

Retlif Testing Laboratories

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FCC COMPLIANCE TEST REPORT ON A

**8.2 MHZ SWEPT RF
TRANSMITTER/RECEIVER
MODEL: SENTECH MODEL "X" AISLE
FCC ID: J3Q3701**

CUSTOMER NAME: North American Technical Services

CUSTOMER P.O.: 0198

DATE OF REPORT: April 23, 1998

TEST REPORT NO.: R-7387, Rev. A

TEST START DATE: January 16, 1998

TEST FINISH DATE: January 20, 1998

TEST TECHNICIAN: D. Cortes

TEST ENGINEER: T. Schneider

SUPERVISOR: R.J. Reitz

REPORT PREPARED BY: L. Anderson

GOVERNMENT SOURCE INSPECTION: Not Applicable

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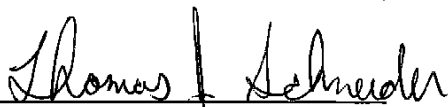


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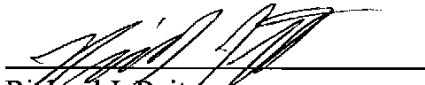


CERTIFICATION AND SIGNATURES

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**

REPORT No. R-7387

Exhibit 5

Report of Measurements

Radiated Emissions, Spurious Case



Retlif Testing Laboratories

REPORT No. R-7387

APPLICANT KNOGO North America 350 Wireless Boulevard Hauppauge, NY 11788	MANUFACTURER KNOGO North America 350 Wireless Boulevard Hauppauge, NY 11788
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TEST SPECIFICATION: FCC Rules and Regulations Part 15, Subpart CTEST PROCEDURE: ANSI C63.4:1992**TEST SAMPLE DESCRIPTION**BRANDNAME: KNOGO MODEL: Sentech Model "X" AisleTYPE: 8.2 MHz Swept RF Transmitter/ReceiverPOWER REQUIREMENTS: 115 VAC, 60 Hz, Single PhaseFREQUENCY OF OPERATION: 8.2 MHz (1.705 to 10 MHz Band)**TESTS PERFORMED**

Para. 15.223(a), Radiated Emissions, Fundamental (1.705 to 10 MHz Band)

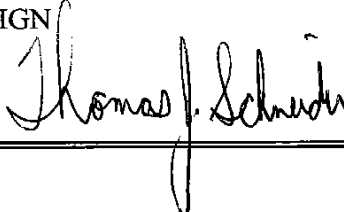
Para. 15.223(b), Radiated Emissions, Spurious Case (1.705 to 10 MHz Band)

Para. 15.223, Occupied Bandwidth

Para. 15.207(a), Conducted Emissions, 450 kHz to 30 MHz

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-7387, Rev. A

REPORT OF MEASUREMENTS

Applicant: KNOGO North America
Device: 8.2 MHz Swept RF Transmitter/Receiver
FCC ID: J3Q3701
Power Requirements: 115 VAC, 60 Hz, Single Phase
Applicable Rule Section: Part 15, Subpart C, Section 15.223

TEST RESULTS

- 15.223 (a) - The field strength of any emission did not exceed 891 microvolts/meter at a distance of 10 meters (100 microvolts at 30 meters) in the 1.705 to 10 MHz frequency band.
- 15.223(b) - The field strength outside the band 1.705 to 10 MHz did not exceed the general radiated emissions limits in 15.209.
- 15.207(a) - The radio frequency voltage that was conducted back on to the AC power line on any frequency (frequencies) within the band 450 kHz to 30 MHz did not exceed 250 microvolts.

MODIFICATIONS MADE TO TEST SAMPLE TO ENSURE COMPLIANCE:

- 1) Internal cables were rerouted as in normal installation.
- 2) A Ferrite, manufactured by Fair-Rite P/N: 0443164151, was placed on the receive antenna leads.

GENERAL NOTES:

- 1) All readings above 30 MHz were taken utilizing a quasi-peak detector function at test distance of 3 meters. Below 30 MHz measurements were taken utilizing a peak detector function at test distance of 10 meters and extrapolated to 30 meters via $40 \log (d_2/d_1)$.
- 2) The frequency was scanned from 1.705 to 1000 MHz. All emissions not reported were more than 20dB below the specified limit.

**Retlif Testing Laboratories**

Test Report Number R-7387, Rev. A

Exhibit 5

Report of Measurements

Radiated Emissions, Fundamental



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TABULAR DATA SHEET

NOTES: Detector Function: Quasi-Peak
Test Distance: 10 Meters (Extrapolated to 30 meters via $(40 \log d_2/d_1)$) = Factor of -19.0 dB

R-7387

Exhibit 5

Report of Measurements

Radiated Emissions, Spurious Case



Retlif Testing Laboratories

REPORT No. R-7387

RETLIF TESTING LABORATORIES

TABULAR DATA SHEET

TEST METHOD: FCC Part 15 Radiated Emissions, 1.705 Mhz to 1 GHz

CUSTOMER: North American Technical Services (Knogo) JOB No.: R-7387

TEST SAMPLE: 8.2 Mhz Swept RF Transmitter / Receiver

MODEL No.: TX97 / RV97 SERIAL No.: FCC ID:J3Q3701-SLIMLINE

TEST SPECIFICATION: FCC Part 15, Subpart C PARAGRAPH: 15.209(a)

