

APPLICANT		MANUFACTURER	
X-10 (USA), Inc. 81 Rackman Road Cherry, NJ 07824-0420		X-10 Electronics Shenzhen Co. Ltd. X-10 Building Labor Industrial District Shenzhen, Xixiang, Bao An Guang Dong, China, 518102	
TEST SPECIFICATION: FCC Part 15C Subpart C, Subpart C, Subpart C, Subpart C			
TEST PROCEDURE: ANSI C13.1-1992			
TEST SAMPLE DESCRIPTION			
BRANDNAME: X-10 (USA), Inc.		MODEL: CM19A	
TYPE: Pulsed Transmitter			
POWER REQUIREMENTS: +5 VDC, derived from Host PC via USB			
FREQUENCY OF OPERATION: 312 MHz			
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			
REPORT OF MEASUREMENTS			
Applicant: X-10 (USA), Inc.			
Device: Pulsed Transmitter			
FCC ID: B45CM19A			
Power Requirements: +5 VDC, derived from Host PC via USB			
Applicable Rule Section: Part 15, Subpart C			
		Retilf Testino Laboratories	
		Test Report No. R-0012-1	
		FCC ID: B45CM19A	



Retif Testino Laboratories

Test Report No. R-0012-1
FEE: \$1,000.00

FCC REPORT

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 400kHz to 30MHz did not exceed 250 microvolts.

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 5920 pV/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 592 pV/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	= 312	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 = 5920 pV/M (AVERAGE) @ 3 Meters

Harmonic Limit = 592 pV/M (AVERAGE) @ 3 Meters



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Test Report No. R-0012-1
FCC ID: B2C3456789

DUTY CYCLE DETERMINATION

Thesant'sRFoutputwas directly coupled to the input of the spectrum analyzer. The analyzer was set for a frequency span of 6Hz. The sweep time was then adjusted in order to display one full pulse train. The transmitter on time was then summed and comparedtothe time for one full cycle in order to obtain the duty cycle.(See plots for additional information)

Transmitter On Time	=	31.125 milliseconds (maximum- worst case in 100 ms)
Transmitter Cycle Time	=	94.5
Transmitter Duty Cycle	=	32.9 %

CALCULATION:

1 Large Pulse	=	10.5 milliseconds
33 x 625 μ s (small pulse)	=	20.625 milliseconds
10.5 + 20.625	=	32.9 milliseconds
Duty Cycle	=	32.9 %
Correction Factor = 20 log(0.248)	=	-6.6

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 pulsedesensitizationequaltozeroand utilizing the minimum observed pulse width of 20 μ s yields a minimum required bandwidth of 33.3 KHz. FCC specified bandwidths of 100kHz and 1MHz were utilized below and above 1GHz, respectively.



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Test Report No. R-0012-1

FCC ID: B2C3610A

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.

FCC15.231 Compliance Testing					
RN	Type	Manufacturer	Description	Model No.	Cal Date Due Date
067	Open Area Test Site	Redif	3 Meter	80V	9/20/08 9/20/09
076	ESN	Solu Electronics	10 MHz - 30 MHz	8012-50-B-248ENC	2/9/01 2/9/02
088A	Control Log Signal	Electro-Mechanics	200 MHz - 1 GHz	2101	2/9/01 2/9/02
128C	Double Ridge Guide	Kaiser Corporation	1 GHz - 18 GHz	90001	9/18/08 9/18/01
133	Broadband Pre-Amplifier	Electro-Merics	10 MHz - 1 GHz, 200MHz	1000	6/13/00 6/13/00
143A	Graphics Platter	Howden Packard	NA	7470A	3/5/01 3/5/02
202	Transmiter Limiter	Howden Packard	200 MHz - 200 MHz		1/9/74 7/24/00
724/01					
2008	6.0 dB Attenuator	Stewart	0 - 1.0 GHz	09-20 - 0-00	6/13/00 6/13/01
200A		Signal Generator	Howden Packard	500 MHz - 1024 MHz	6/10/00 7/20/00
728/01					
450	ESN	Solu Electronics	DC - 50 Hz	9400-50-B-24	7/26/00 7/26/01
523	Bicoupling	Electro-Mechanics	25 - 2000 MHz	3142B	6/8/00 6/8/01
543	Preamplifier	Howden Packard	1.0 GHz - 28.5 GHz	8443B	6/10/99 6/10/01
617	Bandwidth Analyser	Electro-Merics	50 MHz - 1 GHz	EMC-30	2/27/01 2/27/02
7010	EMC Analyser	Howden Packard	90Hz - 1.8GHz	8551EM	3/6/01 3/6/02
712	EMC Test Receiver	Robble B. Schwart	20 Hz - 26.5 GHz	83100	2/1/00 6/1/01



