NVLAP Lab Code 200087-0

SUBMITTAL APPLICATION REPORT

FOR

FCC And INDUSTRY CANADA GRANT OF CERTIFICATION

FOR

Model: 9060 Wireless Keypad
903 – 927.1 MHz Low Power Transmitter

FCC ID: CCKPC0126
IC: 5251A-PC0126

FOR

DIGITAL MONITORING PRODUCTS, INC.

2500 North Partnership Boulevard
Springfield, MO 65802-6310

Test Report Number: 100223

Authorized Signatory: Scot D Rogers
Scot D. Rogers

NVLAP Lab Code 200087-0

ROGERS LABS, INC.

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

Engineering Test Report Application for Grant of Certification

FOR

CFR 47, PART 15C - Intentional Radiators
Paragraph 15.249 and Industry Canada, RSS-210
Low Power Transmitter

For

DIGITAL MONITORING PRODUCTS, INC.
2500 North Partnership Boulevard
Springfield, MO 65802-6310
Terry Shelton,

Model: 9060 Wireless Keypad

Frequency 903 – 927.1 MHz
FCC ID#: CCKPC0126, IC: 5251A-PC0126

Test Date: February 23, 2010

Certifying Engineer: Scot D Rogers

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

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The following information is submitted for consideration in obtaining Grant of Certification for a Low Power intentional radiator operating under CFR 47 Paragraph 15.249 and Industry Canada standard RSS-210.

Name of Applicant: Digital Monitoring Products, Inc.
2500 North Partnership Boulevard
Springfield, MO 65802-6310

Model: 9060 Wireless Keypad

FCC I.D.: CCKPC0126 IC: 5251A-PC0126

Frequency Range: 903-927.1 MHz.

Operating Power: 92.9 dBμV/m @ 3-meters (3- meter radiated measurement)

Occupied Band Width 102.5 kHz

Applicable Standards & Test Procedures

In accordance with the Federal Communications Commission, Code of Federal Regulations CFR 47, dated October 1, 2009, Part 2, Subpart J, Paragraphs 2.907, 2.911, 2.913, 2.925, 2.926, 2.1031 through 2.1057, applicable parts of paragraph 15, Part 15C paragraph 15.249, and RSS-210 the following information is submitted for consideration in obtaining grant of certification. Test procedures used are the established Methods of Measurement of Radio-Noise Emissions as described in the ANSI 63.4-2003 Document.

Opinion / Interpretation of Results

Tests Performed	Results
Emissions Tests	
Emissions as per CFR 47 paragraphs 2 and 15.205	Complies
Emissions as per CFR 47 paragraphs 2 and 15.209	Complies
Emissions as per CFR 47 paragraphs 2 and 15.249	Complies
Emissions as per RSS-210	Complies

Summary of Results

Test Performed	Margin (dB)	Results
Antenna requirement	N/A	Complies
Radiated Emissions in Restricted Bands	14.8	Complies
AC Line Conducted Emissions	30.2	Complies
General Radiated Emissions	12.2	Complies
Transmitter Emissions	1.1	Complies

Environmental Conditions

Ambient Temperature 21.1° C

Relative Humidity 18%

Atmospheric Pressure 1025.5 mb

Units of Measurements

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

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

Test Site Locations

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 Registration Refer to Annex for FCC Site Registration Letter, # 90910 and Industry Canada Registration Letter reference 3041A

NVLAP Lab code 200087-0

List of Test Equipment

A Rohde and Schwarz ESU40, Hewlett Packard 8591EM and or 8562A Spectrum Analyzer was used as the measuring equipment for emissions testing. The analyzer settings used are described in the following table. Refer to the annex for a complete list of Test Equipment.

Spectrum Analyzer Settings		
Conducted Emissions		
RBW	AVG. BW	Detector Function
9 kHz	30 kHz	Peak/Quasi Peak
Radiated Emissions (30 – 1000 MHz)		
RBW	AVG. BW	Detector Function
120 kHz	300 kHz	Peak/Quasi Peak
Spectrum Analyzer Settings		
Radiated Emissions (1 – 40 GHz)		
RBW	AVG. BW	Detector Function
1 MHz	1 MHz	Peak/Average
Antenna Conducted Emissions		
RBW	AVG. BW	Detector Function
120 kHz	300 kHz	Peak

Equipment	Manufacturer	Model	Calibration Date	Due
LISN	Comp. Design	FCC-LISN-2-MOD.CD	10/09	10/10
Antenna	ARA	BCD-235-B	10/09	10/10
Antenna	EMCO	3147	10/09	10/10
Antenna	EMCO	3143	5/09	5/10
Analyzer	HP	8591EM	5/09	5/10
Analyzer	HP	8562A	5/09	5/10
Analyzer	Rohde & Schwarz	ESU40	2/09	2/10

Application for Certification

(1) Manufacturer: Digital Monitoring Products, Inc.

2500 North Partnership Boulevard

Springfield, MO 65802-6310

(2) Identification: Model: 9060 Wireless Keypad

FCC I.D.: CCKPC0126

IC: 5251A-PC0126

(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.

Statement of Modifications and Deviations

No modifications to the EUT were required for the equipment to demonstrate compliance with the FCC CFR 47 Part 15C and Industry Canada RSS-210 Emissions Standards. There were no deviations to the specifications.

Equipment Tested

Equipment	Model	FCC ID	IC
EUT	9060 Wireless Keypad	CCKPC0126	5251A-PC0126

Equipment Function and Testing Setup Configuration

The 9060 Wireless Keypad is a control point for use in alarm panel installation environments. The EUT incorporates a 902-928 MHz radio transmitter used to wirelessly interface with remote sensors offering state/alarm conditions in alarm system installation. The EUT communicates with other compliant equipment. The unit is marketed for use to incorporate a wireless link in an alarm system solution. Test software was installed in the test sample allowing for special testing requirements and purposes. The modified software allowed the transmitter to be set to transmit on channels dependant on activation of key press incorporated in the EUT. The unit operates on 12 volts DC. An AC/DC power adapter was supplied for testing purposes. The design offers provision to interface with other compliant alarm panel components.

