

# **RUBICOM SYSTEMS, INC.**

**FCC CLASS B TEST REPORT**

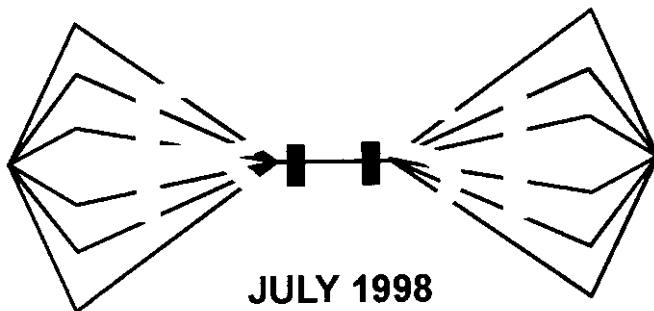
**FOR THE**

**TRANSEND CORPORATION**

**GEMINI 112K MODEM**

**FCC ID: MZNGMN112E**

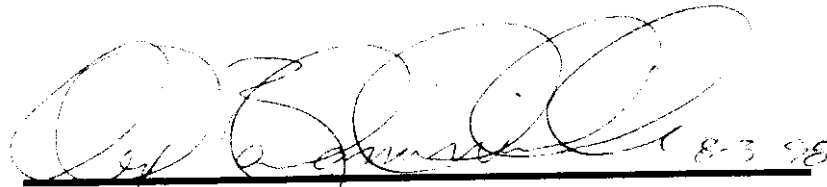
**COPY 1**



**FCC CLASS B TEST REPORT**  
**FOR THE**  
**TRANSEND CORPORATION**  
**GEMINI 112K MODEM**

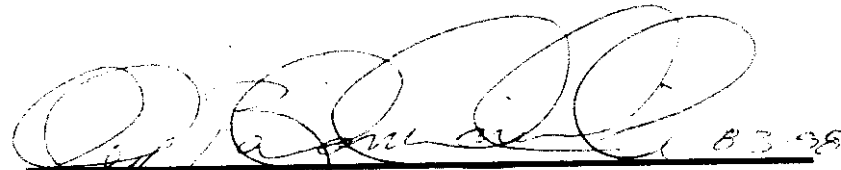
**S/N: PROD. #1**

Prepared by:

A handwritten signature in dark ink, appearing to read 'Alex Belardinelli', is written over a horizontal line. To the right of the signature, the date '8-3-98' is handwritten.

Alex Belardinelli

Tested by:

A handwritten signature in dark ink, appearing to read 'Alex Belardinelli', is written over a horizontal line. To the right of the signature, the date '8-3-98' is handwritten.

Alex Belardinelli

Performed by:

RUBICOM SYSTEMS, INC.  
284 West Drive, Suite B  
Melbourne, Florida 32904

Performed for:

TRANSEND CORPORATION  
2105 Rockledge Drive  
Rockledge, Florida 32955

RECEIVED: July 24, 1998

COMPLETED: July 29, 1998

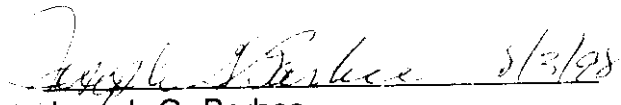
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### CERTIFICATION

Rubicom Systems, Inc. certifies the information obtained in this report was performed consistent with the requirements of ANSI C63.4-1992. The Transend Corporation Gemini 112K Modem complies with the requirements of CFR 47 Part 15, Subpart B for Class B Digital devices.

This data was obtained while testing a Gemini 112K Modem furnished by Transend Corporation as described in Paragraph 1.3 of this document. Any modifications to the unit as tested may invalidate the data and void this certification.

  
\_\_\_\_\_  
Joseph G. Barbee  
President

**ABSTRACT**

This report presents test results of the emanations found emitting from a Transend Gemini 112K Modem (s/n: PROD. #1) and the comparison of these emissions to the requirements of the FCC, Title 47, Part 15, Subpart B for Class B Digital devices. The modem model number is referenced in this document as a Gemini 112K Modem.

This testing was performed on a 3-meter open field test site at Rubicom Systems, Inc. (RSI). The testing was performed for Transend Corporation under a verbal purchase order and is on file at RSI under JA Number 1577. The results of this test effort demonstrate compliance of the Gemini 112K Modem to the FCC, Title 47, Part 15, Subpart B, Class B Digital devices. The unit is powered by a 120VAC input to a Univ power AC/DC power adapter Model SA-051A5F-1 with a DC output rating of 5VDC/1.5A. The modem board and power supply are mounted on a single PC board.

## 1.0 INTRODUCTION

### 1.1 Purpose

The purpose of this report is to show compliance of the Gemini 112K Modem to the requirements for Class B digital devices.

### 1.2 Requirements

The test requirements for FCC Class B digital devices are as follows:

#### CONDUCTED

<u>Freq. (MHz)</u>	<u><math>\mu</math>Volts</u>	<u>dB<math>\mu</math>V</u>
.450-30MHz	250	48

#### RADIATED

<u>Freq. (MHz)</u>	<u>Distance Meters</u>	<u>Field Strength <math>\mu</math>V/M</u>	<u>20 Log 3 Meter dB<math>\mu</math>V/M</u>
30 - 88	3	100	40.0
88 - 216	3	150	43.5
216 - 960	3	200	46.0
960 - Above	3	500	54.0

### 1.3 Unit Under Test Description

The Transend Gemini 112K Modem is a single external modem, referred to hereafter as the Gemini 112K.

The modem card with front display and power supply are all on one printed circuit board. Phone cables (two meter) were plugged into the two phone jack positions. A four foot length of 25 pin sub-D cable was attached to the computer port. The 25 pin Sub D cable was loaded with a Packard Bell 486 Legend 233 Plus computer.

### 1.4 Summary of Results

Power line conducted data is presented in Figures 6.1-1 and 6.1-2. No failures were experienced during the conducted testing. No modifications were required throughout this test effort.

The electric field data presented in Figures 6.2.2-1 through 6.2.2-6 provide in graphic form, the levels of signals emanating from the EUT with respect to the appropriate limit. Each division of the amplitude scale (Y-Axis) of the data sheet is equal to 10dB. The EUT is compliant to the radiated requirements of FCC, Title 47, Part 15, Subpart B for Class B digital devices. All signals are below the Class B limit.

Paragraph 6.2 contains the tabular listing of frequencies where the levels are within 10dB of the requirements.

## 2.0 APPLICABLE DOCUMENTS

The following documents form a part of this report to the extent expressed herein:

FCC Code of Federal Regulations Title 47, Part 15,

FCC Procedure for Measuring RF Emissions from Computing  
Devices FCC/OET MP-4, July 1987

ANSI C63.4-1992

FCC Characteristics of Open Field Test Sites Bulletin  
OET 55, October 1989



### 3.0 TEST SITE DESCRIPTION

This testing was performed at Rubicom Systems, Inc. 3-meter test site. The description of the measurement facility was found to be compliant with the requirements of Section 2.948 of the FCC Rules. A copy of the compliance letter is attached to this report as Appendix A.

#### 3.1 Environmental Conditions

Environmental conditions during testing of the EUT were as follows:

Date: **July 28, 1998**

Date: **July 29, 1998**

Temperature: **81°F**

Temperature: **79°F**

Barometer: **29.55 inches**

Barometer: **29.50 inches**

Humidity: **75%**

Humidity: **74%**

**4.0 TEST INSTRUMENTATION**

The following test equipment was used to perform this testing.

<u>Qty.</u>	<u>Description</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Last Cal.</u>	<u>Cal Cycle</u>
1	Spectrum Analyzer	Advantest	R3271	05/26/99	1 yr
1	Log Periodic Antenna	A.H. Systems	SAS-200/512	01/15/99	1 yr
1	Biconical Antenna	A.H. Systems	SAS-200/540	11/11/98	1 yr
1	Power Line Stab. Network	Solar Elect.	8012-50-5-24-BNC	NCR	
1	Plotter	Hewlett Packard	7440A	NCR	

## 5.0 TEST SAMPLE SETUP AND CONFIGURATIONS

The EUT was placed on a nonconductive 80cm high manual turntable. The unit was configured with the following cabling.

- \*Two each Phone Cables (Approximately 2 Meters)
- \*One each Computer 25 Pin Subminiature Cable (6 ft.)

The unit was exercised using the internal analog mode. This mode was found to be the worse case emanation mode. The manufacturer was in agreement that this mode exercised the unit in it's worse case. The modem was tested using the RSI minimum system components as listed below:

FCC ID# INWUSA-61984-KX-E	Smart Max II	Tele-Signal Model 6500
FCC ID# AS55HY-16291-MT-E	Telephone	AT&T Model 412
FCC ID# FODPB421P	Personal Computer	Packard Bell 486 Legend 233 Plus
FCC ID# E5XKBP10110	Keyboard	Packard Bell
FCC ID# KH2MUSJG	Mouse	Packard Bell
FCC ID# DTSCMC1417A	Monitor	Daewood Model CMC-1417AE

Power to the unit was derived from an AC/DC power adapter model SA-051A5F-1 manufactured by UNIV Power.

Testing was performed on a production unit supplied by Transend Corporation. No modifications were required.

The test setup for conducted data is shown in Photo 1.

The test setup for radiated data is shown in Photo's 2 and 3.

