

EXHIBIT F

Paragraph 2.983(e)

Test Data and Measurement Procedures



Retlif Testing Laboratories

Test Report Number No. R-3244N
FCC ID: NVRCSI210-01

EXHIBIT F

Paragraph 2.985(a)

Power Output



Retlif Testing Laboratories

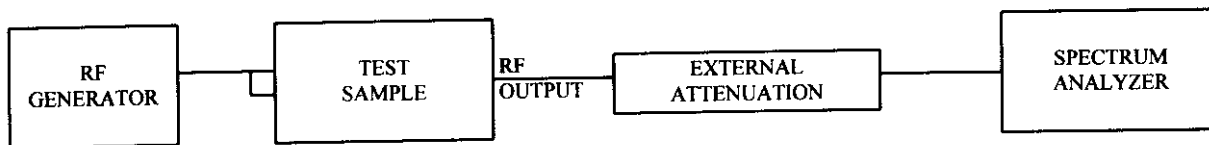
Test Report Number No. R-3244N
FCC ID: NVRC SI210-01

POWER OUTPUT (Para. 2.985(a))

Measurement Procedure:

The uplink and downlink of the test sample were alternately connected through external attenuators to a spectrum analyzer. The power output was measured for the cellular range of unmodulated frequencies.

BASIC TEST SETUP



RF Power Output:

- 1.1 Set up spectrum analyzer:
 - 1.1.1 RES BW @ 10kHz.
 - 1.1.2 Video BW @ 30kHz.
 - 1.1.3 Center frequency to desired carrier frequency.
 - 1.1.4 Span 1.0MHz.
- 1.2 Connect signal generator to EUT uplink input.
- 1.3 Connect EUT uplink output to spectrum analyzer.
- 1.4 Manually turn the gain control of the EUT to maximum.
- 1.5 Input the low uplink frequency (806MHz) into the EUT.
- 1.6 Increase the input power until the maximum output power is achieved (the output power will no longer increase).
- 1.7 Plot this display. This is the max power output.
- 1.8 Remove the input cable from the EUT and connect it to the to the spectrum analyzer.
Plot this display. This is the max power in.



Retlif Testing Laboratories

Test Report Number No. R-3244N
FCC ID: NVRCSI210-01

POWER OUTPUT (Para. 2.985(a) (continued))

- 1.9 Repeat Steps 1.1.3, 1.6 through 1.8 for the midband and high uplink frequencies.
- 1.10 Reverse the cable connections on the EUT.
- 1.11 Repeat Steps 1.1.3, 1.4, 1.6 through 1.8 for the low, mid, and high downlink frequencies.
- 1.12 Reduce the input power by 15, 30, and 60dB for all the above cases, and measure the output signal to verify signal gain at different power levels. Plot each case.

Measurement Results:

Examination of the test data indicates that the operation of the EUT caused no unacceptable deviations.

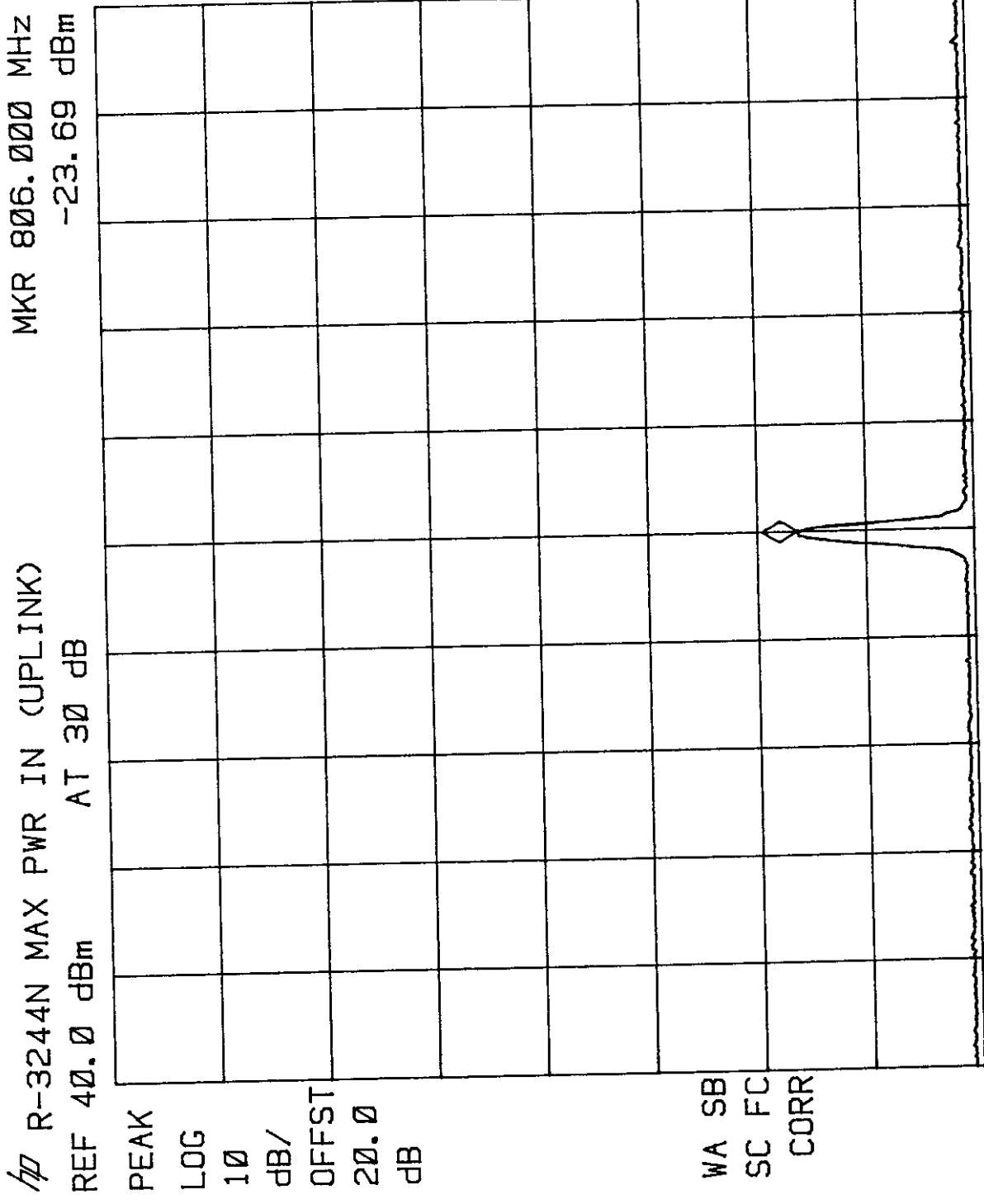


Retlif Testing Laboratories

Test Report Number No. R-3244N
FCC ID: NVRCSI210-01

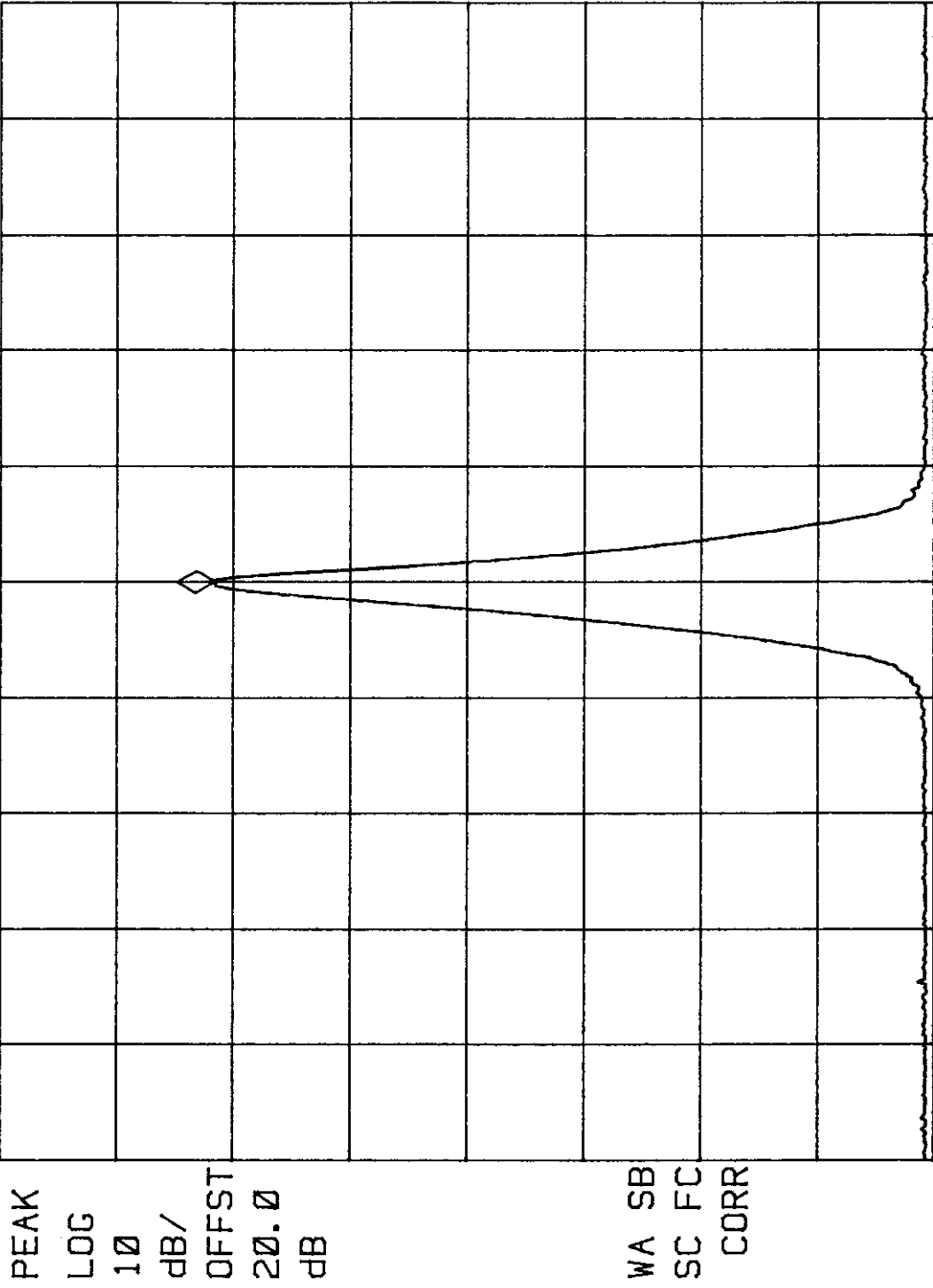
RETLIF TESTING LABORATORIES

RF POWER OUTPUT		Test Method
Cellular Specialties	Job No. R-3244N	Customer
Bidirectional Amplifier	Serial No. 1040	Test Sample
RF Power Output	Paragraph 2.985	Model No.
Amplifying incoming and outgoing cellular phone signals		Test Specification
T. Cracco	Date 4/30/98	Operating Mode
Gain control adjusted to maximum. Input signal adjusted to yield maximum power out.		Technician
		Notes



2

R-3244N MAX PWR OUT (UPLINK)
REF 40.0 dBm AT 30 dB
MKR 806.000 MHz
21.55 dBm



CENTER 806.000 MHz
#RES BW 10 kHz
SPAN 1.000 MHz
SWP 30.0 msec
VBW 30 kHz

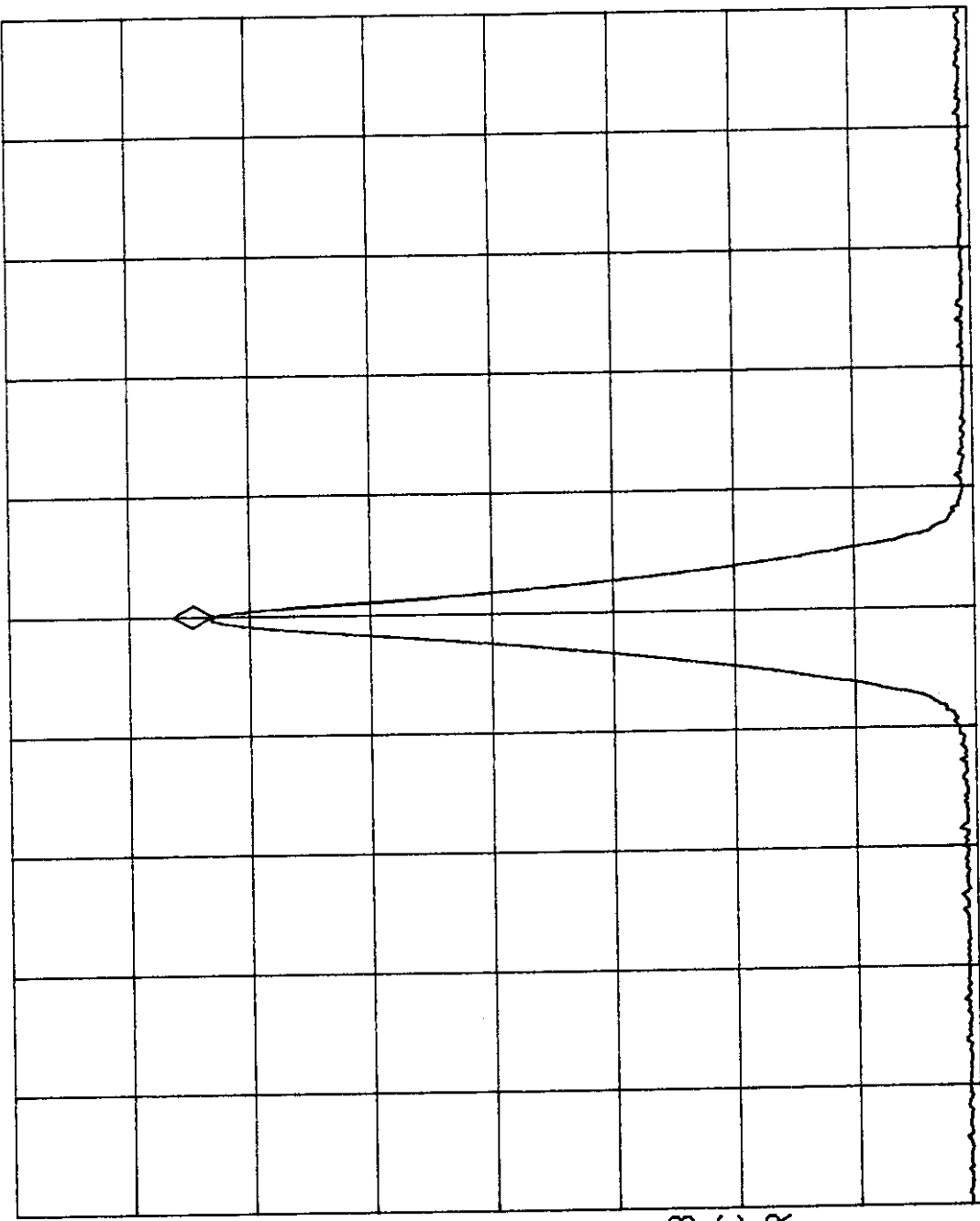
RF POWER OUTPUT	Job No.	R-3244N
Cellular Specialties	Serial No.	1040
Bidirectional Amplifier	Model No.	110
Test Sample	Test Specification	RF Power Output
Customer	Operating Mode	Amplifying incoming and outgoing cellular phone signals
Test Method	Technician	T. Crisco
	Date	4/30/98
	Paragraph	2.985
Notes Gain control adjusted to maximum. Input signal adjusted to yield maximum power out.		

RETLIF TESTING LABORATORIES

RF POWER OUTPUT	<input type="text" value="R-3244N"/>	Job No.	<input type="text" value="R-3244N"/>	Cellular Specialties	<input type="text" value=""/>
Bidirectional Amplifier	<input type="text" value="1040"/>	Serial No.	<input type="text" value="1040"/>	Model No.	<input type="text" value=""/>
RF Power Output	Paragraph 2.985				
Amplifying incoming and outgoing cellular phone signals	<input type="text" value=""/>				
Operating Mode	<input type="text" value=""/>				
Test Specification	<input type="text" value=""/>				
Test Sample	<input type="text" value=""/>				
Customer	<input type="text" value=""/>				
Test Method	<input type="text" value=""/>				
Notes	Gain control adjusted to maximum. Input signal adjusted to yield maximum power out.				

Sheet **3** of **12**

MKR 815.000 MHz
 REF 40.0 dBm AT 30 dB
 PEAK
 LOG
 10
 /BP
 OFFST
 20.0
 dB
 WA SB
 SC FC
 CORR



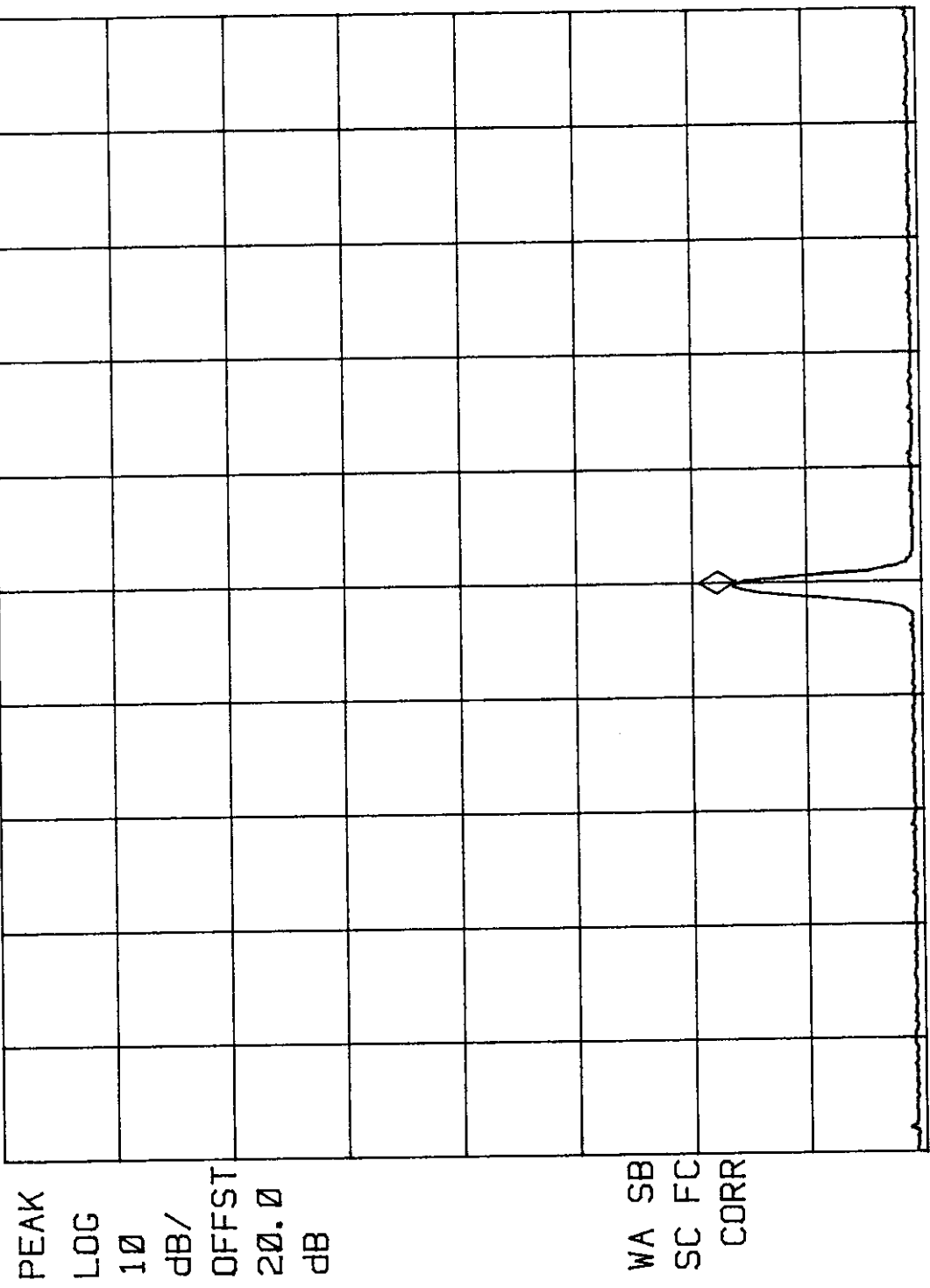
CENTER 815.000 MHz
 #RES BW 10 kHz
 SPAN 1.000 MHz
 SWP 30.0 msec
 VBW 30 kHz

RETLIE TESTING LABORATORIES

RF POWER OUTPUT		Cellular Specialties	Job No.	R-3244N
Bidirectional Amplifier			Serial No.	1040
110			RF Power Output	Paragraph 2.985
Test Specification		Amplifying incoming and outgoing cellular phone signals		
Model No.			Date	4/30/98
Test Sample			T. Crisco	
Customer			Notes	
Test Method			Gain control adjusted to maximum. Input signal adjusted to yield maximum power out.	

Sheet 4 of 12

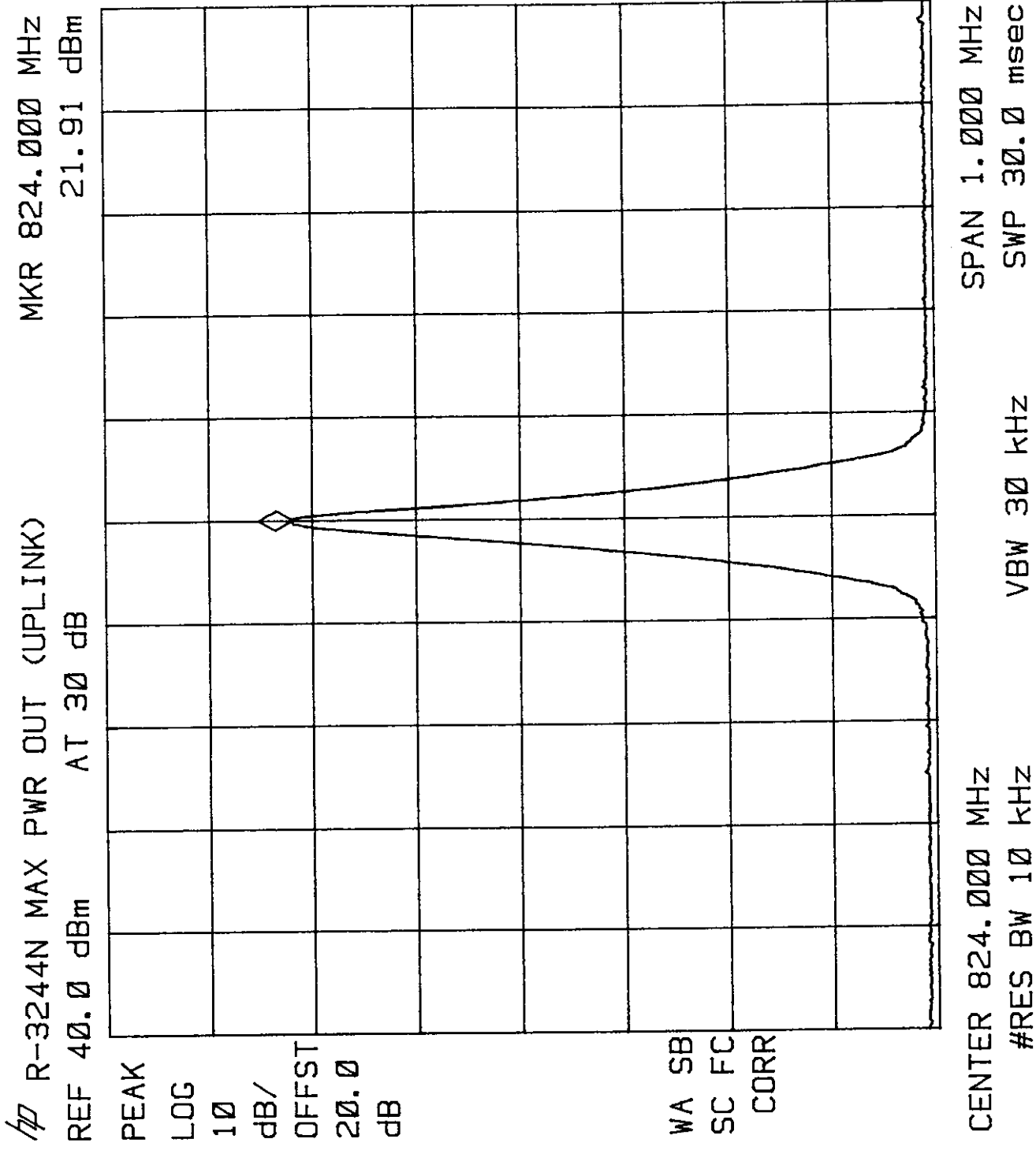
MKR 815.000 MHz
 REF 40.0 dBm AT 30 dB
 -23.80 dBm



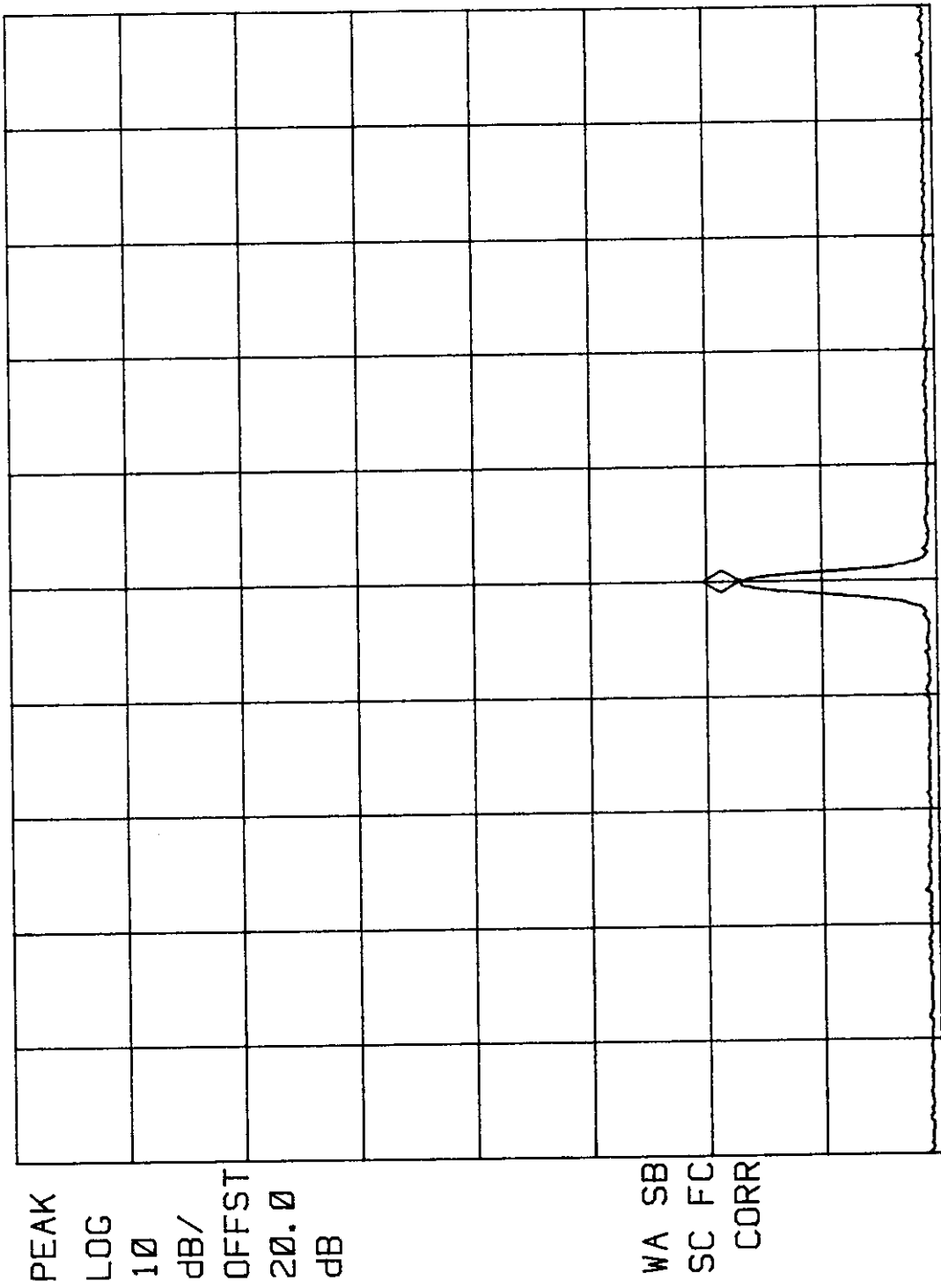
CENTER 815.000 MHz
 #RES BW 10 KHZ
 SPAN 1.000 MHz
 SWP 30.0 msec
 VBW 30 KHZ

RETLIE TESTING LABORATORIES

RF POWER OUTPUT	Job No.	R-3244N	Cellular Specialties	Customer	Test Method
			Bidirectional Amplifier		
		110			Model No.
		Serial No. 1040			Test Sample
		Paragraph 2.985			Test Specification
					Operating Mode
					Technician
					Notes
					Amplifying incoming and outgoing cellular phone signals
					Date
					4/30/98
					T. Crisco
					Gain control adjusted to maximum. Input signal adjusted to yield maximum power out.



47 R-3244N MAX PWR IN (UPLINK) MKR 824.000 MHz
 REF 40.0 dBm AT 30 dB -22.91 dBm



CENTER 824.000 MHz SPAN 1.000 MHz
 #RES BW 10 KHZ VBW 30 KHZ SWP 30.0 msec

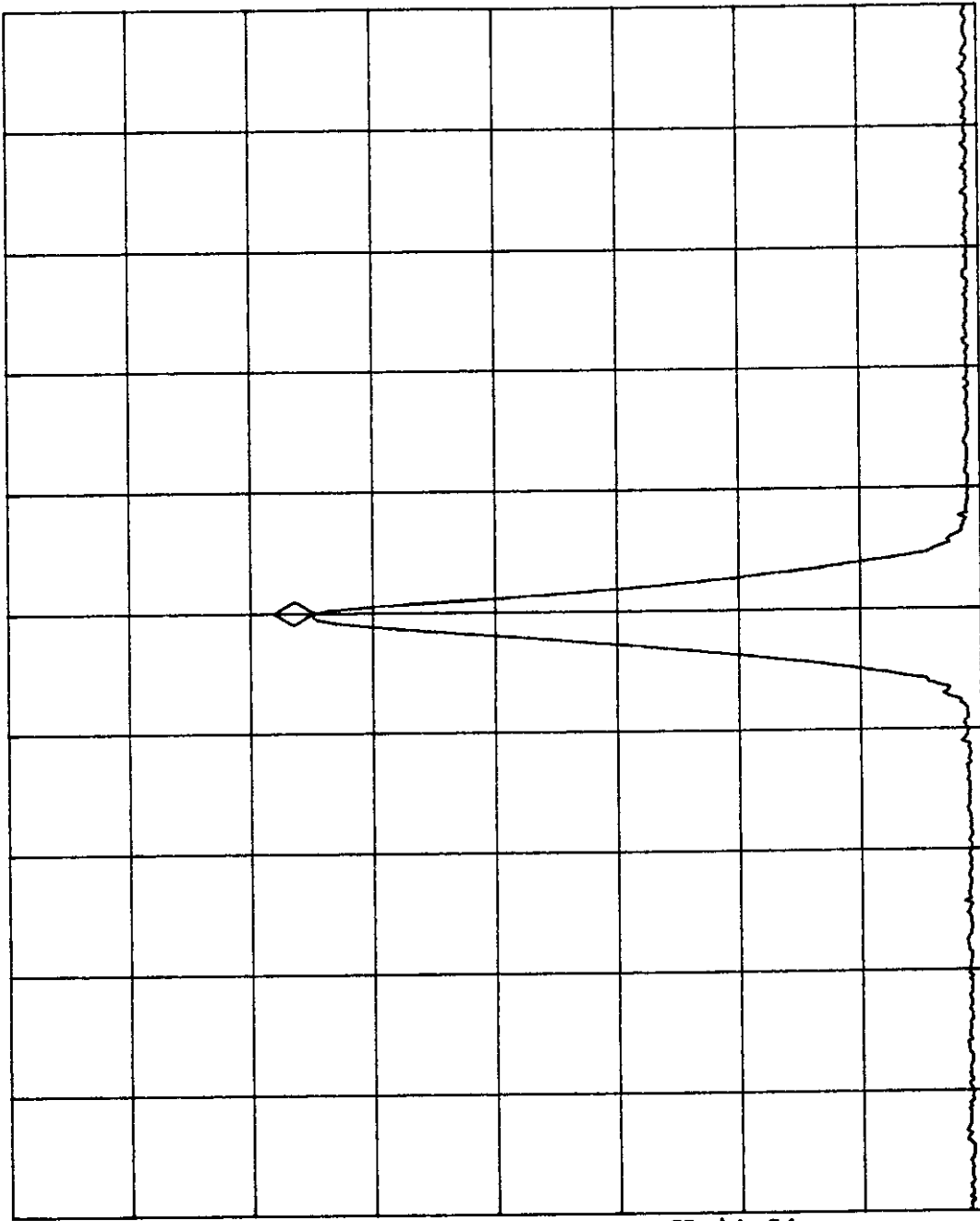
PEAK
 LOG
 10
 dB/
 OFFST
 20.0
 dB
 WA SB
 SC FC
 CORR

RF POWER OUTPUT	Job No.	R-3244N
Cellular Specialties	Serial No.	1040
Bidirectional Amplifier	Paragraph	2.985
Model No.	Date	4/30/98
Test Sample	Amplifying incoming and outgoing cellular phone signals	
Customer	T. Cinco	
Test Method	Gain control adjusted to maximum. Input signal adjusted to yield maximum power out.	

RETLIF TESTING LABORATORIES

RF POWER OUTPUT	Job No. <input type="text" value="R-3244N"/>	Cellular Specialties	Customer	Test Method
	Serial No. <input type="text" value="1040"/>	Bidirectional Amplifier	Test Sample	
	Paragraph 2.985	RF Power Output	Model No.	
	Amplifying incoming and outgoing cellular phone signals		Test Specification	
	Date <input type="text" value="4/30/98"/>		Operating Mode	
	T. Cracco		Technician	
	Notes			

MKR 858.000 MHz
 REF 40.0 dBm AT 30 dB
 PEAK
 LOG
 10
 dB/
 OFFST
 20.0
 dB



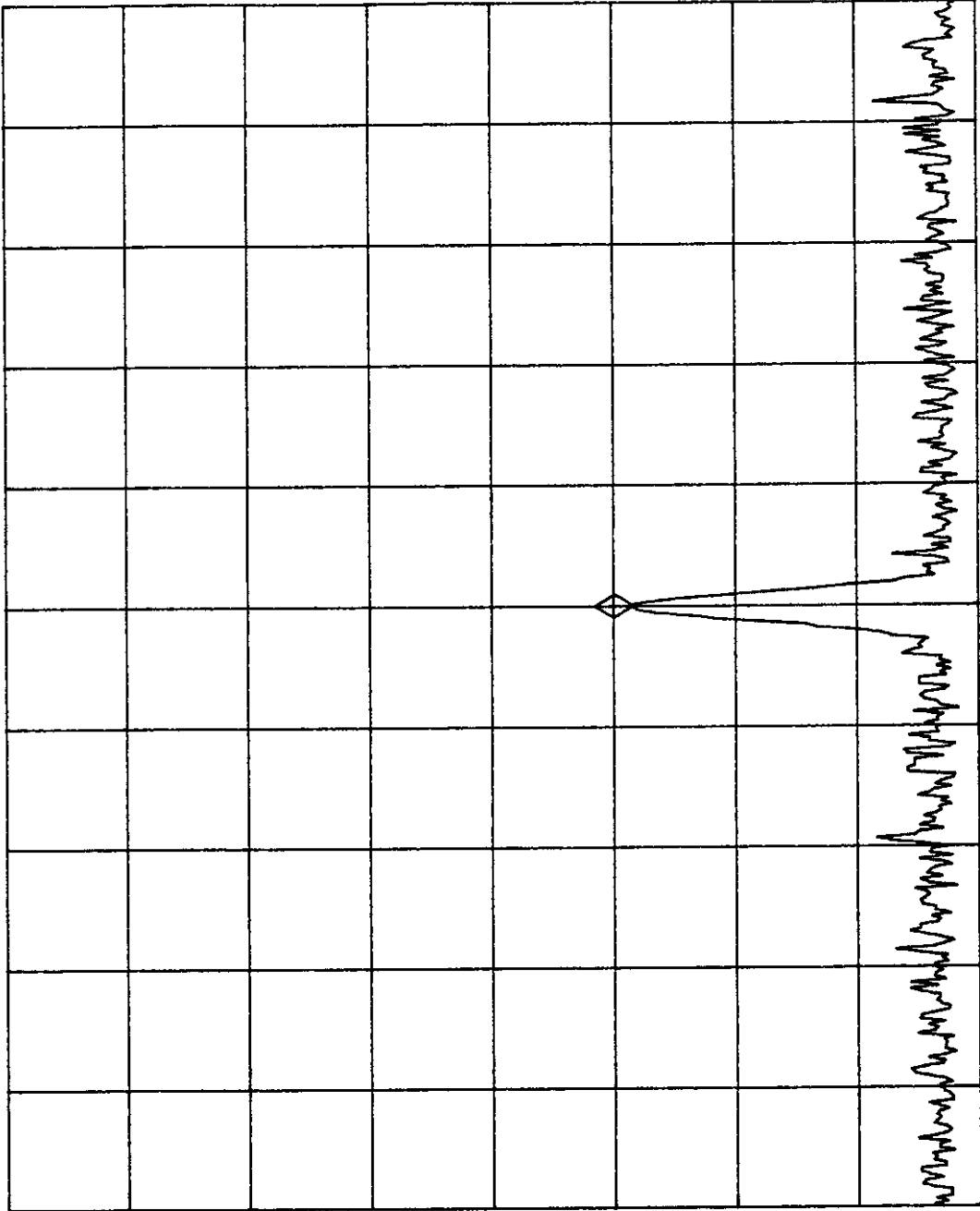
CENTER 858.000 MHz
 #RES BW 10 kHz
 VBW 30 kHz
 SWP 30.0 msec
 SPAN 1.000 MHz

RETLIF TESTING LABORATORIES

RF POWER OUTPUT	Job No. R-3244N	Cellular Specialties	Bidirectional Amplifier	110	Serial No. 1040	RF Power Output Paragraph 2.985	Amplifying incoming and outgoing cellular phone signals	T. Crisco	Date 4/30/98	Gain control adjusted to maximum. Input signal adjusted to yield maximum power out.
Test Method	Customer	Test Sample	Model No.	Test Specification	Operating Mode	Notes	Technician			

Sheet 8 of 12

R-3244N MAX PWR IN (DNLINK) MKR 858.000 MHz
 REF .0 dBm AT 10 dB -51.70 dBm
 PEAK
 LOG
 10
 dB/
 OFFST
 20.0
 dB



WA SB
 SC FC
 CORR

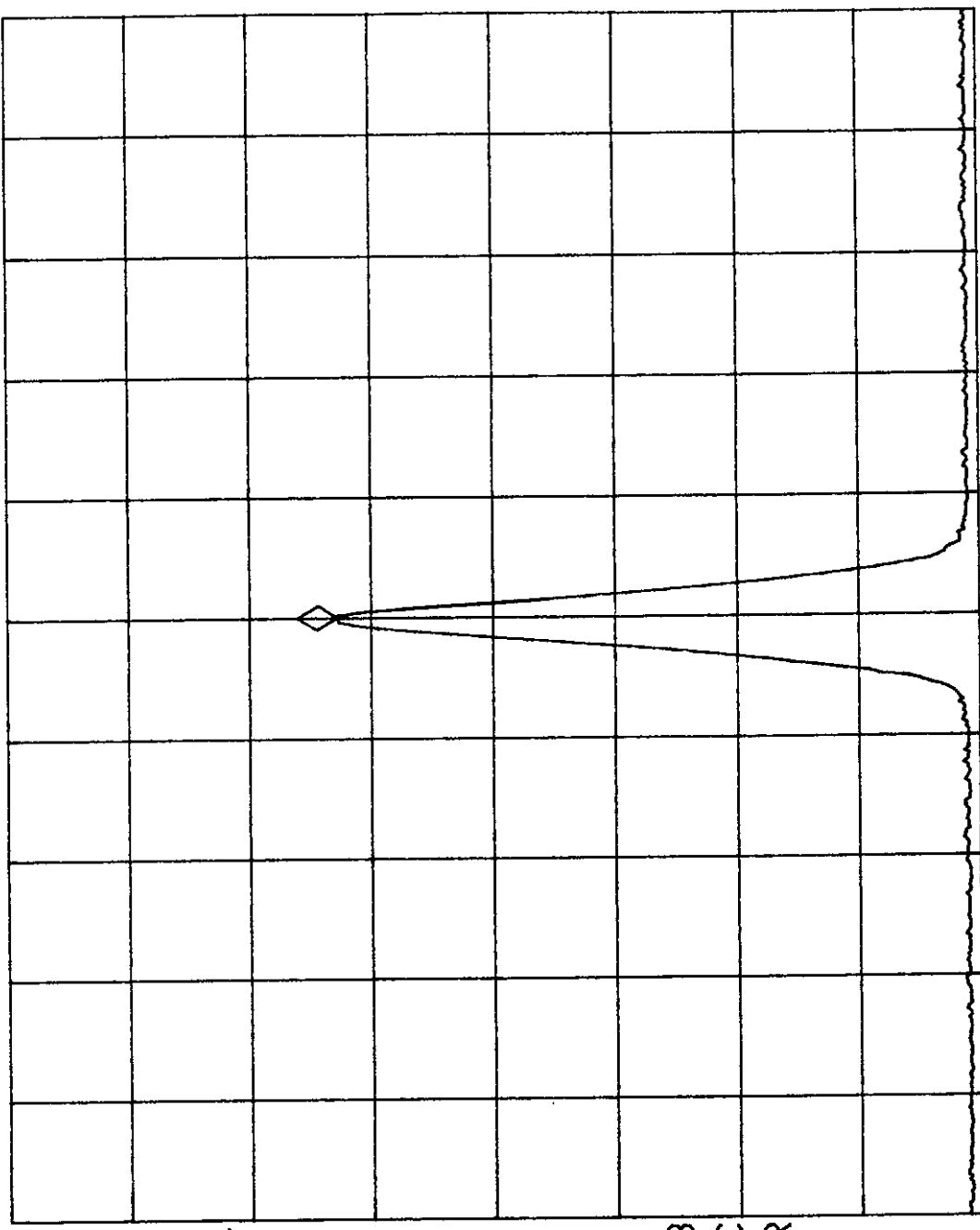
CENTER 858.000 MHz SPAN 1.000 MHz
 #RES BW 10 KHZ VBW 30 KHZ SWP 30.0 msec

RETLIF TESTING LABORATORIES

RF POWER OUTPUT				
Cellular Specialties	Job No.	R-3244N		
Bidirectional Amplifier	Serial No.	1040		
110	RF Power Output	Paragraph	2.985	
Amplifying incoming and outgoing cellular phone signals				
Technician		T. Circo	Date	
			4/30/98	
Notes				
Gain control adjusted to maximum. Input signal adjusted to yield maximum power out.				

