

TEST REPORT

Metawave Communications Corporation

**Spotlight 2000
FCC ID: M9PSPOTLIGHT2000**

Emissions Report

Report Prepared By:



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May 27, 1999

Report No. METW0019

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1.0 General Information

1.1 Scope

This Test Report documents the results of the electromagnetic compatibility (EMC) testing performed by Northwest EMC, Inc. Details and results of testing performed on May 17, 1999 through May 27, 1999 are contained within.

1.2 Purpose

Testing was performed to evaluate the electromagnetic compatibility (EMC) performance of the EUT (Equipment Under Test).

1.3 Product Information

Manufactured By Metawave Communications Corporation
Address 8700 148th Ave. N.E., Redmond, WA 98052
Test Requested By: Dean Busch
Model Spotlight 2000
FCC ID: M9PSPOTLIGHT2000
Serial Number N/A
Date of Test May 17, 1999 through May 27, 1999
Receipt Date of Test Samples May 17, 1999
Job Number METW0019

1.4 Summary

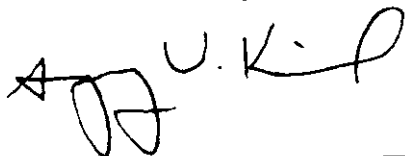
Description	Specified Requirement
Occupied Bandwidth	FCC Para. 22.901
Spurious Emissions	FCC Para. 22.917
Field Intensity of Spurious Radiation	FCC 22.917(e) & 2.1053
Frequency Stability	FCC Para. 2.1055

Prepared By:



Brenda Wood, Technical Report Writer

Technical Review By:



Gregory Kiemel, Director of Engineering

Administrative Review By:



Vicki Albertson, Technical Report/Documentation Manager

Approved By:



Donald Facteau, Information Services Manager

This Report may only be duplicated in its entirety. The results of this test pertain only to the sample tested.

1.5 Hardware Description

The EUT (Equipment Under Test) is the Metawave Communications Corporation, Spotlight 2000 system; FCC ID: M9PSPOTLIGHT2000; a Smart Antenna System.

Clocks/Oscillators: 3 MHz, 10 MHz, 14.4 MHz, 25 MHz, 50 MHz clocks

EUT I/O Ports: RS-232, Ethernet, Berg (RF)

1.6 Tested System Details

1.6.1 EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
Computer	IBM	Thinkpad	78-GB494
CDMA generator	Rhode-Schwartz	SMI-Q03	DE23542
CDMA generator	Rhode-Schwartz	SMI-Q03	
CDMA generator	Rhode-Schwartz	SMI-Q03	
Multi-Tone generator	RDL	IMD-801D-03A	262
Communications Test Set	Hewlett Packard	HP8921A	3614A03301
Power Meter	Hewlett Packard	E4418A	US37480671
Power Sensor	Hewlett Packard	8481A	US37292932
Spectrum Analyzer	Hewlett Packard	8594E	3746A05372
IDLS	Filtronic	CA297-F1V1	DQG001
IDLS	Filtronic	CA297-F1V1	DQG002
IDLS	Filtronic	CA297-F1V1	DQG003
IDLS	Filtronic	CA297-F1V1	DQG004
IDLS	Filtronic	CA297-F1V1	DQG005
IDLS	Filtronic	CA297-F1V1	DQG006
IDLS	Filtronic	CA297-F1V1	DQG007
IDLS	Filtronic	CA297-F1V1	DQG008
IDLS	Filtronic	CA297-F1V1	DQG009
IDLS	Filtronic	CA297-F1V1	DQG010
IDLS	Filtronic	CA297-F1V1	DQG011
IDLS	Filtronic	CA297-F1V1	DQG012
LPA Cage	Metawave	MCR4100-4-4	203065
LPA Cage	Metawave	MCR4100-4-4	203130
LPA Cage	Metawave	MCR4100-4-4	203132
LPA Cage	Metawave	MCR4100-4-4	203136
LPA	Metawave	MCA 910050	177648
LPA	Metawave	MCA 910050	190272
LPA	Metawave	MCA 910050	190532
LPA	Metawave	MCA 910050	190636
LPA	Metawave	MCA 910050	190643
LPA	Metawave	MCA 910050	190650
LPA	Metawave	MCA 910050	190651
LPA	Metawave	MCA 910050	190658
LPA	Metawave	MCA 910050	190710
LPA	Metawave	MCA 910050	190727
LPA	Metawave	MCA 910050	190729
LPA	Metawave	MCA 910050	190757

1.8 Accreditations and Authorizations



NVLAP

Northwest EMC, Inc., is recognized under the United States Department of Commerce, National Institute of Standards and Technology, National Voluntary Laboratory Accreditation Program (NVLAP) for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations. These criteria encompass the requirements of ISO/IEC Guide 25 and the relevant requirements of ISO 9002 (ANSI/ASQC Q92-1987) as suppliers of calibration or test results. NVLAP Lab Code: 200059-0.



FCC

The Open Area Test Sites and conducted measurement facilities of Northwest EMC, Inc., have been fully described in reports filed with the FCC (Federal Communications Commission), and accepted by the FCC in letters maintained in our files.



TÜV Product Service

TUV Product Service Group in its Listing of Recognized Laboratories includes Northwest EMC, Inc. It qualifies in connection with the TUV Certification after Recognition of Agent's Testing Program for the product categories and/or standards shown in TUV's current Listing of CARAT Laboratories available from TUV. A certificate was issued to represent that this laboratory continues to meet TUV's CARAT Program requirements and is maintained in our files.



TÜV Rheinland

Northwest EMC, Inc., has been authorized to carry out EMC tests by order and under supervision of TÜV Rheinland. This authorization is based on "Conditions for EMC-Subcontractors" November 1992.



NEMKO

Northwest EMC, Inc., has been assessed and accredited by NEMKO (Norwegian testing and certification body) for European emissions and immunity testing. As a result of NEMKO's laboratory assessment, they will accept test results from Northwest EMC, Inc., for product certification.



ITI

Northwest EMC, Inc., has been assessed in accordance with ISO Guide 25 defining the general international requirements for the competence of calibration and testing laboratories and with ITI assessment criteria LAC0196. Based upon that assessment Interference Technology International, Ltd., has granted approval for specifications implementing the EU Directive on EMC (89/336/EEC and amendments). The scope of the approval was provided on a Schedule of Assessment supplied with the certificate and is available upon request.



AUSTEL

Northwest EMC, Inc., has been accredited by AUSTEL (Australian Telecommunications Authority) as an approved third-party test house. This approval is a part of the Technical Approvals Guide No. 3 (TAG3) issue 6.1, Telecommunications Equipment, Standards and Labeling.



VCCI

Northwest EMC, Inc., has been accepted as an Associate Member to the VCCI, Acceptance No. 564. The conducted and radiated measurement facilities have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. Registration Numbers R-165, C-160, R-677, C-694, R-871, and C-905.

BSMI

Northwest EMC, Inc., has been accredited by BSMI (Bureau of Standards, Metrology and Inspection) in Taiwan. As an accredited EMC Laboratory, our test data will be accepted for commodity EMC type approval in Taiwan. License No. SL2-IN-E-1017.



Industry Canada

Industry Canada has accredited Northwest EMC, Inc., for the performance of radiated measurements. Our open area test sites comply with RSP 100, Issue 7, section 3.3. Certificates of approval are maintained in our files.

1.9 Test Methodology

Description	Test Method	Year Issued
Occupied Bandwidth	ANSI C63.4	1992
Spurious Emissions	ANSI C63.4	1992
Field Intensity of Spurious Radiation	ANSI C63.4	1992
Frequency Stabilization	ANSI C63.4	1992

2.0 System Test Configuration

2.1 Justification

The EUT was configured to simulate typical use. Cables were attached to each of the available I/O Ports. Where applicable, peripherals were attached to the I/O Cables. The mode of operation utilized for testing was selected

2.2 EUT Exercise Software

GUI, Embedded software was utilized to exercise the EUT for each of the tests.

2.3 Special Accessories

No special accessories are sold with the EUT.

2.4 Equipment Modifications

No EMI suppression devices were added or modified. The EUT was tested as delivered.

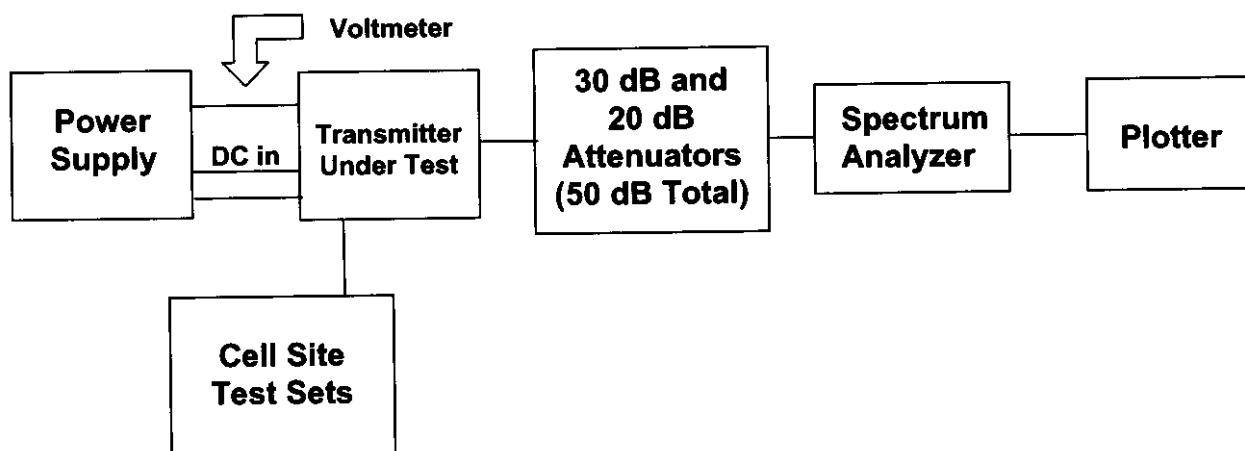
3.0 Occupied Bandwidth

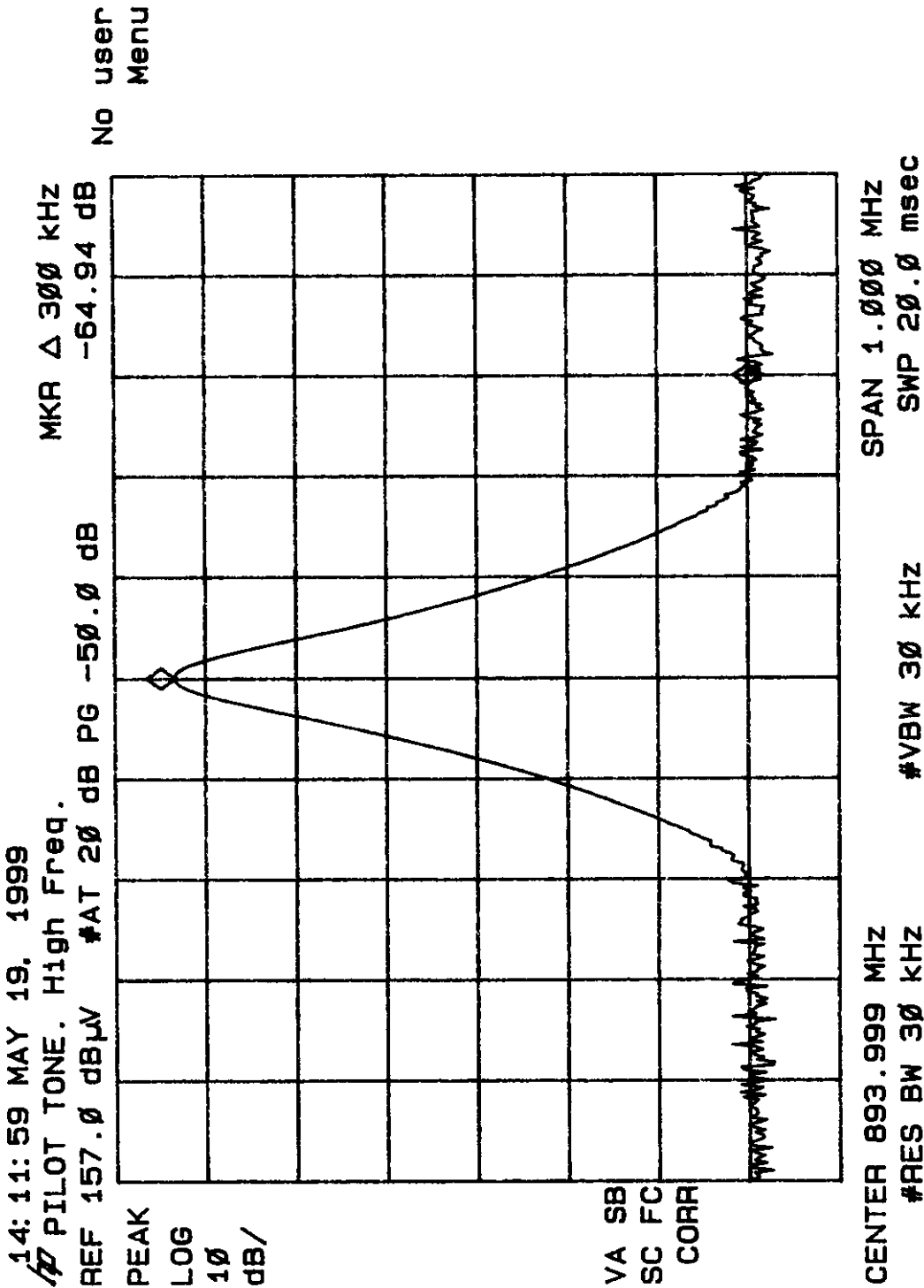
Specification Para. 22.901 (d)
Equipment Authorization Procedure 2.1049
Measurement Data See attached plots

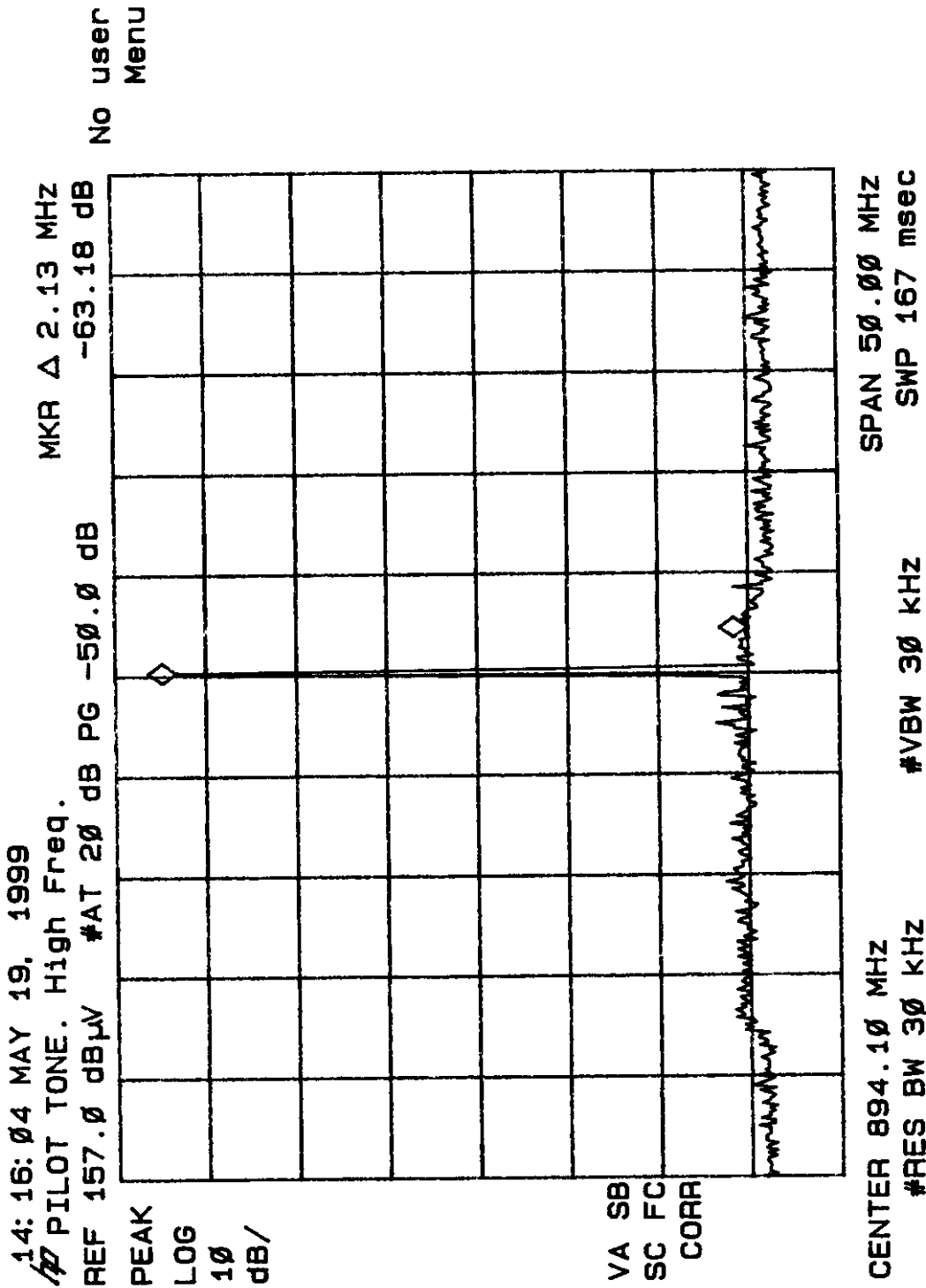
3.1 Measurement Equipment

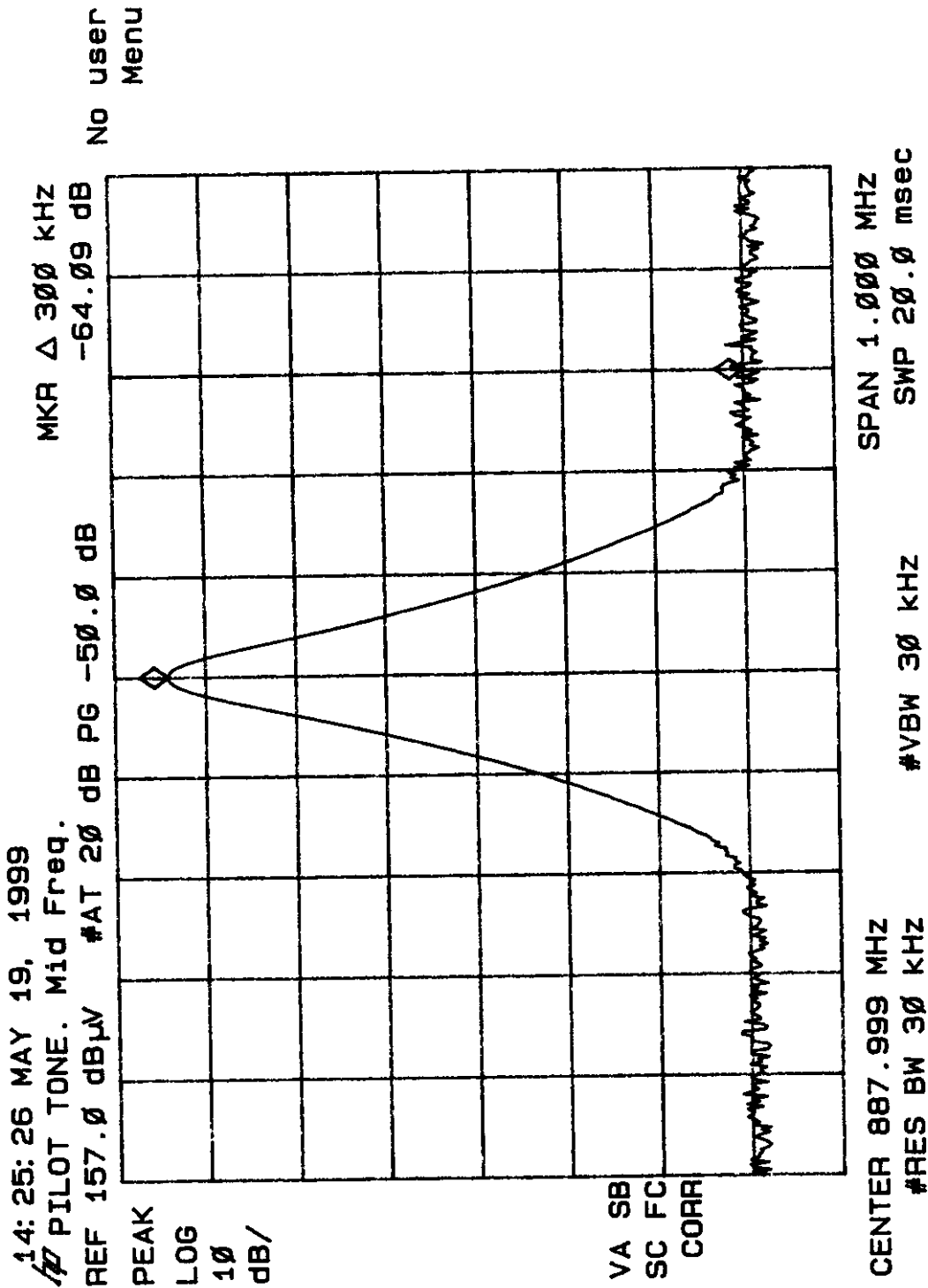
Instrument	Model	Serial No.	Freq. Range	Last Cal	Cal Due
Spectrum Analyzer	HP 8593EM	3536A00134	9 kHz – 22 GHz	04/05/99	04/05/00

