

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

*for*

**INTENTIONAL RADIATOR**

**434 MHz CAR ALARM TRANSMITTER**

**MODEL NO: ELVYT0A**

**FCC ID NO: ELVYT0A**

**REPORT NO: 00E9185**

**ISSUE DATE: DECEMBER 28, 2000**

*Prepared for*

**NUTEK CORPORATION  
5F, NO. 3, ALLEY 6, LANE 45, PAO-HSING ROAD,  
HSING-TIEN CITY, TAIPEI, TAIWAN, R. O. C.**

*Prepared by*

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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: NUTEK CORPORATION  
5F, NO. 3, ALLEY 6, LANE 45, PAO-HSING ROAD.,  
HSING-TIEN CITY, TAIPEI, TAIWAN, R. O. C.

CONTACT PERSON: RUBY HSIEH

TELEPHONE NO.: (02) 2918-9478

EUT DESCRIPTION: 434 MHz CAR ALARM TRANSMITTER

MODEL NAME/NUMBER: ELVYT0A

FCC ID: ELVYT0A

DATE TESTED: DECEMBER 13, 2000 ~ DECEMBER 20, 2000

REPORT NUMBER: 00E9185

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.

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## 2. Product Description

Fundamental Frequency	<b>434 MHz</b>
Power Source	<b>3V Battery</b>
Transmitting Time	<b>Periodic <math>\leq</math> 5 seconds</b>
Associated Receiver	<b>MODEL:282058 (FCC-DOC)</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
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**

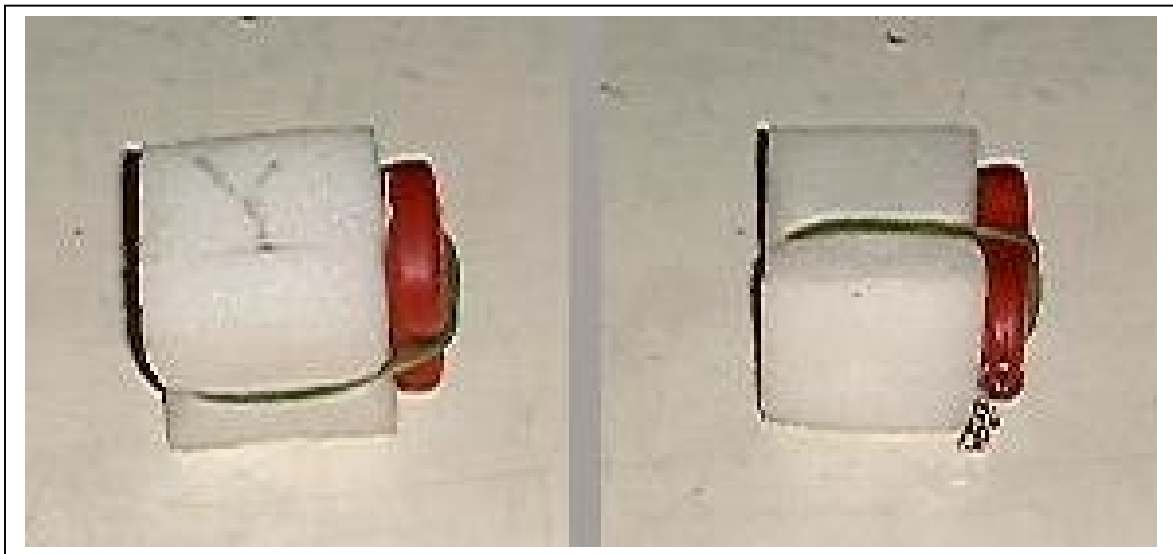
CONNECTED TO AC POWER LINE	SECTION 15.207
CARRIER CURRENT SYSTEM IN THE FREQUENCY RANGE OF 450 kHz TO 30 MHz	SECTION 15.205 AND SECTION 15.209, 15.221, 15.223, 15.225 OR 15.227, AS APPROPRIATE.
BATTERY POWER	NO REQUIRED.

