

Exhibit H:

L5X-PMP-01-000

Measured RF Output Power

This Exhibit provides a response to Section 2.1046 (a), based on the transmitter power limitations of Section 101.113.

Transmitter Power Limitations:

<u>Frequency</u>	<u>Max Allowable EIRP</u>
38.600 GHz to 40.000 GHz	+55 dBW

Each hub antenna has an elevation beamwidth of six degrees and an azimuth beamwidth of 90 degrees. The antennas with these beamwidths provide a Peak gain of 17.5 dBi as specified by the vendor. This gain applies to both frequency bands.

The power amplifiers in the 38 GHz band RF Unit have a P1dB of +25 dBm at the antenna interface. With no backoff the maximum EIRP of this system will be $(17.5 + 25)$ or 42.5 dBm. In practice, this equipment will operate with a minimum backoff of 7 dB that will provide a peak EIRP of 35.5 dBm.

The antennas are discussed in more detail in Exhibit N.

The above calculations indicate that the equipment will not exceed the maximum EIRP limitation of +55 dBW at any time.

Exhibit I:

S5X-PMP-01-000

Modulation Characteristics

This Exhibit provides a response to Section 2.1047 (d), based on the requirements specified in Section 101.141.

Refer to Table 1 FDMA Modem and compare columns under the headings ATM Cell Rate Mbits/s and DSB BW (MHz).

Table 1 FDMA Modem

Modulation Type	Number of T1/E1's	ATM Cell Rate (Mbits/s)	symbol rate (Msym/s)	DSB BW (MHz)	Channel spacing (MHz)	Demod Supported (Hub or Remote)
64-QAM	2/1	3.7	0.664902	0.745	1.0	Sector only
64-QAM	4/3	7.2	1.316528	1.475	2.0	Both Sector and Remote
64-QAM	8/6	14.4	2.619781	2.934	4.0	Both Sector and Remote
64-QAM	12/9	21.7	3.949127	4.423	5.6	Both Sector and Remote
64-QAM	16/13	30.9	5.625000	6.300	8.0	Both Sector and Remote
64-QAM	22**/17**	40.0	7.265625	8.138	10.0	Remote only
16-QAM	1/1	2.4	0.664902	0.745	1.0	Hub only
16-QAM	2/2	4.8	1.316528	1.475	2.0	Both Sector and Remote
16-QAM	5/4	9.6	2.619781	2.934	4.0	Both Sector and Remote
16-QAM	8/6	14.5	3.949127	4.423	5.6	Both Sector and Remote
16-QAM	11/8	20.6	5.625000	6.300	8.0	Both Sector and Remote
16-QAM	14/11	26.7	7.265625	8.138	10.0	Remote only
QPSK	N/A	1.2	0.664902	0.745	1.0	Sector only
QPSK	1/1	2.4	1.316528	1.475	2.0	Both Sector and Remote
QPSK	2/2	4.8	2.619781	2.934	4.0	Both Sector and Remote
QPSK	4/3	7.2	3.949127	4.423	5.6	Both Sector and Remote
QPSK	5/4	10.3	5.625000	6.300	8.0	Both Sector and Remote
QPSK	7/5	13.3	7.265625	8.138	10.0	Remote only

** These rates are not supported with the present clear channel FDMA Cell Engine design

Exhibit J:

L5X-PMP-01-000

Occupied Bandwidth

This Exhibit provides a response to Section 2.1049, based on the requirements specified in Section 101.109.

Frequency Band

38.600 GHz to 40.000 GHz

Maximum Authorized Bandwidth

50 MHz

Refer to Table 1 FDMA Modem. In the column under the heading DSB BW (MHz) occupied Bandwidths are listed and referenced to each Modulation Type and selected Bit Rate.

Modulation Type	Number of T1/E1's	ATM Cell Rate (Mbits/s)	symbol rate (Msym/s)	DSB BW (MHz)	Channel spacing (MHz)	Demod Supported (Hub or Remote)
64-QAM	2/1	3.7	0.664902	0.745	1.0	Sector only
64-QAM	4/3	7.2	1.316528	1.475	2.0	Both Sector and Remote
64-QAM	8/6	14.4	2.619781	2.934	4.0	Both Sector and Remote
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64-QAM	16/13	30.9	5.625000	6.300	8.0	Both Sector and Remote
64-QAM	22**/17**	40.0	7.265625	8.138	10.0	Remote only
16-QAM	1/1	2.4	0.664902	0.745	1.0	Hub only
16-QAM	2/2	4.8	1.316528	1.475	2.0	Both Sector and Remote
16-QAM	5/4	9.6	2.619781	2.934	4.0	Both Sector and Remote
16-QAM	8/6	14.5	3.949127	4.423	5.6	Both Sector and Remote
16-QAM	11/8	20.6	5.625000	6.300	8.0	Both Sector and Remote
16-QAM	14/11	26.7	7.265625	8.138	10.0	Remote only
QPSK	N/A	1.2	0.664902	0.745	1.0	Sector only
QPSK	1/1	2.4	1.316528	1.475	2.0	Both Sector and Remote
QPSK	2/2	4.8	2.619781	2.934	4.0	Both Sector and Remote
QPSK	4/3	7.2	3.949127	4.423	5.6	Both Sector and Remote
QPSK	5/4	10.3	5.625000	6.300	8.0	Both Sector and Remote
QPSK	7/5	13.3	7.265625	8.138	10.0	Remote only

** These rates are not supported with the present clear channel FDMA Cell Engine design

Exhibit K:

L5X-PMP-01-000

Spurious Emission

Refer to Section 6.1.3.2 Radiated 15.209(a)/101.111 of Exhibit R (Independent Laboratory Test Results) for detailed information on radiated emissions.

Exhibit L:

L5X-PMP-01-000

Measured Spurious Field Strength

Refer to Section 6.1.3.2 Radiated 15.209(a)/101.111 of Exhibit R (Independent Laboratory Test Results) for detailed information on radiated emissions.

Exhibit M:

L5X-PMP-01-000

Measured Frequency Stability

This Exhibit provides a response to Section 2.1055, based on the requirements specified in Section 101.107.

(a) The frequency stability shall be measured with variation of ambient temperature as follows:

(1) From -30 degrees to +50 degrees centigrade...

P-COM Test Results for Sector Terminal Indoor Unit Frequency Stability

Purpose: Long-term frequency stability of the Sector IDU is compliant to product specifications at room and elevated temperatures. This test is conducted at RF.

Pass Criteria: Based on measurements every 15 minutes over a 45 minute period, the frequency deviation shall be within ± 1 ppm.

Test Environment: **P-COM Engineering Laboratory.**

Equipment: **One Sector Terminal, Frequency Counter (HP 53152A), Environmental Chamber.**

Sector Terminal Indoor Unit Tests Results

Test Frequency: 38.765 GHz

Test Time*	Temperature	Measured Frequency
0 min.	25°C	38.764977243
15 min.		38.764977103
30 min.		38.764977125
45 min.		38.764977129
0 min.	0°C	38.764969831
15 min.		38.764969146
30 min.		38.764968568
45 min.		38.764968252
0 min.	45°C	38.764968630
15 min.		38.764969078
30 min.		38.764969676
45 min.		38.764970204

*After initial 20 minutes soak.

Test Setup Diagram

Frequency Stability – Sector Terminal Outdoor Unit

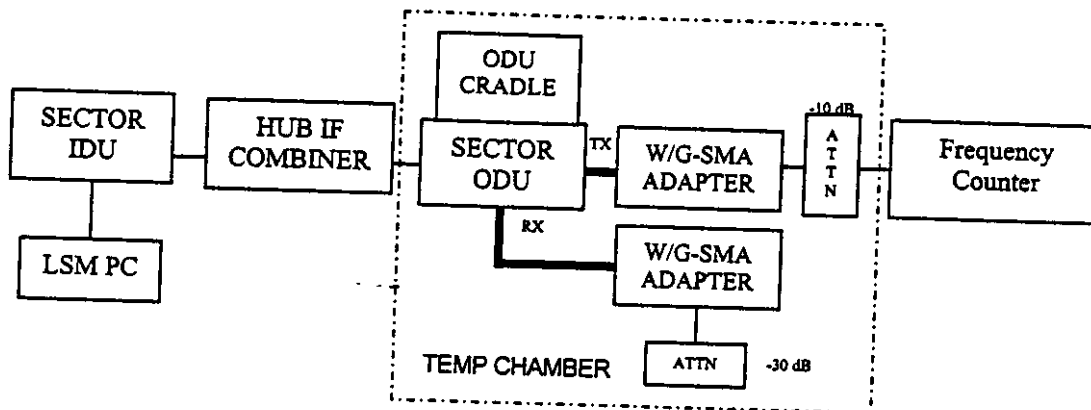


Exhibit N

L5X-PMP-01-000

Antenna Characteristics

The information on antenna characteristics provided in this exhibit includes responses to Sections 101.115 & 101.117 of the FCC Rules and Regulations.

