NVLAP Lab Code 200087-0

SUBMITTAL APPLICATION REPORT

FOR
FCC And INDUSTRY CANADA GRANT OF CERTIFICATION

FOR

Model: DWM1000-ICT
902.9 - 927 MHz FHSS Transmitter

FCC ID: WPZ-DWMICT1
IC: 7945A-DWMICT1

FOR

DIGITAL ALLY, INC.
7304 West 130th, Suite 290
Overland, Park, KS 66213

Test Report Number: 080930ICT

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
FOR
APPLICATION of
GRANT of CERTIFICATION

FOR

CFR47, PART 15C - INTENTIONAL RADIATORS
Paragraph 15.247 and Industry Canada, RSS-210
Frequency Hopping Spread Spectrum Transmitter

For

DIGITAL ALLY, INC.
7304 West 130th, Suite 290
Overland, Park, KS 66213
Jeff Burgess
Engineering Manager

Model: DWM1000-ICT

Frequency 902.9-927 MHz
FCC ID#: WPZ-DWMICT1, IC: 7945A-DWMICT1

Test Date: September 30, 2008

Certifying Engineer: Scot D Rogers

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

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Table of Contents

Forward

The following information is submitted for consideration in obtaining Grant of Certification for frequency hopping spread spectrum intentional radiator operating under CFR47 Paragraph 15.247 and Industry Canada standard RSS-210.

Name of Applicant:

Digital Ally, Inc.
7304 West 130th, Suite 290
Overland, Park, KS 66213

Model: DWM1000-ICT wireless transceiver

FCC I.D.: WPZ-DWMICT1 IC: 7945A-DWMICT1

Frequency Range: 902.99-927 MHz

Operating Power: 30 dBm antenna port conducted power, 120.1 dBµV/m @ 3-meters (3-meter radiated measurement)

Opinion / Interpretation of Results

Tests Performed	Results
Emissions Tests	
Emissions as per CFR47 paragraphs 2 and 15.205	Complies
Emissions as per CFR47 paragraphs 2 and 15.209	Complies
Emissions as per CFR47 paragraphs 2 and 15.247, and RSS-210	Complies

Environmental Conditions

Ambient Temperature	23.3° C
Relative Humidity	45%
Atmospheric Pressure	29.85 in Hg

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.

2.1033(b) Application for Certification

(1) Manufacturer: Digital Ally, Inc.

7304 West 130th, Suite 290

Overland, Park, KS 66213

(2) Identification: Model: DWM1000-ICT Wireless Transceiver

FCC I.D.: WPZ-DWMICT1

IC: 7945A-DWMICT1

(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.

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 and Industry Canada Site Registration Letters

List of Test Equipment

A Hewlett Packard 8591EM Spectrum Analyzer was used as the measuring device for the emissions testing of frequencies below 1 GHz. A 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.

HP 8591 EM Analyzer Settings		
Conducted Emissions		
RBW	AVG. BW	Detector Function
9 kHz	30 kHz	Peak / Quasi Peak
Radiated Emissions		
RBW	AVG. BW	Detector Function
120 kHz	300 kHz	Peak / Quasi Peak
HP 8562A Analyzer Settings		
RBW	Video BW	Detector Function
100 kHz	100 kHz	Peak
1 MHz	1 MHz	Peak / Average

EQUIPMENT	MFG.	MODEL	CAL. DATE	DUE.
LISN	Comp. Design	FCC-LISN-2-MOD.CD	10/07	10/08
LISN	Comp. Design	1762	2/08	2/09
Antenna	ARA	BCD-235-B	10/07	10/08
Antenna	EMCO	3147	10/07	10/08
Antenna	EMCO	3143	5/08	5/09
Analyzer	HP	8591EM	5/08	5/09
Analyzer	HP	8562A	5/08	5/09

Applicable Standards & Test Procedures

In accordance with the Federal Communications Code of Federal Regulations, dated October 1, 2007, 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 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 63.4-2003 Document FCC, documents DA00-1407 and DA00-705 and/or TIA/EIA 603-1.

AC Line Conducted Emission Test Procedure

The EUT operates solely from DC power and offers no provision to connect to utility AC power systems. Therefore no AC line conducted emissions testing required.

Radiated Emission Test Procedure

Testing for the unintentional 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.

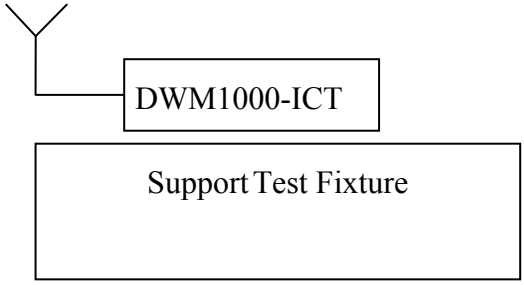
Equipment Tested

Equipment	Model	FCC ID	IC
EUT	DWM1000-ICT	WPZ-DWMICT1	7945A-DWMICT1
Stub antenna			
Magnet Mount Antenna 5dBi			
Magnet Mount Antenna 6dBi			

Equipment Function

The EUT is a 902.9-927 MHz radio transmitter used to wirelessly interface with remote compliant equipment offering communications and data information exchange in the law enforcement profession. The DWM1000-ICT is the central communications point for interfacing with remote complaint equipment in a professional environment. The unit is marketed for use to incorporate a wireless link in the law enforcement profession. The link offers remote officers the ability to communicate to the patrol vehicle mounted equipment while outside the vehicle. Test software was installed in a test sample allowing for special testing requirements and purposes. The modified software allowed the transmitter to be set to transmit and receive on channels for testing purposes. The equipment was placed on a testing interface enclosure allowing for control of the transmitter functions for testing purposes. This configuration represented the worst-case emissions profile for the equipment. The design offers the manufacturer the ability to incorporate the design into many patrol vehicle applications. The equipment operates from external DC power only.

Equipment Configuration



Subpart B – Unintentional Radiators

Radiated EMI

The unit typically receives power from the automotive DC wiring harness. For testing purposes the equipment was powered from batteries located inside the test fixture during testing. The EUT was arranged on a test fixture emulating a typical equipment configuration and placed on a 1 x 1.5-meter wooden bench 80 cm above the conducting ground plane, floor of a screen room. Preliminary testing was performed in a screen room with the EUT positioned 1 meter from the FSM. Radiated emissions measurements were performed to identify the frequencies, which produced the highest emissions. Plots were made of the frequency spectrum from 30 MHz to 22,000 MHz for the preliminary testing. Refer to figures one through seven showing 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, double ridge or pyramidal horns and mixers from 4 GHz to 40 GHz, notch filters and appropriate amplifiers were utilized.

