APPLICANT		MANUFACTURER	
Name:	X10 (USA), Inc.	Name:	X-10 Electronics (Shenzhen) Co. Ltd.
Address:	Blackriver Corporate Park 620 Naches Ave SW, Building A	Address:	Together Rich Industrial Park B Sanwei Industrial District, Xixiang Town
City, State, Zip:	Renton, WA 98057	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: 310 MHz and 418.4 MHz Pulsed Transmitter

BRANDNAME(s): X10 (USA)

MODEL(s): IR32A

FCC ID: B4SIR32A

TYPE: Pulsed Transmitter

POWER REQUIREMENTS: 4.5 VDC derived from three alkaline batteries

FREQUENCY OF OPERATION: 310 and 418.4 MHz

APPLICABLE RULE SECTION: Part 15, Subpart C, Section 15.231

Tests Performed

Para. 15.231(b),	Field Strength of Emissions, Fundamental and Harmonics
Para. 15.231(b),	Field Strength of Emissions, Spurious
Para. 15.231(b)(a)	Duty Cycle Determination
Para. 15.231(c)	Occupied Bandwidth

Test Results

15.231 (a): This device transmits a control signal for use in wireless home automation / remote control systems.

15.231 (a)(1) The transmitter is manually operated. Transmission ends within 5 seconds of deactivation.

15.231 (a)(2) The transmitter is manually operated.

15.231 (a)(3): The transmitter does not perform periodic transmissions

15.231 (a)(4) The transmitter is not used for emergencies.

EUT Operating at 310 MHz

15.231 (b): The fundamental field strength did not exceed 5833.3 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 583.3 µV/M (AVERAGE).

15.231 (c) The Bandwidth of the emission was no wider than 0.25% of the center frequency (775 kHz) as measured 20 db down from the modulated carrier. The measured Bandwidth was 70 kHz.

EUT Operating at 418.4 MHz

15.231 (b): The fundamental field strength did not exceed 10,350 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 1035.0 µV/M (AVERAGE).

15.231 (c) The Bandwidth of the emission was no wider than 0.25% of the center frequency (1.046 MHz) as measured 20 db down from the modulated carrier. The Measured bandwidth was 637 kHz.

Determination of Field Strength Limits

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

EUT Operating at 310 MHz

	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 =	5833.3	µV/M (AVERAGE) @ 3 Meters
Harmonic Limit =	583.3	µV/M (AVERAGE) @ 3 Meters

EUT Operating at 418.4 MHz

	Frequency		Limit	
F1 =	260		3750 =	L1
Fo =	418.4		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 =	10350.0	µV/M (AVERAGE) @ 3 Meters
Harmonic Limit =	1035.0	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).

EUT Operating at 310 MHz

Transmitter On Time = 100 milliseconds (maximum)
Transmitter Cycle Time = 28.2 milliseconds
Transmitter Duty Cycle = 28.2 %

Calculation

1 Large Pulse = 9.2 milliseconds
34 x 560 µs (small pulse) = 19.04 milliseconds
9.2 + 19.04 = 28.2 milliseconds
Duty Cycle (28.2/100) x 100= 28.2 %
Correction Factor =20 log (0.282) = -11 dB

EUT Operating at 418.4 MHz

Transmitter On Time = 100 milliseconds (maximum)
Transmitter Cycle Time = 11.2 milliseconds
Transmitter Duty Cycle = 11.2 %

Calculation

3 X 1.6 3 Large Pulse = 4.8 milliseconds
8 x 800 µs (small pulse) = 6.4 milliseconds
4.8 + 6.4 = 11.2 milliseconds
Duty Cycle (11.2/100) x 100= 11.2 %
Correction Factor =20 log (0.112) = -19.02 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 560 µs yields a minimum required bandwidth of 1190 Hz. FCC specified bandwidths of 100 kHz and 1 MHz 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 4.184 GHz. All emissions not reported were more than 20 dB below the specified limit.

Equipment Lists

FCC Part 15.231 (b), Field Strength of Emissions, Fundamental and Harmonics

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
067	Open Area Test Site	Retlif	3/10 Meter	RNY	9/12/2006	9/12/2009
128	Double Ridged Guide	Electro-Mechanics	1 GHz - 18 GHz	3105	2/21/2008	2/21/2009
133	Broadband Pre-Amplifier	Electro-Metrics	10 kHz - 1 GHz, 26dB	BPA-1000	4/28/2008	4/28/2009
141	Spectrum Analyzer	Hewlett Packard	100 Hz - 40 GHz	8566B	4/30/2008	4/30/2009
141B	Quasi-Peak Adaptor	Hewlett Packard	100 Hz - 1 GHz	85650A	4/30/2008	4/30/2009
206B	6.0 dB Attenuator	Texscan	0 - 1.0 GHz	FP-50 - 6 dB	4/28/2008	4/28/2009
512	Graphics Plotter	Hewlett Packard	N/A	7470A	10/19/2007	10/19/2008
523	Biconilog	Electro-Mechanics	26 - 2000 MHz	3142B	10/24/2007	10/24/2008
543	Preamplifier	Hewlett Packard	1.0 GHz - 26.5 GHz	8449B	9/26/2007	9/26/2008
617	Interference Analyzer	Electro-Metrics	10 kHz - 1 GHz	EMC-30	10/24/2007	10/24/2008

FCC Part 15.231 (b), Field Strength of Emissions, Spurious

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
067	Open Area Test Site	Retlif	3/10 Meter	RNY	9/12/2006	9/12/2009
128	Double Ridged Guide	Electro-Mechanics	1 GHz - 18 GHz	3105	2/21/2008	2/21/2009
133	Broadband Pre-Amplifier	Electro-Metrics	10 kHz - 1 GHz, 26dB	BPA-1000	4/28/2008	4/28/2009
141	Spectrum Analyzer	Hewlett Packard	100 Hz - 40 GHz	8566B	4/30/2008	4/30/2009
141B	Quasi-Peak Adaptor	Hewlett Packard	100 Hz - 1 GHz	85650A	4/30/2008	4/30/2009
206B	6.0 dB Attenuator	Texscan	0 - 1.0 GHz	FP-50 - 6 dB	4/28/2008	4/28/2009
512	Graphics Plotter	Hewlett Packard	N/A	7470A	10/19/2007	10/19/2008
523	Biconilog	Electro-Mechanics	26 - 2000 MHz	3142B	10/24/2007	10/24/2008
543	Preamplifier	Hewlett Packard	1.0 GHz - 26.5 GHz	8449B	9/26/2007	9/26/2008
617	Interference Analyzer	Electro-Metrics	10 kHz - 1 GHz	EMC-30	10/24/2007	10/24/2008

FCC Part 15.231(b)(2), Duty Cycle Determination

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
067	Open Area Test Site	Retlif	3/10 Meter	RNY	9/12/2006	9/12/2009
141	Spectrum Analyzer	Hewlett Packard	100 Hz - 40 GHz	8566B	4/30/2008	4/30/2009
141B	Quasi-Peak Adaptor	Hewlett Packard	100 Hz - 1 GHz	85650A	4/30/2008	4/30/2009
512	Graphics Plotter	Hewlett Packard	N/A	7470A	10/19/2007	10/19/2008

FCC Part 15.231(c), Occupied Bandwidth

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
067	Open Area Test Site	Retlif	3/10 Meter	RNY	9/12/2006	9/12/2009
141	Spectrum Analyzer	Hewlett Packard	100 Hz - 40 GHz	8566B	4/30/2008	4/30/2009
141B	Quasi-Peak Adaptor	Hewlett Packard	100 Hz - 1 GHz	85650A	4/30/2008	4/30/2009
512	Graphics Plotter	Hewlett Packard	N/A	7470A	10/19/2007	10/19/2008

FCC Part 15 Subpart C
Para.15.231(b) Field Strength of Emissions, Fundamental & Harmonics
310 MHz Transmitter
Test Data

Test Method:	FCC Part 15 Subpart C, Radiated Emissions, Fundamental & Harmonic Emissions,		
Customer:	X-10 (USA), Inc.	**Job No.**	R-12563-1
Test Sample:	310 and 418.4 MHz Pulse Transmitter		
Model No.:	IR32A	**FCC ID:**	B4SIR32A
Operating Mode:	Continuously transmitting a Pulsed 310.0 MHz signal.		
Technician:	K. McDonald	**Date:**	July 31, 2008

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	dBµV	dB	dBµV/m	uV/m	uV/m
310.0	V / 1.0	X	66.80	-4.3	62.5	1333.5	58333.0
|	V / 1.7	Y	79.40	-4.3	75.1	5688.5	|
|	V / 1.4	Z	71.80	-4.3	67.5	2371.4	|
|	H / 1.0	X	80.50	-4.3	76.2	6456.5	|
|	H / 1.7	Y	67.70	-4.3	63.4	1479.1	|
310.0	H / 1.0	Z	77.8	-4.3	73.5	4731.5	58333.0
620.0	V / 1.0	X	46.0	4.2	50.2	323.6	5833.3
|	V / 1.5	Y	45.8	4.2	50.0	316.2	|
|	V / 1.0	Z	42.5	4.2	46.7	216.3	|
|	H / 1.0	X	49.8	4.2	54.0	501.2	|
|	H / 1.0	Y	41.1	4.2	45.3	184. 1	|
620.0	H / 1.0	Z	48.7	4.2	52.9	441.6	5833.3
930.0	V / 1.0	X	40.5	9.1	49.6	302.0	5833.3
|	V / 2.1	Y	39.9	9.1	49.0	281.8	|
|	V / 1.0	Z	38.9	9.1	48.0	251.2	|
|	H / 1.0	X	39.7	9.1	48.8	275.4	|
|	H / 1.0	Y	35.3	9.1	44.4	165.9	|
930.0	H / 1.0	Z	37.3	9.1	46.4	208.9	5833.3
1240.0	V / 1.0	X	47.5	1.5	49	*281.8	5000.0
|	V / 1.0	Y	47.5	1.5	49	*281.8	|
|	V / 1.0	Z	47.5	1.5	49	*281.8	|
|	H / 1.0	X	45.1	1.5	46.6	*213.8	|
|	H / 1.0	Y	45.1	1.5	46.6	*213.8	|
1240.0	H / 1.0	Z	45.1	1.5	46.6	*213.8	5000.0
1550.0	V / 1.0	X	46.9	1.0	47.9	*248.3	5000.0
|	V / 1.0	Y	46.9	1.0	47.9	*248.3	|
|	V / 1.0	Z	46.9	1.0	47.9	*248.3	|
|	H / 1.0	X	47.9	1.0	48.9	*278.6	|
|	H / 1.0	Y	47.9	1.0	48.9	*278.6	|
1550.0	H / 1.0	Z	47.9	1.0	48.9	*278.6	5000.0

The frequency range was scanned from 30 MHz to 3.1 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 sensitivity).

