

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

for

INTENTIONAL RADIATOR

434 MHz CAR ALARM TRANSMITTER

MODEL NO:M3RF3

FCC ID NO: H5OT15

REPORT NO: 01E9364

ISSUE DATE: APRIL 13, 2001

Prepared for

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Prepared by

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**FCC, VCCI, CISPR, CE
UL, CSA, TÜV, VDE**

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TABLE OF CONTENTS	PAGE
1. VERIFICATION OF COMPLIANCE.....	1
2. Product Description.....	2
3. Test Facility.....	2
4. Measurement Standards	2
5. Test Methodology	2
6. Measurement Equipment Used	2
7. POWERLINE RFI LIMIT	3
8. RADIATED EMISSION LIMITS	3
9. SYSTEM TEST CONFIGURATION.....	4
10. Test Procedure.....	5
11. Equipment Modifications.....	6
12. TEST RESULT	7
12.1 Maximum Modulation Percentage (M%)	7
12.2 The Emissions Bandwidth.....	7

TEST DATA

- Maximum Modulation Percentage Plot
- Emission Bandwidth Plot
- Radiated Emission Worksheet for Average Measurement

1. VERIFICATION OF COMPLIANCE

COMPANY NAME: ADVANCE SECURITY INC.
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CONTACT PERSON: MICHAEL CHEN / PRESIDENT

TELEPHONE NO.: (886-2) 2643-8192

EUT DESCRIPTION: 434 MHz CAR ALARM TRANSMITTER

MODEL NAME/NUMBER: M3RF3

FCC ID: H5OT15

DATE TESTED: MARCH 26, 2001

REPORT NUMBER: 01E9364

TYPE OF EQUIPMENT	SECURITY EQUIPMENT (INTENTIONAL RADIATOR)
EQUIPMENT TYPE	434 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 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.



RICK YEO / EMC MANAGER
COMPLIANCE ENGINEERING SERVICES, INC.

PAGE NO: 1

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2. Product Description

Fundamental Frequency	434 MHz
Power Source	12V Battery
Transmitting Time	Periodic $\leq$ 5 seconds
Associated Receiver	FCC ID: H5OR32

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

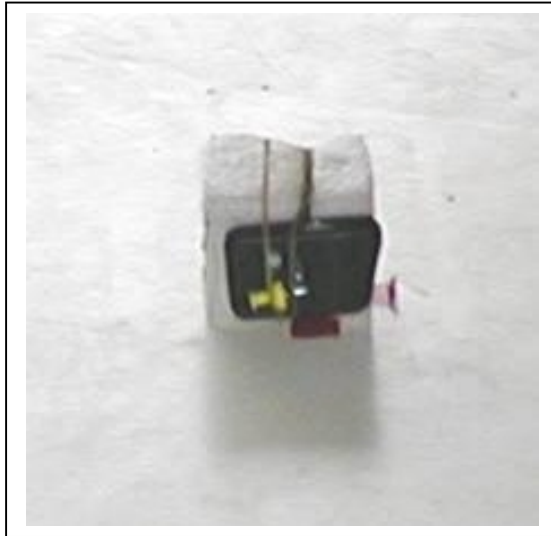
CONNECTED TO AC POWER LINE	SECTION 15.207
CARRIER CURRENT SYSTEM IN THE FREQUENCY RANGE OF 450 kHz TO 30 MHz	SECTION 15.205 AND SECTION 15.209, 15.221, 15.223, 15.225 OR 15.227, AS APPROPRIATE.
BATTERY POWER	NO REQUIRED.

