

## Technical Information

| APPLICANT                                     | MANUFACTURER                                  |
|-----------------------------------------------|-----------------------------------------------|
| Name: <u>CRN Telemetry Devices, Inc.</u>      | Name: <u>CRN Telemetry Devices, Inc.</u>      |
| Address: <u>1515 Middle Country Road</u>      | Address: <u>1515 Middle Country Road</u>      |
| City, State, Zip: <u>Centereach, NY 11720</u> | City, State, Zip: <u>Centereach, NY 11720</u> |

**TEST SPECIFICATION:** FCC Rules and Regulations Part 90

### TEST SAMPLE DESCRIPTION

BRANDNAME(s): CRN Telemetry Devices, Inc.

MODEL(s): CRNSS7

FCC ID: ITCCRNSBU

TYPE: Frequency Modulated (FM)

POWER REQUIREMENTS: 12 VDC

FREQUENCY OF OPERATION: 450-454 MHz, 456-460 MHz, 460-462.5375 MHz,  
462.7375-467.5375 MHz and 467.7375-512 MHz

APPLICABLE RULE SECTION: Part 90

### TESTS PERFORMED

- **2.1046** RF Power Output
- **2.1047** Modulation Characteristics
- **2.1049** Occupied Bandwidth
- **2.1051** Spurious Emissions at Antenna Terminals
- **2.1053** Field Strength of Spurious Radiation
- **2.1055** Frequency Stability
- **90.2154** Transient Frequency Behavior

## **TEST RESULTS**

### **2.1046 RF Power Output**

The RF Power Output of the EUT was measured with the transmitter adjusted for maximum power output. The highest observed power output was measured to be 1.47 Watts. The measured power output is in compliance with the requirements specified in section 90.205h of the FCC Rules.

### **2.1047 Modulation Characteristics**

The curve showing the frequency response of its audio low pass filter is enclosed.

### **2.1049 Occupied Bandwidth**

The Occupied Bandwidth of the transmitter was measured and found to be 10 kHz. Utilizing this Bandwidth, the transmitter complied with the requirements for Emissions Mask B contained in section 90.210(b) and the Bandwidth Limitations of section 90.209.

### **2.1051 Spurious Emissions at Antenna Terminals**

The Spurious Emissions present at the antenna terminals were measured over the frequency range of 30 MHz to 5 GHz (ten times the operating frequency) in accordance with section 2.1057. Spurious emissions were attenuated at least  $43 + 10 \log P$  (Watts) from the carrier as required by sections 90.209 and 90.210.

### **2.1053 Field Strength of Spurious Radiation**

The Field Strength of Spurious Radiation was measured over the frequency range of 30 MHz to 5 GHz. All spurious emissions complied with the requirements of sections 90.209 and 90.210.

### **2.1054 Frequency Stability**

The frequency stability of the transmitter was measured over temperature extremes of  $-30^{\circ}$  to  $+50^{\circ}$  C and with the input voltages varied from 85 to 115%. The EUT carrier frequency was found to remain within the 5 ppm tolerance as specified in section 90.213(a).

### **2.1055 Transient Frequency Behavior**

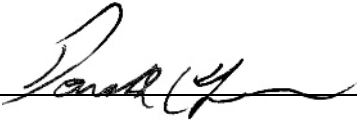
The transient frequency behavior was measured. No Transient emissions were observed.

## **GENERAL NOTES**

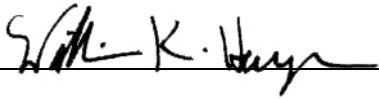
1. The DC input was varied from 85% to 115% of the rated input. Field strength measurements were taken with the DC input adjusted to produce maximum emissions.
2. All user accessible controls were adjusted to produce maximum emissions.
3. The unit operates at the following frequencies:
  - 466.3876 MHz
4. The unit was tested at the following frequencies:
  - 466.3876 MHz
5. The frequency range was scanned from 30 MHz to 5 GHz. All emissions not reported were more than 20 dB below the specified limit.
6. To comply with the spurious radiation limits, the original antenna was replaced with model TQX-400/1.5 antenna.

## Certification and Signatures

We certify that this report is a true representation of the results obtained from the tests of the equipment stated. We further certify that the measurements shown in this report were made in accordance with the procedures indicated and vouch for the qualifications of all Retlif Testing Laboratories personnel taking them.



Donald C. Lerner  
EMC Test Engineer



William K. Hayes  
Executive Vice President

### Non-Warranty Provision

The testing services have been performed, findings obtained and reports prepared in accordance with generally accepted laboratory principles and practices. This warranty is in lieu of all others, either expressed or implied.

### Non-Endorsement

This test report contains only findings and results arrived at after employing the specific test procedures and standards listed herein. It is not intended to constitute a recommendation, endorsement or certification of the product or material tested. This test report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

## FCC 2.1046, RF Power Output

### Measurement Procedure:

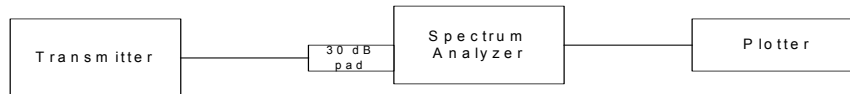
The RF output of the test sample was connected through external attenuators to a spectrum analyzer using a 3MHz resolution bandwidth. The power output was measured for the unmodulated carrier frequency with the EUT being supplied with a low voltage, nominal voltage, and high voltage.

### Direct Connection:

### Equipment Required:

| EN   | Type               | Manufacturer    | Description      | Model No. | Cal Date  | Due Date   |
|------|--------------------|-----------------|------------------|-----------|-----------|------------|
| 1259 | 30 DB Atten.       | Narda           | dc - 18GHz       | 776B-30   | 6/12/2008 | 6/12/2009  |
| 5201 | Digital Multimeter | Wavetek         | N/A              | DM25XT    | 7/9/2008  | 7/9/2009   |
| 696  | DC Power Supply    | BK Precision    | 30V/3A           | 1730      | 9/14/2007 | 9/14/2009  |
| 712  | EMI Test Receiver  | Rohde & Schwarz | 20 Hz - 26.5 GHz | ESIB26    | 9/11/2007 | 11/11/2008 |

### Test Set Up:



**FCC Part 2, RF Power Output, Paragraph 2.1046  
Test Data**



## FCC 2.1047, Modulation Characteristics

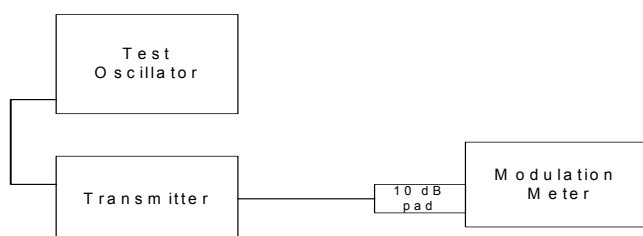
This unit contains an audio low pass filter. A curve showing the frequency response of the filter is attached.

### Direct Connection:

### Equipment Required:

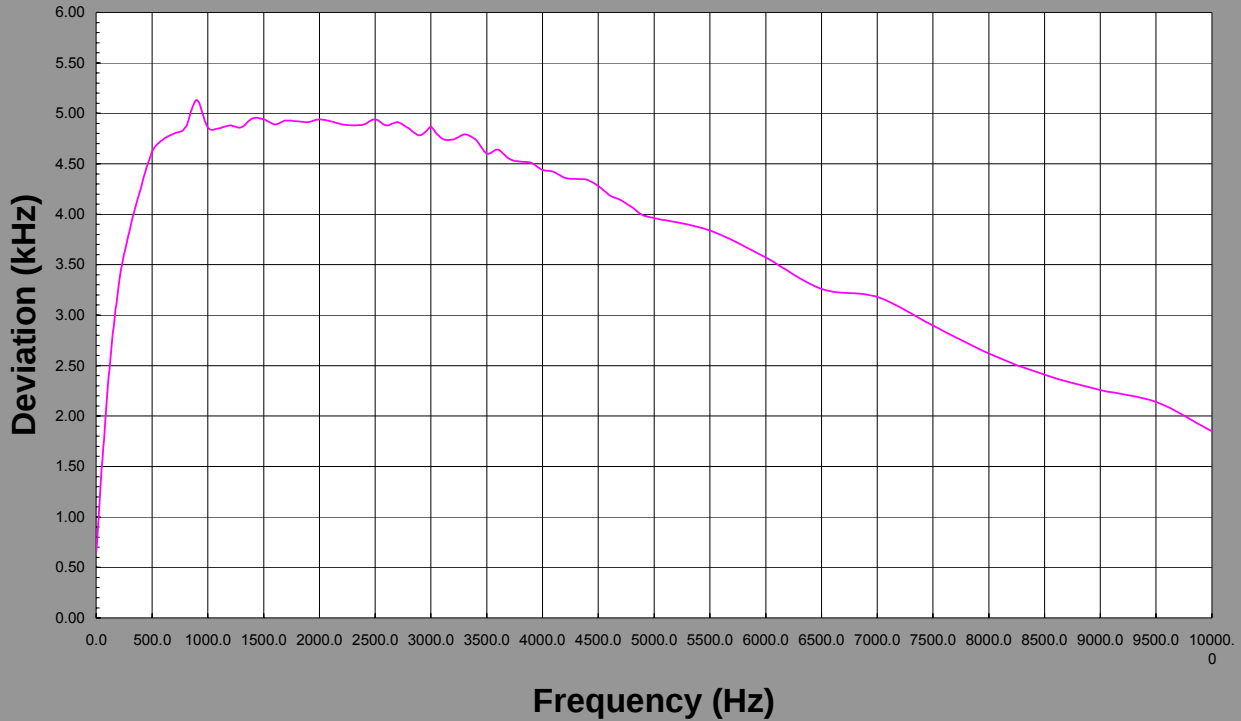
| EN   | Type                   | Manufacturer        | Description      | Model No. | Cal Date  | Due Date  |
|------|------------------------|---------------------|------------------|-----------|-----------|-----------|
| 1216 | Oscilloscope           | Tektronix           | 200 MHz          | TDS 2022B | 1/2/2008  | 1/2/2009  |
| 1254 | 20 DB Atten.           | Narda               | dc - 18GHz       | 776B-20   | 6/12/2008 | 6/12/2009 |
| 160  | Function Generator     | Hewlett Packard     | .0005 Hz - 5 MHz | 3310A     | 9/10/2008 | 9/10/2009 |
| 419  | Modulation Meter       | Boonton Electronics | .01 - 1.2 GHz    | 82AD      | 12/9/2008 | 12/9/2009 |
| 703  | DC Power Supply        | EPSCO INC.          | 16V8A/32V4A      | EFB       | 1/15/2008 | 1/15/2009 |
| 762  | AM/FM Signal Generator | Marconi Instru.     | 10 kHz - 1.2 GHz | 2023      | 6/26/2008 | 6/26/2009 |

