

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

*for*

**INTENTIONAL RADIATOR**

**315MHz WIRELESS REMOTE CONTROLLER TRANSMITTER**

**MODEL NO: HP313 (T-2B)**

**FCC ID NO: OAVTX315**

**REPORT NO: 01E9362**

**ISSUE DATE: April 16, 2001**

*Prepared for*

**ALTRUSTY ENTERPRISE CO., LTD.  
4<sup>TH</sup> FLOOR, NO. 3, ALLEY 16, LANE 235, BAU CHAIU ROAD,  
HSIN-TEN CITY, TAIPEI,  
TAIWAN, R. O. C.**

*Prepared by*

**COMPLIANCE ENGINE ERING SERVICES, INC.  
NO. 199, CHUNG SHENG ROAD,  
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TAIWAN, R. O. C.**

*d.b.a.*

**COMPLIANCE CERTIFICATION SERVICES**



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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: ALTRUSTY ENTERPRISE CO., LTD.  
4<sup>TH</sup> FLOOR, NO. 3, ALLEY 16, LANE 235, BAU CHAIU ROAD,  
HSIN-TEN CITY, TAIPEI, TAIWAN, R. O. C.

CONTACT PERSON: ANDREW FALCON WU / VICE GENERAL MANAGER

TELEPHONE NO.: (02) 8665-6969

EUT DESCRIPTION: 315MHz WIRELESS REMOTE CONTROLLER TRANSCEIVER

MODEL NAME/NUMBER: HP313 (T-2B)

FCC ID: OAVTX315

DATE TESTED: April 6 ~ April 10, 2001

REPORT NUMBER: 01E9362

TYPE OF EQUIPMENT	SECURITY EQUIPMENT (INTENTIONAL RADIATOR)
EQUIPMENT TYPE	315MHz WIRELESS REMOTE CONTROLLER TRANSCEIVER
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>315 MHz</b>
Power Source	<b>DC 12V</b>
Transmitting Time	<b>Periodic &lt; 5 seconds</b>
Associated Transceiver	<b>Trade Name: VESPID Model Name: OAVRX315 (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)	12/2001
H.P.	8595EM	Spectrum Analyzer (9KHz – 6.5GHz)	01/2002
EMCO	3115	Antenna (1-18GHz)	02/2002
EMCO	3142	Antenna (30-2000MHz)	06/2001
T.E.C.	PA-102	Amplifier(30-2000MHz)	05/2001
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

PAGE NO: 3

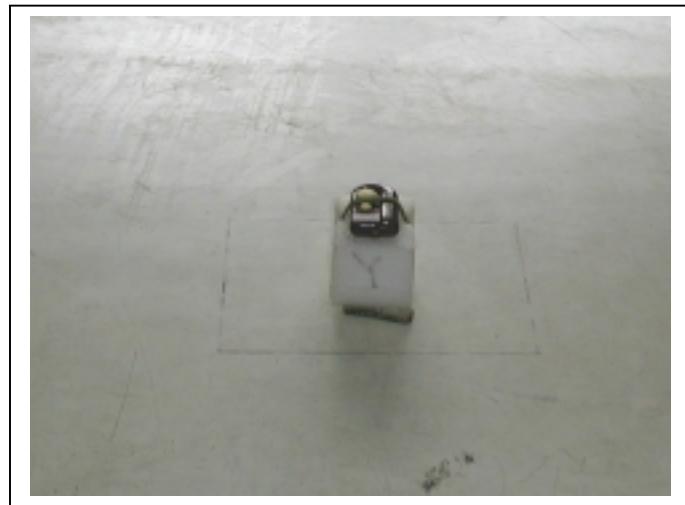
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COMPLIANCE ENGINEERING SERVICES, INC. TEL: (02)2217-0894 FAX: (02)2217-1254  
NO. 199, CHUNG SHENG ROAD, HSIN TIEN CITY, TAIPEI, TAIWAN, R. O. C.

