

## 10.4 Measurement Data

Test Date : Nov. 14, 2002      Temperature : 25      Humidity: 60 %

- 1) 2402 MHz : the dwell time is  $0.417\text{ms} \times 30 = 12.510 \text{ ms}$
- 2) 2441 MHz : the dwell time is  $0.417\text{ms} \times 30 = 12.510 \text{ ms}$
- 3) 2480 MHz : the dwell time is  $0.417\text{ms} \times 30 = 12.510 \text{ ms}$

The maximum time of occupancy for a particular channel is 249.9 msec in any 30 second period, which is less than the 400 msec allowed by the rules; therefore, it meets the requirements of this section.

***Note : 1. Please see appendix 5 for Plotted Data***

***2. The expanded uncertainty of dwell time on each channel tests is 2dB.***

## 11 OUTPUT POWER MEASUREMENT

### 11.1 Standard Applicable

For direct sequence system, according to 15.247(b), the maximum peak output power of the transmitter shall not exceed 1 Watt. If transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### 11.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in figure 4 without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 1 MHz and VBW to 1 MHz.
4. Measure the highest amplitude appearing on spectral display and record the level to calculate result data.
5. Repeat above procedures until all frequencies measured were complete.

### 11.3 Measurement Equipment

Equipment	Manufacturer	Model No.	Next Cal. Due
Spectrum Analyzer	Hewlett-Packard	8564E	04/14/2003
Attenuator	Weinschel Engineering	1	N/A

## 11.4 Measurement Data

Test Date : Nov. 14, 2002      Temperature : 25      Humidity: 60 %

- 1) 2402 MHz : Output Peak Power is 12.83 dBm = **19.18** mW
- 2) 2441 MHz : Output Peak Power is 13.33 dBm = **21.52** mW
- 3) 2480 MHz : Output Peak Power is 13.83 dBm = **24.15** mW

*Note : 1. Please see appendix 6 for Plotted Data*

*2. The expanded uncertainty of output power measurement tests is 2dB.*

## 12 100 kHz BANDWIDTH OF BAND EDGES MEASUREMENT

### 12.1 Standard Applicable

According to 15.247(c), if any 100 kHz bandwidth outside these frequency bands, the radio frequency power that is produced by the modulation products of the spreading sequence, the information sequence and the carrier frequency shall be either at least 20 dB below that in any 100 kHz bandwidth within the band that contains the highest level of the desired power or shall not exceed the general levels specified in § 15.209(a), whichever results in the lesser attenuation.

### 12.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in figure 4 without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

### 12.3 Measurement Equipment

Equipment	Manufacturer	Model No.	Next Cal. Due
Spectrum Analyzer	Hewlett-Packard	8564E	04/14/2003
Plotter	Hewlett-Packard	7440A	N/A

## 12.4 Measurement Data

Test Date : Nov. 14, 2002      Temperature : 25      Humidity: 60 %

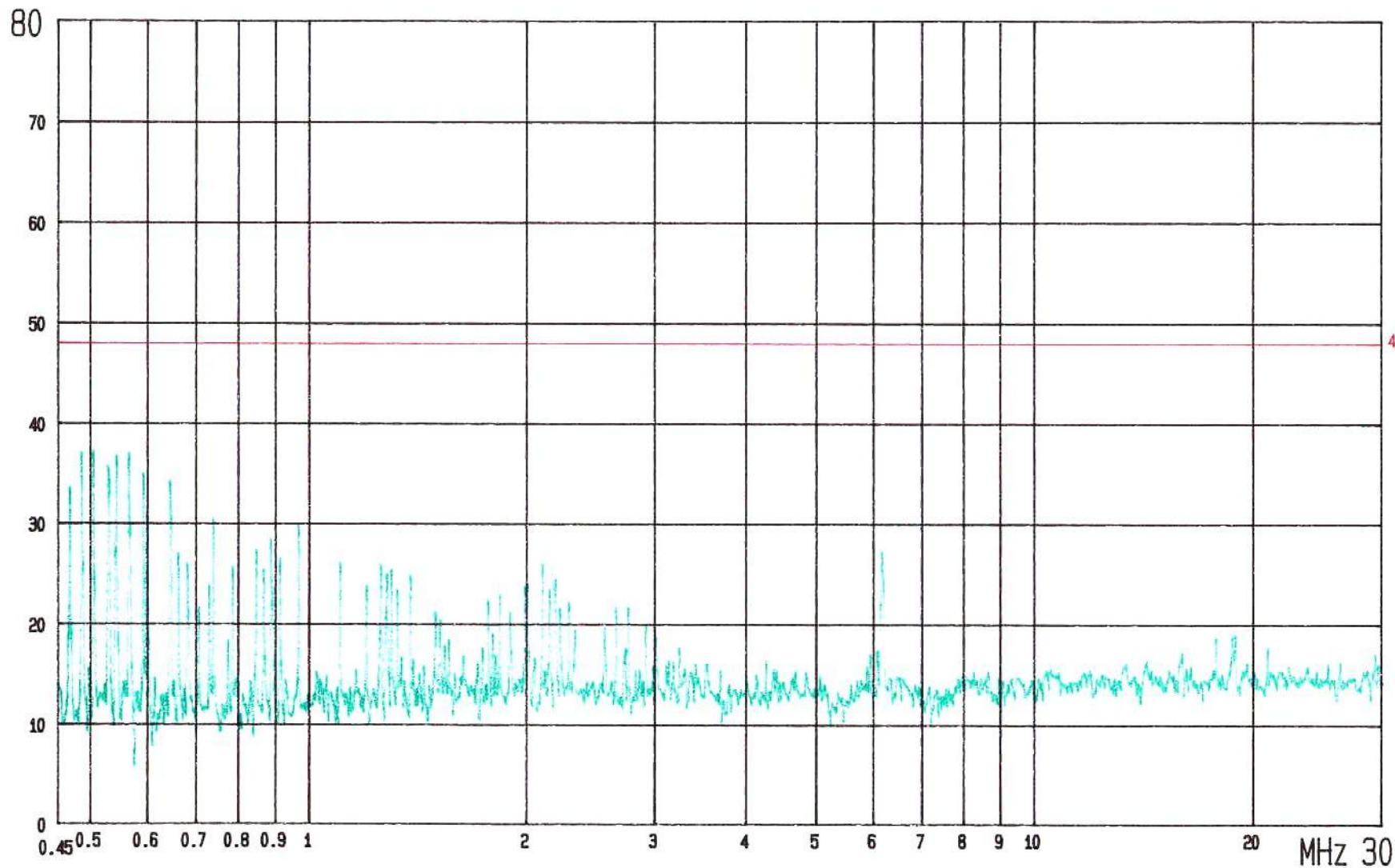
- a) Lower Band Edge : All emissions in this 100kHz bandwidth are attenuated more than 20dB from the carrier.
- b) Upper Band Edge : All emissions in this 100kHz bandwidth are attenuated more than 20dB from the carrier.

***Note : 1. Please see appendix 7 for Plotted Data***

***2. The expanded uncertainty of the 100 KHz bandwidth of band edges tests is 1000Hz.***

## **Appendix 1 : Plotted Data of Power Line Conducted Emissions**

dBuV



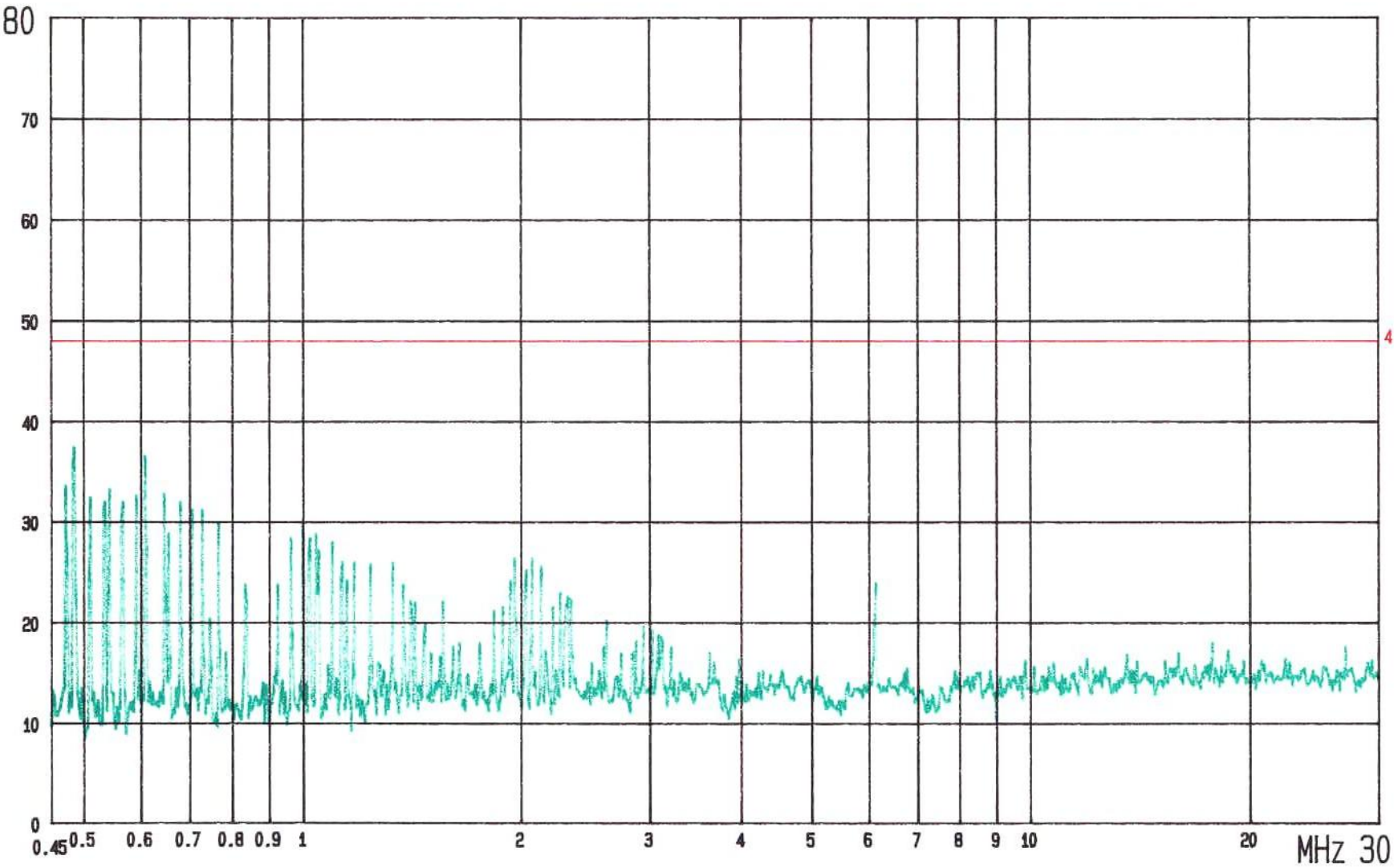
CONDUCTED TEST  
MODEL: BT3021

MODE: CH LO

4: QP  
LISN: N

CLASS B LIMIT  
ETC EMI LAB.

