

## 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

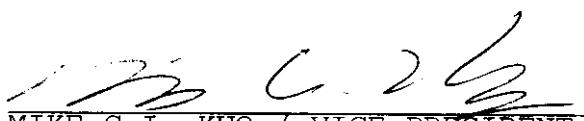
FCC ID : NPZDTIPSN-97TRK

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.

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**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

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## 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:

$$\text{Average Reading} = \text{Peak Reading (dBuV/m)} \times 20 \log^{(M\%)}$$

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

$$\begin{aligned} \text{WHERE} T \text{ (1 period)} &= 100 \text{ ms} \\ t_1 + t_2 + t_3 + \dots + t_n &= 7.44 \text{ ms} \end{aligned}$$

$$\begin{aligned} M\% &= ((t_1 + t_2 + t_3 + \dots + t_n) / T) \times 100\% \\ &= 7.44\% \end{aligned}$$

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.

>> 3 M RADIATED EMISSION DATA <<

Report No. : 980812B1  
 Date : 08/12/1998  
 Time : 08:58  
 Test Engr : MIKE ZHU 1/2

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
<b>H/X:</b>							
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
<b>H/Y:</b>							
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
<b>H/Z:</b>							
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
<b>V/X:</b>							
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
<b>V/Y:</b>							
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
<b>V/Z:</b>							
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  
DOLPHIN TECHNOLOGY  
EUT: Remote Key Tx

8/12/98

Mike Zhu

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

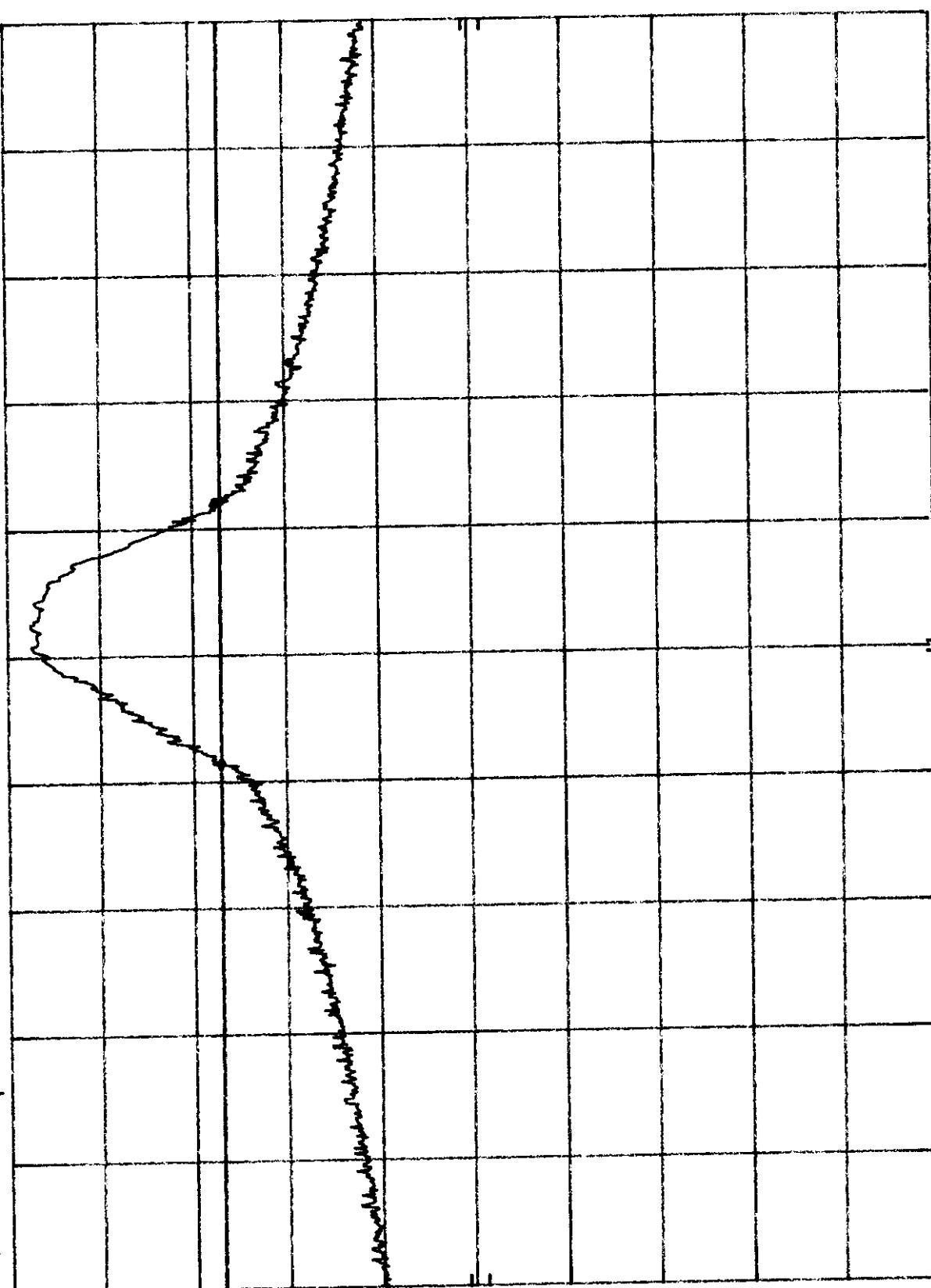
Analyzer:8593EM, cal due:5/29/99  
Antenna:DRG-118/A, cal due:1/15/99  
Preamp=HP8449B, cal due:4/2/99  
Lc=cable loss

