

MEASUREMENT/TECHNICAL REPORT

**Company - Model: Visonic Inc.
MCT 131, MCT 132, and MCT 134
FCC ID: GSAMCT134
October 27, 1998**

Description: This is a report to support a request for an original grant of equipment authorization.

Equipment Type: Control transmitter

Report prepared by:

Dave Heald
Curtis-Straus LLC
527 Great Road
Littleton, MA 01460 USA
Phone: 978-486-8880
FAX: 978-486-8828

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Letter of Agency



Visonic Inc

10 Northwood Drive
Bloomfield, CT 06002-1911
Tel: (860) 243-0833, (800) 223-0020
Fax: (860) 242-8094

6 October, 1998

Curtis Straus LLC
527 Great Road
Littleton, MA 01460

I, an officer of Visonic Inc. do hereby authorize Curtis Straus LLC to act on our behalf in front of the Federal Communications commission with respect to all matters relating to certification of equipment under Part 15 and part 68 of the FCC rules. This appointment is valid until further notice.

I further certify that no party (as defined in 1.2002(b) of CFR 47, 1992) to this application, including myself, is subject to a denial of federal benefits, that includes FCC benefits, pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C., 853(a).

Equipment: MCT-131, MCT-132, MCT-134

Sincerely,

Marc Freundlich
President

Introduction

This report is an application for Certification of a Transmitter operating pursuant to Part 15.231 of the FCC Rules, Code of Federal Regulations 47. Three model numbers are proposed to be covered under this application. The transmitter portions of the device are identical except for the portions controlling the modulation sequence. All three use pulse code modulation and a common transmitter module, but have slightly different coding schemes. The model numbers covered are MCT 131, MCT 132, and MCT 134. Data is presented for all configurations. This report is designed to demonstrate compliance of these devices with the requirements outlined in Part 15 of CFR 47 using the methods outlined in Part 2 of CFR 47. The current revision date, October 1, 1997, of each Part has been used for technical requirements.

The confidential information and descriptions included in this application are detailed descriptions of the products, block diagrams, component specifications, and schematic diagrams. We hereby respectfully request under the provision of section 0.457d of the code that the documents listed below be held confidential.

Exhibit 6: Technical Specifications

Visonic Inc. is requesting that the technical specifications, including schematics, be kept confidential in the FCC application because of the proprietary design developed by Visonic and which is unique to the industry.

EXHIBIT 1:**1.0 Statement of Conformity**

The Visonic Inc. MCT 131, MCT 132, and MCT 134 have been found to conform with the following parts of the 47 CFR as detailed below:

Part 2	Part 15	Comments
§2.925	15.19	The label is shown in the label exhibit.
	15.203	The antenna is permanently attached to the printed circuit board.
	15.205	The fundamental is not in a Restricted band and the spurious and harmonics in Restricted bands comply with the general emission limits of 15.209.
	15.207	The unit is battery operated and the line conducted limits are therefore, not applicable.
	15.231(a)(1)	Unit transmits a control signal upon manual activation and signal ceases immediately upon switch release.
	15.231(b)	The unit complies with the field strength limits of the 15.231(b) table including the 20dB peak restriction of 15.35.
	15.231(c)	The occupied bandwidth complies and a plot is included.

EXHIBIT 2

2.0 General Description

2.1 Product Description

The product is a self-contained battery operated home security system transmitter consisting of a motherboard and a plugged in transmitter module type RFT 3. It transmits a PCM ON-OFF signal at 315 MHz to control devices.

2.2 Related Submittal(s) Grants

There are no other approvals required for this device.

2.3 Test Methodology

Radiated emission testing was performed according to the procedures in ANSI C63.4 (1992). Radiated testing was performed at an antenna to EUT distance of 3 meters below 1 GHz, and at a distance of 3 or 1 meter(s) for signals above 1 GHz. The actual test distance used is noted in the test data sheets. The devices performance was investigated to 10 times the fundamental frequency. A fresh battery was used for all testing. Since the device does not contain voltage regulating circuitry, the emissions in each configuration were maximized and the battery changed in the maximized configuration just prior to the reading being taken to insure that maximum emissions were recorded.

All other performance tests were made in accordance with the procedures outlined in Part 15 of CFR 47. The applicable sections provided under Part 15 are provided in the measurement section of this report, Exhibit 3.

2.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located at 527 Great Road, Littleton, MA 01460. Site "A" was used. This test facility has been fully described in a report submitted to your office, and a letter from your office dated March 10, 1998 verified receipt of this report and confirmed compliance of this site. Please reference your file # 31040/SIT 1300F2 should you have any questions regarding the test site construction.

2.5 Test Equipment Used

SPECTRUM ANALYZER(S)

[]	RED 8591E	HP	S/N:3441A03559	Calibration Due:13-MAR-99
	9 kHz-1.8GHz			
[X]	WHITE 8593E	HP	S/N:3547U01252	Calibration Due:17-MAR-99
	9 kHz-26.5 GHz			
[]	BLUE 8591E	HP	S/N:3223A00227	Calibration Due:5-FEB-99
	9 kHz-1.8 GHz			
[X]	YELLOW 8594E	HP	S/N:3523A01958	Calibration Due:18-MAR-99

[]	9 kHz-2.9 GHz BLACK 3585A	HP	S/N:A183438	Calibration Due:10-NOV-98
	20 Hz-40.0 MHz			
[]	8591EM	HP	S/N:3710A01179	Calibration Due:20-JAN-99
	9 kHz-1.8 MHz			

ANTENNA(S)

[]	GREEN CBL6112B	Chase	S/N:2435	Calibration Due:16-JUL-99
	Bilog 30 MHz-2 GHz			
[X]	GREEN-BLACK CBL6112B	Chase	S/N:2412	Calibration Due:30-MAR-99
	Bilog 30 MHz-2 GHz			
[]	RED 3143	EMCO	S/N:1270	Calibration Due:28-MAY-99
	Biconilog 30 MHz-1.1 GHz			
[]	BLUE 3143	EMCO	S/N:1271	Calibration Due:28-MAY-99
	Biconilog 30 MHz-1.1 GHz			
[]	GREY 3141	EMCO	S/N:9703-1038	Calibration Due:19-MAR-99
	Biconilog 26 MHz-2 GHz			
[]	YELLOW-BLACK CBL6140A	Chase	S/N:1112	Calibration Due:19-MAR-99
	X-Wing Bilog	20 - 2000 MHz		
[X]	YELLOW 3115	EMCO	S/N:9608-4989	Calibration Due:3-MAR-99
	Horn Antenna	1-18 GHz		
[]	BLACK 3115	EMCO	S/N:9703-5148	Calibration Due:16-MAR-99
	Horn Antenna	1-18 GHz		
[]	WHITE 3160-09	EMCO	S/N:9610-09	Calibration Due:8-DEC-98
	Standard Gain Horn Antenna	18-26.5 GHz		
[]	LOOP PLA-130/A	ARA	S/N:1024	Calibration Due:13-AUG-98
	Passive Loop Antenna	9 KHz-30 MHz		
[]	LOOP 6511	EMCO	S/N:9704-1154	Calibration Due:11-AUG-99
	Passive Loop Antenna	20 Hz-5 MHz		
[]	MONOPOLE 3301B	EMCO	S/N:3824	Calibration Due:31-MAR-99
	Active Monopole antenna	30 Hz-30 MHz		
[]	DIPOLE 3121C	EMCO	S/N:1370	Calibration Due:01-APR-99
	Adjustable Dipole Antenna	30-1000 MHz		
[]	DIPOLE 3121C	EMCO	S/N:1371	Calibration Due:01-APR-99
	Adjustable Dipole Antenna	30-1000 MHz		

PREAMPLIFIER(S)

☒	RED	ZFL-1000-LN	MiniCircuits		Calibration Due:16-APR-99
		RF Preamplifier 10 - 2000 MHz			
☐	BLUE	ZFL-1000-LN	MiniCircuits		Calibration Due:15-MAY-99
		RF Preamplifier 10 - 2000 MHz			
☐	GREEN	ZFL-1000-LN	MiniCircuits		Calibration Due:24-SEP-98
		RF Preamplifier 10 - 2000 MHz			
☐	GOLD	ZFL-1000-LN	MiniCircuits		Calibration Due:25-AUG-99
		RF Preamplifier 10 - 2000 MHz			
☒	WHITE	SMC-12A	MITEQ	S/N:426643	Calibration Due:28-OCT-98
		RF Preamplifier 2000 - 18000 MHz			
☐	YELLOW	AFS4-18002650-60-8P-4	MITEQ	S/N:467559	Calibration Due:1-MAY-99
		RF Preamplifier 18 - 26.5 GHz			

OPEN AREA TEST SITE(S)

☐	SITE "F"	Calibration Due:9-OCT-98
☐	SITE "T"	Calibration Due:28-MAY-99
☒	SITE "A"	Calibration Due:25-SEP-98
☐	SITE "M"	Calibration Due:17-JUL-99

Unless otherwise noted the calibration interval is one year. All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

EXHIBIT 3**3.0 Measurement Results****3.1 Operating Frequency**

The devices operating frequency is 315 MHz.

3.2 Electric Field Strength Radiation Measurements

Data was obtained using the procedures outlined in ANSI C63.4 (1992). All signals from the transmitter within 20 dB of the emission limit are reported in the following data table.

Insert data tables here

Radiated Emissions Chart								Curtis-Straus LLC		
Date: 27-Aug-98		Company: Visonic, Inc.						Distance: 3 m		
Engineer: David Heald		EUT Desc: MCT 134						Table No: 1		
Notes:								Work Order: 980686		
EUT Axis / Ant. Polarity (X-Y-Z-Z' / H-V)	Frequency (MHz)	Peak Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Averaging Factor (dB)	Adjusted Reading (dBµV/m)	FCC Class B		
								Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)
X / H	315.0	52.5	0.0	13.2	1.5	3.5	63.7	75.6	-11.9	Pass
X / H	630.0	30.6	22.5	18.7	2.4	3.5	25.7	46.0	-20.3	Pass
X / H	945.1	35.5	22.5	21.0	3.1	3.5	33.6	46.0	-12.4	Pass
Noise floor	1260.1	31.3	22.5	23.4	3.8	3.5	32.5	54.0	-21.5	Pass
Noise floor	1575.1	30.9	20.2	24.9	4.4	3.5	36.5	54.0	-17.5	Pass
X / H	1890.1	31.7	19.2	27.1	5.0	3.5	41.1	54.0	-12.9	Pass
X / H	2205.1	32.3	19.2	29.2	1.3	3.5	40.1	54.0	-13.9	Pass
Noise floor	2520.2	31.9	19.2	29.9	1.5	3.5	40.6	54.0	-13.4	Pass
Noise floor	2835.2	28.1	19.1	30.8	1.6	3.5	37.9	54.0	-16.1	Pass
Noise floor	3150.2	29.7	19.0	31.8	1.7	3.5	40.7	54.0	-13.3	Pass
Pre-Amp: Red, White OATS: "A" Cable: 50' 8' RG8A U Analyzer: White, Yellow Antenna: Green-Black, Yellow										

Radiated Emissions Chart								Curtis-Straus LLC		
Date: 27-Aug-98		Company: Visonic, Inc.						Distance: 3 m		
Engineer: David Heald		EUT Desc: MCT 132						Table No: 2		
Notes:								Work Order: 980686		
EUT Axis / Ant. Polarity (X-Y-Z-Z' / H-V)	Frequency (MHz)	Peak Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Averaging Factor (dB)	Adjusted Reading (dBµV/m)	FCC Class B		
								Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)
X / H	315.0	52.9	0.0	13.2	1.5	3.5	64.1	75.6	-11.5	Pass
X / H	630.0	29.3	22.5	18.7	2.4	3.5	24.4	46.0	-21.6	Pass
X / H	945.1	35.5	22.5	21.0	3.1	3.5	33.6	46.0	-12.4	Pass
Noise floor	1260.1	31.1	22.5	23.4	3.8	3.5	32.3	54.0	-21.7	Pass
Noise floor	1575.1	32.8	20.2	24.9	4.4	3.5	38.4	54.0	-15.6	Pass
X / H	1890.1	31.2	19.2	27.1	5.0	3.5	40.6	54.0	-13.4	Pass
X / H	2205.1	32.4	19.2	29.2	1.3	3.5	40.2	54.0	-13.8	Pass
Noise floor	2520.2	30.1	19.2	29.9	1.5	3.5	38.8	54.0	-15.2	Pass
Noise floor	2835.2	29.3	19.1	30.8	1.6	3.5	39.1	54.0	-14.9	Pass
Noise floor	3150.2	28.6	19.0	31.8	1.7	3.5	39.6	54.0	-14.4	Pass
Pre-Amp: Red, White OATS: "A" Cable: 50', 8' RG8A/U Analyzer: White, Yellow Antenna: Green-Black, Yellow										

Radiated Emissions Chart								Curtis-Straus LLC		
Date: 27-Aug-98		Company: Visonic, Inc.		Distance: 3 m						
Engineer: David Heald		EUT Desc: MCT 131		Table No: 3						
Notes:					Work Order: 980686					
EUT Axis / Ant. Polarity (X-Y-Z-Z' / H-V)	Frequency (MHz)	Peak Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Averaging Factor (dB)	Adjusted Reading (dBµV/m)	FCC Class B		
								Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)
X / H	315.0	50.1	0.0	13.2	1.5	3.5	61.3	75.6	-14.3	Pass
X / H	630.0	31.0	22.5	18.7	2.4	3.5	26.1	46.0	-19.9	Pass
X / H	945.1	35.5	22.5	21.0	3.1	3.5	33.6	46.0	-12.4	Pass
Noise floor	1260.1	29.4	22.5	23.4	3.8	3.5	30.6	54.0	-23.4	Pass
Noise floor	1575.1	33.8	20.2	24.9	4.4	3.5	39.4	54.0	-14.6	Pass
X / H	1890.1	31.4	19.2	27.1	5.0	3.5	40.8	54.0	-13.2	Pass
X / H	2205.1	31.5	19.2	29.2	1.3	3.5	39.3	54.0	-14.7	Pass
Noise floor	2520.2	31.2	19.2	29.9	1.5	3.5	39.9	54.0	-14.1	Pass
Noise floor	2835.2	29.0	19.1	30.8	1.6	3.5	38.8	54.0	-15.2	Pass
Noise floor	3150.2	28.0	19.0	31.8	1.7	3.5	40.0	54.0	-14.0	Pass
Pre-Amp: Red, White		OATS: "A"		Cable: 50' 8' R 39		Analyzer: White, Yellow		Antenna: Green-Black, Yellow		

