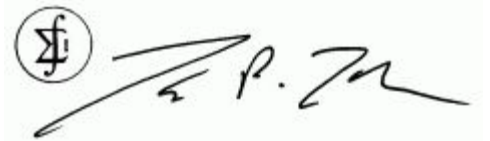


Smith Electronics, Inc.
Electromagnetic Compatibility Laboratories

Radio Frequency Measurement Report
FCC Certification for Unintentional Radiator
on the
FieldPro
418 MHz Receiver
Model: ProRX-1
FCC ID: O2CPRORX-1

June 5, 2000

Prepared by:

A circular stamp containing a stylized 'S' and 'E' logo is positioned to the left of a handwritten signature in black ink.

Kenneth P. Klann
NARTE Cert. EMC-001505-NE

Prepared for:

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Smith Electronics, Inc.
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1.0 Objective:

To perform radiated field intensity measurements to certify that the FieldPro model ProRX-1 418 MHz battery operated receiver meets FCC unintentional radiator requirements per CFR 47 1999, FCC Part 15.109(a) with supplied rubberized antenna and birdcage. The FieldPro receiver is the companion unit to the FieldPro handheld transmitter (FCC ID: O2CPROTX-1).

1.1 Summary:

The FieldPro model ProRX-1 (FCC ID: O2CPRORX-1) has been examined and tested in accordance with FCC Part 15.31, 15.33, & 15.35, and ANSI C63.4-1992, and found compliant with FCC Part 15.109(a).

The FieldPro 418 MHz receiver system is based on the Linx RXM-418-LC receiver module. The receiver employs a SAW local oscillator operating at 10.7 MHz below the receive frequency generating a 10.7 MHz intermediate frequency. With the receiver operating and fitted with the birdcage, the local oscillator (407.3 MHz) was detectable along with the harmonics to forth order. Open field tests indicated that the local oscillator frequency (407.3 MHz) meets FCC Part 15.209(a) field strength requirements by 18.4 dB. The worst case measurable harmonic frequency (814.7 MHz) met by 9.6 dB.

Therefore, the FieldPro ProRX-1 (FCC ID: O2CPRORX-1) meets all requirements to be certified per requirements of FCC Part 15.101(a).

I, Kenneth P Klann, an engineer at Smith Electronics, Inc., undertook the preparation of this report, performed all measurements contained herein, and attest to their accuracy.



Kenneth P. Klann

The results contained in this report describe the performance of the particular device tested and do not represent endorsement by any government agency. This unintentional radiator must be certified by the FCC pursuant to the procedures in Part 2, Subpart J of CFR 47 1999 prior to marketing this device. This report must be reproduced in full. It can only be reproduced in part after obtaining written permission from Smith Electronics, Inc.

2.0 Administrative Information:

Manufacturer:	FieldPro, LLC. 14120 Galehouse Road Doylestown, Ohio 44230
Test Facility:	Smith Electronics, Inc. 8200 Snowville Road Brecksville, Ohio 44141
Contacts:	Jay Howard, President FieldPro, LLC. Phone: (330) 685-7705 (330) 262-1984 E276 Kenneth P. Klann, Test Engineer Smith Electronics, Inc. Phone: (440) 526-4386 Fax: (440) 526-9205
Test Dates:	21 April & 23 May 2000

2.1 Equipment Under Test:

FieldPro receiver with detachable
birdcage
Model: ProRX-1
FCC ID: O2CPRORX-1
SN: Sample #1
Receive Frequency: 418 MHz,
based on Linx RXM-418-LC
receiver module.
Intermediate Frequency: 10.7 MHz
Local oscillator Frequency: 407.3
MHz
Antenna: Linx ¼ wave rubberized,
with reverse SMA termination.
Linx PN: ANT-418-CW-QW
Battery: 6 V (4 AA batteries)

