APPLICANT	MANUFACTURER
X-10 USA, Inc. 19823, 58th Place S. Kent, WA 98032	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 C63.4:2001

TEST SAMPLE DESCRIPTION

BRANDNAME: Black & Decker MODEL: FWMR

TYPE: Pulsed Transmitter

POWER REQUIREMENTS: 2 "AAA" Batteries

FREQUENCY OF OPERATION: 418 MHz

TESTS PERFORMED

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

Para. 15.231(b), 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:	B4SFWMR
Power Requirements:	2 “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.

Transmitter On Time	=	14.36 milliseconds (maximum)
Transmitter Cycle Time	=	64 milliseconds
Transmitter Duty Cycle	=	22.4 %

See separate e-file plots named dutycycle.pdf for additional information.

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 420 µs yields a minimum required bandwidth of 1587 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 Testing

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due
067A	Test Site Attenuation	Retlif	3 Meter	RNY	8/11/2003	8/11/2004
128	Double Ridged Guide	Electro-Mechanics	1 GHz - 18 GHz	3105	6/13/2003	6/13/2004
133	Broadband Pre-Amplifier	Electro-Metrics	10 kHz - 1 GHz, 26dB	BPA-1000	6/12/2003	6/12/2004
141	Spectrum Analyzer	Hewlett Packard	100 Hz - 40 GHz	8566B	7/23/2003	1/23/2004
141A	Graphics Plotter	Hewlett Packard	N/A	7470A	3/5/2003	3/5/2004
141B	Quasi-Peak Adaptor	Hewlett Packard	100 Hz - 1 GHz	85650A	7/23/2003	1/23/2004
206B	6.0 dB Attenuator	Texscan	0 - 1.0 GHz	FP-50 - 6 dB	6/12/2003	6/12/2004
543	Preamplifier	Hewlett Packard	1.0 GHz - 26.5 GHz	8449B	7/24/2003	7/24/2004
617	Interference Analyzer	Electro-Metrics	10 kHz - 1 GHz	EMC-30	8/23/2002	9/30/2003
767	Biconilog	EMCO	26 - 2000 MHz	3142B	9/4/2003	9/4/2004

FCC 15.231(b)

RADIATED EMISSIONS, FUNDAMENTAL & SPURIOUS CASE

(See separate e-file named Refundharm & REspur.pdf)

FCC 15.231(c)

