

APPLICATION FOR FCC CERTIFICATION

Symbol Technologies Inc.

Spread Spectrum (Network Phone)

Model: NP3010

FCC ID: H9PNP3010

LTO# J98017873

Number of Pages: 24 pp. + Supporting Data and Documents

Date of Report: July 10, 1998

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Intertek Testing Services - Menlo Park

Symbol Technologies Inc., Spread Spectrum
FCC ID: H9PNP3010

Date of Test: June 17 - 22, 1998 & July 8, 1998

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1.0 Summary of Tests

Symbol Technologies Inc. - Model No.: NP3010
FCC ID: HPPNP3010

TEST	REFERENCE	RESULTS
Max. Output power	15.247(b)(3)	Pass
20 dB Bandwidth	15.247(a)(1)	Pass
Min. Channel Separation	15.247(a)(1)	Pass
Min. Hopping Channels	15.247(a)(1)	Pass
Average Channel Occupancy Time	15.47(a)(1)	Pass
Out of Band Antenna Conducted Emission	15.247(c)	Pass
Out of Band Radiated Emission	15.247(c)	Not Applicable
Radiated Emission in Restricted Bands	15.247(c), 15.209(a)	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
Antenna Requirement	15.203	Pass

Test Engineer:

Ollie Moyrong
Ollie Moyrong

Date:

7/13/98

EMC Site Mgr.:

David Chernomordik
David Chernomordik

Date:

7/13/98

Intertek Testing Services - Menlo Park

Symbol Technologies Inc., Spread Spectrum
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Date of Test: June 17 - 22, 1998 & July 8, 1998

2.0 General Description

2.1 Product Description

The Symbol Technologies Inc. Model NP3010 is a spread spectrum (network phone).

Overview of the EUT

Applicant	Symbol Technologies Inc.
Trade Name & Model No.	Symbol Technologies, Model No. NP3010
FCC Identifier	H9PNP3010
Use of Product	
Manufacturer & Model of Spread Spectrum Module	
Type of Transmission	Frequency Hopping
Rated RF Output (mW)	
Frequency Range (MHz)	2402 - 2480
Number of Channel(s)	79
Antenna(s) & Gain, dBi	
Processing Gain Measurements	<input type="checkbox"/> Will be provided to ITS for submission with the application <input checked="" type="checkbox"/> Will be provided directly to the FCC reviewing engineer by the client or manufacturer of the spread spectrum module
Antenna Requirement	<input type="checkbox"/> The EUT uses a permanently connected antenna. <input type="checkbox"/> 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. <input type="checkbox"/> The EUT requires professional installation (attach supporting documentation if using this option).
Manufacturer name & address	Symbol Technologies 2145 Hamilton Avenue San Jose, CA 95125

2.2 Related Submittal(s) Grants

None.

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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 located at South San Francisco. This test facility and site measurement data have been fully placed on file with the FCC.

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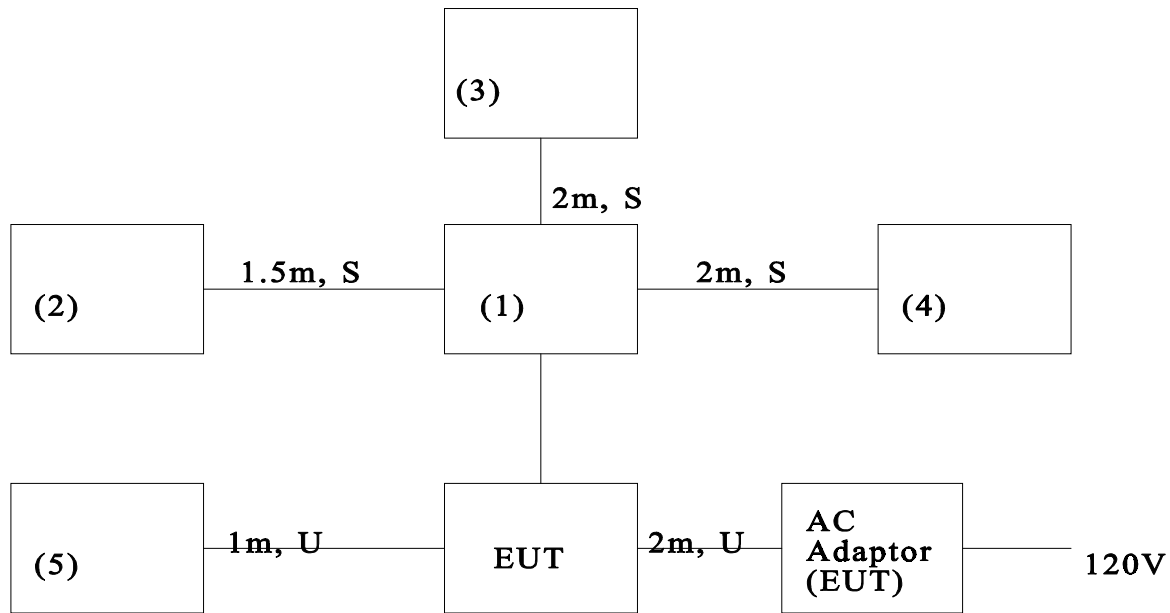
Date of Test: June 17 - 22, 1998 & July 8, 1998

3.0 System Test Configuration

3.1 Support Equipment

Item #	Description	Model No.	Serial No.	FCC ID
1	Compaq Notebook PC	Contura 400CX	B04AB0G5BDL08F 1	CNT75MB2CA
2	Samsung Monitor	CVM4967T	23N39DL04955	A3LVT485
3	HP Printer	2225	H1FC3034000	DSI6XU2225
4	Compaq Mouse	M-S28-6MD	3120S96606	DZL210472
5	Sony Headphones	N/A	6626HVRST057	N/A

3.2 Block Diagram of Test Setup



* = EUT	S = Shielded;	F = With Ferrite
** = No ferrites on video cable	U = Unshielded	

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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.

3.5 Mode of Operation During Test

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.

3.6 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 Symbol Technologies Inc. prior to compliance testing):

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

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4.0 Measurement Results

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

With the hopping function turned OFF:

- 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.

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.

NOTE: Hopping function disabled during test

Frequency (MHz)	Output in dBm	Output in mWatt
2402	19.4	87
2440	20	100
2480	20	100

Cable loss: 1 dB

External Attenuation: 0 dB

Cable loss, external attenuation:

included in OFFSET function

added to SA raw reading

EUT Transmit Antenna Gain(dBi) +20 dBm max. output level = 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

MKR 2.402 00 GHz

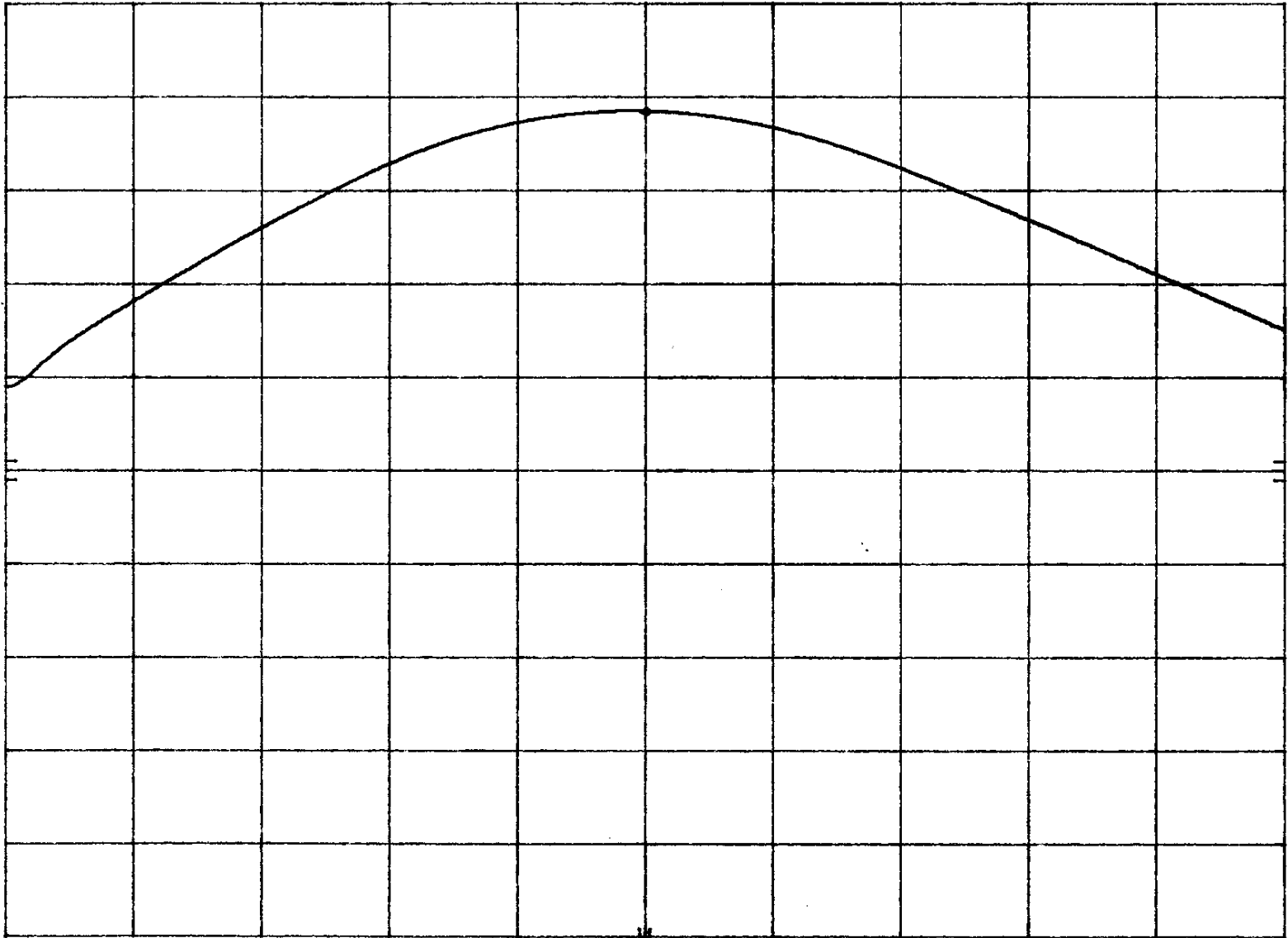
18.40 dBm

hp

REF 30.0 dBm

ATTEN 40 dB

10 dB/



CENTER 2.402 0 GHz

RES BW 3 MHz

VBW 3 MHz

SPAN 10.0 MHz

SWP 20.0 msec

PLOT# 1b

MKR 2.440 00 GHz

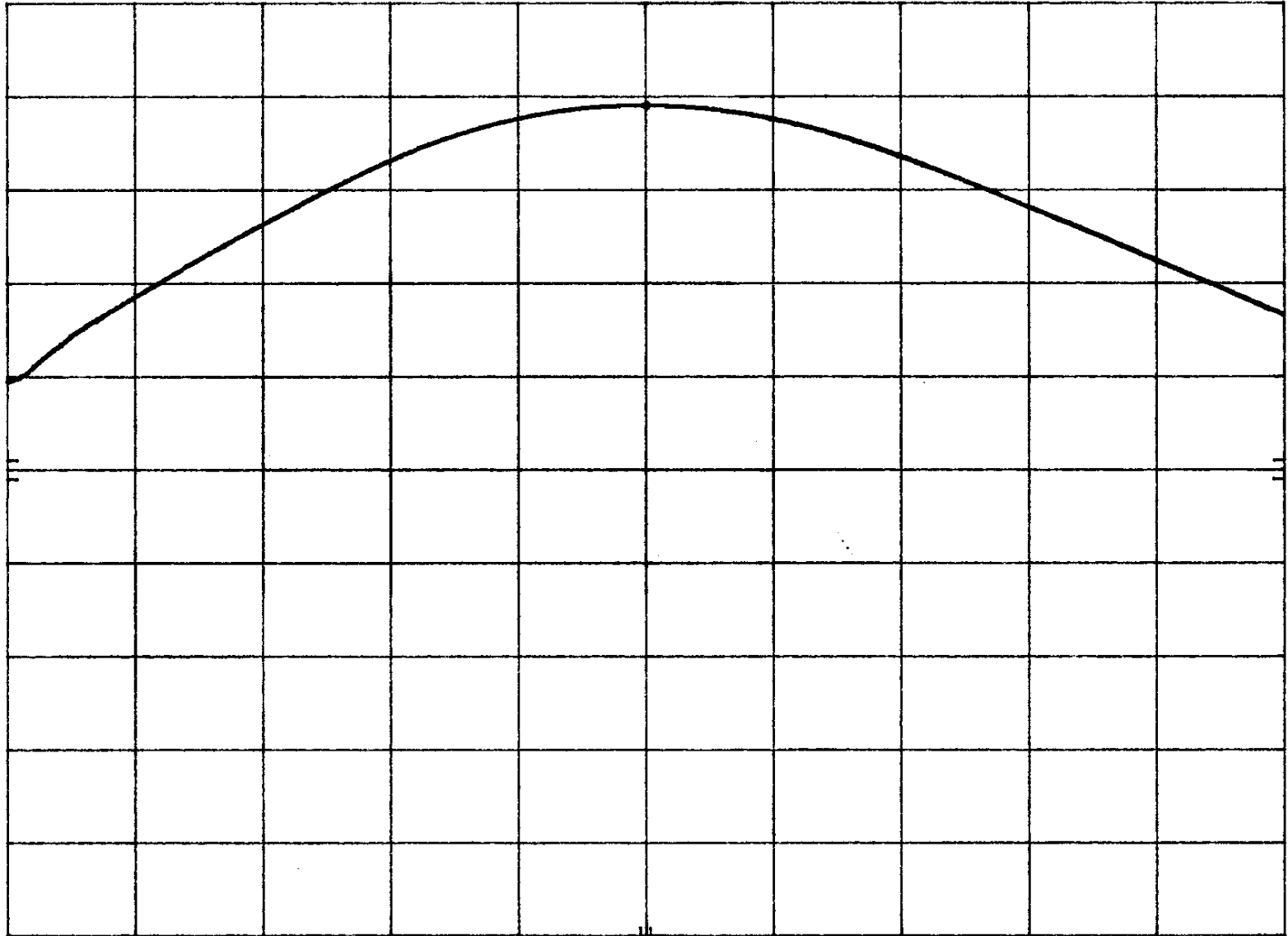
19.00 dBm

hp

REF 30.0 dBm

ATTEN 40 dB

10 dB/



CENTER 2.440 0 GHz

RES BW 3 MHz

VBW 3 MHz

SPAN 10.0 MHz

SWP 20.0 msec

PLOT# 1c

MKR 2.480 00 GHz

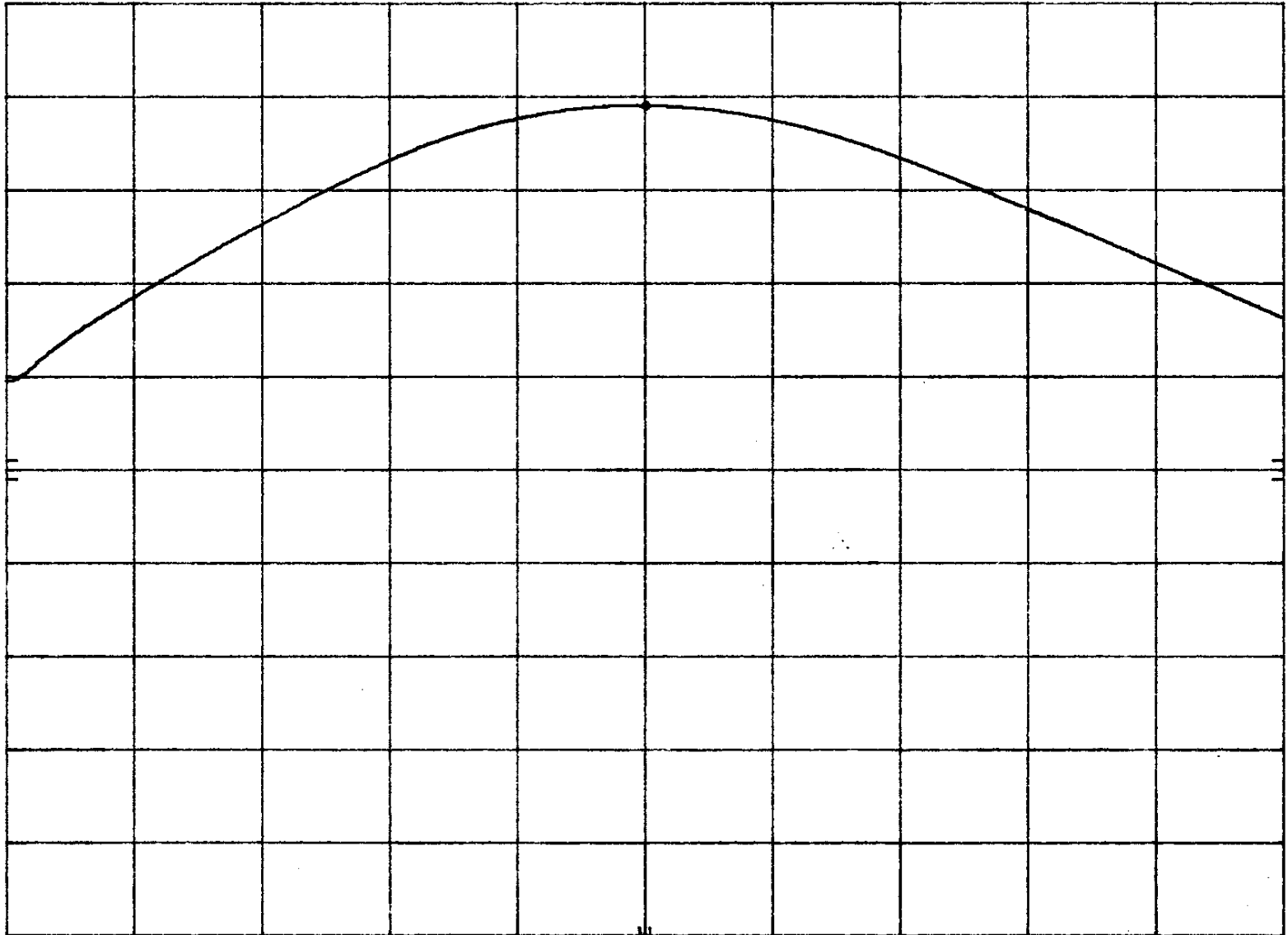
hp

REF 30.0 dBm

ATTEN 40 dB

19.00 dBm

10 dB/



CENTER 2.480 0 GHz

RES BW 3 MHz

VBW 3 MHz

SPAN 10.0 MHz

SWP 20.0 msec

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4.2 Hopping Channel 20 dB RF Bandwidth, FCC Ref: 15.247(a)(1)

Test results:

Channel (Frequency, MHz)		20 dB Bandwidth (kHz)
Low,	2402	998
Middle,	2440	990
High,	2480	986

Please refer to the attached plots for details:

Plot 2a - 2c

PLOT# 2a

MKR Δ 998 kHz

hp

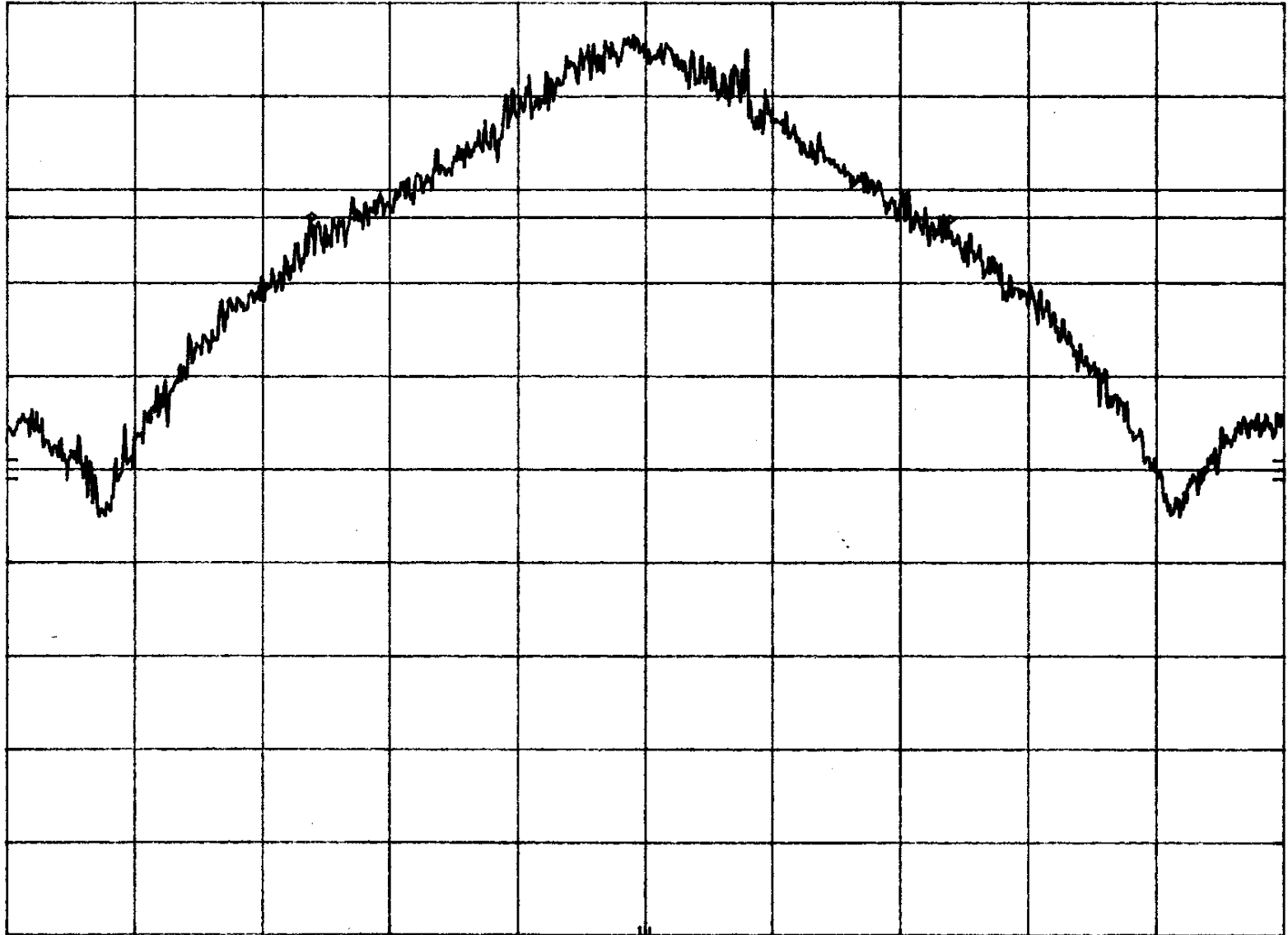
REF 20.0 dBm

ATTEN 40 dB

-0.30 dB

10 dB/

DL
-3.0
dBm



CENTER 2.402 00 GHz

RES BW 30 kHz

VBW 30 kHz

SPAN 2.00 MHz

SWP 20.0 msec

PLOT# 2b

MKR Δ 990 kHz

hp

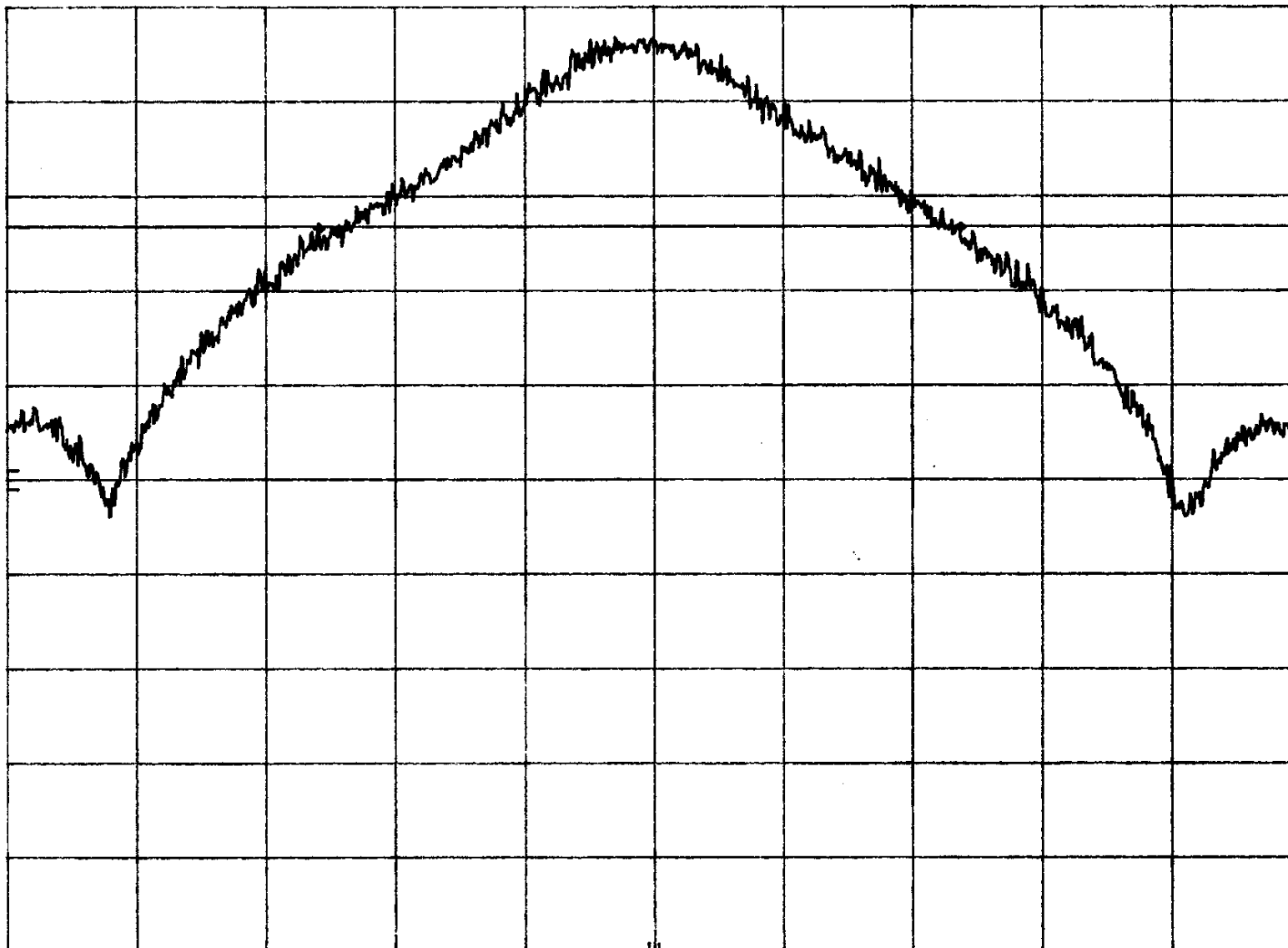
REF 20.0 dBm

ATTEN 40 dB

0.10 dB

10 dB/

DL
-3.2
dBm



CENTER 2.440 00 GHz

RES BW 30 kHz

VBW 30 kHz

SPAN 2.00 MHz

SWP 20.0 msec

PLOT# 2c

MKR Δ 986 kHz

hp

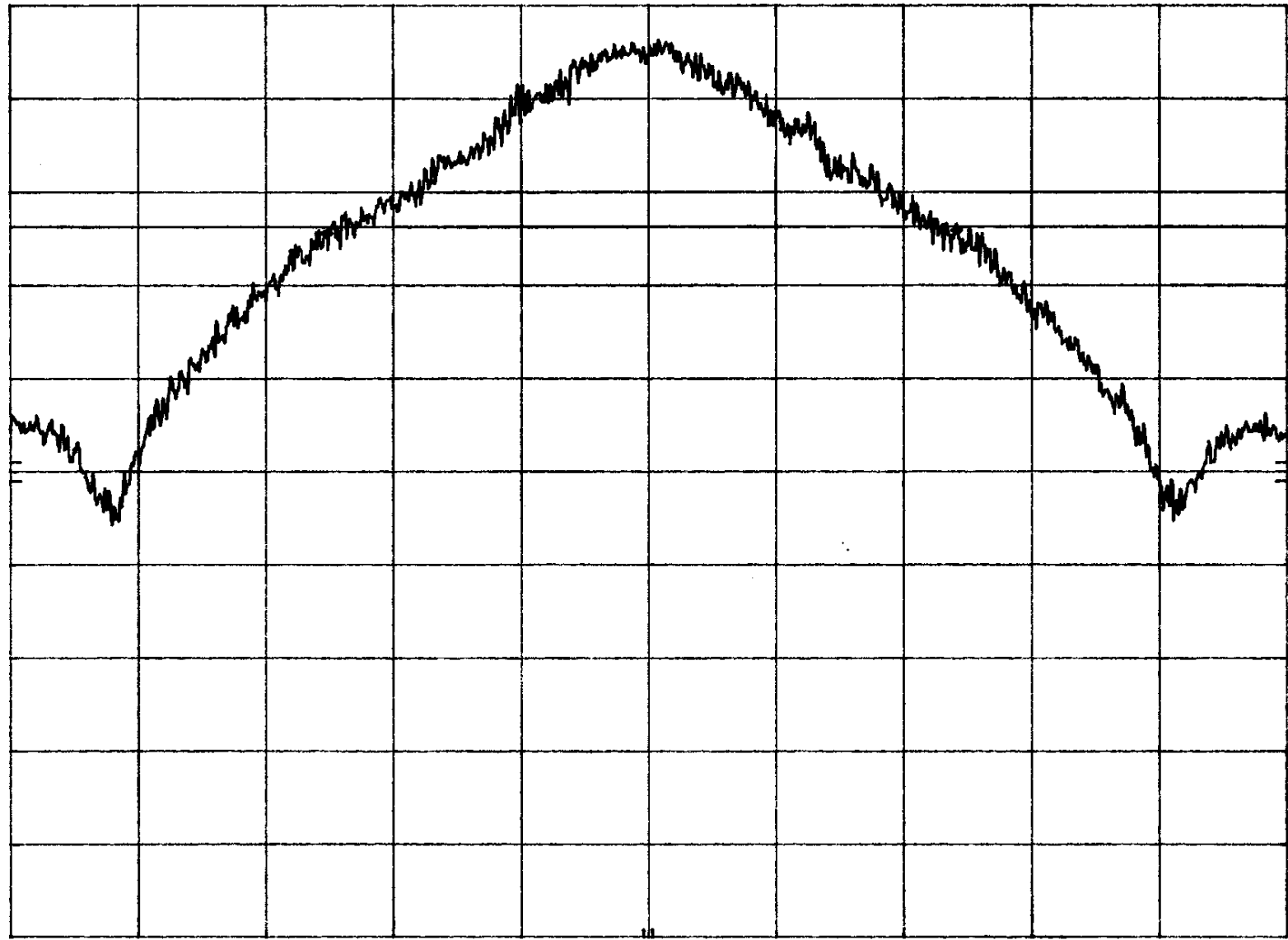
REF 20.0 dBm

ATTEN 40 dB

0.30 dB

10 dB/

DL
-3.7
dBm



CENTER 2.480 00 GHz

RES BW 30 kHz

VBW 30 kHz

SPAN 2.00 MHz

SWP 20.0 msec

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4.3 Minimum Hopping Channel Carrier Frequency Separation, FCC Ref: 15.247(a)(1)

Using the DELTA MARKER function of the analyzer, the frequency separation between two adjacent channels was measured and compared against the limit.

25 kHz

20 dB bandwidth of hopping channel

Please refer to the attached data and spectrum analyzer Plot # 2a - 2c in section 4.2 for the test result.

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4.4 Minimum Number of Hopping Frequencies, FCC Ref: 15.247(a)(1)(i&ii)

The RF passband of the EUT was divided into 2 approximately equal bands. With the analyzer set to MAX HOLD readings were taken for 2 - 3 minutes in each band. The channel peaks so recorded were added together, and the total number compared to the minimum number of channels required in the regulation.

No. of hopping channels	79
-------------------------	----

Minimum Requirements:

at least 50 channels for 902 - 928 MHz band;

at least 75 channels for 2400 - 2483.5 and 5725 - 5850 MHz systems

Refer to spectrum analyzer charts 4a - 4b.

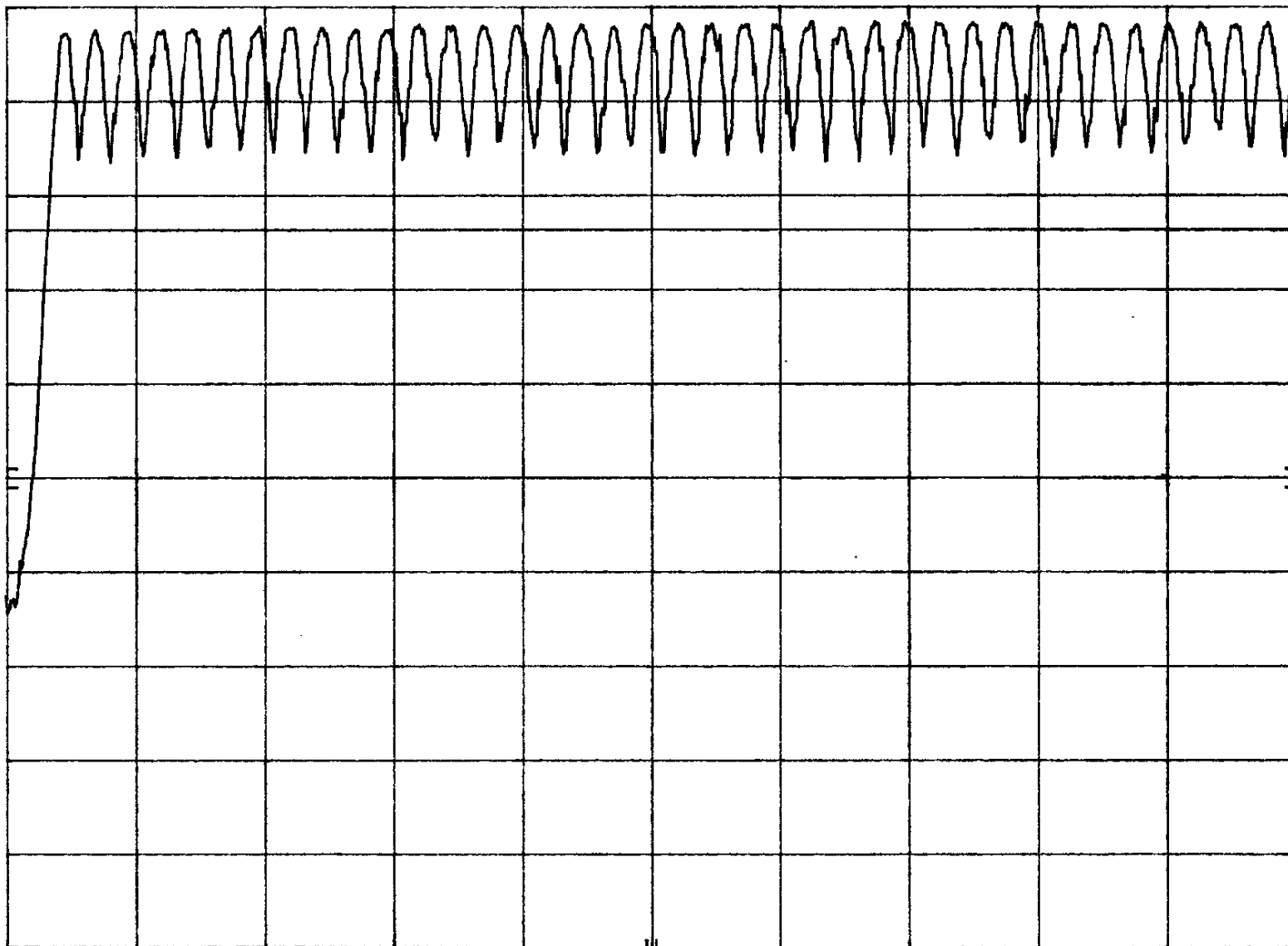
PLOT# 4a

hp

REF 20.0 dBm ATTN 40 dB

10 dB/

DL
-3.7
dBm



START 2.400 0 GHz

RES BW 300 kHz

VBW 30 kHz

STOP 2.440 0 GHz

SWP 20.0 msec

PLOT# 4b

MKR 2.475 54 GHz

hp

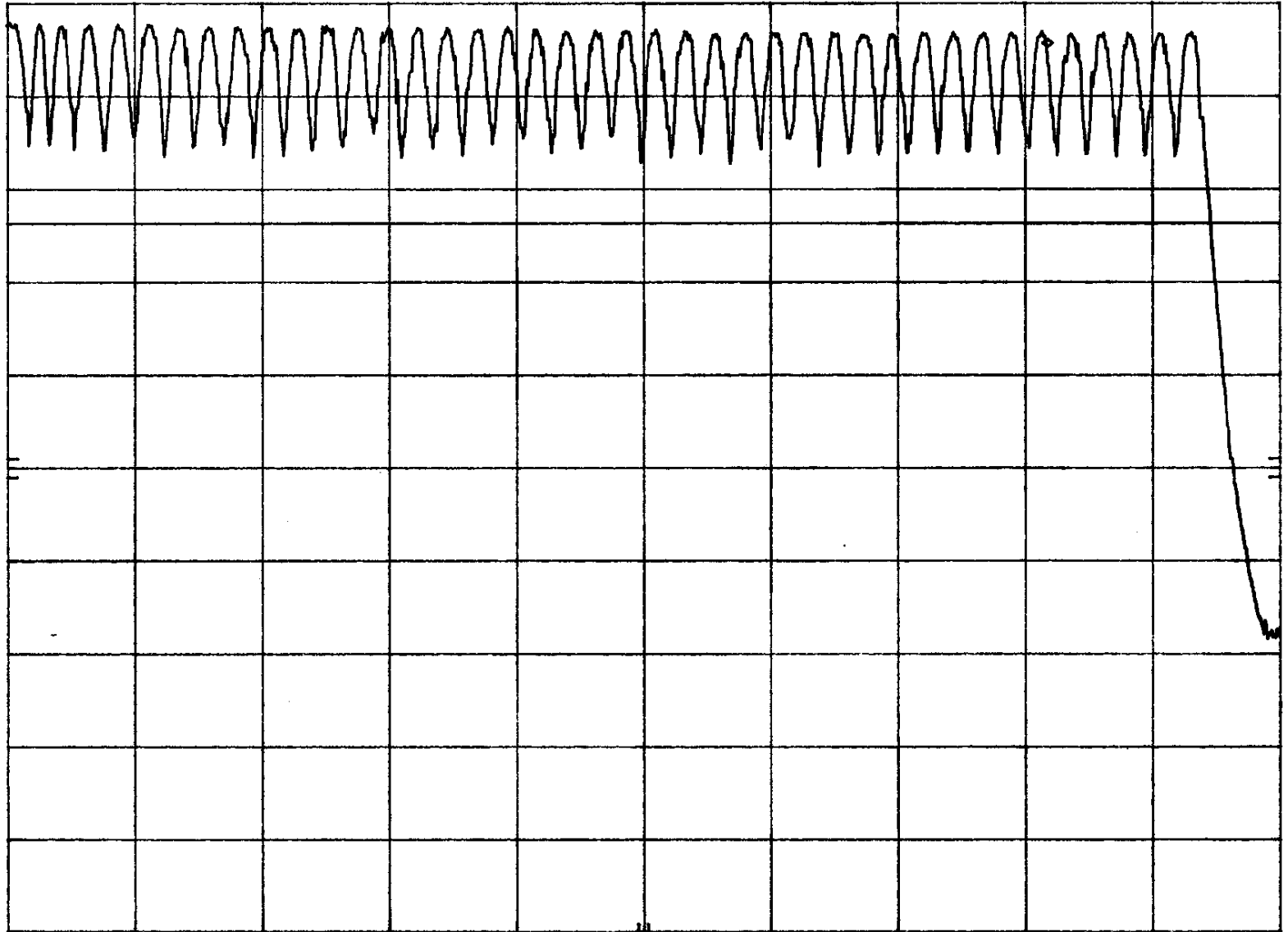
REF 20.0 dBm

ATTEN 40 dB

15.70 dBm

10 dB/

DL
-3.7
dBm



START 2.440 0 GHz

RES BW 300 kHz

VBW 30 kHz

STOP 2.483 5 GHz

SWP 20.0 msec

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4.5 Average Channel Occupancy Time, FCC Ref: 15.247(a)(1)(i&ii)

The spectrum analyzer center frequency was set to one of the known hopping channels. The SWEEP was set to 0.4 second, the SPAN was set to ZERO SPAN, and the TRIGGER was set to VIDEO. The time duration of the transmission so captured was measured with the MARKER DELTA function.