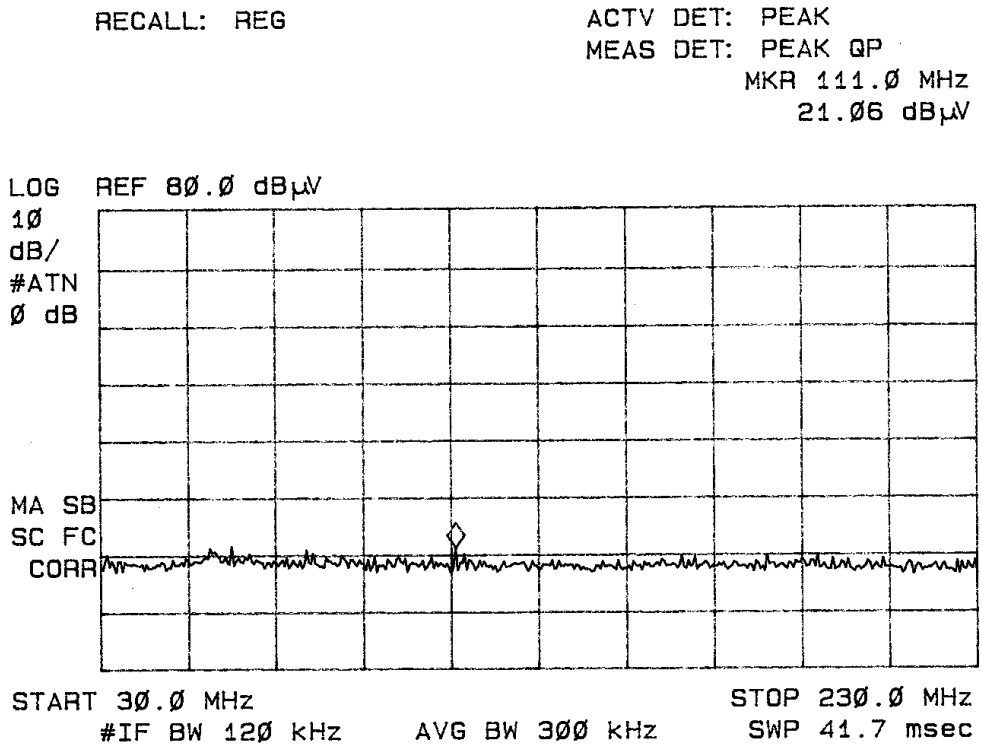


Figure one Plot of General Radiated Emissions

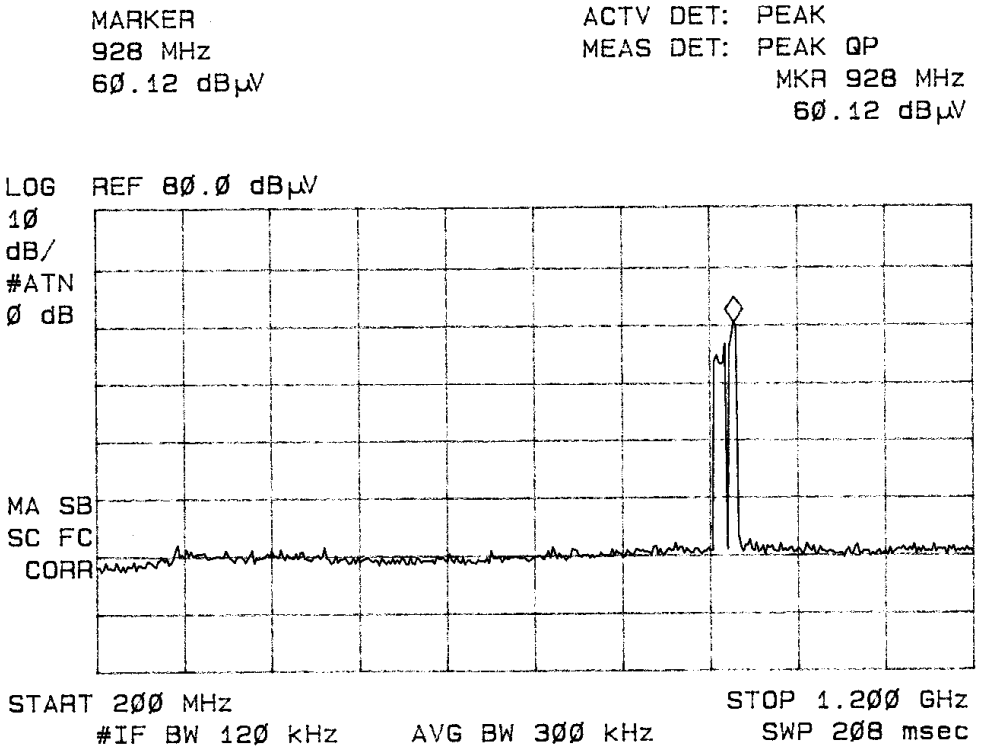


Figure two Plot of General Radiated Emissions

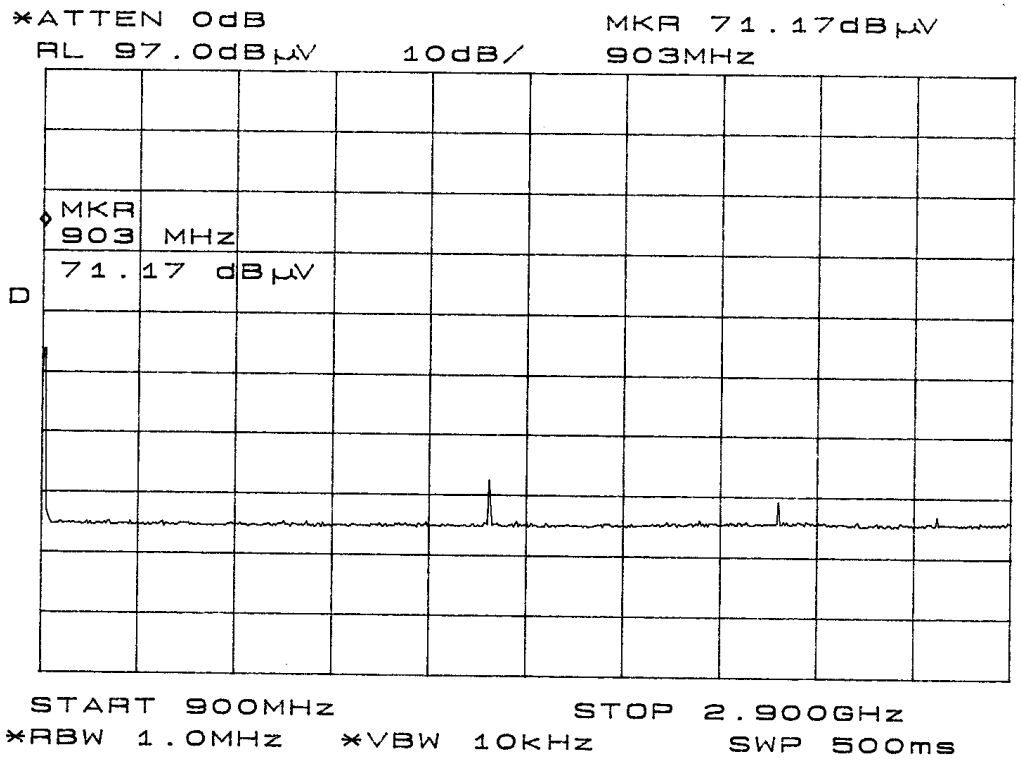


Figure three Plot of General Radiated Emissions

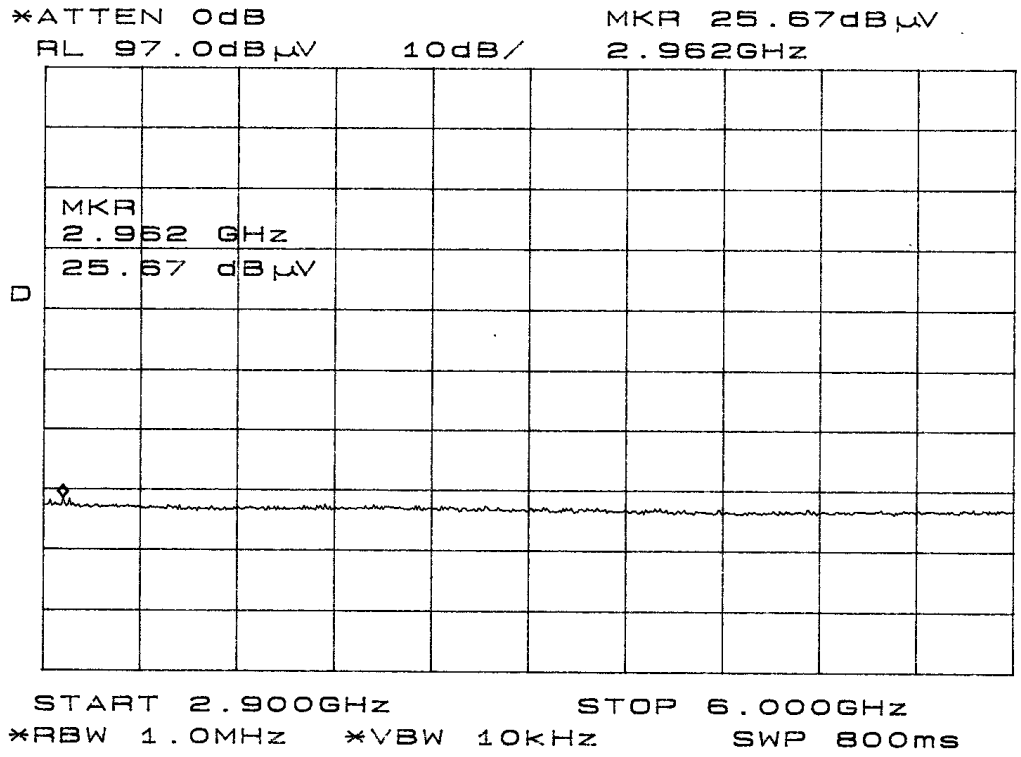


Figure four Plot of General Radiated Emissions

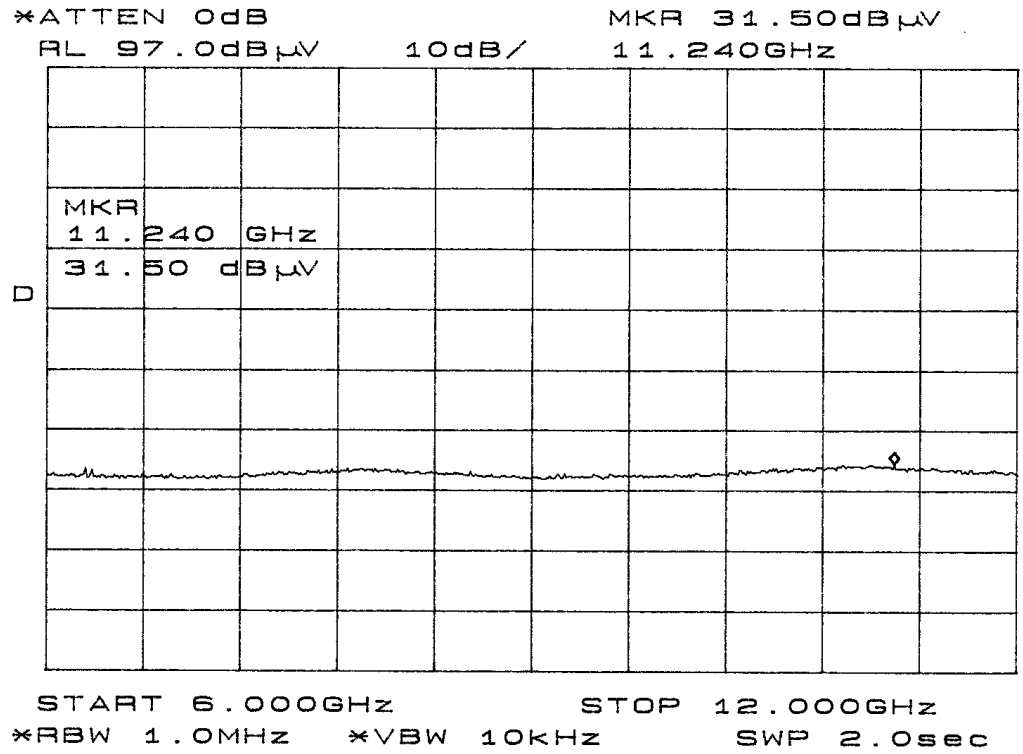


Figure five Plot of General Radiated Emissions

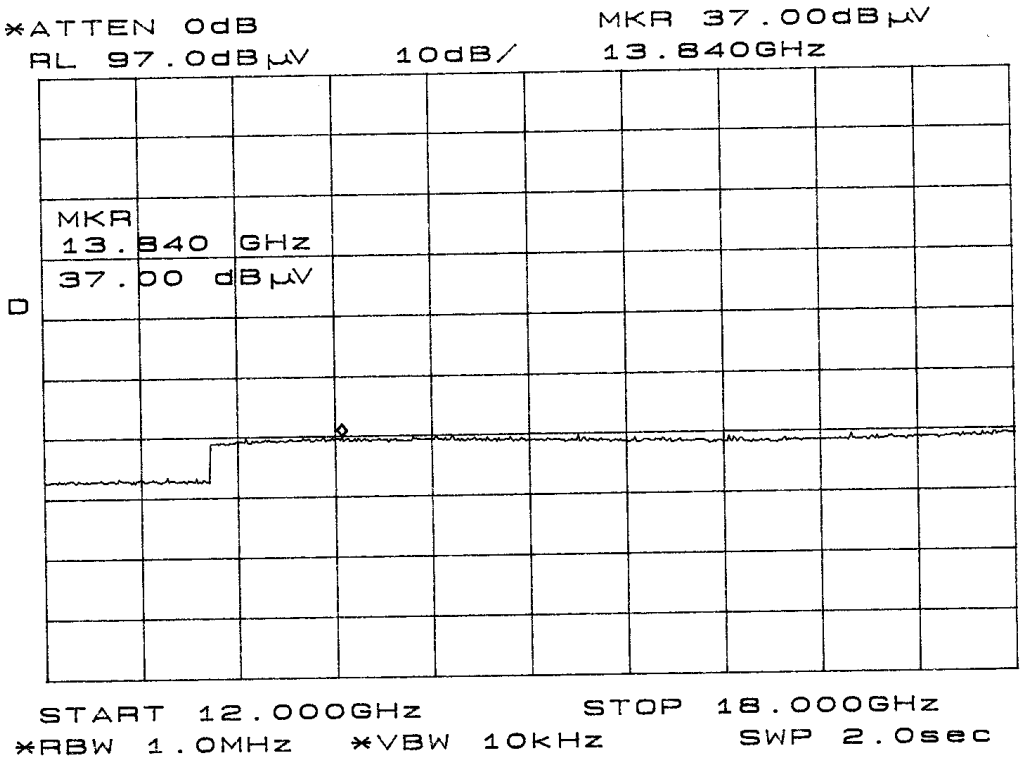


Figure six Plot of General Radiated Emissions