10: 54: 36 27 AUG 1998

MKR 315.015 MHZ
52.56 dBμV

70

REF 70.0 dBμV #AT 0 dB 012134 FORD

PEAK

LOG

10

dB/

MARKER

315.015 MHZ

52.56 dBμV

QP AUTO
AT MKR

QP Man
At MKR

CLEAR
QP DATA

WA SB
SC FS
CORR

QP 52.52

SPAN 1.000 MHZ
SWP 20.0 msec

CENTER 315.020 MHZ
#RES BW 120 KHZ

VBW 300 KHZ

11:31:06 27 AUG 1998
hp

MKR 630.0475 MHz
30.76 dBμV

REF 70.0 dB μ V #AT Ø dB

PEAK
LOG
1Ø
dB/

MARKER
630.0475 MHz
30.76 dBμV

QP AUTO
AT MKR

Qp Man
At Mkr

CLEAR
QP DATA

CENTER 630.0475 MHZ	SPAN 500.0 KHZ
#RES BW 120 KHZ	VBW 300 KHZ
	SWP 20.0 msec

WA SB
SC FS
CORR

4

REF 70.0 dB μ V #AT Ø dB

MARKER
945.0600 MHz
35.55 dBμV

CENTER 945.0600 MHz
#RES BW 120 KHZ
SPAN 500.0 KHZ
VBW 300 KHZ
SWP 20.0 msec

13:29:21 27 AUG 1998
hp

MKR 1.2600800 GHz
30.73 dBμVREF 70.0 dB μ V #AT 0 dB30.73 dB μ V

CLEAR
WRITE A

MAX
HOLD A

VIEW A

BLANK A

Trace	A	B	C
-------	---	---	---

More
1 of 3

PEAK
LOG
1Ø
dB/

SWEPTIME
20.0 msec

MA	SB
SC	FC
CORR	

CENTER 1.2600800 GHz
#RES BW 1.0 MHz

SPAN 500.0 KHZ
SWP 20.0 msec

#VBW 1 MHz

14: 06: 56 27 AUG 1998

HP

MARK 1.575100 GHZ

REF 70.0 dBμV #AT 0 dB

29.14 dBμV

PEAK

LOG

10

dB/

CLEAR
WRITE A

MAX
HOLD A

VIEW A

BLANK A

Trace
A B C

More
1 of 3

MARKER
1.575100 GHZ
29.14 dBμV



MA SB
SC FC
CORR

CENTER 1.575100 GHZ
#RES BW 1.0 MHz

VBW 1 MHz

SPAN 5.000 MHz
#SWP 20.0 msec

14:05:09 27 AUG 1998

hp

MKR 1.890283 GHz

REF 70.0 dBμV #AT 0 dB

31.95 dBμV

PEAK
LOG
10
dB/

CLEAR
WRITE A

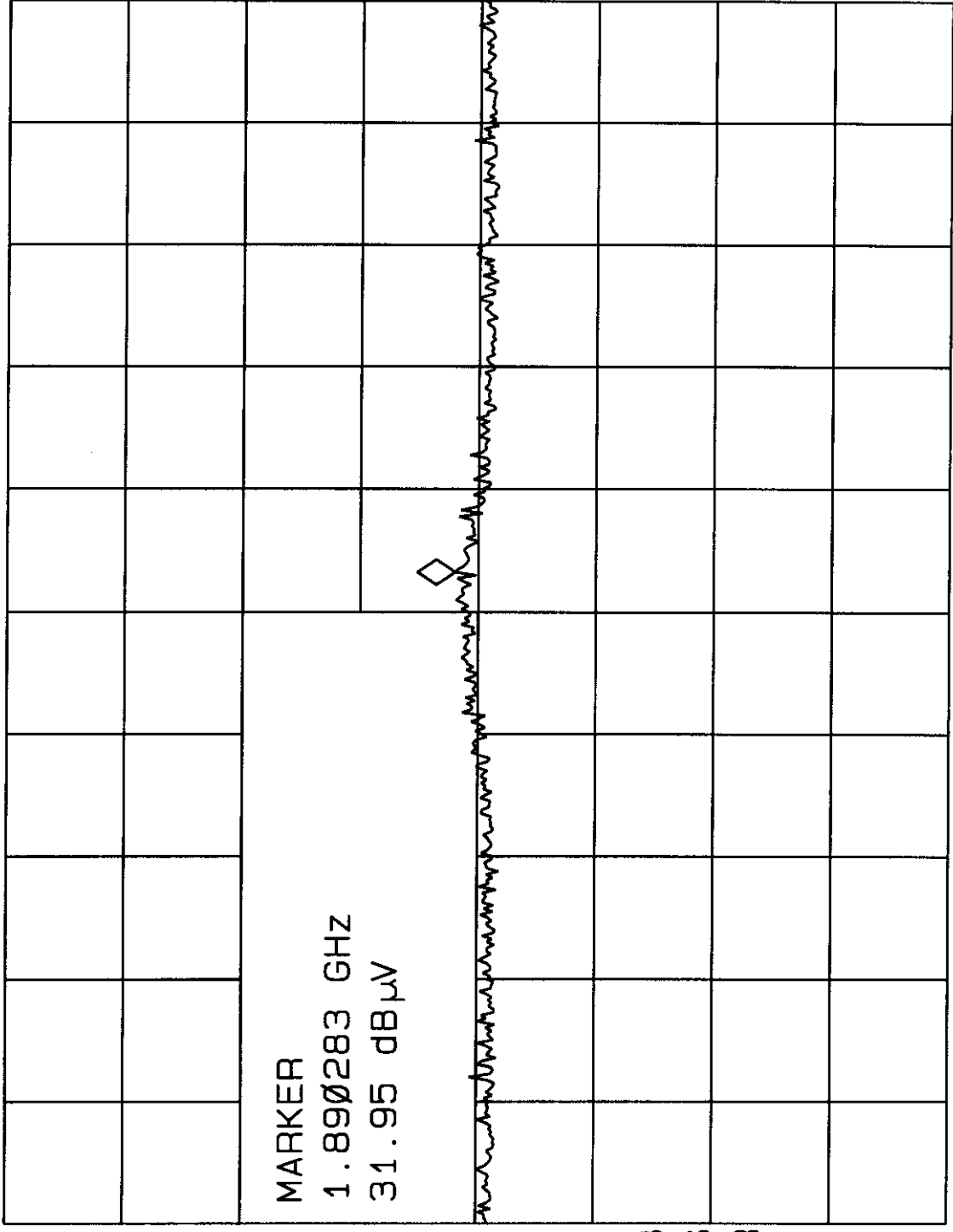
MAX
HOLD A

VIEW A

BLANK A

Trace
