

**Interactive Technologies, Inc.  
Shatter Pro  
B4Z-799A-SOUND  
Certification**

|                                                                                                     |                               |              |
|-----------------------------------------------------------------------------------------------------|-------------------------------|--------------|
| 03/21/01 11:42 AM                                                                                   | <b>FCC ID: B4Z-799A-SOUND</b> | Page 1 of 24 |
| H:\PRJ\DEG\ACTIVE\60-873-95 Shatter Pro\Communications\FCC\Part 15<br>Submittal\peices\FCC_REPT.DOC |                               |              |

**Interactive Technologies Inc**

**Shatter Pro  
B4Z-799A-SOUND**

**01/08/2001**

**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 glass break alarm transmitter for use in a wireless security system. The unit is self-contained and powered by two 3.0 Volt Lithium batteries. The transmitter's frequency is crystal controlled and is not adjustable by the user. The device measures approximately 4.25" in length, 3" in width, and 1.75" in height. The unit weighs approximately 4.9 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 01/08/01.

### §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-799A-SOUND." 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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### §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 01/08/01. 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-799A-SOUND**
  - 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.

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### 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 a glass break alarm, 8 packets are sent in the transmission. The packet duration is, at most, 30 mS, see **Duty Cycle Correction Factor** [§15.231(b)(2) and §15.35(c)]. The time between packets random between 100 mS and 450 mS so the length of the longest transmission is:

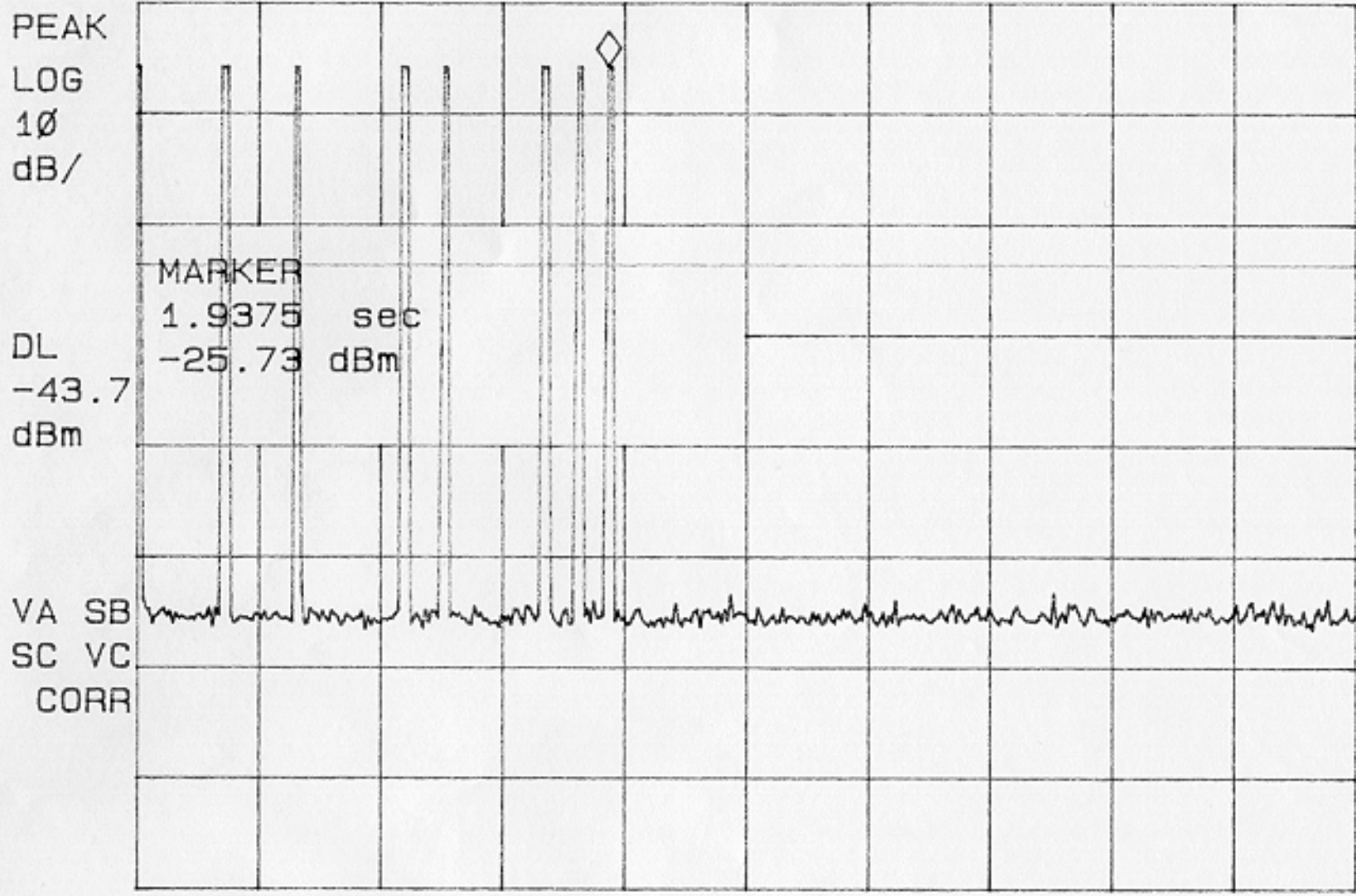
$$8*30\text{mS} + 7*450\text{mS} = 3.39 \text{ seconds.}$$

