Technical Information

APPLICANT		MANUFACTURER	
Name:	X10 (USA), Inc.	**Name:**	X-10 Electronics (Shenzhen) Co. Ltd.
Address:	19823 58th Place South	**Address:**	Together Rich Industrial Park B Sanwei Industrial District, Xixiang Town
City, State, Zip:	Kent, WA 98032	**City, State, Zip:**	Baoan County, Shenzhen, China

Test Specification: FCC Rules and Regulations Part 15, Subpart C, Para. 15.231

Test Procedure: ANSI C63.4:2003

Test Sample Description

Test Sample: 433 MHz Pulsed Transmitter

Brandname(s): X10 (USA)

Model Number: VR46A and RadioShack Cat. No. 151-2572T

FCC ID: B4SVR46A

Type: Pulsed Transmitter

Power Requirements: 6 VDC derived from external AC Adapter

Frequency of Operation: 433 MHz

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

Tests Performed

Para. 15.207(a), Conducted Emissions

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

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

Para. 15.231(b), Duty Cycle Determination

Para. 15.231(c), Occupied Bandwidth

Test Results

15.207(a): The radio frequency voltage that was conducted back on to the AC power line on any frequency/frequencies within the bandwidth of 150 kHz to 30 MHz did not exceed Class B limits as specified in CISPR 22.

15.231 (a): This device transmits a control signal and is used as a remote control transmitter.

15.231 (a)(2) The transmitter is automatically operated. Transmission ends 5 seconds after activation.

15.231 (a)(3): The transmitter does not perform periodic transmissions or the transmitter performs periodic transmissions at predetermined intervals greater than 1 hour apart and are shorter than 1 second in duration.

15.231 (b): The fundamental field strength did not exceed 11000 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 1100 µV/M (AVERAGE).

15.231 (c) The Bandwidth of the emission was no wider than 0.25% of the center frequency (1083 kHz) as measured 20 db down from the modulated carrier.

Determination of Field Strength Limits

The field strength limits shown below are found in Section 15.231:

	Frequency		Limit
F1 =	260	3750 =	L1
Fo =	433 MHz	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 = 11000 µV/M (AVERAGE) @ 3 Meters

Harmonic Limit = 1100 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 0 Hz. 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 = 26.62 milliseconds (maximum per cycle)

Transmitter Cycle Time = 102.4 milliseconds (100 ms maximum)

Transmitter Duty Cycle = 26.6 %

Calculation

1 Large Pulse = 8.8 milliseconds

33 x 540 µs (small pulse) = 17.82 milliseconds

8.8 + 17.82 = 26.62 milliseconds

Duty Cycle (XX/100) = 26.6 %

Correction Factor =20 log (0.XX) = -11.5 dB

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: minimum bandwidth = 1/{minimum pulse width (in seconds) x 1.5} = Hz

Setting pulse desensitization equal to zero and utilizing the minimum observed pulse width of 540 µs yields a minimum required bandwidth of 1,234.0 Hz. FCC specified bandwidths of 100 kHz and 1 MHz were utilized below and above 1 GHz, respectively.

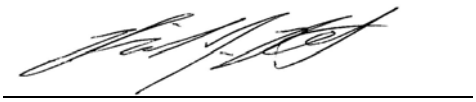
General Notes

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 4.4 GHz. All emissions not reported were more than 20 dB below the specified limit.

Certification and Signatures

We certify that this report is a true representation of the results obtained from the tests of the equipment stated. We further certify that the measurements shown in this report were made in accordance with the procedures indicated and vouch for the qualifications of all Retlif Testing Laboratories personnel taking them.

Donald C. Lerner
EMC Test Engineer



Richard J. Reitz
Laboratory Manager

Non-Warranty Provision
The testing services have been performed, findings obtained and reports prepared in accordance with generally accepted laboratory principles and practices. This warranty is in lieu of all others, either expressed or implied.