Sheet **9** of **12**

R-3244N MAX PWR OUT (DNLINK)
MRK 849.000 MHz
REF 40.0 dBm AT 30 dB
12.75 dBm
PEAK
LOG
10
dB/
OFFST
20.0
BP



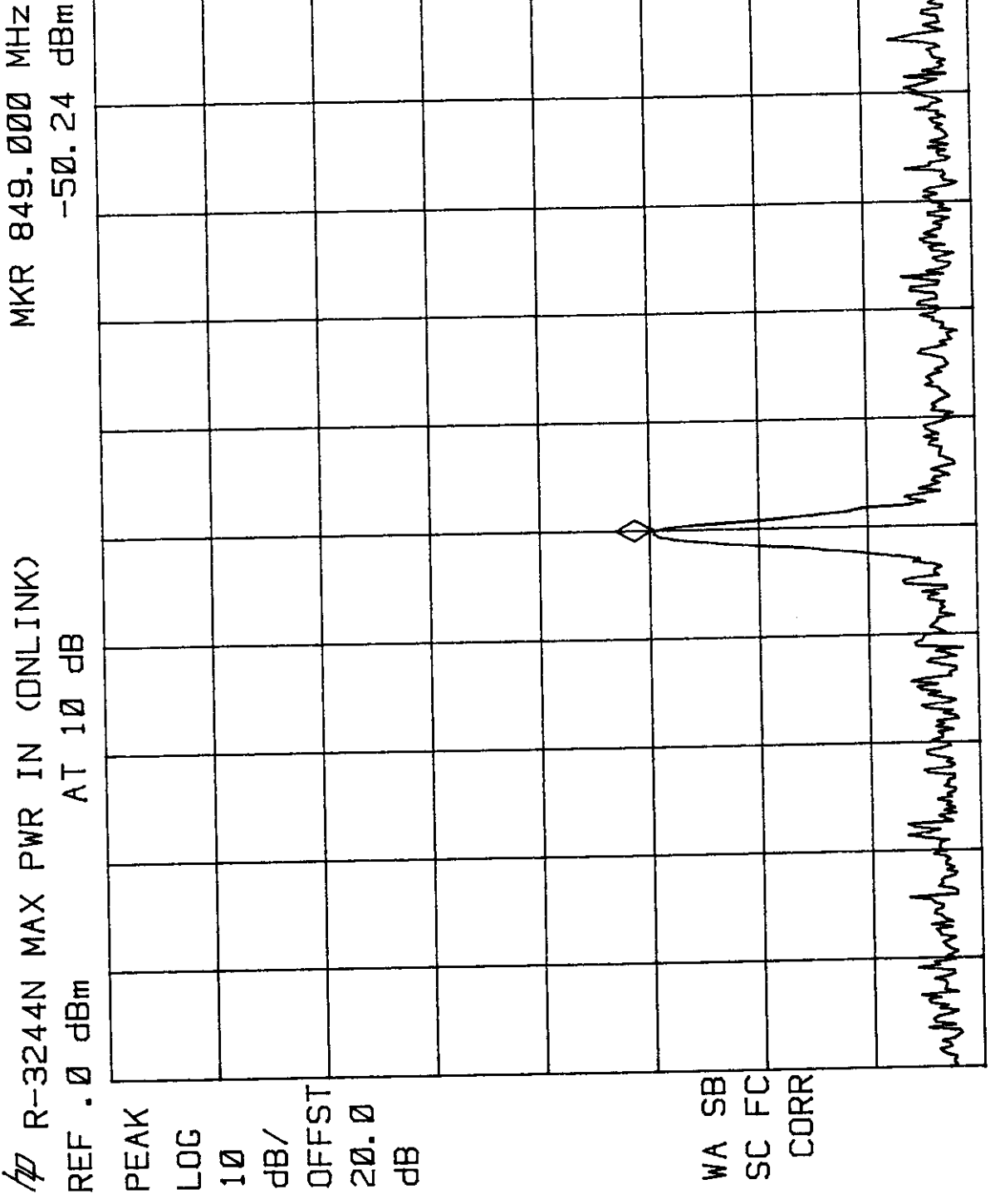
WA SB
SC FC
CORR

CENTER 849.000 MHz
#RES BW 10 KHz
SPAN 1.000 MHz
SWP 30.0 msec
VBW 30 KHz

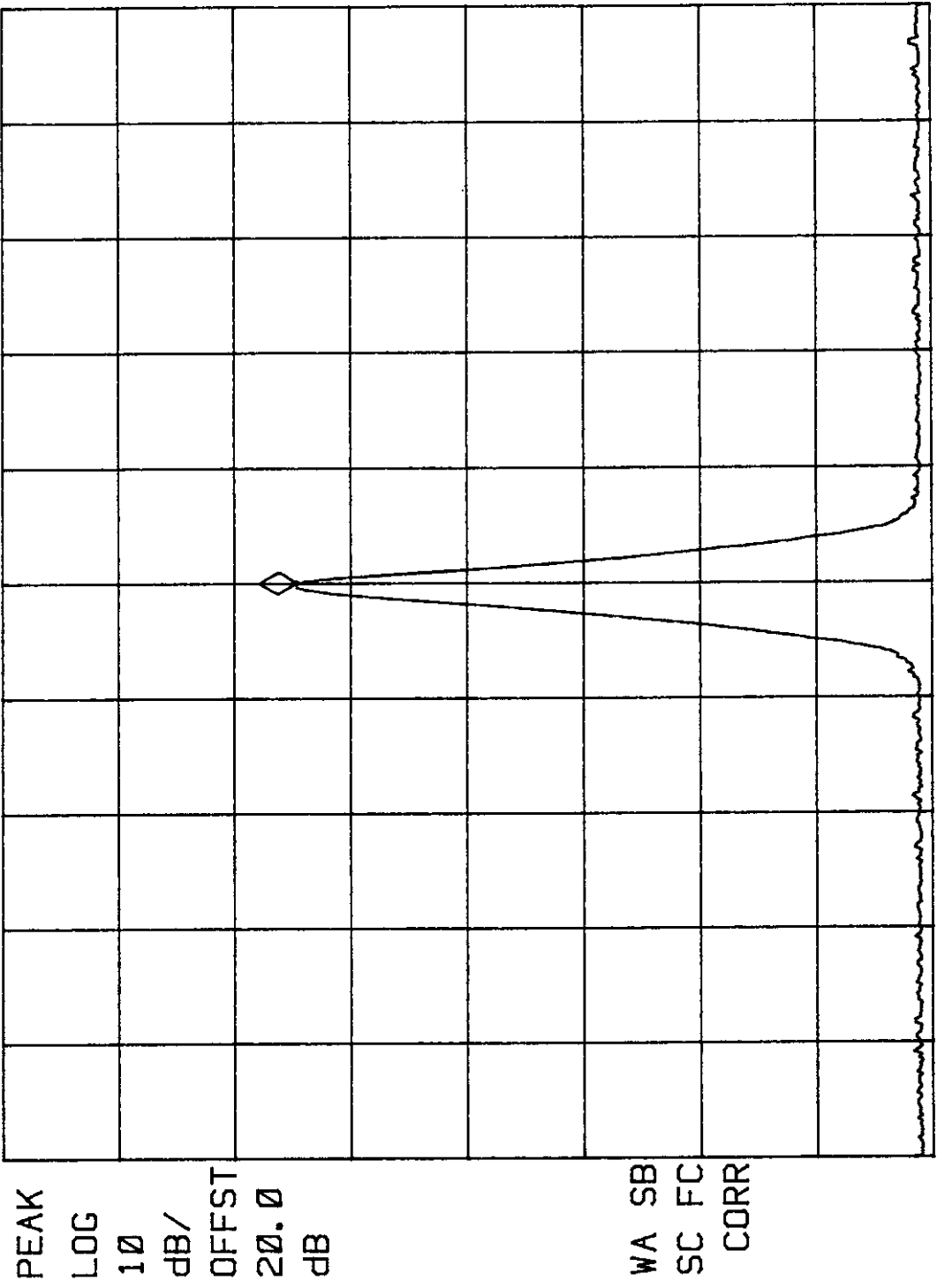
RETLIF TESTING LABORATORIES

RF POWER OUTPUT	Job No.	R-3244N	Cellular Specialties	Customer
			Bidirectional Amplifier	Test Sample
		1040	Serial No.	Model No.
		Paragraph 2.985	RF Power Output	Test Specification
			Amplifying incoming and outgoing cellular phone signals	
		4/30/98	Date	Operating Mode
			T. Crisco	Technician
		Gain control adjusted to maximum. Input signal adjusted to yield maximum power out.		

Sheet 10 of 12



✓ R-3244N MAX PWR OUT (DNLINK) MKR 867.000 MHz
 REF 40.0 dBm AT 30 dB 14.57 dBm



CENTER 867.000 MHz SPAN 1.000 MHz
 #RES BW 10 kHz VBW 30 kHz SWP 30.0 msec

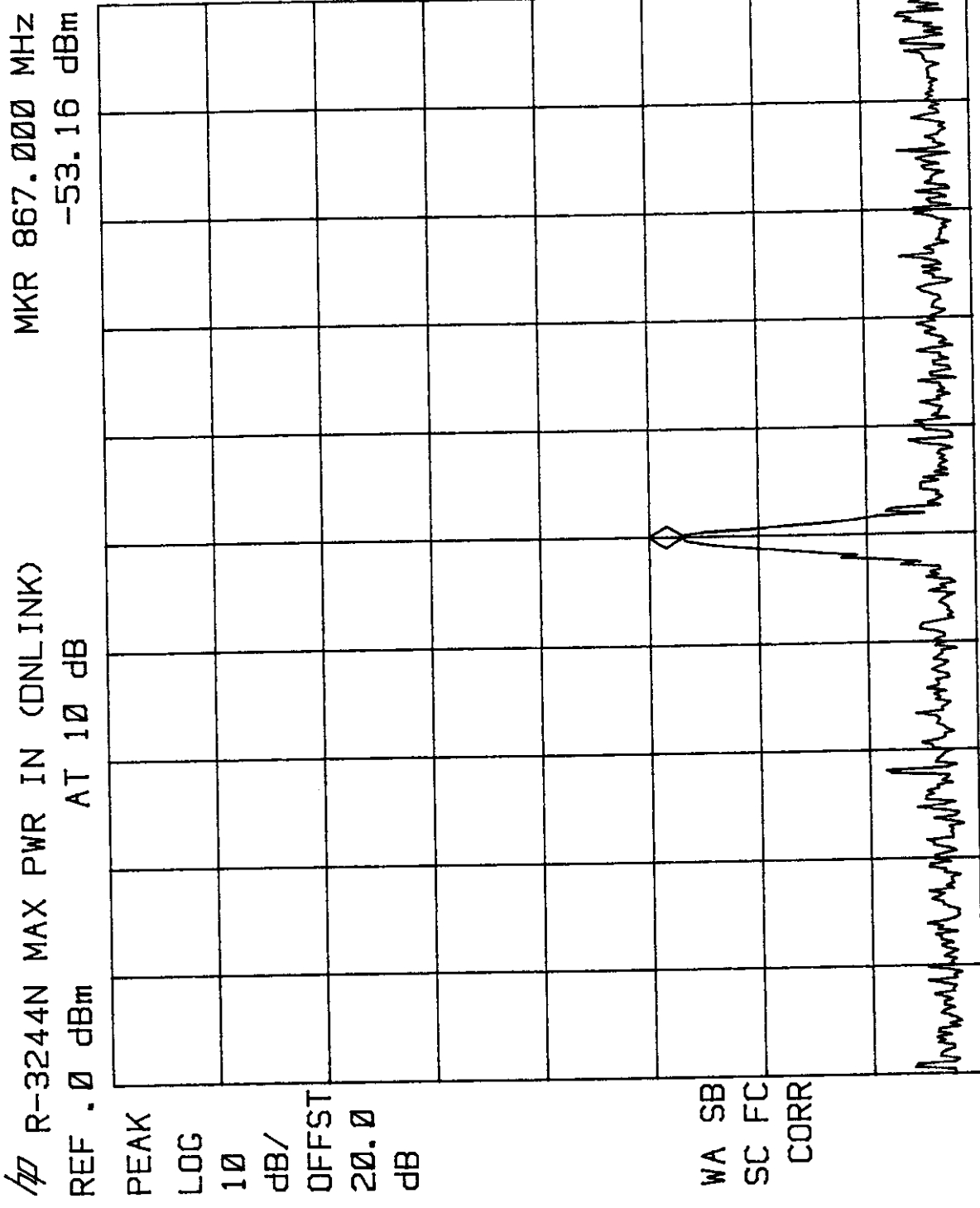
PEAK
 LOG
 10
 dB/
 OFFST
 20.0
 dB
 WA SB
 SC FC
 CORR

RF POWER OUTPUT	Job No.	R-3244N
Cellular Specialties	Serial No.	1040
Bidirectional Amplifier	RF Power Output	Paragraph 2.985
Test Sample	Operating Mode	Amplifying incoming and outgoing cellular phone signals
Customer	Technician	T. Critco
Test Method	Notes	Gain control adjusted to maximum. Input signal adjusted to yield maximum power out.

RETLIF TESTING LABORATORIES

RF POWER OUTPUT	Job No.	R-3244N	Cellular Specialties	Customer	Test Method
			Bidirectional Amplifier		Test Sample
	Serial No.	1040			Model No.
			RF Power Output	Paragraph	2.985
			Amplifying incoming and outgoing cellular phone signals		
	Date	4/30/98			Operating Mode
					Technician
					Notes

Sheet 12 of 12



CENTER 867.000 MHz SPAN 1.000 MHz
 #RES BW 10 KHZ VBW 30 KHZ SWP 30.0 msec

RETLIF TESTING LABORATORIES

RF POWER OUTPUT
 Cellular Specialties
 Bidirectional Amplifier
 110
 RF Power Output
 Paragraph 2.985
 Amplifying incoming and outgoing cellular phone signals
 T. Cracco
 Date 4/30/98

Notes

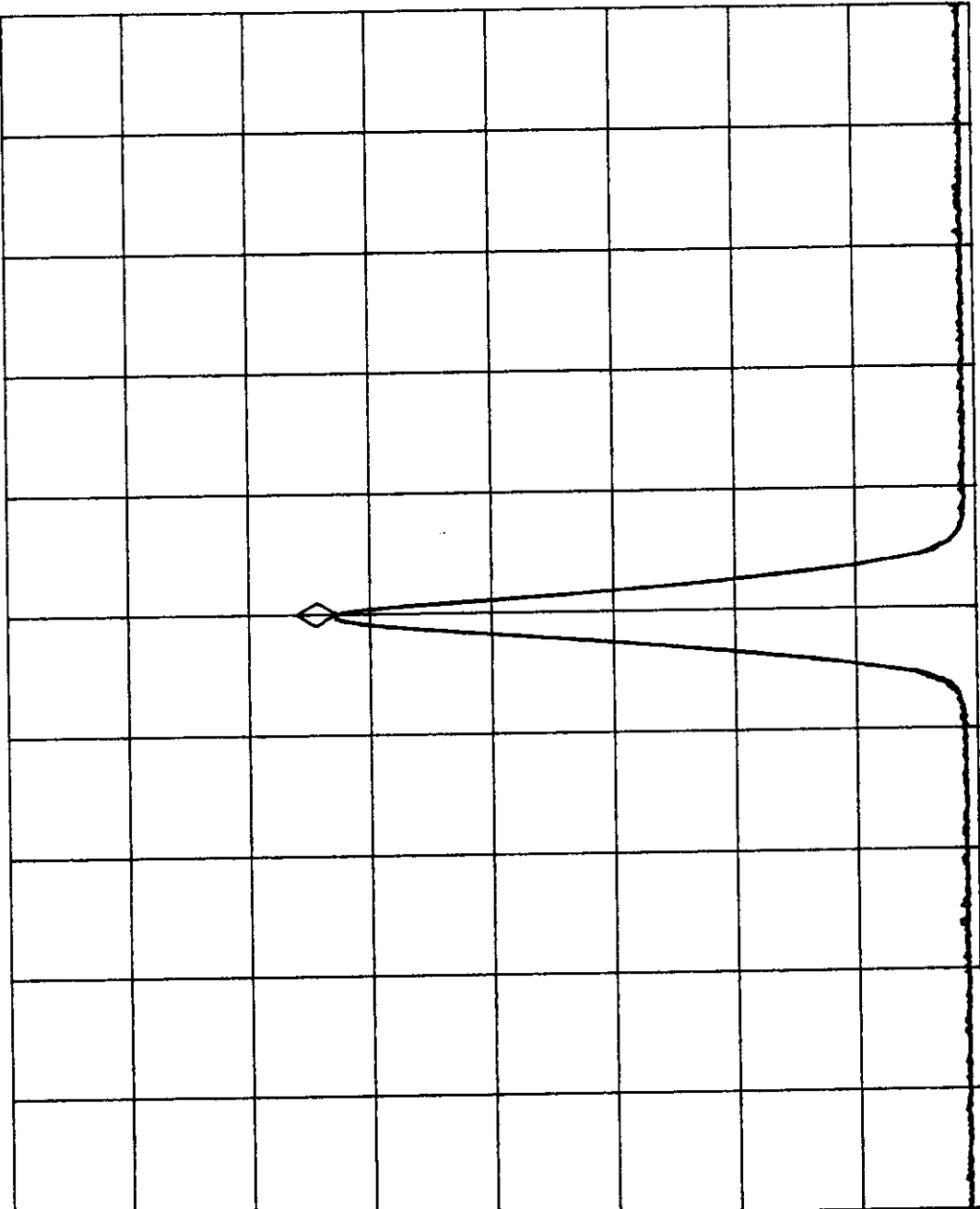
Sheet 1 of 1

Test Method
 Customer
 Test Sample
 Model No.
 Test Specification
 Operating Mode
 Technician

R-3244N INPUT VOLTAGE VARIATION (TYP) 115V +/- 15%
 REF 40.0 dBm AT 30 dB

PEAK
 LOG
 10
 dB/
 OFFST
 20.0
 dB

WA SB
 SC FC
 CORR



CENTER 849.000 MHz
 #RES BW 10 KHz
 VBW 30 KHz
 SWP 30.0 msec
 SPAN 1.000 MHz

EXHIBIT F

Paragraph 2.989

Occupied Bandwidth



Retlif Testing Laboratories

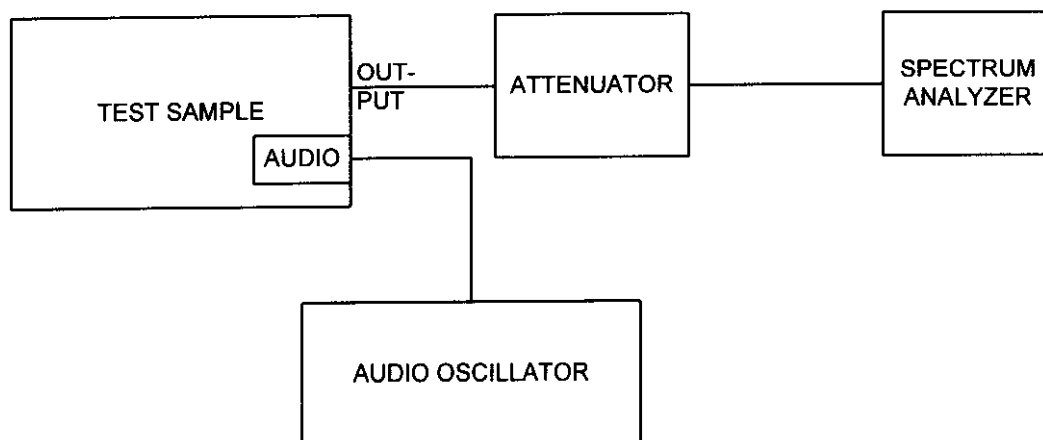
Test Report Number No. R-3244N
FCC ID: NVRCSI210-01

OCCUPIED BANDWIDTH (PARA.2.989)

Measurement Procedure:

An audio signal was coupled to the input terminal of the EUT. The output was monitored. The audio input level was increased to produce 50% modulation. The output was then coupled through external attenuators to a spectrum analyzer and the audio level was increased by 16 dB. The occupied bandwidth of the carrier, modulated at 50% plus 16 dB, was then measured at the low, mid, and high frequencies.

BASIC TEST SETUP



Occupied Bandwidth:

- 2.1 Set up spectrum analyzer:
 - 2.1.1 RES BW @ 300Hz.
 - 2.1.2 Video BW @ 1kHz.
 - 2.1.3 Center frequency to desired carrier frequency.
 - 2.1.4 Span @ 250kHz.
 - 2.1.5 Trace on Channel "A".
 - 2.1.6 Reference level set to the maximum power input/output of the desired frequency.



Retlif Testing Laboratories

Test Report Number No. R-3244N
FCC ID: NVRCSI210-01

OCCUPIED BANDWIDTH (PARA.2.989) (continued)

- 2.2 Connect the output of the signal generator to the spectrum analyzer.
- 2.3 From the information attained from Step 1.8, set the signal generator to the maximum input power for the desired carrier frequency.
- 2.4 Allow the spectrum analyzer to show the display of the carrier frequency; set the reference level so that the maximum carrier signal is at the top of the analyzer display; then use the "VIEW A" function to freeze the image.
- 2.5 Set trace to Channel "B".
- 2.6 Apply a 16kHz Sine Wave FM modulation to the carrier signal. Allow the spectrum analyzer to show the display of the modulated signal, then use the "VIEW B" function to freeze the image.
- 2.7 Plot this information.
- 2.8 Connect the output of the signal generator to the EUT. Connect the EUT to the spectrum analyzer.
- 2.9 Repeat Steps 2.4 through 2.7.
- 2.10 Repeat Steps 2.2 through 2.9 for the 5 remaining carrier frequencies.
- 2.11 Repeat Steps 2.2 through 2.10 except apply a 16kHz Square Wave FM modulation signal to the carrier frequencies.

Measurement Results:

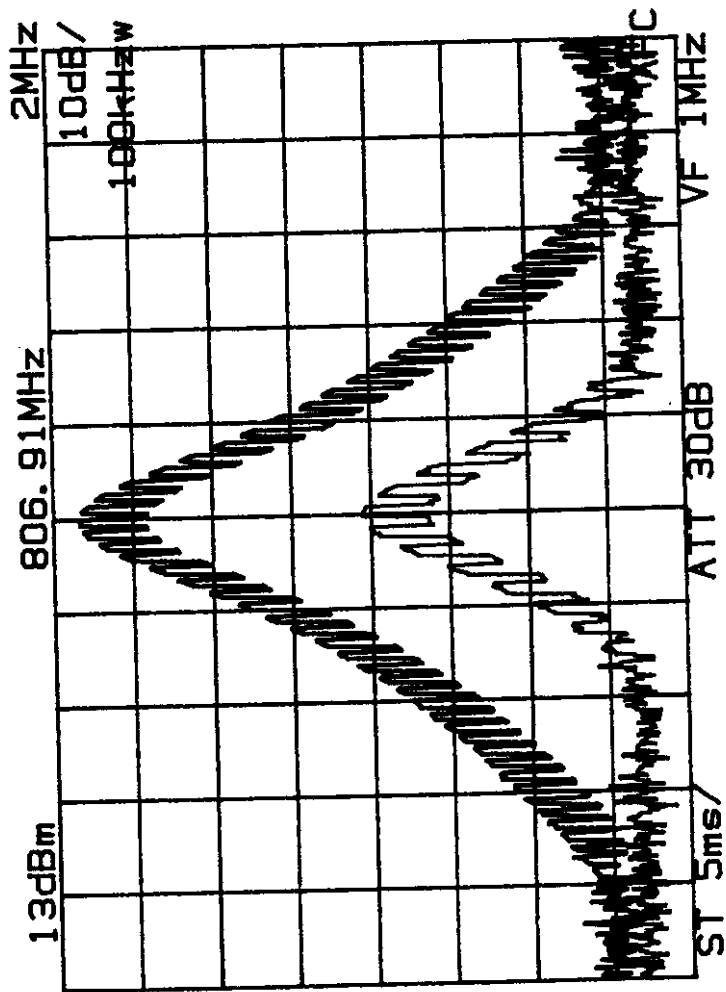
Examination of the test data indicates that the operation of the EUT caused no unacceptable deviations.



Retlif Testing Laboratories

Test Report Number No. R-3244N
FCC ID: NVRCSI210-01

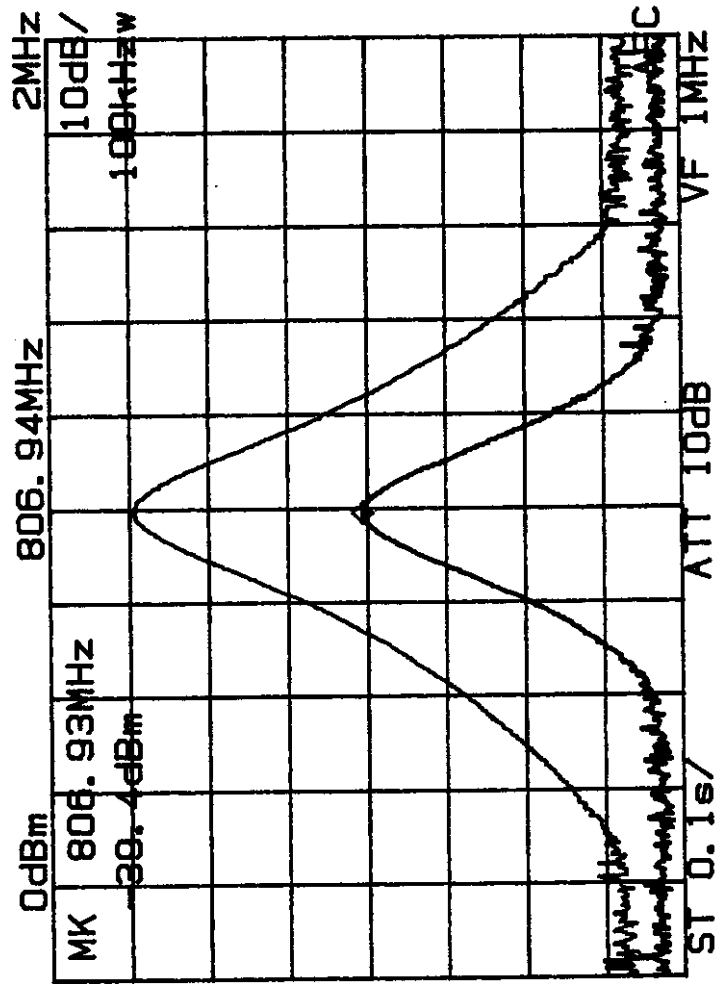
OCCUPIED BANDWIDTH COMPARISON
USING DIGITAL SIGNAL
INTO UPLINK PORT ONLY



Retlif Testing Laboratories

Test Report Number No. R-3244N
FCC ID: NVRCSI210-01

OCCUPIED BANDWIDTH COMPARISON
USING ANALOG SIGNAL
INTO UPLINK PORT ONLY



Retlif Testing Laboratories

Test Report Number No. R-3244N
FCC ID: NVRCSI210-01

OCCUPIED BANDWIDTH DATA
WITH
GENERATOR OUTPUT CONNECTED TO UPLINK PORT
(12 PAGES OF DATA)



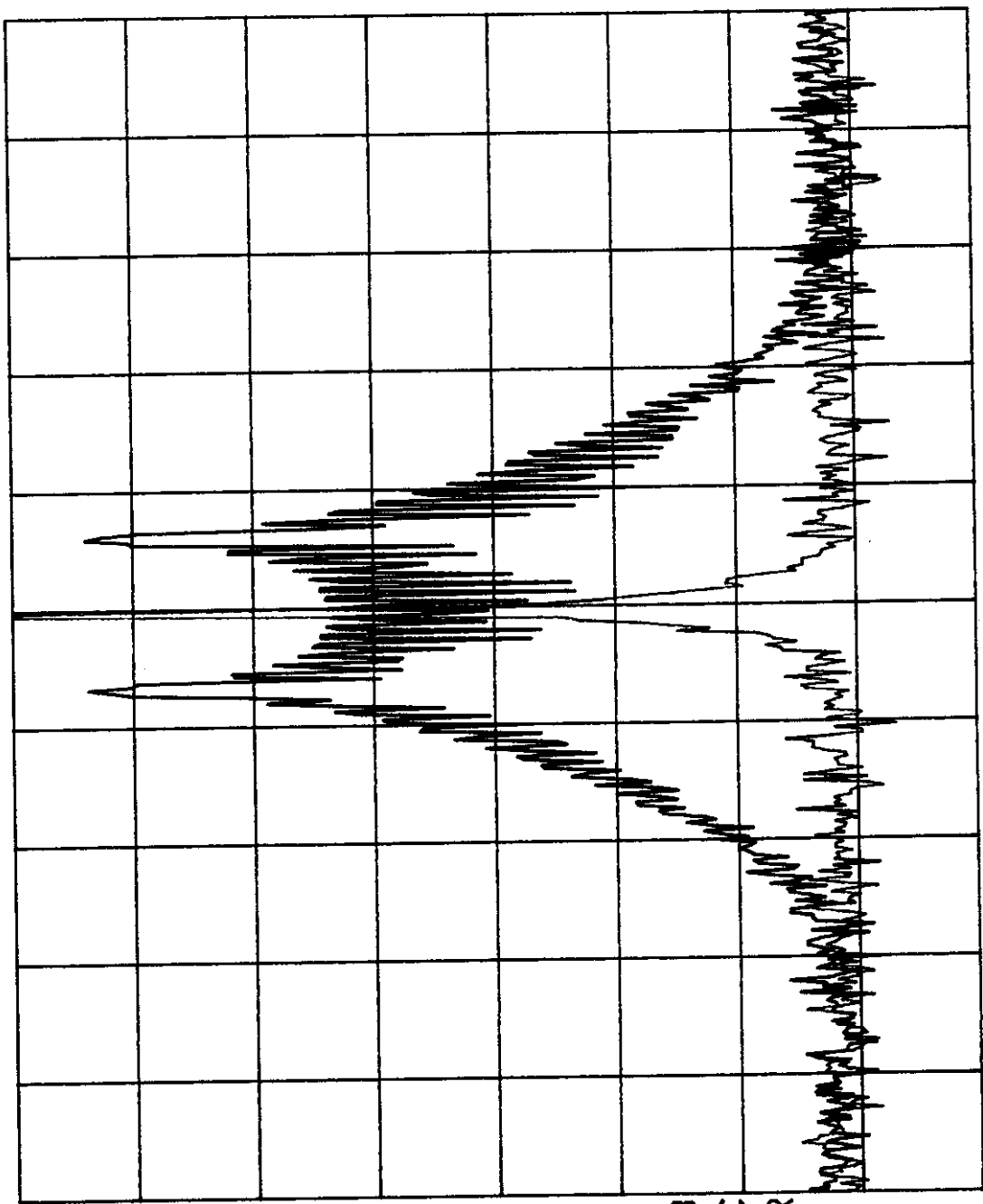
Retlif Testing Laboratories

Test Report Number No. R-3244N
FCC ID: NVRCSI210-01

R-3244N OCCUPIED BANDWIDTH (SOURCE)

REF -24.4 dBm AT 10 dB

PEAK
LOG
10
dB/
OFFST
20.0
dB



VA VB
SC FC
CORR

CENTER 806.0000 MHz
#RES BW 300 Hz

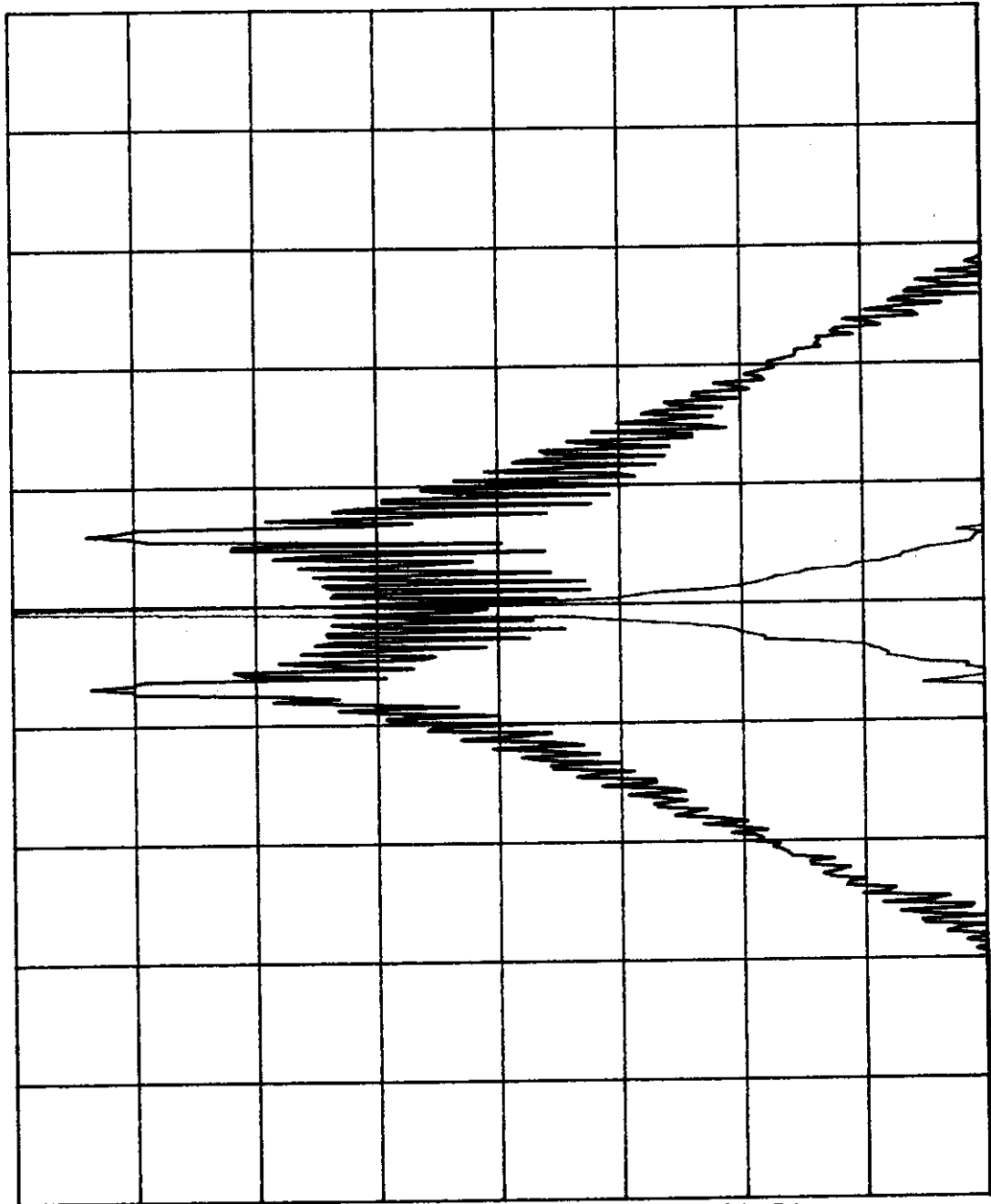
SPAN 250.0 kHz
SWP 8.33 sec

VBW 1 kHz

R-3244N OCCUPIED BANDWIDTH (AMP)
REF 22.3 dBm AT 20 dB

PEAK
LOG
10
dB/
OFFST
20.0
dB

VA VB
SC FC
CORR



CENTER 806.0000 MHz
#RES BW 300 Hz
SPAN 250.0 KHz
SWP 8.33 sec
VBW 1 KHz

R-3244N OCCUPIED BANDWIDTH (SOURCE)

REF -24.5 dBm AT 10 dB

PEAK

LOG

10

dB/

OFFST

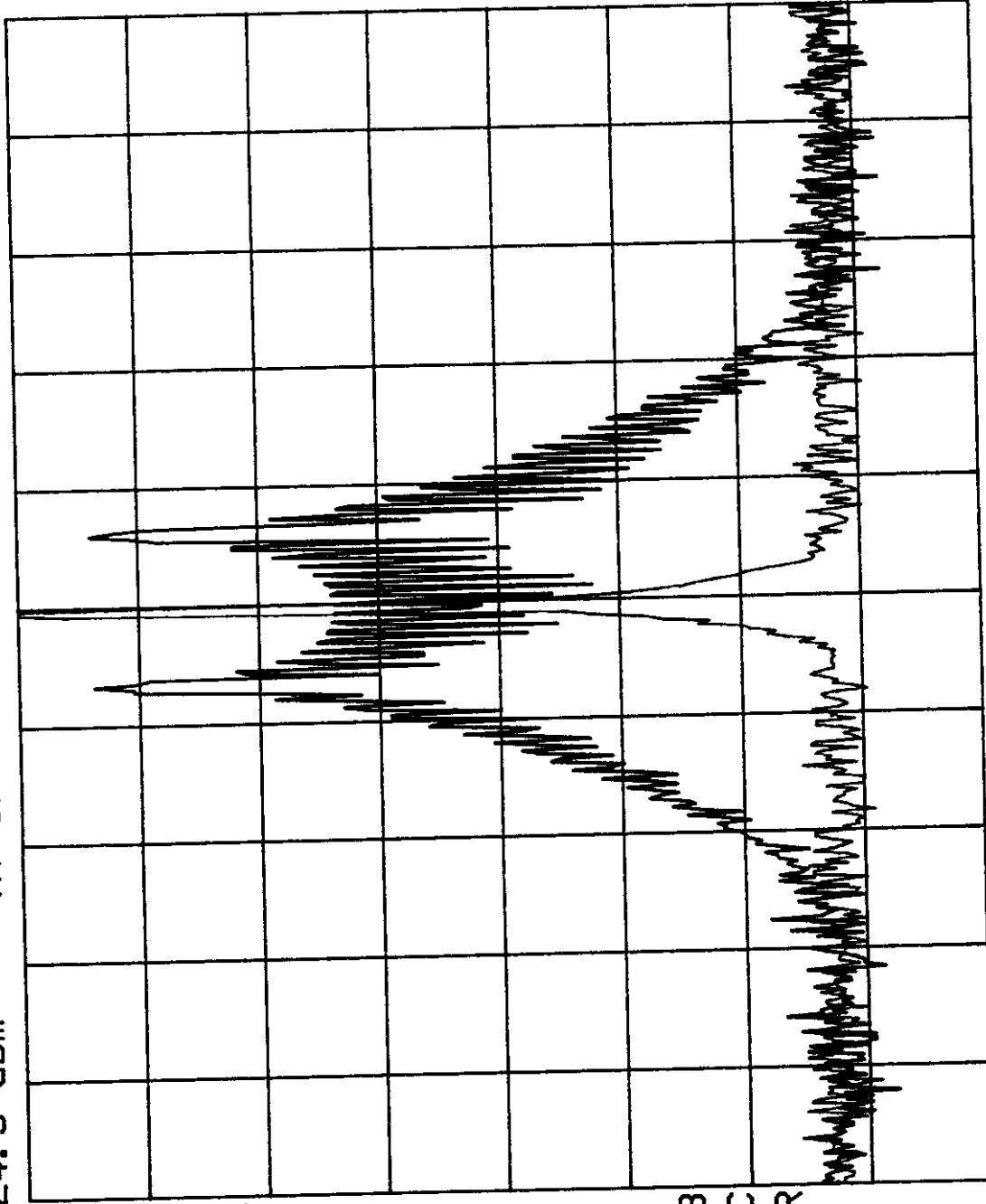
20.0

dB

VA VB

SC FC

CORR



SPAN 250.0 KHZ

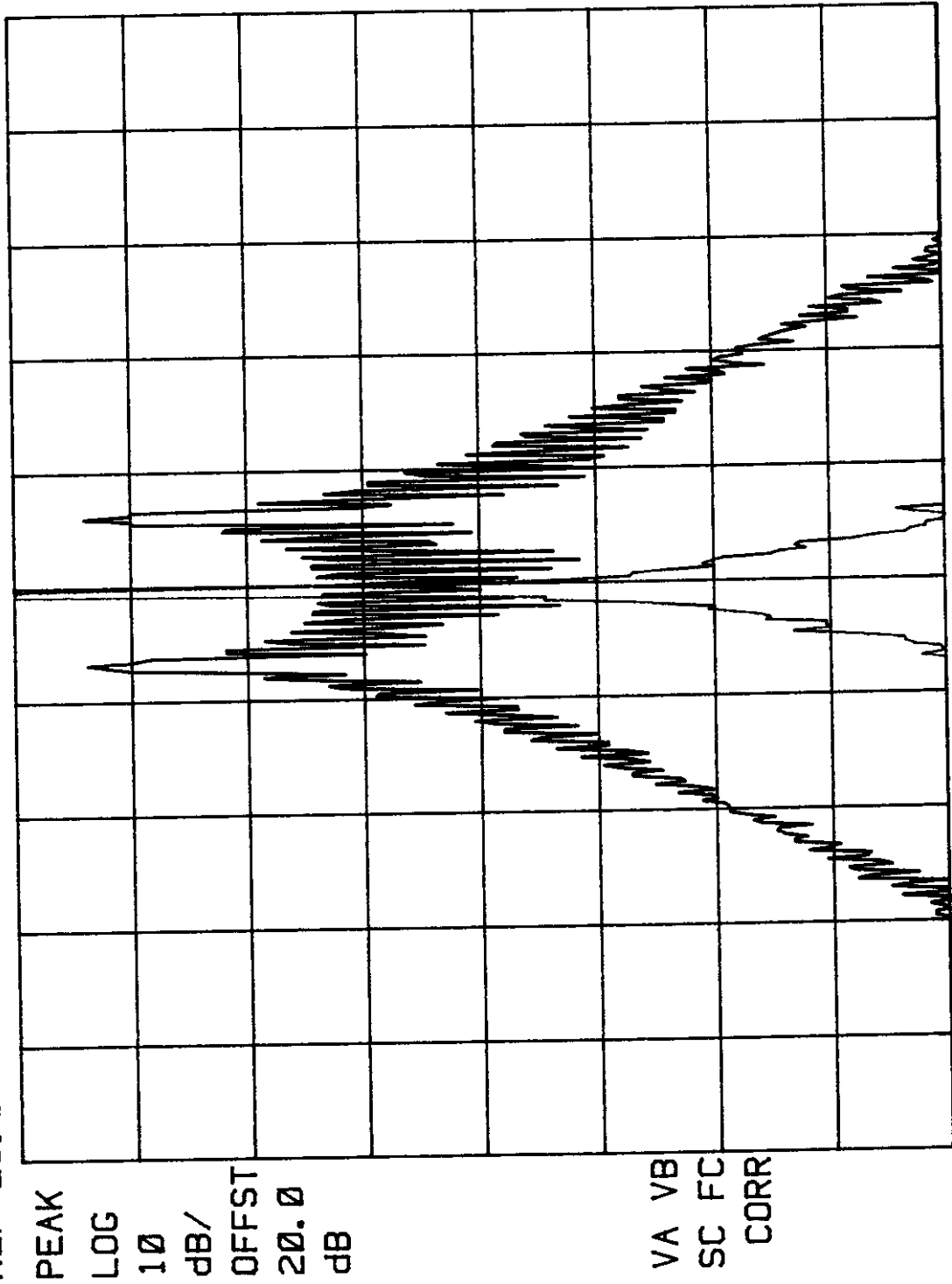
SWP 8.33 sec

VBW 1 KHZ

CENTER 815.0000 MHZ

#RES BW 300 Hz

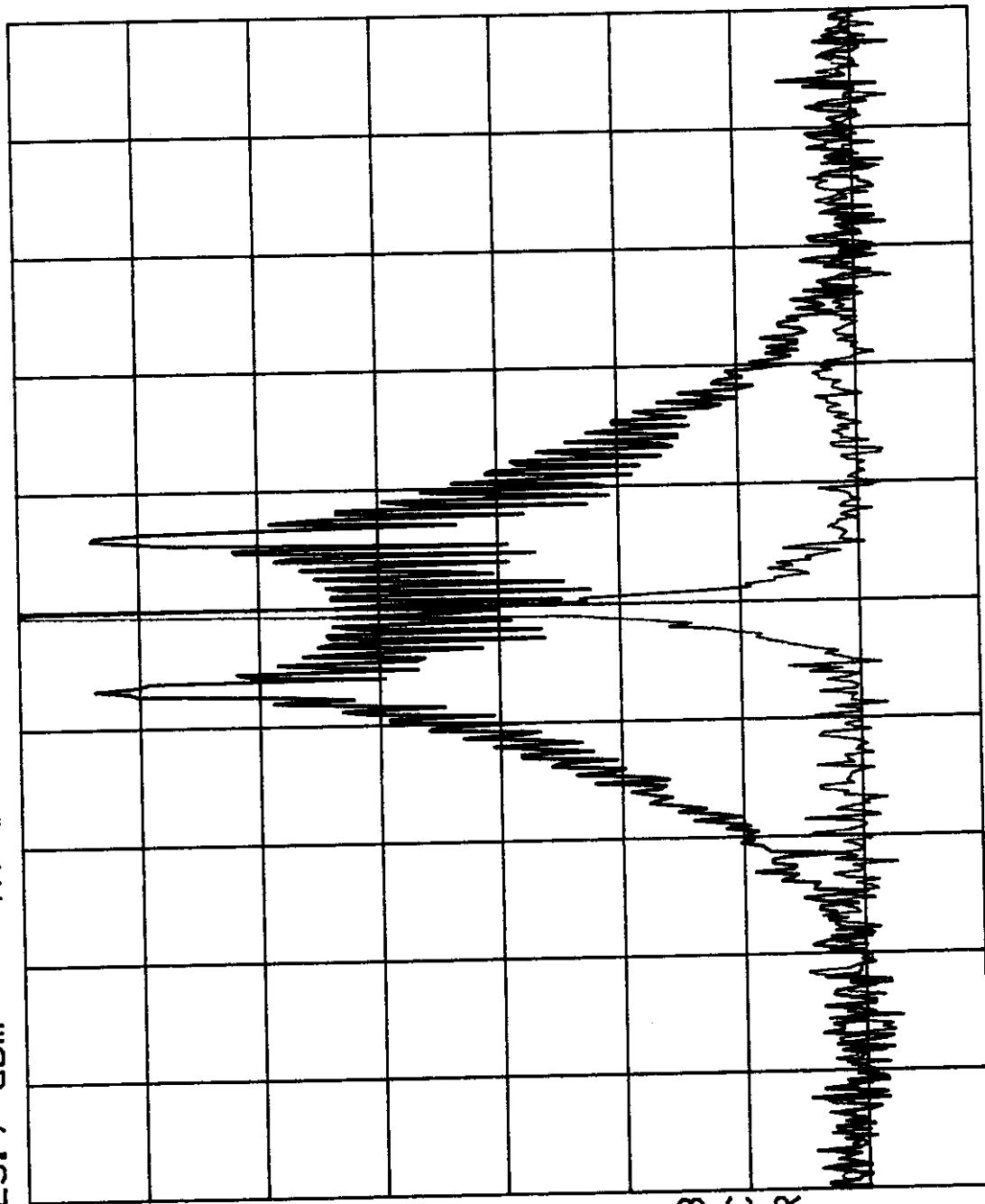
R-3244N OCCUPIED BANDWIDTH (AMP)
REF 23.3 dBm AT 20 dB



