

## 1. VERIFICATION OF COMPLIANCE

COMPANY NAME : DOLPHIN TECHNOLOGY  
1200 SOUTH 192ND, SUITE 300  
SEATTLE, WA 98148

CONTACT PERSON : PING CHEE

TELEPHONE NO. : (206) 241-8966

EUT DESCRIPTION : REMOTE CONTROLLER TRANSMITTER

MODEL NAME/NUMBER : PSN/97


FCC ID : NPZDTIPSN-97TRK

DATE TESTED : AUGUST 12, 1998

REPORT NUMBER : 98E7638

TYPE OF EQUIPMENT	SECURITY EQUIPMENT (INTENTIONAL RADIATOR)
EQUIPMENT TYPE	303 MHz TRANSMITTER
MEASUREMENT PROCEDURE	ANSI 63.4 / 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 CFR 47, PART 15. This said equipment in the configuration described in this report shows that maximum emission levels emanating from equipment are within the compliance requirements.

  
MIKE C.I. KUO / VICE PRESIDENT  
COMPLIANCE ENGINEERING SERVICES, INC.

**2 Product Description**

Fundamental Frequency	303 MHz
Power Source	9V Battery
Transmitting Time	Periodic $\leq$ 5 seconds
Antenna Type	Build-In PCB
Associated Receiver	Dolphin Technology Inc. Model No: PSN/97, FCC DoC

**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.	8568A	Spectrum Analyzer (100Hz - 1.5GHz)	02/99
H.P.	8566B	Spectrum Analyzer (100Hz - 22GHz)	09/98
EMCO	3146	Antenna (200-1000 MHz)	10/98
H.P.	8447D	Preamplifier (0.1 - 1300 MHz)	09/98
ARA	DRG-18/A	Antenna(1 - 18GHZ)	12/98
H.P.	8449B	Preamplifier (1-26.5GHZ)	03/99

**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

## 10. Test Procedure

1. The EUT was placed on a wooden table on the outdoor ground plane. The search antenna was placed 3 ft 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:

NOT APPLICABLE

**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) X 20log<sup>(M%)</sup>

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

WHERE T (1 period ) = 100 mS  
 t1+t2+t3...+tn = 7.44 mS

M% = ((t1 + t2 + t3 + .....tn) / T ) X 100%  
 = 7.44%

Maximum Modulation Percentage	7.44 %
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**12.2 The Emissions Bandwidth**

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

Center Frequency	Measured	Limits
303 MHz	205KHz <	303MHz x 0.25%= 757KHz

Compliance Engineering Services Inc.

Report No. : 980812B1

Date : 08/12/1998

Time : 08:58

Test Engr : MIKE ZHU

>> 3 M RADIATED EMISSION DATA <<

Company : DOLPHIN TECHNOLOGY  
 Equipment Under Test : REMOTE KEY TRANSMITTER  
 Test Configuration : EUT ONLY  
 Type of Test : FCC CLASS B  
 Mode of Operation : STANDARD

	Freq.	dBuV-PK	dBuV-AVE	CF(dB)	dBuV-AVE	FCC-B	EUT-B	Note
H/X:								
	303.90	90.5	67.9	-9.6	58.4	73.7	-15.3	Horizontal
	607.80	53.5	30.9	-3.1	27.8	53.7	-25.8	Horizontal
	911.00	57.8	35.2	1.5	36.7	53.7	-17.0	Horizontal
H/Y:								
	303.90	86.7	64.1	-9.6	54.6	73.7	-19.1	Horizontal
	607.80	53.1	30.5	-3.1	27.4	53.7	-26.2	Horizontal
	911.70	62.4	39.8	1.5	41.3	53.7	-12.4	Horizontal
H/Z:								
	303.90	79.4	56.8	-9.6	47.3	73.7	-26.4	Horizontal
	607.90	51.2	28.6	-3.1	25.5	53.7	-28.1	Horizontal
	911.70	52.5	29.9	1.5	31.4	53.7	-22.3	Horizontal
V/X:								
	303.90	69.7	47.1	-9.4	37.8	73.7	-35.9	Vertical
	607.90	52.7	30.1	-4.0	26.1	53.7	-27.6	Vertical
	911.70	51.2	28.6	0.7	29.4	53.7	-24.3	Vertical
V/Y:								
	303.90	84.6	62.0	-9.4	52.7	73.7	-21.0	Vertical
	607.90	53.3	30.7	-4.0	26.7	53.7	-27.0	Vertical
	911.70	52.9	30.3	0.7	31.1	53.7	-22.6	Vertical
V/Z:								
	303.90	86.8	64.2	-9.4	54.9	73.7	-18.8	Vertical
	607.90	51.6	29.0	-4.0	25.0	53.7	-28.7	Vertical
	911.68	63.5	40.9	0.7	41.7	53.7	-12.0	Vertical

