NVLAP Lab Code 200087-0

SUBMITTAL APPLICATION REPORT

FOR
Grant Of Certification

FOR

Model: 76007
902.75 - 927.25 MHz
FHSS Transceiver Module
FCC ID: FIH76007
IC: 1584A-76007

FOR

Transcore - Amtech Technology Center

8600 Jefferson Street, NE
Albuquerque, NM 87113

Test Report Number: 091116

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 Grant of Certification Application

FOR

CFR47, Part 15C - Intentional Radiator, Paragraph 15.247 and
Industry Canada RSS-210
License Exempt Intentional Radiator

For

Transcore - Amtech Technology Center
8600 Jefferson Street, NE
Albuquerque, NM 87113

Larry Barnsdale
Senior Quality Engineer III

Frequency Hopping Spread Spectrum Transceiver Module
Model: 76007
Frequency Range 902.75 - 927.25 MHz
FCC ID#: FIH76007
IC: 1584A-76007

Test Date: November 16, 2009

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 License Exempt Intentional Radiator operating under CFR47 Paragraph 15.247 and RSS-210. The frequency hopping spread spectrum transceiver module is designed for incorporation into OEM equipment offering low cost solution for remote wireless communications.

Name of Applicant:
Transcore - Amtech Technology Center
8600 Jefferson Street, NE
Albuquerque, NM 87113

Model: 76007

FCC I.D.: FIH76007 FRN: 0007-0674-81 IC: 1584A-76007

Frequency Range: 902.75 - 927.25 MHz

Authorized Antennas include Part numbers 07558-01 and 07553-01 (maximum 2.8 dBi gain)

Operating Power: 1.0 Watt antenna port conducted, 126.9 dBµV/m @ 3-meters, Occupied Bandwidth 259.6 kHz, and worst-case receiver radiated emission 42.3 dBµV/m @ 3-meters

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 15.207	Complies
Emissions as per CFR47 paragraphs 2 and 15.209	Complies
Emissions as per CFR47 paragraphs 2 and 15.247	Complies
Emissions as per RSS-210 Issue 7, Dated June 2007	Complies

Environmental Conditions

Ambient Temperature	21.4° C
Relative Humidity	34%
Atmospheric Pressure	1014.6 mb

Equipment Tested

Equipment	Model	FCC I.D.#	IC:
EUT	76007	FIH76007	1584A-76007
Support Device	CE5240	N/A	N/A

2.1033(b) Application for Certification

(1) Manufacturer: Transcore - Amtech Technology Center
8600 Jefferson Street, NE
Albuquerque, NM 87113

(2) Identification: Model: 76007

FCC I.D.: FIH76007 IC: 1584A-76007

(3) Instruction Book:

Refer to Exhibit for Instruction Manual.

(4) Description of Circuit Functions:

Refer to Exhibit of Operational Description.

(5) Block Diagram with Frequencies:

Refer to Exhibit of Operational Description.

(6) Report of Measurements:

Report of measurements follows in this Report.

(7) Photographs: Construction, Component Placement, etc.:

Refer to Exhibit for photographs of equipment.

(8) List of Peripheral Equipment Necessary for operation. The equipment operates from power received from the support equipment circuitry. The module was connected to the support unit offering data communications, control and power to the EUT during testing.

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

(10) Not Applicable. The unit is not a scanning receiver.

(11) Not Applicable. The EUT does not operate in the 59 – 64 GHz frequency band.

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

Applicable Standards & Test Procedures

In accordance with the Federal Communications Code of Federal Regulations, dated October 1, 2008, 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 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.

Equipment Function and Testing Procedures

The EUT is a 902.75 - 927.25 MHz frequency hopping spread spectrum transceiver module used to transmit data in applications offering remote wireless connectivity. The transmitter portion of the design is received as a module and placed on support equipment and incorporated into OEM system design. The unit is marketed for use to incorporate a wireless link to exchange data information from one point to another. For testing purposes the 76007 was connected to the support digital equipment communicating and receiving power from the support system allowing for operational control of the transmitter and communications. The 76007 receives power form the support circuitry and offers no provision to connect to utility AC power systems. No other interfacing options are provided on the design. For testing purposes the 76007 and support equipment were powered from the internal battery power of the support equipment and set to transmit through all data modes available. The device is marketed for modular solution for incorporation into OEM designed systems and used with approved antennas only. The design complies with the unique antenna connection requirements. Authorized antennas tested and for use with this module include part numbers 07558-01 and 07553-01.

Equipment and Cable Configurations

AC Line Conducted Emission Test Procedure

The 76007 operates from DC power only and must be connected to support system for operation. No AC power line conducted emissions testing was performed for this equipment as it operates solely from DC power.

Radiated Emission Test Procedure

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. Testing for the radiated emissions was performed as defined in sections 8 and 13.1.4 of ANSI C63.4. 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 test setup exhibits for EUT placement during testing.

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

Conducted EMI	The AC power line conducted emissions testing were 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 Registration	Refer to Annex for FCC and Industry Canada Site Registration Letters
NVLAP	Lab code 200087-0

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

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

Subpart C - Intentional Radiators

As per CFR47, Subpart C, paragraph 15.247 the following information is submitted.

Antenna Requirements

The product is produced with a unique antenna connector to be used only with unique and authorized antennas and coaxial cable. The antenna connection point complies with the unique antenna connection requirements. The requirements of 15.203 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 measured 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 (dBµV/m @ 3m) = Measured Emission FSM(dBµV) + Antenna Factor(dB) + Cable Losses (dB) – Amplifier Gain(dB)

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

Radiated Emissions in Restricted Bands Data (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)
120.0	48.1	42.2	7.1	30	25.2	19.3	43.5
125.0	47.8	40.0	7.8	30	25.6	17.8	43.5
166.4	45.5	36.5	8.7	30	24.2	15.2	43.5
166.7	45.5	37.8	8.7	30	24.2	16.5	43.5
256.8	60.4	51.1	12.4	30	42.8	33.5	46.0
276.3	61.7	44.6	12.6	30	44.3	27.2	46.0
328.2	54.2	53.1	14.6	30	38.8	37.7	46.0
2708.3	20.5	29.9	29.3	25.0	24.8	34.2	54.0
2744.3	33.9	25.8	29.3	25.0	38.2	30.1	54.0
2781.8	34.5	33.1	29.3	25.0	16.6	37.4	54.0
7222.0	16.7	11.5	36.4	25.0	28.1	22.9	54.0
7318.0	22.2	23.4	36.5	25.0	33.7	34.9	54.0
7418.0	14.9	16.0	36.6	25.0	16.6	27.6	54.0

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

Summary of Results for Radiated Emissions in Restricted Bands

The EUT demonstrated compliance with the radiated emissions requirements of CFR47 Part 15C and RSS-210 Intentional Radiators. The EUT demonstrated a minimum margin of 1.7 dB below the requirements. Peak, Quasi-peak, and average amplitudes were checked for compliance with the regulations. Worst-case emissions are reported with other emissions found in the restricted frequency bands at least 20 dB below the requirements.

Statement of Modifications and Deviations

No modifications to the EUT were required for the unit to demonstrate compliance with the CFR47 Part 15C paragraph 15.205 and RSS-210 emissions requirements. There were no deviations or exceptions to the specifications.

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 10,000 MHz for the preliminary testing. Refer to figures one through five for plots of the general 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 10,000 MHz was searched for general 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.

