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: CR15A

TYPE: Pulsed Transmitter

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

FREQUENCY OF OPERATION: 310 MHz

TESTS PERFORMED

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

REPORT OF MEASUREMENTS

Applicant:	X-10 (USA), Inc.
Device:	Pulsed Transmitter
FCC ID:	B4SCR15A
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 5830 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 583.0 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	=	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 = 5830 µV/M (AVERAGE) @ 3 Meters

Harmonic Limit = 583.0 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	=	17.65 milliseconds (maximum)
Transmitter Cycle Time	=	42.6 milliseconds
Transmitter Duty Cycle	=	41.4 %

CALCULATION:

1 Large Pulse	=	4 milliseconds
21 x 650 μs (small pulse)	=	13.65 milliseconds
4 + 13.65	=	17.65 milliseconds
Duty Cycle (17.65/42.6)	=	41.4 %
Correction Factor = 20 log(0.414)	=	-7.7 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:

Setting pulse desensitization equal to zero and utilizing the minimum observed pulse width of 650μs yields a minimum required bandwidth of 1,025 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. 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 15.231 Compliance Testing

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
067	Open Area Test Site	Retlif	3 Meter	RNY	09/20/2000	09/20/2003
128	Double Ridged Guide	Electro-Mechanics	1 GHz - 18 GHz	3105	05/31/2001	05/31/2002
133	Broadband Pre-Amplifier	Electro-Metrics	10 kHz - 1 GHz, 26dB	BPA-1000	06/13/2001	06/13/2002
141	Spectrum Analyzer	Hewlett Packard	100 Hz - 40 GHz	8566B	01/16/2002	07/16/2002
141A	Graphics Plotter	Hewlett Packard	N/A	7470A	03/05/2002	03/05/2003
141B	Quasi-Peak Adaptor	Hewlett Packard	100 Hz - 1 GHz	85650A	01/15/2002	07/15/2002
206B	6.0 dB Attenuator	Texscan	0 - 1.0 GHz	FP-50 - 6 dB	06/13/2001	06/13/2002
543	Preamplifier	Hewlett Packard	1.0 GHz - 26.5 GHz	8449B	06/27/2001	06/27/2002
767	Biconilog	EMCO	26 - 2000 MHz	3142B	08/28/2001	08/28/2002

