

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

*for*

**INTENTIONAL RADIATOR**

**303 MHz CAR ALARM TRANSMITTER**

**MODEL NO: TX-22-2**

**FCC ID NO: KFRTX-22-2**

**REPORT NO: 00E8935**

**ISSUE DATE: SEPTEMBER 19, 2000**

*Prepared for*

**VISION AUTOMOBILE ELECTRONICS INDUSTRIAL CO., LTD.  
NO. 17, ALLEY 92, LANE 189, SEC. 1,  
AN CHUNG RD., TAINAN,  
TAIWAN, R.O.C.**

*Prepared by*

**COMPLIANCE ENGINEERING SERVICES, INC.**

*d.b.a.*

**COMPLIANCE CERTIFICATION SERVICES**

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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: VISION AUTOMOBILE ELECTRONICS  
INDUSTRIAL CO., LTD.  
NO. 17, ALLEY 92, LANE 189, SEC. 1,  
AN CHUNG RD., TAINAN, TAIWAN, R.O.C.

CONTACT PERSON: WANG TSUNG CHIN / ENGINEER

TELEPHONE NO.: 06-255-1269

EUT DESCRIPTION: 303 MHz CAR ALARM TRANSMITTER

MODEL NAME/NUMBER: TX-22-2

FCC ID: KFRTX-22-2

DATE TESTED: SEPTEMBER 4, 2000 ~ SEPTEMBER 14, 2000

REPORT NUMBER: 00E8935

TYPE OF EQUIPMENT	SECURITY EQUIPMENT (INTENTIONAL RADIATOR)
EQUIPMENT TYPE	303 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

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## 2. Product Description

Fundamental Frequency	<b>303 MHz</b>
Power Source	<b>6V Battery</b>
Transmitting Time	<b>Periodic <math>\leq</math> 5 seconds</b>
Associated Receiver	<b>FCC ID: KFR-IHS-01SS</b>

## 3. Test Facility

The 3/10/30 meter open area test site and conducted measurement facility used to collect the radiated data is located at 561F Monterey Road, Morgan Hill, California, U.S.A. A detailed description of the test facility was submitted to the Commission on May 27,1994.

## 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
H.P.	8595EM	Spectrum Analyzer (9KHz – 6.5GHz)	01/01
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**

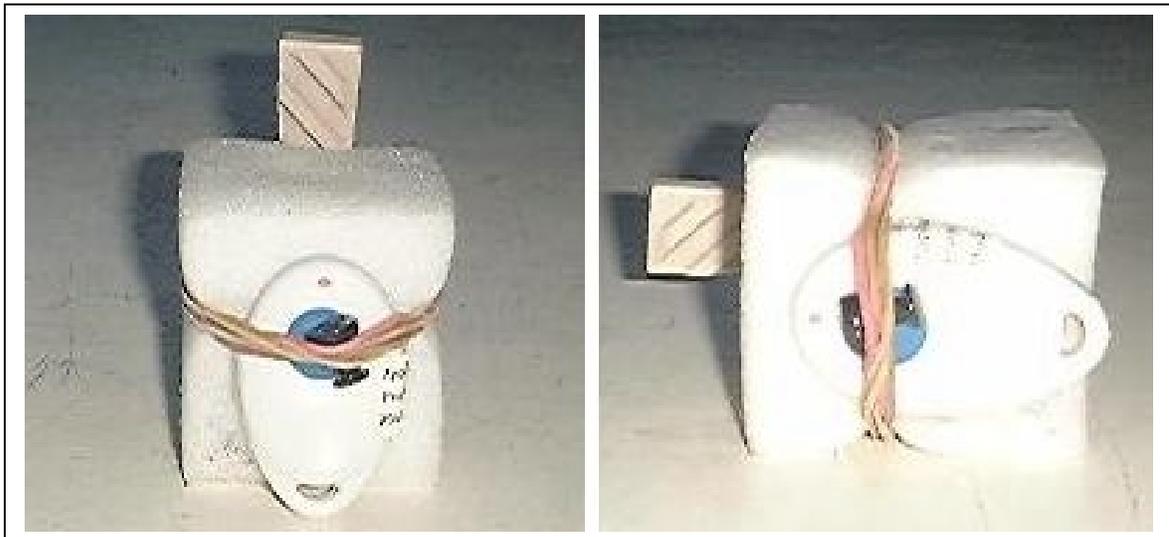
CONNECTED TO AC POWER LINE	SECTION 15.207
CARRIER CURRENT SYSTEM IN THE FREQUENCY RANGE OF 450 kHz TO 30 MHz	SECTION 15.205 AND SECTION 15.209, 15.221, 15.223, 15.225 OR 15.227, AS APPROPRIATE.
BATTERY POWER	NO REQUIRED.

