APPLICANT	MANUFACTURER
Bosch Security Systems, Inc. 130 Perinton Parkway Fairport, NY 14450	Bosch Security Systems, Inc. 130 Perinton Parkway Fairport, NY 14450

TEST SPECIFICATION: FCC Rules and Regulations Part 15, Subpart C, Para. 15.231

TEST PROCEDURE: ANSI C63.4:2001

TEST SAMPLE DESCRIPTION

BRANDNAME: Bosch Security Systems, Inc. MODEL: RF1100

TYPE: Pulsed Transmitter

POWER REQUIREMENTS: 2 AA Batteries

FREQUENCY OF OPERATION: 304 MHz

TESTS PERFORMED

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

Para. 15.231(b), Duty Cycle Determination

Para. 15.231(c), Occupied Bandwidth

REPORT OF MEASUREMENTS

Applicant:	Bosch Security Systems, Inc.
Device:	Pulsed Transmitter
FCC ID:	ESV-RF1100
Power Requirements:	2 AA Batteries
Applicable Rule Section:	Part 15, Subpart C, Section 15.231

TEST RESULTS

15.231 (a): This device is used as a Remote Control/Security device.

15.231 (a)(1) & The transmitter is automatically operated.

15.231 (a)(3): The transmitter does perform periodic transmissions at intervals greater than once per hour.

15.231 (b): The fundamental field strength did not exceed 5580 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 558 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	=	304			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 = 5580 µV/M (AVERAGE) @ 3 Meters

Harmonic Limit = 558 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	=	7.4 milliseconds (maximum)
Transmitter Cycle Time	=	213 milliseconds
Transmitter Duty Cycle	=	7.4 %

CALCULATION:

Duty Cycle (7.4/100)	=	7.4 %
Correction Factor = 20 log(0.074)	=	-22.6 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 200 µs yields a minimum required bandwidth of 3333 Hz. FCC specified bandwidths of 100 kHz 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

RE Fundamental and Harmonics

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due
067	Open Area Test Site	Retlif	3 Meter	RNY	10/1/2003	10/1/2006
128	Double Ridged Guide	Electro-Mechanics	1 GHz - 18 GHz	3105	6/13/2004	6/21/2005
133	Broadband Pre-Amplifier	Electro-Metrics	10 kHz - 1 GHz, 26dB	BPA-1000	6/21/2004	6/12/2005
141	Spectrum Analyzer	Hewlett Packard	100 Hz - 40 GHz	8566B	½6/2004	7/26/2004
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	9/30/2003	9/30/2004
712A	Cable	Retlif	10 kHz - 18 GHz	R&S Analyzer	7/9/2003	7/9/2004
723	H.P. Filter	Mini-Circuits	1 GHz	BHP-1000	7/11/2003	7/11/2004
206B	6.0 dB Attenuator	Texscan	0 - 1.0 GHz	FP-50 - 6 dB	6/12/2004	6/12/2005

FCC 15.231(b)

RADIATED EMISSIONS, FUNDAMENTAL

(See separate e-file named Refundharm.pdf)

FCC 15.231(c)

