Intertek Testing Services

APPLICATION FOR FCC CERTIFICATION

GVC Corporation

900 MHz DSSS Cordless Telephone

Model: 39520

FCC ID: DK4CT9000

Job # J98026020

Number of Pages: 14 pp. + Supporting Data and Documents

Date of Report: October 12, 1998

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1.0 **Summary of Tests**

GVC Corporation - Model No.: 39520
FCC ID: DK4CT9000

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	Not Applicable
Processing Gain Measurements	15.247(e)	Provided by applicant
Antenna Requirement	15.203	Pass*

* EUT has non-detachable antenna.

Xi-Ming Yang

Test Engineer: _____ Date: October 19, 1998
Xi-Ming Yang

David Chernomordik

EMC Site Manager: _____ Date: October 20, 1998
David Chernomordik

2.0 General Description

2.1 Product Description

The Model 39520 is a 900 MHz DSSS digital cordless telephone.

A pre-production version of the sample was received on September 29, 1998 in good condition.

Overview of 900 MHz DSSS Cordless Telephone

Applicant	**GVC Corporation**
Trade Name & Model No.	**GVC Corporation, Memorex, 39520**
FCC Identifier	**DK4CT9000**
Use of Product	Cordless Telephone
Manufacturer & Model of Spread Spectrum Module	GVC Corporation
Type of Transmission	Direct Sequence
Rated RF Output (mW)	100
Frequency Range (MHz)	903.6 - 926.4
Number of Channel(s)	20
Antenna(s) & Gain, dBi	0
Processing Gain Measurements	[X] 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	[X] 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	GVC Corporation 4F, No. 6, Lane 359, Sec. 2, Chung-shan Rd., Chung-Ho, Taipei, Taiwan, R.O.C.

2.2 Related Submittal(s) Grants

None.

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

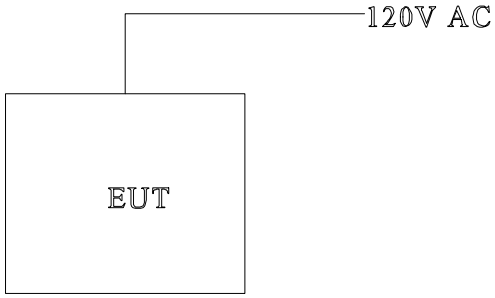
The open area test site and conducted measurement facility used to collect the radiated data is site 1. This test facility and site measurement data have been fully placed on file with the FCC and NVLAP accredited.

3.0 System Test Configuration

3.1 Support Equipment and description

None, the EUT is a standalone device.

3.2 Block Diagram of Test Setup



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

The EUT was running in a transmitting mode.

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 GVC Corporation 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.

4.0 **Measurement Results**

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

[ ] 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.

[X] The antenna port of the EUT was connected to the input of a spectrum analyzer. The analyzer was set for maximun 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.

(Base Unit)		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 903.6	16.3	42.7
Middle Channel: 914.4	15.6	36.3
High Channel: 926.4	13.5	22.4

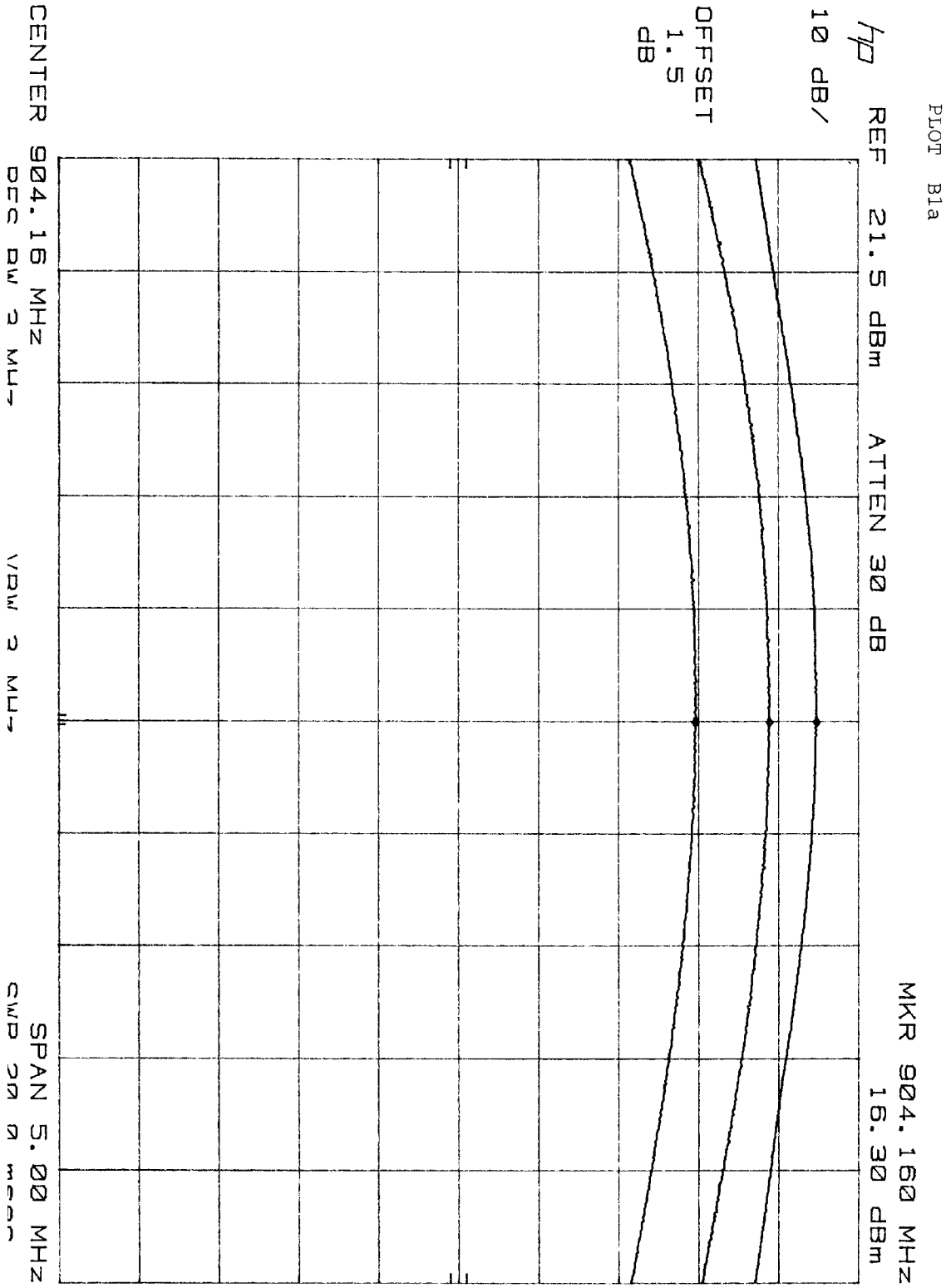
Cable loss: 1.5 dB External Attenuation: 0 dB

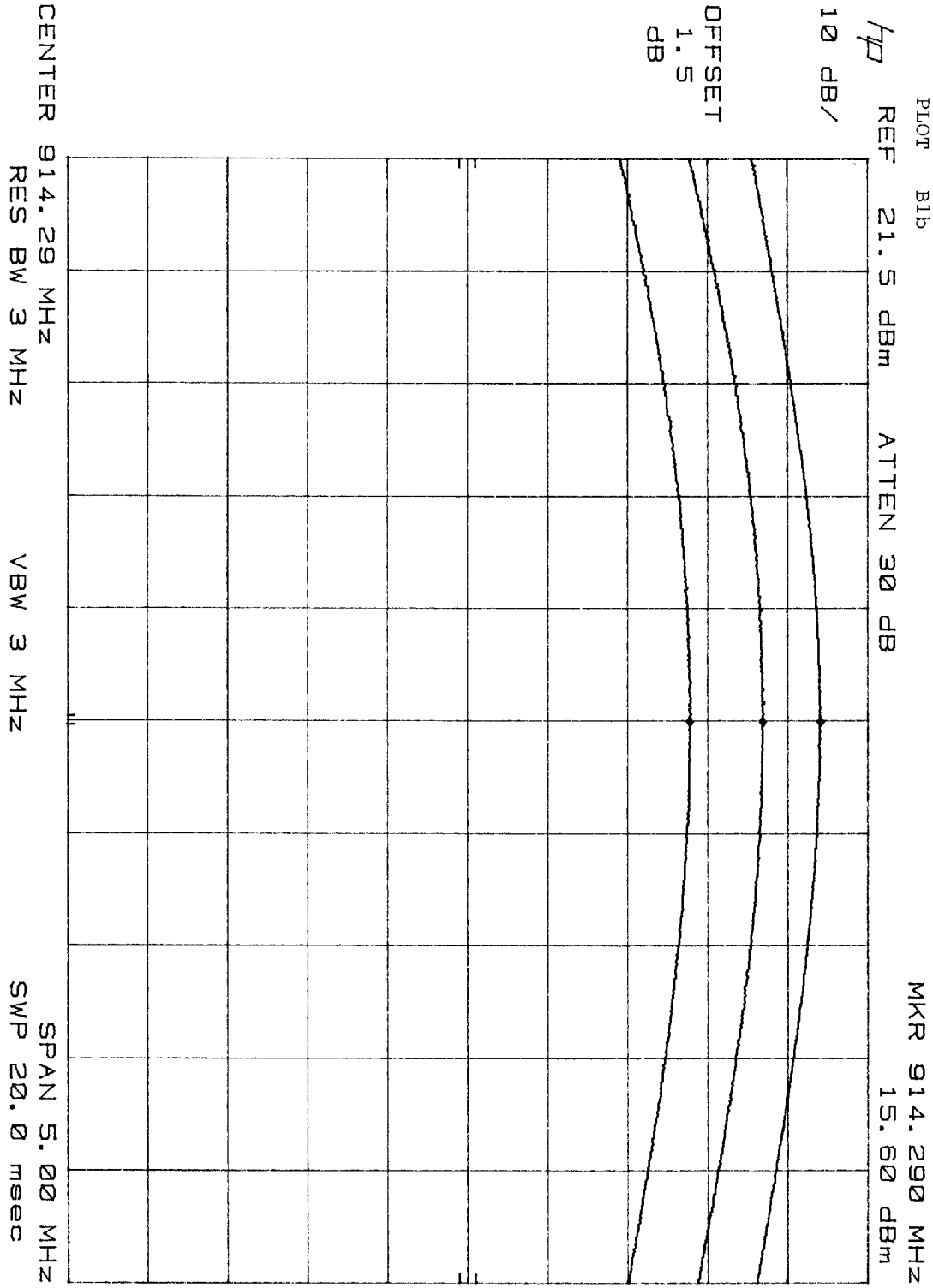
Cable loss, external attenuation: [X] included in OFFSET function
[ ]added to SA raw reading

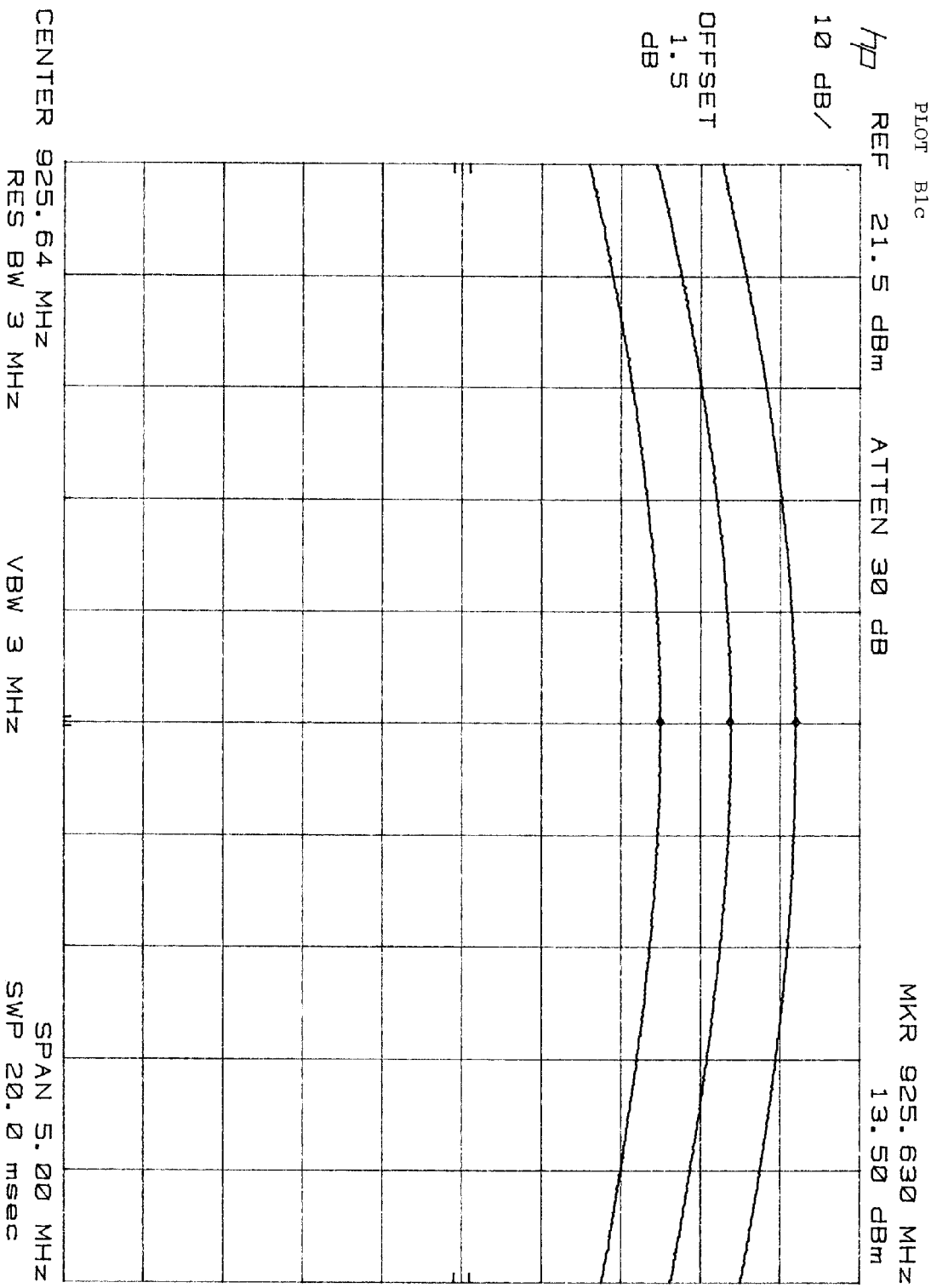
EUT Transmit Antenna Gain(dBi) + dBm max. output level = 16.3 dBm (36 dBm or less)

Please refer to the attached plots for details:

Plot B1a: Low Channel Output Power
Plot B1b: Middle Channel Output Power
Plot B1c: High Channel Output Power


PLOT B1a
REF 21.5 dBm
ATTEN 30 dB
MKR 904.160 MHz
16.30 dBm
10 dB/
OFFSET
1.5
dB
CENTER 904.16 MHz
RES BW 3 MHz
VBW 3 MHz
SPAN 5.00 MHz
SWP 20.0 msec


PLOT B1b
REF 21.5 dBm
ATTEN 30 dB
MKR 914.290 MHz
15.60 dBm
10 dB/
OFFSET
1.5
dB
CENTER 914.29 MHz
RES BW 3 MHz
VBW 3 MHz
SPAN 5.00 MHz
SWP 20.0 msec


PLOT B1c
REF 21.5 dBm
ATTEN 30 dB
MKR 925.630 MHz
13.50 dBm
10 dB/
OFFSET
1.5
dB
CENTER 925.64 MHz
RES BW 3 MHz
VBW 3 MHz
SPAN 5.00 MHz
SWP 20.0 msec

(Handset Unit)		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 903.6	17.2	52.7
Middle Channel: 914.4	16.9	49.0
High Channel: 926.4	16.5	44.7

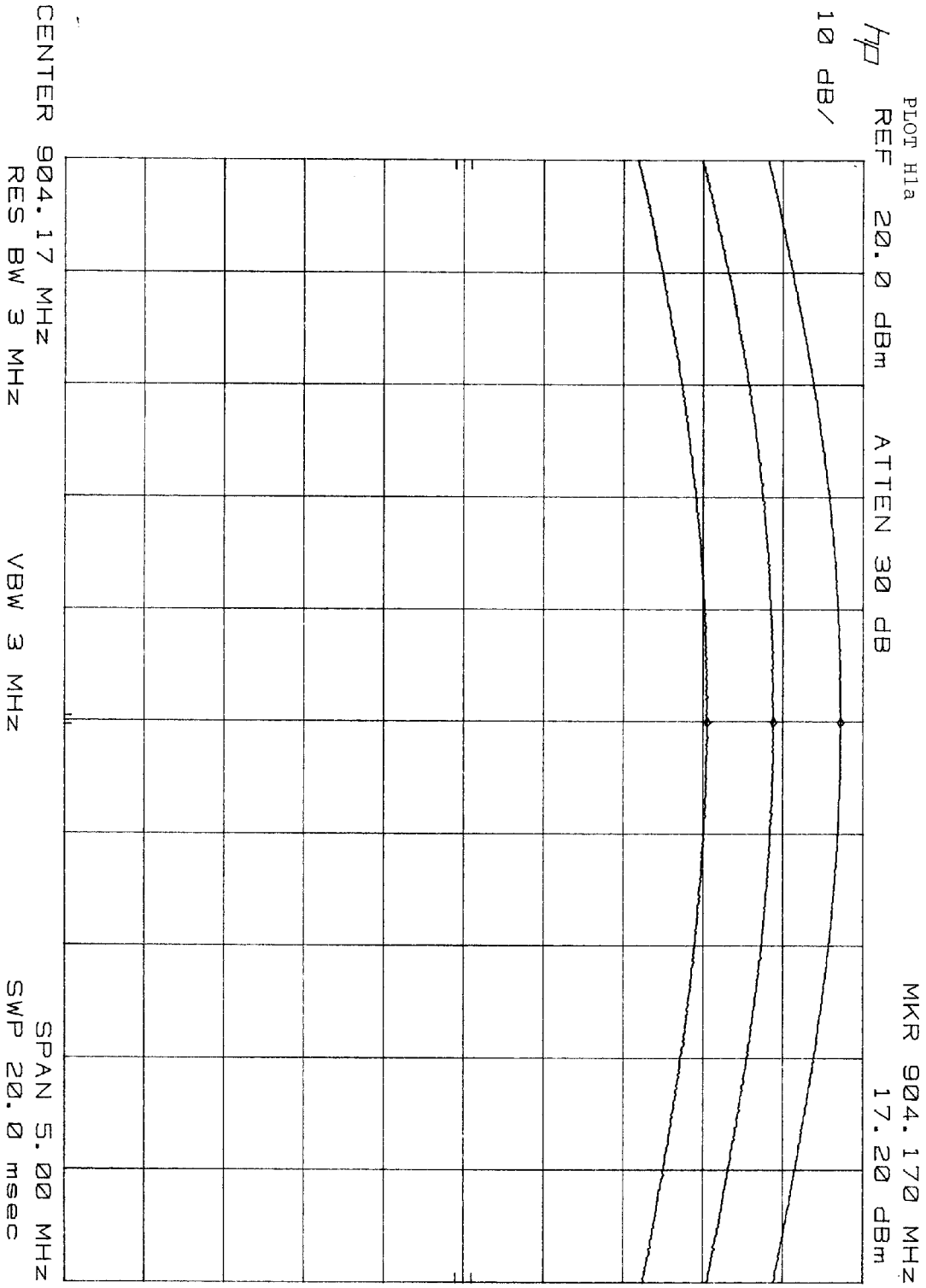
Cable loss: __0__dB External Attenuation: ___0___ dB

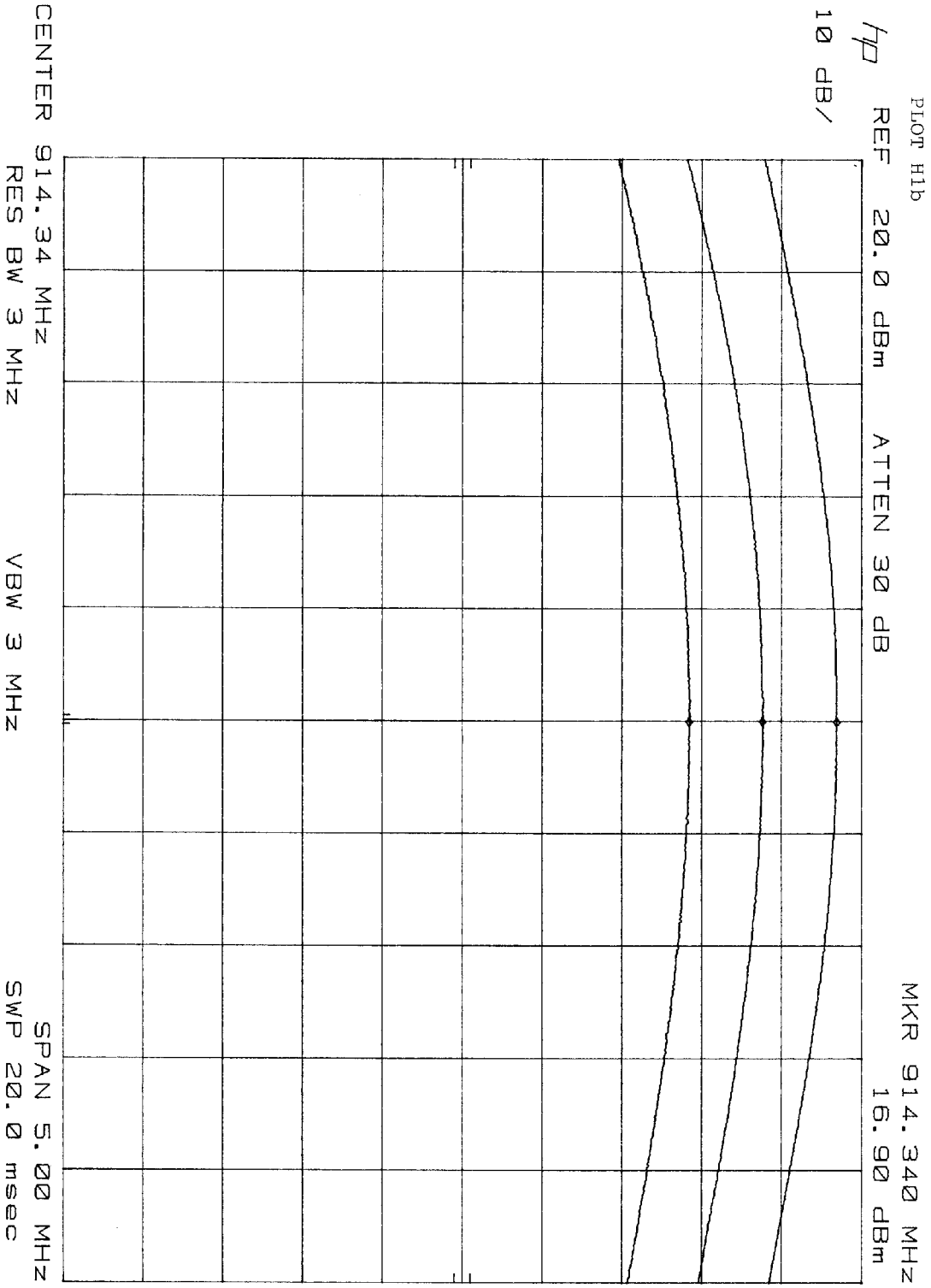
Cable loss, external attenuation: [X] included in OFFSET function
[ ]added to SA raw reading

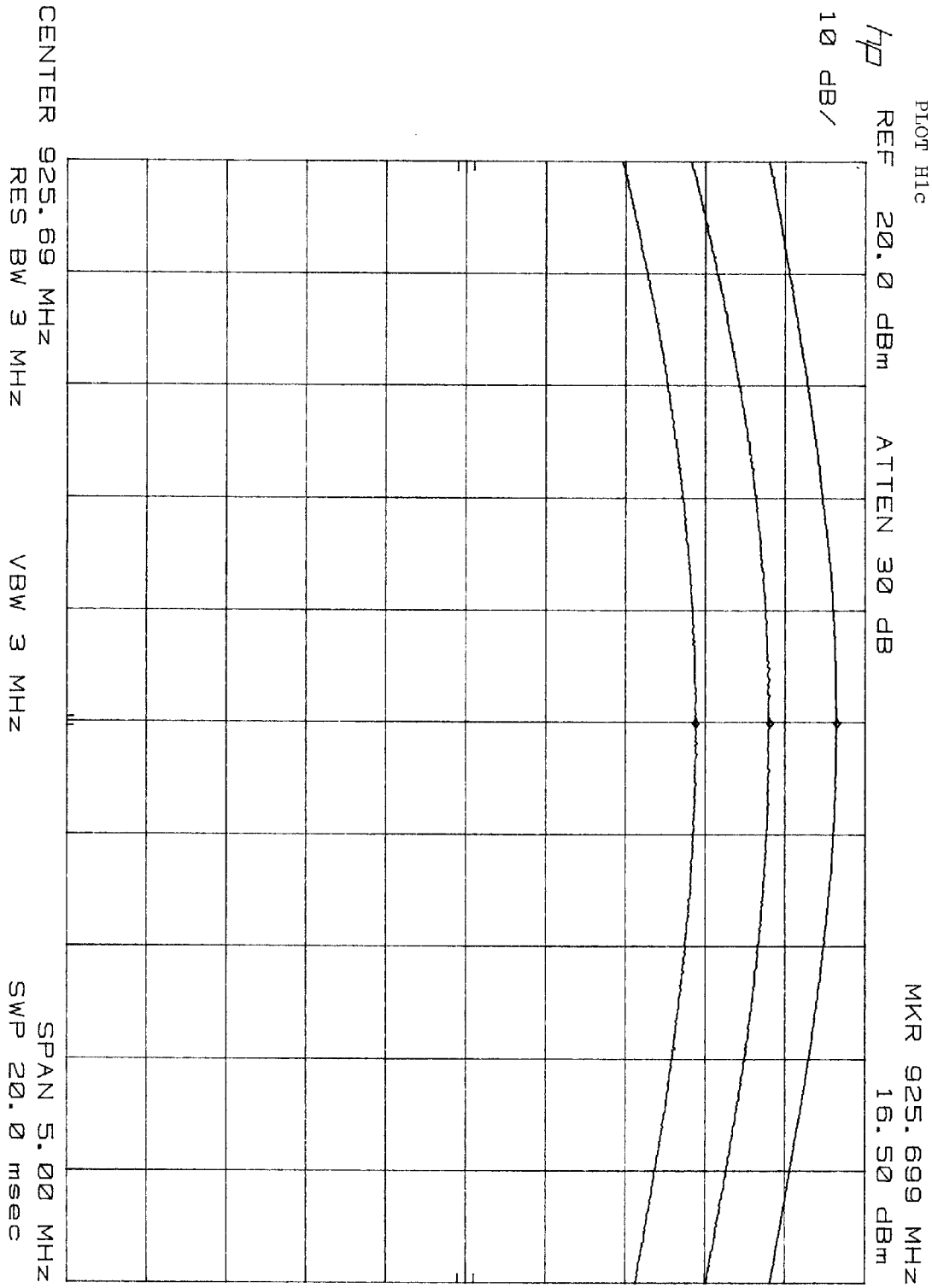
EUT Transmit Antenna Gain(dBi) + dBm max. output level = 17.2 dBm (36 dBm or less)

Please refer to the attached plots for details:

Plot H1a: Low Channel Output Power
Plot H1b: Middle Channel Output Power
Plot H1c: High Channel Output Power


PLOT H1a
REF 20.0 dBm
ATTEN 30 dB
MKR 904.170 MHz
17.20 dBm
10 dB/
CENTER 904.17 MHz
RES BW 3 MHz
VBW 3 MHz
SPAN 5.00 MHz
SWP 20.0 msec


PLOT H1b
REF 20.0 dBm
ATTEN 30 dB
10 dB/
MKR 914.340 MHz
16.90 dBm
CENTER 914.34 MHz
RES BW 3 MHz
VBW 3 MHz
SPAN 5.00 MHz
SWP 20.0 msec


PLOT H1c
hp
REF 20.0 dBm
ATTEN 30 dB
10 dB/
MKR 925.699 MHz
16.50 dBm
CENTER 925.69 MHz
RES BW 3 MHz
VBW 3 MHz
SPAN 5.00 MHz
SWP 20.0 msec

