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ENGINEERING TEST REPORT
FOR
APLLICATION of
GRANT of CERTIFICATION

FOR

CFR 47, PART 15C - INTENTIONAL RADIATORS
Paragraph 15.247
Spread Spectrum Frequency Hopping System
Operation in the 902-928 MHz band

For

HOPKINS MANUFACTURING CORP.
428 Peyton
Emporia, KS 66801
Jon Gray,
Engineer

Model: BRAKE BUDDY VANTAGE
Frequency 902-928 MHz
FCC ID#: TJJ-BB002
IC: 6047A-BB002

Test Date: October 7, 2005

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FORWARD

The following is submitted for consideration in obtaining a Grant of Certification for an intentional radiator operating in one of two modes, spread spectrum frequency hopping intentional radiator per CFR Paragraph 15.247 operation in the 902 - 928MHz band.

Name of Applicant: HOPKINS MANUFACTURING CORP.
428 Peyton
Emporia, KS 66801

Model: BRAKE BUDDY VANTAGE.

FCC I.D.: TJJ-BB002.
Frequency Range: 902-928 MHz.

Operating Power: 1 mW (as design specification, measured 96.6 dBµV/m @ 3 meters).

1) Applicable Standards & Test Procedures

a) In accordance with the Federal Communications Code of Federal Regulations, dated October 1, 2004, 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 paragraphs 15.247, and FCC documents DA00-705 and DA00-1407 the following is submitted:

b) Test procedures used are the established Methods of Measurement of Radio-Noise Emissions as described in the ANSI 63.4-2003 Document FCC and documents DA00-1407 and DA00-705.

2.1033(b) Application for Certification

(1) Manufacturer: HOPKINS MANUFACTURING CORP.
428 Peyton
Emporia, KS 66801

(2) Identification: Model: BRAKE BUDDY VANTAGE
FCC I.D.: TJJ-BB002
IC: 6047A-BB002

(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:

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) Frequency hopping Spread Spectrum transmitters:

Compliance with 15.247(a)(1) and the receiver bandwidth requirement are demonstrated in this report and exhibits.

(11) Not Applicable. The EUT is not a Scanning Receiver.

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

2) Equipment Tested

Equipment	Model	FCC I.D.#
EUT	BRAKE BUDDY VANTAGE	TJJ-BB002

3) Equipment Function and Testing Procedures

The EUT is a 902-928 MHz radio transmitter used to transmit data for control of a remote brake assist system for towed equipment. The BRAKE BUDDY VANTAGE is a wireless link used for transmitting control information from one location to another. The unit operates from direct current power supplied from internal AA batteries or a 12-volt supply. The unit has no provision to connect to external peripheral equipment or alternate power sources. Upon power up the user enables an identification service, which allows the receiver to shift frequencies in synchronization with the transmitter. The EUT was tested in all standard equipment configurations and through all modes of operation.

4) Equipment and Cable Configurations

Conducted Emission Test Procedure

The unit operates from direct current power only and has no provision to connect to the public utility power system. Therefore, AC line conducted emission measurements are not required.

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. 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 exhibit for EUT placement.

5) 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	10/04	10/05
LISN	FCC	FCC-LISN-50-16-2-08	6/05	6/07
LISN	Comp. Design	1762	2/05	2/06
Antenna	ARA	BCD-235-B	10/04	10/05
Antenna	EMCO	3147	10/04	10/05
Antenna	EMCO	3143	5/05	5/06
Analyzer	HP	8591EM	5/05	5/06
Analyzer	HP	8562A	2/05	2/06

6) 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.

7) Test Site Locations

Conducted EMI: The AC power line conducted emissions tests 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 Approval: Refer to Appendix for FCC Site Approval Letter, Reference # 90910.

8) SUBPART B – UNINTENTIONAL RADIATORS

Conducted EMI

The unit operates from direct current power only and has no provision to connect to the public utility power system. Therefore, AC line conducted emission measurements are not required.

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. Plots were made of the frequency spectrum from 30 MHz to 10,000 MHz for the preliminary testing. Refer to figures one through four showing plots of the radiated emissions spectrum taken in a screen room. 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 OATS at a distance of 3 meters between the EUT and the receiving antenna. The frequency spectrum from 30 MHz to 10,000 MHz was searched for radiated emissions. Measured emission levels were maximized by EUT placement on the table, rotating the turntable through 360 degrees, varying the antenna height between 1 and 4 meters above the ground plane and changing antenna position between horizontal and vertical polarization. Antennas used were Broadband 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 10 GHz, notch filters and appropriate amplifiers were utilized.

Sample Calculations:

