

EXHIBIT "C"
TECHNICAL REPORT
CENSUS READERS
FCC ID: JHD-CEN1

- | | | |
|----|--|--|
| 1) | CR1A | Single Reader |
| 2) | CR1A-DS | Direction Reader - 2 loops |
| 3) | CR1A-DS1 | Direction Reader - 1 loop dual receivers |
| 4) | CR1A-MS | Single Reader - 2 loops master/slave |
| 5) | CR1A-DS-MS | Direction Reader - 2 loops master/slave |
| 6) | Typical PCB configuration | |
| 7) | Schematics/Layout/Component Placements | |

Terminal Board
Processor Board
Aerial Board
Display Board
Auxiliary Comm's Board
Receiver Pod SL4A
R/X Multiplex Board
Master/Slave Board
Hybrid Module Aerial R/X
Hybrid Module Main R/X
Hybrid Module Synthesiser
Hybrid Module Demodulator

REPORT OF MEASUREMENTS

Para. 2.1033(b)(6)



Retlif Testing Laboratories

Test Report No. R-7513-1
FCC ID: JHD-CEN1

APPLICANT Identec, Ltd. Mercantile Road Rainton Bridge Industrial Estate Houghton-le-Spring, County Durham England DH4 5PH	MANUFACTURER SAME
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TEST SPECIFICATION: FCC Rules and Regulations Part 15, Subpart C, Para. 15.209

TEST PROCEDURE: ANSI C63.4:1992

TEST SAMPLE DESCRIPTION

BRANDNAME: KNOGO MODEL: SEE BELOW

TYPE: RFID System with the following (3) antenna configurations

- 1) **MODEL CR1ADS XYZ:** Door Frame, Two (2) AM4A Antennas & Two (2) Type SL4A Receivers
- 2) **MODEL CR1AMS1XYZ:** Two (2) Type AM4A Antennas
- 3) **MODEL CR1ADS1XYZ:** Two (2) Type SL4A Antennas

POWER REQUIREMENTS: 12 VDC Derived from Stancor # STA-4812A AC Adapter

FREQUENCY OF OPERATION: 153.6 kHz

TESTS PERFORMED

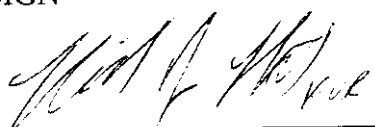
Para. 15.209(a), Radiated Emissions

Para. 15.207(a), Conducted Emissions

Duty Cycle Determination

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 Thomas J. Schneider	TITLE EMC Test Engineer
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	Retlif Testing Laboratories
	Test Report No. R-7513-1 FCC ID: JHD-CEN1

REPORT OF MEASUREMENTS

Applicant: KNOGO North America
Device: RFID System with Three (3) Antenna Configurations
FCC ID: JHD-CEN1
Power Requirements: 12 VDC derived from Stancor # STA-4812A AC Adapter
Applicable Rule Section: Part 15, Subpart C, Section 15.209

DETERMINATION OF DUTY CYCLE

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.

CALCULATION:

$$\begin{aligned} 4.5 \text{ milliseconds} \times 4 &= 18.0 \text{ milliseconds} \\ 1.2 \text{ milliseconds} \times 5 &= 11.0 \text{ milliseconds} \\ 18.0 \text{ milliseconds} + 11.0 \text{ milliseconds} &= 29.0 \\ \text{Duty Cycle} &= 29.0 \% \end{aligned}$$

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 1200 microseconds yields a minimum required bandwidth of 555 Hz. FCC specified bandwidths of 10kHz were utilized for 9 kHz to 30 MHz and 100 kHz for 30 MHz to 1 GHz for all measurements taken.



Retlif Testing Laboratories

Test Report No. R-7513-1
FCC ID: JHD-CEN1

REPORT OF MEASUREMENTS (continued)

GENERAL NOTES:

1. All readings were taken utilizing a Quasi-Peak detector function, except for 110 kHz to 490 kHz range which was measured in Peak. All measurements below 30 MHz were taken at a test distance of 10 meters and all measurements from 30 MHz to 200 MHz were taken 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 9 kHz to 200 MHz. All emissions not reported were more than 20 dB below the specified limit.



Retlif Testing Laboratories

Test Report No. R-7513-1
FCC ID: JHD-CEN1

MODEL CR1ADS XYZ

REPORT OF MEASUREMENTS

Radiated Emissions Test Data, Fundamental and Harmonics Para. 15.209(a)



Retlif Testing Laboratories

Test Report No. R-7513-1
FCC ID: JHD-CEN1

RETLIF TESTING LABORATORIES

TABULAR DATA SHEET

TEST METHOD:	FCC Part 15 Radiated Emissions, 9 KHz to 200 MHz		
CUSTOMER:	N A T S (Knogo North America)	JOB No.:	R-7513
TEST SAMPLE:	RFID system FCC ID: JHD-CEN1		
MODEL No.:	CRIADS XYZ	SERIAL No.:	N/A
TEST SPECIFICATION:	FCC Part 15, Subpart C PARAGRAPH: 15.209(a)		
OPERATING MODE:	Continuously Transmitting 153.6 KHz Signal		
TECHNICIAN:	Dennis Cortes	DATE:	4-17-98
NOTES:	Detector Function: Quasi-Peak except for (110KHz-490KHz measured in peak) Test Distance: Below 30 Mhz= 10 Meters (30-200) Mhz= 3 Meters		

Test Frequency	Antenna Position	Turntable Position	Meter Reading	Correction Factor	Test Distance Correction fact.	Corrected Reading	Converted Reading	Limit
MHz	(H/V/C)-Height	Degrees	dBuV	dB	dBuV	dBuV/m	uV/m	uV/m
009								266.7
141	C-1.0	180	79.6	-9.5	-59.0	11.1	3.6	
149	C-1.0	180	84.3	-9.5	-59.0	15.8	6.2	
490								V
490								4.9
1.705								48.9
1.705								14.0
29.49	C-1.0	248	44.0	-11.7	-19.0	13.3	4.6	30.0
30.00								100
30.00								
44.21	V-1.5	135	35.6	-10.4	0.0	25.2	18.2	
51.60	V-1.0	203	44.1	-12.4	0.0	31.7	38.5	
59.00	V-1.0	158	37.8	-12.7	0.0	25.1	18.0	
66.45	V-1.0	225	35.0	-11.7	0.0	23.3	14.6	
70.30	V-1.0	270	30.1	-11.2	0.0	18.9	8.8	
73.72	V-1.0	225	41.0	-11.0	0.0	30.0	31.6	
81.25	V-1.0	225	40.6	-10.5	0.0	30.1	32.0	
84.50	V-1.0	270	34.3	-10.6	0.0	23.7	15.3	
88.00								V
88.00								100
145.20	V-1.0	270	28.3	-8.1	0.0	20.2	10.2	150
153.66	V-1.0	225	30.7	-8.2	0.0	22.5	13.3	
177.00	V-1.0	090	34.5	-9.0	0.0	25.5	18.8	
184.90	V-1.0	225	33.9	-8.7	0.0	25.2	18.2	
V								V
200.00								150

The frequency range was scanned from 9 KHz to 200 MHz. All emissions not recorded were more than 10dB below the specified limit. Emissions observed from the EUT do not exceed the specified limit.

TABULAR DATA SHEET

FCC Part 15 Radiated Emissions, 9 KHz to 200 MHz

N.A.T.S. (Knogo North America)

JOB No. _____

R-7513

RFID system

FCC ID: JHD-CEN1

CR1ADS XYZ

SERIAL No .

	N/A
--	-----

FCC Part 15, Subpart C

PARAGRAPH: 15 209(a)

Continuously Transmitting 153.6 KHz Signal

TECHNICIAN:

Dennis Cortes

DATE:

4-17-98

Detector Function: Peak Test Distance correction factor =-59.0dB

Test Distance: 10 Meters Worst Case Duty Cycle = 24.0 % (Duty Cycle Correction factor = -12.4 dB)

[illegible]

MODEL CR1ADS XYZ

REPORT OF MEASUREMENTS

Conducted Emissions Test Data, Para. 15.207(a)



Retlif Testing Laboratories

Test Report No. R-7513-1
FCC ID: JHD-CEN1

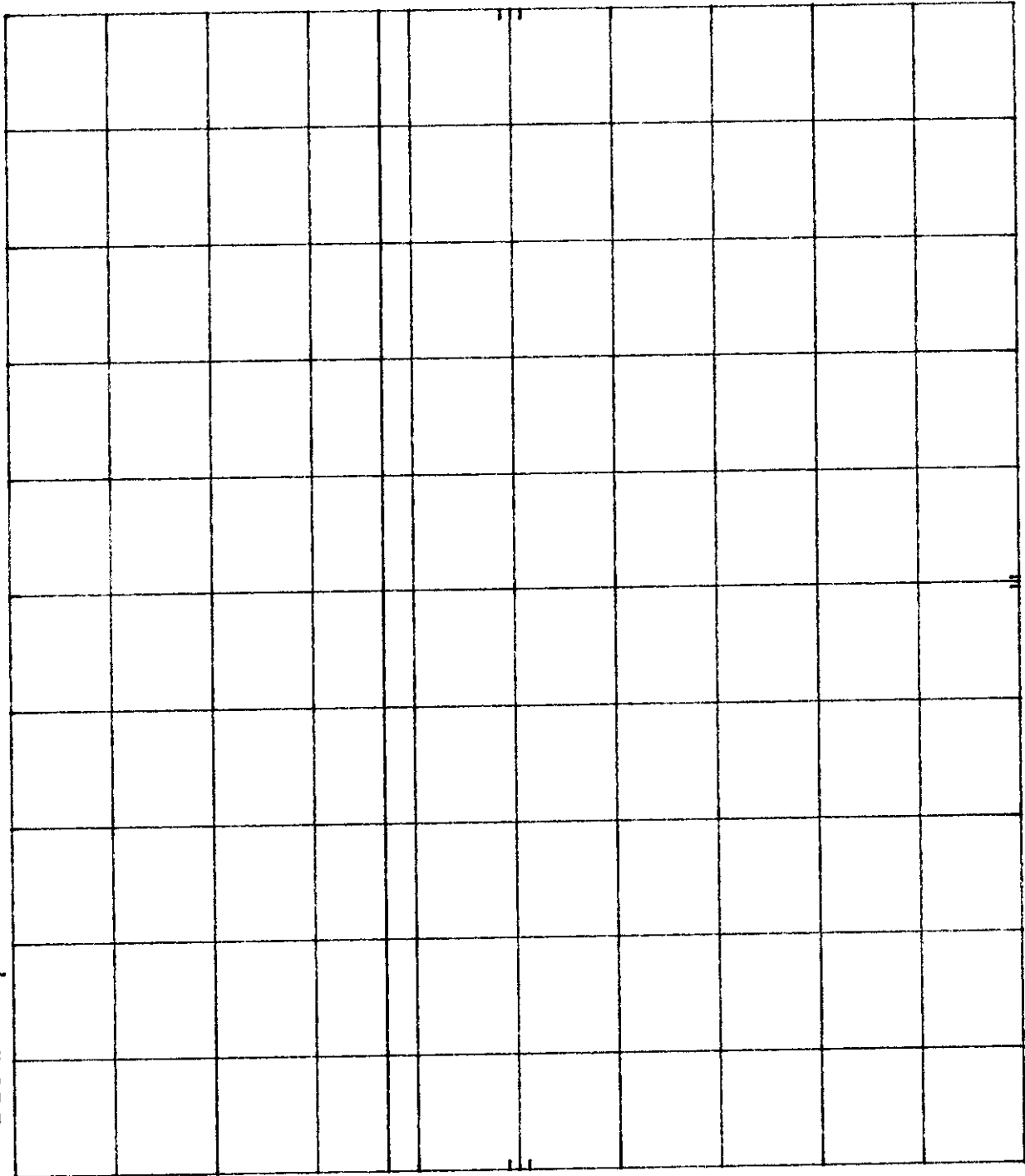
R-7513 CRIADS XYZ FCC15.207a CE DC 4/17/98 LEAD-HOT
 REF 85.0 dBμV ATTEN 10 dB

hp

10 dB/

OFFSET
10.0
dB

DL
48.0
dBμV



START 450 kHz RES BW 100 kHz VBW 300 kHz SWP 150 sec STOP 1.70 MHz

Customer:	N.A.T.S. (Knogo)
Test Sample:	RFID System with Door Frame Antenna
Model No:	CRIADS XYZ
Test Method:	FCC 15.207(a) Conducted Emissions
Notes:	Lead Tested: Hot Detector: Quasi-Peak
Date:	April 17, 1998
Tech:	Dennis Cortes
Sheet	1 of 6