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

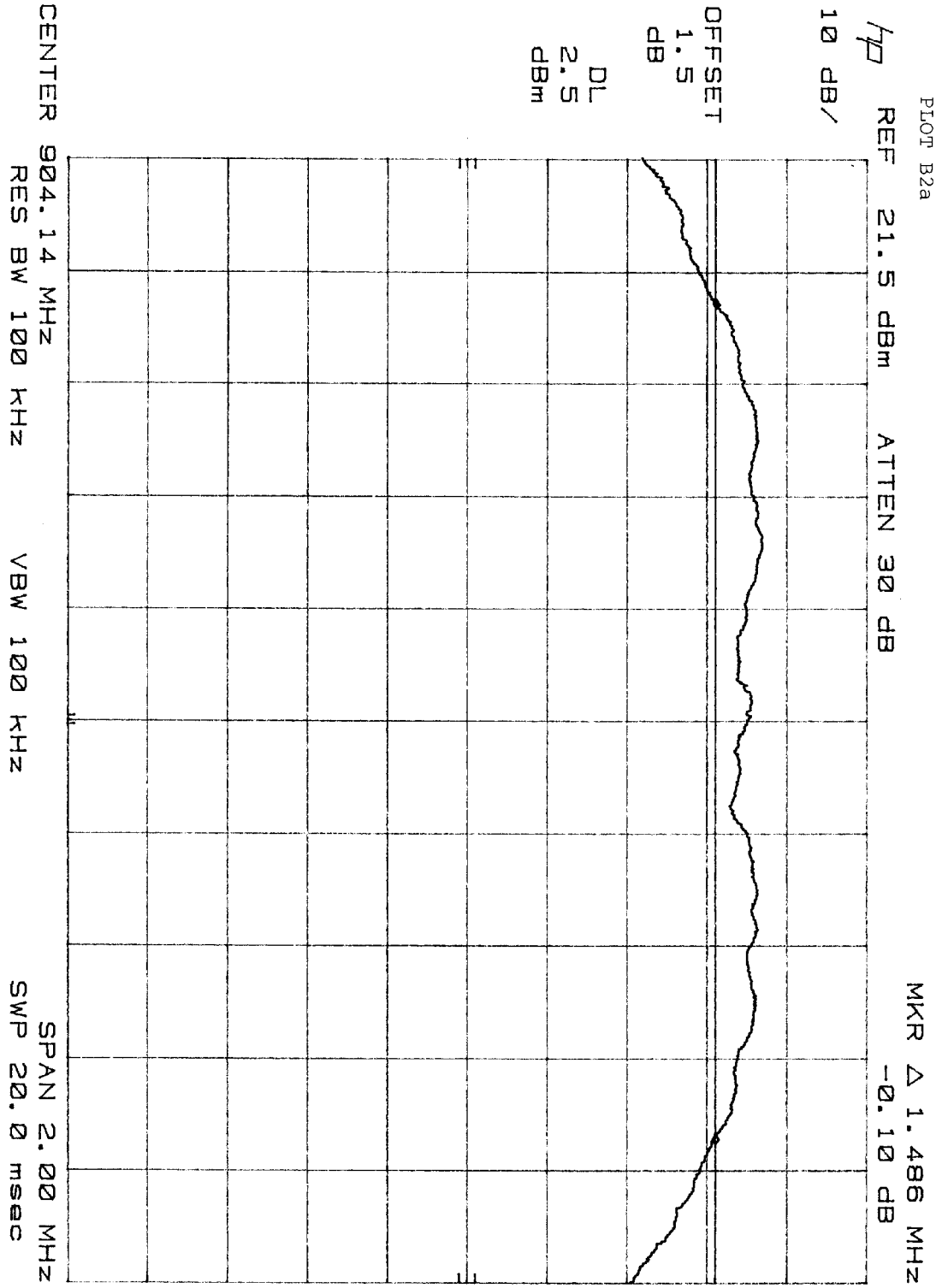
The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RES BW was set to 100 kHz. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK output reading was taken, a DISPLAY line was drawn 6 dB lower than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

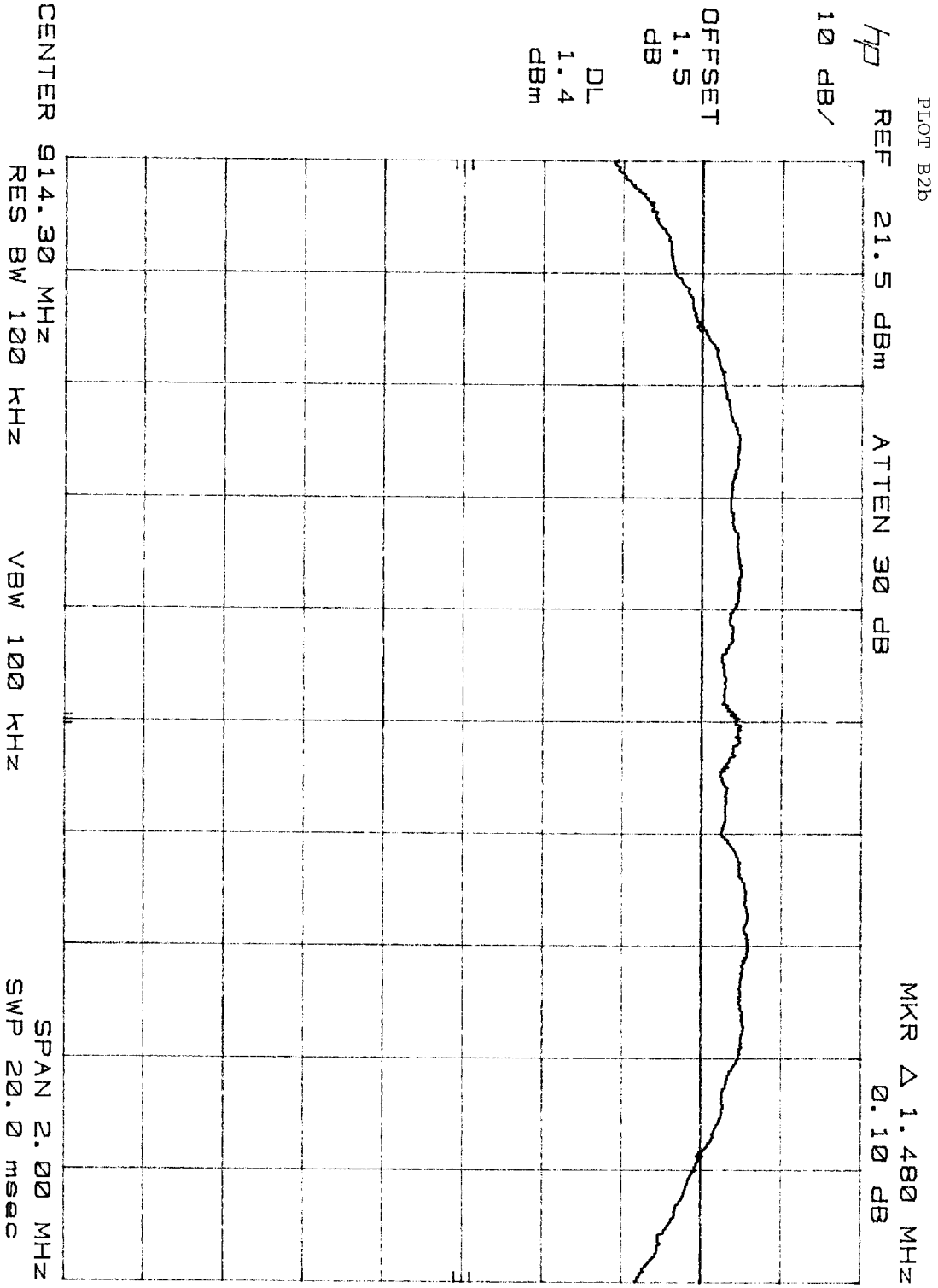
(Base Unit)	
Frequency (MHz)	Max. 6 dB Bandwidth (kHz)
926.4	1450

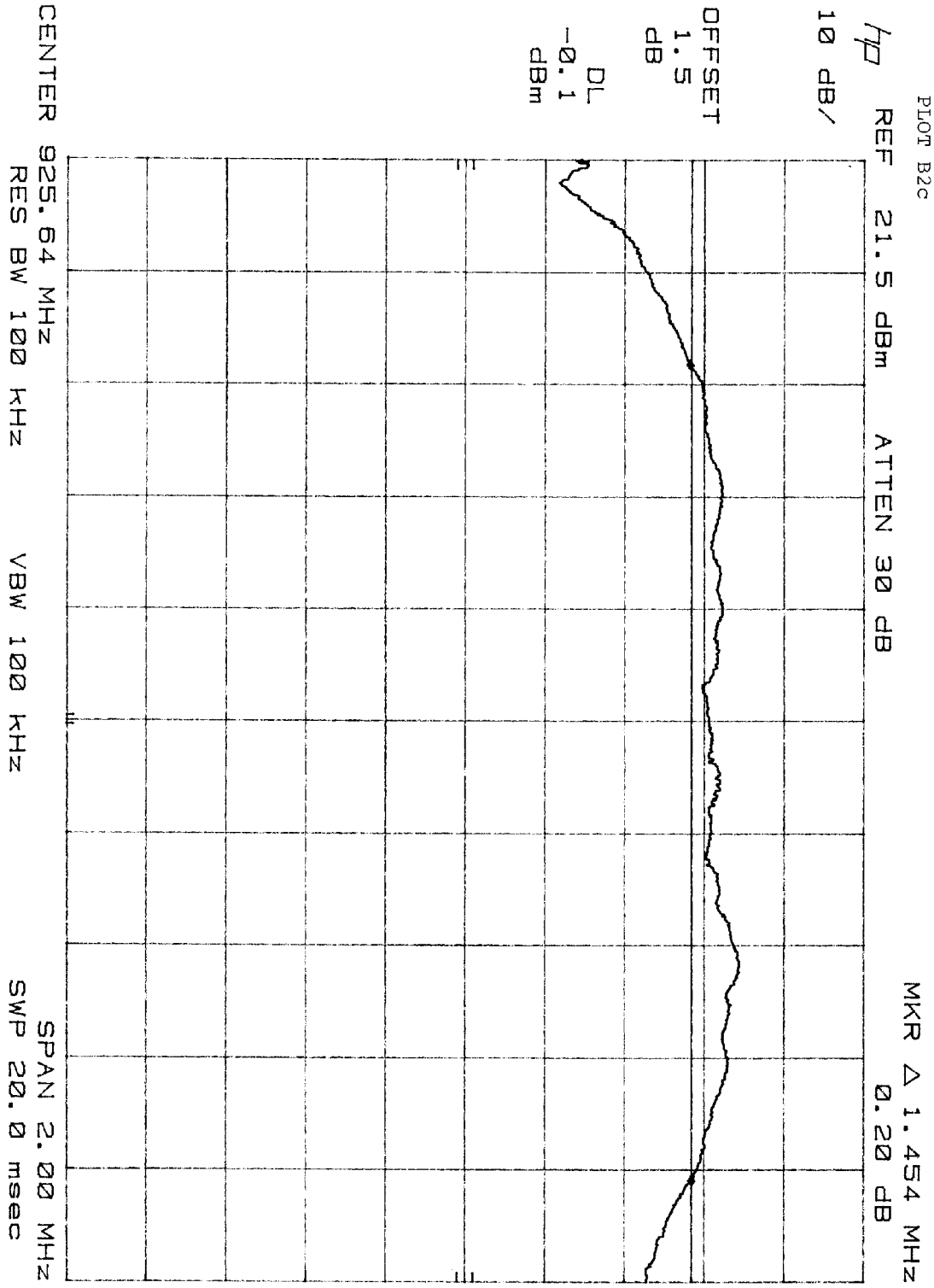
(Handset Unit)	
Frequency (MHz)	Max. 6 dB Bandwidth (kHz)
914.4	1474

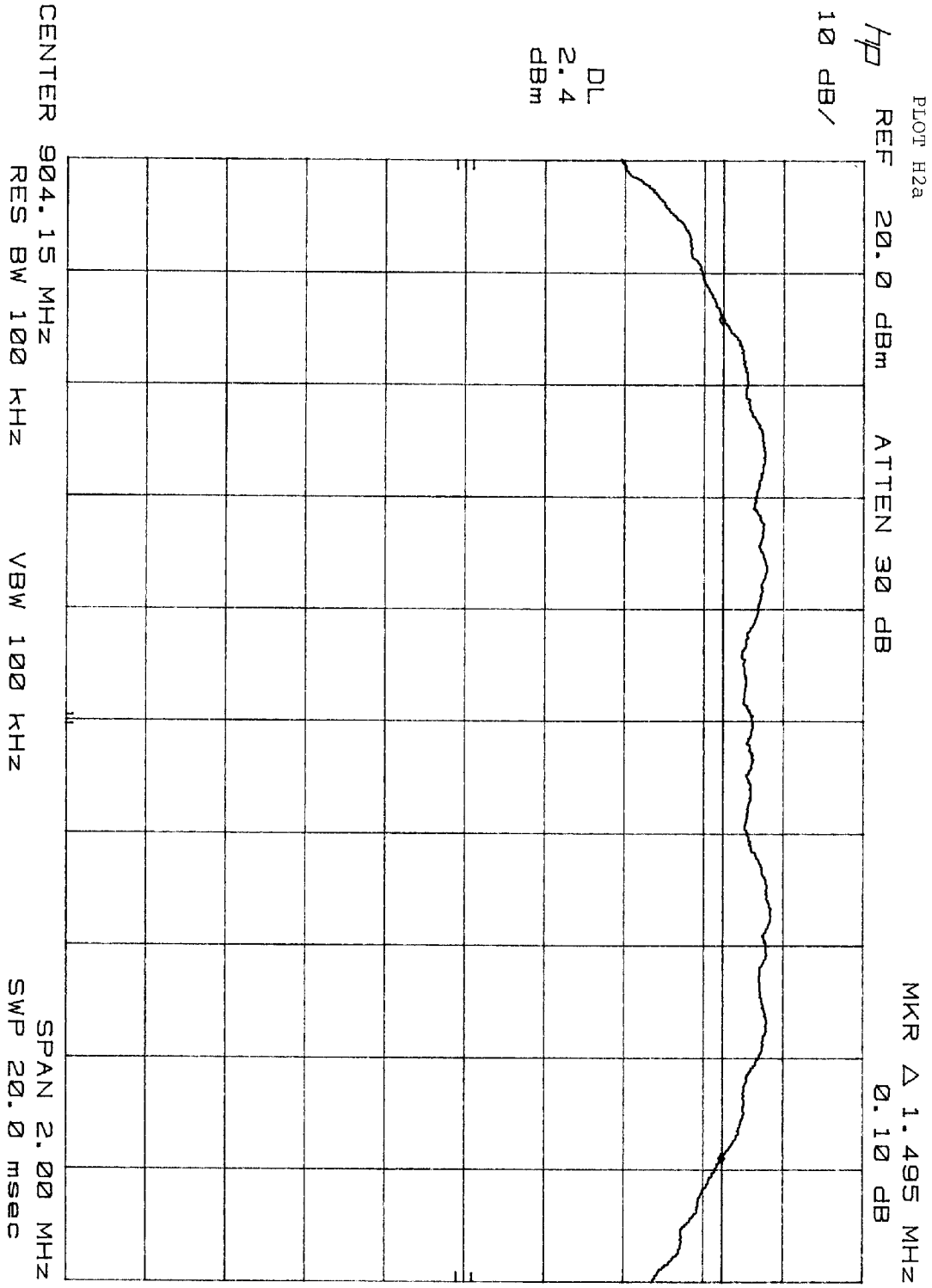
Refer to the following plots for 6 dB bandwidth sharp:

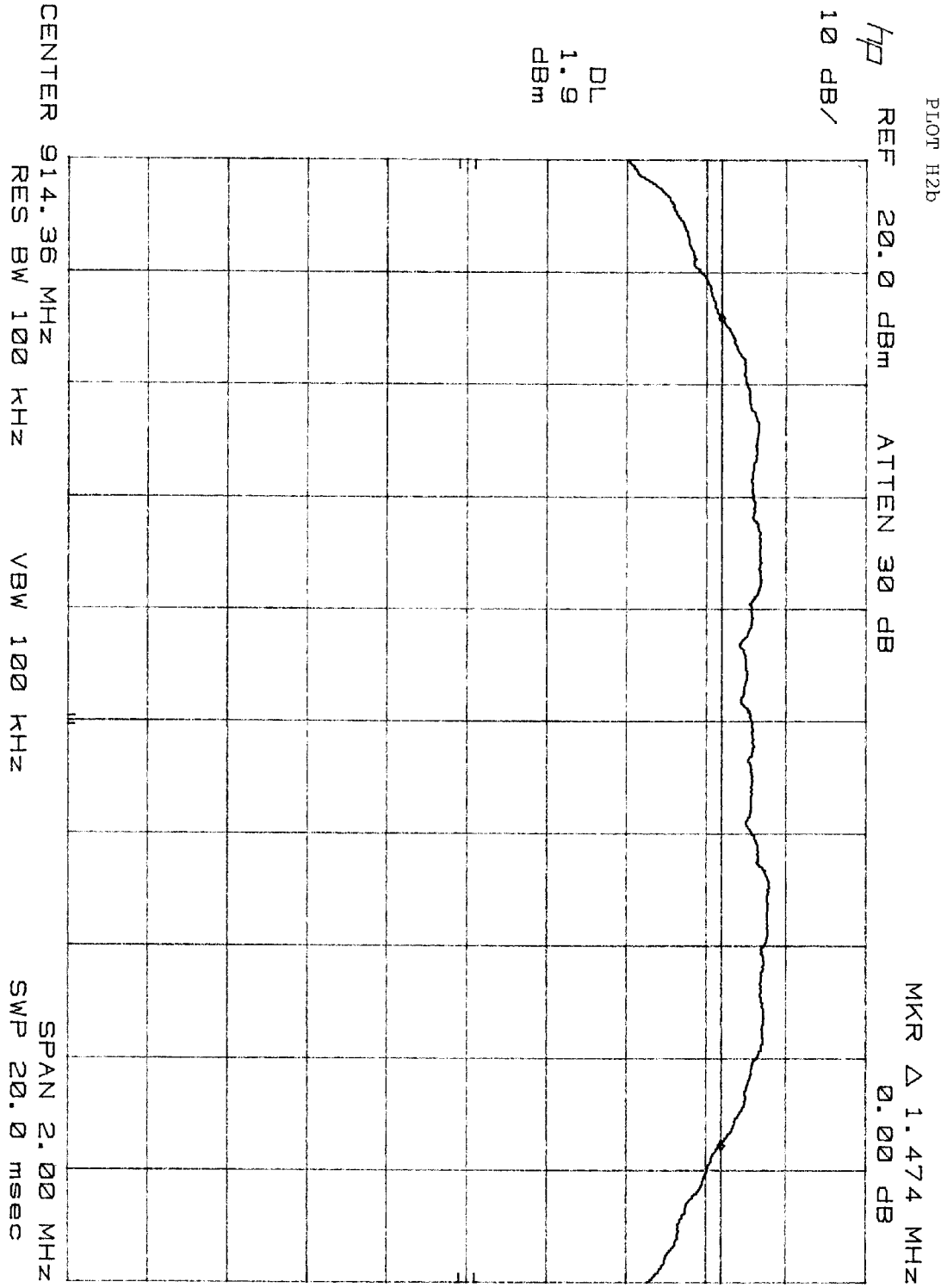
Plot B2a: Low Channel 6 dB RF Bandwidth
Plot B2b: Middle Channel 6 dB RF Bandwidth
Plot B2c: High Channel 6 dB RF Bandwidth
Plot H2a: Low Channel 6 dB RF Bandwidth
Plot H2b: Middle Channel 6 dB RF Bandwidth
Plot H2c: High Channel 6 dB RF Bandwidth


PLOT B2a
REF 21.5 dBm
ATTEN 30 dB
MKR Δ 1.486 MHz
-0.10 dB
10 dB/
OFFSET
1.5
dB
DL
2.5
dBm
CENTER 904.14 MHz
RES BW 100 kHz
VBW 100 kHz
SPAN 2.00 MHz
SWP 20.0 msec


PLOT B2b
REF 21.5 dBm
ATTEN 30 dB
MKR Δ 1.480 MHz
0.10 dB
10 dB/
OFFSET
1.5
dB
DL
1.4
dBm
CENTER 914.30 MHz
RES BW 100 kHz
VBW 100 kHz
SPAN 2.00 MHz
SWP 20.0 msec


PLOT B2c
REF 21.5 dBm
ATTEN 30 dB
MKR Δ 1.454 MHz
0.20 dB
10 dB/
OFFSET
1.5
dB
DL
-0.1
dBm
CENTER 925.64 MHz
RES BW 100 kHz
VBW 100 kHz
SPAN 2.00 MHz
SWP 20.0 msec


PLOT H2a
REF 20.0 dBm
ATTEN 30 dB
10 dB/
DL
2.4
dBm
MKR Δ 1.495 MHz
0.10 dB
CENTER 904.15 MHz
RES BW 100 kHz
VBW 100 kHz
SPAN 2.00 MHz
SWP 20.0 msec


PLOT H2b
REF 20.0 dBm
ATTEN 30 dB
10 dB/
DL
1.9
dBm
MKR Δ 1.474 MHz
0.00 dB
CENTER 914.36 MHz
RES BW 100 kHz
VBW 100 kHz
SPAN 2.00 MHz
SWP 20.0 msec

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

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:

SWEEP TIME (SEC) = (Fstop, kHz - Fstart, kHz)/3 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.

(Base Unit)	
Frequency (MHz)	Power Density (dBm)
903.9	3.4

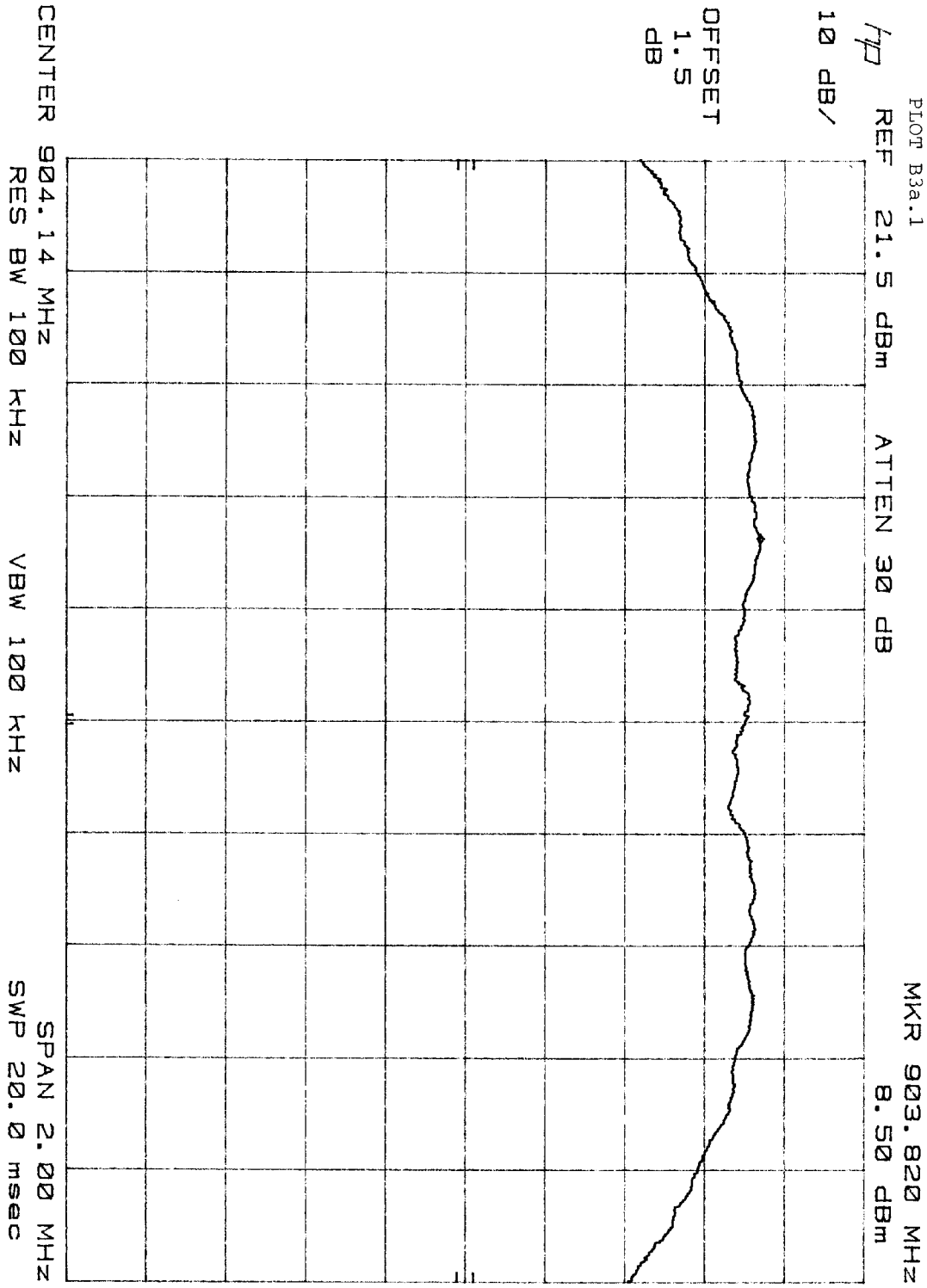
(Handset Unit)	
Frequency (MHz)	Power Density (dBm)
904.7	2.8

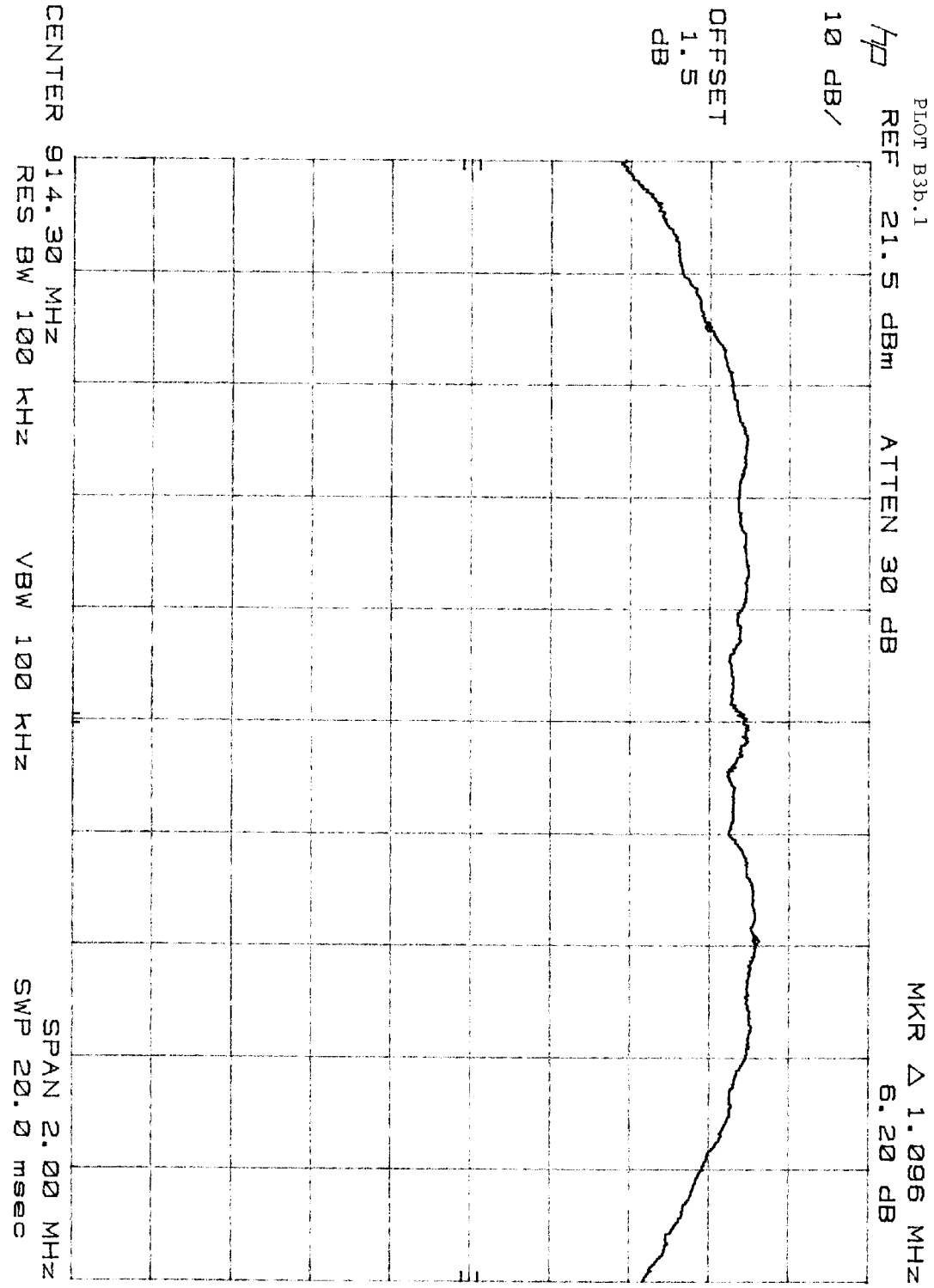
Frequency Span = 600 kHz

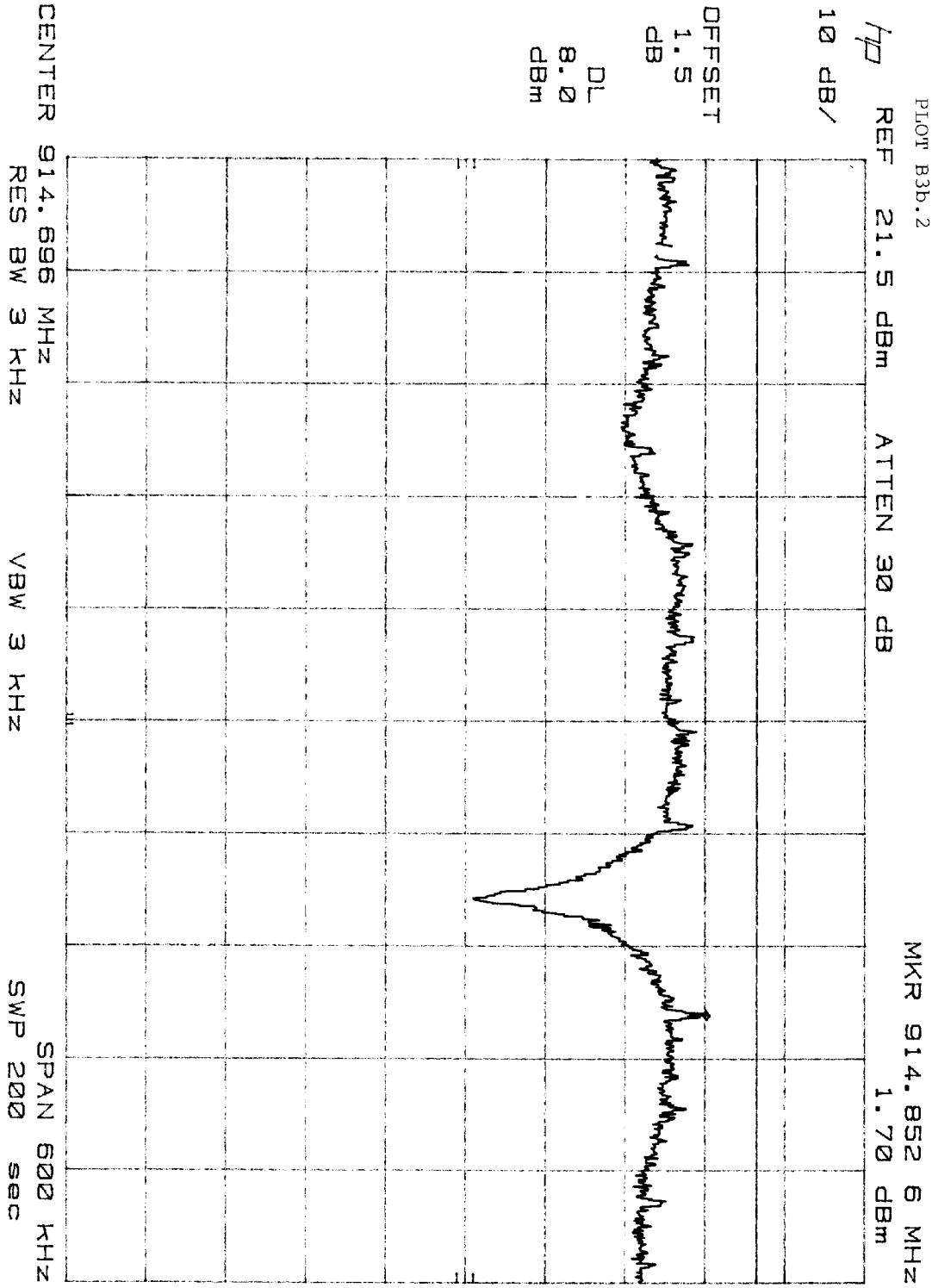
Sweep Time = 600 Frequency Span/3 kHz
= 200 seconds

