ROGERS LABS, INC.
4405 West 259th Terrace
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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 Module

For

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

DATA TRANSMITTER
Model: 1100 WIRELESS
Frequency 902-928 MHz
FCC ID#: CCK 1100

Test Date: October 27, 2003

Certifying Engineer: Scot D Rogers

Scot D. Rogers
ROGERS LABS, INC.
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FORWARD:

The following is submitted for consideration in obtaining a Grant of Certification for frequency hopping spread spectrum intentional radiators operating under CFR Paragraph 15.247.

Name of Applicant:

DIGITAL MONITORING PRODUCTS, Inc.
2500 North Partnership Boulevard
Springfield, MO 65802-6310

Model: 1100 WIRELESS.

FCC I.D.: CCK 1100.

Frequency Range: 902-928 MHz.

Operating Power: 0.034 W (3 meter effective radiated measurement).

1) Applicable Standards & Test Procedures

a) In accordance with the Federal Communications Code of Federal Regulations, dated October 1, 2002, 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 the following is submitted:

b) Test procedures used are the established Methods of Measurement of Radio-Noise Emissions as described in the ANSI 63.4-1992 Document FCC, documents DA00-1407 and DA00-705 and/or TIA/EIA 603-1.

2.1033(b) Application for Certification

(1) Manufacturer: DIGITAL MONITORING PRODUCTS, INC.
2500 North Partnership Boulevard
Springfield, MO 65802-6310

(2) Identification: Model: 1100 WIRELESS
FCC I.D.: CCK 1100

(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) 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	1100 WIRELESS	CCK 1100

3) Equipment Function and Testing Procedures

The EUT is a 902-928 MHz radio transmitter used to transmit alarm contact conditions for use in an alarm panel installation. The 1100 WIRELESS DATA TRANSMITTER is a wireless link used for transmitting information from one remote location to another. The unit is marketed for use to incorporate a wireless link in an alarm system solution. The unit typically operates from an ac wall transformer source. For testing purposes, a wall transformer, supplied by the manufacturer, was used to power the unit. The device utilizes a permanently connected antenna system with no provision for user replacement. The unit has no provision to connect to external auxiliary equipment.

4) Equipment and Cable Configurations

Conducted Emission Test Procedure

The unit typically operates from an ac wall transformer with battery backup supplied in the control panel enclosure. For testing purposes, a wall transformer was used to power the unit. The test setup, including the EUT, was arranged in a typical equipment configuration and placed on a 1 x 1.5-meter wooden bench, 0.8 meters high located in a screen room. The power lines of the system were isolated from the power source using a standard LISN with a 50-µHy choke. EMI was coupled to the spectrum analyzer through a 0.1 µF capacitor internal to the LISN. The LISN was positioned on the floor beneath

the wooden bench supporting the EUT. The power lines and cables were draped over the back edge of the table.

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 exhibits 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. DATES	DUE.
LISN Comp. Design	FCC-LISN-2-MOD.CD	10/03	10/04
Antenna ARA	BCD-235-B	10/03	10/04
Antenna EMCO	3147	10/03	10/04
Antenna EMCO	3143	5/03	5/04
AnalyzerHP	8591EM	5/03	5/04
AnalyzerHP	8562A	2/03	2/04

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 EUT was arranged in a typical equipment configuration and placed on a 1 x 1.5-meter wooden bench 80 cm above the conducting ground plane, floor of a screen room. The bench was positioned 40 cm away from the wall of the screen room. The LISN was positioned on the floor of the screen room 80 cm from the rear of the EUT. The

manufacturer supplied AC power wall adapter for the EUT was connected to the LISN. A second LISN was positioned on the floor of the screen room 80 cm from the rear of the supporting equipment of the EUT. All power cords except the EUT were then powered from the second LISN. EMI was coupled to the spectrum analyzer through a 0.1 µF capacitor, internal to the LISN. Power line conducted emissions testing was carried out individually for each current carrying conductor of the EUT. The excess length of lead between the system and the LISN receptacle was folded back and forth to form a bundle not exceeding 40 cm in length. The screen room, conducting ground plane, analyzer, and LISN were bonded together to the protective earth ground. Preliminary testing was performed to identify the frequency of each radio frequency emission displaying the highest amplitude. The cables were repositioned to obtain maximum amplitude of measured EMI level. Once the worst-case configuration was identified, plots were made of the EMI from 0.15 MHz to 30 MHz then the data was recorded with maximum conducted emissions levels. Refer to figures one and two for plots of conducted emissions.

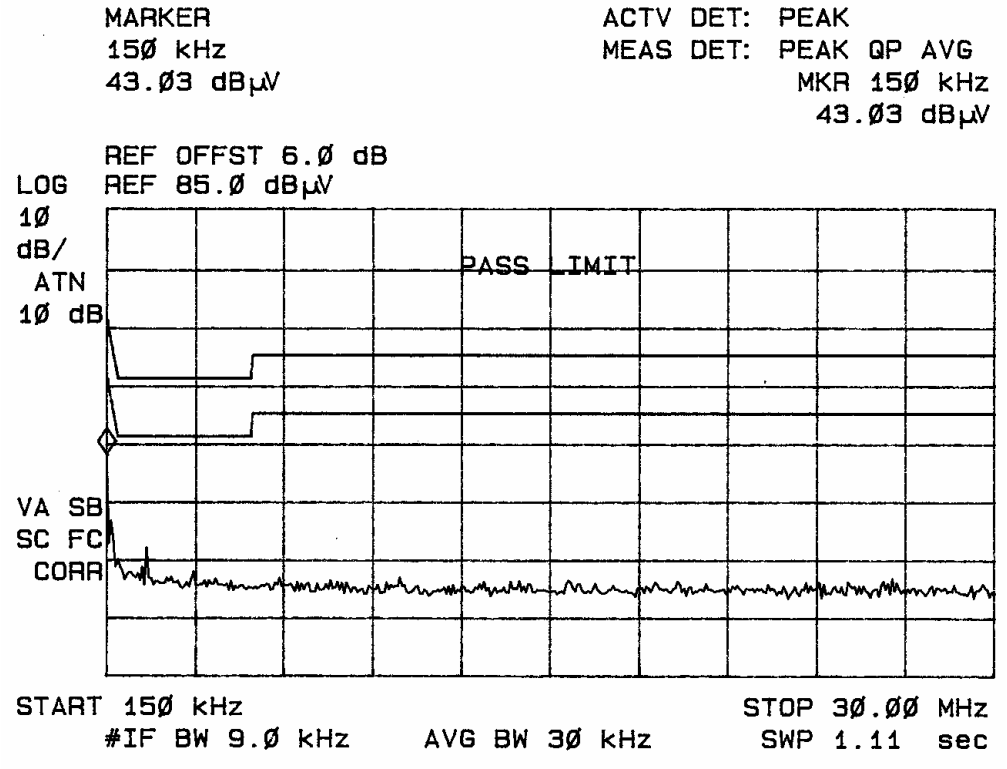

Figure one Line Conducted Emissions Line 1.