Emissions Test Procedures

AC Line Conducted Emission Test Procedure

Testing for the AC line-conducted emissions was performed as defined in sections 7.2.4 and 13 of ANSI C63.4. The test setup, including the EUT, was arranged in the test configurations as shown above and placed on a 1 x 1.5-meter wooden 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-µHy choke. EMI was coupled to the spectrum analyzer through a 0.1 µF 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 photographs in exhibits for EUT placement used during testing.

Radiated Emission Test Procedure

Testing of radiated emissions was performed as defined in section 8 of ANSI C63.4. 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 photographs in the exhibits for EUT placement.

Subpart C - Intentional Radiators

As per CFR 47 Part 15, Subpart C, paragraphs 15.203, 15.205, 15.209, 15.249 and RSS-210 the following information is submitted.

Antenna Requirements

The unit is produced with a permanently attached antenna inside the plastic case. No provisions for modification or alterations of the antenna configuration are available to the end user. The requirements of 15.203 are met 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 investigated at the OATS, using appropriate antennas or pyramidal horns, amplification stages, and 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 63.4-2003 paragraphs 13.1 and 8.3.1.2 were used during testing. No other significant emission was observed which fell into the restricted bands of operation. Computed emission values take into account the received radiated field strength, receive antenna correction factor, amplifier gain stage, and test system cable losses.

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

Radiated Emissions Data in Restricted Bands

Frequency in MHz	FSM Horz. (dBμV)	FSM Vert. (dBμV)	A.F. (dB/m)	Amp. Gain (dB)	RFS Horz. @ 3m (dBμV/m)	RFS Vert. @ 3m (dBμV/m)	FCC Class B Limit @ 3m (dBμV/m)
2709.9	16.2	27.8	28.1	25.0	19.3	30.9	54.0
2745.0	18.2	16.8	28.1	25.0	21.3	19.9	54.0
2781.3	17.0	19.8	28.1	25.0	20.1	22.9	54.0
3613.2	22.2	16.5	30.5	25.0	27.7	22.0	54.0
3660.0	21.6	23.8	30.5	25.0	27.1	29.3	54.0
3708.4	15.8	19.9	30.5	25.0	21.3	25.4	54.0
4516.5	28.8	27.8	32.5	25.0	36.3	35.3	54.0
4575.0	29.6	28.4	32.5	25.0	37.1	35.9	54.0
4635.5	31.7	27.0	32.5	25.0	39.2	34.5	54.0
5419.8	25.4	28.8	33.1	25.0	33.5	36.9	54.0
7320.0	20.1	17.4	36.7	25.0	31.8	29.1	54.0
7416.8	9.5	17.5	36.7	25.0	21.2	29.2	54.0
8129.7	11.5	12.1	36.6	25.0	23.1	23.7	54.0
8235.0	15.2	12.5	36.6	25.0	26.8	24.1	54.0
8343.9	16.3	14.5	36.6	25.0	27.9	26.1	54.0

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

Summary of Results for Radiated Emissions in Restricted Bands

The EUT demonstrated compliance with radiated emissions requirements of FCC Part 15C and RSS-210 Intentional Radiators. The EUT presented with 14.8 dB minimum margin below the limits. Both average and peak amplitudes above 1000 MHz were investigated for compliance with the regulations. No other emissions where found in the restricted frequency bands. Other emissions were present with amplitudes at least 20 dB below the Limits.

AC Line Conducted emissions limits; general requirements

AC Line Conducted Emissions Testing

The EUT was arranged in typical equipment configurations (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 63.4-2003 paragraphs 13.1.3 and 7.2.4. 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 μF 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 had 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 and two showing plots of the worst-case AC Line conducted emissions frequency spectrum taken in the screen room.

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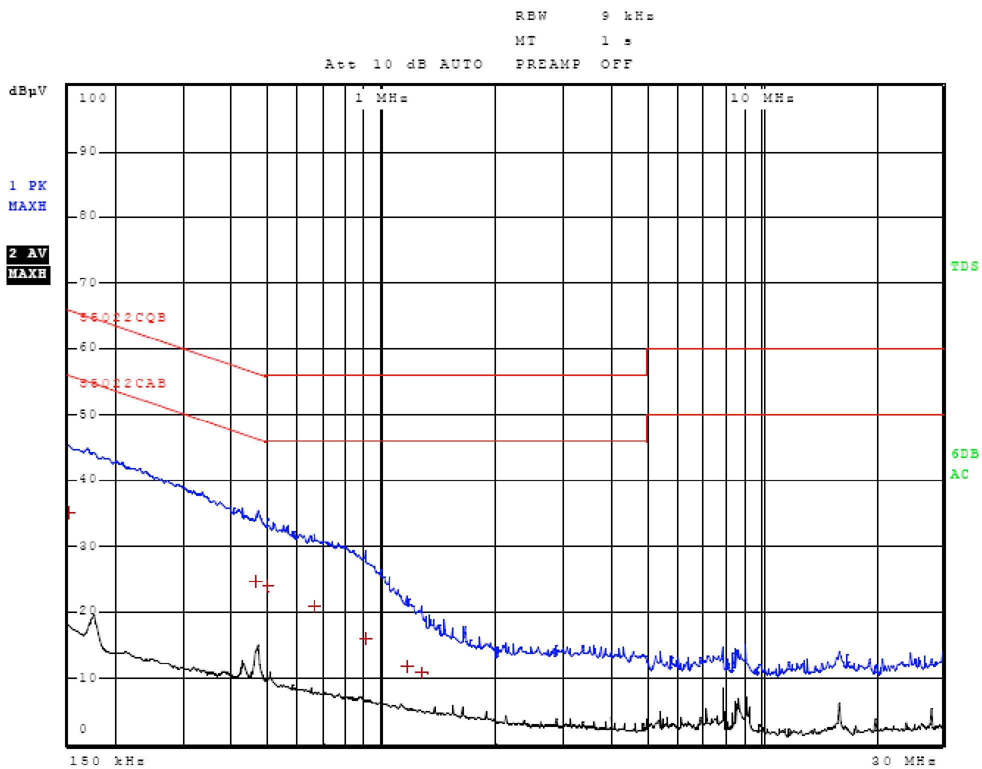