dBuV



CONDUCTED TEST  
MODEL: BT3021

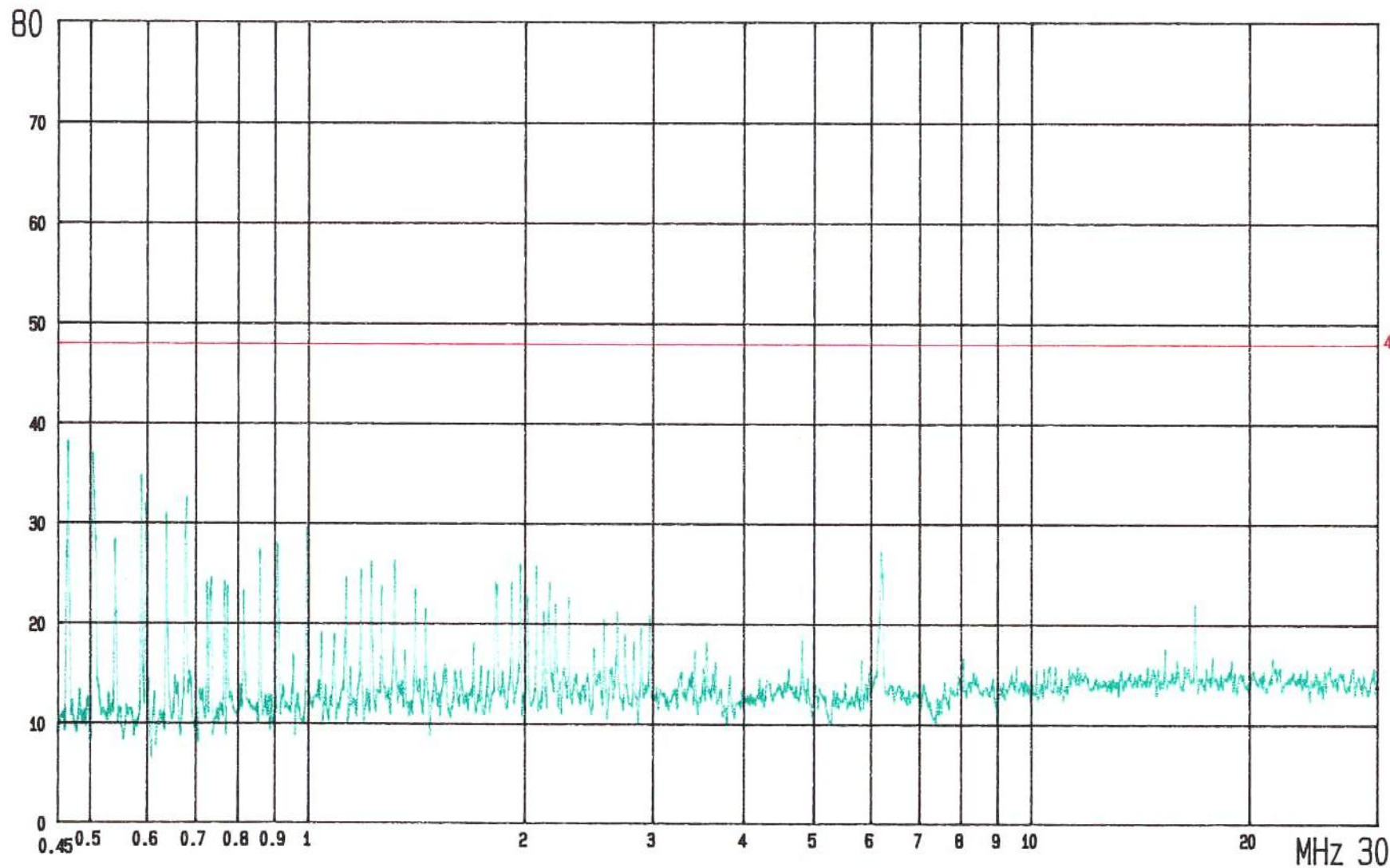
MODE: CH L0

4: QP  
LISN: L1

CLASS B LIMIT  
ETC EMI LAB.



dBuV



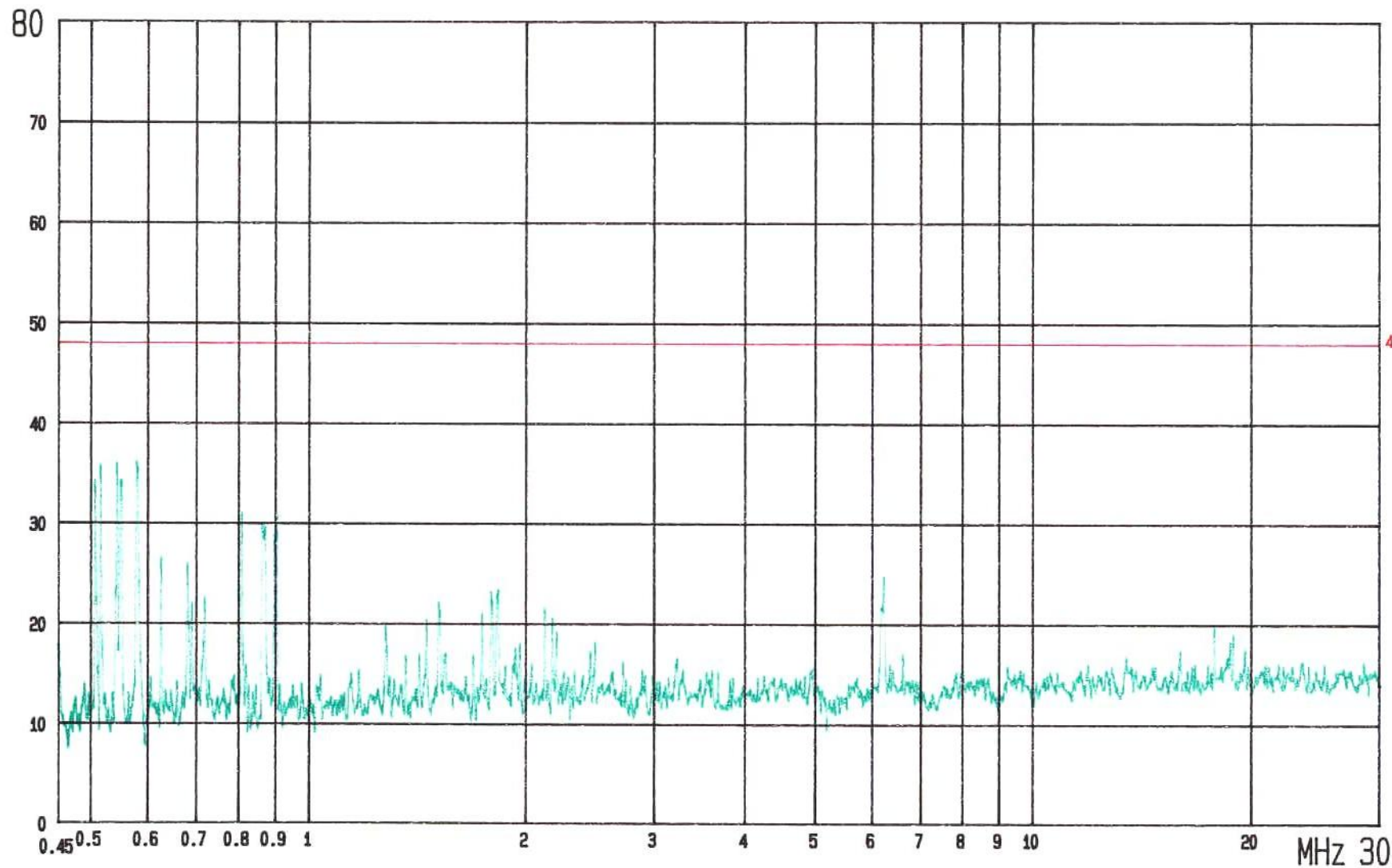
CONDUCTED TEST  
MODEL: BT3021

MODE: CH MID

4: QP  
LISN: N

CLASS B LIMIT  
ETC EMI LAB.

