

TESTED BY ORTEL CORPORATION
CONDUCTED MEASUREMENT INFORMATION

Test Equipment Used:

Signal Generator HP8648C, Hewlett Packard
Spectrum Analyzer HP8563E, Hewlett Packard
-RF cables (with SMA connectors), 7/16 to N connectors, N to SMA connectors, attenuation pad (for
repeater output), and passive external combiner used for two tone testing.

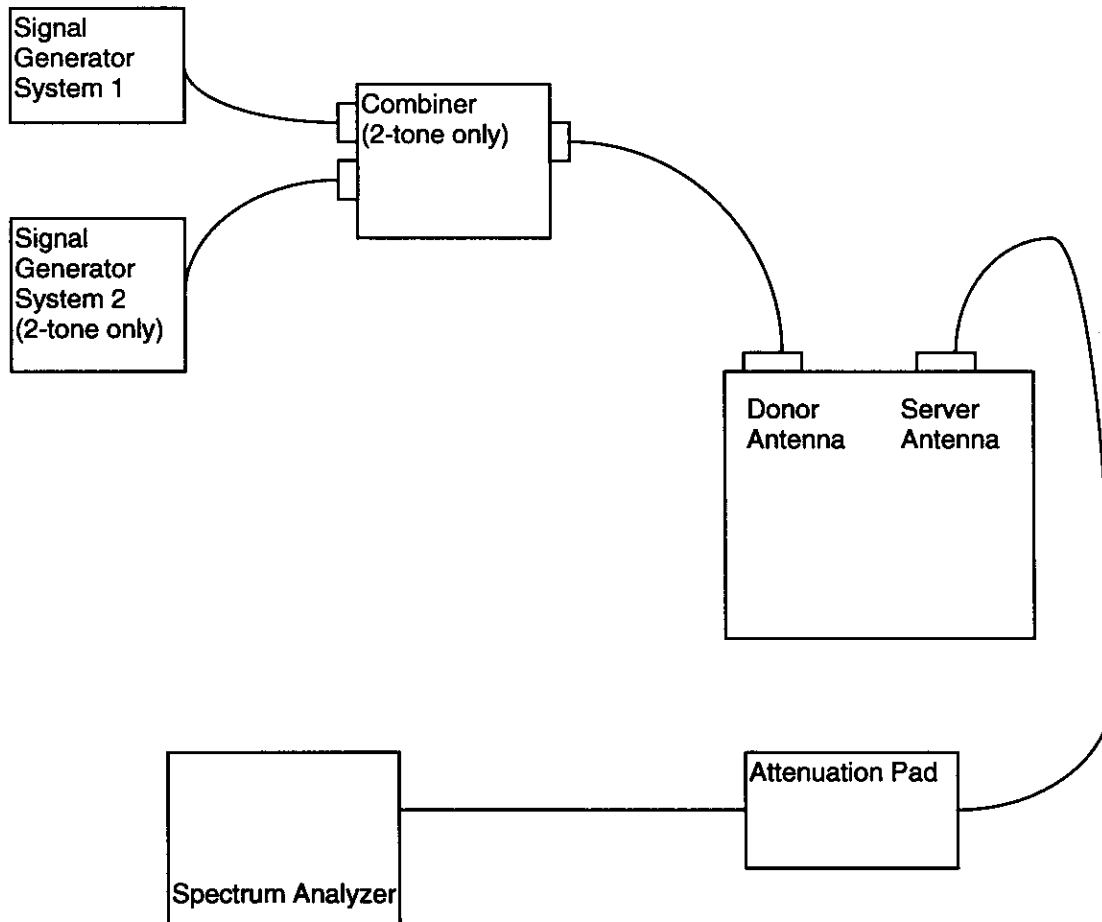
Tests performed for D-band

2.985, 2.989, 2.991, and 24.238 and In/Out

Test setup on next page.

CONDUCTED MEASUREMENT TEST SETUP

TESTED BY ORTEL CORPORATION



Downlink mode shown. For uplink, swap antenna connections at the repeater.

NOTE: All cables, connectors, and the attenuation pad are calibrated out at the

DL Low
D-band

DL Output
 $P_{in} = -54.2 \text{ dBm @ } 1945.2 \text{ MHz (ch.1)}$
CW source

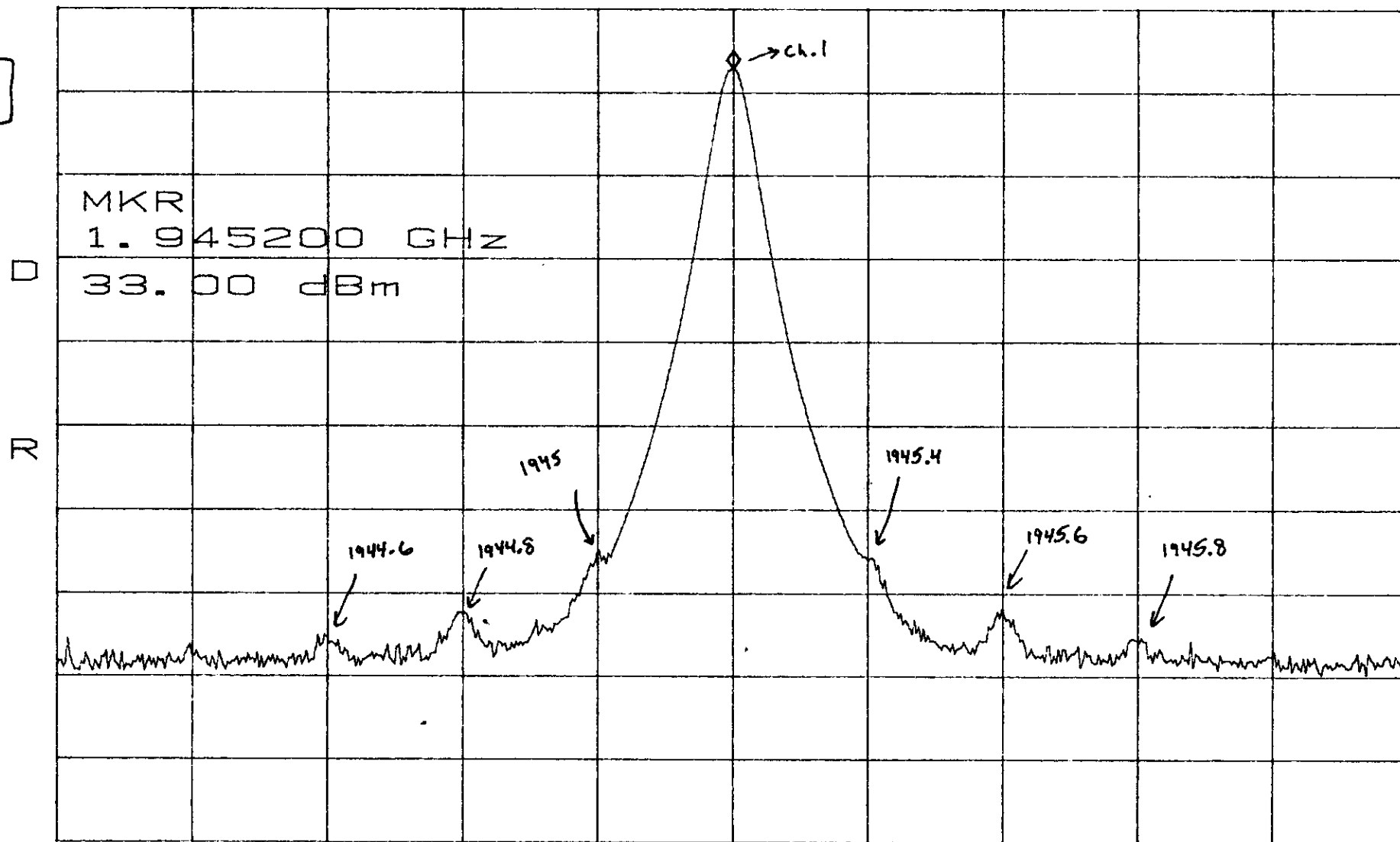
9/16/98
LB41901

ATTEN 30dB
RL 40.0dBm

10dB/

MKR 33.00dBm
1.945200GHz

2.985



CENTER 1.945200GHz

SPAN 2.000MHz

RBW 30kHz

VBW 30kHz

SWP 50.0ms

DL Low
D-band

DL Output
 $P_{in} = -54.5 \text{ dBm} @ 1945.2 \text{ MHz (Ch.1)}$

9/16/98
LB41901

ATTEN 30dB CW Source

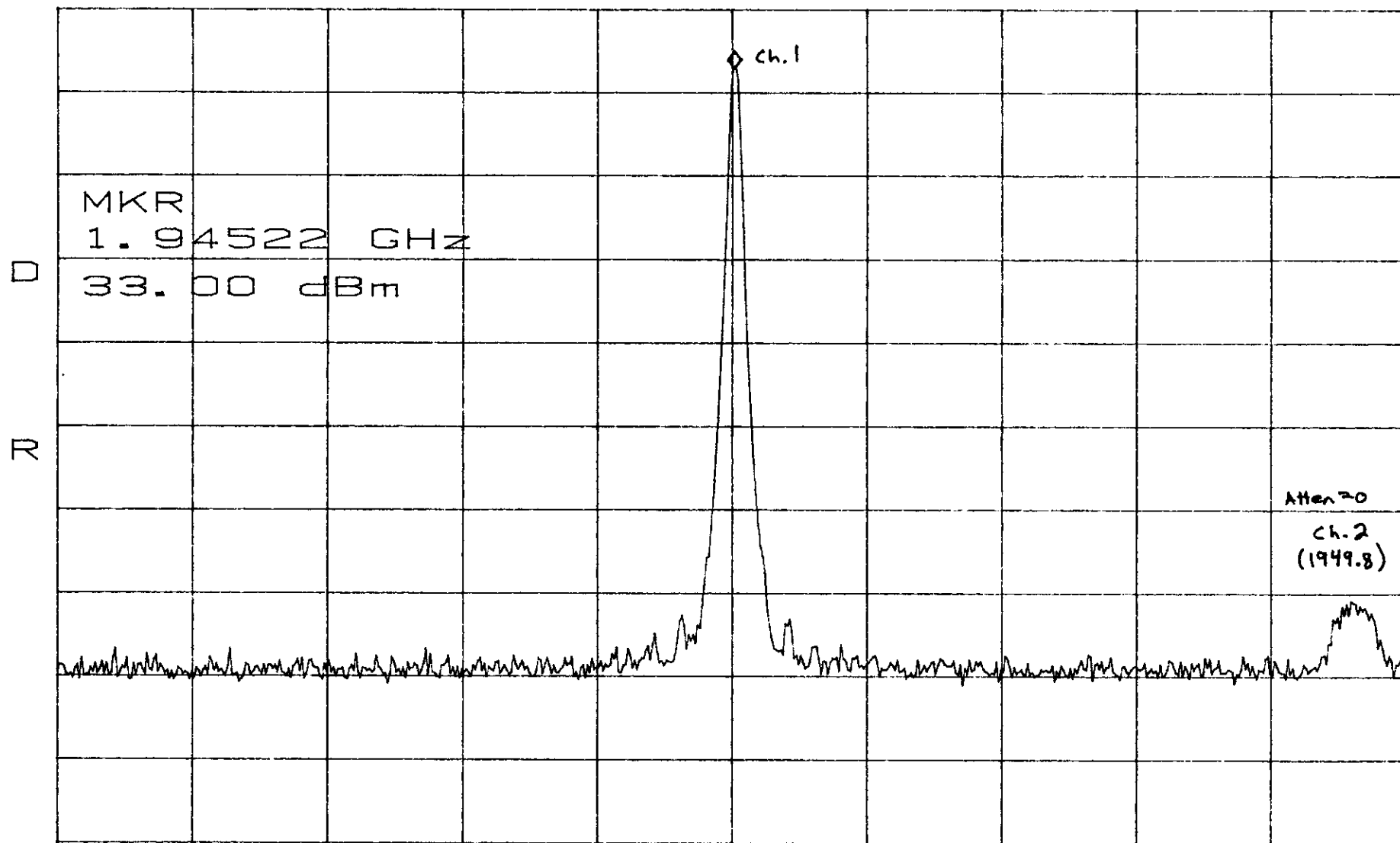
MKR 33.00dBm

RL 40.0dBm

10dB/

1.94522GHz

2.985



CENTER 1.94520GHz

SPAN 10.00MHz

*RBW 30kHz

VBW 30kHz

SWP 50.0ms

DL Mid
D-band

DL Output
 $P_{in} = -54.4 \text{ dBm @ } 1947.4 \text{ MHz (Ch.1)}$

9/16/98
LB41901

ATTEN 30dB CW source

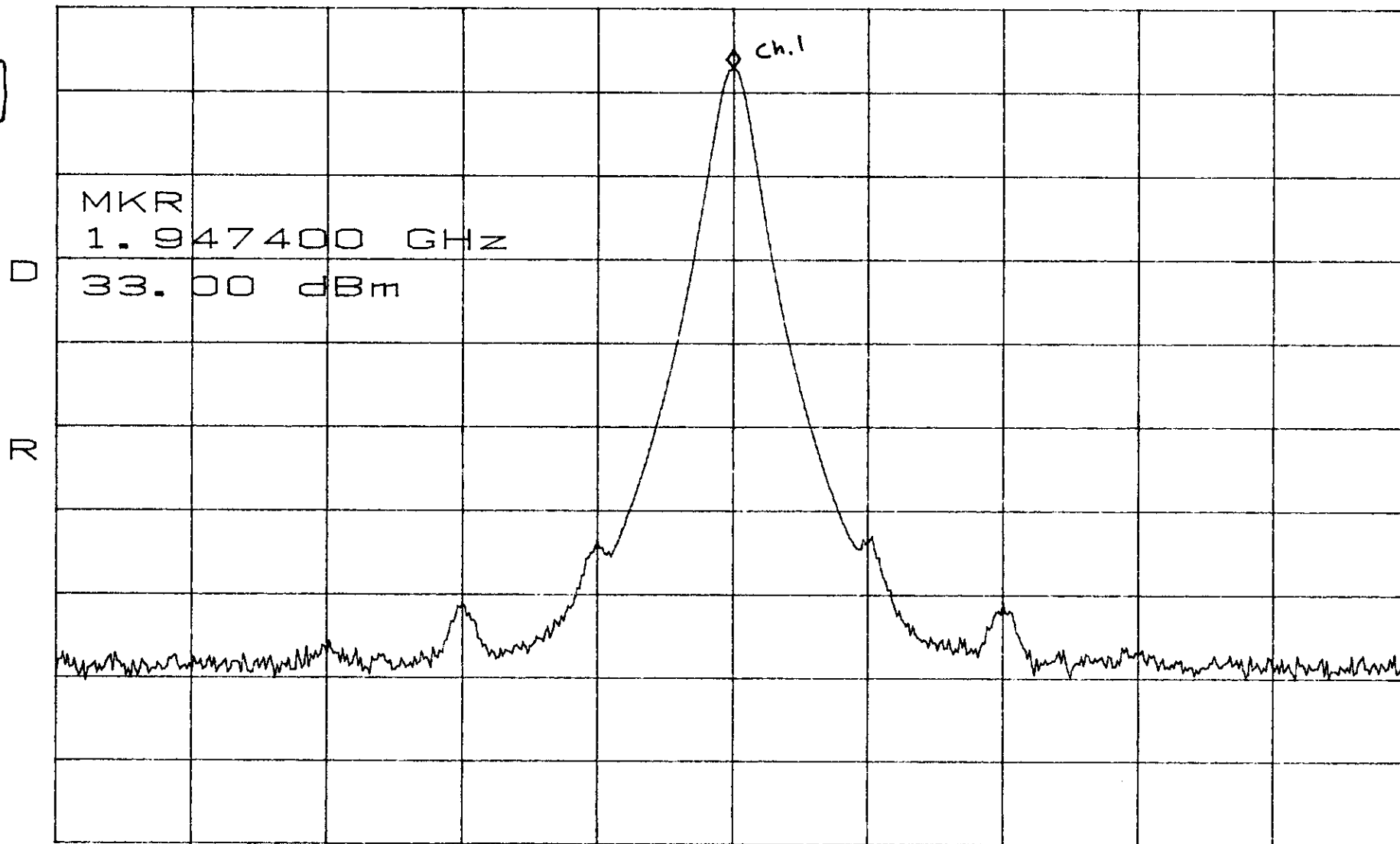
MKR 33.00dBm

RL 40.0dBm

10dB/

1.947400GHz

2.985



CENTER 1.947400GHz

SPAN 2.000MHz

*RBW 30kHz

VBW 30kHz

SWP 50.0ms

DL Mid
D-band

DL Output
 $P_{in} = -54.4 \text{ dBm}$ @ 1947.4 MHz (ch.1)

9/16/98
LB41901

ATTEN 30dB
RL 40.0dBm

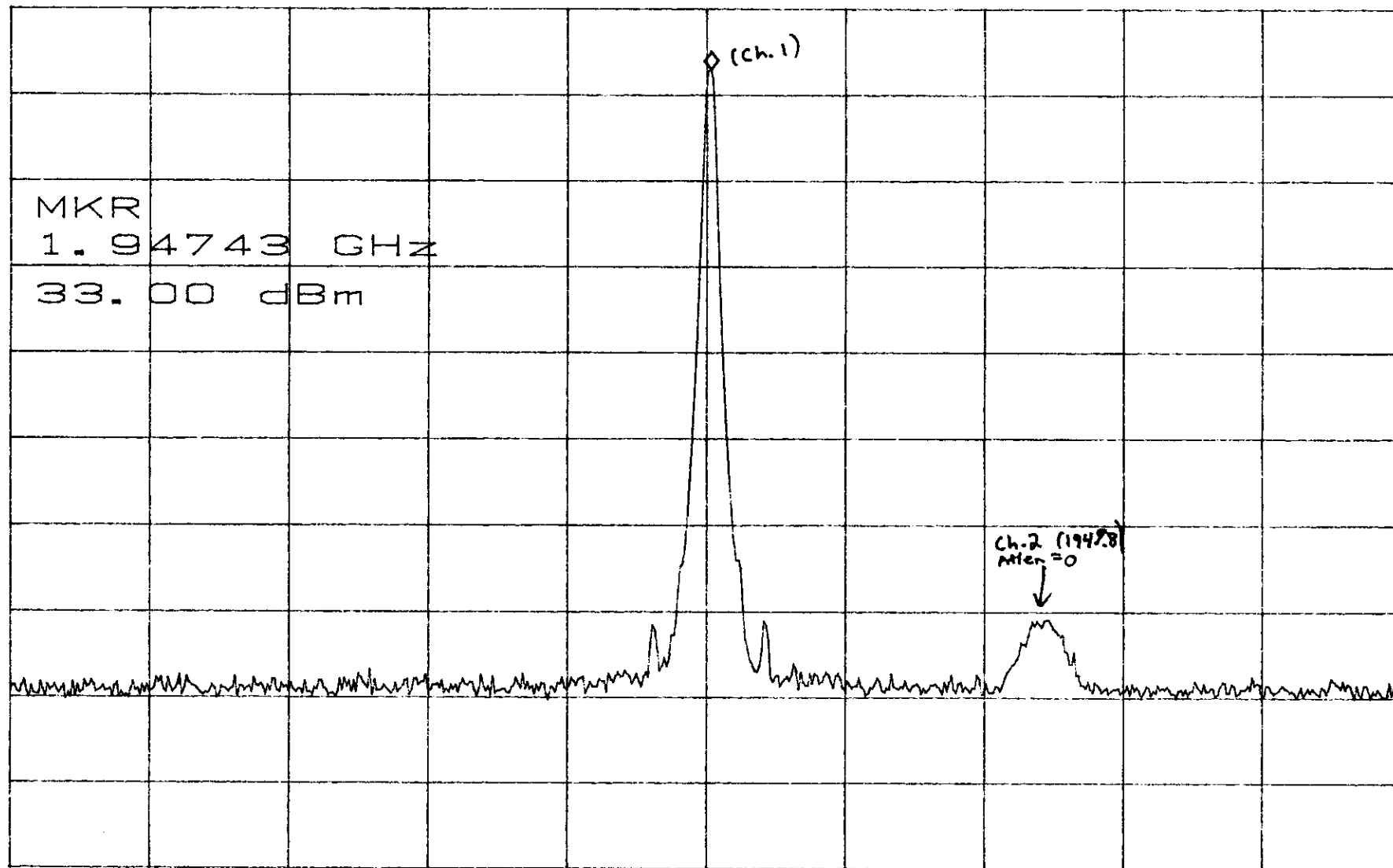
CW-source
10dB/

MKR 33.00dBm
1.94743GHz

2.985

D
R

MKR
1.94743 GHz
33.00 dBm



CENTER 1.94740GHz

SPAN 10.00MHz

*RBW 30kHz

VBW 30kHz

SWP 50.0ms

DL High
D-band

DL Output
 $P_{in} = -54.4 \text{ dBm}$ @ 1949.8 MHz (Ch.1)

9/16/98

LB41901

ATTEN 30dB

CW Source

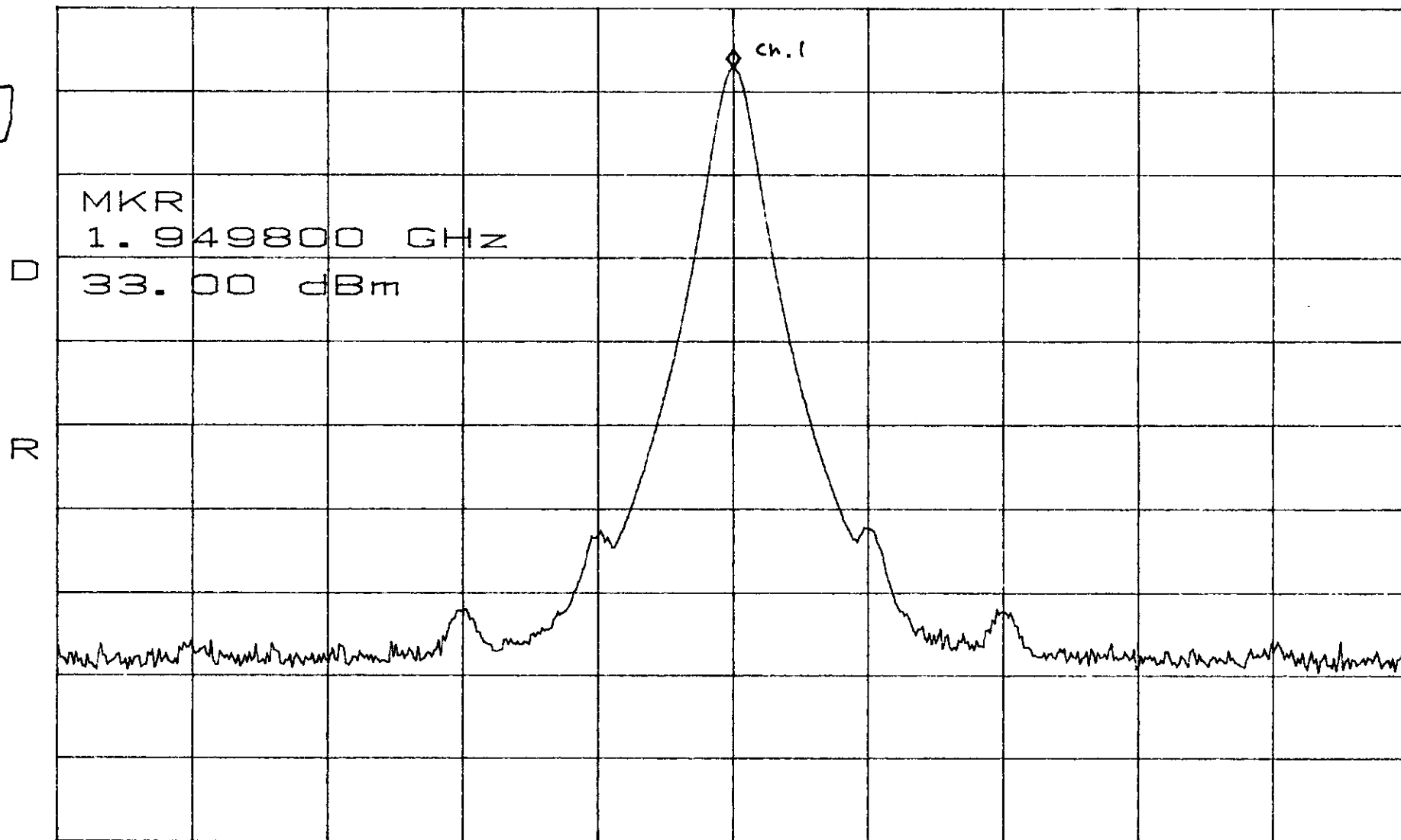
MKR 33.00dBm

RL 40.0dBm

10dB/

1.949800GHz

2.985



CENTER 1.949800GHz

SPAN 2.000MHz

*RBW 30kHz

VBW 30kHz

SWP 50.0ms

DL High
D-band

DL Output
 $P_{in} = -54.4 \text{ dBm}$ @ 1949.8 MHz (Ch.1)

