

**APPLICANT**

X-10 (USA), Inc.  
400 Forge Way, Suite 412  
Rockaway, NJ 07866-2033

**MANUFACTURER**

X-10 Electronics Shenzhen Co. Ltd.  
X-10 Building  
Labour Industrial District  
Shenzhen, Xixiang, Bao An  
Guang Dong, China, 518102

TEST SPECIFICATION: FCC Rules and Regulations Part 15, Subpart C, Para. 15.231

TEST PROCEDURE: ANSI C63.4:1992

**TEST SAMPLE DESCRIPTION**

BRANDNAME: X-10 (USA), Inc. MODEL: UR86A

TYPE: Pulsed Transmitter

POWER REQUIREMENTS: 6 VDC derived from (4) new "AAA" Batteries

FREQUENCY OF OPERATION: 310 MHz

**TESTS PERFORMED**

Para. 15.231(b)(1), Radiated Emissions, Fundamental and Harmonics

Para. 15.231(b)(3), Radiated Emissions, Spurious Case

Para. 15.231(c), Occupied Bandwidth

Para. 15.35, Duty Cycle Determination

**REPORT OF MEASUREMENTS**

Applicant: X-10 (USA), Inc.

Device: Pulsed Transmitter

FCC ID: B4SUR86A

Power Requirements: 6 VDC derived from (4) new "AAA" Batteries

Applicable Rule Section: Part 15, Subpart C, Section 15.231

**Retlif Testing Laboratories**

Test Report No. R-9234-1

FCC ID: B4SUR86A



**Retlif Testing Laboratories**

Test Report No. R-9234-1

FCC ID: B4SUR86A

## REPORT OF MEASUREMENTS (continued)

### TEST RESULTS

- 15.231 (a): This device is used as a remote control transmitter.
- 15.231 (a)(1) & 15.231(a)(2): The transmitter is manually operated and ceases transmission within 5 seconds after deactivation.
- 15.231 (a)(3): The transmitter does not perform periodic transmissions.
- 15.231 (b): The fundamental field strength did not exceed 5833  $\mu\text{V/M}$  (Average) at a test distance of 3 meters. In addition, the requirements of section 15.35 for averaging pulsed emissions and for limiting peak emissions were met.
- The field strength of harmonic and spurious emissions did not exceed 583  $\mu\text{V/M}$  (AVERAGE).

### DETERMINATION OF FIELD STRENGTH LIMITS

The field strength limits shown below are found in Section 15.231.

| Frequency |   |     | Limit |   |    |
|-----------|---|-----|-------|---|----|
| F1        | = | 260 | 3750  | = | L1 |
| Fo        | = | 310 |       |   | Lo |
| F2        | = | 470 | 12500 | = | L2 |

The formula below was utilized to determine the limits:

$$\text{Limit} = L1 + [(Fo-F1)(L2-L1)/(F2-F1)]$$

Solving yields:

$$\text{Fundamental Limit} = 5833 \mu\text{V/M (AVERAGE) @ 3 Meters}$$

$$\text{Harmonic Limit} = 583 \mu\text{V/M (AVERAGE) @ 3 Meters}$$



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Test Report No. R-9234-1

FCC ID: B4SUR86A

## REPORT OF MEASUREMENTS (continued)

### DUTY CYCLE DETERMINATION

The unit's RF output was directly coupled to the input of the spectrum analyzer. The analyzer was set for a frequency span of 0Hz. The sweep time was then adjusted in order to display one full pulse train. The transmitter on time was then summed and compared to the time for one full cycle in order to obtain the duty cycle. (See plots for additional information)

|                        |   |                                        |
|------------------------|---|----------------------------------------|
| Transmitter On Time    | = | 17.4 milliseconds (maximum- per cycle) |
| Transmitter Cycle Time | = | 48 milliseconds                        |
| Transmitter Duty Cycle | = | 36.3 %                                 |

#### CALCULATION:

|                                      |   |                     |
|--------------------------------------|---|---------------------|
| 1 Large Pulse                        | = | 4.3 milliseconds    |
| 21 x 625 $\mu$ s (small pulse)       | = | 13.1 milliseconds   |
| 4.3 + 13.1                           | = | 17.4 milliseconds   |
| Cycle Time                           | = | 48 milliseconds     |
| Duty Cycle                           | = | $17.4/48 = 36.3 \%$ |
| Correction Factor = $20 \log(0.363)$ | = | -8.8                |

### SPECTRUM ANALYZER DESENSITIZATION CONSIDERATIONS

Due to the nature of the emissions being measured, care was taken to ensure that the resolution bandwidth of the spectrum analyzer was adequate to provide accurate measurements. The following formula was utilized:

Setting pulse desensitization equal to zero and utilizing the minimum observed pulse width of 625 $\mu$ s yields a minimum required bandwidth of 1.067 kHz. FCC specified bandwidths of 100kHz and 1MHz were utilized below and above 1GHz, respectively.



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## GENERAL NOTES

1. All readings were taken utilizing a peak detector function at a test distance of 3 meters.
2. The duty cycle was applied to the peak readings in order to determine the average value of the emissions.
3. The frequency range was scanned from 30 MHz to 3.1 GHz. All emissions not reported were more than 20 dB below the specified limit.



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## EQUIPMENT LIST

### FCC15.231 Compliance testing

| EN   | Type                    | Manufacturer      | Description          | Model No.    | Cal Date   | Due Date   |
|------|-------------------------|-------------------|----------------------|--------------|------------|------------|
| 067  | Open Area Test Site     | Retlif            | 3 Meter              | RNY          | 09/20/2000 | 09/20/2003 |
| 128C | Double Ridge Guide      | Eaton Corporation | 1 GHz - 18 GHz       | 96001        | 09/21/2001 | 09/21/2002 |
| 133  | Broadband Pre-Amplifier | Electro-Metrics   | 10 kHz - 1 GHz, 26dB | BPA-1000     | 06/13/2001 | 06/13/2002 |
| 141  | Spectrum Analyzer       | Hewlett Packard   | 100 Hz - 40 GHz      | 8566B        | 07/02/2001 | 01/02/2002 |
| 141A | Graphics Plotter        | Hewlett Packard   | N/A                  | 7470A        | 03/05/2001 | 03/05/2002 |
| 141B | Quasi-Peak Adaptor      | Hewlett Packard   | 100 Hz - 1 GHz       | 85650A       | 02/20/2001 | 01/02/2002 |
| 206B | 6.0 dB Attenuator       | Texscan           | 0 - 1.0 GHz          | FP-50 - 6 dB | 06/13/2001 | 06/13/2002 |
| 543  | Preamplifier            | Hewlett Packard   | 1.0 GHz - 26.5 GHz   | 8449B        | 06/27/2001 | 06/27/2002 |
| 767  | Biconilog               | EMCO              | 26 - 2000 MHz        | 3142B        | 08/28/2001 | 08/28/2002 |



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Test Report No. R-9234-1

FCC ID: B4SUR86A

FCC 15.231(b)

RADIATED EMISSIONS, FUNDAMENTAL & SPURIOUS CASE

See separate e-file attachment named REfundharm.pdf and REspur.pdf



**Retlif Testing Laboratories**

Test Report No. R-9234-1

FCC ID: B4SUR86A

FCC 15.231(c)

