

**ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT  
CERTIFICATION TO FCC PART 15 REQUIREMENTS**

*for*

**INTENTIONAL RADIATOR**

**302 MHz CAR ALARM TRANSMITTER**

**MODEL NO: PRO-01LR**

**FCC ID NO: BGA2KTX**

**REPORT NO: 01E9644**

**ISSUE DATE: August 2, 2001**

*Prepared for*

**AUDIOVOX CORPORATION  
150 MARCUS BLVD., HAUPPAUGE, N.Y. 11788 U.S.A.**

*Prepared by*

**COMPLIANCE ENGINEERING SERVICES, INC.  
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TAIWAN, R. O. C.**

*d.b.a.*

**COMPLIANCE CERTIFICATION SERVICES**



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UL, CSA, TÜV, VDE**

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**TEST DATA**

- Maximum Modulation Percentage Plot
- Emission Bandwidth Plot
- Radiated Emission Worksheet for Average Measurement

**1. VERIFICATION OF COMPLIANCE**

COMPANY NAME: AUDIOVOX CORPORATION  
150 MARCUS BLVD., HAUPPAUGE, N.Y. 11788 U.S.A.

CONTACT PERSON: PAT LAVELLE / EXECUTIVE VICE PRESIDENT

TELEPHONE NO.: (516)231-7750

EUT DESCRIPTION: 302 MHz CAR ALARM TRANSMITTER

MODEL NAME/NUMBER: PRO-01LR

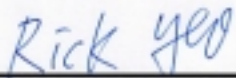
FCC ID: BGA2KTX

DATE TESTED: August 1, 2001

REPORT NUMBER: 01E9644

TYPE OF EQUIPMENT	SECURITY EQUIPMENT (INTENTIONAL RADIATOR)
EQUIPMENT TYPE	302 MHz CAR ALARM TRANSMITTER
MEASUREMENT PROCEDURE	ANSI C63.4 / 1992
LIMIT TYPE	CERTIFICATION
FCC RULE	CFR 47, PART 15

The above equipment was tested by Compliance Engineering Services, Inc. for compliance with the requirements set forth in the FCC CFR 47, PART 15. The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties. **Warning** : This document reports conditions under which testing was conducted and results of tests performed. This document may not be altered or revised in any way unless done so by Compliance Engineering Services, Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Engineering Services, Inc. will constitute fraud and shall nullify the document.

  
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 RICK YEO / EMC MANAGER  
 COMPLIANCE ENGINEERING SERVICES, INC.

## 2. Product Description

Fundamental Frequency	<b>302 MHz</b>
Power Source	<b>12V Battery</b>
Transmitting Time	<b>Periodic <math>\leq</math> 5 seconds</b>
Associated Receiver	<b>FCC ID: BGA2KRX</b>

## 3. Test Facility

The open area test sites and conducted measurement facilities used to collect the radiated data are located at No. 199, Chung Sheng Road, Hsin Tien City, Taipei, Taiwan, R.O.C. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

## 4. Measurement Standards

The site is constructed and calibrated in conformance with the requirements of ANSI C63.4/1992.

## 5. Test Methodology

For an intentional radiator, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 KHz, up to at least the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower. (CFR 47 Section 15.33)

## 6. Measurement Equipment Used

Manufacturer	Model Number	Description	Cal Due Date
R & S	DSAI-D 804.8932.52	Spectrum Analyzer (20Hz – 5GHz)	11/2001
R & S	ESBI- RF/1005.4300.52	Spectrum Analyzer (20Hz – 5GHz)	11/2001
H.P.	8595EM	Spectrum Analyzer (9KHz – 6.5GHz)	01/2002
EMCO	3115	Antenna (1-18GHz)	02/2002
SCHWARZB ECK	VULB 9160	Antenna (30-2000 MHz)	05/2002
H.P.	8447D	Amplifier	05/2002
MITEQ	NSP2600-44	Amplifier(1-26GHz)	02/2002

**7. POWERLINE RFI LIMIT**

CONNECTED TO AC POWER LINE	SECTION 15.207
CARRIER CURRENT SYSTEM IN THE FREQUENCY RANGE OF 450 kHz TO 30 MHz	SECTION 15.205 AND SECTION 15.209, 15.221, 15.223, 15.225 OR 15.227, AS APPROPRIATE.
BATTERY POWER	NO REQUIRED.