CENTER 815.0000 MHz
#RES BW 300 Hz
SPAN 250.0 KHz
SWP 8.33 sec
VBW 1 KHz

R-3244N OCCUPIED BANDWIDTH (SOURCE)
 REF -23.7 dBm AT 10 dB

PEAK
 LOG
 10
 dB/
 OFFST
 20.0
 dB



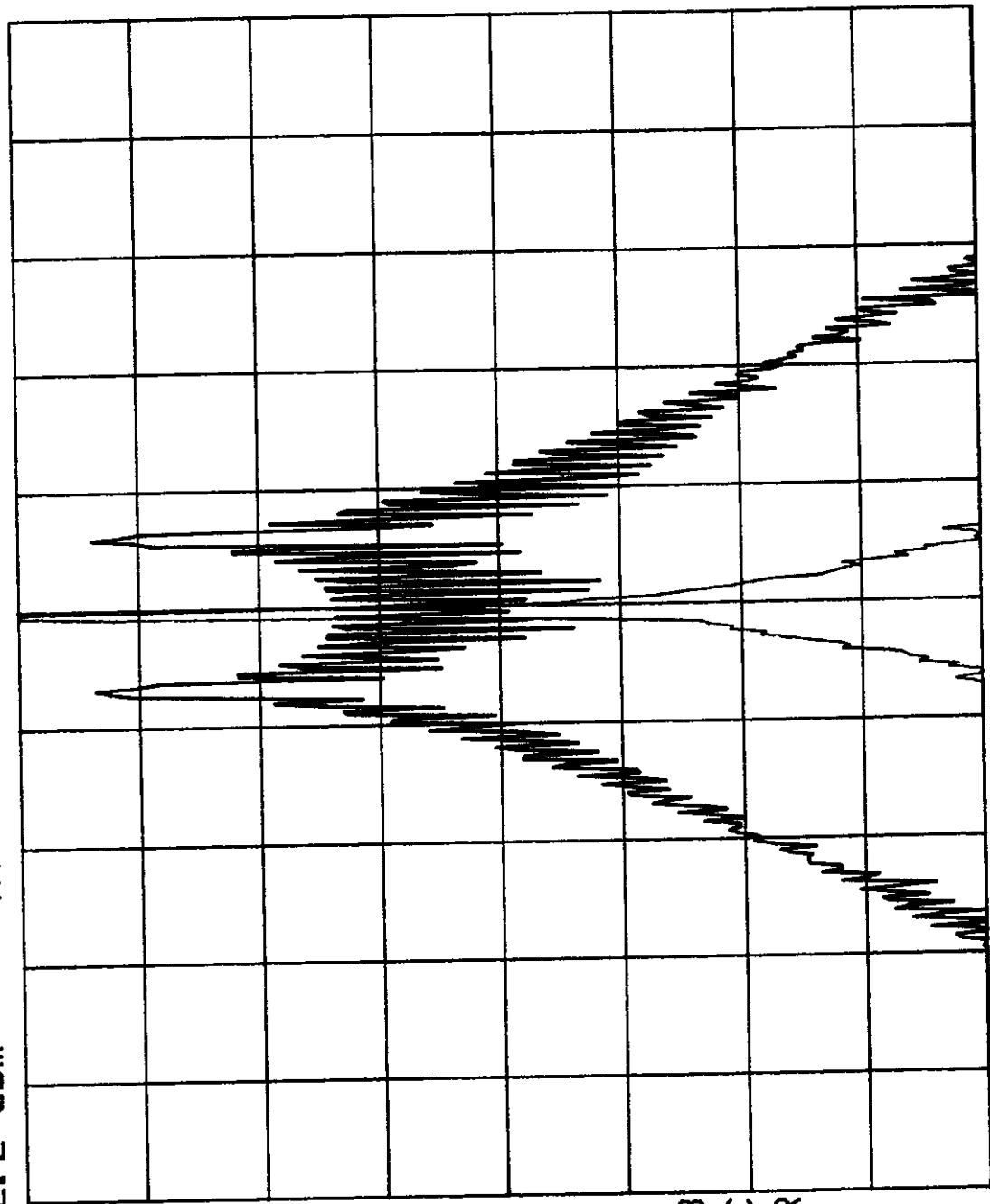
VA VB
 SC FC
 CORR

CENTER 824.0000 MHz
 #RES BW 300 Hz
 SPAN 250.0 kHz
 SWP 8.33 sec
 VBW 1 kHz

R-324N OCCUPIED BANDWIDTH (AMP)
REF 22.2 dBm AT 20 dB

PEAK
LOG
10
dB/
OFFST
20.0
dB

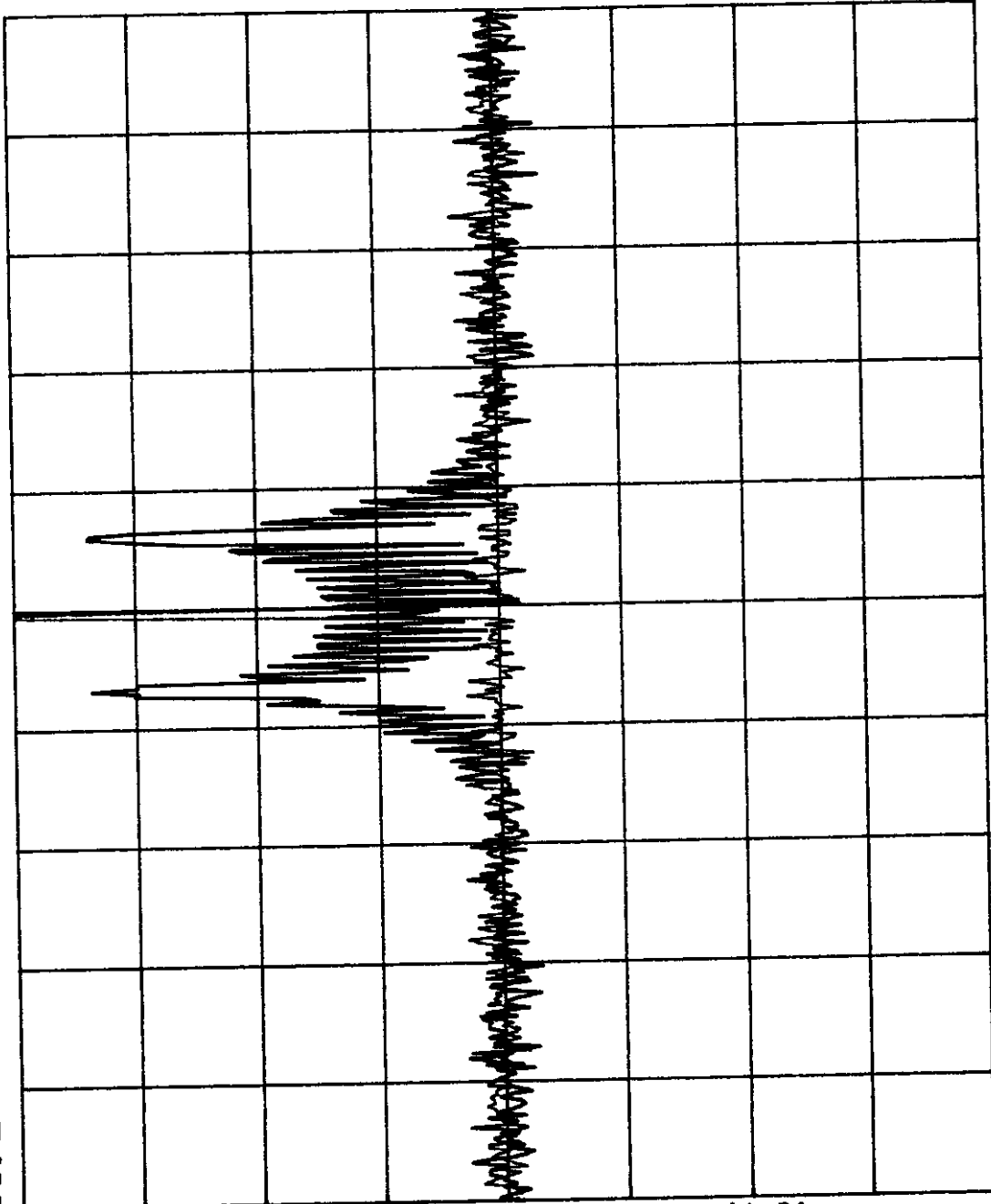
VA VB
SC FC
CORR



CENTER 824.0000 MHz
#RES BW 300 Hz
SPAN 250.0 kHz
SWP 8.33 sec
VBW 1 kHz

R-3244N OCCUPIED BANDWIDTH (SOURCE)
REF -51.2 dBm AT 10 dB

PEAK
LOG
10
dB/
OFFST
20.0
dB



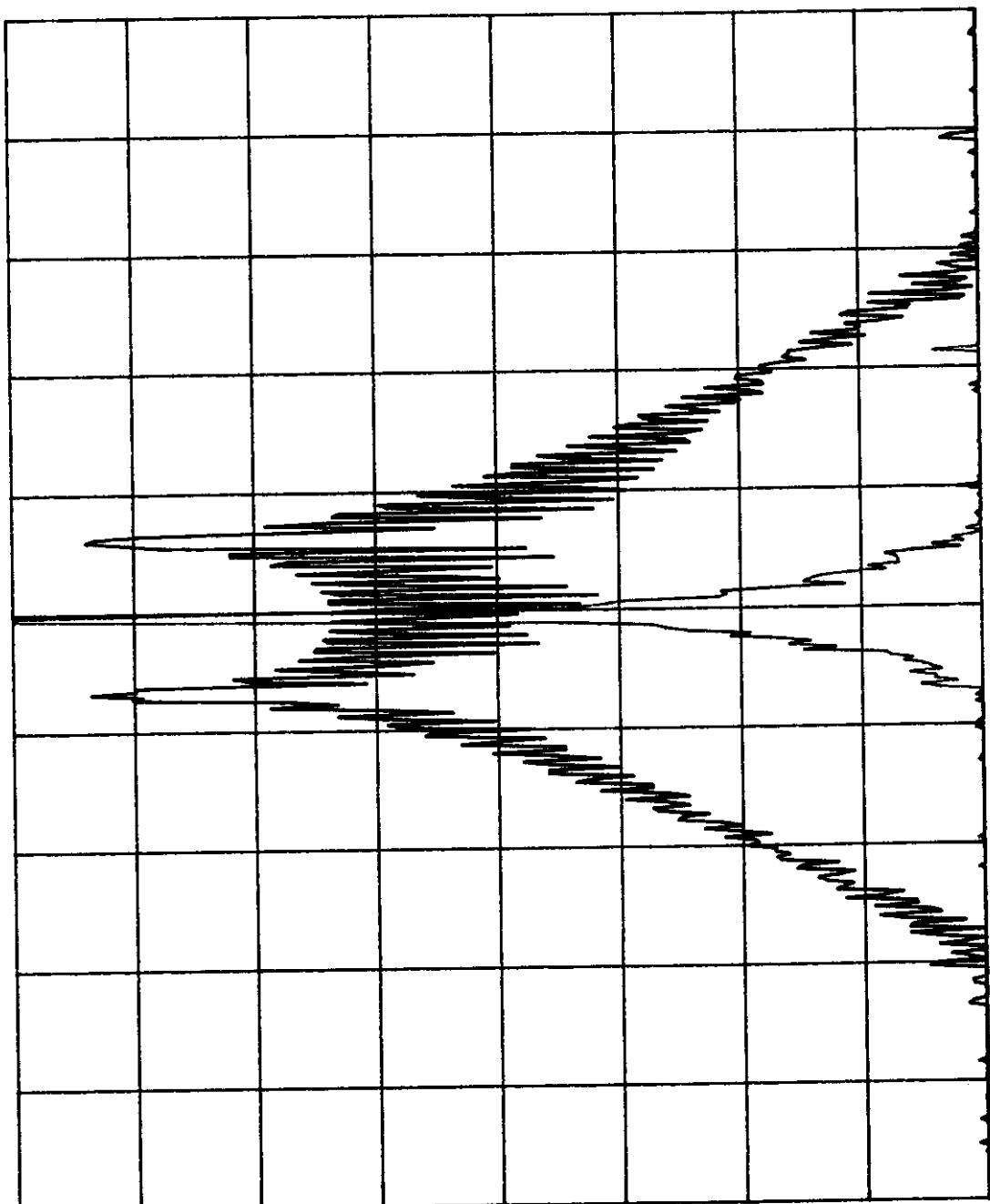
VA VB
SC FC
CORR

CENTER 849.0000 MHz
#RES BW 300 Hz
SPAN 250.0 kHz
SWP 8.33 sec
VBW 1 kHz

R-3244N OCCUPIED BANDWIDTH (AMP)

REF 13.0 dBm AT 10 dB

PEAK
LOG
10
dB/
OFFST
20.0
dB

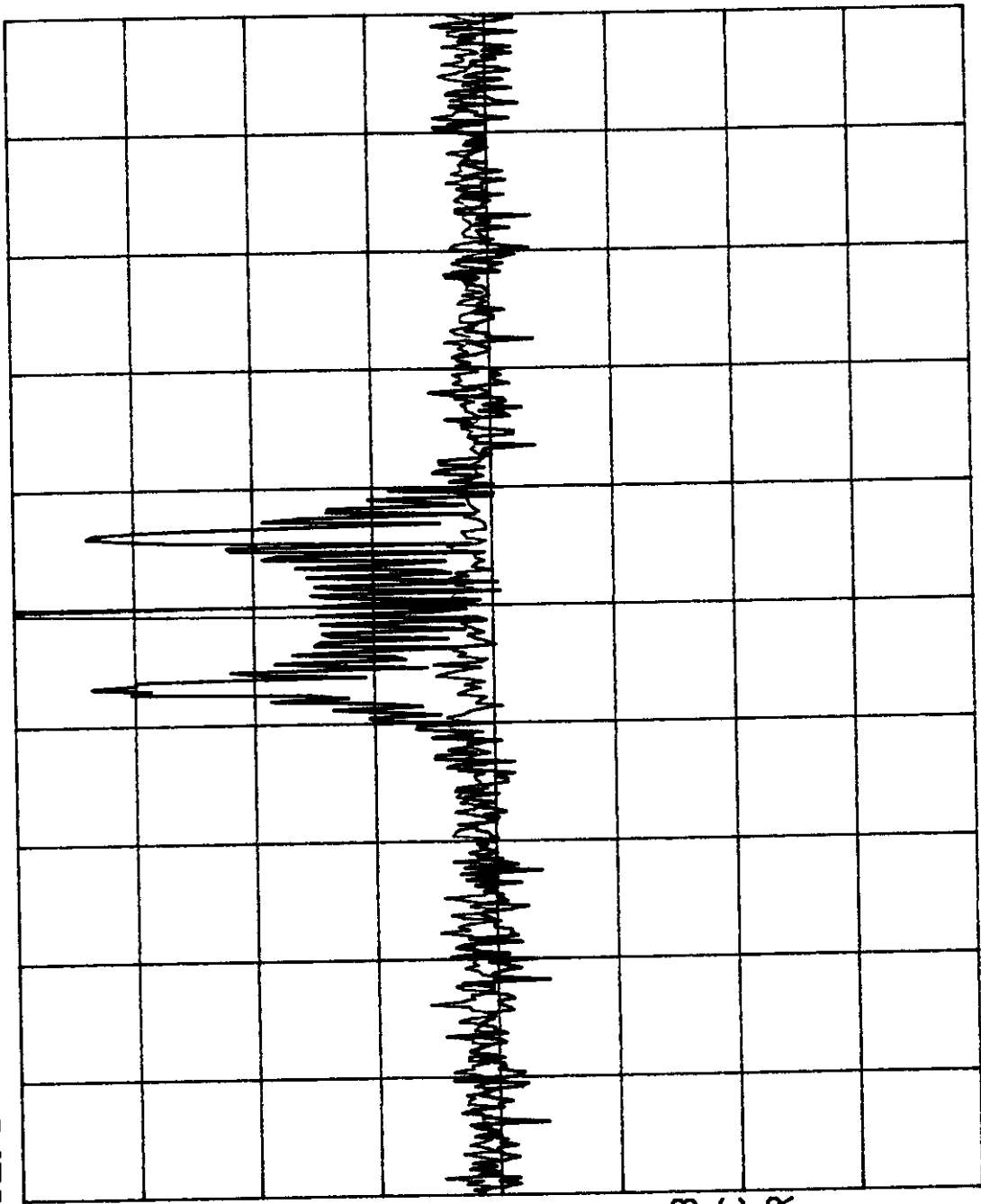


VA VB
SC FC
CORR

CENTER 849.0000 MHz
#RES BW 300 Hz
SPAN 250.0 kHz
SWP 8.33 sec
VBW 1 kHz

✓ R-3244N OCCUPIED BANDWIDTH (SOURCE)
REF -52.8 dBm AT 10 dB

PEAK
LOG
10
dB/
OFFST
20.0
dB



VA VB
SC FC
CORR

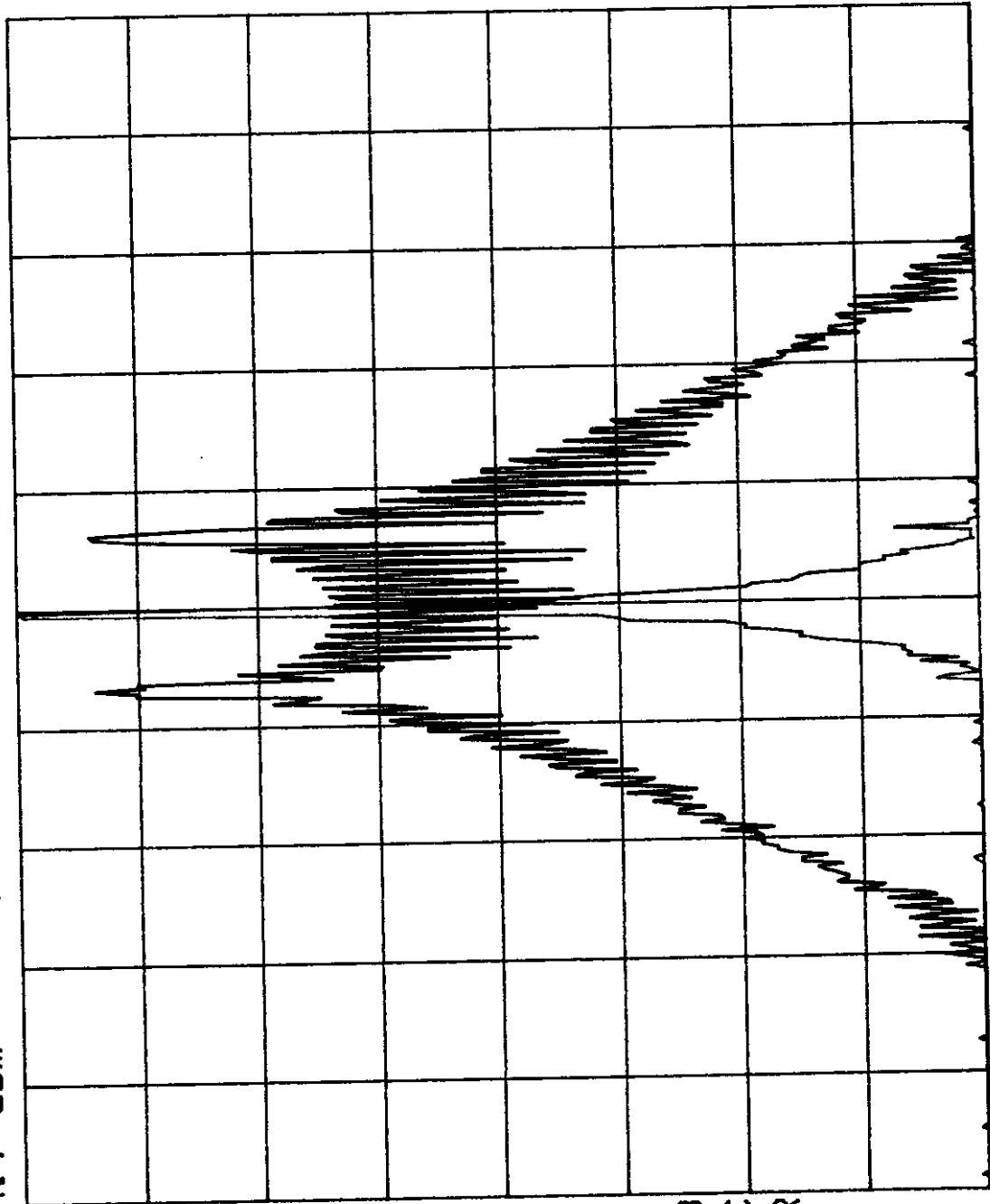
CENTER 858.0000 MHz
#RES BW 300 Hz
SPAN 250.0 kHz
SWP 8.33 sec
VBW 1 kHz

7 R-3244N OCCUPIED BANDWIDTH (AMP)

REF 14.7 dBm AT 10 dB

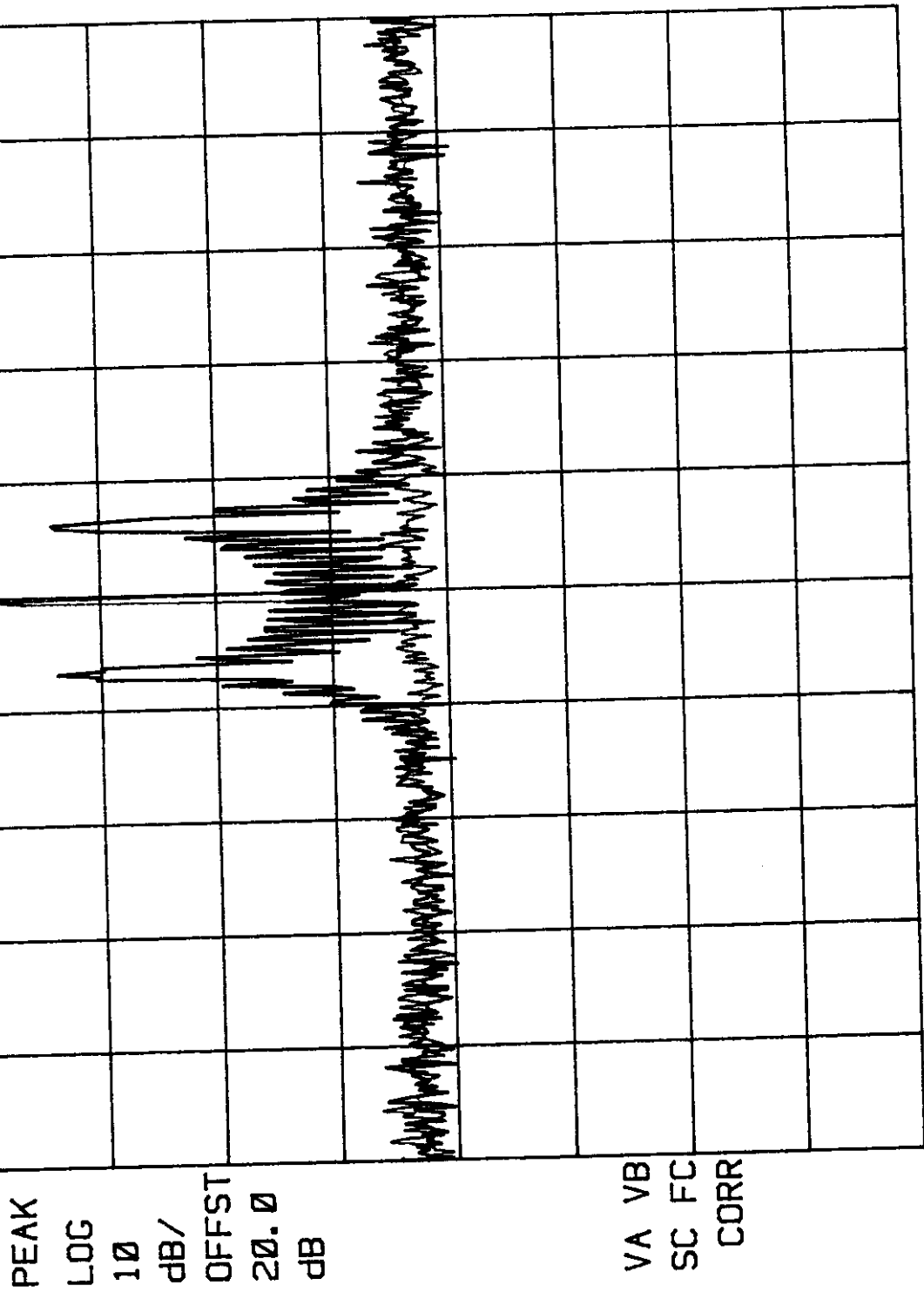
PEAK
LOG
10
dB/
OFFST
20.0
dB

VA VB
SC FC
CORR



CENTER 858.0000 MHz
#RES BW 300 Hz
SPAN 250.0 kHz
SWP 8.33 sec
VBW 1 kHz

R-3244N OCCUPIED BANDWIDTH (SOURCE)
REF -54.4 dBm AT 10 dB

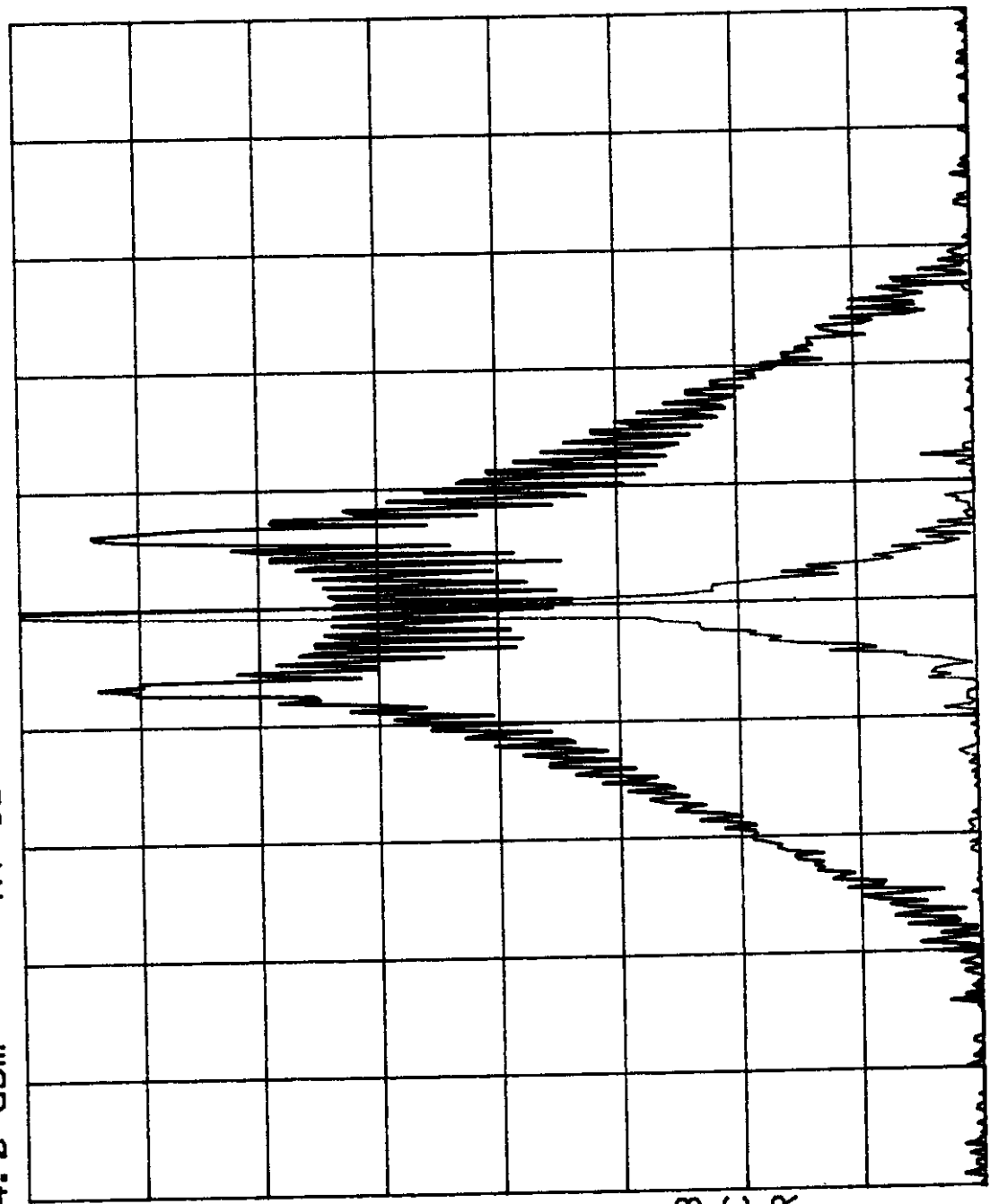


CENTER 867.0000 MHz
#RES BW 300 Hz
SPAN 250.0 kHz
SWP 8.33 sec
VBW 1 kHz

47 R-3244N OCCUPIED BANDWIDTH (AMP)
REF 14.0 dBm AT 10 dB

PEAK
LOG
10
dB/
OFFST
20.0
dB

VA VB
SC FC
CORR



CENTER 867.0000 MHz
#RES BW 300 Hz
SPAN 250.0 kHz
SWP 8.33 sec
VBW 1 kHz

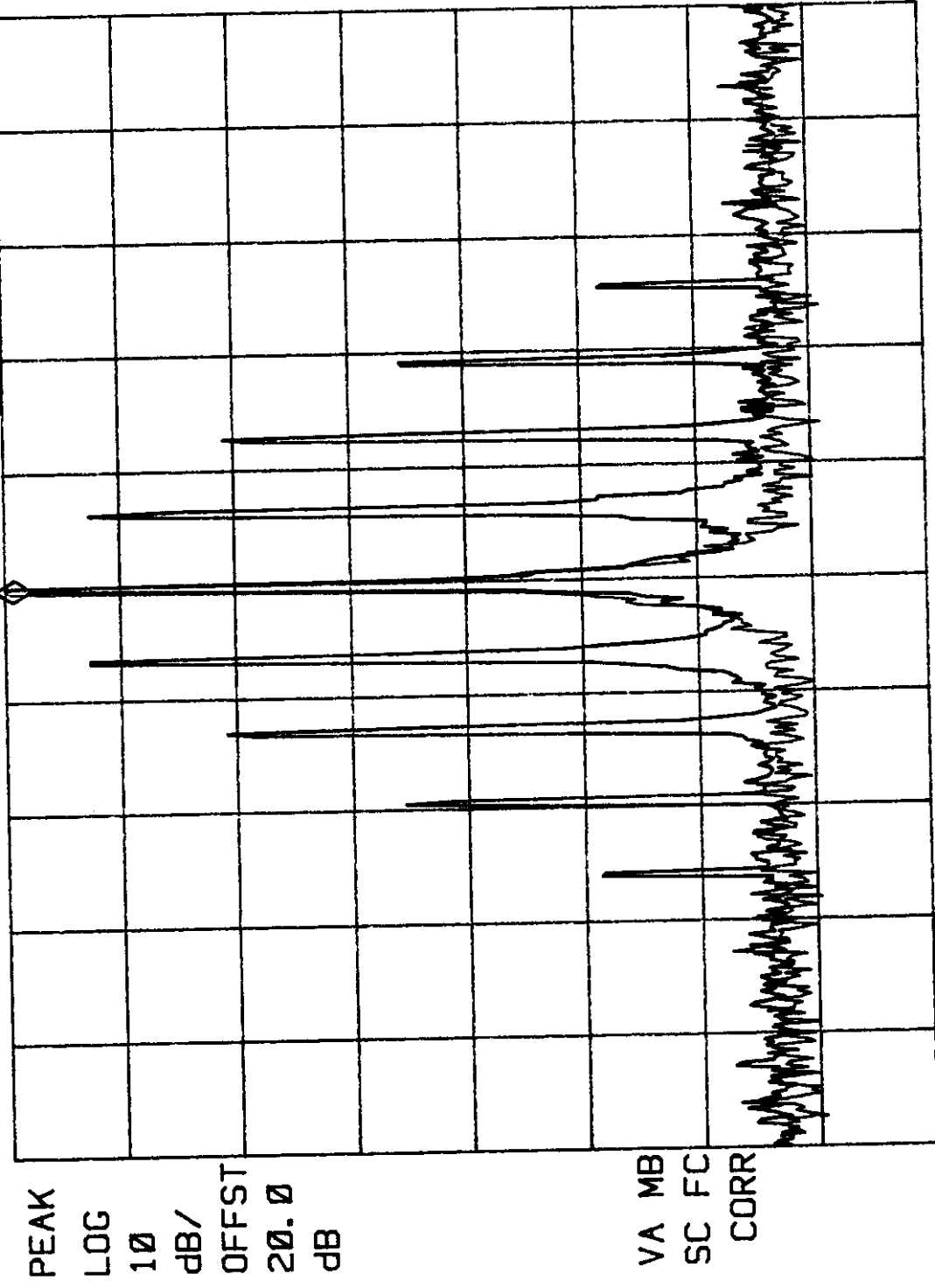
OCCUPIED BANDWIDTH DATA
WITH
GENERATOR OUTPUT CONNECTED TO DOWNLINK PORT
(12 PAGES OF DATA)



Retlif Testing Laboratories

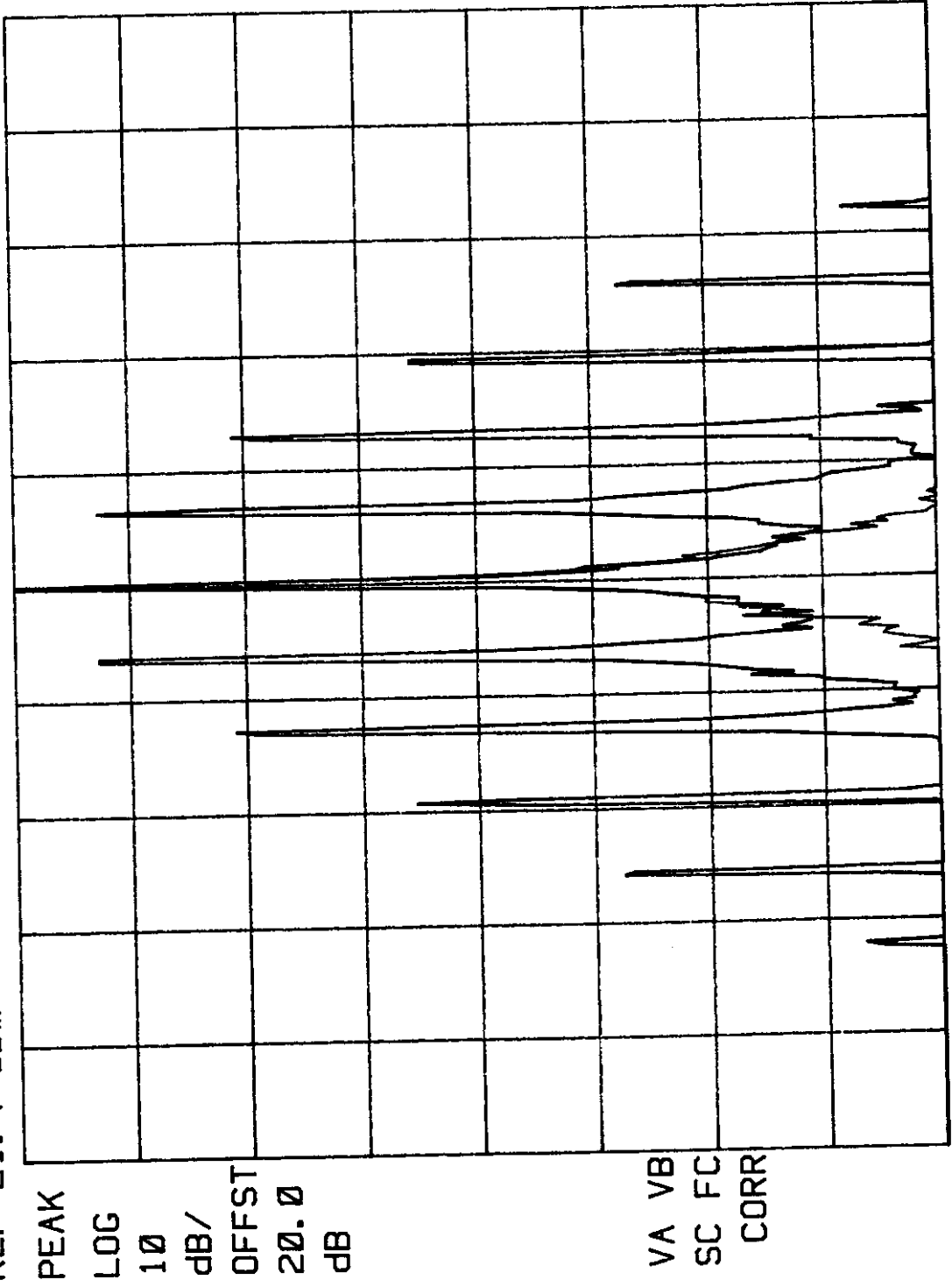
Test Report Number No. R-3244N
FCC ID: NVRCSE210-01

R-3244N OCCUPIED BANDWIDTH (SOURCE) MKR 805.9994 MHz
REF -24.1 dBm AT 10 dB -26.48 dBm



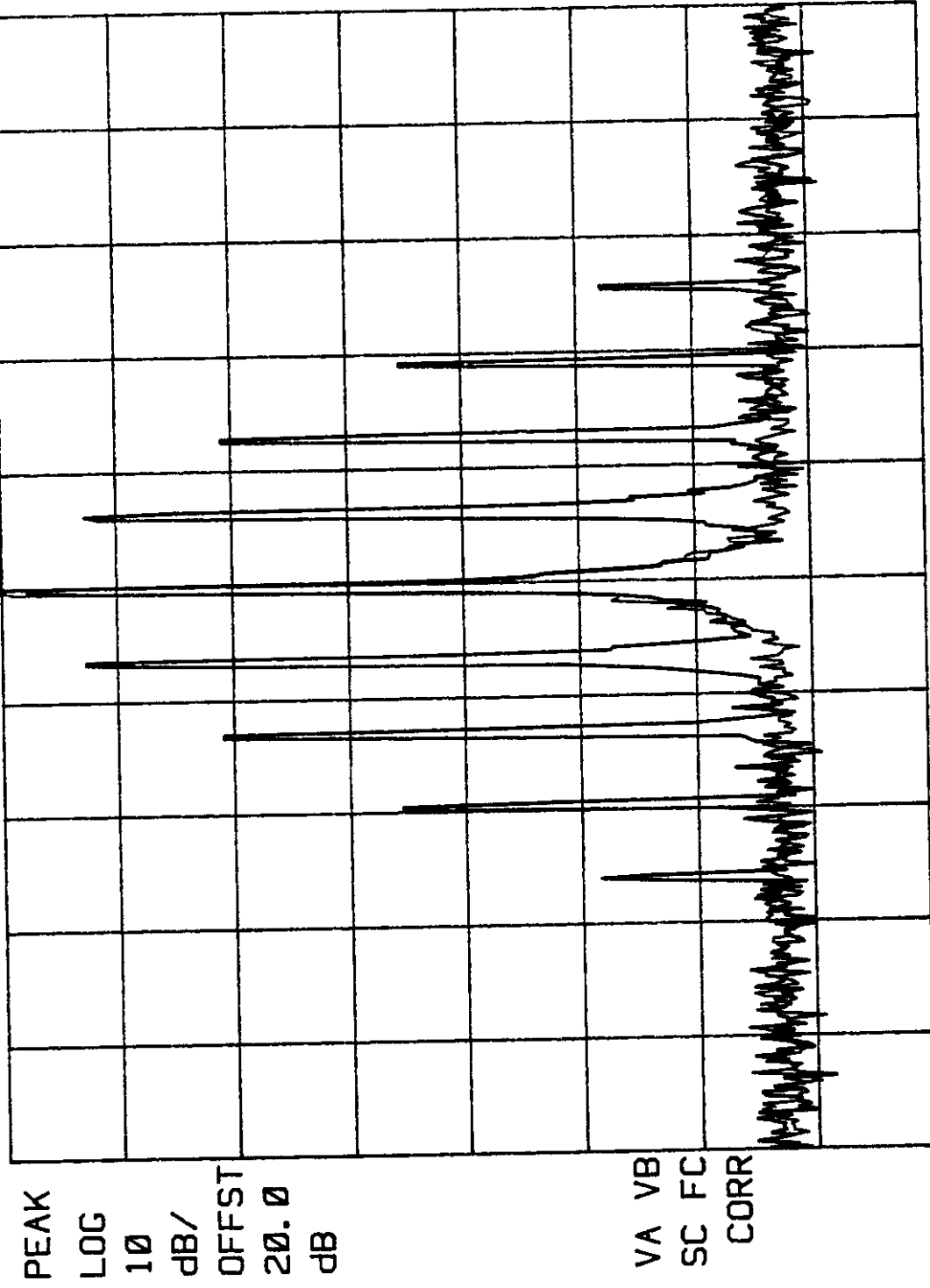
CENTER 806.0000 MHz
#RES BW 300 Hz
SPAN 250.0 kHz
SWP 8.33 sec
VBW 1 kHz