Retiff Testino Laboratories

Test Report No. R-0012-1

FCC ID: D58269A

FCC 15.207(a)
Conducted Emissions
Please refer to separate electronic file named cedata.pdf

FCC 15.231(b)
RADIATED EMISSIONS, FUNDAMENTAL & SPURIOUS CASE
See separate e-file attachment named REfundham.pdf and REspur.pdf

	Retif Testino Laboratories
	Test Report No. R-0012-1 FCC ID: B2C2490A

FCC 15.231(c)
OCCUPIED BANDWIDTH
Please refer to separate electronic file named Occhw.pdf

FCC 15.231(c)
DUTY CYCLE

Please refer to separate electronic file named DutyCycle.pdf



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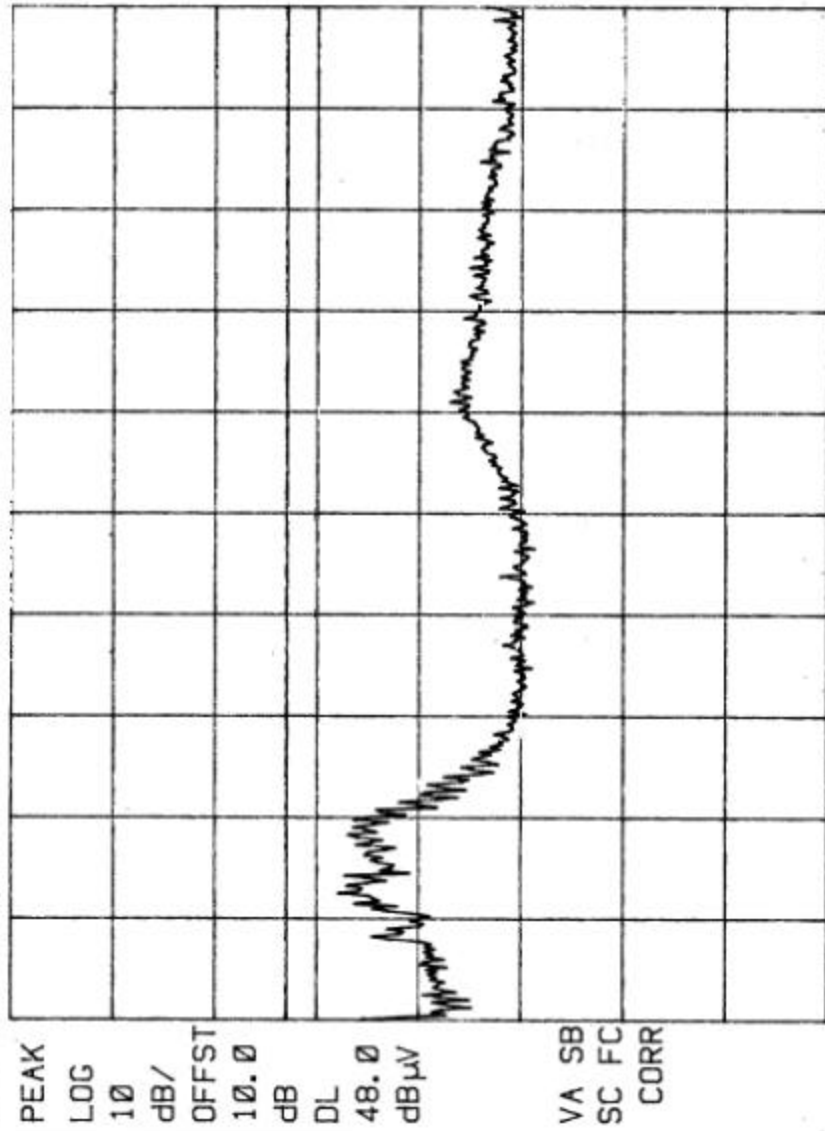
Test Report No. R-0012-1
FCC ID: B5C2490A



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Test Report No. R-0012-1
FEE: 01-00000000

14:41:32 MAY 21, 2001
 R9012 X10 CM19A Conducted Emissions PL Lead=H
 REF 75.0 dBμV #AT 10 dB