### Test Setup:



**FCC Part 2.1047 Modulation Characteristics  
Test Data**

## Modulation Characteristic



### FCC Part 2.1047 Modulation Characteristics

**Note:** Carrier frequency at 466.38 MHz.

**Note:** The modulating frequency was applied between the frequency range of 0 Hz to 10000 Hz.

|                         |                              |                   |  |
|-------------------------|------------------------------|-------------------|--|
| Customer                | CRN Telemetry Devices, Inc.  |                   |  |
| Test Sample             | UHF Alarm System Transmitter |                   |  |
| Part Number             | N/A                          | FCC ID: ITCCRNSBU |  |
| Date: December 10, 2008 | Tech: R.S                    | Sheet 1 of 1      |  |

## FCC 2.1049, Occupied Bandwidth

### Measurement Procedure:

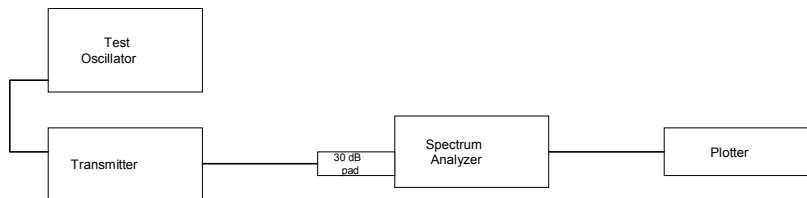
An audio signal was electrically coupled to the audio input terminals of the test sample. The RF output was monitored using a deviation meter. The audio input level was increased to produce 50% modulation. The RF output was then coupled through external attenuators to a spectrum analyzer and the audio level was increased by 16 dB. The occupied bandwidth of the RF carrier, modulated at 50% plus 16 dB, was then measured. The above procedure was performed with the audio input frequencies of 300 MHz, 2 kHz, and 4 kHz applied to the unit. The modulated signal must be within the template as specified by the applicable paragraph in Part 90.

### Direct Connection:

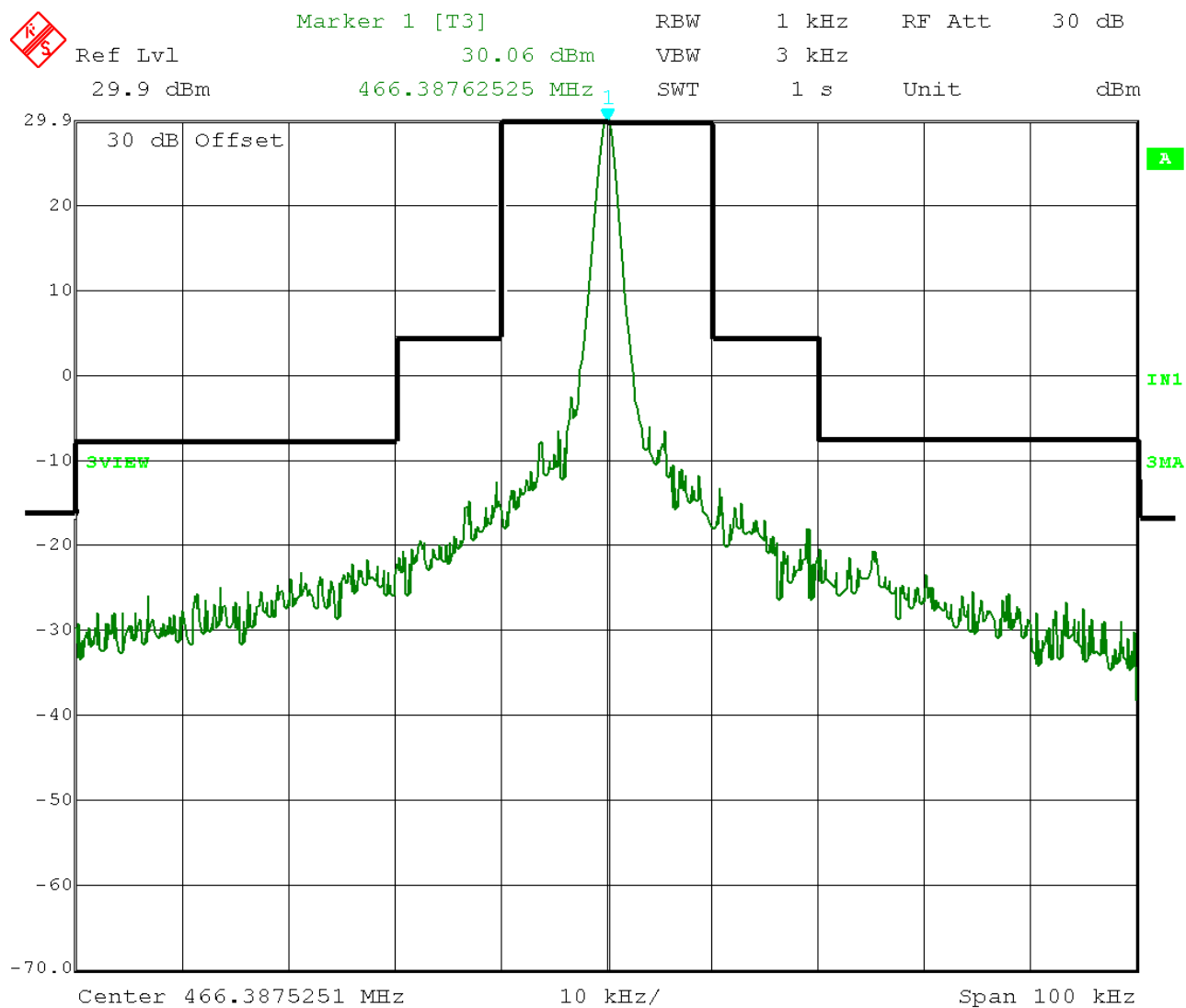
### Equipment Required:

| EN   | Type                    | Manufacturer      | Description      | Model No. | Cal Date  | Due Date   |
|------|-------------------------|-------------------|------------------|-----------|-----------|------------|
| 1086 | Oscilloscope            | Tektronix         | DC - 500MHz      | TDS3052B  | 3/12/2008 | 3/12/2009  |
| 1222 | Arbitrary Waveform Gen. | Tegam Corporation |                  | 2720A     | 1/7/2008  | 1/7/2009   |
| 1259 | 30 DB Atten.            | Narda             | dc - 18GHz       | 776B-30   | 6/12/2008 | 6/12/2009  |
| 5201 | Digital Multimeter      | Wavetek           | N/A              | DM25XT    | 7/9/2008  | 7/9/2009   |
| 696  | DC Power Supply         | BK Precision      | 30V/3A           | 1730      | 9/14/2007 | 9/14/2009  |
| 712  | EMI Test Receiver       | Rohde & Schwarz   | 20 Hz - 26.5 GHz | ESIB26    | 9/11/2007 | 11/11/2008 |