Total # of data 18

V.1.0a

Radiated Emissions

8/12/98

DOLPHIN TECHNOLOGY

Mike Zhu *MZ*

EUT: Remote Key Tx

Site:1m

M/N: PRN-7

Freq. (Mhz)	Level (dBuv)	Amp. (dB)	DIST (dB)	AF (dB)	Lc (dB)	Total (dBuv/m)	Lim (dBuv/m)	Margin (dB)
1215.6pk	91.4	-37.8	-10.5	26.05	0.24	69.39	74	-4.61
1215.6av	63.2	-37.8	-10.5	26.05	0.24	41.19	54	-12.81
1519.5pk	90.1	-37.3	-10.5	26.90	0.30	69.50	74	-4.50
1519.5av	62.7	-37.3	-10.5	26.90	0.30	42.10	54	-11.90
1823.4pk	74.4	-37.0	-10.5	28.20	0.32	55.42	74	-18.58
1823.4av	49.1	-37.0	-10.5	28.20	0.32	30.12	54	-23.88
2127.3pk	72.9	-36.4	-10.5	29.40	0.34	55.74	74	-18.26
2127.3av	46.8	-36.4	-10.5	29.40	0.34	29.64	54	-24.36
2431.2pk	62.3	-36.2	-10.5	30.20	0.38	46.18	74	-27.82
2431.2av	38.8	-36.2	-10.5	30.20	0.38	22.68	54	-22.68

\*3ft measurement distance=-10.5dB

Analyzer:8593EM,cal due:5/29/99  
Antenna:DRG-118/A,cal due:1/15/99  
Preamp=HP8449B,cal due:4/2/99  
Lc=cable loss