The SWEEP was then set to the time required by the regulation (20 seconds for 902-928 MHz devices, 30 seconds for all other bands). The analyzer was set to SINGLE SWEEP, the total ON time was added and compared against the limit (0.4 seconds).

Average 0.4 seconds maximum occupancy in 20 seconds, 902-928 MHz

Average 0.4 seconds maximum occupancy in 30 seconds, 2400-2483.5/5725-5850 MHz

Refer to attached spectrum analyzer plots 5a - 5b for details.

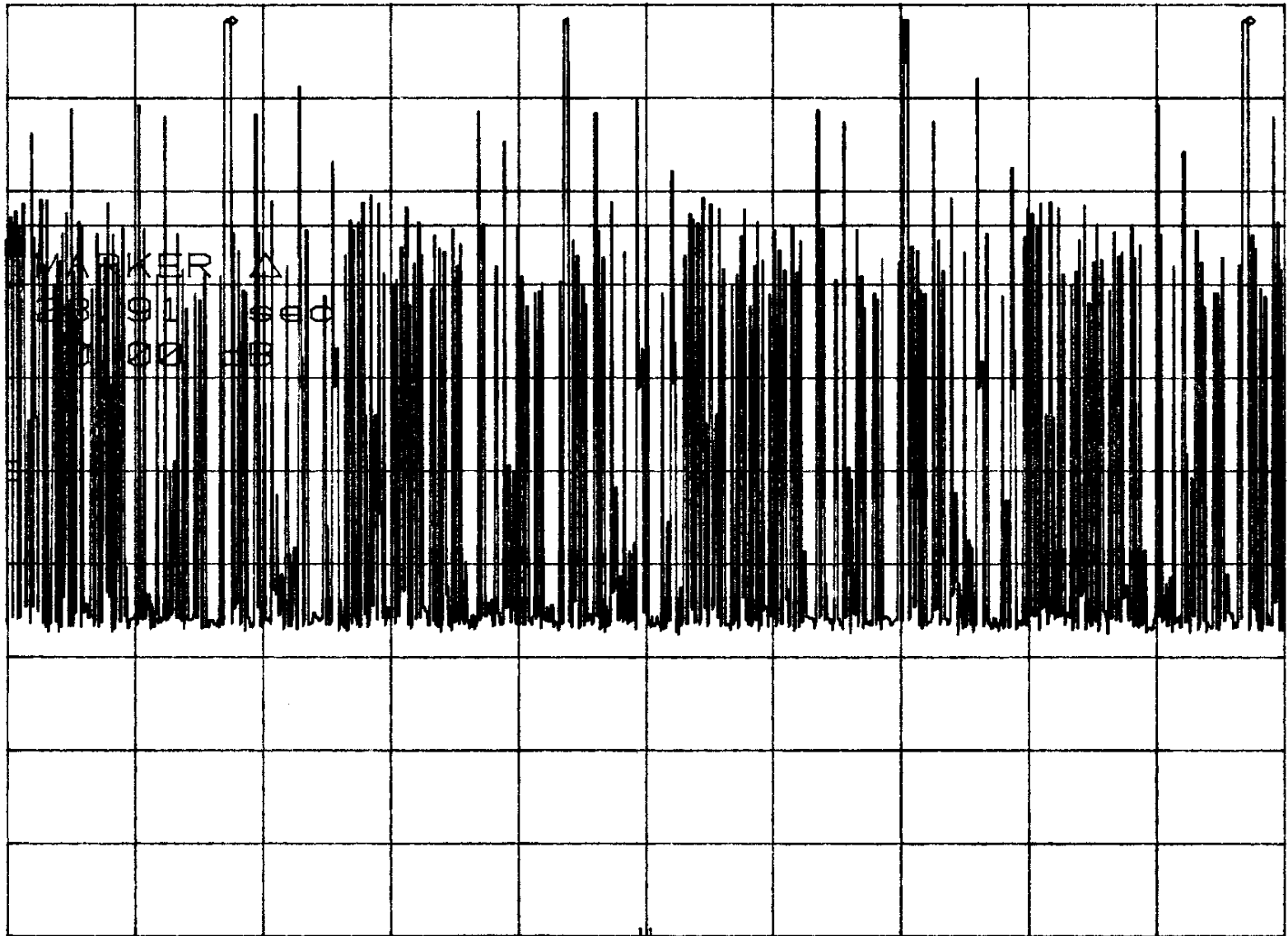
PLOT# 5a

MKR Δ 23.91 sec
0.00 dB

hp REF 20.0 dBm ATTN 40 dB

10 dB/

DL
-3.7
dBm



CENTER 2.442 972 442 GHz
RES BW 100 kHz

VBW 100 kHz

SPAN 0 Hz
SWP 30.0 sec

PLOT# 5b

MKR Δ 100.0 msec

hp

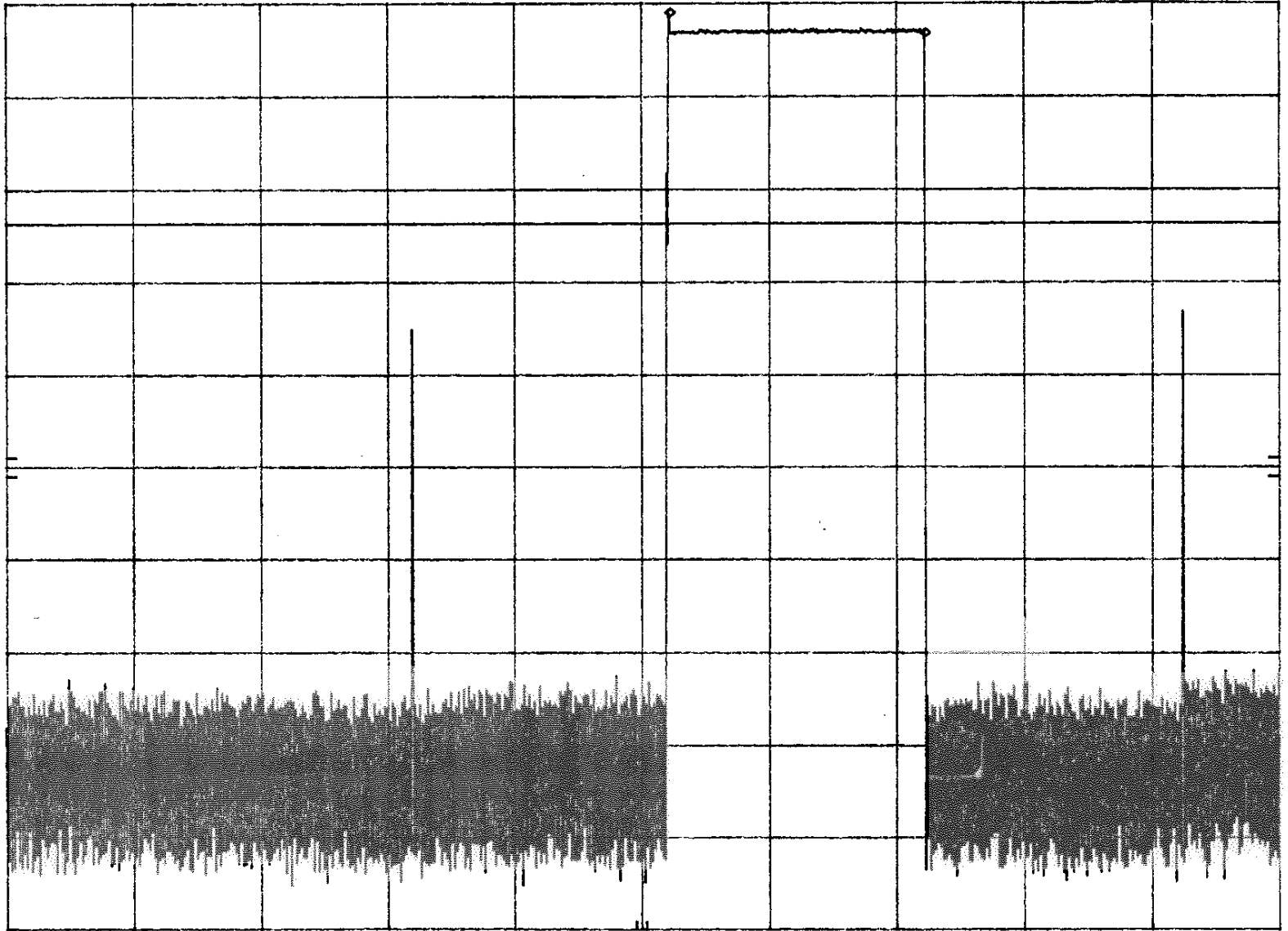
REF 20.0 dBm

ATTEN 40 dB

-2.20 dB

10 dB/

DL
-3.7
dBm



CENTER 2.442 972 442 GHz

SPAN 0 Hz

RES BW 30 kHz

VBW 30 kHz

SWP 500 msec

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4.6 Out of Band Conducted Emissions, FCC Ref: 15.247(c)

For EUT antenna conducted output frequencies from 1 MHz to the 10th harmonic of the transmitter operating frequency (or 40 GHz, whichever is lower):

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.

Please refer to the attached Plots for details:

Low Channel	Plots 6a - 6f
Middle Channel	Plots 6g - 6l
High Channel	Plots 6m - 6r