The following plot shows an 8-packet transmission that concludes in less than 5 seconds.

04: 28: 04 DEC 28, 2000

REF -20.0 dBm AT 10 dB

MKR 1.9375 sec  
-25.73 dBm



CENTER 319.508 MHz SPAN 0 Hz  
#RES BW 300 kHz #VBW 300 kHz #SWP 5.00 sec



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

As permitted, this device will transmit three packets for supervision purposes. The inter-packet delay is a random time between 100 mS and 450 mS. The packet itself may be as long as 30 ms depending on the data sent. The longest time to conclude a supervisory transmission is then:

$$3 * 30 \text{ mS} + 2 * 450 \text{ mS} = 990 \text{ mS}$$

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

1. The transmitter employs amplitude modulation and transmits 63 bits. Three bits are latched with a total “ON” time of 976µS. Another bit has a “ON” time of 366µS. All other bits have a “ON” time of 122µS.

The total on time of a single packet is:

$$59 * 122 \mu\text{S} + 366 \mu\text{S} + 976 \mu\text{S} = 8.54 \text{ mS}.$$

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

$$20 * \text{LOG} (8.54/100) = -21.37 \text{ dB}$$

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 18.65 mS

04: 14: 18 DEC 28, 2000

REF -20.0 dBm

AT 10 dB

MKR 3.7500 msec

-26.82 dBm

PEAK

LOG

10

dB/

DL

-65.7

dBm

VA SB

SC VC

CORR

MARKER  
3.7500 msec  
-26.82 dBm

MARKER

NORMAL

MARKER

Δ

MARKER

AMPTD

SELECT

1 2 3 4

MARKER 1

ON OFF

More

1 of 2

CENTER 319.508 MHz

#RES BW 100 kHz

#VBW 300 kHz

SPAN 0 Hz

#SWP 100 msec

04: 22: 52 DEC 28, 2000

MKR  $\Delta$  18.655 msec

REF -20.0 dBm

AT 10 dB

.14 dB

PEAK  
LOG  
10  
dB/

MARKER  
NORMAL

MARKER  
 $\Delta$

DL  
-65.7  
dBm

MARKER  $\Delta$   
18.655 msec  
.14 dB

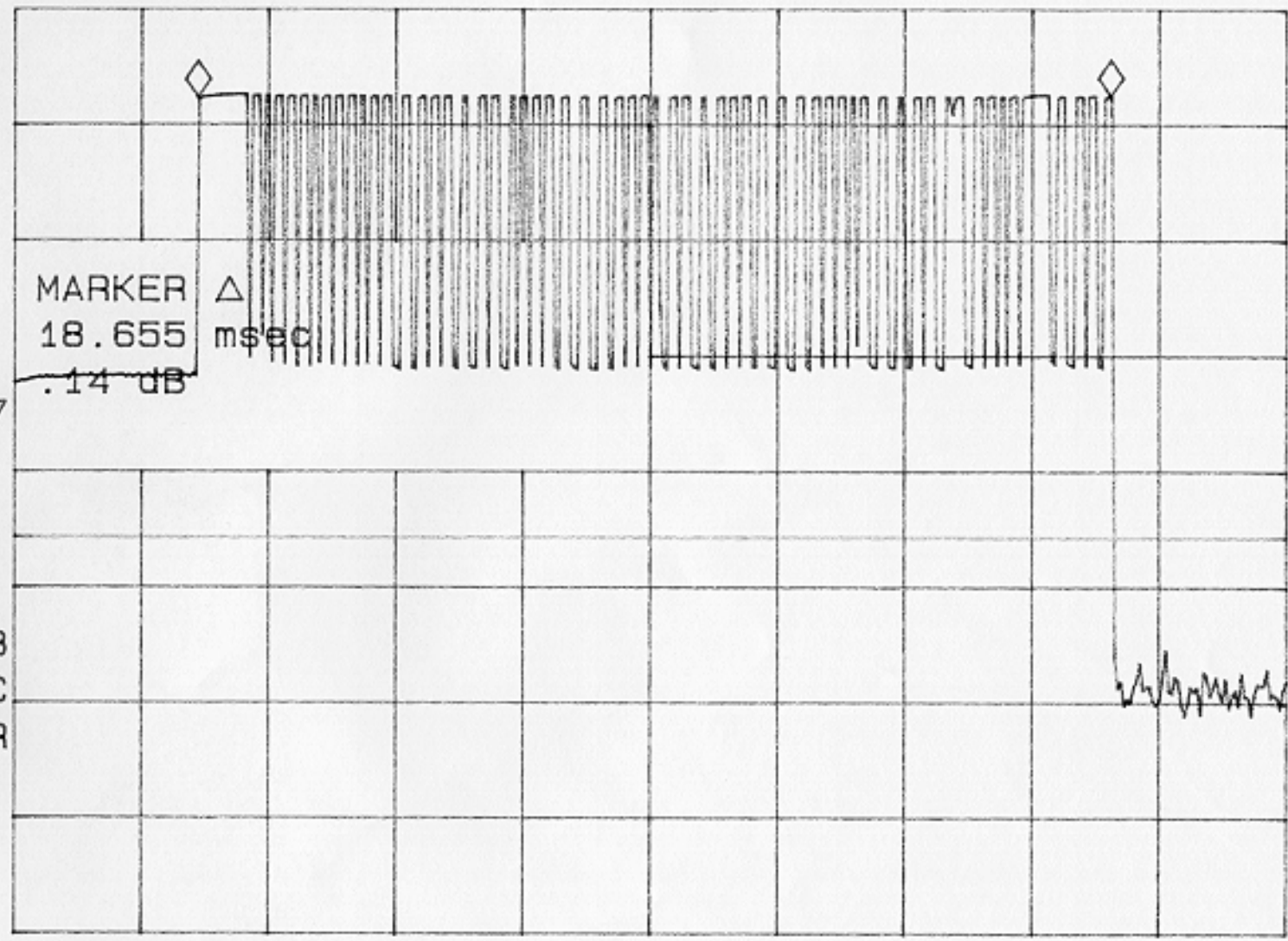
MARKER  
AMPTD

SELECT  
1 2 3 4

VA SB  
SC VC  
CORR

MARKER 1  
ON OFF

More  
1 of 2



CENTER 319.508 MHz

SPAN 0 Hz

