

**Interactive Technologies, Inc.  
345MHz Saw PIR  
B4Z-788C-PIR  
Certification**

**Interactive Technologies Inc**

**345MHz Saw PIR  
B4Z-788C-PIR**

**01/05/2001**

**Interactive Technologies, Inc.  
2266 North Second Street  
North Saint Paul, MN 55109  
(651) 777-2690**

|                                   |                      |              |
|-----------------------------------|----------------------|--------------|
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# Interactive Technologies Inc

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# Interactive Technologies Inc

## 1. Introduction

This device is a wireless PIR motion alarm transmitter for use in a wireless security system. The unit is self-contained and powered by three 3.0 Volt Lithium batteries. The transmitter's frequency is crystal controlled and is not adjustable by the user. The device measures approximately 4.5" in length, 3" in width and 2." in height. The unit weighs approximately 4.06 ounces without batteries.

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

Please send comments/suggestions on the report format to knelson@ITII.com.

## 2. Statement of Compliance

**§2.907**

### **Certification**

This is an application for certification

**§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 on 01/05/01.

**§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: B4Z-788C-PIR." 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*

|                                   |                      |              |
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## Interactive Technologies Inc

### §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 TUV Testing Services Open Test Site. The FCC keeps a full description of the measurement facilities on file. TUV's acceptance and approval is dated as December 5, 1993 in a letter received from the FCC.

The address of the test facility is:

TUV Product Service  
19035 Wild Mountain Road  
Taylors Falls, MN 55084-1758

Phone: 651-638-0297  
Contact: Joel Schneider  
Test Engineer in Charge

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

### §2.1033 Application for Certification

- a) Form 731 has been electronically filed on 01/05/01. 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:  
Interactive Technologies Inc  
2266 North Second Street  
North Saint Paul, MN 55109
  - 2) FCC Identifier:  
**B4Z-788C-PIR**
  - 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*  
See Exhibit D, PDF file *schemat.pdf* for schematics (page 1) and parts placement (page 2) diagrams.

|                                   |                      |              |
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- 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 since this device is stand-alone product.
- 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 Transmissions shall cease within 5 seconds of activation [ **§15.231(a)(2)** ]

In the event of an alarm, 10 packets are sent in the transmission. The packet duration is, at most, 20 mS, see **Duty Cycle Correction Factor [§15.231(b)(2) and §15.35(c)]**. The time between packets is nominally 90 mS so the length of the longest transmission is:

$$10*20\text{mS} + 9*90\text{mS} = 1.01 \text{ seconds.}$$

The following plot shows a 10-packet transmission that concludes in less than 5 seconds.

07:11:38 DEC 13, 2000

RL 0.00 dBm

MKR #1 SWT 1.300 sec

ATTEN 10 dB

-21.27 dBm

10.00 dB/DIV

MARKER

1.300 sec

-21.27 dBm

CENTER 345.000 000 MHz

SPAN 0 Hz

\*RB 300 kHz

\*VB 100 kHz

\*ST 5.000 sec

## Interactive Technologies Inc

### 3.1.2 Supervisory Calculation [ §15.231(a)(3) ]

As permitted, this device will transmit 5 packets for supervision purposes. The inter-packet delay is a time 90 mS The packet itself is never more than 20 ms. The longest time to conclude a supervisory transmission is then:

$$5*20 + 4*90 = 460\text{mS}$$

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

The transmitter employs amplitude modulation and transmits 63 bits. On average each bit has an “ON” time of 141μS, and a “OFF” time of 141μS. The total on time of a single packet is:

$$63*141\mu\text{S} = 8.88\text{mS}$$

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

$$20*\text{LOG}( 8.88/100) = -21.03\text{dB}$$

The maximum allowed correction factor is 20 dB.