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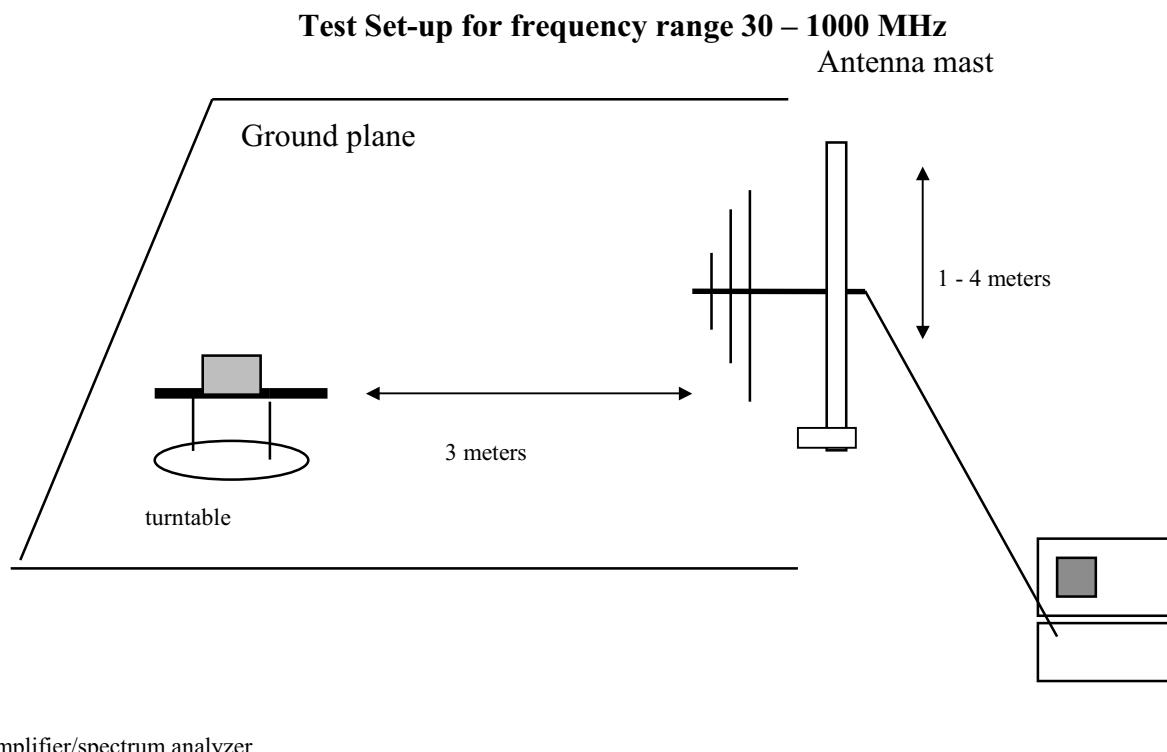
## 9 . SYSTEM TEST CONFIGURATION

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.

