

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

for

INTENTIONAL RADIATOR

302 MHz CAR ALARM TRANSMITTER

MODEL NO: 6945PET

FCC ID NO: ELVMT0C

REPORT NO: 00E8840

ISSUE DATE: JULY 25, 2000

Prepared for

**NUTEK CORPORATION
5F, NO. 3, ALLEY 6, LANE 45
PAO-HSING ROAD, HSIN TIEN, 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
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HSIN TIEN, TAIPEI, TAIWAN
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EUT DESCRIPTION: 302 MHz CAR ALARM TRANSMITTER

MODEL NAME/NUMBER: 6945PET

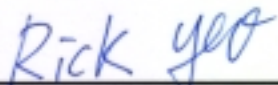
FCC ID: ELVMT0C

DATE TESTED: JULY 15, 2000 ~ JULY 18, 2000

REPORT NUMBER: 00E8840

TYPE OF EQUIPMENT	SECURITY EQUIPMENT (INTENTIONAL RADIATOR)
EQUIPMENT TYPE	302 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 / EMC MANAGER
COMPLIANCE ENGINEERING SERVICES, INC.

PAGE NO: 1

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2. Product Description

Fundamental Frequency	302 MHz
Power Source	6V Battery
Transmitting Time	Periodic $\leq$ 5 seconds
Associated Receiver	FCC ID: ELVMT0C

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)	09/00
EMCO	3142	Antenna (30-2000MHz)	06/01
H.P.	8447E B	Amplifier(30-1300MHz)	09/00
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

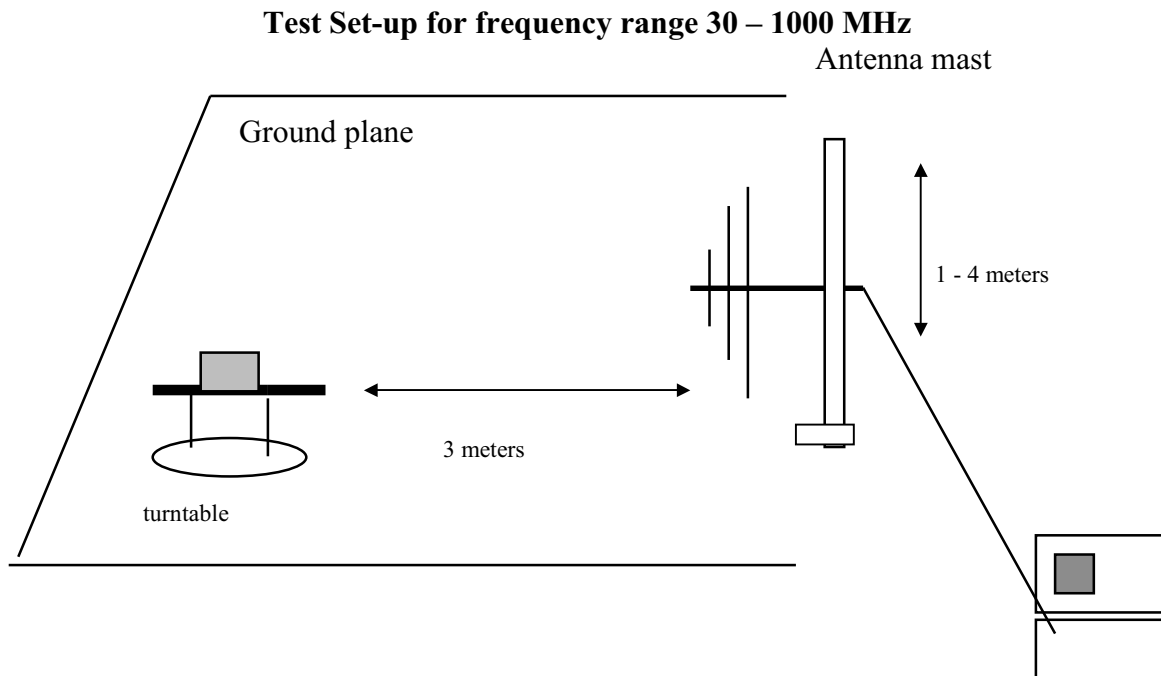
Use a block of foam and combined it with EUT wrapping rubber band around it. This way it can test X.Y, and Z axis. To activate continuous transmission, place a small plastic block between rubber band and EUT push button.