START 450 kHz STOP 30.00 MHz
 #RES BW 10 kHz #SWP 20.0 sec
 VBW 30 kHz

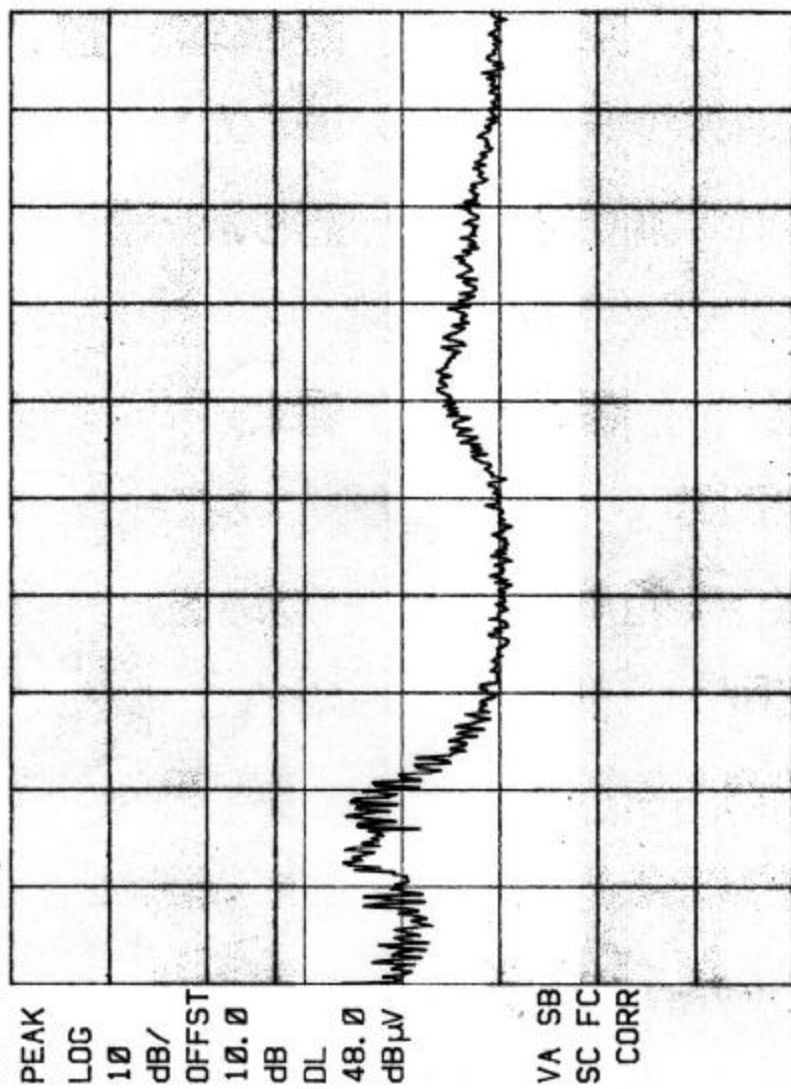
Customer:	8-10 (USA)
Test Sample:	312MHz Pulsed Transmitter
Model No.:	CM19A
Test Method:	FCC15.209(a) Conducted Emissions, 450kHz to 30MHz
Notes:	FCC M. 84SCM19A Lead=H0T Detector=Peak
Date:	May 21, 2001
Tech:	Peter Lananna
Sheet:	1 of 2



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Report No. 9012-1

14:45:35 MAY 21, 2001
 R9012 X10 CM19A Conducted Emissions PL Lead=New tra
 REF 75.0 dBμV #AT 10 dB