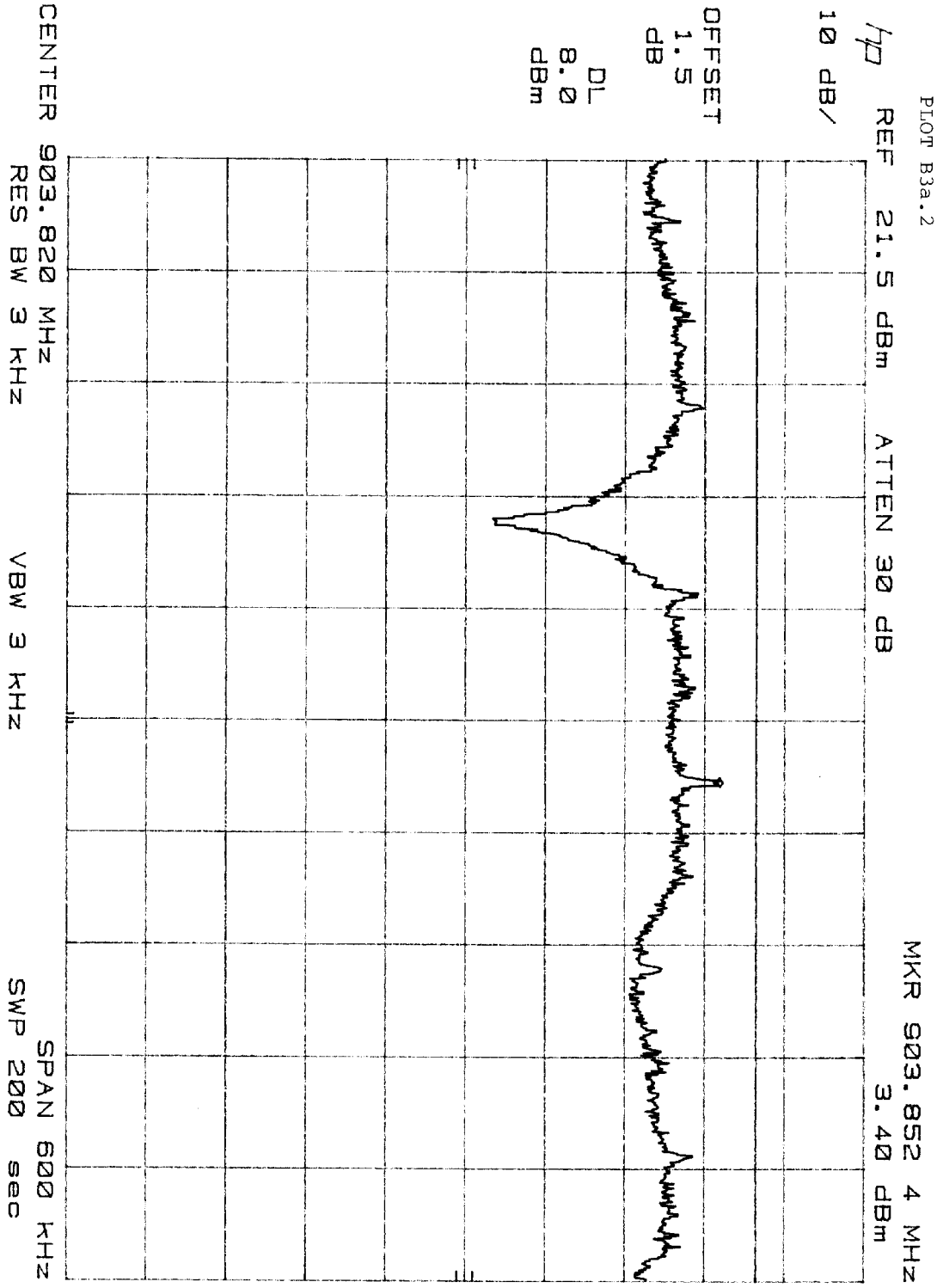
Refer to the following plots for power density data:

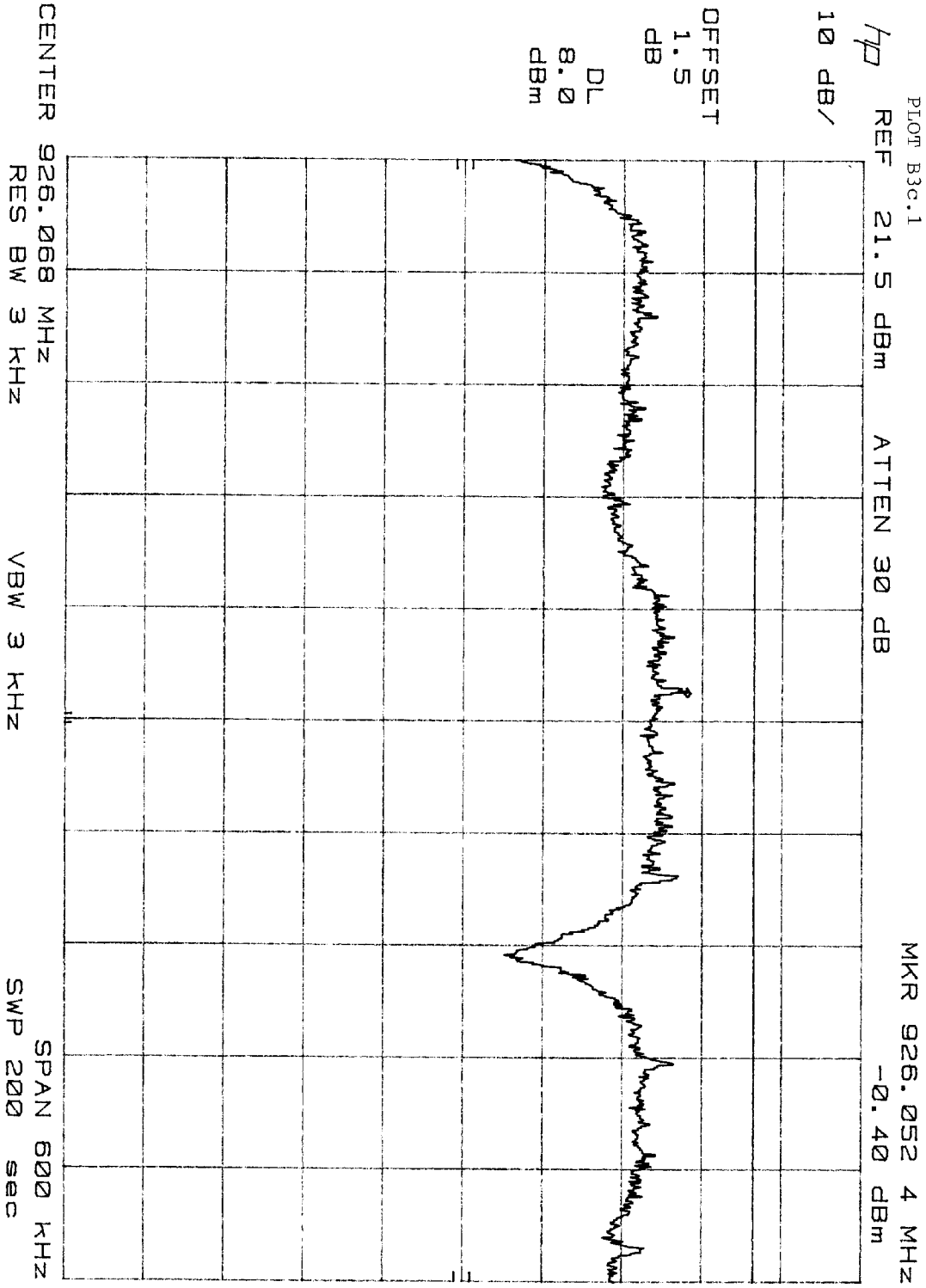
Plot B3a.1 - B3a.2 Low Channel Power Density
Plot B3b.1 - B3b.2 Middle Channel Power Density
Plot B3c.1 - B3c.2: High Channel Power Density
Plot H3a.1 - H3a.2 Low Channel Power Density
Plot H3b.1 - H3b.2 Middle Channel Power Density
Plot H3c.1 - H3c.2: High Channel Power Density

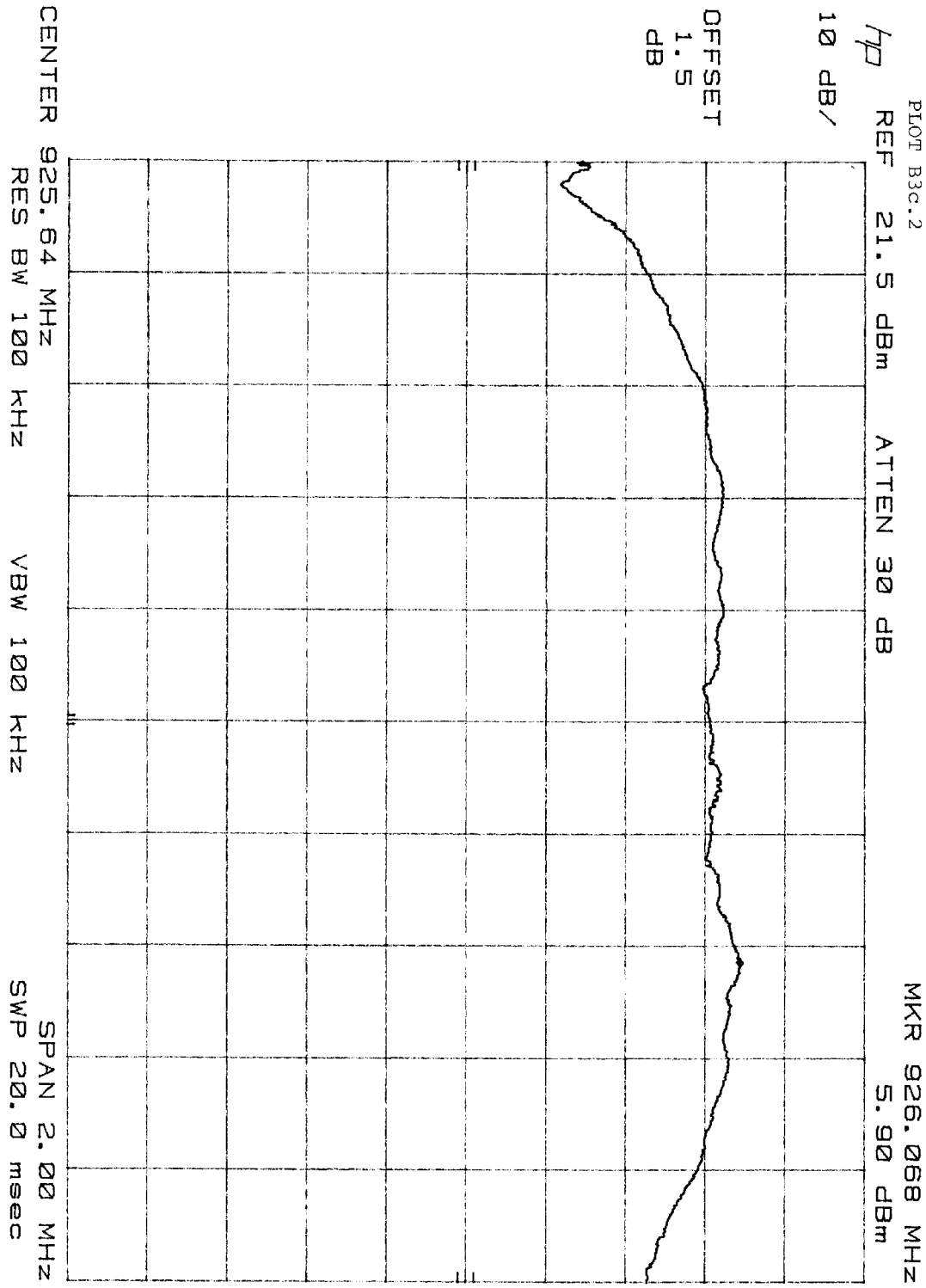

PLOT B3a.1
REF 21.5 dBm
ATTEN 30 dB
MKR 903.820 MHz
8.50 dBm
10 dB/
OFFSET
1.5
dB
CENTER 904.14 MHz
RES BW 100 kHz
VBW 100 kHz
SPAN 2.00 MHz
SWP 20.0 msec

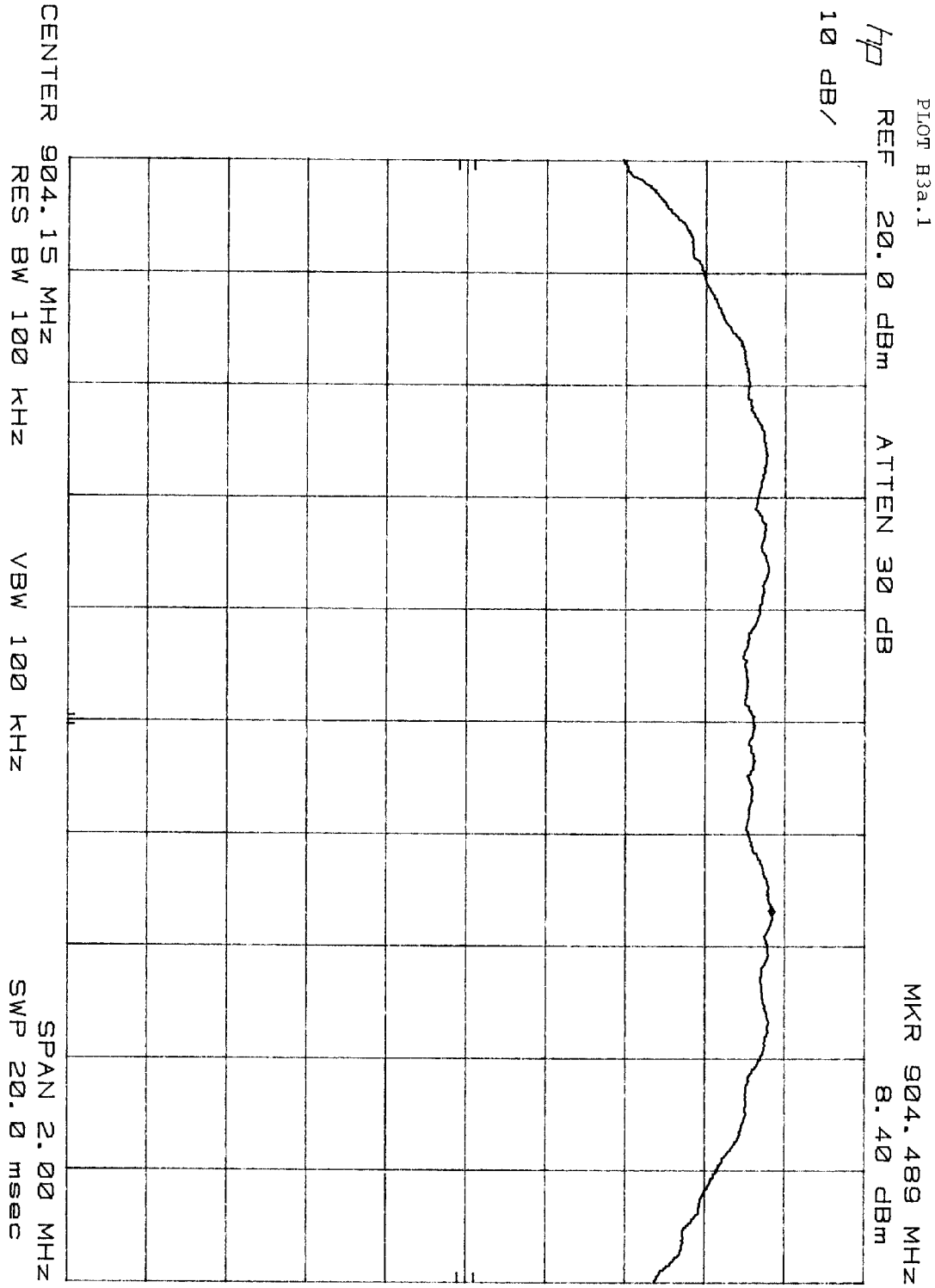

PLOT B3b.1
REF 21.5 dBm
ATTEN 30 dB
10 dB/
OFFSET
1.5
dB
MKR Δ 1.096 MHz
6.20 dB
CENTER 914.30 MHz
RES BW 100 kHz
VBW 100 kHz
SPAN 2.00 MHz
SWP 20.0 msec

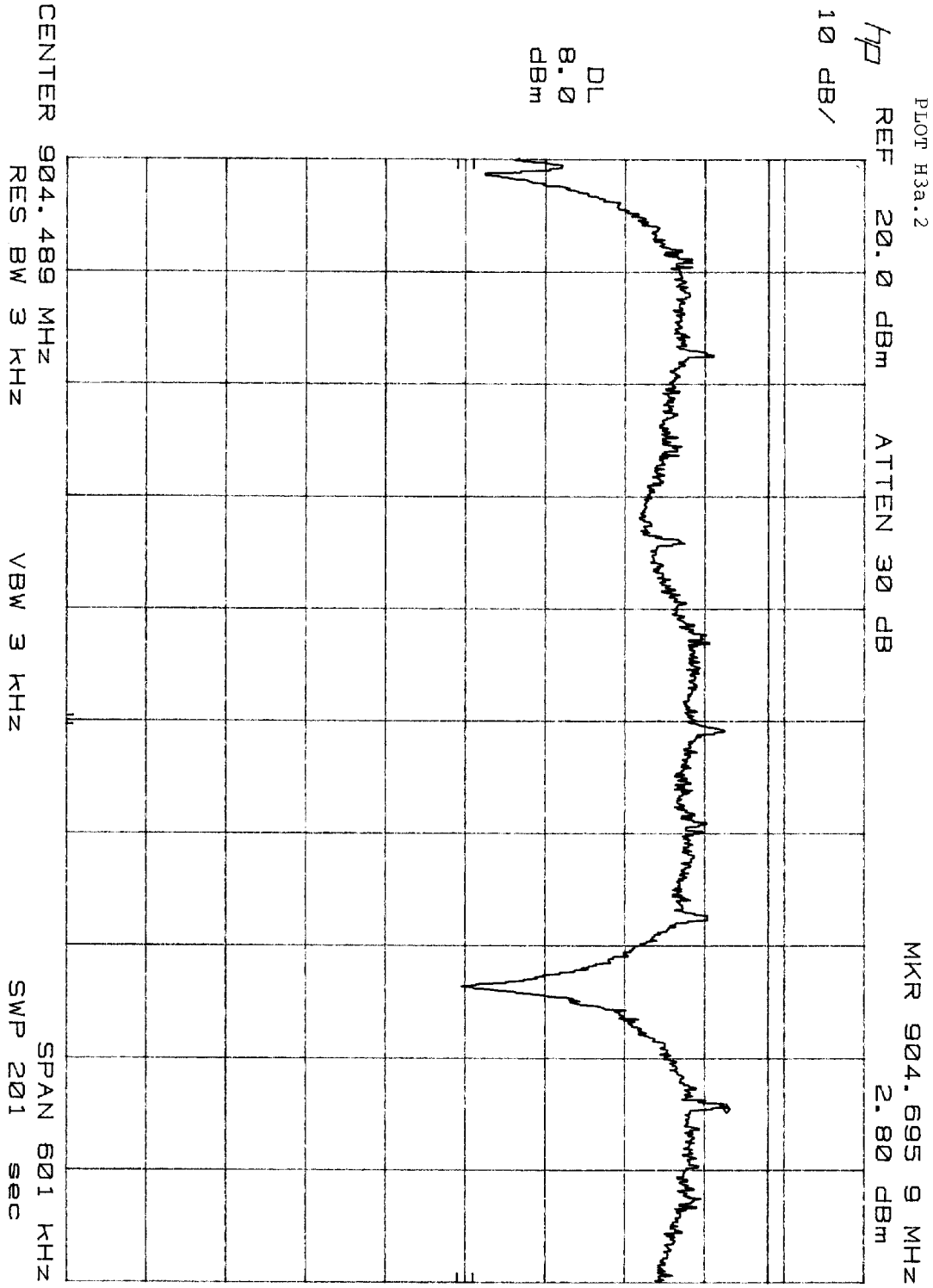

PLOT B3b.2
REF 21.5 dBm
ATTEN 30 dB
MKR 914.852 6 MHz
1.70 dBm
10 dB/
OFFSET
1.5
dB
DL
8.0
dBm
CENTER 914.696 MHz
RES BW 3 kHz
VBW 3 kHz
SPAN 600 kHz
SWP 200 sec

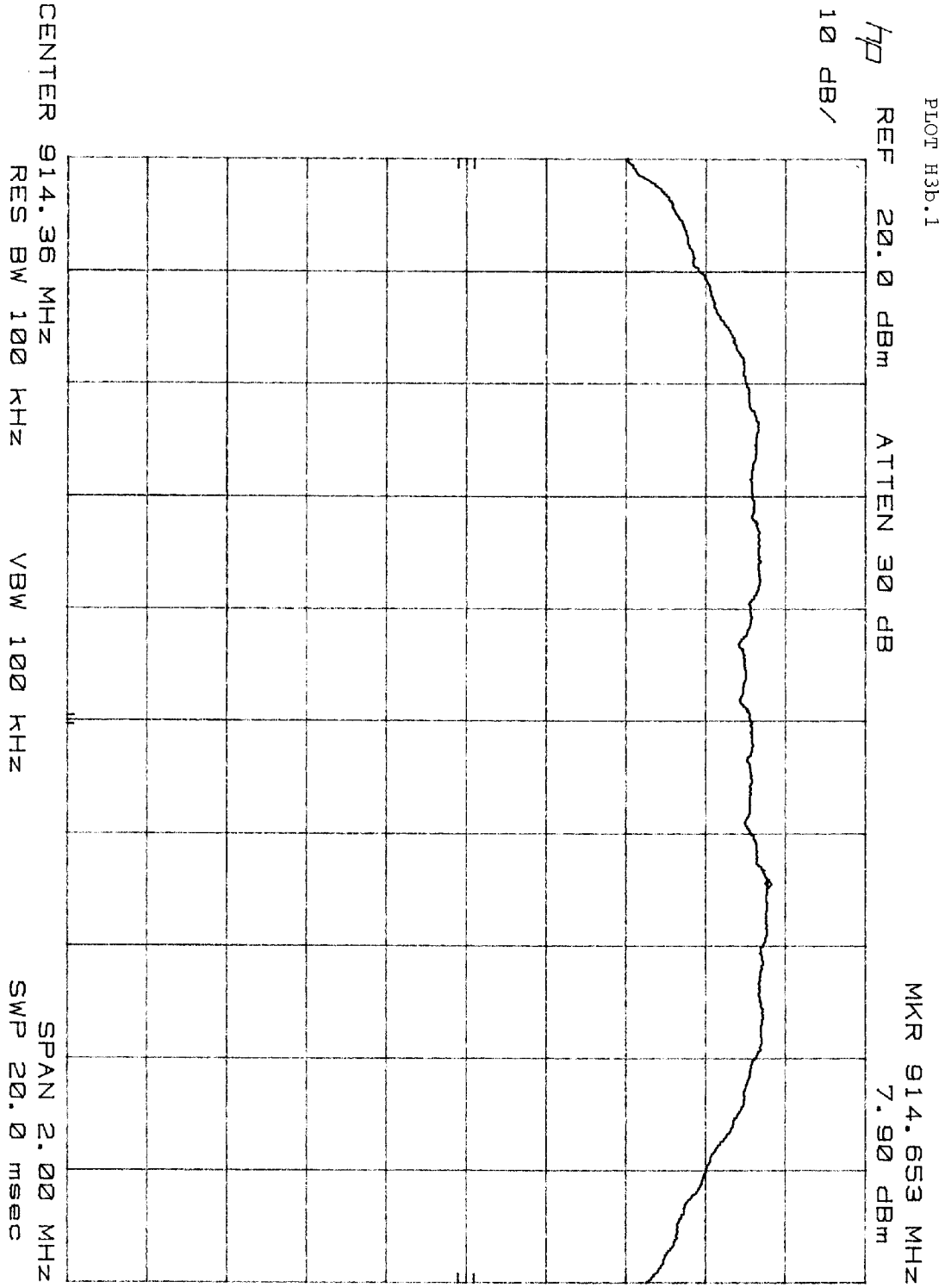

PLOT B3a.2
REF 21.5 dBm
ATTEN 30 dB
MKR 903.852 4 MHz
3.40 dBm
10 dB/
OFFSET
1.5
dB
DL
8.0
dBm
CENTER 903.820 MHz
RES BW 3 kHz
VBW 3 kHz
SPAN 600 kHz
SWP 200 sec

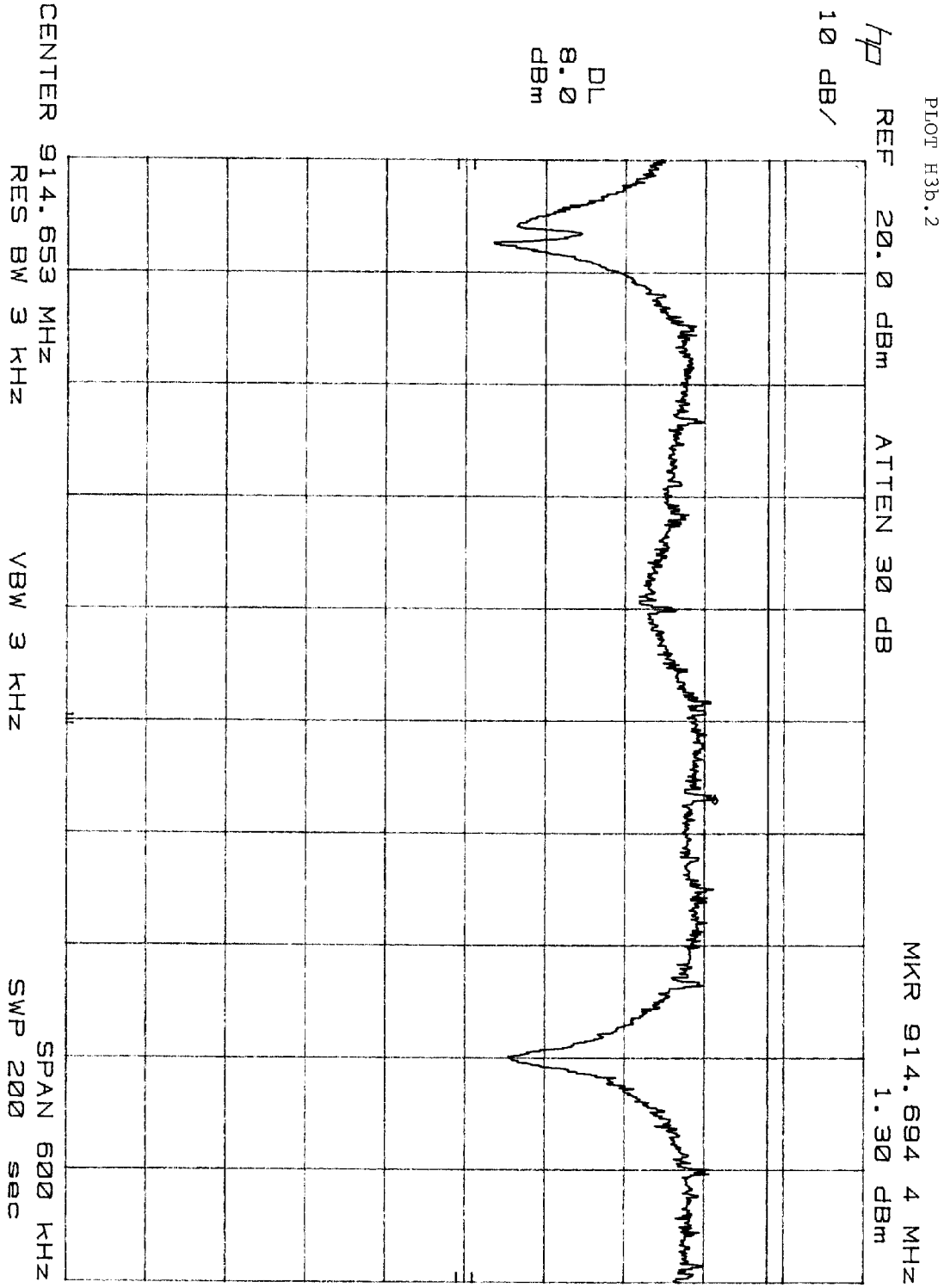

PLOT B3c.1
REF 21.5 dBm
ATTEN 30 dB
10 dB/
OFFSET
1.5
dB
DL
8.0
dBm
MKR 926.052 4 MHz
-0.40 dBm
CENTER 926.068 MHz
RES BW 3 kHz
VBW 3 kHz
SPAN 600 kHz
SWP 200 sec

