

Intertek Testing Services -Menlo Park

Samjoo Electronics, 900 MHz Direct Sequence Spread Spectrum
FCC ID: NR839510

Date of Test: April 23, 1998

1.0 Summary of Tests

Samjoo Electronics - Model No.: 39510
FCC ID: NR839510

TEST	REFERENCE	RESULTS
Max. Output power	15.247(b)	Pass
6 dB Bandwidth	15.247(a)(2)	Pass
Max. Power Density	15.247(d)	Pass
Out of Band Antenna Conducted Emission	15.247(c)	Pass
Out of Band Radiated Emission	15.247(c)	N/A
Radiated Emission in Restricted Bands	15.35(b)(c)	Pass
AC Conducted Emission	15.207	Pass
Radiated Emission from Digital Part	15.109	Pass
Radiated Emission from Receiver L.O.	15.109	Pass
Processing Gain Measurements	15.247(e)	Provided by applicant
Antenna Requirement	15.203	Pass

Test Engineer:

Xi-Ming Yang
Xi-Ming Yang

Date: 5-5-98

EMC Site Manager:

David Chernomordik
David Chernomordik

Date: 5-8-98

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Samjoo Electronics, 900 MHz Direct Sequence Spread Spectrum
FCC ID: NR839510

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2.0 General Description

2.1 Product Description

The Samjoo Electronics Model No.: 39510 is a 900 MHz direct sequence spread spectrum cordless telephone.

A prototype version of the sample was received on April 12, 1998 in good condition.

Overview of 900 MHz Direct Sequence Spread Spectrum

Applicant	Samjoo Electronics
Trade Name & Model No.	Samjoo, 39510
FCC Identifier	NR839510
Use of Product	Cordless Phone
Manufacturer & Model of Spread Spectrum Module	N/A
Type of Transmission	Direct Sequence
Rated RF Output (mW)	0.031
Frequency Range (MHz)	902-928
Number of Channel(s)	20
Antenna(s) & Gain, dBi	2
Processing Gain Measurements	☒ Will be provided to ITS for submission with the application ☐ Will be provided directly to the FCC reviewing engineer by the client or manufacturer of the spread spectrum module
Antenna Requirement	☒ The EUT uses a permanently connected antenna. ☐ The antenna is affixed to the EUT using a unique connector which allows for replacement of a broken antenna, but DOES NOT use a standard antenna jack or electrical connector. ☐ The EUT requires professional installation (attach supporting documentation if using this option).
Manufacturer name & address	Unical Enterprises, Inc. 16960 Gale Avenue, City of Industry, California 91745

2.2 Related Submittal(s) Grants

A separate FCC Part 68 application has been prepared.

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2.3 Test Methodology

Both AC mains line-conducted and radiated emissions measurements were performed according to the procedures in ANSI C63.4 (1992). Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "Data Sheet" of this Application. All other measurements were made in accordance with the procedures in part 2 of CFR 47.

2.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is site . This test facility and site measurement data have been fully placed on file with the FCC and NVLAP accredited.

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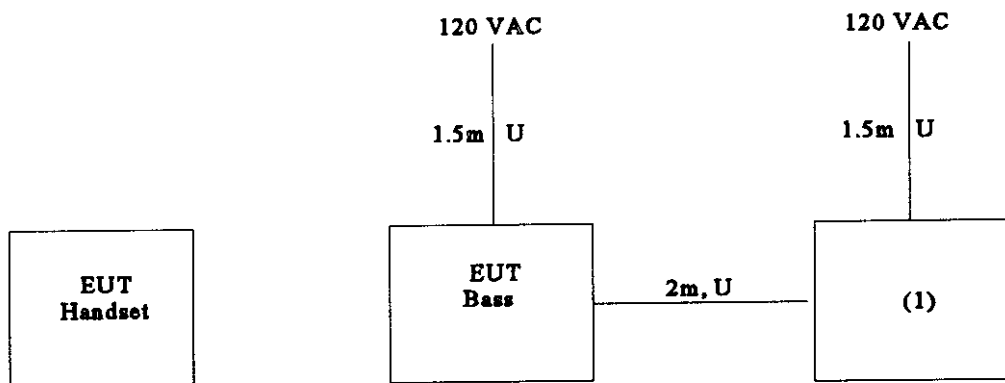
3.0 System Test Configuration

3.1 Support Equipment and description

The FCC ID's for all equipment used in the tested system (included inserted cards, which have grants) are:

Item #	Description	Model No.	Serial No.	FCC ID
1	Teltona Telephone Line Simulator	TLS-3150a	019666	N/A

3.2 Block Diagram of Test Setup



* = EUT
** = No ferrites on video cable

S = Shielded;
U = Unshielded

F = With Ferrite

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3.3 Justification

For emission testing, the equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). During testing, all cables were manipulated to produce worst case emissions.

For radiated emission measurements, the EUT is attached to a cardboard box (if necessary) and placed on the wooden turntable. If the EUT attaches to peripherals, they are connected and operational (as typical as possible). The EUT is wired to transmit full power without modulation.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Detector function is in peak mode. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance.

3.4 Software Exercise Program

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. For emissions testing, the units were setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing.

3.5 Mode of Operation During Test

3.6 Modifications Required for Compliance

The following modifications were installed during compliance testing in order to bring the product into compliance (Please note that this list does not include changes made specifically by Samjoo Electronics prior to compliance testing):

No modifications were made to the EUT by Intertek Testing Services.

3.7 Additions, deviations and exclusions from standards

No additions, deviations or exclusion have been made from standard.

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4.0 Measurement Results

4.1 Maximum Conducted Output Power at Antenna Terminals FCC Rules 15.247(b): (Base Unit)

- [] The antenna port of the EUT was connected to the input of a power meter. Power was read directly and cable loss correction was added to the reading to obtain power at the EUT antenna terminals.
- [] The antenna port of the EUT was connected to the input of a spectrum analyzer. The analyzer was set for maximum RES BW and power was read directly in dBm. External attenuation and cable loss were compensated for using the OFFSET function of the analyzer.

For antennas with gains of 6 dBi or less , maximum allowed transmitter output is 1 watt (+30 dBm).

For antennas with gains greater than 6 dBi, transmitter output level must be decreased by an amount equal to (GAIN - 6) dBm.

Max. antenna gain =		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Ch: 903.6	14.8	30.2
Mid Ch: 914.4	14.6	28.8
Hi Ch: 926.4	13.50	22.4

Cable loss: 0 dB

External Attenuation: 0 dB

Cable loss, external attenuation:

- [] included in OFFSET function
[] added to SA raw reading

EUT Transmit Antenna Gain(dBi) + dBm max. output level = 16.8 dBm (36 dBm or less)

Please refer to the attached plots for details:

Plot 1a: Low Channel Output Power

Plot 1b: Middle Channel Output Power

Plot 1c: High Channel Output Power

PLOT # 1a - Base

MKR 903.56 MHz

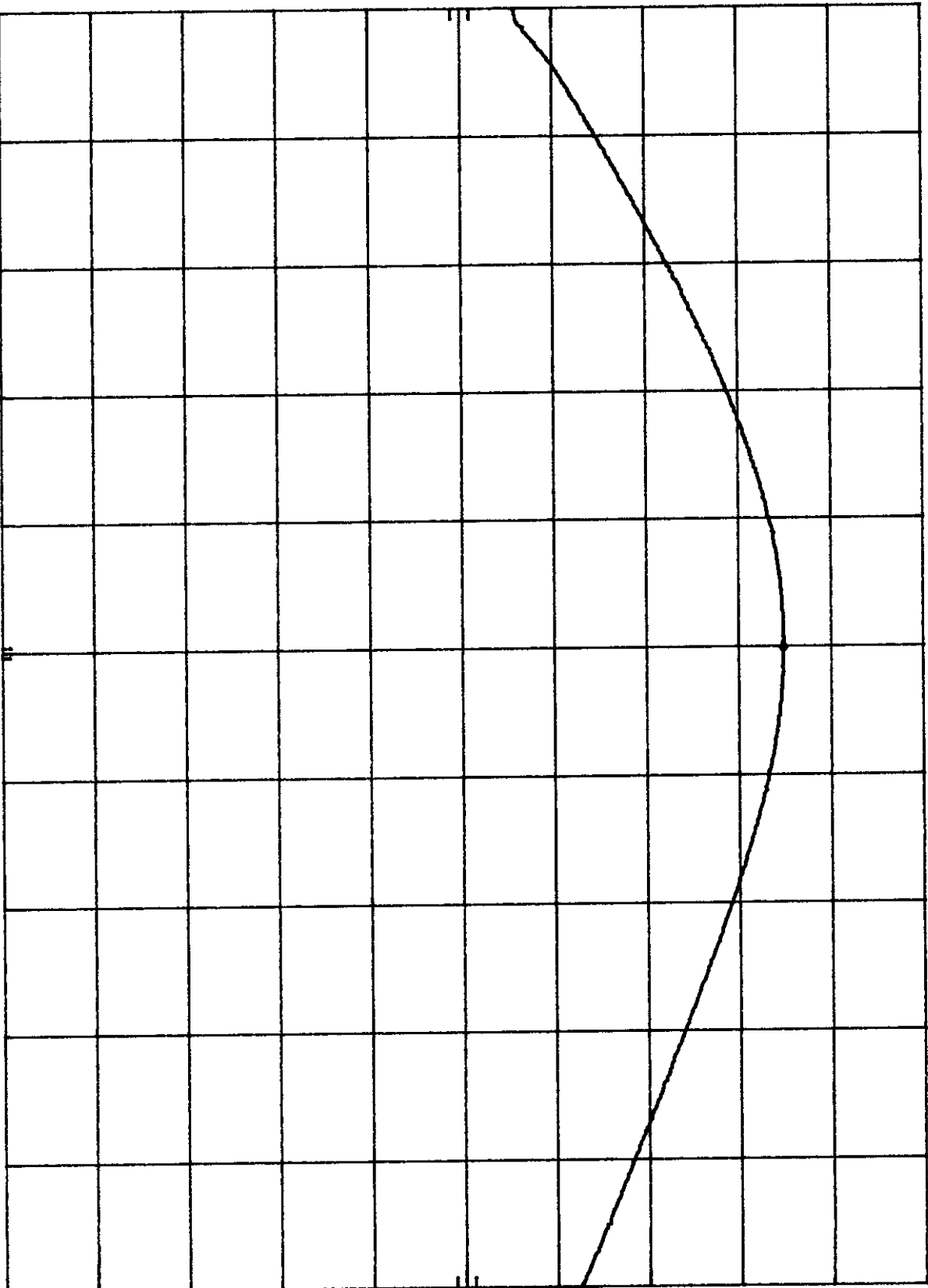
14.80 dBm

HP

REF 30.0 dBm

ATTEN 40 dB

10 dB/



CENTER 903.5 MHz

RES BW 3 MHz

VBW 3 MHz

SPAN 10.0 MHz

SWP 20.0 msec

PLOT #1b - Base

MKR 914.32 MHz

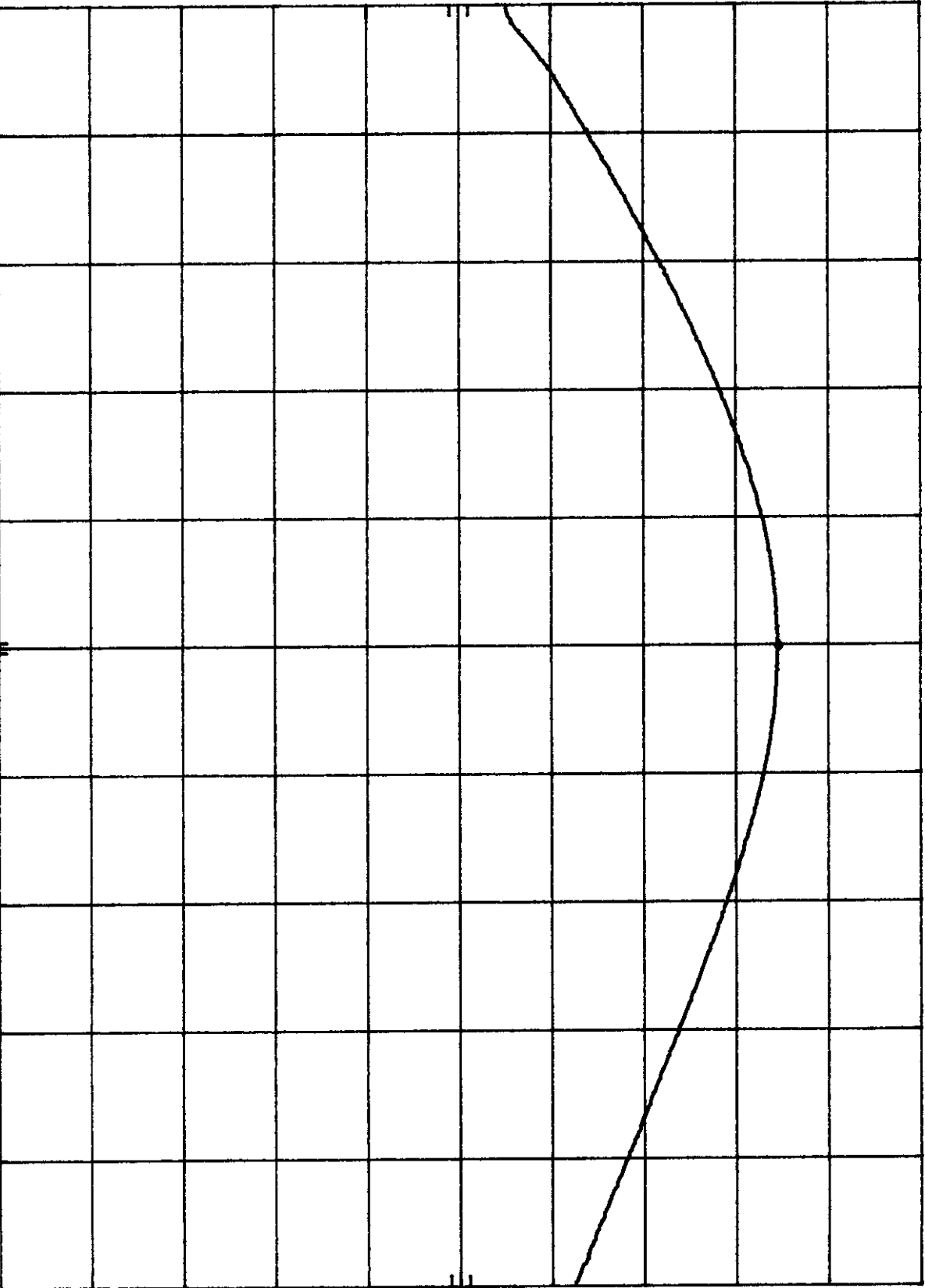
hp

REF 30.0 dBm

ATTEN 40 dB

14.60 dBm

10 dB/



CENTER 914.3 MHz

RES BW 3 MHz

VBW 3 MHz

SWP 20.0 msec

SPAN 10.0 MHz

PLOT #1c - Base

MKR 926.36 MHz

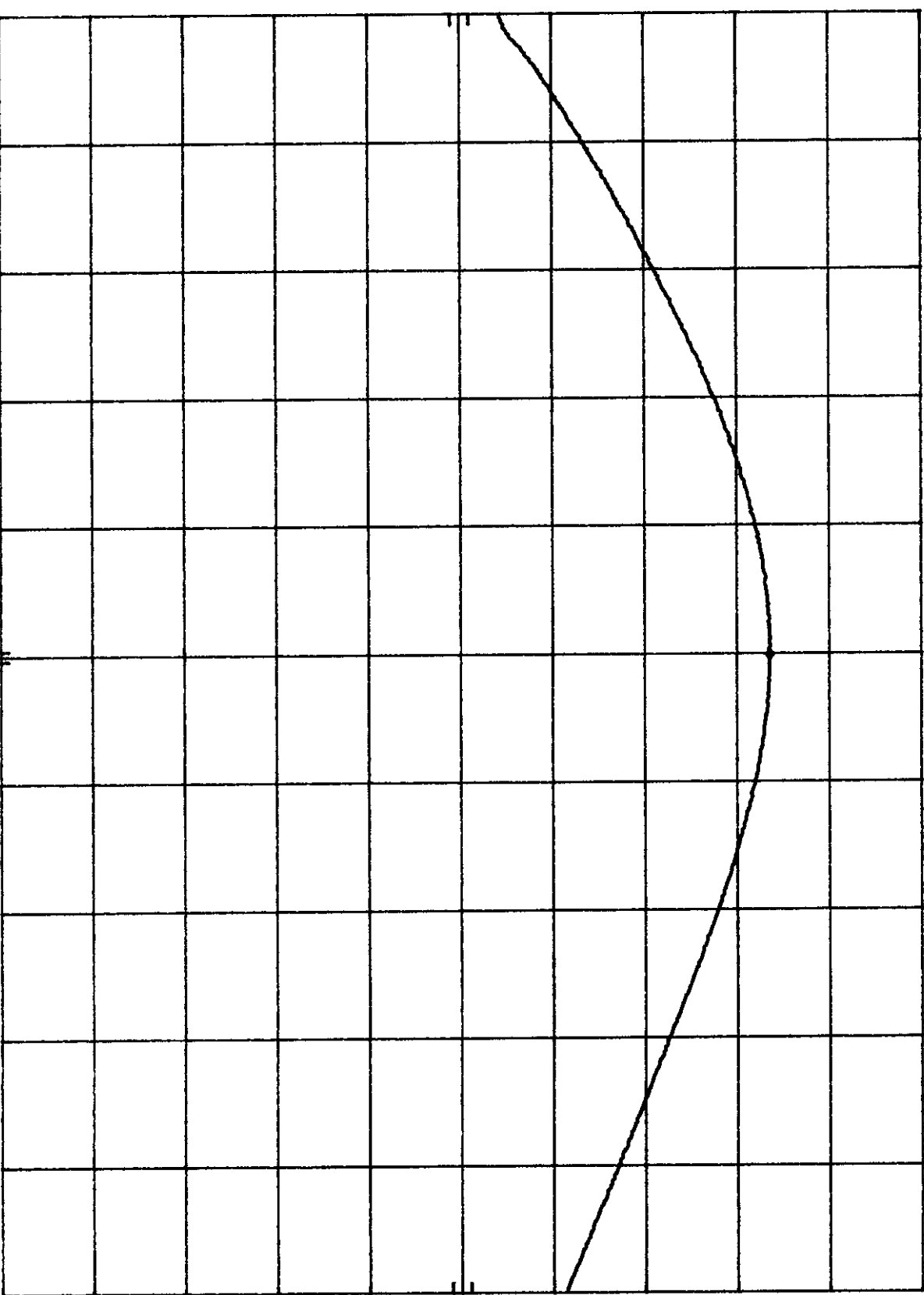
REF 30.0 dBm

ATTEN 40 dB

13.50 dBm

hp

10 dB/



CENTER 926.3 MHz

RES BW 3 MHz

VBW 3 MHz

SPAN 10.0 MHz
SWP 20.0 msec

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4.1(a) Maximum Conducted Output Power at Antenna Terminals FCC Rules 15.247(b): (Handset Unit)

- ☐ The antenna port of the EUT was connected to the input of a power meter. Power was read directly and cable loss correction was added to the reading to obtain power at the EUT antenna terminals.
- ☐ The antenna port of the EUT was connected to the input of a spectrum analyzer. The analyzer was set for maximum RES BW and power was read directly in dBm. External attenuation and cable loss were compensated for using the OFFSET function of the analyzer.

For antennas with gains of 6 dBi or less, maximum allowed transmitter output is 1 watt (+30 dBm).

For antennas with gains greater than 6 dBi, transmitter output level must be decreased by an amount equal to (GAIN - 6) dBm.

Max. antenna gain = 2		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Ch: 903.6	14.90	30.9
Mid Ch: 914.4	14.2	26.3
Hi Ch: 926.4	13.8	24.0

Cable loss: 0 dB

External Attenuation: 0 dB

Cable loss, external attenuation:

- ☐ included in OFFSET function
☐ added to SA raw reading

EUT Transmit Antenna Gain(dBi) + dBm max. output level = 16.9 dBm (36 dBm or less)

Please refer to the attached plots for details:

Plot 1a: Low Channel Output Power

Plot 1b: Middle Channel Output Power

Plot 1c: High Channel Output Power

PLOT#1a - Handset

MKR 903.480 MHz

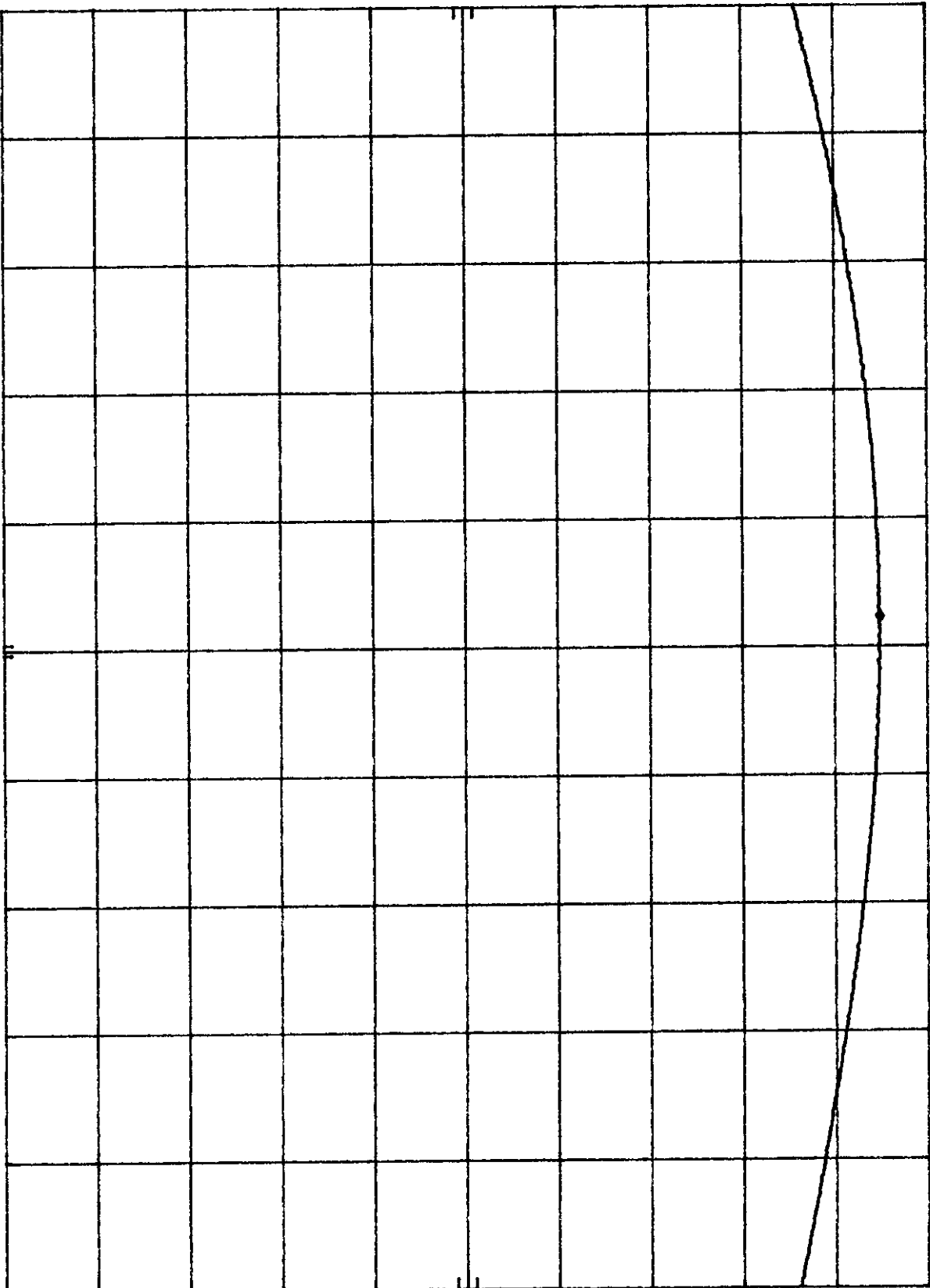
hp

REF 20.0 dBm

ATTEN 30 dB

14.90 dBm

10 dB/



CENTER 903.60 MHz

RES BW 3 MHz

VBW 3 MHz

SPAN 5.00 MHz
SWP 20.0 msec

PLOT #1b - Handset

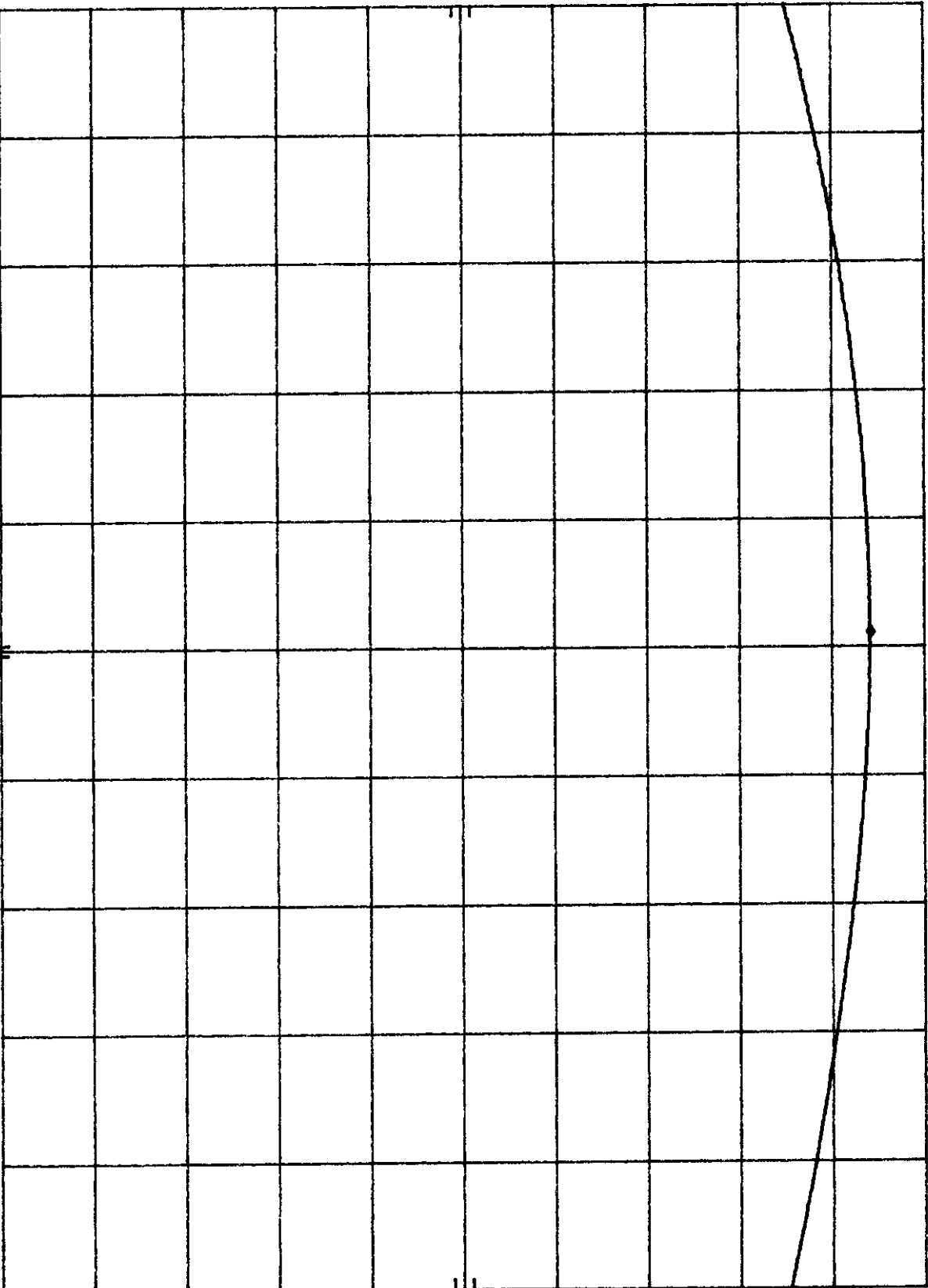
MKR 914.340 MHz

hp REF 20.0 dBm

ATTEN 30 dB

14.20 dBm

10 dB/



CENTER 914.40 MHz

RES BW 3 MHz

VBW 3 MHz

SPAN 5.00 MHz

SWP 20.0 msec

PLOT #1c - Handset

MR 925.960 MHz

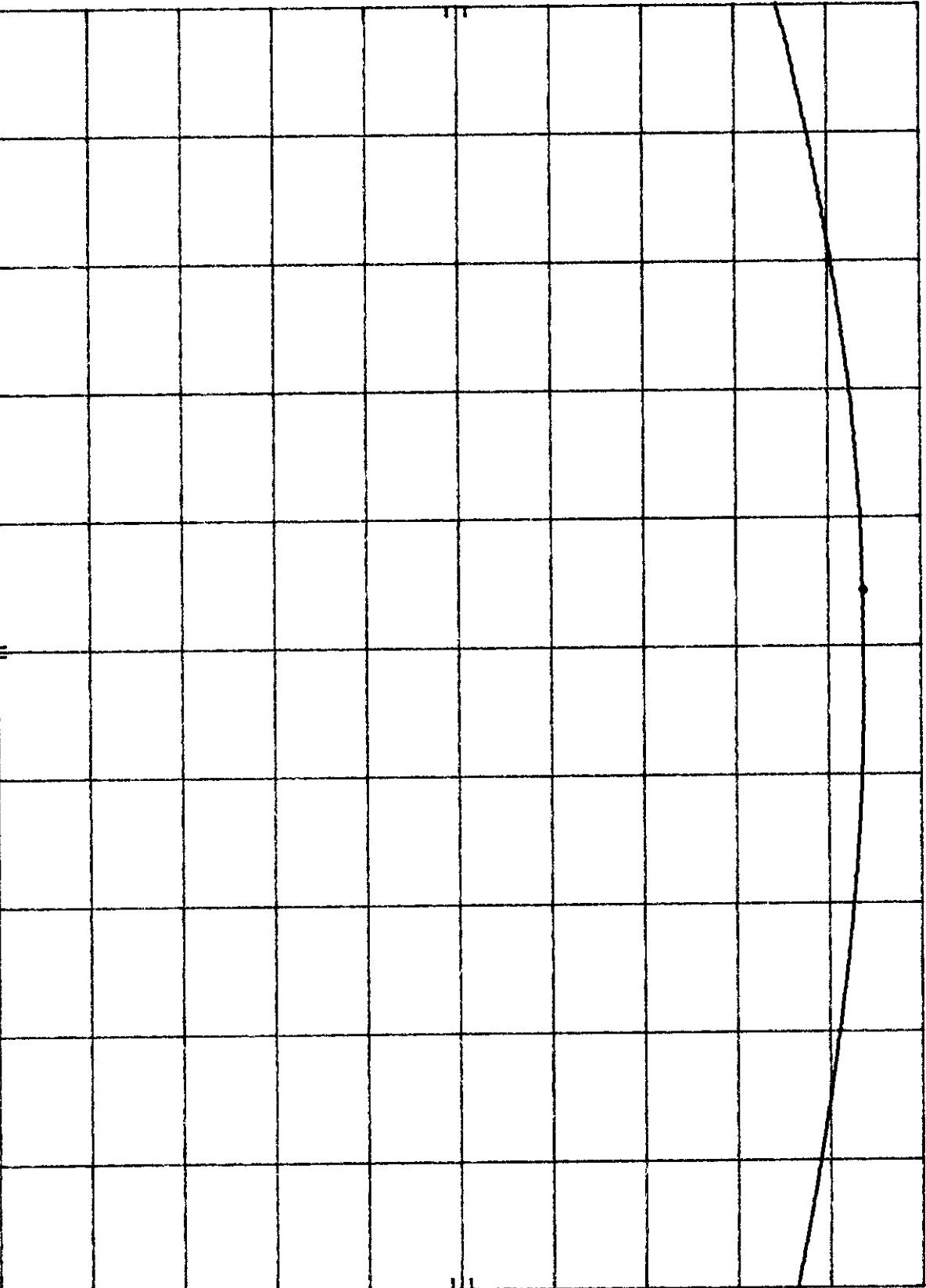
HP

REF 20.0 dBm

ATTEN 30 dB

13.80 dBm

10 dB/



CENTER 926.18 MHz

RES BW 3 MHz

VBW 3 MHz

SPAN 5.00 MHz
SWP 20.0 msec

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4.2 Minimum 6 dB RF Bandwidth, FCC Rule 15.247(a)(2): (Base Unit)

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RES BW was set to 100 kHz. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK output reading was taken, a DISPLAY line was drawn 6 dB lower than PEAK level. The 6 dB bandwidth was determined from where the channel output spectrum intersected the display line.