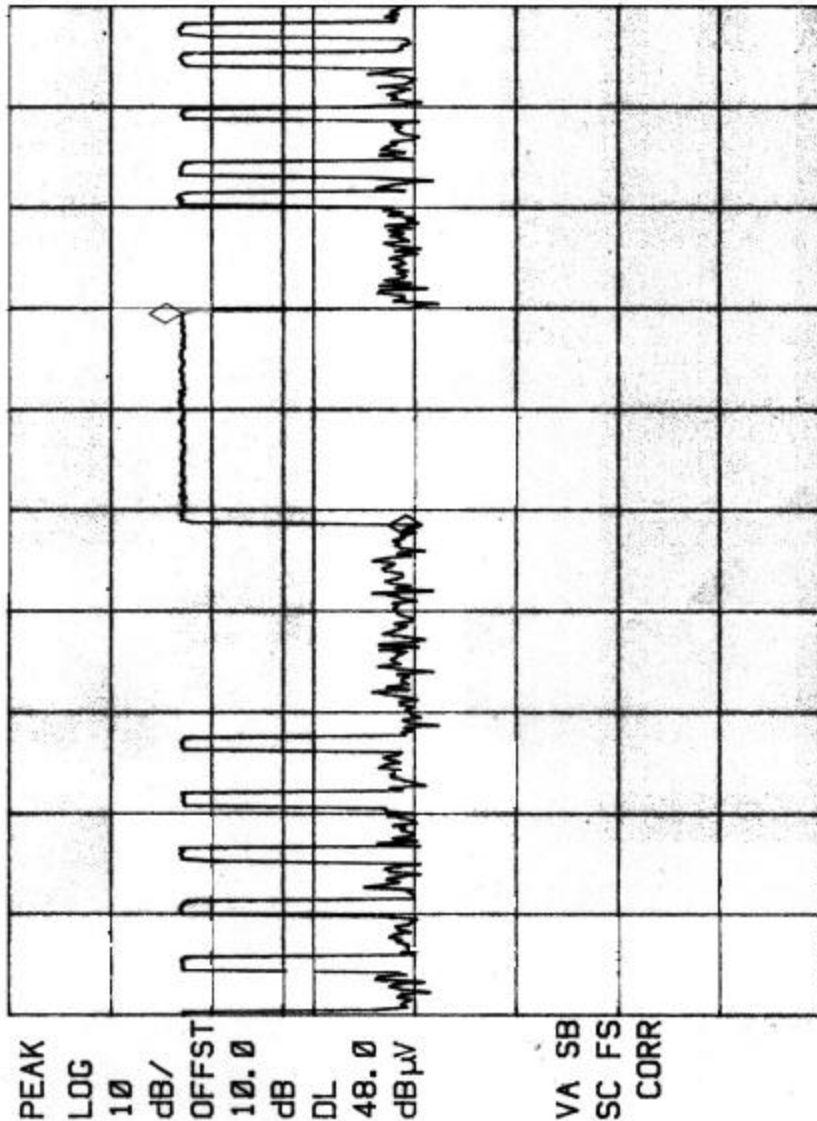
START 450 KHz #RES BW 10 KHz
 STOP 30.00 MHz #SWP 20.0 sec
 VBW 30 KHz

Customer:	X-10 (USA)
Test Sample:	312MHz Pulsed Transmitter
Model No.:	CM19A
Test Method:	FCC15.209(a) Conducted Emissions, 450KHz to 30MHz
Notes:	FCC H.945CM19A Lead=NEUTRAL Detector=Peak
Date:	May 21, 2001
Test:	Peter Lananna
Sheet:	2 of 2



Retlif Testing Laboratories
 Report No. 9012-1

15:23:10 MAY 21. 2001
 R9012 X10 CM19A OccBw.
 REF 75.0 dBμV #AT 10 dB
 MKR 10.500 msec
 23.57 dB



CENTER 311.982 MHz
 #RES BW 100 kHz
 SPAN 0 Hz
 #SWP 50.0 msec
 VBW 300 kHz

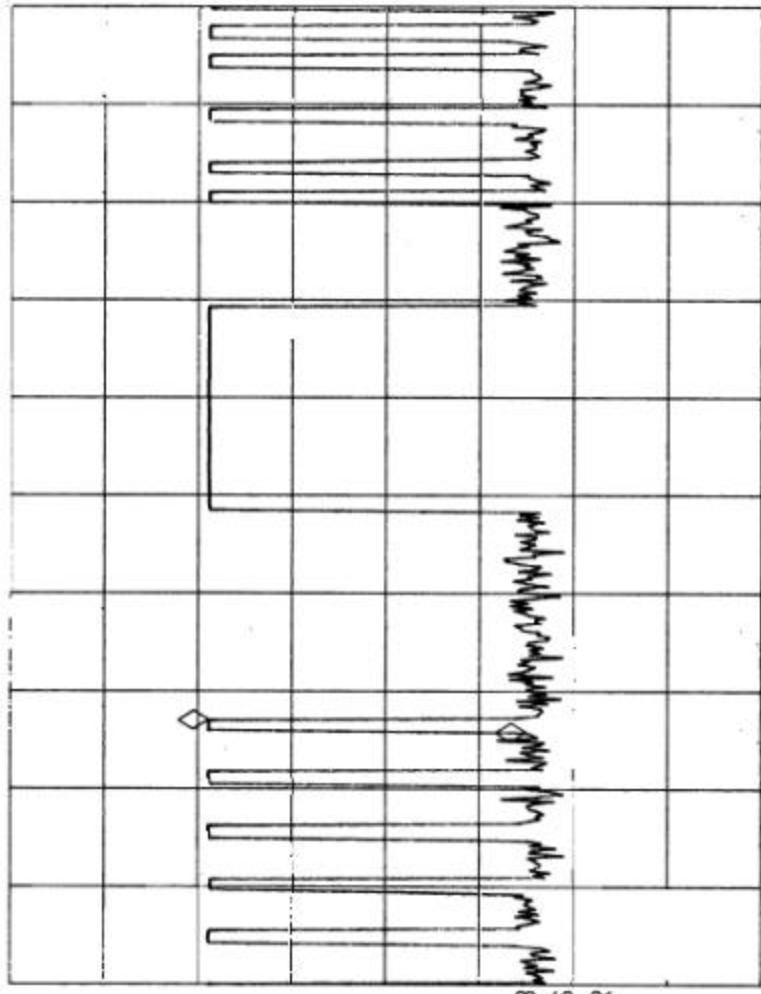
Customer:	X-10 (USA)		
Test Sample:	312MHz Pulsed Transmitter		
Model No.:	CM19A		
Test Method:	FCC15.35 Duty Cycle Determination		
Notes:	FCC IS-B4SCM19A		
	Large Pulse: 10.5msec		
Date:	May 21, 2001	Tech:	Peter Lianana
		Sheet:	1 of 3