Test Method:	FCC Part 15 Subpart C, Radiated Emissions, Fundamental & Harmonic Emissions,		
Customer:	X-10 (USA), Inc.	**Job No.**	R-12563-1
Test Sample:	310 and 418.4 MHz Pulse Transmitter		
Model No.:	IR32A	**FCC ID:**	B4SIR32A
Operating Mode:	Continuously transmitting a Pulsed 310.0 MHz signal.		
Technician:	K. McDonald	**Date:**	July 31, 2008

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	dBµV	dB	dBµV/m	uV/m	uV/m
1860.0	V / 1.0	X	45.4	2.5	47.9	*248.3	5833.3
|	V / 1.0	Y	45.4	2.5	47.9	*248.3	|
|	V / 1.0	Z	45.4	2.5	47.9	*248.3	|
|	H / 1.0	X	44.7	2.5	47.2	*229.1	|
|	H / 1.0	Y	44.7	2.5	47.2	*229.1	|
1860.0	H / 1.0	Z	44.7	2.5	47.2	*229.1	5833.3
2170.0	V / 1.0	X	46.7	4.0	50.7	*342.8	5833.3
|	V / 1.0	Y	46.7	4.0	50.7	*342.8	|
|	V / 1.0	Z	46.7	4.0	50.7	*342.8	|
|	H / 1.0	X	44.8	4.0	48.8	*275.4	|
|	H / 1.0	Y	44.8	4.0	48.8	*275.4	|
2170.0	H / 1.0	Z	44.8	4.0	48.8	*275.4	5833.3
2480.0	V / 1.0	X	46.6	4.7	51.3	*367.3	5833.3
|	V / 1.0	Y	46.6	4.7	51.3	*367.3	|
|	V / 1.0	Z	46.6	4.7	51.3	*367.3	|
|	H / 1.0	X	46.6	4.7	51.3	*367.3	|
|	H / 1.0	Y	46.6	4.7	51.3	*367.3	|
2480.0	H / 1.0	Z	46.6	4.7	51.3	*367.3	5833.3
2790.0	V / 1.0	X	46.2	6.0	52.2	*407.4	5000.0
|	V / 1.0	Y	46.2	6.0	52.2	*407.4	|
|	V / 1.0	Z	46.2	6.0	52.2	*407.4	|
|	H / 1.0	X	46.3	6.0	52.3	*412.1	|
|	H / 1.0	Y	46.3	6.0	52.3	*412.1	|
2790.0	H / 1.0	Z	46.3	6.0	52.3	*412.1	5000.0
3100.0	V / 1.0	X	46.5	7.5	54.0	*501.2	5833.3
|	V / 1.0	Y	46.5	7.5	54.0	*501.2	|
|	V / 1.0	Z	46.5	7.5	54.0	*501.2	|
|	H / 1.0	X	46.2	7.5	53.7	*484.2	|
|	H / 1.0	Y	46.2	7.5	53.7	*484.2	|
3100.0	H / 1.0	Z	46.2	7.5	53.7	*484.2	5833.3

The frequency range was scanned from 30 MHz to 3.1 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-12563-1
Test Sample:	310 and 418.4 MHz Pulse Transmitter		
Model No.:	IR32A	**FCC ID:**	B4SIR32A
Operating Mode:	Continuously transmitting a Pulsed 310.0 MHz signal.		
Technician:	K. McDonald	**Date:**	July 31, 2008

Notes: Test Distance: 3 Meters — Duty Cycle: 28.2%
Detector: Peak, unless otherwise specified — Duty Cycle Correction: -11.0 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	dBµV	dB	dBµV/m	uV/m	uV/m
310.0	V / 1.0	X	62.5	-11.0	51.5	375.8	5833.3
|	V / 1.7	Y	75.1	-11.0	64.1	1603.2	|
|	V / 1.5	Z	67.5	-11.0	56.5	668.3	|
|	H / 1.0	X	76.2	-11.0	65.2	1819.7	|
|	H / 2.2	Y	63.4	-11.0	52.4	416.9	|
310.0	H / 1.0	Z	73.5	-11.0	62.5	1333.5	5833.3
620.0	V / 1.0	X	50.2	-11.0	39.2	91.2	583.3
|	V / 1.0	Y	50.0	-11.0	39.0	89.1	|
|	V / 1.0	Z	46.7	-11.0	35.7	61.0	|
|	H / 1.0	X	54.0	-11.0	43.0	141.3	|
|	H / 1.0	Y	45.3	-11.0	34.3	51.9	|
620.0	H / 1.0	Z	52.9	-11.0	41.9	124.5	583.3
930.0	V / 1.0	X	49.6	-11.0	38.6	85.1	583.3
|	V / 1.0	Y	49.0	-11.0	38.0	79.4	|
|	V / 1.0	Z	48.0	-11.0	37.0	70.8	|
|	H / 1.0	X	48.8	-11.0	37.8	77.6	|
|	H / 1.0	Y	44.4	-11.0	33.4	46.8	|
930.0	H / 1.0	Z	46.4	-11.0	35.4	58.9	583.3
1240.0	V / 1.0	X	49.0	-11.0	38.0	*79.4	500.0
|	V / 1.0	Y	49.0	-11.0	38.0	*79.4	|
|	V / 1.0	Z	49.0	-11.0	38.0	*79.4	|
|	H / 1.0	X	46.6	-11.0	35.6	*60.3	|
|	H / 1.0	Y	46.6	-11.0	35.6	*60.3	|
1240.0	H / 1.0	Z	46.6	-11.0	35.6	*60.3	500.0
1550.0	V / 1.0	X	47.9	-11.0	36.9	*70.0	500.0
|	V / 1.0	Y	47.9	-11.0	36.9	*70.0	|
|	V / 1.0	Z	47.9	-11.0	36.9	*70.0	|
|	H / 1.0	X	48.9	-11.0	37.9	*78.5	|
|	H / 1.0	Y	48.9	-11.0	37.9	*78.5	|
1550.0	H / 1.0	Z	48.9	-11.0	37.9	*78.5	500.0

The frequency range was scanned from 30 MHz to 3.1 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-12563-1
Test Sample:	310 and 418.4 MHz Pulse Transmitter		
Model No.:	IR32A	**FCC ID:**	B4SIR32A
Operating Mode:	Continuously transmitting a Pulsed 310.0 MHz signal.		
Technician:	K. McDonald	**Date:**	July 31, 2008

Notes: Test Distance: 3 Meters — Duty Cycle: 28.2%
Detector: Peak, unless otherwise specified — Duty Cycle Correction: -11.0 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	dBµV	dB	dBµV/m	uV/m	uV/m
1860.0	V / 1.0	X	47.9	-11.0	36.9	*70.0	583.3
|	V / 1.0	Y	47.9	-11.0	36.9	*70.0	|
|	V / 1.0	Z	47.9	-11.0	36.9	*70.0	|
|	H / 1.0	X	47.2	-11.0	36.2	*64.6	|
|	H / 1.0	Y	47.2	-11.0	36.2	*64.6	|
1860.0	H / 1.0	Z	47.2	-11.0	36.2	*64.6	583.3
2170.0	V / 1.0	X	50.7	-11.0	39.7	*96.6	583.3
|	V / 1.0	Y	50.7	-11.0	39.7	*96.6	|
|	V / 1.0	Z	50.7	-11.0	39.7	*96.6	|
|	H / 1.0	X	48.8	-11.0	37.8	*77.6	|
|	H / 1.0	Y	48.8	-11.0	37.8	*77.6	|
2170.0	H / 1.0	Z	48.8	-11.0	37.8	*77.6	583.3
2480.0	V / 1.0	X	51.3	-11.0	40.3	*103.5	583.3
|	V / 1.0	Y	51.3	-11.0	40.3	*103.5	|
|	V / 1.0	Z	51.3	-11.0	40.3	*103.5	|
|	H / 1.0	X	51.3	-11.0	40.3	*103.5	|
|	H / 1.0	Y	51.3	-11.0	40.3	*103.5	|
2480.0	H / 1.0	Z	51.3	-11.0	40.3	*103.5	583.3
2790.0	V / 1.0	X	52.2	-11.0	41.2	*114.8	500.0
|	V / 1.0	Y	52.2	-11.0	41.2	*114.8	|
|	V / 1.0	Z	52.2	-11.0	41.2	*114.8	|
|	H / 1.0	X	52.3	-11.0	41.3	*116.1	|
|	H / 1.0	Y	52.3	-11.0	41.3	*116.1	|
2790.0	H / 1.0	Z	52.3	-11.0	41.3	*116.1	500.0
3100.0	V / 1.0	X	54.0	-11.0	43.0	*141.3	583.3
|	V / 1.0	Y	54.0	-11.0	43.0	*141.3	|
|	V / 1.0	Z	54.0	-11.0	43.0	*141.3	|
|	H / 1.0	X	53.7	-11.0	42.7	*136.5	|
|	H / 1.0	Y	53.7	-11.0	42.7	*136.5	|
3100.0	H / 1.0	Z	53.7	-11.0	42.7	*136.5	583.3

The frequency range was scanned from 30 MHz to 3.1 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)

FCC Part 15 Subpart C
Para.15.231(b) Field Strength of Emissions, Fundamental & Harmonics
418.4 MHz Transmitter
Test Data