### Test Set Up:



**FCC Part 2, Paragraph 2.1049 Occupied Bandwidth,  
Test Data**



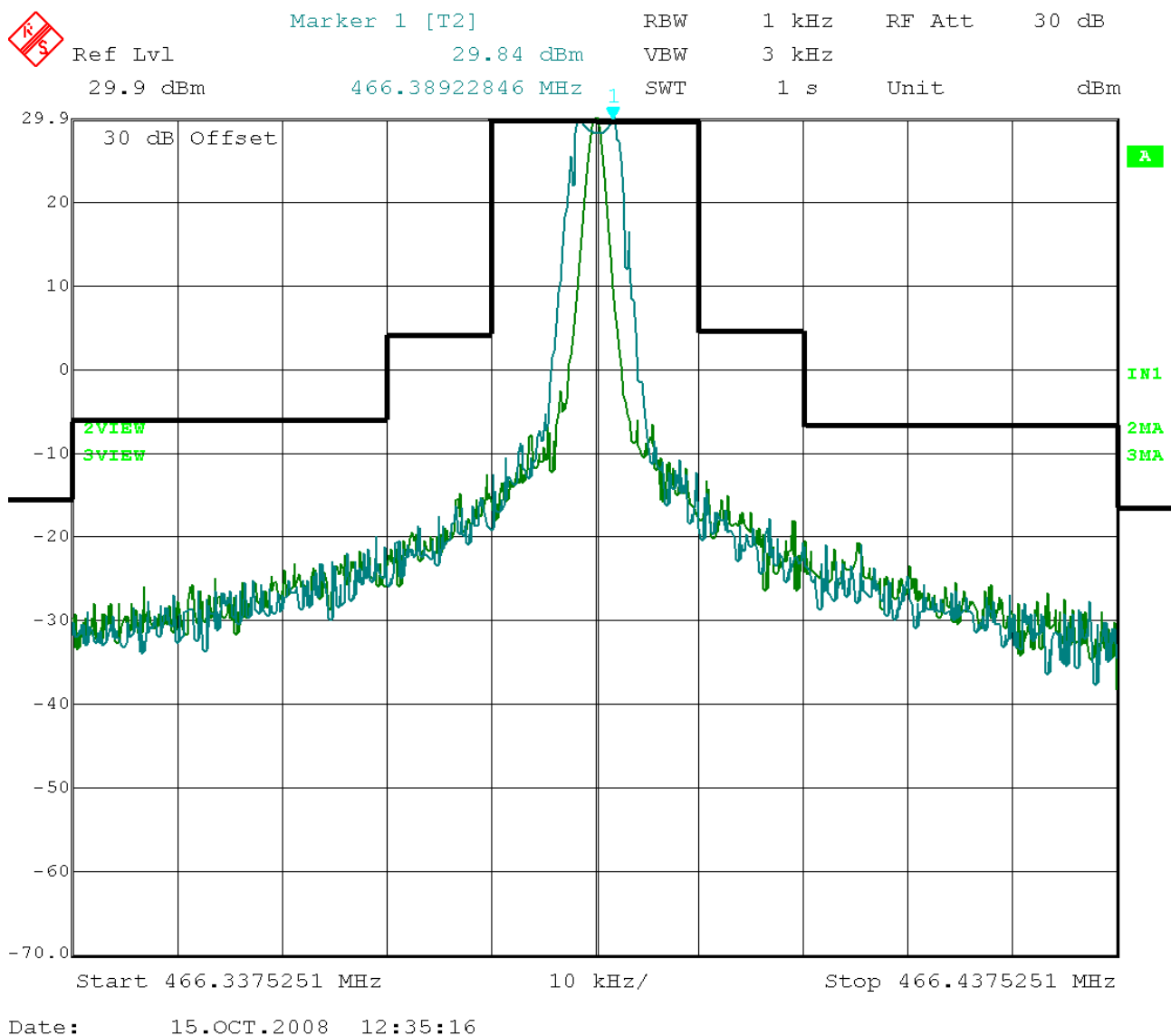
Date: 15.OCT.2008 12:47:58

**FCC Part 2, Paragraph 2.1049 Occupied Bandwidth,**

**Note:** Carrier frequency only at 466.38 MHz.

**FCC ID:** ITCCRNSBU

|                        |                              |              |  |
|------------------------|------------------------------|--------------|--|
| Customer               | CRN Telemetry Devices, Inc.  |              |  |
| Test Sample            | UHF Alarm System Transmitter |              |  |
| Part Number            | N/A                          |              |  |
| Date: October 15, 2008 | Tech: R.Soodoo               | Sheet 1 of 4 |  |



**FCC Part 2, Paragraph 2.1049 Occupied Bandwidth,**

**Note:** FCC Part 90: Paragraph 90.209 (1)(i) &(ii) 1V peak to peak, 300 Hz, Audio input.

**FCC ID:** ITCCRNSBU

|                        |                              |              |  |
|------------------------|------------------------------|--------------|--|
| Customer               | CRN Telemetry Devices, Inc.  |              |  |
| Test Sample            | UHF Alarm System Transmitter |              |  |
| Part Number            | N/A                          |              |  |
| Date: October 15, 2008 | Tech: R.Soodoo               | Sheet 2 of 4 |  |



Marker 1 [T3]

