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: Zenith MODEL: ZN551T

TYPE: Pulsed Transmitter

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

FREQUENCY OF OPERATION: 418 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:	B4SZN551T
Power Requirements:	3 VDC derived from 2 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 10,330 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 1,033 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	=	418		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 = 10,330 µV/M (AVERAGE) @ 3 Meters

Harmonic Limit = 1,033 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	=	27.0 milliseconds (maximum- worst case in 100 ms)
Transmitter Cycle Time	=	106.8 milliseconds
Transmitter Duty Cycle	=	27.0 %

CALCULATION:

1 Large Pulse	=	8.85 milliseconds
33 x 550 µs (small pulse)	=	18.15 milliseconds
8.85 + 18.15	=	27.0 milliseconds
Duty Cycle	=	27.0 %
Correction Factor = 20 log(0.27)	=	-11.4dB

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 1333 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 4.2 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
128C	Double Ridge Guide	Eaton Corporation	1 GHz - 18 GHz	96001	09/21/2001	09/21/2002
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	03/05/2001	03/05/2002
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
617	Interference Analyzer	Electro-Metrics	10 kHz - 1 GHz	EMC-30	01/17/2002	01/17/2003
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, Spurious Case Radiated Emissions, Paragraph 15.209(a)		
Customer:	X-10 Wireless Technologies, Inc.	**Job No.**	R-9382-1
Test Sample:	418MHz Pulsed Transmitter		
Model No.:	ZN551T	**FCC ID:**	B4SZN551T
Operating Mode:	Continuously transmitting a pulsed signal at 418MHz.		
Technician:	Peter Lananna	**Date:**	March 5, 2002

Notes: Test Distance: 3 Meters Temp:14C Humidity: 42%
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
4200.0							500

The EUT was scanned from 30 MHz to 4.2 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-9382-1

Test Method:	FCC Part 15 Subpart C Radiated Emissions, Fundamental & Harmonic Emissions		
Customer:	X-10 Wireless Technologies, Inc.	**Job No.**	R-9382-1
Test Sample:	418MHz Pulsed Transmitter	**Paragraph:**	15.231
Model No.:	ZN551T	**FCC ID:**	B4SZN551T
Operating Mode:	Continuously Transmitting a 418 MHz Signal		
Technician:	Peter Lananna	**Date:**	March 5, 2002

Notes: Test Distance: 3 Meters — Peak passes the Average limit.
Detector: Peak, Unless otherwise specified

Test Freq.	Antenna Pol./Height	EUT Orientation	Meter Reading	Correction Factor	Corrected Reading	Converted Reading	Average Limit
MHz	(V/H)/Meters	X / Y / Z	dBuV	dB	dBuV/m	uV/m	uV/m
418	H / 2.8	X	46.3	19.3	65.6	1905.5	10330
|	H / 3.0	Y	48.6	19.3	67.9	2483.1	|
|	H / 2.5	Z	47.2	19.3	66.5	2113.5	|
|	V / 1.0	X	52.1	19.3	71.4	3715.4	|
|	V / 1.0	Y	51.9	19.3	71.2	3630.8	|
418	V / 1.3	Z	45.8	19.3	65.1	1798.9	10330
836	H / 1.3	X	44.8	7.2	52.0	398.1	1033
|	H / 1.0	Y	50.1	7.2	57.3	732.8	|
|	H /2.0	Z	47.2	7.2	54.4	524.8	|
|	V / 1.1	X	51.9	7.2	59.1	901.6	|
|	V / 1.3	Y	49.5	7.2	56.7	683.9	|
836	V / 2.8	Z	42.9	7.2	50.1	319.9	1033
1254	H / 1.3	X	46.6	-3.0	43.6	151.4	1033
|	H / 2.3	Y	47.0	-3.0	44.0	158.5	|
|	H / 1.8	Z	47.7	-3.0	44.7	171.8	|
|	V / 1.3	X	48.4	-3.0	45.4	186.2	|
|	V / 1.1	Y	46.0	-3.0	43.0	141.3	|
1254	V / 1.5	Z	47.6	-3.0	44.6	169.8	1033
1672	H / 1.8	X	44.9	1.3	46.2	204.2	500
|	H / 1.0	Y	44.3	1.3	45.6	190.5	|
|	H / 1.5	Z	43.7	1.3	45.0	177.8	|
|	V / 1.5	X	45.6	1.3	46.9	221.3	|
|	V / 1.0	Y	43.6	1.3	44.9	175.8	|
1672	V / 1.3	Z	43.9	1.3	45.2	182.0	500
2090	H / 1.0	X	39.9	0.4	40.3	103.5*	1033
|	H / 1.0	Y	39.9	0.4	40.3	103.5*	|
|	H / 1.0	Z	39.9	0.4	40.3	103.5*	|
|	V / 1.0	X	39.9	0.4	40.3	103.5*	|
|	V / 1.0	Y	39.9	0.4	40.3	103.5*	|
2090	V / 1.0	Z	39.9	0.4	40.3	103.5*	1033
	The frequency range was scanned from 30 MHz to 4.2 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-9382-1