A B C

More
1 of 3



CENTER 1.890120 GHz SPAN 5.000 MHz
#RES BW 1.0 MHz #SWP 20.0 msec
VBW 1 MHz

MKR 2.20514 GHz
32.25 dBμVREF 70.0 dB_{μV} #AT Ø dB

PEAK

LOG

10

dB/

CLEAR
WRITE A

MAX
HOLD A

VIEW A

BLANK A

MA SB
SC FC
CORR

Trace	A	B	C
-------	---	---	---

More
1 of 3

CENTER 2.20514 GHZ
#RES BW 1.0 MHZ

SPAN 10.00 MHz
SWP 20.0 msec

#VBW 1 MHz

hp

MKR 2.52016 GHz

31.85 dBμV

#AT 0 dB

REF 70.0 dBμV

PEAK

LOG

10

dB/

MARKER
→ CF

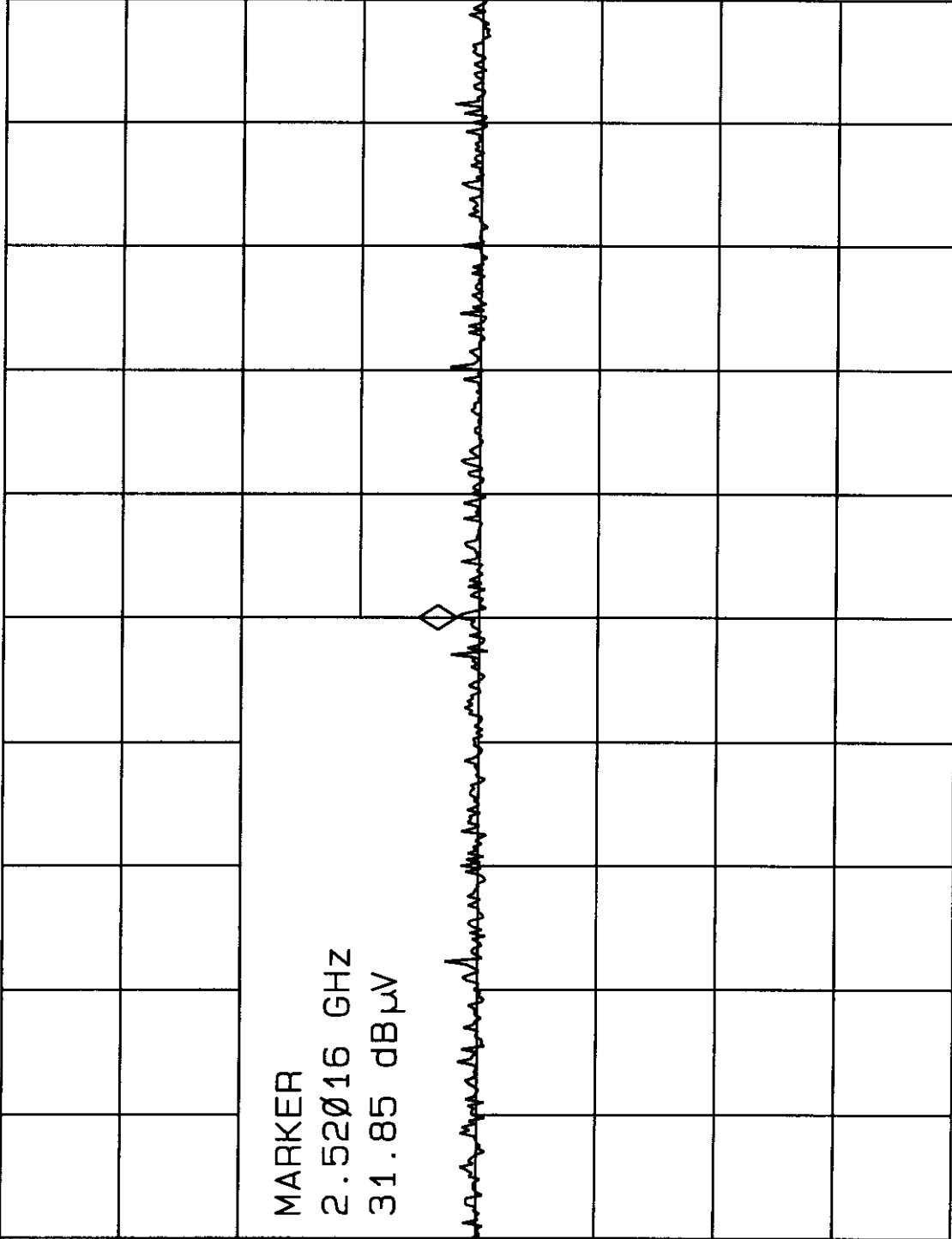
MARKER
→REF LVL

MARKER
→CF STEP

MARKER Δ
→SPAN

MARKER
→MINIMUM

More
1 of 2



MA SB
SC FC
CORR

CENTER 2.52016 GHz

#RES BW 1.0 MHz

SPAN 10.00 MHz

SWP 20.0 msec

#VBW 1 MHz

hp

REF 70.0 dBμV #AT 0 dB

MKR 2.83518 GHz
28.09 dBμV

PEAK

LOG

10

dB/

CLEAR
WRITE A

MAX
HOLD A

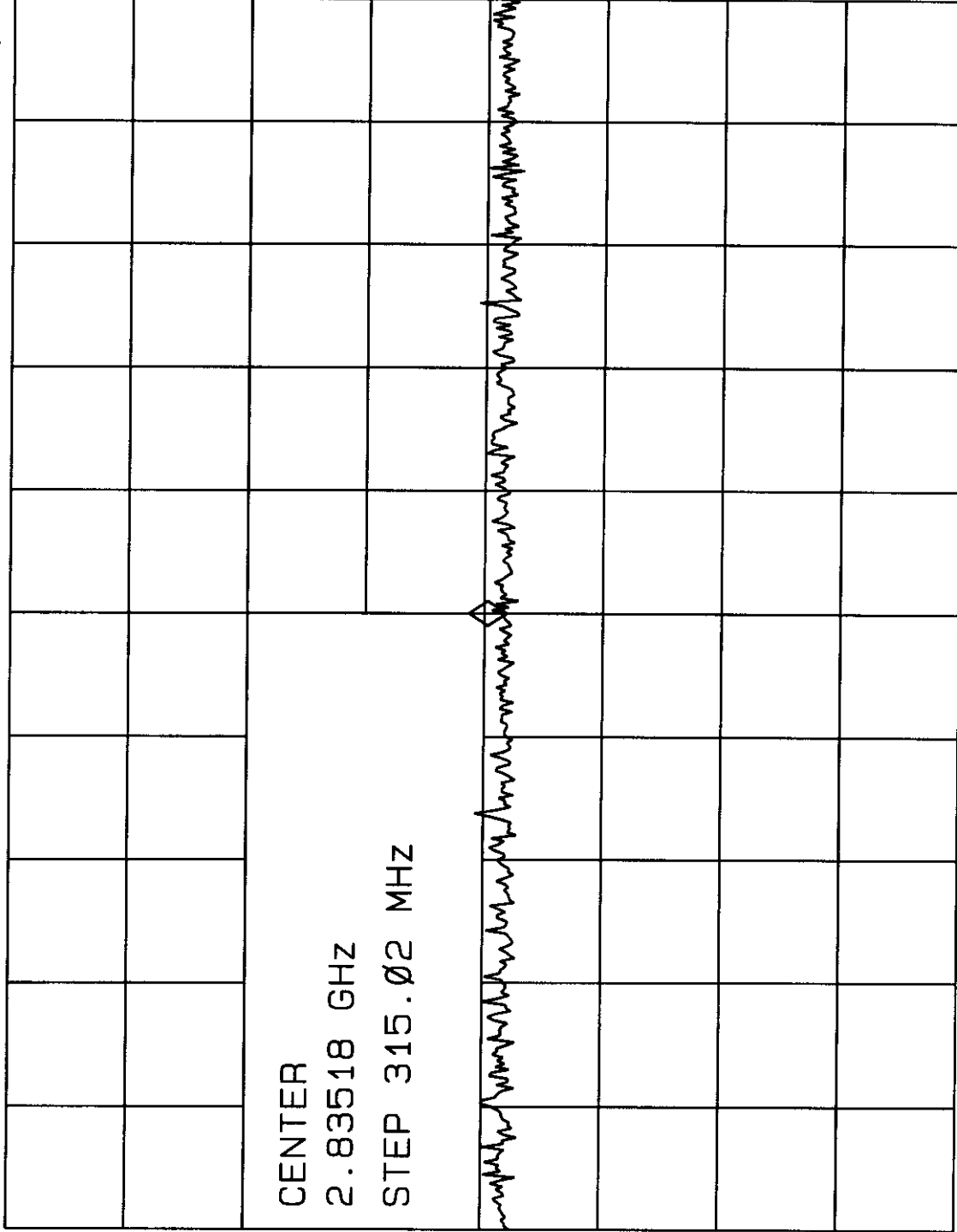
VIEW A

BLANK A

MA SB
SC FC
CORR

Trace
A B C

More
1 of 3



CENTER 2.83518 GHz
#RES BW 1.0 MHz

SPAN 10.00 MHz
SWP 20.0 msec
#VBW 1 MHz

hp

REF 70.0 dBμV #AT 0 dB

MKR 3.15020 GHz
29.71 dBμV

PEAK

LOG

10

dB/

MARKER
→ CF

MARKER
→REF LVL

MARKER
→CF STEP

MARKER Δ
→SPAN

MARKER
→MINIMUM

More
1 of 2

MARKER
3.15020 GHz
29.71 dBμV



MA SB
SC FC
CORR

CENTER 3.15020 GHz

#RES BW 1.0 MHz

SPAN 10.00 MHz

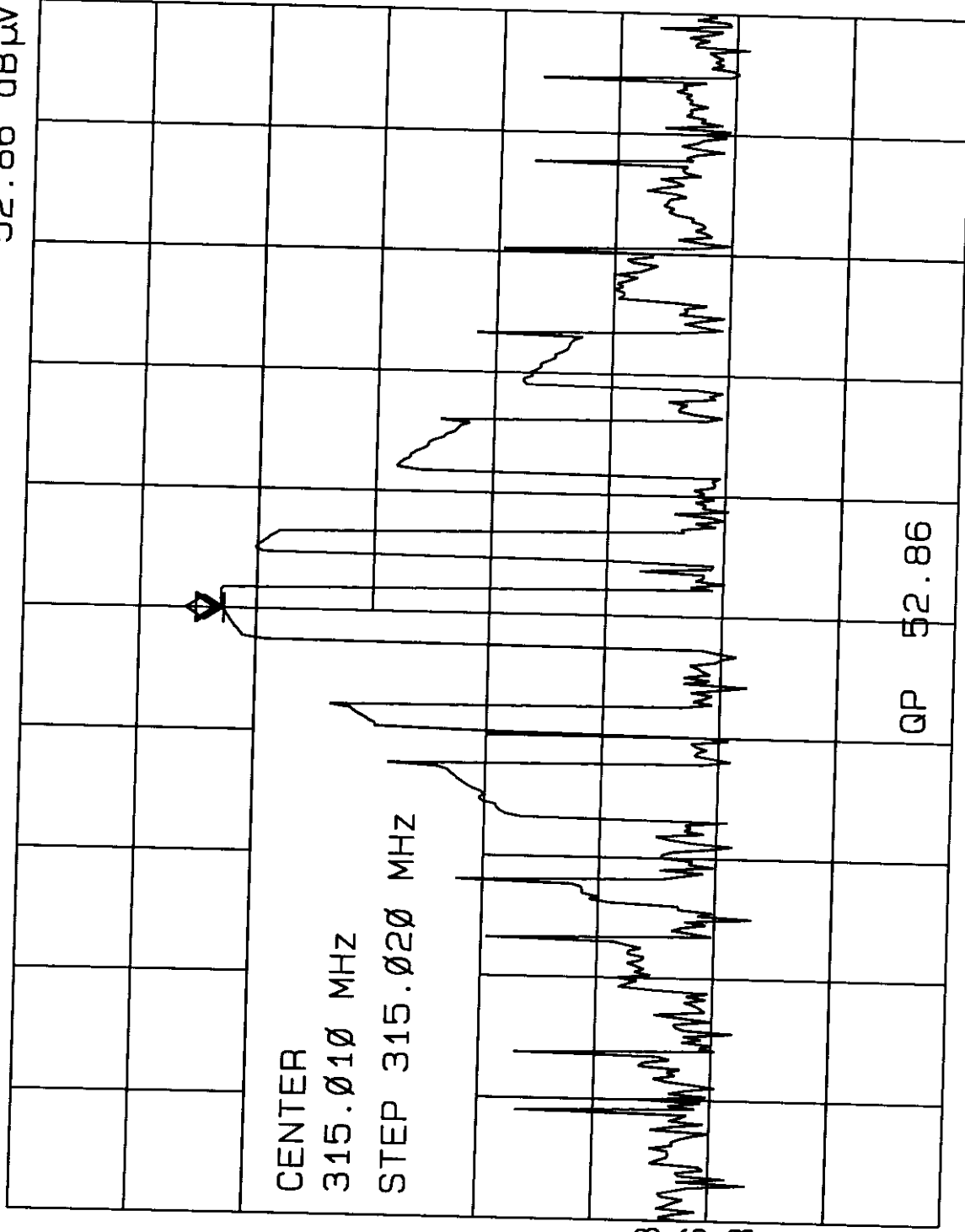
#VBW 1 MHz SWP 20.0 msec

15: 04: 31 27 AUG 1998

h
MKR 315.010 MHz
52.86 dBμV

REF 70.0 dBμV #AT 0 dB

PEAK
LOG
10
dB/



QP AUTO
AT MKR

Qp Man
At Mkr

CLEAR
QP DATA

CENTER 315.010 MHz
#RES BW 120 KHz

SPAN 1.000 MHz
SWP 20.0 msec

#VBW 300 KHz

