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: RF3402

TYPE: Pulsed Transmitter

POWER REQUIREMENTS: 3 VDC via a CR2 Lithium Battery

FREQUENCY OF OPERATION: 304 MHz

TESTS PERFORMED

Para. 15.231(b), Fundamental & Harmonics

Para. 15.231(b), Spurious Case

Para. 15.231(c), Occupied Bandwidth

Para. 15.35, Duty Cycle Determination

REPORT OF MEASUREMENTS

Applicant:	Bosch Security Systems, Inc.
Device:	Pulsed Transmitter
FCC ID:	ESV-RF3402
Power Requirements:	3 VDC via a CR2 Lithium Battery
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) & (a)(2) The transmitter is manually operated and ceases transmission within 5 seconds of activation.

15.231 (a)(3): The transmitter does perform periodic transmissions at intervals greater than once per hour (Every 65 minutes).

15.231 (b): The fundamental field strength did not exceed 5560 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 556 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 = 5560 µV/M (AVERAGE) @ 3 Meters

Harmonic Limit = 556 µV/M (AVERAGE) @ 3 Meters

Bandwidth = 760 kHz

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 = 15.0 milliseconds (maximum)

Transmitter Cycle Time = 110 milliseconds

Transmitter Duty Cycle = 15.0 %

CALCULATION:

Duty Cycle (15/100) = 15 %

Correction Factor = 20 log(0.15) = -16.5 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 15 milliseconds yields a minimum required bandwidth of 44 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. All measurements were made with new 3V CR2 Lithium Battery.

4. The frequency range was scanned from 30 MHz to 3.04 GHz. All emissions not reported were more than 20 dB below the specified limit.

EQUIPMENT LIST

FCC Part 15 Subpart C 15.231;Radiated Emissions.

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	6/21/2004	6/21/2005
133	Broadband Pre-Amplifier	Electro-Metrics	10 kHz - 1 GHz, 26dB	BPA-1000	6/12/2004	6/12/2005
206B	6.0 dB Attenuator	Texscan	0 - 1.0 GHz	FP-50 - 6 dB	6/12/2004	6/12/2005
543	Preamplifier	Hewlett Packard	1.0 GHz - 26.5 GHz	8449B	7/27/2004	7/27/2005
617	Interference Analyzer	Electro-Metrics	10 kHz - 1 GHz	EMC-30	10/5/2004	10/5/2005
723	H.P. Filter	Mini-Circuits	1 GHz	BHP-1000	7/14/2004	7/14/2005
763	Spectrum Analyzer	Agilent	30 Hz - 13.2 GHz	E4405B	7/9/2004	7/9/2005
767	Biconilog	EMCO	26 - 2000 MHz	3142B	10/7/2004	10/7/2005

FCC 15.231(b)

FUNDAMENTAL & HARMONICS

Test Method:	FCC Part 15 Subpart C Radiated Emissions, Fundamental & Harmonic Emissions		
Customer:	Bosch Security System Inc.		R-10620
Test Sample:	RF3402 Transmitter	**Paragraph:**	15.231
Model No.:	RF 3402	**FCC ID:**	ESV-RF3402
Operating Mode:	Continuously Transmitting a 304 MHz Signal		
Technician:	R. Soodoo	**Date:**	October 30, 2004.

Notes: Test Distance: 3 Meters Temperature: 12°C Humidity: 92%
Detector: Peak, unless otherwise specified