The following plots show:

1. Single packet in 100 mS window.
2. Expanded view of a packet with a duration of 19.97 mS

06:57:28 DEC 13, 2000

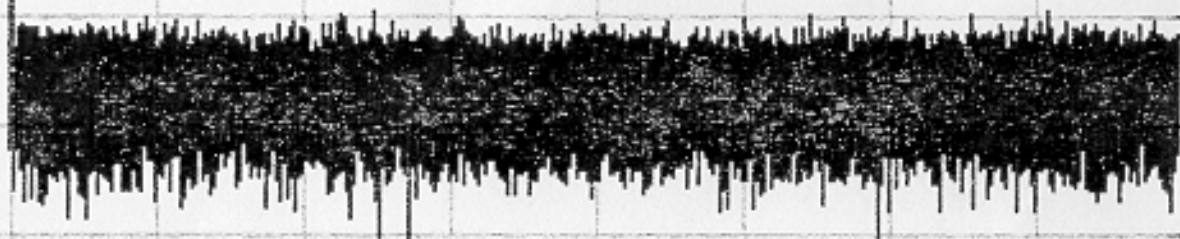
RL 0.00 dBm

MKR #1 SWT 20.13 msec

ATTEN 10 dB

-12.69 dBm

10.00 dB/DIV



CENTER 345.000 000 MHz

SPAN 0 Hz

\*RB 300 kHz

\*VB 100 kHz

\*ST 100.0 msec

07:07:09 DEC 13, 2000

RL 0.00 dBm

MKR #1 SWT 19.97 msec

ATTEN 10 dB

-12.84 dBm

10.00 dB/DIV

MARKER

19.97 msec

-12.84 dBm

1

CENTER 345.000 000 MHz

SPAN 0 Hz

\*RB 300 kHz

\*VB 100 kHz

\*ST 25.00 msec

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

Bandwidth Measurements were made in peak mode, using a Hewlett Packard Spectrum Analyzer, model number 70000.

The spectrum analyzer 20 dB skirt bandwidth is 3.4KHz.

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

Estimated signal bandwidth = Measured signal bandwidth - analyzer bandwidth.

| Center Frequency<br>MHz | Measured 20 dB<br>Bandwidth in<br>KHz | Estimated 20 dB<br>signal Bandwidth in<br>KHz | FCC allowed 20 dB<br>Bandwidth in<br>KHz |
|-------------------------|---------------------------------------|-----------------------------------------------|------------------------------------------|
| 345                     | 28.1                                  | 24.7                                          | 799                                      |

The following three plots show:

1. Bandwidth of carrier without modulation
2. Bandwidth of signal with modulation, 200 KHz span
3. Bandwidth of signal with modulation, 200 MHz span