R-3244N OCCUPIED BANDWIDTH (AMP)
REF 21.4 dBm AT 20 dB



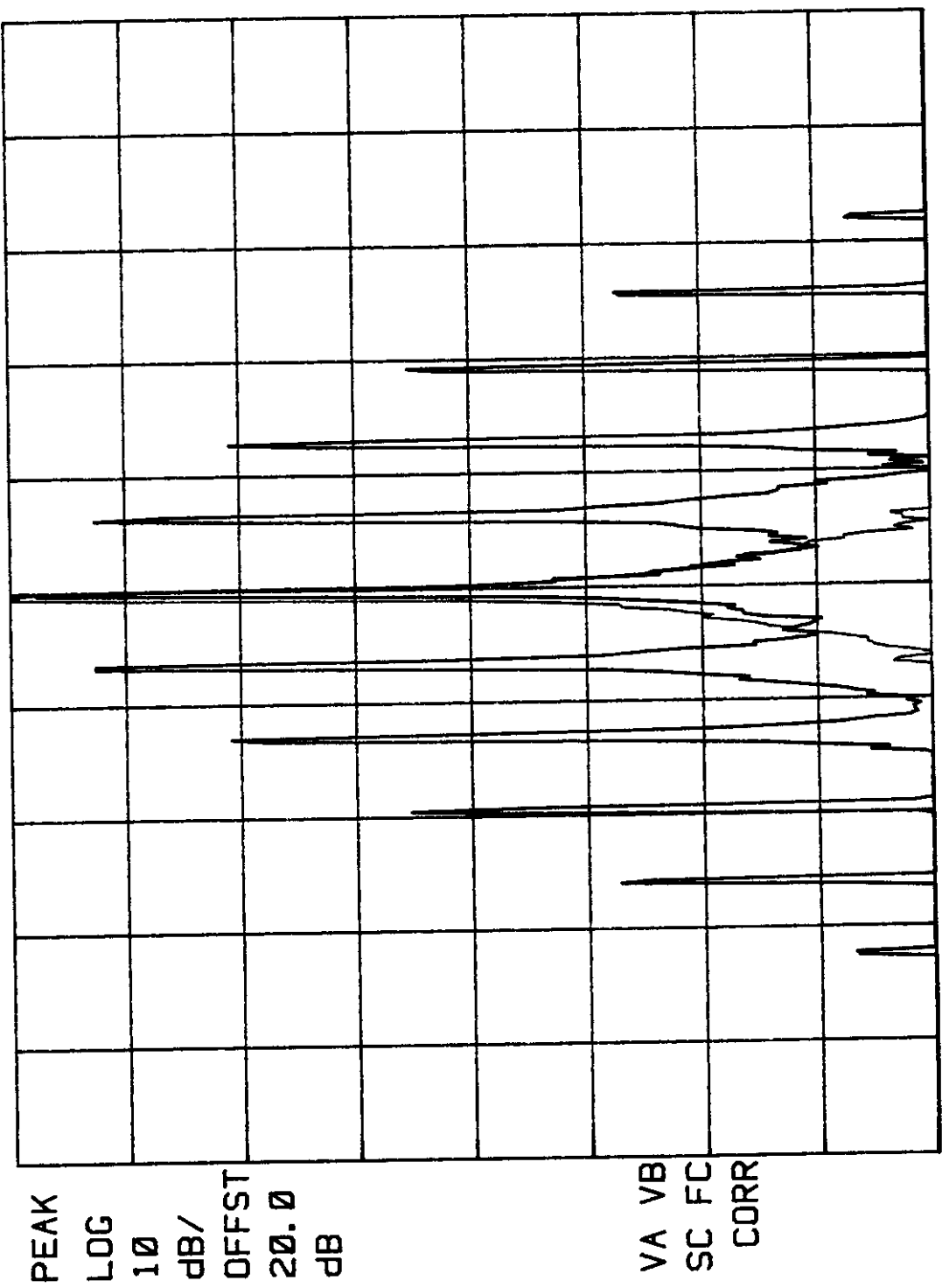
CENTER 805.9994 MHz
#RES BW 300 Hz
SPAN 250.0 KHz
SWP 8.33 sec
VBW 1 KHz

R-3244N OCCUPIED BANDWIDTH (SOURCE)
REF -24.3 dBm AT 10 dB



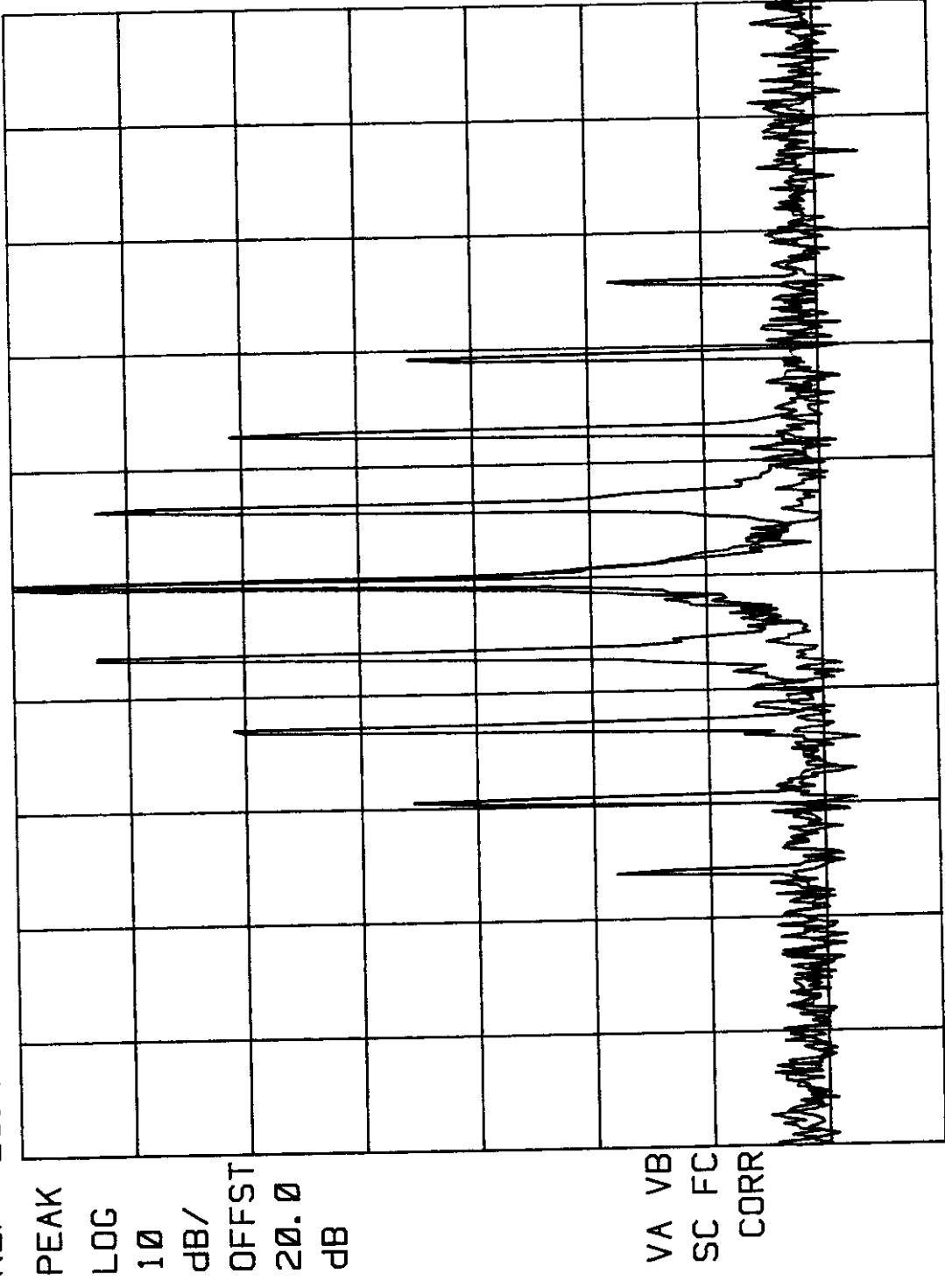
CENTER 815.0000 MHz
#RES BW 300 Hz
SPAN 250.0 KHz
SWP 8.33 sec
VBW 1 KHz

7 R-3244N OCCUPIED BANDWIDTH (AMP)
REF 23.2 dBm AT 20 dB



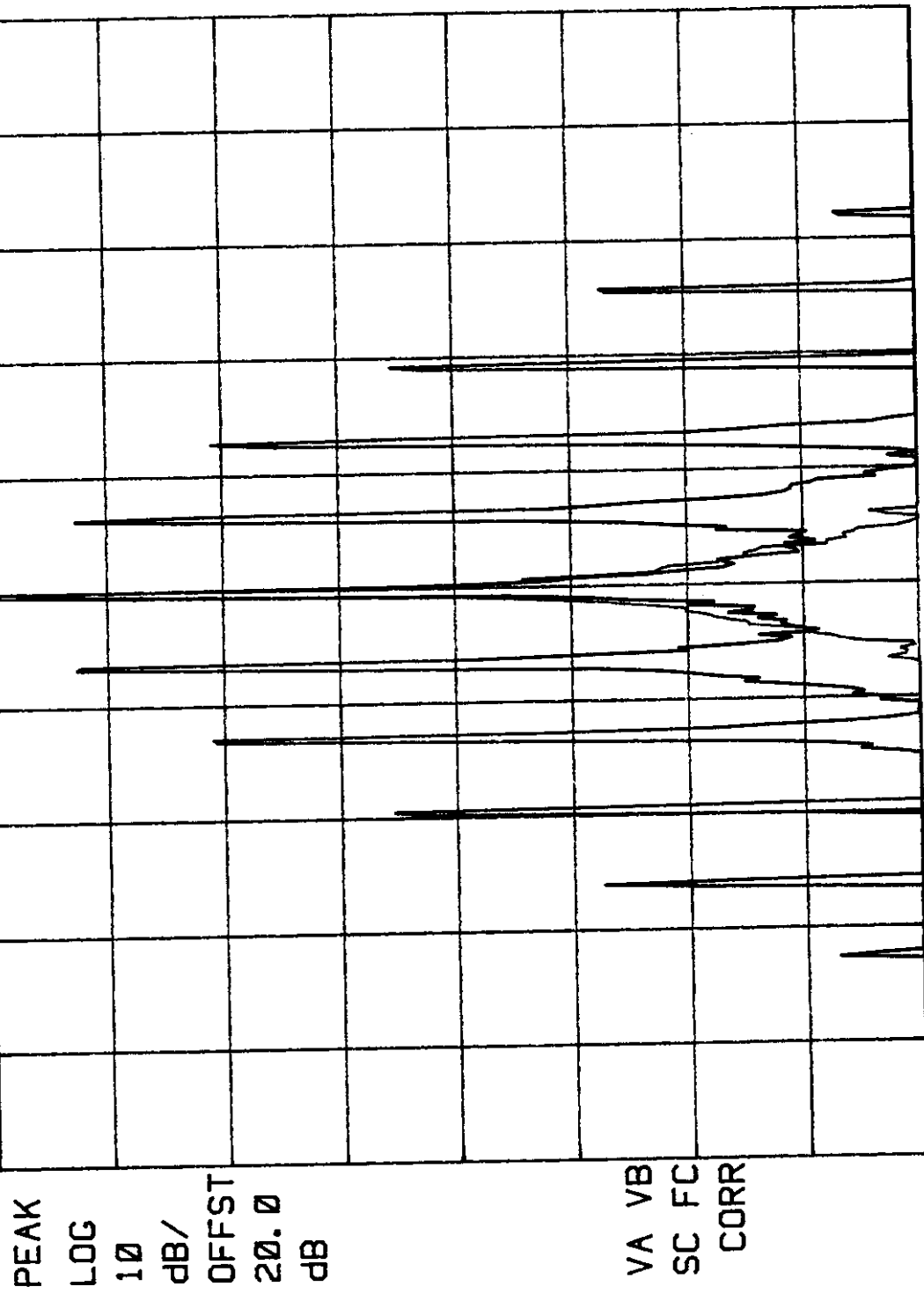
CENTER 815.0000 MHz
#RES BW 300 Hz
SPAN 250.0 kHz
SWP 8.33 sec
VBW 1 kHz

47 R-3244N OCCUPIED BANDWIDTH (SOURCE)
REF -23.6 dBm AT 10 dB



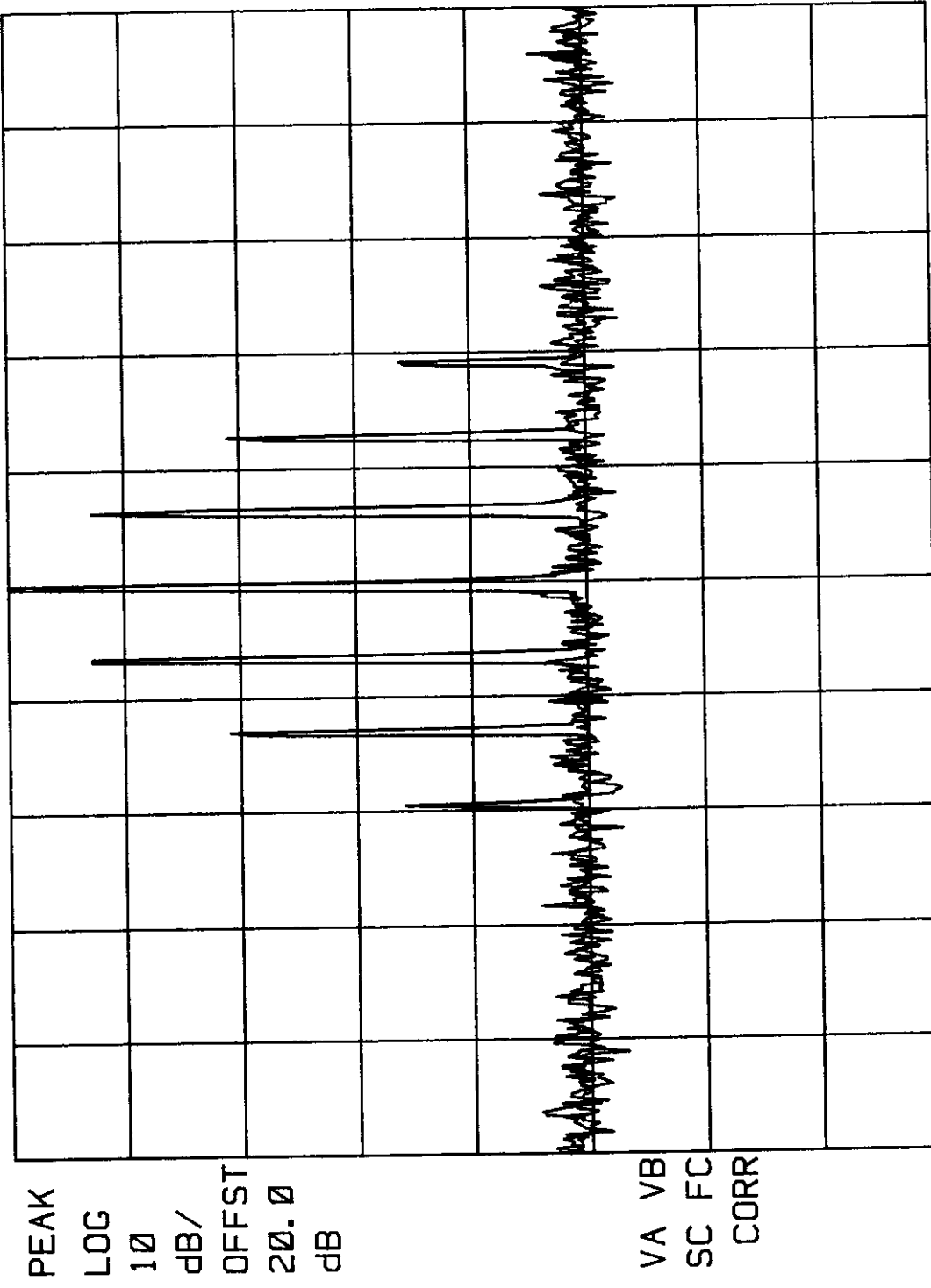
CENTER 824.0000 MHz
#RES BW 300 Hz
SPAN 250.0 KHz
SWP 8.33 sec
VBW 1 KHz

hp R-3244N OCCUPIED BANDWIDTH (AMP)
REF 22.1 dBm AT 20 dB



CENTER 824.0000 MHz
#RES BW 300 Hz
SPAN 250.0 kHz
VBW 1 kHz
SWP 8.33 sec

R-3244N OCCUPIED BANDWIDTH (SOURCE)
 REF -51.0 dBm #AT 0 dB

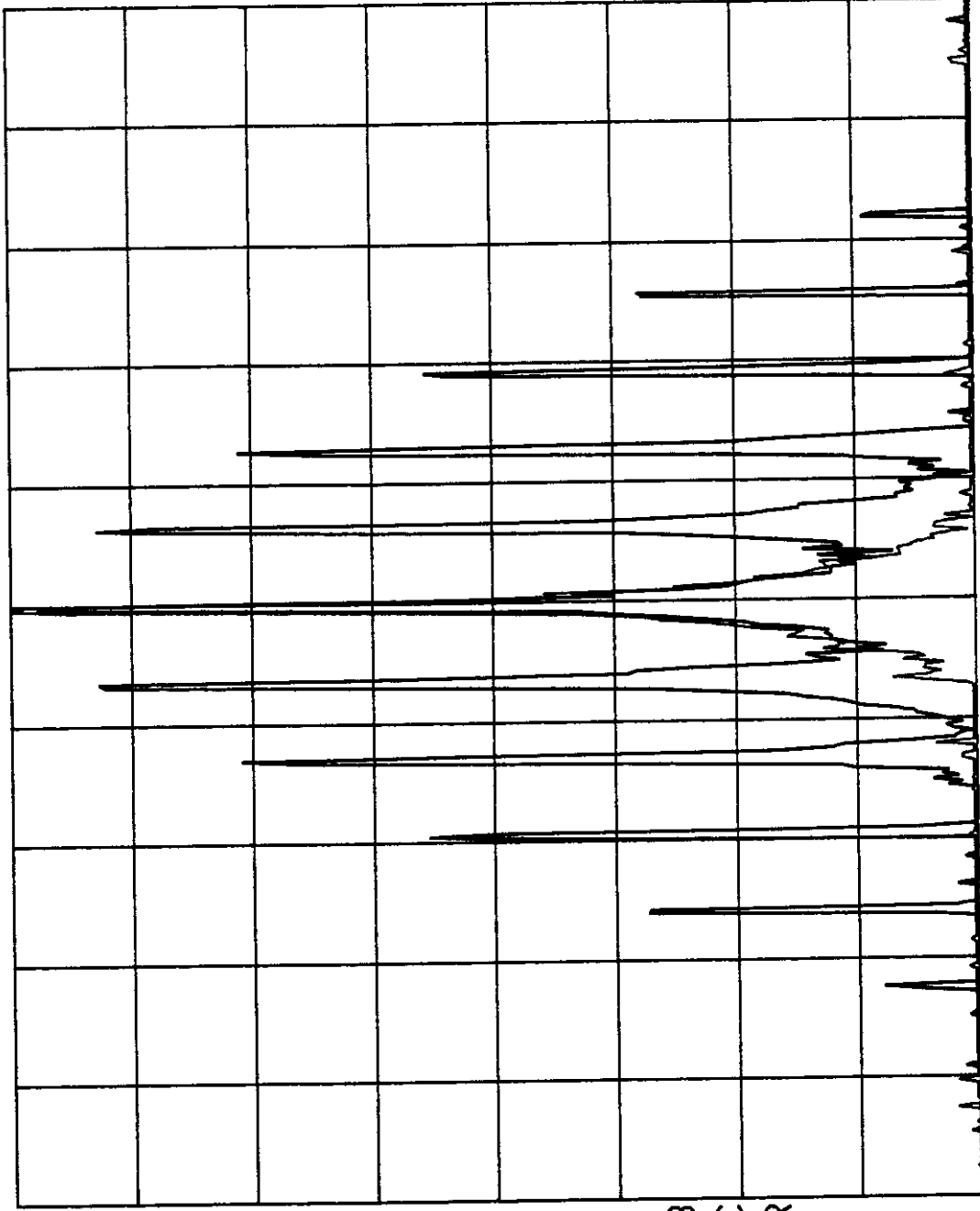


CENTER 849.0000 MHz
 #RES BW 300 Hz
 SPAN 250.0 KHz
 SWP 8.33 sec
 VBW 1 KHz

7 R-3244N OCCUPIED BANDWIDTH (AMP)

REF 12.3 dBm AT 10 dB

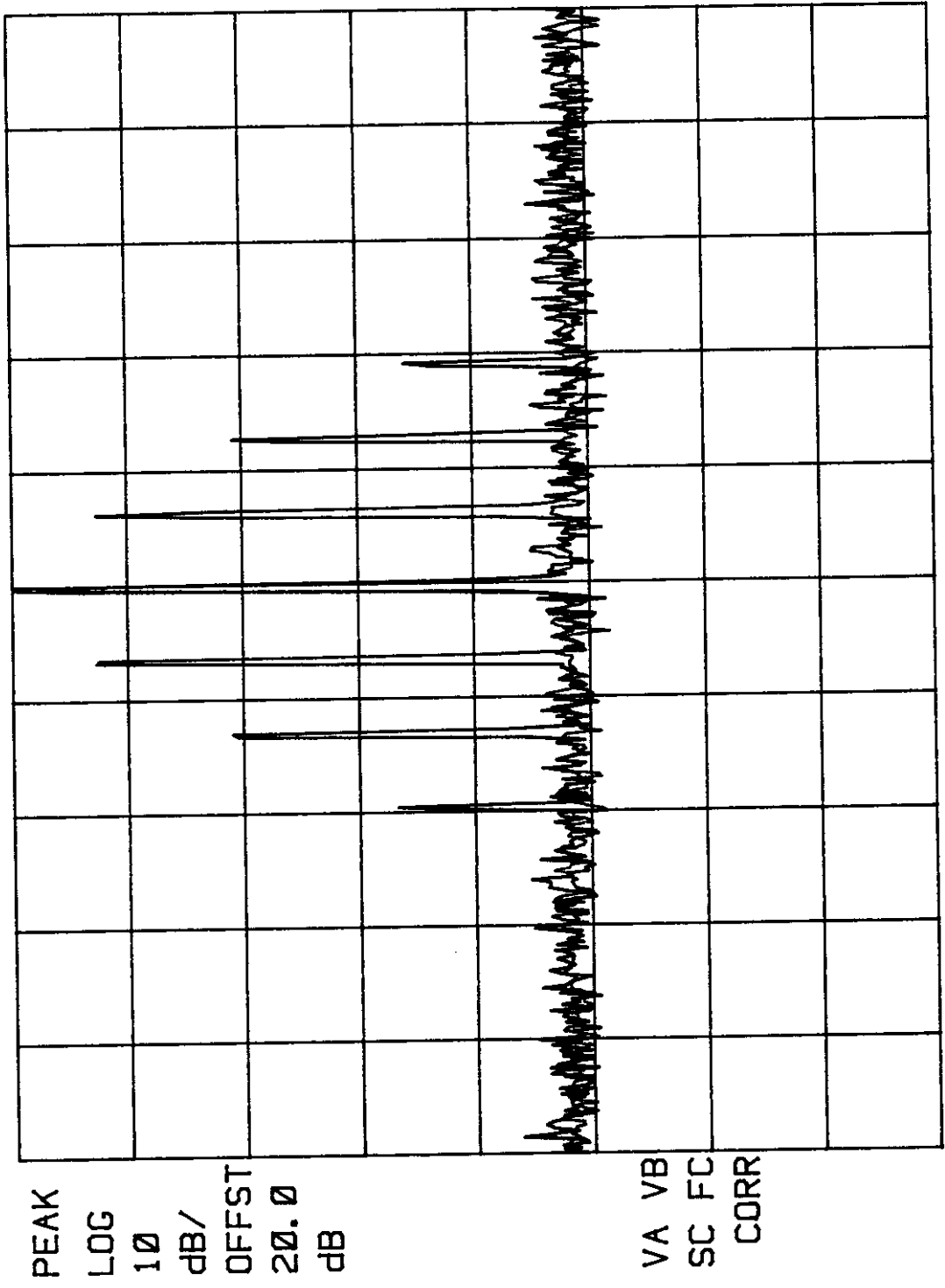
PEAK
LOG
10
dB/
OFFST
20.0
dB



VA VB
SC FC
CORR

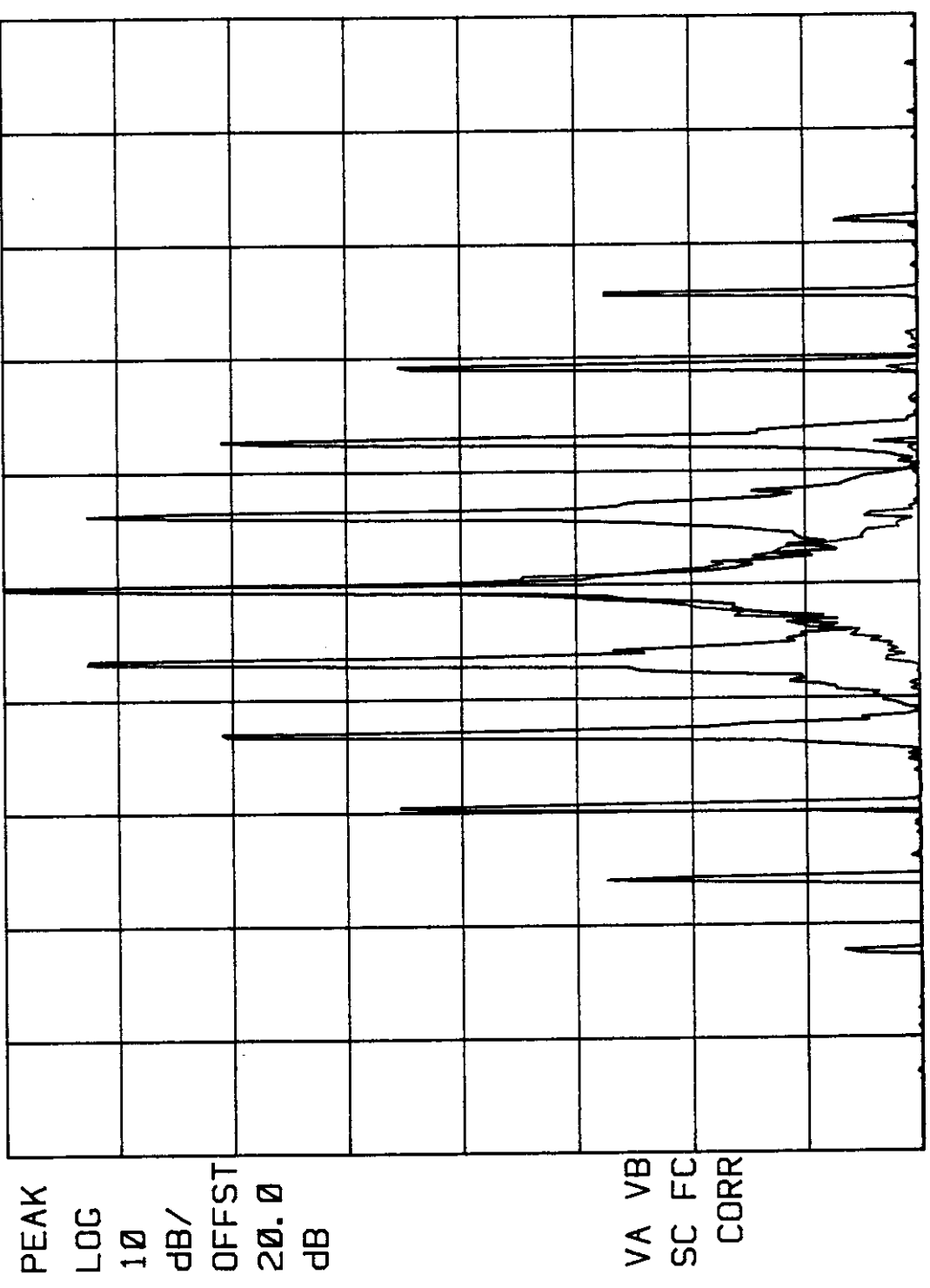
CENTER 849.0000 MHz
#RES BW 300 Hz
SPAN 250.0 kHz
SWP 8.33 sec
VBW 1 kHz

R-3244N OCCUPIED BANDWIDTH (SOURCE)
 REF -52.5 dBm #AT 0 dB



CENTER 858.0000 MHz
 #RES BW 300 Hz
 SPAN 250.0 kHz
 SWP 8.33 sec
 VBW 1 kHz

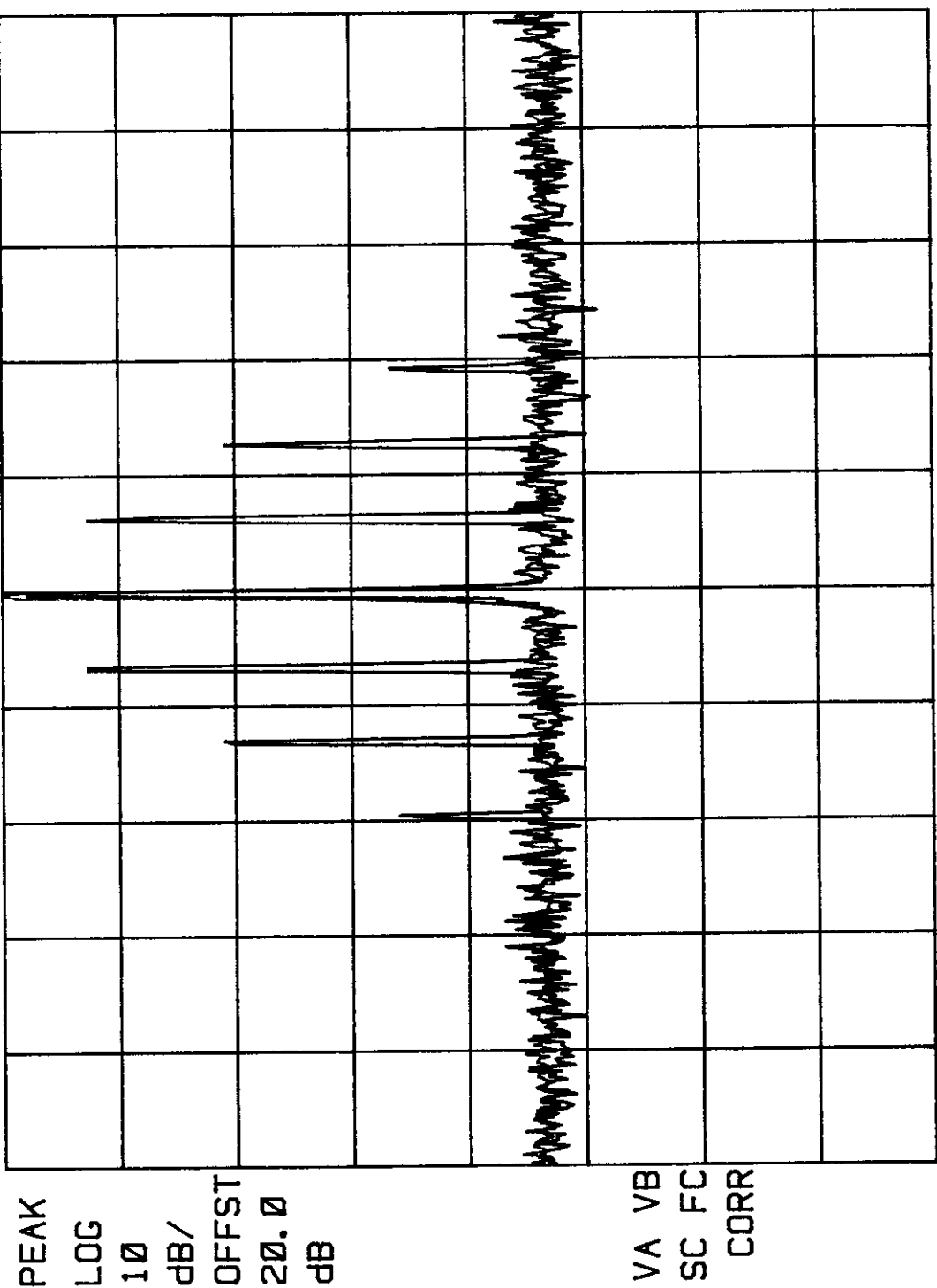
R-3244N OCCUPIED BANDWIDTH (AMP)
REF 14.7 dBm AT 10 dB



CENTER 858.0000 MHz
#RES BW 300 Hz
SPAN 250.0 kHz
SWP 8.33 sec
VBW 1 kHz

R-3244N OCCUPIED BANDWIDTH (SOURCE)

REF -54.0 dBm #AT 0 dB

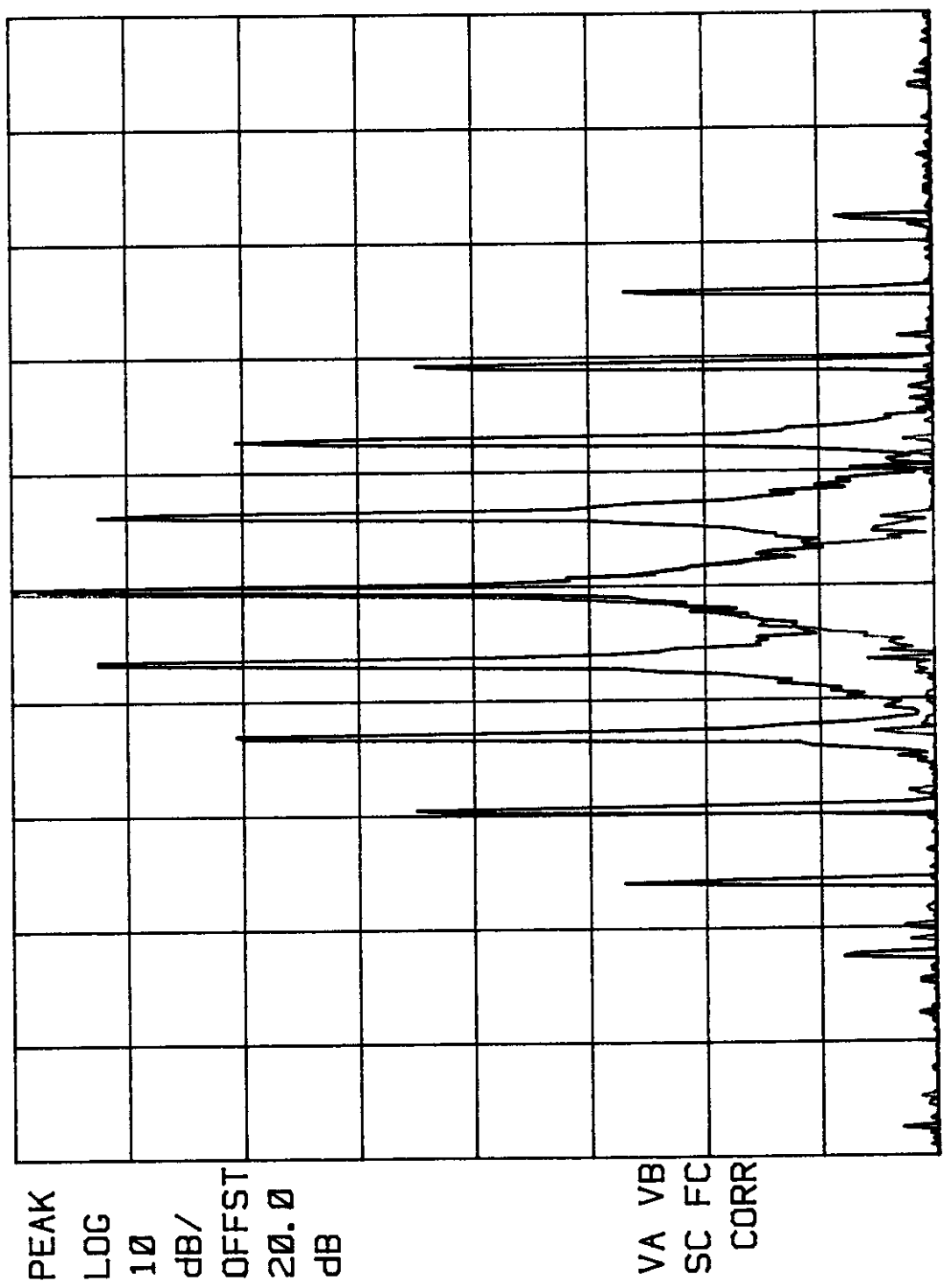


CENTER 867.0000 MHz
#RES BW 300 Hz

SPAN 250.0 KHz
SWP 8.33 sec

VBW 1 KHz

7 R-3244N OCCUPIED BANDWIDTH (AMP)
REF 14.1 dBm AT 10 dB



CENTER 867.0000 MHz
#RES BW 300 Hz
SPAN 250.0 kHz
SWP 8.33 sec
VBW 1 kHz

EXHIBIT F

Paragraph 2.991

**Modulation Characteristics
and Spurious Emissions**



Retlif Testing Laboratories

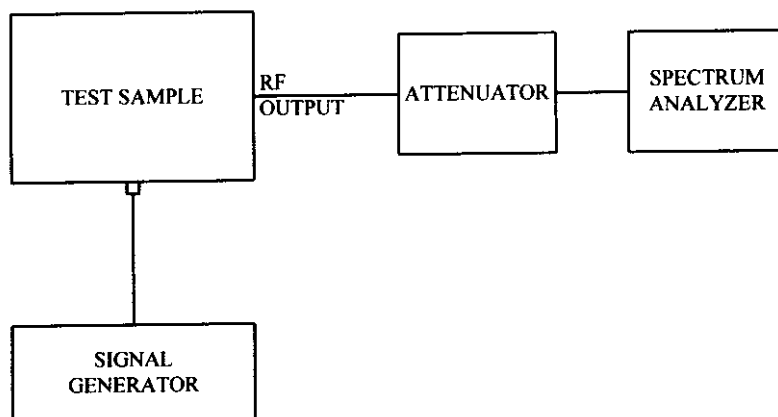
Test Report Number No. R-3244N
FCC ID: NVRCSI210-01

MODULATION CHARACTERISTICS AND SPURIOUS EMISSIONS (PARA.2.991)

Measurement Procedure:

The signal generator output was connected, in turn, to the uplink and downlink ports of the EUT. The output of the generator was examined with and without the EUT connected. The results were recorded for comparison to determine if the IBA influenced the modulation characteristics of the generated signal or if any spurious emissions were created when using the IBA.

BASIC TEST SETUP



Modulation Characteristics and Spurious Emissions:

- 3.1 Set up spectrum analyzer:
 - 3.1.1 RES BW @ 100kHz.
 - 3.1.2 Video BW @ 300kHz.
 - 3.1.3 Center Frequency to band center of uplink frequency range or downlink frequency range.
 - 3.1.4 Trace on Channel "A".
- 3.2 From the information attained from Step 1.8, set the signal generator to the maximum input signal for the uplink center frequency.



Retlif Testing Laboratories

Test Report Number No. R-3244N
FCC ID: NVRCSI210-01

MODULATION CHARACTERISTICS AND SPURIOUS EMISSIONS (PARA.2.991) (continued)

- 3.3 Adjust signal generator to sweep the range of the center frequency + and - 23MHz.
- 3.4 Set span of the analyzer to 45MHz.
- 3.5 Connect output of signal generator to EUT. Connect EUT to spectrum analyzer.
- 3.6 Set trace to "MAX HOLD A" and sweep the range per Step 3.3.
- 3.7 Once sweep is complete, set trace to "VIEW A".
- 3.8 Set trace to Channel "B".
- 3.9 Connect the output of the signal generator to the spectrum analyzer.
- 3.10 Set trace to "MAX HOLD B" and sweep the range per Step 3.3.
- 3.11 Once sweep is complete, set trace to "VIEW B".
- 3.12 Plot display. This is a comparison of the swept input signal vs the output signal over the entire frequency range, showing the characteristics of the internal band pass filter.
- 3.13 Adjust signal generator to sweep the range of the center frequency + and - 230MHz.
- 3.14 Set span of analyzer to 450MHz.
- 3.15 Repeat Steps 3.5 through 3.12, except sweep the range per 3.13.
- 3.16 From the information attained from Step 1.8, set the signal generator to the maximum input signal for the downlink center frequency.
- 3.17 Repeat Steps 3.3 through 3.16.