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

9. SYSTEM TEST CONFIGURATION

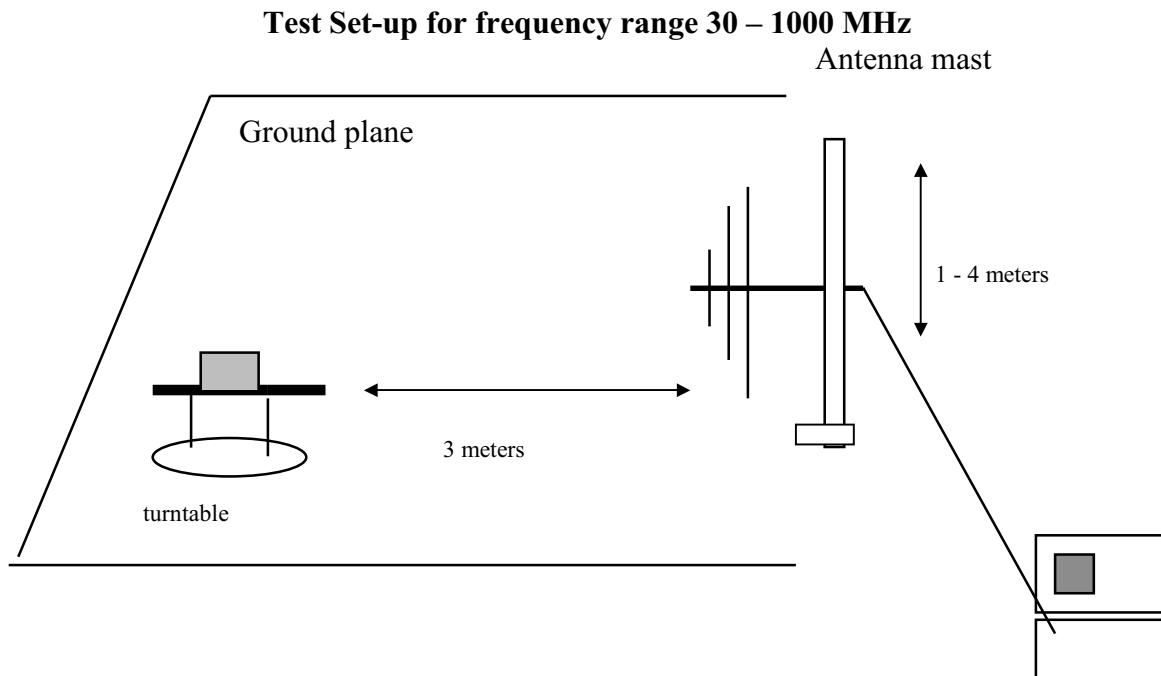
Use a block of foam and combined it with EUT wrapping rubber band around it. This way it can test X.Y, and Z axis. To activate continuous transmission, place a small plastic block between rubber band and EUT push button.



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.