Retlif Testing Laboratories

Report No. R-7513

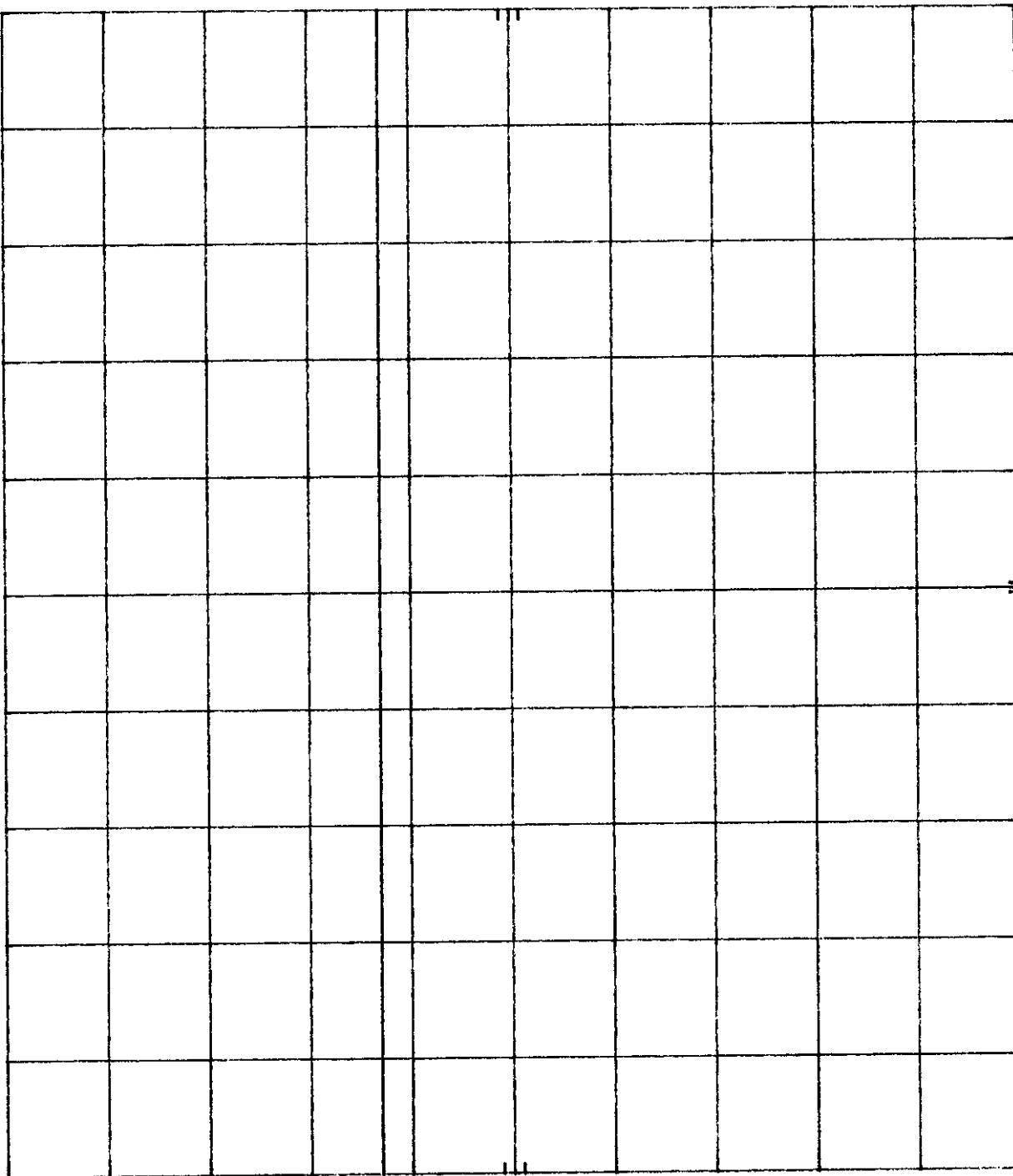
R-7513 CRIADS XYZ FCC15.207a CE DC 4/17/98 LEAD-NEUTRAL
 REF 85.0 dBμV ATTEN 10 dB

hp

10 dB/

OFFSET
 10.0
 dB

DL
 48.0
 dBμV



START 450 kHz RES BW 100 kHz VBW 300 kHz STOP 1.70 MHz SWP 150 sec

Customer:	N.A.T.S. (Knogo)
Test Sample:	RFID System with Door Frame Antenna
Model No:	CRIADS XYZ
Test Method:	FCC 15.207(a) Conducted Emissions
Notes:	Lead Tested: Neutral Detector: Quasi-Peak
Date:	April 17, 1998
Tech:	Dennis Cortes
Sheet:	2 of 6



Retlif Testing Laboratories

Report No. R-7513

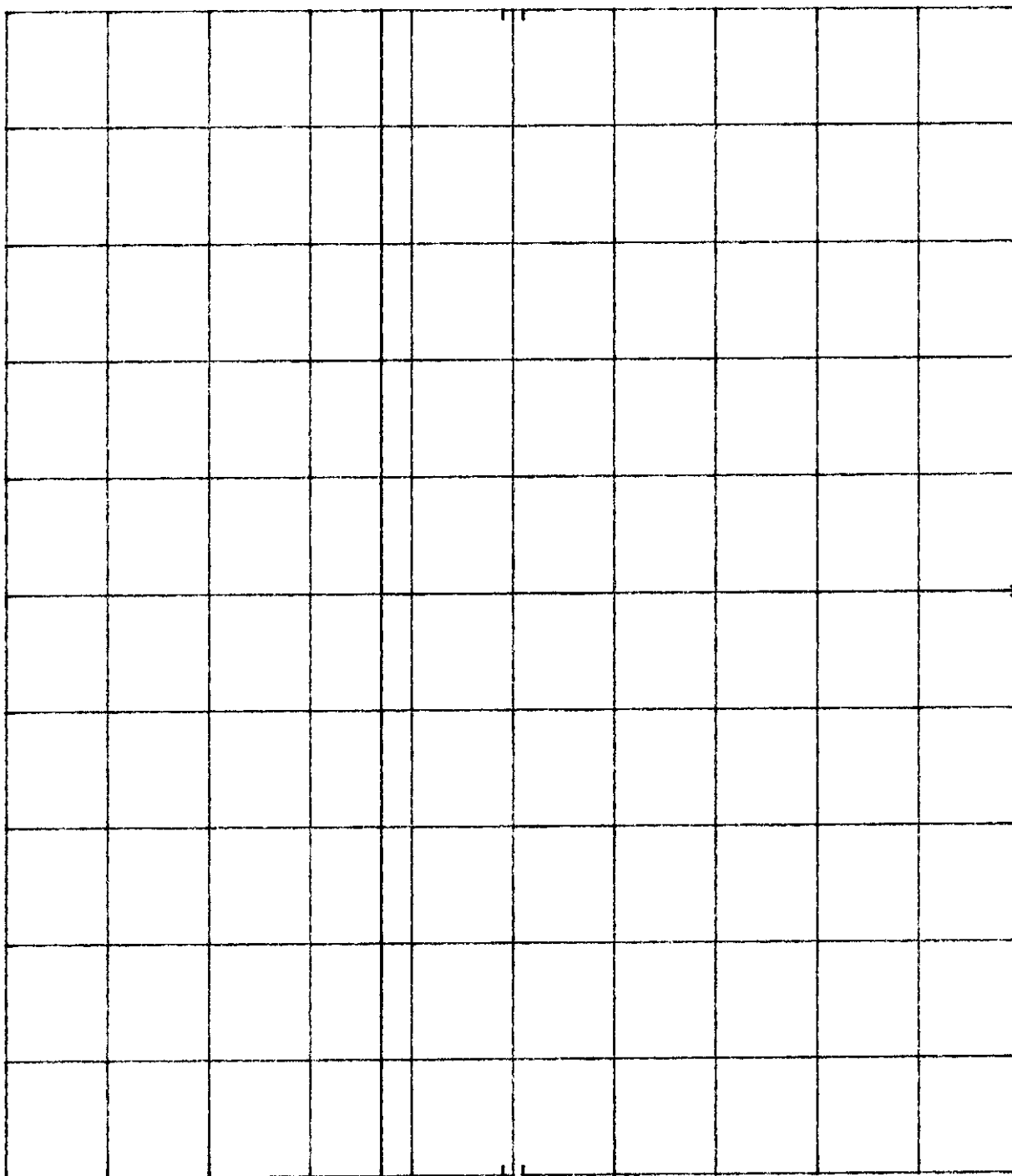
R-7513 CRIADS XYZ FCC15.207a CE DC 4/17/98 LEAD-HOT

h₀

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:	N.A.T.S. (Knogo)		
Test Sample:	RFID System with Door Frame Antenna		
Model No:	CRIADS XYZ		
Test Method:	FCC 15.207(a) Conducted Emissions		
Notes:	Lead Tested: Hot		
	Detector: Peak		
Date:	April 17, 1998	Tech:	Dennis Cortes
Sheet	3	of	6



Retlif Testing Laboratories

Report No. R-7513

R-7513 CRIADS XYZ FCC15.207a CE DC 4/17/98 LEAD-NEUTRAL
 REF 85.0 dBμV ATTEN 10 dB

hp

10 dB/

OFFSET

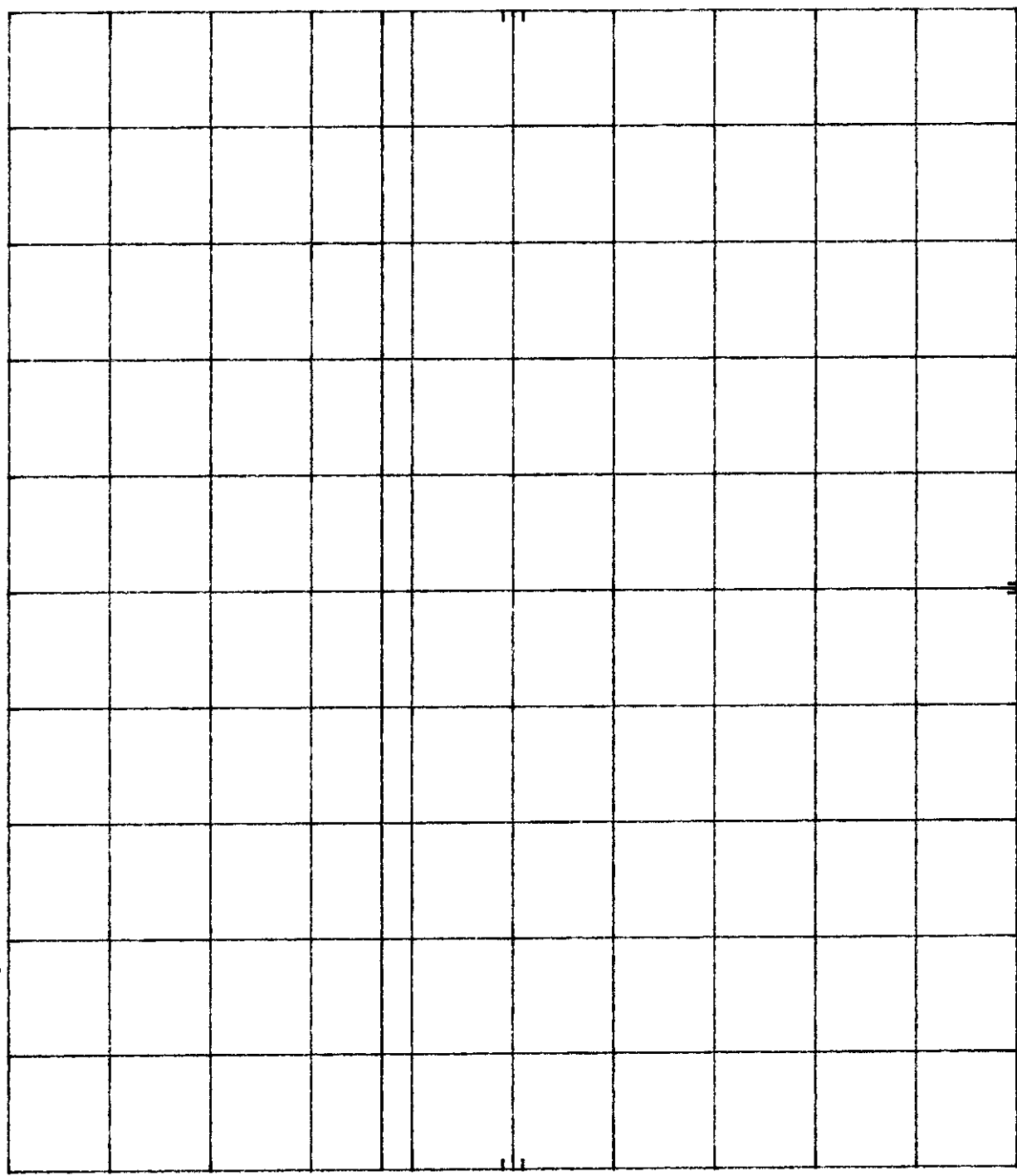
10.0

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:	N.A.T.S. (Knogo)		
Test Sample:	RFID System with Door Frame Antenna		
Model No.:	CRIADS XYZ		
Test Method:	FCC 15.207(a) Conducted Emissions		
Notes:	Lead Tested: Neutral		
	Detector: Peak		
Date:	April 17, 1998	Tech:	Dennis Cortes
Sheet:	4	of	6