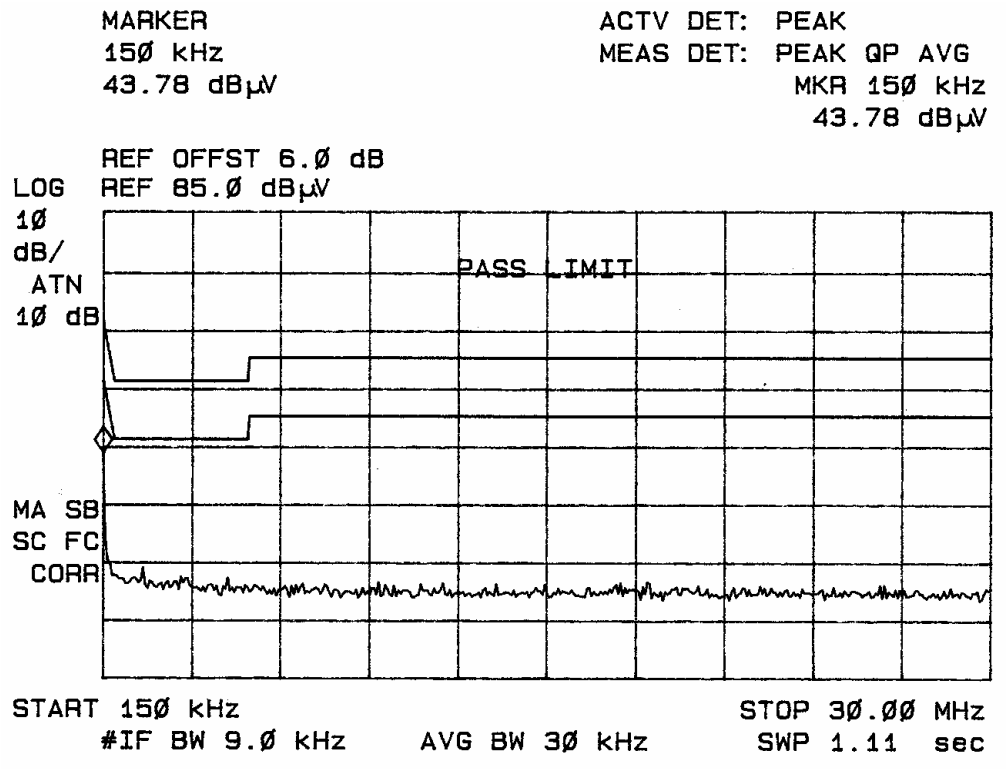

Figure two Line Conducted Emissions Line 2.

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 three through eight for plots of the radiated emissions spectrum taken in a screen room. The highest radiated emission was then re-maximized at the OATS location before final radiated emissions measurements were performed. Final data was taken with the EUT located at the OATS at a distance of 3 meters between the EUT and the receiving antenna. The frequency spectrum from 30 MHz to 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 = 42.2 + 9.4 - 30
= 21.6

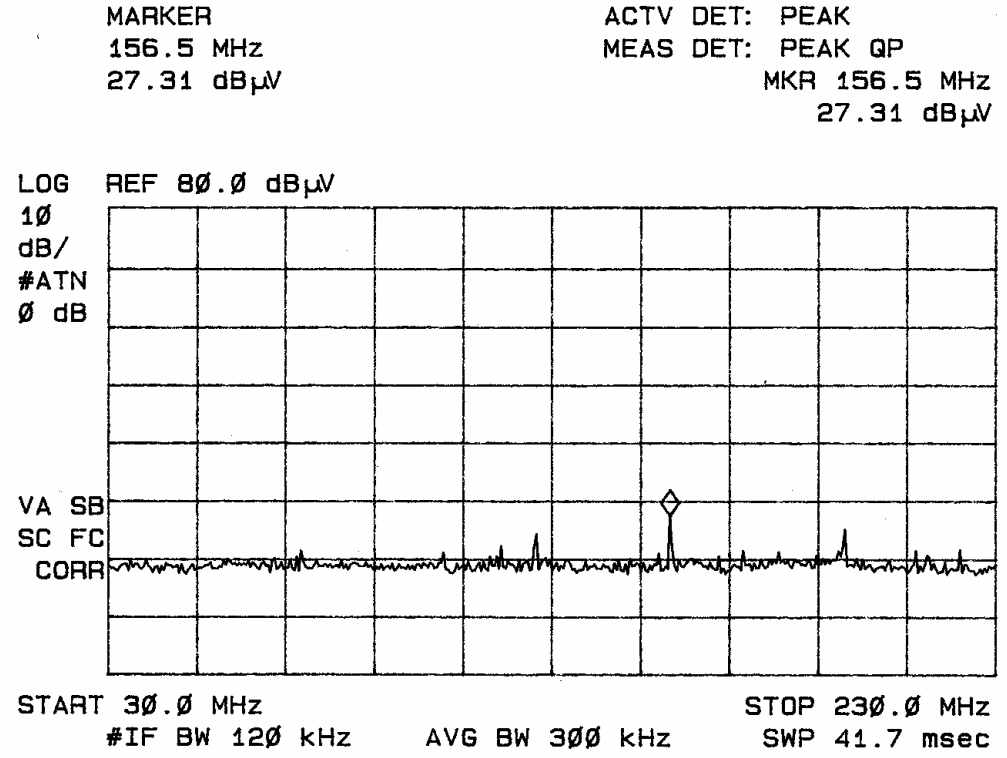

Figure three Radiated Emissions taken at 1 meter in screen room.