Test Method:	FCC Part 15 Subpart C Radiated Emissions, Fundamental & Harmonic Emissions		
Customer:	X-10 Wireless Technologies, Inc.	**Job No.**	R-9382-1
Test Sample:	418MHz Pulsed Transmitter	**Paragraph:**	15.231
Model No.:	ZN551T	**FCC ID:**	B4SZN551T
Operating Mode:	Continuously Transmitting a 418 MHz Signal		
Technician:	Peter Lananna	**Date:**	March 5, 2002

Notes: Test Distance: 3 Meters — Peak passes the Average limit.

Detector: Peak, unless otherwise specified

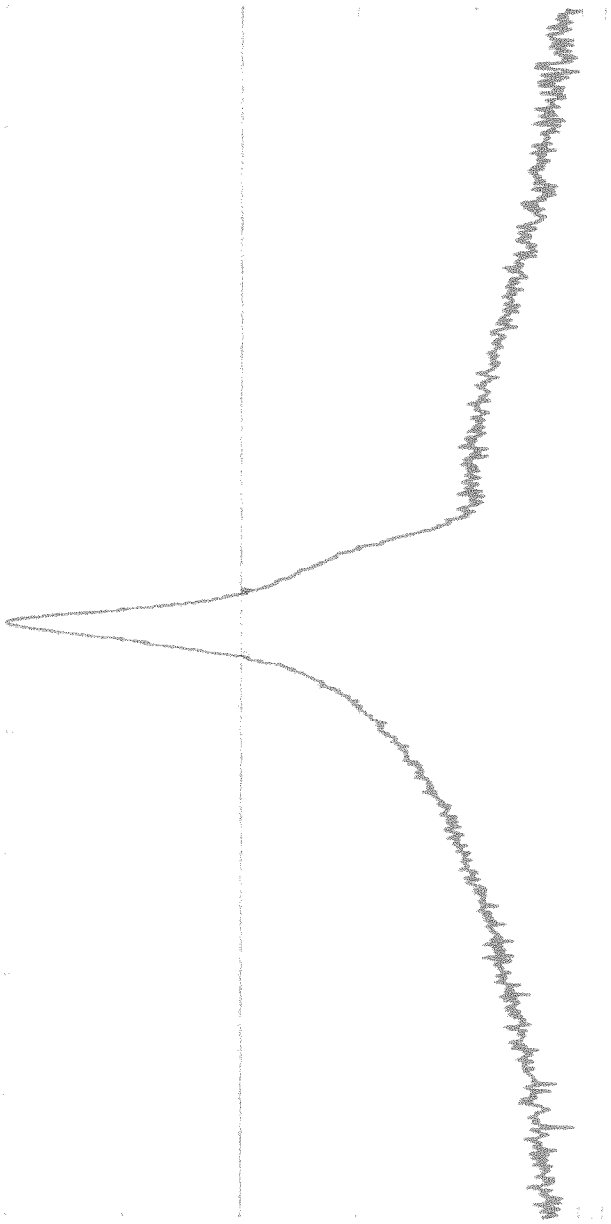
Test Freq.	Antenna Pol./Height	EUT Orientation	Meter Reading	Correction Factor	Corrected Reading	Converted Reading	Peak Limit
MHz	(V/H)-Meters	X / Y / Z	dBuV	dB	dBuV/m	uV/m	uV/m
2508	H / 1.0	X	38.6	3.8	42.4	131.8*	1033
|	H / 1.0	Y	38.6	3.8	42.4	131.8*	|
|	H / 1.0	Z	38.6	3.8	42.4	131.8*	|
|	V / 1.0	X	38.6	3.8	42.4	131.8*	|
|	V / 1.0	Y	38.6	3.8	42.4	131.8*	|
2508	V / 1.0	Z	38.6	3.8	42.4	131.8*	1033
2926	H / 1.0	X	39.6	6.4	46.0	199.5*	1033
|	H / 1.0	Y	39.6	6.4	46.0	199.5*	|
|	H / 1.0	Z	39.6	6.4	46.0	199.5*	|
|	V / 1.0	X	39.6	6.4	46.0	199.5*	|
|	V / 1.0	Y	39.6	6.4	46.0	199.5*	|