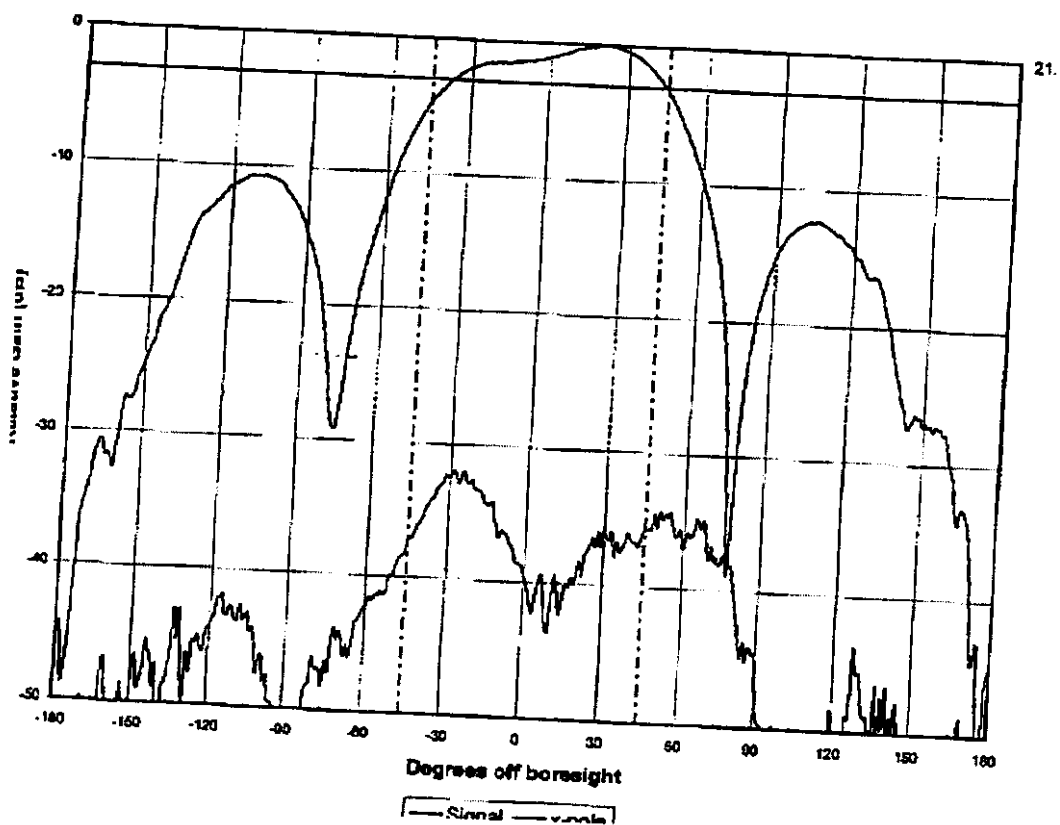
The Point to Multipoint hub terminal uses a horn antenna for transmission and reception. The specifications for the horn antenna is as follows:

38 GHz Horn Antenna:

Beamwidth, El	6 degrees
Beamwidth, Az	90 degrees
3 dB	
Gain, peak	17.5 dBi
Cross Pol	> 25 dB within 3 dB beamwidth
Isolation	
F/B ratio	40 dB

See Attached Patterns

Linear Polarization (vertical) is used for transmission and reception.



38 GHz Vertical Polarization, 90 Degree x 6 Degree Horn, Azimuth Pattern

Exhibit O:

L5X-PMP-01-000

Modulation System Description

This Exhibit provides a response to Section 2.1033 (c) (13).

For equipment employing digital modulation techniques, a detailed description of the modulation system to be used, including the response characteristics (frequency, phase and amplitude) of any filters provided, and a description of the modulating wavetrain, shall be submitted for the maximum rated conditions under which the equipment will be operated.

The P-Com Point-to-Multipoint product utilizes digital modulation. There are three selectable types of modulation implemented; Quadrature Phase Shift Keying (QPSK), 16-Ary Quadrature Amplitude Modulation (16-QAM) and 64-Ary Quadrature Amplitude Modulation (64-QAM). All three of these modulation types are spectral shaped.

The filters implementing the spectral shaping is a linear phase square-root Nyquist baseband filter with a 12 % excess bandwidth. A X/six X filter is also implemented to provide for baseband DAC distortion compensation. The various combinations of symbol rates and modulation types are listed in the table below:

List of Data Rates for the PTM product Line

Table 1 FDMA

Modulation Type	Number of T1/E1's	ATM Cell Rate (Mbits/s)	symbol rate (Msym/s)	DSB BW (MHz)	Channel spacing (MHz)	Demod Supported (Hub or Remote)
64-QAM	2/1	3.7	0.664902	0.745	1.0	Sector only
64-QAM	4/3	7.2	1.316528	1.475	2.0	Both Sector and Remote
64-QAM	8/6	14.4	2.619781	2.934	4.0	Both Sector and Remote
64-QAM	12/9	21.7	3.949127	4.423	5.6	Both Sector and Remote
64-QAM	16/13	30.9	5.625000	6.300	8.0	Both Sector and Remote
64-QAM	22**/17**	40.0	7.265625	8.138	10.0	Remote only
16-QAM	1/1	2.4	0.664902	0.745	1.0	Both Sector and Remote
16-QAM	2/2	4.8	1.316528	1.475	2.0	Both Sector and Remote
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QPSK	7/5	13.3	7.265625	8.138	10.0	Remote only

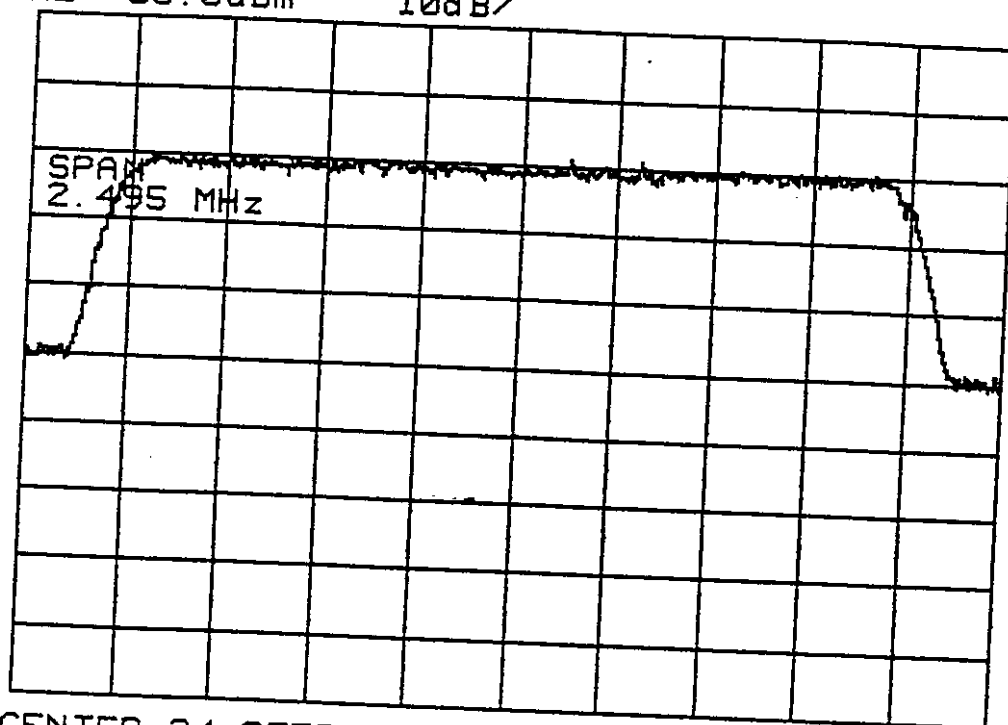
** These rates are not supported with the present clear channel FDMA Cell Engine design.

The digital modulation modem is implemented in two application-specific-integrated-circuits (ASICs). There is an Intermediate Frequency (IF) interface going into the demodulator and an IF interface coming out the modulator ASIC. Thus the ASIC implementation prevents a baseband modulating wavetrain from being measured and provided in this report. Shown below are measured spectrum plots with the user input rate kept constant at 2XT1 rate.