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)	**Job No.**	R-9422-1
Test Sample:	RF remote	**Paragraph:**	15.231
Model No.:	CR15A	**FCC ID:**	B4SCR15A
Operating Mode:	Continuously Transmitting a 310 MHz Signal		
Technician:	Peter Lananna	**Date:**	April 23, 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
310	H / 1.0	X	48.9	16.8	65.7	1927.5	58300
|	H / 1.0	Y	51.9	16.8	68.7	2722.7	|
|	H / 1.0	Z	51.7	16.8	68.5	2660.7	|
|	V / 1.8	X	48.9	16.8	65.7	1927.5	|
|	V / 2.0	Y	47.1	16.8	63.9	1566.8	|
310	V / 2.0	Z	47.9	16.8	64.7	1717.9	58300
620	H / 1.0	X	43.8	3.9	47.7	242.7	5830
|	H / 1.0	Y	50.4	3.9	54.3	518.8	|
|	H /1.3	Z	52.4	3.9	56.3	653.1	|
|	V / 2.0	X	50.3	3.9	54.2	512.9	|
|	V / 1.0	Y	49.0	3.9	52.9	441.6	|
620	V / 2.8	Z	44.6	3.9	48.5	266.1	5830
930	H / 1.0	X	21.3	8.5	29.8	30.9*	5830
|	H / 1.0	Y	21.3	8.5	29.8	30.9*	|
|	H / 1.0	Z	21.3	8.5	29.8	30.9*	|
|	V /1.0	X	21.3	8.5	29.8	30.9*	|
|	V / 1.0	Y	21.3	8.5	29.8	30.9*	|
930	V / 1.0	Z	21.3	8.5	29.8	30.9*	5830
1240	H / 1.0	X	38.8	-3.0	35.8	61.7*	5000
|	H / 1.0	Y	38.8	-3.0	35.8	61.7*	|
|	H / 1.0	Z	38.8	-3.0	35.8	61.7*	|
|	V /1.0	X	38.8	-3.0	35.8	61.7*	|
|	V / 1.0	Y	38.8	-3.0	35.8	61.7*	|
1240	V / 1.0	Z	38.8	-3.0	35.8	61.7*	5000
1550	H / 1.0	X	41.7	1.0	42.7	136.5*	5000
|	H / 1.0	Y	41.7	1.0	42.7	136.5*	|
|	H / 1.0	Z	41.7	1.0	42.7	136.5*	|
|	V /1.0	X	41.7	1.0	42.7	136.5*	|
|	V / 1.0	Y	41.7	1.0	42.7	136.5*	|
1550	V / 1.0	Z	41.7	1.0	42.7	136.5*	5000
	The frequency range was scanned from 30 MHz to 3.1 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)	**Job No.**	R-9422-1
Test Sample:	RF remote	**Paragraph:**	15.231
Model No.:	CR15A	**FCC ID:**	B4SCR15A
Operating Mode:	Continuously Transmitting a 310 MHz Signal		
Technician:	Peter Lananna	**Date:**	April 23, 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
1860	H / 1.0	X	42.7	3.6	46.3	206.5*	5830
|	H / 1.0	Y	42.7	3.6	46.3	206.5*	|
|	H / 1.0	Z	42.7	3.6	46.3	206.5*	|
|	V /1.0	X	42.7	3.6	46.3	206.5*	|
|	V / 1.0	Y	42.7	3.6	46.3	206.5*	|
1860	V / 1.0	Z	42.7	3.6	46.3	206.5*	5830
2170	H / 1.0	X	42.7	1.2	43.9	156.7*	5830
|	H / 1.0	Y	42.7	1.2	43.9	156.7*	|
|	H / 1.0	Z	42.7	1.2	43.9	156.7*	|
|	V /1.0	X	42.7	1.2	43.9	156.7*	|
|	V / 1.0	Y	42.7	1.2	43.9	156.7*	|
2170	V / 1.0	Z	42.7	1.2	43.9	156.7*	5830
2480	H / 1.0	X	41.5	3.8	45.3	184.1*	5830
|	H / 1.0	Y	41.5	3.8	45.3	184.1*	|
|	H / 1.0	Z	41.5	3.8	45.3	184.1*	|
|	V /1.0	X	41.5	3.8	45.3	184.1*	|
|	V / 1.0	Y	41.5	3.8	45.3	184.1*	|
2480	V / 1.0	Z	41.5	3.8	45.3	184.1*	5830
2790	H / 1.0	X	40.6	6.2	46.8	218.8*	5000
|	H / 1.0	Y	40.6	6.2	46.8	218.8*	|
|	H / 1.0	Z	40.6	6.2	46.8	218.8*	|
|	V /1.0	X	40.6	6.2	46.8	218.8*	|
|	V / 1.0	Y	40.6	6.2	46.8	218.8*	|
2790	V / 1.0	Z	40.6	6.2	46.8	218.8*	5000
3100	H / 1.0	X	42.0	6.8	48.8	275.4*	5830
|	H / 1.0	Y	42.0	6.8	48.8	275.4*	|
|	H / 1.0	Z	42.0	6.8	48.8	275.4*	|
|	V /1.0	X	42.0	6.8	48.8	275.4*	|
|	V / 1.0	Y	42.0	6.8	48.8	275.4*	|
3100	V / 1.0	Z	42.0	6.8	48.8	275.4*	5830
	The frequency range was scanned from 30 MHz to 3.1 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)	**Job No.**	R-9422-1
Test Sample:	RF remote	**Paragraph:**	15.231
Model No.:	CR15A	**FCC ID:**	B4SCR15A
Operating Mode:	Continuously Transmitting a 310 MHz Signal		
Technician:	Peter Lananna	**Date:**	April 23, 2002