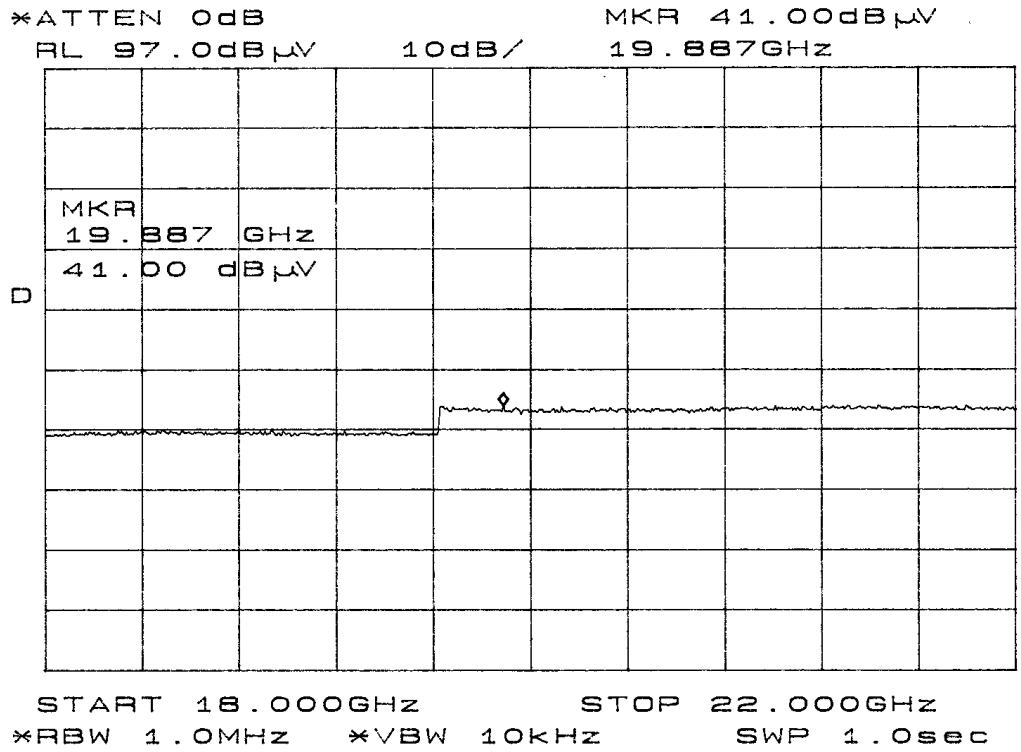


Figure seven Plot of General Radiated Emissions

General Radiated Emissions Data from EUT

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)

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

Summary of Results for General Radiated Emissions

The radiated emissions for the EUT meet the requirements for CISPR 22, CFR47, and Industry Canada requirements. The EUT had at least a 20 dB minimum margin below the limit. Other emissions were present with amplitudes at least 20 dB below the limit.