Test Method:	FCC Part 15 Subpart C, Radiated Emissions, Fundamental & Harmonic Emissions,		
Customer:	X-10 (USA), Inc.	**Job No.**	R-12563-1
Test Sample:	310 and 418.4 MHz Pulse Transmitter		
Model No.:	IR32A	**FCC ID:**	B4SIR32A
Operating Mode:	Continuously transmitting a Pulsed 418.4 MHz signal.		
Technician:	K. McDonald	**Date:**	July 31, 2008

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	dBµV	dB	dBµV/m	uV/m	uV/m
418.4	V / 2.6	X	72.8	-0.7	72.1	4027.2	103500.0
|	V / 1.0	Y	74.0	-0.7	73.3	4623.8	|
|	V / 1.9	Z	61.5	-0.7	60.8	1096.5	|
|	H / 2.0	X	61.5	-0.7	60.8	1096.5	|
|	H / 2.4	Y	58.6	-0.7	57.9	785.2	|
418.4	H / 1.8	Z	66.5	-0.7	65.8	1949.8	103500.0
836.8	V / 1.0	X	44.4	7.4	51.8	389.0	10350.0
|	V / 1.5	Y	37.8	7.4	45.2	182.0	|
|	V / 1.6	Z	40.2	7.4	47.6	239.9	|
|	H / 1.6	X	41.9	7.4	49.3	291.7	|
|	H / 2.0	Y	32.9	7.4	40.3	103.5	|
836.8	H / 1.0	Z	35.8	7.4	43.2	144.5	10350.0
1255.2	V / 1.0	X	50.0	1.5	51.5	375.8	10350.0
|	V / 1.1	Y	50.1	1.5	51.6	380.2	|
|	V / 1.3	Z	51.2	1.5	52.7	431.5	|
|	H / 1.0	X	52.6	1.5	54.1	507.0	|
|	H / 1.0	Y	48.1	1.5	49.6	302.0	|
1255.2	H / 1.0	Z	46.1	1.5	47.6	239.9	10350.0
1673.6	V / 1.1	X	44.0	2.1	46.1	201.8	5000.0
|	V / 1.0	Y	44.0	2.1	46.1	201.8	|
|	V / 1.0	Z	44.0	2.1	46.1	201.8	|
|	H / 1.0	X	44.1	2.1	46.2	204.2	|
|	H / 1.0	Y	44.1	2.1	46.2	204.2	|
1673.6	H / 1.0	Z	44.1	2.1	46.2	204.2	5000.0
2092.0	V / 1.0	X	43.5	4.0	47.5	237.1	10350.0
|	V / 1.0	Y	43.5	4.0	47.5	237.1	|
|	V / 1.0	Z	43.5	4.0	47.5	237.1	|
|	H / 1.0	X	43.6	4.0	47.6	239.9	|
|	H / 1.0	Y	43.6	4.0	47.6	239.9	|
2092.0	H / 1.0	Z	43.6	4.0	47.6	239.9	10350.0

The frequency range was scanned from 30 MHz to 4.34 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 sensitivity).

Test Method:	FCC Part 15 Subpart C, Radiated Emissions, Fundamental & Harmonic Emissions,		
Customer:	X-10 (USA), Inc.	**Job No.**	R-12563-1
Test Sample:	310 and 418.4 MHz Pulse Transmitter		
Model No.:	IR32A	**FCC ID:**	B4SIR32A
Operating Mode:	Continuously transmitting a Pulsed 418.4 MHz signal.		
Technician:	K. McDonald	**Date:**	July 31, 2008

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	dBµV	dB	dBµV/m	uV/m	uV/m
2510.4	V / 1.0	X	43.1	5.0	48.1	254.1	10996.0
|	V / 1.0	Y	43.1	5.0	48.1	254.1	|
|	V / 1.0	Z	43.1	5.0	48.1	254.1	|
|	H / 1.0	X	43.4	5.0	48.4	263.0	|
|	H / 1.0	Y	43.4	5.0	48.4	263.0	|
2510.4	H / 1.0	Z	43.4	5.0	48.4	263.0	10996.0
2928.8	V / 1.0	X	44.5	7.2	51.7	384.6	10996.0
|	V / 1.0	Y	44.5	7.2	51.7	384.6	|
|	V / 1.0	Z	44.5	7.2	51.7	384.6	|
|	H / 1.0	X	44.5	7.2	51.7	384.6	|
|	H / 1.0	Y	44.5	7.2	51.7	384.6	|
2928.8	H / 1.0	Z	44.5	7.2	51.7	384.6	10996.0
3347.2	V / 1.0	X	43.8	9.6	53.4	467.7	10996.0
|	V / 1.0	Y	43.8	9.6	53.4	467.7	|
|	V / 1.0	Z	43.8	9.6	53.4	467.7	|
|	H / 1.0	X	43.9	9.6	53.5	473.2	|
|	H / 1.0	Y	43.9	9.6	53.5	473.2	|
3347.2	H / 1.0	Z	43.9	9.6	53.5	473.2	10996.0
3765.6	V / 1.0	X	43.3	12.8	56.1	638.3	5000.0
|	V / 1.0	Y	43.3	12.8	56.1	638.3	|
|	V / 1.0	Z	43.3	12.8	56.1	638.3	|
|	H / 1.0	X	43.0	12.8	55.8	616.6	|
|	H / 1.0	Y	43.0	12.8	55.8	616.6	|
3765.6	H / 1.0	Z	43.0	12.8	55.8	616.6	5000.0
4184.0	V / 1.0	X	43.0	13.2	56.2	645.7	5000.0
|	V / 1.0	Y	43.0	13.2	56.2	645.7	|
|	V / 1.0	Z	43.0	13.2	56.2	645.7	|
|	H / 1.0	X	44.1	13.2	57.3	732.8	|
|	H / 1.0	Y	44.1	13.2	57.3	732.8	|
4184.0	H / 1.0	Z	44.1	13.2	57.3	732.8	5000.0

The frequency range was scanned from 30 MHz to 4.34 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-12563-1
Test Sample:	310 and 418.4 MHz Pulse Transmitter		
Model No.:	IR32A	**FCC ID:**	B4SIR32A
Operating Mode:	Continuously transmitting a Pulsed 418.4 MHz signal.		
Technician:	K. McDonald	**Date:**	July 31, 2008

Notes: Test Distance: 3 Meters — Duty Cycle: 11.2%
Detector: Peak, unless otherwise specified — Duty Cycle Correction: -19.0dB

Test Freq.	Antenna Pol./Height	EUT Orientation	Peak Reading	Correction Factor	Corrected Reading	Converted Reading	Avg. Limit
MHz	(V/H)-Meters	X / Y / Z	dBµV	dB	dBµV/m	uV/m	uV/m
418.4	V / 1.0	X	72.1	-19.0	53.1	451.9	10350.0
|	V / 1.0	Y	73.3	-19.0	54.3	518.8	|
|	V / 1.5	Z	60.8	-19.0	41.8	123.0	|
|	H / 2.1	X	60.8	-19.0	41.8	123.0	|
|	H / 1.7	Y	57.9	-19.0	38.9	88.1	|
418.4	H / 1.8	Z	65.8	-19.0	46.8	218.8	10350.0
836.8	V / 1.0	X	51.8	-19.0	32.8	43.7	1035.0
|	V / 1.5	Y	45.2	-19.0	26.2	20.4	|
|	V / 1.6	Z	47.6	-19.0	28.6	26.9	|
|	H / 1.0	X	49.3	-19.0	30.3	32.7	|
|	H / 1.0	Y	40.3	-19.0	21.3	11.6	|
836.8	H / 1.0	Z	43.2	-19.0	24.2	16.2	1035.0
1255.2	V / 1.0	X	51.5	-19.0	32.5	42.2	1035.0
|	V / 1.0	Y	51.6	-19.0	32.6	42.7	|
|	V / 1.0	Z	52.7	-19.0	33.7	48.4	|
|	H / 1.0	X	54.1	-19.0	35.1	56.9	|
|	H / 1.0	Y	49.6	-19.0	30.6	33.9	|
1255.2	H / 1.0	Z	47.6	-19.0	28.6	26.9	1035.0
1673.6	V / 1.1	X	46.1	-19.0	27.1	22.6	500.0
|	V / 1.0	Y	46.1	-19.0	27.1	22.6	|
|	V / 1.0	Z	46.1	-19.0	27.1	22.6	|
|	H / 1.0	X	46.2	-19.0	27.2	22.9	|
|	H / 1.0	Y	46.2	-19.0	27.2	22.9	|
1673.6	H / 1.0	Z	46.2	-19.0	27.2	22.9	500.0
2092.0	V / 1.0	X	47.5	-19.0	28.5	26.6	1035.0
|	V / 1.0	Y	47.5	-19.0	28.5	26.6	|
|	V / 1.0	Z	47.5	-19.0	28.5	26.6	|
|	H / 1.0	X	47.6	-19.0	28.6	26.9	|
|	H / 1.0	Y	47.6	-19.0	28.6	26.9	|
2092.0	H / 1.0	Z	47.6	-19.0	28.6	26.9	1035.0

The frequency range was scanned from 30 MHz to 4.34 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-12563-1
Test Sample:	310 and 418.4 MHz Pulse Transmitter		
Model No.:	IR32A	**FCC ID:**	B4SIR32A
Operating Mode:	Continuously transmitting a Pulsed 418.4 MHz signal.		
Technician:	K. McDonald	**Date:**	July 31, 2008

Notes: Test Distance: 3 Meters — Duty Cycle: 11.2%
Detector: Peak, unless otherwise specified — Duty Cycle Correction: -19.0dB

