APPLICANT	MANUFACTURER
X-10 (USA), Inc. 400 Forge Way, Suite 412 Rockaway, NJ 07866-2033	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) MODEL: UR88A

TYPE: Pulsed Transmitter

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

FREQUENCY OF OPERATION: 434 MHz

TESTS PERFORMED

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

Para. 15.209, 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: B4SUR88A

Power Requirements: 6 VDC derived from 4 New "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 11,000 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 1,100 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	=	434		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 = 11,000 µV/M (AVERAGE) @ 3 Meters

Harmonic Limit = 1,100 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.(See plots for additional information)

Transmitter On Time	=	16.5 milliseconds (maximum- worst case in 100 ms)
Transmitter Cycle Time	=	48.2 milliseconds
Transmitter Duty Cycle	=	34.2 %

CALCULATION:

1 Large Pulse	=	3.9 milliseconds
21 x 600 µs (small pulse)	=	12.6 milliseconds
3.9 + 12.6	=	16.5 milliseconds
Duty Cycle (16.5/48.2)	=	34.2 %
Correction Factor = 20 log(0.342)	=	-9.3dB

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 550µs yields a minimum required bandwidth of 1.1 kHz. 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. The frequency range was scanned from 30 MHz to 4.2 GHz. All emissions not reported were more than 20 dB below the specified limit.

Test Setup Photograph

EQUIPMENT LIST

FCC 15.231 Compliance Testing

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
067	Open Area Test Site	Retlif	3 Meter	RNY	9/20/2000	9/20/2003
128	Double Ridged Guide	Electro-Mechanics	1 GHz - 18 GHz	3105	6/7/2002	6/7/2003
133	Broadband Pre-Amplifier	Electro-Metrics	10 kHz - 1 GHz, 26dB	BPA-1000	6/11/2002	6/11/2003
141	Spectrum Analyzer	Hewlett Packard	100 Hz - 40 GHz	8566B	7/17/2002	1/17/2003
141A	Graphics Plotter	Hewlett Packard	N/A	7470A	3/5/2002	3/5/2003
141B	Quasi-Peak Adaptor	Hewlett Packard	100 Hz - 1 GHz	85650A	7/16/2002	1/16/2003
206B	6.0 dB Attenuator	Texscan	0 - 1.0 GHz	FP-50 - 6 dB	6/11/2002	6/11/2003
543	Preamplifier	Hewlett Packard	1.0 GHz - 26.5 GHz	8449B	7/11/2002	7/11/2003
617	Interference Analyzer	Electro-Metrics	10 kHz - 1 GHz	EMC-30	8/23/2002	8/23/2003
763	Spectrum Analyzer	Agilent	30 Hz - 13.2 GHz	E4405B	7/26/2002	7/26/2003
767	Biconilog	EMCO	26 - 2000 MHz	3142B	9/3/2002	9/3/2003

FCC 15.231(b)

RADIATED EMISSIONS, FUNDAMENTAL & SPURIOUS CASE

FCC 15.231(c)