QP 52.86

14: 54: 29 27 AUG 1998

h

MKR 630.040 MHz
29.29 dBμV

REF 70.0 dBμV #AT 0 dB

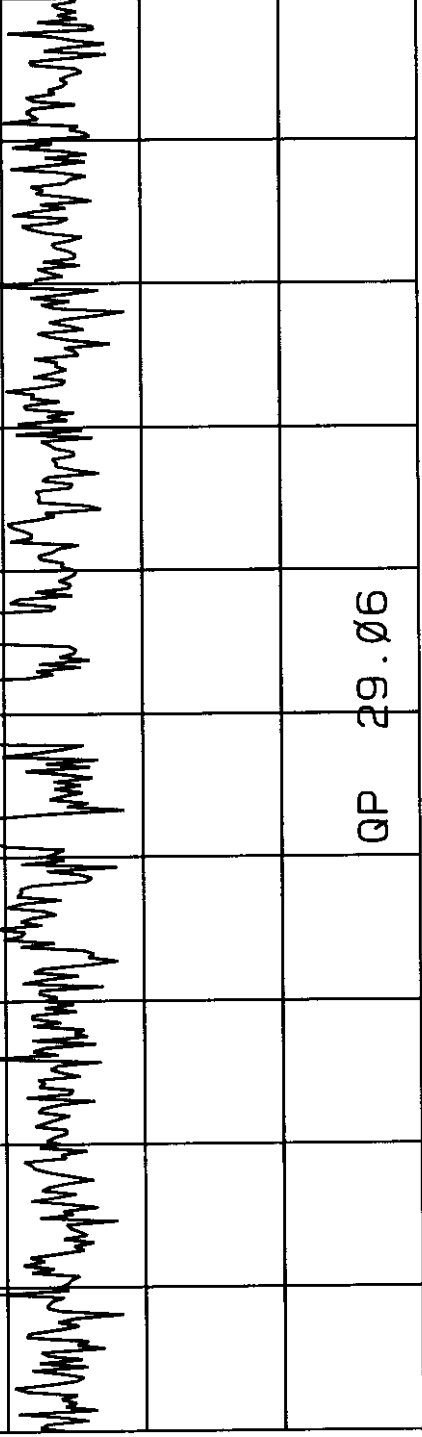
PEAK
LOG
10
dB/

CENTER
630.040 MHz
STEP 315.020 MHz

QP AUTO
AT MKR

Qp Man
At Mkr

CLEAR
QP DATA



CENTER 630.040 MHz SPAN 1.000 MHz
#RES BW 120 KHZ #VBW 300 KHZ SWP 20.0 msec

14: 48: 35 27 AUG 1998

hp

0.000000

REF 70.0 dBμV

#AT 0 dB

MKR 945.057 MHz

35.48 dBμV

PEAK

LOG

10

dB/

MARKER
→ CF

MARKER
→REF LVL

MARKER
→CF STEP

MARKER Δ
→SPAN

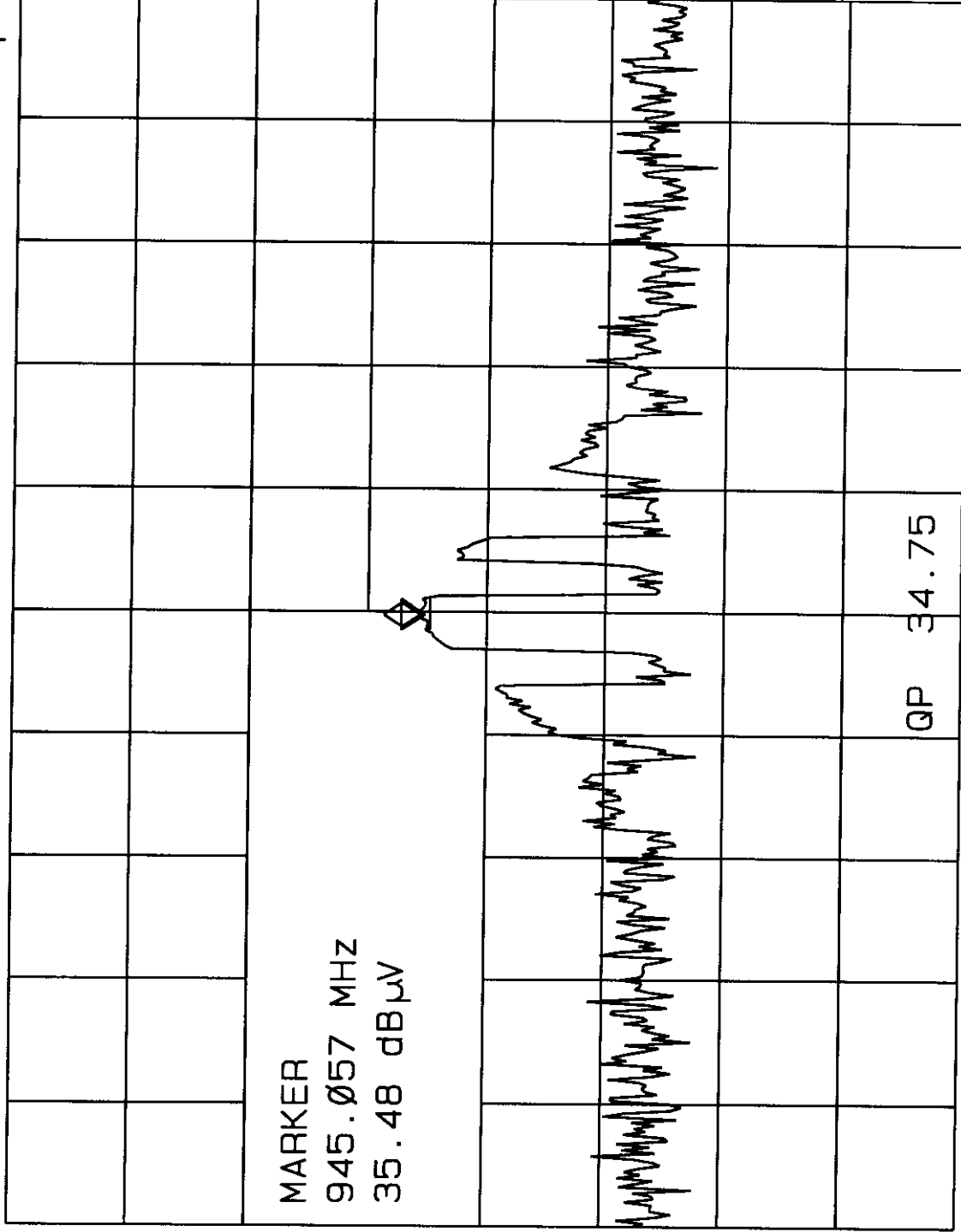
MARKER
→MINIMUM

More
1 of 2

MARKER
945.057 MHz
35.48 dBμV



WA SB
SC FS
CORR



CENTER 945.060 MHz

#RES BW 120 kHz

#VBW 300 kHz

SPAN 1.000 MHz
SWP 20.0 msec

14: 39: 45 27 AUG 1998

hpo MKR 1.260068 GHZ
31.12 dB μ V

REF 70.0 dB μ V #AT 0 dB

PEAK
LOG
10
dB/

CLEAR
WRITE A

MAX
HOLD A

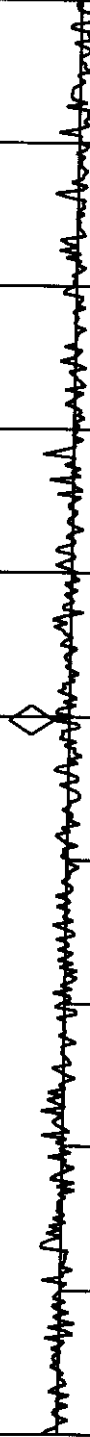
VIEW A

BLANK A

Trace
A B C

More
1 of 3

MARKER
1.260068 GHZ
31.12 dB μ V



MA SB
SC FC
CORR

CENTER 1.260080 GHZ SPAN 5.000 MHz
#RES BW 1.0 MHz SWP 20.0 msec
VBW 1 MHz

14: 35: 16 27 AUG 1998
hp

REF 70.0 dBμV #AT 0 dB

MKR 1.575038 GHz
32.80 dBμV

MARKER
→ CF

PEAK
LOG
10
dB/

MARKER
Δ

MARKER
1.575038 GHz
32.80 dBμV

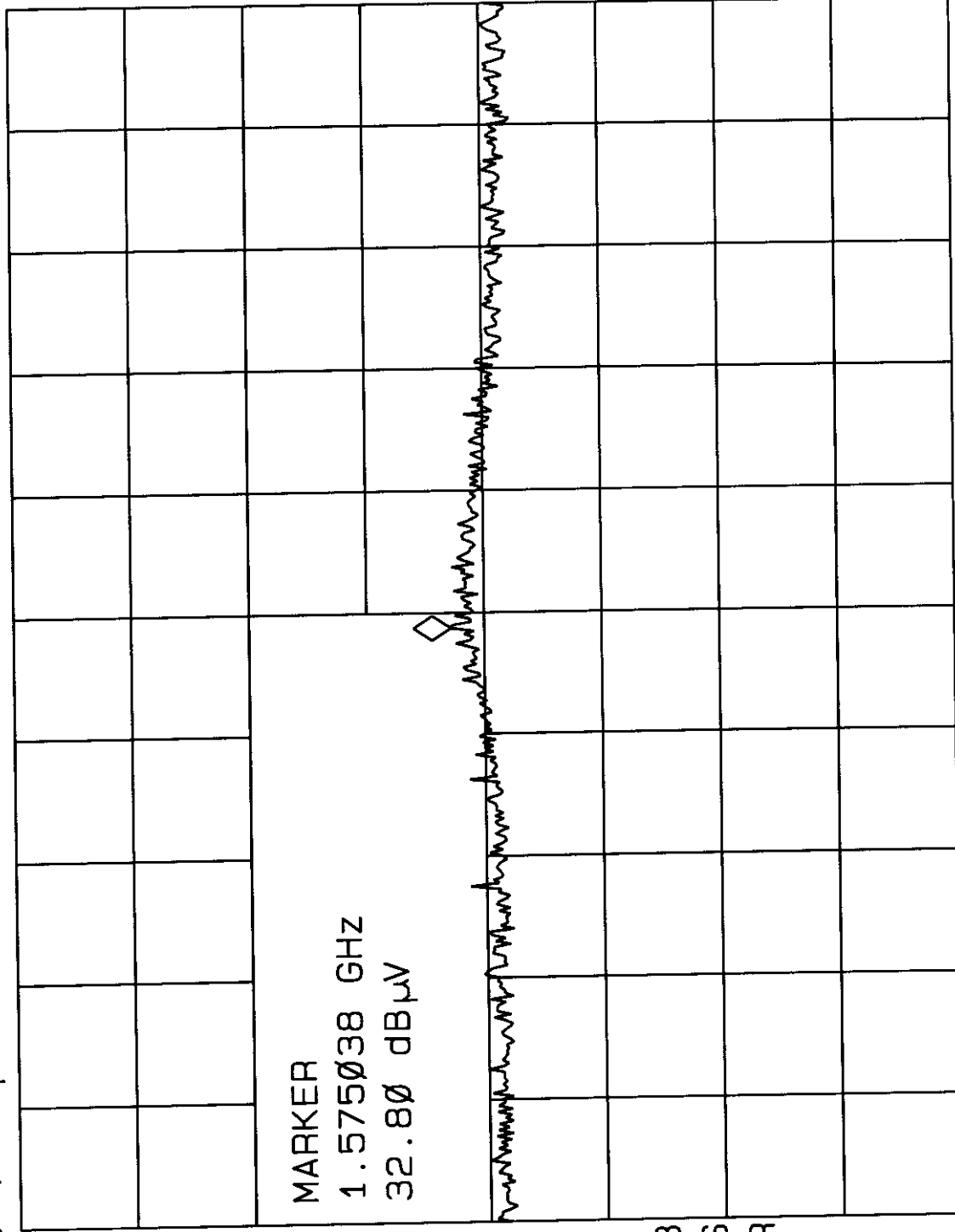
NEXT
PEAK

NEXT PK
RIGHT

MA SB
SC FS
CORR

NEXT PK
LEFT

More
1 of 2



CENTER 1.575100 GHz
#RES BW 1.0 MHz

SPAN 5.000 MHz
#SWP 20.0 msec

VBW 1 MHz

14: 30: 30 27 AUG 1998

MR 1.890133 GHz
31.21 dBμV

REF 70.0 dBμV #AT 0 dB

PEAK
LOG
10
dB/

CLEAR
WRITE A

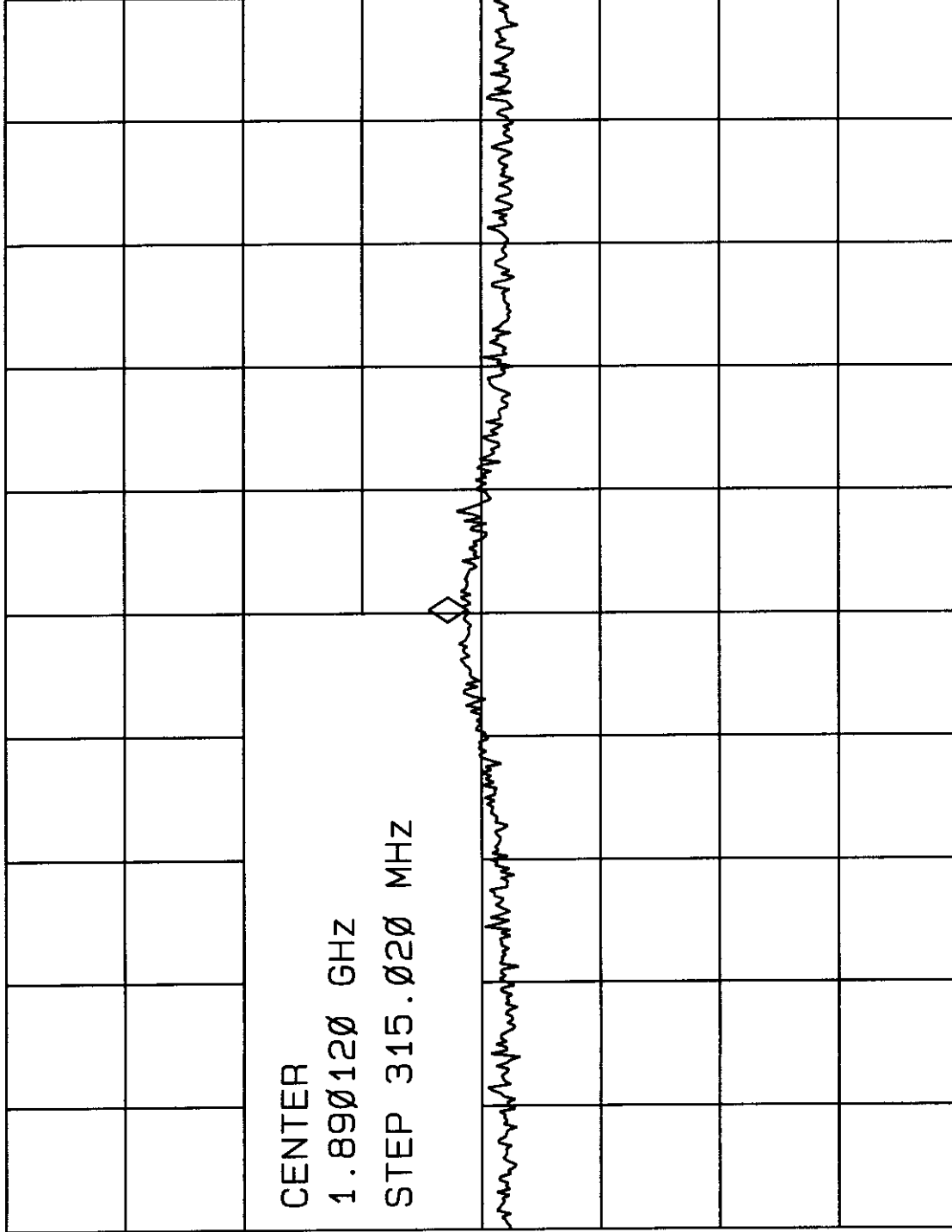