Statement of Modifications and Deviations

No modifications to the EUT were required for the unit to meet the CISPR 22, CFR47, and Industry Canada requirements. There were no deviations or exceptions to the specifications.

Subpart C - Intentional Radiators

As per CFR47 Part 15, Subpart C, paragraphs 15.203, 15.205, 15.209, 15.247 and RSS-210 the following information is submitted.

15.203 Antenna Requirements

The equipment is professionally installed and maintained in controlled environments. The unit is produced with a unique antenna connection used by authorized service personnel and professional installers only. The equipment offers no other provision for user service, replacement, or antenna modification. The requirements of 15.203 are fulfilled and there are no deviations or exceptions to the specification.

15.205 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 Calculations:

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

= 23.2 + 29.0 - 30

= 22.2

Radiated Emissions Data in Restricted Bands (Worst-case)

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)
2709.0	23.2	22.8	29.0	30.0	22.2	21.8	54.0
2745.0	20.3	20.8	29.0	30.0	19.3	19.8	54.0
2780.7	19.9	20.4	29.0	30.0	18.9	19.4	54.0
3612.0	22.5	25.1	30.7	30.0	23.2	25.8	54.0
3660.0	22.1	23.7	30.7	30.0	22.8	24.4	54.0
3707.6	20.2	21.3	30.7	30.0	20.9	22.0	54.0
4515.0	20.1	21.3	32.5	30.0	22.6	23.8	54.0
4575.0	19.3	20.4	32.5	30.0	21.8	22.9	54.0
4634.5	19.9	20.8	32.5	30.0	22.4	23.3	54.0
5418.0	18.6	18.8	33.1	30.0	21.7	21.9	54.0

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

Summary of Results for Radiated Emissions in Restricted Bands

The radiated emissions for the EUT meet the requirements for FCC Part 15C Intentional Radiators. The EUT had a 28.2 dB minimum margin below the limits for restricted bands of operation. Both average and peak amplitudes above 1000 MHz were checked 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 FCC Limits.

15.209 Radiated Emissions Limits; General Requirements

Radiated EMI

The EUT was arranged in a typical equipment configuration and operated through all of its various modes. 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. Emissions were checked in the screen room from 30 to 22,000 MHz and plots were made of the frequency spectrum from 30 MHz to 22,000 MHz for the preliminary testing. The highest radiated emission was then re-maximized at this location 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. 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 polarization between horizontal and vertical. Antennas used were Broadband Biconical from 30 MHz to 200 MHz, Biconilog from 30 MHz to 1000 MHz, Log Periodic from 200 MHz to 5 GHz, and/or Pyramidal Horns from 4 GHz to 40 GHz.

General Radiated Emissions Data from EUT (15.209)

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)

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

Summary of Results for Radiated Emissions

The radiated emissions for the EUT meet the requirements for CFR47 Part 15C, and Industry Canada requirements. The EUT had at least at least a 20 dB minimum margin below the general emissions limit. Other emissions were present with amplitudes at least 20 dB below the limit.

15.247 Operation in the Band 902.9-927 MHz

The power output was measured on an Open Area Test Site at a 3 meters distance. The EUT and test fixture 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 the carrier frequency was measured using a spectrum analyzer. The peak and average amplitude of the spurious emissions above 1000 MHz were measured using a spectrum analyzer then data was recorded from the analyzer display. Refer to figures eight through seventeen for plots of the spectrum analyzer display demonstrating compliance to the specifications. The EUT is a frequency hopping spread spectrum intentional radiator utilizing at least 50 hopping channels. Figures eight and nine demonstrate power output and number of channels used in 902.9-927 MHz frequency band. Figures ten through twelve demonstrate power output, and occupied bandwidth of channels in the 902.9-927 MHz band. The 20-dB bandwidth of 93 kHz complies with the requirement of less than 250 kHz wide and utilizing at least 50 hopping frequencies. Figure thirteen demonstrates the 93 kHz channel spacing in the 902.9-927 MHz band. The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a twenty-second-time period. Figures fourteen and fifteen demonstrate dwell time on channel and number of times on channel in a 20-second period. These plots demonstrate compliance with 11 mS dwell time and number of times on channel in a 20-second period. As described in the operational description exhibit, the equipment complies with requirements of channel occupancy.

The maximum peak output power of the unit was measured at the antenna port and again at a distance of three meters while tested on the OATS with the available antenna options. The amplitudes of each emission and spurious emission were measured at a distance of 3 meters from the FSM antenna on the OATS. The amplitude of each emission was maximized by varying the FSM antenna height, polarization, and by rotating the turntable. Emissions were measured in dBµV/m at three meters. The amplitude of each measured 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 and/or Pyramidal Horn Antennas from 4 GHz to 40 GHz. Data was

taken per Paragraph 2.1046(a), 15.247 and RSS-210. The 902 and 928 MHz band edges are protected due to the 902.9– 927 MHz channels used for frequency of operation. Figures sixteen and seventeen demonstrate band edge compliance.

Sample Calculation

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

= 107.2 + 23.3 - 30

= 100.5

Antenna Port Conducted Power Output Data

Frequency	**P_{dBm}**	**P_{mw}**	**P_{w}**
902.9	29.8	955.0	1.0
915.0	29.8	955.0	1.0
927.0	29.5	891.3	0.9