**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

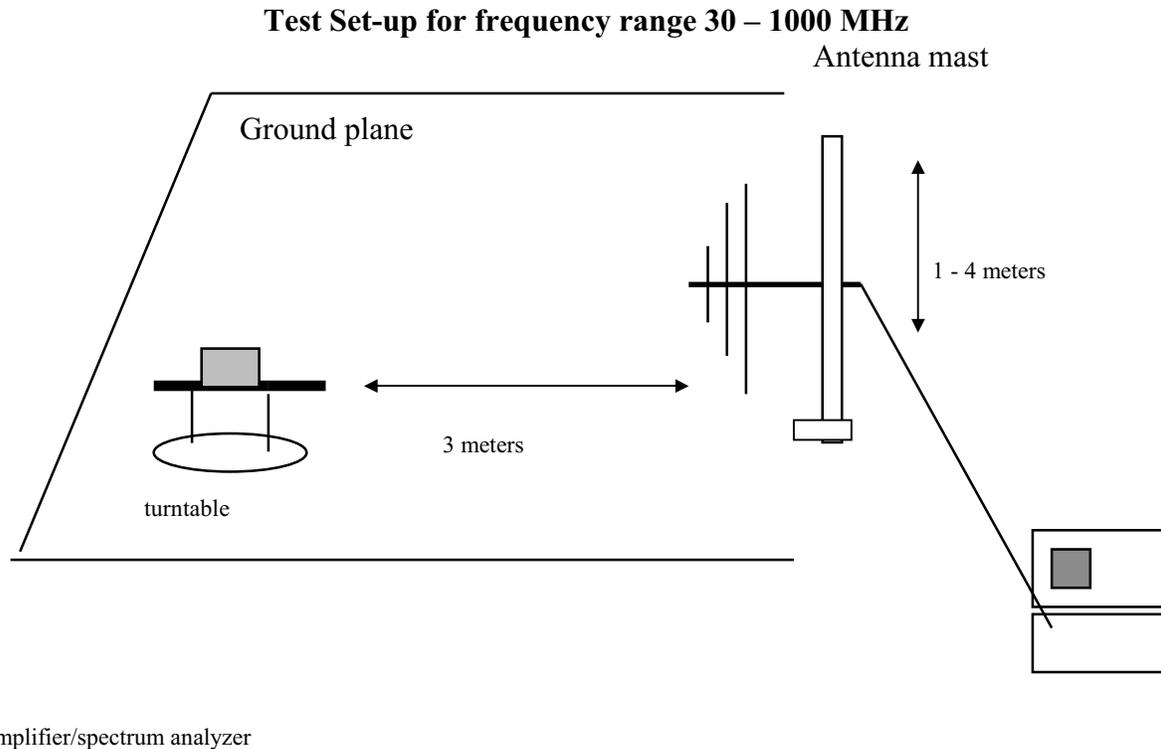
## 9. SYSTEM TEST CONFIGURATION

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)



**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.

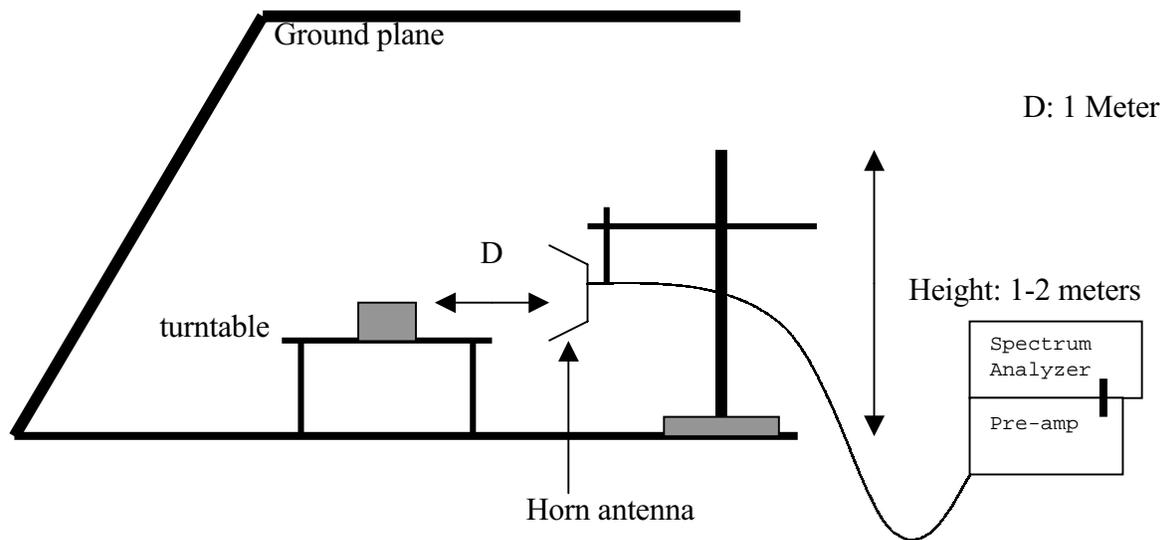
**Test set-up for measurements above 1GHz**

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 = 99.377 mS.  
 Long pulse =0.644 mS  
 Short pulse = 0.289 mS  
 No of Long pulse =49  
 No of Short pulse = 29