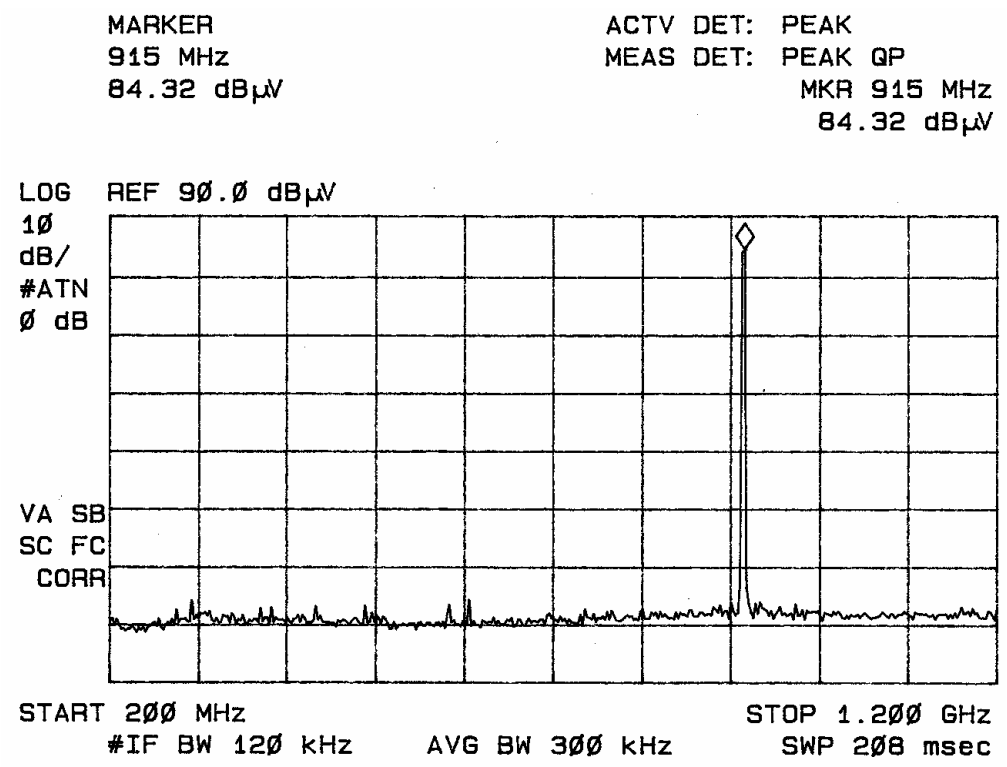

Figure four Radiated Emissions taken at 1 meter in screen room.

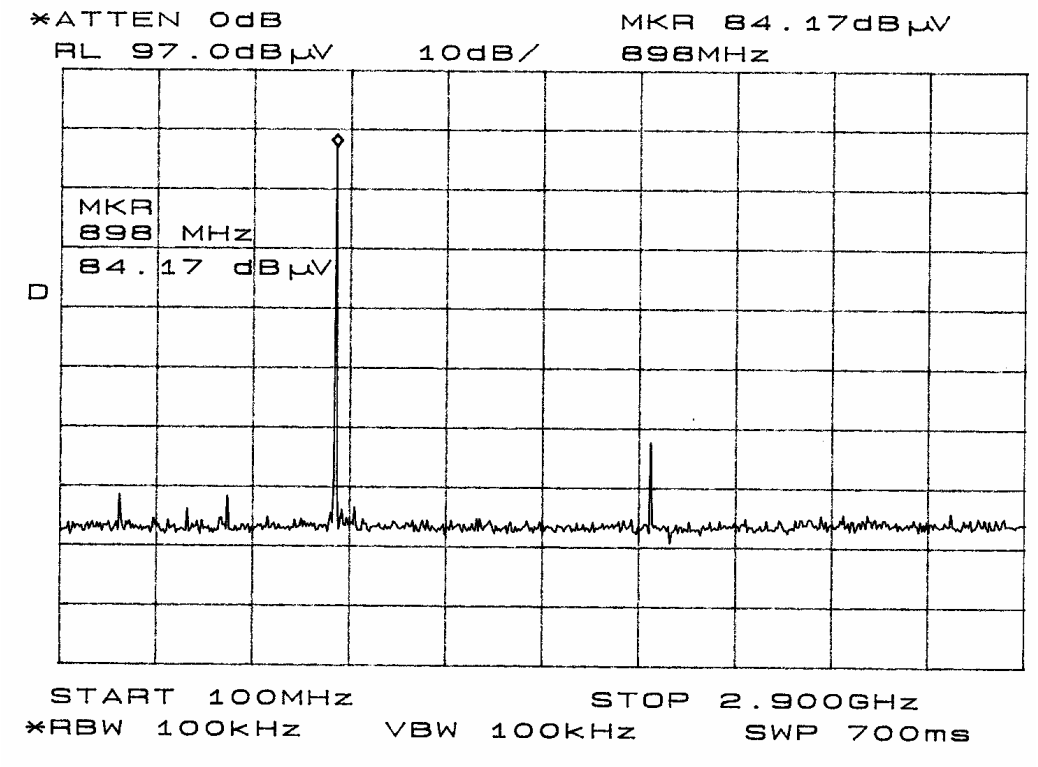

Figure five Radiated Emissions taken at 1 meter in screen room.