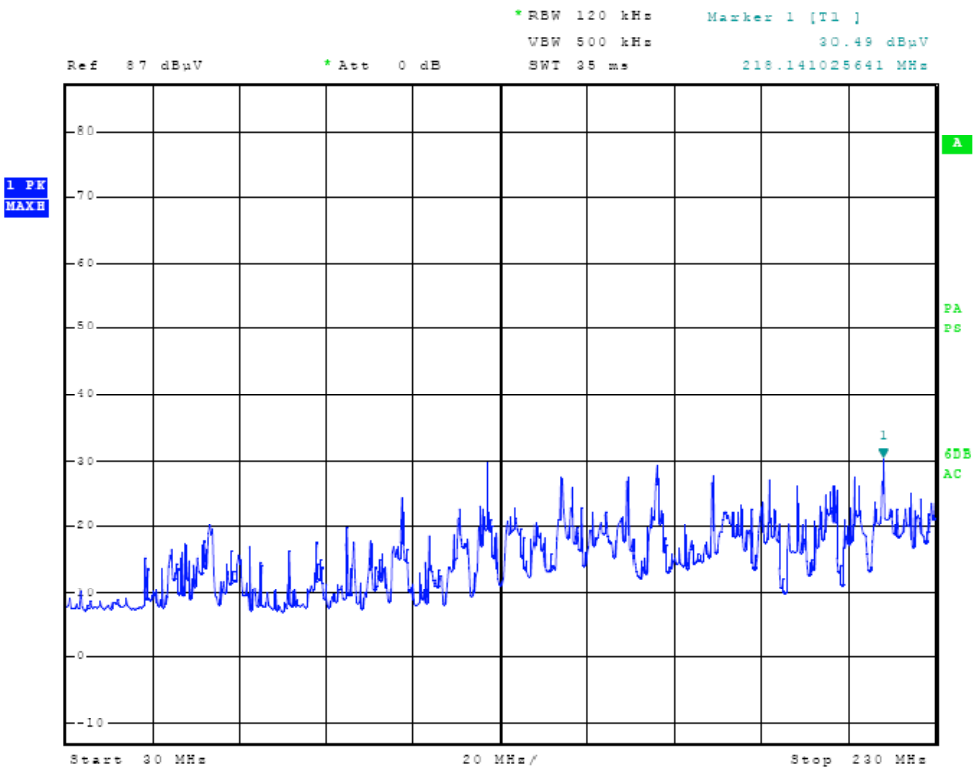

Figure One General Radiated Emissions taken at 1 meter in screen room

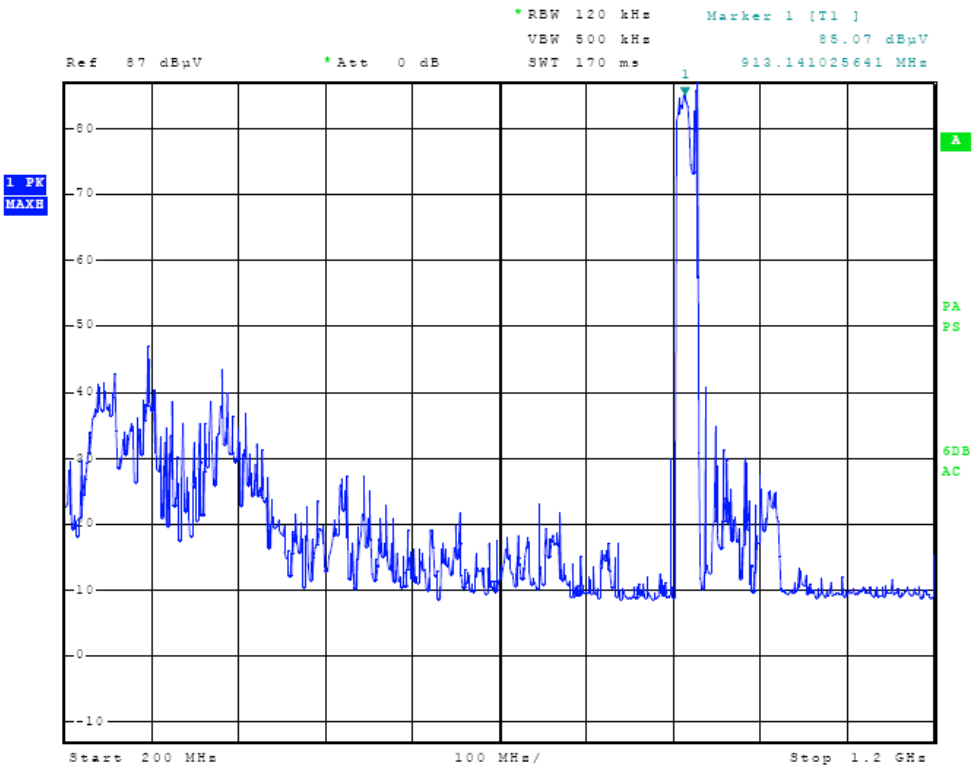

Figure Two General Radiated Emissions taken at 1 meter in screen room

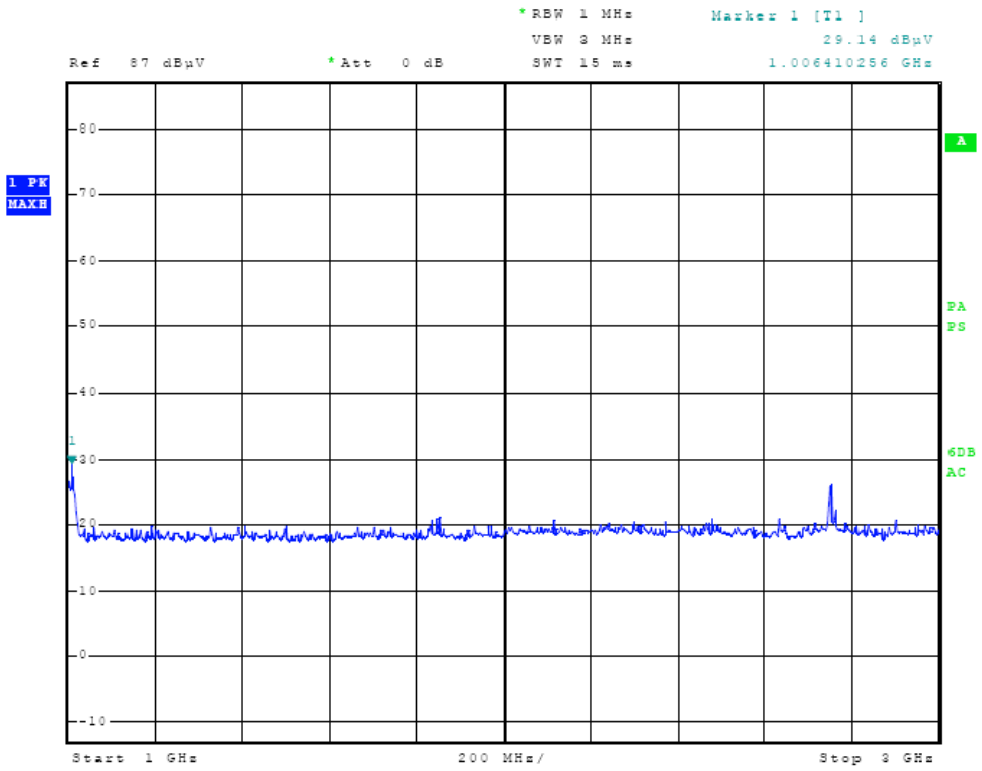

Figure Three General Radiated Emissions taken at 1 meter in screen room

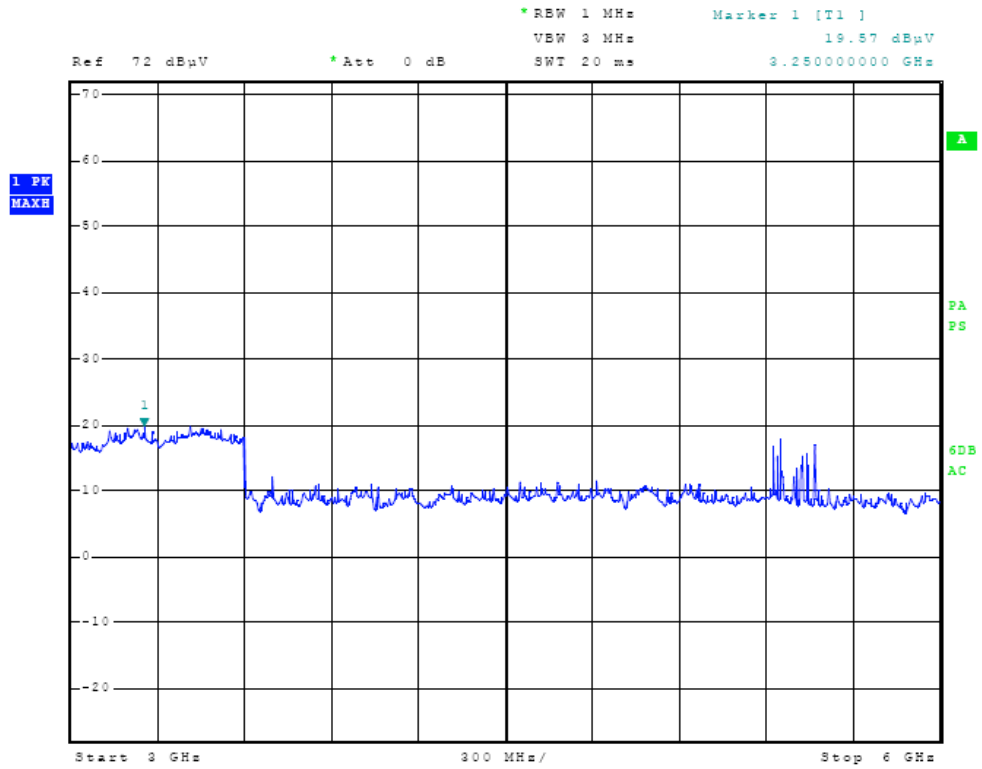

Figure Four General Radiated Emissions taken at 1 meter in screen room

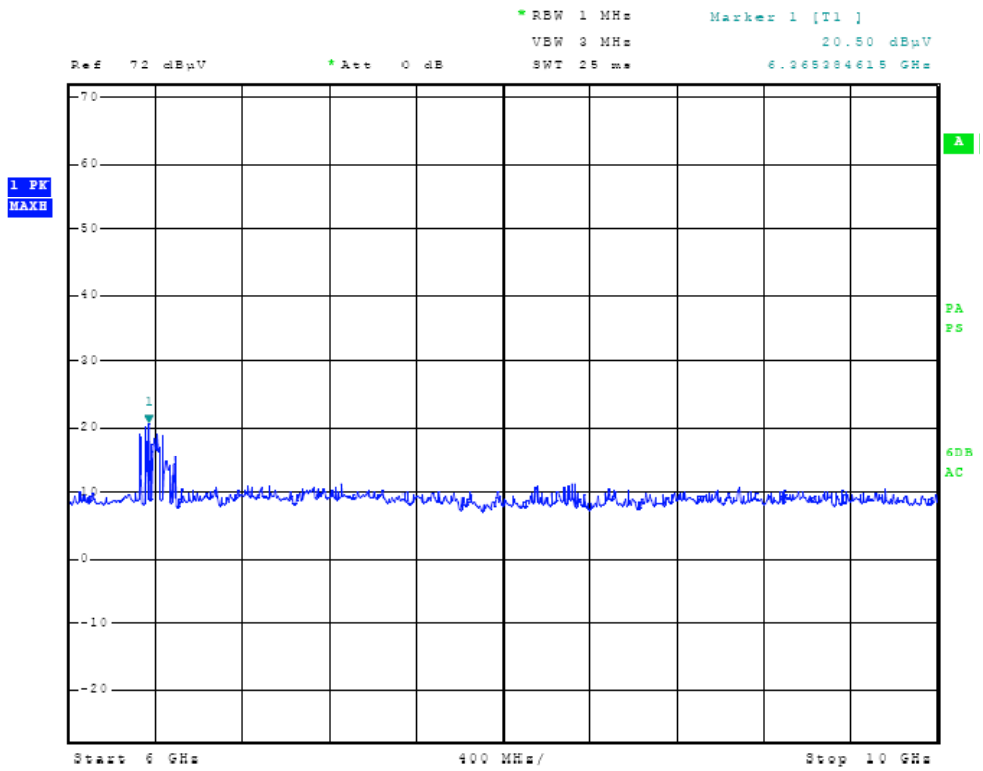

Figure Five General Radiated Emissions taken at 1 meter in screen room

Radiated Emissions from EUT Data (Highest 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)	Limit @ 3m (dBμV/m)
120.0	48.1	42.2	7.1	30	25.2	19.3	43.5
125.0	47.8	40.0	7.8	30	25.6	17.8	43.5
166.4	45.5	36.5	8.7	30	24.2	15.2	43.5
166.7	45.5	37.8	8.7	30	24.2	16.5	43.5
184.7	44.4	38.6	9.9	30	24.3	18.5	43.5
192.2	54.1	39.8	10.5	30	34.6	20.3	43.5
198.3	48.9	43.6	10.5	30	29.4	24.1	43.5
