# Retlif Testing Laboratories

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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

## 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.

TABLE OF EXHIBITS

EXHIBIT 6

Report of Measurements

Para. 2.1033(b)(6)

| APPLICANT | MANUFACTURER |
|---|---|
| Detection Systems<br>130 Perinton Parkway<br>Fairport, NY 14450 | 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.

| SIGN | PRINT | TITLE |
|---|---|---|
| Thomas J. Schneider | Thomas J. Schneider | EMC Test Engineer |

## 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 $\mu$V/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$\mu$V/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).

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 $\mu$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 | = | >/= 100.0 milliseconds |
| Transmitter Duty Cycle | = | 10.0 % |

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:

Pulse Desensitization = 20 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.

Exhibit 6

Report of Measurements

Radiated Emissions Data, Para. 15.231(b)

# 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 Transmiting 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 |
| 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 Transmiting 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 Transmiting 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
PARAGRAPH: 15.231

OPERATING MODE: Continuously Transmiting 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 |
| 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

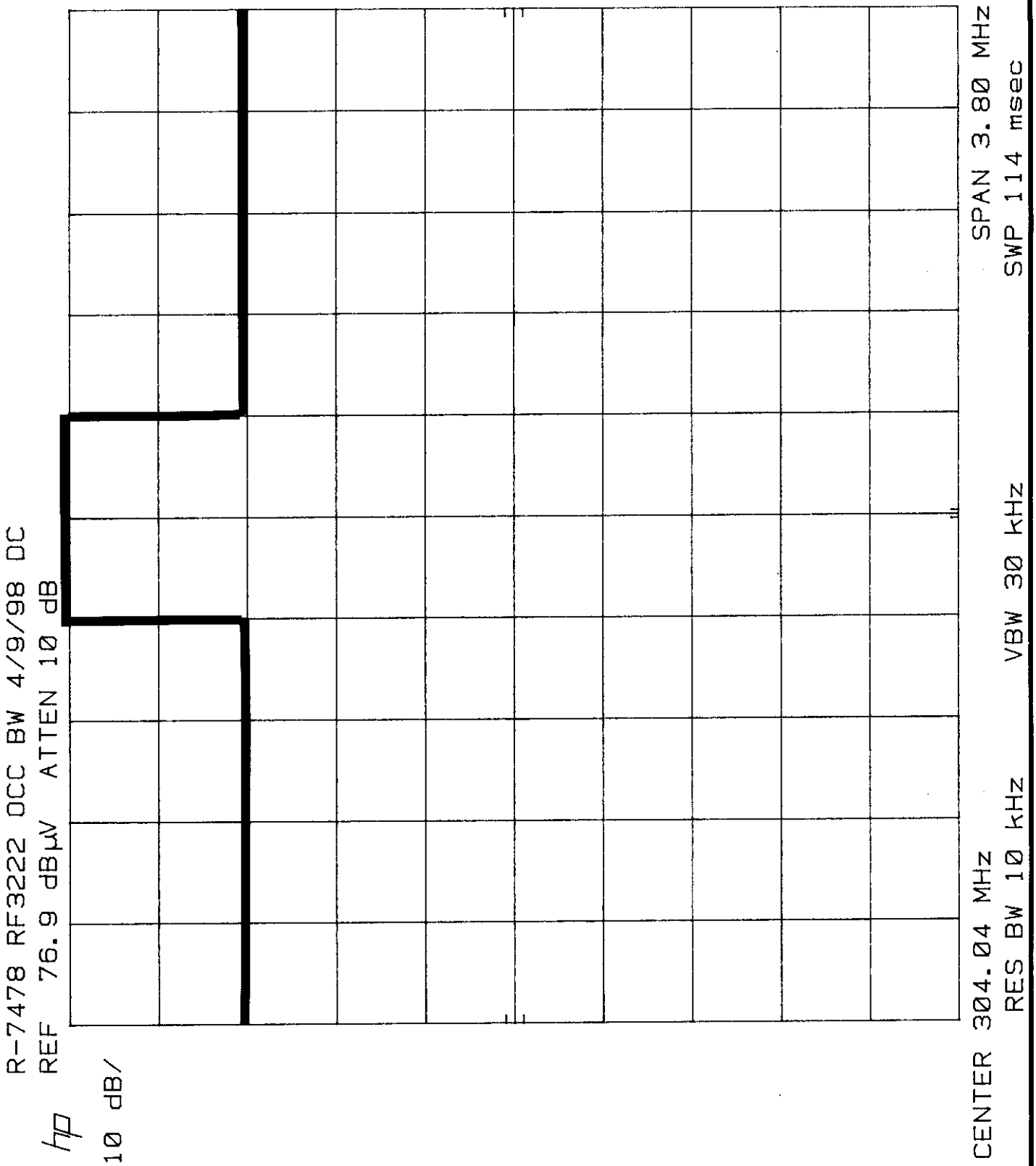
Report of Measurements

Occupied Bandwidth, Para. 15.231(c)