**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

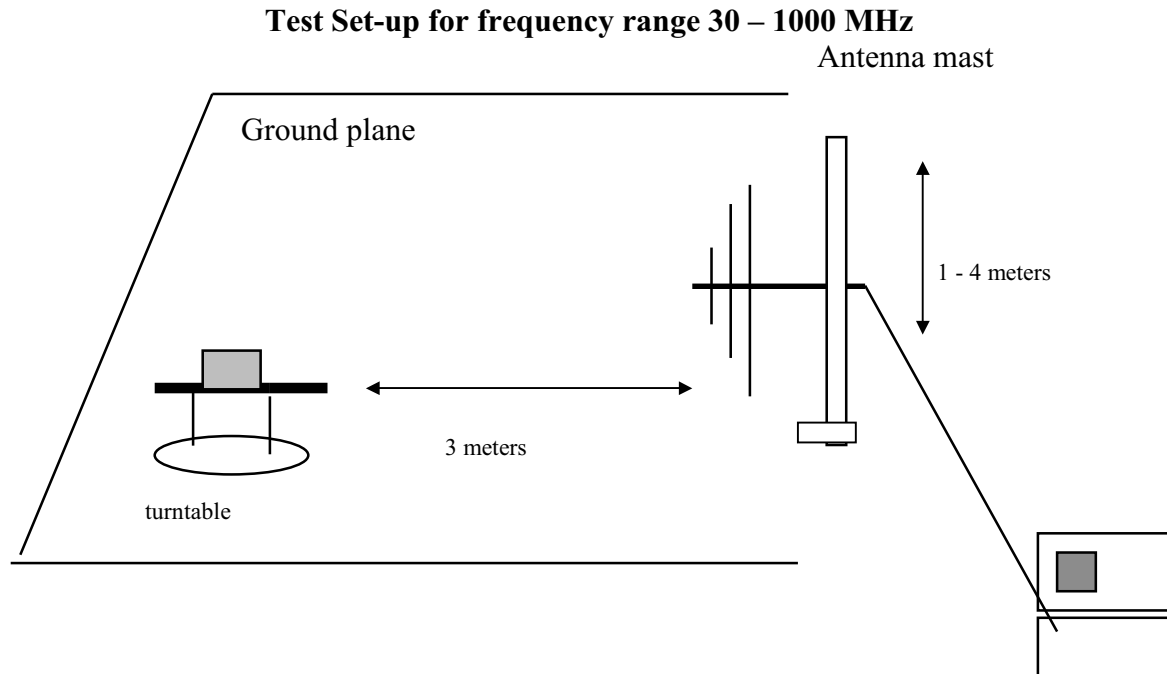
## 9. SYSTEM TEST CONFIGURATION

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

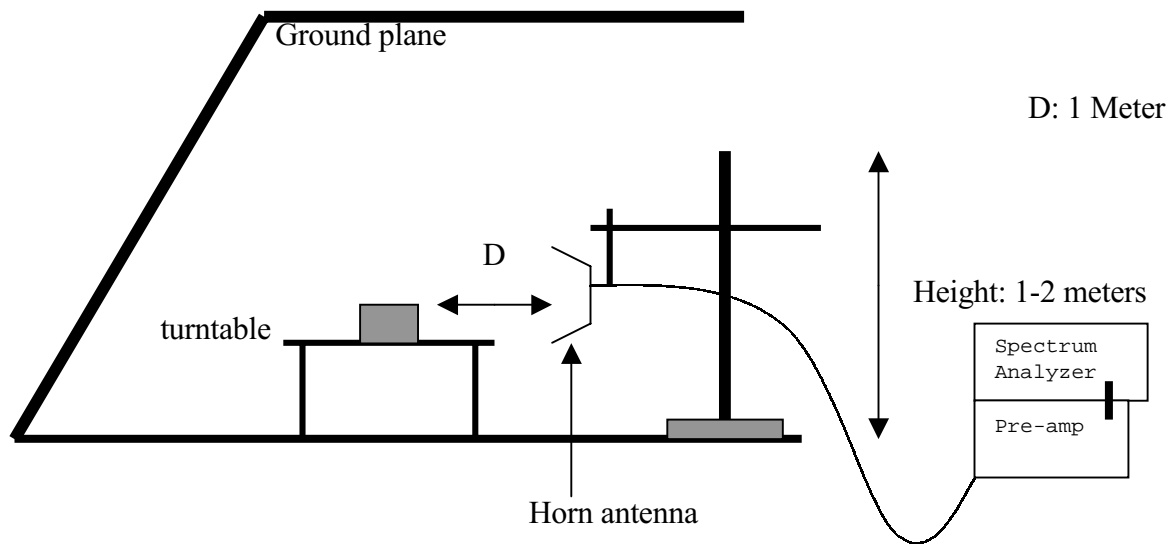


FIG. 2

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**

<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                      =99.911 mS.  
                  Long pulse                      =0.867 mS  
                  Short pulse                      =0.400 mS  
                  No of Long pulse              =4  
                  No of Short pulse              =27

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

Duty Cycle = ((4X0.867)+(27X0.400))/99.911=0.1428=14.28% or -16.91dB

**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>434 MHz</b>	<b>364.4 kHz &lt; (refer to plot)</b>	<b>434X0.25%=1085 kHz</b>



