

**iSECUREtrac, Inc.**  
**Cuff**  
**OAM5000CUFF**  
**Certification**

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**iSECUREtrac**

**Cuff**  
**OAM5000CUFF**

**07-23-2007**

**iSECUREtrac, Inc.  
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Omaha, NE 68137  
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**<http://www.isecuretrac.com>**

# iSECUREtrac

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## **1. Introduction**

This device is attached to an offender's ankle to monitor their compliance with parole or conditions of release as administered by state or federal department of corrections personal. The device monitors the strap and housing integrity and reports an alarm condition if a tamper is detected. In normal operation, the device transmits about every 32 seconds to a monitoring receiver that may be carried by the offender, or may be located in the offenders home.

The power for the device is supplied by a 1/2 AA lithium battery. The device alternates transmission on two different frequencies to overcome any interference present on one of its channels. To overcome nulls, there are two transmit antenna and transmissions alternate from those antennas. The device measures approximately 4.75" by 1.75" by 1.5." The unit weighs about 7 ounces.

We are requesting Certification under FCC Rules, Part 15, Subpart C, Paragraph 15.231.

Please send comments/suggestions on the report format to [dsempek@isecuretrac.com](mailto:dsempek@isecuretrac.com)

## **2. Statement of Compliance**

### **§2.907      Certification**

This is an application for certification of the transmitter portions. The receiver portions are subject to Verification under **§15.101b**.

### **§2.911      Application**

- a) This is an application and has been filed electronically with form 731.
- b) All information required has been supplied.
- c) The applicant has signed the application (electronically).
- d) The technical data has been signed.  
(See Radiated Emissions)
- e) Applicant signature block on electronic form 731 completed by officer of the company or authorized company personnel.
- f) The appropriate fee has been paid electronically with VISA

### **§2.915      Grant**

This application demonstrates that all applicable technical standards have been met and a grant of this application will serve the public interest.

**§2.925**

**Label**

Each piece of equipment for which authorization will be granted will be uniquely identified with “FCC ID: OAM5000CUFF.” The required statement will appear with the FCC ID on the product and, although not required, in the installation instructions. See Exhibit A, PDF file *id\_label.pdf*

**§2.947**

**Measurement Procedure**

- a) The measurement procedure follows ANSI C63.4 procedure.  
Procedural notes are contained in the laboratory report.
- d) A list of test equipment used is contained in the laboratory report.

**§2.948**

**Description of Measurement Facilities**

Measurements were performed at Rhein Tech Laboratories, Inc. The FCC keeps a full description of the measurement facilities on file.

The address of the test facility is:  
Rhein Tech Laboratories, Inc.  
360 Herndon Parkway, Suite 1400  
Herndon, VA 210170

Phone: 703-689-0368  
Contact: Rick McMurray  
Test Engineer in Charge

See Exhibit F, PDF file *test\_phot.pdf* for sketch of measurement setup

**§2.1033**

**Application for Certification**

- a) Form 731 has been electronically filed. Items that did not apply were left blank.
- b) This technical report contains the following information where applicable.
  - 1) Full name and mailing address of manufacturer and applicant for certification:  
iSECUREtrac, Inc.  
5078 S. 111th Street  
Omaha, NE 68137
  - 2) FCC Identifier:  
**OAM5000CUFF**
  - 3) Copy of installation instructions:  
See Exhibit G, PDF file: *user\_man.pdf*
  - 4) Brief Description of circuit functions and device operation:  
See Exhibit I, PDF file *op\_desc.pdf*

## iSECUREtrac

See Exhibit D, PDF file *schemat.pdf* for schematics (page 1) and parts placement (pages 2 & 3) diagrams.

- 5) Block Diagram  
See Exhibit C, PDF file *block.pdf*.
- 6) Report of the measurements of radiation and conducted emissions:  
This document.
- 7) Photographs
  - External:  
See Exhibit B, PDF file *extern.pdf*
  - Internal:  
See Exhibit H, PDF file *intern.pdf*
- 8) Peripheral or Accessory devices:  
This is not applicable to device in this application.
- 9) Transition Rules  
This application is not pursuant to the transition rules of §15.37
- 10) Emergency Broadcast decoding:  
This is not applicable to device in this application.
- 11) Application for direct sequence spread spectrum devices...  
This is not applicable to device in this application.
- 12) Application for scanning receivers...  
This is not applicable to device in this application.

c) Composite Systems  
This is not applicable to device in this application.

