

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

for

INTENTIONAL RADIATOR

434 MHz CAR ALARM TRANSMITTER

MODEL NO: PROOE4B

FCC ID NO: BGA104T

REPORT NO: 00E9119

ISSUE DATE: NOVEMBER 27, 2000

Prepared for

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

Prepared by

**COMPLIANCE ENGINEERING SERVICES, INC.
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TEST DATA

- Maximum Modulation Percentage Plot
- Emission Bandwidth Plot
- Radiated Emission Worksheet for Peak Measurement
- 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: 434 MHz CAR ALARM TRANSMITTER

MODEL NAME/NUMBER: PROOE4B

FCC ID: BGA104T

DATE TESTED: NOVEMBER 14, 2000 ~ NOVEMBER 28, 2000

REPORT NUMBER: 00E9119

TYPE OF EQUIPMENT	SECURITY EQUIPMENT (INTENTIONAL RADIATOR)
EQUIPMENT TYPE	434 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 Certification Services 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 Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification will constitute fraud and shall nullify the document.

Rick Yeo

RICK YEO / EMC MANAGER
COMPLIANCE ENGINEERING SERVICES, INC.

PAGE NO: 1

COMPLIANCE ENGINEERING SERVICES, INC.

DOCUMENT NO: CCSTP4006

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2. Product Description

Fundamental Frequency	434 MHz
Power Source	12V Battery
Transmitting Time	Periodic \leq 5 seconds
Associated Receiver	FCC ID: BGA104R

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
H.P.	8566B	Spectrum Analyzer (100Hz – 22GHz)	12/00
R & S	ESBI-RF/1005.4300.52	EMI Test Receiver (20Hz-5GHz)	11/01
EMCO	3115	Antenna (1-18GHz)	09/01
EMCO	3142	Antenna (30-2000MHz)	06/01
T.E.C.	PA-102	Amplifier(30-2000MHz)	05/01
MITEQ	NSP2600-44	Amplifier(1-26GHz)	12/00

7. POWERLINE RFI LIMIT

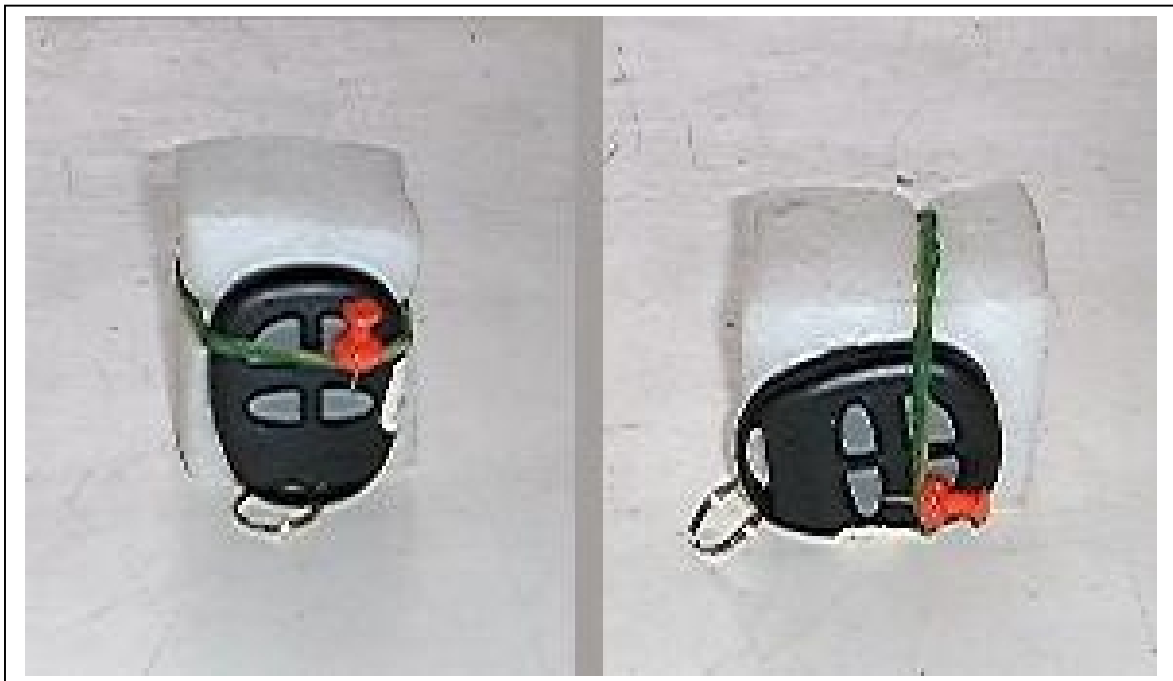
CONNECTED TO AC POWER LINE	SECTION 15.207
CARRIER CURRENT SYSTEM IN THE FREQUENCY RANGE OF 450 kHz TO 30 MHz	SECTION 15.205 AND SECTION 15.209, 15.221, 15.223, 15.225 OR 15.227, AS APPROPRIATE.
BATTERY POWER	NO REQUIRED.