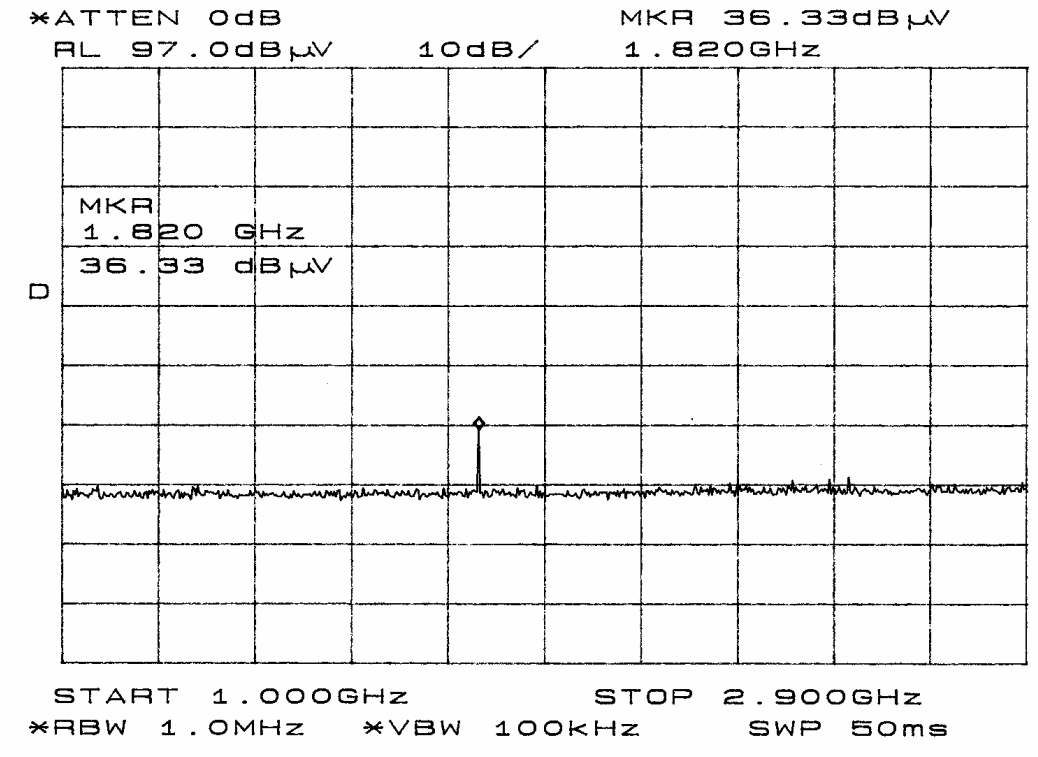

Figure six Radiated Emissions taken at 1 meter in screen room.

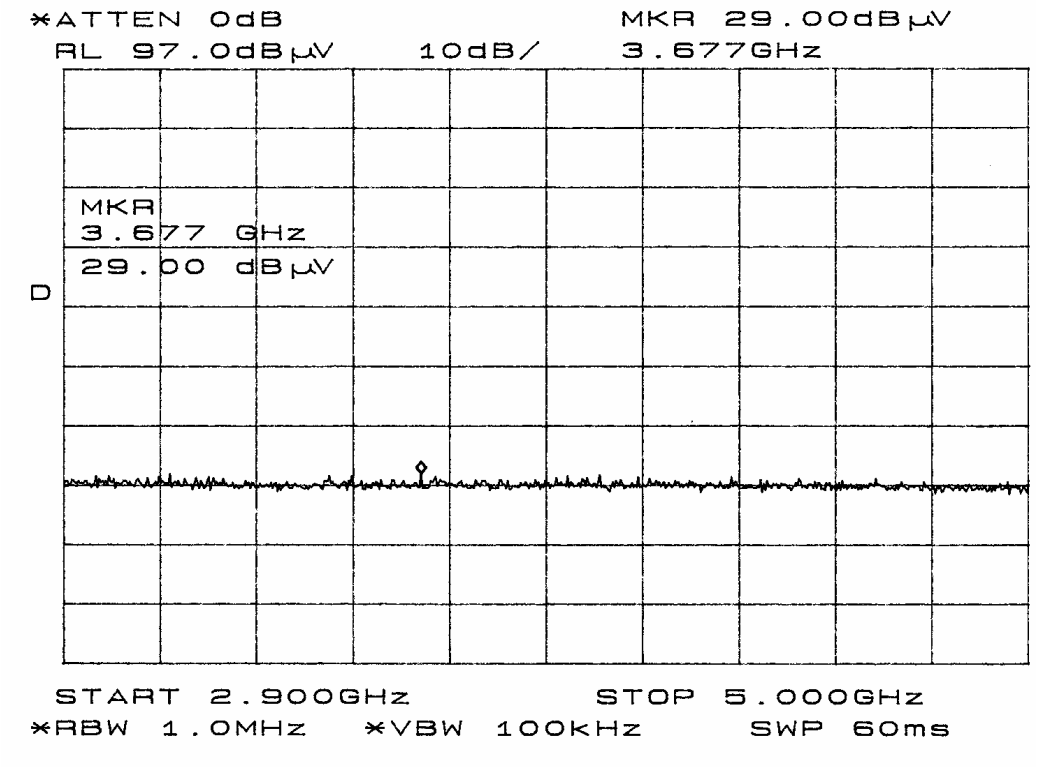

Figure seven Radiated Emissions taken at 1 meter in screen room.

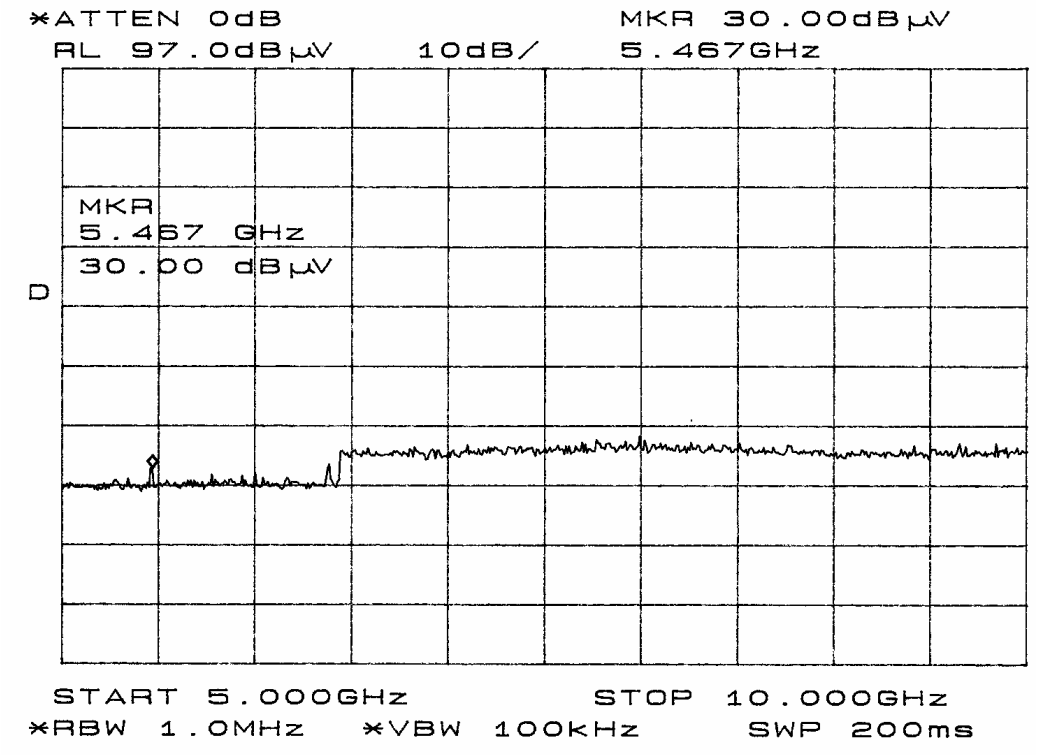

Figure eight Radiated Emissions taken at 1 meter in screen room.