Figure One AC Line Conducted emissions of EUT line 1

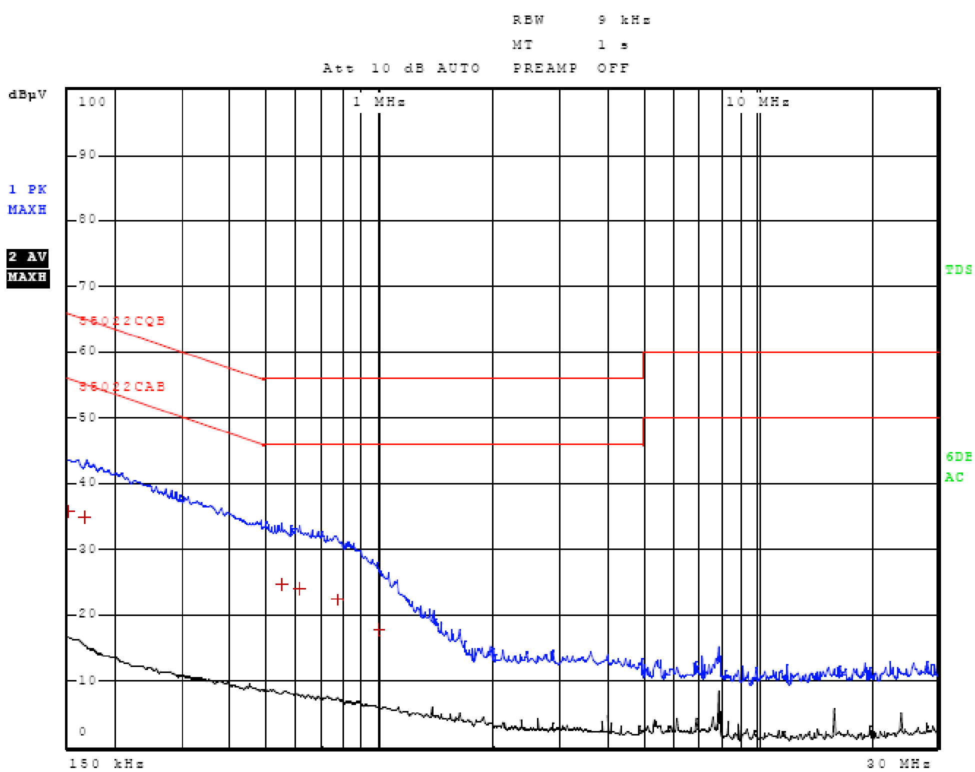

Figure Two AC Line Conducted emissions of EUT line 2

Data, AC Line Conducted Emissions

Line 1

Trace	Frequency	Level (dBµV)	Detector	Delta Limit/dB
1	150.000000000 kHz	35.12	Quasi Peak	-30.88
1	466.000000000 kHz	24.77	Quasi Peak	-31.82
1	498.000000000 kHz	23.98	Quasi Peak	-32.05
1	658.000000000 kHz	20.83	Quasi Peak	-35.17
1	902.000000000 kHz	16.10	Quasi Peak	-39.90
1	1.158000000 MHz	11.77	Quasi Peak	-44.23
1	1.270000000 MHz	10.85	Quasi Peak	-45.15

Line 2

Trace	Frequency	Level (dBµV)	Detector	Delta Limit/dB
1	150.000000000 kHz	35.74	Quasi Peak	-30.26
1	166.000000000 kHz	34.88	Quasi Peak	-30.28
1	546.000000000 kHz	24.61	Quasi Peak	-31.39
1	610.000000000 kHz	24.06	Quasi Peak	-31.94
1	766.000000000 kHz	22.36	Quasi Peak	-33.64
1	990.000000000 kHz	17.74	Quasi Peak	-38.26

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

Summary of Results for AC Line Conducted Emissions

The EUT demonstrated compliance with the conducted emissions requirements of CFR 47 Part 15C and other applicable standards for Intentional Radiators. The EUT worst-case configuration demonstrated minimum margin of 30.2 dB below the CFR 47 limits. Other emissions were present with recorded data representing the worst-case amplitudes.

Radiated Emissions Testing Procedure

The EUT was arranged in a typical equipment configuration and operated through all available modes with worst-case data recorded. 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 12,000 MHz for the preliminary testing. Refer to figures three through seven for plots of the radiated emissions spectrum taken in a screen room. The highest 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 12,000 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 Biconical from 30 to 200 MHz, Biconilog from 30 to 1000 MHz, Log Periodic from 200 MHz to 5 GHz and or, pyramidal horns and mixers from 4 GHz to 30 GHz, notch filters and appropriate amplifiers were utilized.

