

# Retlif Testing Laboratories

795 Marconi Avenue, Ronkonkoma, N.Y. 11779 (516) 737-1500 - FAX 516-737-1497

(Branch Office)

101 New Boston Road, Goffstown, N.H. 03045 (603) 497-4600 - FAX (603) 497-5281

FCC COMPLIANCE TEST REPORT  
ON  
DETECTION SYSTEMS, INC.  
304 MHz SECURITY AND ALARM  
RECEIVER & TRANSCEIVER  
Models: RF3222 & RF3223  
FCC ID: ESV-0406-1

CUSTOMER NAME: Detection Systems

CUSTOMER P.O.: 104422SKI

DATE OF REPORT: May 4, 1998

TEST REPORT NO.: R-7478-1

TEST START DATE: March 26, 1998

TEST FINISH DATE: April 24, 1998

TEST TECHNICIAN: D. Cortes

TEST ENGINEER: T. Schneider

SUPERVISOR: R.J. Reitz

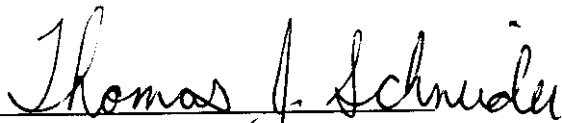
REPORT PREPARED BY: L. Anderson

GOVERNMENT SOURCE INSPECTION: Not Applicable

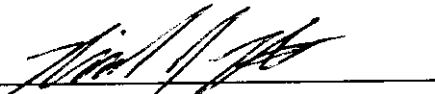
Our letters and reports are for the exclusive use of the customer to whom they are addressed, and their communications to any other or the use of the name of RETLIF TESTING LABORATORIES must receive our prior written approval. Our letters and reports apply only to the sample tested and are not necessarily indicative of the qualities of apparently identical or similar products. The reports and letters and the name of RETLIF TESTING LABORATORIES or insignia are not to be used under any circumstances in advertising to the general public. This report may not be used by you to claim product endorsement by NVLAP or any agency of the U.S. Government. This test report shall not be reproduced, except in full, without the written approval of RETLIF TESTING LABORATORIES.

## CERTIFICATION AND SIGNATURES

We certify that this report is a true report of the results obtained from the tests of the equipment stated. We further certify that the measurements shown in this report were made in accordance with the procedures indicated and vouch for the qualifications of all Retlif Testing Laboratories personnel taking them.



Thomas J. Schneider  
EMC Test Engineer  
NVLAP Approved Signatory



Richard J. Reitz  
Laboratory Manager  
NVLAP Approved Signatory

### NON-WARRANTY PROVISION

The testing services have been performed, findings obtained, and reports prepared in accordance with generally accepted testing laboratory principles and practices. This warranty is in lieu of all other warranties, either express or implied.

### NON-ENDORSEMENT

This test report contains only findings and results arrived at after employing the specific test procedures and standards listed herein. It is not intended to constitute a recommendation endorsement, or certification of the product or material tested. This report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.



**Retlif Testing Laboratories**

Test Report No. R-7478-1  
FCC ID: ESV-0406-1

TABLE OF EXHIBITS

Exhibit 1 ..... Equipment Label per 2.1033(b)(7)

Exhibit 2 ..... Equipment Photographs per 2.1033(b)(7)

Exhibit 3 ..... Technical Description per 2.1033(b)(4)

Exhibit 4 ..... Block Diagram and Schematics per 2.1033(b)(5)

Exhibit 5 ..... Installation and Operating Instructions per 2.1033(b)(3)

Exhibit 6 ..... Report of Measurements - per 2.1033(b)(6)



**Retlif Testing Laboratories**

Test Report No. R-7478-1  
FCC ID: ESV-0406-1

EXHIBIT 6

Report of Measurements

Para. 2.1033(b)(6)



**Retlif Testing Laboratories**

Test Report No. R-7478-1  
FCC ID: ESV-0406-1

<b>APPLICANT</b> Detection Systems 130 Perinton Parkway Fairport, NY 14450	<b>MANUFACTURER</b>  SAME
---	---------------------------------

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

TEST PROCEDURE: ANSI C63.4:1992

**TEST SAMPLE DESCRIPTION**

BRANDNAME: Detection Systems MODEL: RF3222 & RF3223

TYPE: Security Transceiver

POWER REQUIREMENTS: 115 VAC, 60 Hz

FREQUENCY OF OPERATION: 304 MHz

**TESTS PERFORMED**

Para. 15.231(a), Radiated Emissions, Fundamental & Spurious

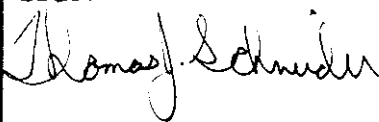
Para. 15.231(c), Occupied Bandwidth

Duty Cycle Determination

Para. 15.207(a), Conducted Emissions

I HEREBY CERTIFY THAT: The measurements shown here were in accordance with the procedure indicated and that the energy emitted by this equipment was found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements and vouch for the qualifications of all persons taking them.

I FURTHER CERTIFY THAT: On the basis of the measurements made, the device tested is capable of operation in compliance with the requirements of Part 15 of the FCC Rules under normal use and maintenance.

<b>SIGN</b> 	<b>PRINT</b> Thomas J. Schneider	<b>TITLE</b> EMC Test Engineer
--	-------------------------------------	-----------------------------------



**Retlif Testing Laboratories**

Test Report No. R-7478-1  
 FCC ID: ESV-0406-1

## REPORT OF MEASUREMENTS

Applicant: Detection Systems  
Device: 304 MHz Security Transmitter  
FCC ID: ESV-0406-1  
Power Requirements: 115 VAC, 60 Hz  
Applicable Rule Section: Part 15, Subpart C, Section 15.231

### TEST RESULTS

- 15.231 (a) - The device is a Security System Transmitter used to test system integrity and status.. ✓
- 15.231 (a)(1) - The transmitter is automatically operated.
- 15.231 (a)(2) - The device transmits to indicate an alarm condition for a maximum time of less than 100 milliseconds
- 15.231 (a)(3) - The unit performs periodic transmissions at 70 minute intervals for system integrity and status purposes.
- 15.231 (a)(4) - The device is used for Security purposes.
- 15.231 (b) - The fundamental field strength did not exceed  $5580 \mu\text{V}/\text{M}$  (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  $558 \mu\text{V}/\text{M}$  (AVERAGE).
- 15.231 (c) - The device operates at 304 MHz. The bandwidth of emissions did not exceed 0.25% of the operating frequency (760 kHz).



**Retlif Testing Laboratories**

Test Report No. R-7478-1  
FCC ID: ESV-0406-1

## REPORT OF MEASUREMENTS (continued)

### 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:

$$\text{Limit} = L1 + [(Fo-F1)(L2-L1)/(F2-F1)]$$

Solving yields:

Fundamental Limit = 5580  $\mu$ V/M (AVERAGE) @ 3 Meters

Harmonic Limit = 558  $\mu$ V/M (AVERAGE) @ 3 Meters

### DETERMINATION OF DUTY CYCLE AS PER DETECTION SYSTEMS:

The data is modulated using the Manchester on/off key encoding scheme with 50% duty cycle. The on-air format is defined with a "1" bit which is carrier turning on at the bit center and an "0" bit which is carrier turning off at the bit center. The packet consists of on-air bits that are transmitted to provide the system with the current status of the transmitter. A single message is comprised of up to 8 packets of the same data. Time between packets is defined as a pseudo-random time length between 100 milliseconds and 275 milliseconds.

Packet width of  $\leq 20$  ms with 50% duty cycle Manchester modulation makes the on-air time  $\leq 10$  ms. Therefore, no transmission has more than 10 ms of on time out of 100 ms.

Transmitter On Time = 10.0 milliseconds (maximum)

Transmitter Cycle Time =  $\geq 100.0$  milliseconds

Transmitter Duty Cycle = 10.0 %



**Retlif Testing Laboratories**

Test Report No. R-7478-1

FCC ID: ESV-0406-1

## REPORT OF MEASUREMENTS (continued)

### 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:

$$\text{Pulse Desensitization} = 20 \text{ Log ( PW * BW * 1.5)}$$

Setting pulse desensitization equal to zero and utilizing the minimum observed pulse width of 100 microseconds yields a minimum required bandwidth of 6666.6 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 was scanned from 30 MHz to 3.04 GHz. All emissions not reported were more than 20 dB below the specified limit.



**Retlif Testing Laboratories**

Test Report No. R-7478-1  
FCC ID: ESV-0406-1



Exhibit 6

Report of Measurements

Radiated Emissions Data, Para. 15.231(b)



**Retlif Testing Laboratories**

Test Report No. R-7478-1  
FCC ID: ESV-0406-1

# RETLIF TESTING LABORATORIES

## TABULAR DATA SHEET

TEST METHOD:	FCC Part 15 Subpart C Radiated Emissions		
CUSTOMER:	Detection Systems, Inc.	JOB No.:	R-7478-1
TEST SAMPLE:	Pulsed RF Transmitter FCC ID: ESV-0406-1		
MODEL No.:	RF3222	SERIAL No.:	N/A
TEST SPECIFICATION:	FCC Part 15 Subpart C PARAGRAPH: 15.231		
OPERATING MODE:	Continuously Transmitting 304 Mhz Signal		
TECHNICIAN:	Dennis Cortes <i>DC</i>	DATE:	April 6, 1998
NOTES:	Test Distance: 3 Meters Detector Function: Peak		

Test Frequency	Antenna Pol./Height	EUT Orientation	Meter Reading	Correction Factor	Corrected Reading	Converted Reading	Peak Limit
MHz	(H/V) / meters	X / Y / Z	dBuV	dB	dBuV/m	uV/m	uV/m
304	H/1.0	X	82.8	-4.4	78.4	8317.6	55800
304	H/1.1	Y	73.4	-4.4	69.0	2818.4	55800
304	H/1.0	Z	87.7	-4.4	83.3	14621.8	55800
304	V/1.1	X	80.3	-4.4	75.9	6237.3	55800
304	V/1.5	Y	83.8	-4.4	79.4	9332.5	55800
304	V/1.8	Z	76.3	-4.4	71.9	3935.5	55800
608	H/1.0	X	58.0	2.4	60.4	1047.1	5000
608	H/1.0	Y	54.0	2.4	56.4	660.7	5000
608	H/1.0	Z	58.3	2.4	60.7	1083.9	5000
608	V/2.0	X	46.8	2.4	49.2	288.4	5000
608	V/1.6	Y	54.9	2.4	57.3	732.8	5000
608	V/1.6	Z	54.2	2.4	56.6	676.1	5000
912	H/1.0	X	31.0	8.3	39.3	92.3	5580
912	H/1.2	Y	29.0	8.3	37.3	73.3	5580
912	H/1.4	Z	25.1	8.3	33.4	46.8	5580
912	V/1.3	X	30.8	8.3	39.1	90.2	5580
912	V/1.2	Y	28.3	8.3	36.6	67.6	5580
912	V/1.3	Z	29.0	8.3	37.3	73.3	5580
1216	H/1.3	X	46.9	-5.6	41.3	116.1	5000
1216	H/1.2	Y	49.4	-5.6	43.8	154.9	5000
1216	H/1.1	Z	46.5	-5.6	40.9	110.9	5000
1216	V/1.0	X	42.0	-5.6	36.4	66.1	5000
1216	V/1.8	Y	44.4	-5.6	38.8	87.1	5000
1216	V/2.1	Z	46.1	-5.6	40.5	105.9	5000
1520	H/1.2	X	42.2	-4.7	37.5	75.0	5000
1520	H/1.3	Y	45.2	-4.7	40.5	105.9	5000
1520	H/1.7	Z	48.1	-4.7	43.4	147.9	5000
1520	V/1.0	X	44.7	-4.7	40.0	100.0	5000
1520	V/1.5	Y	43.1	-4.7	38.4	83.2	5000
1520	V/1.1	Z	45.1	-4.7	40.4	104.7	5000

The frequency range was scanned from 30 MHz to 3.04 GHz. All emissions not recorded were more than 10dB below the specified limit.  
Emissions from the EUT do not exceed the specified limits.