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

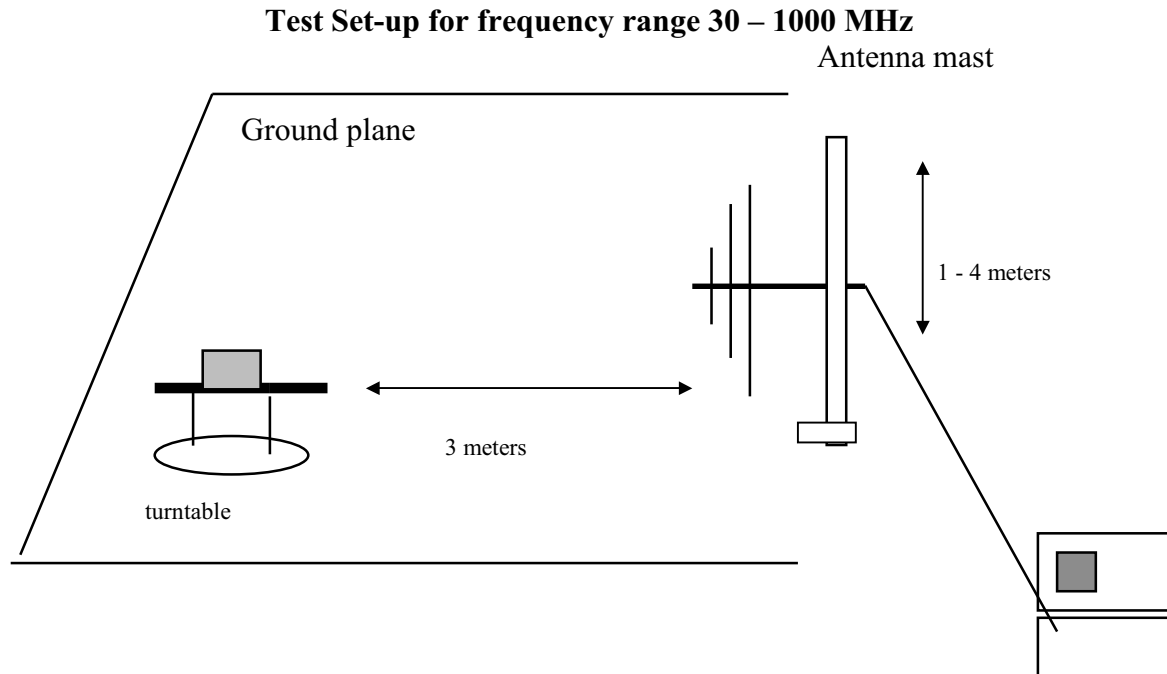
9. SYSTEM TEST CONFIGURATION

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.



10. Test Procedure

Radiated Emissions, 15.231(4)(b)



preamplifier/spectrum analyzer

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.

Test set-up for measurements above 1GHz

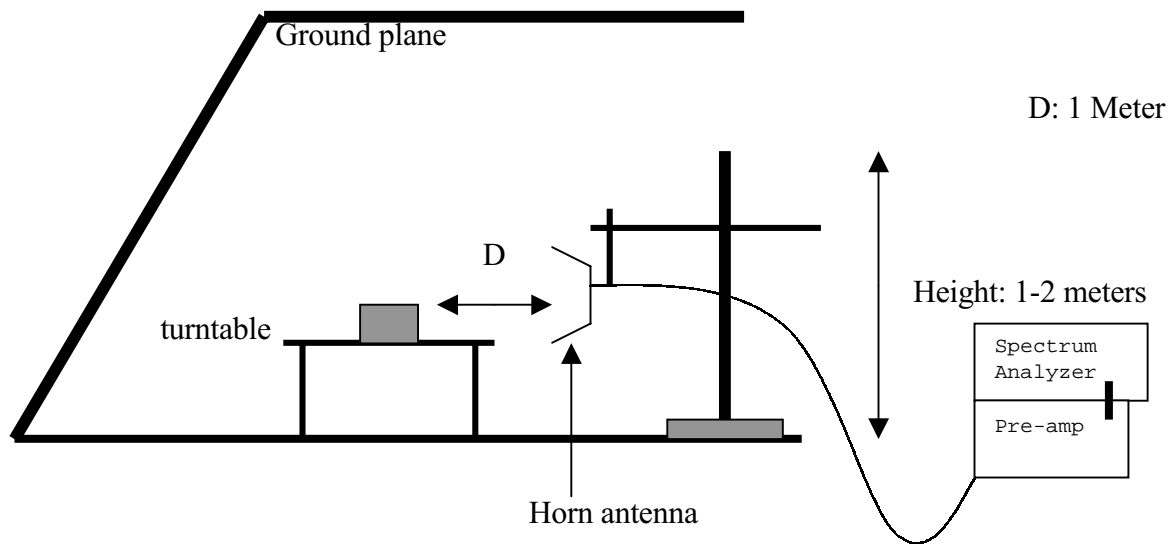


FIG. 2

1. The EUT was placed on a wooden table on the outdoor ground plane. The search antenna was placed 1-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

Powerline RFI Class B	Eut	Radiated Emission Limits	Eut
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 =102.20 mS. >100 mS. use 100 mS for calculation
 Long pulse =0.750 mS
 Short pulse =0.375 mS
 No of Long pulse =38
 No of Short pulse =41