Notes: Test Distance: 3 Meters — Duty Cycle: 41.4%

Detector: Peak, unless otherwise specified — Duty Cycle Correction: -7.7dB

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
310	H / 1.0	X	65.7	-7.7	58.0	794.3	5830
|	H / 1.0	Y	68.7	-7.7	61.0	1122.0	|
|	H / 1.0	Z	68.5	-7.7	60.8	1096.5	|
|	V / 1.8	X	65.7	-7.7	58.0	794.3	|
|	V / 2.0	Y	63.9	-7.7	56.2	645.7	|
310	V / 2.0	Z	64.7	-7.7	57.0	707.9	5830
620	H / 1.0	X	47.7	-7.7	40.0	100.0	583
|	H / 1.0	Y	54.3	-7.7	46.6	213.8	|
|	H /1.3	Z	56.3	-7.7	48.6	269.2	|
|	V / 2.0	X	54.2	-7.7	46.5	211.3	|
|	V / 1.0	Y	52.9	-7.7	45.2	182.0	|
620	V / 2.8	Z	48.5	-7.7	40.8	109.6	583
930	H / 1.0	X	29.8	-7.7	22.1	12.7*	583
|	H / 1.0	Y	29.8	-7.7	22.1	12.7*	|
|	H / 1.0	Z	29.8	-7.7	22.1	12.7*	|
|	V /1.0	X	29.8	-7.7	22.1	12.7*	|
|	V / 1.0	Y	29.8	-7.7	22.1	12.7*	|
930	V / 1.0	Z	29.8	-7.7	22.1	12.7*	583
1240	H / 1.0	X	35.8	-7.7	28.1	25.4*	500
|	H / 1.0	Y	35.8	-7.7	28.1	25.4*	|
|	H / 1.0	Z	35.8	-7.7	28.1	25.4*	|
|	V /1.0	X	35.8	-7.7	28.1	25.4*	|
|	V / 1.0	Y	35.8	-7.7	28.1	25.4*	|
1240	V / 1.0	Z	35.8	-7.7	28.1	25.4*	500
1550	H / 1.0	X	42.7	-7.7	35.0	56.2*	500
|	H / 1.0	Y	42.7	-7.7	35.0	56.2*	|
|	H / 1.0	Z	42.7	-7.7	35.0	56.2*	|
|	V /1.0	X	42.7	-7.7	35.0	56.2*	|
|	V / 1.0	Y	42.7	-7.7	35.0	56.2*	|
1550	V / 1.0	Z	42.7	-7.7	35.0	56.2*	500

The frequency range was scanned from 30 MHz to 3.1 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-9422-1

Test Method:	FCC Part 15 Subpart C Radiated Emissions, Fundamental & Harmonic Emissions		
Customer:	X-10 (USA)	**Job No.**	R-9422-1
Test Sample:	RF remote	**Paragraph:**	15.231
Model No.:	CR15A	**FCC ID:**	B4SCR15A
Operating Mode:	Continuously Transmitting a 310 MHz Signal		
Technician:	Peter Lananna	**Date:**	April 23, 2002

Notes: Test Distance: 3 Meters — Duty Cycle: 41.4%

Detector: Peak, unless otherwise specified — Duty Cycle Correction: -7.7dB

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
1860	H / 1.0	X	46.3	-7.7	38.6	85.1*	583
|	H / 1.0	Y	46.3	-7.7	38.6	85.1*	|
|	H / 1.0	Z	46.3	-7.7	38.6	85.1*	|
|	V / 1.0	X	46.3	-7.7	38.6	85.1*	|
|	V / 1.0	Y	46.3	-7.7	38.6	85.1*	|
1860	V / 1.0	Z	46.3	-7.7	38.6	85.1*	583
2170	H / 1.0	X	43.9	-7.7	36.2	64.6*	583
|	H / 1.0	Y	43.9	-7.7	36.2	64.6*	|
|	H / 1.0	Z	43.9	-7.7	36.2	64.6*	|
|	V / 1.0	X	43.9	-7.7	36.2	64.6*	|
|	V / 1.0	Y	43.9	-7.7	36.2	64.6*	|
2170	V / 1.0	Z	43.9	-7.7	36.2	64.6*	583
2480	H / 1.0	X	45.3	-7.7	37.6	75.9*	583
|	H / 1.0	Y	45.3	-7.7	37.6	75.9*	|
|	H / 1.0	Z	45.3	-7.7	37.6	75.9*	|
|	V / 1.0	X	45.3	-7.7	37.6	75.9*	|
|	V / 1.0	Y	45.3	-7.7	37.6	75.9*	|
2480	V / 1.0	Z	45.3	-7.7	37.6	75.9*	583
2790	H / 1.0	X	46.8	-7.7	39.1	90.2*	500
|	H / 1.0	Y	46.8	-7.7	39.1	90.2*	|
|	H / 1.0	Z	46.8	-7.7	39.1	90.2*	|
|	V / 1.0	X	46.8	-7.7	39.1	90.2*	|
|	V / 1.0	Y	46.8	-7.7	39.1	90.2*	|
2790	V / 1.0	Z	46.8	-7.7	39.1	90.2*	500
3100	H / 1.0	X	48.8	-7.7	41.1	113.5*	583
|	H / 1.0	Y	48.8	-7.7	41.1	113.5*	|
|	H / 1.0	Z	48.8	-7.7	41.1	113.5*	|
|	V / 1.0	X	48.8	-7.7	41.1	113.5*	|
|	V / 1.0	Y	48.8	-7.7	41.1	113.5*	|
3100	V / 1.0	Z	48.8	-7.7	41.1	113.5*	583
	The frequency range was scanned from 30 MHz to 3.1 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-9422-1