### **3. Lab Measurements Discussion / Test Notes**

#### **3.1 Test Notes**

##### **3.1.1 Periodic transmissions at regular predetermined intervals... [ §15.231(a)(3) ]**

The cuff transmits every 32 seconds in normal operation. Every transmission has at least one packet, but every 9<sup>th</sup> transmission consists of three packets. A packet is always 10mS in duration. The total transmission time (worst case) per hour is then:

$$3600 \text{ secs/hr} / 32 \text{ secs/tx} = 113 \text{ transmissions/hour}$$

There can be, at most, 12 of the 3 packet transmissions per hour with 101 of the single packet transmissions. This is a total on-time of:

$$12 \text{ tx's} * 30\text{mS/tx} + 101 \text{ tx's}*10\text{mS/tx} = 1,370 \text{ mS or 1.37 Seconds}$$

##### **3.1.2 Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life... [ §15.231(a)(4) ]**

The cuff monitors the leg band that secures it to the sex offender being monitored. If the offender cuts the band to remove the cuff, the cuff goes into alarm. For about 2.5 minutes, the cuff will transmit the alarm condition every 4 seconds. At the end of this time, the cuff returns to its normal transmission schedule and sends supervisory messages, as discussed above. The supervisory message contains a bit that is set when the cuff has had an alarm condition.

##### **3.1.3 (5) Transmission of set-up information for security systems...**

The cuff may be configured when initially deployed, or re-deployed, with a small amount of configuration information. For example, certain features of the cuff may be enabled or disabled, or the time for certain fault conditions may be adjusted based on the level of the sex offender. These transmissions would result in an on-air time of a few hundred milliseconds, and would cease within 10 seconds.

### 3.1.4 Duty Cycle Correction Factor [§15.231(b)(2) and §15.35(c)]

The transmitter employs FSK modulation and transmits 40 bits. Each bit is 250  $\mu$ S. The total on time of a single packet is:

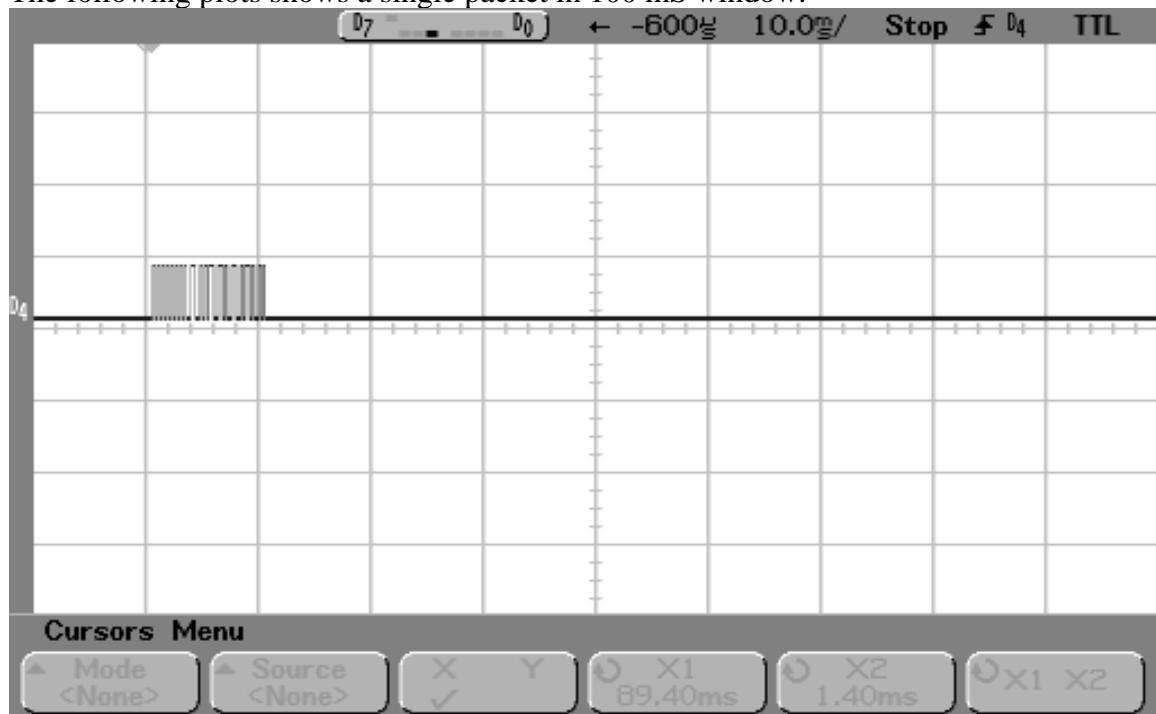
$$40 * 125 \mu\text{S} = 10.0\text{mS.}$$