Test Freq.	Antenna Pol./Height	EUT Orientation	Peak Reading	Correction Factor	Corrected Reading	Converted Reading	Avg. Limit
MHz	(V/H)-Meters	X / Y / Z	dBµV	dB	dBµV/m	uV/m	uV/m
2510.4	V / 1.0	X	48.1	-19.0	29.1	28.5	1035.0
|	V / 1.0	Y	48.1	-19.0	29.1	28.5	|
|	V / 1.0	Z	48.1	-19.0	29.1	28.5	|
|	H / 1.0	X	48.4	-19.0	29.4	29.5	|
|	H / 1.0	Y	48.4	-19.0	29.4	29.5	|
2510.4	H / 1.0	Z	48.4	-19.0	29.4	29.5	1035.0
2928.8	V / 1.0	X	51.7	-19.0	32.7	43.2	1035.0
|	V / 1.0	Y	51.7	-19.0	32.7	43.2	|
|	V / 1.0	Z	51.7	-19.0	32.7	43.2	|
|	H / 1.0	X	51.7	-19.0	32.7	43.2	|
|	H / 1.0	Y	51.7	-19.0	32.7	43.2	|
2928.8	H / 1.0	Z	51.7	-19.0	32.7	43.2	1035.0
3347.2	V / 1.0	X	53.4	-19.0	34.4	52.5	500.0
|	V / 1.0	Y	53.4	-19.0	34.4	52.5	|
|	V / 1.0	Z	53.4	-19.0	34.4	52.5	|
|	H / 1.0	X	53.5	-19.0	34.5	53.1	|
|	H / 1.0	Y	53.5	-19.0	34.5	53.1	|
3347.2	H / 1.0	Z	53.5	-19.0	34.5	53.1	500.0
3765.6	V / 1.0	X	56.1	-19.0	37.1	71.6	500.0
|	V / 1.0	Y	56.1	-19.0	37.1	71.6	|
|	V / 1.0	Z	56.1	-19.0	37.1	71.6	|
|	H / 1.0	X	55.8	-19.0	36.8	69.2	|
|	H / 1.0	Y	55.8	-19.0	36.8	69.2	|
3765.6	H / 1.0	Z	55.8	-19.0	36.8	69.2	500.0
4184.0	V / 1.0	X	56.2	-19.0	37.2	72.4	500.0
|	V / 1.0	Y	56.2	-19.0	37.2	72.4	|
|	V / 1.0	Z	56.2	-19.0	37.2	72.4	|
|	H / 1.0	X	57.3	-19.0	38.3	82.2	|
|	H / 1.0	Y	57.3	-19.0	38.3	82.2	|
4184.0	H / 1.0	Z	57.3	-19.0	38.3	82.2	500.0

The frequency range was scanned from 30 MHz to 4.34 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)

FCC Part 15, Subpart C
Paragraph 15.231(b) Field Strength of Emissions, Spurious
30 MHz to 4.184 GHz,
Test Data

Test Method:	**FCC Part 15, Subpart C, Radiated Emissions Spurious Case, 30 MHz to 4.184 GHz, Para:15.231(b)**		
Customer:	X-10 (USA), Inc.	**Job No.:**	R-12563-1
Test Sample:	310 and 418.4 MHz Pulse Transmitter		
Model No.:	IR32A	**FCC ID:**	B4SIR32A
Operating Mode:	Continuously transmitting a Pulsed 310.0 MHz signal.		
Technician:	K. McDonald	**Date:**	July 31, 2008

Notes: Test Distance: 3 Meters Temp: 26.9°C Humidity: 76%
Detector: Quasi-Peak Below 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
30.00							100
|							|
|							|
88.00							100
88.00							150
|							|
|							|
109.4	H / 1.4	0.0	32.9	-10.4	22.5	13.3	|
117.0	H / 1.4	0.0	37.6	-11.1	26.5	21.1	|
122.5	H / 1.4	0.0	40.8	-11.4	29.4	29.5	|
126.2	H / 1.4	0.0	40.8	-11.5	29.3	29.2	|
128.1	H / 1.4	0.0	40.8	-11.7	29.1	28.5	|
130.2	H / 1.2	0.0	40.9	-11.8	29.1	28.5	|
133.0	H / 1.2	0.0	40.0	-11.7	28.3	26.0	|
138.0	H / 1.2	0.0	37.0	-11.2	25.8	19.5	|
140.0	H / 1.2	0.0	35.0	-11.1	24.9	17.6	|
142.0	H / 1.2	0.0	34.0	-11.0	23.0	14.1	|
|							|
|							|
|							|
|							|
|							|
|							150
216.0							200
216.0							|
|							|
|							|
960.00							200
960.00							500
|							|
|							|
4184.0							500

The frequency range was scanned from 30 MHz to 4.184 GHz.
The emissions observed from the EUT do not exceed the specified limits.
Emissions not recorded were more than 20dB under the specified limit.

Page 1 of 2

Test Method:	**FCC Part 15, Subpart C, Radiated Emissions Spurious Case, 30 MHz to 4.184 GHz, Para:15.231(b)**		
Customer:	X-10 (USA), Inc.	**Job No.:**	R-12563-1
Test Sample:	310 and 418.4 MHz Pulse Transmitter		
Model No.:	IR32A	**FCC ID:**	B4SIR32A
Operating Mode:	Continuously transmitting a Pulsed 418.4 MHz signal.		
Technician:	K. McDonald	**Date:**	July 31, 2008

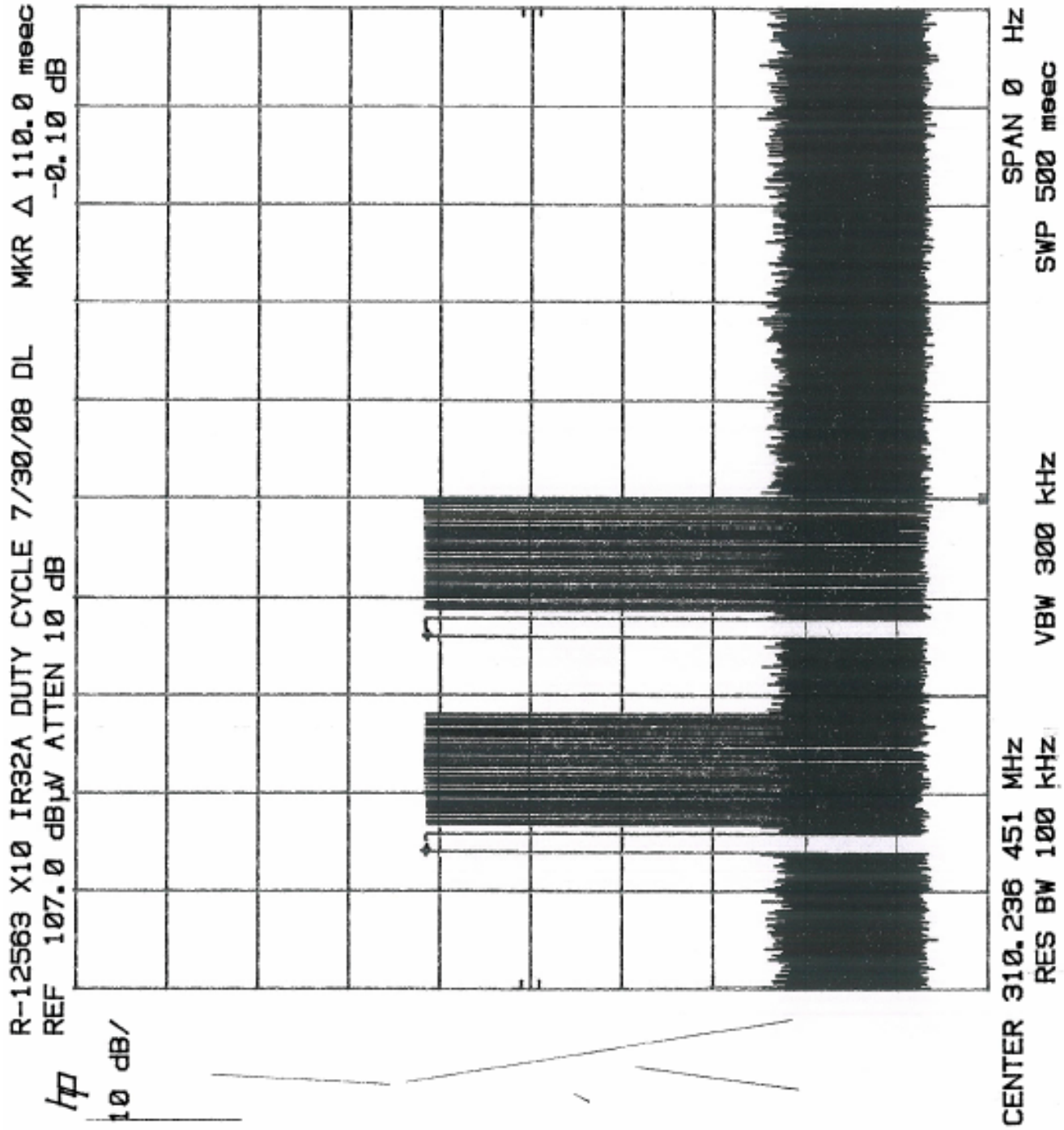
Notes: Test Distance: 3 Meters Temp: 26.9°C Humidity: 76%
Detector: Quasi-Peak Below 1 GHz, Peak above 1 GHz

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
30.00							100
|							|
|							|
88.00							100
88.00							150
|							|
|							|
112.4	H / 1.5	180.0	35.7	-10.4	25.3	18.4	|
113.6	H / 1.5	180.0	36.4	-10.6	25.8	19.5	|
114.6	H / 1.5	180.0	37.7	-10.7	26.0	20.0	|
118.0	H / 1.5	180.0	40.5	-11.1	29.4	29.5	|
121.1	H / 1.5	180.0	40.9	-11.3	29.6	30.2	|
122.6	H / 1.5	180.0	41.2	-11.4	29.8	30.9	|
123.6	H / 1.5	180.0	41.3	-11.4	29.9	31.3	|
124.9	H / 1.5	180.0	41.6	-11.5	30.1	32.0	|
127.7	H / 1.5	180.0	41.0	-11.1	28.9	27.9	|
130.2	H / 1.2	0.0	39.4	-11.8	27.6	24.0	|
134.0	H / 1.2	0.0	38.3	-11.7	25.6	18.4	|
143.6	H / 1.2	0.0	32.0	-11.0	21.0	19.5	|
|							|
|							|
|							|
|							150
216.0							200
216.0							|
|							|
|							|
960.00							200
960.00							500
|							|
|							|
4184.0							500

The frequency range was scanned from 30 MHz to 4.184 GHz.
The emissions observed from the EUT do not exceed the specified limits.
Emissions not recorded were more than 20dB under the specified limit.