Test Method:	FCC Part 15 Subpart C, Spurious Case Radiated Emissions, Paragraph 15.209(a)		
Customer:	X-10 (USA)	**Job No.**	R-9422-1
Test Sample:	310MHZ Pulsed Transmitter		
Model No.:	CR15A	**FCC ID:**	B4SCR15A
Operating Mode:	Continuously transmitting a 310MHz signal.		
Technician:	Peter Lananna	**Date:**	April 23, 2002

Notes: Test Distance: 3 Meters Temp: 15C Humidity: 69%
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
|							|
|							|

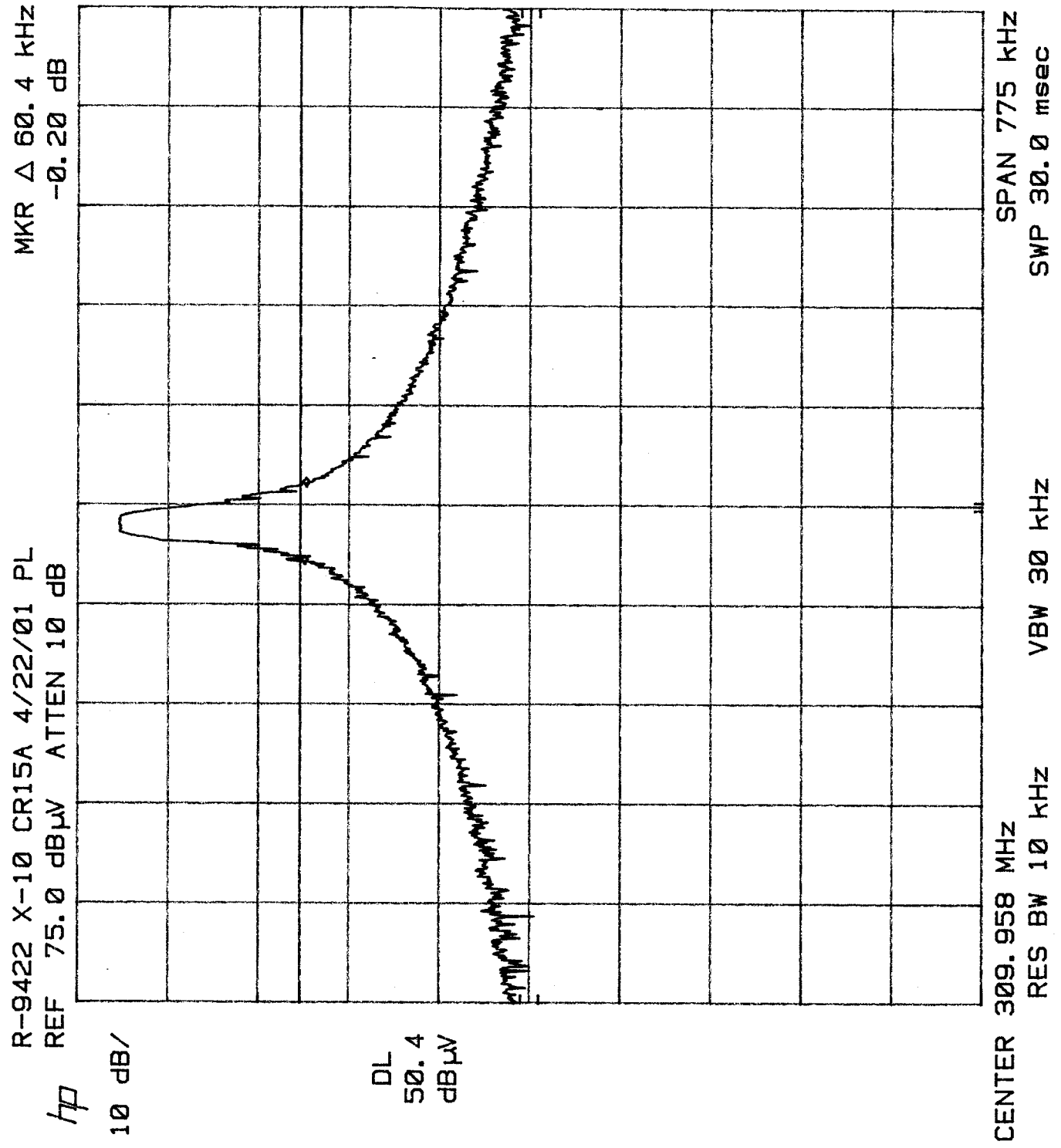
No emissions detected at specified test distance.