dBuV



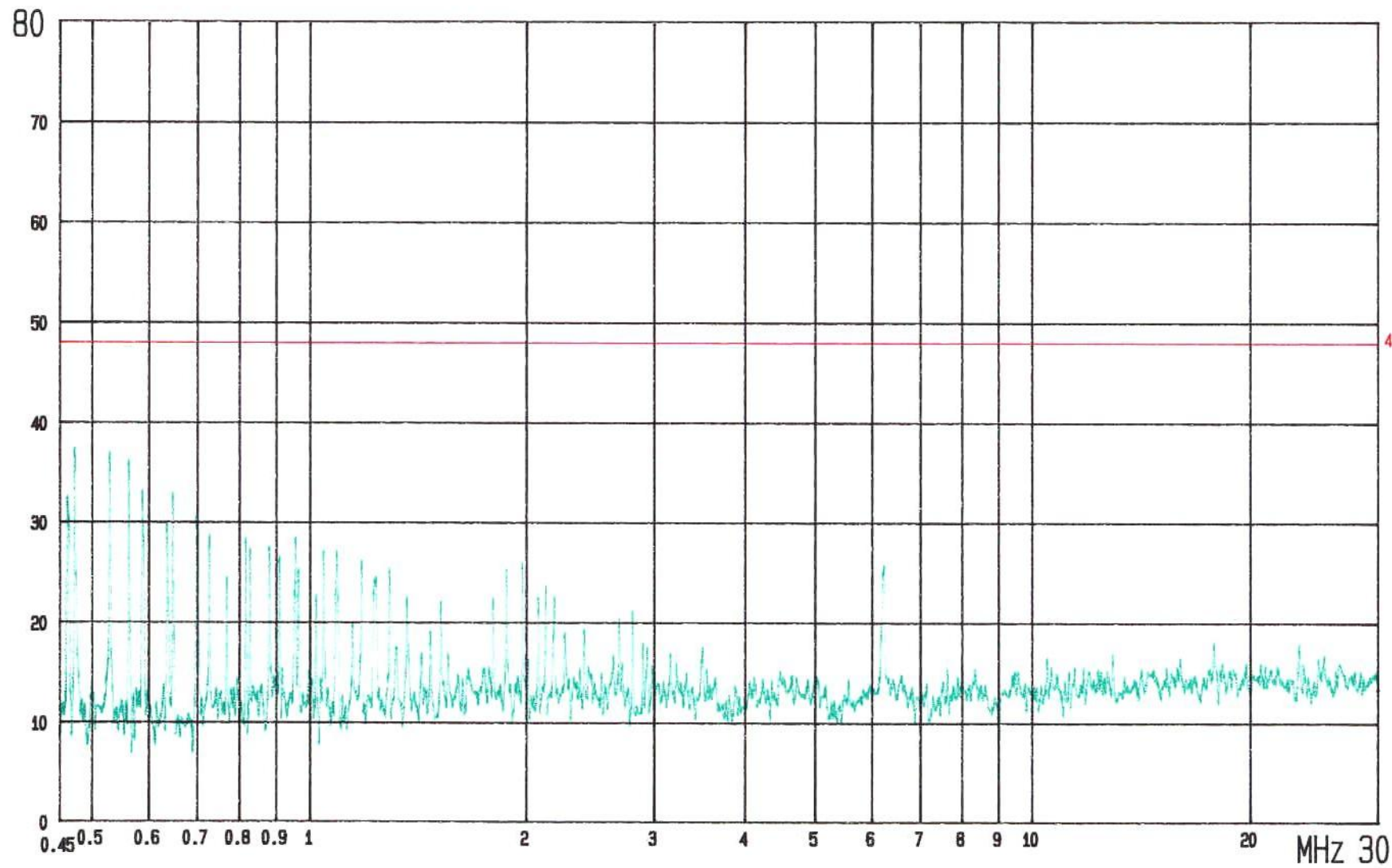
CONDUCTED TEST  
MODEL: BT3021

MODE: CH MID

4: QP  
LISN: L1

CLASS B LIMIT  
ETC EMI LAB.

dBuV



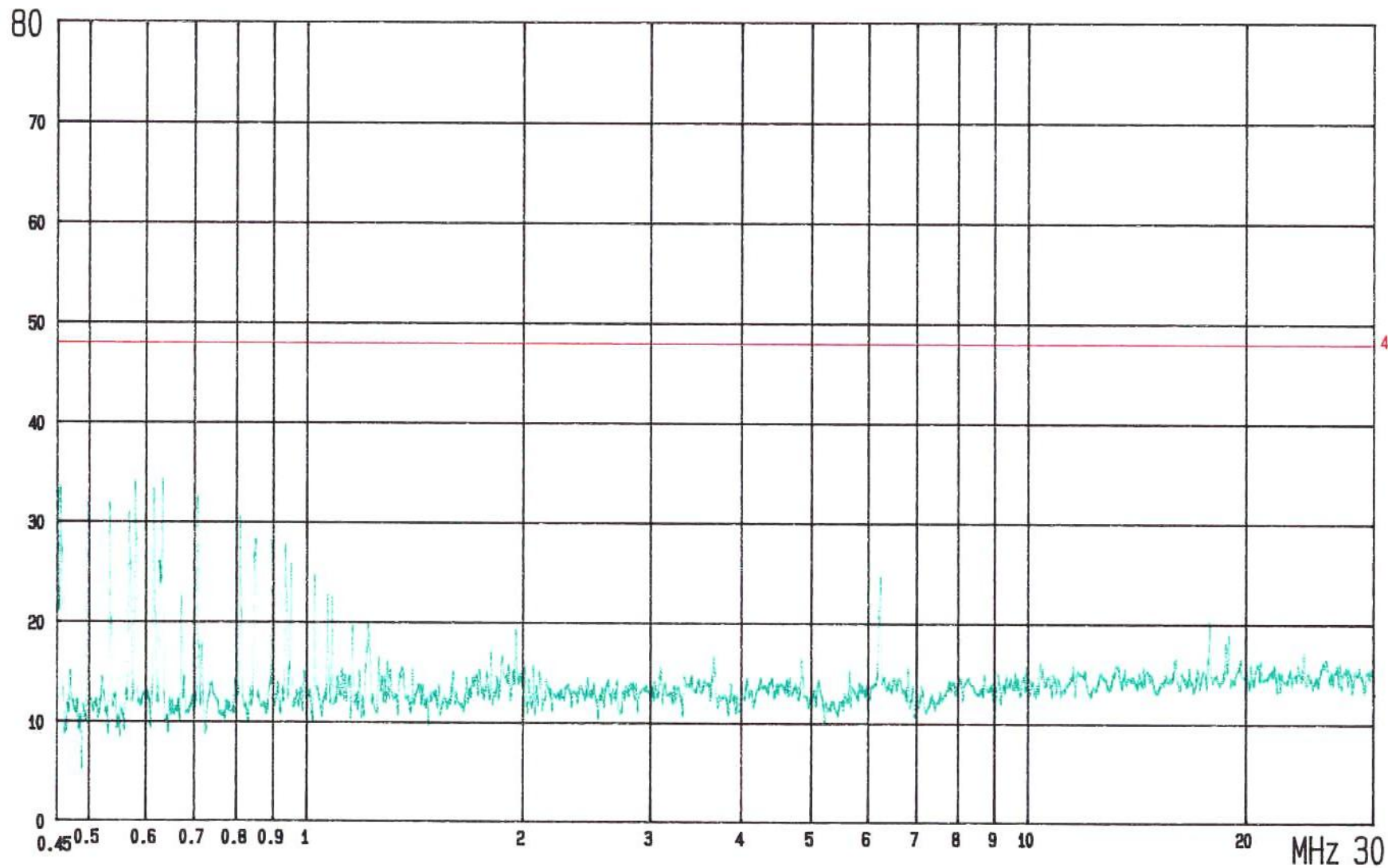
CONDUCTED TEST  
MODEL: BT3021

MODE: CH HI

4: QP  
LISN: N

CLASS B LIMIT  
ETC EMI LAB.

dBuV



4

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CONDUCTED TEST  
MODEL: BT3021

MODE: CH HI

4: QP  
LISN: L1

CLASS B LIMIT  
ETC EMI LAB.