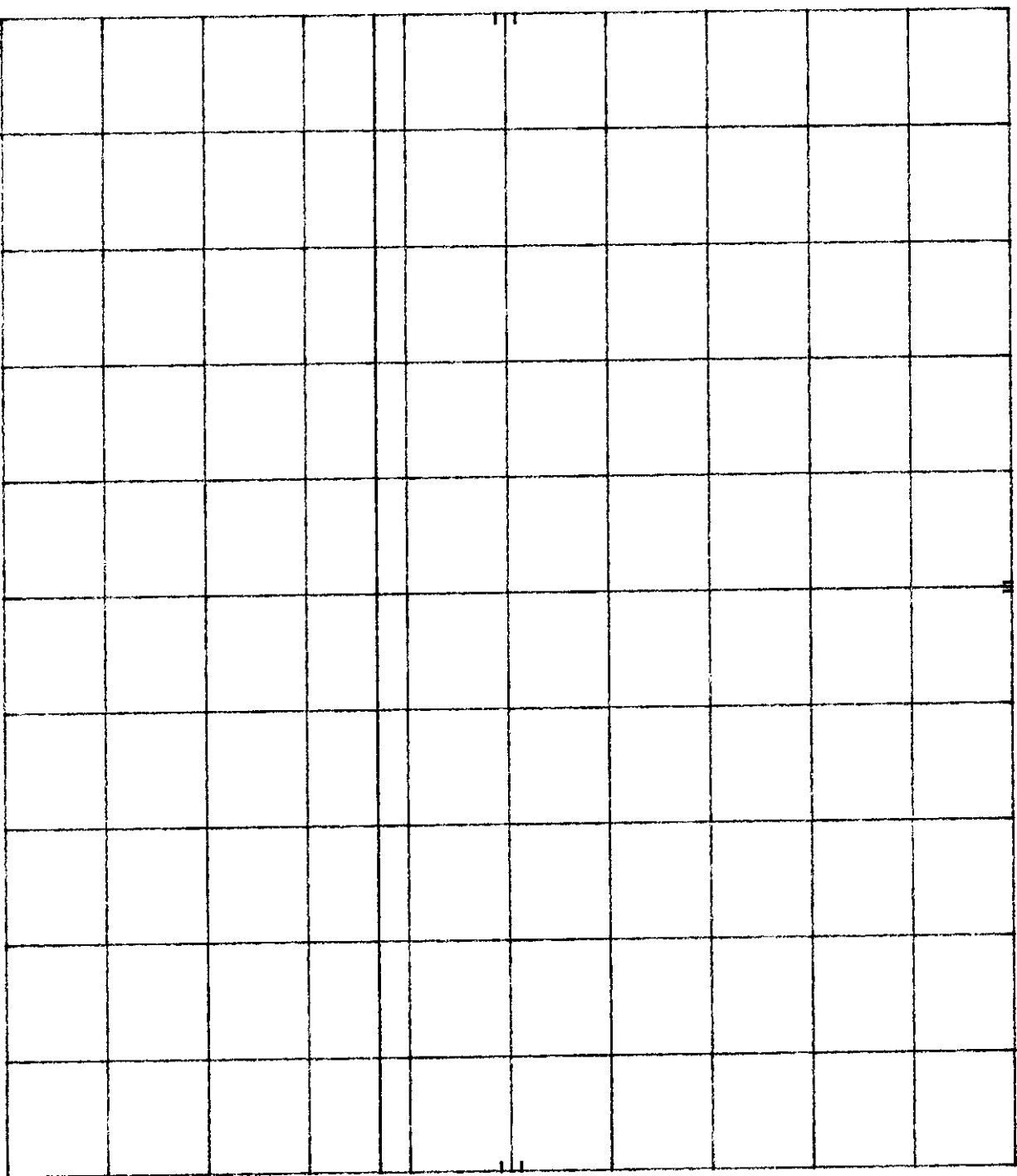


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Report No. R-7513

R-7513 CRIADS XYZ FCC15.207a CE DC 4/17/98 LEAD-HOT

hp 10 dB/
 OFFSET 10.0 dB
 DL 48.0 dBμV



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

Customer:	N.A.T.S. (Knogo)			
Test Sample:	RFID System with Door Frame Antenna			
Model No.:	CRIADS XYZ			
Test Method:	FCC 15.207(a) Conducted Emissions			
Notes:	Lead Tested: Hot			
	Detector: Peak			
Date:	April 17, 1998	Tech:	Dennis Cortes	Sheet 5 of 6



Retlif Testing Laboratories

Report No. R-7513

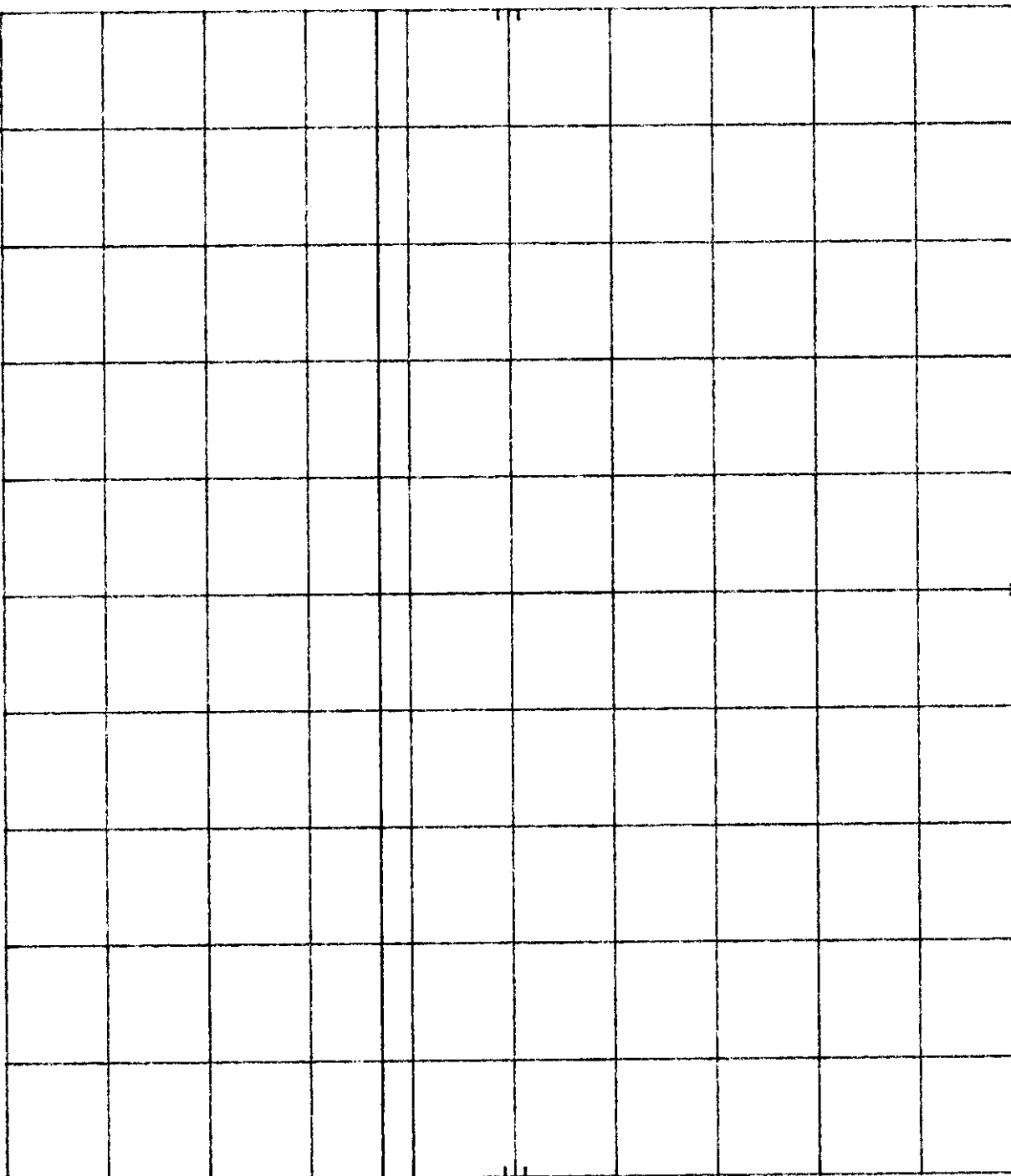
R-7513 CRIADS XYZ FCC15.207a CE DC 4/17/98 LEAD-NEUTRAL
 REF 85.0 dBμV ATTEN 10 dB

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:	N.A.T.S. (Knogo)		
Test Sample:	RFID System with Door Frame Antenna		
Model No.:	CRIADS XYZ		
Test Method:	FCC 15.207(a) Conducted Emissions		
Notes:	Lead Tested: Neutral		
	Detector: Peak		
Date:	April 17, 1998	Tech:	Dennis Cortes
Sheet	6	of	6



Retlif Testing Laboratories

Report No. R-7513

MODEL CRIAMS XYZ

REPORT OF MEASUREMENTS

Radiated Emissions Test Data, Fundamental and Harmonics Para. 15.209(a)



Retlif Testing Laboratories

Test Report No. R-7513-1
FCC ID: JHD-CEN1

RETLIF TESTING LABORATORIES

TABULAR DATA SHEET

TEST METHOD:	FCC Part 15 Radiated Emissions, 9 KHz to 200 MHz		
CUSTOMER:	N.A.T.S. (Knogo North America)	JOB No.:	R-7513
TEST SAMPLE:	RFID system FCC ID: JHD-CEN1		
MODEL No.:	CR1AMS XYZ	SERIAL No.:	N/A
TEST SPECIFICATION:	FCC Part 15, Subpart C PARAGRAPH: 15.209(a)		
OPERATING MODE:	Continuously Transmitting 153.6 KHz Signal		
TECHNICIAN:	Dennis Cortes	DATE:	4-17-98
NOTES:	Detector Function: Quasi-Peak except for (110KHz-490KHz measured in peak) Test Distance: Below 30 Mhz= 10 Meters (30-200) Mhz= 3 Meters		

Test Frequency	Antenna Position	Turntable Position	Meter Reading	Correction Factor	Test Distance Correction fact	Corrected Reading	Converted Reading	Limit
MHz	(H/V/C)-Height	Degrees	dBuV	dB	dB	dBuV/m	uV/m	uV/m
009								266.7
V								
150	C-1.0	180	61.7	-9.5	-59.0	-6.8	0.5	
V								V
490								4.9
490								48.9
V								V
1.705								14.0
1.705								30.0
V								
29.49	C-1.0	225	53.5	-11.7	-19.0	22.8	13.8	
V								V
30.00								30
30.00								100
V								
33.90	V-1.0	158	37.5	-7.5	0.0	30.0	31.6	
39.30	V-1.0	180	35.6	-9.0	0.0	26.6	21.4	
44.20	V-1.4	158	36.5	-10.5	0.0	26.0	20.0	
58.92	V-1.0	225	34.0	-12.7	0.0	21.3	11.6	
73.80	V-1.0	203	34.4	-10.9	0.0	23.5	15.0	
V								V
88.00								100
88.00								150
V								
165.00	V-1.0	180	27.3	-9.1	0.0	18.2	8.1	
194.12	V-1.0	158	28.5	-8.3	0.0	20.2	10.2	
198.53	V-1.0	180	28.1	-8.2	0.0	19.9	9.9	
V								V
200.00	The frequency range was scanned from 9 KHz to 200 MHz. All emissions not recorded were more than 10dB below the specified limit. Emissions observed from the EUT do not exceed the specified limit.							150

MODEL CR1AMS XYZ

REPORT OF MEASUREMENTS

Conducted Emissions Test Data, Para. 15.207(a)