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

Duty Cycle = ((49x0.644)+(29x0.289))/99.377=0.4019=40.19% or -7.92dB

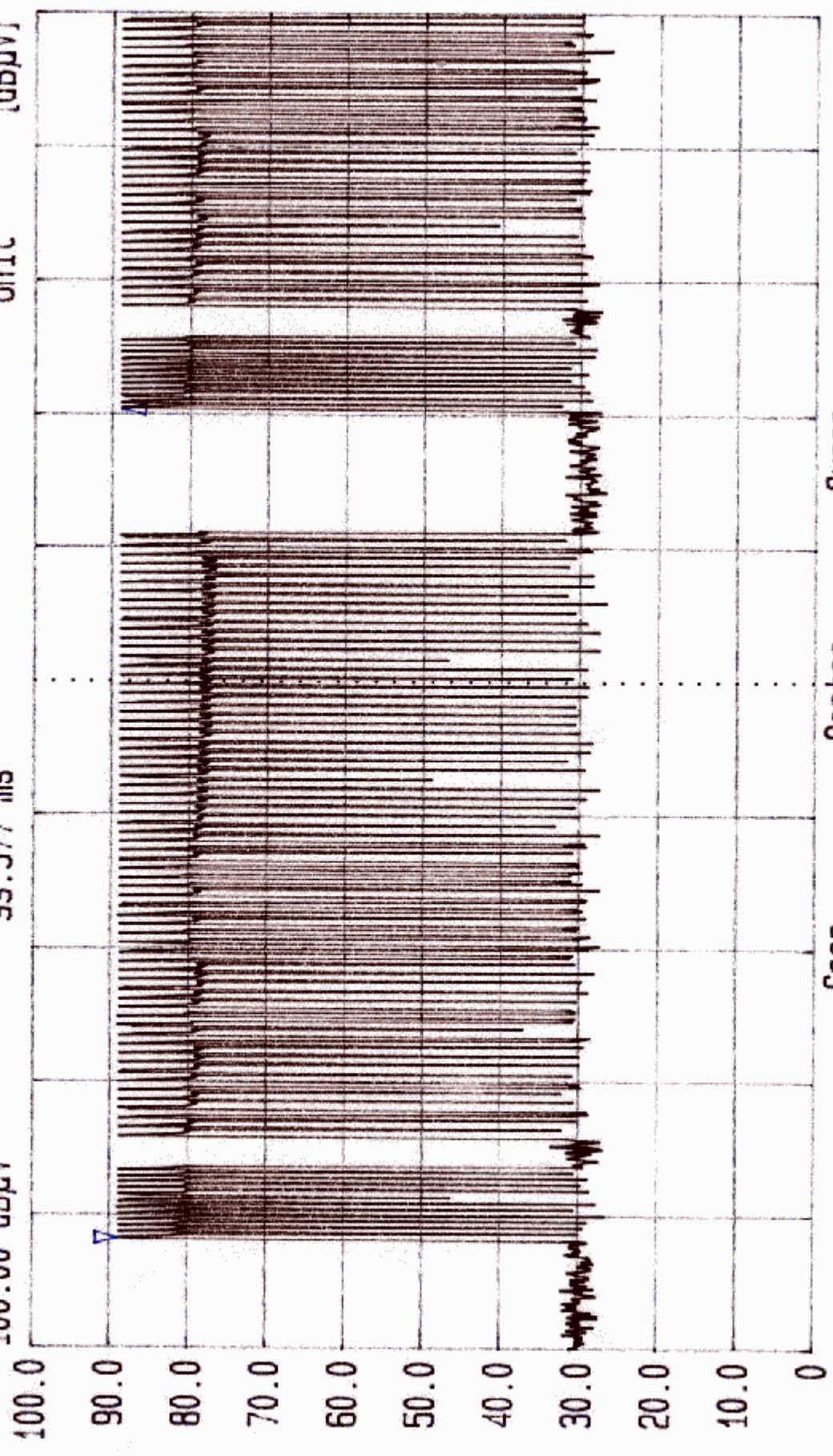
**12.2 The Emissions Bandwidth**

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

<b>Center Frequency</b>	<b>Measured</b>	<b>Limits</b>
<b>303 MHz</b>	<b>555.5 kHz &lt; (refer to plot)</b>	<b>303X0.25%=757.5 kHz</b>



Date 04.Sep.'00 Time 18:20:34 TRG  
Ref.Lvl Delta -0.16 dB  
100.00 dBµV 99.377 ms  
Res.Bw 120 kHz [imp] off  
TG.Lvl 12.000 kHz  
CF.Stp  
Vid.Bw 300 kHz  
RF.Att 10 dB  
Unit [dBµV]



