

APPLICANT

X-10 (USA), Inc.
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MANUFACTURER

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

TEST PROCEDURE: ~~ANSI C63.4:1992~~

TEST SAMPLE DESCRIPTION

BRANDNAME: ~~ATI Technologies, Inc.~~ MODEL: ~~UR84A~~

TYPE: ~~Pulsed Transmitter~~

POWER REQUIREMENTS: ~~6 VDC derived from 4 New "AAA" Batteries~~

FREQUENCY OF OPERATION: ~~434 MHz~~

TESTS PERFORMED

Para. 15.231(a), Radiated Emissions, Fundamental and Harmonics

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

Para. 15.231(b), Duty Cycle Determination

Para. 15.231(c), Occupied Bandwidth

REPORT OF MEASUREMENTS

Applicant: X-10 (USA), Inc.

Device: Pulsed Transmitter

FCC ID: B4SUR84A

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-9132-1

FCC ID: B4SUR84A

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 11,000 $\mu\text{V/M}$ (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 1,100 $\mu\text{V/M}$ (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	=	312			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:

Fundamental Limit = 11,000 $\mu\text{V/M}$ (AVERAGE) @ 3 Meters

Harmonic Limit = 1,100 $\mu\text{V/M}$ (AVERAGE) @ 3 Meters



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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 = 17.125 milliseconds (maximum- worst case in 100 ms)

Transmitter Cycle Time = 74.5

Transmitter Duty Cycle = 22.98 %

CALCULATION:

1 Large Pulse = 4.5 milliseconds

21 x 625 μ s (small pulse) = 13.125 milliseconds

10.5 + 20.625 = 22.98 milliseconds

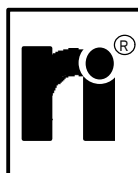
Duty Cycle = 22.98 %

Correction Factor = $20 \log(0.248)$ = -12.77

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 μ 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 4.5 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	9/20/00	9/20/03
128C	Double Ridge Guide	Eaton Corporation	1 GHz - 18 GHz	96001	9/18/00	9/18/01
133	Broadband Pre-Amplifier	Electro-Metrics	10 kHz - 1 GHz, 26dB	BPA-1000	6/13/01	6/13/02
141A	Graphics Plotter	Hewlett Packard	N/A	7470A	3/5/01	3/5/02
206B	6.0 dB Attenuator	Texscan	0 - 1.0 GHz	FP-50 - 6 dB	6/13/01	6/13/02
523	Biconilog	Electro-Mechanics	26 - 2000 MHz	3142B	6/8/00	9/8/01
543	Preamplifier	Hewlett Packard	1.0 GHz - 26.5 GHz	8449B	6/27/01	6/27/02
617	Interference Analyzer	Electro-Metrics	10 kHz - 1 GHz	EMC-30	2/27/01	2/27/02
R105	Spectrum Analyzer	Agilent	9 kHz - 26.5 GHz	E4407B	2/17/01	2/17/02



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FCC 15.231(b)

RADIATED EMISSIONS, FUNDAMENTAL & SPURIOUS CASE

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



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Test Report No. R-9132-1

FCC ID: B4SUR84A

FCC 15.231(c)

OCCUPIED BANDWIDTH

Please refer to separate electronic file named Occbw.pdf



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Test Report No. R-9012-1

FCC ID: B4SUR84A

FCC 15.231(c)

DUTY CYCLE

Please refer to separate electronic file named Dutycycle.pdf



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Test Report No. R-9012-1

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Test Setup Photograph



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