Measurement Results:

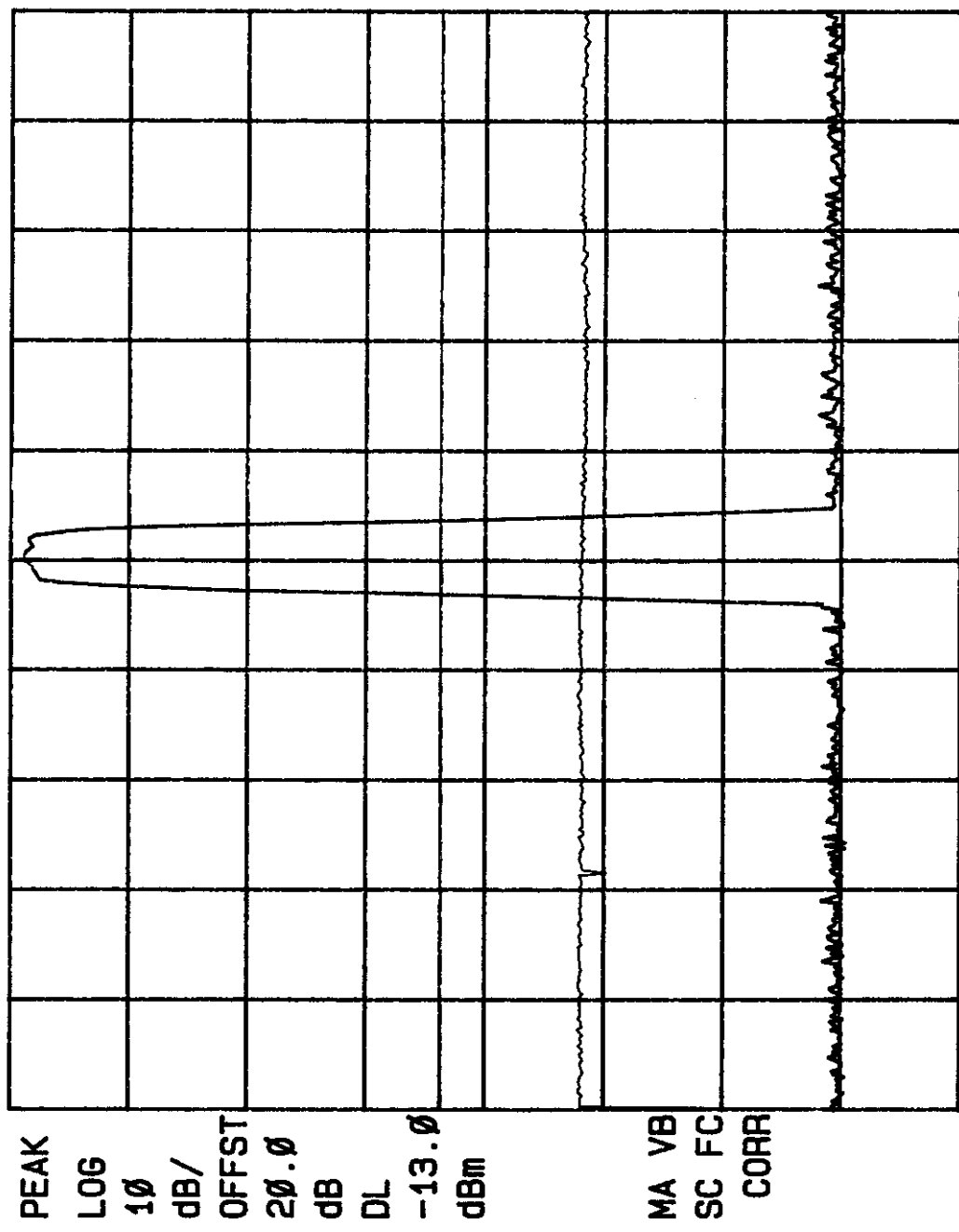
Examination of the test data indicates that the operation of the EUT caused no unacceptable deviations.



Retlif Testing Laboratories

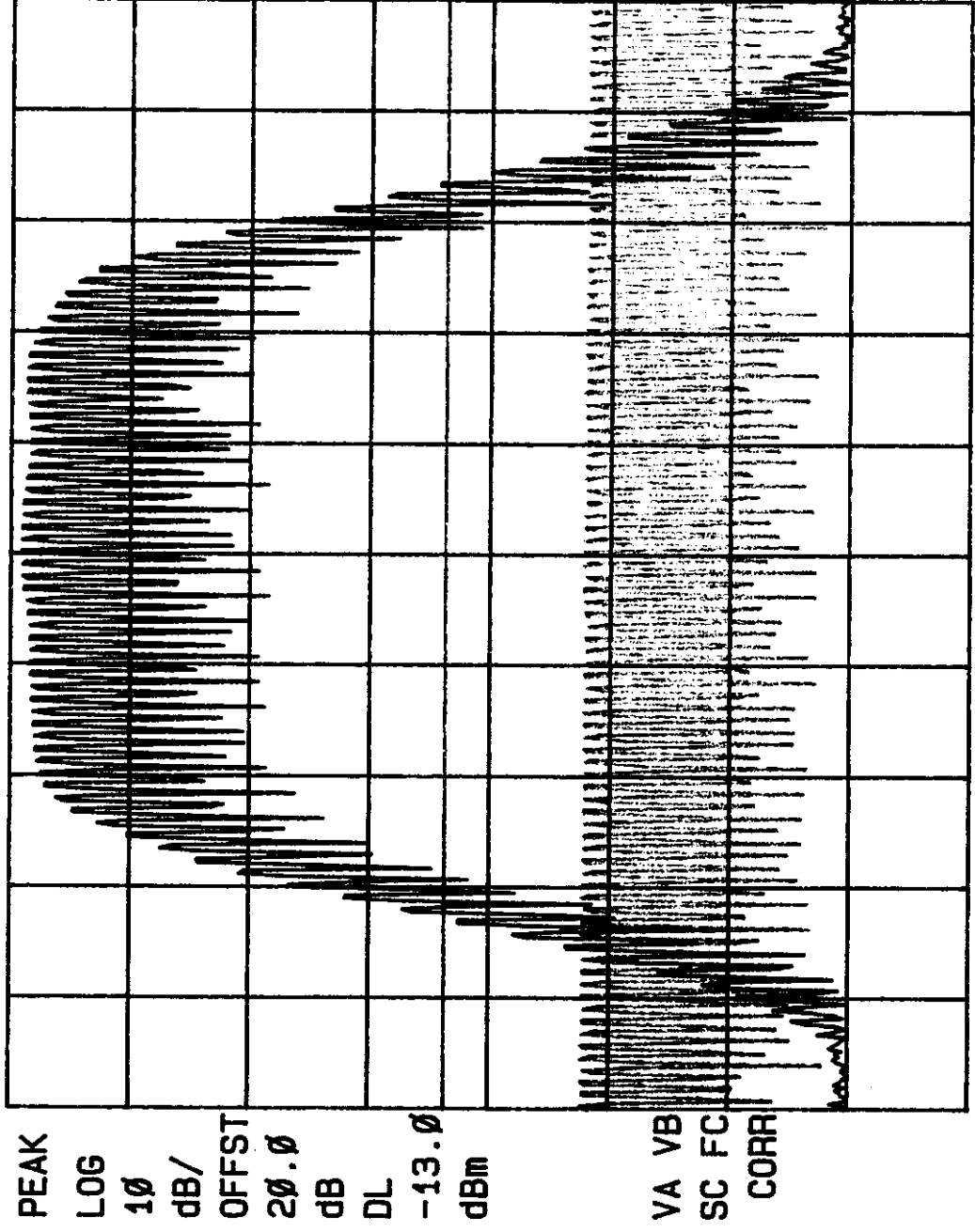
Test Report Number No. R-3244N
FCC ID: NVRCSI210-01

R-3244N ANTENNA CONDUCTED: SIGNAL IN VS SIGNAL OUT
REF 23.3 dBm AT 20 dB



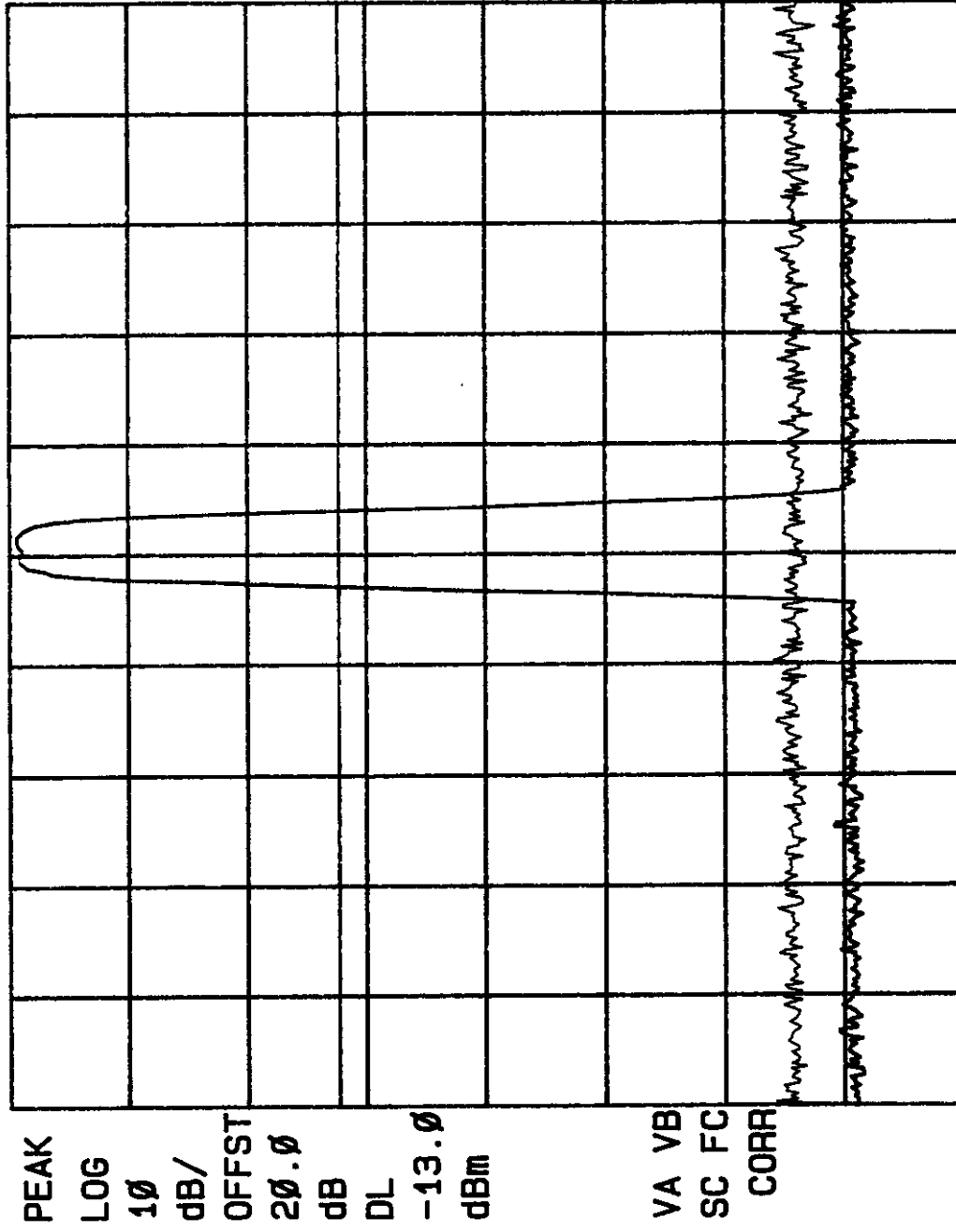
CENTER 815.0 MHz SPAN 450.0 MHz
#RES BW 100 kHz VBW 300 kHz SWP 135 msec

R-3244N ANTENNA CONDUCTED: SIGNAL IN VS SIGNAL OUT
REF 23.3 dBm AT 20 dB



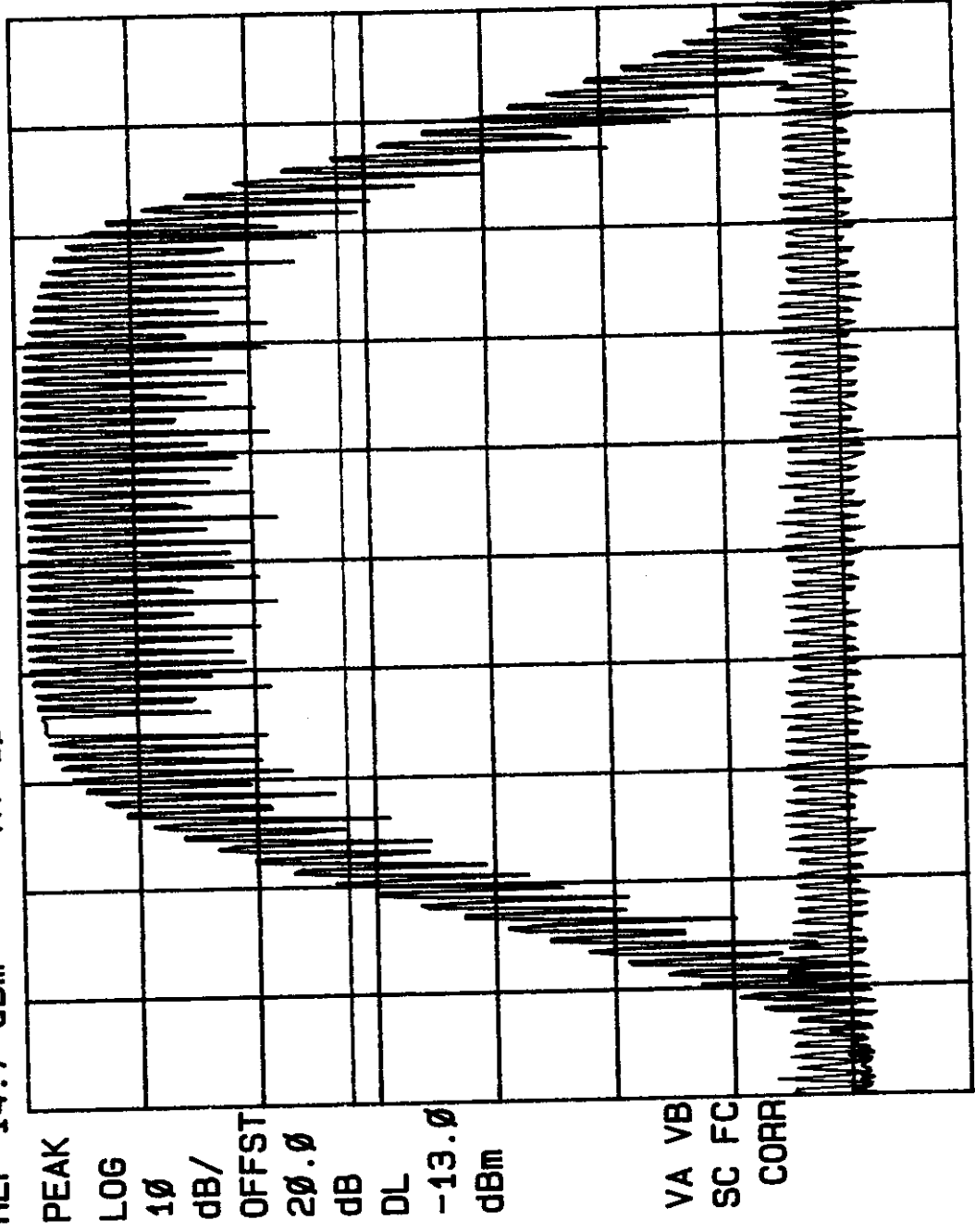
CENTER 815.00 MHZ
#RES BW 100 KHZ
SPAN 45.00 MHZ
SWP 20.0 msec
VBW 300 KHZ

R-3244N ANTENNA CONDUCTED: SIGNAL IN VS SIGNAL OUT
REF 14.7 dBm AT 10 dB



CENTER 858.0 MHz
#RES BW 100 kHz
SPAN 450.0 MHz
SWP 135 msec
VBW 300 kHz

R-3244N ANTENNA CONDUCTED: SIGNAL IN VS SIGNAL OUT
REF 14.7 dBm AT 10 dB



CENTER 858.00 MHz
#RES BW 100 KHZ
SPAN 45.00 MHz
SWP 20.0 msec
VBW 300 KHZ

EXHIBIT F

Para. 2.995

Frequency Stability



Retlif Testing Laboratories

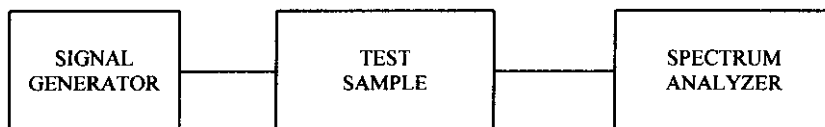
Test Report Number No. R-3244N
FCC ID: NVRCSE210-01

FREQUENCY STABILITY MEASUREMENTS (PARA 2.995)

Measurement Procedure (Frequency vs. Voltage):

The RF output of the signal generator was connected to the input (uplink or downlink) of the EUT, and the output was connected to a spectrum analyzer. The input signal level was varied. Measurements were taken with the EUT supplied with signals at levels -15, -30, and -60dB from the maximum input power.

BASIC TEST SETUP



Frequency Stability:

- 4.1 With the know max power in for uplink or downlink:
 - 4.1.1 Inject signal minus 15, 30, and 60dB for low, mid, and high frequencies.
 - 4.1.2 Monitor the frequency drift, if any, and plot results.

Measurement Results:

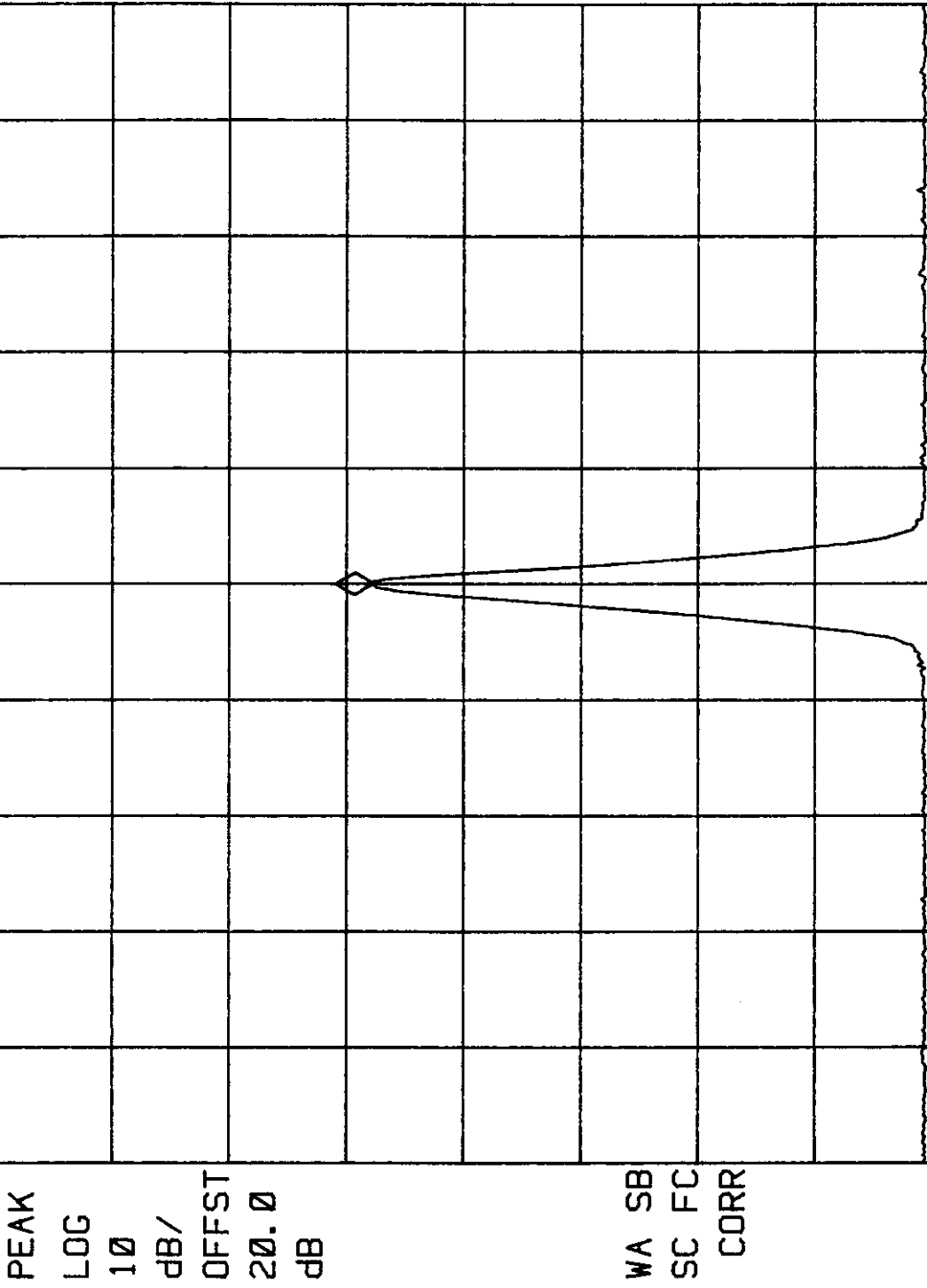
Examination of the test data indicates that the operation of the EUT caused no unacceptable deviations.



Retlif Testing Laboratories

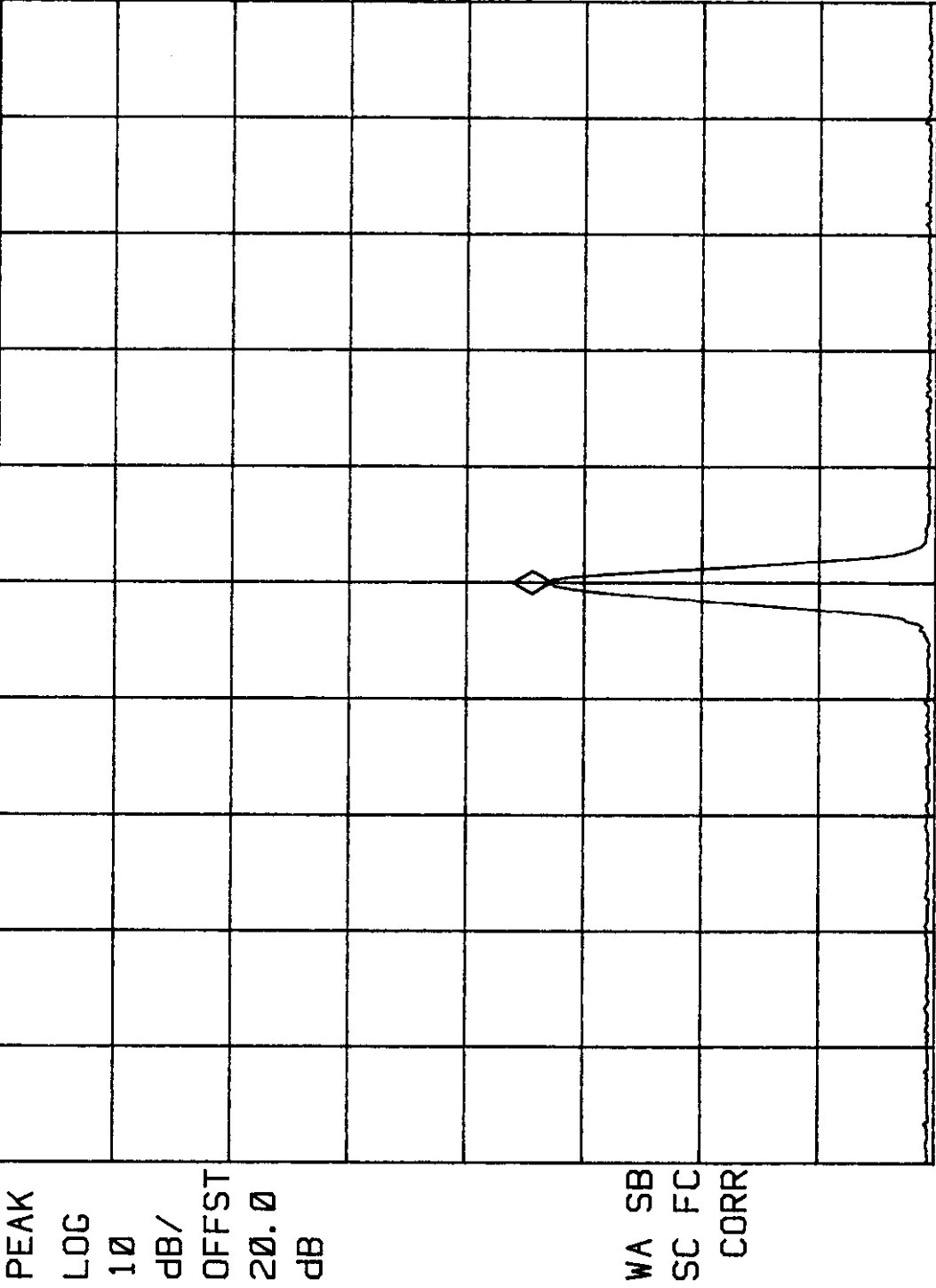
Test Report Number No. R-3244N
FCC ID: NVRCSI210-01

R-3244N MAX PWR IN MINUS 15dB (UP) MKR 806.000 MHz
REF 40.0 dBm AT 30 dB 7.71 dBm



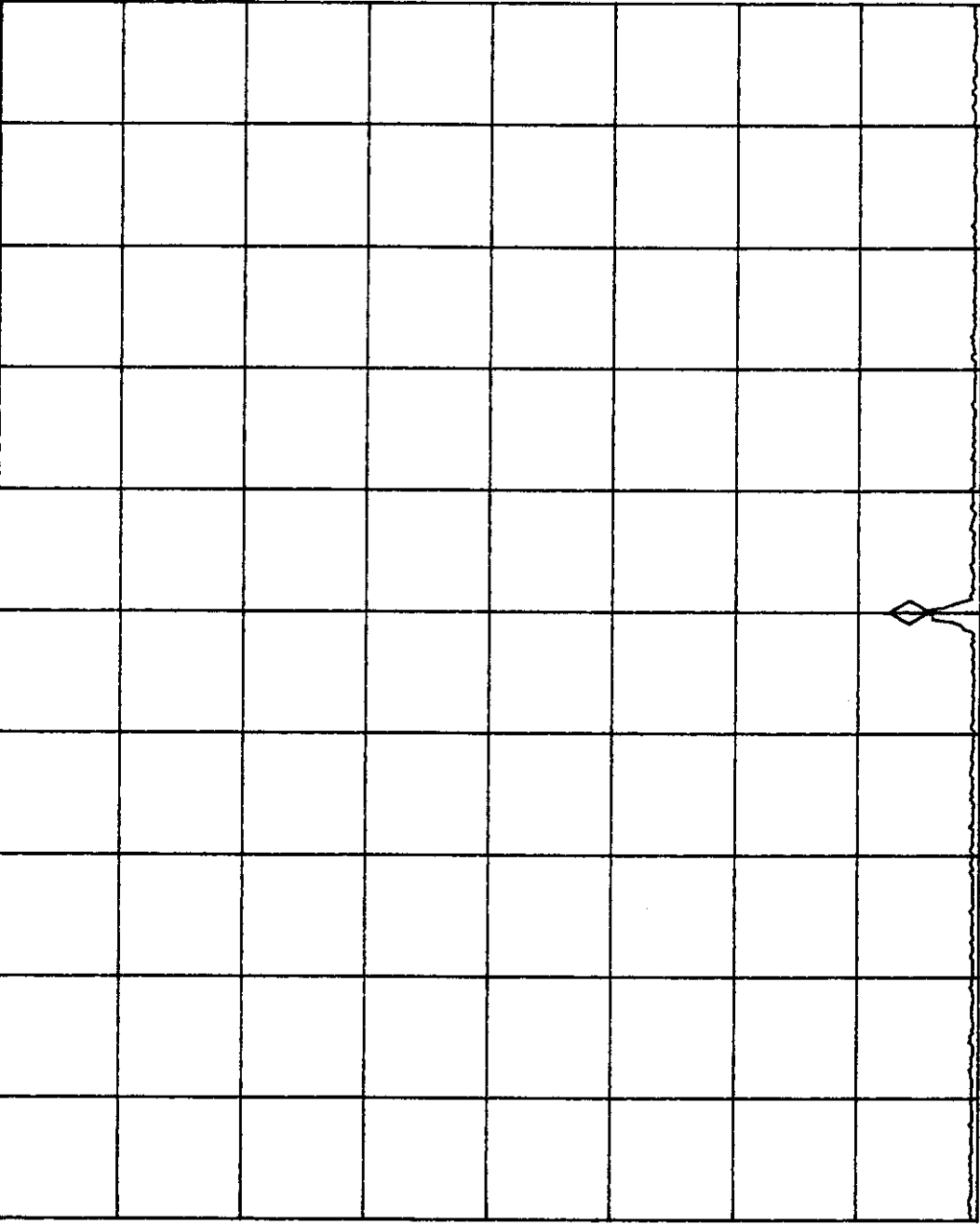
CENTER 806.000 MHz SPAN 1.000 MHz
#RES BW 10 kHz VBW 30 kHz SWP 30.0 msec

R-3244N MAX PWR IN MINUS 30dB (UP) MKR 806.000 MHz
REF 40.0 dBm AT 30 dB -7.20 dBm



CENTER 806.000 MHz SPAN 1.000 MHz
#RES BW 10 kHz VBW 30 kHz SWP 30.0 msec

R-3244N MAX PWR IN MINUS 60dB (UP) MKR 806.000 MHz
REF 40.0 dBm AT 30 dB -35.81 dBm

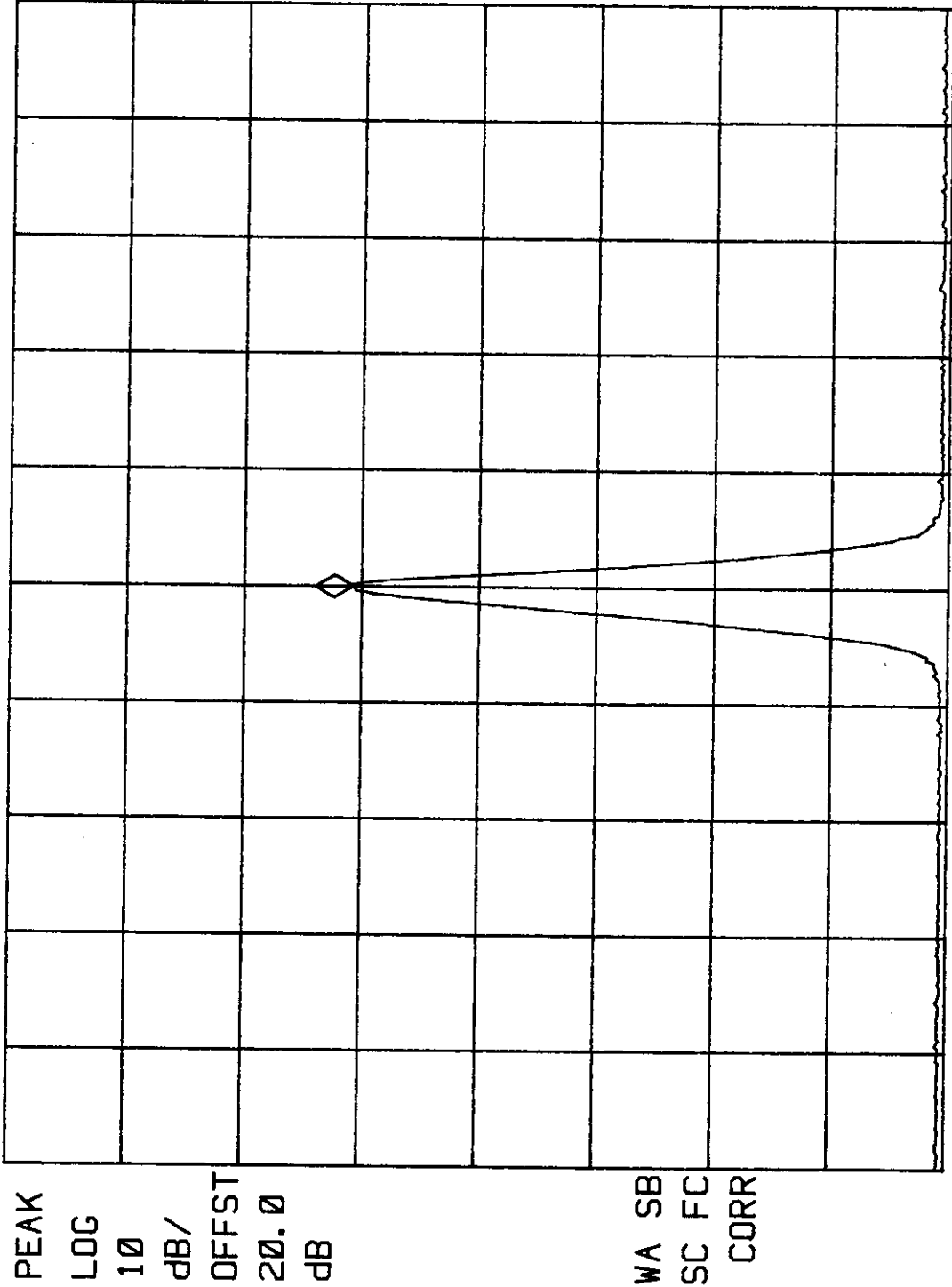


PEAK
LOG
10
dB/
OFFST
20.0
dB

WA SB
SC FC
CORR

CENTER 806.000 MHz SPAN 1.000 MHz
#RES BW 10 kHz VBW 30 kHz SWP 30.0 msec

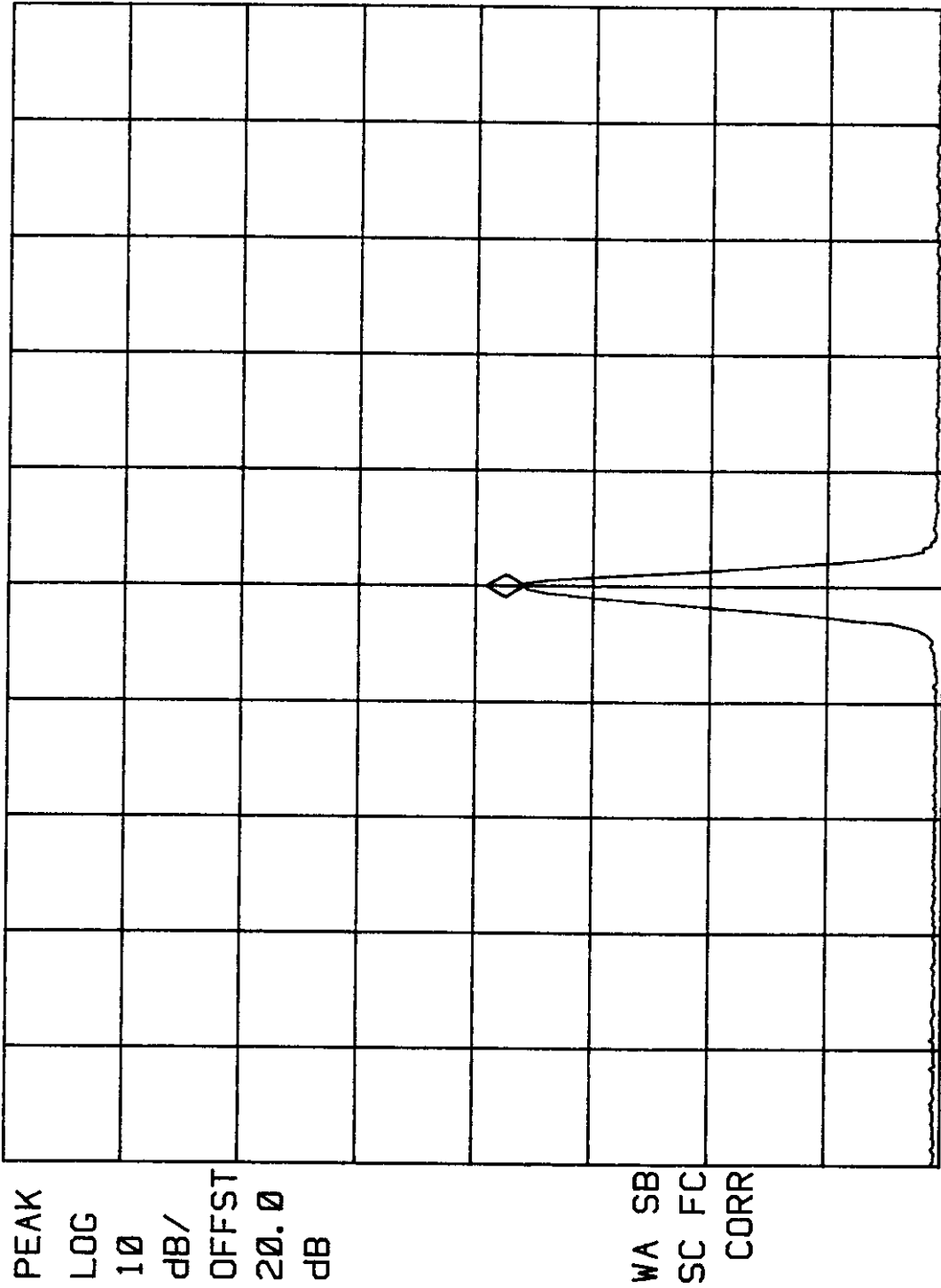
~~/~~ R-3244N MAX PWR IN MINUS 15dB (UP) MKR 815.000 MHz
REF 40.0 dBm AT 30 dB 10.71 dBm