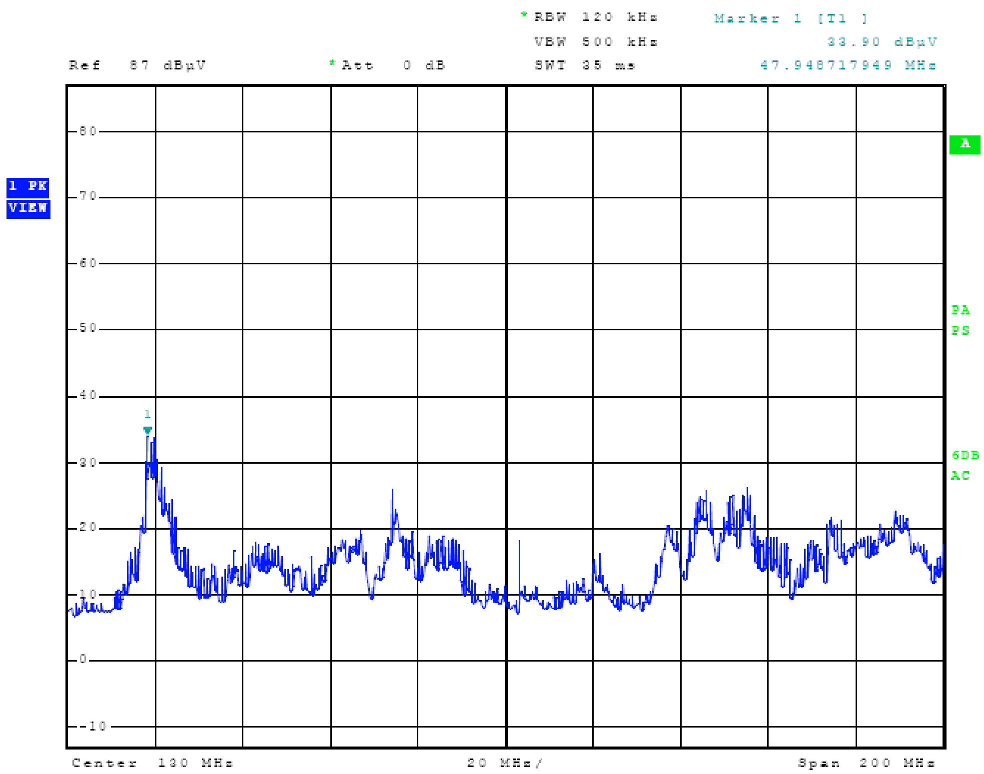

Figure Three General Radiated Emissions taken at 1 meter in screen room

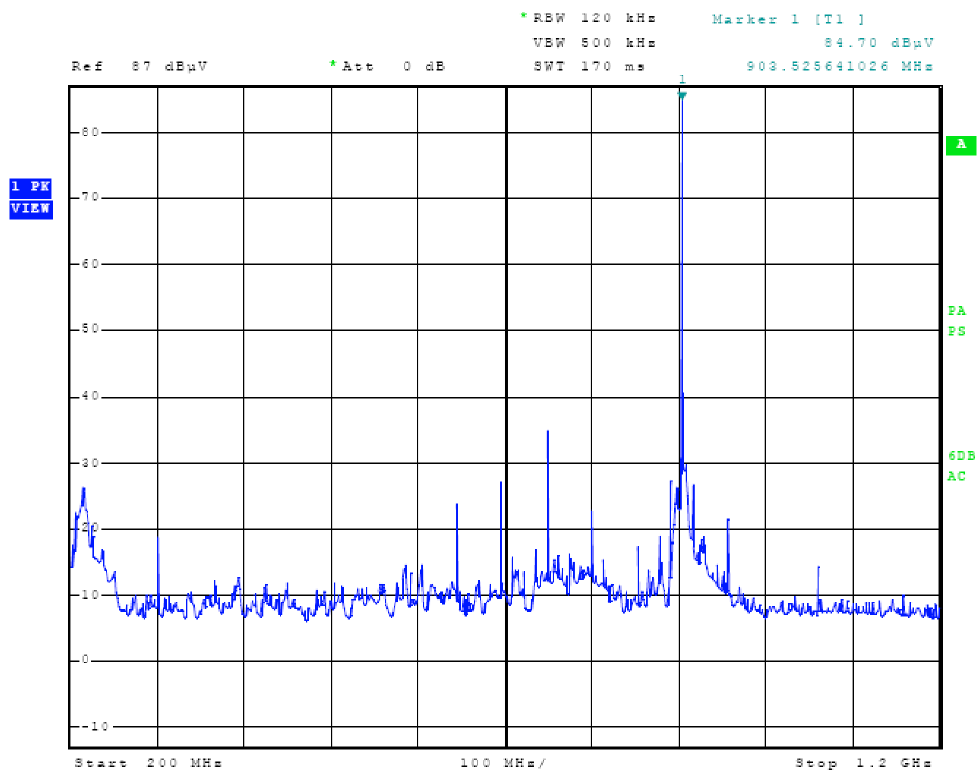

Figure Four General Radiated Emissions taken at 1 meter in screen room

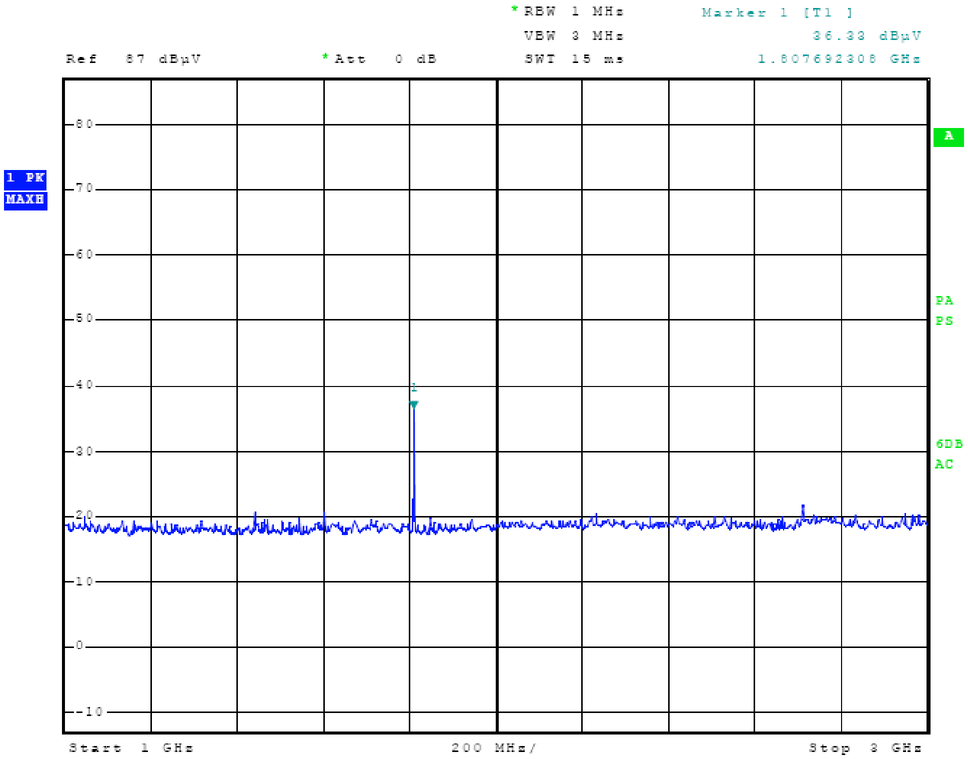

Figure Five General Radiated Emissions taken at 1 meter in screen room

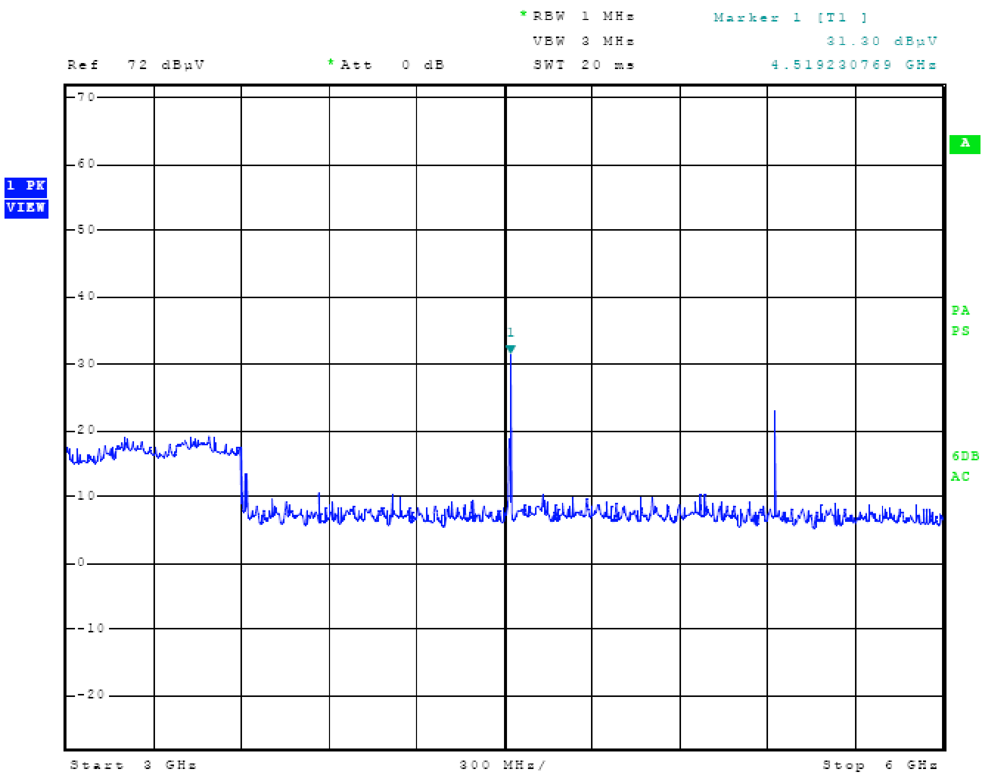

Figure Six General Radiated Emissions taken at 1 meter in screen room

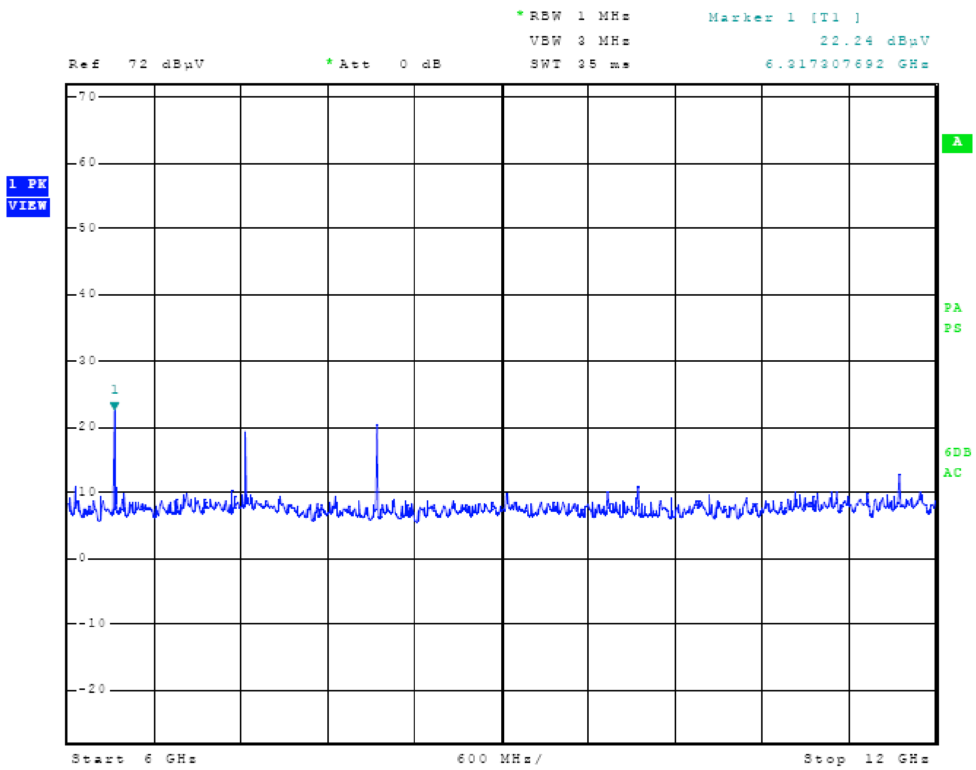

Figure Seven General Radiated Emissions taken at 1 meter in screen room

Data, General Radiated Emissions

Frequency in MHz	FSM Horz. (dBµV)	FSM Vert. (dBµV)	A.F. (dB/m)	Amp. Gain (dB)	RFS Horz. @ 3m (dBµV/m)	RFS Vert. @ 3m (dBµV/m)	FCC Class B Limit @ 3m (dBµV/m)
47.4	47.3	49.4	6.6	30	23.9	26.0	40.0
48.2	48.1	49.8	6.6	30	24.7	26.4	40.0
48.9	49.0	45.7	6.6	30	25.6	22.3	40.0
49.3	48.9	46.3	6.6	30	25.5	22.9	40.0
54.0	45.0	49.6	5.2	30	20.2	24.8	40.0
97.0	39.1	51.1	7.3	30	16.4	28.4	43.5
97.8	44.8	54.0	7.3	30	22.1	31.3	43.5
99.4	37.0	47.4	7.2	30	14.2	24.6	43.5
205.5	38.7	34.7	10.5	30	19.2	15.2	43.5
206.2	38.9	34.7	10.5	30	19.4	15.2	43.5
5419.0	33.3	31.8	33.1	30	36.4	34.9	54.0

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

Summary of Results for General Radiated Emissions

The EUT demonstrated compliance with radiated emissions requirements for CFR 47 Part 15C, and Industry Canada requirements. The EUT presented with 12.2 dB minimum margin below the limit. Other emissions were present with amplitudes at least 20 dB below the limit.

