

APPLICATION SUBMITTAL REPORT

FOR

FCC And INDUSTRY CANADA
GRANT OF CERTIFICATION

FOR

Model: Sensor SV1.1

315 MHz Transmitter

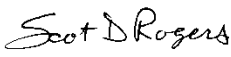
FCC ID: ZQQ-SV11

FOR

Zebo Trending And Communications Inc.

11936 West 119th Street
Overland Park, KS 66213

Test Report Number: 110725

Authorized Signatory: 
Scot D. Rogers



ROGERS LABS, INC.

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

Application Submittal Engineering Test Report for Grant of Certification

Per

CFR47, PART 15C - INTENTIONAL RADIATORS
Paragraph 15.231 and Industry Canada, RSS-210
Periodic Operation Low Power Transmitter

For


Zebo Trending And Communications Inc.

11936 West 119th Street
Overland Park, KS 66213
Jim Farnham

Model: Sensor SV1.1

Frequency 315 MHz
FCC ID#: ZQQ-SV11

Test Date: July 25, 2011

Certifying Engineer: 

Scot D. Rogers
Rogers Labs, Inc.
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Forward

The following information is submitted for consideration in obtaining Grant of Certification for a license exempt low power periodic operation intentional radiator operating under CFR47

Paragraph 15.231 and Industry Canada standard RSS-210.

Name of Applicant:

Zebo Trending and Communications Inc.
11936 West 119th Street
Overland Park, KS 66213

Model: Sensor SV1.1

FCC I.D.: ZQQ-SV11 IC:

Frequency Range: 315 MHz.

Average Operating Power: 61.2 dBµV/m @ 3-meters (3 meter radiated measurement),
Occupied Bandwidth 78.52 kHz

Opinion / Interpretation of Results

Test Performed	Minimum Margin (dB)	Results
Antenna requirement per CFR 47 15.203	N/A	Complies
Restricted Bands Emissions as per CFR 47 15.205 and RSS-210 A2.2	-4.2	Complies
AC Line Conducted Emissions as per CFR 47 15.207	N/A	Complies
Radiated Emissions as per CFR 47 15.209 and RSS-210 A2.2	-15.1	Complies
Radiated Harmonic Emissions per CFR 47 15.231 and RSS-210 A2.9	-2.4	Complies
Receivers emissions per CFR 47 15.111 and RSS-210 and RSS-GEN	N/A	Complies

Environmental Conditions

Ambient Temperature 22.3° C

Relative Humidity 44%

Atmospheric Pressure 1008.9 mb



Application for Certification

- (1) Manufacturer: Zebo Trending and Communications Inc.
11936 West 119th Street
Overland Park, KS 66213

- (2) Identification: Model: Sensor SV1.1
FCC I.D.: ZQQ-SV11

- (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) No Peripheral Equipment was Necessary.

- (9) Transition Provisions of 15.37 are not being requested.

- (10) Equipment is not a scanning receiver and this section is not applicable.

- (11) The equipment does not operate in the 59 – 64 GHz frequency band and this section is not applicable.

- (12) The equipment is not software defined and this section is not applicable.

Applicable Standards & Test Procedures

In accordance with the Federal Communications Code of Federal Regulations, dated October 1, 2010, 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 15.231, and Industry Canada standard RSS-210 the following information is submitted.

Test procedures used are the established Methods of Measurement of Radio-Noise Emissions as described in the ANSI C63.4-2009 Document FCC, documents DA00-1407 and DA00-705 and/or TIA/EIA 603-1.

Equipment Tested

<u>Equipment</u>	<u>Model</u>	<u>FCC ID</u>
EUT	Sensor SV1.1	ZQQ-SV11

Equipment Function and Testing Procedures

The EUT is a periodic operation 315 MHz radio transmitter used to transmit sensor information conditions. The Sensor SV1.1 wireless transmitter offers a wireless signal used for transmitting remote sensor information in installation environments. The design offers use for various transducer (sensor) offering remote access to sensor data. The device randomly sends communication signal of the sensor information to compliant Base Station system components. The design operates from internal replaceable DC battery power and offers interface termination contacts for passive compliant sensors. For testing purposes samples were provided with transmit duty cycle approaching 100%. This modification offered test personnel ability to measure worst-case fundamental and harmonic emissions. Data was taken on test samples and de-rating calculations used to correct for worst-case installation production equipment.

Configurations Options of the Sensor

Sensor SV1.1 EUT

Equipment and Cable Configurations

Radiated Emission Test Procedure

Testing of the radiated emissions was performed as defined in sections 8.3 and/or 13.1.4 of ANSI C63.4-2009. For testing purposes samples were provided with transmit duty cycle approaching 100%. Data was collected using peak, quasi-peak and average measurement detectors. The EUT was placed on a rotating 1 x 1.5-meter wooden platform, 0.8 meters above the ground plane at a distance of 3 meters from the FSM antenna. 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. Refer to test setup photographs in the exhibits for EUT placement.