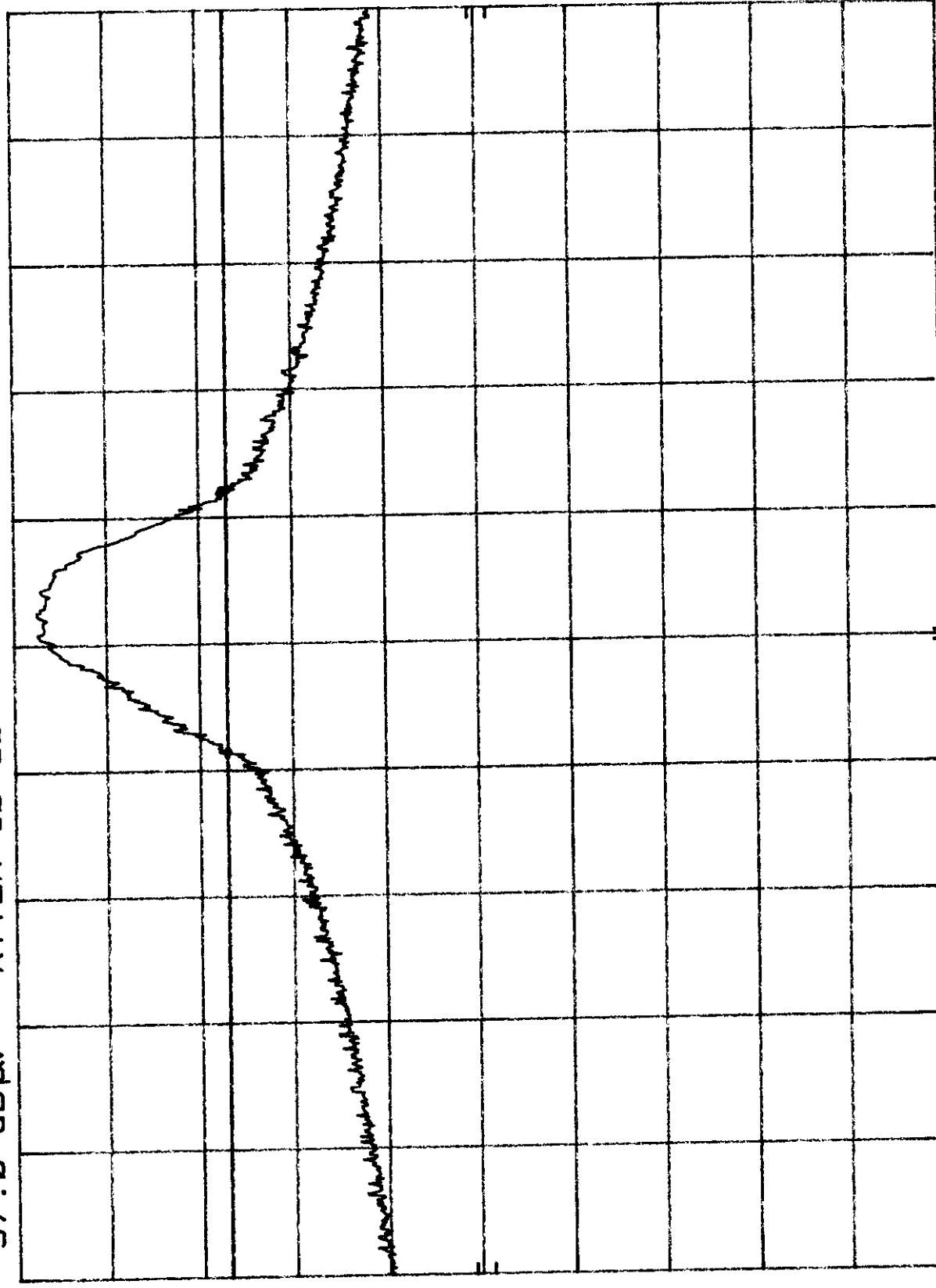
Analyzer bandwidth settings:  
Peak Ave.  
RES BW:1Mhz 1Mhz  
VID BW:1Mhz 10Hz