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

Duty Cycle = ((35X0.750)+(43x0.375))/100=0.4388=43.88% or -7.15dB

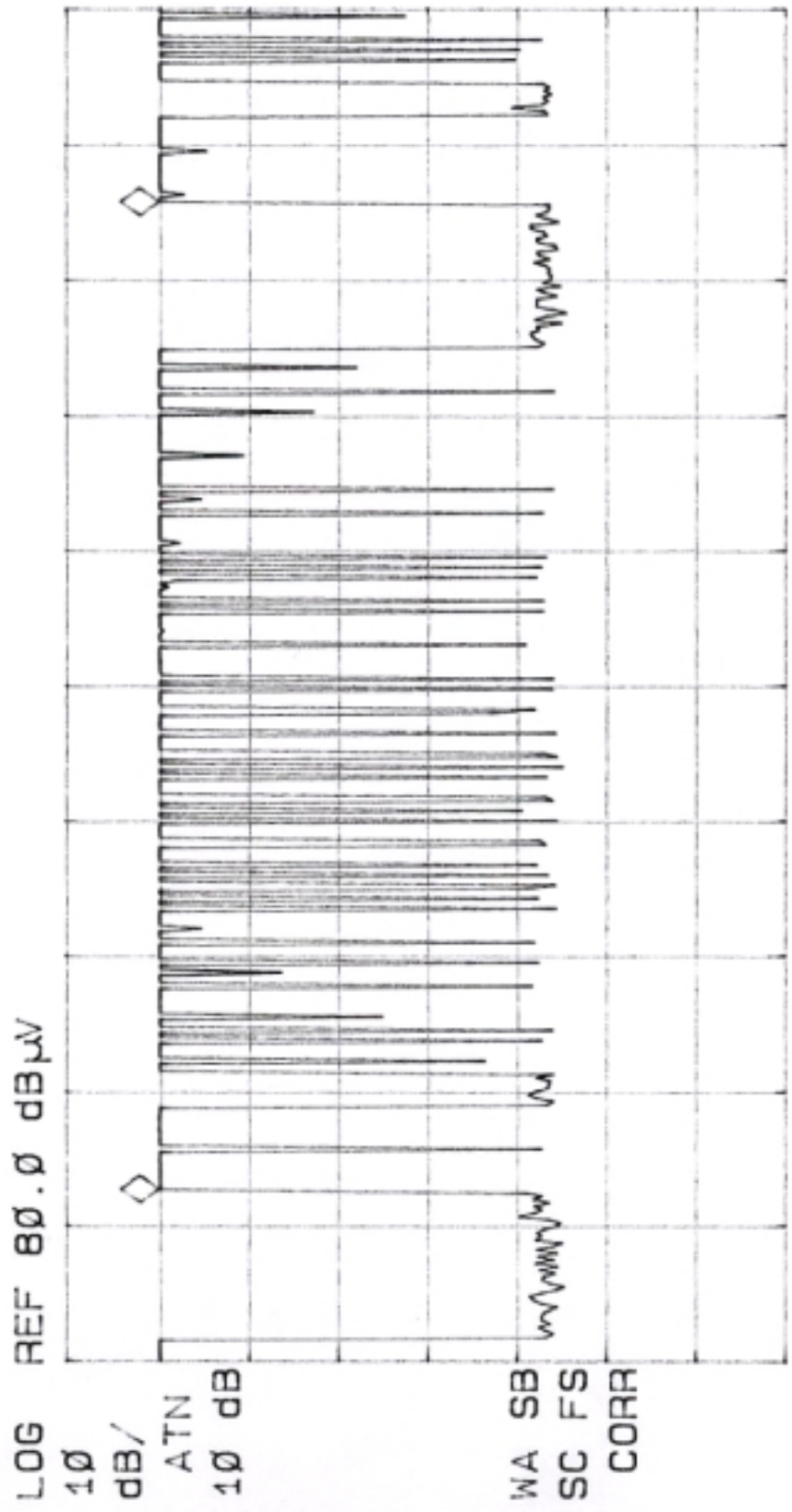
12.2 The Emissions Bandwidth

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

Center Frequency	Measured	Limits
434 MHz	544.4 kHz < (refer to plot)	434X0.25%=1085 kHz

10:26:15 NOV 14, 2000

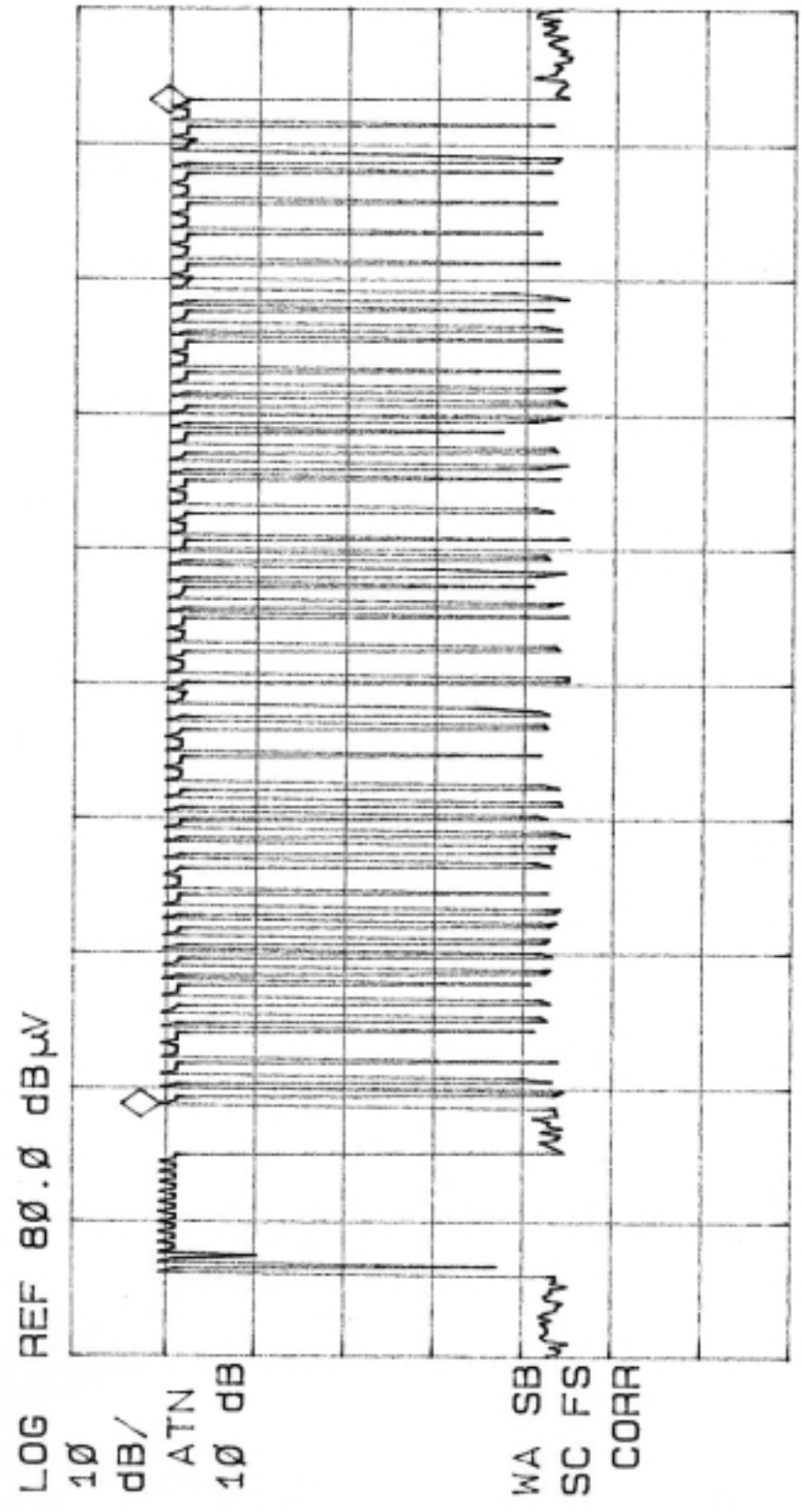
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 102.20 msec
.00 dB