(hp) 07:38:34 DEC 13, 2000

RL 0.00 dBm

MKR #3 $\Delta$ FRQ 1.5 kHz

ATTEN 10 dB

-20.59 dB

10.00 dB/DIV

MKR AMPLITUDE right

1.5 kHz

-20.50 dB

3

Marker Bandwidth

3.4 kHz



CENTER 345.076 3 MHz

SPAN 100.0 kHz

RB 1.00 kHz

VB 1.00 kHz

ST 305.0 msec

06:19:15 DEC 13, 2000

RL 0.00 dBm

MKR #1  $\Delta$  FRQ 20.5 kHz

ATTEN 10 dB

-1.31 dB

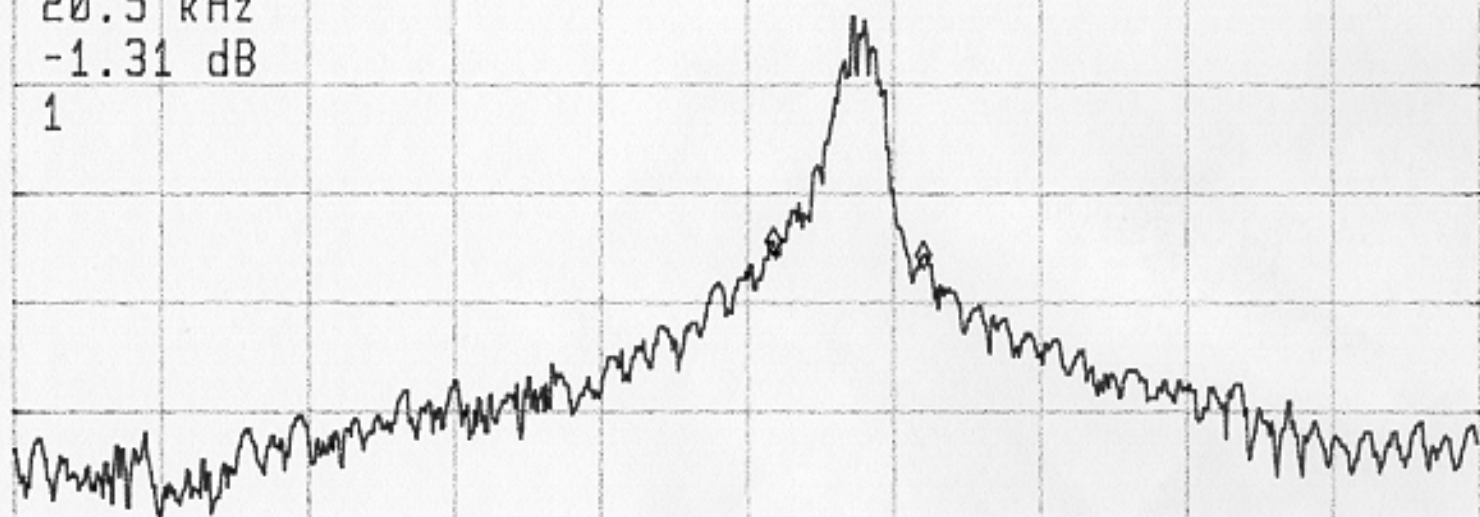
10.00 dB/DIV

MARKER  $\Delta$

20.5 kHz

-1.31 dB

1



CENTER 345.000 0 MHz

SPAN 200.0 kHz

RB 2.15 kHz

VB 3.00 kHz

ST 141.9 msec

06:51:10 DEC 13, 2000

RL 0.00 dBm

MKR #1 FRQ 345.5 MHz

ATTEN 10 dB

-14.36 dBm

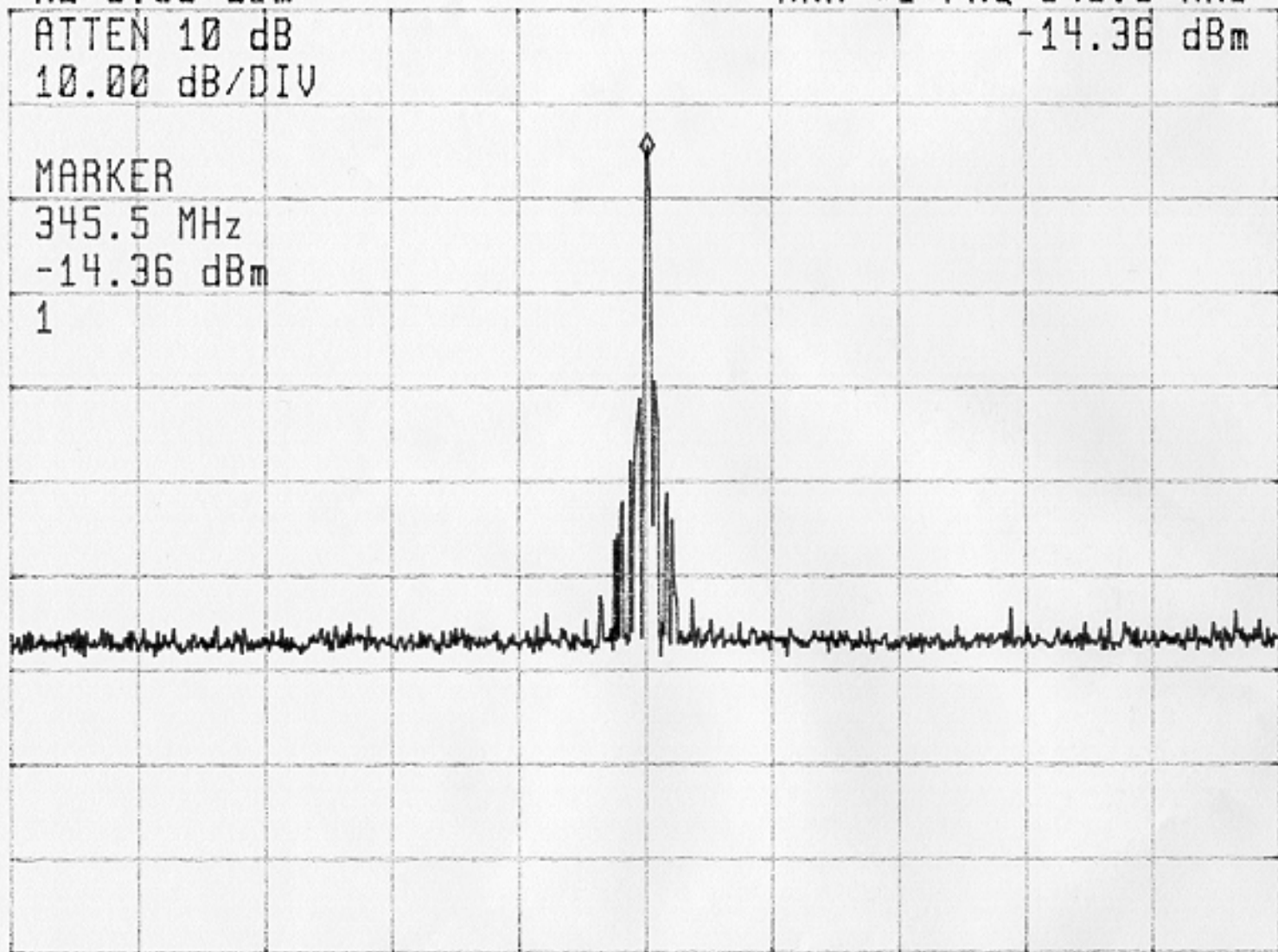
10.00 dB/DIV

MARKER

345.5 MHz

-14.36 dBm

1



CENTER 345.0 MHz

SPAN 200.0 MHz

RB 300 kHz

VB 300 kHz

ST 10.00 msec

## Interactive Technologies Inc

### 3.1.5 Emissions Measurements

#### 3.1.5.1 Radiated Emissions Summary

The 345MHZ Saw PIR passes FCC Rules Part 15, Subpart C, Paragraph 15.231. The highest fundamental radiated emission was 1.0dB below the FCC limit at 345MHz. The highest spurious emission measurement was 23.3dB below the FCC limit at 690.19MHz. The highest forbidden band emission was 23.3dB below the FCC limit at 1035.29MHz.

#### 3.1.5.2 FCC Emissions Calculation

##### 3.1.5.2.1 Terms

| <b>Term</b>           | <b>Abbreviation</b> | <b>Units</b> | <b>Description</b>                                                                                                                                             |
|-----------------------|---------------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Analyzer Reading      | AR                  | dB $\mu$ V   | The power reading read directly from the analyzer without any correction for cabling or receive antenna.                                                       |