## **Appendix 2 : Plotted Data for Separation of Adjacent Channel**



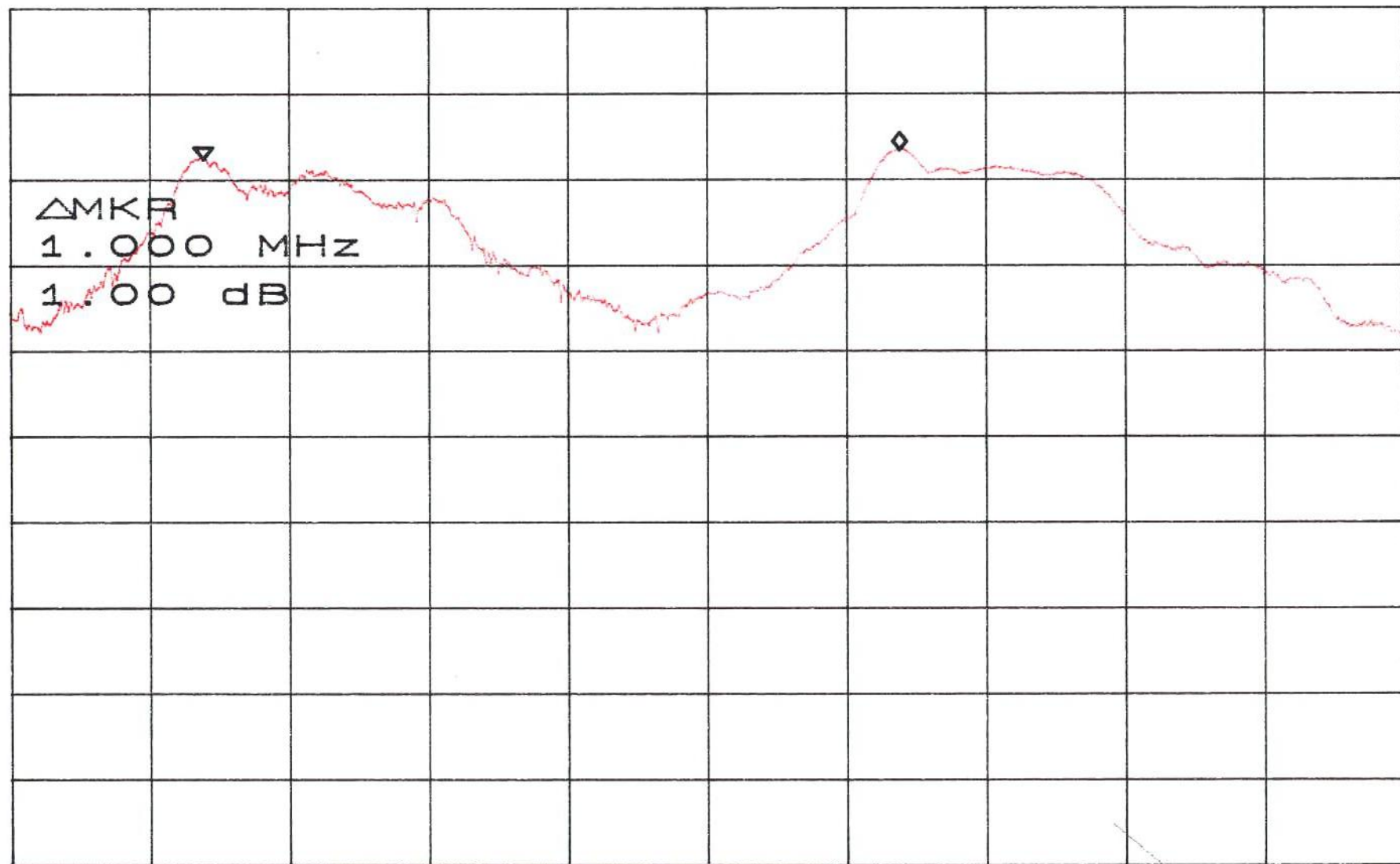
ATTEN 40dB

RL 30.0dBm

10dB/

$\Delta$ MKR 1.00dB

1.000MHz



CENTER 2.402500GHz

SPAN 2.000MHz

\*RBW 100kHz

VBW 100kHz

SWP 50.0ms

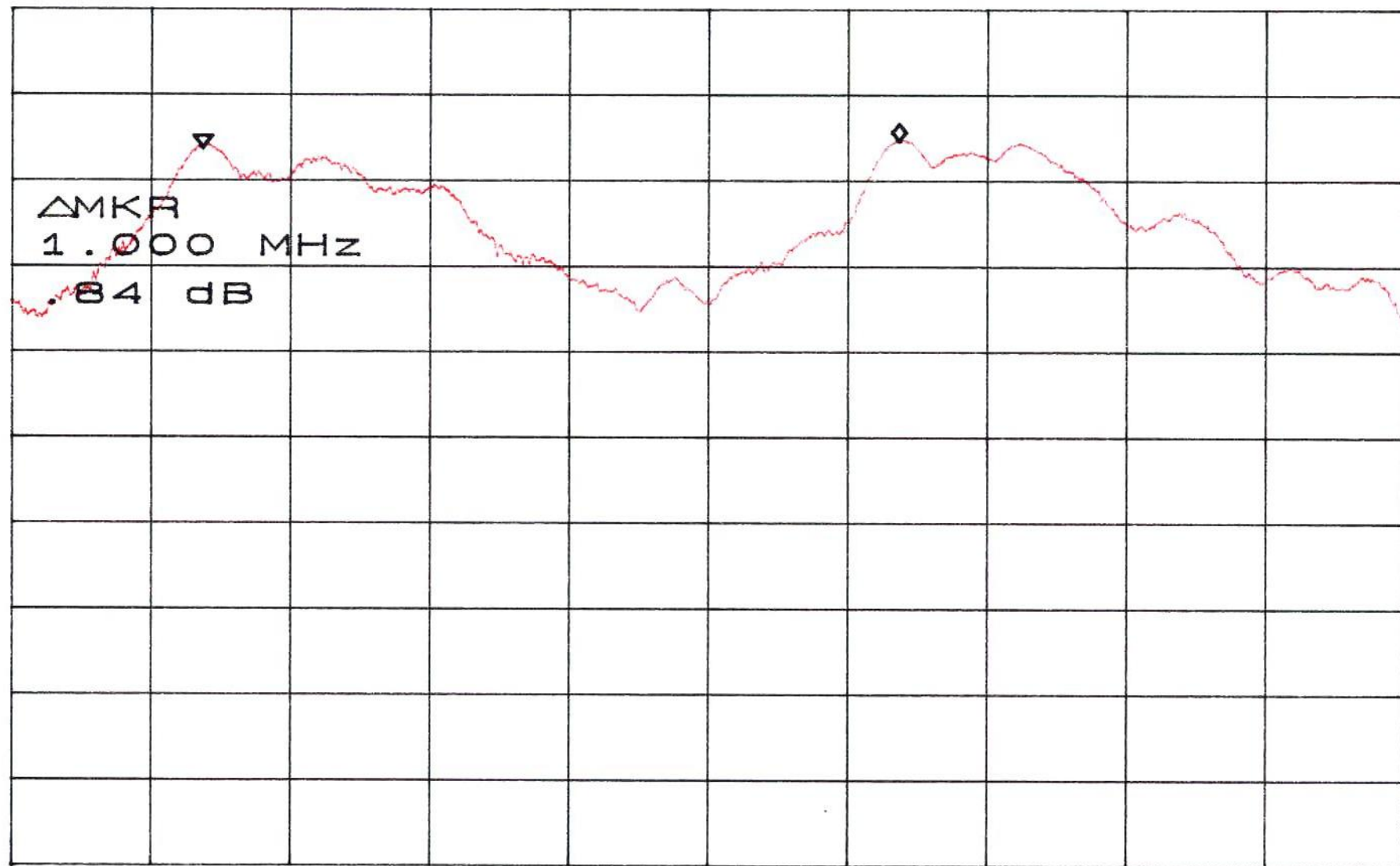
ATTEN 40dB

RL 30.0dBm

10dB/

$\Delta MKR$  .84dB

1.000MHz



CENTER 2.441500GHz

SPAN 2.000MHz

\*RBW 100kHz

VBW 100kHz

SWP 50.0ms

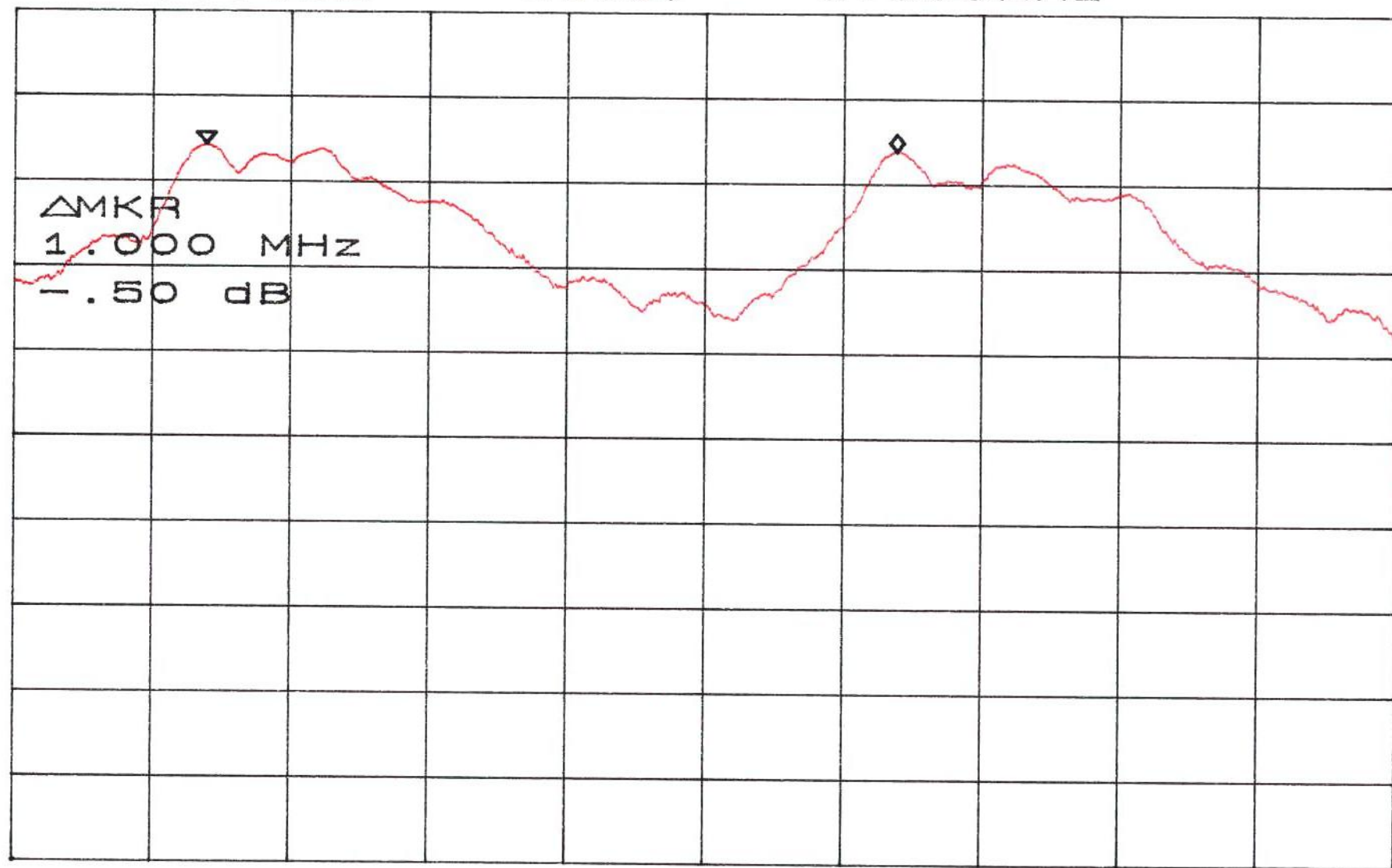
ATTEN 40dB

RL 30.0dBm

10dB/

$\Delta MKR$  -.50dB

1.000MHz



CENTER 2.479500GHz

SPAN 2.000MHz

\*RBW 100kHz

VBW 100kHz

SWP 50.0ms

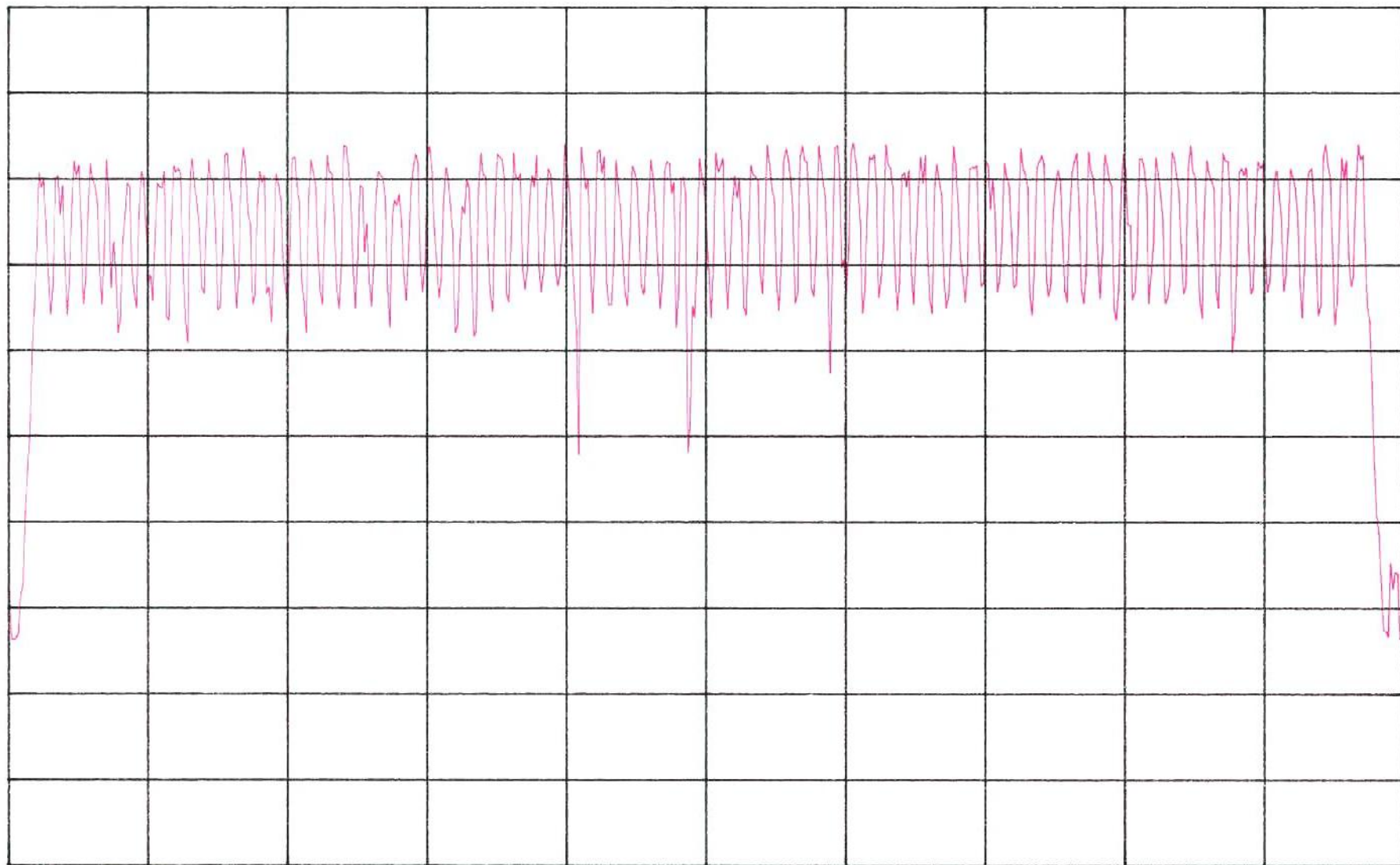