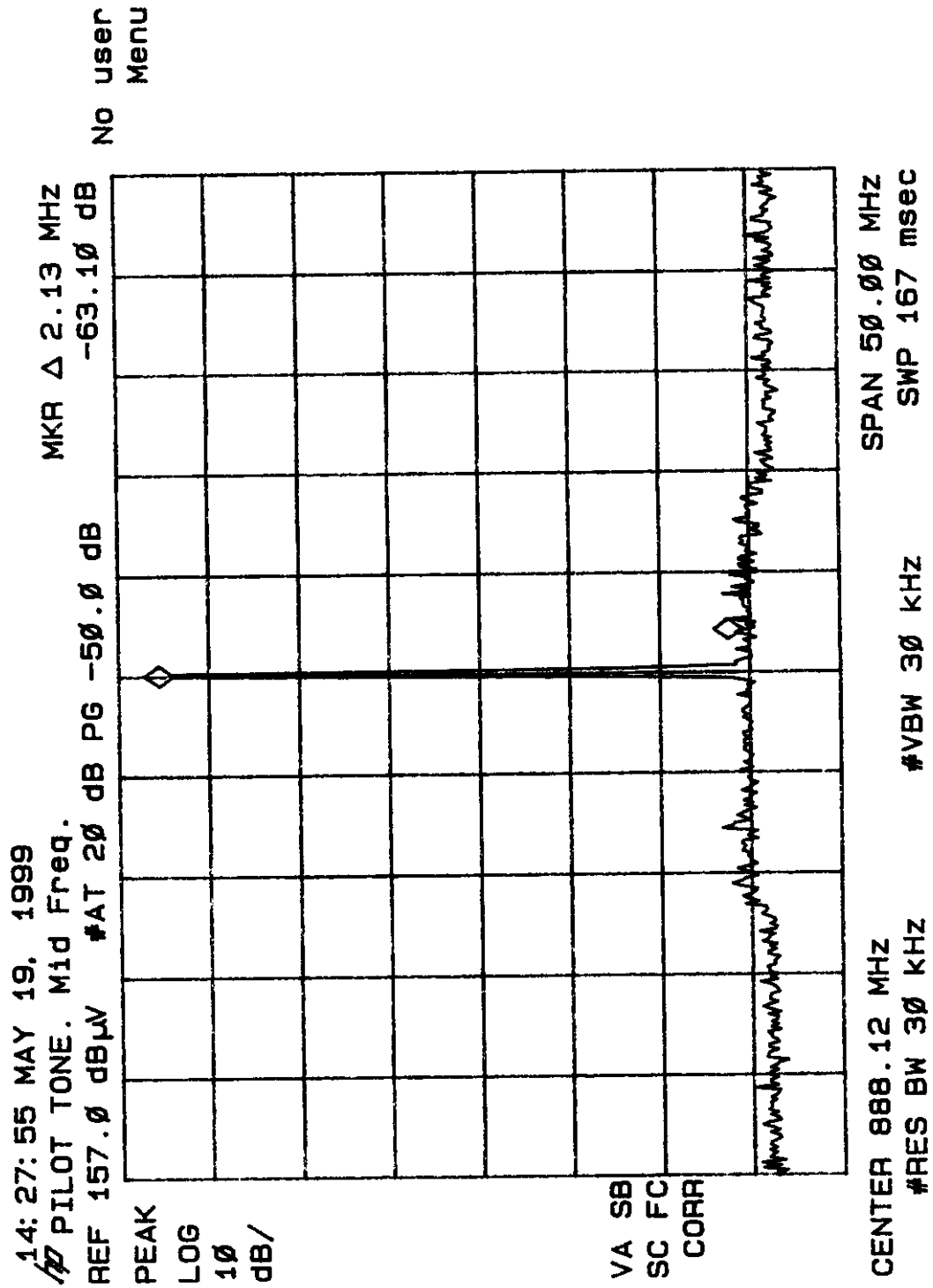
3.2 Test Equipment Setup

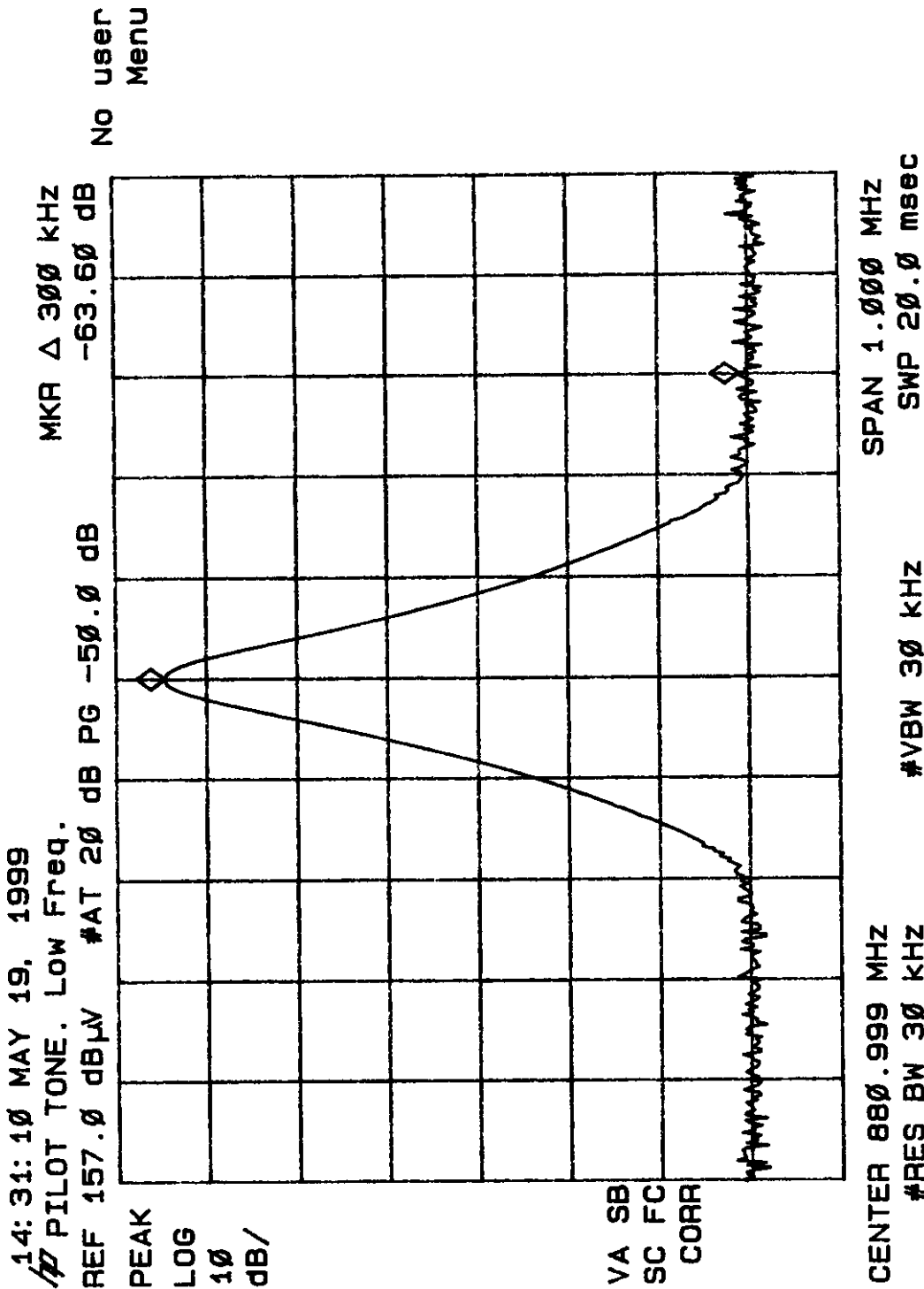


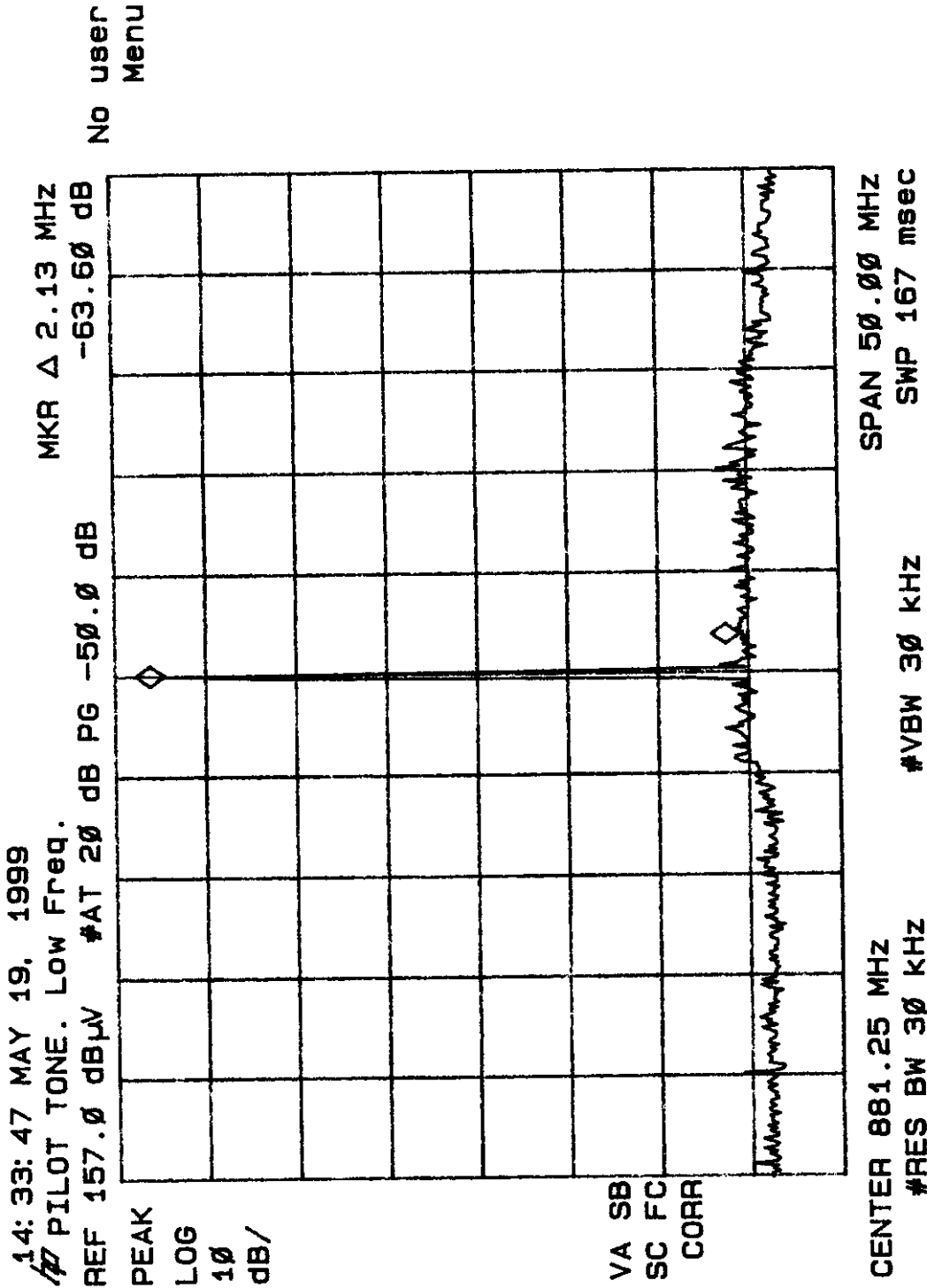


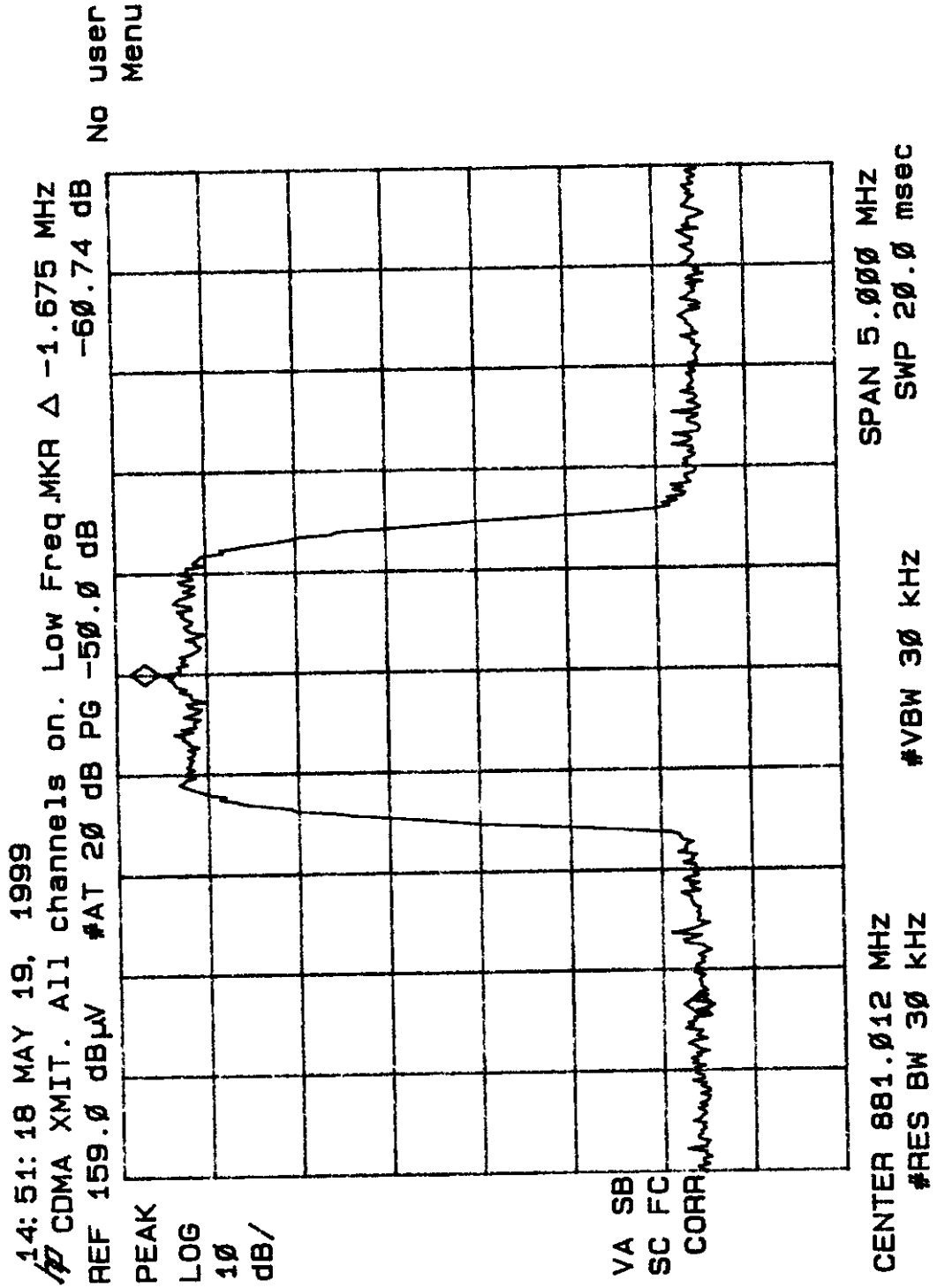


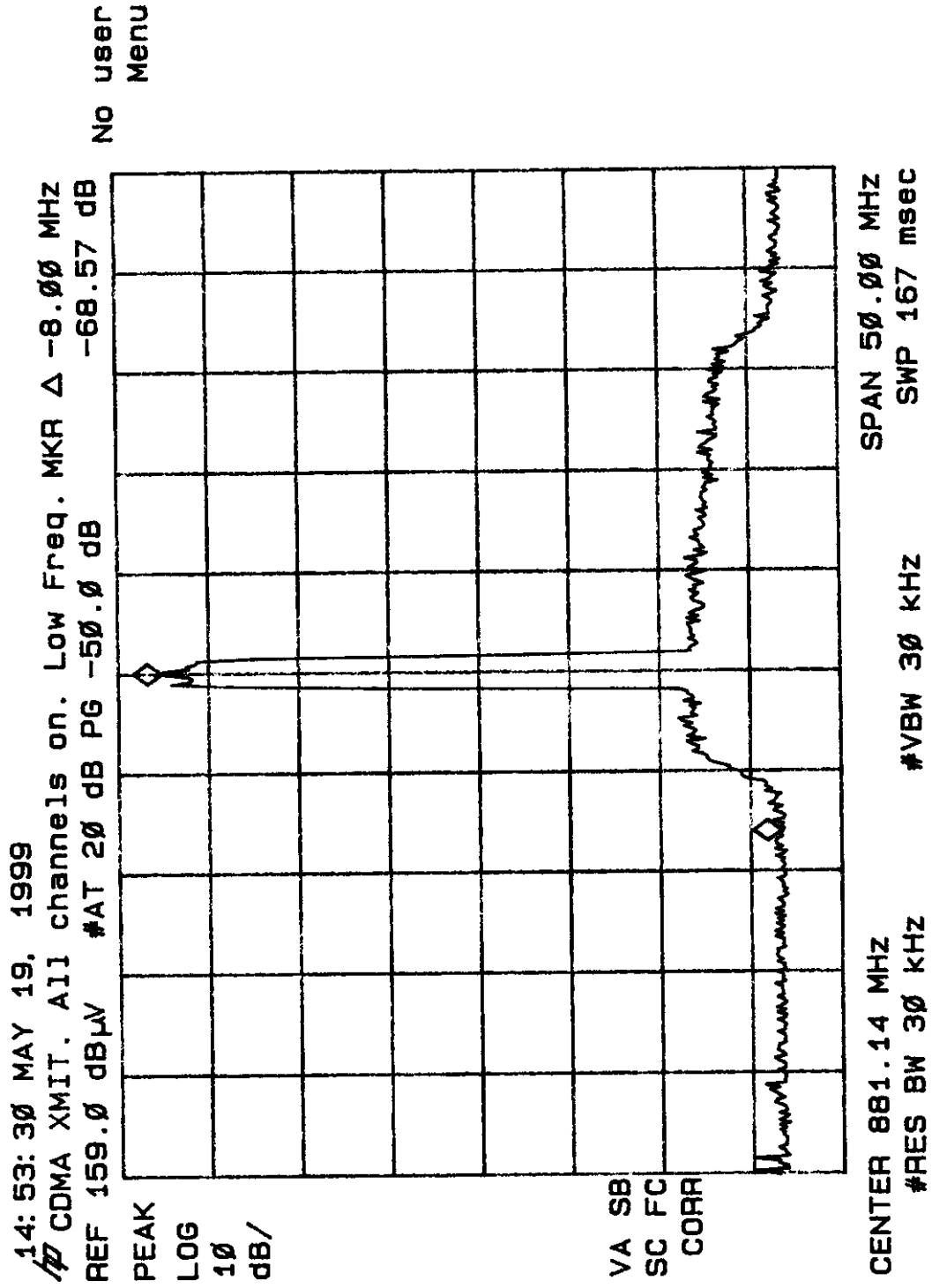




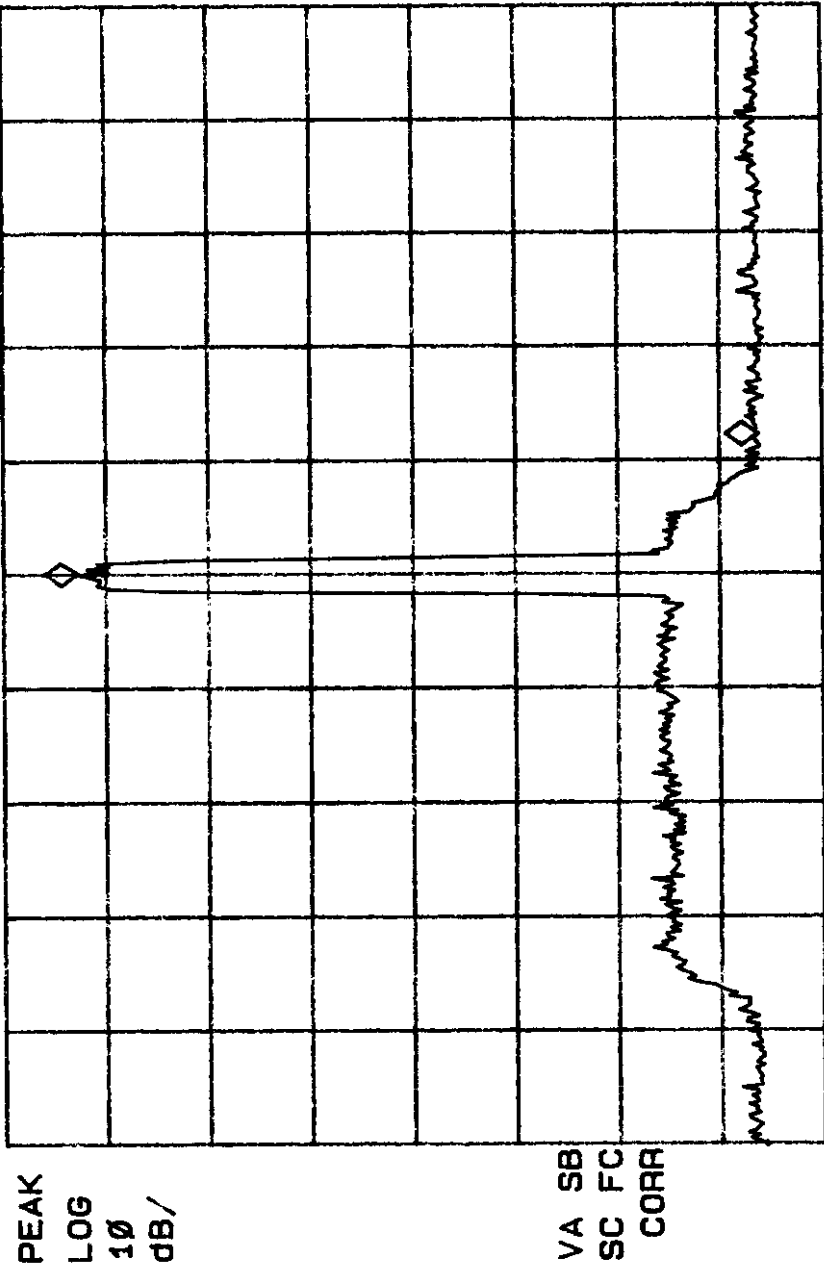


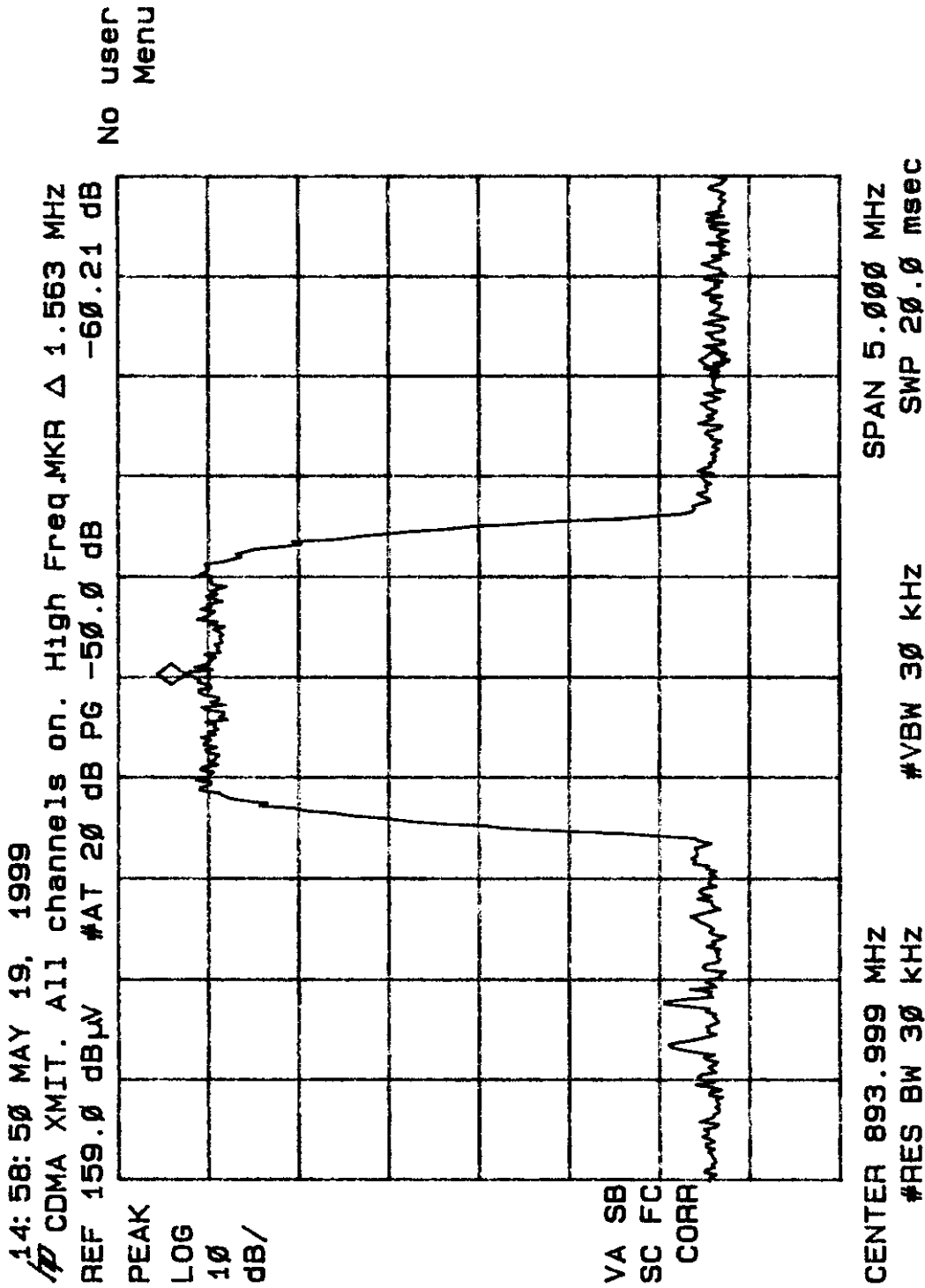


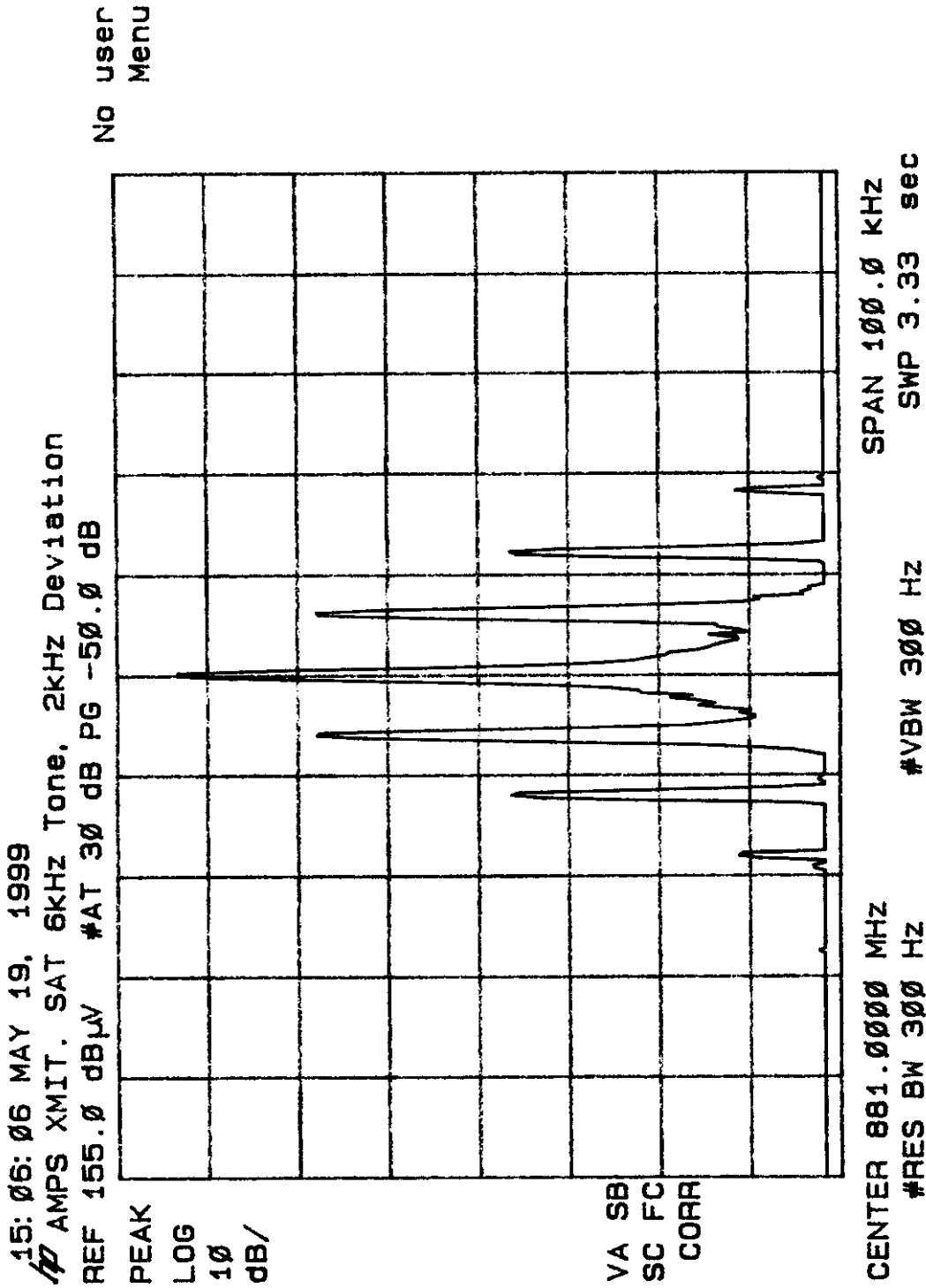


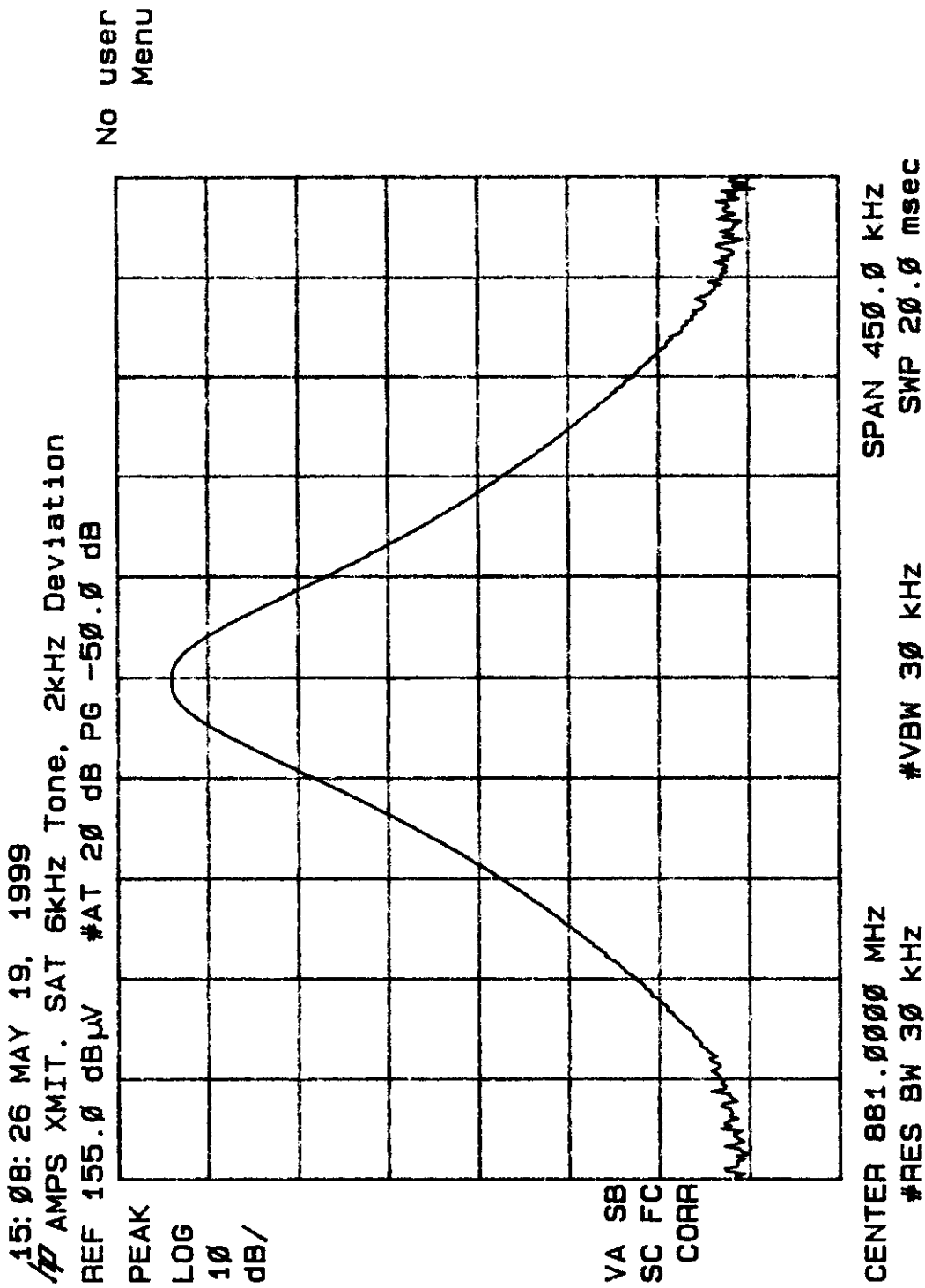


14:55:44 MAY 19, 1999
CDMA XMIT. All channels on. High Freq. MKR Δ 6.13 MHz
REF 159.0 dB μ V #AT 20 dB PG -50.0 dB -66.53 dB
No user
Menu



