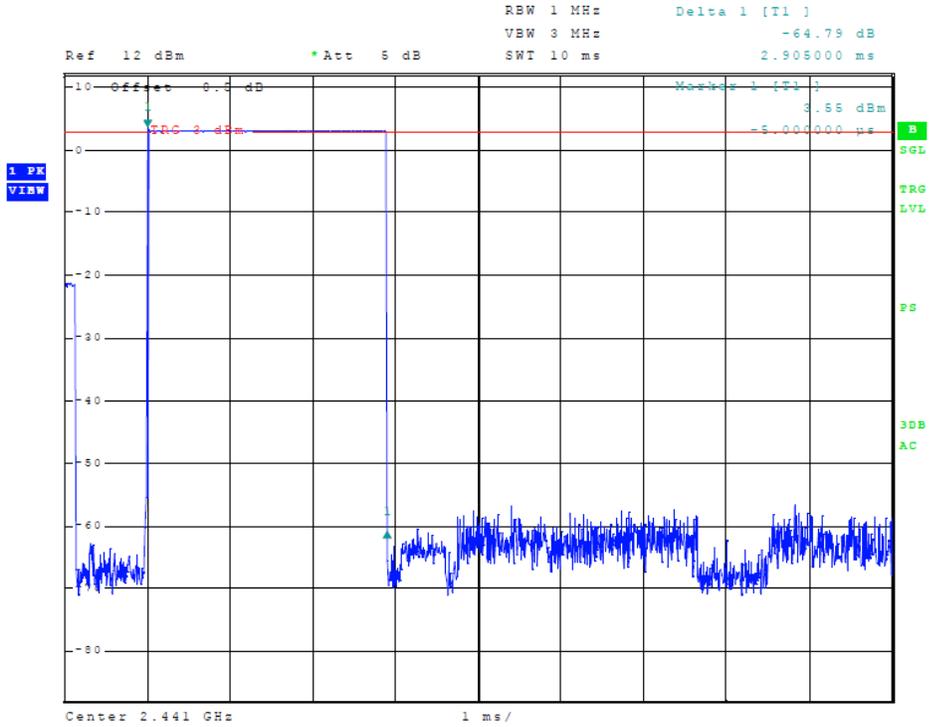
**Figure 6 Plot of Operation across Frequency band**



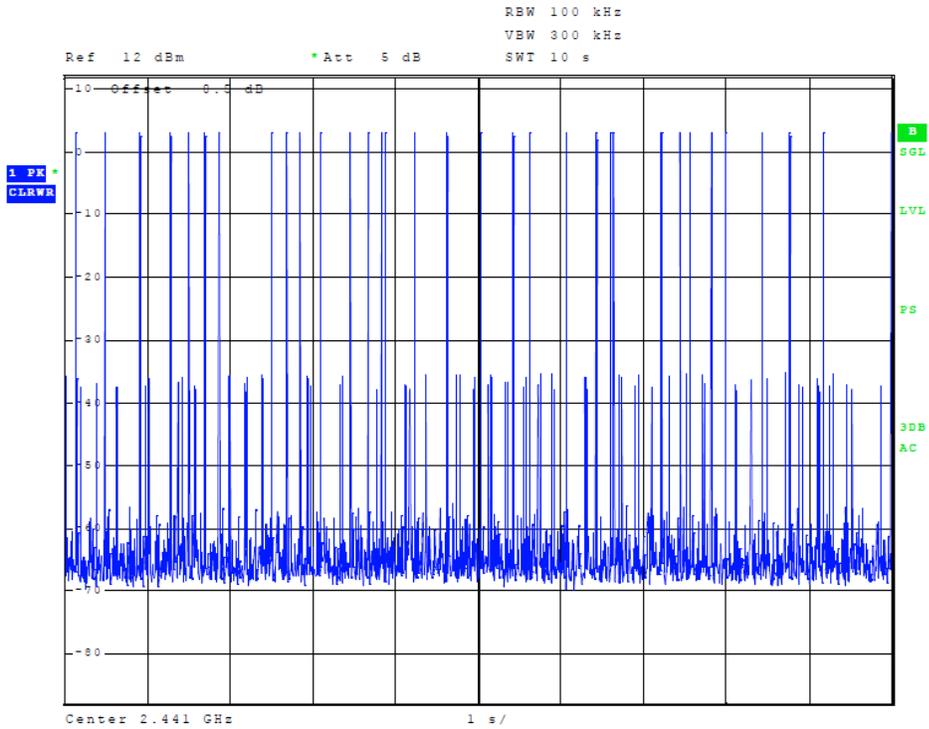
**Figure 7 Plot of Operation across Frequency band**