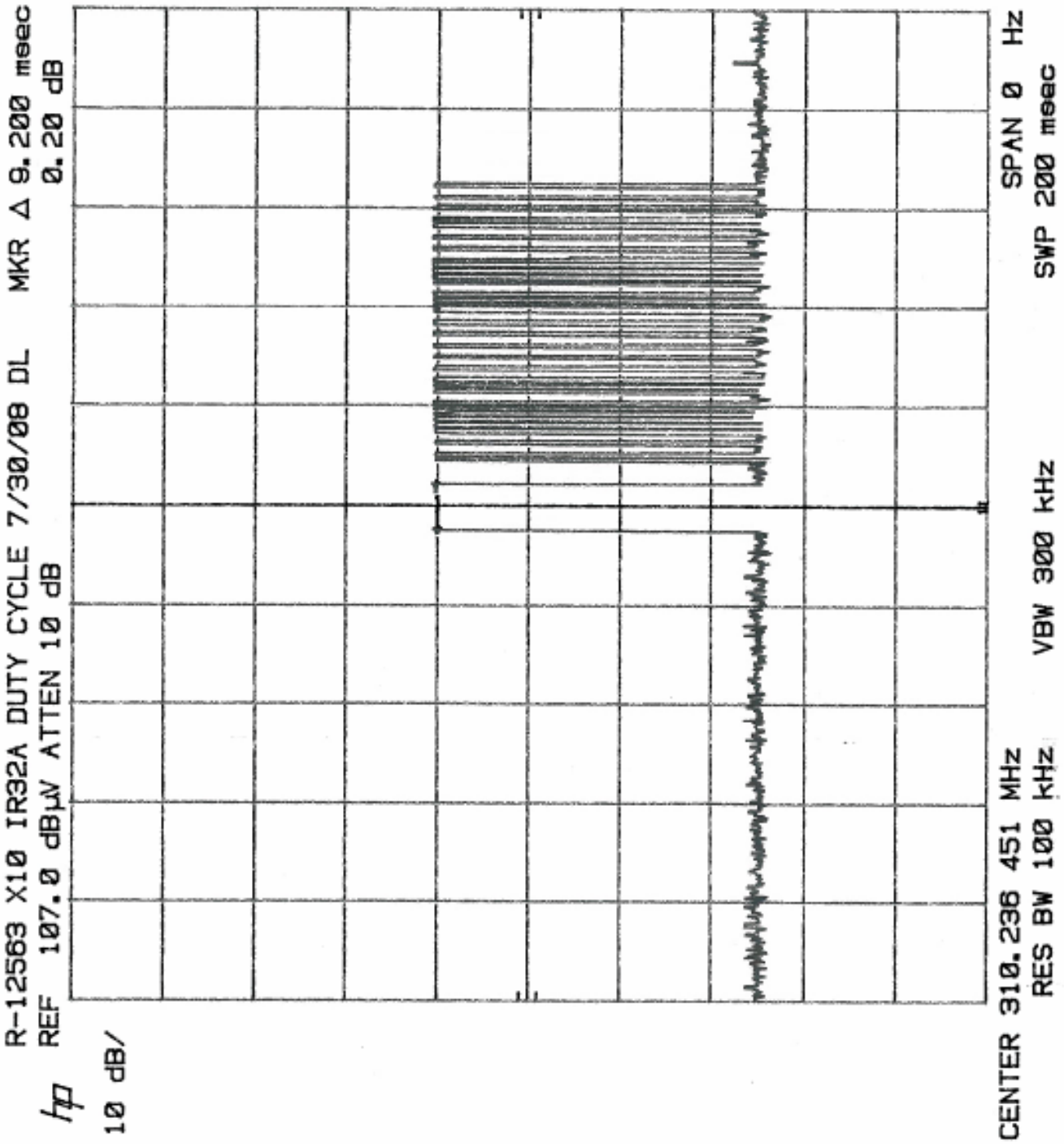
Page 2 of 2

FCC Part 15.231(b)(2), Duty Cycle Determination
310 MHz Transmitter
Test Data



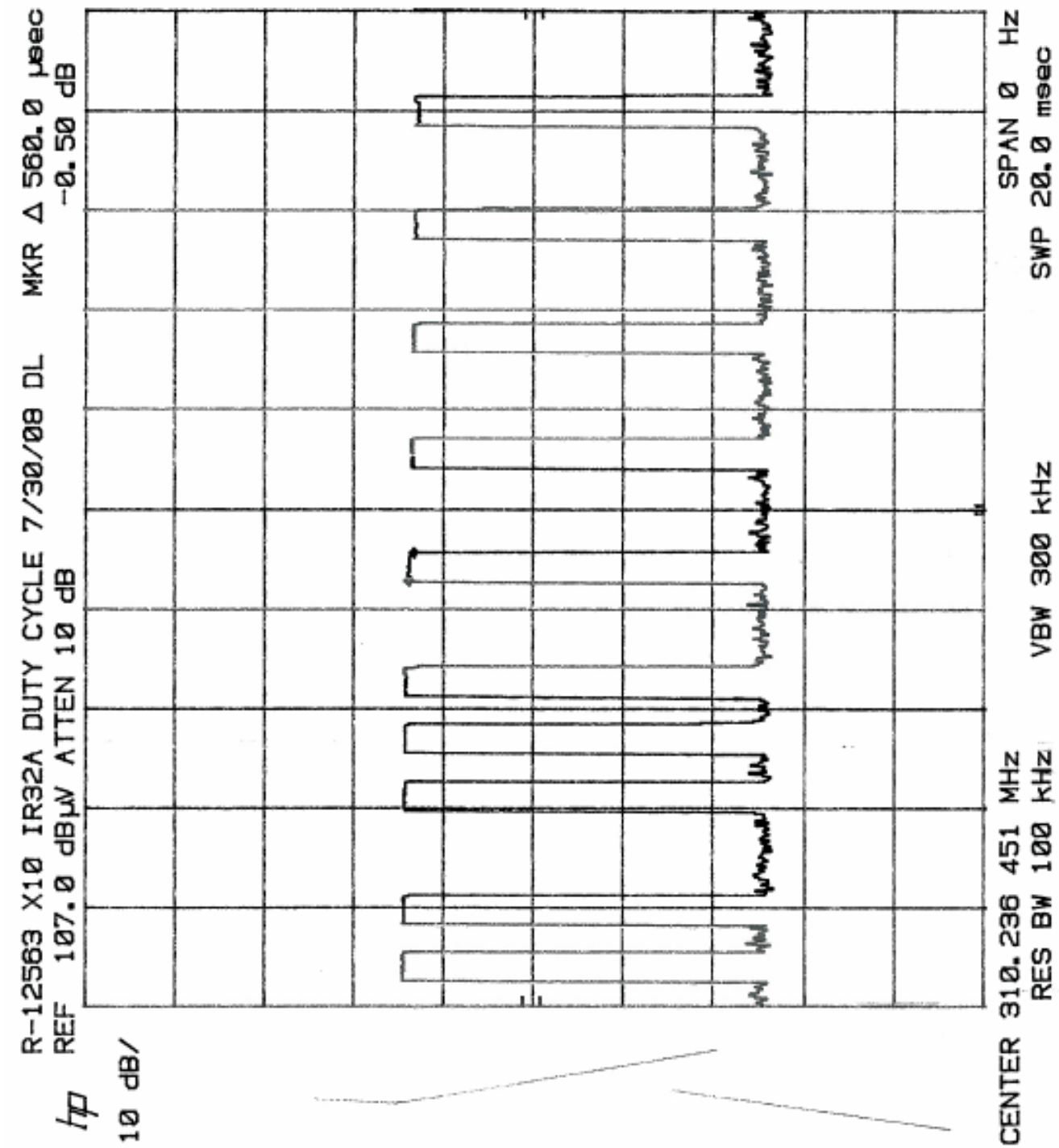
Test Method: **FCC Part 15.35, Duty Cycle Determination**.
Notes: Measurement of cycle time = 110.0mSec.
FCC ID.: B4SIR32A

Customer	X-10 (USA), Inc.	
Test Sample	310 and 418.4 MHz Pulsed Transmitter	
Model No.:	IR32A	
Date: July 30, 2008	Tech: D.L./K.M.	Sheet 1 of 4