Frequency (MHz)	Max. 6 dB Bandwidth (kHz)
926.4	1.130

Refer to the following plots for 6 dB bandwidth sharp:

Plot 2a: Low Channel 6 dB RF Bandwidth

Plot 2b: Middle Channel 6 dB RF Bandwidth

Plot 2c: High Channel 6 dB RF Bandwidth

PLOT #2a- Base

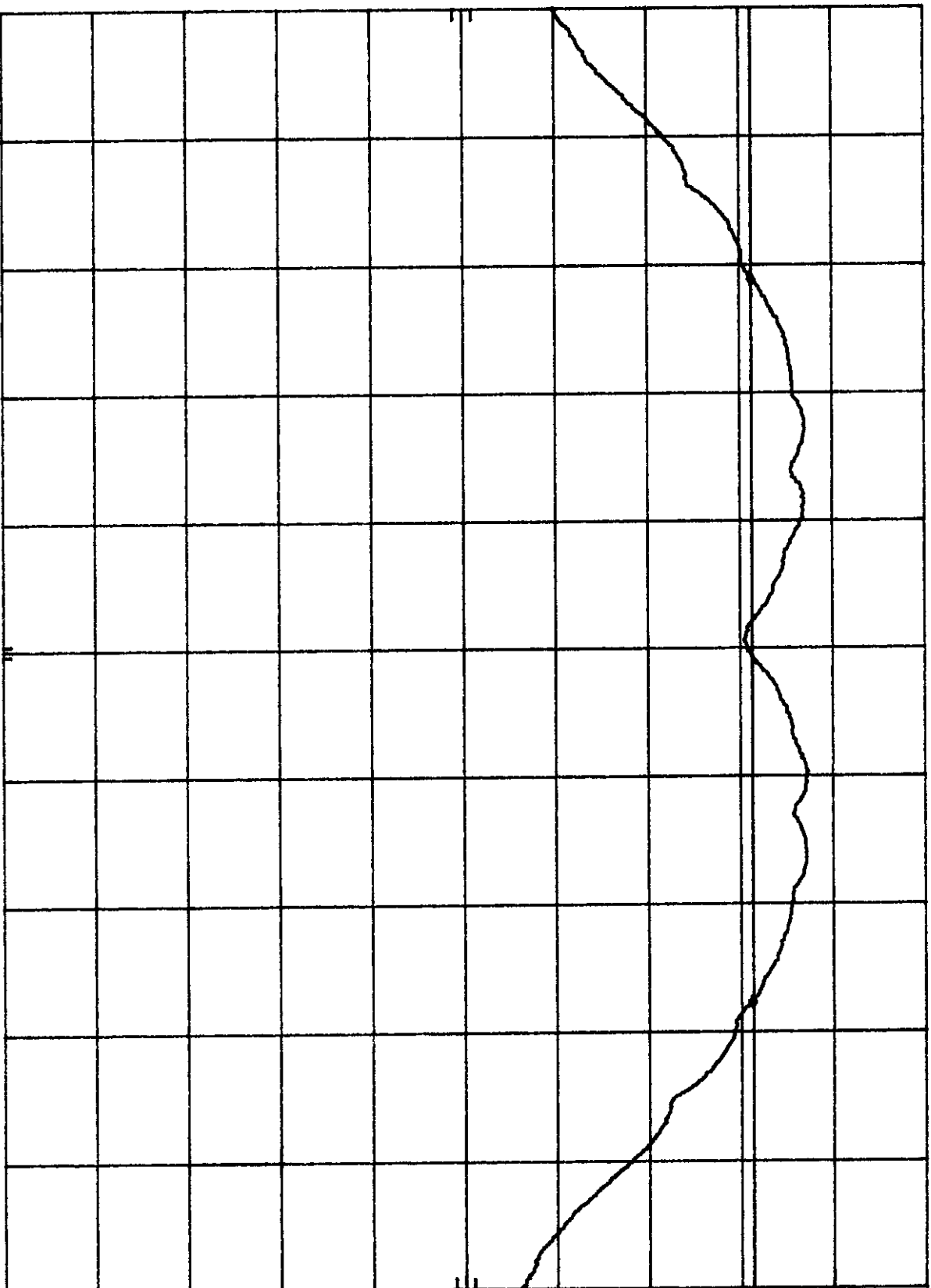
MKR Δ 1.130 MHz
-0.10 dB

HP

REF 20.0 dBm ATTEN 40 dB

10 dB/

DL
1.3
dBm



CENTER 903.60 MHz

RES BW 100 KHz

VBW 100 KHz

SPAN 2.00 MHz
SWP 20.0 msec

PLOT #2b - Base

MKR Δ 1.136 MHz
0.10 dB

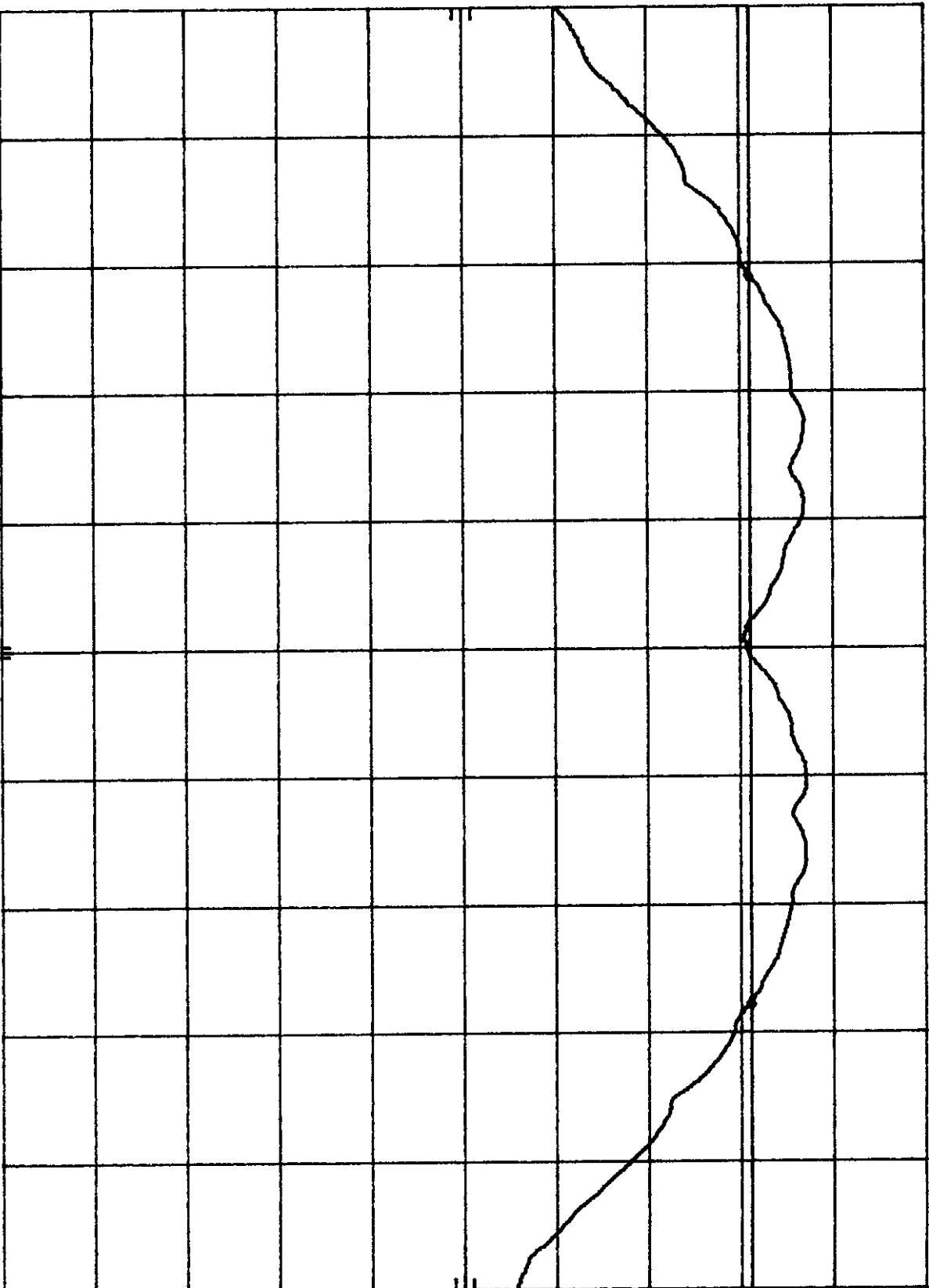
HP

REF 20.0 dBm

ATTEN 40 dB

10 dB/

DL
1.1
dBm



CENTER 914.40 MHz

RES BW 100 KHz

VBW 100 KHz

SPAN 2.00 MHz
SWP 50.0 msec

PLOT #2c - Base

MKR Δ 1.138 MHz

REF 20.0 dBm

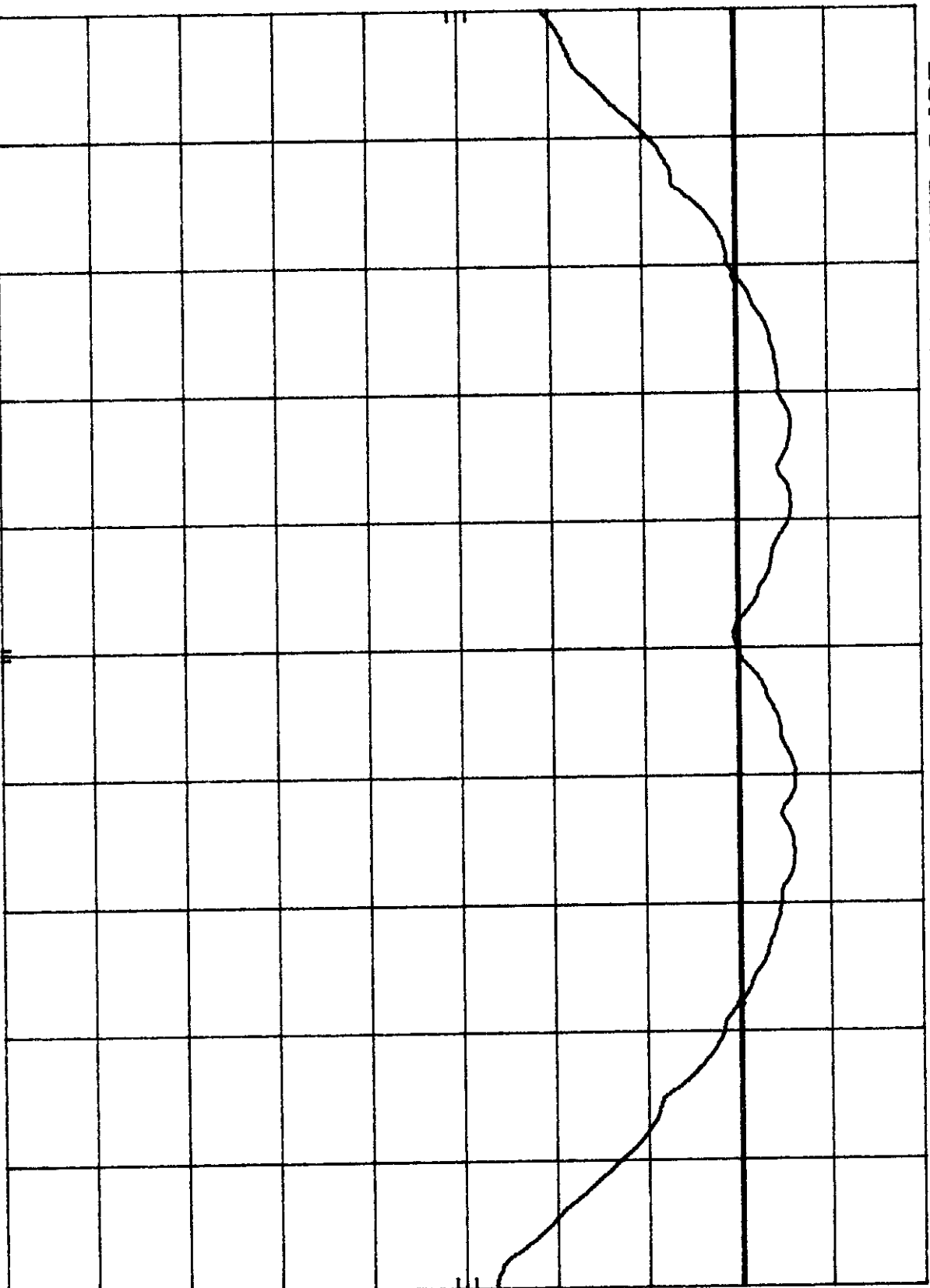
ATTEN 40 dB

0.10 dB

HP

10 dB/

DL
0.3
dBm



CENTER 926.40 MHz

RES BW 100 kHz

VBW 100 kHz

SPAN 2.00 MHz

SWP 50.0 msec

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4.2(a) Minimum 6 dB RF Bandwidth, FCC Rule 15.247(a)(2): (Handset Unit)

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RES BW was set to 100 kHz. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK output reading was taken, a DISPLAY line was drawn 6 dB lower than PEAK level. The 6 dB bandwidth was determined from where the channel output spectrum intersected the display line.

Frequency (MHz)	Max. 6 dB Bandwidth (kHz)
914.4	1.130

Refer to the following plots for 6 dB bandwidth sharp:

Plot 2a: Low Channel 6 dB RF Bandwidth

Plot 2b: Middle Channel 6 dB RF Bandwidth

Plot 2c: High Channel 6 dB RF Bandwidth

PLOT #2a - Handset

MKR Δ 1.132 MHz

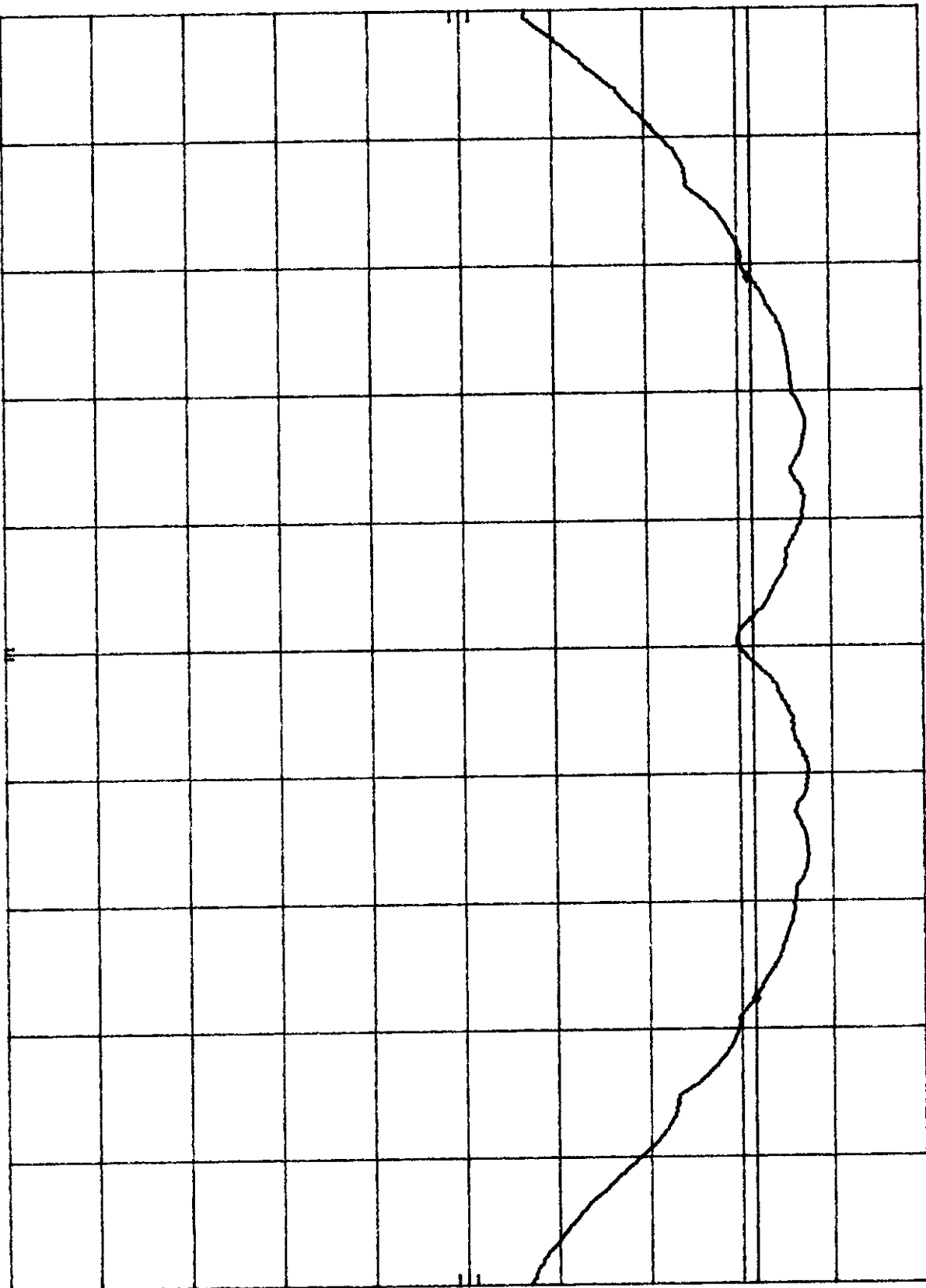
REF 20.0 dBm

ATTEN 30 dB

0.30 dB

10 dB/

DL
1.5
dBm



CENTER 903.60 MHz

RES BW 100 KHz

VBW 100 KHz

SPAN 2.00 MHz
SWP 20.0 msec

PLOT #2b - Handset

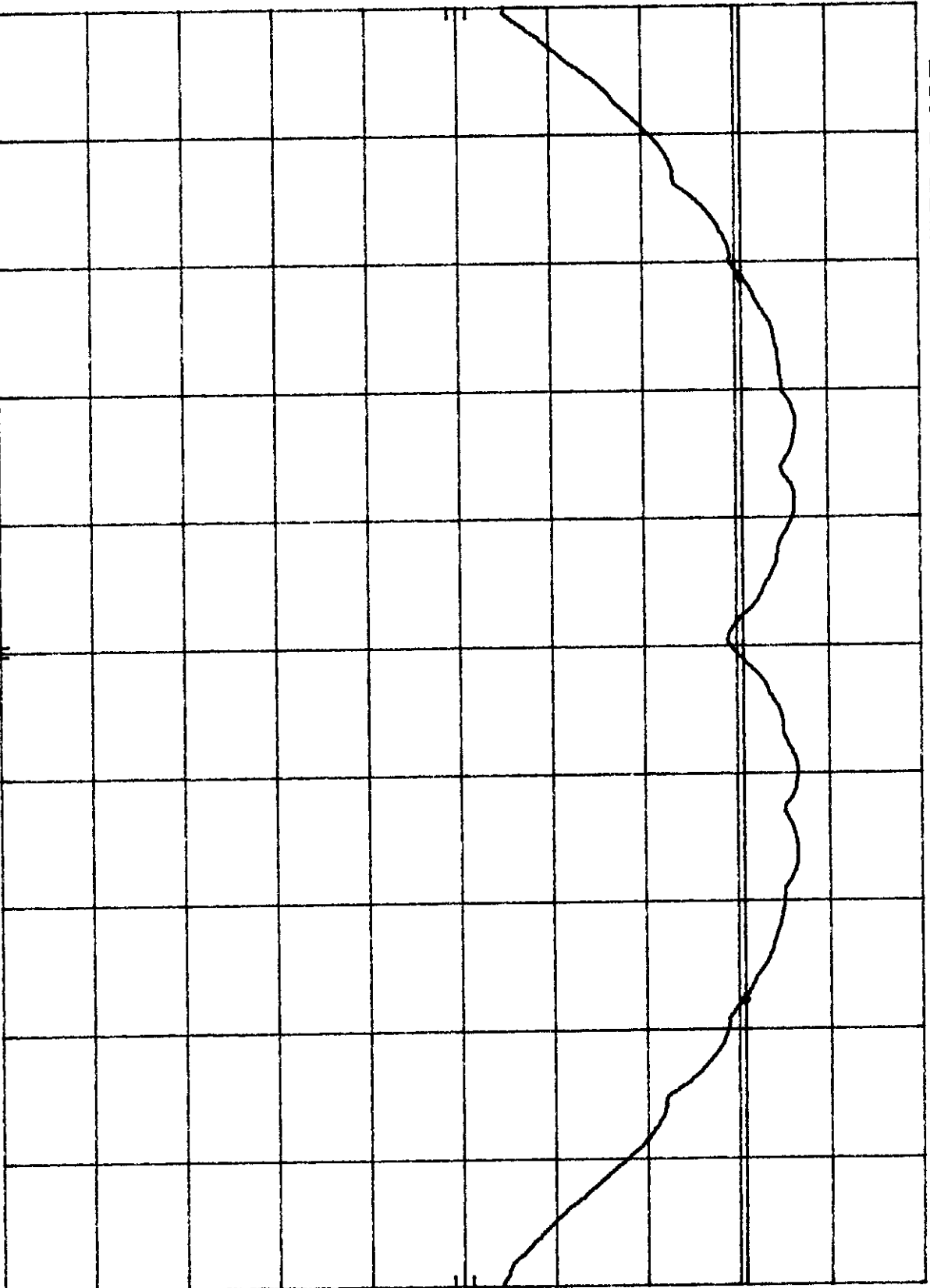
REF 20.0 dBm

ATTEN 30 dB

MKR Δ 1.130 MHz
0.20 dB

hp
10 dB/

DL
0.7
dBm



CENTER 914.40 MHz

RES BW 100 kHz

VBW 100 kHz

SPAN 2.00 MHz
SWP 20.0 msec

Plot #2c - Handset

HP

REF 20.0 dBm

ATTEN 30 dB

MKR Δ 1.136 MHz
-0.30 dB

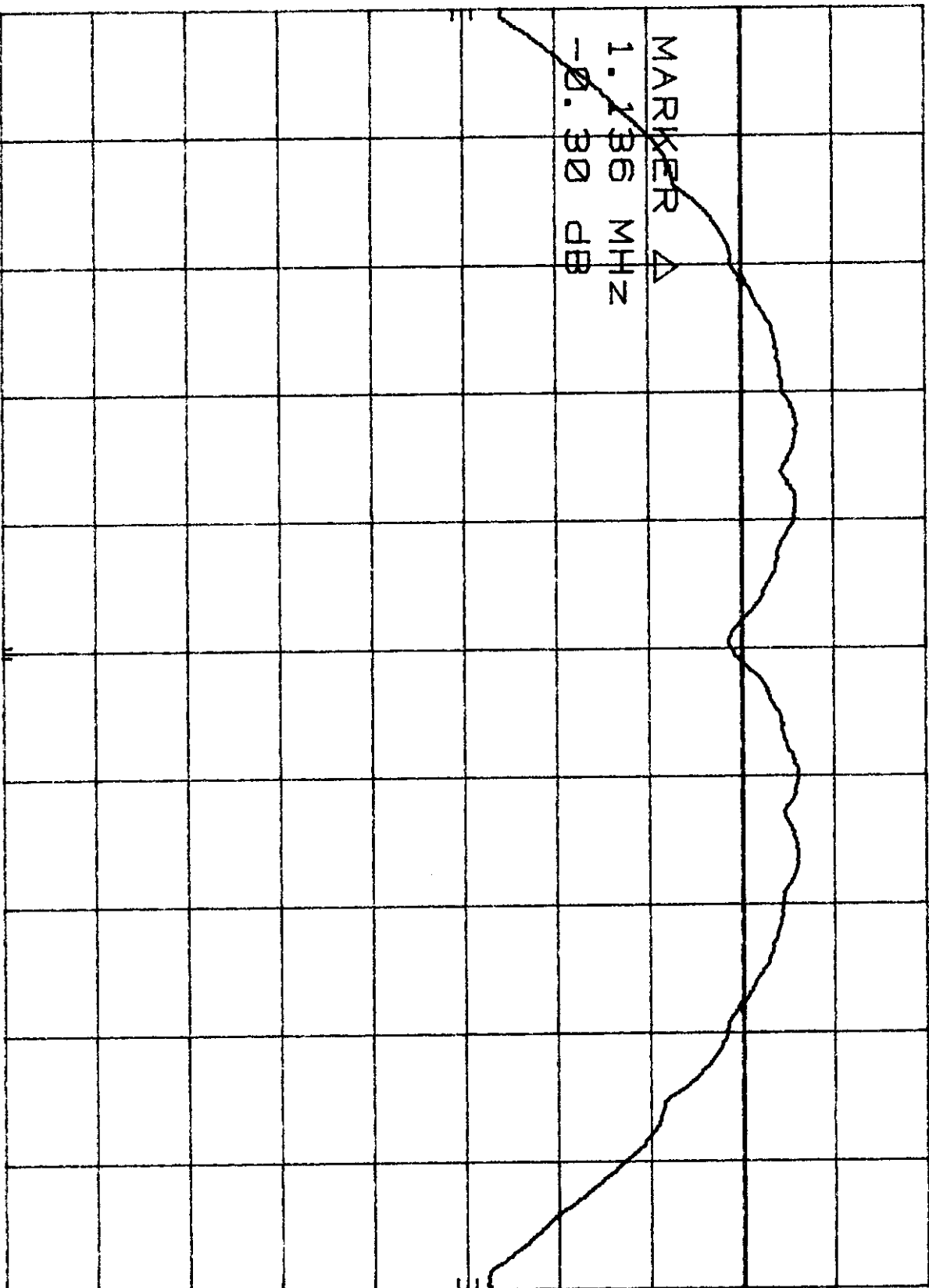
10 dB/

DL
0.2
dBm

MARKER Δ

1.136 MHz

-0.30 dB



CENTER 926.40 MHz

RES BW 100 kHz

VBW 100 kHz

SPAN 2.00 MHz
SWP 20.0 msec

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FCC ID: NR839510

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4.3 Maximum Power Density Reading, FCC Rule 15.247(d): (Base Unit)

The spectrum analyzer RES BW was set to 3 kHz. The START and STOP frequencies were set to the band edges of the maximum output passband. If there is no clear maximum amplitude in any given portion of the band, it may be necessary to make measurements at a number of bands defined by several START and STOP frequency pairs. The specification calls for a 1 second interval at each 3 kHz bandwidth; total SWEEP TIME is calculated as follows:

$$\text{SWEEP TIME (SEC)} = (\text{Fstop, kHz} - \text{Fstart, kHz}) / 3 \text{ kHz}$$

Antenna output of the EUT was coupled directly to spectrum analyzer; if an external attenuator and/or cable was used, these losses are compensated for with the analyzer OFFSET function.

Frequency (MHz)	Power Density (dBm)
903.84	1.1

Frequency Span = 1200 kHz

Sweep Time = Frequency Span / 3 kHz = 400 seconds

Refer to the following plots for power density data:

Plot 3a.1 - 3a.2: Low Channel Power Density

Plot 3b.1 - 3b.2: Middle Channel Power Density

Plot 3c.1 - 3c.2: High Channel Power Density

PLOT #3a.1 - Base

hp

REF 20.0 dBm

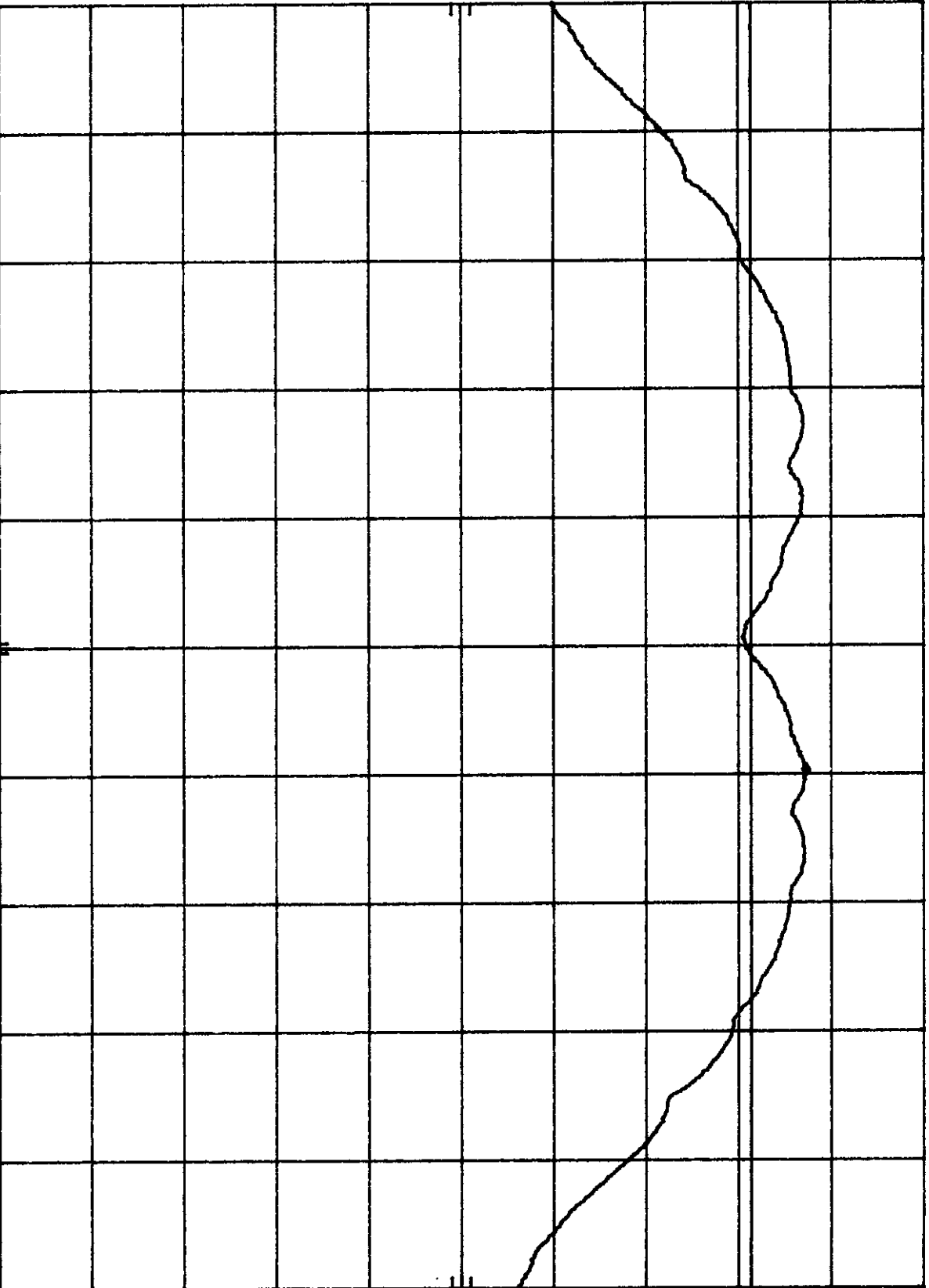
ATTEN 40 dB

MKR 903.792 MHz

7.30 dBm

10 dB/

DL
1.3
dBm



CENTER 903.60 MHz

RES BW 100 KHz

VBW 100 KHz

SWP 20.0 msec

PLOT #3a.2 - Base

MKR 903.836 MHz

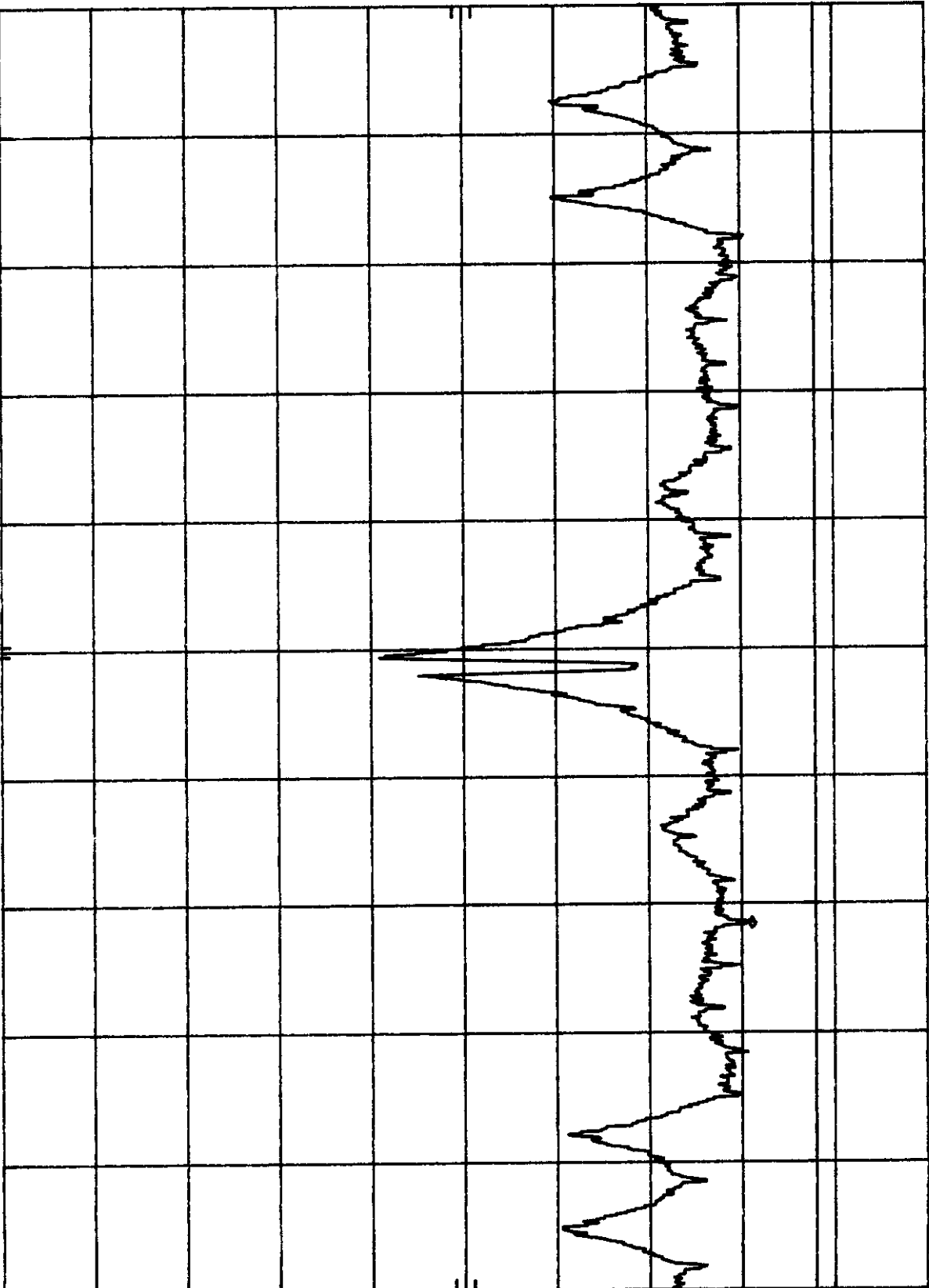
HP REF 20.0 dBm

ATTEN 40 dB

1.10 dBm

10 dB/

DL
8.0
dBm



CENTER 903.57 MHz

RES BW 3 kHz

VBW 3 kHz

SWP 400 sec

SPAN 1.20 MHz

PLOT #3b.1 - Base

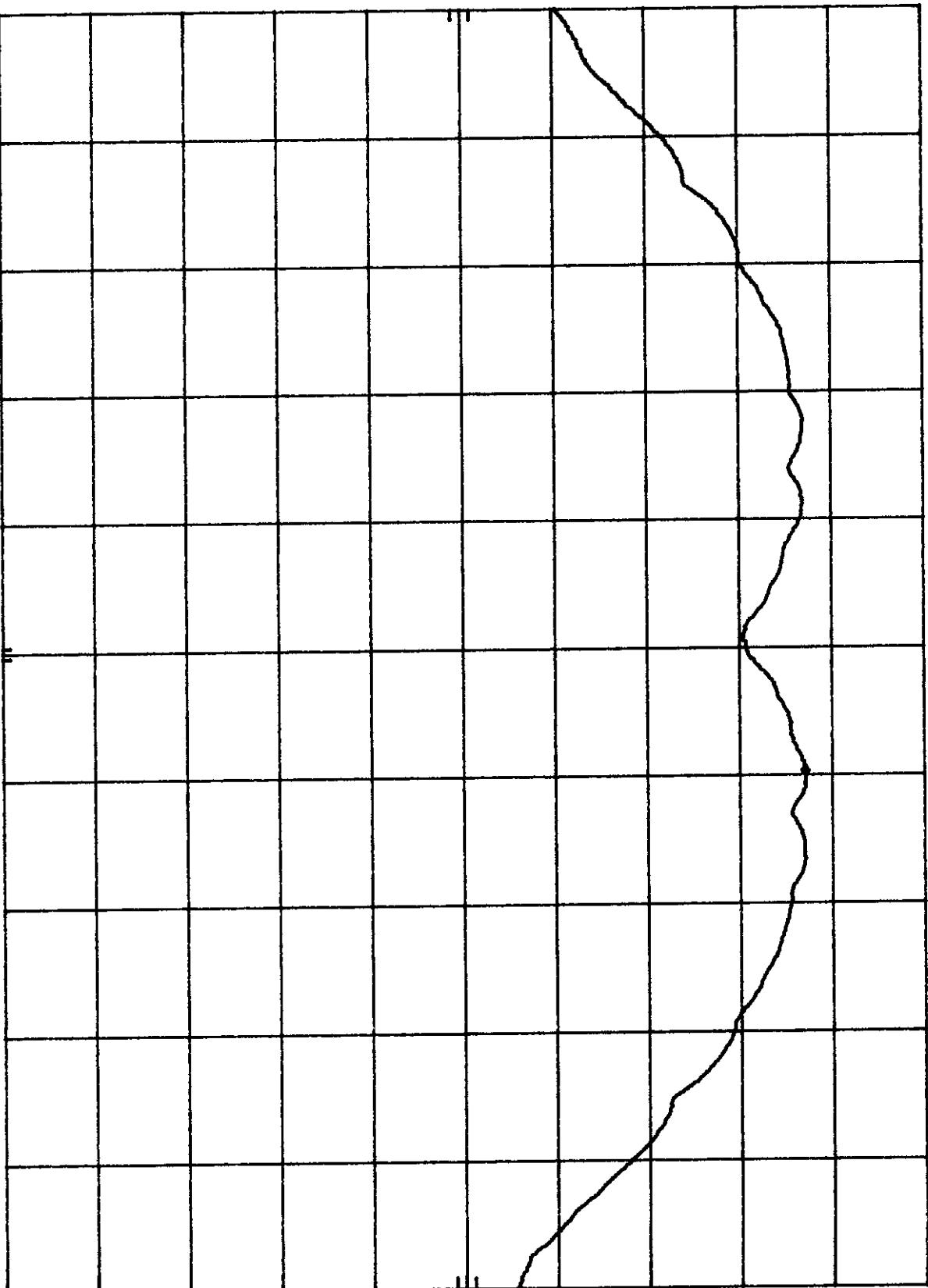
MKR 914.592 MHz
7.10 dBm

HP

REF 20.0 dBm

ATTEN 40 dB

10 dB/



CENTER 914.40 MHz

RES BW 100 kHz

VBW 100 kHz

SPAN 2.00 MHz
SWP 50.0 msec

PLOT #3b.2 - Base

MKR 914.759 MHz

REF 20.0 dBm

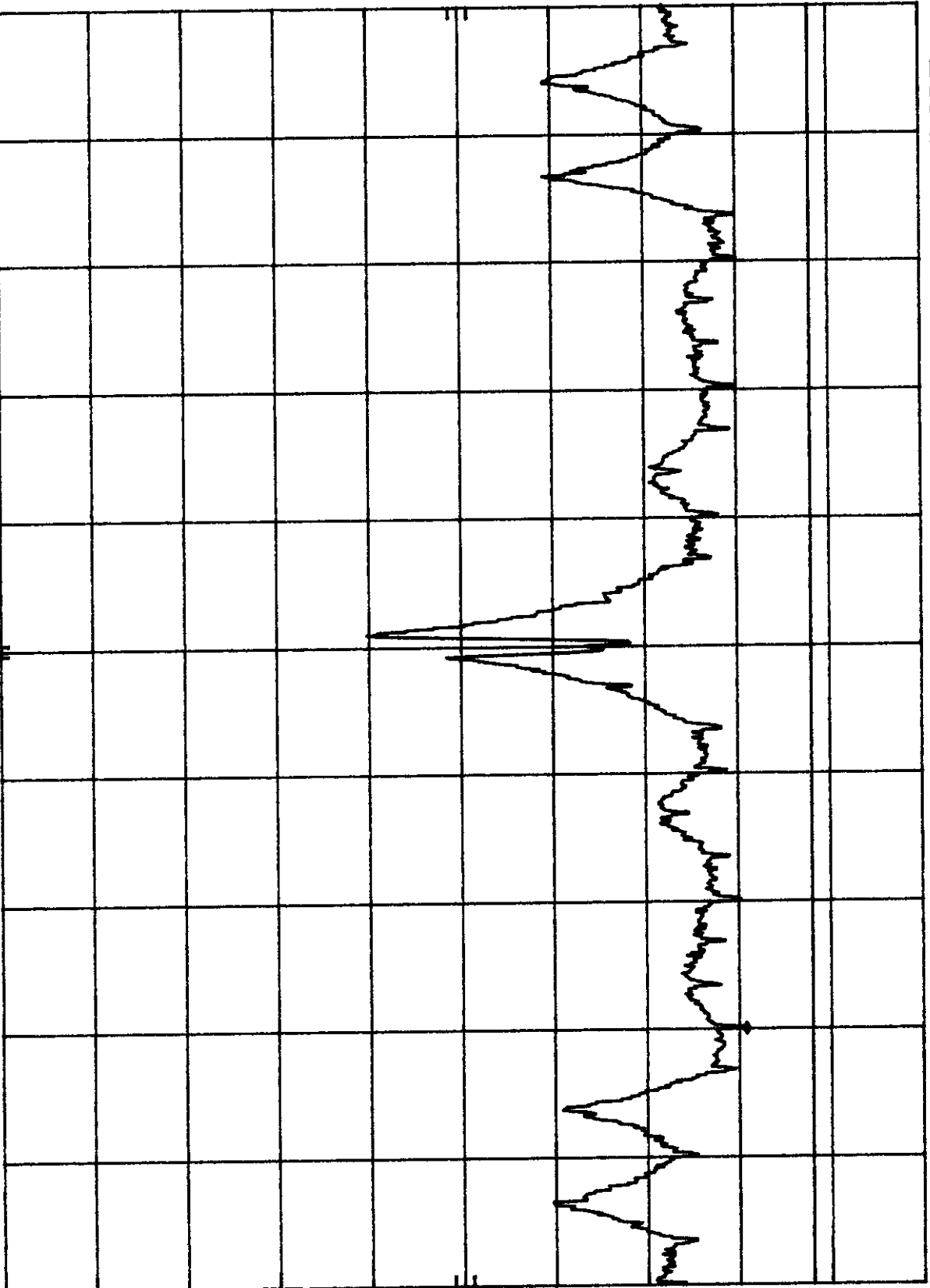
ATTEN 40 dB

0.80 dBm

HP

10 dB/

DL
8.0
dBm



CENTER 914.40 MHz

RES BW 3 KHz

VBW 3 KHz

SPAN 1.20 MHz
SWP 400 sec

PLOT #3c.1 - Base

MKR 926.592 MHz

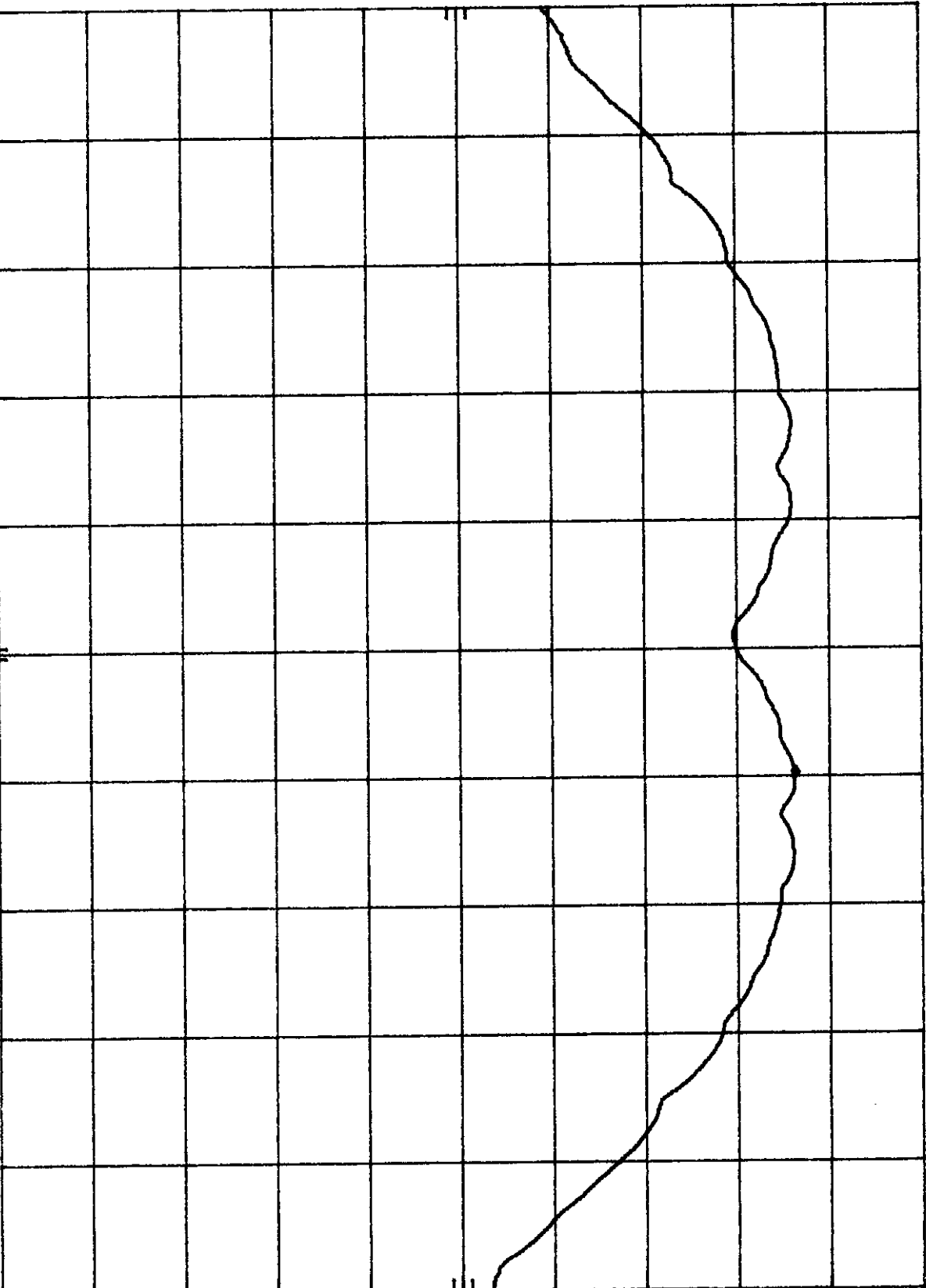
6.30 dBm

HP

REF 20.0 dBm

ATTEN 40 DB

10 DB/



CENTER 926.40 MHz

RES BW 100 KHz

VBW 100 KHz

SPAN 2.00 MHz
SWP 50.0 msec

PLOT #3c.2 - Base

MKR 926.758 MHz

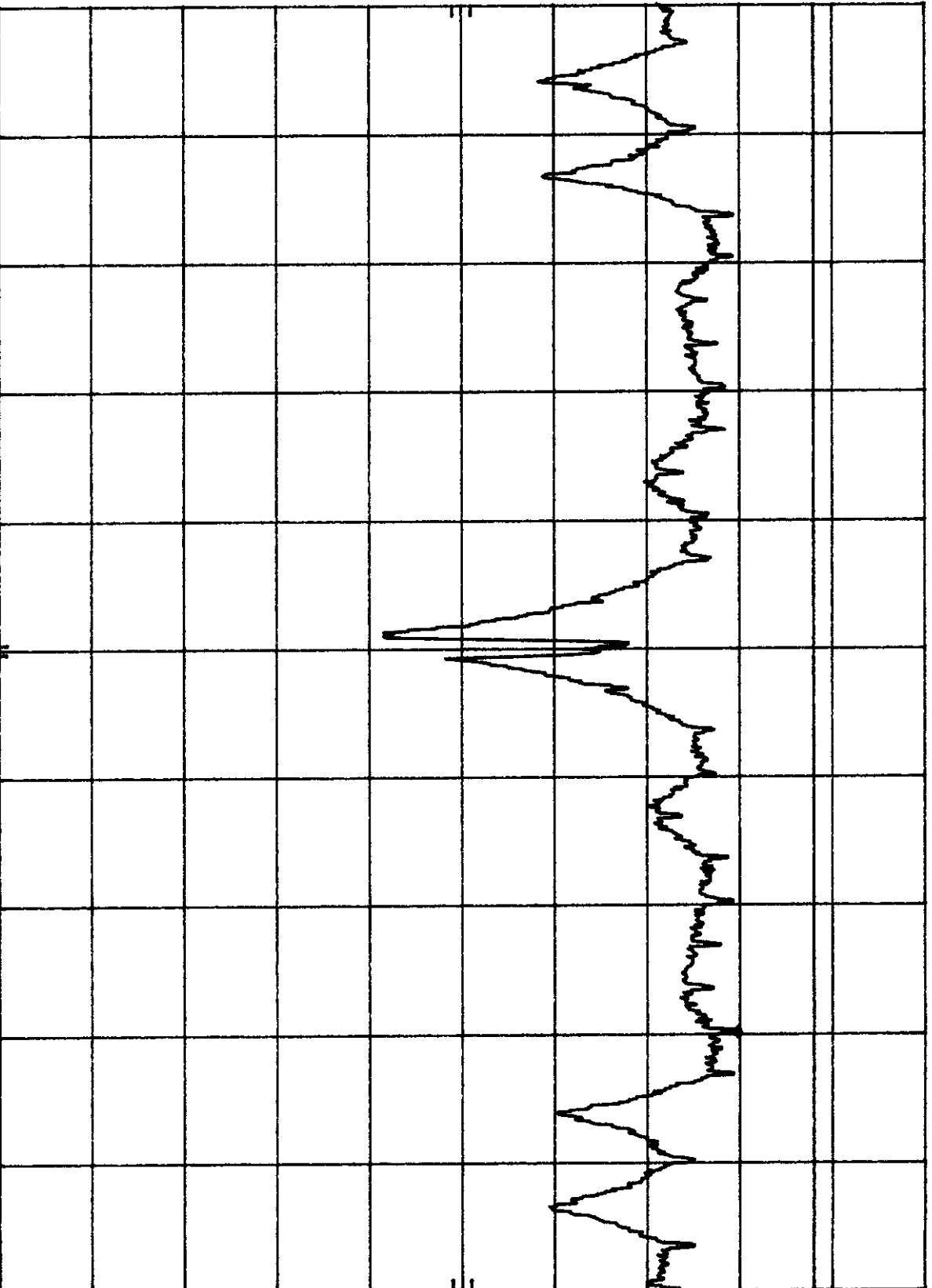
REF 20.0 dBm

ATTEN 40 dB

-0.20 dBm

HP 10 dB/

DL
8.0
dBm



CENTER 926.40 MHz

RES BW 3 kHz

VBW 3 kHz

SPAN 1.20 MHz

SWP 400 sec

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4.3(a) Maximum Power Density Reading, FCC Rule 15.247(d): (Handset Unit)

The spectrum analyzer RES BW was set to 3 kHz. The START and STOP frequencies were set to the band edges of the maximum output passband. If there is no clear maximum amplitude in any given portion of the band, it may be necessary to make measurements at a number of bands defined by several START and STOP frequency pairs. The specification calls for a 1 second interval at each 3 kHz bandwidth; total SWEEP TIME is calculated as follows:

$$\text{SWEEP TIME (SEC)} = (\text{Fstop, kHz} - \text{Fstart, kHz}) / 3 \text{ kHz}$$

Antenna output of the EUT was coupled directly to spectrum analyzer; if an external attenuator and/or cable was used, these losses are compensated for with the analyzer OFFSET function.

Frequency (MHz)	Power Density (dBm)
903.84	1.10

Frequency Span = 1200 kHz

Sweep Time = Frequency Span/3 kHz = 400 seconds

Refer to the following plots for power density data:

Plot 3a.1 - 3a.2: Low Channel Power Density

Plot 3b.1 - 3b.2: Middle Channel Power Density

Plot 3c.1 - 3c.2: High Channel Power Density

PLOT #3a.1 - Handset

MKR 903.796 MHz

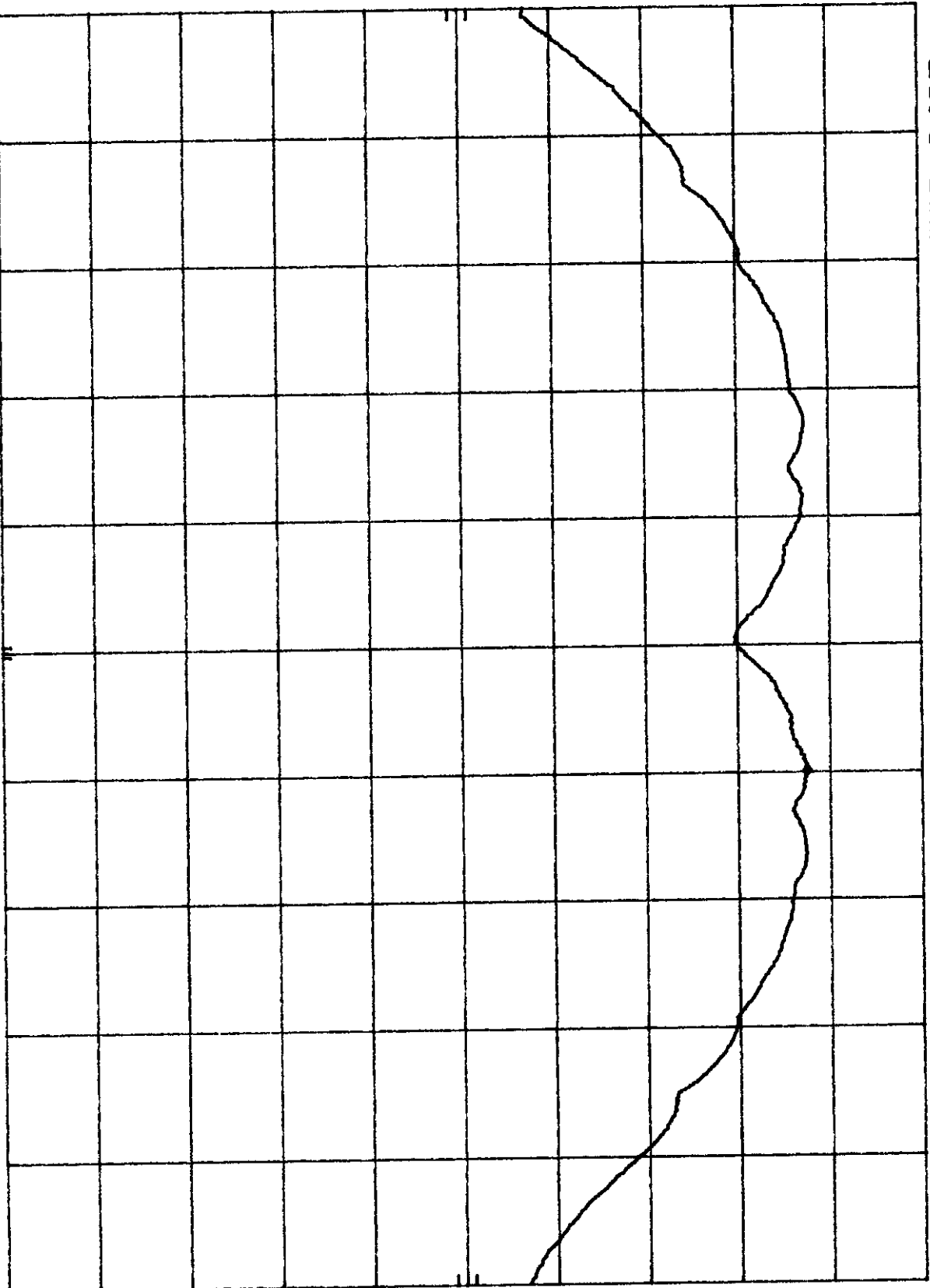
HP

REF 20.0 dBm

ATTEN 30 dB

7.50 dBm

10 dB/



CENTER 903.60 MHz

RES BW 100 KHz

VBW 100 KHz

SWP 20.0 msec

SPAN 2.00 MHz

PLOT #3c.1 - Handset

MKR 926.592 MHz

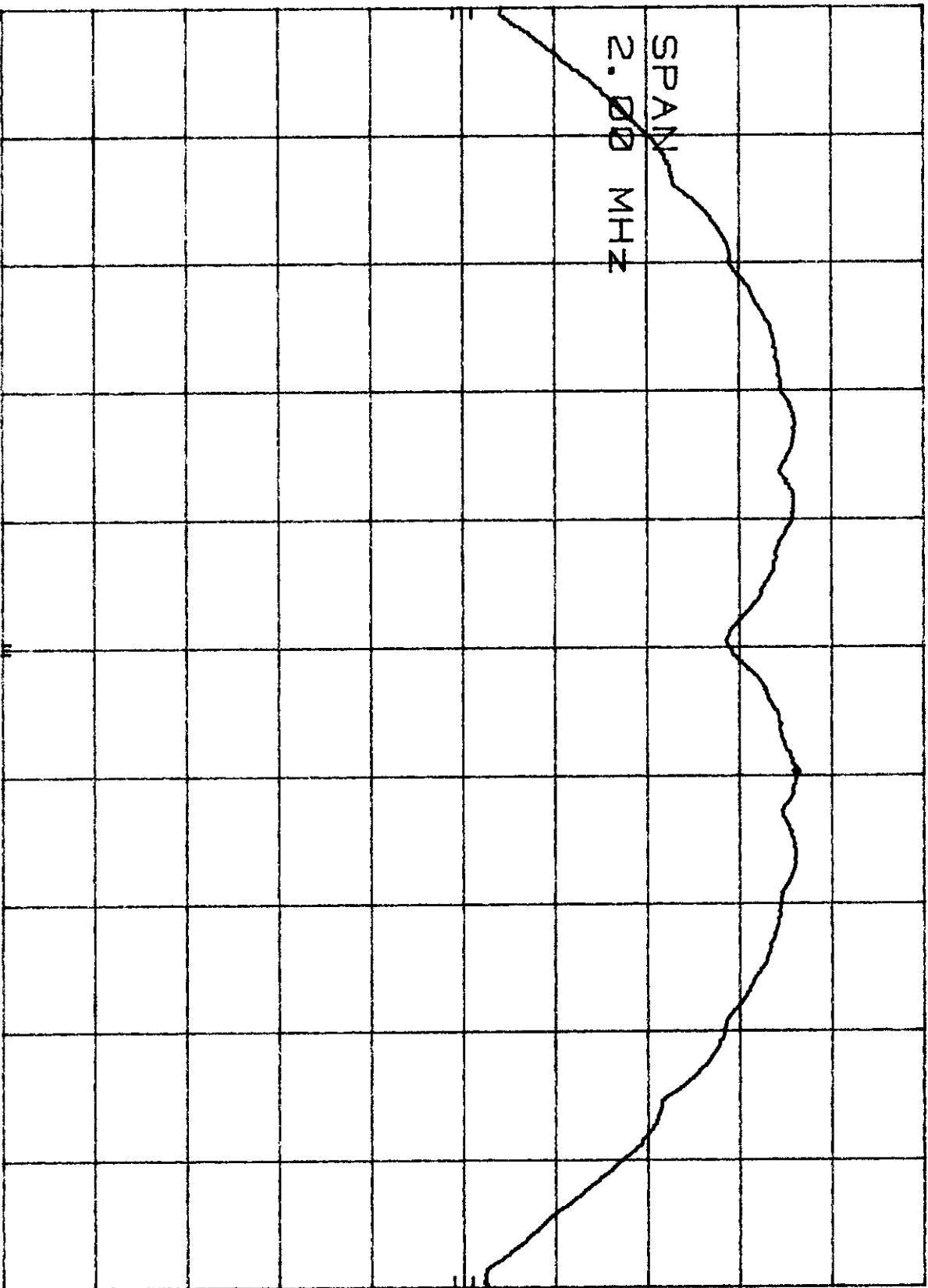
6.20 dBm

REF 20.0 dBm

ATTEN 30 dB

10 dB/

SPAN
2.00 MHz



CENTER 926.40 MHz

RES BW 100 KHz

VBW 100 KHz

SPAN 2.00 MHz
SWP 20.0 msec

PLOT #3b.2 - Handset

MKR 914.036 MHz

HP

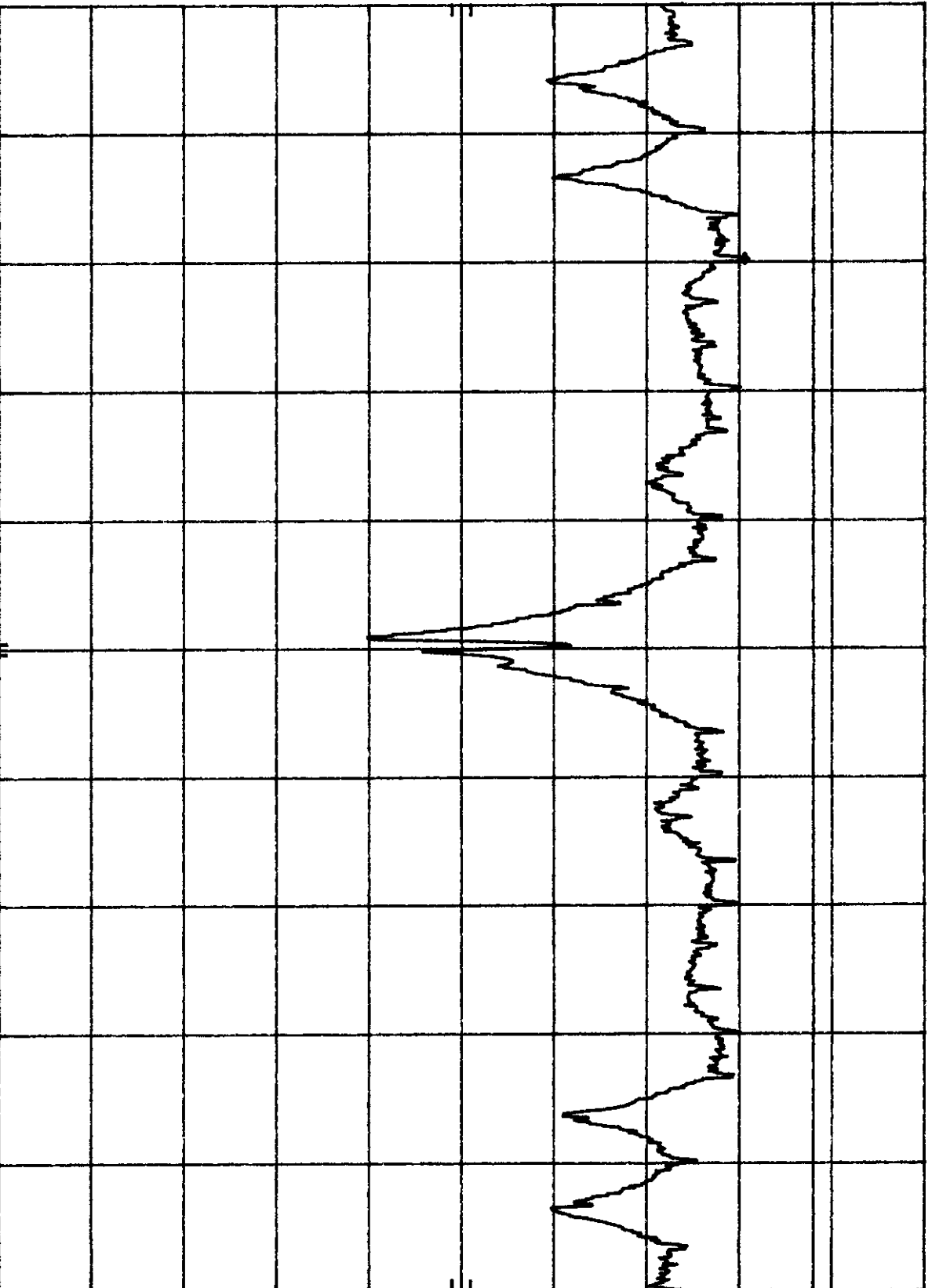
REF 20.0 dBm

ATTEN 30 dB

0.60 dBm

10 dB/

DL
8.0
dBm



CENTER 914.40 MHz

RES BW 3 kHz

VBW 3 kHz

SWP 400 sec

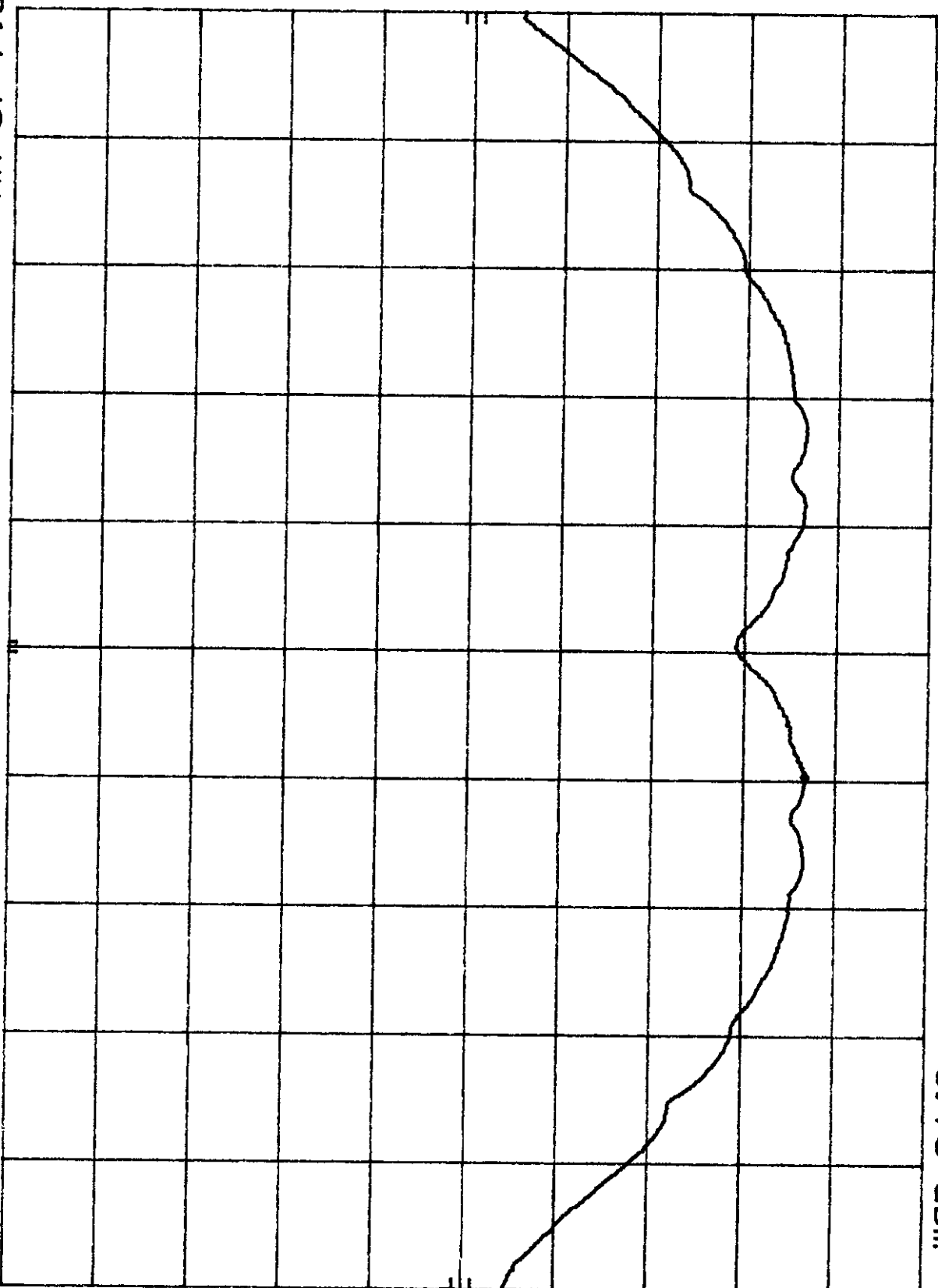
SPAN 1.20 MHz

PIOT #3b.1 - Handset

HP REF 20.0 dBm
10 dB/

ATTEN 30 dB

MKR 914.592 MHz
6.70 dBm



CENTER 914.40 MHz

RES BW 100 KHz

VBW 100 KHz

SPAN 2.00 MHz
SWP 20.0 msec

PLOT #3a.2 - Handset

MKR 903.839 MHz

1.10 dBm

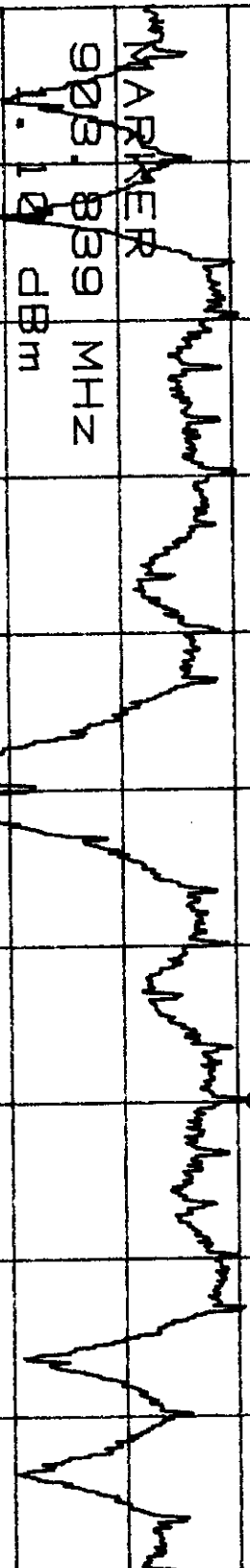
HP

REF 20.0 dBm

ATTEN 30 dB

10 dB/

DL
8.0
dBm



CENTER 903.60 MHz

RES BW 3 kHz

VBW 3 kHz

SPAN 1.20 MHz
SWP 400 sec

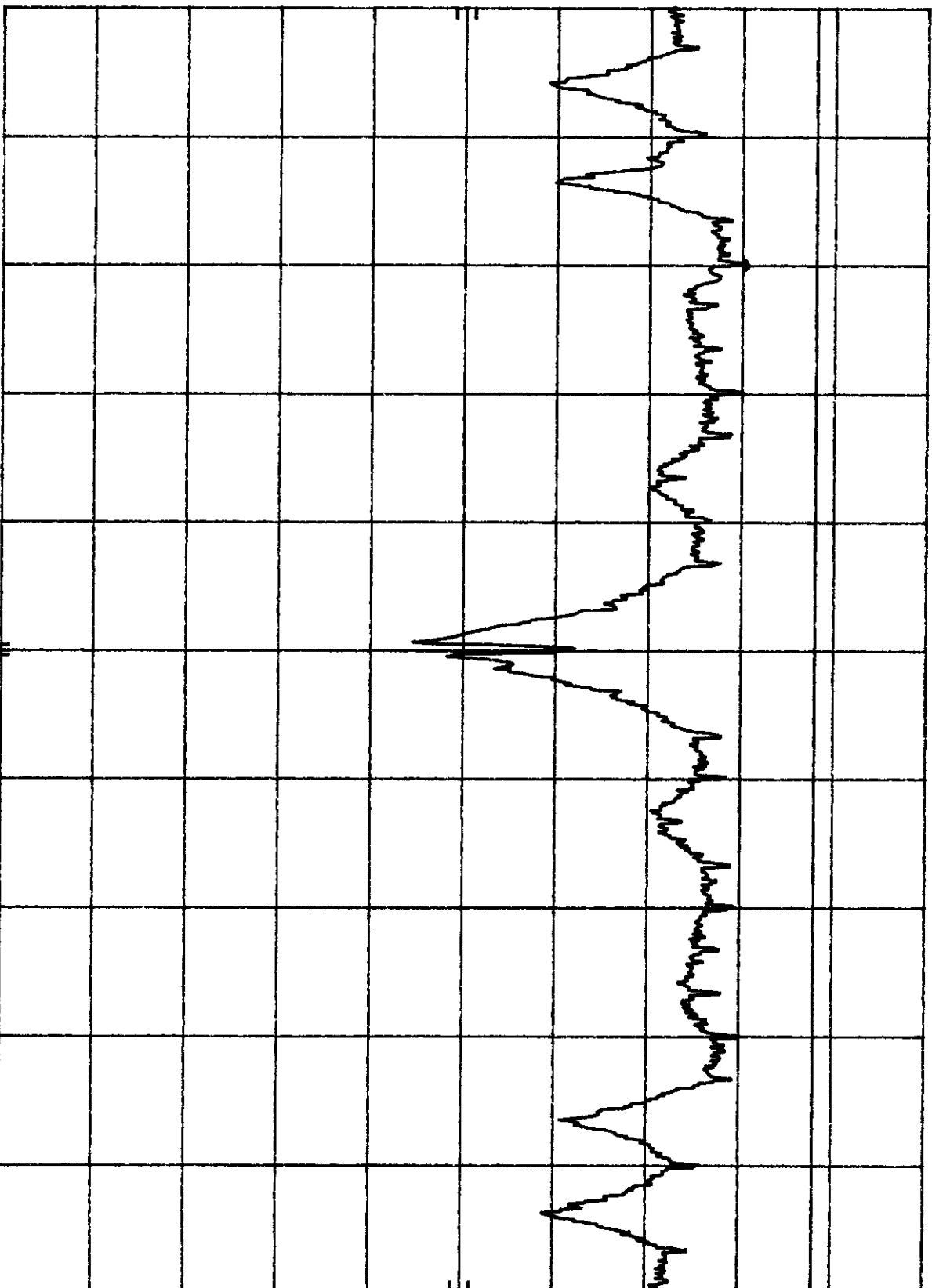
Plot #3c.2 - Handset

MKR 926.039 MHz
0.30 dBm

HP REF 20.0 dBm ATTN 30 dB

10 dB/

DL
8.0
dBm



CENTER 926.40 MHz

RES BW 3 KHz

VBW 3 KHz

SPAN 1.20 MHz
SWP 400 sec

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4.4 Out of Band Conducted Emissions, FCC Rule 15.247(c): (Base Unit)

In any 100 kHz bandwidth outside the EUT passband, the RF power produced by the modulation products of the spreading sequence, the information sequence, and the carrier frequency shall be at least 20 dB below that of the maximum in-band 100 kHz emission, or else shall meet the general limits for radiated emissions at frequencies outside the passband, whichever results in lower attenuation.

All other types of emissions from the EUT shall meet the general limits for radiated frequencies outside the passband.

Refer to the following plots for out of band conducted emissions data:

Plot 4a.1 - 4a.6: Low Channel Emissions

Plot 4b.1 - 4b.5: Middle Channel Emissions

Plot 4c.1 - 4c.5: High Channel Emissions

PLOT #4a.1 - Base

HP

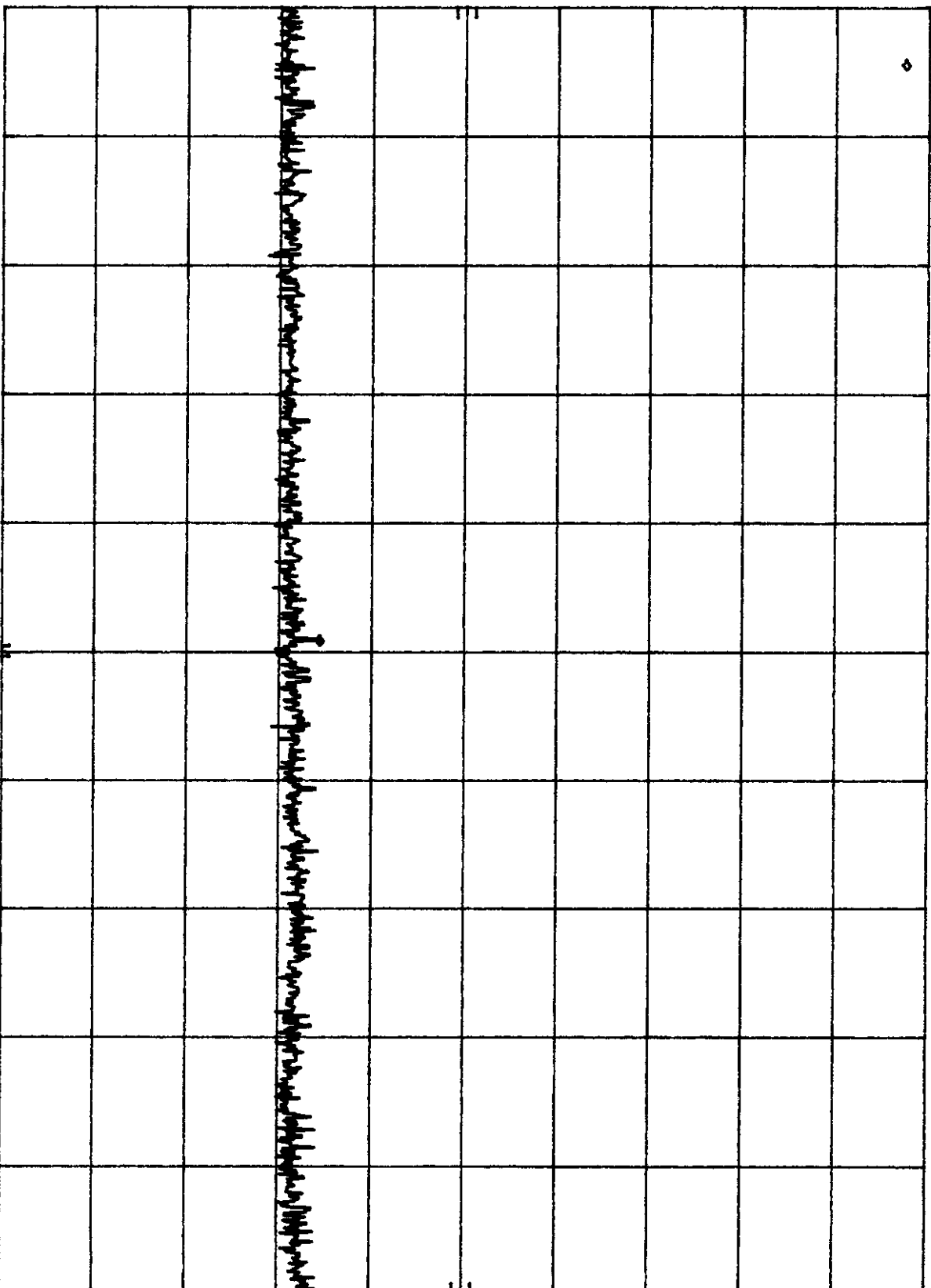
REF 10.0 dBm

ATTEN 30 dB

MKR Δ 379.5 MHz

-63.10 dB

10 dB/



START 1 MHz

RES BW 100 kHz

VBW 100 kHz

STOP 850 MHz

SWP 255 msec

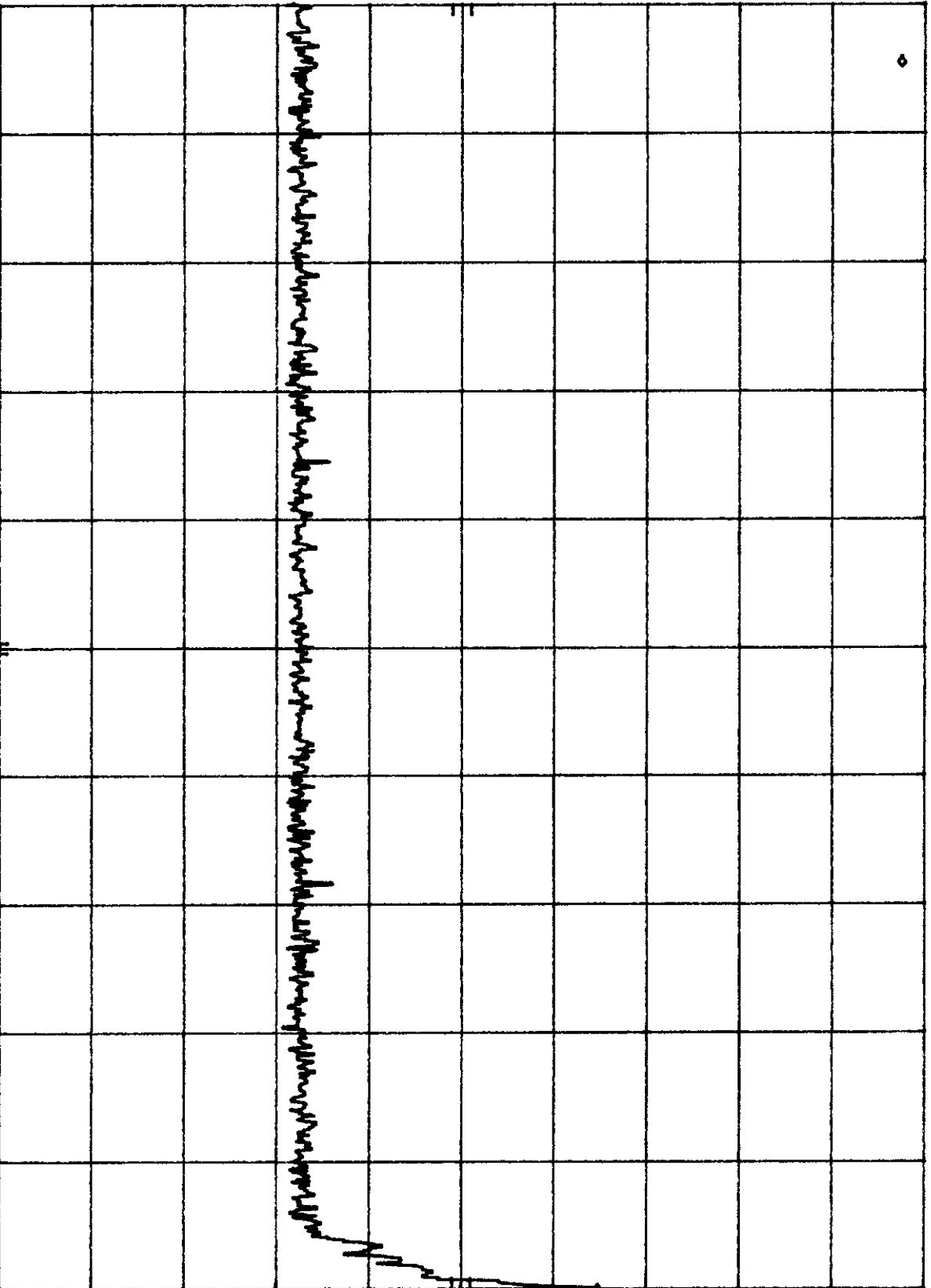
PLOT #4a.2 - Base

MKR Δ 49.71 MHz
-32.70 dB

HP REF 10.0 dBm

ATTEN 30 dB

10 dB/



START 850.0 MHz

RES BW 100 KHz

VBW 100 KHz

STOP 902.0 MHz
SWP 20.0 msec

PLOT #4a.3 - Base

MKR Δ -1.14 MHz

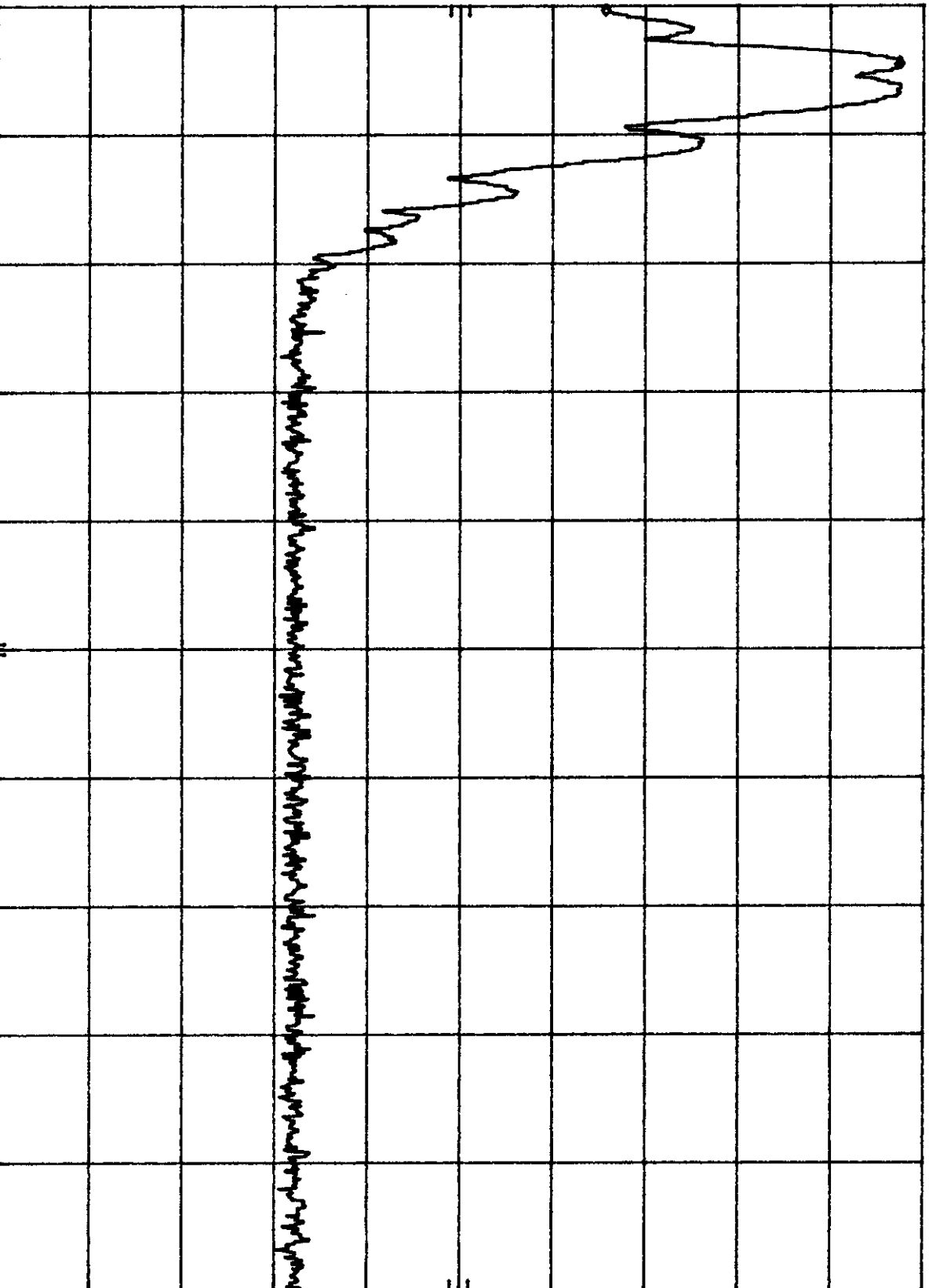
-31.80 dB

HP

REF 10.0 dBm

ATTEN 30 dB

10 dB/



START 902.0 MHz

STOP 928.0 MHz

RES BW 100 kHz

VBW 100 kHz

SWP 20.0 msec

PLOT #4a.4 - Base

MKR Δ 38.02 MHz
-62.10 dB

HP REF 10.0 dBm

ATTEN 30 dB

10 dB/

START
928.0 MHz

START 928.0 MHz
RES BW 100 kHz

VBW 100 kHz

STOP 1.000 0 GHz
SWP 21.6 msec

PLOT #4a.5 - Base

MKR Δ 492 MHz

-62.70 dB

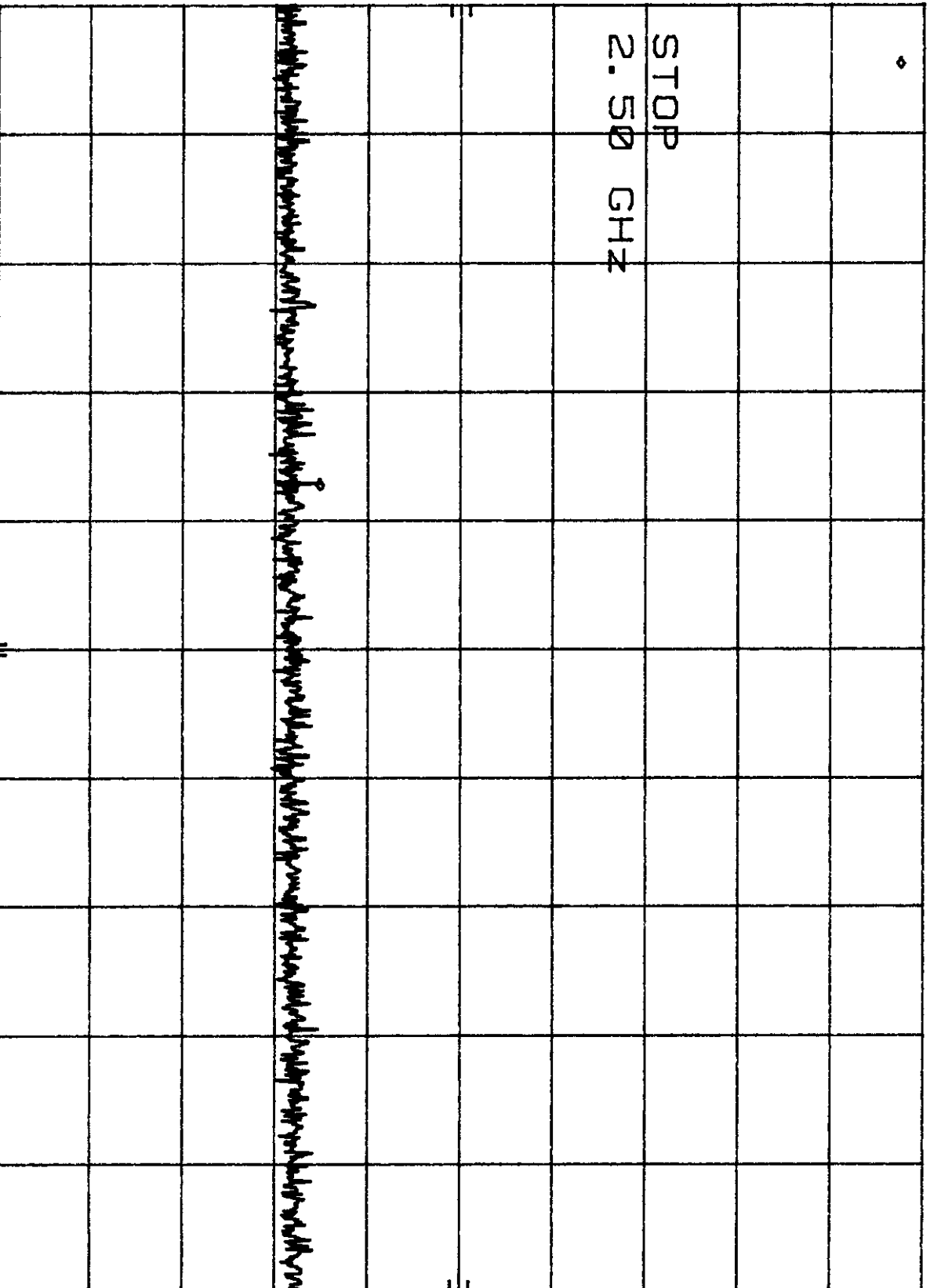
HP

REF 10.0 dBm

ATTEN 30 dB

10 dB/

STOP
2.50 GHz



PLOT #4a.6 - Base

HP

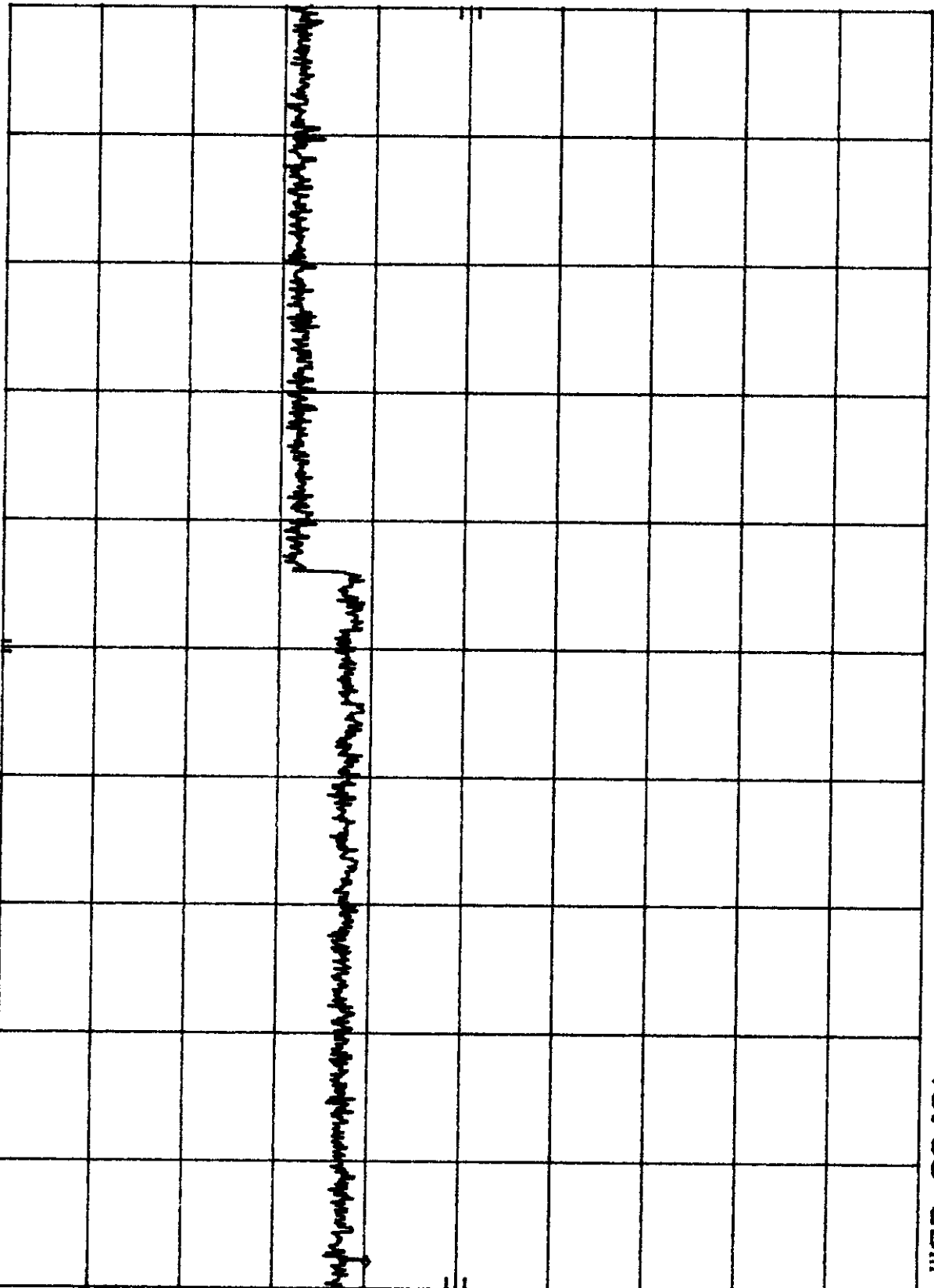
REF 10.0 dBm

ATTEN 30 dB

MKR 9.835 GHz

-49.80 dBm

10 dB/



START 2.50 GHz

RES BW 100 KHz

VBW 100 KHz

STOP 10.00 GHz

SWP 2.25 sec

PLOT #4b.1 - Base

hp

REF

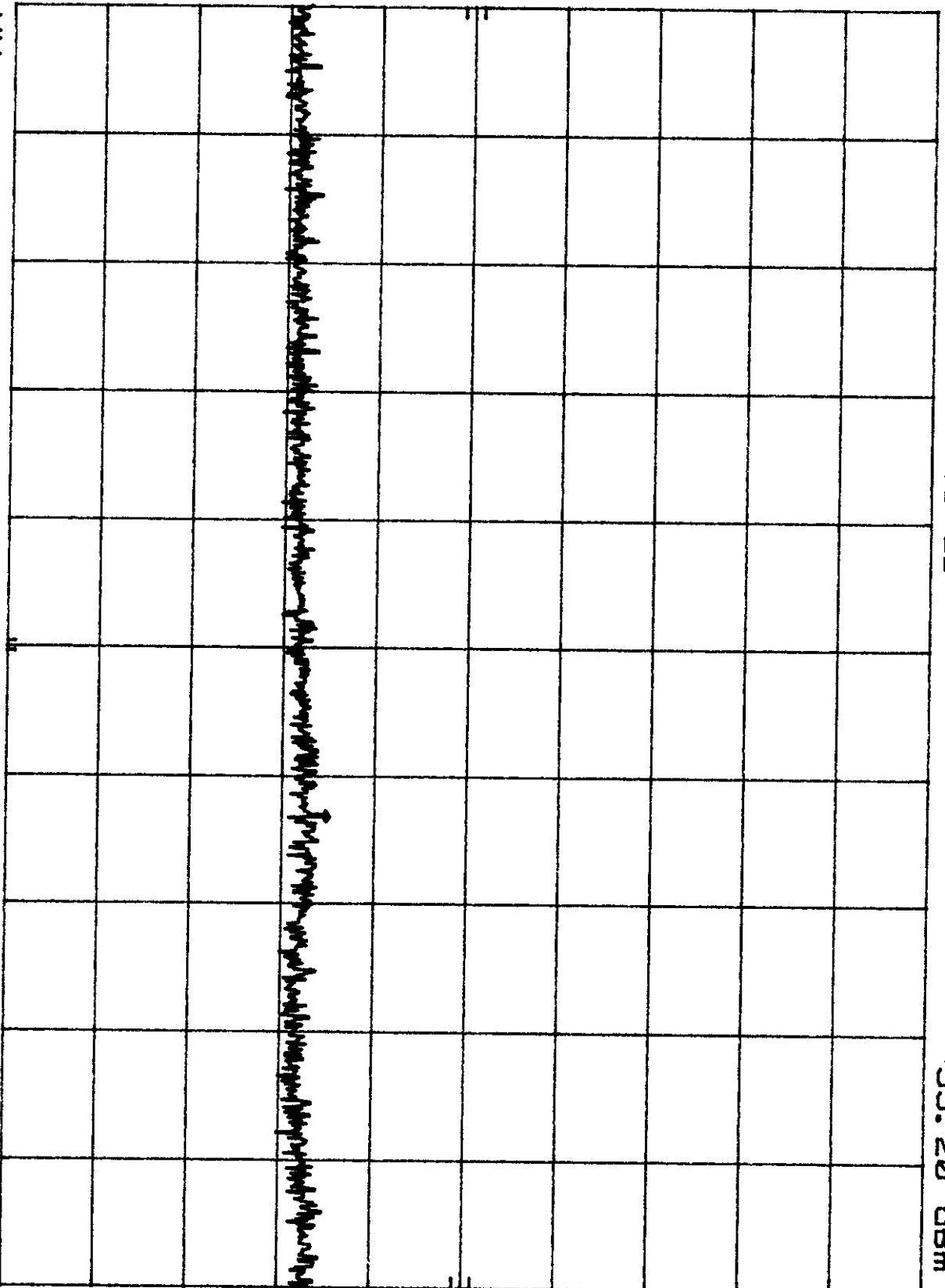
10.0 dBm

ATTEN 30 dB

MKR 569.5 MHz

-55.20 dBm

10 dB/



START 1 MHz

RES BW

100 KHz

VBW

100 KHz

STOP 902 MHz

SWP

270 msec

PLOT #4b.2 - Base

HP

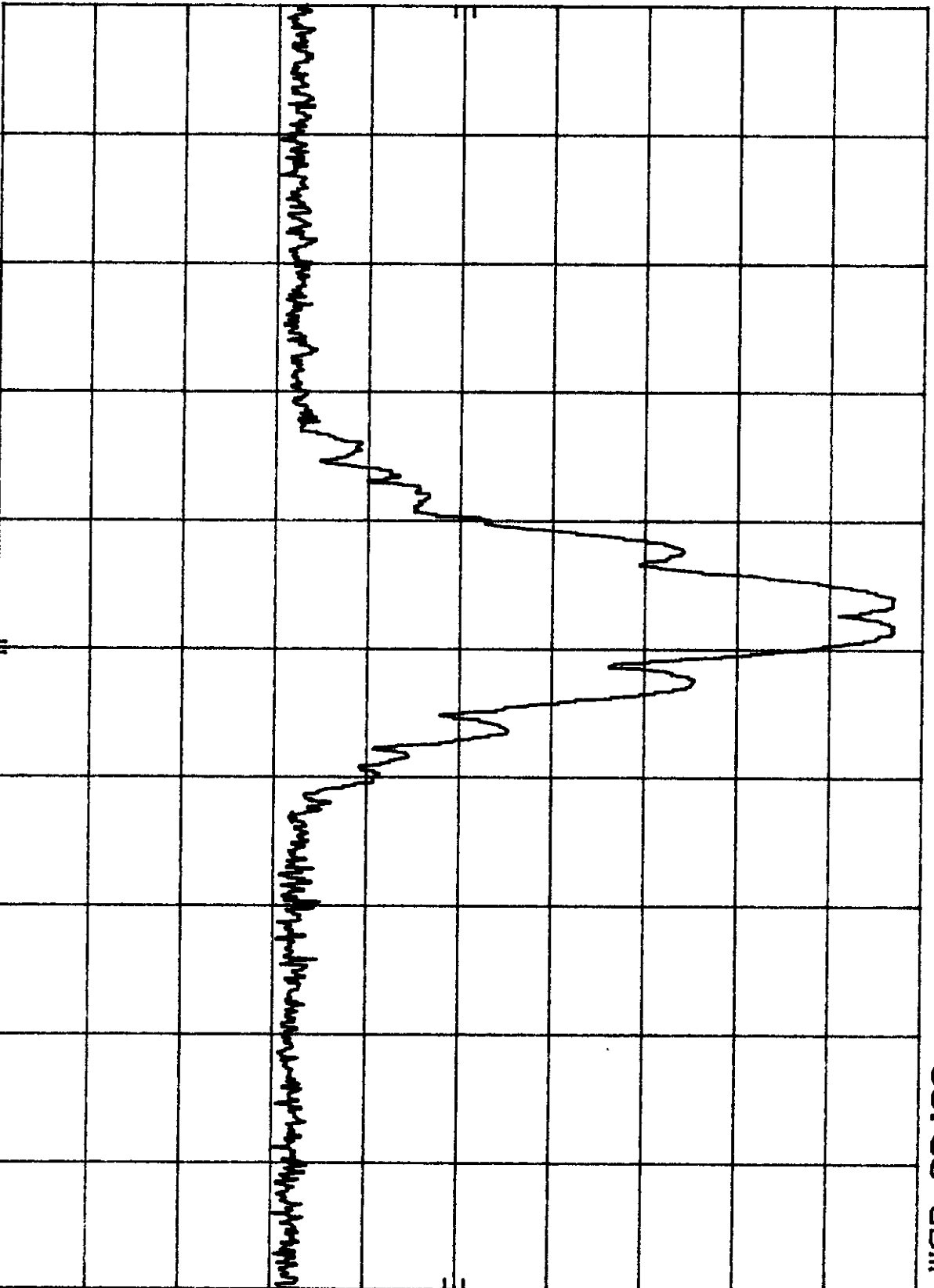
REF 10.0 dBm

ATTEN 30 dB

MKR 918.41 MHz

-58.00 dBm

10 dB/



START 902.0 MHz

RES BW 100 kHz

VBW 100 kHz

STOP 928.0 MHz

SWP 20.0 msec

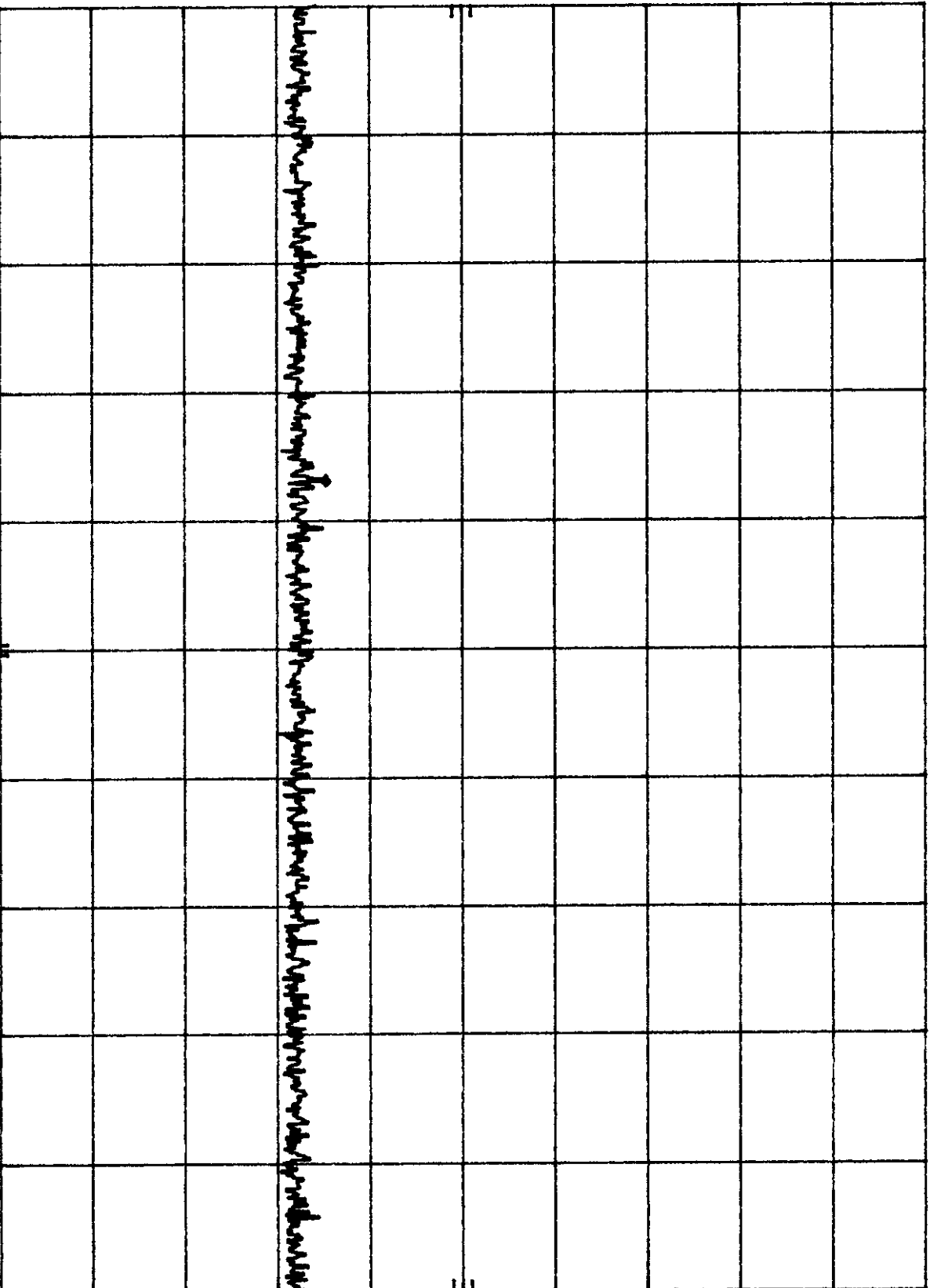
PLOT #4b.3 - Base

MKR 954.50 MHz
-54.70 dBm

HP

REF 10.0 dBm ATTN 30 dB

10 dB/



START 928.0 MHz

RES BW 100 KHz

VBW 100 KHz

STOP 1.000 0 GHz

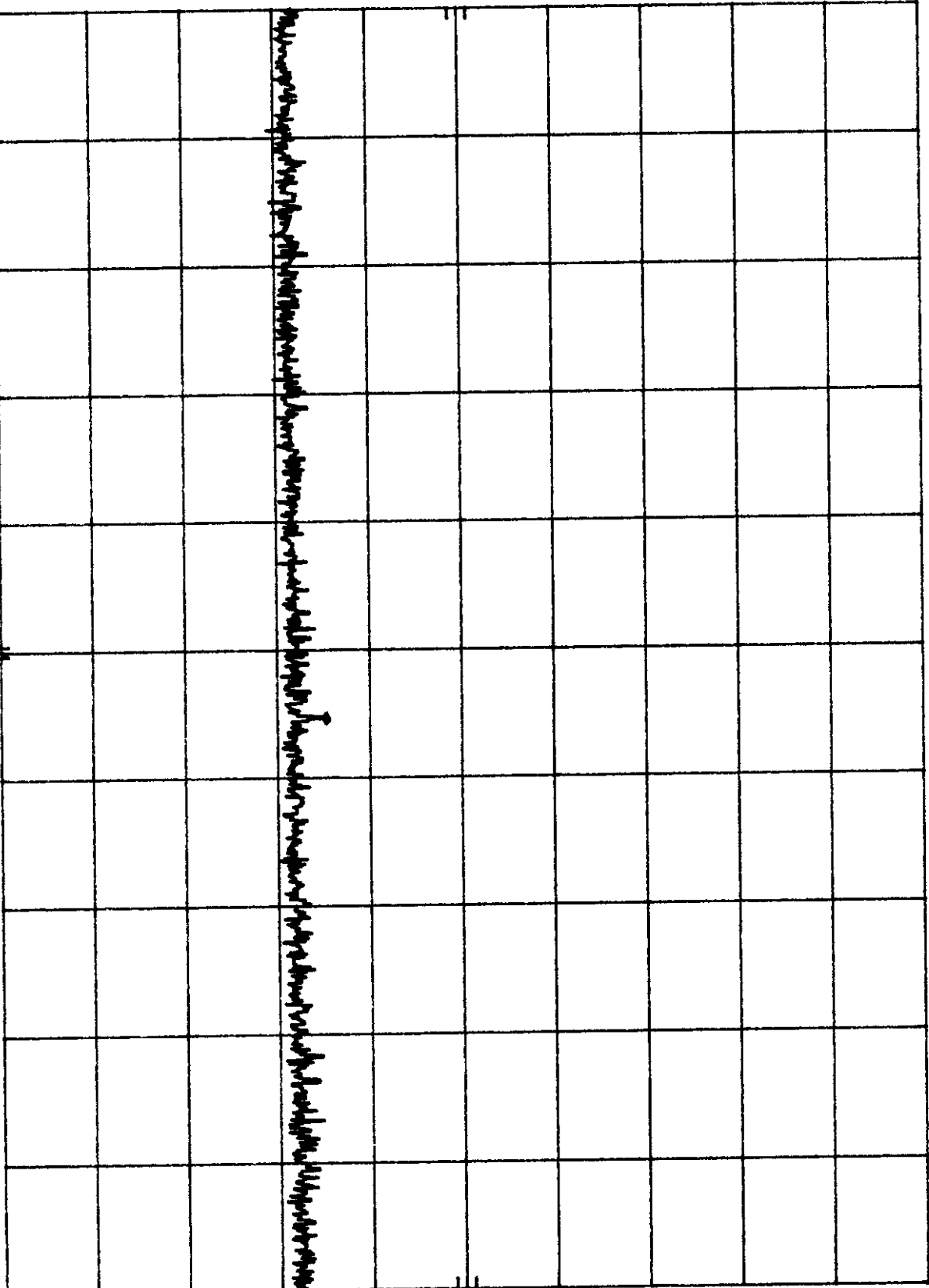
SWP 21.6 msec

PLOT #4b.4 - Base

MKR 1.830 GHz
-54.70 dBm

hp REF 10.0 dBm
10 dB/

ATTEN 30 dB



START 1.00 GHz RES BW 100 kHz VBW 100 kHz STOP 2.50 GHz