Only one packet is sent in any given 100 mS window for a duty cycle correction factor of:

$$20 * \text{LOG}(10/100) = -20\text{dB}$$

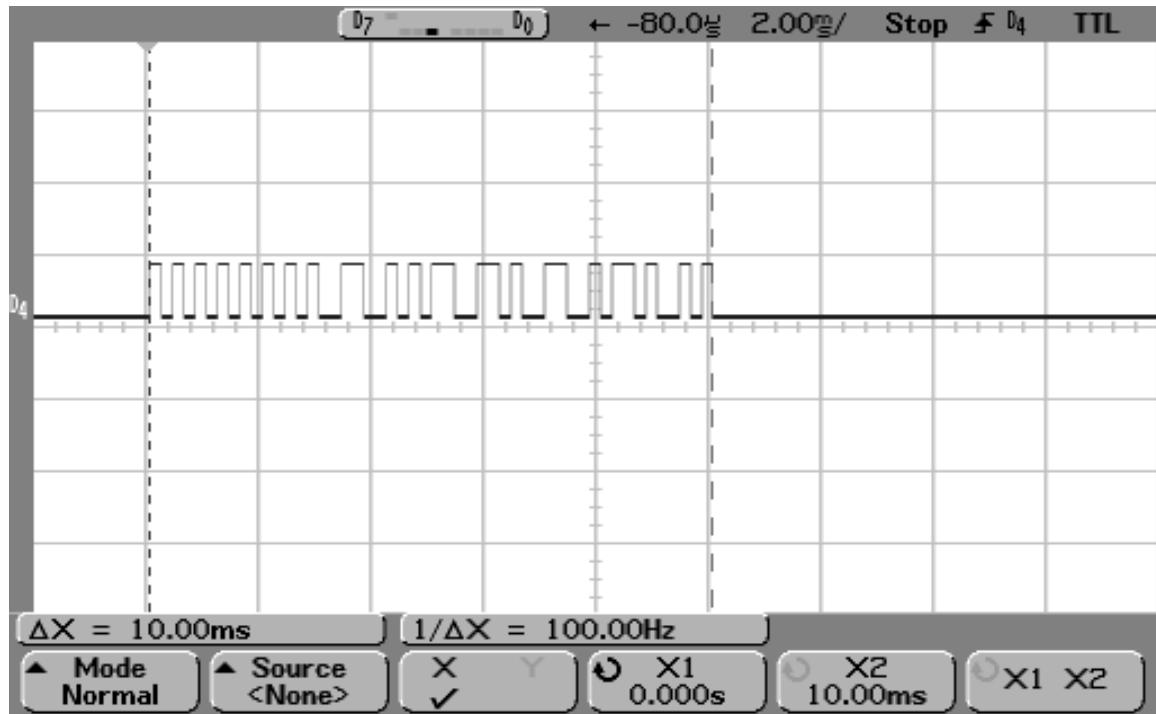
The maximum allowed correction factor is -20.0 dB.

The following plots shows a single packet in 100 mS window.



# iSECUREtrac

This plot shows a packet with 25 bits, manchester encoded, lasting 10 mS



### 3.1.5 Bandwidth Measurement [ §15.231(c) ]

Bandwidth Measurements were made in peak mode, using a Hewlett Packard Spectrum Analyzer, model number 8591E

The spectrum analyzer 20 dB skirt bandwidth is 13 KHz.

The allowed 20 dB bandwidth is 0.25% of center frequency.

Measured 20 dB Bandwidth in KHz	FCC allowed 20 dB Bandwidth in KHz
48	1,130

The plot (Bandwidth.pdf) shows the bandwidth measurements.

## Emissions Measurements

### *3.1.5.1 Radiated Emissions Summary*

The Cuff transmitter passes FCC Rules Part 15, Subpart C, Paragraph §15.231. The highest fundamental radiated emission was 0.4 dB below the FCC limit at 451.41 MHz. The highest spurious emission measurement was 5.1 dB below the FCC limit at 902.8 MHz. .

### *3.1.5.2 Radiated Emissions*

The highest fundamental emission along with the three highest spurious and restricted band emissions are listed in the test data as per ANSI C63.4 paragraph 10.1.8.2. Emissions from 0.009 MHz to the tenth harmonic were measured as per FCC Rules Part 15, Subpart C, Paragraph §15.33(a). Emission limits were derived from §15.231(b).

### *3.1.5.3 Forbidden Bands*

The following harmonics of 451.4MHz fall into forbidden bands per **§15.205**.

1354.2  
2257.0  
2708.4  
3611.2  
4062.6  
4514.0

for 439.2 MHz, the Forbidden bands are:

1317.6  
3952.8  
4392.0

All harmonics in forbidden bands are in compliance.