Radiated Open Site Test Set-up

10. Test Procedure

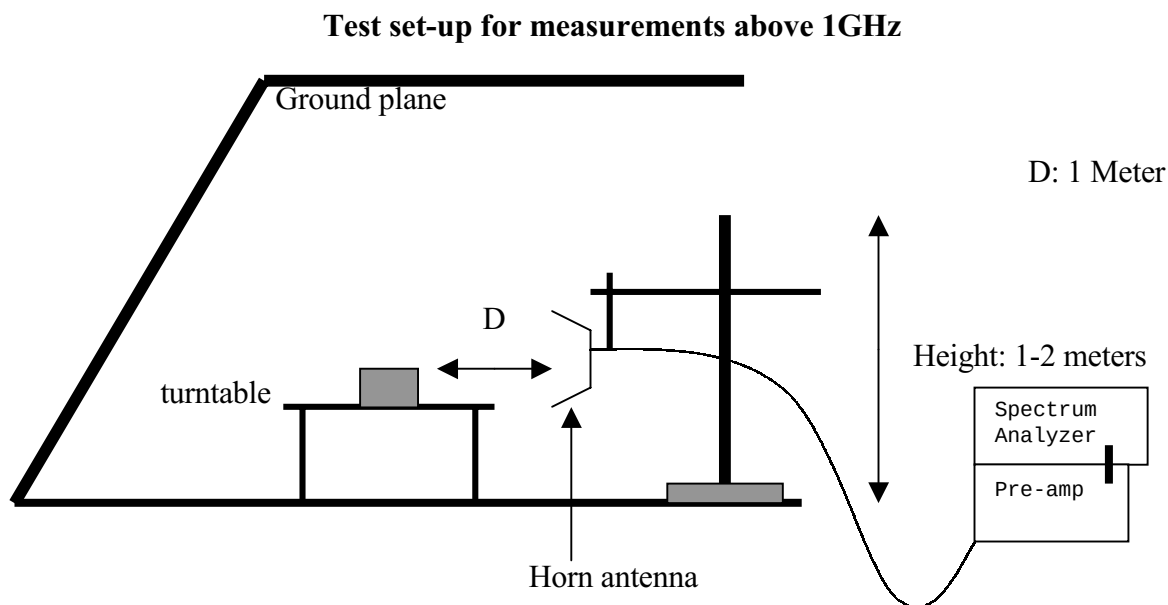
Radiated Emissions, 15.231(4)(b)



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.



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)	

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 = 106.88 mS > 100mS. Use 100mS for calculation.
 Long pulse = 1.3 mS
 Short pulse = 0.5 mS
 No of Long pulse = 15
 No of Short pulse = 22

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

Duty Cycle = ((15x1.3)+(22x0.5))/100=0.3050=30.50% or -10.314dB

12.2 The Emissions Bandwidth

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

Center Frequency	Measured	Limits
302 MHz	424.4 kHz < (refer to plot)	302X0.25%=755 kHz

[illegible]

[illegible]



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

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Project #: 00E8840
Report #: 8840D3
Date & Time: 7/25/00 09:47
Test Engr: Vince Chiang

Company: NUTЕК CORPORATION
EUT Description: 6945PET (Alarm TX / 302MHz)
Test Configuration : EUT ONLY
Type of Test: FCC CLASS B
Mode of Operation: NORMAL MODE