MAX
HOLD A

VIEW A

BLANK A

Trace
A B C

More
1 of 3



MA SB
SC FS
CORR

CENTER 1.890120 GHz SPAN 5.000 MHz
#RES BW 1.0 MHz #SWP 20.0 msec
VBW 1 MHz

hp

REF 70.0 dBμV #AT 0 dB

MKR 2.20514 GHz

32.36 dBμV

PEAK

LOG

10

dB/

CLEAR
WRITE A

MAX
HOLD A

VIEW A

BLANK A

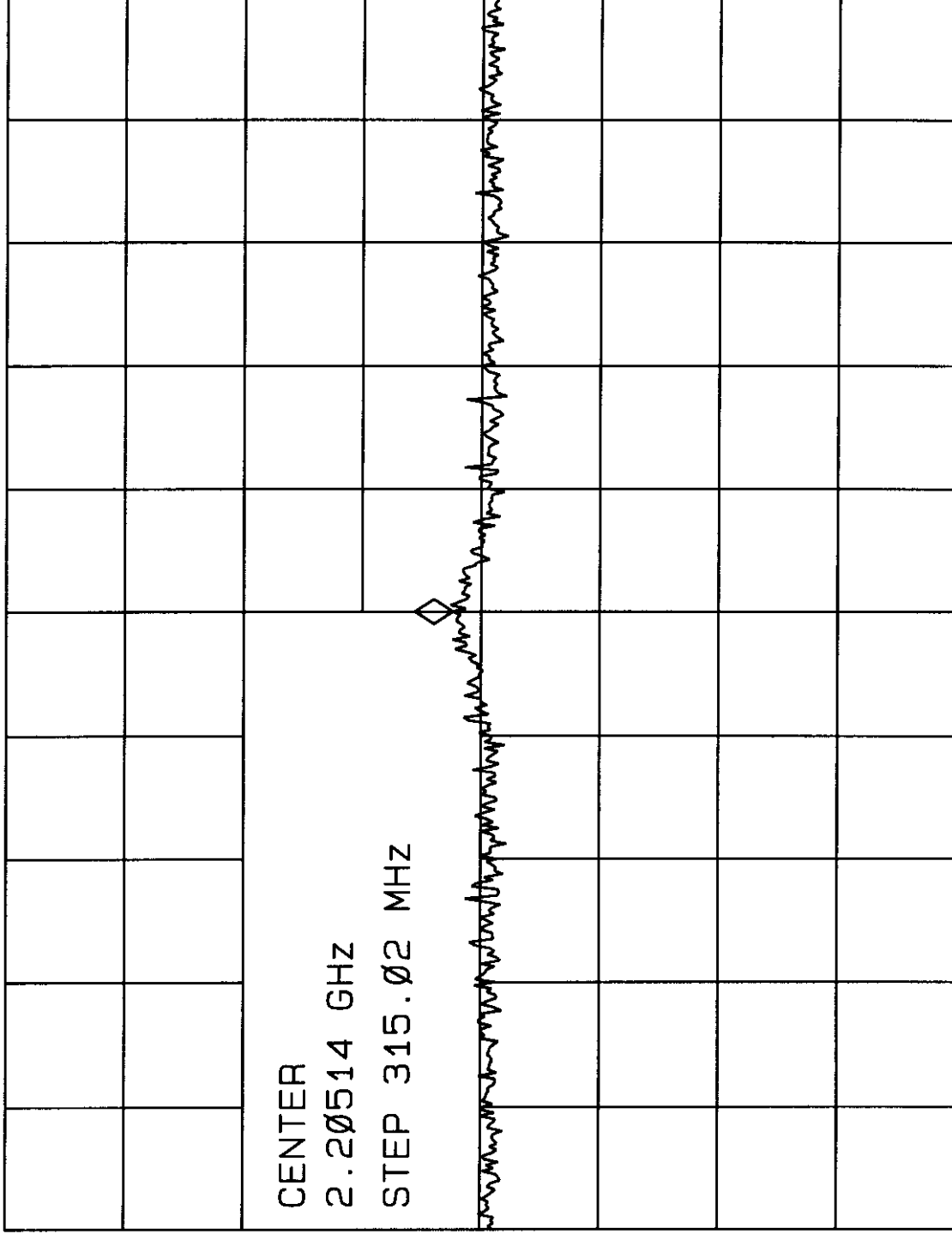
MA SB

SC FS

CORR

Trace
A B C

More
1 of 3



CENTER 2.20514 GHz

#RES BW 1.0 MHz

#VBW 1 MHz

SPAN 10.00 MHz

SWP 20.0 msec

MKR 2.52016 GHz

30.14 dB μ V

MARKER → CF

907

dB/

MARKER
→REF LVL

2.52016 GHz

30.14 dB μ V

MARKER
→CF STEP

MARKER Δ
→SPAN

CS
EF

CORR

MARKER
→ MINIMUM

More
1 of 2

SPAN 10.00 MHz

#VBW 1 MHz

SWP 20.0 msec

hp

REF 70.0 dBμV #AT 0 dB

MKR 2.83516 GHz
29.28 dBμV

PEAK
LOG
10
dB/

MARKER
→ CF

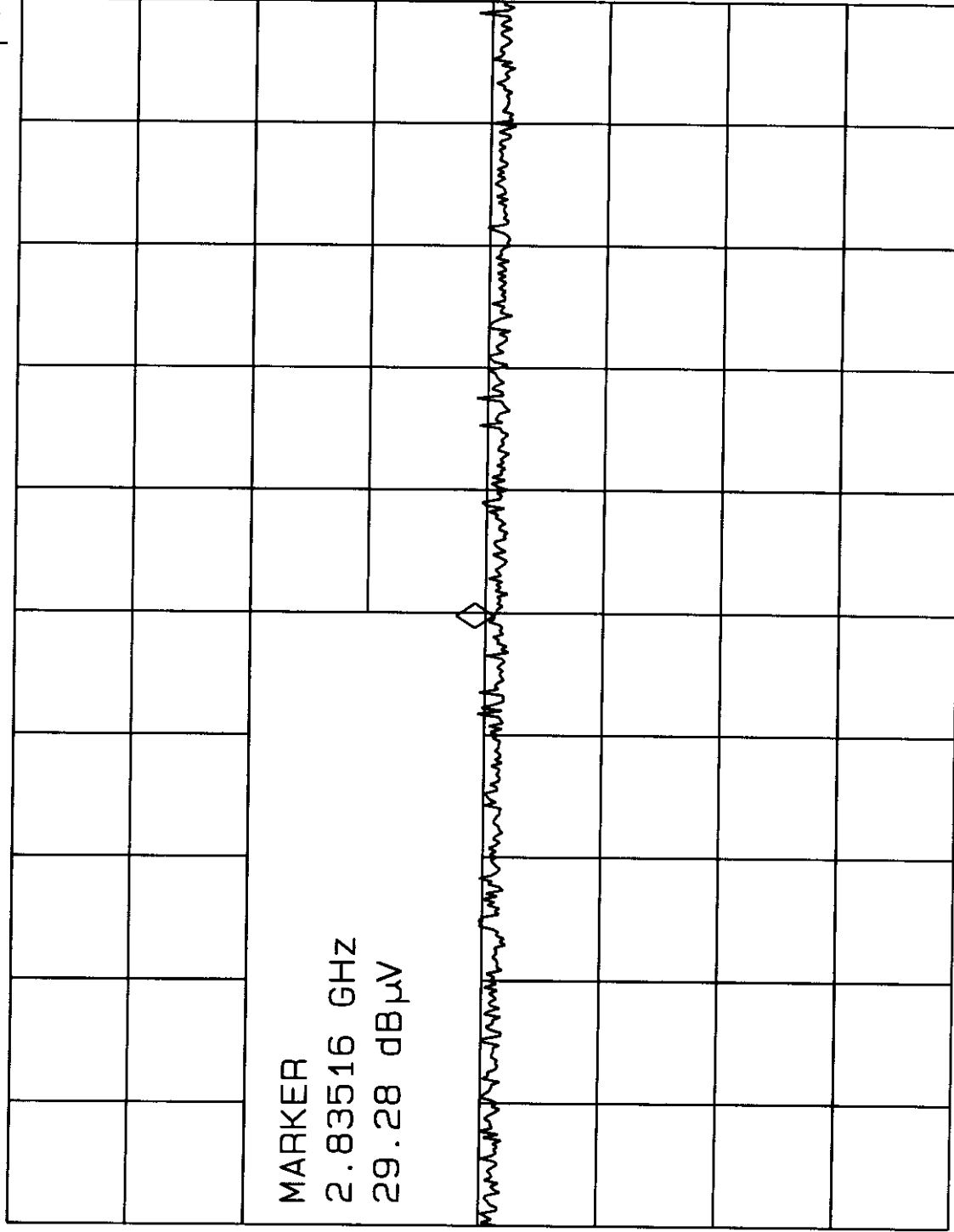
MARKER
→REF LVL

MARKER
→CF STEP

MARKER Δ
→SPAN

MARKER
→MINIMUM

MORE
1 of 2



MA SB
SC FC
CORR

CENTER 2.83518 GHz

#RES BW 1.0 MHz

SPAN 10.00 MHz

SWP 20.0 msec

#VBW 1 MHz

hp

MKR 3.15025 GHz

28.63 dB μ V

REF 70.0 dB μ V #AT 0 dB

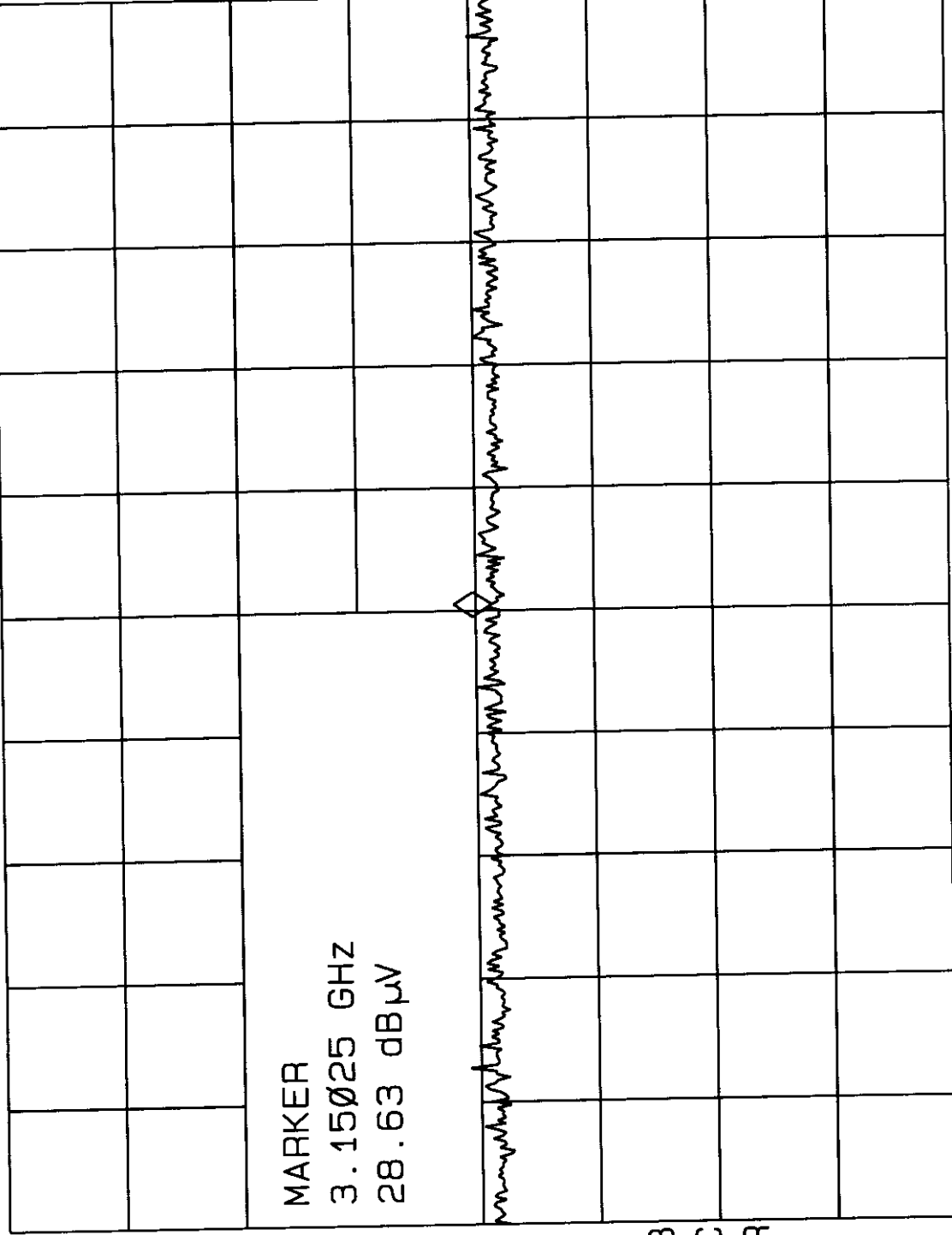
MARKER

PEAK

LOG

10

dB/



MARKER
3.15025 GHz
28.63 dB μ V

MARKER Δ
→SPAN

MARKER
→CF STEP

MARKER
→REF LVL

MARKER
→MINIMUM

More
1 of 2

MA SB
SC FC
CORR

CENTER 3.15020 GHz

#RES BW 1.0 MHz

#VBW 1 MHz

SPAN 10.00 MHz

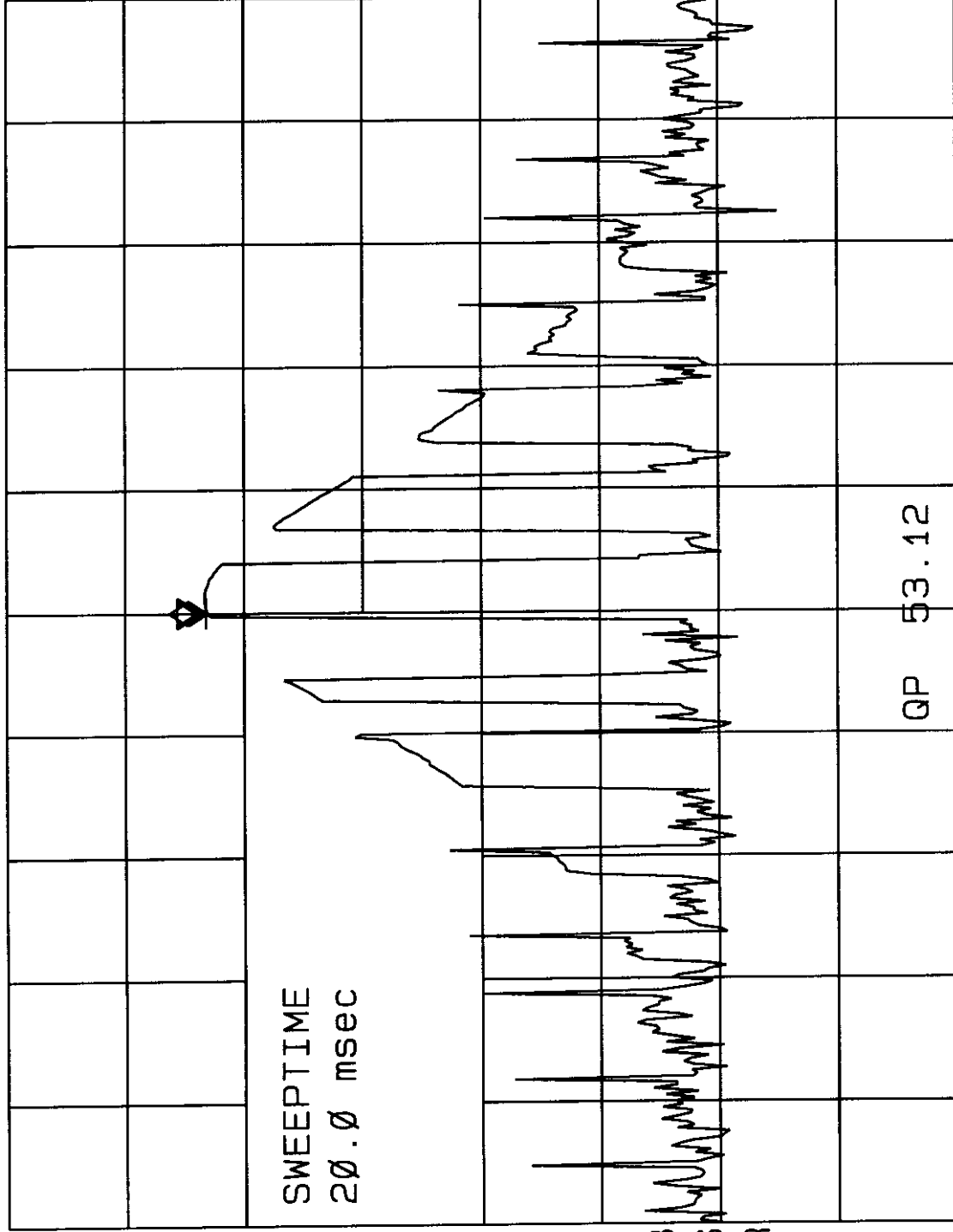
SWP 20.0 msec

15: 19: 05 27 AUG 1998

MR 315.010 MHz
53.09 dBu

REF 70.0 dBu #AT 0 dB

PEAK
LOG
10
dB/



WA SB
SC FS
CORR

CLEAR
QP DATA

CENTER 315.010 MHz
#RES BW 120 kHz