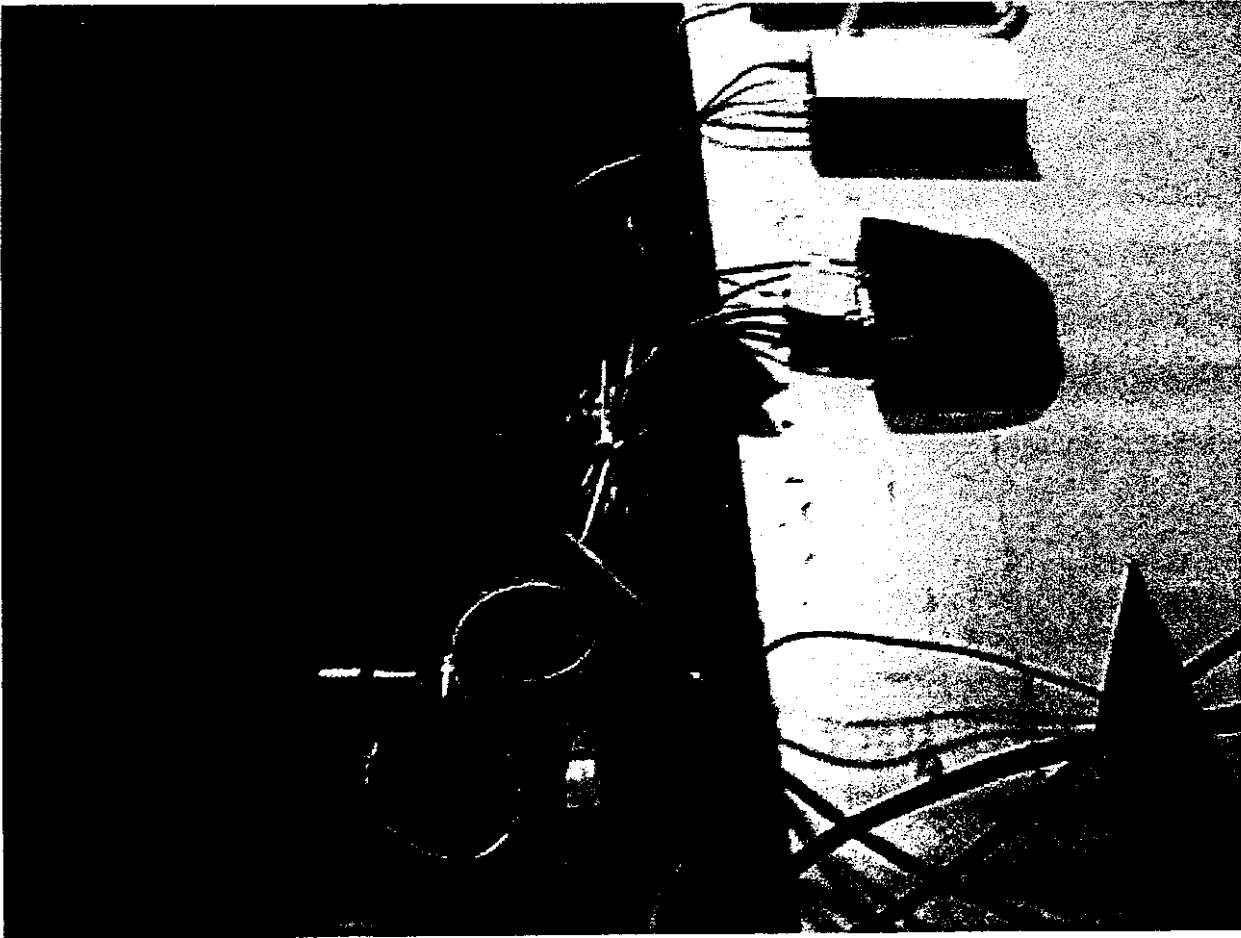


PHOTO #1

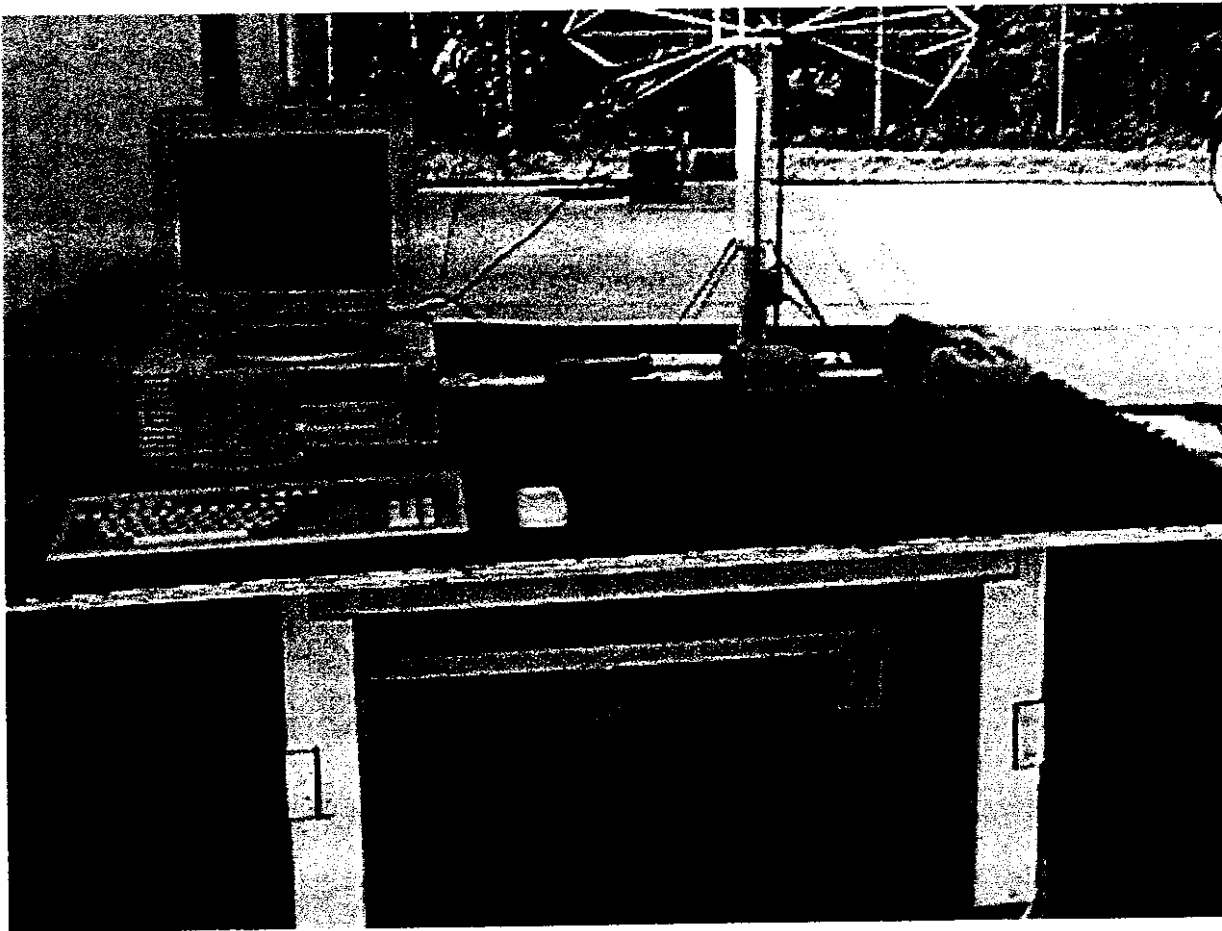


PHOTO #2

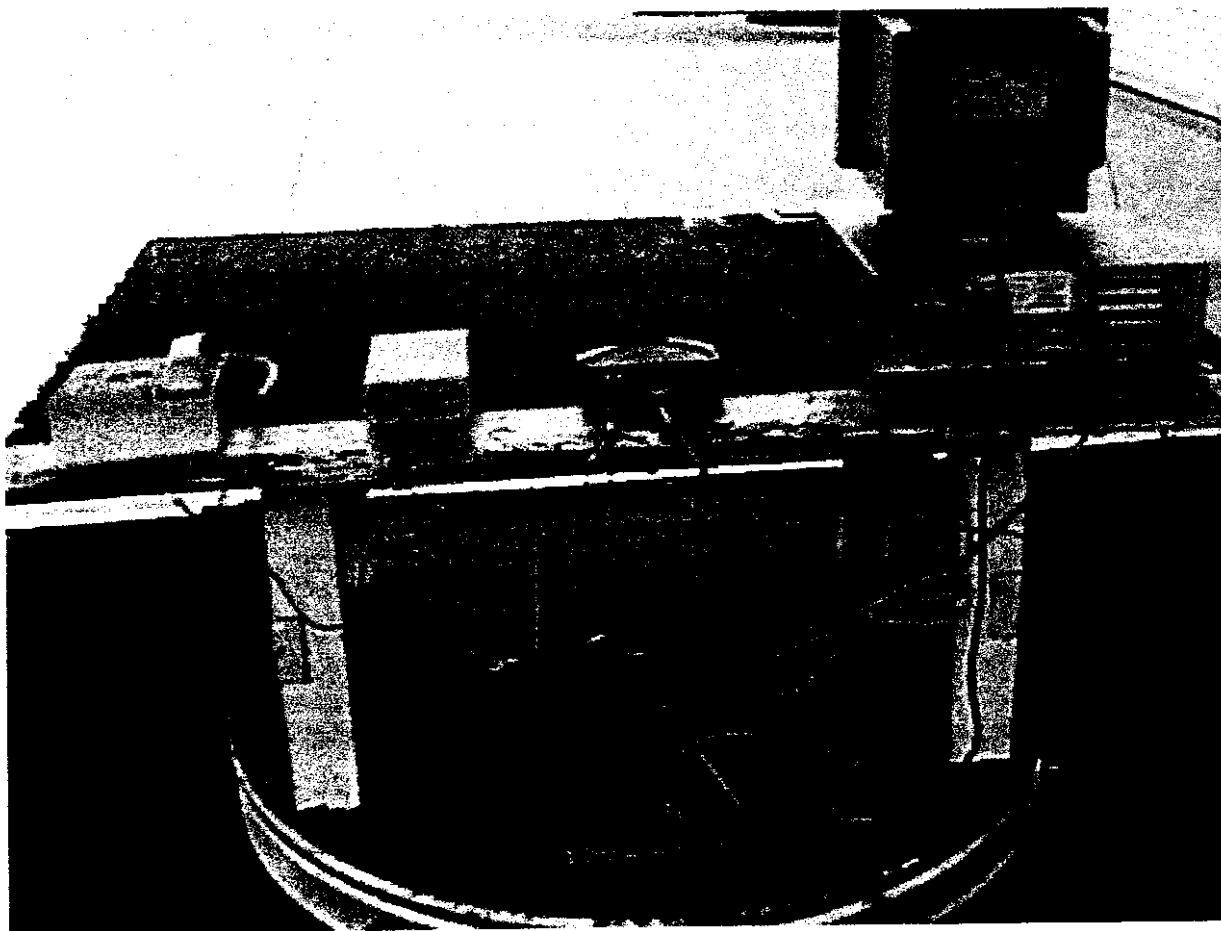


PHOTO #3

## 6.0 PROCEDURES AND RESULTS

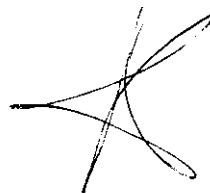
### 6.1 Power Line Conducted

The unit was tested in the shielded enclosure using the Solar Model 8012-50-R-24-BNC PLISN (50 $\mu$ H/50ohm). Both the phase and neutral leads were tested. As can be seen in the conducted data sheets Figures 6.1-1 and 6.1-2, any signals measured within 10dB of the requirement are listed below. No signals were found within 10dB, therefore no list is presented.

### 6.2 Radiated Emissions

The following procedures are used to the extent required to ensure that all significant signals emanating from the EUT are identified in frequency and amplitude. These procedures are used for electric field emissions due to the high ambients. The following is the tabular listing of signals emitting from the modem within 10dB of the requirement

<u>Frequency</u> <u>(MHz)</u>	<u>Antenna</u> <u>Pol.</u>	<u>Elevation</u>	<u>Azimuth</u>	<u>Measured</u> <u>(dB<math>\mu</math>V/m)</u>	<u>Q.P. Limit</u> <u>(dB<math>\mu</math>V/m @</u> <u>3 Meters</u>	<u>Margin</u> <u>(dB)</u>
300MHz	H	1.0M	90°	41.75	46 47.0 ?	-5.25
300MHz	V	1.5M	180°	38.0	46 47.0	-9.0



### 6.2.1 Pretest

An initial pretest for electric field signals is performed inside a shielded room to identify frequencies emanating from the EUT without the test site ambient interference. This data is presented in Figures 6.2.1-1 through 6.2.1-6.

### 6.2.2 Official Quasi-Peak Scans

This testing involves maximizing the radiated emissions for peak amplitude levels in antenna height and equipment under test azimuth. This peaking is performed using the frequencies noted during pretest. The maximized height and azimuth are noted on each frequency band. The maximization is performed for each polarization and frequency band. This data is presented in Figures 6.2.2-1 through 6.2.2-6. If required, the following paragraphs are performed to assist in determining the true signals from the EUT. EUT signals are identified on the graph by circles and a number above the signal. Each signal identified as being from the EUT is maximized in elevation and azimuth. Example; a signal at 65MHz is 5dB below the specification and would be noted as: 65-5.

### 6.2.3 Peak Ambient (EUT Off/Support Equipment "On")

This paragraph is Quasi-peak plots of the ambient for the purpose of allowing for normalization and to allow viewing the emission without the ambients. Data is presented in Figures 6.2.3-1 through 6.2.3-6 of the environmental ambient.



#### 6.2.4 Normalized Ambient (EUT Off/Support "On")

This data shows the normalized ambient with the EUT in the "off" state and support equipment (if applicable) turned on. The new signals are identified as being from the support equipment.

#### 6.2.5 Normalized EUT Scan (EUT and Support "On")

This data is performed to show the new signals generated above the environmental ambient. The delta signals found in these scans can be attributed to the EUT. This information is used to identify the signals in the plot of Paragraph 6.2.2.

#### 6.2.6 High Ambient Investigation

In the 85MHz to 110MHz range the analyzer is used in the normalized mode to subtract out the ambient signals for a better resolution of the high ambient frequency band.



TEST: FCC CONDUCTED EUT: GEMINI 112K/PS#1 S/N: PROD #1  
FREQ: 450K-30MHz SPEC: FCC CLASS B ANT.HT/POL: N/A  
DETECTOR: PEAK LINE UNDER TEST: PHASE EUT POSITION: FRONT  
DATE: 7-27-98 TEST SITE: ROOM 1 TESTER: *AB*