Retlif Testing Laboratories

Test Report No. R-7513-1
FCC ID: JHD-CEN1

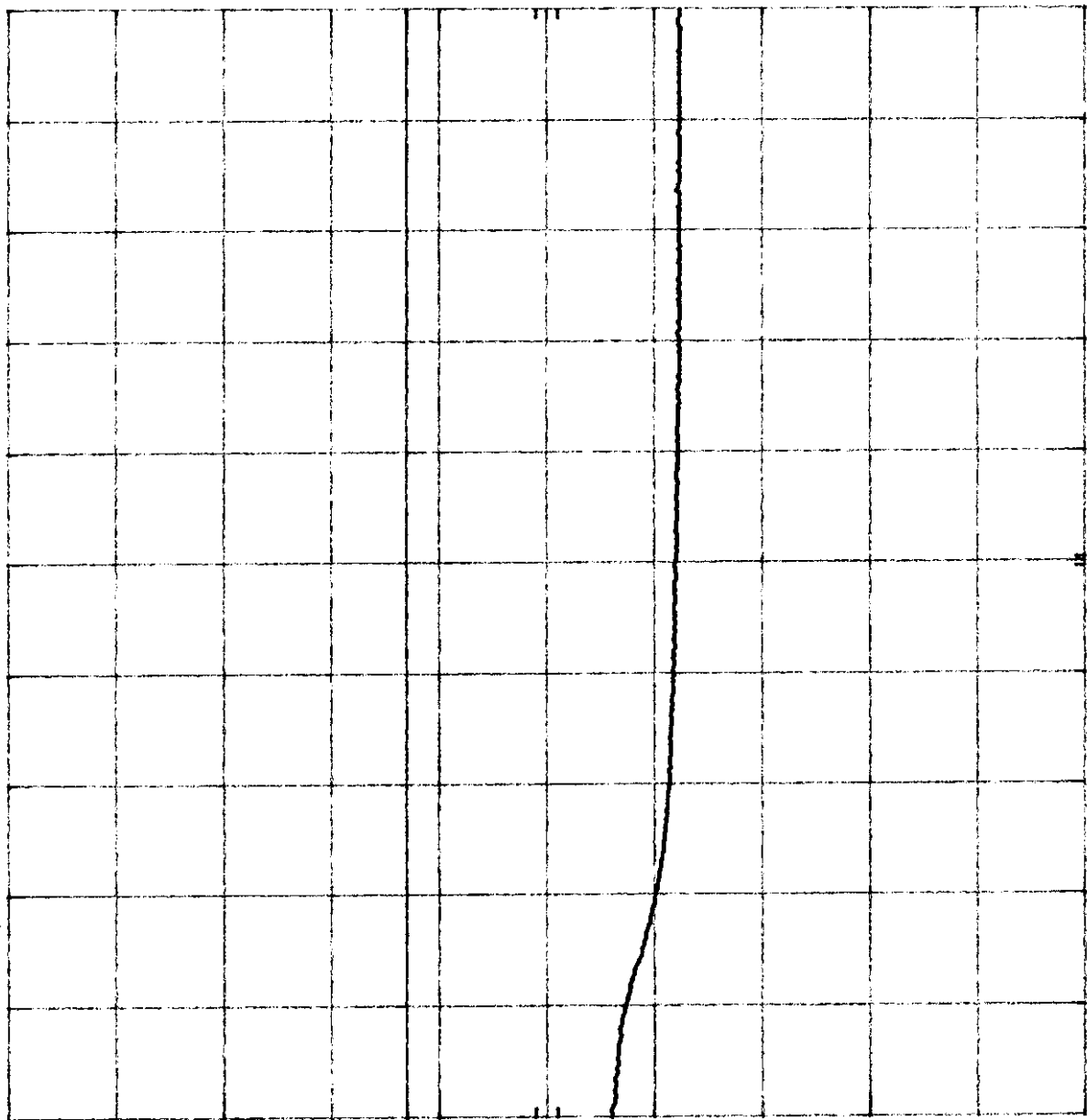
R-7513 KNOGO CR1AMS XYZ 15.207(a) CE TS 4/20/98 Lead- Hot
 REF 85.0 dBμV ATTEN 10 dB

hp

10 dB/

OFFSET
10.0
dB

DL
48.0
dBμV



START 450 kHz RES BW 900 kHz VBW 300 kHz STOP 1.70 MHz SWP 130 sec

Customer:	NATS (KNOGO North America)				
Test Sample:	RF ID Transmitter				
Model No.:	CR1AMS XYZ, FCC ID: JHD-CEN1				
Test Method:	FCC 15.207(a), AC Line Conducted Emissions				
Notes:	Lead- Hot				
	Detector- Quasi-Peak				
Date:	April 21, 1998	Tech:	T. Schneider	Sheet	1 of 6



Retlif Testing Laboratories

Report No. R-7513

R-7513 KNOGO CR1AMS XYZ 15.207(a) CE TS 4/20/98 Lead-Neutral

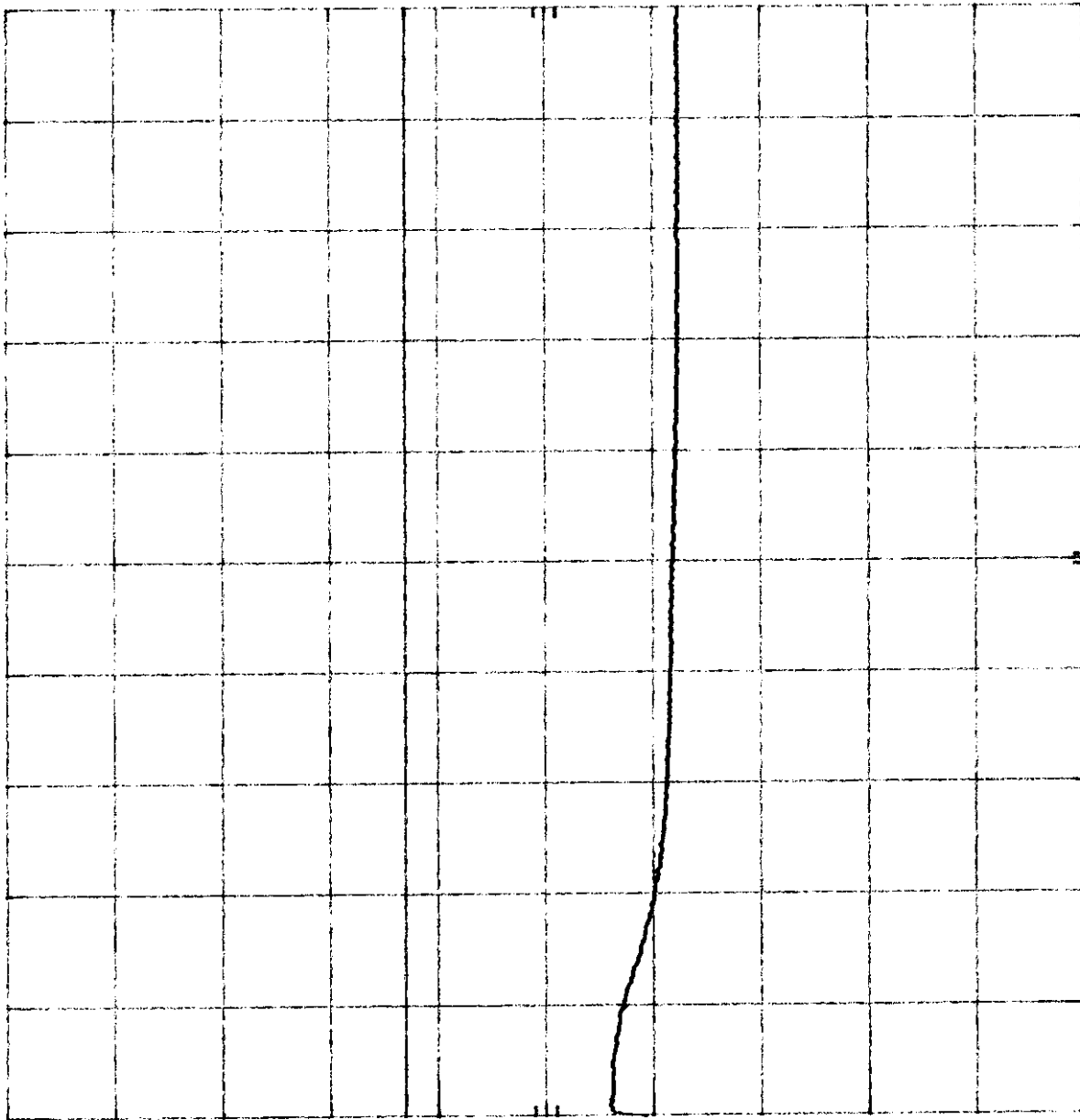
REF 85.0 dBμV ATTN 10 dB

hp

10 dB/

OFFSET
10.0
dB

DL
48.0
dBμV



START 450 kHz RES BW 900 kHz VBW 300 kHz STOP 1.70 MHz SWP 130 sec

Customer:	NATS (KNOGO North America)				
Test Sample:	RF ID Transmitter				
Model No:	CR1AMS XYZ, FCC ID: JHD-CEN1 ⁴				
Test Method:	FCC 15.207(a), AC Line Conducted Emissions				
Notes:	Lead- Neutral				
	Detector- Quasi-Peak				
Date:	April 21, 1998	Tech:	T. Schneider	Sheet:	2 of 6



Retlif Testing Laboratories

Report No. R-7513

R-7513 KNOGO CR1AMS XYZ 15.207 (a) CE TS 4/20/98 Lead- Hot

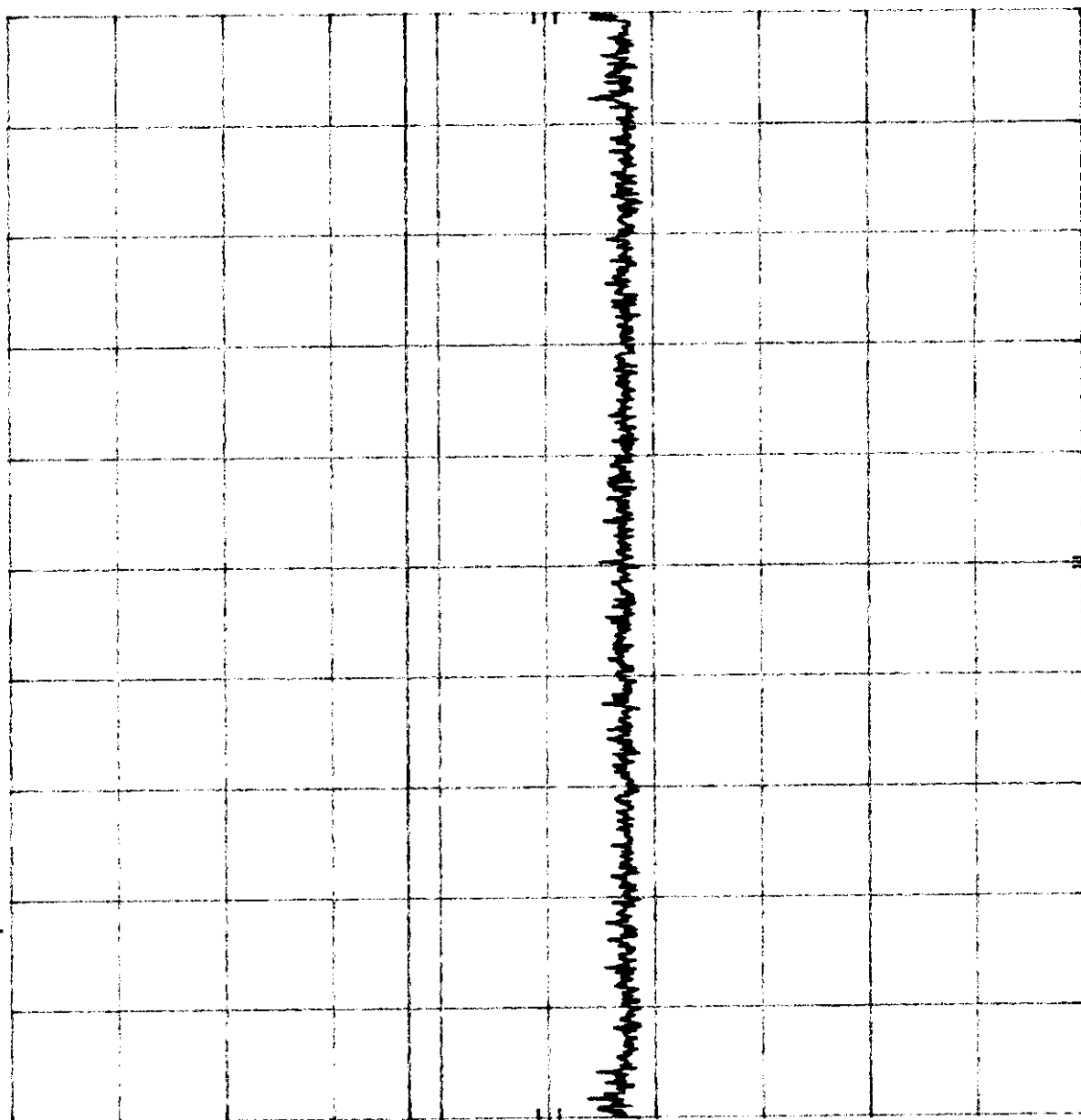
REF 85.0 dBμV ATTEN 10 dB

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:	NATS (KNOGO North America)
Test Sample:	RF ID Transmitter
Model No.:	CR1AMS XYZ, FCC ID: JHD-CEN 1
Test Method:	FCC 15.207(a), AC Line Conducted Emissions
Notes:	Lead- Hot Detector- Peak
Date:	April 21, 1998
Tech:	T. Schneider
Sheet:	3 of 6