2926	V / 1.0	Z	39.6	6.4	46.0	199.5*	1033
3344	H / 1.0	X	37.3	7.6	44.9	175.8*	1033
|	H / 1.0	Y	37.3	7.6	44.9	175.8*	|
|	H / 1.0	Z	37.3	7.6	44.9	175.8*	|
|	V / 1.0	X	37.3	7.6	44.9	175.8*	|
|	V / 1.0	Y	37.3	7.6	44.9	175.8*	|
3344	V / 1.0	Z	37.3	7.6	44.9	175.8*	1033
3762	H / 1.0	X	37.4	9.2	46.6	213.8*	500
|	H / 1.0	Y	37.4	9.2	46.6	213.8*	|
|	H / 1.0	Z	37.4	9.2	46.6	213.8*	|
|	V / 1.0	X	37.4	9.2	46.6	213.8*	|
|	V / 1.0	Y	37.4	9.2	46.6	213.8*	|
3762	V / 1.0	Z	37.4	9.2	46.6	213.8*	500
4180	H / 1.0	X	37.1	10.3	47.4	234.4*	500
|	H / 1.0	Y	37.1	10.3	47.4	234.4*	|
|	H / 1.0	Z	37.1	10.3	47.4	234.4*	|
|	V / 1.0	X	37.1	10.3	47.4	234.4*	|
|	V / 1.0	Y	37.1	10.3	47.4	234.4*	|
4180	V / 1.0	Z	37.1	10.3	47.4	234.4*	500

The frequency range was scanned from 30 MHz to 4.2 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)

FCC 15.231(c)

OCCUPIED BANDWIDTH



Customer:	X-10 Wireless Technologies, Inc.
Test Sample:	418MHz Pulsed Transmitter
Model No.	ZN551T FCC ID: B4SZN551T
Test Method:	15.231(c) Occupied Bandwidth
Notes:	The bandwidth of the emissions is less than 0.25% of the center frequency.