OCCUPIED BANDWIDTH

Please refer to separate electronic file named Occbw.pdf



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Test Report No. R-9234-1

FCC ID: B4SUR86A

FCC 15.35

DUTY CYCLE

Please refer to separate electronic file named Dutycycle.pdf



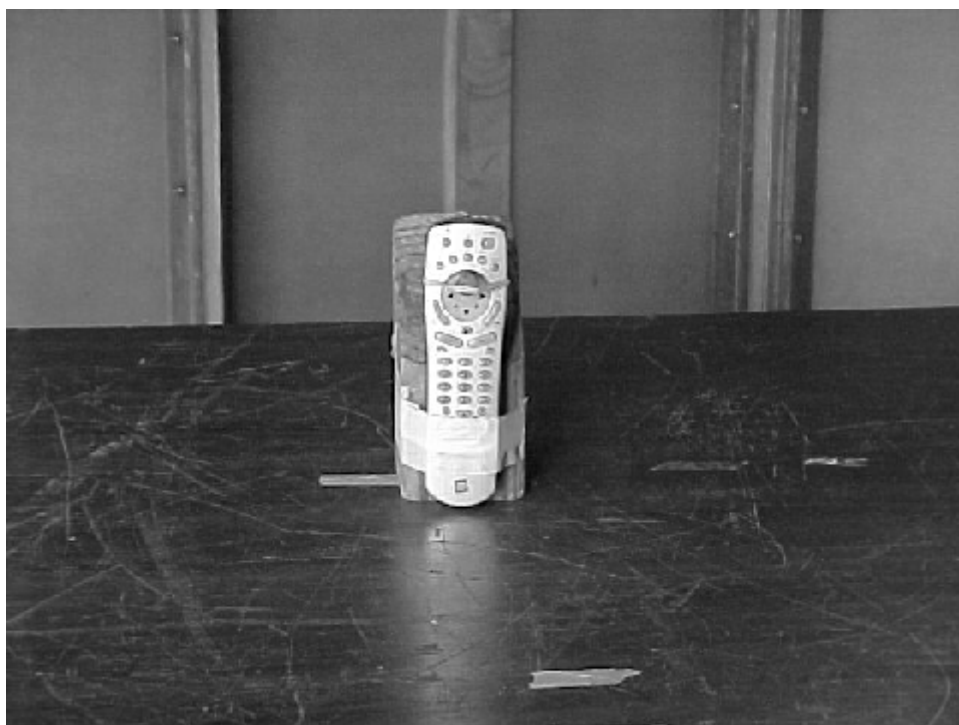
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Test Report No. R-9234-1

FCC ID: B4SUR86A

## Test Setup Photograph

### Radiated Emissions



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Test Report No. R-9234-1

FCC ID: B4SUR86A

|                 |                                                                                                  |                                                                            |               |                   |                   |                   |                  |  |
|-----------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|---------------|-------------------|-------------------|-------------------|------------------|--|
| Test Method:    |                                                                                                  | FCC Part 15 Subpart C Radiated Emissions, Fundamental & Harmonic Emissions |               |                   |                   |                   |                  |  |
| Customer:       |                                                                                                  | X-10 (USA)                                                                 |               |                   | Job No.           |                   | R-9234-1         |  |
| Test Sample:    |                                                                                                  | RF remote                                                                  |               |                   | Paragraph:        |                   | 15.231           |  |
| Model No.:      |                                                                                                  | UR86A                                                                      |               |                   | FCC ID:           |                   | B4SUR86A         |  |
| Operating Mode: |                                                                                                  | Continuously Transmitting a 310 MHz Signal                                 |               |                   |                   |                   |                  |  |
| Technician:     |                                                                                                  | Peter Lananna                                                              |               |                   | Date:             |                   | November 5, 2001 |  |
| Notes:          |                                                                                                  | Test Distance: 3 Meters<br>Detector: Peak, Unless otherwise specified      |               |                   |                   |                   |                  |  |
| Test Freq.      | Antenna Pol./Height                                                                              | EUT Orientation                                                            | Meter Reading | Correction Factor | Corrected Reading | Converted Reading | Peak Limit       |  |
| MHz             | (V/H)/Meters                                                                                     | X / Y / Z                                                                  | dBuV          | dB                | dBuV/m            | uV/m              | uV/m             |  |
| 310             | H / 2.3                                                                                          | X                                                                          | 65.9          | -3.8              | 62.1              | 1273.5            | 58300            |  |
|                 | H / 1.0                                                                                          | Y                                                                          | 78.1          | -3.8              | 74.3              | 5188.0            |                  |  |
|                 | H / 2.3                                                                                          | Z                                                                          | 69.8          | -3.8              | 66.0              | 1995.3            |                  |  |
|                 | V / 1.8                                                                                          | X                                                                          | 77.2          | -3.8              | 73.4              | 4677.4            |                  |  |
|                 | V / 3.0                                                                                          | Y                                                                          | 68.4          | -3.8              | 64.6              | 1698.2            |                  |  |
| 310             | V / 2.3                                                                                          | Z                                                                          | 72.3          | -3.8              | 68.5              | 2660.7            | 58300            |  |
|                 |                                                                                                  |                                                                            |               |                   |                   |                   |                  |  |
| 620             | H / 1.0                                                                                          | X                                                                          | 45.2          | 3.9               | 49.1              | 285.1             | 5830             |  |
|                 | H / 1.3                                                                                          | Y                                                                          | 52.8          | 3.9               | 56.7              | 683.9             |                  |  |
|                 | H / 1.3                                                                                          | Z                                                                          | 53.6          | 3.9               | 57.5              | 749.9             |                  |  |
|                 | V / 2.0                                                                                          | X                                                                          | 53.0          | 3.9               | 56.9              | 699.8             |                  |  |
|                 | V / 1.0                                                                                          | Y                                                                          | 49.8          | 3.9               | 53.7              | 484.2             |                  |  |
| 620             | V / 1.0                                                                                          | Z                                                                          | 47.7          | 3.9               | 51.6              | 380.2             | 5830             |  |
|                 |                                                                                                  |                                                                            |               |                   |                   |                   |                  |  |
| 930             | H / 2.0                                                                                          | X                                                                          | 36.0          | 8.5               | 44.5              | 167.9             | 5830             |  |
|                 | H / 2.0                                                                                          | Y                                                                          | 41.3          | 8.5               | 49.8              | 309.0             |                  |  |
|                 | H / 1.5                                                                                          | Z                                                                          | 34.1          | 8.5               | 42.6              | 134.9             |                  |  |
|                 | V / 1.0                                                                                          | X                                                                          | 44.4          | 8.5               | 52.9              | 441.6             |                  |  |
|                 | V / 2.3                                                                                          | Y                                                                          | 38.21         | 8.5               | 46.7              | 216.5             |                  |  |
| 930             | V / 2.8                                                                                          | Z                                                                          | 38.3          | 8.5               | 46.8              | 218.8             | 5830             |  |
|                 |                                                                                                  |                                                                            |               |                   |                   |                   |                  |  |
| 1240            | H / 1.8                                                                                          | X                                                                          | 49.2          | -3.0              | 46.2              | 204.2             | 5000             |  |
|                 | H / 2.0                                                                                          | Y                                                                          | 48.7          | -3.0              | 45.7              | 192.8             |                  |  |
|                 | H / 1.8                                                                                          | Z                                                                          | 46.7          | -3.0              | 43.7              | 153.1             |                  |  |
|                 | V / 1.3                                                                                          | X                                                                          | 50.5          | -3.0              | 47.5              | 237.1             |                  |  |
|                 | V / 1.8                                                                                          | Y                                                                          | 47.9          | -3.0              | 44.9              | 175.8             |                  |  |
| 1240            | V / 1.0                                                                                          | Z                                                                          | 48.7          | -3.0              | 45.7              | 192.8             | 5000             |  |
|                 |                                                                                                  |                                                                            |               |                   |                   |                   |                  |  |
| 1550            | H / 1.0                                                                                          | X                                                                          | 41.7          | 1.0               | 42.7              | 136.5*            | 5000             |  |
|                 | H / 1.0                                                                                          | Y                                                                          | 41.7          | 1.0               | 42.7              | 136.5*            |                  |  |
|                 | H / 1.0                                                                                          | Z                                                                          | 41.7          | 1.0               | 42.7              | 136.5*            |                  |  |
|                 | V / 1.0                                                                                          | X                                                                          | 41.7          | 1.0               | 42.7              | 136.5*            |                  |  |
|                 | V / 1.0                                                                                          | Y                                                                          | 41.7          | 1.0               | 42.7              | 136.5*            |                  |  |
| 1550            | V / 1.0                                                                                          | Z                                                                          | 41.7          | 1.0               | 42.7              | 136.5*            | 5000             |  |
|                 | The frequency range was scanned from 30 MHz to 3.1 GHz. All emissions not recorded were more     |                                                                            |               |                   |                   |                   |                  |  |
|                 | Than 10 dB below the specified limit. Emissions from the EUT do not exceed the specified limits. |                                                                            |               |                   |                   |                   |                  |  |
|                 | *=Noise Floor Measurements (Minimum system sensitivity)                                          |                                                                            |               |                   |                   |                   |                  |  |