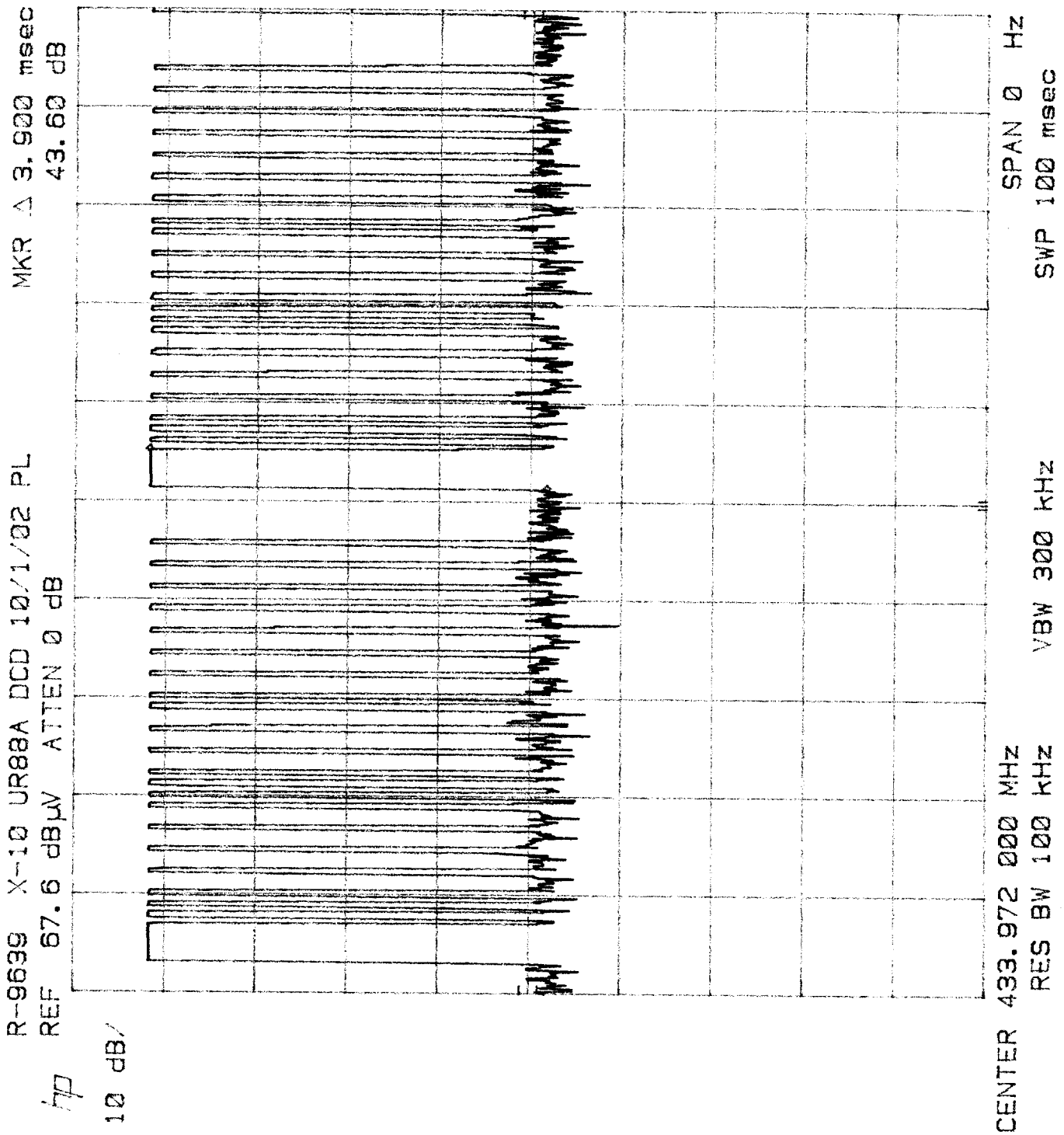
OCCUPIED BANDWIDTH

FCC 15.231(c)

DUTY CYCLE

FCC 15.231(c)