**8. RADIATED EMISSION LIMITS**

GENERAL REQUIREMENTS	SECTION 15.209
RESTRICTED BANDS OF OPERATION	SECTION 15.205
PERIODIC OPERATION IN THE BAND 40.66 -40.70 MHz AND ABOVE 70 MHz.	SECTION 15.231

## 9. SYSTEM TEST CONFIGURATION

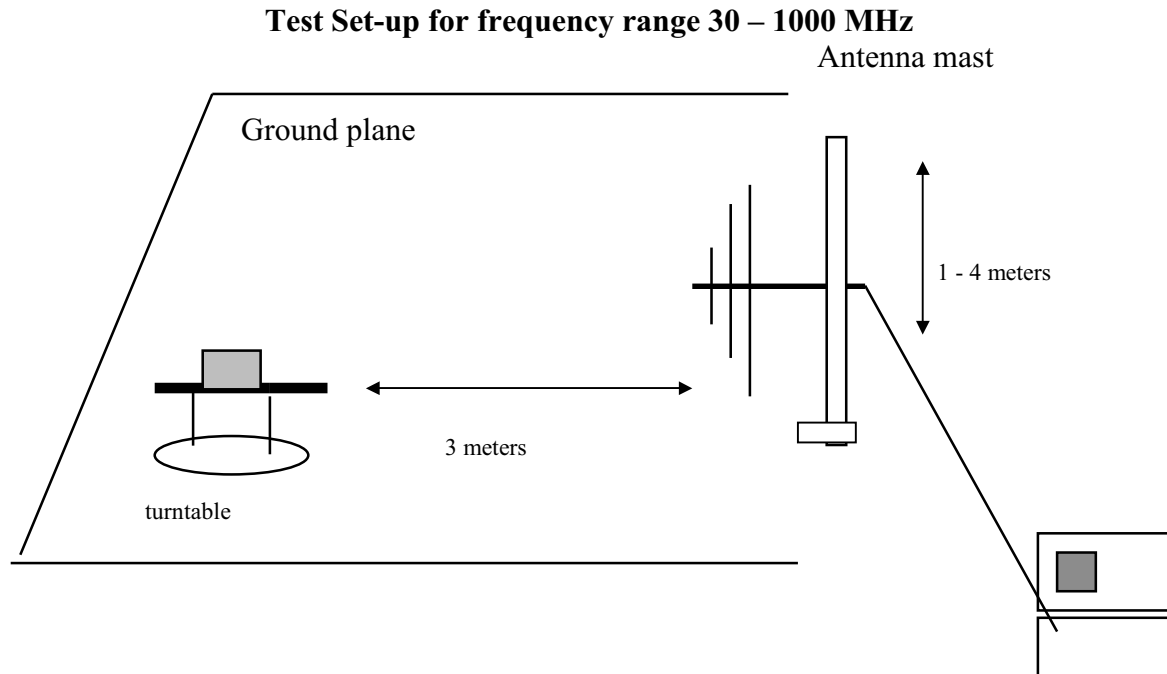
Use a block of foam and combined it with EUT wrapping rubber band around it. This way it can test X.Y, and Z axis. To activate continuous transmission, place a small plastic block between rubber band and EUT push button.



Radiated Open Site Test Set-up

## 10. Test Procedure

### Radiated Emissions, 15.231(4)(b)



**Fig. 1**

1. The EUT was placed on a wooden table on the outdoor ground plane. The search antenna was placed 3-meters from the EUT.
2. The turntable was slowly rotated to locate the direction of maximum emission at each emission falling in the restricted bands of 15.205. The EUT was moved throughout the XY, XZ, and YZ planes to maximize emissions received by the search antenna.
3. Once maximum direction was determined, the search antenna was raised and lowered in both vertical and horizontal polarizations. The maximum readings so obtained are recorded in the data listed below.