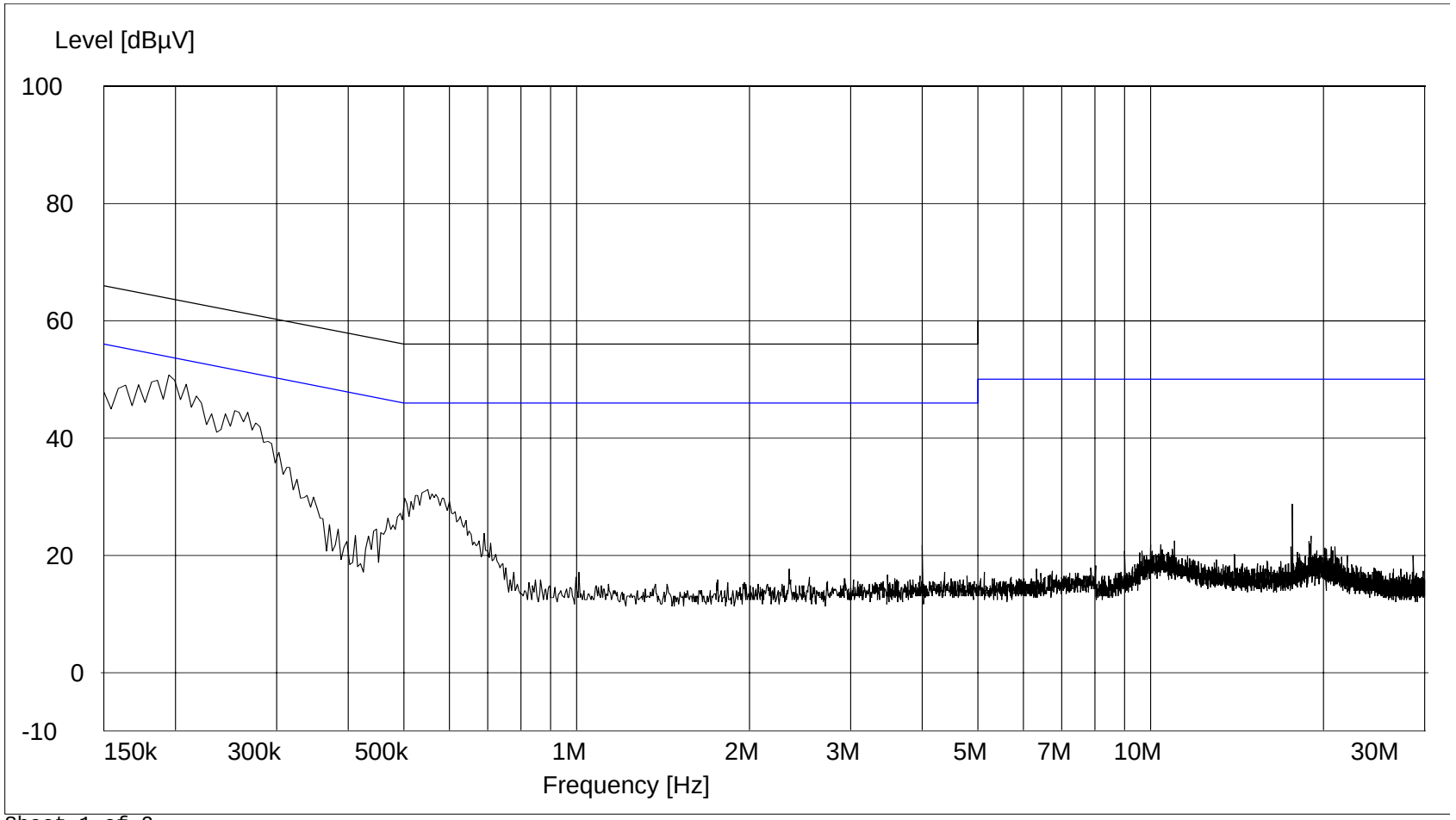
Non-Endorsement
This test report contains only findings and results arrived at after employing the specific test procedures and standards listed herein. It is not intended to constitute a recommendation, endorsement or certification of the product or material tested. This test report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

FCC Part 15, Subpart C, Conducted Emissions, Power Leads,
Test Data

Retlif Testing Laboratories, Job Number R-11570-1

FCC Part 15 Subpart C, Conducted Emissions, 150 kHz to 30 MHz.

```
Customer:           X-10 (USA), Inc.
Test Sample:        433 MHz Pulsed Transmitter
Model Number:       VR46A       Serial No.: N/A
Test Specification: FCC Part 15 Subpart B, 15.209
Mode of Operation:  Continuously transmitting a pulsed 433 MHz signal
Lead Tested:        Hot input to ac adapter
Technician / Date:  R. S / August 04, 2006.
Detector / Note:    Peak / Peak passed average limit
```