OCCUPIED BANDWIDTH

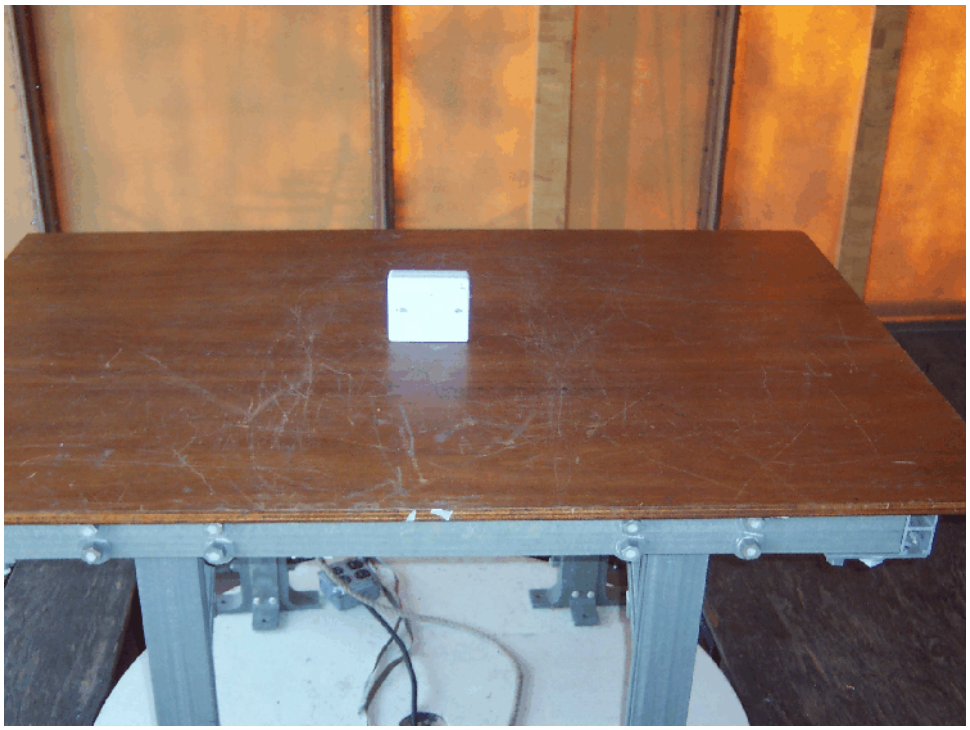
(See separate e-file named occbw.pdf)

FCC 15.231(c)

DUTY CYCLE

(See separate e-file named dutycycle.pdf)

Test Setup Photograph



Test Method:	FCC Part 15 Subpart C Radiated Emissions, Fundamental & Harmonic Emissions.		
Customer:	Bosch Security Systems, Inc.	**Job No.**	R-10364-1
Test Sample:	304 MHz Pulsed Transmitter.	**Paragraph:**	15.231
Model No.:	RF1100E	**FCC ID:**	ESV-
Operating Mode:	Continuously transmitting a 304 MHz signal.		
Technician:	R. Soodoo / D. Lerner	**Date:**	June 23, 2004

Notes: Test Distance: 3 Meters

Detector: Peak, Unless otherwise specified. **QP** + = Quasi Peak limit at this frequency.

Test Freq.	Antenna Pol./Height	EUT Orientation	Meter Reading	Correction Factor	Corrected Reading	Converted Reading	Peak Limit
MHz	(V/H)/Meters	Degrees	dBuV	dB	dBuV/m	uV/m	uV/m
	H/1.0	Y	65.0	10.8	75.8	61656.0	
	V/1.5	X	71.0	10.8	81.8	12303.0	
	V/1.5	Y	71.0	10.8	81.8	12303.0	
304							110000
608	H/1.0	X	19.0	14.6	33.6	47.9 **QP**	200 **QP+**
	H/1.0	Y	19.0	14.6	33.6	47.9 **QP**	
	V/1.5	X	12.0	14.5	26.5	21.1 **QP**	
	V/1.5	Y	12.0	14.5	26.5	21.1 **QP**	
608							200 **QP+**
912	H/1.25	X	14.0	17.6	31.6	38.0	11000
	H/1.25	Y	14.0	17.6	31.6	38.0	
	V/1.5	X	10.0	17.9	27.9	24.8	
	V/1.5	Y	10.0	17.9	27.9	24.8	
912							11000
1216	H/2.5	X	42.6	-7.6	34.9	55.6*	11000
	H/2.5	Y	42.6	-7.6	34.9	55.6*	
	V/1.0	X	42.5	-7.6	35.0	56.2*	
	V/1.0	Y	42.5	-7.6	35.0	56.2*	
1216							11000
1520	H/2.0	X	43.4	-7.4	36.0	63.1*	11000
	H/2.0	Y	43.4	-7.4	36.0	63.1*	
	V/1.0	X	45.2	-7.4	37.8	77.6*	
	V/1.0	Y	45.2	-7.4	37.8	77.6*	
1520							11000

The frequency range was scanned from 304 MHz to 3.1GHz. 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:	Bosch Security Systems, Inc.	**Job No.**	R-10364-1
Test Sample:	304 MHz Pulsed Transmitter.	**Paragraph:**	15.231
Model No.:	RF1100E	**FCC ID:**	ESV-
Operating Mode:	Continuously transmitting a 304 MHz signal.		
Technician:	R. Soodoo / D. Lerner	**Date:**	June 23, 2004.