**Retlif Testing Laboratories**

Retlif Job Number R-9234-1

|                 |                                                                                                  |                                                                            |               |                   |                   |                   |                  |  |
|-----------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|---------------|-------------------|-------------------|-------------------|------------------|--|
| Test Method:    |                                                                                                  | FCC Part 15 Subpart C Radiated Emissions, Fundamental & Harmonic Emissions |               |                   |                   |                   |                  |  |
| Customer:       |                                                                                                  | X-10 (USA)                                                                 |               |                   | Job No.           |                   | R-9234-1         |  |
| Test Sample:    |                                                                                                  | RF remote                                                                  |               |                   | Paragraph:        |                   | 15.231           |  |
| Model No.:      |                                                                                                  | UR86A                                                                      |               |                   | FCC ID:           |                   | B4SUR86A         |  |
| Operating Mode: |                                                                                                  | Continuously Transmitting a 310 MHz Signal                                 |               |                   |                   |                   |                  |  |
| Technician:     |                                                                                                  | Peter Lananna                                                              |               |                   | Date:             |                   | November 5, 2001 |  |
| Notes:          |                                                                                                  | Test Distance: 3 Meters<br>Detector: Peak, unless otherwise specified      |               |                   |                   |                   |                  |  |
| Test Freq.      | Antenna Pol./Height                                                                              | EUT Orientation                                                            | Meter Reading | Correction Factor | Corrected Reading | Converted Reading | Peak Limit       |  |
| MHz             | (V/H)-Meters                                                                                     | X / Y / Z                                                                  | dBuV          | dB                | dBuV/m            | uV/m              | uV/m             |  |
| 1860            | H / 1.0                                                                                          | X                                                                          | 42.7          | 3.6               | 46.3              | 206.5*            | 5830             |  |
|                 | H / 1.0                                                                                          | Y                                                                          | 42.7          | 3.6               | 46.3              | 206.5*            |                  |  |
|                 | H / 1.0                                                                                          | Z                                                                          | 42.7          | 3.6               | 46.3              | 206.5*            |                  |  |
|                 | V /1.0                                                                                           | X                                                                          | 42.7          | 3.6               | 46.3              | 206.5*            |                  |  |
|                 | V / 1.0                                                                                          | Y                                                                          | 42.7          | 3.6               | 46.3              | 206.5*            |                  |  |
| 1860            | V / 1.0                                                                                          | Z                                                                          | 42.7          | 3.6               | 46.3              | 206.5*            | 5830             |  |
|                 |                                                                                                  |                                                                            |               |                   |                   |                   |                  |  |
| 2170            | H / 1.0                                                                                          | X                                                                          | 42.7          | 1.2               | 43.9              | 156.7*            | 5830             |  |
|                 | H / 1.0                                                                                          | Y                                                                          | 42.7          | 1.2               | 43.9              | 156.7*            |                  |  |
|                 | H / 1.0                                                                                          | Z                                                                          | 42.7          | 1.2               | 43.9              | 156.7*            |                  |  |
|                 | V /1.0                                                                                           | X                                                                          | 42.7          | 1.2               | 43.9              | 156.7*            |                  |  |
|                 | V / 1.0                                                                                          | Y                                                                          | 42.7          | 1.2               | 43.9              | 156.7*            |                  |  |
| 2170            | V / 1.0                                                                                          | Z                                                                          | 42.7          | 1.2               | 43.9              | 156.7*            | 5830             |  |
|                 |                                                                                                  |                                                                            |               |                   |                   |                   |                  |  |
| 2480            | H / 1.0                                                                                          | X                                                                          | 41.5          | 3.8               | 45.3              | 184.1*            | 5830             |  |
|                 | H / 1.0                                                                                          | Y                                                                          | 41.5          | 3.8               | 45.3              | 184.1*            |                  |  |
|                 | H / 1.0                                                                                          | Z                                                                          | 41.5          | 3.8               | 45.3              | 184.1*            |                  |  |
|                 | V /1.0                                                                                           | X                                                                          | 41.5          | 3.8               | 45.3              | 184.1*            |                  |  |
|                 | V / 1.0                                                                                          | Y                                                                          | 41.5          | 3.8               | 45.3              | 184.1*            |                  |  |
| 2480            | V / 1.0                                                                                          | Z                                                                          | 41.5          | 3.8               | 45.3              | 184.1*            | 5830             |  |
|                 |                                                                                                  |                                                                            |               |                   |                   |                   |                  |  |
| 2790            | H / 1.0                                                                                          | X                                                                          | 40.6          | 6.2               | 46.8              | 218.8*            | 5000             |  |
|                 | H / 1.0                                                                                          | Y                                                                          | 40.6          | 6.2               | 46.8              | 218.8*            |                  |  |
|                 | H / 1.0                                                                                          | Z                                                                          | 40.6          | 6.2               | 46.8              | 218.8*            |                  |  |
|                 | V /1.0                                                                                           | X                                                                          | 40.6          | 6.2               | 46.8              | 218.8*            |                  |  |
|                 | V / 1.0                                                                                          | Y                                                                          | 40.6          | 6.2               | 46.8              | 218.8*            |                  |  |
| 2790            | V / 1.0                                                                                          | Z                                                                          | 40.6          | 6.2               | 46.8              | 218.8*            | 5000             |  |
|                 |                                                                                                  |                                                                            |               |                   |                   |                   |                  |  |
| 3100            | H / 1.0                                                                                          | X                                                                          | 42.0          | 6.8               | 48.8              | 275.4*            | 5830             |  |
|                 | H / 1.0                                                                                          | Y                                                                          | 42.0          | 6.8               | 48.8              | 275.4*            |                  |  |
|                 | H / 1.0                                                                                          | Z                                                                          | 42.0          | 6.8               | 48.8              | 275.4*            |                  |  |
|                 | V /1.0                                                                                           | X                                                                          | 42.0          | 6.8               | 48.8              | 275.4*            |                  |  |
|                 | V / 1.0                                                                                          | Y                                                                          | 42.0          | 6.8               | 48.8              | 275.4*            |                  |  |
| 3100            | V / 1.0                                                                                          | Z                                                                          | 42.0          | 6.8               | 48.8              | 275.4*            | 5830             |  |
|                 | The frequency range was scanned from 30 MHz to 3.1 GHz. All emissions not recorded were more     |                                                                            |               |                   |                   |                   |                  |  |
|                 | Than 10 dB below the specified limit. Emissions from the EUT do not exceed the specified limits. |                                                                            |               |                   |                   |                   |                  |  |
|                 | *=Noise Floor Measurements ( Minimum system sensitivity)                                         |                                                                            |               |                   |                   |                   |                  |  |