SPAN 1.000 MHz
SWP 20.0 msec
#VBW 300 kHz

hp

REF 70.0 dBμV #AT 0 dB MKR 630.048 MHz 30.97 dBμV

PEAK
LOG
10
dB/

MARKER
→ CF

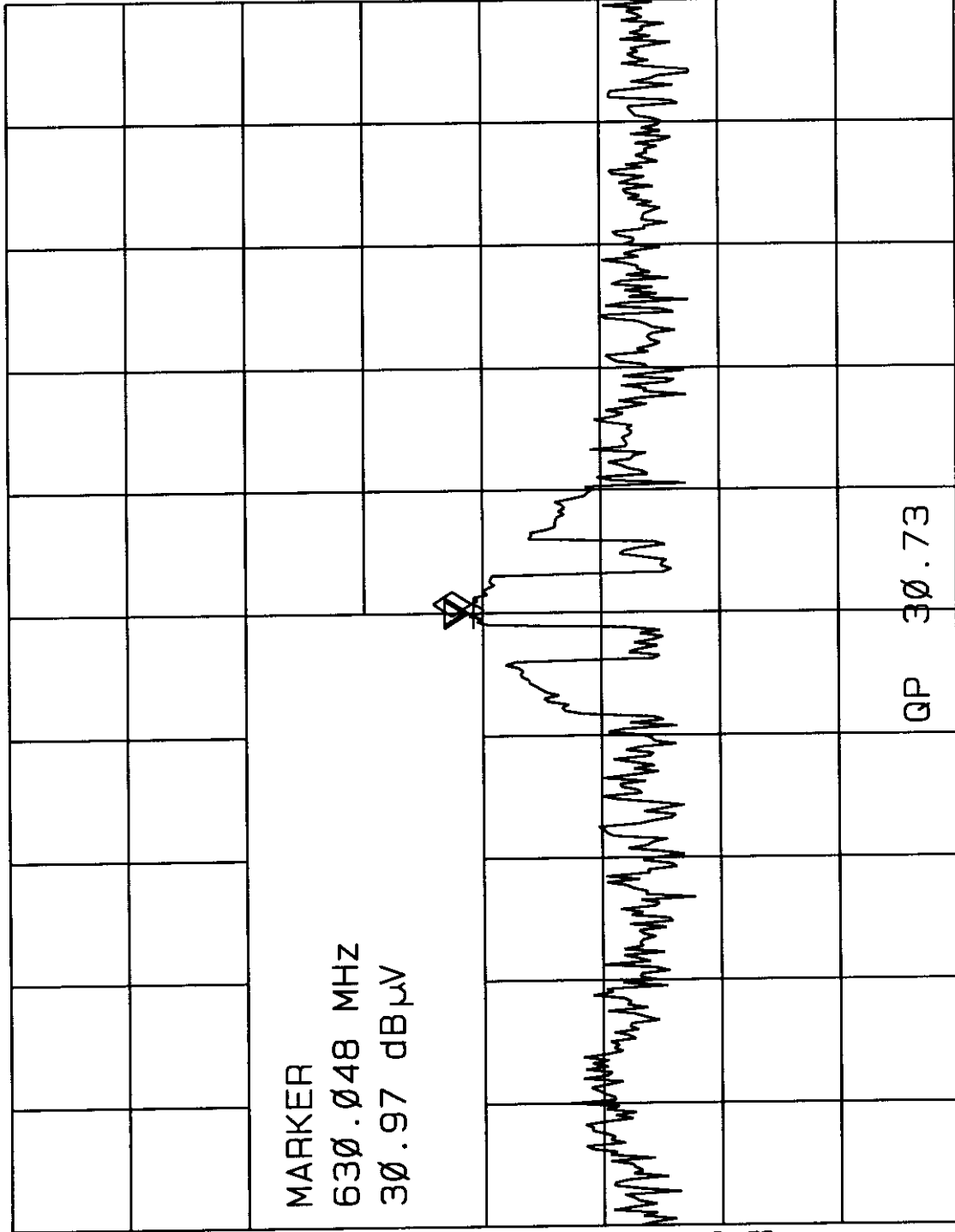
MARKER
→REF LVL

MARKER
→CF STEP

MARKER Δ
→SPAN

MARKER
→MINIMUM

More
1 of 2



WA SB
SC FS
CORR

CENTER 630.040 MHz SPAN 1.000 MHz #RES BW 120 kHz #SWP 20.0 msec VBW 300 kHz

hp

REF 70.0 dBμV #AT 0 dB

MKR 945.067 MHz
35.53 dBμV

PEAK

LOG

10

dB/

MARKER
→ CF

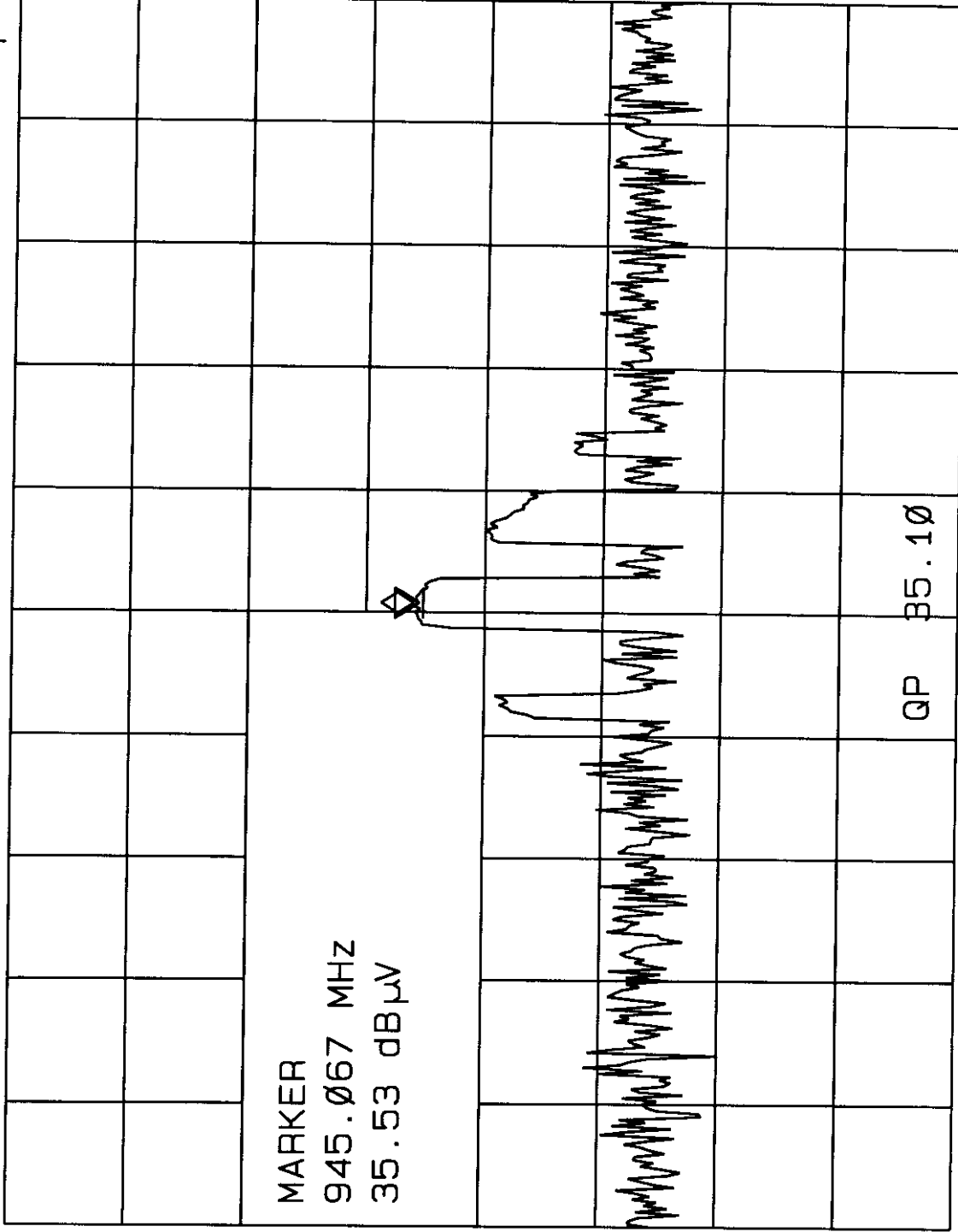
MARKER
→REF LVL

MARKER
→CF STEP

MARKER Δ
→SPAN

MARKER
→MINIMUM

More
1 of 2



WA SB
SC FS
CORR

CENTER 945.060 MHz

#RES BW 120 KHz

SPAN 1.000 MHz
#SWP 20.0 msec

VBW 300 KHz

hp

REF 70.0 dBμV #AT 0 dB MKR 1.260080 GHz 29.38 dBμV

PEAK
LOG
10
dB/

CLEAR
WRITE A

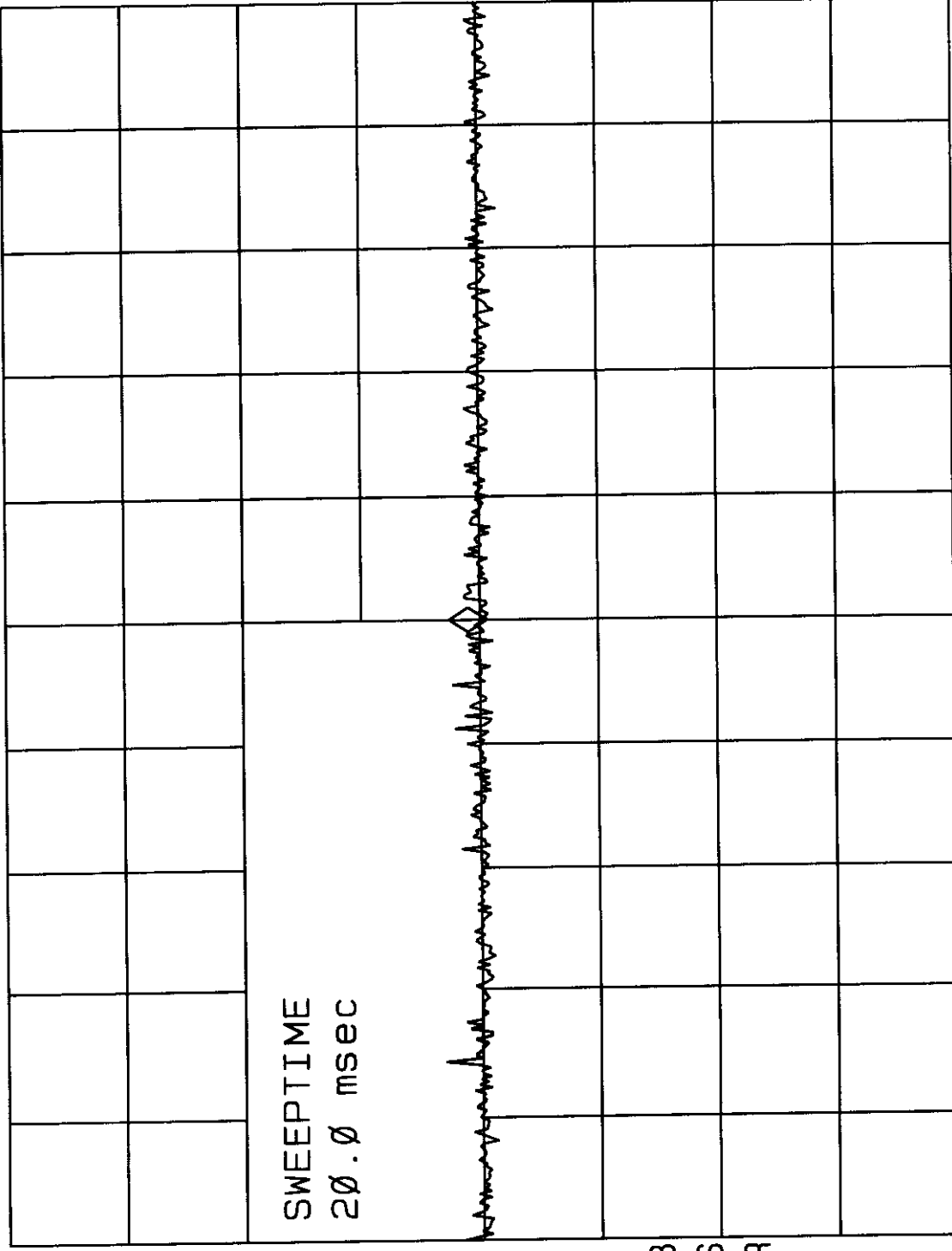
MAX
HOLD A

VIEW A

BLANK A

Trace
A B C

More
1 of 3



MA SB
SC FS
CORR

CENTER 1.260080 GHz SPAN 5.000 MHz
#RES BW 1.0 MHz #VBW 1 MHz #SWP 20.0 msec

hp

MKR 1.575100 GHZ

33.81 dB μ V

REF 70.0 dB μ V #AT 0 dB

PEAK

LOG

10

dB/

CLEAR

WRITE A

MAX

HOLD A

VIEW A

BLANK A

MA SB

SC FS

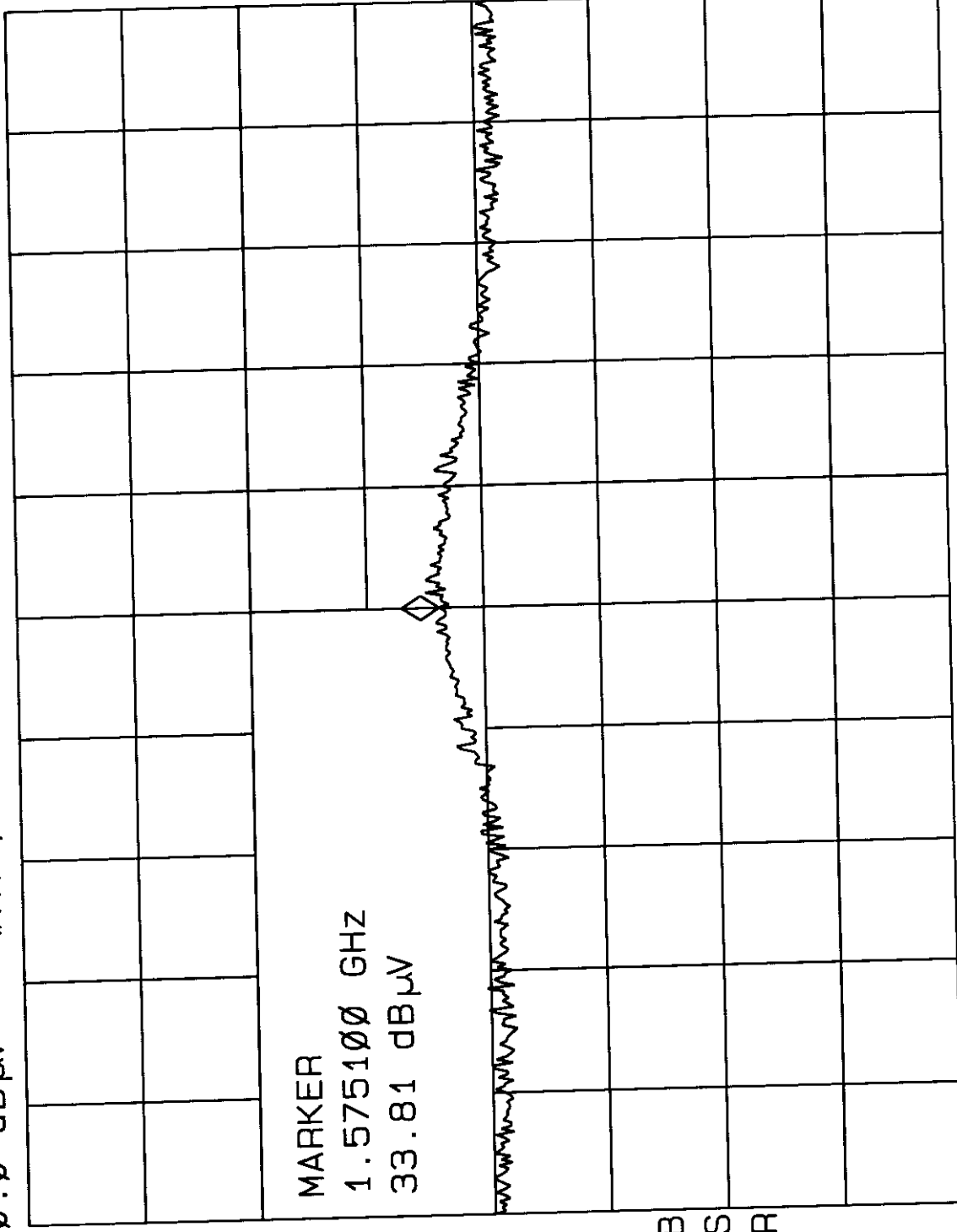
CORR

Trace

A B C

More

1 of 3



SPAN 5.000 MHZ

#SWP 20.0 msec

CENTER 1.575100 GHZ

#RES BW 1.0 MHZ

#VBW 1 MHZ

hp

REF 70.0 dBμV #AT 0 dB

MKR 1.890108 GHz
31.39 dBμV

PEAK
LOG
10
dB/

MARKER
→ CF

MARKER
→REF LVL

MARKER
1.890108 GHz
31.39 dBμV

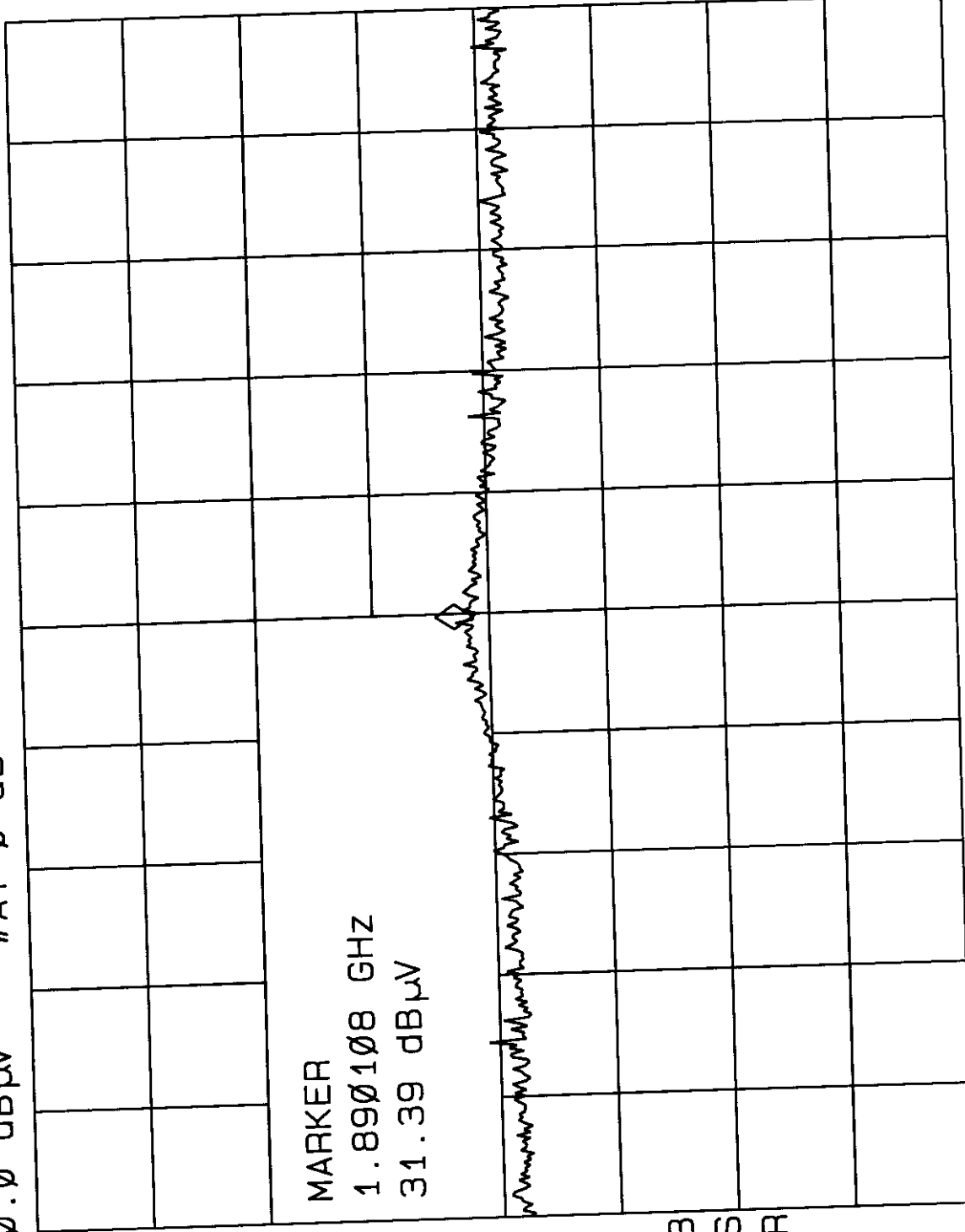
MARKER
→CF STEP

MARKER Δ
→SPAN

MA SB
SC FS
CORR

MARKER
→MINIMUM

More
1 of 2



CENTER 1.890120 GHz