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Report No. 9012-1

16:17:35 MAY 17, 2001
 R9012 X10 CM19A DCD
 REF 85.0 dBμV AT 10 dB
 MKR 625.00 μsec
 33.62 dB



CENTER 311.953 MHz
 #RES BW 100 kHz
 SPAN 0 Hz
 #SWP 50.0 msec
 VBW 300 kHz

Customer: A-10 (USA)
 Test Sample: 312MHz Pulsed Transmitter
 Model No.: CM19A
 Test Method: FCC15.35 Duty Cycle Determination
 Notes: FCC ID: B49CM19A
 Small Pulse: 625μseconds, Number of small pulses per cycle: 33
 625μseconds * 33 = 20.625μseconds

Date: May 10, 2001 Tech: Peter Laranna Sheet 2 of 3



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Report No. 9012-1

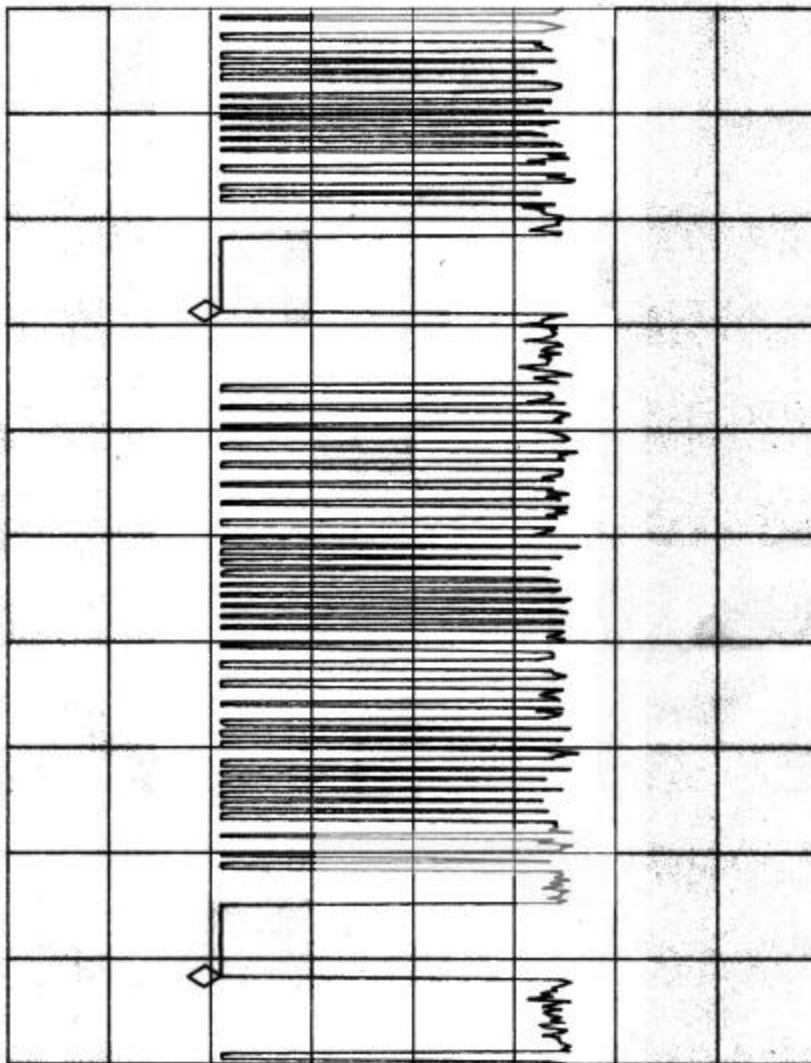
16:25:27 MAY 17, 2001

R9012 X10 CM19A DCD

REF 85.0 dBμV AT 10 dB

MKR 94.500 msec

-0.07 dB



CENTER 311.953 MHz
#RES BW 100 kHz

SPAN 0 Hz
#SWP 150 msec

VBW 300 kHz

PEAK
-0.07
10
dB/

