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: CM17A

TYPE: 310 MHz RF Transmitter

POWER REQUIREMENTS: 5 VDC derived from Host PC

FREQUENCY OF OPERATION: 310 MHz

TESTS PERFORMED

Para. 15.207(a), AC Line Conducted Emissions

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: 310 MHz Wireless Computer Interface

FCC ID: B4SCM17A

Power Requirements: 5 VDC

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 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)- The device is employed for RC purposes involving security.

15.231 (b) - The fundamental field strength did not exceed 5900 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 590 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	=	311.6			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 = 5,900 µV/M (AVERAGE) @ 3 Meters

Harmonic Limit = 590 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.

Transmitter On Time	=	32.1 milliseconds (maximum- worst case in 100 ms)
Transmitter Cycle Time	=	111.2 milliseconds
Transmitter Duty Cycle	=	32.1 %

CALCULATION:

1 Large Pulse	=	9.0 milliseconds
33 x 700 µs (small pulse)	=	23.1 milliseconds
9.0 + 23.1	=	32.1 milliseconds

Duty Cycle = 32.1 %

Correction Factor = -9.9 db (.321 log 20 = -9.9)

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 952.4 Hz. FCC specified bandwidths of 100kHz and 1MHz were utilized below and above 1GHz, respectively.

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 5 VDC being derived from the support PC.

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

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	6/22/98	6/22/99
141	Spectrum Analyzer	Hewlett Packard	100 Hz - 40 GHz	8566B	9/19/98	3/19/99
141A	Graphics Plotter	Hewlett Packard	N/A	7470A	3/4/98	3/4/99
141B	Quasi-Peak Adaptor	Hewlett Packard	100 Hz - 1 GHz	85650A	9/19/98	3/19/99
206B	6.0 dB Attenuator	Texscan	0 - 1.0 GHz	FP-50 - 6 dB	6/22/98	6/22/99
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	9/3/98	9/3/99

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

Test Report No. R-7977-1
FCC ID: B4SCM17A

TEST SAMPLE: Pulsed RF Transmitter
APPLICANT: X-10 (U.S.A.)
FCC ID: B4SCM17A
TEST METHOD: Radiated Emissions, Fundamental and Spurious Case
SPECIFICATION: FCC Part 15, Paragraph 15.231(b)
PERFORMED BY: T. Schneider
DATE: February 26,1999

Field Strength - Peak

Frequency MHz	Antenna Position & Distance H / V	EUT Orientation X / Y	Corrected Meter Reading dBuV	Correction Factor dB	Corrected Reading dBuV/M	Converted Reading uV/M	Peak Limit at 3 Meters uV/M
311.6	H-1.0	X	86.9	-3.9	83.0	14125.3	59000
	H-1.0	Y	88.4	-3.9	84.5	16788.0	59000
	V-1.7	X	82.1	-3.9	78.2	8128.3	59000
	V-1.1	Y	83.4	-3.9	79.5	9440.6	59000
623.2	H-1.0	X	51.8	3.3	55.1	568.8	5900
	H-1.8	Y	53.5	3.3	56.8	691.8	5900
	V-1.5	X	55.2	3.3	58.5	841.4	5900
	V-2.0	Y	55.5	3.3	58.8	871.0	5900
934.8	H-2.0	X	41.1	7.7	48.8	275.4	5900
	H-1.8	Y	42.0	7.7	49.7	305.5	5900
	V-1.5	X	41.5	7.7	49.2	288.4	5900
	V-1.0	Y	46.4	7.7	54.1	507.0	5900

1246.6.	H-1.0	X	45.0	-3.9	41.1	113.5	5900
	H-1.0	Y	46.0	-3.9	42.1	127.4	5900
	V-1.3	X	46.7	-3.9	42.8	138.0	5900
	V-1.0	Y	47.5	-3.9	43.6	151.3	5900
1558.2	H-1.0	X*	41.6	-0.3	41.3	116.1	5000
	H-1.0	Y*	41.6	-0.3	41.3	116.1	5000
	V-1.0	X*	41.6	-0.3	41.3	116.1	5000
	V-1.0	Y*	41.6	-0.3	41.3	116.1	5000
1869.8	H-1.0	X*	42.0	1.6	43.6	151.3	5900
	H-1.0	Y*	42.0	1.6	43.6	151.3	5900
	V-1.0	X*	42.0	1.6	43.6	151.3	5900
	V-1.0	Y*	42.0	1.6	43.6	151.3	5900
2181.4	H-1.0	X*	41.5	-1.3	40.2	102.3	5900
	H-1.0	Y*	41.5	-1.3	40.2	102.3	5900
	V-1.0	X*	41.5	-1.3	40.2	102.3	5900
	V-1.0	Y*	41.5	-1.3	40.2	102.3	5900
2493	H-1.0	X*	41.6	0.1	41.7	121.6	5000
	H-1.0	Y*	41.6	0.1	41.7	121.6	5000
	V-1.0	X*	41.6	0.1	41.7	121.6	5000