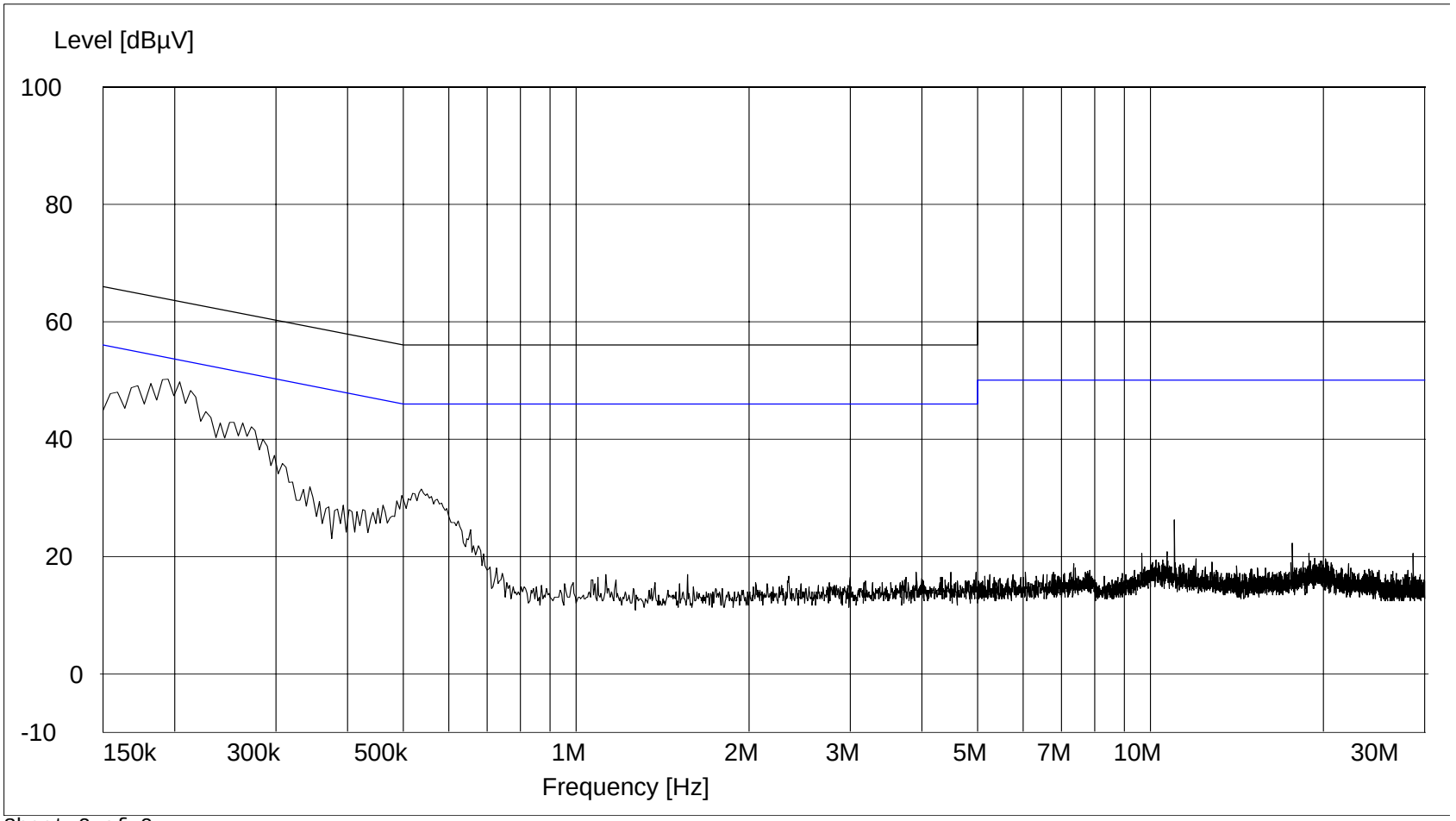


Sheet 1 of 2

Retlif Testing Laboratories, Job Number R-11570-1

FCC Part 15 Subpart C, Conducted Emissions, 150 kHz to 30 MHz.

```
Customer:           X-10 (USA), Inc.
Test Sample:        433 MHz Pulsed Transmitter
Model Number:       VR46A       Serial No.: N/A
Test Specification: FCC Part 15 Subpart B, 15.209
Mode of Operation:  Continuously transmitting a pulsed 433 MHz signal
Lead Tested:        Neutral input to ac adapter
Technician / Date:  R. S / August 04, 2006.
Detector / Note:    Peak / Peak passed average limit
```



Sheet 2 of 2

FCC Part 15 Subpart C Radiated Emissions
Test Data

Test Method:	FCC Part 15 Subpart C Radiated Emissions, Fundamental & Harmonic Emissions		
Customer:	X-10 (USA), Inc.	**Job No.**	R-11570-1
Test Sample:	433 MHz Pulsed Transmitter	**Paragraph:**	15.231
Model No.:	VR46A	**FCC ID:**	B4SVR46A
Operating Mode:	Continuously transmitting a 433 MHz signal		
Technician:	D. Lerner	**Date:**	August 12, 2006.

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
433.8	V / 1.0	X	91.9	-0.5	91.4	37153.5	110000
|	V / 1.0	Y	84.5	-0.5	84.0	15848.9	|
|	V / 1.0	Z	85.7	-0.5	85.2	18197.0	|
|	H / 1.5	X	88.2	-0.5	87.7	24266.1	|
|	H / 1.0	Y	85.8	-0.5	85.3	18407.7	|
433.8	H / 1.0	Z	85.7	-0.5	85.2	18197.0	110000
867.7	V / 1.0	X	48.0	7.1	55.1	568.9	11000
|	V / 1.5	Y	40.0	7.1	47.1	226.5	|
|	V / 1.0	Z	35.4	7.1	42.5	133.4	|
|	H / 1.5	X	40.0	7.1	47.1	226.5	|
|	H / 1.0	Y	44.9	7.1	52.0	398.1	|
867.7	H / 1.5	Z	42.0	7.1	49.1	285.1	11000
1301.4	V / 1.0	X	44.0	-3.9	40.9	110.9	5000
|	V / 1.0	Y	51.8	-3.9	47.9	248.3	|
|	V / 1.0	Z	51.2	-3.9	47.3	231.7	|
|	H / 1.0	X	57.4	-3.9	53.5	473.2	|
|	H / 1.0	Y	52.8	-3.9	48.9	278.6	|
1301.4	H / 1.0	Z	50.2	-3.9	46.3	206.5	5000
1735.0	V / 1.0	X	44.0	-2.0	42.0	125.9	11000
|	V / 1.0	Y	48.5	-2.0	46.5	211.3	|
|	V / 1.0	Z	46.0	-2.0	44.0	158.5	|
|	H / 1.0	X	46.9	-2.0	44.9	175.8	|
|	H / 1.0	Y	47.2	-2.0	45.2	182.0	|
1735.0	H / 1.0	Z	44.1	-2.0	42.1	127.4	11000
2168.0	V / 1.0	X	36.0	1.2	37.2 *	72.4	11000
|	V / 1.0	Y	36.0	1.2	37.2 *	72.4	|
|	H / 1.0	Z	36.0	1.2	37.2 *	72.4	|
|	H / 1.0	X	36.0	1.2	37.2 *	72.4	|
|	H / 1.0	Y	36.0	1.2	37.2 *	72.4	|
2168.0	V / 1.0	Z	36.0	1.2	37.2 *	72.4	11000
	The frequency range was scanned from 30 MHz to 4.4GHz. All emissions not recorded were more						
	Than 20 dB below the specified limit. Emissions from the EUT do not exceed the specified limits.						
	*= Noise Floor Measurements (minimum sensitivity).						

Test Method:	FCC Part 15 Subpart C Radiated Emissions, Fundamental & Harmonic Emissions		
Customer:	X-10 (USA), Inc.	**Job No.**	R-11570-1
Test Sample:	433 MHz Pulsed Transmitter	**Paragraph:**	15.231
Model No.:	VR46A	**FCC ID:**	B4SVR46A
Operating Mode:	Continuously transmitting a 433 MHz signal		
Technician:	D. Lerner	**Date:**	August 12, 2006.