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

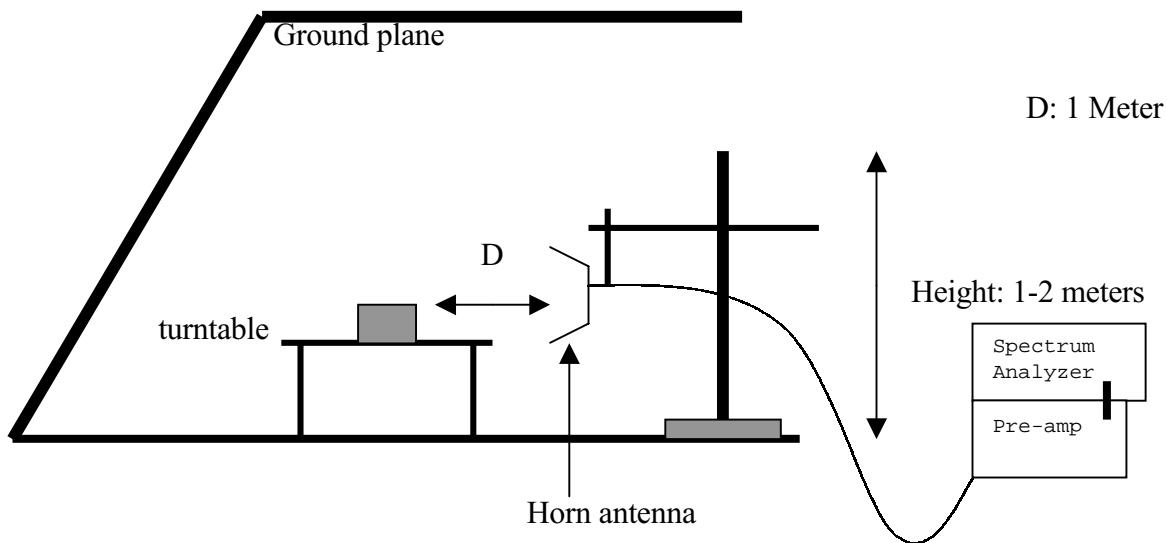


FIG. 2

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)	
		SECTION 15.109	

### 12.1 Maximum Modulation Percentage (M%)

#### CALCULATION:

$$\text{Average Reading} = \text{Peak Reading (dBuV/m)} + 20\log(\text{Duty Cycle})$$

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

WHERE	1 Period	= 44.222 mS
	Long pulse	= 1.022 mS
	Short pulse	= 0.267 mS
	No of Long pulse	= 13
	No of Short pulse	= 13

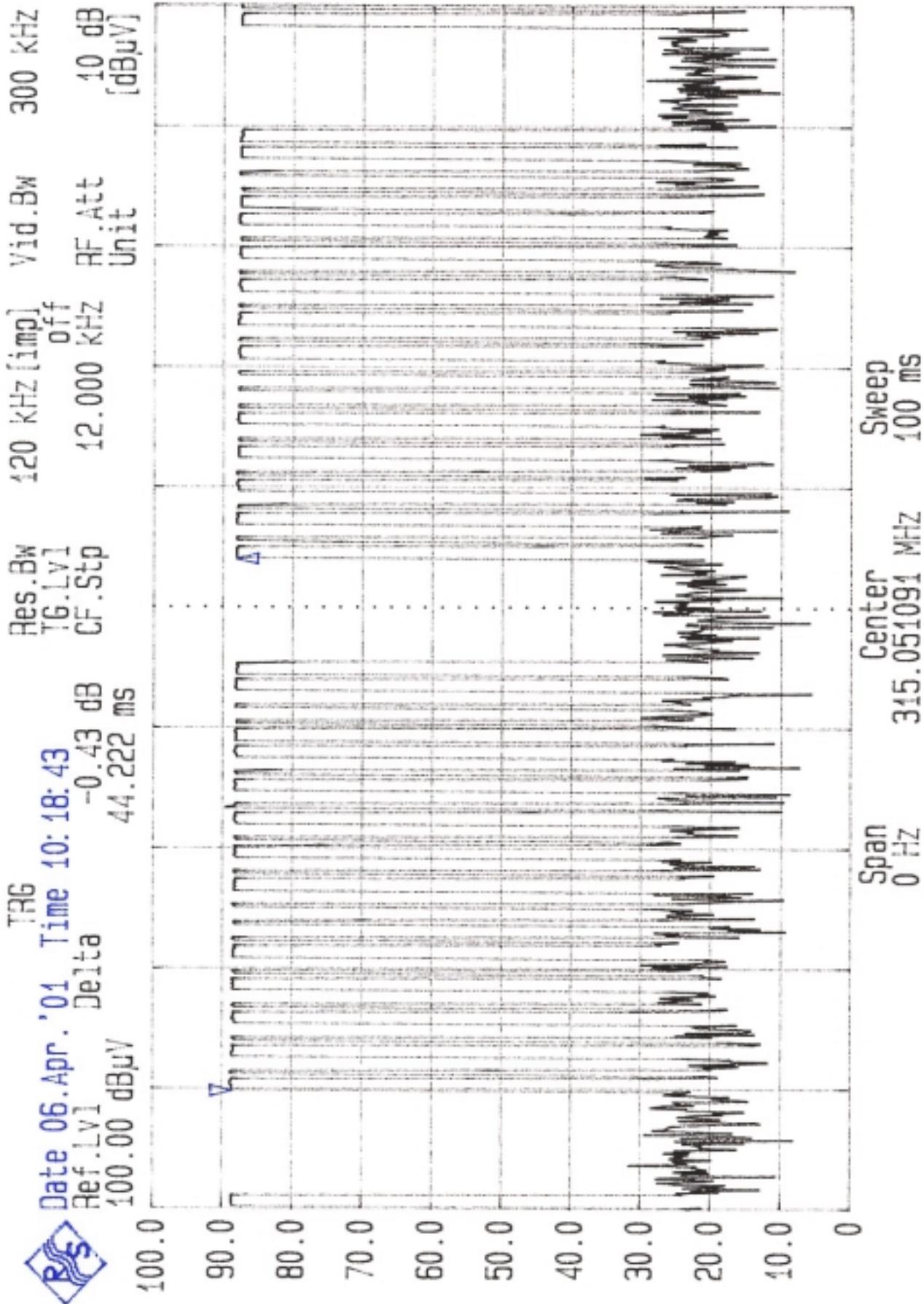
$$\text{Duty Cycle} = (N_1L_1 + N_2L_2 + \dots + N_{n-1}L_{n-1} + N_nL_n) / 100 \text{ or } T$$