OCCUPIED BANDWIDTH

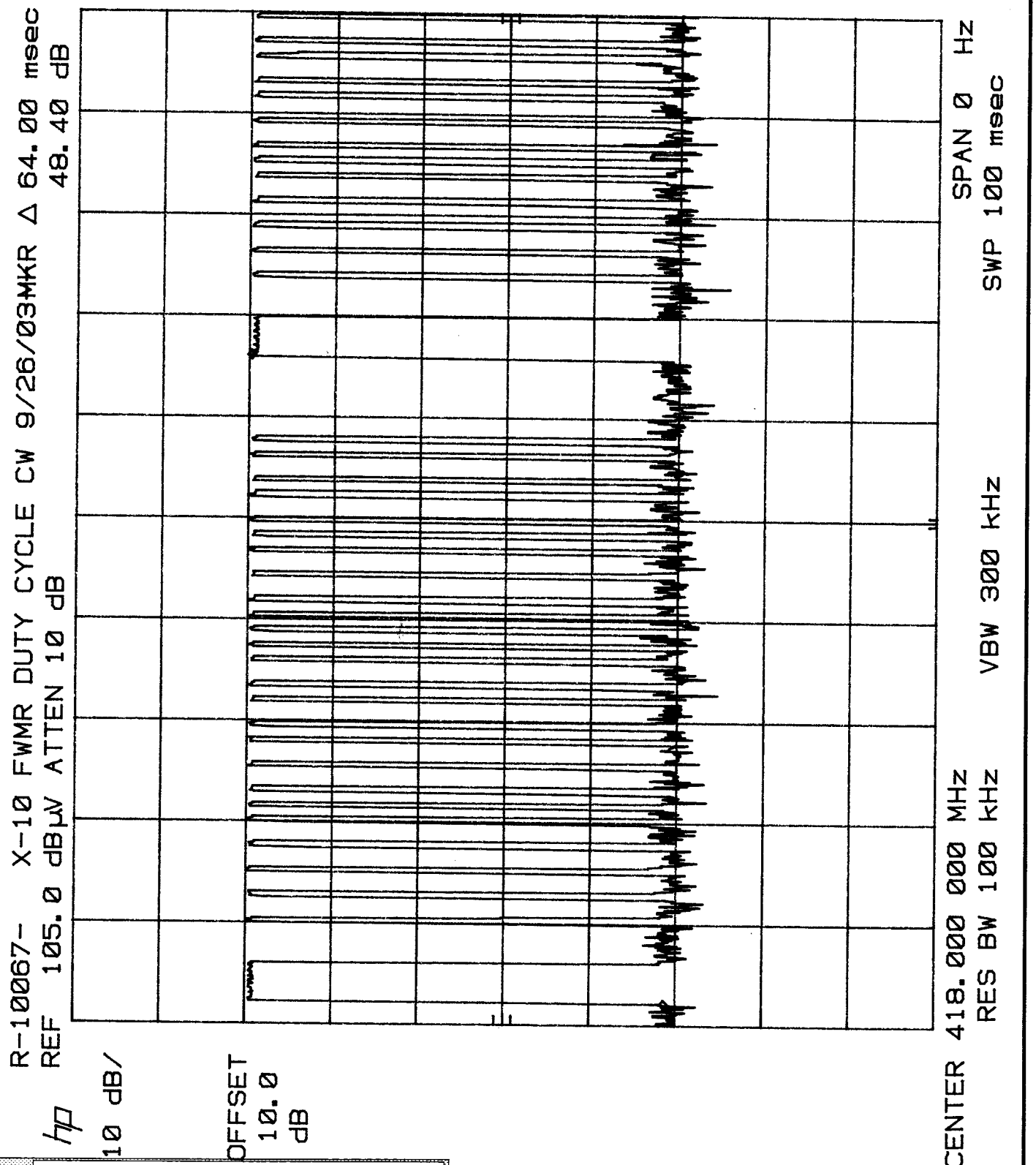
(See separate e-file named occbw.pdf)

FCC 15.231(c)

DUTY CYCLE

(See separate e-file named dutycycle.pdf)

Test Setup Photograph



Customer:	X-10 Wireless Technology Inc.
Test Sample:	418 Mhz Transmitter
Model No:	FWMR FCC ID:B4S FWMR
Test Method:	FCC 15.35 Duty Cycle Determination
Notes:	Transmitter Cycle Time= 64 msec
	Duty Cycle={3.86 mSec+ (25x0.42mSec)}/64.0mSec=0.224=22.4%