Occupied Band Width Antenna Port Conducted Data

Frequency (MHz)	Occupied bandwidth(kHz)
902.9	78
915.0	75
927.0	75

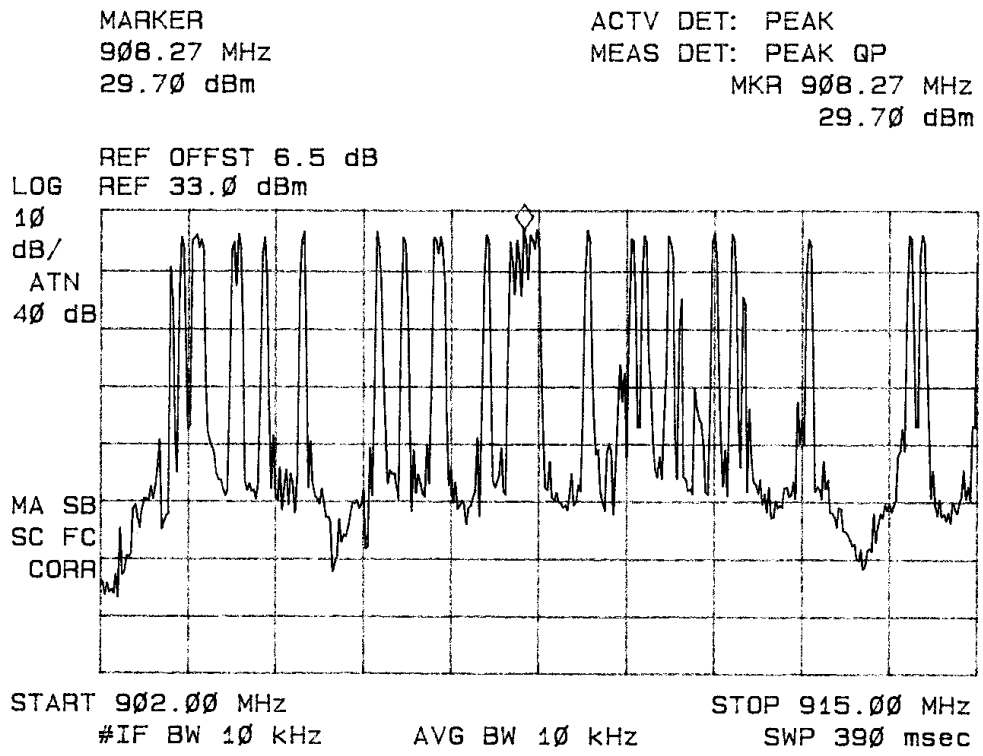


Figure eight Plot of output Power and number of channels in band

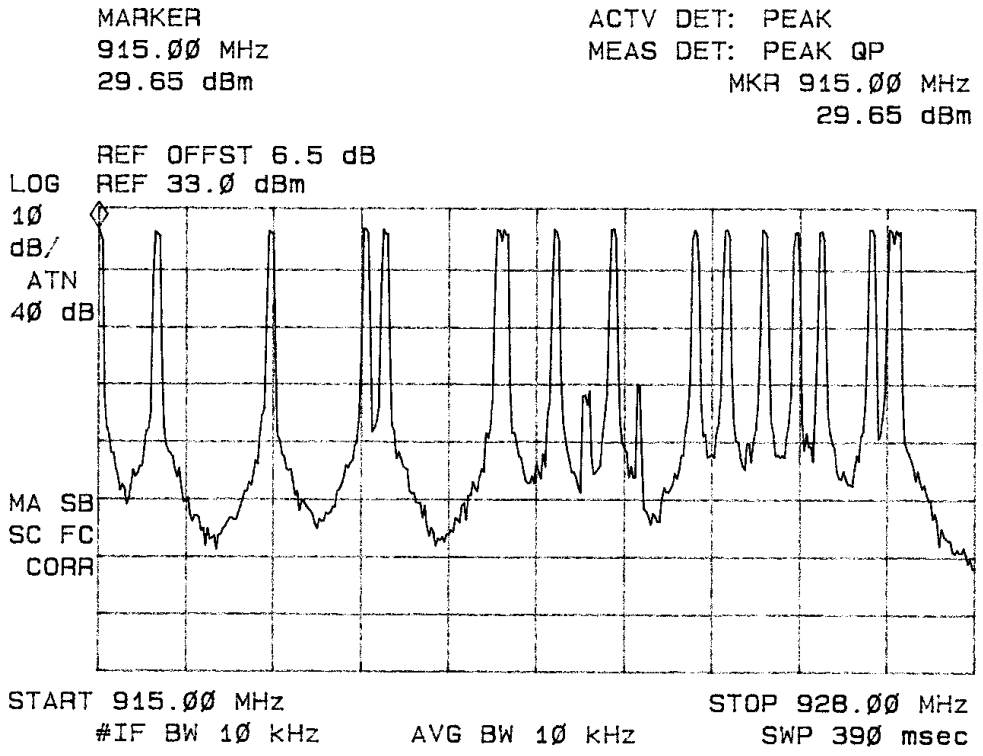


Figure nine Plot of output Power and number of channels in band

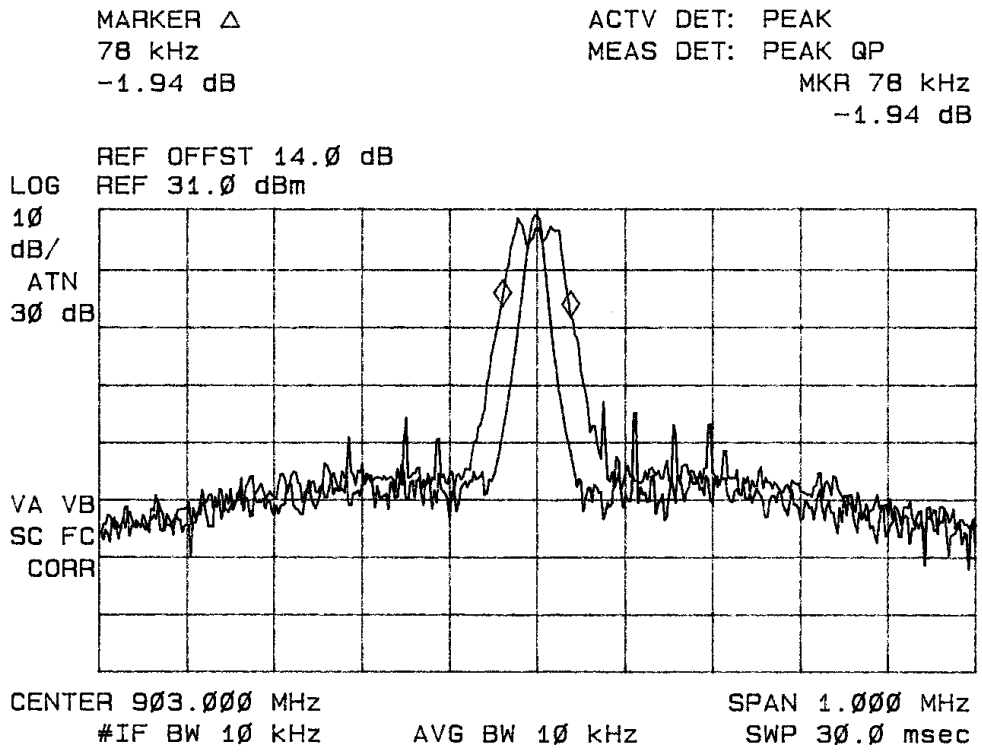