PLOT# 6a

MKR 1.20 MHz

hp

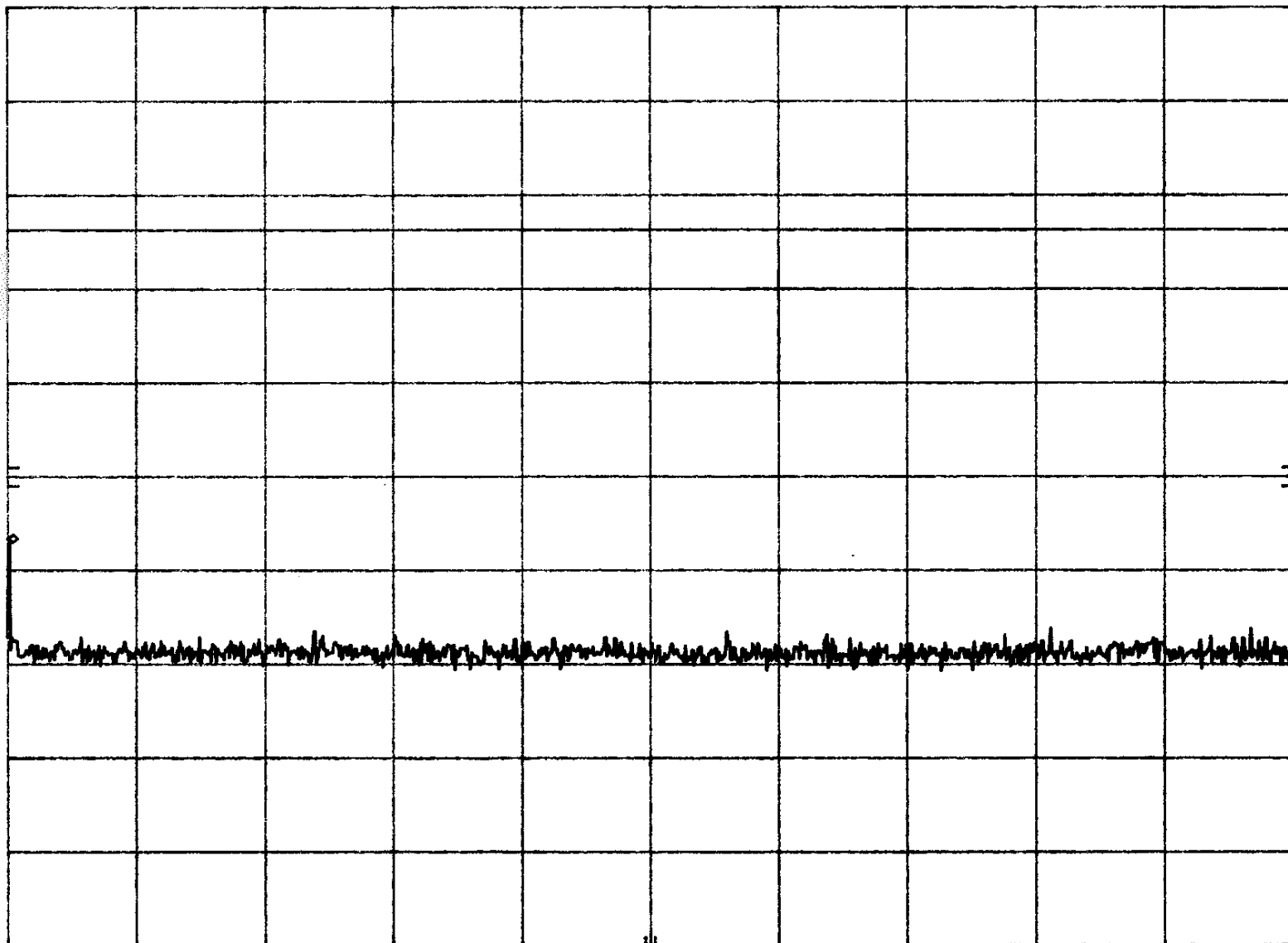
REF 20.0 dBm

ATTEN 40 dB

-36.60 dBm

10 dB/

DL
-3.7
dBm



START 1.0 MHz

RES BW 100 kHz

VBW 100 kHz

STOP 100.0 MHz

SWP 500 msec

PLOT# 6b

MKR 101.8 MHz

hp

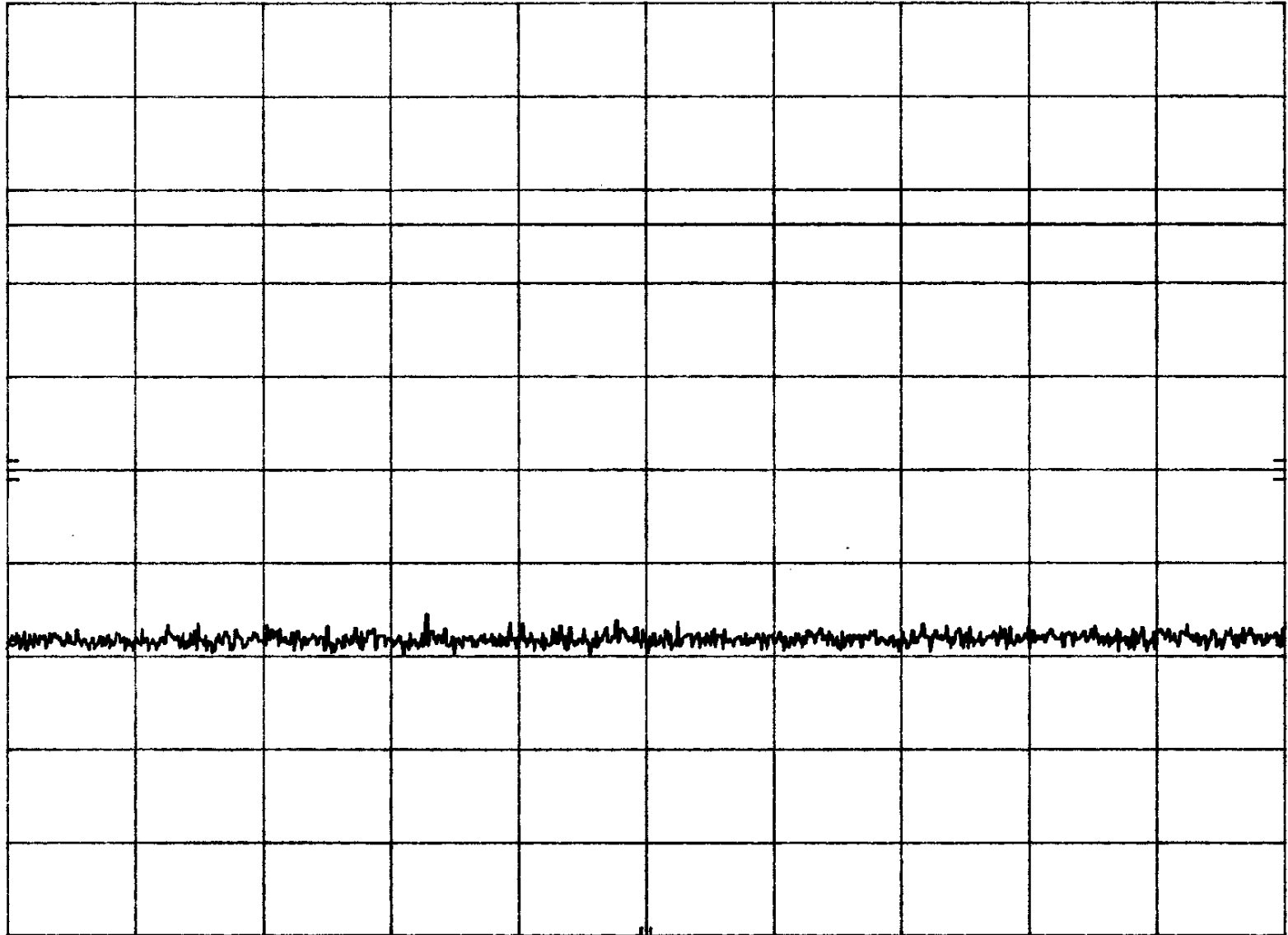
REF 20.0 dBm

ATTEN 40 dB

-48.50 dBm

10 dB/

DL
-3.7
dBm



START 100 MHz

RES BW 100 kHz

VBW 100 kHz

STOP 1.000 GHz

SWP 500 msec

PLOT# 6c

MKR 2.033 GHz

hp

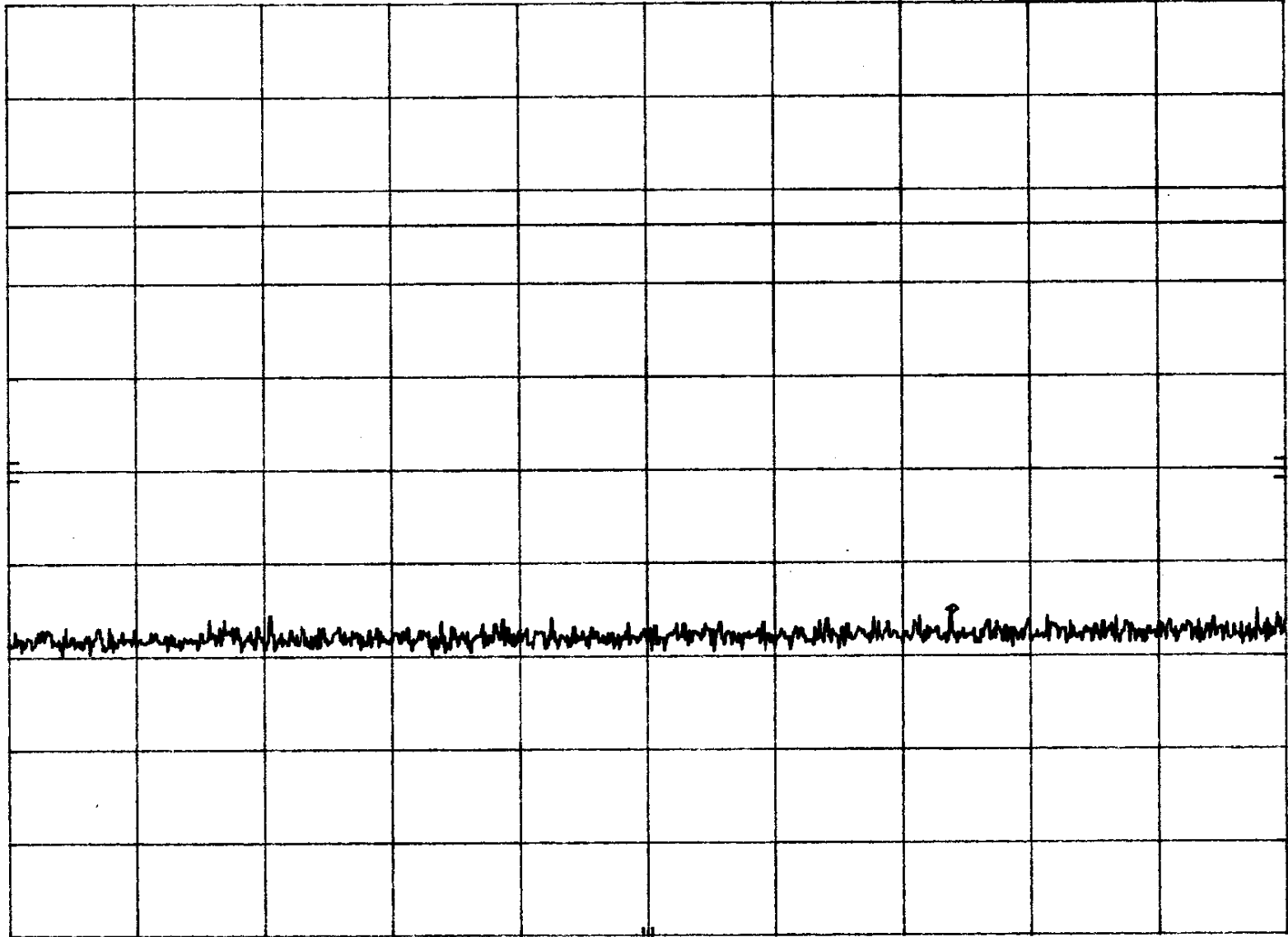
REF 20.0 dBm

ATTEN 40 dB

-45.00 dBm

10 dB/

DL
-3.7
dBm



START 1.00 GHz

RES BW 100 kHz

VBW 100 kHz

STOP 2.40 GHz

SWP 500 msec

PLOT# 6d

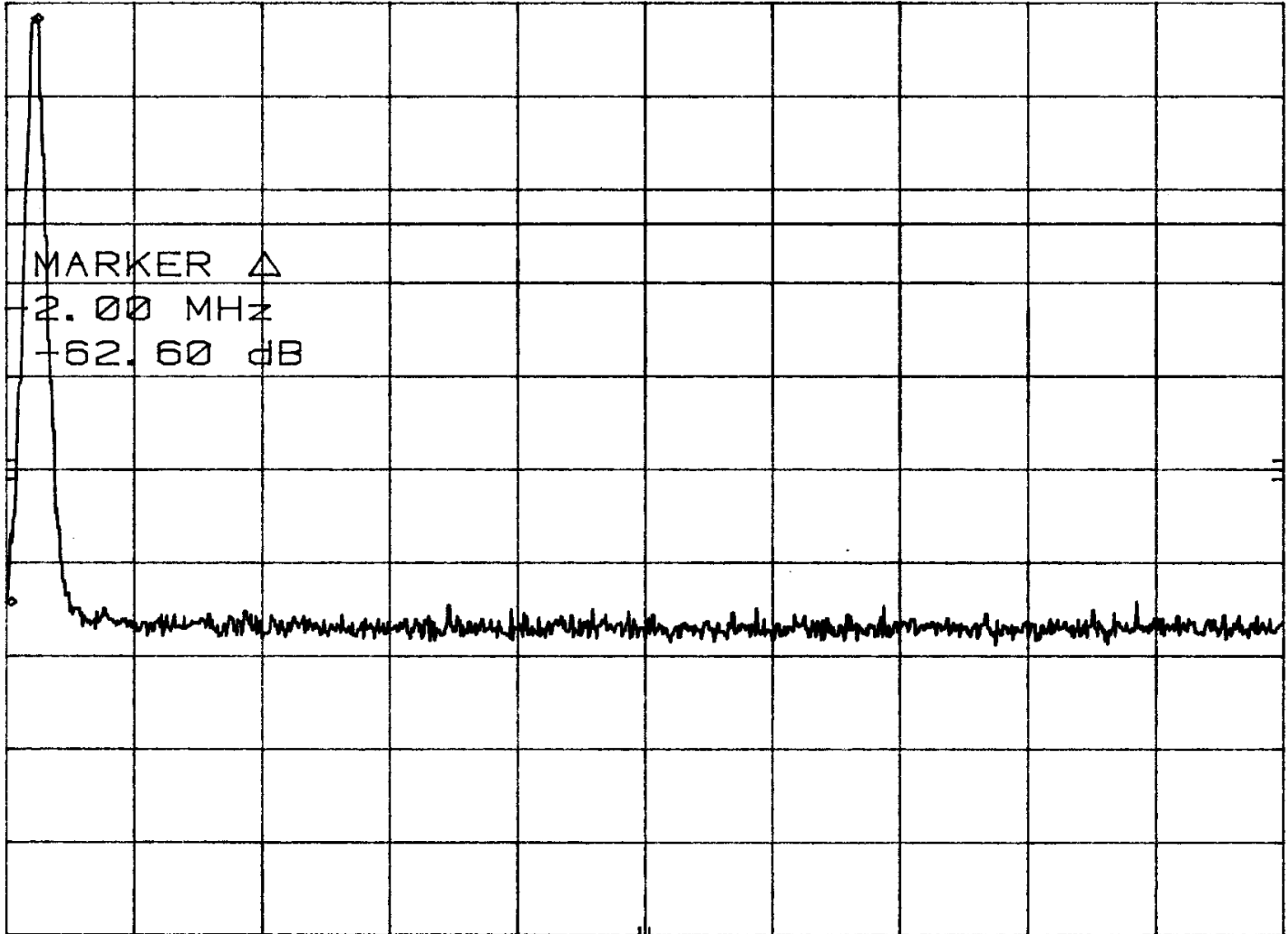
MKR Δ -2.00 MHz
BP 09.29 -62.60 dB

hp

REF 20.0 dBm ATTN 40 dB

10 dB/

DL
-3.7
dBm



START 2.400 0 GHz

RES BW 100 kHz

VBW 100 kHz

STOP 2.483 5 GHz

SWP 500 msec

PLOT# 6e

MKR Δ 4.930 GHz

hp

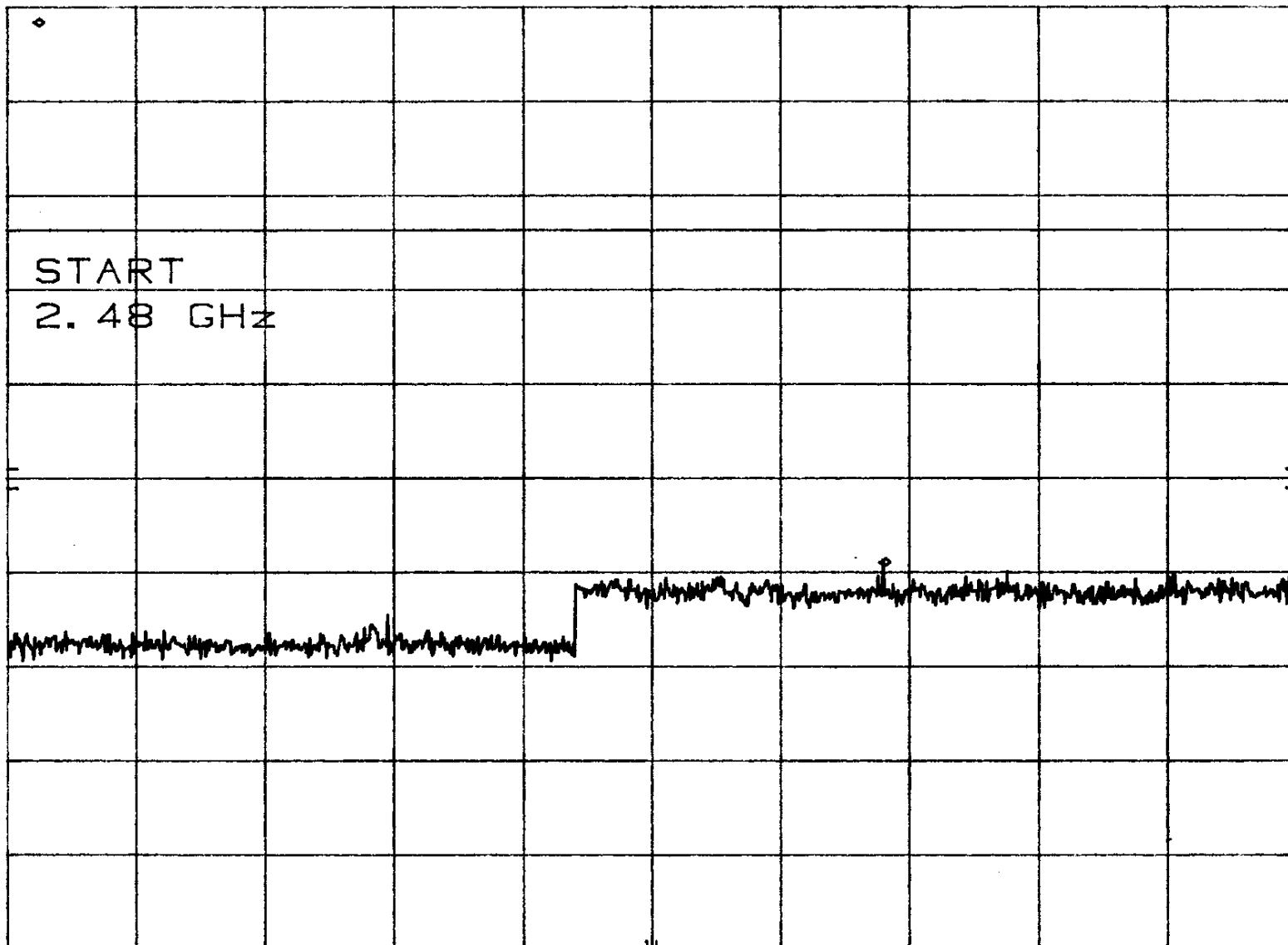
REF 20.0 dBm

ATTEN 40 dB

-57.30 dB

10 dB/

DL
-3.7
dBm



START 2.48 GHz

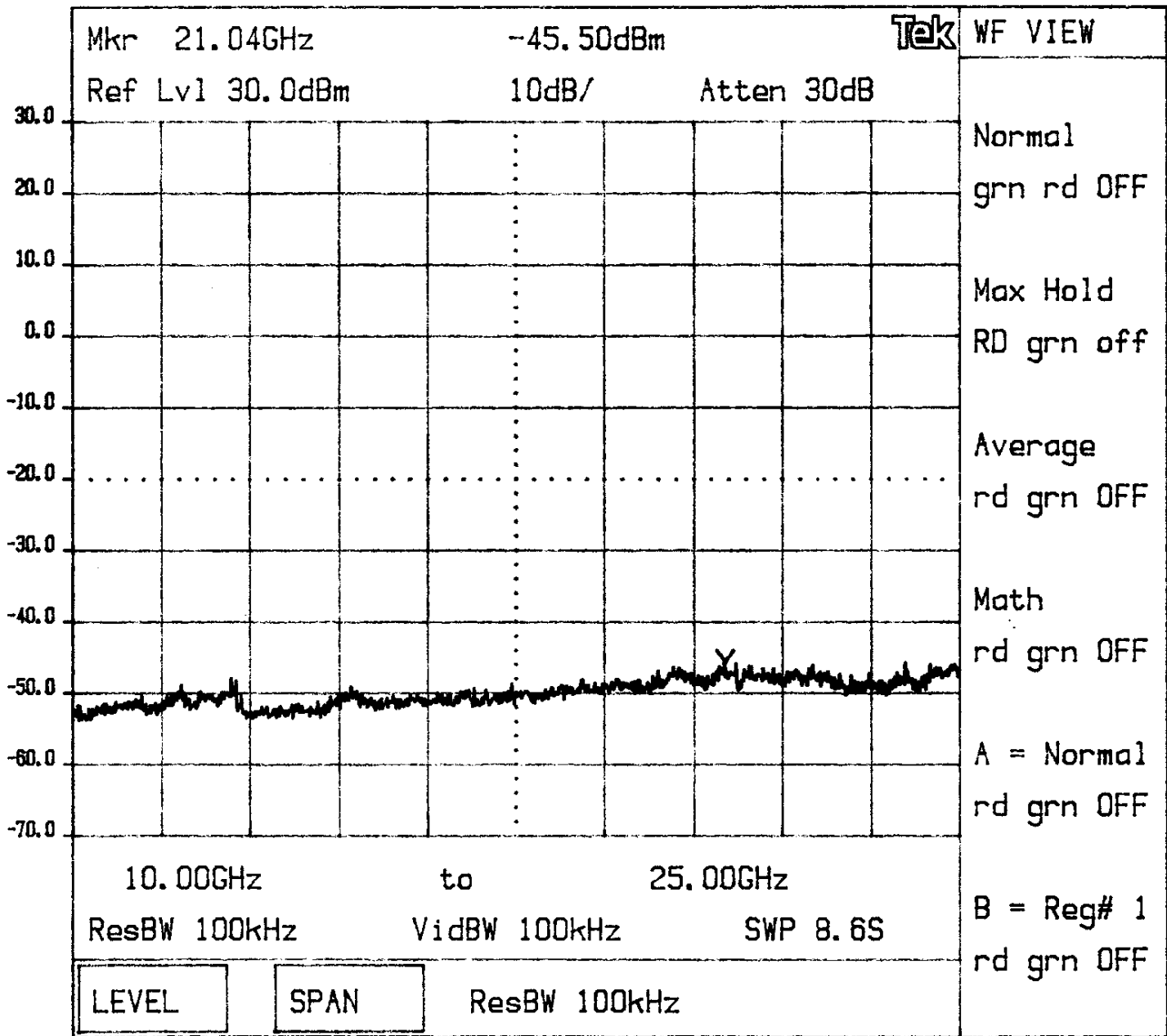
RES BW 100 kHz

VBW 100 kHz

STOP 10.00 GHz

SWP 2.25 sec

PLOT# 6E



PLOT# 6g

MKR 1.69 MHz

hp

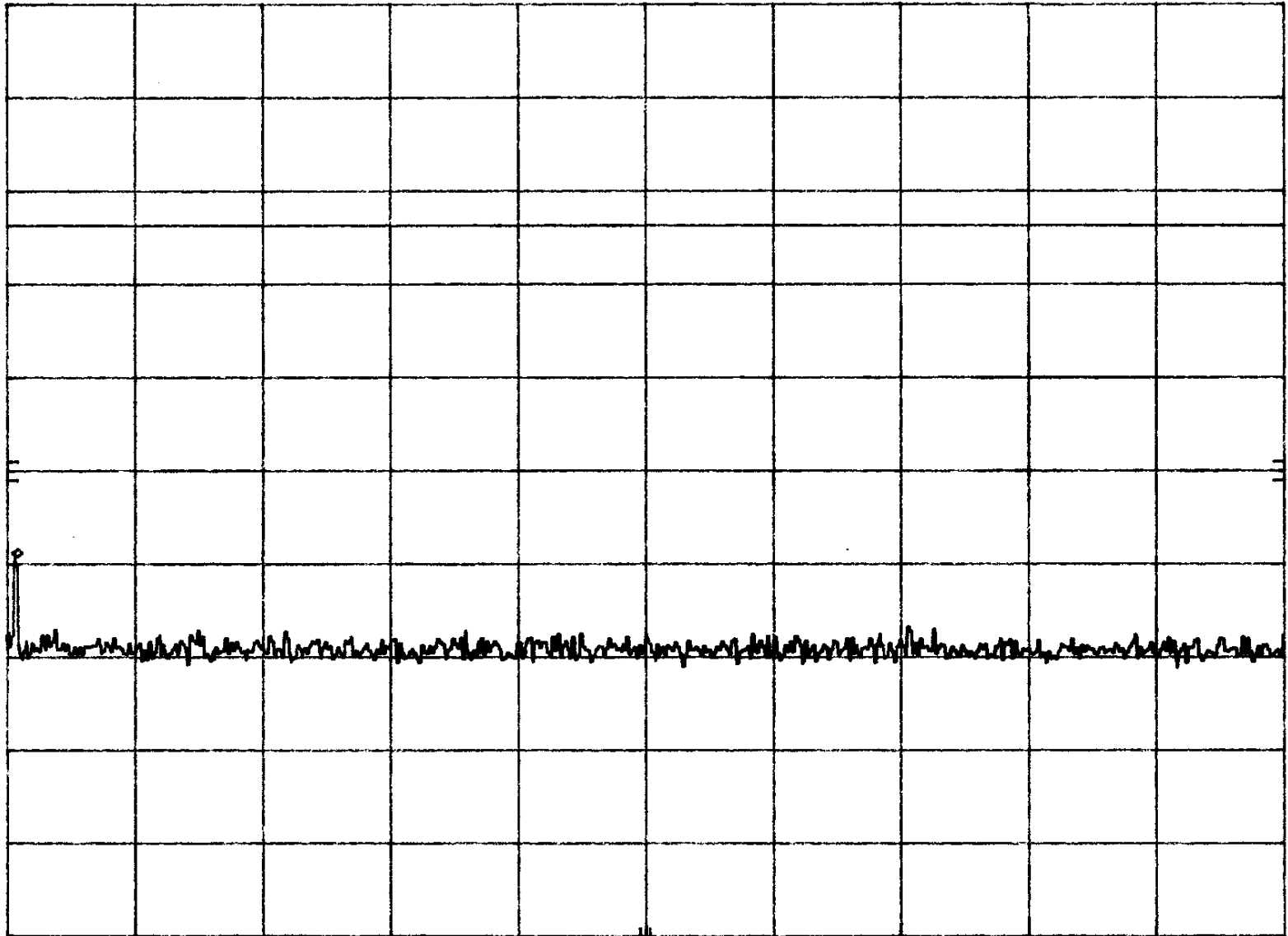
REF 20.0 dBm

ATTEN 40 dB

-38.80 dBm

10 dB/

DL
-3.7
dBm



START 1.0 MHz

RES BW 100 kHz

VBW 100 kHz

STOP 100.0 MHz

SWP 29.7 msec

PLOT# 6h

MKR 967.6 MHz

hp

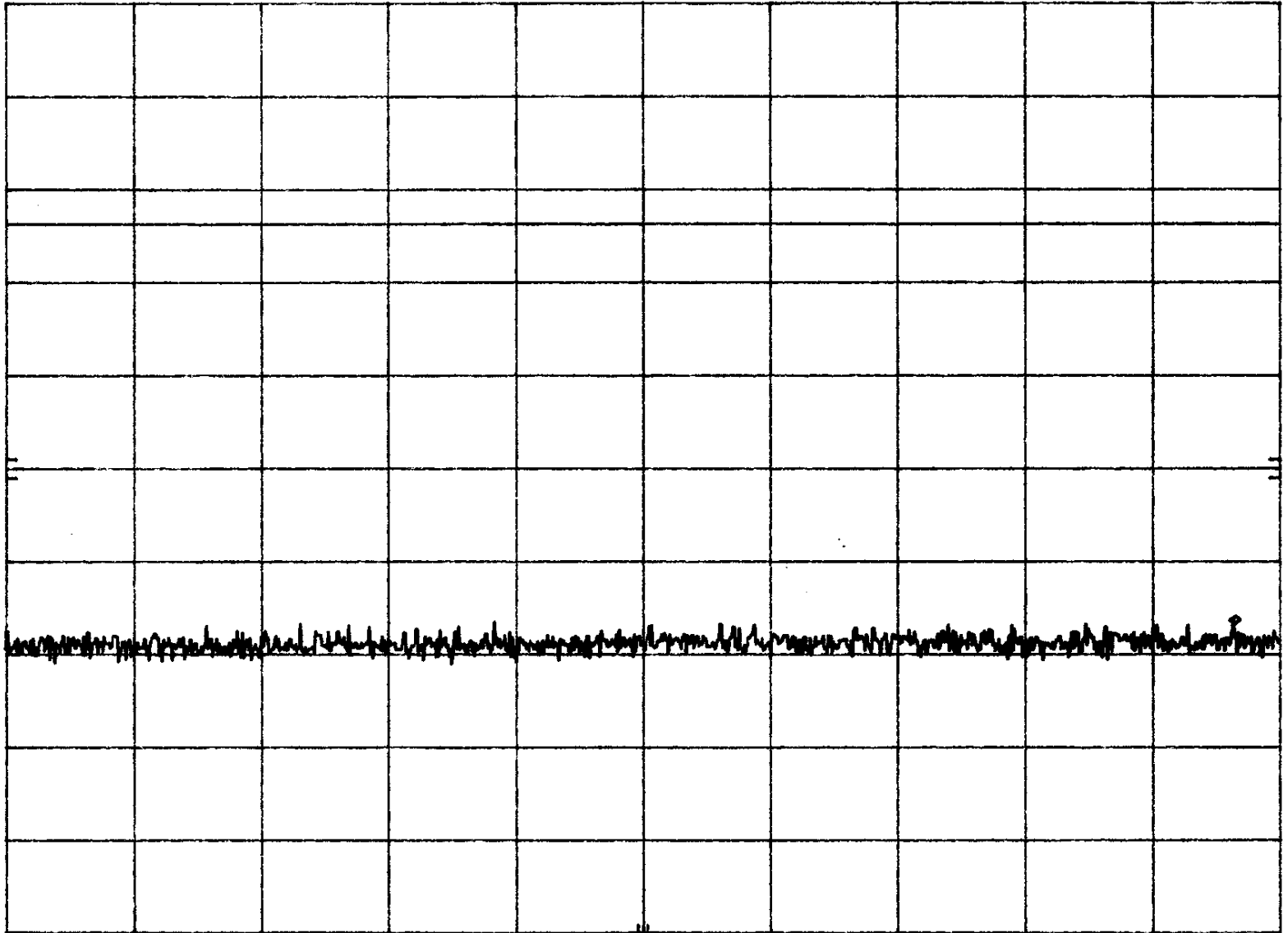
REF 20.0 dBm

ATTEN 40 dB

-46.30 dBm

10 dB/

DL
-3.7
dBm



START 100 MHz

RES BW 100 kHz

VBW 100 kHz

STOP 1.000 GHz

SWP 270 msec

PLOT# 6i

MKR 2.063 GHz

hp

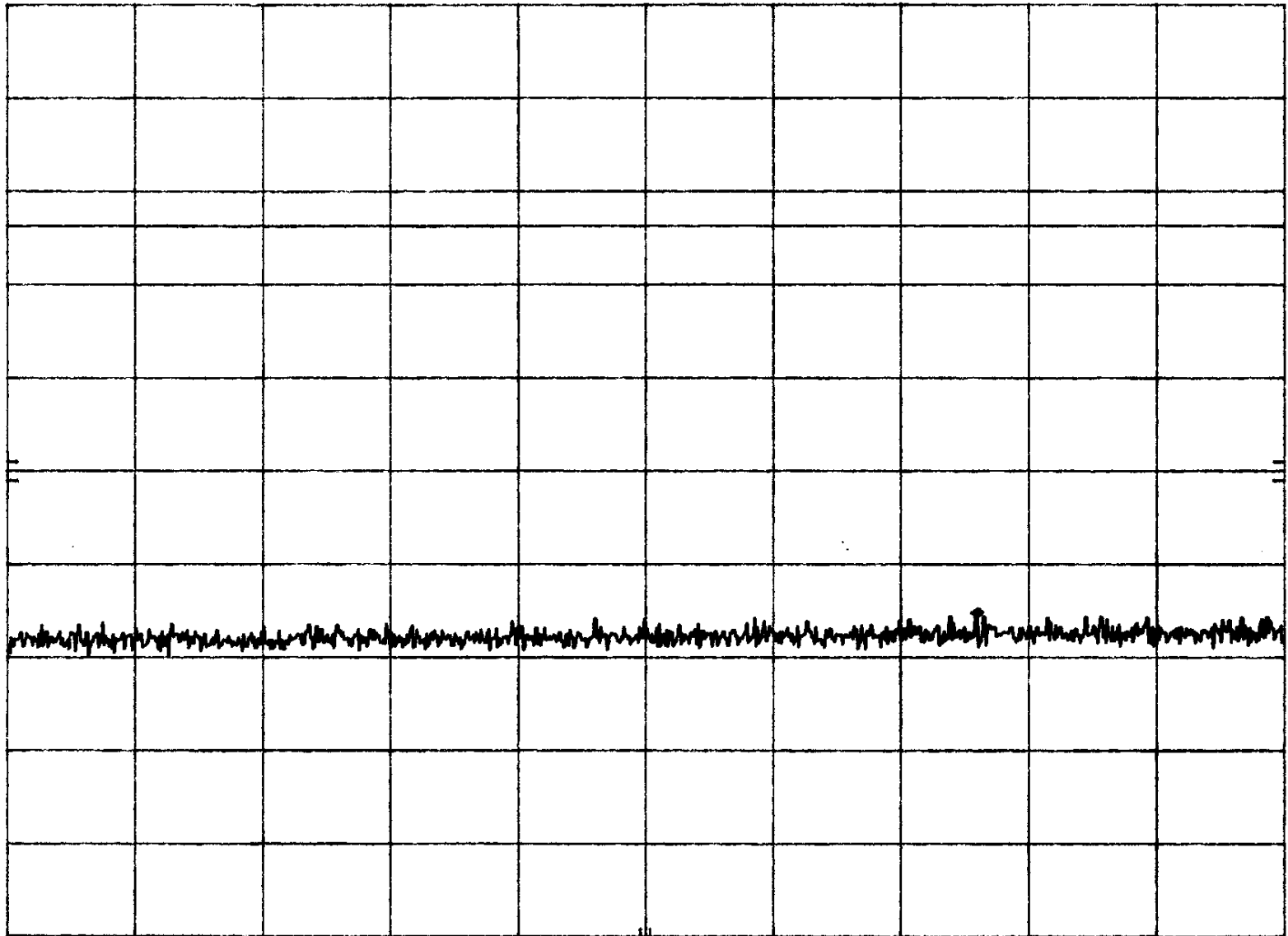
REF 20.0 dBm

ATTEN 40 dB

-45.20 dBm

10 dB/

DL
-3.7
dBm



START 1.00 GHz

RES BW 100 kHz

VBW 100 kHz

STOP 2.40 GHz

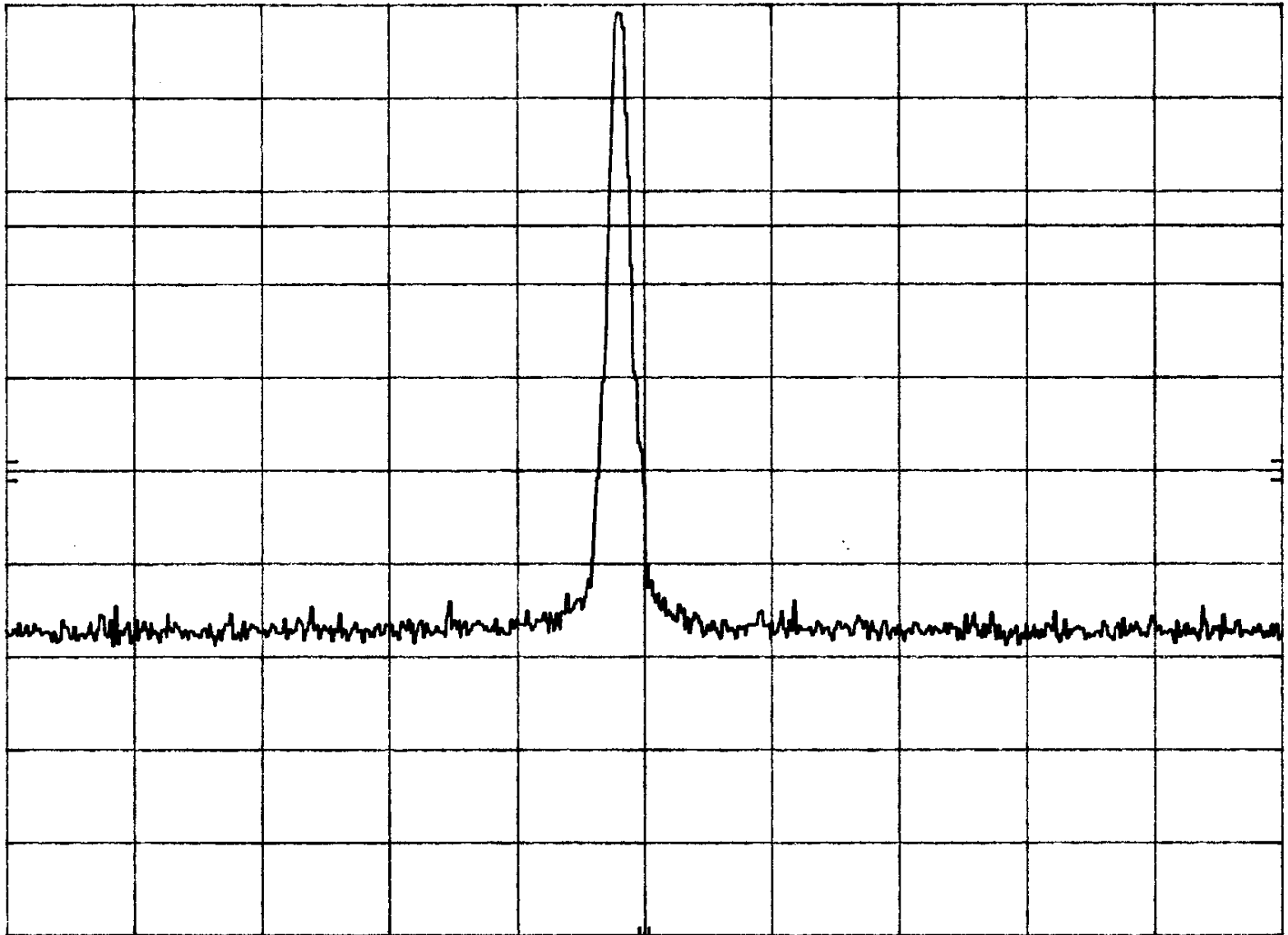
SWP 420 msec

PLOT# 6j

hp REF 20.0 dBm ATTN 40 dB

10 dB/

DL
-3.7
dBm



START 2.400 0 GHz

RES BW 100 kHz

VBW 100 kHz

STOP 2.483 5 GHz

SWP 25.1 msec

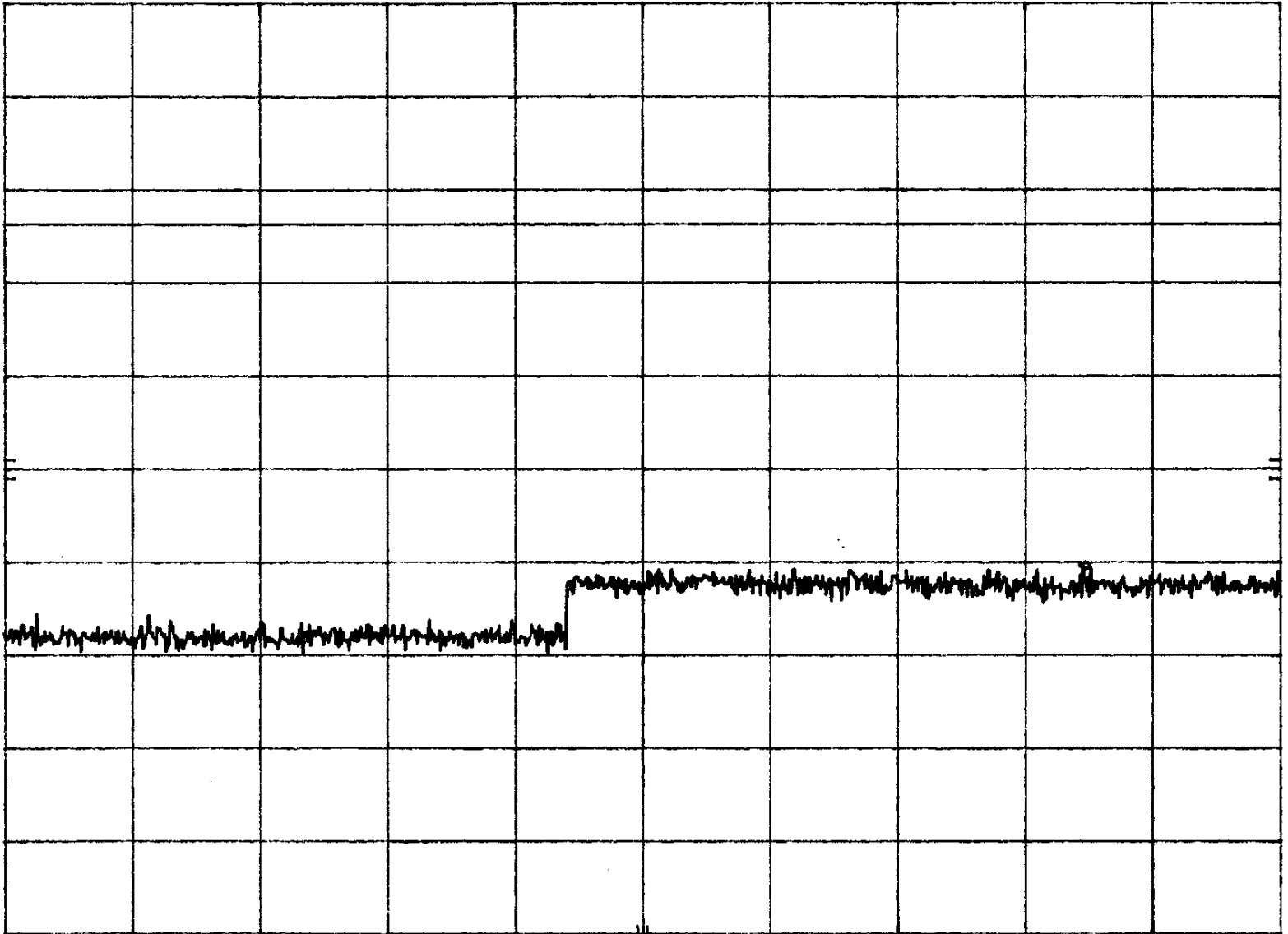
PLOT# 6k

MKR 8.842 GHz

-40.40 dBm

hp REF 20.0 dBm ATTN 40 dB
10 dB/

DL
-3.7
dBm



START 2.48 GHz

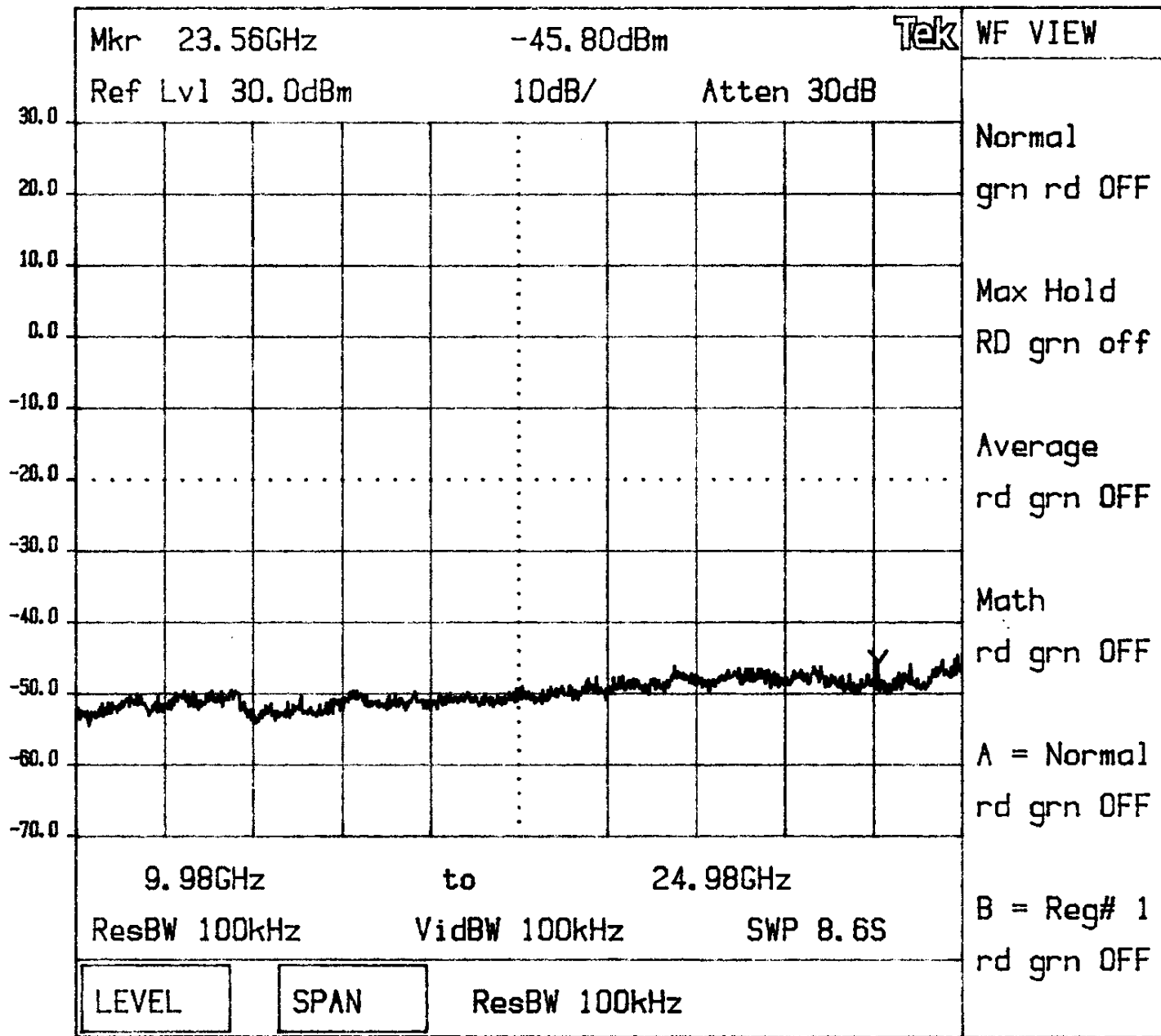
RES BW 100 kHz

VBW 100 kHz

STOP 10.00 GHz

SWP 2.25 sec

PLOT# 61



Knob 2

Knob 1

Keypad

Tektronix

2784

PLOT# 6m

MKR 1.69 MHz

hp

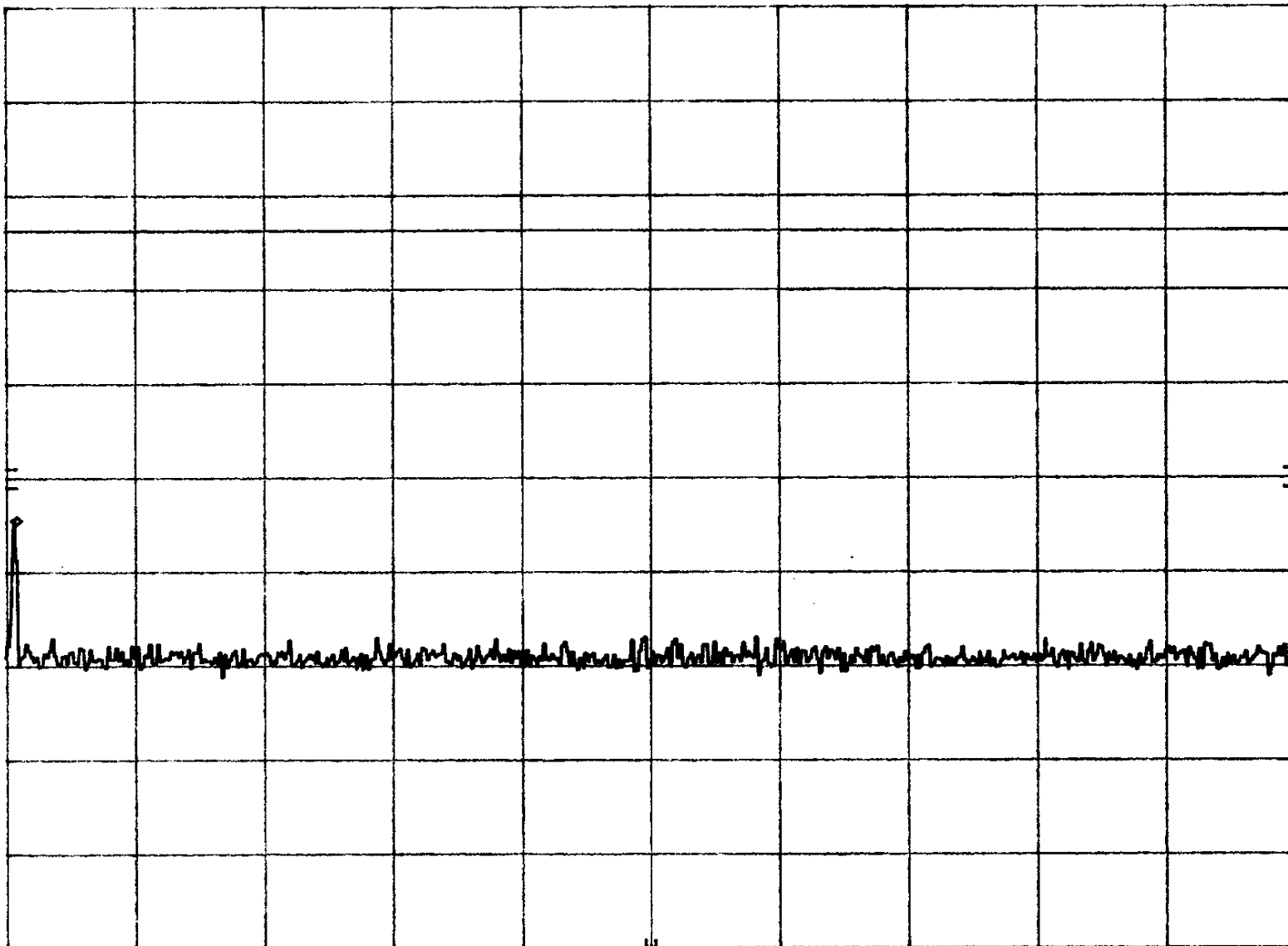
REF 20.0 dBm

ATTEN 40 dB

-34.50 dBm

10 dB/

DL