Frequency	Antenna Pol./Height	EUT Orientation	Meter Reading	Correction Factor	Corrected Reading	Converted Reading	Peak Limit
|	H / 1.00	Y	84	-3.1	80.9	11091.7	|
|	H / 1.00	Z	92	-3.1	88.9	27861.2	|
|	V / 1.00	X	84	-2.4	81.6	12022.6	|
|	V / 1.50	Y	88	-2.4	85.6	19054.6	|
304	V / 1.50	Z	84	-2.4	81.6	12022.6	55590
608	H / 1.00	X	18	15.7	33.7 **QP**	48.40	200 **QP**
|	H / 1.00	Y	23	15.7	38.7 **QP**	86.10	|
|	H / 1.00	Z	21	15.7	36.7 **QP**	68.40	|
|	H / 1.00	X	22	14.8	36.8 **QP**	69.20	|
|	H / 1.00	Y	19	14.8	33.8 **QP**	49.00	|
608	H / 1.00	Z	23	14.8	37.8 **QP**	77.60	200 **QP**
912	H / 1.00	X	45	9.9	54.9	555.9	5559
|	H / 1.00	Y	34	9.9	43.9	156.7	|
|	H / 1.00	Z	40	9.9	49.9	312.6	|
|	V / 1.25	X	44	9.9	53.9	495.5	|
|	V / 1.00	Y	44	9.9	53.9	495.5	|
912	V / 1.25	Z	43	9.9	52.9	441.6	5559
1216	H / 2.25	X	51	-2.3	48.7	272.3	5012
|	H / 1.00	Y	41	-2.3	38.7	86.10	|
|	H / 2.50	Z	50	-2.3	47.7	242.7	|
|	V / 1.25	X	51	-2.4	48.6	269.2	|
|	V / 1.25	Y	53	-2.4	50.6	338.8	|
1216	V / 1.00	Z	52	-2.4	49.6	302.0	5012
1520	H / 1.50	X	45	1.6	46.6	213.8	5012
|	H / 1.25	Y	39	1.6	40.6	107.2	|
|	H / 1.50	Z	42	1.6	43.6	151.4	|
|	V / 1.00	X	46	0.6	46.6	213.8	|
|	V / 1.25	Y	54	0.6	54.6	537.0	|
1520	V / 1.00	Z	47	0.6	47.6	239.9	5012
	The frequency range was scanned from 30 MHz to 3.04 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).						

Retlif Testing Laboratories

Retlif Job Number R-10620

Test Method:	FCC Part 15 Subpart C Radiated Emissions, Fundamental & Harmonic Emissions		
Customer:	Bosch Security System Inc.		R-10620
Test Sample:	RF3402 Transmitter	**Paragraph:**	15.231
Model No.:	RF 3402	**FCC ID:**	ESV-RF3402
Operating Mode:	Continuously Transmitting a 304 MHz Signal		
Technician:	R. Soodoo	**Date:**	October 30, 2004.

Notes: Test Distance: 3 Meters Temperature: 12 °C Humidity: 92 %

Detector: Peak, unless otherwise specified

Frequency	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	30.0	4.9	34.9	55.6*	|
|	H / 1.0	Z	30.0	4.9	34.9	55.6*	|
|	V / 1.0	X	30.0	4.0	34.0	50.1*	|
|	V / 1.0	Y	30.0	4.0	34.0	50.1*	|
1827	V / 1.0	Z	30.0	4.0	34.0	50.1*	5559
2128	H / 1.0	X	40.0	1.2	41.2	114.8*	5559
|	H / 1.0	Y	40.0	1.2	41.2	114.8*	|
|	H / 1.0	Z	40.0	1.2	41.2	114.8*	|
|	V / 1.0	X	40.0	1.2	41.2	114.8*	|
|	V / 1.0	Y	40.0	1.2	41.2	114.8*	|
2128	V / 1.0	Z	40.0	1.2	41.2	114.8*	5559
2432	H / 1.0	X	40.0	3.8	43.8	154.9*	5559
|	H / 1.0	Y	40.0	3.8	43.8	154.9*	|
|	H / 1.0	Z	40.0	3.8	43.8	154.9*	|
|	V / 1.0	X	40.0	3.8	43.8	154.9*	|
|	V / 1.0	Y	40.0	3.8	43.8	154.9*	|
2432	V / 1.0	Z	40.0	3.8	43.8	154.9*	5559
2736	H / 1.0	X	40.0	5.1	45.1	179.9*	5012
|	H / 1.0	Y	40.0	5.1	45.1	179.9*	|
|	H / 1.0	Z	40.0	5.1	45.1	179.9*	|
|	V / 1.0	X	40.0	5.1	45.1	179.9*	|
|	V / 1.0	Y	40.0	5.1	45.1	179.9*	|
2736	V / 1.0	Z	40.0	5.1	45.1	179.9*	5012
3040	H / 1.0	X	40.0	6.2	46.2	204.2*	5559
|	H / 1.0	Y	40.0	6.2	46.2	204.2*	|
|	H / 1.0	Z	40.0	6.2	46.2	204.2*	|
|	V / 1.0	X	40.0	6.2	46.2	204.2*	|
|	V / 1.0	Y	40.0	6.2	46.2	204.2*	|
3040	V / 1.0	Z	40.0	6.2	46.2	204.2*	5559