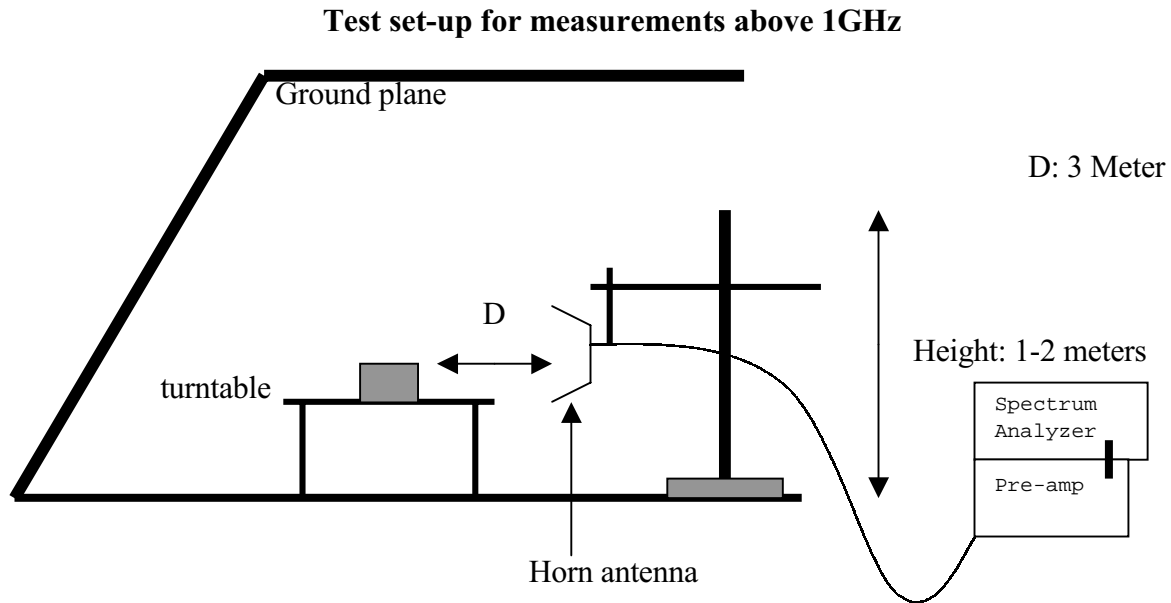


FIG. 2

1. The EUT was placed on a wooden table on the outdoor ground plane. The search antenna was placed 3-meters from the EUT. The EUT antenna was mounted vertically as per normal installation.
2. The turntable was slowly rotated to locate the direction of maximum emission at each emission falling in the restricted bands of 15.205. The EUT was moved throughout the XY, XZ, and YZ planes to maximize emissions received by the search antenna.
3. Once maximum direction was determined, the search antenna was raised and lowered in both vertical and horizontal polarizations. The maximum readings so obtained are recorded in the data listed below.

## 11. Equipment Modifications

To achieve compliance to FCC Section 15.231 technical limits, the following change(s) were made during compliance testing:

**NONE**



**12. TEST RESULT**

<b>Powerline RFI Class B</b>	<b>Eut</b>	<b>Radiated Emission Limits</b>	<b>Eut</b>
SECTION 15.207		SECTION 15.209	X
SECTION 15.205, 15.209, 15.221, 15.223, x 15.225 OR 15.227		SECTION 15.205	
BATTERY POWER	X	SECTION 15.231 (b)	X
		SECTION 15.231 (e)	

**12.1 Maximum Modulation Percentage (M%)**

CALCULATION:

Average Reading = Peak Reading (dBuV/m)+ 20log (Duty Cycle)

In order to determine possible Maximum Modulation percentage, alternations are made to the EUT. We measured:

WHERE      1 Period                    = 24.75 mS  
               Long pulse                = 0.562 mS  
               Short pulse                 = 0.225 mS  
               No of Long pulse         = 8  
               No of Short pulse         = 5

Duty Cycle = ( N1L1+N2L2+...+Nn-1Ln-1+NnLn)/100 or T

Duty Cycle = ((8x0.562)+(5x0.225))/24.75=0.2271=22.71% or -12.876dB

**12.2 The Emissions Bandwidth**

The bandwidth of the emissions were investigated per 15.231(c)