DUTY CYCLE

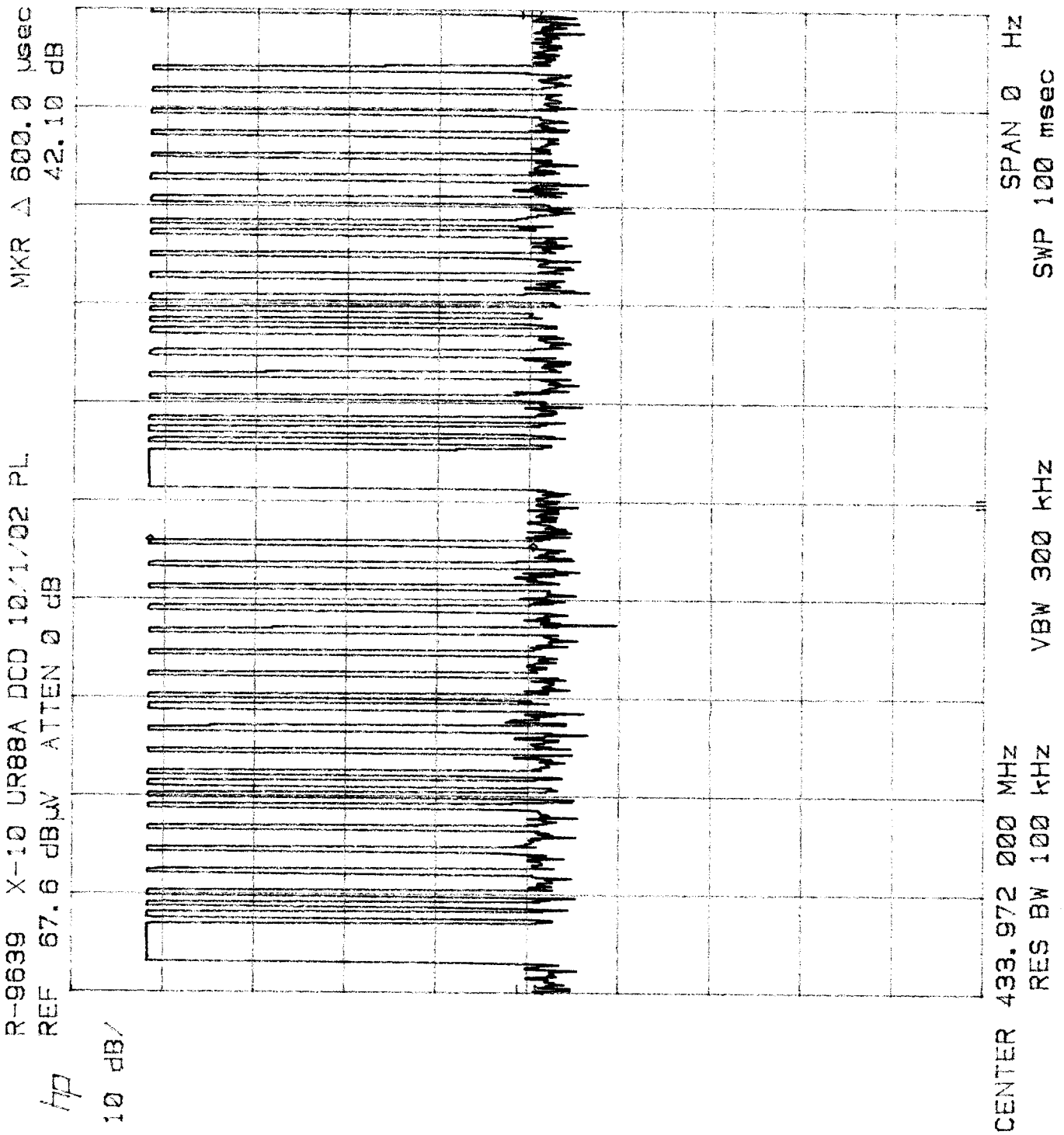


Customer:	X-10 (USA), Inc.
Test Sample:	434MHz Pulsed Transmitter
Model No.:	UR88A FCC ID.: B4SUR88A
Test Method:	FCC 15.35 Duty Cycle Determination
Notes:	Large Pulse = 3.9milliseconds