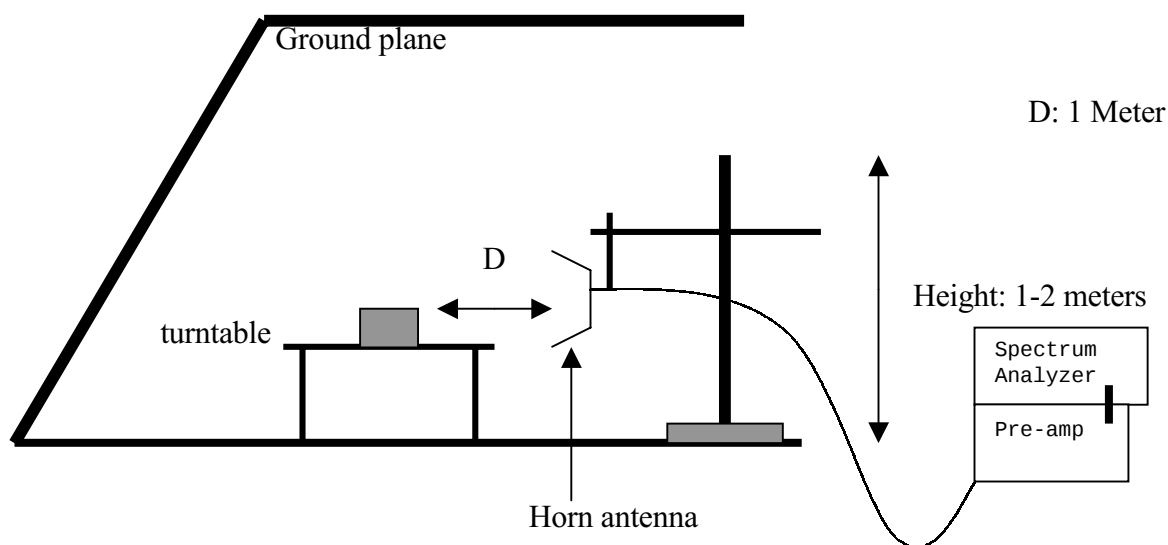
Test set-up for measurements above 1GHz

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)	

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 = 138.333 mS > 100 mS. use 100 mS for calculation
 Long pulse = 1.555 mS
 Short pulse = 0.489 mS
 No of Long pulse = 34
 No of Short pulse = 22

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

Duty Cycle = ((34x1.555)+(22x0.489))/100=0.6363=63.63% or -3.93dB

12.2 The Emissions Bandwidth

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

Center Frequency	Measured	Limits
434 MHz	482.2 kHz < (refer to plot)	434X0.25%=1085 kHz