203.1	53.7	42.3	10.5	30	34.2	22.8	43.5
210.2	51.2	39.8	11.0	30	32.2	20.8	43.5
217.7	55.1	44.8	11.2	30	36.3	26.0	46.0
222.2	52.2	42.6	11.2	30	33.4	23.8	46.0
224.3	53.3	42.2	11.2	30	34.5	23.4	46.0
256.8	60.4	51.1	12.4	30	42.8	33.5	46.0
276.3	61.7	44.6	12.6	30	44.3	27.2	46.0
295.8	55.4	45.7	13.8	30	39.2	29.5	46.0
302.2	52.6	43.1	13.9	30	36.5	27.0	46.0
308.9	54.9	48.6	14.5	30	39.4	33.1	46.0
315.6	58.5	51.3	14.7	30	43.2	36.0	46.0
321.7	55.2	52.5	14.7	30	39.9	37.2	46.0
328.2	54.2	53.1	14.6	30	38.8	37.7	46.0
341.1	57.5	52.5	15.1	30	42.6	37.6	46.0
344.6	55.9	53.1	15.1	30	41.0	38.2	46.0
347.6	56.9	50.7	15.4	30	42.3	36.1	46.0
347.7	56.8	52.0	15.4	30	42.2	37.4	46.0
354.1	58.4	49.7	15.4	30	43.8	35.1	46.0

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 of CFR47 Part 15C paragraph 15.209 and RSS-210 Intentional Radiators. The EUT demonstrated a minimum margin of 1.7 dB below the requirements. Other emissions were present with amplitudes at least 20 dB below the Limits.