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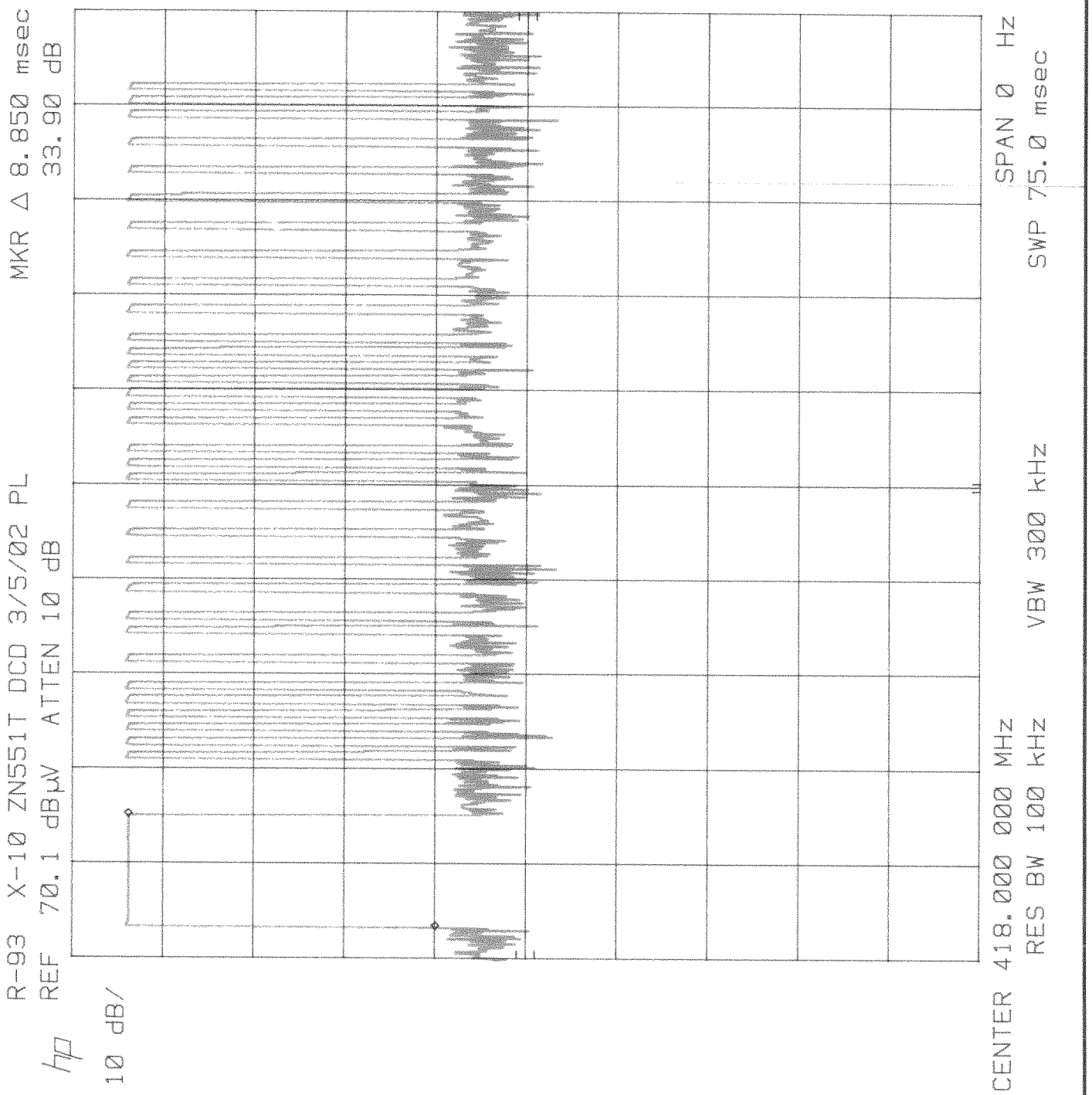
FCC 15.231(c)

DUTY CYCLE



Customer:	X-10 Wireless Technologies, Inc.
Test Sample:	418MHz Pulsed Transmitter
Model No.	ZN551T FCC ID: B4SZN551T
Test Method:	15.35 Duty Cycle Determination
Notes:	Large Pulse= 8.85milliseconds