Date: Oct. 1, 2002 Tech: Peter Lananna Sheet 1 of 3

Retlif Testing Laboratories

Report No. R-9639-1

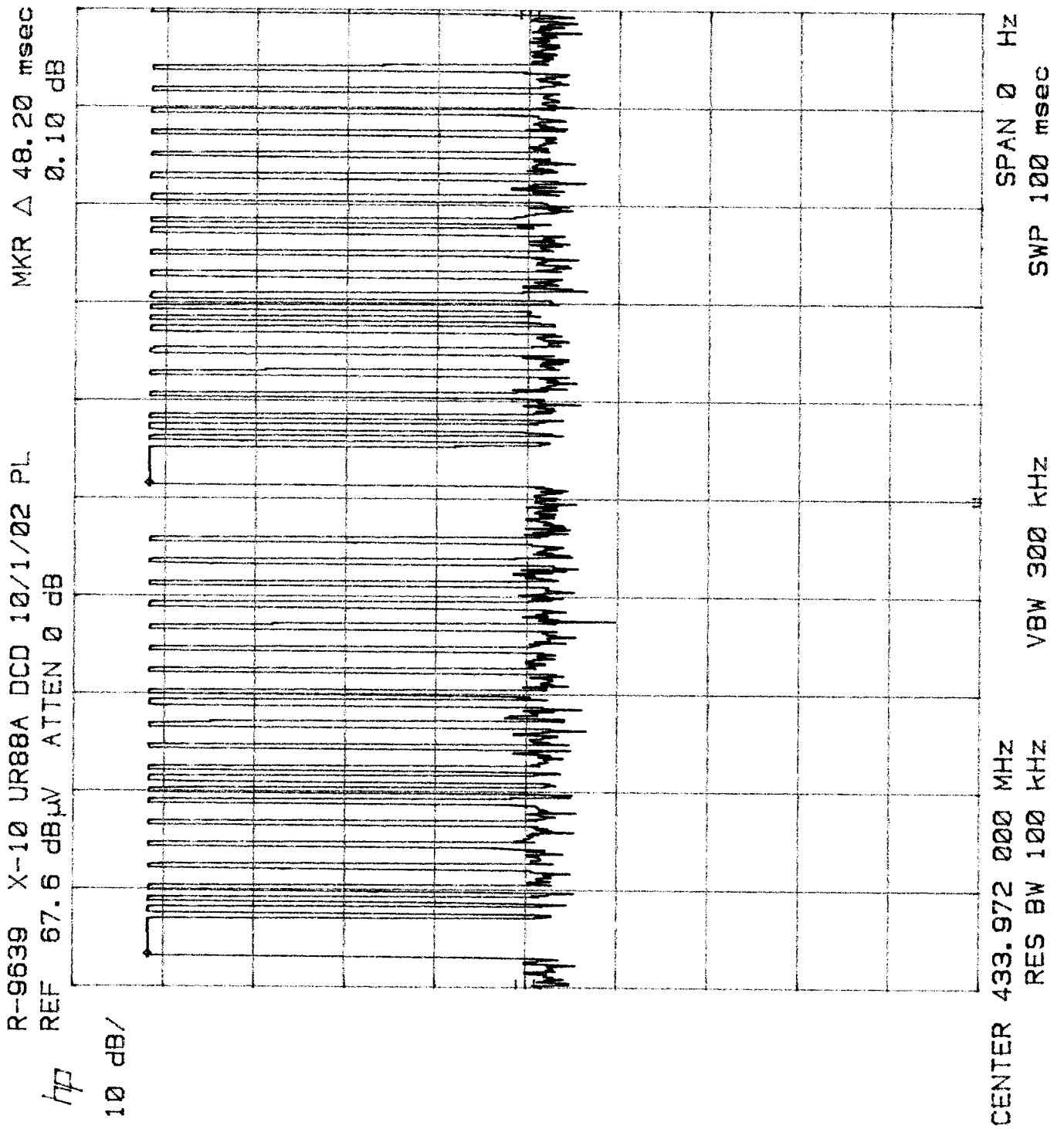


Customer:	X-10 (USA), Inc.
Test Sample:	434MHz Pulsed Transmitter
Model No.:	UR88A FCC ID.: B4SUR88A
Test Method:	FCC 15.35 Duty Cycle Determination
Notes:	Small Pulse =600microseconds Small Pulses = 600micro * 21 = 12.6milliseconds

Date: Oct. 1, 2002 Tech: Peter Lananna Sheet 2 of 3

Retlif Testing Laboratories

Report No. R-9639-1



Customer:	X-10 (USA), Inc.
Test Sample:	434MHz Pulsed Transmitter
Model No.:	UR88A FCC ID.: B4SUR88A
Test Method:	FCC 15.35 Duty Cycle Determination
Notes:	Cycle Time =48.2milliseconds (Large Pulse + Small Pulses) / Cycle Time = Duty Cycle (3.9m + 12.6m)/ 48.2m = 0.342 = 34.2% = -9.3dB

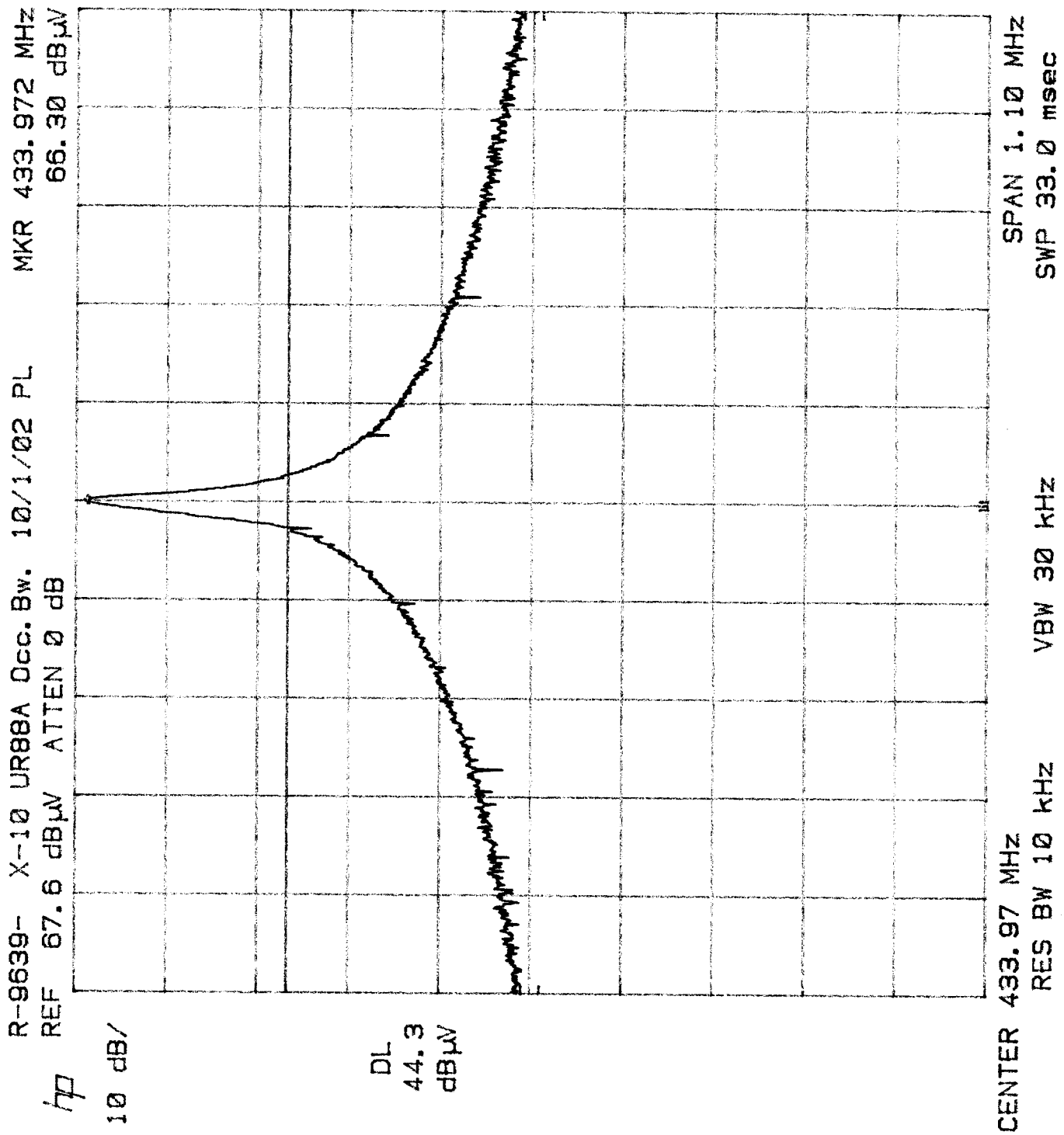
Date: Oct. 1, 2002 Tech: Peter Lananna Sheet 3 of 3