$$\text{Duty Cycle} = ((13 \times 1.022) + (13 \times 0.267)) / 44.222 = 0.3789 = 37.89\% \text{ or } -8.429 \text{ dB}$$

### 12.2 The Emissions Bandwidth

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

Center Frequency	Measured	Limits
315 MHz	497.7 kHz < (refer to plot)	315X0.25% = 787.5 kHz

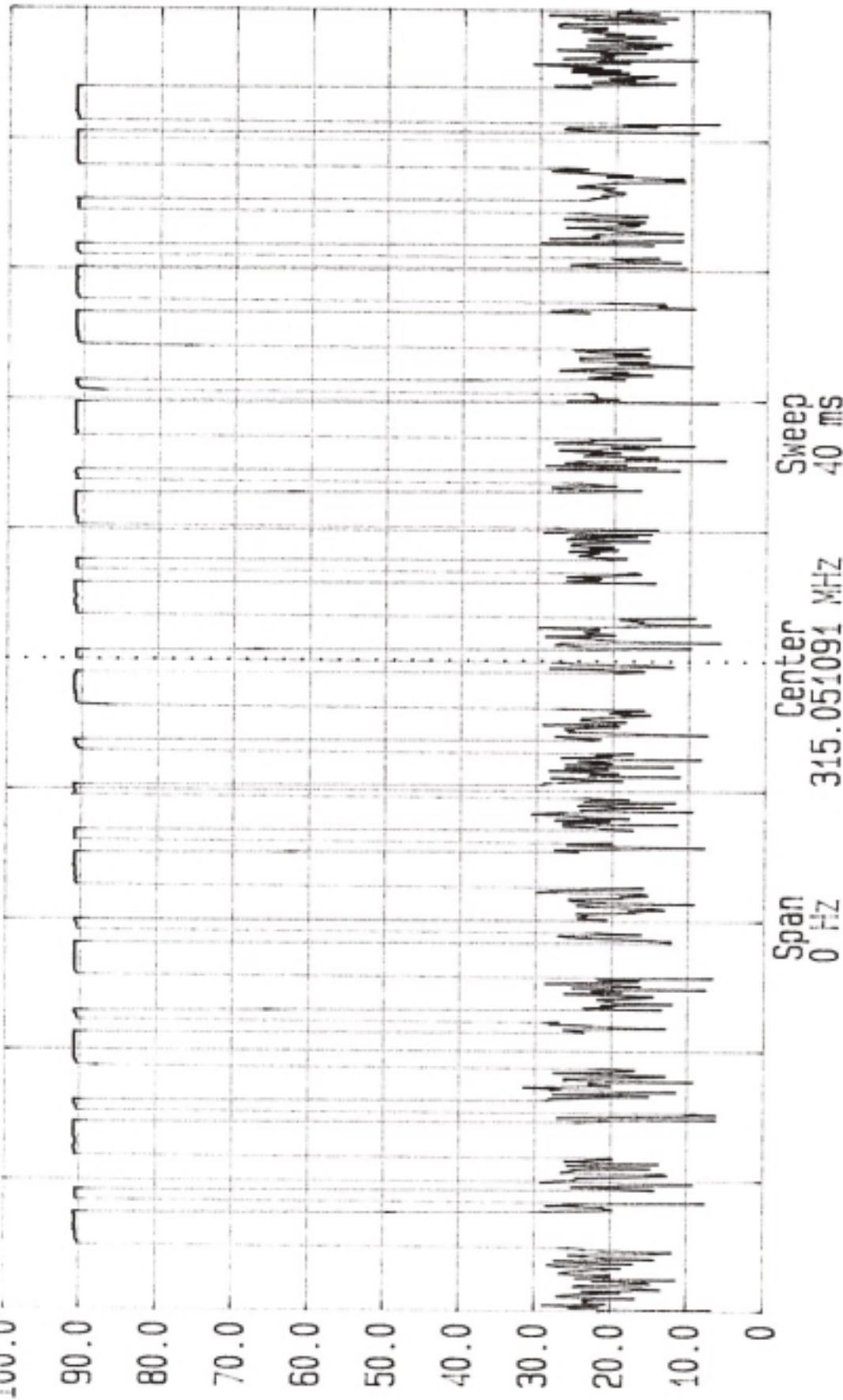




Date 06.Apr.'01 Ref.Lv1 TRG

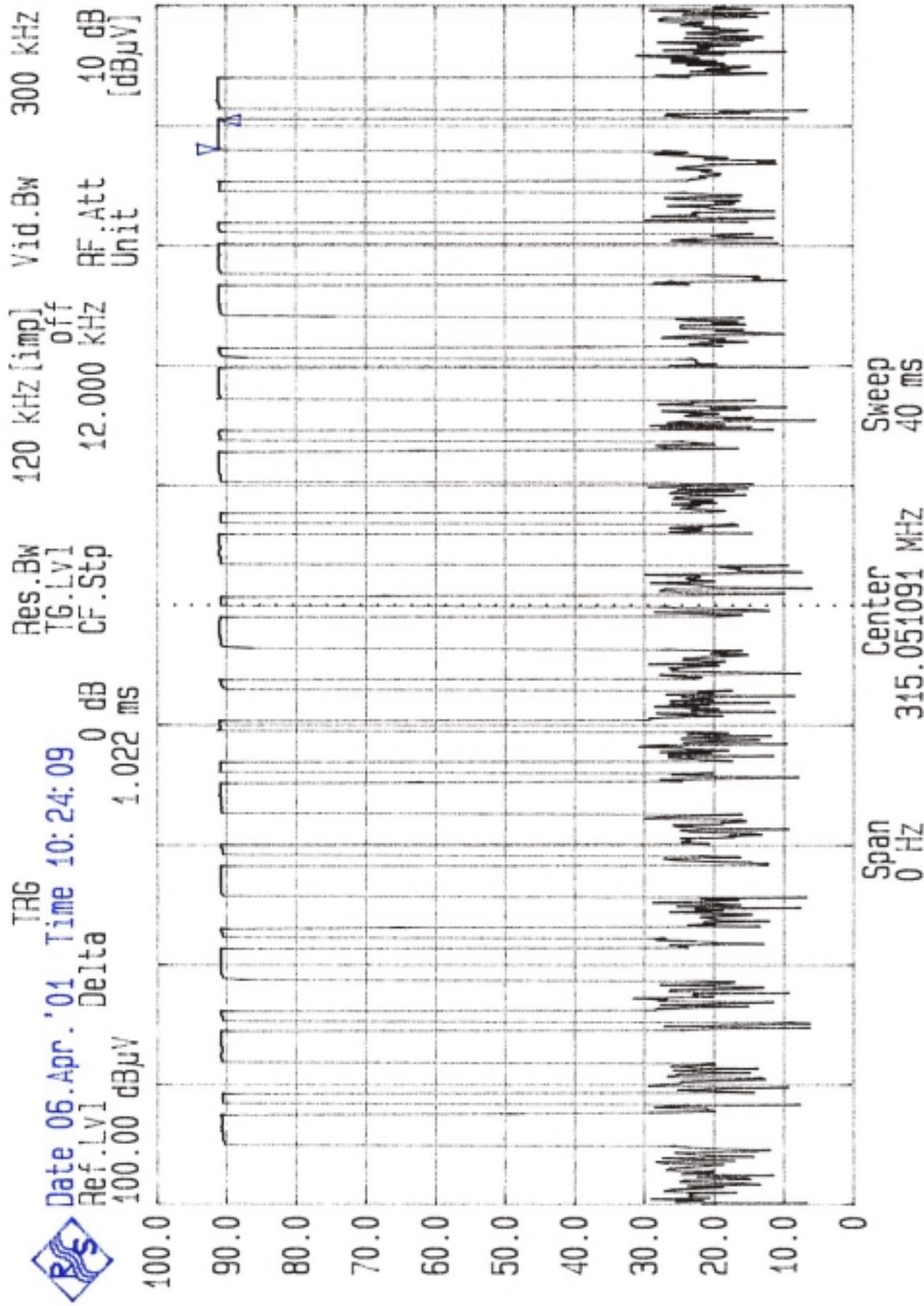
400.00 dB $\mu$ V

Res.Bw 120 kHz [imp] Vid.Bw 300 kHz  
TG [V]  
CF.Stp 12.000 kHz RF.Att 10 dB  
Unit dB $\mu$ V