| Duty Cycle Correction | DC                  | dB           | Correction for averaging measurement, see <b>Duty Cycle Correction Factor</b> [§15.231(b)(2) and §15.35(c)]                                                    |
| Antenna Factor        | AF                  | dB           | Calibration factor for measurement antenna which converts from dB $\mu$ V measured with antenna to the field strength received by the antenna in dB $\mu$ V/M. |
| Cable Loss            | CL                  | dB           | Amount of power lost in cable (and connectors, if any) between antenna and analyzer                                                                            |
| Pre-Amp               | PA                  | dB           | Gain in pre-amp                                                                                                                                                |

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### 3.1.5.2.2 Example Calculation

AR = 99.3 dBμV

AF = 13.9 dB

CL = 3.8 dB

DC = 20 dB

PA=26.2 dB

The field strength for comparison to FCC limits is found to be:

$$AR + AF + CL - DC - PA = 99.3 + 13.9 + 3.8 - 20 - 26.2 = 70.8 \text{ dB}\mu\text{V/M}$$

Alternatively, the AR + AF + CL - PA is compared to the FCC limit + DC. This number is often written to the right of measurement data on the test results. For example, the FCC limit for ITI transmitters at 345 MHz is approximately 97.2dBμV/M. The limit from §15.231(b) with linear interpolation yields a limit, without consideration for duty cycle, of approximately 77.2 dBμV/M.