CENTER 815.000 MHz
#RES BW 10 kHz
SPAN 1.000 MHz
SWP 30.0 msec
VBW 30 kHz

7

R-3244N MAX PWR IN MINUS 30dB (UP) MKR 815.000 MHz
REF 40.0 dBm AT 30 dB -4.17 dBm

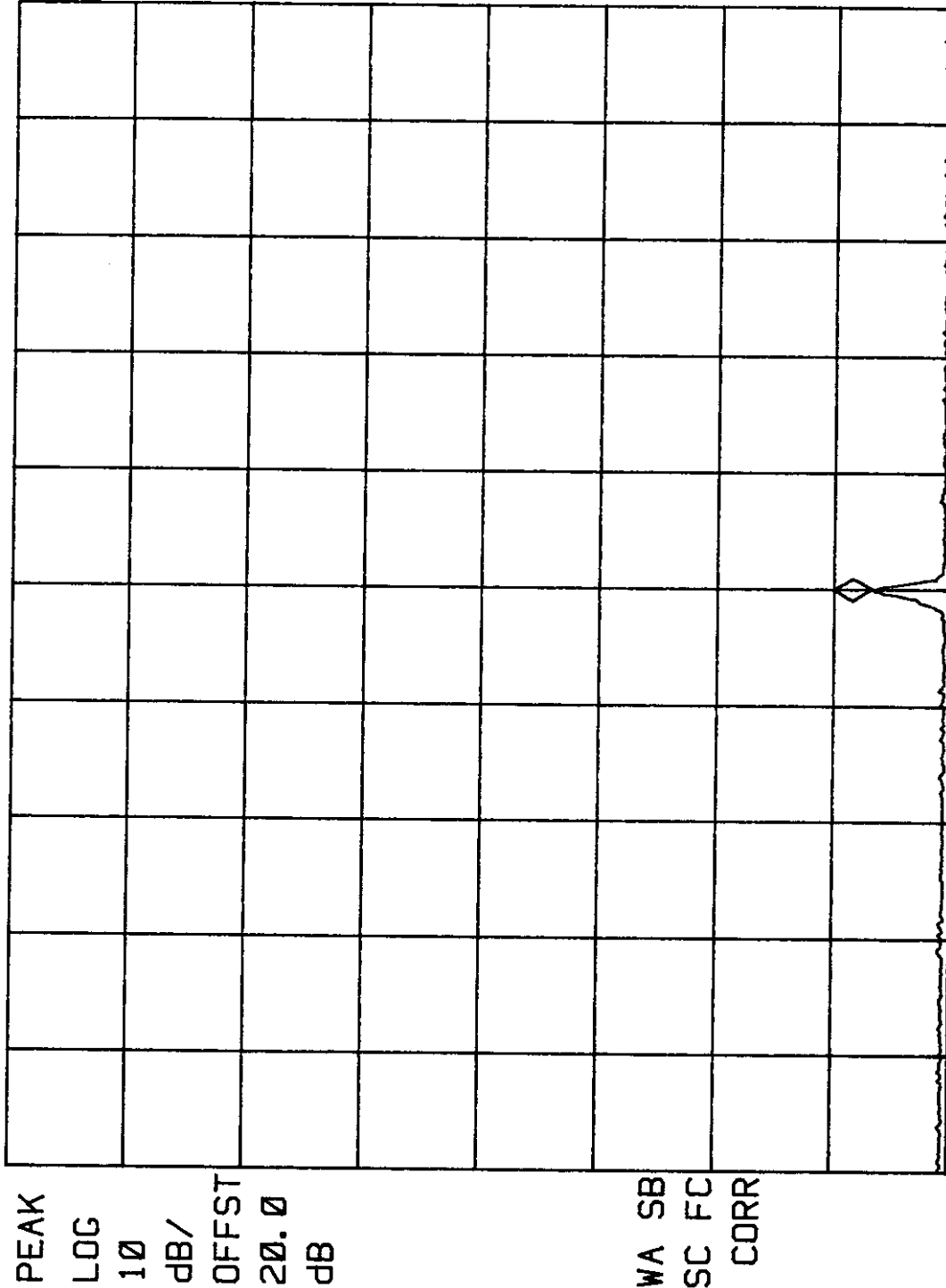


PEAK
LOG
10
dB/
OFFST
20.0
dB

WA SB
SC FC
CORR

CENTER 815.000 MHz
#RES BW 10 kHz
SPAN 1.000 MHz
SWP 30.0 msec
VBW 30 kHz

R-3244N MAX PWR IN MINUS 60dB (UP) MKR 815.000 MHz
REF 40.0 dBm AT 30 dB -33.23 dBm

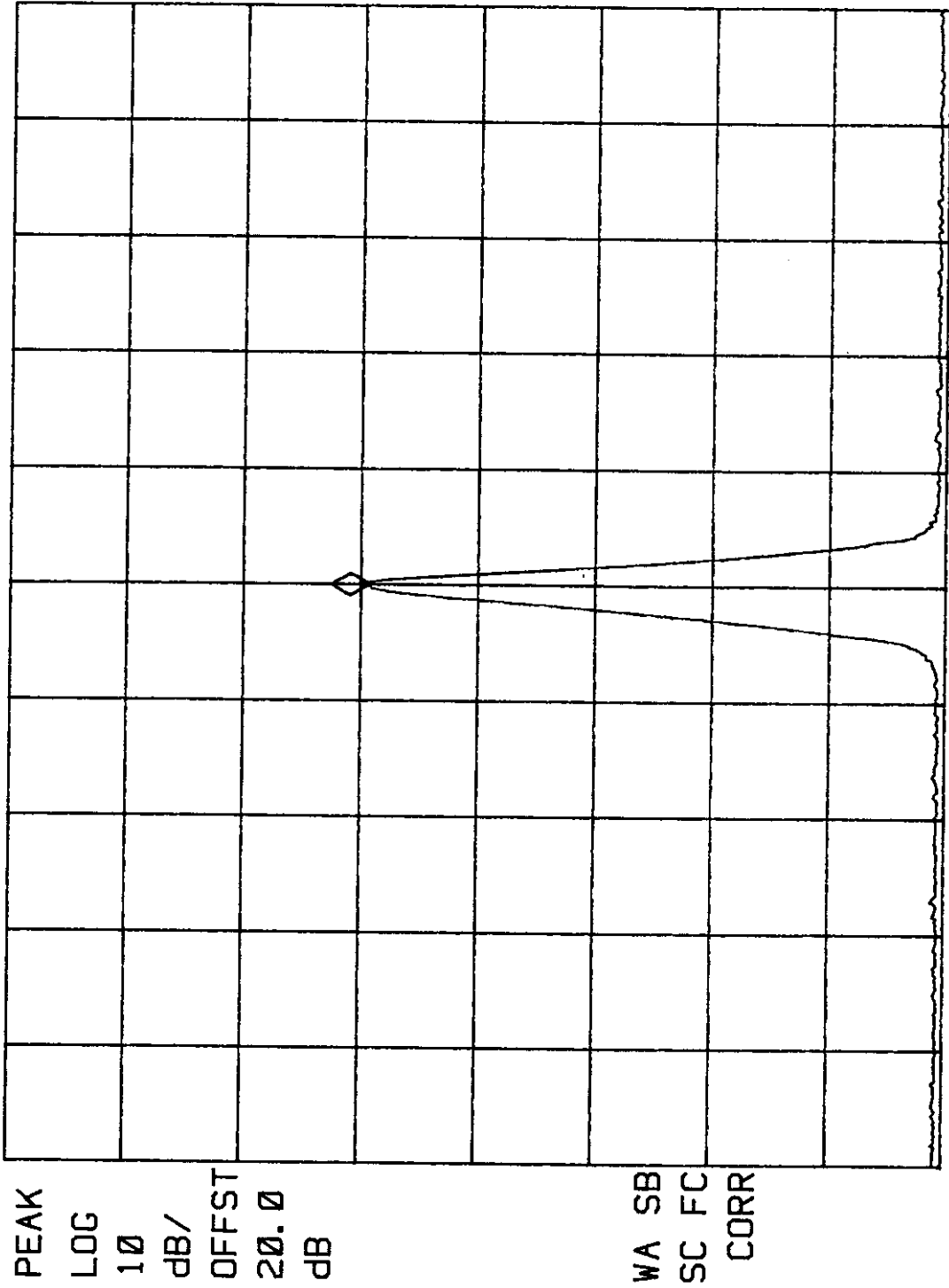


CENTER 815.000 MHz SPAN 1.000 MHz
#RES BW 10 KHZ VBW 30 KHZ SWP 30.0 msec

PEAK
LOG
10
dB/
OFFST
20.0
dB

WA SB
SC FC
CORR

~~7~~ R-3244N MAX PWR IN MINUS 15dB (UP) MKR 824.000 MHz
REF 40.0 dBm AT 30 dB 9.26 dBm

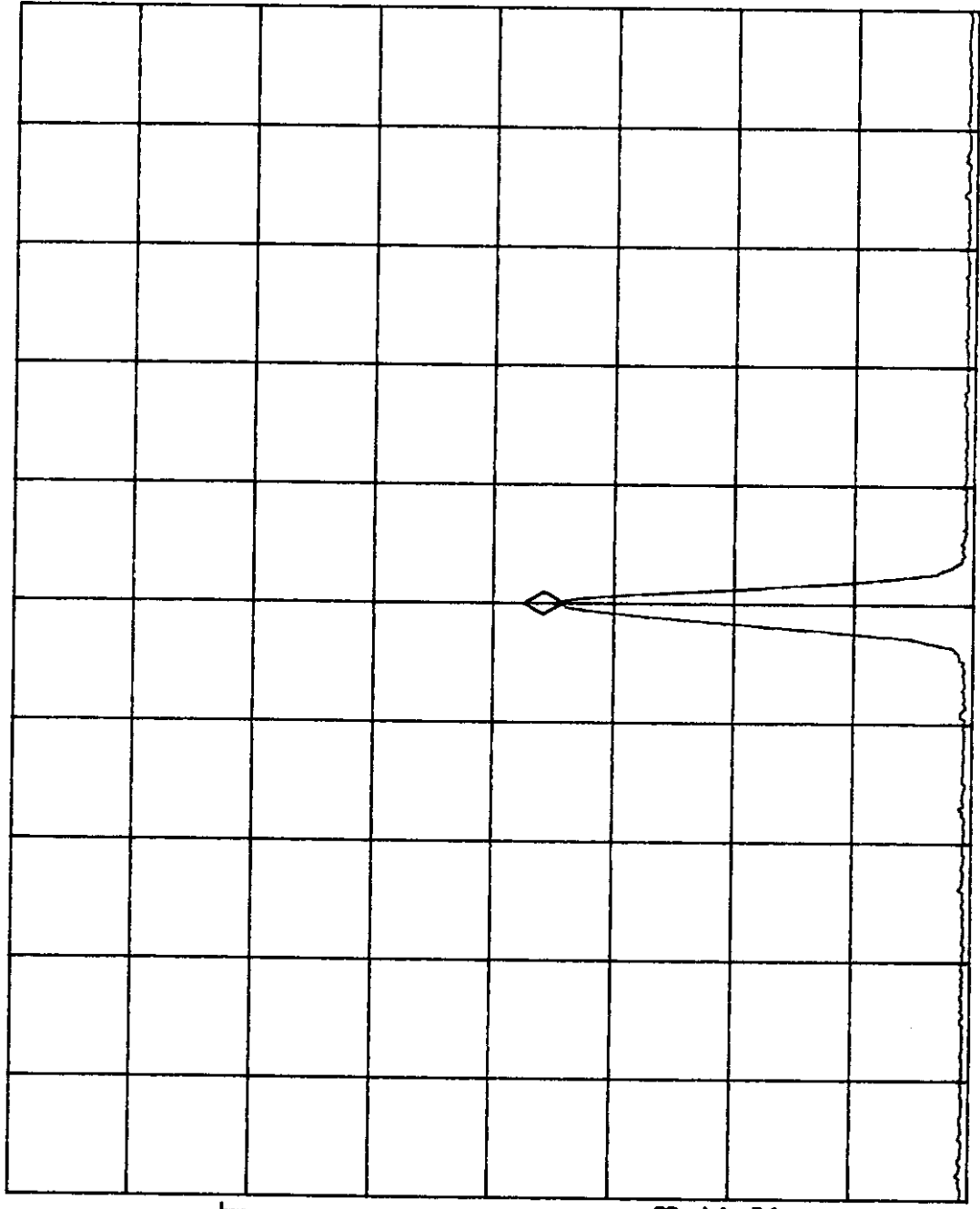


PEAK
LOG
10
dB/
OFFST
20.0
dB

WA SB
SC FC
CORR

CENTER 824.000 MHz
#RES BW 10 kHz
SPAN 1.000 MHz
SWP 30.0 msec
VBW 30 kHz

R-3244N MAX PWR IN MINUS 30dB (UP) MKR 824.000 MHz
REF 40.0 dBm AT 30 dB -5.79 dBm

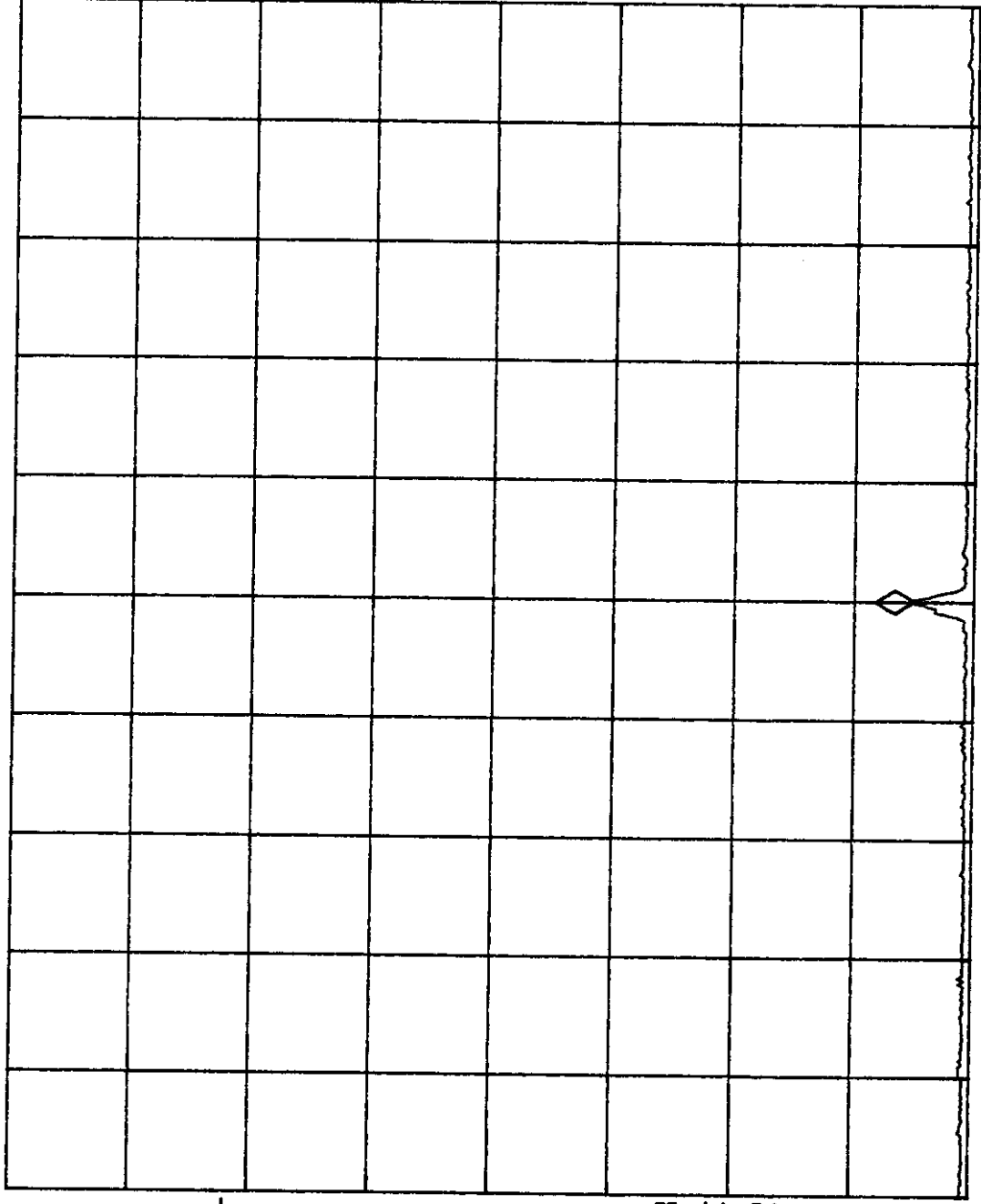


PEAK
LOG
10
dB/
OFFST
20.0
dB

WA SB
SC FC
CORR

CENTER 824.000 MHz SPAN 1.000 MHz
#RES BW 10 kHz SWP 30.0 msec
VBW 30 kHz

R-3244N MAX PWR IN MINUS 60dB (UP) MKR 824.000 MHz
REF 40.0 dBm AT 30 dB -35.03 dBm

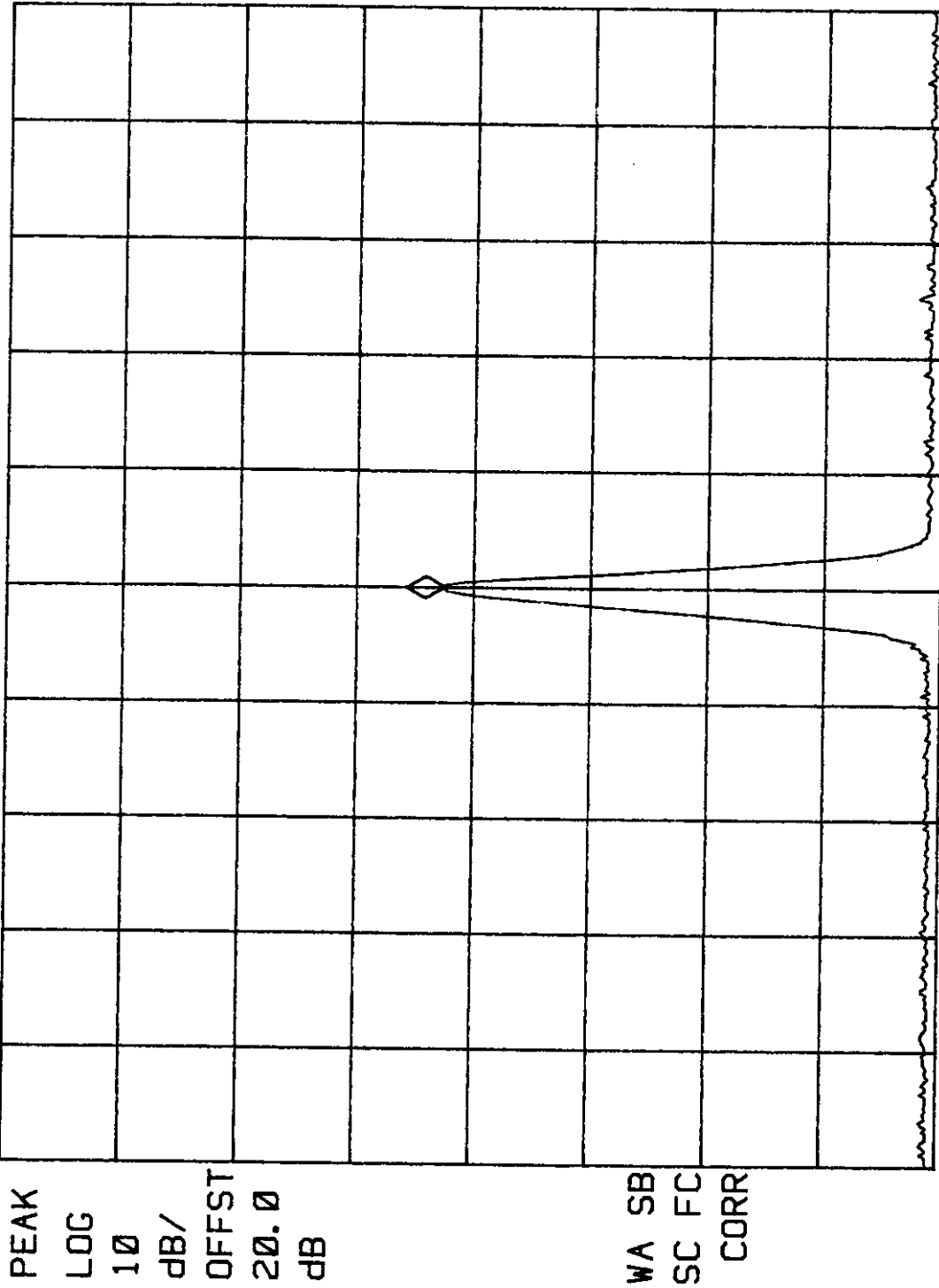


PEAK
LOG
10
dB/
OFFST
20.0
dB

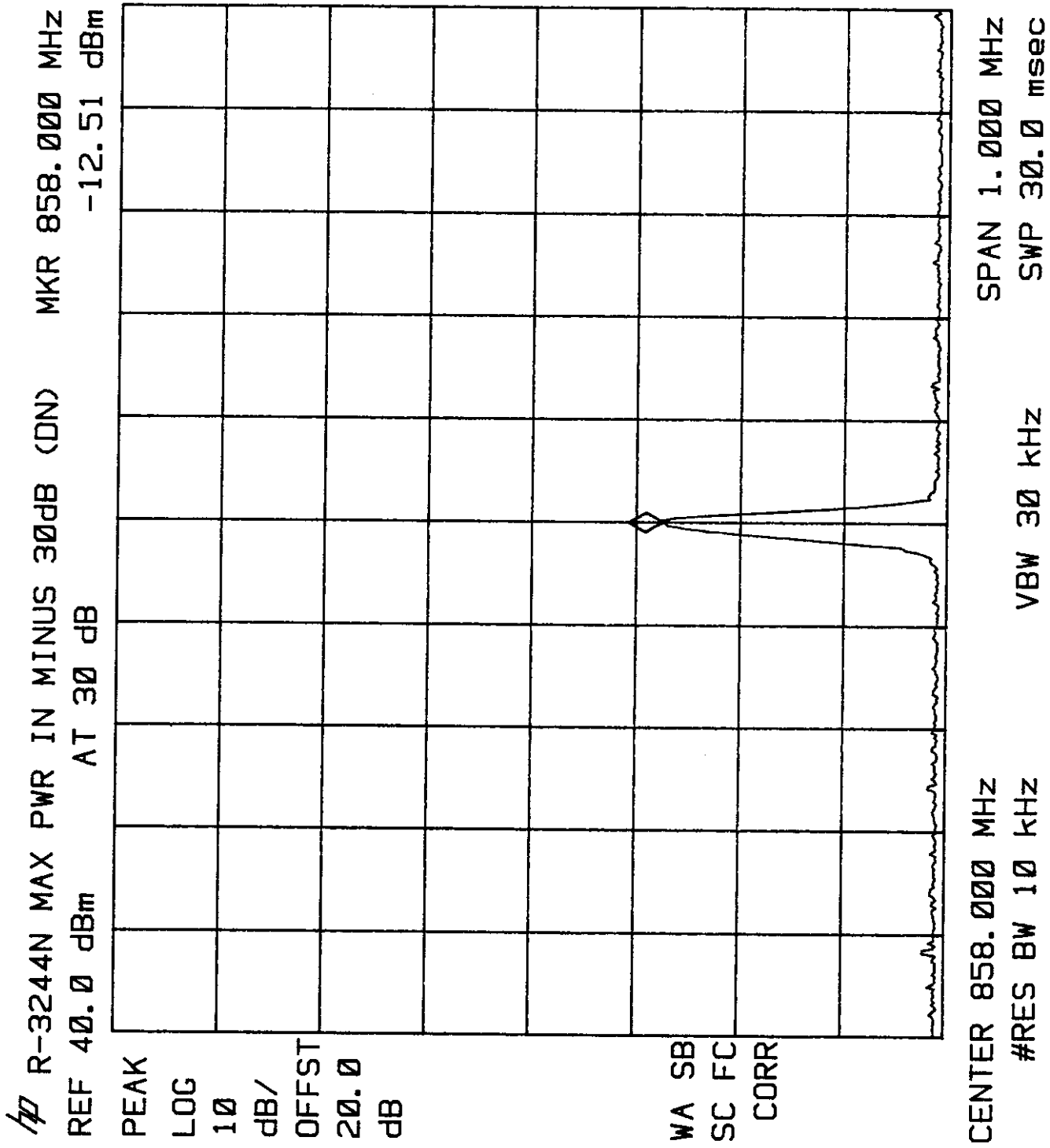
WA SB
SC FC
CORR

CENTER 824.000 MHz
#RES BW 10 kHz
SPAN 1.000 MHz
SWP 30.0 msec
VBW 30 kHz

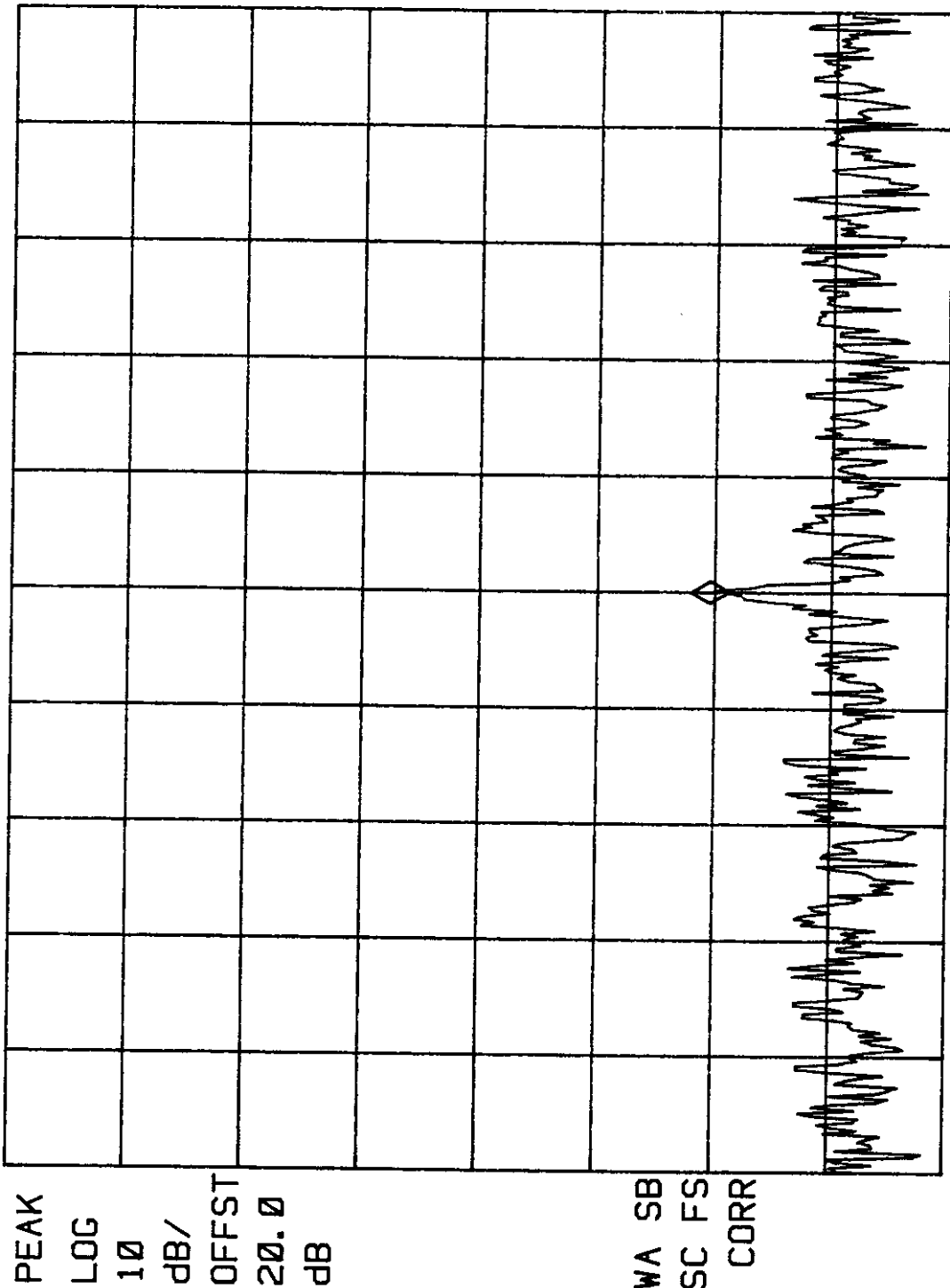
~~/~~ R-3244N MAX PWR IN MINUS 15dB (DN) MKR 858.000 MHz
REF 40.0 dBm AT 30 dB 2.50 dBm



CENTER 858.000 MHz SPAN 1.000 MHz
#RES BW 10 kHz VBW 30 kHz SWP 30.0 msec



R-3244N MAX PWR IN MINUS 60dB (DN) MKR 858.000 MHz
 REF 20.0 dBm AT 10 dB -41.20 dBm

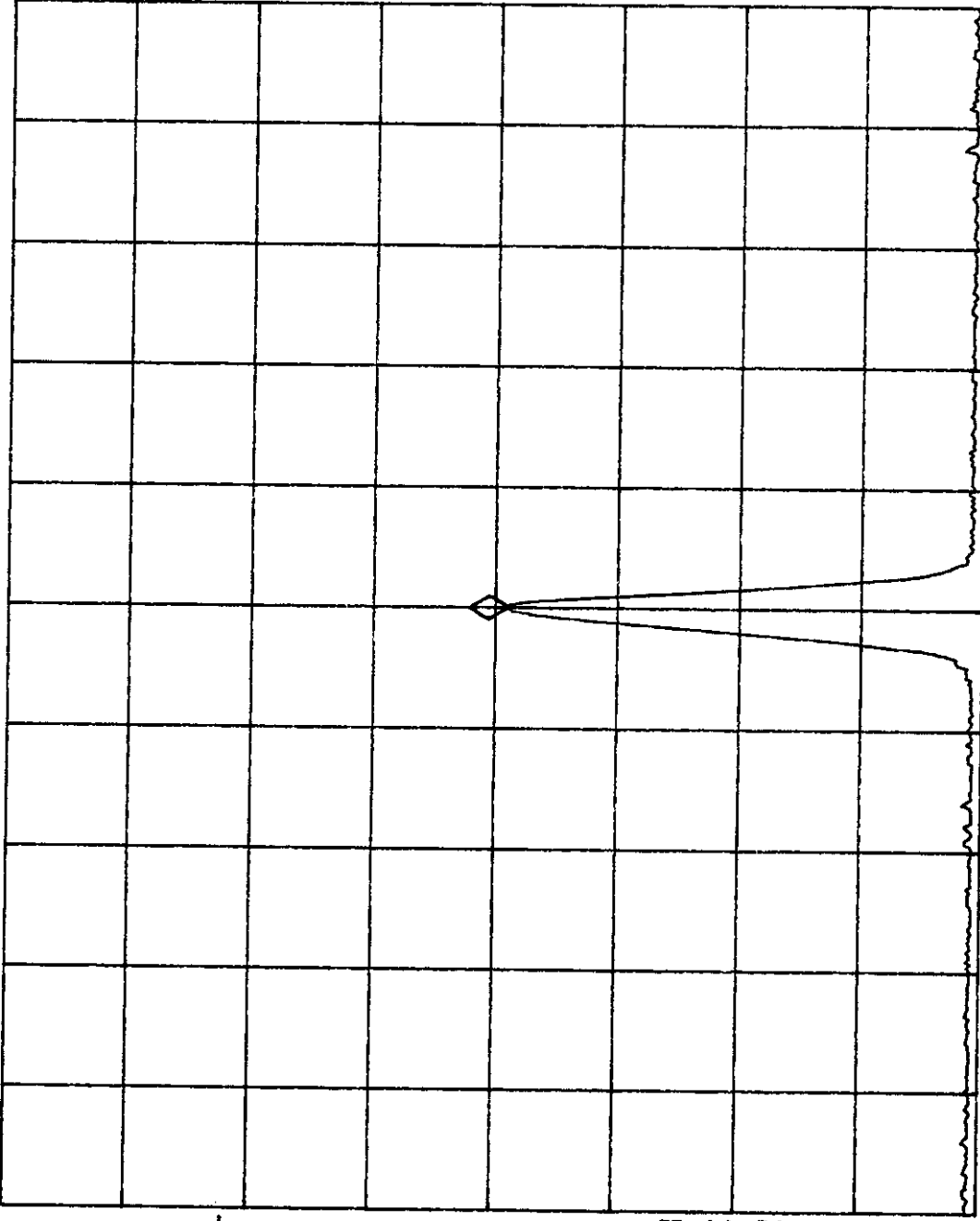


PEAK
 LOG
 10
 dB/
 OFFST
 20.0
 dB

WA SB
 SC FS
 CORR

CENTER 858.000 MHz SPAN 1.000 MHz
 #RES BW 10 KHZ VBW 30 KHZ SWP 30.0 msec

R-3244N MAX PWR IN MINUS 15dB (DN) MKR 849.000 MHz
REF 40.0 dBm AT 30 dB -1.09 dBm

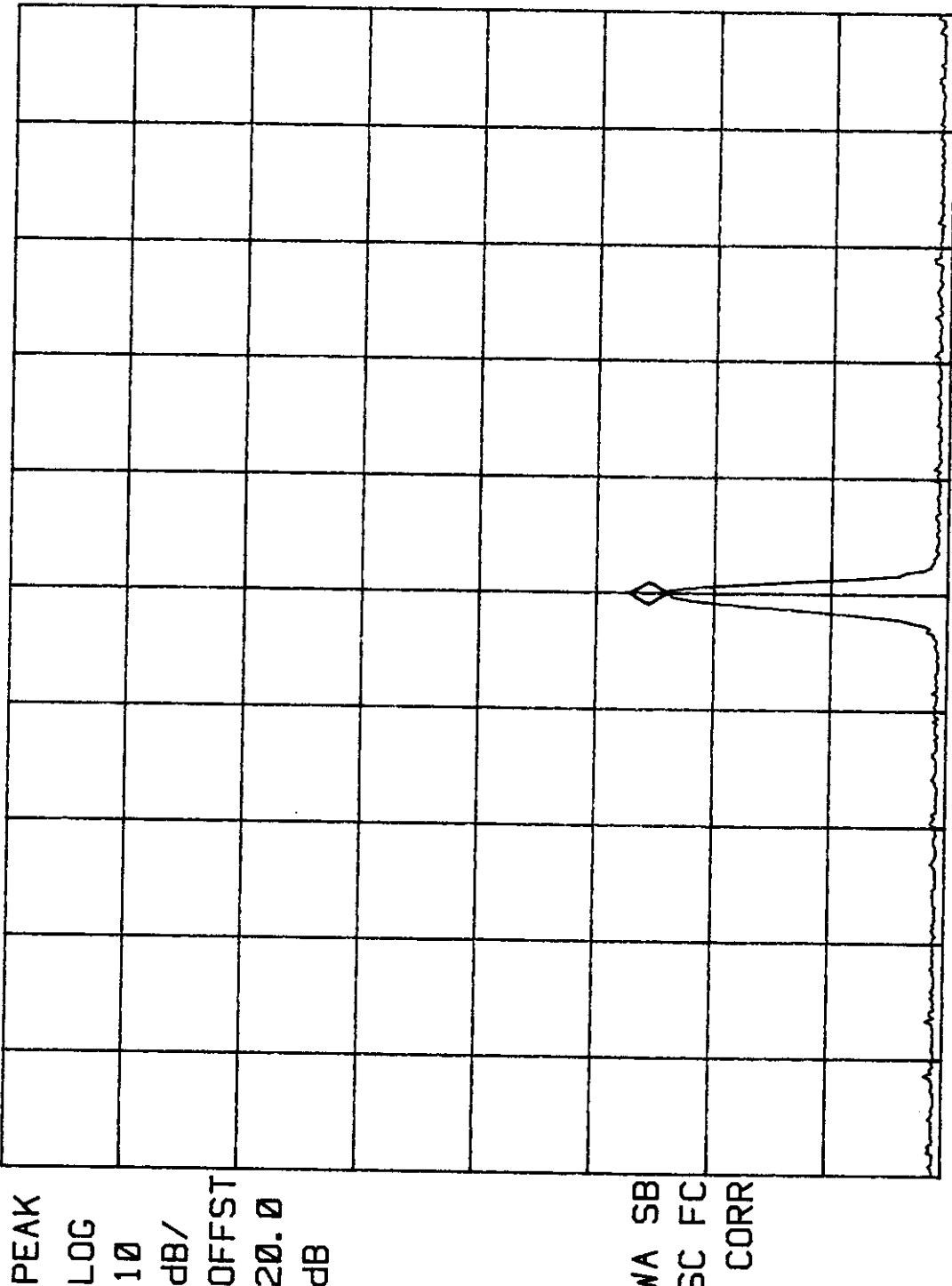


PEAK
LOG
10
dB/
OFFST
20.0
dB

WA SB
SC FC
CORR

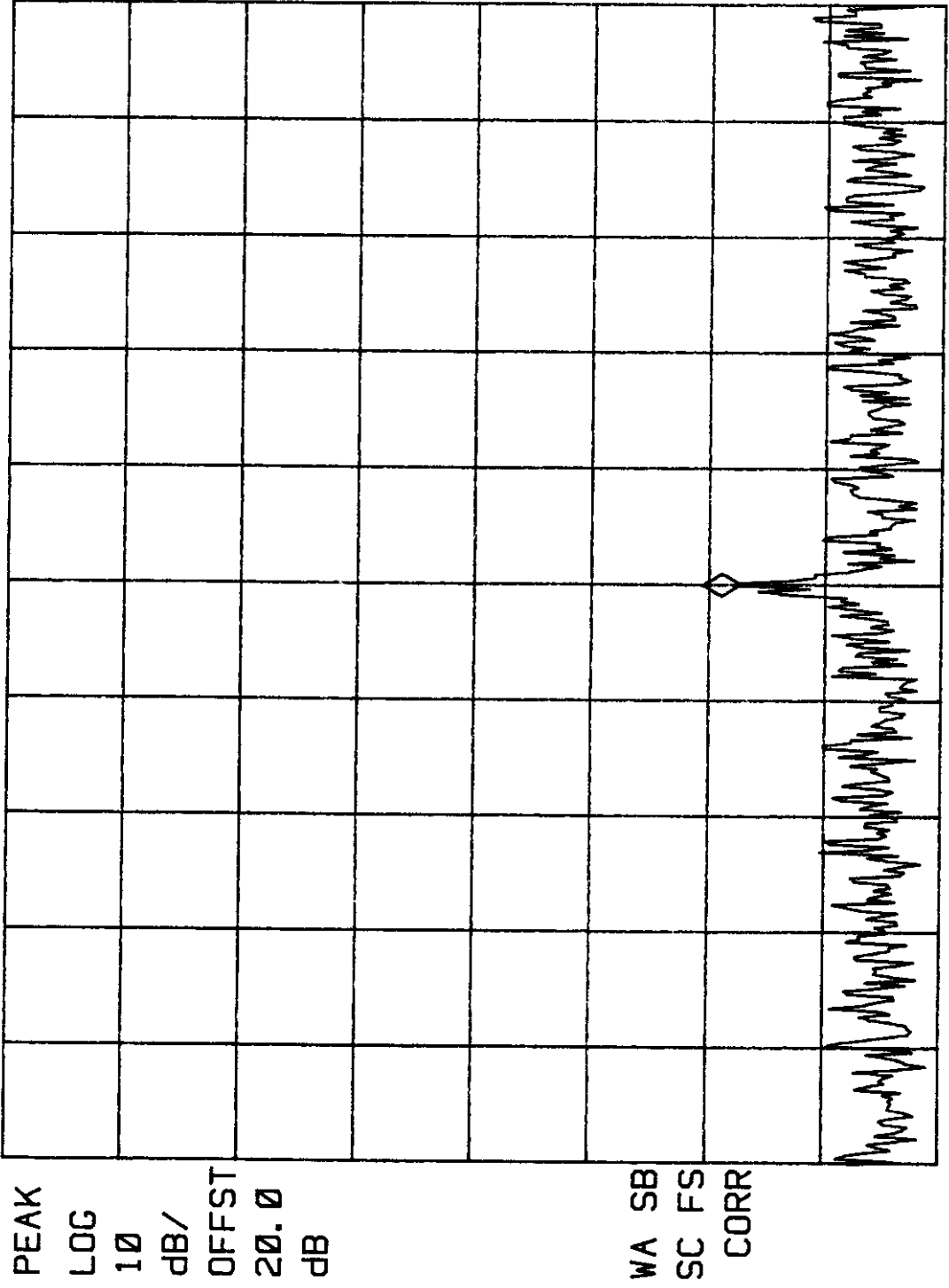
CENTER 849.000 MHz SPAN 1.000 MHz
#RES BW 10 kHz VBW 30 kHz SWP 30.0 msec

R-3244N MAX PWR IN MINUS 30dB (DN) MKR 849.000 MHz
REF 40.0 dBm AT 30 dB -16.07 dBm



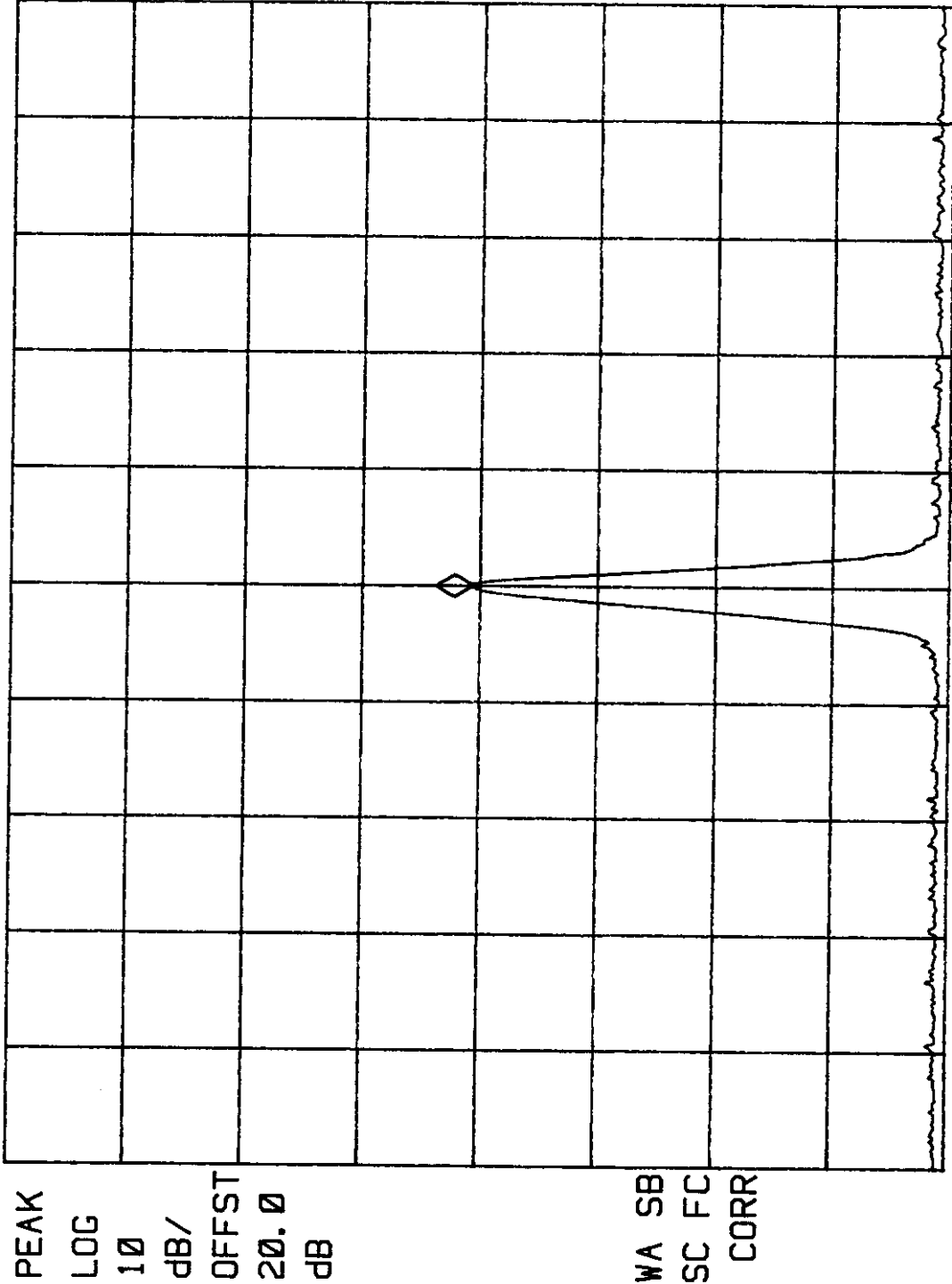
CENTER 849.000 MHz SPAN 1.000 MHz
#RES BW 10 KHZ VBW 30 KHZ SWP 30.0 msec

7 R-3244N MAX PWR IN MINUS 60dB (DN) MKR 849.000 MHz
REF 20.0 dBm AT 10 dB -42.72 dBm



CENTER 849.000 MHz SPAN 1.000 MHz
#RES BW 10 kHz VBW 30 kHz SWP 30.0 msec

R-3244N MAX PWR IN MINUS 15dB (DN) MKR 867.000 MHz
REF 40.0 dBm AT 30 dB .53 dBm

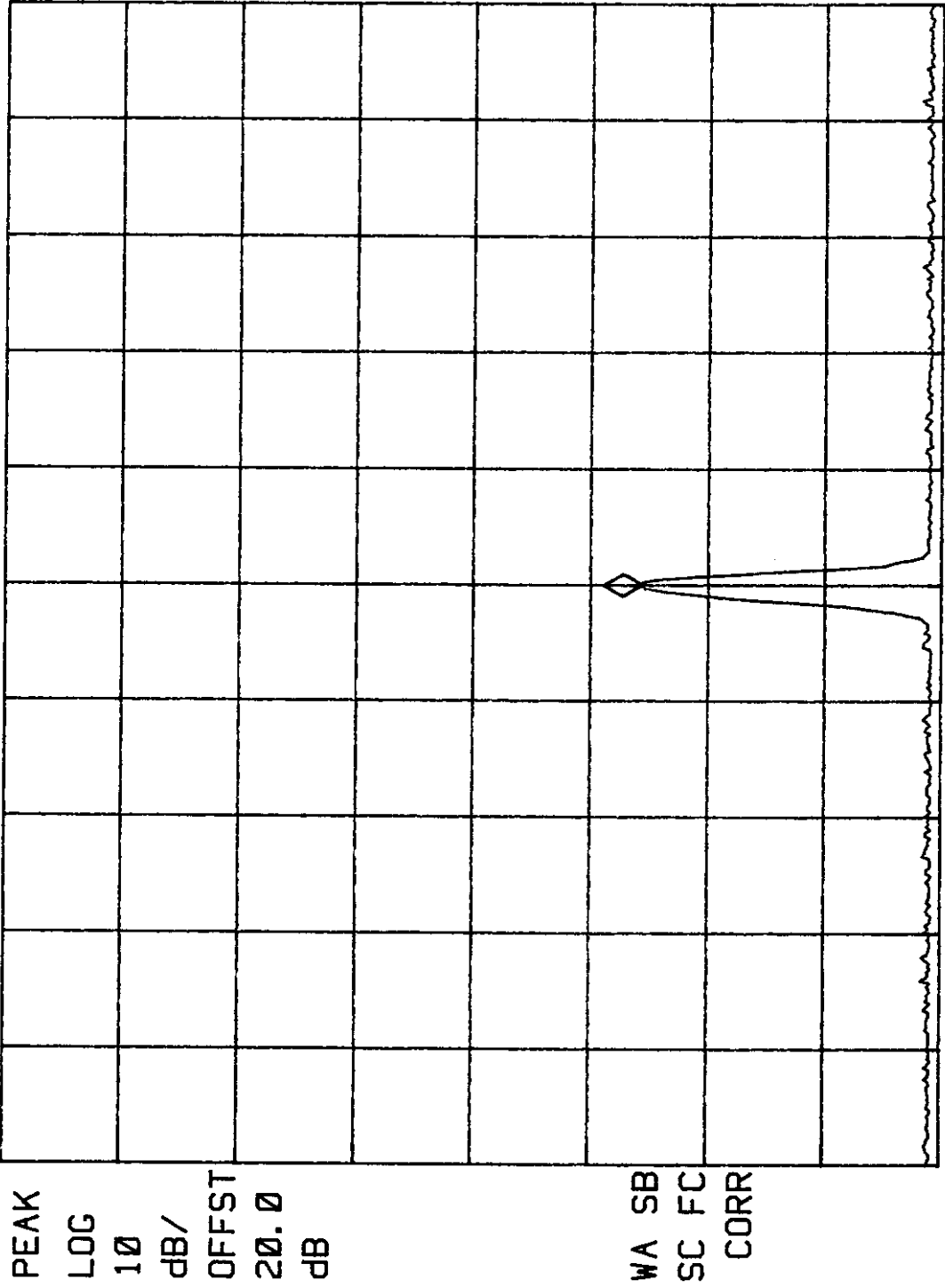


PEAK
LOG
10
dB/
OFFST
20.0
dB

WA SB
SC FC
CORR

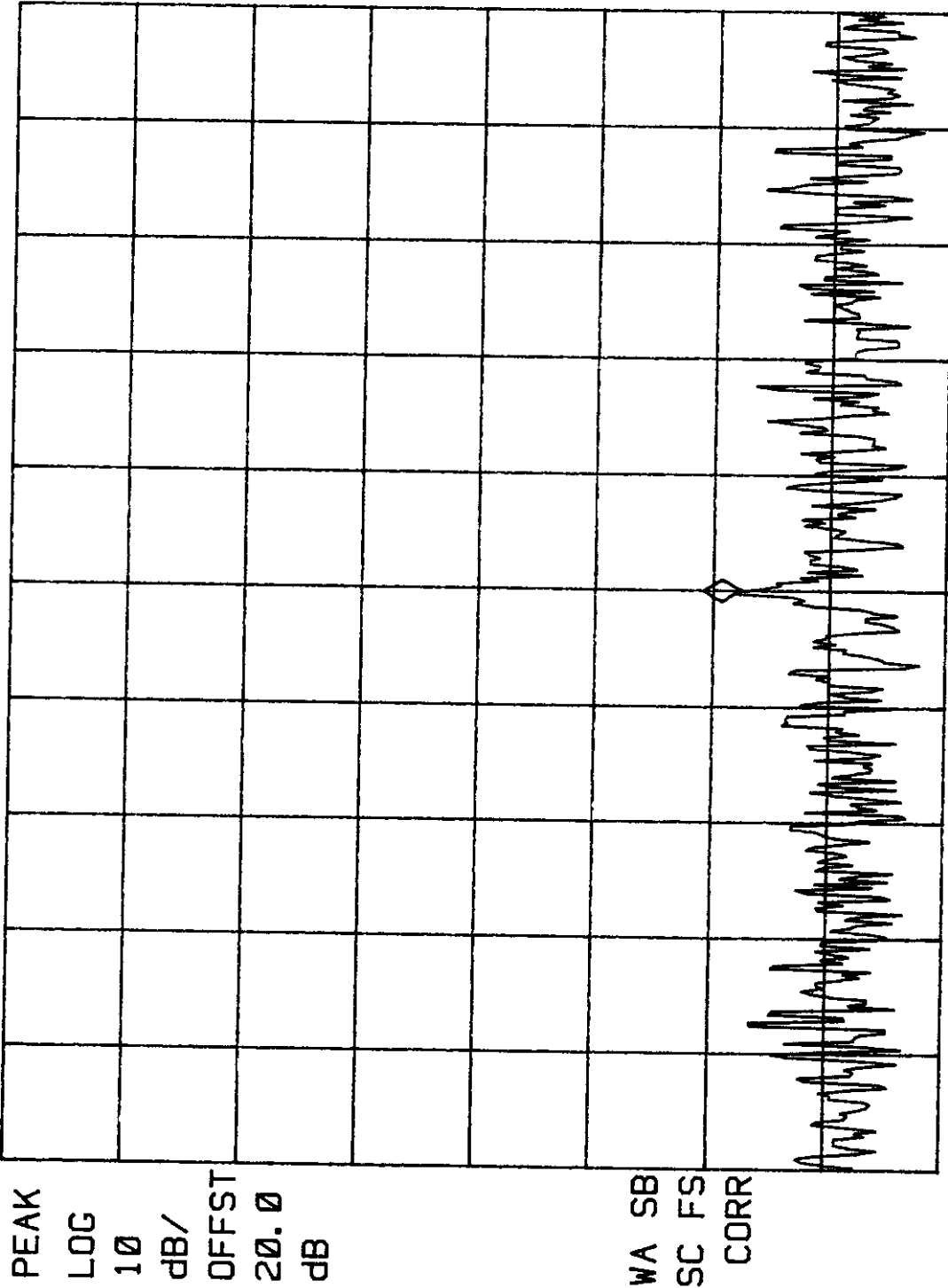
CENTER 867.000 MHz SPAN 1.000 MHz
#RES BW 10 kHz VBW 30 kHz SWP 30.0 msec