#RES BW 300 kHz

#VBW 300 kHz

#SWP 26.0 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 8591E.

The spectrum analyzer 20 dB skirt bandwidth is 3.3 KHz.

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 |
|-------------------------|---------------------------------------|-----------------------------------------------|------------------------------------------|
| 319.5                   | 29.0                                  | 25.7                                          | 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

06:18:26 DEC 28, 2000

RL 0.00 dBm

ATTEN 10 dB

10.00 dB/DIV

MKR #3  $\Delta$ FRQ 1.5 kHz

-20.08 dB

MKR AMPLITUDE right

1.5 kHz

-20.01 dB

3

Marker Bandwidth

3.3 kHz



CENTER 319.508 0 MHz

RB 1.00 kHz

VB 1.00 kHz

SPAN 100.0 kHz

ST 305.0 msec

03: 59: 49 DEC 28, 2000

MKR  $\Delta$  29.0 kHz

REF -20.0 dBm #AT 0 dB

-.84 dB

MARKER  
NORMAL

PEAK  
LOG  
10  
dB/

MARKER  
 $\Delta$

MARKER  $\Delta$   
29.0 kHz  
-.84 dB

MARKER  
AMPTD

SELECT  
1 2 3 4

VA SB  
SC FC  
CORR

MARKER 1  
ON OFF

More  
1 of 2

CENTER 319.5080 MHz  
RES BW 3.0 kHz

VBW 3 kHz

SPAN 200.0 kHz  
SWP 100 msec



04: 40: 07 DEC 28, 2000

HP

REF -10.0 dBm #AT 0 dB

MKR 319.8 MHz

-17.35 dBm

PEAK

LOG

10

dB/

SPAN  
200.0 MHz

VA SB

SC FC

CORR

CLEAR  
WRITE A

MAX  
HOLD A

VIEW A

BLANK A

Trace  
A B C

More  
1 of 3

CENTER 319.8 MHz

RES BW 1.0 MHz

VBW 300 kHz

SPAN 200.0 MHz

SWP 20.0 msec

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### 3.1.5 Emissions Measurements

#### 3.1.5.1 Radiated Emissions Summary

The Shatter Pro passes FCC Rules Part 15, Subpart C, Paragraph 15.231. The highest fundamental radiated emission was 4.4 dB below the FCC limit at 319.5 MHz. The highest spurious emission measurement was 12.7 dB below the FCC limit at 638.9 MHz. The highest forbidden band emission was 15.3 dB below the FCC limit at 2769.07 MHz.