To convert to μV/M the following equation is used:

$$\mu\text{V/M} = \text{INVLOG}( \text{dB}\mu\text{V/M} / 20 )$$

For the above example, 70.8 dBμV/M is 3,467.369μV/M

### 3.1.5.3 Radiated Emissions

The highest fundamental emission along with the three highest spurious and restricted band emissions are listed below 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).

| Frequency | Analyzer Reading | Duty Cycle Correction | Cable Loss | Antenna Factor | Pre-Amp | Field Strength | Field Strength | FCC Limit |
|-----------|------------------|-----------------------|------------|----------------|---------|----------------|----------------|-----------|
| MHz       | dBuV             | dB                    | dB         | dB             | dB      | dBuV/M         | uV/M           | uV/M      |
| 345.1     | 79.50            | 20                    | 2.1        | 14.6           | 0       | 76.20          | 6,457          | 6,229     |
| 690.19    | 57.20            | 20                    | 2.9        | 19.8           | 26.1    | 33.80          | 49             | 623       |
| 1035      | 53.60            | 20                    | 3.5        | 22.3           | 25.5    | 33.90          | 50             | 623       |
| 1725.49   | 45.60            | 20                    | 5.6        | 27.3           | 25.8    | 32.70          | 43             | 623       |

### 3.1.5.4 Forbidden Bands

Noise floor of spectrum analyzer with antenna factors and duty cycle correction converted to μV/M at approximately one meter.

|                                   |                      |               |
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All measurements were taken with an HP 8566B Spectrum Analyzer. The bandwidth was 100 KHz for measurements below 1000 MHz. The bandwidth was 1 MHz for measurements above 1000 MHz. The video filter was off.

The noise floor measurements are summarized in the table below. See also the test data included in this report.