✓ R-3244N MAX PWR IN MINUS 30dB (DN) MKR 867.000 MHz
REF 40.0 dBm AT 30 dB -14.40 dBm



CENTER 867.000 MHz SPAN 1.000 MHz
#RES BW 10 KHz VBW 30 KHz SWP 30.0 msec

R-3244N MAX PWR IN MINUS 60dB (DN) MKR 867.000 MHz
 REF 20.0 dBm AT 10 dB -42.34 dBm



PEAK
 LOG
 10
 dB/
 OFFST
 20.0
 dB

WA SB
 SC FS
 CORR

CENTER 867.000 MHz SPAN 1.000 MHz
 #RES BW 10 KHZ VBW 30 KHZ SWP 30.0 msec

TEST EQUIPMENT LIST



Retlif Testing Laboratories

Test Report Number No. R-3244N
FCC ID: NVRC SI210-01

TEST EQUIPMENT LIST

Item No.	Model No.	Type	Manufacturer	Frequency Range	Serial No.	Cal Date	Due Date
100	105K-XT	AC Power Source	Pacific Power Source	2Hz-2MHz, 0-250VAC	2997	12/11/97	12/11/98
34	3-D	3-Phase Signal Gen., Plug In	Pacific Power Source	20Hz-2kHz	0005	12/11/97	12/11/98
35	8037	Transient Generator	Pacific Power Source	20Hz-2kHz	0256	12/11/97	12/11/98
36	1-X	1-Phase Wideband Amp.	Pacific Power Source	2 Hz-2kHz	0243	12/11/97	12/11/98
128	HP8491A	Attenuator	Hewlett Packard	DC-18 GHz	40295	02/21/98	02/21/99
250	8640B-OPT-323	Signal Generator	Hewlett Packard	500kHz-1GHz	1420A00435	06/19/97	06/19/98
896	7470A	Plotter	Hewlett Packard	N/A	2308A67727	08/22/97	08/22/98
30A	2023	Signal Generator	Marconi Instruments	10KHz - 1.2GHz	112164/070	03/19/98	03/19/99



Retlif Testing Laboratories

Test Report Number No. R-3244N
FCC ID: NVRCSI210-01

EXHIBIT F

Intermodulation Characteristics



Retlif Testing Laboratories

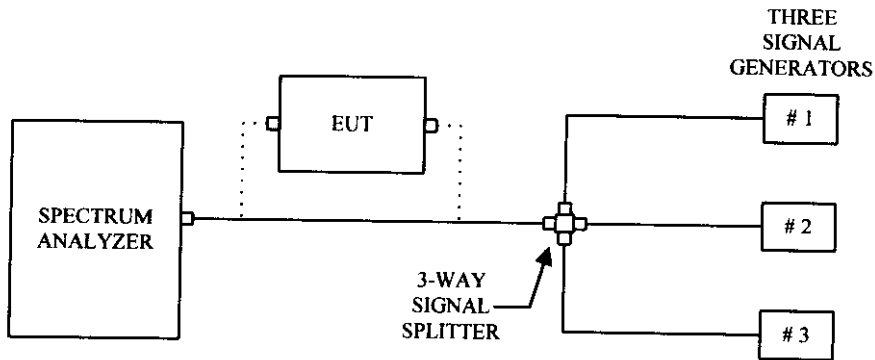
Test Report Number No. R-3244N
FCC ID: NVRCSI210-01

INTERMODULATION CHARACTERISTICS

Measurement Procedure:

Three separate signal generators and a three-way splitter were employed for this testing. Each generator was tuned to a different frequency, two frequencies close together at the low end of the frequency range, and one at the upper end of the frequency range. All generators were set for the same amplitude. The three output signals were recorded on the analyzer. The three signals were then sent into the EUT through the uplink port, and the EUT output was recorded. The results were examined for any signs of intermodulation.

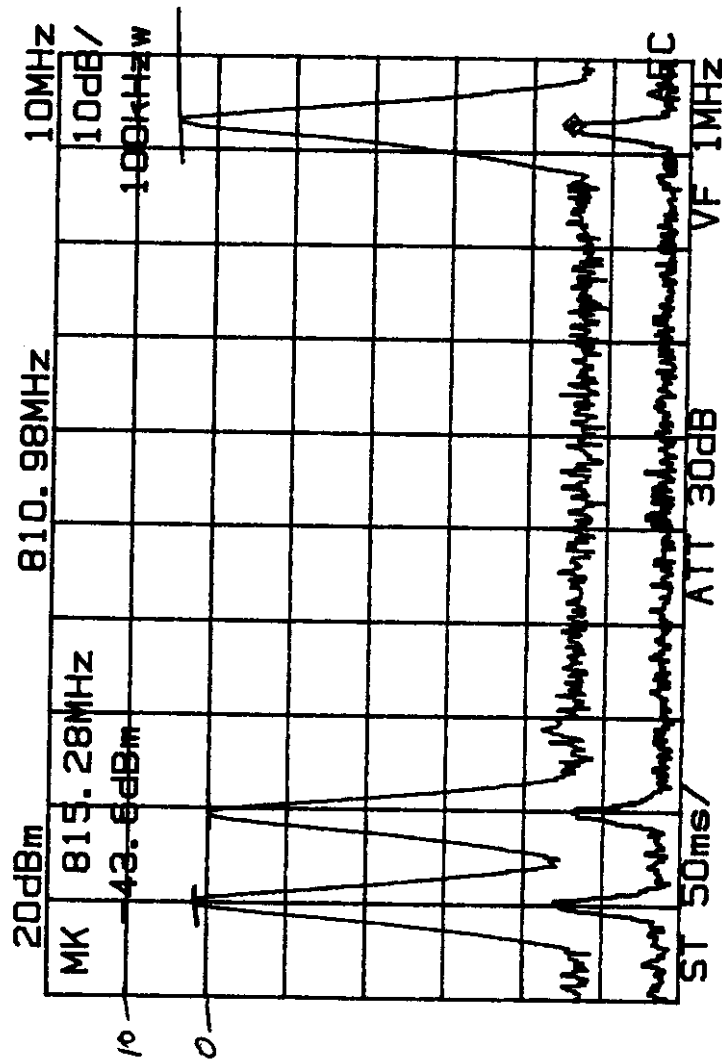
BASIC TEST SETUP



Measurement Results:

Examination of the test data indicates that the operation of the EUT caused no unacceptable deviations.

INTERMODULATION CHARACTERISTICS
WITH THREE INPUT SIGNALS



Retlif Testing Laboratories

Test Report Number No. R-3244N
FCC ID: NVRCSI210-01

Response to question #2.

In order to maintain the spurious emissions in compliance with 47 CFR 90, subpart I and 47CFR 22 subpart K spurious emissions shall be no greater than $43 + 10 \text{Log}_{10}(\text{Power Out})$ below the carrier. For both the uplink and downlink this equates to -13 dBm .

With this limitation the available power per channel can be calculated by the formula:

Power output = $\text{Ip3} + \text{Intermod power}/3 - 5 \text{Log}_{10} K$ where

$K = n^2 - 1.5n$; where $n = 2, 4, 6, 8$ $K = n^2 - 1.5n + .5$; where $n = 1, 3, 5, 7$

Using uplink parameters of Power out = $+22 \text{ dBm}$ and Ip3 of $+38 \text{ dBm}$

Then:

#ch	Po(dBm)
1	+20.7
2	+17.2
3	+15.7
4	+14.4
5	+13.6
6	+12.8
7	+12.1
8	+11.6
9	+11.1
10	+10.6

Using Downlink Parameters of Power out = $+15 \text{ dBm}$ and Ip3 of $+27 \text{ dBm}$.

Then:

# Ch.	Po(dBm)
1	+13.7
2	+10.2
3	+8.7
4	+7.4
5	+6.6
6	+5.8
7	+5.1
8	+4.6
9	+4.1
10	+3.6

HARMONIC SPURIOUS EMISSIONS
(DOWNLINK)

RETLIF TESTING LABORATORIES

Test Method	Spurious Emissions		
Customer	Cellular Specialties, Inc.	Job No.	R-3244N
Test Sample	Bidirectional Amplifier		
Model No.	110	Serial No.	1040
Test Specification	Harmonic Spurious Emissions at the Antenna Terminals	Paragraph	2.991
Operating Mode	Amplifying Incoming and Outgoing Cellular Phone Signals		
Technician	T. Cricco	Date	8/13/98
Lead Tested	Downlink Output		
Notes			

14:02:01 AUG 13, 1998
 3244N-HARMONIC SPURIOUS EMISSIONS @ ANTENNA TERMINAL
 REF 20.0 dBm AT 10 dB

PEAK																								
LOG																								
10																								
dB/																								
OFFST																								
20.0																								
dB																								
MA SB																								
SC FC																								
CORR																								

START 200.0 MHz #RES BW 120 KHZ
 STOP 500.0 MHz SWP 62.5 msec
 VBW 300 KHZ

HARMONIC SPURIOUS EMISSIONS
(UPLINK)

RETLIF TESTING LABORATORIES

Test Method	Spurious Emissions		
Customer	Cellular Specialities, Inc.	Job No.	R-3244N
Test Sample	Bidirectional Amplifier		
Model No.	110	Serial No.	1040
Test Specification	Harmonic Spurious Emissions at the Antenna Terminals	Paragraph	2.991
Operating Mode	Amplifying Incoming and Outgoing Cellular Phone Signals		
Technician	T. Cricco	Date	8/13/98
Lead Tested	Uplink Output		
Notes			

Sheet 20 of 24

14:19:48 AUG 13, 1998
 3244N-HARMONIC SPURIOUS EMISSIONS @ ANTENNA TERMINAL
 REF 30.0 dBm AT 20 dB

PEAK
 LOG
 10
 dB/
 OFFST
 20.0
 dB

MA SB
 SC FC
 CORR

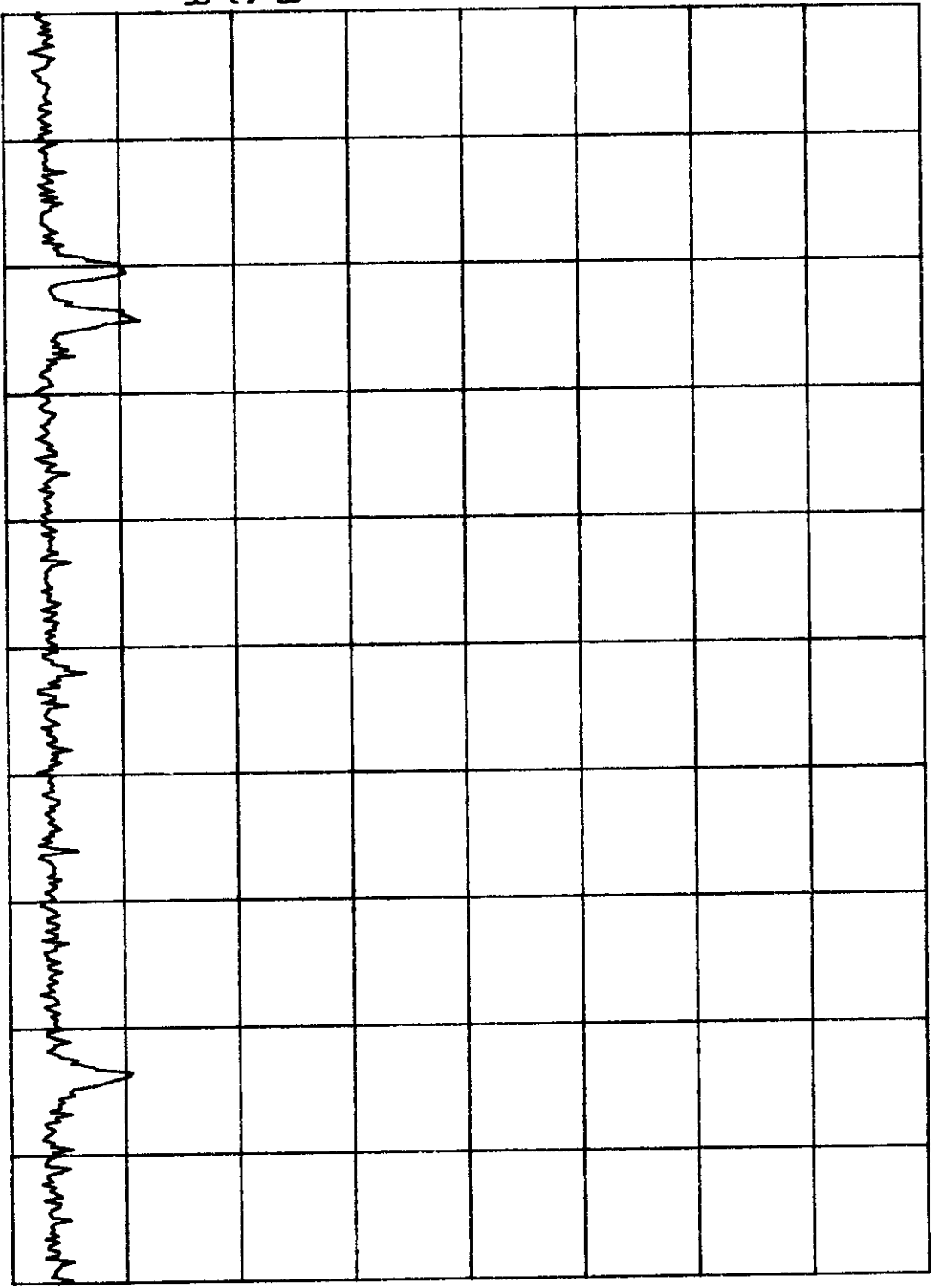
START 200.0 MHZ
 #RES BW 120 KHZ
 STOP 500.0 MHZ
 VBW 300 KHZ
 SWP 62.5 msec

INTERMODULATION

16:09:32 AUG 14, 1998
 R-3244 CELLULAR INTERMODULATION DOWNLINK
 REF 10.0 DBM #AT 20 DB

PEAK
 LOG
 10
 DB/

WA VB
 SC FC
 CORR



START 845.00 MHZ

STOP 870.00 MHZ

Customer:	Cellular Specialties, Inc.
Test Sample:	Bidirectional Amplifier
Model No:	110
Test Method:	Intermodulation Characteristics Using Three Input Signals
Notes:	Downlink
Date	8/14/98
Tech:	T. Crizzo
Sheet	2 of 2

Report No. R-3244N

15:07:28 AUG 14, 1998

R-3244 CELLULAR INTERMODULATION UPLINK

REF. 0 DBM #AT 20 DB

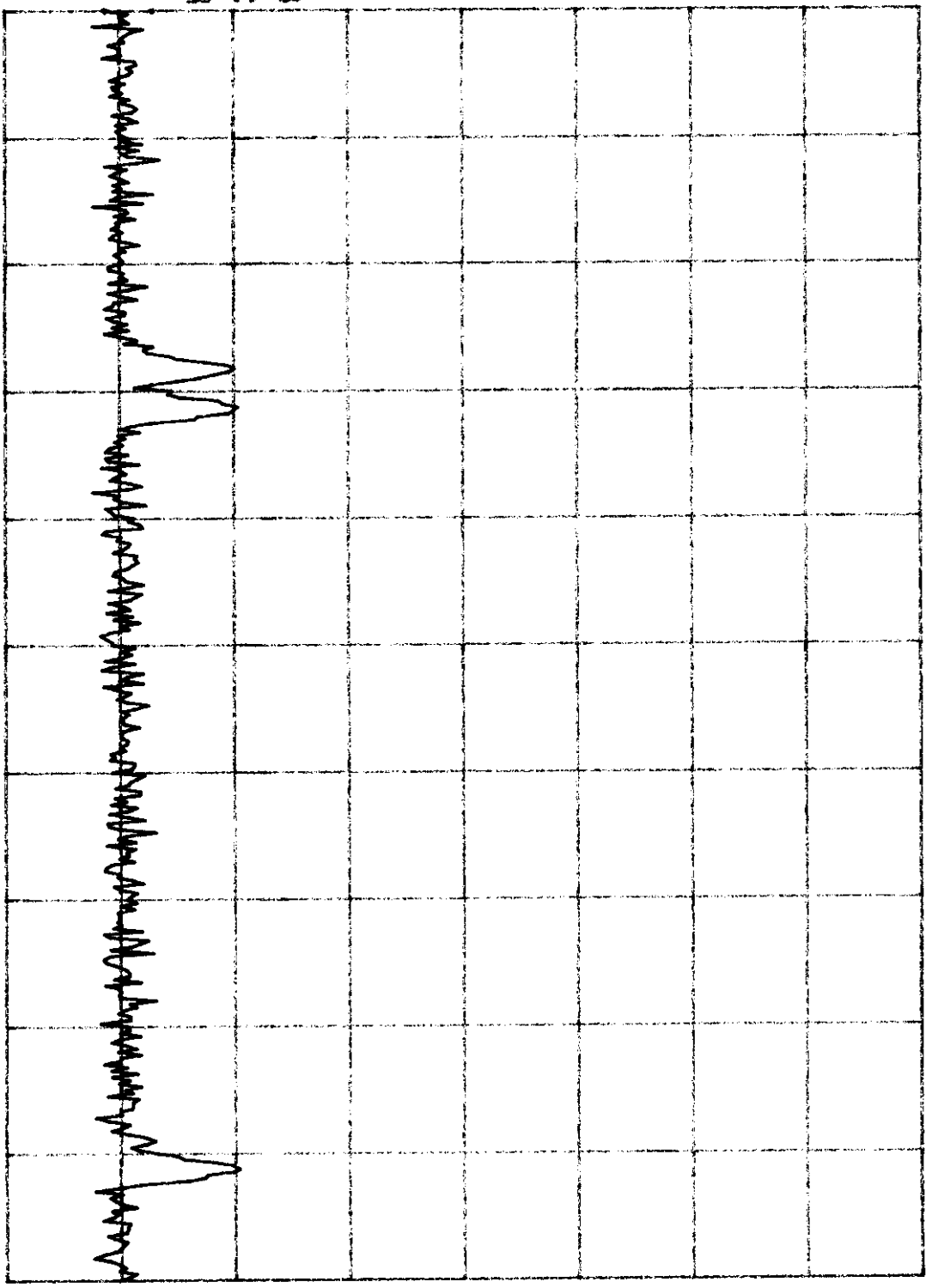
PEAK

LOG

10

dB/

WA VB
SC FC
CORR



START 800.00 MHz

STOP 825.00 MHz

Customer:	Cellular Specialties, Inc.
Test Sample:	Bidirectional Amplifier
Model No.:	110
Test Method:	Intermodulation Characteristics Using Three Input Signals
Notes:	Uplink
Date:	8/14/98
Tech:	T. Crizzo
Sheet:	1 of 2

Report No. R-3244N

RADIATED SPURIOUS EMISSIONS

Response to Question 7

Since the generated power out on both the uplink and down link is significantly lower than that coming from the 0.5 watt (+27 dBm) hand held telephone it is believed that there should be no issues with regard to RF exposure. Since antennas with no more than 3 dB gain are used on the downlink, the maximum ERP generated would be +18 dBm or 9 dB below that radiated by the handset. These antennas are placed above ceilings in most cases although flush mounted ceiling antennas are sometimes used. In either case the antennas are a minimum of 2 feet above personnel and have very low gain directly below the antenna.

Maximum ERP for the uplink would be $+22 \text{ dBm} + 10 \text{ dB} = +32 \text{ dBm}$ (1.6 watts) when a directional antenna is used. These antennas are mounted on the roofs of the building where personnel would not be subject to exposure. However the following paragraph will be added to the installation manual:

While Radio Frequency radiation levels emitted by this equipment are well below safe minimums it should be noted that continued exposure to RF fields generated by high gain (directional) rooftop antenna installations should be avoided. A distance of 2 feet from any antenna provides an adequate measure of protection for continued exposure of personnel. There is no risk of RF radiation resulting from short and occasional exposure to radiation from any system antennas.

Response to question #2.

In order to maintain the spurious emissions in compliance with 47 CFR 90, subpart I and 47CFR 22 subpart K spurious emissions shall be no greater than $43 + 10 \text{ Log}_{10}(\text{Power Out})$ below the carrier. For both the uplink and downlink this equates to -13 dBm .

With this limitation the available power per channel can be calculated by the formula:

Power output = $\text{Ip3} + \text{Intermod power}/3 - 5 \text{ Log}_{10} K$ where

$K = n^2 - 1.5n$; where $n = 2, 4, 6, 8$ $K = n^2 - 1.5n + .5$; where $n = 1, 3, 5, 7$

Using uplink parameters of Power out = $+22 \text{ dBm}$ and Ip3 of $+38 \text{ dBm}$

Then:

#ch	Po(dBm)
1	+20.7
2	+17.2
3	+15.7
4	+14.4
5	+13.6
6	+12.8
7	+12.1
8	+11.6
9	+11.1
10	+10.6

Using Downlink Parameters of Power out = $+15 \text{ dBm}$ and Ip3 of $+27 \text{ dBm}$.

Then:

# Ch.	Po(dBm)
1	+13.7
2	+10.2
3	+8.7
4	+7.4
5	+6.6
6	+5.8
7	+5.1
8	+4.6
9	+4.1
10	+3.6

← 9

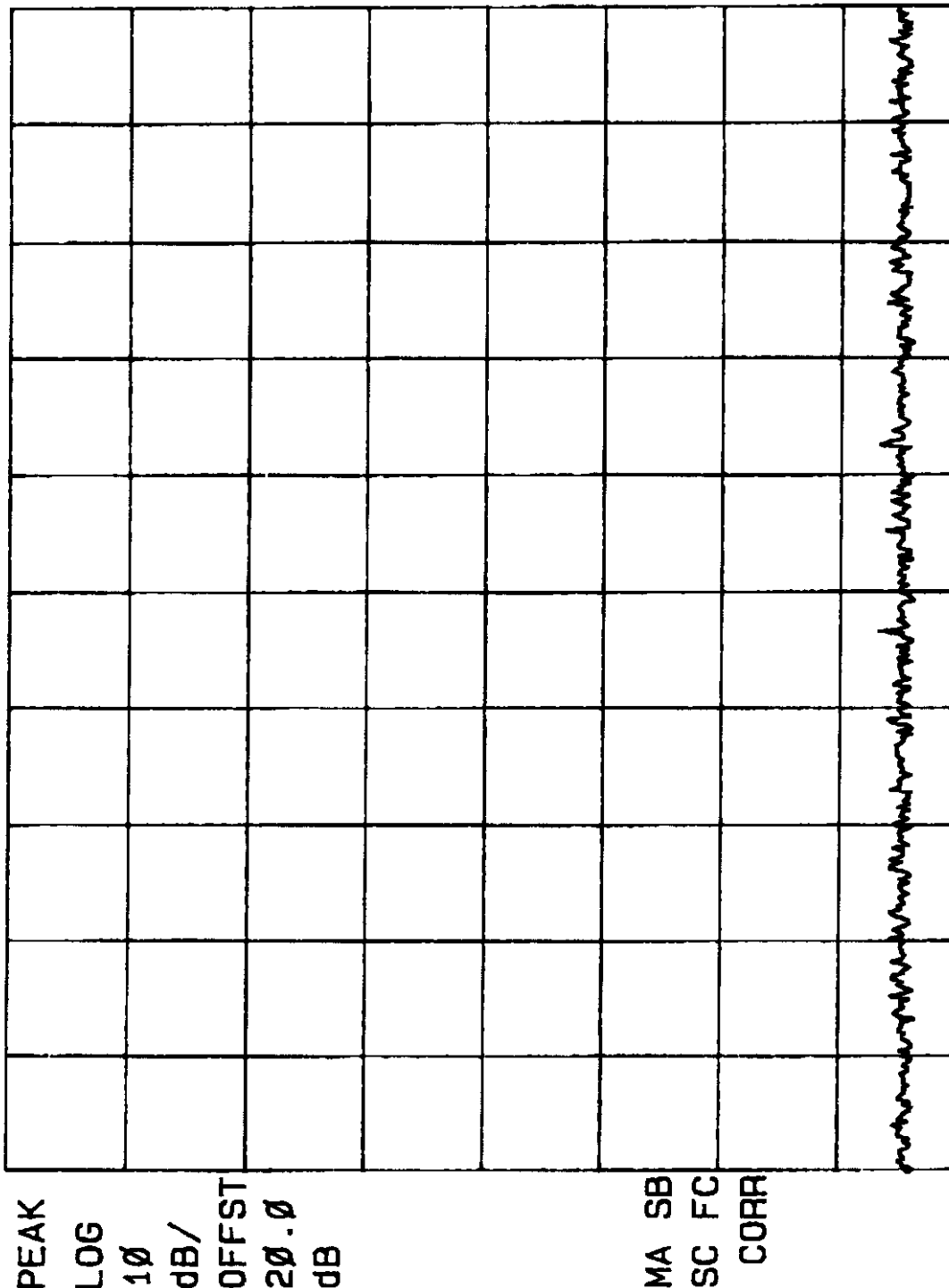
HARMONIC SPURIOUS EMISSIONS (DOWNLINK)

RETLIF TESTING LABORATORIES

Test Method	Spurious Emissions		
Customer	Cellular Specialties, Inc.	Job No.	R-3244N
Test Sample	Bidirectional Amplifier		
Model No	110	Serial No.	1040
Test Specification	Harmonic Spurious Emissions at the Antenna Terminals	Paragraph	2.991
Operating Mode	Amplifying Incoming and Outgoing Cellular Phone Signals		
Technician	T. Creco	Date	8/13/98
Lead Tested	Downlink Output		
Notes			

Sheet 7 of 24

14:00:08 AUG 13, 1998
 3244N-HARMONIC SPURIOUS EMISSIONS @ ANTENNA TERMINAL
 REF 20.0 dBm AT 10 dB



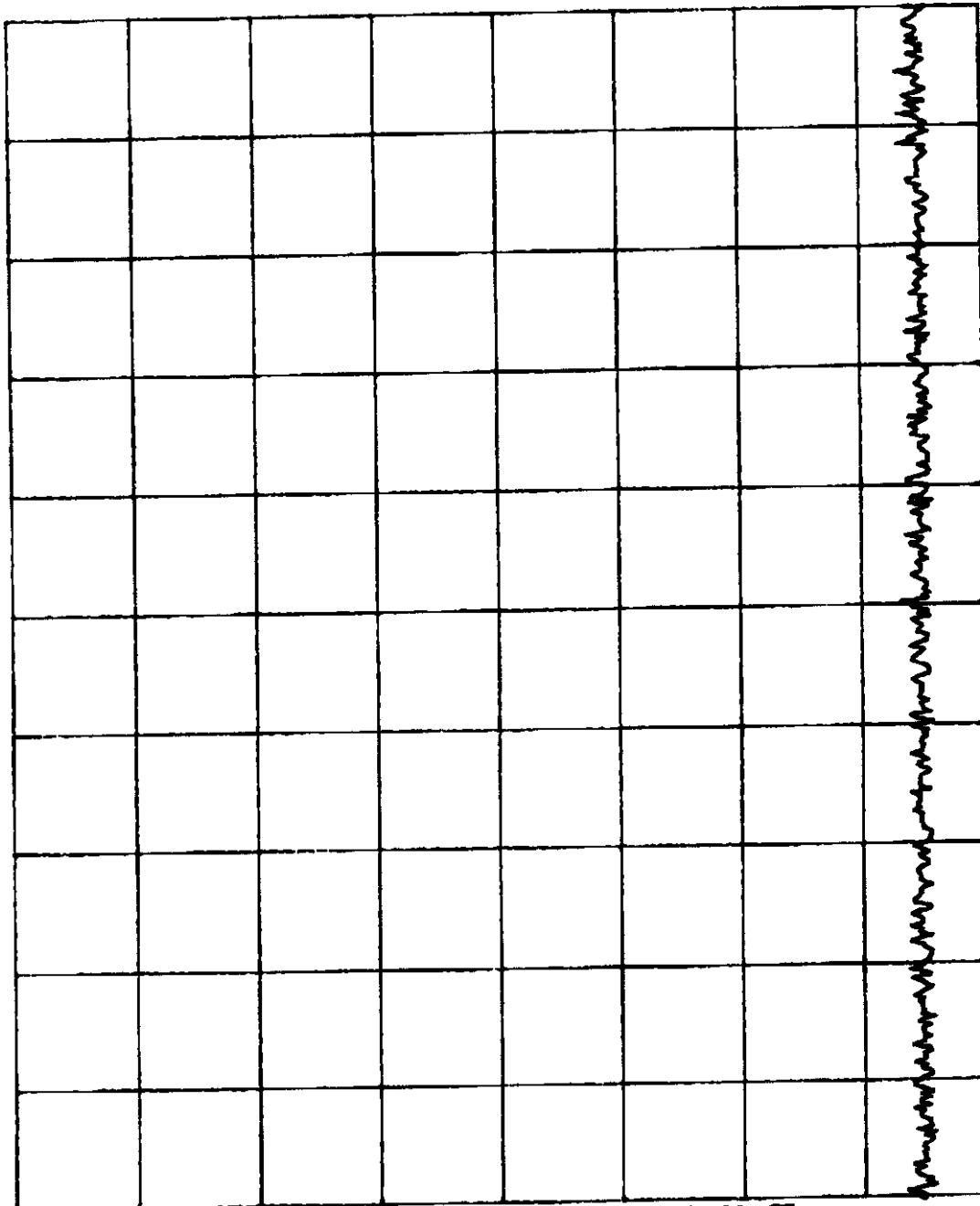
START 30.0 MHz
 #RES BW 120 KHZ
 VBW 300 KHZ
 SWP 35.4 msec
 STOP 200.0 MHz

RETLIF TESTING LABORATORIES

Test Method	Spurious Emissions		
Customer	Cellular Specialties, Inc.	Job No.	R-3244N
Test Sample	Bidirectional Amplifier		
Model No.	110	Serial No.	1040
Test Specification	Harmonic Spurious Emissions at the Antenna Terminals	Paragraph	2.991
Operating Mode	Amplifying Incoming and Outgoing Cellular Phone Signals		
Technician	T. Crcco	Date	8/13/98
Lead Tested	Downlink Output		
Notes			

Sheet **5** of 24

14:02:01 AUG 13, 1998
 3244N-HARMONIC SPURIOUS EMISSIONS @ ANTENNA TERMINAL
 REF 20.0 dBm AT 10 dB



PEAK
 LOG
 10
 dB/
 OFFST
 20.0
 dB

MA SB
 SC FC
 CORR

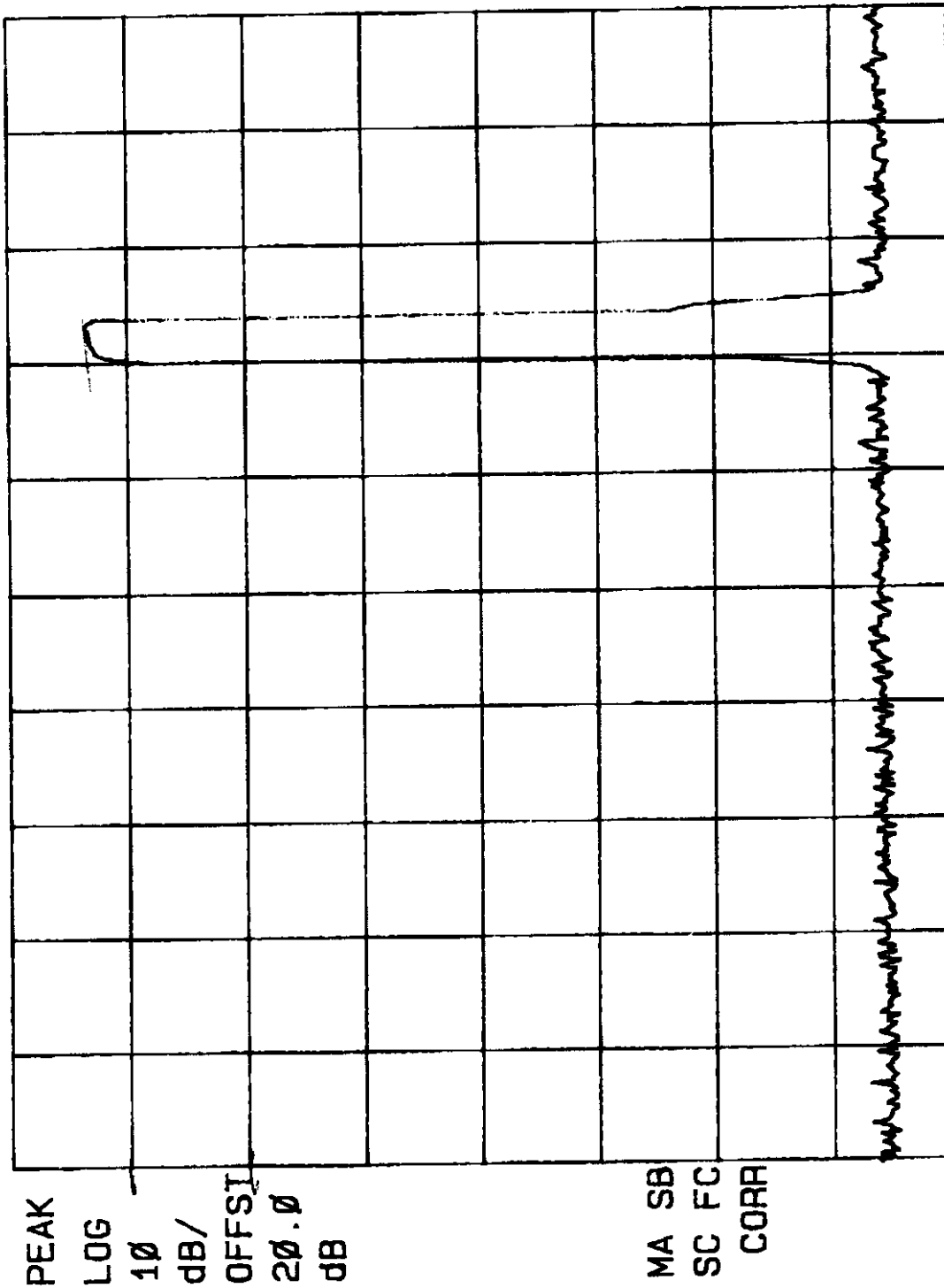
START 200.0 MHz #RES 8W 120 KHZ
 STOP 500.0 MHz SWP 62.5 msec
 VBW 300 KHZ

RETLIF TESTING LABORATORIES

Test Method	Spurious Emissions		
Customer	Cellular Specialties, Inc.	Job No.	R-3244N
Test Sample	Bidirectional Amplifier		
Model No.	110	Serial No.	1040
Test Specification	Harmonic Spurious Emissions at the Antenna Terminals		Paragraph 2.891
Operating Mode	Amplifying Incoming and Outgoing Cellular Phone Signals		
Technician	T. Crisco	Date	8/13/98
Lead Tested	Downlink Output		
Notes			

Sheet 9 of 24

14:03:47 AUG 13, 1998
 3244N-HARMONIC SPURIOUS EMISSIONS @ ANTENNA TERMINAL
 REF 20.0 dBm AT 10 dB



START 500.0 MHz #RES BW 120 KHZ
 STOP 1.0000 GHz SWP 104 msec
 VBW 300 KHZ

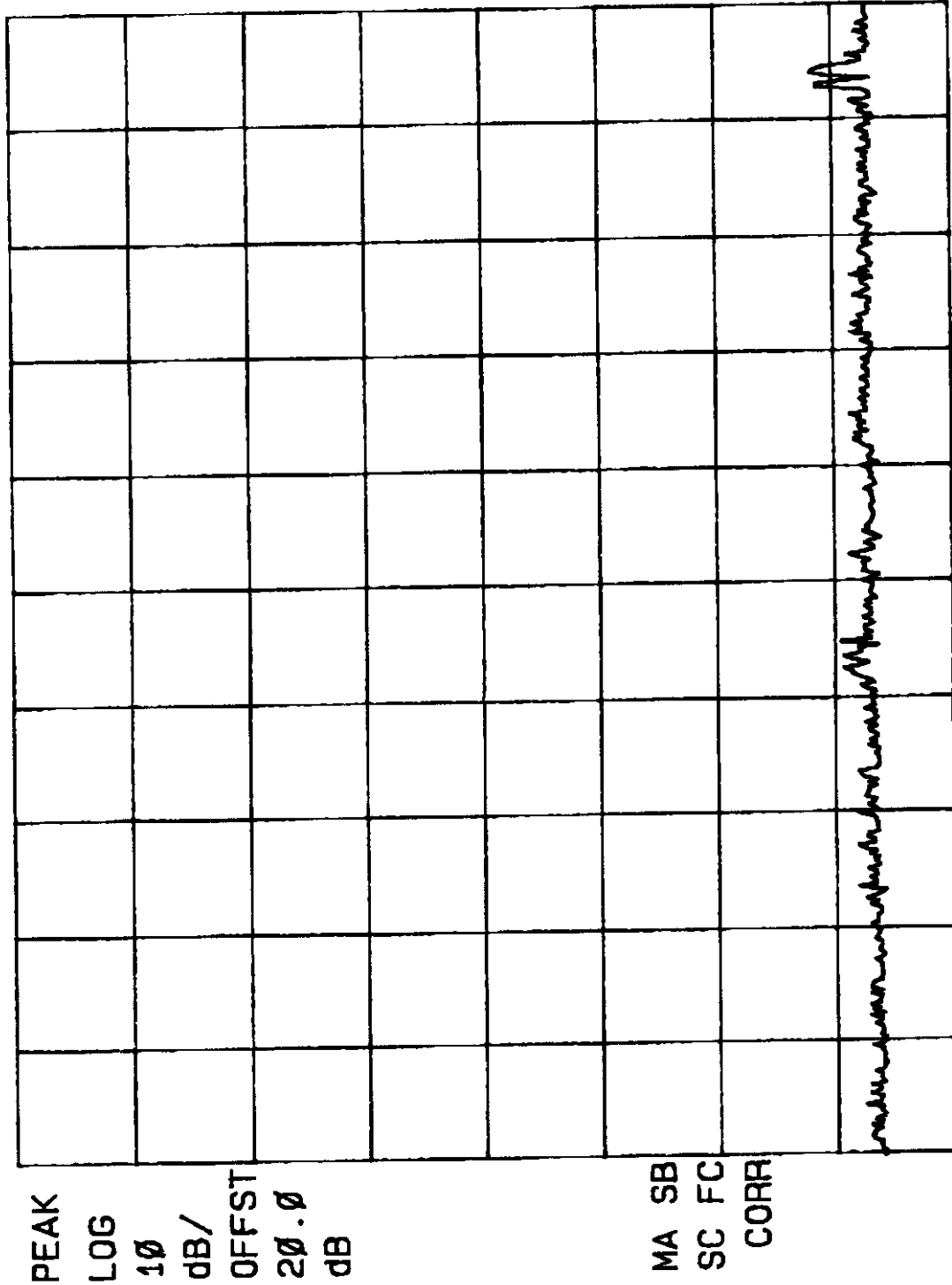
RETLIF TESTING LABORATORIES

Test Method	Spurious Emissions		
Customer	Cellular Specialties, Inc.	Job No.	R-3244N
Test Sample	Bidirectional Amplifier		
Model No.	110	Serial No.	1040
Test Specification	Harmonic Spurious Emissions at the Antenna Terminals		Paragraph 2.991
Operating Mode	Amplifying Incoming and Outgoing Cellular Phone Signals		
Technician	T. Cricco	Date	8/13/98
Lead Tested	Downlink Output		
Notes			