**Retlif Testing Laboratories**

Retlif Job Number R-9234-1

|                 |                                                                                                  |                                                                            |              |                   |                               |                   |            |
|-----------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|--------------|-------------------|-------------------------------|-------------------|------------|
| Test Method:    |                                                                                                  | FCC Part 15 Subpart C Radiated Emissions, Fundamental & Harmonic Emissions |              |                   |                               |                   |            |
| Customer:       |                                                                                                  | X-10 (USA)                                                                 |              |                   | Job No.                       | R-9234-1          |            |
| Test Sample:    |                                                                                                  | RF remote                                                                  |              |                   | Paragraph:                    | 15.231            |            |
| Model No.:      |                                                                                                  | UR86A                                                                      |              |                   | FCC ID:                       | B4SUR86A          |            |
| Operating Mode: |                                                                                                  | Continuously Transmitting a 310 MHz Signal                                 |              |                   |                               |                   |            |
| Technician:     |                                                                                                  | Peter Lananna                                                              |              |                   | Date:                         | November 5, 2001  |            |
| Notes:          |                                                                                                  | Test Distance: 3 Meters                                                    |              |                   | Duty Cycle:36.3 %             |                   |            |
|                 |                                                                                                  | Detector: Peak, unless otherwise specified                                 |              |                   | Duty Cycle Correction: -8.8dB |                   |            |
| Test Freq.      | Antenna Pol./Height                                                                              | EUT Orientation                                                            | Peak Reading | Correction Factor | Corrected Reading             | Converted Reading | Avg. Limit |
| MHz             | (V/H)-Meters                                                                                     | X / Y / Z                                                                  | dBuV         | dB                | dBuV/m                        | uV/m              | uV/m       |
| 310             | H / 2.3                                                                                          | X                                                                          | 62.1         | -8.8              | 53.3                          | 462.4             | 5830       |
|                 | H / 1.0                                                                                          | Y                                                                          | 74.3         | -8.8              | 65.5                          | 1883.6            |            |
|                 | H / 2.3                                                                                          | Z                                                                          | 66.0         | -8.8              | 57.2                          | 724.4             |            |
|                 | V / 1.8                                                                                          | X                                                                          | 73.4         | -8.8              | 64.6                          | 1698.2            |            |
|                 | V / 3.0                                                                                          | Y                                                                          | 64.6         | -8.8              | 55.8                          | 616.6             |            |
| 310             | V / 2.3                                                                                          | Z                                                                          | 68.5         | -8.8              | 59.7                          | 966.1             | 5830       |
|                 |                                                                                                  |                                                                            |              |                   |                               |                   |            |
| 620             | H / 1.0                                                                                          | X                                                                          | 49.1         | -8.8              | 40.3                          | 103.5             | 583        |
|                 | H / 1.3                                                                                          | Y                                                                          | 56.7         | -8.8              | 47.9                          | 248.3             |            |
|                 | H / 1.3                                                                                          | Z                                                                          | 57.5         | -8.8              | 48.7                          | 272.3             |            |
|                 | V / 2.0                                                                                          | X                                                                          | 56.9         | -8.8              | 48.1                          | 254.1             |            |
|                 | V / 1.0                                                                                          | Y                                                                          | 53.7         | -8.8              | 44.9                          | 175.8             |            |
| 620             | V / 1.0                                                                                          | Z                                                                          | 51.6         | -8.8              | 42.8                          | 138.0             | 583        |
|                 |                                                                                                  |                                                                            |              |                   |                               |                   |            |
| 930             | H / 2.0                                                                                          | X                                                                          | 44.5         | -8.8              | 35.7                          | 61.0              | 583        |
|                 | H / 2.0                                                                                          | Y                                                                          | 49.8         | -8.8              | 41.0                          | 112.2             |            |
|                 | H / 1.5                                                                                          | Z                                                                          | 42.6         | -8.8              | 33.8                          | 49.0              |            |
|                 | V / 1.0                                                                                          | X                                                                          | 52.9         | -8.8              | 44.1                          | 160.3             |            |
|                 | V / 2.3                                                                                          | Y                                                                          | 46.7         | -8.8              | 37.9                          | 78.5              |            |
| 930             | V / 2.8                                                                                          | Z                                                                          | 46.8         | -8.8              | 38.0                          | 79.4              | 583        |
|                 |                                                                                                  |                                                                            |              |                   |                               |                   |            |
| 1240            | H / 1.8                                                                                          | X                                                                          | 46.2         | -8.8              | 37.4                          | 74.1              | 500        |
|                 | H / 2.0                                                                                          | Y                                                                          | 45.7         | -8.8              | 36.9                          | 70.0              |            |
|                 | H / 1.8                                                                                          | Z                                                                          | 43.7         | -8.8              | 34.9                          | 55.6              |            |
|                 | V / 1.3                                                                                          | X                                                                          | 47.5         | -8.8              | 38.7                          | 86.1              |            |
|                 | V / 1.8                                                                                          | Y                                                                          | 44.9         | -8.8              | 36.1                          | 63.8              |            |
| 1240            | V / 1.0                                                                                          | Z                                                                          | 45.7         | -8.8              | 36.9                          | 70.0              | 500        |
|                 |                                                                                                  |                                                                            |              |                   |                               |                   |            |
| 1550            | H / 1.0                                                                                          | X                                                                          | 42.7         | -8.8              | 33.9                          | 49.5*             | 500        |
|                 | H / 1.0                                                                                          | Y                                                                          | 42.7         | -8.8              | 33.9                          | 49.5*             |            |
|                 | H / 1.0                                                                                          | Z                                                                          | 42.7         | -8.8              | 33.9                          | 49.5*             |            |
|                 | V / 1.0                                                                                          | X                                                                          | 42.7         | -8.8              | 33.9                          | 49.5*             |            |
|                 | V / 1.0                                                                                          | Y                                                                          | 42.7         | -8.8              | 33.9                          | 49.5*             |            |
| 1550            | V / 1.0                                                                                          | Z                                                                          | 42.7         | -8.8              | 33.9                          | 49.5*             | 500        |
|                 | The frequency range was scanned from 30 MHz to 3.1 GHz. All emissions not recorded were more     |                                                                            |              |                   |                               |                   |            |
|                 | Than 10 dB below the specified limit. Emissions from the EUT do not exceed the specified limits. |                                                                            |              |                   |                               |                   |            |
|                 | *=Noise Floor Measurements ( Minimum system sensitivity)                                         |                                                                            |              |                   |                               |                   |            |