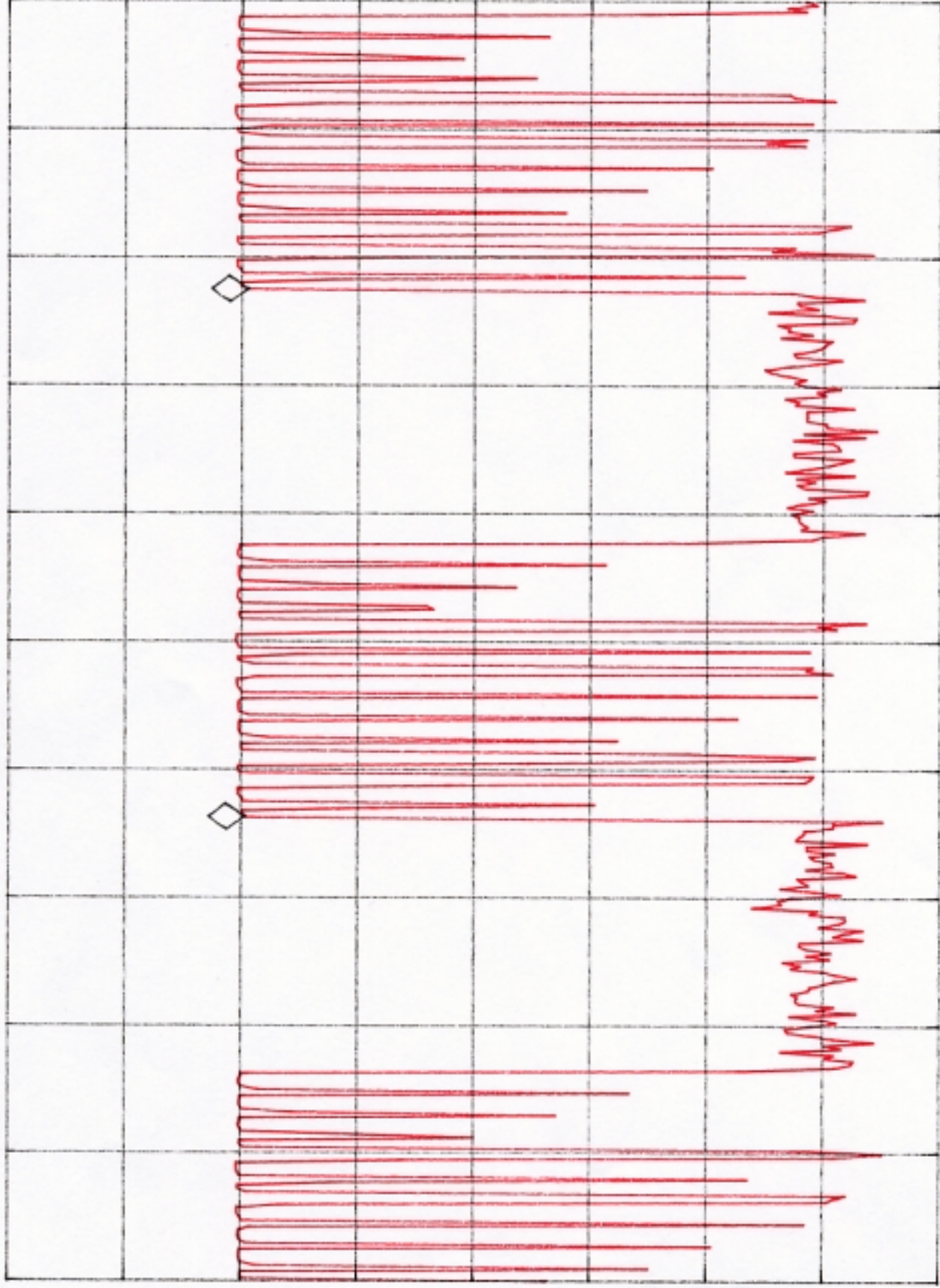
<b>Center Frequency</b>	<b>Measured</b>	<b>Limits</b>
<b>302 MHz</b>	<b>464.4 kHz &lt; (refer to plot)</b>	<b>302X0.25%=755 kHz</b>