Retlif Testing Laboratories

Report No. R-7513

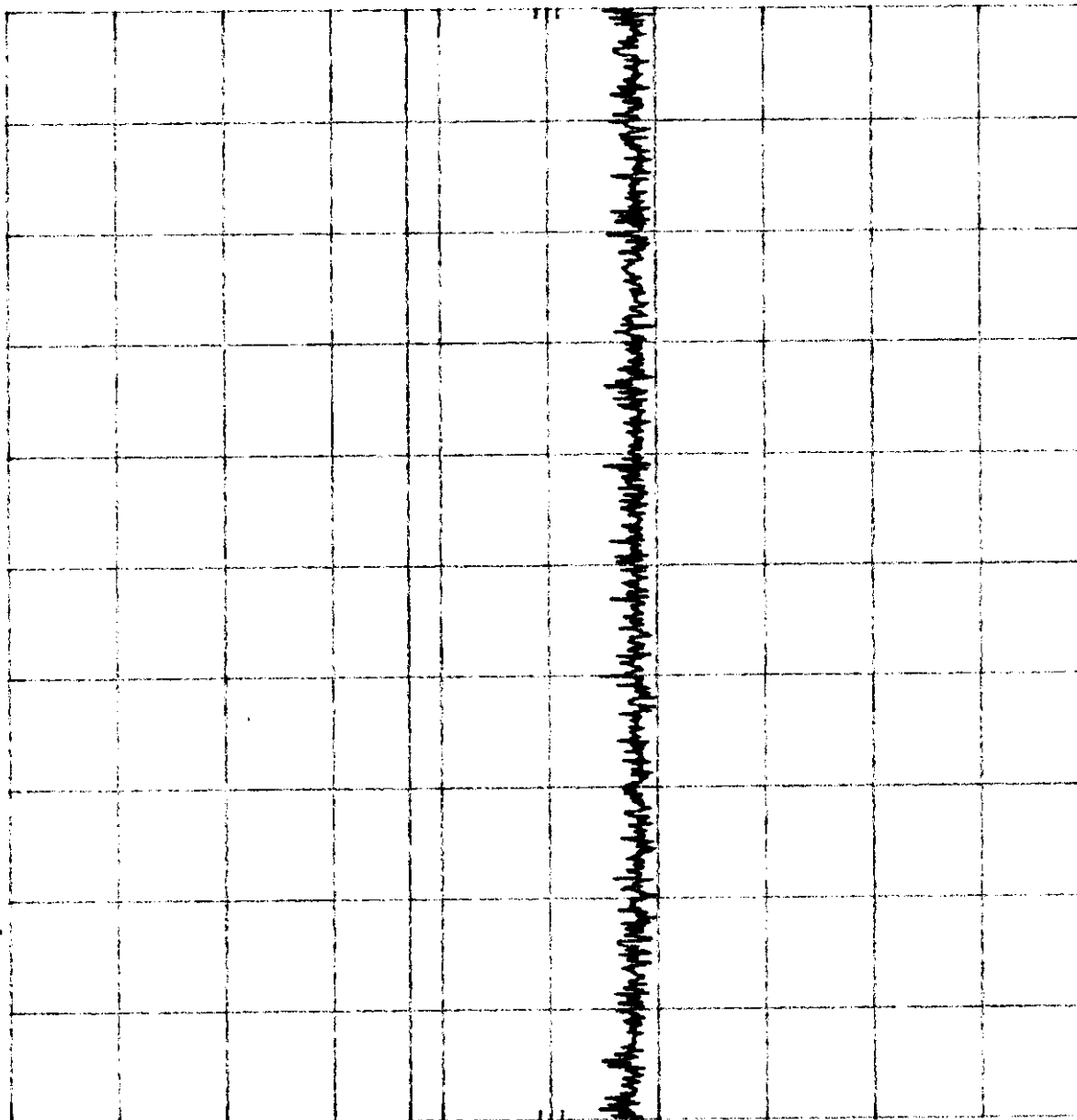
R-7513 KNOGO CR1AMS XYZ 15.207 (a) CE TS 4/20/98 Lead-Neutral
 REF 85.0 dBμV ATTEN 10 dB

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: NATS (KNOGO North America)
 Test Sample: RF ID Transmitter
 Model No.: CR1AMS XYZ, FCC ID: JHD-CEN1
 Test Method: FCC 15.207(a), AC Line Conducted Emissions
 Notes: Lead-Neutral
 Detector- Peak

Date: April 21, 1998 Tech: T. Schneider Sheet 4 of 6



Retlif Testing Laboratories

Report No. R-7513

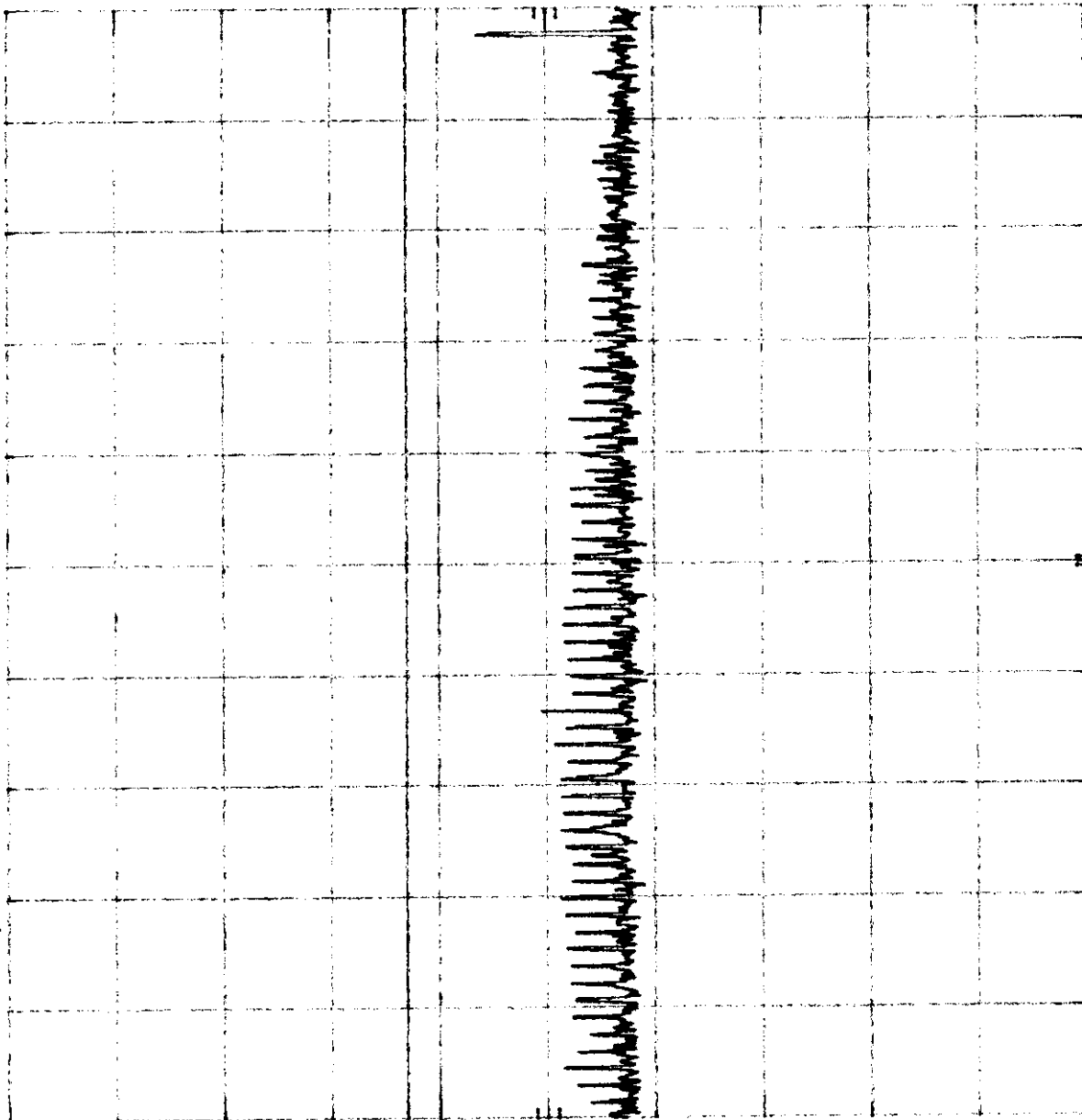
R-7513 KNOGO CR1AMS XYZ 15.207 (a) CE TS 4/20/98 Lead- Hot
 REF 85.0 dBμV ATTEN 10 dB

10 dB/

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:	NATS (KNOGO North America)			
Test Sample:	RF ID Transmitter			
Model No.:	CR1AMS XYZ, FCC ID: JHD-CEN1			
Test Method:	FCC 15.207(a), AC Line Conducted Emissions			
Notes:	Lead- Hot			
	Detector- Peak			
Date:	April 21, 1998	Tech:	T. Schneider	Sheet: 5 of 6



Retlif Testing Laboratories

Report No. R-7513

R-7513 KNOGO CR1AMS XYZ 15.207(a) CE TS 4/20/98 Lead-Neutral

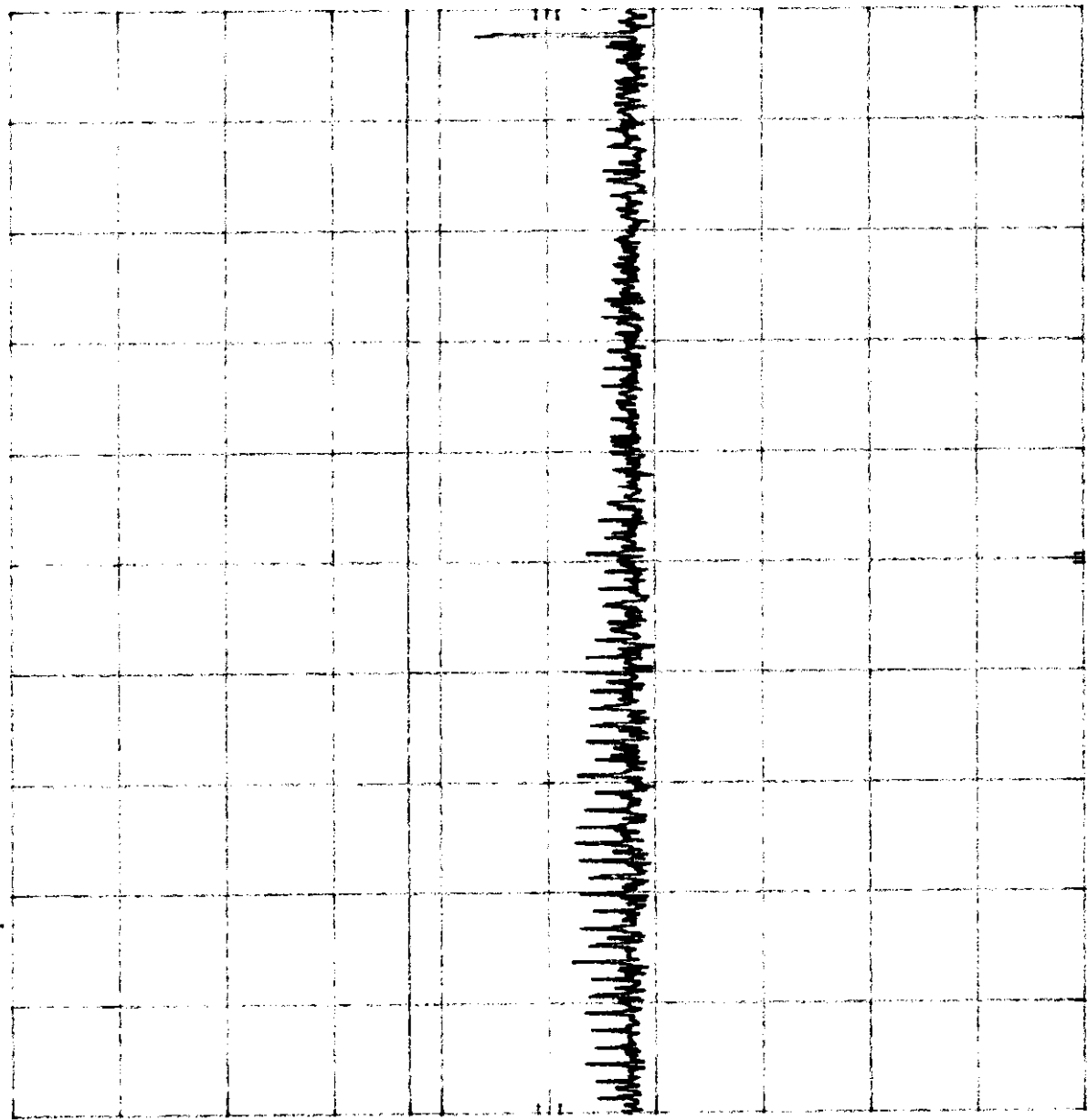
REF 85.0 dBμV ATTEN 10 dB

hp

10 dB/

OFFSET
10.0
dB

DL
48.0
dBμV



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

Customer:	NATS (KNOGO North America)			
Test Sample:	RF ID Transmitter			
Model No:	CR1AMS XYZ, FCC ID: JHD-CEN 1			
Test Method:	FCC 15.207(a), AC Line Conducted Emissions			
Notes:	Lead- Neutral			
	Detector- Peak			
Date:	April 21, 1998	Tech:	T. Schneider	Sheet 6 of 6



Retliff Testing Laboratories

Report No. R-7513

MODEL CR1ADS1 XYZ

REPORT OF MEASUREMENTS

Radiated Emissions Test Data, Fundamental and Harmonics Para. 15.209(a)



Retlif Testing Laboratories

Test Report No. R-7513-1
FCC ID: JHD-CEN1

RETLIF TESTING LABORATORIES

TABULAR DATA SHEET

TEST METHOD:	FCC Part 15 Radiated Emissions, 9 KHz to 200 MHz		
CUSTOMER:	N.A.T.S. (Knogo North America)	JOB No.:	R-7513
TEST SAMPLE:	RFID system FCC ID: JHD-CEN1		
MODEL No.:	CRIADS1 XYZ	SERIAL No.:	N/A
TEST SPECIFICATION:	FCC Part 15, Subpart C PARAGRAPH: 15.209(a)		
OPERATING MODE:	Continuously Transmitting 153.6 KHz Signal		
TECHNICIAN:	Dennis Cortes	DATE:	4-17-98
NOTES:	Detector Function: Quasi-Peak except for (110KHz-490KHz measured in peak) Test Distance: Below 30 Mhz= 10 Meters (30-200) Mhz= 3 Meters		