| Frequency Range |            |                     |                 |                |                |                |                |                  |  |
|-----------------|------------|---------------------|-----------------|----------------|----------------|----------------|----------------|------------------|--|
| Low Limit       | High Limit | Noise Floor Reading | Duty Cycle Corr | Field Strength | Field Strength | FCC Limit @ 3M | FCC Limit @ 1M |                  |  |
| MHz             | MHz        | dBuV                | dB              | dBuV/M         | uV/M           | uV/M           | uV/M           |                  |  |
| 0.09000         | 0.11000    | N/A                 | 20              | N/A            | N/A            | 2400/F         |                |                  |  |
| 0.49500         | 0.50500    | N/A                 | 20              | N/A            | N/A            | 2400/F         |                |                  |  |
| 2.13750         | 2.19050    | N/A                 | 20              | N/A            | N/A            | 30             | 90             |                  |  |
| 4.12500         | 4.12800    | N/A                 | 20              | N/A            | N/A            | 30             | 90             |                  |  |
| 4.17725         | 4.17775    | N/A                 | 20              | N/A            | N/A            | 30             | 90             |                  |  |
| 4.20725         | 4.20775    | N/A                 | 20              | N/A            | N/A            | 30             | 90             |                  |  |
| 6.21500         | 6.21800    | N/A                 | 20              | N/A            | N/A            | 30             | 90             |                  |  |
| 6.26775         | 6.26825    | N/A                 | 20              | N/A            | N/A            | 30             | 90             |                  |  |
| 6.31175         | 6.31225    | N/A                 | 20              | N/A            | N/A            | 30             | 90             |                  |  |
| 8.29100         | 8.29400    | N/A                 | 20              | N/A            | N/A            | 30             | 90             |                  |  |
| 8.36200         | 8.36600    | N/A                 | 20              | N/A            | N/A            | 30             | 90             |                  |  |
| 8.37625         | 8.38675    | N/A                 | 20              | N/A            | N/A            | 30             | 90             |                  |  |
| 8.41425         | 8.41475    | N/A                 | 20              | N/A            | N/A            | 30             | 90             |                  |  |
| 12.29000        | 12.29300   | N/A                 | 20              | N/A            | N/A            | 30             | 90             |                  |  |
| 12.51975        | 12.52025   | N/A                 | 20              | N/A            | N/A            | 30             | 90             |                  |  |
| 12.57675        | 12.57725   | N/A                 | 20              | N/A            | N/A            | 30             | 90             |                  |  |
| 13.36000        | 13.41000   | N/A                 | 20              | N/A            | N/A            | 30             | 90             |                  |  |
| 16.42000        | 16.42300   | N/A                 | 20              | N/A            | N/A            | 30             | 90             |                  |  |
| 16.69475        | 16.69525   | N/A                 | 20              | N/A            | N/A            | 30             | 90             |                  |  |
| 16.80425        | 16.80475   | N/A                 | 20              | N/A            | N/A            | 30             | 90             |                  |  |
| 25.50000        | 25.67000   | N/A                 | 20              | N/A            | N/A            | 30             | 90             |                  |  |
| 37.50000        | 38.25000   | 23.00               | 20              | 3.0            | 1.4            | 100            | 300            |                  |  |
| 73.00000        | 74.60000   | 17.20               | 20              | -2.8           | 0.7            | 100            | 300            |                  |  |
| 74.80000        | 75.20000   | 19.00               | 20              | -1.0           | 0.9            | 100            | 300            |                  |  |
| 108.00000       | 121.94000  | 14.50               | 20              | -5.5           | 0.5            | 150            | 450            |                  |  |
| 123.00000       | 138.00000  | 14.50               | 20              | -5.5           | 0.5            | 150            | 450            |                  |  |
| 149.90000       | 150.05000  | 14.50               | 20              | -5.5           | 0.5            | 150            | 450            |                  |  |
| 156.52475       | 156.52525  | 14.50               | 20              | -5.5           | 0.5            | 150            | 450            |                  |  |
| 156.70000       | 156.90000  | 14.50               | 20              | -5.5           | 0.5            | 150            | 450            |                  |  |
| 162.01250       | 167.17000  | 14.50               | 20              | -5.5           | 0.5            | 150            | 450            |                  |  |
| 167.72000       | 173.20000  | 14.50               | 20              | -5.5           | 0.5            | 150            | 450            |                  |  |
| 240.0           | 285.0      | 21.80               | 20              | 1.8            | 1.2            | 200            | 600            |                  |  |
| 322.0           | 335.4      | 21.80               | 20              | 1.8            | 1.2            | 200            | 600            |                  |  |
| 399.9           | 410.0      | 21.80               | 20              | 1.8            | 1.2            | 200            | 600            |                  |  |
| 608.0           | 614.0      | 21.80               | 20              | 1.8            | 1.2            | 200            | 600            |                  |  |
| 960.0           | 1240.0     | 21.80               | 20              | 1.8            | 1.2            | 500            | 1500           | 1065, 1171       |  |
| 1300.0          | 1427.0     | 36.80               | 20              | 16.8           | 6.9            | 500            | 1500           | 1384             |  |
| 1435.0          | 1626.5     | 38.00               | 20              | 18.0           | 7.9            | 500            | 1500           | 1491,1597        |  |
| 1645.5          | 1646.5     | 40.90               | 20              | 20.9           | 11.1           | 500            | 1500           |                  |  |
| 1660.0          | 1710.0     | 40.90               | 20              | 20.9           | 11.1           | 500            | 1500           | 1704             |  |
| 1718.8          | 1722.2     | 43.70               | 20              | 23.7           | 15.3           | 500            | 1500           |                  |  |
| 2200.0          | 2300.0     | 41.60               | 20              | 21.6           | 12.0           | 500            | 1500           | 2236             |  |
| 2310.0          | 2390.0     | 41.60               | 20              | 21.6           | 12.0           | 500            | 1500           | 2343             |  |
| 2483.5          | 2500.0     | 41.60               | 20              | 21.6           | 12.0           | 500            | 1500           |                  |  |
| 2655.0          | 2900.0     | 41.60               | 20              | 21.6           | 12.0           | 500            | 1500           | 2662, 2769, 2875 |  |
| 3260.0          | 3267.0     | 41.60               | 20              | 21.6           | 12.0           | 500            | 1500           |                  |  |
| 3332.0          | 3339.0     | 41.60               | 20              | 21.6           | 12.0           | 500            | 1500           |                  |  |
| 3345.8          | 3358.0     | 41.60               | 20              | 21.6           | 12.0           | 500            | 1500           |                  |  |
| 3600.0          | 4400.0     | 41.60               | 20              | 21.6           | 12.0           | 500            | 1500           |                  |  |