*ATTEN 20dB

RL -30.0dBm

10dB/



CENTER 24.255000GHz

RBW 30kHz

VBW 300Hz

SPAN 2.495MHz

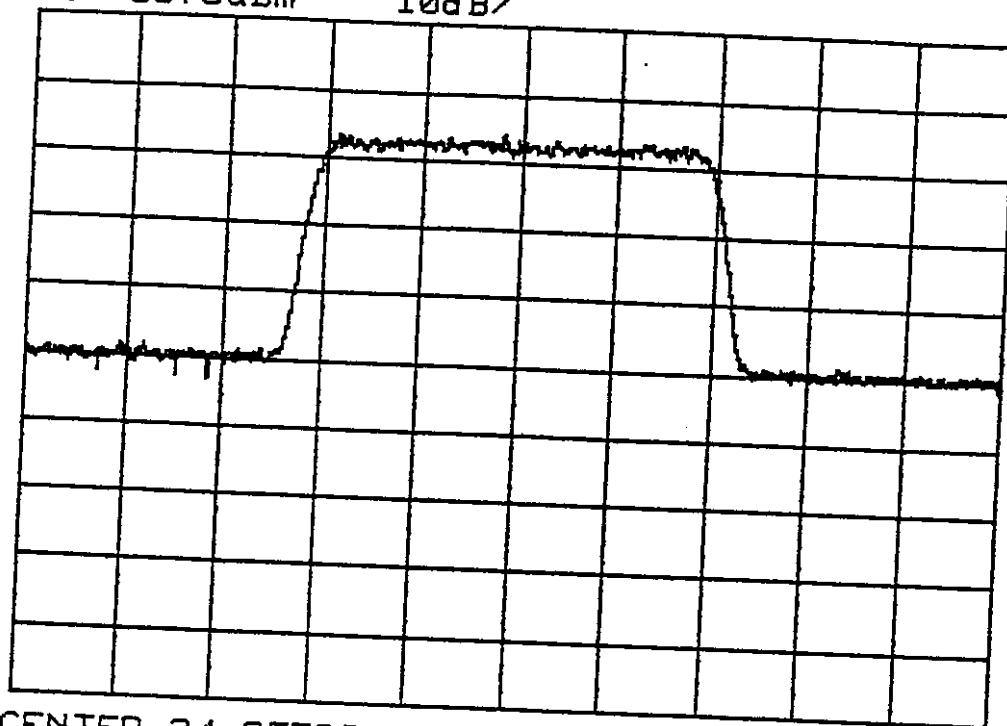
SWP 700ms

QPSK 2X71

*ATTEN 20dB

RL -30.0dBm

10dB/



CENTER 24.255000GHz

RBW 30kHz

VBW 300Hz

SPAN 2.495MHz

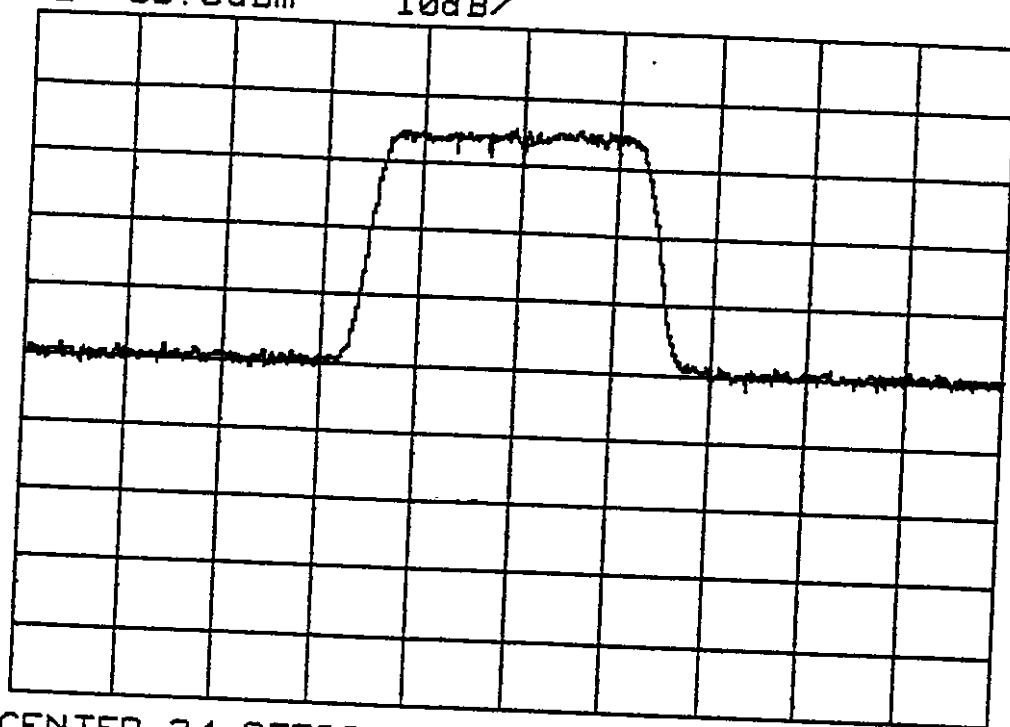
SWP 700ms

16 QAm 2xT1

*ATTEN 20dB

RL -30.0dBm

10dB/



CENTER 24.255000GHz

RBW 30kHz

VBW 300Hz

SPAN 2.495MHz

SWP 700ms

64 QAM 2xTs

Exhibit R

L5X-PMP-01-000

**INDEPENDENT LABORATORY
RESULTS**

RUBICOM SYSTEMS, INC.



**FCC INTENTIONAL RADIATOR
TEST REPORT
FOR THE
P-COM
POINT TO MULTIPOINT HUB TERMINAL**



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

THIS REPORT SHALL NOT BE REPRODUCED
EXCEPT IN FULL WITHOUT THE WRITTEN
APPROVAL OF THE TESTING LABORATORY

FCC INTENTIONAL RADIATOR
TEST REPORT
FOR THE
P-COM
POINT TO MULTIPOINT HUB TERMINAL

Prepared by:

Joseph G. Barbee 1-19-99
Joseph G. Barbee

Tested by:

Joseph G. Barbee 1-19-99
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Performed by:

RUBICOM SYSTEMS INC.
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Performed for:

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Received: December 9, 1998

Completed: January 8, 1999

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ABSTRACT

This report presents test results of the emanations found emitting from the P-Com Point to Multipoint HUB Terminal and the comparison of these emissions to the requirements of FCC, Title 47, Part 101 Fixed Point to Multipoint Microwave Service as required for a Digital Electronics Message Service. In accordance with Part 2.99(a)(3) radiated measurements were extended to 200GHz. The indoor unit (IDU) was tested to Part 15 requirements.

This testing was performed at Rubicom Systems, Inc. (RSI). The testing was performed for P-Com under purchase order F63737. The results of this test effort indicates compliance of the P-Com HUB Terminal to FCC, Title 47 requirements.

1.0 INTRODUCTION

1.1 Propose

The purpose of this report is to show compliance of the Multipoint HUB Terminal to the requirements of CFR 47, Part 101 Subpart C for Fixed Point to Multipoint Microwave Service and Part 15.209(a) and 15.207 for the IDU low frequency. The band of operation is 38.6GHz to 40GHz. The HUB Terminal test was performed in a semi-anechoic chamber at a distance of 1 meter and .33 meters. Other emissions test were performed on a 3 meter O.A.T.S. Distances are noted on the data plots.

1.2 Requirements

This report is to provide results of testing to CFR 47, Part 101 Subpart C (specifically 101.109, 101.111(2)(ii) and 101.113) for a 38.6GHz to 40GHz common carrier fixed point to multipoint microwave service terminal.

Bandwidth 101.109 (50MHz Max)

Emission Limitation 101.111(2)(ii)(iii)

Transmitter Power Limitation 100.113 (+55dBw EIRP)

Signals outside the intended band must be attenuated by 56dB at 250% of bandwidth, and 33dB of attenuation below the measured transmit level (123dB μ V/m) for harmonics and spurious signals above the transmitter.

Signals appearing in the restricted bands must meet the requirements of 15.209.

1.3 Unit Under Test Description

The P-Com Point to Multipoint HUB Terminal consists of an indoor unit (IDU) including an IF Combiner and outdoor unit (ODU). The IDU controls the transmit modulation, IF frequencies, 10MHz power output level plus a 10MHz reference signal and DC power to the ODU. The IDU also demodulates the incoming signals during receive mode.

The ODU performs the UP/down conversion of the 38.6GHz-40GHz plus amplification. The ODU has a transmit band of 38.95-39.36GHz and receive band of 39.65-40.0GHz.

The two units are connected using 100 ft. Of LMR 400 communications cable (50 ohms).

The system was configured as follows:

IDU S/N 203

- 1 ea. Control PCB
- 9 ea. Demodulator PCB
- 1 ea. Modulator PCB
- 5 ea. E1/T1 PCB
- 2 ea. Power Supply
- 1 ea. PTM IF Combiner

ODU S/N 38SL200001

- 1 ea. P-Com PTM 38GHz Low 2

1.4 Modifications

The IDU required a power line filter be added and I/O connectors required filtering at the bulkhead.

Power Filter

Manufacturer: Schurter
Part No. KFB 4302.5313

I/O Filter

Manufacturer: Amphenol
Part No. FCC 57-22500-430

Power Supply

- Cover Plate - Closed seams at top of unit.
- Input Leads - Added ferrite bead inside of host unit.
Steward Part #28A 2029-OAO.
- Output Leads - Added ferrite bead inside of host unit.
Steward Part #28A 2024-OAO.

IDU Chassis

- Paint removed around the inside front panel.
- Paint removed under power supplies attachment point.
- Paint removed and EMI Gasket added at bottom of power supplies.
- Gasket Manufacturer Chomerics, Part #82-121-74011

1.5 Summary of Results

Paragraph 6.0 of this document presents the results of the tabulated levels detected during testing of the Point to Multipoint HUB Terminal. There were no failures after modifications were made to the IDU. Those modifications are noted above in Paragraph 1.4 above. Both the applicable paragraphs of Part 15 and Part 101 are within the limits determined in this report.

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 and 101

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 and in a semi-anechoic chamber above 18GHz. 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

This test effort was performed between December 9, 1998 through January 8, 1999.

Typical conditions in the laboratory during this testing were:

Temperature: **78°**

Barometer: **29.75 in.**

Humidity: **50%**

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>Cal Date</u>
1	Coax Attenuator	Hewlett Packard	8494B	03/13/98
1	Bilog Antenna	Chase	CLB6111B	07/24/98
1	Standard Gain Horn	Flann	23240-20	NCR
1	Ridge Guide Horn	Electro Metrics	RGA-180	10/23/98
1	Standard Gain Horn	NARDA	Model 638	NCR
1	Standard Gain Horn	NARDA	V637	NCR
1	Standard Gain Horn	Flann Microwave	25240-20	NCR
1	Standard Gain Horn	Flann Microwave	27240-20	NCR
1	Spectrum Analyzer	Advantest	R3271	09/09/98
1	Harmonic Mixer	Hewlett Packard	11970Q	NCR
1	Harmonic Mixer	Hewlett Packard	11970A	NCR
1	Harmonic Mixer	Hewlett Packard	11970V	06/20/98
1	Harmonic Mixer	Hewlett Packard	11970W	06/20/98
1	Harmonic Mixer	OML	M06HW	NCR
1	Waveguide Adapter	OMNI	WR28-SMA	NCR
1	Preamplifier 1-18GHz	Pacific Microwave	W2063-01	05/07/99
1	Preamplifier 8-18GHz	Pacific Microwave	W5053-01	05/07/99
1	Spectrum Analyzer	Hewlett Packard	HP8563A	11/17/98
1	Spectrum Analyzer	Hewlett Packard	HP8566BA	05/12/98

JA-1578-1

<u>Qty.</u>	<u>Description</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>Cal Date</u>
1	Coax Attenuator	Hewlett Packard	8494B	03/13/98
1	Standard Gain Horn	Custom Microwave	H06R	NCR
1	Meter	Hewlett Packard	436A	04/24/98
1	Sensor	Hewlett Packard	8487A	04/24/98
1	Antenna Adapter	Hill Manufacturing	1781702	NCR
1	WG to Coaxial Adapter	Hewlett Packard	P281A	NCR

5.0 TEST SAMPLE SETUP AND CONFIGURATIONS

The unit was placed on a nonconductive table on the 3 meter OATS. The unit was powered from 120 VAC 60Hz filtered power. Measurements from 30MHz-8GHz were performed on the 3 meter site at 3 meter distance.