OPERATING MODE: Continuously Transmitting Swept RF Signal

TECHNICIAN: Dennis Cortes DATE: January 20, 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
1.70							30
V							
5.60	V-1.0	270	36.3	-9.3	27.0	22.4	
V							V
30.00							30
30.00							100
V							
40.90	V-1.0	158	41.0	-9.5	31.5	37.6	
51.63	V-1.0	225	38.5	-12.3	26.2	20.4	
55.75	V-1.0	203	46.8	-12.5	34.3	51.9	
60.45	V-1.0	113	36.5	-12.6	23.9	15.7	
67.75	V-1.0	113	30.1	-11.5	18.6	8.5	
74.25	V-1.0	158	31.0	-10.9	20.1	10.1	
77.60	V-1.0	135	33.2	-10.7	22.5	13.3	
83.25	V-1.0	158	37.3	-10.6	26.7	21.6	
V							V
88.00							100
88.00							150
V							
104.65	V-1.0	225	40.3	-11.4	28.9	27.9	
108.80	V-1.0	248	39.8	-11.6	28.2	25.7	
117.00	V-1.2	203	40.2	-11.4	28.8	27.5	
120.00	V-1.0	180	39.0	-11.3	27.7	24.3	
130.00	V-1.0	225	35.6	-10.3	25.3	18.4	
137.70	V-1.3	135	29.6	-8.9	20.7	10.8	
142.49	V-1.0	338	32.9	-8.2	24.7	17.2	
145.20	V-1.0	180	31.8	-8.1	23.7	15.3	
150.10	V-1.0	135	33.3	-7.9	25.4	18.6	
160.10	V-1.0	158	34.5	-8.9	25.6	19.1	
166.75	V-1.0	158	37.3	-9.1	28.2	25.7	V
171.48	V-1.0	158	34.0	-9.2	24.8	17.4	150
The frequency range was scanned from 1.705 MHz to 1 GHz.							
Emissions observed from the EUT do not exceed the specified limit.							

RETLIF TESTING LABORATORIES

TABULAR DATA SHEET

TEST METHOD:	FCC Part 15 Radiated Emissions, 1.705 Mhz to 1 GHz		
CUSTOMER:	North American Technical Services (Knogo)	JOB No.:	R-7387
TEST SAMPLE:	8.2 Mhz Swept RF Transmitter / Receiver		
MODEL No.:	TX97 / RV97	SERIAL No.:	FCC ID.J3Q3701-SLIMLINE
TEST SPECIFICATION:	FCC Part 15, Subpart C		PARAGRAPH: 15.209(a)
OPERATING MODE:	Continuously Transmitting Swept RF Signal		
TECHNICIAN:	Dennis Cortes	DATE:	January 20, 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
173.75	V-1.0	158	32.8	-9.1	23.7	15.3	150
200.00	H-1.2	090	29.3	-8.1	21.2	11.5	
V							V
216.00							150
216.00							200
V							
236.00	H-1.1	293	33.3	-6.9	26.4	20.9	
263.00	H-1.5	090	42.3	-5.9	36.4	66.1	
277.30	H-1.4	090	39.3	-5.4	33.9	49.5	
278.70	V-1.1	158	42.8	-5.4	37.4	74.1	
299.80	H-1.9	090	47.2	-4.7	42.5	133.4	
311.80	H-1.7	113	41.0	-3.9	37.1	71.6	
337.30	H-2.1	090	28.5	-3.0	25.5	18.8	
359.00	H-2.1	113	39.6	-3.0	36.6	67.6	
398.50	H-1.2	090	42.4	-1.0	41.4	117.5	
409.30	H-1.0	090	41.0	-0.7	40.3	103.5	
428.80	H-1.5	090	38.6	-0.3	38.3	82.2	
441.50	H-1.7	113	38.2	-0.2	38.0	79.4	
481.30	H-1.5	090	38.0	0.6	38.6	85.1	
496.30	H-1.5	090	33.8	0.7	34.5	53.1	
504.00	H-1.0	090	35.8	0.9	36.7	68.4	
536.20	H-1.0	068	37.8	1.7	39.5	94.4	
548.00	H-1.0	068	39.6	1.8	41.4	117.5	
560.00	H-1.8	090	40.2	1.8	42.0	125.9	
568.10	H-1.0	090	39.8	1.9	41.7	121.6	
579.00	H-1.2	090	38.9	1.9	40.8	109.6	
590.00	H-1.2	090	31.4	2.1	33.5	47.3	
601.30	H-1.2	090	42.6	2.2	44.8	173.8	
620.30	H-1.3	045	35.1	2.8	37.9	78.5	
642.00	H-1.3	068	36.6	3.2	39.8	97.7	
654.10	H-1.5	068	35.8	3.3	39.1	90.2	
664.00	H-1.5	068	34.9	3.5	38.4	83.2	
V							V
960.00							200
960.00	The frequency range was scanned from 1.705 MHz to 1 GHz.						200
V	Emissions observed from the EUT do not exceed the specified limit.						V
1000.00							500