**Figure 8 Plot of Channel Separation**



**Figure 9 Plot of Dwell Time on Channel**

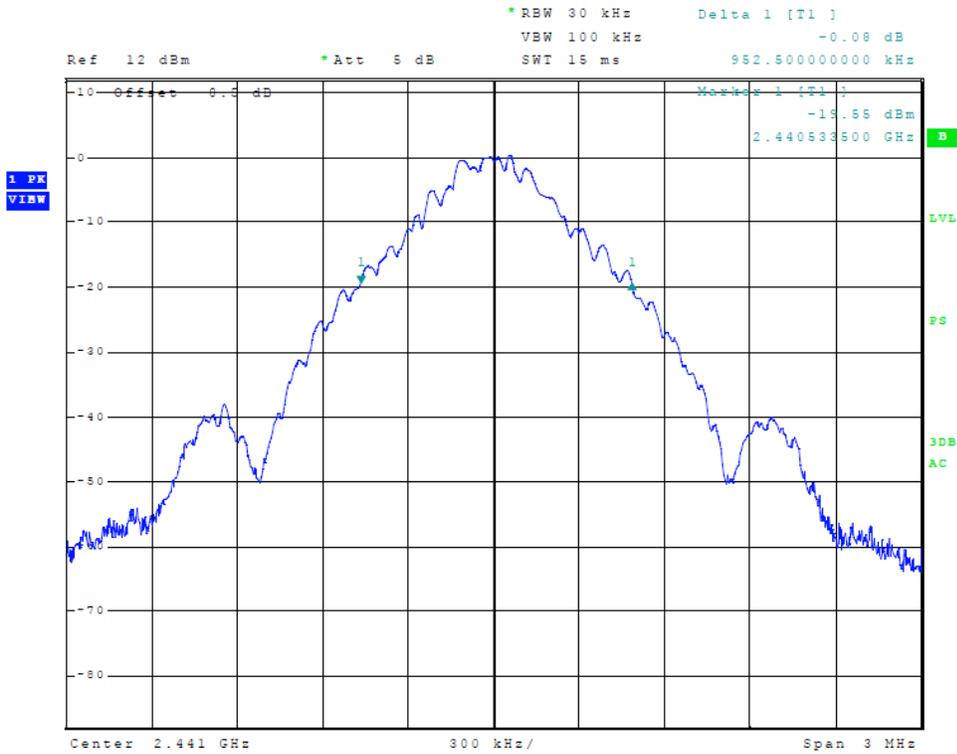


**Figure 10 Plot of 34 Times on Channel over 10 second period**

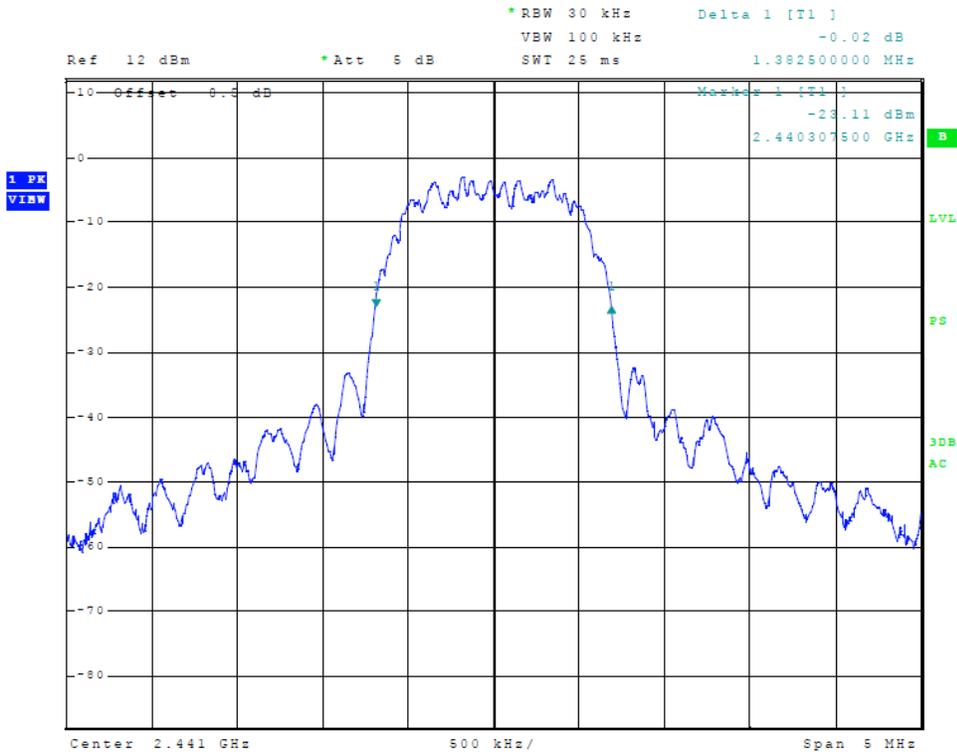
Rogers Labs, Inc.  
 4405 W. 259th Terrace  
 Louisburg, KS 66053  
 Phone/Fax: (913) 837-3214  
 Revision 3

Garmin International, Inc.  
 Model: A03185  
 Test #: 161010  
 Test to: 47CFR (15.247), RSS-247  
 File: A03185 FHSS TstRpt 161010 r3