SWP 450 msec

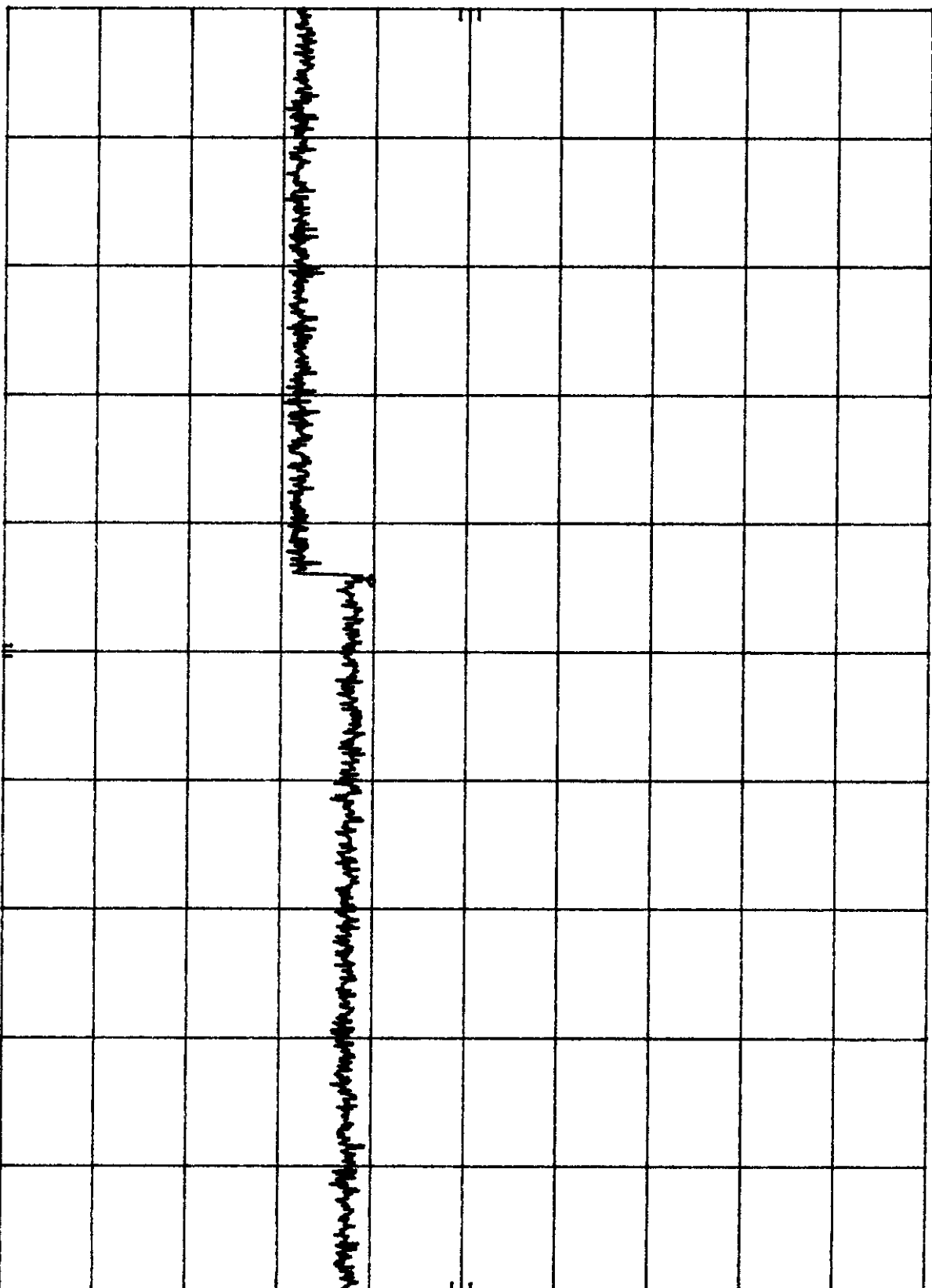
PLOT #4b.5 - Base

h₀

REF 10.0 dBm ATTEN 30 dB

MKR 5.830 GHz
-50.30 dBm

10 dB/



START 2.50 GHz

RES BW 100 kHz

VBW 100 kHz

STOP 10.00 GHz
SWP 2.25 sec

PLOT #4c.1 - Base

HP

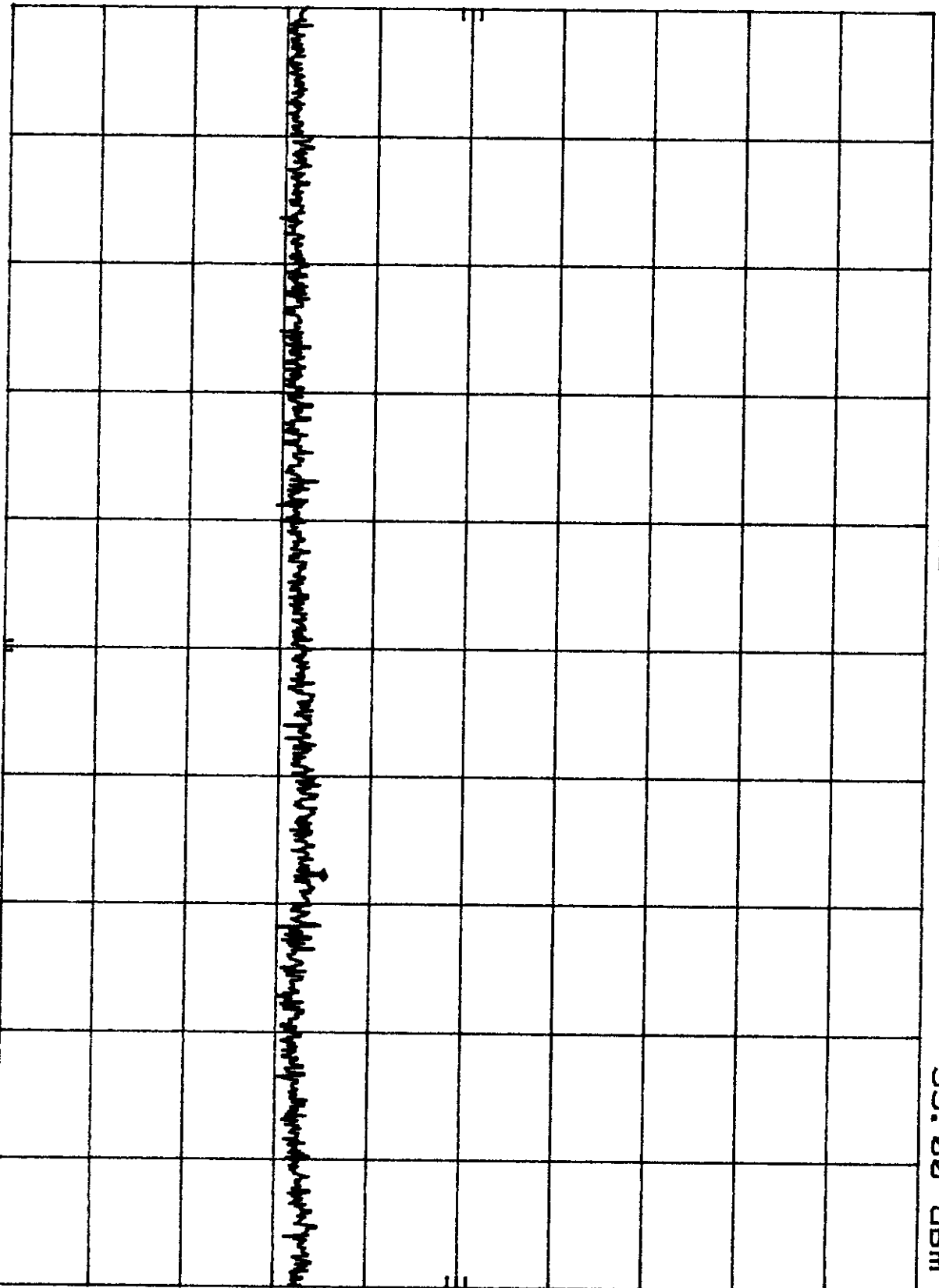
REF 10.0 dBm

ATTEN 30 dB

MKR 611.0 MHz

-55.00 dBm

10 dB/



START 1 MHz

RES BW 100 KHz

VBW 100 KHz

STOP 902 MHz

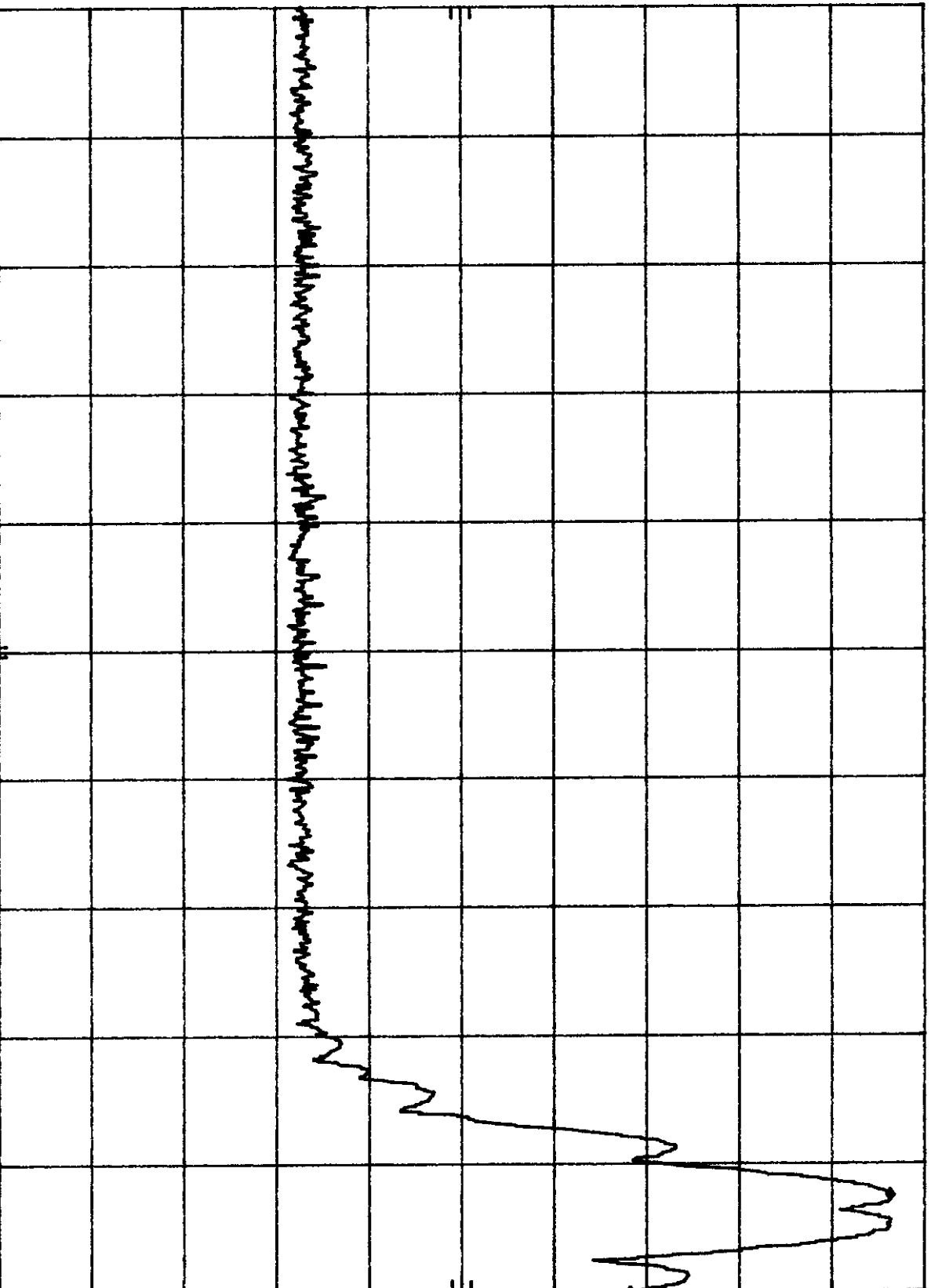
SWP 270 msec

PLOT #4c.2 - Base

MKR Δ 1.98 MHz

-28.10 dB

hp REF 10.0 dBm ATTN 30 dB
10 dB/



START 902.0 MHz

RES BW 100 kHz

VBW 100 kHz

SWP 20.0 msec

STOP 928.0 MHz

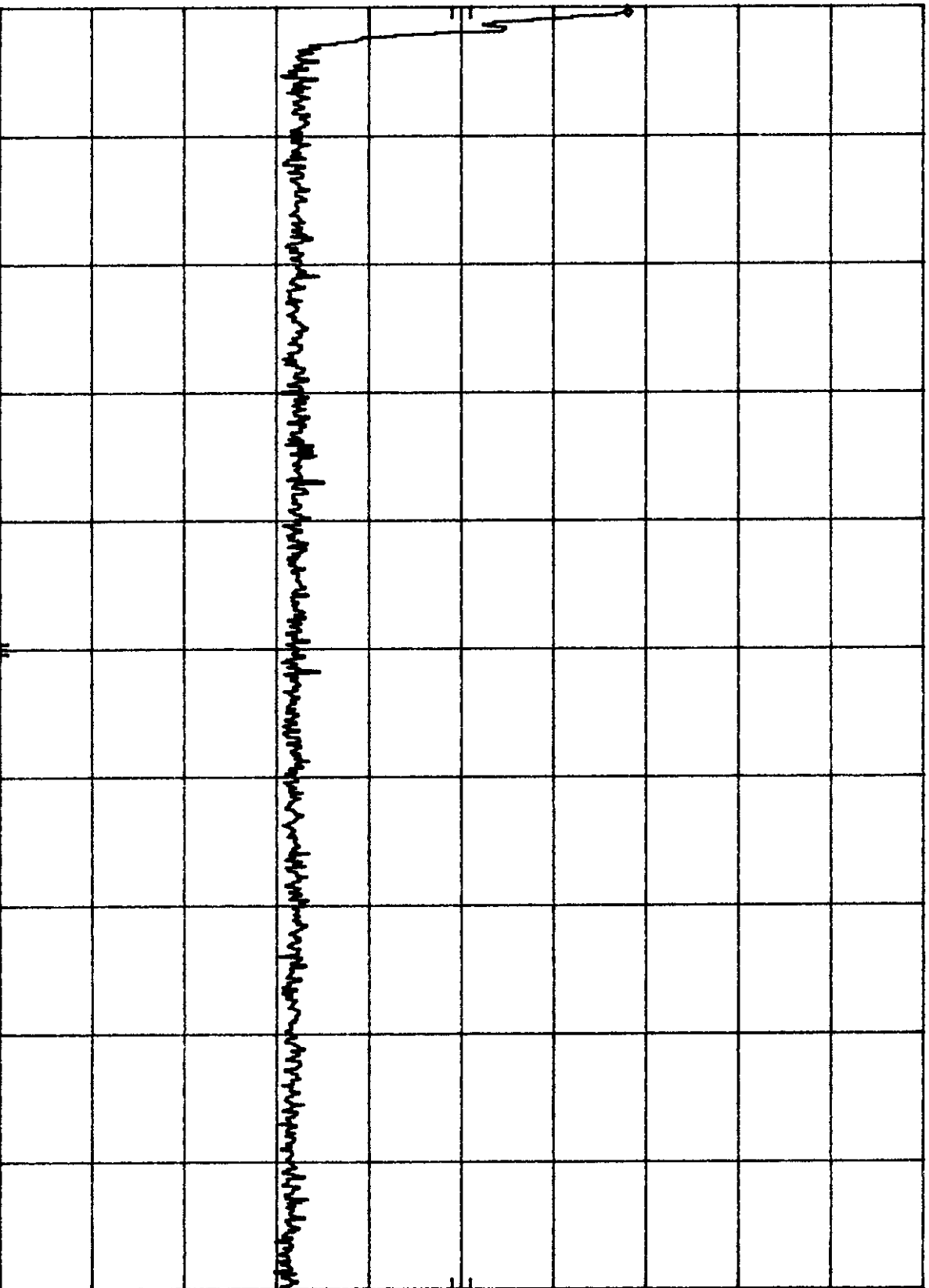
PLOT #4C.3 - Base

MKR 928.14 MHz
-21.90 dBm

HP REF 10.0 dBm

ATTEN 30 dB

10 dB/



START 928.0 MHz

RES BW 100 KHz

VBW 100 KHz

STOP 1.000 0 GHz

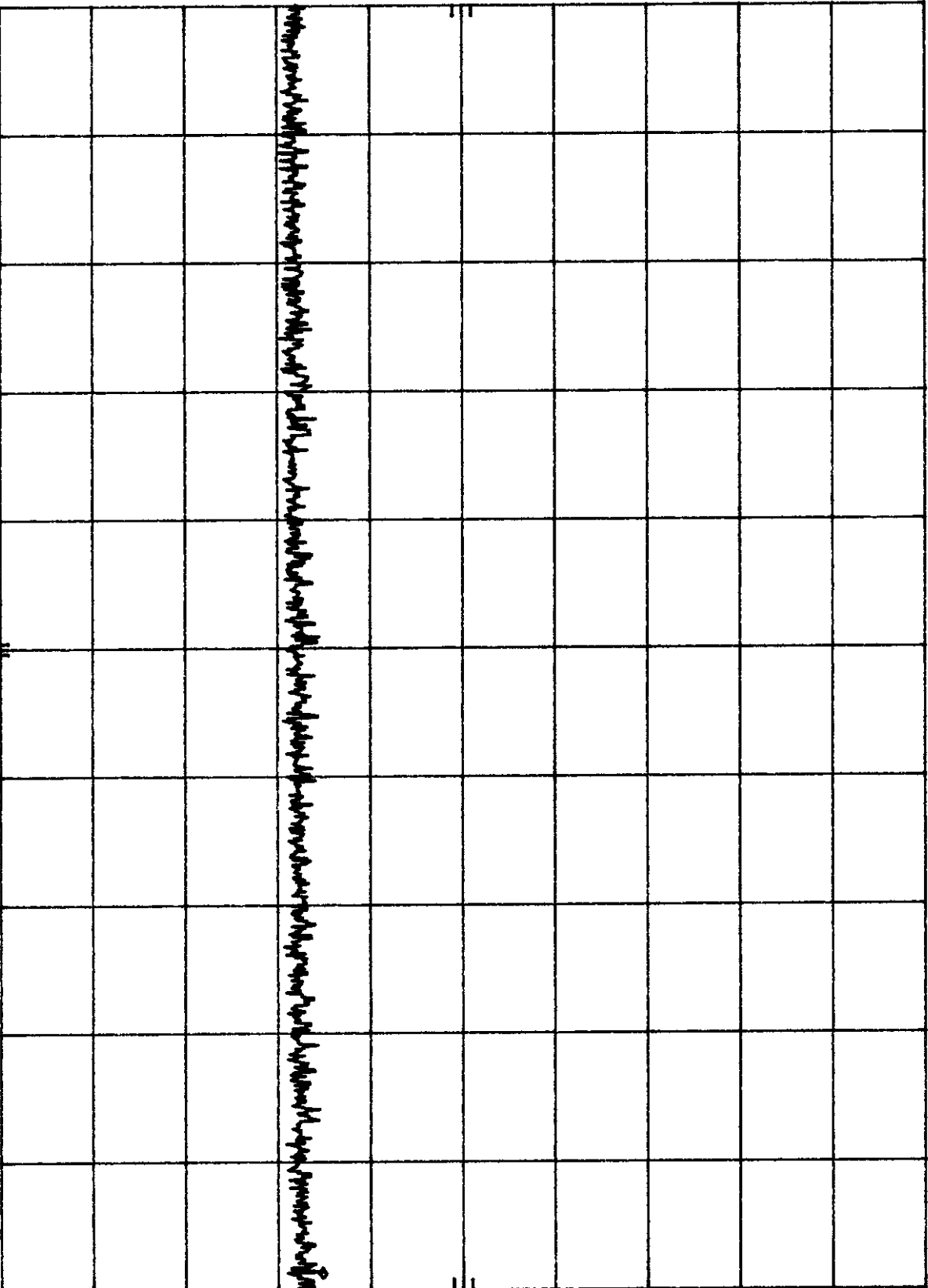
SWP 21.6 msec

PLOT #4c.4 - Base

MKR 2.479 GHz
-55.20 dBm

40 REF 10.0 dBm
10 dB/

ATTEN 30 dB



START 1.00 GHz RES BW 100 KHz VBW 100 KHz STOP 2.50 GHz
SWP 450 msec

PLOT #4c.5 - Base

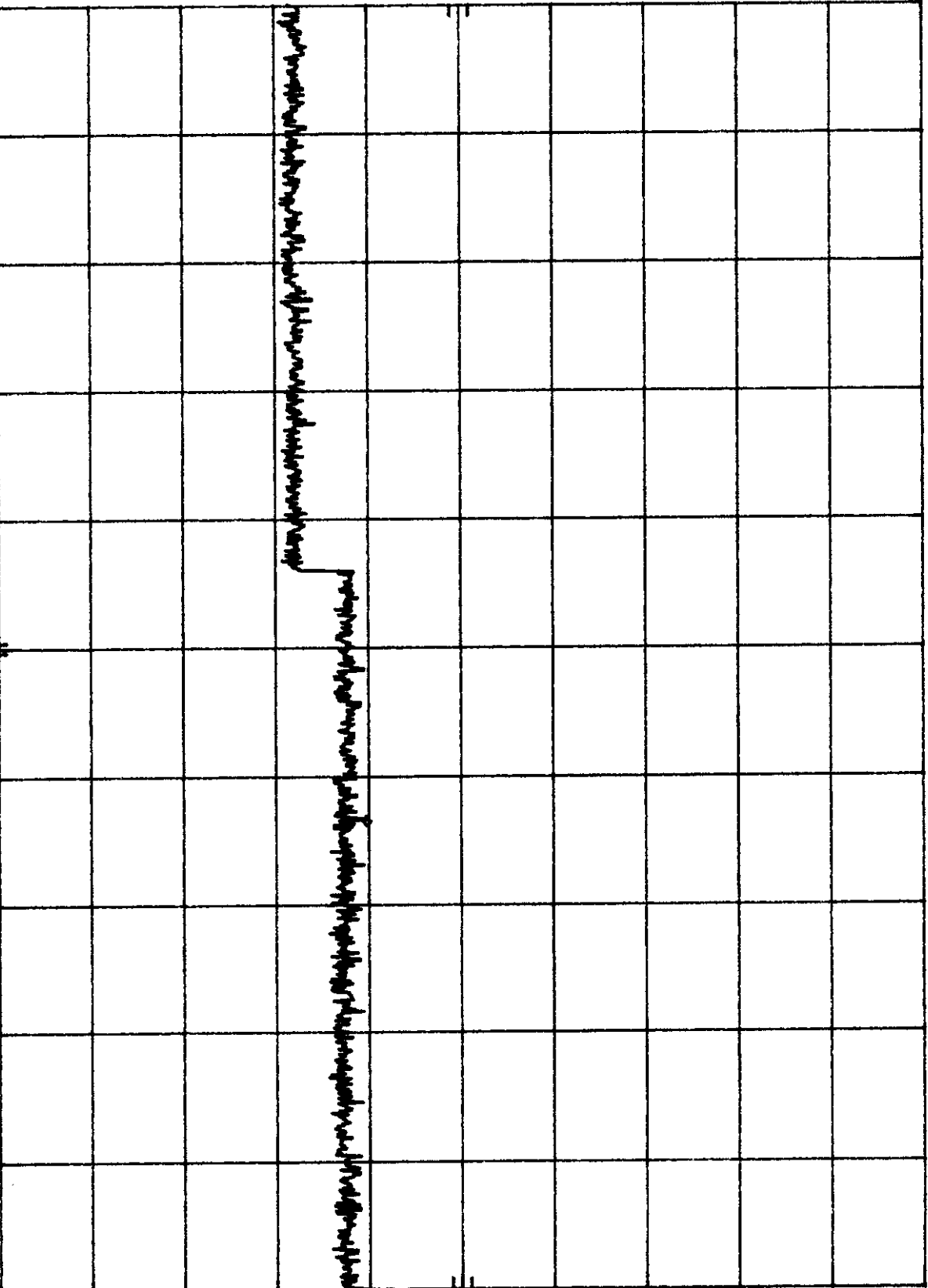
MKR 7.255 GHz
-50.20 dBm

hp

REF 10.0 dBm

ATTEN 30 dB

10 dB/



START 2.50 GHz

RES BW 100 KHz

VBW 100 KHz

STOP 10.00 GHz
SWP 2.25 sec

Intertek Testing Services -Menlo Park

**Samjoo Electronics, 900 MHz Direct Sequence Spread Spectrum
FCC ID: NR839510**

Date of Test: April 23, 1998

4.4(a) Out of Band Conducted Emissions, FCC Rule 15.247(c): (Handset Unit)

In any 100 kHz bandwidth outside the EUT passband, the RF power produced by the modulation products of the spreading sequence, the information sequence, and the carrier frequency shall be at least 20 dB below that of the maximum in-band 100 kHz emission, or else shall meet the general limits for radiated emissions at frequencies outside the passband, whichever results in lower attenuation.

All other types of emissions from the EUT shall meet the general limits for radiated frequencies outside the passband.

Refer to the following plots for out of band conducted emissions data:

Plot 4a.1 - 4a.4: Low Channel Emissions

Plot 4b.1 - 4b.5: Middle Channel Emissions

Plot 4c.1 - 4c.5: High Channel Emissions

PLOT #4a.1 - Handset

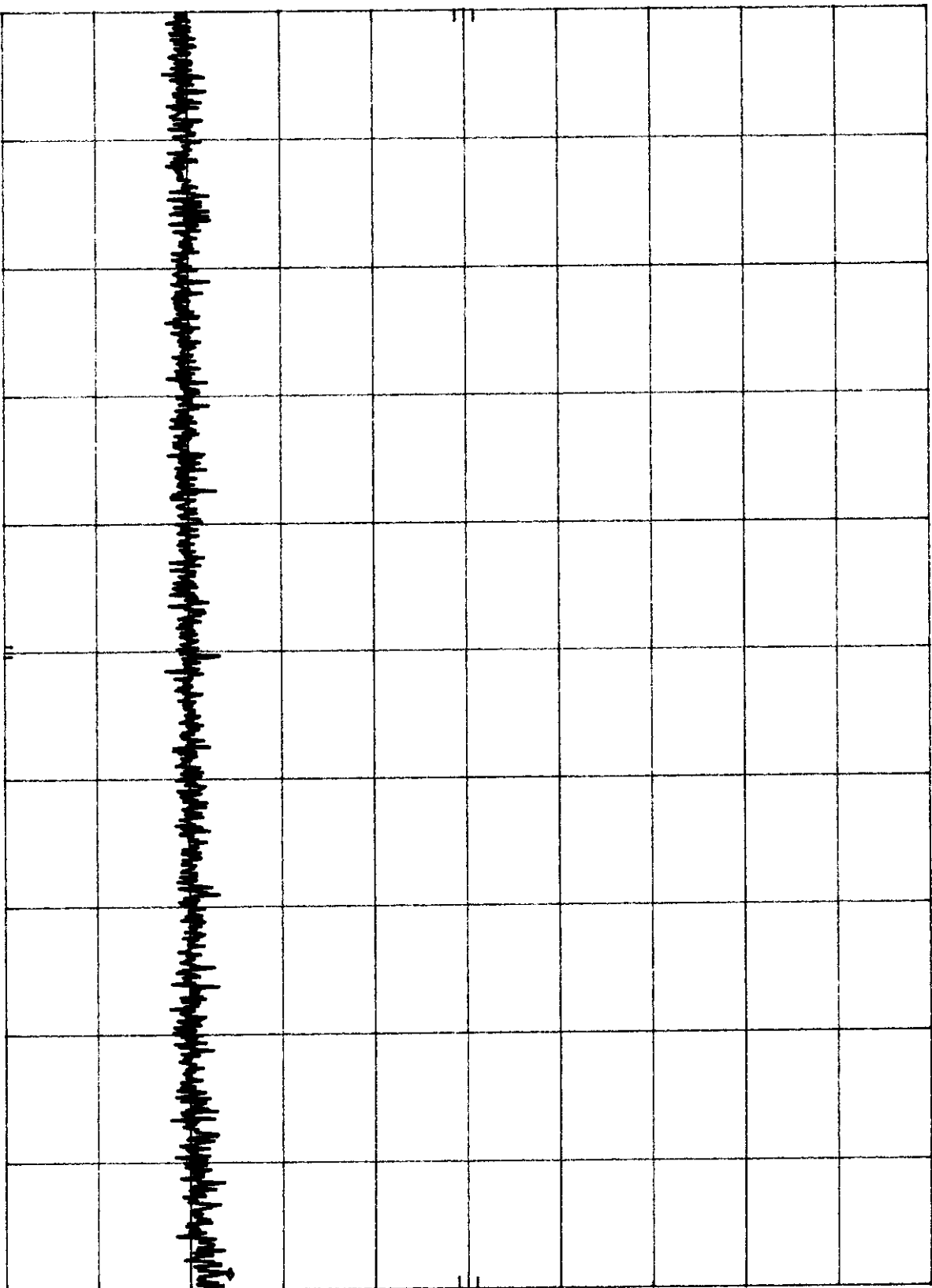
MKR 883.4 MHz
-55.80 dBm

HP

REF 20.0 dBm

ATTEN 30 dB

10 dB/



START 1.0 MHz

FES BW 100 KHz

VBW 100 KHz

STOP 895.0 MHz
SWP 200 msec

PLOT #4a.2 - Handset

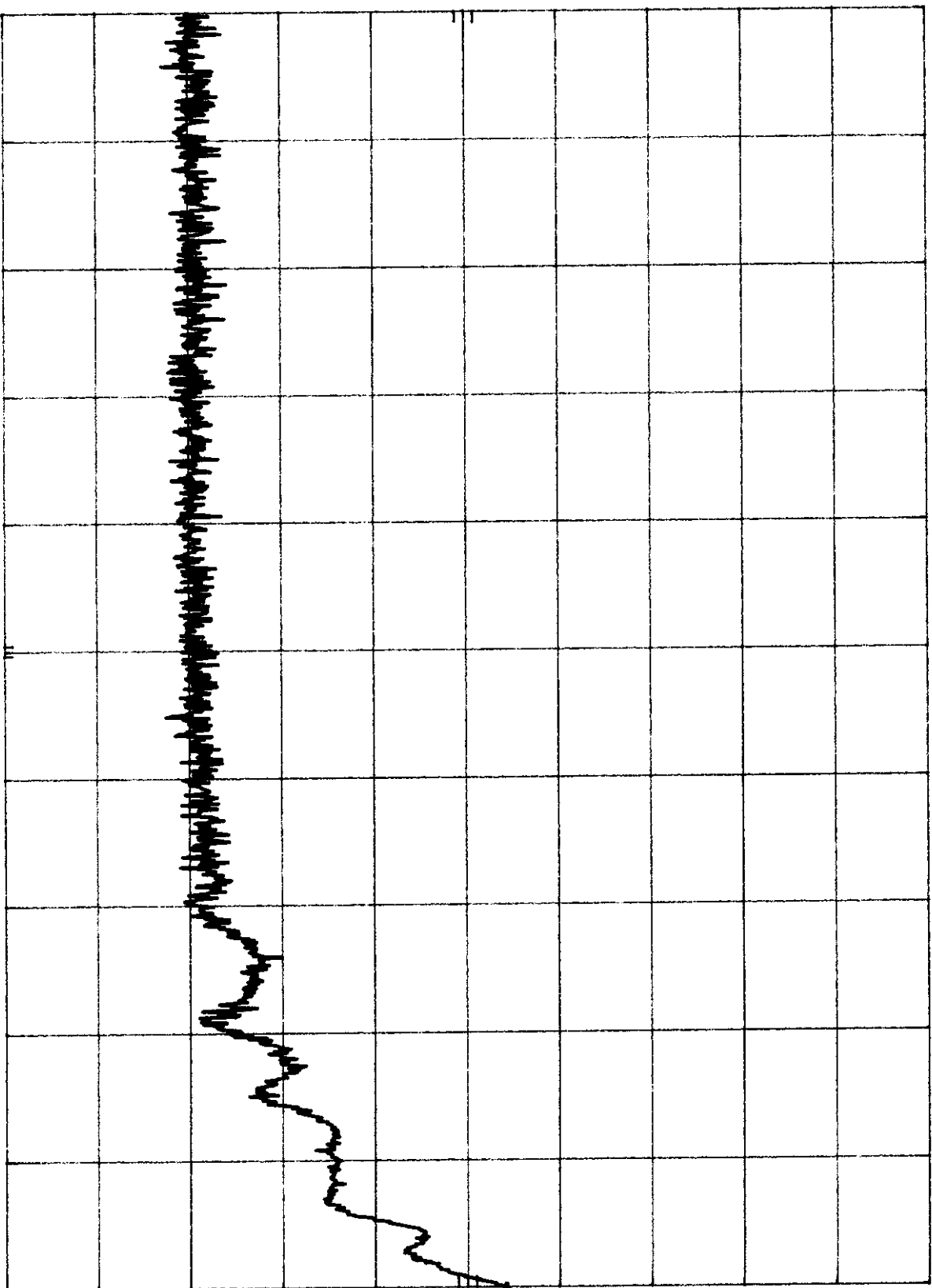
MKR 902.000 MHz
-25.80 dBm

hp

REF 20.0 dBm

ATTEN 30 dB

10 dB/



START 895.000 MHz

RES BW 100 KHz

VBW 100 KHz

STOP 902.000 MHz
SWP 20 msec

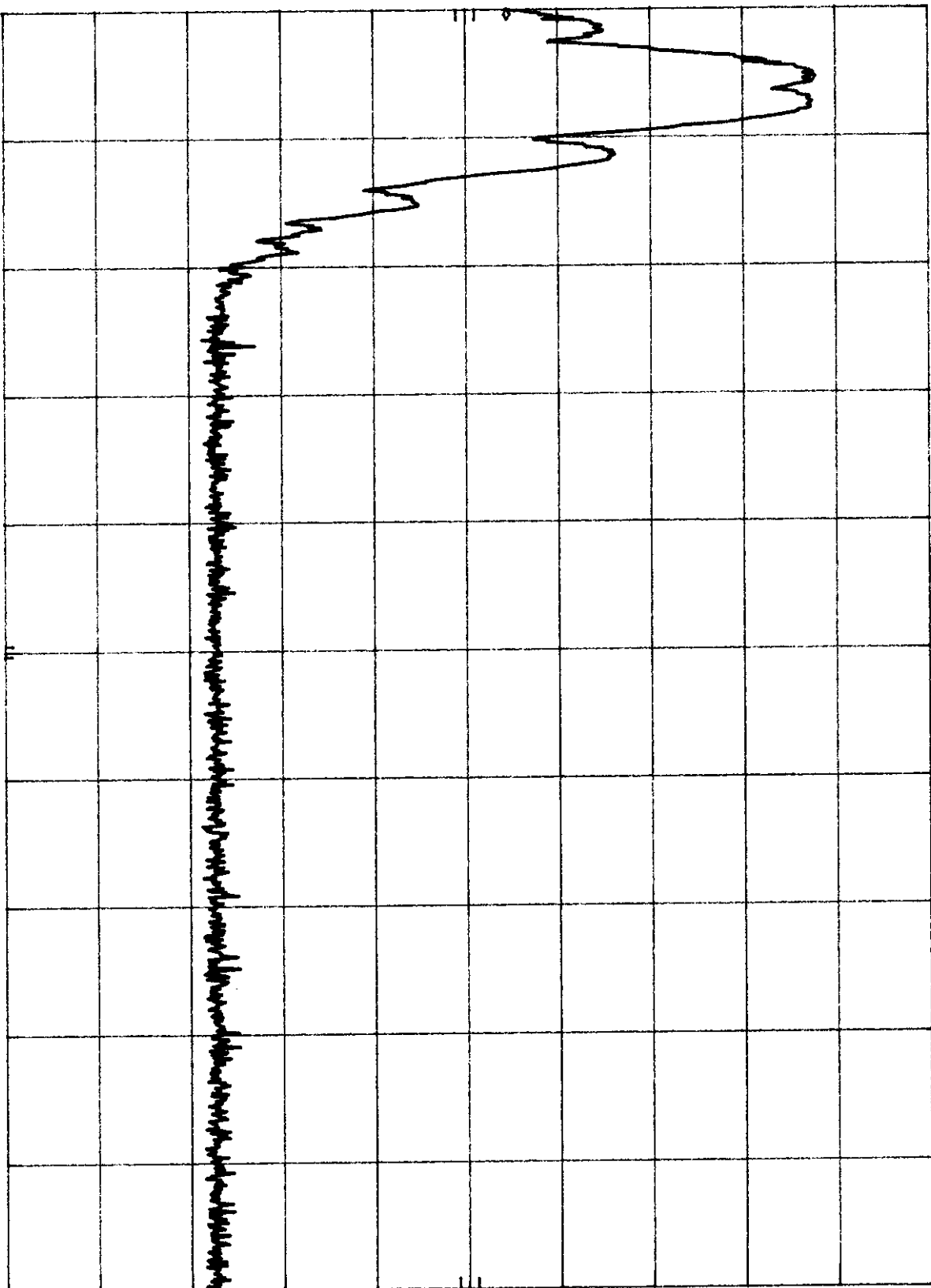
PLOT #4a.3 - Handset

MKR Δ -1.38 MHz
-33.00 dB

HP REF 20.0 dBm

ATTEN 30 dB

10 dB/

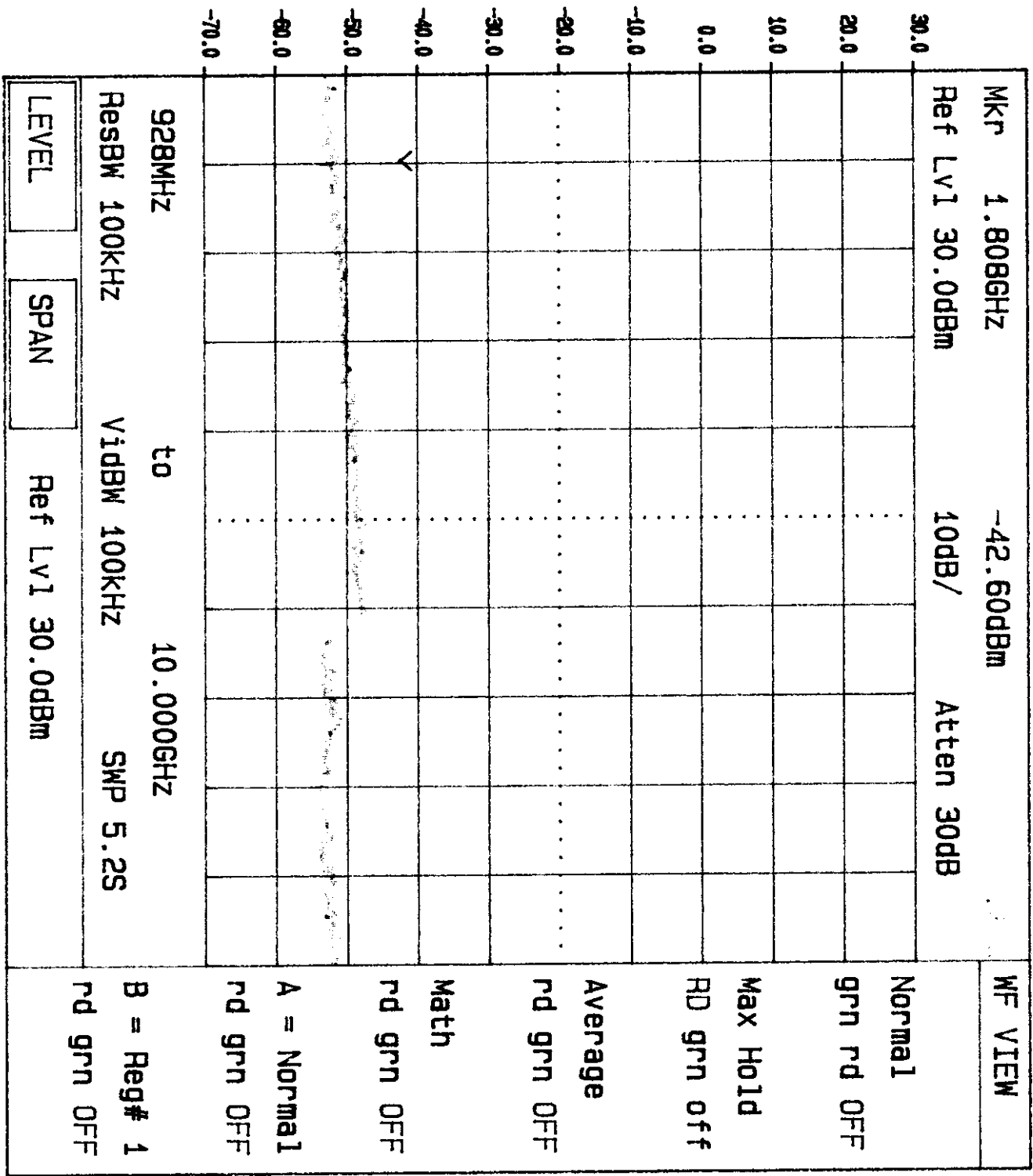


START 902.00 MHz

RES BW 100 KHz

VBW 100 KHz

STOP 928.00 MHz
SWP 20 msec



PLOT #4b.1 - Handset

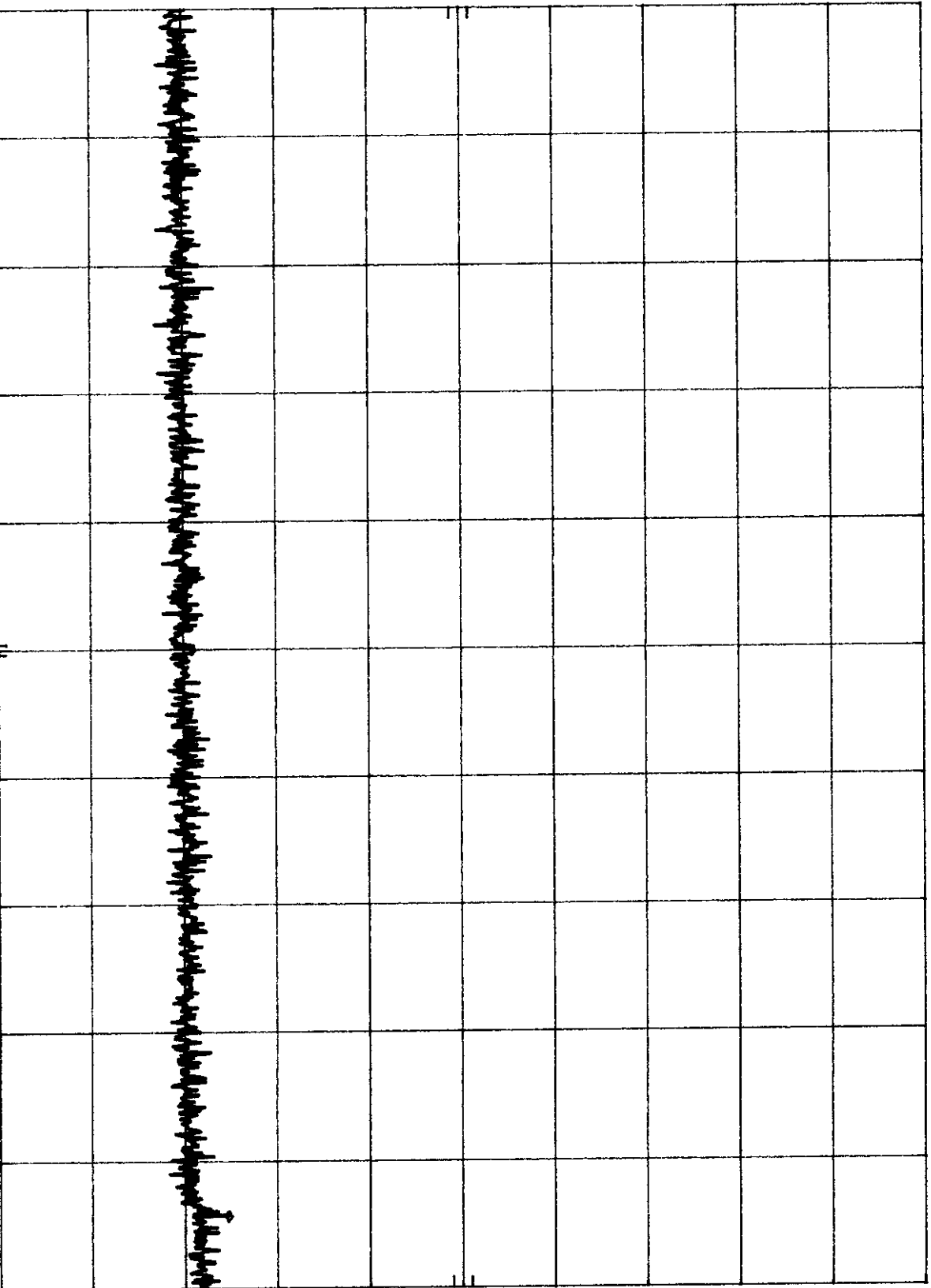
MKR 849.7 MHz
-55.30 dBm

HP

REF 20.0 dBm

ATTEN 30 dB

10 dB/



START 1.0 MHz

RES BW 100 KHz

VBW 100 KHz

STOP 902.0 MHz
SWP 200 msec

Plot #4b.2 - Handset

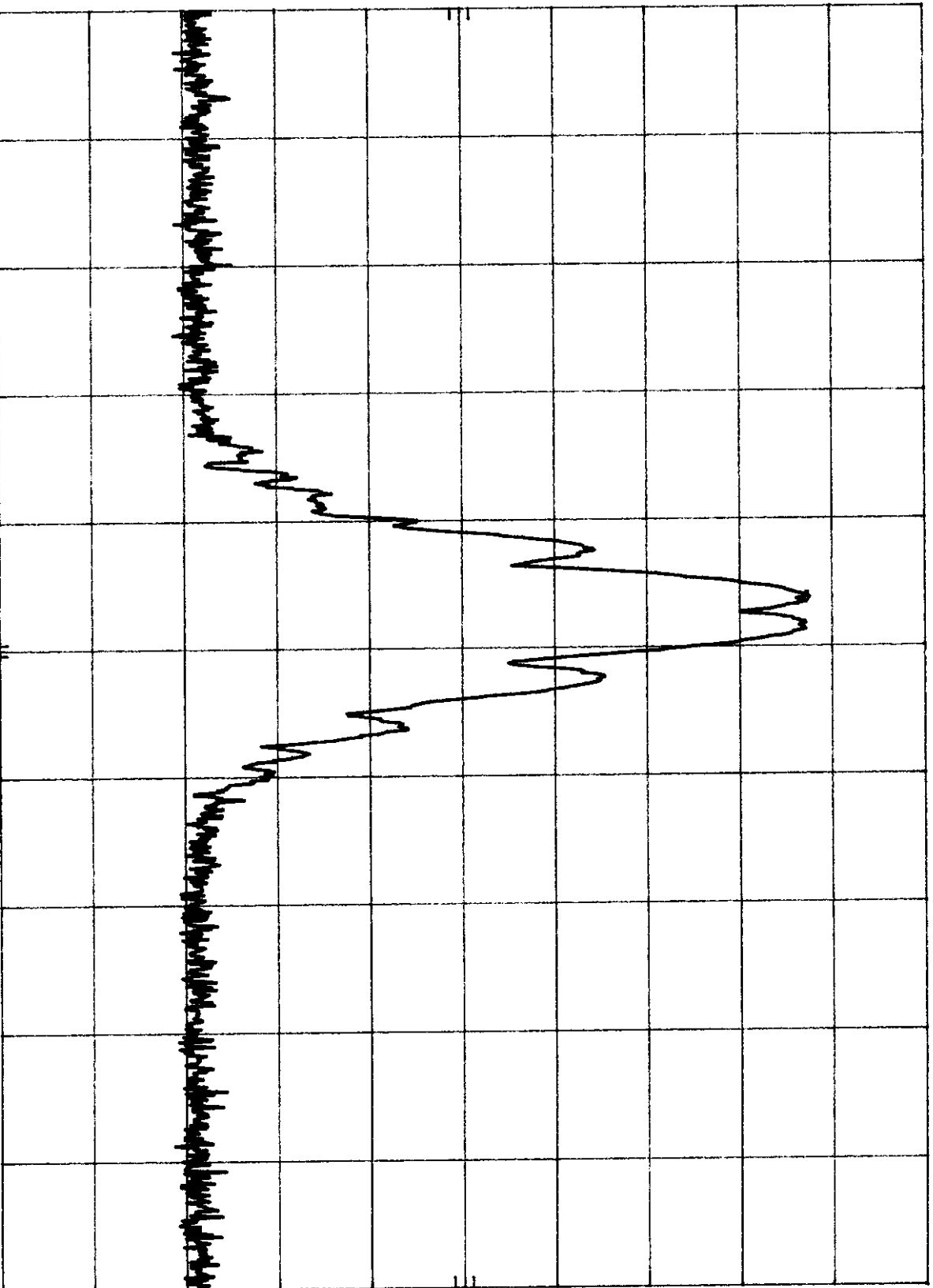
MKR 913.99 MHz
7.20 dBm

HP

REF 20.0 dBm

ATTEN 30 dB

10 dB/



START 902.00 MHz
RES BW 100 KHz
VBW 100 KHz
STOP 928.00 MHz
SWP 20 msec

PLOT #4b.3 - Handset

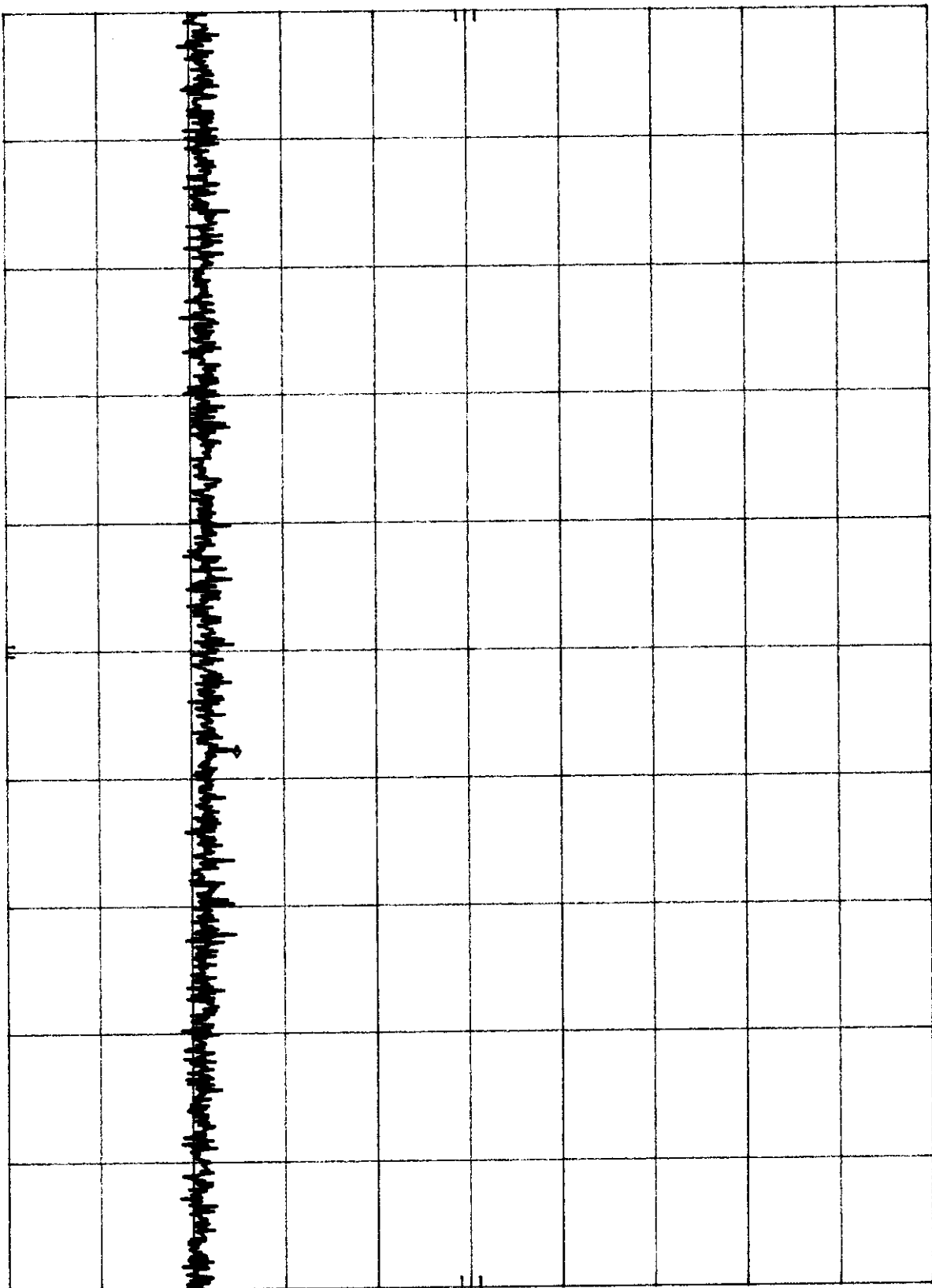
MKR 969.62 MHz
-55.10 dBm

HP

REF 20.0 dBm

ATTEN 30 dB

10 dB/



START 928.00 MHz

RES BW 100 KHz

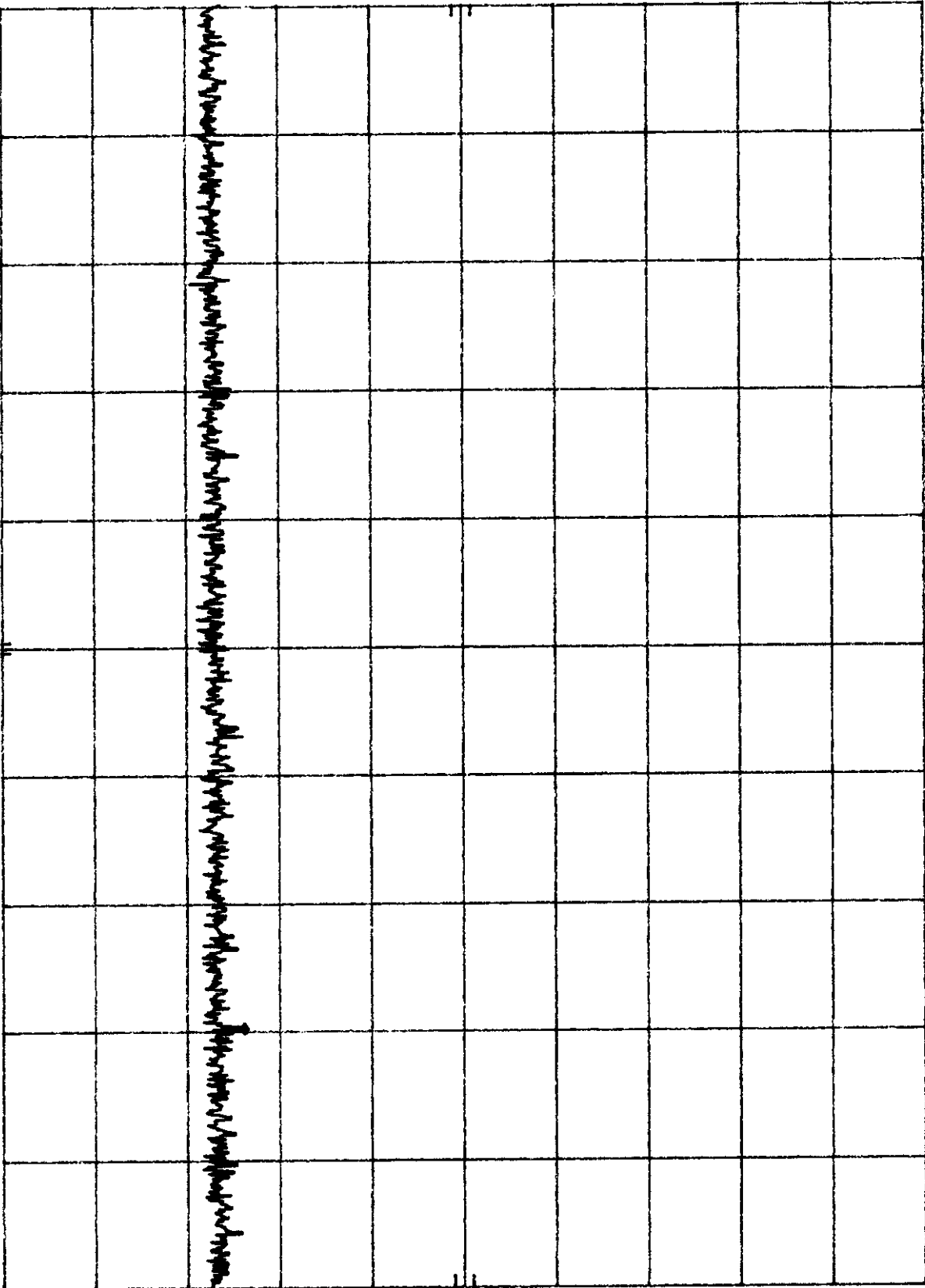
VBW 100 KHz

STOP 1000.00 MHz
SWP 20 msec

PLOT #4b.4 - Handset

MKR 2.196 GHz
-53.80 dBm

hp REF 20.0 dBm ATTEN 30 dB
10 dB/



START 1.00 GHz

RES BW 100 KHz

VBW 100 KHz

STOP 2.50 GHz
SWP 450 msec

PLOT #4b.5 - Handset

MKR 7.060 GHz

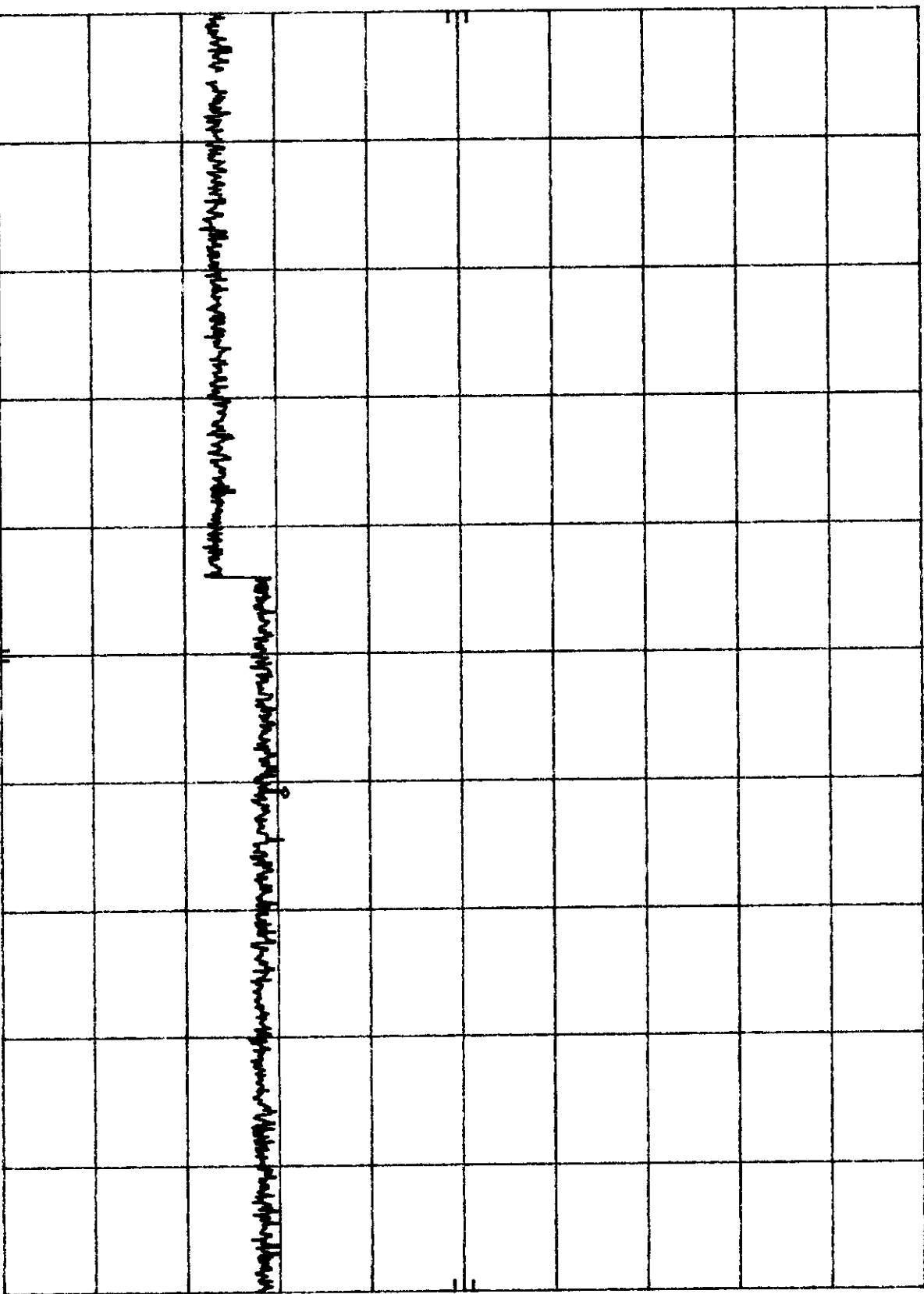
-49.20 dBm

HP

REF 20.0 dBm

ATTEN 30 dB

10 dB/



START 2.50 GHz

RES BW 100 KHz

VBW 100 KHz

STOP 10.00 GHz

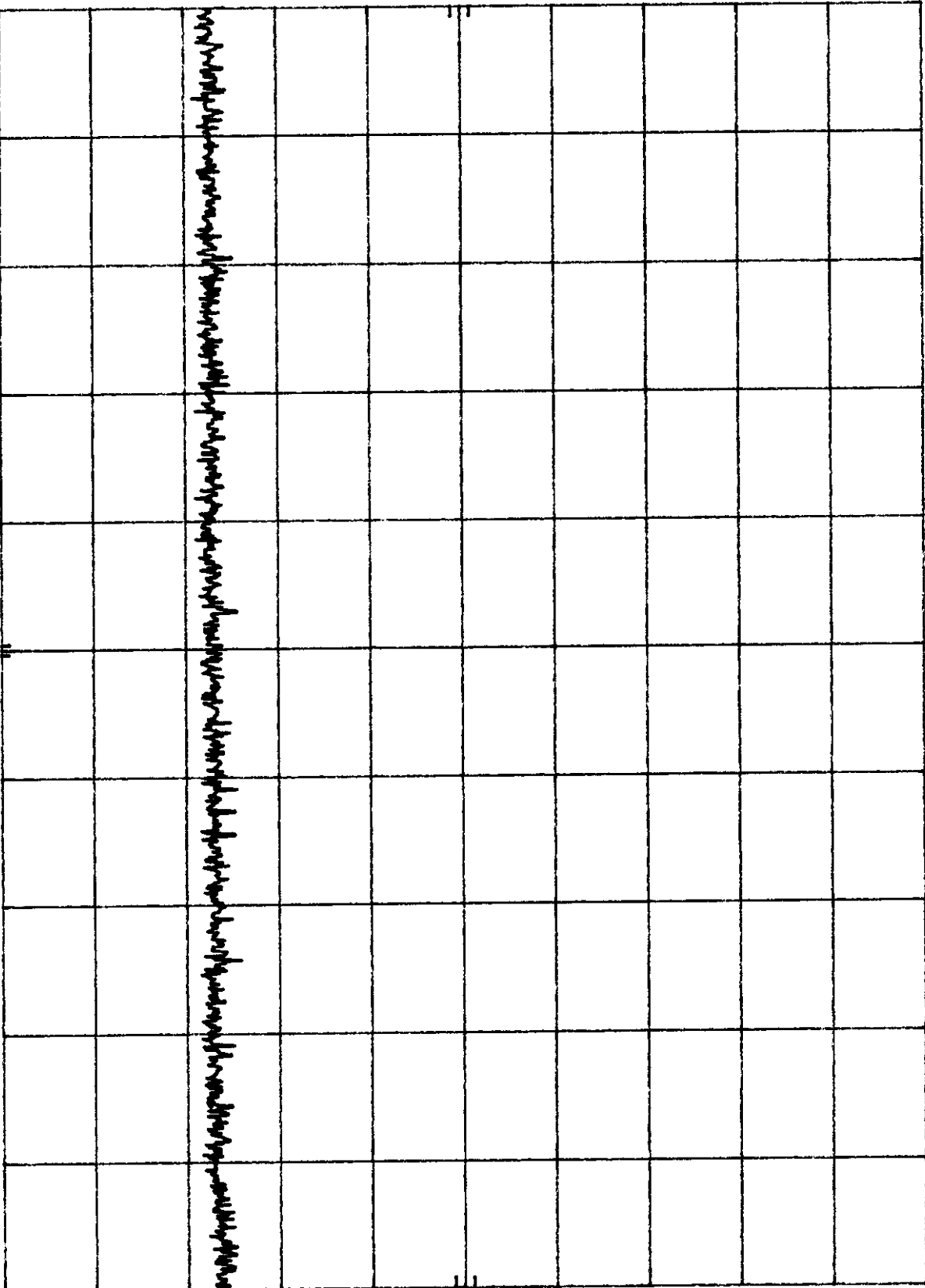
SWP 2.25 sec

PLOT #4c.1 - Handset

MKR 769.6 MHz

-57.60 dBm

hp REF 20.0 dBm ATTEN 30 dB
10 dB/



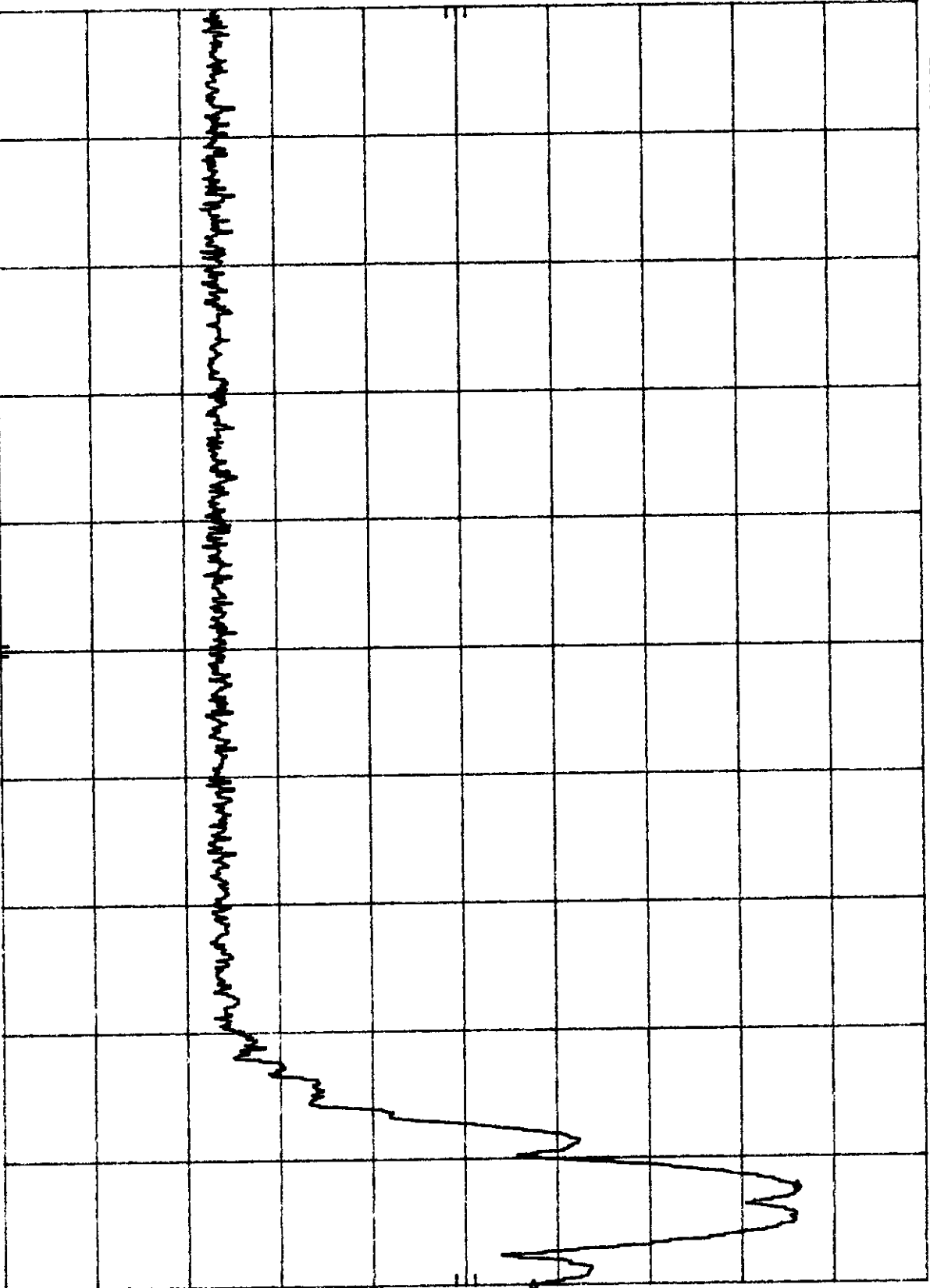
START 1 MHz RES BW 100 KHz VBW 100 KHz SWP 270 msec STOP 902 MHz

PLOT #4.c.c.2 - Handset

MKR Δ 1.98 MHz
-28.70 dB

HP REF 20.0 dBm ATTEN 30 dB

10 dB/



START 902.0 MHz

RES BW 100 kHz

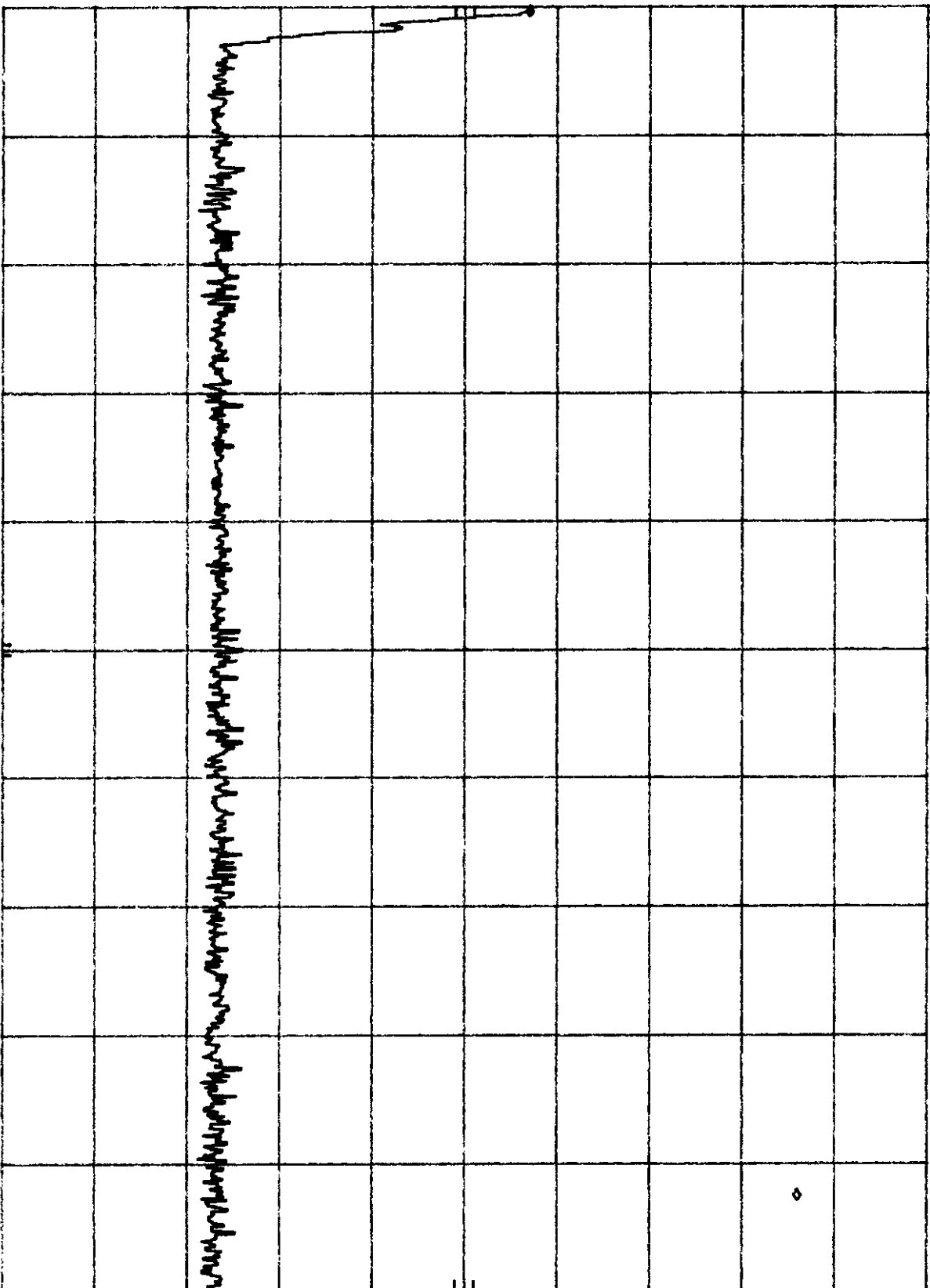
VBW 100 kHz

STOP 928.0 MHz
SWP 20.0 msec

PLOT #4c.3 - Handset

MKR Δ -66.53 MHz
-29.00 dB

10 dB/ REF 20.0 dBm ATTEN 30 dB



START 928.0 MHz

RES BW 100 KHz

VBW 100 KHz

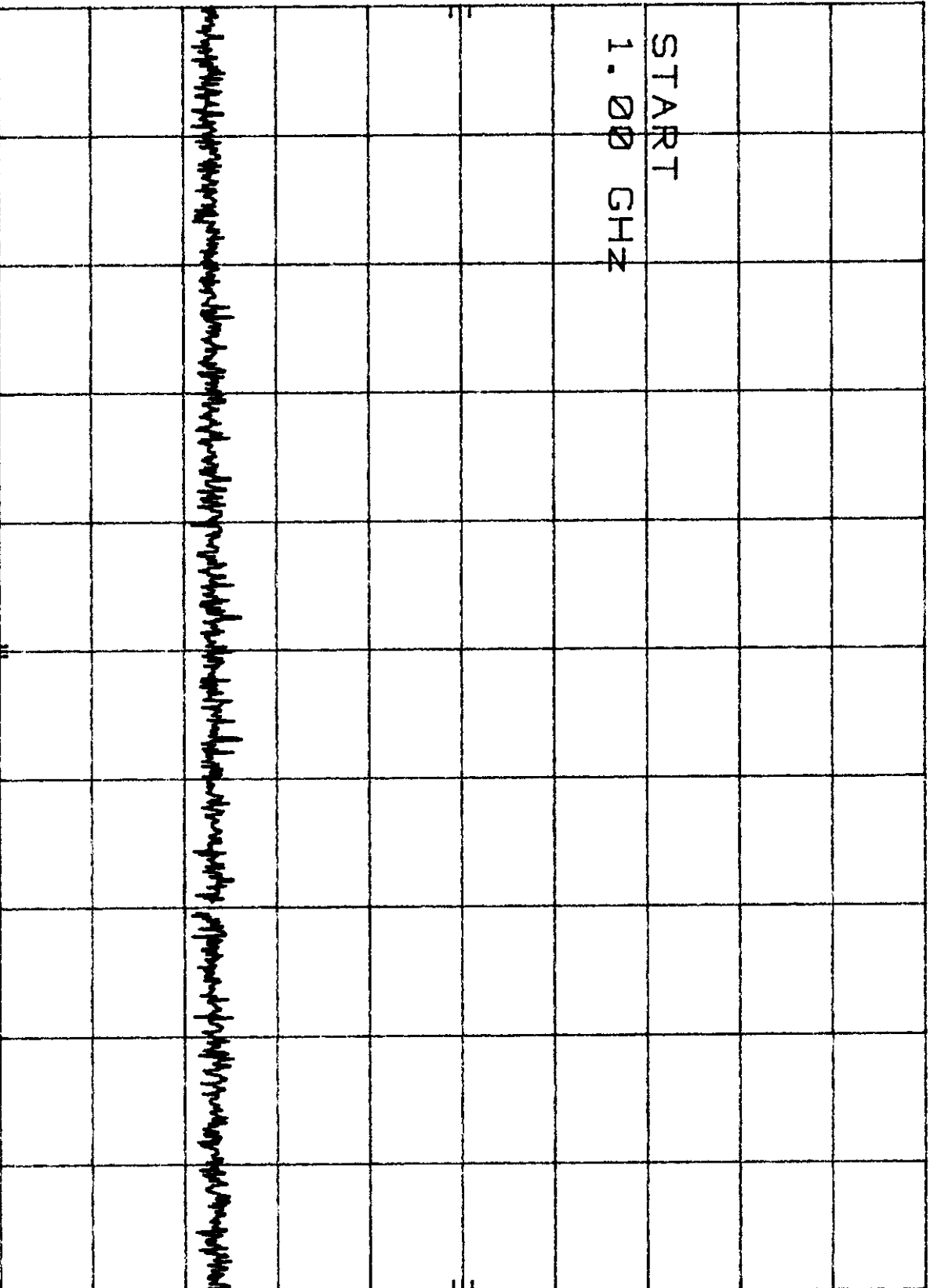
STOP 1.000 0 GHz

SWP 21.6 msec

PLOT #4c.4 - Handset

MKR 1.000 GHz
-56.90 dBm

hp REF 20.0 dBm ATTEN 30 dB
10 dB/



START 1.00 GHz STOP 2.50 GHz
RES BW 100 KHz VBW 100 KHz SWP 450 msec

PLOT #4.c.5 - Handset

MKR 6.378 GHz

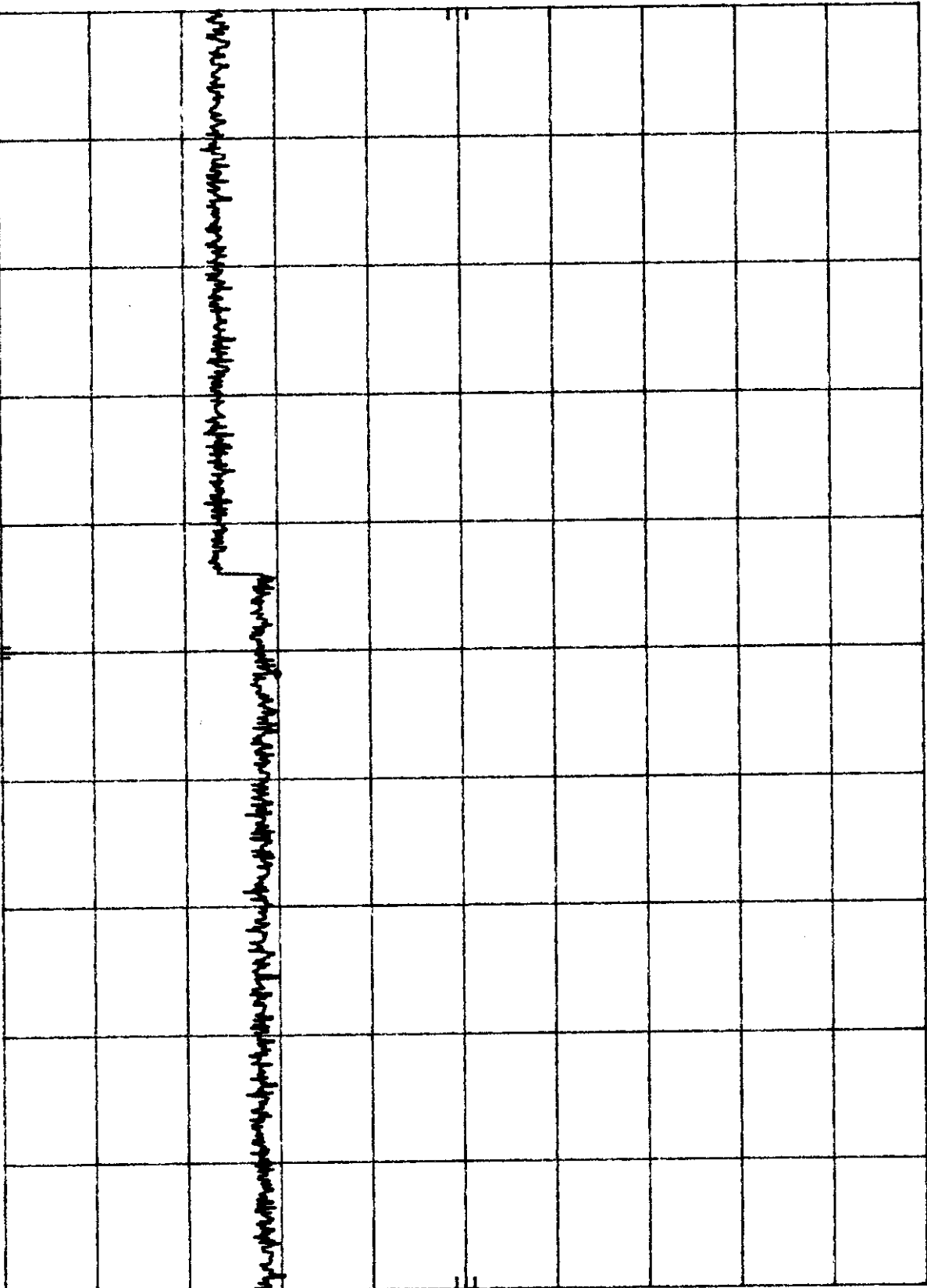
-50.10 dBm

HP

REF 20.0 dBm

ATTEN 30 dB

10 dB/



START 2.50 GHz

RES BW 100 KHz

VBW 100 KHz

STOP 10.00 GHz
SWP 2.25 sec

Intertek Testing Services -Menlo Park

**Samjoo Electronics, 900 MHz Direct Sequence Spread Spectrum
FCC ID: NR839510**

Date of Test: April 23, 1998

4.5 Out of Band Radiated Emissions (for emissions in 4. above that are less than 26 dB below carrier), FCC Rule 15.247(c):

For out of band emissions that are close to or that exceed the 20 dB attenuation requirement described in the specification, radiated measurements were performed at a 3 m separation distance to determine whether these emissions complied with the general radiated emission requirement.