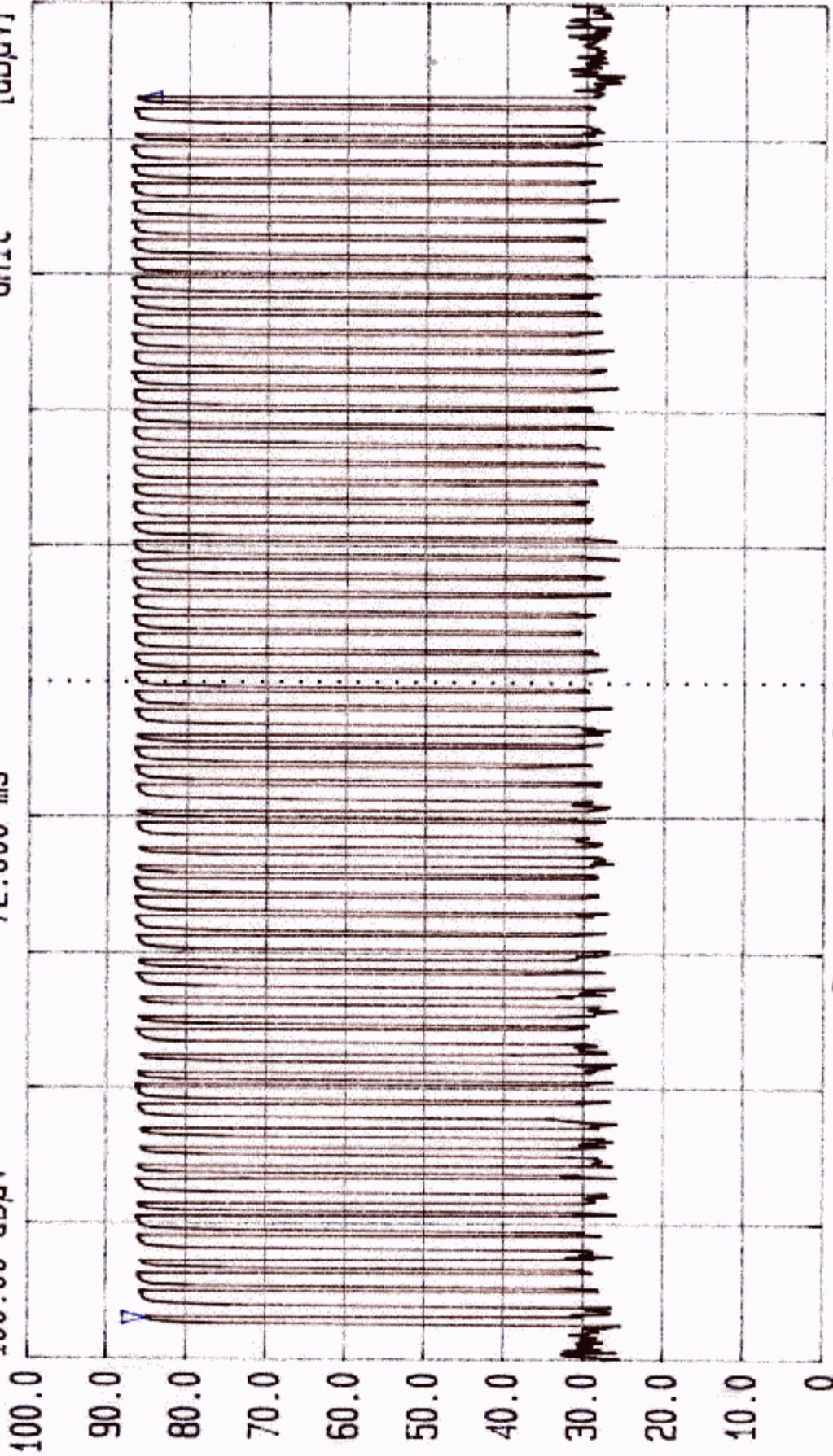
Span 0 Hz  
Center 302.846109 MHz  
Sweep 160 ms



TAG

Date 04.Sep.'00 Time 18:43:04  
Ref.Lvl Delta 1.65 dB  
100.00 dBuV 72.000 ms

Res.Bw 120 kHz [imp] 300 kHz  
TG.Lvl Off  
CF.Stp 12.000 kHz  
RF.Att 10 dB  
Unit [dBuV]