During radiated emissions above 8GHz the unit was placed on a table inside a test chamber (semi-anechoic) and rotated for maximum level at 1 meter distance. Above 18GHz the measurements were performed at .3 meter distance.

Photo 1 shows the typical radiated test setup on the OATS.

The configuration of the IDU and ODU were as listed below:

<u>Indoor Unit PCB's</u>	<u>Outdoor Unit</u>	<u>100 Ft. I/O Cable</u>
1 ea. Controller	1 ea. PTM	
9 ea. Demodulator	PTM 38GHz Low 2	LMR-400, 50 ohm
1 ea. Modulator	S/N: 38SL200001	Communication Cable
5 ea. E1/T1 Channel	TX 38.95-39.3GHz	
2 ea. Indoor Power Supplies		
1 RX 39.65 - 40GHz		
1 ea. PTM HUB IF Combiner		

JA-1578-1

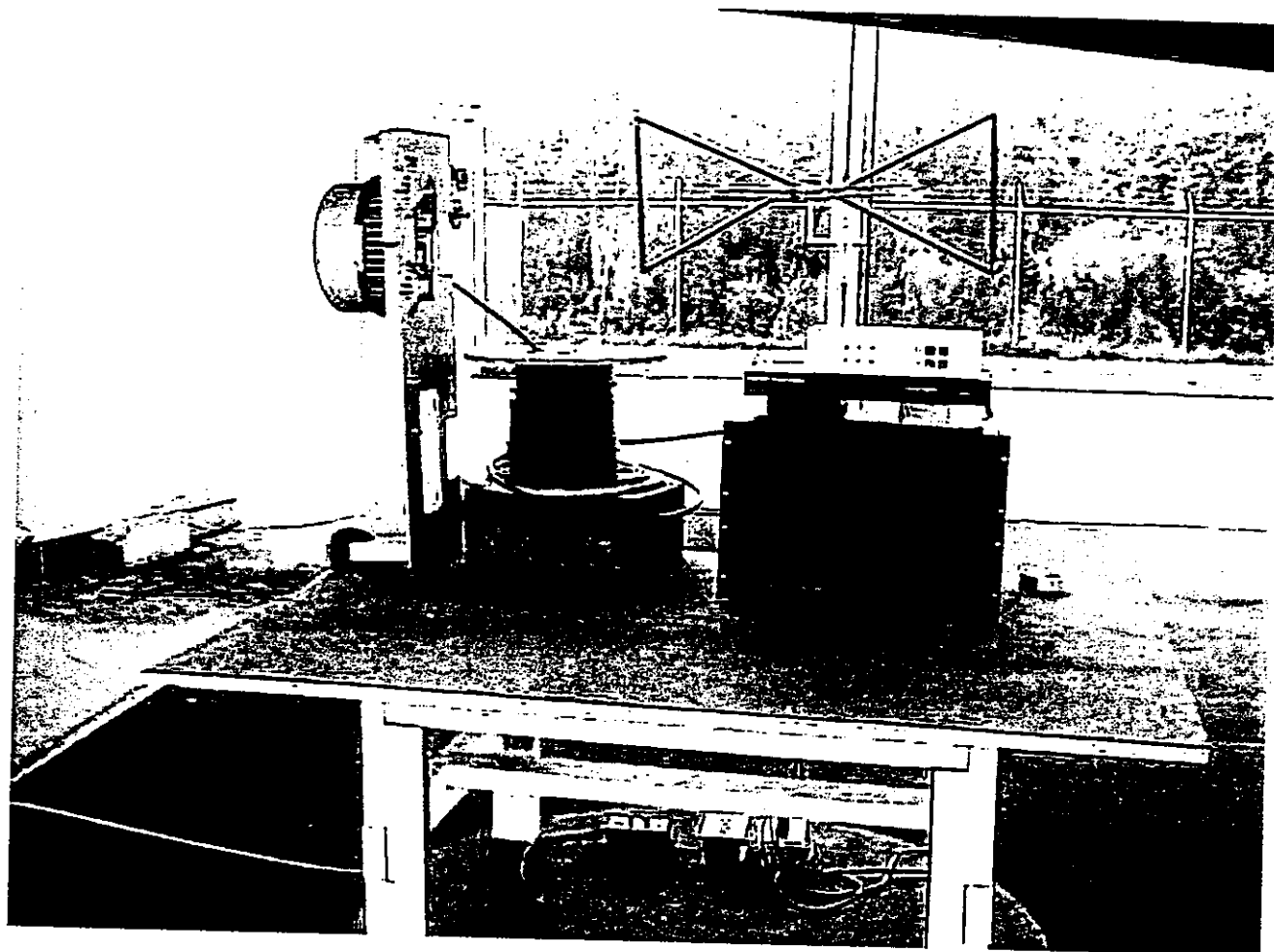


PHOTO 1

6.0 PROCEDURES AND RESULTS

6.1 General

The IDU and ODU were tested for radiated emissions on the 3 meter test site up to 18GHz. Above 18GHz the unit was tested inside a semi-anechoic chamber where the high frequency radiated measurements were completed to 200GHz and the power and bandwidth measurements were performed in the chamber.

The IDU was tested for power line conduction and radiated emission up to 5GHz (10 x highest frequency generated of 490MHz). Since the transmitter is at 38GHz the gap between 5GHz and 38GHz was tested for any spurious emissions that would be generated by the receiver or transmitter. The IDU was compared to Part 15.209. The ODU was tested to part 101. The following paragraphs present the test results and procedures for the testing.

6.1.1 Occupied Bandwidth (101.109)

Bandwidth requirements applicable to the 38.6GHz to 40GHz range is 50MHz maximum. Table 6.1-1 presents the 99.5% bandwidth measurements at the minimum, mid and maximum transmit frequencies with the minimum, mid and maximum modulation rates. Data Sheets 6.1.1-1 through 6.1.1-9 are included for reference.

NOTE: The IF signal (321MHz) of the HP mixer was input to an amplifier and then to the Advantest 3271 to allow the spectrum analyzer to calculate the occupied bandwidth.

RESULT: The maximum bandwidth measured was 18.79Hz. The unit complies with the <50MHz requirement.

EUT Remote IDU/38GHz Low 4 ODUS/N 203/00001MIN TX FREQ. 38.950 GHzMODULATION MIN 17.43 MHzMID 17.43 MHzMAX 14.29 MHzMID TX FREQ. 39.136 GHzMODULATION MIN 18.79 MHzMID 18.50 MHzMAX 15.0 MHzMAX TX FREQ. 39.31 GHzMODULATION MIN 18.75 MHzMID 18.50 MHzMAX 15.43 MHz