# RETLIF TESTING LABORATORIES

## TABULAR DATA SHEET

TEST METHOD: **FCC Part 15 Subpart C Radiated Emissions**

CUSTOMER: **Detection Systems, Inc.** JOB No.: **R-7478-1**

TEST SAMPLE: **Pulsed RF Transmitter**  
**FCC ID: ESV-0406-1**

MODEL No.: **RF3222** SERIAL No.: **N/A**

TEST SPECIFICATION: **FCC Part 15 Subpart C** PARAGRAPH: **15.231**

OPERATING MODE: **Continuously Transmitting 304 Mhz Signal**

TECHNICIAN: **Dennis Cortes** DATE: **April 6, 1998**

NOTES: **Test Distance: 3 Meters**  
**Detector Function: Peak**

Test Frequency	Antenna Pol./Height	EUT Orientation	Meter Reading	Correction Factor	Corrected Reading	Converted Reading	Peak Limit
MHz	(H/V) / meters	X / Y / Z	dBuV	dB	dBuV/m	uV/m	uV/m
1824	H/1.5	X	42.3	-2.7	39.6	95.5	5580
1824	H/1.3	Y	43.3	-2.7	40.6	107.2	5580
1824	H/1.2	Z	44.7	-2.7	42.0	125.9	5580
1824	V/1.3	X	42.2	-2.7	39.5	94.4	5580
1824	V/1.0	Y	*38.8	-2.7	36.1	63.8	5580
1824	V/1.3	Z	43.9	-2.7	41.2	114.8	5580
2128	H/1.0	X	*42.0	-1.4	40.6	107.2	5580
2128	H/1.0	Y	*42.0	-1.4	40.6	107.2	5580
2128	H/1.0	Z	*42.0	-1.4	40.6	107.2	5580
2128	V/1.0	X	*42.0	-1.4	40.6	107.2	5580
2128	V/1.0	Y	*42.0	-1.4	40.6	107.2	5580
2128	V/1.0	Z	*42.0	-1.4	40.6	107.2	5580
2432	H/1.0	X	*41.8	-0.1	41.7	121.6	5580
2432	H/1.0	Y	*41.8	-0.1	41.7	121.6	5580
2432	H/1.0	Z	*41.8	-0.1	41.7	121.6	5580
2432	V/1.0	X	*41.8	-0.1	41.7	121.6	5580
2432	V/1.0	Y	*41.8	-0.1	41.7	121.6	5580
2432	V/1.0	Z	*41.8	-0.1	41.7	121.6	5580
2736	H/1.0	X	*42.1	1.0	43.1	142.9	5000
2736	H/1.0	Y	*42.1	1.0	43.1	142.9	5000
2736	H/1.0	Z	*42.1	1.0	43.1	142.9	5000
2736	V/1.0	X	*42.1	1.0	43.1	142.9	5000
2736	V/1.0	Y	*42.1	1.0	43.1	142.9	5000
2736	V/1.0	Z	*42.1	1.0	43.1	142.9	5000
3040	H/1.0	X	*42.3	3.2	45.5	188.4	5580
3040	H/1.0	Y	*42.3	3.2	45.5	188.4	5580
3040	H/1.0	Z	*42.3	3.2	45.5	188.4	5580
3040	V/1.0	X	*42.3	3.2	45.5	188.4	5580
3040	V/1.0	Y	*42.3	3.2	45.5	188.4	5580
3040	V/1.0	Z	*42.3	3.2	45.5	188.4	5580

The frequency range was scanned from 30 MHz to 3.04 GHz. All emissions not recorded were more than 10dB below the specified limit.

Emissions from the EUT do not exceed the specified limits.

\*=Noise Floor Measurements

# RETLIF TESTING LABORATORIES

## TABULAR DATA SHEET

TEST METHOD:	FCC Part 15 Subpart C Radiated Emissions		
CUSTOMER:	Detection Systems, Inc.	JOB No.:	R-7478-1
TEST SAMPLE:	Pulsed RF Transmitter FCC ID: ESV-0406-1		
MODEL No.:	RF3222	SERIAL No.:	N/A
TEST SPECIFICATION:	FCC Part 15 Subpart C PARAGRAPH: 15.231		
OPERATING MODE:	Continuously Transmitting 304 Mhz Signal		
TECHNICIAN:	Dennis Cortes	DATE:	April 6, 1998
NOTES:	Test Distance: 3 Meters Detector Function: Peak Worst Case Duty Cycle: 10.0% (-20.0 dB Duty Cycle Correction Factor)		

Test Frequency	Antenna Pol./Height	EUT Orientation	Peak Corrected Reading	Duty Cycle Corr. Factor	Corrected Average	Converted Average	Average Limit
MHz	(H/V) / meters	X / Y / Z	dBuV/m	dB	dBuV/m	uV/m	uV/m
304	H/1.0	X	78.4	-20.0	58.4	831.8	5580
304	H/1.1	Y	69.0	-20.0	49.0	281.8	5580
304	H/1.0	Z	83.3	-20.0	63.3	1462.2	5580
304	V/1.1	X	75.9	-20.0	55.9	623.7	5580
304	V/1.5	Y	79.4	-20.0	59.4	933.3	5580
304	V/1.8	Z	71.9	-20.0	51.9	393.6	5580
608	H/1.0	X	60.4	-20.0	40.4	104.7	500
608	H/1.0	Y	56.4	-20.0	36.4	66.1	500
608	H/1.0	Z	60.7	-20.0	40.7	108.4	500
608	V/2.0	X	49.2	-20.0	29.2	28.8	500
608	V/1.6	Y	57.3	-20.0	37.3	73.3	500
608	V/1.6	Z	56.6	-20.0	36.6	67.6	500
912	H/1.0	X	39.3	-20.0	19.3	9.2	558
912	H/1.2	Y	37.3	-20.0	17.3	7.3	558
912	H/1.4	Z	33.4	-20.0	13.4	4.7	558
912	V/1.3	X	39.1	-20.0	19.1	9.0	558
912	V/1.2	Y	36.6	-20.0	16.6	6.8	558
912	V/1.3	Z	37.3	-20.0	17.3	7.3	558
1216	H/1.3	X	41.3	-20.0	21.3	11.6	500
1216	H/1.2	Y	43.8	-20.0	23.8	15.5	500
1216	H/1.1	Z	40.9	-20.0	20.9	11.1	500
1216	V/1.0	X	36.4	-20.0	16.4	6.6	500
1216	V/1.8	Y	38.8	-20.0	18.8	8.7	500
1216	V/2.1	Z	40.5	-20.0	20.5	10.6	500
1520	H/1.2	X	37.5	-20.0	17.5	7.5	500
1520	H/1.3	Y	40.5	-20.0	20.5	10.6	500
1520	H/1.7	Z	43.4	-20.0	23.4	14.8	500
1520	V/1.0	X	40.0	-20.0	20.0	10.0	500
1520	V/1.5	Y	38.4	-20.0	18.4	8.3	500
1520	V/1.1	Z	40.4	-20.0	20.4	10.5	500

The frequency range was scanned from 30 MHz to 4.18 GHz. All emissions not recorded were more than 10dB below the specified limit.  
Emissions from the EUT do not exceed the specified limits.

# RETLIF TESTING LABORATORIES

## TABULAR DATA SHEET

TEST METHOD:	FCC Part 15 Subpart C Radiated Emissions		
CUSTOMER:	Detection Systems, Inc.	JOB No.:	R-7478-1
TEST SAMPLE:	Pulsed RF Transmitter FCC ID: ESV-0406-1		
MODEL No.:	RF3222	SERIAL No.:	N/A
TEST SPECIFICATION:	FCC Part 15 Subpart C <span style="float: right;">PARAGRAPH: 15.231</span>		
OPERATING MODE:	Continuously Transmitting 304 Mhz Signal		
TECHNICIAN:	Dennis Cortes	DATE:	April 6, 1998
NOTES:	Test Distance: 3 Meters Detector Function: Peak <span style="float: right;">Worst Case Duty Cycle: 10.0% (-20.0 dB Duty Cycle Correction Factor)</span>		

Test Frequency	Antenna Pol./Height	EUT Orientation	Peak Corrected Reading	Duty Cycle Corr. Factor	Corrected Average	Converted Average	Average Limit
MHz	(H/V) / meters	X / Y / Z	dBuV/m	dB	dBuV/m	uV/m	uV/m
1824	H/1.5	X	39.6	-20.0	19.6	9.5	558
1824	H/1.3	Y	40.6	-20.0	20.6	10.7	558
1824	H/1.2	Z	42.0	-20.0	22.0	12.6	558
1824	V/1.3	X	39.5	-20.0	19.5	9.4	558
1824	V/1.0	Y	*36.1	-20.0	16.1	6.4	558
1824	V/1.3	Z	41.2	-20.0	21.2	11.5	558
2128	H/1.0	X	*40.6	-20.0	20.6	10.7	558
2128	H/1.0	Y	*40.6	-20.0	20.6	10.7	558
2128	H/1.0	Z	*40.6	-20.0	20.6	10.7	558
2128	V/1.0	X	*40.6	-20.0	20.6	10.7	558
2128	V/1.0	Y	*40.6	-20.0	20.6	10.7	558
2128	V/1.0	Z	*40.6	-20.0	20.6	10.7	558
2432	H/1.0	X	*41.7	-20.0	21.7	12.2	558
2432	H/1.0	Y	*41.7	-20.0	21.7	12.2	558
2432	H/1.0	Z	*41.7	-20.0	21.7	12.2	558
2432	V/1.0	X	*41.7	-20.0	21.7	12.2	558
2432	V/1.0	Y	*41.7	-20.0	21.7	12.2	558
2432	V/1.0	Z	*41.7	-20.0	21.7	12.2	558
2736	H/1.0	X	*43.1	-20.0	23.1	14.3	500
2736	H/1.0	Y	*43.1	-20.0	23.1	14.3	500
2736	H/1.0	Z	*43.1	-20.0	23.1	14.3	500
2736	V/1.0	X	*43.1	-20.0	23.1	14.3	500
2736	V/1.0	Y	*43.1	-20.0	23.1	14.3	500
2736	V/1.0	Z	*43.1	-20.0	23.1	14.3	500
3040	H/1.0	X	*45.5	-20.0	25.5	18.8	558
3040	H/1.0	Y	*45.5	-20.0	25.5	18.8	558
3040	H/1.0	Z	*45.5	-20.0	25.5	18.8	558
3040	V/1.0	X	*45.5	-20.0	25.5	18.8	558
3040	V/1.0	Y	*45.5	-20.0	25.5	18.8	558
3040	V/1.0	Z	*45.5	-20.0	25.5	18.8	558
The frequency range was scanned from 30 MHz to 4.18 GHz. All emissions not recorded were more than 10dB below the specified limit. Emissions from the EUT do not exceed the specified limits.							
* = Noise Floor Measurements							

Exhibit 6

Report of Measurements

Occupied Bandwidth, Para. 15.231(c)