2.2 Modifications to EUT:

None

2.3 Measurement Equipment:

Hewlett Packard spectrum analyzer	Type 8568B with 85680A RF section SN: 2216A02120 85662A display section SN: 2152A03686 85680A quasi-peak adapter SN: 2043A00350 Calibrated: 5/99 Used between: 30-1000 MHz
Hewlett Packard spectrum analyzer	Type 8593EM SN: 3536A00147 Calibrated: 6/99 Used between: 1-4.2 GHz
Singer Instrumentation interference receiver	Model: NM-37/57 SN: 0366-06168 Calibrated: 4/99 Used between: 30-1000 MHz
Hewlett Packard preamplifier	Type 8447D SN: 1726A01282 Gain: 26 dB Frequency range: .075-1700 MHz
Hewlett Packard vector plotter	Type 7407A SN: 2308A39494
Biconical antenna	EMCO model: 3104 Frequency range: 30-200 MHz (Shielded room)
Log periodic antenna	EMCO model: 3146 Frequency range: 200-1000 MHz (Shielded room)
Tuned dipole antenna	Stoddart model: 91598-2 Frequency range: 350-1000 MHz (Open field site)
Horn Antenna	EMCO Model: 3115 Frequency range: 1-18 GHz (Shielded room/open field site)
Coaxial cable type RG-214/U	8 meter length (shielded room <1GHz) 13 meter length (open field <1GHz) 1 meter length (shielded room/open field)

>1GHz)

3.1 Description:

The FieldPro ProRX-1 receiver is a component of a low power communications device used to remotely control a game bird ejection device. The bird ejection device incorporates the FieldPro ProRX-1 receiver and a detachable metal birdcage. The complete system consists of receiver/birdcage and a hand held transmitter (ProTX-1, FCC ID: O2CPROTX-1). The FieldPro system is designed to aid in training of hunting dogs. The major objective of the FieldPro system is to train the dog to point at hidden game birds obscured in brush without disturbing the bird. The bird can be remotely released with this system if the dog approaches too quickly or closely, thus providing correct training reinforcement for the dog.

The FieldPro ProRX-1 receiver operates at 418 MHz and is designed around a Linx RXM-418-LC receiver module. The receiver is designed to receive pulse coded (on-off keying) provided by the FieldPro TX-1 transmitter. Receivers are available each with different coding options so that a single hand held transmitter can control up to four different receiver/birdcage's. The transmitter is equipped with four momentary contact push buttons to operate the transmitter and associated receiver/birdcage. The receiver incorporates a 10.7 MHz intermediate frequency and a 407.3 MHz local oscillator.

The receiver is equipped with a rubberized (flexible) antenna. The antenna is detachable and replaceable by the end user. The antenna connector is a nonstandard so that a replacement must be ordered from FieldPro. The antenna connector is a reverse polarity SMA designed to prevent use of unauthorized antennas.

3.2 Field Strength of Emissions:

Initial measurements of radiated emissions from the FieldPro 418 MHz receiver was performed in a shielded room using a spectrum analyzer (HP 8566B & 8593EM) over a frequency range of 0.03-2.5 GHz to characterize the emissions. The test setup is recorded in Pictorial-1. These measurements were performed with broadband antennas at a 1-meter distance using a peak detector. The frequencies of the generated emissions were recorded so they could be reexamined later, on the open field site. The receiver's local oscillator and harmonics thereof, were detectable to the fourth order. The emissions were predominately liberated by the receiver's antenna. Removal of the antenna dropped the emissions level below the measurement system noise floor. There were no significant emissions from the digital device that controls the functions of the receiver. The digital device emissions remained at least 25 dB below the Class B limits.

3.2.1 Radiated Emissions, Open Field Site:

Having identified the signals of interest in the shielded room, certification measurements on the receiver were performed on the open field site. The open field measurements will determine compliance with FCC Parts 15.209(a) regarding field strength of emissions. The open field site located at the Smith Electronics 8200 Snowville Road facility (FCC Registration Number: 90938)

was used for all tests. The test setup is recorded in Pictorials 2, 3, & 4.

Prior to commencing open field measurements the receiver was fitted with new batteries and the antenna supplied by the manufacturer. Since the birdcage is detachable from the receiver, two sets of open field measurements were performed:

- Receiver fitted with the metal birdcage, placed in normal operating (upright) position.
- Receiver without cage, examined in three orthogonal positions.