☒ D Site

☐ E Site

6 W orst

Descendin

Freq.	Reading	AF	Closs	Pre-amp	Dist	Level	Limit	Margin	Pol	Az	Height	Mark
(MHz)	(dBuV)	(dB)	(dB)	(dB)	dB	(dBuV/m)	FCC_B	(dB)	(H/V)	(Deg)	(Meter)	(P/Q/A)
1207	50.48	25.2	2.7	43.32	-9.5	25.52	54.0	-28.48	1mV	90	1.0	P
1509	52.70	25.2	3.0	43.16	-9.5	28.27	54.0	-25.73	1mV	90	1.0	P
1811	53.50	26.4	3.4	43.00	-9.5	30.82	54.0	-23.18	1mV	90	1.0	P
2112	49.50	27.6	3.7	42.85	-9.5	28.37	54.0	-25.63	1mV	90	1.0	P
2414	49.44	28.6	3.8	42.69	-9.5	29.61	54.0	-24.39	1mV	90	1.0	P
2716	48.63	29.6	4.0	42.53	-9.5	30.22	54.0	-23.78	1mV	90	1.0	P
3018	48.86	30.8	4.2	42.38	-9.5	31.93	54.0	-22.07	1mV	90	1.0	P
1207	51.30	25.2	2.7	43.32	-9.5	26.34	54.0	-27.66	1mH	270	1.0	P
1509	51.70	25.2	3.0	43.16	-9.5	27.27	54.0	-26.73	1mH	270	1.0	P
1811	52.13	26.4	3.4	43.00	-9.5	29.45	54.0	-24.55	1mH	270	1.0	P
2112	50.79	27.6	3.7	42.85	-9.5	29.66	54.0	-24.34	1mH	270	1.0	P
2414	50.84	28.6	3.8	42.69	-9.5	31.01	54.0	-22.99	1mH	270	1.0	P
2716	48.93	29.6	4.0	42.53	-9.5	30.52	54.0	-23.48	1mH	270	1.0	P
3018	48.43	30.8	4.2	42.38	-9.5	31.50	54.0	-22.50	1mH	270	1.0	P

* All Test Data Under Average Limit For Peak Reading.