CENTER 433.660 MHz SPAN 0 Hz
IF BW 120 kHz AVG BW 300 kHz #SWP 140 msec

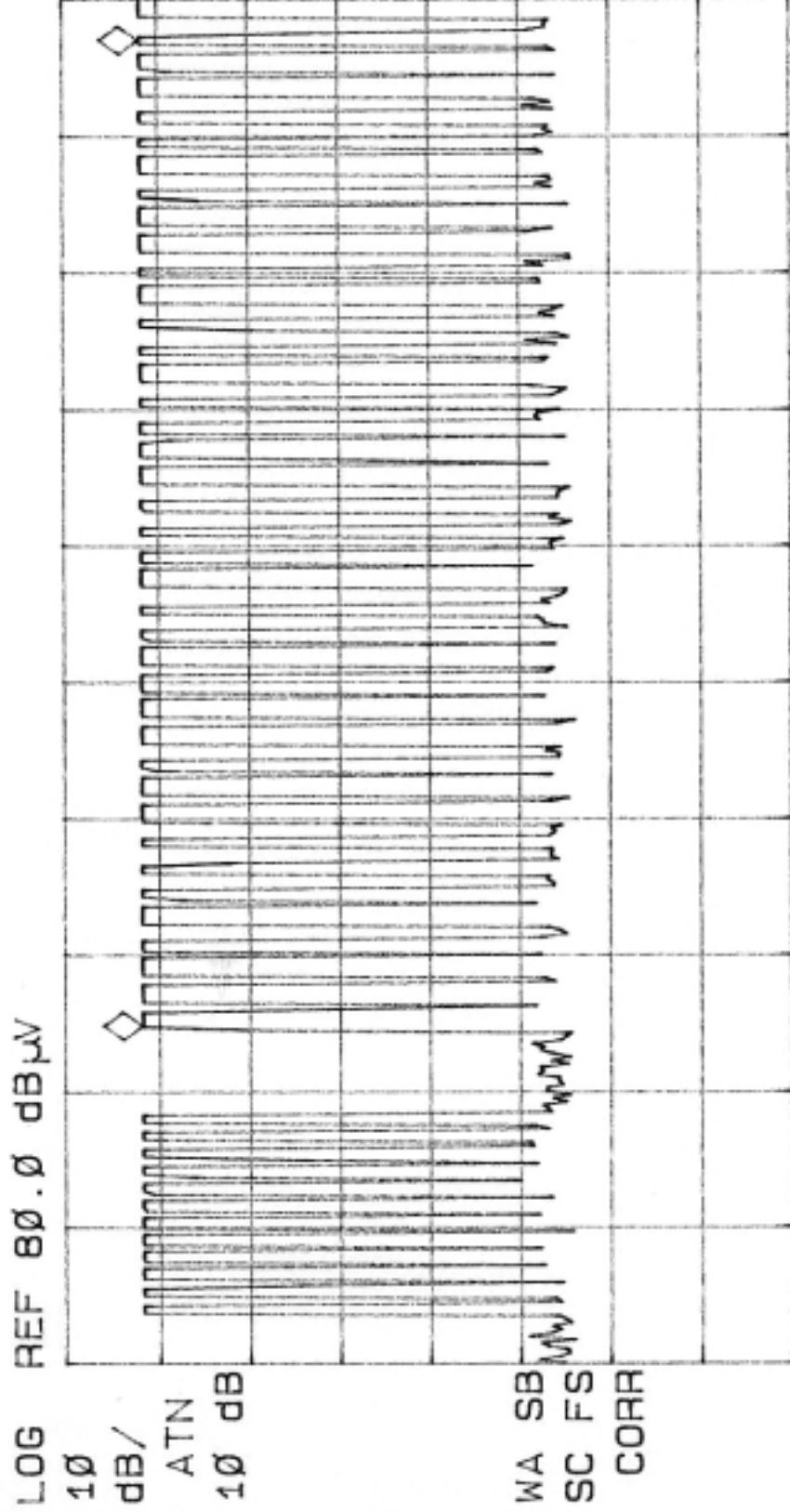
19:39:30 NOV 28, 2000
APD

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 74.500 msec
-2.63 dB



19:57:00 NOV 28, 2000
HP

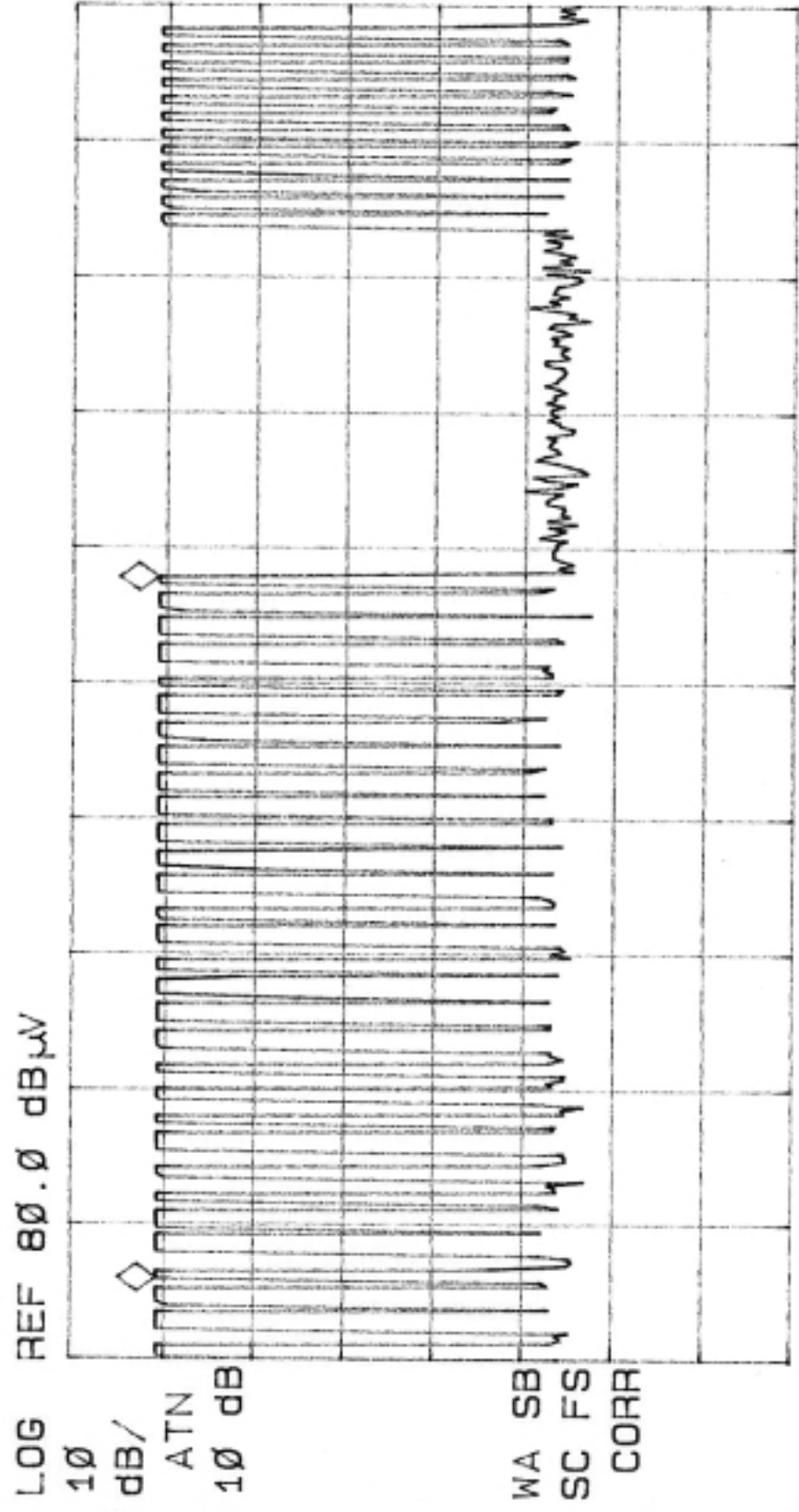