Retlif Testing Laboratories

Report No. R-9639-1

FCC 15.231(c)

OCCUPIED BANDWIDTH



Customer:	X-10 (USA), Inc.
Test Sample:	434MHz Pulsed Transmitter
Model No.:	UR88A FCC ID.:B4SUR88A
Test Method:	FCC 15.35 Occupied Bandwidth
Notes:	Span of emissions is less than 0.25% of center frequency, 20dB(c). 434*0.25=1.1MHz

Date: Oct. 1, 2002 Tech. Peter Lananna Sheet 1 of 1

Retlif Testing Laboratories

Report No. R-9639-1

FCC 15.231(b)

RADIATED EMISSIONS, FUNDAMENTAL & SPURIOUS CASE

Test Method:	FCC Part 15 Subpart C Radiated Emissions, Fundamental & Harmonic Emissions		
Customer:	X-10 (USA), Inc.	**Job No.**	R-9639-1
Test Sample:	434MHz Pulsed Transmitter	**Paragraph:**	15.231(b)
Model No.:	UR88A	**FCC ID:**	B4SUR88A
Operating Mode:	Continuously Transmitting a 434MHz Signal		
Technician:	Peter Lananna	**Date:**	October 1, 2002

Notes: Test Distance: 3 Meters
Detector: Peak, Unless otherwise specified

Test Freq.	Antenna Pol./Height	EUT Orientation	Meter Reading	Correction Factor	Corrected Reading	Converted Reading	Peak Limit
MHz	(V/H)/Meters	X / Y / Z	dBuV	dB	dBuV/m	uV/m	uV/m
434	H / 1.3	X	70.0	-0.7	69.3	2917.4	110000
|	H / 3.0	Y	69.4	-0.7	68.7	2722.7	|
|	H / 3.0	Z	72.4	-0.7	71.7	3845.9	|
|	V / 1.0	X	80.0	-0.7	79.3	9225.7	|
|	V / 1.3	Y	73.5	-0.7	72.8	4365.2	|
434	V / 1.8	Z	71.4	-0.7	70.7	3427.7	110000
868	H / 1.0	X	24.6	8.0	32.6	42.7*	11000
|	H / 1.0	Y	24.6	8.0	32.6	42.7*	|
|	H / 1.0	Z	24.6	8.0	32.6	42.7*	|
|	V / 1.0	X	24.6	8.0	32.6	42.7*	|
|	V / 1.0	Y	24.6	8.0	32.6	42.7*	|
868	V / 1.0	Z	24.6	8.0	32.6	42.7*	11000
1302	H / 1.5	X	52.0	-0.6	51.4	371.5	5000
|	H / 1.5	Y	52.0	-0.6	51.4	371.5	|
|	H / 1.8	Z	52.2	-0.6	51.6	380.2	|
|	V / 1.3	X	53.5	-0.6	52.9	441.6	|
|	V / 1.5	Y	49.1	-0.6	48.5	266.1	|
1302	V / 1.0	Z	49.1	-0.6	48.5	266.1	5000
1736	H / 1.0	X	42.5	2.5	45.0	177.8*	11000
|	H / 1.0	Y	42.5	2.5	45.0	177.8*	|
|	H / 1.0	Z	42.5	2.5	45.0	177.8*	|
|	V / 1.0	X	42.5	2.5	45.0	177.8*	|
|	V / 1.0	Y	42.5	2.5	45.0	177.8*	|
1736	V / 1.0	Z	42.5	2.5	45.0	177.8*	11000
2170	H / 1.0	X	39.5	1.2	40.7	108.4*	11000
|	H / 1.0	Y	39.5	1.2	40.7	108.4*	|
|	H / 1.0	Z	39.5	1.2	40.7	108.4*	|
|	V / 1.0	X	39.5	1.2	40.7	108.4*	|
|	V / 1.0	Y	39.5	1.2	40.7	108.4*	|
2170	V / 1.0	Z	39.5	1.2	40.7	108.4*	11000
	The frequency range was scanned from 30 MHz to 4.4 GHz. All emissions not recorded were more						
	Than 10 dB below the specified limit. Emissions from the EUT do not exceed the specified limits.						
	*=Noise Floor Measurements (Minimum system sensitivity)						