|							|
|							|
|							|
|							|
216.00							150
216.00							200
|							|
|							|
|							|
960.00							200
960.00							500
|							|
|							|
|							|
3100.0							500

The EUT was scanned from 30 MHz to 3.1 GHz
The emissions observed from the EUT do not exceed the specified limits. Emissions not recorded were more than 10dB under the specified limit

FCC 15.231(c)

OCCUPIED BANDWIDTH



Customer:	X-10 (USA)
Test Sample:	310MHz Pulsed Transmitter
Model No.	CR15A FCC ID: B4SCR15A
Test Method:	FCC 15.231(c) Occupied Bandwidth
Notes:	Bandwidth of the Emission is less than 0.25% of center frequency, measured 20dB(c) from the modulated carrier.

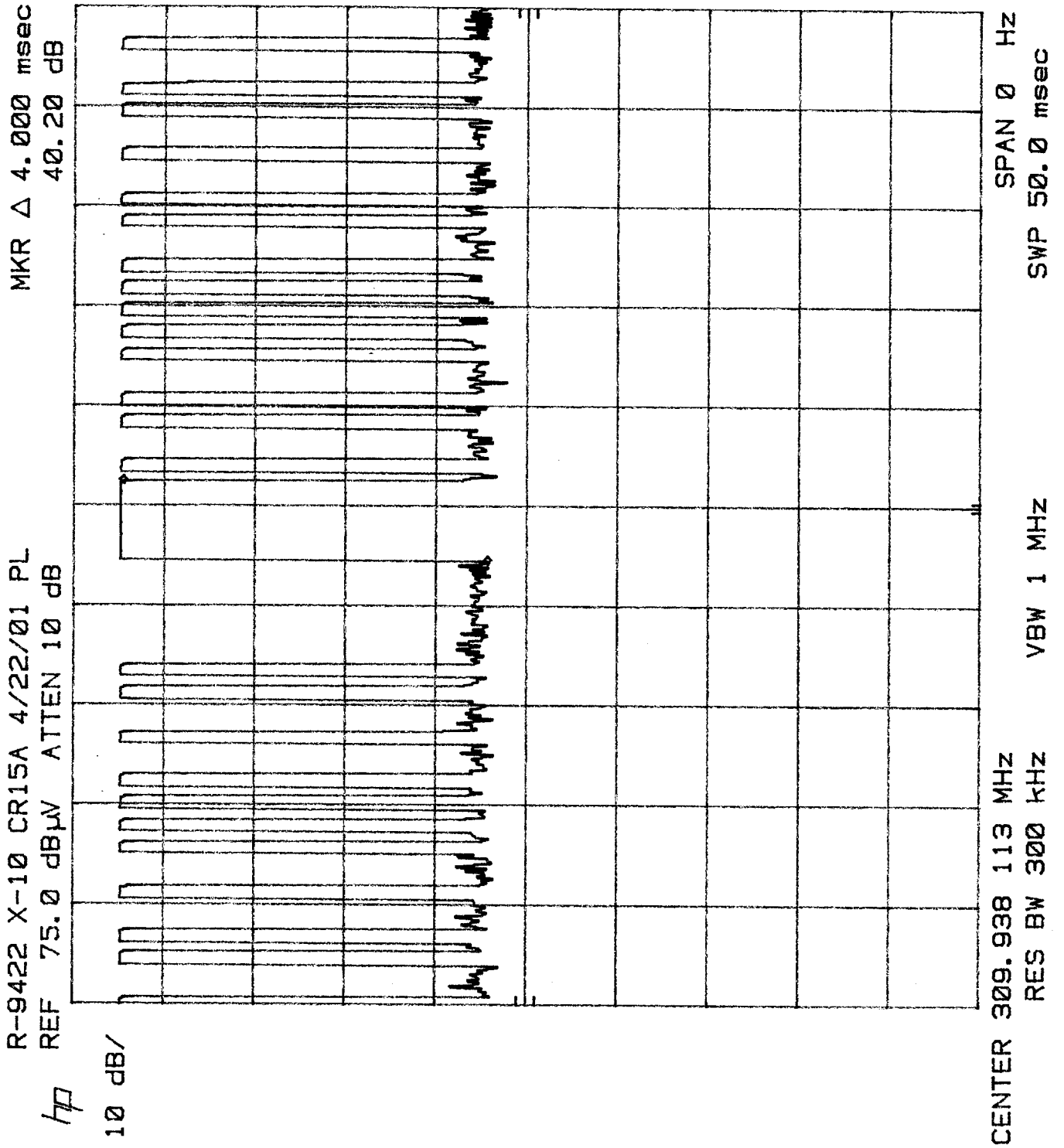
Date: April 22, 2002 Tech: Peter Lananna Sheet 1 of 1