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 43.350 msec
.16 dB



CENTER 433.570 MHZ SPAN 0 HZ
IF BW 120 KHZ AVG BW 300 KHZ #SWP 60.0 msec

20:07:00 NOV 28, 2000

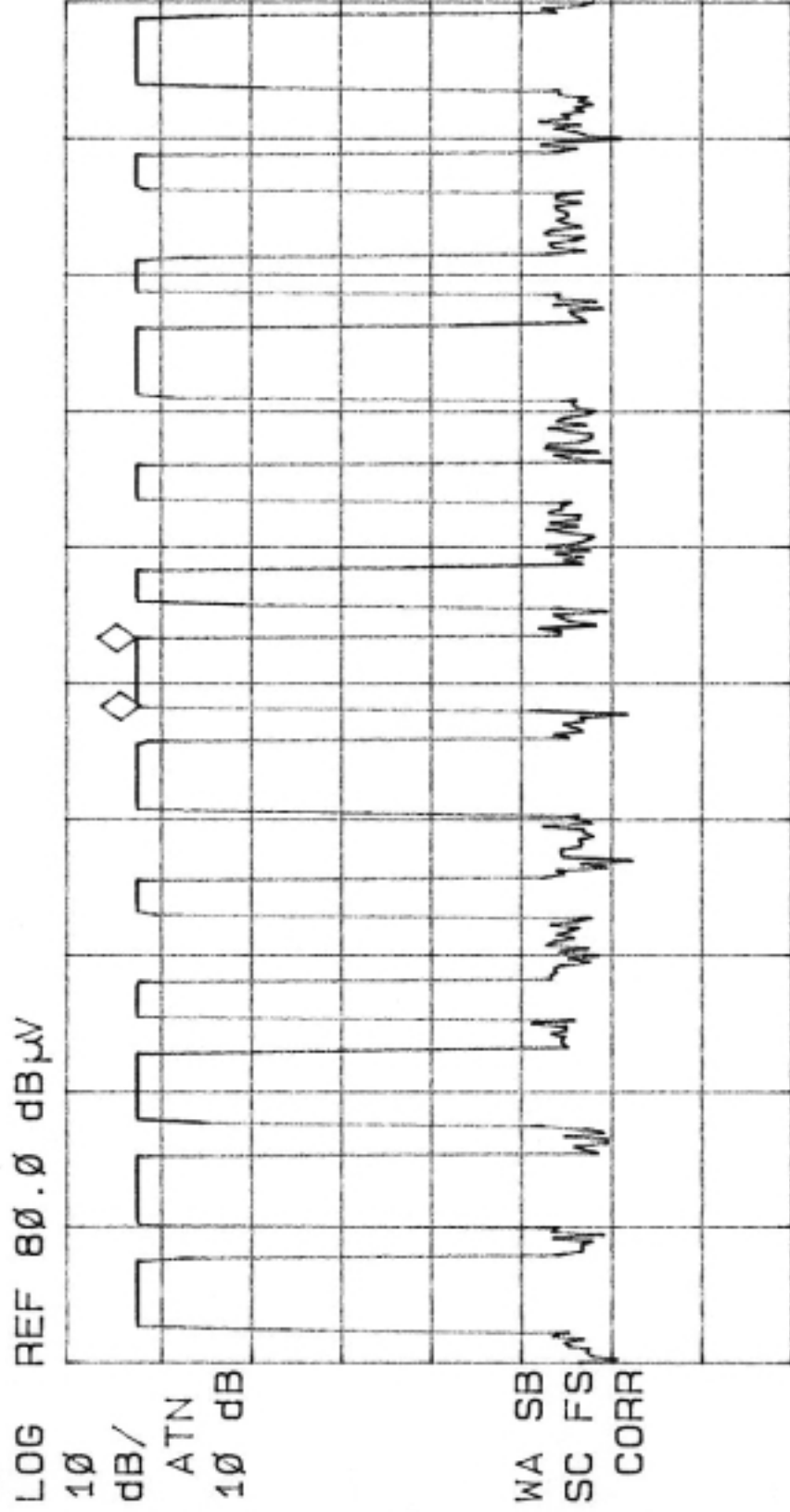
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 31.050 msec
.07 dB