| | |
|---|---|
| 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




| | |
|---|---|
| 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**

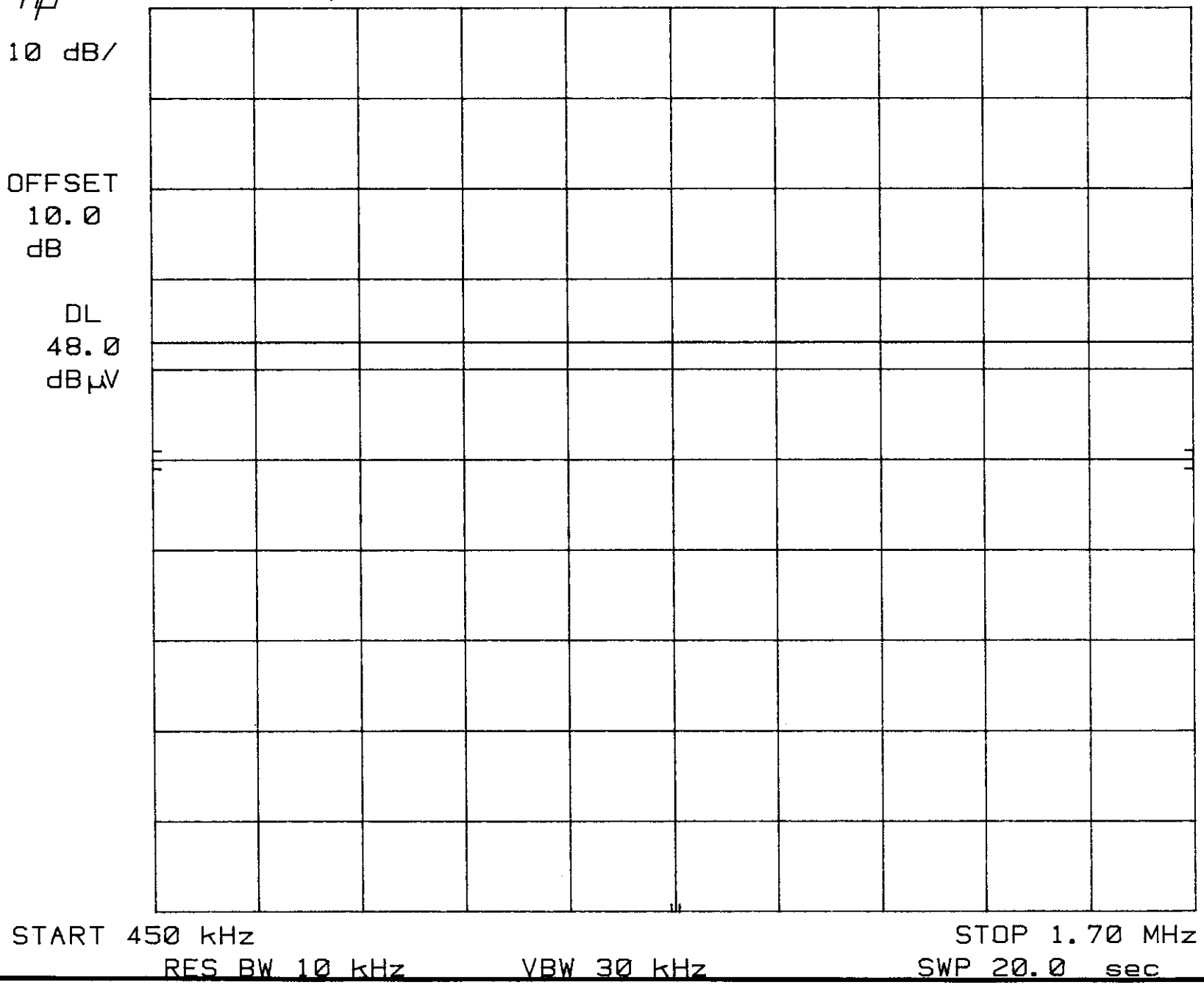
Report No. R-7478-1

Exhibit 6

Report of Measurements

Para. 15.207, Conducted Emissions Test Data

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

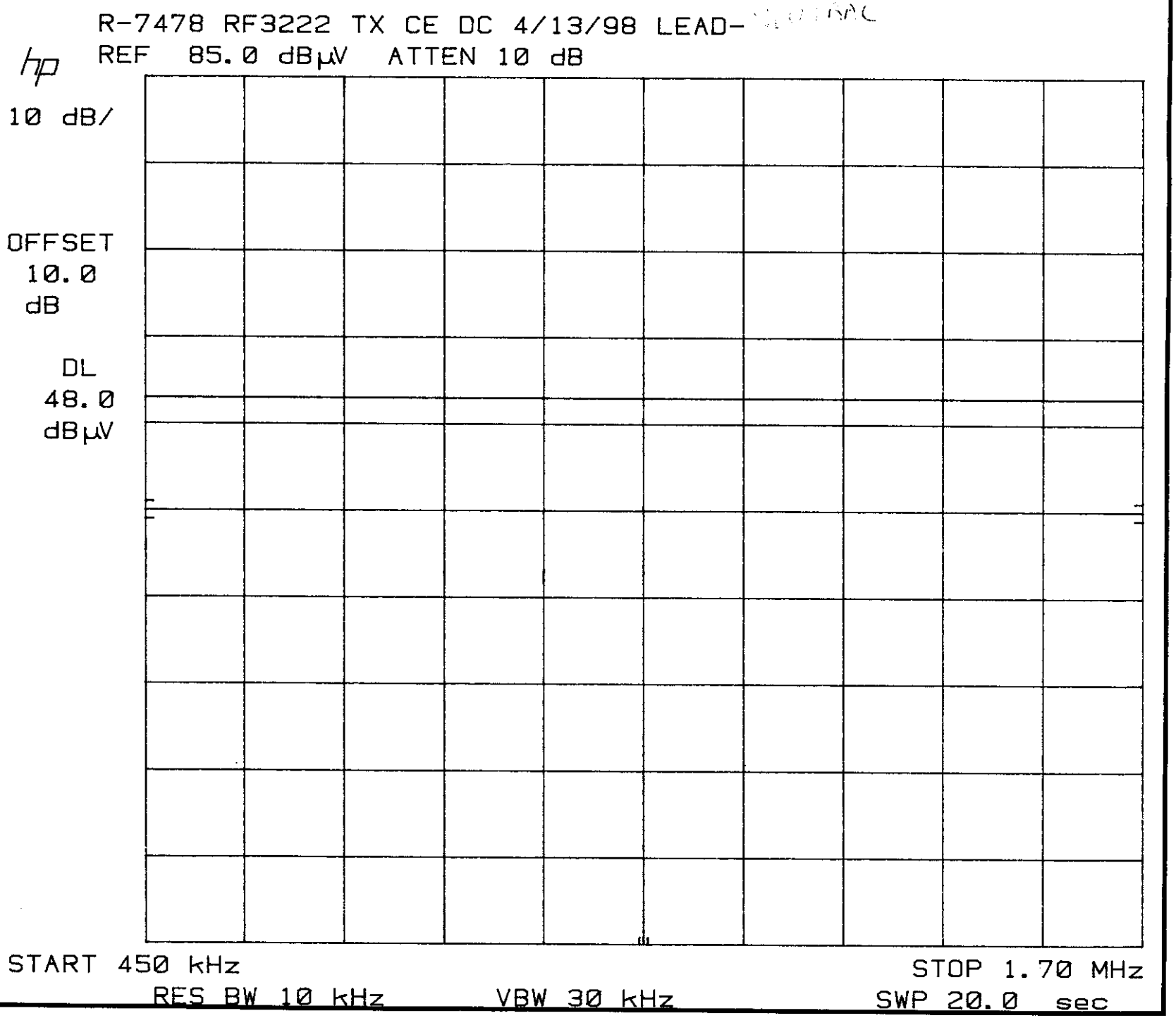



Retlif Testing Laboratories

Report No. R-7478-1

| | |
|---|---|
| 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: | Tech. | Sheet | of |
|---|---|---|---|
| April 13,1998 | Dennis Cortes | 2 | 6 |




**Retlif Testing Laboratories**

Report No. R-7478-1

Customer:
Test Sample: Detection Systems 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