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
2602.8	V / 1.0	X	40	-1.7	38.3 *	82.2	11000
|	V / 1.0	Y	40	-1.7	38.3 *	82.2	|
|	V / 1.0	Z	40	-1.7	38.3 *	82.2	|
|	H / 1.0	X	40	-1.7	38.3 *	82.2	|
|	H / 1.0	Y	40	-1.7	38.3 *	82.2	|
2602.8	H / 1.0	Z	40	-1.7	38.3 *	82.2	11000
3036.6	V / 1.0	X	40	-0.5	39.5 *	94.4	11000
|	V / 1.0	Y	40	-0.5	39.5 *	94.4	|
|	V / 1.0	Z	40	-0.5	39.5 *	94.4	|
|	H / 1.0	X	40	-0.5	39.5 *	94.4	|
|	H / 1.0	Y	40	-0.5	39.5 *	94.4	|
3036.6	H / 1.0	Z	40	-0.5	39.5 *	94.4	11000
3470.4	V / 1.0	X	38.5	0.8	39.3 *	92.3	11000
|	V / 1.0	Y	38.5	0.8	39.3 *	92.3	|
|	V / 1.0	Z	38.5	0.8	39.3 *	92.3	|
|	H / 1.0	X	38.5	0.8	39.3 *	92.3	|
|	H / 1.0	Y	38.5	0.8	39.3 *	92.3	|
3470.4	H / 1.0	Z	38.5	0.8	39.3 *	92.3	11000
3904.2	V / 1.0	X	38.2	2.5	40.7 *	108.4	5000
|	V / 1.0	Y	38.2	2.5	40.7 *	108.4	|
|	V / 1.0	Z	38.2	2.5	40.7 *	108.4	|
|	H / 1.0	X	38.2	2.5	40.7 *	108.4	|
|	H / 1.0	Y	38.2	2.5	40.7 *	108.4	|
3904.2	H / 1.0	Z	38.2	2.5	40.7 *	108.4	5000
				-11.5			
4338.0	V / 1.0	X	39.3	3.1	42.4 *	131.8	5000
|	V / 1.0	Y	39.3	3.1	42.4 *	131.8	|
|	V / 1.0	Z	39.3	3.1	42.4 *	131.8	|
|	H / 1.0	X	39.3	3.1	42.4 *	131.8	|
|	H / 1.0	Y	39.3	3.1	42.4 *	131.8	|
4338.0	H / 1.0	Z	39.3	3.1	42.4 *	131.8	5000
	The frequency range was scanned from 30 MHz to 4.4 GHz. All emissions not recorded were more						
	Than 20 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-11570-1
Test Sample:	433 MHz Pulsed Transmitter	**Paragraph:**	15.231
Model No.:	VR46A	**FCC ID:**	B4SVR46A
Operating Mode:	Continuously transmitting a 433 MHz signal		
Technician:	D. Lerner	**Date:**	August 12, 2006.
Notes:	Test Distance: 3 Meters	Duty Cycle: 26.7%	
	Detector: Peak, unless otherwise specified	Duty Cycle Correction: -11.5dB	

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
433.8	V / 1.0	X	91.4	-11.5	79.9	9885.5	11000
|	V / 1.0	Y	84.0	-11.5	72.5	4217.0	|
|	V / 1.0	Z	85.2	-11.5	73.7	4841.7	|
|	H / 1.5	X	87.7	-11.5	76.2	6456.5	|
|	H / 1.0	Y	85.3	-11.5	73.8	4897.8	|
433.8	H / 1.0	Z	85.2	-11.5	73.7	4841.7	11000
867.7	V / 1.0	X	55.1	-11.5	43.6	151.4	1100
|	V / 1.5	Y	47.1	-11.5	35.6	60.3	|
|	V / 1.0	Z	42.5	-11.5	31	35.5	|
|	H / 1.5	X	47.1	-11.5	35.6	60.3	|
|	H / 1.0	Y	52.0	-11.5	40.5	105.9	|
867.7	H / 1.5	Z	49.1	-11.5	37.6	75.9	1100
1301.4	V / 1.0	X	40.9	-11.5	29.4	29.5	500
|	V / 1.0	Y	47.9	-11.5	36.4	66.1	|
|	V / 1.0	Z	47.3	-11.5	35.8	61.7	|
|	H / 1.0	X	53.5	-11.5	42	125.9	|
|	H / 1.0	Y	48.9	-11.5	37.4	74.1	|
1301.4	H / 1.0	Z	46.3	-11.5	34.8	55.0	500
1735.0	V / 1.0	X	42.0	-11.5	30.5	33.5	1100
|	V / 1.0	Y	46.5	-11.5	35	56.2	|
|	V / 1.0	Z	44.0	-11.5	32.5	42.2	|
|	H / 1.0	X	44.9	-11.5	33.4	46.8	|
|	H / 1.0	Y	45.2	-11.5	33.7	48.4	|
1735.0	H / 1.0	Z	42.1	-11.5	30.6	33.9	1100
2168.0	V / 1.0	X	37.2 *	-11.5	25.7	19.3	1100
|	V / 1.0	Y	37.2 *	-11.5	25.7	19.3	|
|	H / 1.0	Z	37.2 *	-11.5	25.7	19.3	|
|	H / 1.0	X	37.2 *	-11.5	25.7	19.3	|
|	H / 1.0	Y	37.2 *	-11.5	25.7	19.3	|
2168.0	V / 1.0	Z	37.2 *	-11.5	25.7	19.3	1100
	The frequency range was scanned from 30 MHz to 4.4GHz. All emissions not recorded were more						
	Than 20 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-11570-1
Test Sample:	433 MHz Pulsed Transmitter	**Paragraph:**	15.231
Model No.:	VR46A	**FCC ID:**	B4SVR46A
Operating Mode:	Continuously transmitting a 433 MHz signal		
Technician:	D. Lerner	**Date:**	August 12, 2006.