DOLPHIN TECHNOLOGY, REMOTE KEY TX FCCID- MKR  $\Delta$  205 KHZ  
REF 97.0 dB $\mu$ V ATTEN 10 dB .60 dB

hp

10 dB/

DL  
74.6  
dB $\mu$ V

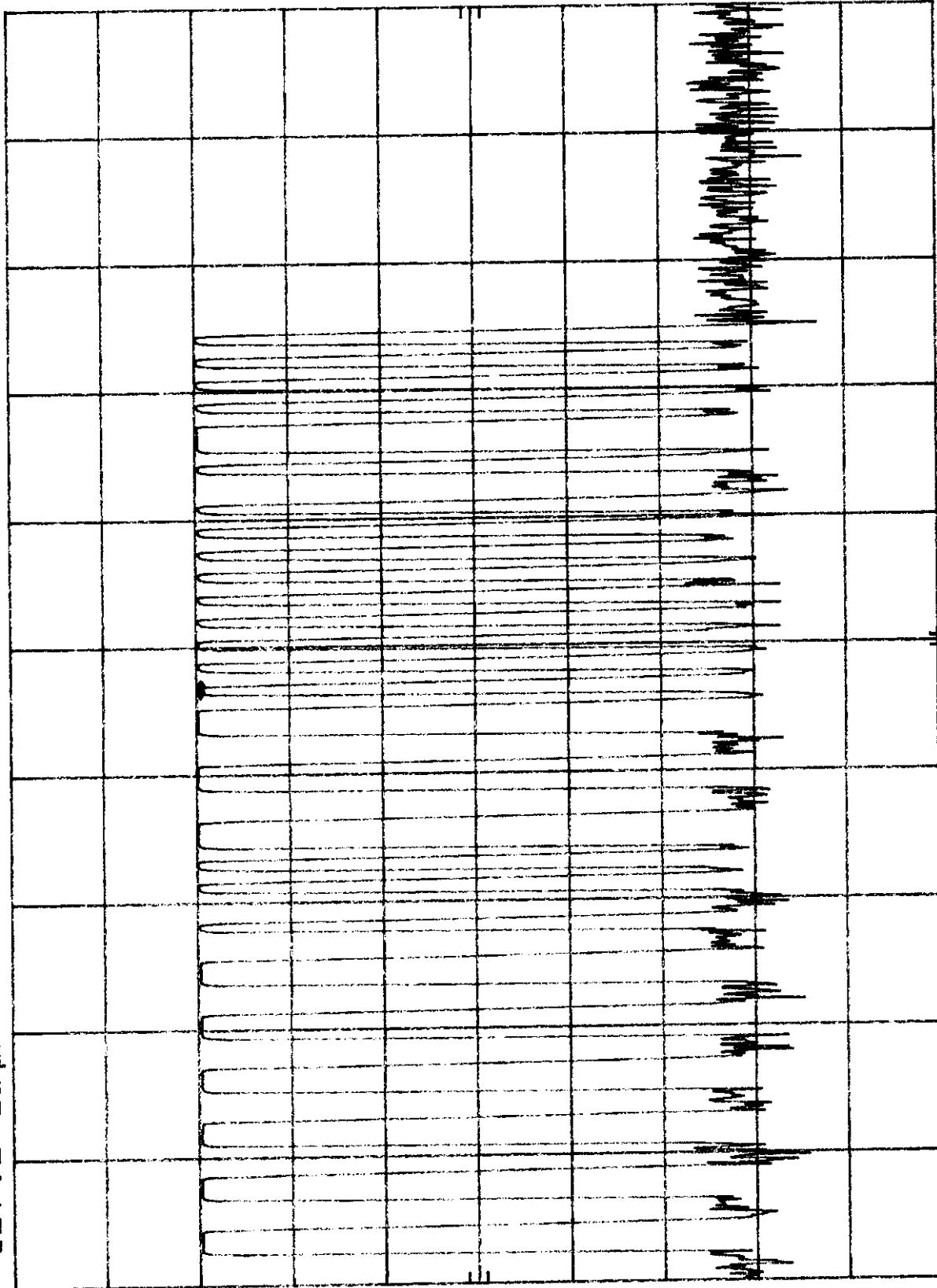


CENTER 303.800 MHZ RES BW 100 KHZ VBW 100 KHZ SPAN 1.000 MHZ SWP 20 msec