Exhibit 5

Report of Measurements

Occupied Bandwidth



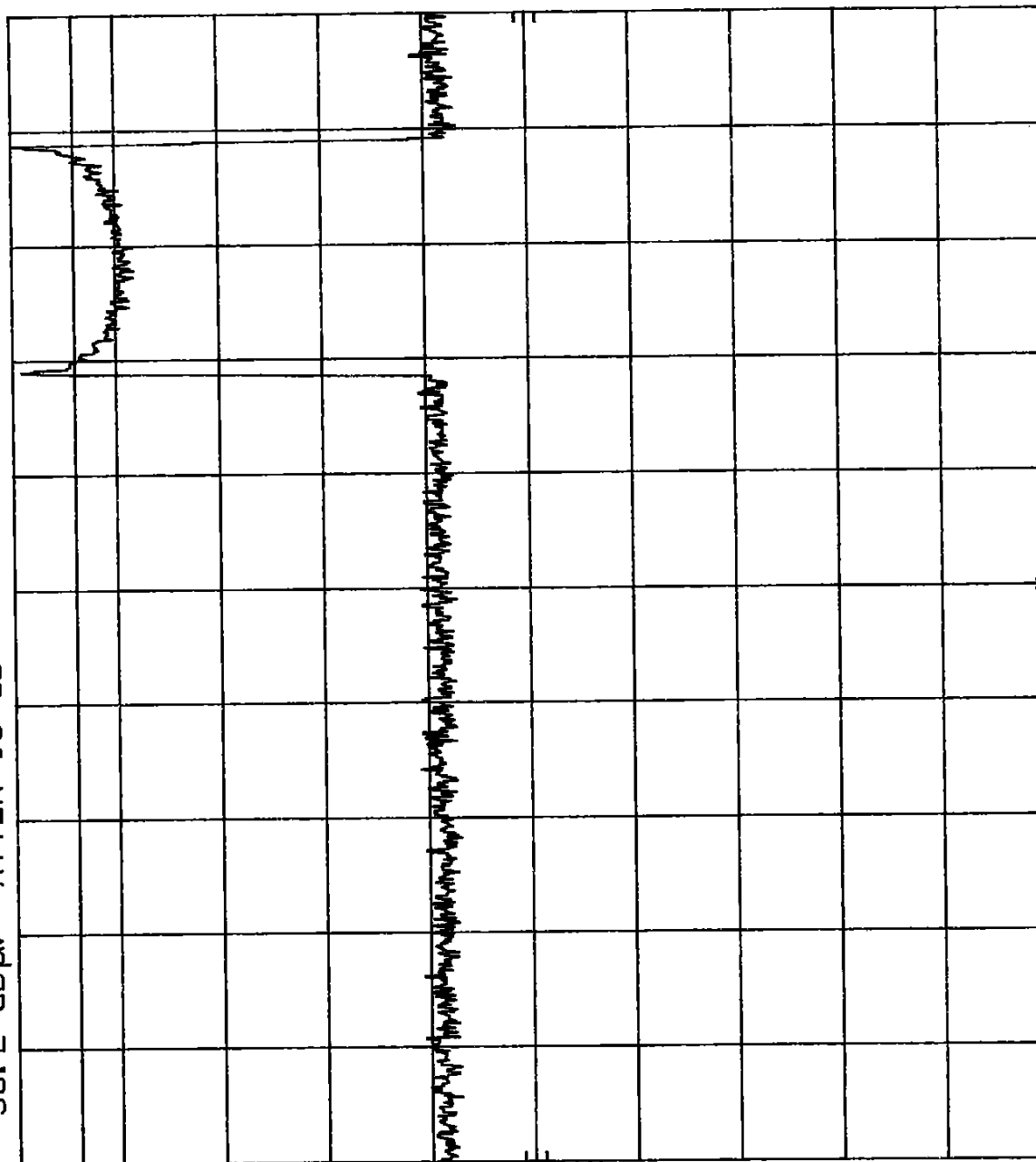
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REPORT No. R-7387

R-7387 NATS OCC. BW 1/16/98 DC
REF 58.2 dB μ V ATTEN 10 dB

hp

10 dB/

DL
52.2
dB μ V

STOP 10.00 MHz
SWP 249 msec

VBW 30 kHz

START 1.70 MHz
RES BW 10 kHz

Customer:	North American Technical Services (Knogo)
Test Sample:	8.2 Mhz Swept RF Transmitter / Receiver
Model No:	TX97 / RV97
Test Method:	Occupied Bandwidth Determination
Notes:	The Bandwidth of emission is greater than 10% of center frequency at 6dB down from the modulated carrier.
Date:	01-20-98
Tech:	Dennis Cortes
Sheet	1 of 1