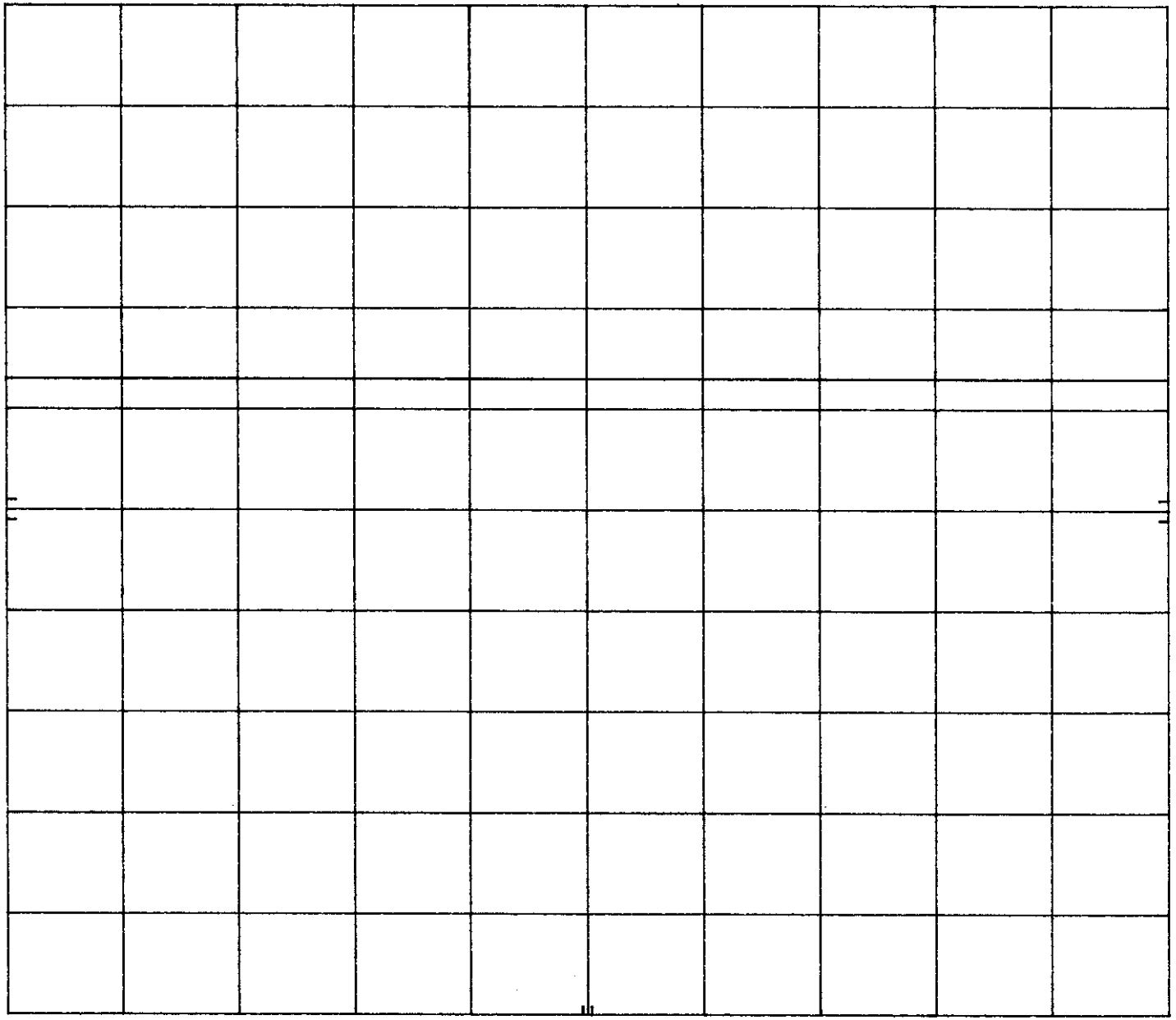
R-7478 RF3222 TX CE DC 4/13/98 LEAD- HOT

REF 85.0 dBµV ATTEN 10 dB

10 dB/

OFFSET 10.0 dB

DL 48.0 dBµV



START 1.70 MHz STOP 10.00 MHz

RES BW 10 kHz VBW 30 kHz SWP 20.0 sec

Retlif Testing Laboratories

Report No. R-7478-1

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

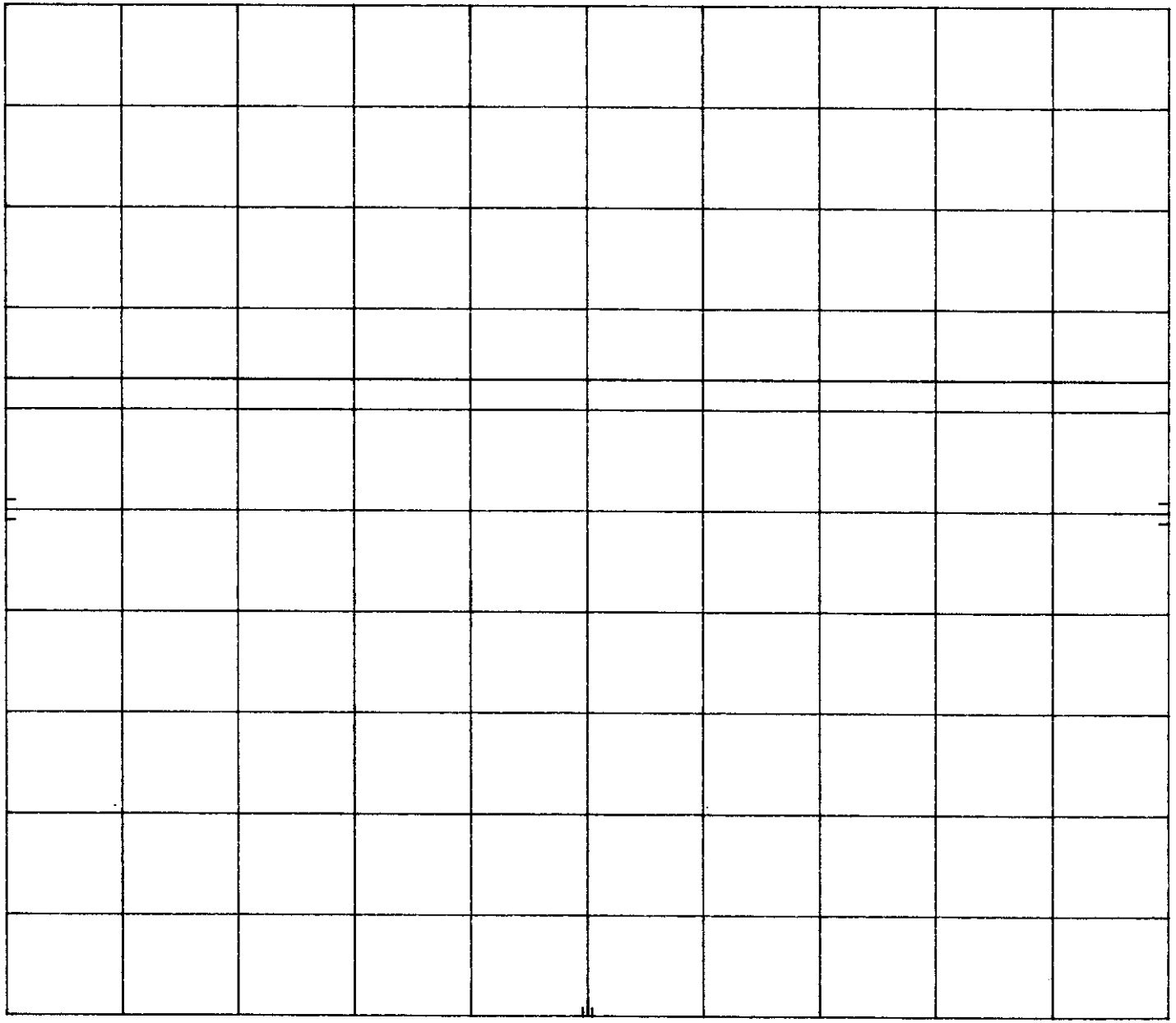
R-7478 RF3222 TX CE DC 4/13/98 LEAD- NEUTRAL