Total data #: 14
V.2d

Peak: RBW=VBW=1MHz
Average: RBW=1MHz, VBW=10Hz

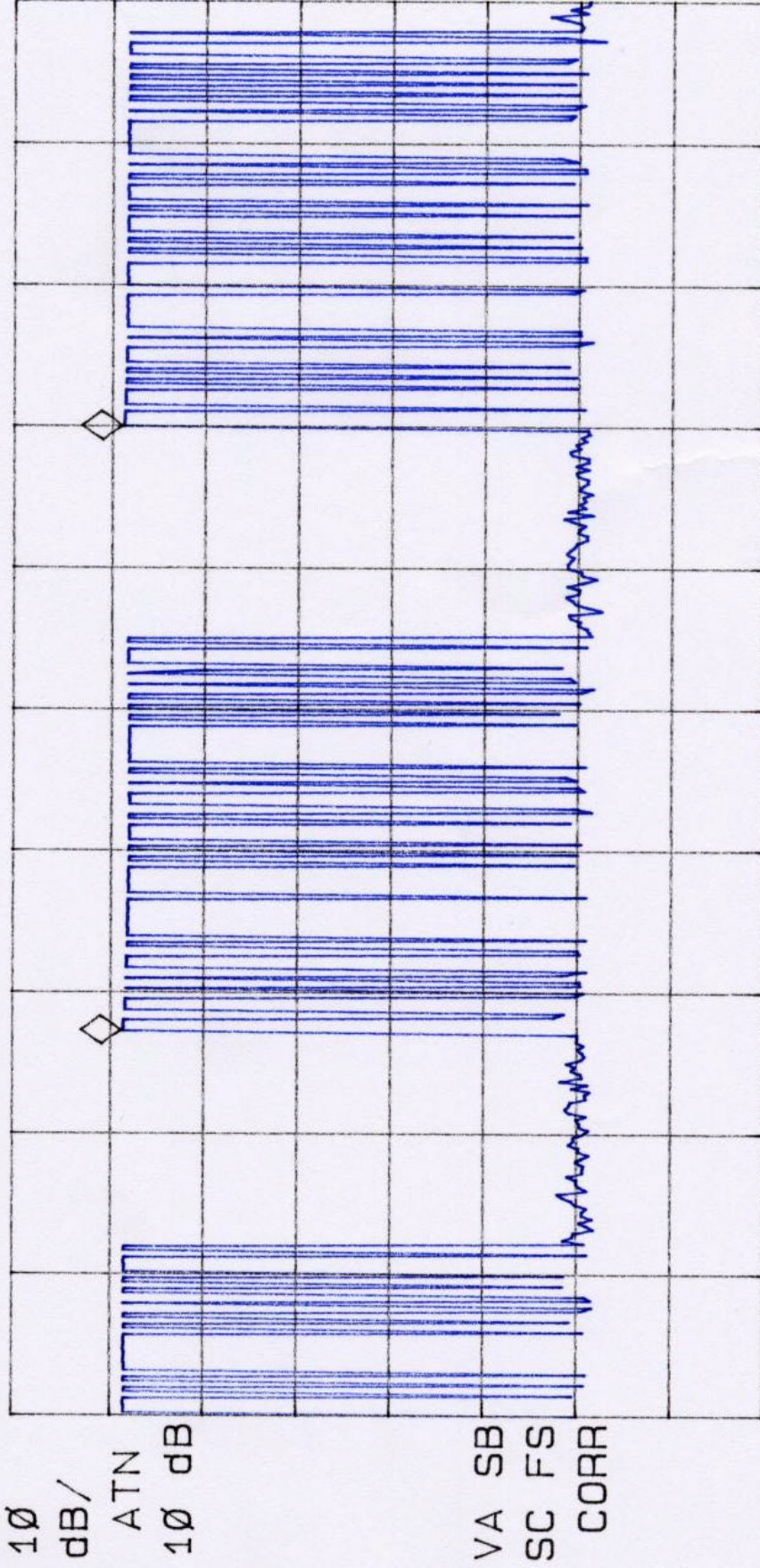
Distance = $20\log(1/3) = -9.5\text{dB}$