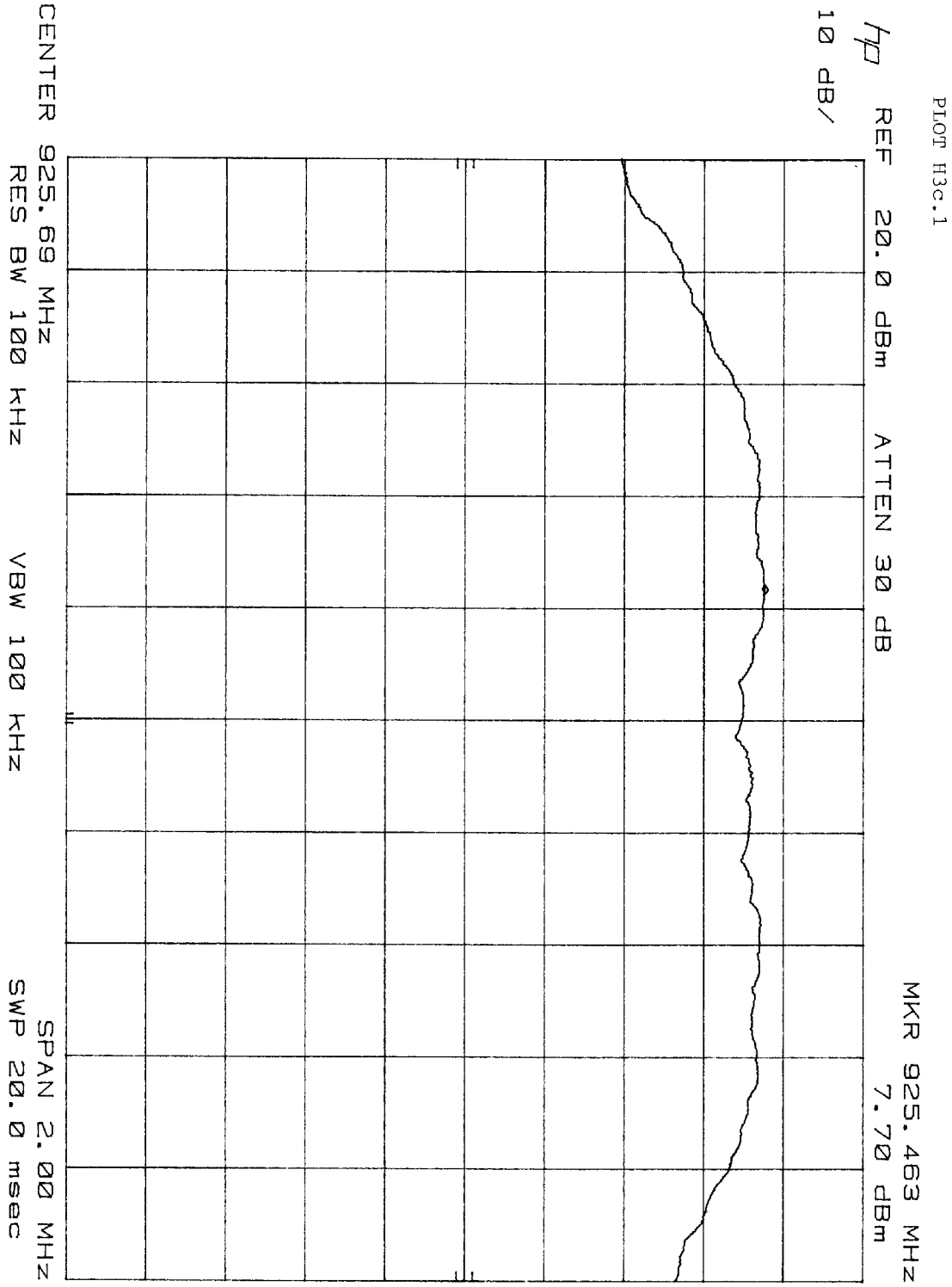

PLOT B3c.2
hp
REF 21.5 dBm
ATTEN 30 dB
MKR 926.068 MHz
5.90 dBm
10 dB/
OFFSET
1.5
dB
CENTER 925.64 MHz
RES BW 100 kHz
VBW 100 kHz
SPAN 2.00 MHz
SWP 20.0 msec

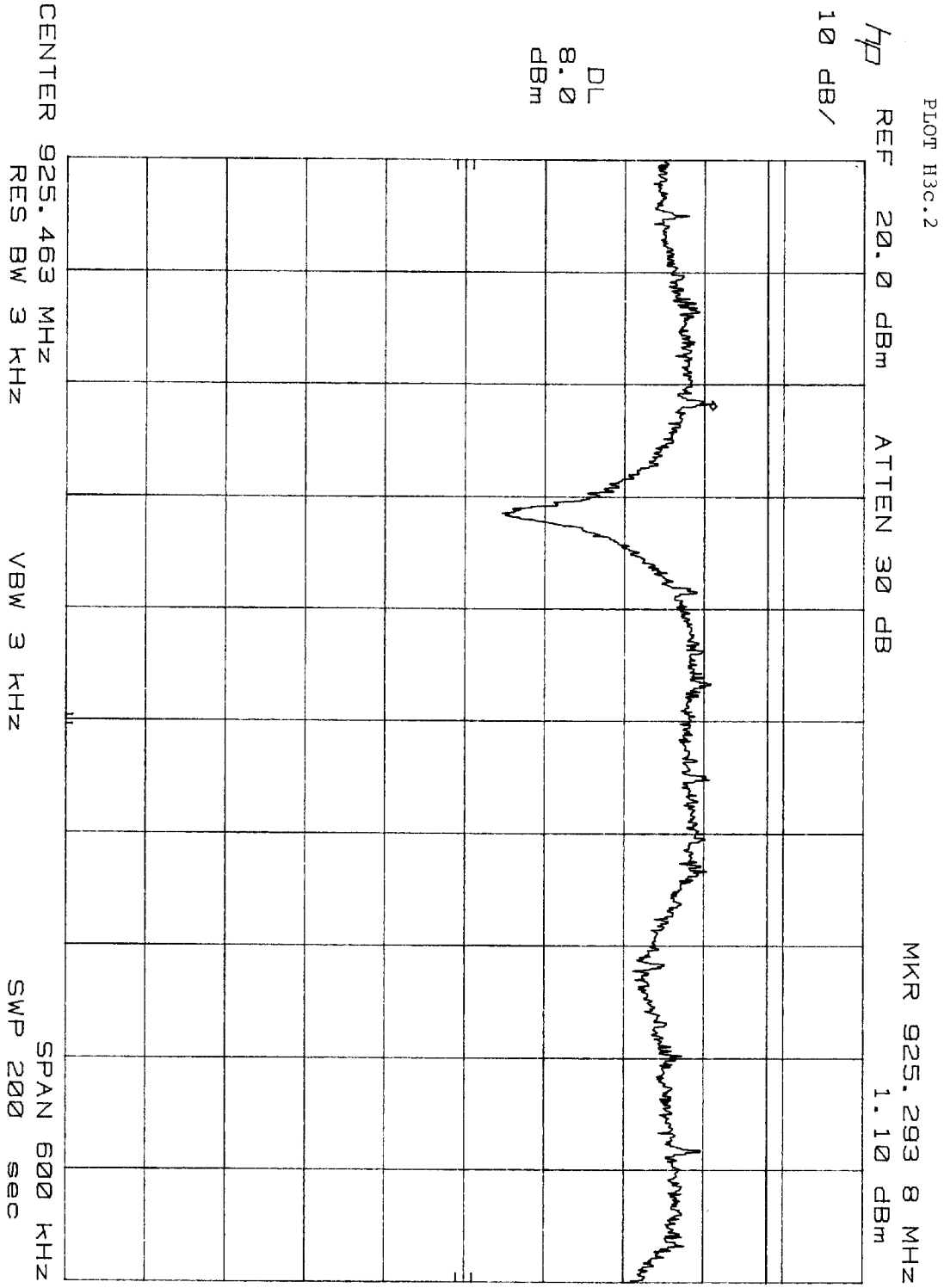

PLOT B3a.1
REF 20.0 dBm
ATTEN 30 dB
10 dB/
MKR 904.489 MHz
8.40 dBm
CENTER 904.15 MHz
RES BW 100 kHz
VBW 100 kHz
SPAN 2.00 MHz
SWP 20.0 msec


PLOT H3a.2
REF 20.0 dBm
ATTEN 30 dB
MKR 904.695 9 MHz
2.80 dBm
10 dB/
DL
8.0
dBm
CENTER 904.489 MHz
RES BW 3 kHz
VBW 3 kHz
SPAN 601 kHz
SWP 201 sec


PLOT H3b.1
REF 20.0 dBm
ATTEN 30 dB
MKR 914.653 MHz
7.90 dBm
10 dB/
CENTER 914.36 MHz
RES BW 100 kHz
VBW 100 kHz
SPAN 2.00 MHz
SWP 20.0 msec


PLOT H3b.2
REF 20.0 dBm
ATTEN 30 dB
MKR 914.694 4 MHz
1.30 dBm
10 dB/
DL
8.0
dBm
CENTER 914.653 MHz
RES BW 3 kHz
VBW 3 kHz
SPAN 600 kHz
SWP 200 sec


PLOT H3c.1
REF 20.0 dBm
ATTEN 30 dB
10 dB/
MKR 925.463 MHz
7.70 dBm
CENTER 925.69 MHz
RES BW 100 kHz
VBW 100 kHz
SPAN 2.00 MHz
SWP 20.0 msec


PLOT H3c.2
REF 20.0 dBm
ATTEN 30 dB
MKR 925.293 8 MHz
1.10 dBm
10 dB/
DL
8.0
dBm
CENTER 925.463 MHz
RES BW 3 kHz
VBW 3 kHz
SPAN 600 kHz
SWP 200 sec

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

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 B4a.1 - B4a.5: Low Channel Emissions
Plot B4b.1 - B4b.4: Middle Channel Emissions
Plot B4c.1 - B4c.5: High Channel Emissions
Plot H4a.1 - H4a.4: Low Channel Emissions
Plot H4b.1 - H4b.4: Middle Channel Emissions
Plot H4c.1 - H4c.5: High Channel Emissions

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.

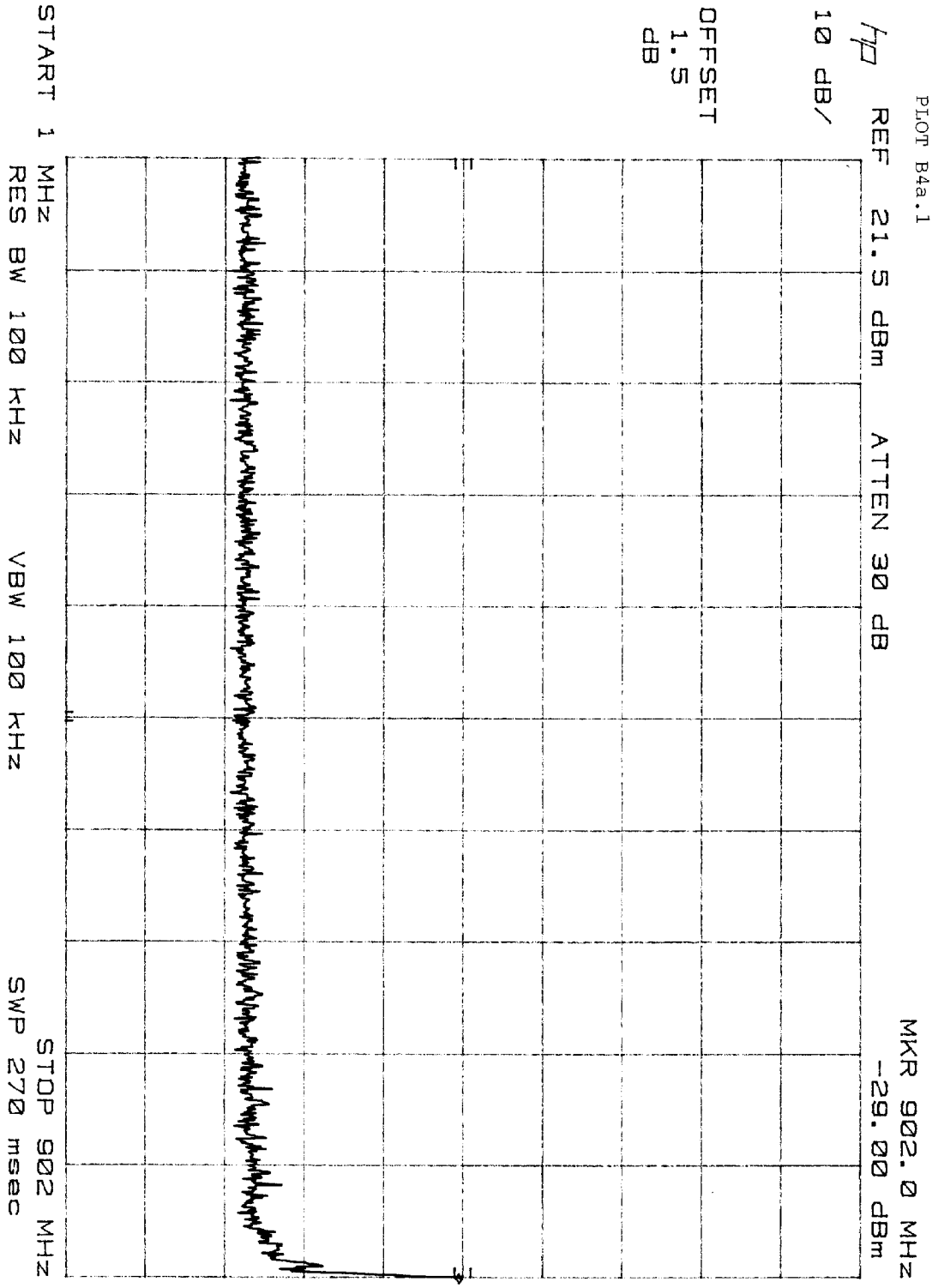
[x] Not required
[ ] See attached data sheet

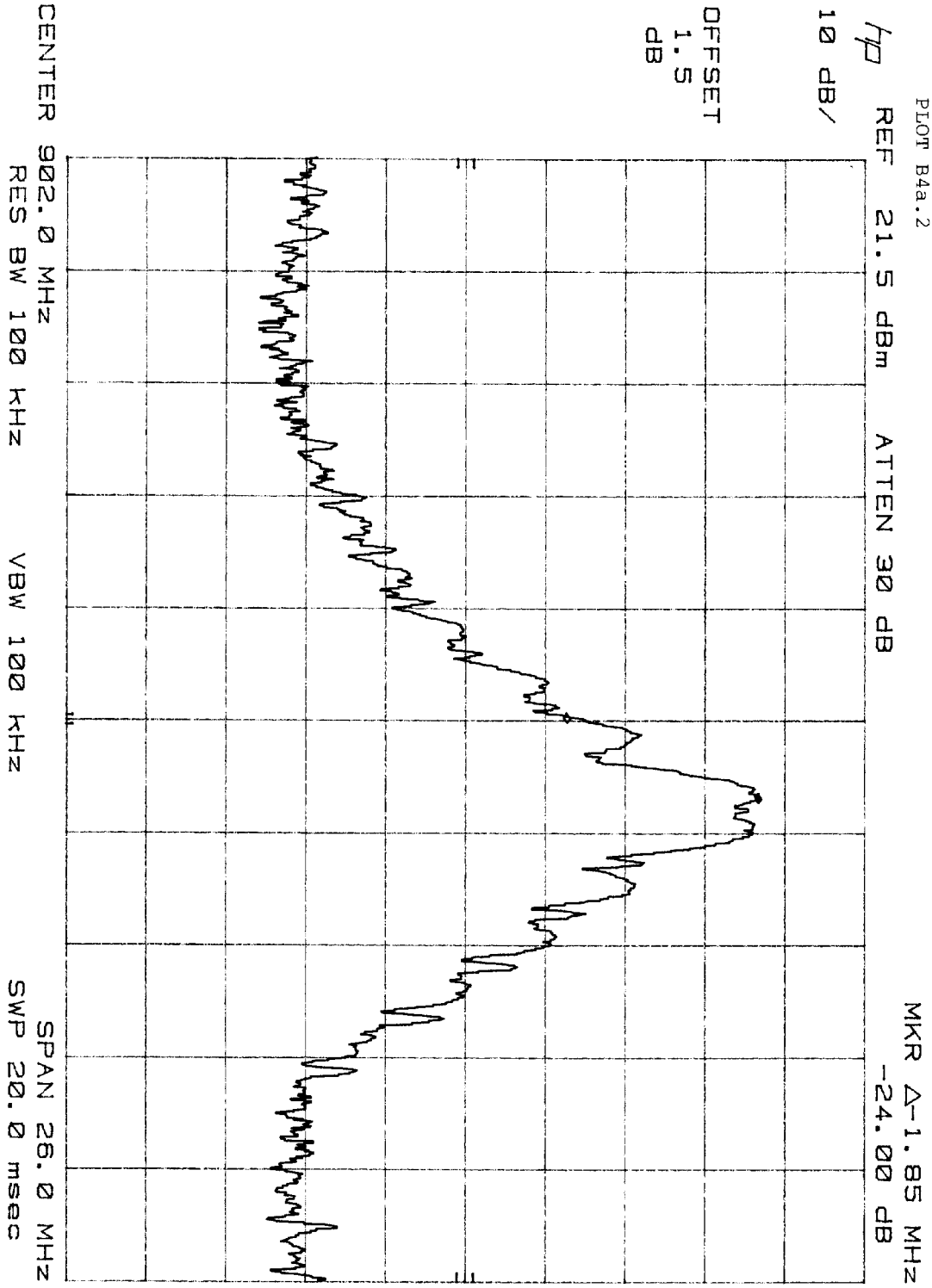
4.6 Transmitter Radiated Emissions in Restricted Bands, FCC Rule 15.35(b), (c):

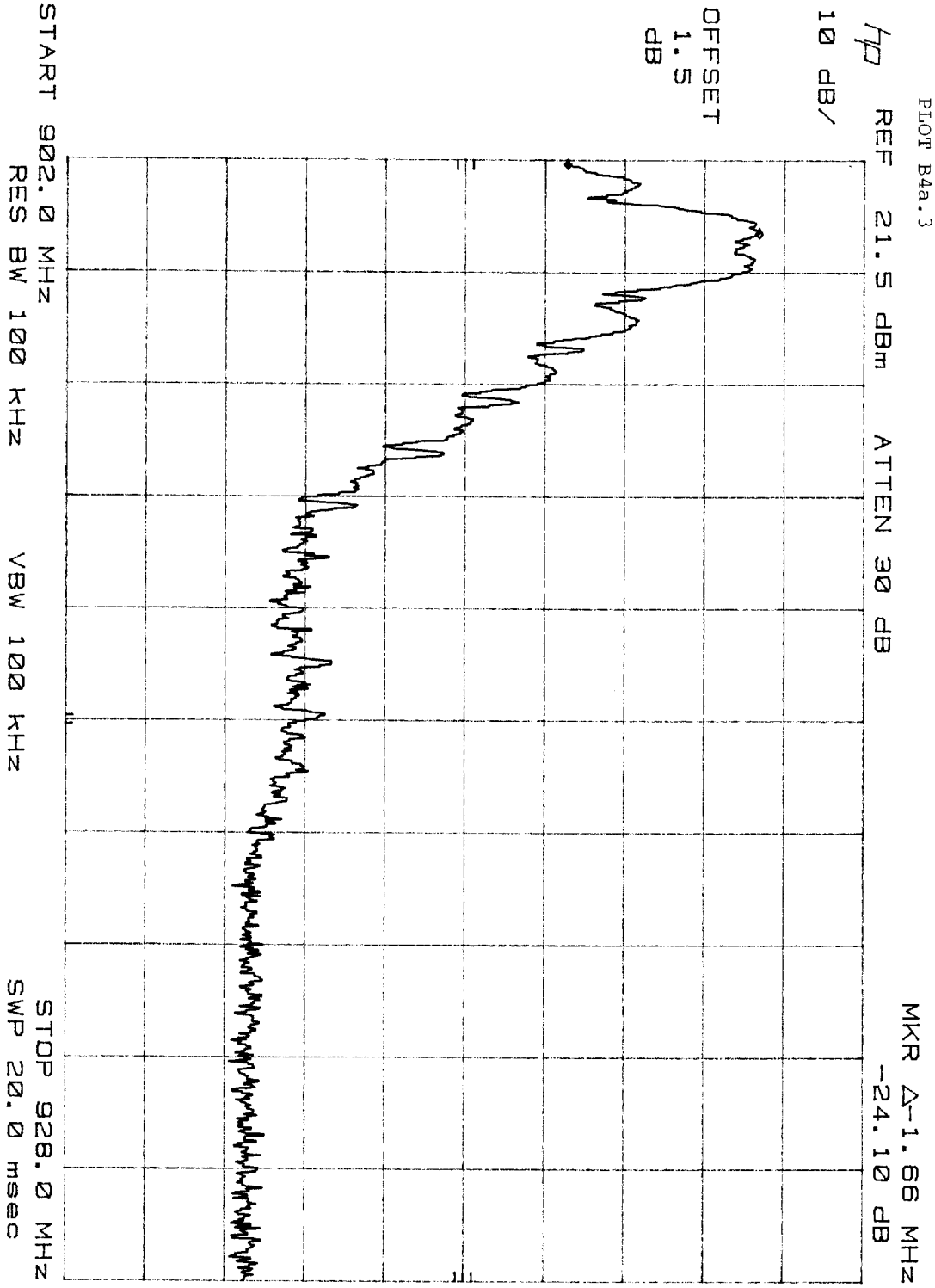
Radiated emission measurements were performed from 30 MHz to <10000> MHz. Analyzer resolution is 100 kHz or greater for 30 MHz to 1000 MHz, 1 MHz for >1000 MHz.

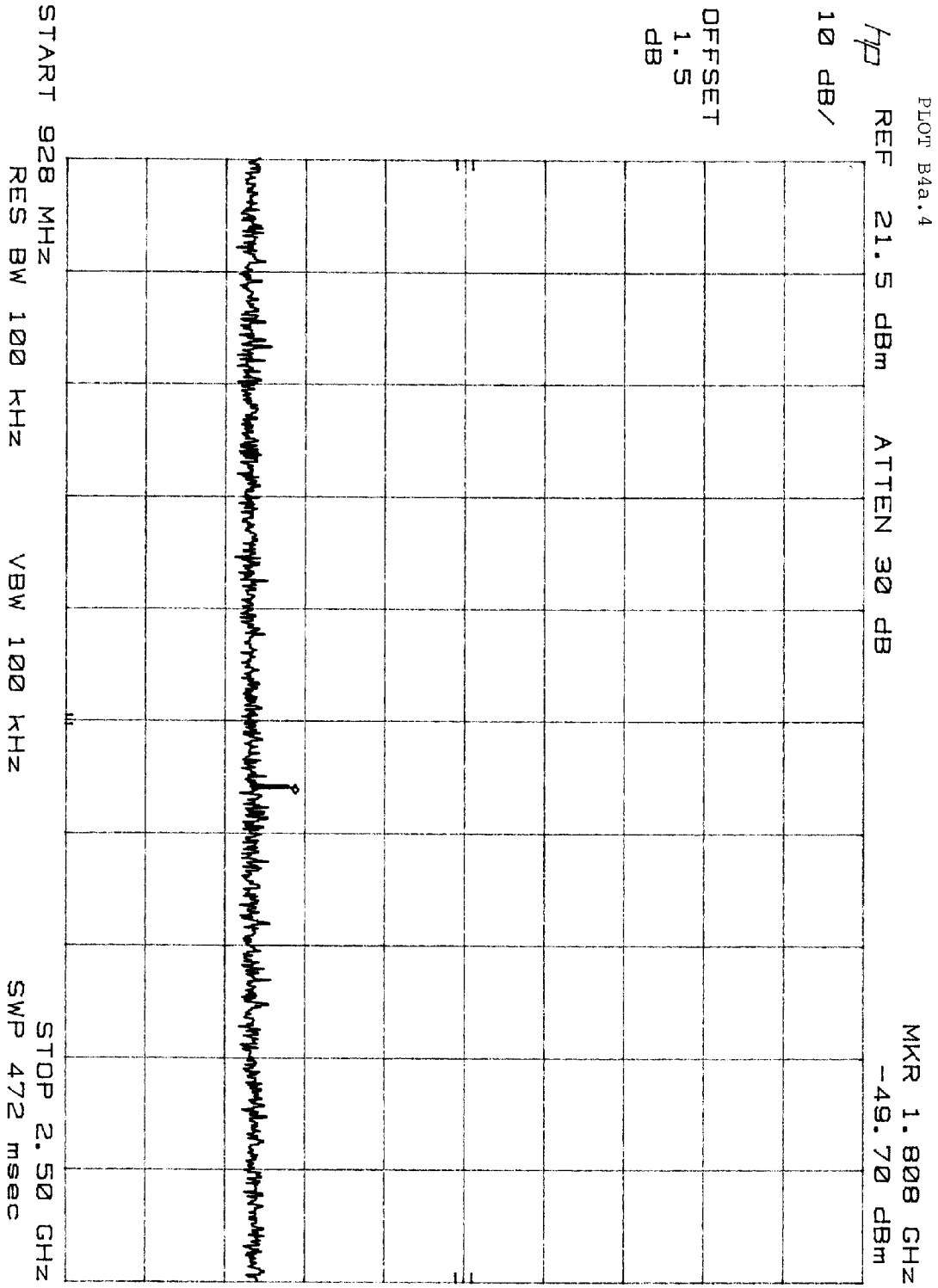
Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included. All measurements were performed with peak detection unless otherwise specified.