MA SB
SC FS
CORR

Customer:	X-10 (USA)
Test Sample:	312MHz Pulsed Transmitter
Model No.:	CM19A
Test Method:	FCC15.35 Duty Cycle Determination
Notes:	FCC ID: B48CM19A Cycle time=94.5mseconds (20.625ms+10.5ms)/94.5ms=32.9%, 20log(32.9%)=-9.6dB
Date:	May 16, 2001
Tech:	Peter Lananra
Sheet	3 of 3

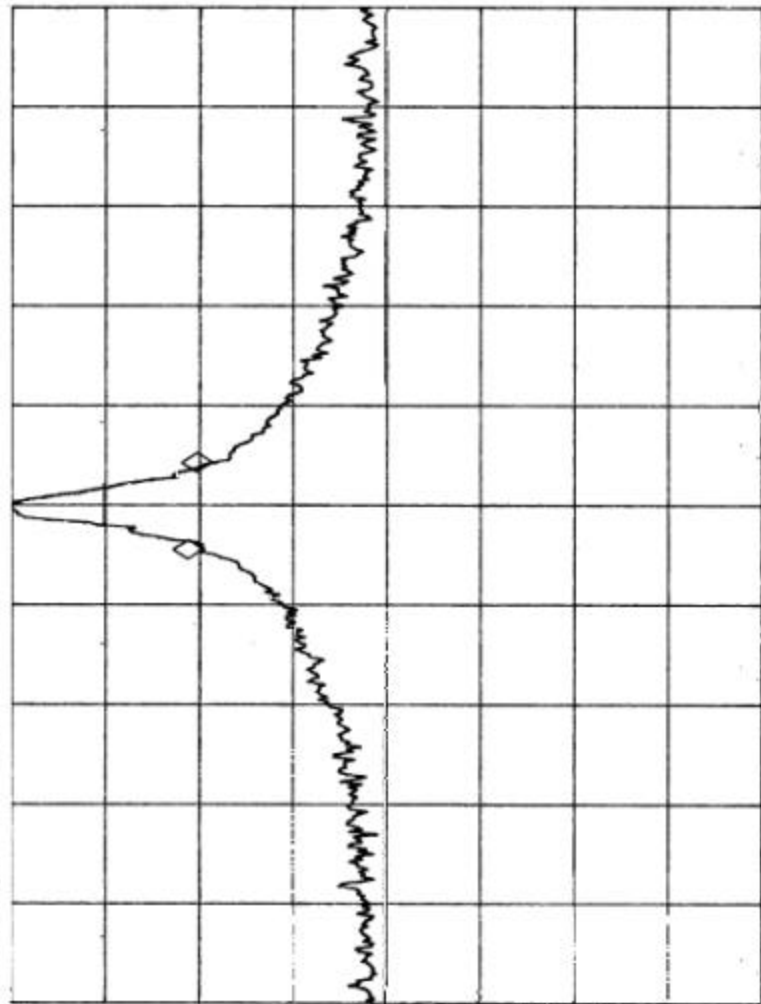


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Report No. 9012-1

09:07:21 MAY 18, 2001
 R9012 X10 CM19A OccBw.
 REF 62.4 dBμV #AT 10 dB

MKR 68.3 kHz
 -.92 dB



PEAK
 LOG
 10
 dB/
 42.4
 dBμV

VA SB
 SC FC
 CORR

CENTER 311.9844 MHz
 #RES BW 10 kHz
 SPAN 780.0 kHz
 SWP 30.0 msec

Customer: 312MHz Pulsed Transmitter
 Test Sample: CM19A
 Model No.:
 Test Method: FCC 15.231(c) Occupied Bandwidth
 Notes: FCC 10: B43CM19A
 The bandwidth of the emissions is less than 0.25% of the center frequency, measured 20dB/3.