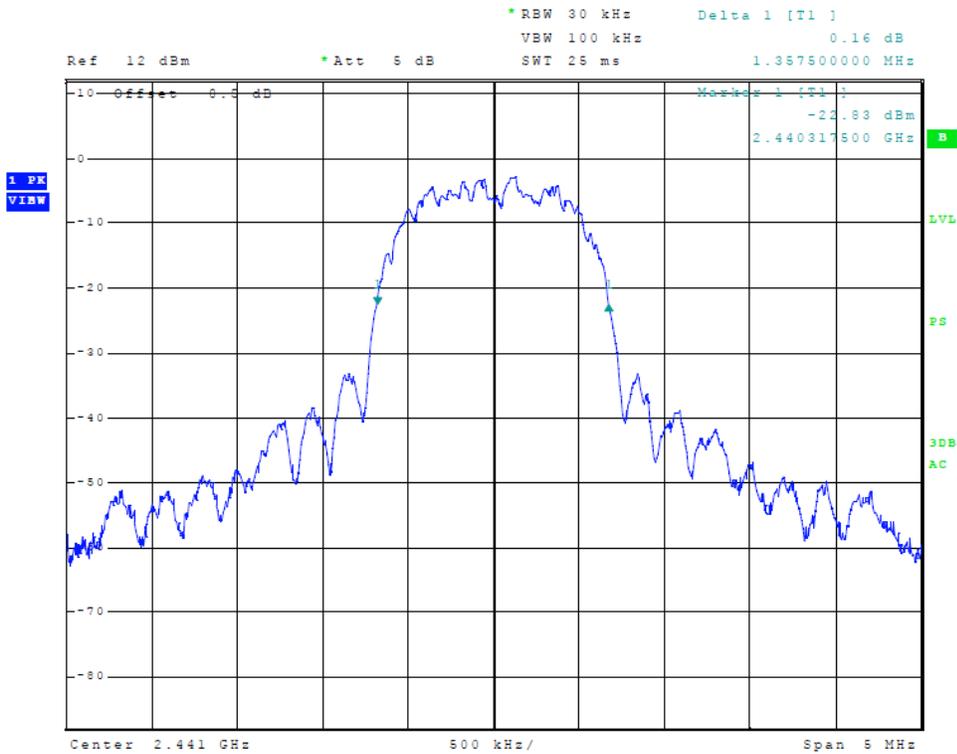
FCC ID: IPH-03185  
 IC: 1792A-03185  
 SN: M1248Q/M123W5  
 Date: January 5, 2017  
 Page 28 of 42



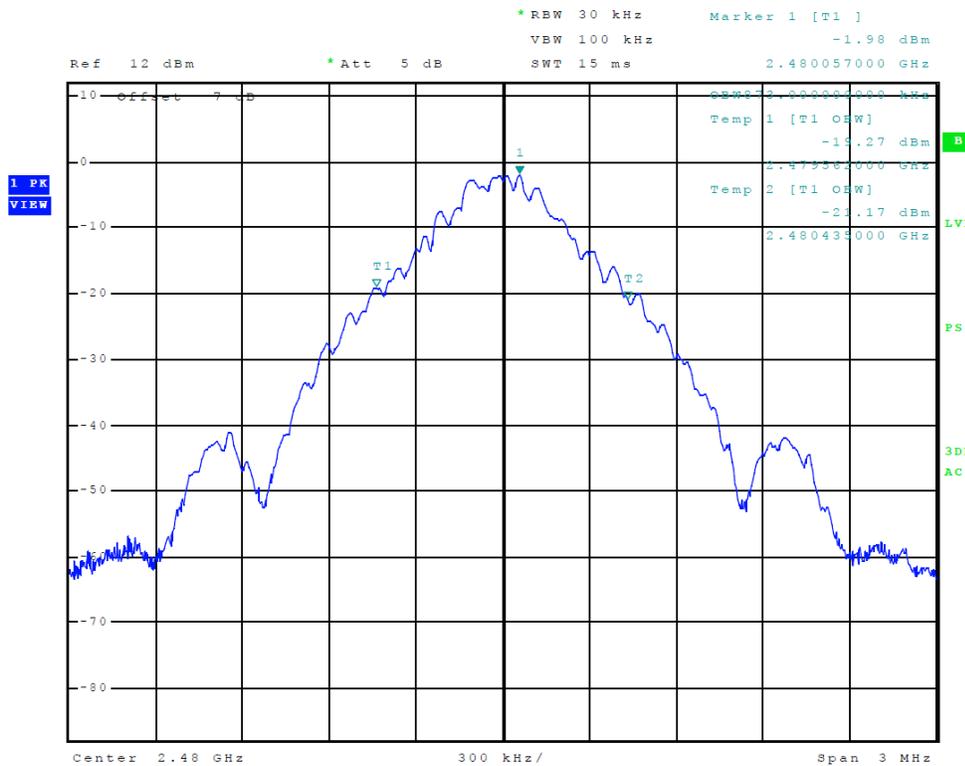
**Figure 11 Plot of 20-dB down Occupied Bandwidth GFSK**



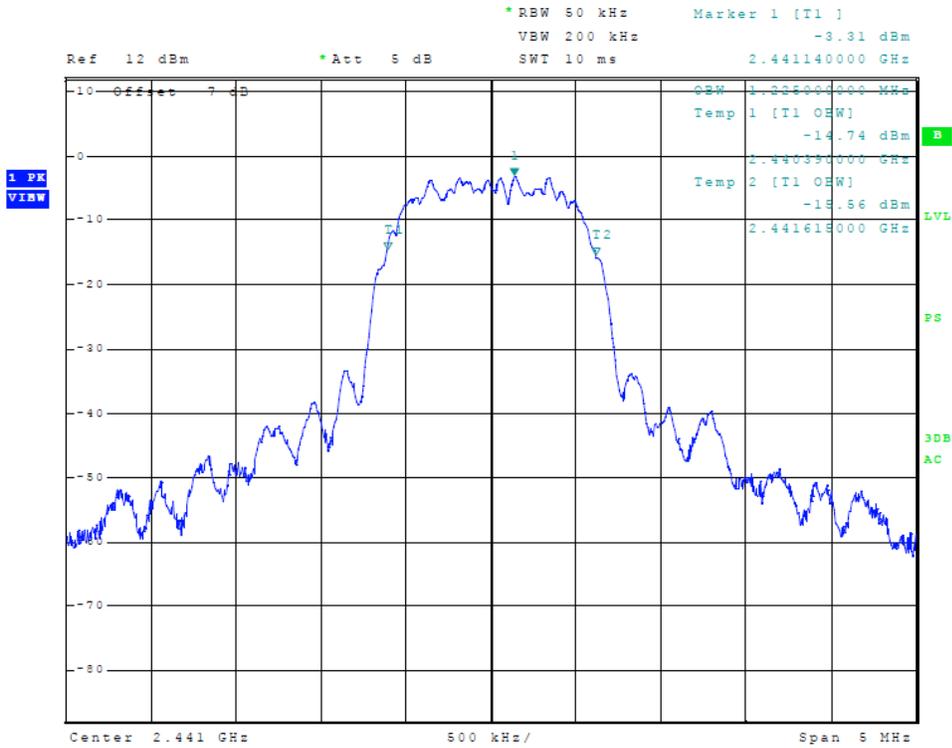
**Figure 12 Plot of 20-dB down Occupied Bandwidth 2EDR**