hp

MKR 24.750 msec  
-21 dB

REF 80.0 dB $\mu$ V AT 10 dB

PEAK  
LOG  
10  
dB/



WA SB  
SC FS  
CORR

CENTER 302.0000 MHz

RES BW 10 KHz

VBW 10 KHz

#SWP 60.0

SPAN 0 Hz

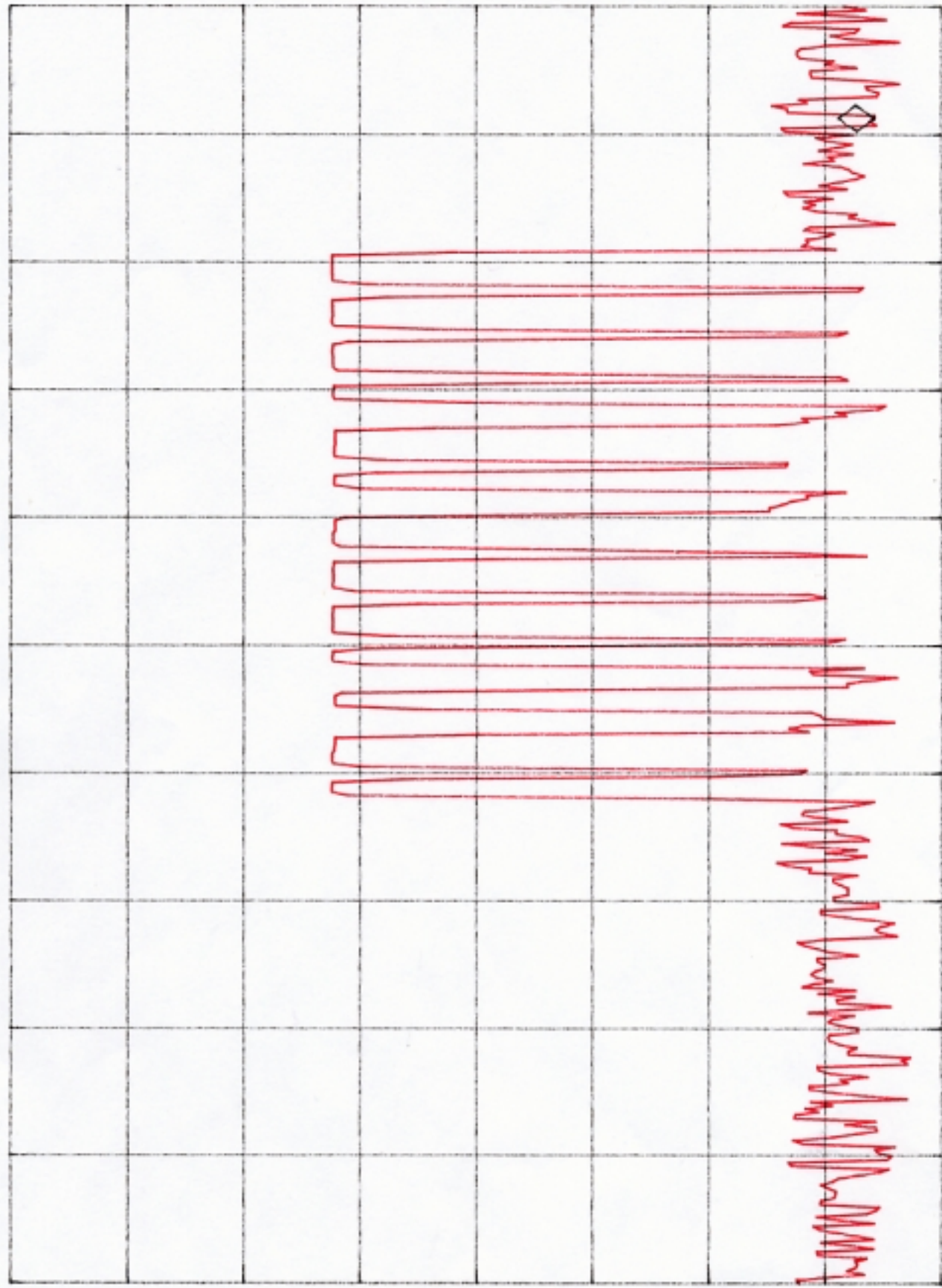
70

MKR 27.375 msec  
5.70 dB $\mu$ V

AT 10 dB

REF 80.0 dB $\mu$ V

PEAK  
LOG  
10  
dB/



WA SB  
SC FS  
CORR

CENTER 302.0000 MHz  
RES BW 10 kHz

VBW 10 kHz

SPAN 30.0 MHz  
#SWP 30.0 msec



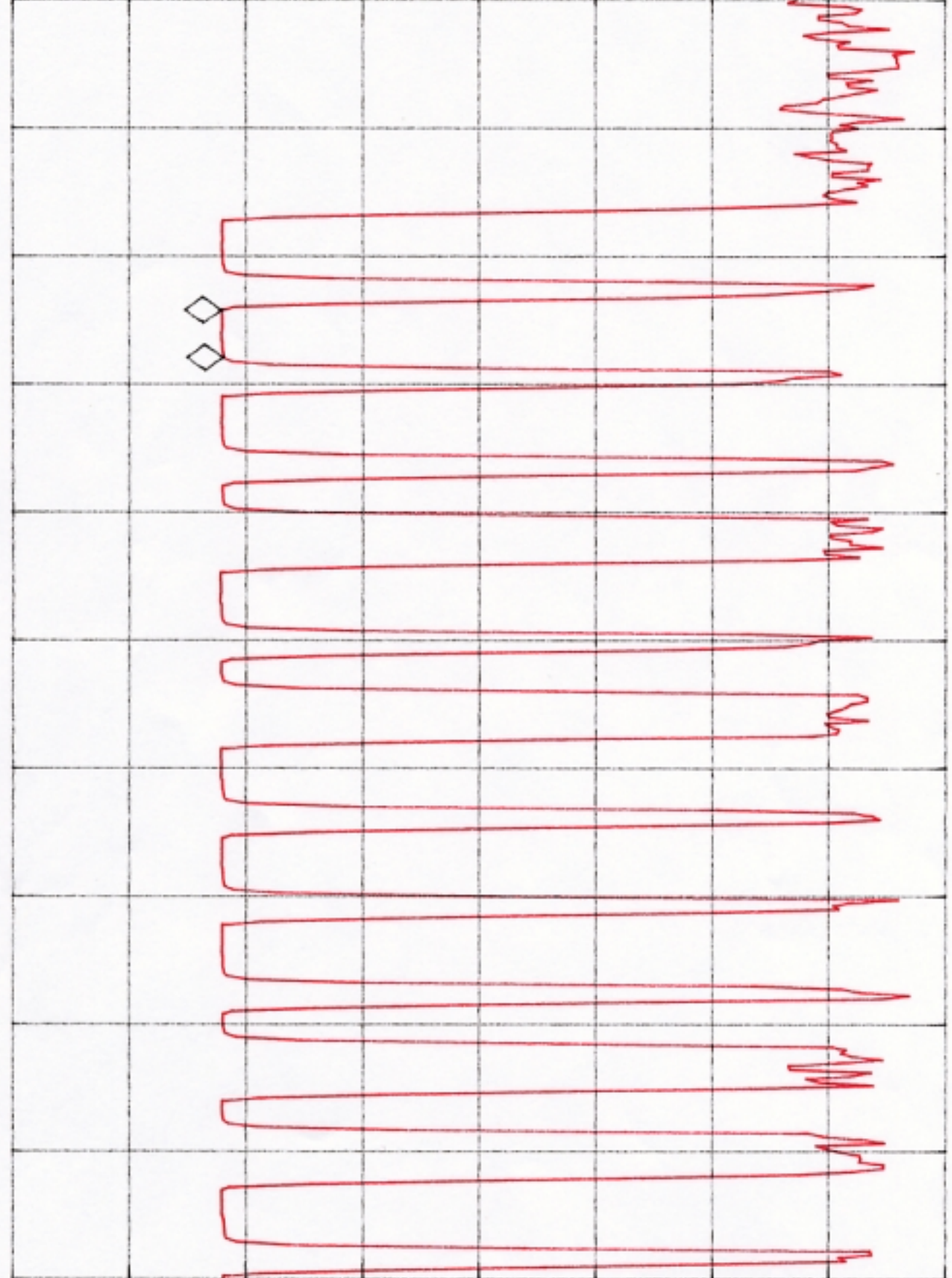
70

MKR 562.00  $\mu$ sec  
.19 dB

AT 10 dB

REF 80.0 dB $\mu$ V