#### 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 319.5 MHz is approximately 95.8 dBμV/M. The limit from §15.231(b) with linear interpolation yields a limit, without consideration for duty cycle, of approximately 75.8 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      |
| 319.5     | 73.90            | 20                    | 3.9        | 13.6           | 0       | 71.40          | 3,715          | 6,229     |
| 638.99    | 38.10            | 20                    | 5.7        | 19.3           | 0       | 43.10          | 143            | 623       |
| 425.98    | 41.90            | 20                    | 4.6        | 16.3           | 0       | 42.80          | 138            | 623       |
| 2769.07   | 44.50            | 20                    | 13.2       | 31.0           | 28.2    | 40.50          | 106            | 623       |

### 3.1.5.4 Forbidden Band4s

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           |                  |

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The test data follows on the next 5 pages:

|                                   |                               |               |
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# Radiated Electromagnetic Emissions

|                  |                      |            |               |                    |          |
|------------------|----------------------|------------|---------------|--------------------|----------|
| Test Report #:   | <b>W0665 Run 01</b>  | Test Area: | STS 3m        |                    |          |
| Test Method:     | N/A                  | Test Date: | 22-Dec-2000   |                    |          |
| EUT Model #:     | Shatter Pro # 55-799 | EUT Power: | Battery power |                    |          |
| EUT Serial #:    | Board # 1            |            |               | Temperature:       | 15 °C    |
| Manufacturer:    | ITI                  |            |               | Relative Humidity: | 20 %     |
| EUT Description: |                      |            |               | Air Pressure:      | 99.8 kPa |
| Notes:           |                      |            |               | Page:              | 1 of 5   |

| FREQ<br>(MHz)                             | LEVEL<br>(dBuV) | CABLE / ANT / PREAMP<br>(dB) | FINAL<br>(dBuV) | POL / HGT / AZ<br>(m) (DEG) | DELTA1<br>N/A | DELTA2<br>N/A |
|-------------------------------------------|-----------------|------------------------------|-----------------|-----------------------------|---------------|---------------|
| res bw = 100 khz, video bw = 100 khz      |                 |                              |                 |                             |               |               |
| following is with preamp removed:         |                 |                              |                 |                             |               |               |
| 319.47                                    | 73.9 Pk         | 3.9 / 13.6 / 0.0             | 91.3            | H / 1.0 / 0.0               | N/A           | N/A           |
| 319.47                                    | 59.3 Pk         | 3.9 / 13.6 / 0.0             | 76.8            | V / 1.0 / 0.0               | N/A           | N/A           |
| eut standing upright                      |                 |                              |                 |                             |               |               |
| 319.47                                    | 66.0 Pk         | 3.9 / 13.6 / 0.0             | 83.5            | H / 1.0 / 0.0               | N/A           | N/A           |
| 319.48                                    | 67.9 Pk         | 3.9 / 13.6 / 0.0             | 85.4            | V / 1.0 / 0.0               | N/A           | N/A           |
| eut returned to laying flat on test table |                 |                              |                 |                             |               |               |
| 319.47                                    | 73.6 Pk         | 3.9 / 13.6 / 0.0             | 91.1            | H / 1.0 / 0.0               | N/A           | N/A           |
| 212.97                                    | 43.7 Pk         | 3.1 / 10.9 / 0.0             | 57.7            | H / 1.0 / 0.0               | N/A           | N/A           |
| 106.47                                    | 39.9 Pk         | 2.2 / 8.2 / 0.0              | 50.3            | H / 1.0 / 0.0               | N/A           | N/A           |
| 425.98                                    | 41.9 Pk         | 4.6 / 16.3 / 0.0             | 62.8            | H / 1.0 / 0.0               | N/A           | N/A           |
| 532.48                                    | 35.1 Pk         | 5.2 / 17.6 / 0.0             | 58.0            | H / 1.0 / 0.0               | N/A           | N/A           |
| 638.99                                    | 38.1 Pk         | 5.7 / 19.3 / 0.0             | 63.1            | H / 1.0 / 0.0               | N/A           | N/A           |
| installed preamp                          |                 |                              |                 |                             |               |               |
| 745.49                                    | 50.2 Pk         | 6.3 / 20.7 / 27.8            | 49.5            | H / 1.0 / 0.0               | N/A           | N/A           |
| 851.99                                    | 48.5 Pk         | 6.7 / 21.5 / 27.5            | 49.2            | H / 1.0 / 0.0               | N/A           | N/A           |
| 958.50                                    | 37.7 Pk         | 7.1 / 22.8 / 27.3            | 40.3            | H / 1.0 / 0.0               | N/A           | N/A           |
| 106.47                                    | 59.5 Pk         | 2.2 / 8.2 / 28.2             | 41.7            | V / 1.0 / 0.0               | N/A           | N/A           |
| 212.97                                    | 66.5 Pk         | 3.1 / 10.9 / 28.1            | 52.5            | V / 1.0 / 0.0               | N/A           | N/A           |
| 425.98                                    | 66.2 Pk         | 4.6 / 16.3 / 28.2            | 59.0            | V / 1.0 / 0.0               | N/A           | N/A           |
| 532.49                                    | 57.5 Pk         | 5.2 / 17.6 / 28.2            | 52.1            | V / 1.0 / 0.0               | N/A           | N/A           |
| 638.99                                    | 59.4 Pk         | 5.7 / 19.3 / 28.0            | 56.4            | V / 1.0 / 0.0               | N/A           | N/A           |
| 638.99                                    | 59.5 Pk         | 5.7 / 19.3 / 28.0            | 56.5            | V / 1.0 / 0.0               | N/A           | N/A           |
| 745.49                                    | 47.8 Pk         | 6.3 / 20.7 / 27.8            | 47.0            | V / 1.0 / 0.0               | N/A           | N/A           |
| 851.99                                    | 48.8 Pk         | 6.7 / 21.5 / 27.5            | 49.5            | V / 1.0 / 0.0               | N/A           | N/A           |
| 958.50                                    | 43.7 Pk         | 7.1 / 22.8 / 27.3            | 46.3            | V / 1.0 / 0.0               | N/A           | N/A           |