-3.7
dBm



START 1.0 MHz

RES BW 100 kHz

VBW 100 kHz

STOP 100.0 MHz

SWP 29.7 msec

PLOT# 6n

MKR 930.7 MHz

hp

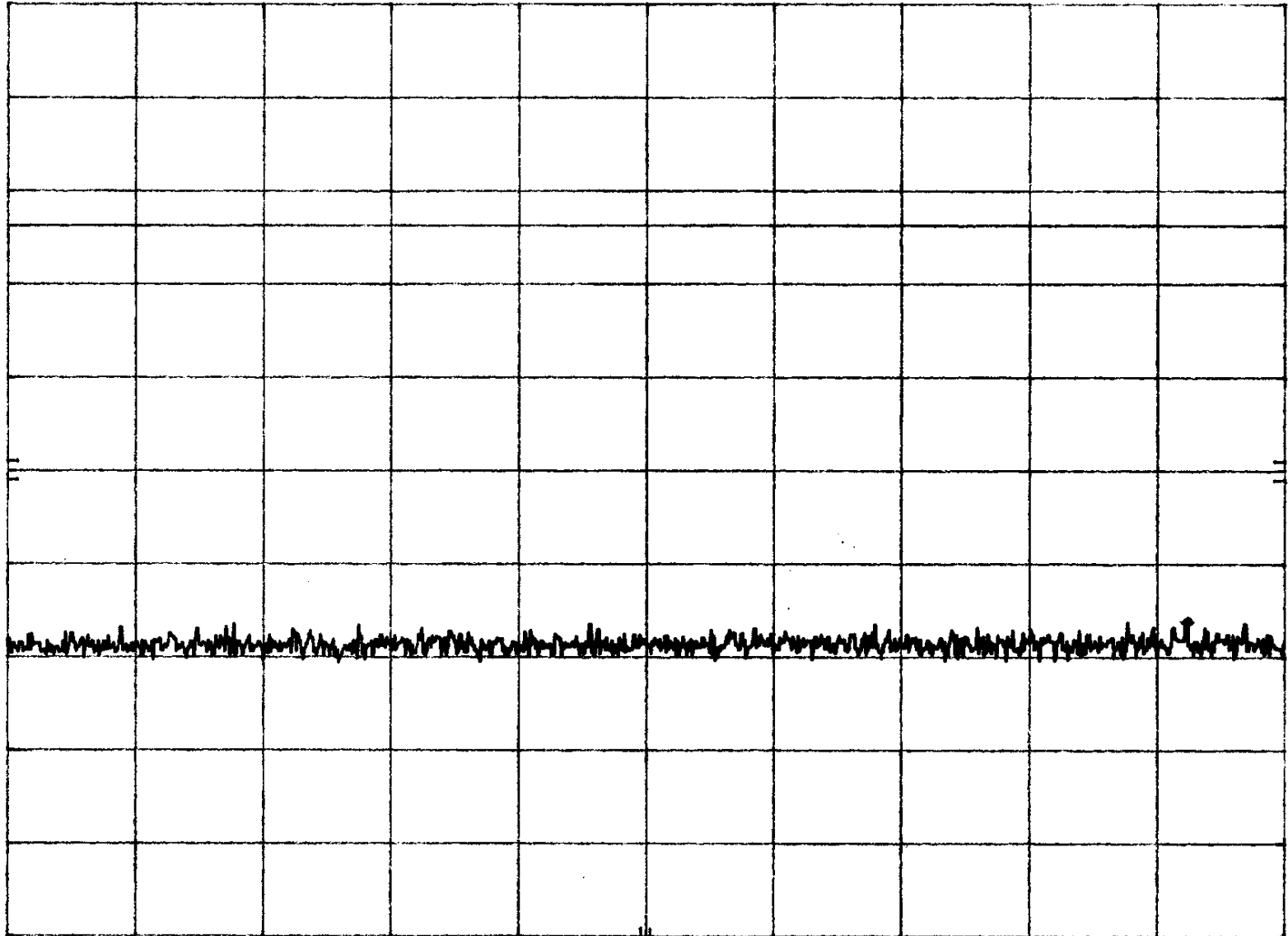
REF 20.0 dBm

ATTEN 40 dB

-46.20 dBm

10 dB/

DL
-3.7
dBm



START 100 MHz

RES BW 100 kHz

VBW 100 kHz

STOP 1.000 GHz

SWP 270 msec

PLOT# 60

MKR 2.112 GHz

hp

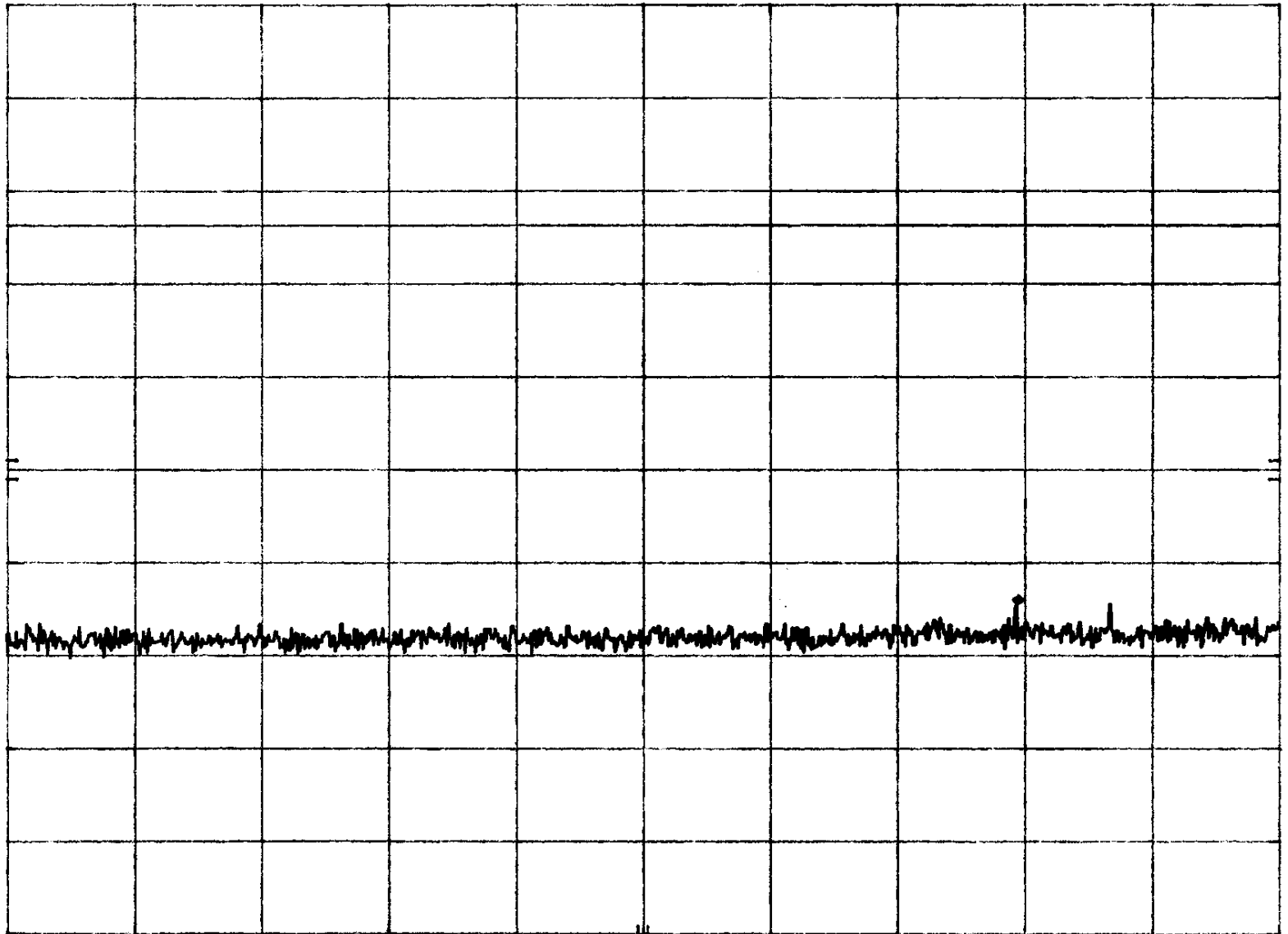
REF 20.0 dBm

ATTEN 40 dB

-44.00 dBm

10 dB/

DL
-3.7
dBm



START 1.00 GHz

RES BW 100 kHz

VBW 100 kHz

STOP 2.40 GHz

SWP 420 msec

PLOT# 6p

MKR Δ 2.84 MHz

hp

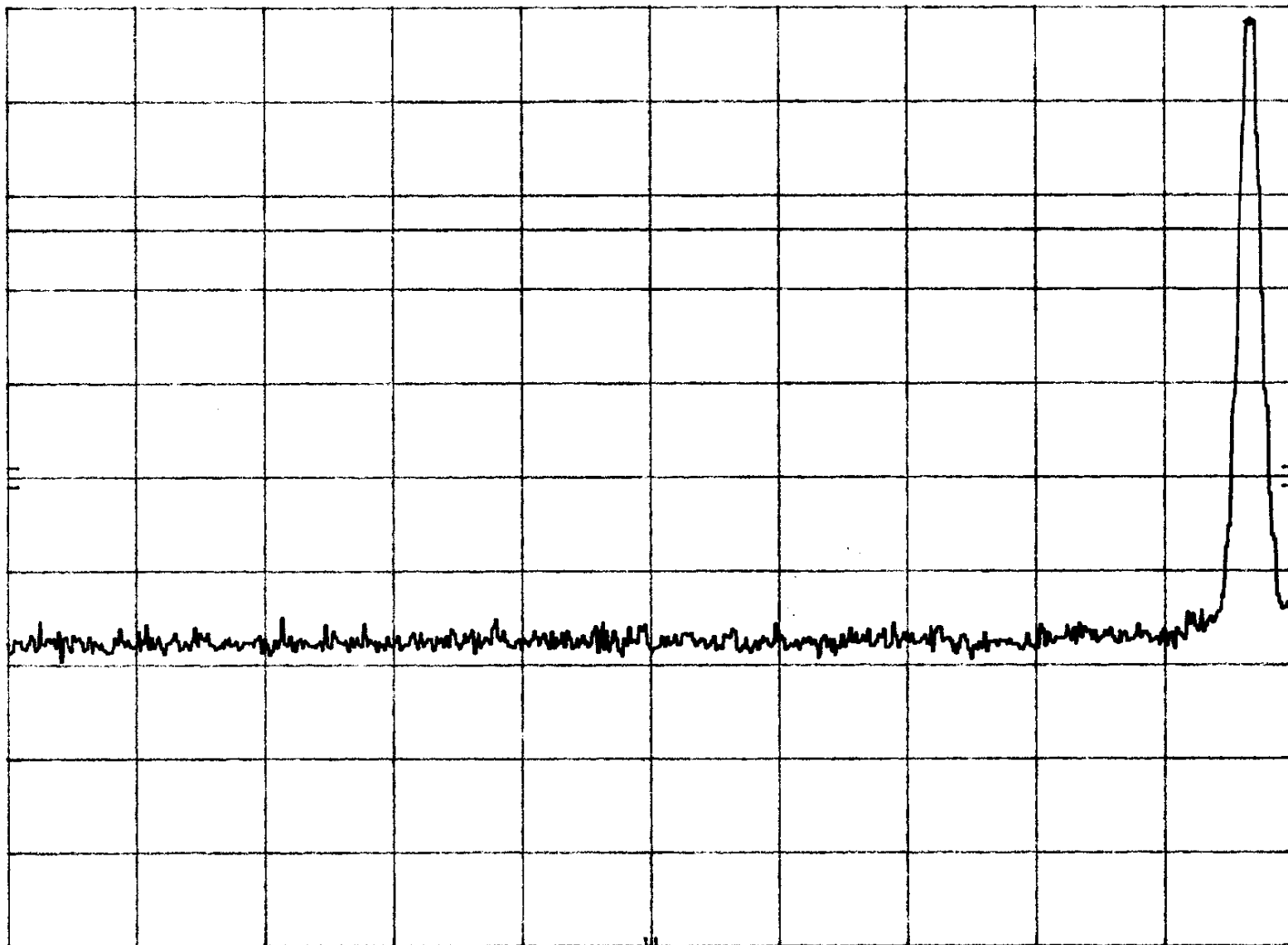
REF 20.0 dBm

ATTEN 40 dB

-62.40 dB

10 dB/

DL
-3.7
dBm



START 2.400 0 GHz

RES BW 100 kHz

VBW 100 kHz

STOP 2.483 5 GHz

SWP 25.1 msec

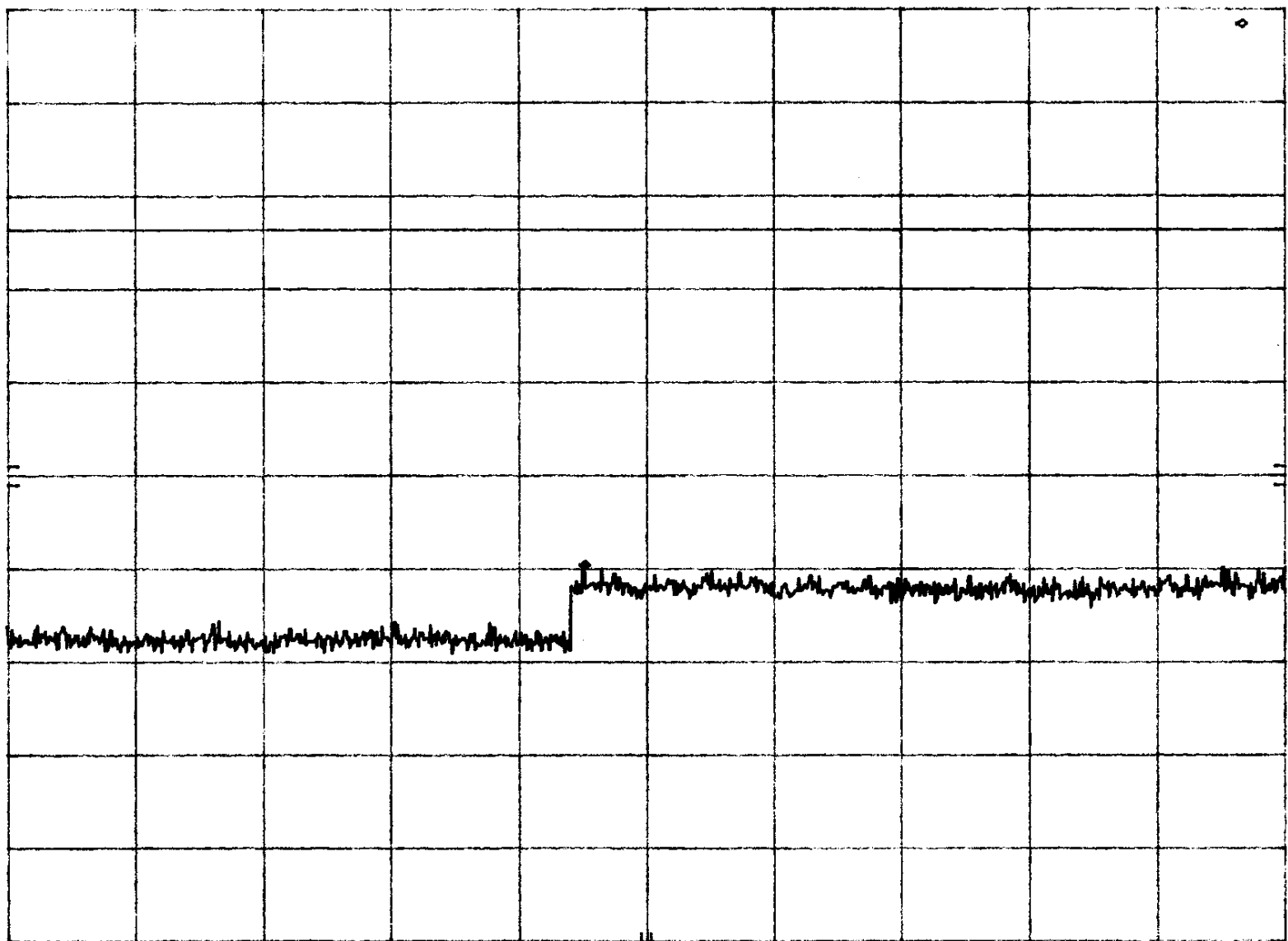
PLOT# 6q

MKR Δ -3.871 GHz
-58.00 dB

hp
10 dB/

REF 20.0 dBm ATTN 40 dB

DL
-3.7
dBm



START 2.48 GHz

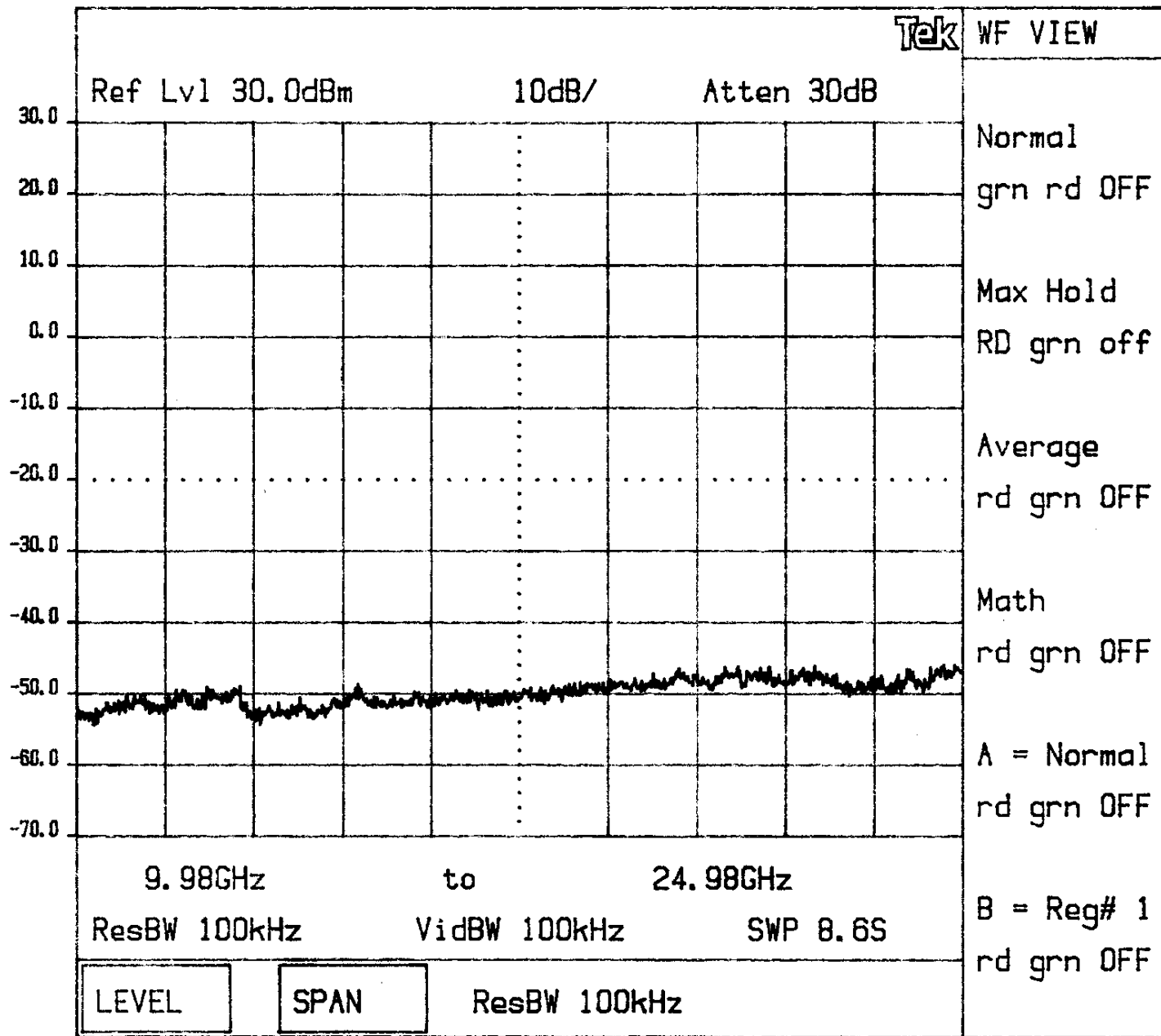
RES BW 100 kHz

VBW 100 kHz

STOP 10.00 GHz

SWP 2.25 sec

PLOT# 6r



Knob 2

Knob 1

Keypad

Tektronix

2784

Intertek Testing Services - Menlo Park

Symbol Technologies Inc., Spread Spectrum
FCC ID: H9PNP3010

Date of Test: June 17 - 22, 1998 & July 8, 1998

- 4.7 Out of Band Radiated Emissions (for emissions in § 4.6 above that are less than 26 dB below carrier), FCC Ref: 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.

Test results are attached.

Not required, all emissions more than 26 dB below fundamental

Intertek Testing Services - Menlo Park

**Symbol Technologies Inc., Spread Spectrum
FCC ID: H9PNP3010**

Date of Test: June 17 - 22, 1998 & July 8, 1998

4.8 Transmitter Radiated Emissions in Restricted Bands, FCC Ref: 15.247(c),

Radiated emission measurements were performed from 30 MHz to 24000 MHz. Analyzer resolution is 100 kHz or greater for frequencies from 30 MHz to 1000 MHz and 1 MHz for frequencies above 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 and average detection (above 1 GHz) unless otherwise specified.

On the following pages, the emissions on the harmonics frequencies, the limits, and the margin of compliance are presented. These tests were made when the transmitter is in full radiated power.

The additional test was performed to show compliance with the requirement at the band-edge frequency 2483.5 MHz and up to 2500 MHz.