**Retlif Testing Laboratories**

Test Report No. R-7478-1  
FCC ID: ESV-0406-1

R-7478 RF3222 OCC BW 4/9/98 DC  
REF 76.9 dBμV ATTEN 10 dB

7/2

10 dB/

SPAN 760 KHZ  
SWP 30.0 msec

CENTER 304.042 MHZ  
RES BW 10 KHZ  
VBW 30 KHZ

Customer:	Detection Systems, Inc
Test Sample:	Pulsed RF Transmitter
Model No:	RF3222      FCC ID: ESV-0406-1
Test Method:	FCC 15.231 (c) Occupied Bandwidth
Notes:	The Bandwidth of the emission is not wider than .25% of the Center Frequency 20 dB down from the modulated carrier
Date:	April 9, 1998
Tech:	Dennis Cortes
Sheet:	1 of 2



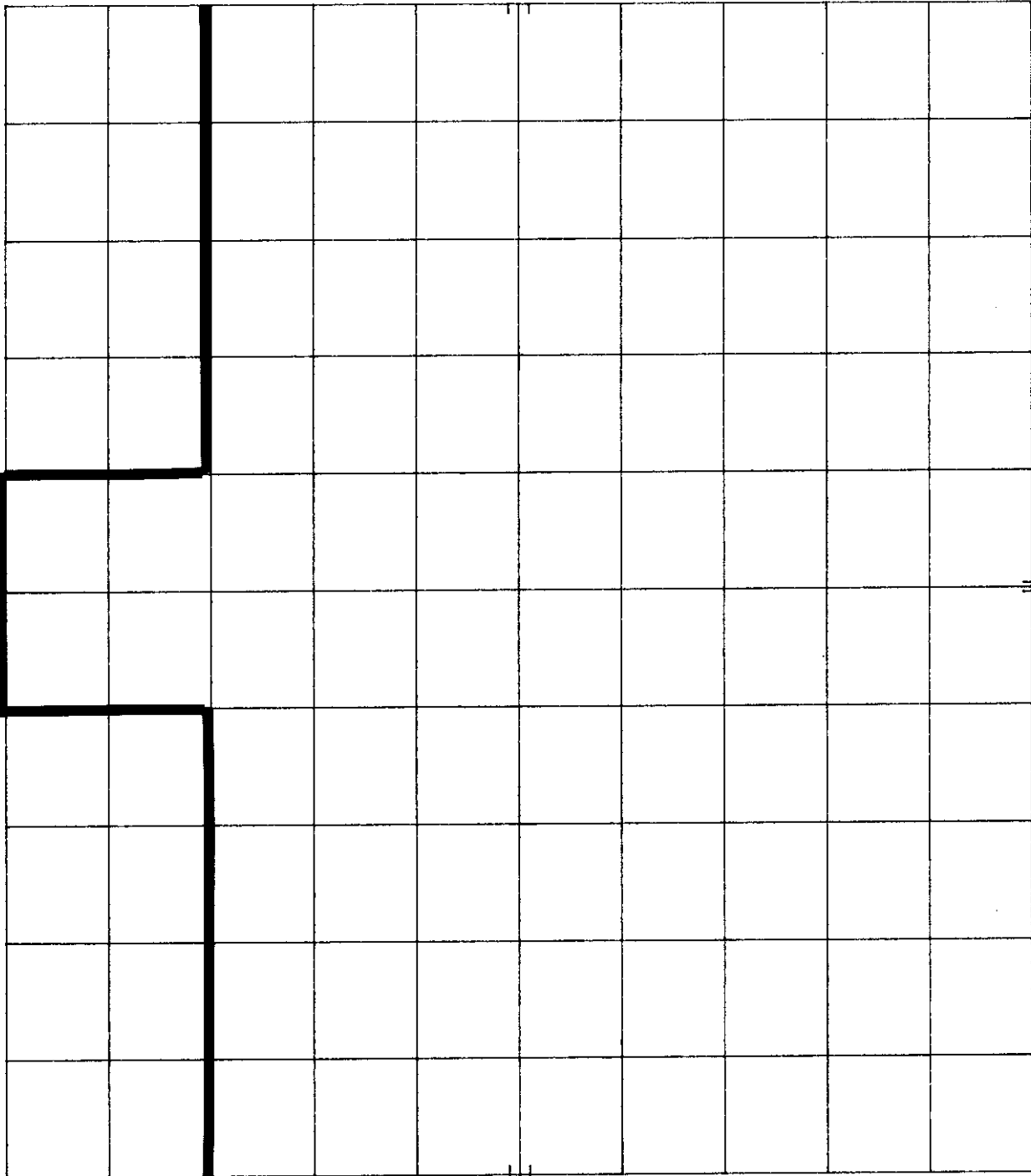
**Retlif Testing Laboratories**

Report No. R-7478-1

R-7478 RF3222 OCC BW 4/9/98 DC  
 REF 76.9 dBμV ATTEN 10 dB

hp

10 dB/



SPAN 3.80 MHz  
 SWP 114 msec

VBW 30 kHz

CENTER 304.04 MHz

RES BW 10 kHz

Customer:	Detection Systems, Inc
Test Sample:	Pulsed RF Transmitter
Model No.:	RF3222      FCC ID: ESV-0406-1
Test Method:	FCC 15.231 (c) Occupied Bandwidth
Notes:	The Bandwidth of the emission is not wider than .25% of the Center Frequency 20 dB down from the modulated carrier
Date:	April 9, 1998
Tech.:	Dennis Cortes
Sheet:	2 of 2



**Retlif Testing Laboratories**

Report No. R-7478-1



Exhibit 6

Report of Measurements

Para. 15.207, Conducted Emissions Test Data



**Retlif Testing Laboratories**

Test Report No. R-7478-1  
FCC ID: ESV-0406-1

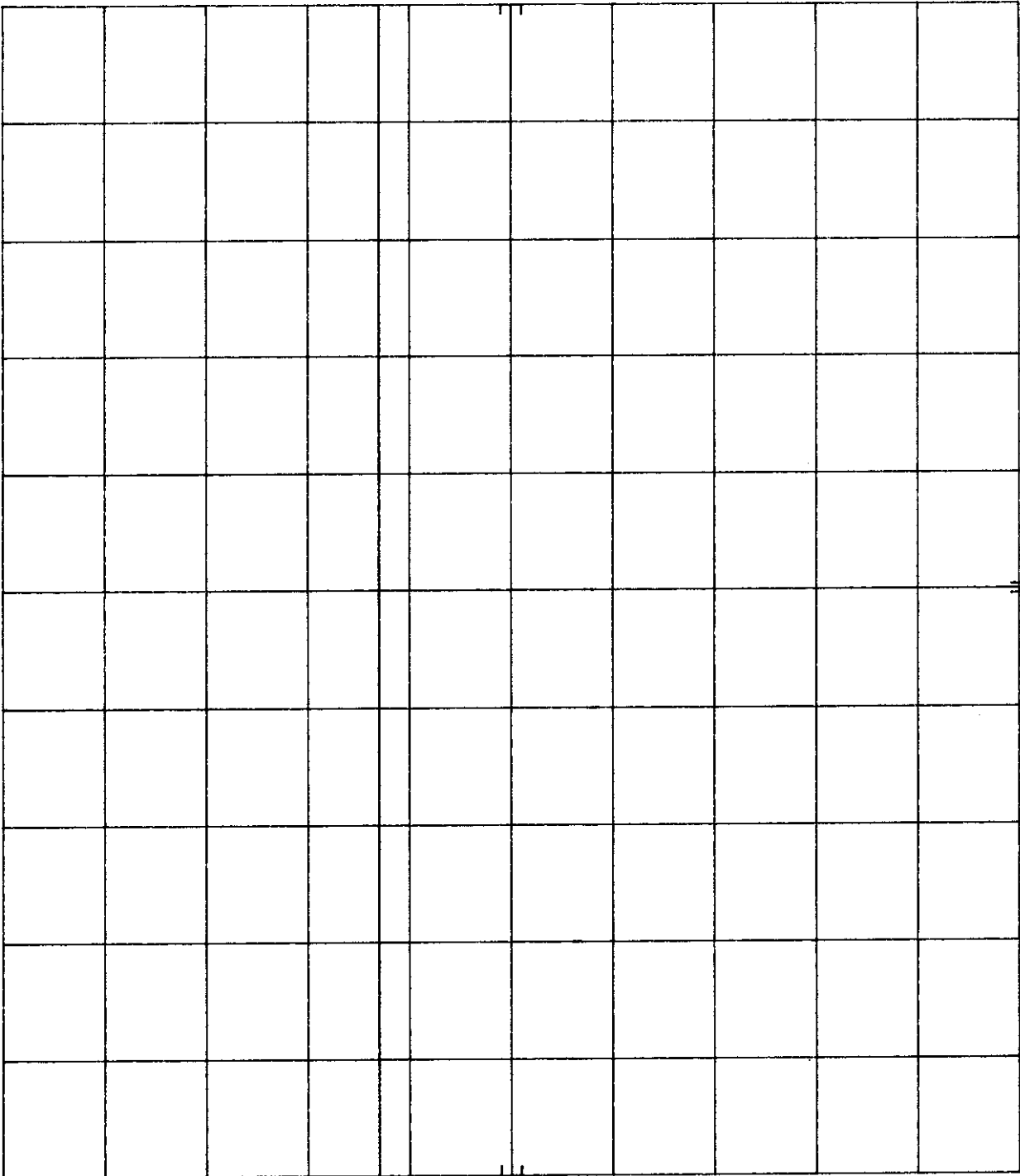
R-7478 RF3222 TX CE DC 4/13/98 LEAD-10CT  
 REF 85.0 dBμV ATTEN 10 dB