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Exhibit 5

Report of Measurements

Conducted Emissions



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REPORT No. R-7387

LEAD - HOT

REF 85.0 dBμV ATTN 10 dB

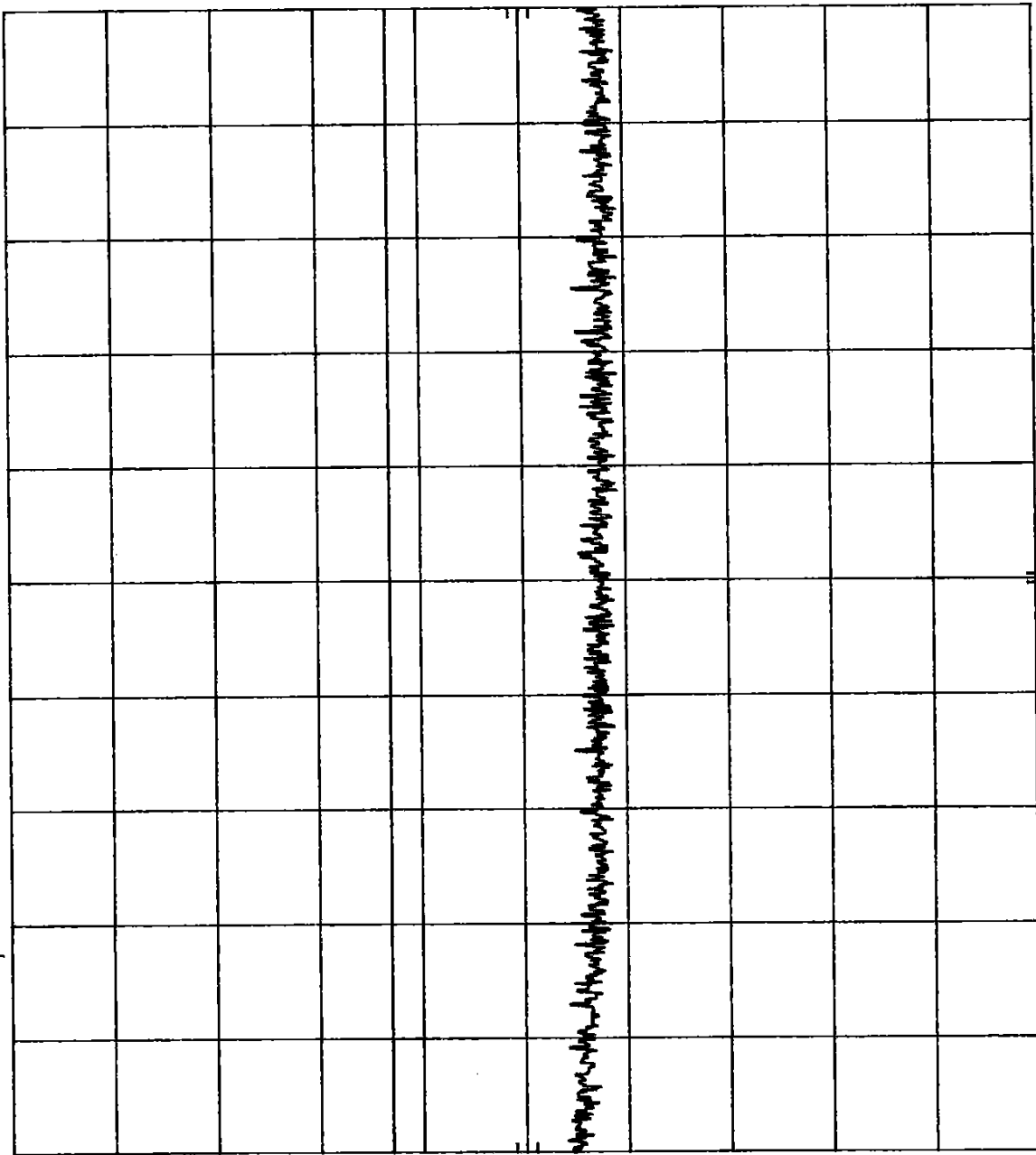
hp

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:	North American Technical Services (Knogo North America)
Test Sample:	8.2 Mhz Swept RF Transmitter / Receiver
Model No:	TX97 / RVM97
Test Method:	FCC 15.207 Conducted Emissions
Notes:	Lead Tested: Hot Detector: Peak
Date:	01-16-98
Tech:	Dennis Cortes
Sheet	1 of 6



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LEAD - NEUTRAL
 REF 85.0 dBμV ATTEN 10 dB