#RES BW 1.0 MHz

SPAN 5.000 MHz
#SWP 20.0 msec

#VBW 1 MHz

hp

MKR 2.20514 GHz

REF 70.0 dBμV #AT 0 dB

31.45 dBμV

PEAK

LOG

10

dB/

CLEAR
WRITE A

MAX
HOLD A

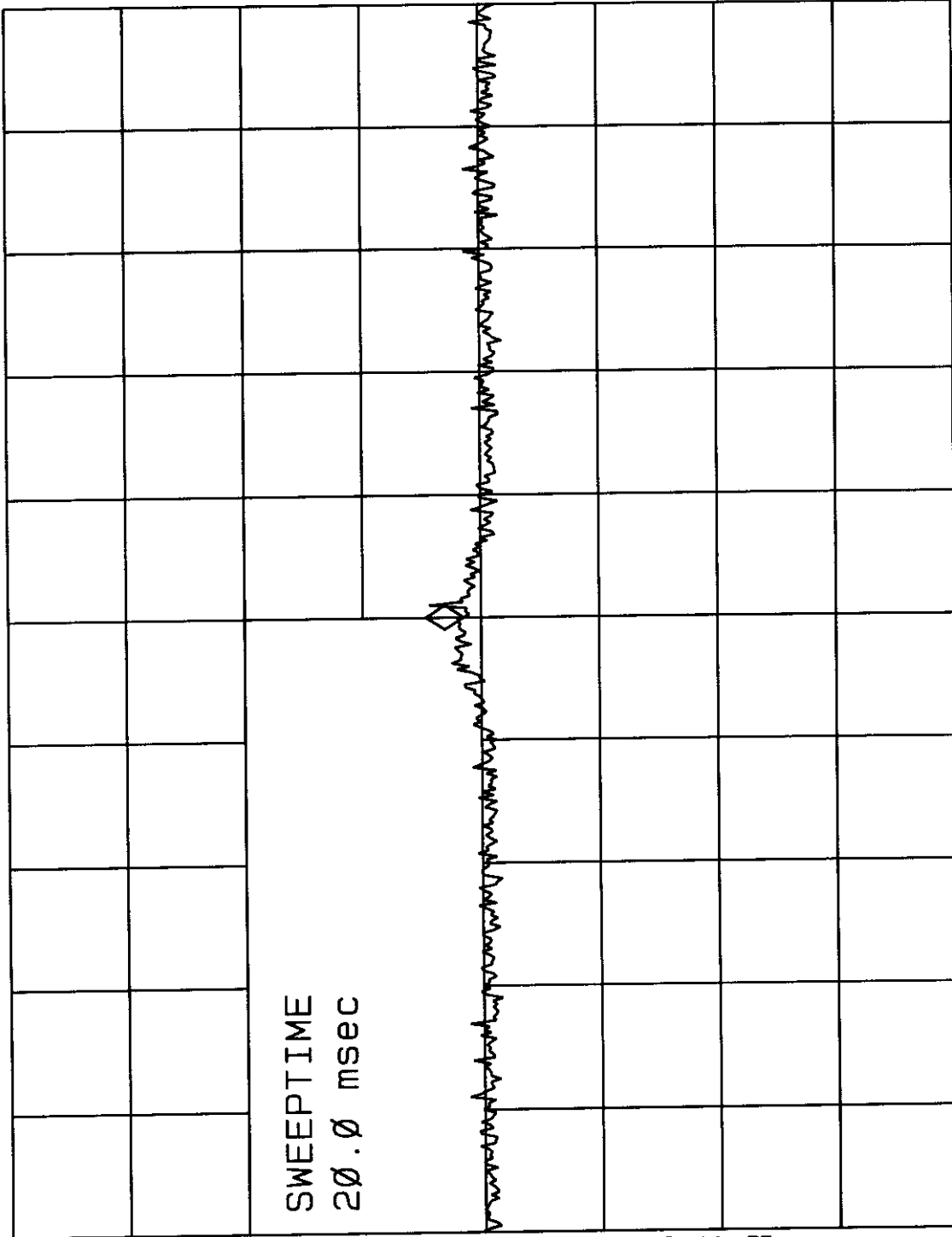
VIEW A

BLANK A

MA SB
SC FC
CORR

Trace
A B C

More
1 of 3



CENTER 2.20514 GHz

#RES BW 1.0 MHz

SPAN 10.00 MHz

#VBW 1 MHz

SWP 20.0 msec

hp

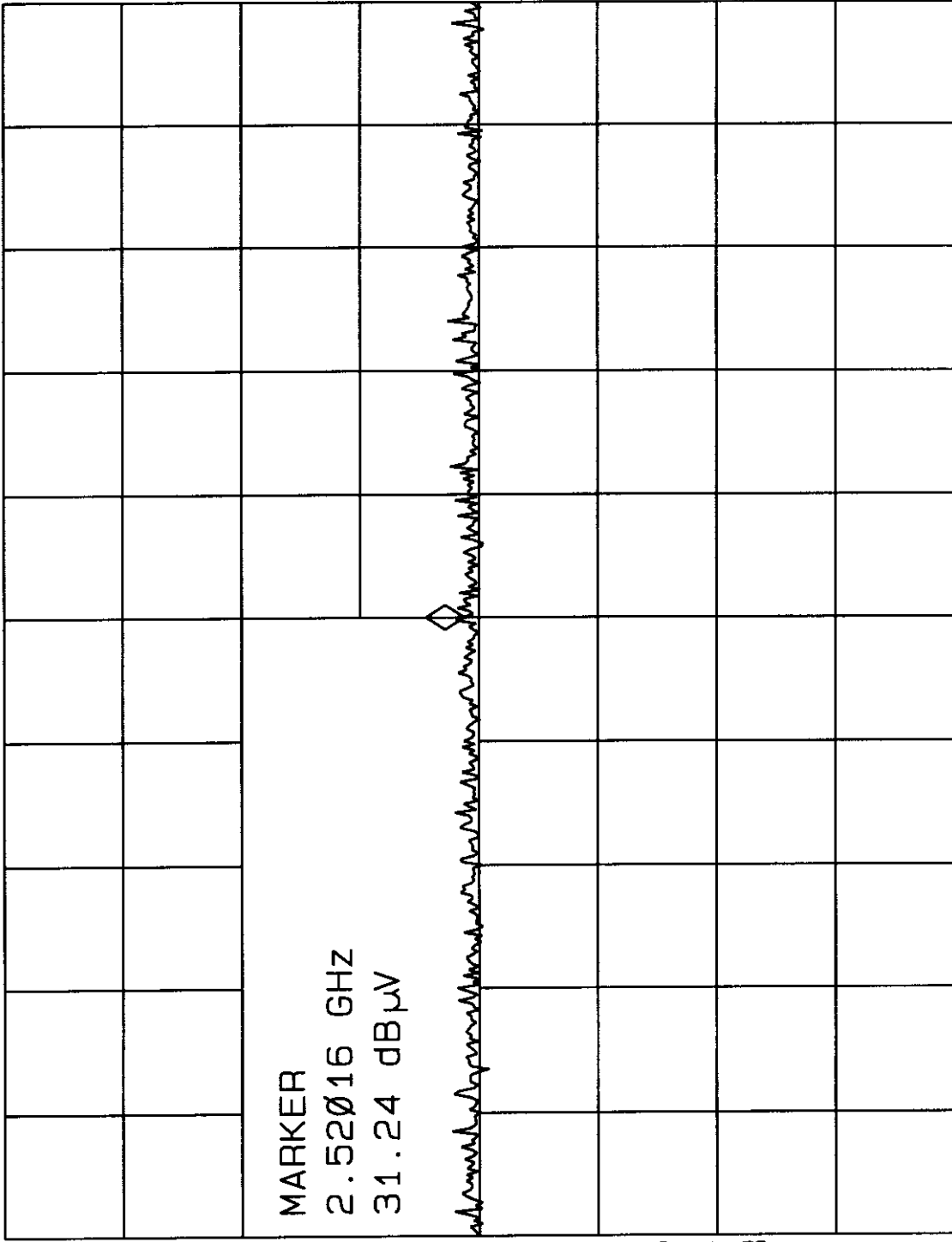
MR 2.52016 GHz

31.24 dBμV

#AT 0 dB

REF 70.0 dBμV

MARKER
→ CF



MARKER
→REF LVL

MARKER
→CF STEP

MARKER Δ
→SPAN

MARKER
→MINIMUM

More
1 of 2

MA SB
SC FC
CORR

CENTER 2.52016 GHz

#RES BW 1.0 MHz

#VBW 1 MHz

SPAN 10.00 MHz

SWP 20.0 msec

hp

MR 2.83521 GHz

29.04 dBμV

#AT 0 dB

REF 70.0 dBμV

PEAK

LOG

10

dB/

MARKER
→ CF

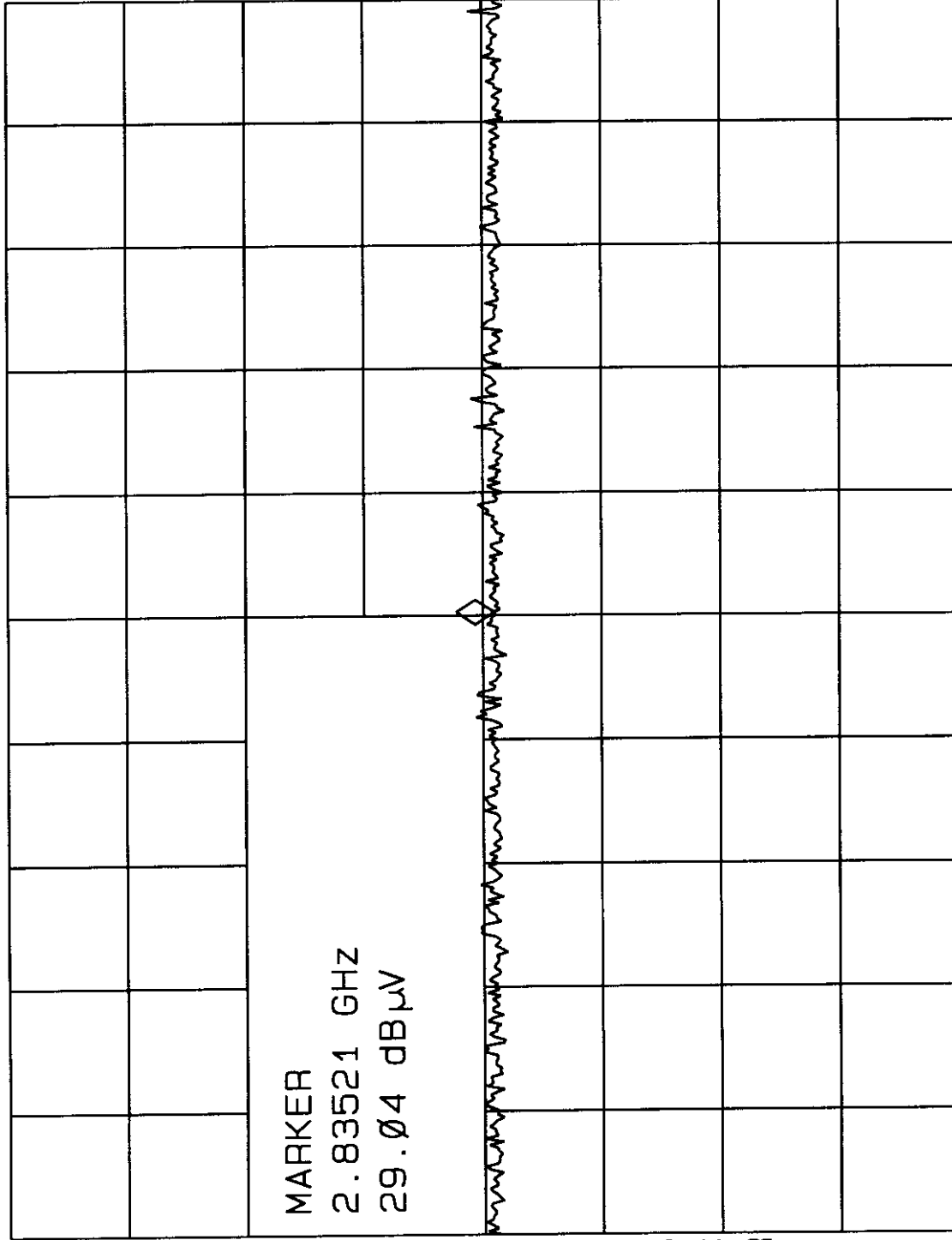
MARKER
→REF LVL

MARKER
→CF STEP

MARKER Δ
→SPAN

MARKER
→MINIMUM

More
1 of 2



MARKER

2.83521 GHz

29.04 dBμV

MA SB

SC FC

CORR

CENTER 2.83518 GHz

#RES BW 1.0 MHz

#VBW 1 MHz

SPAN 10.00 MHz

SWP 20.0 msec

hp

REF 70.0 dBμV #AT 0 dB

PEAK

LOG

10

dB/

MKR 3.15020 GHz
28.00 dBμV

CLEAR
WRITE A

MAX
HOLD A

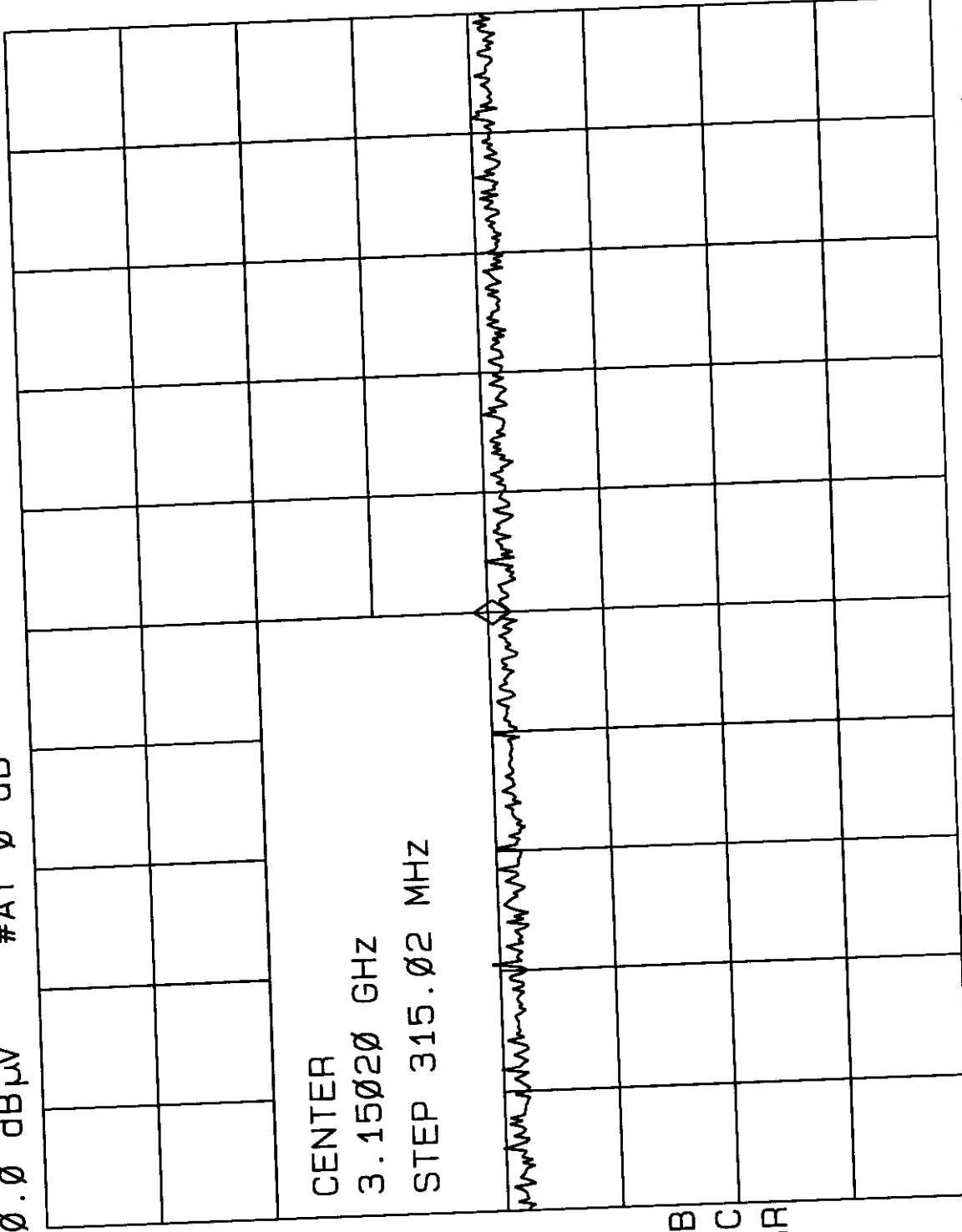
VIEW A

BLANK A

MA SB
SC FC
CORR

Trace
A B C

More
1 of 3



CENTER 3.15020 GHz

#RES BW 1.0 MHz

SPAN 10.00 MHz

SWP 20.0 msec

#VBW 1 MHz

3.3 Occupied Bandwidth Measurements

A plot was obtained with the unit operating with modulation. The bandwidth observed to be less than 48.5 kHz at the 20dB down points. Allowable bandwidth is 0.25% of 315 MHz or 0.78 MHz. The plot is attached.