RBW

1 kHz

RF Att

30 dB

Ref Lvl

30.06 dBm

VBW

3 kHz

29.9 dBm

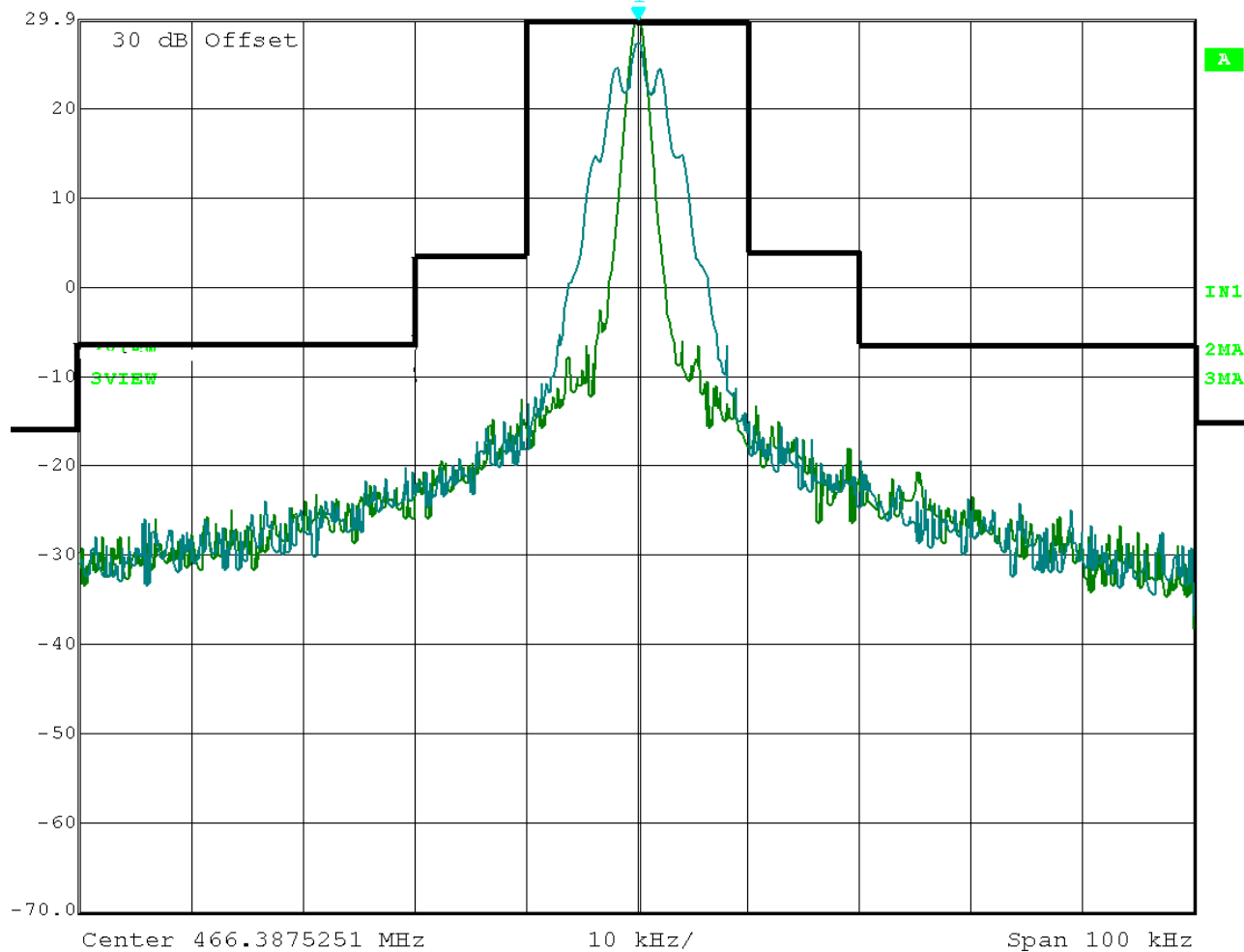
466.38762525 MHz

SWT

1 s

Unit

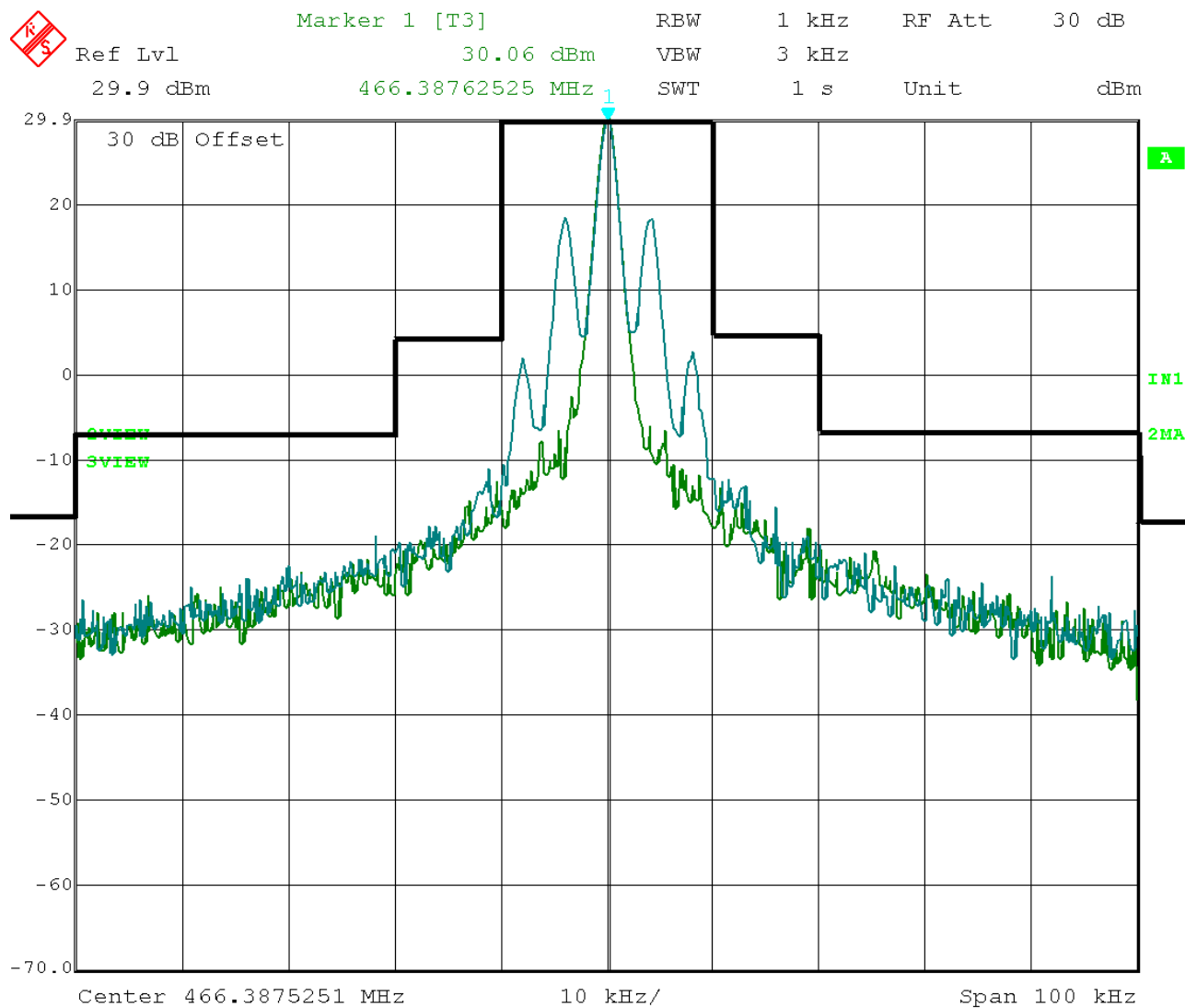
dBm



Date: 15.OCT.2008 12:42:43

**FCC Part 2, Paragraph 2.1049 Occupied Bandwidth,****Note:** FCC Part 90: Paragraph 90.209 (1)(i) &(ii) 1V peak to peak, 2 kHz, Audio input.**FCC ID:** ITCCRNSBU

|                        |                              |              |  |
|------------------------|------------------------------|--------------|--|
| Customer               | CRN Telemetry Devices, Inc.  |              |  |
| Test Sample            | UHF Alarm System Transmitter |              |  |
| Part Number            | N/A                          |              |  |
| Date: October 15, 2008 | Tech: R.Soodoo               | Sheet 3 of 4 |  |



Date: 15.OCT.2008 12:45:31

**FCC Part 2, Paragraph 2.1049 Occupied Bandwidth,**

**Note:** FCC Part 90: Paragraph 90.209 (1)(i) &(ii) 1V peak to peak, 4 kHz, Audio input.

**FCC ID:** ITCCRNSBU

|                        |                              |              |  |
|------------------------|------------------------------|--------------|--|
| Customer               | CRN Telemetry Devices, Inc.  |              |  |
| Test Sample            | UHF Alarm System Transmitter |              |  |
| Part Number            | N/A                          |              |  |
| Date: October 15, 2008 | Tech: R.Soodoo               | Sheet 4 of 4 |  |

## FCC 2.1051, Spurious Emissions at Antenna Terminals

### Measurement Procedure:

The RF output of the test sample was coupled to a spectrum analyzer. The test sample was then modulated as stated in the occupied bandwidth test. The frequency range was scanned from the lowest frequency generated by the test sample to its harmonic. The limits for the spurious emissions are calculated utilizing the measured output power and the following equation:

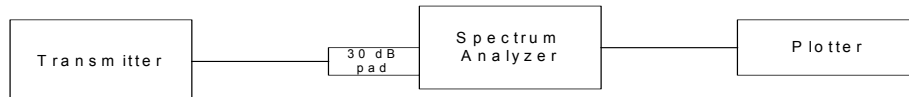
$$\text{Limit} = \text{Level of Fundamental} - (43 + 10 \log P_T)$$

### Direct Connection:

### Equipment Required:

| EN   | Type                    | Manufacturer      | Description      | Model No. | Cal Date  | Due Date   |
|------|-------------------------|-------------------|------------------|-----------|-----------|------------|
| 1086 | Oscilloscope            | Tektronix         | DC - 500MHz      | TDS3052B  | 3/12/2008 | 3/12/2009  |
| 1222 | Arbitrary Waveform Gen. | Tegam Corporation |                  | 2720A     | 1/7/2008  | 1/7/2009   |
| 5201 | Digital Multimeter      | Wavetek           | N/A              | DM25XT    | 7/9/2008  | 7/9/2009   |
| 696  | DC Power Supply         | BK Precision      | 30V/3A           | 1730      | 9/14/2007 | 9/14/2009  |
| 712  | EMI Test Receiver       | Rohde & Schwarz   | 20 Hz - 26.5 GHz | ESIB26    | 9/11/2007 | 11/11/2008 |

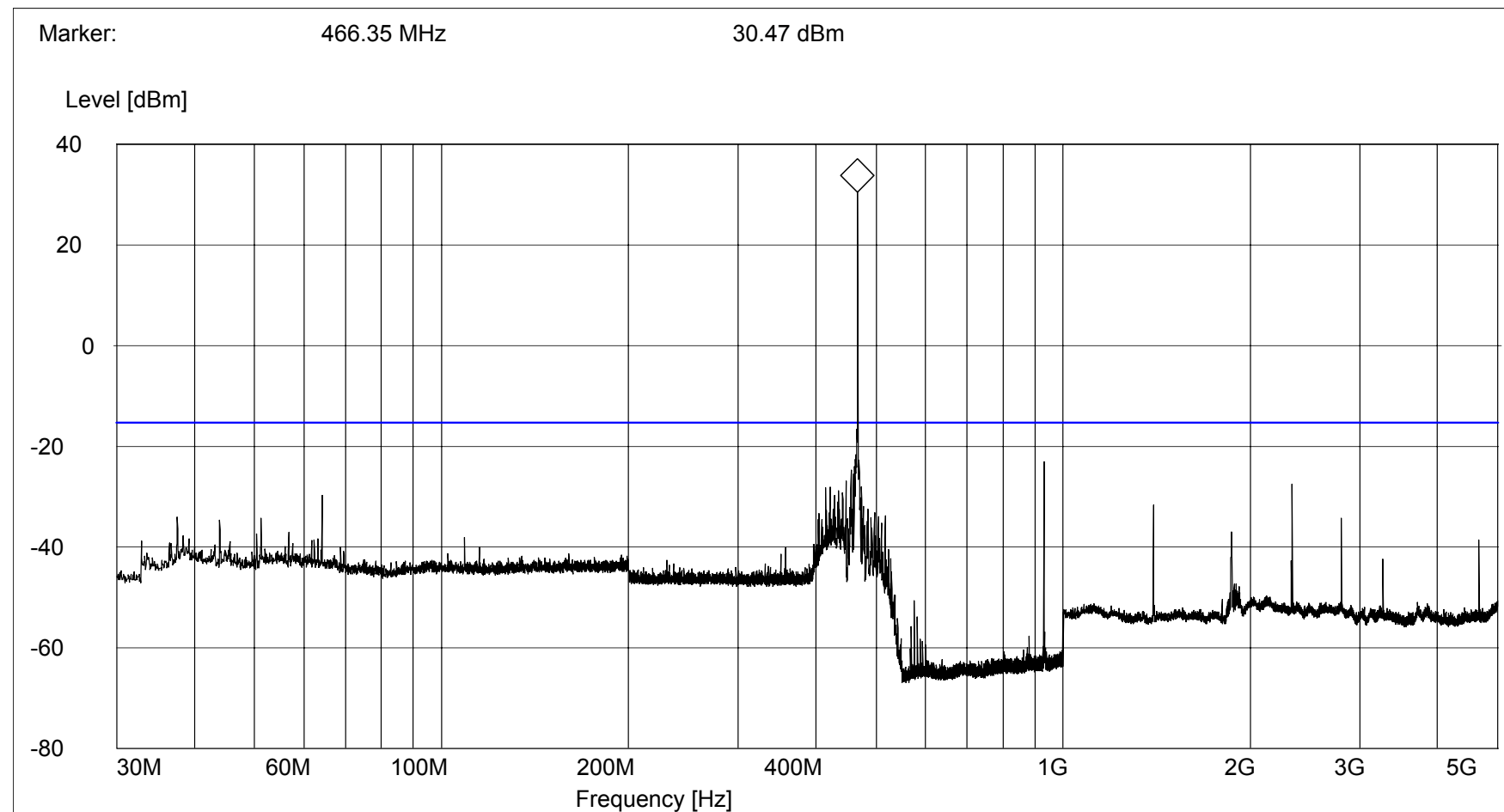
### Test Set Up:



**FCC Part 2, Paragraph 2.1051, Antenna Spurious Emissions  
30 MHz to 5.0 GHz  
Test Data**

FCC Part 2, Antenna Spurious Emissions, 30 MHz to 5.0 GHz

Customer: CRN Telemetry Devices, Inc.  
Test Sample: UHF Alarm System Transmitter  
Part Number: N/A  
FCC ID No.: ITCCRNBSU  
Test Specification: FCC Part 2, paragraph 2.1051  
Mode of Operation: Continuously transmitting a FM signal with a 2kHz 1V peak-peak audio signal.  
Technician / Date: R.Soodoo / October 16, 2008.  
Notes: Limit = Power output - (43 + 10 log PT) = 30.47-(43 + 10 log 2) = -15.3dBm  
Notes: Limit line = -15.3dBm



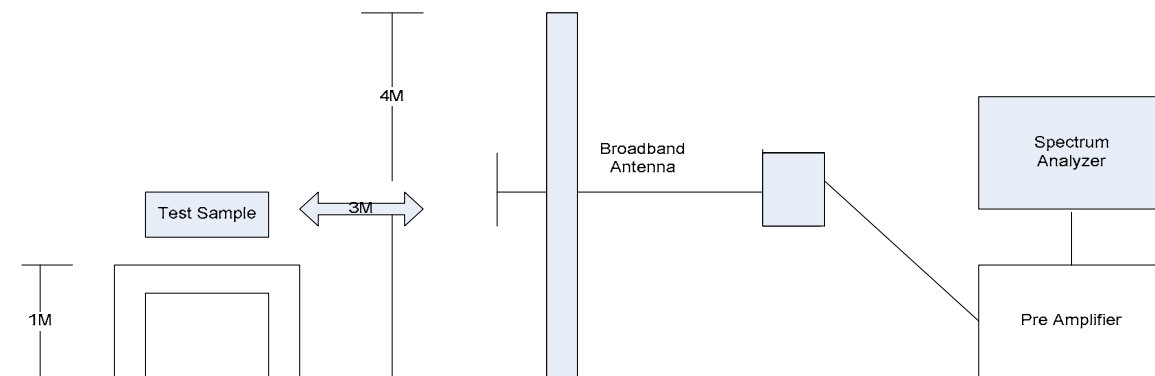
## FCC Part 2, Radiated Spurious Emissions, 30 MHz to 5.0 GHz

### Measurement Procedure:

The RF output of the test sample was terminated utilizing a shielded load. The test sample was then placed on a one meter high wooden test stand which was located three meters from the test antenna on an FCC listed test site. The frequency range scanned was from the lowest frequency generated by the test sample to its tenth harmonic. In order to maximize the level of each emission observed from the test sample, the tuned dipole antenna was tuned to the frequency of each emission and test sample was rotated 360 degrees. To further maximize each emission observed, the test antenna was both horizontally and vertically polarized, and then was raised and lowered from one to four meters from the ground plane. The limits for all of the spurious emissions were calculated utilizing the measured output power and the following equation:

$$\text{Limit (dB}\mu\text{V/M)} = 20 \log [(49.2 * P_T)^{1/2} / 3] - (43 + 10 \log P_T)$$

### Test Set Up



### Equipment Required:

| EN   | Type                   | Manufacturer       | Description         | Model No. | Cal Date  | Due Date  |
|------|------------------------|--------------------|---------------------|-----------|-----------|-----------|
| 1254 | 20 DB Atten.           | Narda              | dc - 18GHz          | 776B-20   | 6/12/2008 | 6/12/2009 |
| 319  | Dummy Load             | Bird Electronics   | DC - 1 GHz, 50 Ohm  | 811152    | 6/2/2008  | 6/2/2009  |
| 520L | Digital Multimeter     | Wavetek            | N/A                 | 25XT      | 7/7/2008  | 7/7/2009  |
| 7016 | EMC Analyzer           | Hewlett Packard    | 9kHz - 1.8GHz       | 8591EM    | 8/8/2008  | 8/8/2009  |
| 733A | DC Power Supply        | Electro            | 0-8/0-16 volts, 10A | D-612T    | 3/3/2008  | 3/3/2010  |
| 810  | Temperature Chamber    | Tenney Engineering | -40 to 100 deg C    | T5S-5     | 7/29/2008 | 7/29/2009 |
| 965  | High Power Dir Coupler | Werlatone Inc.     | 10 kHz - 1 GHz      | C5571-13  | 1/26/2008 | 1/26/2009 |

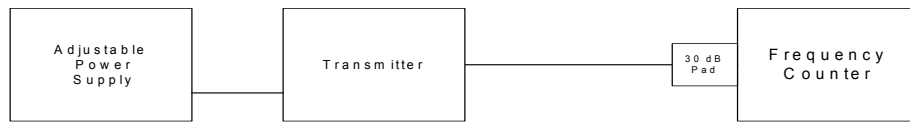
**FCC Part 2, Radiated Spurious Emissions, 30 MHz to 5.0 GHz,  
Paragraph 2.1053  
Retest Data**

[illegible]