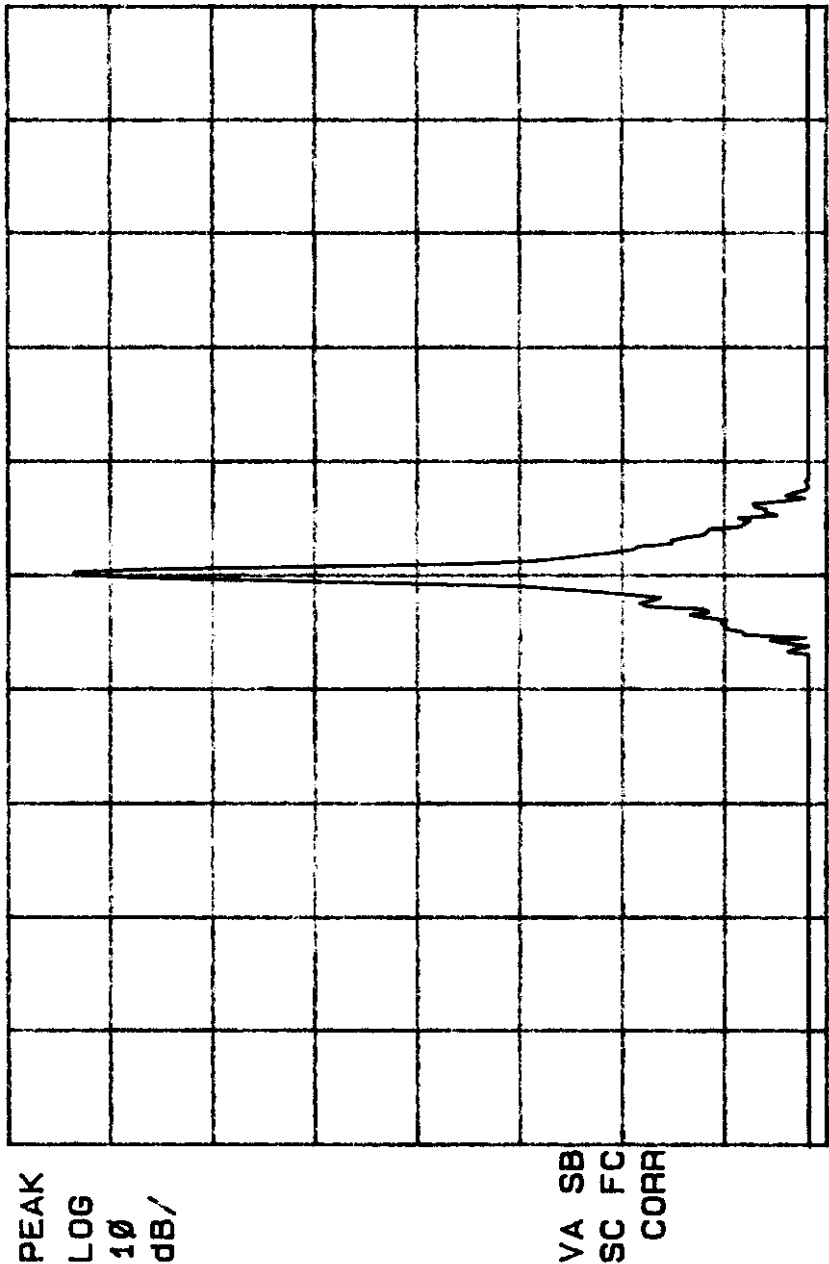






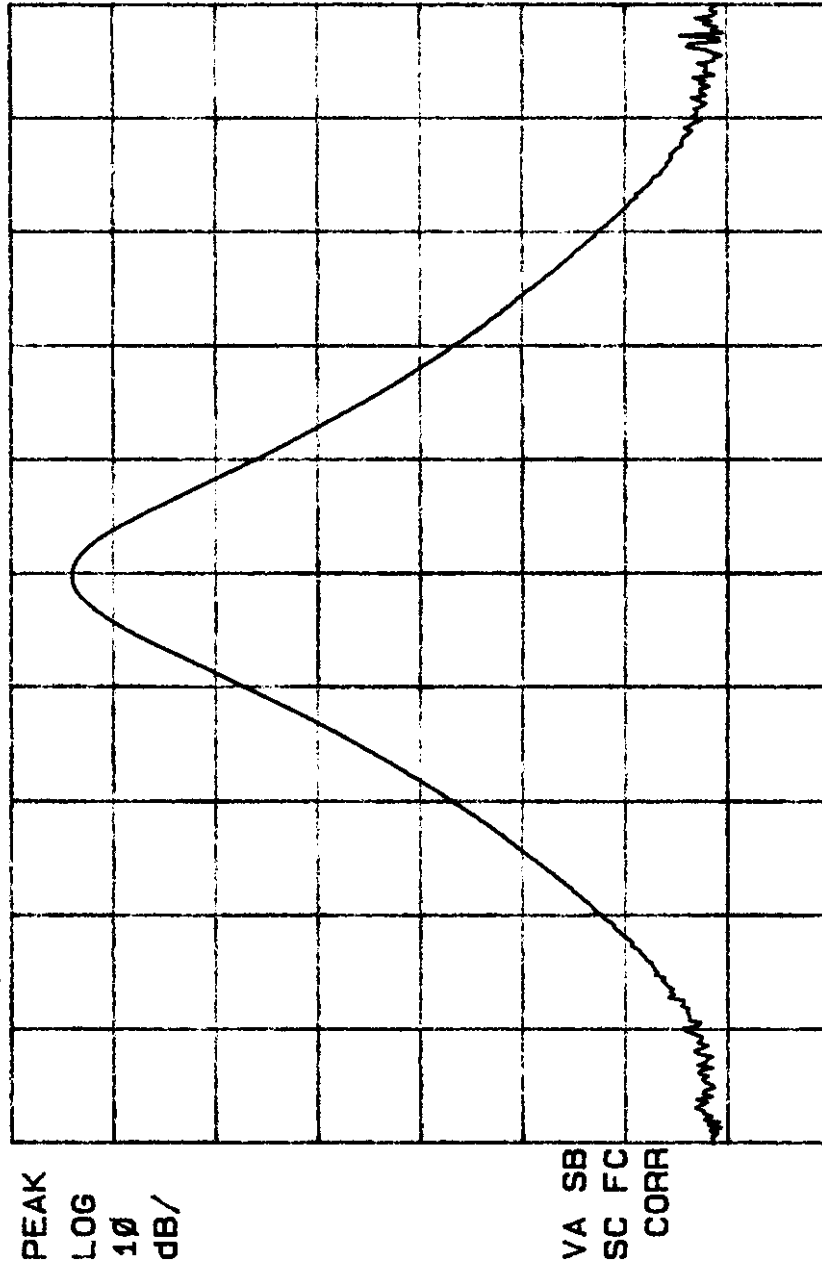
15: 12: 36 MAY 19, 1999
/P AMPS XMIT. DSAT 2000bps, 700Hz Deviation
REF 155.0 dBμV #AT 20 dB PG -50.0 dB

No user
Menu



CENTER 881.0000 MHz
#RES BW 300 Hz
SPAN 100.0 KHz
SWP 3.33 sec
#VBW 300 Hz

15:14:24 MAY 19, 1999
 17 AMPS XMIT. DSAT 200bps. 700Hz Deviation
 REF 155.0 dBμV #AT 20 dB PG -50.0 dB
 No User
 Menu

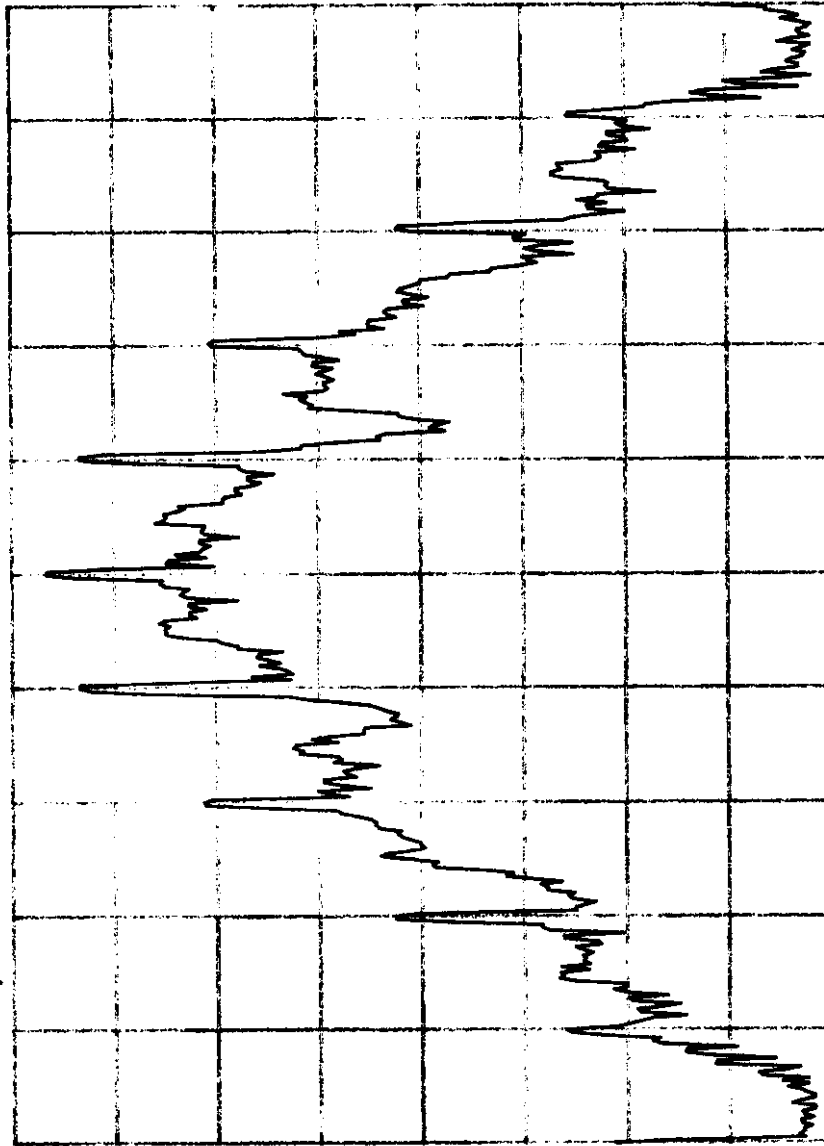


CENTER 881.0000 MHz
 #RES BW 30 KHZ
 #VBW 30 KHZ
 SPAN 450.0 KHZ
 SWP 20.0 msec

15:27:40 MAY 19, 1999

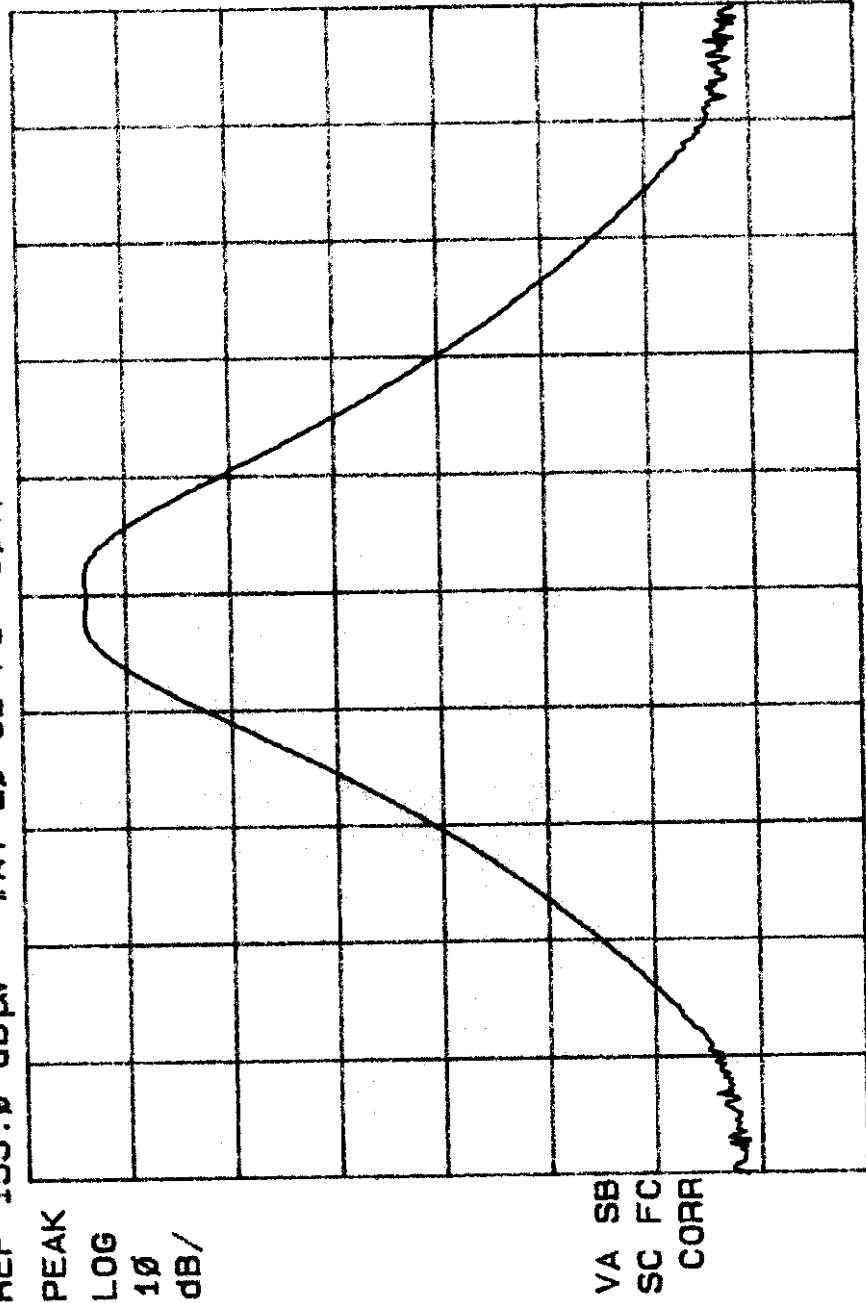
10 AMPS XMIT. CONTROL CH. Wideband data. 10kbps 8kHz DE

REF 148.0 dBμV #AT 20 dB PG -50.0 dB

No user
MenuVA SB
SC FC
CORRCENTER 881.0000 MHz
#RES BW 300 HzSPAN 100.0 kHz
SWP 3.33 sec

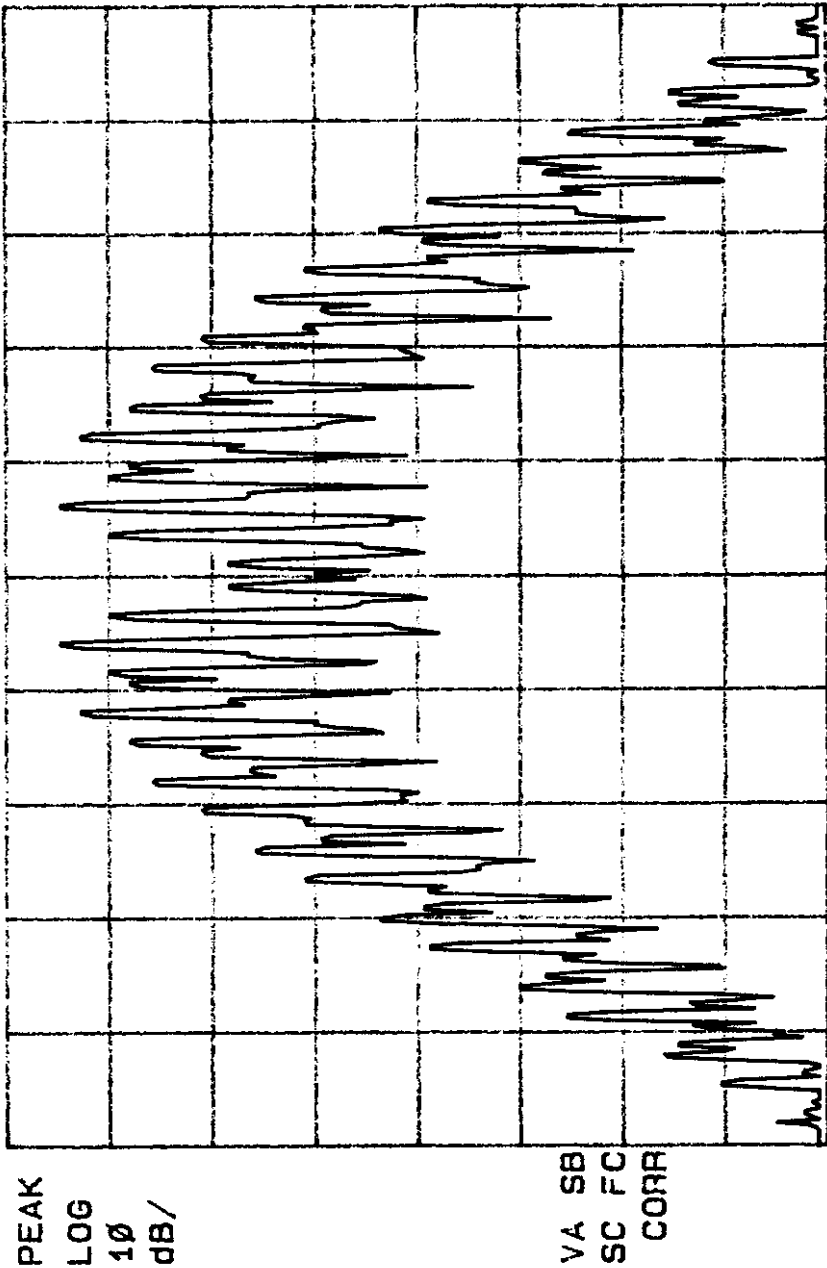
#VBW 300 Hz

15:30:05 MAY 19, 1999
 17 AMPS XMIT. CONTROL CH, Wideband data. 10kbps 8kHz DE
 REF 155.0 dBμV #AT 20 dB PG -50.0 dB
 No User
 Menu



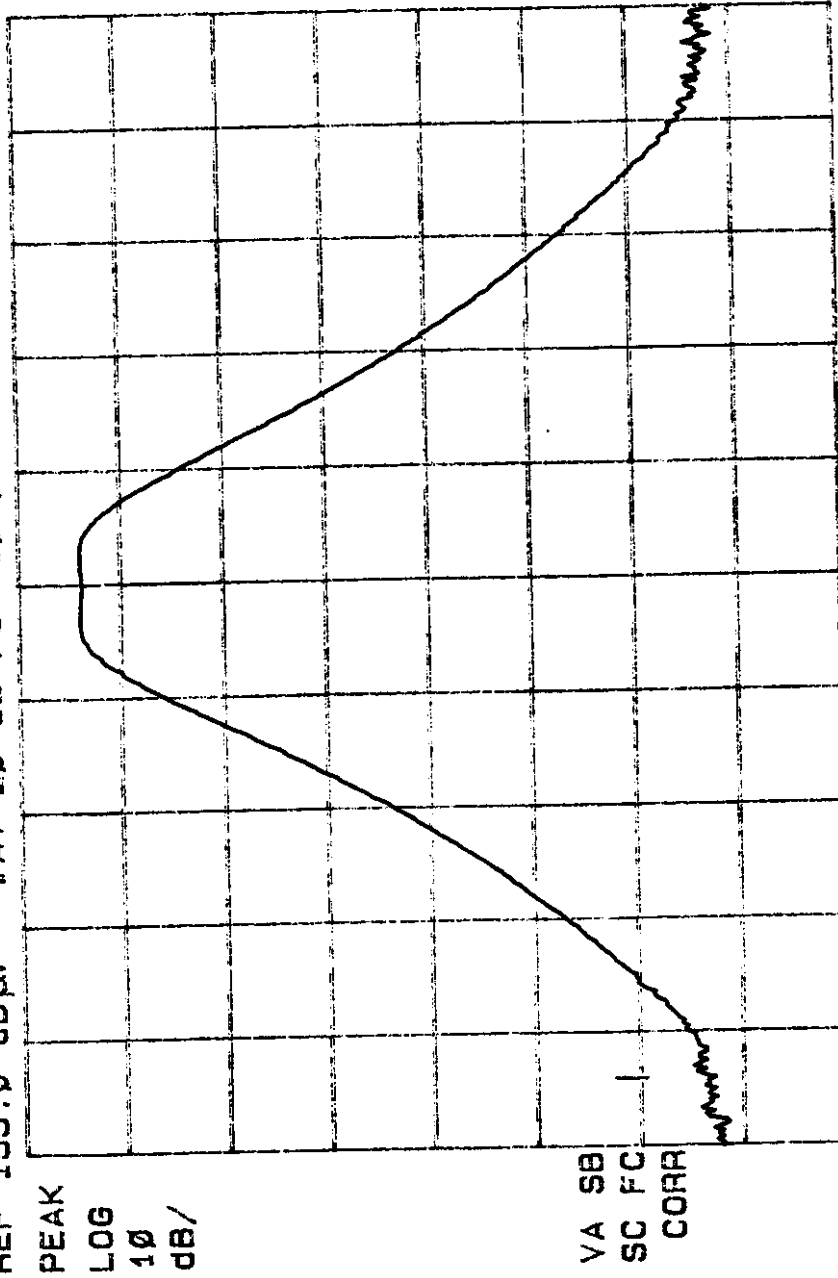
CENTER 881.0000 MHz
 #RES BW 30 kHz
 #VBW 30 kHz
 SPAN 450.0 kHz
 SWP 20.0 msec

15: 43: 13 MAY 19, 1999
AMPS XMIT. VOICE CH 2.5kHz, SAT 6kHz, 14kHz DEV
REF 146.0 dBμV #AT 20 dB PG -50.0 dB
No user
Menu



CENTER 881.0000 MHz
#RES BW 300 Hz
SPAN 100.0 kHz
SWP 3.33 sec

15:45:28 MAY 19, 1999
 70 AMPS XMIT. VOICE CH 2.5KHZ, SAT 6KHZ, 14KHZ DEV
 REF 155.0 dBμV #AT 20 dB PG -50.0 dB
 No User
 Menu



CENTER 881.0000 MHz
 #RES BW 30 KHZ
 #VBW 30 KHZ
 SPAN 450.0 KHZ
 SWP 20.0 msec

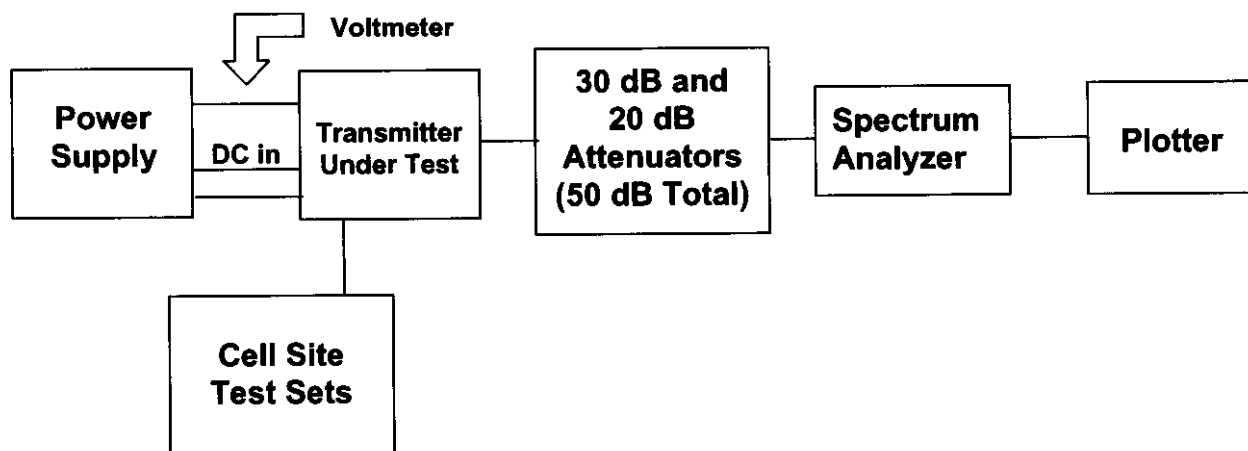
4.0 Spurious Emissions at Antenna Terminals

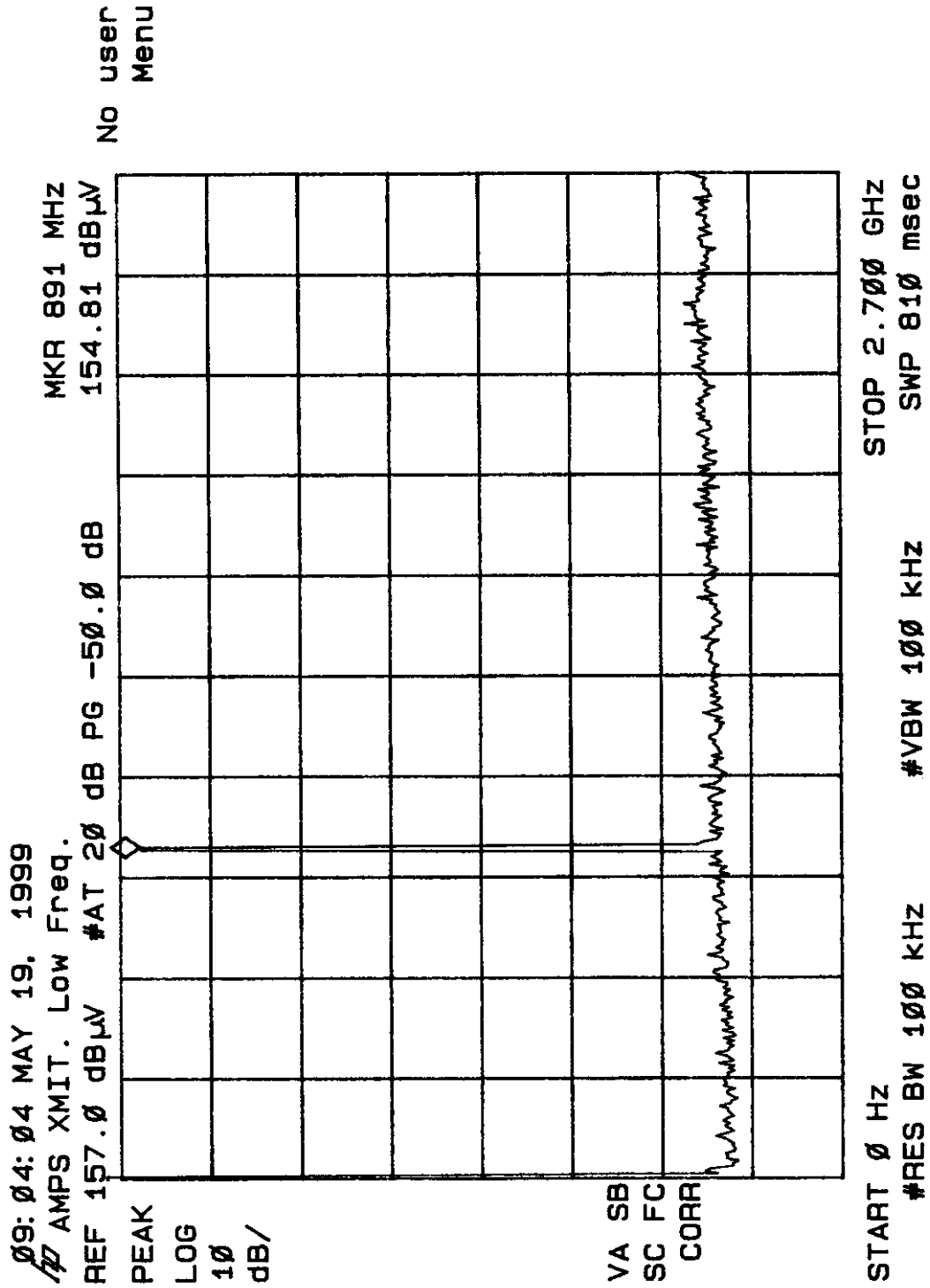
Specification Para. 22.917
 Equipment Authorization Procedure Para. 2.1051
 Measurement Frequency Range 0 MHz – 10 GHz
 TX Output Power 50W
 Limit - 60 dB
 Measurement Data See attached plots for Low, Mid and High
 Frequencies. Modulation noted on each
 plot.

4.1 Measurement Equipment

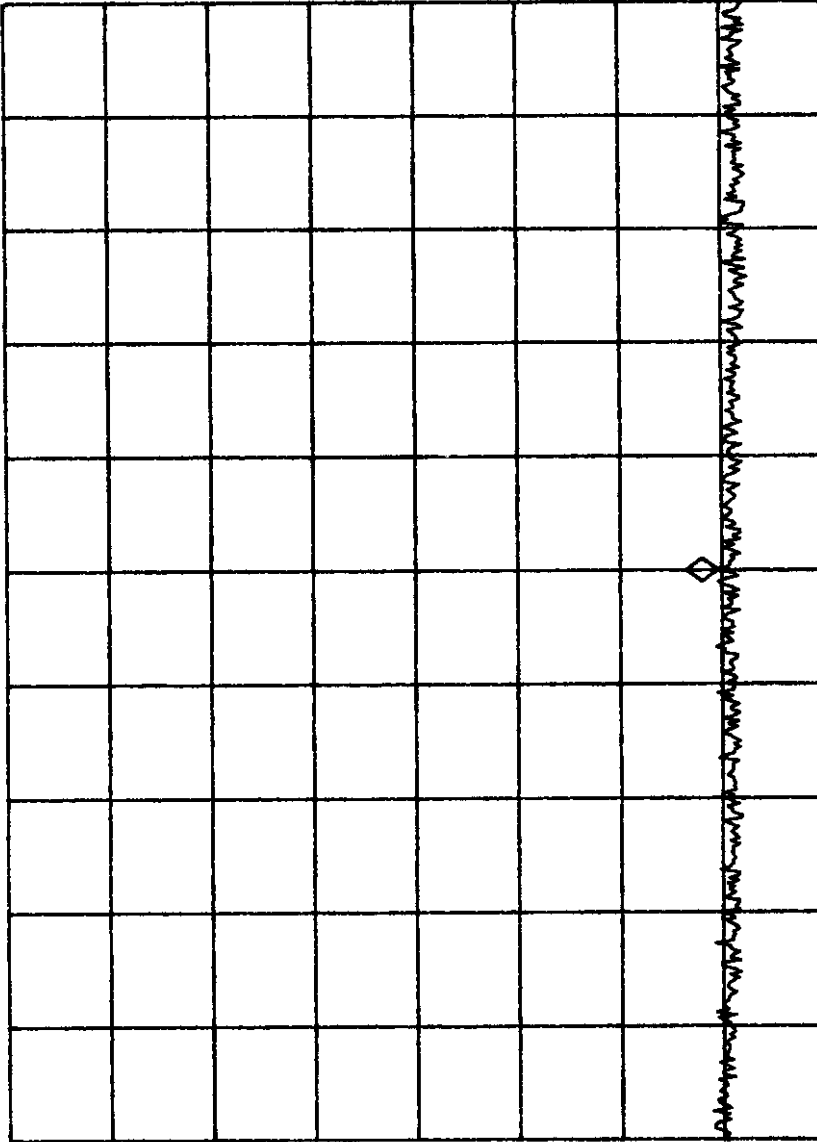
Instrument	Model	Serial No.	Freq. Range	Last Cal	Cal Due
Spectrum Analyzer	HP 8593EM	3536A00134	9 kHz – 22 GHz	04/05/99	04/05/00

4.2 Test Equipment Setup





09:07:46 MAY 19, 1999
 17 AMPS XMIT. Low Freq.
 REF 157.0 dBμV #AT 10 dB PG -50.0 dB MKR 4.445 GHz 87.35 dBμV
 No user
 Menu



START 2.690 GHz #RES BW 100 KHz STOP 6.200 GHz SWP 1.05 sec
 #VBW 100 KHz

Ø9: 22: 19 MAY 19, 1999

~~NO~~ AMPS XMIT. Mid Freq.

REF 157.0 dBμV

#AT 1Ø

PEAK

LOG

10

dB/

VA SB

OF CS

COAR

START 2.690 GHZ

#RES BW 100 KHZ

#VBW 100 KHZ

STOP 6.200 GHz

SWP 1.05 sec

MKR 4.445 GHz

86.40 dB μ V

**No user
Menu**

09: 22: 19 MAY '19, 1999
17 AMPS XMIT. Mid Freq.

~~70~~ AMPS XMIT. Mid Freq.