Units of Measurements

Conducted EMI Data is in dB μ V; dB referenced to one microvolt.

Radiated EMI Data is in dB μ V/m; dB/m referenced to one microvolt per meter.

Test Site Locations

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

Site Approval Refer to Annex for FCC Site Registration Letter, # 90910, and Industry Canada Site Registration Letter, IC3041A-1.

List of Test Equipment

A Rohde & Schwarz ESU40 and/or Hewlett Packard 8591EM Spectrum Analyzer was used as the measuring device for the emissions testing of frequencies below 1 GHz. A Rohde & 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.

Analyzer Settings		
AC Line Conducted Emissions:		
RBW	AVG. BW	Detector Function
9 kHz	30 kHz	Peak/Quasi Peak
Radiated Emissions 30-1000 MHz		
RBW	AVG. BW	Detector Function
100 kHz	100 kHz	Peak
120 kHz	300 kHz	Peak/Quasi Peak
Radiated Emissions Above 1000 MHz		
RBW	Video BW	Detector Function
1 MHz	1 MHz	Peak / Average

<u>Equipment</u>	<u>Manufacturer</u>	<u>Model</u>	<u>Calibration Date</u>	<u>Due</u>
LISN	Comp. Design	FCC-LISN-2-MOD.CD	10/10	10/11
Antenna	ARA	BCD-235-B	10/10	10/11
Antenna	EMCO	3147	10/10	10/11
Antenna	EMCO	3143	5/11	5/12
Analyzer	HP	8591EM	5/11	5/12
Analyzer	HP	8562A	5/11	5/12
Analyzer	Rohde & Schwarz	ESU40	5/11	5/12

General Emissions (Unintentional Radiators)

The unit operates from internal DC battery power only. The replaceable batteries are accessed at battery compartment offering access to batteries. The EUT was arranged in a typical equipment configuration and placed on a 1 x 1.5-meter wooden bench 80 cm above the conducting ground plane.

Radiated EMI

The EUT was arranged in a typical equipment configuration and operated in a test mode for testing purposes. The test mode of operation forced the EUT to transmit near 100 percent duty cycle. This transmitter test operation offered testing personnel ability to fully test transmitter and harmonic emissions. 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 radiated frequency spectrum from 30 MHz to 6,000 MHz for the preliminary testing. Refer to figures one through four showing plots of the radiated emissions spectrum taken in a screen room. Each radiated emission was then re-maximized at the OATS location before final radiated emissions measurements were performed. Final data was taken with the EUT located at the OATS at a distance of 3 meters between the EUT and the receiving antenna. The frequency spectrum from 30 MHz to 10,000 MHz was searched for 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 Broadband Biconilog, Biconilog, Log Periodic and or, pyramidal horns and mixers from 30 MHz to 10 GHz, notch filters and appropriate amplifiers were utilized.