Notes: Test Distance: 3 Meters — Duty Cycle: 26.7%

Detector: Peak, unless otherwise specified — Duty Cycle Correction: -11.3dB

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
2602.8	V / 1.0	X	38.3 *	-11.5	26.8	21.9	1100
|	V / 1.0	Y	38.3 *	-11.5	26.8	21.9	|
|	V / 1.0	Z	38.3 *	-11.5	26.8	21.9	|
|	H / 1.5	X	38.3 *	-11.5	26.8	21.9	|
|	H / 1.0	Y	38.3 *	-11.5	26.8	21.9	|
2602.8	H / 1.0	Z	38.3 *	-11.5	26.8	21.9	1100
3036.6	V / 1.0	X	39.5 *	-11.5	28.0	25.1	1100
|	V / 1.5	Y	39.5 *	-11.5	28.0	25.1	|
|	V / 1.0	Z	39.5 *	-11.5	28.0	25.1	|
|	H / 1.5	X	39.5 *	-11.5	28.0	25.1	|
|	H / 1.0	Y	39.5 *	-11.5	28.0	25.1	|
3036.6	H / 1.5	Z	39.5 *	-11.5	28.0	25.1	1100
3470.4	V / 1.0	X	39.3 *	-11.5	27.8	24.5	1100
|	V / 1.0	Y	39.3 *	-11.5	27.8	24.5	|
|	V / 1.0	Z	39.3 *	-11.5	27.8	24.5	|
|	H / 1.0	X	39.3 *	-11.5	27.8	24.5	|
|	H / 1.0	Y	39.3 *	-11.5	27.8	24.5	|
3470.4	H / 1.0	Z	39.3 *	-11.5	27.8	24.5	1100
3904.2	V / 1.0	X	40.7 *	-11.5	29.2	28.8	500
|	V / 1.0	Y	40.7 *	-11.5	29.2	28.8	|
|	V / 1.0	Z	40.7 *	-11.5	29.2	28.8	|
|	H / 1.0	X	40.7 *	-11.5	29.2	28.8	|
|	H / 1.0	Y	40.7 *	-11.5	29.2	28.8	|
3904.2	H / 1.0	Z	40.7 *	-11.5	29.2	28.8	500
4338.0	V / 1.0	X	42.4 *	-11.5	30.9	35.1	500
|	V / 1.0	Y	42.4 *	-11.5	30.9	35.1	|
|	H / 1.0	Z	42.4 *	-11.5	30.9	35.1	|
|	H / 1.0	X	42.4 *	-11.5	30.9	35.1	|
|	H / 1.0	Y	42.4 *	-11.5	30.9	35.1	|
4338.0	V / 1.0	Z	42.4 *	-11.5	30.9	35.1	500

The frequency range was scanned from 30 MHz to 4.4 GHz. All emissions not recorded were more

Than 20 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, Spurious Case Radiated Emissions, Paragraph 15.209(a)		
Customer:	X-10 (USA) Inc.	**Job No.**	R-11570-1
Test Sample:	433 MHz Pulsed Transmitter	**FCC ID:**	BS4VR46A
Model No.:	VR46A		
Operating Mode:	Continuously transmitting a 433 MHz signal		
Technician:	D. Lerner	**Date:**	August 12, 2006

Notes: Test Distance: 3 Meters Temp: 26°C Humidity: 44%

Detector: Quasi-Peak from 30 MHz to 1 GHz, Peak above 1 GHz

Frequency	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							100
|							|
|							|
|							|
|							|
|							|
|							|
88							100
88							150
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216							150
216							200
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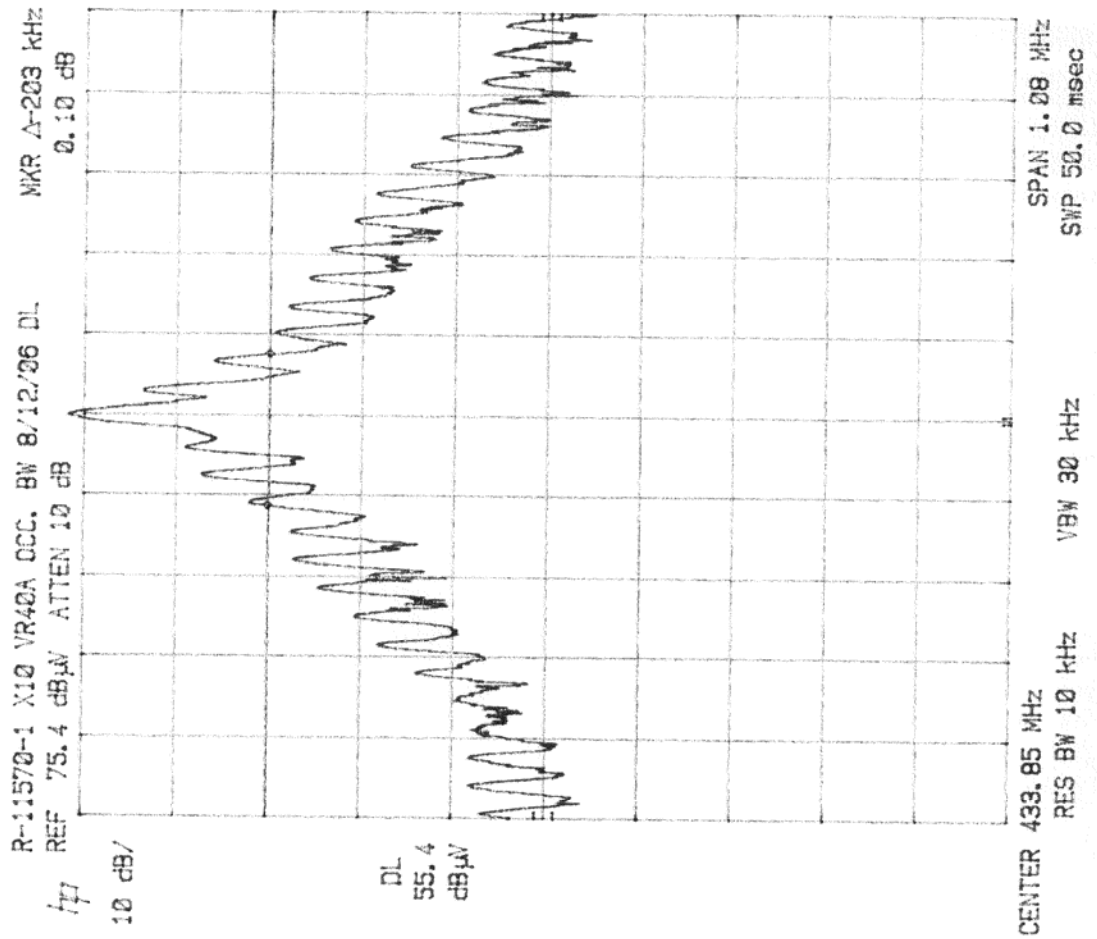
|							|
|							|
|							|
960							200
960							500
|							|
|							|
|							|
|							|
4338							500