3.4 Averaging factor derivation based on worst case 100mS period.

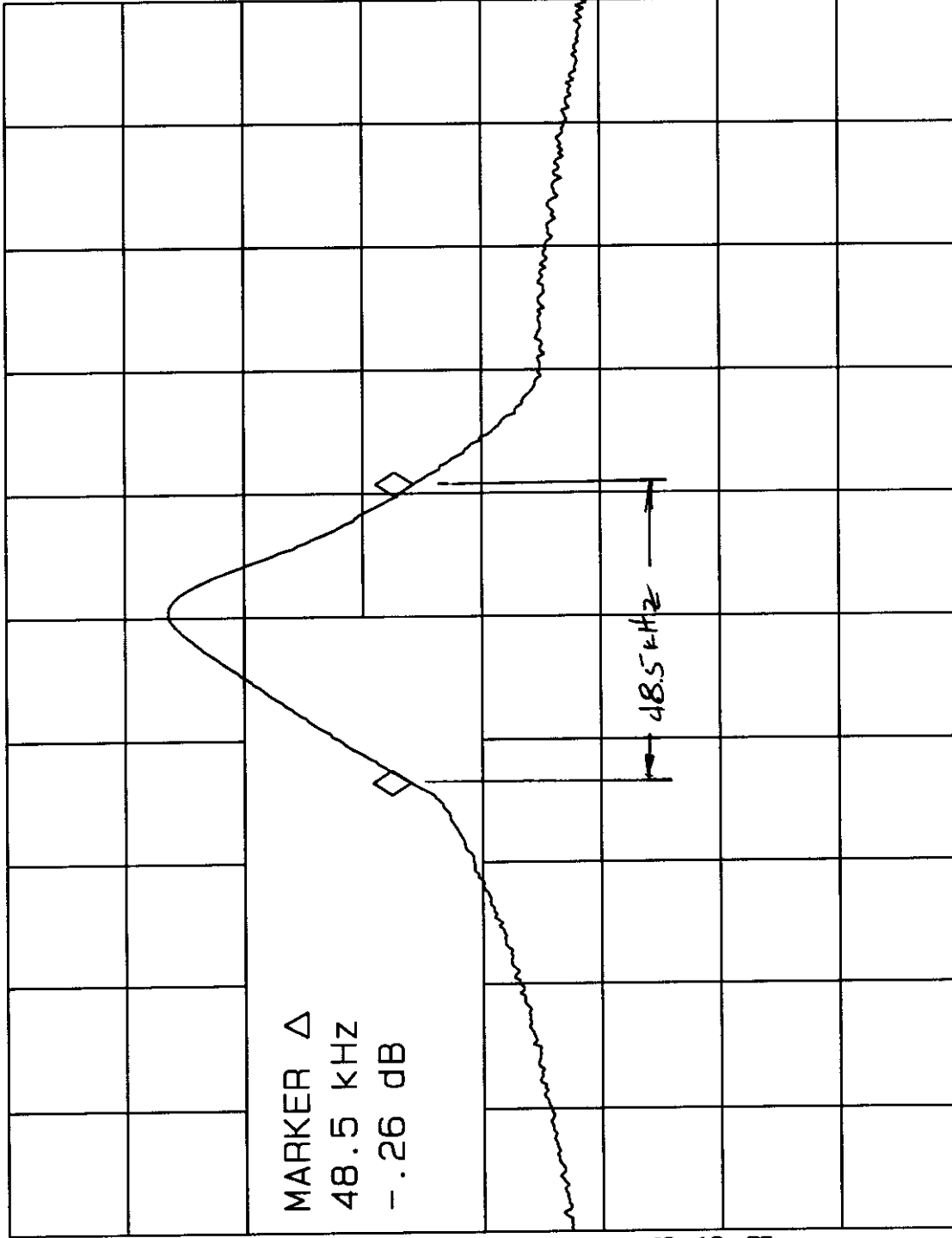
Attached is a discussion of the pulse code modulation scheme employed by the device. As can be seen, the worst case 100mS second period results in an averaging factor of 3.5dB.

15: 47: 41 27 AUG 1998
hp

REF -40.0 dBm #AT 0 dB

MKR Δ 48.5 kHz
-.26 dB

PEAK
LOG
10
dB/



MARKER
NORMAL

MARKER
Δ

MARKER
AMPTD

SELECT
1 2 3 4

MARKER 1
ON OFF

More
1 of 2

CENTER 315.0210 MHz
#RES BW 10 kHz

SPAN 200.0 kHz
#VBW 10 kHz
SWP 30.0 msec

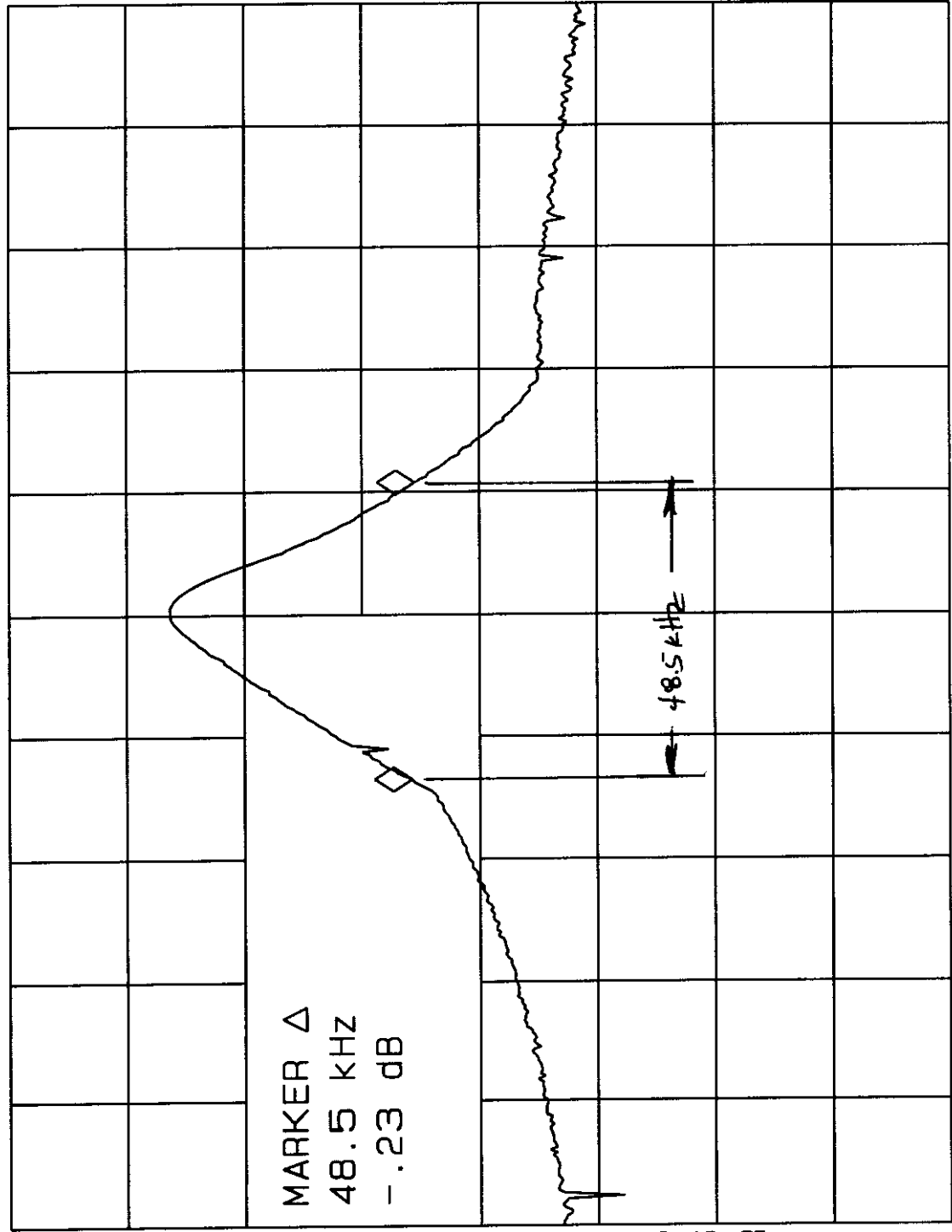
MA SB
SC FS
CORR

15: 29: 45 27 AUG 1998
hp

REF -40.0 dBm #AT 0 dB

MKR Δ 48.5 KHz
- .23 dB

PEAK
LOG
10
dB/



MA SB
SC FS
CORR

MARKER
NORMAL

MARKER
Δ

MARKER
AMPTD

SELECT
1 2 3 4

MARKER 1
ON OFF

More
1 of 2

CENTER 315.0210 MHz
#RES BW 10 KHz

SPAN 200.0 KHz
SWP 30.0 msec

#VBW 10 KHz

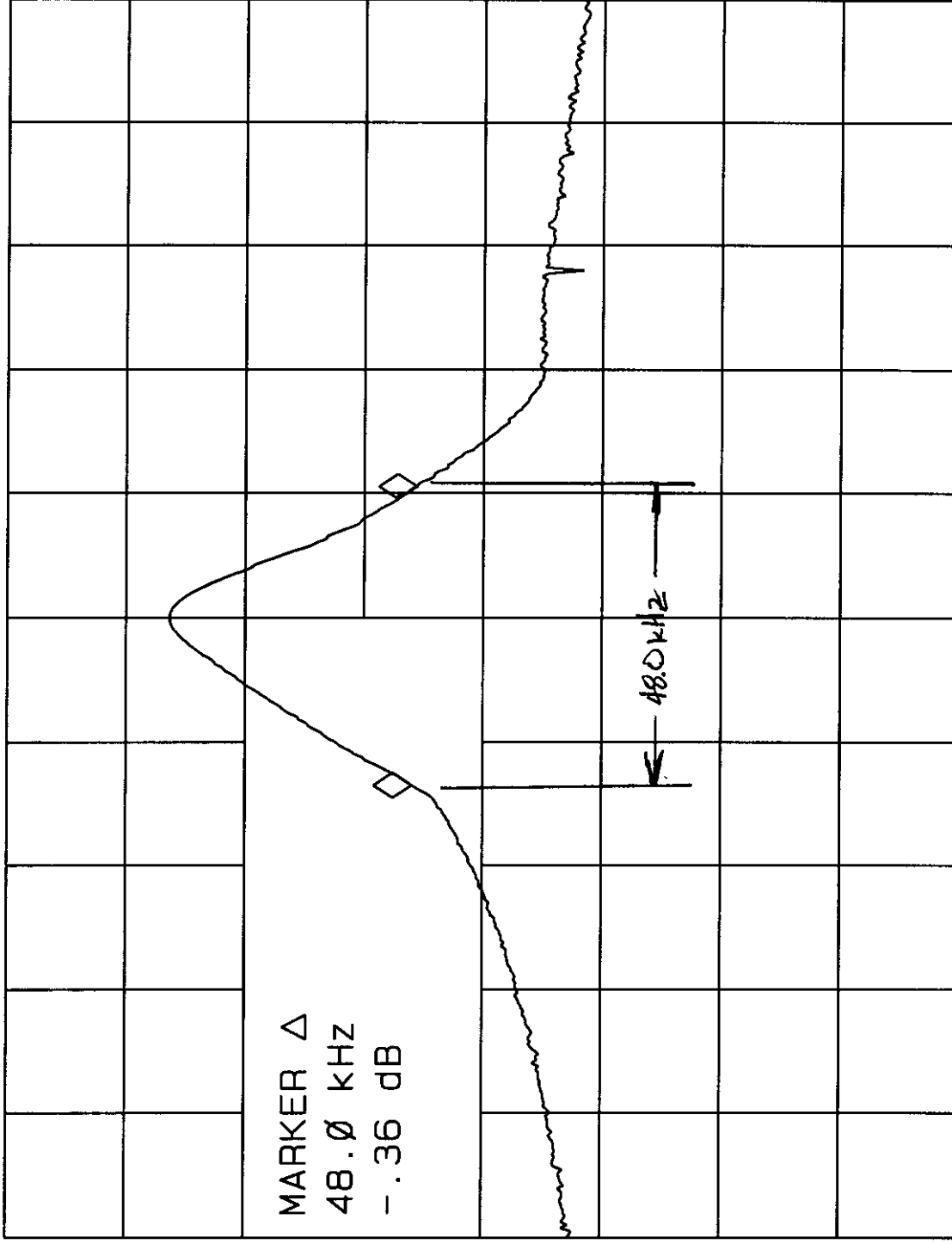
15: 27: 11 27 AUG 1998

hp

REF -40.0 dBm #AT 0 dB

MKR Δ 48.0 KHz
- .36 dB

PEAK
LOG
10
dB/



MA SB
SC FS
CORR

CENTER 315.0210 MHz
#RES BW 10 KHz

#VBW 10 KHz

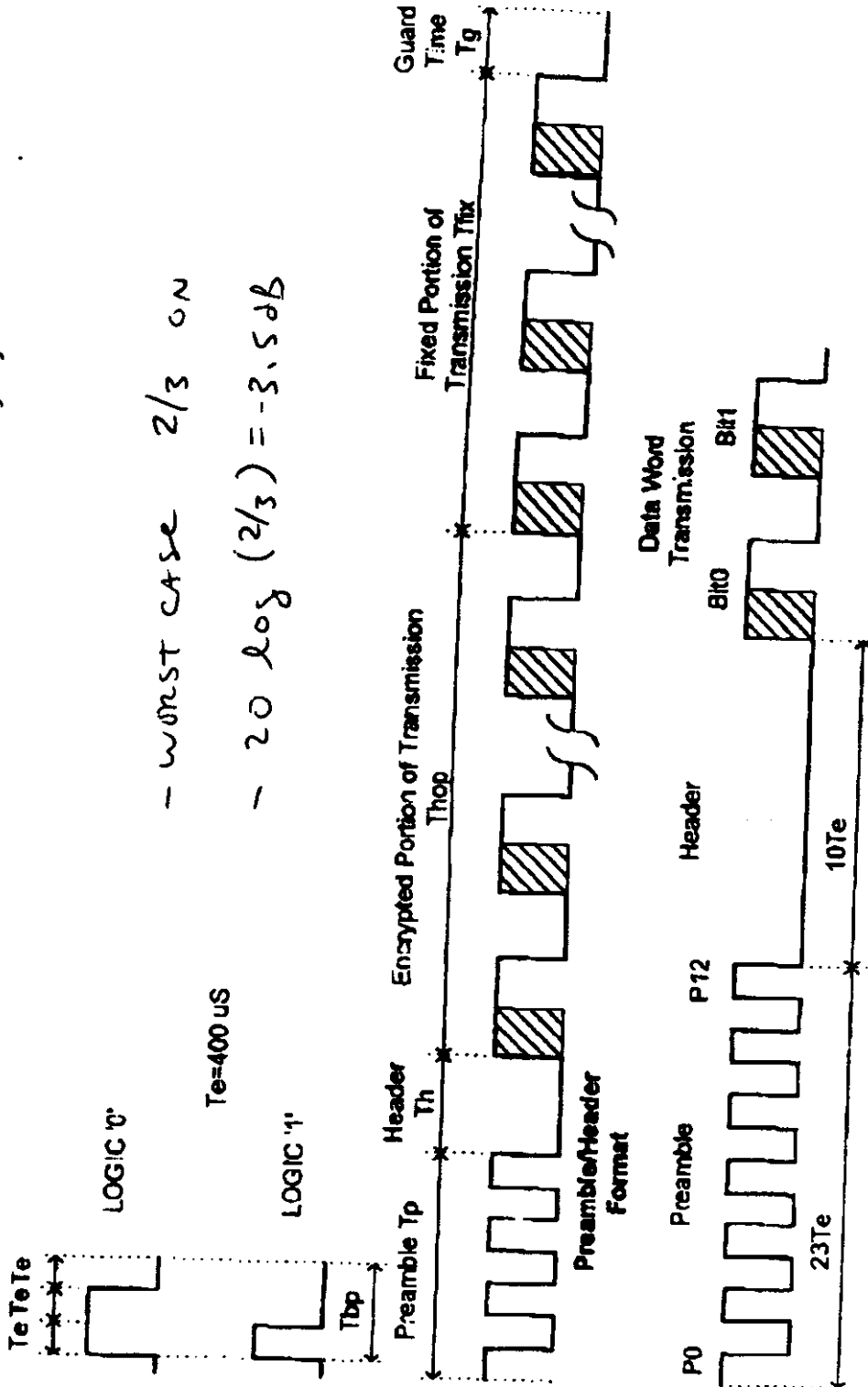
SPAN 200.0 KHz
SWP 30.0 msec

TIMING DIAGRAM FOR MCT 132,131,134

- WORST CASE 2/3 ON

- $20 \log(2/3) = -3.5 \text{ dB}$

$T_e = 400 \text{ uS}$



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Date Revises: 1.9.97 To Whom:		Name: Date:		Signature: Scale:		1	
		Designated: SHAP RA 01.04.98		Catalog No.: 0-2081-0		2	
		Deposited: SHAPRA 01.04.98		Drawing No.: 0F-2381-00		3	
		Updated:		File Name: 0F238100.VED		4	
		Approved: J. P. H. S. 1.9.97		Sheet No. of: 1/1		5	