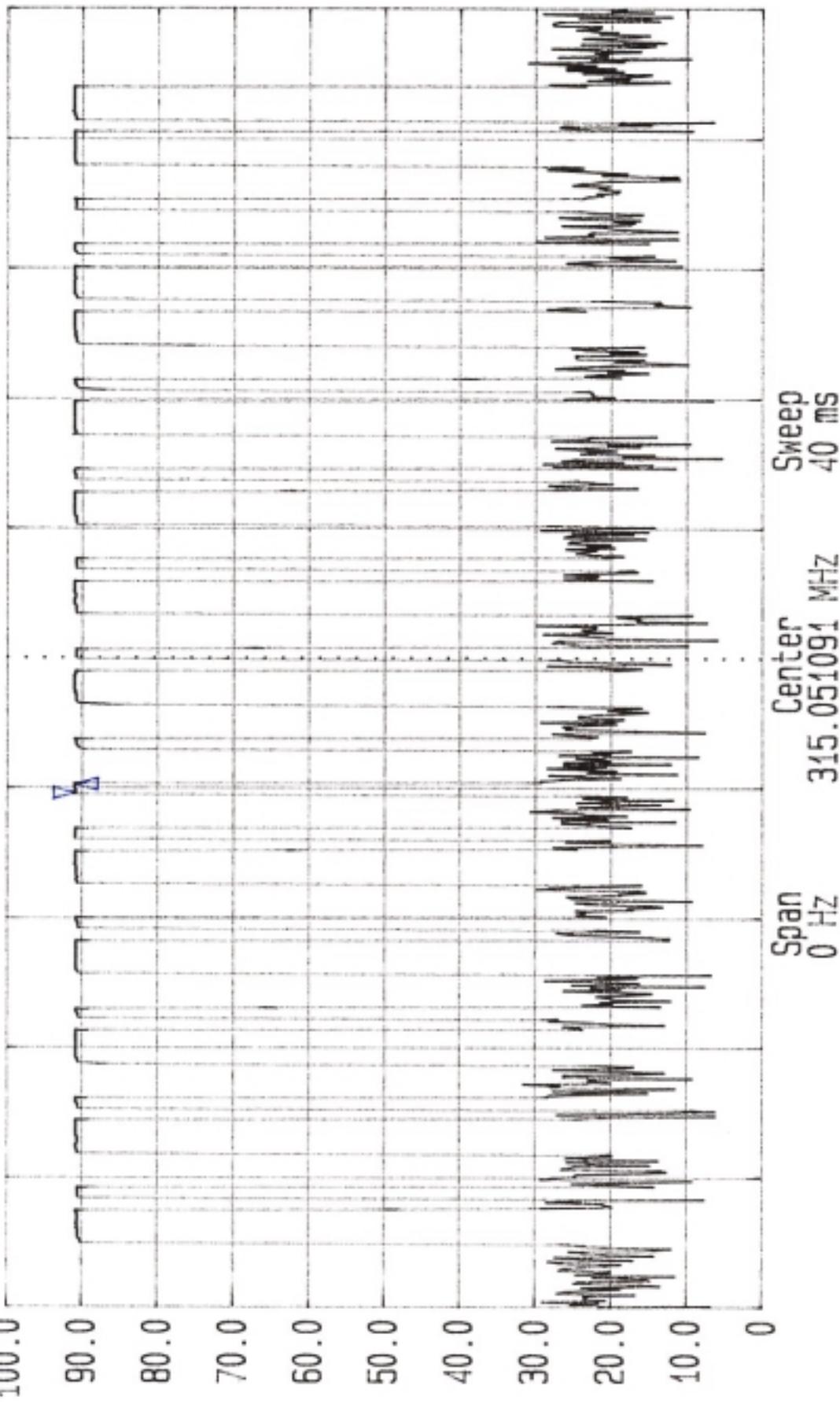


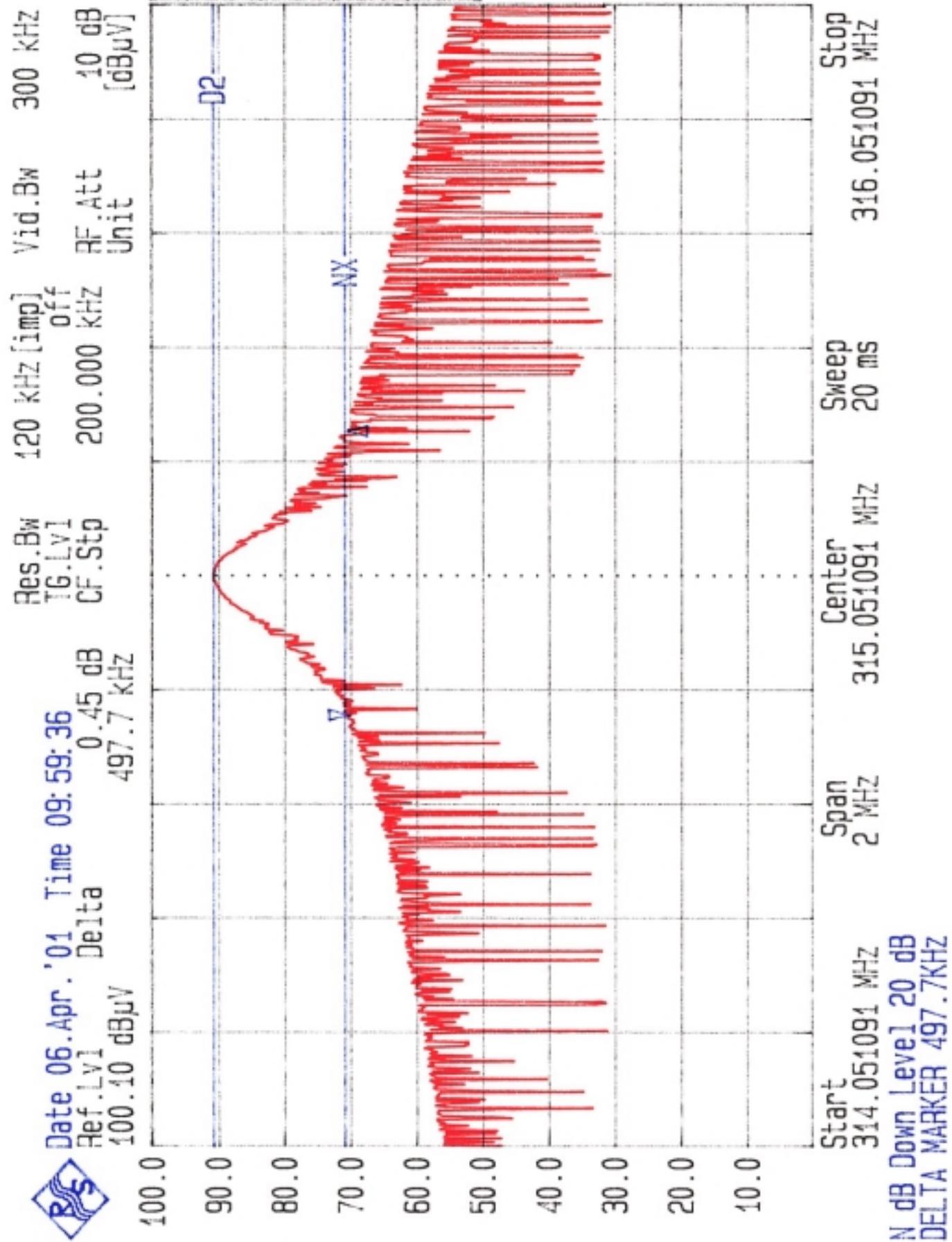
Date 06.Apr.'01 Time 10:24:09  
TR6 Ref.Lv1 Delta 400.00 dB $\mu$ V  
100.00 dB $\mu$ V