No Emissions Observed at specified test distance

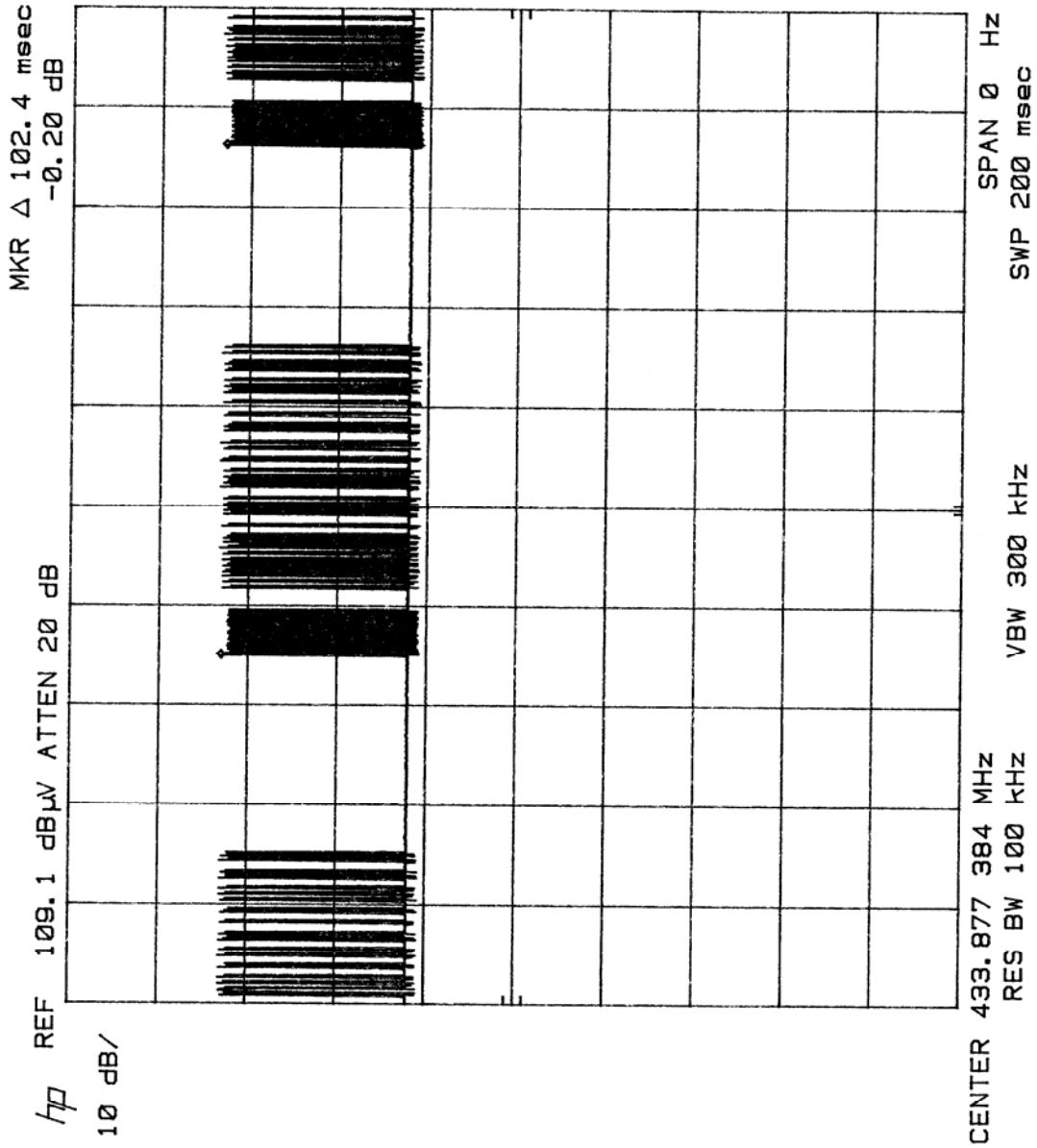
	The frequency range was scanned from 30 MHz to 4.338 GHz.
	The emissions observed from the EUT do not exceed the specified limits.
	Emissions not recorded were more than 20dB under the specified limit.