HP  
DOLPHIN TECHNOLOGY, REMOTE KEY TX FCCID--  
REF 107.0 dBμV ATTEN 10 dB MKR Δ 100 μsec .00 dB

10 dB/  
POS PK



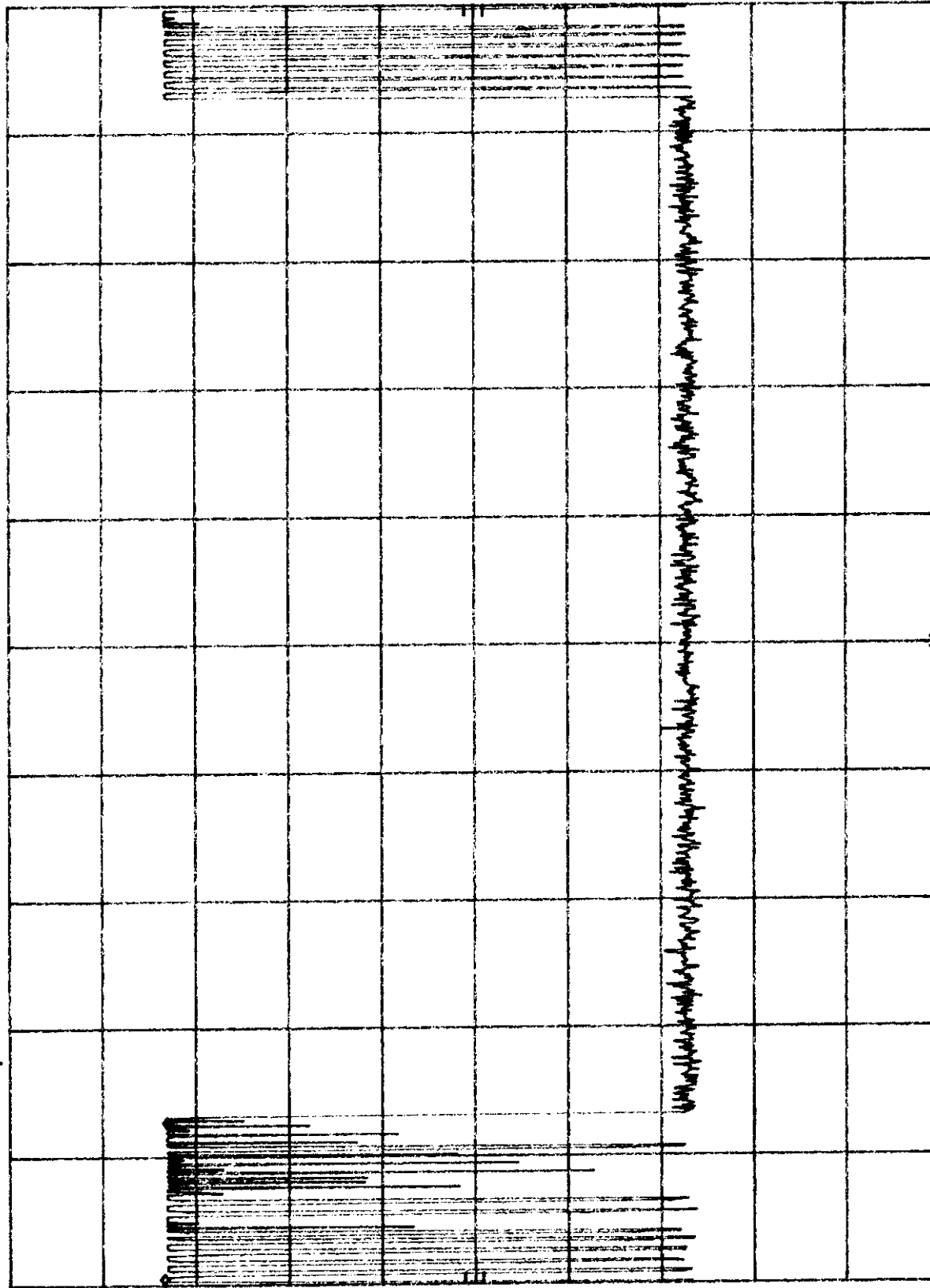
CENTER 303.800 MHz RES BW 100 KHZ VBW 100 KHZ SWP 20 msec SPAN 0 Hz