9/16/98
LB41901

ATTEN 30dB

CW Source

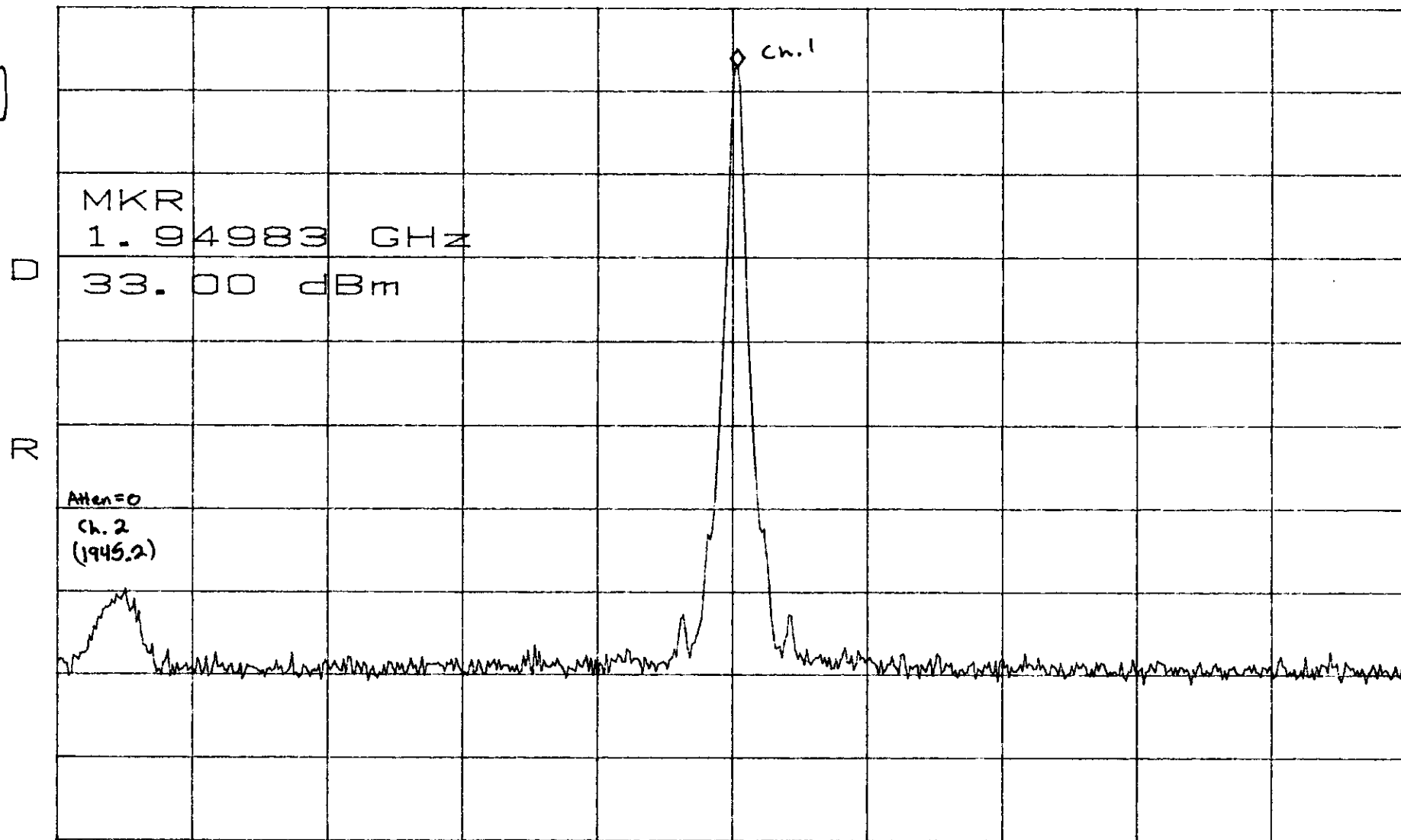
MKR 33.00dBm

RL 40.0dBm

10dB/

1.94983GHz

2.985



CENTER 1.94980GHz

SPAN 10.00MHz

*RBW 30kHz

VBW 30kHz

SWP 50.0ms

UL Low
D-band

UL Output

9/17/98

LB41901

ATTEN 30dB

$P_{in} = -51.9 \text{ dBm} @ 1865.2 \text{ MHz (ch.1)}$

MKR 32.67dBm

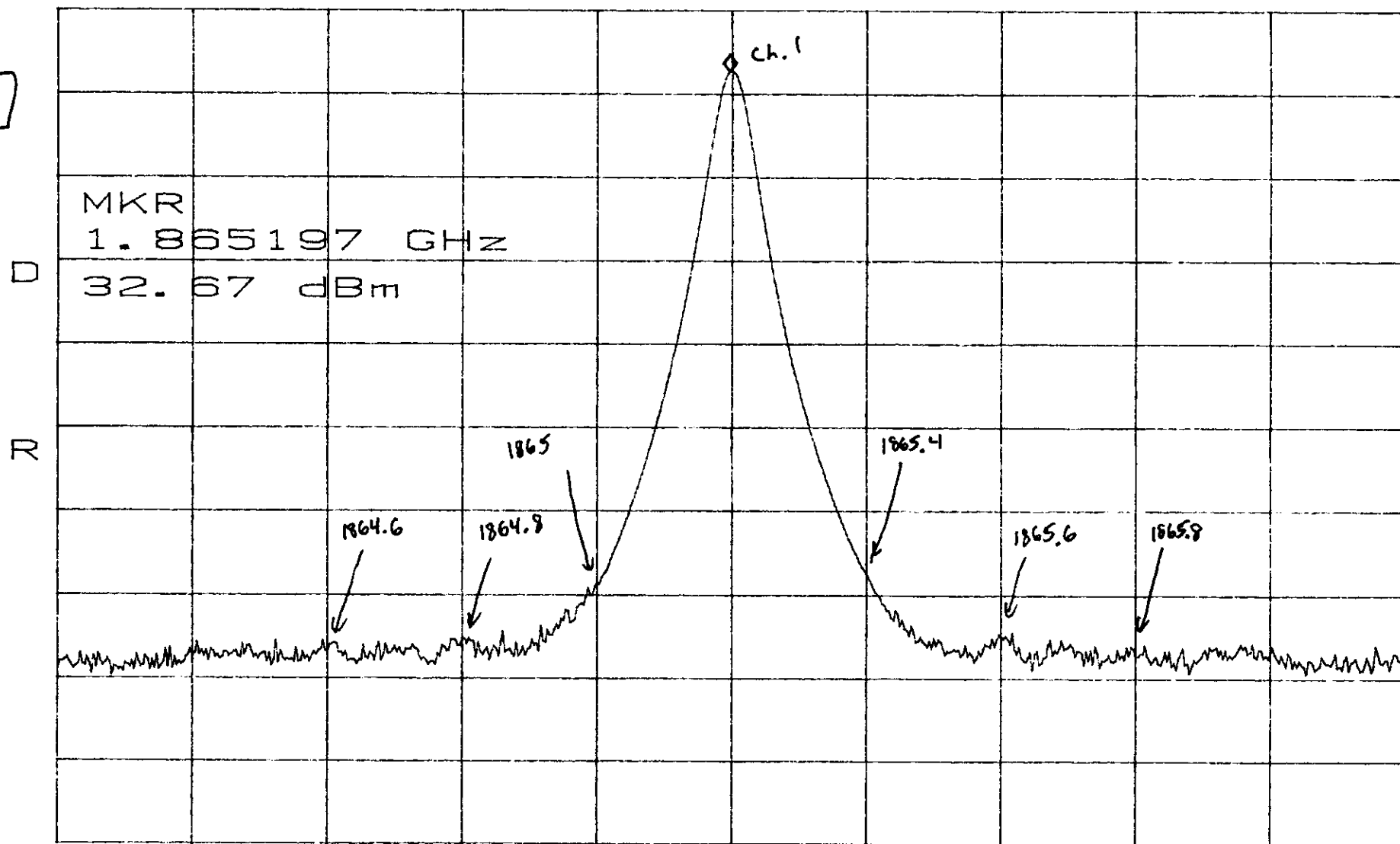
RL 40.0dBm

CW Source

10dB/

1.865197GHz

2.985



CENTER 1.865200GHz

SPAN 2.000MHz

*RBW 30kHz

VBW 30kHz

SWP 50.0ms

UL Low
D-band

UL output
 $P_{in} = -51.9 \text{ dBm} @ 1865.2 \text{ MHz (ch.1)}$

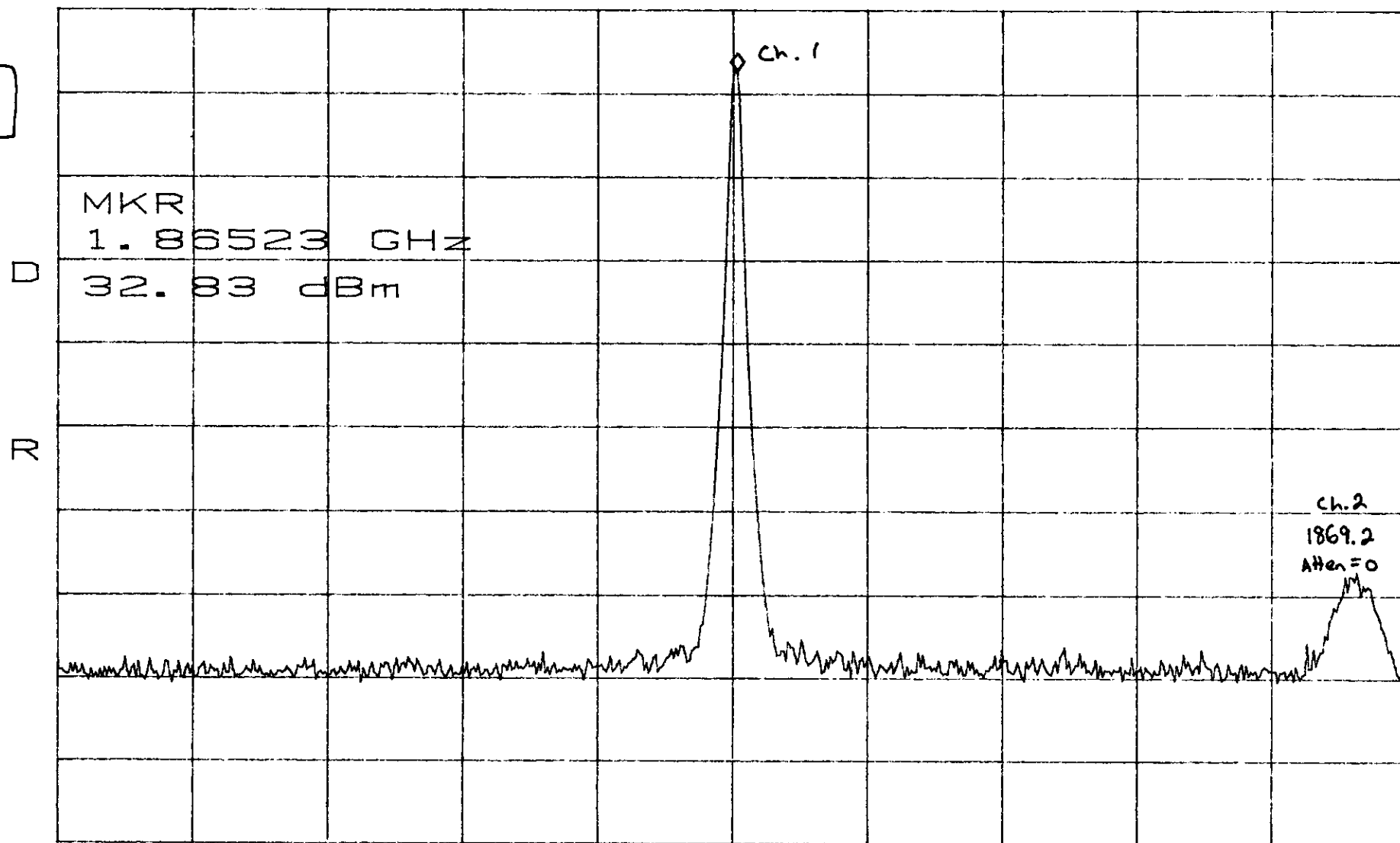
9/17/98
LB41901

ATTEN 30dB
RL 40.0dBm

cw source
10dB/

MKR 32.83dBm
1.86523GHz

2.985



CENTER 1.86520GHz SPAN 10.00MHz
*RBW 30kHz VBW 30kHz SWP 50.0ms

UL Mid
D-band

UL output
 $P_{in} = -52.6 \text{ dBm} @ 1867.4 \text{ MHz}$ (ch.1)

9/17/98

LB41901

ATTEN 30dB

cw source

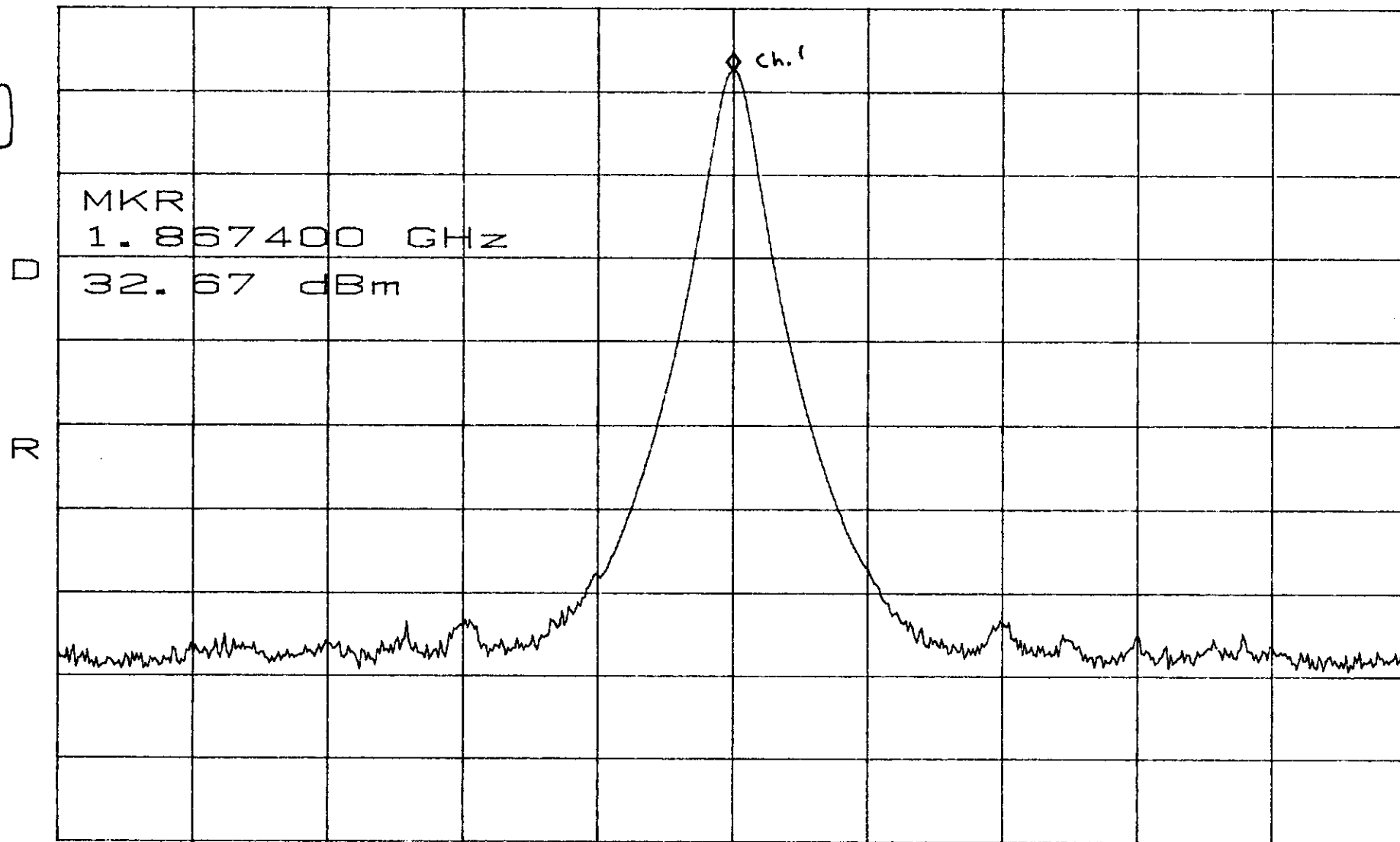
MKR 32.67dBm

RL 40.0dBm

10dB/

1.867400GHz

2.985



CENTER 1.867400GHz

SPAN 2.000MHz

*RBW 30kHz

VBW 30kHz

SWP 50.0ms

UL Mid
D-band

UL Output
 $P_{in} = -52.6 \text{ dBm} @ 1867.4 \text{ MHz (Ch.1)}$

ATTEN 30dB

cw source

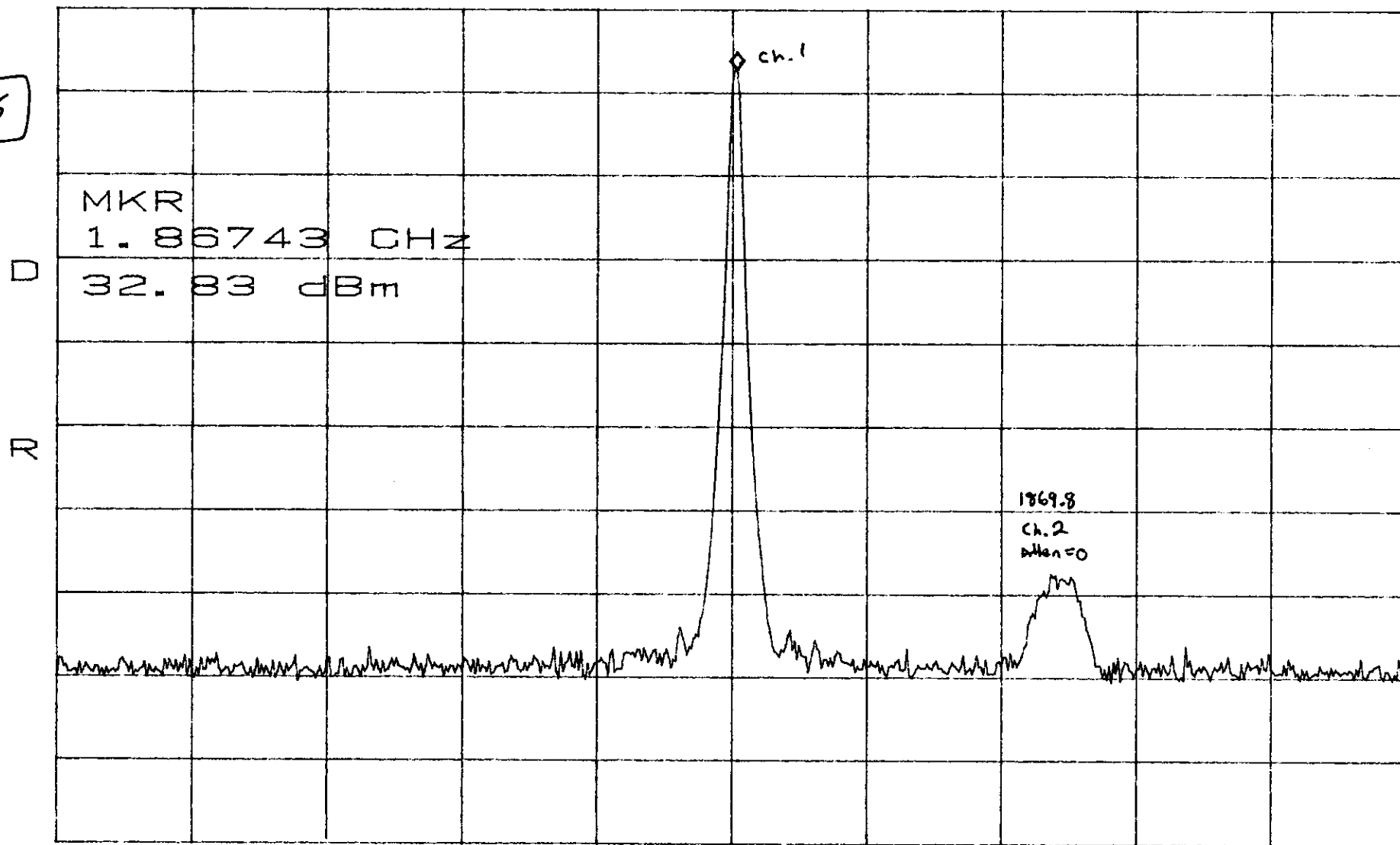
MKR 32.83dBm

RL 40.0dBm

10dB/

1.86743GHz

2.985



CENTER 1.86740GHz

SPAN 10.00MHz

*RBW 30kHz

VBW 30kHz

SWP 50.0ms

UL High
D-band

UL Output
 $P_{in} = -53.0 \text{ dBm}$ @ 1869.8 MHz (ch.1)