FCC Part 15 Subpart C Occupied Bandwidth
Test Data

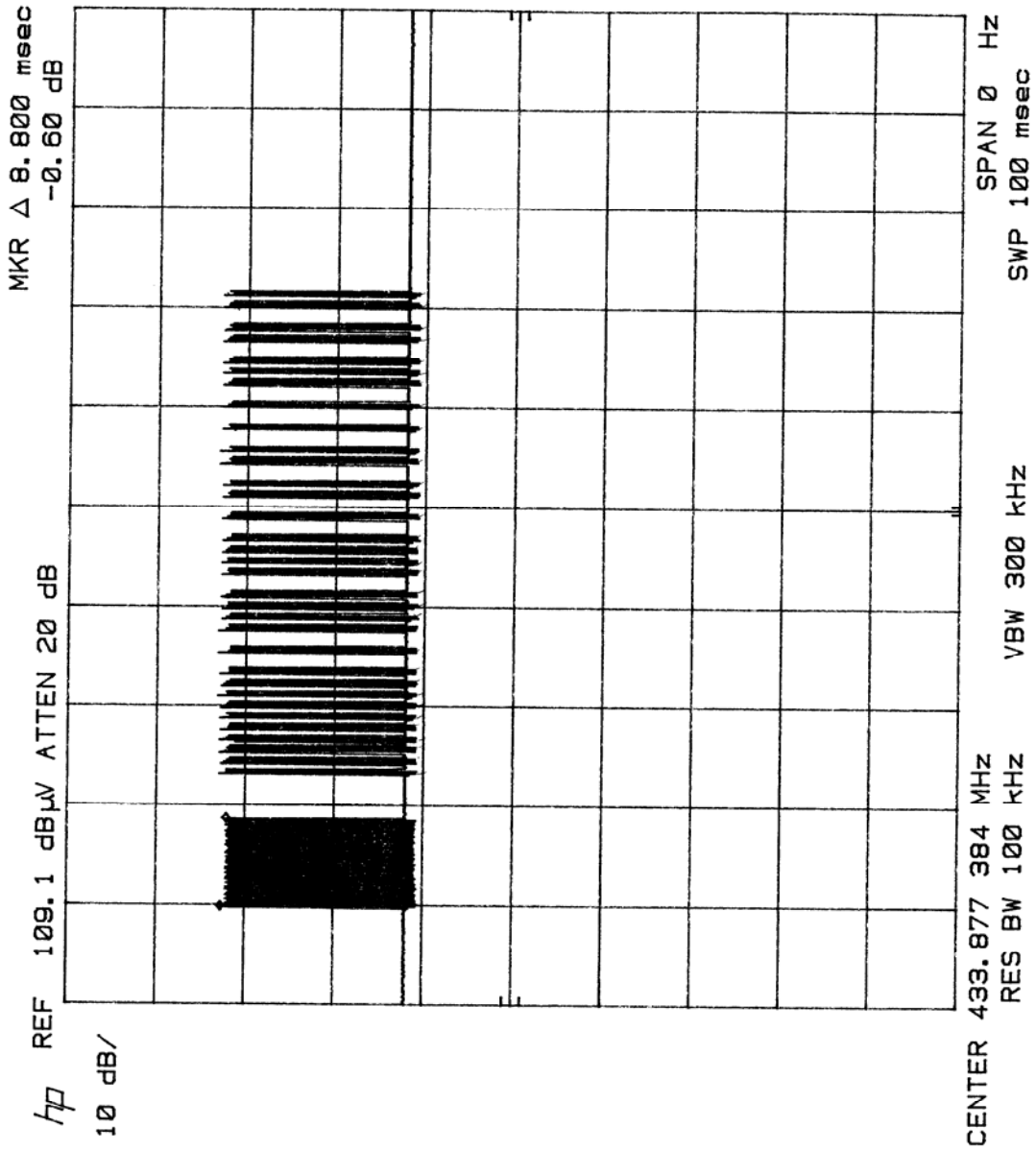


Test Method: FCC Part 15, Subpart C, 15.231(c), Occupied Bandwidth.
Notes: Bandwidth of 203 kHz does not exceed 0.25% of center frequency at the 20 dBc points (1045 kHz)

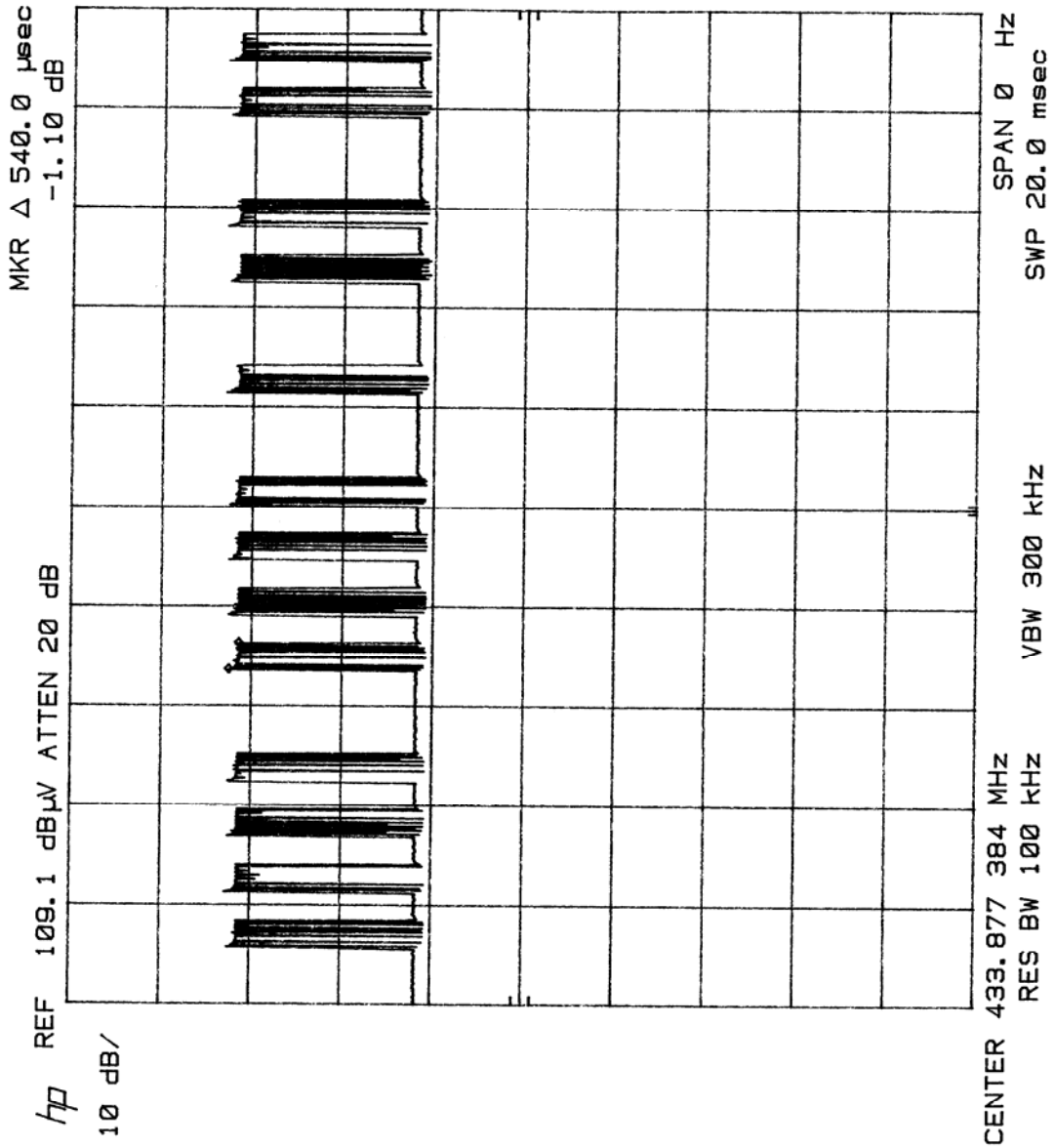
FCC Part 15 Subpart C Duty Cycle
Test Data