FCC ID: MZNGMN112E

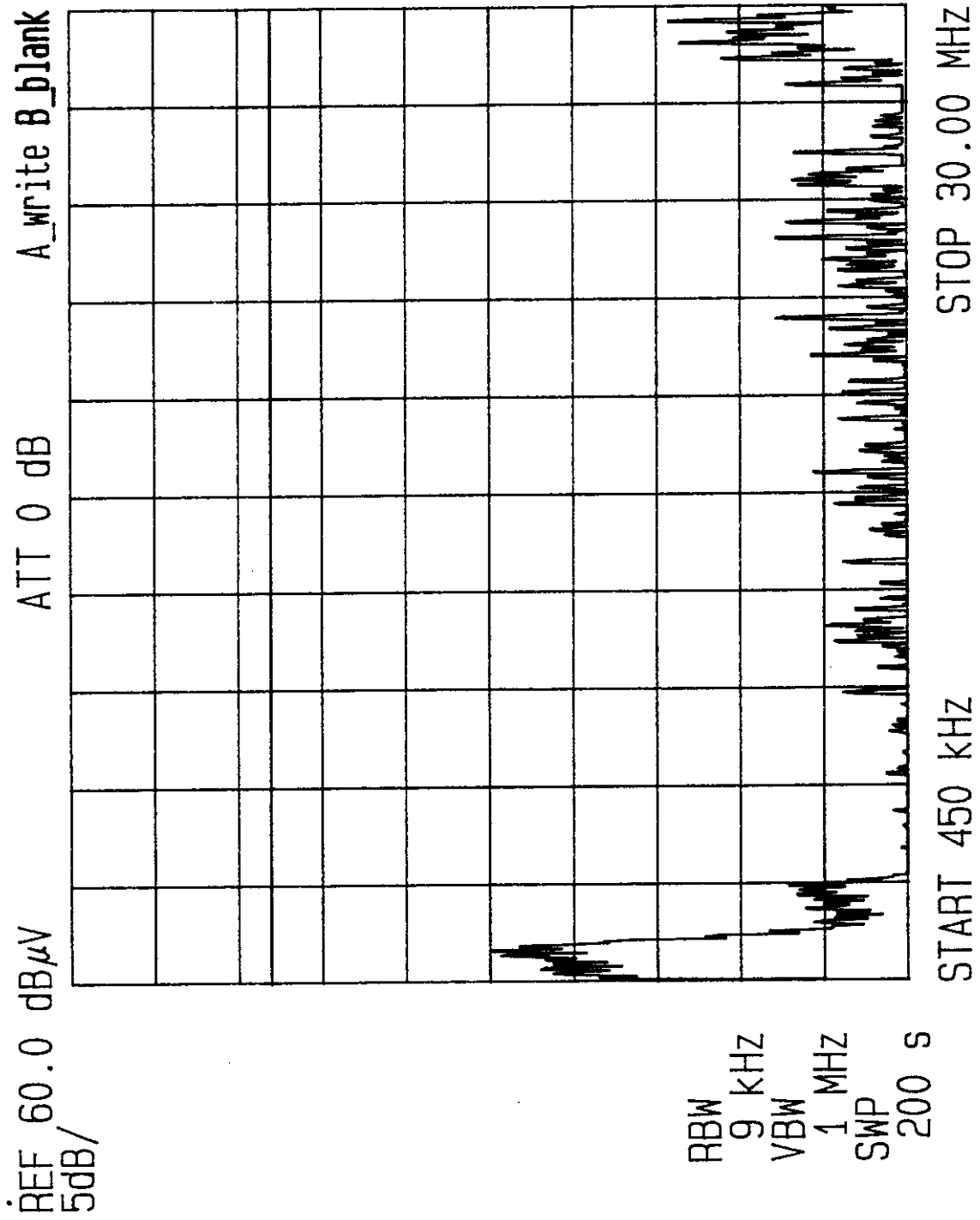


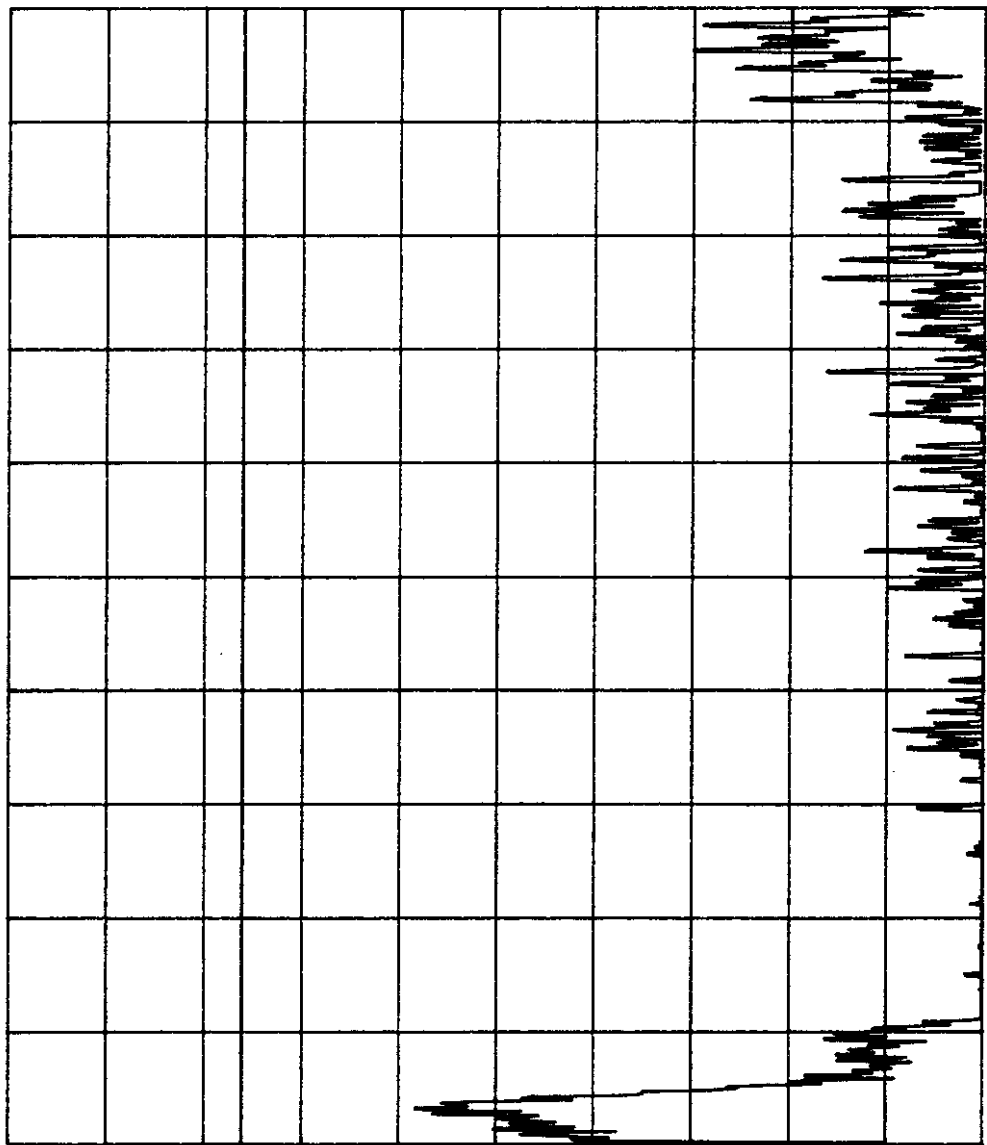
Figure 6.1-1



TEST: FCC CONDUCTED EUT: GEMINI 112K/PS#1 S/N: PROD #1  
FREQ: 450K-30MHZ SPEC: FCC CLASS B ANT.HT/POL: N/A  
DETECTOR: PEAK LINE UNDER TEST: NEUTRAL EUT POSITION: FRONT  
DATE: 7-27-98 TEST SITE: ROOM 1 TESTER: *AB*

FCC ID: MZNGHN112E

REF 60.0 dB $\mu$ V ATT 0 dB A\_write B\_blank  
5dB/



RBW 9 KHZ  
VBW 1 MHZ  
SWP 200 S

START 450 KHZ STOP 30.00 MHZ

FIGURE 6.1-2



TEST: FCC RADIATED      EUT: GEMINI 112K      S/N: PROD #1  
FREQ: 30M-100MHz      SPEC: FCC CLASS B      ANT.HT/POL: 1M/      H  
DETECTOR: PEAK      LINE UNDER TEST: N/A      EUT POSITION: FRONT  
DATE: 7-27-98      TEST SITE: ROOM 1      TESTER: *[Signature]*

FCC ID: MZNGMN112E

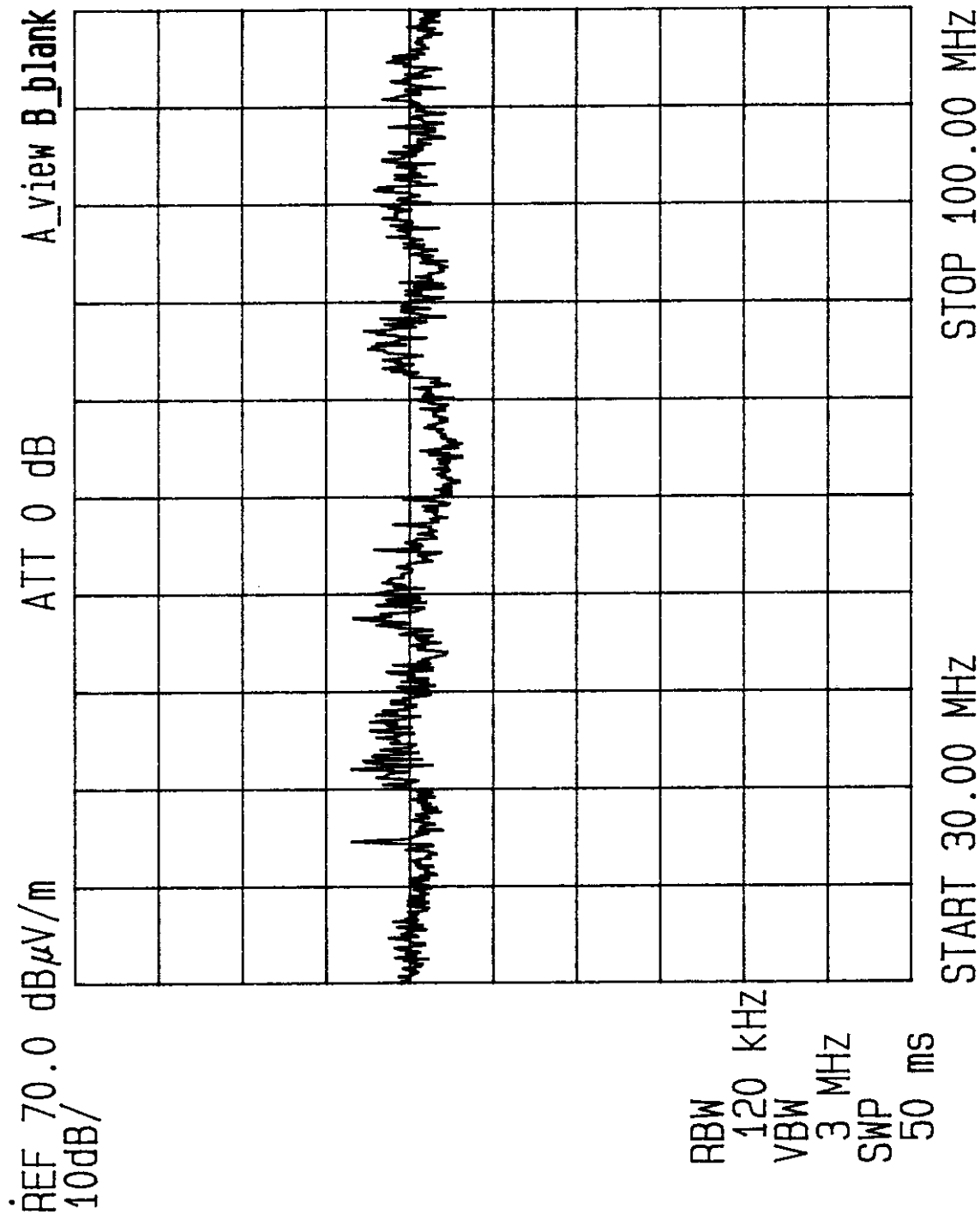


FIGURE 6.2.1-1



TEST: FCC RADIATED EUT: GEMINI 112K S/N: PROD #1  
FREQ: 30M-100MHz SPEC: FCC CLASS B ANT.HT/POL: 1M/ V  
DETECTOR: PEAK LINE UNDER TEST: N/A EUT POSITION: FRONT  
DATE: 7-27-98 TEST SITE: ROOM 1 TESTER: *[Signature]*

FCC ID: MZNGHN112E

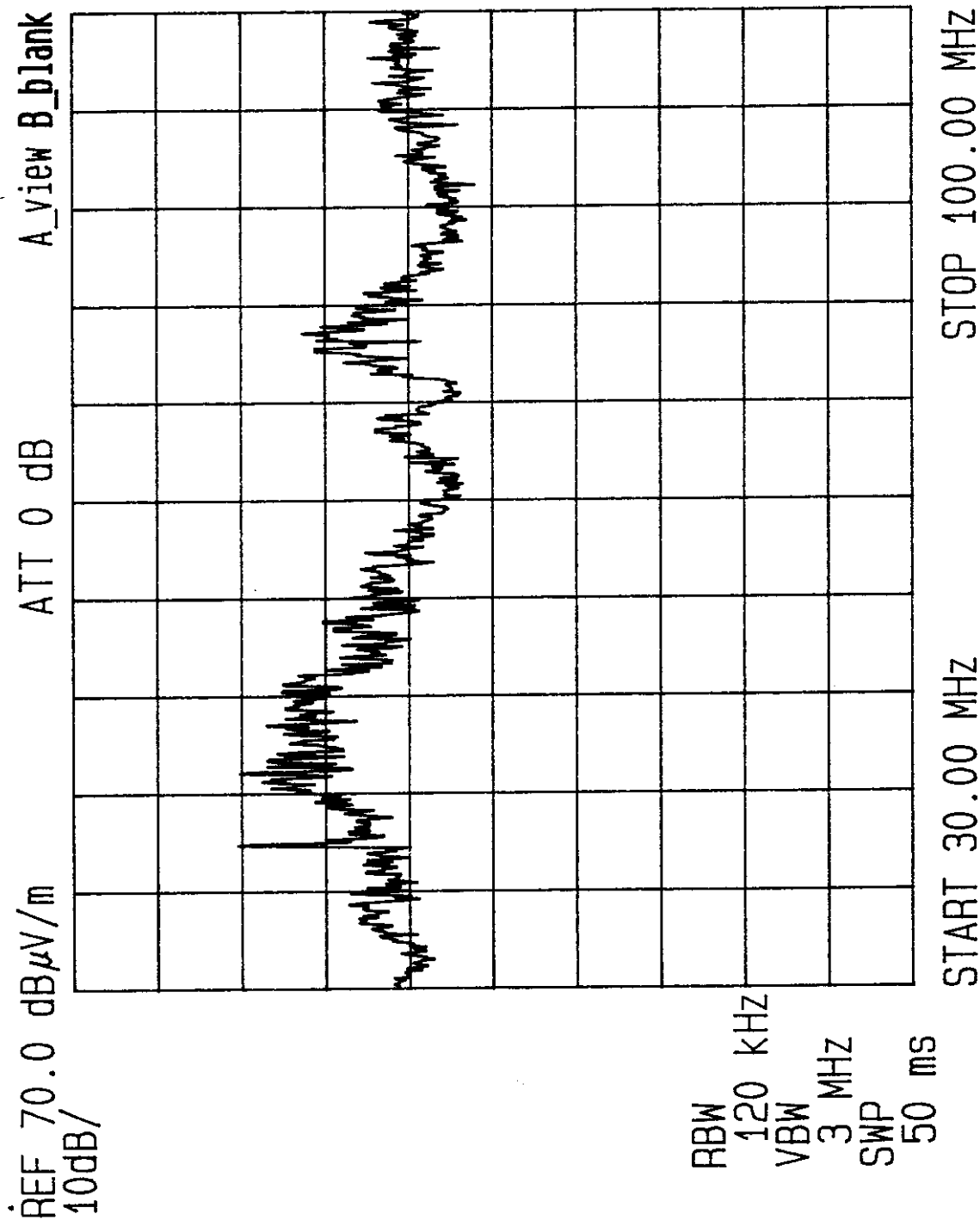


FIGURE 6.2.1-2



TEST: FCC RADIATED EUT: GEMINI 112K S/N: PROD #1  
FREQ: 100M-200MHz SPEC: FCC CLASS B ANT.HT/POL: 1M/ H  
DETECTOR: PEAK LINE UNDER TEST: N/A EUT POSITION: FRONT  
DATE: 7-27-98 TEST SITE: ROOM 1 TESTER: *AB*