9/17/98

LB41901

ATTN 30dB

CW Source

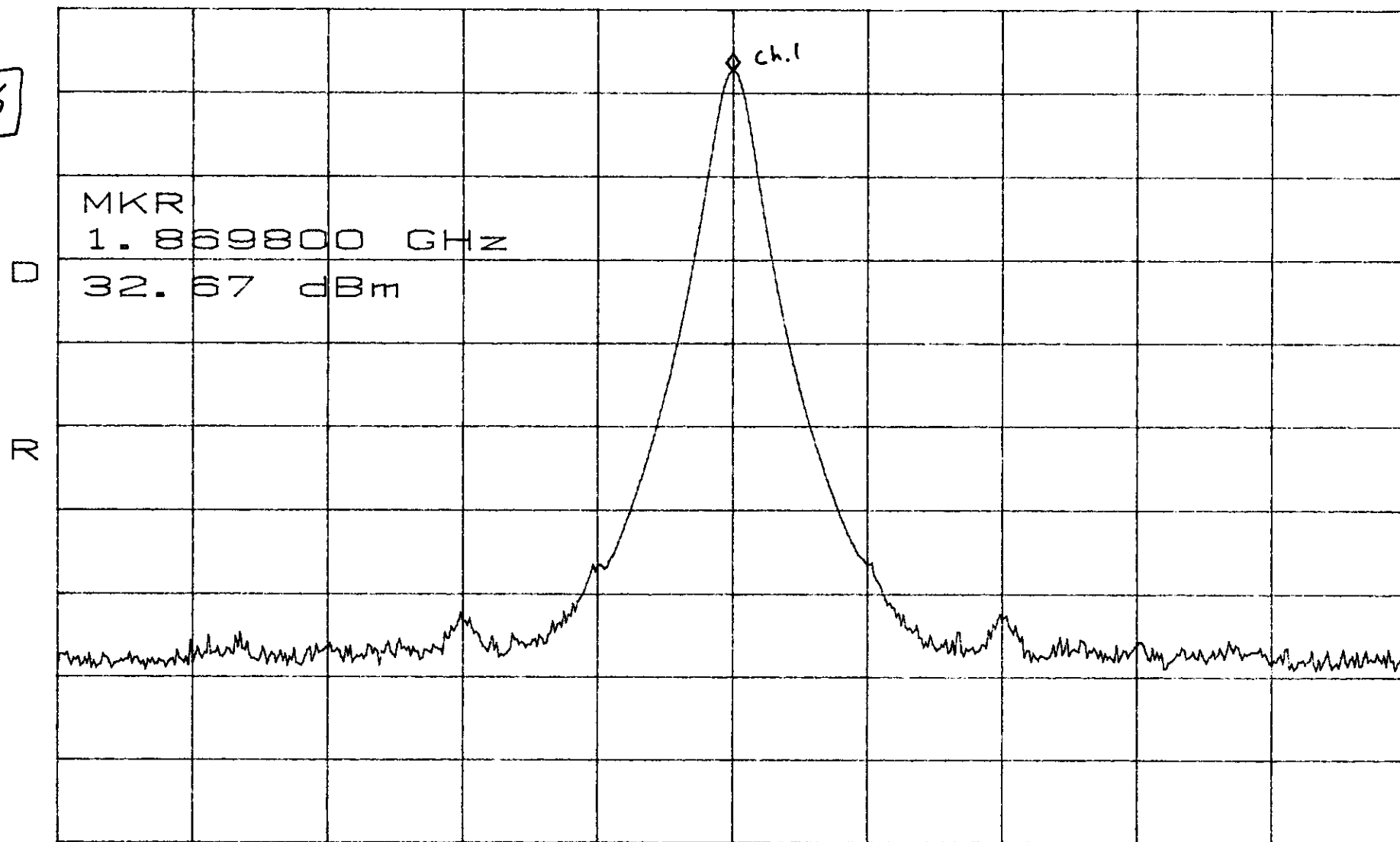
MKR 32.67 dBm

RL 40.0 dBm

10 dB/

1.869800 GHz

2.985



CENTER 1.869800 GHz

SPAN 2.000 MHz

*RBW 30 kHz

VBW 30 kHz

SWP 50.0 ms

UL High
D-band

UL output
 $P_{in} = -53.0 \text{ dBm} @ 1869.8 \text{ MHz (ch.1)}$

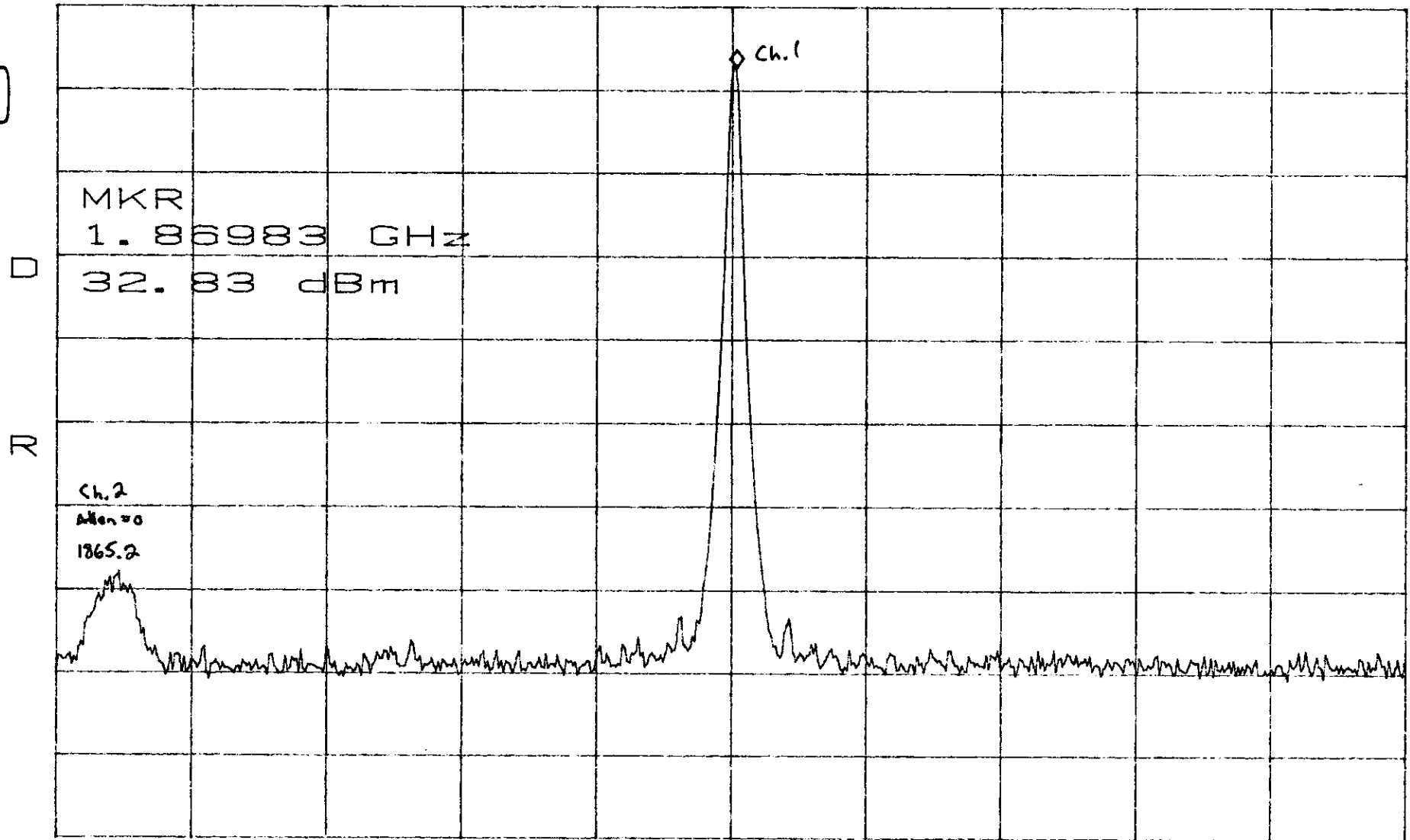
9/17/98
LB41901

ATTEN 30dB
RL 40.0dBm

CW Source
10dB/

MKR 32.83dBm
1.86983GHz

2.985



CENTER 1.86980GHz SPAN 10.00MHz
*RBW 30kHz VBW 30kHz SWP 50.0ms

DL Low
D-band

Occupied BW
CW Source

9/17/98
LB41901

ATTEN 30dB
RL 40.0dBm

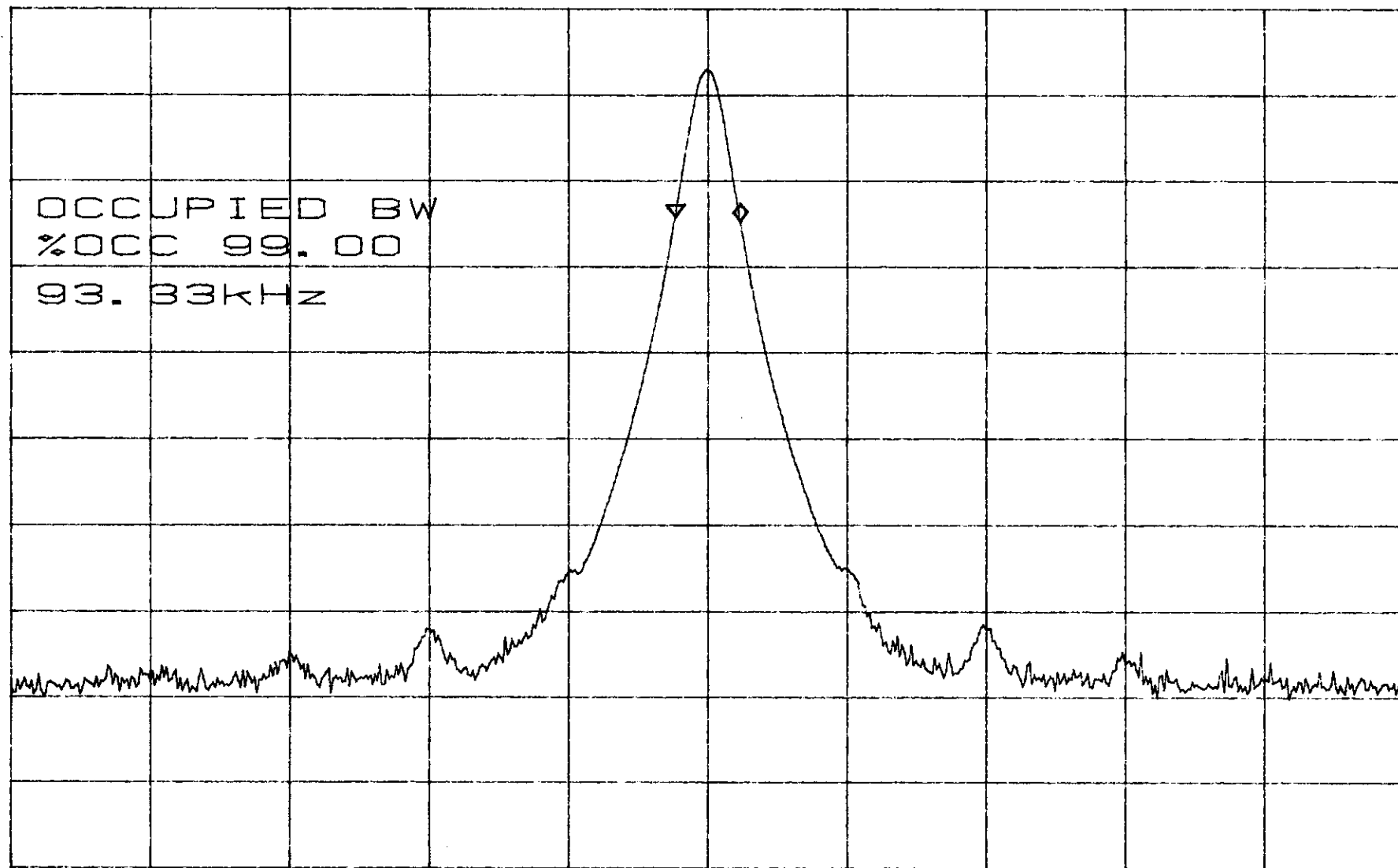
10dB/

ΔMKR - .50dB
93kHz

2.989

D
R

OCCUPIED BW
%OCC 99.00
93.33kHz



CENTER 1.945200GHz SPAN 2.000MHz
*RBW 30kHz VBW 30kHz SWP 50.0ms

DL Mid
D-band

Occupied BW
CW Source

9/17/98
LB4/901

ATTEN 30dB
RL 40.0dBm

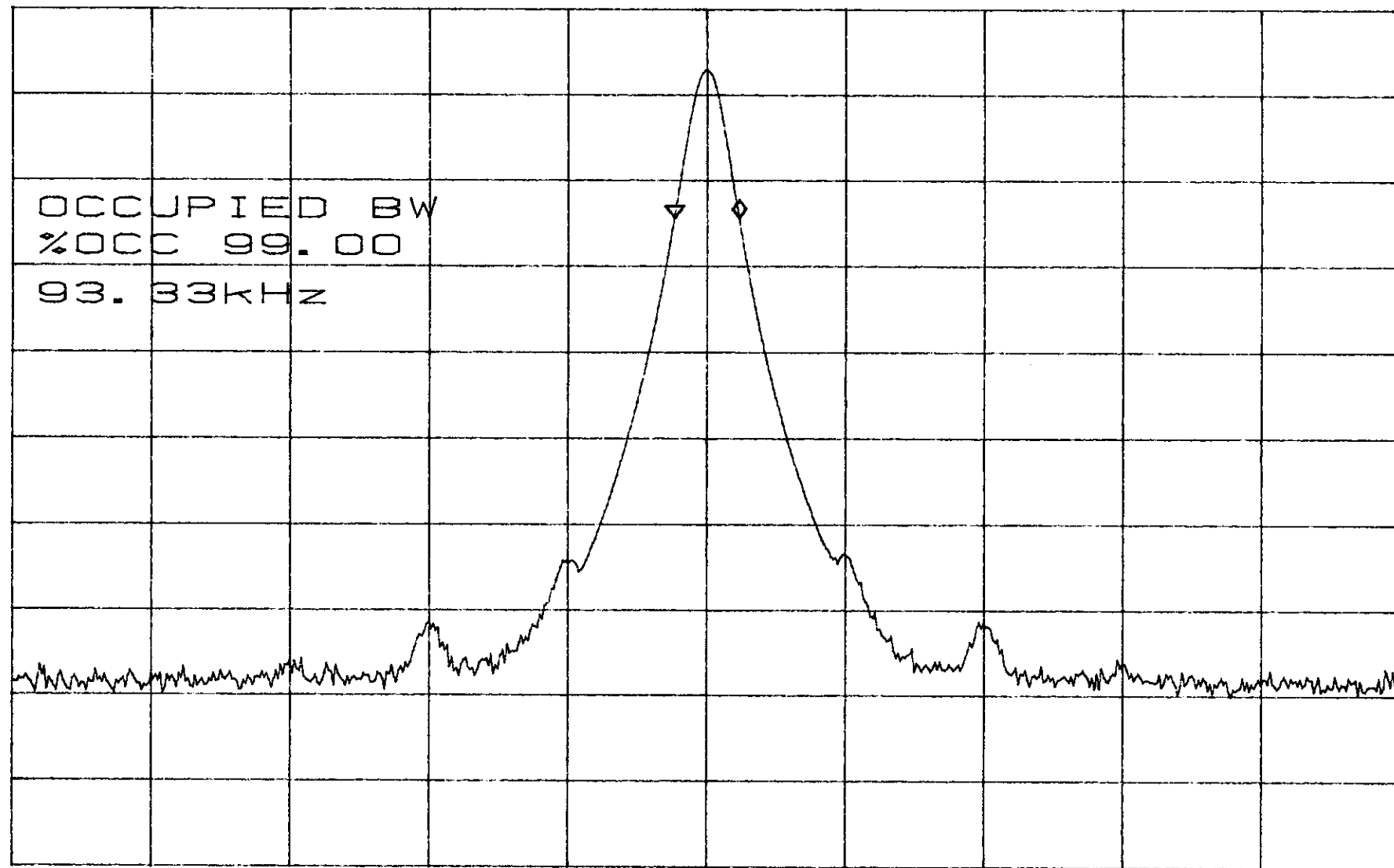
10dB/

Δ MKR 0dB
93kHz

2.989

D
R

OCCUPIED BW
%OCC 99.00
93.33kHz



CENTER 1.947400GHz
*RBW 30kHz VBW 30kHz

SPAN 2.000MHz
SWP 50.0ms

DL High
D-band

Occupied BW

9/17/98

LB41901

ATTEN 30dB

CV Source

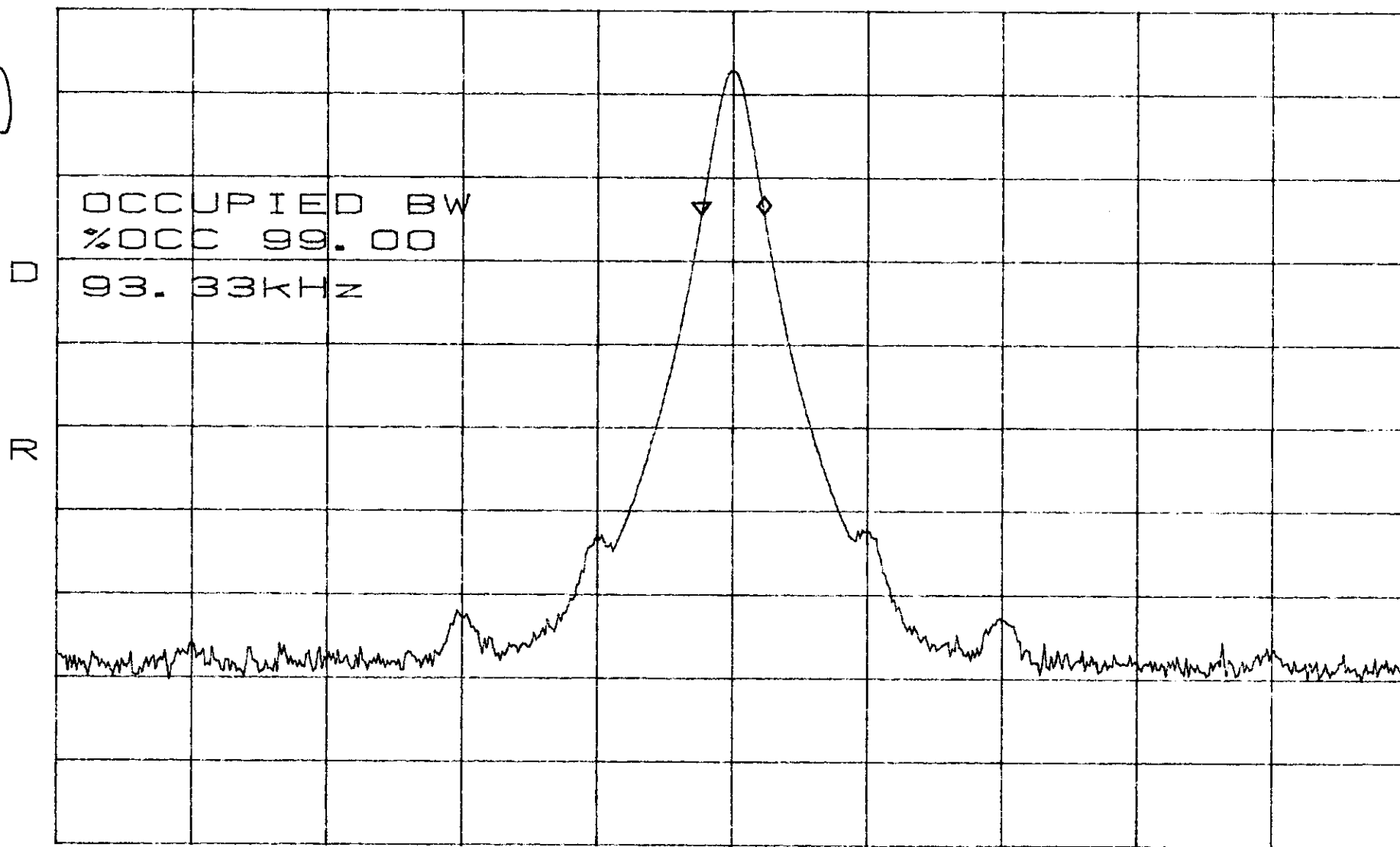
ΔMKR 0dB

RL 40.0dBm

10dB/BPO1

93kHz

2.989



CENTER 1.949800GHz

SPAN 2.000MHz

*RBW 30kHz

VBW 30kHz

SWP 50.0ms

VL Low
D-band

Occupied BW

9/17/98

LB41901

CW source

ATTEN 30dB

ΔMKR - .50dB

RL 40.0dBm

10dB/

93kHz

2.989

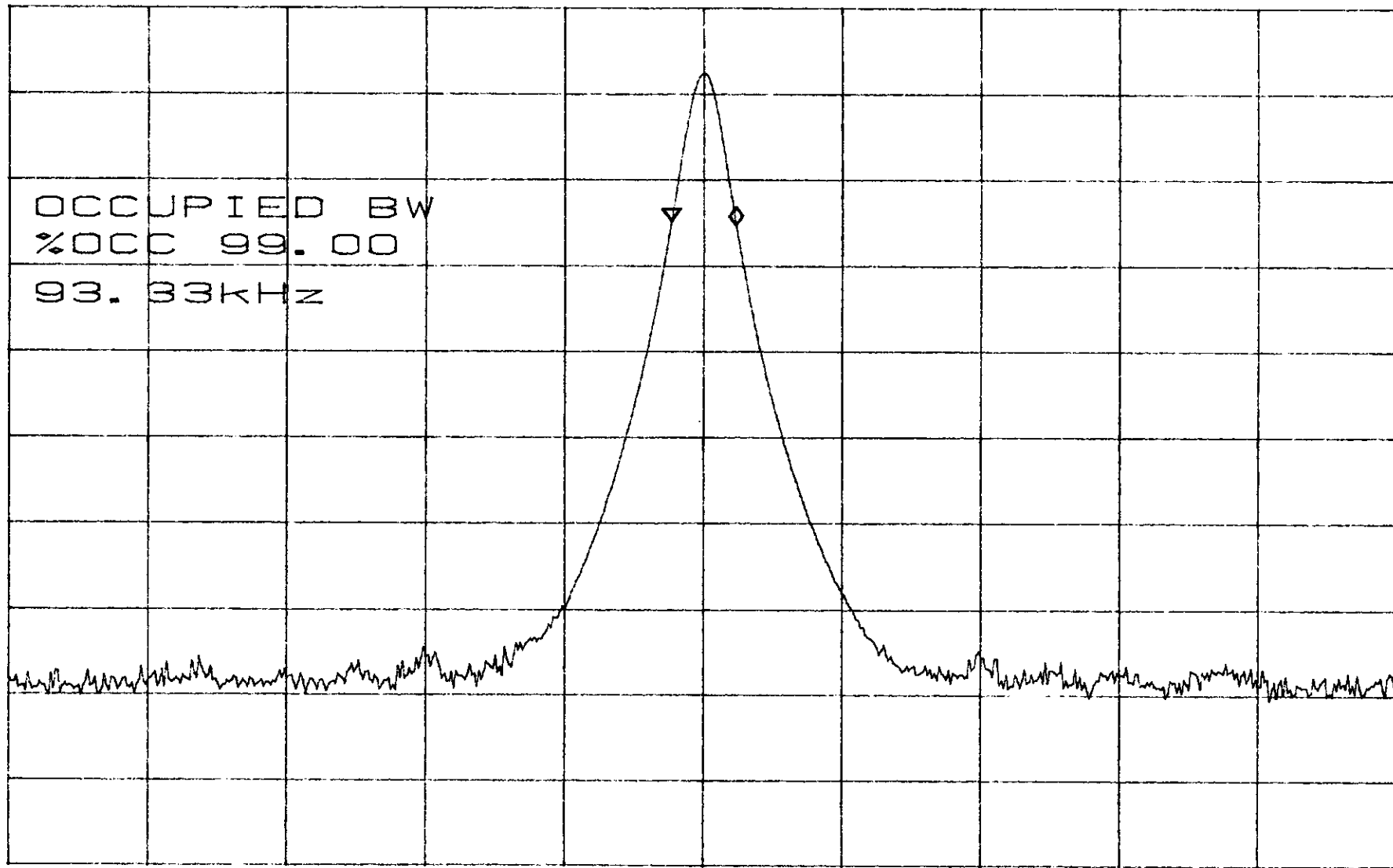
OCCUPIED BW

%OCC 99.00

93.33kHz

D

R



CENTER 1.865200GHz

SPAN 2.000MHz

*RBW 30kHz

VBW 30kHz

SWP 50.0ms

UL Mid

D-band

Occupied BW

cw source

9/17/98

LB41901

ATTEN 30dB

RL 40.0dBm

ΔMKR -.34dB

10dB/

93kHz

2.989

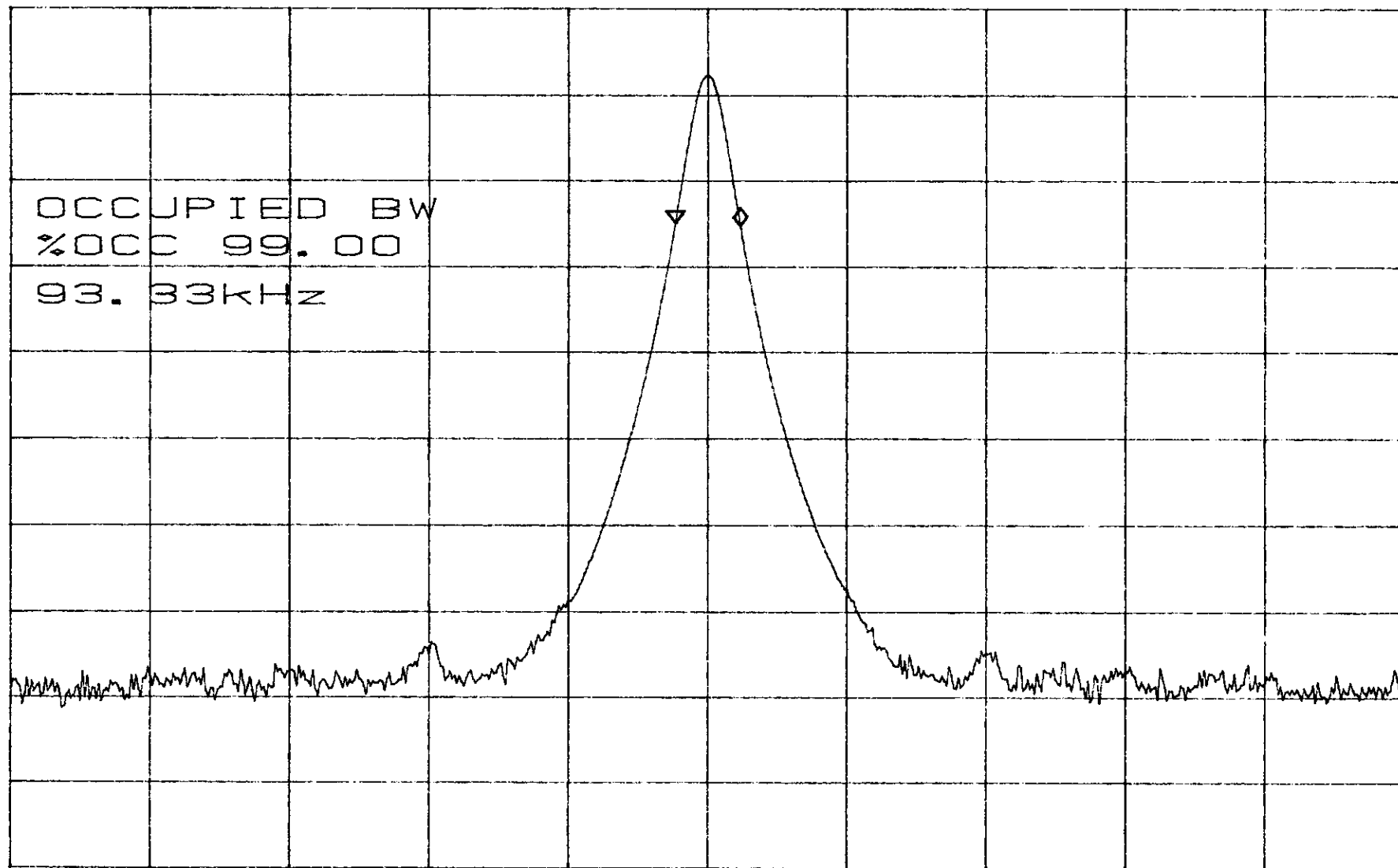
OCCUPIED BW

%OCC 99.00

93.33kHz

D

R



CENTER 1.867400GHz

SPAN 2.000MHz

*RBW 30kHz

VBW 30kHz

SWP 50.0ms

UL High
D-band

Occupied BW

9/17/98

LB41901

ATTEN 30dB

CW Source

Δ MKR -.50dB

RL 40.0dBm

10dB/

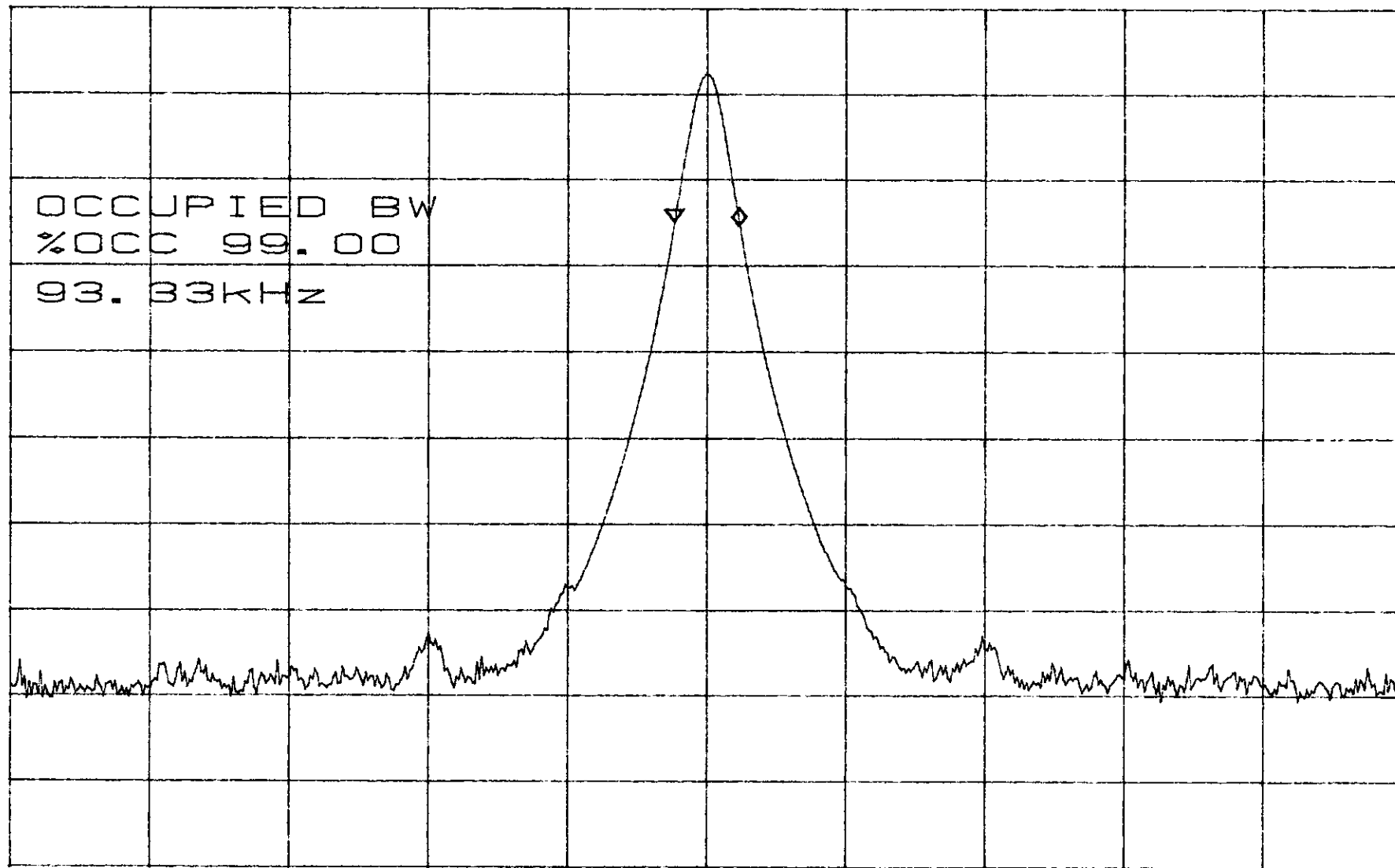
93kHz

2.989

OCCUPIED BW
%OCC 99.00
93.33kHz

D

R



CENTER 1.869800GHz

SPAN 2.000MHz

*RBW 30kHz

VBW 30kHz

SWP 50.0ms

DL Low
D-band

9/23/98
LB41901

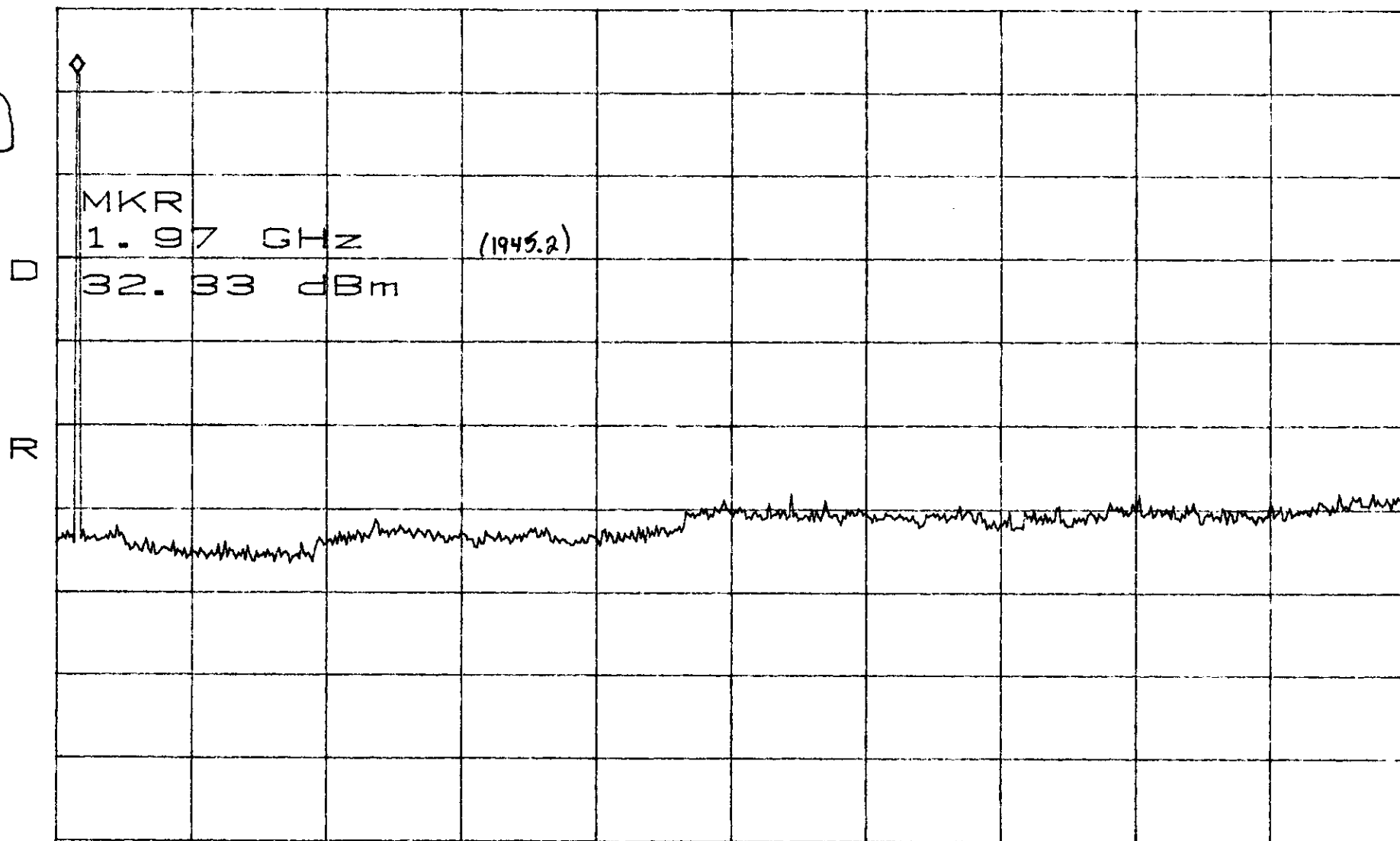
cw

*ATTEN 30dB
RL 40.0dBm

MKR 32.33dBm
1.97GHz

10dB/

2.991



START 1.60GHz

STOP 26.50GHz

*RBW 1.0MHz

*VBW 1.0MHz

SWP 500ms

DL Mid
D-band

9/23/98

LB41901

cu

*ATTEN 30dB

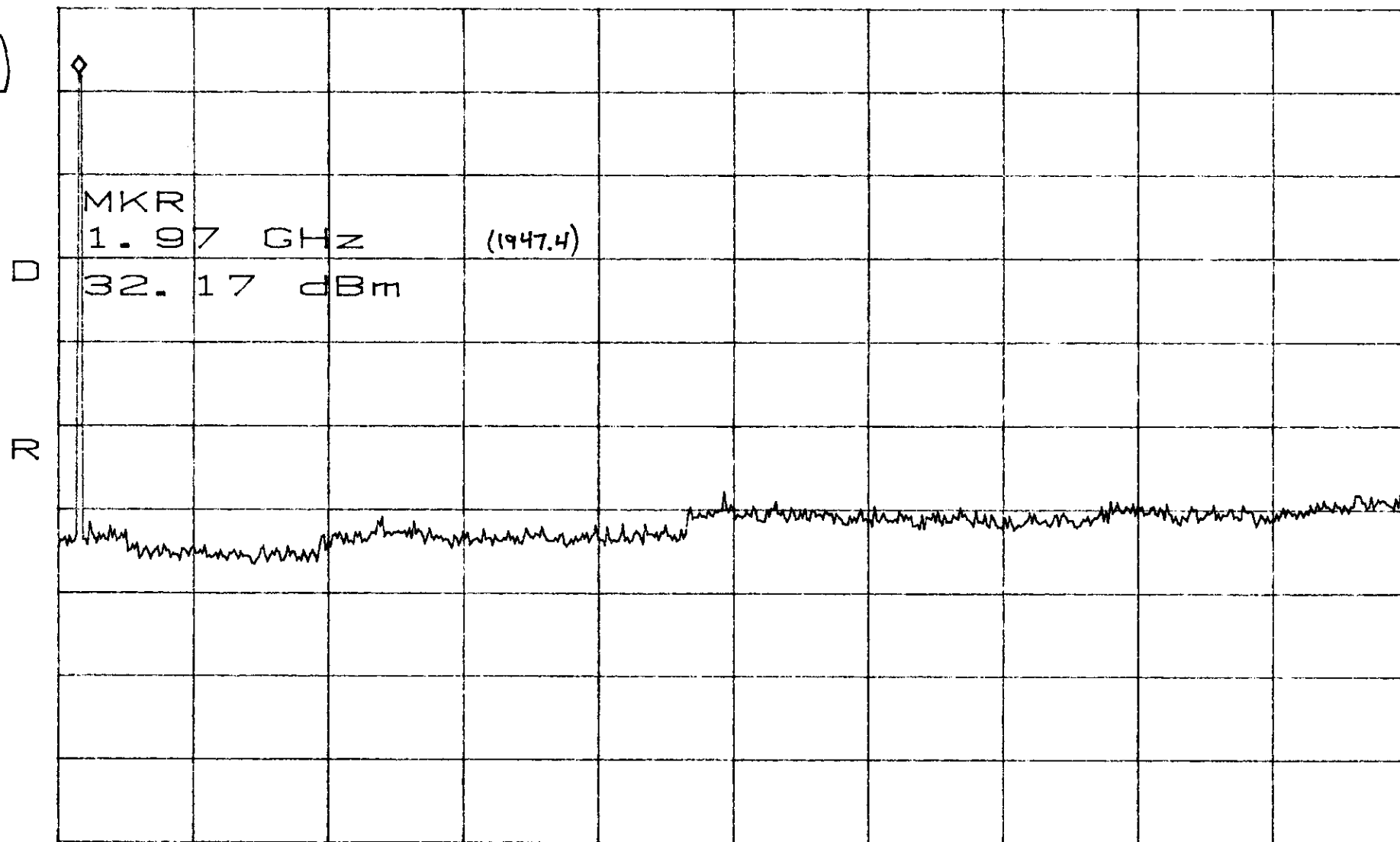
MKR 32.17dBm

RL 40.0dBm

10dB/

1.97GHz

2.991



START 1.60GHz

STOP 26.50GHz

*RBW 1.0MHz

*VBW 1.0MHz

SWP 500ms

DL High

D-band

9/23/98

LB41901

*ATTEN 30dB

cw

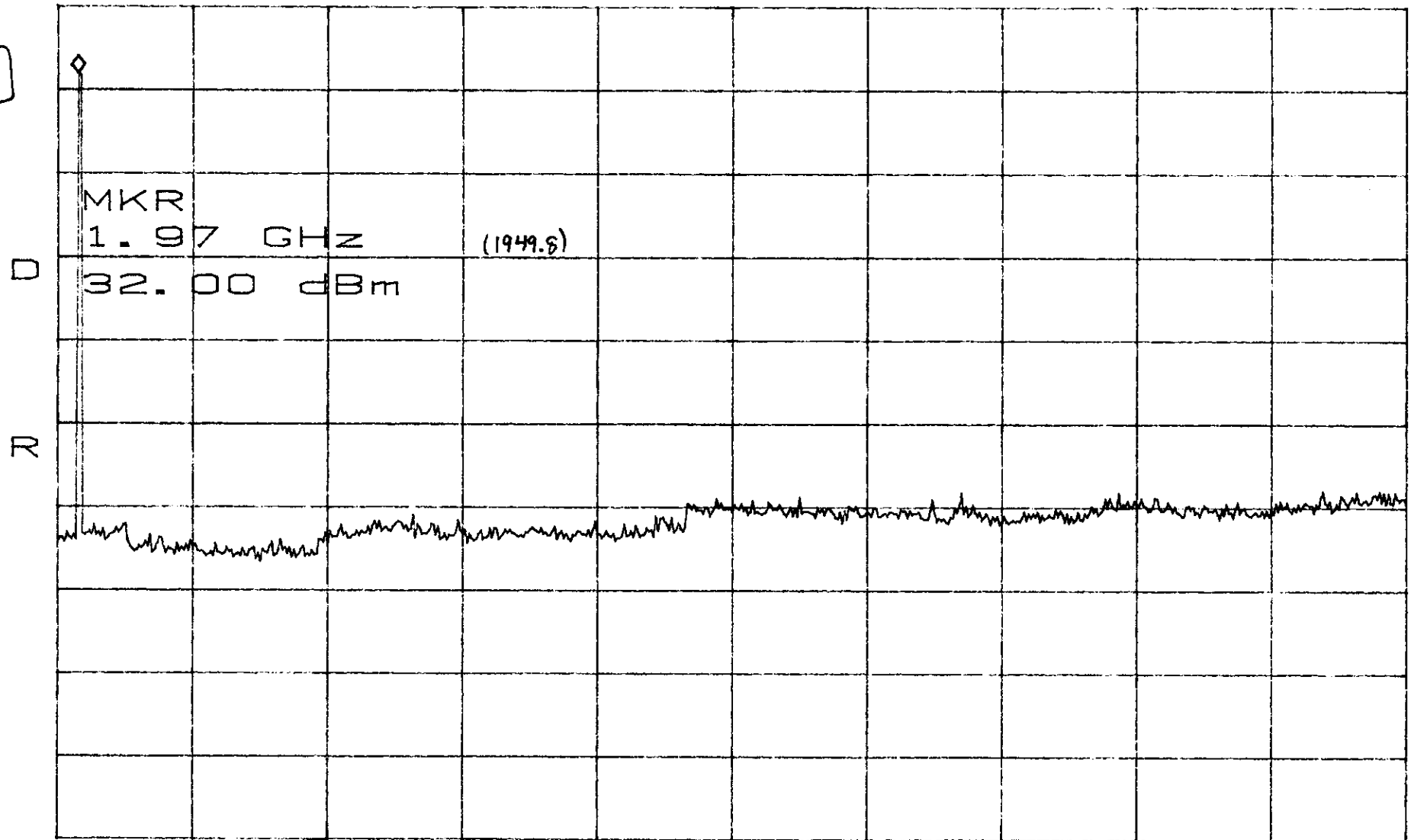
MKR 32.00dBm

RL 40.0dBm

10dB/

1.97GHz

2.991



START 1.60GHz

STOP 26.50GHz

*RBW 1.0MHz

*VBW 1.0MHz

SWP 500ms

UL Low
D-band

cw

9/23/98

LB41901

*ATTEN 30dB

MKR 31.83dBm

RL 40.0dBm

10dB/

1.89GHz

2.991

MKR

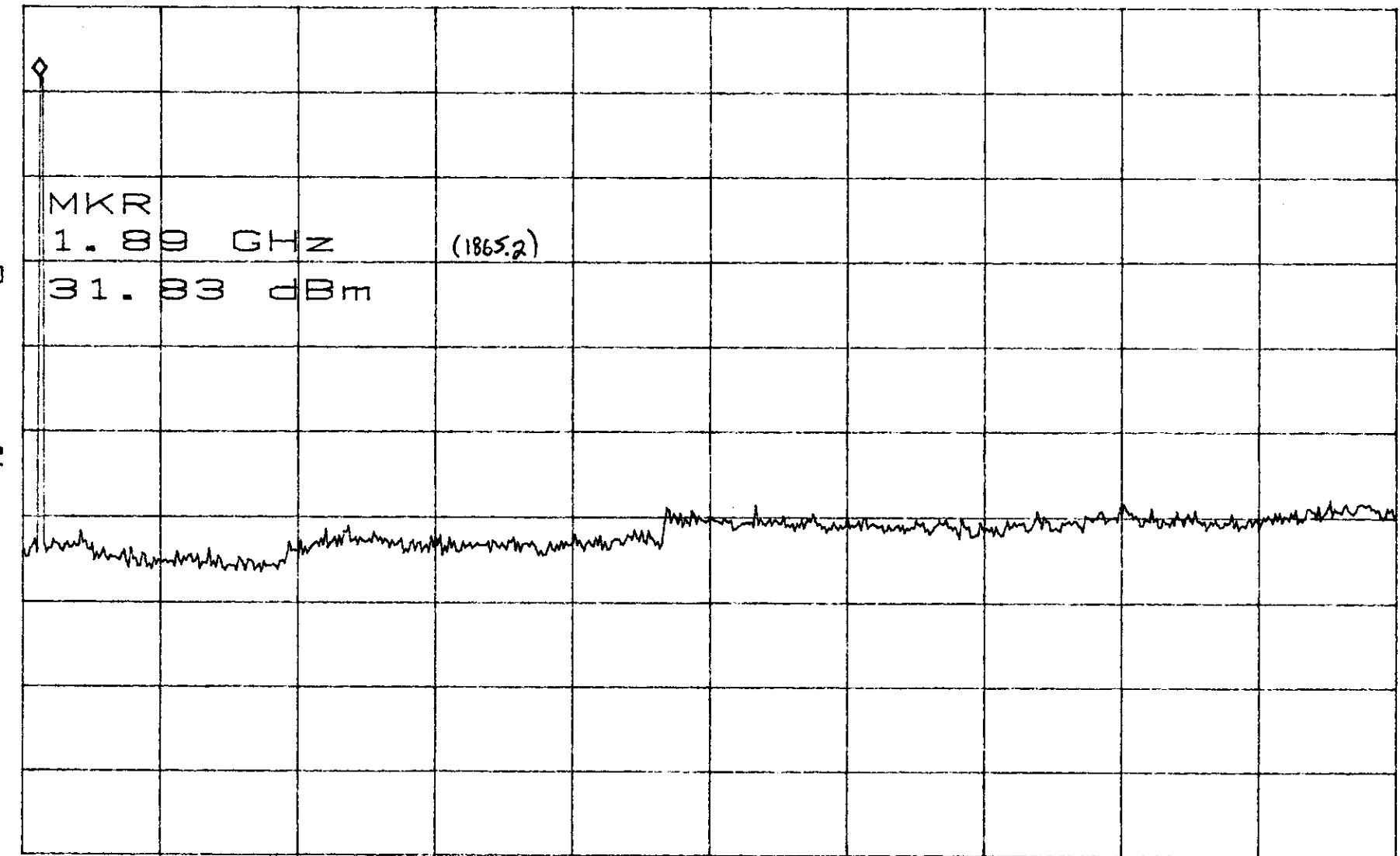
1.89 GHz

(1865.2)