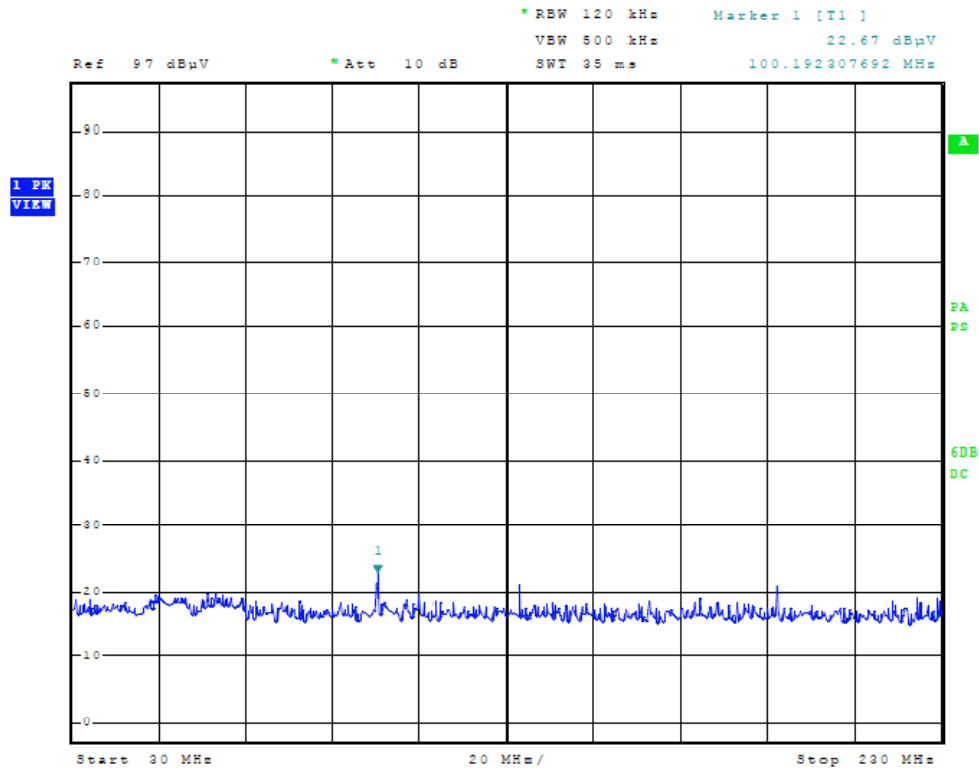


Figure One Plot of General Radiated Emissions

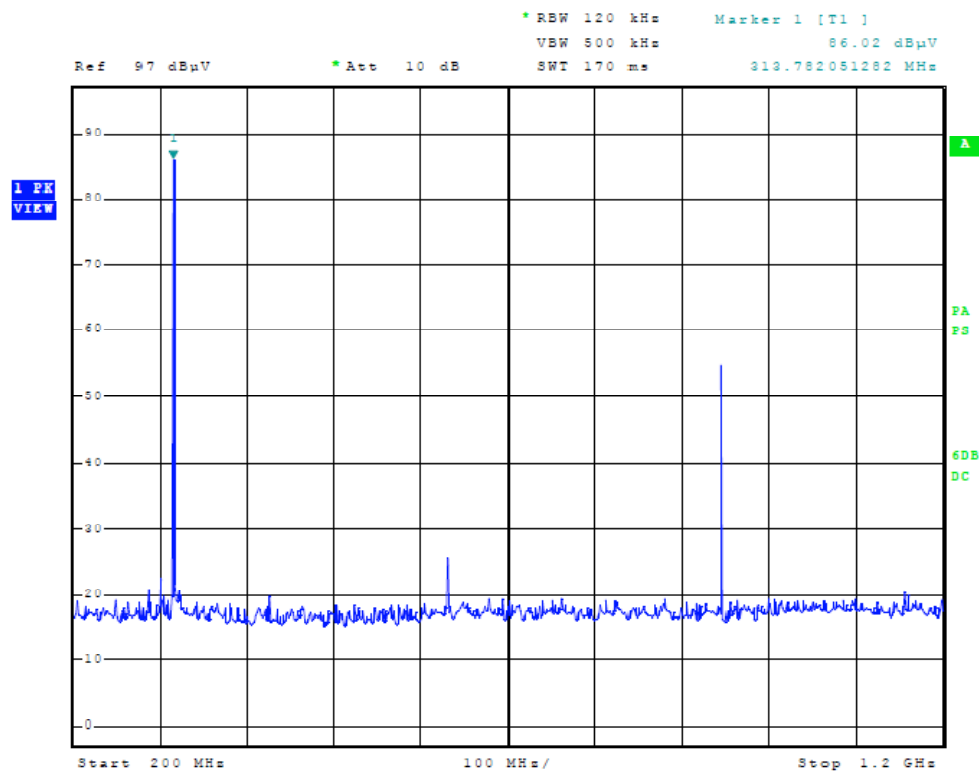


Figure Two Plot of General Radiated Emissions

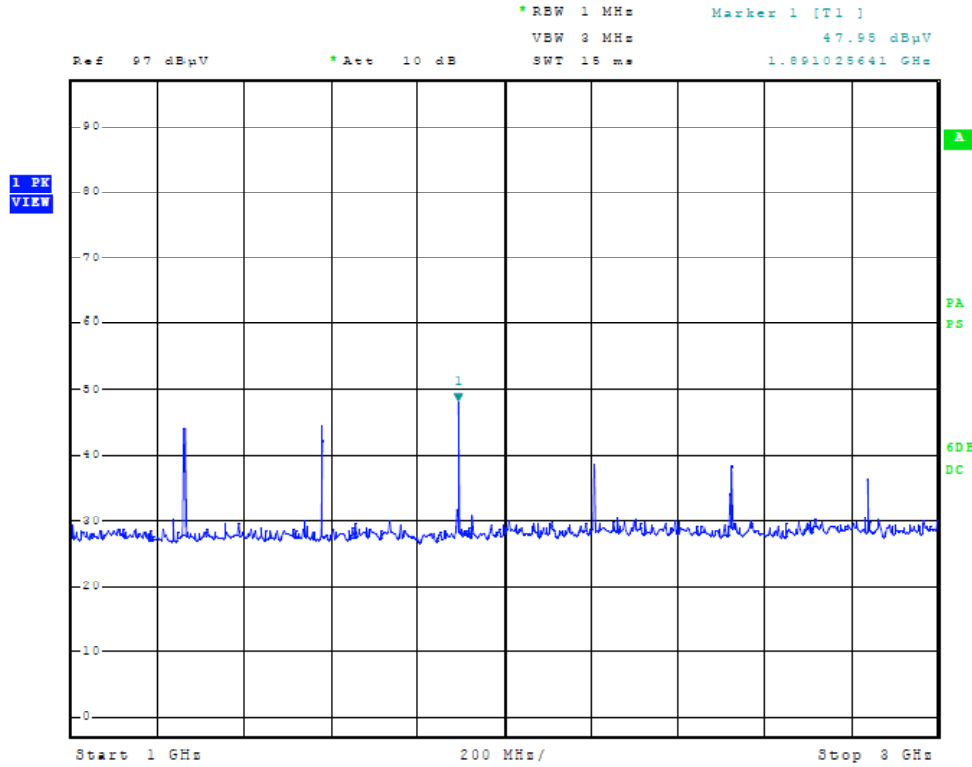


Figure Three Plot of General Radiated Emissions

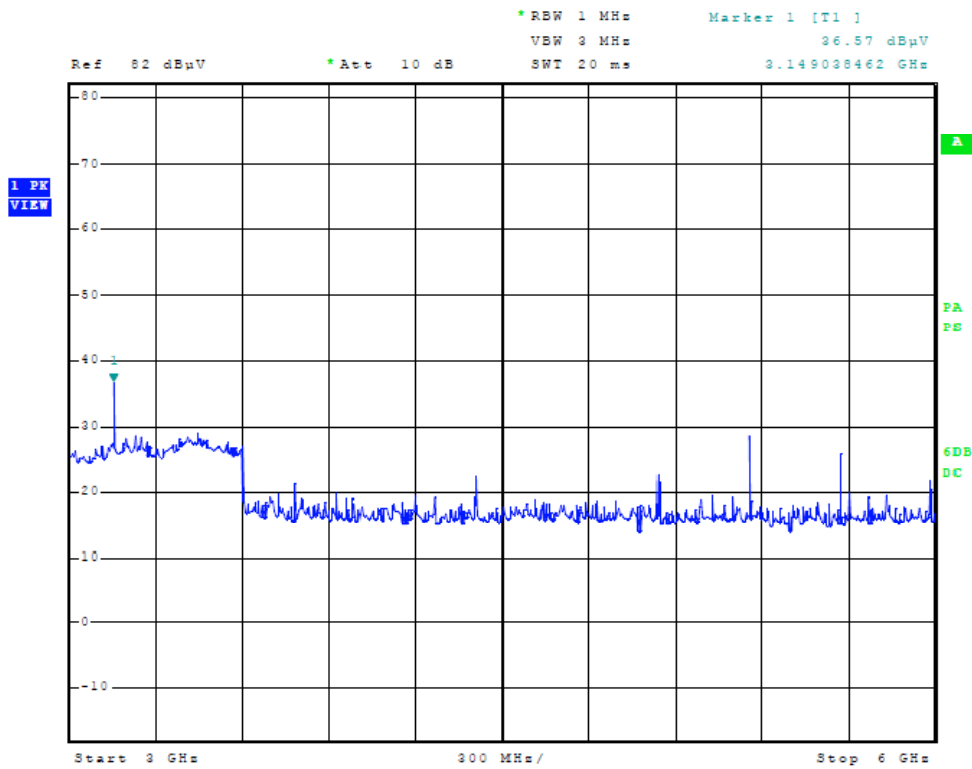


Figure Four Plot of General Radiated Emissions

General Radiated Emissions Data from EUT

Frequency in MHz	Horizontal Peak (dBµV)	Horizontal Quasi-Peak (dBµV)	Horizontal Average (dBµV)	Vertical Peak (dBµV)	Vertical Quasi-Peak (dBµV)	Vertical Average (dBµV)	Limit @ 3m (dBµV/m)
99.8	35.0	28.4	N/A	29.6	25.2	N/A	43.5
100.1	31.8	22.9	N/A	32.3	23.3	N/A	43.5
119.6	25.4	21.1	N/A	24.4	18.5	N/A	43.5
121.4	25.8	15.5	N/A	21.9	14.0	N/A	43.5

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

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 Radiated Emissions

The EUT demonstrated compliance with limits specified in CFR47 part 15C and Industry Canada requirements. The EUT demonstrated a -15.1 dB minimum margin below requirements. Other emissions were present with amplitudes at least 20 dB below the limit.