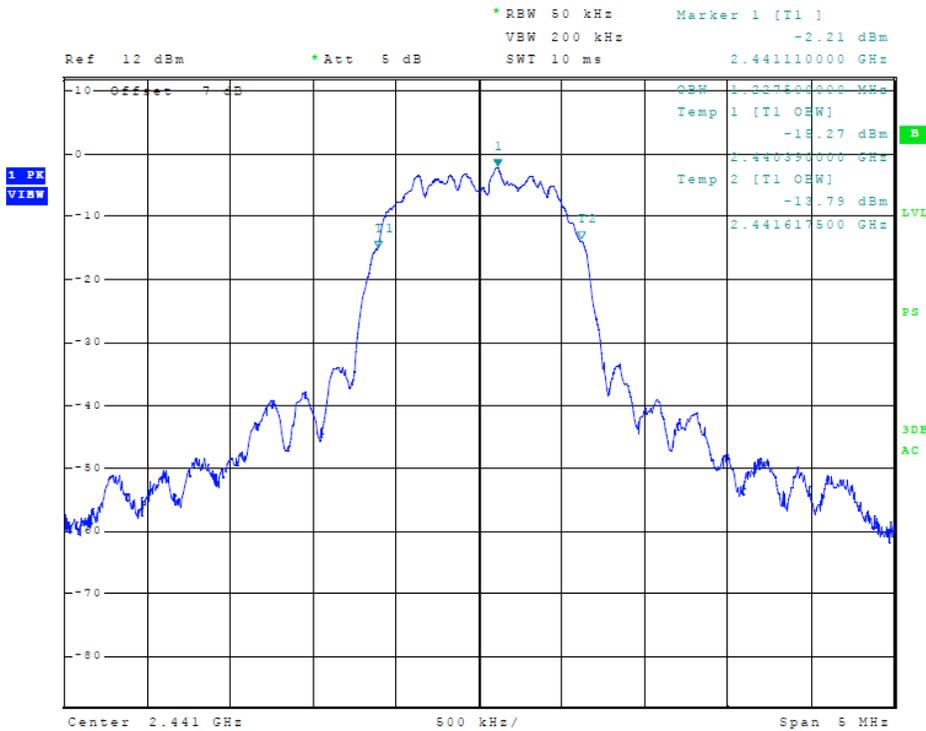
**Figure 13 Plot of 20-dB down Occupied Bandwidth 3EDR**



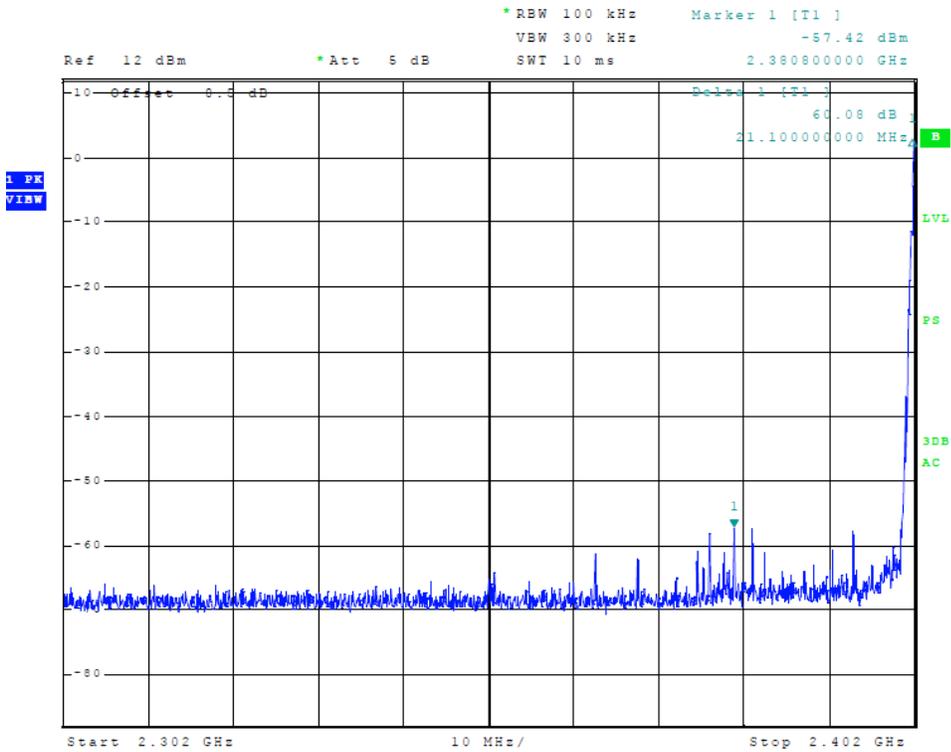
**Figure 14 Plot of 99% Occupied Bandwidth GFSK**