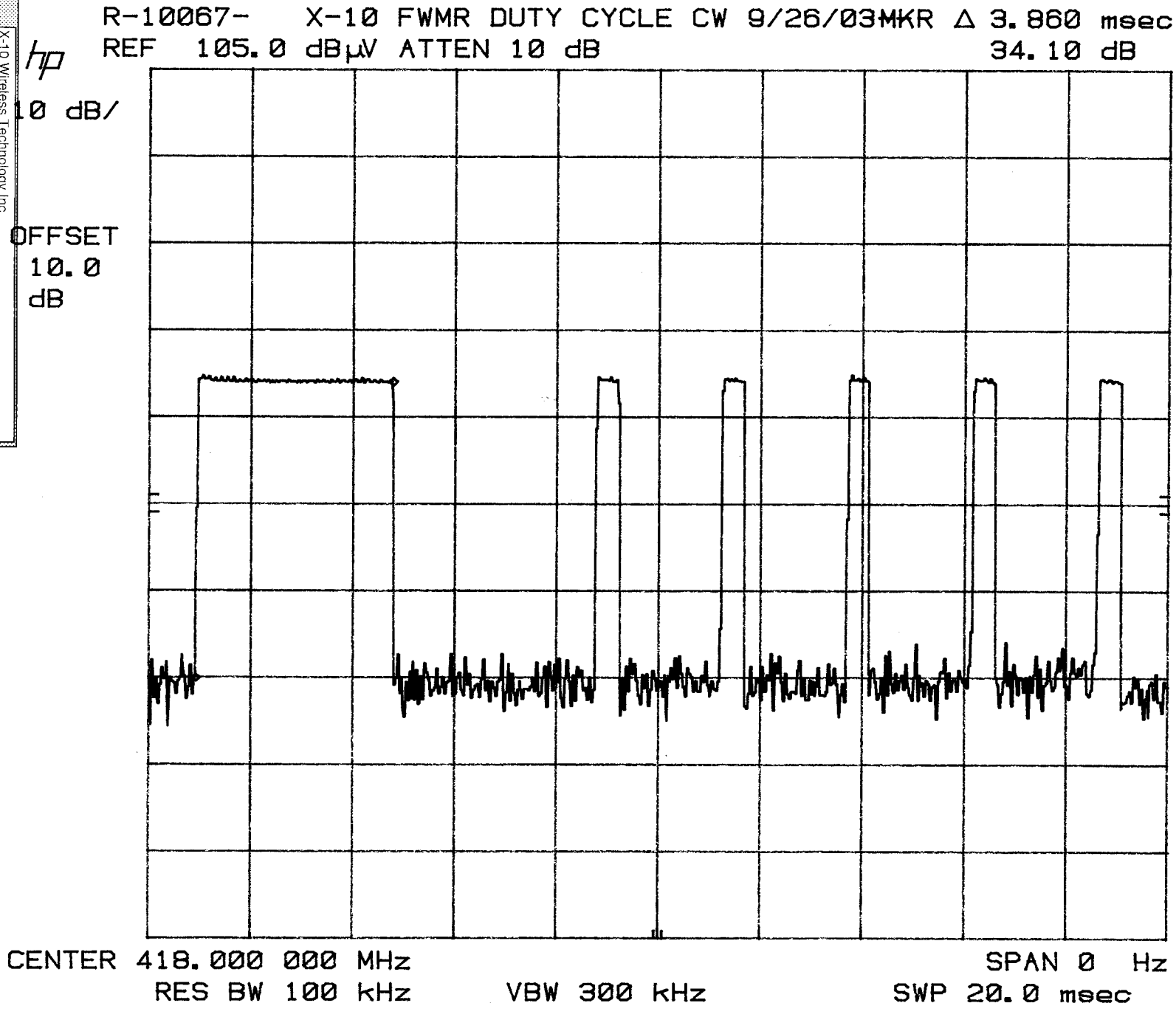
Date: September 29, 2003 Tech: C. Weber Sheet 1 of 3