RFS = Radiated Field Strength

dBµV/m @ 3m = dBµV + A.F. - Amplifier Gain

dBµV/m @ 3m = 46.9 + 5.4 - 30

= 22.3

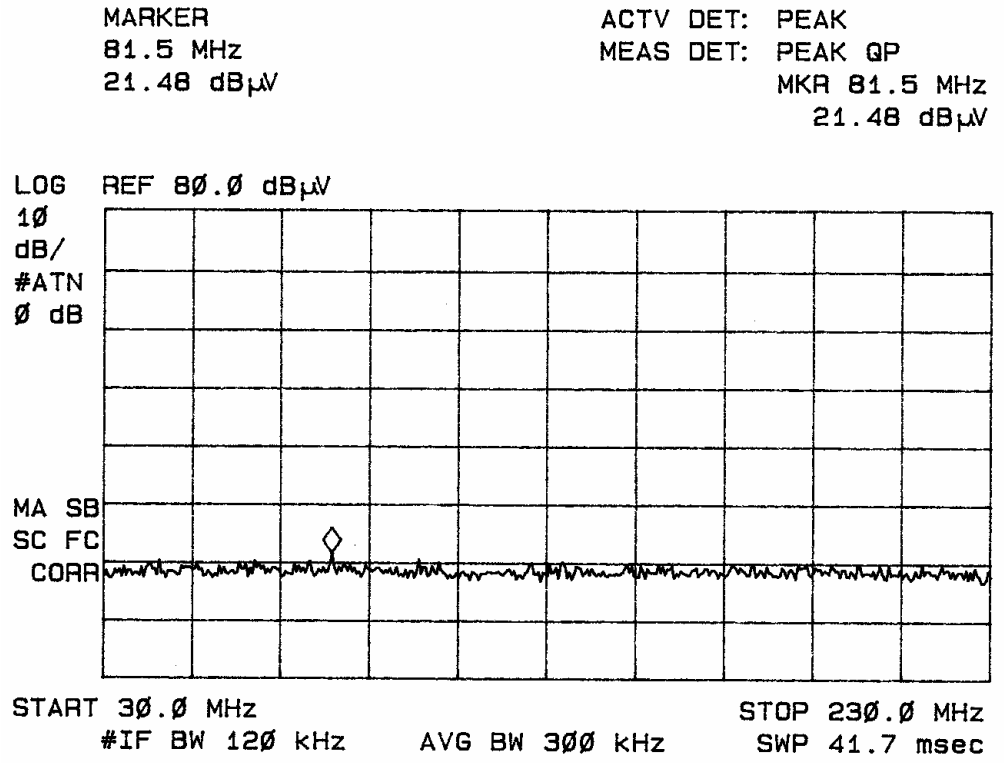

Figure 1 Radiated Emissions taken at 1 meter in screen room

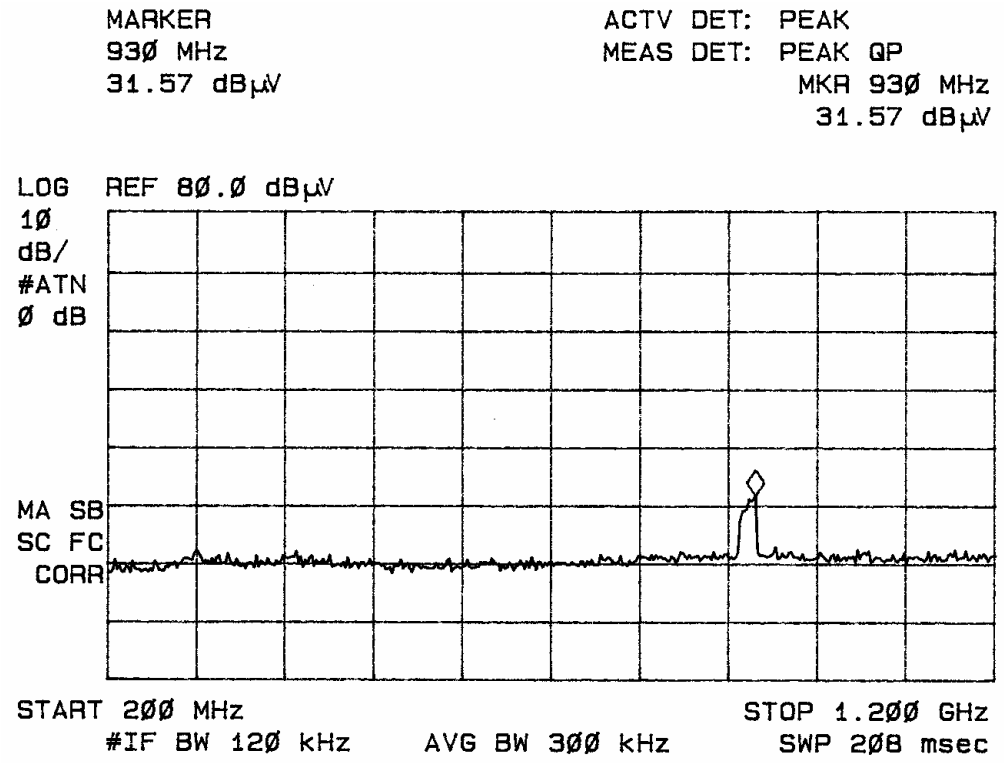

Figure 2 Radiated Emissions taken at 1 meter in screen room

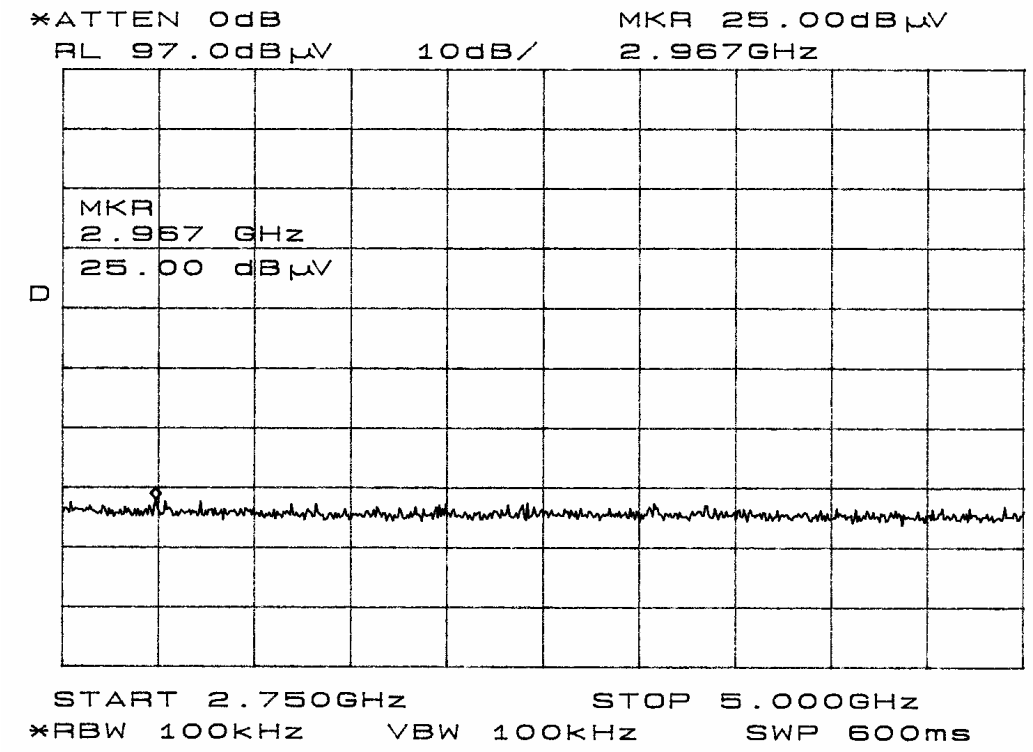

Figure 3 Radiated Emissions taken at 1 meter in screen room

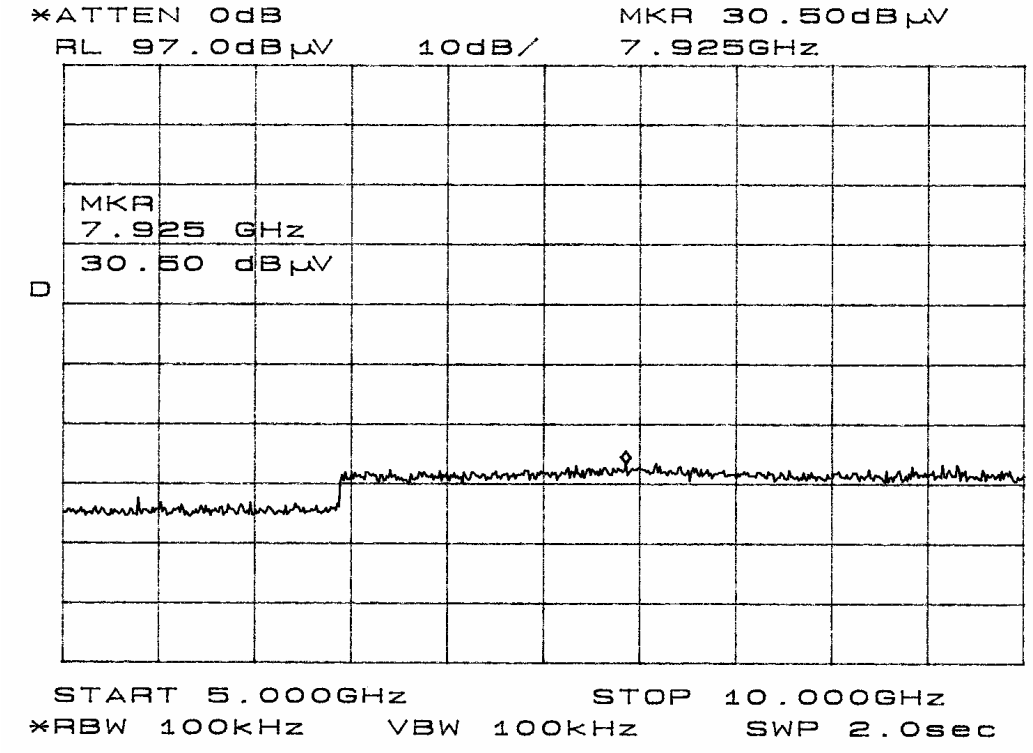

Figure 4 Radiated Emissions taken at 1 meter in screen room

Data Conducted Emissions (7 Highest Emissions)

Frequency band (MHz)	L1 Level (dBµV) Peak	Q.P.	AVE	L2 Level (dBµV) Peak	Q.P.	AVE	CISPR 22 Limit Q.P. Ave(dBµV)
0.15 – 0.5							66 – 56 / 56 - 46
0.5 – 5							56 / 46
5 – 10							60 / 50
10 – 15							60 / 50
15 – 20							60 / 50
20 – 25							60 / 50
25 – 30							60 / 50

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

Data General Radiated Emissions from EUT (6 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)	FCC Class B Limit @ 3m (dBµV/m)
55.3	46.9	53.4	5.4	30	22.3	28.8	40.0
80.0	47.3	44.5	7.8	30	25.1	22.3	40.0
120.0	51.9	47.2	7.0	30	28.9	24.2	43.5
150.0	45.2	45.3	10.2	30	25.4	25.5	43.5
160.0	47.2	54.3	8.8	30	26.0	35.1	43.5
270.0	49.3	40.5	12.5	30	31.8	23.0	46.0

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

Summary of Results for Conducted Emissions

The conducted emissions for the EUT meet the requirements for CISPR 22 and FCC Part 15B CLASS B Digital Devices. The unit operates from direct current power only and has no provision to connect to the public utility power system. Therefore, AC line conducted emission measurements are not required.

Summary of Results for Radiated Emissions

The radiated emissions for the EUT meet the requirements for CISPR 22 and FCC Part 15B CLASS B Digital Devices. The EUT had a 10.4 dB minimum margin below the Quasi-Peak 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 or FCC Part 15B Class B emissions standards. There were no deviations to the specifications.