hp

10 dB/

OFFSET  
 10.0  
 dB

DL  
 48.0  
 dBμV



START 450 KHZ RES BW 10 KHZ VBW 30 KHZ SWP 20.0 sec STOP 1.70 MHz

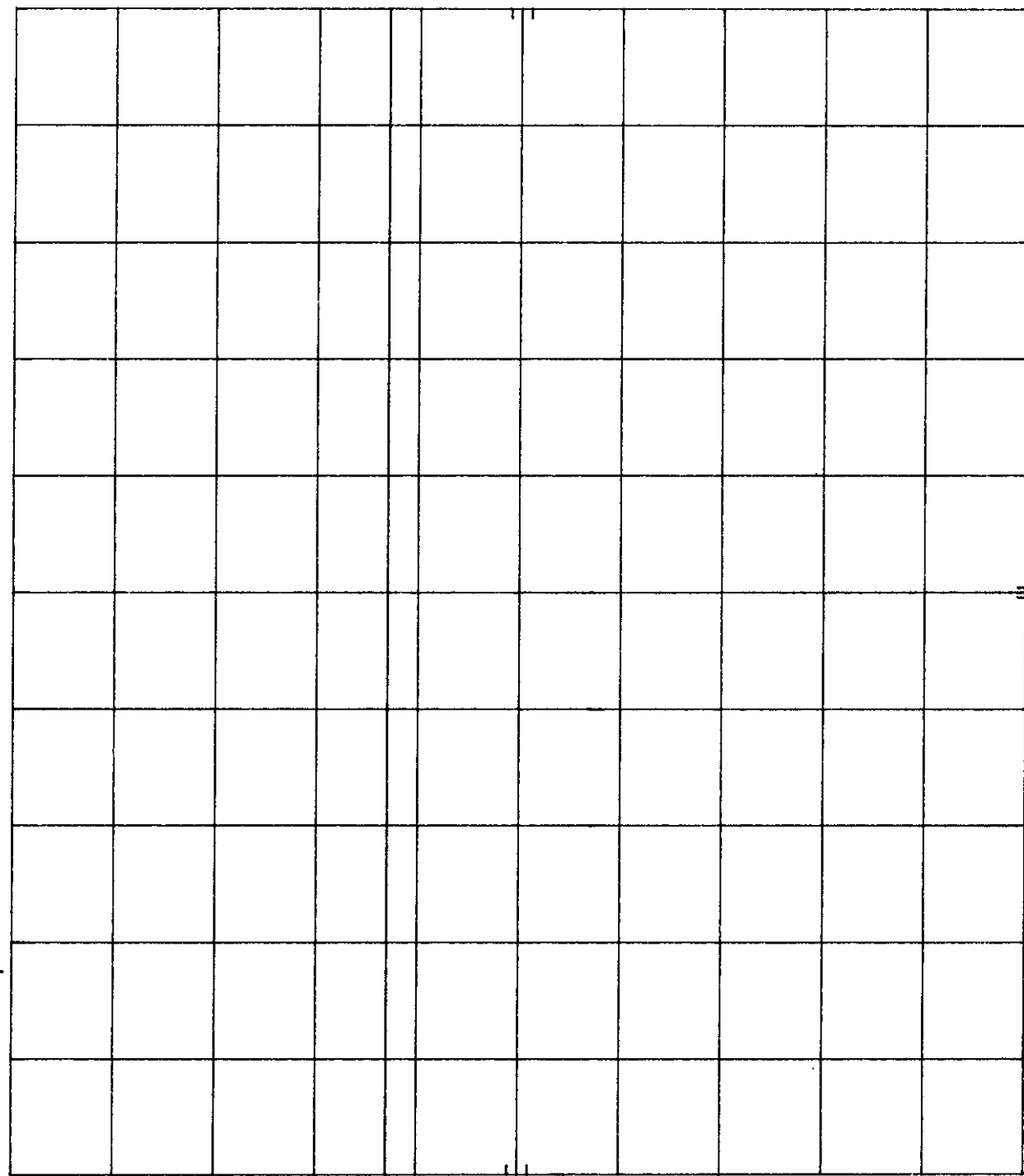
Customer:	Detection Systems
Test Sample:	Pulsed RF Transmitter
Model No.:	RF3222
Test Method:	FCC 15.207(a) Conducted Emissions
Notes:	Lead Tested: Hot Detector: Peak
Date:	April 13, 1998
Tech:	Dennis Cortes
Sheet:	1 of 6



**Retlif Testing Laboratories**

Report No. R-7478-1


R-7478 RF3222 TX CE DC 4/13/98 LEAD-  
 REF 85.0 dBμV ATTEN 10 dB



START 450 KHZ RES BW 10 KHZ VBW 30 KHZ STOP 1.70 MHz SWP 20.0 sec

hp  
 10 dB/  
 OFFSET  
 10.0  
 dB  
 DL  
 48.0  
 dBμV

Customer:	Detection Systems
Test Sample:	Pulsed RF Transmitter
Model No.:	RF3222
Test Method:	FCC 15.207(a) Conducted Emissions
Notes:	Lead Tested: Neutral Detector: Peak
Date:	April 13, 1998
Tech:	Dennis Cortes
Sheet:	2 of 6



**Retlif Testing Laboratories**

Report No. R-7478-1

R-7478 RF3222 TX CE DC 4/13/98 LEAD- HOT  
 REF 85.0 dBμV ATTEN 10 dB

hp

10 dB/

OFFSET

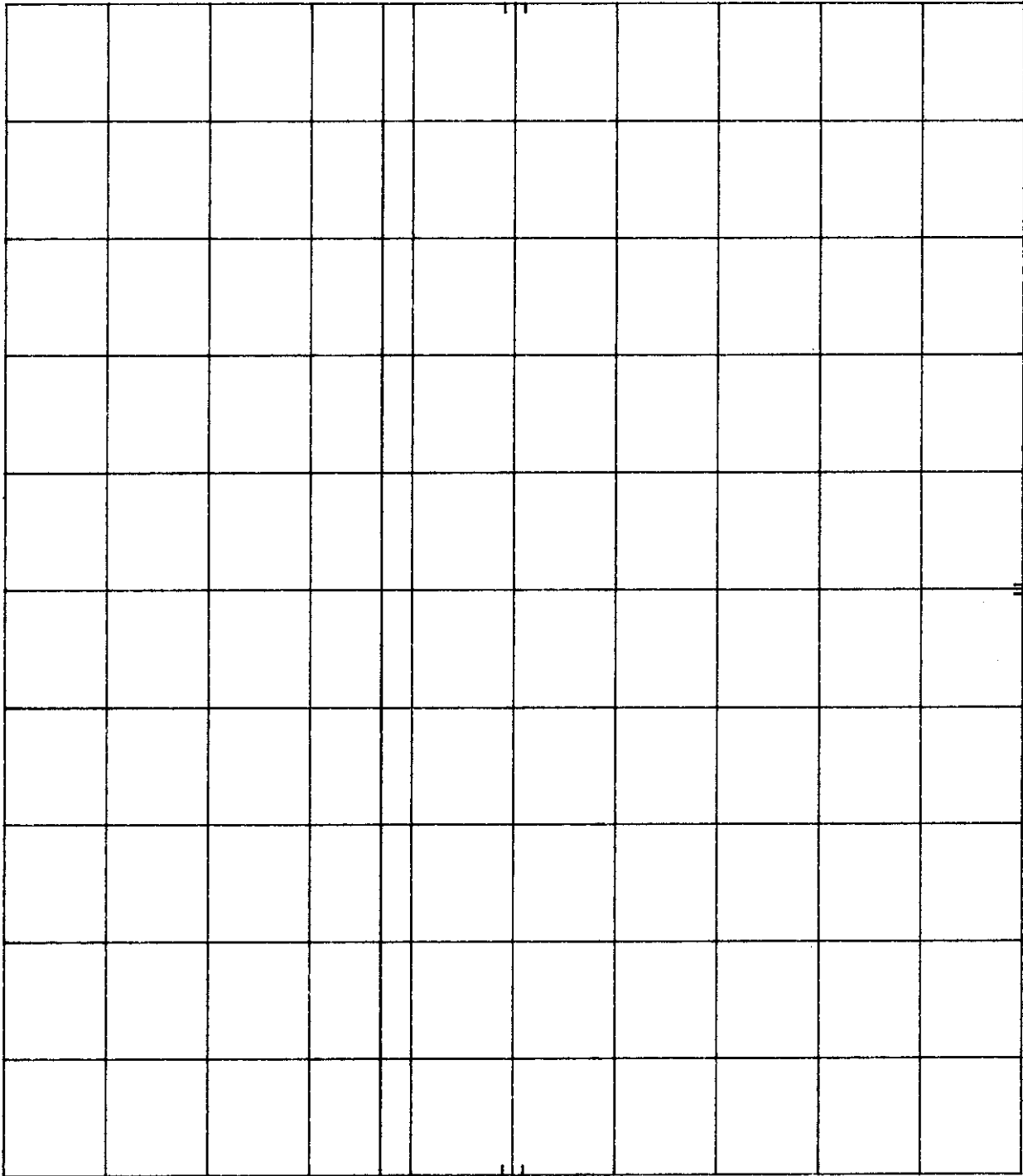
10.0

dB

DL

48.0

dBμV



START 1.70 MHz

RES BW 10 KHZ

VBW 30 KHZ

STOP 10.00 MHz

SWP 20.0 sec

Customer:	Detection Systems
Test Sample:	Pulsed RF Transmitter
Model No.:	RF3222
Test Method:	FCC 15.207(a) Conducted Emissions
Notes:	Lead Tested: Hot Detector: Peak
Date:	April 13, 1998
Tech:	Dennis Cortes
Sheet	3 of 6



Retlif Testing Laboratories

Report No. R-7478-1

R-7478 RF3222 TX CE DC 4/13/98 LEAD- ~~XXXXXXXXXX~~  
 REF 85.0 dBμV ATTEN 10 dB

hp

10 dB/

OFFSET

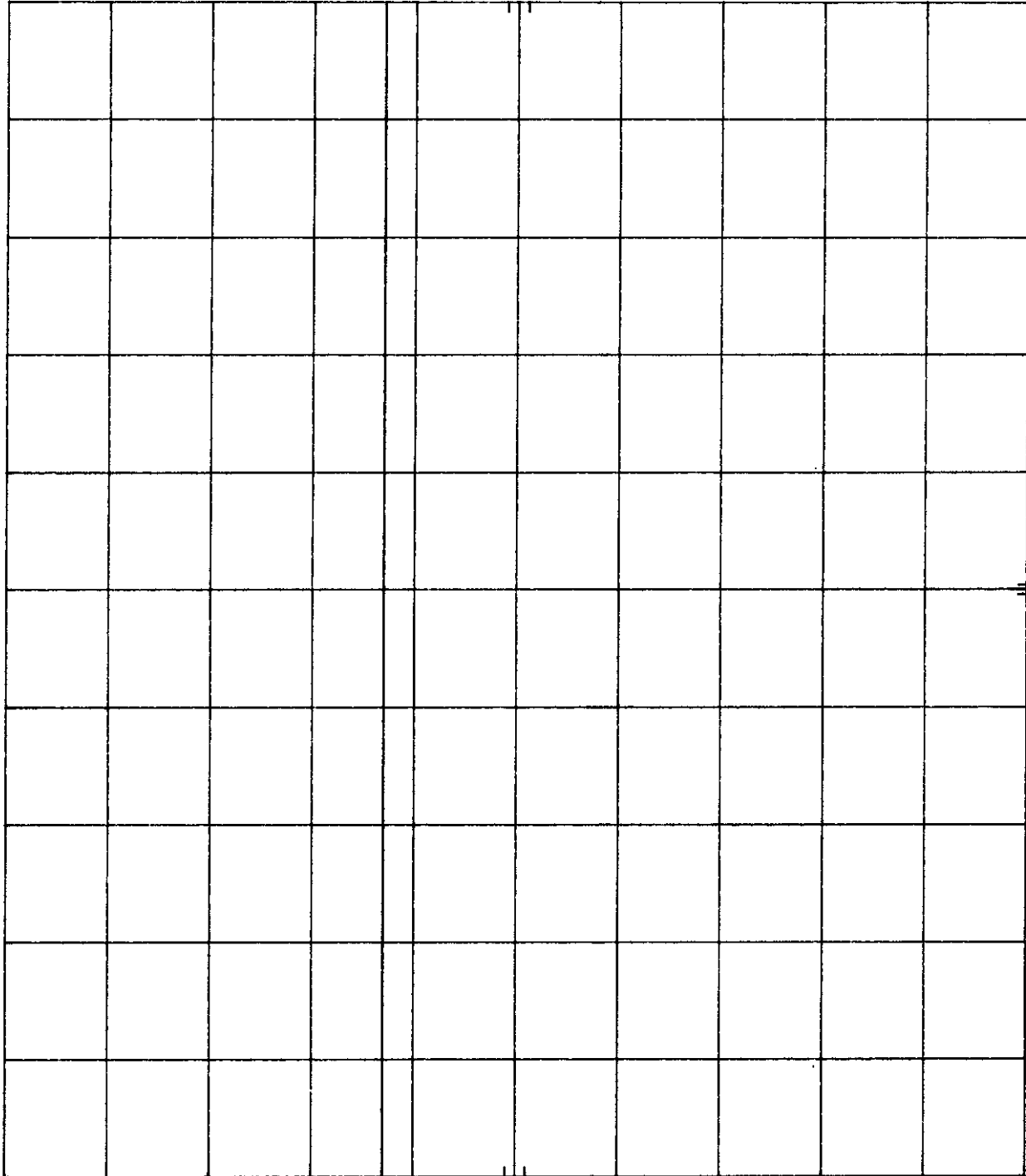
10.0

dB

DL

48.0

dBμV



START 1.70 MHz

RES BW 10 kHz

VBW 30 kHz

STOP 10.00 MHz

SWP 20.0 sec

Customer:	Detection Systems
Test Sample:	Pulsed RF Transmitter
Model No.:	RF3222
Test Method:	FCC 15.207(a) Conducted Emissions
Notes:	Lead Tested: Neutral Detector: Peak
Date:	April 13, 1998
Tech:	Dennis Cortes
Sheet:	4 of 6