Retlif Testing Laboratories

Report No. 10067-3

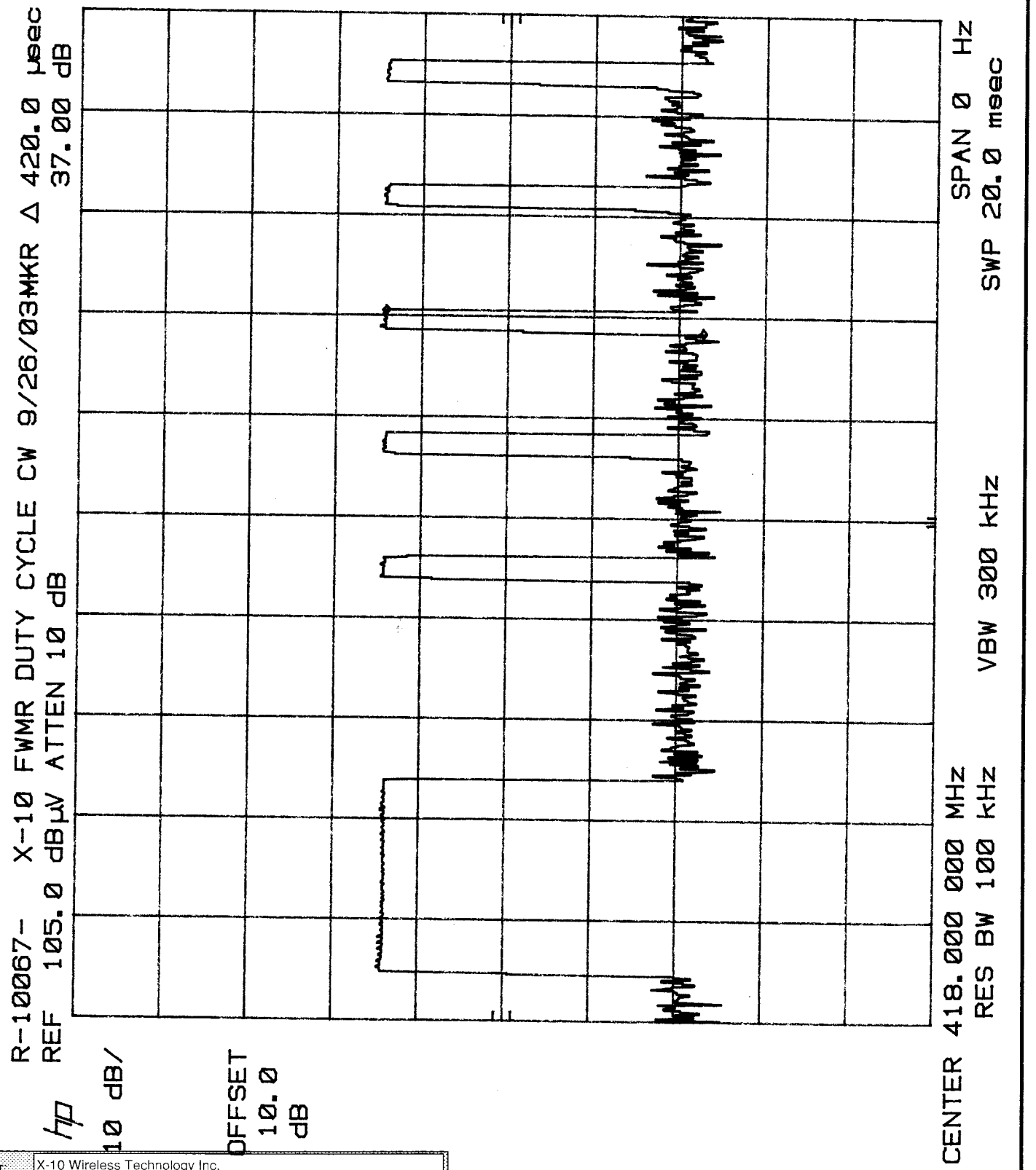
Customer: X-10 Wireless Technology Inc.
Test Sample: 418 Mhz Transmitter
Model No: FWMR FCC ID:B4S FWMR
Test Method: FCC 15.35 Duty Cycle Determination
Notes: Large Pulse Duration Time= 3.86 msec
Duty Cycle=[3.86 mSec+ (25x0.42mSec)]/64.0mSec=0.224=22.4%

Date: September 29, 2003 Tech: C. Weber Sheet 2 of 3



Retlif Testing Laboratories

Report No. 10067-3



Customer:	X-10 Wireless Technology Inc.
Test Sample:	418 Mhz Transmitter
Model No:	FWMR FCC ID:B4S FWMR
Test Method:	FCC 15.35 Duty Cycle Determination
Notes:	Small Pulse Duration Time= 0.42 msec
	Duty Cycle={3.86 mSec+ (25x0.42mSec)}/64.0mSec=0.224=22.4%

Date: September 29, 2003 Tech: C. Weber Sheet 3 of 3

Retlif Testing Laboratories

Report No. 10067-3

Test Method:	FCC Part 15 Subpart C Radiated Emissions, Fundamental & Harmonic Emissions		
Customer:	X-10 Wireless Technology, Inc.	**Job No.**	R-10067-3
Test Sample:	Pulsed RF Transmitter	**Paragraph:**	15.231
Model No.:	FWMR	**FCC ID:**	B4S FWMR
Operating Mode:	Continuously Transmitting a pulsed 418 MHz Signal		
Technician:	C. Weber	**Date:**	September 29, 2003