Intentional Radiators Emissions

As per CFR47 Part 15, Subpart C, paragraphs 15.203, 15.205, 15.209, 15.231 and RSS-210 the following information is submitted.

Antenna Requirements

The unit is produced with a permanently attached antenna and has no provision for user service, replacement, or antenna modification. The antenna requirements are fulfilled and 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 a distance of three meters at the OATS. The EUT utilizes frequency, determining circuitry, which generates harmonics falling in the restricted bands. Emissions were checked at the OATS, using appropriate antennas or pyramidal horns, amplification stages, and a spectrum analyzer. No other significant emission was observed which fell into the restricted bands of operation.

Sample Calculation:

$$RFS \text{ (dB}\mu\text{V/m @ 3m)} = FSM \text{ (dB}\mu\text{V)} + \text{Antenna Factor (dB)} - \text{Amplifier Gain (dB)}$$

Restricted Bands Radiated Emissions Data

Frequency in MHz	Horizontal Peak (dBμV)	Horizontal Quasi-Peak (dBμV)	Horizontal Average (dBμV)	Vertical Peak (dBμV)	Vertical Quasi-Peak (dBμV)	Vertical Average (dBμV)	Limit @ 3m (dBμV/m)
119.6	25.4	21.1	N/A	24.4	18.5	N/A	43.5
121.4	25.8	15.5	N/A	21.9	14.0	N/A	43.5
1575.0	58.5	N/A	49.8	51.9	N/A	42.5	54.0
2205.0	46.3	N/A	42.8	46.7	N/A	43.6	54.0
2835.0	53.1	N/A	46.8	50.4	N/A	46.3	54.0

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

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 Radiated Emissions in Restricted Bands

The EUT demonstrated compliance with requirements of CFR47 15C, and Industry Canada RSS-210 requirements. The EUT demonstrated a -4.2 dB minimum margin below requirements. Both average and peak amplitudes of frequencies above 1000 MHz were measured for demonstration of compliance with the regulations. No other emissions were found in the restricted frequency bands. Other emissions were present with amplitudes at least 20 dB below the Limits.



Operation in the Band 315 MHz

The power output was measured on an Open Area Test Site at a 3 meters distance. Data was taken per Paragraph 2.1046(a), 15.231, and RSS-210. For testing purposes samples were provided with transmit duty cycle approaching 100%. This modification offered test personnel ability to measure worst-case fundamental and harmonic emissions. Data was taken on test samples and de-rating calculations used to correct for worst-case installation production equipment. The EUT was placed on a wooden turntable 0.8 meters above the ground plane at a distance of 3 meters from the FSM antenna. The peak and quasi-peak amplitude of the frequencies below 1000 MHz, including carrier frequency, was measured using a spectrum analyzer. The peak and average amplitude of emissions above 1000 MHz including spurious emissions were measured using a spectrum analyzer then data was recorded from the analyzer display. Spurious emissions shall be attenuated to the average limits as defined in regulation or to the general radiated emission limits in 15.209 (and/or RSS-210). The amplitude of each emission was maximized by varying the FSM antenna height, polarization, and by rotating the turntable. Antennas used were Broadband Biconilog, Biconilog, Log Periodic and or, pyramidal horns and mixers from 30 MHz to 10 GHz, notch filters and appropriate amplifiers were utilized. Refer to figure five showing compliance with occupied bandwidth requirements. Formulas and calculations for correcting test sample data is offered below for reference.

The maximum transmissions used would occur at data rates of 115.2K baud rate. At this rate there could be a maximum of 931 transmissions in an hour. The maximum transmission time duration for this device is 2.08 mS (0.00208 seconds). Calculation of 931 transmissions of 2.08 mS duration in an hour period equates to 1, 936.5 ms per hour (less than 2 seconds per hour as required).

Calculation of the duty Cycle = $(.00208s * 931)/3600s = .00054\%$.

Calculation of duty cycle reduction for measured data (or limit level increase) is as follows:

(Transmit time on) * (number of possible transmissions) divided by seconds in hour