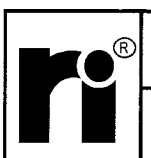
Test Method:	FCC Part 15 Subpart C Radiated Emissions, Fundamental & Harmonic Emissions		
Customer:	X-10 (USA), Inc.	**Job No.**	R-9639-1
Test Sample:	434MHz Pulsed Transmitter	**Paragraph:**	15.231(b)
Model No.:	UR88A	**FCC ID:**	B4SUR88A
Operating Mode:	Continuously Transmitting a 434MHz Signal		
Technician:	Peter Lananna	**Date:**	October 1, 2002

Notes: Test Distance: 3 Meters
Detector: Peak, unless otherwise specified

Test Freq.	Antenna Pol./Height	EUT Orientation	Meter Reading	Correction Factor	Corrected Reading	Converted Reading	Peak Limit
MHz	(V/H)-Meters	X / Y / Z	dBuV	dB	dBuV/m	uV/m	uV/m
2604	H / 1.0	X	39.7	4.8	44.5	167.9*	11000
|	H / 1.0	Y	39.7	4.8	44.5	167.9*	|
|	H / 1.0	Z	39.7	4.8	44.5	167.9*	|
|	V / 1.0	X	39.7	4.8	44.5	167.9*	|
|	V / 1.0	Y	39.7	4.8	44.5	167.9*	|
2604	V / 1.0	Z	39.7	4.8	44.5	167.9*	11000
3038	H / 1.0	X	40.5	6.5	47.0	223.9*	11000
|	H / 1.0	Y	40.5	6.5	47.0	223.9*	|
|	H / 1.0	Z	40.5	6.5	47.0	223.9*	|
|	V / 1.0	X	40.5	6.5	47.0	223.9*	|
|	V / 1.0	Y	40.5	6.5	47.0	223.9*	|
3038	V / 1.0	Z	40.5	6.5	47.0	223.9*	11000
3472	H / 1.0	X	40.3	8.3	48.6	269.2*	11000
|	H / 1.0	Y	40.3	8.3	48.6	269.2*	|
|	H / 1.0	Z	40.3	8.3	48.6	269.2*	|
|	V / 1.0	X	40.3	8.3	48.6	269.2*	|
|	V / 1.0	Y	40.3	8.3	48.6	269.2*	|
3472	V / 1.0	Z	40.3	8.3	48.6	269.2*	11000
3906	H / 1.0	X	40.1	9.8	49.9	312.6*	5000
|	H / 1.0	Y	40.1	9.8	49.9	312.6*	|
|	H / 1.0	Z	40.1	9.8	49.9	312.6*	|
|	V / 1.0	X	40.1	9.8	49.9	312.6*	|
|	V / 1.0	Y	40.1	9.8	49.9	312.6*	|
3906	V / 1.0	Z	40.1	9.8	49.9	312.6*	5000
4340	H / 1.0	X	39.4	11.0	50.4	331.1*	5000
|	H / 1.0	Y	39.4	11.0	50.4	331.1*	|
|	H / 1.0	Z	39.4	11.0	50.4	331.1*	|
|	V / 1.0	X	39.4	11.0	50.4	331.1*	|
|	V / 1.0	Y	39.4	11.0	50.4	331.1*	|
4340	V / 1.0	Z	39.4	11.0	50.4	331.1*	5000
	The frequency range was scanned from 30 MHz to 4.4 GHz. All emissions not recorded were more						
	Than 10 dB below the specified limit. Emissions from the EUT do not exceed the specified limits.						
	*=Noise Floor Measurements (Minimum system sensitivity)						