Retlif Testing Laboratories

Report No. R-9422-1

FCC 15.231(c)

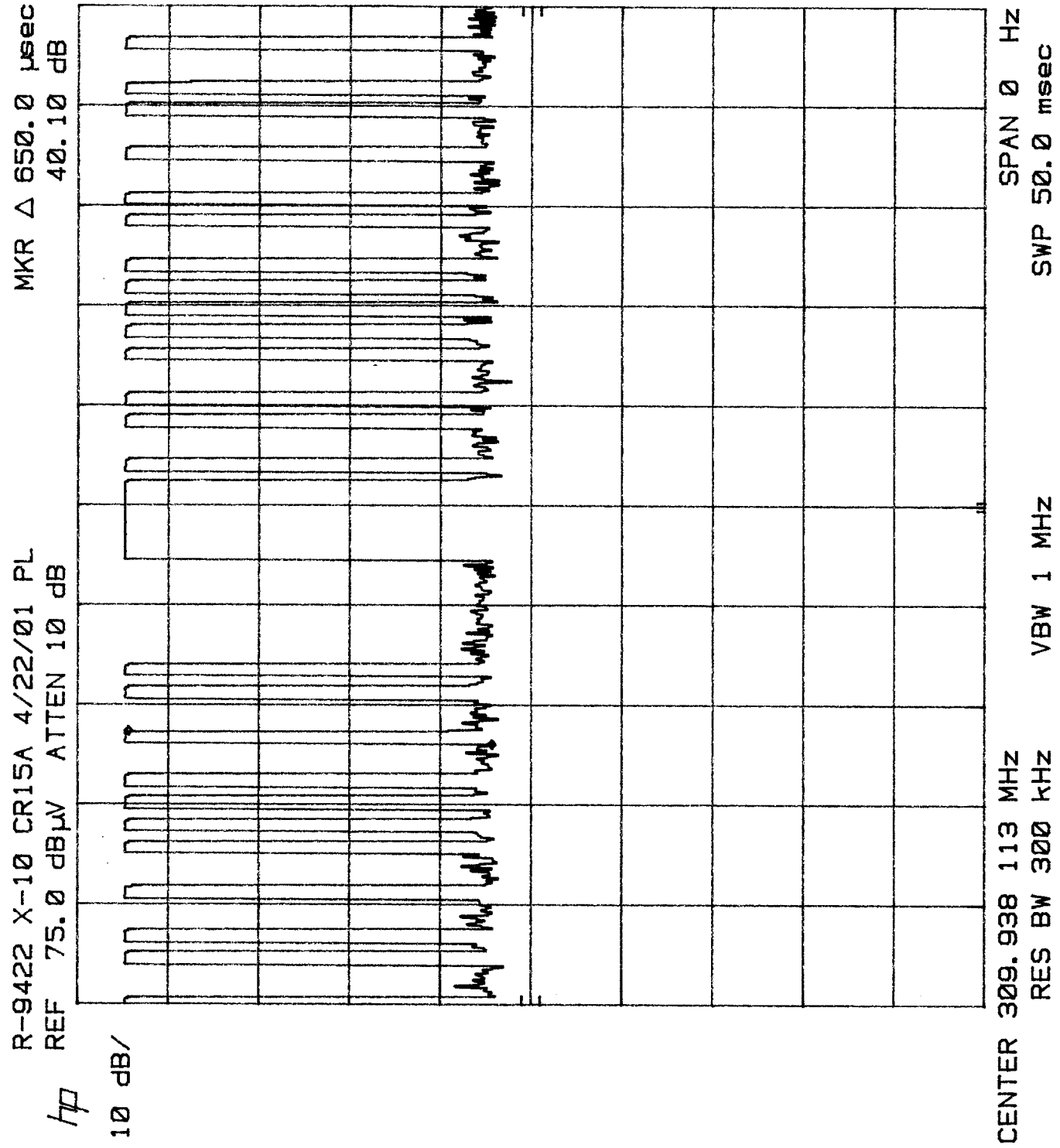
DUTY CYCLE



Customer:	X-10 (USA)
Test Sample:	310MHz Pulsed Transmitter
Model No.:	CR15A FCC ID: B4SCR15A
Test Method:	FCC15.35 Duty Cycle Determination
Notes:	Large Pulkse= 4.0miliseconds
Date: April 22, 2002	Tech: Peter Lananna Sheet 1 of 3