### **Appendix 3 : Plotted Data for Total Used Hopping Frequencies**

ATTEN 40dB

RL 30.0dBm

10dB/



START 2.40000GHz

STOP 2.48350GHz

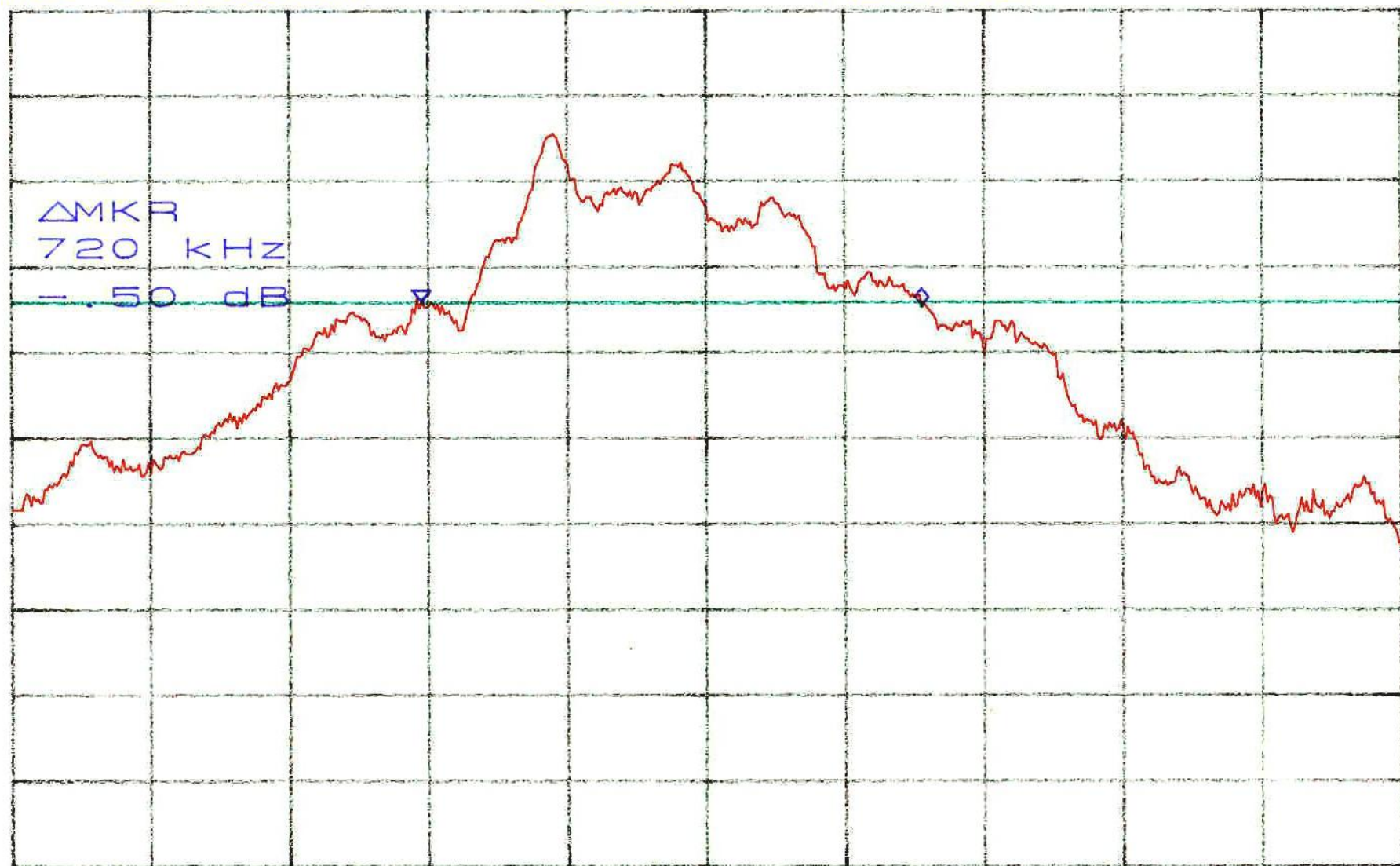
\*RBW 100kHz

VBW 100kHz

SWP 50.0ms

## **Appendix 4 : Plotted Data for Channel Bandwidth**

\*ATTEN 40dB  $\Delta MKR - .50dB$   
RL 30.0dBm 10dB/ 720kHz



CENTER 2.402000GHz

SPAN 2.000MHz

\*RBW 30kHz

\*VBW 100kHz

SWP 50.0ms

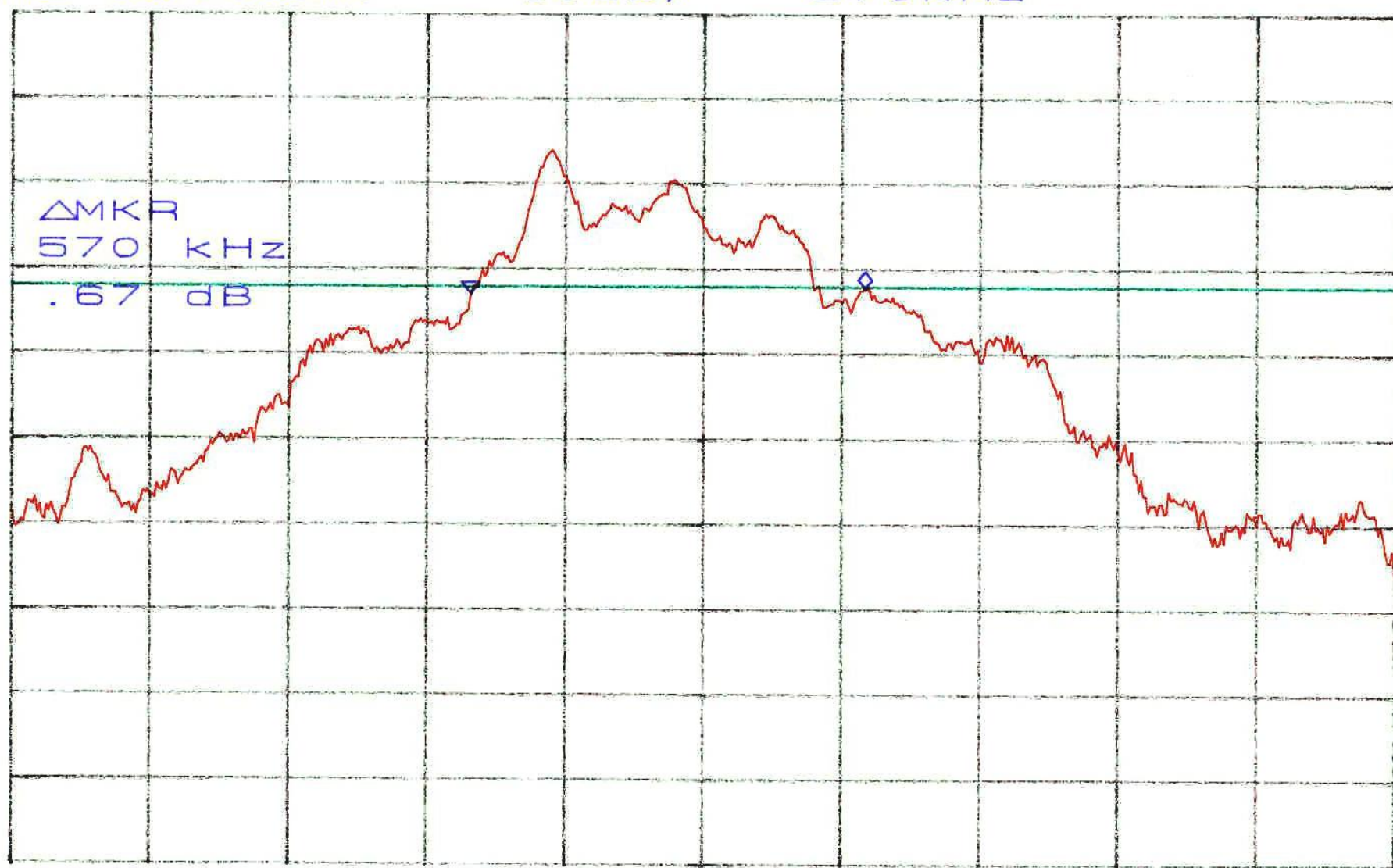
\*ATTEN 40dB

RL 30.0dBm

10dB/

$\Delta$ MKR .67dB

570kHz



CENTER 2.441000GHz

SPAN 2.000MHz

\*RBW 30kHz

\*VBW 100kHz

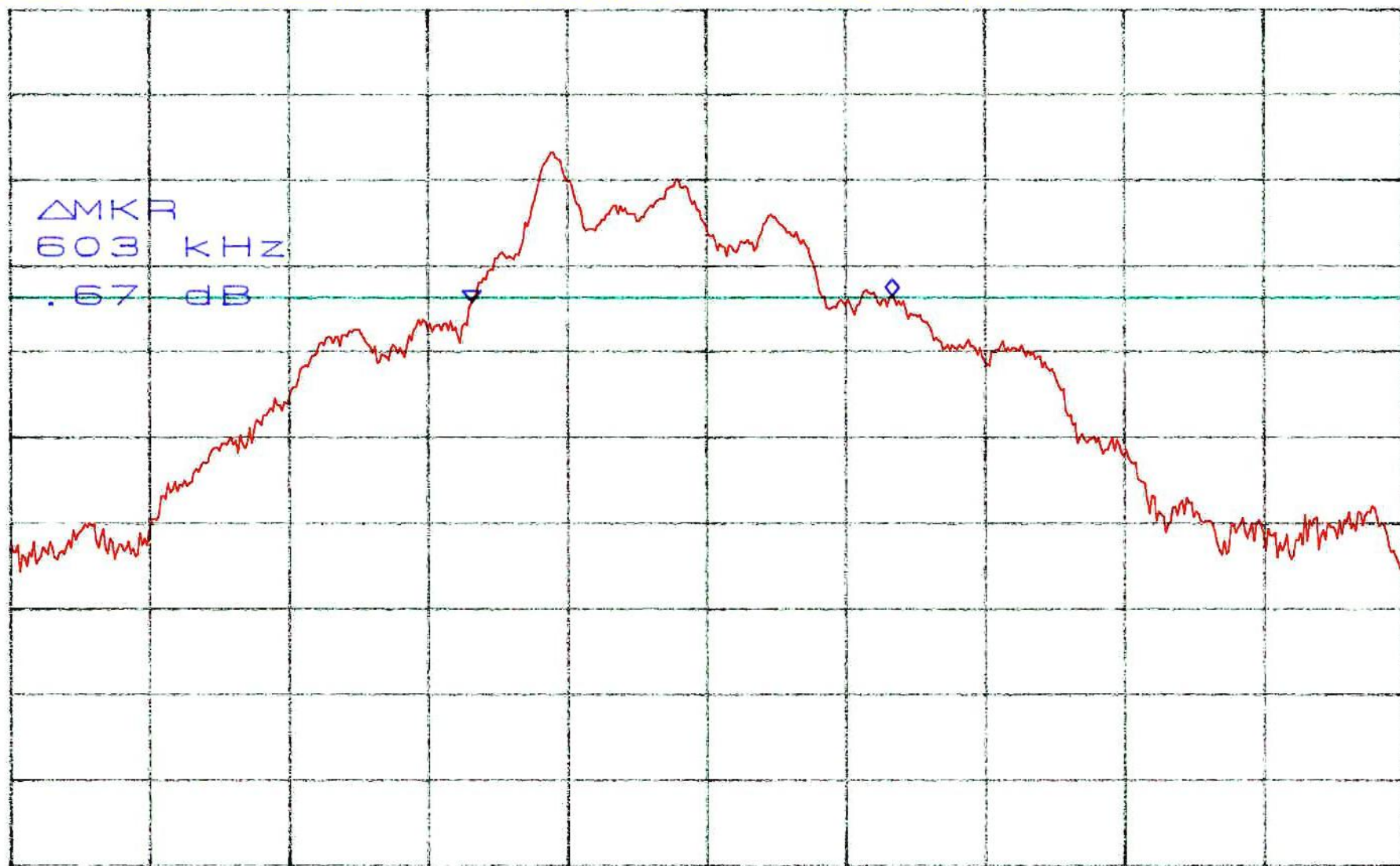
SWP 50.0ms



\*ATTEN 40dB  
RL 30.0dBm

10dB/

$\Delta$ MKR .67dB  
603kHz



CENTER 2.480000GHz