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# Radiated Electromagnetic Emissions

|                  |                      |                    |               |              |
|------------------|----------------------|--------------------|---------------|--------------|
| Test Report #:   | <b>W0665 Run 01</b>  | Test Area:         | STS 3m        |              |
| Test Method:     | N/A                  | Test Date:         | 22-Dec-2000   |              |
| EUT Model #:     | Shatter Pro # 55-799 | EUT Power:         | Battery power |              |
| EUT Serial #:    | Board # 1            | Temperature:       | 15            | °C           |
| Manufacturer:    | ITI                  | Relative Humidity: | 20            | %            |
| EUT Description: |                      | Air Pressure:      | 99.8          | kPa          |
| Notes:           |                      |                    |               | Page: 2 of 5 |

| FREQ<br>(MHz)                     | LEVEL<br>(dBuV) | CABLE / ANT / PREAMP<br>(dB) | FINAL<br>(dBuV) | POL / HGT / AZ<br>(m) (DEG) | DELTA1<br>N/A | DELTA2<br>N/A |
|-----------------------------------|-----------------|------------------------------|-----------------|-----------------------------|---------------|---------------|
| res bw = 1 MHz, video bw = 1 MHz: |                 |                              |                 |                             |               |               |
| 1065.02                           | 44.9 Pk         | 7.9 / 22.6 / 27.2            | 48.2            | V / 1.0 / 0.0               | N/A           | N/A           |
| 1171.52                           | 38.1 Pk         | 8.2 / 22.5 / 27.2            | 41.5            | V / 1.0 / 0.0               | N/A           | N/A           |
| 1278.02                           | 42.6 Pk         | 8.7 / 22.7 / 27.3            | 46.7            | V / 1.0 / 0.0               | N/A           | N/A           |
| 1384.52                           | 33.9 Pk         | 9.3 / 23.9 / 27.4            | 39.7            | V / 1.0 / 0.0               | N/A           | N/A           |
| 1491.02                           | 38.0 Pk         | 9.5 / 25.0 / 27.4            | 45.0            | V / 1.0 / 0.0               | N/A           | N/A           |
| 1597.52                           | 46.0 Pk         | 10.3 / 25.4 / 27.5           | 54.1            | V / 1.0 / 0.0               | N/A           | N/A           |
| 1917.03                           | 37.5 Pk         | 11.3 / 26.9 / 27.8           | 47.9            | V / 1.0 / 0.0               | N/A           | N/A           |
| 1065.02                           | 40.4 Pk         | 7.9 / 22.6 / 27.2            | 43.7            | H / 1.0 / 0.0               | N/A           | N/A           |
| 1171.52                           | 37.4 Pk         | 8.2 / 22.5 / 27.2            | 40.9            | H / 1.0 / 0.0               | N/A           | N/A           |
| 1278.02                           | 38.9 Pk         | 8.7 / 22.7 / 27.3            | 43.0            | H / 1.0 / 0.0               | N/A           | N/A           |
| 1384.52                           | 36.1 Pk         | 9.3 / 23.9 / 27.4            | 41.9            | H / 1.0 / 0.0               | N/A           | N/A           |
| 1491.02                           | 41.8 Pk         | 9.5 / 25.0 / 27.4            | 46.9            | H / 1.0 / 0.0               | N/A           | N/A           |
| 1597.52                           | 41.1 Pk         | 10.3 / 25.4 / 27.5           | 49.2            | H / 1.0 / 0.0               | N/A           | N/A           |
| 1704.02                           | 38.7 Pk         | 10.7 / 25.7 / 27.5           | 47.5            | H / 1.0 / 0.0               | N/A           | N/A           |
| 1810.52                           | 34.4 Pk         | 10.7 / 26.2 / 27.6           | 43.6            | H / 1.0 / 0.0               | N/A           | N/A           |
| 1704.02                           | 34.1 Pk         | 10.7 / 25.7 / 27.5           | 42.9            | V / 1.0 / 0.0               | N/A           | N/A           |
| 1810.52                           | 32.5 Pk         | 10.7 / 26.2 / 27.6           | 41.7            | V / 1.0 / 0.0               | N/A           | N/A           |
| Antenna: STS Horn Antenna         |                 |                              |                 |                             |               |               |
| 2023.52                           | 43.1 Pk         | 11.3 / 29.4 / 27.7           | 56.2            | V / 1.0 / 0.0               | N/A           | N/A           |
| 2130.04                           | 33.0 Pk         | 11.6 / 29.6 / 27.5           | 46.7            | V / 1.0 / 0.0               | N/A           | N/A           |
| 2236.54                           | 41.2 Pk         | 11.8 / 29.9 / 27.4           | 55.5            | V / 1.0 / 0.0               | N/A           | N/A           |
| 2343.04                           | 37.1 Pk         | 12.0 / 30.2 / 27.7           | 51.7            | V / 1.0 / 0.0               | N/A           | N/A           |
| 2449.54                           | 34.0 Pk         | 12.4 / 30.5 / 28.1           | 48.7            | V / 1.0 / 0.0               | N/A           | N/A           |
| 2556.07                           | 37.9 Pk         | 12.8 / 30.7 / 28.2           | 53.2            | V / 1.0 / 0.0               | N/A           | N/A           |
| 2662.57                           | 40.8 Pk         | 13.0 / 30.8 / 28.2           | 56.4            | V / 1.0 / 0.0               | N/A           | N/A           |
| 2769.07                           | 41.5 Pk         | 13.2 / 31.0 / 28.2           | 57.5            | V / 1.0 / 0.0               | N/A           | N/A           |