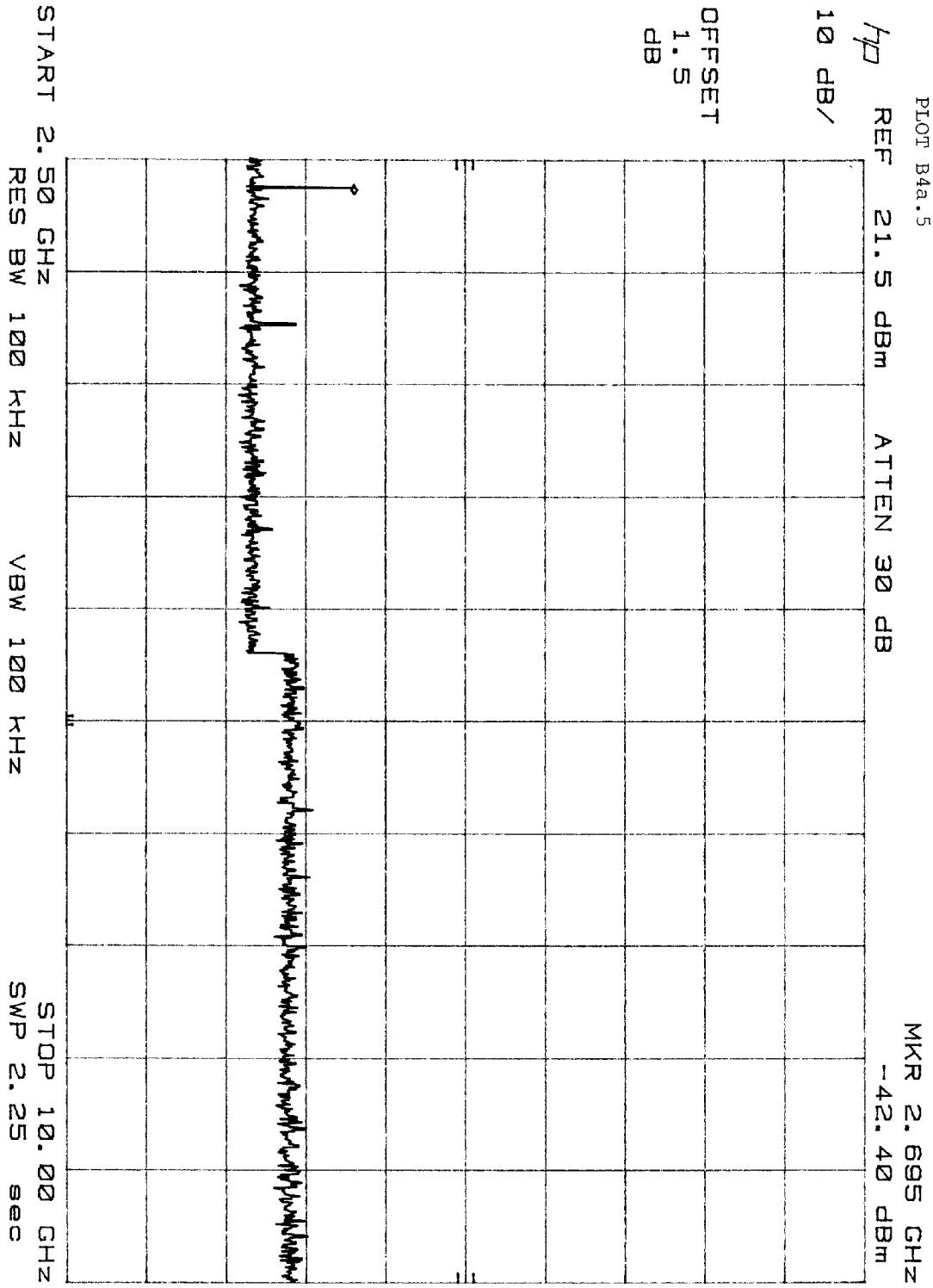
The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

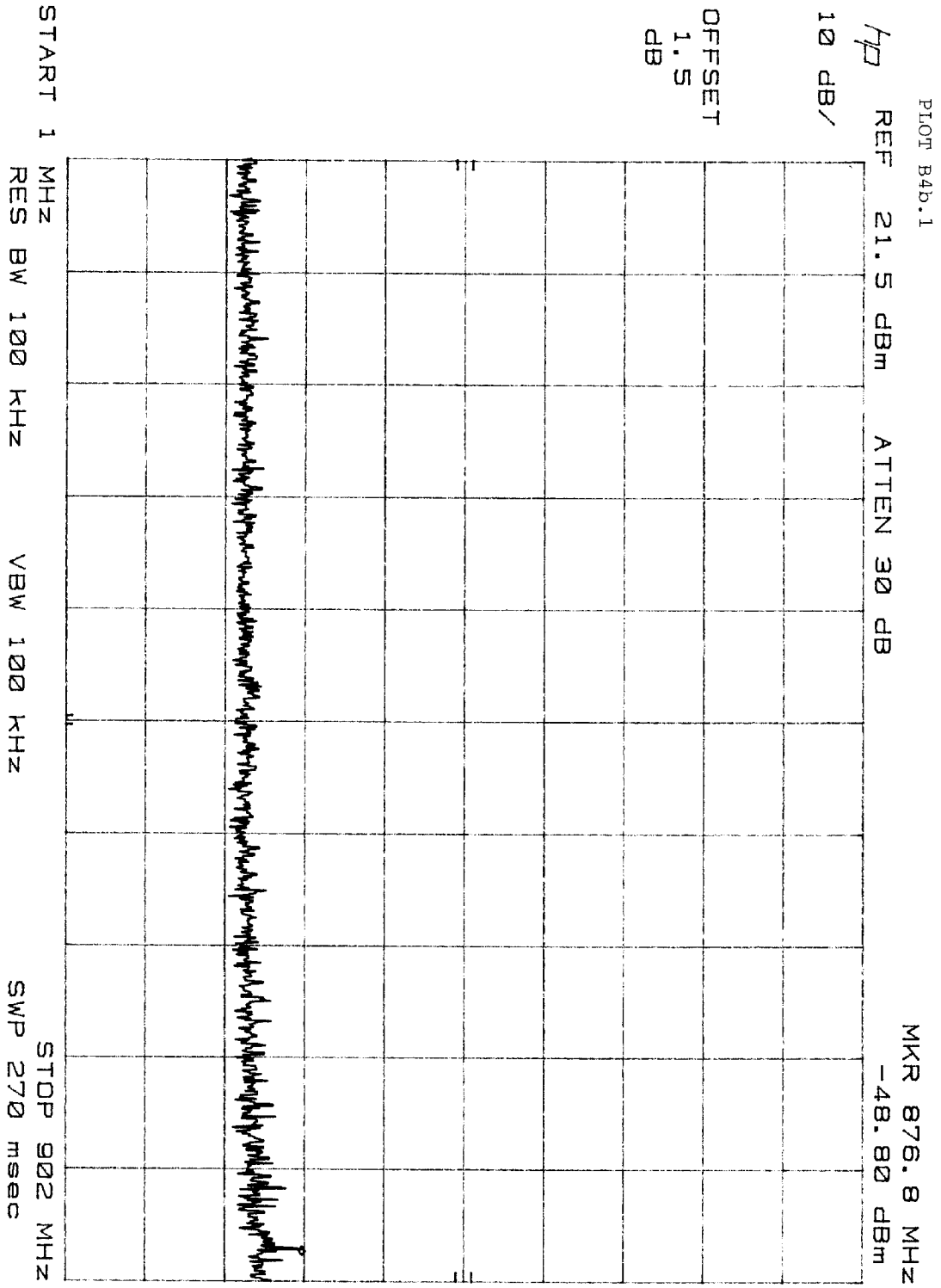

PLOT B4a.1
REF 21.5 dBm
ATTEN 30 dB
10 dB/
OFFSET
1.5
dB
MKR 902.0 MHz
-29.00 dBm
START 1 MHz
RES BW 100 kHz
VBW 100 kHz
STOP 902 MHz
SWP 270 msec

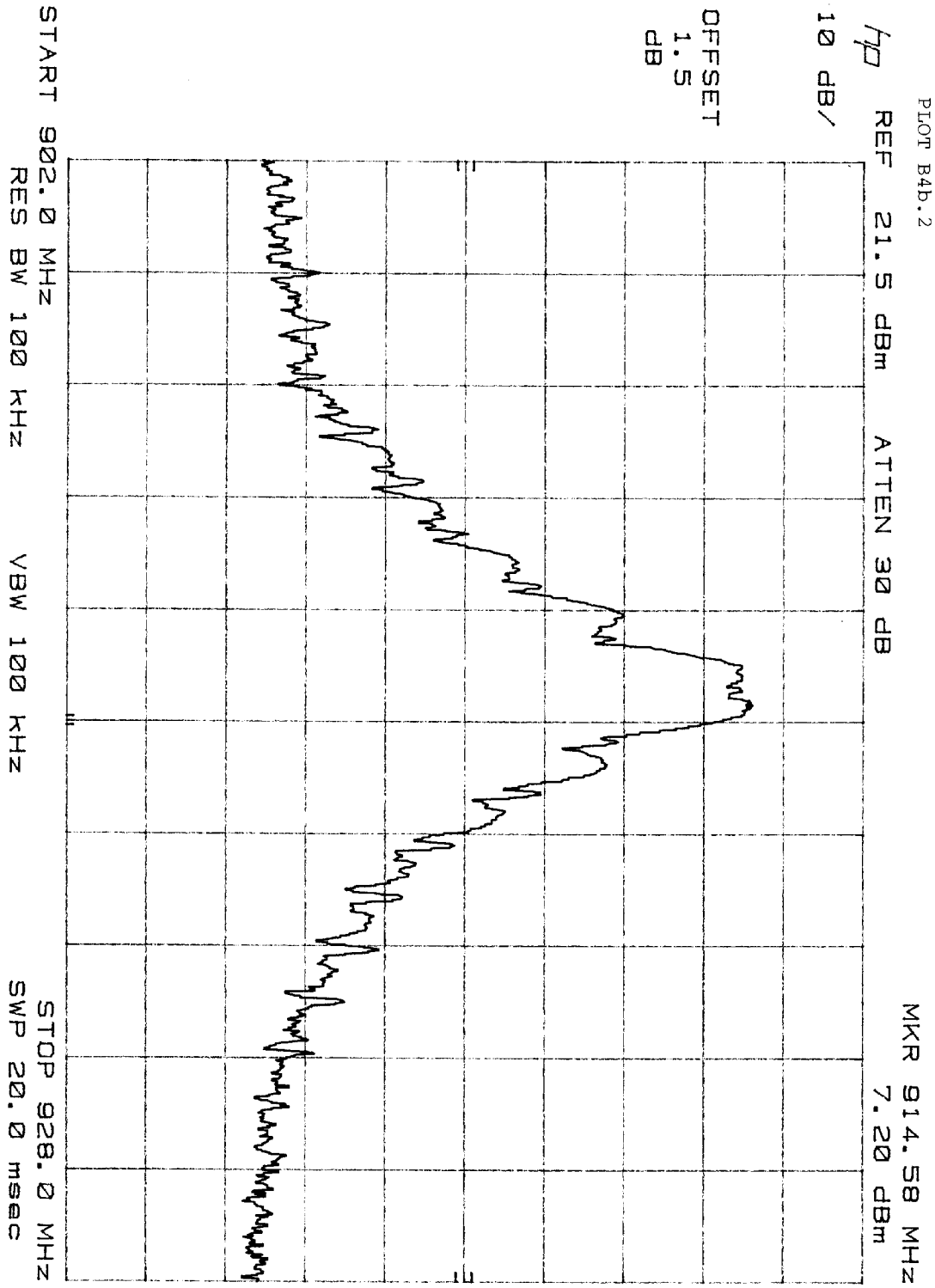

PLOT B4a.2
REF 21.5 dBm
ATTEN 30 dB
10 dB/
OFFSET
1.5
dB
MKR Δ-1.85 MHz
-24.00 dB
CENTER 902.0 MHz
RES BW 100 kHz
VBW 100 kHz
SPAN 26.0 MHz
SWP 20.0 msec

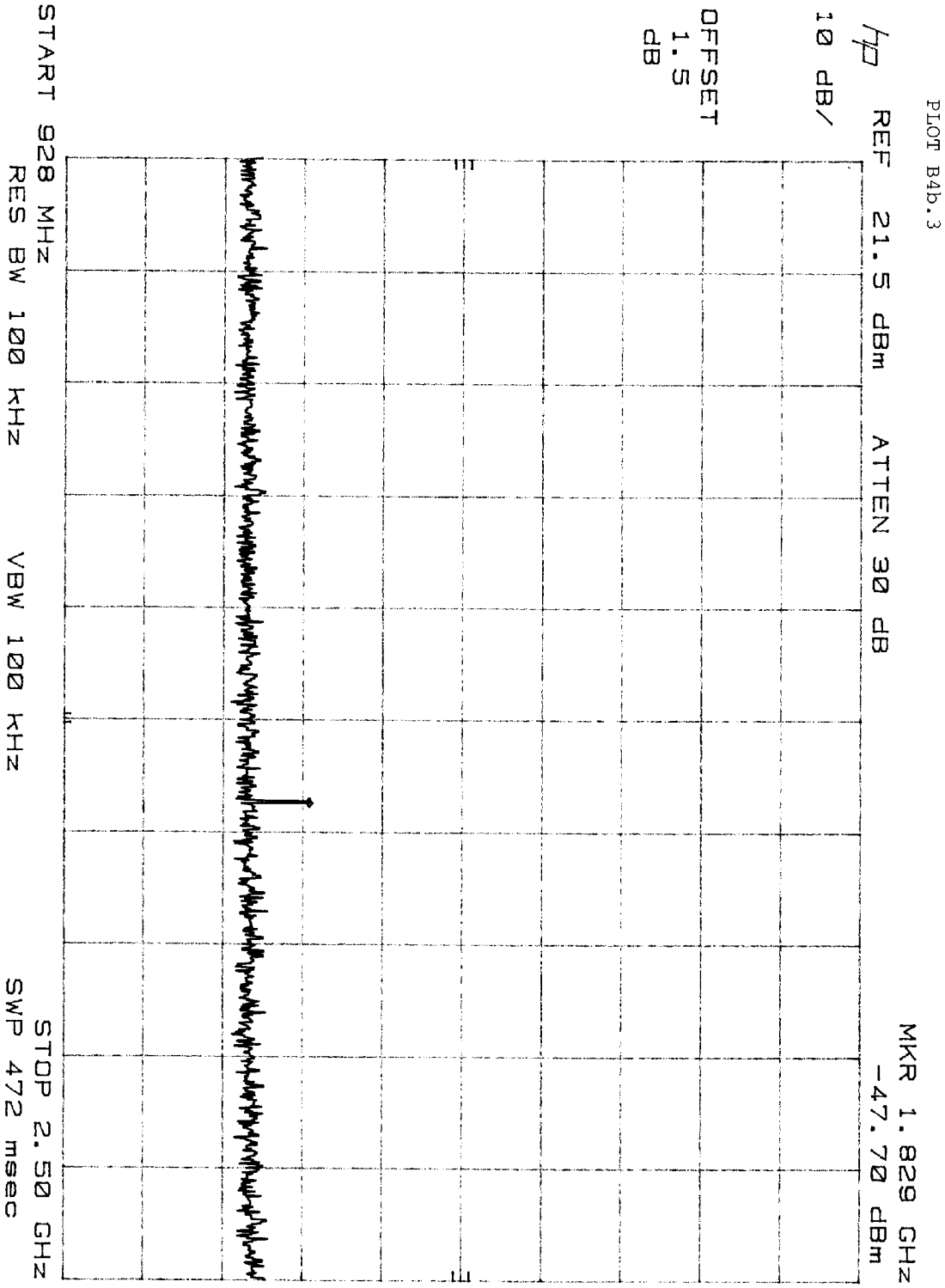

PLOT B4a.3
REF 21.5 dBm
ATTEN 30 dB
10 dB/
OFFSET
1.5
dB
MKR Δ-1.66 MHz
-24.10 dB
START 902.0 MHz
RES BW 100 kHz
VBW 100 kHz
STOP 928.0 MHz
SWP 20.0 msec

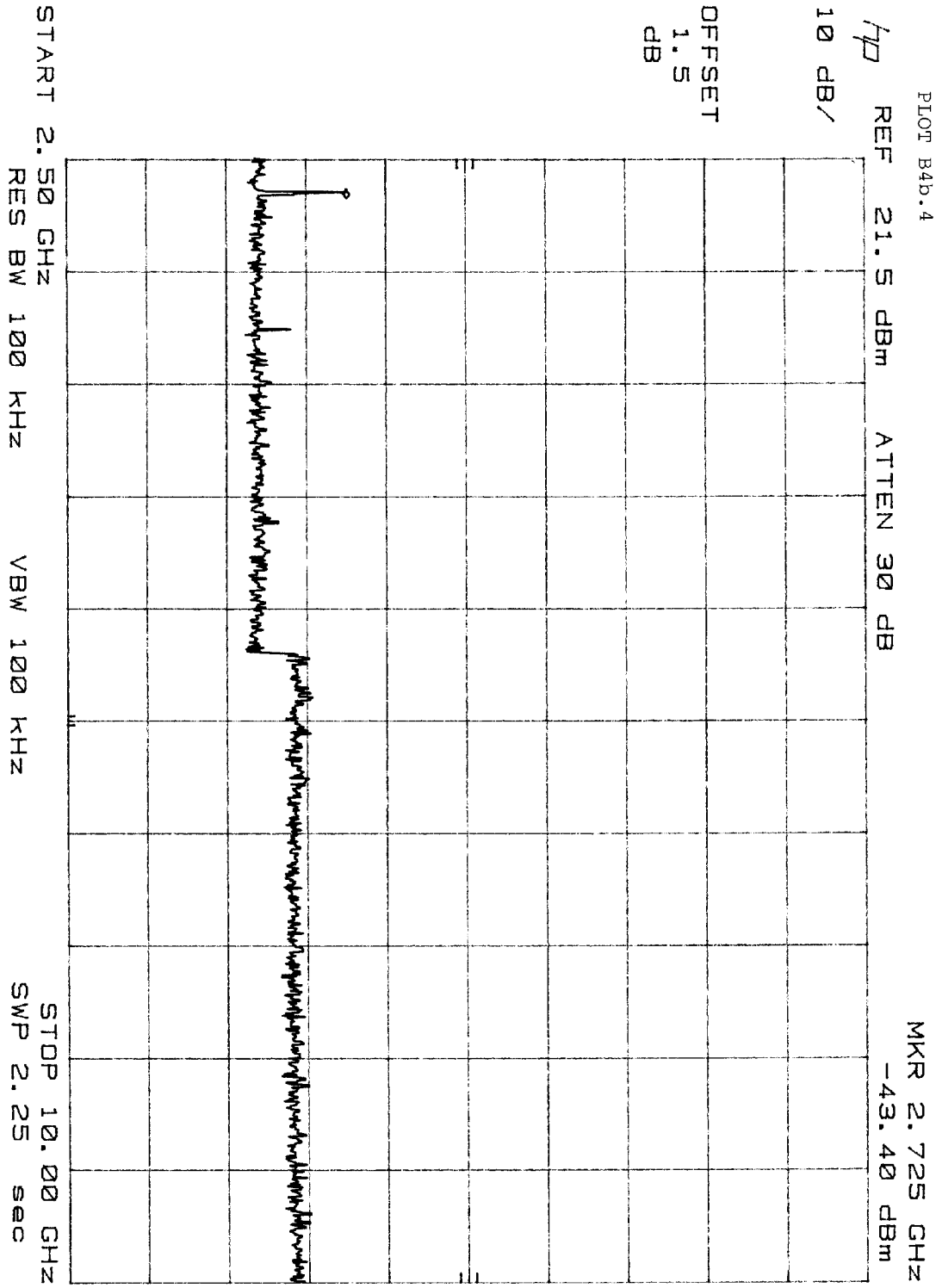

PLOT B4a.4
hp
REF 21.5 dBm
ATTEN 30 dB
10 dB/
OFFSET
1.5
dB
MKR 1.808 GHz
-49.70 dBm
START 928 MHz
RES BW 100 kHz
VBW 100 kHz
STOP 2.50 GHz
SWP 472 msec

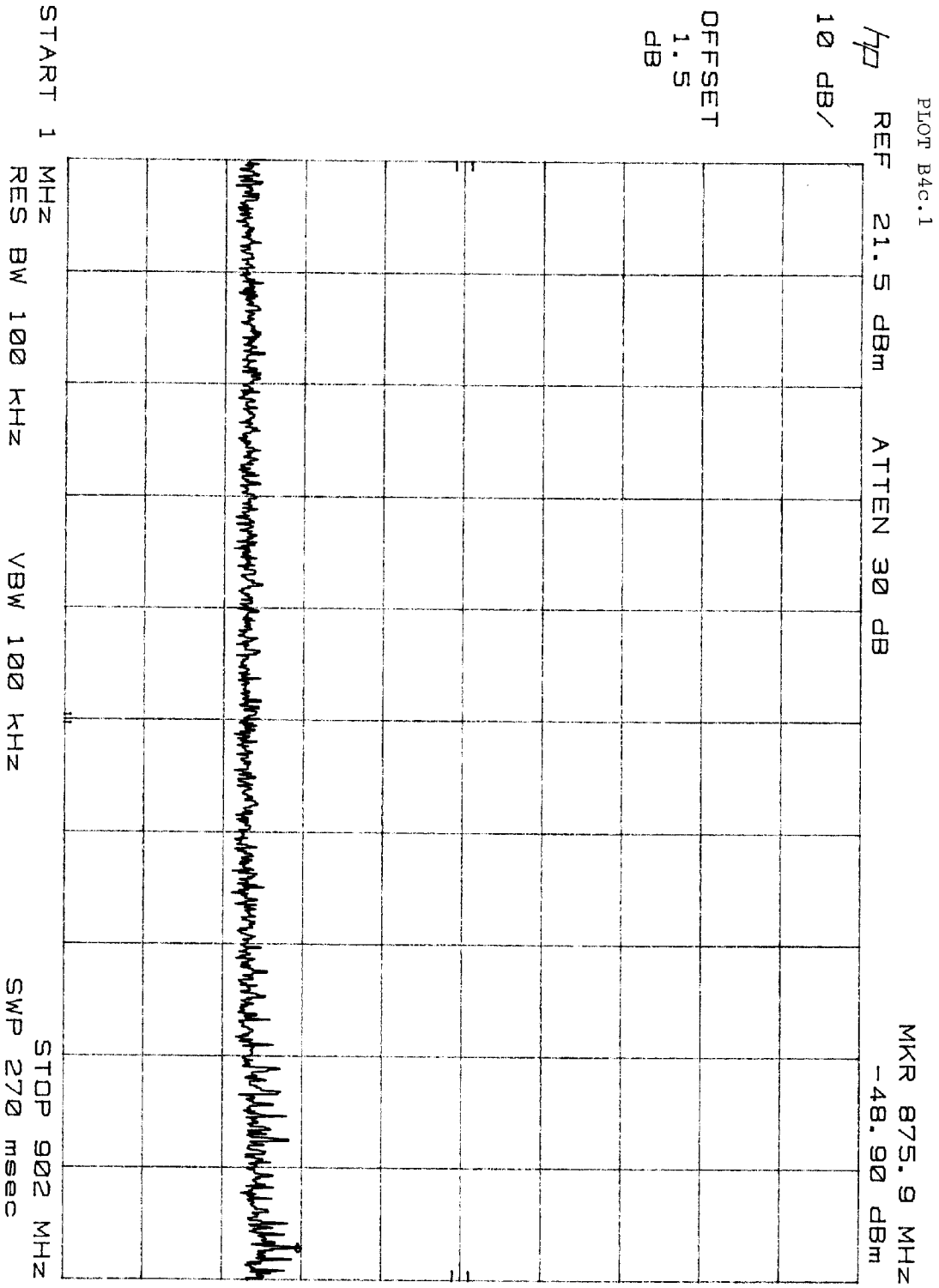

PLOT B4a.5
hp
REF 21.5 dBm
ATTEN 30 dB
10 dB/
OFFSET
1.5
dB
MKR 2.695 GHz
-42.40 dBm
START 2.50 GHz
RES BW 100 kHz
VBW 100 kHz
STOP 10.00 GHz
SWP 2.25 sec

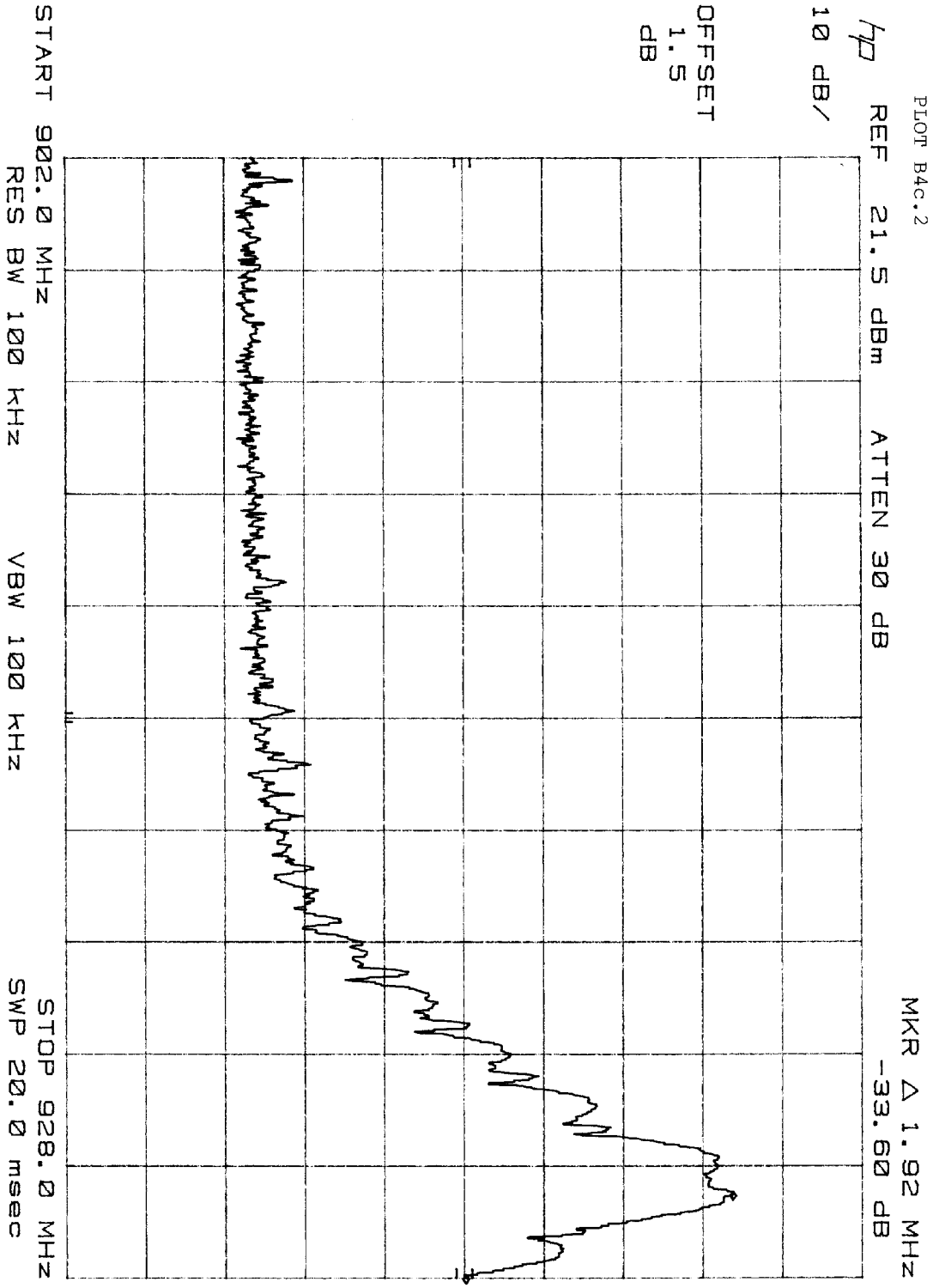

PLOT B4b.1
REF 21.5 dBm
ATTEN 30 dB
10 dB/
OFFSET
1.5
dB
MKR 876.8 MHz
-48.80 dBm
START 1 MHz
RES BW 100 kHz
VBW 100 kHz
STOP 902 MHz
SWP 270 msec

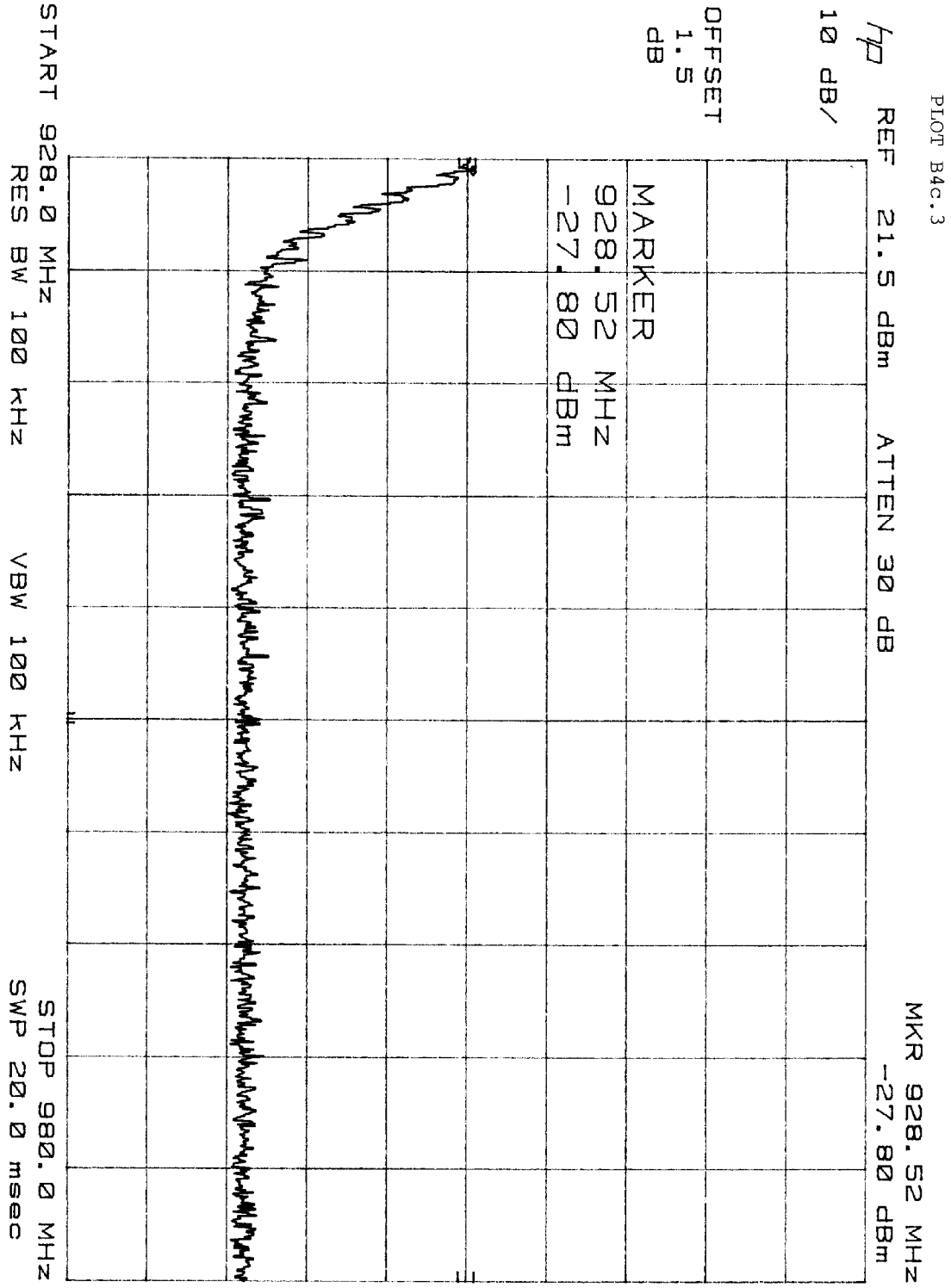

PLOT B4b.2
REF 21.5 dBm
ATTEN 30 dB
10 dB/
OFFSET
1.5
dB
MKR 914.58 MHz
7.20 dBm
START 902.0 MHz
RES BW 100 kHz
VBW 100 kHz
STOP 928.0 MHz
SWP 20.0 msec