Date: May 18, 2001 Tech: Peter Lannan Sheet: 1 of 1



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Report No. 9012-1

Test Method:		FCC Part 15 Subpart C Radiated Emissions, Fundamental & Harmonic Emissions						
Customer:		X-10			Job No.		R-9012-1	
Test Sample:		312MHz Transmitter			Paragraph:		15.231	
Model No.:		CM19A			FCC ID:		B4SCM19A	
Operating Mode:		Continuously Transmitting a 312MHz Signal						
Technician:		Peter Lananna			Date:		May 21, 2001	
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	
312	H / 1.0	X	67.8	-4.0	63.8	1548.8	59200	
	H / 1.0	Y	65.3	-4.0	61.3	1161.4		
	H / 1.0	Z	68.2	-4.0	64.2	1621.8		
	V / 2.0	X	65.3	-4.0	61.3	1161.4		
	V / 2.0	Y	66.3	-4.0	62.3	1303.2		
312	V / 2.0	Z	60.7	-4.0	56.7	683.9	59200	
624	H / 1.3	X	46.6	3.2	49.8	309.0	5920	
	H / 1.0	Y	43.0	3.2	46.2	204.2		
	H / 1.3	Z	47.1	3.2	50.3	327.3		
	V / 1.0	X	44.4	3.2	47.6	239.9		
	V / 2.0	Y	44.1	3.2	47.3	231.7		
624	V / 1.5	Z	46.9	3.2	50.1	319.9	5920	
936	H / 1.3	X	39.5	7.4	46.9	221.3	5920	
	H / 1.3	Y	38.8	7.4	46.2	204.2		
	H / 1.0	Z	37.0	7.4	44.4	166.0		
	V / 1.3	X	35.5	7.4	42.9	139.6		
	V / 1.0	Y	41.0	7.4	48.4	263.0		
936	V / 2.3	Z	37.8	7.4	45.2	182.0	5920	
1248	H / 1.0	X	40.0	-5.6	34.4	52.5*	5000	
	H / 1.0	Y	40.0	-5.6	34.4	52.5*		
	H / 1.0	Z	40.0	-5.6	34.4	52.5*		
	V / 1.0	X	40.0	-5.6	34.4	52.5*		
	V / 1.0	Y	40.0	-5.6	34.4	52.5*		
1248	V / 1.0	Z	40.0	-5.6	34.4	52.5*	5000	
1560	H / 1.0	X	40.0	-4.4	35.6	60.3*	5000	
	H / 1.0	Y	40.0	-4.4	35.6	60.3*		
	H / 1.0	Z	40.0	-4.4	35.6	60.3*		
	V / 1.0	X	40.0	-4.4	35.6	60.3*		
	V / 1.0	Y	40.0	-4.4	35.6	60.3*		
1560	V / 1.0	Z	40.0	-4.4	35.6	60.3*	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)							



Retlif Testing Laboratories

Retlif Job Number R-9012-1

Test Method:		FCC Part 15 Subpart C Radiated Emissions, Fundamental & Harmonic Emissions						
Customer:		X-10			Job No.		R-9012-1	
Test Sample:		312MHz Transmitter			Paragraph:		15.231	
Model No.:		CM19A			FCC ID:		B4SCM19A	
Operating Mode:		Continuously Transmitting a 312MHz Signal						
Technician:		Peter Lananna			Date:		May 21, 2001	
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	
1872	H /	X	36.0	-2.4	33.6	47.9*	5920	
	H /	Y	36.0	-2.4	33.6	47.9*		
	H /	Z	36.0	-2.4	33.6	47.9*		
	V /	X	36.0	-2.4	33.6	47.9*		
	V /	Y	36.0	-2.4	33.6	47.9*		
1872	V /	Z	36.0	-2.4	33.6	47.9*	5920	
2184	H /	X		-1.3			5920	
	H /	Y		-1.3				
	H /	Z		-1.3				
	V /	X		-1.3				
	V /	Y		-1.3				
2184	V /	Z		-1.3			5920	
2496	H /	X		-0.1			5920	
	H /	Y		-0.1				
	H /	Z		-0.1				
	V /	X		-0.1				
	V /	Y		-0.1				
2496	V /	Z		-0.1			5920	
2808	H /	X		1.5			5000	
	H /	Y		1.5				
	H /	Z		1.5				
	V /	X		1.5				
	V /	Y		1.5				
2808	V /	Z		1.5			5000	
3120	H /	X		3.5			5920	
	H /	Y		3.5				
	H /	Z		3.5				
	V /	X		3.5				
	V /	Y		3.5				
3120	V /	Z		3.5			5920	
	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-9012-1