	V-1.0	Y*	41.6	0.1	41.7	121.6	5000
2804.6	H-1.0	X*	40.6	1.4	42.0	125.9	5000
	H-1.0	Y*	40.6	1.4	42.0	125.9	5000
	V-1.0	X*	40.6	1.4	42.0	125.9	5000
	V-1.0	Y*	40.6	1.4	42.0	125.9	5000
3116.2	H-1.0	X*	38.0	3.5	45.1	179.9	5900
	H-1.0	Y*	38.0	3.5	45.1	179.9	5900
	V-1.0	X*	38.0	3.5	45.1	179.9	5900
	V-1.0	Y*	38.0	3.5	45.1	179.9	5900

Field Strength - Average

Frequency MHz	Antenna Position & Distance H / V	EUT Orientation X / Y	Peak Corrected Reading dBuV	Duty Cycle Correction Factor dB	Corrected Average Reading dBuV/M	Converted Average Reading uV/M	Peak Limit at 3 Meters uV/M
311.6	H-1.8	X	83.0	-9.9	73.1	4518.6	5900
	H-1.1	Y	84.5	-9.9	74.6	5370.3	5900
	V-1.9	X	78.2	-9.9	68.3	2600.2	5900
	V-1.0	Y	79.5	-9.9	69.6	3020.0	5900

623.2	H-1.0	X	55.1	-9.9	45.2	182.0	590
	H-1.0	Y	56.8	-9.9	46.9	221.3	590
	V-1.5	X	58.5	-9.9	48.6	269.1	590
	V-1.1	Y	58.8	-9.9	48.9	278.6	590
934.8	H-1.0	X	48.8	-9.9	38.9	88.1	590
	H-1.2	Y	49.7	-9.9	39.8	97.7	590
	V-1.0	X	49.2	-9.9	39.3	92.2	590
	V-1.1	Y	54.1	-9.9	44.2	162.2	590
1246.4	H-1.0	X*	41.1	-9.9	31.2	36.3	590
	H-1.0	Y*	42.1	-9.9	32.2	40.7	590
	V-1.0	X*	42.8	-9.9	32.9	44.1	590
	V-1.0	Y*	43.6	-9.9	33.7	48.4	590
1558	H-1.0	X*	41.3	-9.9	31.4	37.1	500
	H-1.0	Y*	41.3	-9.9	31.4	37.1	500
	V-1.0	X*	41.3	-9.9	31.4	37.1	500
	V-1.0	Y*	41.3	-9.9	31.4	37.1	500
1869.6	H-1.0	X*	43.6	-9.9	33.7	48.4	590
	H-1.0	Y*	43.6	-9.9	33.7	48.4	590
	V-1.0	X*	43.6	-9.9	33.7	48.4	590
	V-1.0	Y*	43.6	-9.9	33.7	48.4	590
2181.2	H-1.0	X*	40.2	-9.9	30.3	30.3	590

	H-1.0	Y*	40.2	-9.9	30.3	30.3	590
	V-1.0	X*	40.2	-9.9	30.3	30.3	590
	V-1.0	Y*	40.2	-9.9	30.3	30.3	590
2492.8	H-1.0	X*	41.7	-9.9	31.8	38.9	500
	H-1.0	Y*	41.7	-9.9	31.8	38.9	500
	V-1.0	X*	41.7	-9.9	31.8	38.9	500
	V-1.0	Y*	41.7	-9.9	31.8	38.9	500
2804.4	H-1.0	X*	42.0	-9.9	32.1	40.3	500
	H-1.0	Y*	42.0	-9.9	32.1	40.3	500
	V-1.0	X*	42.0	-9.9	32.1	40.3	500
	V-1.0	Y*	42.0	-9.9	32.1	40.3	500
3116	H-1.0	X*	45.1	-9.9	35.2	57.5	590
	H-1.0	Y*	45.1	-9.9	35.2	57.5	590
	V-1.0	X*	45.1	-9.9	35.2	57.5	590
	V-1.0	Y*	45.1	-9.9	35.2	57.5	590

*=Noise Floor Measurements (Minimum System Sensitivity)

FCC 15.231(c)

OCCUPIED BANDWIDTH

Test Report No. R-7977-1
FCC ID: B4SCM17A

Customer:	X-10(USA) Inc.
Test Sample:	310 MHz Computer Interface Transmitter
Model No:	CM17A FCC ID: BP5 CM17A
Test Method:	Occupied Bandwidth
Notes:	Bandwidth does not exceed 1.25% of center frequency(775kHz) as measured 20 dB down
Date:	February 25, 1999
Tech:	T. Schneider
Sheet:	1 of 1

Retlif Testing Laboratories

Report No. R-7977-J

15.207(a)

AC LINE CONDUCTED EMISSIONS

Please refer to separate electronic file named Conducted Emissions Data

DUTY CYCLE PLOTS

Please refer to separate electronic file named Duty Cycle Plots