Sheet 10 of 24

14:06:34 AUG 13, 1998
3244N-HARMONIC SPURIOUS EMISSIONS @ ANTENNA TERMINAL

REF 20.0 dBm AT 10 dB



PEAK
LOG
10
dB/
OFFST
20.0
dB

STOP 2.679 GHZ
SWP 350 msec
VBW 300 KHZ
STOP 2.679 GHZ
SWP 350 msec

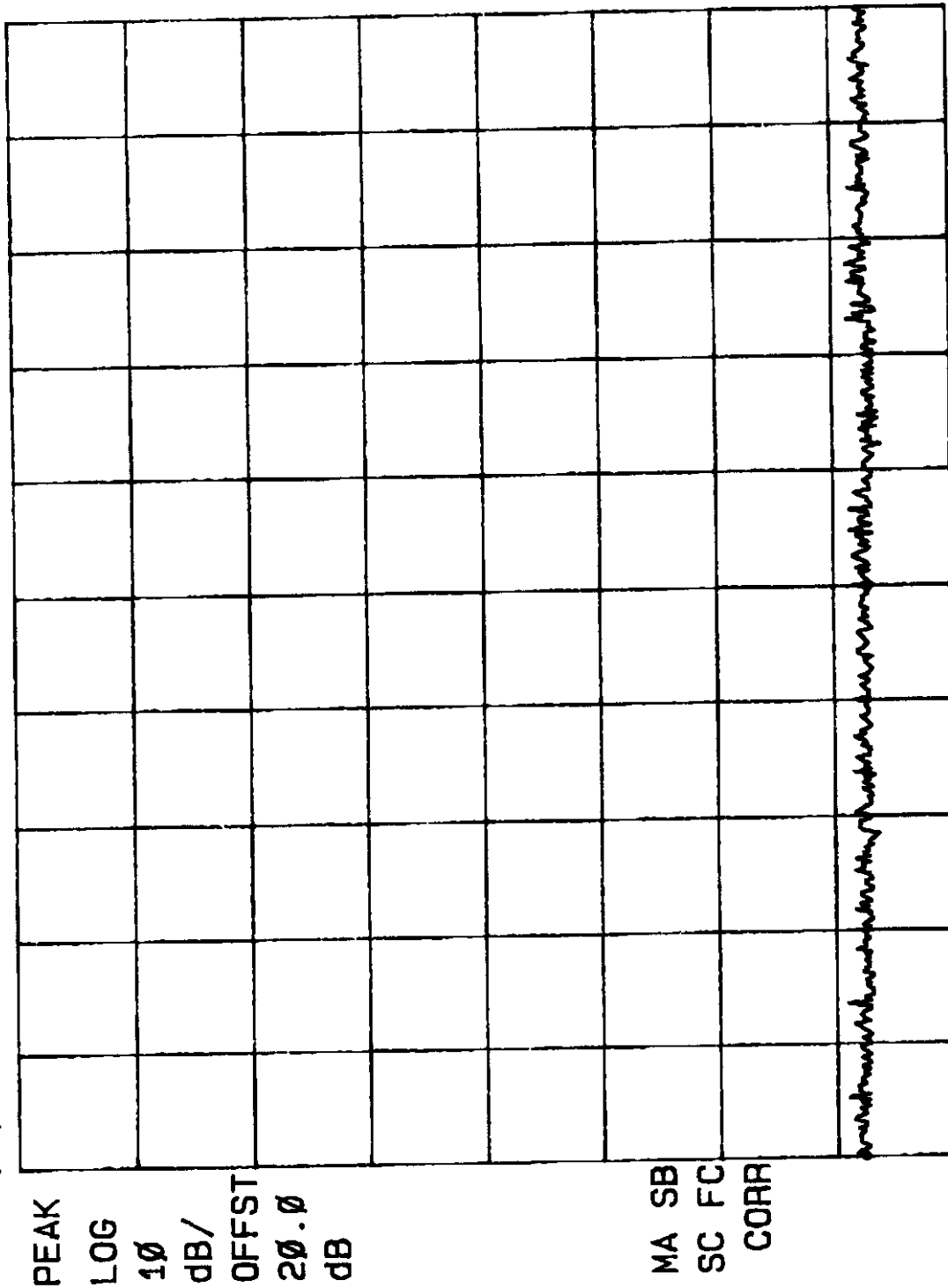
RETLIF TESTING LABORATORIES

Test Method	Spurious Emissions		
Customer	Cellular Specialties, Inc.	Job No.	R-3244N
Test Sample	Bidirectional Amplifier		
Model No	110	Serial No.	1040
Test Specification	Harmonic Spurious Emissions at the Antenna Terminals		Paragraph 2.991
Operating Mode	Amplifying Incoming and Outgoing Cellular Phone Signals		
Technician	T. Crisco	Date	8/13/98
Lead Tested	Downlink Output		
Notes			

Sheet 11 of 24

14:08:24 AUG 13, 1998
 3244N-HARMONIC SPURIOUS EMISSIONS @ ANTENNA TERMINAL

REF 20.0 dBm AT 10 dB



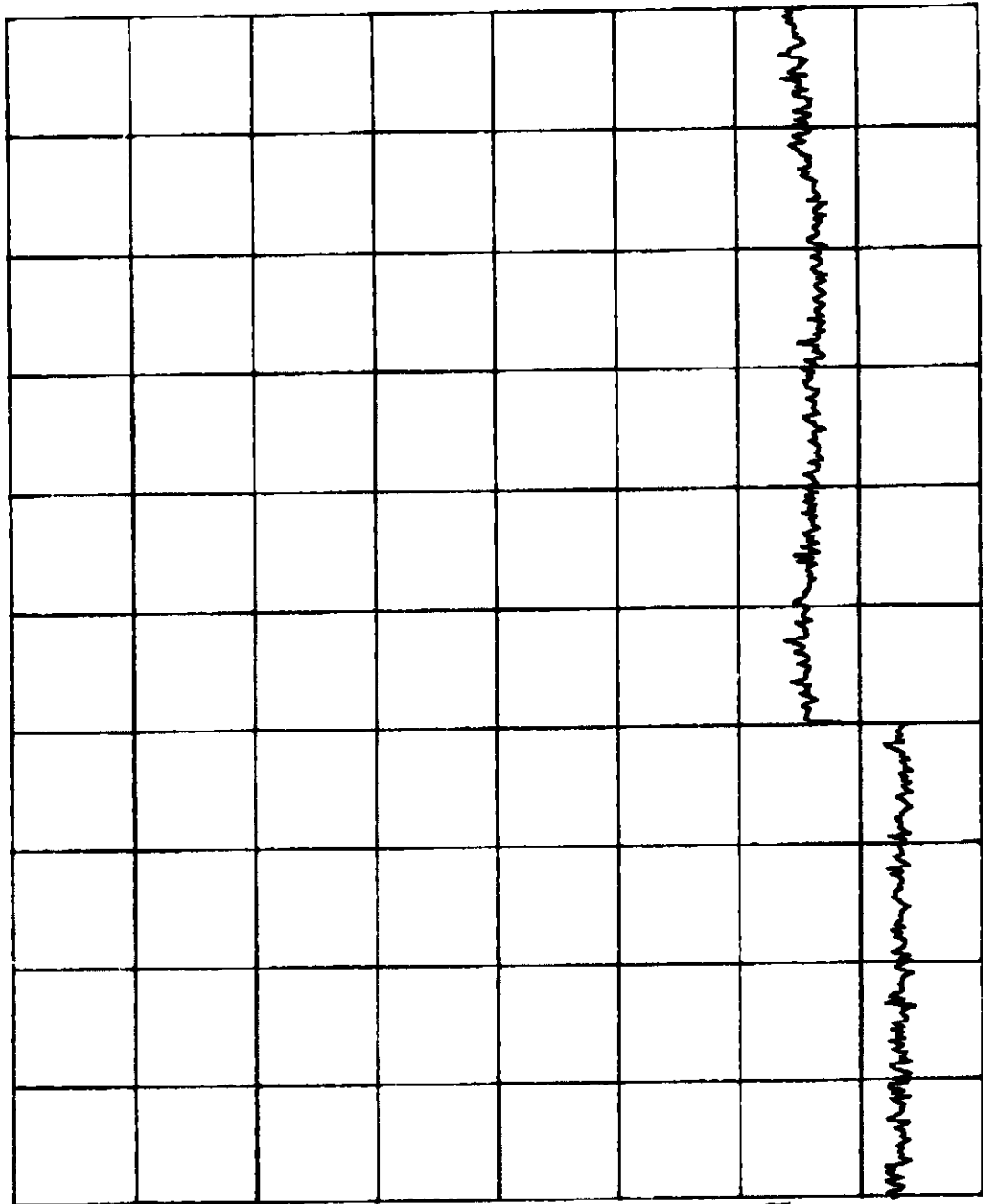
START 2.679 GHZ #RES BW 120 KHZ
 STOP 5.000 GHZ SWP 484 msec
 VBW 300 KHZ

RETLIF TESTING LABORATORIES

Test Method	Spurious Emissions		
Customer	Cellular Specialties, Inc.	Job No.	R-3244N
Test Sample	Bidirectional Amplifier		
Model No.	110	Serial No.	1040
Test Specification	Harmonic Spurious Emissions at the Antenna Terminals	Paragraph	2.991
Operating Mode	Amplifying Incoming and Outgoing Cellular Phone Signals		
Technician	T. Cricco	Date	8/13/98
Lead Tested	Downlink Output		
Notes			

Sheet 12 of 24

14: 14: 07 AUG 13, 1998
 3244N-HARMONIC SPURIOUS EMISSIONS @ ANTENNA TERMINAL
 REF 10.0 dBm #AT 0 dB



PEAK
 LOG
 10
 dB/
 OFFST
 20.0
 dB

MA SB
 SC FC
 CORR

START 5.000 GHZ
 #RES BW 120 KHZ
 STOP 8.750 GHZ
 VBW 300 KHZ
 SWP 781 msec

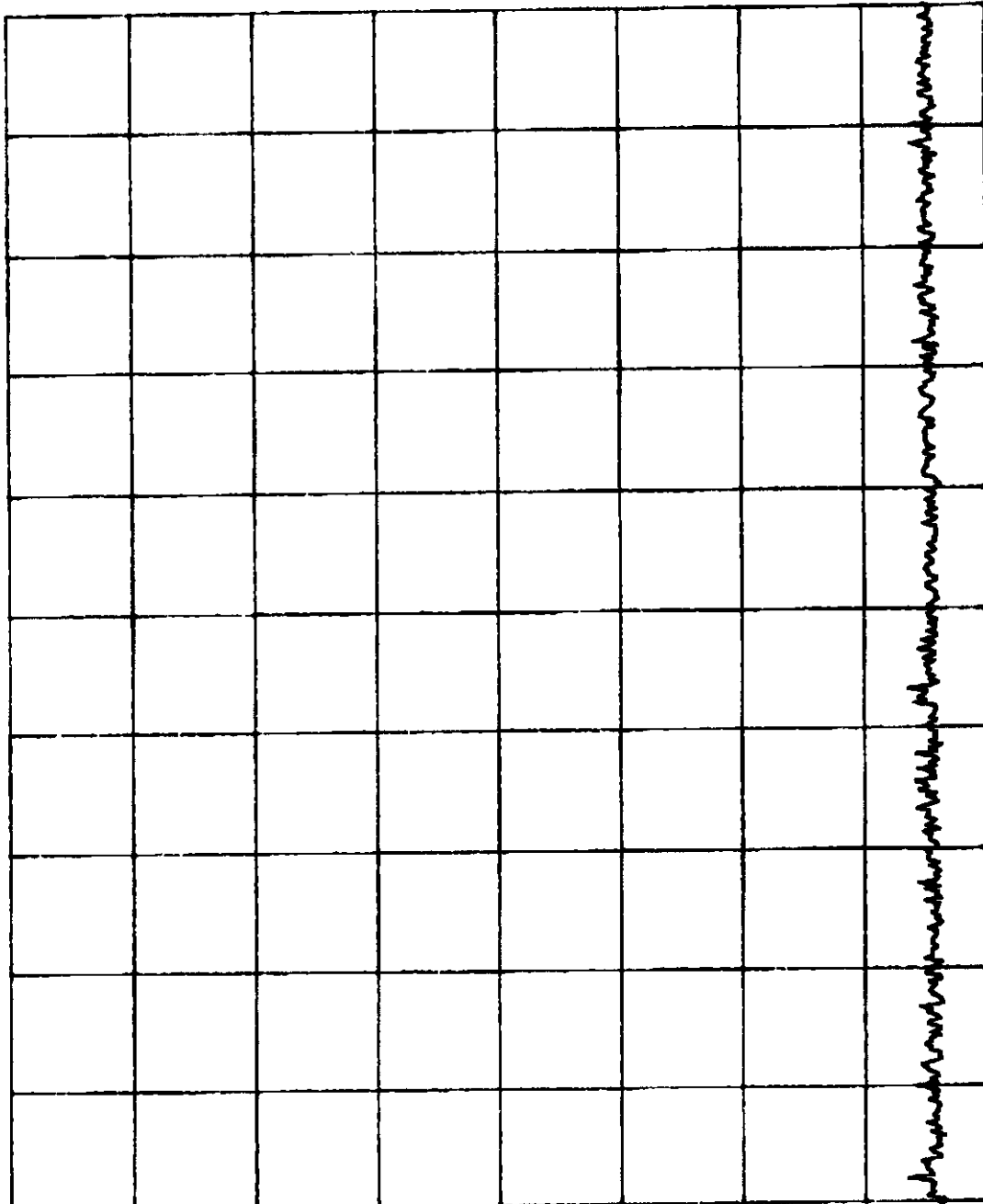
**HARMONIC SPURIOUS EMISSIONS
(UPLINK)**

RETLIF TESTING LABORATORIES

Test Method	Spurious Emissions		
Customer	Cellular Specialties, Inc.	Job No.	R-3244N
Test Sample	Bidirectional Amplifier		
Model No.	110	Serial No.	1040
Test Specification	Harmonic Spurious Emissions at the Antenna Terminals	Paragraph	2.991
Operating Mode	Amplifying Incoming and Outgoing Cellular Phone Signals		
Technician	T. Crisco	Date	8/13/98
Lead Tested	Uplink Output		
Notes			

Sheet 19 of 24

14: 18:20 AUG 13, 1998
 3244N-HARMONIC SPURIOUS EMISSIONS @ ANTENNA TERMINAL
 REF 30.0 dBm AT 20 dB



PEAK
 LOG
 10 dB/
 OFFST
 20.0 dB

MA SB
 SC FC
 CORR

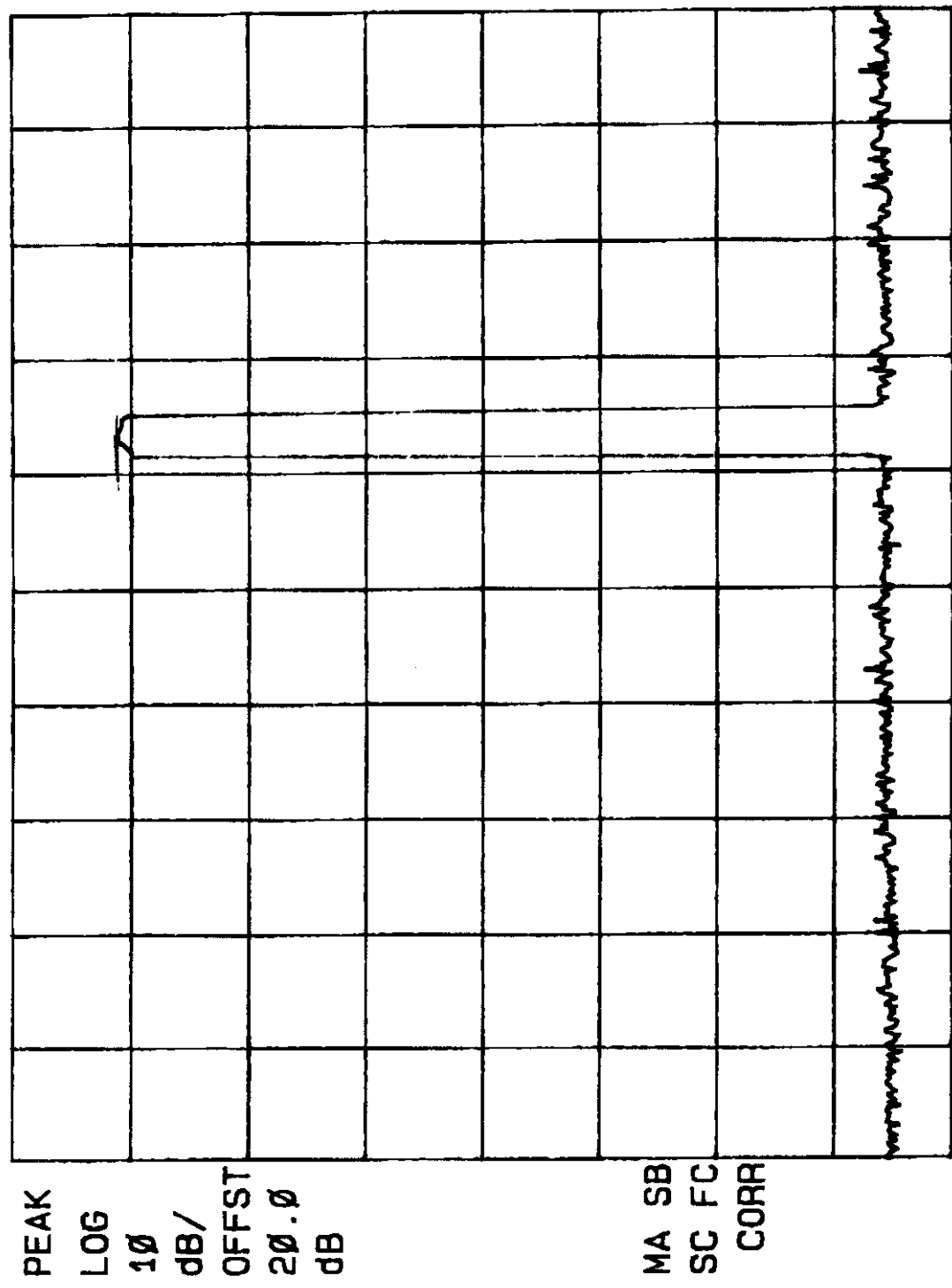
START 30.0 MHz
 #RES BW 120 kHz
 VBW 300 kHz
 SWP 35.4 msec
 STOP 200.0 MHz

RETLIF TESTING LABORATORIES

Test Method	Spurious Emissions		
Customer	Cellular Specialties, Inc.	Job No.	R-3244N
Test Sample	Bidirectional Amplifier		
Model No.	110	Serial No.	1040
Test Specification	Harmonic Spurious Emissions at the Antenna Terminals		Paragraph 2.991
Operating Mode	Amplifying Incoming and Outgoing Cellular Phone Signals		
Technician	T. Grillo	Date	8/13/98
Lead Tested	Uplink Output		
Notes			

Sheet 21 of 24

14:21:26 AUG 13, 1998
 3244N-HARMONIC SPURIOUS EMISSIONS @ ANTENNA TERMINAL
 REF 30.0 dBm AT 20 dB



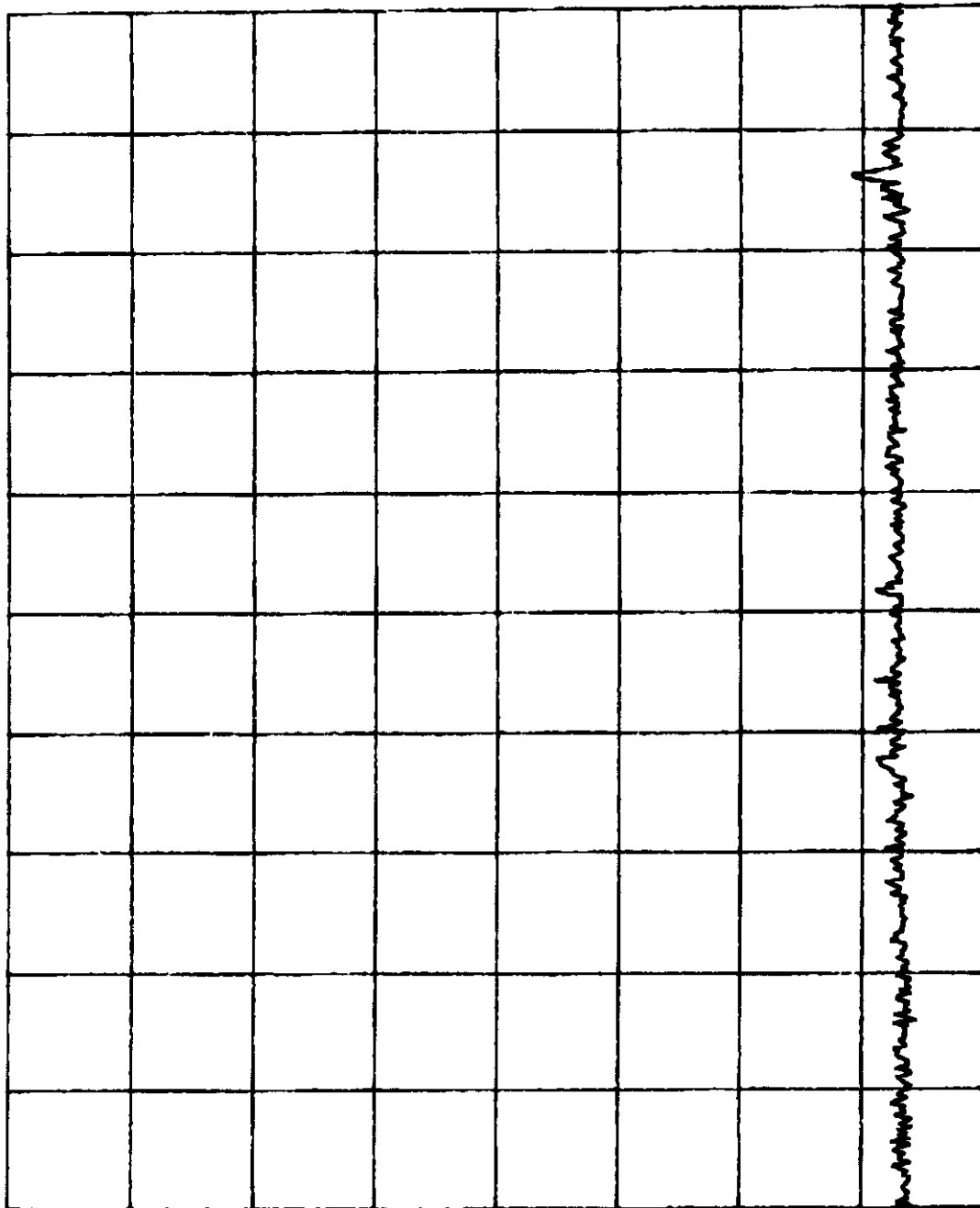
START 500.0 MHz #RES BW 120 KHZ
 STOP 1.0000 GHz VBW 300 KHZ SWP 104 msec

RETLIF TESTING LABORATORIES

Test Method	Spurious Emissions		
Customer	Cellular Specialties, Inc.	Job No.	R-3244N
Test Sample	Bidirectional Amplifier		
Model No.	110	Serial No.	1040
Test Specification	Harmonic Spurious Emissions at the Antenna Terminals		Paragraph 2.991
Operating Mode	Amplifying Incoming and Outgoing Cellular Phone Signals		
Technician	T. Crisco	Date	8/13/98
Lead Tested	Uplink Output		
Notes			

Sheet 22 of 24

14:24:09 AUG 13, 1998
 3244N-HARMONIC SPURIOUS EMISSIONS @ ANTENNA TERMINAL
 REF 30.0 dBm AT 20 dB



PEAK
 LOG
 10
 dB/
 OFFST
 20.0
 dB

MA SB
 SC FC
 CORR

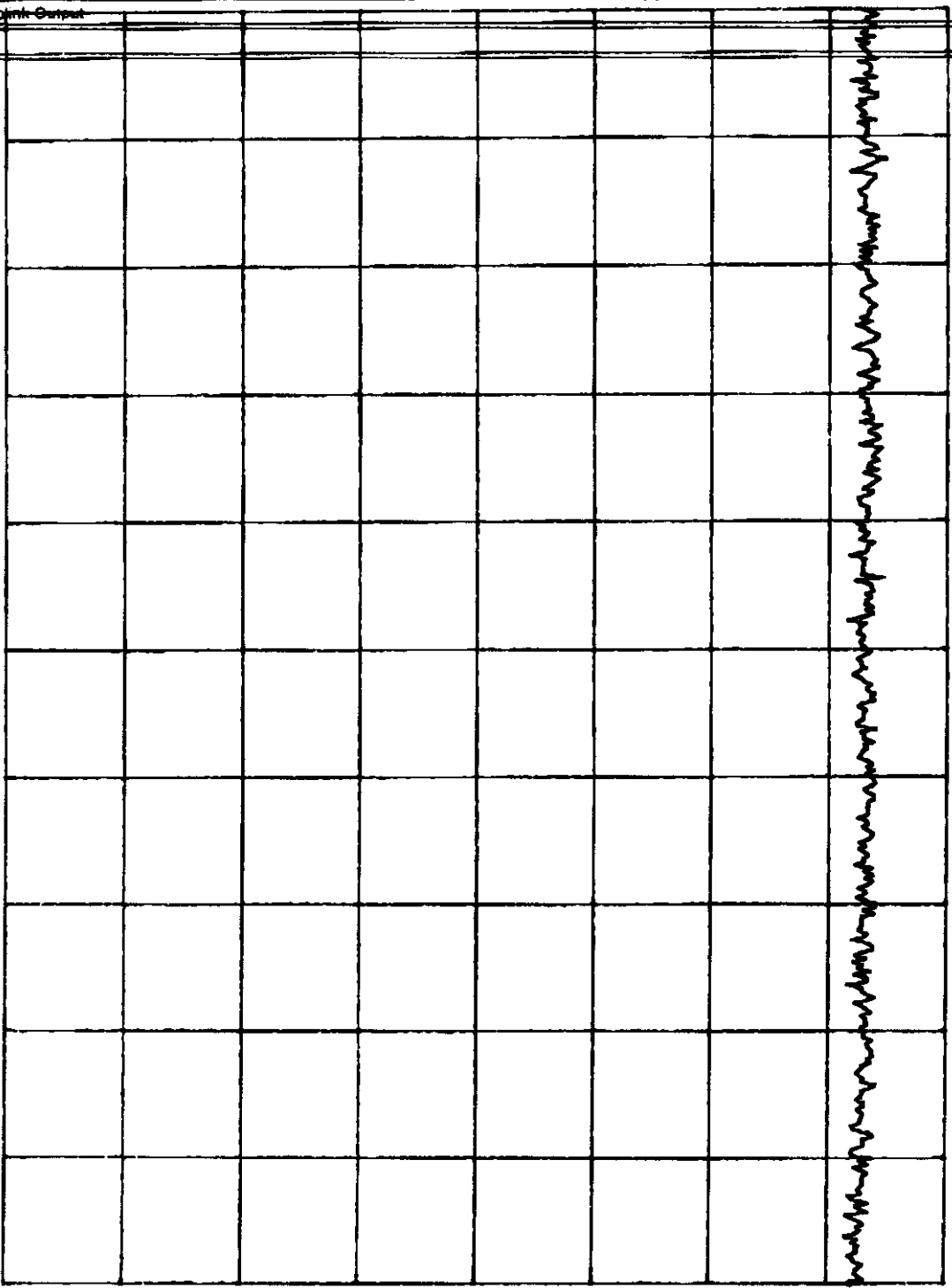
START 1.000 GHZ
 #RES BW 120 KHZ
 STOP 2.679 GHZ
 VBW 300 KHZ
 SWP 350 msec

RETLIF TESTING LABORATORIES

Test Method	Spurious Emissions		
Customer	Cellular Specialties, Inc.	Job No.	R-3244N
Test Sample	Bidirectional Amplifier		
Model No.	110	Serial No.	1040
Test Specification	Harmonic Spurious Emissions at the Antenna Terminals	Paragraph	2.991
Operating Mode	Amplifying Incoming and Outgoing Cellular Phone Signals		
Technician	T. Crisco	Date	8/13/98
Lead Tested	Uplink Output		
Notes			

Sheet 23 of 24

14:25:37 AUG 13, 1998
 3244N-HARMONIC SPURIOUS EMISSIONS @ ANTENNA TERMINAL
 REF 30.0 dBm AT 20 dB



PEAK
 LOG
 10
 dB/
 OFFST
 20.0
 dB

MA SB
 SC FC
 CORR

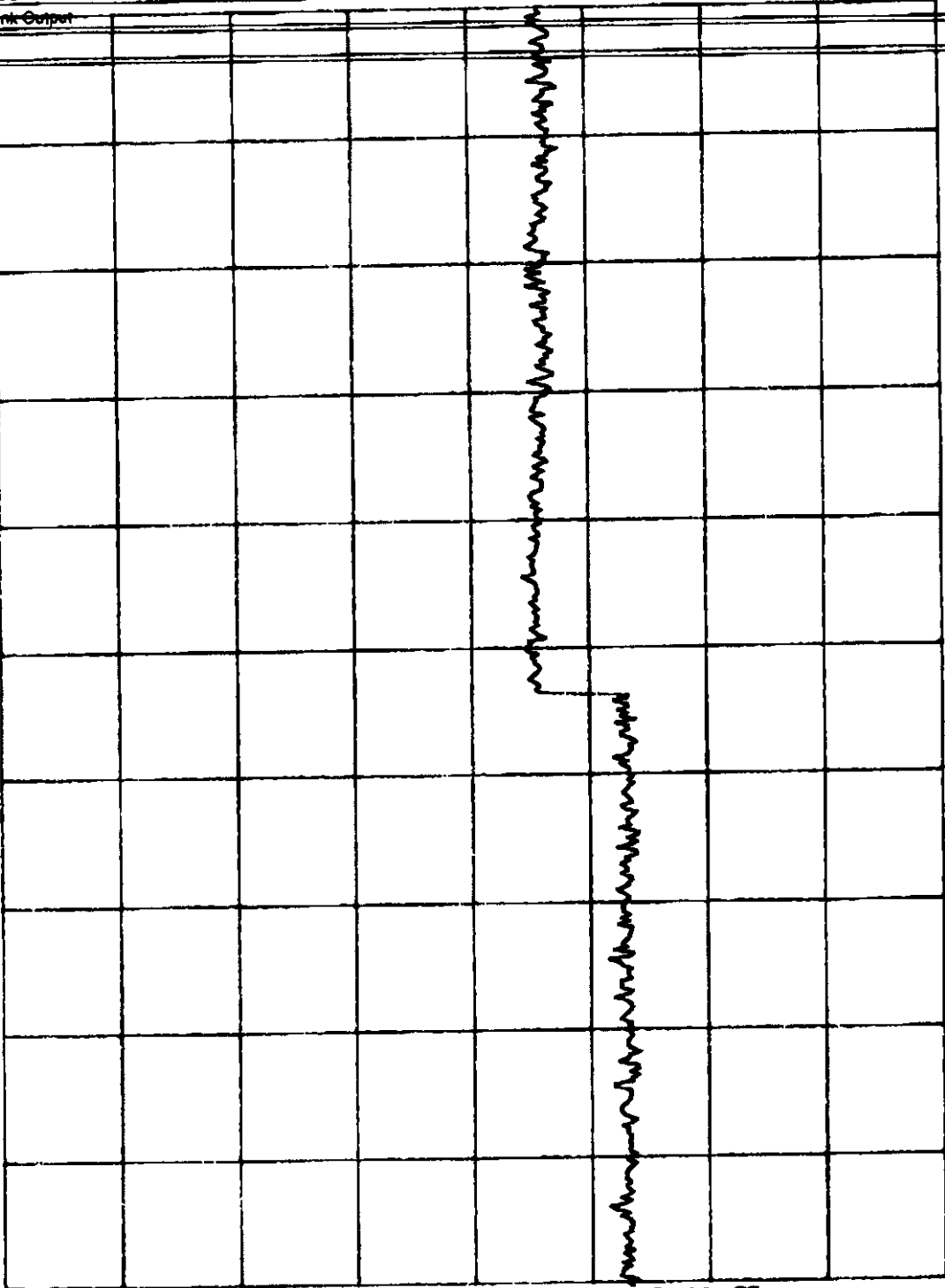
START 2.679 GHZ
 #RES BW 120 KHZ
 VBW 300 KHZ
 STOP 5.000 GHZ
 SWP 484 msec

RETLIF TESTING LABORATORIES

Test Method	Spurious Emissions		
Customer	Cellular Specialties, Inc.	Job No.	R-3244N
Test Sample	Bidirectional Amplifier		
Model No.	110	Serial No.	1040
Test Specification	Harmonic Spurious Emissions at the Antenna Terminals	Paragraph	2.991
Operating Mode	Amplifying Incoming and Outgoing Cellular Phone Signals		
Technician	T. Crisco	Date	8/13/98
Lead Tested	Uplink Output		
Notes			

Sheet 24 of 24

14: 28: 48 AUG 13, 1998
 3244N-HARMONIC SPURIOUS EMISSIONS @ ANTENNA TERMINAL
 REF 10.0 dBm #AT 0 dB



PEAK
 LOG
 10
 dB/
 OFFST
 20.0
 dB

MA SB
 SC FC
 CORR

START 5.000 GHZ
 #RES BW 120 KHZ

STOP 8.250 GHZ
 SWP 677 msec

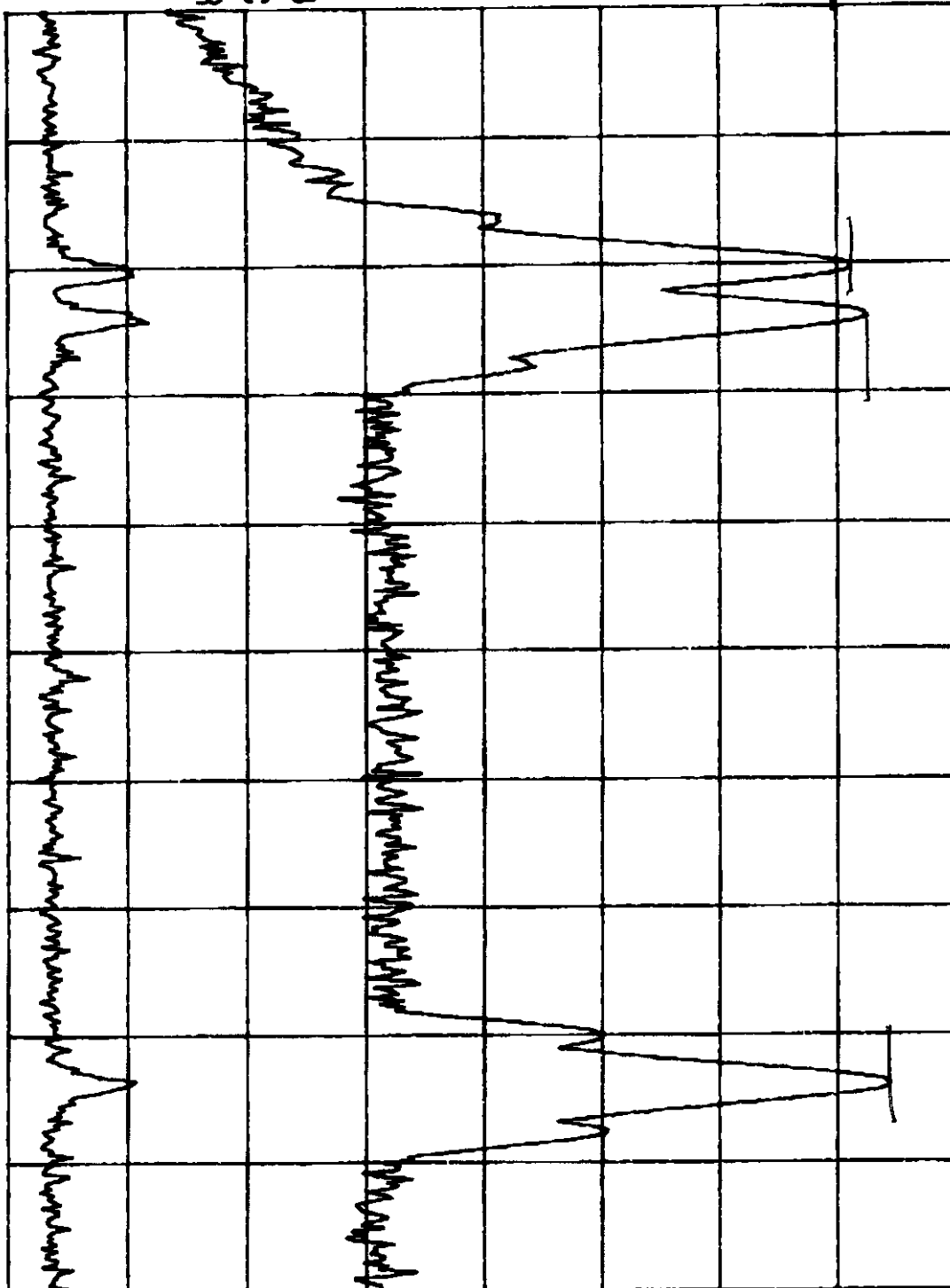
VBW 300 KHZ

INTERMODULATION

16:09:32 AUG 14, 1998
R-3244 CELLULAR INTERMODULATION DOWNLINK
REF 10.0 DBM #AT 20 DB

PEAK
LOG
10
DB/

WA VB
SC FC
CORR



START 845.00 MHz

STOP 870.00 MHz

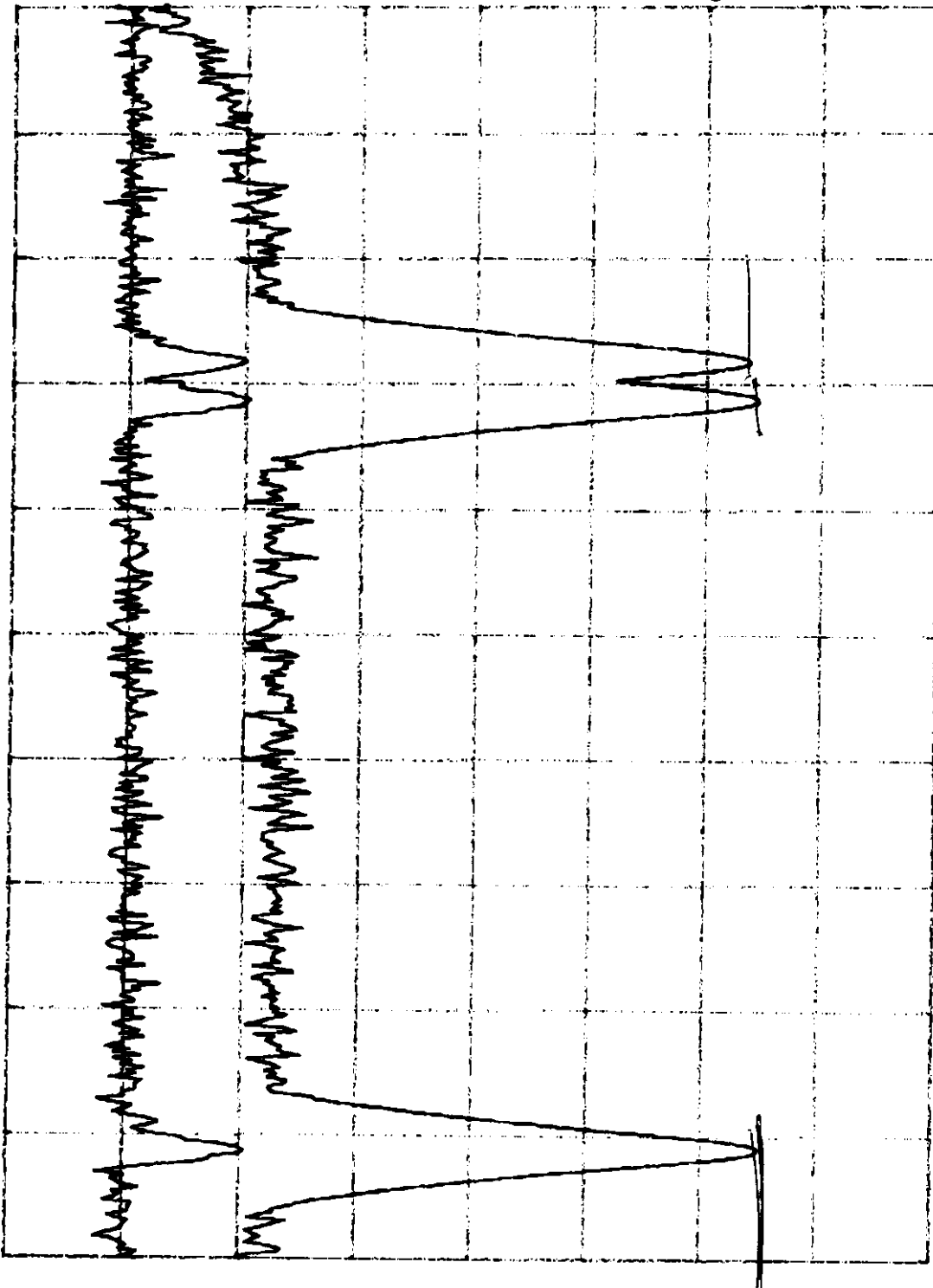
Cellular Specialties, Inc.
Bidirectional Amplifier
110
Intermodulation Characteristics Using Three Input Signals
Downlink
8/14/98
T. Crisco
2 of 2

Report No. R-3244N

45:07:28 AUG 14, 1998
R-3244 CELLULAR INTERMODULATION UPLINK
REF. 0 DBM #AT 20 DB

PEAK
LOG
-10
-20
DB/

MA YB
SC FC
CORR



START 800.00 MHz

STOP 825.00 MHz

Cellular Specialties, Inc.	
Bidirectional Amplifier	
110	
Intermodulation Characteristics Using Three Input Signals	
Uplink	
8/14/98	T. Crisco
1	2

RADIATED SPURIOUS EMISSIONS

Response to Question 7

Since the generated power out on both the uplink and down link is significantly lower than that coming from the 0.5 watt (+27 dBm) hand held telephone it is believed that there should be no issues with regard to RF exposure. Since antennas with no more than 3 dB gain are used on the downlink, the maximum ERP generated would be +18 dBm or 9 dB below that radiated by the handset. These antennas are placed above ceilings in most cases although flush mounted ceiling antennas are sometimes used. In either case the antennas are a minimum of 2 feet above personnel and have very low gain directly below the antenna.

Maximum ERP for the uplink would be $+22 \text{ dBm} + 10 \text{ dB} = +32 \text{ dBm}$ (1.6 watts) when a directional antenna is used. These antennas are mounted on the roofs of the building where personnel would not be subject to exposure. However the following paragraph will be added to the installation manual:

While Radio Frequency radiation levels emitted by this equipment are well below safe minimums it should be noted that continued exposure to RF fields generated by high gain (directional) rooftop antenna installations should be avoided. A distance of 2 feet from any antenna provides an adequate measure of protection for continued exposure of personnel. There is no risk of RF radiation resulting from short and occasional exposure to radiation from any system antennas.

* * * ERROR REPORT (AUG.19.1998 6:38AM) * * *

TTI FCC LAB 301-344-2050

LE	PERS. NAME	ADDRESS	MODE	TIME	PAGE	RESULT
3		408 565 2575	RES	40'29"	P.22	E

PAGE NOT RECEIVE

QUICK SERVICE CODE

P.22

0-24

BATCH
MEMORY
STANDARD

C : CONFIDENTIAL
L : SEND LATER
D : DETAIL

\$: TRANSFER
@ : FORWARDING
F : FINE

P : POLLING
E : ECM
> : REDUCTION