Notes: Test Distance: 3 Meters Temp: 31°C Humidity: 35%
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
418	H / 1.0	X	75.0	-0.9	74.1	5069.9	103,300
|	H / 1.0	Y	80.8	-0.9	79.9	9885.5	|
|	H / 1.0	Z	78.5	-0.9	77.6	7585.8	|
|	V / 1.0	X	80.3	-0.9	79.4	9332.5	|
|	V / 2.5	Y	70.2	-0.9	69.3	2917.4	|
418	V / 1.0	Z	81.9	-0.9	81.0	11220.2	103,300
836	H / 1.0	X	34.6	+7.4	42.0	125.9	10,330
|	H / 1.0	Y	37.1	+7.4	44.5	167.9	|
|	H / 1.0	Z	36.2	+7.4	43.6	151.4	|
|	V / 1.3	X	39.0	+7.4	46.4	208.9	|
|	V / 1.5	Y	35.3	+7.4	42.7	136.5	|
836	V / 1.0	Z	32.7	+7.4	40.1	101.2	10,330
1254	H / 1.0	X	53.6	-1.1	52.5	421.7	10,330
|	H / 1.5	Y	44.0	-1.1	42.9	139.6	|
|	H / 1.3	Z	50.7	-1.1	49.6	302.0	|
|	V / 1.0	X	51.3	-1.1	50.2	323.6	|
|	V / 1.0	Y	53.3	-1.1	52.2	407.4	|
1254	V / 1.0	Z	54.0	-1.1	52.9	441.6	10,330
1672	H / 1.3	X	54.2	+3.2	57.4	741.3	5,000
|	H / 1.0	Y	46.6	+3.2	49.8	309.0	|
|	H / 1.4	Z	50.0	+3.2	53.2	457.1	|
|	V / 1.0	X	52.0	+3.2	55.2	575.4	|
|	V / 1.0	Y	53.6	+3.2	56.8	691.8	|
1672	V / 1.0	Z	53.5	+3.2	56.7	683.9	5,000
2090	H / 1.0	X	50.9	+11.0	61.9	1244.5	10,330
|	H / 1.2	Y	49.2	+11.0	60.2	1023.3	|
|	H / 1.0	Z	45.0	+11.0	56.0	631.0	|
|	V / 1.5	X	53.0	+11.0	64.0	1584.9	|
|	V / 1.2	Y	48.7	+11.0	59.7	966.1	|
2090	V / 2.5	Z	47.5	+11.0	58.5	841.4	10,330

The frequency range was scanned from 30 MHz to 4.18 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-10067-3

Test Method:	FCC Part 15 Subpart C Radiated Emissions, Fundamental & Harmonic Emissions		
Customer:	X-10 Wireless Technology, Inc.	**Job No.**	R-10067-3
Test Sample:	Pulsed RF Transmitter	**Paragraph:**	15.231
Model No.:	FWMR	**FCC ID:**	B4S FWMR
Operating Mode:	Continuously Transmitting a pulsed 418 MHz Signal		
Technician:	C. Weber	**Date:**	September 29, 2003

Notes: Test Distance: 3 Meters Temp: 31°C Humidity: 35%

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 / 1.4	X	50.2	-1.5	48.7	272.3	10,330
|	H / 1.0	Y	47.9	-1.5	46.4	208.9	|
|	H / 1.0	Z	43.3	-1.5	41.8	123.0	|
|	V / 1.5	X	54.3	-1.5	52.8	436.5	|
|	V / 1.3	Y	47.9	-1.5	46.4	208.9	|
2508	V / 1.2	Z	47.1	-1.5	45.6	190.5	10,330
2926	H / 1.0	X	33.9	+0.3	34.2	51.3*	10,330
|	H / 1.3	Y	38.3	+0.3	38.6	85.1	|
|	H / 1.0	Z	37.0	+0.3	37.3	73.3	|
|	V / 1.3	X	43.3	+0.3	43.6	151.4	|
|	V / 1.2	Y	37.8	+0.3	38.1	80.4	|
2926	V / 1.0	Z	33.9	+0.3	34.2	51.3*	10,330
3344	H / 1.0	X	32.0	+0.7	32.7	43.2*	10,330
|	H / 1.0	Y	32.0	+0.7	32.7	43.2*	|
|	H / 1.0	Z	32.0	+0.7	32.7	43.2*	|
|	V / 1.3	X	35.3	+0.7	36.0	63.1	|
|	V / 1.0	Y	32.0	+0.7	32.7	43.2*	|
3344	V / 1.0	Z	32.0	+0.7	32.7	43.2*	10,330
3762	H / 1.2	X	39.8	+1.7	41.5	118.9	5,000
|	H / 1.5	Y	40.3	+1.7	42.0	125.9	|
|	H / 1.5	Z	39.2	+1.7	40.9	110.9	|
|	V / 1.0	X	43.1	+1.7	44.8	173.8	|
|	V / 1.3	Y	43.5	+1.7	45.2	182.0	|
3762	V / 1.0	Z	38.7	+1.7	40.4	104.7	5,000
4180	H / 1.0	X	34.5	+2.7	37.2	72.4*	5,000
|	H / 1.3	Y	34.5	+2.7	37.2	72.4*	|
|	H / 1.0	Z	34.5	+2.7	37.2	72.4*	|
|	V / 1.3	X	37.6	+2.7	40.3	103.5	|
|	V / 1.0	Y	34.5	+2.7	37.2	72.4*	|
4180	V / 1.0	Z	34.5	+2.7	37.2	72.4*	5,000