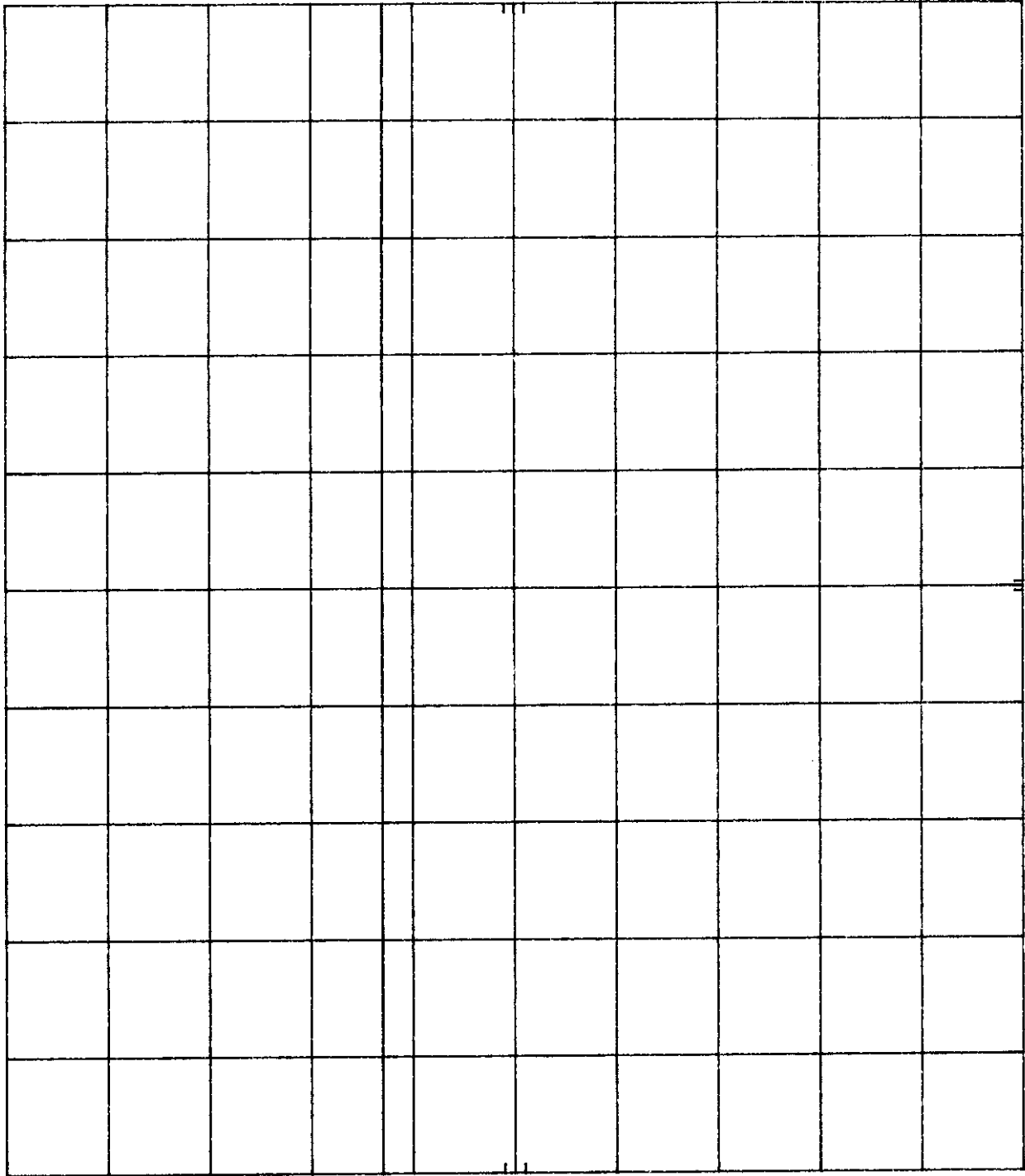


Retlif Testing Laboratories

Report No. R-7478-1

R-7478 RF3222 TX CE DC 4/13/98 LEAD- HOT  
 REF 85.0 dBμV ATTEN 10 dB

HP  
 10 dB/  
 OFFSET  
 10.0  
 dB  
 DL  
 48.0  
 dBμV



START 10.0 MHz RES BW 10 KHZ VBW 30 KHZ  
 STOP 30.0 MHz SWP 20.0 sec

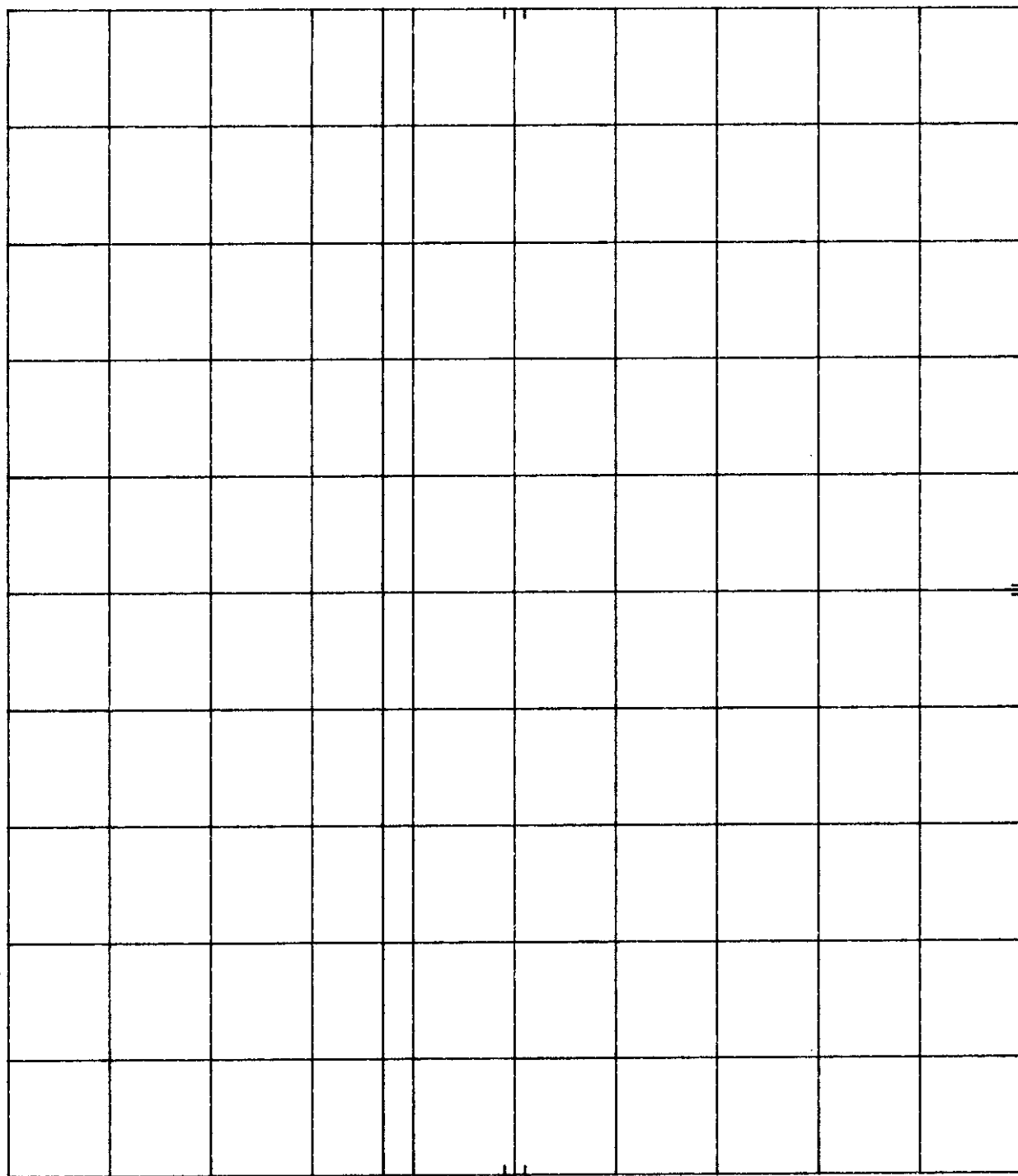
Customer:	Detection Systems
Test Sample:	Pulsed RF Transmitter
Model No:	RF3222
Test Method:	FCC 15.207(a) Conducted Emissions
Notes:	Lead Tested: Hot Detector: Peak
Date:	April 13, 1998
Tech:	Dennis Cortes
Sheet	5 of 6



**Retlif Testing Laboratories**

Report No. R-7478-1

R-7478 RF3222 TX CE DC 4/13/98 LEAD-NEUTRAL  
 REF 85.0 dBμV ATTEN 10 dB



START 10.0 MHz RES BW 10 KHz VBW 30 KHz SWP 20.0 sec  
 STOP 30.0 MHz

HP 10 dB/  
 OFFSET 10.0 dB  
 DL 48.0 dBμV

Customer:	Detection Systems
Test Sample:	Pulsed RF Transmitter
Model No.:	RF3222
Test Method:	FCC 15.207(a) Conducted Emissions
Notes:	Lead Tested: Neutral Detector: Peak
Date:	April 13, 1998
Tech:	Dennis Cortes
Sheet	6 of 6



**Retlif Testing Laboratories**  
 Report No. R-7478-1

Exhibit 6

Report of Measurements

TEST EQUIPMENT LIST



**Retlif Testing Laboratories**

Test Report No. R-7478-1  
FCC ID: ESV-0406-1



# Equipment List

## FCC 15.231(a) Radiated Emissions

EN	Type	Manufacturer	Frequency Range	Model No.	Serial No.	Cal Date	Due Date
067	Open Area Test Site	Retlif	3 Meter	RNY	001	8/30/97	8/30/99
128C	Double Ridge Guide	Eaton Corporation	1 GHz - 18 GHz	96001	2385	10/6/97	10/6/98
133	Broadband Pre-Amplifier	Electro-Metrics	10 kHz - 1 GHz, 26dB	BPA-1000	174	6/20/97	6/20/98
141	Spectrum Analyzer	Hewlett Packard	100 Hz - 40 GHz	8566B	2637A03491	3/2/98	9/2/98
141A	Graphics Plotter	Hewlett Packard	N/A	7470A	2517A07605	3/4/98	3/4/99
206B	6.0 dB Attenuator	Texsean	0 - 1.0 GHz	FP-50 - 6 dB	5785	6/20/97	6/20/98
523	Biconilog	Electro-Mechanics	26 MHz - 1100 MHz	3143	9602-1234	9/30/97	9/30/98
543	Preamplifier	Hewlett Packard	1.0 GHz - 26.5 GHz	8449B	3008A00829	8/12/97	8/12/98