Date: March 5, 2002 Tech: Peter Lananna Sheet 1 of 3

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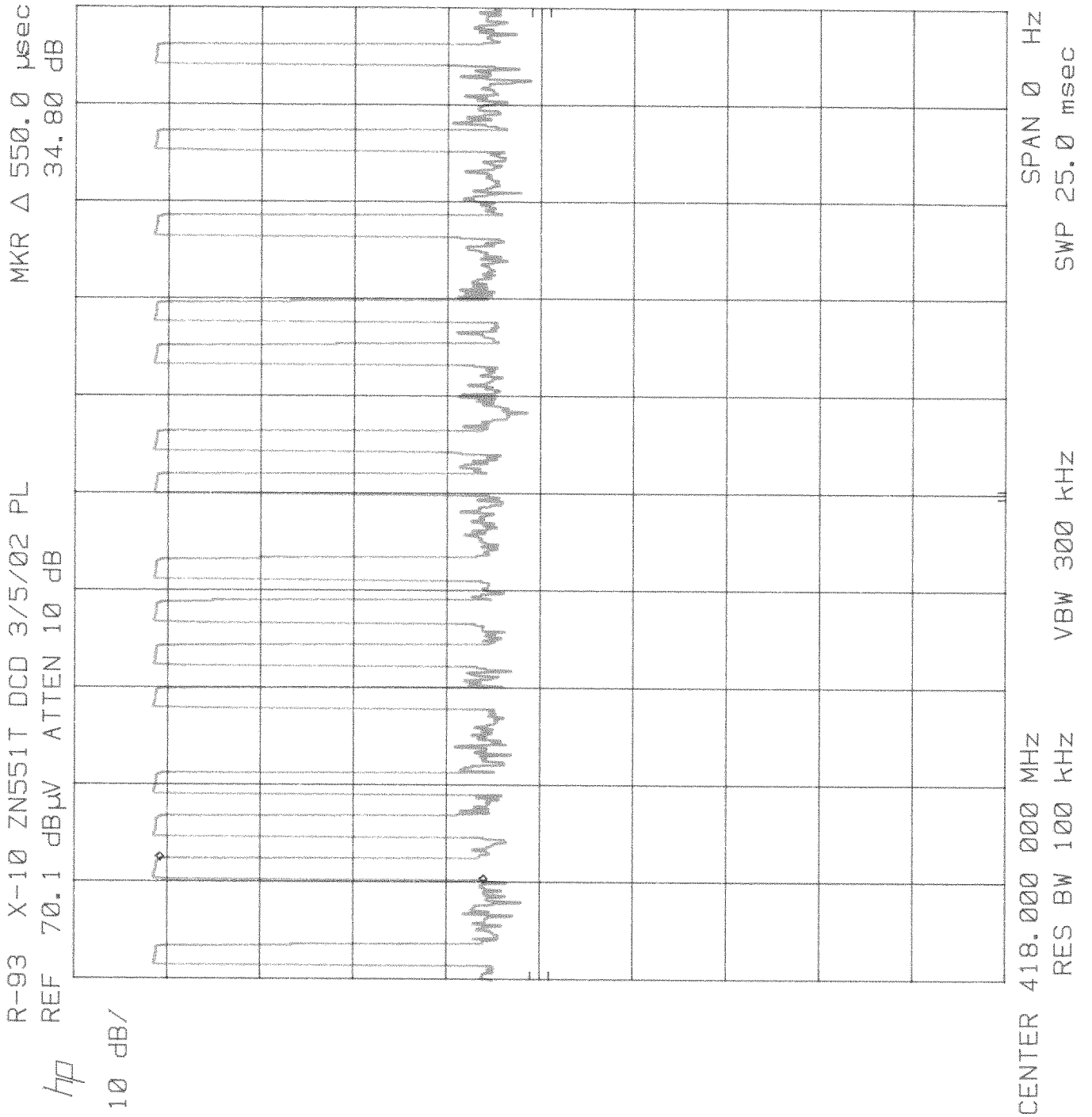

Customer:	X-10 Wireless Technologies, Inc.
Test Sample:	418MHz Pulsed Transmitter
Model No.	ZN551T FCC ID: B4SZN551T
Test Method:	15.35 Duty Cycle Determination
Notes:	Small Pulse=550microseconds Small Pulses= 550µs*33=18.15milliseconds