The frequency range was scanned from 30 MHz to 3.04 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:	Bosch Security System Inc.		R-10620
Test Sample:	RF3402 Transmitter	**Paragraph:**	15.231
Model No.:	RF 3402	**FCC ID:**	ESV-RF3402
Operating Mode:	Continuously Transmitting a 304 MHz Signal		
Technician:	R. Soodoo	**Date:**	October 30, 2004.

Notes: Test Distance: 3 Meters — Duty Cycle: 15 %

Detector: Peak, unless otherwise specified — Duty Cycle Correction: -16.5 dB

Frequency	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
|	H /	Y	80.9	-16.5	64.4	1659.6	|
|	H /	Z	88.9	-16.5	72.4	4168.7	|
|	V /	X	81.6	-16.5	65.1	1798.9	|
|	V /	Y	85.6	-16.5	69.1	2851.0	|
304	V /	Z	81.6	-16.5	65.1	1798.9	5559.0
608	H /	X	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
|	H /	Y	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
|	H /	Z	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
|	V /	X	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
|	V /	Y	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
608	V /	Z	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
912	H /	X	54.9	-16.5	38.4	83.2	555.9
|	H /	Y	43.9	-16.5	27.4	23.4	|
|	H /	Z	49.9	-16.5	33.4	46.8	|
|	V /	X	53.9	-16.5	37.4	74.1	|
|	V /	Y	53.9	-16.5	37.4	74.1	|
912	V /	Z	52.9	-16.5	36.4	66.1	555.9
1216	H /	X	48.7	-16.5	32.2	40.7	501.2
|	H /	Y	38.7	-16.5	22.2	12.9	|
|	H /	Z	47.7	-16.5	31.2	36.3	|
|	V /	X	48.6	-16.5	32.1	40.3	|
|	V /	Y	50.6	-16.5	34.1	50.7	|
1216	V /	Z	49.6	-16.5	33.1	45.2	501.2
1520	H /	X	46.6	-16.5	30.1	32.0	501.2
|	H /	Y	40.6	-16.5	24.1	16.0	|
|	H /	Z	43.6	-16.5	27.1	22.6	|
|	V /	X	46.6	-16.5	30.1	32.0	|
|	V /	Y	54.6	-16.5	38.1	80.4	|
1520	V /	Z	47.6	-16.5	31.1	35.9	501.2

The frequency range was scanned from 30 MHz to 3.04 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).

Retlif Testing Laboratories

Retlif Job Number R-10620

Test Method:	FCC Part 15 Subpart C Radiated Emissions, Fundamental & Harmonic Emissions		
Customer:	Bosch Security System Inc.		R-10620
Test Sample:	RF3402 Transmitter	**Paragraph:**	15.231
Model No.:	RF 3402	**FCC ID:**	ESV-RF3402
Operating Mode:	Continuously Transmitting a 304 MHz Signal		
Technician:	R. Soodoo	**Date:**	October 30, 2004.