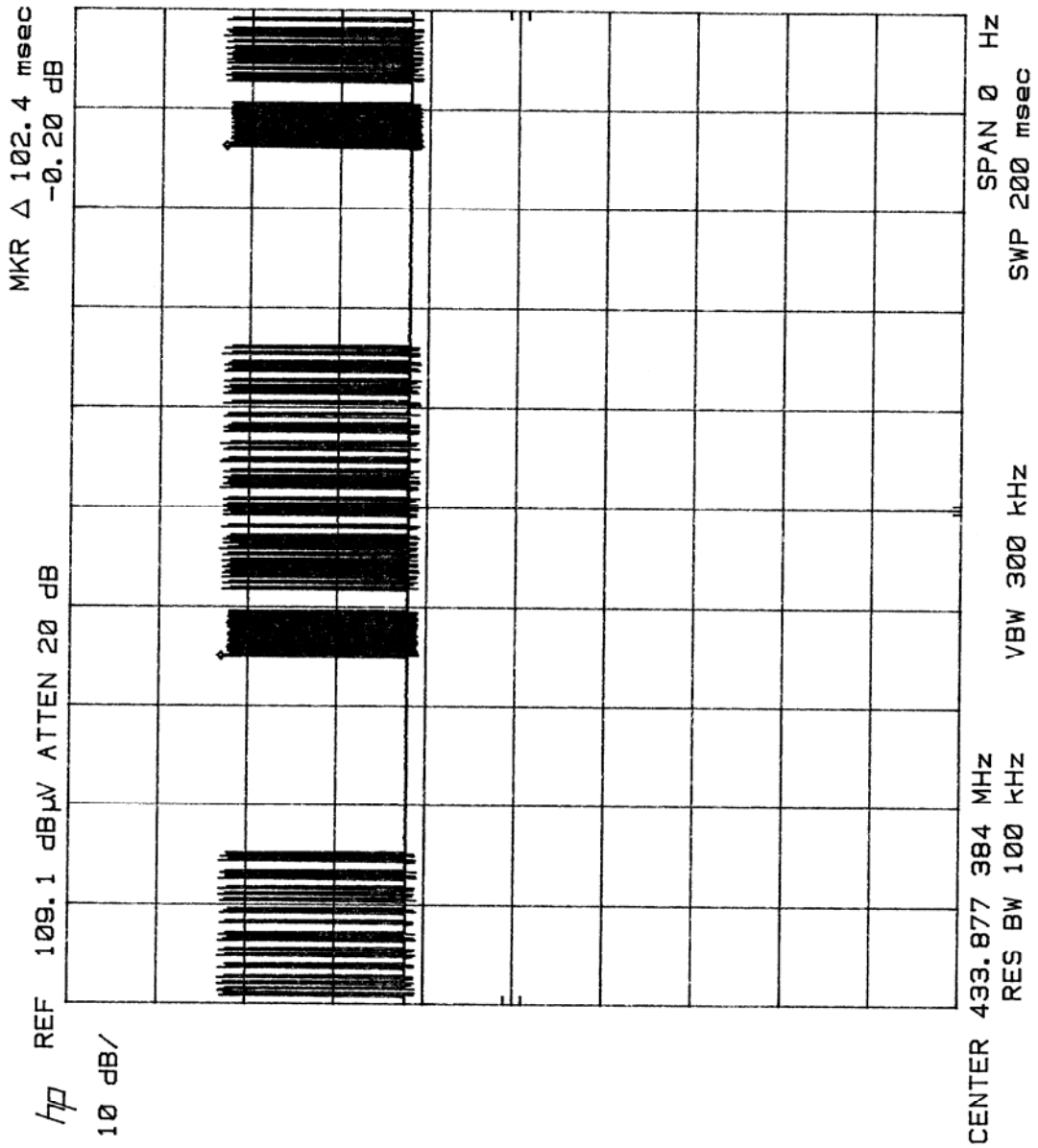
Test Method: FCC Part 15.35, Duty Cycle Determination.
Notes: Measurement of cycle time = 102.4 mSec.



Test Method: FCC Part 15.35, Duty Cycle Determination.
Notes: Measurement of 1 large pulse = 8.8 mSec.



Test Method: FCC Part 15.35, Duty Cycle Determination.
Notes: Measurement of 1 small pulse = 540µSec.
Measurements of 33 small pulses = 33(540µSec) = 17.82 mSec.



Test Method: FCC Part 15.35, Duty Cycle Determination.
Notes: Duty cycle = (1)(8.8mSec) + (33) (540µSec) = 26.62 mSec.
= 26.62 mSec / 100 mSec = 26.62 % = 0.26
= 20 log 0.262 = -11.5 dB