Test Method:	FCC Part 15 Subpart C Radiated Emissions, Fundamental & Harmonic Emissions		
Customer:	X-10 (USA), Inc.	**Job No.**	R-9639-1
Test Sample:	434MHz Pulsed Transmitter	**Paragraph:**	15.231(b)
Model No.:	UR88A	**FCC ID:**	B4SUR88A
Operating Mode:	Continuously Transmitting a 434MHz Signal		
Technician:	Peter Lananna	**Date:**	October 1, 2002
Notes:	Test Distance: 3 Meters	Duty Cycle: 34.2%	
	Detector: Peak, unless otherwise specified	Duty Cycle Correction: - 9.3 dB	

Test Freq.	Antenna Pol./Height	EUT Orientation	Peak Reading	Correction Factor	Corrected Reading	Converted Reading	Avg. Limit
MHz	(V/H)-Meters	X / Y / Z	dBuV	dB	dBuV/m	uV/m	uV/m
434	H / 1.3	X	69.3	-9.3	60.0	1000.0	11000
|	H / 3.0	Y	68.7	-9.3	59.4	933.3	|
|	H / 3.0	Z	71.7	-9.3	62.4	1318.3	|
|	V / 1.0	X	79.3	-9.3	70.0	3162.3	|
|	V / 1.3	Y	72.8	-9.3	63.5	1496.2	|
434	V / 1.8	Z	70.7	-9.3	61.4	1174.9	11000
868	H / 1.0	X	32.6	-9.3	23.3	14.6*	1100
|	H / 1.0	Y	32.6	-9.3	23.3	14.6*	|
|	H / 1.0	Z	32.6	-9.3	23.3	14.6*	|
|	V / 1.0	X	32.6	-9.3	23.3	14.6*	|
|	V / 1.0	Y	32.6	-9.3	23.3	14.6*	|
868	V / 1.0	Z	32.6	-9.3	23.3	14.6*	1100
1302	H / 1.5	X	51.4	-9.3	42.1	127.4	500
|	H / 1.5	Y	51.4	-9.3	42.1	127.4	|
|	H / 1.8	Z	51.6	-9.3	42.3	130.3	|
|	V / 1.3	X	52.9	-9.3	43.6	151.4	|
|	V / 1.5	Y	48.5	-9.3	39.2	91.2	|
1302	V / 1.0	Z	48.5	-9.3	39.2	91.2	500
1736	H / 1.0	X	45.0	-9.3	35.7	61.0*	1100
|	H / 1.0	Y	45.0	-9.3	35.7	61.0*	|
|	H / 1.0	Z	45.0	-9.3	35.7	61.0*	|
|	V / 1.0	X	45.0	-9.3	35.7	61.0*	|
|	V / 1.0	Y	45.0	-9.3	35.7	61.0*	|
1736	V / 1.0	Z	45.0	-9.3	35.7	61.0*	1100
2170	H / 1.0	X	40.7	-9.3	31.4	37.2*	1100
|	H / 1.0	Y	40.7	-9.3	31.4	37.2*	|
|	H / 1.0	Z	40.7	-9.3	31.4	37.2*	|
|	V / 1.0	X	40.7	-9.3	31.4	37.2*	|
|	V / 1.0	Y	40.7	-9.3	31.4	37.2*	|
2170	V / 1.0	Z	40.7	-9.3	31.4	37.2*	1100
	The frequency range was scanned from 30 MHz to 4.4 GHz. All emissions not recorded were more						
	Than 10 dB below the specified limit. Emissions from the EUT do not exceed the specified limits.						
	*=Noise Floor Measurements (Minimum system sensitivity)						



Retlif Testing Laboratories

Retlif Job Number R-9639-1

Test Method:	FCC Part 15 Subpart C Radiated Emissions, Fundamental & Harmonic Emissions		
Customer:	X-10 (USA), Inc.	**Job No.**	R-9639-1
Test Sample:	434MHz Pulsed Transmitter	**Paragraph:**	15.231(b)
Model No.:	UR88A	**FCC ID:**	B4SUR88A
Operating Mode:	Continuously Transmitting a 434MHz Signal		
Technician:	Peter Lananna	**Date:**	October 1, 2002