Operation in the Band 902-928 MHz

The power output was measured on an open area test site @ 3 meters. Test procedures of ANSI 63.4-2003 paragraphs 13.1 and 8.3.1.2 were used during testing. The EUT was placed on a wooden turntable 0.8 meters above the ground plane and at a distance of 3 meters from the FSM antenna. 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. The amplitude of the emission was then recorded from the analyzer display. Emissions radiated outside of the specified bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in 15.209, whichever is the lesser attenuation. Refer to figures eight through eleven demonstrating compliance with operation in the 902-928 MHz frequency band. The amplitudes of each radiated spurious emission were measured at the OATS at a distance of 3 meters from the FSM antenna. The amplitude of each radiated spurious emission was maximized by varying the FSM antenna height, polarization, and by rotating the turntable. A Biconilog Antenna was used for measuring emissions from 30 to 1000 MHz, a Log Periodic Antenna for 200 to 5000 MHz, and Double-ridge horn and/or Pyramidal Horn Antennas from 4 GHz to 25 GHz. Emissions were measured in dBμV/m @ 3 meters.

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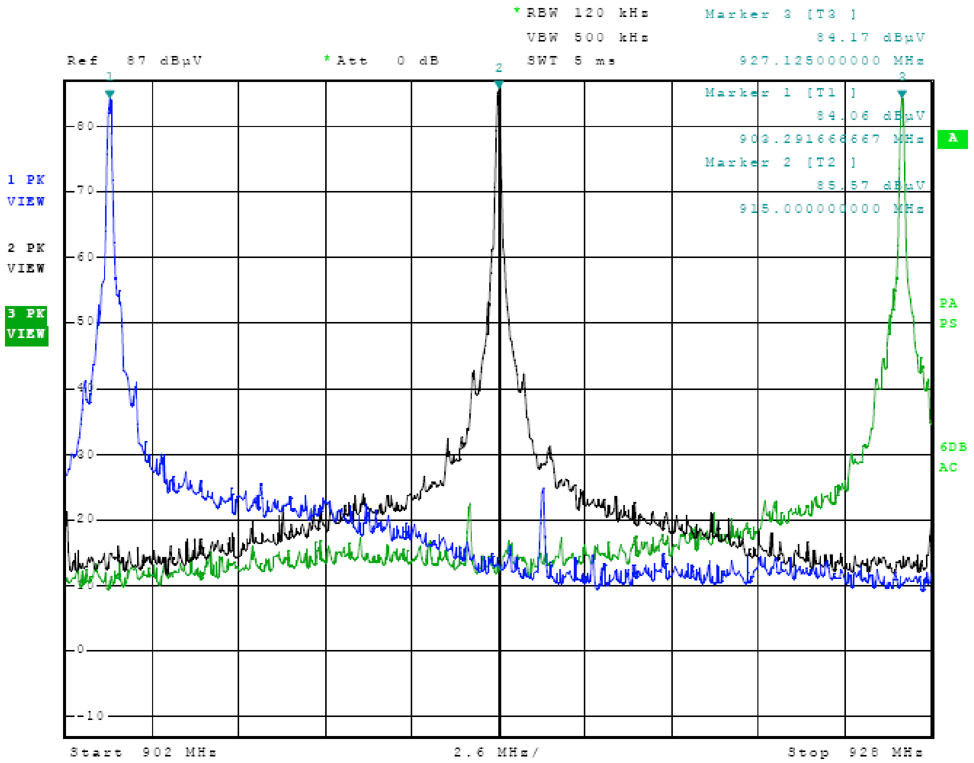

Figure Eight Output power across band

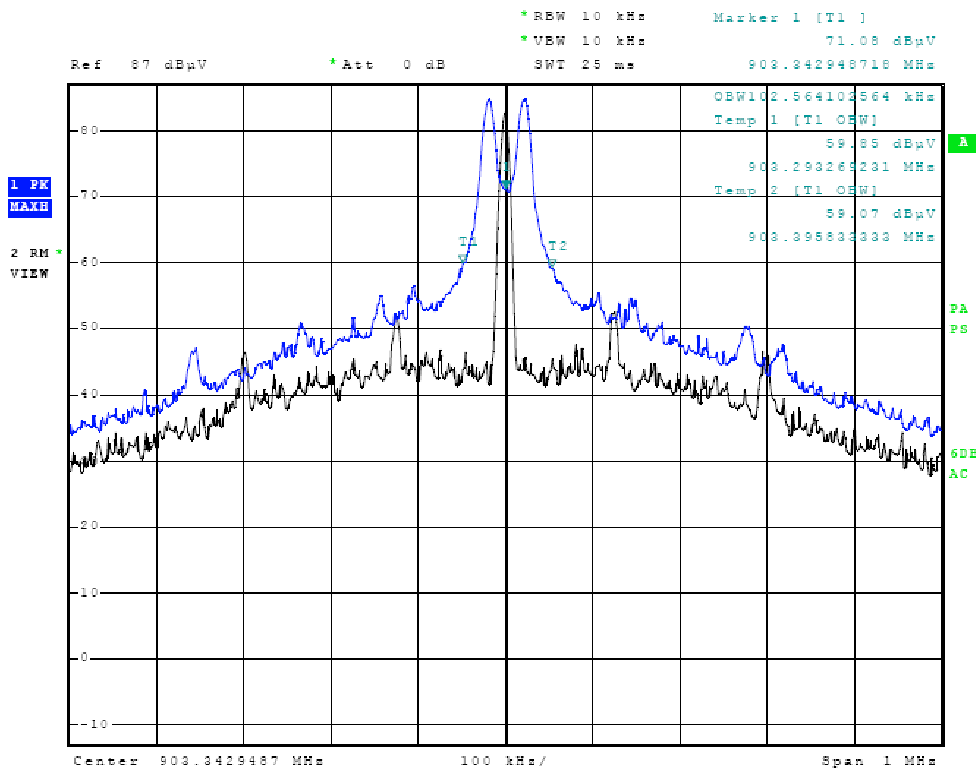

Figure Nine Occupied Bandwidth (Low Channel)