**Retlif Testing Laboratories**

Retlif Job Number R-9234-1

|                        |                                                                                                  |                                                                            |              |                   |                               |                   |                  |  |
|------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|--------------|-------------------|-------------------------------|-------------------|------------------|--|
| <b>Test Method:</b>    |                                                                                                  | FCC Part 15 Subpart C Radiated Emissions, Fundamental & Harmonic Emissions |              |                   |                               |                   |                  |  |
| <b>Customer:</b>       |                                                                                                  | X-10 (USA)                                                                 |              |                   | <b>Job No.</b>                |                   | R-9234-1         |  |
| <b>Test Sample:</b>    |                                                                                                  | RF remote                                                                  |              |                   | <b>Paragraph:</b>             |                   | 15.231           |  |
| <b>Model No.:</b>      |                                                                                                  | UR86A                                                                      |              |                   | <b>FCC ID:</b>                |                   | B4SUR86A         |  |
| <b>Operating Mode:</b> |                                                                                                  | Continuously Transmitting a 310 MHz Signal                                 |              |                   |                               |                   |                  |  |
| <b>Technician:</b>     |                                                                                                  | Peter Lananna                                                              |              |                   | <b>Date:</b>                  |                   | November 5, 2001 |  |
| <b>Notes:</b>          |                                                                                                  | Test Distance: 3 Meters                                                    |              |                   | Duty Cycle: 36.3%             |                   |                  |  |
|                        |                                                                                                  | Detector: Peak, unless otherwise specified                                 |              |                   | Duty Cycle Correction: -8.8dB |                   |                  |  |
| Test Freq.             | Antenna Pol./Height                                                                              | EUT Orientation                                                            | Peak Reading | Correction Factor | Corrected Reading             | Converted Reading | Avg. Limit       |  |
| MHz                    | (V/H)-Meters                                                                                     | X / Y / Z                                                                  | dBuV         | dB                | dBuV/m                        | uV/m              | uV/m             |  |
| 1860                   | H / 1.0                                                                                          | X                                                                          | 46.3         | -8.8              | 37.5                          | 75.0*             | 583              |  |
|                        | H / 1.0                                                                                          | Y                                                                          | 46.3         | -8.8              | 37.5                          | 75.0*             |                  |  |
|                        | H / 1.0                                                                                          | Z                                                                          | 46.3         | -8.8              | 37.5                          | 75.0*             |                  |  |
|                        | V / 1.0                                                                                          | X                                                                          | 46.3         | -8.8              | 37.5                          | 75.0*             |                  |  |
|                        | V / 1.0                                                                                          | Y                                                                          | 46.3         | -8.8              | 37.5                          | 75.0*             |                  |  |
| 1860                   | V / 1.0                                                                                          | Z                                                                          | 46.3         | -8.8              | 37.5                          | 75.0*             | 583              |  |
|                        |                                                                                                  |                                                                            |              |                   |                               |                   |                  |  |
| 2170                   | H / 1.0                                                                                          | X                                                                          | 43.9         | -8.8              | 35.1                          | 56.9*             | 583              |  |
|                        | H / 1.0                                                                                          | Y                                                                          | 43.9         | -8.8              | 35.1                          | 56.9*             |                  |  |
|                        | H / 1.0                                                                                          | Z                                                                          | 43.9         | -8.8              | 35.1                          | 56.9*             |                  |  |
|                        | V / 1.0                                                                                          | X                                                                          | 43.9         | -8.8              | 35.1                          | 56.9*             |                  |  |
|                        | V / 1.0                                                                                          | Y                                                                          | 43.9         | -8.8              | 35.1                          | 56.9*             |                  |  |
| 2170                   | V / 1.0                                                                                          | Z                                                                          | 43.9         | -8.8              | 35.1                          | 56.9*             | 583              |  |
|                        |                                                                                                  |                                                                            |              |                   |                               |                   |                  |  |
| 2480                   | H / 1.0                                                                                          | X                                                                          | 45.3         | -8.8              | 36.5                          | 66.8*             | 583              |  |
|                        | H / 1.0                                                                                          | Y                                                                          | 45.3         | -8.8              | 36.5                          | 66.8*             |                  |  |
|                        | H / 1.0                                                                                          | Z                                                                          | 45.3         | -8.8              | 36.5                          | 66.8*             |                  |  |
|                        | V / 1.0                                                                                          | X                                                                          | 45.3         | -8.8              | 36.5                          | 66.8*             |                  |  |
|                        | V / 1.0                                                                                          | Y                                                                          | 45.3         | -8.8              | 36.5                          | 66.8*             |                  |  |
| 2480                   | V / 1.0                                                                                          | Z                                                                          | 45.3         | -8.8              | 36.5                          | 66.8*             | 583              |  |
|                        |                                                                                                  |                                                                            |              |                   |                               |                   |                  |  |
| 2790                   | H / 1.0                                                                                          | X                                                                          | 46.8         | -8.8              | 38.0                          | 79.4*             | 500              |  |
|                        | H / 1.0                                                                                          | Y                                                                          | 46.8         | -8.8              | 38.0                          | 79.4*             |                  |  |
|                        | H / 1.0                                                                                          | Z                                                                          | 46.8         | -8.8              | 38.0                          | 79.4*             |                  |  |
|                        | V / 1.0                                                                                          | X                                                                          | 46.8         | -8.8              | 38.0                          | 79.4*             |                  |  |
|                        | V / 1.0                                                                                          | Y                                                                          | 46.8         | -8.8              | 38.0                          | 79.4*             |                  |  |
| 2790                   | V / 1.0                                                                                          | Z                                                                          | 46.8         | -8.8              | 38.0                          | 79.4*             | 500              |  |
|                        |                                                                                                  |                                                                            |              |                   |                               |                   |                  |  |
| 3100                   | H / 1.0                                                                                          | X                                                                          | 48.8         | -8.8              | 40.0                          | 100.0*            | 583              |  |
|                        | H / 1.0                                                                                          | Y                                                                          | 48.8         | -8.8              | 40.0                          | 100.0*            |                  |  |
|                        | H / 1.0                                                                                          | Z                                                                          | 48.8         | -8.8              | 40.0                          | 100.0*            |                  |  |
|                        | V / 1.0                                                                                          | X                                                                          | 48.8         | -8.8              | 40.0                          | 100.0*            |                  |  |
|                        | V / 1.0                                                                                          | Y                                                                          | 48.8         | -8.8              | 40.0                          | 100.0*            |                  |  |
| 3100                   | V / 1.0                                                                                          | Z                                                                          | 48.8         | -8.8              | 40.0                          | 100.0*            | 583              |  |
|                        | The frequency range was scanned from 30 MHz to 3.1 GHz. All emissions not recorded were more     |                                                                            |              |                   |                               |                   |                  |  |
|                        | Than 10 dB below the specified limit. Emissions from the EUT do not exceed the specified limits. |                                                                            |              |                   |                               |                   |                  |  |
|                        | *=Noise Floor Measurements ( Minimum system sensitivity)                                         |                                                                            |              |                   |                               |                   |                  |  |