10 dB/

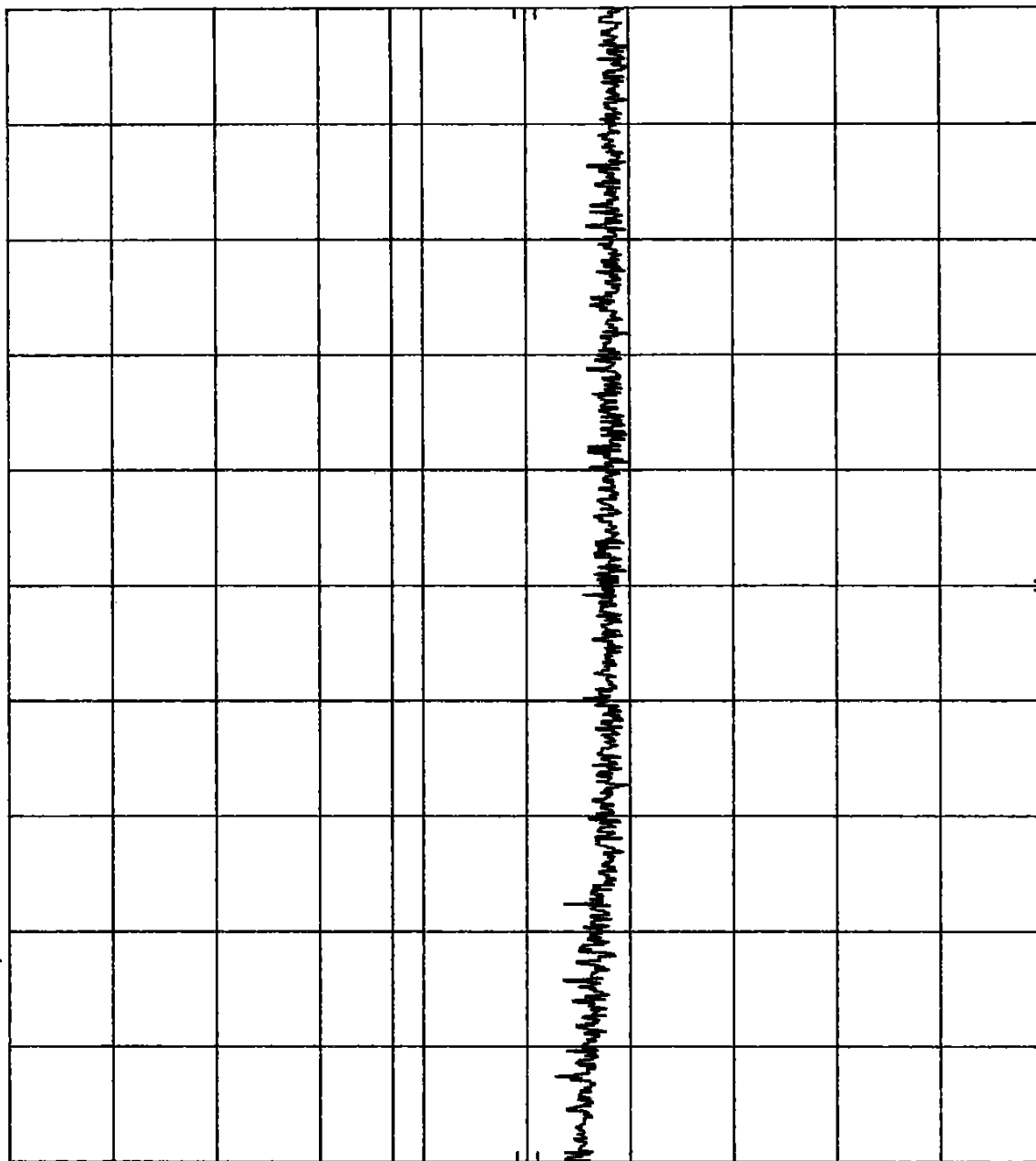
10 dB/

OFFSET

10.0
dB

DL

48.0
dBμV



STOP 1.70 MHz
SWP 20.0 sec

VBW 30 kHz

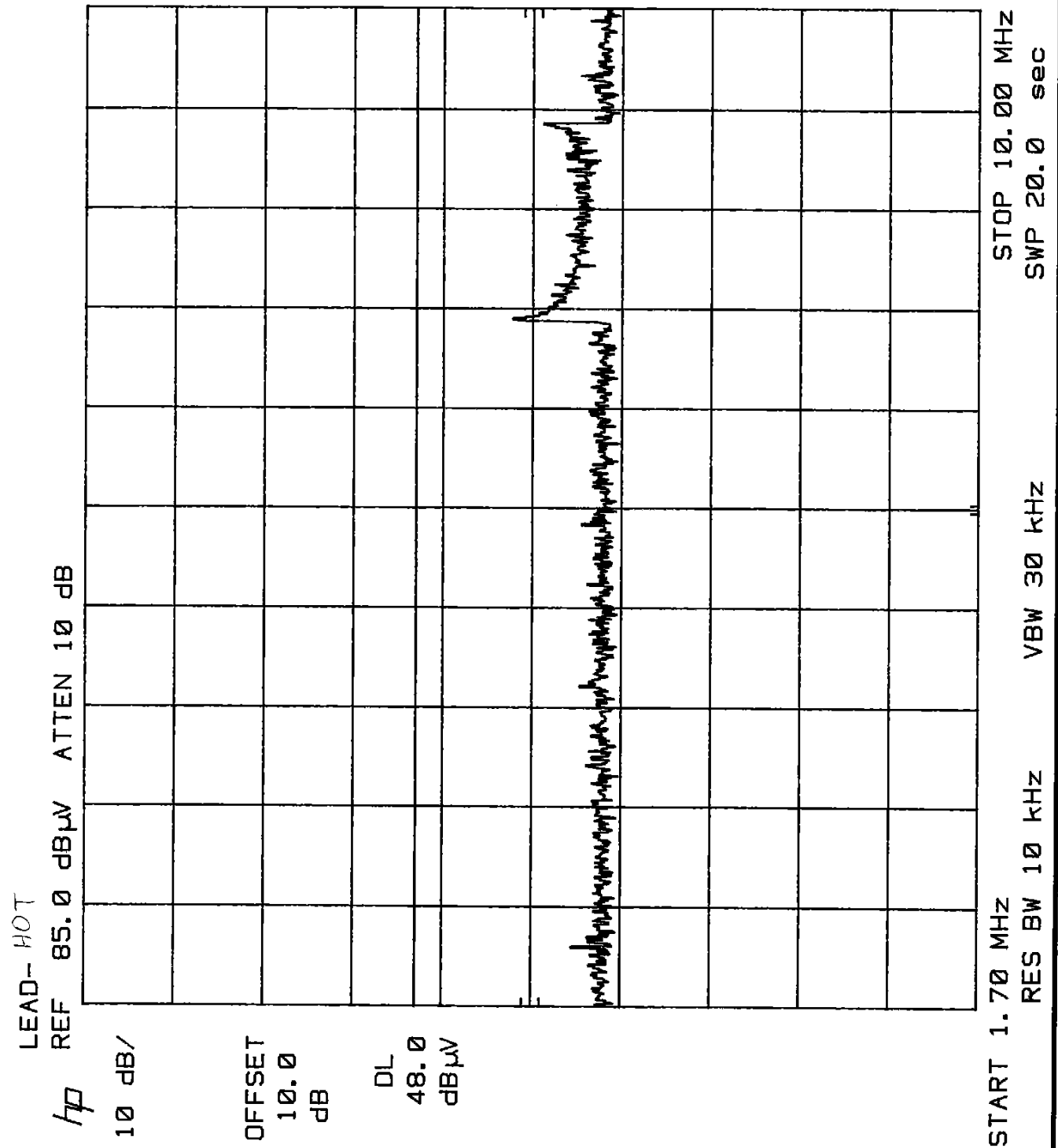
START 450 kHz
RES BW 10 kHz

Customer:	North American Technical Services (Knogo North America)
Test Sample:	8.2 Mhz Swept RF Transmitter / Receiver
Model No:	TX97 / RVM97
Test Method:	FCC 15.207 Conducted Emissions
Notes:	Lead Tested: Neutral Detector: Peak
Date:	01-16-98
Tech:	Dennis Cortes
Sheet:	2 of 6