Span 0 Hz  
Center 302.846109 MHz  
Sweep 80 ms

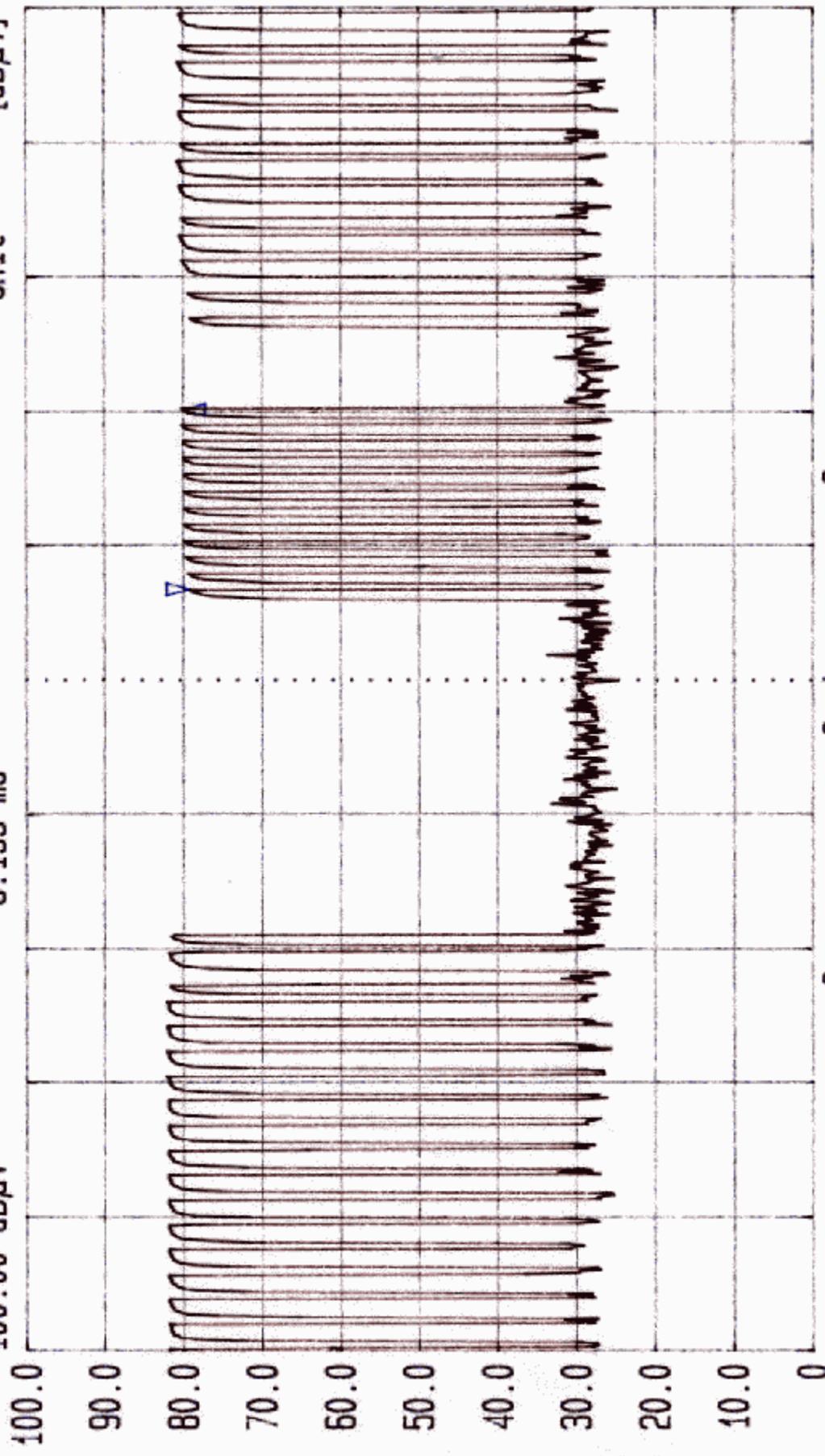


Date 04.Sep.'00 Time 18:49:49  
Ref.Lvl Delta 100.00 dBuV  
1.14 dB  
8.133 ms

IRG

Res.Bw 120 kHz [imp] Off  
TG.Lvl 12.000 kHz  
CF.Stp

Vid.Bw 300 kHz  
RF.Att 10 dB  
Unit [dBuV]



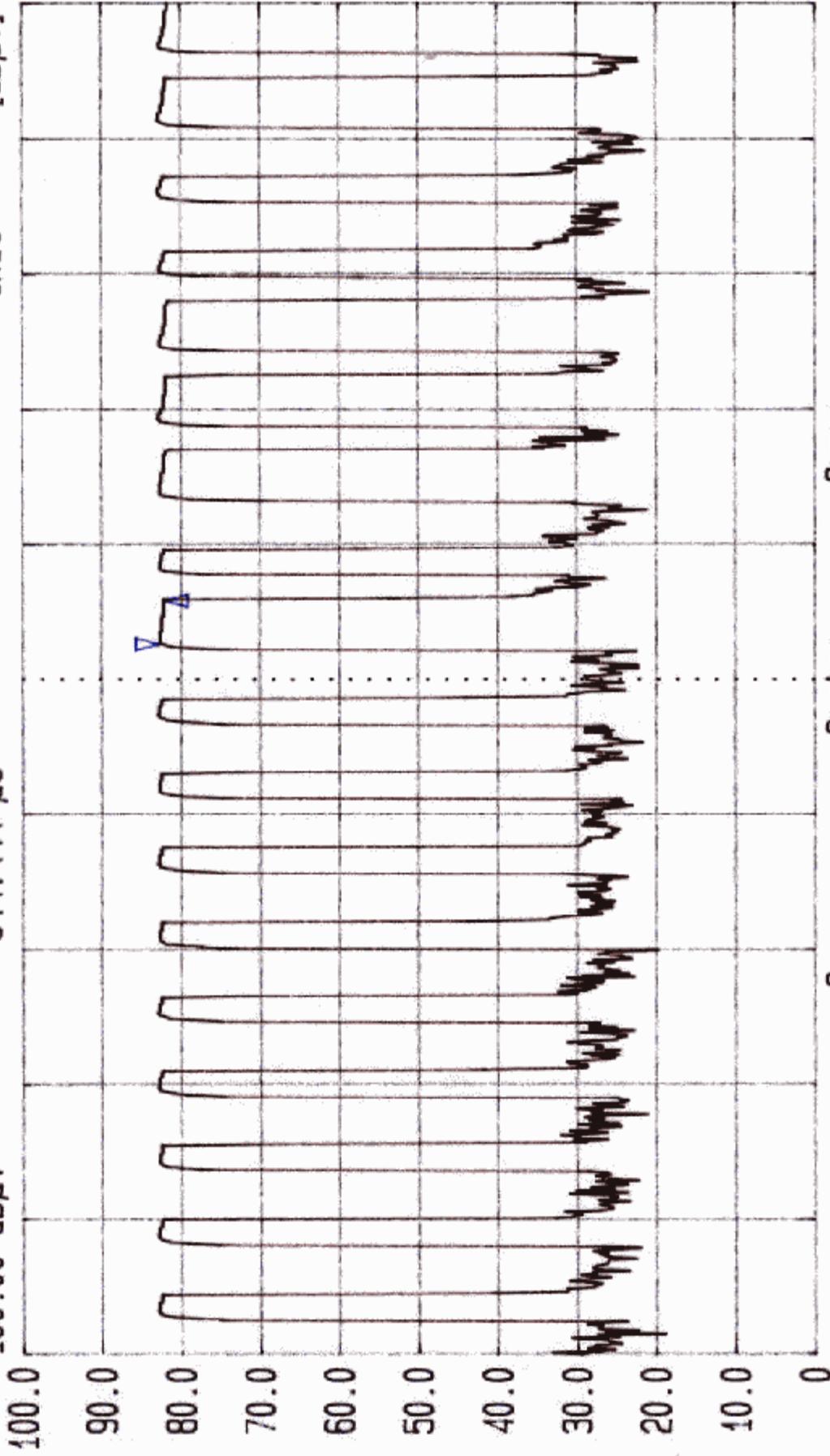
Span 0 Hz  
Center 302.846109 MHz  
Sweep 60 ms