**Retlif Testing Laboratories**

Retlif Job Number R-9234-1

|                                                  |                                                                                                                         |                 |                |                   |                   |                   |              |
|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|-----------------|----------------|-------------------|-------------------|-------------------|--------------|
| <b>Test Method:</b>                              | FCC Part 15 Subpart C, Spurious Case Radiated Emissions, Paragraph 15.209(a)                                            |                 |                |                   |                   |                   |              |
| <b>Customer:</b>                                 | X-10 (USA)                                                                                                              |                 |                |                   | <b>Job No.</b>    | R-9234-1          |              |
| <b>Test Sample:</b>                              | RF Remote                                                                                                               |                 |                |                   | <b>FCC ID.</b>    | B4SUR86A          |              |
| <b>Model No.:</b>                                | UR86A                                                                                                                   |                 |                |                   | <b>Serial No.</b> | N/A               |              |
| <b>Operating Mode:</b>                           | Continuously Transmitting a Pulsed 310MHz Signal.                                                                       |                 |                |                   |                   |                   |              |
| <b>Technician:</b>                               | Peter Lananna                                                                                                           |                 |                |                   | <b>Date:</b>      | November 5, 2001  |              |
| <b>Notes:</b>                                    | Test Distance: 3 Meters      Temp:17C      Humidity:27%<br>Detector: Quasi-Peak Below 30 MHz to 1 GHz, Peak above 1 GHz |                 |                |                   |                   |                   |              |
| Test Freq.                                       | Antenna Position                                                                                                        | EUT Orientation | Meter Readings | Correction Factor | Corrected Reading | Converted Reading | <b>LIMIT</b> |
| MHz                                              | (V/H) / Meters                                                                                                          | Degrees         | dBuV           | dB                | dBuV/m            | uV/m              | uV/m         |
| 30.00                                            |                                                                                                                         |                 |                |                   |                   |                   | 100          |
|                                                  |                                                                                                                         |                 |                |                   |                   |                   |              |
|                                                  |                                                                                                                         |                 |                |                   |                   |                   |              |
|                                                  |                                                                                                                         |                 |                |                   |                   |                   |              |
|                                                  |                                                                                                                         |                 |                |                   |                   |                   |              |
|                                                  |                                                                                                                         |                 |                |                   |                   |                   |              |
|                                                  |                                                                                                                         |                 |                |                   |                   |                   |              |
|                                                  |                                                                                                                         |                 |                |                   |                   |                   |              |
| 88.00                                            |                                                                                                                         |                 |                |                   |                   |                   | 100          |
| 88.00                                            |                                                                                                                         |                 |                |                   |                   |                   | 150          |
|                                                  |                                                                                                                         |                 |                |                   |                   |                   |              |
|                                                  |                                                                                                                         |                 |                |                   |                   |                   |              |
| No emissions detected at specified test distance |                                                                                                                         |                 |                |                   |                   |                   |              |
|                                                  |                                                                                                                         |                 |                |                   |                   |                   |              |
|                                                  |                                                                                                                         |                 |                |                   |                   |                   |              |
|                                                  |                                                                                                                         |                 |                |                   |                   |                   |              |
|                                                  |                                                                                                                         |                 |                |                   |                   |                   |              |
| 216.00                                           |                                                                                                                         |                 |                |                   |                   |                   | 150          |
| 216.00                                           |                                                                                                                         |                 |                |                   |                   |                   | 200          |
|                                                  |                                                                                                                         |                 |                |                   |                   |                   |              |
|                                                  |                                                                                                                         |                 |                |                   |                   |                   |              |
|                                                  |                                                                                                                         |                 |                |                   |                   |                   |              |
| 960.00                                           |                                                                                                                         |                 |                |                   |                   |                   | 200          |
| 960.00                                           |                                                                                                                         |                 |                |                   |                   |                   | 500          |
|                                                  |                                                                                                                         |                 |                |                   |                   |                   |              |
|                                                  |                                                                                                                         |                 |                |                   |                   |                   |              |
|                                                  |                                                                                                                         |                 |                |                   |                   |                   |              |
| 3100.0                                           |                                                                                                                         |                 |                |                   |                   |                   | 500          |
|                                                  |                                                                                                                         |                 |                |                   |                   |                   |              |
|                                                  |                                                                                                                         |                 |                |                   |                   |                   |              |
|                                                  |                                                                                                                         |                 |                |                   |                   |                   |              |
|                                                  | The EUT was scanned from 30 MHz to 3.1 GHz                                                                              |                 |                |                   |                   |                   |              |
|                                                  | The emissions observed from the EUT do not exceed the specified limits. Emissions not recorded                          |                 |                |                   |                   |                   |              |
|                                                  | were more than 10dB under the specified limit                                                                           |                 |                |                   |                   |                   |              |