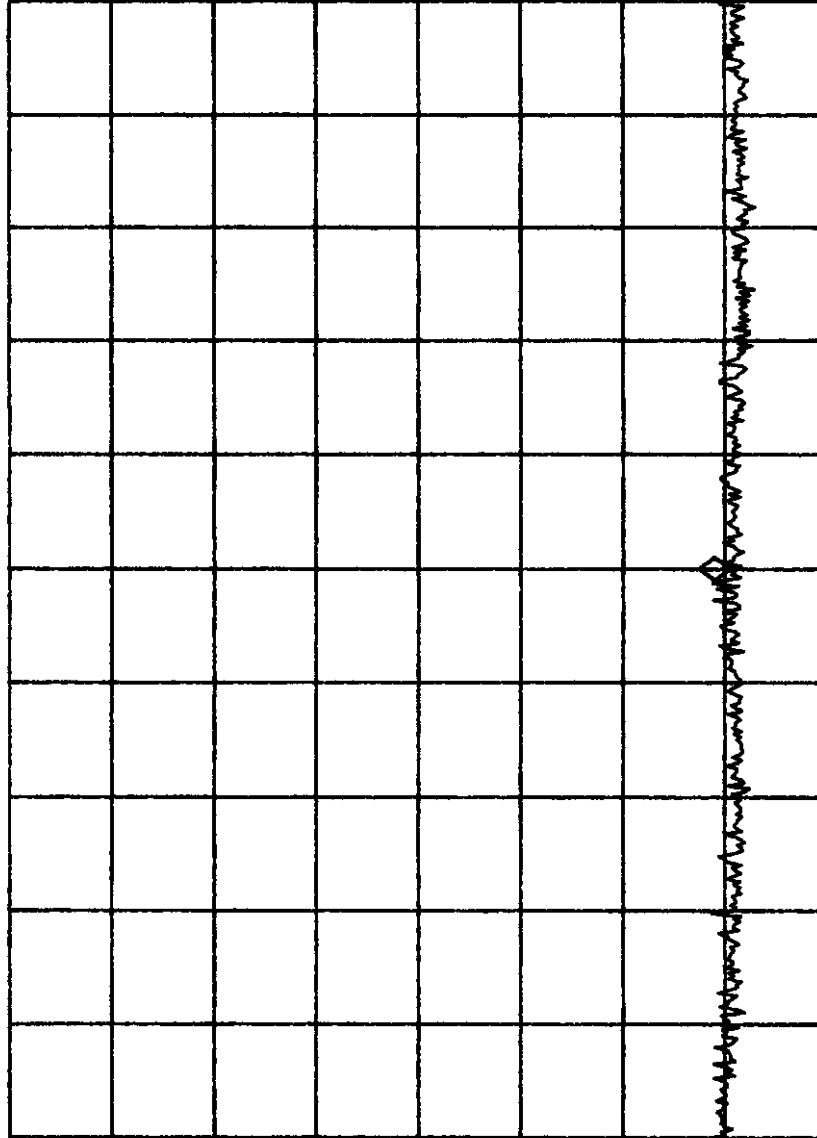
70 AMPS XMIT. Mid Freq. MKR 4.445 GHz
REF 157.0 dBμV #AT 10 dB PG -50.0 dB 86.40 dBμV

86.40 dB μ V

No user Menu

PEAK
LOG
10
dB/

VA SB
SC FC
CORR



START 2.690 GHz	STOP 6.200 GHz
#RES BW 100 kHz	#VBW 100 kHz
	SWP 1.05 sec

~~09:24:57~~ MAY 19, 1999
~~17~~ AMPS XMIT. Mid Freq.

Ø9: 24: 57 MAY 19, 1999

~~7~~ AMPS XMIT. Mid Freq.

REF 147.0 dB_{μV}

#AT Ø dB

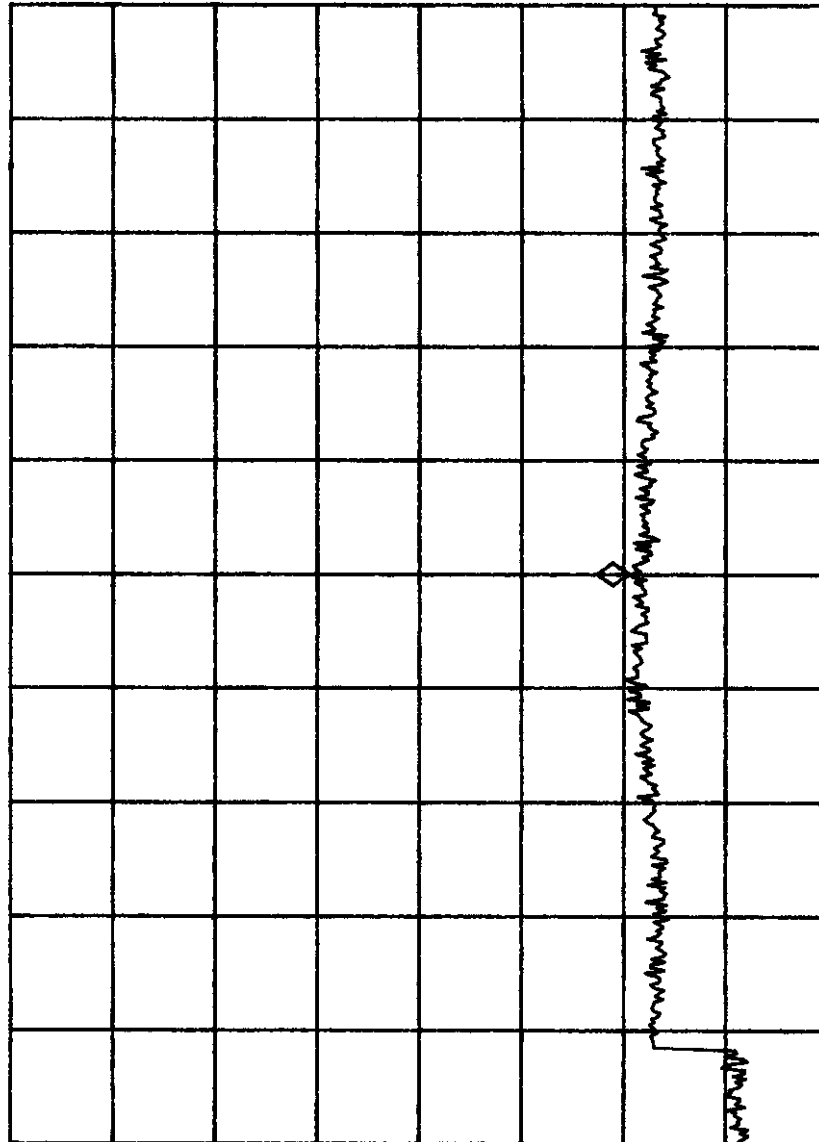
PG -50- 94

86.48 dB μ V

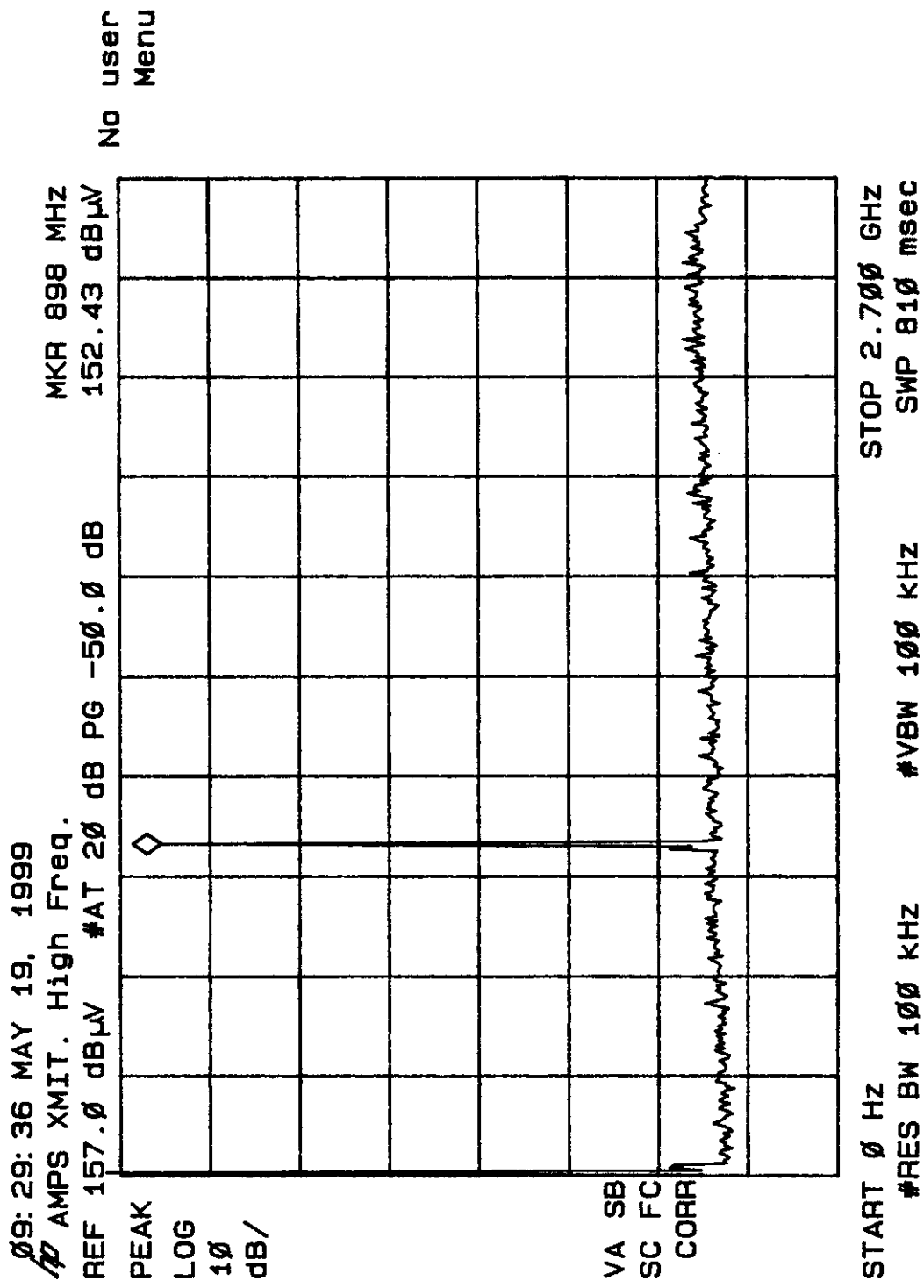
No user Menu

PEAK
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10
dB/

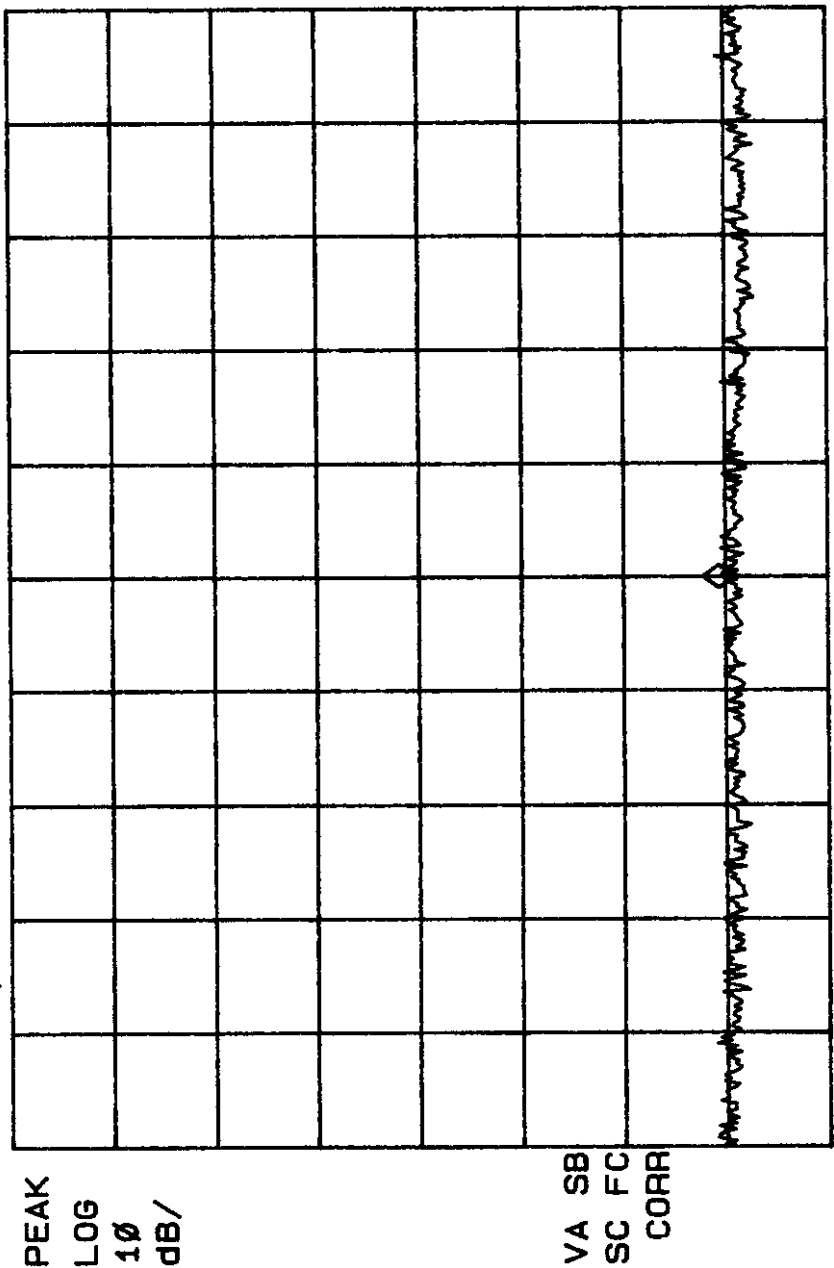
VA SB
SC FC
CORR



START 6.190 GHZ	STOP 10.000 GHZ
#RES BW 100 KHZ	#VBW 100 KHZ
	SWP 1.14 sec



09:32:33 MAY 19, 1999
AMPS XMIT. High Freq.
REF 157.0 dBμV #AT 10 dB PG -50.0 dB MKR 4.445 GHz 86.07 dBμV
No user Menu



START 2.690 GHz #RES BW 100 KHz STOP 6.200 GHz #VBW 100 KHz SWP 1.05 sec

Ø9: 35: Ø7 MAY 19. 1999

~~NO~~ AMPS XMIT. High Freq.

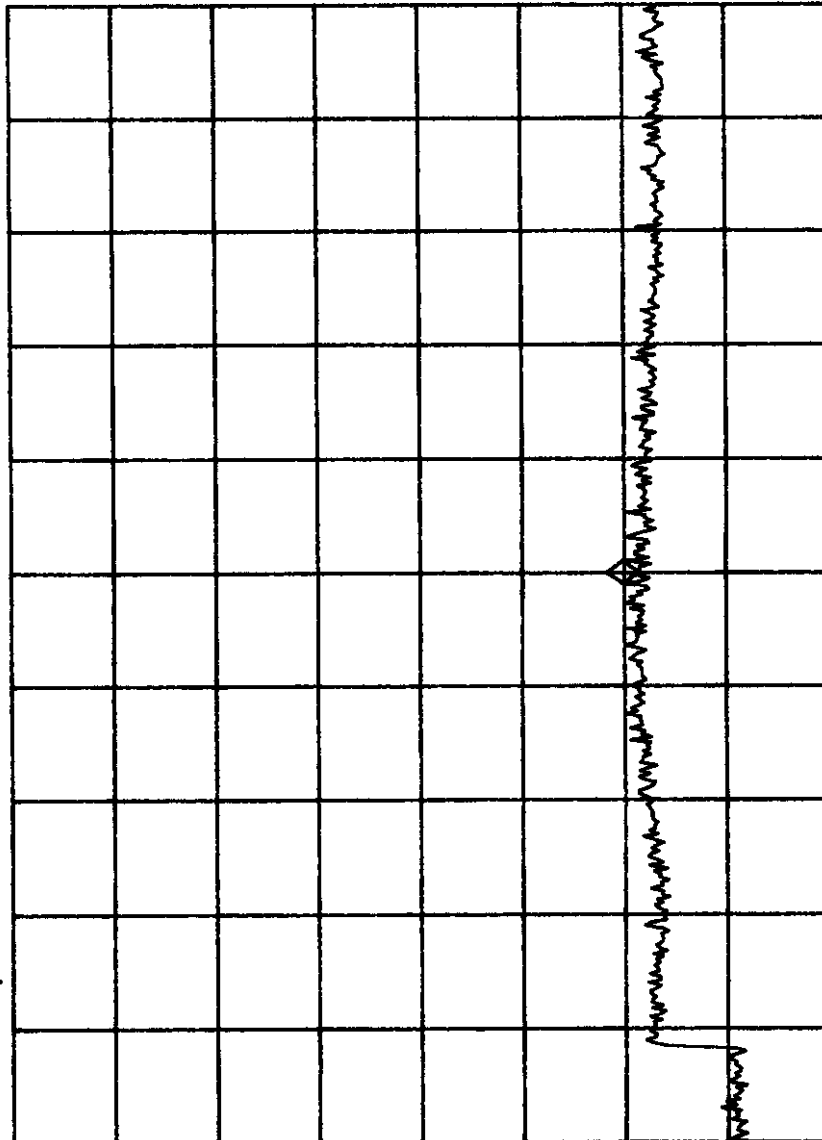
REF 147.0 dB μ V #AT 0 dB PG -50.0 dB

MKR 8.095 GHz
85.55 dBμV

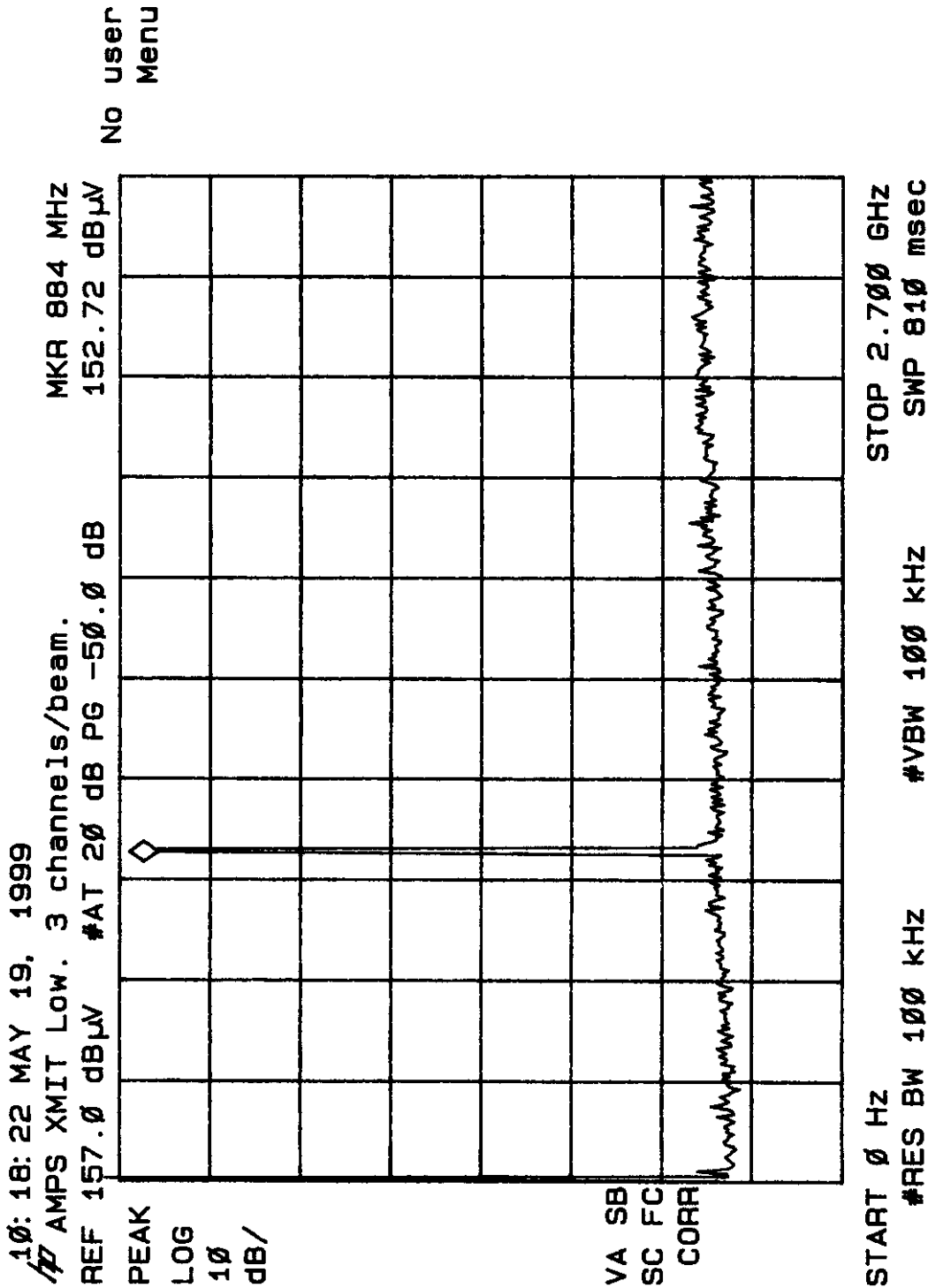
No user	Menu
1	1
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97	97
98	98
99	99
100	100

PEAK
LOG
1Ø
dB/

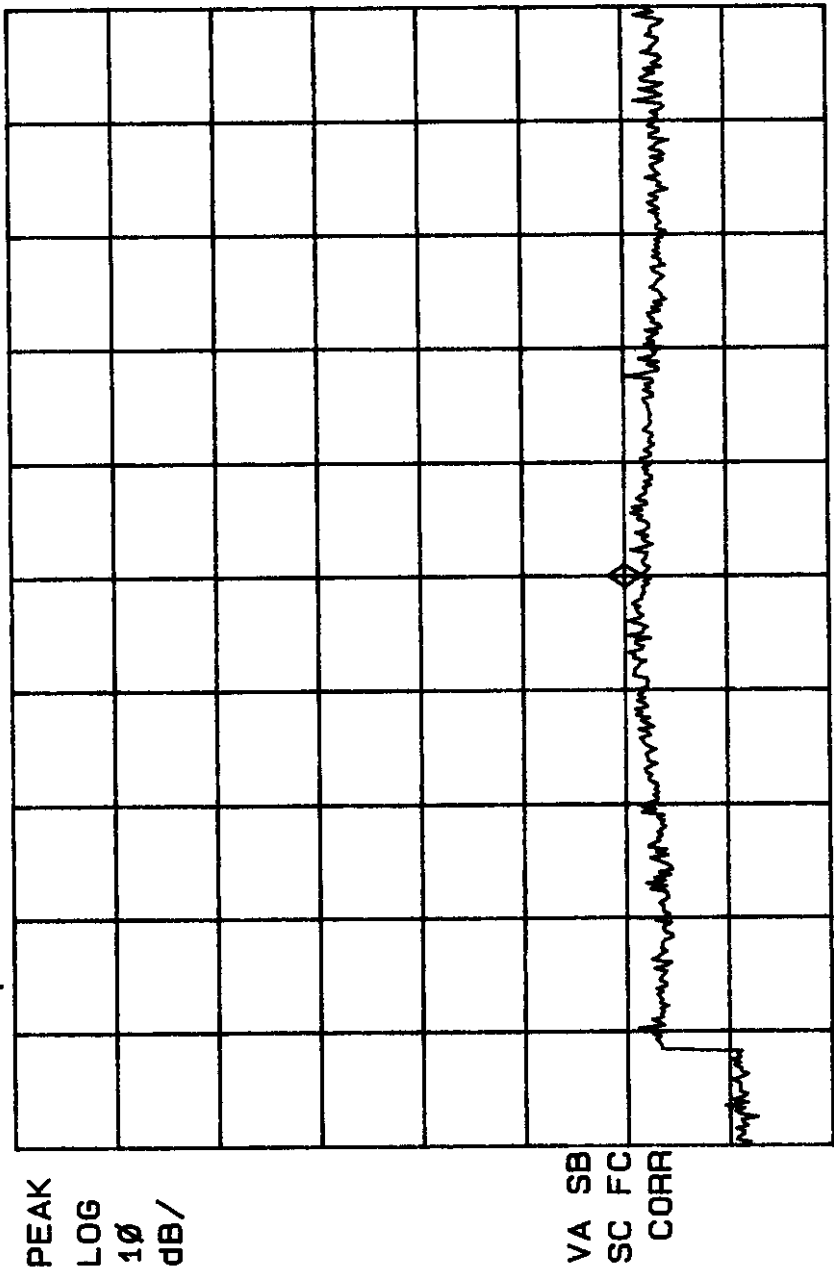
VA	SB
SC	FC
CORR	



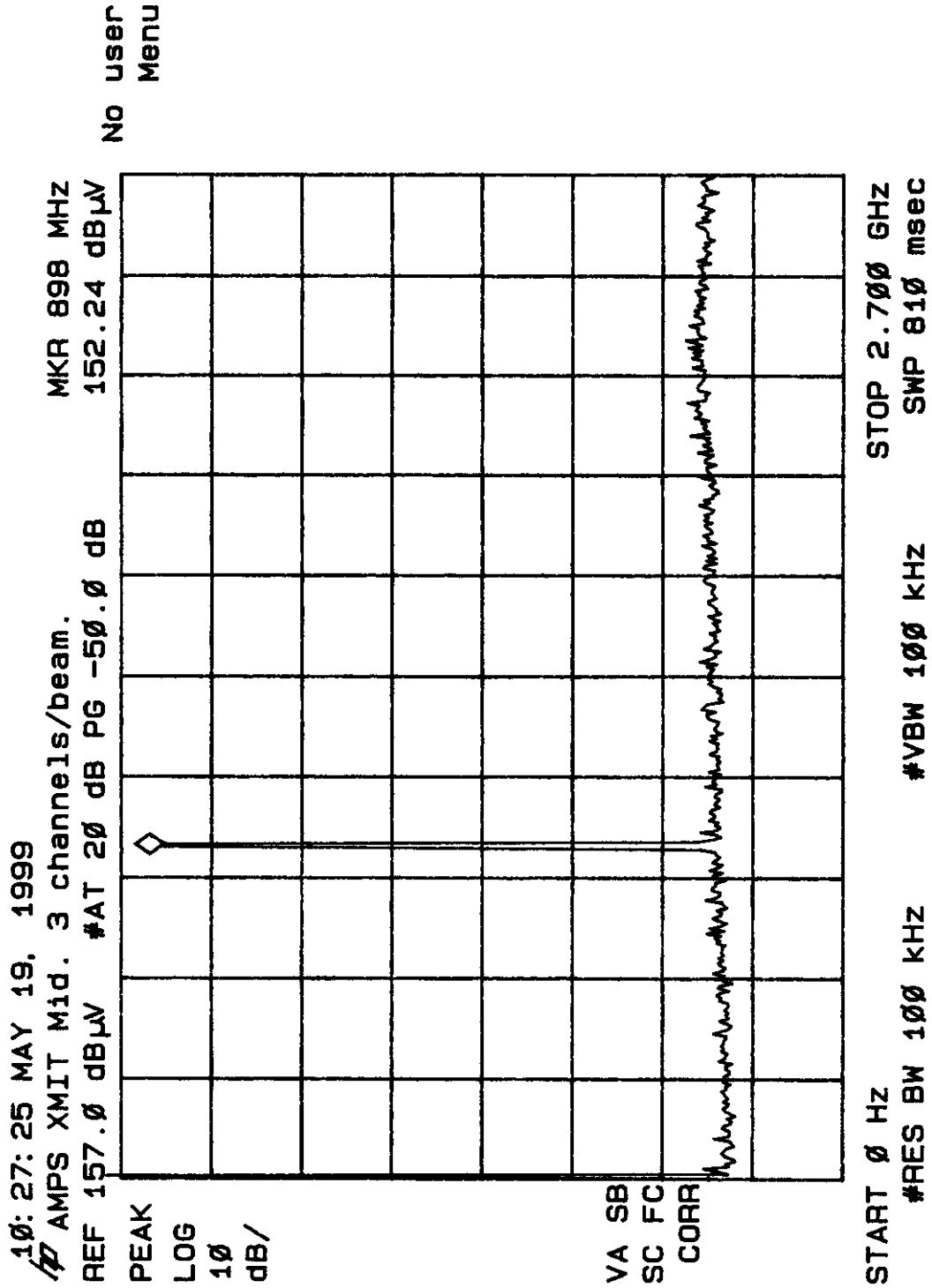
START 6.190 GHz	STOP 10.000 GHz
#RES BW 100 KHz	#VBW 100 KHz
	SWP 1.14 sec



10:23:12 MAY 19, 1999
/P AMPS XMIT Low. 3 channels/beam.
REF 147.0 dBμV #AT 0 dB PG -50.0 dB MKR 8.095 GHz 85.37 dBμV
No user Menu



START 6.190 GHz #RES BW 100 KHz STOP 10.000 GHz SWP 1.14 sec



10:29:58 MAY 19, 1999

AMPS XMIT Mid. 3 channels/beam.