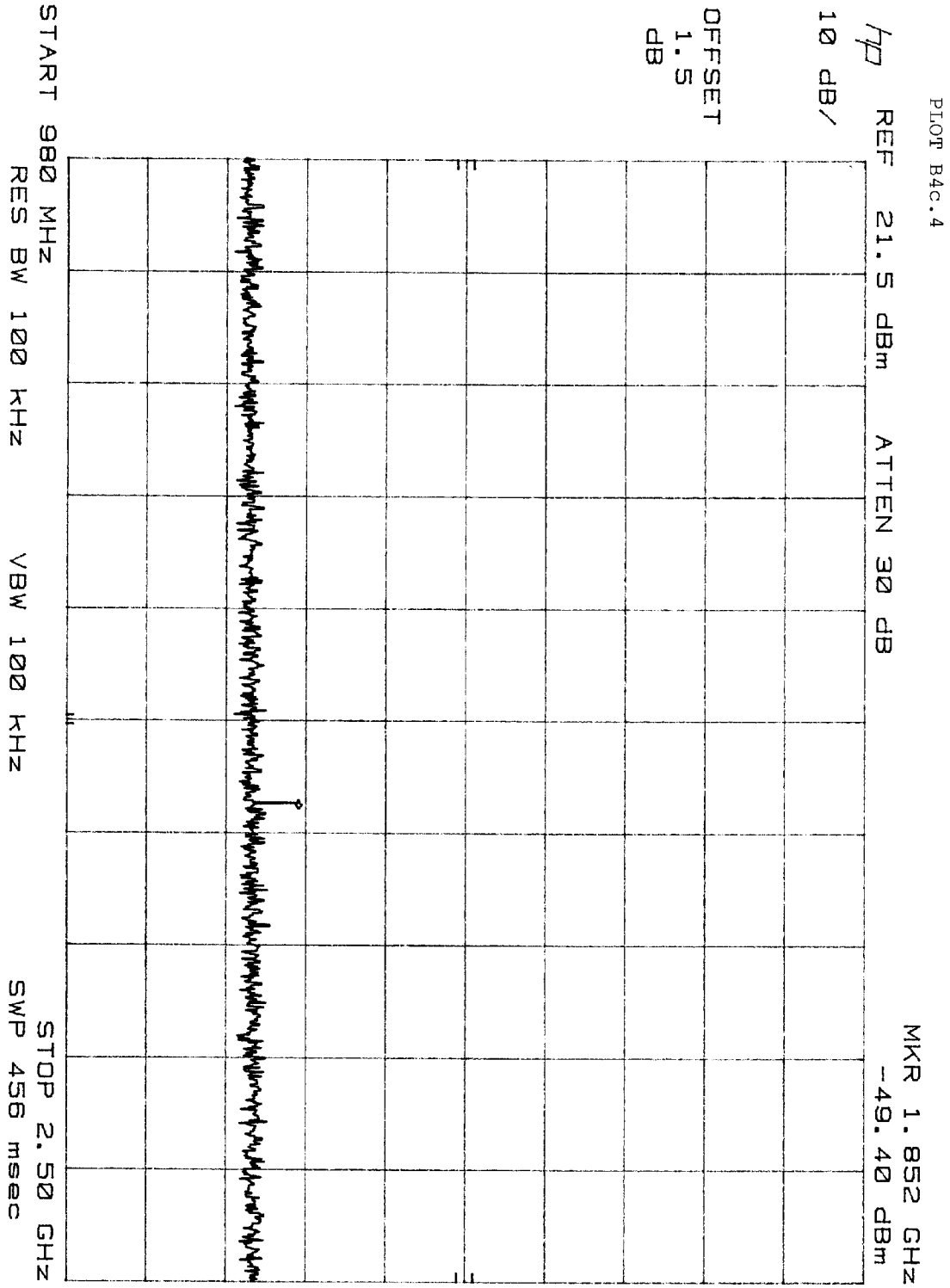

PLOT B4b.3
hp
REF 21.5 dBm
ATTEN 30 dB
10 dB/
OFFSET
1.5
dB
MKR 1.829 GHz
-47.70 dBm
START 928 MHz
RES BW 100 kHz
VBW 100 kHz
STOP 2.50 GHz
SWP 472 msec

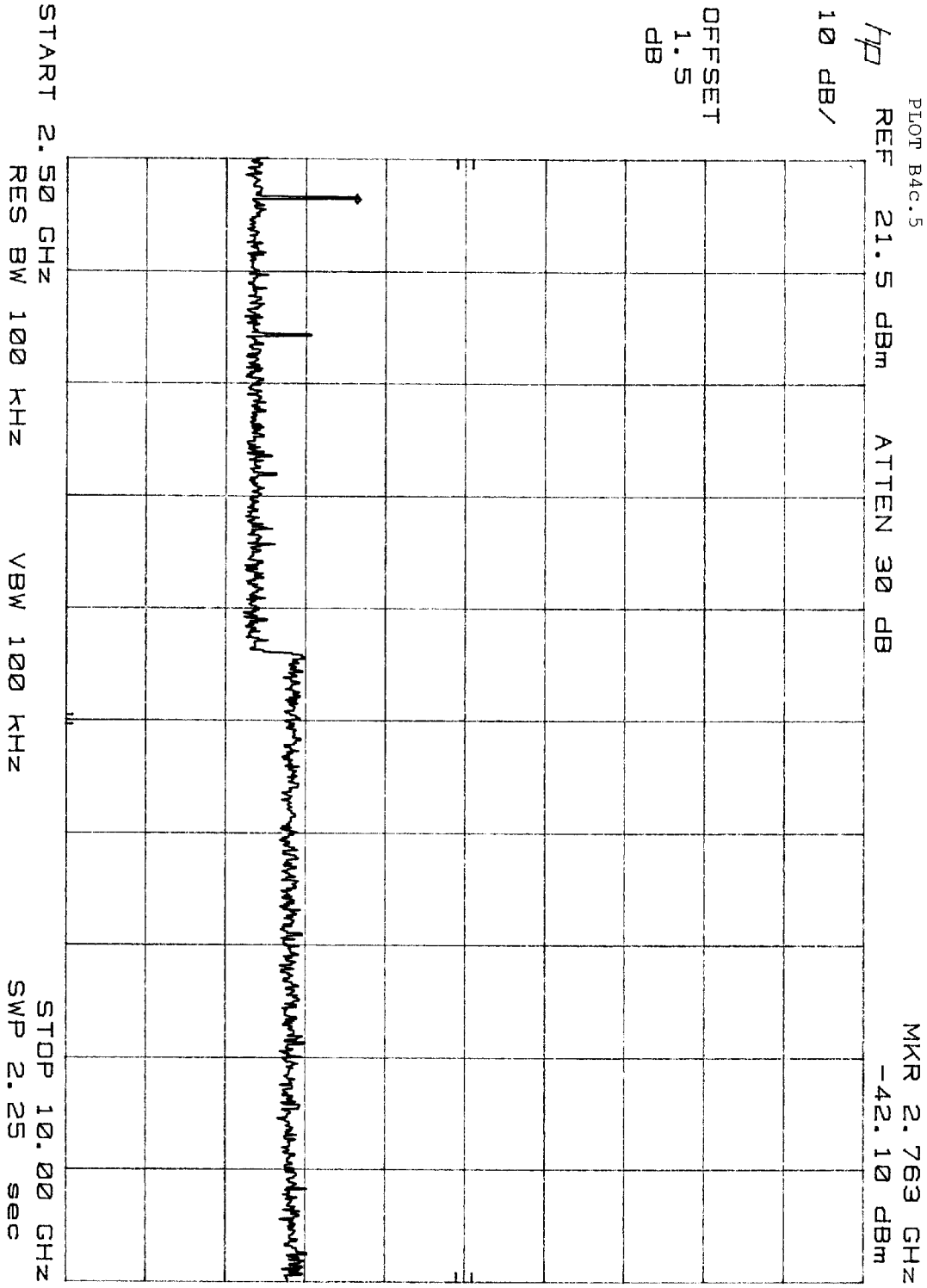

PLOT B4b.4
REF 21.5 dBm
ATTEN 30 dB
10 dB/
OFFSET
1.5
dB
MKR 2.725 GHz
-43.40 dBm
START 2.50 GHz
RES BW 100 kHz
VBW 100 kHz
STOP 10.00 GHz
SWP 2.25 sec

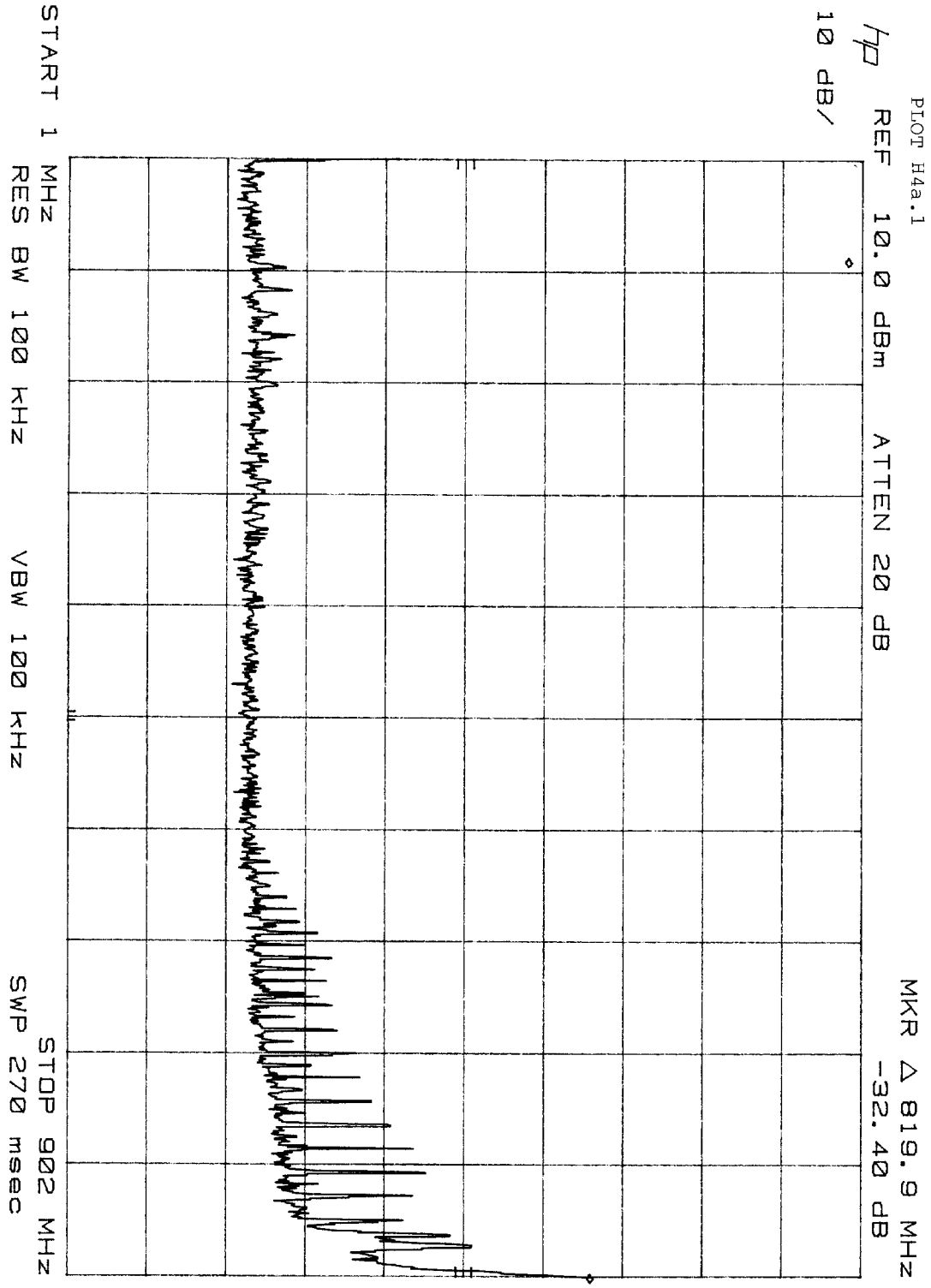

PLOT B4c.1
hp
REF 21.5 dBm
ATTEN 30 dB
10 dB/
OFFSET
1.5
dB
MKR 875.9 MHz
-48.90 dBm
START 1 MHz
RES BW 100 kHz
VBW 100 kHz
STOP 902 MHz
SWP 270 msec

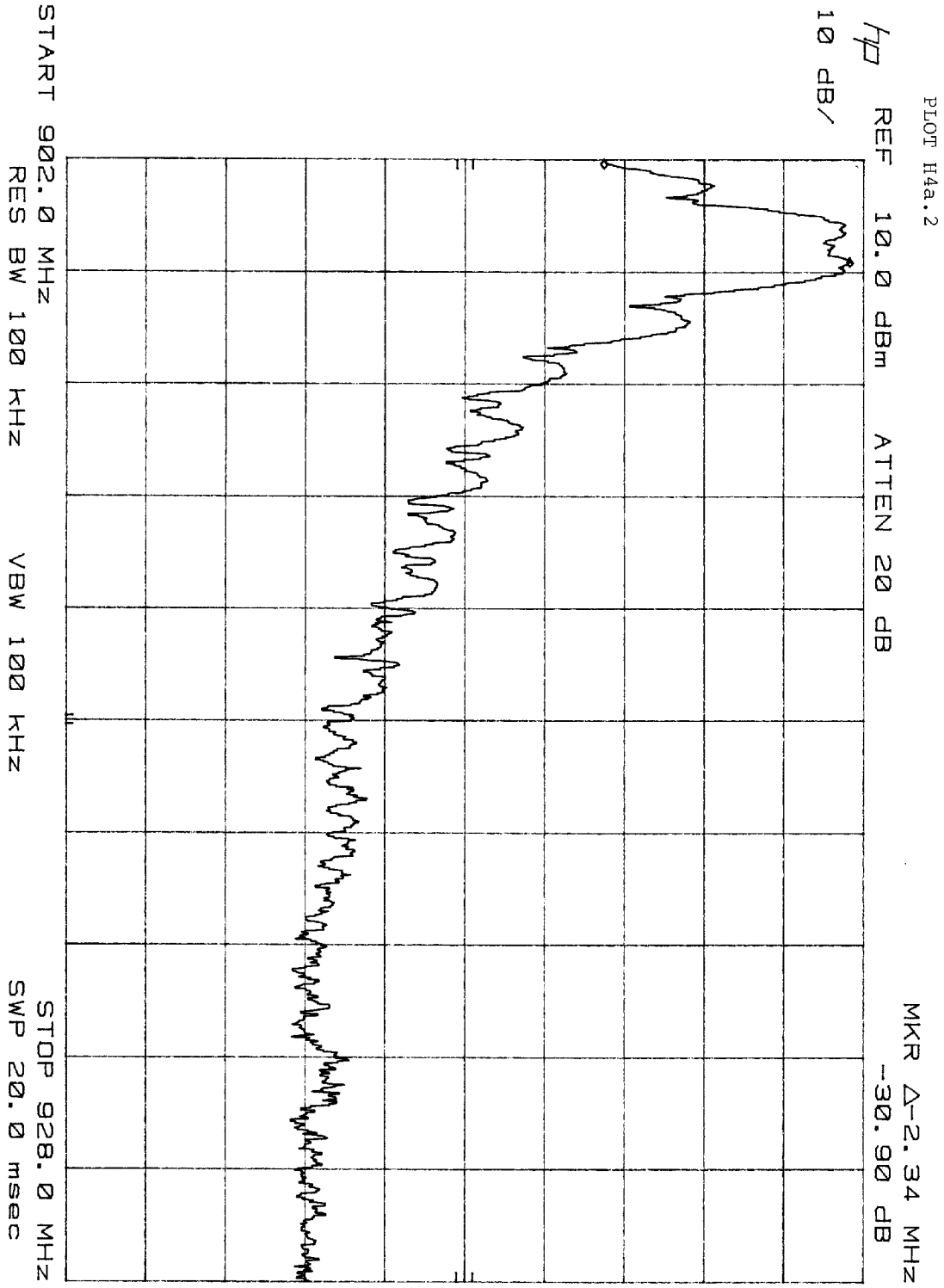

PLOT B4c.2
REF 21.5 dBm
ATTEN 30 dB
10 dB/
OFFSET
1.5
dB
MKR Δ 1.92 MHz
-33.60 dB
START 902.0 MHz
RES BW 100 kHz
VBW 100 kHz
STOP 928.0 MHz
SWP 20.0 msec

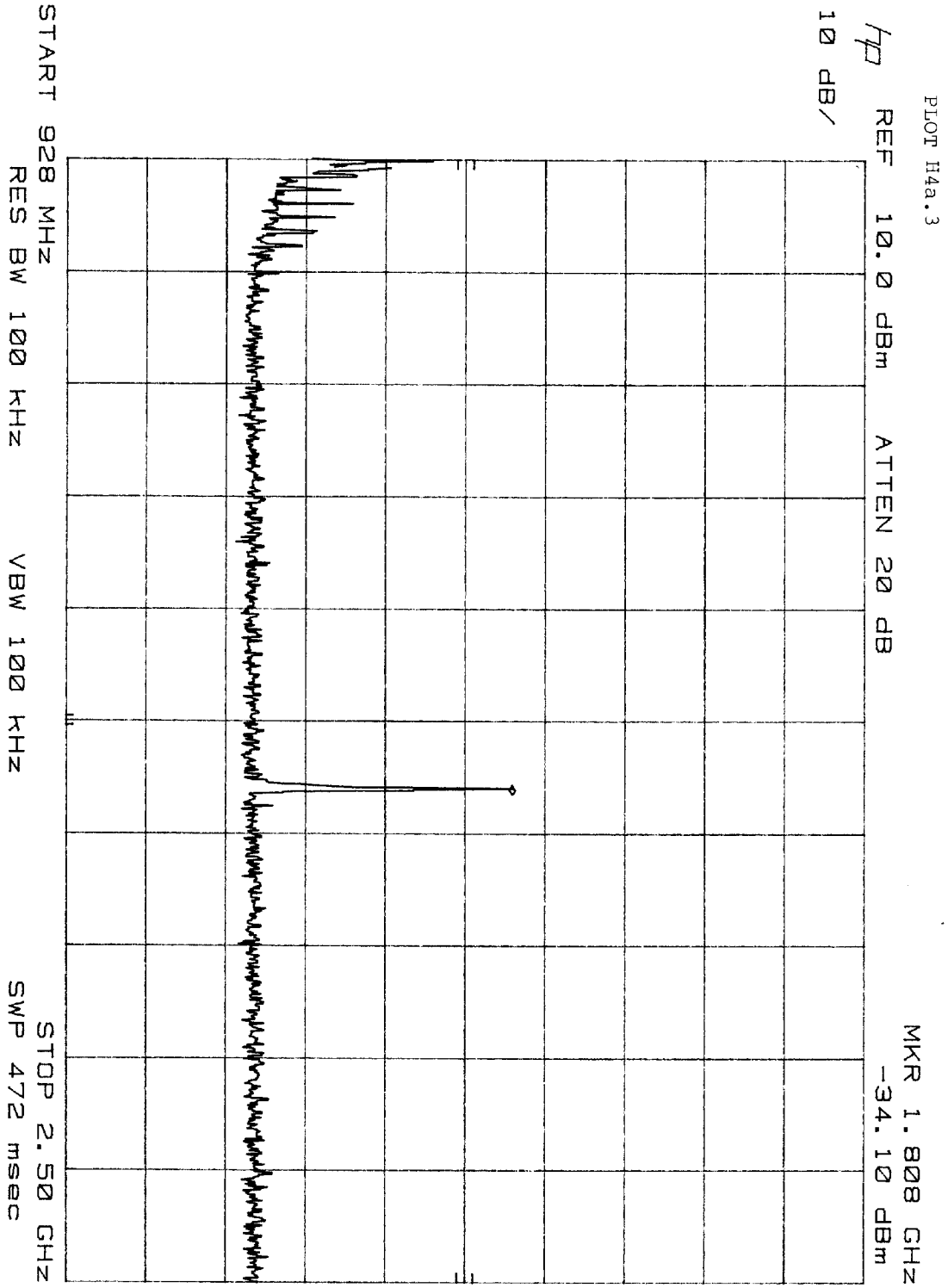

PLOT B4c.3
hp
REF 21.5 dBm
ATTEN 30 dB
10 dB/
OFFSET
1.5
dB
MARKER
928.52 MHz
-27.80 dBm
MKR 928.52 MHz
-27.80 dBm
START 928.0 MHz
RES BW 100 kHz
VBW 100 kHz
STOP 980.0 MHz
SWP 20.0 msec

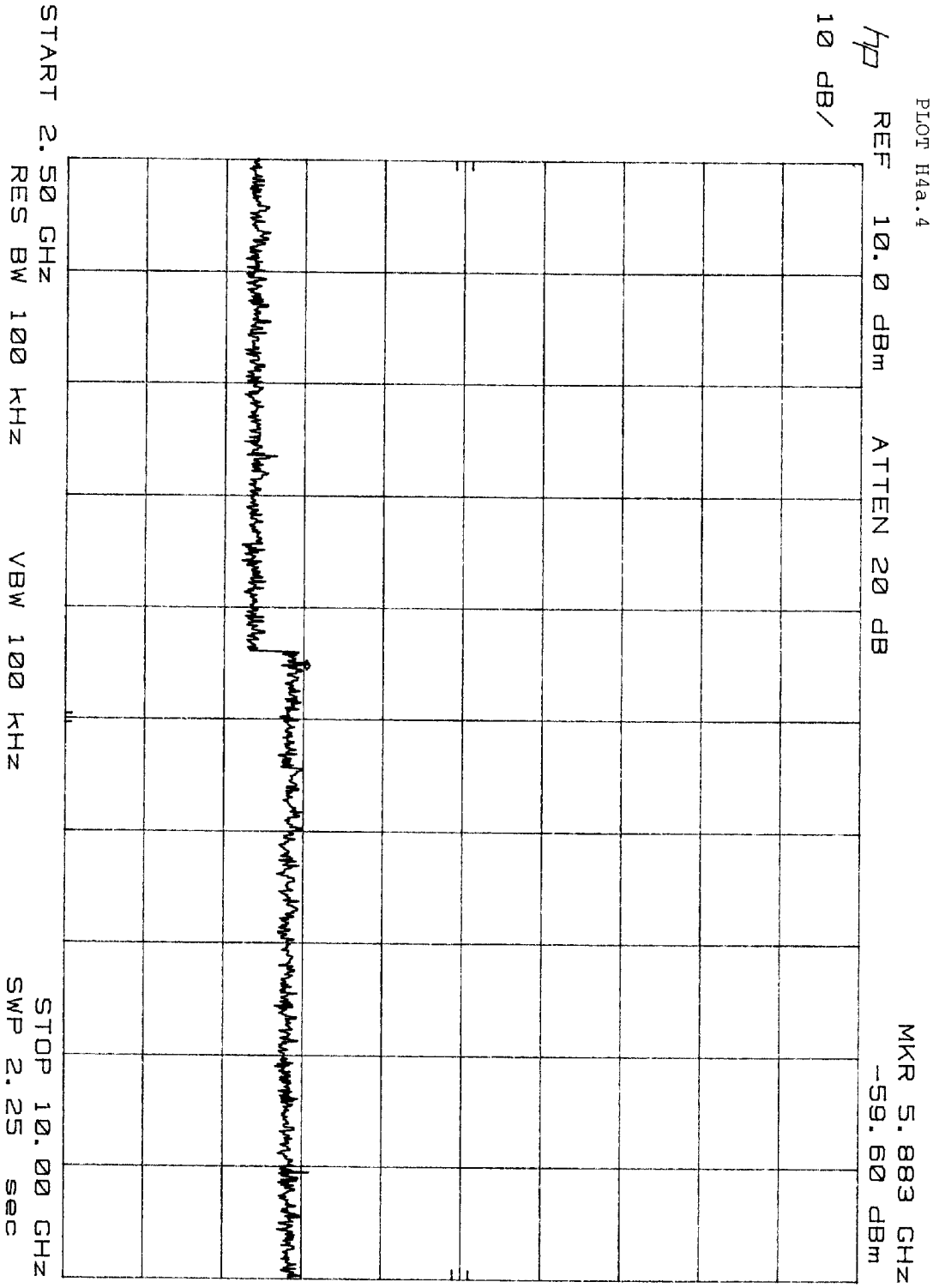

PLOT B4c.4
REF 21.5 dBm
ATTEN 30 dB
10 dB/
OFFSET
1.5
dB
MKR 1.852 GHz
-49.40 dBm
START 980 MHz
RES BW 100 kHz
VBW 100 kHz
STOP 2.50 GHz
SWP 456 msec

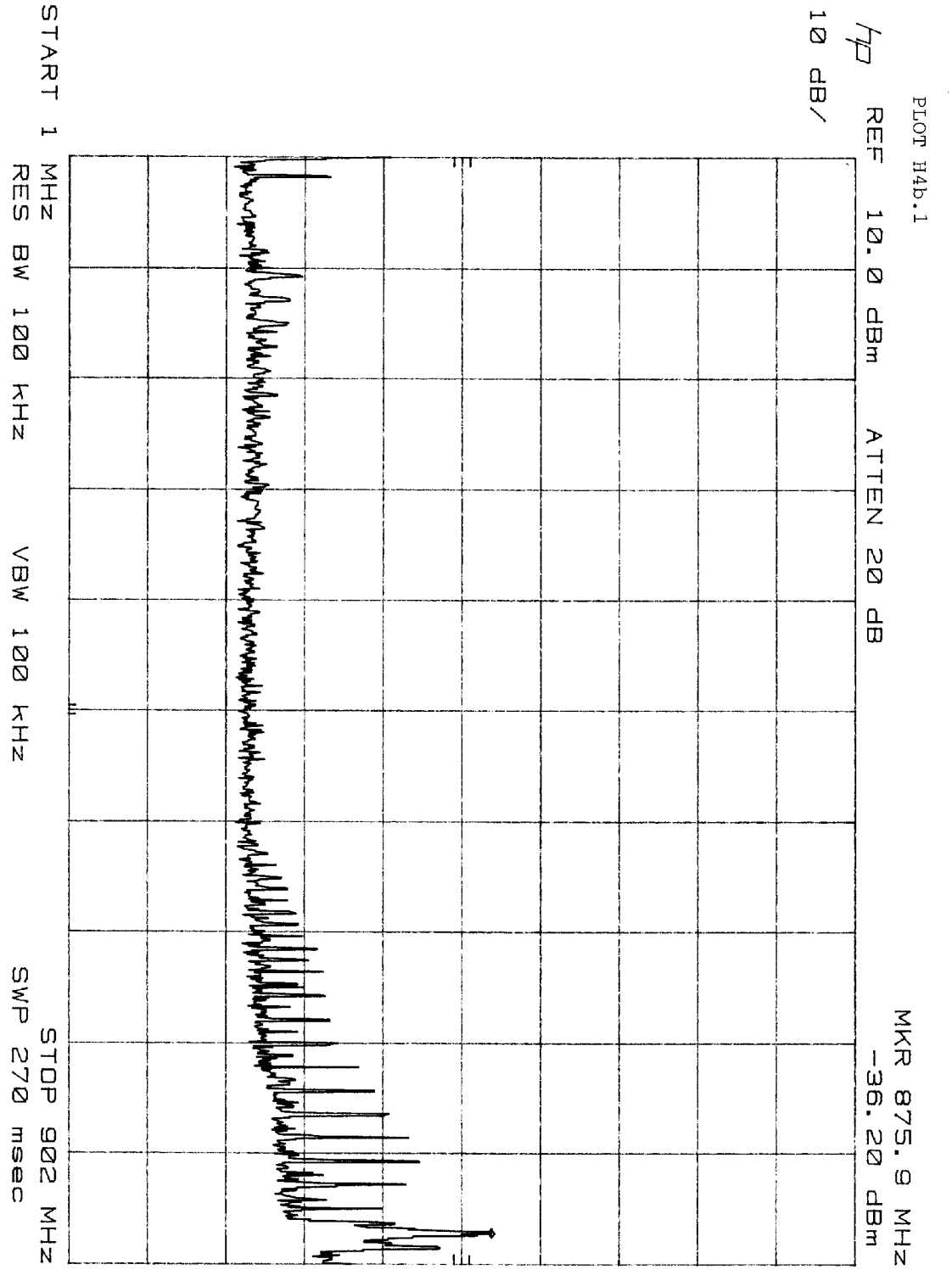

PLOT B4c.5
hp
REF 21.5 dBm
ATTEN 30 dB
10 dB/
OFFSET
1.5
dB
MKR 2.763 GHz
-42.10 dBm
START 2.50 GHz
RES BW 100 kHz
VBW 100 kHz
STOP 10.00 GHz
SWP 2.25 sec