$(.00208s * 931)/3600s = .00054$

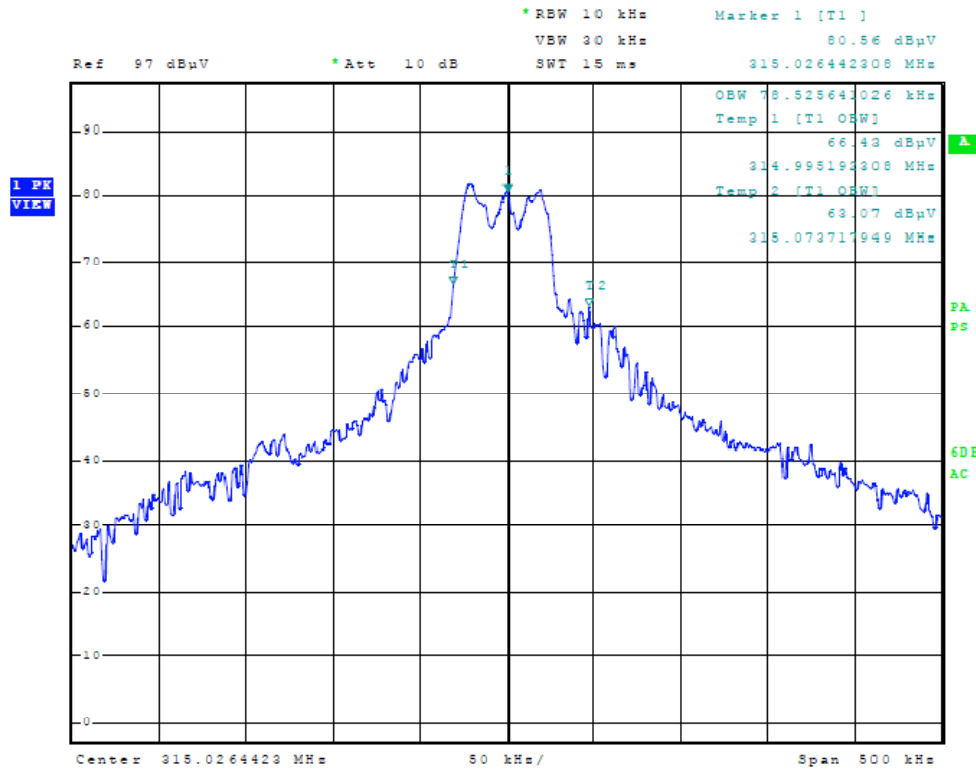
Calculation of reduction rating of measured emission (in dB) is as follows:

$10 * \log(\text{duty cycle})$

$10 * \log(0.00054) = -32.67 \text{ dB}$

Therefore worst-case maximum measured average emission data has been reduced by 32.67 dB as presented in data tables.

The sensor SV1.1 operates from internal battery power and is further limited to 6 transmissions per hour (to conserve battery life).



**Figure Five Occupied Band Width Low channel
Transmitter Radiated Emissions Data**

Frequency in MHz	Horizontal Peak (dBμV)	Horizontal Quasi-Peak (dBμV)	Horizontal Average (dBμV)	Vertical Peak (dBμV)	Vertical Quasi-Peak (dBμV)	Vertical Average (dBμV)	Limit @ 3m (dBμV/m) Peak/Ave
315.0	93.1	93.0	N/A	94.0	94.0	N/A	95.6/75.6
630.0	23.2	18.1	N/A	24.7	24.7	N/A	46.0
945.0	43.7	42.9	N/A	44.2	44.2	N/A	46.0
1260.0	57.8	N/A	50.7	54.8	N/A	48.5	54.0
1575.0	58.5	N/A	49.8	51.9	N/A	42.5	54.0
1890.0	48.6	N/A	33.8	51.4	N/A	40.2	54.0
2205.0	46.3	N/A	42.8	46.7	N/A	43.6	54.0
2520.0	47.6	N/A	42.4	46.4	N/A	42.6	54.0
2835.0	53.1	N/A	46.8	50.4	N/A	46.3	54.0
3150.0	49.5	N/A	38.3	52.0	N/A	46.9	54.0
3465.0	51.7	N/A	40.1	50.4	N/A	38.2	54.0

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

Note: No reduction of measured power levels are performed on data presented above. All limits presented are compliant with restricted bands of operation limitations and requirements.

Reduction of measured transmitter average emission data was performed and recorded in the table below for reference. Note all other measured emissions demonstrate compliance without correction for duty-cycle reduction.

Frequency in MHz	Horizontal Peak (dBμV)	Horizontal Quasi-Peak (dBμV)	Horizontal Average (dBμV)	Vertical Peak (dBμV)	Vertical Quasi-Peak (dBμV)	Vertical Average (dBμV)	Limit @ 3m (dBμV/m)
315.0	--	60.3	N/A	--	61.2	N/A	75.6

Average amplitude emissions are recorded above for fundamental frequency.

