RUBICOM SYSTEMS, INC.

FCC CLASS B TEST REPORT

FOR THE

TRANSEND CORPORATION

GEMINI 112K MODEM CARD

FCC ID: MZNGMN112I

COPY 1

RSI

NOVEMBER 1998

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

FCC ID: MZNGMN112I

FCC CLASS B TEST REPORT

FOR THE

TRANSEND CORPORATION

GEMINI 112K MODEM CARD

S/N: PROD #1

Prepared by: Joseph G Barbee 11/12/98

Joseph G. Barbee

Tested by: 11-12-98

Alex Belardinelli

Performed by:

RUBICOM SYSTEMS, INC.
284 West Drive, Suite B
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Performed for:

TRANSEND CORPORATION
2105 Rockledge Drive
Rockledge, Florida 32955

RECEIVED: November 3, 1998

COMPLETED: November 10, 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 card 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 card 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 11.2.98

Joseph G. Barbee
President

ABSTRACT

This report presents test results of the emanations found emitting from a Transend Gemini 112K modem card (s/n: PROD. 01) and the comparison of these emissions to the requirements of the FCC, Title 47, Part 15, Subpart B for Class B Digital devices. The Gemini 112K modem card is referenced in this document as the "modem card".

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 1609. The results of this test effort demonstrate compliance of the modem card to the FCC, Title 47, Part 15, Subpart B, Class B Digital devices. The modem card is an "add-on" card for installation in a host computer.

1.0 INTRODUCTION

1.1 Purpose

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

1.2 Requirements

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

CONDUCTED

Freq. (MHz)	μVolts	dB>μV
.450-30MHz	250	48

RADIATED

Freq. (MHz)	Distance Meters	Field Strength μV/M	20 Log 3 Meter dBμV/M
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 card is an internal mounted modem board added to a host computer. The card is installed in a personal computer for testing purposes.

The modem card has three standard RJ-11 ports and 1 each RJ-45 port. A standard telephone was installed in one of the RJ-11 ports. Two meter phone cables were installed in the remaining RJ-11 ports. The RJ-45 port was loaded with a Gemini modem status device.

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 conducted measurements were performed on the host computer power with the modem installed.

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 5dB. 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.

There was one modification required for compliance. A signal at MHz exceeded the Class B limits. A ferrite block with one turn was installed on the RJ-45 load cable. The level was reduced to 4dB below the requirement.

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: **November 9, 1998**

Temperature: **72°F**

Barometer: **30.12 inches**

Humidity: **68%**

4.0 TEST INSTRUMENTATION

The following test equipment was used to perform this testing.

Qty.	Description	Manufacturer	Model No.	Last Cal.	Cal Cycle
1	Spectrum Analyzer	Advantest	R3271	09/09/98	1 yr
1	Power Line Stab. Network	Solar Elect.	8012-50-5-24-BNC	NCR	
1	Plotter	Hewlett Packard	7440A	NCR	
1	BiLog Antenna	Chase	CLB6111B	07/24/98	1 yr

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.

*One Standard AT&T Phone
*Two each Phone Cables (Approximately 2 Meters)
*One each Computer 25 Pin Subminiature Cable (6 ft.)
*One Gemini Status Unit (RJ-45 Connection)

The unit was installed in an empty ISA slot. Windows 95 detects the modem and uses an existing driver. The setup instructions are included in Appendix B. The modem was tested using the RSI minimum system components as listed below:

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

Testing was performed on a production unit supplied by Transend Corporation. Modifications were required on one RJ-45 port. The cable connected to the RJ-45 interface port allowed radiation above the Class B limits. A ferrite block was added to the cable within 3 inches of the card interface plug. The cable was installed with a one turn loop around the ferrite block. The ferrite block was a Fair-Rite p/n: 28A2029-0A0.

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

The test setup for radiated data is shown in Photo 2.

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 (50μH/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

Frequency (MHz)	Antenna Pol.	Elevation	Azimuth	Measured (dBμV/m)	Q.P. Limit (dBμV/m @ 3 Meters	Margin (dB)
221MHz	H	1.25M	202°	36.0	47.0	-10.0
398MHz	V	1.5M	135°	42.0	46.0	-4.0
429MHz	V	1.5M	135°	37.0	46.0	-9.0
487MHz	V	1.5M	180°	40.0	46.0	-6.0
553MHz	V	1.25M	292°	40.0	46.0	-6.0
685MHz	V	1.25M	180°	42.0	46.0	-4.0

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: TRANSEND P-n-P GEMINI S/N: PROD. 01
FREQ: 450K-30MHz SPEC: CFR 15.249 ANT.HT/POL: N/A
DETECTOR: PEAK LINE UNDER TEST: NEUTRAL EUT POSITION: FRONT
DATE: 11/9/98 TEST SITE: ROOM 1 TESTER:

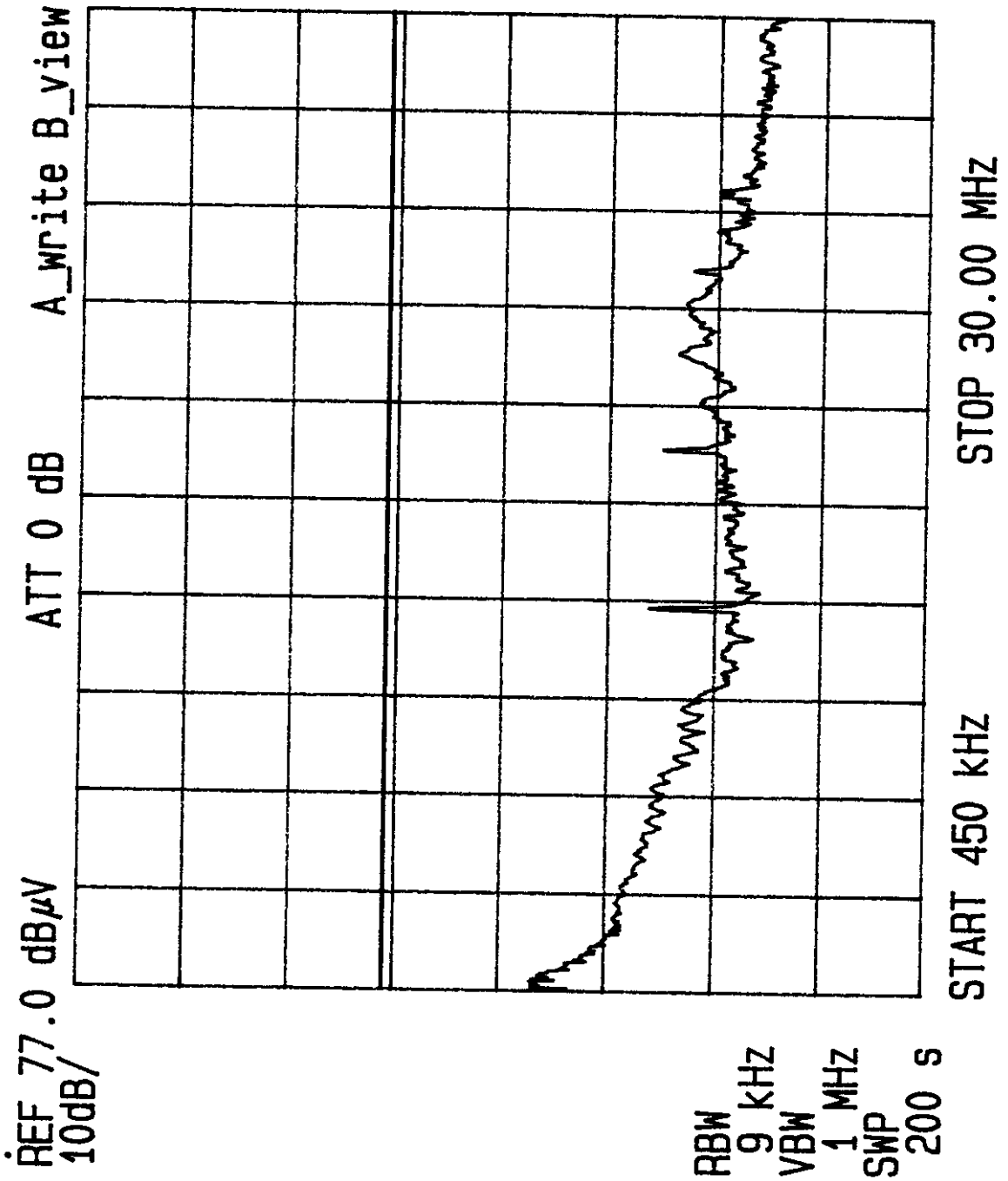

FIGURE 6.1-1

TEST: FCC CONDUCTED	EUT: TRANSEND P-n-P GEMINI	S/N: PROD. 01
FREQ: 450K-30MHz	SPEC: CFR 15.249	ANT.HT/POL: N/A
DETECTOR: PEAK	LINE UNDER TEST: PHASE	EUT POSITION: FRONT
DATE: 11/9/98	TEST SITE: ROOM 1	TESTER:

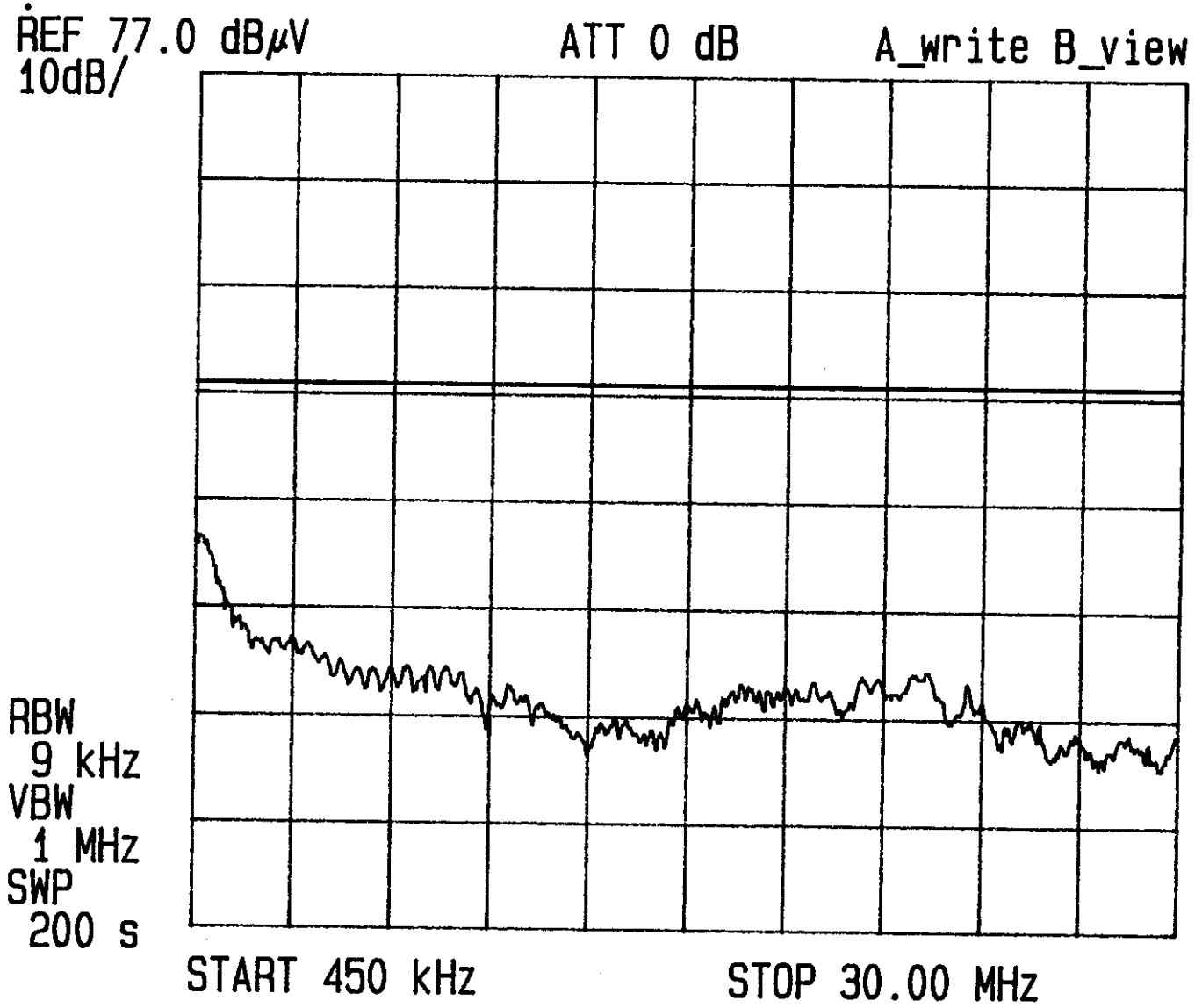

FIGURE 6.1-2

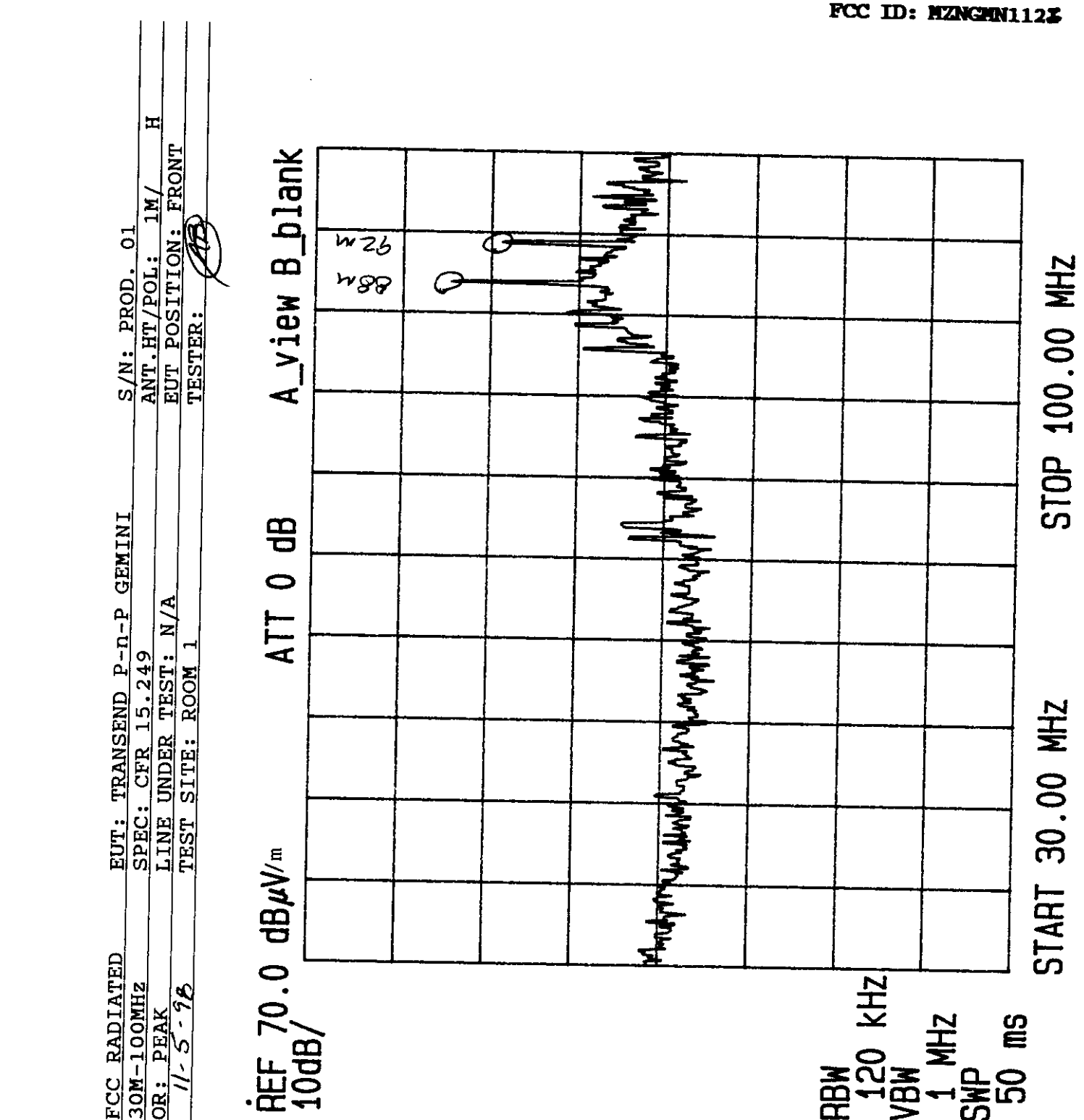
TEST: FCC RADIATED EUT: TRANSEND P-n-P GEMINI S/N: PROD. 01
FREQ: 30M-100MHz SPEC: CFR 15.249 ANT.HT/POL: 1M/ H
DETECTOR: PEAK LINE UNDER TEST: N/A EUT POSITION: FRONT
DATE: 11-5-98 TEST SITE: ROOM 1 TESTER:
REF 70.0 dBµV/m
10dB/
ATT 0 dB
A_view B_blank
88m
92m
RBW 120 kHz
VBW 1 MHz
SWP 50 ms
START 30.00 MHz
STOP 100.00 MHz

FIGURE 6.2.1-1

TEST: FCC RADIATED EUT: TRANSEND P-n-P GEMINI S/N: PROD. 01
FREQ: 100M-200MHz SPEC: CFR 15.249 ANT.HT/POL: 1M/ H
DETECTOR: PEAK LINE UNDER TEST: N/A EUT POSITION: FRONT
DATE: 11-5-98 TEST SITE: ROOM 1 TESTER:

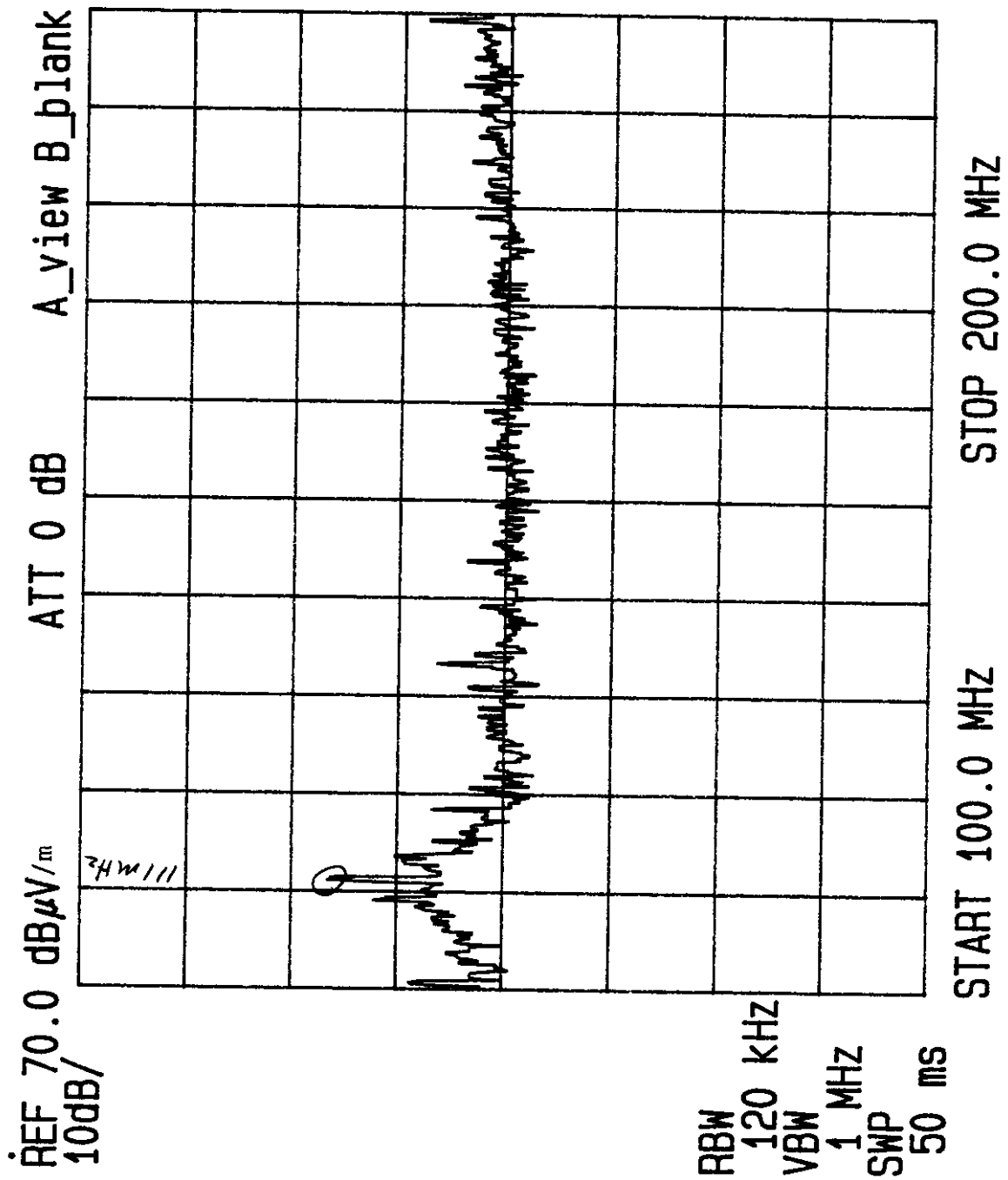

FIGURE 6.2.1-2

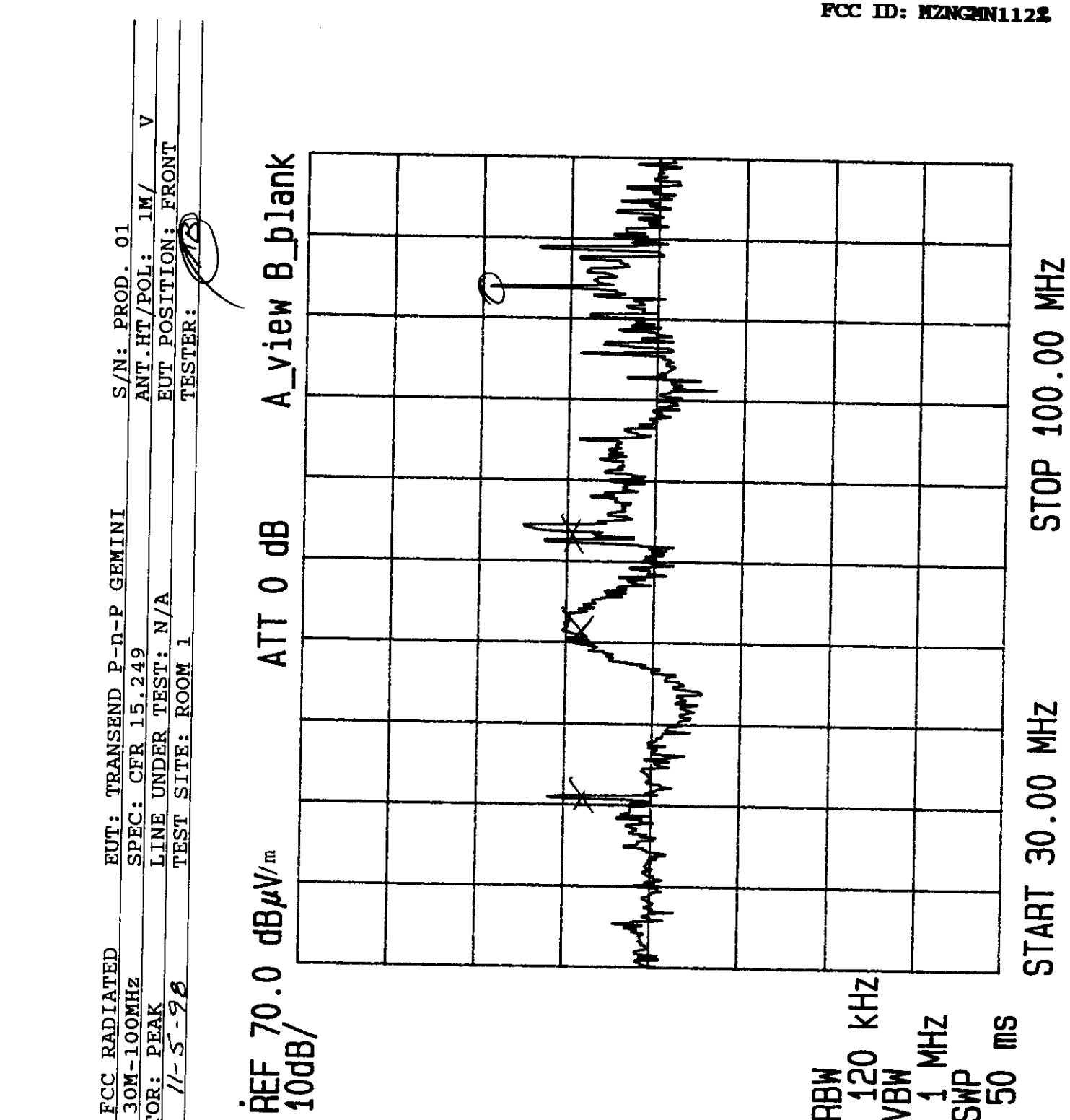
TEST: FCC RADIATED
EUT: TRANSEND P-n-P GEMINI
S/N: PROD. 01
FREQ: 30M-100MHz
SPEC: CFR 15.249
ANT.HT/POL: 1M/ V
DETECTOR: PEAK
LINE UNDER TEST: N/A
EUT POSITION: FRONT
DATE: 11-5-98
TEST SITE: ROOM 1
TESTER:
REF 70.0 dBμV/m
10dB/
ATT 0 dB
A_view B_blank
RBW 120 kHz
VBW 1 MHz
SWP 50 ms
START 30.00 MHz
STOP 100.00 MHz

FIGURE 6.2.1-3

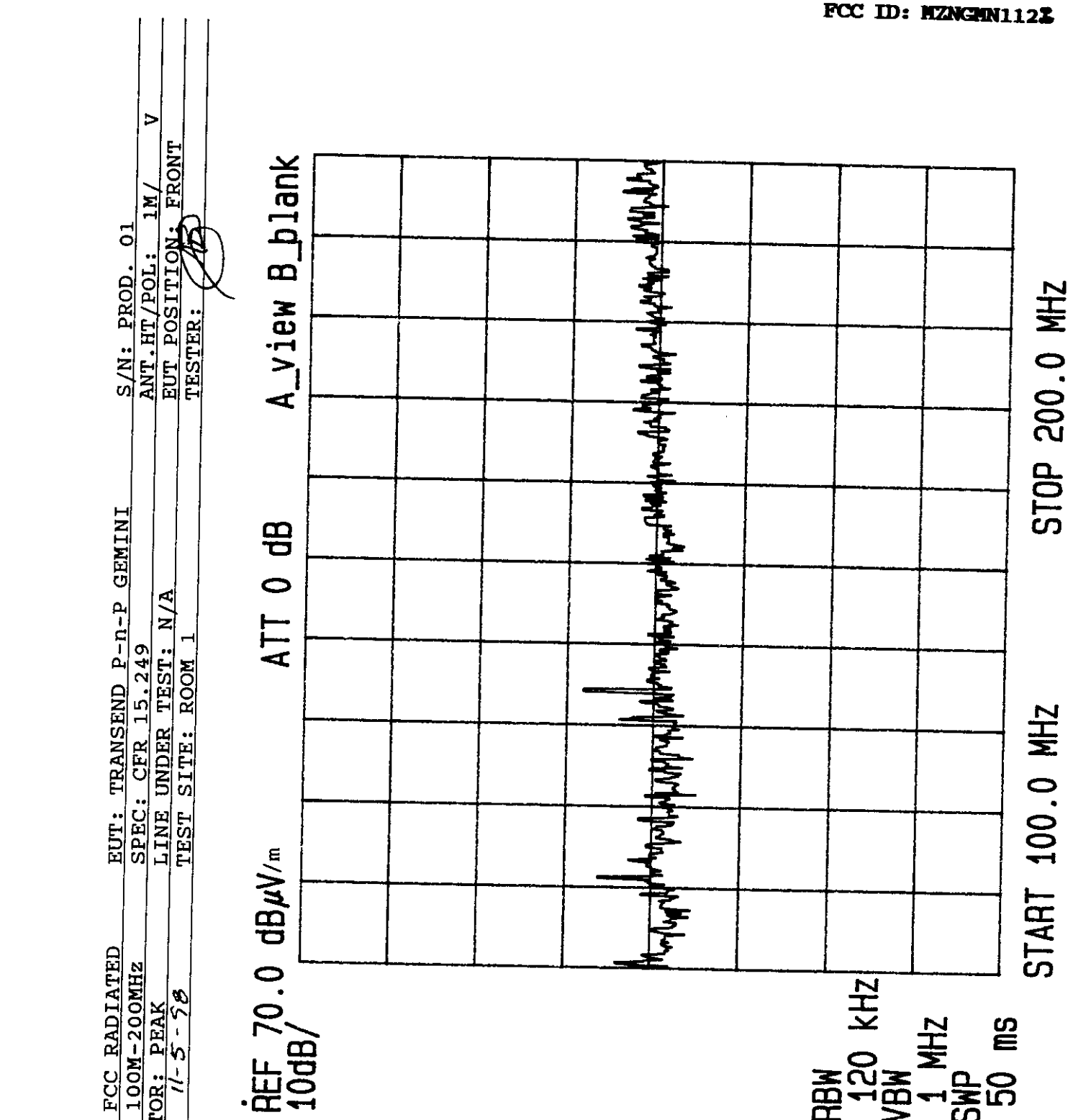
TEST: FCC RADIATED
EUT: TRANSEND P-n-P GEMINI
S/N: PROD. 01
FREQ: 100M-200MHz
SPEC: CFR 15.249
ANT.HT/POL: 1M/ V
DETECTOR: PEAK
LINE UNDER TEST: N/A
EUT POSITION: FRONT
DATE: 11-5-98
TEST SITE: ROOM 1
TESTER:
REF 70.0 dBµV/m
10dB/
ATT 0 dB
A_view B_blank
RBW 120 kHz
VBW 1 MHz
SWP 50 ms
START 100.0 MHz
STOP 200.0 MHz

FIGURE 6.2.1-4

TEST: FCC RADIATED	EUT: TRANSEND P-n-P GEMINI	S/N: PROD. 01
FREQ: 200M-1GHz	SPEC: CFR 15.249	ANT.HT/POL: 1M/ H
DETECTIOR: PEAK	LINE UNDER TEST: N/A	EUT POSITION: FRONT
DATE: 11-5-98	TEST SITE: ROOM 1	TESTER:

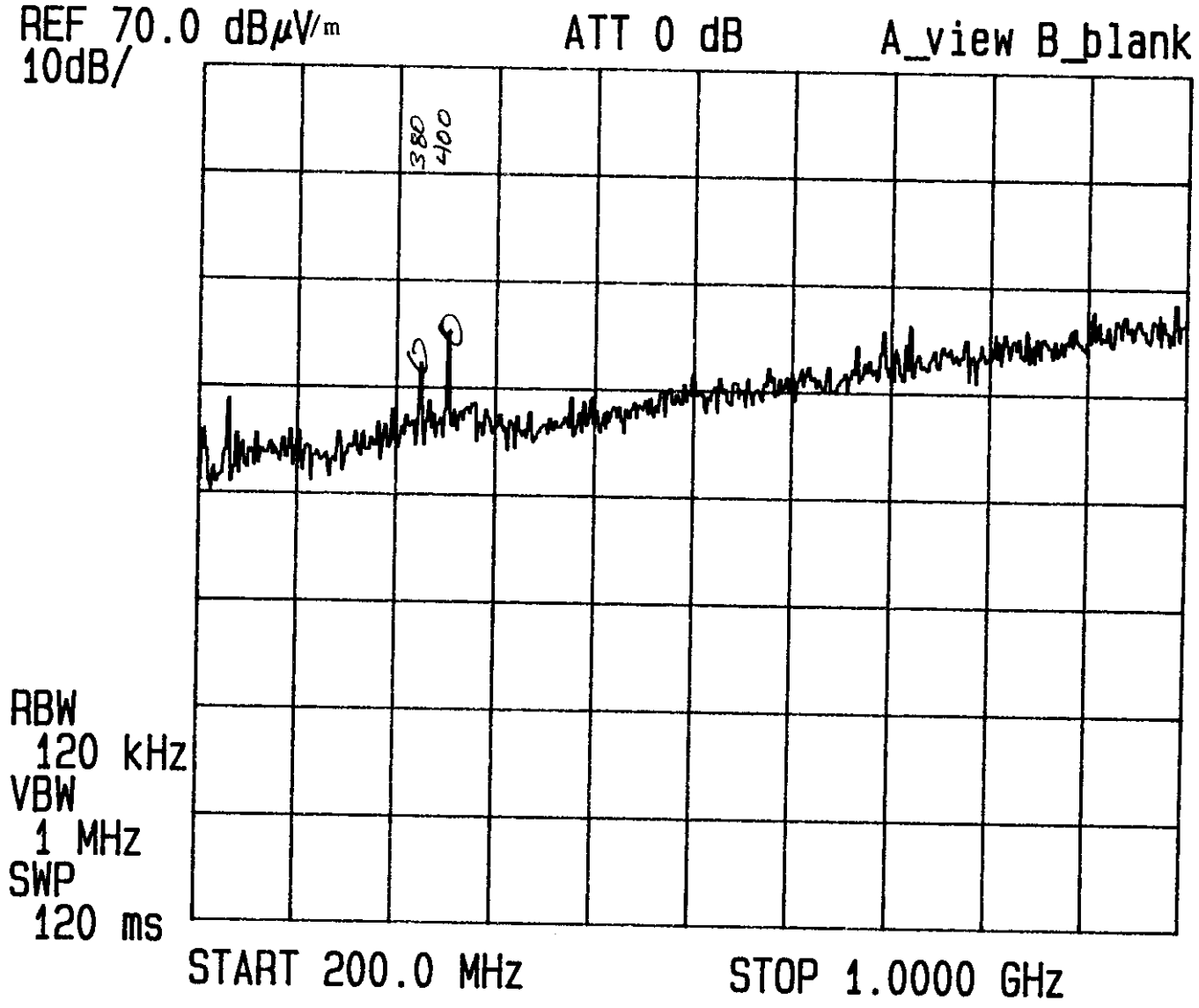

FIGURE 6.2.1-5

TEST: FCC RADIATED	EUT: TRANSEND P-n-P GEMINI	S/N: PROD. 01
FREQ: 200M-1GHz	SPEC: CFR 15.249	ANT.HT/POL: 1M/ V
DETECTION: PEAK	LINE UNDER TEST: N/A	EUT POSITION: FRONT
DATE: 11-5-98	TEST SITE: ROOM 1	TESTER:

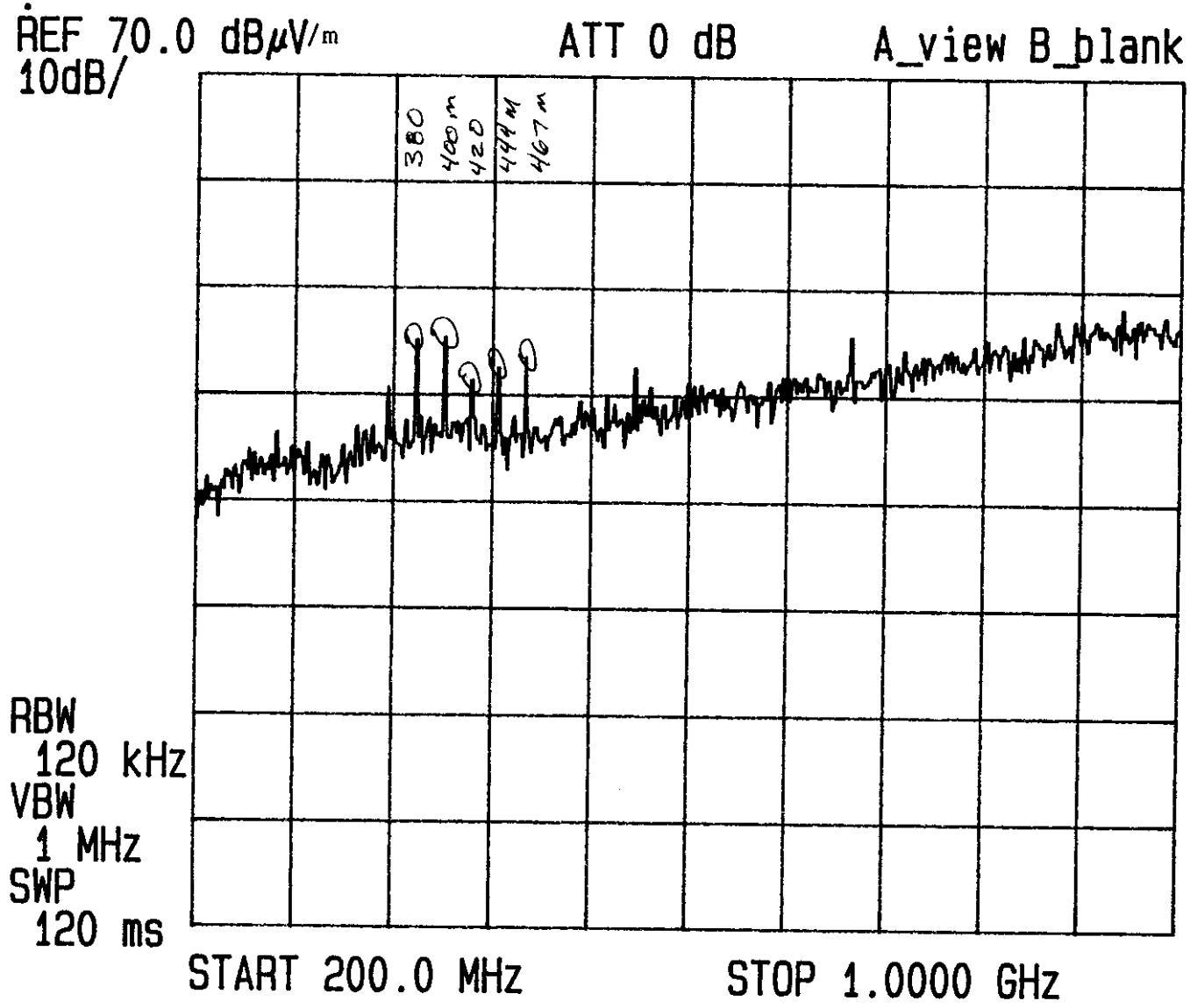

FIGURE 6.2.1-6

TEST: FCC RADIATED EUT: TRANSEND P-n-P GEMINI S/N: PROD. 01
FREQ: 30M-100MHz SPEC: CFR 15.249 ANT.HT/POL: 1.25 H
DETECTOR: QUASI PEAK LINE UNDER TEST: N/A EUT POSITION: 202
DATE: 11/9/99 TEST SITE: 3 METER TESTER:

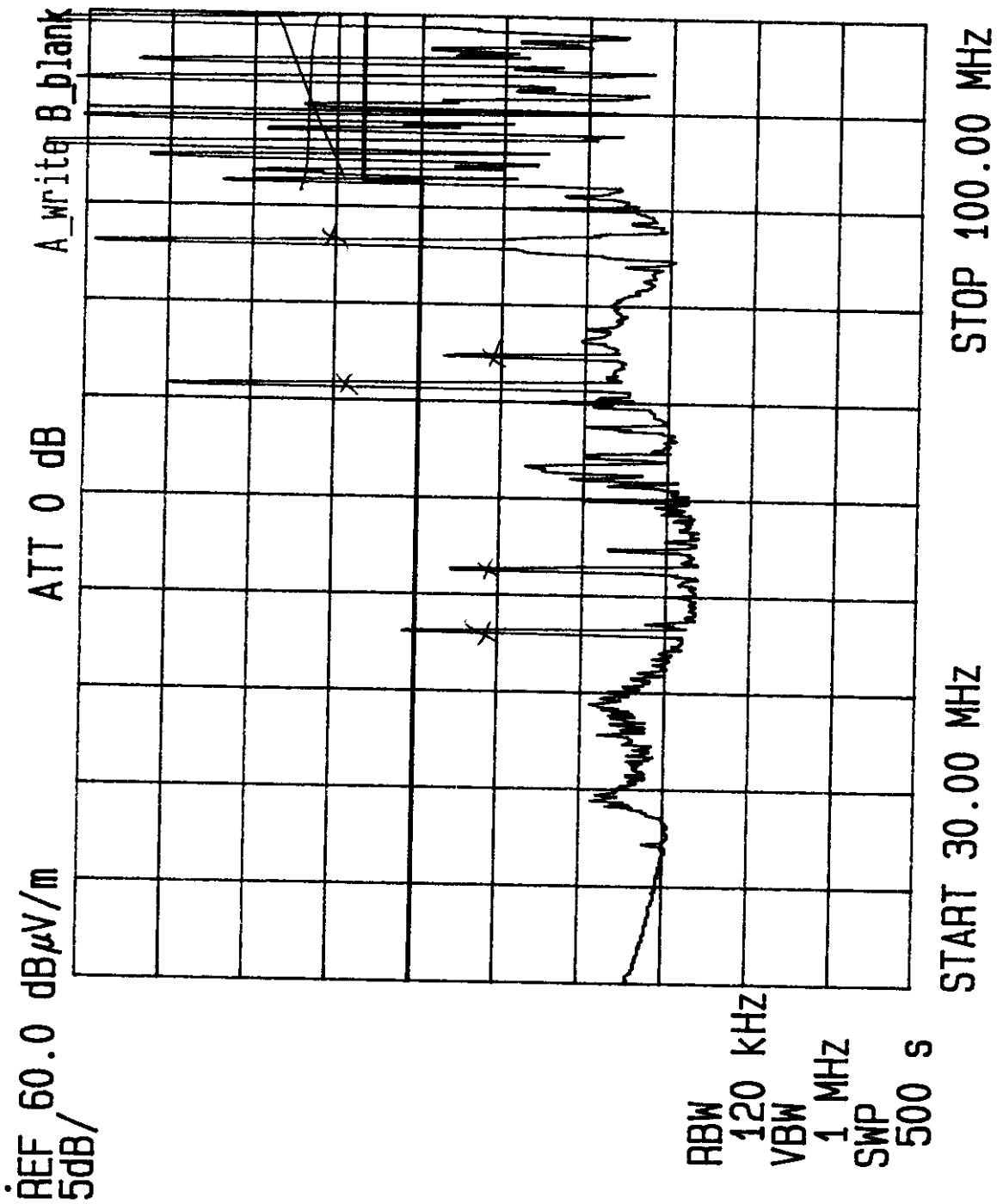

FIGURE 6.2.2-1

TEST: FCC RADIATED EUT: TRANSEND P-n-P GEMINI S/N: PROD. 01
FREQ: 30M-100MHz SPEC: CFR 15.249 ANT.HT/POL: 1.5m V
DETECTOR: QUASI PEAK LINE UNDER TEST: N/A EUT POSITION: 135°
DATE: 11/9/99 TEST SITE: 3 METER TESTER:

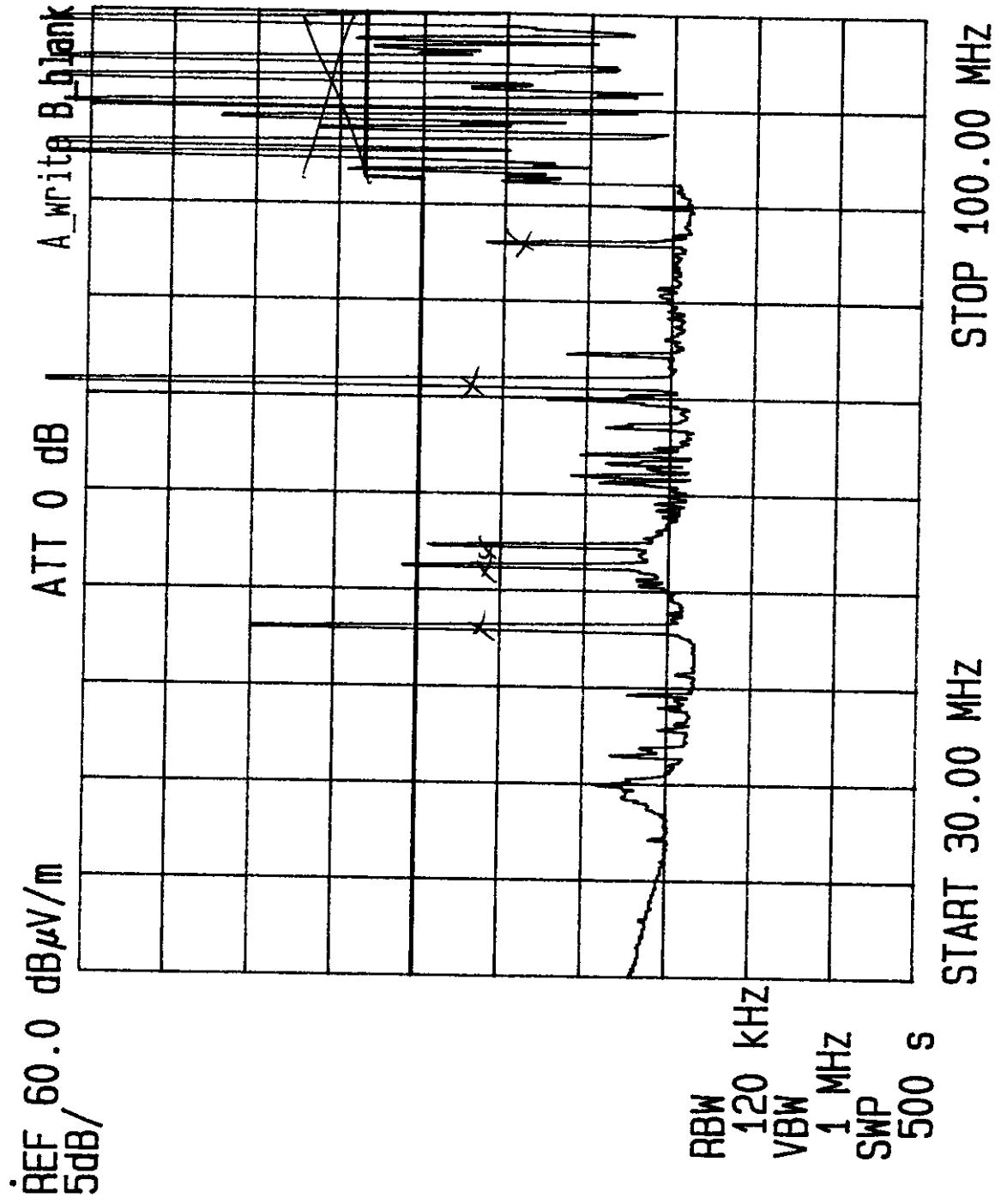

FIGURE 6.2.2-2

TEST: FCC RADIATED	EUT: TRANSEND P-n-P GEMINI	S/N: PROD. 01
FREQ: 100M-200MHz	SPEC: CFR 15.249	ANT.HT/POL: 1.5m V
DETECTOR: QUASI PEAK	LINE UNDER TEST: N/A	EUT POSITION: 135°
DATE: 11/9/98	TEST SITE: 3 METER	TESTER:

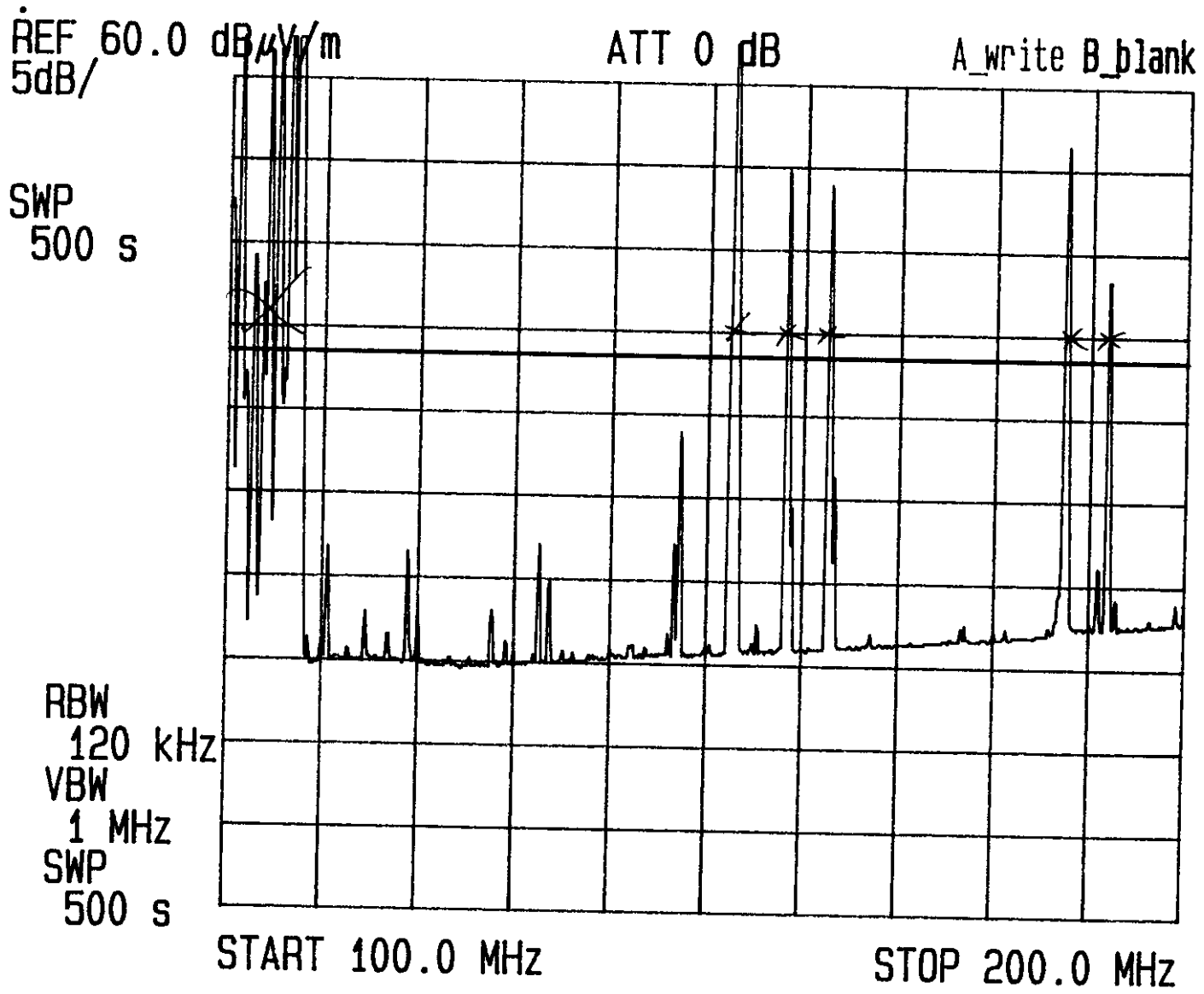

FIGURE 6.2.2-3

TEST: FCC RADIATED	EUT: TRANSEND P-n-P GEMINI	S/N: PROD. 01
FREQ: 100M-200MHz	SPEC: CFR 15.249	ANT.HT/POL: 1.25 H
DETECTOR: QUASI PEAK	LINE UNDER TEST: N/A	EUT POSITION: 60°
DATE: 11/9/98	TEST SITE: 3 METER	TESTER:

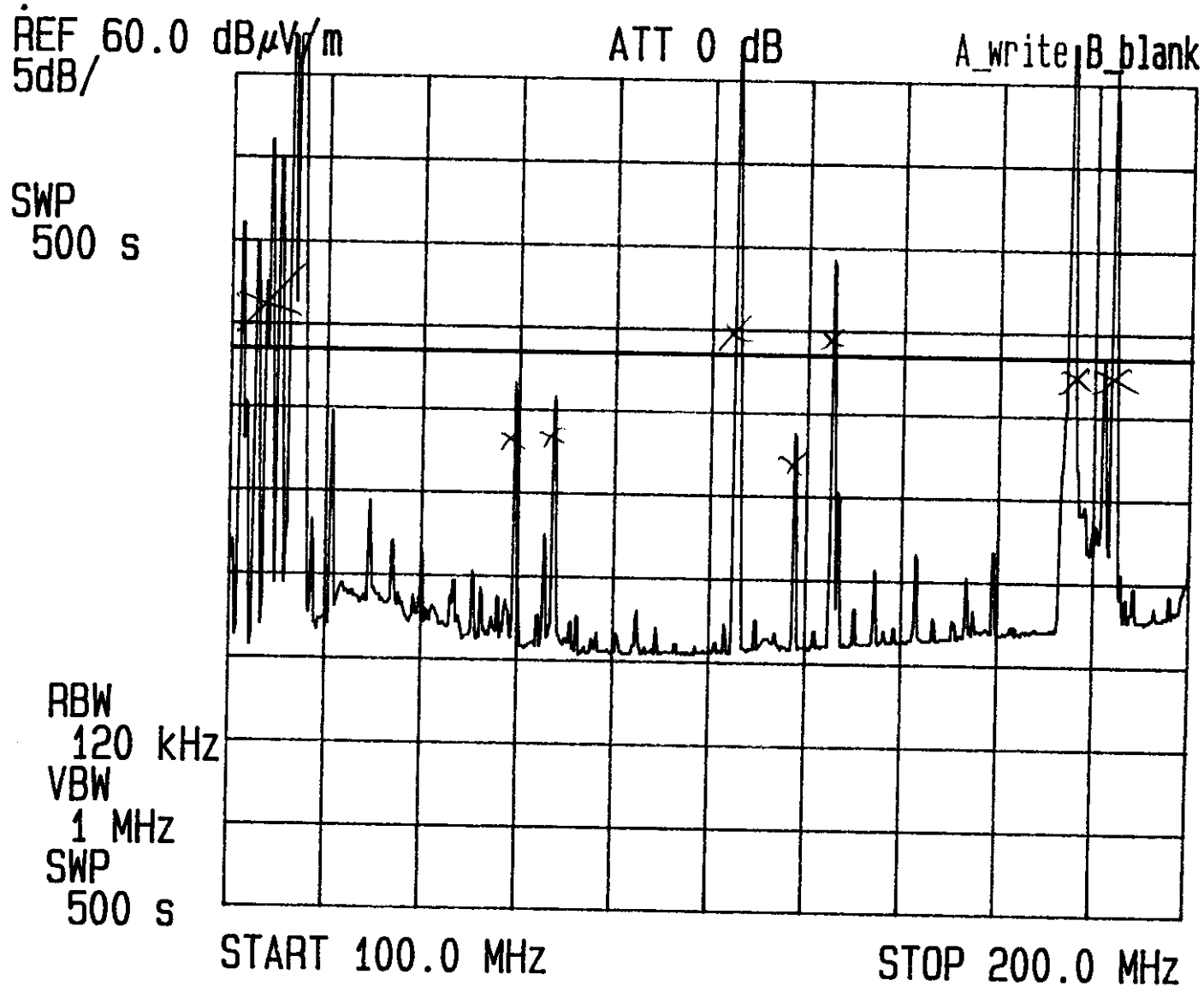

FIGURE 6.2.2-4

TEST: FCC RADIATED	EUT: TRANSEND P-n-P GEMINI	S/N: PROD. 01
FREQ: 200M-1GHz	SPEC: CFR 15.249	ANT.HT/POL: 1.25m\H
DETECTOR: QUASI PEAK	LINE UNDER TEST: N/A	EUT POSITION: 202°
DATE: 11-9-98	TEST SITE: 3 METER	TESTER: AB