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
|	H/1.0	Y	40.0	-4.5	35.5	59.6*	|
|							|
|	V/1.0	X	39.5	-4.5	35.0	56.2*	|
|	V/1.0	Y	39.5	-4.5	35.0	56.2*	|
1824							11000
2128	H/1.0	X	39.4	-3.6	35.8	61.7*	11000
|	H/1.0	Y	39.4	-3.6	35.8	61.7*	|
|							|
|	V/1.0	X	40.0	-3.6	36.4	66.0*	|
|	V/1.0	Y	40.0	-3.6	36.4	66.0*	|
2128							11000
2432	H/1.0	X	45.6	-1.9	43.7	153.0*	11000
|	H/1.0	Y	45.6	-1.9	43.7	153.0*	|
|							|
|	V/1.0	X	39.4	-1.9	37.5	75.0*	|
|	V/1.0	Y	39.4	-1.9	37.5	75.0*	|
2432							11000
2736	H/1.0	X	42.2	-1.7	40.5	106.0*	11000
|	H/1.0	Y	42.2	-1.7	40.5	106.0*	|
|							|
|	V/1.0	X	41.3	-1.7	39.6	95.5*	|
|	V/1.0	Y	41.3	-1.7	39.6	95.5*	|
2736							11000
3040	H/1.0	X	40.0	-0.3	39.7	96.6*	11000
|	H/1.0	Y	40.0	-0.3	39.7	96.6*	|
|							|
|	V/1.0	X	39.3	-0.3	39.0	89.1*	|
|	V/1.0	Y	39.3	-0.3	39.0	89.1*	|
3040							11000
	The frequency range was scanned from 304 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:	Bosch Security Systems, Inc.	**Job No.**	R-10364-1
Test Sample:	304 MHz Pulsed Transmitter.	**Paragraph:**	15.231
Model No.:	RF1100E	**FCC ID:**	ESV-
Operating Mode:	Continuously transmitting a 304 MHz signal.		
Technician:	R. Soodoo / D. Lerner	**Date:**	June 23, 2004.

Notes: Test Distance: 3 Meter Duty Cycle: 7.4% Duty Cycle Correction: -22.6 dB
Detector: Peak, unless otherwise specified. **QP** + = Quasi Peak limit at this frequency.

Test Freq.	Antenna Pol./Height	EUT Orientation	Peak Reading	Duty Cycle Correction Factor	Corrected Reading	Converted Reading	Avg. Limit
MHz	(V/H)-Meters	X / Y / Z	dBuV	dB	dBuV/m	uV/m	uV/m
	H/1.0	Y	75.8	-22.6	53.2	457.1	
	V/1.5	X	81.8	-22.6	59.2	912.0	
	V/1.5	Y	81.8	-22.6	59.2	912.0	
304							11000
608	H/1.0	X	33.6 **QP**	N/A	33.6	47.9	200 **QP**+
	H/1.0	Y	33.6 **QP**	N/A	33.6	47.9	
	V/1.5	X	26.5 **QP**	N/A	26.5	21.1	
	V/1.5	Y	26.5 **QP**	N/A	26.5	21.1	
608							200 **QP**+
912	H/1.25	X	31.6	-22.6	9.0	2.8	11000
	H/1.25	Y	31.6	-22.6	9.0	2.8	
	V/1.5	X	27.9	-22.6	5.3	1.8	
	V/1.5	Y	27.9	-22.6	5.3	1.8	
912							11000
1216	H/2.5	X	34.9	-22.6	12.3*	4.1	1100
	H/2.5	Y	34.9	-22.6	12.3*	4.1	
	V/1.0	X	35.0	-22.6	12.4*	4.1	
	V/1.0	Y	35.0	-22.6	12.4*	4.1	
1216							1100
1520	H/2.0	X	36.0	-22.6	13.4*	4.7	1100
	H/2.0	Y	36.0	-22.6	13.4*	4.7	
	V/1.0	X	37.8	-22.6	15.2*	5.8	
	V/1.0	Y	37.8	-22.6	15.2*	5.8	
1520							1100

The frequency range was scanned from 304 MHz to 3.1GHz. All emissions not recorded were more than 10 dB below the specified limit. Emissions from the EUT do not exceed the specified limits.