Date: March 5, 2002 Tech: Peter Lananna Sheet 2 of 3

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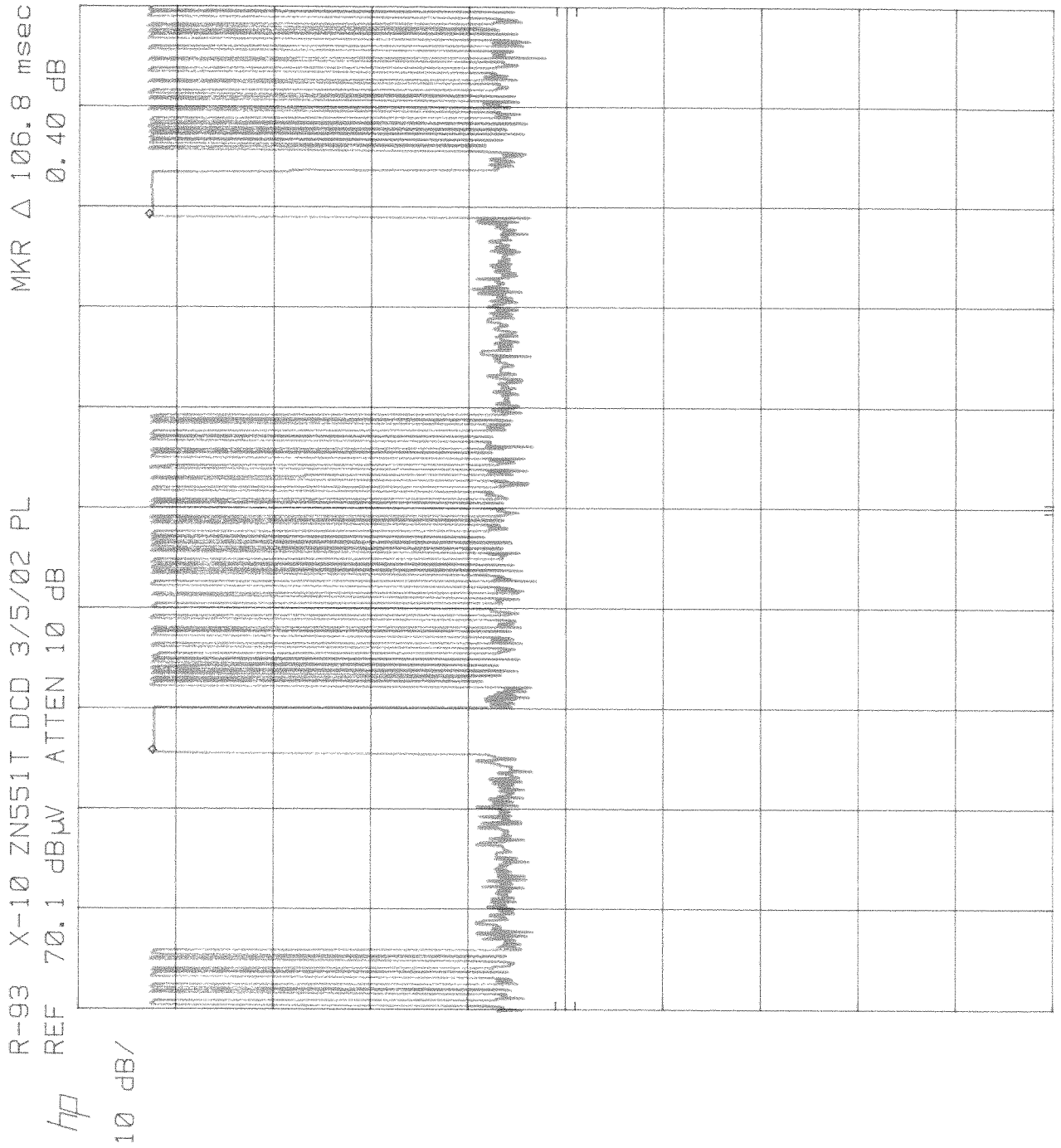

Customer:	X-10 Wireless Technologies, Inc.
Test Sample:	418MHz Pulsed Transmitter
Model No.	ZN551T FCC ID: B4SZN551T
Test Method:	15.35 Duty Cycle Determination
Notes:	Large Pulse=8.85milliseconds
	Small Pulses= 550µs*33=18.15milliseconds
	Worst case Cycle time =27milliseconds/100msec=-11.4dB

Date: March 5, 2002 Tech: Peter Lananna Sheet 3 of 3

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Test Setup Photograph