|                                                                         |                  |                                                                                             |                |                   |                    |                   |                   |
|-------------------------------------------------------------------------|------------------|---------------------------------------------------------------------------------------------|----------------|-------------------|--------------------|-------------------|-------------------|
| <b>Test Method:</b>                                                     |                  | <b>FCC Part 2, Radiated Spurious Emissions, 30 MHz to 5.0 GHz, Paragraph 2.1053 Retest.</b> |                |                   |                    |                   |                   |
| <b>Customer:</b>                                                        |                  | CRN Telemetry Devices,Inc.                                                                  |                |                   | <b>Job No.:</b>    |                   | R-12661           |
| <b>Test Sample:</b>                                                     |                  | UHF Alarm System Transmitter                                                                |                |                   |                    |                   |                   |
| <b>Model No.:</b>                                                       |                  | N/A                                                                                         |                |                   | <b>Serial No.:</b> |                   | N/A               |
| <b>FCC ID No.:</b>                                                      |                  | ITCCRNSBU                                                                                   |                |                   |                    |                   |                   |
| <b>Operating Mode:</b>                                                  |                  | Continuously transmitting a CW signal at center frequency.                                  |                |                   |                    |                   |                   |
| <b>Technician:</b>                                                      |                  | R.Soodoo                                                                                    |                |                   | <b>Date:</b>       |                   | November 7, 2008. |
| <b>Notes:</b>                                                           |                  | Test Distance: 3 Meters<br>Detector: Peak                                                   |                |                   | Temp: 24.0°C       |                   | Humidity:67.0 %   |
| Frequency                                                               | Antenna Position | EUT Orientation                                                                             | Meter Readings | Correction Factor | Corrected Reading  | Converted Reading | Limit             |
| MHz                                                                     | (V/H) / Meters   | x / y / z                                                                                   | dBuV           | dB                | dBuV/m             | uV/m              | uV/m              |
| 30.00                                                                   |                  |                                                                                             |                |                   |                    |                   | 16596.0           |
|                                                                         |                  |                                                                                             |                |                   |                    |                   |                   |
|                                                                         |                  |                                                                                             |                |                   |                    |                   |                   |
|                                                                         |                  |                                                                                             |                |                   |                    |                   |                   |
|                                                                         |                  |                                                                                             |                |                   |                    |                   |                   |
|                                                                         |                  |                                                                                             |                |                   |                    |                   |                   |
|                                                                         |                  |                                                                                             |                |                   |                    |                   |                   |
| 271.4                                                                   | H / 1.7          | Y                                                                                           | 55.9           | -5.1              | 50.8               | 346.7             |                   |
| 279.8                                                                   | V / 1.0          | Y                                                                                           | 54.4           | -5.1              | 49.3               | 291.7             |                   |
| 377.9                                                                   | H / 1.7          | Y                                                                                           | 65.2           | -1.5              | 63.7               | 1531.1            |                   |
| 378.2                                                                   | 1 / 1.0          | Y                                                                                           | 60.3           | -1.5              | 58.8               | 871.0             |                   |
| 403.4                                                                   | H / 1.7          | Y                                                                                           | 61.7           | -0.7              | 61.0               | 1122.0            |                   |
| 416.7                                                                   | V / 1.0          | Y                                                                                           | 58.9           | -0.8              | 58.1               | 803.5             |                   |
| 503.9                                                                   | H / 1.0          | Y                                                                                           | 56.5           | 1.1               | 57.6               | 758.6             |                   |
| 932.7                                                                   | V / 1.0          | Y                                                                                           | 49.9           | 26.3              | 76.2               | 6456.5            |                   |
| 1400.0                                                                  | V / 1.0          | Y                                                                                           | 65.8           | 1.2               | 67.0               | 2238.7            |                   |
| 1865.0                                                                  | V / 1.0          | Y                                                                                           | 81.0           | 2.5               | 83.5               | 14962.4           |                   |
| 2331.0                                                                  | V / 1.3          | Y                                                                                           | 64.6           | 4.0               | 68.6               | 2691.5            |                   |
| 2798.0                                                                  | V / 1.8          | Y                                                                                           | 55.4           | 5.9               | 61.3               | 1161.4            |                   |
|                                                                         |                  |                                                                                             |                |                   |                    |                   |                   |
|                                                                         |                  |                                                                                             |                |                   |                    |                   |                   |
|                                                                         |                  |                                                                                             |                |                   |                    |                   |                   |
|                                                                         |                  |                                                                                             |                |                   |                    |                   |                   |
|                                                                         |                  |                                                                                             |                |                   |                    |                   |                   |
|                                                                         |                  |                                                                                             |                |                   |                    |                   |                   |
|                                                                         |                  |                                                                                             |                |                   |                    |                   |                   |
|                                                                         |                  |                                                                                             |                |                   |                    |                   |                   |
|                                                                         |                  |                                                                                             |                |                   |                    |                   |                   |
|                                                                         |                  |                                                                                             |                |                   |                    |                   |                   |
| 5000.0                                                                  |                  |                                                                                             |                |                   |                    |                   | 16596.0           |
| The frequency range was scanned from 30 MHz to 5.0 GHz.                 |                  |                                                                                             |                |                   |                    |                   |                   |
| The emissions observed from the EUT do not exceed the specified limits. |                  |                                                                                             |                |                   |                    |                   |                   |
|                                                                         |                  |                                                                                             |                |                   |                    |                   |                   |
|                                                                         |                  |                                                                                             |                |                   |                    |                   |                   |

| <b>Test Method:</b>                                                     | <b>FCC Part 2, Radiated Spurious Emissions, 30 MHz to 5.0 GHz, Paragraph 2.1053 Retest.</b> |                 |                |                   |                    |                   |         |
|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-----------------|----------------|-------------------|--------------------|-------------------|---------|
| <b>Customer:</b>                                                        | CRN Telemetry Devices, Inc.                                                                 |                 |                |                   | <b>Job No.:</b>    | R-12661           |         |
| <b>Test Sample:</b>                                                     | UHF Alarm System Transmitter                                                                |                 |                |                   |                    |                   |         |
| <b>Model No.:</b>                                                       | N/A                                                                                         |                 |                |                   | <b>Serial No.:</b> | N/A               |         |
| <b>FCC ID No.:</b>                                                      | ITCCRNSBU                                                                                   |                 |                |                   |                    |                   |         |
| <b>Operating Mode:</b>                                                  | Continuously transmitting a CW signal at center frequency.                                  |                 |                |                   |                    |                   |         |
| <b>Technician:</b>                                                      | R.Soodoo                                                                                    |                 |                |                   | <b>Date:</b>       | November 7, 2008. |         |
| <b>Notes:</b>                                                           | Test Distance: 3 Meters<br>Detector: Peak                                                   |                 |                | Temp: 24.0°C      |                    | Humidity: 67.0 %  |         |
| Frequency                                                               | Antenna Position                                                                            | EUT Orientation | Meter Readings | Correction Factor | Corrected Reading  | Converted Reading | Limit   |
| MHz                                                                     | (V/H) / Meters                                                                              | x / y / z       | dBuV           | dB                | dBuV/m             | uV/m              | uV/m    |
| 30.00                                                                   |                                                                                             |                 |                |                   |                    |                   | 16596.0 |
|                                                                         |                                                                                             |                 |                |                   |                    |                   |         |
|                                                                         |                                                                                             |                 |                |                   |                    |                   |         |
|                                                                         |                                                                                             |                 |                |                   |                    |                   |         |
|                                                                         |                                                                                             |                 |                |                   |                    |                   |         |
|                                                                         |                                                                                             |                 |                |                   |                    |                   |         |
|                                                                         |                                                                                             |                 |                |                   |                    |                   |         |
| 271.0                                                                   | V / 1.6                                                                                     | Z               | 51.6           | -5.0              | 46.6               | 213.8             |         |
| 280.0                                                                   | V / 1.6                                                                                     | Z               | 54.2           | -5.0              | 49.2               | 288.4             |         |
| 288.4                                                                   | V / 1.6                                                                                     | Z               | 52.1           | -5.0              | 47.1               | 226.5             |         |
| 369.0                                                                   | V / 1.0                                                                                     | Z               | 60.0           | -1.5              | 58.5               | 841.4             |         |
| 377.4                                                                   | V / 1.0                                                                                     | Z               | 64.0           | -1.5              | 62.5               | 1333.5            |         |
| 415.0                                                                   | V / 1.0                                                                                     | Z               | 60.8           | -0.8              | 60.0               | 1000.0            |         |
| 503.9                                                                   | V / 1.0                                                                                     | Z               | 58.7           | 1.1               | 59.8               | 977.2             |         |
| 932.7                                                                   | V / 1.4                                                                                     | Z               | 50.5           | 23.6              | 74.1               | 5069.9            |         |
| 1400.0                                                                  | V / 1.3                                                                                     | Z               | 66.1           | 1.2               | 67.3               | 2317.4            |         |
| 1865.0                                                                  | H / 1.5                                                                                     | Z               | 80.8           | 2.5               | 83.3               | 14621.8           |         |
| 2331.0                                                                  | H / 1.2                                                                                     | Z               | 58.0           | 4.0               | 62.0               | 1258.9            |         |
| 2798.0                                                                  | H / 1.4                                                                                     | Z               | 58.9           | 5.9               | 64.8               | 1737.8            |         |
|                                                                         |                                                                                             |                 |                |                   |                    |                   |         |
|                                                                         |                                                                                             |                 |                |                   |                    |                   |         |
|                                                                         |                                                                                             |                 |                |                   |                    |                   |         |
|                                                                         |                                                                                             |                 |                |                   |                    |                   |         |
|                                                                         |                                                                                             |                 |                |                   |                    |                   |         |
|                                                                         |                                                                                             |                 |                |                   |                    |                   |         |
|                                                                         |                                                                                             |                 |                |                   |                    |                   |         |
|                                                                         |                                                                                             |                 |                |                   |                    |                   |         |
|                                                                         |                                                                                             |                 |                |                   |                    |                   |         |
|                                                                         |                                                                                             |                 |                |                   |                    |                   |         |
|                                                                         |                                                                                             |                 |                |                   |                    |                   |         |
|                                                                         |                                                                                             |                 |                |                   |                    |                   |         |
| 5000.0                                                                  |                                                                                             |                 |                |                   |                    |                   | 16596.0 |
| The frequency range was scanned from 30 MHz to 5.0 GHz.                 |                                                                                             |                 |                |                   |                    |                   |         |
| The emissions observed from the EUT do not exceed the specified limits. |                                                                                             |                 |                |                   |                    |                   |         |
|                                                                         |                                                                                             |                 |                |                   |                    |                   |         |

## FCC Part 90.213 Frequency Stability



### Test Procedure:

1. Connect the antenna output to the frequency counter with the 30 dB attenuator in line.
2. Power the frequency counter and allow to warm up.
3. Adjust the power supply to nominal voltage and take a frequency reading and list.
4. Adjust the power supply to be 85% of nominal voltage and take a frequency reading.
5. Adjust the power supply to be 115% of nominal voltage and take a frequency reading.
6. Verify all readings are within the specified tolerance parameters.