The transmitter was setup to transmit at the highest channel. The spectrum analyzer with resolution bandwidth 1 MHz was connected to the antenna terminal of the transmitter. The antenna conducted emissions in the band 2400 - 2483.5 MHz were measured and plotted. The difference (delta) between the levels on fundamental frequency and on the frequency 2483.5 MHz was determined. Then the field strength (E_0 in dBuV/m) of radiated emission at the fundamental frequency at 3 m was measured.

The radiated emission (E_1 in dBuV/m) at 2483.5 MHz was calculated as follows:

$$E_1 = E_0 - \text{delta.}$$

The same procedure was used to measure the radiated emissions at the frequency 2390 MHz and down to 2310 MHz.

For the test results, see data sheet below and attached plots.

Freq. MHz	Antenna Polarization H/V	Detector	Reading dBuV	Antenna Factor dB(1/m)	Cable Loss dB	Field Strength dB(uV/m)	Limit dB(uV/m)	Margin dB
2480.0	V	Ave.*	83.9	27.9	2.3	114.1	-	-
2402.0	V	Ave.*	81.7	27.9	2.3	111.9	-	-
2483.5	V	-	Plot 4.8a	-	-	114.1-66.3= 47.8	54.0	-6.2
2390.0	V	-	Plot 4.8b	-	-	111.9-65.8= 46.1	54.0	-7.9

*: EUT transmitting in CW mode.

For transmitters with hopping channel ON times < 100 msec, DUTY CYCLE CORRECTION is permitted for emissions above 1000 MHz:

No Duty Cycle was used.

INTERTEK TESTING SERVICES

Company: Symbol Technologies
 EUT: Network Phone
 Model: H9PNP3010
 Test Mode: Tx @ Low Channel 2402 MHz

Project #: J98017873
 Date of Test: 6/17/98
 Test Site #: 1
 Engineer: Xi-Ming Yang

FCC Part 15.247 Radiated Emissions

Frequency (MHz)	Antenna Location (m)	Antenna Polariz. H=0/V=1	Reading (dBuV)	Antenna Factor (dB/m)	Preamp (dB)	Correction Factor (dB)	Cable Loss (dB)	Corrected Reading (dBuV/m)	Limit At 3 m (dBuV/m)	Margin (dB)	
4804.0	3.0	0	53.2	32.2	-37.2	0.0	3.2	51.4	54.0	-2.6	a
4804.0	3.0	0	59.4	32.2	-37.2	0.0	3.2	57.6	74.0	-16.4	p
7205.0	3.0	0	42.4	35.8	-36.3	0.0	4.3	46.2	54.0	-7.8	a
7205.0	3.0	0	49.5	35.8	-36.3	0.0	4.3	53.3	74.0	-20.7	p
12010.0	3.0	0	34.7	38.9	-39.1	0.0	5.9	40.4	54.0	-13.6	a
12010.0	3.0	0	42.4	38.9	-39.1	0.0	5.9	48.1	74.0	-25.9	p
19216.0	1.0	0	30.1	40.2	-23.3	-9.5	8.4	45.9	54.0	-8.1	a
19216.0	1.0	0	38.2	40.2	-23.3	-9.5	8.4	54.0	74.0	-20.0	p
21618.0	1.0	0	28.3	40.3	-23.9	-9.5	9.2	44.4	54.0	-9.6	a
21618.0	1.0	0	37.1	40.3	-23.9	-9.5	9.2	53.2	74.0	-20.8	p