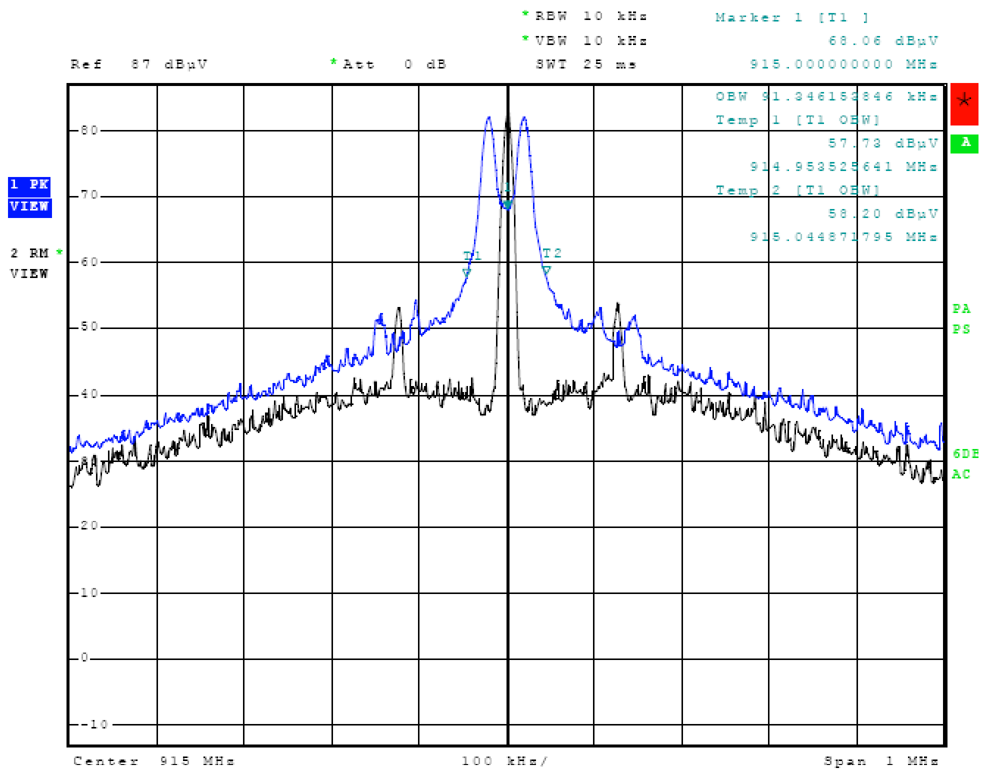

Figure Ten Occupied Bandwidth (Mid Channel)

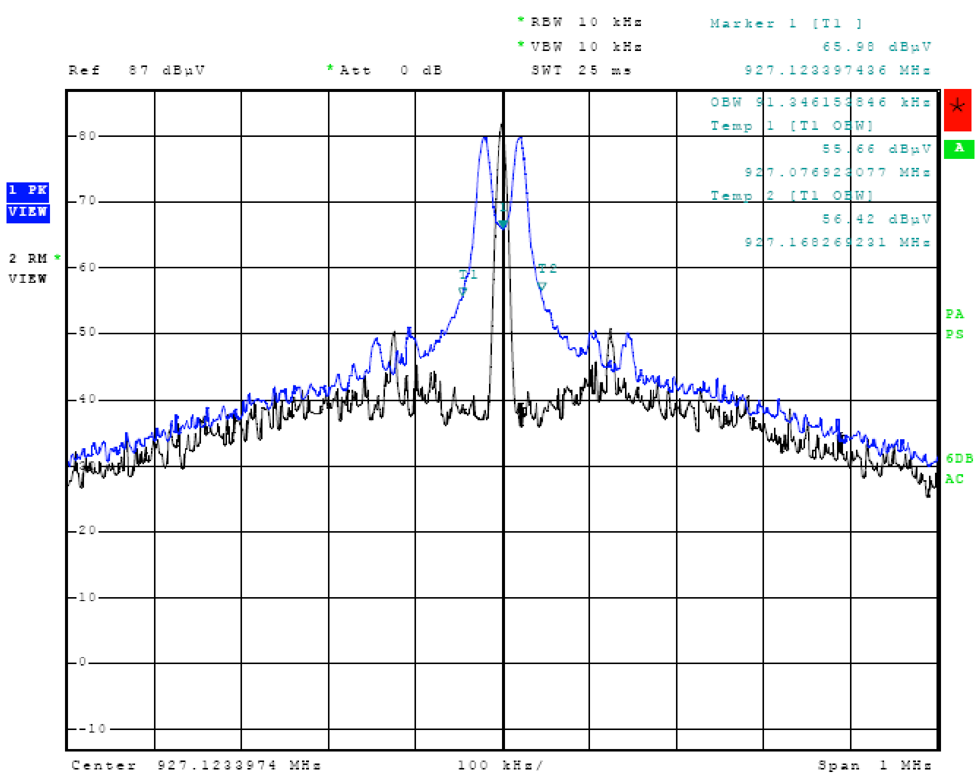

Figure Eleven Occupied Bandwidth (High Channel)

Data Transmitter Radiated Emissions

Frequency	FSM Hor	FSM Vert	AF	Amp Gain	CFS @ 3 m Hor	CFS @ 3 m Vert	Limit
903.3	99.5	97.6	23.4	30	92.9	91.0	94
1806.6	35.9	41.7	29.4	25	40.3	46.1	54.0
2709.9	16.2	27.8	28.1	25	19.3	30.9	54.0
3613.2	22.2	16.5	30.5	25	27.7	22.0	54.0
4516.5	28.8	27.8	32.5	25	36.3	35.3	54.0
5419.8	25.4	28.8	33.1	25	33.5	36.9	54.0
6323.1	24.5	22.1	34.2	25	33.7	31.3	54.0
7226.4	18.5	17.8	36.7	25	30.2	29.5	54.0
915.0	99.5	98.5	23.4	30	92.9	91.9	94
1830.0	35.6	37.0	29.3	25	39.9	41.3	54.0
2745.0	18.2	16.8	28.1	25	21.3	19.9	54.0
3660.0	21.6	23.8	30.5	25	27.1	29.3	54.0
4575.0	29.6	28.4	32.5	25	37.1	35.9	54.0
5490.0	24.5	24.9	33.1	25	32.6	33.0	54.0
6405.0	24.2	22.7	34.2	25	33.4	31.9	54.0
7320.0	20.1	17.4	36.7	25	31.8	29.1	54.0
927.1	96.6	95.4	23.4	30	90.0	88.8	94
1854.2	41.4	39.9	29.4	25	45.8	44.3	54.0
2781.3	17.0	19.8	28.1	25	20.1	22.9	54.0
3708.4	15.8	19.9	30.5	25	21.3	25.4	54.0
4635.5	31.7	27.0	32.5	25	39.2	34.5	54.0
5562.6	28.4	26.6	33.1	25	36.5	34.7	54.0
6489.7	25.9	22.0	34.2	25	35.1	31.2	54.0
7416.8	9.5	17.5	36.7	25	21.2	29.2	54.0