TRG

Date 13.Dec.'00 Time 20:17:14

Ref.Lvl 100.00 dBuV

Delta -0.02 dB

99.911 ms

Res.Bw 120 kHz [imp]

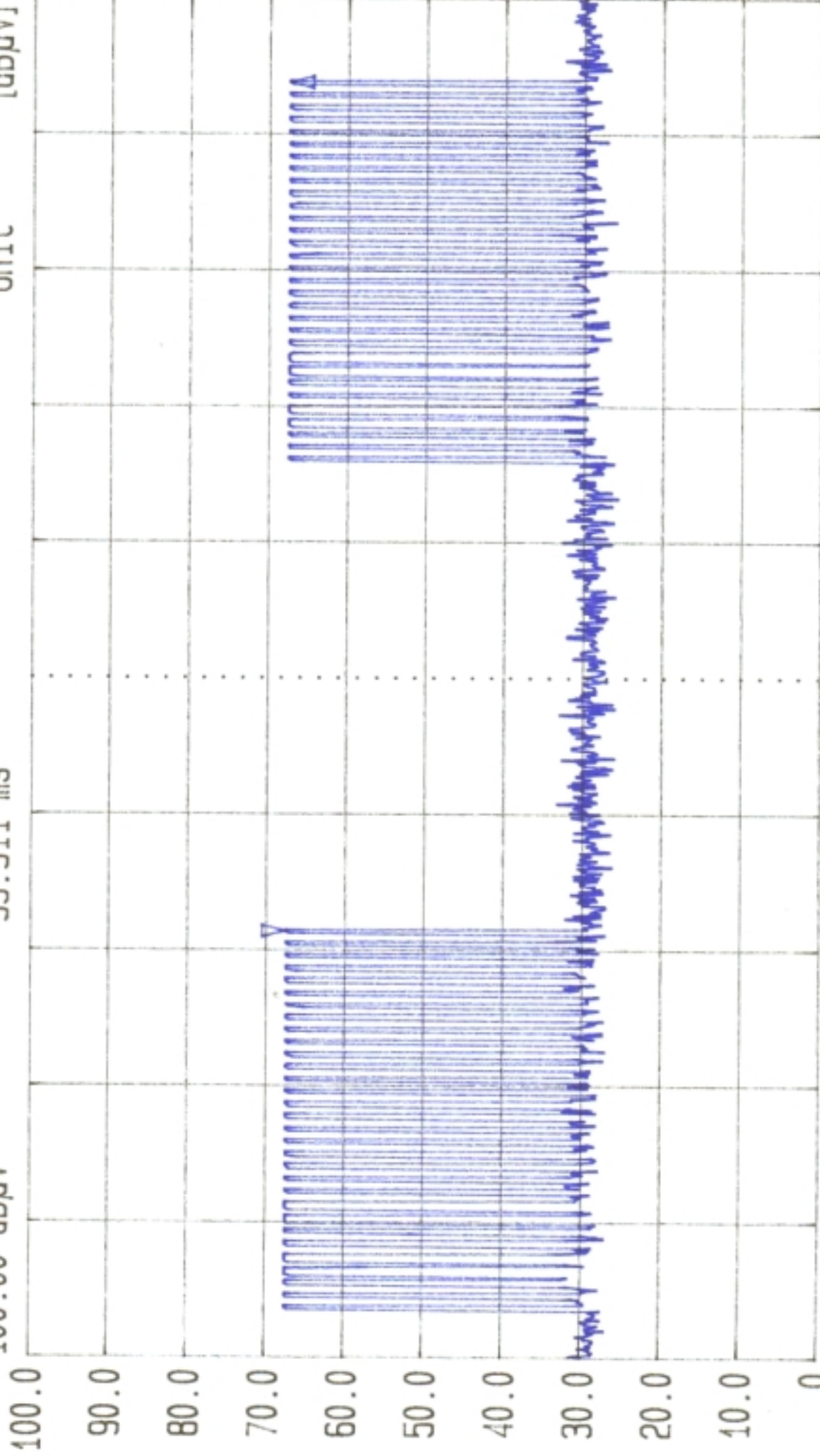
TG.Lvl1 off

CF.Stp 22.580 MHz

Vid.Bw 300 kHz

RF.Att Unit

10 dB [dBuV]