CENTER 433.566 MHz
IF BW 120 kHz
AVG BW 300 kHz
SPAN 0 Hz
#SWP 60.0 msec

11: 28: 57 NOV 14, 2000
AP

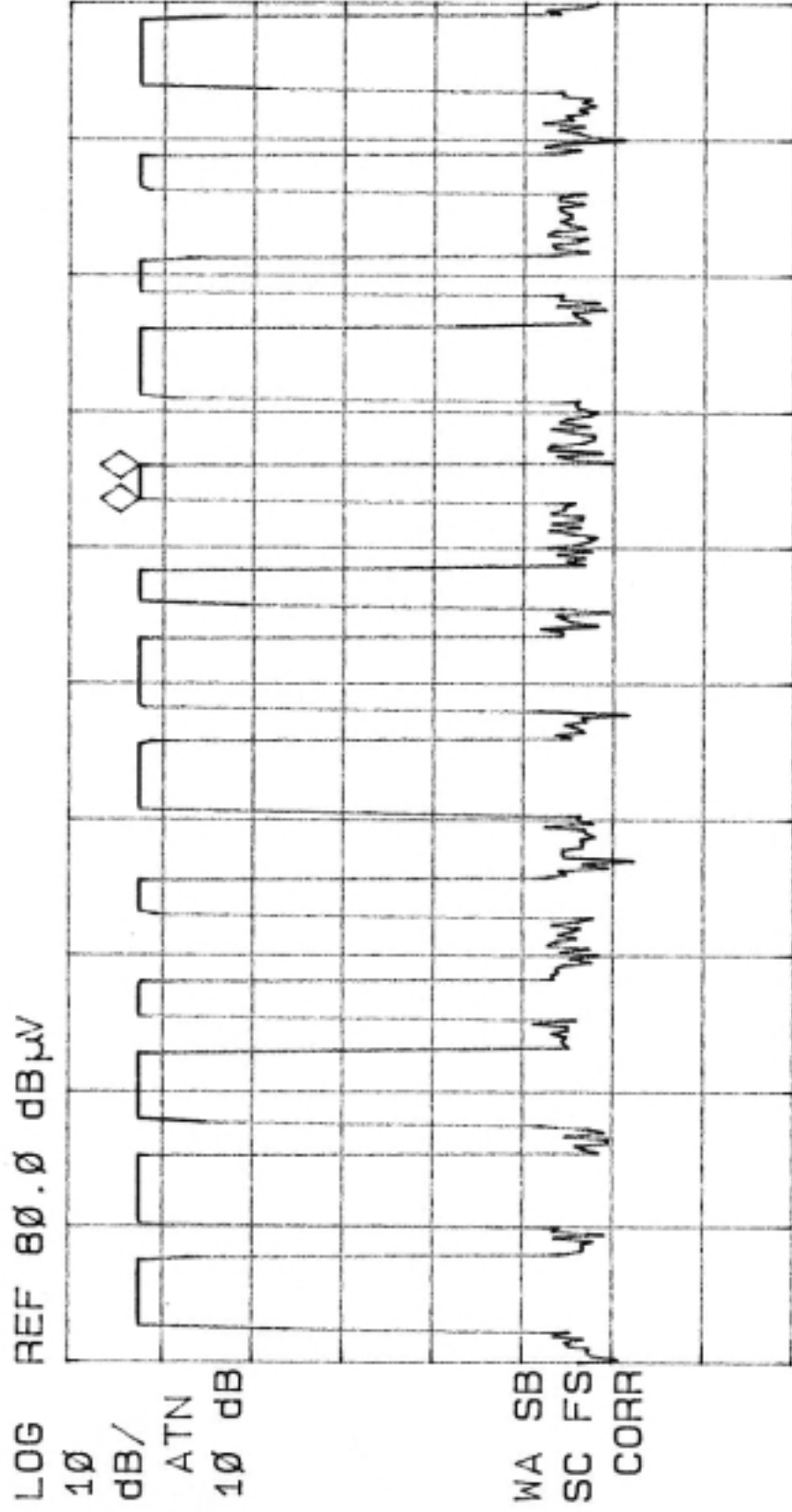
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 750.00 μ sec
.38 dB