Figure ten Plot of Occupied Bandwidth low frequency

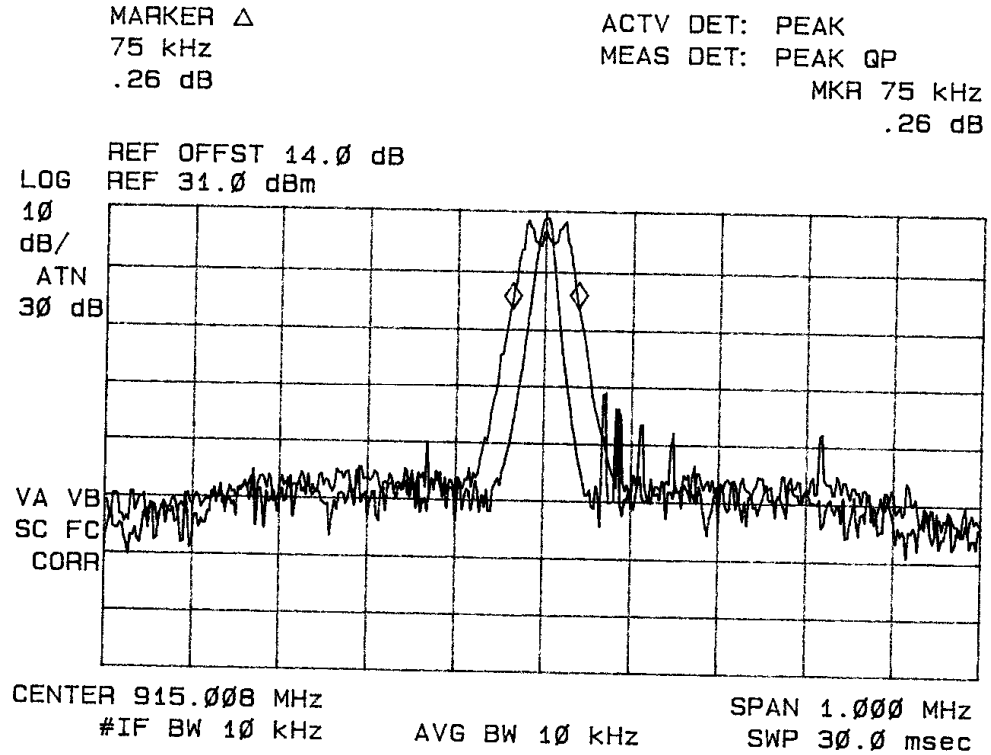


Figure eleven Plot of Occupied Bandwidth middle frequency

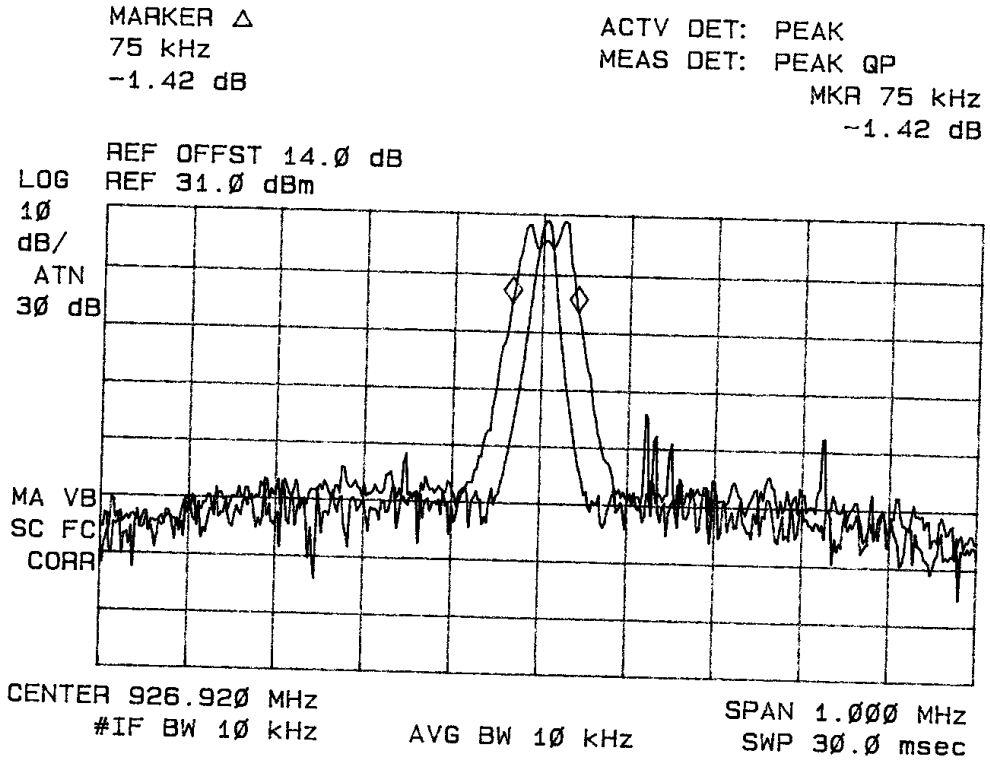


Figure twelve Plot of Occupied Bandwidth high frequency

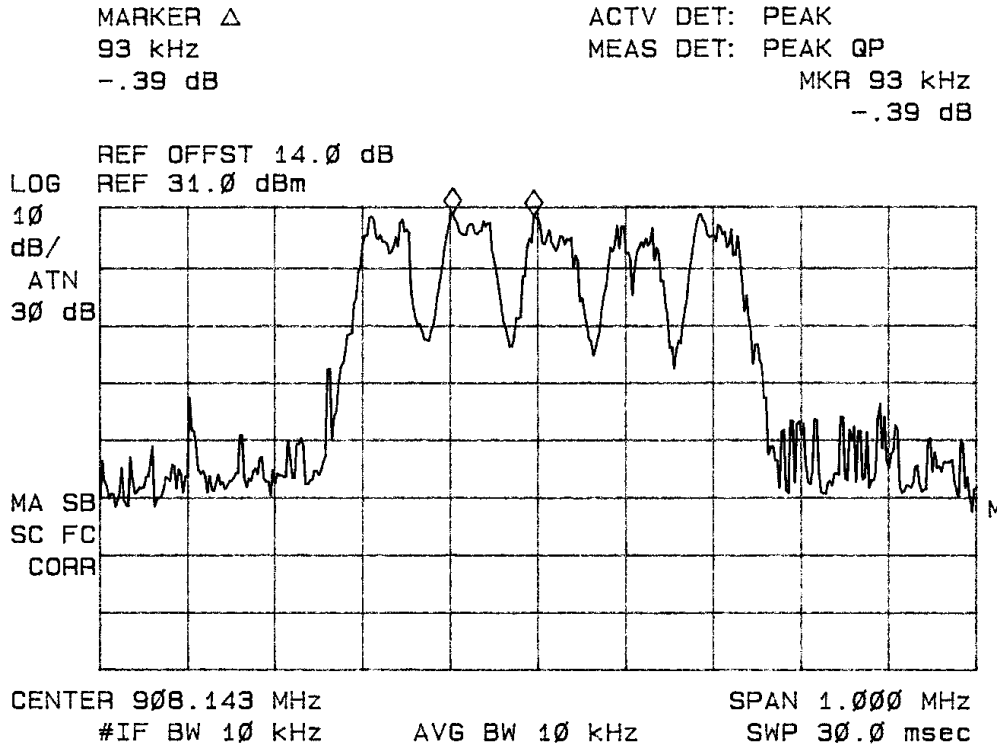


Figure thirteen Plot of Channel Spacing

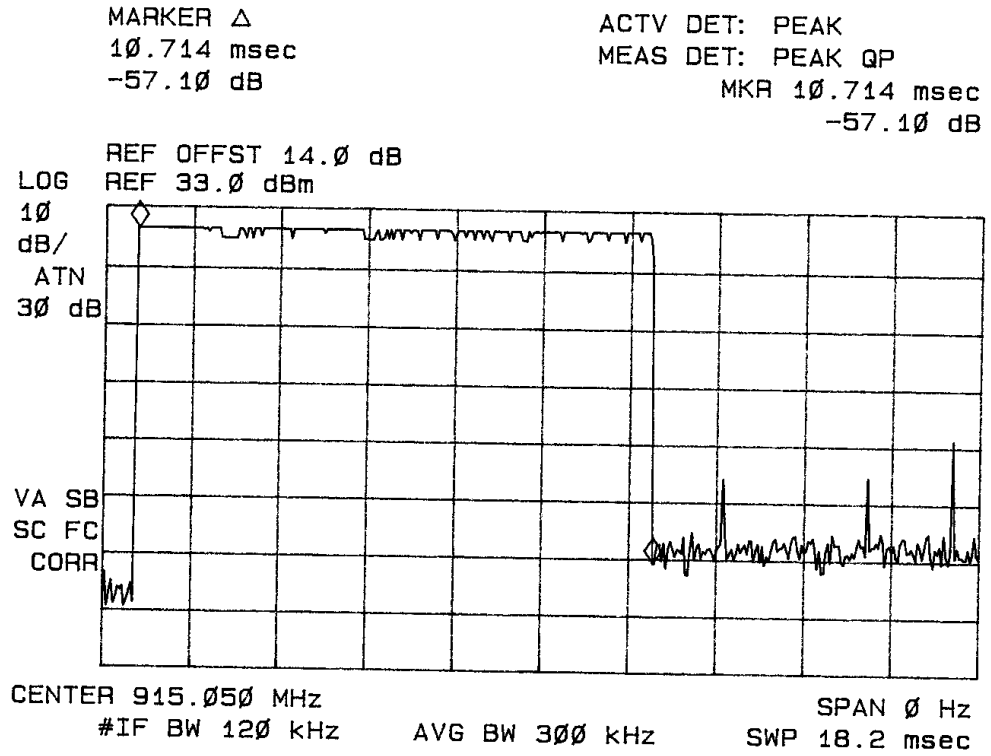