PEAK  
LOG  
10  
dB/



WA SB  
SC FS  
CORR

CENTER 302.0000 MHz

RES BW 10 KHz

VBW 10 KHz

#SWP 15.0

SPAN 0 Hz

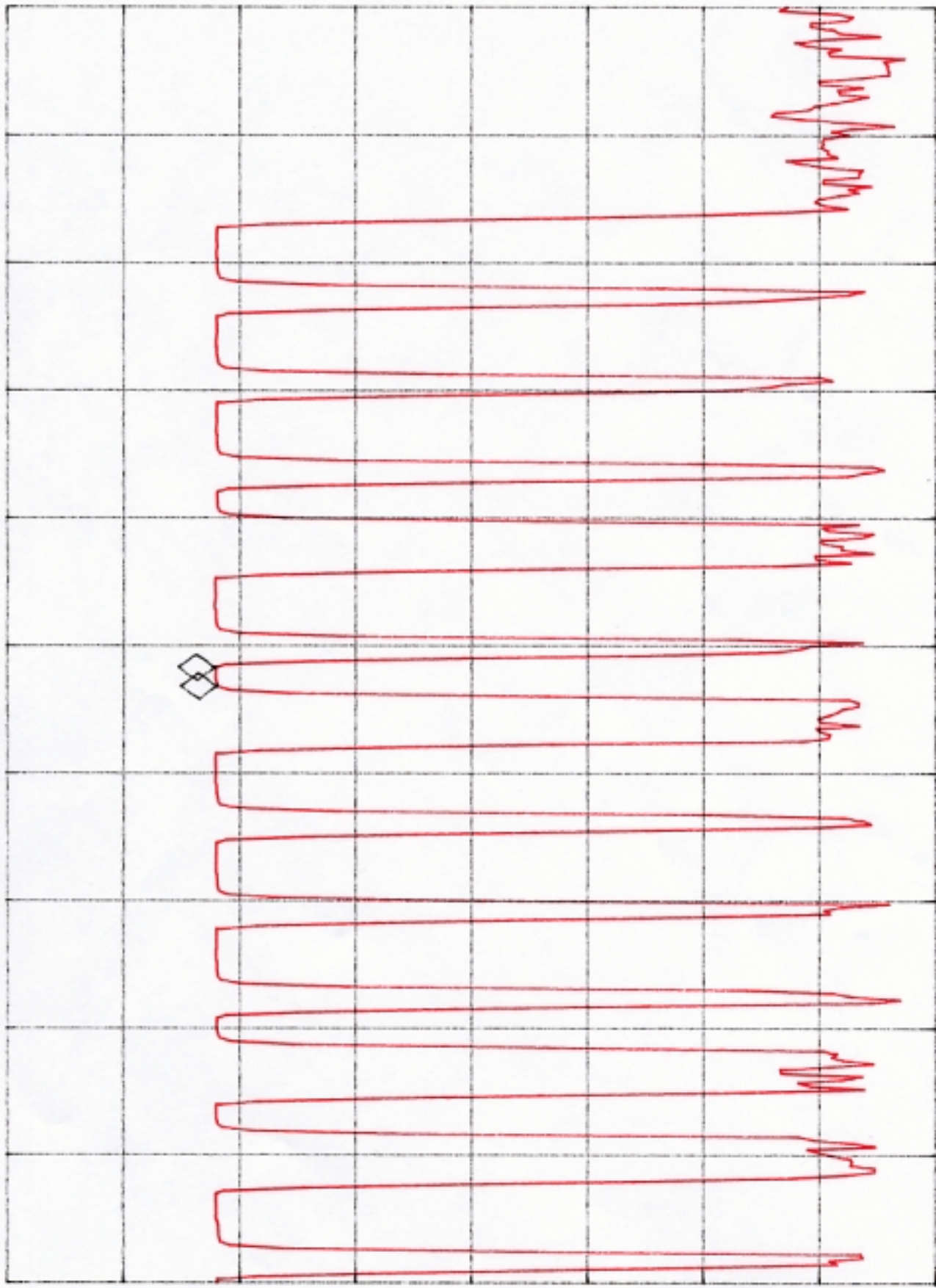
hp

MKA 225.00  $\mu$ sec  
.20 dB

AT 10 dB

REF 80.0 dB $\mu$ W

PEAK  
LOG  
10  
dB/



WA SB  
SC FS  
CORR

CENTER 302.0000 MHz

RES BW 10 KHZ

VBW 10 KHZ

#SWP 15.0

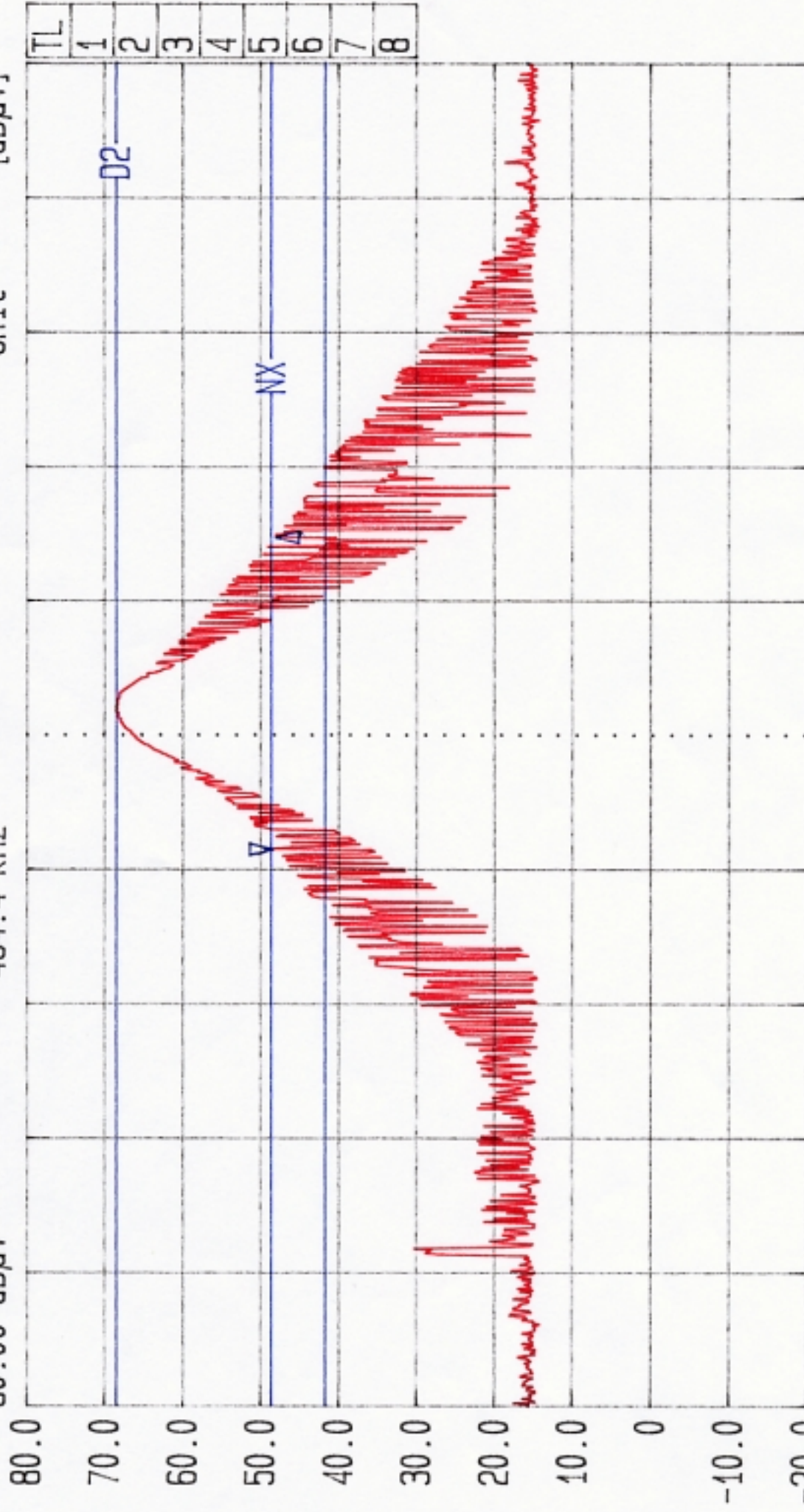
SPAN 0 HZ





Date 01.Aug.'01 Time 12:10:28  
Ref.Lvl Delta -0.30 dB  
80.00 dBuV 464.4 kHz

Res.Bw 120 kHz [imp] Off  
TG.Lvl 10.000 MHz  
