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: GB10A~~

TYPE: Pulsed RF Transmitter

POWER REQUIREMENTS: 3 VDC derived from 2 "AAA" Batteries

FREQUENCY OF OPERATION: 310 MHz

TESTS PERFORMED

Para. 15.231(a), 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:	B4SGB10A
Power Requirements:	3VDC
Applicable Rule Section:	Part 15, Subpart C, Section 15.231

TEST RESULTS

15.231 (a) - The device is used as a transmitter for security purposes.

15.231 (a)(1) & 15.231(2) - The transmitter automatically operates and ceases transmission within 5 seconds after deactivation.

15.231 (a)(3) - The transmitter does not perform periodic transmissions.

15.231 (a)(4)- The device is employed for RC purposes involving security and when activated to signal an alarm, operates during the pendency of the alarm condition.

15.231 (b) - The fundamental field strength did not exceed 5833 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 = 5,833 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	=	38.55 milliseconds (maximum- worst case in 100 ms)
Transmitter Cycle Time	=	> 100 milliseconds
Transmitter Duty Cycle	=	38.55 %

CALCULATION:

1 Large Pulse	=	9.15 milliseconds
42 x 700 µs (small pulse)	=	29.4 milliseconds
9.15 + 29.4	=	38.55 milliseconds
Duty Cycle	=	38.55 %
Correction Factor = 20 log(0.3855)	=	-8.3

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 700µs yields a minimum required bandwidth of 952 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 3 VDC being derived from 2 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.

EQUIPMENT LIST

FCC Part 15 Subpart C Radiated Emissions Paragraph 15.231

EN	Type	Manufacturer	Frequency Range	Model No.	Cal Date	Due Date
067	Open Area Test Site	Retlif	3 Meter	RNY	8/30/97	8/30/99
128C	Double Ridge Guide	Eaton Corporation	1 GHz - 18 GHz	96001	10/6/98	10/6/99
133	Broadband Pre-Amplifier	Electro-Metrics	10 kHz - 1 GHz, 26dB	BPA-1000	6/22/99	6/22/00
141	Spectrum Analyzer	Hewlett Packard	100 Hz - 40 GHz	8566B	3/16/99	9/16/99
141A	Graphics Plotter	Hewlett Packard	N/A	7470A	3/5/99	3/5/00
141B	Quasi-Peak Adaptor	Hewlett Packard	100 Hz - 1 GHz	85650A	3/16/99	9/16/99
206B	6.0 dB Attenuator	Texscan	0 - 1.0 GHz	FP-50 - 6 dB	6/22/99	6/22/00
523	Biconilog	Electro-Mechanics	26 - 2000 MHz	3142B	10/22/98	4/22/00
543	Preamplifier	Hewlett Packard	1.0 GHz - 26.5 GHz	8449B	6/16/99	6/16/01

FCC 15.231(b)
RADIATED EMISSIONS, FUNDAMENTAL & SPURIOUS CASE

FCC 15.231(c)

OCCUPIED BANDWIDTH

Please refer to separate electronic file named Occbw.Doc

DUTY CYCLE PLOTS

Please refer to separate electronic file named Duty Cycle Plots.Doc