**Retlif Testing Laboratories**

Test Report No. R-7478-1

FCC ID: ESV-0406-1

# EQUIPMENT LIST

## Conducted Emissions

<b>EN</b>	<b>Type</b>	<b>Manufacturer</b>	<b>Frequency Range</b>	<b>Model No.</b>	<b>Cal Date</b>	<b>Due Date</b>
077	LISN	Solar Electronics	10 kHz - 30 MHz	8028-50-TS24BNC	5/5/97	5/5/98
079	LISN	Solar Electronics	10 kHz - 30 MHz	8028-50-TS24BNC	5/5/97	5/5/98
141	Spectrum Analyzer	Hewlett Packard	100 Hz - 40 GHz	8566B	3/2/98	9/2/98
141A	Graphics Plotter	Hewlett Packard	N/A	7470A	3/4/98	3/4/99
141B	Quasi-Peak Adaptor	Hewlett Packard	100 Hz - 1 GHz	85650A	3/3/98	9/3/98
202	Transient Limiter	Hewlett Packard	.009 MHz - 200 MHz	11947A	8/21/97	8/21/98



**Retlif Testing Laboratories**

Test Report No. R-7478-1  
FCC ID: ESV-0406-1

Report of Measurements

304 MHz Receiver Section of Transceiver

Part 15, Subpart B, Class B Verification Test Data

Conducted and Radiated Emissions



**Retlif Testing Laboratories**

Test Report No. R-7478-1

FCC ID: ESV-0406-1

Report of Measurements

Paragraph 15.107(a)

Conducted Emissions Test Data



**Retlif Testing Laboratories**

Test Report No. R-7478-1  
FCC ID: ESV-0406-1

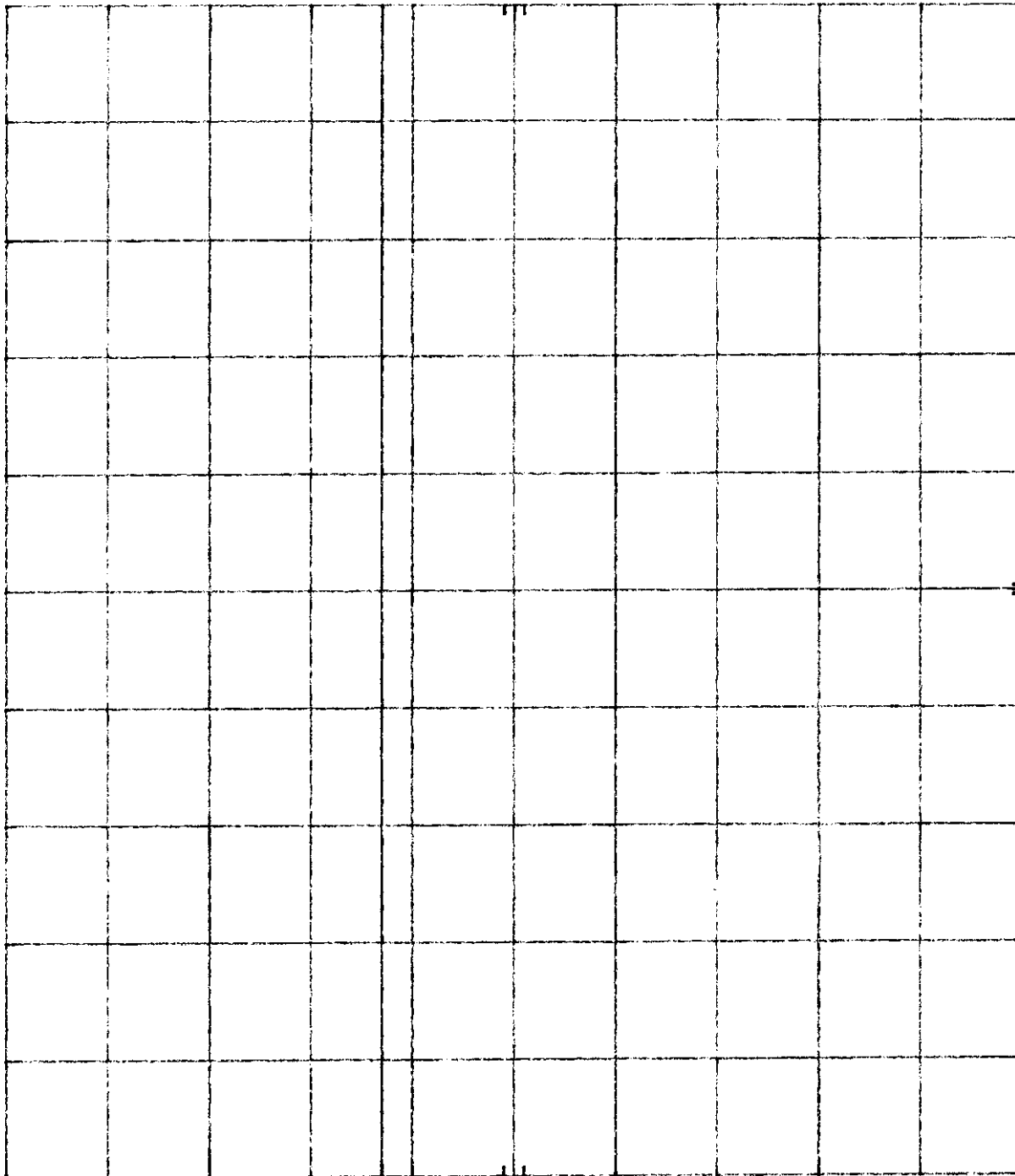
R-7478 RF3222 CE DC 4/23/98 LEAD-HOT  
REF 85.0 dBμV ATTEN 10 dB

hp

10 dB/

OFFSET  
10.0  
dB

DL  
48.0  
dBμV



STOP 1.70 MHz  
SWP 20.0 sec

VBW 30 KHZ

START 450 KHZ  
RES BW 10 KHZ

Customer:	Detection Systems, Inc
Test Sample:	RF Receiver
Model No.:	RF3222 FCC ID: ESV-0406-1
Test Method:	FCC 15.107(a) Conducted Emissions
Notes:	Lead Tested: Hot Detector: Peak
Date:	April 23, 1998
Tech:	Dennis Cortes
Sheet:	1 of 6



Retlif Testing Laboratories

Report No. R-7478-1

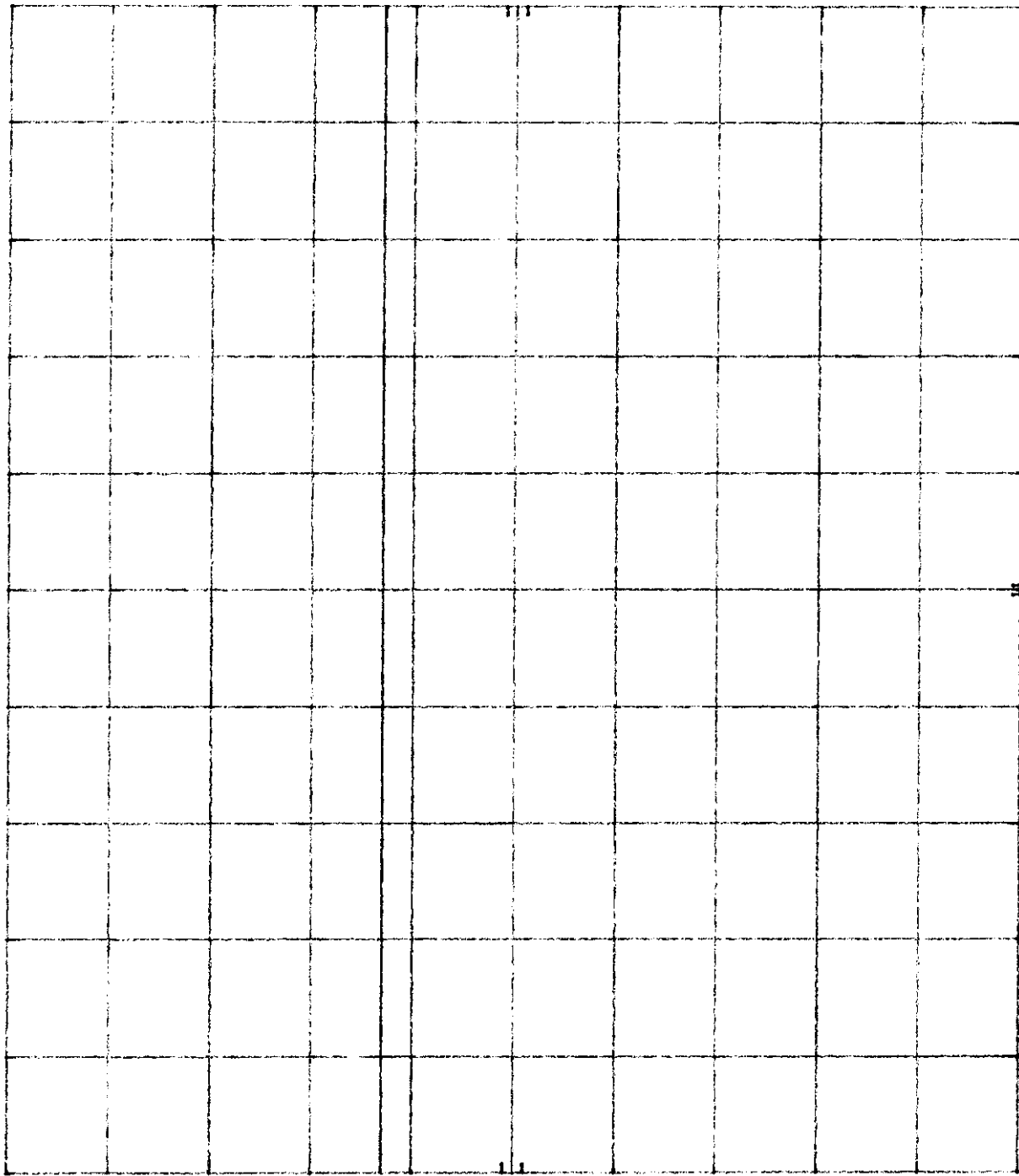
R-7478 RF3222 CE DC 4/23/98 LEAD-NEUTRAL  
REF 85.0 dBμV ATTEN 10 dB

hp

10 dB/

OFFSET  
10.0  
dB

DL  
48.0  
dBμV



START 450 kHz

RES BW 10 kHz

VBW 30 kHz

STOP 1.70 MHz  
SWP 20.0 sec

Customer:	Detection Systems, Inc
Test Sample:	RF Receiver
Model No.:	RF3222 FCC ID: ESV-0406-1
Test Method:	FCC 15.107(a) Conducted Emissions
Notes:	Lead Tested: Neutral Detector: Peak
Date:	April 23, 1998
Tech:	Dennis Cortes
Sheet	2 of 6