MKR 4.445 GHz

REF 157.0 dB μ V #AT 10 dB PG -50.0 dB

85.59 dB μ V

PEAK

LOG

10

४८

VA SB

CS
CF

COHA

START 2.690 GHZ

#RES BW 100 KHZ

#VBW 1ØØ KHZ

STOP 6.200 GHz

SWP 1.05 sec

No user Menu

10:37:43 MAY 19, 1999

AMPS XMIT Mid. 3 channels/beam.

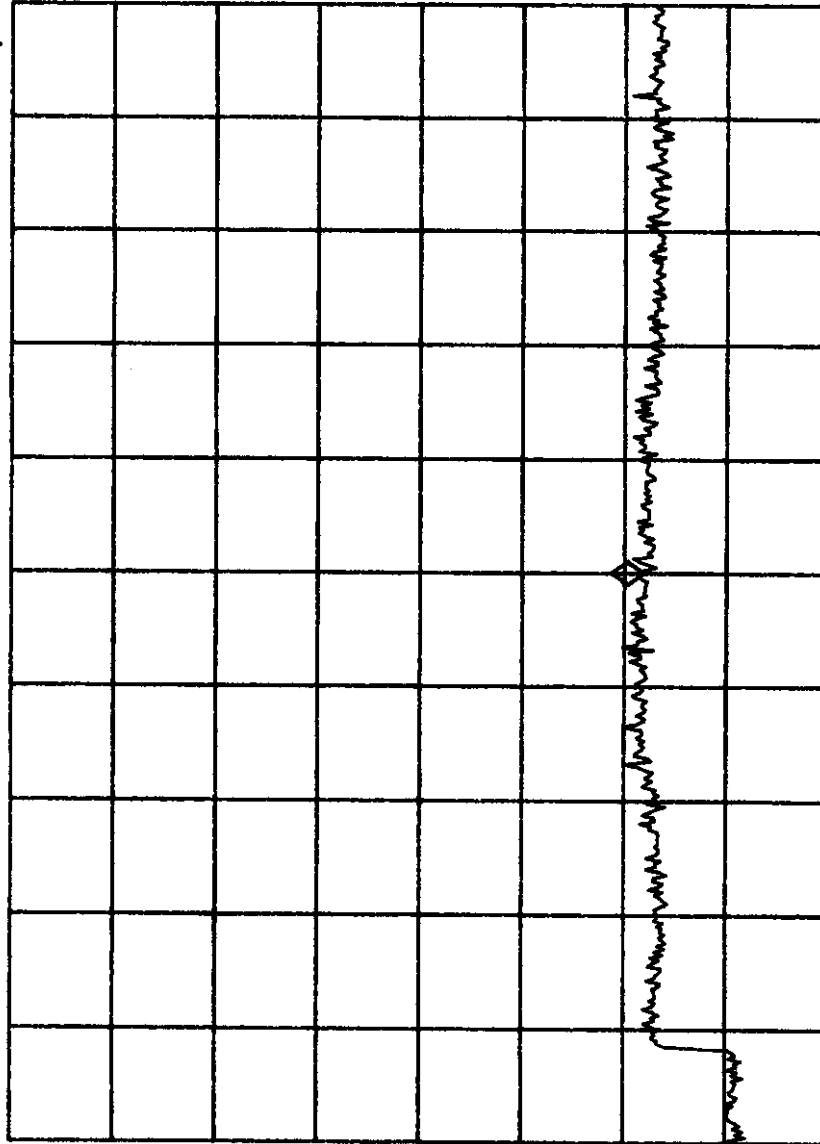
MKR 8.095 GHz

REF	147.0	dB μ V	#AT	0	dB	PG	-50.0	dB	85.10	dB μ V
-----	-------	------------	-----	---	----	----	-------	----	-------	------------

No user Menu

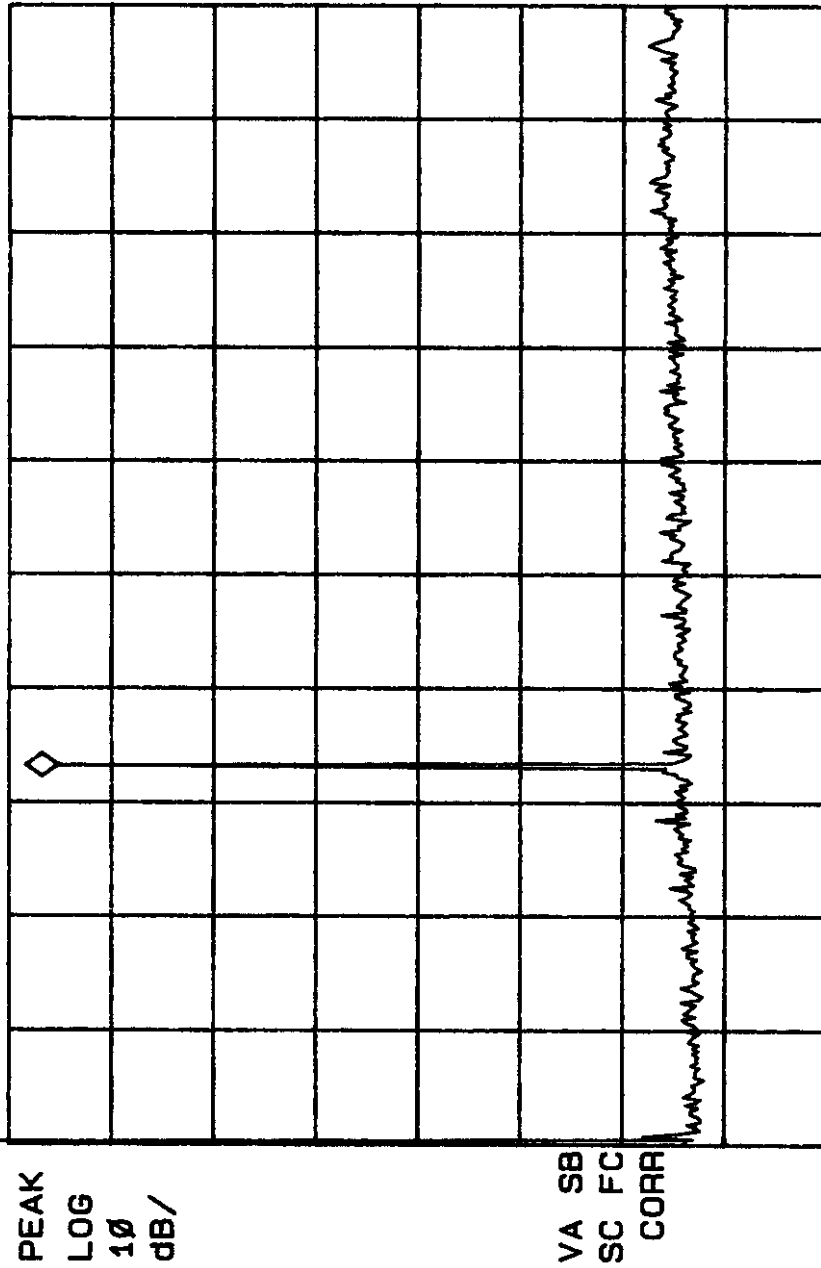
PEAK
LOG
1Ø
dB/

VA	SB
SC	FC
CORR	



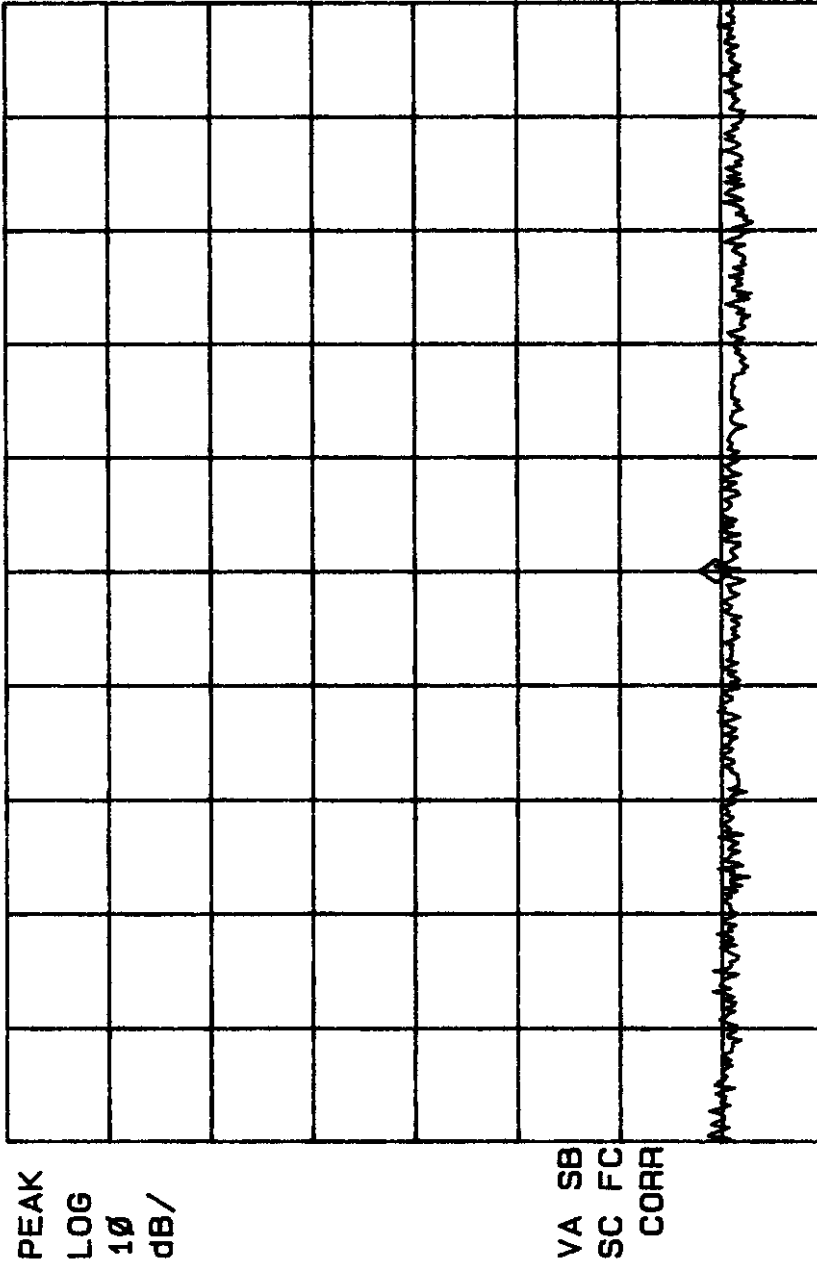
START 6.190 GHZ	STOP 10.000 GHZ
#RES BW 100 KHZ	#VBW 100 KHZ
	SWP 1.14 sec

10: 42: 33 MAY 19, 1999
/ AMPX XMIT High. 3 channels/beam. MKR 898 MHz
REF 157.0 dBμV #AT 20 dB PG -50.0 dB 152.15 dBμV
No user
Menu



START 0 HZ #RES BW 100 kHz STOP 2.700 GHz
#VBW 100 kHz SWP 810 msec

10: 46: 58 MAY 19, 1999
 10 AMPS XMIT High. 3 channels/beam.
 REF 157.0 dBμV #AT 10 dB PG -50.0 dB MKR 4.445 GHz
 No user Menu
 85.98 dBμV



START 2.690 GHz #RES BW 100 kHz STOP 6.200 GHz SWP 1.05 sec
 #VBW 100 kHz

1999 MAY 19: 09:49:10

~~77~~ AMPS XMIT High. 3 channels/beam.

REF 147.0 dB μ V #AT 0 dB PG -50.0 dB

MKR 8.095 GHz

84.68 dB μ V

No user	Menu
1	1
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PEAK

LOG

10

dB/

VA SB

CS CS

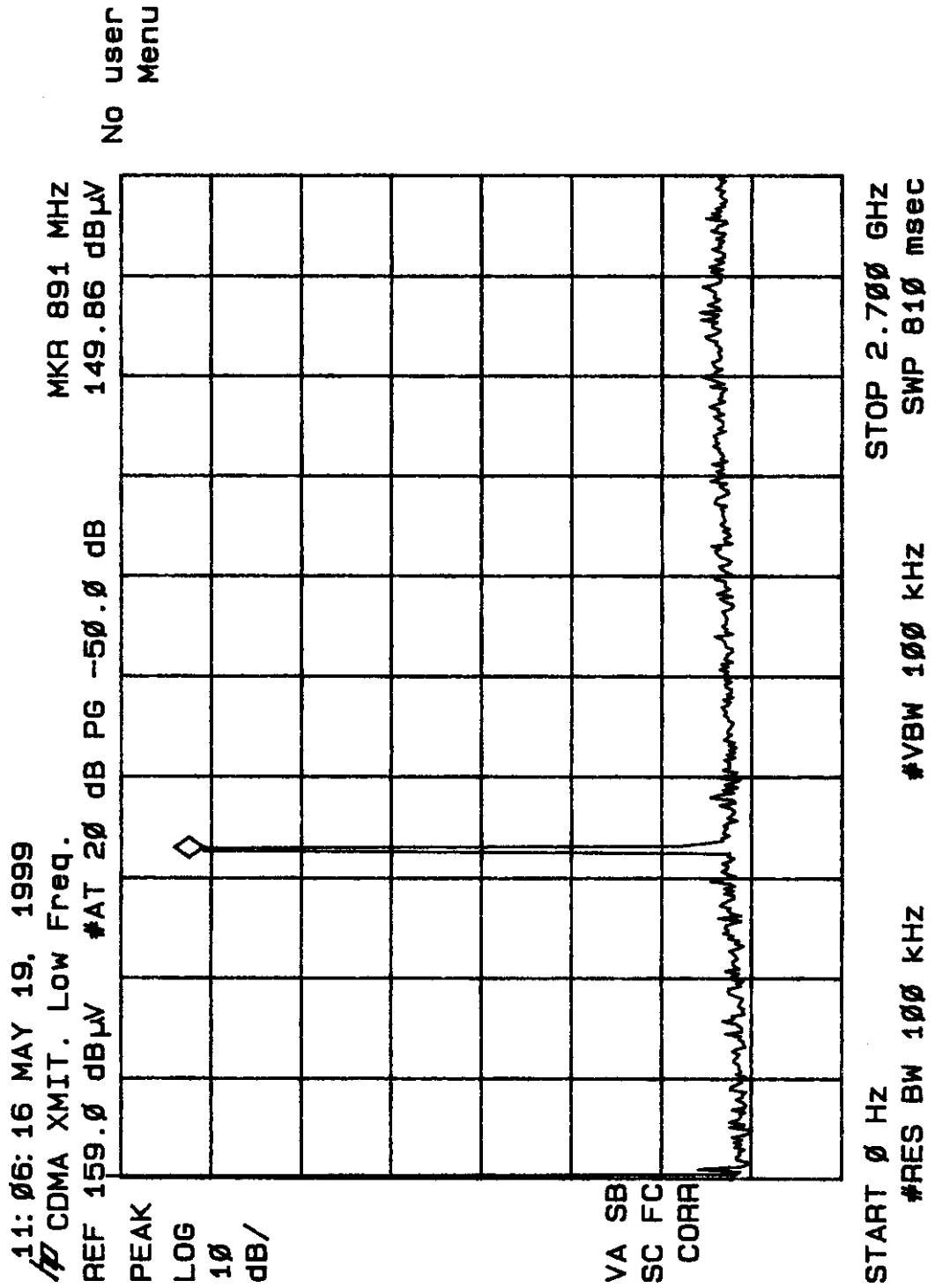
COFF

START 6.190 GHZ

#RES BW 100 KHZ

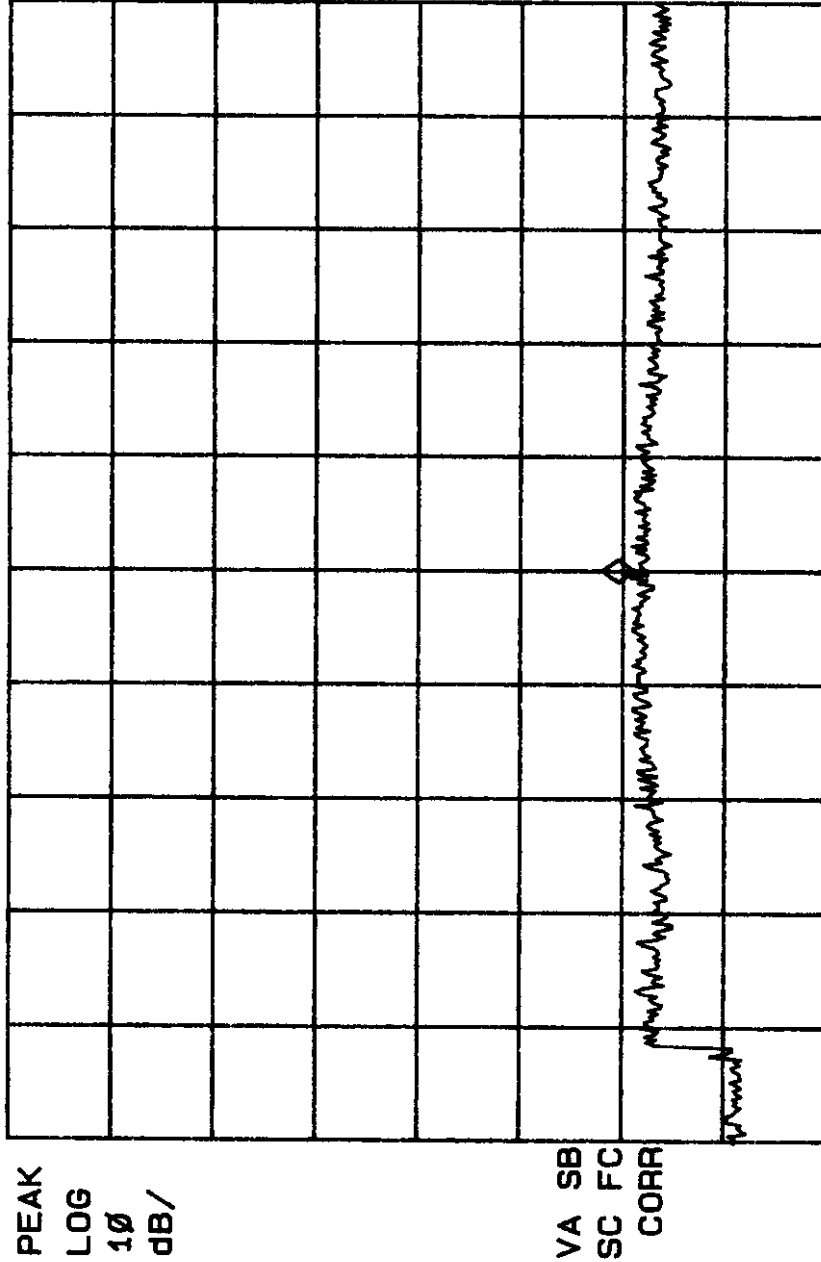
#VBW 100 KHZ

STOP 10.000 GHZ
SWP 1.14 sec

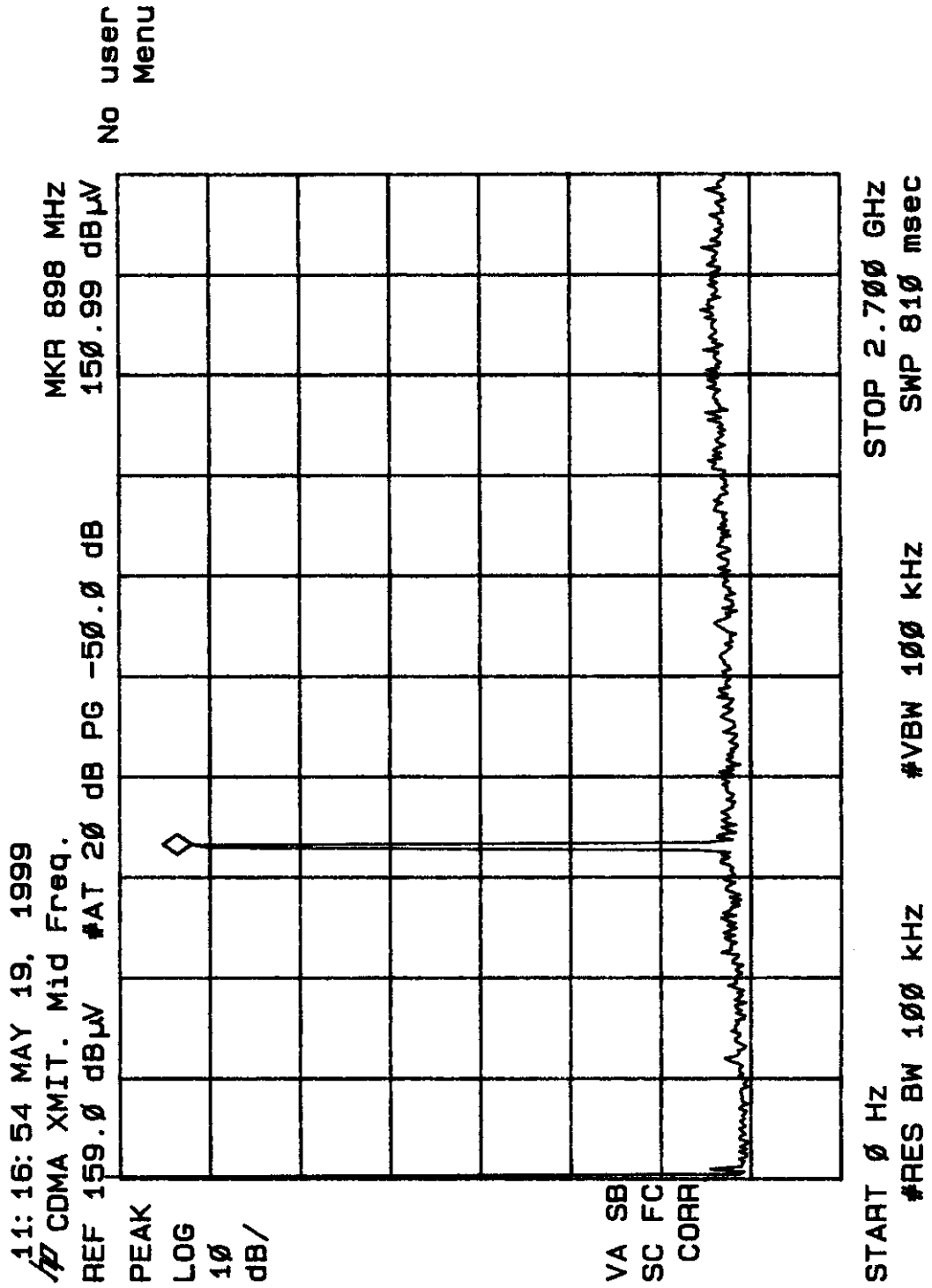


SWP 1.05 sec

11: 10: 49 MAY 19, 1999
 CDMA XMIT. Low Freq.
 REF 147.0 dBμV #AT 0 dB PG -50.0 dB MKR 8.095 GHz 85.81 dBμV
 No user
 Menu



START 6.190 GHz #RES BW 100 KHz STOP 10.000 GHz SWP 1.14 sec
 #VBW 100 KHz

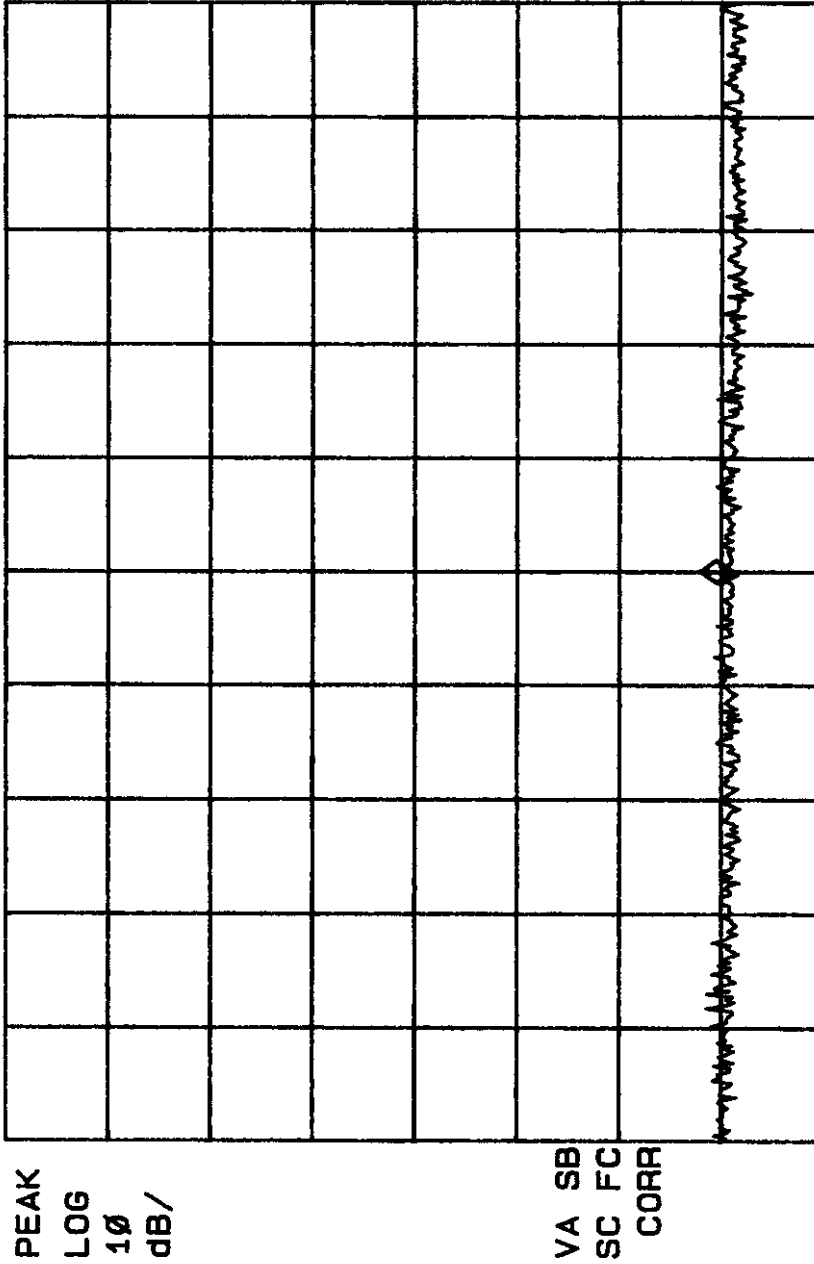


11:20:26 MAY 19, 1999

CDMA XMIT. Mid Freq.