FCC ID: MZNGMN112E

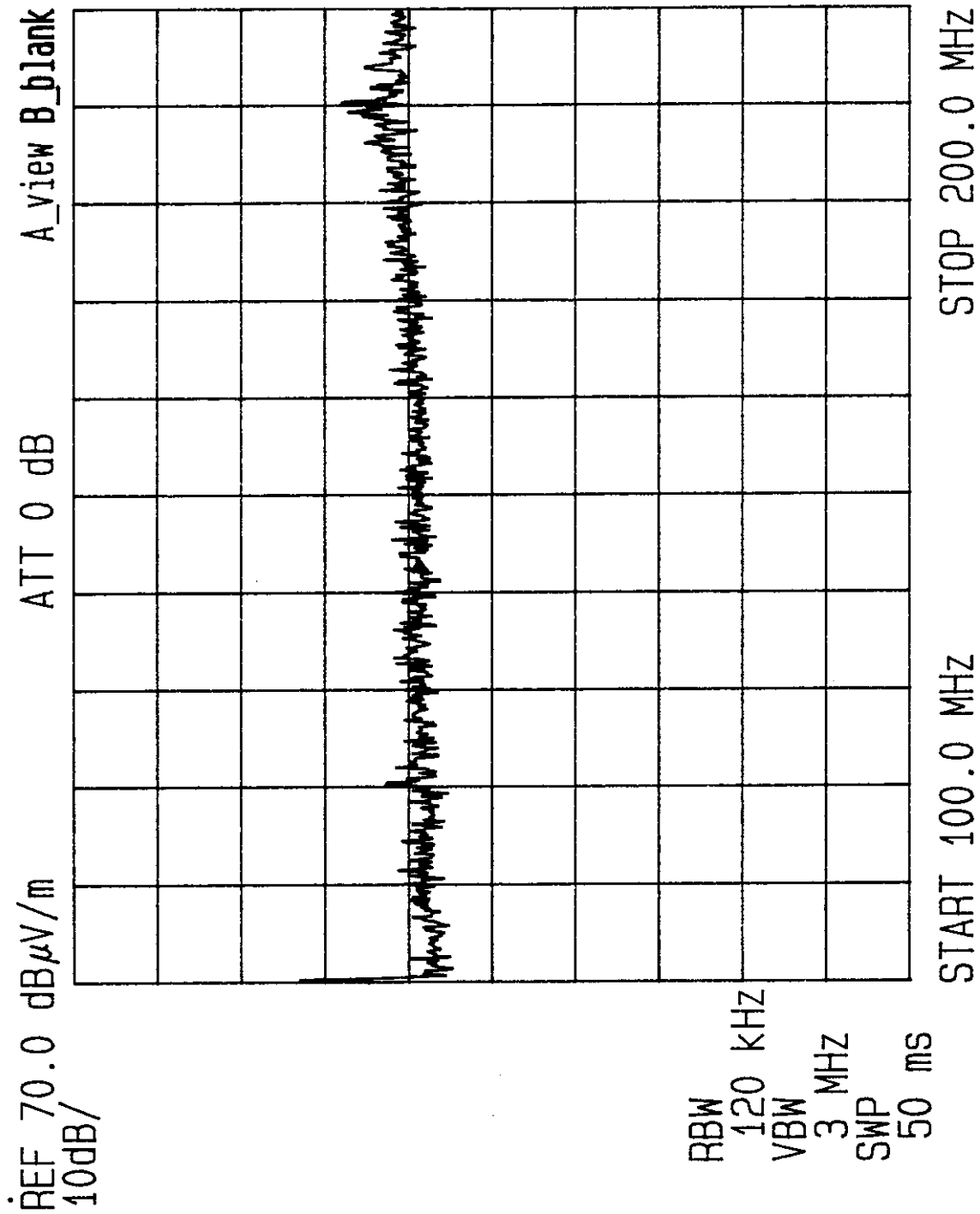


FIGURE 6.2.1-3



TEST: FCC RADIATED	EUT: GEMINI 112K	S/N: PROD #1
FREQ: 100M-200MHZ	SPEC: FCC CLASS B	ANT.HT/POL: 1M/ V
DETECTOR: PEAK	LINE UNDER TEST: N/A	EUT POSITION: FRONT
DATE: 7-27-98	TEST SITE: ROOM 1	TESTER: <i>[Signature]</i>

FCC ID: MZNGMN112E

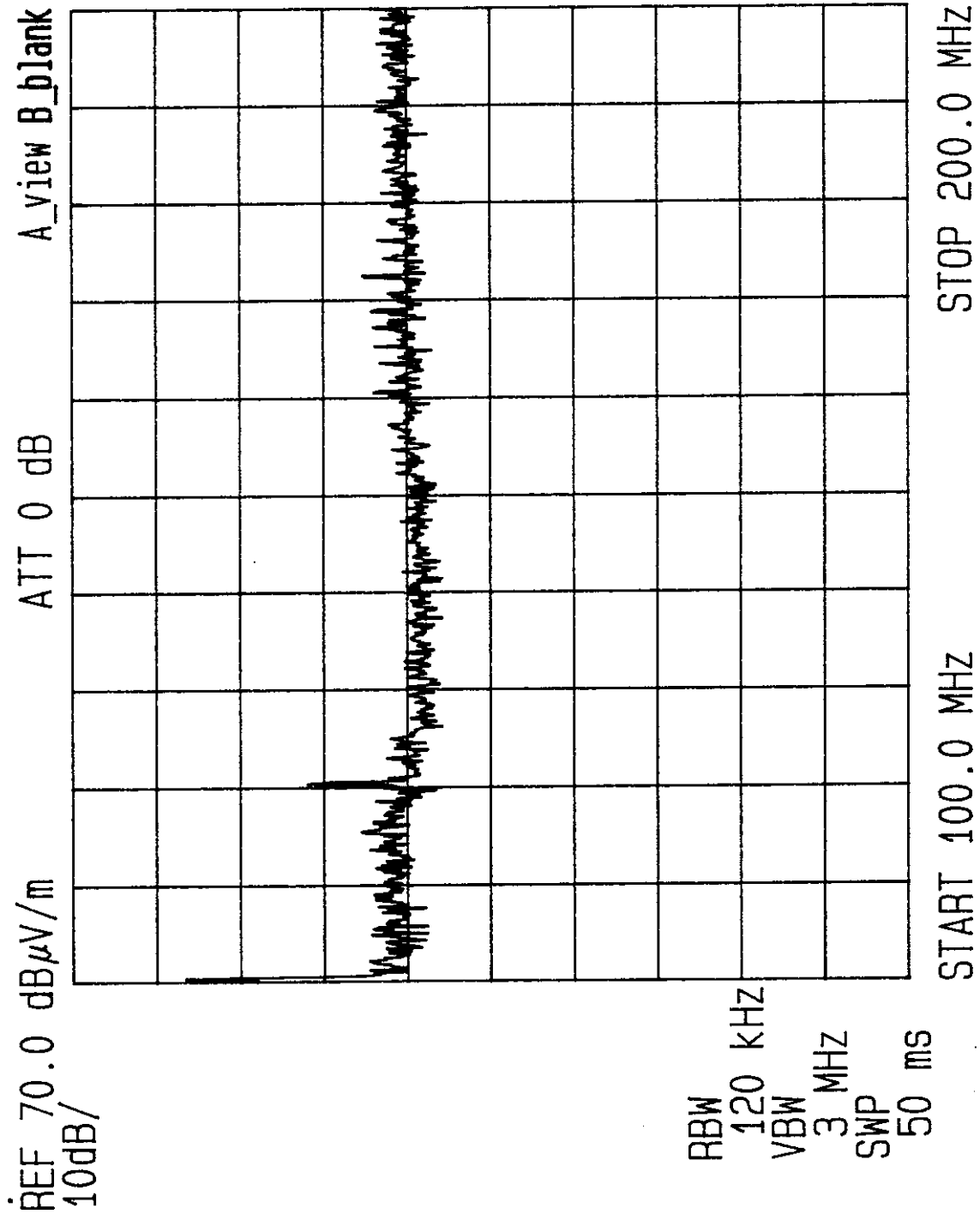


FIGURE 6.2.1-4



TEST: FCC RADIATED EUT: GEMINI 112K S/N: PROD #1  
FREQ: 200M-1GHZ SPEC: FCC CLASS B ANT.HT/POL: 1M/ H  
DETECTOR: PEAK LINE UNDER TEST: N/A EUT POSITION: FRONT  
DATE: 7-27-98 TEST SITE: ROOM 1 TESTER: *[Signature]*

FCC ID: MZNGMN112E

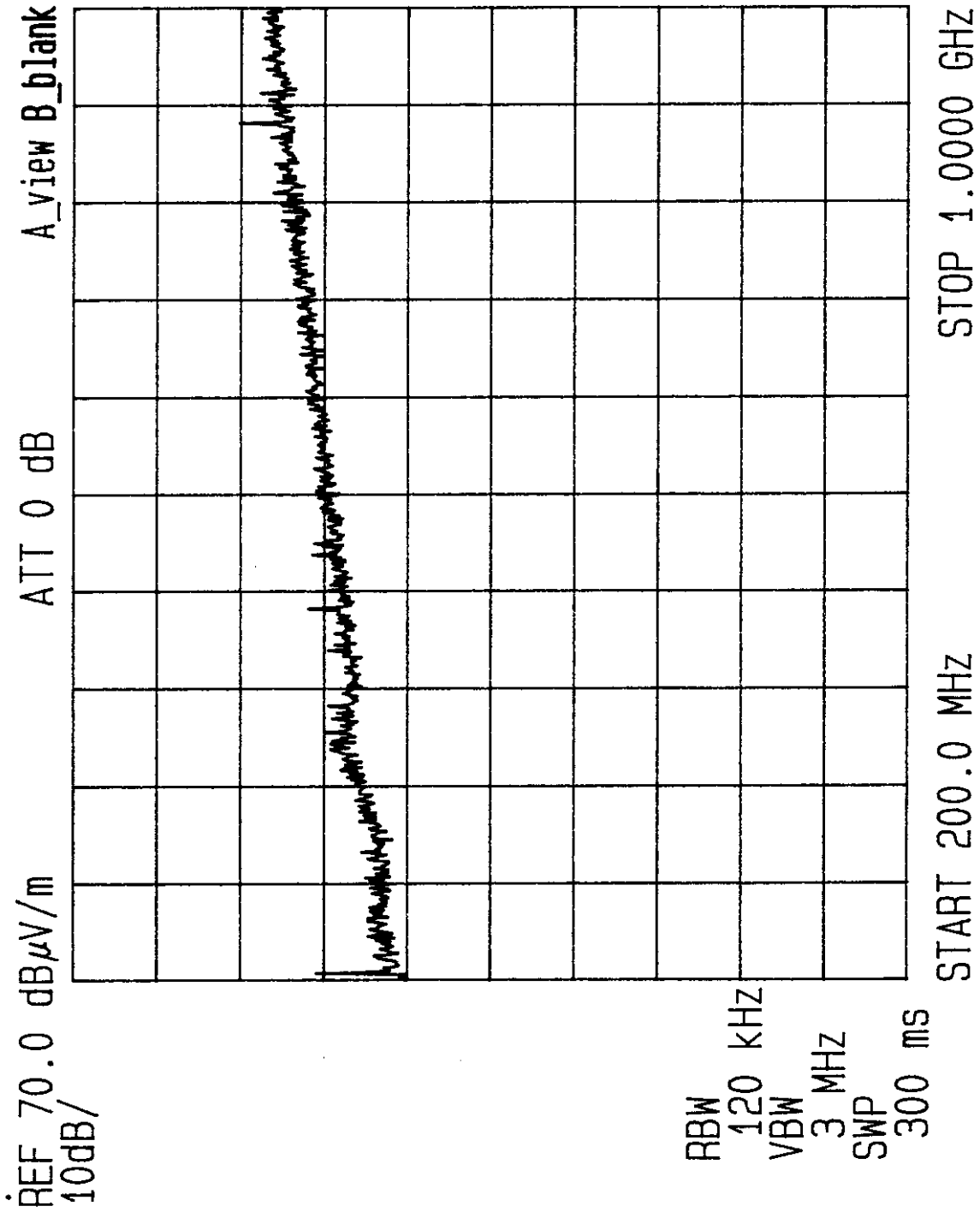


FIGURE 6.2.1-5





TEST: FCC RADIATED EUT: GEMINI 112K S/N: PROD #1  
FREQ: 200M-1GHZ SPEC: FCC CLASS B ANT.HT/POL: 1M/ V  
DETECTOR: PEAK LINE UNDER TEST: N/A EUT POSITION: FRONT  
DATE: 7-27-98 TEST SITE: ROOM 1 TESTER: *[Signature]*