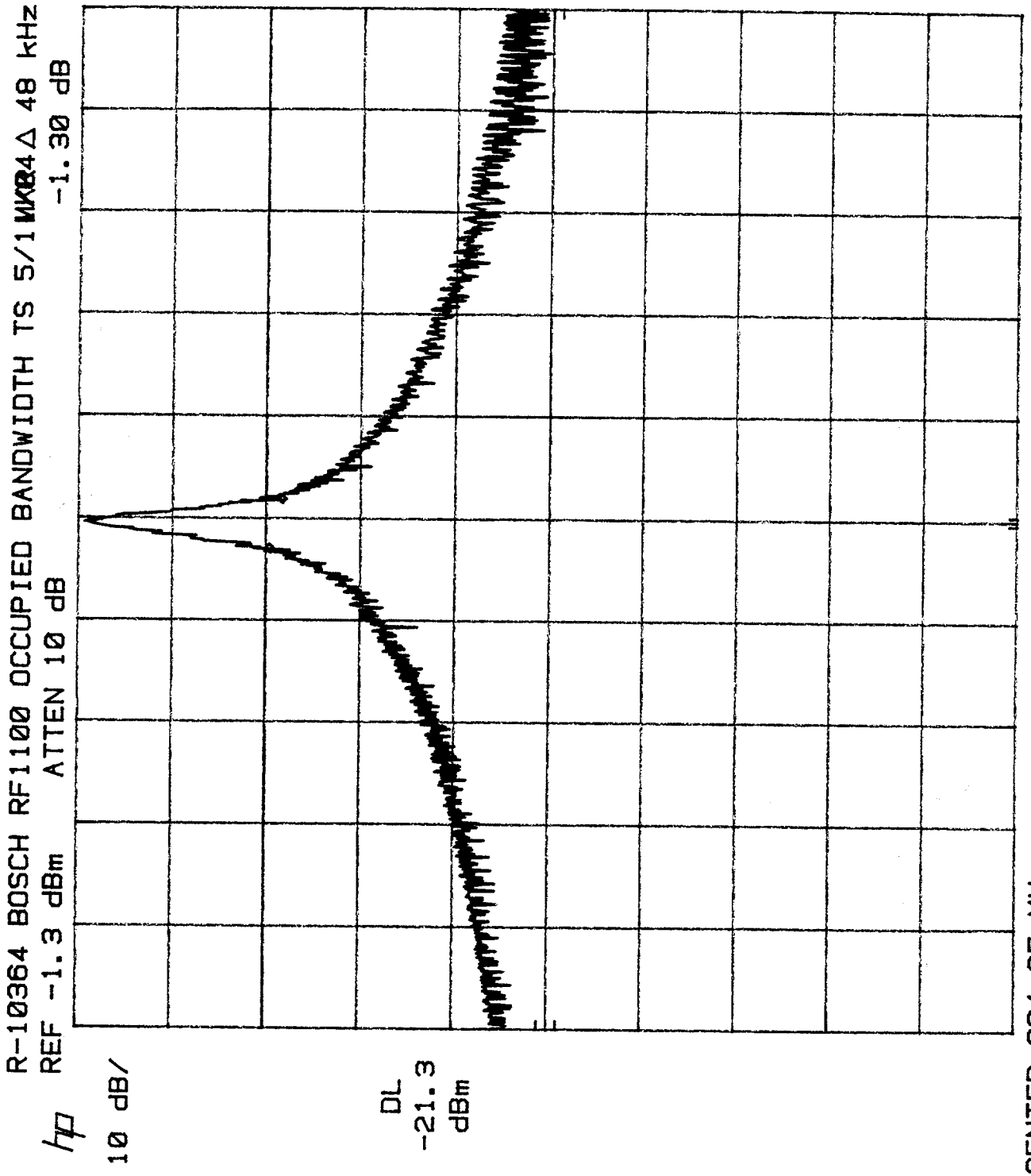
*=Noise Floor Measurements (Minimum system sensitivity).