Test Frequency	Antenna Position	Turntable Position	Meter Reading	Correction Factor	Test Distance Correction fact.	Corrected Reading	Converted Reading	Limit
MHz	(H/V/C)-Height	Degrees	dBuV	dB	dBuV	dBuV/m	uV/m	uV/m
009								266.7
V								
149	C-1.0	180	57.0	-9.5	-59.0	-11.5	0.3	
V								V
490								4.9
490								48.9
1.705								14.0
1.705								30.0
V								
29.50	C-1.0	203	45.3	-11.7	-19.0	14.6	5.4	
								V
30.00								30
30.00								100
31.00	V-1.0	203	36.6	-6.8	0.0	29.8	30.9	
44.20	V-1.5	135	43.3	-10.3	0.0	33.0	44.7	
59.00	V-1.2	248	48.3	-12.7	0.0	35.6	60.3	
68.90	V-1.0	180	34.3	-11.3	0.0	23.0	14.1	
73.72	V-1.0	113	37.4	-10.9	0.0	26.5	21.1	
								V
88.00								100
88.00								150
109.00	V-1.0	113	35.1	-11.6	0.0	23.5	15.0	
111.50	V-1.0	203	36.5	-11.6	0.0	24.9	17.6	
116.60	V-1.0	203	36.1	-11.4	0.0	24.7	17.2	
117.90	V-1.0	270	38.1	-11.4	0.0	26.7	21.6	
129.60	V-1.0	158	31.0	-10.3	0.0	20.7	10.8	
132.70	V-1.0	158	33.6	-9.8	0.0	23.8	15.5	
134.30	V-1.0	158	33.5	-9.5	0.0	24.0	15.8	
140.00	V-1.0	203	31.3	-8.3	0.0	23.0	14.1	
V								V
200.00	The frequency range was scanned from 9 KHz to 200 MHz. All emissions not recorded were more than 10dB below the specified limit. Emissions observed from the EUT do not exceed the specified limit.							150

TABULAR DATA SHEET

FCC Part 15 Radiated Emissions, 9 KHz to 200 MHz

N.A.T.S. (Knogo North America)

JOB No :

R-7513

RFID system

FCC ID: JHD-CEN1

CR1ADS XYZ

SERIAL No.:

N/A

FCC Part 15, Subpart C

PARAGRAPH:

15.209(a)

Continuously Transmitting 153.6 Khz Signal

1

Dennis Cortes

DATE-

4-17-98

Detector Function: Peak

Test Distance correction factor = -59.0 dB

Test Distance: 10 Meters

Worst Case Duty Cycle = 24.0 % (Duty Cycle Correction factor = -12.4 dB)

[illegible]

MODEL CR1ADS1 XYZ

REPORT OF MEASUREMENTS

Conducted Emissions Test Data, Para. 15.207(a)



Retlif Testing Laboratories

Test Report No. R-7513-1
FCC ID: JHD-CEN1

R-7513 KNOGO CR1ADS1 XYZ 15.207(a) CE TS Lead- Hot

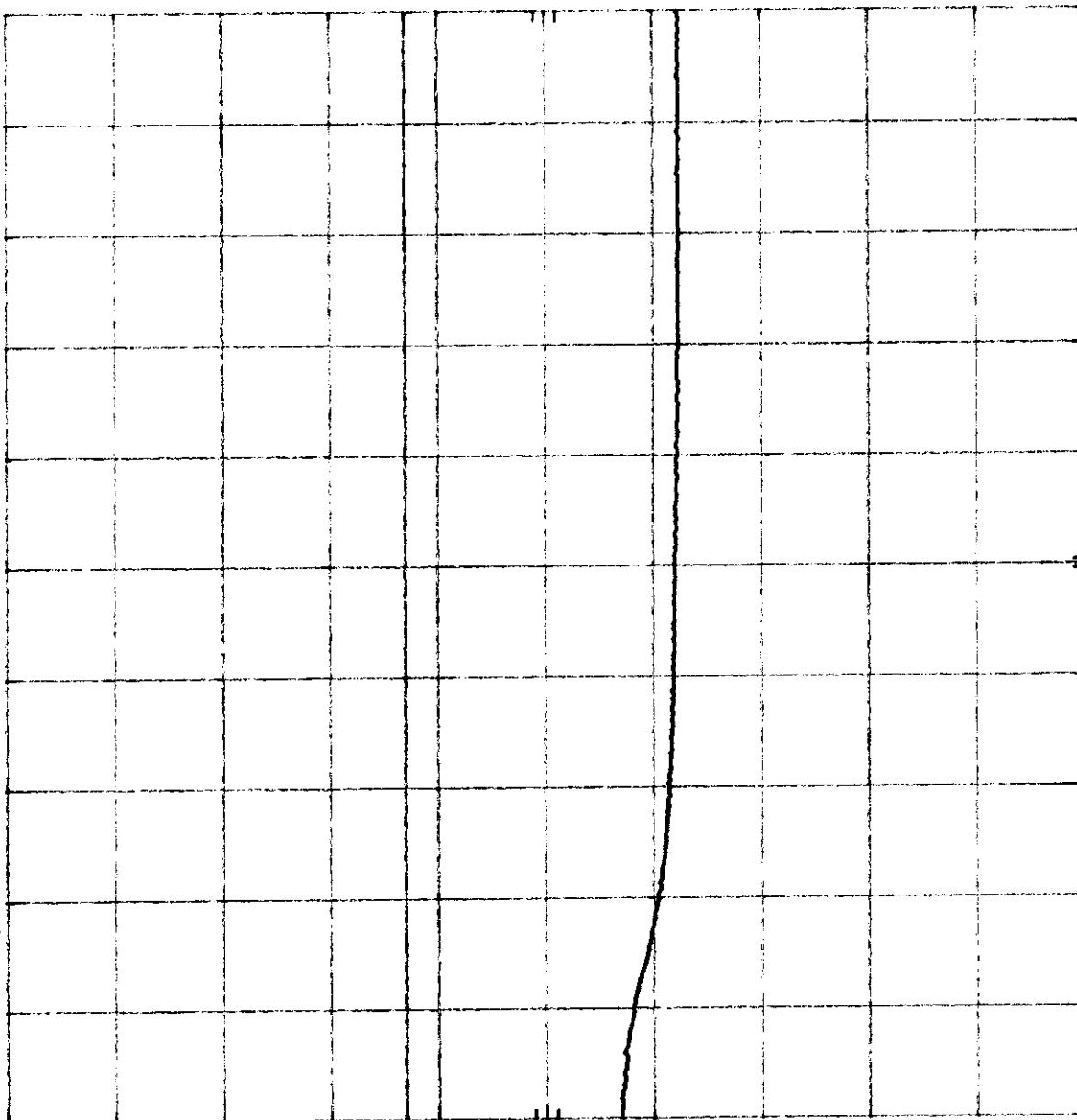
REF 85.0 dB μ V ATTEN 10 dB

hp

10 dB/

OFFSET
10.0
dB

DL
48.0
dB μ V



START 450 kHz RES BW 900 kHz VBW 300 kHz STOP 1.70 MHz SWP 130 sec

Customer: NATS (KNOGO North America)
Test Sample: RF ID Transmitter
Model No.: CR1ADS 1 XYZ, FCC ID: JHD-CEN1
Test Method: FCC 15.207(a), AC Line Conducted Emissions
Notes: Lead- Hot
Detector: Quasi-Peak

Date: April 21, 1998 Tech: T. Schneider Sheet 1 of 6



Retlif Testing Laboratories

Report No. R-7513

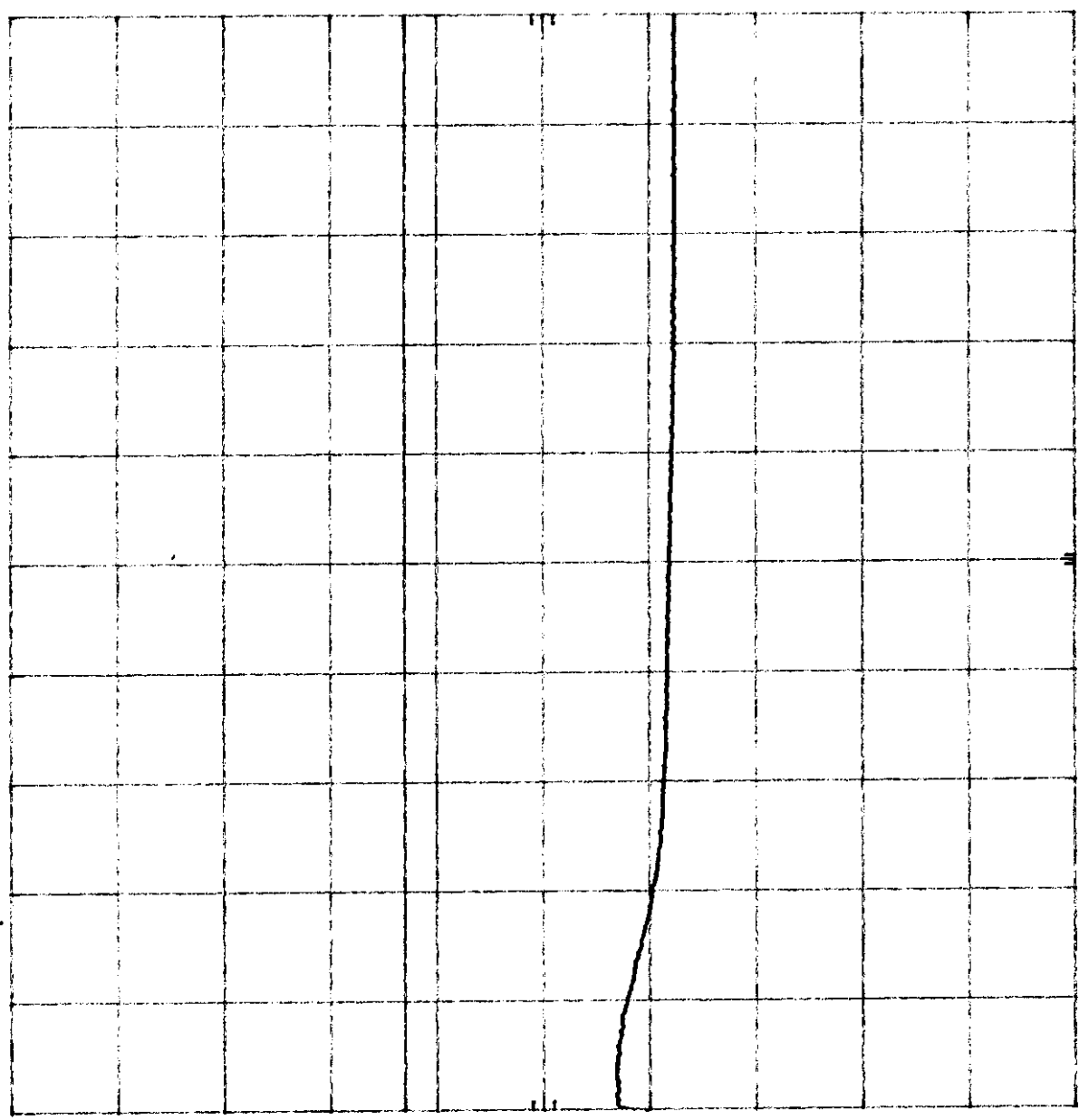
R-7513 KNOGO CR1ADS1 XYZ 15.207(a) CE TS Lead-Neutral
 REF 85.0 dBμV ATTEN 10 dB

hp

10 dB/

OFFSET
10.0
dB

DL
48.0
dBμV



START 450 kHz RES BW 900 kHz VBW 300 kHz STOP 1.70 MHz SWP 130 sec

Customer:	NATS (KNOGO North America)		
Test Sample:	RF ID Transmitter		
Model No:	CR1ADS 1 XYZ, FCC ID: JHD-CEN1		
Test Method:	FCC 15.207(a), AC Line Conducted Emissions		
Notes:	Lead- Neutral Detector- Quasi-Peak		
Date:	April 21, 1998	Tech:	T. Schneider
Sheet	2	of	6



