APPLICANT	MANUFACTURER
X-10 USA, Inc. 19823, 58th Place S. Kent, WA 98032	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 C63.4:2000

TEST SAMPLE DESCRIPTION

BRANDNAME: X-10 USA, Inc. MODEL: SRF1

TYPE: Pulsed Transmitter

POWER REQUIREMENTS: 2 "AAA" Batteries

FREQUENCY OF OPERATION: 418 MHz

TESTS PERFORMED

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

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

Para. 15.35, Duty Cycle Determination

Para. 15.231(c), Occupied Bandwidth

REPORT OF MEASUREMENTS

Applicant: **X-10 (USA), Inc.**

Device: **Pulsed Transmitter**

FCC ID: **B4SSRF1**

Power Requirements: **2 "AAA" Batteries**

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

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 10,333 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 1,033 µV/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	=	418		Lo	
F2	=	470	12500	=	L2

REPORT OF MEASUREMENTS (continued)

The formula below was utilized to determine the limits:

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

Solving yields:

Fundamental Limit = 10,333 µV/M (AVERAGE) @ 3 Meters

Harmonic Limit = 1,033 µV/M (AVERAGE) @ 3 Meters

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.

Transmitter On Time = 10.94 milliseconds (maximum)

Transmitter Cycle Time = 83 milliseconds

Transmitter Duty Cycle = 13.2 %

See separate e-file plots named dutycycle.pdf for additional information.

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 160 μs yields a minimum required bandwidth of 4,167 Hz. FCC specified bandwidths of 100 kHz and 1 MHz were utilized below and above 1 GHz, respectively.

GENERAL NOTES

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

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

The frequency range was scanned from 30 MHz to 4.18 GHz. All emissions not reported were more than 20 dB below the specified limit.

Equipment List

FCC Part 15, Subpart C, Radiated Emissions, 30 MHz to 4.18 GHz

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
128	Double Ridged Guide	Electro-Mechanics	1 GHz - 18 GHz	3105	6/13/03	6/13/04
133	Broadband Pre-Amplifier	Electro-Metrics	10 kHz - 1 GHz, 26dB	BPA-1000	6/12/03	6/12/04
141	Spectrum Analyzer	Hewlett Packard	100 Hz - 40 GHz	8566B	1/23/03	7/23/03
141A	Graphics Plotter	Hewlett Packard	N/A	7470A	3/5/03	3/5/04
141B	Quasi-Peak Adaptor	Hewlett Packard	100 Hz - 1 GHz	85650A	1/23/03	7/23/03
206B	6.0 dB Attenuator	Texscan	0 - 1.0 GHz	FP-50 - 6 dB	6/12/03	6/12/04
543	Preamplifier	Hewlett Packard	1.0 GHz - 26.5 GHz	8449B	7/11/02	7/11/03
617	Interference Analyzer	Electro-Metrics	10 kHz - 1 GHz	EMC-30	8/23/02	8/23/03

FCC 15.231(b)

RADIATED EMISSIONS, FUNDAMENTAL & SPURIOUS CASE

(See separate e-file named Refundharm & REspur.pdf)

FCC 15.231(c)

OCCUPIED BANDWIDTH

(See separate e-file named occbw.pdf)

FCC 15.231(c)

DUTY CYCLE

(See separate e-file named dutycycle.pdf)

Test Setup Photograph