Span 0 Hz

Center 433.888888 MHz

Sweep 160 ms

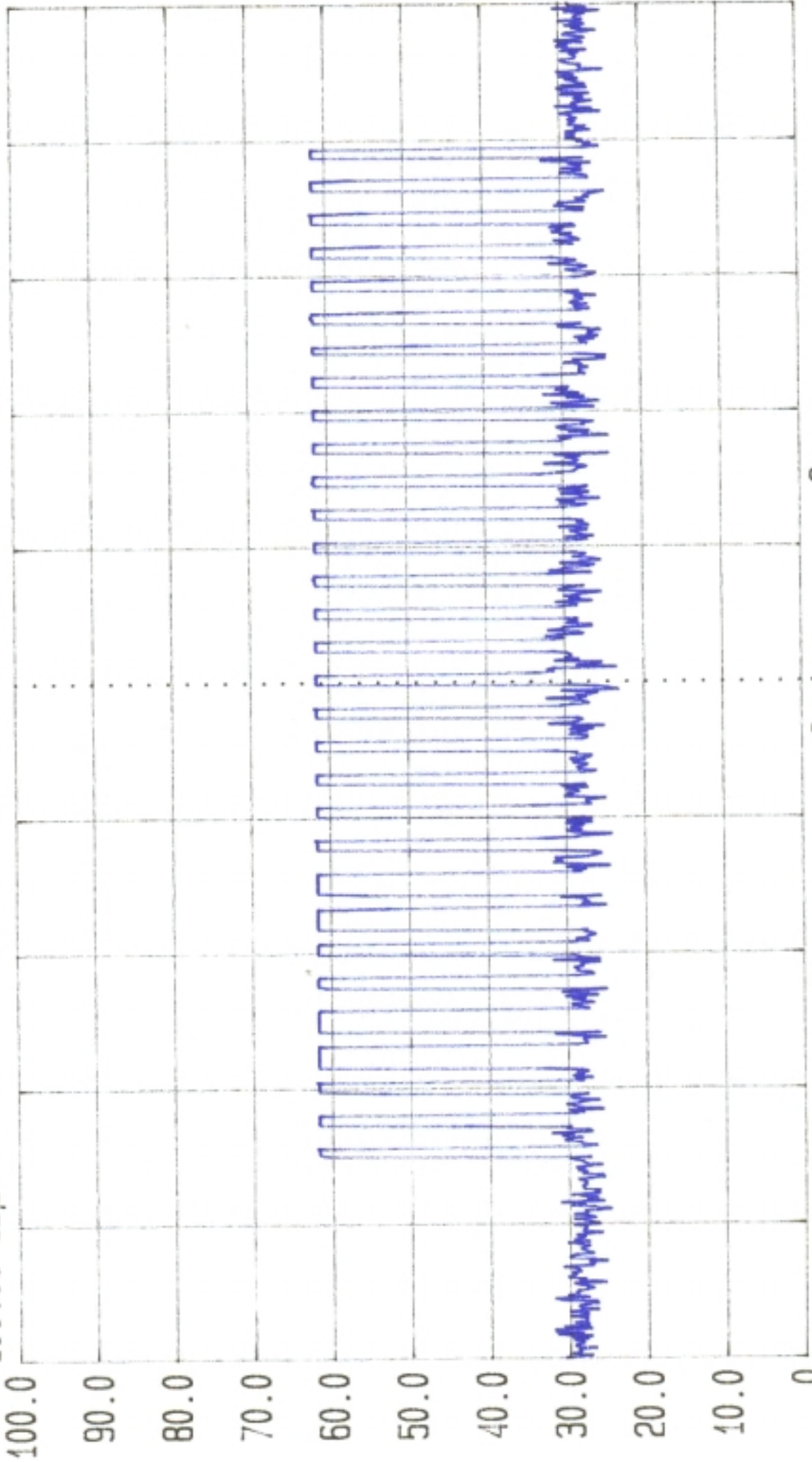


Date 13.Dec.'00 Time 20:22:17

Ref.Lvl  
100.00 dB $\mu$ V

TRG

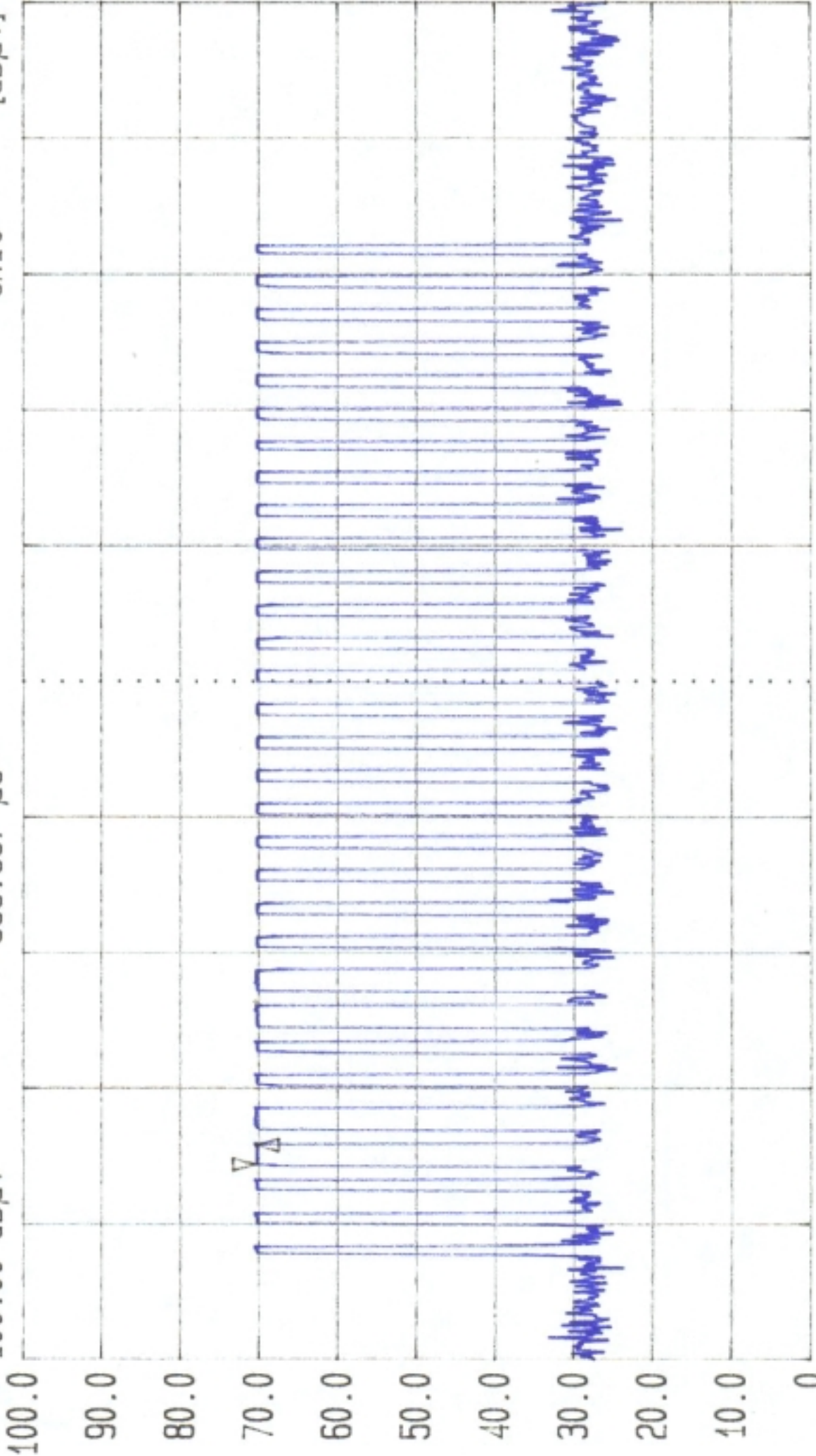
Res.Bw 120 kHz [imp]  
TG.Lvl Off  
CF.Stp 22.580 MHz  
Vid.Bw 300 kHz  
RF.Att Unit



Span 0 Hz  
Center 433.888888 MHz  
Sweep 60 ms



Date 13.Dec.'00 Time 20:28:15  
Ref.Lvl 100.00 dBuV Delta 0.18 dB  
866.667  $\mu$ s  
TAG  
Res.Bw 120 kHz [imp] TG.Lvl Off  
CF.Stp 22.580 MHz  
Vid.Bw 300 kHz  
RF.Att 10 dB  
Unit