SPAN 2.000MHz

\*RBW 30kHz

\*VBW 100kHz

SWP 50.0ms

## **Appendix 5 : Plotted Data for Channel Dwell Time**

ATTEN 40dB

$\Delta MKR$  -.17dB

RL 30.0dBm

10dB/

417  $\mu$ s

$\Delta MKR$   
417  $\mu$ s  
-.17 dB

SS

CENTER 2.402000000GHz

SPAN 0Hz

\*RBW 1.0MHz

VBW 1.0MHz

\*SWP 50.0ms



ATTEN 40dB

RL 30.0dBm

10dB/

SD

\*

CENTER 2.402000000GHz

SPAN 0Hz

\*RBW 1.0MHz

VBW 1.0MHz

\*SWP 1.00sec

ATTEN 40dB

$\Delta MKR$  -.33dB

RL 30.0dBm

10dB/

417  $\mu$ s

SSD

$\Delta MKR$

417  $\mu$ s

-.33 dB

4

CENTER 2.441000000GHz

SPAN 0Hz

\*RBW 1.0MHz

VBW 1.0MHz

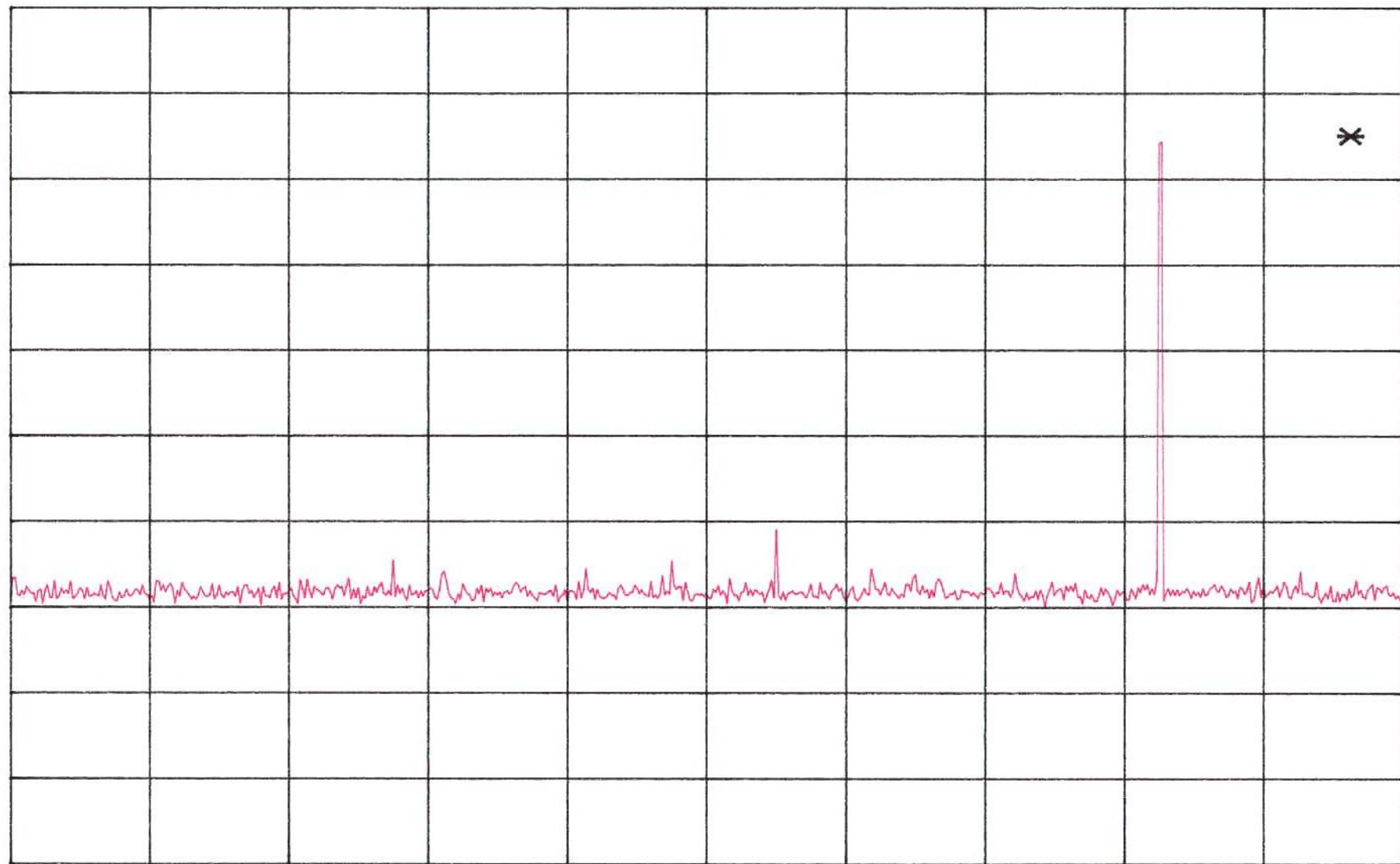
\*SWP 50.0ms

ATTEN 40dB

RL 30.0dBm

10dB/

SD



CENTER 2.4410000000GHz