Note: Negative signs (-) in the Margin column signify levels below the limit.
 a: Average measurements
 p: Peak measurements

INTERTEK TESTING SERVICES

Company: Symbol Technologies
 EUT: Network Phone
 Model: H9PNP3010
 Test Mode: Tx @ Middle Channel 2440 MHz

Project #: J98017873
 Date of Test: 6/18/98
 Test Site #: 1
 Engineer: Xi-Ming Yang

FCC Part 15.247 Radiated Emissions

Frequency (MHz)	Antenna Location (m)	Antenna Polariz. H=0/V=1	Reading (dBuV)	Antenna Factor (dB/m)	Preamp (dB)	Correction Factor (dB)	Cable Loss (dB)	Corrected Reading (dBuV/m)	Limit At 3 m (dBuV/m)	Margin (dB)	
4880.0	3.0	0	53.0	32.2	-37.2	0.0	3.2	51.2	54.0	-2.8	a
4880.0	3.0	0	59.1	32.2	-37.2	0.0	3.2	57.3	74.0	-16.7	p
7420.0	3.0	0	47.1	35.8	-36.3	0.0	4.3	50.9	54.0	-3.1	a
7420.0	3.0	0	52.4	35.8	-36.3	0.0	4.3	56.2	74.0	-17.8	p
12200.0	3.0	0	30.9	38.9	-39.1	0.0	5.9	36.6	54.0	-17.4	a
12200.0	3.0	0	40.0	38.9	-39.1	0.0	5.9	45.7	74.0	-28.3	p
19520.0	1.0	0	32.0	40.2	-23.3	-9.5	8.4	47.8	54.0	-6.2	a
19520.0	1.0	0	39.6	40.2	-23.3	-9.5	8.4	55.4	74.0	-18.6	p
21960.0	1.0	0	32.0	40.3	-23.9	-9.5	9.2	48.1	54.0	-5.9	a
21960.0	1.0	0	40.2	40.3	-23.9	-9.5	9.2	56.3	74.0	-17.7	p

Note: Negative signs (-) in the Margin column signify levels below the limit.
 a: Average measurements
 p: Peak measurements

INTERTEK TESTING SERVICES

Company: Symbol Technologies
 EUT: Network Phone
 Model: H9PNP3010
 Test Mode: Tx @ High Channel 2480 MHz

Project #: J98017873
 Date of Test: 6/19/98
 Test Site #: 1
 Engineer: Xi-Ming Yang

FCC Part 15.247 Radiated Emissions

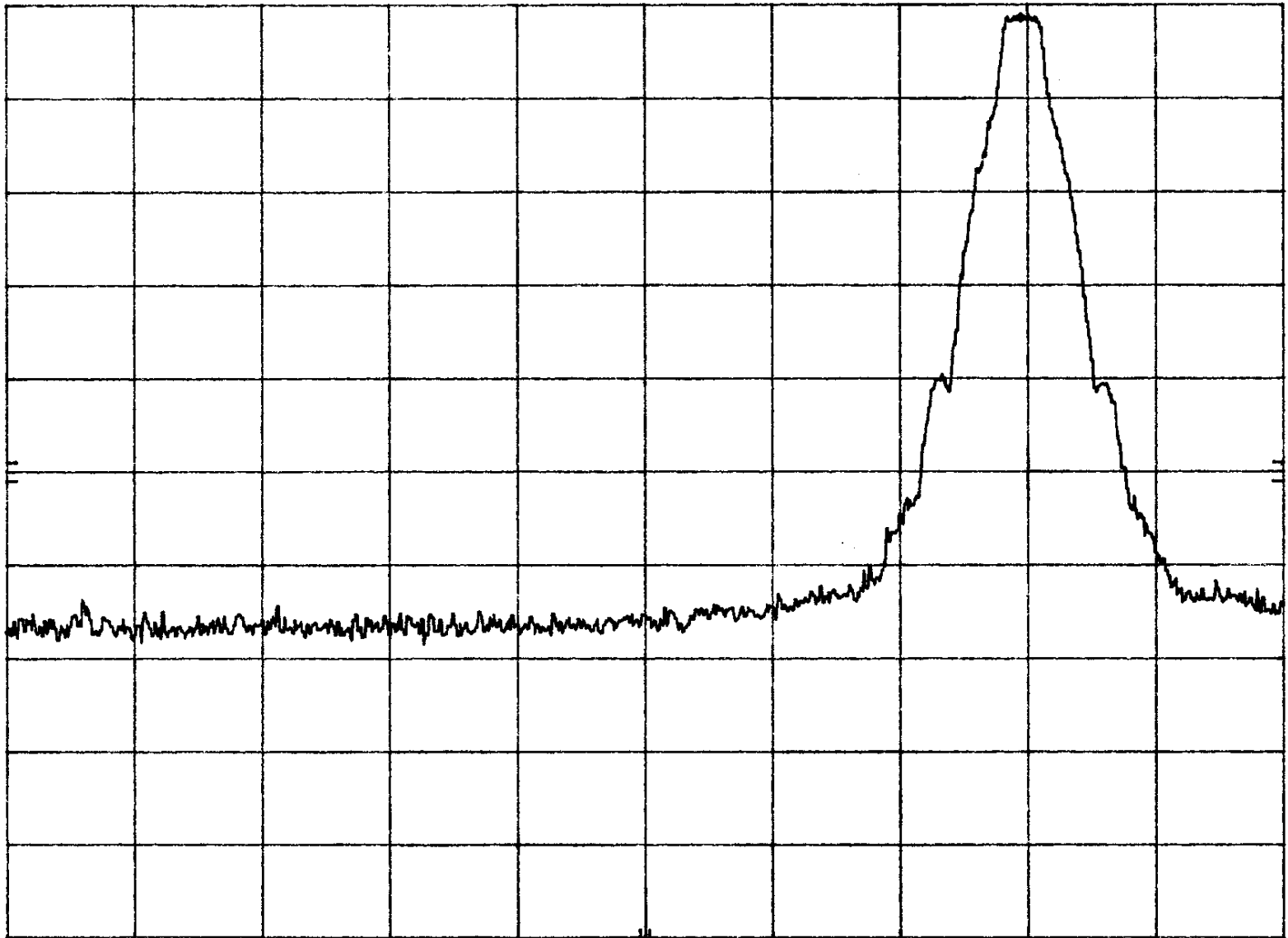
Frequency (MHz)	Antenna Location (m)	Antenna Polariz. H=0/V=1	Reading (dBuV)	Antenna Factor (dB/m)	Preamp (dB)	Correction Factor (dB)	Cable Loss (dB)	Corrected Reading (dBuV/m)	Limit At 3 m (dBuV/m)	Margin (dB)	
4960.0	3.0	0	50.2	32.2	-37.2	0.0	3.2	48.4	54.0	-5.6	a
4960.0	3.0	0	57.7	32.2	-37.2	0.0	3.2	55.9	74.0	-18.1	p
7440.0	3.0	0	44.5	35.8	-36.3	0.0	4.3	48.3	54.0	-5.7	a
7440.0	3.0	0	51.3	35.8	-36.3	0.0	4.3	55.1	74.0	-18.9	p
12400.0	3.0	0	32.6	38.9	-39.1	0.0	5.9	38.3	54.0	-15.7	a
12400.0	3.0	0	40.8	38.9	-39.1	0.0	5.9	46.5	74.0	-27.5	p
19840.0	1.0	0	27.9	40.2	-23.3	-9.5	8.4	43.7	54.0	-10.3	a
19840.0	1.0	0	37.1	40.2	-23.3	-9.5	8.4	52.9	74.0	-21.1	p
22320.0	1.0	0	28.6	40.3	-23.9	-9.5	9.2	44.7	54.0	-9.3	a
22320.0	1.0	0	35.0	40.3	-23.9	-9.5	9.2	51.1	74.0	-22.9	p

