APPLICANT	MANUFACTURER
X-10 (USA), Inc. 91 Ruckman Road Closter, NJ 07624-0420	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: UR73A

TYPE: Pulsed RF Transmitter

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

FREQUENCY OF OPERATION: 310 MHz

TESTS PERFORMED

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

Para. 15.231(c), Occupied Bandwidth

Duty Cycle Determination

REPORT OF MEASUREMENTS

Applicant: X-10 (USA), Inc.

Device: Pulsed RF Transmitter

FCC ID: B4SUR-73A

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

TEST RESULTS

15.231 (a) - The device is used as a transmitter for RF Remote Control purposes.

15.231 (a)(1) & 15.231(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 (a)(4)- Not applicable

15.231 (b) - The fundamental field strength did not exceed 5830 µV/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 µV/M (AVERAGE).

15.231 (c) - The device operates at 310 MHz. The bandwidth of emissions did not exceed 0.25% of the operating frequency (775 kHz).

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:

Limit = L1 + [(Fo-F1)(L2-L1)/(F2-F1)]

Solving yields:

Fundamental Limit = 5,830 µV/M (AVERAGE) @ 3 Meters

Harmonic Limit = 583 µV/M (AVERAGE) @ 3 Meters

DETERMINATION OF DUTY CYCLE

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	=	29.5 milliseconds (maximum- worst case in 100 ms)
Transmitter Cycle Time	=	106.8 milliseconds (107 msec)
Transmitter Duty Cycle	=	29.5 %

CALCULATION:

1 Large Pulse	=	8.875 milliseconds
33 x 625 µs (small pulse)	=	29.5 milliseconds
8.875 + 20.625	=	29.55 milliseconds
Duty Cycle	=	29.5 %
Correction Factor = 20 log(0.295)	=	-10.6

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 625µs yields a minimum required bandwidth of 1067 Hz. FCC specified bandwidths of 100kHz and 1MHz were utilized below and above 1GHz, respectively.

REPORT OF MEASUREMENTS (continued)

GENERAL NOTES

1. All readings were taken utilizing a peak detector function at a test distance of 3 meters.

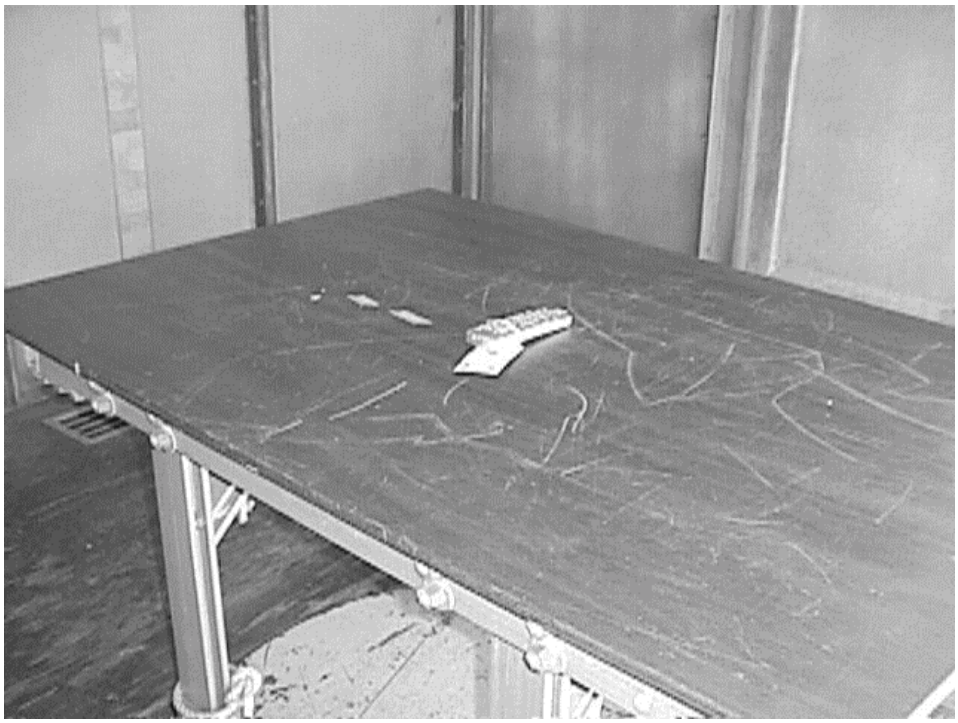
2. The duty cycle was applied to the peak readings in order to determine the average value of the emissions.

3. All measurements were made with 6 VDC derived from 4 new "AAA" Batteries.

4. 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.

TEST SETUP PHOTOGRAPH

RADIATED EMISSIONS



EQUIPMENT LIST

Radiated Emissions, Fundamental and Harmonics & Spurious Case

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
067	Open Area Test Site	Retlif	3 Meter	RNY	10/15/1997	10/15/2000
128C	Double Ridge Guide	Eaton Corporation	1 GHz - 18 GHz	96001	09/16/1999	09/16/2000
133	Broadband Pre-Amplifier	Electro-Metrics	10 kHz - 1 GHz, 26dB	BPA-1000	06/13/2000	06/13/2001
141	Spectrum Analyzer	Hewlett Packard	100 Hz - 40 GHz	8566B	08/03/2000	02/03/2001
141A	Graphics Plotter	Hewlett Packard	N/A	7470A	03/08/2000	03/08/2001
141B	Quasi-Peak Adaptor	Hewlett Packard	100 Hz - 1 GHz	85650A	08/02/2000	02/02/2001
206B	6.0 dB Attenuator	Texscan	0 - 1.0 GHz	FP-50 - 6 dB	06/13/2000	06/13/2001
523	Biconilog	Electro-Mechanics	26 - 2000 MHz	3142B	06/08/2000	06/08/2001
543	Preamplifier	Hewlett Packard	1.0 GHz - 26.5 GHz	8449B	06/16/1999	06/16/2001
617	Interference Analyzer	Electro-Metrics	10 kHz - 1 GHz	EMC-30	01/17/2000	01/17/2001

FCC 15.231(b)

RADIATED EMISSIONS

(Please see separate e-file attachment named REFundHarm.pdf and RESpurious.pdf)

FCC 15.231(c)

OCCUPIED BANDWIDTH

(Please see separate e-file attachment named Occbw.pdf)

DUTY CYCLE PLOTS

(Please see separate e-file attachment named Dutycycle.pdf)