The frequency range was scanned from 30 MHz to 4.18 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 Wireless Technology, Inc.	**Job No.**	R-10067-3
Test Sample:	Pulsed RF Transmitter	**Paragraph:**	15.231
Model No.:	FWMR	**FCC ID:**	B4S FWMR
Operating Mode:	Continuously Transmitting a pulsed 418 MHz Signal		
Technician:	C. Weber	**Date:**	September 29, 2003
Notes:	Test Distance: 3 Meters	Duty Cycle:	22.4 %
	Detector: Peak, unless otherwise specified	Duty Cycle Correction:	-13 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
418	H / 1.0	X	74.1	-13.0	61.1	1135.0	10,330
|	H / 1.0	Y	79.9	-13.0	66.9	2213.1	|
|	H / 1.0	Z	77.6	-13.0	64.6	1698.2	|
|	V / 1.0	X	79.4	-13.0	66.4	2089.3	|
|	V / 2.5	Y	69.3	-13.0	56.3	653.1	|
418	V / 1.0	Z	81.0	-13.0	68.0	2511.9	10,330
836	H / 1.0	X	42.0	-13.0	29.0	28.2	1,033
|	H / 1.0	Y	44.5	-13.0	31.5	37.6	|
|	H / 1.0	Z	43.6	-13.0	30.6	33.9	|
|	V / 1.3	X	46.4	-13.0	33.4	46.8	|
|	V / 1.5	Y	42.7	-13.0	29.7	30.5	|
836	V / 1.0	Z	40.1	-13.0	27.1	22.6	1,033
1254	H / 1.0	X	52.5	-13.0	39.5	94.4	1,033
|	H / 1.5	Y	42.9	-13.0	29.9	31.3	|
|	H / 1.3	Z	49.6	-13.0	36.6	67.6	|
|	V / 1.0	X	50.2	-13.0	37.2	72.4	|
|	V / 1.0	Y	52.2	-13.0	39.2	91.2	|
1254	V / 1.0	Z	52.9	-13.0	39.9	98.9	1,033
1672	H / 1.3	X	57.4	-13.0	44.4	166.0	500
|	H / 1.0	Y	49.8	-13.0	36.8	69.2	|
|	H / 1.4	Z	53.2	-13.0	40.2	102.3	|
|	V / 1.0	X	55.2	-13.0	42.2	128.8	|
|	V / 1.0	Y	56.8	-13.0	43.8	154.9	|
1672	V / 1.0	Z	56.7	-13.0	43.7	153.1	500
2090	H / 1.0	X	61.9	-13.0	48.9	278.6	1,033
|	H / 1.2	Y	60.2	-13.0	47.2	229.1	|
|	H / 1.0	Z	56.0	-13.0	43.0	141.3	|
|	V / 1.5	X	64.0	-13.0	51.0	354.8	|
|	V / 1.2	Y	59.7	-13.0	46.7	216.3	|
2090	V / 2.5	Z	58.5	-13.0	45.5	188.4	1,033
	The frequency range was scanned from 30 MHz to 4.18 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 Wireless Technology, Inc.	**Job No.**	R-10067-3
Test Sample:	Pulsed RF Transmitter	**Paragraph:**	15.231
Model No.:	FWMR	**FCC ID:**	B4S FWMR
Operating Mode:	Continuously Transmitting a pulsed 418 MHz Signal		
Technician:	C. Weber	**Date:**	September 29, 2003