Open field measurements were made with the receiver was placed on a 1-meter high wooden test stand capable of being rotated 360 degrees. The receiver was rotated on the test stand while the height of the measuring antenna was varied, to peak the level of the emissions. This process was repeated for both horizontal and vertical antenna polarizations. This procedure was repeated for each operating position on the receiver. The open field test was performed at a measurement distance of 3 meters for the local oscillator fundamental (407.3 MHz) and second harmonic using a tuned dipole antenna. A 1-meter measurement distance was employed for the upper harmonics using a horn antenna. The upper harmonic signals were of insufficient strength to be measured at a 3-meter distance. All measurements made below 1 GHz used a quasi-peak detector function while a peak detector was used above 1 GHz. Resolution bandwidths of 100 KHz (140 KHz impulse) were used at 1 GHz and below (Singer NM-37/57 receiver). Above 1 GHz, a HP 8593EM spectrum analyzer was used with a 1.0 MHz 6-dB resolution bandwidth (1 MHz impulse). The maximum detected levels for each frequency are recorded in the tables below.

Table 1: Field Pro ProRX-1 Receiver Sample #1, Open Field Test Results
Receiver mounted on bird cage

Frequency MHz	Measurement Distance meters	Measured Level dBuV	(+) Antenna Factor dB	(+) Coax Factor dB	(-) Preamp Gain dB	Actual Level dBuV/m	(-) FCC Limit dBuV/m	dB vs. FCC Limit
407.34	3.00	4.00	21.40	2.20	0.00	27.60	46.02	-18.42
814.67	3.00	5.00	28.00	3.40	0.00	36.40	46.02	-9.62
1222.01	1.00	39.20	24.70	0.40	26.00	38.30	63.52	-25.22
1629.34	1.00	34.50	26.30	0.40	26.00	35.20	63.52	-28.32
2036.68	1.00	25.10	28.50	0.50	0.00	54.10	63.52	-9.42
2444.01	1.00	25.20	29.20	0.50	0.00	54.90	63.52	-8.62

Measurements below 1000 MHz employ a quasi-peak detector, above 1000 MHz a peak detector.

Measurements at and above 2036 MHz represent the noise floor of measurement system.

FCC limit at >216-960 MHz is 200 uV/m (46.02 dBuV/m) @ 3 m.

FCC limit above 960 MHz is 500 uV/m (54.0 dBuV/m) @ 3 m or 1500 uV/m (63.52 dBuV/m) @ 1 m.

Table 2: Field Pro ProRX-1 Receiver Sample #1, Open Field Test Results
Receiver not mounted on bird cage

Frequency MHz	Measurement Distance meters	Measured Level dBuV	(+) Antenna Factor dB	(+) Coax Factor dB	(-) Preamp Gain dB	Actual Level dBuV/m	(-) FCC Limit dBuV/m	dB vs. FCC Limit
407.34	3.00	8.00	21.40	2.20	0.00	31.60	46.02	-14.42
814.67	3.00	7.00	28.00	3.40	0.00	38.40	46.02	-7.62
1222.01	1.00	37.80	24.70	0.40	26.00	36.90	63.52	-26.62
1629.34	1.00	35.50	26.30	0.40	26.00	36.20	63.52	-27.32
2036.68	1.00	25.20	28.50	0.50	0.00	54.20	63.52	-9.32
2444.01	1.00	24.90	29.20	0.50	0.00	54.60	63.52	-8.92

Measurements below 1000 MHz employ a quasi-peak detector, above 1000 MHz a peak detector.

Measurements at and above 2036 MHz represent the noise floor of measurement system.

FCC limit at >216-960 MHz is 200 uV/m (46.02 dBuV/m) @ 3 m.

FCC limit above 960 MHz is 500 uV/m (54.0 dBuV/m) @ 3 m or 1500 uV/m (63.52 dBuV/m) @ 1 m.

Based on these measurements, the FieldPro RX-1 receiver is in compliance with FCC Part 15.109(a) regarding field strength of emissions.

4.0 Conclusion:

The FieldPro model ProRX-1 (FCC ID: O2CPRORX-1) receiver has been examined and tested in accordance with FCC Part 15.31, 15.33, & 15.35, and ANSI C63.4-1992, and found compliant with FCC Part 15.109(a).