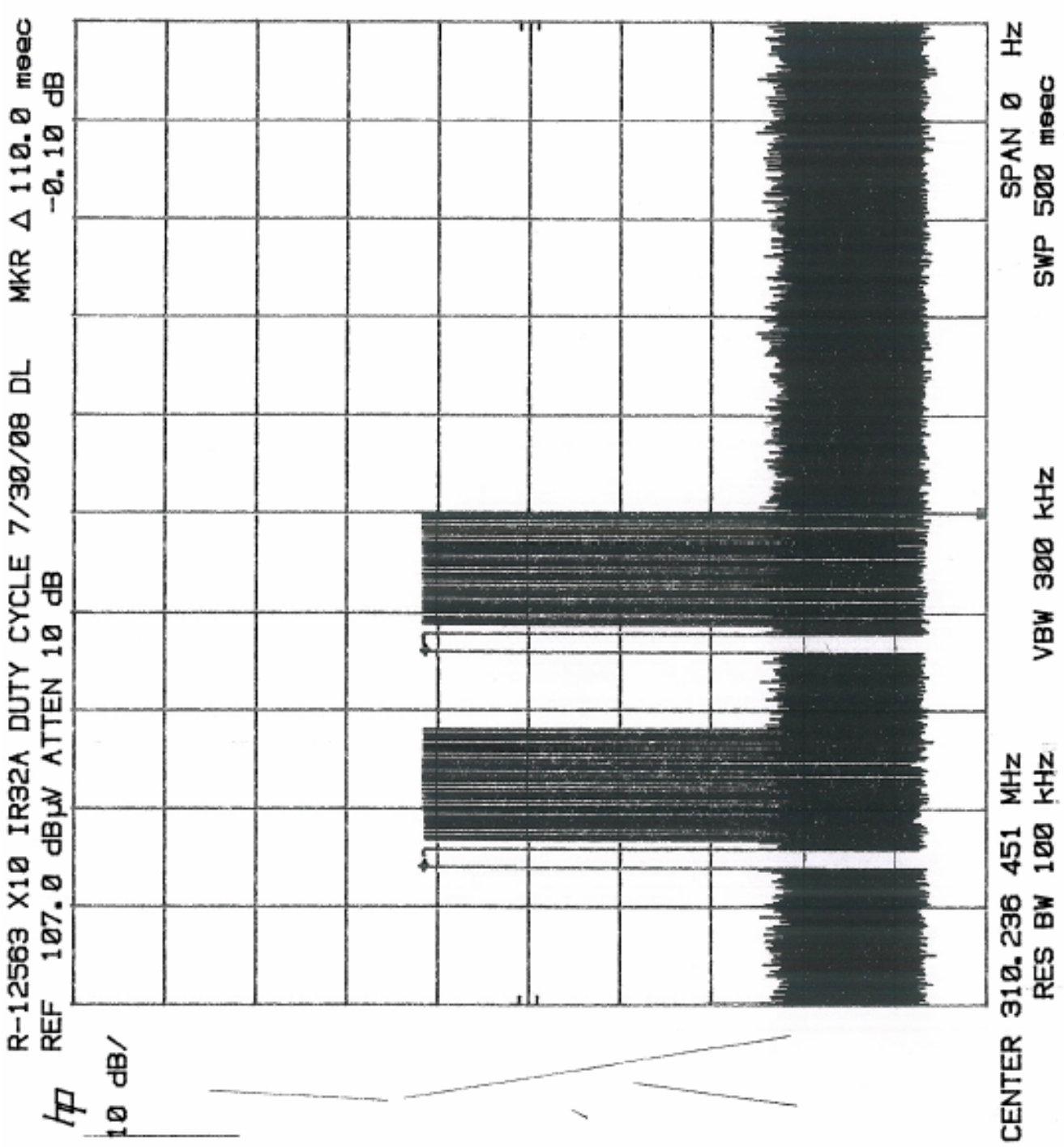
Test Method: FCC Part 15.35, Duty Cycle Determination.
Notes: Measurement of 1 large pulse = 9.2 mSec.
FCC ID.: B4SIR32A

Customer	X-10 (USA), Inc.	
Test Sample	310 and 418.4 MHz Pulsed Transmitter	
Model No.:	IR32A	
Date: July 30, 2008	Tech: D.L./K.M.	Sheet 2 of 4



Test Method: FCC Part 15.35, Duty Cycle Determination.
Notes: Measurement of 1 small pulse = 560 µSec.
Measurements of 34 small pulses = 34(560µSec) = 19.04mSec.
FCC ID.: B4SIR32A

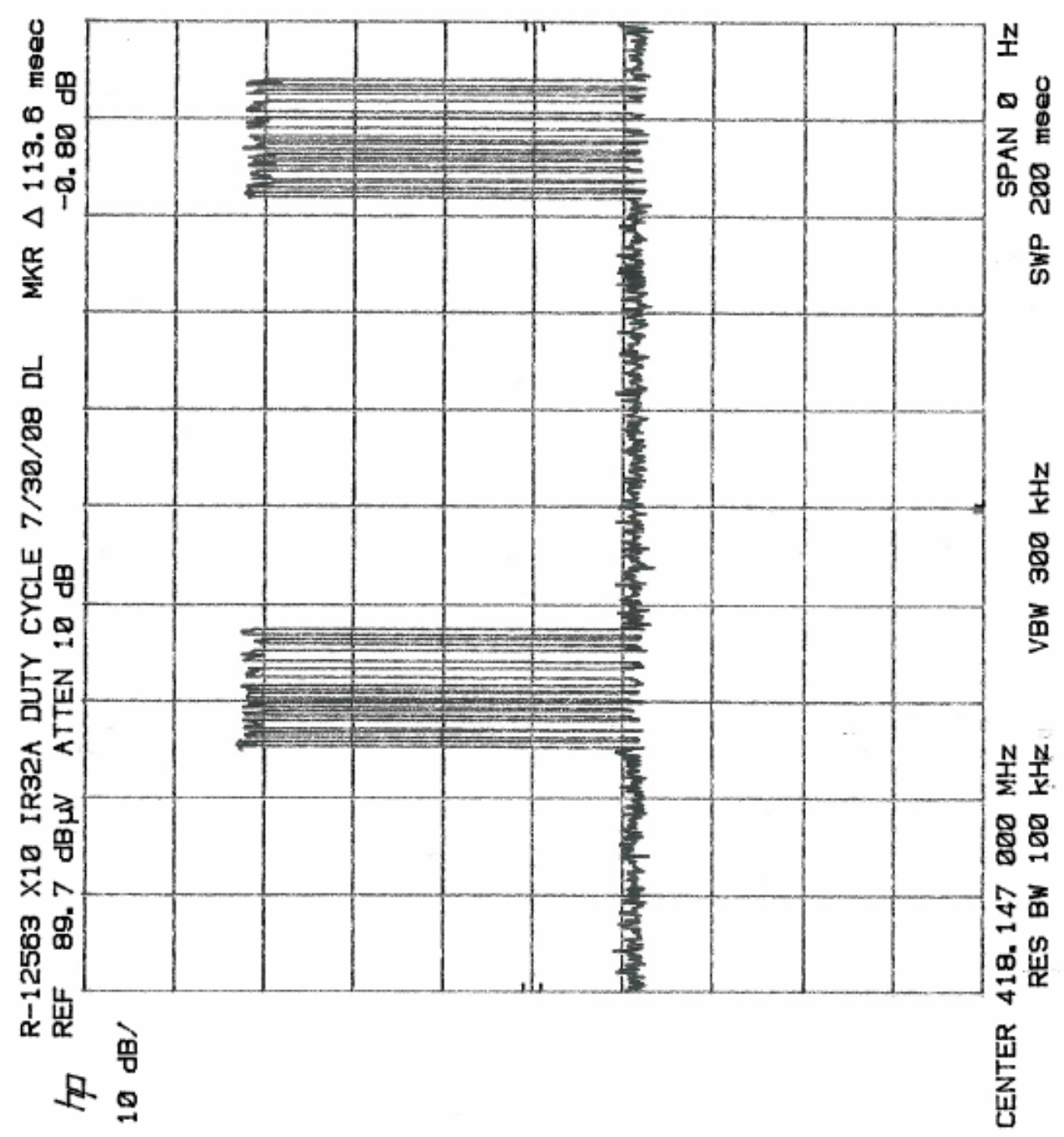
Customer	X-10 (USA), Inc.	
Test Sample	310 and 418.4 MHz Pulsed Transmitter	
Model No.:	IR27A	
Date: June 11, 2008	Tech: D.L./K.M.	Sheet 3 of 4



Test Method: FCC Part 15.35, Duty Cycle Determination.
Notes: Duty cycle = (1) (9.2 mSec) + (34) (480 µSec) = 28.2 mSec.
Duty cycle = (28.2 mSec / 100=0.282) 20 log 0.2824= -11.0 dB
FCC ID.: B4SIR32A

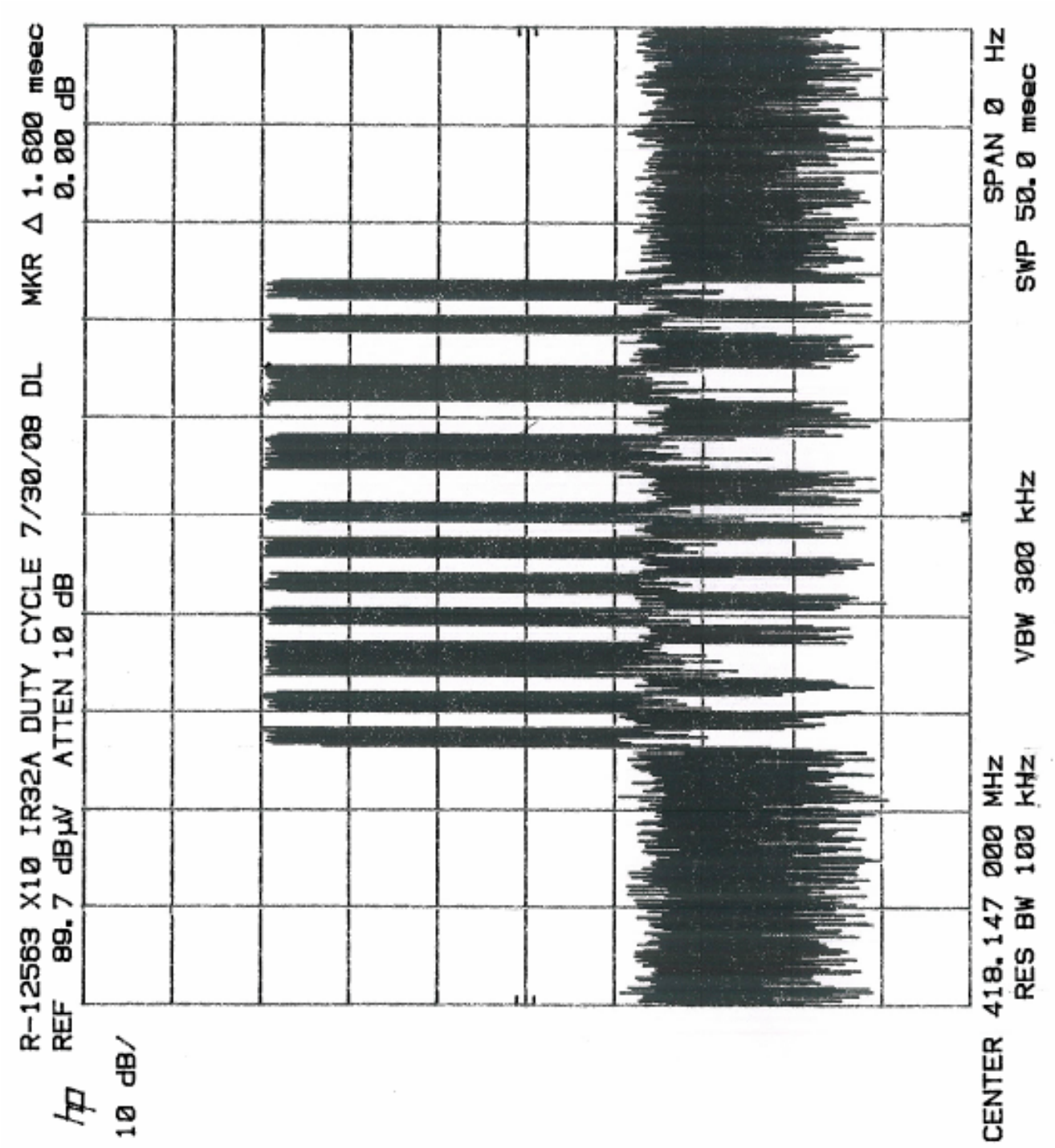
Customer	X-10 (USA), Inc.	
Test Sample	310 and 418.4 MHz Pulsed Transmitter	
Model No.:	IR32A	
Date: July 30, 2008	Tech: D.L./K.M.	Sheet 4 of 4