13: 41: 36 AUG 14, 2000

HP

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 106.88 msec
.05 dB

LOG 10 dB/ ATN 10 dB
REF OFFST 3.0 dB
REF -17.0 dBm

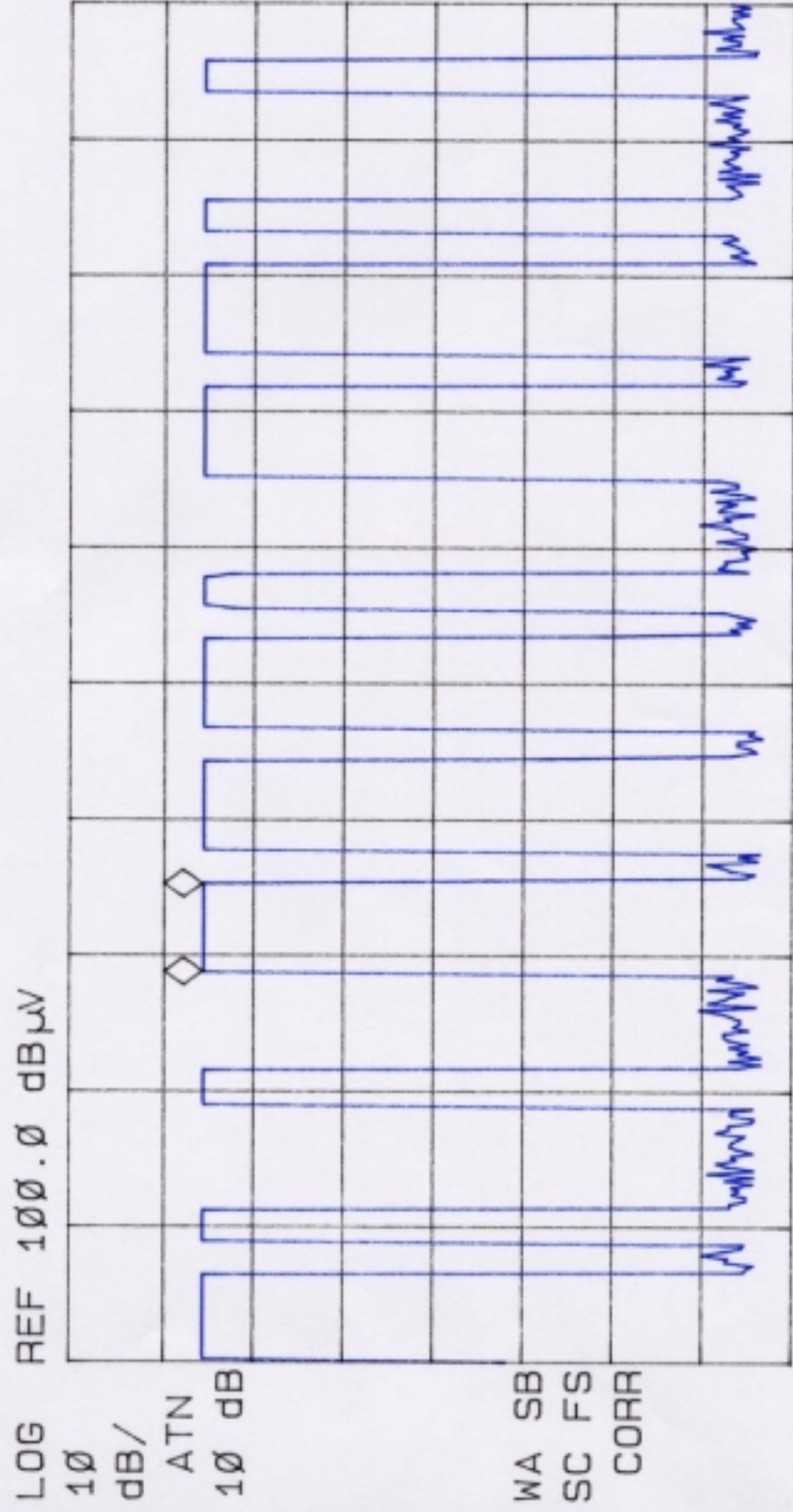


VA SB
SC FS
CORR