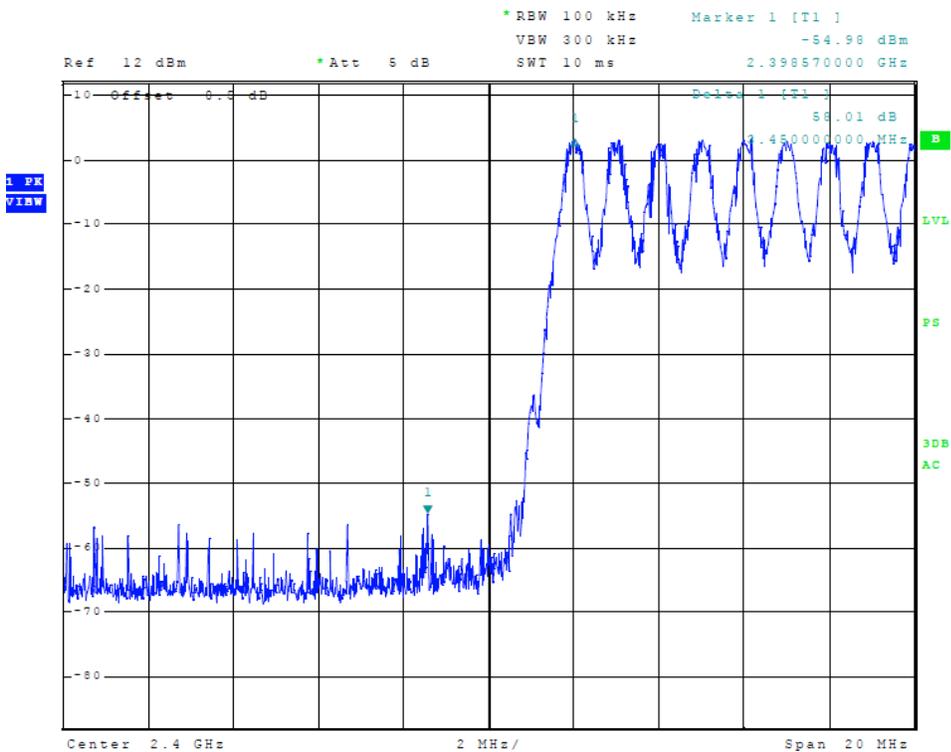
**Figure 15 Plot of 99% Occupied Bandwidth 2EDR**



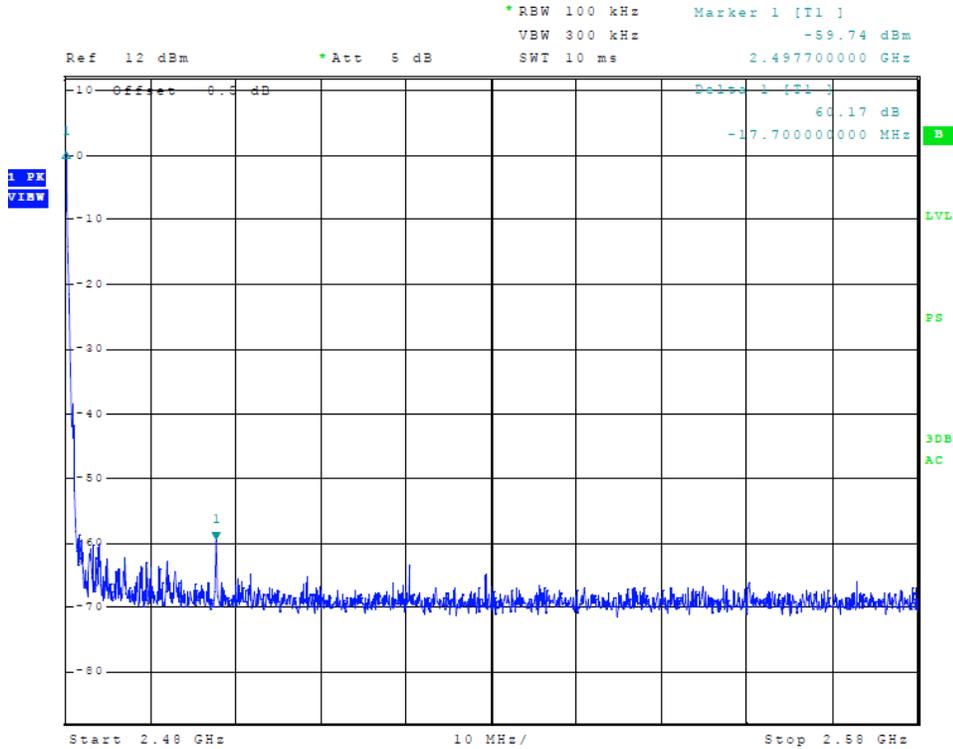
**Figure 16 Plot of 99% Occupied Bandwidth 3EDR**