FCC ID: MZNGMN112E

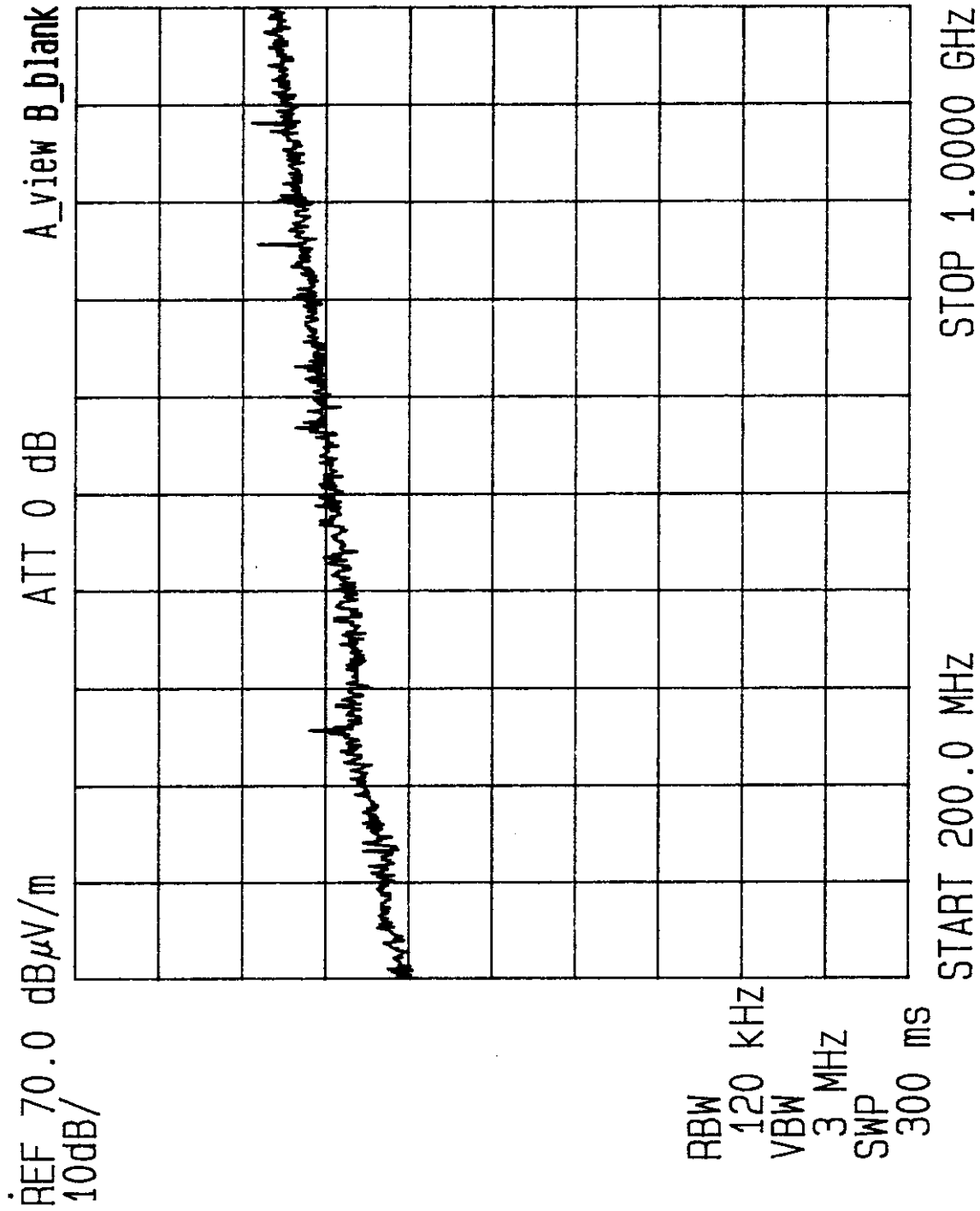


FIGURE 6.2.1-6

TEST: FCC RADIATED      EUT: GEMINI 112K      S/N: PROD #1  
FREQ: 30M-100MHz      SPEC: FCC CLASS B      ANT.HT/POL: 1.5m \H  
DETECTOR: QUASI PEAK      LINE UNDER TEST: N/A      EUT POSITION: 180  
DATE: 7-25-98      TEST SITE: 3 METER      TESTER: AB

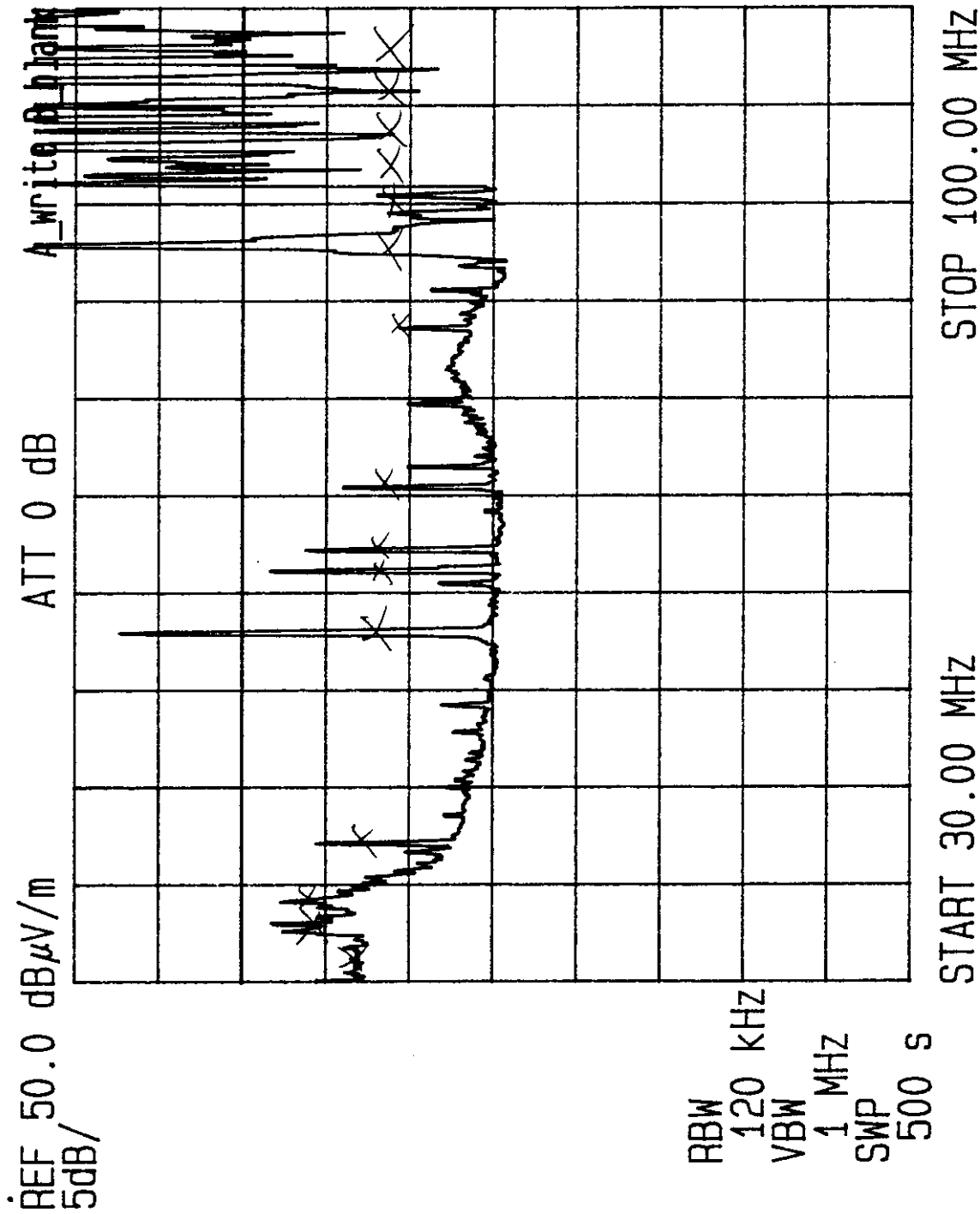


FIGURE 6.2.2-1



TEST: FCC RADIATED	EUT: GEMINI 112K	S/N: PROD #1
FREQ: 30M-100MHz	SPEC: FCC CLASS B	ANT.HT/POL: 1.75m \ V
DETECTOR: QUASI PEAK	LINE UNDER TEST: N/A	EUT POSITION: 180°
DATE: 7-29-98	TEST SITE: 3 METER	TESTER: <i>AB</i>

FCC ID: MZNGMN112E

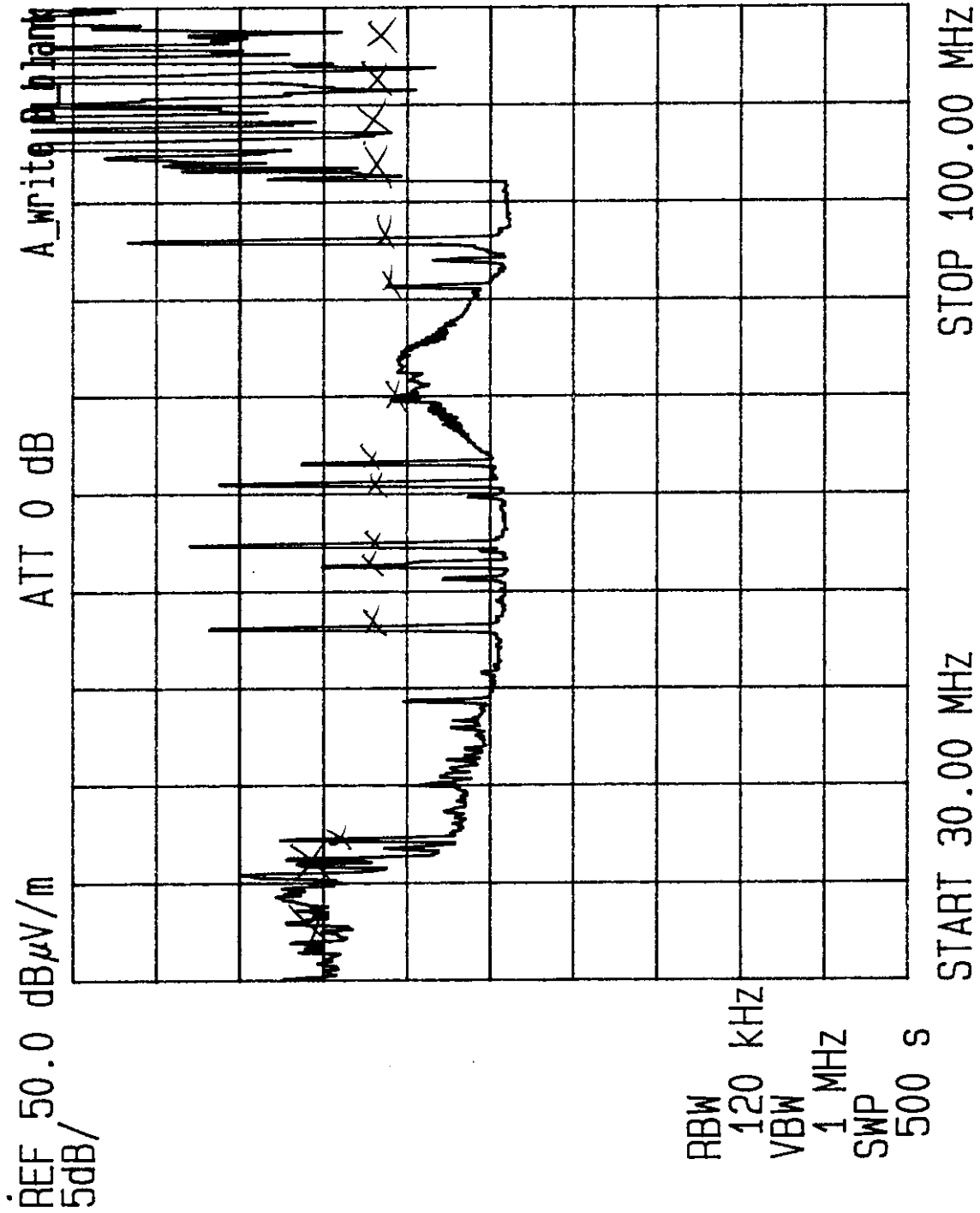


FIGURE 6.2.2-2



TEST: FCC RADIATED EUT: GEMINI 112K S/N: PROD #1  
FREQ: 100M-200MHz SPEC: FCC CLASS B ANT.HT/POL: 1.5m \H  
DETECTOR: QUASI PEAK LINE UNDER TEST: N/A EUT POSITION: 180'  
DATE: 7-28-98 TEST SITE: 3 METER TESTER: *[Signature]*

FCC ID: MZNGMN112E

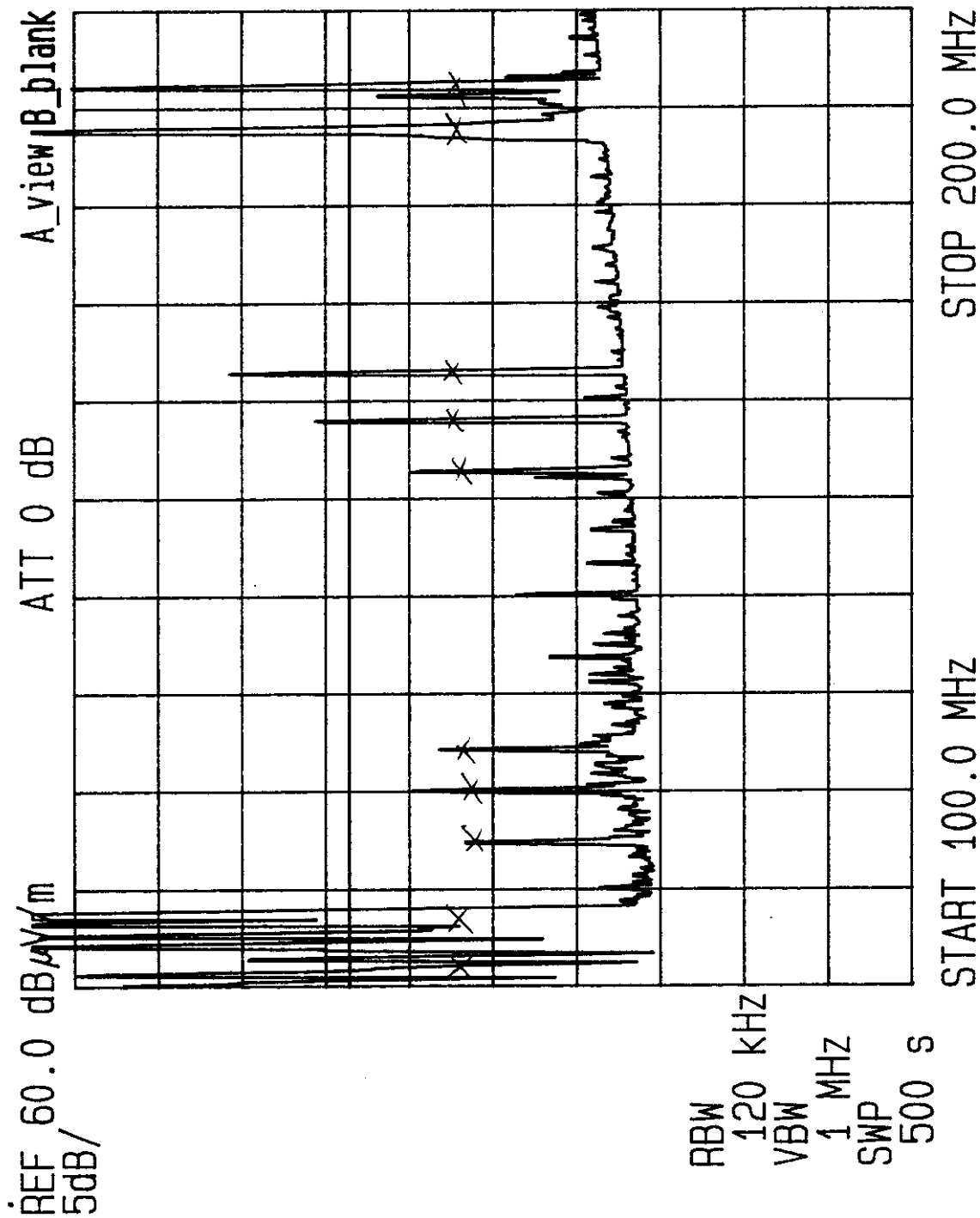


FIGURE 6.2.2-3



TEST: FCC RADIATED EUT: GEMINI 112K S/N: PROD #1  
FREQ: 100M-200MHz SPEC: FCC CLASS B ANT.HT/POL: 1.75m \V  
DETECTOR: QUASI PEAK LINE UNDER TEST: N/A EUT POSITION: /80°  
DATE: 7-28-98 TEST SITE: 3 METER TESTER: *AB*