Test Method:	FCC Part 15 Subpart C Radiated Emissions, Fundamental & Harmonic Emissions.		
Customer:	Bosch Security Systems, Inc.	**Job No.**	R-10364-1
Test Sample:	304 MHz Pulsed Transmitter.	**Paragraph:**	15.231
Model No.:	RF1100E	**FCC ID:**	ESV-
Operating Mode:	Continuously transmitting a 304 MHz signal.		
Technician:	R. Soodoo / D. Lerner	**Date:**	June 23, 2004.

Notes: Test Distance: 3 Meters — Duty Cycle: 7.4 %

Detector: Peak, unless otherwise specified — Duty Cycle Correction: -22.6 dB

Test Freq.	Antenna Pol./Height	EUT Orientation	Peak Reading	Duty Cycle Correction Factor	Corrected Reading	Converted Reading	Avg. Limit
MHz	(V/H)-Meters	X / Y / Z	dBuV	dB	dBuV/m	uV/m	uV/m
|	H/1.0	Y	35.5	-22.6	12.9*	4.4	|
|							|
|	V/1.0	X	35.0	-22.6	12.4*	4.2	|
|	V/1.0	Y	35.0	-22.6	12.4*	4.2	|
1824							1100
2128	H/1.0	X	35.8	-22.6	13.2*	4.6	1100
|	H/1.0	Y	35.8	-22.6	13.2*	4.6	|
|							|
|	V/1.0	X	36.4	-22.6	13.8*	4.9	|
|	V/1.0	Y	36.4	-22.6	13.8*	4.9	|
2128							1100
2432	H/1.0	X	43.7	-22.6	21.1*	11.4	1100
|	H/1.0	Y	43.7	-22.6	21.1*	11.4	|
|							|
|	V/1.0	X	37.5	-22.6	14.9*	5.6	|
|	V/1.0	Y	37.5	-22.6	14.9*	5.6	|
2432							1100
2736	H/1.0	X	40.5	-22.6	17.9*	7.9	500
|	H/1.0	Y	40.5	-22.6	17.9*	7.9	|
|							|
|	V/1.0	X	39.6	-22.6	17*	7.1	|
|	V/1.0	Y	39.6	-22.6	17*	7.1	|
2736							500
3040	H/1.0	X	39.7	-22.6	17.1*	7.2	500
|	H/1.0	Y	39.7	-22.6	17.1*	7.2	|
|							|
|	V/1.0	X	39.0	-22.6	16.4*	6.6	|
|	V/1.0	Y	39.0	-22.6	16.4*	6.6	|
3040							500
	The frequency range was scanned from 304 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)						



Customer:	Bosch Security System, Inc.
Test Sample:	304 MHz Pulsed Transmitter.
Model No.:	RF 1100, FCC ID: ESV-
Test Method:	FCC Part 15 Subpart C 15.231(c), Occupied Bandwidth
Notes:	Bandwidth does not exceed 0.25% of Center Frequency at the 20 dBc points(760 kHz)