## Interactive Technologies Inc

The test data follows on the next 2 pages:

|                                   |                             |               |
|-----------------------------------|-----------------------------|---------------|
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# Radiated Electromagnetic Emissions



Test Report #: **W0381 Run 01** Test Area: **LTS 3m**

Test Method: **N/A** Test Date: **10-Jul-2000**

EUT Model #: **PIR DETECTOR** EUT Power: **BATTERY**

EUT Serial #: \_\_\_\_\_ Temperature: **24** °C

Manufacturer: **ITI** Relative Humidity: **72** %

EUT Description: \_\_\_\_\_ Air Pressure: **98.2** kPa

Notes: \_\_\_\_\_ Page: **1** of **2**

\_\_\_\_\_

\_\_\_\_\_

| FREQ<br>(MHz)                                                              | LEVEL<br>(dBuV/m) | CABLE / ANT / PREAMP<br>(dB) / (dBm) / (dB) | Final Peak<br>(dBuV/m) | POL / HGT / AZ<br>(m) (DEG) | Final Ave<br>(dBuV/m) | Limit FCC 15.231<br>(dBuV/m) |
|----------------------------------------------------------------------------|-------------------|---------------------------------------------|------------------------|-----------------------------|-----------------------|------------------------------|
| ALL READINGS MAXIMIZED IN PEAK. 100KHZ RBW <1000 MHZ - 1MHZ RBW >1000 MHZ. |                   |                                             |                        |                             |                       |                              |
| 345.10                                                                     | 79.5 Pk           | 2.1 / 14.6 / 0.0                            | 96.2                   | H / 1.0 / 90.0              | 76.2                  | 77.2                         |
| 345.10                                                                     | 69.0 Pk           | 2.1 / 14.6 / 0.0                            | 85.7                   | V / 1.0 / 90.0              | 65.7                  | 77.2                         |
| 690.19                                                                     | 57.2 Pk           | 2.9 / 19.8 / 26.1                           | 53.9                   | H / 1.0 / 90.0              | 33.9                  | 57.2                         |
| 1035.29                                                                    | 53.6 Pk           | 3.5 / 22.3 / 25.5                           | 53.9                   | H / 1.0 / 90.0              | 33.9                  | 54.0                         |
| 1380.39                                                                    | 35.7 Pk           | 4.3 / 26.1 / 25.4                           | 40.8                   | H / 1.0 / 90.0              | 20.8                  | 54.0                         |
| 1725.49                                                                    | 45.6 Pk           | 5.6 / 27.3 / 25.8                           | 52.7                   | H / 1.0 / 90.0              | 32.7                  | 57.2                         |
| 2070.59                                                                    | 34.4 Pk           | 4.7 / 29.1 / 25.8                           | 42.4                   | H / 1.0 / 90.0              | 22.4                  | 57.2                         |
| 2415.69                                                                    | 35.3 Pk           | 4.9 / 30.1 / 26.6                           | 43.8                   | H / 1.0 / 90.0              | 23.8                  | 57.2                         |
| 2760.79                                                                    | 35.0 Pk           | 6.0 / 30.8 / 26.6                           | 45.2                   | H / 1.0 / 90.0              | 25.2                  | 54.0                         |
| 3105.89                                                                    | 33.0 Pk           | 6.0 / 31.4 / 26.4                           | 44.0                   | H / 1.0 / 90.0              | 22.0                  | 57.2                         |
| 3450.99                                                                    | 34.7 Pk           | 6.3 / 32.2 / 26.9                           | 46.3                   | H / 1.0 / 90.0              | 26.3                  | 57.2                         |
| END OF SCAN.                                                               |                   |                                             |                        |                             |                       |                              |
|                                                                            |                   |                                             |                        |                             |                       |                              |