Retlif Testing Laboratories

Report No. R-7513

R-7513 KNOGO CR1ADS1 XYZ 15.207(a) CE TS Lead- Hot

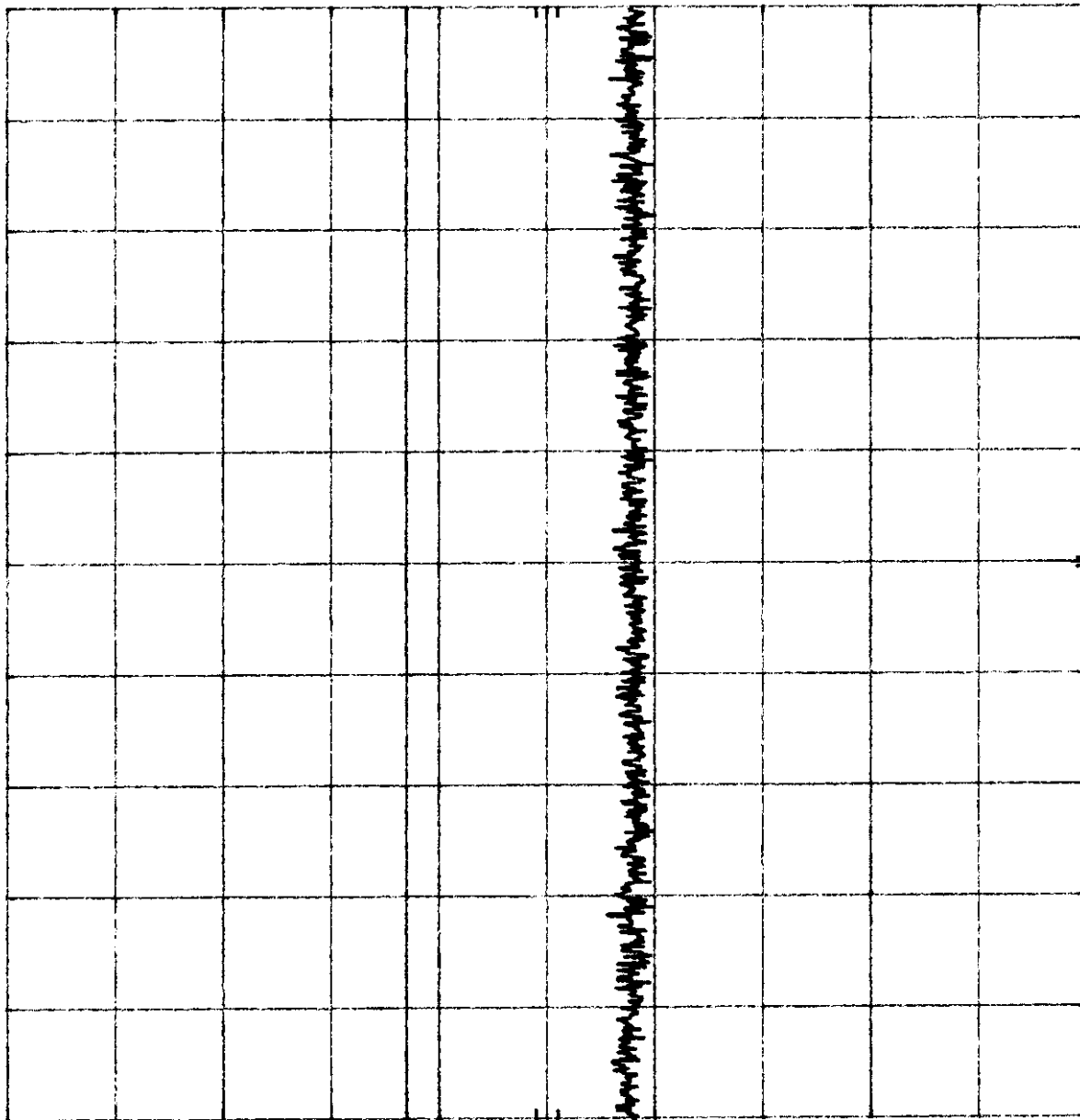
REF 85.0 dBμV ATTN 10 dB

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:	NATS (KNOGO North America)
Test Sample:	RF ID Transmitter
Model No:	CR1ADS 1 XYZ, FCC ID: JHD-CEN1
Test Method:	FCC 15.207(a), AC Line Conducted Emissions
Notes:	Lead- Hot Detector- Peak
Date:	April 21, 1998
Tech:	T. Schneider
Sheet:	3 of 6



Retlif Testing Laboratories

Report No. R-7513

R-7513 KNOGO CR1ADS1 XYZ 15.207(a) CE TS Lead-Neutral

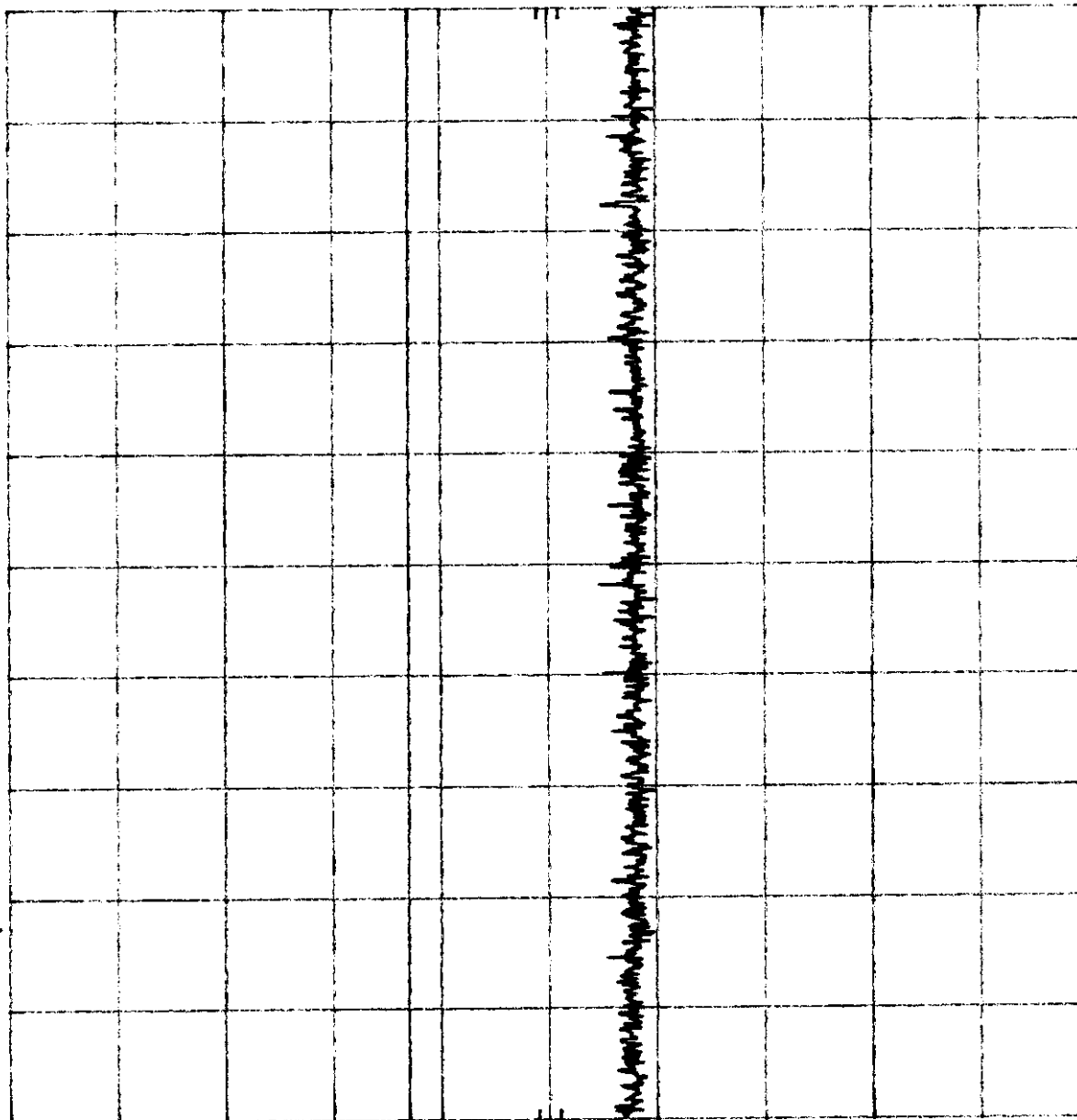
REF 85.0 dBμV ATTEN 10 dB

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:	NATS (KNOGO North America)		
Test Sample:	RF ID Transmitter		
Model No.:	CR1ADS1 XYZ, FCC ID: JHD-CEN1		
Test Method:	FCC 15.207(a), AC Line Conducted Emissions		
Notes:	Lead- Neutral		
	Detector- Peak		
Date:	April 21, 1998	Tech:	T. Schneider
Sheet	4	of	6



Retlif Testing Laboratories

Report No. R-7513

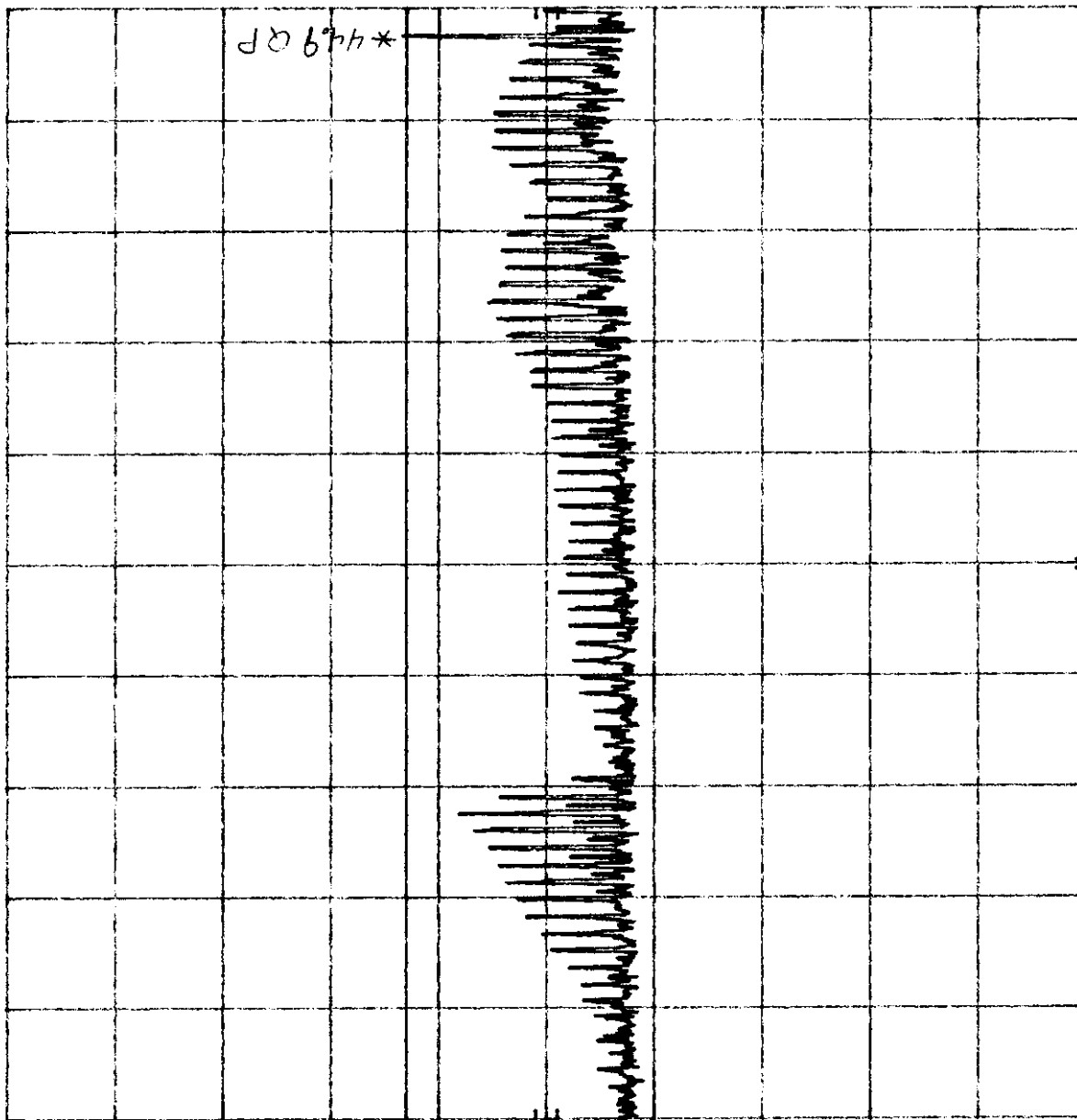
R-7513 KNOGO CR1ADS1 XYZ 15.207(a) CE TS Lead- Hot
 REF 85.0 dBμV ATTN 10 dB

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:	NATS (KNOGO North America)
Test Sample:	RF ID Transmitter
Model No:	CR1ADS 1 XYZ, FCC ID: JHD-CEN 1
Test Method:	FCC 15.207(a), AC Line Conducted Emissions
Notes:	Lead- Hot Detector- Peak(except * = Quasi-Peak Reading)
Date:	April 21, 1998
Tech:	T. Schneider
Sheet:	5 of 6