SPAN 0Hz

\*RBW 1.0MHz

VBW 1.0MHz

\*SWP 1.00sec

ATTEN 40dB

$\Delta MKR$  1.50dB

RL 30.0dBm

10dB/

417  $\mu s$

SD

$\Delta MKR$

417  $\mu s$

1.50 dB

CENTER 2.4800000000GHz

SPAN 0Hz

\*RBW 1.0MHz

VBW 1.0MHz

\*SWP 50.0ms



ATTEN 40dB

RL 30.0dBm

10dB/

SS

\*

CENTER 2.4800000000GHZ

SPAN 0Hz

\*RBW 1.0MHz

VBW 1.0MHz

\*SWP 1.00sec

## **Appendix 6 : Plotted Data for Output Peak Power**

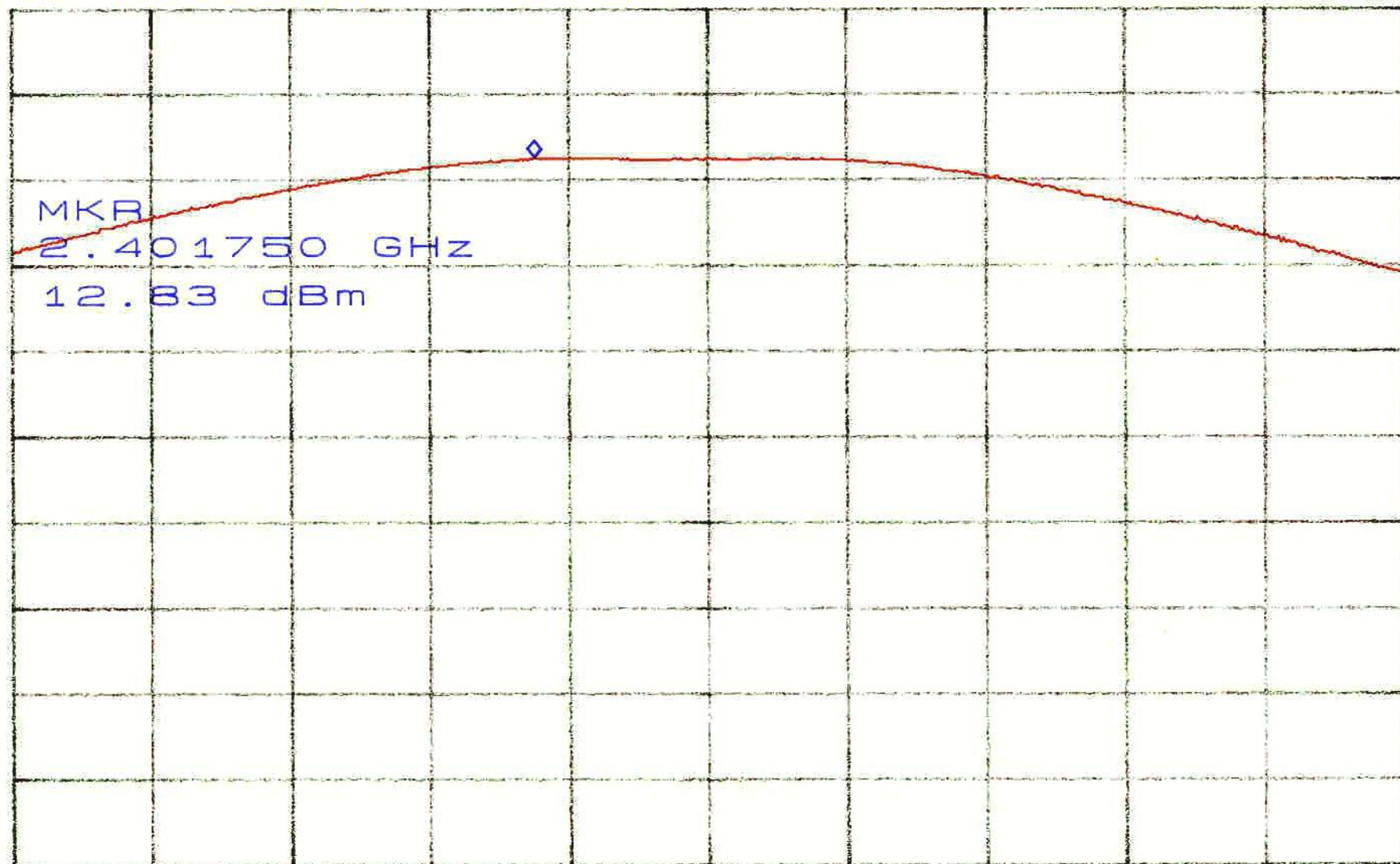
\*ATTEN 40dB

RL 30.0dBm

10dB/

MKR 12.83dBm

2.401750GHz



CENTER 2.402000GHz

SPAN 2.000MHz

\*RBW 1.0MHz

VBW 1.0MHz

SWP 50.0ms

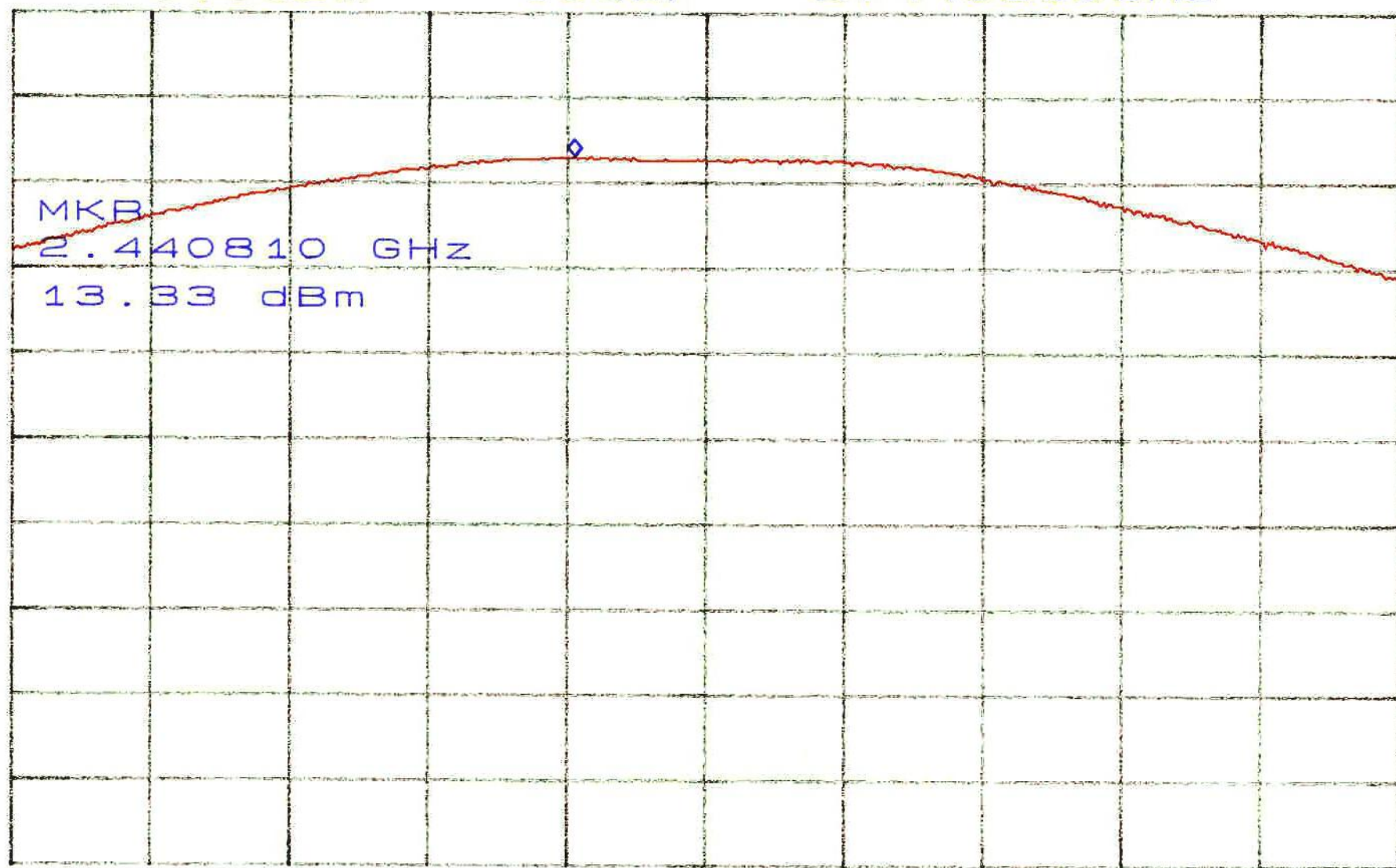
\*ATTEN 40dB

MKR 13.33dBm

RL 30.0dBm

10dB/