Date: June 24, 2004. Tech: T. S. Sheet 1 of 1

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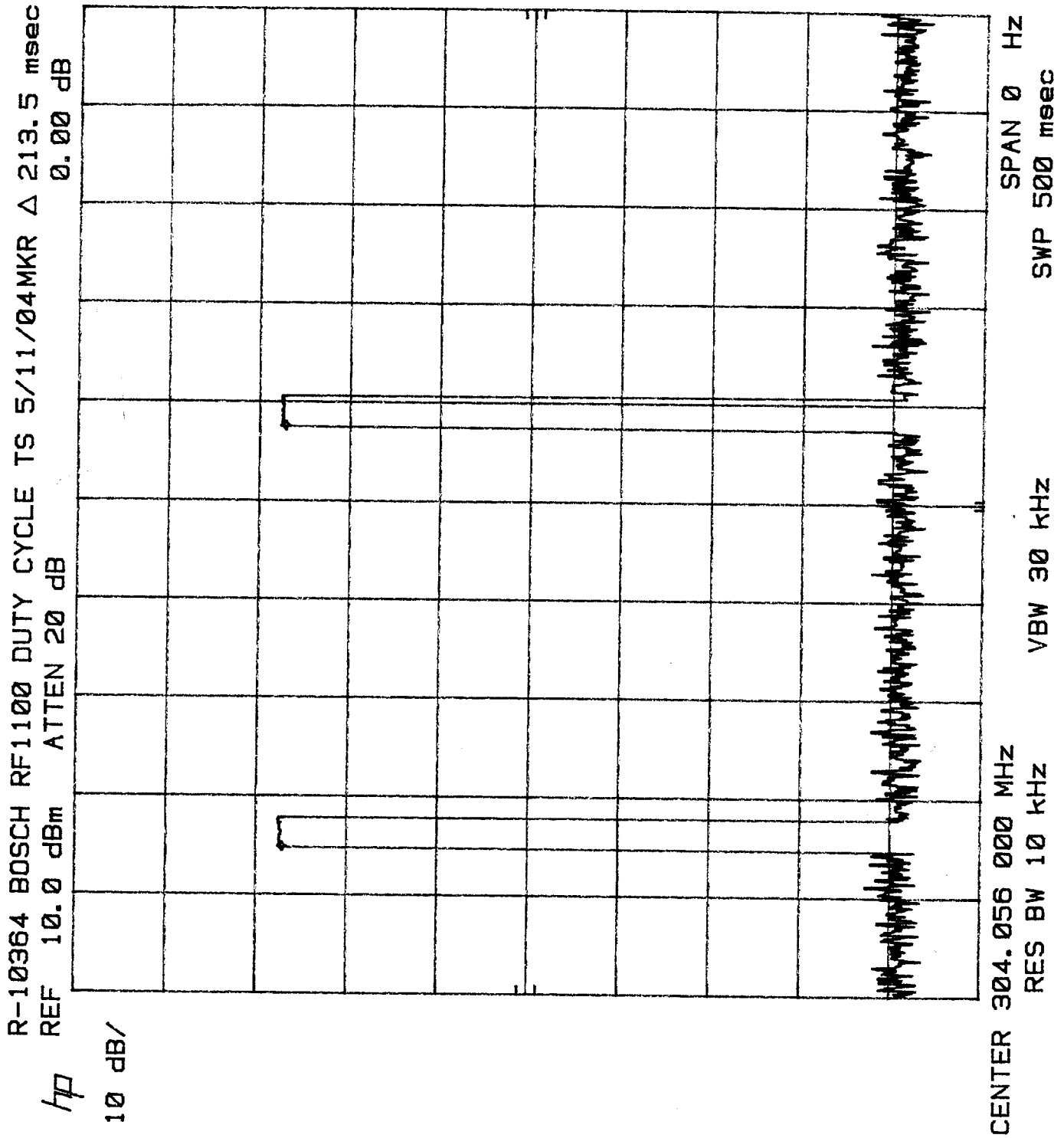

Customer:	Bosch Security System, Inc.
Test Sample:	304 MHz Pulsed Transmitter.
Model No.:	RF 1100, FCC ID: ESV-
Test Method:	FCC Part 15 Subpart , Duty Cycle Determination
Notes:	Pulse train cycle time measurement= 213.5 mSec (> 100 mSec)