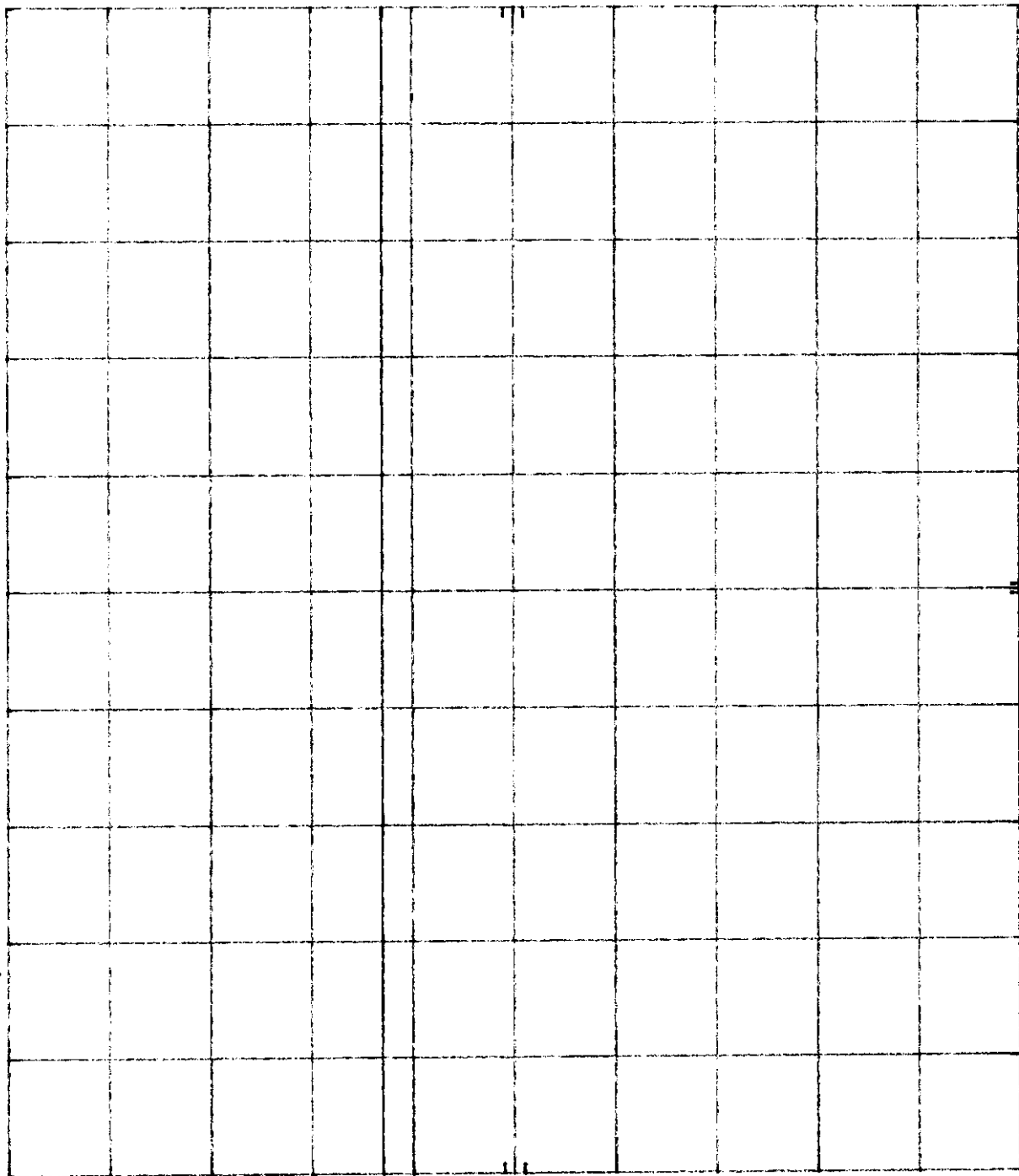


Retlif Testing Laboratories

Report No. R-7478-1

R-7478 RF3222 CE DC 4/23/98 LEAD-HOT  
REF 85.0 dBµV ATTEN 10 dB

10 dB/  
OFFSET 10.0 dB  
DL 48.0 dBµV



START 1.70 MHz RES BW 10 KHZ VBW 30 KHZ STOP 10.00 MHz SWP 20.0 sec

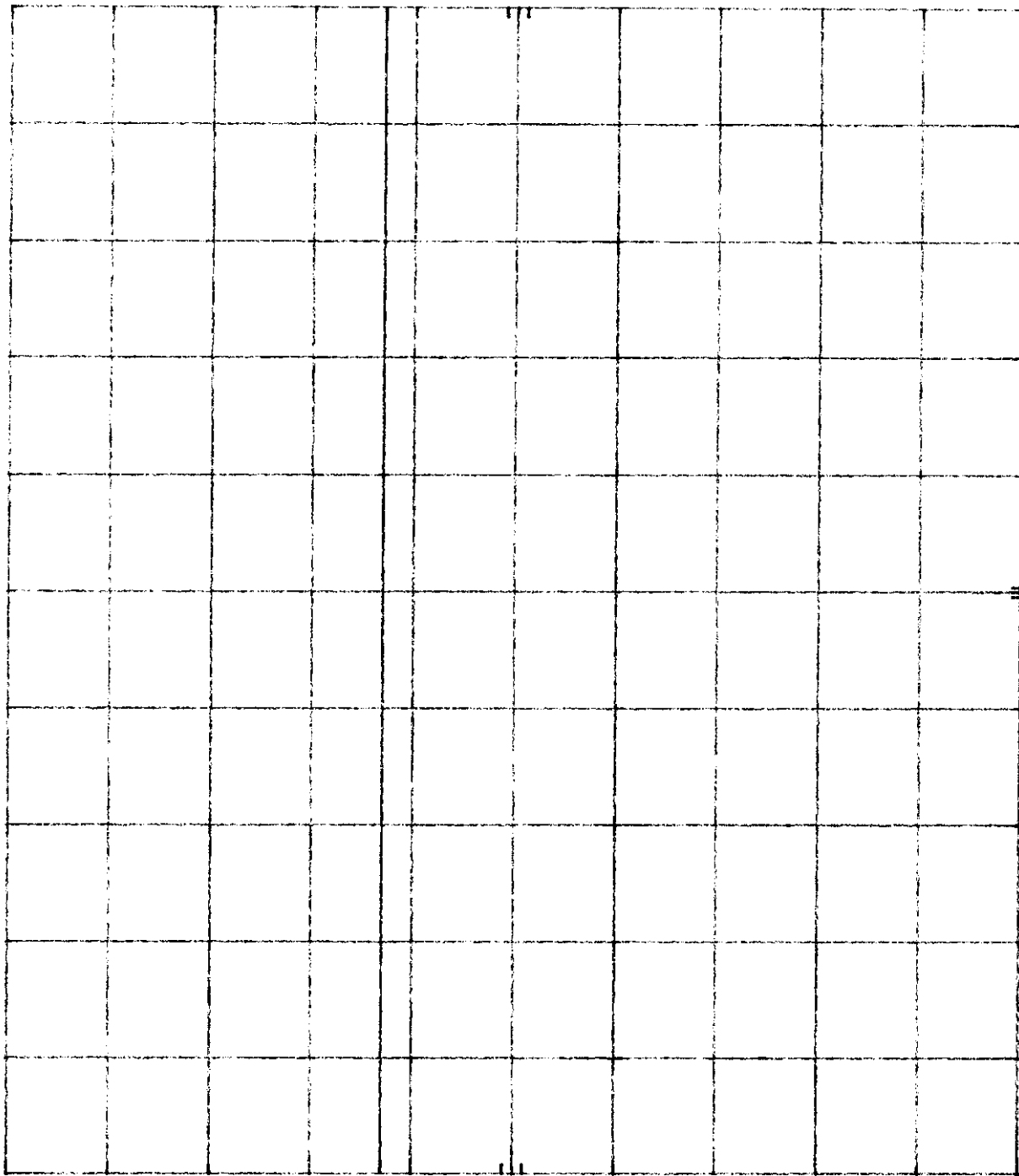
Customer:	Detection Systems, Inc
Test Sample:	RF Receiver
Model No.:	RF3222 FCC ID: ESV-0406-1
Test Method:	FCC 15.107(a) Conducted Emissions
Notes:	Lead Tested: Hot Detector: Peak
Date:	April 23, 1998
Tech:	Dennis Cortes
Sheet	3 of 6



Retlif Testing Laboratories

Report No. R-7478-1

R-7478 RF3222 CE DC 4/23/98 LEAD-NEUTRAL  
REF 85.0 dB $\mu$ V ATTEN 10 dB



STOP 10.00 MHz  
SWP 20.0 sec

VBW 30 kHz

START 1.70 MHz  
RES BW 10 kHz

hp  
10 dB/  
OFFSET  
10.0  
dB  
DL  
48.0  
dB $\mu$ V

Customer:	Detection Systems, Inc
Test Sample:	RF Receiver
Model No:	RF3222 FCC ID: ESV-0406-1
Test Method:	FCC 15.107(a) Conducted Emissions
Notes:	Lead Tested: Neutral Detector: Peak
Date:	April 23, 1998
Tech:	Dennis Cortes
Sheet	4 of 6



**Retlif Testing Laboratories**

Report No. R-7478-1



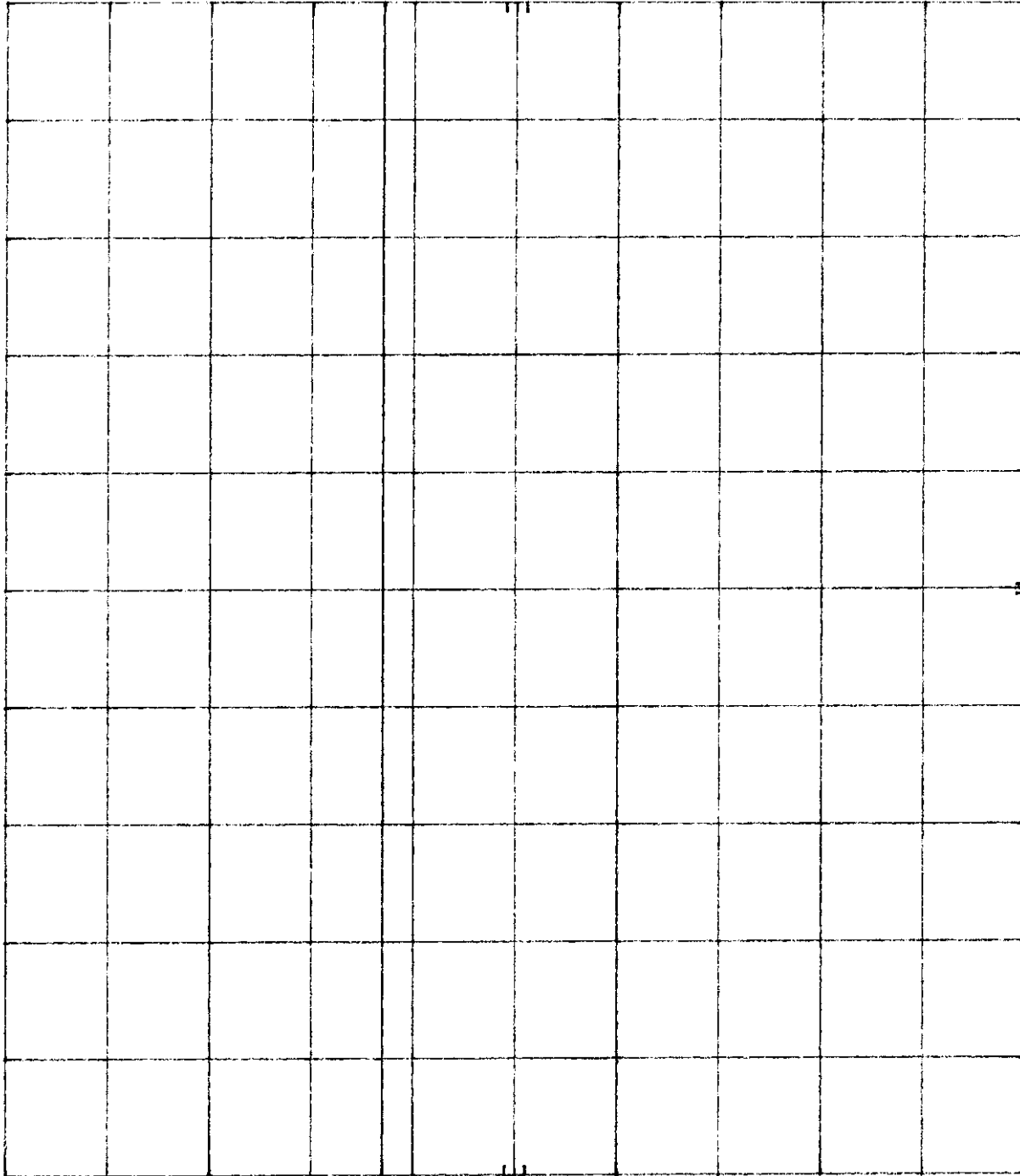
R-7478 RF3222 CE DC 4/23/98 LEAD-HOT  
REF 85.0 dBμV ATTEN 10 dB

hp

10 dB/

OFFSET  
10.0  
dB

DL  
48.0  
dBμV



START 10.0 MHz      RES BW 10 kHz      VBW 30 kHz      STOP 30.0 MHz  
SWP 20.0 sec