TRG

Ref.Lvl
80.00 dB μ V

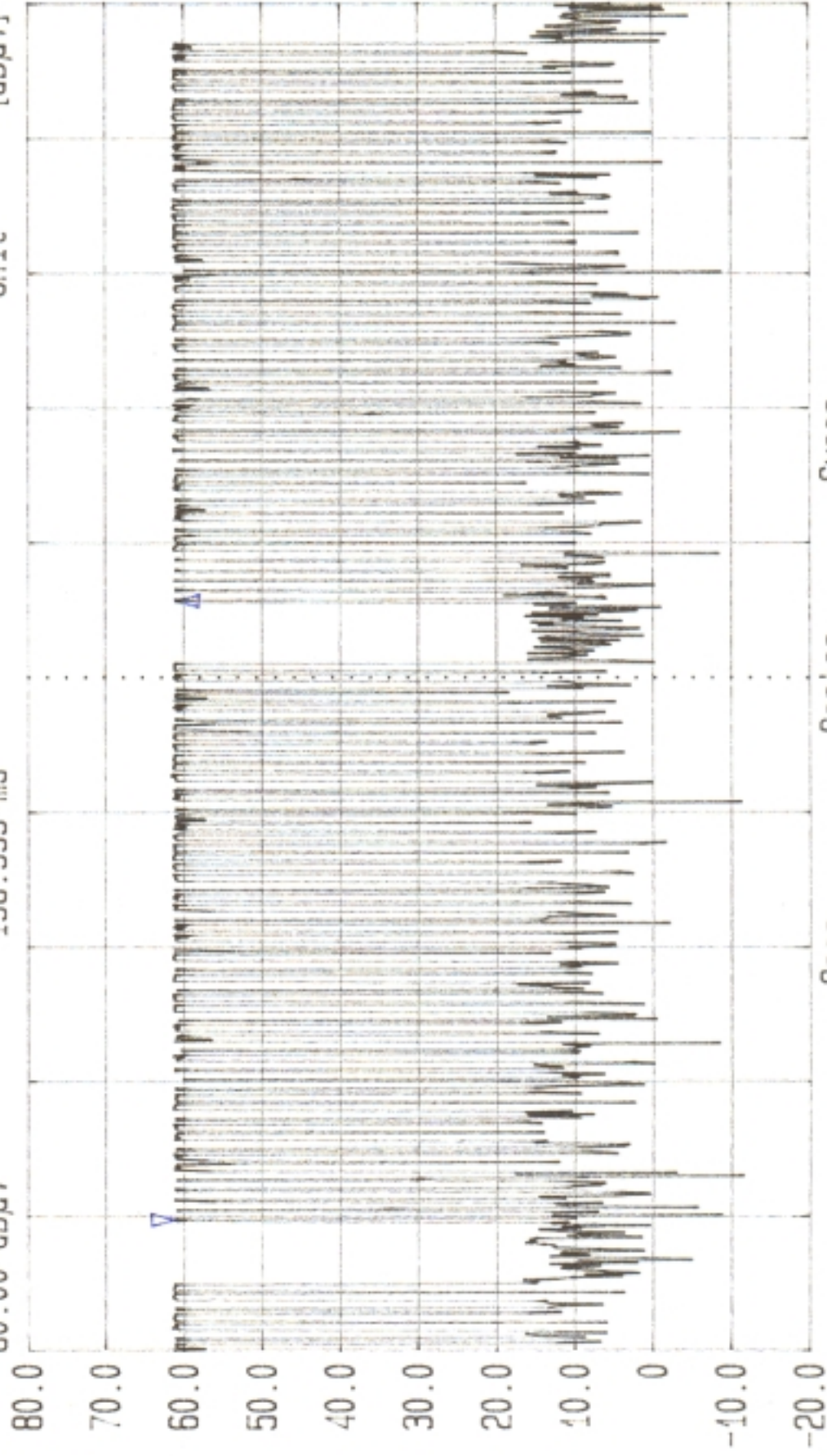
Delta

0.05 dB
138.333 ms

Res.Bw
TG.Lvl
CF.Stp