FCC Part 15.231(b)(2), Duty Cycle Determination
418.4 MHz Transmitter
Test Data



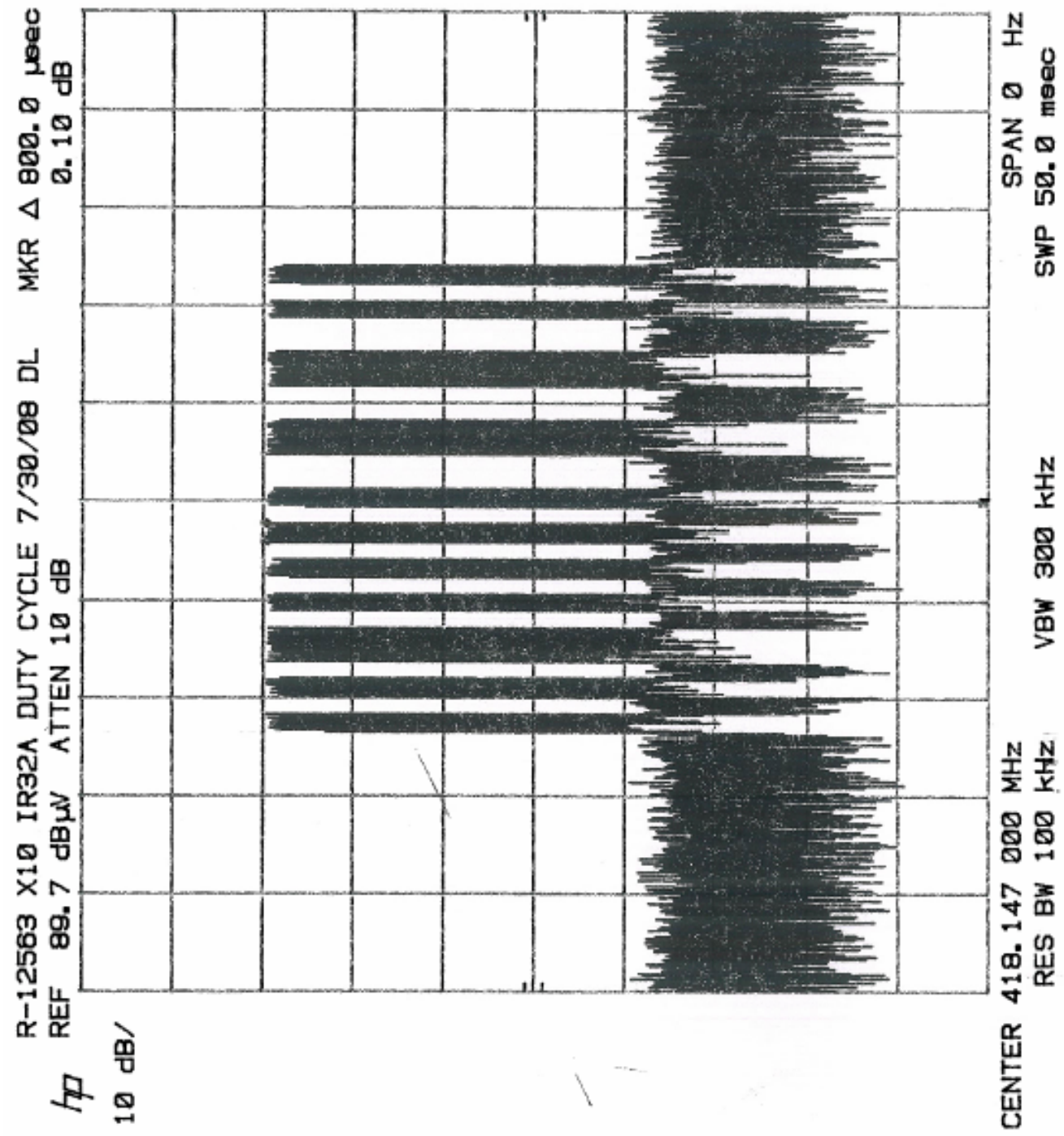
Test Method: **FCC Part 15.35, Duty Cycle Determination**.
Notes: Measurement of cycle time = 113.6mSec.
FCC ID.: B4SIR32A

Customer	X-10 (USA), Inc.	
Test Sample	310 and 418.4 MHz Pulsed Transmitter	
Model No.:	IR32A	
Date: July 30, 2008	Tech: D.L./K.M.	Sheet 1 of 4



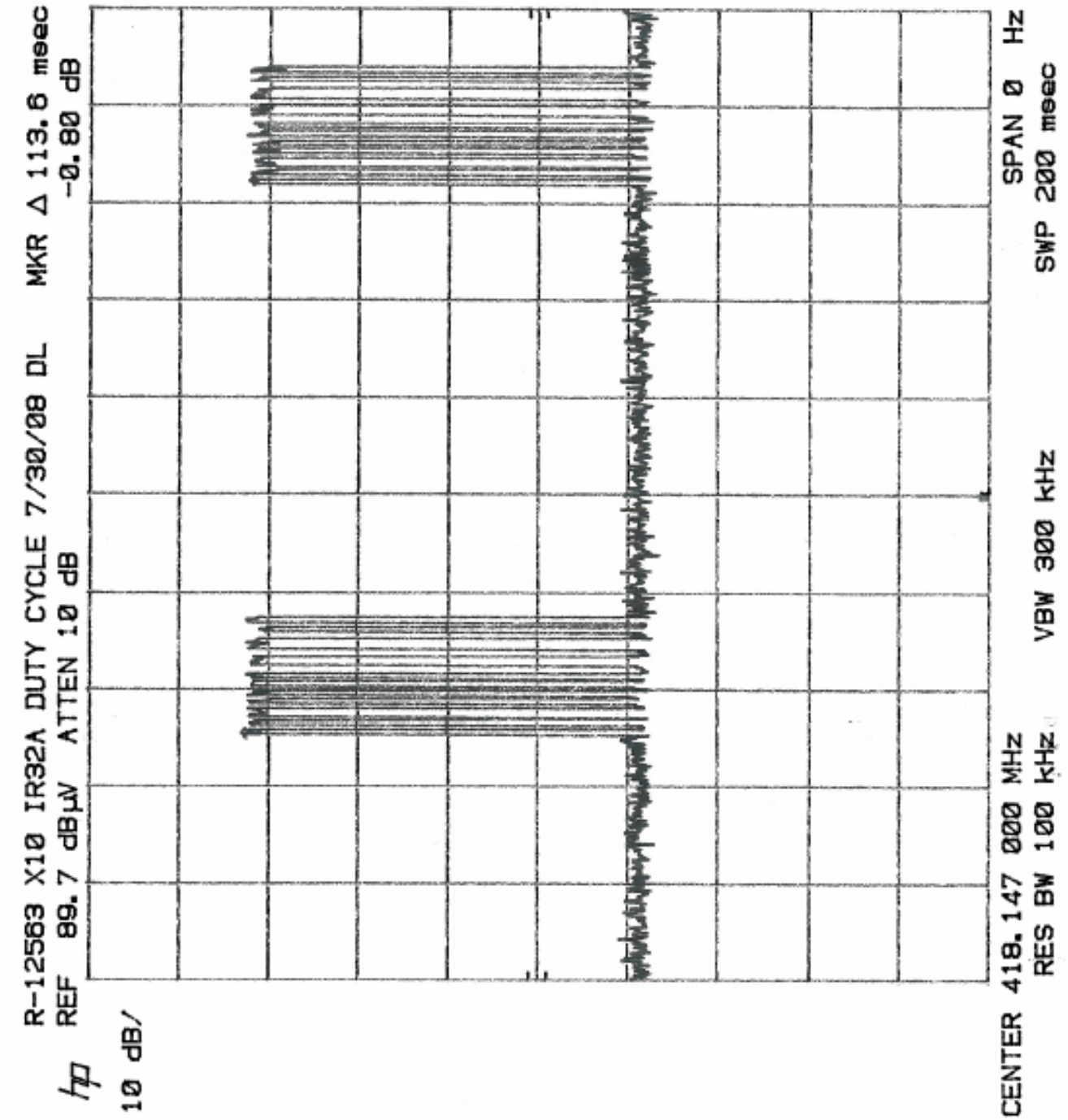
Test Method: FCC Part 15.35, Duty Cycle Determination.
Notes: Measurement of 1 large pulse = 1.6 mSec.
Measurements of 3 large pulses = 3(1.6 mSec) = 4.8 mSec.
FCC ID.: B4SIR32A

Customer	X-10 (USA), Inc.	
Test Sample	310 and 418.4 MHz Pulsed Transmitter	
Model No.:	IR32A	
Date: July 30, 2008	Tech: D.L./K.M.	Sheet 2 of 4