31.83 dBm

D

R



START 1.60GHz

STOP 26.50GHz

*RBW 1.0MHz

*VBW 1.0MHz

SWP 500ms

9/23/98

LB41901

UL Mid
D-band

CW

*ATTEN 30dB

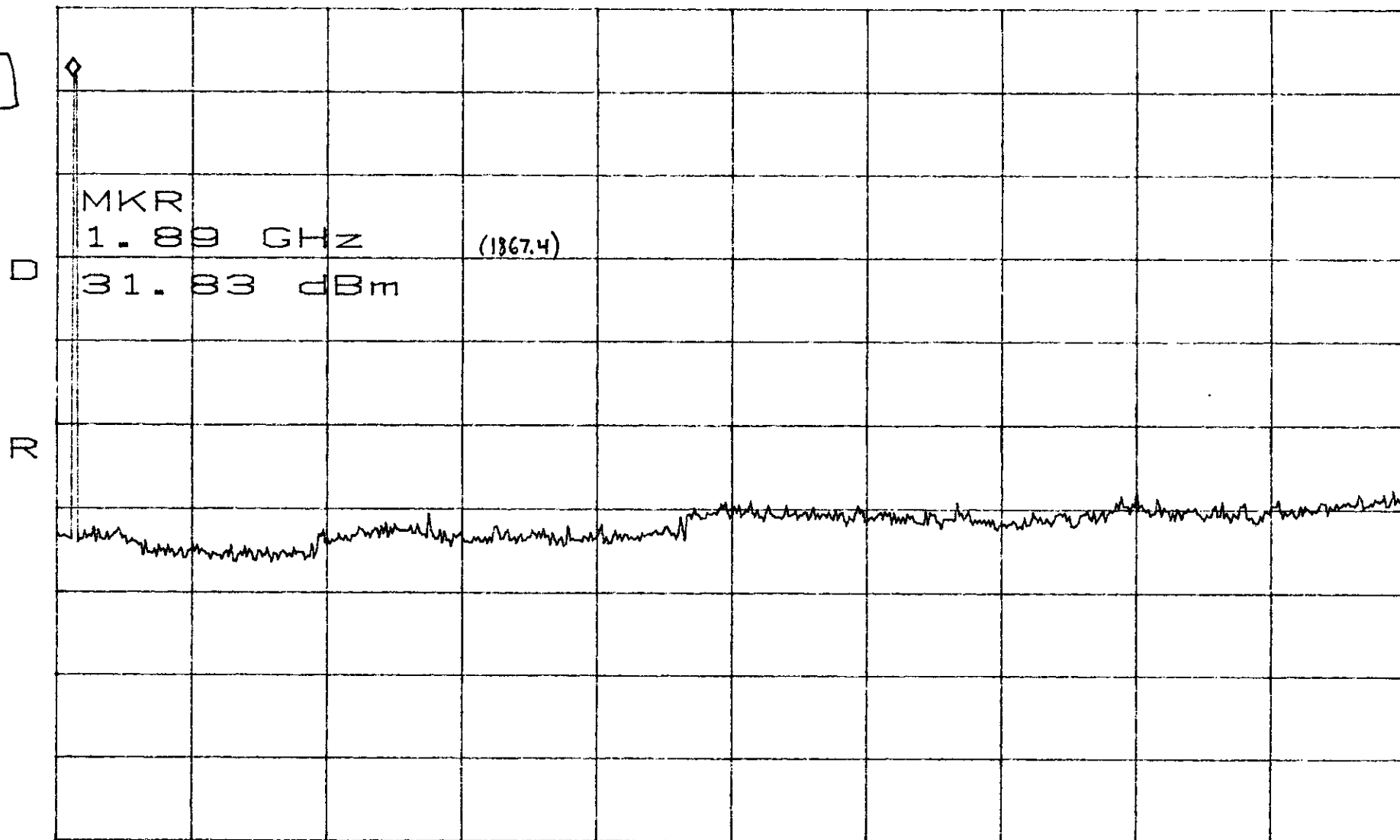
MKR 31.83dBm

RL 40.0dBm

10dB/

1.89GHz

2.991



START 1.60GHz

STOP 26.50GHz

*RBW 1.0MHz

*VBW 1.0MHz

SWP 500ms

UL High
0-band

9/23/98

LB41901

cw

*ATTEN 30dB

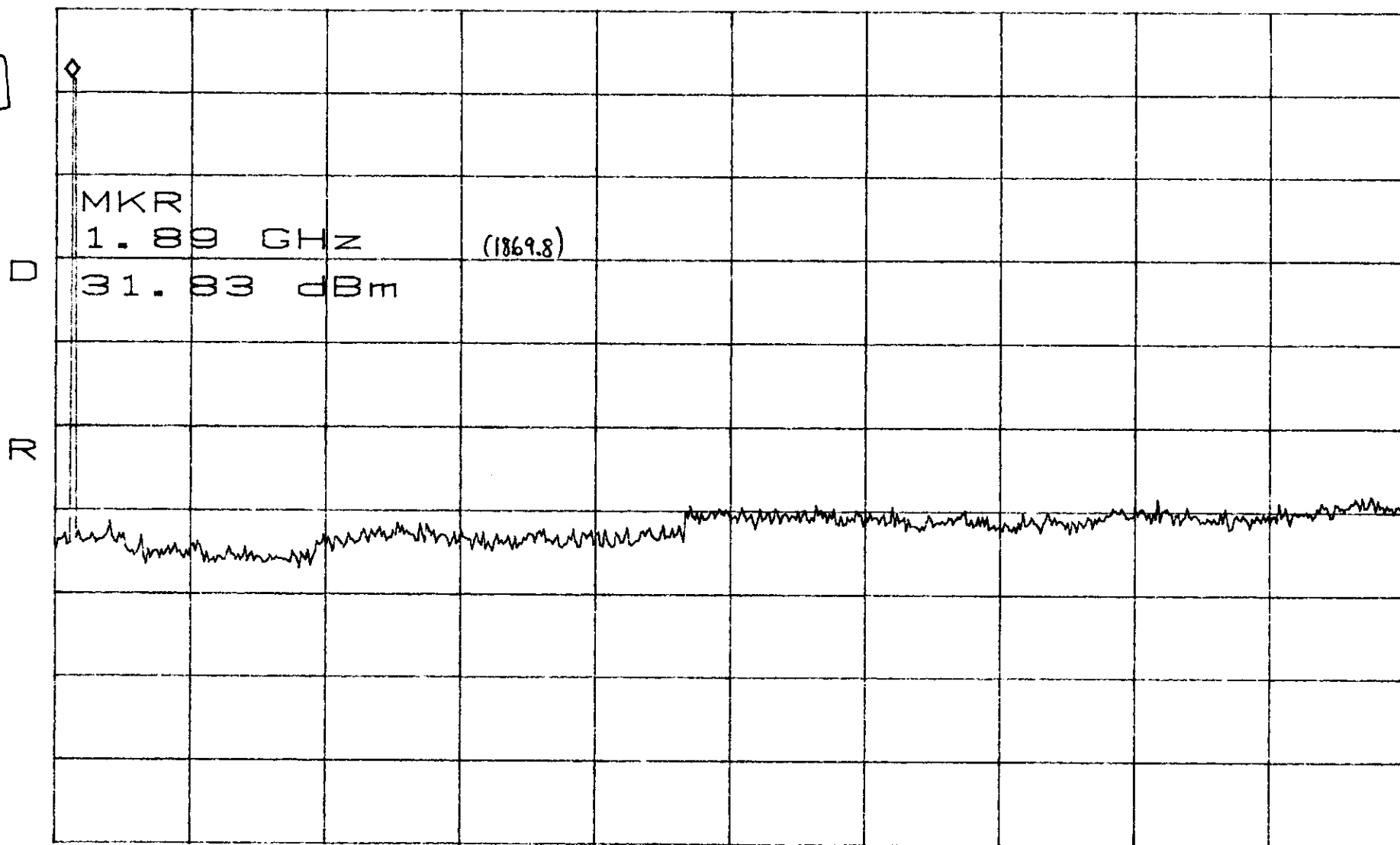
MKR 31.83dBm

RL 40.0dBm

10dB/

1.89GHz

2.991



START 1.60GHz

STOP 26.50GHz

*RBW 1.0MHz

*VBW 1.0MHz

SWP 500ms

DL Low
D-band

Output
cw

9/23/98
LB41901

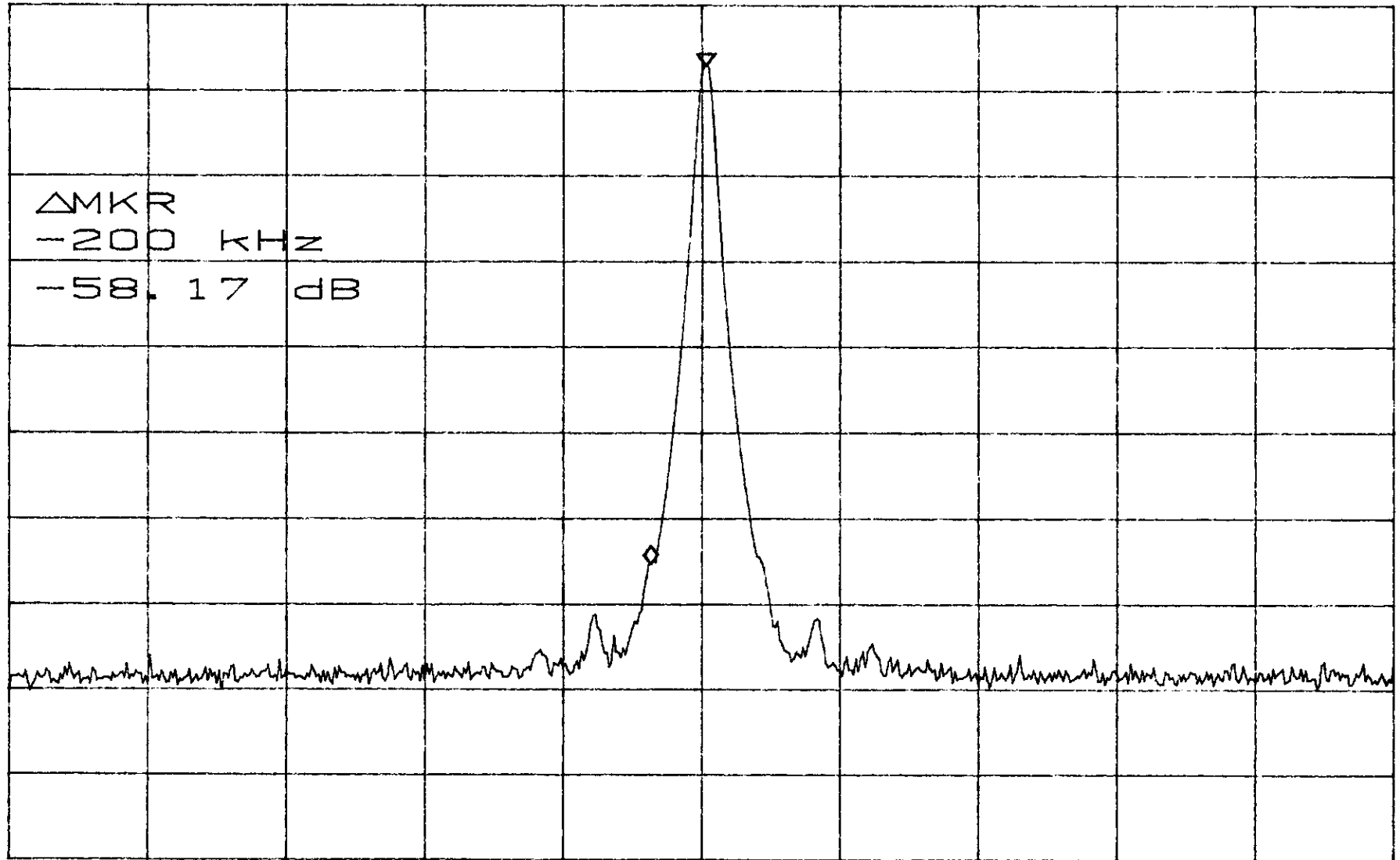
ATTEN 30dB
RL 40.0dBm

10dB/

Δ MKR -58.17dB
-200kHz

24.238

Δ MKR
-200 kHz
-58.17 dB



CENTER 1.945200GHz SPAN 5.000MHz
*RBW 30kHz *VBW 30kHz SWP 50.0ms

DL Low

0-band

Input

9/23/98

LB41901

ATTEN 10dB

CW-source

MKR -55.00dBm

RL 0dBm

10dB/

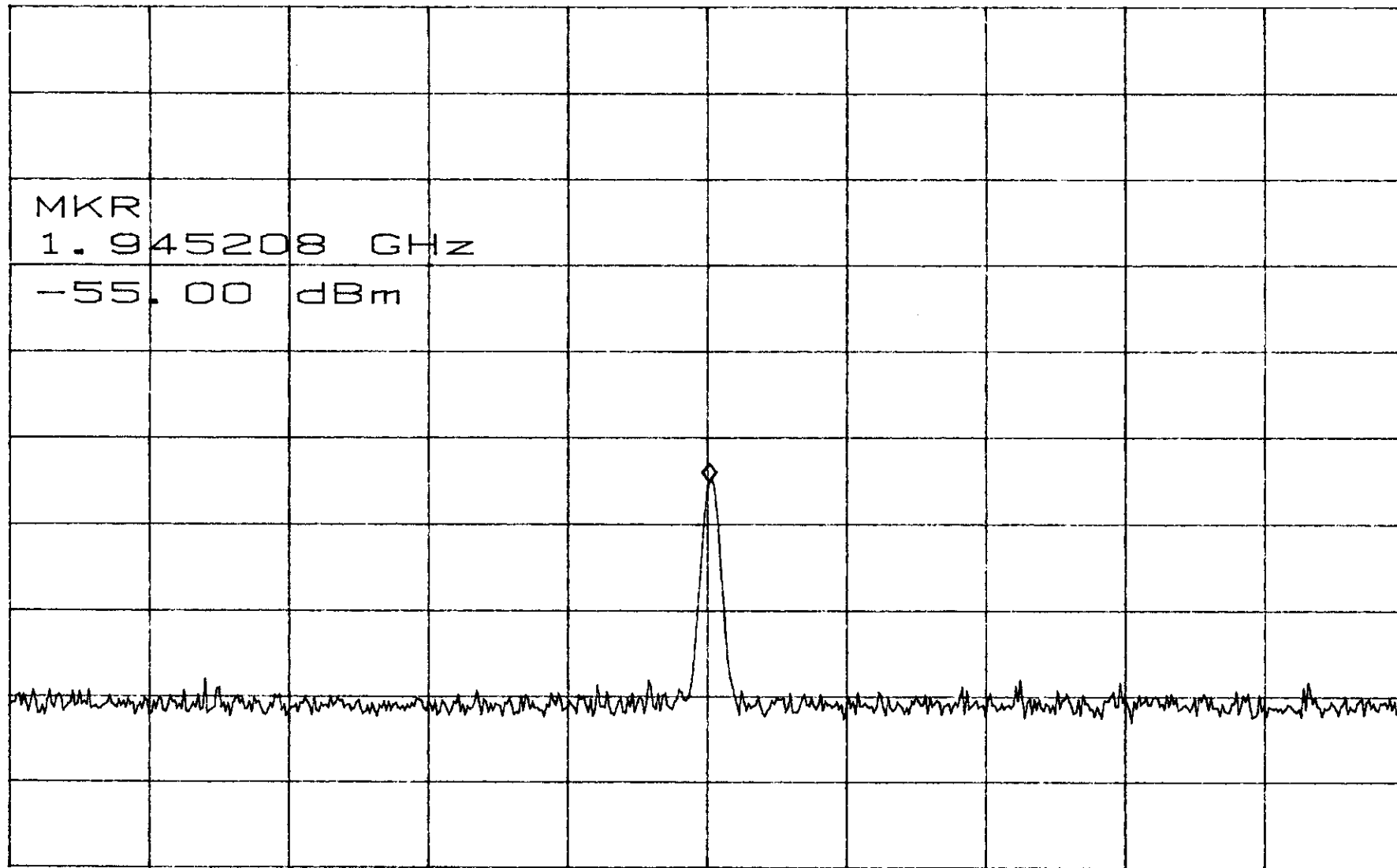
1.945208GHz

24.238

MKR

1.945208 GHz

-55.00 dBm



CENTER 1.945200GHz

SPAN 5.000MHz

*RBW 30kHz

*VBW 30kHz

SWP 50.0ms

OL Low
D-band

Output

9/23/98

LB41901

ATTEN 30dB

cw

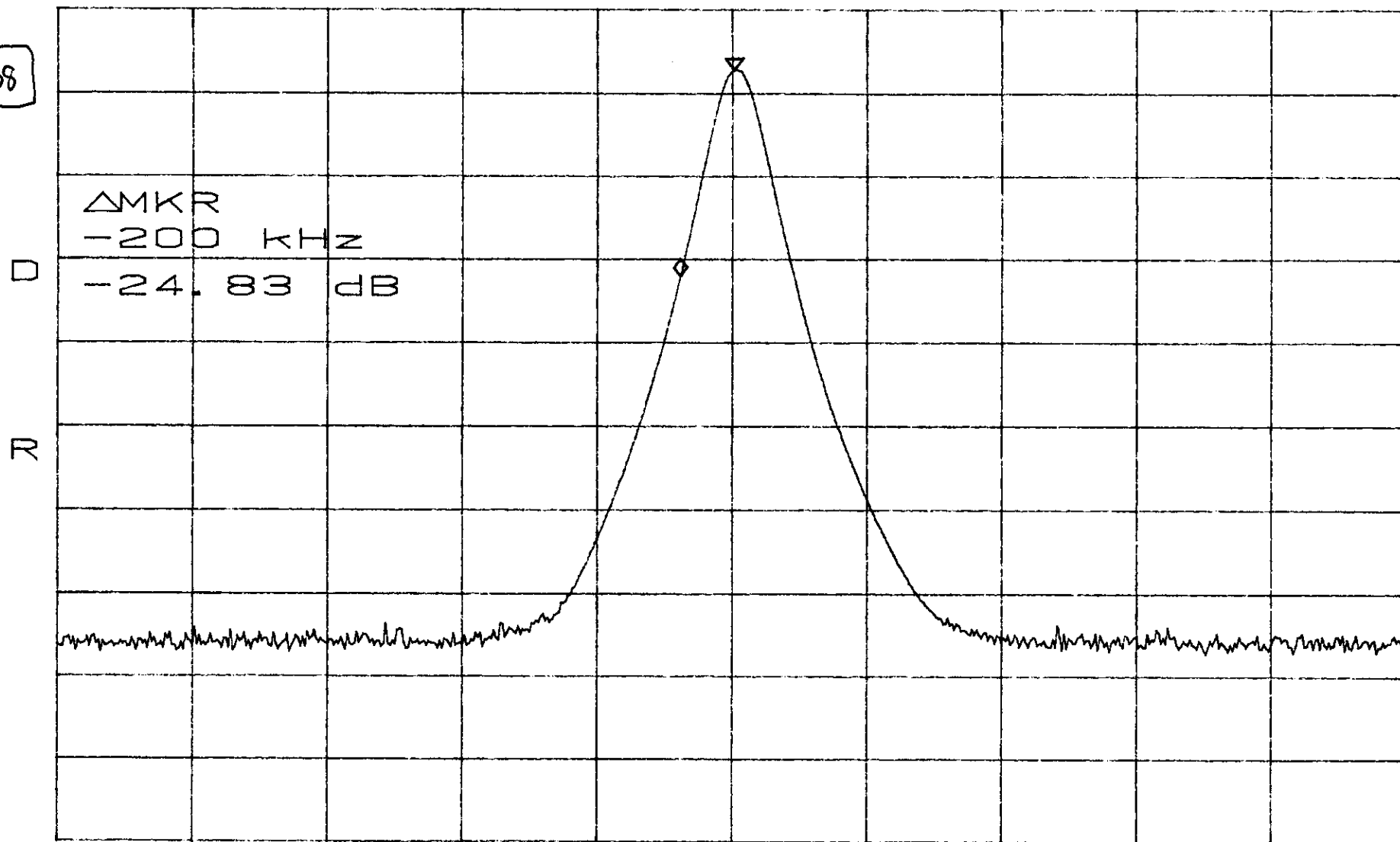
ΔMKR -24.83dB

RL 40.0dBm

10dB/

-200kHz

24.238



CENTER 1.945200GHz

SPAN 5.000MHz

*RBW 100kHz

*VBW 30kHz

SWP 50.0ms

DL Low
D-band

Output
cw

9/23/98
LB41901

ATTEN 30dB

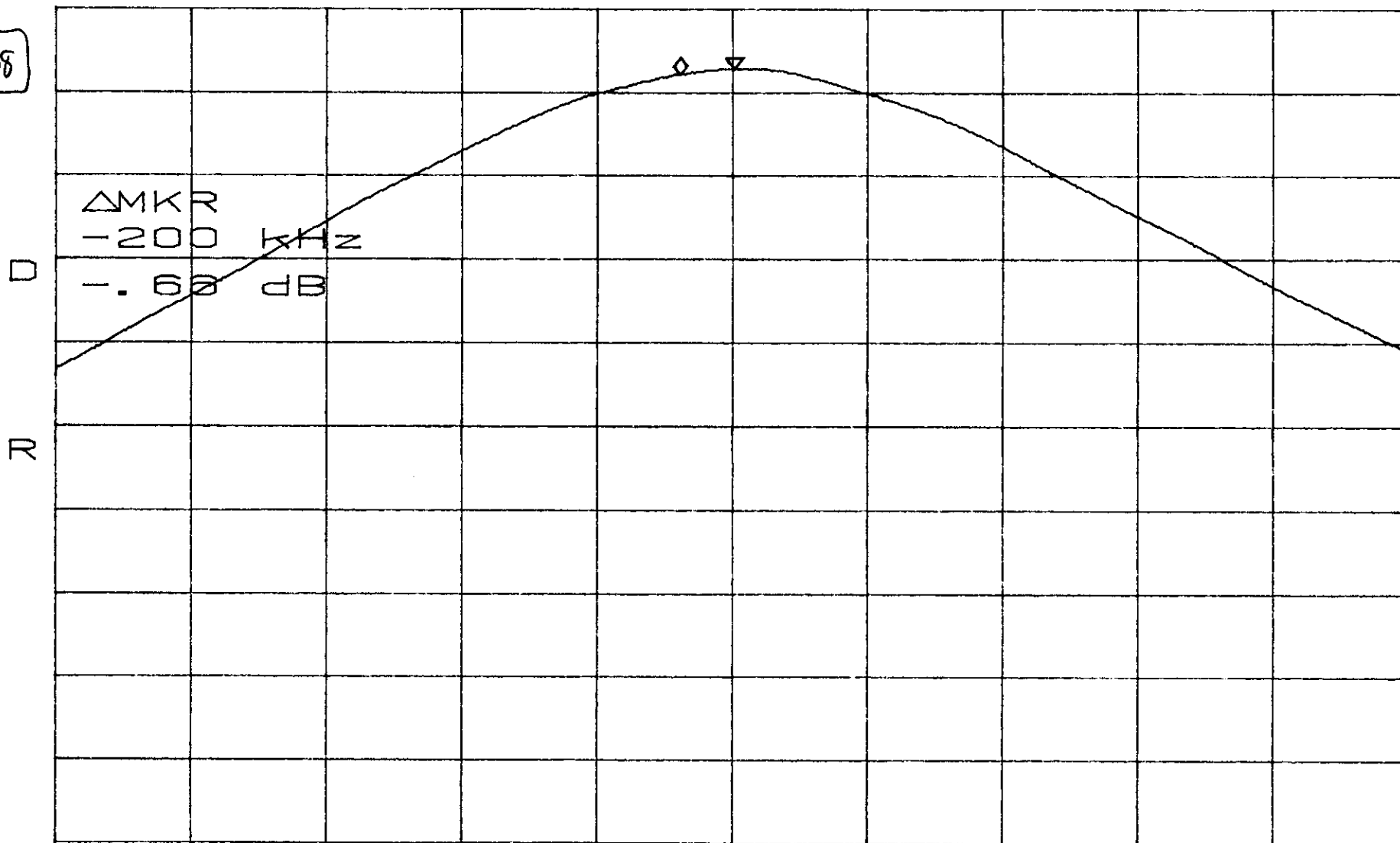
RL 40.0dBm

10dB/

ΔMKR -.66dB

-200kHz

24.238



CENTER 1.945200GHz

SPAN 5.000MHz

*RBW 1.0MHz

*VBW 1.0MHz

SWP 50.0ms

DL Low
D-band

Output
cw

9/23/98
LB41901

ATTEN 30dB

RL 40.0dBm

10dB/

Δ MKR -22.17dB

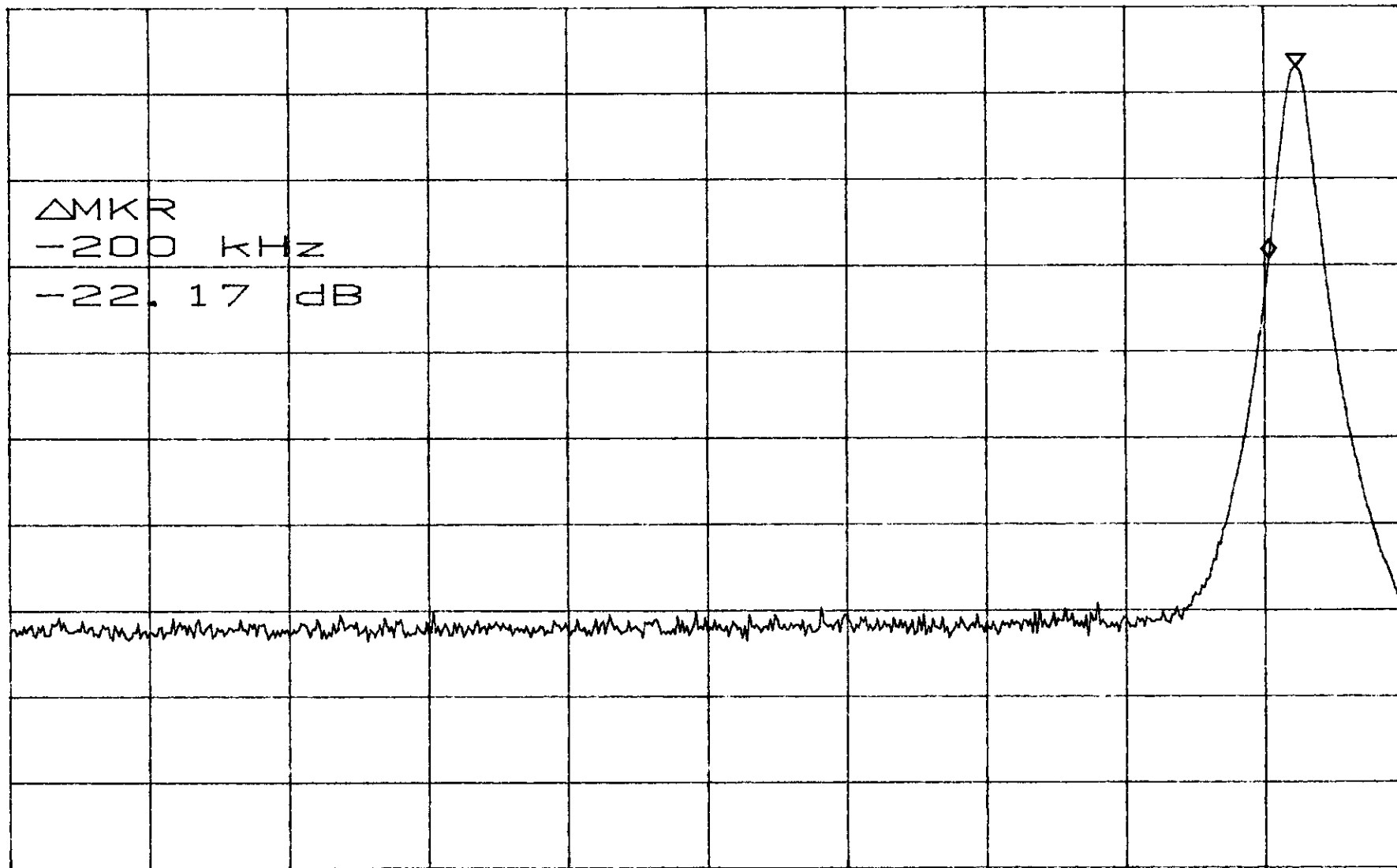
-200kHz

24.238

Δ MKR
-200 kHz
-22.17 dB

D

R



CENTER 1.94100GHz

SPAN 10.00MHz

*RBW 100kHz

*VBW 1.0MHz

SWP 50.0ms

DL Low
D-band

Output
cw-source

9/23/98
LB41907

ATTEN 30dB

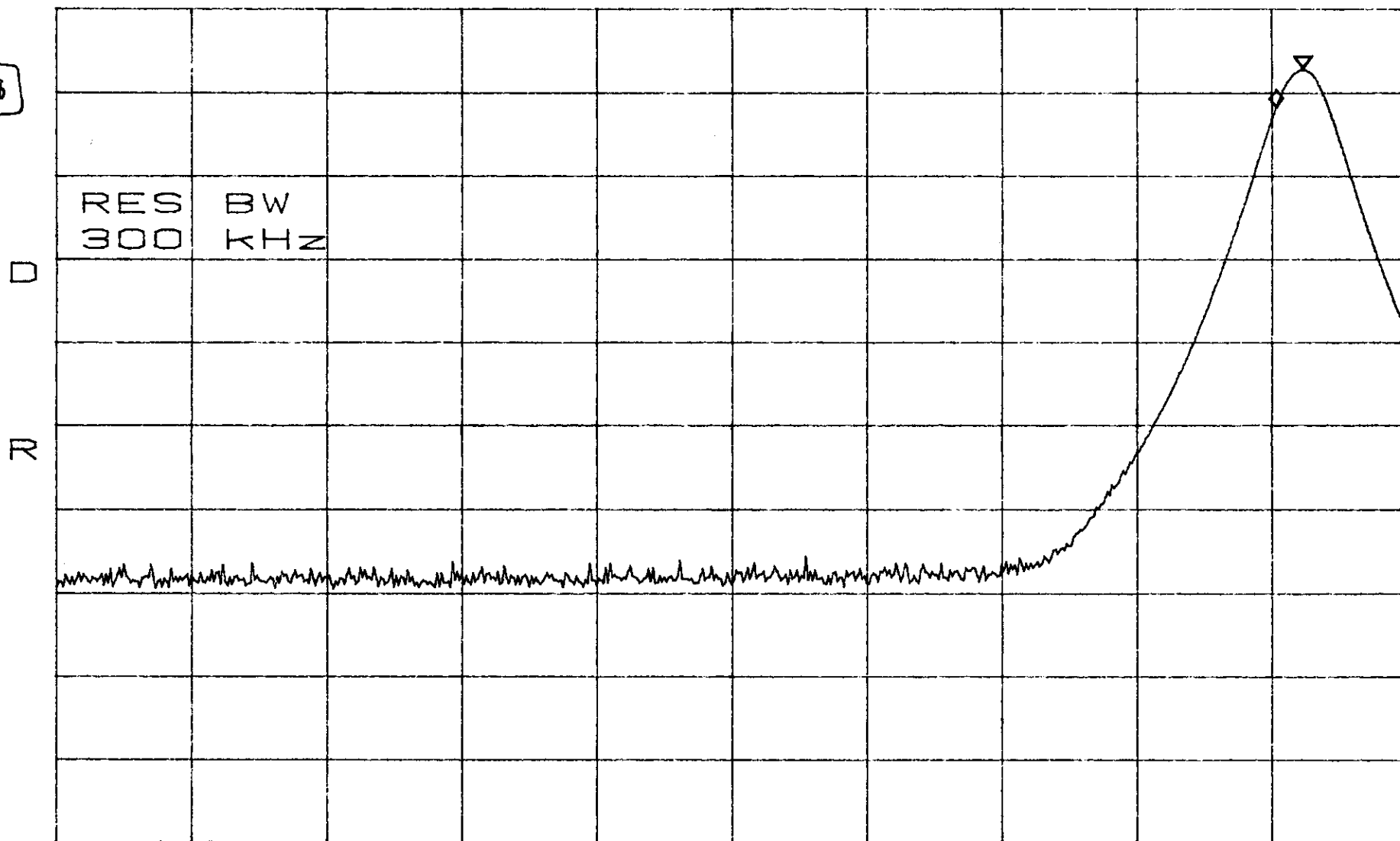
RL 40.0dBm

10dB/

Δ MKR -4.67dB

-200kHz