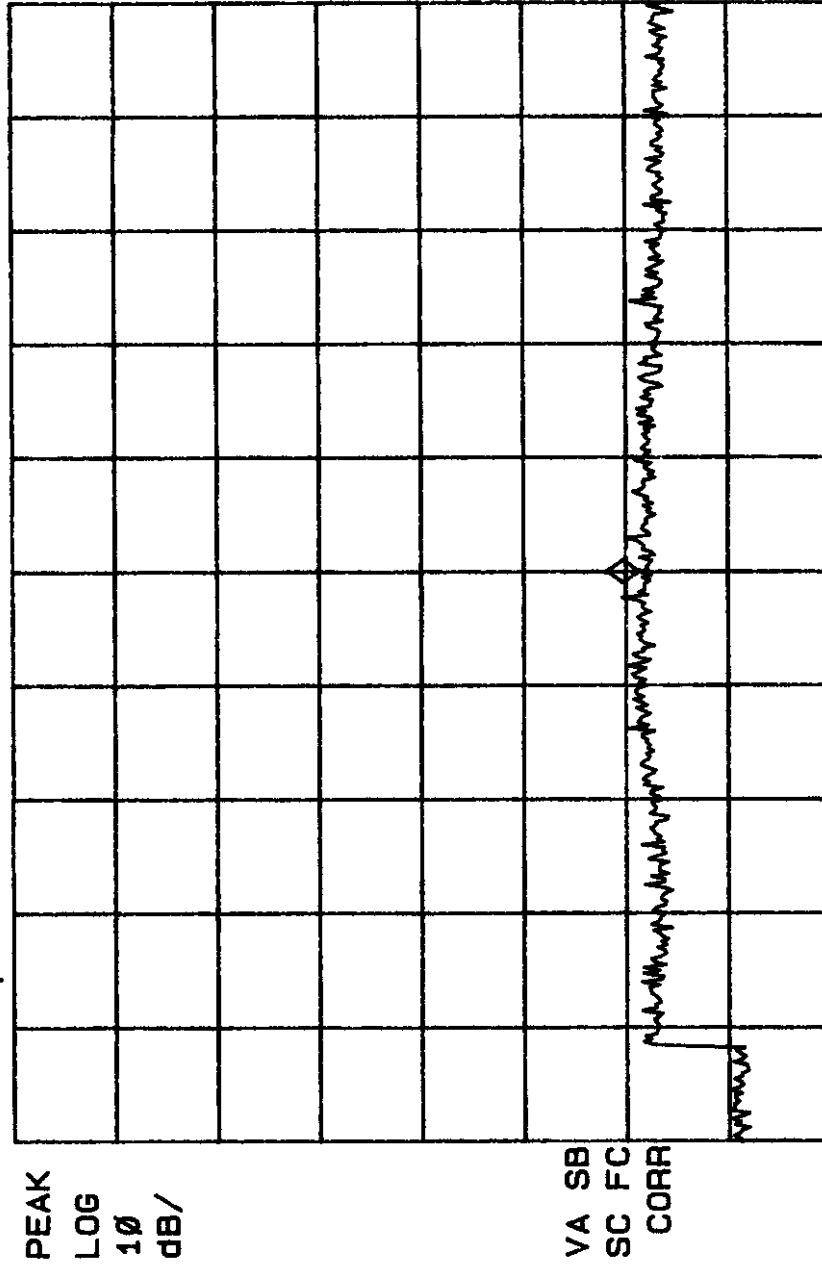
REF 157.0 dBμV #AT 10 dB PG -50.0 dB MKR 4.445 GHz 85.89 dBμV

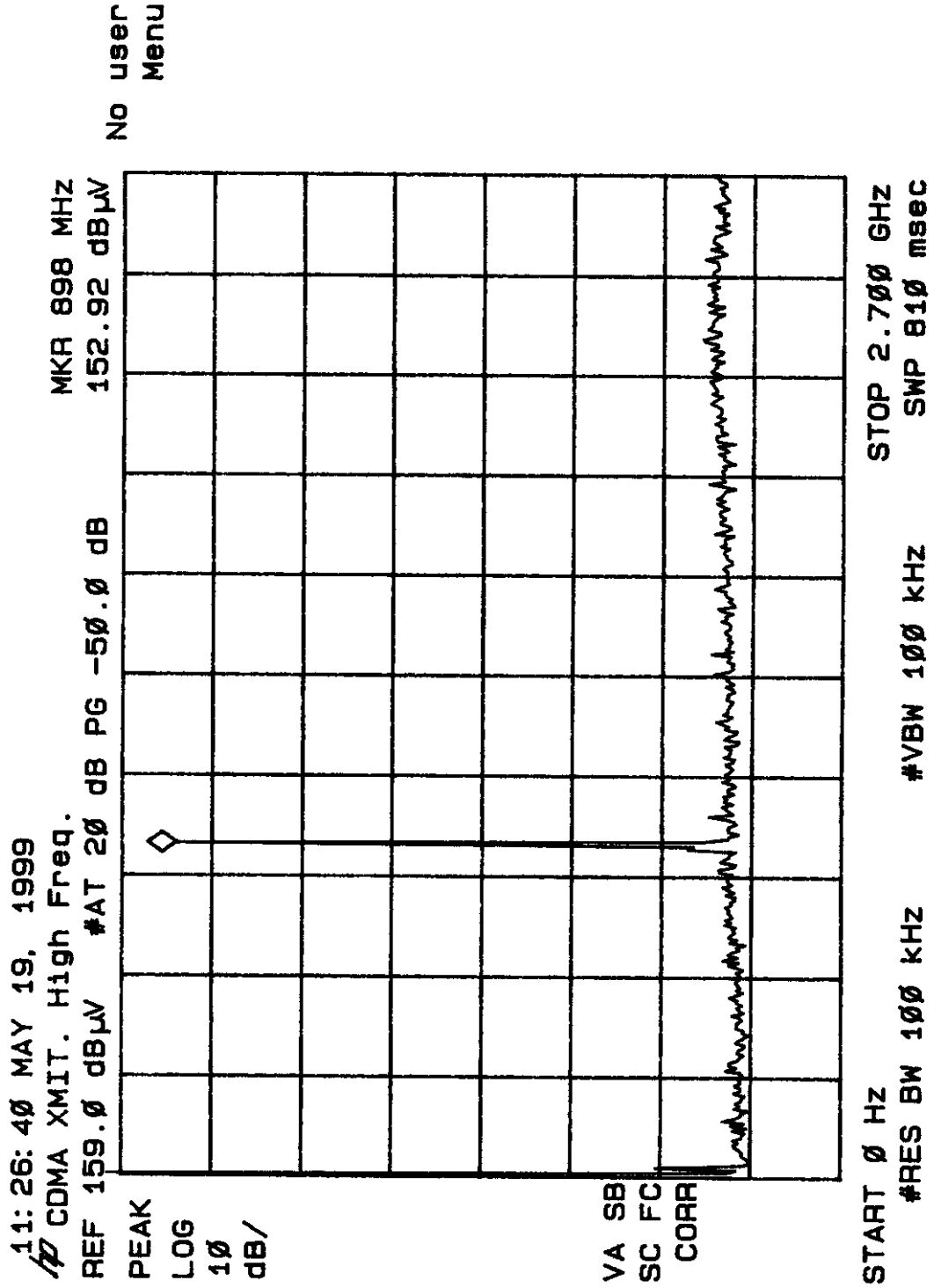
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Menu



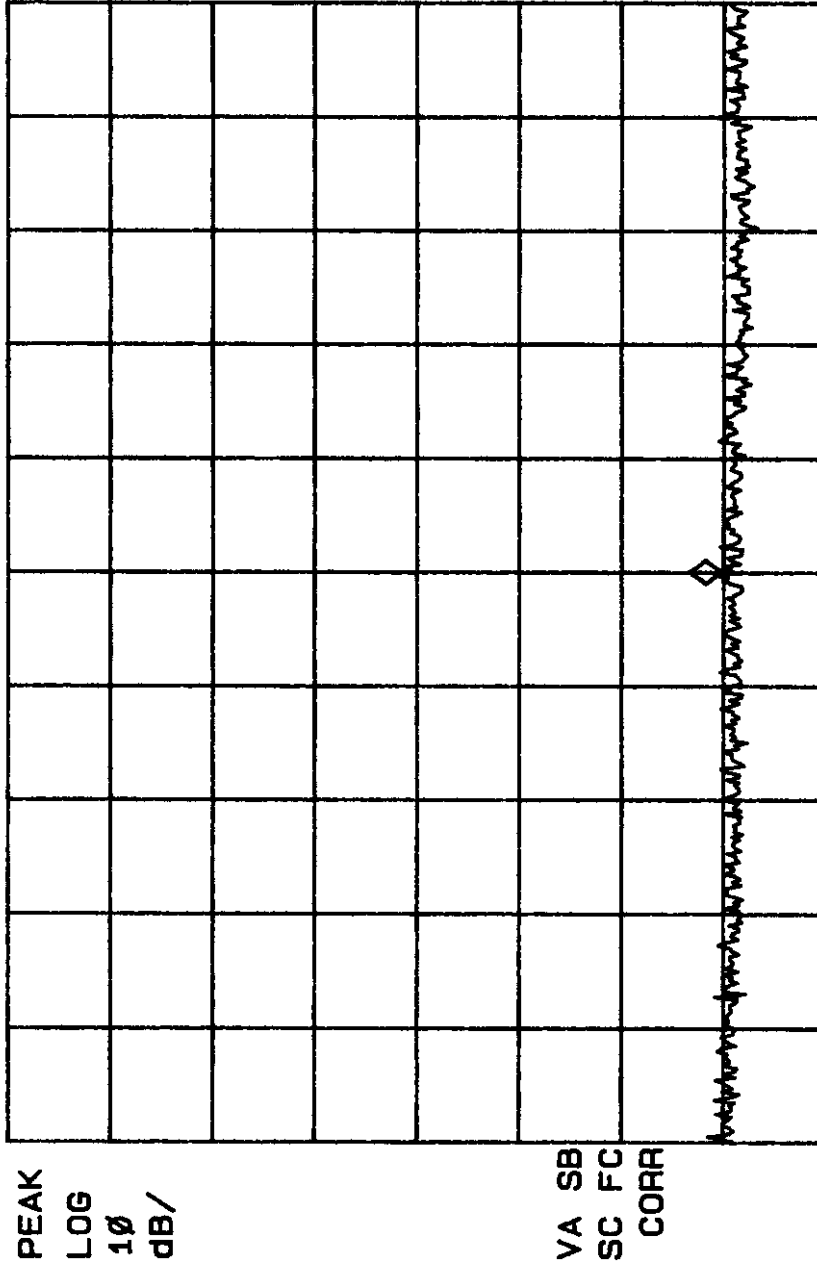
START 2.690 GHz #RES BW 100 KHZ STOP 6.200 GHz SWP 1.05 sec

11: 22: 59 MAY 19, 1999
 CDMA XMIT. Mid Freq.
 REF 147.0 dBμV #AT 0 dB PG -50.0 dB MKR 8.095 GHz
 No user Menu

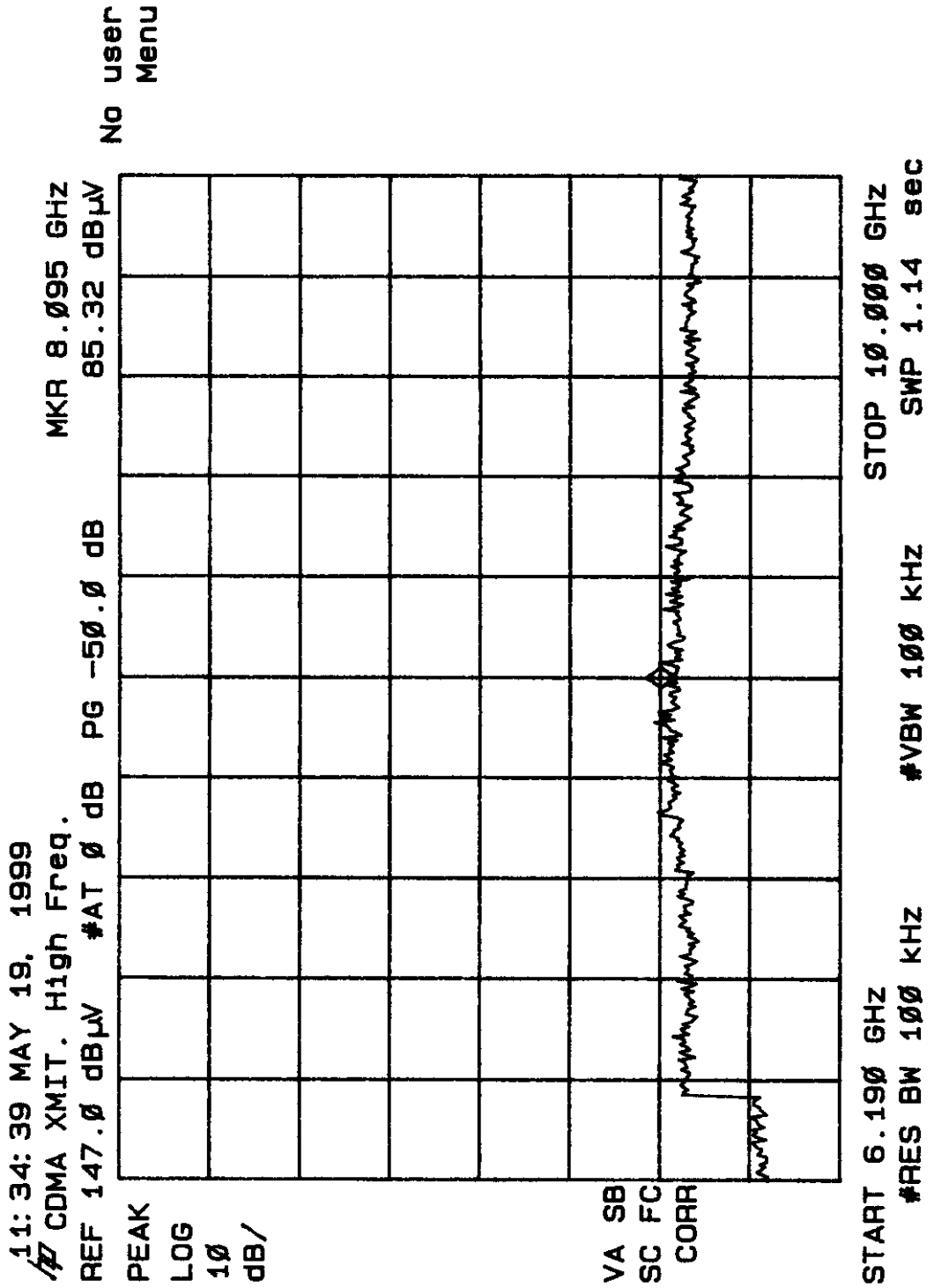


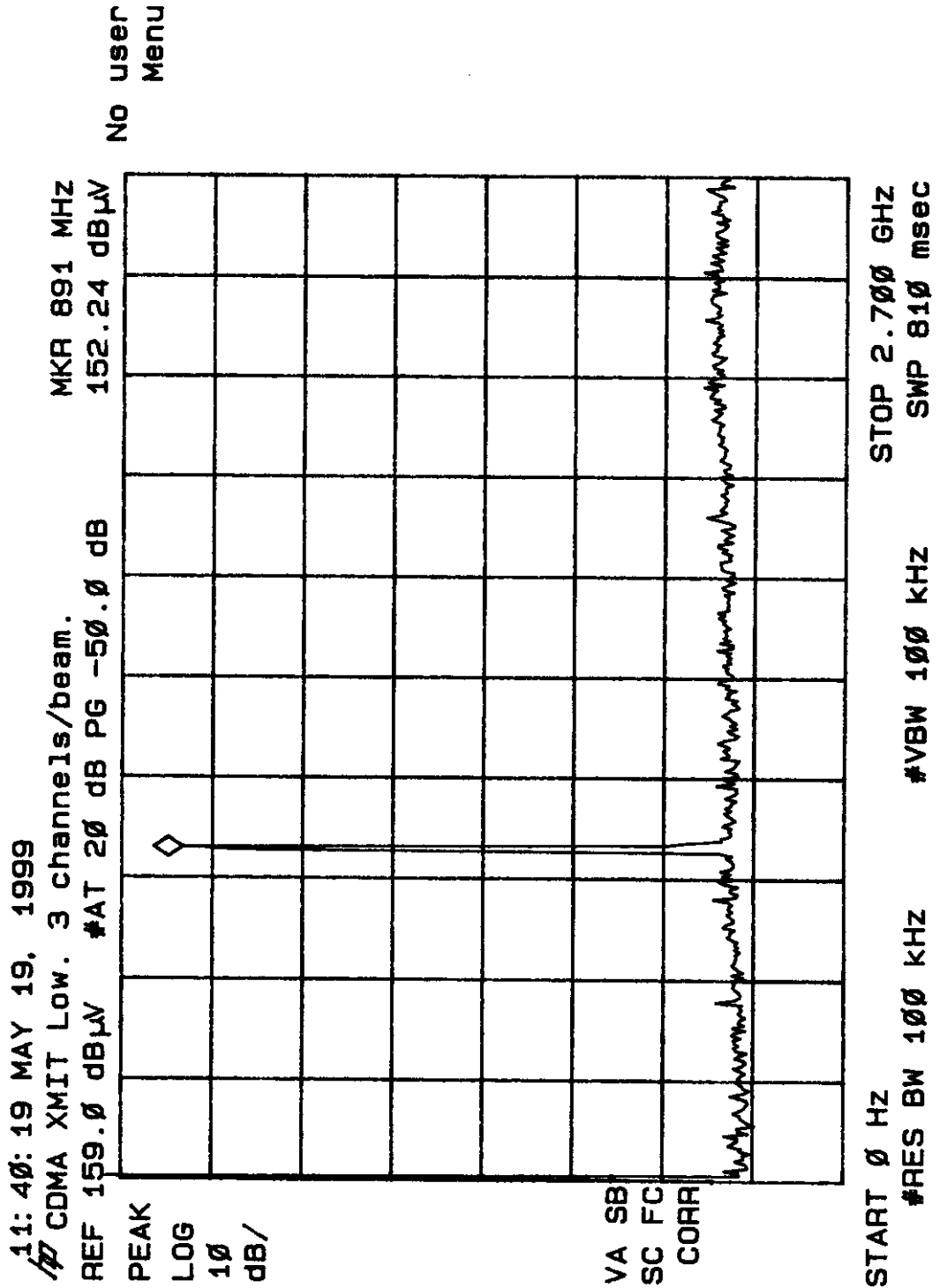


11:32:26 MAY 19, 1999
 / CDMA XMIT. High Freq.
 REF 157.0 dBμV #AT 10 dB PG -50.0 dB MKR 4.445 GHz 87.13 dBμV
 No user Menu



START 2.690 GHz #RES BW 100 KHz STOP 6.200 GHz #VBW 100 KHz SWP 1.05 sec





11:43:Ø1 MAY 19, 1999

CDMA XMIT Low. 3 channels/beam.

MKR 4.445 GHz

REF	157.0	dB μ V	#AT	10	dB	PG	-50.0	dB	86.80	dB μ V
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No user	Menu
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100	100

PEAK
LOG
10
dB/

VA SB
SC FC
CORR

START 2.690 GHZ
#RES BW 100 KHZ
#VBW 100 KHZ
STOP 6.200 GHZ
SWP 1.05 sec

11:45:22 MAY 19, 1999

CDMA XMIT Low. 3 channels/beam.

MKR 8.095 GHz

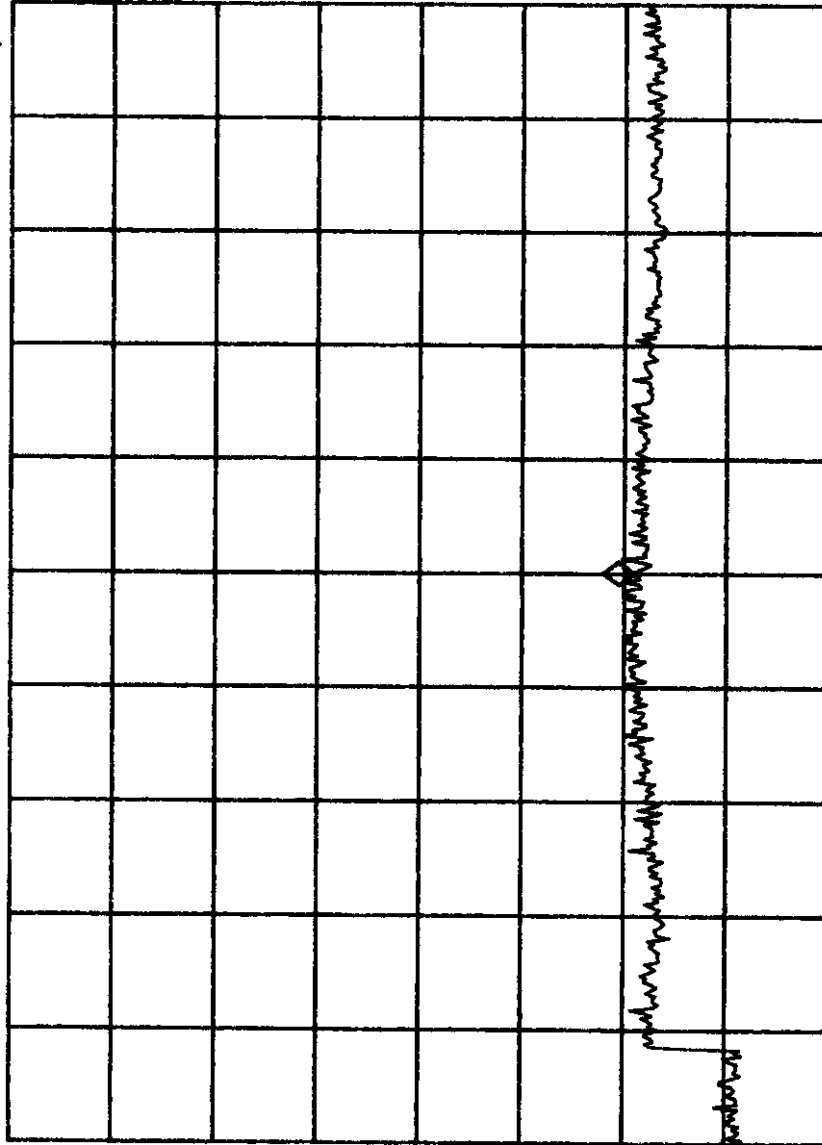
REF	147.0 dBμV	#AT	0 dB	PG	-50.0 dB	85.88 dBμV
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85.88 dBu

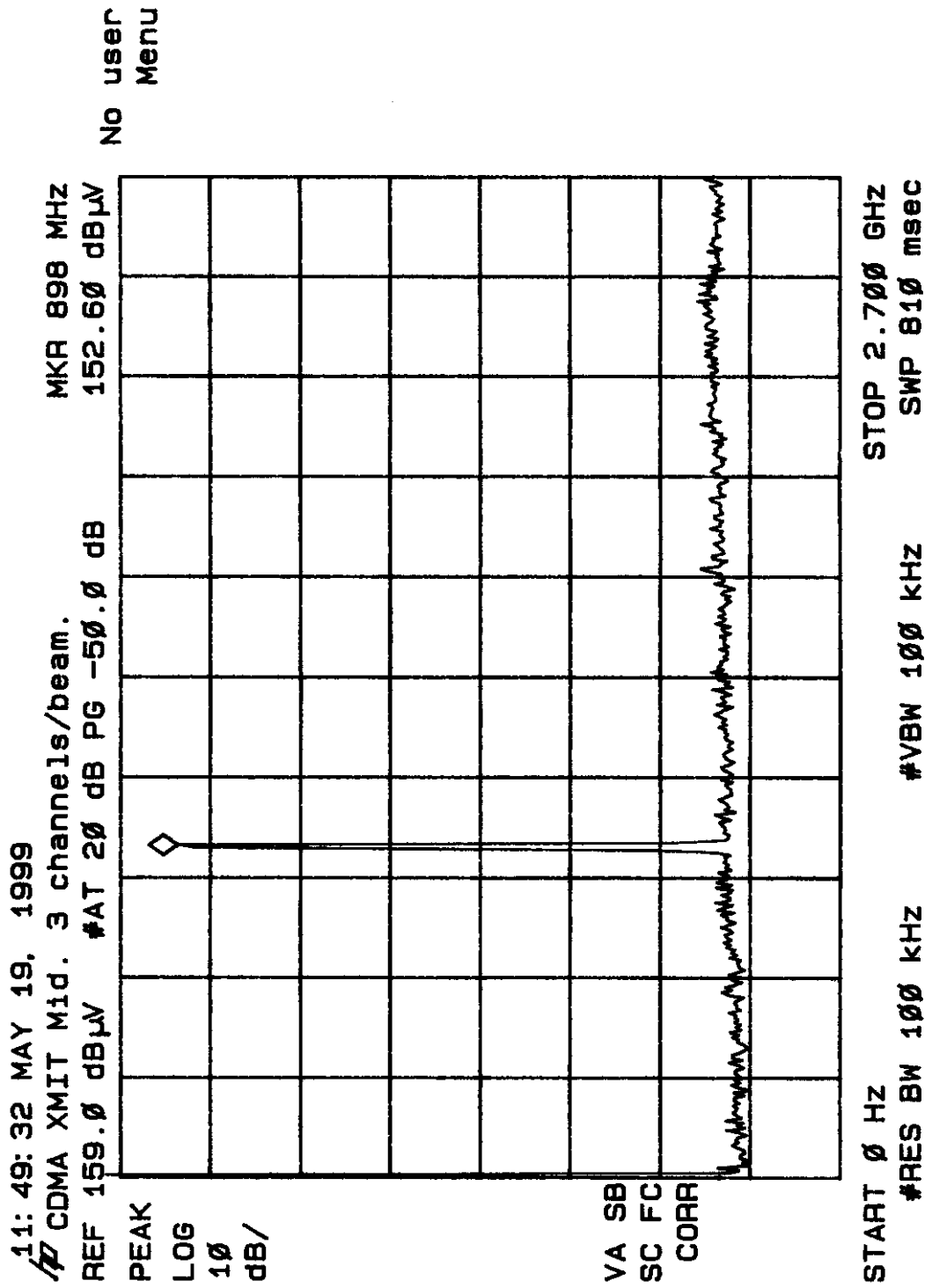
No user Menu

PEAK
LOG
1Ø
dB/

VA SB
SC FC
CORR



START 6.190 GHZ	STOP 10.000 GHZ
#RES BW 100 KHZ	#VBW 100 KHZ
	SWP 1.14 sec



11:53:30 MAY 19, 1999

~~CDMA~~ CDMA XMIT Mid. 3 channels/beam.

MKR 4.445 GHz

REF	157.0	dB μ V	#AT	10	dB	PG	-50.0	dB	86.94	dB μ V
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PEAK

LOG

10

18/

VA SB

33

COFF

START 2.690 GHZ

#RES BW 100 KHZ

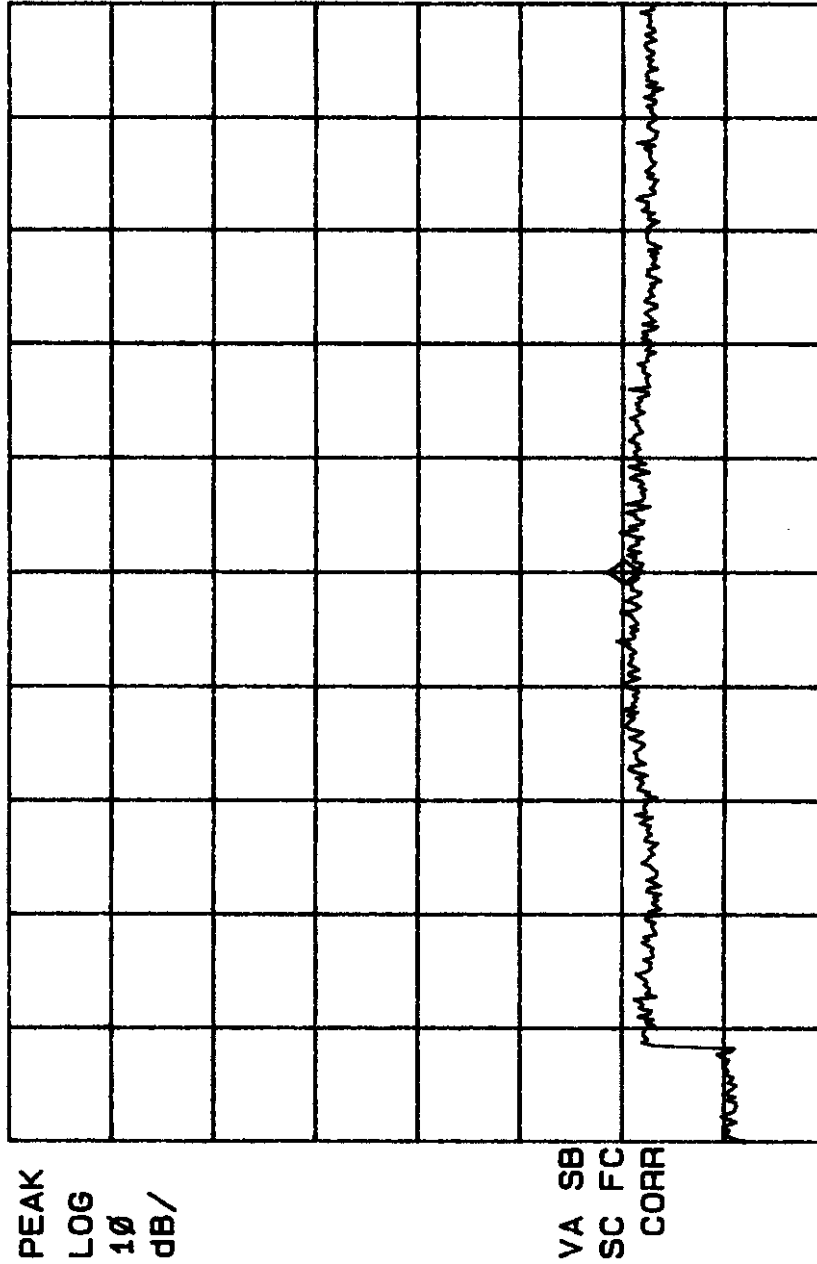
#VBW 100 KHZ

STOP 6.200 GHz

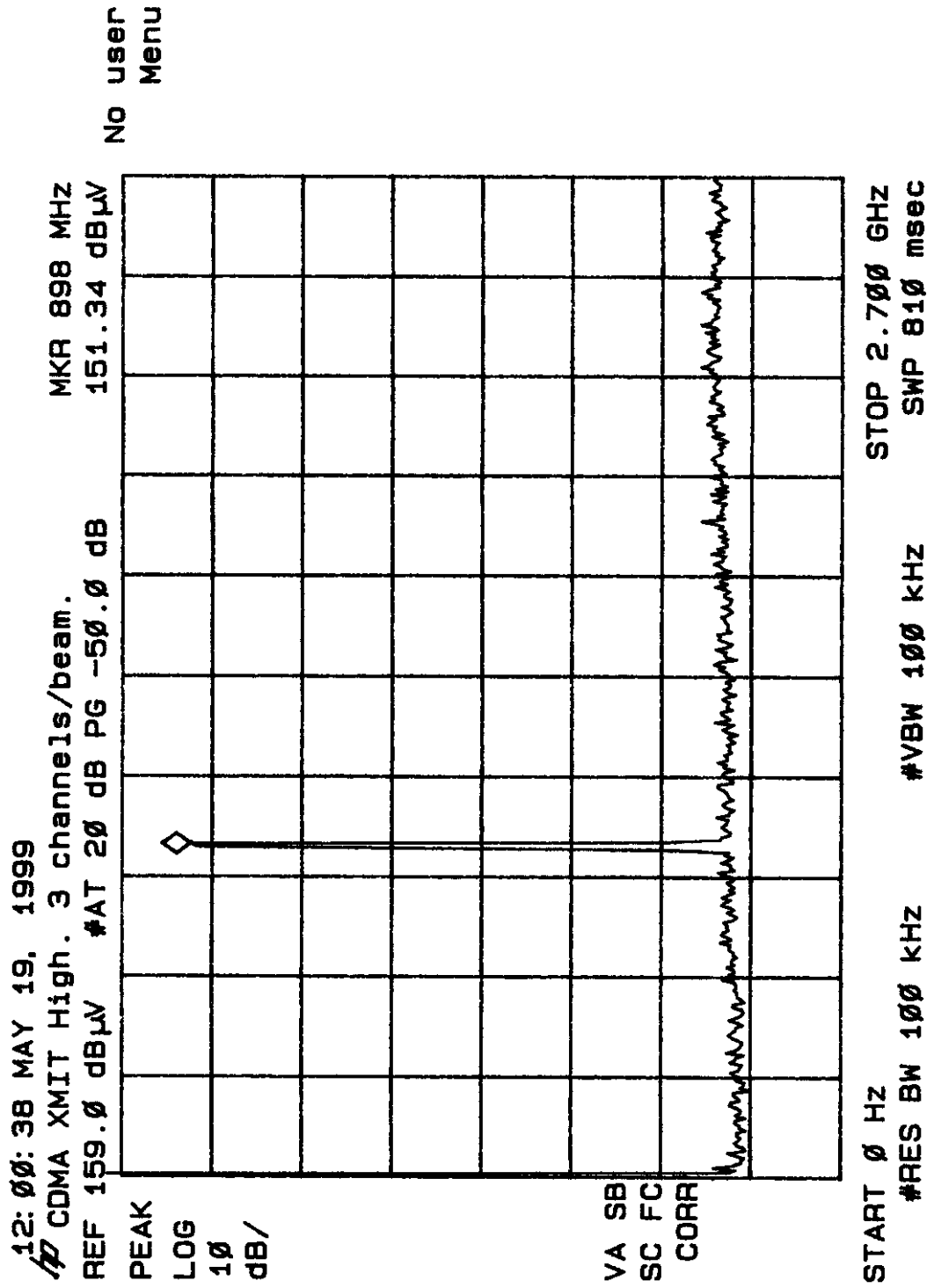
SWP 1.05 sec

No user Menu

11:56:49 MAY 19, 1999
 17 CDMA XMIT Mid. 3 channels/beam. MKR 8.095 GHz
 REF 147.0 dBμV #AT 0 dB PG -50.0 dB 85.24 dBμV
 No User
 Menu