Date: June 24, 2004. Tech: T. S. Sheet 1 of 2

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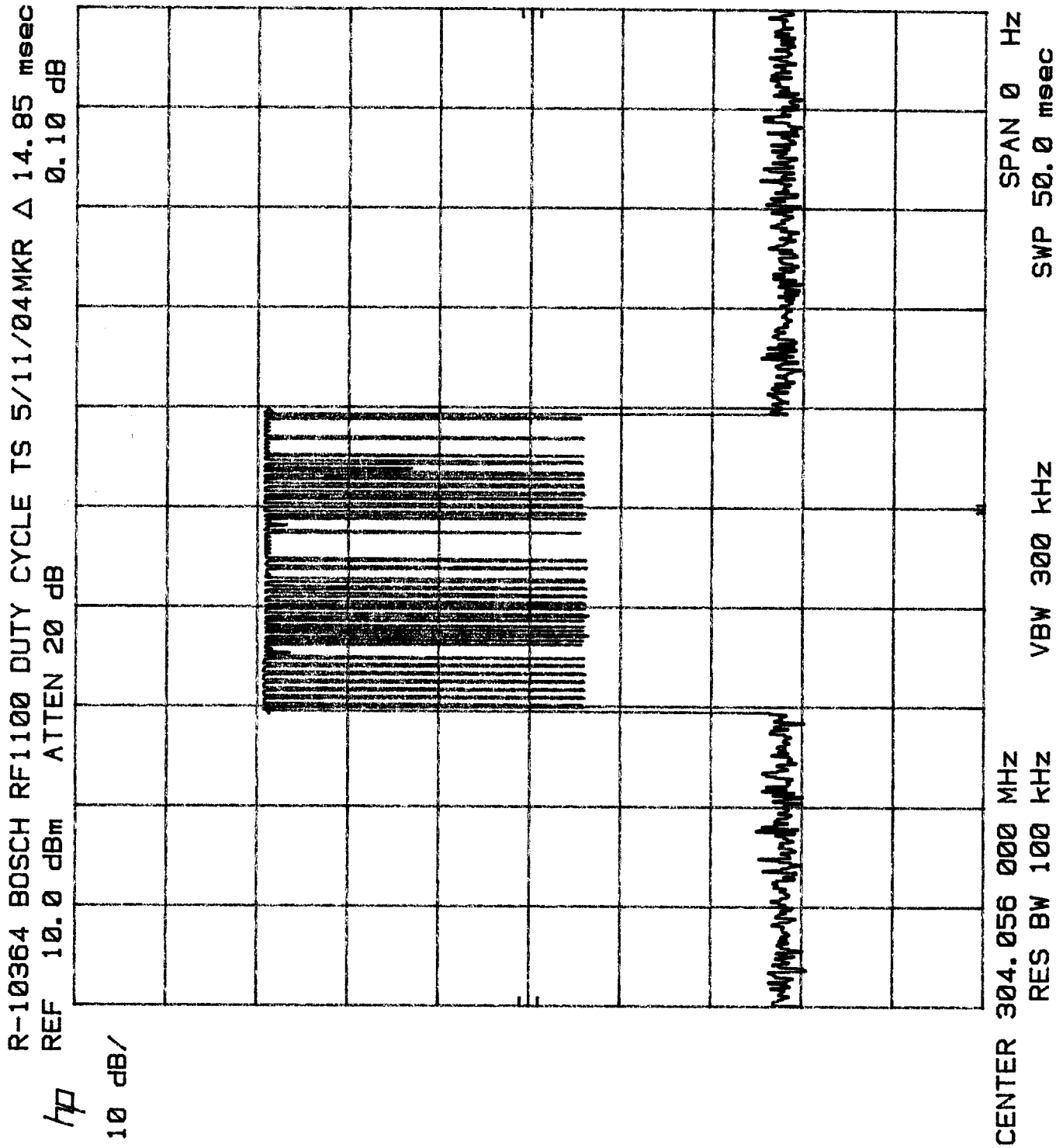

Customer:	Bosch Security System, Inc.
Test Sample:	304 MHz Pulsed Transmitter.
Model No.:	RF 1100, FCC ID: ESV-
Test Method:	FCC Part 15 Subpart C Duty Cycle Determination
Notes:	Transmitter on time measurement= aproximately 50% of total on time= 0.5(14.85 mSec)= 7.4 msec=7.4 % Duty Cycle

Date: June 24, 2004. Tech: T. S. Sheet 2 of 2

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