FCC ID: MZNGMN112E

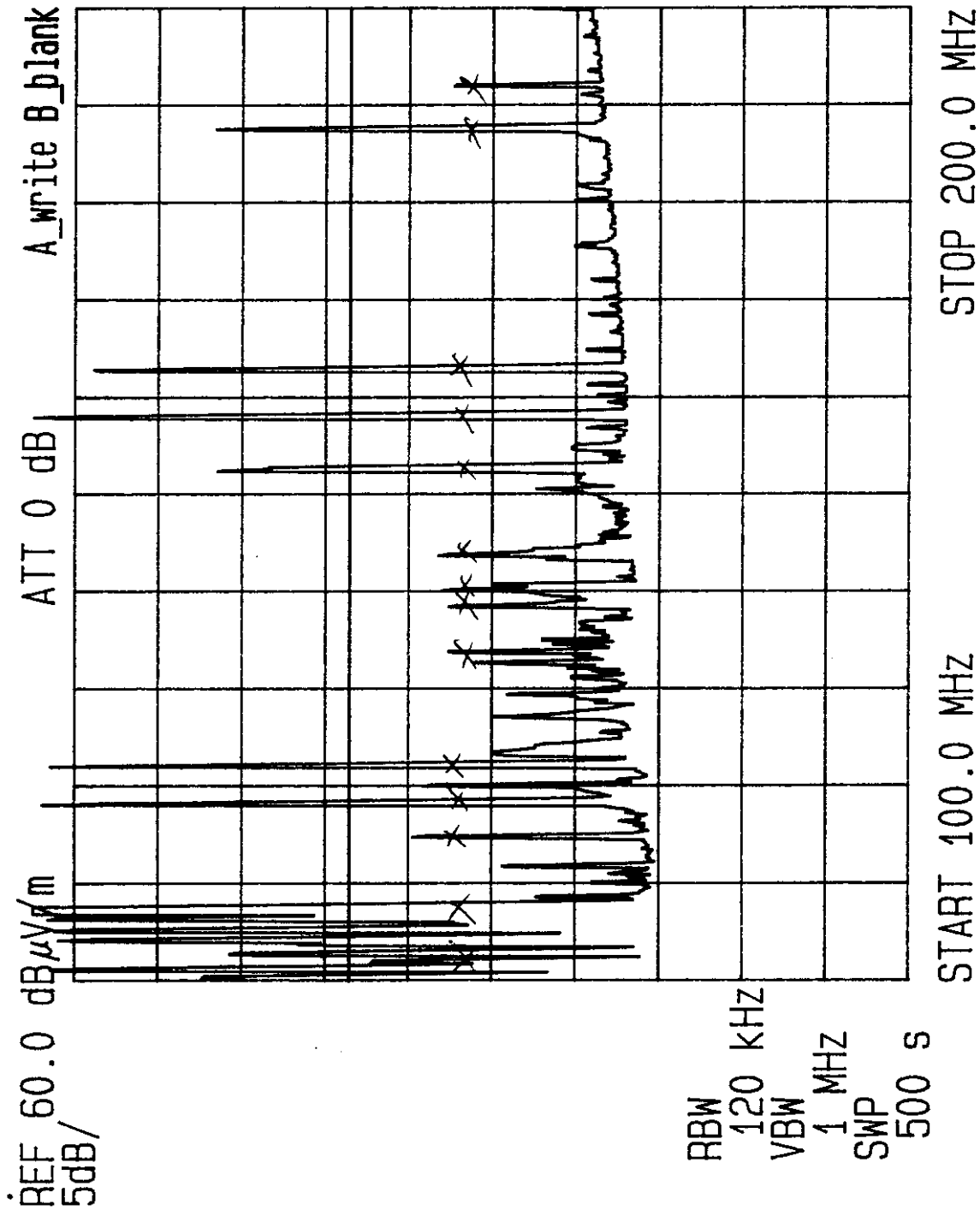


FIGURE 6.2.2-4

TEST: FCC RADIATED EUT: GEMINI 112K S/N: PROD #1  
 FREQ: 200M-1GHZ SPEC: FCC CLASS B ANT.HT/POL: 1.0 m \ H  
 DETECTOR: QUASI PEAK LINE UNDER TEST: N/A EUT POSITION: 90  
 DATE: 7-28-98 TEST SITE: 3 METER TESTER: *AB*

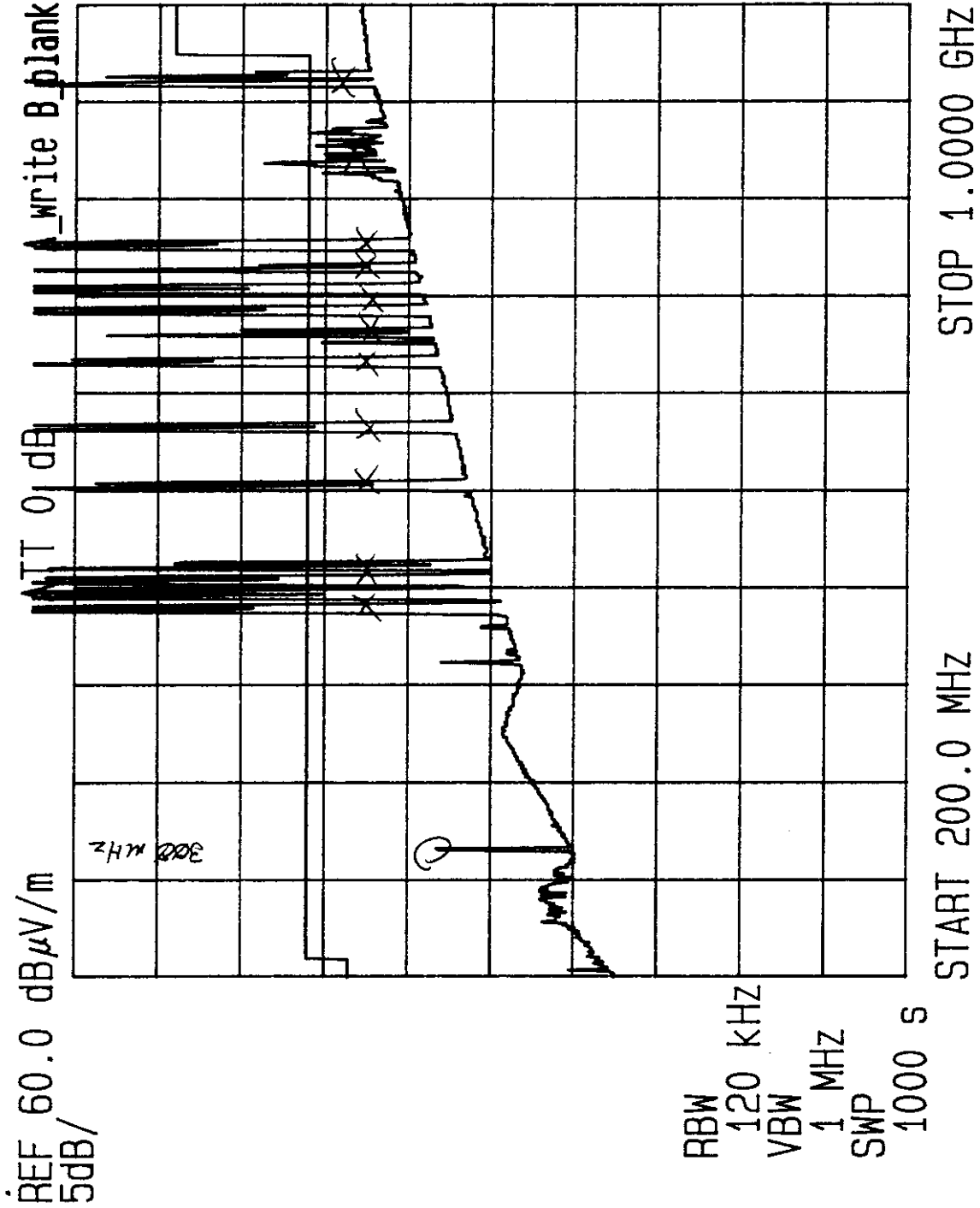


FIGURE 6.2.2-5



TEST: FCC RADIATED EUT: GEMINI 112K S/N: PROD #1  
FREQ: 200M-1GHz SPEC: FCC CLASS B ANT. HT/POL: 1.5m \V  
DETECTOR: QUASI PEAK LINE UNDER TEST: N/A EUT POSITION: 180°  
DATE: 7-28-98 TEST SITE: 3 METER TESTER: AB

FCC ID: MZNGMN112B

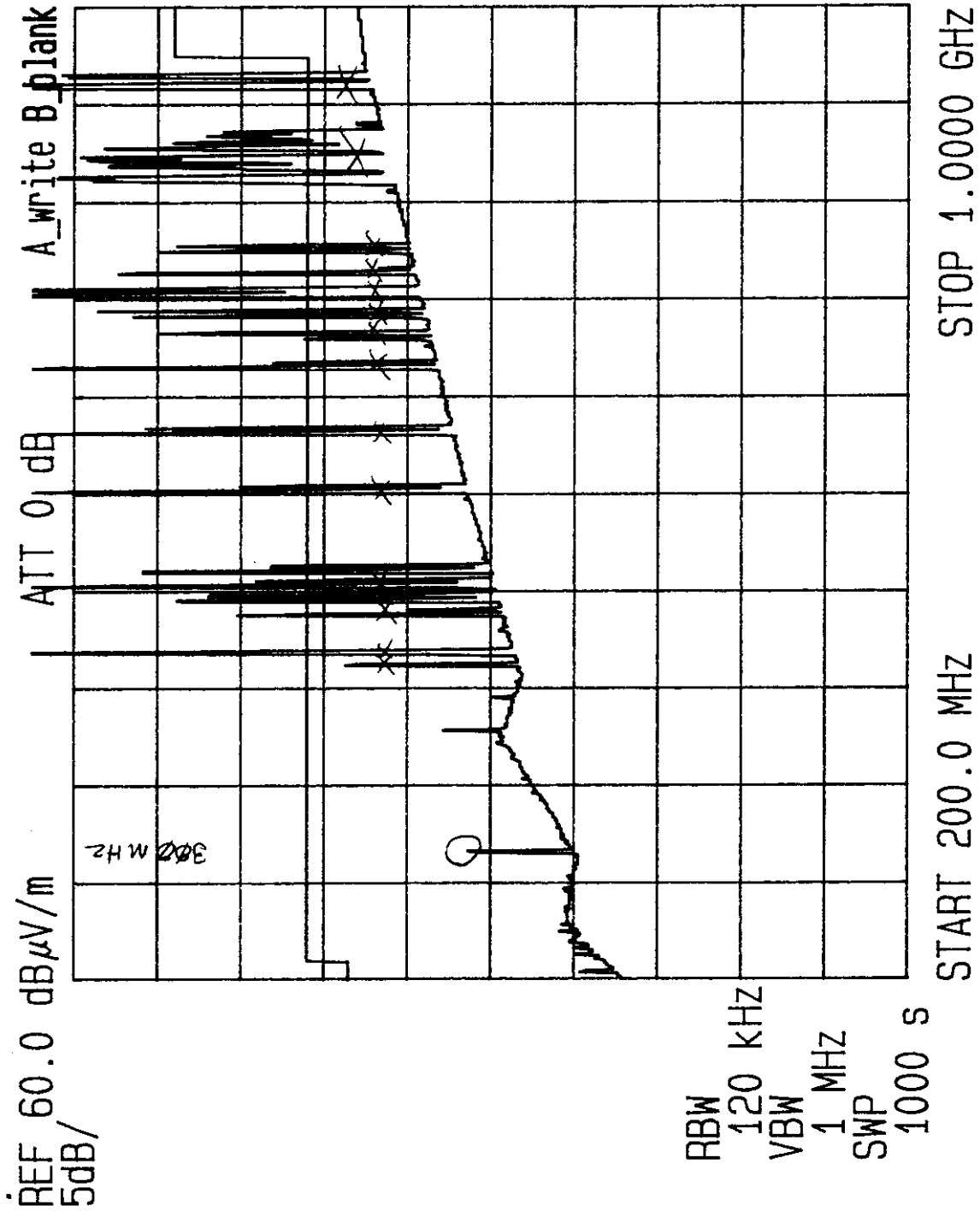


FIGURE 6.2.2-6



TEST: FCC RADIATED EUT: GEMINI 112K S/N: PROD #1  
FREQ: 30M-100MHz SPEC: FCC CLASS B ANT.HT/POL: 1.5m \H  
DETECTOR: Q P AMBIENT LINE UNDER TEST: N/A EUT POSITION: -  
DATE: 7-29-98 TEST SITE: 3 METER TESTER: *[Signature]*