Summary of Results for Radiated Emissions of Intentional Radiator

The EUT demonstrated compliance with the requirements of CFR47 Part 15.231 and RSS-210 Intentional Radiators. The EUT highest peak fundamental transmitting frequency demonstrated emission level of 94.0 dBμV/m at 3 meters offering minimum of -1.6 dB margin below 20 dB above average limit. The average emission measurement of the fundamental (corrected for duty cycle reduction) offered a minimum -14.4 dB margin below the average limit for non-periodic transmitter operation. The EUT presented worst-case harmonic emission margin of -2.4 dB (50.7 dBμV/m at 3 meters without reduction to account for testing transmit duty cycle) margin requirements for harmonic emissions. There were no other measurable emissions greater than 20 dB below requirements in the restricted bands than those recorded in this report. Other emissions were present with amplitudes at least 20 dB below the limits. The EUT demonstrated compliance with specifications of 15.231 and RSS-210. There are no deviations or exceptions to the requirements.

Statement of Modifications and Deviations

No modifications to the EUT were required for the EUT to demonstrate compliance with requirements of CFR47 Part 15C or RSS-210. There were no modifications or deviations to the specifications.



NVLAP Lab Code 200087-0

Annex

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

Annex A Measurement Uncertainty Calculations

Radiated Emissions Measurement Uncertainty Calculation

Measurement of vertically polarized radiated field strength over the frequency range 30 MHz to 1 GHz on an open area test site at 3m and 10m includes following uncertainty:

Contribution	Probability Distribution	Uncertainty (dB)
Antenna factor calibration	normal (k = 2)	±0.58
Cable loss calibration	normal (k = 2)	±0.2
Receiver specification	rectangular	±1.0
Antenna directivity	rectangular	±0.1
Antenna factor variation with height	rectangular	±2.0
Antenna factor frequency interpolation	rectangular	±0.1
Measurement distance variation	rectangular	±0.2
Site Imperfections	rectangular	±1.5
Combined standard uncertainty $u_c(y)$ is		

$$U_c(y) = \pm \sqrt{\left[\frac{1.0}{2}\right]^2 + \left[\frac{0.2}{2}\right]^2 + \left[\frac{1.0^2 + 0.1^2 + 2.0^2 + 0.1^2 + 0.2^2 + 1.5^2}{3}\right]}$$

$$U_c(y) = \pm 1.6 \text{ dB}$$

It is probable that $u_c(y) / s(q_k) > 3$, where $s(q_k)$ is estimated standard deviation from a sample of n readings unless the repeatability of the EUT is particularly poor, and a coverage factor of $k = 2$ will ensure that the level of confidence will be approximately 95%, therefore:

$$s(q_k) = \sqrt{\frac{1}{(n-1)} \sum_{k=1}^n (q_k - \bar{q})^2}$$

$$U = 2 U_c(y) = 2 \times \pm 1.6 \text{ dB} = \pm 3.2 \text{ dB}$$

Notes:

- 1.1 Uncertainties for the antenna and cable were estimated, based on a normal probability distribution with $k = 2$.
- 1.2 The receiver uncertainty was obtained from the manufacturer's specification for which a rectangular distribution was assumed.
- 1.3 The antenna factor uncertainty does not take account of antenna directivity.
- 1.4 The antenna factor varies with height and since the height was not always the same in use as when the antenna was calibrated an additional uncertainty is added.
- 1.5 The uncertainty in the measurement distance is relatively small but has some effect on the received signal strength. The increase in measurement distance as the antenna height is increased is an inevitable consequence of the test method and is therefore not considered a contribution to uncertainty.
- 1.6 Site imperfections are difficult to quantify but may include the following contributions:
 - Unwanted reflections from adjacent objects.
 - Ground plane imperfections: reflection coefficient, flatness, and edge effects.
 - Losses or reflections from "transparent" cabins for the EUT or site coverings.
 - Earth currents in antenna cable (mainly effect Biconical antennas).



The specified limits for the difference between measured site attenuation and the theoretical value (± 4 dB) were not included in total since the measurement of site attenuation includes uncertainty contributions already allowed for in this budget, such as antenna factor.

Conducted Measurements Uncertainty Calculation

Measurement of conducted emissions over the frequency range 9 kHz to 30 MHz includes following uncertainty:

Contribution	Probability Distribution	Uncertainty (dB)
Receiver specification	rectangular	± 1.5
LISN coupling specification	rectangular	± 1.5
Cable and input attenuator calibration	normal (k=2)	± 0.5

Combined standard uncertainty $u_c(y)$ is

$$U_c(y) = \pm \sqrt{\left[\frac{0.5}{2}\right]^2 + \frac{1.5^2 + 1.5^2}{3}}$$

$$U_c(y) = \pm 1.2 \text{ dB}$$

As with radiated field strength uncertainty, it is probable that $u_c(y) / s(q_k) > 3$ and a coverage factor of $k = 2$ will suffice, therefore:

$$U = 2 U_c(y) = 2 \times \pm 1.2 \text{ dB} = \pm 2.4 \text{ dB}$$



Annex B Rogers Labs Test Equipment List

The test equipment is maintained in calibration and good operating condition. Use of this calibrated equipment ensures measurements are traceable to national standards.