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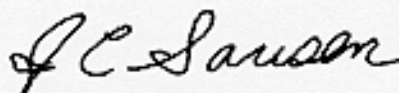
# Radiated Electromagnetic Emissions

|                  |                             |            |                      |                    |                 |
|------------------|-----------------------------|------------|----------------------|--------------------|-----------------|
| Test Report #:   | <u>W0665 Run 01</u>         | Test Area: | <u>STS 3m</u>        |                    |                 |
| Test Method:     | <u>N/A</u>                  | Test Date: | <u>22-Dec-2000</u>   |                    |                 |
| EUT Model #:     | <u>Shatter Pro # 55-799</u> | EUT Power: | <u>Battery power</u> |                    |                 |
| EUT Serial #:    | <u>Board # 1</u>            |            |                      | Temperature:       | <u>15</u> °C    |
| Manufacturer:    | <u>ITI</u>                  |            |                      | Relative Humidity: | <u>20</u> %     |
| EUT Description: |                             |            |                      | Air Pressure:      | <u>99.8</u> kPa |
| Notes:           |                             |            |                      | Page:              | <u>3 of 5</u>   |

| FREQ<br>(MHz) | LEVEL<br>(dBuV) | CABLE / ANT / PREAMP<br>(dB) | FINAL<br>(dBuV) | POL / HGT / AZ<br>(m) (DEG) | DELTA1<br>N/A | DELTA2<br>N/A |
|---------------|-----------------|------------------------------|-----------------|-----------------------------|---------------|---------------|
| 2875.57       | 35.8 Pk         | 13.6 / 31.1 / 28.2           | 52.3            | V / 1.0 / 0.0               | N/A           | N/A           |
| 2982.07       | 38.9 Pk         | 14.0 / 31.3 / 28.1           | 56.1            | V / 1.0 / 0.0               | N/A           | N/A           |
| 3068.57       | 34.5 Pk         | 14.5 / 31.5 / 28.1           | 52.3            | V / 1.0 / 0.0               | N/A           | N/A           |
| 3195.07       | 31.9 Pk         | 14.8 / 31.8 / 28.0           | 50.5            | V / 1.0 / 0.0               | N/A           | N/A           |
| 2023.54       | 37.8 Pk         | 11.3 / 29.4 / 27.7           | 50.8            | H / 1.0 / 0.0               | N/A           | N/A           |
| 2130.04       | 34.7 Pk         | 11.6 / 29.6 / 27.5           | 48.4            | H / 1.0 / 0.0               | N/A           | N/A           |
| 2236.55       | 40.6 Pk         | 11.8 / 29.9 / 27.4           | 55.0            | H / 1.0 / 0.0               | N/A           | N/A           |
| 2343.04       | 38.5 Pk         | 12.0 / 30.2 / 27.7           | 53.0            | H / 1.0 / 0.0               | N/A           | N/A           |
| 2449.54       | 34.1 Pk         | 12.4 / 30.5 / 28.1           | 48.8            | H / 1.0 / 0.0               | N/A           | N/A           |
| 2556.07       | 34.4 Pk         | 12.8 / 30.7 / 28.2           | 49.7            | H / 1.0 / 0.0               | N/A           | N/A           |
| 2662.57       | 39.1 Pk         | 13.0 / 30.8 / 28.2           | 54.7            | H / 1.0 / 0.0               | N/A           | N/A           |
| 2769.07       | 44.5 Pk         | 13.2 / 31.0 / 28.2           | 60.5            | H / 1.0 / 0.0               | N/A           | N/A           |
| 2875.57       | 42.5 Pk         | 13.6 / 31.1 / 28.2           | 59.0            | H / 1.0 / 0.0               | N/A           | N/A           |
| 2982.07       | 45.6 Pk         | 14.0 / 31.3 / 28.1           | 62.8            | H / 1.0 / 0.0               | N/A           | N/A           |
| 3068.57       | 39.1 Pk         | 14.5 / 31.5 / 28.1           | 56.9            | H / 1.0 / 0.0               | N/A           | N/A           |
| 3195.07       | 36.5 Pk         | 14.8 / 31.8 / 28.0           | 55.1            | H / 1.0 / 0.0               | N/A           | N/A           |
| end of run.   |                 |                              |                 |                             |               |               |
|               |                 |                              |                 |                             |               |               |

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# Radiated Electromagnetic Emissions

|                  |                             |            |                      |                    |                 |
|------------------|-----------------------------|------------|----------------------|--------------------|-----------------|
| Test Report #:   | <u>W0665 Run 01</u>         | Test Area: | <u>STS 3m</u>        |                    |                 |
| Test Method:     | <u>N/A</u>                  | Test Date: | <u>22-Dec-2000</u>   |                    |                 |
| EUT Model #:     | <u>Shatter Pro # 55-799</u> | EUT Power: | <u>Battery power</u> |                    |                 |
| EUT Serial #:    | <u>Board # 1</u>            |            |                      | Temperature:       | <u>15</u> °C    |
| Manufacturer:    | <u>ITI</u>                  |            |                      | Relative Humidity: | <u>20</u> %     |
| EUT Description: |                             |            |                      | Air Pressure:      | <u>99.8</u> kPa |
| Notes:           |                             |            |                      | Page:              | <u>4 of 5</u>   |

| FREQ<br>(MHz) | LEVEL<br>(dBuV) | CABLE / ANT / PREAMP<br>(dB) | FINAL<br>(dBuV) | POL / HGT / AZ<br>(m) (DEG) | DELTA1<br>N/A | DELTA2<br>N/A |
|---------------|-----------------|------------------------------|-----------------|-----------------------------|---------------|---------------|
|---------------|-----------------|------------------------------|-----------------|-----------------------------|---------------|---------------|