Notes: Test Distance: 3 Meters — Duty Cycle: 22.4 %

Detector: Peak, unless otherwise specified — Duty Cycle Correction: -13.0 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
2508	H / 1.4	X	48.7	-13.0	35.7	61.0	1,033
|	H / 1.0	Y	46.4	-13.0	33.4	46.8	|
|	H / 1.0	Z	41.8	-13.0	28.8	27.5	|
|	V / 1.5	X	52.8	-13.0	39.8	97.7	|
|	V / 1.3	Y	46.4	-13.0	33.4	46.8	|
2508	V / 1.2	Z	45.6	-13.0	32.6	42.7	1,033
2926	H / 1.0	X	34.2	-13.0	21.2	11.5*	1,033
|	H / 1.3	Y	38.6	-13.0	25.6	19.1	|
|	H / 1.0	Z	37.3	-13.0	24.3	16.4	|
|	V / 1.3	X	43.6	-13.0	30.6	33.9	|
|	V / 1.2	Y	38.1	-13.0	25.1	18.0	|
2926	V / 1.0	Z	34.2	-13.0	21.2	11.5*	1,033
3344	H / 1.0	X	32.7	-13.0	19.7	9.7*	1,033
|	H / 1.0	Y	32.7	-13.0	19.7	9.7*	|
|	H / 1.0	Z	32.7	-13.0	19.7	9.7*	|
|	V / 1.3	X	36.0	-13.0	23.0	14.1	|
|	V / 1.0	Y	32.7	-13.0	19.7	9.7*	|
3344	V / 1.0	Z	32.7	-13.0	19.7	9.7*	1,033
3762	H / 1.2	X	41.5	-13.0	28.5	26.6	500
|	H / 1.5	Y	42.0	-13.0	29.0	28.2	|
|	H / 1.5	Z	40.9	-13.0	27.9	24.8	|
|	V / 1.0	X	44.8	-13.0	31.8	38.9	|
|	V / 1.3	Y	45.2	-13.0	32.2	40.7	|
3762	V / 1.0	Z	40.4	-13.0	27.4	23.4	500
4180	H / 1.0	X	37.2	-13.0	24.2	16.2*	500
|	H / 1.3	Y	37.2	-13.0	24.2	16.2*	|
|	H / 1.0	Z	37.2	-13.0	24.2	16.2*	|
|	V / 1.3	X	40.3	-13.0	27.3	23.2	|
|	V / 1.0	Y	37.2	-13.0	24.2	16.2*	|
4180	V / 1.0	Z	37.2	-13.0	24.2	16.2*	500

The frequency range was scanned from 30 MHz to 4.18 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, Spurious Case Radiated Emissions, Paragraph 15.209(a)		
Customer:	X-10 Wireless Technology, Inc.	**Job No.**	R-10067-3
Test Sample:	Pulsed RF Transmitter		
Model No.:	FWMR	**FCC ID:**	B4S FWMR
Operating Mode:	Continuously Transmitting a pulsed 418 MHz Signal		
Technician:	C. Weber	**Date:**	September 29, 2003

Notes: Test Distance: 3 Meters Temp: 31°C Humidity: 35%
Detector: Quasi-Peak Below 1 GHz, Peak above 1 GHz