DOLPHIN TECHNOLOGY, REMOTE KEY TX FCCID- MKR Δ 12.20 msec  
REF 107.0 dBμV ATTN 10 dB - .30 dB

hp

10 dB/

POS PK



CENTER 303.800 MHZ

RES BW 100 KHZ

VBW 100 KHZ

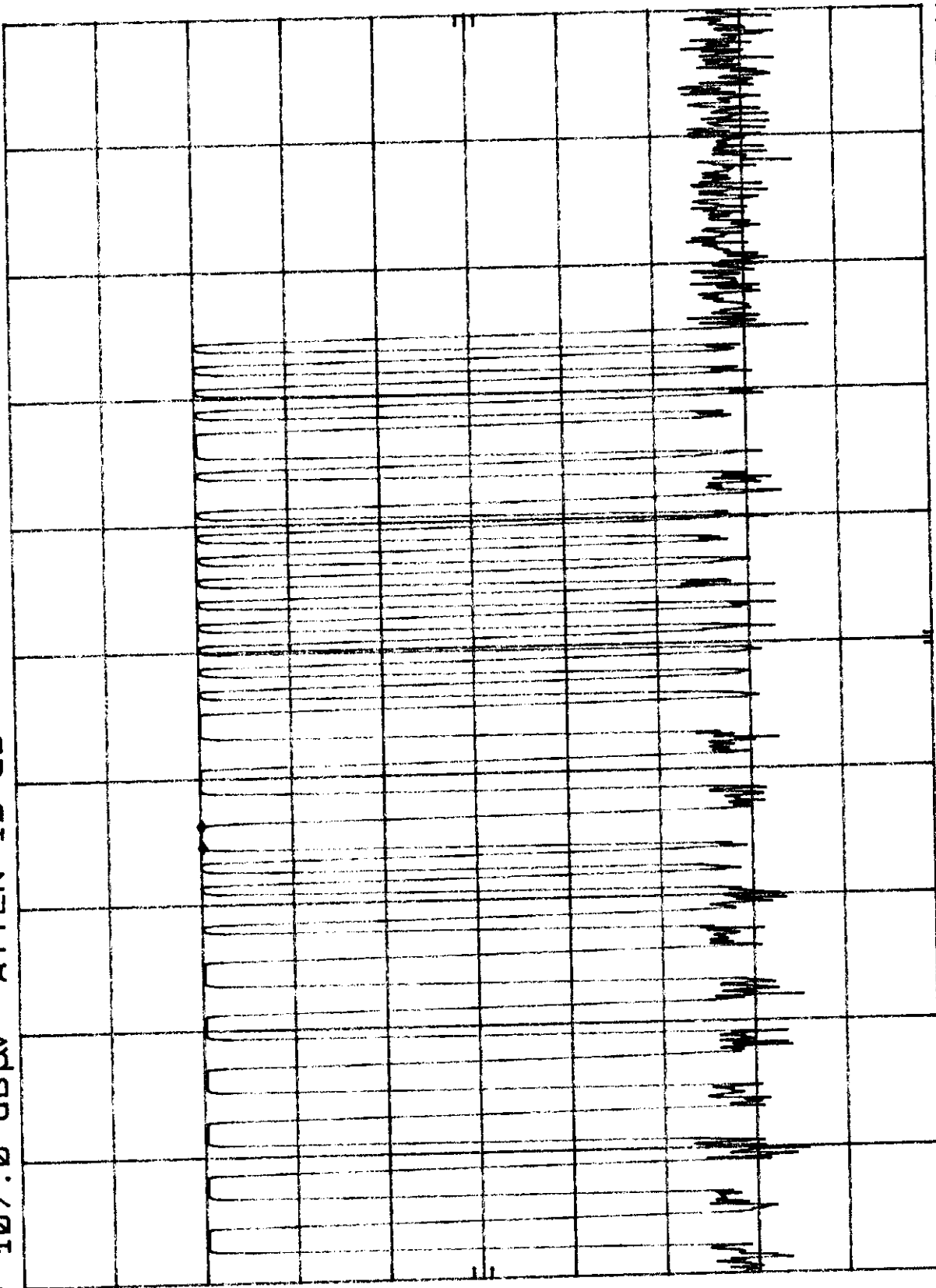
SWP 100 msec

SPAN 0 HZ

HP  
10 dB/  
POS PK

DOLPHIN TECHNOLOGY, REMOTE KEY TX FCCID-  
REF 107.0 dBμV ATTEN 10 dB

MKR Δ 340 μsec  
.10 dB



CENTER 303.800 MHZ  
RES BW 100 KHZ

VBW 100 KHZ

SWP 20 msec

SPAN 0 HZ