| ***** MEASUREMENT SUMMARY ***** |         |                    |      |               |     |     |
|---------------------------------|---------|--------------------|------|---------------|-----|-----|
| 106.47                          | 39.9 Pk | 2.2 / 8.2 / 0.0    | 50.3 | H / 1.0 / 0.0 | N/A | N/A |
| 212.97                          | 43.7 Pk | 3.1 / 10.9 / 0.0   | 57.7 | H / 1.0 / 0.0 | N/A | N/A |
| 319.47                          | 73.9 Pk | 3.9 / 13.6 / 0.0   | 91.3 | H / 1.0 / 0.0 | N/A | N/A |
| 425.98                          | 41.9 Pk | 4.6 / 16.3 / 0.0   | 62.8 | H / 1.0 / 0.0 | N/A | N/A |
| 532.48                          | 35.1 Pk | 5.2 / 17.6 / 0.0   | 58.0 | H / 1.0 / 0.0 | N/A | N/A |
| 638.99                          | 38.1 Pk | 5.7 / 19.3 / 0.0   | 63.1 | H / 1.0 / 0.0 | N/A | N/A |
| 745.49                          | 50.2 Pk | 6.3 / 20.7 / 27.8  | 49.5 | H / 1.0 / 0.0 | N/A | N/A |
| 851.99                          | 48.8 Pk | 6.7 / 21.5 / 27.5  | 49.5 | V / 1.0 / 0.0 | N/A | N/A |
| 958.50                          | 43.7 Pk | 7.1 / 22.8 / 27.3  | 46.3 | V / 1.0 / 0.0 | N/A | N/A |
| 1065.02                         | 44.9 Pk | 7.9 / 22.6 / 27.2  | 48.2 | V / 1.0 / 0.0 | N/A | N/A |
| 1171.52                         | 38.1 Pk | 8.2 / 22.5 / 27.2  | 41.5 | V / 1.0 / 0.0 | N/A | N/A |
| 1278.02                         | 42.6 Pk | 8.7 / 22.7 / 27.3  | 46.7 | V / 1.0 / 0.0 | N/A | N/A |
| 1384.52                         | 36.1 Pk | 9.3 / 23.9 / 27.4  | 41.9 | H / 1.0 / 0.0 | N/A | N/A |
| 1491.02                         | 41.8 Pk | 9.5 / 25.0 / 27.4  | 48.9 | H / 1.0 / 0.0 | N/A | N/A |
| 1597.52                         | 46.0 Pk | 10.3 / 25.4 / 27.5 | 54.1 | V / 1.0 / 0.0 | N/A | N/A |
| 1704.02                         | 38.7 Pk | 10.7 / 25.7 / 27.5 | 47.5 | H / 1.0 / 0.0 | N/A | N/A |
| 1810.52                         | 34.4 Pk | 10.7 / 26.2 / 27.6 | 43.6 | H / 1.0 / 0.0 | N/A | N/A |
| 1917.03                         | 37.5 Pk | 11.3 / 26.9 / 27.8 | 47.9 | V / 1.0 / 0.0 | N/A | N/A |
| 2023.52                         | 43.1 Pk | 11.3 / 29.4 / 27.7 | 56.2 | V / 1.0 / 0.0 | N/A | N/A |
| 2130.04                         | 34.7 Pk | 11.6 / 29.6 / 27.5 | 48.4 | H / 1.0 / 0.0 | N/A | N/A |
| 2236.54                         | 41.2 Pk | 11.8 / 29.9 / 27.4 | 55.5 | V / 1.0 / 0.0 | N/A | N/A |
| 2343.04                         | 38.5 Pk | 12.0 / 30.2 / 27.7 | 53.0 | H / 1.0 / 0.0 | N/A | N/A |
| 2449.54                         | 34.1 Pk | 12.4 / 30.5 / 28.1 | 48.8 | H / 1.0 / 0.0 | N/A | N/A |