Statement of Modifications and Deviations

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

Operation in the Band 902.75 - 927.25 MHz

The power output was measured at the antenna port and again on an Open Area Test Site at a 3 meters distance utilizing the antenna configurations listed. 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 six through eighteen for plots of the transmitter emissions taken at the antenna port demonstrating compliance to the specifications. The EUT is a frequency hopping spread spectrum intentional radiator utilizing 50 hopping channels. The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The EUT demonstrated compliance to channel occupancy. Figures fifteen and sixteen demonstrate compliance with dwell time on channel. As described in the operational description exhibit, the equipment complies with requirements of channel occupancy. The 902 and 928 MHz band edges are protected due to the lowest and highest channels used for frequency of operation and occupied bandwidth. Figures seventeen and eighteen and radiated emissions measurements demonstrate compliance at band edges. 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 radiated emission measured 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.

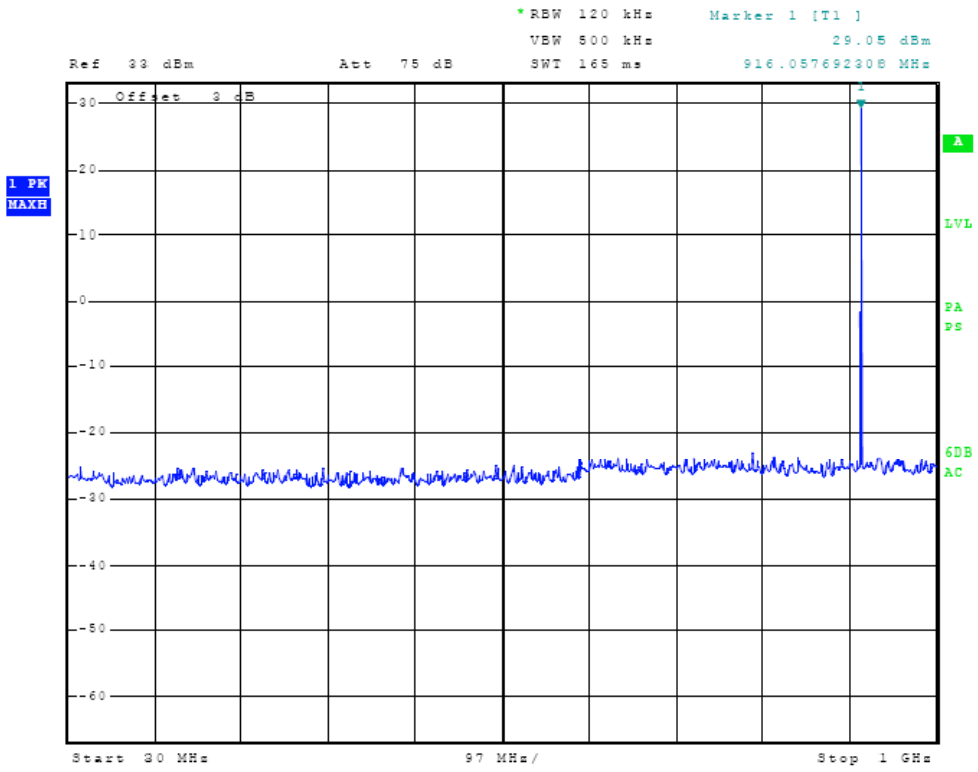

Figure Six Plot of Antenna Port Conducted Emissions

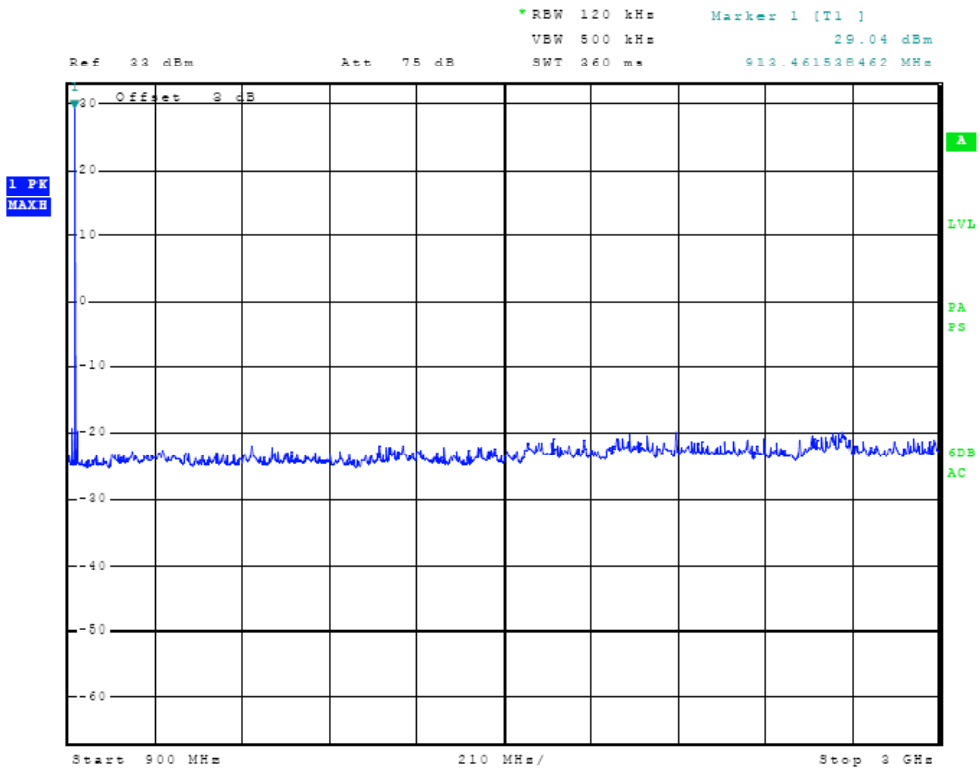

Figure Seven Plot of Antenna Port Conducted Emissions

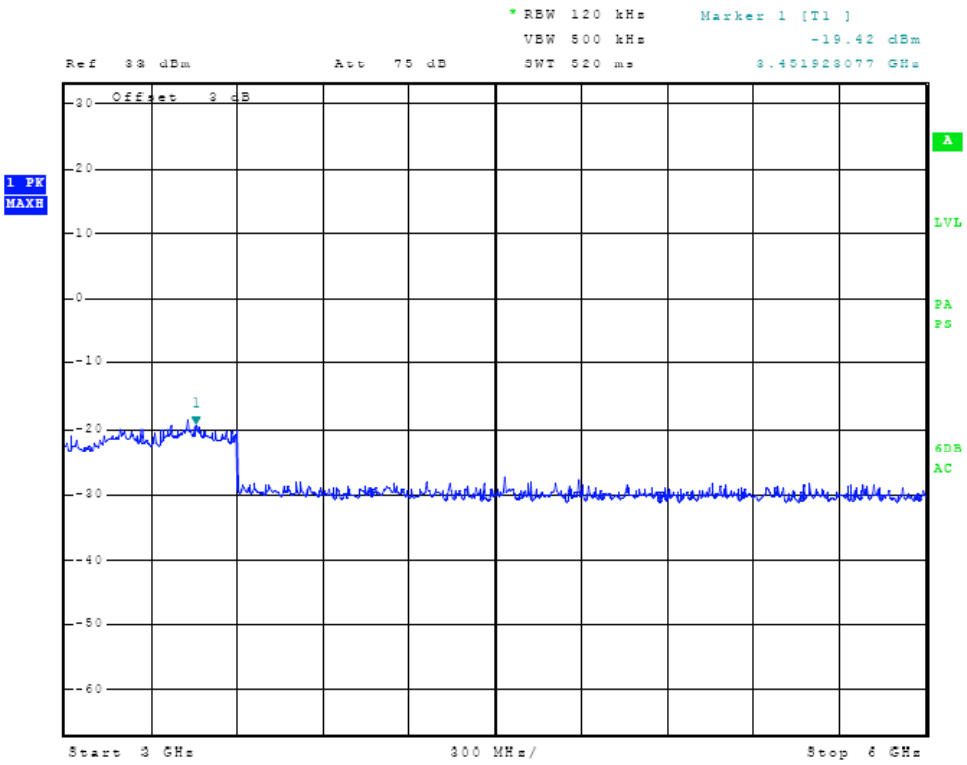

Figure Eight Plot of Antenna Port Conducted Emissions

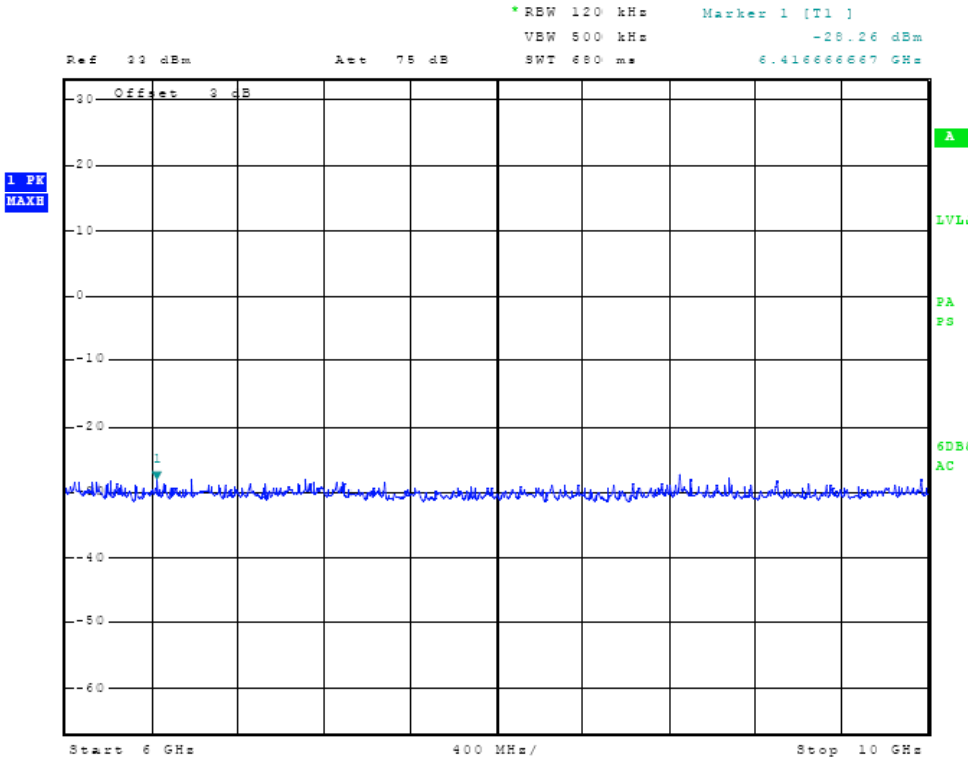

Figure Nine Plot of Antenna Port Conducted Emissions

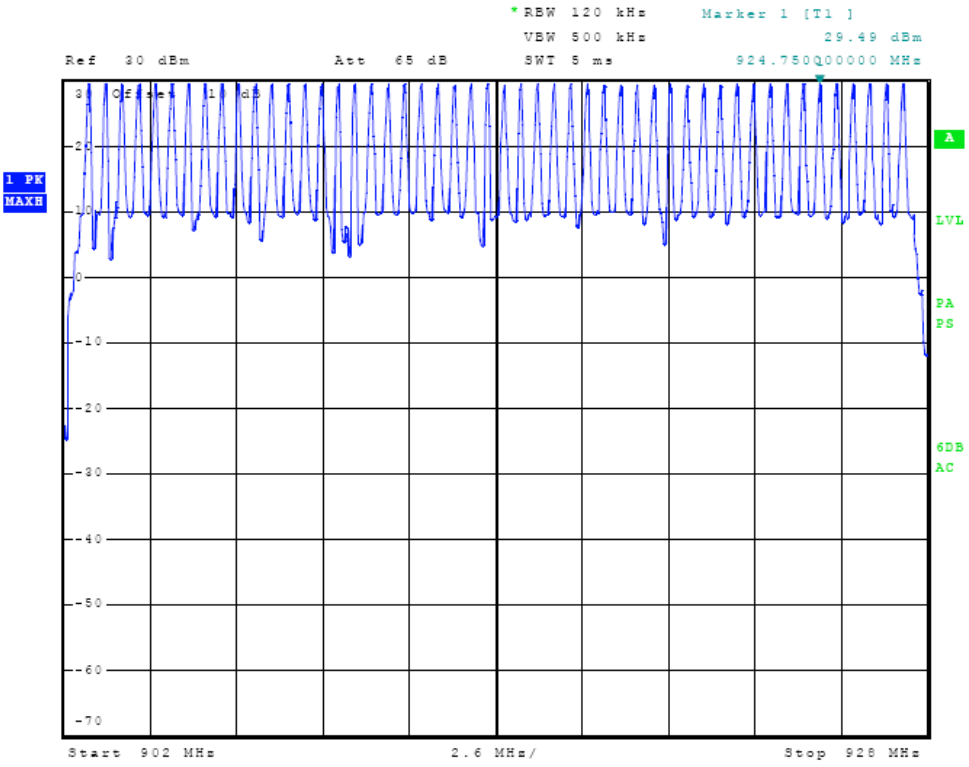

Figure Ten Plot of Antenna Output Power Across Operational Band and Channels

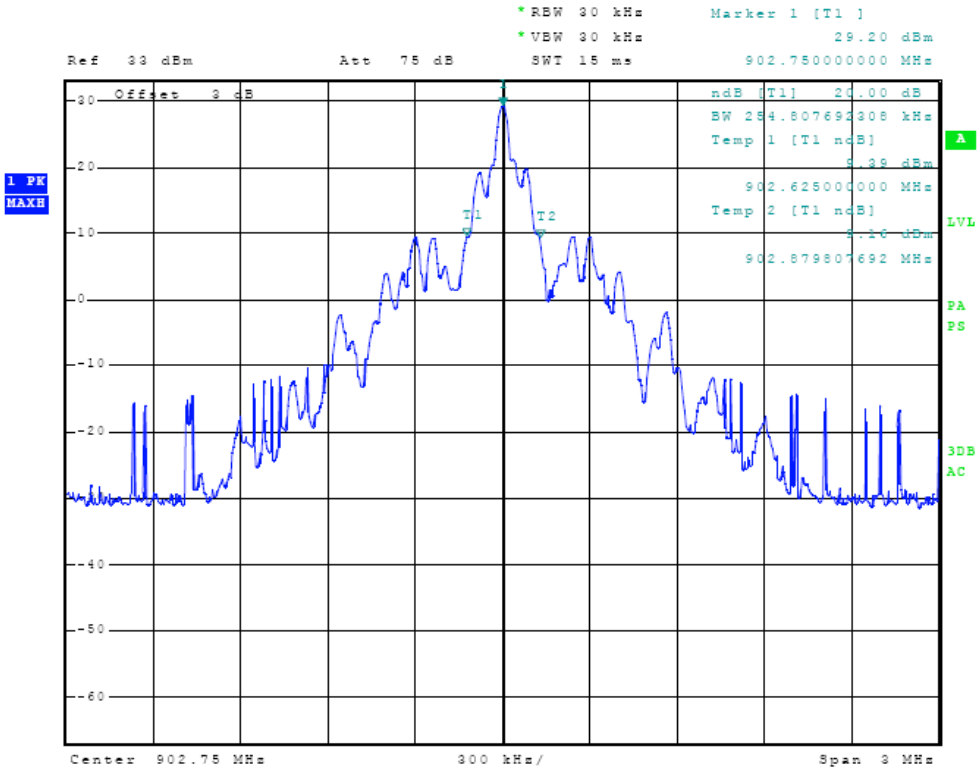

Figure Eleven Plot of 20 dB Occupied Bandwidth

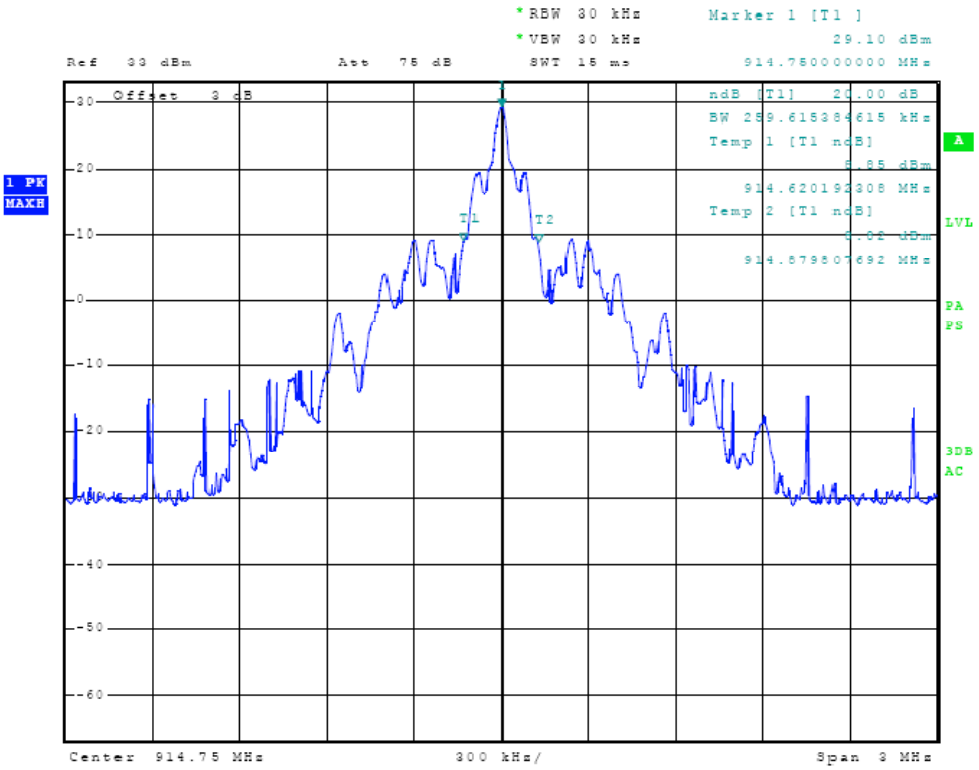

Figure Twelve Plot of 20 dB Occupied Bandwidth

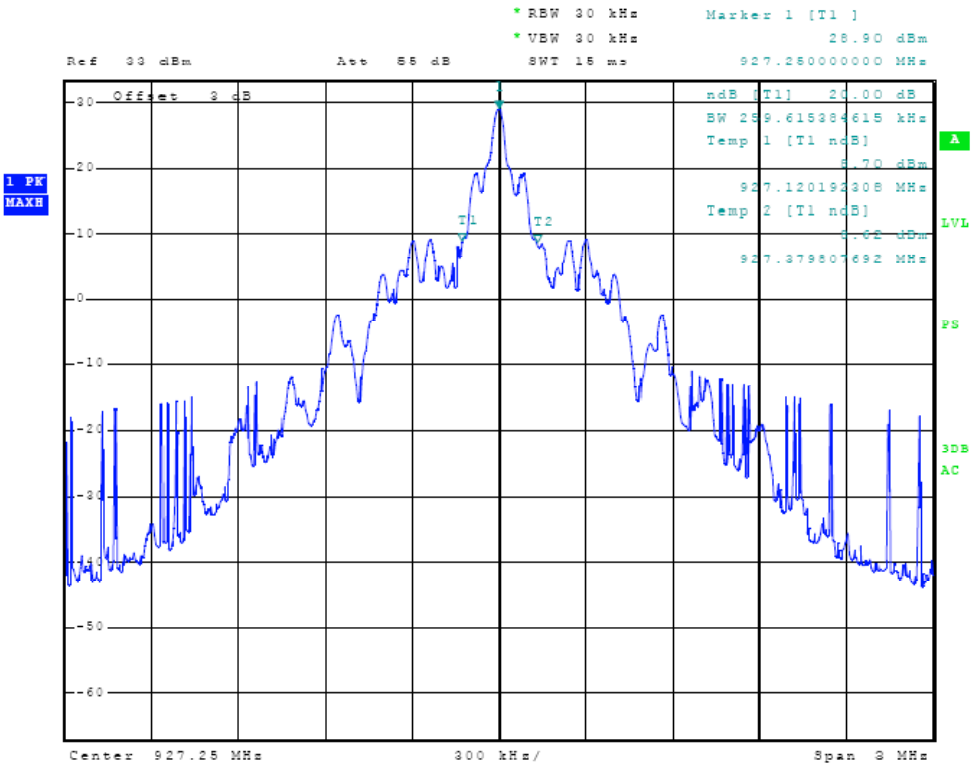

Figure Thirteen Plot of 20 dB Occupied Bandwidth