Figure fourteen Plot of Dwell Time on channel

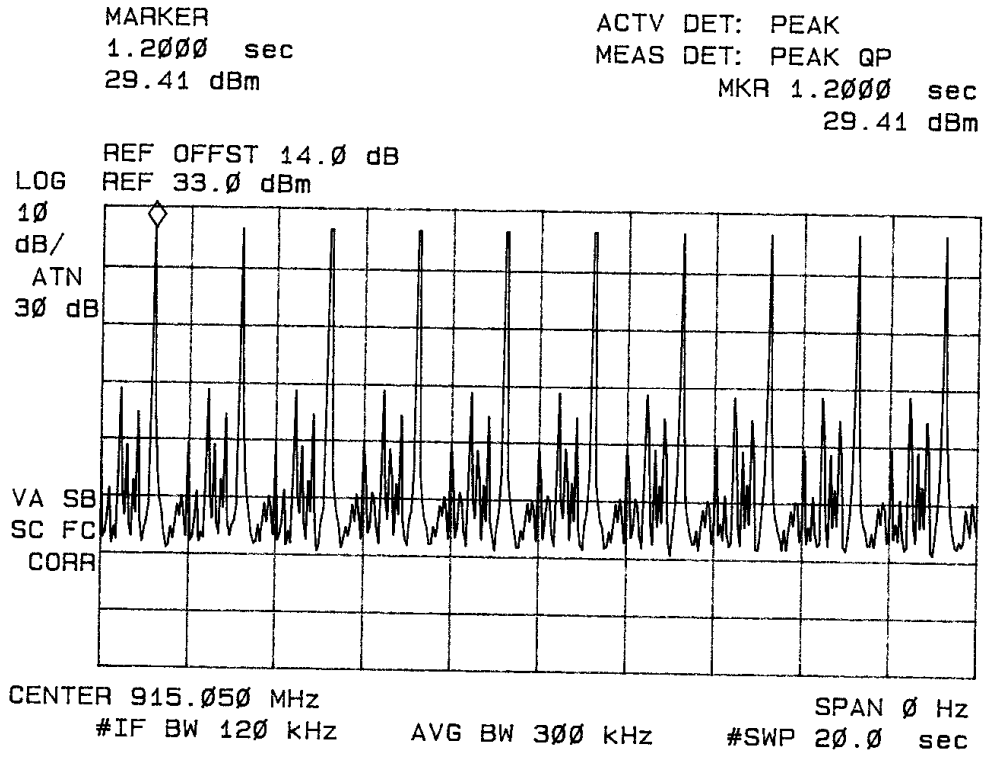


Figure fifteen Plot of Channel Occupancy over 20-second period

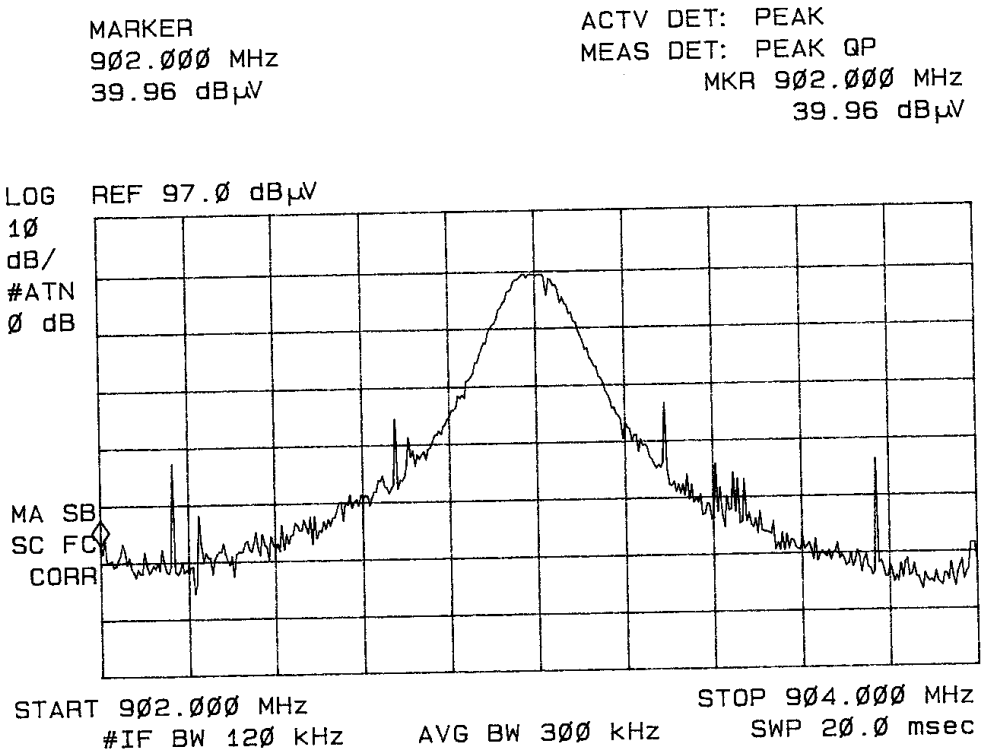


Figure sixteen Plot of lower frequency band edge

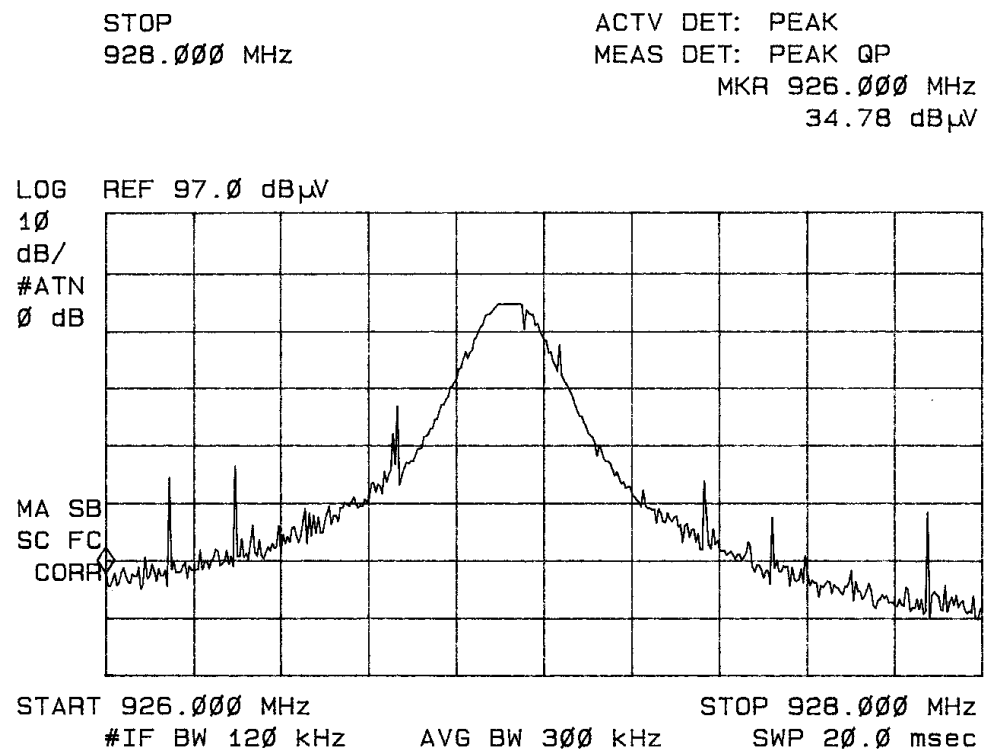


Figure seventeen Plot of higher frequency band edge

Radiated Emissions Data per 15.247 (5 dBi Magnet Mount Antenna)