REF 85.0 dBµV ATTEN 10 dB

10 dB/

OFFSET 10.0 dB

DL 48.0 dBµV



START 1.70 MHz STOP 10.00 MHz

RES BW 10 kHz VBW 30 kHz SWP 20.0 sec

**Retlif Testing Laboratories**

Report No. R-7478-1

Customer:
Test Sample: Detection Systems
Model No: Pulsed RF Transmitter
Test Method: RF3222
Notes: FCC 15.207(a) Conducted Emissions
Lead Tested: Hot
Detector: Peak

Date: April 13,1998
Tech: Dennis Cortes
Sheet 5 of 6

Retlif Testing Laboratories

Report No. R-7478-1

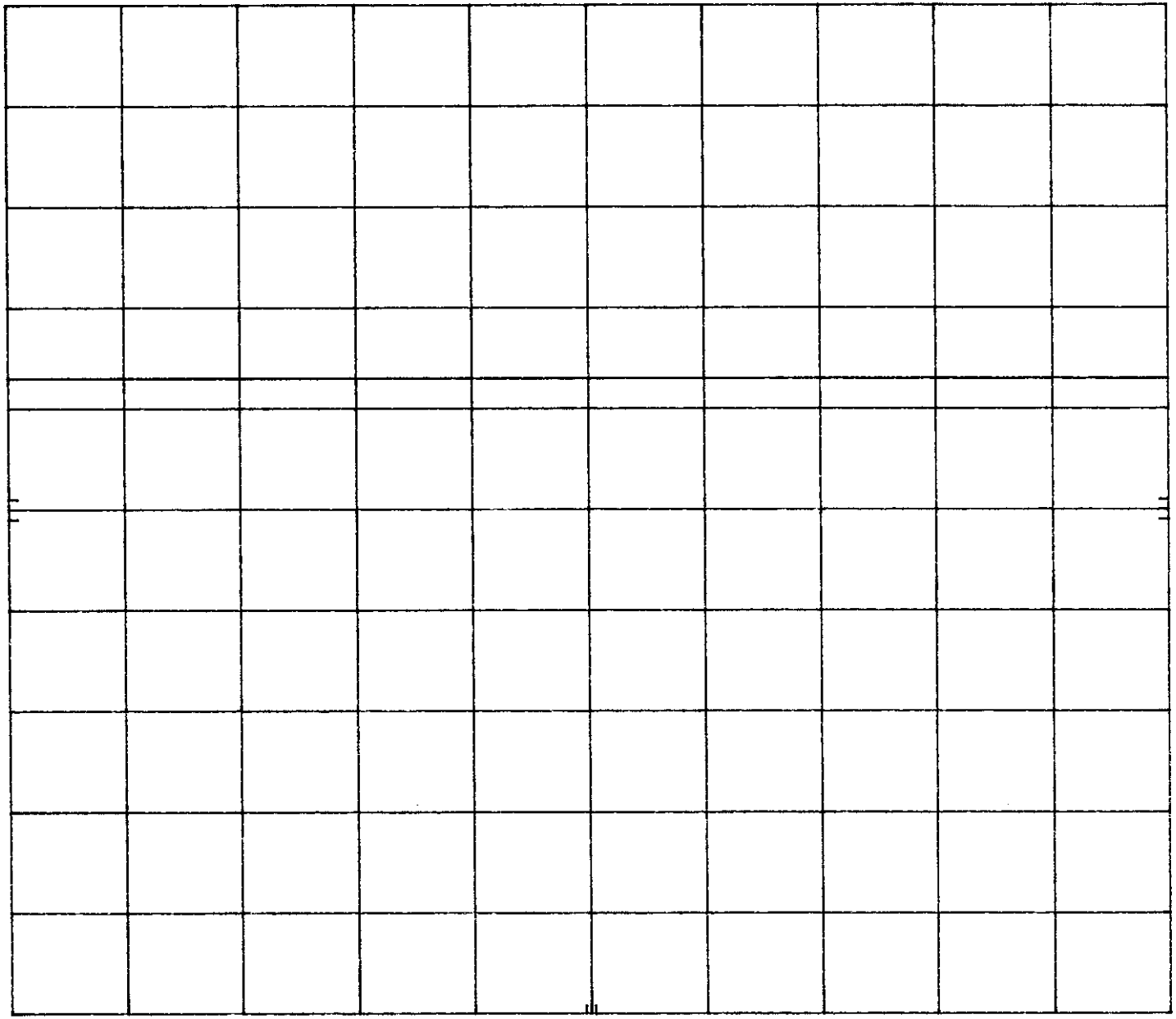
R-7478 RF3222 TX CE DC 4/13/98 LEAD- HOT

REF 85.0 dBµV ATTEN 10 dB

10 dB/

OFFSET 10.0 dB

DL 48.0 dBµV



START 10.0 MHz STOP 30.0 MHz

RES BW 10 kHz VBW 30 kHz 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 | 6 | of | 6 |
|---|---|---|---|---|---|---|---|