Test Method:	FCC Part 15 Subpart C Radiated Emissions, Fundamental & Harmonic Emissions						
Customer:	X-10			Job No.	R-9012-1		
Test Sample:	312MHz Transmitter			Paragraph:	15.231		
Model No.:	CM19A			FCC ID:	B4SCM19A		
Operating Mode:	Continuously Transmitting a 312MHz Signal						
Technician:	Peter Lananna			Date:	May 21, 2001		
Notes:	Test Distance: 3 Meters			Duty Cycle: 32.9%			
	Detector: Peak, unless otherwise specified			Duty Cycle Correction: - 9.6 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
312	H /	X					5920
	H /	Y					
	H /	Z					
	V /	X					
	V /	Y					
312	V /	Z					5920
624	H /	X					592
	H /	Y					
	H /	Z					
	V /	X					
	V /	Y					
624	V /	Z					592
936	H /	X					592
	H /	Y					
	H /	Z					
	V /	X					
	V /	Y					
936	V /	Z					592
1248	H /	X					500
	H /	Y					
	H /	Z					
	V /	X					
	V /	Y					
1248	V /	Z					500
1560	H /	X					500
	H /	Y					
	H /	Z					
	V /	X					
	V /	Y					
1560	V /	Z					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)						



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Retlif Job Number R-9012-1

Test Method:	FCC Part 15 Subpart C Radiated Emissions, Fundamental & Harmonic Emissions						
Customer:	X-10			Job No.	R-9012-1		
Test Sample:	312MHz Transmitter			Paragraph:	15.231		
Model No.:	CM19A			FCC ID:	B4SCM19A		
Operating Mode:	Continuously Transmitting a 312MHz Signal						
Technician:	Peter Lananna			Date:	May 21, 2001		
Notes:	Test Distance: 3 Meters			Duty Cycle: 32.9%			
	Detector: Peak, unless otherwise specified			Duty Cycle Correction: -9.6 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
1872	H /	X					592
	H /	Y					
	H /	Z					
	V /	X					
	V /	Y					
1872	V /	Z					592
2184	H /	X					592
	H /	Y					
	H /	Z					
	V /	X					
	V /	Y					
2184	V /	Z					592
2496	H /	X					592
	H /	Y					
	H /	Z					
	V /	X					
	V /	Y					
2496	V /	Z					592
2808	H /	X					500
	H /	Y					
	H /	Z					
	V /	X					
	V /	Y					
2808	V /	Z					500
3120	H /	X					592
	H /	Y					
	H /	Z					
	V /	X					
	V /	Y					
3120	V /	Z					592
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-9012-1

Test Method:	FCC Part 15 Subpart C, Spurious Case Radiated Emissions, Paragraph 15.209(a)						
Customer:	X-10				Job No.	R-9012-1	
Test Sample:	312MHz Transmitter						
Model No.:	CM19A				FCC Id.	B4SCM19A	
Operating Mode:	Continuously transmitting a 312MHz signal.						
Technician:	Peter Lananna				Date:	May 18, 2001	
Notes:	Test Distance: 3 Meters Temp:28C Humidity:32% Detector: Quasi-Peak 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
40.9	V/1.0	180	30	-6.9	23.1	14.3	
80.0	V/1.0	090	35	-12.5	22.5	13.3	
84.1	V/1.0	022	39	-12.1	26.9	22.1	
88.00							100
88.00							150
100.3	V/1.0	293	48	-10.5	37.5	75.0	
109.0	V/1.0	157	39	-10.4	28.6	26.9	
115.0	H/1.5	293	42	-10.9	31.1	29.9	
121.1	V/1.0	248	45	-11.4	33.6	47.9	
130.0	V/1.0	203	40	-11.6	28.4	26.3	
135.2	V/1.0	225	38	-11.4	26.6	21.4	
147.7	V/1.0	270	38	-10.4	27.6	24.0	
183.4	V/1.0	022	32	-8.6	23.4	14.8	
216.00							150
216.00							200
229.3	H/1.0	112	39	-6.6	32.4	41.7	
234.5	H/1.0	270	35	-6.4	28.6	26.9	
253.3	H/1.0	157	40	-5.8	34.2	51.3	
801.9	V/1.0	180	25	6.6	31.6	38.0	
903.1	V/1.0	293	27	8.3	35.3	58.2	
960.00							200
960.00							500
1000.0	V/1.0	315	50.9	-6.4	44.5	167.9	
3120.0							500
	The EUT was scanned from 30 MHz to 3.2GHz						
	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-9012-1