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Customer: North American Technical Services (Knogo North America)
 Test Sample: 8.2 Mhz Swept RF Transmitter / Receiver
 Model No: TX97 / RVM97
 Test Method: FCC 15.207 Conducted Emissions
 Notes: Lead Tested: Hot
 Detector: Peak

Date: 01-16-98 Tech: Dennis Cortes Sheet 3 of 6



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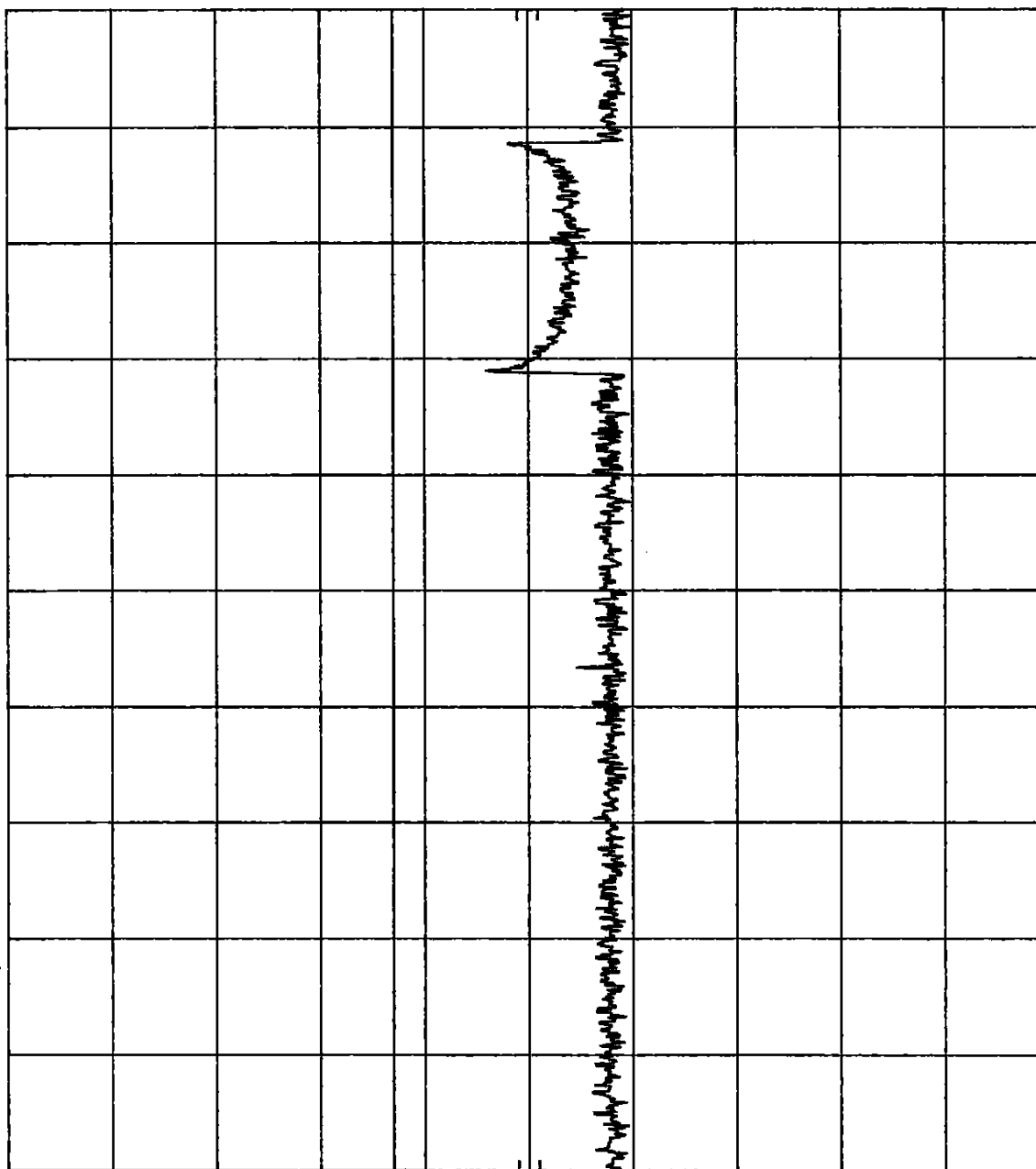
LEAD--NEUTRAL
REF 85.0 dBμV ATTEN 10 dB

10 dB/

10 dB/

OFFSET
10.0
dB

DL
48.0
dBμV



STOP 10.00 MHz
SWP 20.0 sec

VBW 30 kHz

START 1.70 MHz
RES BW 10 kHz

Customer: North American Technical Services (Knogo North America)
Test Sample: 8.2 Mhz Swept RF Transmitter / Receiver
Model No: TX97 / RVM97
Test Method: FCC 15.207 Conducted Emissions
Notes: Lead Tested: Neutral
Detector: Peak