Notes: Test Distance: 3 Meters — Duty Cycle: 34.2%

Detector: Peak, unless otherwise specified — Duty Cycle Correction: - 9.3dB

Test Freq.	Antenna Pol./Height	EUT Orientation	Peak Reading	Correction Factor	Corrected Reading	Converted Reading	Avg. Limit
MHz	(V/H)-Meters	X / Y / Z	dBuV	dB	dBuV/m	uV/m	uV/m
2604	H / 1.0	X	44.5	-9.3	35.2	57.5*	1100
|	H / 1.0	Y	44.5	-9.3	35.2	57.5*	|
|	H / 1.0	Z	44.5	-9.3	35.2	57.5*	|
|	V / 1.0	X	44.5	-9.3	35.2	57.5*	|
|	V / 1.0	Y	44.5	-9.3	35.2	57.5*	|
2604	V / 1.0	Z	44.5	-9.3	35.2	57.5*	1100
3038	H / 1.0	X	47.0	-9.3	37.7	76.7*	1100
|	H / 1.0	Y	47.0	-9.3	37.7	76.7*	|
|	H / 1.0	Z	47.0	-9.3	37.7	76.7*	|
|	V / 1.0	X	47.0	-9.3	37.7	76.7*	|
|	V / 1.0	Y	47.0	-9.3	37.7	76.7*	|
3038	V / 1.0	Z	47.0	-9.3	37.7	76.7*	1100
3472	H / 1.0	X	48.6	-9.3	39.3	92.3*	1100
|	H / 1.0	Y	48.6	-9.3	39.3	92.3*	|
|	H / 1.0	Z	48.6	-9.3	39.3	92.3*	|
|	V / 1.0	X	48.6	-9.3	39.3	92.3*	|
|	V / 1.0	Y	48.6	-9.3	39.3	92.3*	|
3472	V / 1.0	Z	48.6	-9.3	39.3	92.3*	1100
3906	H / 1.0	X	49.9	-9.3	40.6	107.2*	500
|	H / 1.0	Y	49.9	-9.3	40.6	107.2*	|
|	H / 1.0	Z	49.9	-9.3	40.6	107.2*	|
|	V / 1.0	X	49.9	-9.3	40.6	107.2*	|
|	V / 1.0	Y	49.9	-9.3	40.6	107.2*	|
3906	V / 1.0	Z	49.9	-9.3	40.6	107.2*	500
4340	H / 1.0	X	50.4	-9.3	41.1	113.5*	500
|	H / 1.0	Y	50.4	-9.3	41.1	113.5*	|
|	H / 1.0	Z	50.4	-9.3	41.1	113.5*	|
|	V / 1.0	X	50.4	-9.3	41.1	113.5*	|
|	V / 1.0	Y	50.4	-9.3	41.1	113.5*	|
4340	V / 1.0	Z	50.4	-9.3	41.1	113.5*	500
	The frequency range was scanned from 30 MHz to 4.4 GHz. All emissions not recorded were more						
	Than 10 dB below the specified limit. Emissions from the EUT do not exceed the specified limits.						
	*=Noise Floor Measurements (Minimum system sensitivity)						

Retlif Testing Laboratories

Retlif Job Number R-9639-1

Test Method:	FCC Part 15 Subpart C, Spurious Case Radiated Emissions, Paragraph 15.209(a)		
Customer:	X-10 (USA), Inc.	**Job No.**	R-9639-1
Test Sample:	434MHz Pulsed Transmitter		
Model No.:	UR88A	**FCC ID.:**	B4SUR88A
Operating Mode:	Continuously transmitting a 434MHz signal.		
Technician:	Peter Lananna	**Date:**	October 1, 2002

Notes: Test Distance: 3 Meters Temp:20C Humidity:87%
Detector: Quasi-Peak Below 30 MHz to 1 GHz, Peak above 1 GHz

Test Freq.	Antenna Position	EUT Orientation	Meter Readings	Correction Factor	Corrected Reading	Converted Reading	**LIMIT**
MHz	(V/H) / Meters	Degrees	dBuV	dB	dBuV/m	uV/m	uV/m
30.00							100
							|
							|
							|
							|
							|
							|
88.00							100
88.00							150
							|
							|
							|
							|

No emissions detected from specified test distance.

							|
							|
216.00							150
216.00							200
							|
							|
							|
960.00							200
960.00							500
							|
							|
							|
4400.0							500

The EUT was scanned from 30 MHz to 4.4 GHz
The emissions observed from the EUT do not exceed the specified limits. Emissions not recorded were more than 10dB under the specified limit

Retlif Testing Laboratories

Retlif Job Number R-9639-1