List of Test Equipment	Calibration Date
Spectrum Analyzer: Rohde & Schwarz ESU40	5/11
Spectrum Analyzer: HP 8562A, HP Adapters: 11518, 11519, and 11520 Mixers: 11517A, 11970A, 11970K, 11970U, 11970V, 11970W	5/11
Spectrum Analyzer: HP 8591EM	5/11
Antenna: EMCO Biconilog Model: 3143	5/11
Antenna: Sunol Biconilog Model: JB6	10/10
Antenna: EMCO Log Periodic Model: 3147	10/10
Antenna: Antenna Research Biconical Model: BCD 235	10/10
LISN: Compliance Design Model: FCC-LISN-2.Mod.cd, 50 µHy/50 ohm/0.1 µf	10/10
R.F. Preamp CPPA-102	10/10
Attenuator: HP Model: HP11509A	10/10
Attenuator: Mini Circuits Model: CAT-3	10/10
Attenuator: Mini Circuits Model: CAT-3	10/10
Cable: Belden RG-58 (L1)	10/10
Cable: Belden RG-58 (L2)	10/10
Cable: Belden 8268 (L3)	10/10
Cable: Time Microwave: 4M-750HF290-750	10/10
Cable: Time Microwave: 10M-750HF290-750	10/10
Frequency Counter: Leader LDC825	2/11
Oscilloscope Scope: Tektronix 2230	2/11
Wattmeter: Bird 43 with Load Bird 8085	2/11
Power Supplies: Sorensen SRL 20-25, SRL 40-25, DCR 150, DCR 140	2/11
R.F. Generators: HP 606A, HP 8614A, HP 8640B	2/11
R.F. Power Amp 65W Model: 470-A-1010	2/11
R.F. Power Amp 50W M185- 10-501	2/11
R.F. Power Amp A.R. Model: 10W 1010M7	2/11
R.F. Power Amp EIN Model: A301	2/11
LISN: Compliance Eng. Model 240/20	2/11
LISN: Fischer Custom Communications Model: FCC-LISN-50-16-2-08	2/11
Antenna: EMCO Dipole Set 3121C	2/11
Antenna: C.D. B-101	2/11
Antenna: Solar 9229-1 & 9230-1	2/11
Antenna: EMCO 6509	2/11
Audio Oscillator: H.P. 201CD	2/11
Peavey Power Amp Model: IPS 801	2/11
ELGAR Model: 1751	2/11
ELGAR Model: TG 704A-3D	2/11
ESD Test Set 2010i	2/11
Fast Transient Burst Generator Model: EFT/B-101	2/11
Field Intensity Meter: EFM-018	2/11
KEYTEK Ecat Surge Generator	2/11
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. 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:

- 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.



NVLAP Lab Code 200087-0

Annex D FCC Test Site Registration Letter

FEDERAL COMMUNICATIONS COMMISSION

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

May 18, 2010

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: May 18, 2010

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 under E-Filing, OET Equipment Authorization Electronic Filing, Test Firms.

Sincerely,

Phyllis Farrish
Industry Analyst

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

Zebo Trending and Communications
Model: Sensor SV1.1
Test #:110518T SN: ENG1
Test to: FCC Parts 2 and 15.249, RSS-210
File: Zebo Sensor SV1_1 TstRpt 110725

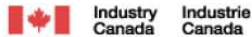
FCC ID#: ZQQ-SV11

Date: July 28, 2011
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NVLAP Lab Code 200087-0

Annex E Industry Canada Test Site Registration Letter



May 26, 2010

OUR FILE: 46405-3041
Submission No: 140719

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

Attention: Mr. Scot D. Rogers

Dear Sir/Madame:

The Bureau has received your application for the renewal of a 3/10m 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 (**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;

- Your primary code is: **3041**
- The company number 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 C63.4-2003 or later. A scope of accreditation indicating the accreditation by a recognized accreditation body to ANSI C63.4-2003 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 C63.4-2003 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 two 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.

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

Yours sincerely,

Dalwinder Gill
For: Wireless Laboratory Manager
Certification and Engineering Bureau
3701 Carling Ave., Building 94
P.O. Box 11490, Station "H"
Ottawa, Ontario K2H 8S2
Email: dalwinder.gill@ic.gc.ca
Tel. No. (613) 998-8363
Fax. No. (613) 990-4752

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

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FCC ID#: ZQQ-SV11
Date: July 28, 2011
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