CENTER 433.660 MHz SPAN 0 Hz
IF BW 120 kHz AVG BW 300 kHz #SWP 15.0 msec

11:32:21 NOV 14, 2000
hp

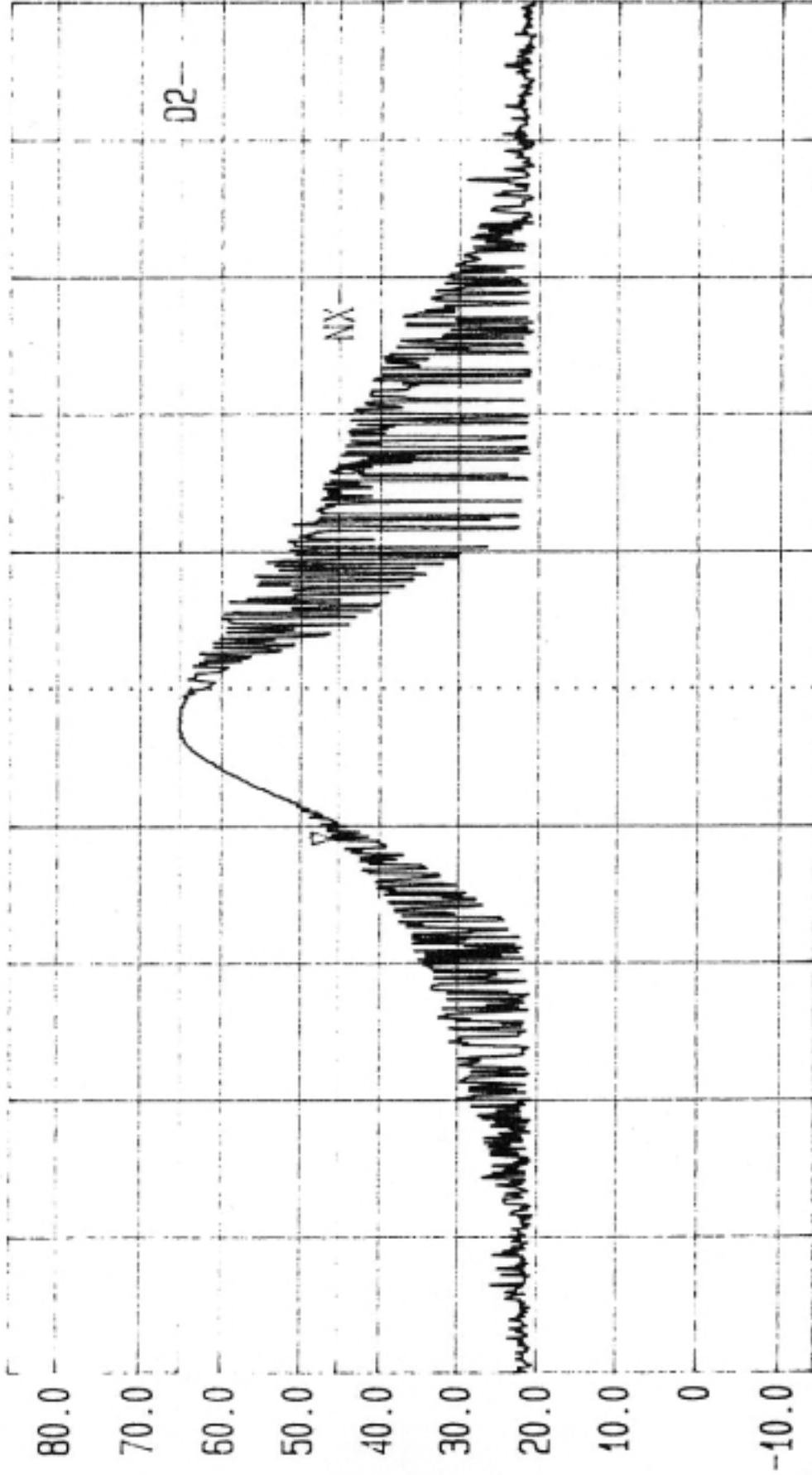
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 375.00 μ sec
.01 dB



CENTER 433.660 MHz SPAN 0 Hz
IF BW 120 KHz AVG BW 300 KHz #SWP 15.0 msec



Ref.Lvl 85.80 dB μ V
Time 22:15:08
Delta -0.36 dB
544.4 kHz
Res.Bw 120 kHz [imp]
TG.Lvl Off
CF.Stp 200.000 kHz
Vid.Bw 300 kHz
AF.Att 10 dB
Unit [dB μ V]



Start 432.837776 MHz
Span 2 MHz
Center 433.837776 MHz
Sweep 20 ms
Stop 434.837776 MHz

N dB down Level 20.0 dB
DELTA MARK 544.4 KHZ



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

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Hsin Tien City, Taipei, Taiwan, R.O.C.
PHONE: 02-2217-0894 FAX: 02-2217-1254

Project #: 00E9119
Report #: 9119D1
Date & Time: 11/16/00
Test Engr: VINCE CHIANG

Company: AUDIOVOX CORPORATION
EUT Description: PROOE4B (Alarm TX / 434MHz)
Test Configuration : EUT ONLY
Type of Test: FCC CLASS B
Mode of Operation: NORMAL MODE

D-Ste

E-Ste

M% = ((t1+t2+t3+...)/T) * 100% = **43.88 %**

Av Reading = Pk Reading + 20*log(M%)
20*log(M%) = **-7.1547**

	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)
	Button #1:											
X	433.66	50.12	42.97	17.49	2.56	21.28	41.74	80.82	-39.08	3mV	90	1.30
	867.27	28.23	21.08	23.34	4.45	20.69	28.18	60.82	-32.64	3mV	90	1.30
Y	432.88	62.76	55.61	17.49	2.56	21.28	54.38	80.82	-26.44	3mV	0	1.40
	866.58	30.13	22.98	23.35	4.45	20.69	30.09	60.82	-30.73	3mV	0	1.40
Z	433.31	62.94	55.79	17.49	2.56	21.28	54.56	80.82	-26.26	3mV	0	1.25
	866.87	27.90	20.75	23.35	4.45	20.69	27.86	60.82	-32.96	3mV	0	1.50
X	433.45	56.92	49.77	17.49	2.56	21.28	48.54	80.82	-32.28	3mH	180	1.25
	866.92	26.58	19.43	23.35	4.45	20.69	26.54	60.82	-34.28	3mH	180	1.30
Y	433.29	55.50	48.35	17.49	2.56	21.28	47.12	80.82	-33.70	3mH	180	1.25
	866.78	23.63	16.48	23.35	4.45	20.69	23.59	60.82	-37.23	3mH	180	1.30
Z	433.15	55.42	48.27	17.49	2.56	21.28	47.04	80.82	-33.78	3mH	0	1.20
	866.02	24.52	17.37	23.34	4.44	20.69	24.46	60.82	-36.36	3mH	0	1.20
	Button #2:											
X	433.45	49.99	42.84	17.49	2.56	21.28	41.61	80.82	-39.21	3mV	0	1.40
	866.80	27.36	20.21	23.35	4.45	20.69	27.32	60.82	-33.50	3mV	0	1.40
Y	432.96	62.05	54.90	17.49	2.56	21.28	53.67	80.82	-27.15	3mV	180	1.30
	866.90	33.89	26.74	23.35	4.45	20.69	33.85	60.82	-26.97	3mV	180	1.30
Z	433.12	61.92	54.77	17.49	2.56	21.28	53.54	80.82	-27.28	3mV	90	1.20
	866.18	30.34	23.19	23.35	4.45	20.69	30.30	60.82	-30.52	3mV	90	1.20
X	432.96	55.65	48.50	17.49	2.56	21.28	47.27	80.82	-33.55	3mH	180	1.25
	866.41	26.22	19.07	23.35	4.45	20.69	26.18	60.82	-34.64	3mH	180	1.15
Y	433.05	54.21	47.06	17.49	2.56	21.28	45.83	80.82	-34.99	3mH	90	1.30
	866.72	25.56	18.41	23.35	4.45	20.69	25.52	60.82	-35.30	3mH	90	1.30
Z	432.82	57.10	49.95	17.49	2.56	21.28	48.72	80.82	-32.10	3mH	0	1.50
	866.02	24.52	17.37	23.34	4.44	20.69	24.46	60.82	-36.36	3mH	0	1.50
	Total data #: 24											