9) Subpart C - Intentional Radiators

As per CFR Part 15, Subpart C, paragraph 15.247 the following information is submitted for consideration in obtaining a Grant of Certification.

15.203 Antenna Requirements

The unit is produced with a permanently attached antenna and is not user serviceable or removable. The requirements of 15.203 are met 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 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. The

transmitter was tested while operating on at least three frequencies in the band of operation. Peak and average amplitudes of frequencies above 1000 MHz were compared to the required limits with worst-case data presented below. 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)
= 51.9 + 7.0 - 30
= 28.9

Data Radiated Emissions 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)
120.0	51.9	47.2	7.0	30	28.9	24.2	43.5
130.0	43.1	47.6	8.0	30	21.1	25.6	43.5
150.0	45.2	45.3	10.2	30	25.4	25.5	43.5
270.0	49.3	40.5	12.5	30	31.8	23.0	46.0
2717.9	20.8	21.1	35.0	30	25.8	26.1	54.0
2745.0	23.5	21.5	35.3	30	28.8	26.8	54.0
2778.2	20.3	20.3	35.5	30	25.8	25.8	54.0
3623.8	20.0	20.3	39.8	30	29.8	30.1	54.0
3660.0	21.1	20.8	39.8	30	30.9	30.6	54.0
3704.4	20.3	20.3	39.8	30	30.1	30.1	54.0

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 14.2-dB minimum margin below the limits. 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 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. Plots were made of the frequency spectrum from 30 MHz to 10,000 MHz for the preliminary testing. Refer to figures five through nine showing plots of the radiated emissions spectrum taken in a screen room. 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 field test site at a distance of 3 meters between the EUT and the receiving antenna. The frequency spectrum from 30 MHz to 10,000 MHz was searched for radiated emissions. Measured emission levels were maximized by EUT placement on the table, rotating the turntable through 360 degrees 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 10 GHz.