Notes: Test Distance: 3 Meters — Duty Cycle: 15 %

Detector: Peak, unless otherwise specified — Duty Cycle Correction: - 16.5dB

Frequency	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
|	H /	Y	34.9	-16.5	18.4	8.3	|
|	H /	Z	34.9	-16.5	18.4	8.3	|
|	V /	X	34.0	-16.5	17.5	7.5	|
|	V /	Y	34.0	-16.5	17.5	7.5	|
1827	V /	Z	34.0	-16.5	17.5	7.5	5559
2128	H /	X	41.2	-16.5	24.7	17.2	5559
|	H /	Y	41.2	-16.5	24.7	17.2	|
|	H /	Z	41.2	-16.5	24.7	17.2	|
|	V /	X	41.2	-16.5	24.7	17.2	|
|	V /	Y	41.2	-16.5	24.7	17.2	|
2128	V /	Z	41.2	-16.5	24.7	17.2	5559
2432	H /	X	43.8	-16.5	27.3	23.2	5559
|	H /	Y	43.8	-16.5	27.3	23.2	|
|	H /	Z	43.8	-16.5	27.3	23.2	|
|	V /	X	43.8	-16.5	27.3	23.2	|
|	V /	Y	43.8	-16.5	27.3	23.2	|
2432	V /	Z	43.8	-16.5	27.3	23.2	5559
2736	H /	X	45.1	-16.5	28.6	26.9	501.2
|	H /	Y	45.1	-16.5	28.6	26.9	|
|	H /	Z	45.1	-16.5	28.6	26.9	|
|	V /	X	45.1	-16.5	28.6	26.9	|
|	V /	Y	45.1	-16.5	28.6	26.9	|
2736	V /	Z	45.1	-16.5	28.6	26.9	501.2
3040	H /	X	46.2	-16.5	29.7	30.5	5559
|	H /	Y	46.2	-16.5	29.7	30.5	|
|	H /	Z	46.2	-16.5	29.7	30.5	|
|	V /	X	46.2	-16.5	29.7	30.5	|
|	V /	Y	46.2	-16.5	29.7	30.5	|
3040	V /	Z	46.2	-16.5	29.7	30.5	5559

The frequency range was scanned from 30 MHz to 3.04 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).

Retlif Testing Laboratories

Retlif Job Number R-10620

FCC 15.231(b)
SPURIOUS CASE

Test Method:	FCC Part 15 Subpart C, Spurious Case Radiated Emissions, Paragraph 15.209(a)		
Customer:	Bosch Security System Inc.		R-10620
Test Sample:	RF3402 Transmitter	**Paragraph:**	15.209(a)
Model No.:	RF 3402	**FCC ID:**	ESV-RF3402
Operating Mode:	Continuously Transmitting a 304 MHz Signal		
Technician:	R. Soodoo	**Date:**	November 03, 2004.

Notes: Test Distance: 3 Meters Temp: 19°C Humidity:42 %

Detector: Quasi-Peak from 30 MHz to 1 GHz, Peak above 1 GHz

Frequency	Antenna Position	EUT Orientation	Meter Readings	Correction Factor	Corrected Reading	Converted Reading	**LIMIT**
MHz	(V/H) /	Degrees	dBuV	dB	dBuV/m	uV/m	uV/m
30							100
88							100
88							150
216							150
216							200
960							200
960							500
3040							500

No Emissions Observed at specified test distance other than Fundamental and Harmonics.

The frequency range was scanned from 30 MHz to 3.04 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