- ☒ Not required
- ☐ See attached data sheet

4.6 Transmitter Radiated Emissions in Restricted Bands, FCC Rule 15.35(b), (c):

Radiated emission measurements were performed from 30 MHz to 1000 MHz. Analyzer resolution is 100 kHz or greater for 30 MHz to 1000 MHz, 1 MHz for > 1000 MHz.

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included. All measurements were performed with peak detection unless otherwise specified.

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

ITS Intertek Testing Services

Company: Sanford Investment
Project #: J98000689
Model: 39510 (Base Unit Tx Ch 1 @ 903.6MHz)
Engineer: Xi-Ming Yang *X.M.*
Date of test: April 13, 1998

FCC15.247 Radiated Emissions

Frequency	Antenna	Reading	Antenna	Pre-amp	Cable	Corrected	Limit	Margin
MHz	Polarity H/V	dB(uV)	Factor dB(1/m)	dB	Loss dB	Reading dB(uV/m)	dB(uV/m)	dB
2710.8	V	40.0*	31.2	-28.2	2.3	45.3	74.0	-28.7
2710.8	V	35.0	31.2	-28.2	2.3	40.3	54.0	-13.7
3614.4	V	37.0*	32.7	-27.8	2.8	44.7	74.0	-29.3
3614.4	V	32.0	32.7	-27.8	2.8	39.7	54.0	-14.3
4518.0	V	31.0*	34.1	-27.9	3.1	40.3	74.0	-33.7
4518.0	V	23.0	34.1	-27.9	3.1	32.3	54.0	-21.7
5421.6	V	31.0*	35.8	-28.3	3.5	42.0	74.0	-32.0
5421.6	V	21.0	35.8	-28.3	3.5	32.0	54.0	-22.0
8132.4	H	35.0*	38.5	-27.2	4.8	51.1	74.0	-22.9
8132.4	H	24.0	38.5	-27.2	4.8	40.1	54.0	-13.9
9036.0	H	35.0*	38.8	-26.8	5.1	52.1	74.0	-21.9
9036.0	H	24.0	38.8	-26.8	5.1	41.1	54.0	-12.9

- Note:**
1. All measurement were made at 3 meters
 2. Negative signs (-) in the margin column signify levels below the limit.
 3. Readings with * are Peak-Readings, all the other are Average-Reading

ITS Intertek Testing Services

Company: Sanford Investment
Project #: J98000689
Model: 39510 (Hand Set Tx Ch 1 @ 903.6MHz)
Engineer: Xi-Ming Yang *X. M.*
Date of test: April 13, 1998

FCC15.247 Radiated Emissions

Frequency	Antenna	Reading	Antenna	Pre-amp	Cable	Corrected	Limit	Margin
MHz	Polarity H/V	dB(uV)	Factor dB(1/m)	dB	Loss dB	Reading dB(uV/m)	dB(uV/m)	dB
2710.8	V	50.4*	31.2	-28.2	2.3	55.7	74.0	-18.3
2710.8	V	44.0	31.2	-28.2	2.3	49.3	54.0	-4.7
3614.4	V	34.0*	32.7	-27.8	2.8	41.7	74.0	-32.3
3614.4	V	26.0	32.7	-27.8	2.8	33.7	54.0	-20.3
4518.0	V	32.0*	34.1	-27.9	3.1	41.3	74.0	-32.7
4518.0	V	21.0	34.1	-27.9	3.1	30.3	54.0	-23.7
5421.6	V	30.0*	35.8	-28.3	3.5	41.0	74.0	-33.0
5421.6	V	21.0	35.8	-28.3	3.5	32.0	54.0	-22.0
8132.4	H	43.0*	38.5	-27.2	4.8	59.1	74.0	-14.9
8132.4	H	24.0	38.5	-27.2	4.8	40.1	54.0	-13.9
9036.0	H	34.0*	38.8	-26.8	5.1	51.1	74.0	-22.9
9036.0	H	24.0	38.8	-26.8	5.1	41.1	54.0	-12.9

- Note:**
1. All measurement were made at 3 meters
 2. Negative signs (-) in the margin column signify levels below the limit.
 3. Readings with * are Peak-Readings, all the other are Average-Reading

ITS Intertek Testing Services

Company: Sanford Investment
Project #: J98000689
Model: 39510 (Base Unit Tx Ch 10 @ 914.4MHz)
Engineer: Xi-Ming Yang X.M
Date of test: April 13, 1998

FCC15.247 Radiated Emissions

Frequency	Antenna	Reading	Antenna	Pre-amp	Cable	Corrected	Limit	Margin
MHz	Polarity		Factor		Loss	Reading		
	H/V	dB(uV)	dB(1/m)	dB	dB	dB(uV/m)	dB(uV/m)	dB
2743.2	V	40.0*	31.2	-28.2	2.3	45.3	74.0	-28.7
2743.2	V	36.0	31.2	-28.2	2.3	41.3	54.0	-12.7
3657.6	V	35.0*	32.7	-27.8	2.8	42.7	74.0	-31.3
3657.6	V	29.0	32.7	-27.8	2.8	36.7	54.0	-17.3
4572.0	V	32.0*	34.1	-27.9	3.1	41.3	74.0	-32.7
4572.0	V	21.0	34.1	-27.9	3.1	30.3	54.0	-23.7
7315.2	V	36.0*	35.8	-28.3	3.5	47.0	74.0	-27.0
7315.2	V	24.0	35.8	-28.3	3.5	35.0	54.0	-19.0
8229.6	H	35.0*	38.5	-27.2	4.8	51.1	74.0	-22.9
8229.6	H	24.0	38.5	-27.2	4.8	40.1	54.0	-13.9
9144.0	H	35.0*	38.8	-26.8	5.1	52.1	74.0	-21.9
9144.0	H	24.0	38.8	-26.8	5.1	41.1	54.0	-12.9

- Note:
1. All measurement were made at 3 meters
 2. Negative signs (-) in the margin column signify levels below the limit.
 3. Readings with * are Peak-Readings, all the other are Average-Reading

ITS Intertek Testing Services

Company: Sanford Investment
Project #: J98000689
Model: 39510 (Hand Set Tx Ch 10 @ 914.4MHz)
Engineer: Xi-Ming Yang *X.M.*
Date of test: April 13, 1998

FCC15.247 Radiated Emissions

Frequency	Antenna	Reading	Antenna	Pre-amp	Cable	Corrected	Limit	Margin
MHz	Polarity	dB(uV)	Factor	dB	Loss	Reading	dB(uV/m)	dB
	H/V		dB(1/m)		dB	dB(uV/m)		
2743.2	V	51.0*	31.2	-28.2	2.3	56.3	74.0	-17.7
2743.2	V	44.4	31.2	-28.2	2.3	49.7	54.0	-4.3
3657.6	V	32.0*	32.7	-27.8	2.8	39.7	74.0	-34.3
3657.6	V	22.0	32.7	-27.8	2.8	29.7	54.0	-24.3
4572.0	V	31.0*	34.1	-27.9	3.1	40.3	74.0	-33.7
4572.0	V	22.0	34.1	-27.9	3.1	31.3	54.0	-22.7
7315.2	V	36.0*	35.8	-28.3	3.5	47.0	74.0	-27.0
7315.2	V	24.0	35.8	-28.3	3.5	35.0	54.0	-19.0
8229.6	H	35.0*	38.5	-27.2	4.8	51.1	74.0	-22.9
8229.6	H	24.0	38.5	-27.2	4.8	40.1	54.0	-13.9
9144.0	H	35.0*	38.8	-26.8	5.1	52.1	74.0	-21.9
9144.0	H	24.0	38.8	-26.8	5.1	41.1	54.0	-12.9

- Note:**
1. All measurement were made at 3 meters
 2. Negative signs (-) in the margin column signify levels below the limit.
 3. Readings with * are Peak-Readings, all the other are Average-Reading

ITS Intertek Testing Services

Company: Sanford Investment
Project #: J98000689
Model: 39510 (Base Unit Tx Ch 20 @ 926.4MHz)
Engineer: Xi-Ming Yang *X.M.*
Date of test: April 13, 1998

FCC15.247 Radiated Emissions

Frequency	Antenna	Reading	Antenna	Pre-amp	Cable	Corrected	Limit	Margin
MHz	Polarity		Factor		Loss	Reading		
	H/V	dB(uV)	dB(1/m)	dB	dB	dB(uV/m)	dB(uV/m)	dB
2779.2	V	39.6*	31.2	-28.2	2.3	44.9	74.0	-29.1
2779.2	V	32.0	31.2	-28.2	2.3	37.3	54.0	-16.7
3705.6	V	35.7*	32.7	-27.8	2.8	43.4	74.0	-30.6
3705.6	V	29.1	32.7	-27.8	2.8	36.8	54.0	-17.2
4632.0	V	32.0*	34.1	-27.9	3.1	41.3	74.0	-32.7
4632.0	V	21.0	34.1	-27.9	3.1	30.3	54.0	-23.7
7411.2	V	35.0*	35.8	-28.3	3.5	46.0	74.0	-28.0
7411.2	V	24.0	35.8	-28.3	3.5	35.0	54.0	-19.0
8337.6	H	35.0*	38.5	-27.2	4.8	51.1	74.0	-22.9
8337.6	H	24.0	38.5	-27.2	4.8	40.1	54.0	-13.9
9264.0	H	35.0*	38.8	-26.8	5.1	52.1	74.0	-21.9
9264.0	H	24.0	38.8	-26.8	5.1	41.1	54.0	-12.9

- Note:**
1. All measurement were made at 3 meters
 2. Negative signs (-) in the margin column signify levels below the limit.
 3. Readings with * are Peak-Readings, all the other are Average-Reading

ITS Intertek Testing Services

Company: Sanford Investment
Project #: J98000689
Model: 39510 (Hand Set Tx Ch 20 @ 926.4MHz)
Engineer: Xi-Ming Yang *X.M.*
Date of test: April 13, 1998

FCC15.247 Radiated Emissions

Frequency	Antenna	Reading	Antenna	Pre-amp	Cable	Corrected	Limit	Margin
MHz	Polarity		Factor		Loss	Reading		
	H/V	dB(uV)	dB(1/m)	dB	dB	dB(uV/m)	dB(uV/m)	dB
2779.2	V	46.0*	31.2	-28.2	2.3	51.3	74.0	-22.7
2779.2	V	38.8	31.2	-28.2	2.3	44.1	54.0	-9.9
3705.6	V	31.0*	32.7	-27.8	2.8	38.7	74.0	-35.3
3705.6	V	21.0	32.7	-27.8	2.8	28.7	54.0	-25.3
4632.0	V	34.0*	34.1	-27.9	3.1	43.3	74.0	-30.7
4632.0	V	24.0	34.1	-27.9	3.1	33.3	54.0	-20.7
7411.2	V	34.0*	35.8	-28.3	3.5	45.0	74.0	-29.0
7411.2	V	24.0	35.8	-28.3	3.5	35.0	54.0	-19.0
8337.6	H	34.0*	38.5	-27.2	4.8	50.1	74.0	-23.9
8337.6	H	24.0	38.5	-27.2	4.8	40.1	54.0	-13.9
9264.0	H	35.0*	38.8	-26.8	5.1	52.1	74.0	-21.9
9264.0	H	24.0	38.8	-26.8	5.1	41.1	54.0	-12.9

- Note:**
1. All measurement were made at 3 meters
 2. Negative signs (-) in the margin column signify levels below the limit.
 3. Readings with * are Peak-Readings, all the other are Average-Reading

Intertek Testing Services -Menlo Park

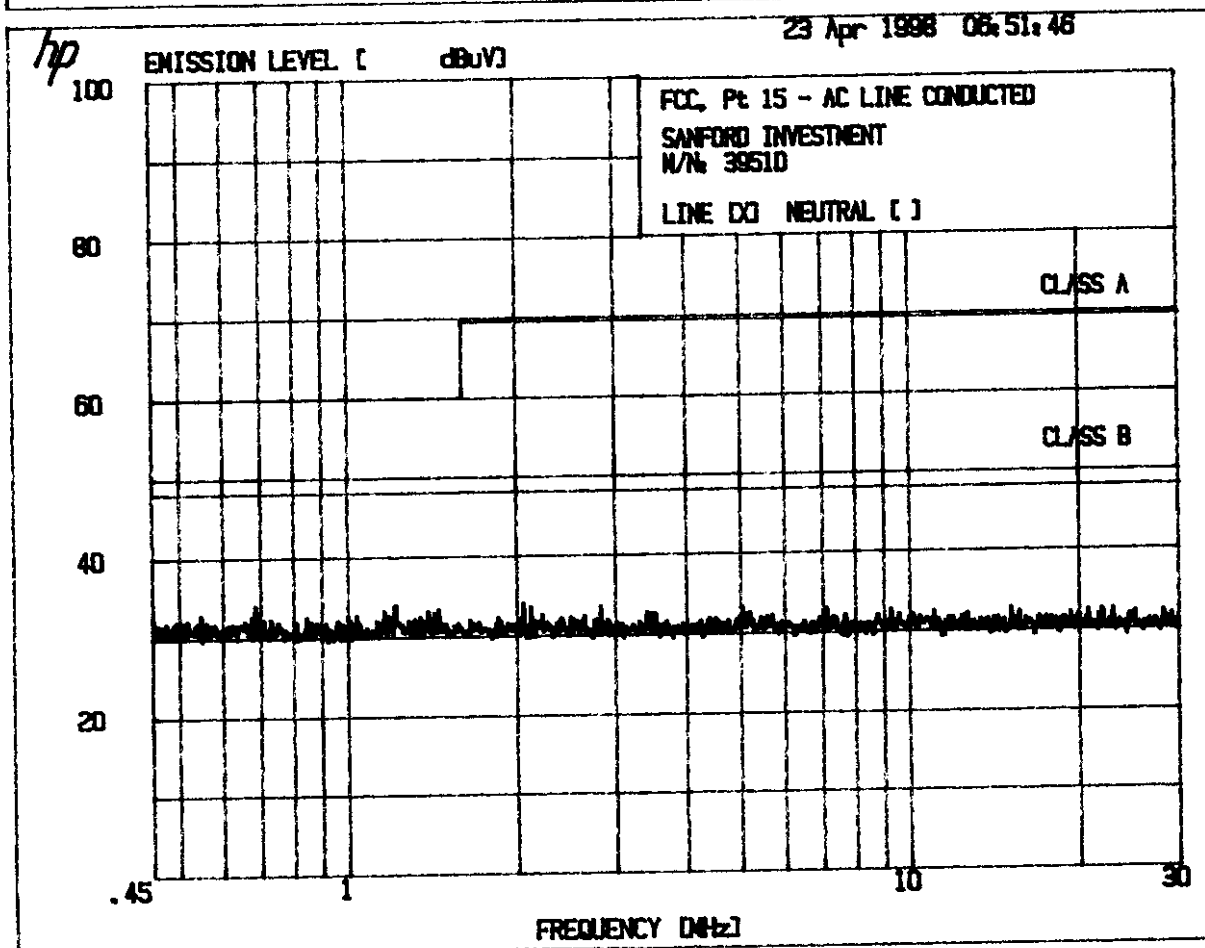
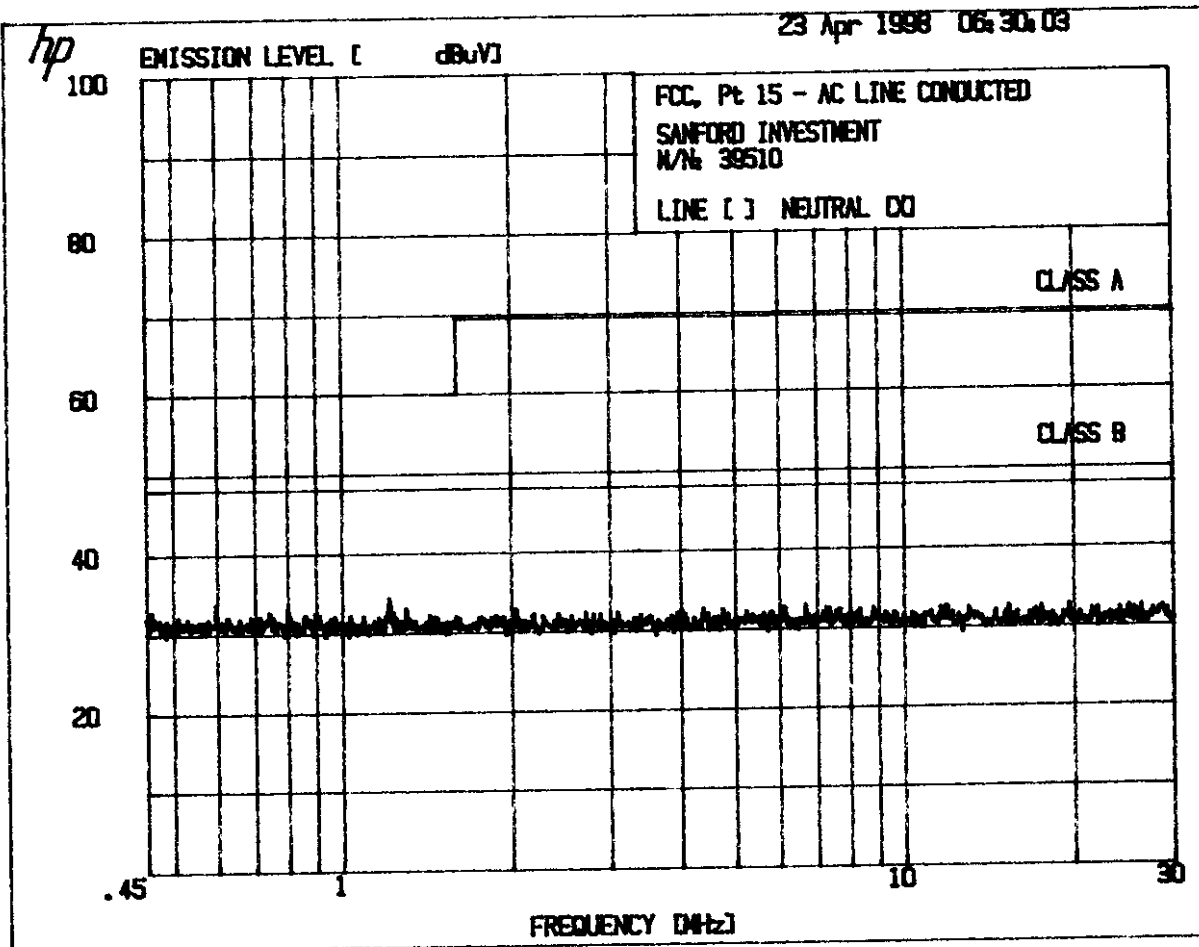
Samjoo Electronics, 900 MHz Direct Sequence Spread Spectrum
FCC ID: NR839510

Date of Test: April 23, 1998

4.8 AC Line Conducted Emission, FCC Rule 15.207:

[] Not required; battery operation only

[x] Test data attached



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23 Apr 1998 06:30:03

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3. FCC CFR 47, Pt 15

3.1 FCC, Pt 15 - AC LINE CONDUCTED

=====

SANFORD INVESTMENT

M/N: 39510

LINE [] NEUTRAL [X]

PEAKS FOUND ABOVE 33 dBuV

PEAK#	FREQ (MHz)	AMPL (dBuV)
1	.6011	33.9
2	.8063	33.3
3	1.221	34.6
4	1.312	33.2
5	2.055	33.0
6	6.709	33.1

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23 Apr 1998 06:51:46

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3. FCC CFR 47, Pt 15

3.1 FCC, Pt 15 - AC LINE CONDUCTED

=====

SANFORD INVESTMENT

M/N: 39510

LINE [X] NEUTRAL []

PEAKS FOUND ABOVE 33 dBuV

PEAK#	FREQ (MHz)	AMPL (dBuV)
1	.5527	33.0
2	.6903	34.2
3	1.171	33.4
4	1.221	34.1
5	1.403	33.3
6	1.463	33.4
7	2.072	34.3
8	2.134	33.6
9	2.839	33.6
10	5.065	33.3
11	7.144	33.1

Intertek Testing Services -Menlo Park

Samjoo Electronics, 900 MHz Direct Sequence Spread Spectrum
FCC ID: NR839510

Date of Test: April 23, 1998

4.10 Radiated Emissions from Digital Section of Transceiver (Transmitter), FCC Ref:
15.109

- ☐ Not required - No digital part
- ☒ Test results are attached
- ☐ Included in the separate DOC report.

4.11 Radiated Emissions from Receiver Section of Transceiver (L.O. Radiation), FCC Ref:
15.109, 15.111

- ☐ Not required - EUT operation above 960 MHz only
- ☐ Not required - EUT is transmitter only
- ☐ Not performed; exempt until June 1999
- ☒ Test results are attached

ITS Intertek Testing Services

Company: Sanford Investment
Project #: J98000689
Model: 39510 (Base Unit)
Engineer: Xi-Ming Yang *X.M.*
Date of test: Apr 13, 1998

FCC15.109 Radiated Emissions

Frequency	Antenna	Reading	Antenna	Pre-amp	Distance	Corrected	Limit	Margin
MHz	Polarity		Factor		Factor	Reading		
	H/V	dB(uV)	dB(1/m)	dB	dB	dB(uV/m)	dB(uV/m)	dB
40.0	V	12.0	12.4	0.0	0.0	24.4	40.0	-15.6
128.0	V	14.0	11.9	0.0	0.0	25.9	43.5	-17.6
133.0	V	18.7	11.7	0.0	0.0	30.4	46.0	-15.6
172.8	V	19.0	15.7	0.0	0.0	34.7	46.0	-11.3
177.5	V	18.0	16.3	0.0	0.0	34.3	46.0	-11.7
196.8	H	19.0	17.0	0.0	0.0	36.0	46.0	-10.0
230.4	H	21.0	11.8	0.0	0.0	32.8	46.0	-13.2
241.9	H	17.0	12.2	0.0	0.0	29.2	46.0	-16.8
540.0	H	15.0	18.4	0.0	0.0	33.4	46.0	-12.6

- Note:
1. All measurement were made at 3 meters
 2. Negative signs (-) in the margin column signify levels below the limit.

ITS Intertek Testing Services

Company: Sanford Investment
Project #: J98000689
Model: 39510 (Hand set)
Engineer: Xi-Ming Yang X.M.
Date of test: April 13, 1998

FCC15.109 Radiated Emissions

Frequency	Antenna	Reading	Antenna	Pre-amp	Distance	Corrected	Limit	Margin
MHz	Polarity	dB(uV)	Factor	dB	Factor	Reading	dB(uV/m)	dB
40.0	V	16.0	12.4	0.0	0.0	28.4	40.0	-11.6
130.0	V	16.0	11.7	0.0	0.0	27.7	43.5	-15.8
244.8	H	14.1	12.2	0.0	0.0	26.3	46.0	-19.7
259.4	H	15.0	12.2	0.0	0.0	27.2	46.0	-18.8
278.4	H	13.5	13.4	0.0	0.0	26.9	46.0	-19.1
297.6	H	13.0	14.1	0.0	0.0	27.1	46.0	-18.9
523.7	H	13.0	18.5	0.0	0.0	31.5	46.0	-14.5

- Note:**
1. All measurement were made at 3 meters
 2. Negative signs (-) in the margin column signify levels below the limit.

Intertek Testing Services -Menlo Park

Samjoo Electronics, 900 MHz Direct Sequence Spread Spectrum
FCC ID: NR839510

Date of Test: April 23, 1998

4.12 Processing Gain Measurements, FCC Rule 15.247(e)

The processing gain shall be determined from the ratio in dB of the signal to noise ratio with the system spreading code turned OFF, to the signal to noise ratio with the system spreading code turned ON, as measured at the demodulated output of the receiver. The processing gain shall be at least 10 dB for a direct sequence spread spectrum system.

X	Refer to attached test procedure and data sheets.
	Refer to circuit analysis and processing gain calculations provided by manufacturer.

4.13 Transmitter Duty Cycle Calculation and Measurements, FCC Rule 15.35(b), (c)

The EUT antenna output port was connected to the input of the spectrum analyzer. The analyzer center frequency was set to EUT RF channel carrier. The SWEEP function on the analyzer was set to ZERO SPAN. The transmitter ON time was determined from the resultant time-amplitude display:

Duty cycle = Maximum ON time in 100 msec/100

Duty cycle correction, dB = $20 * \log(\text{DC})$

X	See attached spectrum analyzer chart(s) for transmitter timing
	See transmitter timing diagram provided by manufacturer

PROCESS GAIN MESUREMENT

MODEL NO. : NWB # 39510

TEST METHOD

THE PROCESSING GAIN MAY BE MEASURED USING THE CW JAMMING MARGIN METHOD. FIGURE 1 SHOWS THE TEST CONFIGURATION. THE TEST CONSIST OF STEPPING A SIGNAL GENERATOR IN 50 KHz INCREMENTS ACROSS THE PASSBAND OF THE SYSTEM (UP TO 960 KHz AWAY IN RLS DCT). AT EACH POINT, THE GENERATOR LEVEL REQUIRED TO PRODUCE THE RECOMMENDED BIT ERROR RATE (BER) (SET AT $BER = 10^{-3}$) IS RECORDED. THE LEVEL IS JAMMING LEVEL. THE OUTPUT POWER OF THE TRANSMITTING UNIT IS MEASURED AT THE SAME POINT. THE JAMMER TO SIGNAL (J/S) RATIO IS THEN CALCULATED. DISCARD THE WORST 20 % OF THE J/S DATA POINTS. THE LOWEST REMAINING J/S RATIO IS USED TO CALCULATE THE PROCESSING GAIN.

THE MAXIMUM IMPLEMENTATION LOSS A SYSTEM CAN CLAIM IN CALCULATING PROCASSING GAIN IS 2 dB. THE EQUATION TO CALCULATE THE PROCESSING GAIN (G_p) IS THE FOLLOWING.

$$G_p = (S/N)_o + M_j + L_{sys}$$

$(S/N)_o$ = SIGNAL TO NOISE RATIO REQUIRED @ BER OF 10^{-3} = 8.0 dB FOR DBPSK

M_j = JAMMING MARGINE (J/S) in dB.

L_{sys} = SYSTEM IMPLEMENTATION LOSSES = 2 dB

S = SIGNAL POWER - ATTENUATION - COMBINE LOSS - CABLE LOSS

$$= -4.0 - 19.8 - 3.6 - 0.8 = -28.2$$

J = SIGNAL GENERATOR OUTPUT LEVEL (N) - CAL FACTOR - COMBINE LOSS

$$= N - 0.3 - 3.6 \text{ dB}$$

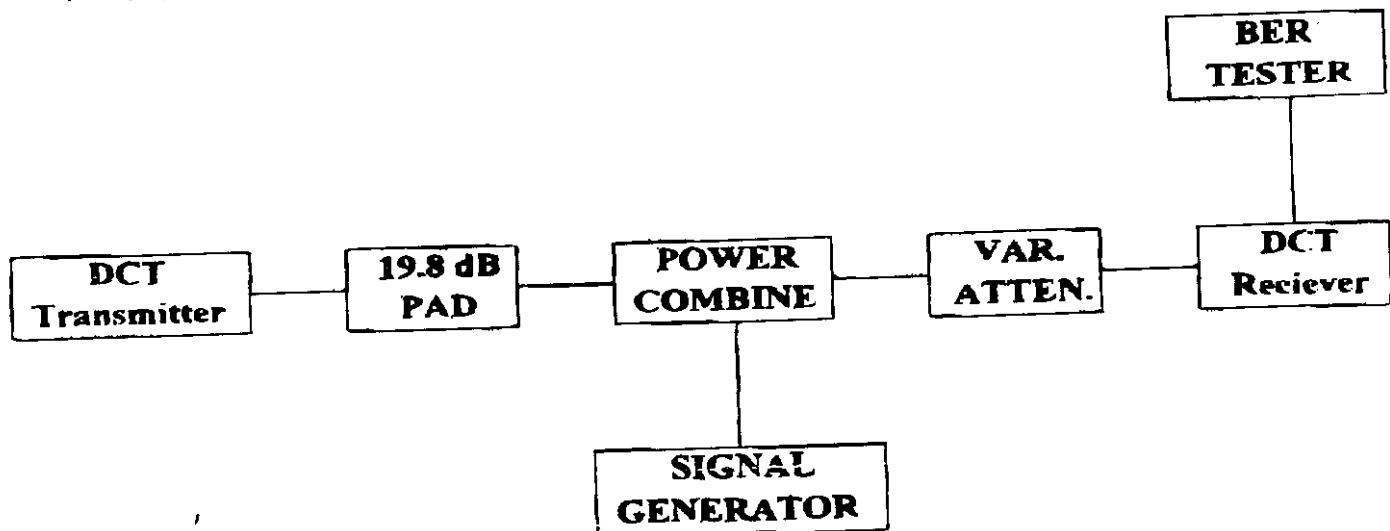


FIGURE 1 : JAMMING TEST SETUP.

Test Equipment :

Signal Generator

: Gigatronics 6100

BER Tester

: Rockwell FCC Test Support Program Ver. 1.0

Intertek Testing Services -Menlo Park

**Samjoo Electronics, 900 MHz Direct Sequence Spread Spectrum
FCC ID: NR839510**

Date of Test: April 23, 1998

5.0 Equipment Photographs

Photographs of the EUT are attached.

Intertek Testing Services -Menlo Park

Samjoo Electronics, 900 MHz Direct Sequence Spread Spectrum
FCC ID: NR839510

Date of Test: April 23, 1998

7.3 Antenna gain and Mounting Information

The antennas are permanently attached to the phones.

Intertek Testing Services -Menlo Park

Samjoo Electronics, 900 MHz Direct Sequence Spread Spectrum
FCC ID: NR839510

Date of Test: April 23, 1998

8.0 Instruction Manual

Attached is a preliminary copy of the Instruction Manual.

This manual will be provided to the end-user with each unit sold/leased in the United States.