Note: Negative signs (-) in the Margin column signify levels below the limit.
 a: Average measurements
 p: Peak measurements

Plot 48a

MKR Δ -11.86 MHz
BP \emptyset 8.59 dB

hp REF 86.7 dB μ V ATTN \emptyset dB
10 dB/



START 2.390 0 GHz

RES BW 100 kHz

VBW 100 kHz

STOP 2.404 9 GHz

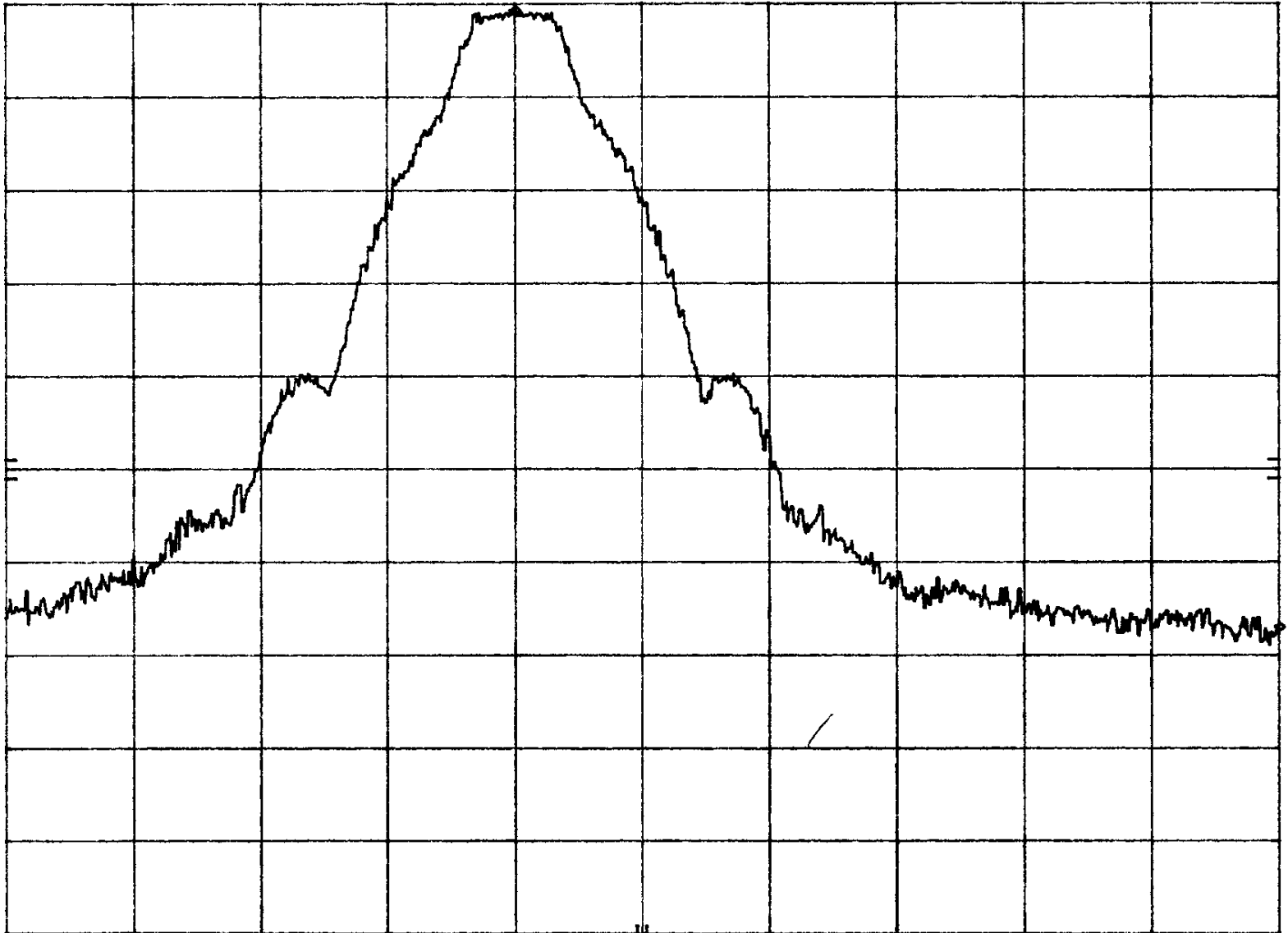
SWP 20.0 msec

Plot 4.8b

MKR Δ 3.529 MHz
BP Δ 66.30 dB

hp REF 90.9 dB μ V ATTN 0 dB

10 dB/



START 2.477 61 GHz
RES BW 100 kHz

VBW 100 kHz

STOP 2.483 50 GHz
SWP 20.0 msec

Intertek Testing Services - Menlo Park

Symbol Technologies Inc., Spread Spectrum
FCC ID: H9PNP3010

Date of Test: June 17 - 22, 1998 & July 8, 1998

4.9 Radiated Emission Configuration Photograph



Intertek Testing Services - Menlo Park

Symbol Technologies Inc., Spread Spectrum
FCC ID: H9PNP3010

Date of Test: June 17 - 22, 1998 & July 8, 1998

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

Not Applicable - No digital part

Test results are attached

Intertek Testing Services - Menlo Park

Symbol Technologies Inc., Spread Spectrum
FCC ID: H9PNP3010

Date of Test: June 17 - 22, 1998 & July 8, 1998

INTERTEK TESTING SERVICES

Company: Symbol Technologies
J98017873
EUT: Network Phone
7/08/98
Model: H9PNP3010
Test Mode: Rx @ Middle Channel
Moyrong

Project #:
Date of Test:
Test Site #: 1
Engineer: Ollie

FCC Part 15.109 Class B Radiated Emissions

Frequency (MHz)	Antenna Location (m)	Antenna Polariz. (H=0/V=1)	Reading (dBuV)	Antenna Factor (dB/m)	Preamp (dB)	Correction Factor (dB)	Cable Loss (dB)	Corrected Reading (dBuV/m)	Limit At 3 m (dBuV/m)	Margin (dB)
32.8	3.0	1	40.9	13.4	-28.2	0.0	0.8	26.9	40.0	-13.1
40.0	3.0	1	48.2	10.9	-28.2	0.0	0.8	31.7	40.0	-8.3
60.0	3.0	1	41.5	6.6	-28.2	0.0	1.1	21.0	40.0	-19.0
80.0	3.0	1	52.7	6.5	-28.2	0.0	1.6	32.6	40.0	-7.4
120.0	3.0	0	56.0	7.0	-28.2	0.0	2.1	37.0	43.5	-6.5
140.0	3.0	0	48.5	9.1	-28.0	0.0	2.2	31.8	43.5	-11.7
160.0	3.0	0	56.4	9.3	-28.0	0.0	2.2	40.0	43.5	-3.5 *
180.0	3.0	0	49.9	9.0	-27.8	0.0	2.3	33.4	43.5	-10.1
200.0	3.0	0	52.2	11.3	-27.8	0.0	2.4	38.1	43.5	-5.4
220.0	3.0	0	50.3	12.0	-27.8	0.0	2.4	36.9	46.0	-9.1
240.0	3.0	0	45.0	12.2	-27.8	0.0	2.5	31.9	46.0	-14.1
260.0	3.0	0	54.1	13.1	-27.8	0.0	2.7	42.1	46.0	-3.9 *
280.0	3.0	0	44.3	13.1	-27.9	0.0	3.1	32.6	46.0	-13.4
300.0	3.0	1	48.0	13.9	-27.7	0.0	3.5	37.7	46.0	-8.3
320.0	3.0	1	43.8	14.3	-27.7	0.0	3.9	34.3	46.0	-11.7

Note: Negative signs (-) in the Margin column signify levels below the limit.
Readings proceeded with a '*' are Quasi-Peak measurements.
All other readings are Peak measurements.

Intertek Testing Services - Menlo Park

Symbol Technologies Inc., Spread Spectrum
FCC ID: H9PNP3010

Date of Test: June 17 - 22, 1998 & July 8, 1998

- 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 Applicable - EUT is transmitter only
- [] Not performed; exempt until June 1999
- [] Test results are attached

Intertek Testing Services - Menlo Park

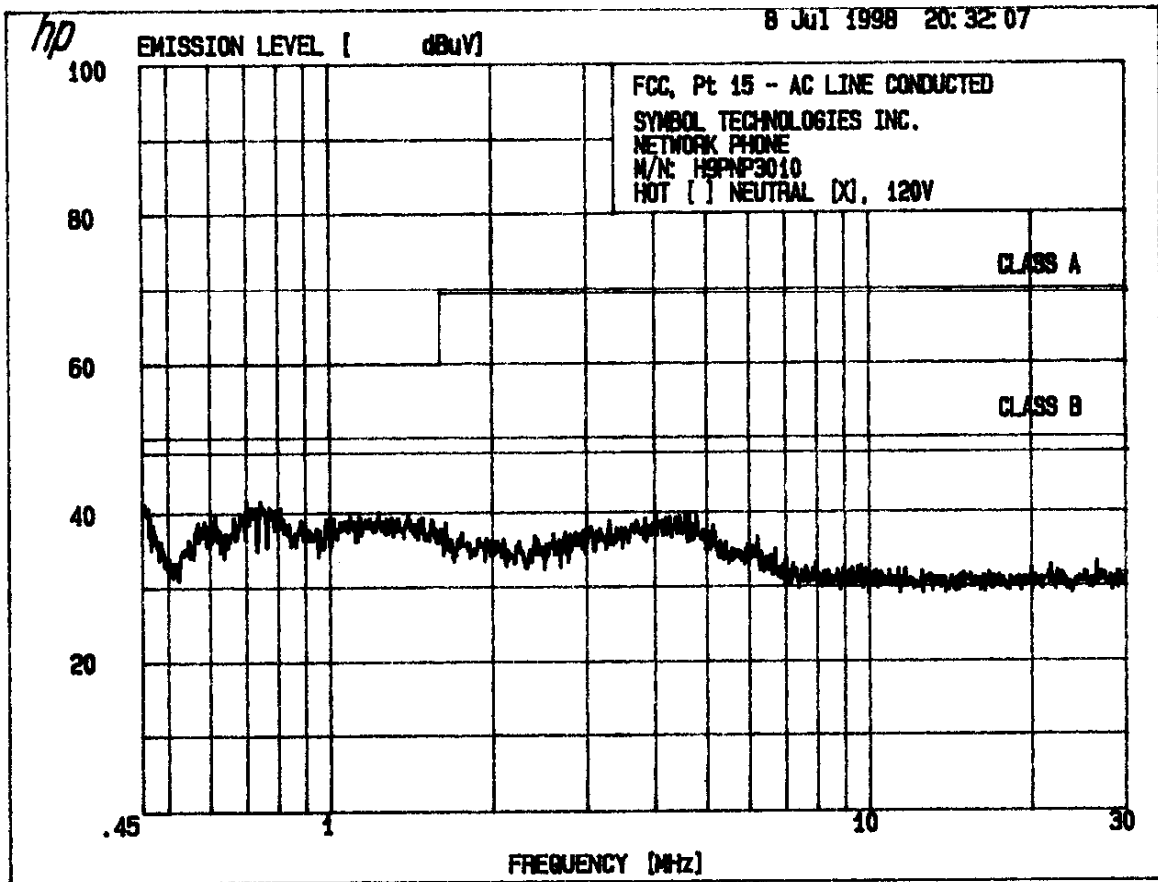
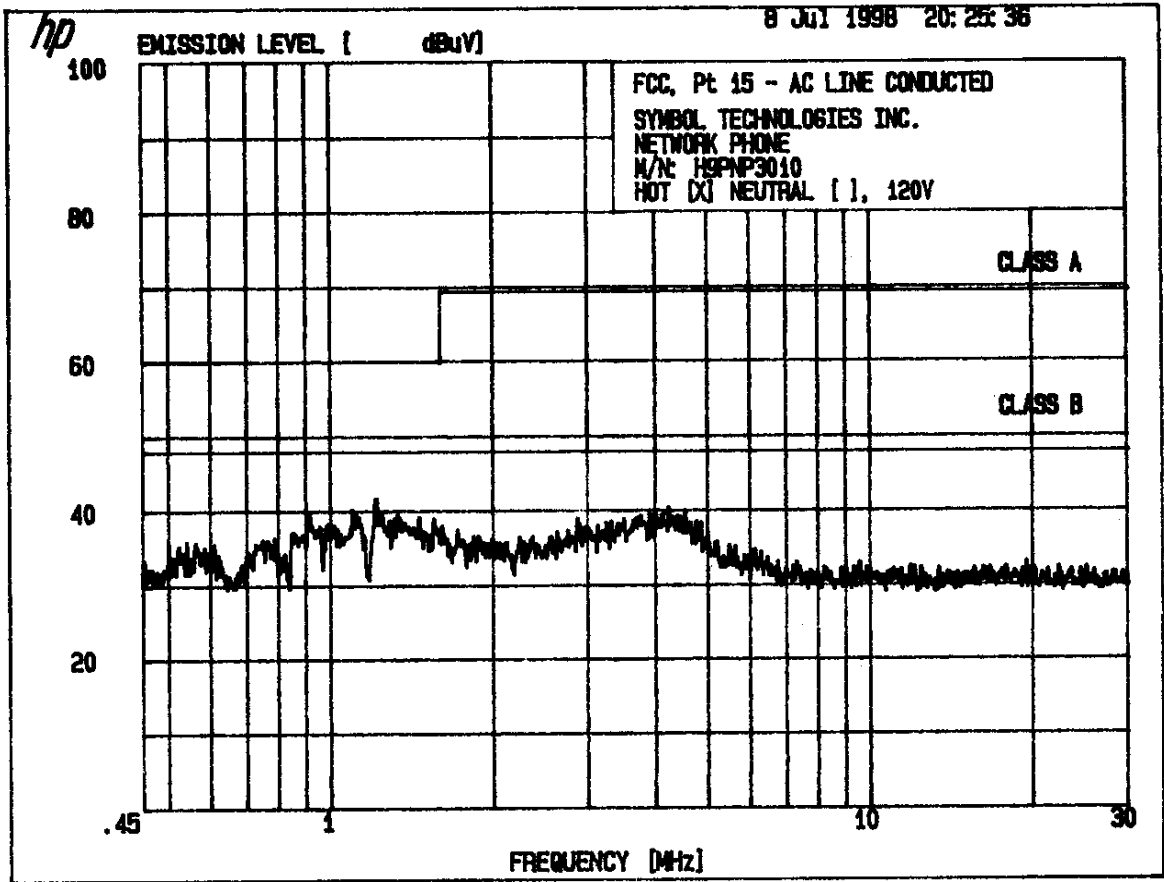
Symbol Technologies Inc., Spread Spectrum
FCC ID: H9PNP3010

Date of Test: June 17 - 22, 1998 & July 8, 1998

4.12 AC Line Conducted Emission, FCC Rule 15.207:

Not required; battery operation only

Test data attached



6 Jul 1988 20:25:38

3. FCC CFR 47, Pt 15
3.1 FCC, Pt 15 - AC LINE CONDUCTED

SYMBOL TECHNOLOGIES INC.
NETWORK PHONE
M/N: HSPNP3010
HOT [X] NEUTRAL [], 120V

PEAKS FOUND ABOVE 38 dBuV

PEAK#	FREQ (MHz)	AMPL (dBuV)
1	.3221	38.8
2	1.104	40.3
3	1.221	41.7
4	1.340	39.5
5	1.564	39.0
6	2.687	39.0
7	3.260	38.4
8	3.776	39.3
9	3.921	39.7
10	4.246	40.5
11	4.776	38.6

=====

8 Jul 1998 20:32:07

=====

3. FCC CFR 47, Pt 15
3.1 FCC, Pt 15 - AC LINE CONDUCTED

=====

SYMBOL TECHNOLOGIES INC.
NETWORK PHONE
M/N: H9PNP3010
HOT [] NEUTRAL [X], 120V

PEAKS FOUND ABOVE 38 dBuV

PEAK#	FREQ (MHz)	AMPL(dBuV)
1	.4732	38.4
2	.5886	38.9
3	.6164	39.7
4	.6676	39.4
5	.6932	39.7
6	.7020	41.8
7	.7476	41.6
8	.7764	40.8
9	.8131	40.8
10	.8880	39.0
11	.9903	39.2
12	1.096	39.5
13	1.237	40.1
14	1.645	38.7
15	3.061	38.1
16	3.315	38.9
17	3.656	39.3
18	4.038	39.8
19	4.657	40.0
20	4.796	39.6
21	5.150	38.3

Intertek Testing Services - Menlo Park

Symbol Technologies Inc., Spread Spectrum
FCC ID: H9PNP3010

Date of Test: June 17 - 22, 1998 & July 8, 1998

4.13 AC Line Conducted Configuration Photograph



Intertek Testing Services - Menlo Park

Symbol Technologies Inc., Spread Spectrum
FCC ID: H9PNP3010

Date of Test: June 17 - 22, 1998 & July 8, 1998

5.0 Equipment Photographs

Photographs of the EUT are attached.

Intertek Testing Services - Menlo Park

Symbol Technologies Inc., Spread Spectrum
FCC ID: H9PNP3010

Date of Test: June 17 - 22, 1998 & July 8, 1998

6.0 **Product Labelling**

6.1 Label Artwork

6.2 Label Location

See attached pages.

Intertek Testing Services - Menlo Park

Symbol Technologies Inc., Spread Spectrum
FCC ID: H9PNP3010

Date of Test: June 17 - 22, 1998 & July 8, 1998

7.0 Technical Specifications

7.1 Circuit Diagram

See attached page.

Intertek Testing Services - Menlo Park

Symbol Technologies Inc., Spread Spectrum
FCC ID: H9PNP3010

Date of Test: June 17 - 22, 1998 & July 8, 1998

7.2 Block Diagram

See attached page.

Intertek Testing Services - Menlo Park

Symbol Technologies Inc., Spread Spectrum
FCC ID: H9PNP3010

Date of Test: June 17 - 22, 1998 & July 8, 1998

7.3 Antenna gain and Mounting Information

See attached pages.

Intertek Testing Services - Menlo Park

Symbol Technologies Inc., Spread Spectrum
FCC ID: H9PNP3010

Date of Test: June 17 - 22, 1998 & July 8, 1998

8.0 Instruction Manual

Attached is a preliminary copy of the Instruction Manual.

Please note that the required FCC Information to the User can be found on Page ___ of this manual.

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