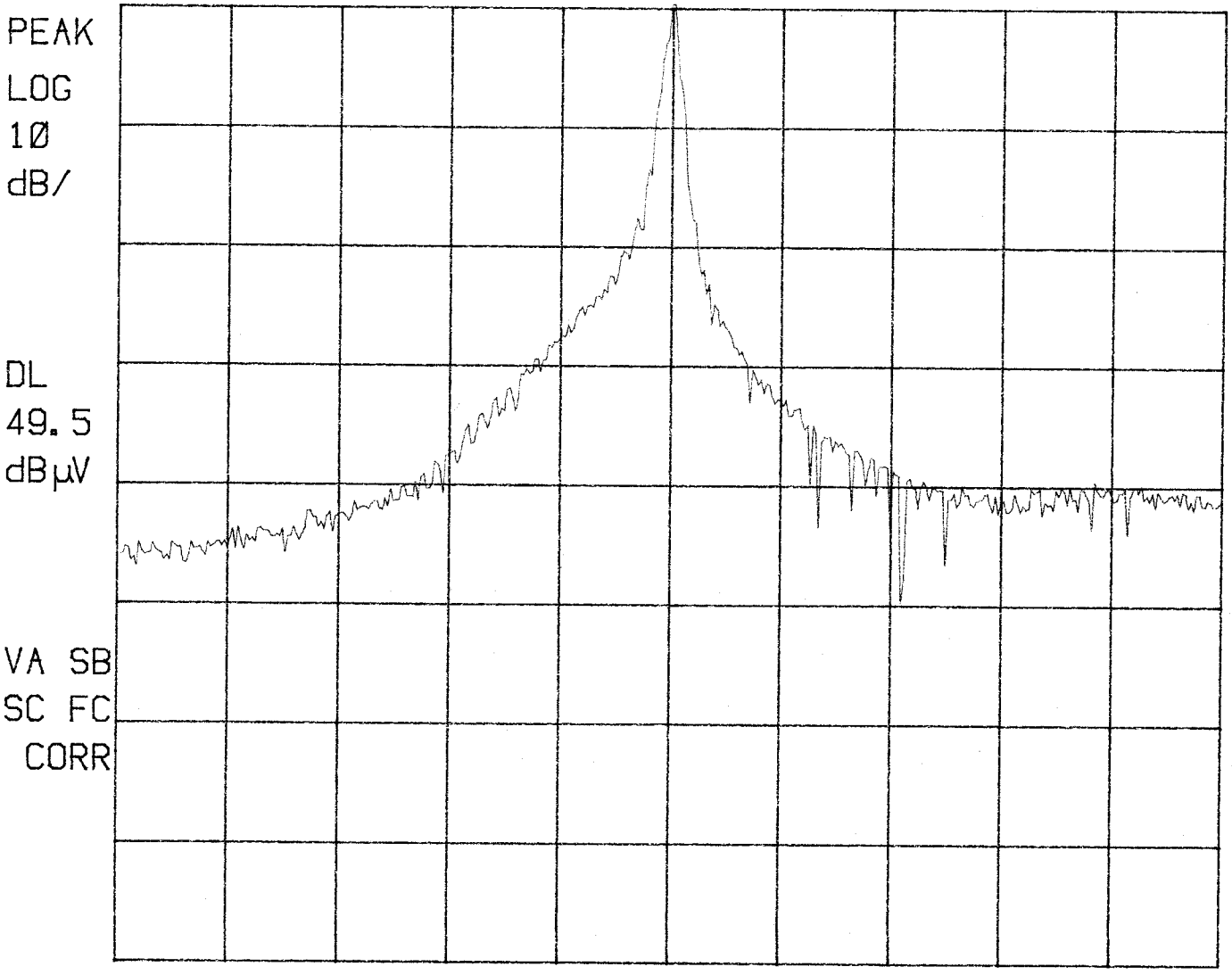
Retlif Job Number R-10620

FCC 15.231(c)

OCCUPIED BANDWIDTH

Customer:	Bosch Security Systems Inc.
Test Sample:	304 MHz Pulsed RF Transmitter
Model No.	RF3402, FCC ID: ESV-RF3402
Test Method:	FCC Part 15, Para. 15.231(c) Occupied Bandwidth
Notes:	Bandwidth does not exceed 0.25 % of Center Frequency =760 kHz at the 20 dB down points
Date:	October 29, 2004
Tech:	T. Schneider
Sheet	1 of 1

14:35:59 OCT 29, 2004
R-10620 BOSCH RF3402 Occupied Bandwidth TS
REF 69.5 dBµV AT 10 dB