FCC ID: MZNGMN112E

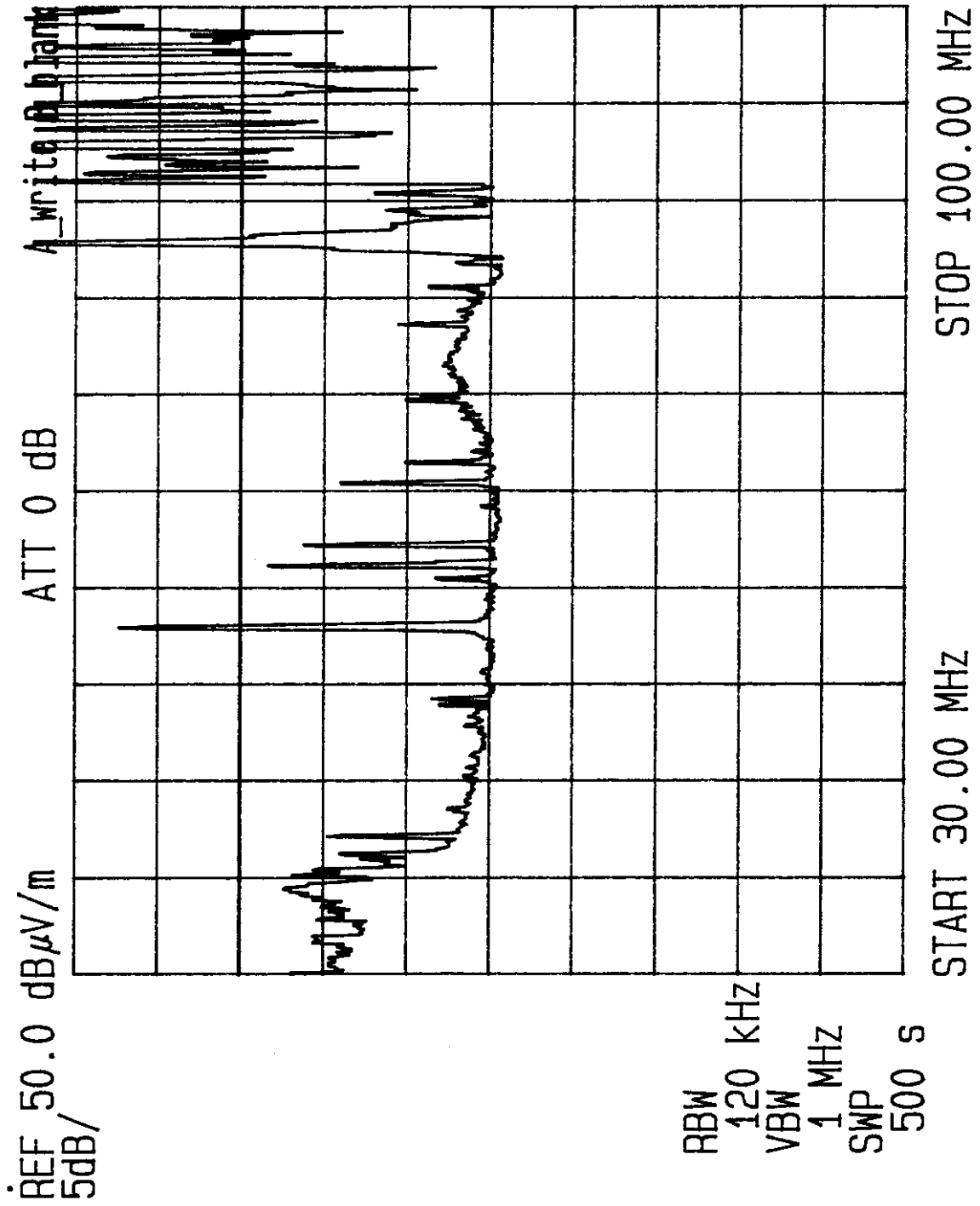


FIGURE 6.2.3-1





TEST: FCC RADIATED EUT: GEMINI 112K S/N: PROD #1  
FREQ: 30M-100MHZ SPEC: FCC CLASS B ANT.HT/POL: 1.75m \V  
DETECTOR: Q P AMBIENT LINE UNDER TEST: N/A EUT POSITION: —  
DATE: 7-29-98 TEST SITE: 3 METER TESTER: *AS*

FCC ID: MZNGMN112E

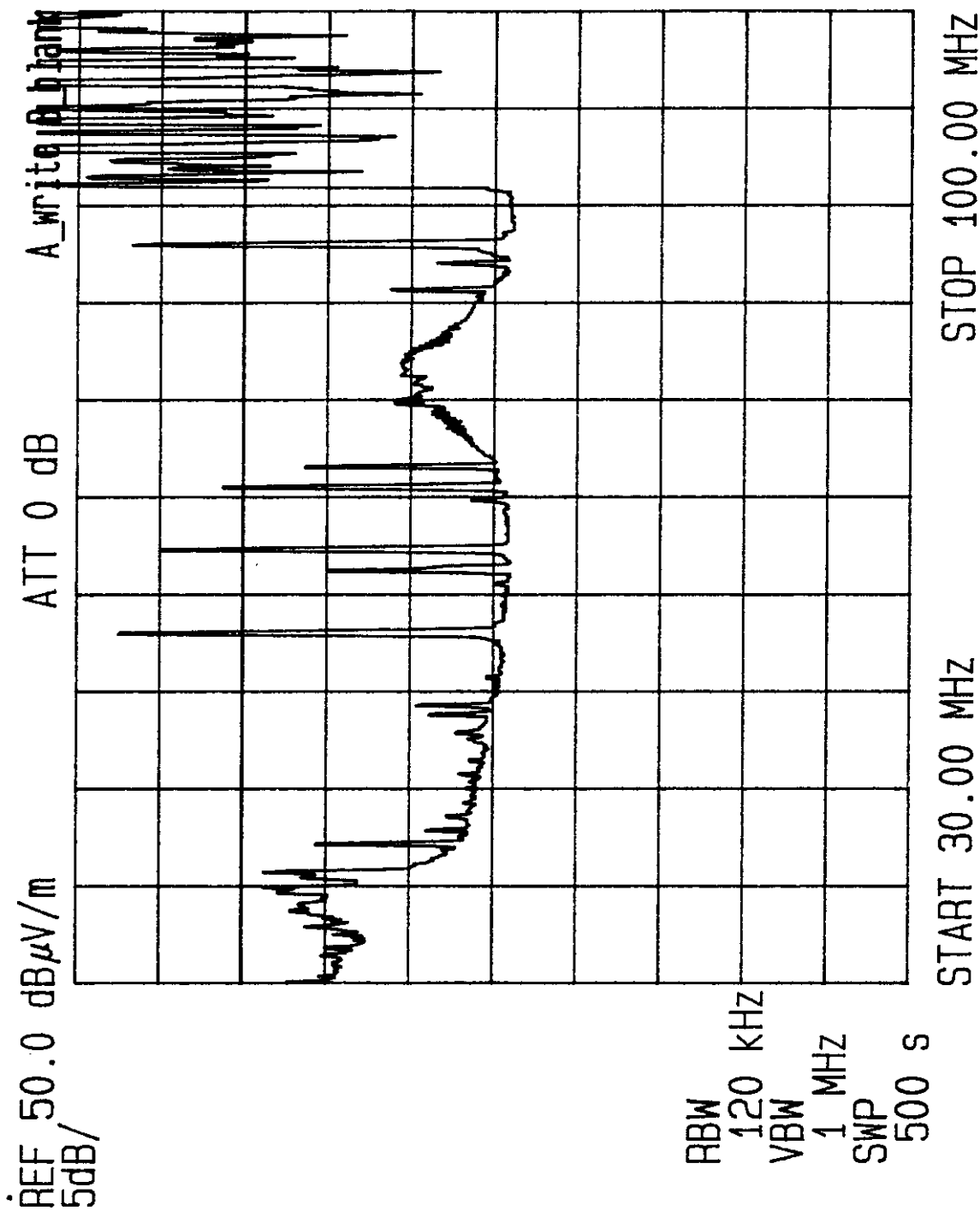


FIGURE 6.2.3-2



TEST: FCC RADIATED EUT: GEMINI 112K S/N: PROD #1  
FREQ: 100M-200MHZ SPEC: FCC CLASS B ANT. HT/POL: 1.5 m \H  
DETECTOR: Q P AMBIENT LINE UNDER TEST: N/A EUT POSITION:  
DATE: 7-28-98 TEST SITE: 3 METER TESTER: *AB*

FCC ID: MZNGMN112E

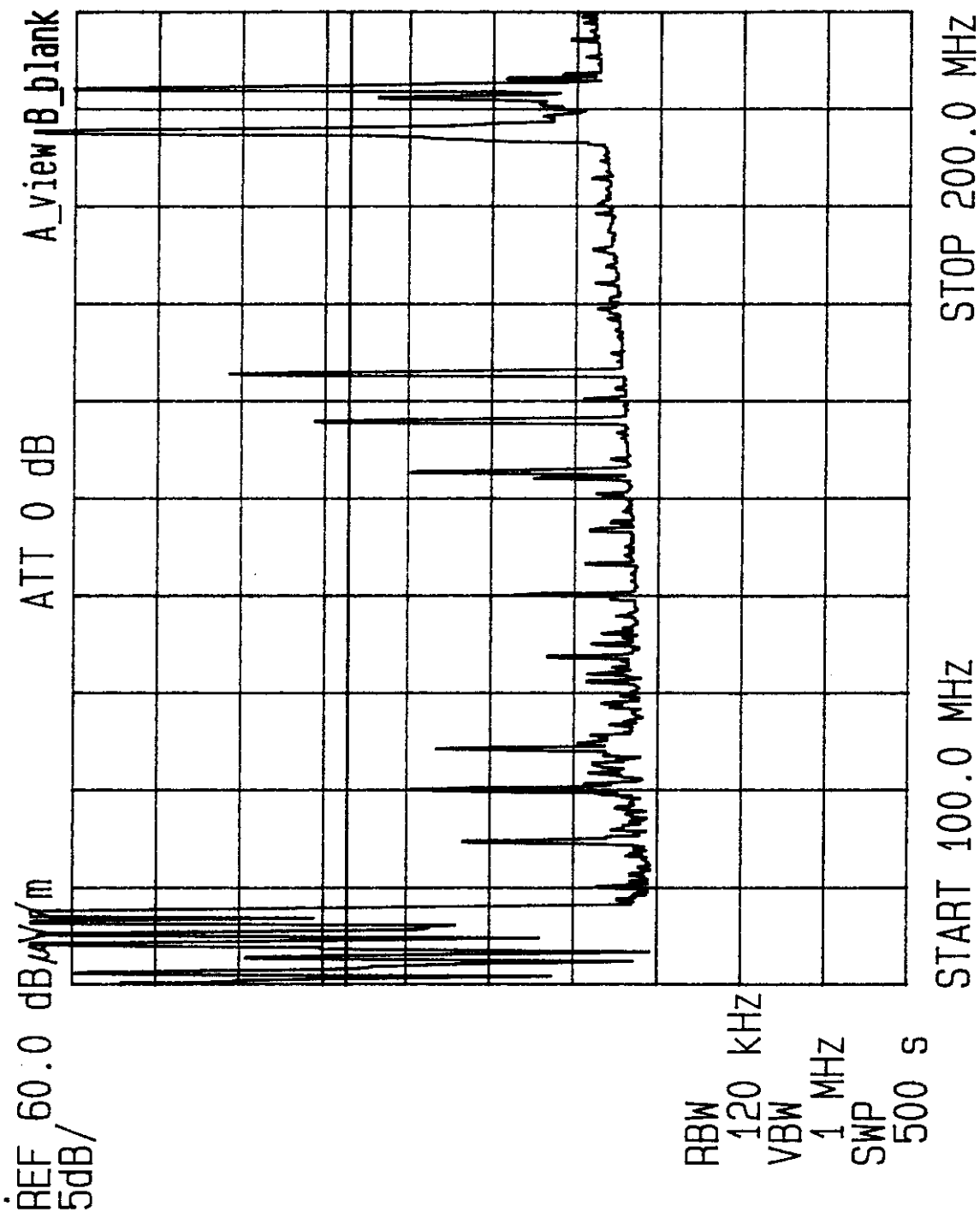


FIGURE 6.2.3-3



TEST: FCC RADIATED EUT: GEMINI 112K S/N: PROD #1  
FREQ: 100M-200MHZ SPEC: FCC CLASS B ANT.HT/POL: 1.75m \V  
DETECTOR: Q P AMBIENT LINE UNDER TEST: N/A EUT POSITION: -  
DATE: 7-28-98 TEST SITE: 3 METER TESTER: *AB*