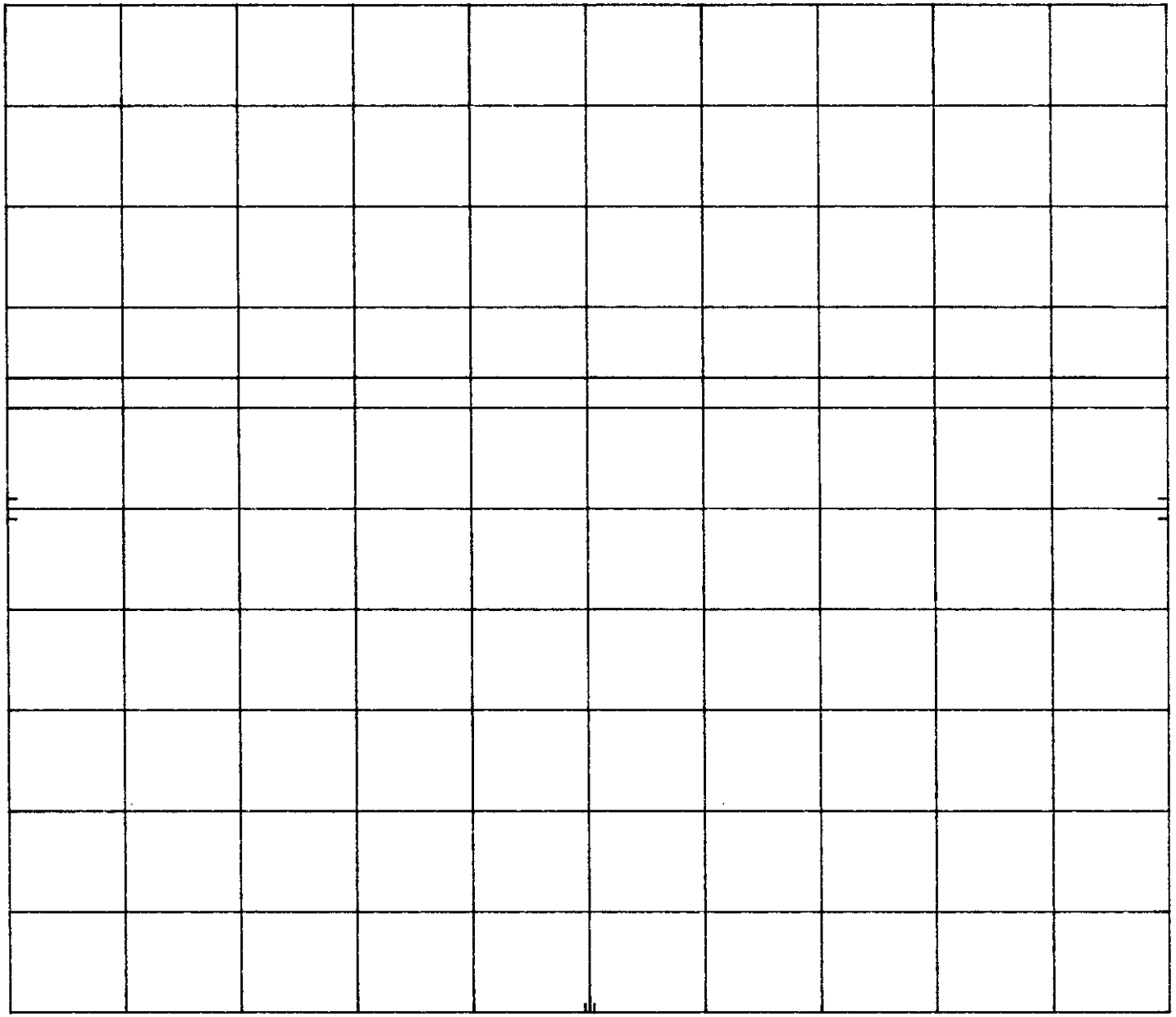
R-7478 RF3222 TX CE DC 4/13/98 LEAD-NEUTRAL

REF 85.0 dBµV ATTEN 10 dB

10 dB/

OFFSET
10.0
dB

DL
48.0
dBµV



START 10.0 MHz STOP 30.0 MHz

RES BW 10 kHz VBW 30 kHz SWP 20.0 sec

Retlif Testing Laboratories

Report No. R-7478-1

Exhibit 6

Report of Measurements

TEST EQUIPMENT LIST

# 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 | Texscan | 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 |

# EQUIPMENT LIST

## Conducted Emissions

| EN | Type | Manufacturer | Frequency Range | Model No. | Cal Date | Due Date |
|---|---|---|---|---|---|---|
| 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 |

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**

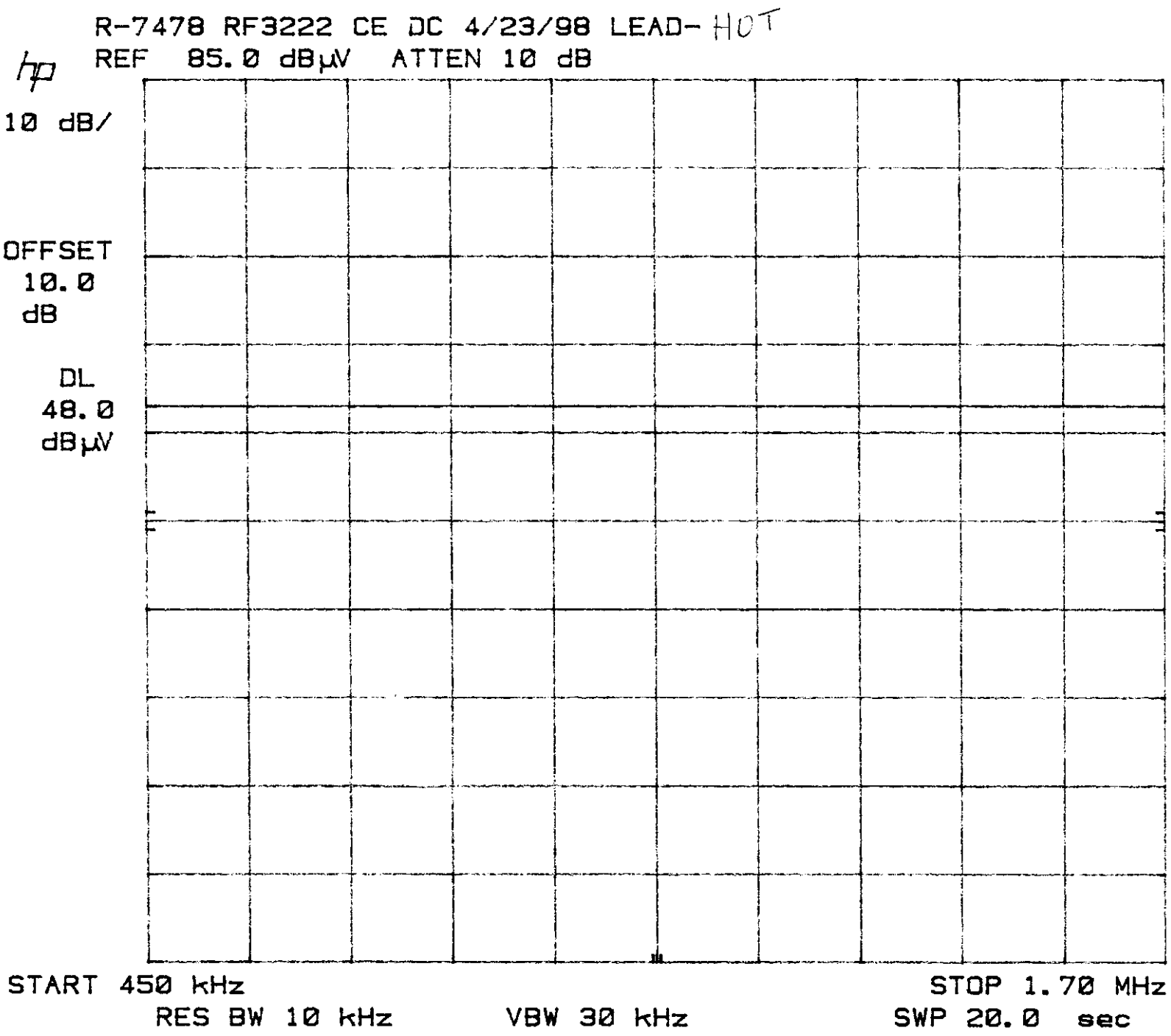
Test Report No. R-7478-1
FCC ID: ESV-0406-1

Report of Measurements

Paragraph 15.107(a)