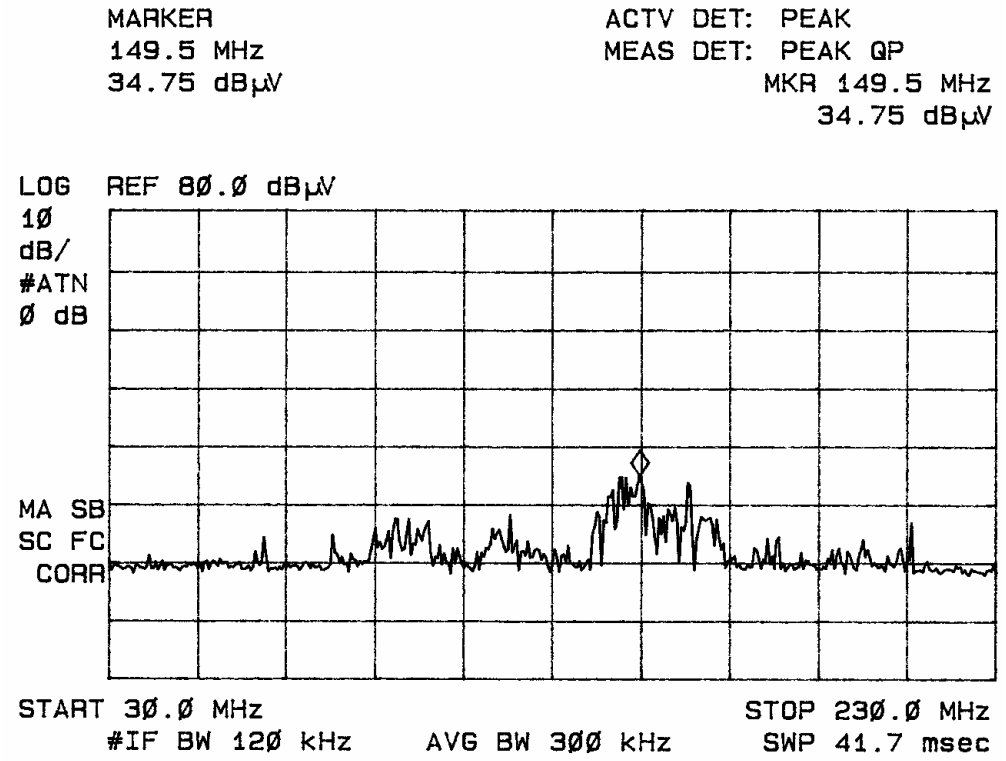

Figure 5 Radiated Emissions taken at 1 meter in screen room

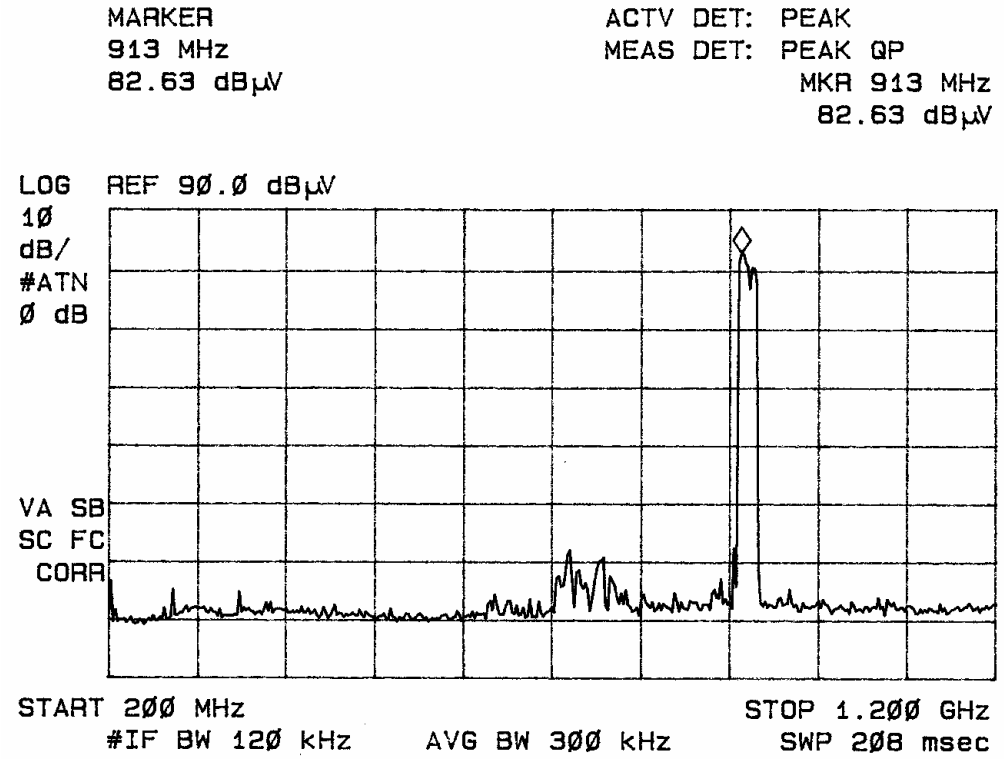

Figure 6 Radiated Emissions taken at 1 meter in screen room

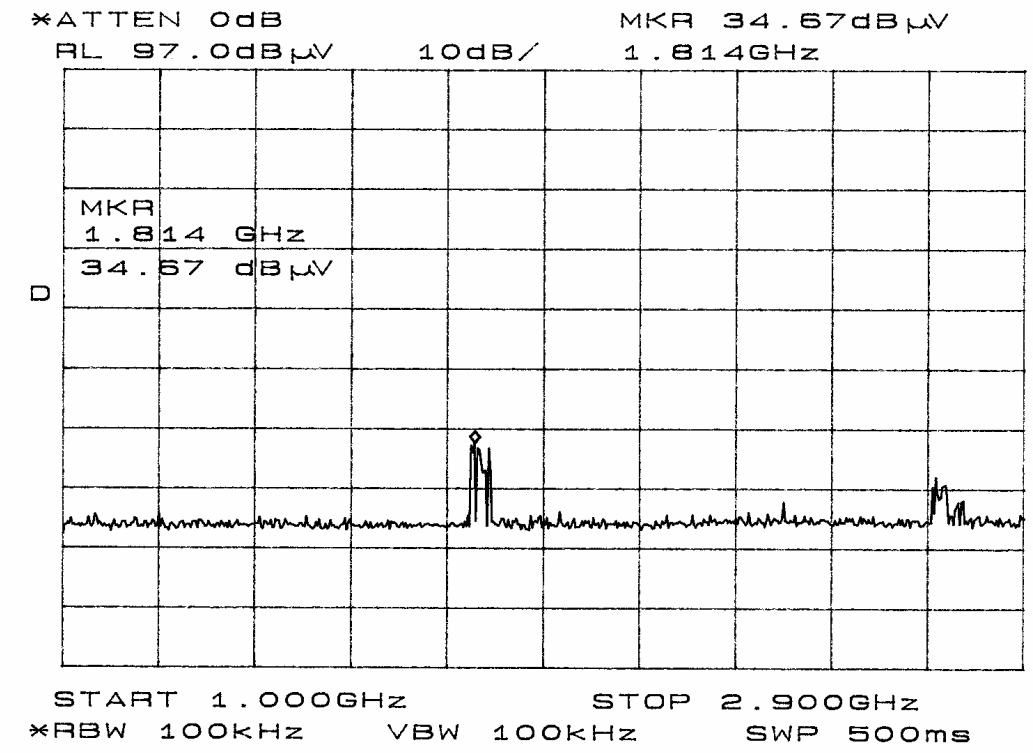

Figure 7 Radiated Emissions taken at 1 meter in screen room

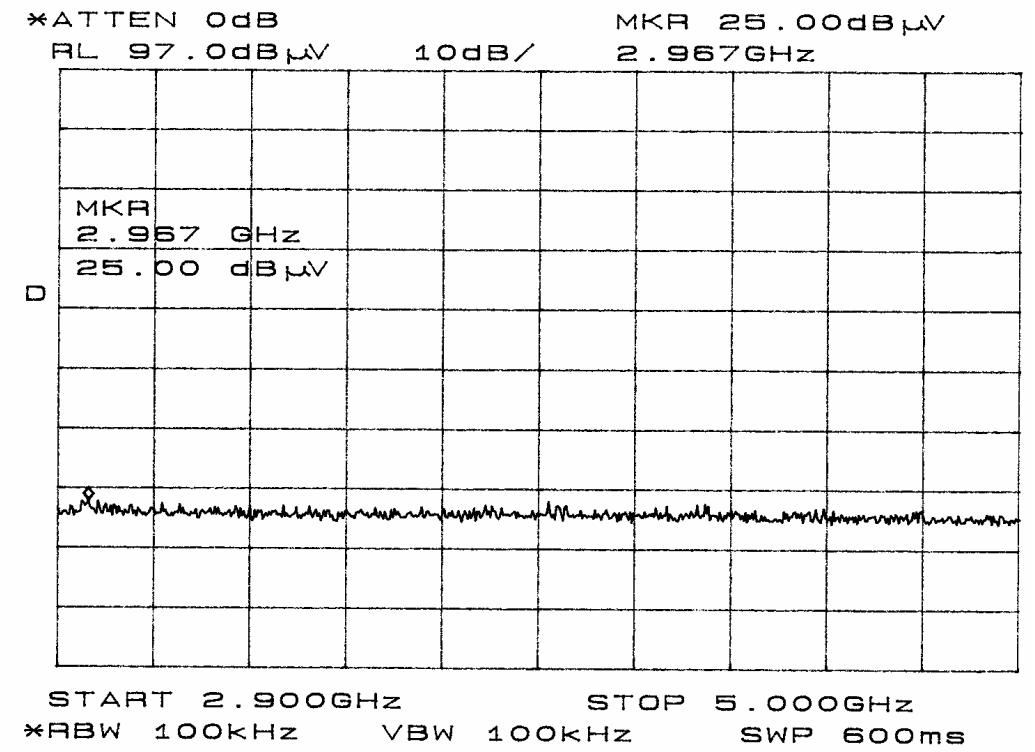

Figure 8 Radiated Emissions taken at 1 meter in screen room

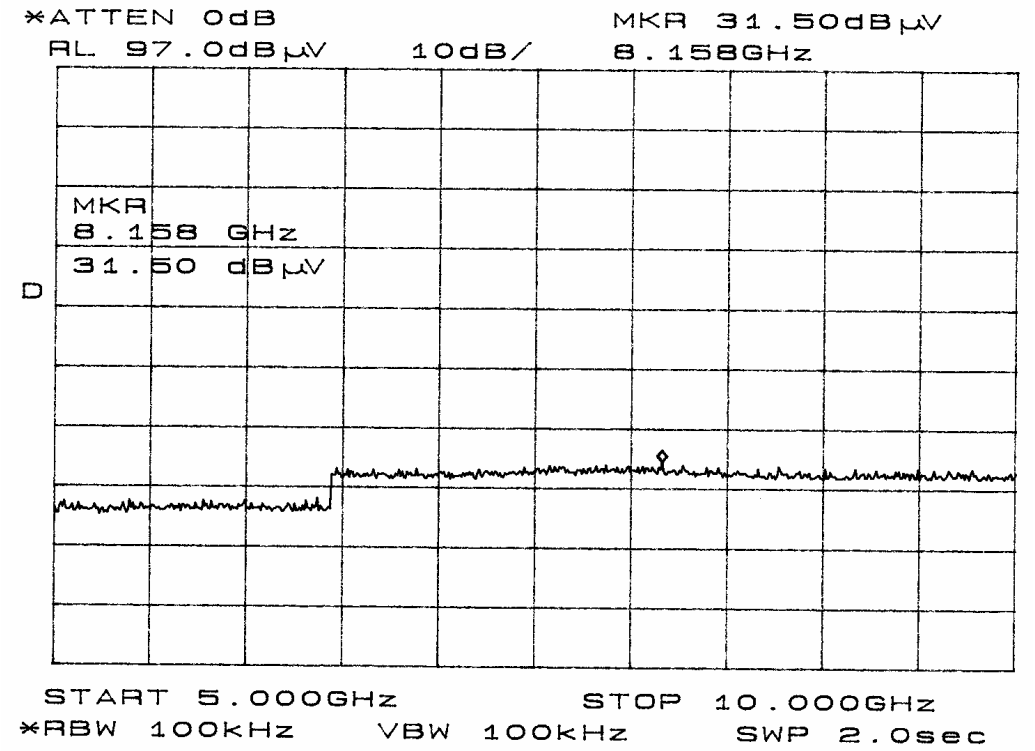

Figure 9 Radiated Emissions taken at 1 meter in screen room

Sample Calculation of radiated field strength

RFS = Radiated Field Strength
dBµV/m @ 3m = dBµV + A.F. - Amplifier Gain
dBµV/m @ 3m = 46.9 + 5.4 - 30
= 22.3

Data General Radiated Emissions from EUT (6 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)	FCC Class B Limit @ 3m (dBµV/m)
55.3	46.9	53.4	5.4	30	22.3	28.8	40.0
80.0	47.3	44.5	7.8	30	25.1	22.3	40.0
120.0	51.9	47.2	7.0	30	28.9	24.2	43.5
150.0	45.2	45.3	10.2	30	25.4	25.5	43.5
160.0	47.2	54.3	8.8	30	26.0	35.1	43.5
270.0	49.3	40.5	12.5	30	31.8	23.0	46.0

Other emissions present had amplitudes at least 10 dB below the limit.

Summary of Results for Radiated Emissions

The radiated emissions for the EUT meet the requirements for FCC Part 15C Intentional Radiators. The EUT had a 10.4 dB minimum margin below the quasi-peak limits. Other emissions were present with amplitudes at least 20 db below the FCC limits.