Conducted (7 Highest Emissions)

Frequency band (MHz)	L1 Level (dBµV) Peak	Q.P.	AVE	L2 Level (dBµV) Peak	Q.P.	AVE	CISPR 22 Q.P./AVE Limit(dBµV)
0.15 - 0.5	43.0	38.7	24.9	43.8	38.9	23.0	66 / 56
0.5 – 5	28.3	23.2	17.8	23.9	20.8	16.7	56 / 46
5 – 10	20.4	15.6	9.3	20.7	15.3	9.0	60 / 50
10 – 15	19.1	15.0	8.6	20.0	15.0	9.0	60 / 50
15 – 20	19.2	15.0	8.8	21.6	15.1	8.6	60 / 50
20 – 25	19.5	14.9	8.7	19.2	15.0	8.9	60 / 50
25 - 30	19.5	14.9	8.8	21.3	14.7	8.5	60 / 50

Other emissions present had amplitudes at least 10 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)
156.0	42.2	51.8	9.4	30	21.6	31.2	43.5
195.0	56.2	50.5	10.4	30	36.6	30.9	43.5
211.4	42.3	43.2	10.6	30	22.9	23.8	43.5
295.2	48.1	51.0	13.5	30	31.6	34.5	46.0
438.0	50.1	51.6	16.6	30	36.7	38.2	46.0
585.0	42.7	35.8	19.0	30	31.7	24.8	46.0

Other emissions present had amplitudes at least 10 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 EUT had a 27.1 dB minimum margin below the quasi-peak limit and a 28.2 dB margin below the average limit. Other emissions were present with recorded data representing worst-case amplitudes.

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 6.9 dB minimum margin below the quasi-peak limit. Other emissions were present with amplitudes at least 10 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 or exceptions to the specifications.

9) Subpart C - Intentional Radiators

As per CFR Part 15, Subpart C, paragraph 15.247 the following information is submitted.

15.203 Antenna Requirements

The unit is produced with permanently attached antennas and has no 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)
= 34.0 + 6.3 - 30
= 10.3

Data: 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)
115.6	34.0	36.0	6.3	30	10.3	12.3	43.5
126.0	36.6	38.0	7.5	30	14.1	15.5	43.5
172.4	31.2	44.0	8.7	30	9.9	22.7	43.5
2713.8	29.5	29.5	35.5	27.5	37.5	37.5	54.0
2745.0	29.5	29.1	35.3	27.5	37.3	36.9	54.0
2781.0	30.5	30.0	35.5	27.5	38.5	38.0	54.0
3618.4	31.8	31.5	39.8	27.5	44.1	43.8	54.0
3660.0	30.5	31.5	39.8	27.5	42.8	43.8	54.0
3708.0	31.5	31.6	39.8	27.5	43.8	43.9	54.0
4523.0	31.3	30.8	43.7	27.5	47.5	47.0	54.0
4575.0	31.3	31.3	44.2	27.5	48.0	48.0	54.0
4635.0	31.0	30.5	44.0	27.5	47.5	47.0	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 6.0 dB minimum margin below the limits. Both average and peak amplitudes 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 10 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 10,000 MHz and plots were made of the frequency spectrum from 30 MHz to 10,000 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 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 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.

Sample Calculations:

RFS = Radiated Field Strength

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

dBµV/m @ 3m = 42.7 + 7.7 - 35

= 15.4

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)
156.0	42.2	51.8	9.4	30	21.6	31.2	43.5
195.0	56.2	50.5	10.4	30	36.6	30.9	43.5
211.4	42.3	43.2	10.6	30	22.9	23.8	43.5
295.2	48.1	51.0	13.5	30	31.6	34.5	46.0
438.0	50.1	51.6	16.6	30	36.7	38.2	46.0
585.0	42.7	35.8	19.0	30	31.7	24.8	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 6.9 dB minimum margin below the limits. Other emissions were present with amplitudes at least 10 dB below the FCC Limits.

15.247 Operation in the Band 902-928 MHz

The power output was measured at the open area test site at a three-meter distance. Data was taken per Paragraph 2.1046(a) and 15.247. The 902 and 928 MHz band edges are protected due to the 902.4 – 927.6 MHz channels used for frequency of operation. Refer to figures nine through thirteen showing plots taken of the EUT performance displaying compliance with the specifications.

(a)(1)(i) The EUT is a frequency hopping spread spectrum intentional radiator utilizing at least 50 hopping channels. The 20-dB bandwidth of 245 kHz meets the requirement of less than 500 kHz wide with the average time of occupancy on any frequency not greater than 0.4 seconds within a twenty-second-time period. Figure 9 shows the dwell time of occupancy of 30 mS. The pseudo random lookup table goes

through the 61 channels taking a calculated 1.83 seconds (61 x 30 mS = 1.83 S). The table will repeat after completion of one full cycle thus allowing the channel to be occupied less than eleven times in any twenty second period therefore allowing less than 330 mS of channel occupancy in any twenty second interval.

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

Pseudorandom hopping sequence

The system uses 61 hop channels. They are evenly spaced between 902.9729 MHz and 927.0271 MHz. They are listed, in order, below:

channel	frequency	channel	frequency	channel	frequency
0	902.9729	20	910.9910	40	919.0090
1	903.3738	21	911.3919	41	919.4099
2	903.7747	22	911.7928	42	919.8108
3	904.1756	23	912.1937	43	920.2118
4	904.5765	24	912.5946	44	920.6127
5	904.9774	25	912.9955	45	921.0136
6	905.3783	26	913.3964	46	921.4145
7	905.7792	27	913.7973	47	921.8154
8	906.1801	28	914.1982	48	922.2163
9	906.5810	29	914.5991	49	922.6172
10	906.9819	30	915.0000	50	923.0181
11	907.3828	31	915.4009	51	923.4190
12	907.7837	32	915.8018	52	923.8199
13	908.1846	33	916.2027	53	924.2208
14	908.5855	34	916.6036	54	924.6217
15	908.9864	35	917.0045	55	925.0226
16	909.3873	36	917.4054	56	925.4235
17	909.7882	37	917.8063	57	925.8244
18	910.1892	38	918.2072	58	926.2253
19	910.5901	39	918.6081	59	926.6262
				60	927.0271

The order is determined by cycling through the numbers 0-60 in order, and generating a channel number to use with the following equation:

Channel # = Hop XOR (Hop * 8) AND 0x3F
If Channel > 60, try again

Where Hop is the sequence 0,1,2,3,4,5,6,7,8,9,10,11…59,60,0,1…

This generates the channel numbers 0, 9, 18, 27, 36, 45, 54, 7, 8, 1, 26, 19…

A complete cycle is as follows:

channel	frequency	channel	frequency	channel	frequency
0	902.9729	21	911.3919	58	926.2253
9	906.5810	38	918.2072	51	923.4190
18	910.1892	47	921.8154	12	907.7837
27	913.7973	24	912.5946	5	904.9774
36	917.4054	17	909.7882	30	915.0000
45	921.0136	10	906.9819	23	912.1937
54	924.6217	3	904.1756	48	922.2163
7	905.7792	60	927.0271	57	925.8244
8	906.1801	53	924.2208	34	916.6036
1	903.3738	46	921.4145	43	920.2118
26	913.3964	39	918.6081	20	910.9910
19	910.5901	32	915.8018	29	914.5991
44	920.6127	41	919.4099	6	905.3783
37	917.8063	50	923.0181	15	908.9864
14	908.5855	59	926.6262	56	925.4235
55	925.0226	4	904.5765	49	922.6172
16	909.3873	13	908.1846	42	919.8108
25	912.9955	22	911.7928	35	917.0045
2	903.7747	31	915.4009	28	914.1982
11	907.3828	40	919.0090		
52	923.8199	33	916.2027		

Multiple system coexistence

For multiple systems to coexist properly, each system within range of another is assigned a unique number between 1 and 60. That number is multiplied by the hop sequence is modified by multiplying each hop number by a system number (1-60) and using that value modulo 61 as the hop number. For example, rather than hopping 0,1,2,3,4, a system with a system number of 3 would use hop sequence 0,3,6,9,12…, which would lead to the channel sequence 0, 27, 54, 1, 44…

This allows up to 60 systems to coexist because of the unique hopping sequence of each.

(b) The maximum peak output power of the unit was measured at the OATS at a distance of three meters. Figure 10 shows relative level output of transmitter taken at a distance of three meters in a screen room. 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.

Sample calculation.

dBµv/m@ 3m = FSM + A.F. + cable loss – Amplifier gain stage

= 78.8 + 23.8 – 2.5

= 104.5

(c) The band edges are protected due to the frequency of operation of the EUT. Figure 13 shows band edge protection and sixty-one hopping channels of the EUT.

(g) The unit employs 61 hopping channels with a defined packet length regardless of the message sent. This forces the unit to occupy a channel for 30 mS each time the system runs through the lookup table.

(h) The unit does not incorporate any intelligence in avoiding other systems in operation. It selects the channel from the pseudo random lookup table sequentially and runs the entire table before starting over. This complies with the requirements of this section.

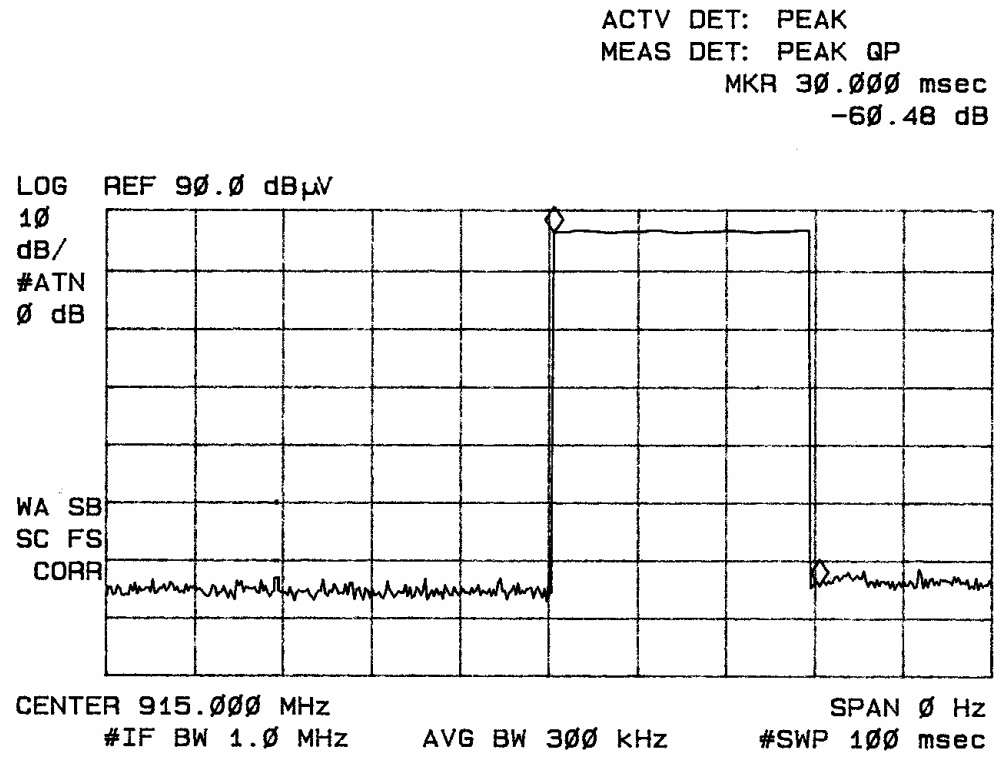

Figure nine Dwell Time of Occupancy.

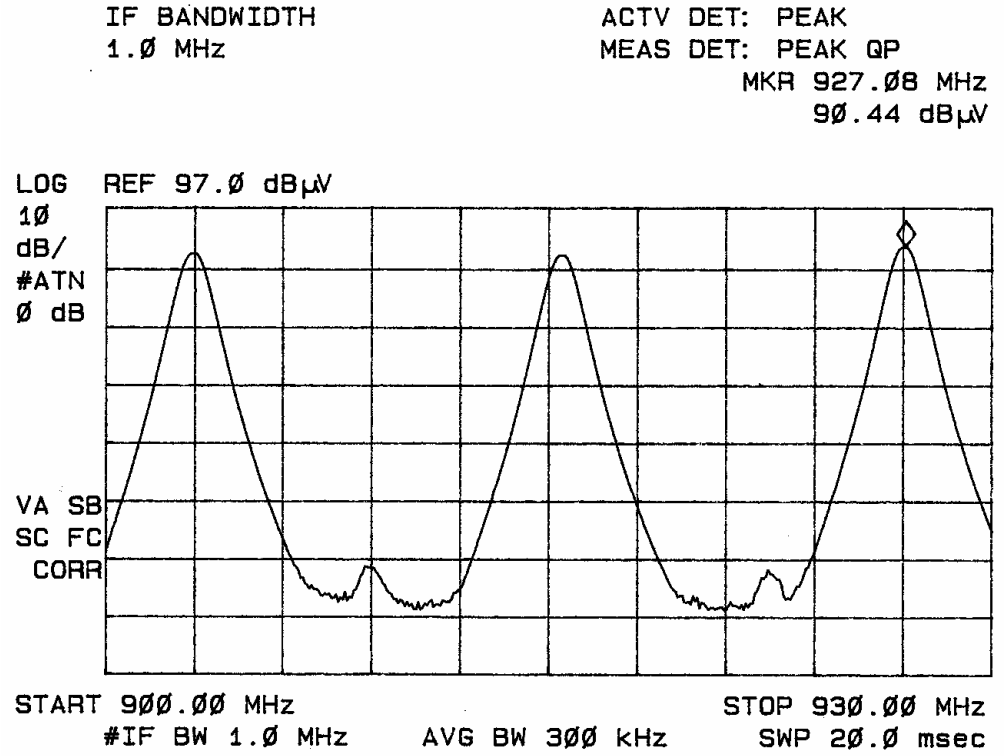

Figure ten Maximum Power output across band (taken in screen room at 1 meter).