CF.Stp Unit  
Vid.Bw 300 kHz  
RF.Att 0 dB



Start 301 MHz  
Span 2 MHz  
Center 302 MHz  
Sweep 20 ms  
Stop 303 MHz

N dB down Level 20.0 dB  
DELTA MARK 464.4 KHZ





FCC, VCCI, CISPR, CE, AUSTEL, NZ  
UL, CSA, TUV, BSMI, DHHS, NVLAP

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**Project #:** 01E9644  
**Report #:** 9644D2  
**Date & Time:** 2001/08/01  
**Test Engr:** Vince Chiang

**Company:** AUDIOVOX CORPORATION  
**EUT Description:** PRO-01LR (Alarm Tx / 302MHz)  
**Test Configuration :** EUT ONLY  
**Type of Test:** FCC 15.231(b)/FCC 15.209  
**Mode of Operation:** NORMAL MODE

D-Ste    
  E-Ste    
 6 W oist    
 Des

Freq. (MHz)	Pk Rdg (dBuV)	Av Rdg (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)	Mark (P/Q/A)
1208	49.85	36.974	24.7	3.4	38.00	27.01	54.0	-26.99	1mV	0	1.0	A
1208	48.86	35.984	24.7	3.4	38.00	26.02	54.0	-27.98	1mH	0	1.0	A

\* No other emission were found within 20dB under the limits upto 3.5 GHz.

Total data #:2  
V.2d  
P(Peak): RBW=VBW=1MHz  
A(Average): Pk Reading -12.876dB