15.247 Operation in the Band 902-928 MHz

The power output and harmonic emissions were measured on an open area test site at a three-meter distance. Both peak and average amplitude of emissions were verified for compliance with worst-case data presented. The harmonic emissions in the restricted bands of operation were reported above and aging in the following emissions table. Data was taken per Paragraph 2.1046(a) and 15.247. The 902 and 928

MHz band edges are protected due to the 905 – 926.6 MHz channels used for frequency of operation. Refer to figures ten through fourteen showing plots taken of the spectrum analyzer display demonstrating compliance with the specifications.

(a) The EUT is a frequency hopping spread spectrum intentional radiator utilizing at least 25 hopping channels. The 20-dB bandwidth of 160 kHz meets the requirements of less than 250 kHz wide with the average time of occupancy on any frequency not greater than 0.4 seconds within a twenty-second time-period.

Information showing compliance for dwell time of occupancy and hopping sequence are displayed below.

The BRAKE BUDDY VANTAGE sequentially steps through a list of 50 channel frequencies, dwelling on channel for of 9.0 milliseconds per frequency. This equates to taking 450 milliseconds to complete one cycle through the 50 channels. Software dictates each channel used equally and only once during a cycle. During a 20 second period the transmitter will be on a channel 2222 times (20/.009)=2222. Since each channel is active only 44.4 times (2222/50=44.4) during the interval and active for 9 mS (44.4x.009), the total channel occupancy for a 20 second interval is 400 mS, which complies with the 400 mS within the 20 second period requirement. The frequencies are spaced 400 kilohertz apart and the sequence was determined at random.

(b) The maximum peak output power of the unit was measured at the open area test site since the unit has no provision to connect to the antenna port. The amplitudes of each emission and spurious emission were measured at a distance of 3 meters from the FSM antenna at the OATS. The amplitude of each 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, Log Periodic Antenna for 200 to 5000 MHz, and Pyramidal Horn antennas from 4 GHz to 10 GHz. Emissions were measured in dBµV/m at three-meters.

(c) The band edges are protected due to the frequency of operation of the EUT.

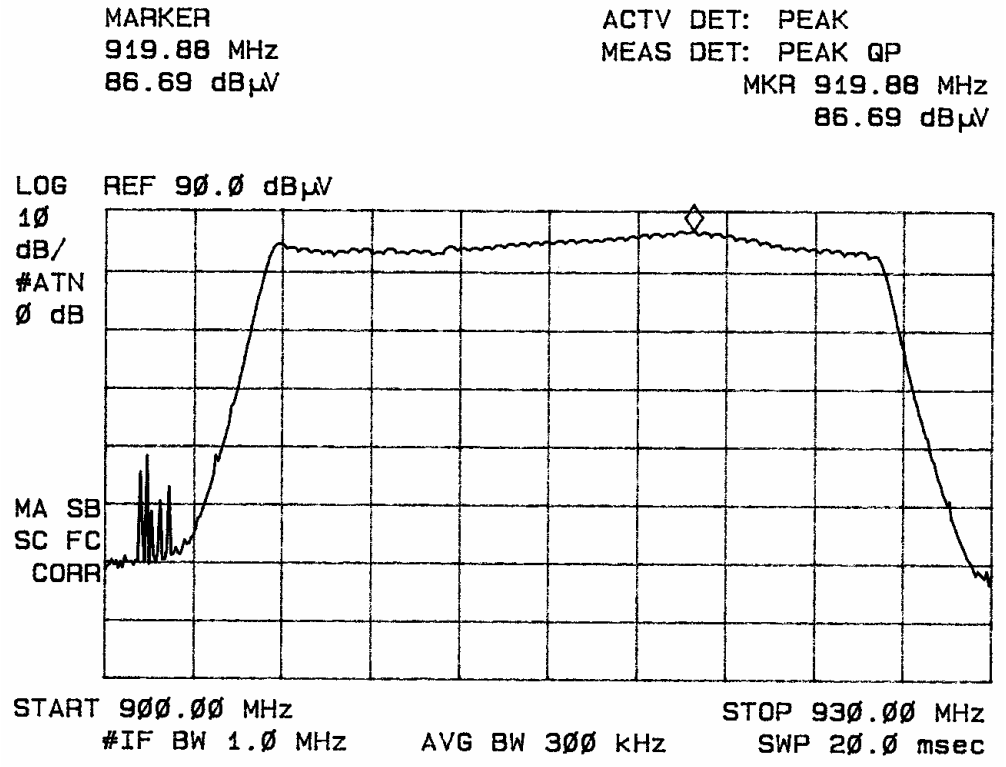

Figure 10 Maximum Power output and band edge

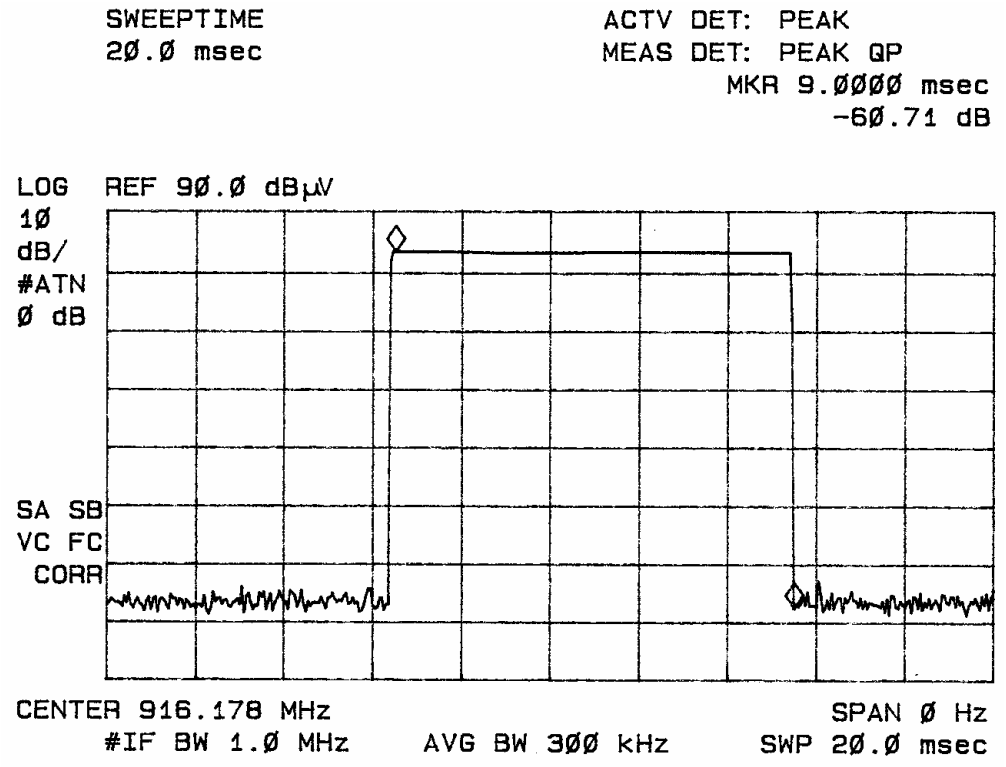

Figure 11 Dwell Time of Occupancy.