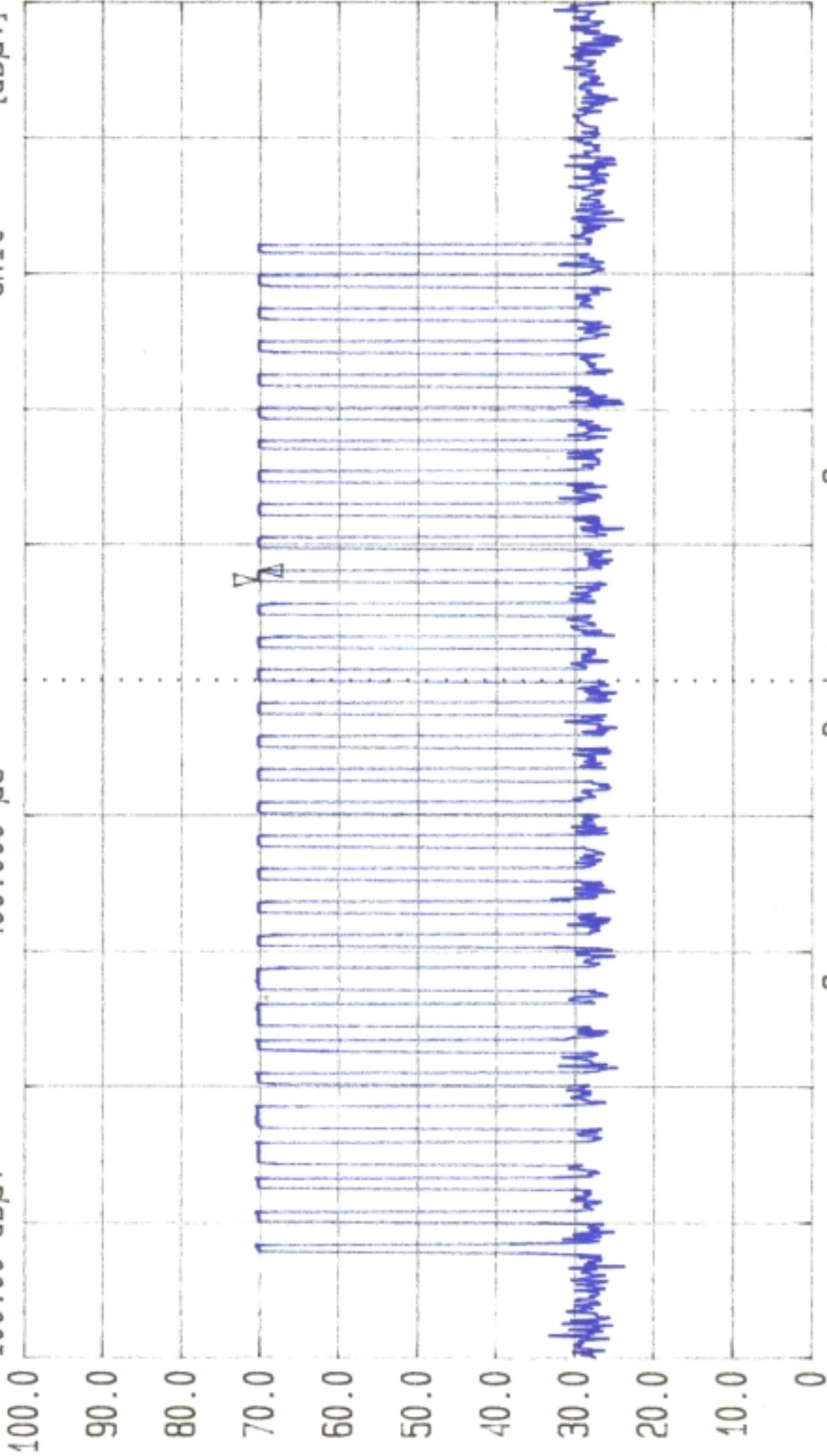
Span 0 Hz  
Center 433.888888 MHz  
Sweep 60 ms



Date 13.Dec.'00 Time 20:32:37  
Ref.Lvl Delta 0.21 dB  
100.00 dB $\mu$ V 400.000  $\mu$ s

TRG  
Res.Bw 120 kHz [imp]  
TG.Lvl1 Off  
CF.Stp 22.580 MHz

Vid.Bw 300 kHz  
RF.Att 10 dB  
Unit [dB $\mu$ V]