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

DOLPHIN TECHNOLOGY, REMOTE KEY TX FCCID-  
REF 97.0 dB $\mu$ V ATTN 10 dB

MKR  $\Delta$  205 kHz  
.60 dB

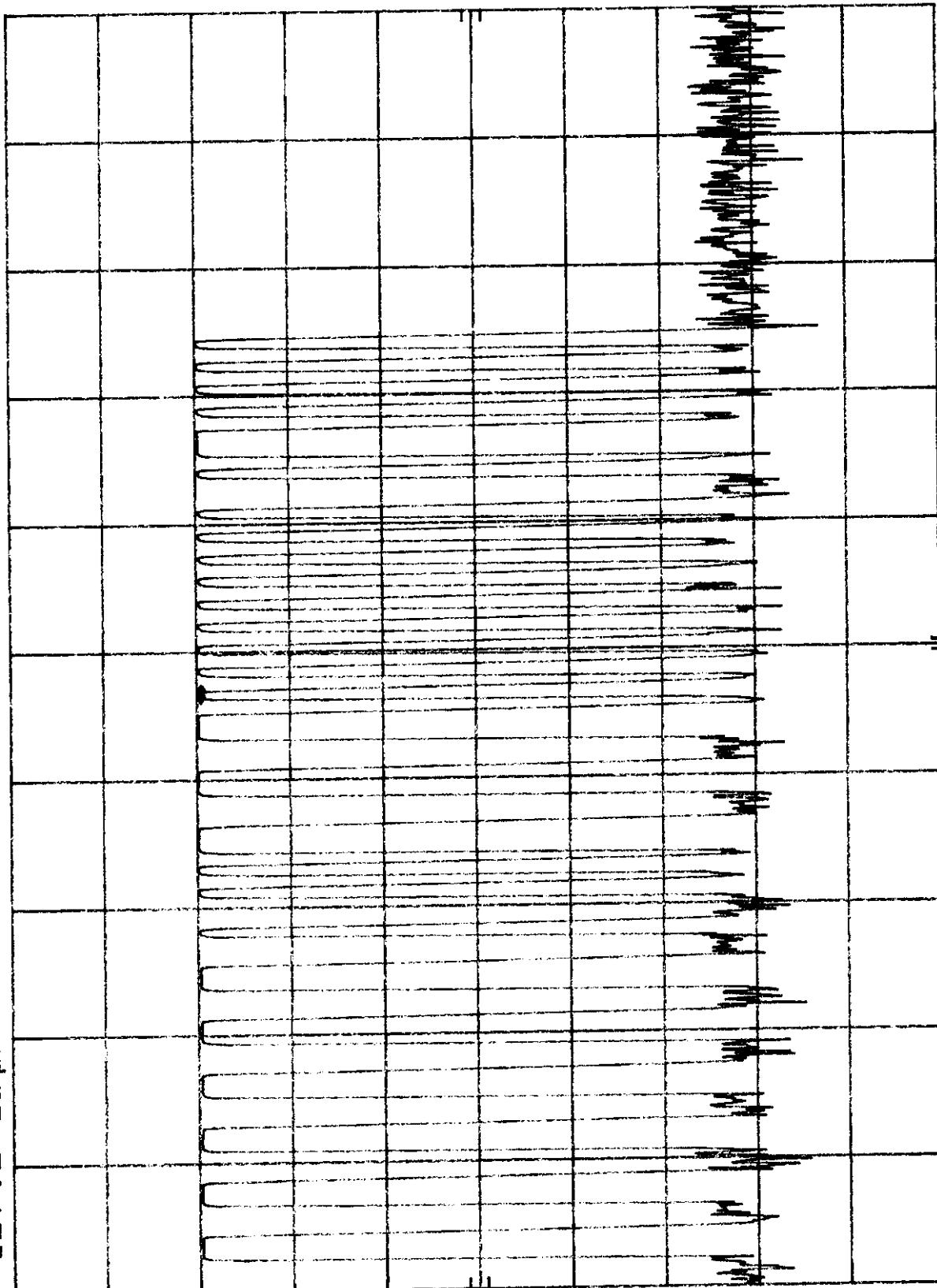
10 dB/  
μV