TAG

Date 04.Sep.'00 Time 18:57:24  
Ref.Lvl Delta -0.71 dB  
100.00 dBuV 644.444 μs

Res.Bw 120 kHz [imp] Vid.Bw 300 kHz  
TG.Lvl Off RF.Att 10 dB  
CF.Stp 12.000 kHz Unit [dBuV]



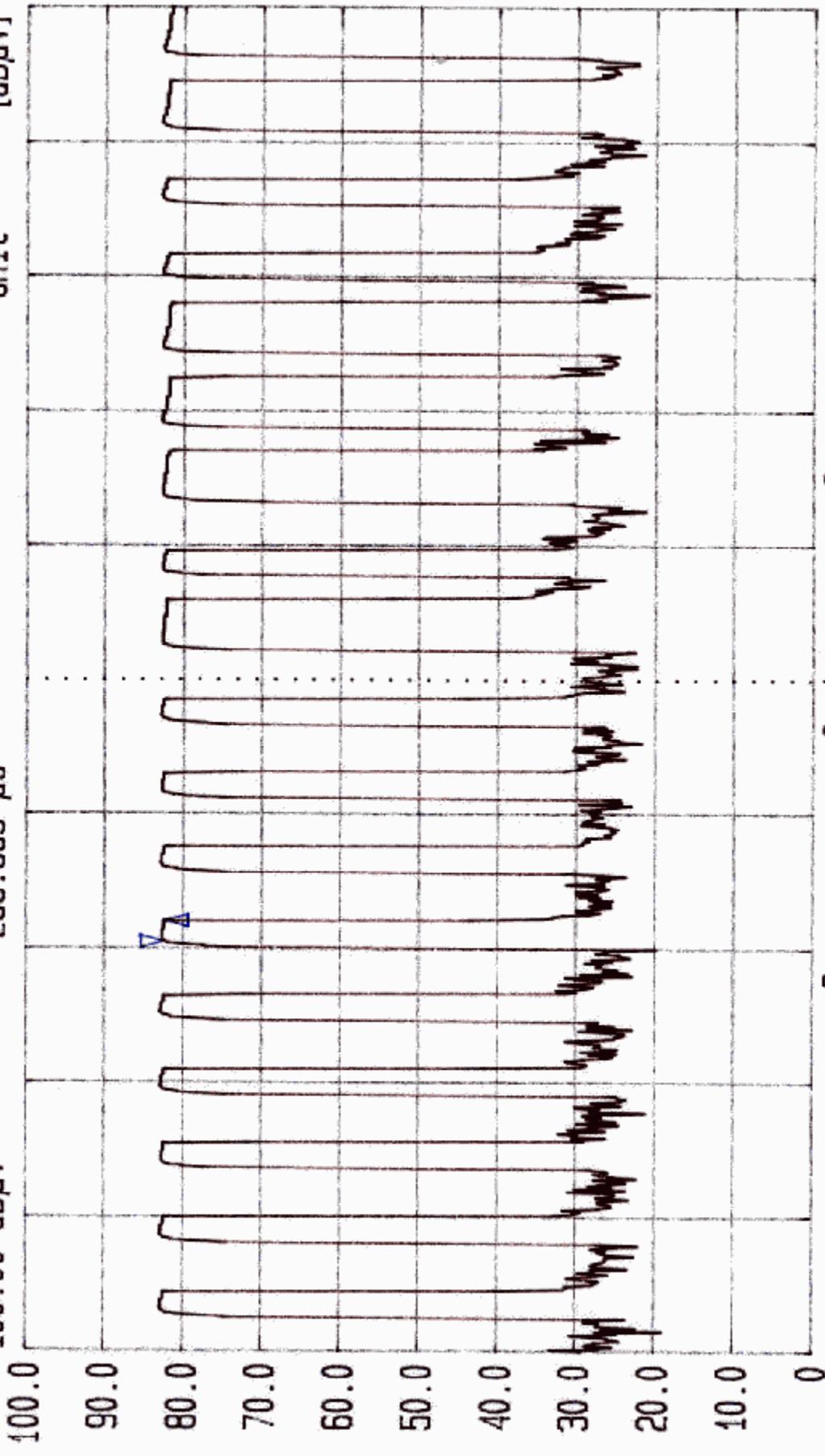
Span 0 Hz Center 302.846109 MHz Sweep 20 ms



TRG

Date 04.Sep.'00 Time 19:03:54  
Ref.Lvl 100.00 dBµV  
Delta -0.07 dB  
288.889 µs

Res.Bw 120 kHz [imp]  
TG.Lvl Off  
CF.Stp 12.000 kHz  
Vid.Bw 300 kHz  
RF.Att 10 dB  
Unit [dBµV]