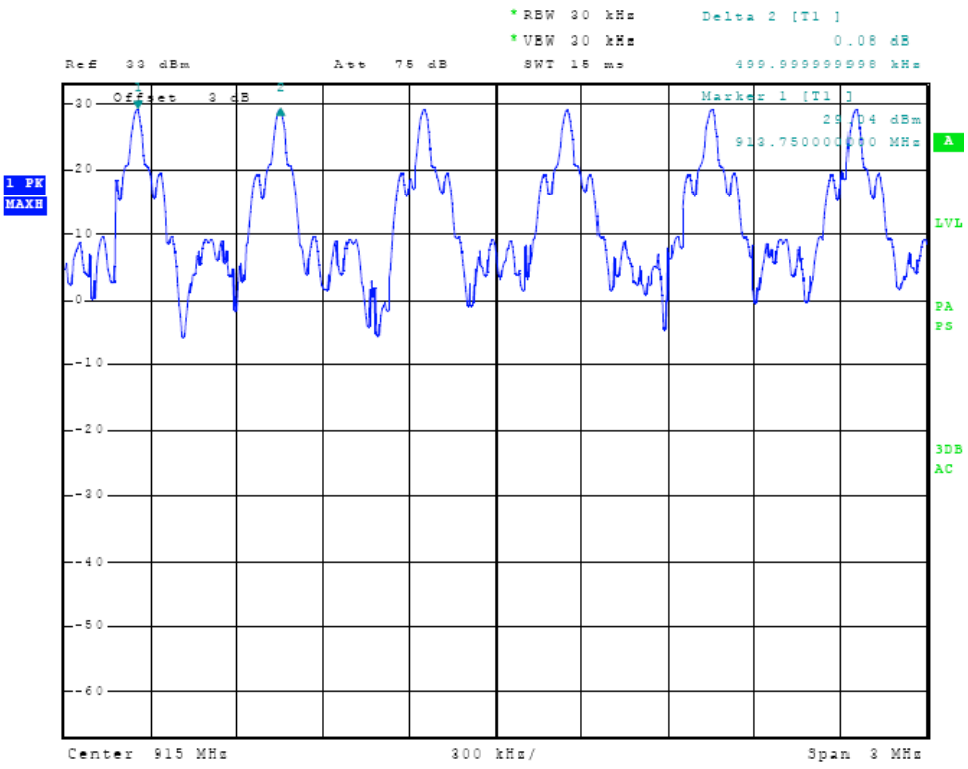

Figure Fourteen Plot of Channel Spacing

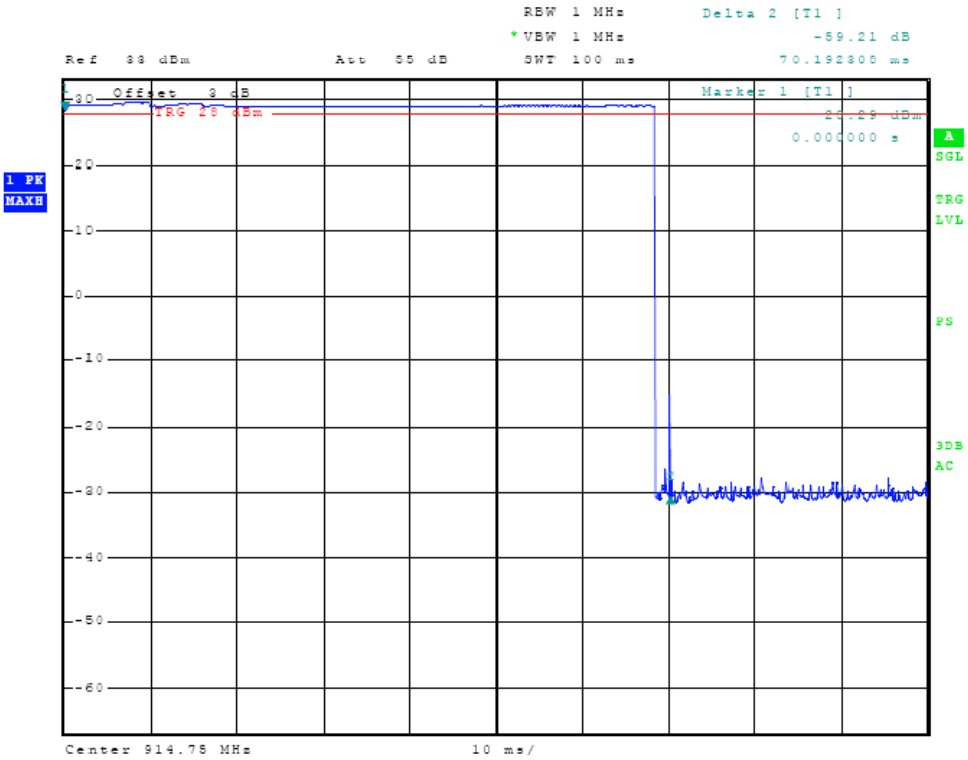

Figure Fifteen Plot of Dwell time on Channel

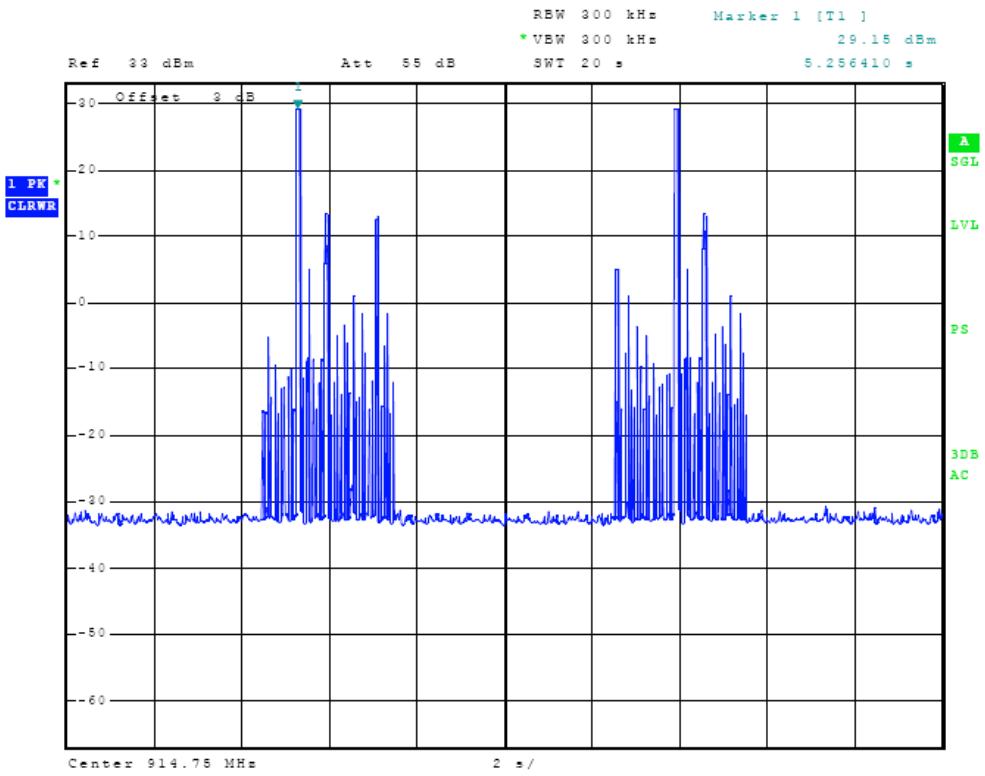

Figure Sixteen Plot of Channel Occupancy

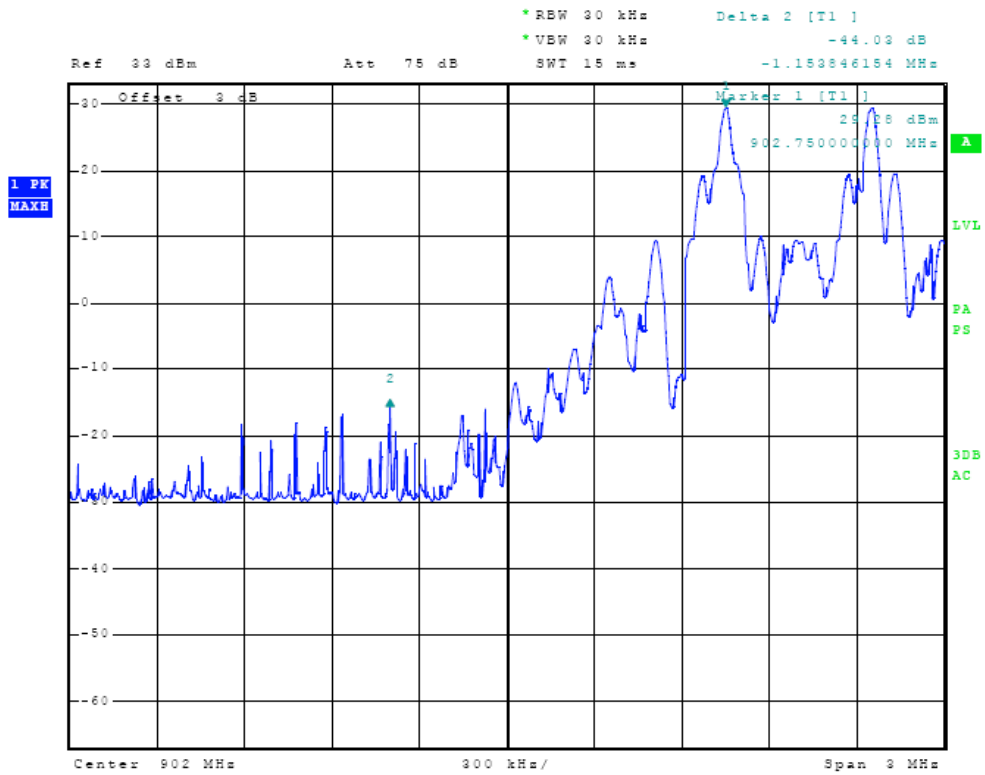

Figure Seventeen Plot of Low Band Edge

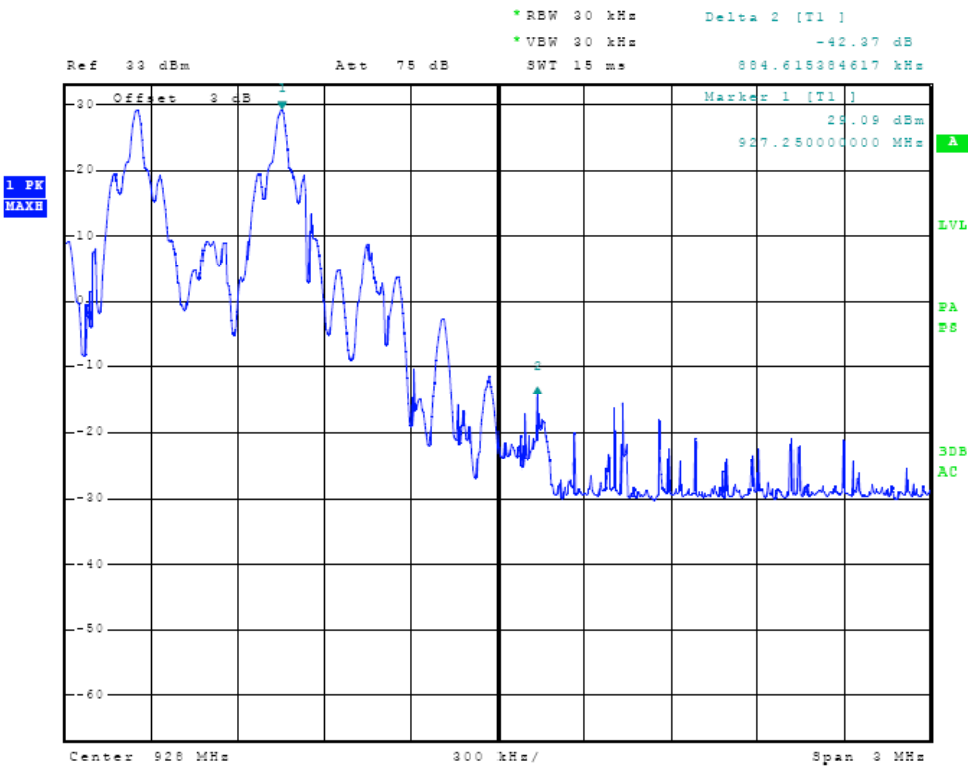

Figure Eighteen Plot of High Band Edge

Transmitter Antenna Conducted Emissions Data

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

Frequency MHz	Antenna Conducted Output Power dBm	Antenna Conducted Output Power mW	Occupied Bandwidth kHz
902.75	29.98	995.4	254.8
914.75	29.92	981.7	259.6
927.25	29.89	975.0	259.6

Transmitter Radiated Emissions Data

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)	Limit @ 3m (dBµV/m)
902.75	100.9	84.4	26.0	0	126.9	110.4	--
1805.5	28.8	36.8	29.8	25	33.6	41.6	54.0
2708.3	20.5	29.9	29.3	25	24.8	34.2	54.0
3611.0	13.7	19.3	30.5	25	19.2	24.8	54.0
4513.8	19.6	15.4	32.5	25	27.1	22.9	54.0