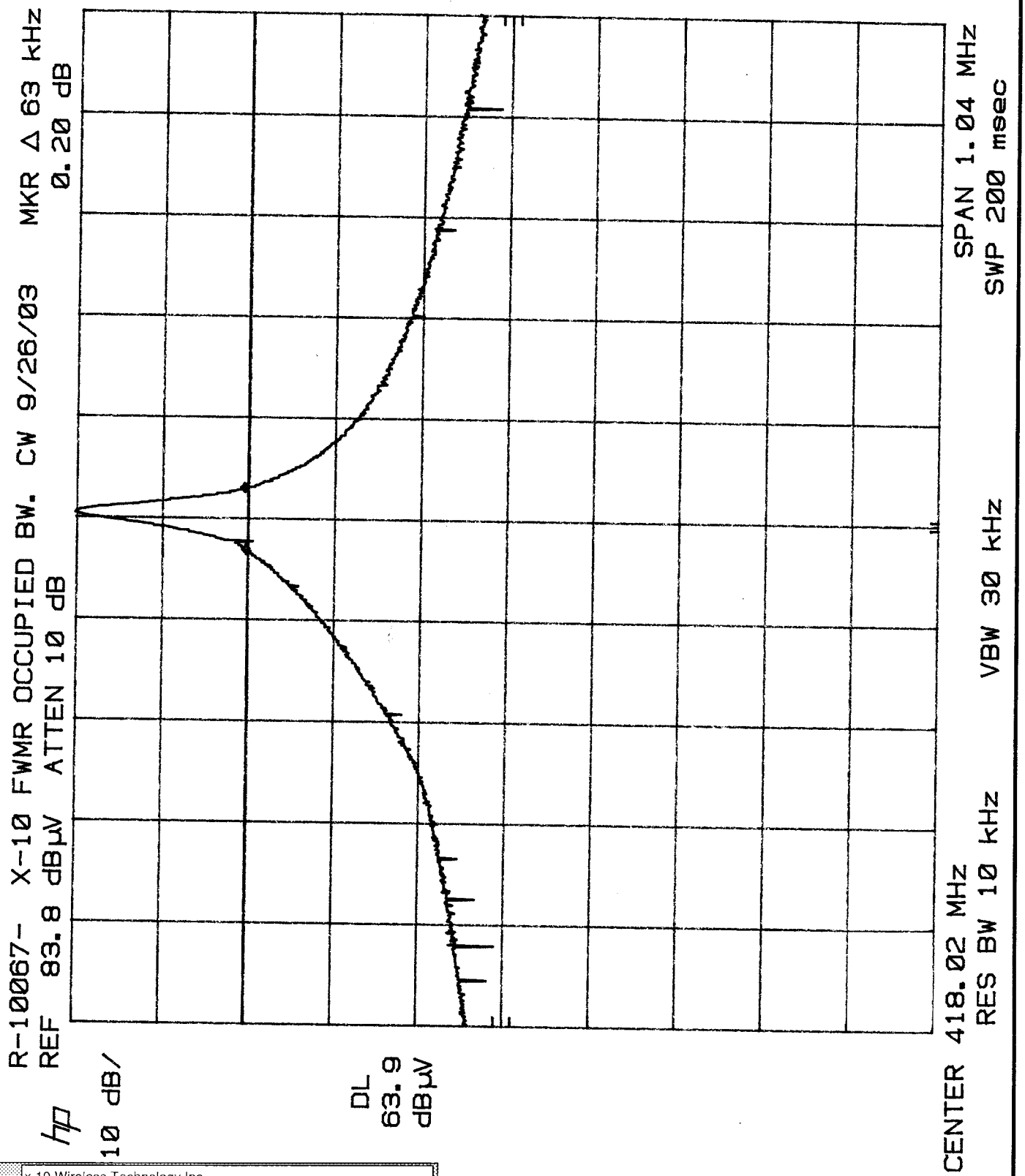
Test Freq.	Antenna Position	EUT Orientation	Meter Readings	Correction Factor	Corrected Reading	Converted Reading	**LIMIT**
MHz	(V/H) / Meters	Degrees	dBuV	dB	dBuV/m	uV/m	uV/m
30.00							100
88.00							100
88.00							150
216.00							150
216.00							200
960.00							200
960.00							500
4180.0							500

NO EMMISSIONS OBSERVED AT 3 METERS

The EUT was scanned from 30 MHz to 4.18 GHz
The emissions observed from the EUT do not exceed the specified limits.
Emissions not recorded were more than 20dB under the specified limit.

Retlif Testing Laboratories

Retlif Job Number R-10067-3



Customer:	x-10 Wireless Technology Inc.
Test Sample:	418 Mhz Transmitter
Model No:	FWMR FCC ID: B4S FWMR
Test Method:	FCC 15.231 (c) Occupied Bandwidth
Notes:	20db Bsndwidth does not exceed 0.25% of the center frequency (418 MHz) Maximum allowable 20dB Bandwidth=1.045 MHz.

Date: September 29, 2003 Tech: JC Weber Sheet: 1 of 1

Retlif Testing Laboratories

Report No. 10067-13 CW