120 kHz [imp]
Off
12.000 kHz

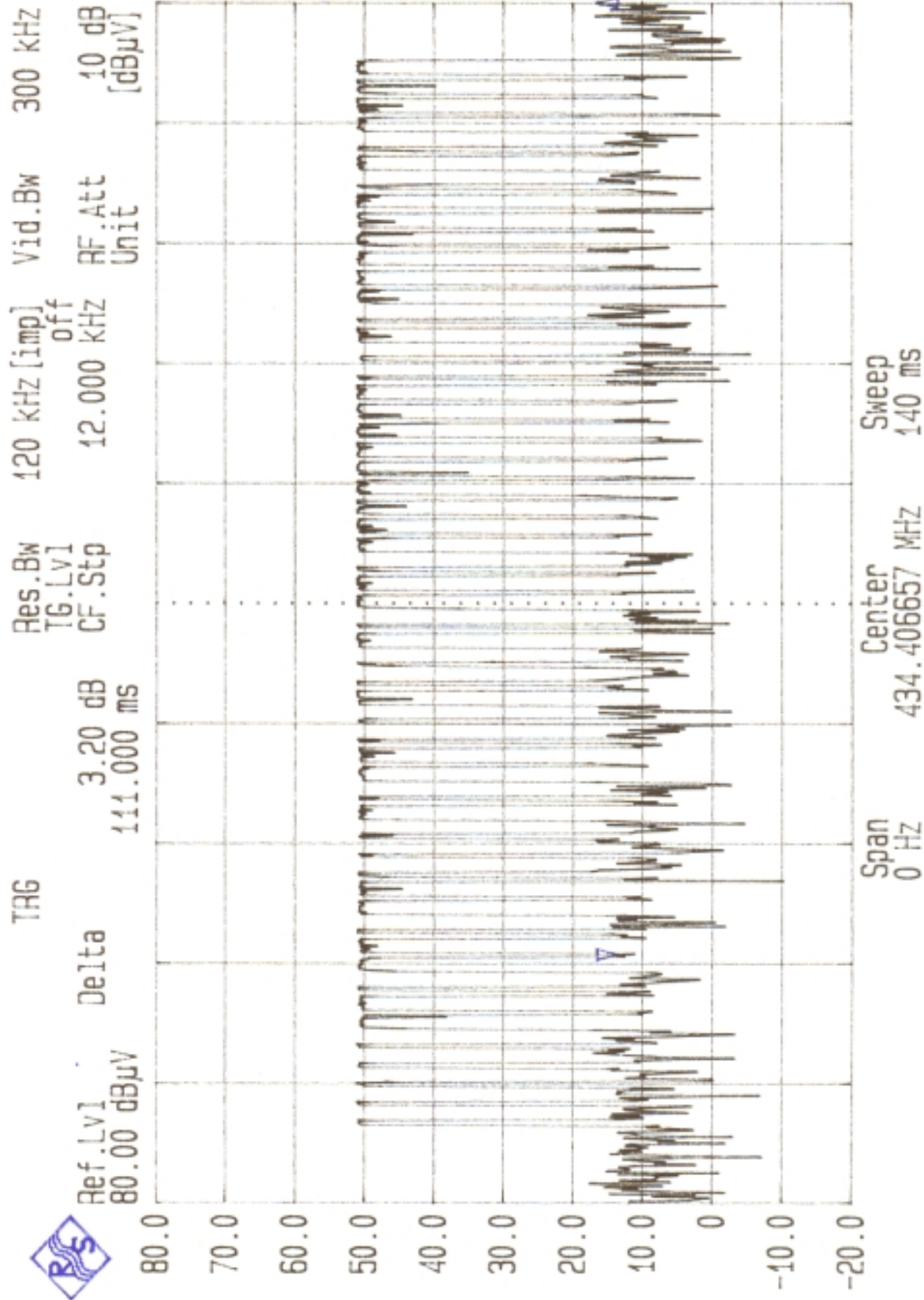
Vid.Bw
RF.Att
Unit
300 kHz
10 dB
[dB μ V]