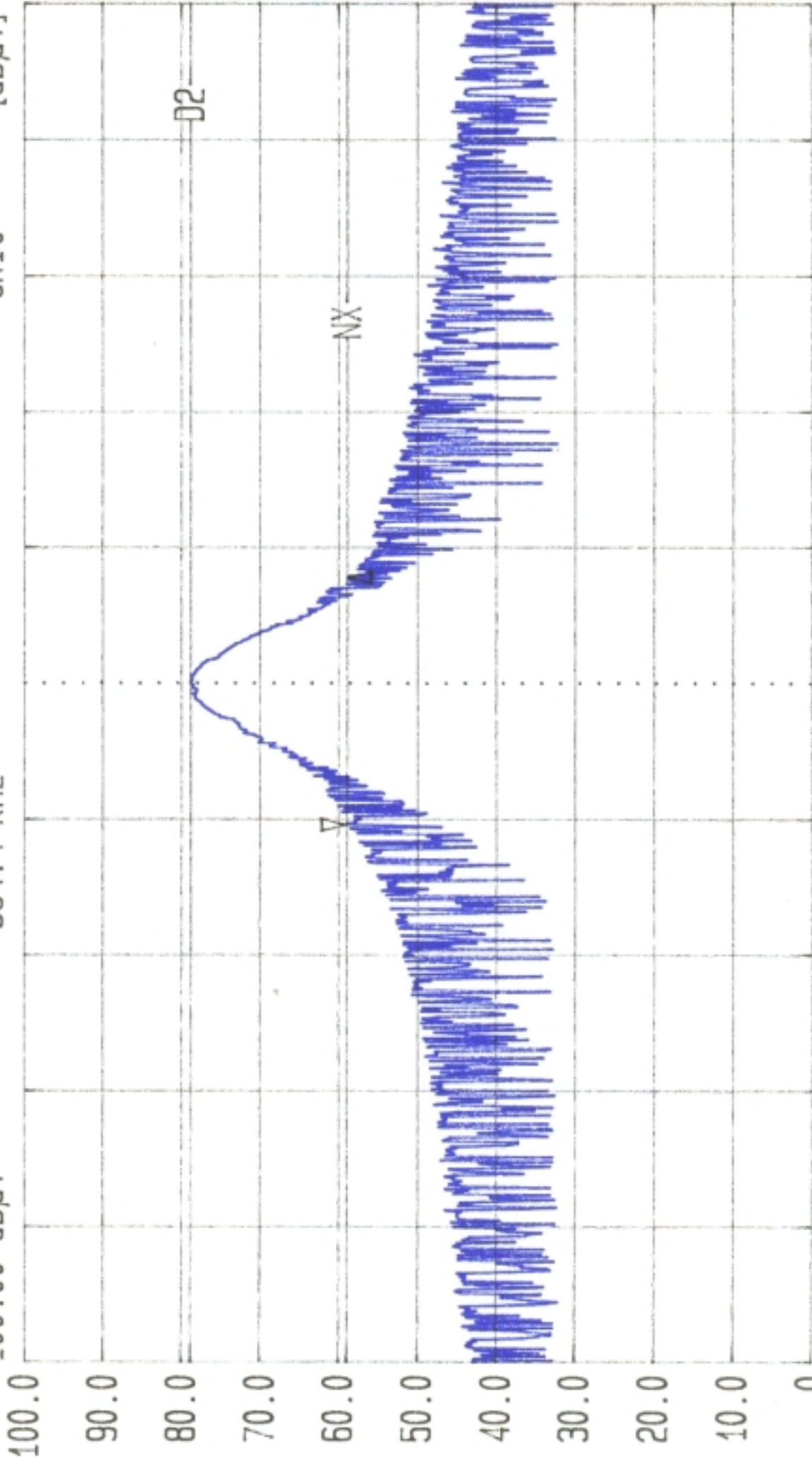


Span 0 Hz  
Center 433.888888 MHz  
Sweep 60 ms



Date 13.Dec.'00 Time 20:39:00  
Ref.Lvl Delta -0.38 dB  
100.00 dBuV 364.4 kHz

Res.Bw 120 kHz [imp] Vid.Bw 300 kHz  
TG.Lvl Off  
CF.Stp 22.580 MHz RF.Att 10 dB  
Unit [dBuV]



Start 432.888888 MHz Stop 434.888888 MHz  
Center 433.888888 MHz  
Span 2 MHz Sweep 60 ms

N dB down Level 20.0 dB  
DELTA MARK 364.4 KHZ



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

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**Project #:** 00E9185  
**Report #:** 9185D1  
**Date & Time:** 12/14/00  
**Test Engr:** MICHAEL HUNG

**Company:** NUTEK CORPORATION  
**EUT Description:** ELVYT0A (Alarm Tx / 434MHz)  
**Test Configuration :** EUT ONLY  
**Type of Test:** FCC 15.231  
**Mode of Operation:** NORMAL MODE