FCC ID: MZNGMN112B

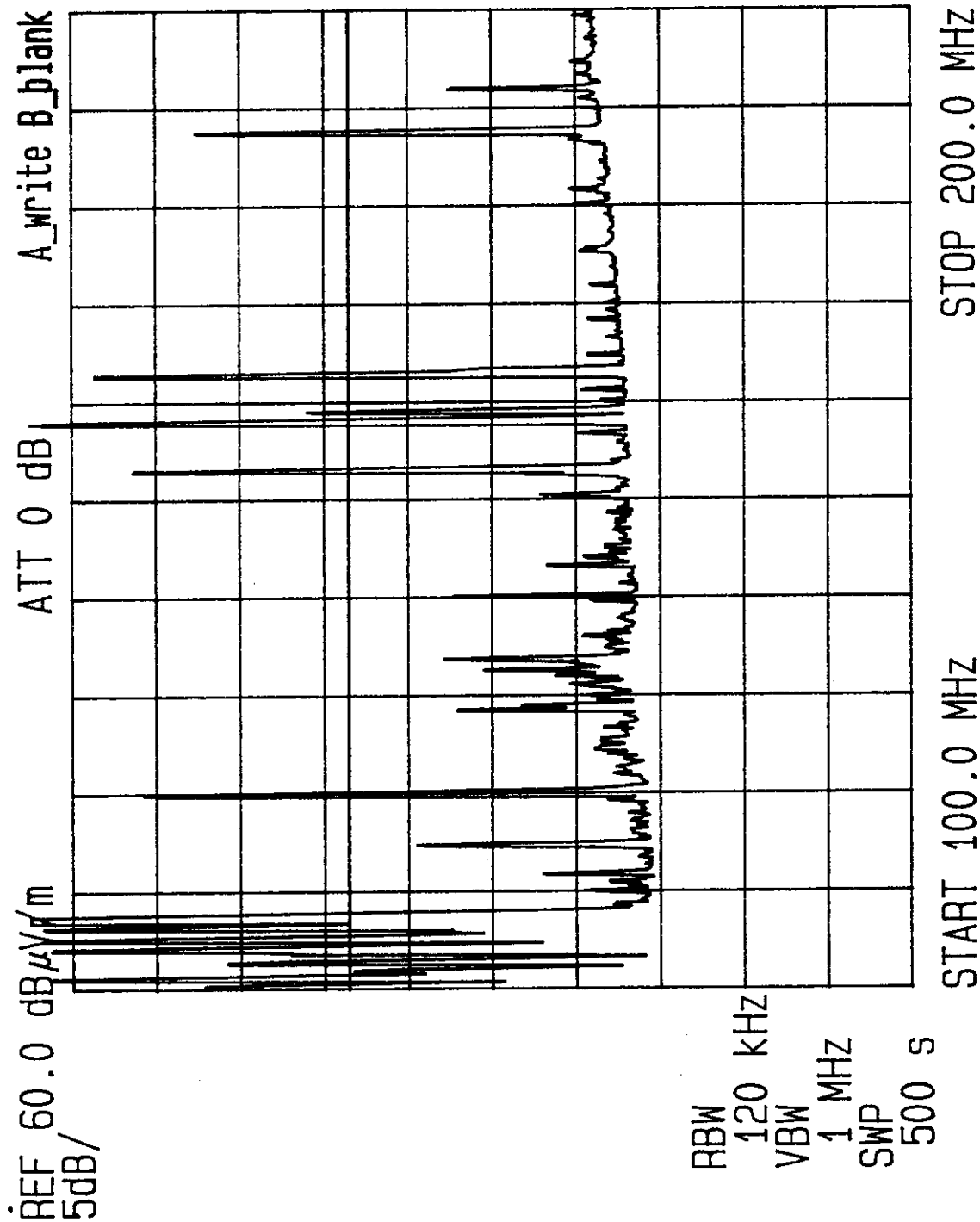


FIGURE 6.2.3-4



TEST: FCC RADIATED EUT: GEMINI 112K S/N: PROD #1  
FREQ: 200M-1GHz SPEC: FCC CLASS B ANT.HT/POL: 1.0m \H  
DETECTOR: Q P AMBIENT LINE UNDER TEST: N/A EUT POSITION: -  
DATE: 7-28-98 TEST SITE: 3 METER TESTER: AB

FCC ID: MZNGMN112K

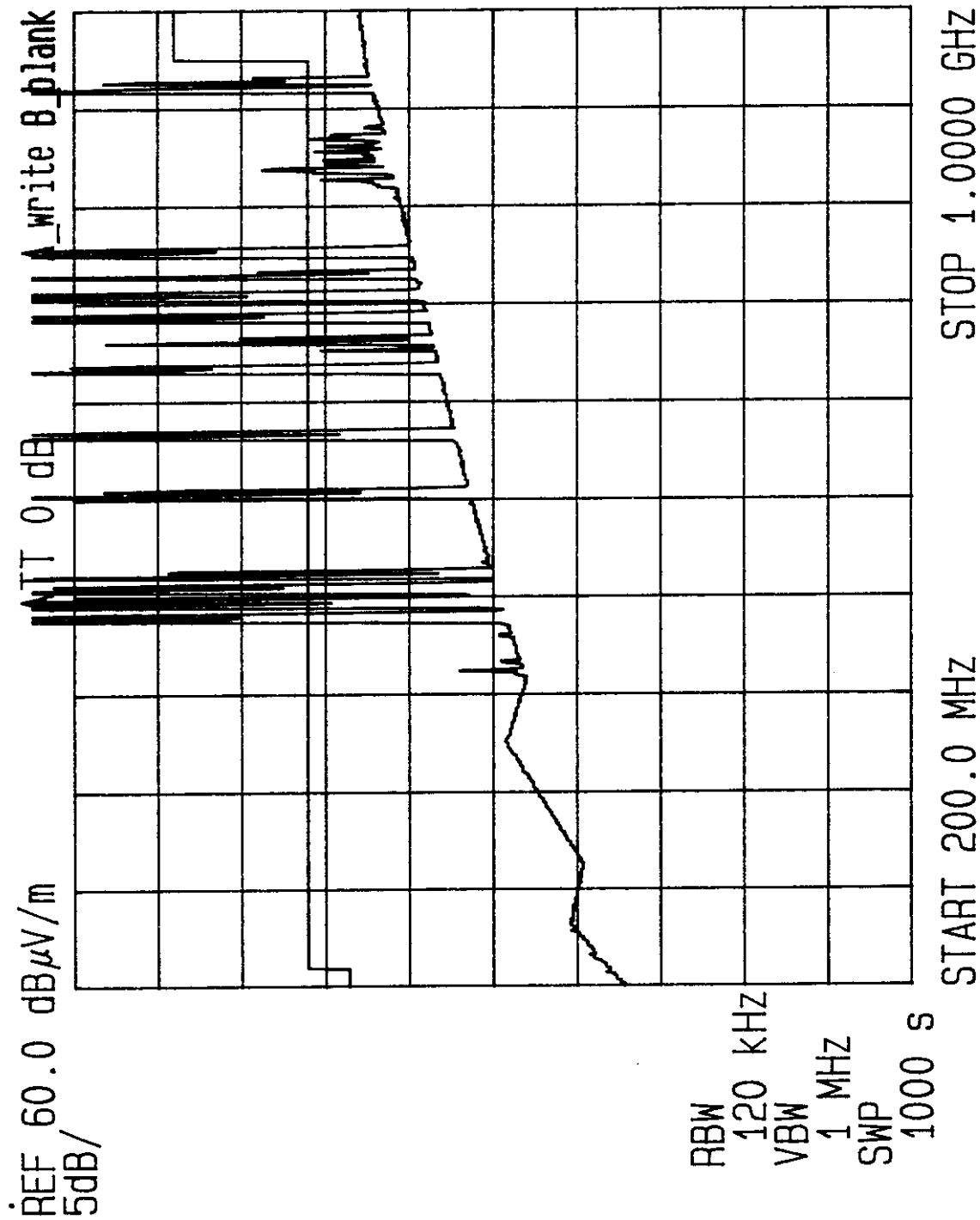


FIGURE 6.2.3-5



TEST: FCC RADIATED EUT: GEMINI 112K S/N: PROD #1  
FREQ: 200M-1GHZ SPEC: FCC CLASS B ANT.HT/POL: 6.5m \ V  
DETECTOR: Q P AMBIENT LINE UNDER TEST: N/A EUT POSITION: -  
DATE: 7-28-98 TEST SITE: 3 METER TESTER: AB

FCC ID: MZNGMN112E

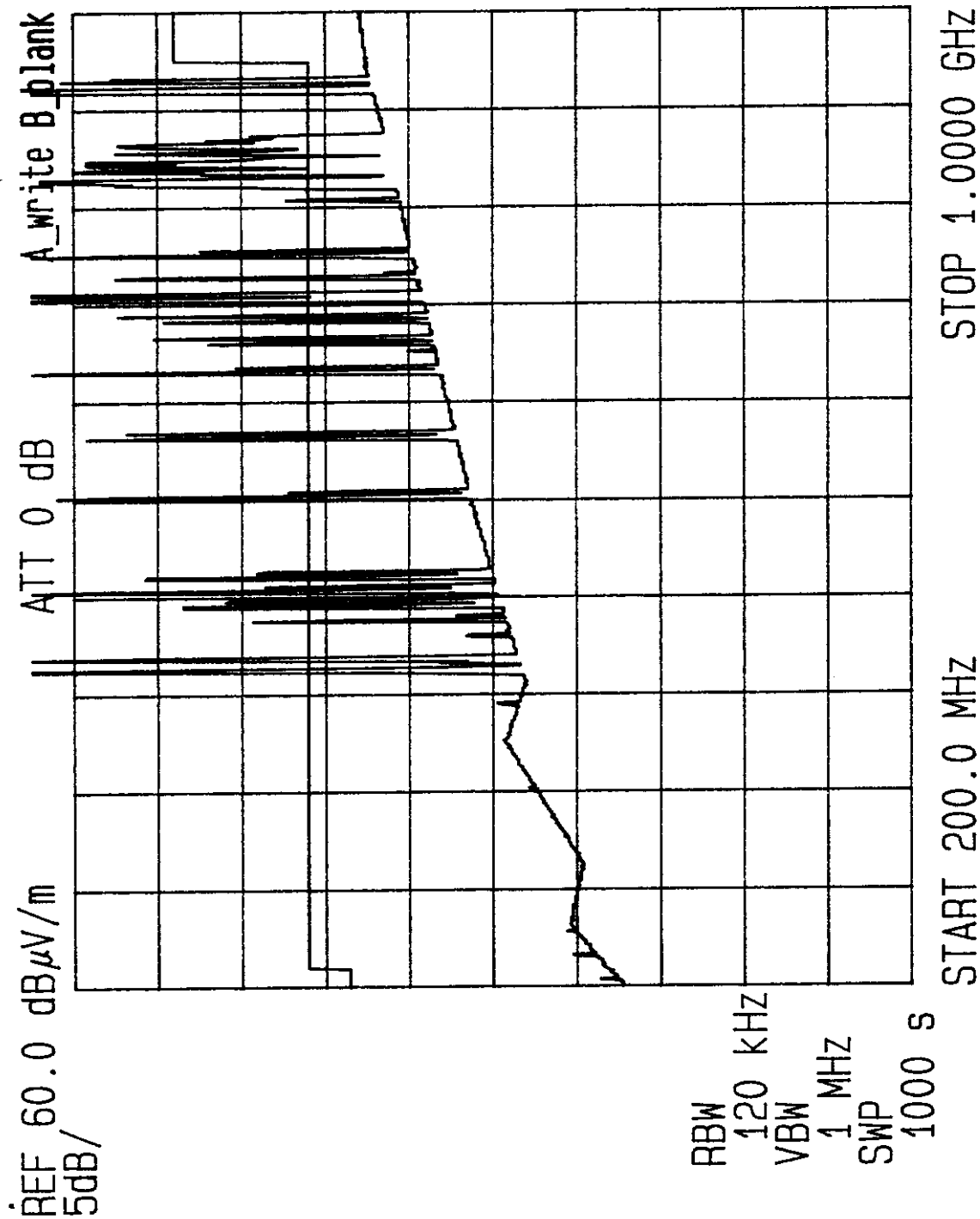


FIGURE 6.2.3-6

**APPENDIX A**  
**COMPLIANCE LETTER**

# FEDERAL COMMUNICATIONS COMMISSION

7435 Oakland Mills Road  
Columbia, MD 21046  
Telephone: 301-725-1585 (ext-218)  
Facsimile: 301-344-2050

**FCC ID: MZNGMN112E**

December 5, 1996

IN REPLY REFER TO  
31040/SIT  
1300F2

Rubicom Systems, Inc.  
284 West Drive, Suite B  
Melbourne, FL 32904

Attention: Joseph G. Barbee

Re: Measurement facility located at above address  
(3 meter site)

Gentlemen:

Your submission of the description of the subject measurement facility has been reviewed and found to be in compliance with the requirements of Section 2.948 of the FCC Rules. The description has, therefore, been placed on file and the name of your organization added to the Commission's list of facilities whose measurement data will be accepted in conjunction with applications for certification or notification under Parts 15 or 18 of the Commission's Rules. Our list will also indicate that the facility complies with the radiated and AC line conducted test site criteria in ANSI C63.4-1992. Please note that this filing must be updated for any changes made to the facility, and at least every three years the data on file must be certified as current.

Per your request, the above mentioned facility has been also added to our list of those who perform these measurement services for the public on a fee basis. This list is published periodically and is also available on the Laboratory's Public Access Link as described in the enclosed Public Notice.

Sincerely,



Thomas W. Phillips  
Electronics Engineer  
Customer Service Branch

Enclosure:  
PAL PN