Test Method: FCC Part 15.35, Duty Cycle Determination.
Notes: Measurement of 1 small pulse = 800 µSec.
Measurements of 8 small pulses = 8(800µSec) = 6.40mSec.
FCC ID.: B4SIR32A

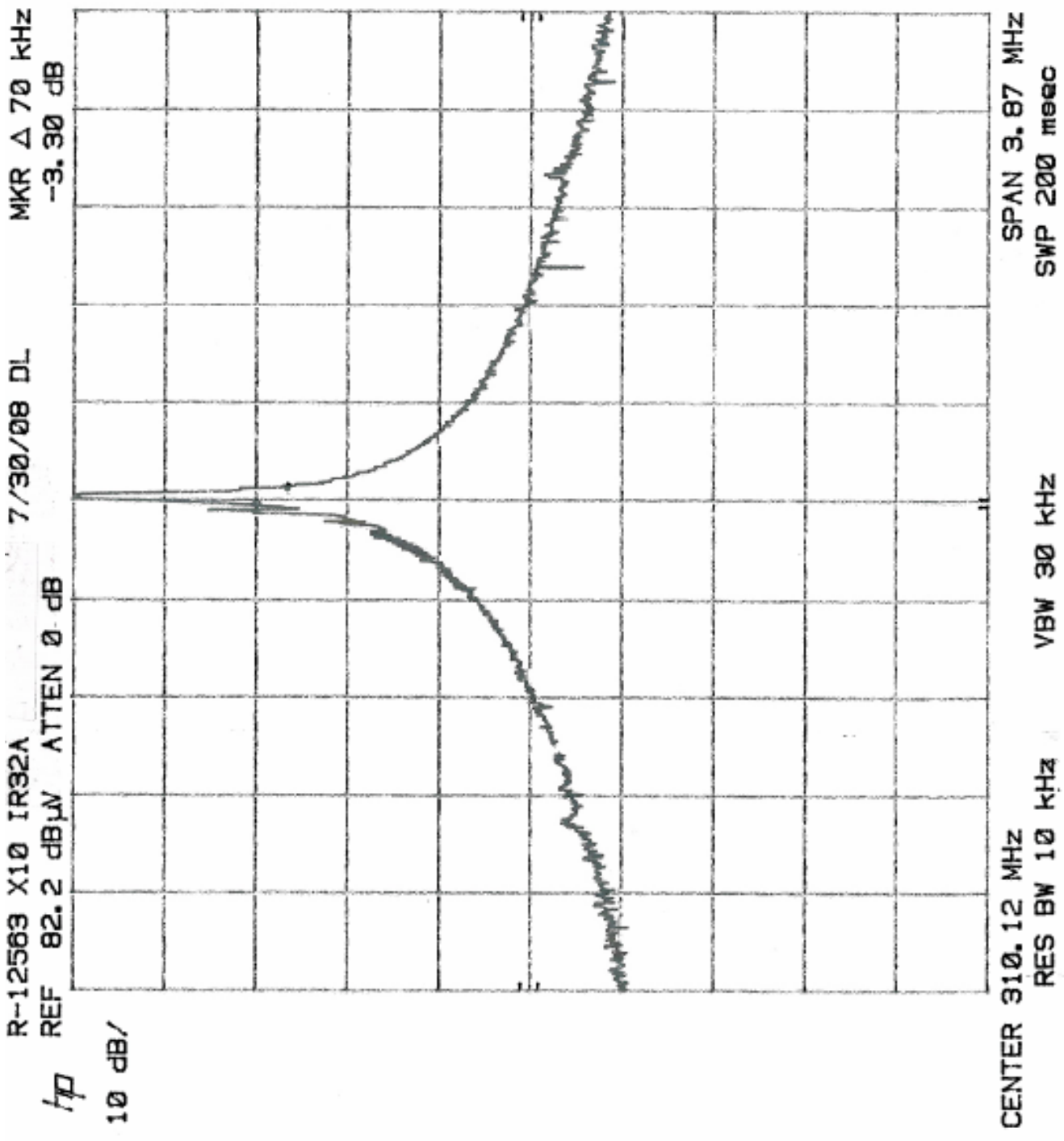
Customer	X-10 (USA), Inc.	
Test Sample	310 and 418.4 MHz Pulsed Transmitter	
Model No.:	IR32A	
Date: July 30, 2008	Tech: D.L./K.M.	Sheet 3 of 4



Test Method: FCC Part 15.35, Duty Cycle Determination.
Notes: Duty cycle = (3) (1.6 mSec) + (8) (800µSec) = 11.2 mSec.
Duty cycle = (11.2 mSec / 100=0.112) 20 log 0.112 = -19.02dB
FCC ID.: B4SIR32A

Customer	X-10 (USA), Inc.	
Test Sample	310 and 418.4 MHz Pulsed Transmitter	
Model No.:	IR32A	
Date: July 30, 2008	Tech: D.L./K.M.	Sheet 4 of 4

FCC Part 15, Subpart C, 15.231(c), Occupied Bandwidth
310 MHz Transmitter
Test Data



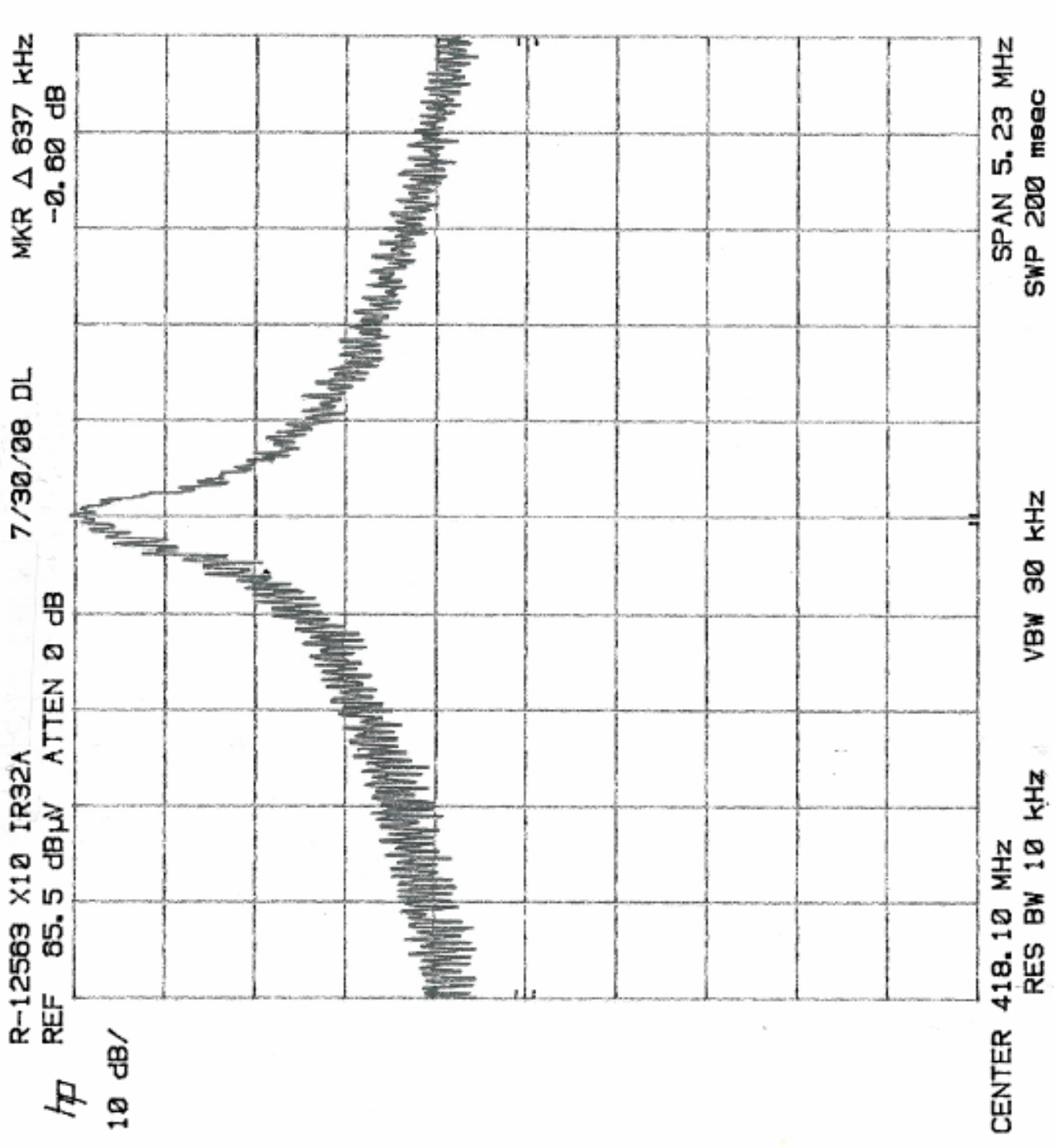
Test Method: **FCC Part 15, Subpart C, 15.231(c), Occupied Bandwidth**.

Notes: Occupied Bandwidth measured 70.0 kHz, does not exceed 0.25% of center frequency at the 20 dBc points (775 kHz)

FCC ID.: B4SIR32A

Customer	X-10 (USA), Inc.	
Test Sample	310 and 418.4 MHz Pulsed Transmitter	
Model No.:	IR32A	
Date: July 30, 2008	Tech: D.L./K.M.	Sheet 1 of 1

FCC Part 15, Subpart C, 15.231(c), Occupied Bandwidth
418.4 MHz Transmitter
Test Data



Test Method: **FCC Part 15, Subpart C, 15.231(c), Occupied Bandwidth**.

Notes: Occupied Bandwidth measured 637.0 kHz, does not exceed 0.25% of center frequency at the 20 dBc points (1.046 MHz)

FCC ID.: B4SIR32A

Customer	X-10 (USA), Inc.	
Test Sample	310 and 418.4 MHz Pulsed Transmitter	
Model No.:	IR32A	
Date: July 30, 2008	Tech: D.L./K.M.	Sheet 1 of 1