24.238



CENTER 1.94100GHz

SPAN 10.00MHz

*RBW 300kHz

*VBW 1.0MHz

SWP 50.0ms

DL High
D-band

DL Output
cw source

9/23/98
LB41901

ATTEN 30dB

RL 40.0dBm

10dB/

Δ MKR -55.33dB

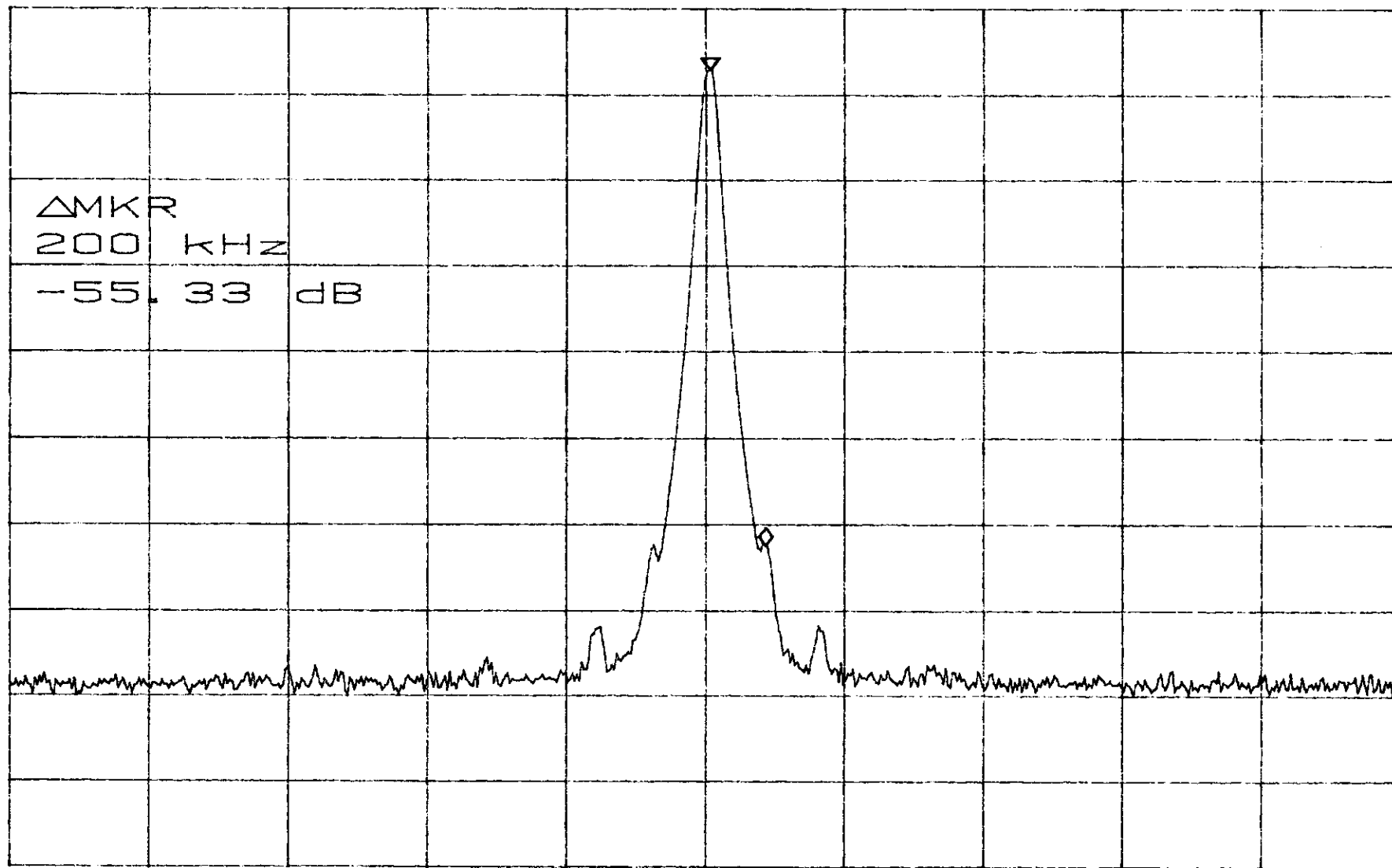
200kHz

24.238

Δ MKR
200 kHz
-55.33 dB

D

R



CENTER 1.949800GHz

SPAN 5.000MHz

*RBW 30kHz

*VBW 30kHz

SWP 50.0ms

DL High
D-band

~~0.000~~ Input
CW source

9/23/98
LB41901

ATTEN 10dB

RL 0dBm

MKR -54.33dBm

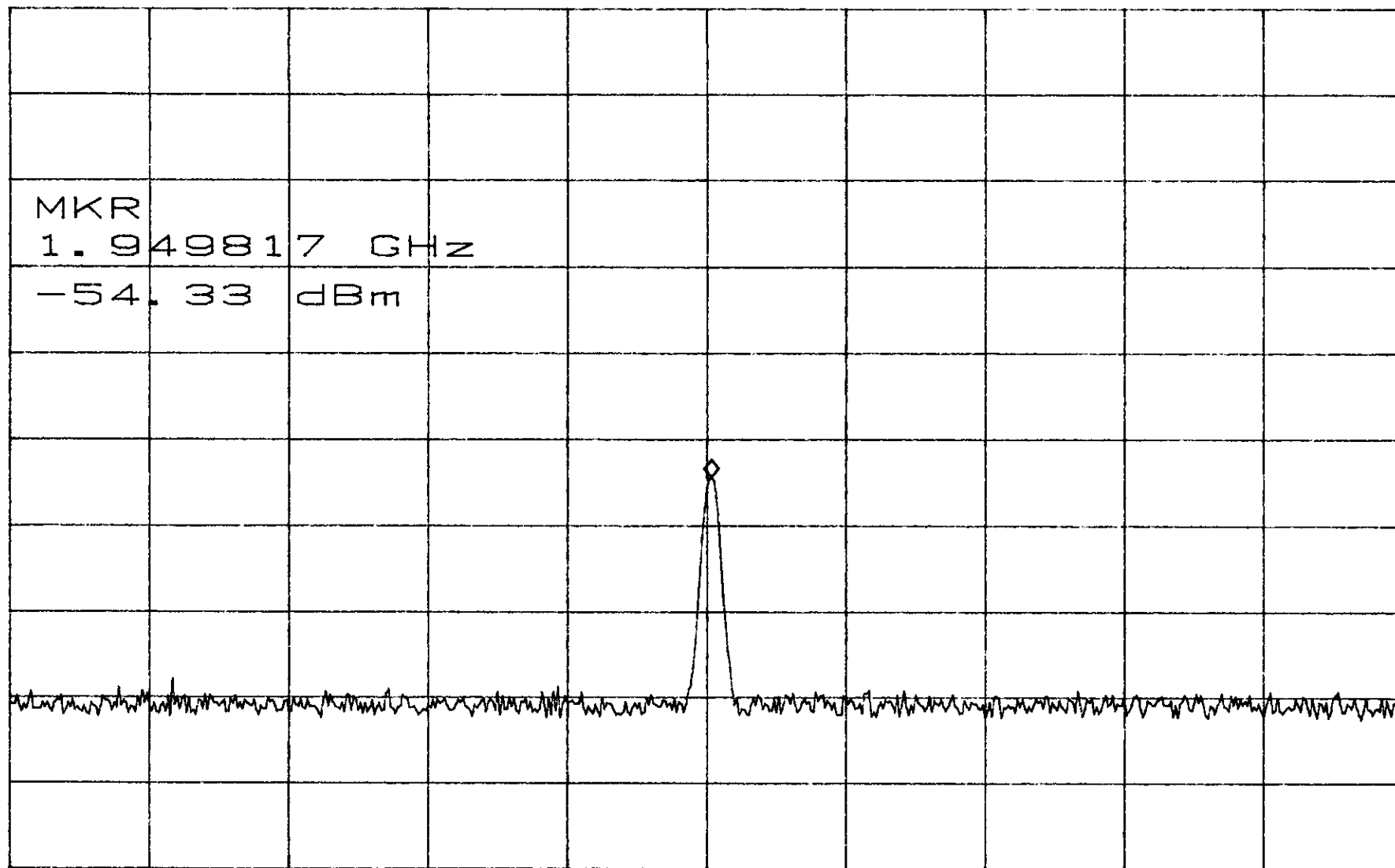
10dB/

1.949817GHz

24.238

D

MKR
1.949817 GHz
-54.33 dBm



CENTER 1.949800GHz

SPAN 5.000MHz

*RBW 30kHz

*VBW 30kHz

SWP 50.0ms

DL High
D-band

Output
cw

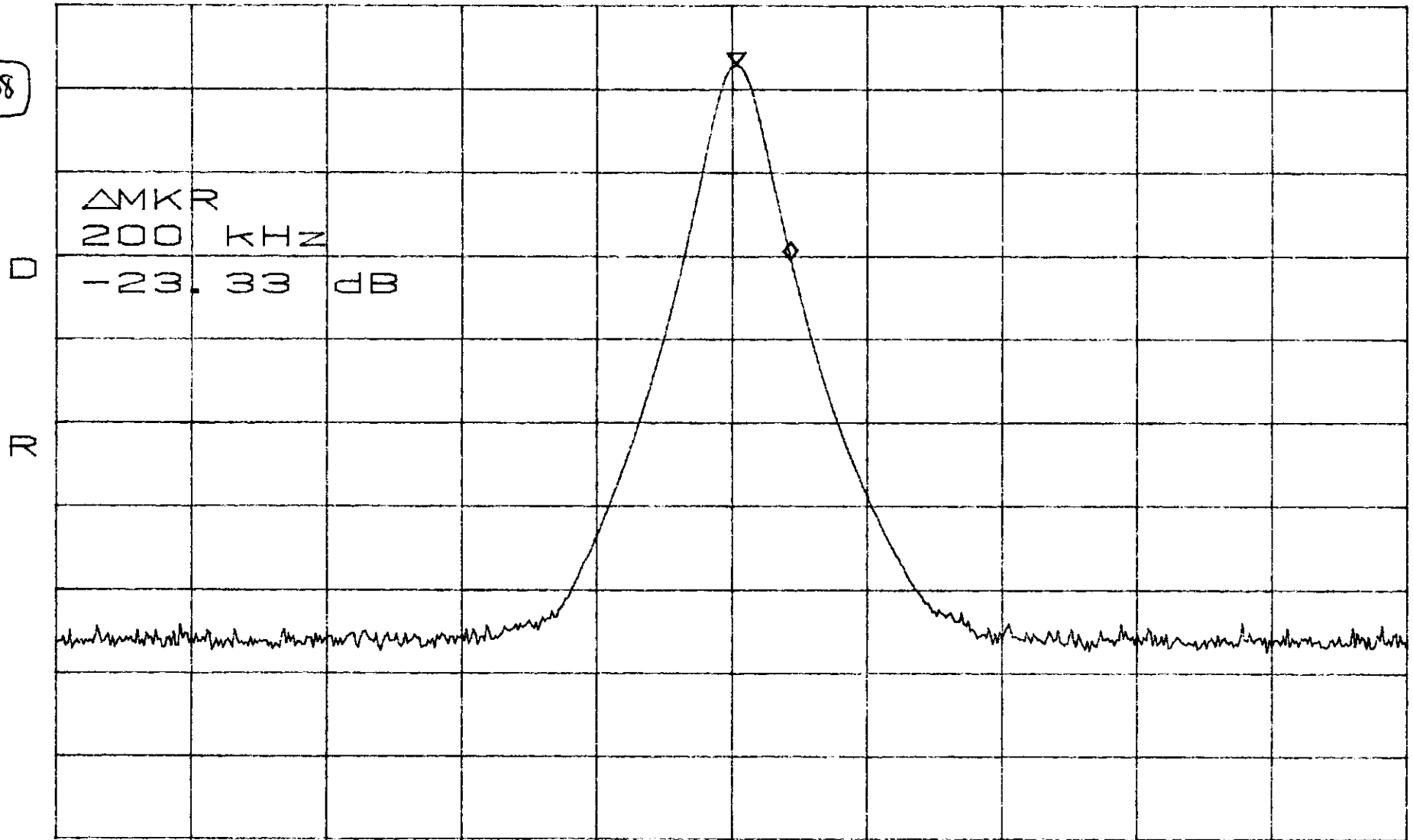
9/23/98
LB41901

ATTEN 30dB
RL 40.0dBm

10dB/

Δ MKR -23.33dB
200kHz

24.238



CENTER 1.949800GHz
*RBW 100kHz *VBW 30kHz

SPAN 5.000MHz
SWP 50.0ms

DL High
D-band

ATTEN 30dB
RL 40.0dBm

Output
cw

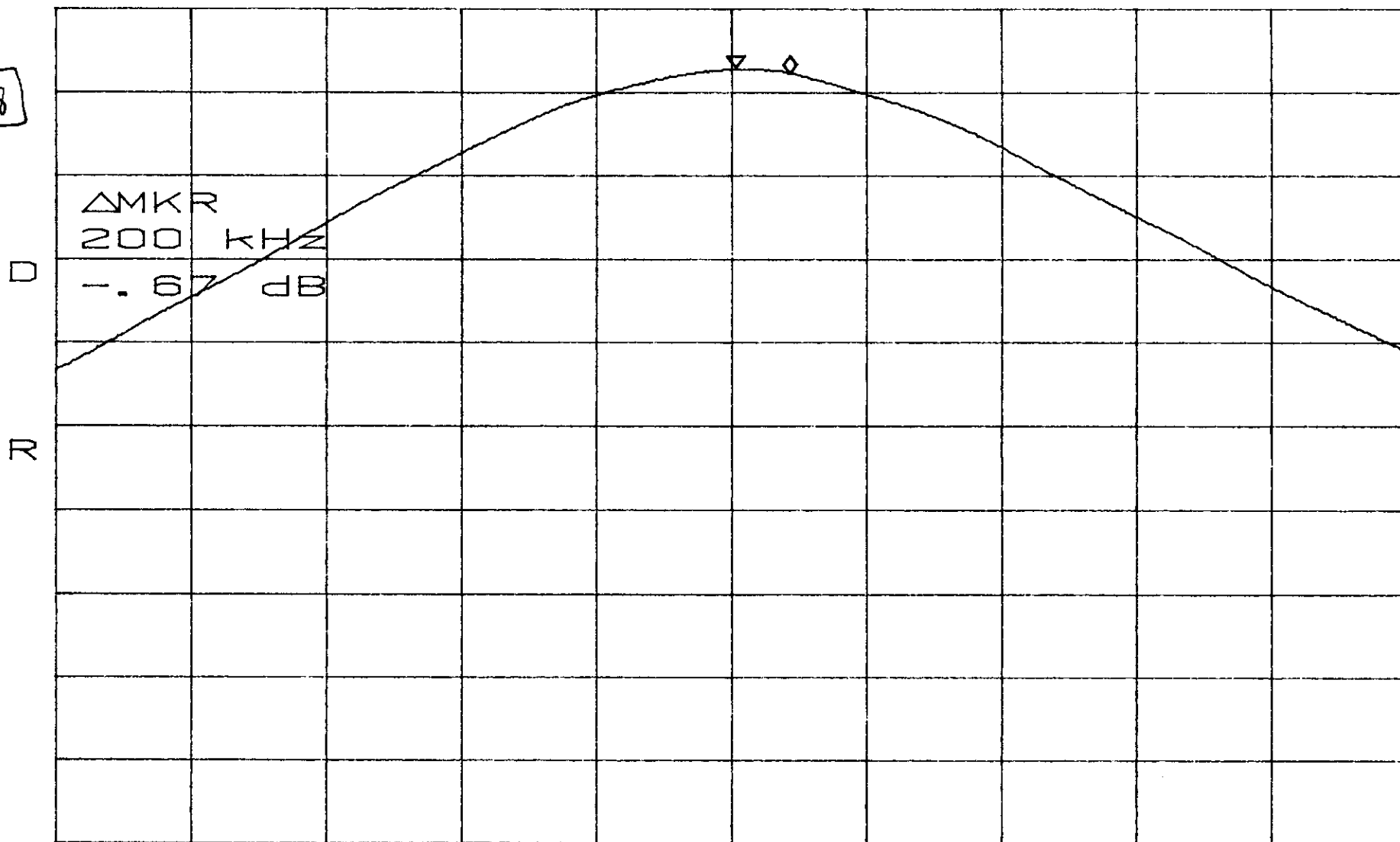
10dB/BPO1

9/23/98

LB41901

Δ MKR -.67dB
200kHz

24.238



CENTER 1.949800GHz

SPAN 5.000MHz

*RBW 1.0MHz

*VBW 1.0MHz

SWP 50.0ms

DL High
D-band

Output
cw

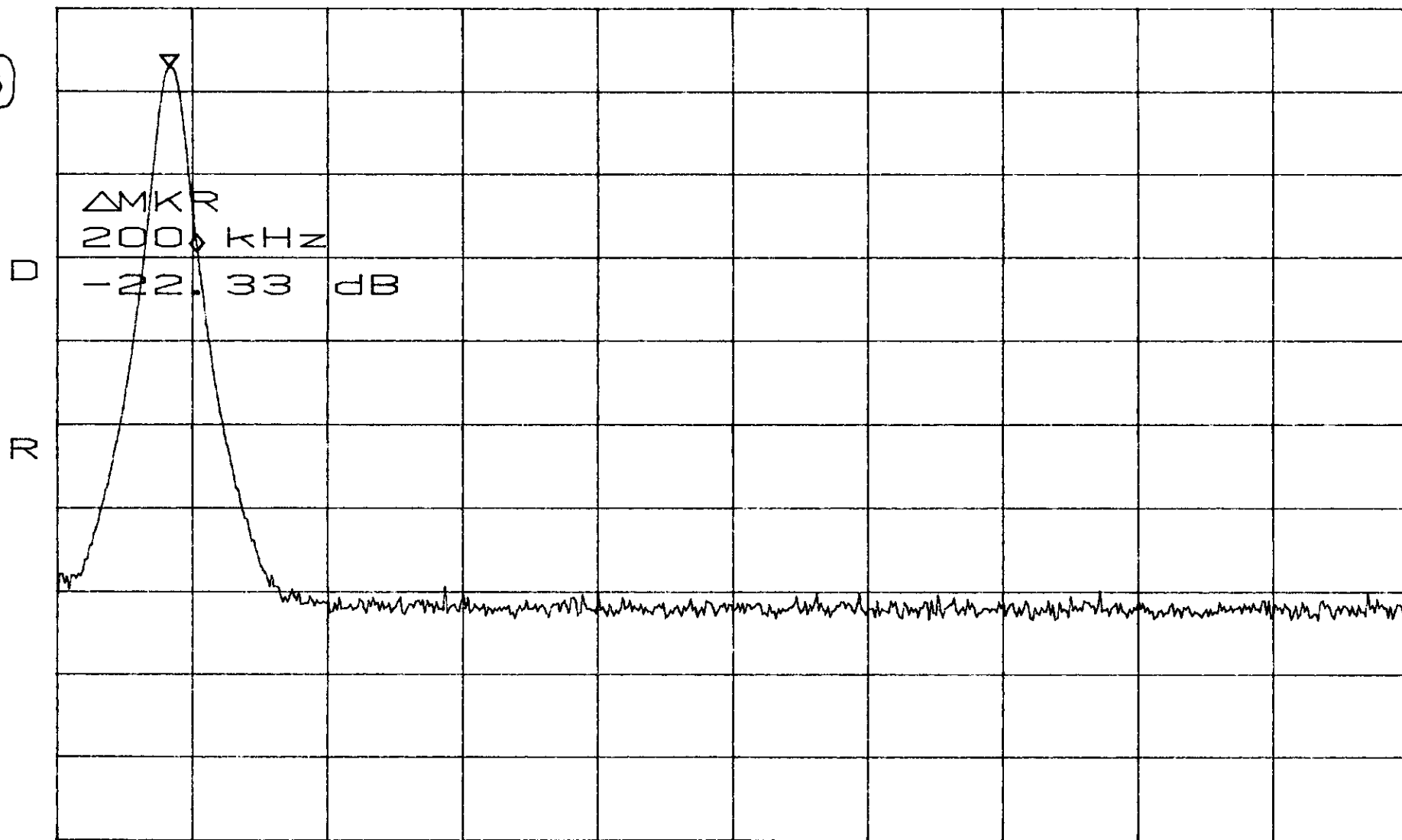
9/23/98
LB41901

ATTEN 30dB
RL 40.0dBm

10dB/

Δ MKR -22.33dB
200kHz

24.238



CENTER 1.95400GHz SPAN 10.00MHz
*RBW 100kHz *VBW 1.0MHz SWP 50.0ms

DL High
D-band

Output

9/23/98

LB41901

ATTN 30dB

cw

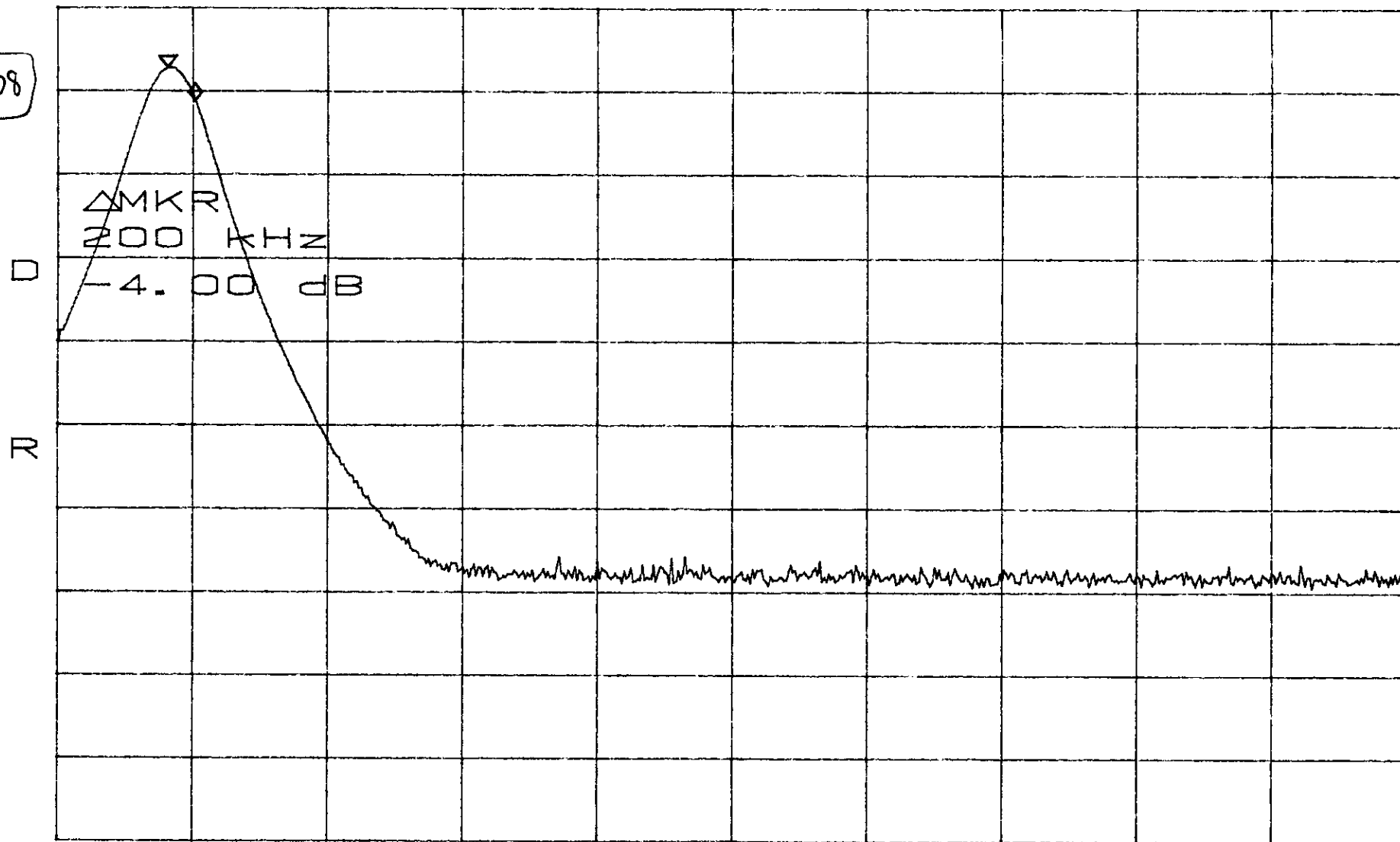
Δ MKR -4.00dB

RL 40.00dBm

10dB/BPO1

200kHz

24.238



CENTER 1.95400GHz

SPAN 10.00MHz

*RBW 300kHz

*VBW 1.0MHz

SWP 50.0ms

UL Low
D-band

UL Output
CW Source

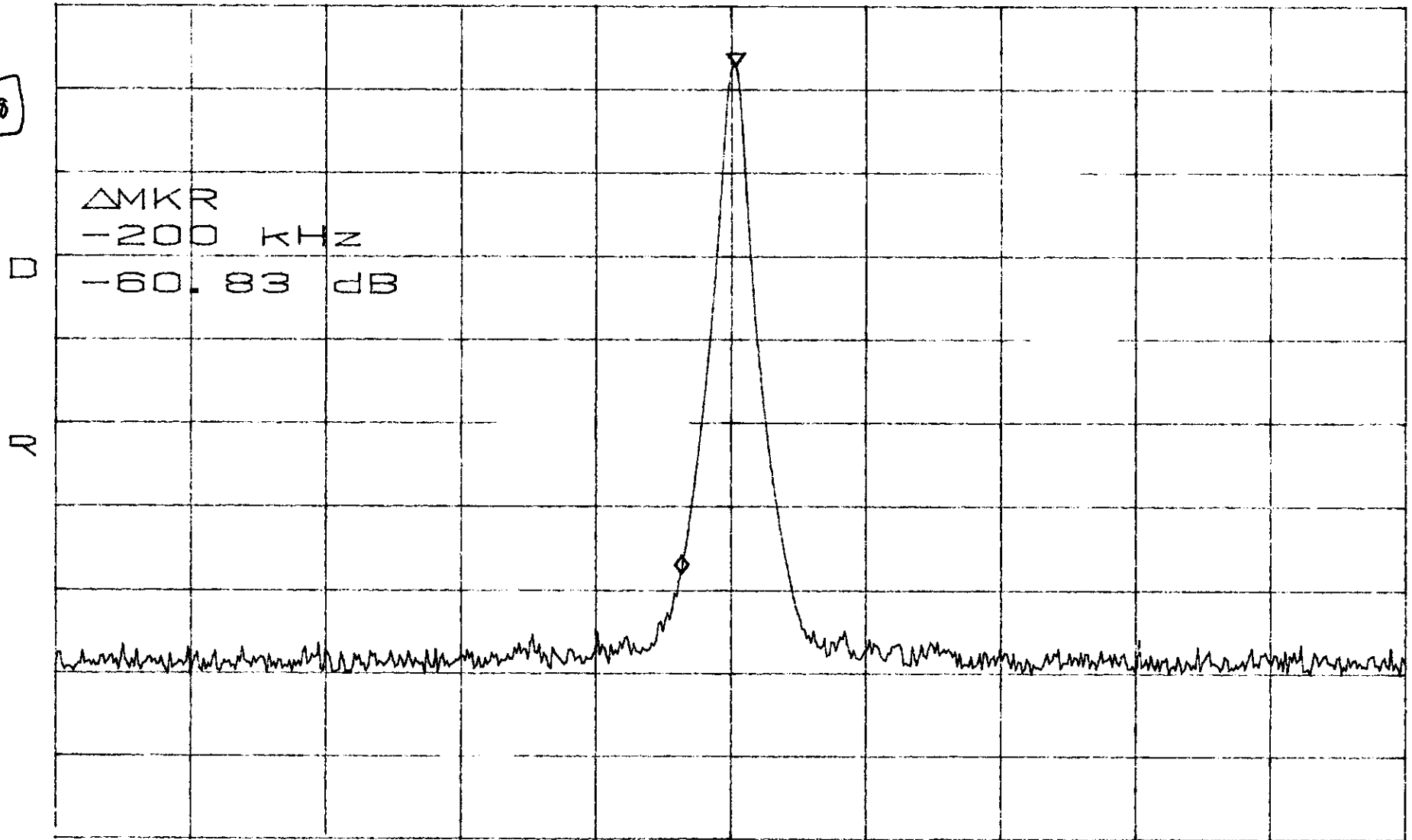
9/17/98
LB41901

ATTEN 30dB
RL 40.0dBm

10dB/

Δ MKR -60.83dB
-200kHz

24.238



CENTER 1.865200GHz SPAN 5.000MHz
*RBW 30kHz VBW 30kHz SWP 50.0ms

UL Low
D-band

UL Input
cw source

9/17/98
LB41901

ATTEN 10dB

RL 0dBm

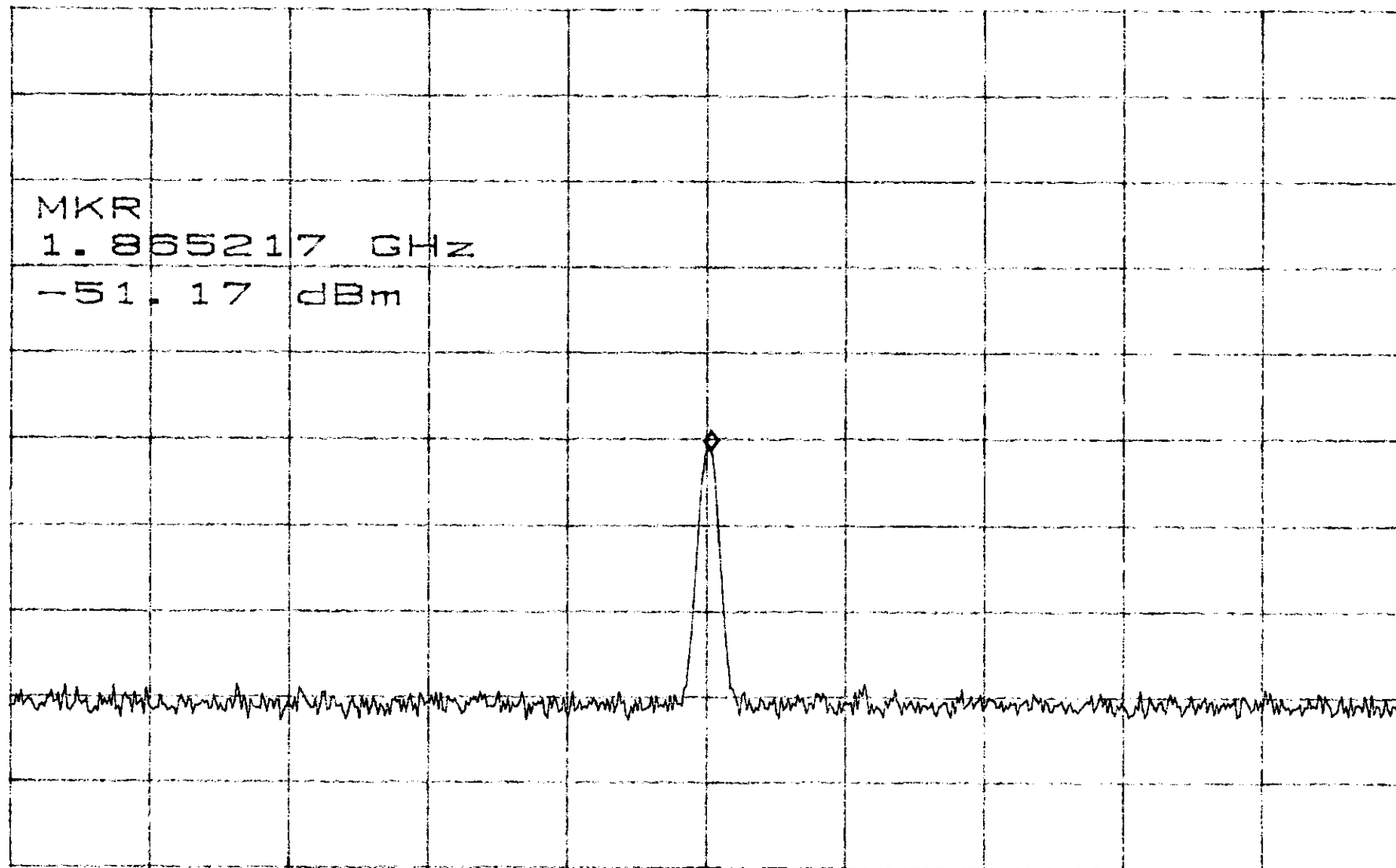
10dB/