REQUIREMENT: <50MHz

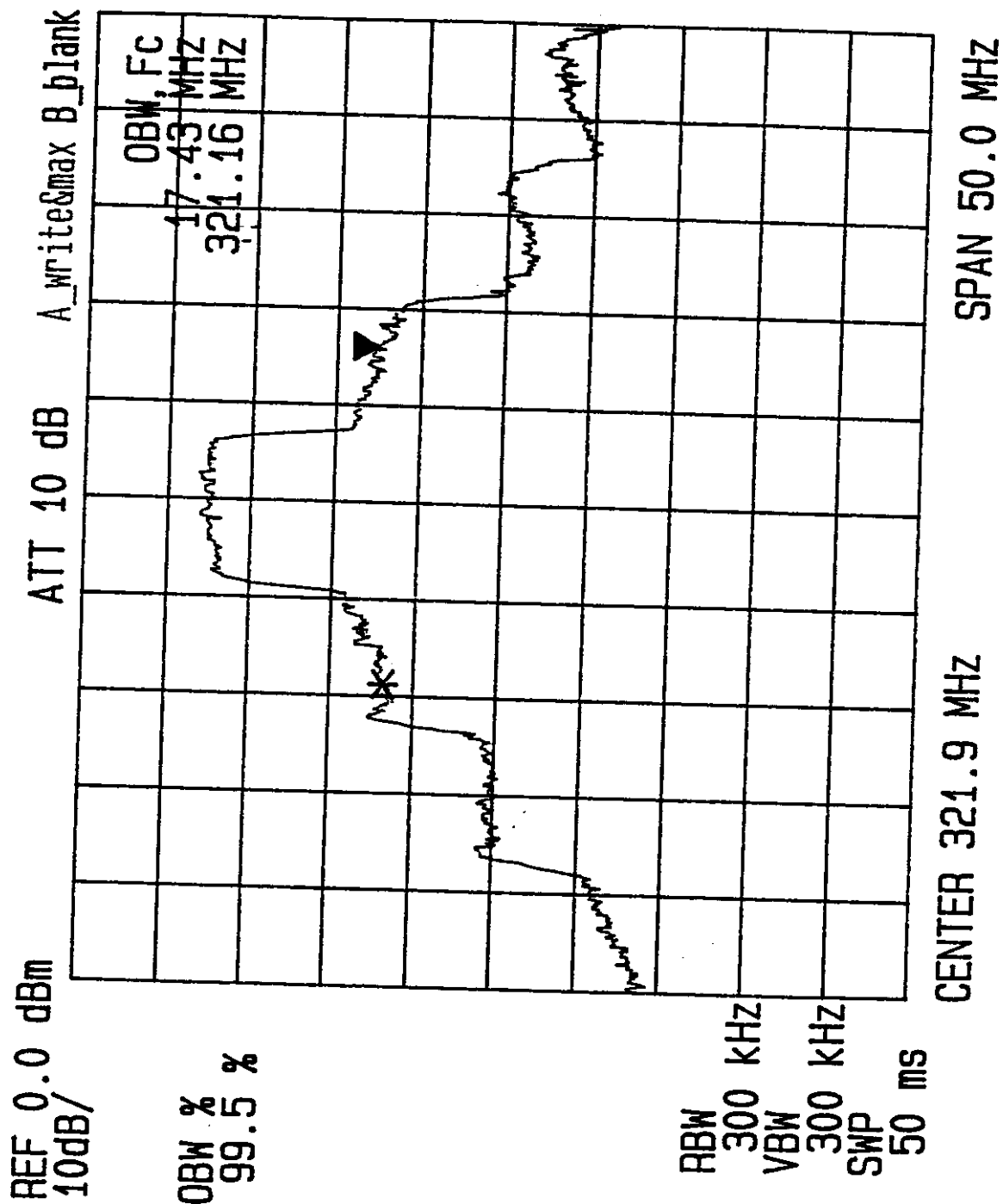
TABULATED BANDWIDTHS

TABLE 6.1.1-1



TEST: OCCUPIED B.W. EUT: P-COM HUB S/N: 00203
FREQ: 200-6.100 SPEC: FCC ANT. HT/POL:
DETECTOR: ANTENNA: EUT POSITION:
DATE: 12-31-98 TEST SITE: OATS/ROOM 1 TESTER:

JA-1578-1

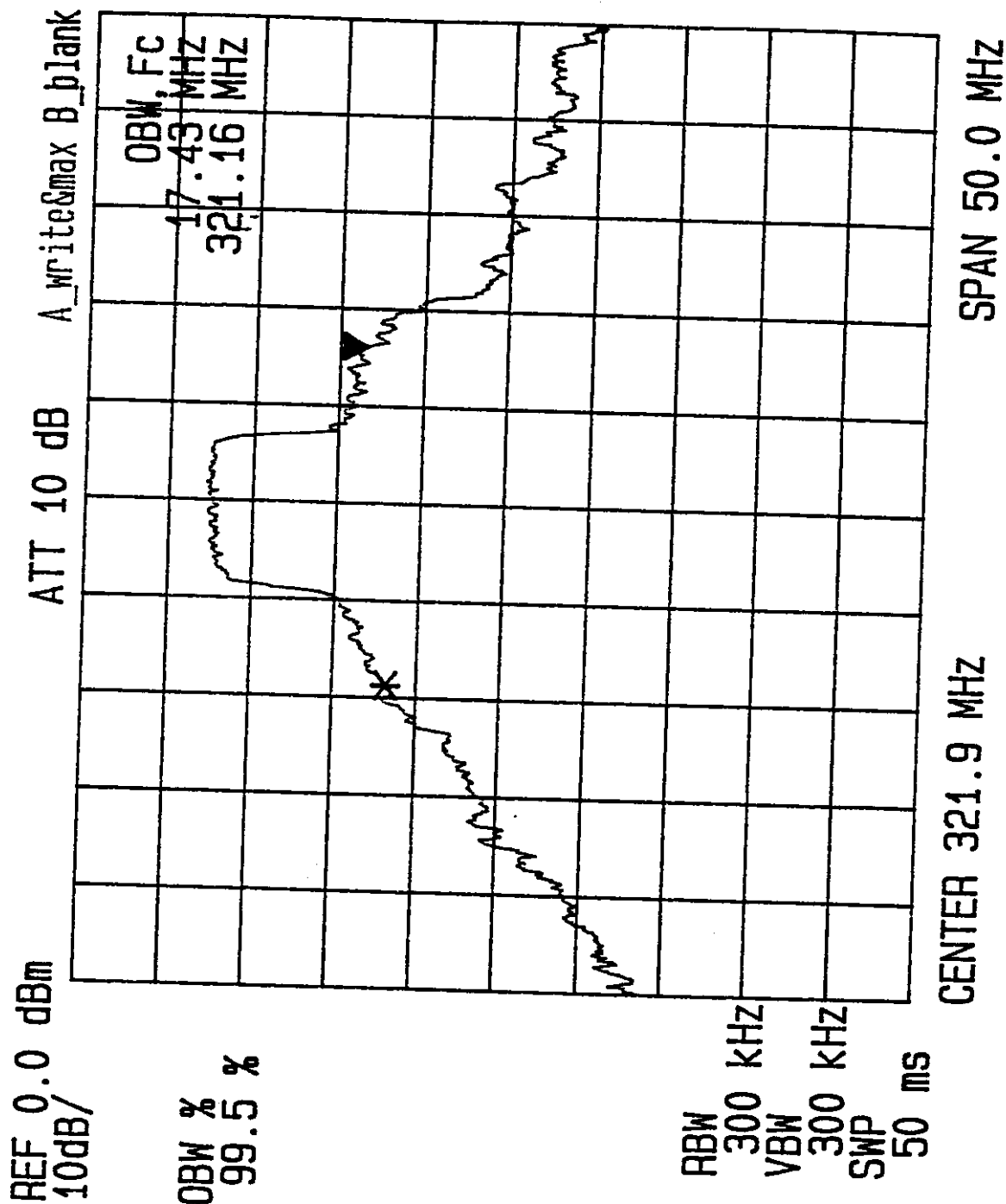


DATA SHEET 6.1.1-1



JA-1578-1

TEST: OCCUPIED B.W. EUT: P-COM HUB S/N: 00203
FREQ: 2000 - 11.1100 SPEC: FCC ANT. HT/POL:
DETECTOR: ANTENNA: EUT POSITION:
DATE: 12-31-98 TEST SITE: OATS/ROOM 1 TESTER:

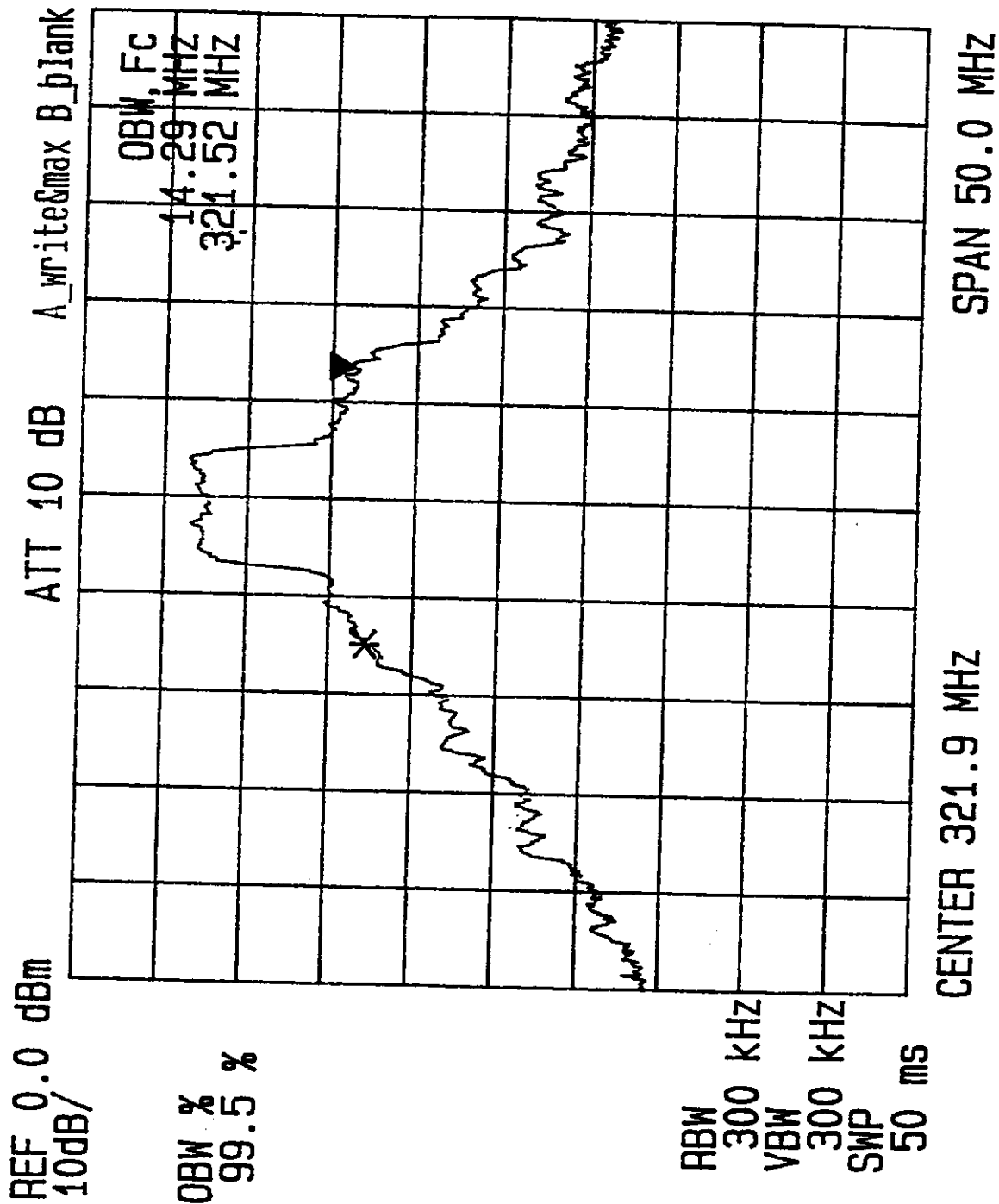


DATA SHEET 6.1.1-2



TEST: OCCUPIED B.W. EUT: P-COM HUB S/N: 00203
FREQ: 2020 ~ 14.1100 ANT. HT/POL: /
DETECTOR: ANTENNA: EUT POSITION: /
DATE: 12-31-98 TEST SITE: OATS/ROOM 1 TESTER: /