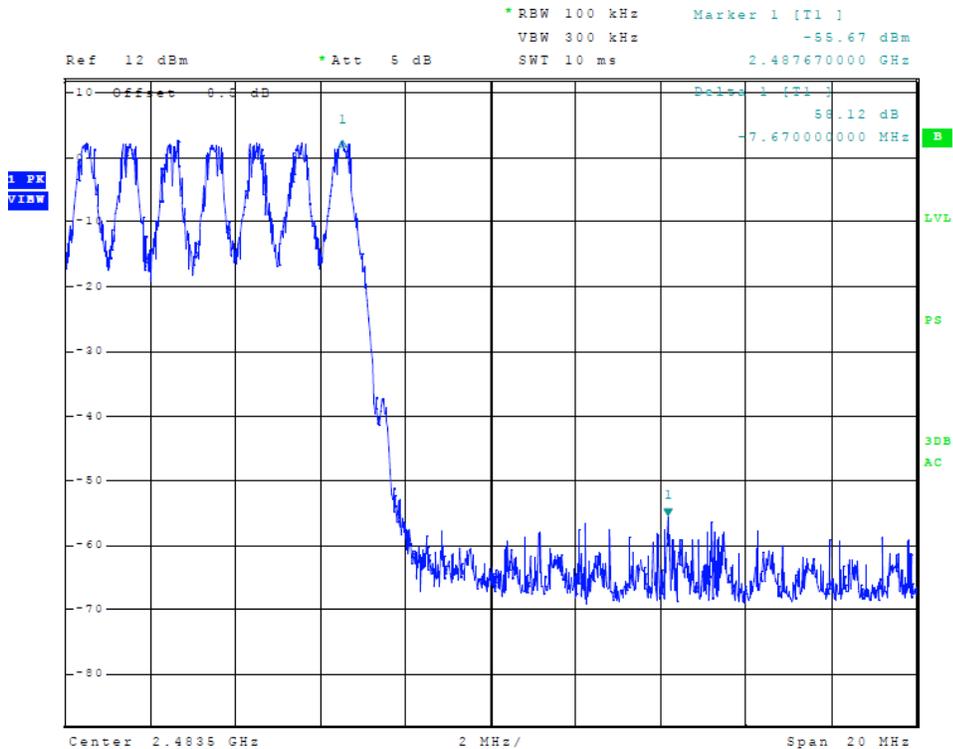
**Figure 17 Plot of Low Band Edge Emissions (Single Channel Operation band edge)**



**Figure 18 of Plot of Low Band Edge Emissions (Hopping Channels Operation band edge)**



**Figure 19 of Plot of High Band Edge Emissions (Single Channel Operation band edge)**



**Figure 20 of Plots of High Band Edge Emissions (Hopping Channels Operation band edge)**

## Transmitter Emissions Data

**Table 8 Transmitter Radiated Emission Data GFSK**

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)
2402.0	--	--	--	--	--	--	--
4804.0	43.9	N/A	30.4	43.2	N/A	30.5	54.0
7206.0	45.4	N/A	33.0	46.5	N/A	33.0	54.0
9608.0	46.7	N/A	33.4	46.2	N/A	33.4	54.0
12010.0	51.4	N/A	37.8	51.0	N/A	37.8	54.0
14412.0	53.2	N/A	39.3	52.1	N/A	39.1	54.0
2441.0	--	--	--	--	--	--	--
4882.0	43.4	N/A	30.6	43.2	N/A	29.3	54.0
7323.0	47.2	N/A	33.5	45.5	N/A	32.7	54.0
9764.0	47.8	N/A	34.5	47.3	N/A	34.3	54.0
12205.0	50.1	N/A	37.5	50.5	N/A	37.4	54.0
14646.0	51.7	N/A	38.7	52.2	N/A	38.9	54.0
2480.0	--	--	--	--	--	--	--
4960.0	43.6	N/A	30.5	43.4	N/A	30.6	54.0
7440.0	46.2	N/A	33.2	45.8	N/A	32.4	54.0
9920.0	47.8	N/A	34.4	47.2	N/A	34.4	54.0
12400.0	49.5	N/A	36.7	49.5	N/A	36.7	54.0
14880.0	52.0	N/A	39.3	52.4	N/A	39.4	54.0

Other emissions present had amplitudes at least 20 dB below the limit.

Quasi-Peak amplitude emissions are recorded above for frequency range of 30-1000 MHz.

Average amplitude emissions are recorded above for frequency range above 1000 MHz.

**Table 9 Transmitter Radiated Emission Data EDR (worst case)**

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)
2402.0	--	--	--	--	--	--	--
4804.0	45.6	N/A	32.3	45.2	N/A	32.4	54.0
7206.0	44.9	N/A	31.2	43.6	N/A	31.3	54.0
9608.0	41.0	N/A	28.5	41.3	N/A	28.5	54.0
12010.0	40.9	N/A	27.9	41.8	N/A	28.5	54.0
14412.0	39.6	N/A	27.0	39.6	N/A	27.1	54.0
2441.0	--	--	--	--	--	--	--
4882.0	45.3	N/A	32.3	46.2	N/A	32.6	54.0
7323.0	44.4	N/A	31.4	44.5	N/A	31.6	54.0
9764.0	42.1	N/A	29.3	42.1	N/A	29.2	54.0
12205.0	41.2	N/A	28.0	40.6	N/A	28.0	54.0
14646.0	39.7	N/A	26.6	40.3	N/A	26.6	54.0
2480.0	--	--	--	--	--	--	--
4960.0	45.3	N/A	32.7	45.0	N/A	32.6	54.0
7440.0	43.4	N/A	30.7	43.4	N/A	30.7	54.0
9920.0	41.4	N/A	28.5	41.2	N/A	28.5	54.0
12400.0	40.3	N/A	27.1	40.2	N/A	27.1	54.0
14880.0	40.3	N/A	26.8	39.2	N/A	26.8	54.0

Other emissions present had amplitudes at least 20 dB below the limit.

Quasi-Peak amplitude emissions are recorded above for frequency range of 30-1000 MHz.