MKR -51.17dBm

1.865217GHz

24.238

MKR
1.865217 GHz
-51.17 dBm



CENTER 1.865200GHz

SPAN 5.000MHz

*RBW 30kHz

VBW 30kHz

SWP 50.0ms

UL Low
P-band

Output
CW Source

9/17/98
LB41901

ATTEN 30dB
RL 40.0dBm

ΔMKR -23.50dB
-200kHz

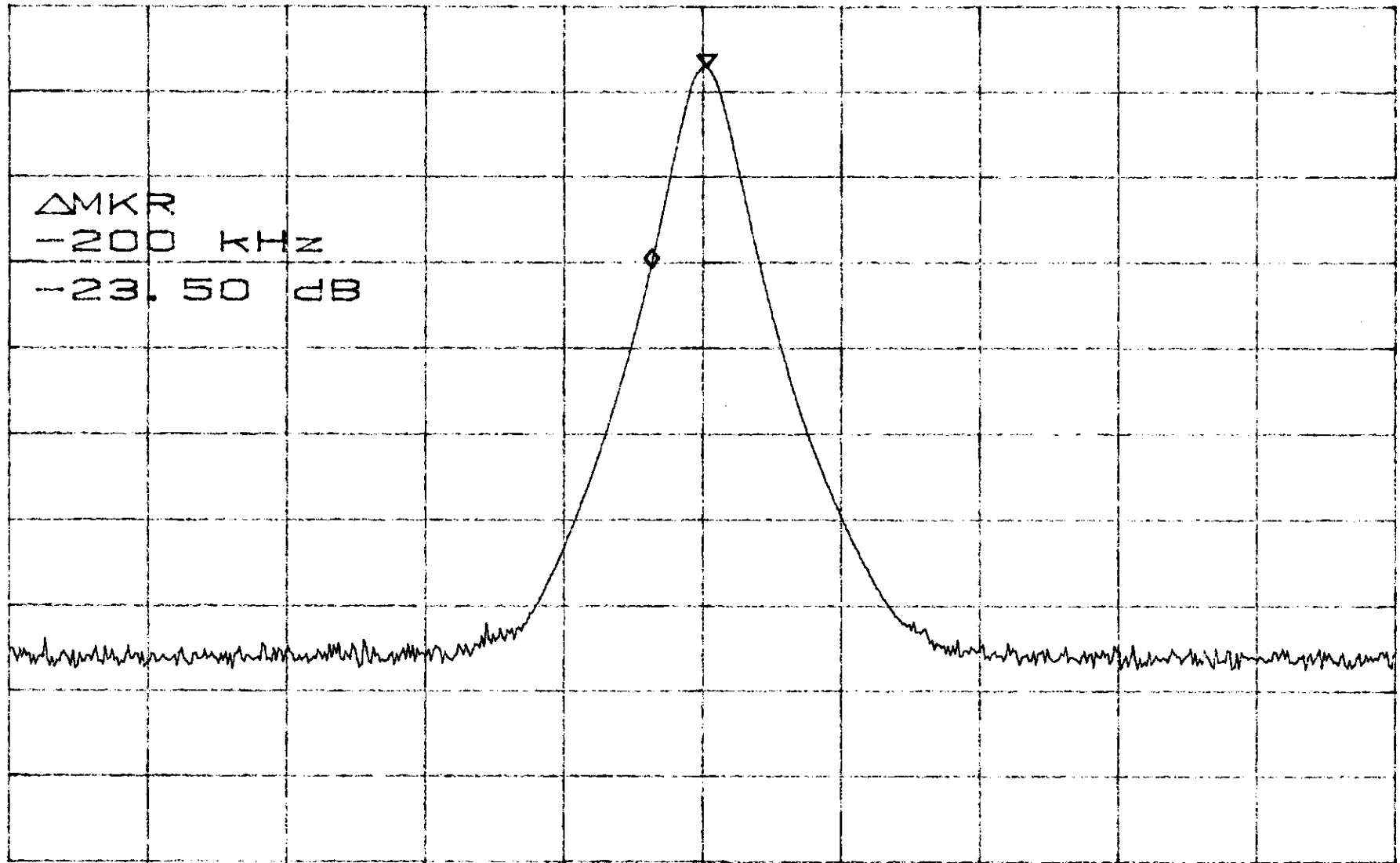
10dB/

24.238

ΔMKR
-200 kHz
-23.50 dB

D

R



CENTER 1.865200GHz

SPAN 5.000MHz

*RBW 100kHz

*VBW 30kHz

SWP 50.0ms

UL Low
D-band

Output
CW source

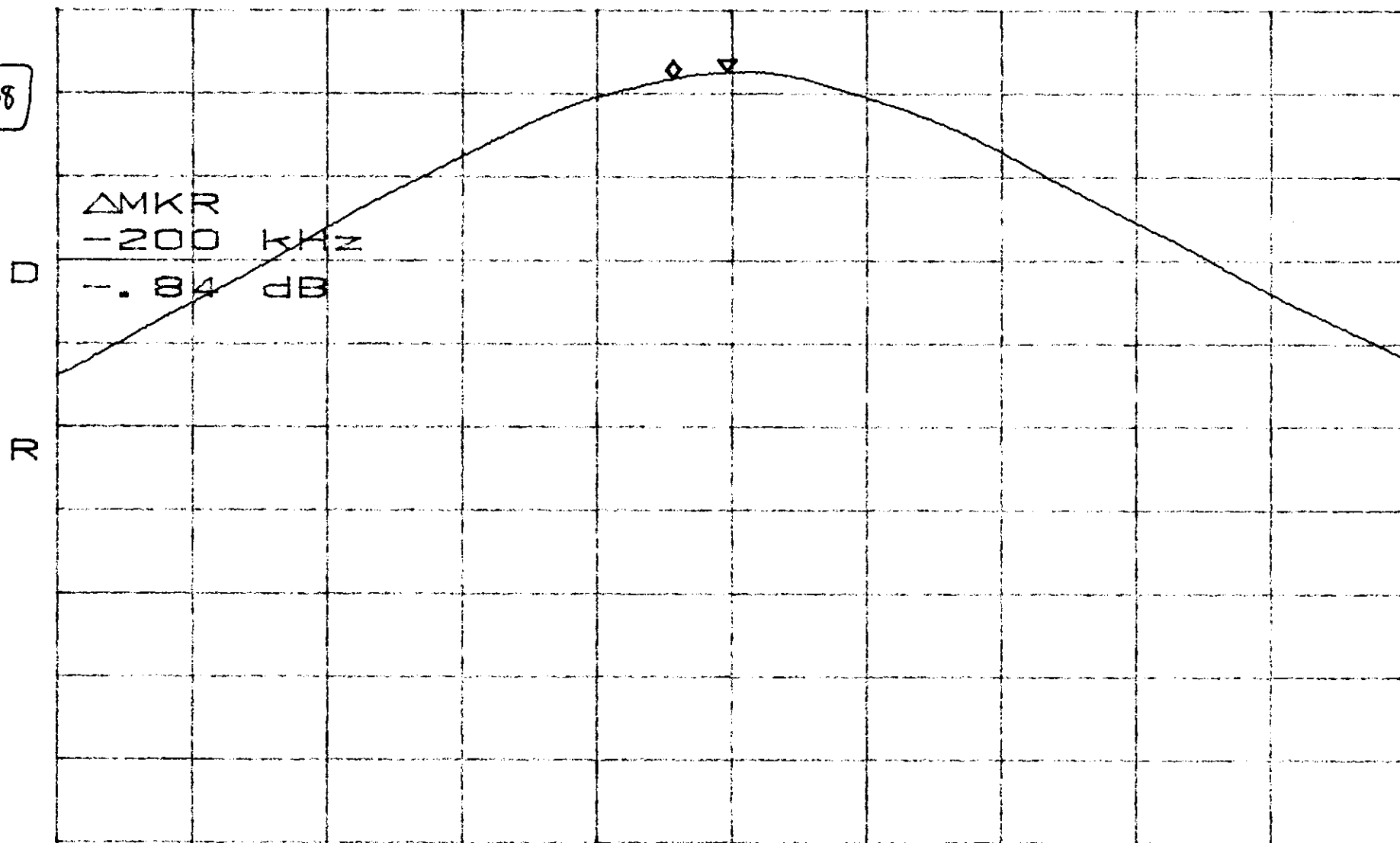
9/17/98
LB41901

ATTEN 30dB
RL 40.0dBm

10dB/

ΔMKR -.84dB
-200kHz

24.238



CENTER 1.865200GHz SPAN 5.000MHz
*RBW 1.0MHz *VBW 1.0MHz SWP 50.0ms

UL Low
D-band

Output
CW Source

9/17/98
LB41901

ATTEN 30dB
RL 40.0dBm

10dB/BPO1

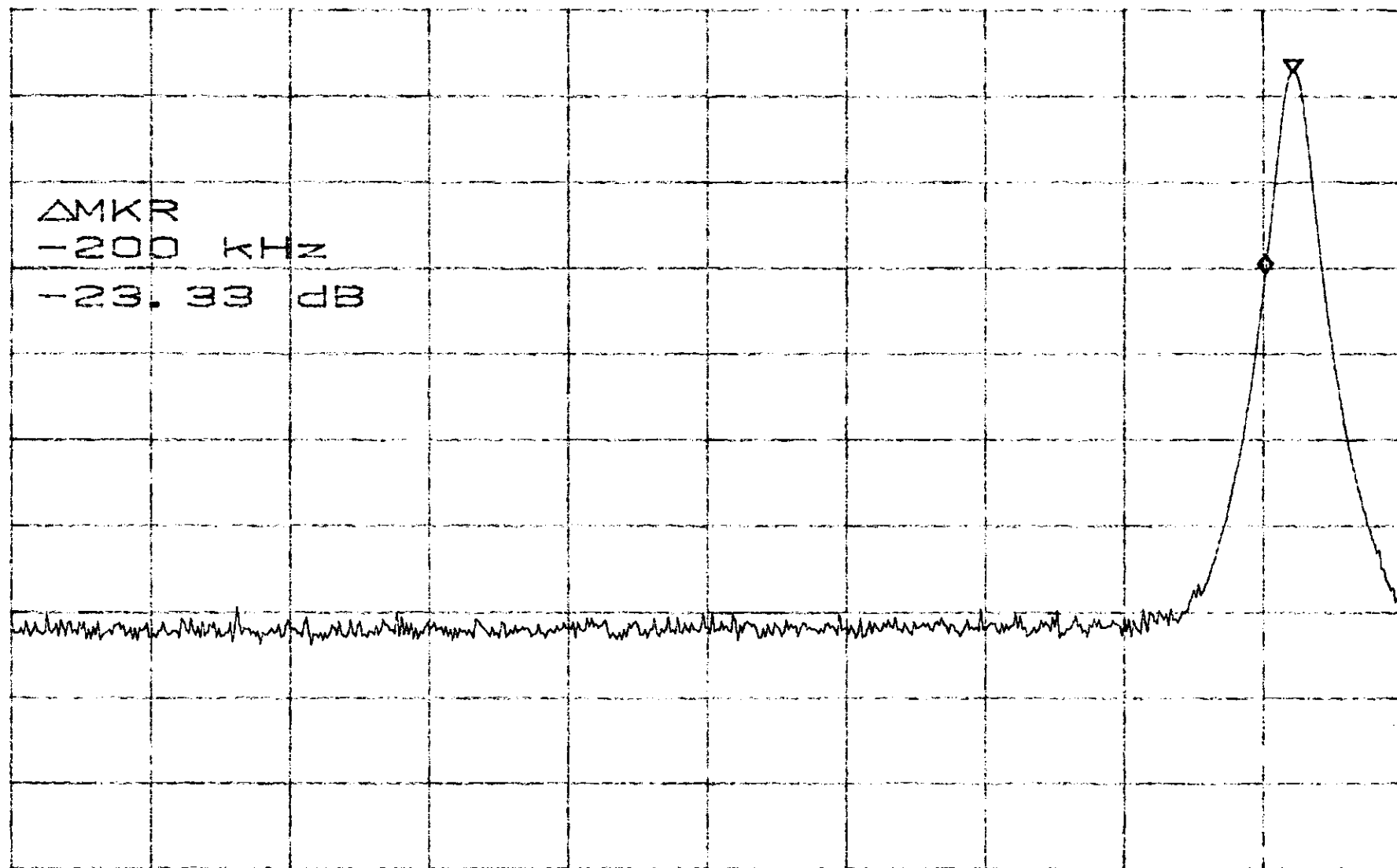
Δ MKR -23.33dB
-200kHz

24.239

Δ MKR
-200 kHz
-23.33 dB

D

R



CENTER 1.86100GHz

SPAN 10.00MHz

*RBW 100kHz

*VBW 1.0MHz

SWP 50.0ms

UL Low
D-band

Output
cw-source

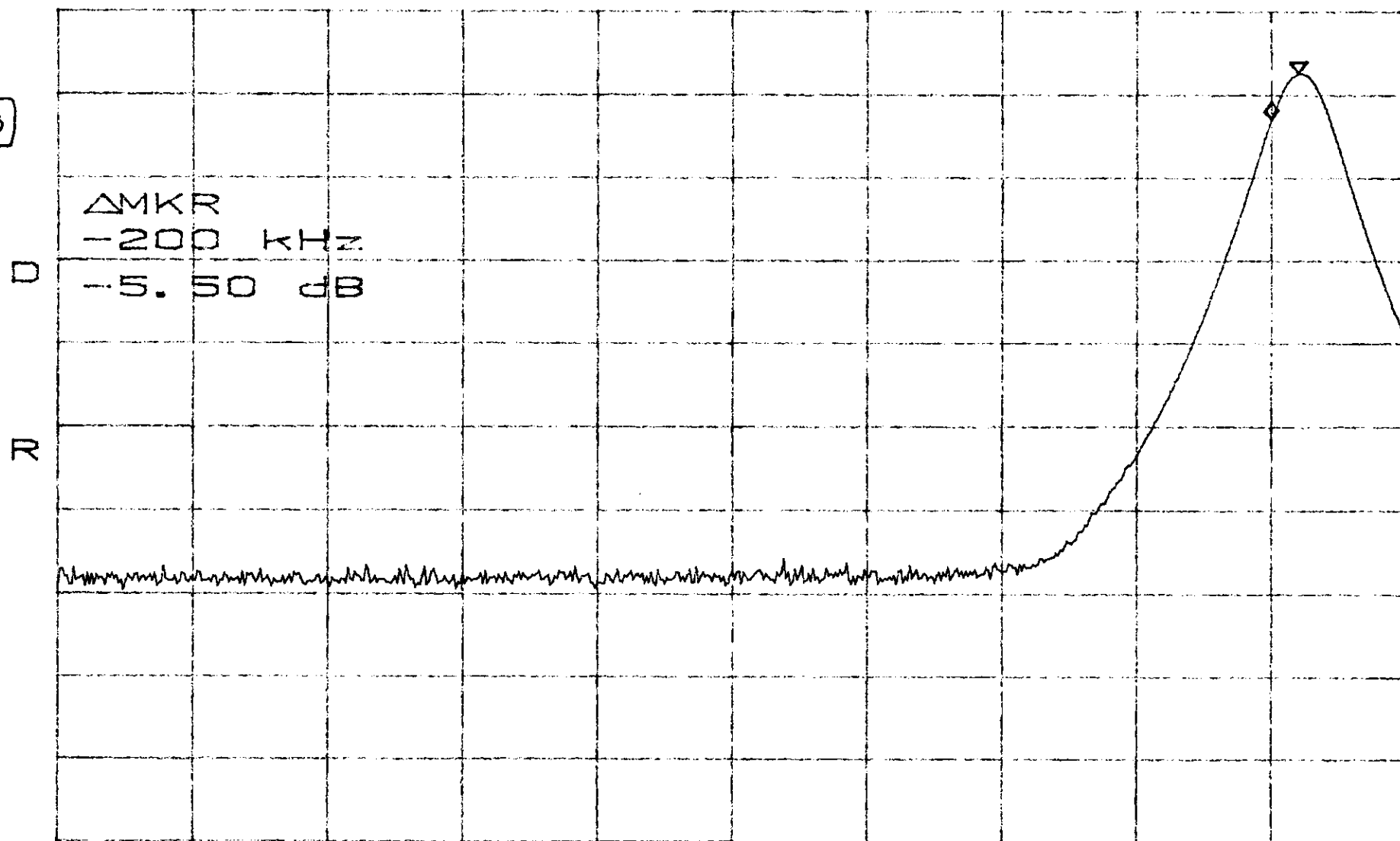
9/17/98
LB41901

ATTEN 30dB
RL 40.0dBm

10dB/

Δ MKR --5.50dB
-200kHz

24.238



CENTER 1.86100GHz SPAN 10.00MHz
*RBW 300kHz *VBW 1.0MHz SWP 50.0ms

UL High
D-band

UL Output
cw source

9/23/98
LB41901

ATTEN 30dB

RL 40.0dBm

10dB/

Δ MKR -59.17dB

200kHz

24.238

D

Δ MKR

200 kHz

-59.17 dB

R

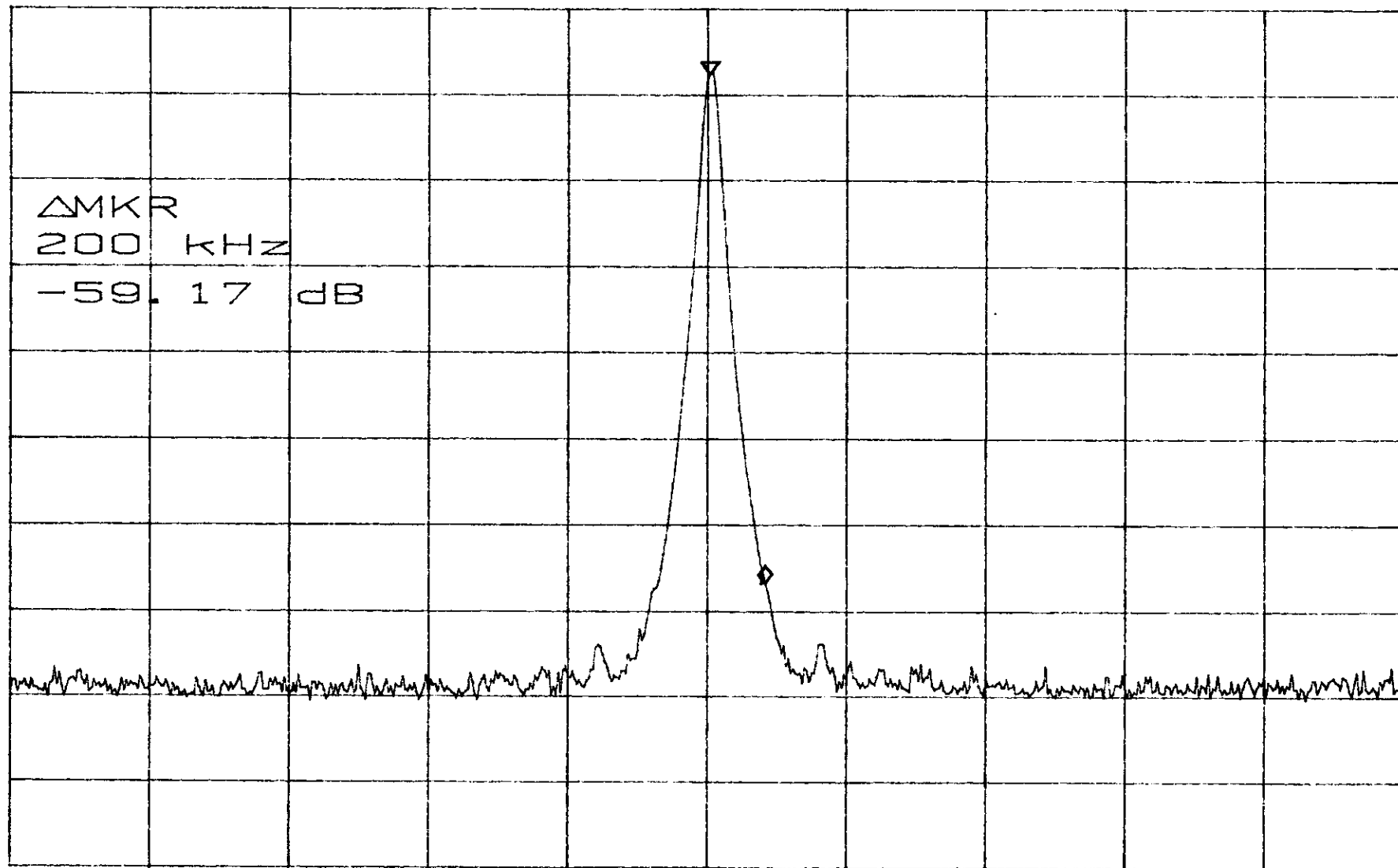
CENTER 1.869800GHz

SPAN 5.000MHz

RBW 30kHz

VBW 30kHz

SWP 50.0ms



UL High
D-band

UL Input
CW Source

9/23/98
LB41901

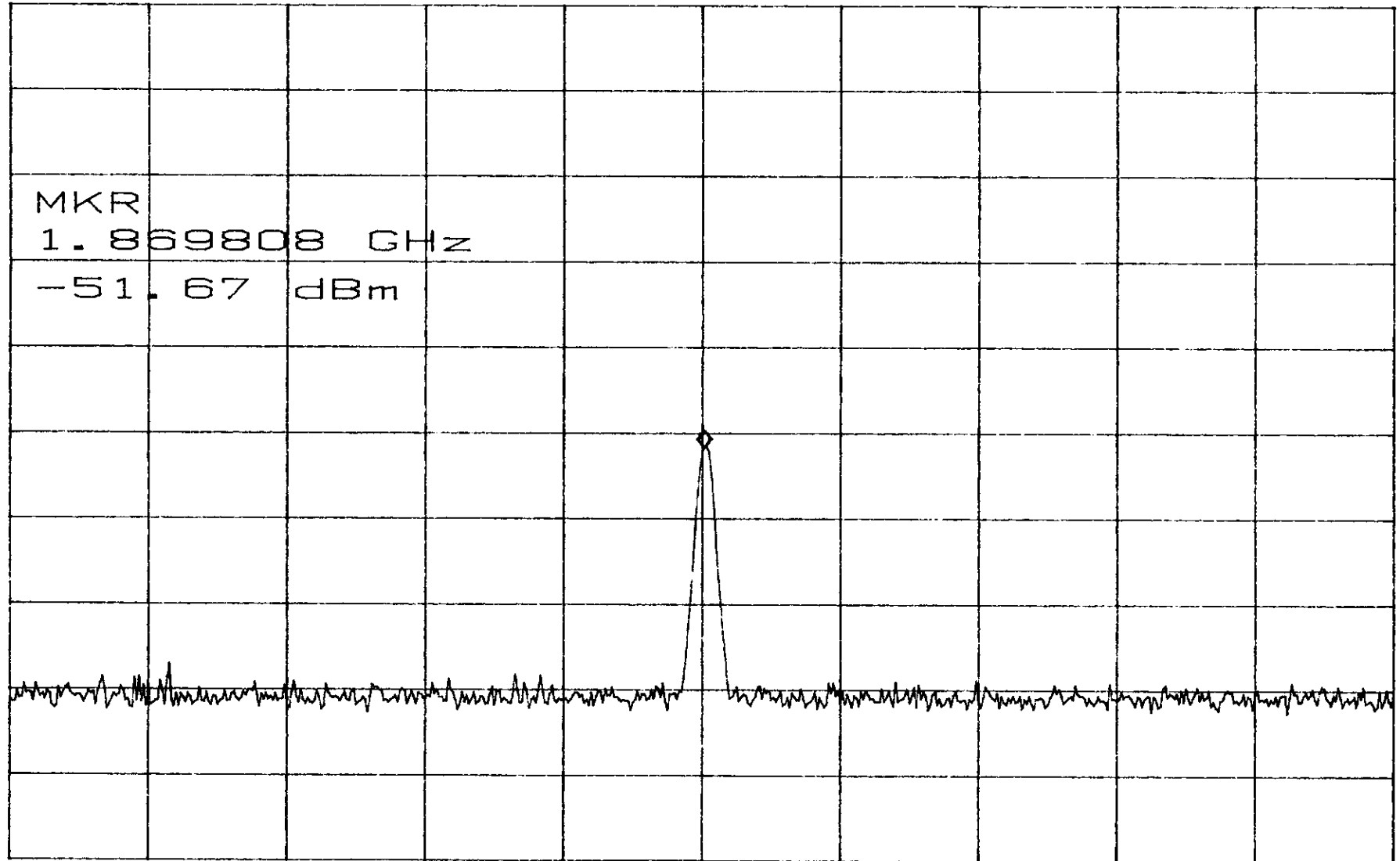
ATTEN 10dB
RL 0dBm

10dB/BPO1

MKR -51.67dBm
1.869808GHz

24.238

D
MKR
1.869808 GHz
-51.67 dBm



CENTER 1.869800GHz

SPAN 5.000MHz

RBW 30kHz

VBW 30kHz

SWP 50.0ms

VL High
D-band

VL Output
CW Source

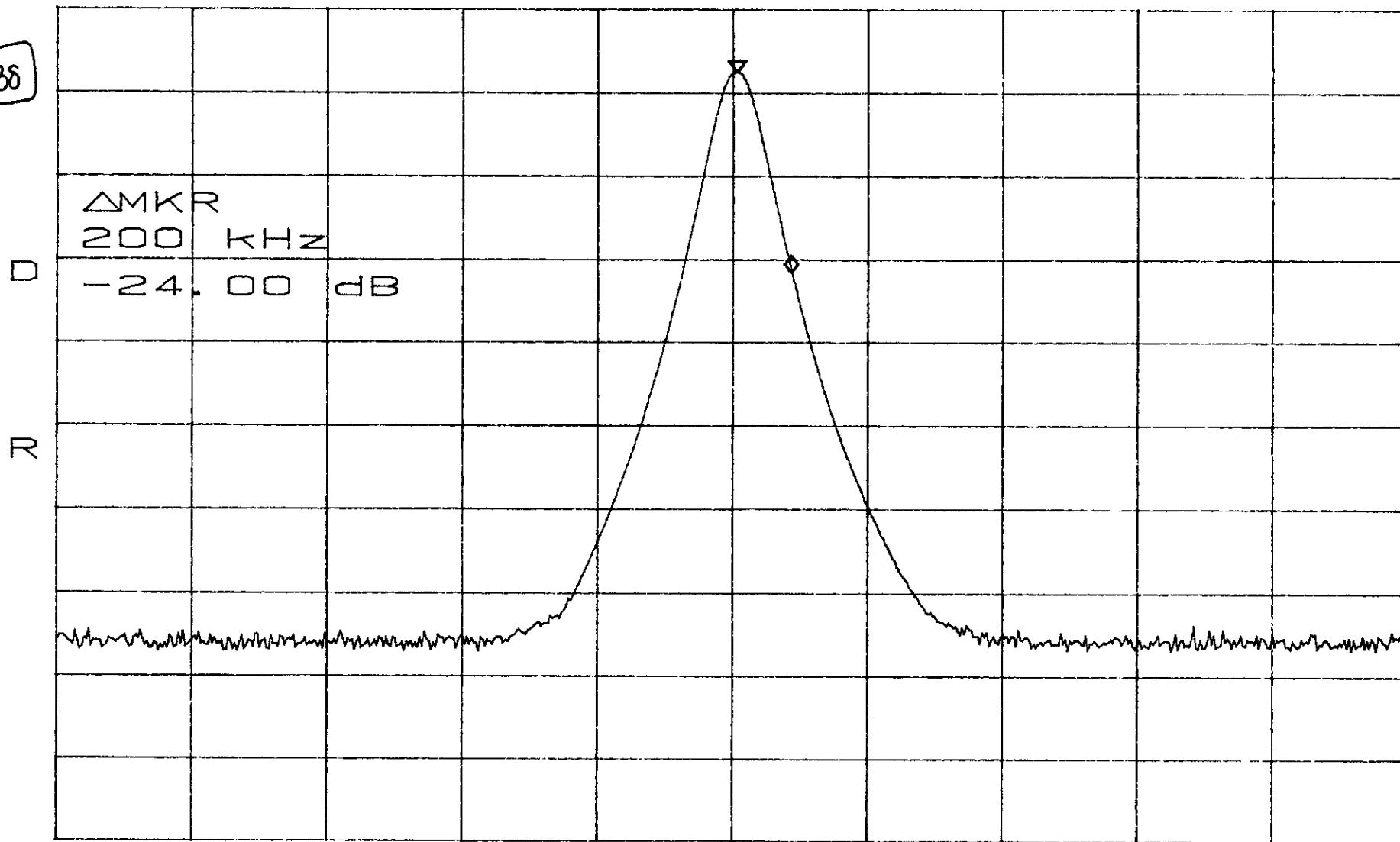
9/23/98
LB41901

ATTEN 30dB
RL 40.0dBm

10dB/

Δ MKR -24.00dB
200kHz

24.235



CENTER 1.869800GHz SPAN 5.000MHz
*RBW 100kHz *VBW 30kHz SWP 50.0ms