Span
0 Hz

Center
434.406657 MHz

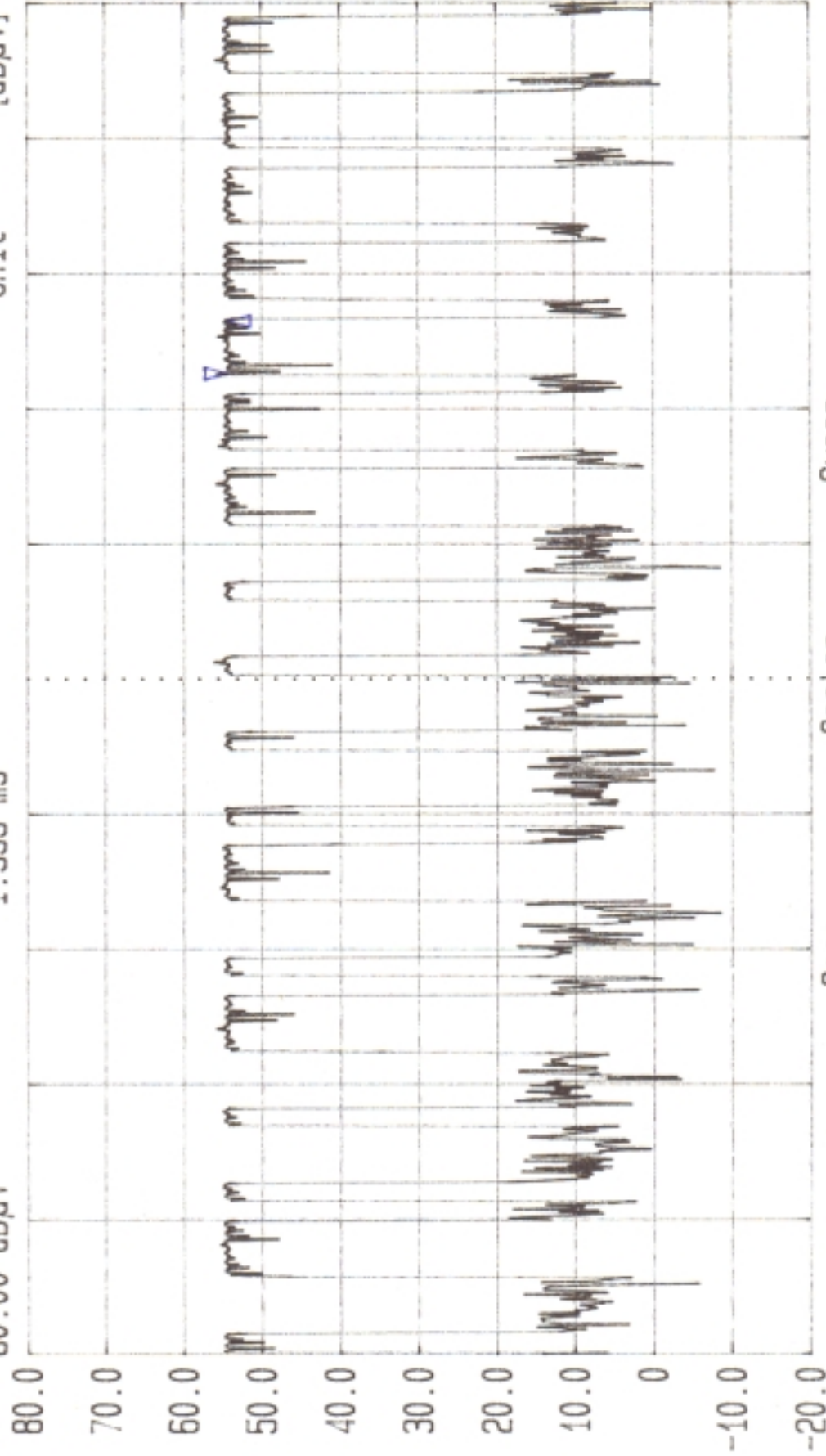
Sweep
300 ms





TRG

Ref.Lvl	Delta	Res.Bw	120 kHz [imp]	Vid.Bw	300 kHz
80.00 dBuV	0.51 dB	TG.Lvl	off		
	1.555 ms	CF.Stp	12.000 kHz	RF.Att	10 dB
				Unit	[dBuV]