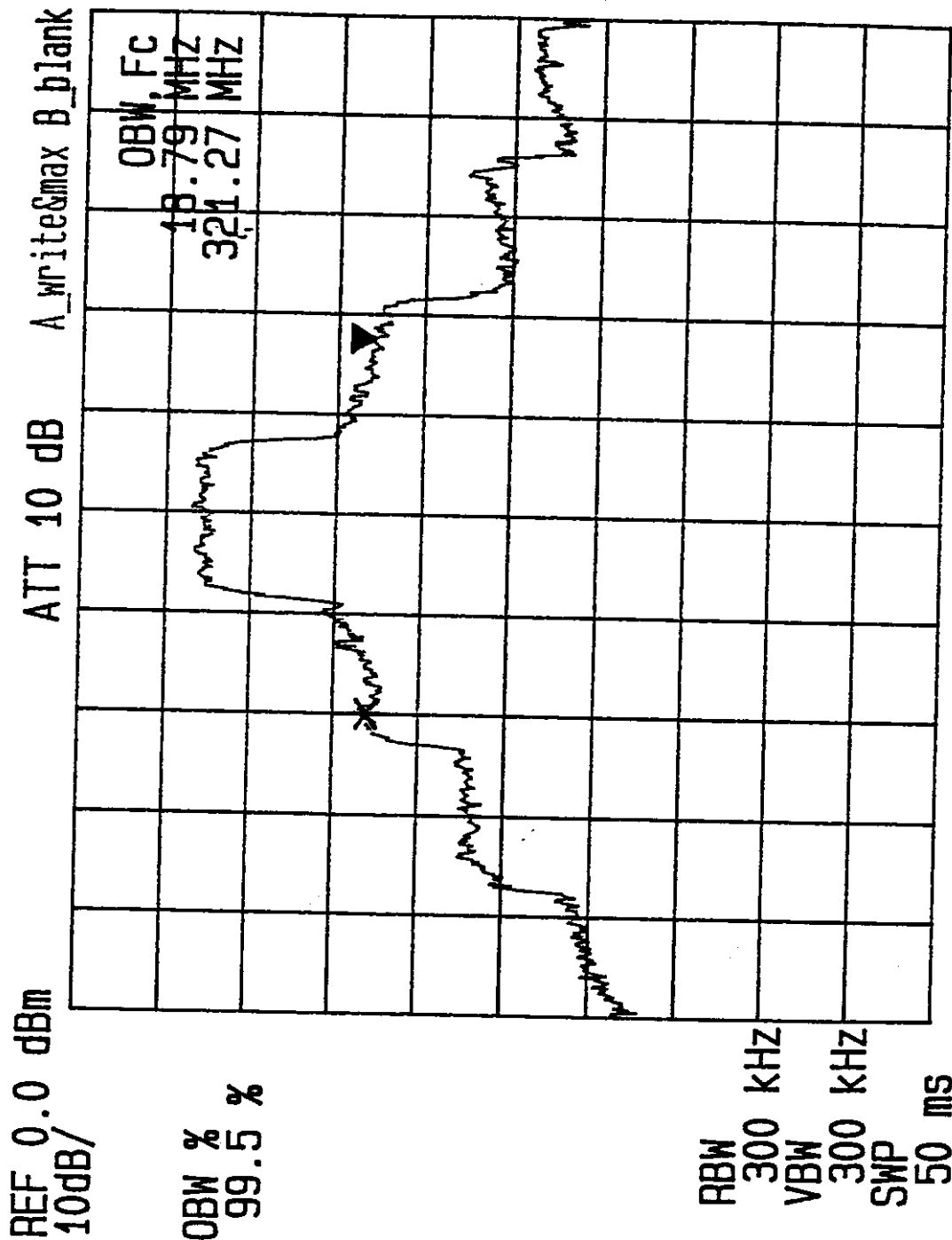
JA-1578-1



DATA SHEET 6.1.1-3



TEST: OCCUPIED B.W. EUT: P-COM HUB S/N: 00203
FREQ: 2050-2.1 MHz ANT. HT/POL:
DETECTOR: ANTENNA: EUT POSITION:
DATE: 12-31-98 TEST SITE: OATS/ROOM 1 TESTER: *[Signature]*