Average amplitude emissions are recorded above for frequency range above 1000 MHz.

**Table 10 Transmitter Antenna Conducted Emissions Data**

Operational Mode	Conducted Output Power dBm	Calculated Output Power Watts	20-dB Occupied Bandwidth kHz	99% Occupied Bandwidth kHz
GFSK	3.99	0.003	949.0	873.0
2EDR	3.57	0.002	1382.5	1222.5
3EDR	4.02	0.003	1357.5	1230.0

The antenna conducted output power and 20-dB bandwidth were measured while operating in available modes for the lowest, middle and highest available channels. The data reported below represents the worst-case operational conditions.

***Summary of Results for Radiated Emissions of Intentional Radiator***

The EUT demonstrated antenna port conducted output power of 4 dBm, 2.5 milliwatts (0.003 Watts). The EUT demonstrated a minimum out of band radiated emission margin of -10.3 dB below the restricted emissions requirements. The EUT demonstrated a minimum radiated harmonics emission margin of -9.5 dB below the emissions requirements. The EUT tested was observed in compliance with the radiated emissions requirements of 47CFR Part 15.247 and Industry Canada RSS-247 Intentional Radiators. There were no other significantly measurable emissions observed in restricted bands other than those recorded in this report. Other emissions were present with amplitudes at least 20 dB below the requirements. There were no deviations or exceptions to the requirements.

## Annex

- Annex A Measurement Uncertainty Calculations
- Annex B Rogers Labs Test Equipment List
- Annex C Rogers Qualifications
- Annex D FCC Site Registration Letter
- Annex E Industry Canada Site Registration Letter

### **Annex A Measurement Uncertainty Calculations**

Measurement uncertainty calculations were made for the laboratory. Result of measurement uncertainty calculations are recorded below for AC line conducted and radiated emission measurements.

Measurement Uncertainty	$U_{(E)}$	$U_{(lab)}$
3 Meter Horizontal 30-200 MHz Measurements	2.08	4.16
3 Meter Vertical 30-200 MHz Measurements	2.16	4.33
3 Meter Vertical Measurements 200-1000 MHz	2.99	5.97
10 Meter Horizontal Measurements 30-200 MHz	2.07	4.15
10 Meter Vertical Measurements 30-200 MHz	2.06	4.13
10 Meter Horizontal Measurements 200-1000 MHz	2.32	4.64
10 Meter Vertical Measurements 200-1000 MHz	2.33	4.66
3 Meter Measurements 1-6 GHz	2.57	5.14
3 Meter Measurements 6-18 GHz	2.58	5.16
AC Line Conducted	1.72	3.43

## Annex B Rogers Labs Test Equipment List

List of Test Equipment	Calibration	Date	Due
Spectrum Analyzer: Rohde & Schwarz ESU40		5/16	5/17
Spectrum Analyzer: HP 8562A, HP Adapters: 11518, 11519, and 11520 Mixers: 11517A, 11970A, 11970K, 11970U, 11970V, 11970W		5/16	5/17
Spectrum Analyzer: HP 8591EM		5/16	5/17
Antenna: EMCO Biconilog Model: 3143		5/16	5/17
Antenna: Sunol Biconilog Model: JB6		10/16	10/17
Antenna: EMCO Log Periodic Model: 3147		10/16	10/17
Antenna: Com Power Model: AH-118		10/16	10/17
Antenna: Com Power Model: AH-840		5/16	5/18
Antenna: Antenna Research Biconical Model: BCD 235		10/16	10/17
Antenna: Com Power Model: AL-130		10/16	10/17
Antenna: EMCO 6509		10/16	10/17
LISN: Compliance Design Model: FCC-LISN-2.Mod.cd, 50 $\mu$ Hy/50 ohm/0.1 $\mu$ f		10/16	10/17
R.F. Preamp CPPA-102		10/16	10/17
Attenuator: HP Model: HP11509A		10/16	10/17
Attenuator: Mini Circuits Model: CAT-3		10/16	10/17
Attenuator: Mini Circuits Model: CAT-3		10/16	10/17
Cable: Belden RG-58 (L1)		10/16	10/17
Cable: Belden RG-58 (L2)		10/16	10/17
Cable: Belden 8268 (L3)		10/16	10/17
Cable: Time Microwave: 4M-750HF290-750		10/16	10/17
Cable: Time Microwave: 10M-750HF290-750		10/16	10/17
Frequency Counter: Leader LDC825		2/16	2/17
Oscilloscope Scope: Tektronix 2230		2/16	2/17
Wattmeter: Bird 43 with Load Bird 8085		2/16	2/17
Power Supplies: Sorensen SRL 20-25, SRL 40-25, DCR 150, DCR 140		2/16	2/17
R.F. Generators: HP 606A, HP 8614A, HP 8640B		2/16	2/17
R.F. Power Amp 65W Model: 470-A-1010		2/16	2/17
R.F. Power Amp 50W M185- 10-501		2/16	2/17
R.F. Power Amp A.R. Model: 10W 1010M7		2/16	2/17
R.F. Power Amp EIN Model: A301		2/16	2/17
LISN: Compliance Eng. Model 240/20		2/16	2/17
LISN: Fischer Custom Communications Model: FCC-LISN-50-16-2-08		2/16	2/17
Antenna: EMCO Dipole Set 3121C		2/16	2/17
Antenna: C.D. B-101		2/16	2/17
Antenna: Solar 9229-1 & 9230-1		2/16	2/17
Audio Oscillator: H.P. 201CD		2/16	2/17
ESD Test Set 2010i		2/16	2/17
Fast Transient Burst Generator Model: EFT/B-101		2/16	2/17
Field Intensity Meter: EFM-018		2/16	2/17
KEYTEK Ecat Surge Generator		2/16	2/17
Shielded Room 5 M x 3 M x 3.0 M			