**FCC Part 90.213 Frequency Stability  
Test Data**

|                        |                                                                                                        |                         |                       |                 |                       |
|------------------------|--------------------------------------------------------------------------------------------------------|-------------------------|-----------------------|-----------------|-----------------------|
| <b>Test Method:</b>    | FCC Part 90.213 Frequency Stability                                                                    |                         |                       |                 |                       |
| <b>Customer:</b>       | CRN Telemetry Devices, Inc.                                                                            |                         |                       | <b>Job No.:</b> | R-12661               |
| <b>Test Sample</b>     | UHF Alarm System Transmitter                                                                           |                         |                       |                 |                       |
| <b>Model Number</b>    | N/A                                                                                                    |                         |                       |                 |                       |
| <b>FCC ID. Number</b>  | ITCCRNSBU                                                                                              |                         |                       |                 |                       |
| <b>Serial Number</b>   | N/A                                                                                                    |                         |                       |                 |                       |
| <b>Operating Mode:</b> | Continuously transmitting a CW signal at center frequency.                                             |                         |                       |                 |                       |
| <b>Technician:</b>     | D. Lerner                                                                                              |                         |                       | <b>Date:</b>    | December 9, 2008.     |
| <b>Notes:</b>          | Carrier Frequency: 466.3876 MHz<br>Limit = +/- 5ppm $L = (f * 5\text{ppm}) / 10^6 = 2331.9 \text{ Hz}$ |                         |                       |                 |                       |
| Temperature            | Input Voltage                                                                                          | % Nominal Input Voltage | Lower Limit Frequency | Meter Reading   | Upper Limit Frequency |
| Degrees °C             | V                                                                                                      |                         | MHz                   | MHz             | MHz                   |
| 23.0                   | 10.2                                                                                                   | 85%                     | 466.3852              | 466.3876        | 466.3899              |
| 23.0                   | 12.0                                                                                                   | 100%                    | 466.3852              | 466.3876        | 466.3899              |
| 23.0                   | 13.8                                                                                                   | 115%                    | 466.3852              | 466.3876        | 466.3899              |
| -30.0                  | 10.2                                                                                                   | 85%                     | 466.3852              | 466.3876        | 466.3899              |
| -30.0                  | 12.0                                                                                                   | 100%                    | 466.3852              | 466.3871        | 466.3899              |
| -30.0                  | 13.8                                                                                                   | 115%                    | 466.3852              | 466.3874        | 466.3899              |
| -20.0                  | 10.2                                                                                                   | 85%                     | 466.3852              | 466.3874        | 466.3899              |
| -20.0                  | 12.0                                                                                                   | 100%                    | 466.3852              | 466.3877        | 466.3899              |
| -20.0                  | 13.8                                                                                                   | 115%                    | 466.3852              | 466.3871        | 466.3899              |
| -10.0                  | 10.2                                                                                                   | 85%                     | 466.3852              | 466.3874        | 466.3899              |
| -10.0                  | 12.0                                                                                                   | 100%                    | 466.3852              | 466.3874        | 466.3899              |
| -10.0                  | 13.8                                                                                                   | 115%                    | 466.3852              | 466.3874        | 466.3899              |
| 0.0                    | 10.2                                                                                                   | 85%                     | 466.3852              | 466.3873        | 466.3899              |
| 0.0                    | 12.0                                                                                                   | 100%                    | 466.3852              | 466.3873        | 466.3899              |
| 0.0                    | 13.8                                                                                                   | 115%                    | 466.3852              | 466.3873        | 466.3899              |
|                        |                                                                                                        |                         |                       |                 |                       |
|                        |                                                                                                        |                         |                       |                 |                       |

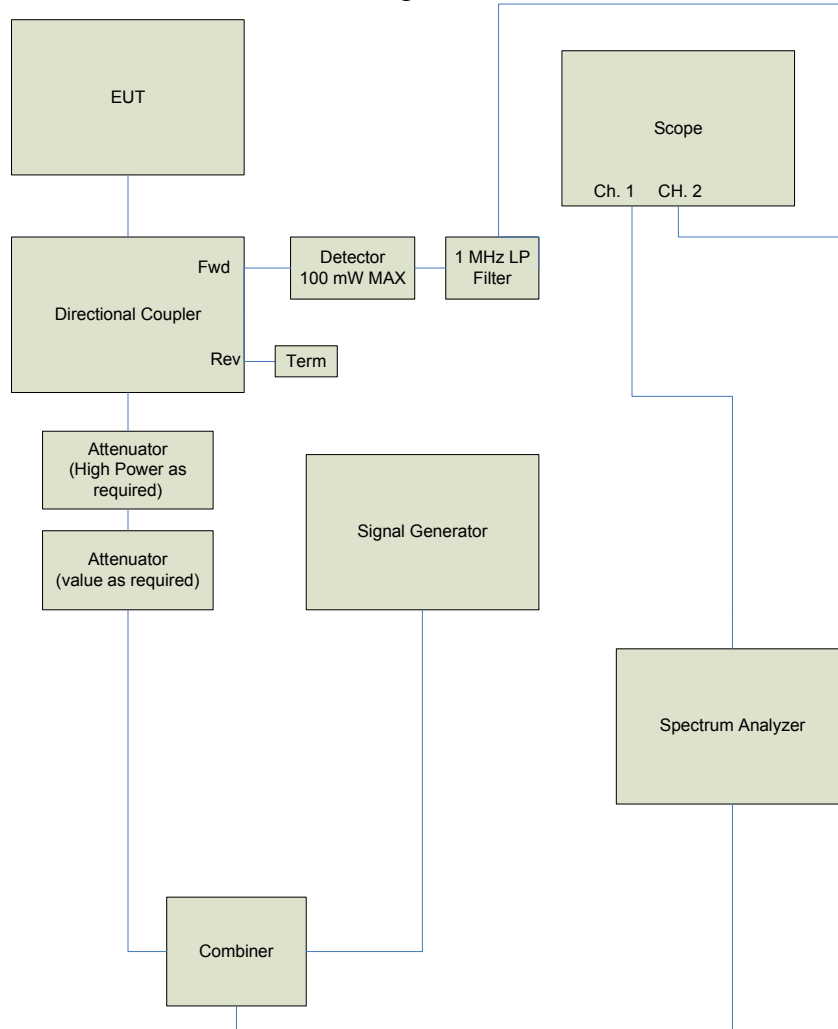
|                        |                                                                                                        |                         |                       |                 |                       |
|------------------------|--------------------------------------------------------------------------------------------------------|-------------------------|-----------------------|-----------------|-----------------------|
| <b>Test Method:</b>    | FCC Part 90.213 Frequency Stability                                                                    |                         |                       |                 |                       |
| <b>Customer:</b>       | CRN Telemetry Devices, Inc.                                                                            |                         |                       | <b>Job No.:</b> | R-12661               |
| <b>Test Sample</b>     | UHF Alarm System Transmitter                                                                           |                         |                       |                 |                       |
| <b>Model Number</b>    | N/A                                                                                                    |                         |                       |                 |                       |
| <b>FCC ID. Number</b>  | ITCCRNSBU                                                                                              |                         |                       |                 |                       |
| <b>Serial Number</b>   | N/A                                                                                                    |                         |                       |                 |                       |
| <b>Operating Mode:</b> | Continuously transmitting a CW signal at center frequency.                                             |                         |                       |                 |                       |
| <b>Technician:</b>     | D. Lerner                                                                                              |                         |                       | <b>Date:</b>    | December 9, 2008.     |
| <b>Notes:</b>          | Carrier Frequency: 466.3876 MHz<br>Limit = +/- 5ppm $L = (f * 5\text{ppm}) / 10^6 = 2331.9 \text{ Hz}$ |                         |                       |                 |                       |
| Temperature            | Input Voltage                                                                                          | % Nominal Input Voltage | Lower Limit Frequency | Meter Reading   | Upper Limit Frequency |
| Degrees °C             | V                                                                                                      |                         | MHz                   | MHz             | MHz                   |
| 10.0                   | 10.2                                                                                                   | 85%                     | 466.3852              | 466.3878        | 466.3899              |
| 10.0                   | 12.0                                                                                                   | 100%                    | 466.3852              | 466.3875        | 466.3899              |
| 10.0                   | 13.8                                                                                                   | 115%                    | 466.3852              | 466.3875        | 466.3899              |
| 20.0                   | 10.2                                                                                                   | 85%                     | 466.3852              | 466.3875        | 466.3899              |
| 20.0                   | 12.0                                                                                                   | 100%                    | 466.3852              | 466.3875        | 466.3899              |
| 20.0                   | 13.8                                                                                                   | 115%                    | 466.3852              | 466.3875        | 466.3899              |
| 30.0                   | 10.2                                                                                                   | 85%                     | 466.3852              | 466.3875        | 466.3899              |
| 30.0                   | 12.0                                                                                                   | 100%                    | 466.3852              | 466.3876        | 466.3899              |
| 30.0                   | 13.8                                                                                                   | 115%                    | 466.3852              | 466.3876        | 466.3899              |
| 40.0                   | 10.2                                                                                                   | 85%                     | 466.3852              | 466.3875        | 466.3899              |
| 40.0                   | 12.0                                                                                                   | 100%                    | 466.3852              | 466.3875        | 466.3899              |
| 40.0                   | 13.8                                                                                                   | 115%                    | 466.3852              | 466.3875        | 466.3899              |
| 50.0                   | 10.2                                                                                                   | 85%                     | 466.3852              | 466.3875        | 466.3899              |
| 50.0                   | 12.0                                                                                                   | 100%                    | 466.3852              | 466.3878        | 466.3899              |
| 50.0                   | 13.8                                                                                                   | 115%                    | 466.3852              | 466.3875        | 466.3899              |
|                        |                                                                                                        |                         |                       |                 |                       |
|                        |                                                                                                        |                         |                       |                 |                       |