5416.5	27.6	26.1	33.0	25	35.6	34.1	54.0
6319.3	20.8	18.1	34.1	25	29.9	27.2	54.0
7222.0	16.7	11.5	36.4	25	28.1	22.9	54.0
914.75	100.3	83.9	26.3	0	126.6	110.2	--
1829.5	27.0	33.8	29.8	25	31.8	38.6	54.0
2744.3	33.9	25.8	29.3	25	38.2	30.1	54.0
3659.0	22.3	21.9	30.7	25	28.0	27.6	54.0
4573.8	22.6	21.7	32.5	25	30.1	29.2	54.0
5488.5	31.6	27.6	33.1	25	39.7	35.7	54.0
6403.3	21.8	21.7	34.1	25	30.9	30.8	54.0
7318.0	22.2	23.4	36.5	25	33.7	34.9	54.0
927.25	101.0	84.8	25.5	0	126.5	110.3	--
1854.5	32.1	36.4	29.8	25	36.9	41.2	54.0
2781.8	34.5	33.1	29.3	25	38.8	37.4	54.0
3709.0	19.7	15.5	30.8	25	25.5	21.3	54.0
4636.3	17.8	15.7	32.6	25	25.4	23.3	54.0
5563.5	27.1	20.5	33.1	25	35.2	28.6	54.0
6490.8	23.3	25.3	34.2	25	32.5	34.5	54.0
7418.0	14.9	16.0	36.6	25	26.5	27.6	54.0

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

Summary of Results for Radiated Emissions of Intentional Radiator

The EUT demonstrated antenna conducted output power of 995.4 milliwatt (at antenna port) and the highest radiated emission of 126.9 dBµV/m at 3 meters at the fundamental frequency of operation. The EUT demonstrated a worst-case margin of 41.6 dB below the limit for harmonic emissions. The EUT demonstrated compliance with the radiated emissions requirements for CFR47 Part 15.247 and RSS-210 Intentional Radiators. 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 requirements. The EUT demonstrated compliance with the specifications of 15.247 and RSS-210. There were no deviations or exceptions to the requirements.

Statement of Modifications and Deviations

No modifications to the EUT were required for the equipment to demonstrate compliance with the CFR47 Part 15C and RSS-210 emissions standards. There were no 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	2/09
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, Mixers: 11517A, 11970A, 11970K, 11970U, 11970V, 11970W HP Adapters: 11518, 11519, 11520	5/09
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

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