## **Annex C Rogers Qualifications**

**Scot D. Rogers, Engineer**

### **Rogers Labs, Inc.**

Mr. Rogers has approximately 17 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

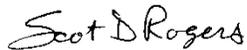
Systems Engineer: A/C Controls Mfg. Co., Inc. 6 Years

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 FCC Site Registration Letter**

**FEDERAL COMMUNICATIONS COMMISSION**

**Laboratory Division  
7435 Oakland Mills Road  
Columbia, MD 21046**

April 16, 2015

Registration Number: 90910

Rogers Labs, Inc.  
4405 West 259th Terrace  
Louisburg, KS 66053

Attention: Scot Rogers,

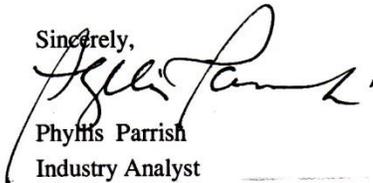
Re: Measurement facility located at Louisburg  
3 & 10 meter site  
Date of Renewal: April 16, 2015

Dear Sir or Madam:

Your request for renewal of the registration of the subject measurement facility has been received. The information submitted has been placed in your file and the registration has been renewed. The name of your organization will remain on the list of facilities whose measurement data will be accepted in conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Please note that the file must be updated for any changes made to the facility and the registration must be renewed at least every three years.

Measurement facilities that have indicated that they are available to the public to perform measurement services on a fee basis may be found on the FCC website [www.fcc.gov](http://www.fcc.gov) under E-Filing, OET Equipment Authorization Electronic Filing, Test Firms.

Sincerely,

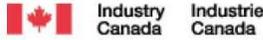
  
Phyllis Parrish  
Industry Analyst

Rogers Labs, Inc.  
4405 W. 259th Terrace  
Louisburg, KS 66053  
Phone/Fax: (913) 837-3214  
Revision 3

Garmin International, Inc.  
Model: A03185  
Test #: 161010  
Test to: 47CFR (15.247), RSS-247  
File: A03185 FHSS TstRpt 161010 r3

FCC ID: IPH-03185  
IC: 1792A-03185  
SN: M1248Q/M123W5  
Date: January 5, 2017  
Page 41 of 42

## Annex E Industry Canada Site Registration Letter



June 08, 2015

OUR FILE: 46405-3041  
Authorization No: 010277847-001

Rogers Labs Inc.  
4405 West 259th Terrace  
Louisburg, KS  
USA  
66053

**Attention:** Mr. Scot D. Rogers

Dear Sir:

The Bureau has received your application for the renewal of 3m OATS. Be advised that the information received was satisfactory to Industry Canada. The following number(s) is now associated to the site(s) for which registration / renewal was sought ( **Site# 3041A-1** ). Please reference the appropriate site number in the body of test reports containing measurements performed on the site. In addition, please keep for your records the following information;

- The company address code associated to the site(s) located at the above address is: **3041A**

Furthermore, to obtain or renew a unique site number, the applicant shall demonstrate that the site has been accredited to ANSI C63.4-2009 or later. A scope of accreditation indicating the accreditation by a recognized accreditation body to ANSI C63.4-2009 or later shall be accepted. Please indicate in a letter the previous assigned site number if applicable and the type of site (example: 3 metre OATS or 3 metre chamber). If the test facility is not accredited to ANSI C63.4-2009 or later, the test facility shall submit test data demonstrating full compliance with the ANSI standard. The Bureau will evaluate the filing to determine if recognition shall be granted.

The frequency for re-validation of the test site and the information that is required to be filed or retained by the testing party shall comply with the requirements established by the accrediting organization. However, in all cases, test site re-validation shall occur on an interval not to exceed **three years**. There is no fee or form associated with an OATS filing. OATS submissions are encouraged to be submitted electronically to the Bureau using the following URL; [http://strategis.ic.gc.ca/epic/internet/inceb-bhst.nsf/en/h\\_tt00052e.html](http://strategis.ic.gc.ca/epic/internet/inceb-bhst.nsf/en/h_tt00052e.html).

If you have any questions, you may contact the Bureau by e-mail at [certification.bureau@ic.gc.ca](mailto:certification.bureau@ic.gc.ca) Please reference our file and submission number above for all correspondence.

Yours sincerely,

A handwritten signature in black ink, appearing to read "Bill Payn".

Bill Payn  
For: Wireless Laboratory Manager  
Certification and Engineering Bureau  
3701 Carling Ave., Building 94  
P.O. Box 11490, Station AH@  
Ottawa, Ontario K2H 8S2  
Email: [certification.bureau@ic.gc.ca](mailto:certification.bureau@ic.gc.ca)

Rogers Labs, Inc.  
4405 W. 259th Terrace  
Louisburg, KS 66053  
Phone/Fax: (913) 837-3214  
Revision 3

Garmin International, Inc.  
Model: A03185  
Test #: 161010  
Test to: 47CFR (15.247), RSS-247  
File: A03185 FHSS TstRpt 161010 r3

FCC ID: IPH-03185  
IC: 1792A-03185  
SN: M1248Q/M123W5  
Date: January 5, 2017  
Page 42 of 42