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Retlif Job Number R-9234-1

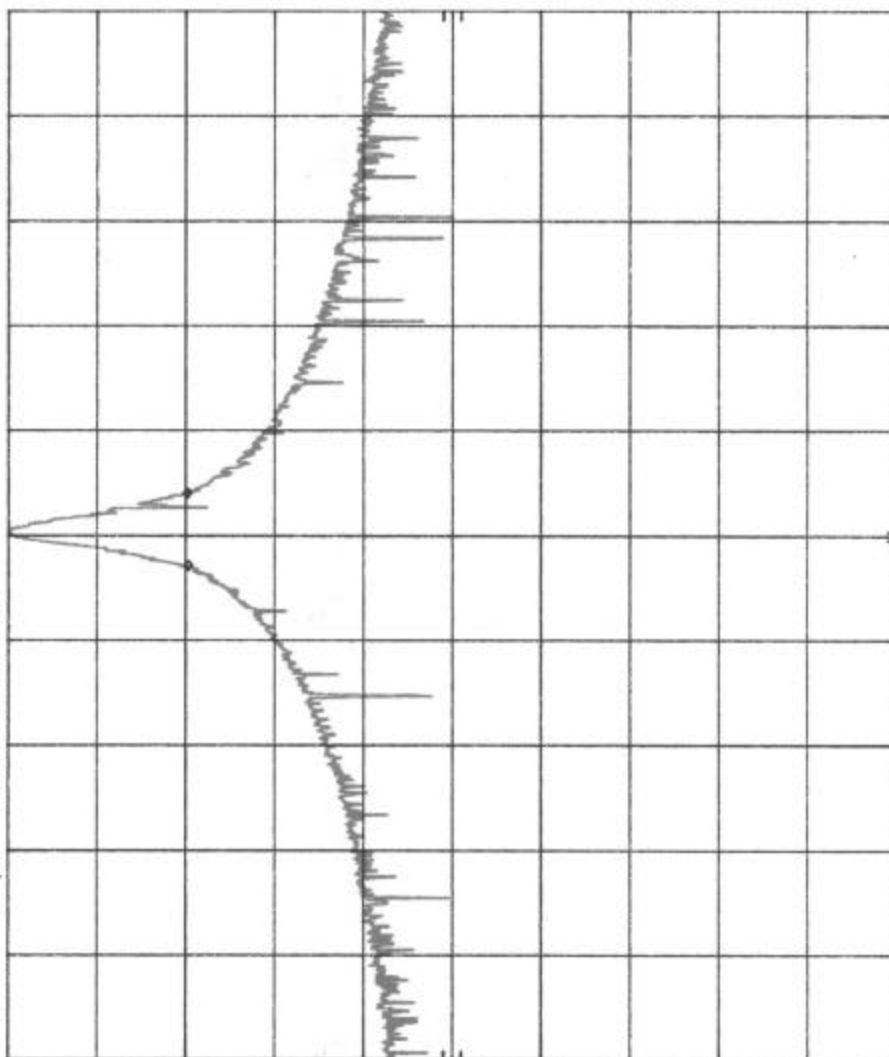
MR  $\Delta$  53.4 kHz  
0.10 dB

R-9234 X-10 UR86A Occ. Bw. 11/2/01 PL  
REF 74.4 dB $\mu$ V ATTN 10 dB

hp

10 dB/

DL  
54.4  
dB $\mu$ V



SPAN 775 kHz  
SWP 30.0 msec

VBW 30 kHz

CENTER 309.511 MHz  
RES BW 10 kHz

|              |                                                                                                                                                             |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Customer:    | X-10 (USA)                                                                                                                                                  |
| Test Sample: | RF Remote                                                                                                                                                   |
| Model No.:   | UR86A                                                                                                                                                       |
| Test Method: | FCC ID B45UR86A                                                                                                                                             |
| Notes:       | FCC 15.231(c) Occupied Bandwidth<br>Bandwidth of emission is less than 0.25% of the center frequency.<br>510MHz $\pm$ 0.25% = 775kHz<br>Bandwidth = 53.4kHz |
| Date:        | November 5, 2001                                                                                                                                            |
| Tech:        | Peter Lanius                                                                                                                                                |
| Sheet:       | 1 of 1                                                                                                                                                      |



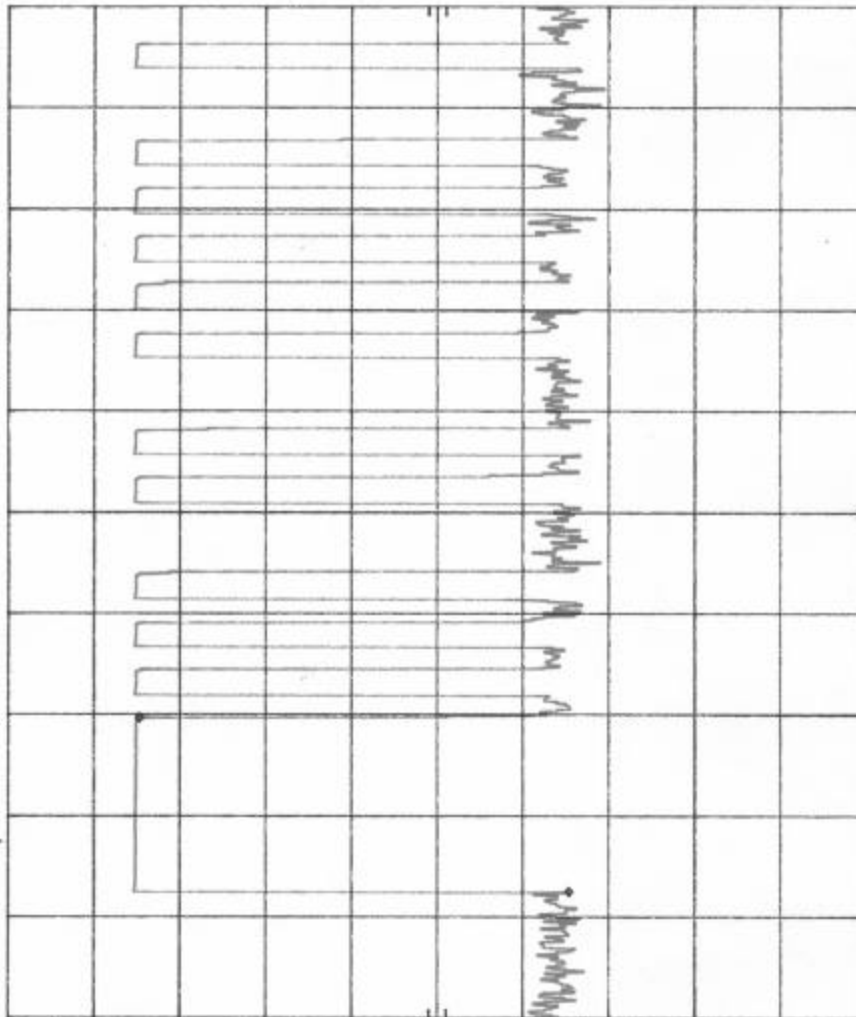
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Report No. R-9234-1

R-9234 X-10 UR86A DCD 11/2/01 PL  
 REF 89.0 dBμV ATTEN 10 dB  
 MKR Δ 4.300 msec  
 50.10 dB

hp

10 dB/



CENTER 309.429 967 MHz  
 RES BW 100 kHz  
 VBW 300 kHz  
 SWP 25.0 msec  
 SPAN 0 Hz

|              |                                    |
|--------------|------------------------------------|
| Customer:    | X-10 (USA)                         |
| Test Sample: | RF Remote                          |
| Model No.:   | UR86A                              |
| Test Method: | FCC ID B4SUR86A                    |
| Notes:       | FCC 15.35 Duty Cycle Determination |
|              | Large Pulse=4.3msec                |
| Date:        | November 5, 2001                   |
| Tech:        | Peter Lianina                      |
| Sheet:       | 1 of 3                             |