2.440810GHz



CENTER 2.441000GHz

SPAN 2.000MHz

\*RBW 1.0MHz

VBW 1.0MHz

SWP 50.0ms



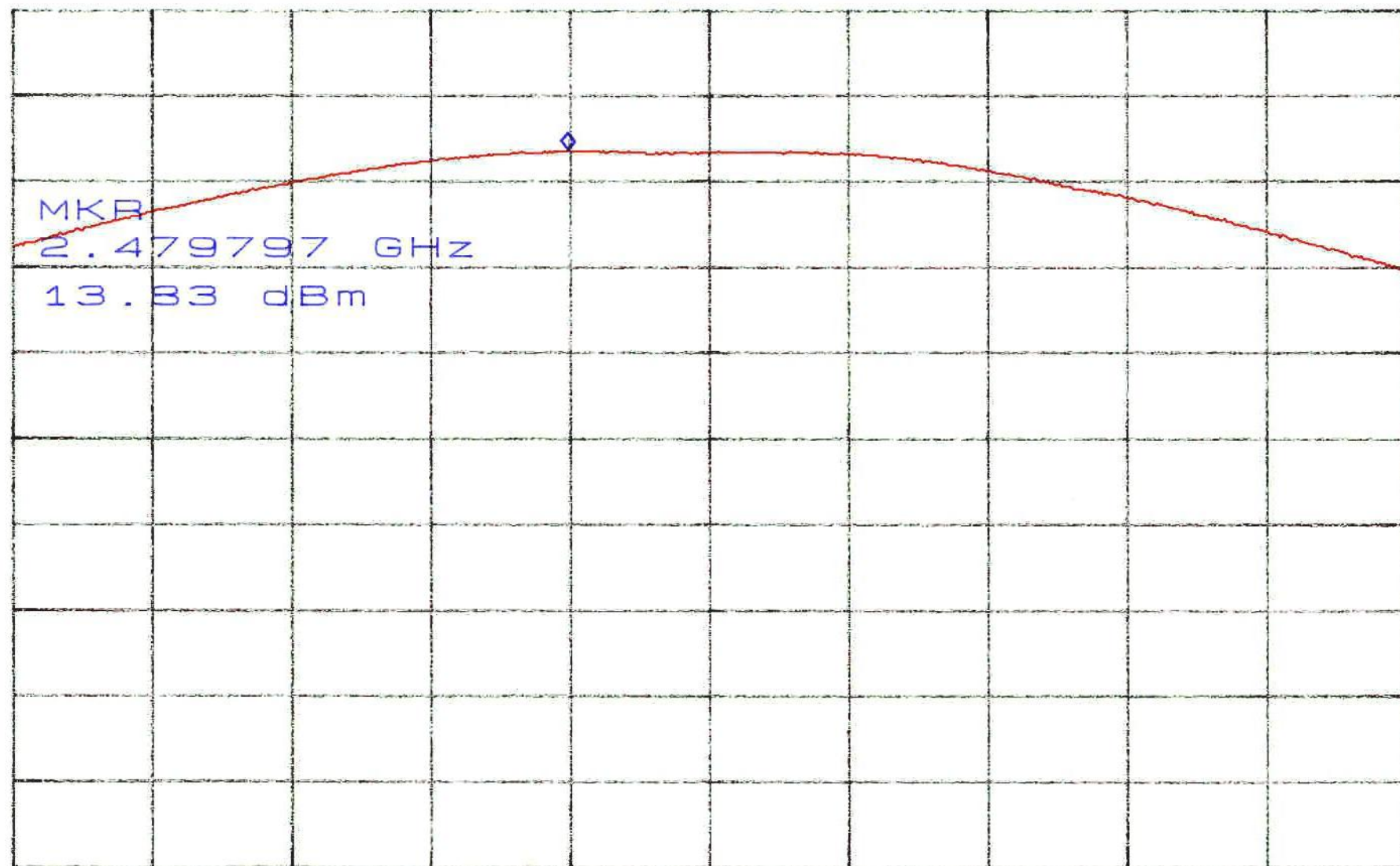
\*ATTEN 40dB

MKR 13.83dBm

RL 30.0dBm

10dB/

2.479797GHz



CENTER 2.480000GHz

SPAN 2.000MHz

\*RBW 1.0MHz

VBW 1.0MHz

SWP 50.0ms

## **Appendix 7 : Plotted Data for 100 kHz Bandwidth from Band Edge**

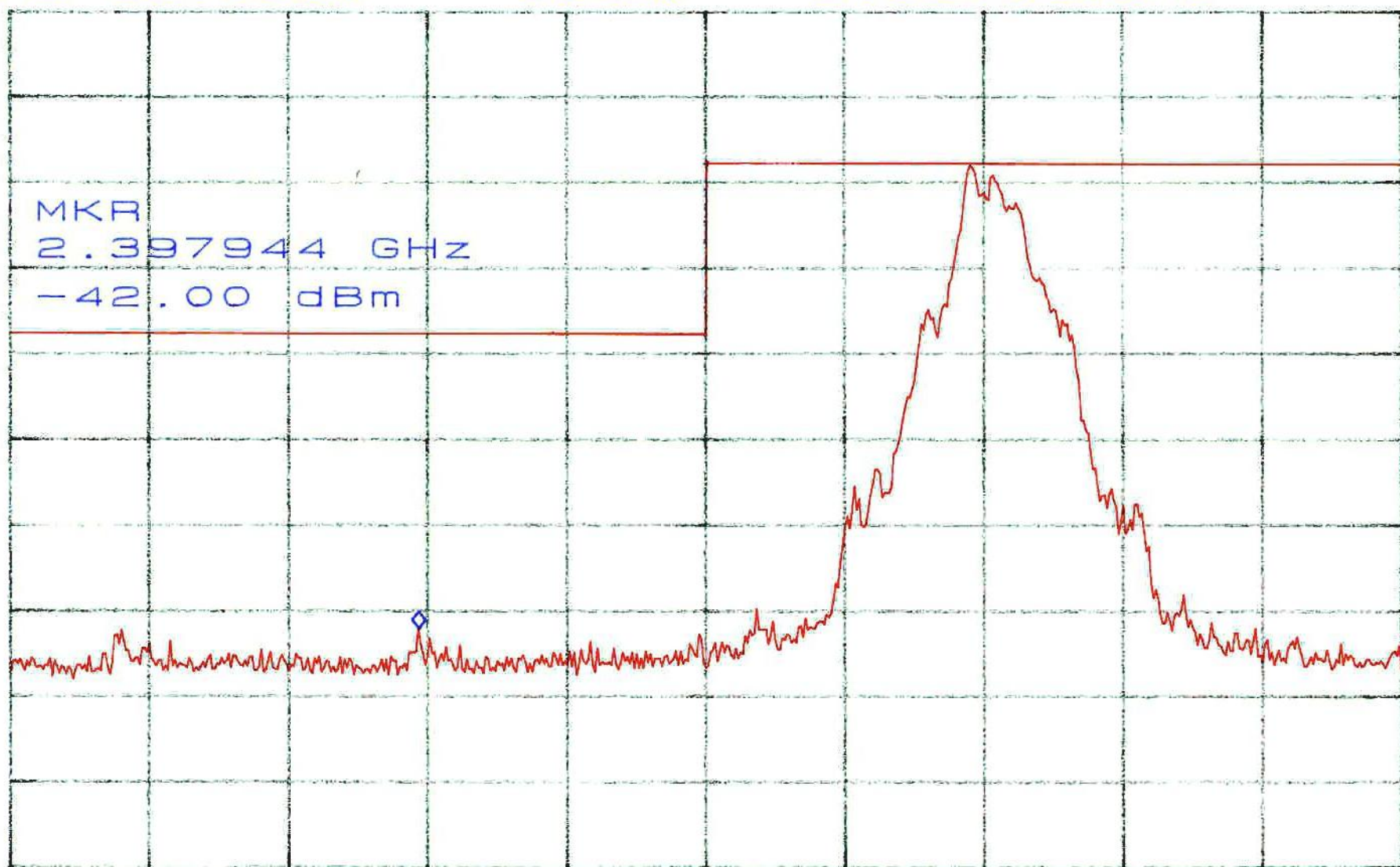
\*ATTEN 40dB

RL 30.0dBm

10dB/

MKR -42.00dBm

2.397944GHz



CENTER 2.400000GHz

SPAN 9.950MHz

\*RBW 100kHz

VBW 100kHz

SWP 50.0ms



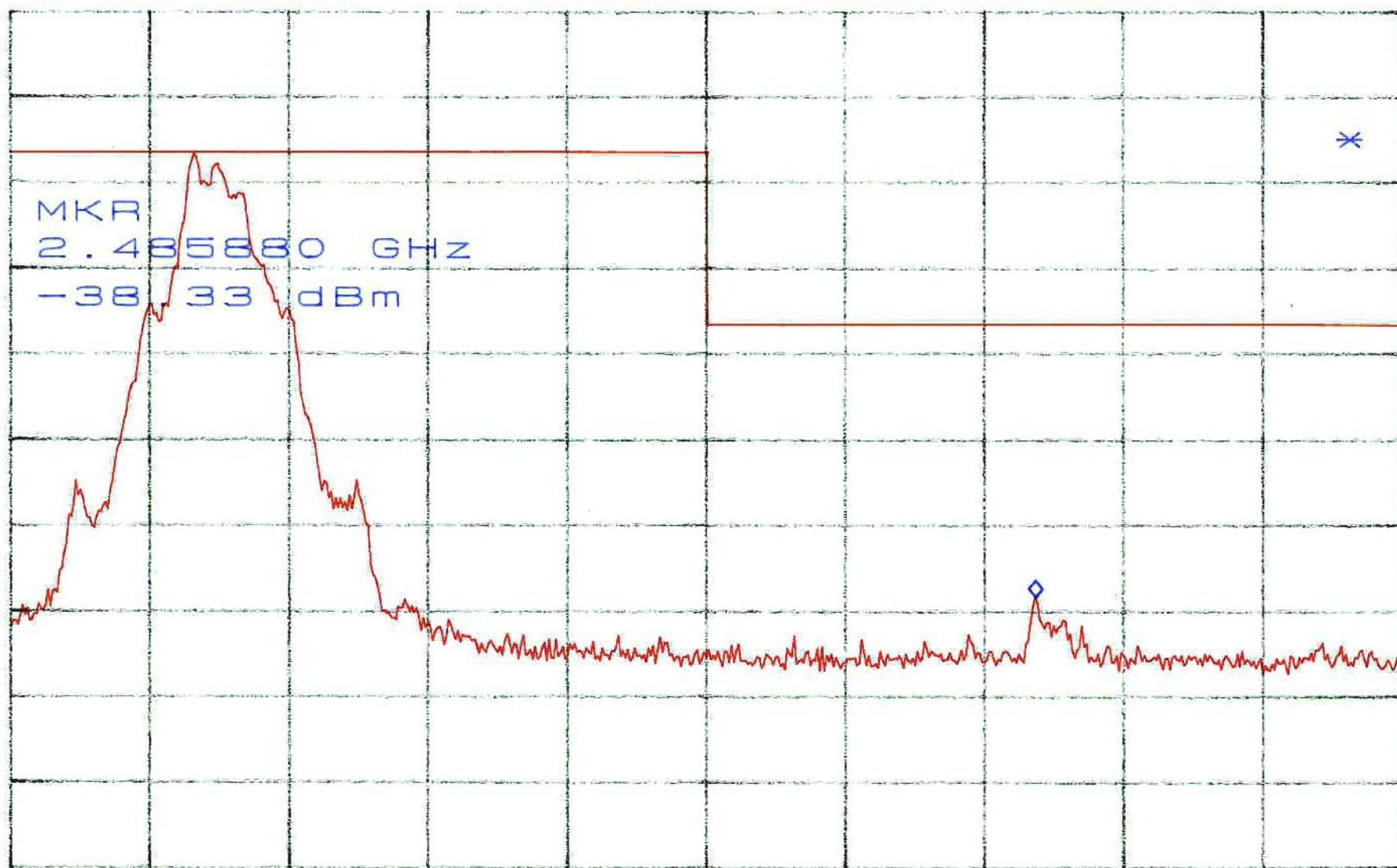
\*ATTEN 40dB

MKR -38.33dBm

RL 30.0dBm

10dB/

2.485880GHz



CENTER 2.483525GHz

SPAN 9.950MHz

\*RBW 100kHz

VBW 100kHz

SWP 50.0ms