Conducted Emissions Test Data

| | |
|---|---|
| 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

| | |
|---|---|
| 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 | |

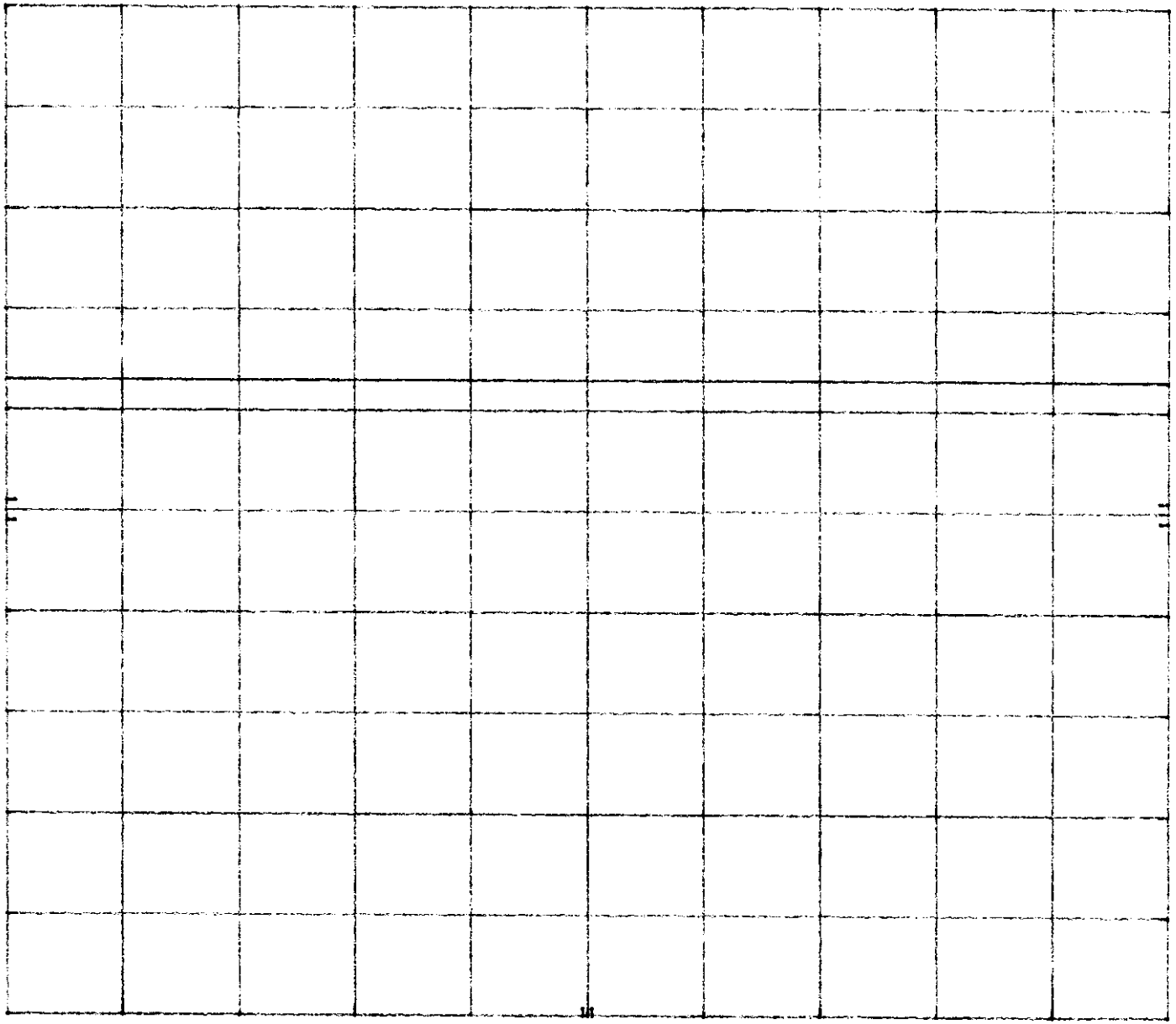
R-7478 RF3222 CE DC 4/23/98 LEAD- NEUTRAL