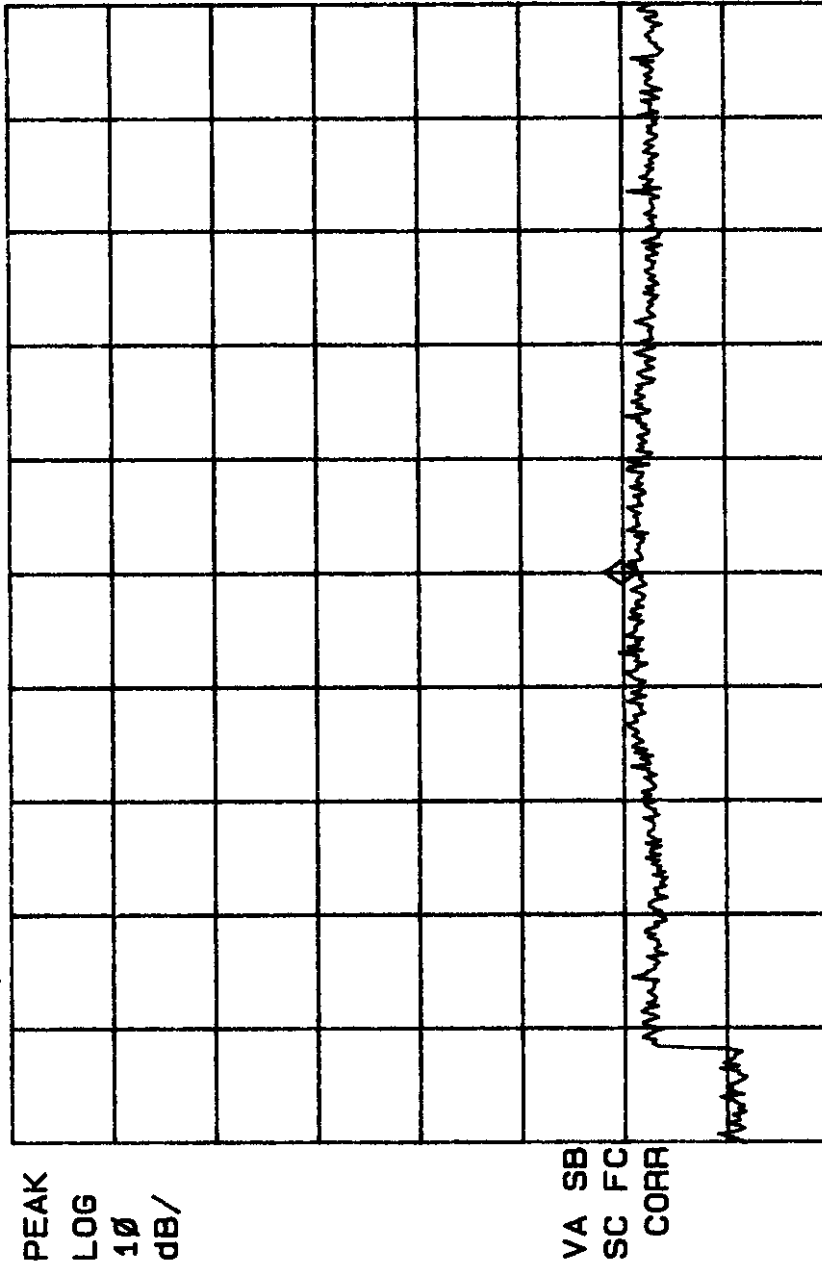
START 6.190 GHz #RES BW 100 KHZ STOP 6.195 GHz SWP 1.14 sec
 #VBW 100 KHZ



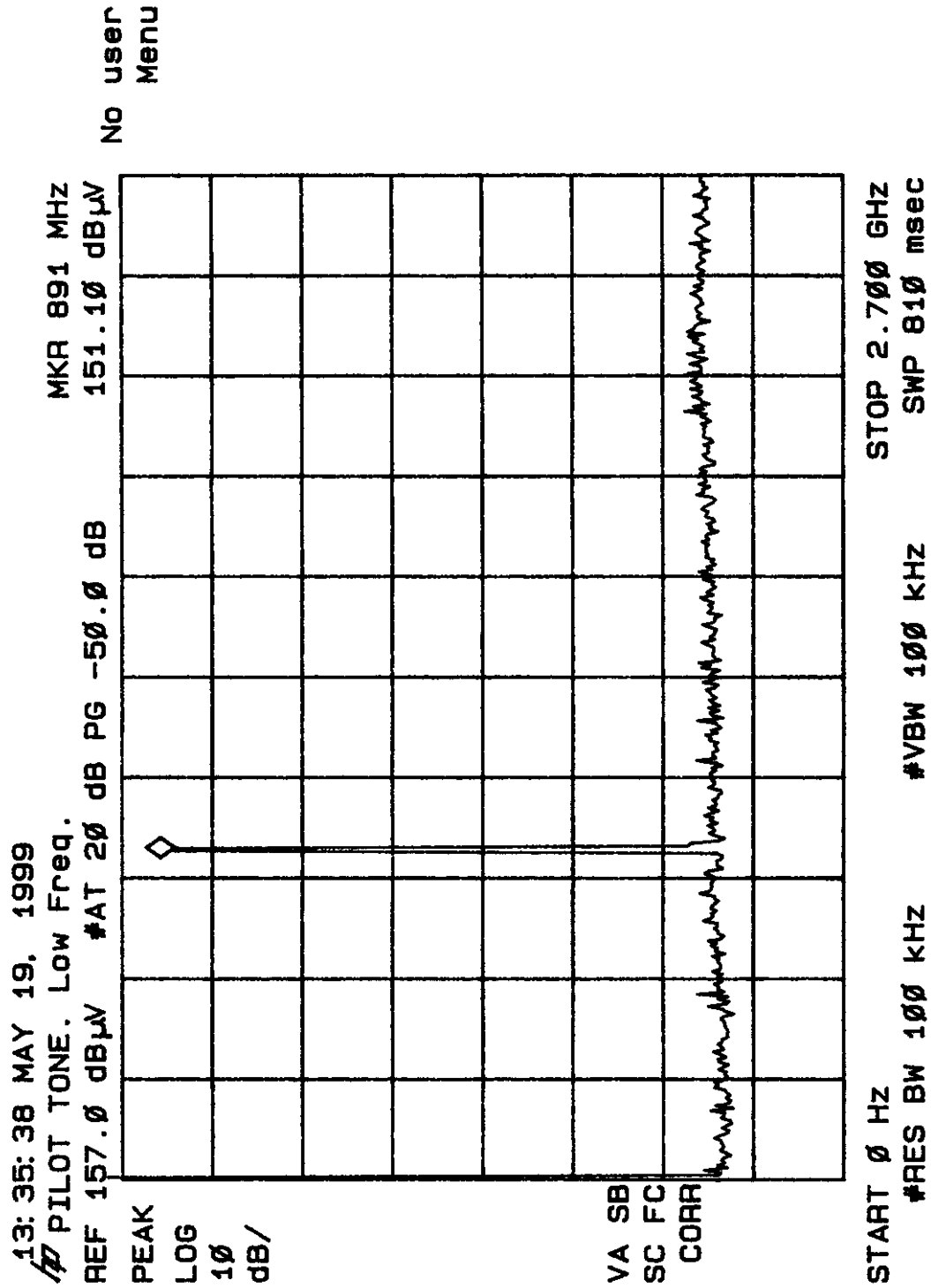
[illegible]

START 2.690 GHz	STOP 6.200 GHz
#RES BW 100 kHz	#VBW 100 kHz
	SWP 1.05 sec

12:05:16 MAY 19, 1999
 / CDMA XMIT High. 3 channels/beam. MKR 8.095 GHz
 REF 147.0 dBμV #AT 0 dB PG -50.0 dB 85.62 dBμV
 No user
 Menu



START 6.190 GHz #RES BW 100 KHZ STOP 10.000 GHz #VBW 100 KHZ SWP 1.14 sec



13:37:56 MAY 19, 1999

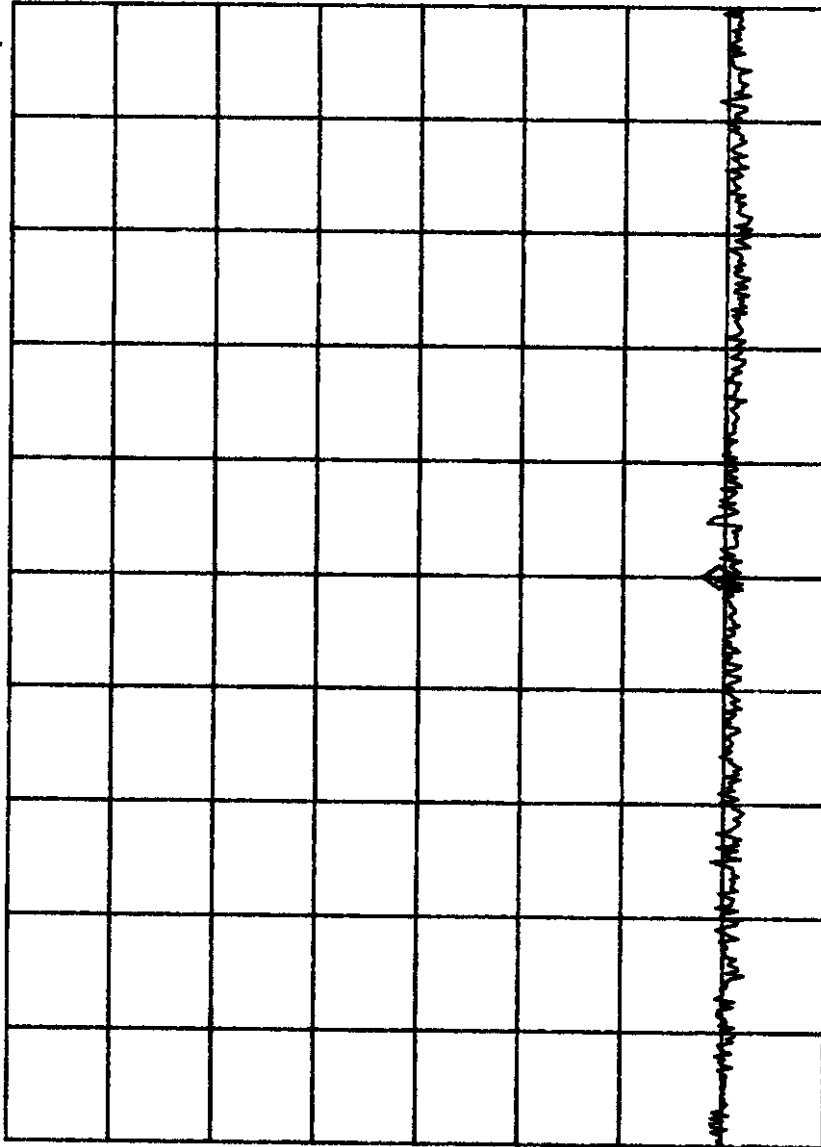
13. 37. 30 MAY 19, 1999
PILOT TONE. Low Freq.

REF 157.0 dBμV #AT 10 dB PG -50.0 dB MKR 4.445 GHz 85.96 dBμV

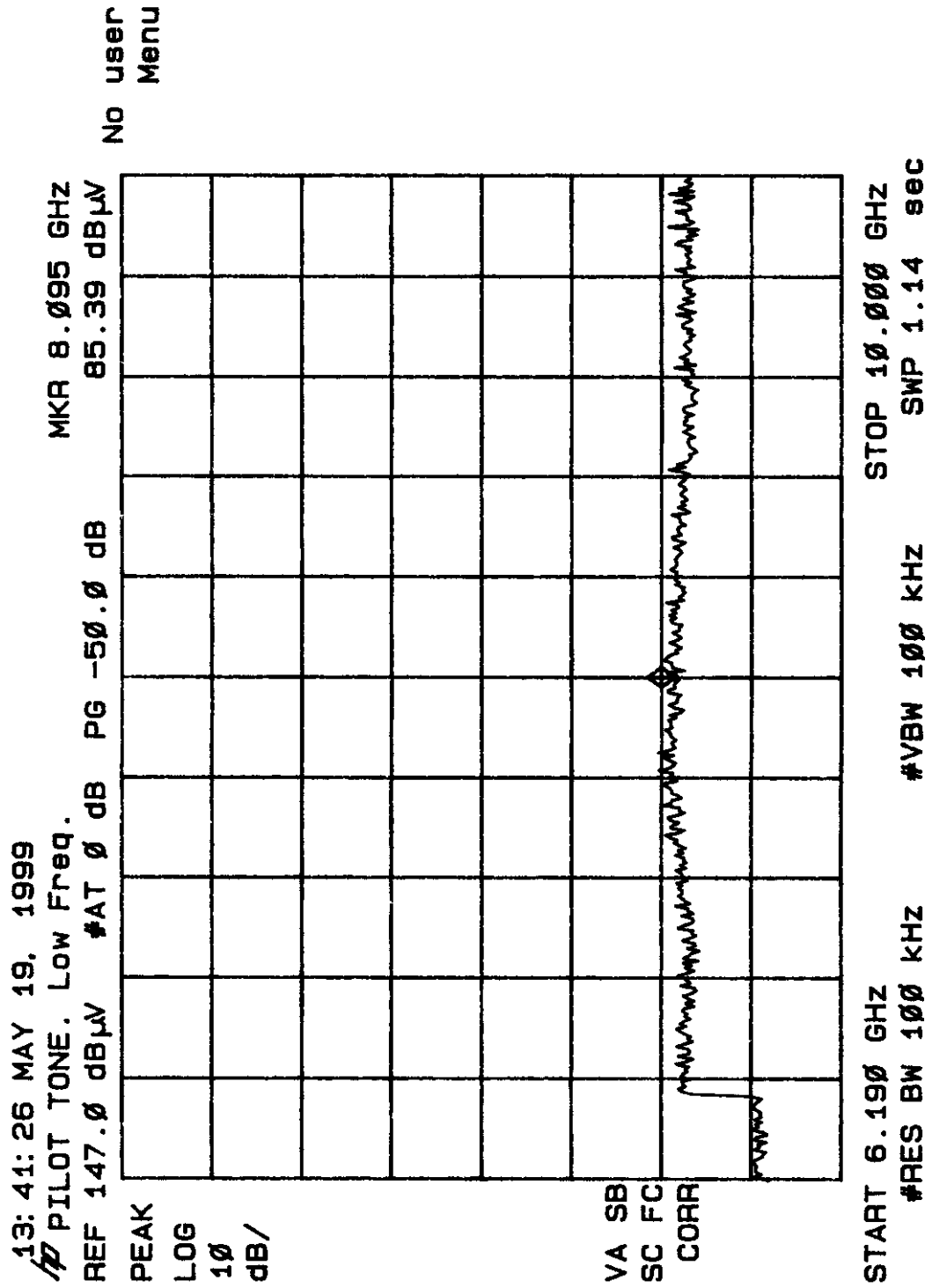
No user Menu

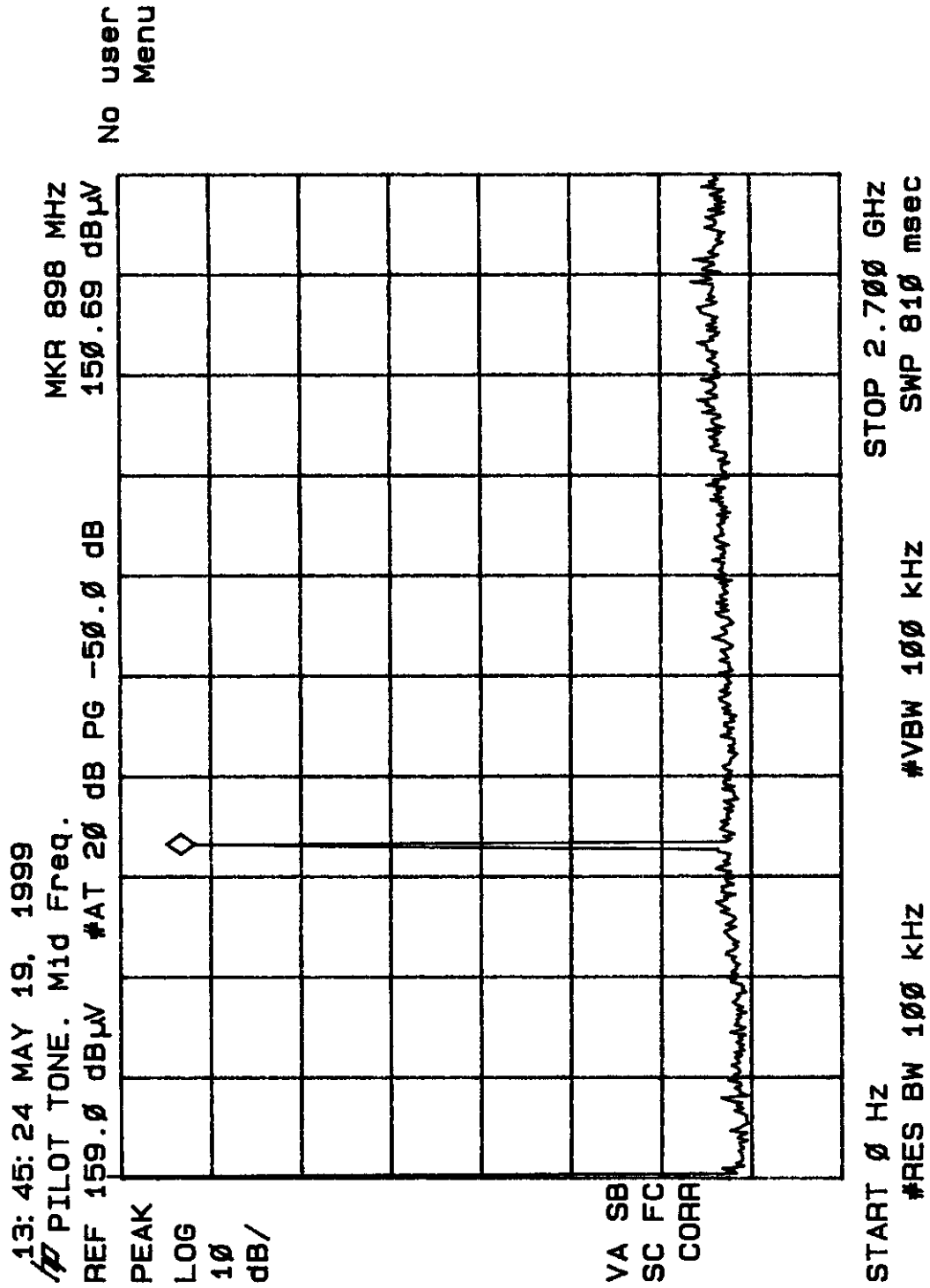
PEAK
LOG
10
dB/

VA SB
SC FC
CORR

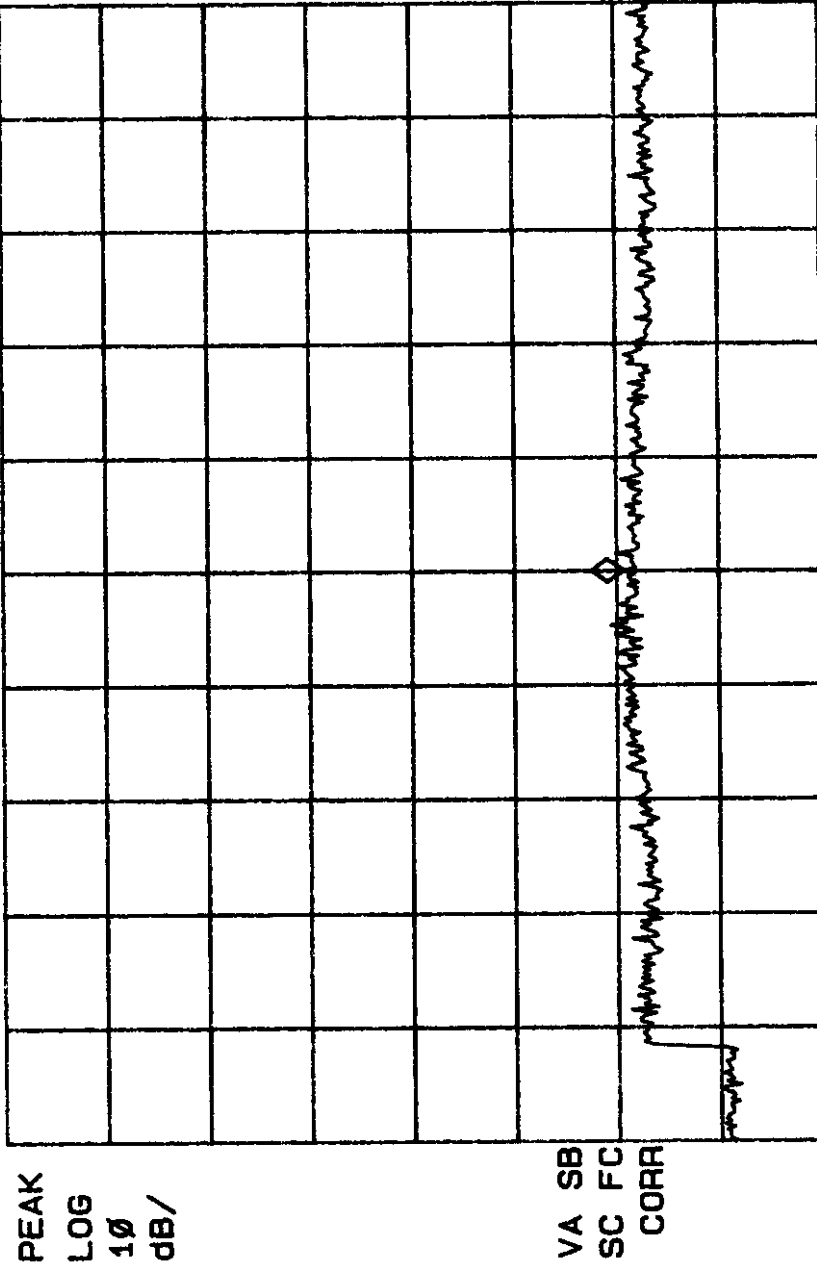


START 2.690 GHz	STOP 6.200 GHz
#RES BW 100 kHz	#VBW 100 kHz
	SWP 1.05 sec

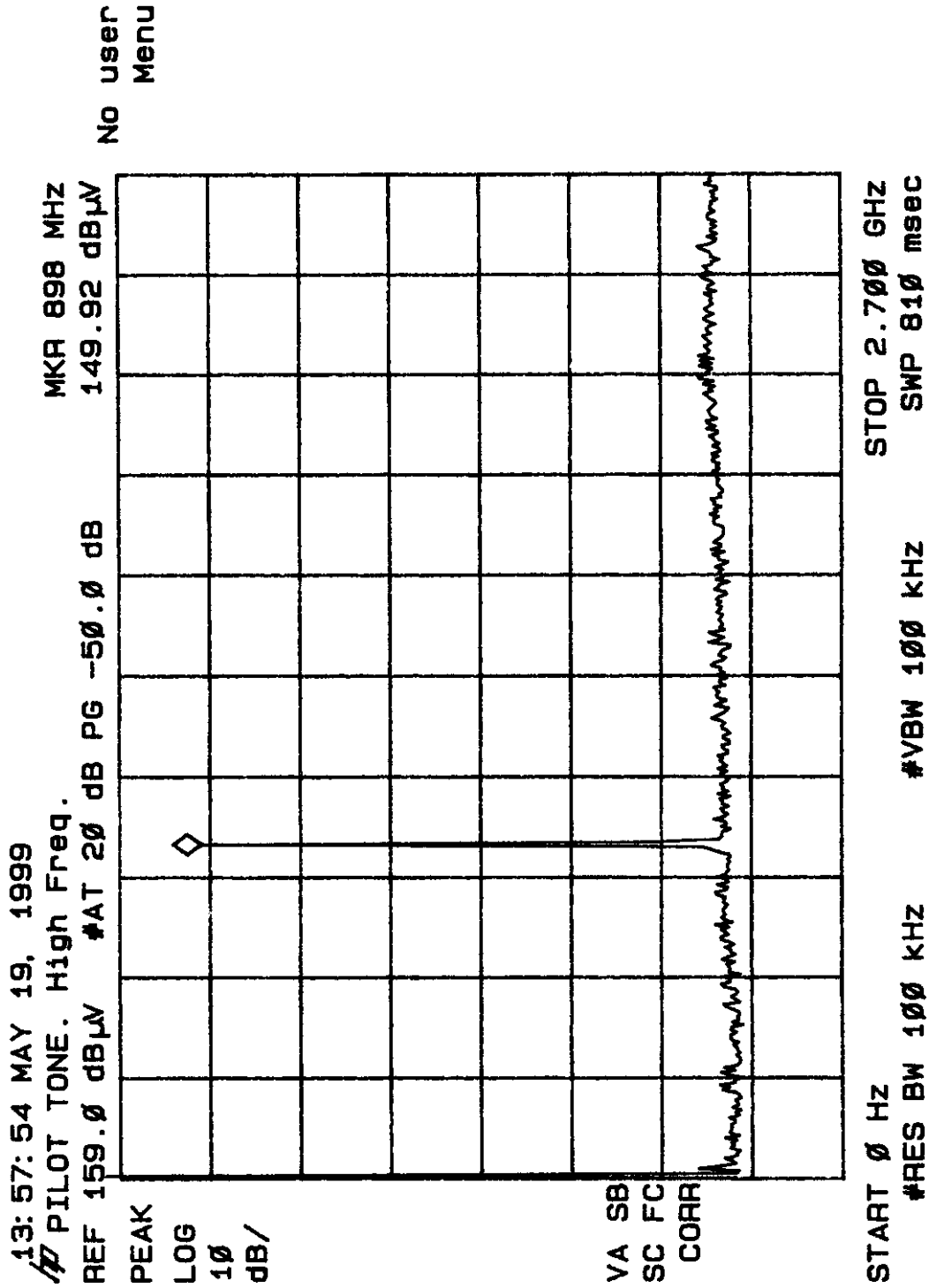




13:52:24 MAY 19, 1999
 / PILOT TONE. Mid Freq.
 REF 147.0 dBμV #AT 0 dB PG -50.0 dB MKR 8.095 GHz
 No user Menu
 86.30 dBμV



START 6.190 GHz #RES BW 100 KHz STOP 10.000 GHz SWP 1.14 sec
 #VBW 100 KHz



SWP 1.05 sec

14:02:32 MAY 19. 1999

~~NO~~ PILOT TONE. High Freq.