CENTER 304.0038 MHz
#RES BW 9.0 kHz
VBW 30 kHz
SPAN 760.0 kHz
SWP 33.3 msec

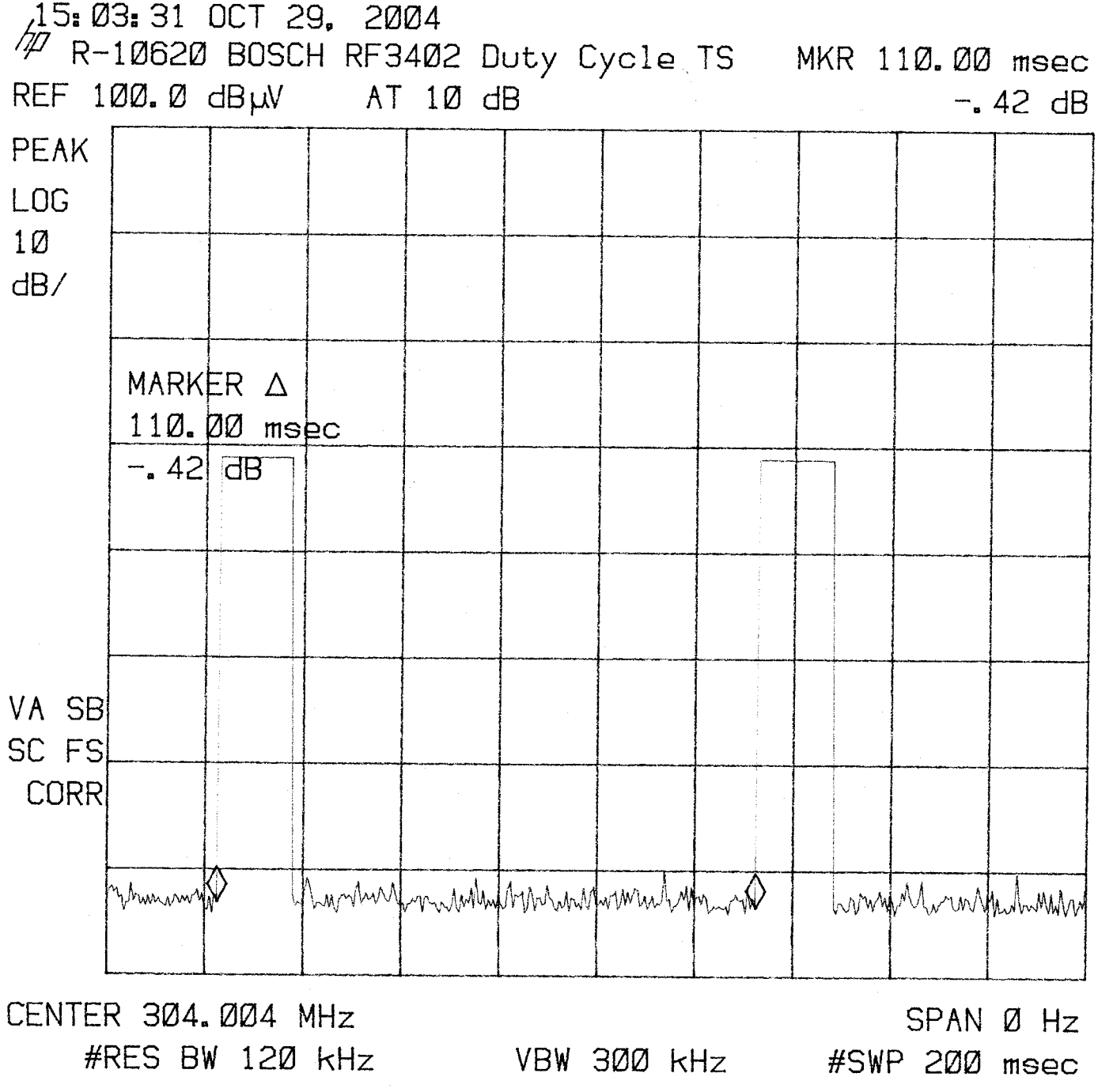
Retlif Testing Laboratories

Report No. R-10630

FCC 15.231(c)

DUTY CYCLE

Customer:	Bosch Security Systems Inc.
Test Sample:	304 MHz Pulsed RF Transmitter
Model No.:	RF3402, FCC ID: ESV-RF3402
Test Method:	FCC Part 15, Para. 15.35 Duty Cycle determination
Notes:	Cycle time determination > 100 msec=110 mSec
Date:	October 29, 2004
Tech:	T. Schneider
Sheet	1 of 2