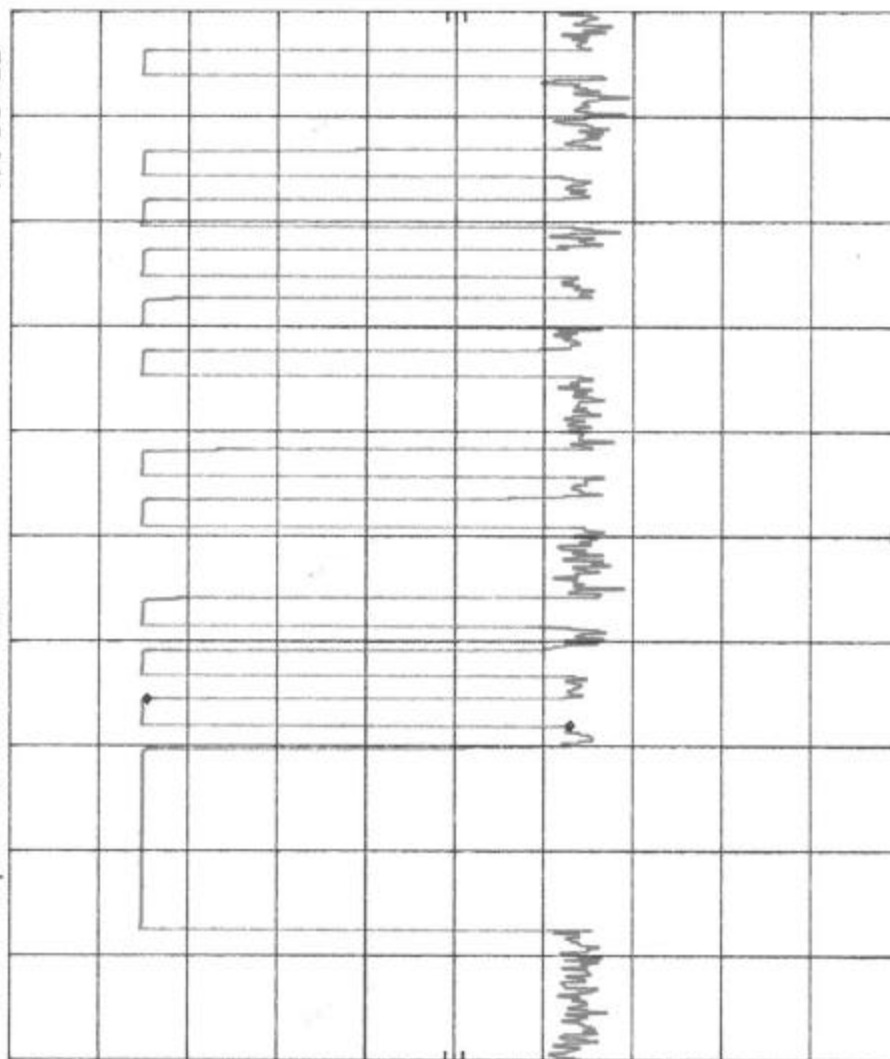
**Retlif Testing Laboratories**

Report No. R-9234-1

|              |                                                           |
|--------------|-----------------------------------------------------------|
| Customer:    | X-10 (USA)                                                |
| Test Sample: | RF Remote                                                 |
| Model No:    | UR86A FCC ID B4SUR86A                                     |
| Test Method: | FCC15.35 Duty Cycle Determination                         |
| Notes:       | Small Pulse=625µsec<br>Small Pulses=625µsec*21=13.125msec |
| Date:        | November 5, 2001                                          |
| Tech:        | Peter Liananna                                            |
| Sheet        | 2 of 3                                                    |

R-9234 X-10 UR86A DCD 11/2/01 PL  
 REF 89.0 dBµV ATTEN 10 dB  
 MKR Δ 625.0 µsec  
 47.60 dB

hp  
 10 dB/



CENTER 309.429 967 MHz  
 RES BW 100 kHz  
 VBW 300 kHz  
 SWP 25.0 msec  
 SPAN 0 Hz



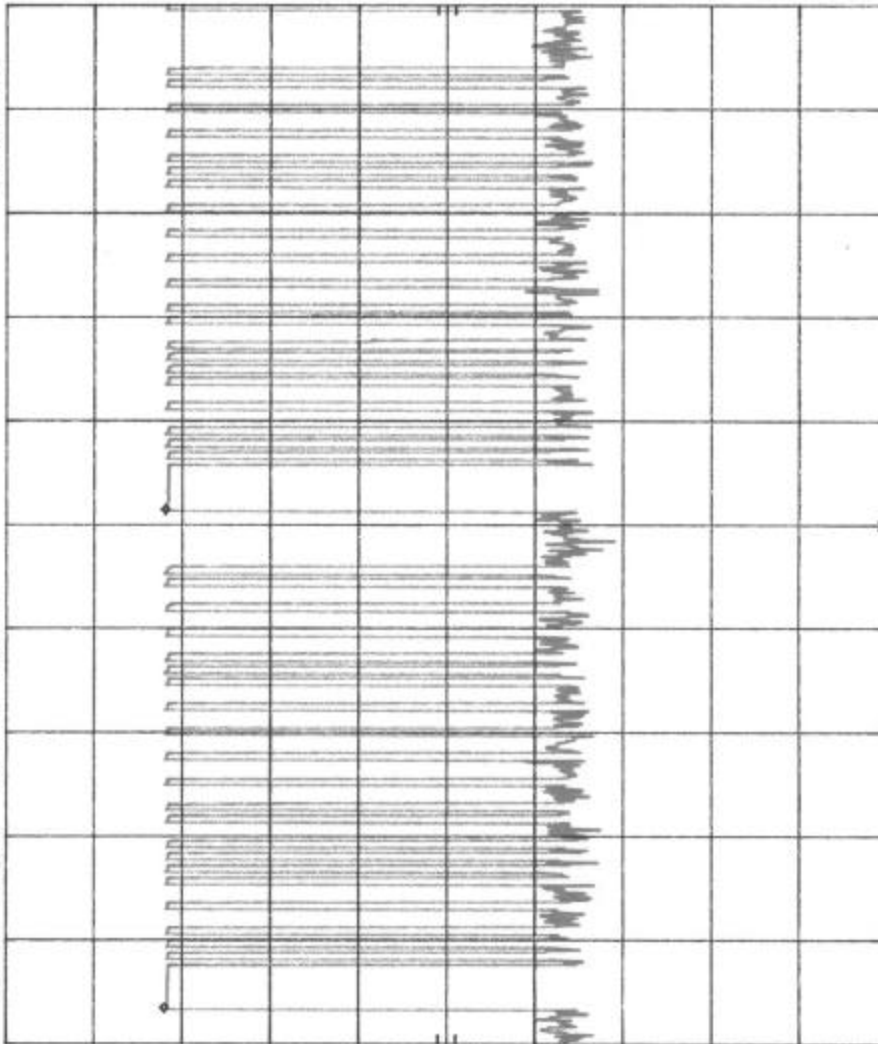
Retlif Testing Laboratories

Report No. R-9234-1

MKR  $\Delta$  48.00 msec  
-0.10 dB

R-9234 X-10 UR86A DCD 11/2/01 PL  
REF 89.0 dB $\mu$ V ATTN 10 dB

hp  
10 dB/



CENTER 309.429 967 MHz  
RES BW 100 kHz  
SPAN 0 Hz  
SWP 100 msec  
VBW 300 kHz

|              |                                                                                                                                                    |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| Customer:    | X-10 (USA)                                                                                                                                         |
| Test Sample: | RF Remote                                                                                                                                          |
| Model No:    | UR86A FCC ID B4SUR86A                                                                                                                              |
| Test Method: | FCC15.35 Duty Cycle Determination                                                                                                                  |
| Notes:       | Cycle time=48msec<br>Transmit on time=4.3msec +13.125msec on=17.425msec<br>Duty Cycle=17.425msec/48msec=36.3%, 20log(36.3%)=-8.8 Correction Factor |
| Date:        | November 5, 2001                                                                                                                                   |
| Test:        | Patric Larrea                                                                                                                                      |
| Sheet:       | 3 of 3                                                                                                                                             |



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Report No. R-9234-1