Span 0 Hz

Center 434.406657 MHz

Sweep 40 ms



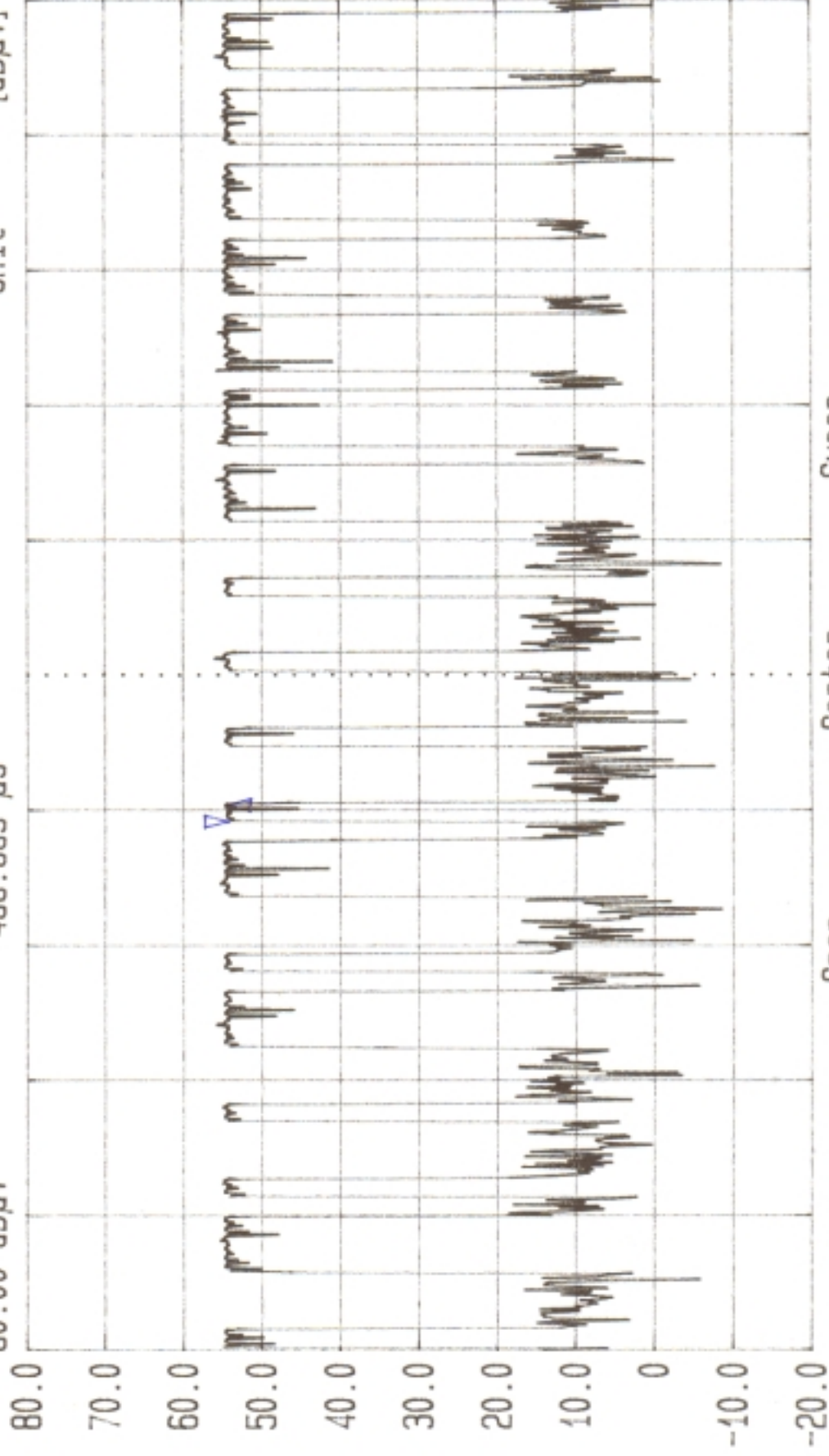
Ref.Lvl Delta TRG
80.00 dB μ V
0.08 dB
488.889 μ s

Res.Bw
TG.Lvl
CF.Stp

120 kHz [imp]
Off
12.000 kHz

Vid.Bw
RF.Att
Unit

300 kHz
10 dB
[dB μ V]