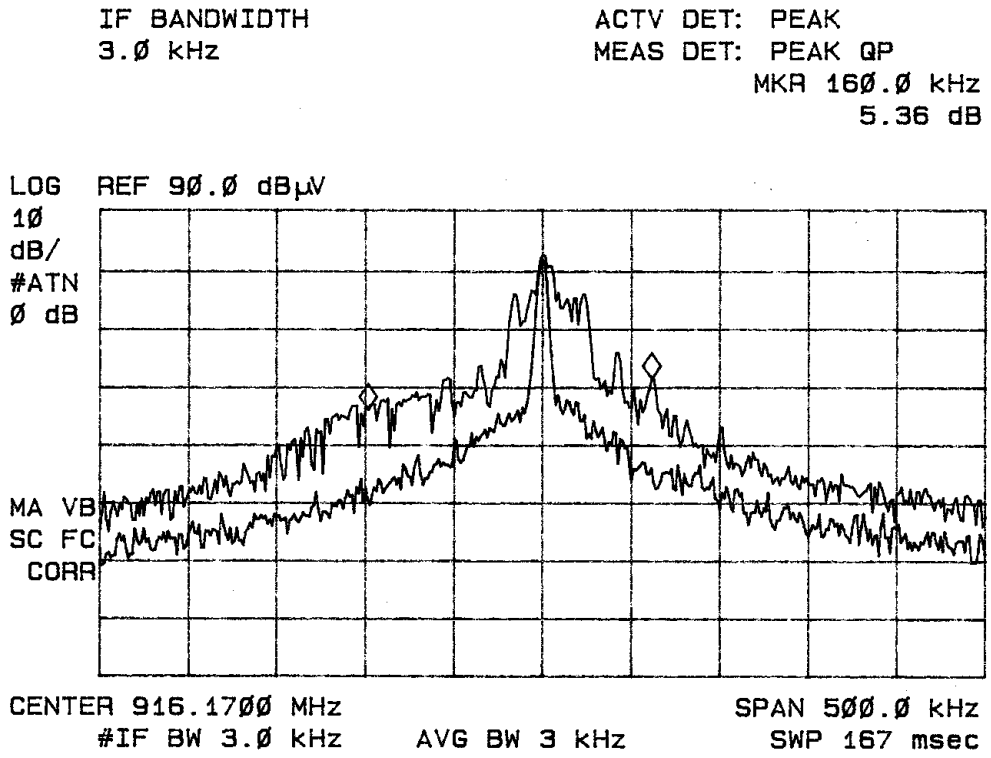

Figure 12 20-dB bandwidth.

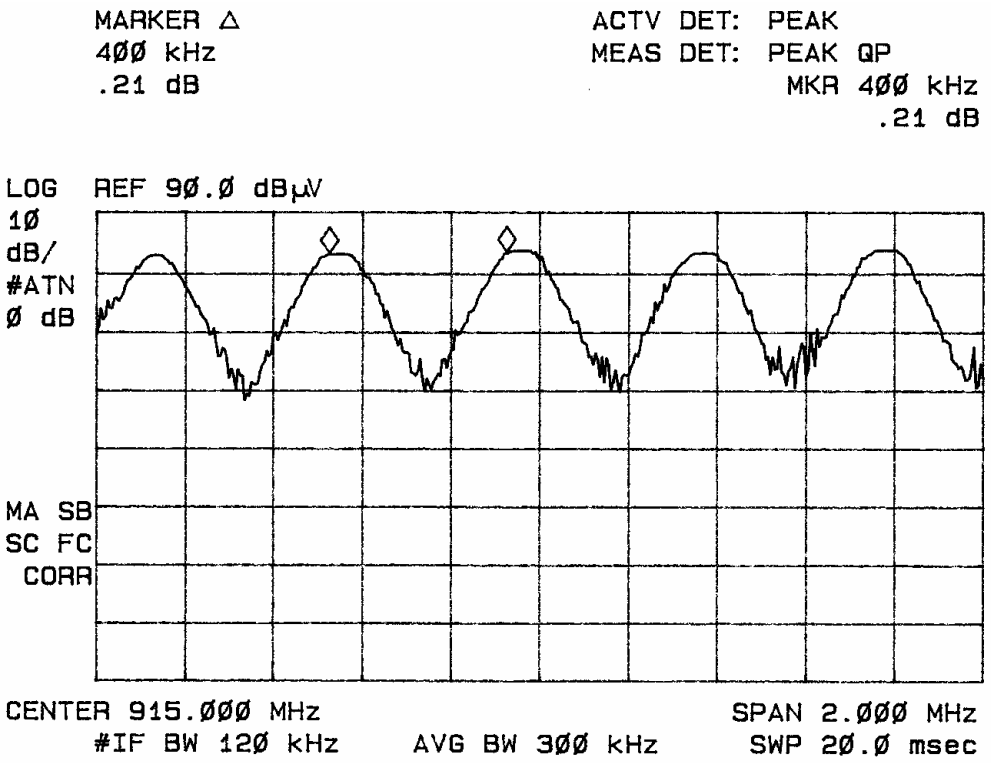

Figure 13 Channel Spacing.