Note: Levels measured @ 3-meter OATS site

Summary of Results for Transmitter Radiated Emissions

The EUT demonstrated compliance with the radiated emissions requirements of CFR 47 Part 15.249, RSS-210 and other applicable standards for Intentional Radiators. The EUT demonstrated compliance for the transmitter fundamental with a margin of 1.1 dB below the limit. The EUT worst-case configuration demonstrated minimum radiated harmonic emission margin of 7.9 dB below the limits. No other radiated emissions were found in the restricted bands less than 20 dB below limits than those recorded in this report. Other emissions were present with amplitudes at least 20 dB below the Limits.

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

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 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:

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

$U = 2\,U_c(y) = 2 \times \pm 1.6$ dB $= \pm 3.2$ 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

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

$U_c(y) = \pm 1.2$ 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:

$U = 2\, U_c(y) = 2 \times \pm 1.2$ dB $= \pm 2.4$ dB

Annex B Rogers Labs Test Equipment List

The test equipment used 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
Oscilloscope Scope: Tektronix 2230	2/09
Wattmeter: Bird 43 with Load Bird 8085	2/09
Power Supplies: Sorensen SRL 20-25, SRL 40-25, DCR 150, DCR 140	2/09
H/V Power Supply: Fluke Model: 408B (SN: 573)	2/09
R.F. Generator: HP 606A	2/09
R.F. Generator: HP 8614A	2/09
R.F. Generator: HP 8640B	2/09
Spectrum Analyzer: Rohde & Schwarz ESU40	2/09
Spectrum Analyzer: HP 8562A,	5/09
Mixers: 11517A, 11970A, 11970K, 11970U, 11970V, 11970W	
HP Adapters: 11518, 11519, 11520	
Spectrum Analyzer: HP 8591EM	5/09
Frequency Counter: Leader LDC825	2/09
Antenna: EMCO Biconilog Model: 3143	5/09
Antenna: EMCO Log Periodic Model: 3147	10/09
Antenna: Antenna Research Biconical Model: BCD 235	10/09
Antenna: EMCO Dipole Set 3121C	2/09
Antenna: C.D. B-101	2/09
Antenna: Solar 9229-1 & 9230-1	2/09
Antenna: EMCO 6509	2/09
Audio Oscillator: H.P. 201CD	2/09
R.F. Power Amp 65W Model: 470-A-1010	2/09
R.F. Power Amp 50W M185- 10-501	2/09
R.F. PreAmp CPPA-102	2/09
LISN 50 µHy/50 ohm/0.1 µf	10/09
LISN Compliance Eng. 240/20	2/09
LISN Fischer Custom Communications FCC-LISN-50-16-2-08	2/09
Peavey Power Amp Model: IPS 801	2/09
Power Amp A.R. Model: 10W 1010M7	2/09
Power Amp EIN Model: A301	2/09
ELGAR Model: 1751	2/09
ELGAR Model: TG 704A-3D	2/09
ESD Test Set 2010i	2/09
Fast Transient Burst Generator Model: EFT/B-101	2/09
Current Probe: Singer CP-105	2/09
Current Probe: Solar 9108-1N	2/09
Field Intensity Meter: EFM-018	2/09
KEYTEK Ecat Surge Generator	2/09

Annex C Rogers Qualifications

Scot D. Rogers, Engineer

Rogers Labs, Inc.

Mr. Rogers has approximately 17 years experience in the field of electronics. Six years working in the automated controls industry and 6 years working with the design, development and testing of radio communications and electronic equipment.

Positions Held

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

Electrical Engineer: Rogers Consulting Labs, Inc. 5 Years

Electrical Engineer: Rogers Labs, Inc. Current

Educational Background

Bachelor of Science Degree in Electrical Engineering from Kansas State University

Bachelor of Science Degree in Business Administration Kansas State University

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

Scot D Rogers

Scot D. Rogers

Annex D FCC Site Registration Letter

FEDERAL COMMUNICATIONS COMMISSION

Laboratory Division
7435 Oakland Mills Road
Columbia, MD 21046

June 18, 2008

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: June 18, 2008

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 Parrish
Industry Analyst

Annex E Industry Canada Site Registration Letter

Industry Canada Industrie Canada

July 29th, 2008

OUR FILE: 46405-3041
Submission No: 127059

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

Attention: Scot D. Rogers

Dear Sir/Madame:

The Bureau has received your application for the registration / 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 **(3040A-1).** Please reference the appropriate site number in the body of test reports containing measurements performed on the site. In addition, please be informed that the Bureau is now utilizing a **new site numbering scheme** in order to simplify the electronic filing process. Our goal is to reduce the number of secondary codes associated to one particular company. The following changes have been made to your records.

Your primary code is: **3041**
The company number associated to the site(s) located at the above address is: **3041A**
The table below is a summary of the changes made to the unique site registration number(s):

New Site Number	Obsolete Site Number	Description of Site	Expiry Date (YYYY-MM-DD)
3041A-1	3041-1	3 / 10m OATS	2010-07-29

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 shall be accepted. Please indicate in a letter the previous assigned site number if applicable and the type of site (example: 3 meter OATS or 3 meter 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;

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,

S. Proulx Wireless Laboratory
Manager Certification and
Engineering Bureau Industry Canada
3701 Carling Ave., Building 94
Ottawa, Ontario K2H 8S2
Canada

Canada