Span
0 Hz

Center
434.406657 MHz

Sweep
40 ms



Ref.Lvl
80.00 dBuV

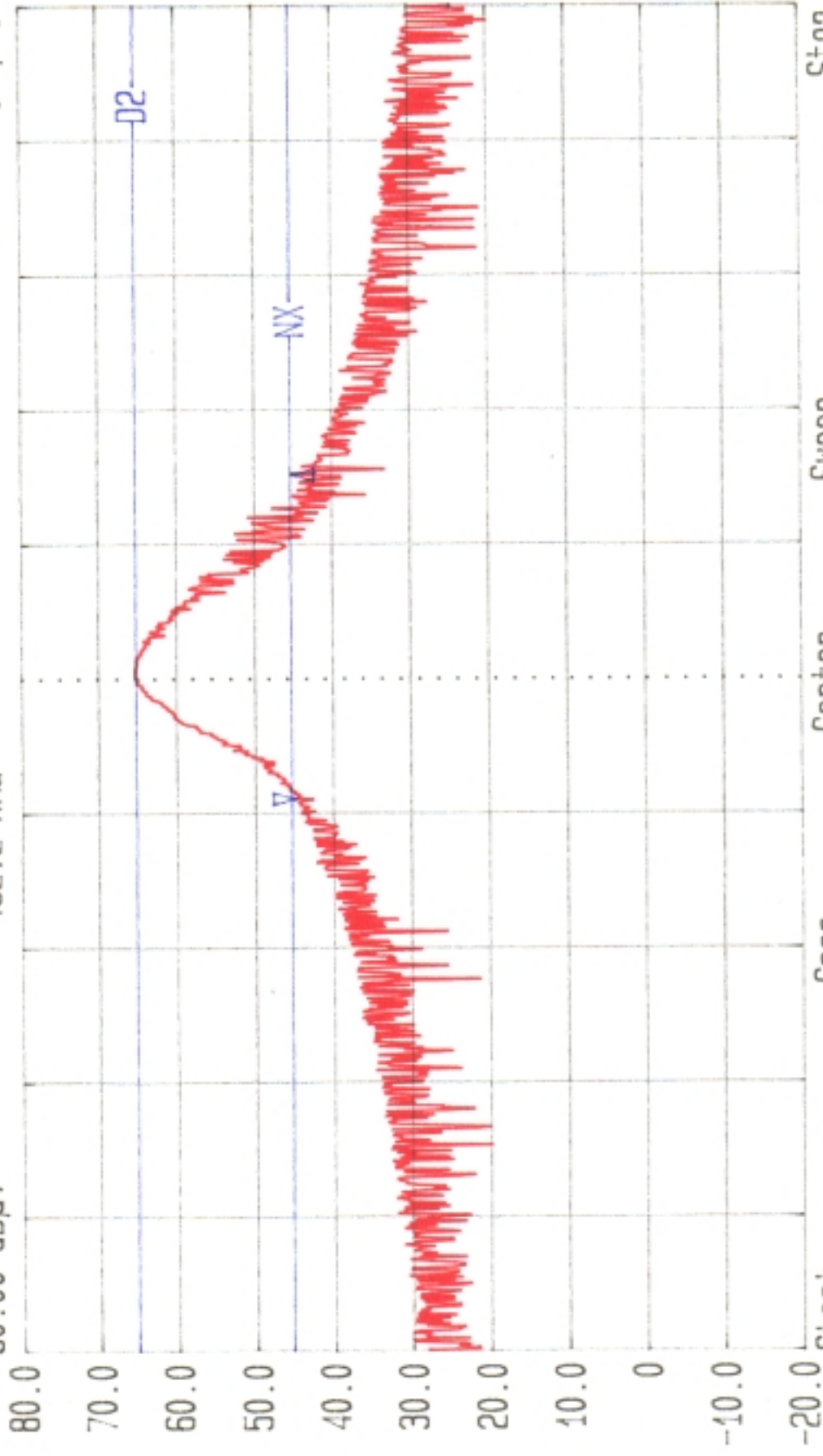
Delta

0.61 dB
482.2 kHz

Res.Bw
TG.Lvl
CF.Stp

120 kHz [imp]
Off
200.000 kHz

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



N dB Down Level 20.0dB
DELTA MARKER 482.2 KHz

[illegible]

[illegible]



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

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Project #: 01E9364
Report #: 9364D3
Date & Time: 4/10/2001
Test Engr: Vince Chiang

Company: ADVANCE SECURITY INC.
EUT Description: M3RF3 (Alarm Tx / 434MHz)
Test Configuration : EUT ONLY
Type of Test: FCC 15.231(b)/FCC 15.209
Mode of Operation: NORMAL MODE

☒ D Site

☐ E Site

6 W orst

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)
1302	52.79	48.86	25.1	2.8	38.00	-9.5	29.31	54.0	-24.69	1mV	0	1.2	A
1736	52.18	48.25	26.7	3.3	37.95	-9.5	30.77	60.9	-30.09	1mV	0	1.2	A
1302	48.60	44.67	25.1	2.8	38.00	-9.5	25.12	54.0	-28.88	1mH	0	1.2	A
1737	46.97	43.04	26.7	3.3	37.95	-9.5	25.56	60.9	-35.30	1mH	0	1.2	A

* No other emission were found within 20dB under the limits upto 4.5 GHz.

Total data #:4
V.2d

P(Peak): RBW=VBW=1MHz
A(Average): Pk Reading - 3.9268dB

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