Tested by: **ROSS M. JOHNSON**

Printed

Signature

Reviewed by: **J. T. Schneider**

Printed

Signature

# Radiated Electromagnetic Emissions



Test Report #: W0381 Run 01 Test Area: LTS 3m

Test Method: N/A Test Date: 10-Jul-2000

EUT Model #: PIR DETECTOR EUT Power: BATTERY

EUT Serial #: \_\_\_\_\_ Temperature: 24 °C

Manufacturer: ITI Relative Humidity: 72 %

EUT Description: \_\_\_\_\_ Air Pressure: 98.2 kPa

Notes: \_\_\_\_\_ Page: 2 of 2

\_\_\_\_\_

\_\_\_\_\_

| FREQ<br>(MHz) | LEVEL<br>(dBuV/m) | CABLE / ANT / PREAMP<br>(dB) / (dB/m) / (dB) | Final Peak<br>(dBuV/m) | POL / HGT / AZ<br>(m) (DEG) | Final Ave<br>(dBuV/m) | Limit FCC 15.231<br>(dBuV/m) |
|---------------|-------------------|----------------------------------------------|------------------------|-----------------------------|-----------------------|------------------------------|
|---------------|-------------------|----------------------------------------------|------------------------|-----------------------------|-----------------------|------------------------------|

| ***** MEASUREMENT SUMMARY ***** |         |                   |      |                |      |      |
|---------------------------------|---------|-------------------|------|----------------|------|------|
| 3450.99                         | 34.7 Pk | 6.3 / 32.2 / 26.9 | 46.3 | H / 1.0 / 90.0 | 26.3 | 57.2 |
| 3105.89                         | 33.0 Pk | 6.0 / 31.4 / 26.4 | 44.0 | H / 1.0 / 90.0 | 24.0 | 57.2 |
| 2760.79                         | 35.0 Pk | 6.0 / 30.8 / 26.6 | 45.2 | H / 1.0 / 90.0 | 25.2 | 54.0 |
| 2415.69                         | 35.3 Pk | 4.9 / 30.1 / 26.6 | 43.8 | H / 1.0 / 90.0 | 23.8 | 57.2 |
| 2070.59                         | 34.4 Pk | 4.7 / 29.1 / 25.8 | 42.4 | H / 1.0 / 90.0 | 22.4 | 57.2 |
| 1725.49                         | 45.6 Pk | 5.6 / 27.3 / 25.8 | 52.7 | H / 1.0 / 90.0 | 32.7 | 57.2 |
| 1380.39                         | 35.7 Pk | 4.3 / 26.1 / 25.4 | 40.8 | H / 1.0 / 90.0 | 20.8 | 54.0 |
| 1035.29                         | 53.6 Pk | 3.5 / 22.3 / 25.5 | 53.9 | H / 1.0 / 90.0 | 33.9 | 54.0 |
| 690.19                          | 57.2 Pk | 2.9 / 19.8 / 26.1 | 53.9 | H / 1.0 / 90.0 | 33.9 | 57.2 |
| 345.10                          | 79.5 Pk | 2.1 / 14.6 / 0.0  | 96.2 | H / 1.0 / 90.0 | 76.2 | 77.2 |
|                                 |         |                   |      |                |      |      |

Tested by: ROSS M. JOHNSON

Printed

Signature

Reviewed by: J. T. Schneider

Printed

Signature