CENTER 301.615 MHz
IF BW 120 kHz
AVG BW 300 kHz
SPAN 0 Hz
#SWP 250 msec

14:25:51 JUL 15, 2000

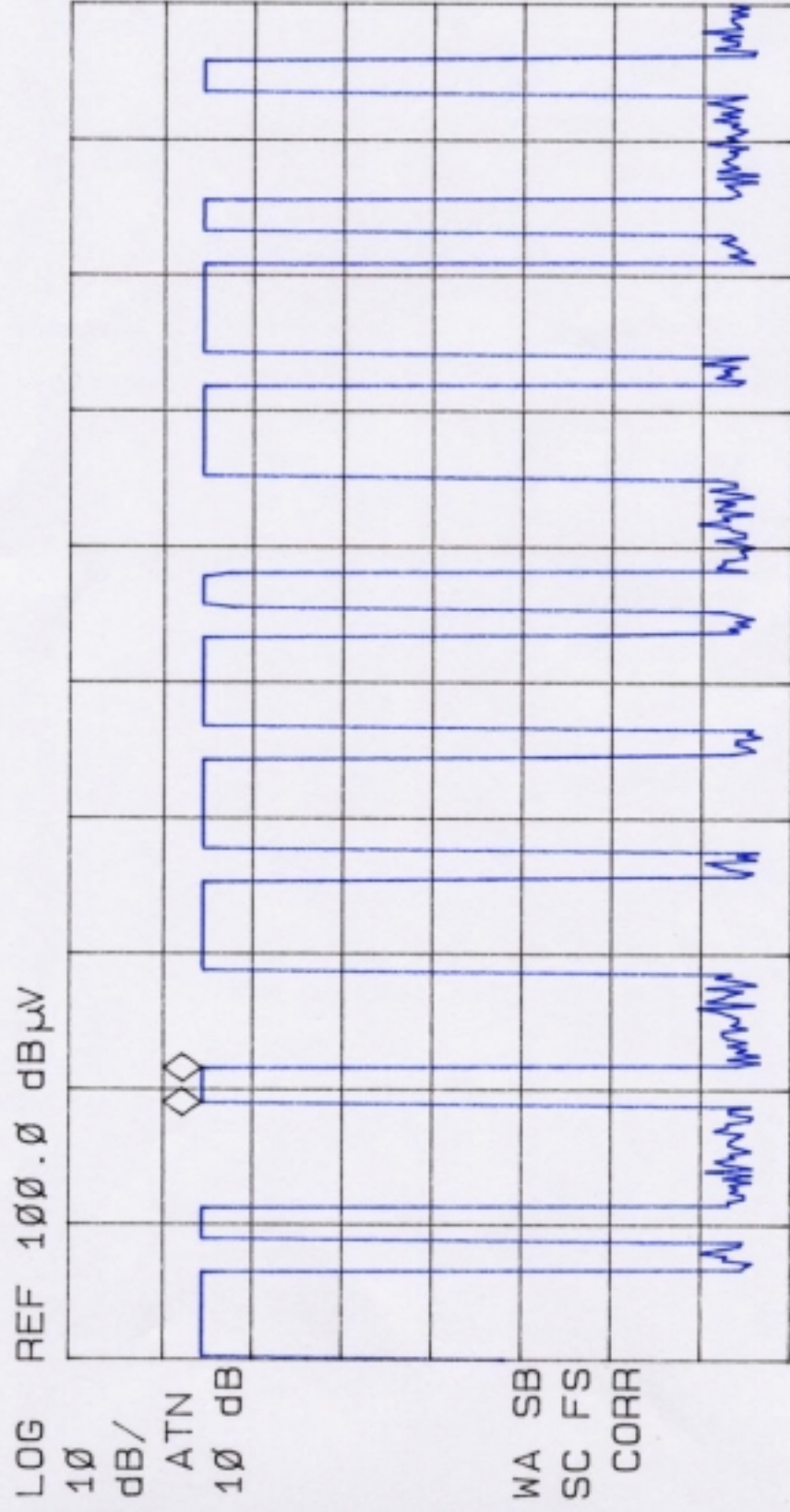
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 1.3000 msec
.03 dB