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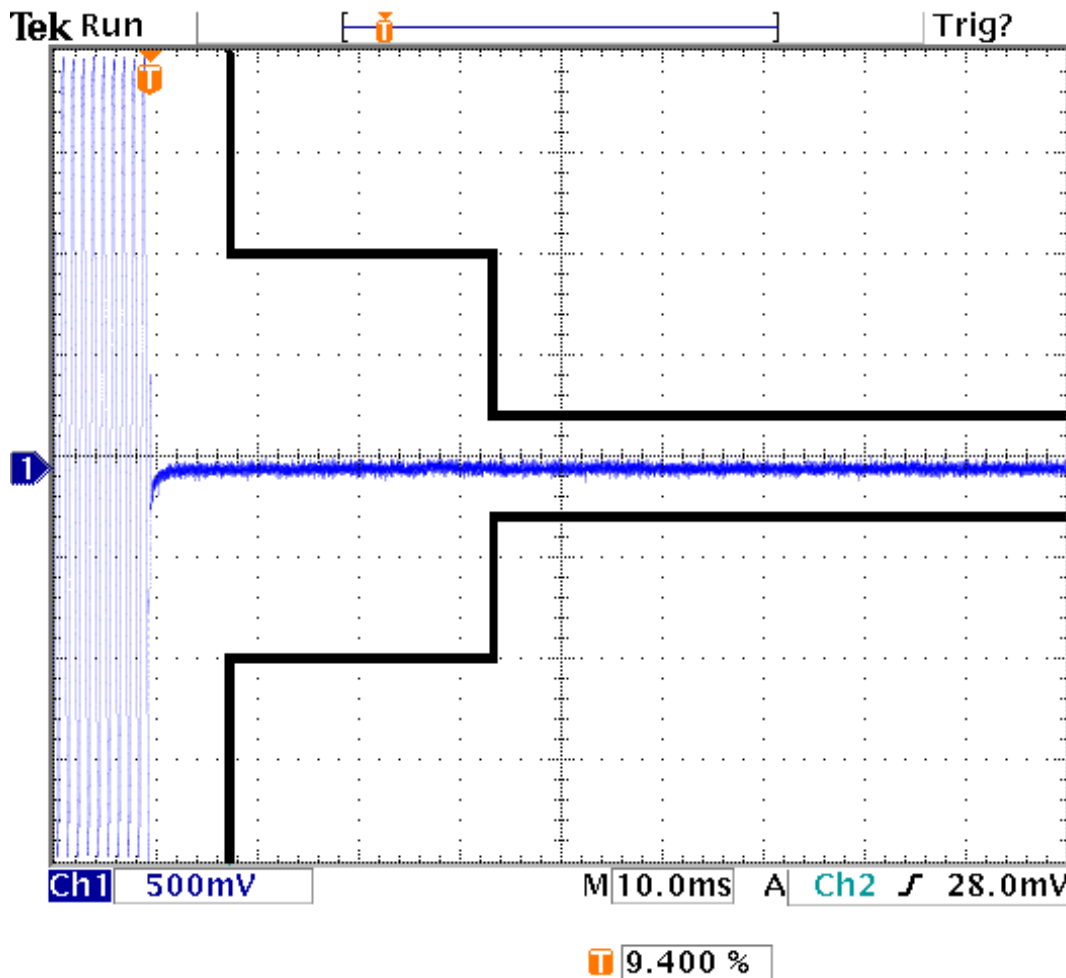
## FCC 90.215, Transient Frequency Behavior

The RF output of the test sample was configured in the set up as shown in Figure 2 below. The test sample was activated and the transients were measured on the oscilloscope. Testing was performed in accordance with EIA/TIA-603.

Figure 2



**FCC Part 90.214 Transient Frequency Behavior  
Test Data**



# FCC Part 90.214 Transient Frequency Behavior

**Note:** Carrier frequency at 466.38 MHz.

**Note:** EUT transmitting audio modulated signal.

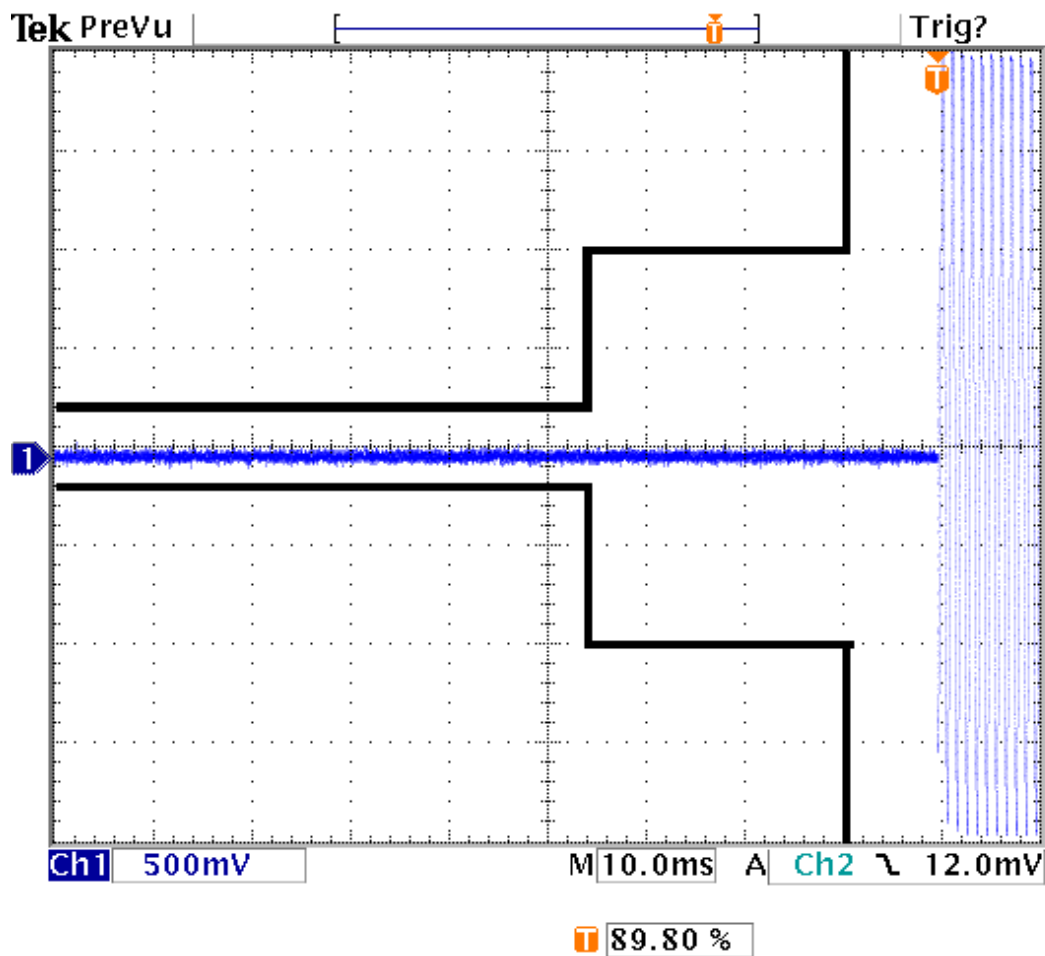
**Note:** Rising edge of transient.

|                        |                              |                   |  |
|------------------------|------------------------------|-------------------|--|
| Customer               | CRN Telemetry Devices, Inc.  |                   |  |
| Test Sample            | UHF Alarm System Transmitter |                   |  |
| Part Number            | N/A                          | FCC ID: ITCCRNSBU |  |
| Date: December 5, 2008 | Tech: DL / SJ                | Sheet 1 of 2      |  |

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# **FCC Part 90.214 Transient Frequency Behavior**

**Note:** Carrier frequency at 466.38 MHz.

**Note:** EUT transmitting audio modulated signal.

**Note:** Falling edge of transient.

|                        |                              |                   |  |
|------------------------|------------------------------|-------------------|--|
| Customer               | CRN Telemetry Devices, Inc.  |                   |  |
| Test Sample            | UHF Alarm System Transmitter |                   |  |
| Part Number            | N/A                          | FCC ID: ITCCRNSBU |  |
| Date: December 5, 2008 | Tech: DL / SJ                | Sheet 2 of 2      |  |

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FCC ID: ITCCRNSBY

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