UL High
D-band

UL Output
cw source

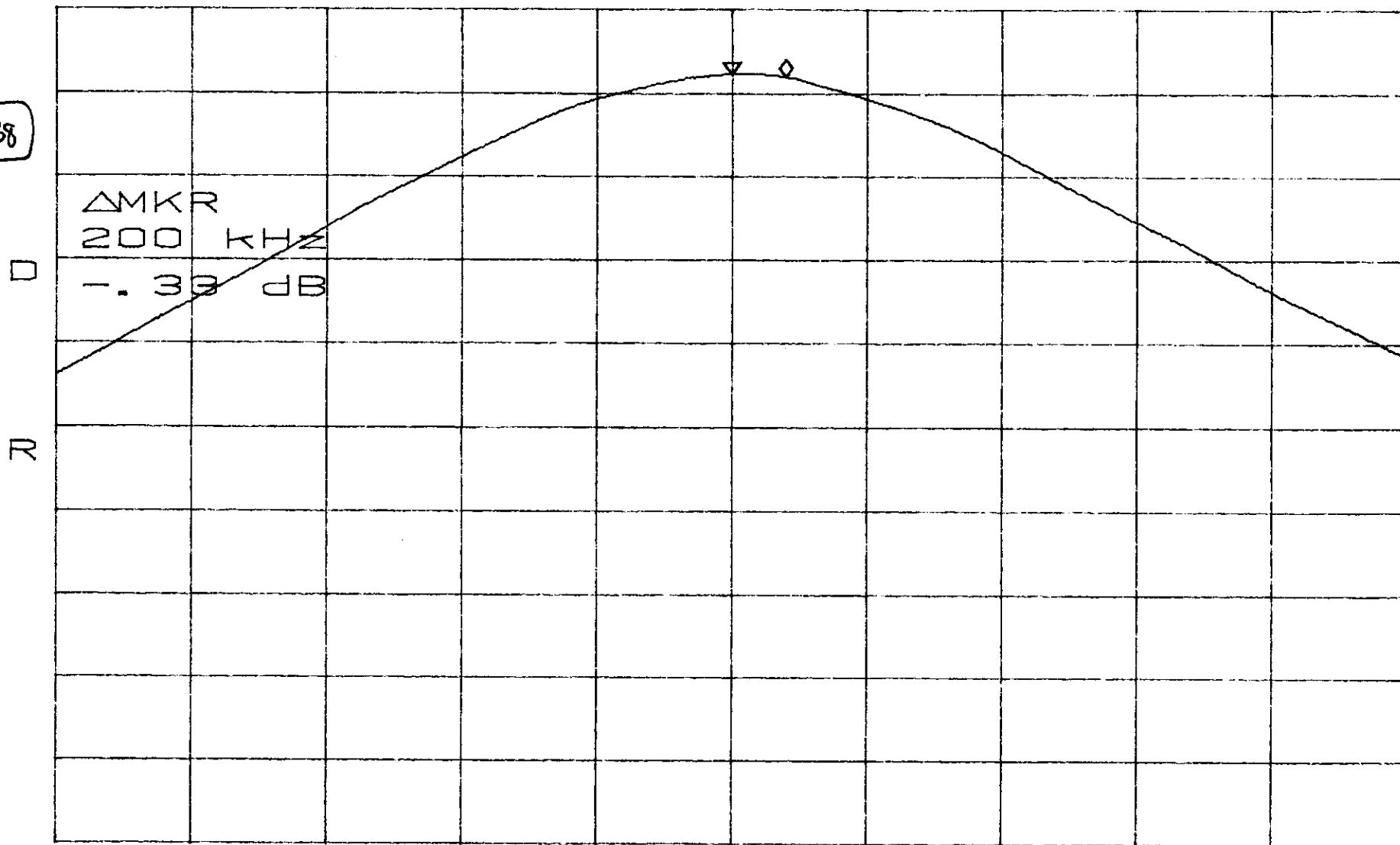
9/23/98
LB41901

ATTEN 30dB
RL 40.0dBm

10dB/

Δ MKR - .33dB
200kHz

24.238



CENTER 1.869800GHz SPAN 5.000MHz
*RBW 1.0MHz *VBW 1.0MHz SWP 50.0ms

UL High
D-band

UL output
CW - Source

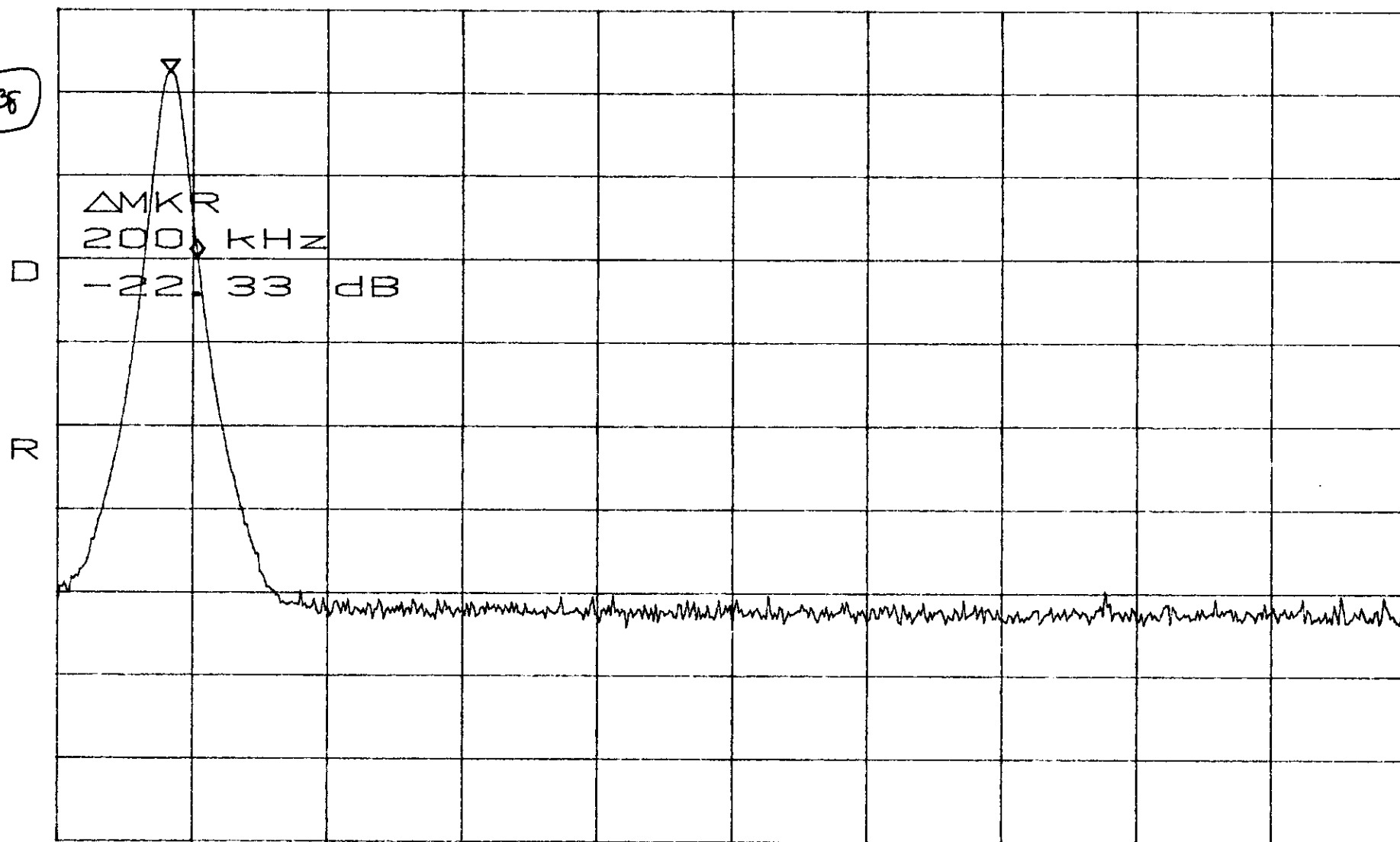
9/23/98
LB41901

ATTEN 30dB
RL 40.0dBm

10dB/

Δ MKR -22.33dB
200kHz

24.235



CENTER 1.87400GHz SPAN 10.00MHz
*RBW 100kHz *VBW 1.0MHz SWP 50.0ms

UL High
D-band

Output
CW-source

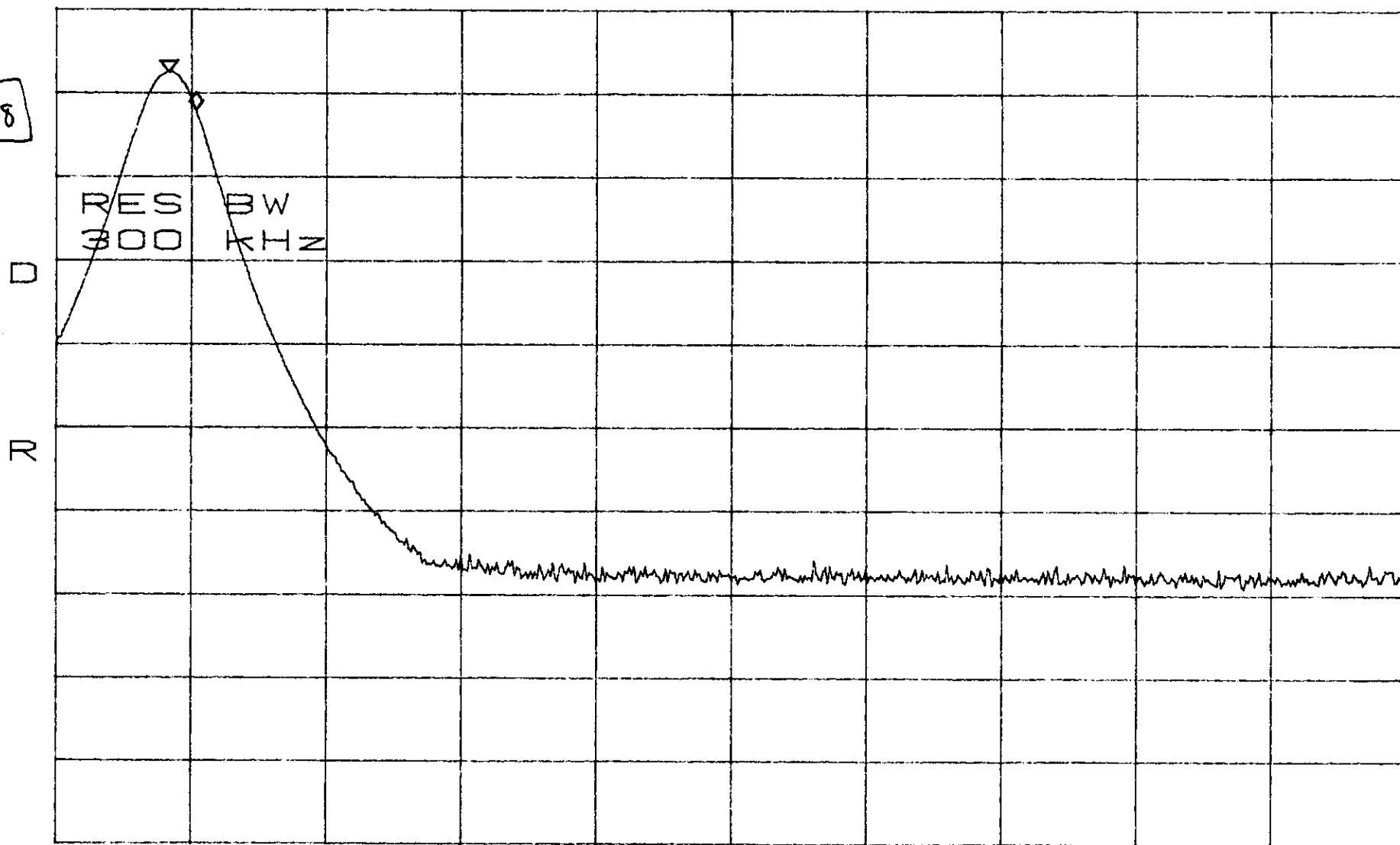
9/23/98
LB41901

ATTEN 30dB
RL 40.0dBm

10dB/

Δ MKR -4.50dB
200kHz

24.238



CENTER 1.87400GHz SPAN 10.00MHz
*RBW 300kHz *VBW 1.0MHz SWP 50.0ms

DL Low
D-band

Input
CW-Source

9/17/98
LB41901

ATTEN 10dB

RL 0dBm

10dB/

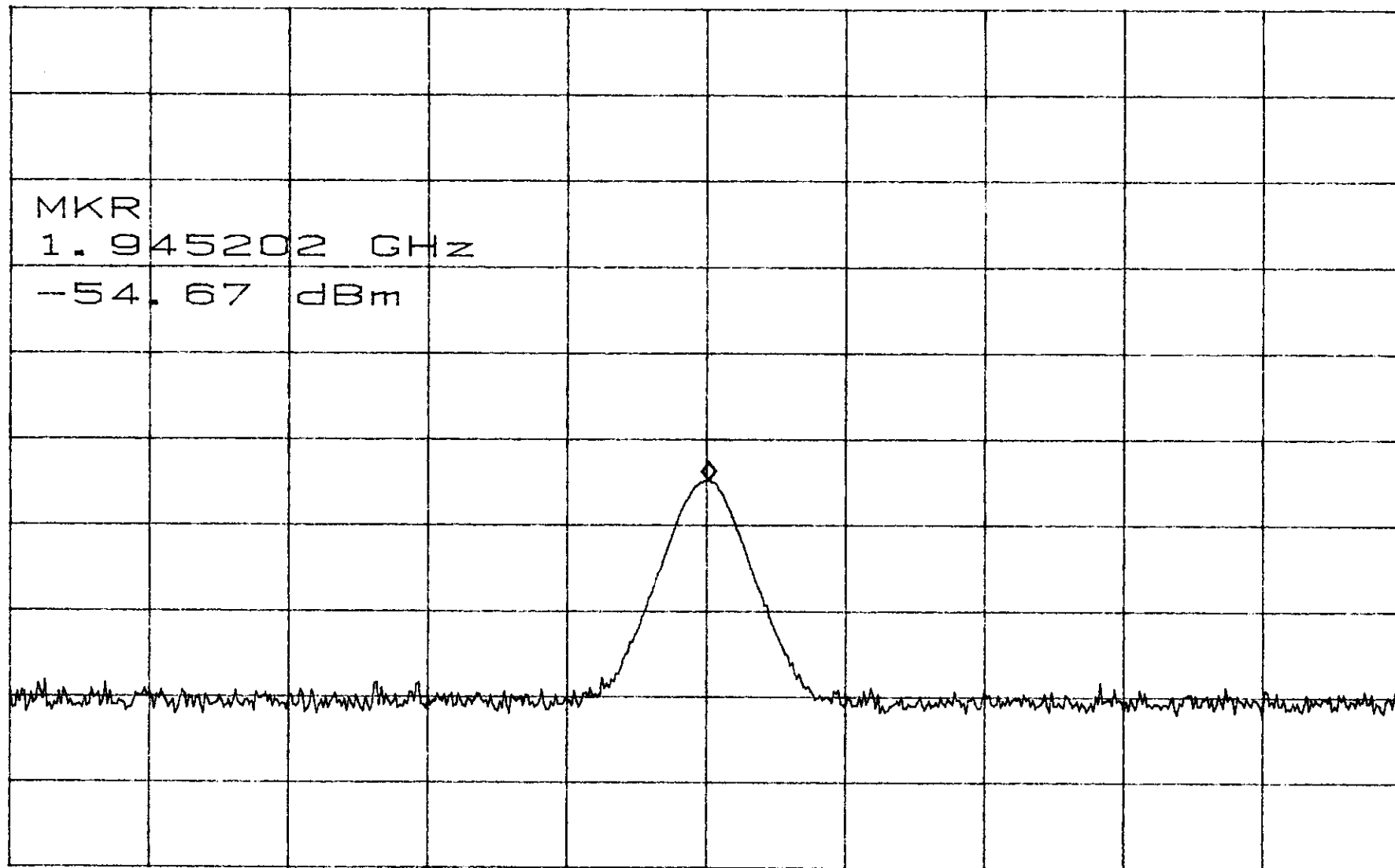
MKR -54.67dBm

1.945202GHz

In/out

D

MKR
1.945202 GHz
-54.67 dBm



CENTER 1.945200GHz

SPAN 1.000MHz

*RBW 30kHz

VBW 30kHz

SWP 50.0ms

DL ~~Low~~ Low
D-band

Output
CW-Source

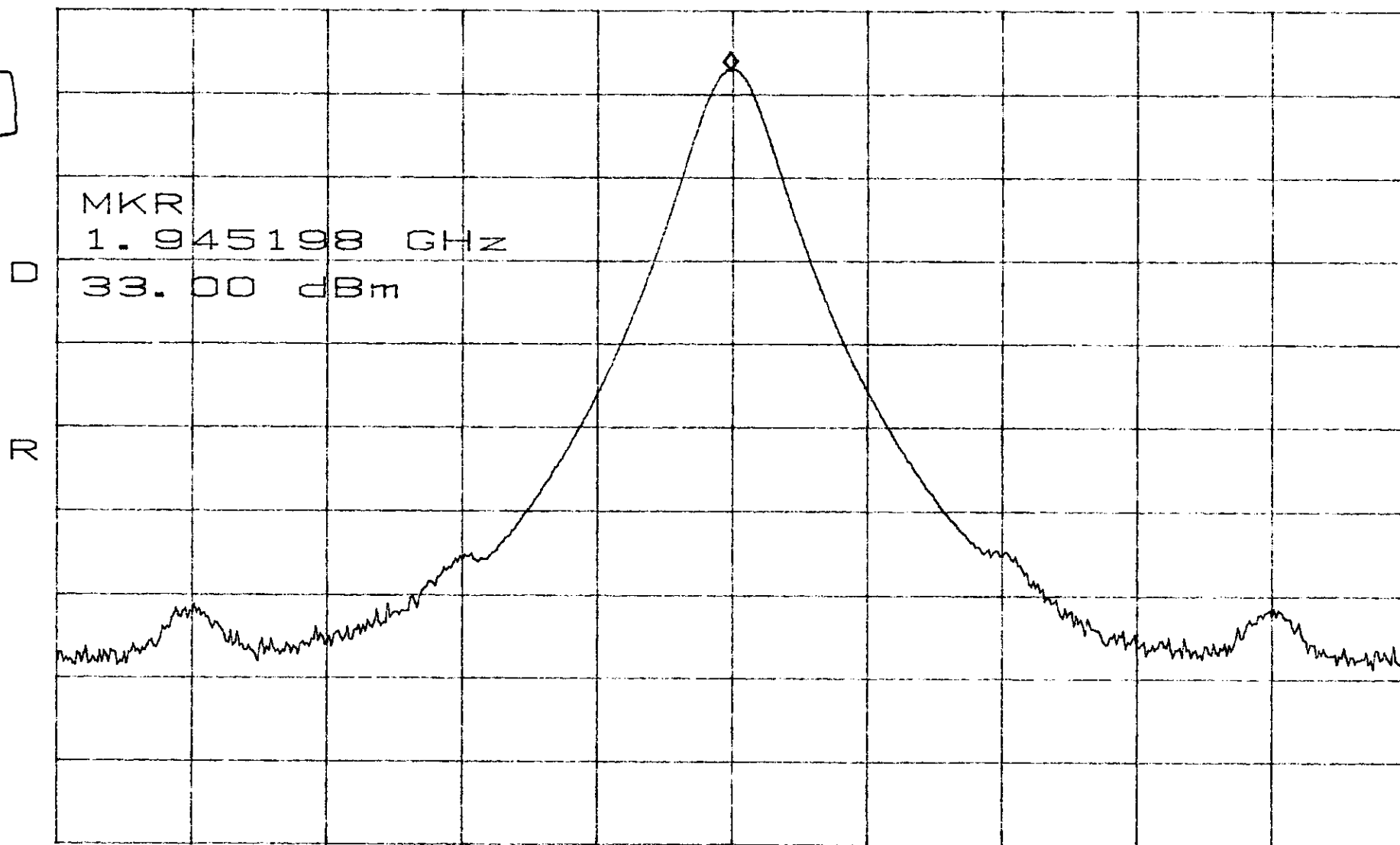
9/17/98
LB41901

ATTEN 30dB
RL 40.0dBm

10dB/

MKR 33.00dBm
1.945198GHz

In/Out



CENTER 1.945200GHz
*RBW 30kHz VBW 30kHz

SPAN 1.000MHz
SWP 50.0ms

DL Mid
D-band

Input
cw source

9/17/98
LB41901

ATTEN 10dB

RL 0dBm

10dB/

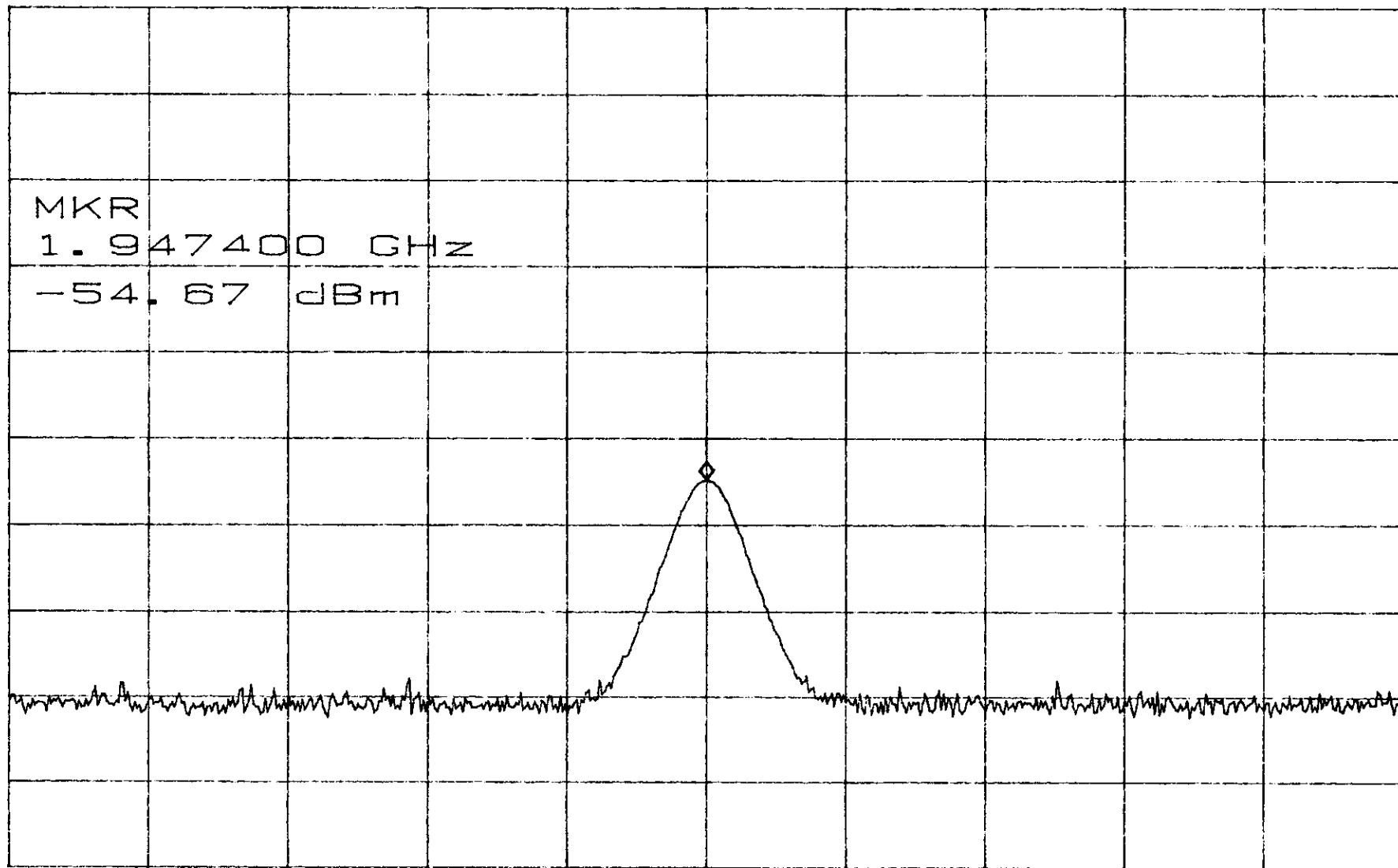
MKR -54.67dBm

1.947400GHz

In/out

D

MKR
1.947400 GHz
-54.67 dBm



CENTER 1.947400GHz

SPAN 1.000MHz

*RBW 30kHz

VBW 30kHz

SWP 50.0ms

DL Mid
D-band

Output
CW Source

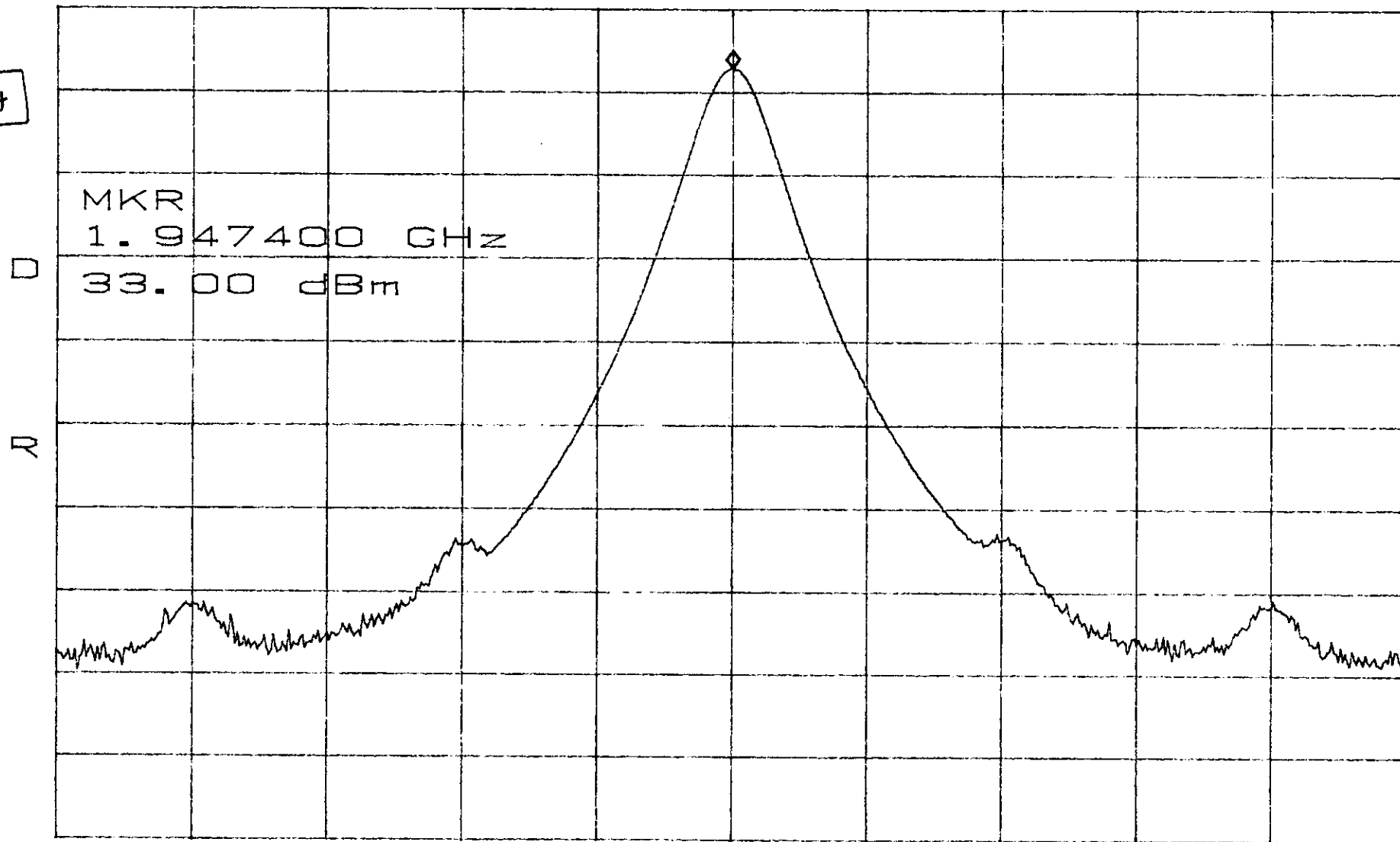
9/17/98
LB41901

ATTEN 30dB
RL 40.0dBm

10dB/

MKR 33.00dBm
1.947400GHz

In/out



CENTER 1.947400GHz SPAN 1.000MHz
*RBW 30kHz VBW 30kHz SWP 50.0ms

DL High
D-band

Input

9/17/98
LB41901

ATTEN 10dB

CW source

MKR -54.33dBm

RL 0dBm

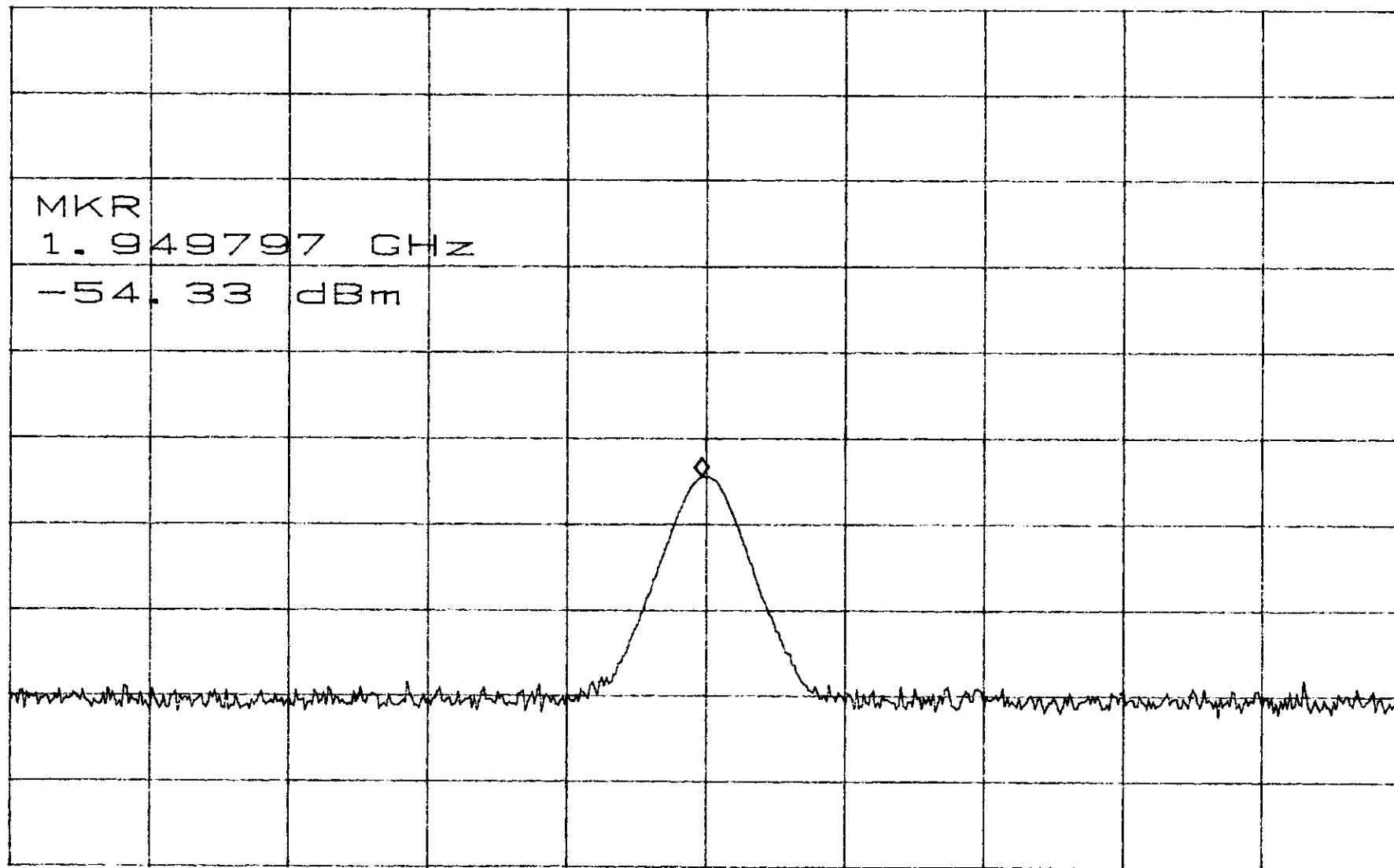
10dB/

1.949797GHz

In/Out

D

MKR
1.949797 GHz
-54.33 dBm