Date: 01-16-98

Tech: Dennis Cortes

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LEAD- HOT

REF 85.0 dB μ V ATTEN 10 dB

hp

10 dB/

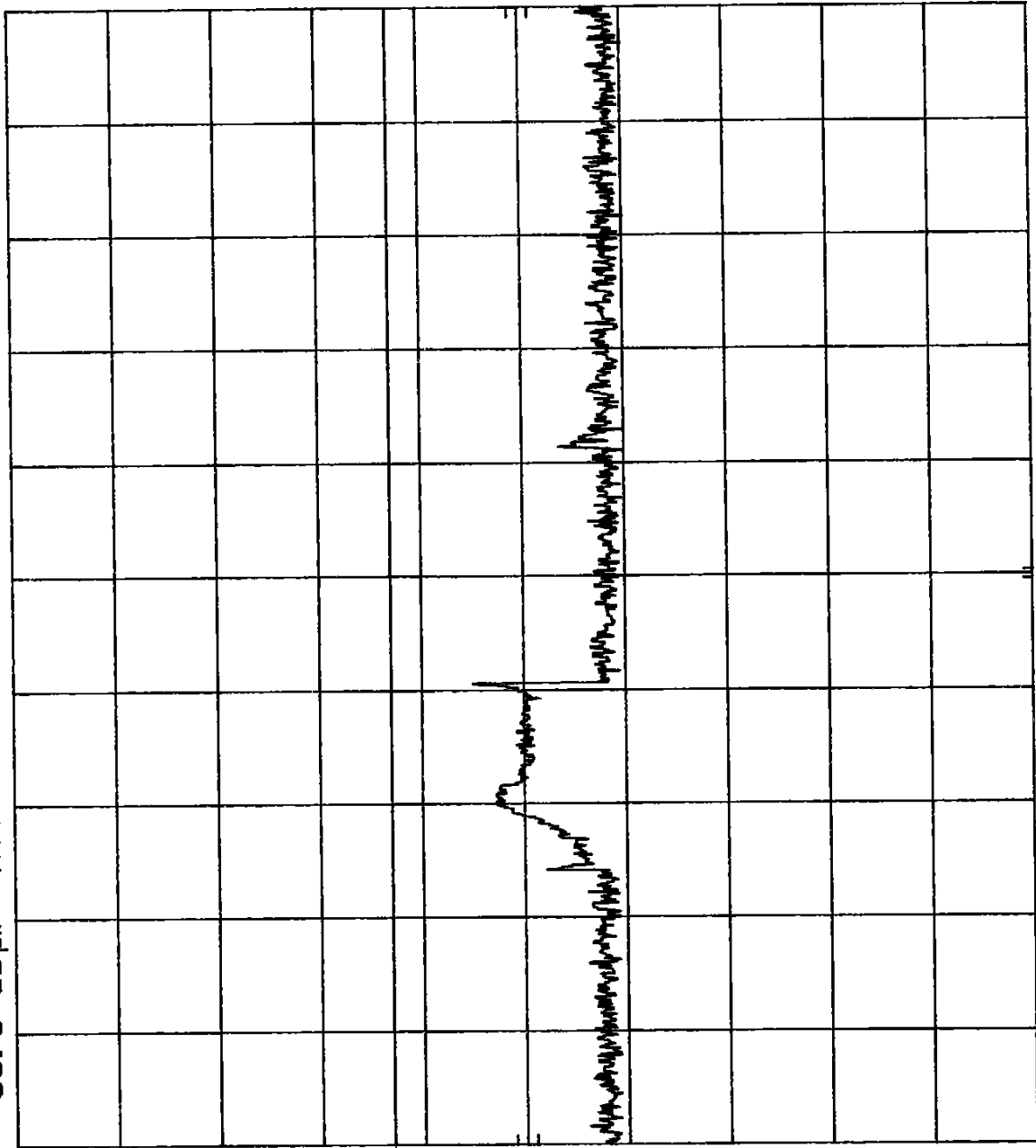
OFFSET

10.0

dB

DL

48.0

dB μ V

START 10.0 MHz

RES BW 10 kHz

VBW 30 kHz

SWP 20.0 sec

STOP 30.0 MHz

Customer: North American Technical Services (Knogo North America)
 Test Sample: 8.2 Mhz Swept RF Transmitter / Receiver
 Model No: TX97 / RVM97
 Test Method: FCC 15.207 Conducted Emissions
 Notes: Lead Tested: Hot
 Detector: Peak