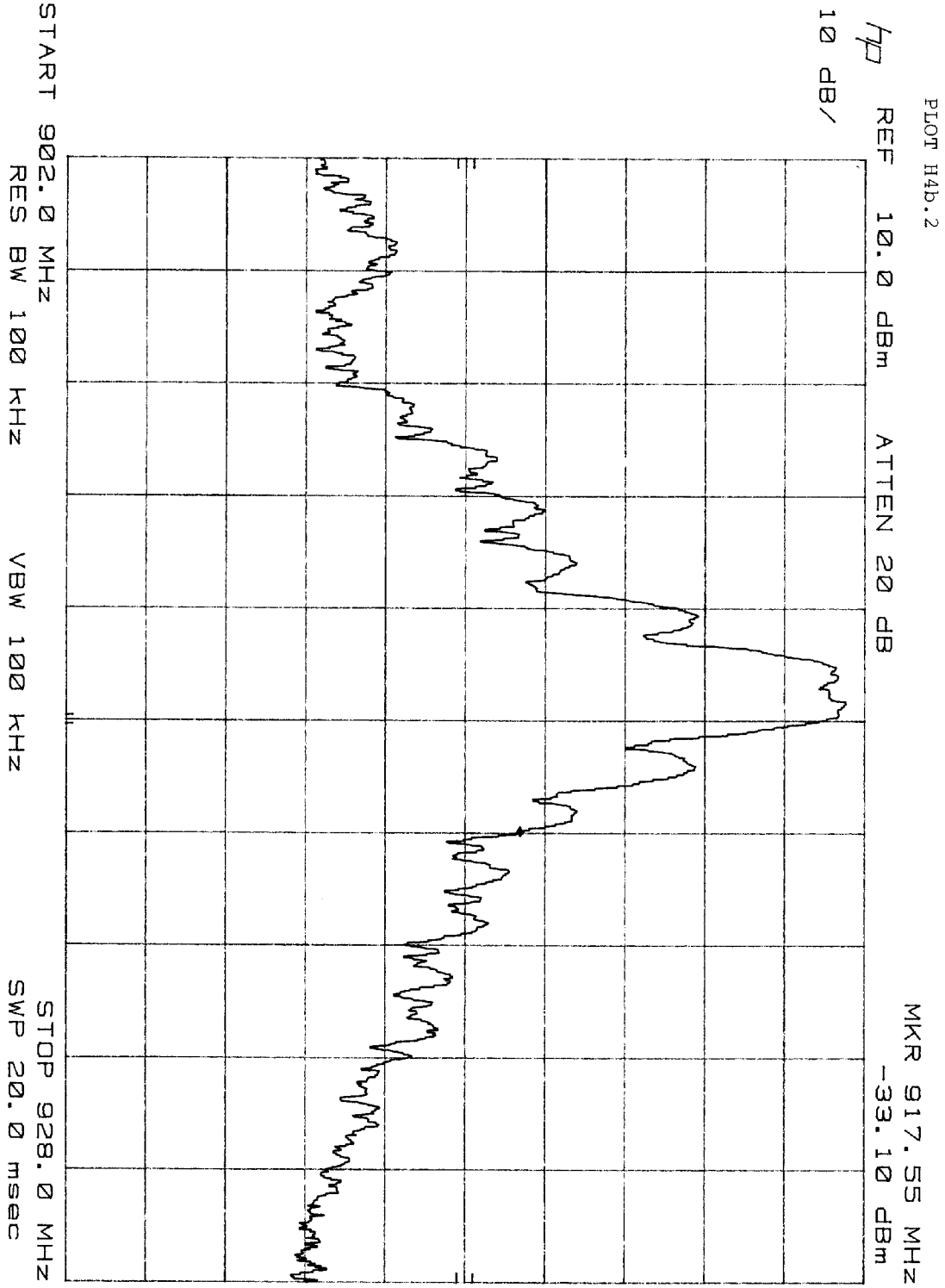

PLOT H4a.1
REF 10.0 dBm
ATTEN 20 dB
10 dB/
MKR Δ 819.9 MHz
-32.40 dB
START 1 MHz
RES BW 100 kHz
VBW 100 kHz
STOP 902 MHz
SWP 270 msec

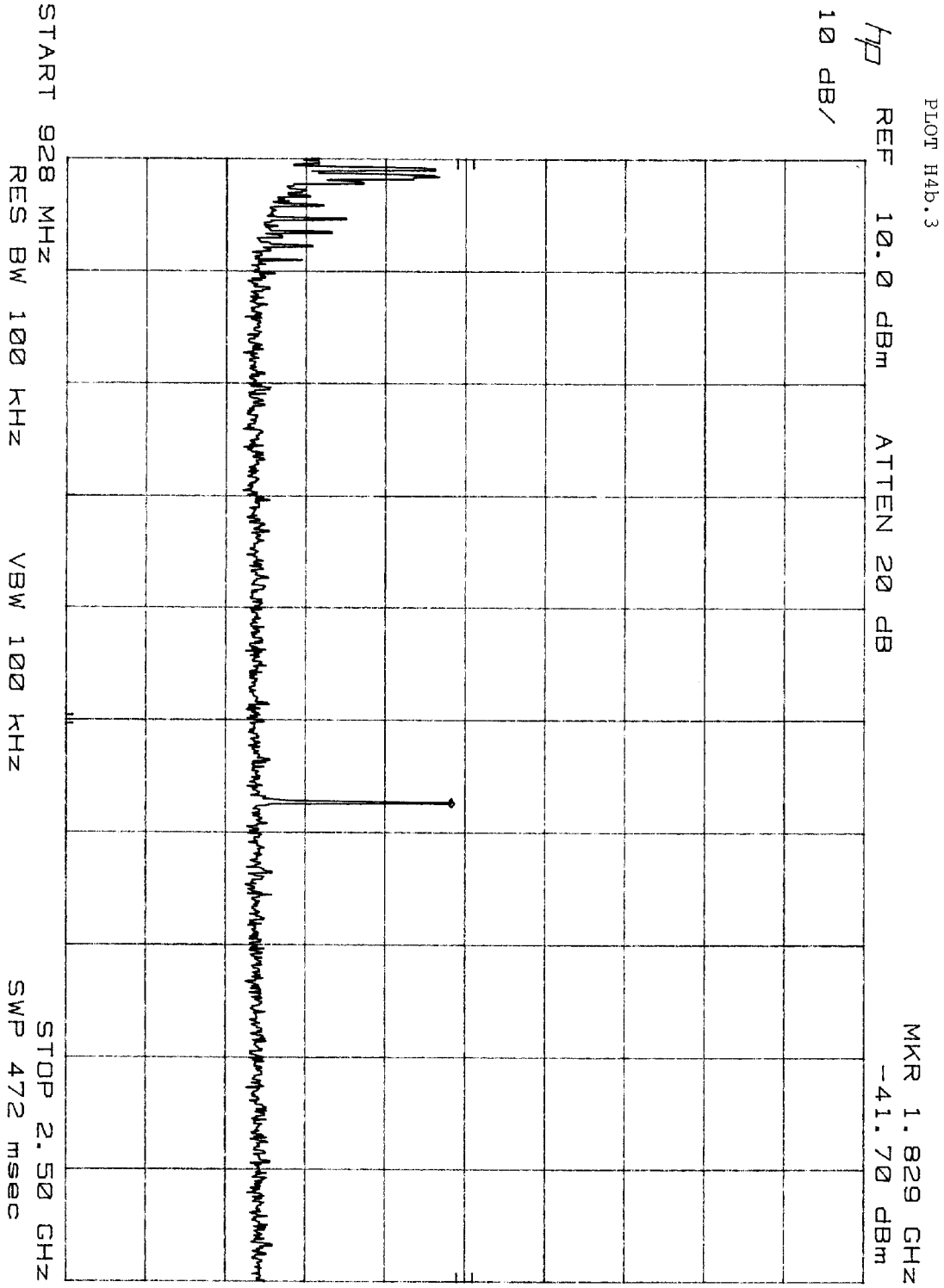

PLOT H4a.2
REF 10.0 dBm
ATTEN 20 dB
10 dB/
MKR Δ-2.34 MHz
-30.90 dB
START 902.0 MHz
RES BW 100 kHz
VBW 100 kHz
STOP 928.0 MHz
SWP 20.0 msec

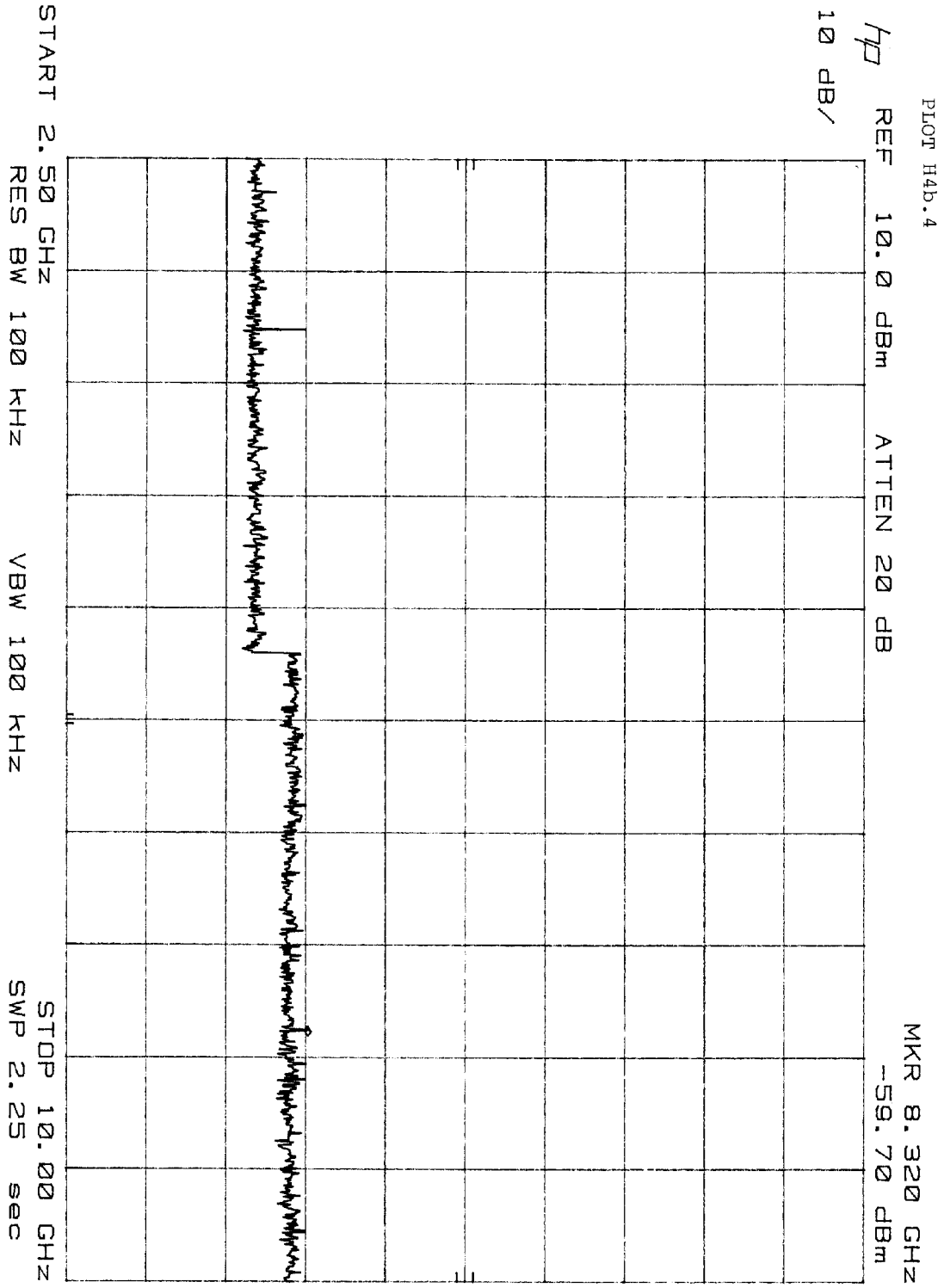

PLOT H4a.3
REF 10.0 dBm
ATTEN 20 dB
10 dB/
MKR 1.808 GHz
-34.10 dBm
START 928 MHz
RES BW 100 kHz
VBW 100 kHz
STOP 2.50 GHz
SWP 472 msec

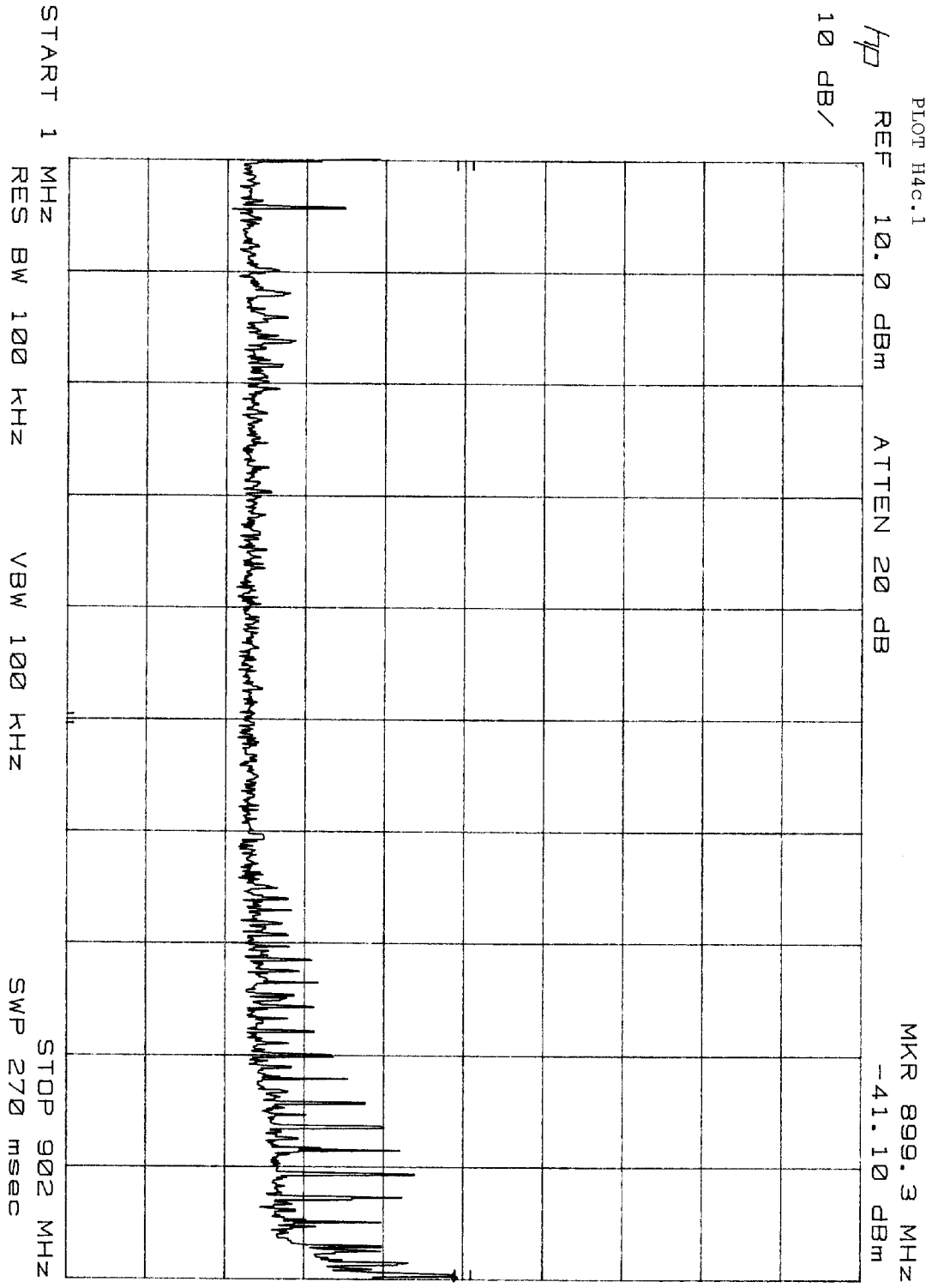

PLOT H4a.4
REF 10.0 dBm
ATTEN 20 dB
10 dB/
MKR 5.883 GHz
-59.60 dBm
START 2.50 GHz
RES BW 100 kHz
VBW 100 kHz
STOP 10.00 GHz
SWP 2.25 sec

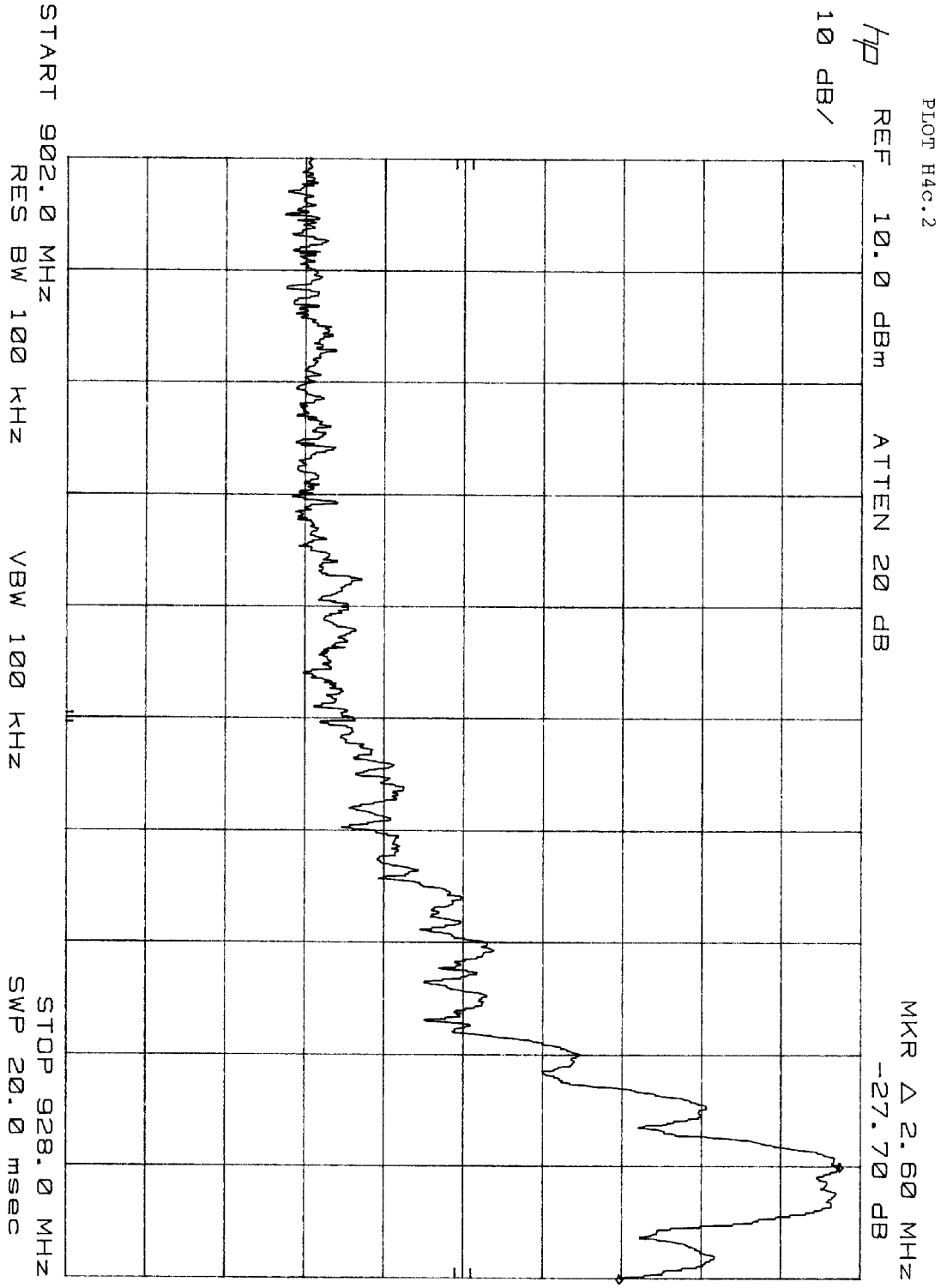

PLOT H4b.1
REF 10.0 dBm
ATTEN 20 dB
10 dB/
MKR 875.9 MHz
-36.20 dBm
START 1 MHz
RES BW 100 kHz
VBW 100 kHz
STOP 902 MHz
SWP 270 msec

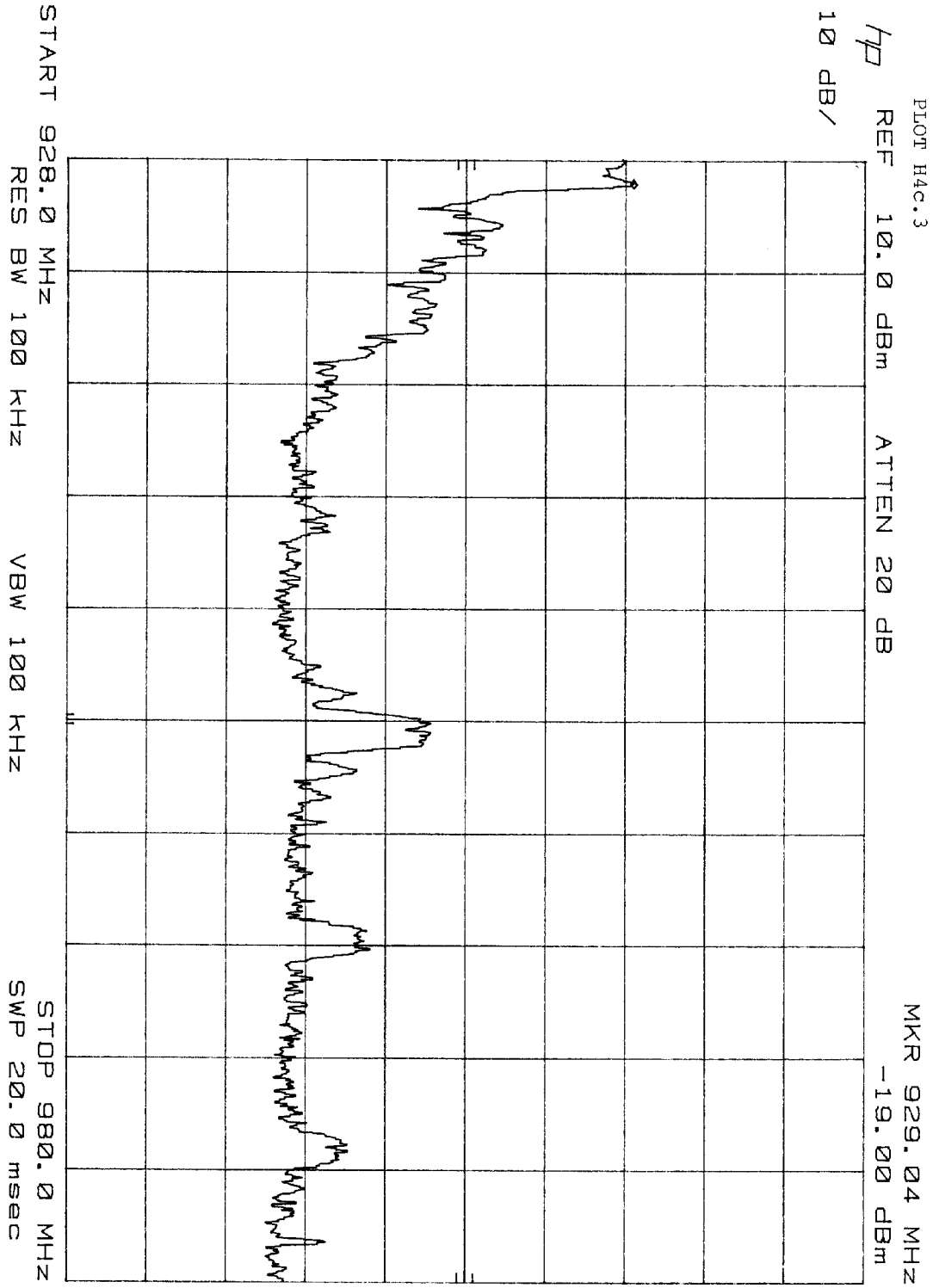

PLOT H4b.2
REF 10.0 dBm
ATTEN 20 dB
10 dB/
MKR 917.55 MHz
-33.10 dBm
START 902.0 MHz
RES BW 100 kHz
VBW 100 kHz
STOP 928.0 MHz
SWP 20.0 msec

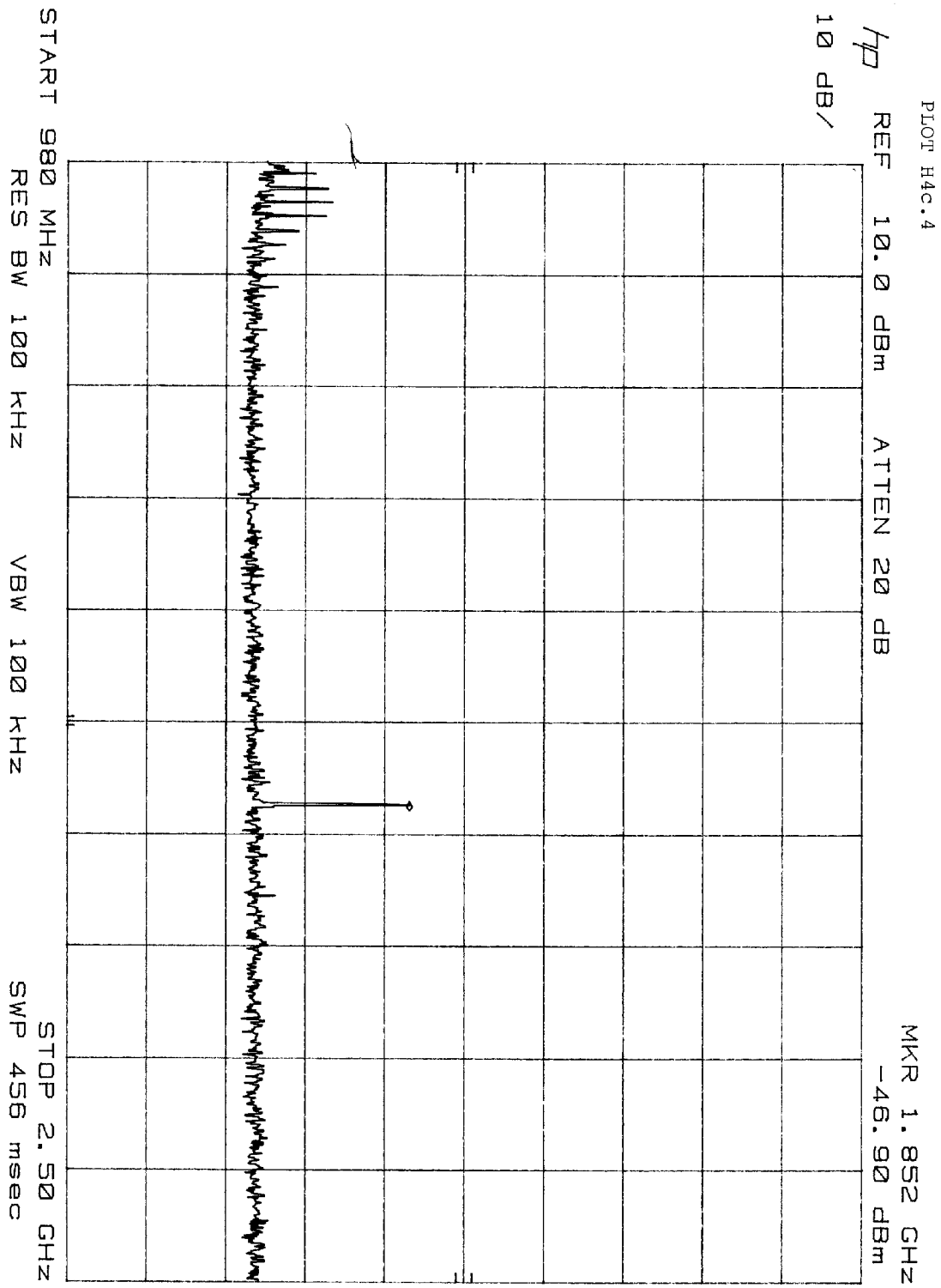

PLOT H4b.3
REF 10.0 dBm
ATTEN 20 dB
10 dB/
MKR 1.829 GHz
-41.70 dBm
START 928 MHz
RES BW 100 kHz
VBW 100 kHz
STOP 2.50 GHz
SWP 472 msec