| 2556.07                         | 37.9 Pk | 12.8 / 30.7 / 28.2 | 53.2 | V / 1.0 / 0.0 | N/A | N/A |
| 2662.57                         | 40.8 Pk | 13.0 / 30.8 / 28.2 | 56.4 | V / 1.0 / 0.0 | N/A | N/A |
| 2769.07                         | 44.5 Pk | 13.2 / 31.0 / 28.2 | 60.5 | H / 1.0 / 0.0 | N/A | N/A |

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# Radiated Electromagnetic Emissions

|                  |                             |            |                      |                    |                 |
|------------------|-----------------------------|------------|----------------------|--------------------|-----------------|
| Test Report #:   | <u>W0665 Run 01</u>         | Test Area: | <u>STS 3m</u>        |                    |                 |
| Test Method:     | <u>N/A</u>                  | Test Date: | <u>22-Dec-2000</u>   |                    |                 |
| EUT Model #:     | <u>Shatter Pro # 55-799</u> | EUT Power: | <u>Battery power</u> |                    |                 |
| EUT Serial #:    | <u>Board # 1</u>            |            |                      | Temperature:       | <u>15</u> °C    |
| Manufacturer:    | <u>ITI</u>                  |            |                      | Relative Humidity: | <u>20</u> %     |
| EUT Description: |                             |            |                      | Air Pressure:      | <u>99.8</u> kPa |
| Notes:           |                             |            |                      | Page:              | <u>5 of 5</u>   |

| FREQ<br>(MHz) | LEVEL<br>(dBuV) | CABLE / ANT / PREAMP<br>(dB) | FINAL<br>(dBuV) | POL / HGT / AZ<br>(m) (DEG) | DELTA1<br>N/A | DELTA2<br>N/A |
|---------------|-----------------|------------------------------|-----------------|-----------------------------|---------------|---------------|
| 2875.57       | 42.5 Pk         | 13.6 / 31.1 / 28.2           | 59.0            | H / 1.0 / 0.0               | N/A           | N/A           |
| 2982.07       | 45.6 Pk         | 14.0 / 31.3 / 28.1           | 62.8            | H / 1.0 / 0.0               | N/A           | N/A           |
| 3088.57       | 39.1 Pk         | 14.5 / 31.5 / 28.1           | 56.9            | H / 1.0 / 0.0               | N/A           | N/A           |
| 3195.07       | 36.5 Pk         | 14.8 / 31.8 / 28.0           | 55.1            | H / 1.0 / 0.0               | N/A           | N/A           |
|               |                 |                              |                 |                             |               |               |

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