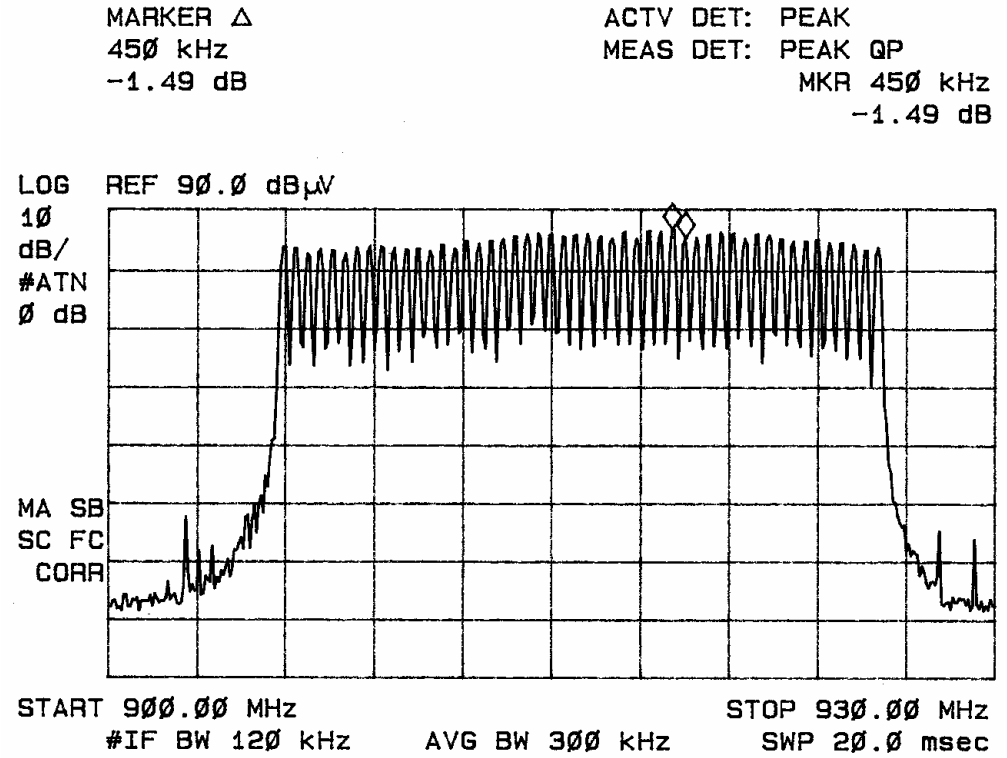

Figure 14 plot showing at least 50 hopping channels.

Sample calculation of radiated field strength

dBµv/m@ 3m = FSM + A.F. - cable loss - amplifier gain
= 73.0 + 23.3 – 0.5 - 0
= 102.4

Data Radiated Emissions from EUT

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)
905.9	67.0	72.8	23.3	-0.5	90.8	96.6	125
1811.9	19.1	20.6	29.7	30	18.8	20.3	54.0
2717.9	20.8	21.1	35.0	30	25.8	26.1	54.0
3623.8	20.0	20.3	39.8	30	29.8	30.1	54.0
4529.7	19.9	20.1	44.3	30	34.2	34.4	54.0
915.0	67.1	71.5	23.7	-0.5	91.3	95.7	125
1830.0	19.1	20.5	29.7	30	18.8	20.2	54.0
2745.0	23.5	21.5	35.3	30	28.8	26.8	54.0
3660.0	21.1	20.8	39.8	30	30.9	30.6	54.0
4575.0	21.0	19.5	44.1	30	35.1	33.6	54.0
926.0	67.3	72.2	23.8	-0.5	91.6	96.5	125
1852.0	19.0	19.0	29.6	30	18.6	18.6	54.0
2778.2	20.3	20.3	35.5	30	25.8	25.8	54.0
3704.4	20.3	20.3	39.8	30	30.1	30.1	54.0
4630.4	19.5	20.0	44.0	30	33.5	34.0	54.0

Data Antenna Substitution Method for Power Output

Frequency of Emission	Measured Amplitude of EUT emission		Signal level to substitution antenna required to reproduce	
	Horizontal	Vertical	Horizontal	Vertical
(MHz)	dBµV	dBµV	dBm	dBm
905.9	67.0	72.8	0	0
915.0	67.1	71.5	0	0
926.0	67.3	72.2	0	0

Summary of Results for Radiated Emissions of Intentional Radiator

The EUT had a 6.4 dB margin below the limit for the harmonic emissions. The radiated emissions for the EUT meet the requirements for FCC Part 15.247 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 10 dB below the FCC Limits. The specification of 15.247 are 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 meet the FCC Part 15C emissions standards. There were no deviations to the specifications.

APPENDIX

Model: BRAKE BUDDY VANTAGE

1. Test Equipment List
2. Rogers Qualifications
3. FCC Site Approval Letter

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:
Scope: Tektronix 2230	2/05
Wattmeter: Bird 43 with Load Bird 8085	2/05
Power Supplies: Sorensen SRL 20-25, SRL 40-25, DCR 150, DCR 140	2/05
H/V Power Supply: Fluke Model: 408B (SN: 573)	2/05
R.F. Generator: HP 606A	2/05
R.F. Generator: HP 8614A	2/05
R.F. Generator: HP 8640B	2/05
Spectrum Analyzer: HP 8562A, Mixers: 11517A, 11970A, 11970K, 11970U, 11970V, 11970W HP Adapters: 11518, 11519, 11520	2/05
Spectrum Analyzer: HP 8591 EM	5/05
Frequency Counter: Leader LDC 825	2/05
Antenna: EMCO Biconilog Model: 3143	5/05
Antenna: EMCO Log Periodic Model: 3147	10/04
Antenna: Antenna Research Biconical Model: BCD 235	10/04
Antenna: EMCO Dipole Set 3121C	2/05
Antenna: C.D. B-101	2/05
Antenna: Solar 9229-1 & 9230-1	2/05
Antenna: EMCO 6509	2/05
Audio Oscillator: H.P. 201CD	2/05
R.F. Power Amp 65W Model: 470-A-1010	2/05
R.F. Power Amp 50W M185- 10-501	2/05
R.F. PreAmp CPPA-102	2/05
LISN 50 µHy/50 ohm/0.1 µf	10/04
LISN Compliance Eng. 240/20	2/05
LISN Fischer Custom Communications FCC-LISN-50-16-2-08	6/05
Peavey Power Amp Model: IPS 801	2/05
Power Amp A.R. Model: 10W 1010M7	2/05
Power Amp EIN Model: A301	2/05
ELGAR Model: 1751	2/05
ELGAR Model: TG 704A-3D	2/05
ESD Test Set 2010i	2/05
Fast Transient Burst Generator Model: EFT/B-101	2/05
Current Probe: Singer CP-105	2/05
Current Probe: Solar 9108-1N	2/05
Field Intensity Meter: EFM-018	2/05
KEYTEK Ecat Surge Generator	2/05
Shielded Room 5 M x 3 M x 3.0 M (101 dB Integrity)	

6/8/2005

QUALIFICATIONS

Of

SCOT D. ROGERS, ENGINEER

ROGERS LABS, INC.

Mr. Rogers has approximately 16 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

October 7, 2005
Date

1/11/03

FEDERAL COMMUNICATIONS COMMISSION

Laboratory Division
7435 Oakland Mills Road
Columbia, MD 21046

August 15, 2003

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: August 15, 2003

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,

Ms. Phyllis Parrish
Information Technician