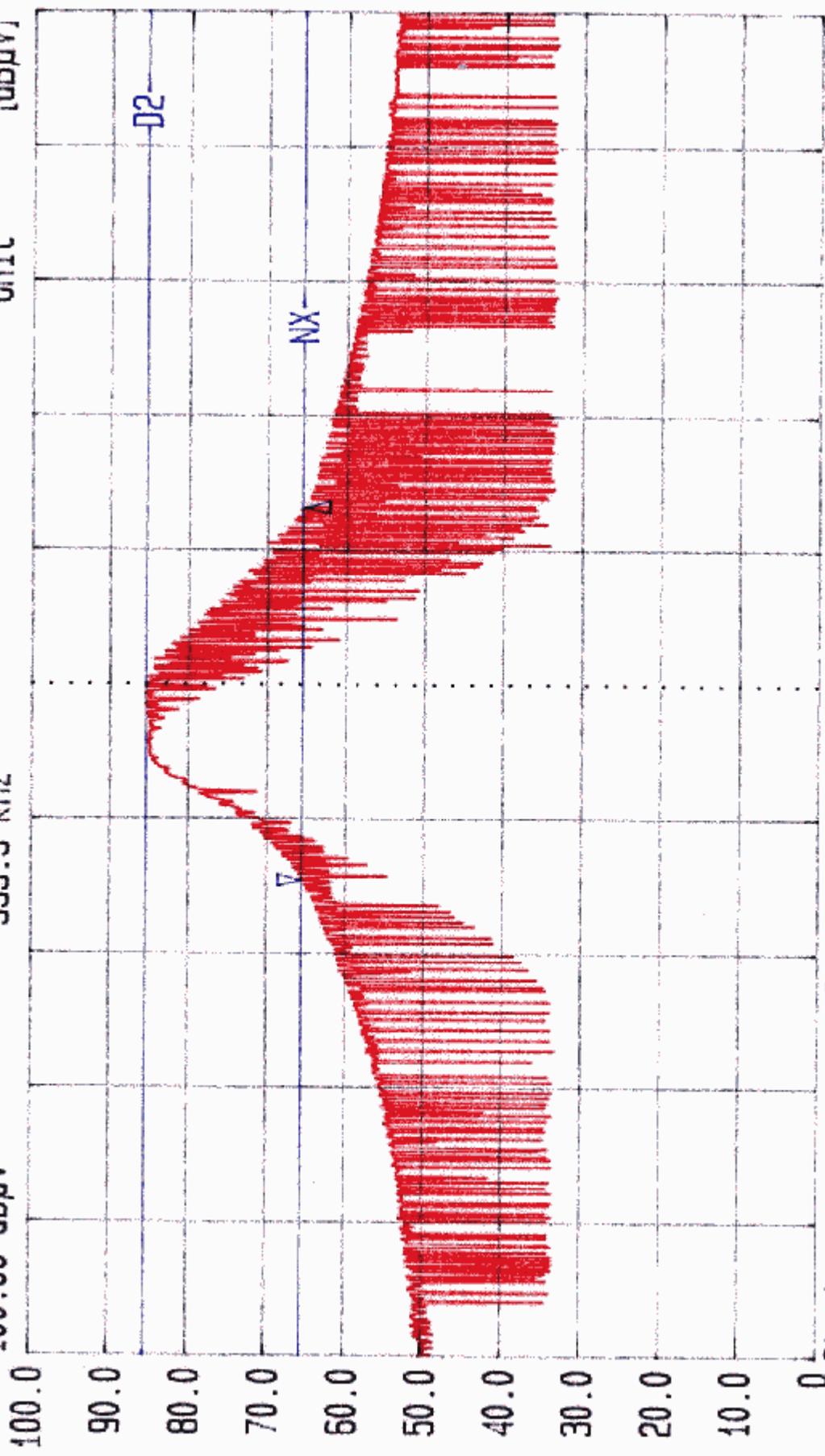


Span 0 Hz  
Center 302.846109 MHz  
Sweep 20 ms



Date 04.Sep.'00 Time 18:11:54  
Ref.Lvl Delta -0.07 dB  
100.00 dBuV 555.5 kHz

Res.Bw 120 kHz [imp] 300 kHz  
TG.Lvl Off  
CF.Stp 200.000 kHz  
RF.Att 10 dB  
Unit [dBuV]



Start 301.75111 MHz  
Center 302.75111 MHz  
Stop 303.75111 MHz  
Span 2 MHz  
Sweep 140 ms

N down level 20.0 db  
DELTA MARK 555.5 KHZ



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

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**Project #:** 00E8935  
**Report #:** 8935D1  
**Date & Time:** 9/6/00 15:11  
**Test Engr:** VINCE CHIANG

**Company:** VISION  
**EUT Description:** TX-22-2 (Alarm TX / 303MHz)  
**Test Configuration :** EUT ONLY  
**Type of Test:** FCC 15.231(b)  
**Mode of Operation:** NORMAL MODE

D-Ste

E-Ste

6 W orst

Descending

$M\% = ((t1+t2+t3+...)/T) * 100\% = 40.19 \%$

$Av \text{ Reading} = Pk \text{ Reading} + 20 * \log(M\%)$   
 $20 * \log(M\%) = -7.9176$