Emission Frequency (MHz)	FSM Horz. (dBµV)	FSM Vert. (dBµV)	Ant. Factor (dB)	Amp Gain (dB)	RFS Horz. @ 3m (dBµV/m)	RFS Vert. @ 3m (dBµV/m)	Limit @ 3m (dBµV/m)
902.9(Peak)	107.2	125.1	23.3	30	100.5	118.4	--
1806.0	23.3	24.6	29.8	30	23.1	24.4	54.0
2709.0	23.2	22.8	29.0	30	22.2	21.8	54.0
3612.0	22.5	25.1	30.7	30	23.2	25.8	54.0
4515.0	20.1	21.3	32.5	30	22.6	23.8	54.0
5418.0	18.6	18.8	33.1	30	21.7	21.9	54.0
915.0(Peak)	106.3	124.0	23.3	30	99.6	117.3	--
1830.0	22.3	25.5	29.8	30	22.1	25.3	54.0
2745.0	20.3	20.8	29.0	30	19.3	19.8	54.0
3660.0	22.1	23.7	30.7	30	22.8	24.4	54.0
4575.0	19.3	20.4	32.5	30	21.8	22.9	54.0
5490.0	19.3	19.5	33.1	30	22.4	22.6	54.0
926.9(Peak)	106.4	124.3	23.4	30	99.8	117.7	--
1853.8	26.3	26.7	29.8	30	26.1	26.5	54.0
2780.7	19.9	20.4	29.0	30	18.9	19.4	54.0
3707.6	20.2	21.3	30.7	30	20.9	22.0	54.0
4634.5	19.9	20.8	32.5	30	22.4	23.3	54.0
5561.4	18.8	19.3	33.1	30	21.9	22.4	54.0

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

Radiated Emissions Data per 15.247 (6 dBi Magnet Mount Antenna)

Emission Frequency (MHz)	FSM Horz. (dBµV)	FSM Vert. (dBµV)	Ant. Factor (dB)	Amp Gain (dB)	RFS Horz. @ 3m (dBµV/m)	RFS Vert. @ 3m (dBµV/m)	Limit @ 3m (dBµV/m)
902.9(Peak)	108.8	126.8	23.3	30	102.1	120.1	--
1806.0	17.7	19.6	29.8	30	17.5	19.4	54.0
2709.0	16.7	16.8	29.0	30	15.7	15.8	54.0
3612.0	19.8	23.3	30.7	30	20.5	24.0	54.0
4515.0	16.3	19.3	32.5	30	18.8	21.8	54.0
5418.0	13.6	14.8	33.1	30	16.7	17.9	54.0
915.0(Peak)	107.8	125.6	23.3	30	101.1	118.9	--
1830.0	17.3	17.8	29.8	30	17.1	17.6	54.0
2745.0	15.3	15.8	29.0	30	14.3	14.8	54.0
3660.0	19.3	19.5	30.7	30	20.0	20.2	54.0
4575.0	14.3	14.5	32.5	30	16.8	17.0	54.0
5490.0	15.8	17.3	33.1	30	18.9	20.4	54.0
926.9(Peak)	108.4	125.6	23.4	30	101.8	119.0	--
1853.8	18.5	16.7	29.8	30	18.3	16.5	54.0
2780.7	15.6	15.5	29.0	30	14.6	14.5	54.0
3707.6	15.2	17.3	30.7	30	15.9	18.0	54.0
4634.5	14.8	14.8	32.5	30	17.3	17.3	54.0
5561.4	14.8	15.3	33.1	30	17.9	18.4	54.0

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

Radiated Emissions Data per 15.247 (Stub Antenna)

Emission Frequency (MHz)	FSM Horz. (dBµV)	FSM Vert. (dBµV)	Ant. Factor (dB)	Amp Gain (dB)	RFS Horz. @ 3m (dBµV/m)	RFS Vert. @ 3m (dBµV/m)	Limit @ 3m (dBµV/m)
902.9(Peak)	104.0	110.1	23.3	30	97.3	103.4	--
1806.0	17.7	19.6	29.8	30	17.5	19.4	54.0
2709.0	16.7	16.8	29.0	30	15.7	15.8	54.0
3612.0	19.8	23.3	30.7	30	20.5	24.0	54.0
4515.0	16.3	19.3	32.5	30	18.8	21.8	54.0
5418.0	13.6	14.8	33.1	30	16.7	17.9	54.0
915.0(Peak)	103.8	109.3	23.3	30	97.1	102.6	--
1830.0	17.3	17.8	29.8	30	17.1	17.6	54.0
2745.0	15.3	15.8	29.0	30	14.3	14.8	54.0
3660.0	19.3	19.5	30.7	30	20.0	20.2	54.0
4575.0	14.3	14.5	32.5	30	16.8	17.0	54.0
5490.0	15.8	17.3	33.1	30	18.9	20.4	54.0
926.9(Peak)	104.9	110.6	23.4	30	98.3	104.0	--
1853.8	18.5	16.7	29.8	30	18.3	16.5	54.0
2780.7	15.6	15.5	29.0	30	14.6	14.5	54.0
3707.6	15.2	17.3	30.7	30	15.9	18.0	54.0
4634.5	14.8	14.8	32.5	30	17.3	17.3	54.0
5561.4	14.8	15.3	33.1	30	17.9	18.4	54.0

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

Summary of Results for Radiated Emissions of Intentional Radiator

The EUT produced 1.0 watts output power measured at the antenna port at the fundamental frequency of operation. The EUT had the highest radiated peak emission of 120.1 dBµV/m at 3 meters at the fundamental frequency of operation. The EUT had a worst-case of 28.2 dB margin below the limit for the harmonic emissions. The radiated emissions for the EUT meet the requirements for CFR47 Part 15.247 Intentional Radiators and RSS-210. There are no 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 limits. The specifications of 15.247 and RSS-210 were met; there are no deviations or exceptions to the requirements.

Statement of Modifications and Deviations

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

Annex

- Annex A, Measurement Uncertainty Calculations
- Annex B, 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 Test Equipment List For Rogers Labs, Inc.

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	2/08
Wattmeter: Bird 43 with Load Bird 8085	2/08
Power Supplies: Sorensen SRL 20-25, SRL 40-25, DCR 150, DCR 140	2/08
H/V Power Supply: Fluke Model: 408B (SN: 573)	2/08
R.F. Generator: HP 606A	2/08
R.F. Generator: HP 8614A	2/08
R.F. Generator: HP 8640B	2/08
Spectrum Analyzer: HP 8562A, Mixers: 11517A, 11970A, 11970K, 11970U, 11970V, 11970W HP Adapters: 11518, 11519, 11520	5/08
Spectrum Analyzer: HP 8591EM	5/08
Frequency Counter: Leader LDC825	2/08
Antenna: EMCO Biconilog Model: 3143	5/08
Antenna: EMCO Log Periodic Model: 3147	10/07
Antenna: Antenna Research Biconical Model: BCD 235	10/07
Antenna: EMCO Dipole Set 3121C	2/08
Antenna: C.D. B-101	2/08
Antenna: Solar 9229-1 & 9230-1	2/08
Antenna: EMCO 6509	2/08
Audio Oscillator: H.P. 201CD	2/08
R.F. Power Amp 65W Model: 470-A-1010	2/08
R.F. Power Amp 50W M185- 10-501	2/08
R.F. PreAmp CPPA-102	2/08
LISN 50 µHy/50 ohm/0.1 µf	10/07
LISN Compliance Eng. 240/20	2/08
LISN Fischer Custom Communications FCC-LISN-50-16-2-08	2/08
Peavey Power Amp Model: IPS 801	2/08
Power Amp A.R. Model: 10W 1010M7	2/08
Power Amp EIN Model: A301	2/08
ELGAR Model: 1751	2/08
ELGAR Model: TG 704A-3D	2/08
ESD Test Set 2010i	2/08
Fast Transient Burst Generator Model: EFT/B-101	2/08
Current Probe: Singer CP-105	2/08
Current Probe: Solar 9108-1N	2/08
Field Intensity Meter: EFM-018	2/08
KEYTEK Ecat Surge Generator	2/08
Shielded Room 5 M x 3 M x 3.0 M	

Annex C 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:

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

Scot D. Rogers

NVLAP Lab Code 200087-0

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