Retlif Testing Laboratories

Report No. R-7513

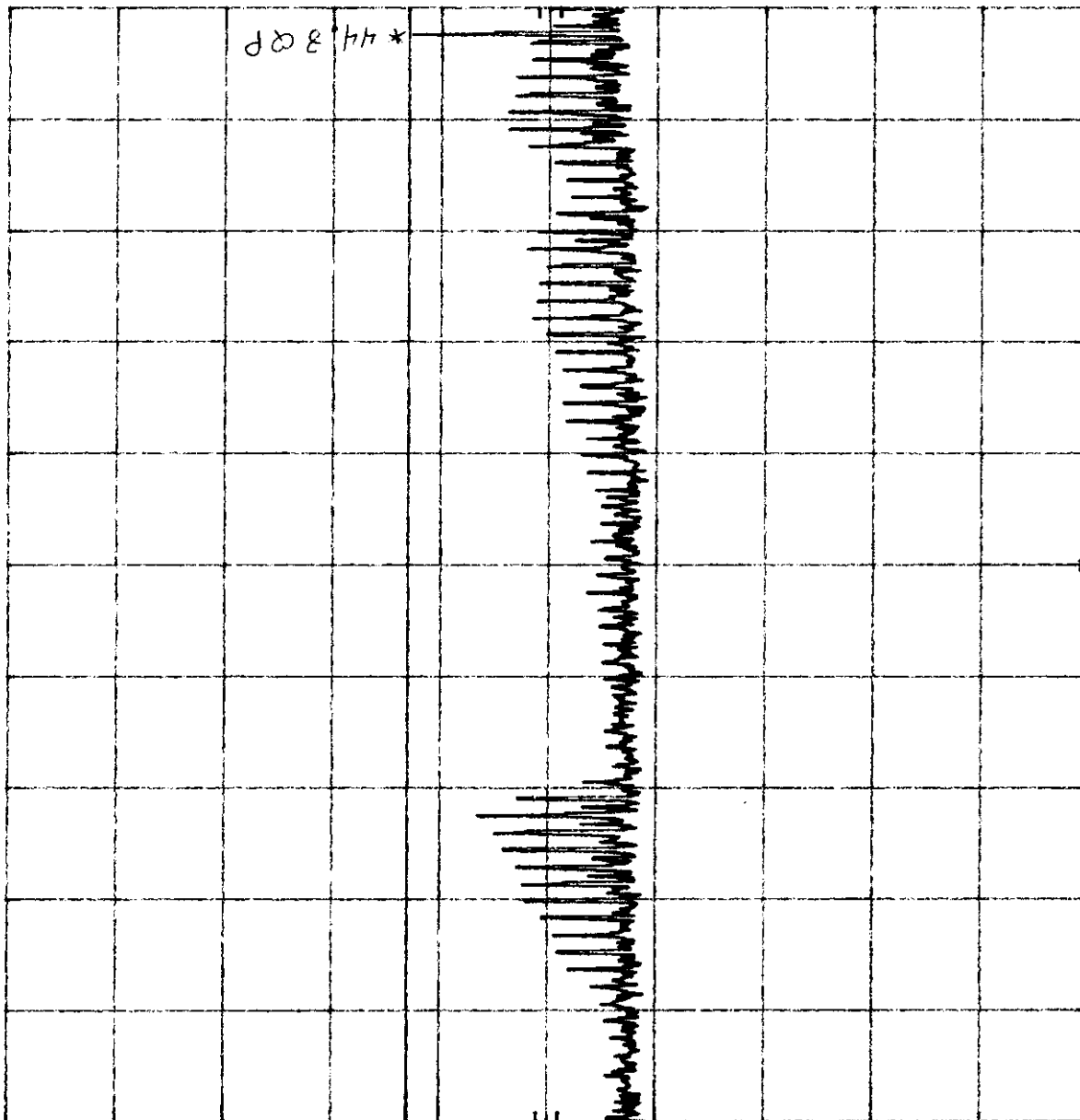
R-7513 KNOGO CRIADS1 XYZ 15.207(a) CE TS Lead- Neutral
 REF 85.0 dBμV ATTN 10 dB

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:	NATS (KNOGO North America)
Test Sample:	RF ID Transmitter
Model No:	CRIADS 1 XYZ, FCC ID: JHD-CEN1
Test Method:	FCC 15.207(a), AC Line Conducted Emissions
Notes:	Lead- Neutral
	Detector- Peak(except * = Quasi-Peak Reading)
Date:	April 21, 1998
Tech:	T. Schneider
Sheet	6 of 6



Retlif Testing Laboratories

Report No. R-7513

REPORT OF MEASUREMENTS

Duty Cycle Determination



Retlif Testing Laboratories

Test Report No. R-7513-1
FCC ID: JHD-CEN1

R-7513 KNOGO FCC15.209 RE DC D=3M 4/17/98 MKR Δ 4.500 msec
 REF 134.7 dB μ V ATTEN 40 dB

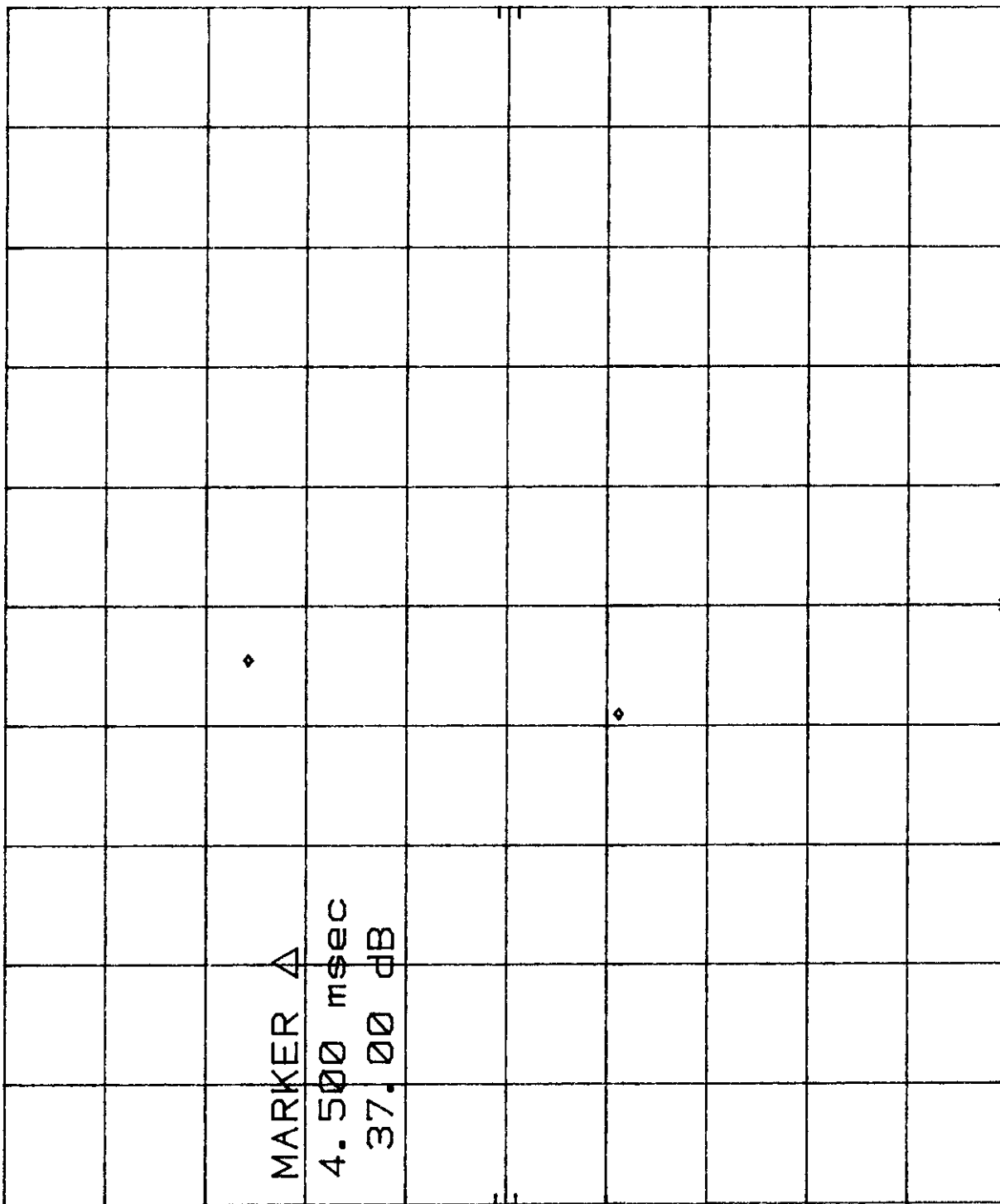
hp

10 dB/

MARKER Δ

4.500 msec

37.00 dB



CENTER 154.283 kHz

RES BW 30 kHz

VBW 100 kHz

SWP 100 msec

SPAN 0 Hz

Customer: N.A.T.S. (Knogo North America)
 Test Sample: RF ID System
 Model No: CR1A Series
 Test Method: Duty Cycle Determination
 Notes: Maximum Pulse Width = 4.5 msec.

Date: April 20, 1998 Tech: Dennis Cortes Sheet 1 of 2



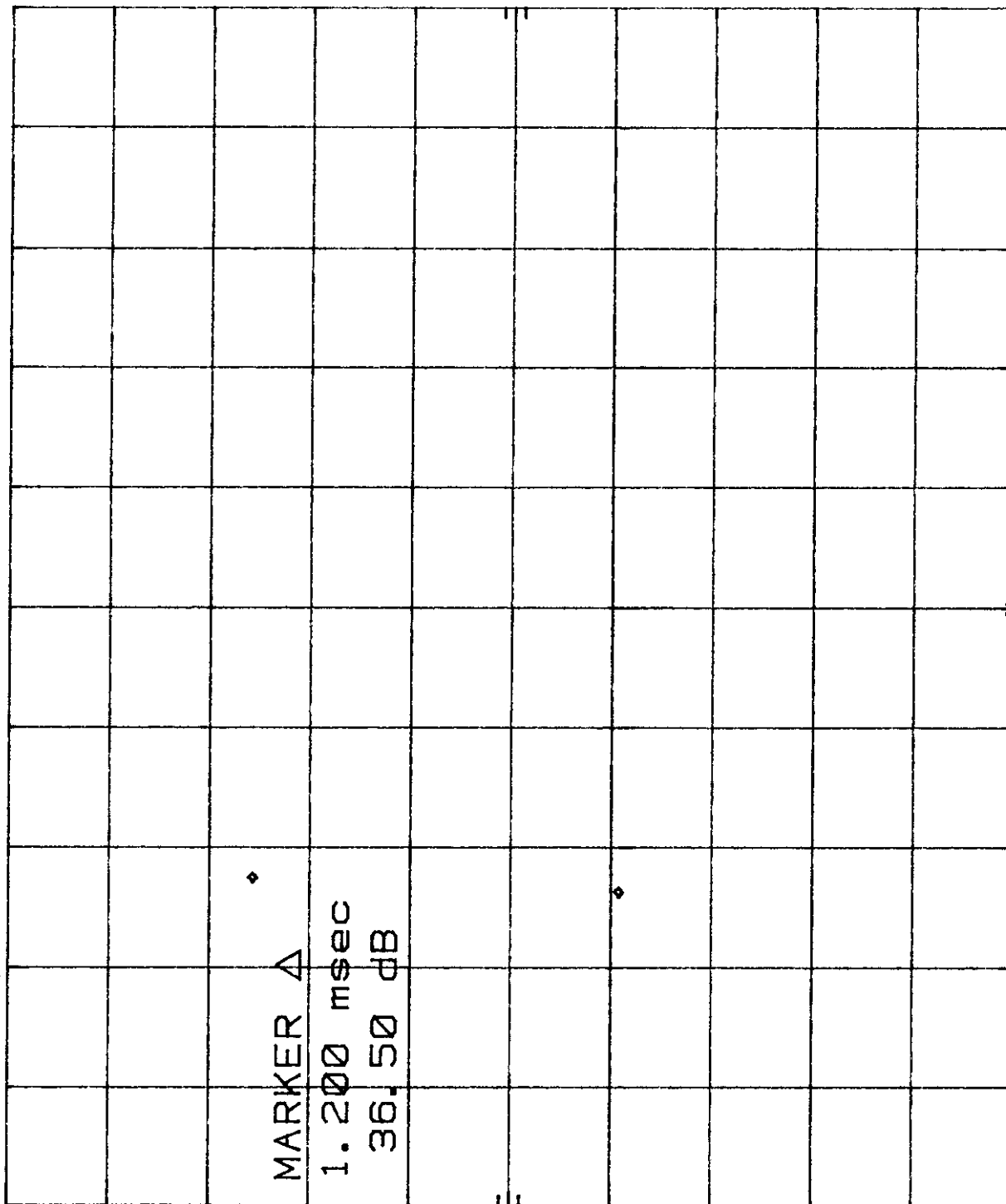
Retlif Testing Laboratories

Report No. R-7513

R-7513 KNOGO FCC15.209 RE DC D=3M 4/17/98 MKR Δ 1.200 msec
 REF 134.7 dBμV ATTEN 40 dB

hp

10 dB/



CENTER 154.283 KHz
 RES BW 30 KHz
 VBW 100 KHz
 SWP 100 msec
 SPAN 0 Hz

Customer:	N.A.T.S. (Knogo North America)
Test Sample:	RF ID System
Model No:	CR1A Series
Test Method:	Duty Cycle Determination
Notes:	Minimum Pulse Width = 1.2 msec.
Date:	April 20, 1998
Tech:	Dennis Cortes
Sheet	2 of 2



Retlif Testing Laboratories

Report No. R-7513

REPORT OF MEASUREMENTS

TEST EQUIPMENT LIST



Retlif Testing Laboratories

Test Report No. R-7513-1
FCC ID: JHD-CEN1

EQUIPMENT LIST

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



Retlif Testing Laboratories

Test Report No. R-7513-1
FCC ID: JHD-CEN1

EQUIPMENT LIST

15.209(a) Radiated Emissions

EN	Type	Manufacturer	Frequency Range	Model No.	Cal Date	Due Date
012	Loop Antenna, Active	EMCO	9 kHz - 30 MHz	6502	10/10/97	10/10/98
067	Open Area Test Site	Retlif	3 Meter	RNY	8/30/97	8/30/99
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



Retlif Testing Laboratories

Test Report No. R-7513-1
FCC ID: JHD-CEN1