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

MKR Δ 100 µsec  
.00 dB

10 dB/  
POS PK



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

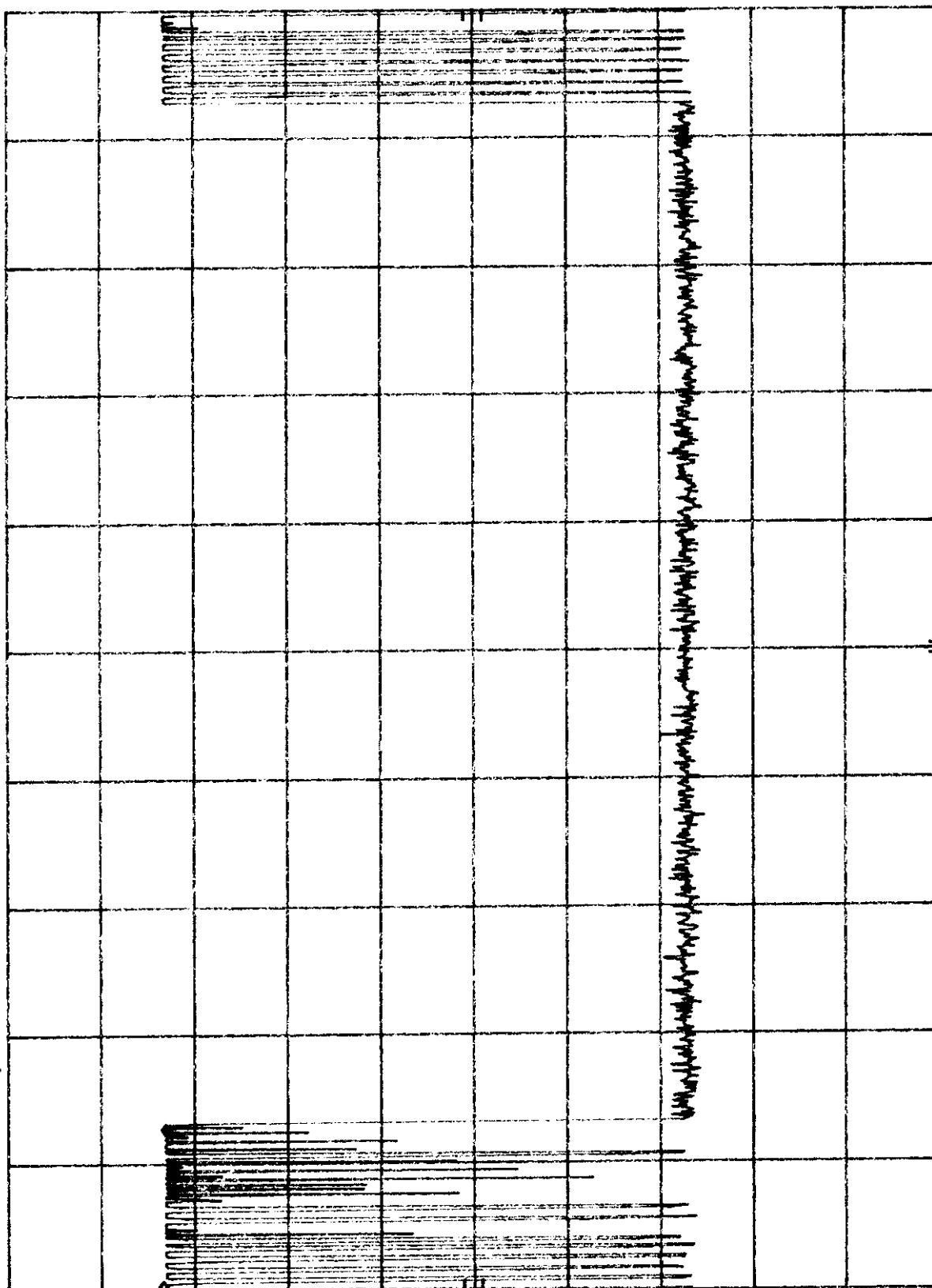
DOLPHIN TECHNOLOGY. REMOTE KEY TX FCCID-  
REF 107.0 dB $\mu$ V ATTN 10 dB