Retlif Testing Laboratories

Report No. R-9422-1

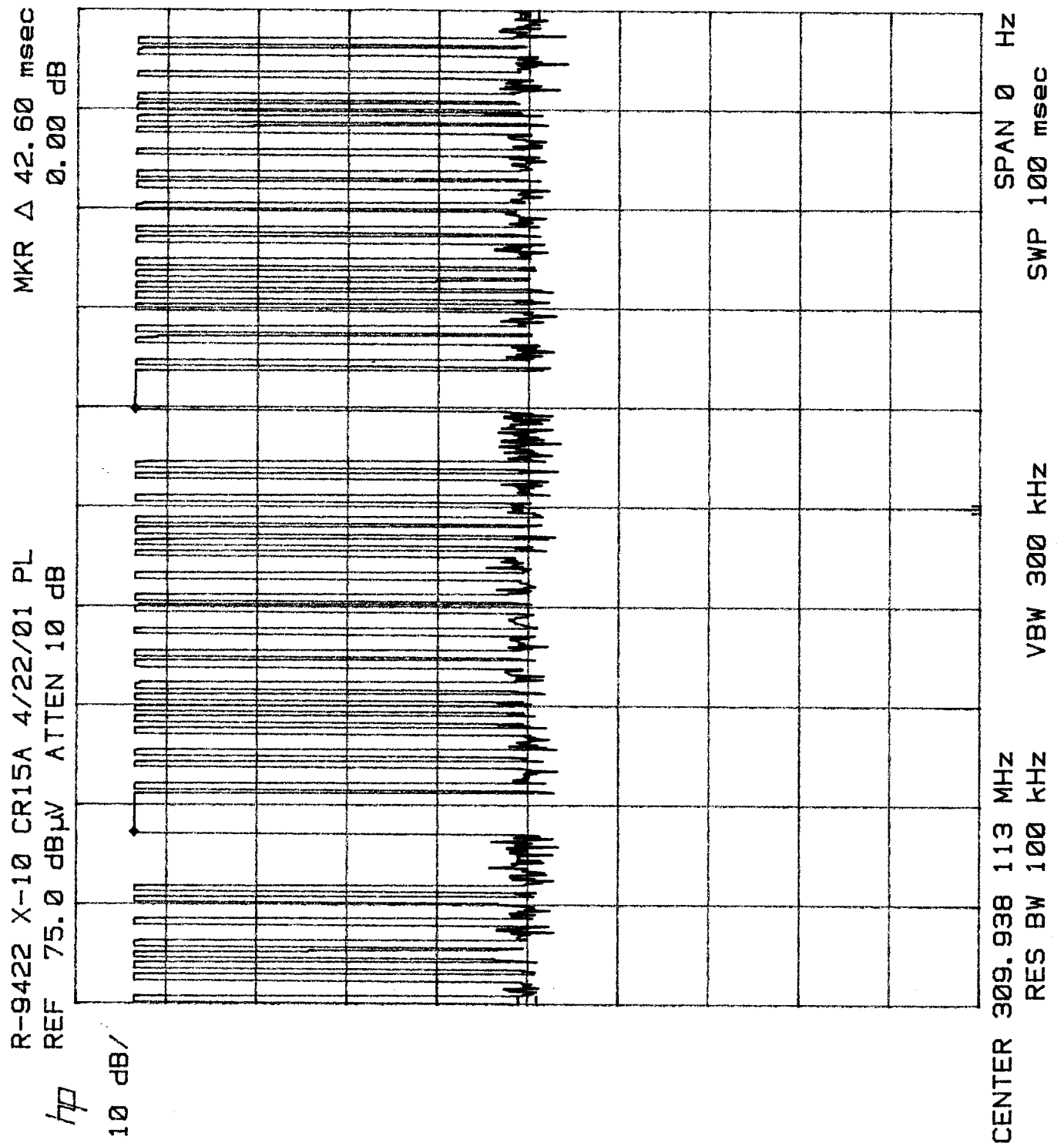


Customer:	X-10 (USA)
Test Sample:	310MHz Pulsed Transmitter
Model No:	CR15A FCC ID: B4SCR15A
Test Method:	FCC15.35 Duty Cycle Determination
Notes:	Small Pulse=650microseconds Number of Small Pulses=21 Small Pulse On Time=13.65miliseconds

Date: April 22, 2002 Tech: Peter Lananna Sheet 2 of 3

Retlif Testing Laboratories

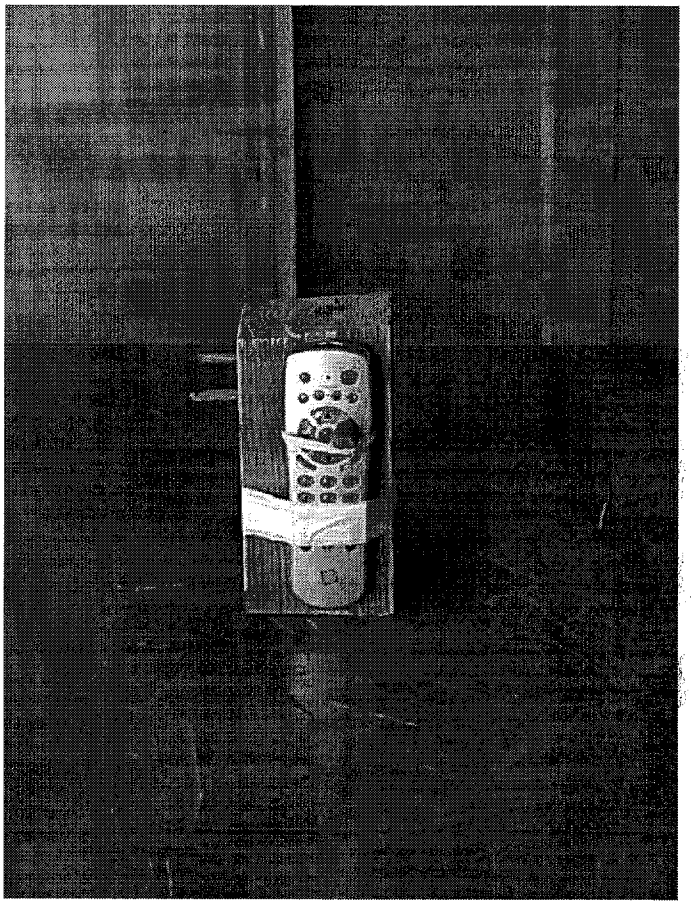
Report No. R-9422-1



Customer:	X-10 (USA)
Test Sample:	310MHz Pulsed Transmitter
Model No.:	CR15A FCC ID: B4SCR15A
Test Method:	FCC15.35 Duty Cycle Determination
Notes:	Transmitter On Tim e= 4.0msec +13.65msec = 17.65milliseconds Transmitter Cycle Time = 42.6milliseconds Duty Cycle = 17.65ms / 42.6ms = 0.414 = 41.4% = -7.7 dB

Date: April 22, 2002 Tech: Peter Lananna Sheet 3 of 3

Retlif Testing Laboratories

Report No. R-9422-1

Test Setup Photograph