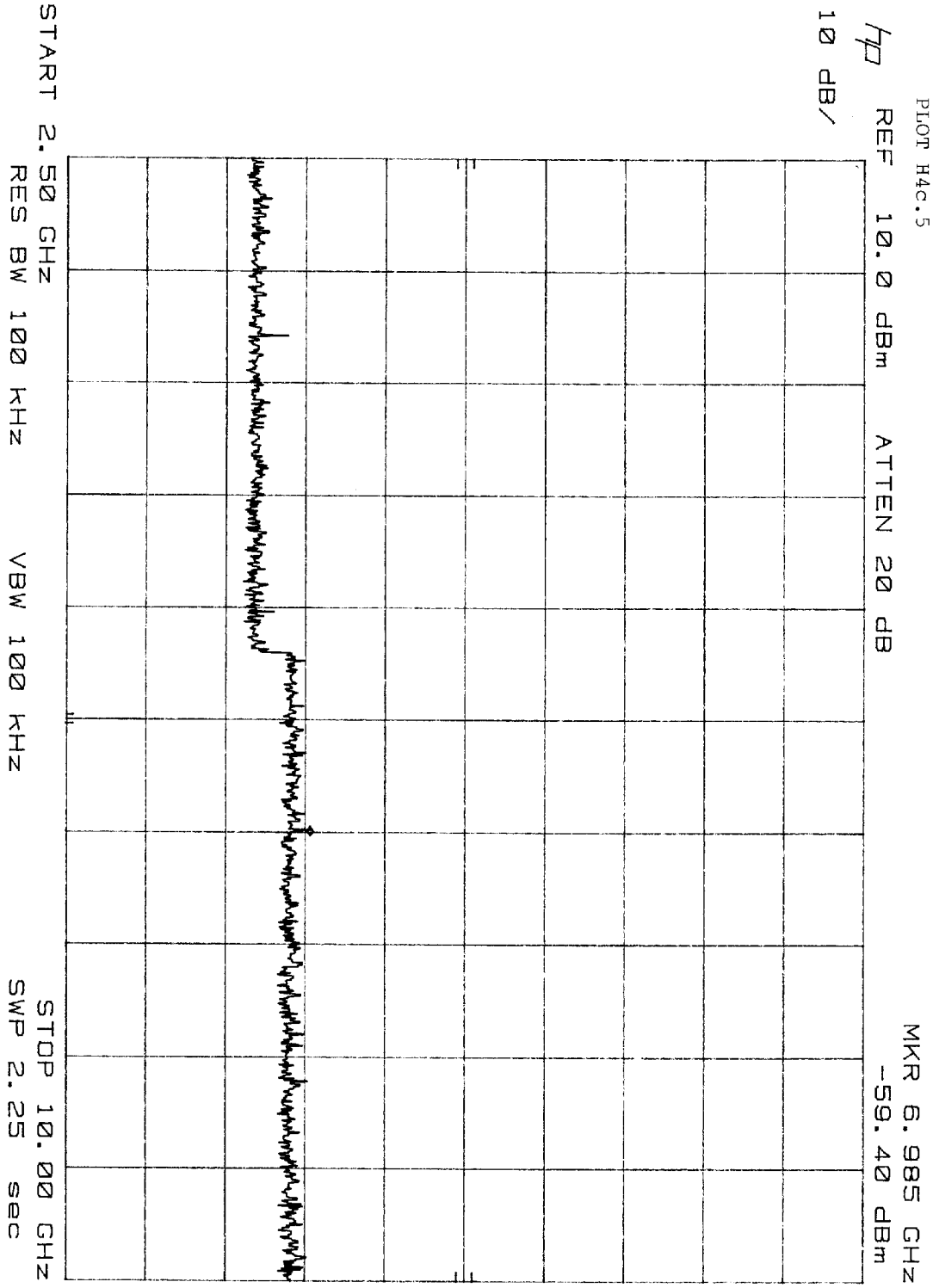

PLOT H4b.4
REF 10.0 dBm
ATTEN 20 dB
10 dB/
MKR 8.320 GHz
-59.70 dBm
START 2.50 GHz
RES BW 100 kHz
VBW 100 kHz
STOP 10.00 GHz
SWP 2.25 sec


PLOT H4c.1
REF 10.0 dBm
ATTEN 20 dB
10 dB/
MKR 899.3 MHz
-41.10 dBm
START 1 MHz
RES BW 100 kHz
VBW 100 kHz
STOP 902 MHz
SWP 270 msec


PLOT H4c.2
REF 10.0 dBm
ATTEN 20 dB
10 dB/
MKR Δ 2.60 MHz
-27.70 dB
START 902.0 MHz
RES BW 100 kHz
VBW 100 kHz
STOP 928.0 MHz
SWP 20.0 msec


PLOT H4c.3
REF 10.0 dBm
ATTEN 20 dB
10 dB/
MKR 929.04 MHz
-19.00 dBm
START 928.0 MHz
RES BW 100 kHz
VBW 100 kHz
STOP 980.0 MHz
SWP 20.0 msec

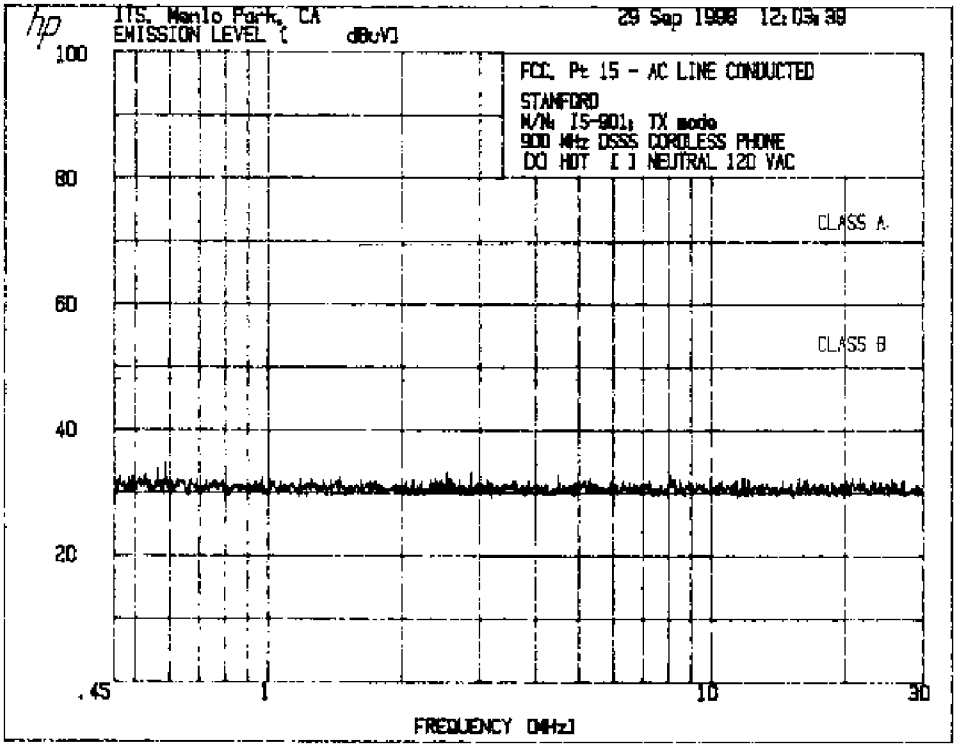

PLOT H4c.4
REF 10.0 dBm
ATTEN 20 dB
10 dB/
MKR 1.852 GHz
-46.90 dBm
START 980 MHz
RES BW 100 kHz
VBW 100 kHz
STOP 2.50 GHz
SWP 456 msec

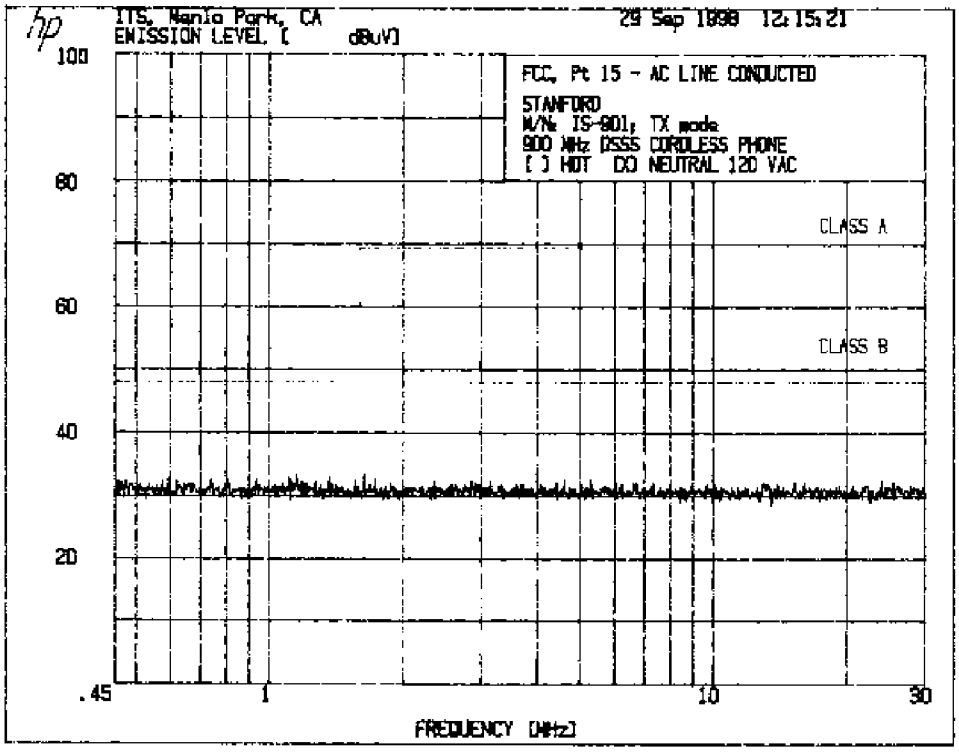

PLOT H4c.5
REF 10.0 dBm
ATTEN 20 dB
10 dB/
MKR 6.985 GHz
-59.40 dBm
START 2.50 GHz
RES BW 100 kHz
VBW 100 kHz
STOP 10.00 GHz
SWP 2.25 sec

4.7 AC Line Conducted Emission, FCC Rule 15.207:

[ ] Not required; battery operation only

[x] Test data attached


ITS, Menlo Park, CA
EMISSION LEVEL [dBuV]
29 Sep 1998 12:05:38
FCC, Pt 15 - AC LINE CONDUCTED
STANFORD
M/N IS-901; TX mode
900 MHz DSSS CORDLESS PHONE
[X] HOT [ ] NEUTRAL 120 VAC
CLASS A
CLASS B
100
80
60
40
20
.45
1
10
30
FREQUENCY [MHz]


ITS, Menlo Park, CA
EMISSION LEVEL [dBuV]
29 Sep 1998 12:15:21
FCC, Pt 15 - AC LINE CONDUCTED
STANFORD
M/N IS-901; TX mode
900 MHz DSSS CORDLESS PHONE
[ ] HOT [X] NEUTRAL 120 VAC
CLASS A
CLASS B
100
80
60
40
20
.45
1
10
30
FREQUENCY [MHz]

```
==================================================================
ITS, Menlo Park, CA                    29 Sep 1998   12:03:39
==================================================================
 3. FCC CFR 47, Pt 15
    3.1  FCC, Pt 15 - AC LINE CONDUCTED
==================================================================
STANFORD
M/N: IS-901; TX mode
900 MHz DSSS CORDLESS PHONE
[X] HOT  [ ] NEUTRAL 120 VAC


PEAKS FOUND ABOVE  33 dBuV

PEAK#  FREQ (MHz)  AMPL(dBuV)
  1        .5692      34.1
  2        .5936      35.0
  3       2.545       33.6
  4       2.887       33.8
  5       4.541       33.1
  6       8.137       33.3


==================================================================
ITS, Menlo Park, CA                    29 Sep 1998   12:15:21
==================================================================
 3. FCC CFR 47, Pt 15
    3.1  FCC, Pt 15 - AC LINE CONDUCTED
==================================================================
STANFORD
M/N: IS-901; TX mode
900 MHz DSSS CORDLESS PHONE
[ ] HOT  [X] NEUTRAL 120 VAC


PEAKS FOUND ABOVE  33 dBuV

PEAK#  FREQ (MHz)  AMPL(dBuV)
  1        .5986      33.0
  2       1.123       33.0
  3       1.166       33.4
  4       1.379       33.1
  5       1.652       33.6
```

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

[ ] Not required - No digital part
[X] Test results are attached
[X] Included in the separate DOC report.

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

[X] 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

1365 Adams Court, Menlo Park CA 94025

Radiated Emissions Test Data

Company:	Stanford	Model #:	IS-901 Digital Spread Spectrum
EUT:	900 MHz cordless phone (base unit)	S/N or FCC	Not labelled
Project #:	J98026020	Engineer:	Ahmad
Test Mode:	TX/ low channel	Date of Test	10/5/98 Initial:

	Antenna	Pre-Amp	Cable A	Cable B	OCF
Number:	8	8	12	0	0
Model:	EMCO 311	CDI_P1000	Green_M+L	None	None

Standard	FCC Part 15.247	
Limits	12	
Test Distance	3	meters

Frequency MHz	Reading dB(uV)	Det. P/A/Q	Ant. Pol. H/V	Ant. Factor dB(1/m)	Pre-Amp dB	Insert. Loss dB	D. F. dB	Net dB(uV/m)	Limit @3m dB(uV/m)	Margin dB
2712.8	45.0	A	V	27.9	28.4	2.3	0.0	46.8	54.0	-7.2
2712.8	50.0	P	V	27.9	28.4	2.3	0.0	51.8	74.0	-22.2
3616.8	51.0	P	H	31.5	27.8	2.7	0.0	57.4	74.0	16.7
3616.8	43.0	A	H	31.5	27.8	2.7	0.0	49.4	54.0	4.6
4521.3	51.0	P	V	32.1	27.9	3.2	0.0	58.4	74.0	15.6
4521.3	42.0	A	V	32.1	27.9	3.2	0.0	49.4	54.0	4.6
5425.3	45.0	P	H	32.9	28.3	3.5	0.0	53.1	74.0	-20.9
5425.3	41.2	A	H	32.9	28.3	3.5	0.0	49.3	54.0	4.7

Notes: a) P: Peak; A: Average; Q: Quasi Peak; H: Horizontal; V: Vertical; OCF: Other Correction Factor; DF: Distance Factor
b) Insert. Loss = Cable A + Cable B + OCF
c) Negative signs (-) in Margin column signify levels below the limits
d) All other emissions not reported are below the equipment noise floor which is at least 20 dB below the limits.

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ITS Intertek Testing Services

1365 Adams Court, Menlo Park CA 94025

Radiated Emissions Test Data

Company:	Stanford	Model #:	IS-901 Digital Spread Spectrum
EUT:	900 MHz cordless phone (base unit)	S/N or FCC:	Not labelled
Project #:	J98026020	Engineer:	Ahmad
Test Mode:	TX/ MID channel	Date of Test:	10/5/98 initial:

	Antenna	Pre-Amp	Cable A	Cable B	OCF
Number:	8	8	12	0	0
Model:	EMCO 311	CDI_P1000	Green_M+L	None	None

Standard_	FCC Part 15.247	
Limits	12	
Test Distance_	3	meters

Frequency MHz	Reading dB(uV)	Det. P/A/Q	Ant. Pol. H/V	Ant. Factor dB(1/m)	Pre-Amp dB	Insert. Loss dB	D. F. dB	Net dB(uV/m)	Limit @3m dB(uV/m)	Margin dB
2743.0	45.0	A	V	27.9	28.4	2.3	0.0	46.8	54.0	7.2
2743.0	50.0	P	V	27.9	28.4	2.3	0.0	51.8	74.0	22.2
3658.0	44.0	P	V	31.3	27.8	2.7	0.0	50.2	74.0	23.8
3658.0	38.0	A	V	31.3	27.8	2.7	0.0	44.2	54.0	-9.8
4572.0	42.8	P	V	32.1	27.9	3.2	0.0	50.2	74.0	-23.8
4572.0	38.0	A	V	32.1	27.9	3.2	0.0	45.4	54.0	-8.6
7315.0	40.0	P	V	36.3	28.0	4.3	0.0	52.6	74.0	21.4
7315.0	35.0	A	V	36.3	28.0	4.3	0.0	47.6	54.0	6.4
8228.0	44.0	P	V	36.9	27.2	4.8	0.0	58.5	74.0	-15.5
8228.0	35.0	A	V	36.9	27.2	4.8	0.0	50.5	54.0	3.5

Notes: a) P: Peak A: Average Q: Quasi Peak H: Horizontal, V: Vertical, OCF: Other Correction Factor, DF: Distance Factor
b) Insert. Loss = Cable A + Cable B + OCF
c) Negative signs (-) in Margin column signify levels below the limits
d) All other emissions not reported are below the equipment noise floor which is at least 20 dB below the limits.

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ITS Intertek Testing Services

1365 Adams Court, Menlo Park CA 94025

Radiated Emissions Test Data

Company: Stanford
EUT: 900 MHz cordless phone (base unit)
Project #: J98026020
Test Mode: TX/ high channel

Model # IS-901 Digital Spread Spectrum
S/N or FCC Not labelled
Engineer Ahmad
Date of Test 10/5/98 Initial:

	Antenna	Pre-Amp	Cable A	Cable B	OCF
Number:	8	8	12	0	0
Model:	EMCO 311	CDI_P1000	Green_M+L	None	None

Standard_ FCC Part 15.247
Limits_ 12
Test Distance_ 3 meters

Frequency MHz	Reading dB(uV)	Det. P/A/Q	Ant. Pol. H/V	Ant. Factor dB(1/m)	Pre-Amp dB	Insert. Loss dB	D. F. dB	Net dB(uV/m)	Limit @3m dB(uV/m)	Margin dB
2776.7	44.0	P	H	28.1	28.4	2.3	0.0	46.0	74.0	-28.0
2776.7	38.0	A	H	28.1	28.4	2.3	0.0	40.0	54.0	-14.0
3703.0	50.0	P	V	31.3	27.8	2.7	0.0	56.2	74.0	-17.8
3703.0	44.0	A	V	31.3	27.8	2.7	0.0	50.2	54.0	-3.8
4629.0	47.0	P	V	32.1	28.0	3.2	0.0	54.3	74.0	-19.7
4629.0	43.0	A	V	32.1	28.0	3.2	0.0	50.3	54.0	-3.7
7406.0	45.0	P	V	36.3	28.0	4.3	0.0	57.6	74.0	-16.4
7406.0	35.0	A	V	36.3	28.0	4.3	0.0	47.6	54.0	-6.4
8332.1	42.0	P	V	36.9	27.2	4.8	0.0	56.5	74.0	-17.5
8332.1	35.0	A	V	36.9	27.2	4.8	0.0	49.5	54.0	-4.5

Notes: a) P: Peak, A: Average, Q: Quasi Peak, H: Horizontal, V: Vertical, OCF: Other Correction Factor, DF: Distance Factor
b) Insert. Loss = Cable A + Cable B + OCF
c) Negative signs (-) in Margin column signify levels below the limits
d) All other emissions not reported are below the equipment noise floor which is at least 20 dB below the limits.

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ITS Intertek Testing Services

1365 Adams Court, Menlo Park CA 94025

Radiated Emissions Test Data

Company	Stanford	Model #	IS-901 Digital Spread Spectrum
EUT.	900 MHz cordless phone (handset	S/N or FCC	Not labelled
Project #	J98026020	Engineer	Ahmad
Test Mode.	TX/ low channel	Date of Test	10/5/98 Initial

	Antenna	Pre-Amp	Cable A	Cable B	OCF
Number:	8	8	12	0	0
Model:	EMCO 311	CDI_P1000	Green_M+L	None	None

Standard_	FCC Part 15.247	
Limits_	12	
Test Distance_	3	meters

Frequency MHz	Reading dB(uV)	Det. P/A/O	Ant. Pol. H/V	Ant. Factor dB(1/m)	Pre-Amp dB	Insert. Loss dB	D. F. dB	Net dB(uV/m)	Limit @3m dB(uV/m)	Margin dB
2712.0	55.0	P	H	28.1	28.4	2.3	0.0	57.0	74.0	-17.0
2712.0	48.0	A	H	28.1	28.4	2.3	0.0	50.0	54.0	4.0
3616.8	51.0	P	H	31.5	27.8	2.7	0.0	57.4	74.0	16.7
3616.8	42.0	A	H	31.5	27.8	2.7	0.0	48.4	54.0	5.6
4520.8	45.0	P	H	32.2	27.9	3.2	0.0	52.5	74.0	21.5
4520.8	41.0	A	H	32.2	27.9	3.2	0.0	48.5	54.0	5.5
7233.0	40.0	P	H	35.6	28.0	4.3	0.0	52.1	74.0	21.9
7233.0	36.1	A	H	35.6	28.0	4.3	0.0	48.2	54.0	5.8

Notes:
a) P: Peak A: Average, Q: Quasi Peak H: Horizontal, V: Vertical OCF Other Correction Factor, DF Distance Factor
b) Insert. Loss = Cable A + Cable B + OCF
c) Negative signs ( ) in Margin column signify levels below the limits
d) All other emissions not reported are below the equipment noise floor which is at least 20 dB below the limits

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ITS Intertek Testing Services

1365 Adams Court, Menlo Park CA 94025

Radiated Emissions Test Data

Company: Stanford
EUT: 900 MHz cordless phone (handset
Project #: J98026020
Test Mode: TX/ MID channel

Model # IS-901 Digital Spread Spectrum
S/N or FCC Not labelled
Engineer Ahmad
Date of Test 10/5/98 Initial

	Antenna	Pre Amp	Cable A	Cable B	OCF
Number:	8	8	12	0	0
Model:	EMCO 311	CDI_P1000	Green_M+L	None	None

Standard	FCC Part 15.247	
Limits_	12	
Test Distance_	3	meters

Frequency MHz	Reading dB(uV)	Det. P/A/Q	Ant. Pol. H/V	Ant. Factor dB(1/m)	Pre-Amp dB	Insert. Loss dB	D. F. dB	Net dB(uV/m)	Limit @3m dB(uV/m)	Margin dB
2743.6	52.0	P	H	28.1	28.4	2.3	0.0	54.0	74.0	20.0
2743.6	47.0	A	H	28.1	28.4	2.3	0.0	49.0	54.0	5.0
3657.0	49.0	P	V	31.3	27.8	2.7	0.0	55.2	74.0	18.8
3657.0	42.0	A	V	31.3	27.8	2.7	0.0	48.2	54.0	5.8
4571.9	48.0	P	H	32.2	27.9	3.2	0.0	55.5	74.0	18.5
4571.9	41.0	A	H	32.2	27.9	3.2	0.0	48.5	54.0	5.5
7316.0	42.0	P	H	35.5	26.0	4.2	0.0	54.1	74.0	19.9
7316.0	35.0	A	H	35.5	26.0	4.2	0.0	47.1	54.0	6.9

Notes: a) P: Peak; A: Average; Q: Quasi Peak; H: Horizontal; V: Vertical; OCF: Other Correction Factor; DF: Distance Factor
b) Insert. Loss = Cable A + Cable B + OCF
c) Negative signs (-) in Margin column signify levels below the limits
d) All other emissions not reported are below the equipment noise floor which is at least 20 dB below the limits

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ITS Intertek Testing Services

1365 Adams Court, Menlo Park CA 94025

Radiated Emissions Test Data

Company: Stanford
EUT: 900 MHz cordless phone (hand set)
Project # J98026020
Test Mode: stand-by

Model # IS-901 Digital Spread Spectrum
S/N or FCC N/A
Engineer C. Kwan
Date of Test 09/30/98 Initial

	Antenna	Pre-Amp	Cable A	Cable B	OCF
Number:	1	7	13	0	0
Model:	EMCO 314	CPPA_102	S2_3m	None	None

Standard_ FCC Part 15B
Limits_ 2
Test Distance_ 3 meters

Frequency MHz	Reading dB(uV)	Det. P/A/Q	Ant. Pol. H/V	Ant. Factor dB(1/m)	Pre-Amp dB	Insert. Loss dB	D. F. dB	Net dB(uV/m)	Limit @3m dB(uV/m)	Margin dB
277.2	32.6	p	v	11.4	35.1	2.9	0.0	11.8	46.0	-34.2
419.2	31.7	p	v	15.1	34.9	4.3	0.0	16.2	46.0	-29.8
543.2	37.6	p	v	17.1	34.8	5.3	0.0	25.2	46.0	-20.8
628.2	31.2	p	v	18.0	35.2	5.9	0.0	19.9	46.0	-26.1
704.7	31.1	p	v	19.3	36.1	6.6	0.0	20.9	46.0	-25.1
790.2	38.5	p	v	19.7	36.1	7.2	0.0	29.3	46.0	-16.7
837.7	30.1	p	v	20.9	28.4	8.2	0.0	30.8	46.0	-15.2
866.2	30.3	p	v	23.3	27.5	8.7	0.0	31.8	46.0	-14.2

Notes:
a) P: Peak, A: Average; Q: Quasi Peak H: Horizontal V: Vertical; OCF:Other Correction Factor, DF:Distance Factor
b) Insert Loss = Cable A + Cable B + OCF
c) Negative signs (-) in Margin column signify levels below the limits
d) All other emissions not reported are below the equipment noise floor which is at least 20 dB below the limits

ITS Intertek Testing Services

1365 Adams Court, Menlo Park CA 94025

Radiated Emissions Test Data

Company: Stanford
EUT: 900 MHz cordless phone (base unit)
Project #: J98026020
Test Mode: stand by

Model #: IS-901Digital Spread Spectrum
S/N or FCC N/A
Engineer: C. Kwan
Date of Test: 09/29/98 Initial:

	Antenna	Pre-Amp	Cable A	Cable B	OCF
Number:	1	7	13	0	0
Model:	EMCO 314	CPPA_102	S2_3m	None	None

Standard_	FCC Part 15B	
Limits_	2	
Test Distance_	3	meters

Frequency MHz	Reading dB(uV)	Det. P/A/Q	Ant. Pol. H/V	Ant. Factor dB(1/m)	Pre-Amp dB	Insert. Loss dB	D. F. dB	Net dB(uV/m)	Limit @3m dB(uV/m)	Margin dB
144.2	30.5	p	v	8.2	35.3	2.1	0.0	5.5	43.5	-38.0
315.2	30.4	p	v	12.9	34.9	3.1	0.0	11.5	46.0	-34.5
486.2	30.4	p	v	16.4	35.0	5.0	0.0	16.9	46.0	-29.2
505.2	30.1	p	v	16.5	34.8	5.3	0.0	17.1	46.0	-28.9
657.2	30.5	p	v	18.4	35.2	6.3	0.0	20.1	46.0	-25.9
885.2	30.2	p	v	20.9	27.5	8.7	0.0	32.3	46.0	-13.7
904.2	31.0	p	v	21.0	29.1	8.3	0.0	31.3	46.0	-14.8
942.2	31.0	p	v	20.9	29.1	8.3	0.0	31.2	46.0	-14.9

Notes:
a) P: Peak; A: Average; Q: Quasi Peak; H: Horizontal; V: Vertical; OCF:Other Correction Factor; DF:Distance Factor
b) Insert. Loss = Cable A + Cable B + OCF.
c) Negative signs (-) in Margin column signify levels below the limits.
d) All other emissions not reported are below the equipment noise floor which is at least 20 dB below the limits.

ITS Intertek Testing Services

1365 Adams Court, Menlo Park CA 94025

Radiated Emissions Test Data

Company: Stanford
EUT: 900 MHz cordless phone (base unit)
Project #: J98026020
Test Mode: stand by

Model # IS-901Digital Spread Spectrum
S/N or FCC N/A
Engineer C. Kwan
Date of Test 09/29/98 Initial

	Antenna	Pre Amp	Cable A	Cable B	OCF
Number:	1	7	13	0	0
Model:	EMCO 314	CPPA_102	S2_3m	None	None

Standard_ FCC Part 15B
Limits_ 2
Test Distance_ 3 meters

Frequency MHz	Reading dB(uV)	Det. P/A/Q	Ant. Pol. H/V	Ant. Factor dB(1/m)	Pre-Amp dB	Insert. Loss dB	D. F. dB	Net dB(uV/m)	Limit @3m dB(uV/m)	Margin dB
144.2	30.5	p	v	8.2	35.3	2.1	0.0	5.5	43.5	-38.0
315.2	30.4	p	v	12.9	34.9	3.1	0.0	11.5	46.0	-34.5
486.2	30.4	p	v	16.4	35.0	5.0	0.0	16.9	46.0	-29.2
505.2	30.1	p	v	16.5	34.8	5.3	0.0	17.1	46.0	-28.9
657.2	30.5	p	v	18.4	35.2	6.3	0.0	20.1	46.0	-25.9
885.2	30.2	p	v	23.9	27.5	8.7	0.0	32.3	46.0	-13.7
904.2	31.0	p	v	21.0	29.1	8.3	0.0	31.3	46.0	-14.8
942.2	31.0	p	v	20.9	29.1	8.3	0.0	31.2	46.0	14.9

Notes: a) P. Peak; A: Average; Q. Quasi Peak; H Horizontal, V Vertical, OCF:Other Correction Factor DF Distance Factor
b) Insert. Loss = Cable A + Cable B + OCF
c) Negative signs (-) in Margin column signify levels below the limits
d) All other emissions not reported are below the equipment noise floor which is at least 20 dB below the limits.

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.

	Refer to attached test procedure and data sheets.
X	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(DC)

	See attached spectrum analyzer chart(s) for transmitter timing
	See transmitter timing diagram provided by manufacturer
X	Not applicable, duty cycle was not used.

5.0 List of Exhibits

Exhibit 1 **ID Label Format**

Exhibit 2 **ID Label Location**

Exhibit 3 **Equipment Photographs**

Exhibit 4 **Block Diagram**

Exhibit 5 **Circuit Diagram**

Exhibit 6 **This Test Report**

Exhibit 7 **Test Setup Photos**

Exhibit 8 **Instruction Manual**