REF 147.0 dB μ V

#AT Ø dB PG -50.0 dB

MKR 8.095 GHz

85.37 dB μ V

No user Menu

PEAK

LOG

10

dB/

VA SB

CS
CF

CORR

START 6.190 GHZ

#RES BW 100 KHZ

#VBW 100 KHZ

STOP 10.000 GHZ

SWP 1.14 sec

5.0 Field Intensity Measurement of Spurious Radiation

Specification Para. 22.917(e)
 Equipment Authorization Procedure Para. 2.1053
 Measurement Frequency Range 30 MHz – 10 GHz
 TX Output Power 50W
 Limit -60 dB = 75.5 dBuV/m at 3 Meters
 Measurement Data See attached data sheets

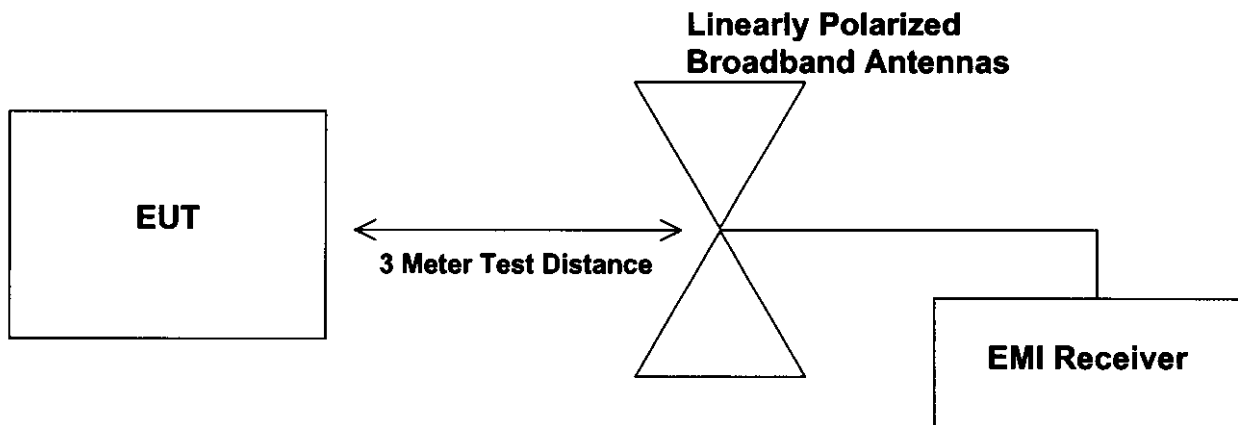
$$P_{app} = 50W/4\pi (3)^2 = .442 V/m^2 =$$

133.4	dBuV/m
+2.1	dB gain for dipole
135.5	dBuV/m
-60.0	dB
75.5	dBuV/m

5.1 Measurement Equipment

Instrument	Manufacturer / Model	Serial No.	Freq. Range	Last Cal	Cal Due
Spectrum Analyzer	HP 8593EM	3536A00134	9 kHz – 22 GHz	04/05/99	04/05/00
Spectrum Analyzer	Hewlett Packard 8567A	2718A00358	10 kHz – 1.5 GHz	04/28/99	04/28/00
Quasi-Peak Adapter	Hewlett Packard 85650A	2811A01175	10 kHz – 1.0 GHz	04/28/99	04/28/00
Pre-Amplifier	Amplifier Research LN1000A	24534	30 MHz – 1.0 GHz	02/12/99	02/12/00
Bicon Antenna	EMCO 3104C	4306	20 MHz – 200 MHz	12/29/98	12/29/99
Log Periodic Antenna	EMCO 3146	9610-4693	200MHz – 1.0 GHz	12/30/98	12/30/99
Pre-Amplifier	Miteq AMF-4D-005180-24-10	614304	1.0 GHz – 20 GHz	03/23/99	03/23/00
Horn Antenna	EMCO 3115	9710-5305	1.0 GHz – 18 GHz	05/08/99	05/08/00

5.2 Test Equipment Setup



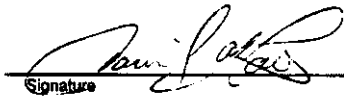
Northwest EMC, Inc.

Version 98.3, April, 1999
Freq. Sort

Equipment Tested: **Spotlight 2000**
 Serial Number: **See test plan**
 Manufacturer: **Metawave Communications**
 Job Number: **METW0019**
 Test Date: **05-18-1999**
 Tested By: **Dan Haas, TE02**
 Test Distance: **3 meters.**
 Comments: **AMPS/CDMA w/ pilot tone. Transmitting**

Field Strength of Spurious Emissions FCC 22.917(e) & 2.1053

Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Antenna Horizontal Vertical	Preamp Gain (dB)	Cable Loss (dB)	Adjusted Level (dBuV/m)	Spec Limit (dBuV/m)	Table Azimuth (degree)	Antenna Height (meters)	Compared (To Limit) (dB)
1766.881 Low freq.	61.7	AV	28.3	HHRN	33.0	4.9	61.9	75.5	17.0	1.8	-13.6
1766.881 Low freq.	73.8	PK	28.3	HHRN	33.0	4.9	73.9	75.5	17.0	1.8	-1.6
1766.881 Low freq.	73.2	PK	28.3	VHRN	33.0	4.9	73.4	75.5	188.0	1.9	-2.1
1766.881 Low freq.	62.3	AV	28.3	VHRN	33.0	4.9	62.5	75.5	188.0	1.9	-13.0
1775.750 Mid. freq.	73.6	PK	28.4	VHRN	33.0	4.9	73.9	75.5	206.0	1.8	-1.6
1775.750 Mid. freq.	60.6	AV	28.4	VHRN	33.0	4.9	60.9	75.5	206.0	1.8	-14.6
1775.750 Mid. freq.	69.6	PK	28.4	HHRN	33.0	4.9	69.9	75.5	287.0	1.6	-5.6
1775.750 Mid. freq.	58.4	AV	28.4	HHRN	33.0	4.9	58.7	75.5	287.0	1.6	-16.8
1782.100 High freq.	79.3	PK	28.4	HHRN	33.0	4.9	79.6	75.5	292.0	1.3	4.1
1782.100 High freq.	64.5	AV	28.4	VHRN	33.0	4.9	64.8	75.5	325.0	2.0	-10.7
1782.100 High freq.	66.6	AV	28.4	HHRN	33.0	4.9	66.9	75.5	292.0	1.3	-8.6
1782.100 High freq.	77.2	PK	28.4	VHRN	33.0	4.9	77.5	75.5	325.0	2.0	2.0


 Signature

 Temperature 75F 40% Humidity
 c:\nwsoft\data\METW0019\metw019b.ra

page 2

Northwest EMC, Inc.

Version 98.3, April, 1999
Freq. Sort

Equipment Tested: Spotlight 2000
 Serial Number: See test plan
 Manufacturer: Metawave Communications
 Job Number: METW0019
 Test Date: 05-18-1999
 Tested By: Dan Haas, TE02
 Test Distance: 3 meters.
 Comments: AMPS/CDMA w/ pilot tone. Transmitting

Field Strength of Spurious Emissions FCC 22.917(e) & 2.1053

Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Antenna Horizontal Vertical	Preamp Gain (dB)	Cable Loss (dB)	Adjusted Level (dBuV/m)	Spec Limit (dBuV/m)	Table Azimuth (degree)	Antenna Height (meters)	Compared (To Limit) (dB)
2646.930 Low freq.	41.2	AV	30.9	VHRN	32.7	5.9	45.3	75.5	216.0	2.0	-30.3
2646.930 Low freq.	56.1	PK	30.9	HHRN	32.7	5.9	60.2	75.5	333.0	2.0	-15.3
2646.930 Low freq.	43.5	AV	30.9	HHRN	32.7	5.9	47.6	75.5	333.0	2.0	-27.9
2646.930 Low freq.	58.2	PK	30.9	VHRN	32.7	5.9	62.3	75.5	216.0	2.0	-13.2
2662.600 Mid. freq.	39.7	AV	31.0	VHRN	32.7	5.9	43.9	75.5	217.0	1.2	-31.6
2662.600 Mid. freq.	58.0	PK	31.0	HHRN	32.7	5.9	62.2	75.5	356.0	2.0	-13.3
2662.600 Mid. freq.	57.8	PK	31.0	VHRN	32.7	5.9	62.0	75.5	217.0	1.2	-13.5
2662.600 Mid. freq.	41.5	AV	31.0	HHRN	32.7	5.9	45.7	75.5	356.0	2.0	-29.8
2673.500 High freq.	61.5	PK	31.0	HHRN	32.7	5.9	65.7	75.5	291.0	2.2	-9.8
2673.500 High freq.	54.4	PK	31.0	VHRN	32.7	5.9	58.6	75.5	230.0	1.0	-16.9
2673.500 High freq.	42.2	AV	31.0	VHRN	32.7	5.9	46.4	75.5	230.0	1.0	-29.1
2673.500 High freq.	42.4	AV	31.0	HHRN	32.7	5.9	46.6	75.5	291.0	2.2	-28.9


 Signature

 Temperature 75F 40% Humidity
 c:\nwoats\data\METW0019\metw019b.ra

page 3

Northwest EMC, Inc.

Version 98.3, April, 1999
Freq. Sort

Equipment Tested: Spotlight 2000
Serial Number: See test plan
Manufacturer: Metawave Communications
Job Number: METW0019
Test Date: 05-18-1999
Tested By: Dan Haas, TE02
Test Distance: 3 meters.
Comments: AMPS/CDMA w/ pilot tone. Transmitting

Field Strength of Spurious Emissions FCC 22.917(e) & 2.1053

Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Antenna Horizontal Vertical	Preamp Gain (dB)	Cable Loss (dB)	Adjusted Level (dBuV/m)	Spec Limit (dBuV/m)	Table Azimuth (degree)	Antenna Height (meters)	Compared (To Limit) (dB)
3528.080 Low freq.	40.5	AV	33.2	HHRN	32.9	6.8	47.6	75.5	322.0	1.5	-27.9
3528.080 Low freq.	51.1	PK	33.2	VHRN	32.9	6.8	58.2	75.5	33.0	1.5	-17.3
3528.080 Low freq.	56.2	PK	33.2	HHRN	32.9	6.8	63.3	75.5	322.0	1.5	-12.2
3528.080 Low freq.	38.3	AV	33.2	VHRN	32.9	6.8	45.4	75.5	33.0	1.5	-30.1
3550.900 Mid. freq.	47.8	PK	33.2	HHRN	32.9	6.8	54.9	75.5	288.0	2.0	-20.6
3550.900 Mid. freq.	33.0	AV	33.2	HHRN	32.9	6.8	40.1	75.5	288.0	2.0	-35.4
3550.900 Mid. freq.	50.4	PK	33.2	VHRN	32.9	6.8	57.5	75.5	312.0	1.1	-18.0
3550.900 Mid. freq.	35.5	AV	33.2	VHRN	32.9	6.8	42.6	75.5	312.0	1.1	-32.9
3563.450 High freq.	31.5	AV	33.2	VHRN	32.9	6.8	38.6	75.5	157.0	2.1	-36.9
3563.450 High freq.	32.9	AV	33.2	HHRN	32.9	6.8	40.0	75.5	336.0	2.3	-35.5
3563.450 High freq.	46.5	PK	33.2	VHRN	32.9	6.8	53.6	75.5	157.0	2.1	-21.9
3563.450 High freq.	48.8	PK	33.2	HHRN	32.9	6.8	55.9	75.5	336.0	2.3	-19.6


 Signature

 Temperature 75F 40% Humidity
 c:\nwsoft\data\METW0019\metw019b.ra

page 4

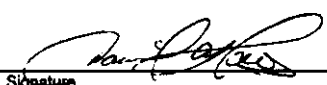
Northwest EMC, Inc.

Version 98.3, April, 1999
Freq. Sort

Equipment Tested: Spotlight 2000
Serial Number: See test plan
Manufacturer: Metawave Communications
Job Number: METW0019
Test Date: 05-18-1999
Tested By: Dan Haas, TE02
Test Distance: 3 meters.
Comments: AMPS/CDMA w/ pilot tone. Transmitting

Field Strength of Spurious Emissions FCC 22.917(e) & 2.1053

Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Antenna Horizontal Vertical	Preamp Gain (dB)	Cable Loss (dB)	Adjusted Level (dBuV/m)	Spec Limit (dBuV/m)	Table Azimuth (degree)	Antenna Height (meters)	Compared (To Limit) (dB)
4411.680 Low freq.	31.3	AV	34.5	VHRN	33.3	8.0	40.5	75.5	228.0	1.8	-35.0
4411.680 Low freq.	49.7	PK	34.5	HHRN	33.3	8.0	58.9	75.5	342.0	1.0	-16.6
4411.680 Low freq.	43.7	PK	34.5	VHRN	33.3	8.0	52.9	75.5	228.0	1.8	-22.6
4411.680 Low freq.	34.7	AV	34.5	HHRN	33.3	8.0	43.9	75.5	342.0	1.0	-31.6
4442.350 Mid. freq.	45.2	PK	34.5	HHRN	33.3	8.0	54.4	75.5	147.0	2.0	-21.1
4442.350 Mid. freq.	31.9	AV	34.5	VHRN	33.3	8.0	41.1	75.5	221.0	2.0	-34.4
4442.350 Mid. freq.	31.4	AV	34.5	HHRN	33.3	8.0	40.6	75.5	147.0	2.0	-34.9
4442.350 Mid. freq.	45.6	PK	34.5	VHRN	33.3	8.0	54.8	75.5	221.0	2.0	-20.7
4457.950 High freq.	37.1	AV	34.6	HHRN	33.3	8.1	46.5	75.5	237.0	1.1	-29.0
4457.950 High freq.	50.9	PK	34.6	HHRN	33.3	8.1	60.3	75.5	237.0	1.1	-15.2
4457.950 High freq.	36.9	AV	34.6	VHRN	33.3	8.1	46.3	75.5	202.0	2.2	-29.2
4457.950 High freq.	52.6	PK	34.6	VHRN	33.3	8.1	62.0	75.5	202.0	2.2	-13.5


 Signature

 Temperature 75F 40% Humidity
 c:\nwcoats\data\METW0019\metw019b.ra

page 5

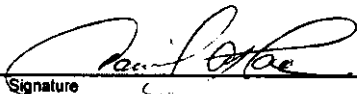
Northwest EMC, Inc.

Version 98.3, April, 1999
Freq. Sort

Equipment Tested: Spotlight 2000
 Serial Number: See test plan
 Manufacturer: Metawave Communications
 Job Number: METW0019
 Test Date: 05-18-1999
 Tested By: Dan Haas, TE02
 Test Distance: 3 meters.
 Comments: AMPS/CDMA w/ pilot tone. Transmitting

Field Strength of Spurious Emissions FCC 22.917(e) & 2.1053

Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Antenna Horizontal Vertical	Preamp Gain (dB)	Cable Loss (dB)	Adjusted Level (dBuV/m)	Spec Limit (dBuV/m)	Table Azimuth (degree)	Antenna Height (meters)	Compared (To Limit) (dB)
5292.330 Low freq.	47.6	PK	36.3	HHRN	33.8	8.5	58.6	75.5	166.0	1.8	-16.9
5292.330 Low freq.	33.1	AV	36.3	HHRN	33.8	8.5	44.1	75.5	166.0	1.8	-31.4
5292.330 Low freq.	48.5	PK	36.3	VHRN	33.8	8.5	59.5	75.5	214.0	1.0	-16.0
5292.330 Low freq.	35.0	AV	36.3	VHRN	33.8	8.5	46.0	75.5	214.0	1.0	-29.5
5327.700 Mid. freq.	31.8	AV	36.3	VHRN	33.8	8.5	42.8	75.5	257.0	2.0	-32.7
5327.700 Mid. freq.	47.5	PK	36.3	HHRN	33.8	8.5	58.5	75.5	300.0	1.4	-17.0
5327.700 Mid. freq.	32.8	AV	36.3	HHRN	33.8	8.5	43.8	75.5	300.0	1.4	-31.7
5327.700 Mid. freq.	46.5	PK	36.3	VHRN	33.8	8.5	57.5	75.5	257.0	2.0	-18.0
5348.100 High freq.	35.6	AV	36.3	VHRN	33.8	8.5	46.6	75.5	224.0	1.8	-28.9
5348.100 High freq.	52.4	PK	36.3	HHRN	33.8	8.5	63.4	75.5	231.0	2.1	-12.1
5348.100 High freq.	37.2	AV	36.3	HHRN	33.8	8.5	48.2	75.5	231.0	2.1	-27.3
5348.100 High freq.	50.0	PK	36.3	VHRN	33.8	8.5	61.0	75.5	224.0	1.8	-14.5



Signature

Temperature 75F 40% Humidity
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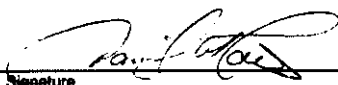
Northwest EMC, Inc.

Version 98.3, April, 1999
Margin Sort

Equipment Tested: Spotlight 2000
 Serial Number: See test plan
 Manufacturer: Metawave Communications
 Job Number: METW0019
 Test Date: 05-18-1999
 Tested By: Dan Haas, TE02
 Test Distance: 3 meters.
 Comments: AMPS/CDMA w/ pilot tone. Transmitting

Field Strength of Spurious Emissions FCC 22.917(e) & 2.1053

Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Antenna Horizontal Vertical	Preamplifier Gain (dB)	Cable Loss (dB)	Adjusted Level (dBuV/m)	Spec Limit (dBuV/m)	Table Azimuth (degree)	Antenna Height (meters)	Compared (To Limit) (dB)
1782.100 High freq.	79.3	PK	28.4	HHRN	33.0	4.9	79.6	75.5	292.0	1.3	4.1
1782.100 High freq.	77.2	PK	28.4	VHRN	33.0	4.9	77.5	75.5	325.0	2.0	2.0
1766.881 Low freq.	73.8	PK	28.3	HHRN	33.0	4.9	73.9	75.5	17.0	1.8	-1.6
1775.750 Mid. freq.	73.6	PK	28.4	VHRN	33.0	4.9	73.9	75.5	206.0	1.8	-1.6
1766.881 Low freq.	73.2	PK	28.3	VHRN	33.0	4.9	73.4	75.5	188.0	1.9	-2.1
1775.750 Mid. freq.	69.6	PK	28.4	HHRN	33.0	4.9	69.9	75.5	287.0	1.6	-5.6
1782.100 High freq.	66.6	AV	28.4	HHRN	33.0	4.9	66.9	75.5	292.0	1.3	-8.6
2673.500 High freq.	61.5	PK	31.0	HHRN	32.7	5.9	65.7	75.5	291.0	2.2	-9.8
1782.100 High freq.	64.5	AV	28.4	VHRN	33.0	4.9	64.8	75.5	325.0	2.0	-10.7
5348.100 High freq.	52.4	PK	36.3	HHRN	33.8	8.5	63.4	75.5	231.0	2.1	-12.1
3528.080 Low freq.	56.2	PK	33.2	HHRN	32.9	6.8	63.3	75.5	322.0	1.5	-12.2
1766.881 Low freq.	62.3	AV	28.3	VHRN	33.0	4.9	62.5	75.5	188.0	1.9	-13.0


 Signature

 Temperature 75F 40% Humidity
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page 2

Northwest EMC, Inc.

Version 98.3, April, 1999
Margin Sort

Equipment Tested: Spotlight 2000
 Serial Number: See test plan
 Manufacturer: Metawave Communications
 Job Number: METW0019
 Test Date: 05-18-1999
 Tested By: Dan Haas, TE02
 Test Distance: 3 meters.
 Comments: AMPS/CDMA w/ pilot tone. Transmitting

Field Strength of Spurious Emissions FCC 22.917(e) & 2.1053

Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Antenna Horizontal Vertical	Preamplifier Gain (dB)	Cable Loss (dB)	Adjusted Level (dBuV/m)	Spec Limit (dBuV/m)	Table Azimuth (degree)	Antenna Height (meters)	Compared (To Limit) (dB)
2646.930 Low freq.	58.2	PK	30.9	VHRN	32.7	5.9	62.3	75.5	216.0	2.0	-13.2
2662.600 Mid. freq.	58.0	PK	31.0	HHRN	32.7	5.9	62.2	75.5	356.0	2.0	-13.3
4457.950 High freq.	52.6	PK	34.6	VHRN	33.3	8.1	62.0	75.5	202.0	2.2	-13.5
2662.600 Mid. freq.	57.8	PK	31.0	VHRN	32.7	5.9	62.0	75.5	217.0	1.2	-13.5
1766.881 Low freq.	61.7	AV	28.3	HHRN	33.0	4.9	61.9	75.5	17.0	1.8	-13.6
5348.100 High freq.	50.0	PK	36.3	VHRN	33.8	8.5	61.0	75.5	224.0	1.8	-14.5
1775.750 Mid. freq.	60.6	AV	28.4	VHRN	33.0	4.9	60.9	75.5	206.0	1.8	-14.6
4457.950 High freq.	50.9	PK	34.6	HHRN	33.3	8.1	60.3	75.5	237.0	1.1	-15.2
2646.930 Low freq.	56.1	PK	30.9	HHRN	32.7	5.9	60.2	75.5	333.0	2.0	-15.3
5292.330 Low freq.	48.5	PK	36.3	VHRN	33.8	8.5	59.5	75.5	214.0	1.0	-16.0
4411.680 Low freq.	49.7	PK	34.5	HHRN	33.3	8.0	58.9	75.5	342.0	1.0	-16.6
1775.750 Mid. freq.	58.4	AV	28.4	HHRN	33.0	4.9	58.7	75.5	287.0	1.6	-16.8


 Signature

 Temperature 75F 40% Humidity
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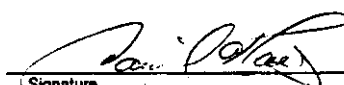
page 3

Northwest EMC, Inc.Version 98.3, April, 1999
Margin Sort

Equipment Tested: Spotlight 2000
Serial Number: See test plan
Manufacturer: Metawave Communications
Job Number: METW0019
Test Date: 05-18-1999
Tested By: Dan Haas, TE02
Test Distance: 3 meters.
Comments: AMPS/CDMA w/ pilot tone. Transmitting

Field Strength of Spurious Emissions FCC 22.917(e) & 2.1053

Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Antenna Horizontal Vertical	Preamp Gain (dB)	Cable Loss (dB)	Adjusted Level (dBuV/m)	Spec Limit (dBuV/m)	Table Azimuth (degree)	Antenna Height (meters)	Compared (To Limit) (dB)
2673.500 High freq.	54.4	PK	31.0	VHRN	32.7	5.9	58.6	75.5	230.0	1.0	-16.9
5292.330 Low freq.	47.6	PK	36.3	HHRN	33.8	8.5	58.6	75.5	166.0	1.8	-16.9
5327.700 Mid. freq.	47.5	PK	36.3	HHRN	33.8	8.5	58.5	75.5	300.0	1.4	-17.0
3528.080 Low freq.	51.1	PK	33.2	VHRN	32.9	6.8	58.2	75.5	33.0	1.5	-17.3
3550.900 Mid. freq.	50.4	PK	33.2	VHRN	32.9	6.8	57.5	75.5	312.0	1.1	-18.0
5327.700 Mid. freq.	46.5	PK	36.3	VHRN	33.8	8.5	57.5	75.5	257.0	2.0	-18.0
3563.450 High freq.	48.8	PK	33.2	HHRN	32.9	6.8	55.9	75.5	336.0	2.3	-19.6
3550.900 Mid. freq.	47.8	PK	33.2	HHRN	32.9	6.8	54.9	75.5	288.0	2.0	-20.6
4442.350 Mid. freq.	45.6	PK	34.5	VHRN	33.3	8.0	54.8	75.5	221.0	2.0	-20.7
4442.350 Mid. freq.	45.2	PK	34.5	HHRN	33.3	8.0	54.4	75.5	147.0	2.0	-21.1
3563.450 High freq.	46.5	PK	33.2	VHRN	32.9	6.8	53.6	75.5	157.0	2.1	-21.9
4411.680 Low freq.	43.7	PK	34.5	VHRN	33.3	8.0	52.9	75.5	228.0	1.8	-22.6


 Signature

 Temperature 75F 40% Humidity
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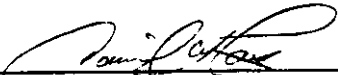
Northwest EMC, Inc.

Version 98.3, April, 1999
Margin Sort

Equipment Tested: Spotlight 2000
 Serial Number: See test plan
 Manufacturer: Metawave Communications
 Job Number: METW0019
 Test Date: 05-18-1999
 Tested By: Dan Haas, TE02
 Test Distance: 3 meters.
 Comments: AMPS/CDMA w/ pilot tone. Transmitting

Field Strength of Spurious Emissions FCC 22.917(e) & 2.1053

Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Antenna Horizontal Vertical	Preamp Gain (dB)	Cable Loss (dB)	Adjusted Level (dBuV/m)	Spec Limit (dBuV/m)	Table Azimuth (degree)	Antenna Height (meters)	Compared (To Limit) (dB)
5348.100 High freq.	37.2	AV	36.3	HHRN	33.8	8.5	48.2	75.5	231.0	2.1	-27.3
3528.080 Low freq.	40.5	AV	33.2	HHRN	32.9	6.8	47.6	75.5	322.0	1.5	-27.9
2646.930 Low freq.	43.5	AV	30.9	HHRN	32.7	5.9	47.6	75.5	333.0	2.0	-27.9
2673.500 High freq.	42.4	AV	31.0	HHRN	32.7	5.9	46.6	75.5	291.0	2.2	-28.9
5348.100 High freq.	35.6	AV	36.3	VHRN	33.8	8.5	46.6	75.5	224.0	1.8	-28.9
4457.950 High freq.	37.1	AV	34.6	HHRN	33.3	8.1	46.5	75.5	237.0	1.1	-29.0
2673.500 High freq.	42.2	AV	31.0	VHRN	32.7	5.9	46.4	75.5	230.0	1.0	-29.1
4457.950 High freq.	38.9	AV	34.6	VHRN	33.3	8.1	46.3	75.5	202.0	2.2	-29.2
5292.330 Low freq.	35.0	AV	36.3	VHRN	33.8	8.5	46.0	75.5	214.0	1.0	-29.5
2662.600 Mid. freq.	41.5	AV	31.0	HHRN	32.7	5.9	45.7	75.5	356.0	2.0	-29.8
3528.080 Low freq.	38.3	AV	33.2	VHRN	32.9	6.8	45.4	75.5	33.0	1.5	-30.1
2646.930 Low freq.	41.2	AV	30.9	VHRN	32.7	5.9	45.3	75.5	216.0	2.0	-30.3


 Signature

Temperature 75F 40% Humidity
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page 5

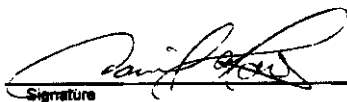
Northwest EMC, Inc.

Version 98.3, April, 1999
Margin Sort

Equipment Tested: Spotlight 2000
Serial Number: See test plan
Manufacturer: Metawave Communications
Job Number: METW0019
Test Date: 05-18-1999
Tested By: Dan Haas, TE02
Test Distance: 3 meters.
Comments: AMPS/CDMA w/ pilot tone. Transmitting

Field Strength of Spurious Emissions FCC 22.917(e) & 2.1053

Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Antenna Horizontal Vertical	Preamp Gain (dB)	Cable Loss (dB)	Adjusted Level (dBuV/m)	Spec Limit (dBuV/m)	Table Azimuth (degree)	Antenna Height (meters)	Compared (To Limit) (dB)
5292.330 Low freq.	33.1	AV	36.3	HHRN	33.8	8.5	44.1	75.5	166.0	1.8	-31.4
2662.600 Mid. freq.	39.7	AV	31.0	VHRN	32.7	5.9	43.9	75.5	217.0	1.2	-31.6
4411.680 Low freq.	34.7	AV	34.5	HHRN	33.3	8.0	43.9	75.5	342.0	1.0	-31.6
5327.700 Mid. freq.	32.8	AV	36.3	HHRN	33.8	8.5	43.8	75.5	300.0	1.4	-31.7
5327.700 Mid. freq.	31.8	AV	36.3	VHRN	33.8	8.5	42.8	75.5	257.0	2.0	-32.7
3550.900 Mid. freq.	35.5	AV	33.2	VHRN	32.9	6.8	42.6	75.5	312.0	1.1	-32.9
4442.350 Mid. freq.	31.9	AV	34.5	VHRN	33.3	8.0	41.1	75.5	221.0	2.0	-34.4
4442.350 Mid. freq.	31.4	AV	34.5	HHRN	33.3	8.0	40.6	75.5	147.0	2.0	-34.9
4411.680 Low freq.	31.3	AV	34.5	VHRN	33.3	8.0	40.5	75.5	228.0	1.8	-35.0
3550.900 Mid. freq.	33.0	AV	33.2	HHRN	32.9	6.8	40.1	75.5	288.0	2.0	-35.4
3563.450 High freq.	32.9	AV	33.2	HHRN	32.9	6.8	40.0	75.5	336.0	2.3	-35.5
3563.450 High freq.	31.5	AV	33.2	VHRN	32.9	6.8	38.6	75.5	157.0	2.1	-36.9



Signature

Temperature 75F 40% Humidity
 c:\nwcoats\data\METW0019\metw019b.ra

6.0 Frequency Stability

Specification Para. 2.1055
Equipment Authorization Procedure Para.2.1055
Temperature Range -30⁰ to +50⁰ centigrade
Supply Voltage Range 23 to 31 VDC (27 VDC nominal)
Limit 2.5ppm
Measurement Data See attached plots for Low, Mid and High Frequencies

6.1 Measurement Equipment

Instrument	Model	Serial No.	Last Cal	Cal Due
Temperature Chamber	Watlow	Series 942	N/A	03/04/00
Spectrum Analyzer	HP 8593E	N/A	04/05/99	04/05/00
DC Power Supply	HP E3611A	KR61310700	05/27/99	Next Use