CENTER 1.949800GHz

SPAN 1.000MHz

*RBW 30kHz

VBW 30kHz

SWP 50.0ms

DL High
D-band

Output
CW-source

9/17/98
LB41901

ATTEN 30dB
RL 40.0dBm

10dB/

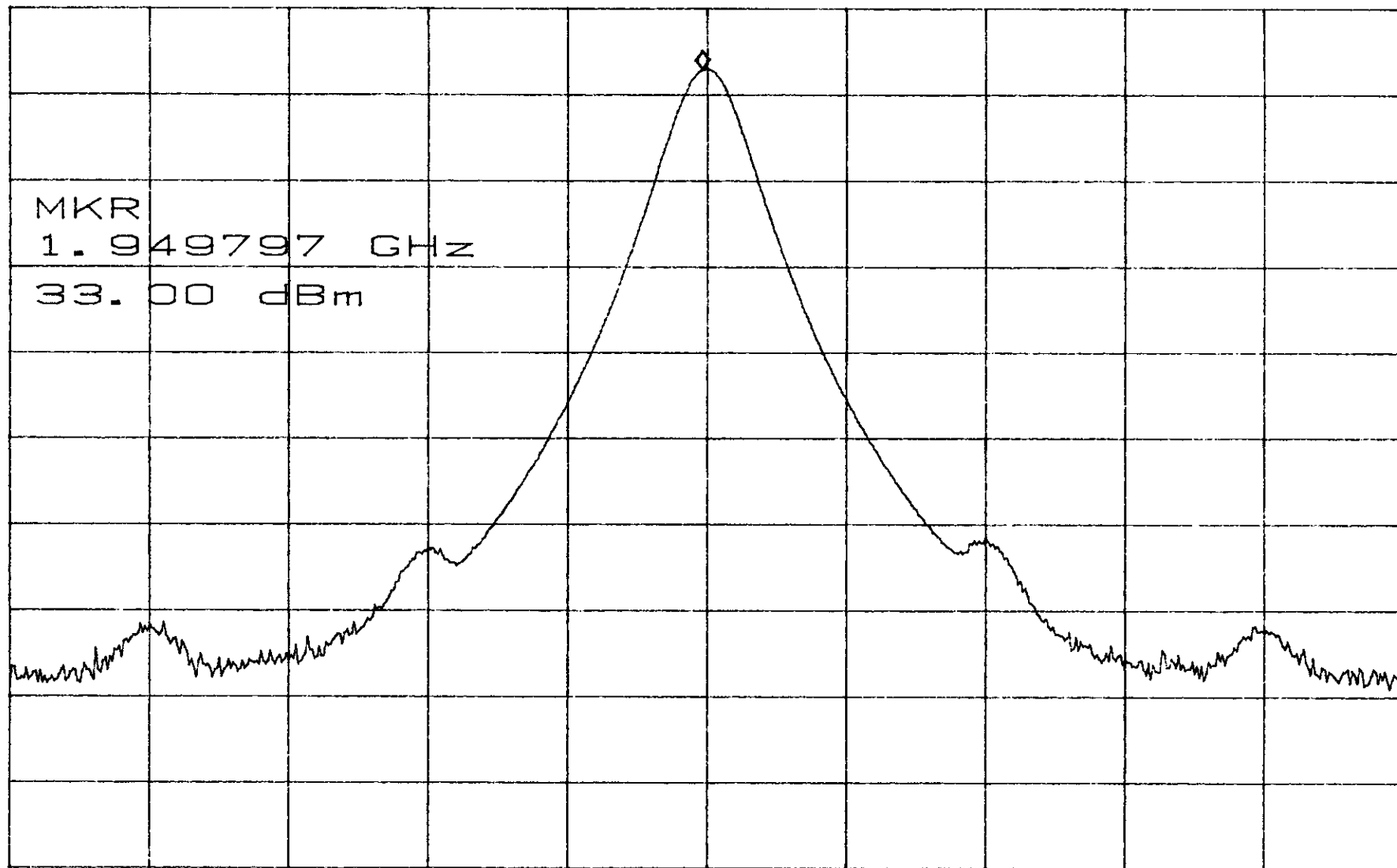
MKR 33.00dBm
1.949797GHz

In/Out

MKR
1.949797 GHz
33.00 dBm

D

R



CENTER 1.949800GHz

SPAN 1.000MHz

*RBW 30kHz

VBW 30kHz

SWP 50.0ms

UL Low
D-band

Input
cw Source

9/17/98
LB41901

ATTEN 10dB

RL 0dBm

10dB/

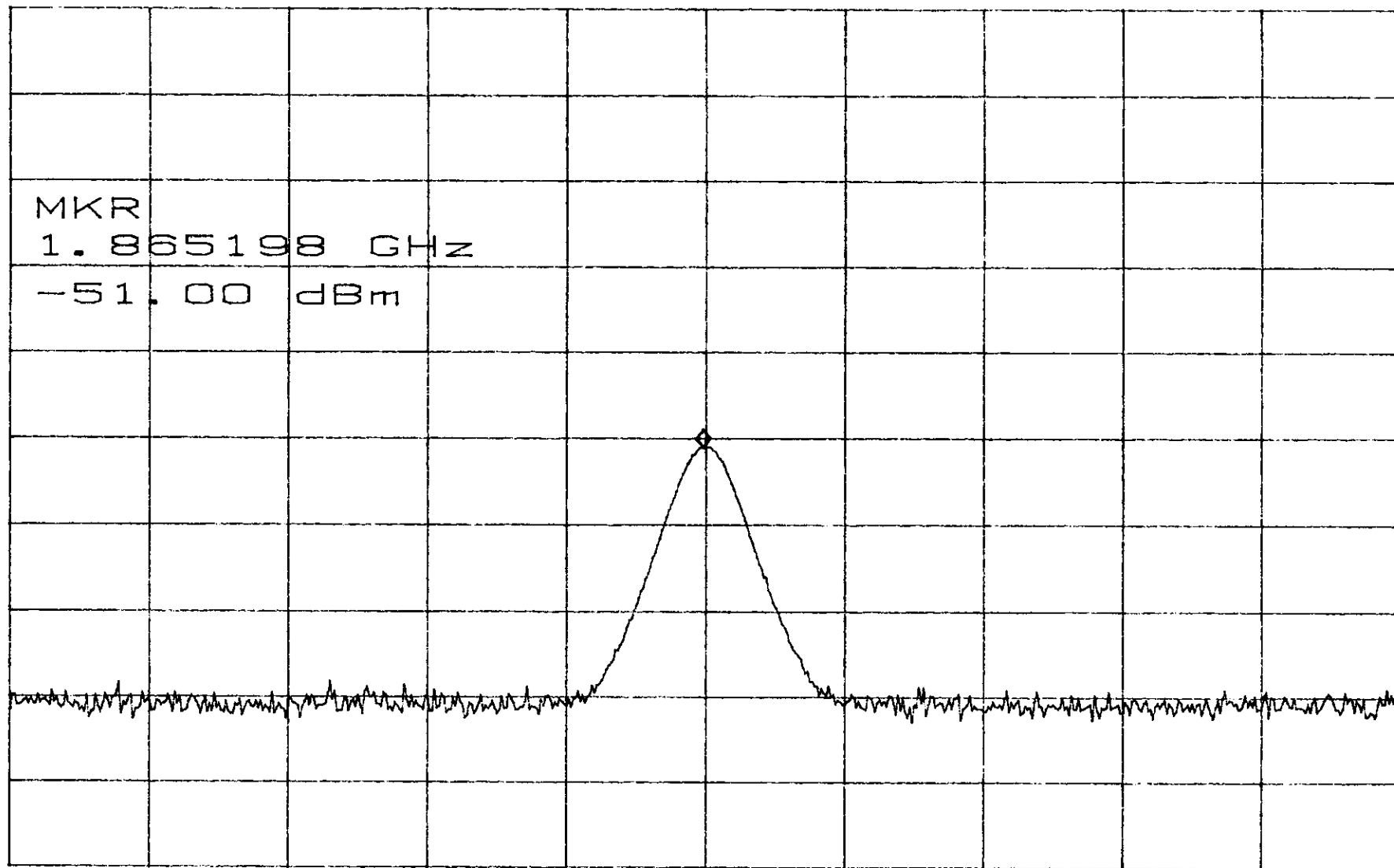
MKR -51.00dBm

1.865198GHz

In/Out

D

MKR
1.865198 GHz
-51.00 dBm



CENTER 1.865200GHz

SPAN 1.000MHz

*RBW 30kHz

VBW 30kHz

SWP 50.0ms

UL Low
D-band

Output
cw-source

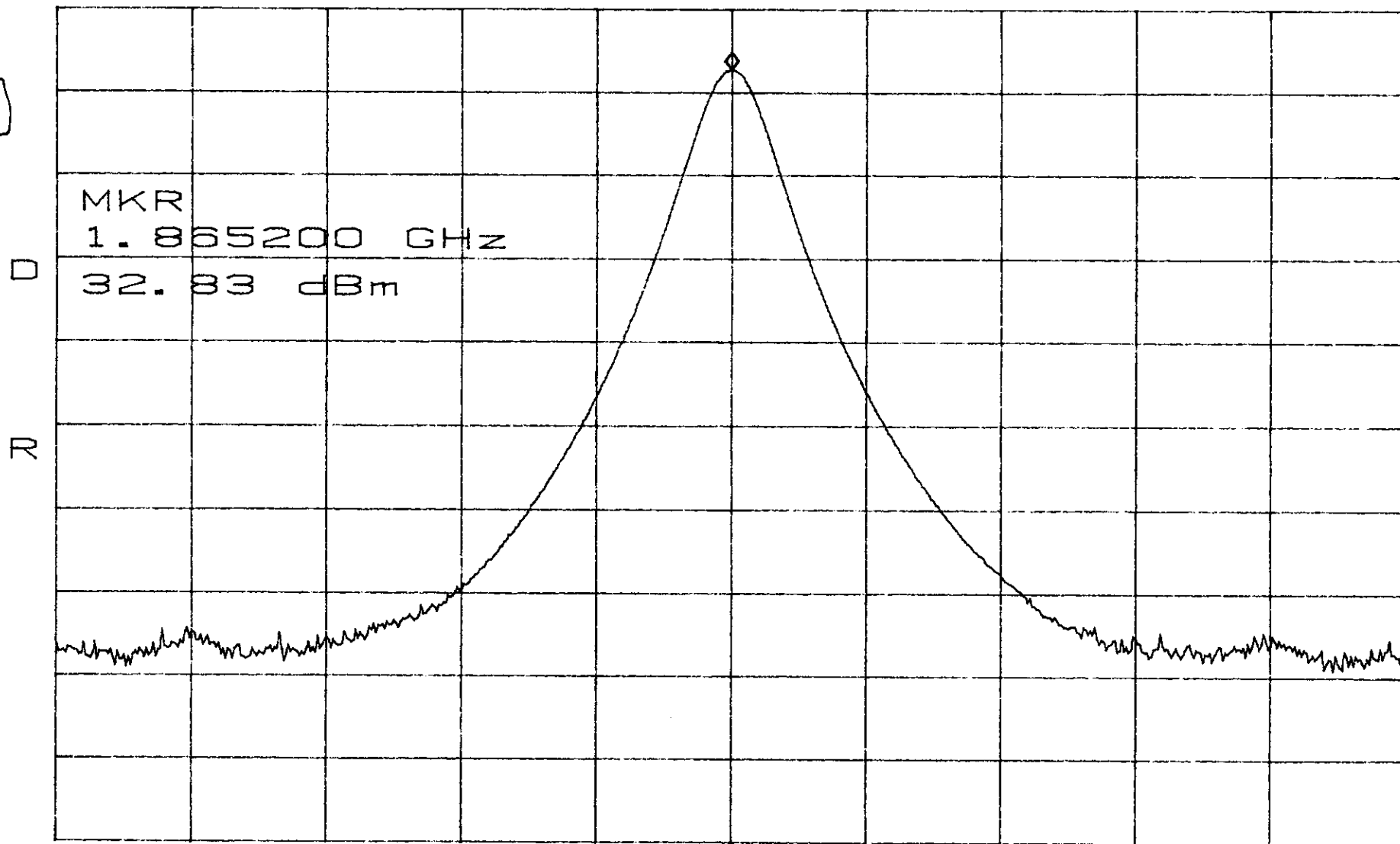
9/17/98
LB41901

ATTEN 30dB
RL 40.0dBm

10dB/

MKR 32.83dBm
1.865200GHz

In/Out



CENTER 1.865200GHz

SPAN 1.000MHz

*RBW 30kHz

VBW 30kHz

SWP 50.0ms

UL Mid
D-band

Input
CW - source

9/17/98
LB41901

ATTEN 10dB

RL 0dBm

MKR -51.67dBm

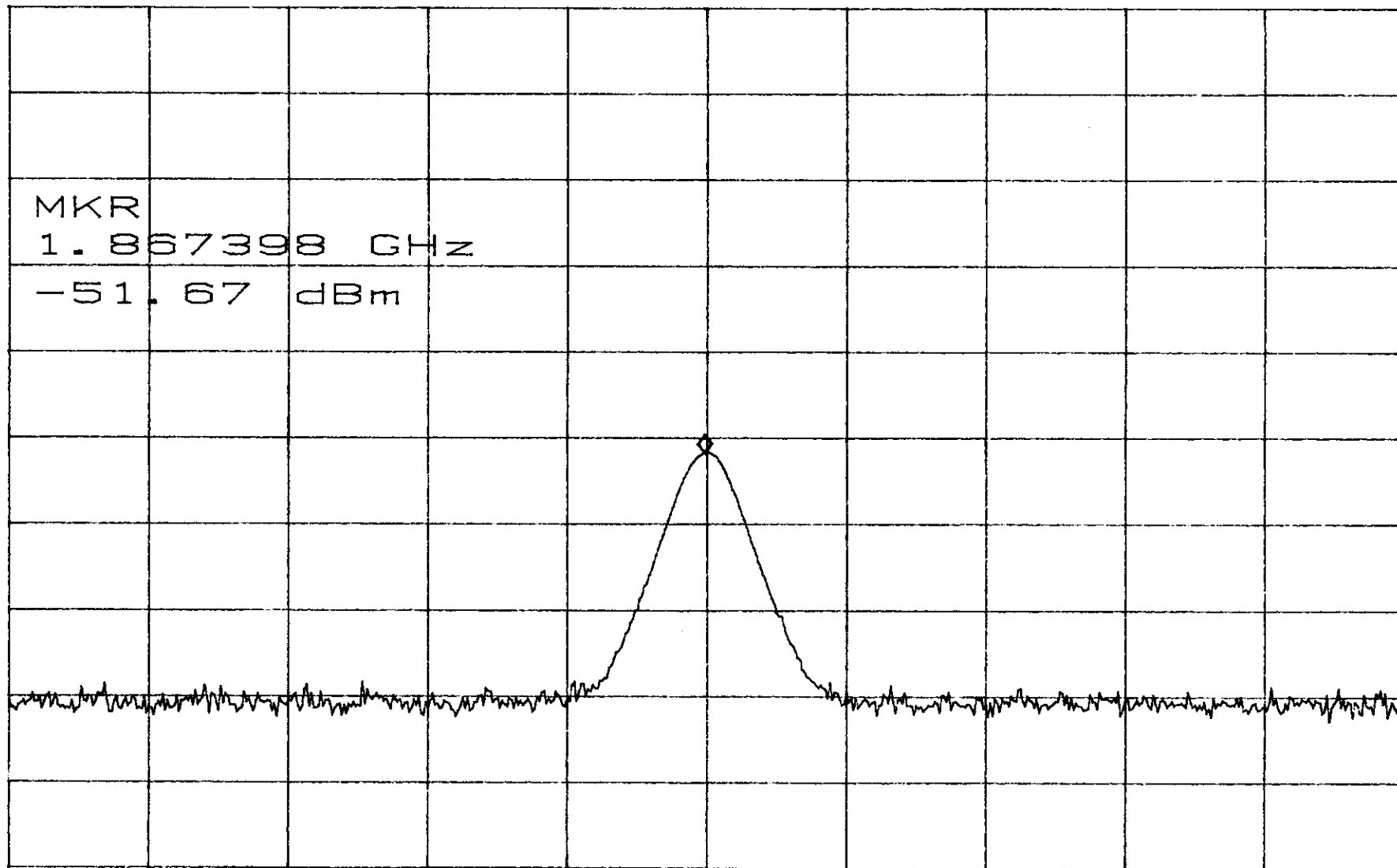
1.867398GHz

10dB/

In/out

MKR
1.867398 GHz

-51.67 dBm



CENTER 1.867400GHz

SPAN 1.000MHz

*RBW 30kHz

VBW 30kHz

SWP 50.0ms

UL Mid
D-band

Output

9/17/98
LB41901

ATTEN 30dB

cw - source

MKR 32.83dBm

RL 40.0dBm

10dB/

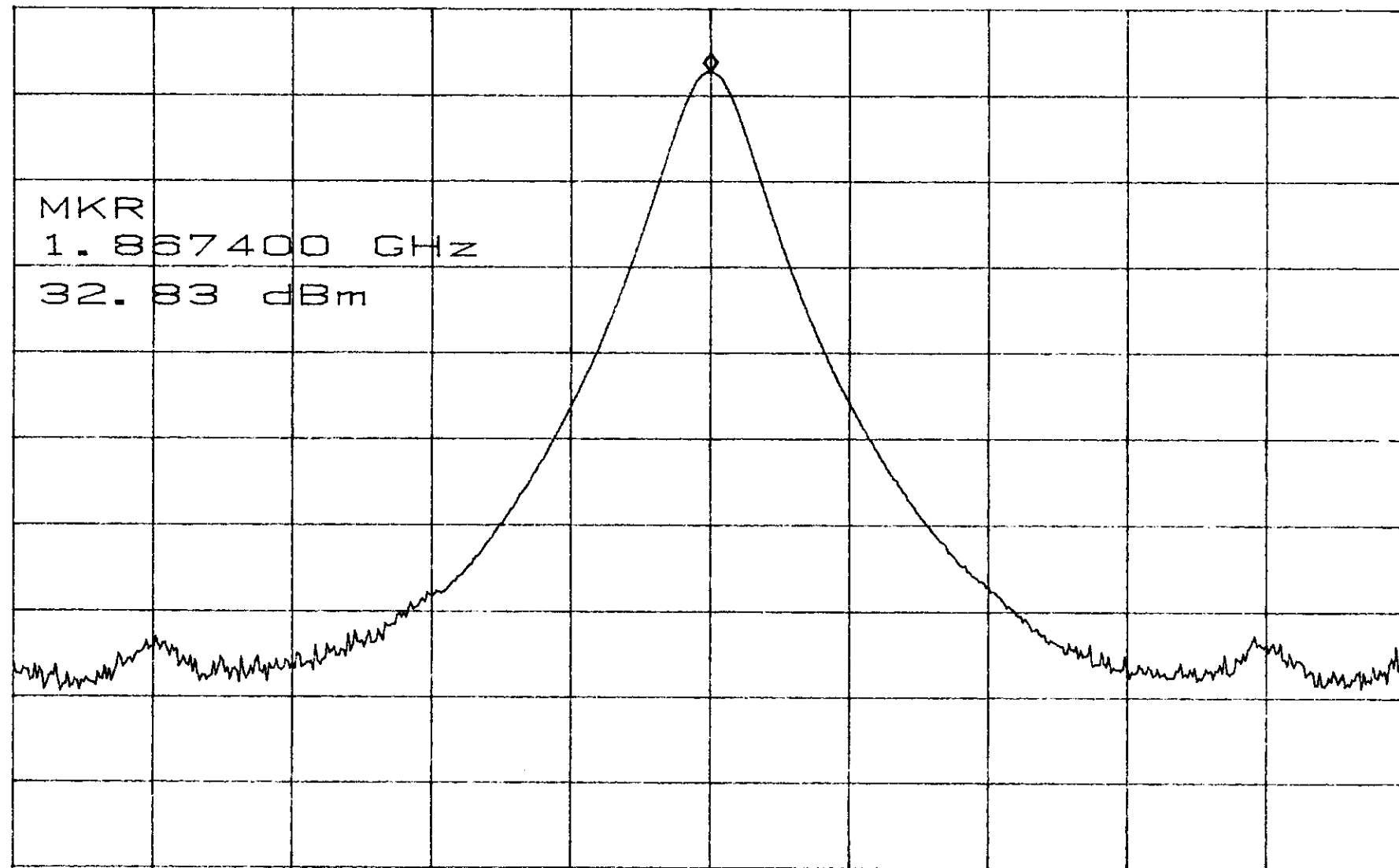
1.867400GHz

In/Out

D

R

MKR
1.867400 GHz
32.83 dBm



CENTER 1.867400GHz

SPAN 1.000MHz

*RBW 30kHz

VBW 30kHz

SWP 50.0ms

UL High
D-band

Input
CW-source

9/17/98
LB41901

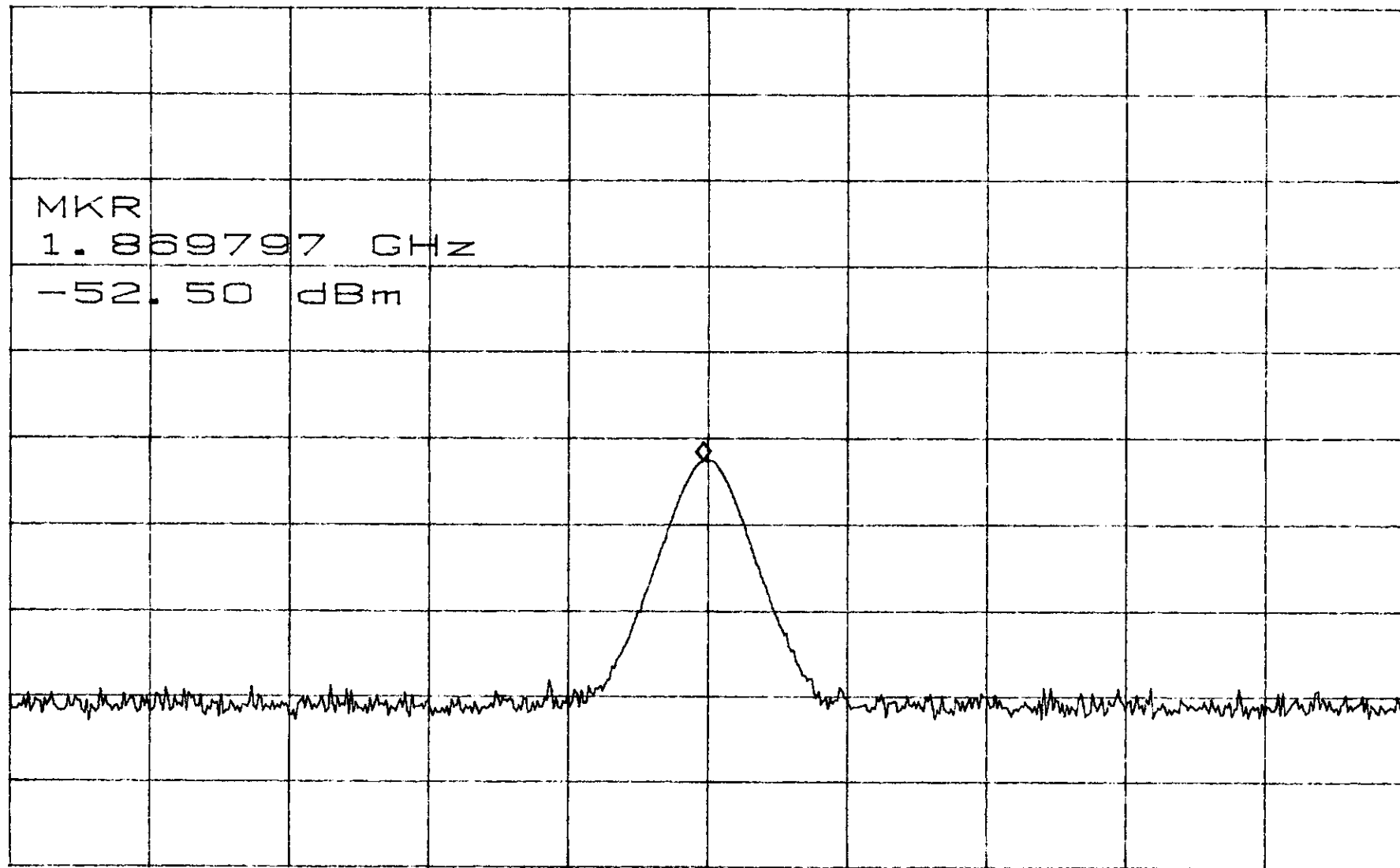
ATTEN 10dB
RL 0dBm

10dB/BPO1

MKR -52.50dBm
1.869797GHz

In/out

MKR
1.869797 GHz
-52.50 dBm



CENTER 1.869800GHz SPAN 1.000MHz
*RBW 30kHz VBW 30kHz SWP 50.0ms

UL High
D-band

Output
CW-Source

9/17/98
LB41901

ATTEN 30dB

RL 40.0dBm

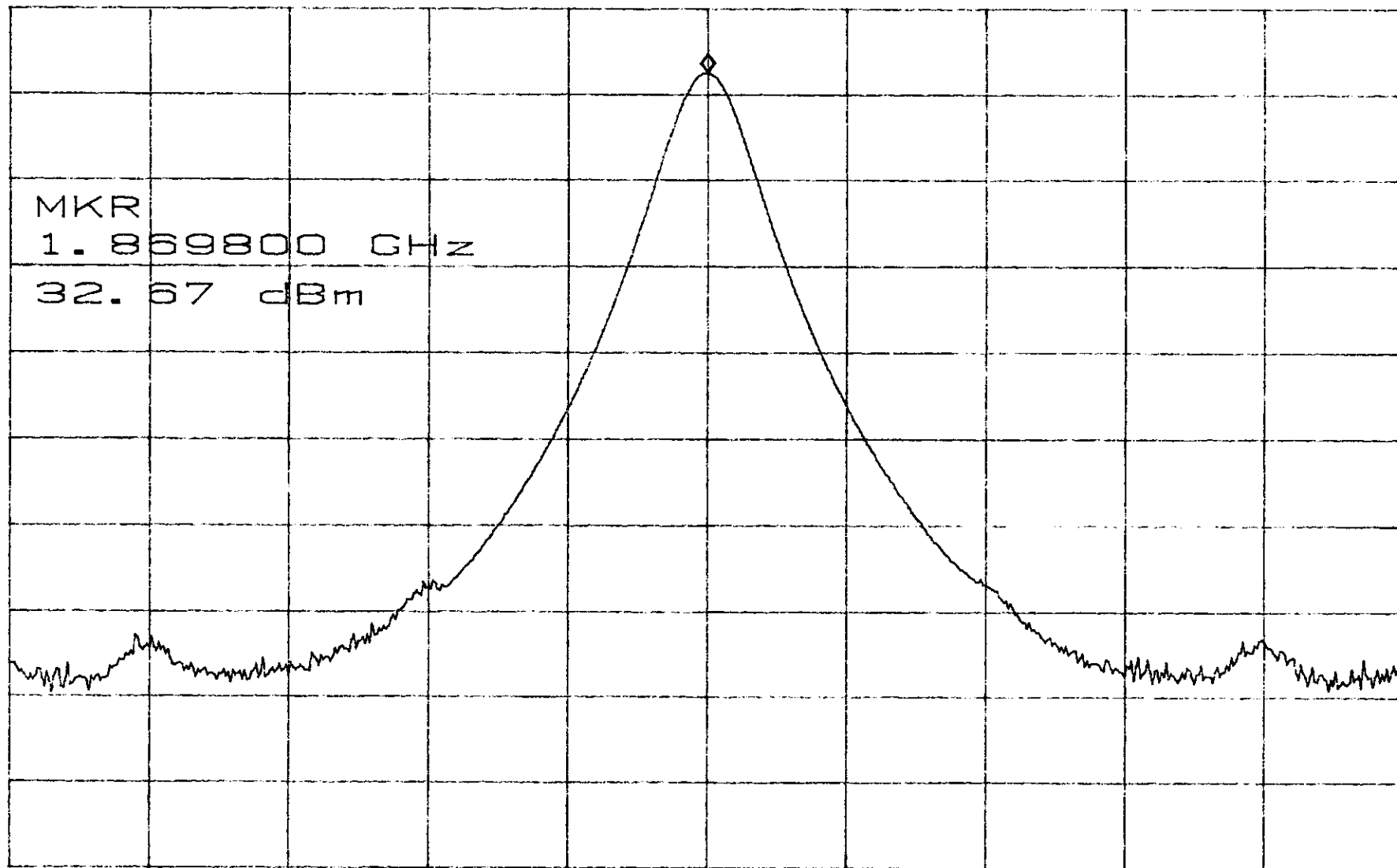
10dB/

MKR 32.67dBm

1.869800GHz

In/out

MKR
1.869800 GHz
32.67 dBm



CENTER 1.869800GHz

SPAN 1.000MHz

*RBW 30kHz

VBW 30kHz

SWP 50.0ms