COMPLIANCE

Certification Services

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

No. 199 Chung Sheng Road
Hsin Tien City, Taipei, Taiwan, R.O.C.
PHONE: 02-2217-0894 FAX: 02-2217-1254

Project #: 00E9119
Report #: 9119D2
Date & Time: 11/16/00
Test Engr: VINCE CHIANG

Company: AUDIOVOX CORPORATION
EUT Description: PROOE4B (Alarm TX / 434MHz)
Test Configuration : EUT ONLY
Type of Test: FCC CLASS B
Mode of Operation: NORMAL MODE

D-Ste

E-Ste

$$M\% = ((t1+t2+t3+...)/T) * 100\% = 43.88 \%$$

$$Av \text{ Reading} = Pk \text{ Reading} + 20 * \log(M\%)$$

$$20 * \log(M\%) = -7.1547$$

	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)
	Button #3:											
X	433.70	51.06	43.91	17.50	2.58	21.28	42.71	80.82	-38.11	3mV	180	1.20
	867.35	26.60	19.45	23.37	4.47	20.69	26.60	60.82	-34.22	3mV	180	1.20
Y	433.17	64.01	56.86	17.50	2.56	21.28	55.64	80.82	-25.18	3mV	0	1.30
	866.23	33.36	26.21	23.37	4.45	20.69	33.34	60.82	-27.48	3mV	0	1.30
Z	433.41	62.53	55.38	17.50	2.56	21.28	54.16	80.82	-26.66	3mV	90	1.25
	866.85	34.75	27.60	23.37	4.45	20.69	34.73	60.82	-26.09	3mV	90	1.30
X	433.28	58.56	51.41	17.50	2.56	21.28	50.19	80.82	-30.63	3mH	180	1.25
	867.00	30.00	22.85	23.37	4.45	20.69	29.98	60.82	-30.84	3mH	180	1.30
Y	433.38	55.35	48.20	17.50	2.56	21.28	46.98	80.82	-33.84	3mH	90	1.25
	866.93	26.78	19.63	23.37	4.45	20.69	26.76	60.82	-34.06	3mH	90	1.25
Z	433.14	57.81	50.66	17.50	2.56	21.28	49.44	80.82	-31.38	3mH	0	1.10
	866.62	29.17	22.02	23.37	4.45	20.69	29.15	60.82	-31.67	3mH	0	1.10
	Button #4:											
X	433.65	52.22	45.07	17.50	2.58	21.28	43.87	80.82	-36.95	3mV	180	1.30
	867.28	26.25	19.10	23.37	4.47	20.69	26.25	60.82	-34.57	3mV	180	1.30
Y	433.13	62.18	55.03	17.50	2.56	21.28	53.81	80.82	-27.01	3mV	90	1.40
	866.93	34.40	27.25	23.37	4.47	20.69	34.40	60.82	-26.42	3mV	90	1.40
Z	433.41	63.35	56.20	17.50	2.56	21.28	54.98	80.82	-25.84	3mV	0	1.20
	866.91	36.28	29.13	23.37	4.47	20.69	36.28	60.82	-24.54	3mV	0	1.20
X	433.44	58.70	51.55	17.50	2.56	21.28	50.33	80.82	-30.49	3mH	0	1.30
	866.91	29.42	22.27	23.37	4.45	20.69	29.40	60.82	-31.42	3mH	0	1.30
Y	433.42	56.21	49.06	17.50	2.56	21.28	47.84	80.82	-32.98	3mH	90	1.20
	866.57	28.35	21.20	23.37	4.45	20.69	28.33	60.82	-32.49	3mH	90	1.20
Z	433.07	59.16	52.01	17.50	2.56	21.28	50.79	80.82	-30.03	3mH	180	1.40
	867.01	27.90	20.75	23.37	4.44	20.69	27.87	60.82	-32.95	3mH	180	1.40
	Total data #: 24											



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

1366 BORDEAUX DRIVE, SUNNYVALE, CA 94089
PHONE: (408) 752-8166 FAX: (408) 752-8168

Project #: 00E9119
Report #: 9119D3
Date & Time: 11/16/00
Test Engr: Vince Chiang

Company: AUDIOVOX CORPORATION
EUT Description: PROOE4B (Alarm TX / 434MHz)
Test Configuration : EUT ONLY
Type of Test: FCC CLASS B
Mode of Operation: NORMAL MODE

D Site

E Site

6 Worst

Descending

Freq. (MHz)	Reading (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Dist (dB)	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)	Mark (P/Q/A)
1300	51.33	25.1	2.8	43.27	-9.5	26.51	74.0	-47.49	1mV	180	1.1	P
1300	41.94	24.8	2.8	43.27	-9.5	16.81	54.0	-37.19	1mV	180	1.1	A
1733	49.90	26.1	3.3	43.04	-9.5	26.78	74.0	-47.22	1mV	90	1.0	P
1733	39.04	25.8	3.3	43.04	-9.5	15.57	54.0	-38.43	1mV	90	1.0	A
1300	54.01	25.1	2.8	43.27	-9.5	29.15	74.0	-44.85	1mH	270	1.0	P
1302	45.67	24.8	2.8	43.27	-9.5	20.50	54.0	-33.50	1mH	270	1.0	A
1733	50.89	26.1	3.3	43.04	-9.5	27.75	74.0	-46.25	1mH	270	1.0	P
1733	41.83	25.8	3.3	43.04	-9.5	18.36	54.0	-35.64	1mH	270	1.0	A

* No other emission were found within 20dB under the limits upto 4.5 GHz.

Total data #: 8
V.2d

Peak: RBW=VBW=1MHz
Average: RBW=1MHz, VBW=10Hz

Distance = $20\log(1/3) = -9.5\text{dB}$