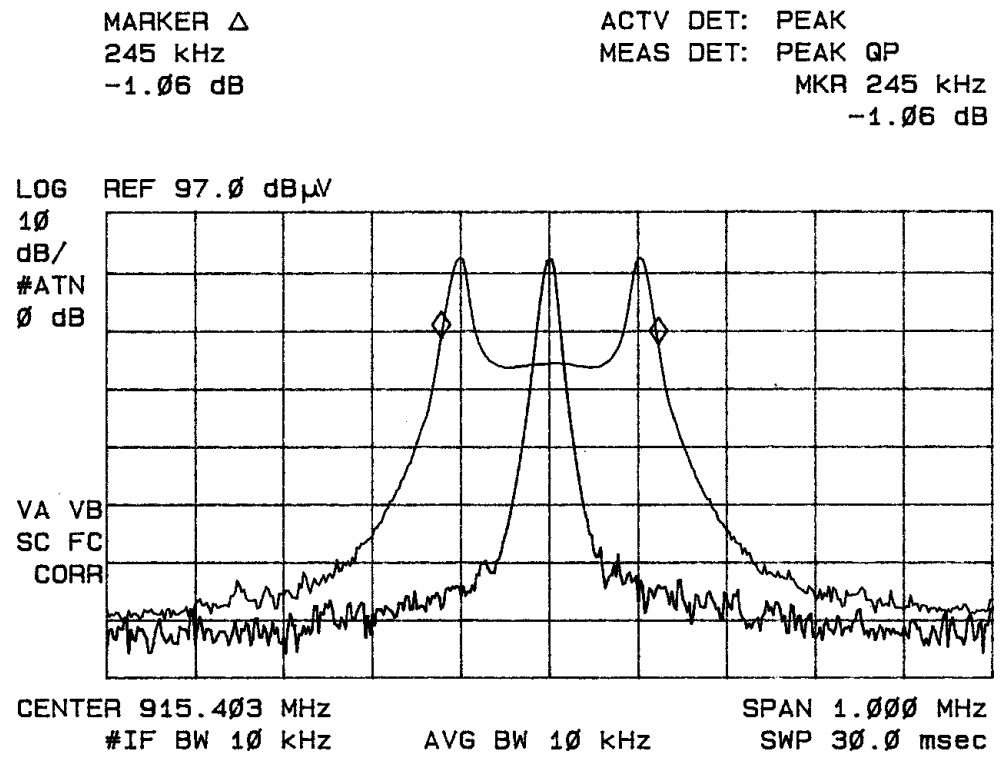

Figure eleven 20-dB bandwidth.

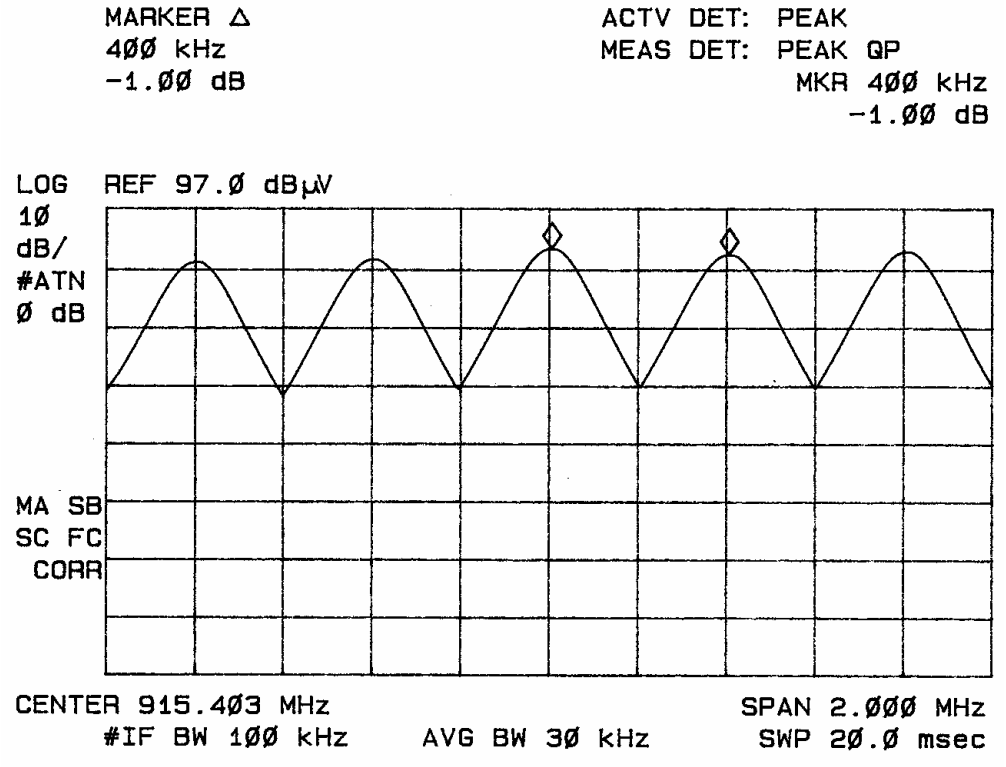

Figure twelve Channel Spacing.