Customer:	Detection Systems, Inc
Test Sample:	RF Receiver
Model No.:	RF3222    FCC ID: ESV-0406-1
Test Method:	FCC 15.107(a) Conducted Emissions
Notes:	Lead Tested: Hot Detector: Peak
Date:	April 23, 1998
Tech:	Dennis Cortez
Sheet	5 of 6



**Retlif Testing Laboratories**  
Report No. R-7478-1

R-7478 RF3222 CE DC 4/23/98 LEAD-NEUTRAL  
 REF 85.0 dBμV ATTEN 10 dB

HP

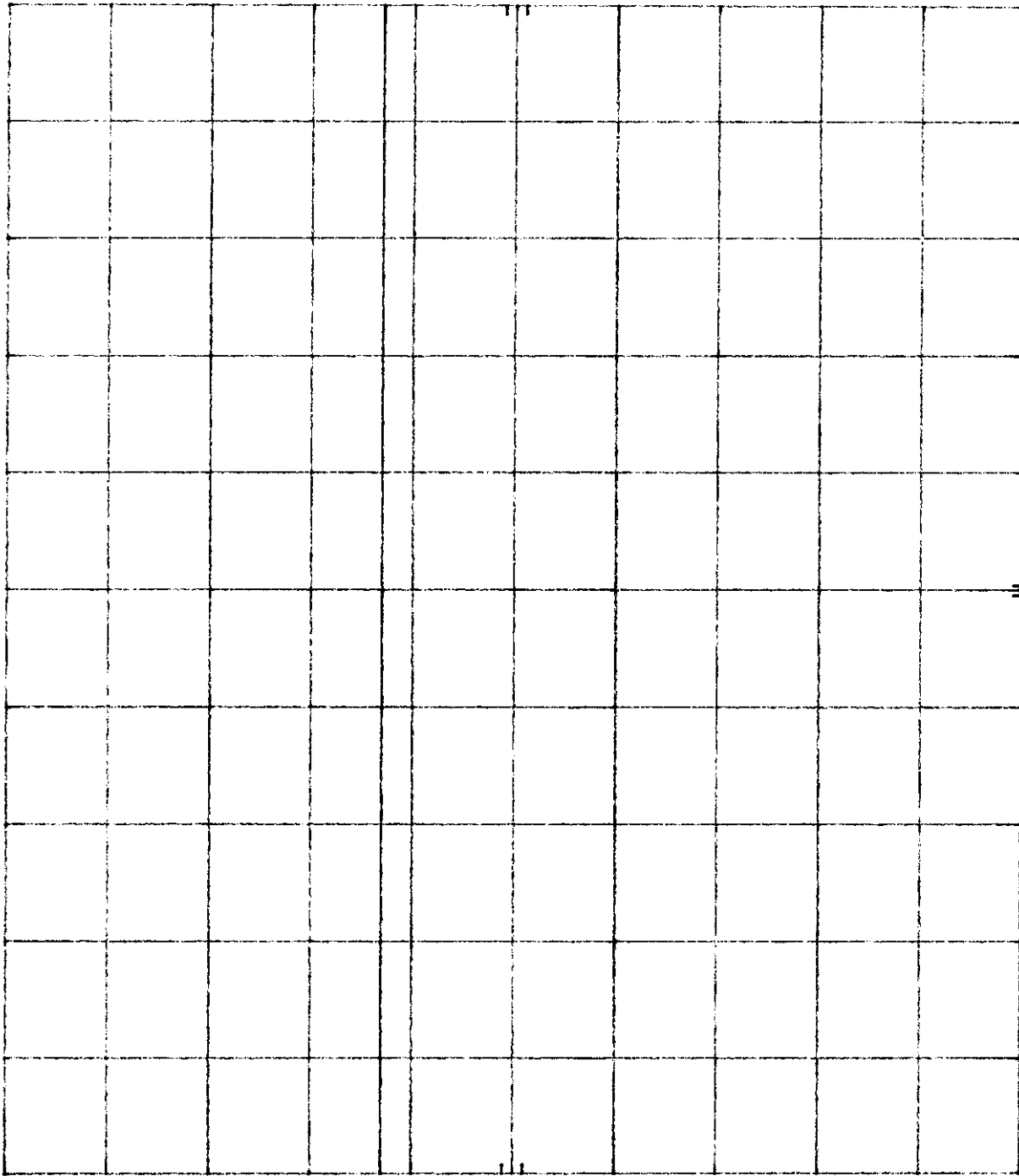
10 dB/

OFFSET

10.0  
dB

DL

48.0  
dBμV



START 10.0 MHz    RES BW 10 kHz    VBW 30 kHz    STOP 30.0 MHz  
 SWP 20.0 sec

Customer:	Detection Systems, Inc
Test Sample:	RF Receiver
Model No.:	RF3222    FCC ID: ESV-0406-1
Test Method:	FCC 15.107(a) Conducted Emissions
Notes:	Lead Tested: Neutral Detector: Peak
Date:	April 23, 1998
Tech:	Dennis Cortes
Sheet:	6 of 6



**Retlif Testing Laboratories**

Report No. R-7478-1

## EQUIPMENT LIST

### FCC 15.107(a) Conducted Emissions

<b>EN</b>	<b>Type</b>	<b>Manufacturer</b>	<b>Frequency Range</b>	<b>Model No.</b>	<b>Cal Date</b>	<b>Due Date</b>
076	LISN	Solar Electronics	10 kHz - 30 MHz	8012-50-R-24BNC	1/16/98	1/16/99
141	Spectrum Analyzer	Hewlett Packard	100 Hz - 40 GHz	8566B	3/2/98	9/2/98
141A	Graphics Plotter	Hewlett Packard	N/A	7470A	3/4/98	3/4/99
141B	Quasi-Peak Adaptor	Hewlett Packard	100 Hz - 1 GHz	85650A	3/3/98	9/3/98
202	Transient Limiter	Hewlett Packard	.009 MHz - 200 MHz	11947A	8/21/97	8/21/98



**Retlif Testing Laboratories**

Test Report No. R-7478-1  
FCC ID: ESV-0406-1

Report of Measurements

Paragraph 15.109(a)

Radiated Emissions Test Data



**Retlif Testing Laboratories**

Test Report No. R-7478-1  
FCC ID: ESV-0406-1

# EQUIPMENT LIST

## RADIATED EMISSIONS

EN	Type	Manufacturer	Frequency Range	Model No.	Cal Date	Due Date
067	Open Area Test Site	Retlif	3 Meter	RNY	8/30/97	8/30/99
128C	Double Ridge Guide	Eaton Corporation	1 GHz - 18 GHz	96001	10/6/97	10/6/98
133	Broadband Pre-Amplifier	Electro-Metrics	10 kHz - 1 GHz, 26dB	BPA-1000	6/20/97	6/20/98
141	Spectrum Analyzer	Hewlett Packard	100 Hz - 40 GHz	8566B	3/2/98	9/2/98
141A	Graphics Plotter	Hewlett Packard	N/A	7470A	3/4/98	3/4/99
141B	Quasi-Peak Adaptor	Hewlett Packard	100 Hz - 1 GHz	85650A	3/3/98	9/3/98
206B	6.0 dB Attenuator	Texscan	0 - 1.0 GHz	FP-50 - 6 dB	6/20/97	6/20/98
523	Biconilog	Electro-Mechanics	26 MHz - 1100 MHz	3143	9/30/97	9/30/98
543	Preamplifier	Hewlett Packard	1.0 GHz - 26.5 GHz	8449B	8/12/97	8/12/98



**Retlif Testing Laboratories**

Test Report No. R-7478-1  
FCC ID: ESV-0406-1

# RETLIF TESTING LABORATORIES

## TABULAR DATA SHEET

TEST METHOD:	FCC Part 15 Radiated Emissions, 30 MHz to 2 GHz		
CUSTOMER:	Detection Systems, Inc.	JOB No.:	R-7478-1
TEST SAMPLE:	RF Receiver FCC ID: ESV-0406-1		
MODEL No.:	RF3222	SERIAL No.:	N/A
TEST SPECIFICATION:	FCC Part 15, Subpart B, Class B  PARAGRAPH: 15.109(a)		
OPERATING MODE:	Continuously Receiving 304 Mhz Signal		
TECHNICIAN:	Dennis Cortes	DATE:	April 6, 1998
NOTES:	Detector Function: Quasi-Peak Test Distance: 3 Meters		

Test Frequency	Antenna Position	Turntable Position	Meter Reading	Correction Factor	Corrected Reading	Converted Reading	Limit
MHz	(H/V) - Height	Degrees	dBuV	dB	dBuV/m	uV/m	uV/m
30.00							100
30.01	V-1.0	158	30.8	-6.5	24.3	16.4	
34.00	V-1.0	158	28.3	-7.5	20.8	11.0	
35.90	V-1.0	180	43.3	-8.1	35.2	57.5	
40.60	V-1.0	180	42.5	-9.3	33.2	45.7	
41.95	V-1.0	135	41.0	-9.8	31.2	36.3	
44.00	V-1.0	180	35.3	-10.4	24.9	17.6	
45.50	V-1.0	203	41.3	-10.9	30.4	33.1	
48.00	V-1.0	203	47.5	-11.6	35.9	62.4	
50.00	V-1.0	180	40.8	-12.3	28.5	26.6	
52.10	V-1.0	180	39.8	-12.4	27.4	23.4	
54.00	V-1.0	158	41.7	-12.5	29.2	28.8	
58.00	V-1.0	180	42.0	-12.6	29.4	29.5	
60.00	V-1.0	180	48.8	-12.7	36.1	63.8	
64.00	V-1.0	203	36.8	-12.1	24.7	17.2	
66.00	V-1.0	248	44.3	-11.8	32.5	42.2	
72.00	V-1.0	135	44.1	-11.1	33.0	44.7	
74.00	V-1.0	158	37.1	-10.9	26.2	20.4	
76.00	V-1.0	180	36.8	-10.8	26.0	20.0	
78.00	V-1.0	180	38.4	-10.6	27.8	24.5	
80.05	V-1.0	315	40.7	-10.5	30.2	32.4	V
88.00							100
88.00							150
120.30	V-1.0	180	32.5	-11.3	21.2	11.5	
126.00	V-1.0	203	37.0	-10.7	26.3	20.7	
134.20	V-1.0	135	32.2	-9.5	22.7	13.6	
140.40	V-1.0	293	29.5	-8.3	21.2	11.5	
150.00	V-1.0	270	28.3	-7.9	20.4	10.5	
174.40	V-1.0	113	30.3	-9.1	21.2	11.5	
180.00	V-1.0	270	33.0	-8.9	24.1	16.0	
							V
216.00							150
216.00							200
314.70	V-1.3	203	40.0	-3.7	36.3	65.3	
							V
960.00							200
960.00	The frequency range was scanned from 30 MHz to 2 GHz. All emissions not recorded were more than 10dB below the specified limit. Emissions observed from the EUT do not exceed the specified limit.						500
V							V
2000.00							500