D-Ste

E-Ste

M% = ((t1+t2+t3+...)/T) \* 100% = **14.28 %**

Av Reading = Pk Reading + 20\*log(M%)  
20\*log(M%) = **-16.905**

	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	433.89	61.01	44.10	17.50	2.58	21.28	42.90	80.82	-37.92	3mV	180	1.20
	867.77	33.10	16.19	23.37	4.47	20.69	23.34	60.82	-37.48	3mV	180	1.30
Y	433.89	74.29	57.38	17.50	2.58	21.28	56.18	80.82	-24.64	3mV	90	1.10
	867.79	31.35	14.44	23.37	4.47	20.69	21.59	60.82	-39.23	3mV	0	1.30
Z	433.89	74.60	57.69	17.50	2.58	21.28	56.49	80.82	-24.33	3mV	0	1.25
	867.78	38.31	21.40	23.37	4.47	20.69	28.55	60.82	-32.27	3mV	180	1.40
X	433.89	73.81	56.90	17.50	2.58	21.28	55.70	80.82	-25.12	3mH	90	1.25
	867.79	38.66	21.75	23.37	4.47	20.69	28.90	60.82	-31.92	3mH	90	1.30
Y	433.89	70.25	53.34	17.50	2.58	21.28	52.14	80.82	-28.68	3mH	180	1.40
	867.78	33.59	16.68	23.37	4.47	20.69	23.83	60.82	-36.99	3mH	180	1.25
Z	433.88	71.02	54.11	17.50	2.58	21.28	52.91	80.82	-27.91	3mH	0	1.20
	867.82	31.15	14.24	23.37	4.47	20.69	21.39	60.82	-39.43	3mH	0	1.15
	Button #2:											
X	433.89	58.42	41.51	17.50	2.58	21.28	40.31	80.82	-40.51	3mV	90	1.30
	867.80	37.04	20.13	23.37	4.47	20.69	27.28	60.82	-33.54	3mV	90	1.30
Y	433.90	77.01	60.10	17.50	2.58	21.28	58.90	80.82	-21.92	3mV	0	1.20
	867.80	35.29	18.38	23.37	4.47	20.69	25.53	60.82	-35.29	3mV	0	1.20
Z	433.90	74.62	57.71	17.50	2.58	21.28	56.51	80.82	-24.31	3mV	90	1.30
	867.81	43.59	26.68	23.37	4.47	20.69	33.83	60.82	-26.99	3mV	90	1.35
X	433.91	73.48	56.57	17.50	2.58	21.28	55.37	80.82	-25.45	3mH	0	1.30
	867.79	37.37	20.46	23.37	4.47	20.69	27.61	60.82	-33.21	3mH	0	1.20
Y	433.89	70.61	53.70	17.50	2.58	21.28	52.50	80.82	-28.32	3mH	180	1.30
	867.80	32.24	15.33	23.37	4.47	20.69	22.48	60.82	-38.34	3mH	180	1.10
Z	433.89	70.94	54.03	17.50	2.58	21.28	52.83	80.82	-27.99	3mH	0	1.20
	867.78	26.58	9.67	23.37	4.47	20.69	16.82	60.82	-44.00	3mH	0	1.25
	Total data #: 24											



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

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*Project #:* 00E9185  
*Report #:* 9185D2  
*Date & Time:* 12/20/2000  
*Test Engr:* Michael Hung

*Company:* NUTEK CORPORATION  
*EUT Description:* ELVYT0A (Alarm Tx / 434MHz)  
*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      Descendin

Freq.	Pk Rdg	Av Rdg	AF	Closs	Pre-amp	Dist	Level	Limit	Margin	Pol	Az	Height	Mark
(MHz)	(dBuV)	(dBuV)	(dB)	(dB)	(dB)	(dB)	(dBuV/m)	FCC_B	(dB)	(H/V)	(Deg)	(Meter)	(P/Q/A)
1090	78.32	61.42	24.9	2.6	43.38	-9.5	35.99	54.0	-18.02	1mV	0	1.2	P
1302	68.88	51.98	24.8	2.8	43.27	-9.5	26.86	54.0	-27.15	1mV	0	1.2	P
1736	46.93	30.03	25.8	3.3	43.04	-9.5	6.56	60.8	-54.27	1mH	270	1.2	A
2170	36.60	19.70	27.6	3.7	42.82	-9.5	-1.36	60.8	-62.18	1mH	270	1.2	A
2603	34.95	18.05	29.6	3.9	42.59	-9.5	-0.52	60.8	-61.33	1mH	270	1.2	A
1090	66.17	49.27	24.9	2.6	43.38	-9.5	23.84	54.0	-30.17	1mV	0	1.2	P
1302	68.06	51.16	24.8	2.8	43.27	-9.5	26.04	54.0	-27.97	1mV	0	1.2	P
1736	49.68	32.78	25.8	3.3	43.04	-9.5	9.31	60.8	-51.52	1mH	270	1.2	A
2170	42.59	25.69	27.6	3.7	42.82	-9.5	4.64	60.8	-56.19	1mH	270	1.2	A
2603	39.96	23.06	29.6	3.9	42.59	-9.5	4.48	60.8	-56.32	1mH	270	1.2	A

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

Total data #:10  
V.2d

P(Peak): RBW=VBW=1MHz  
A(Average): Pk Reading - 16.905dB

Distance = 20log(1/3)= -9.5dB