TR6

Date 06.Apr.'01 Time 10:28:38  
Ref.Lv1 Delta 0.333 dB  
400.00 dB $\mu$ VRes.Bw 120 kHz [imp]  
T6.Lv1 off  
CF.Stp 12.000 kHz RF.Att  
Unit 10 dB  
[dB $\mu$ V]  
100.0





FCC, VCCI, CISPR, CE, AUSTEL, NZUL, CSA, TUV, BSMI, DHHS, NVLAP

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*Project #:* 01E9362  
*Report #:* 9362D1  
*Date & Time:* 2001/4/9  
*Test Engr.:* Bill Huang

<b>Company:</b>	ALTRUSTY ENTERPRISE CO., LTD.
<b>EUT Description:</b>	HP313(T-2B) (Alarm TX / 315MHz)
<b>Test Configuration :</b>	EUT ONLY
<b>Type of Test:</b>	FCC 15.231(b)
<b>Mode of Operation:</b>	NORMAL MODE



$$M\% = ((t_1+t_2+t_3+\dots)/T) * 100\% = 37.89 \%$$

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

$$20 * \log(M\%) = -8.4295$$



FCC, VCCI, CISPR, CE, AUSTEL, NZUL, CSA, TUV, BSMI, DHHS, NVLAP

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*Project #:* 01E9362  
*Report #:* 9362D2  
*Date & Time:* 2001/4/9  
*Test Engr.:* Bill Huang

<b>Company:</b>	ALTRUSTY ENTERPRISE CO., LTD.
<b>EUT Description:</b>	HP313(T-2B) (Alarm TX / 315MHz)
<b>Test Configuration :</b>	EUT ONLY
<b>Type of Test:</b>	FCC 15.231(b)
<b>Mode of Operation:</b>	NORMAL MODE



$$M\% = ((t_1+t_2+t_3+\dots)/T) * 100\% = 37.89\%$$

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

$$20 * \log(M\%) = -8.4295$$



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

1366 BORDEAUX DRIVE, SUNNYVALE, CA 94089  
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**Project #:** 01E9362  
**Report #:** 9362D3  
**Date & Time:** 4/10/2001  
**Test Engr:** Vince Chiang

**Company:** ALTRUSTY ENTERPRISE CO., LTD.  
**EUT Description:** HP313(T-2B) (Alarm TX / 315MHz)  
**Test Configuration :** EUT ONLY  
**Type of Test:** FCC 15.231(b)/FCC 15.209  
**Mode of Operation:** NORMAL MODE



Freq. (MHz)	Pk Rdg (dBuV)	Av Rdg (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
1259	67.18	58.75	25.0	2.8	38.00	-9.5	39.03	55.6	-16.55	1mV	0	1.0	A
1574	63.29	54.86	26.0	3.1	37.98	-9.5	36.52	54.0	-17.48	1mV	0	1.2	A
1889	56.61	48.18	27.3	3.5	37.92	-9.5	31.51	55.6	-24.09	1mV	0	1.0	A
2203	60.84	52.41	28.2	3.8	37.82	-9.5	37.02	54.0	-16.98	1mV	0	1.0	A
1259	66.16	57.73	25.0	2.8	38.00	-9.5	38.01	55.6	-17.57	1mH	0	1.0	A
1574	61.12	52.69	26.0	3.1	37.98	-9.5	34.35	54.0	-19.65	1mH	0	1.2	A
1889	57.15	48.72	27.3	3.5	37.92	-9.5	32.05	55.6	-23.55	1mH	0	1.0	A
2203	61.15	52.72	28.2	3.8	37.82	-9.5	37.33	54.0	-16.67	1mH	0	1.0	A

\* No other emission were found within 20dB under the limits upto 3.2 GHz.

Total data #:8  
V.2d

P(Peak): RBW=VBW=1MHz  
A(Average): Pk Reading - 8.4295dB

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