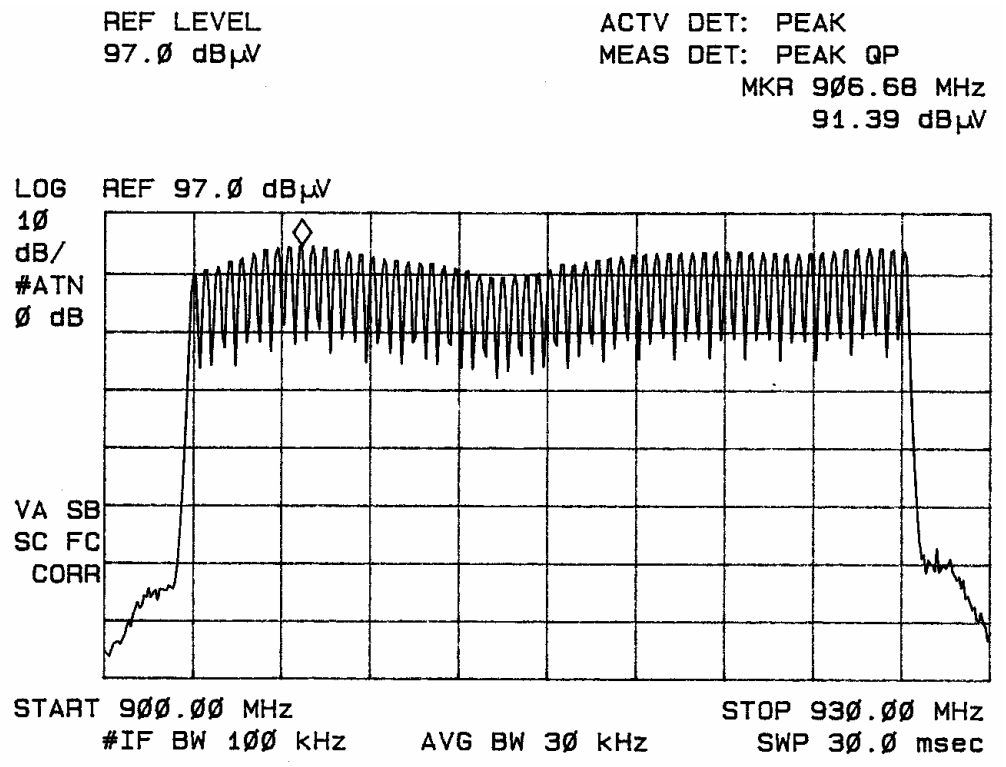

Figure thirteen plot showing 61 hopping channels, (at least 50 hopping channels required).

Data: Radiated Emissions from EUT

Emission Frequency (MHz)	FSM Horz. (dBµV)	FSM Vert. (dBµV)	Ant. Factor (dB)	Amp Gain (dB)	Cable Loss (dB)	RFS Horz. @ 3m (dBµV/m)	RFS Vert. @ 3m (dBµV/m)	Limit @ 3m (dBµV/m)
904.6	78.8	84.0	23.2	0	2.5	104.5	109.7	
1809.2	30.3	29.8	29.9	30	2.5	32.7	32.2	54.0
2713.8	29.5	29.5	35.5	30	2.5	37.5	37.5	54.0
3618.4	31.8	31.5	39.8	30	2.5	44.1	43.8	54.0
4523.0	31.3	30.8	43.7	30	2.5	47.5	47.0	54.0
915.2	77.3	83.8	23.7	0	2.5	103.5	110.0	
1830.0	30.0	29.5	29.7	30	2.5	32.2	31.7	54.0
2745.0	29.5	29.1	35.3	30	2.5	37.3	36.9	54.0
3660.0	30.5	31.5	39.8	30	2.5	42.8	43.8	54.0
4575.0	31.3	31.3	44.2	30	2.5	48.0	48.0	54.0
927.0	76.3	84.0	24.1	0	2.5	102.9	110.6	
1854.0	29.8	29.8	29.6	30	2.5	31.9	31.9	54.0
2781.0	30.5	30.0	35.5	30	2.5	38.5	38.0	54.0
3708.0	31.5	31.6	39.8	30	2.5	43.8	43.9	54.0
4635.0	31.0	30.5	44.0	30	2.5	47.5	47.0	54.0

Summary of Results for Radiated Emissions of Intentional Radiator

The EUT had the highest emission of 110.6 dBmV/m at 3 meters at the fundamental frequency of operation. The EUT had a worst-case of 6.0 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 specifications of 15.247 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 meet the FCC Part 15C emissions standards. There were no deviations to the specifications.

APPENDIX

Model: 1100 WIRELESS DATA TRANSMITTER

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	2/03
Wattmeter: Bird 43 with Load Bird 8085	2/03
Power Supplies: Sorensen SRL 20-25, SRL 40-25, DCR 150, DCR 140	2/03
H/V Power Supply: Fluke Model: 408B (SN: 573)	2/03
R.F. Generator: HP 606A	2/03
R.F. Generator: HP 8614A	2/03
R.F. Generator: HP 8640B	2/03
Spectrum Analyzer: HP 8562A,	2/03
Mixers: 11517A, 11970A, 11970K, 11970U, 11970V, 11970W	
HP Adapters: 11518, 11519, 11520	
Spectrum Analyzer: HP 8591 EM	5/03
Frequency Counter: Leader LDC 825	2/03
Antenna: EMCO Biconilog Model: 3143	5/03
Antenna: EMCO Log Periodic Model: 3147	10/03
Antenna: Antenna Research Biconical Model: BCD 235	10/03
Antenna: EMCO Dipole Set 3121C	2/03
Antenna: C.D. B-101	2/03
Antenna: Solar 9229-1 & 9230-1	2/03
Antenna: EMCO 6509	2/03
Audio Oscillator: H.P. 201CD	2/03
R.F. Power Amp 65W Model: 470-A-1010	2/03
R.F. Power Amp 50W M185- 10-501	2/03
R.F. PreAmp CPPA-102	2/03
LISN 50 µHy/50 ohm/0.1 µf	10/03
LISN Compliance Eng. 240/20	2/03
Peavey Power Amp Model: IPS 801	2/03
Power Amp A.R. Model: 10W 1010M7	2/03
Power Amp EIN Model: A301	2/03
ELGAR Model: 1751	2/03
ELGAR Model: TG 704A-3D	2/03
ESD Test Set 2010i	2/03
Fast Transient Burst Generator Model: EFT/B-101	2/03
Current Probe: Singer CP-105	2/03
Current Probe: Solar 9108-1N	2/03
Field Intensity Meter: EFM-018	2/03
KEYTEK Ecat Surge Generator	2/03
Shielded Room 5 M x 3 M x 3.0 M (101 dB Integrity)	

10/10/2003

QUALIFICATIONS

Of

SCOT D. ROGERS, ENGINEER

ROGERS LABS, INC.

Mr. Rogers has approximately 14 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 27, 2003
Date

1/11/01

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