MKR  $\Delta$  12.20 msec  
-.30 dB

HP

10 dB/

POS PK



CENTER 303.800 MHz  
RES BW 100 kHz

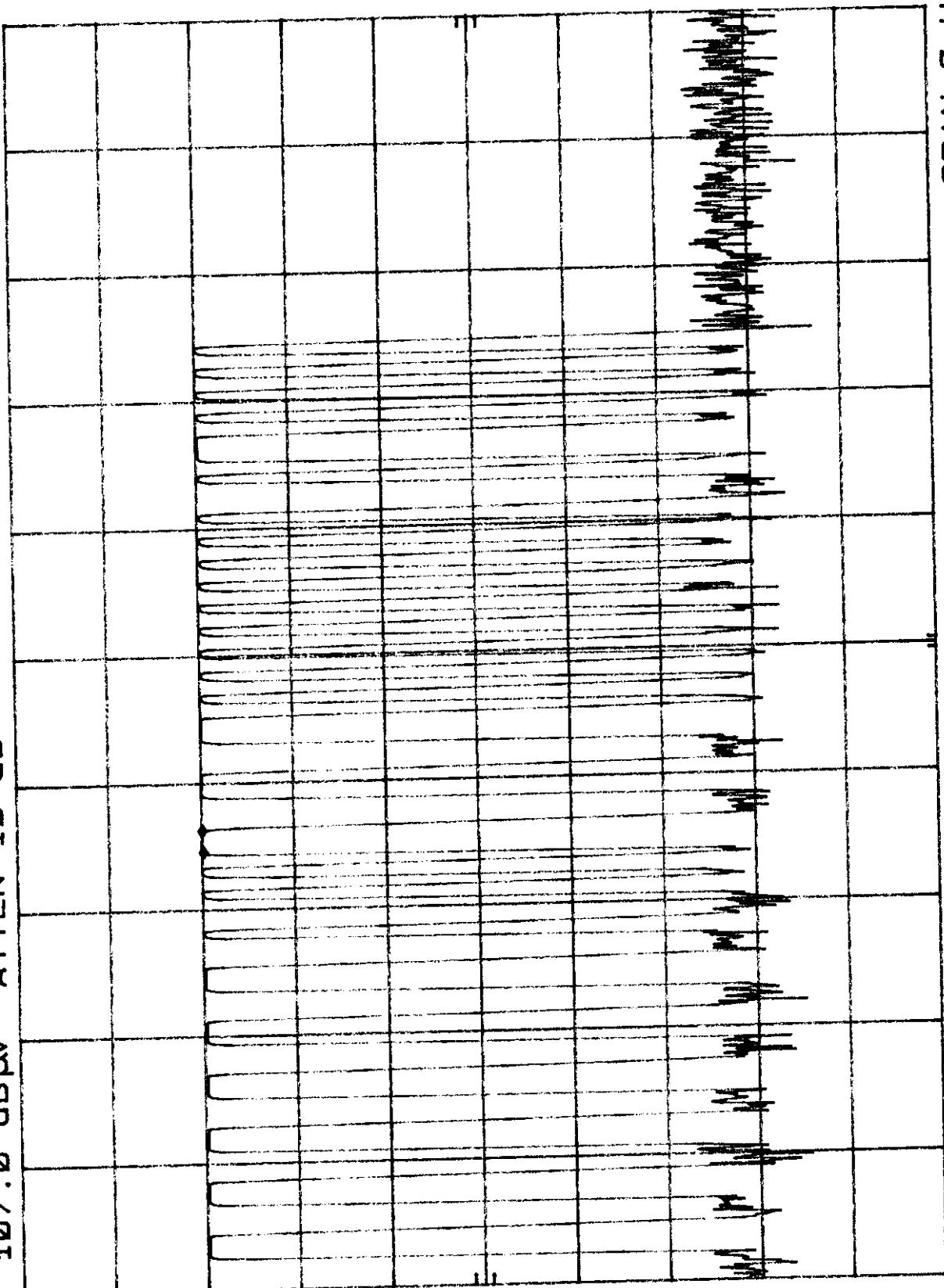
VBW 100 kHz  
SWP 100 msec

SPAN 0 Hz  
SWP 100 msec

DOLPHIN TECHNOLOGY, REMOTE KEY TX FCCID-  
REF 107.0 dB $\mu$ V ATTN 10 dB

MKR  $\Delta$  340  $\mu$ sec  
10 dB

10 dB/  
POS PK



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