CENTER 301.661 MHZ	IF BW 120 KHZ	AVG BW 300 KHZ	SPAN 0 HZ
			#SWP 20.0 msec

14:23:12 JUL 15, 2000
AP AH

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 500.00 μ sec
--.03 dB



CENTER 301.661 MHz

IF BW 120 kHz

AVG BW 300 kHz

#SWP 20.0 msec

SPAN 0 Hz



Date 15.Jul.'00 Time 17:03:49

Ref.Lvl Delta

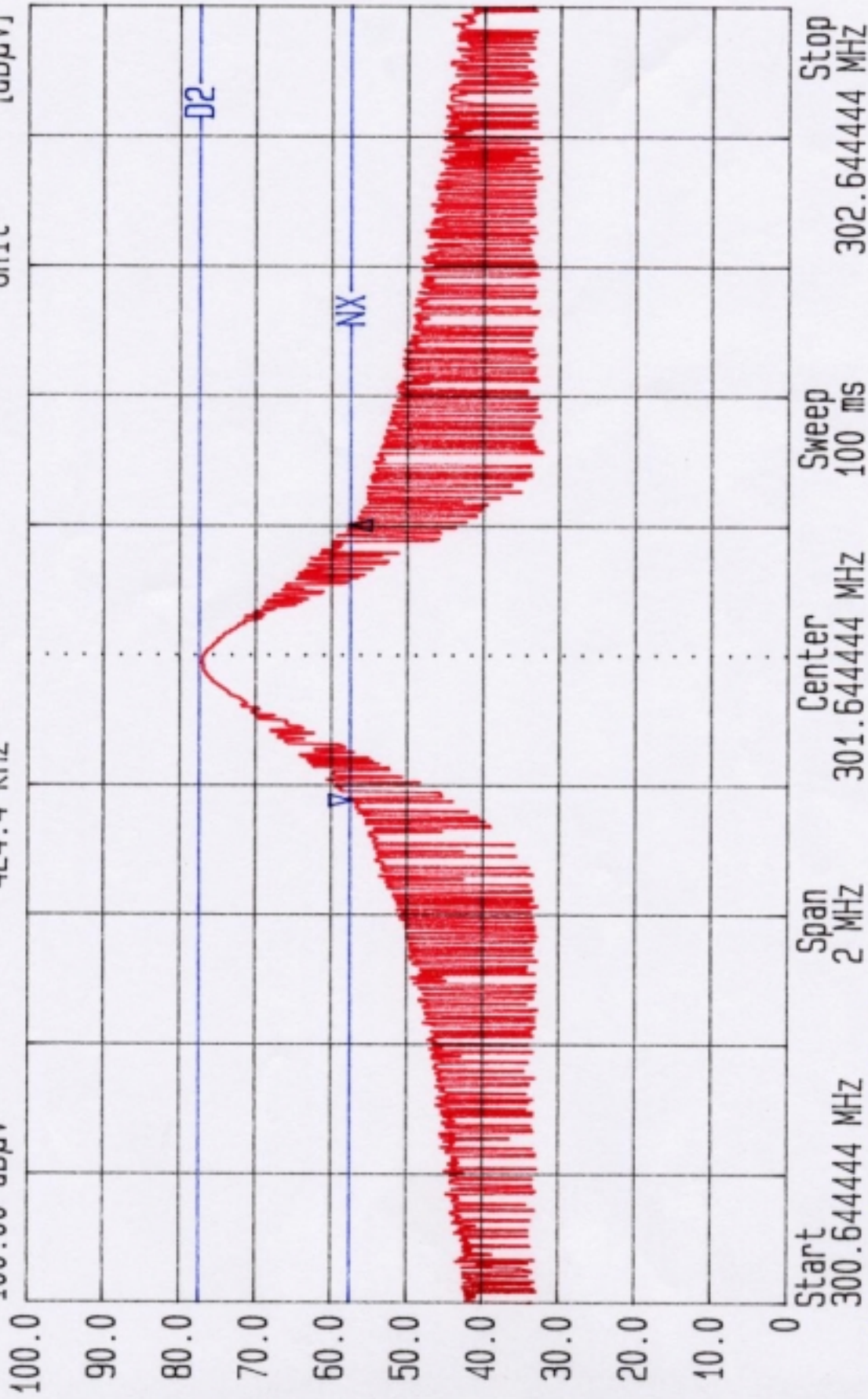
100.00 dB μ V
0.61 dB
424.4 kHz

Res.Bw
TG.Lvl
CF.Stp

120 kHz [imp]
off
200.000 kHz

Vid.Bw
RF.Att
Unit

300 kHz
10 dB
[dB μ V]



N dB down Level 20.0 dB
Delta Mark 424.4 KHz