REF 85.0 dBµV ATTEN 10 dB

10 dB/

OFFSET 10.0 dB

DL 48.0 dBµV



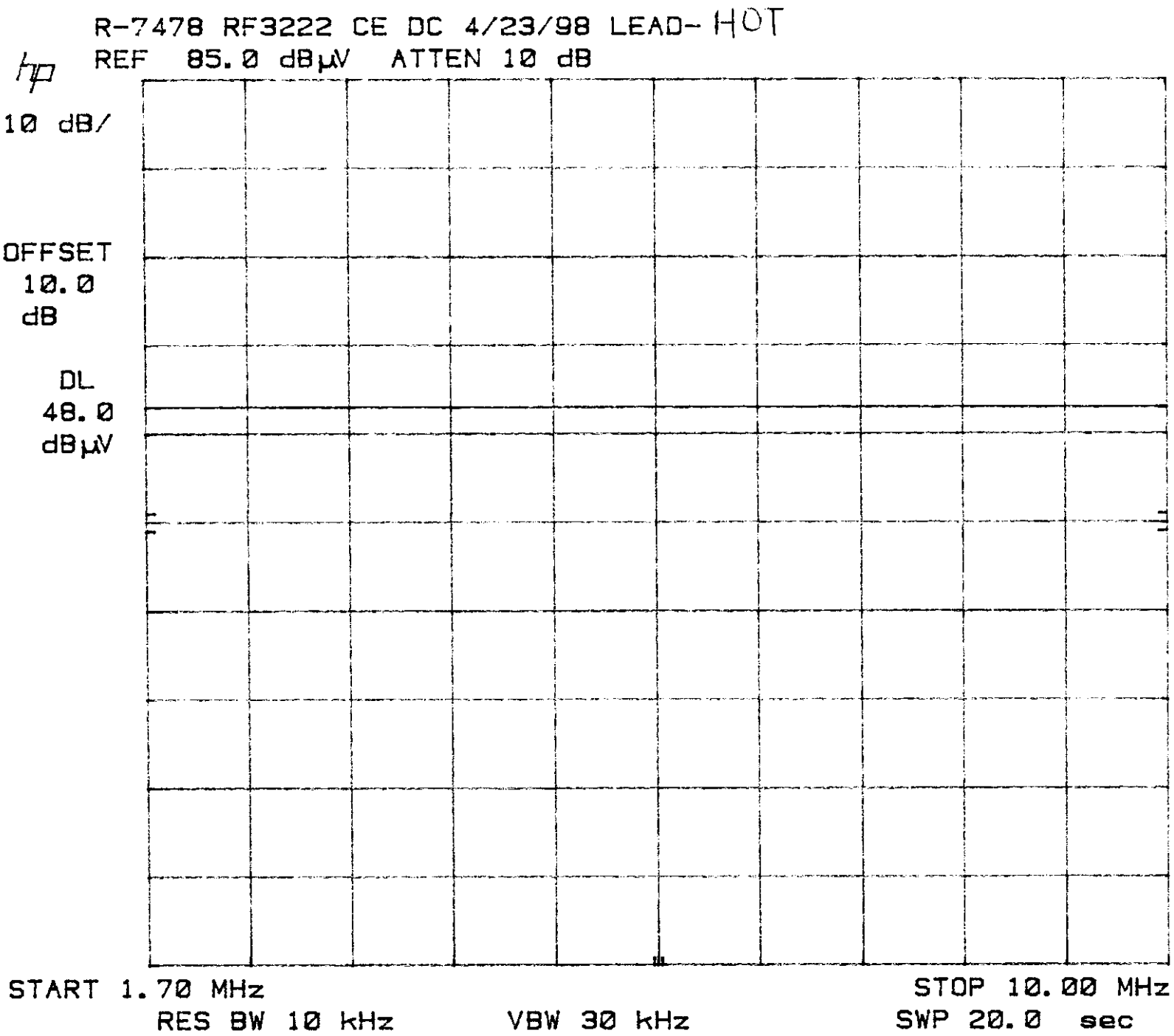
START 450 kHz STOP 1.70 MHz

RES BW 10 kHz VBW 30 kHz SWP 20.0 sec

Retlif Testing Laboratories

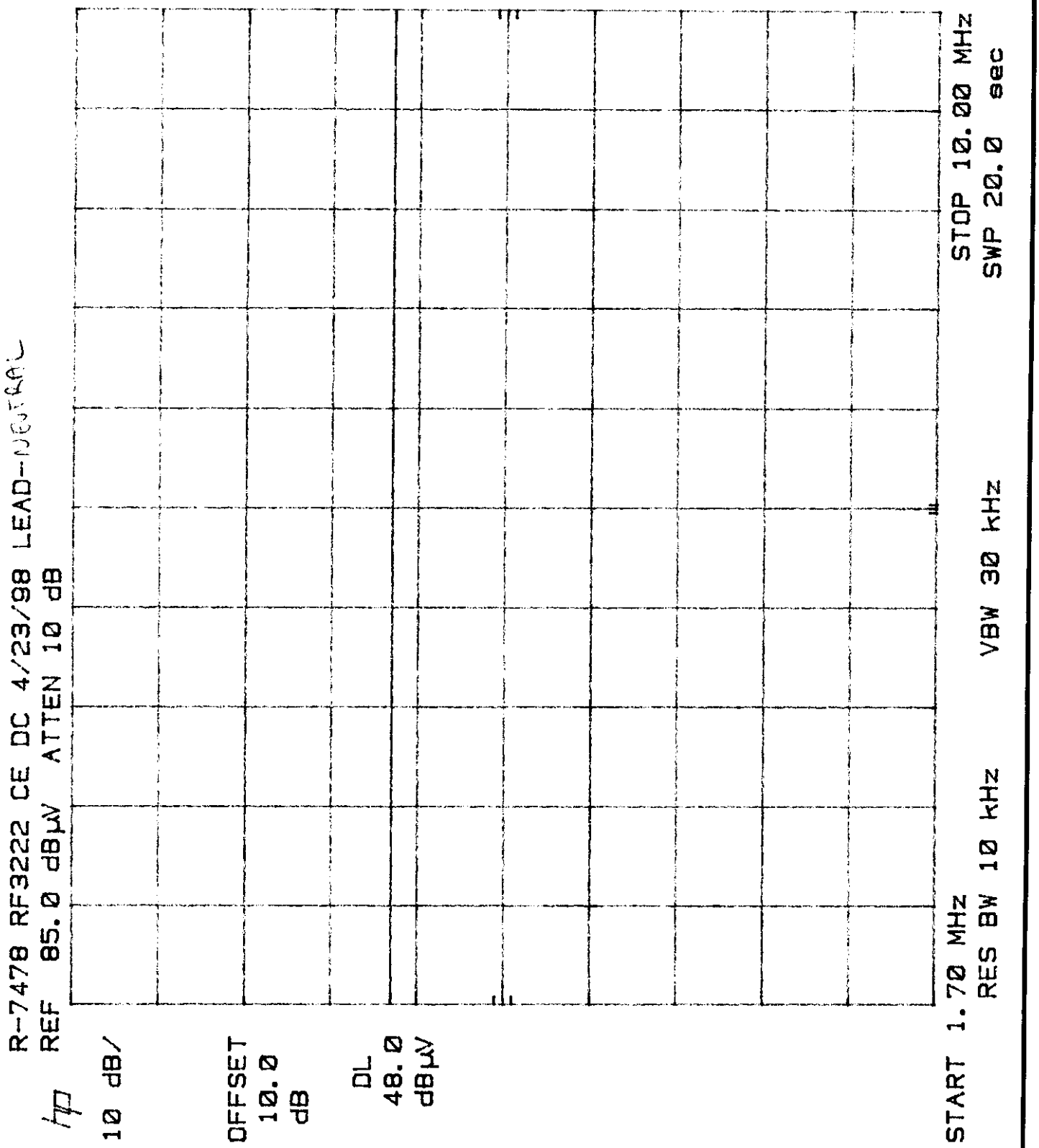
Report No. R-7478-1

| | |
|---|---|
| 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



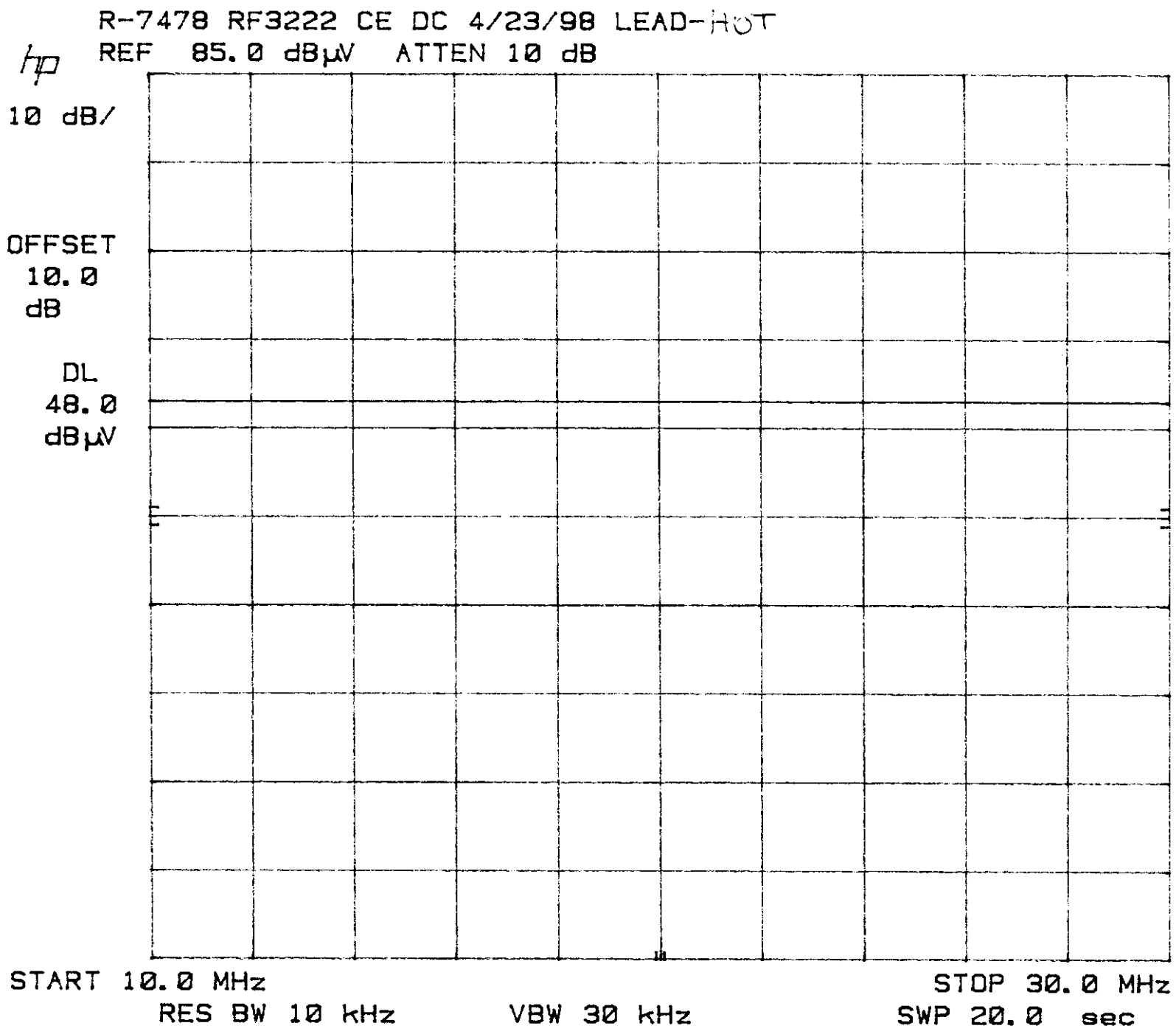

| | |
|---|---|
| Customer: | Detection Systems, Inc |
| Test Sample: | RF Receiver |
| Model No.: | RF3222 FCC ID: ESV-0406-1 |
| Test Method: | FCC 15.107(a) Conducted Emissions |
| Notes: | Lead Tested: Neutral<br>Detector: Peak |

Date: April 23, 1998 Tech: Dennis Cortes Sheet 4 of 6

**Retlif Testing Laboratories**

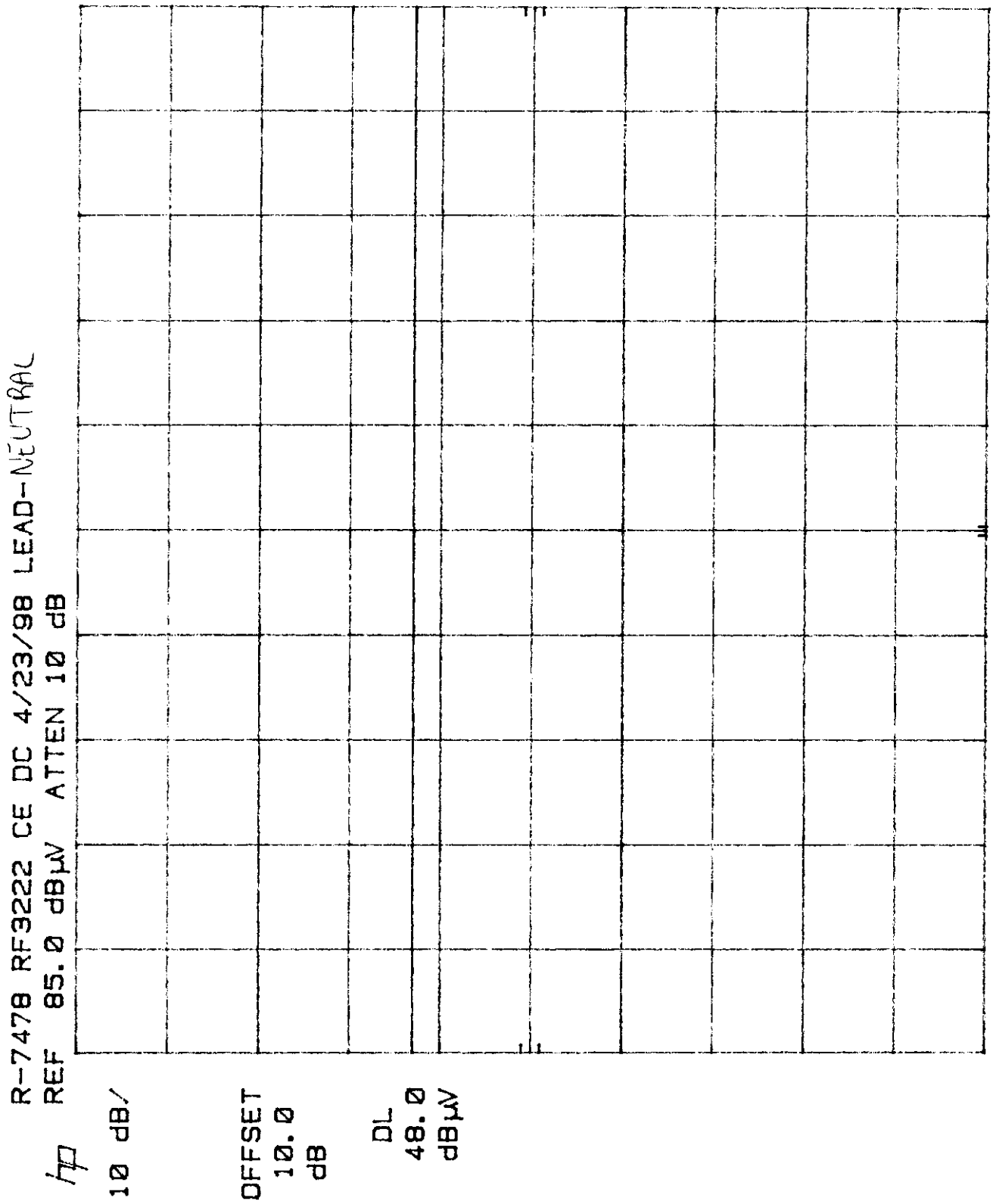
Report No. R-7478-1

| | |
|---|---|
| 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 5 of 6 |




Retlif Testing Laboratories

Report No. R-7478-1




| | |
|---|---|
| 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<br>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

| EN | Type | Manufacturer | Frequency Range | Model No. | Cal Date | Due Date |
|---|---|---|---|---|---|---|
| 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 |

Report of Measurements

Paragraph 15.109(a)

Radiated Emissions Test Data

# 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

## 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<br>FCC ID: ESV-0406-1 |
| MODEL No.: | RF3222 SERIAL No.: N/A |
| TEST SPECIFICATION: | FCC Part 15, Subpart B, Class B<br>PARAGRAPH: 15.109(a) |
| OPERATING MODE: | Continuously Receiving 304 Mhz Signal |
| TECHNICIAN: | Dennis Cortes DATE: April 6, 1998 |
| NOTES: | Detector Function: Quasi-Peak<br>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 | | | | | | | 500 |
| \| | were more than 10dB below the specified limit. Emissions observed from the EUT do not | | | | | | | \| |
| V | exceed the specified limit. | | | | | | | V |
| 2000.00 | | | | | | | | 500 |