	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)
X	303.15	72.00	64.08	13.84	2.70	23.85	56.77	74.87	-18.10	3mV	0.00	1.35
	606.31	50.80	42.88	20.09	4.00	24.21	42.76	54.87	-12.11	3mV	0.00	1.35
	909.48	48.70	40.78	24.38	4.90	23.82	46.24	54.87	-8.63	3mV	0.00	1.35
Y	303.14	88.80	80.88	13.84	2.70	23.85	73.57	74.87	-1.30	3mV	180.00	1.35
	606.29	62.20	54.28	20.09	4.00	24.21	54.16	54.87	-0.71	3mV	180.00	1.35
	909.40	56.10	48.18	24.38	4.90	23.82	53.64	54.87	-1.23	3mV	180.00	1.35
Z	303.09	89.10	81.18	13.84	2.70	23.85	73.87	74.87	-1.00	3mV	90.00	1.60
	606.18	61.80	53.88	20.09	4.00	24.21	53.76	54.87	-1.11	3mV	90.00	1.50
	909.28	50.20	42.28	24.38	4.90	23.82	47.74	54.87	-7.13	3mV	180.00	1.30
X	303.19	89.70	81.78	13.35	2.70	23.85	73.98	74.87	-0.89	3mH	270.00	1.00
	606.40	62.10	54.18	20.20	4.00	24.21	54.17	54.87	-0.70	3mH	270.00	1.00
	909.62	54.60	46.68	23.38	4.90	23.82	51.14	54.87	-3.73	3mH	270.00	1.00
Y	303.12	83.60	75.68	13.35	2.70	23.85	67.88	74.87	-6.99	3mH	270.00	1.00
	606.27	54.80	46.88	20.20	4.00	24.21	46.87	54.87	-8.00	3mH	270.00	1.00
	909.34	47.50	39.58	23.38	4.90	23.82	44.04	54.87	-10.83	3mH	0.00	2.25
Z	303.11	81.60	73.68	13.35	2.70	23.85	65.88	74.87	-8.99	3mH	0.00	1.75
	606.20	57.50	49.58	20.20	4.00	24.21	49.57	54.87	-5.30	3mH	0.00	1.75
	909.32	52.80	44.88	23.38	4.90	23.82	49.34	54.87	-5.53	3mH	0.00	1.75
Total data #: 18												



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

1366 BORDEAUX DRIVE, SUNNYVALE, CA 94089  
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**Project #:** 00E8935  
**Report #:** 8935D2  
**Date & Time:** 9/14/00 22:10  
**Test Engr:** Vince Chiang

**Company:** VISION  
**EUT Description:** TX-22-2 (Alarm TX / 303MHz)  
**Test Configuration :** EUT ONLY  
**Type of Test:** FCC 15.231(b) & 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)
1214	66.32	N/A	25.2	2.7	43.31	-9.5	41.38	74.0	-32.62	1mV	180	1.2	P
1214	N/A	58.98	25.2	2.7	43.31	-9.5	34.04	54.0	-19.96	1mV	180	1.2	A
1518	67.90	N/A	25.2	3.1	43.16	-9.5	43.52	74.0	-30.48	1mV	180	1.2	P
1518	N/A	59.33	25.2	3.1	43.16	-9.5	34.95	54.0	-19.05	1mV	180	1.2	A
1821	72.28	64.36	26.5	3.4	43.00	-9.5	41.74	54.9	-13.13	1mV	180	1.2	A
2125	59.16	51.24	27.6	3.7	42.84	-9.5	30.17	54.9	-24.70	1mV	180	1.2	A
2428	50.83	42.91	28.6	3.8	42.68	-9.5	23.15	54.9	-31.72	1mV	180	1.2	A
2732	57.29	N/A	29.7	4.0	42.53	-9.5	38.93	74.0	-35.07	1mV	180	1.2	P
2732	N/A	40.19	29.7	4.0	42.53	-9.5	21.83	54.0	-32.17	1mV	180	1.2	A
1214	59.80	N/A	25.2	2.7	43.31	-9.5	34.86	74.0	-39.14	1mH	180	1.2	P
1214	N/A	49.45	25.2	2.7	43.31	-9.5	24.51	54.0	-29.49	1mH	180	1.2	A
1517	62.95	N/A	25.2	3.1	43.16	-9.5	38.57	74.0	-35.43	1mH	180	1.2	P
1518	N/A	53.14	25.2	3.1	43.16	-9.5	28.76	54.0	-25.24	1mH	180	1.2	A
1821	68.20	60.28	26.5	3.4	43.00	-9.5	37.65	54.9	-17.22	1mH	180	1.2	A
2125	60.58	52.66	27.6	3.7	42.84	-9.5	31.59	54.9	-23.28	1mH	180	1.2	A
2731	52.28	N/A	29.7	4.0	42.53	-9.5	33.93	74.0	-40.07	1mH	180	1.2	P
2732	N/A	35.03	29.7	4.0	42.52	-9.5	16.70	54.0	-37.30	1mH	180	1.2	A

No other emissions were found within 20dB under the limits upto 4GHz.

Total data #: 17  
V.2d

Peak: RBW=VBW=1MHz Distance = 20log(1/3)= -9.5dB  
Average: RBW=1MHz, VBW=10Hz(For FCC 15.209)  
Average: Pk Reading - 7.9176dB(For FCC 15.231(b))