Date: 01-16-98

Tech: Dennis Cortes

Sheet

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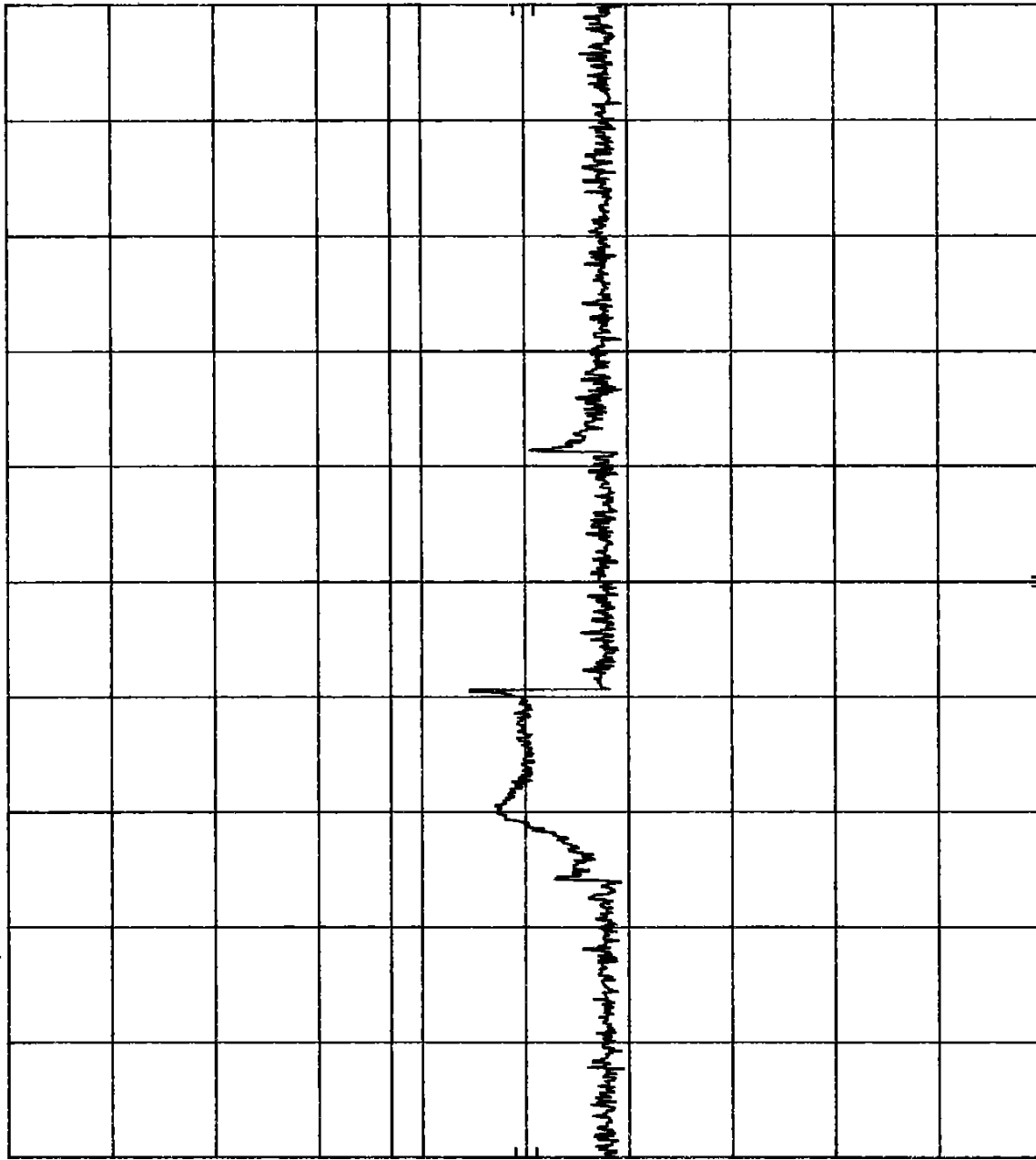
LEAD- NEUTRAL
 REF 85.0 dBμV ATTEN 10 dB

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:	North American Technical Services (Knogo North America)
Test Sample:	8.2 Mhz Swept RF Transmitter / Receiver
Model No.:	TX97 / RVM97
Test Method:	FCC 15.207 Conducted Emissions
Notes:	Lead Tested: Neutral Detector: Peak
Date:	01-16-98
Tech:	Dennis Cortes
Sheet:	6 of 6



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Exhibit 5

TEST EQUIPMENT LIST



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TEST EQUIPMENT LIST

EN	Model No.	Type	Manufacturer	Frequency Range	Serial No.	Cal. Date	Due Date
012	6502	Loop Antenna, Active	EMCO	9 kHz - 30 MHz	2255	10/10/97	10/10/98
067	RNY	Open Area Test Site	Retlif	3 Meter	001	08/30/97	08/30/99
078	8028-50-TS24BN	LISN	Solar Electronics	10 kHz - 30 MHz	849578	05/05/97	05/05/98
092H	LP-105	Loop Antenna	Empire Devices	150 kHz - 30 MHz	012	06/09/97	06/09/98
133	BPA-1000	Broadband Pre-Amplifier	Electro-Metrics	10 kHz - 1 GHz, 26dB	174	06/20/97	06/20/98
141	8566B	Spectrum Analyzer	Hewlett Packard	100 Hz - 40 GHz	2637A03491	09/03/97	03/03/98
141A	7470A	Graphics Plotter	Hewlett Packard	N/A	2517A07605	03/04/97	03/04/98
141B	85650A	Quasi-Peak Adaptor	Hewlett Packard	100 Hz - 1 GHz	2521A00862	09/04/97	03/04/98
202	11947A	Transient Limiter	Hewlett Packard	.009 MHz - 200 MHz	2820A00353	08/21/97	08/21/98
206B	FP-50 - 6 dB	6.0 dB Attenuator	Texscan	0 - 1.0 GHz	5785	06/20/97	06/20/98
513	8028-50-TS24BN	LISN	Solar Electronics	50 Hz - 400 Hz	953932	11/03/97	11/03/98
523	3143	Biconilog	Electro-Mechanics	26 MHz - 1100 MHz	9602-1234	09/30/97	09/30/98
544	8591EM	EMC Analyzer	Hewlett Packard	9.0 kHz - 1.8 GHz	3628A00844	08/11/97	08/11/98
575	7470A	Graphics Plotter	Hewlett Packard		2308A25049	04/30/97	04/30/98



Retlif Testing Laboratories

REPORT No. R-7387

REVISION HISTORY

April 23, 1998, Revision A:

The Model Number and FCC ID Number for the device have been changed as follows:

OLD MODEL NUMBER

TX97/RV97

NEW MODEL NUMBER

Sentech Model "X" Aisle

OLD FCC ID

J3Q3701-SLIMLINE

NEW FCC ID

J3Q3701

ALL REFERENCES TO THE OLD MODEL NUMBER AND FCC ID SHOULD BE REPLACED BY THE NEW ONES.



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Test Report No. R-7387, Rev. A