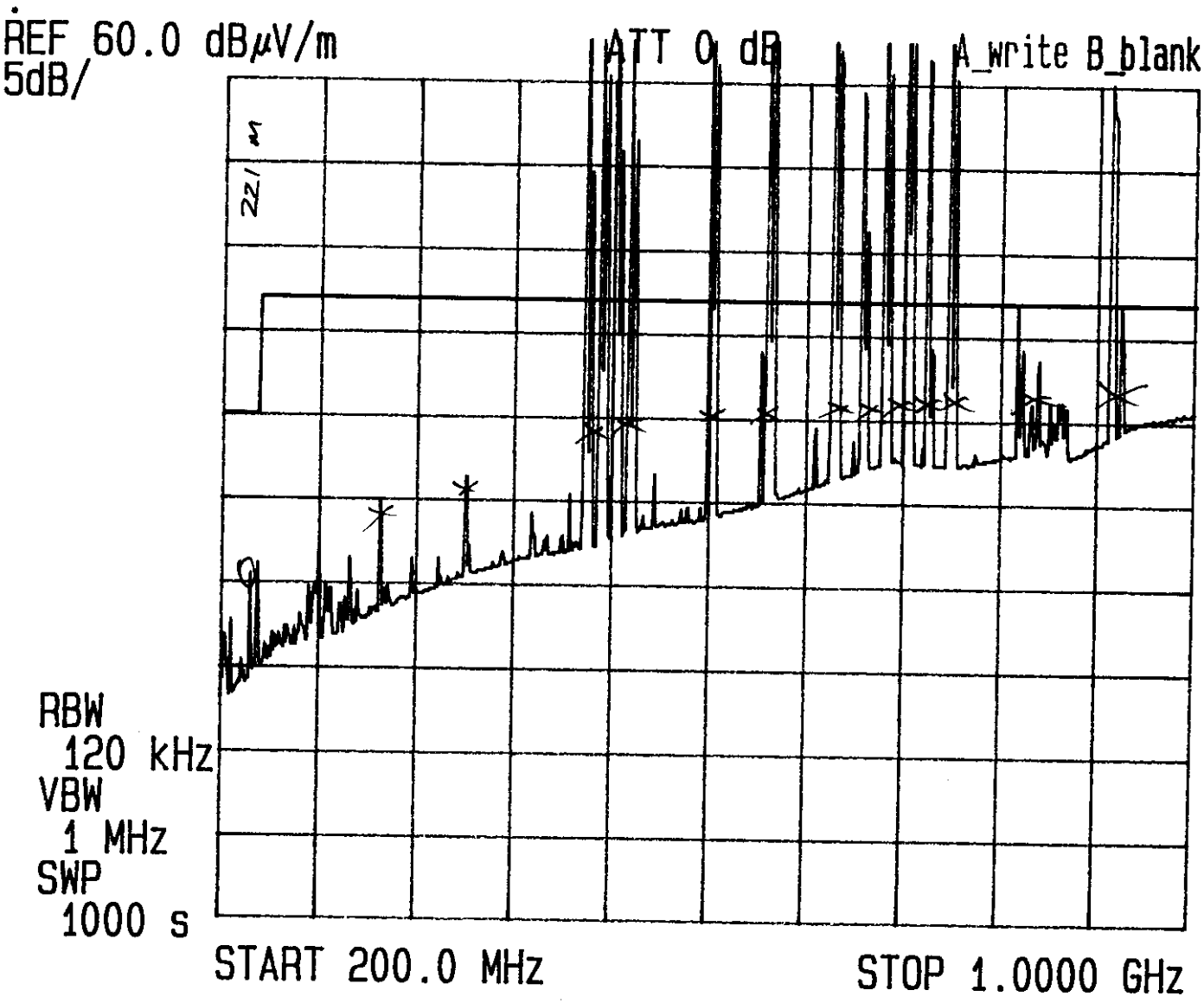

FIGURE 6.2.2-5

TEST: FCC RADIATED EUT: TRANSEND P-n-P GEMINI S/N: PROD. 01
FREQ: 200M-1GHz SPEC: CFR 15.249 ANT.HT/POL: 1.5m / V
DETECTOR: QUASI PEAK LINE UNDER TEST: N/A EUT POSITION: 135°
DATE: 11-9-98 TEST SITE: 3 METER TESTER:

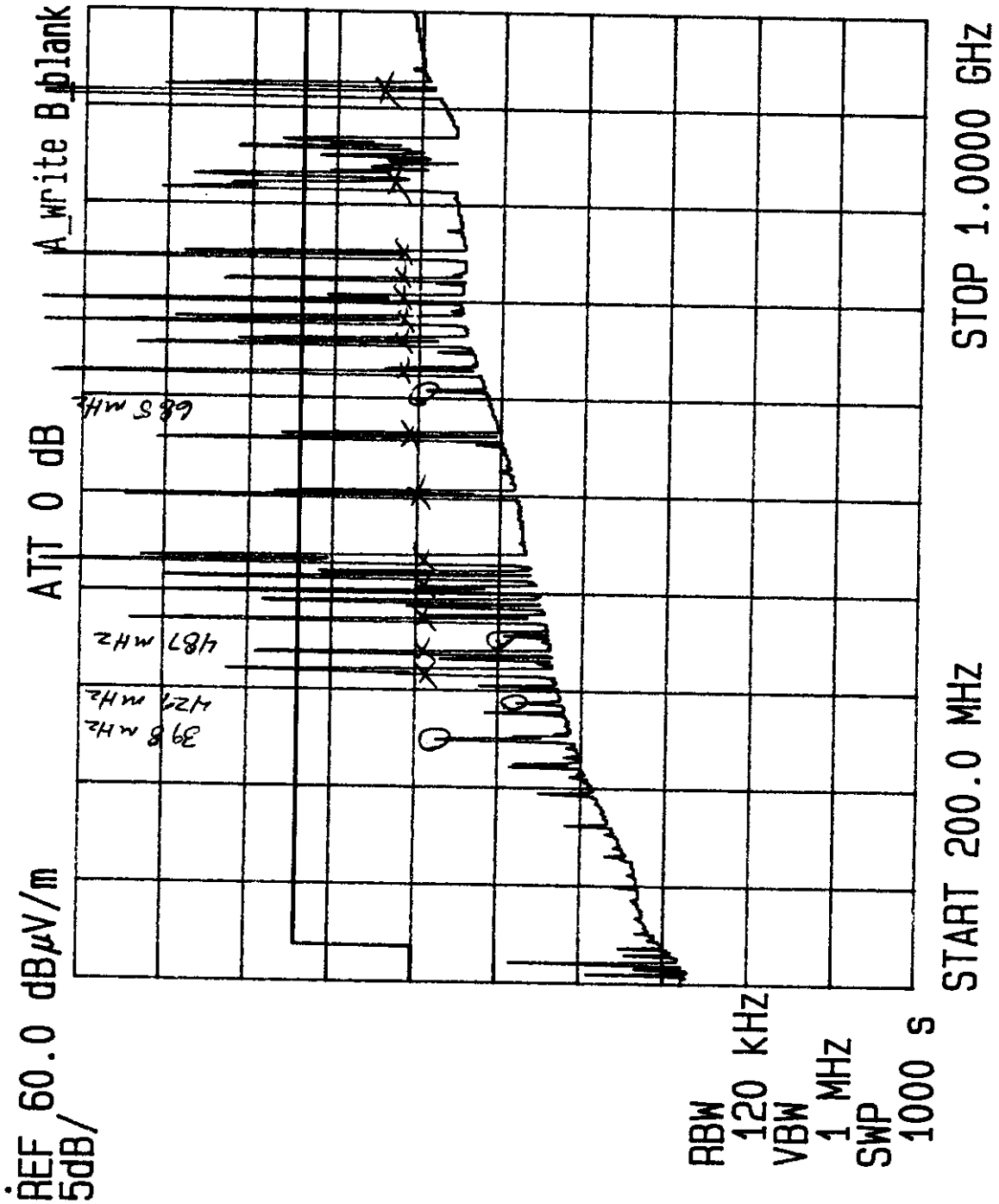

FIGURE 6.2.2-6

TEST: FCC RADIATED	EUT: TRANSEND P-n-P GEMINI	S/N: PROD. 01
FREQ: 30M-100MHz	SPEC: CFR 15.249	ANT.HT/POL: 1.25 H
DETECTOR: Q P AMBIENT	LINE UNDER TEST: N/A	EUT POSITION:
DATE: 11/9/98	TEST SITE: 3 METER	TESTER:

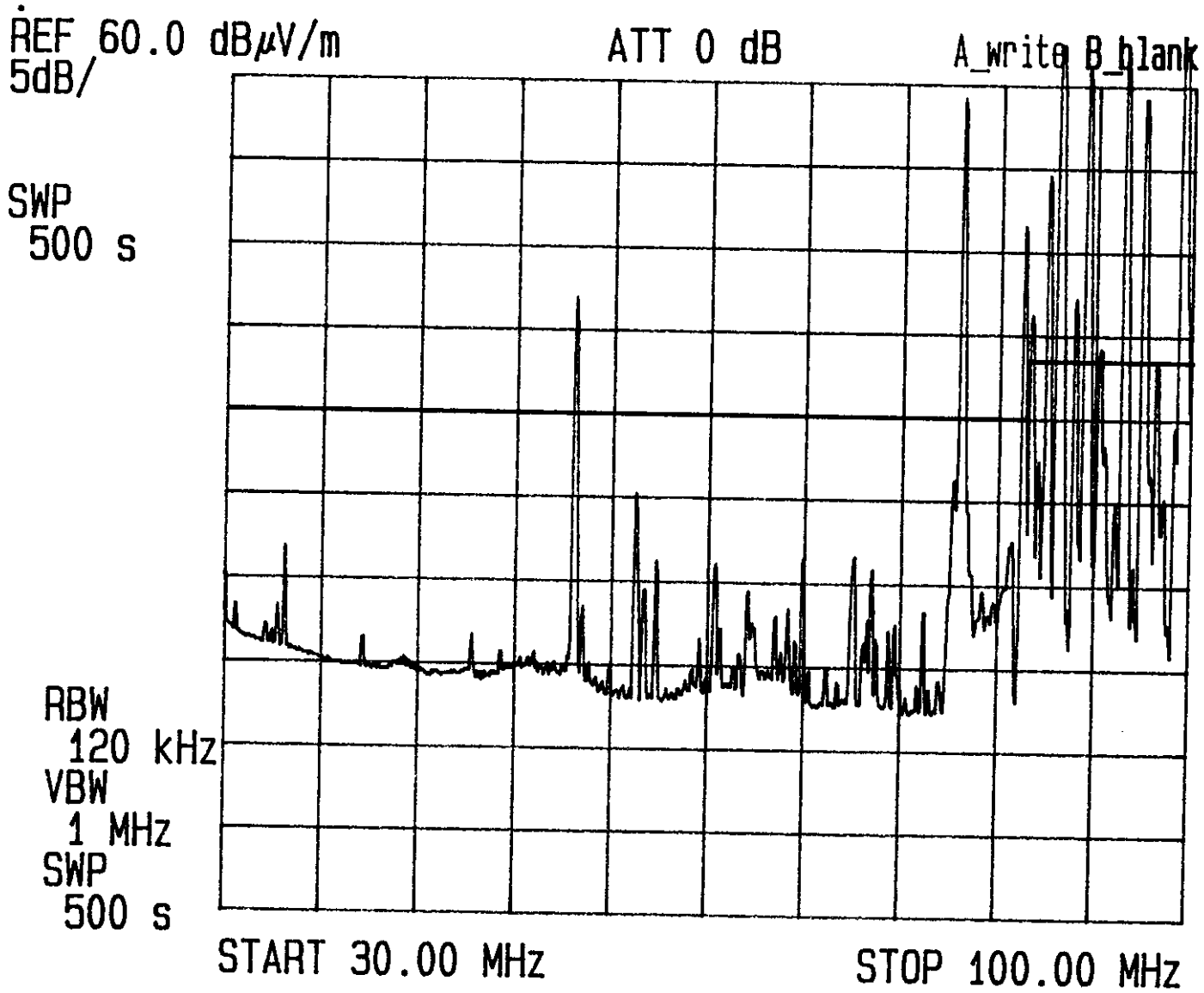

FIGURE 6.2.3-1

TEST: FCC RADIATED EUT: TRANSEND P-n-P GEMINI S/N: PROD. 01
FREQ: 30M-100MHz SPEC: CFR 15.249 ANT.HT/POL: 1.5' V
DETECTOR: Q P AMBIENT LINE UNDER TEST: N/A EUT POSITION: —
DATE: 11/4/98 TEST SITE: 3 METER TESTER:

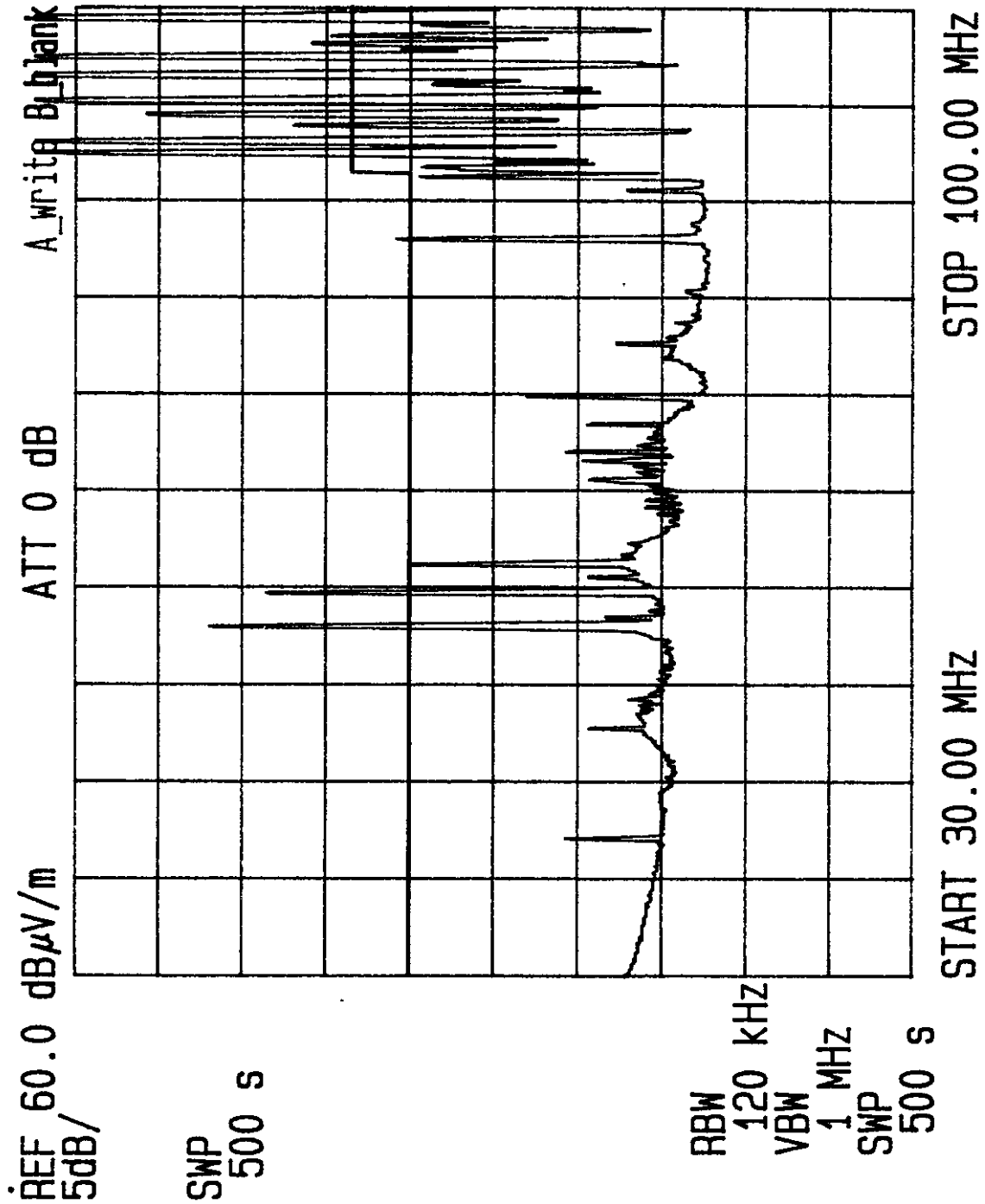

FIGURE 6.2.3-2

TEST: FCC RADIATED	EUT: TRANSEND P-n-P GEMINI	S/N: PROD. 01
FREQ: 100M-200MHz	SPEC: CFR 15.249	ANT.HT/POL: 1.5 H
DETECTOR: Q P AMBIENT	LINE UNDER TEST: N/A	EUT POSITION:
DATE: 11/9/98	TEST SITE: 3 METER	TESTER:

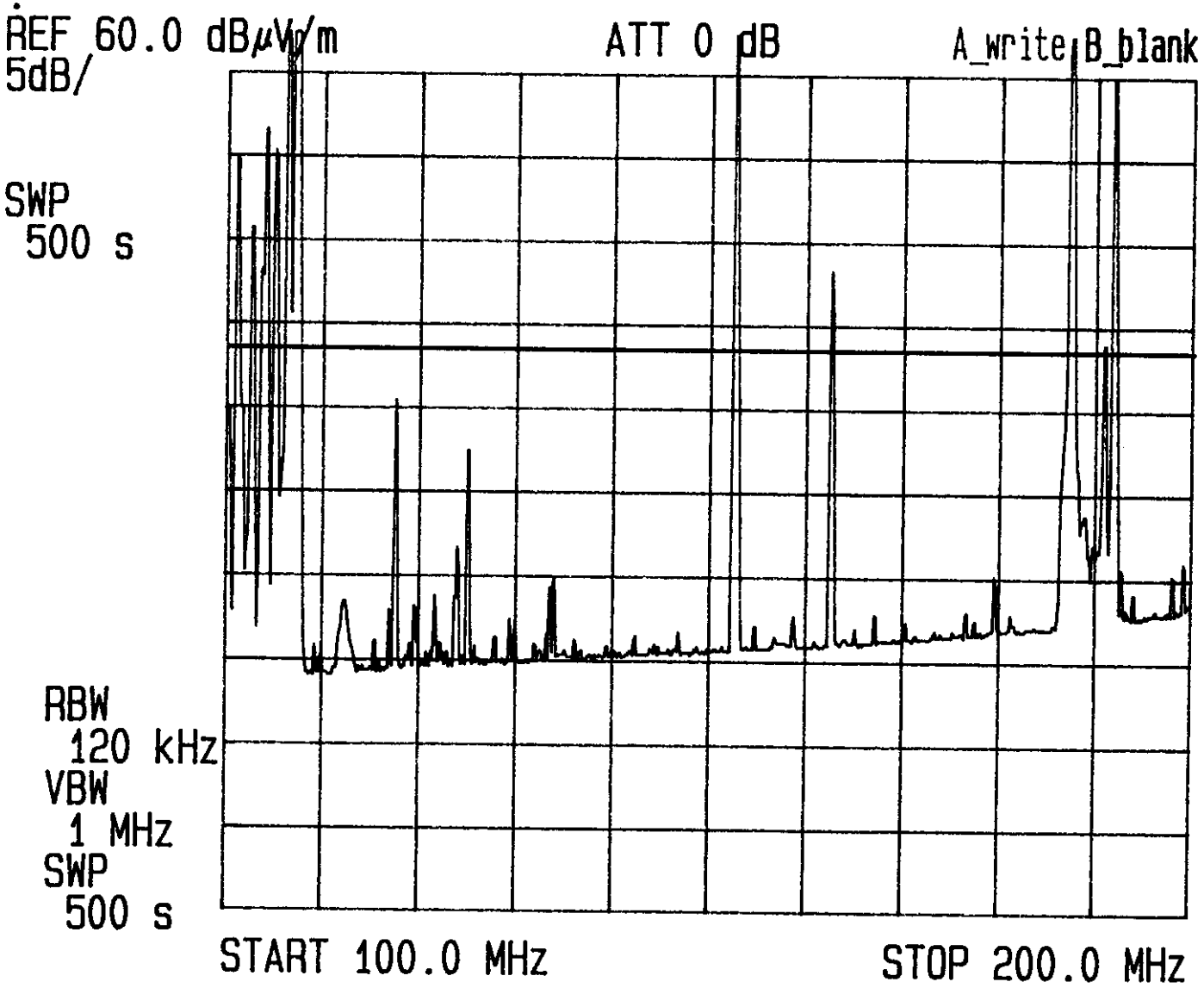

FIGURE 6.2.3-3

TEST: FCC RADIATED	EUT: TRANSEND P-n-P GEMINI	S/N: PROD. 01
FREQ: 100M-200MHz	SPEC: CFR 15.249	ANT.HT/POL: 1.5 V
DETECTOR: Q P AMBIENT	LINE UNDER TEST: N/A	EUT POSITION:
DATE: 11/09/98	TEST SITE: 3 METER	TESTER:

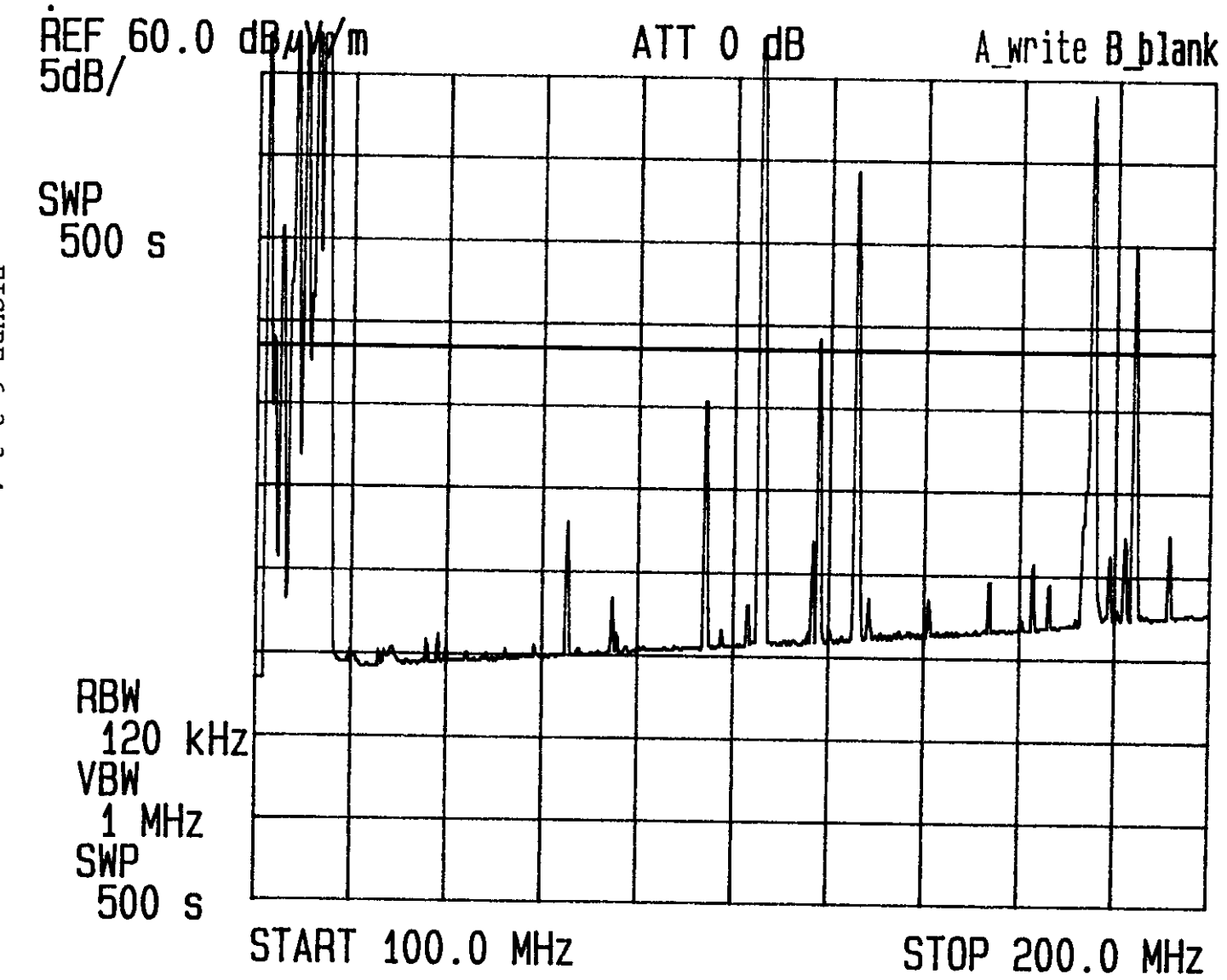

FIGURE 6.2.3-4

TEST: FCC RADIATED	EUT: TRANSEND P-n-P GEMINI	S/N: PROD. 01
FREQ: 200M-1GHz	SPEC: CFR 15.249	ANT.HT/POL: 1.25 H
DETECTOR: Q P AMBIENT	LINE UNDER TEST: N/A	EUT POSITION: —
DATE: 11/9/98	TEST SITE: 3 METER	TESTER:

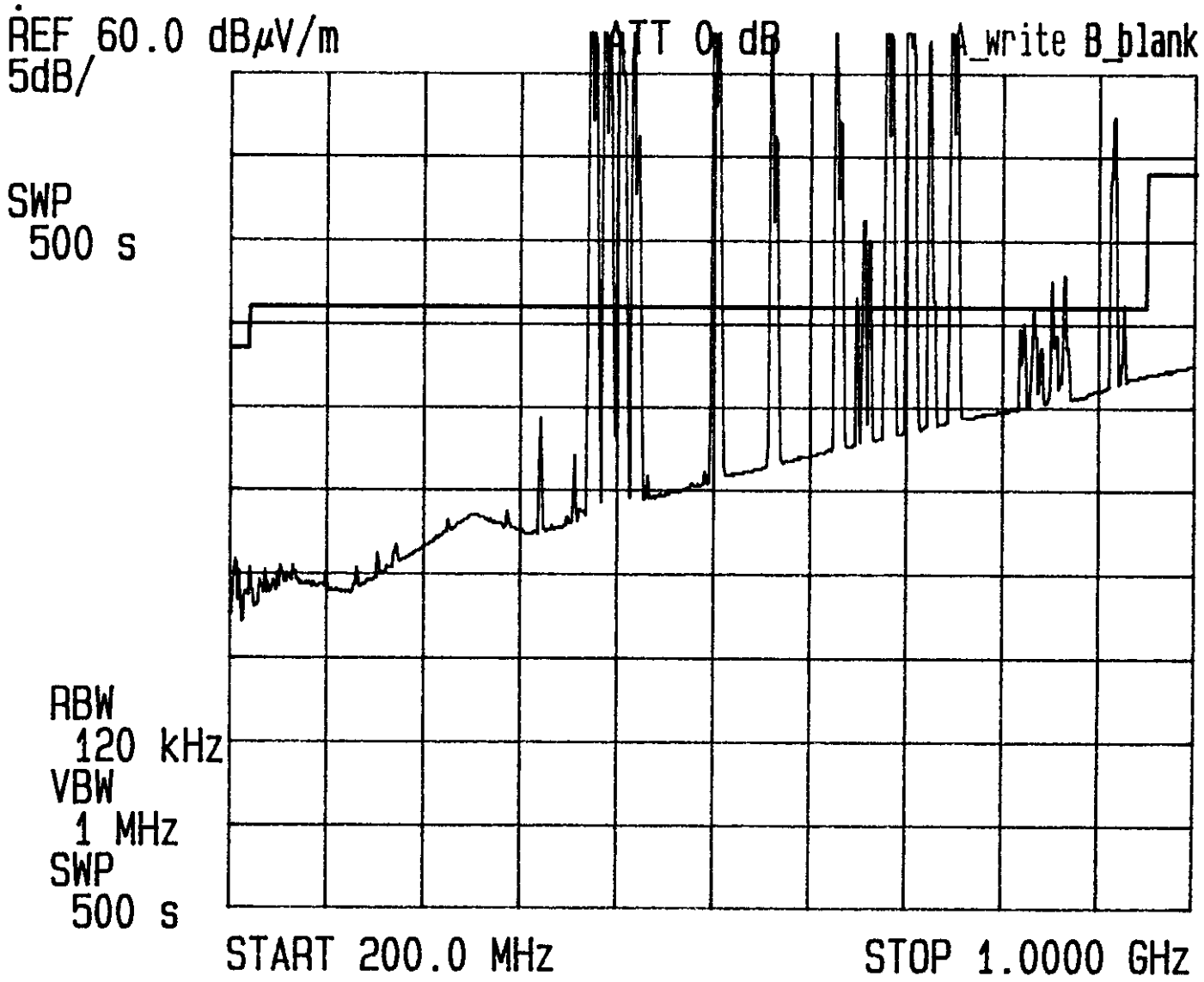

FIGURE 6.2.3-5

TEST: FCC RADIATED	EUT: TRANSEND P-n-P GEMINI	S/N: PROD. 01
FREQ: 200M-1GHz	SPEC: CFR 15.249	ANT.HT/POL: 1.5 V
DETECTOR: Q P AMBIENT	LINE UNDER TEST: N/A	EUT POSITION:
DATE: 11/9/98	TEST SITE: 3 METER	TESTER:

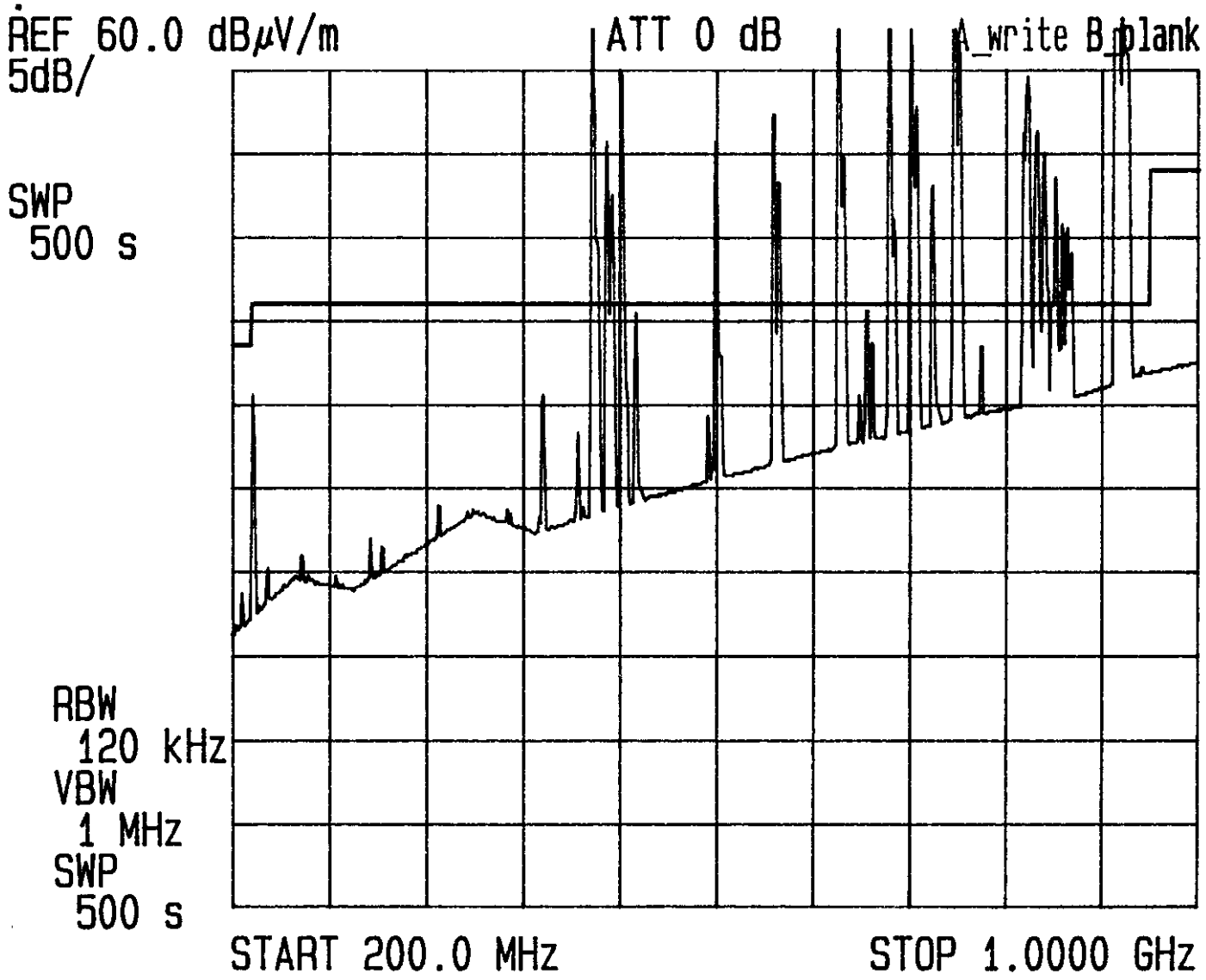

FIGURE 6.2.3-6

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: MZNGMN112T

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

APPENDIX B

INSTALLATION INSTRUCTIONS

Installation Instructions for P-n-P Gemini

Insert Gemini board into an empty ISA slot. Turn computer on and start Windows 95. Windows 95 will detect the Gemini board as a new com port and will use the existing communications port driver (just click ok on "use existing driver").

To install the modem go to control panel and select "modem". Click "add" and add a new modem and check "do not detect modem". Select Standard 28800 from the list of modems provided and click "next". Communications port 5 is the Gemini board so attach the modem to that port and click "next". Make the max speed of the modem 57600 and click "finish".

To test the modem click on HyperTerminal. Enter a name for the new connection and fake phone number. Next hit cancel to bring you to the blank terminal screen. Go to File and Properties then Configure and make sure the modems max speed = 57600. Click ok to get back to the terminal screen and you are ready to enter AT commands.

Commands that are working:
AT, AT%V, AT&V, ATE1, ATE0, ATE1, AT&F

EXHIBIT D

Manual

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