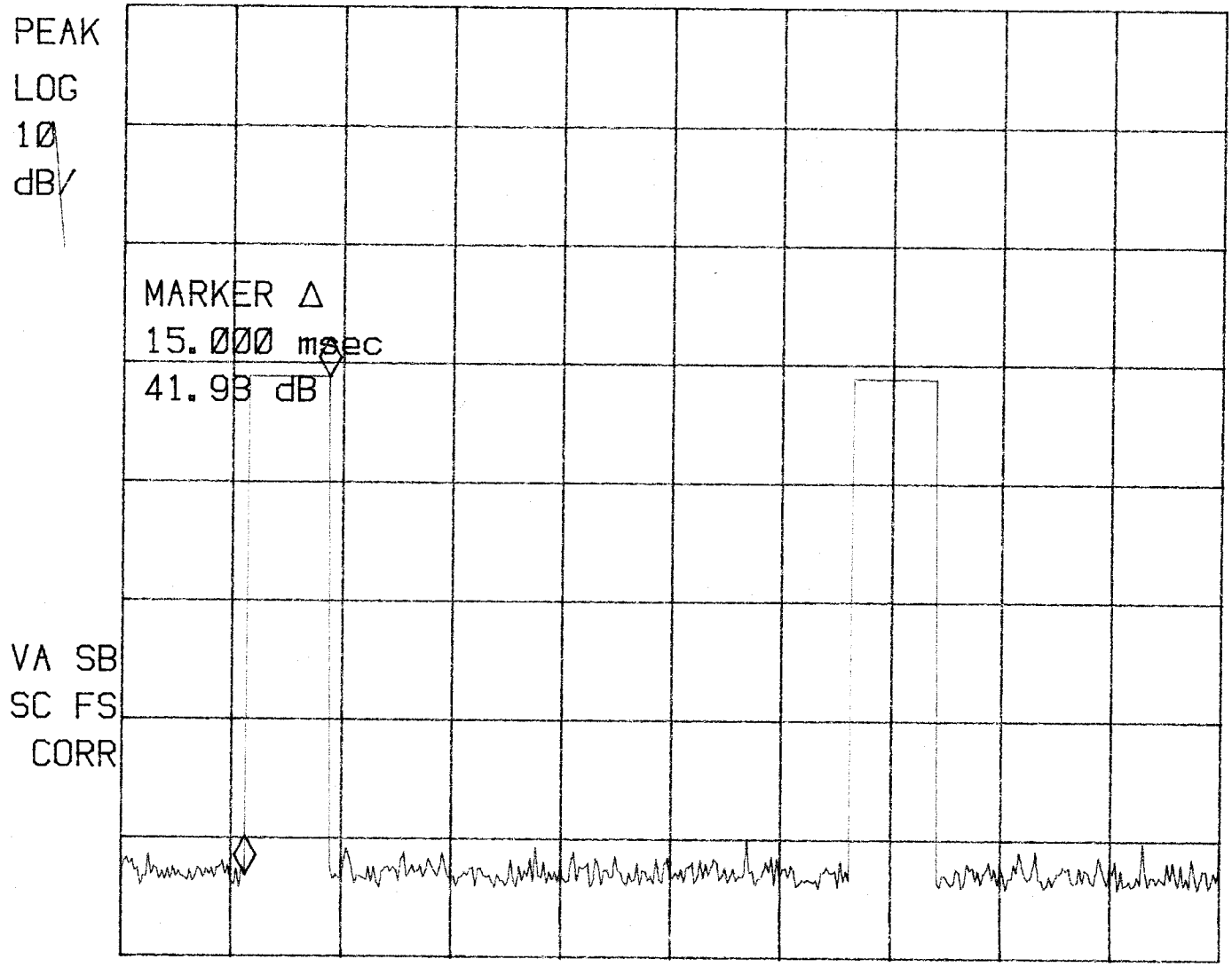
Retlif Testing Laboratories

Report No. R-10630

Customer: Bosch Security Systems Inc.
Test Sample: 304 MHz Pulsed RF Transmitter
Model No.: RF3402, FCC ID: ESV-RF3402
Test Method: FCC Part 15, Para. 15.35 Duty Cycle determination
Notes: On time determination = 15.0 mscec

Date: October 29, 2004 Tech: T. Schneider Sheet 2 of 2

15:09:04 OCT 29, 2004
R-10620 BOSCH RF3402 Duty Cycle TS
REF 100.0 dBµV AT 10 dB
MKR 15.000 msec
41.93 dB



CENTER 304.004 MHz
#RES BW 120 kHz
VBW 300 kHz
SPAN 0 Hz
#SWP 200 msec

Retlif Testing Laboratories

Report No. R-10630