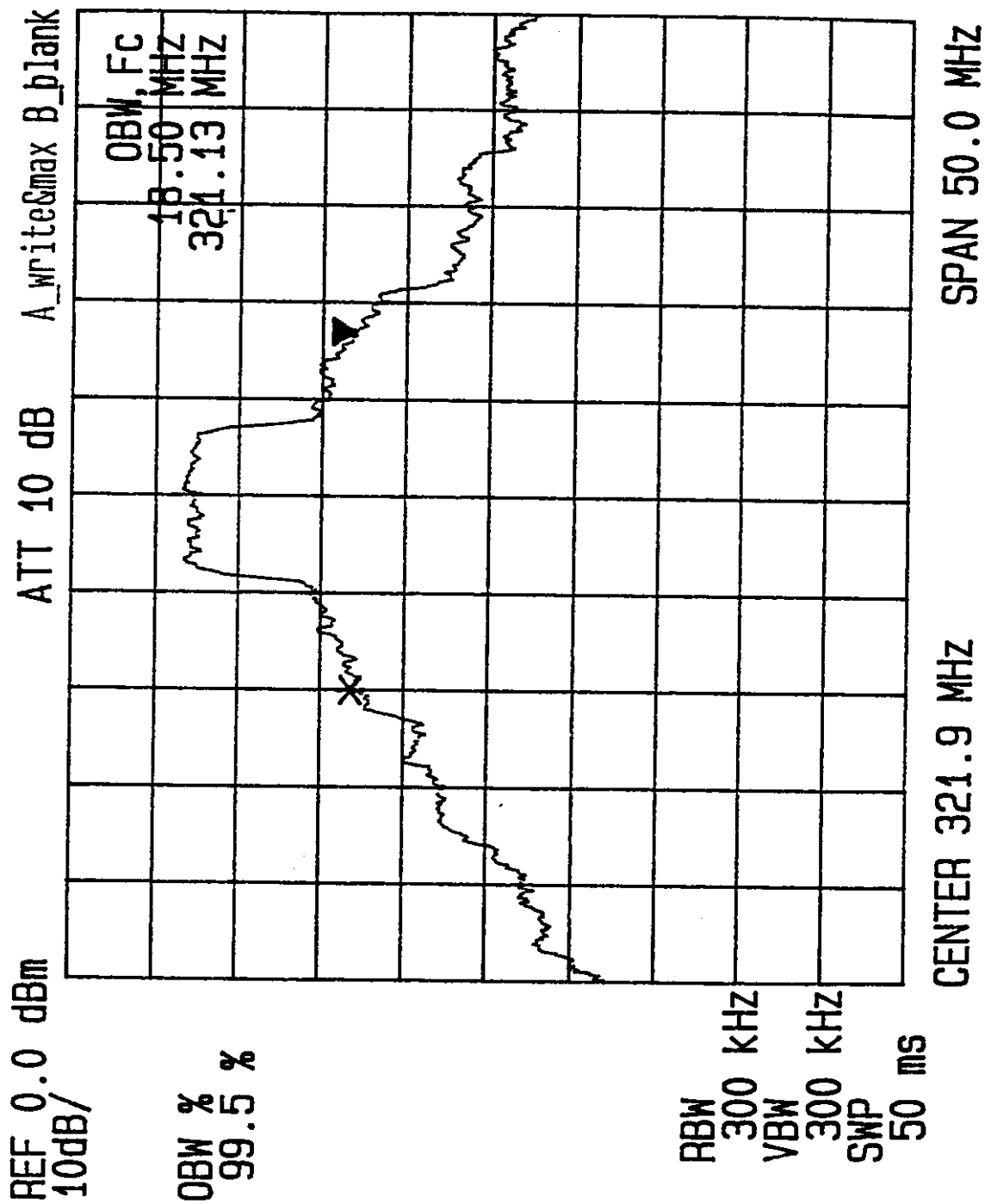


JA-1578-1

DATA SHEET 6.1.1-4



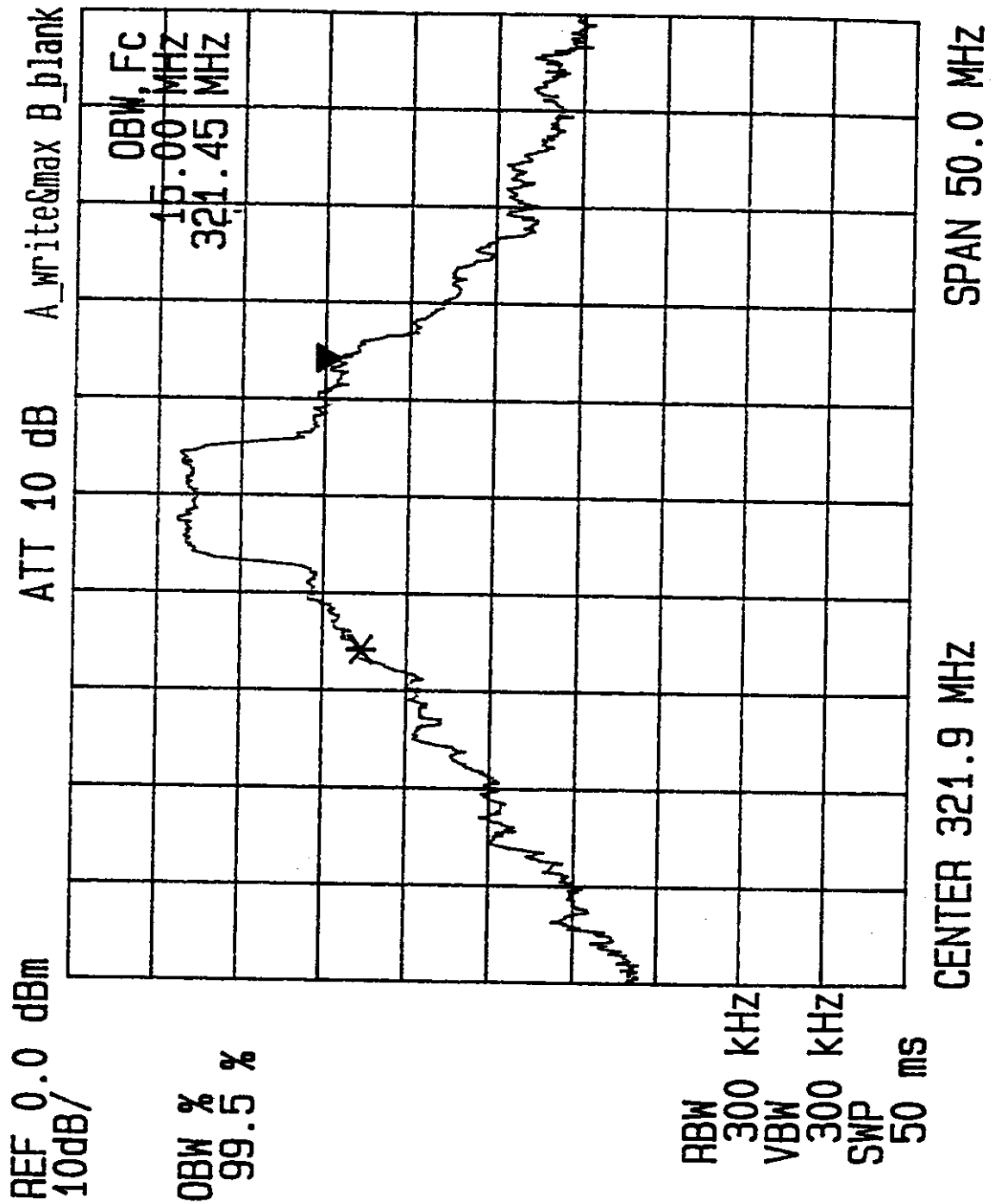
TEST: OCCUPIED B.W. EUT: P-COM HUB S/N: 00203
FREQ: 2050 - M. 1100 SPEC: FCC ANT. HT/POL: .
DETECTOR: ANTENNA: EUT POSITION: .
DATE: 12-31-98 TEST SITE: OATS/ROOM 1 TESTER:



JA-1578-1



TEST: OCCUPIED B.W. EUT: P-COM HUB S/N: 00203
FREQ: 2050 - H. MOD SPEC: FCC ANT. HT/POL:
DETECTOR: ANTENNA: EUT POSITION:
DATE: 12-31-98 TEST SITE: OATS/ROOM 1 TESTER: (signature)



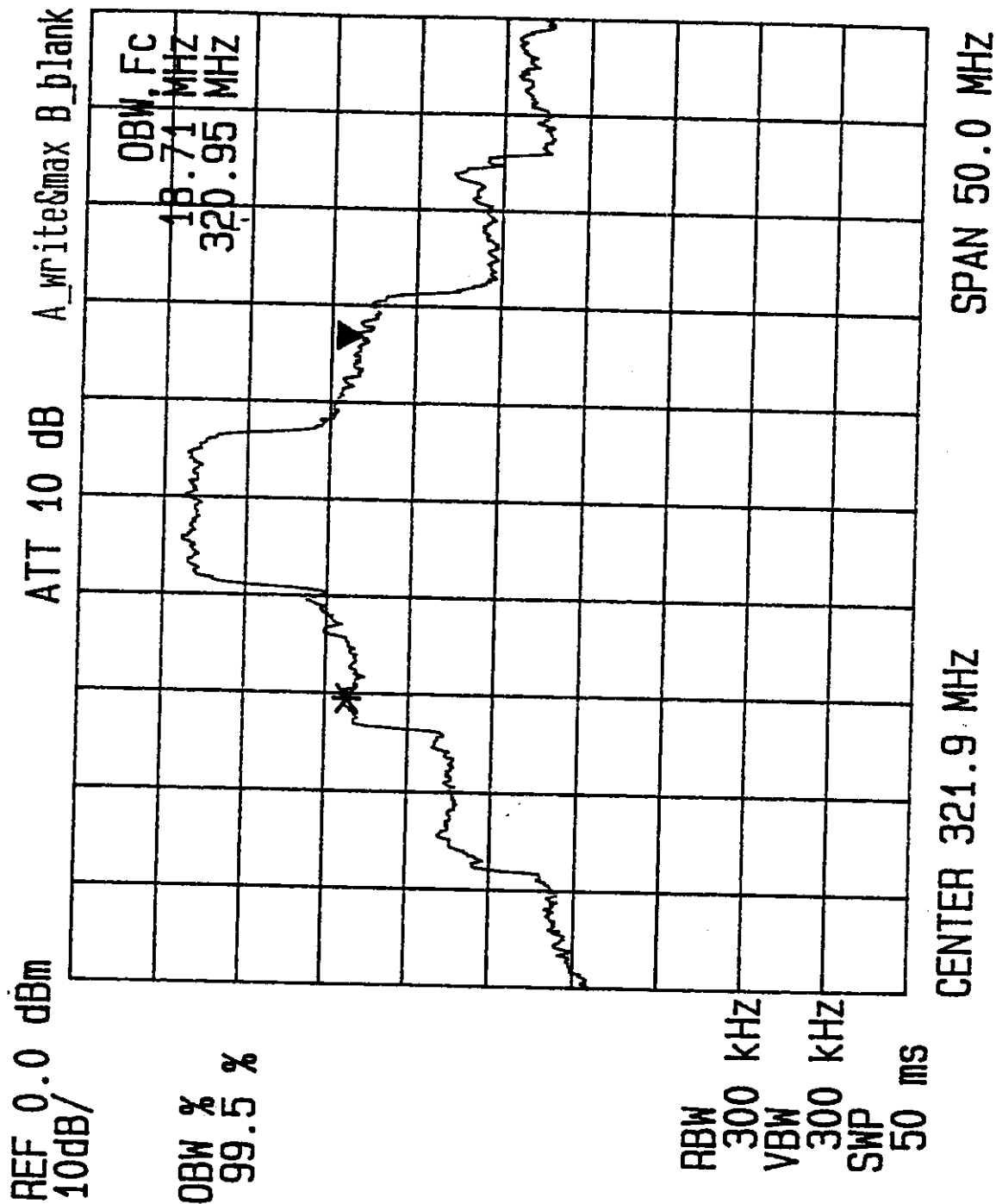
JA-1578-1

DATA SHEET 6.1.1-6



TEST: OCCUPIED B.W. EUT: P-COM HUB S/N: 00203
FREQ: 2000-4.000 SPEC: FCC ANT. HT/POL:
DETECTOR: ANTENNA: EUT POSITION:
DATE: 12-31-98 TEST SITE: OATS/ROOM 1 TESTER:

JA-1578-1

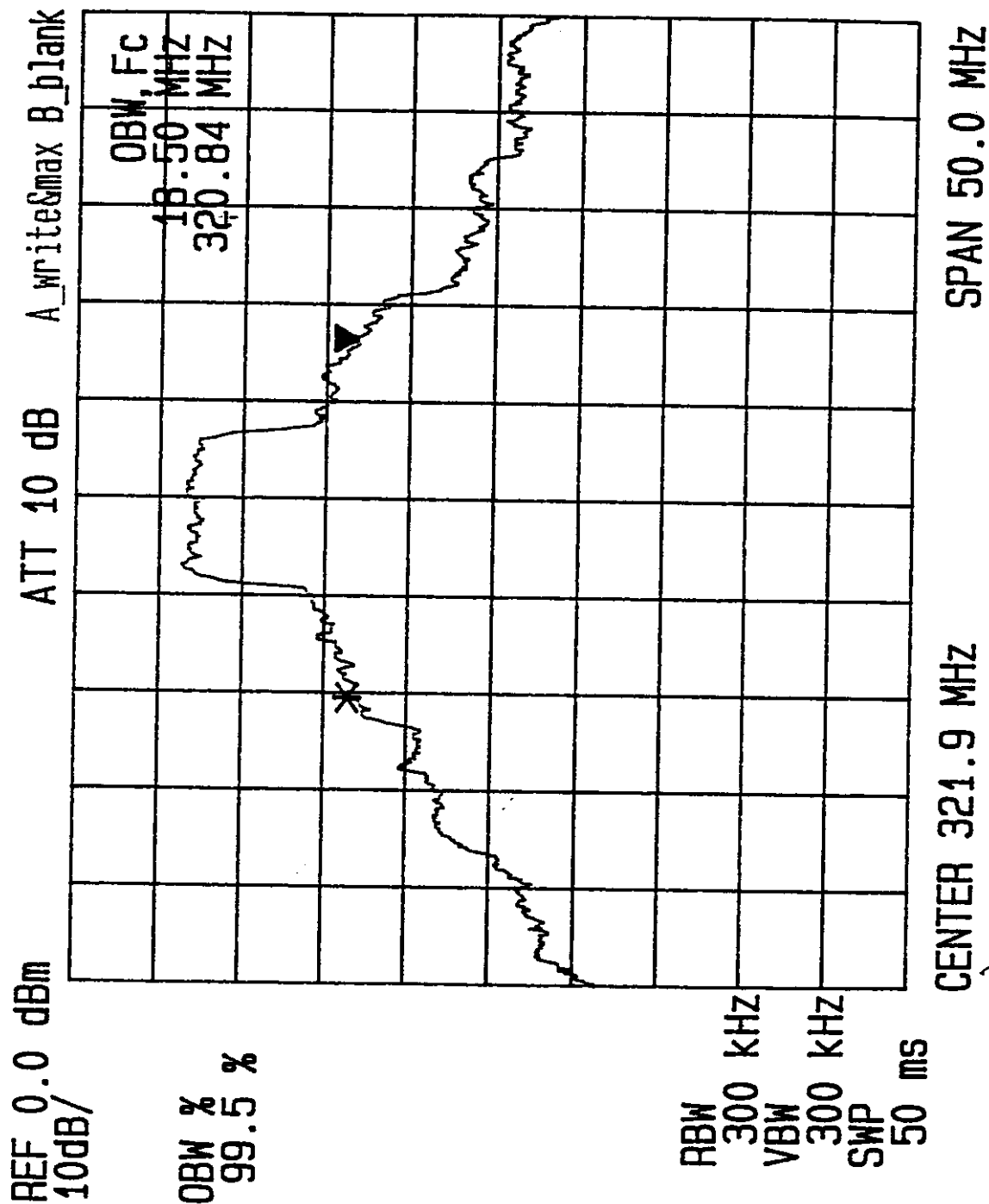


DATA SHEET 6.1.1-7



TEST: OCCUPIED B.W. EUT: P-COM HUB S/N: 00203
FREQ: 2400 - M. MOD SPEC: FCC ANT. HT/POL:
DETECTOR: ANTENNA: EUT POSITION:
DATE: 12-31-98 TEST SITE: OATS/ROOM 1 TESTER: *[Signature]*

JA-1578-1

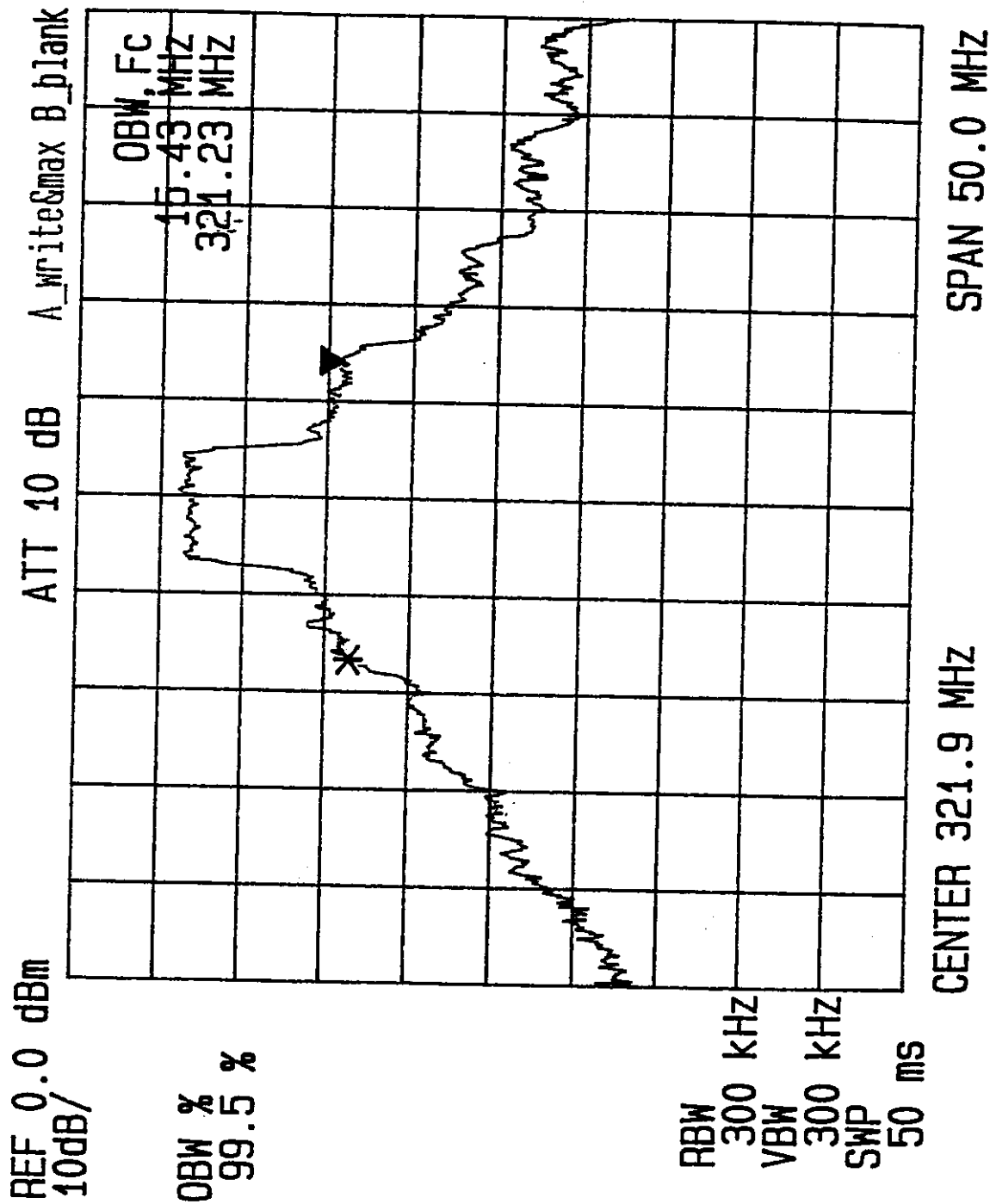


DATA SHEET 6.1.1-8



TEST: OCCUPIED B.W. EUT: P-COM HUB S/N: 00203
FREQ: 2/00 - H. mod ANT. HT/POL:
DETECTOR: ANTENNA: EUT POSITION:
DATE: 12-31-98 TEST SITE: OATS/ROOM 1 TESTER: (88)

JA-1578-1



DATA SHEET 6.1.1-9

6.1.2 Transmitter Power Limitations

Power measurements were made at the input to the antenna. Measurements were made using a Hewlett Packard Model 436A power meter with a Model 8487A power sensor. An antenna adapter for conversion to 2.9mm connector by Hill Mfg. (Model 1781702).

Antenna gain (dBi) was added to the measurements in dBw to obtain the EIRP.

Table 6.1.2-1 presents the tabulated results.

Results: The output was compliant to the required 55dBw by greater than 54dB.

Power Output Measurement

Frequencies: Min = 38.950GHz, Mid = 39.136GHz, Max = 39.31GHz

<u>Freq.</u>	<u>Modulation</u>	<u>Measured Power dBw</u>	<u>Ant. Gain</u>	<u>ERIP dBw</u>	<u>Ref. 55dBw</u>
Min	Min	-17.7	17.5	-.2	-55.2
	Mid	-17.6	17.5	-.1	-55.1
	Max	-17.3	17.5	+.1	-54.9
Mid	Min	-17.7	17.5	-.2	-55.2
	Mid	-17.7	17.5	-.2	-55.2
	Max	-17.7	17.5	-.2	-55.2
Max	Min	-17.8	17.5	-.3	-55.3
	Mid	-17.8	17.5	-.3	-55.3
	Max	-17.8	17.5	-.3	-55.3

Table 6.1.2-1

6.1.3 Conducted and Radiated Emissions, Part 15 and Part 101

This paragraph presents the conducted and radiated emissions for the 38GHz HUB terminal which includes the IDU as a separate unintentional radiator and tested to the requirements of part 15.207 and 209, plus the ODU transmitter requirements to Part 101.111. Figure 6.1.3-1 presents the mixer setups used to cover the 200GHz range.

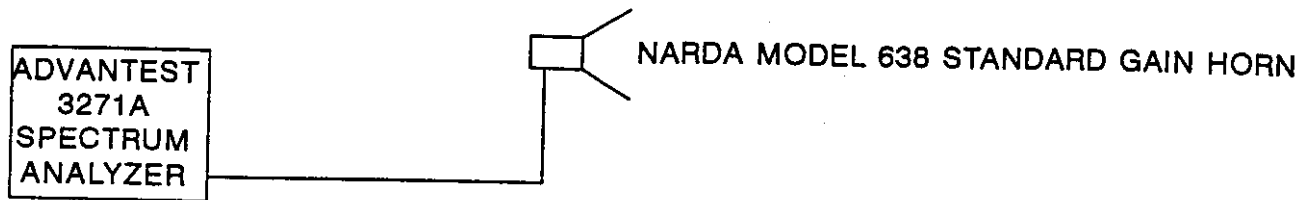
6.1.3.1 Conducted (15.207)

Conducted measurements are shown in Data Sheets 6.1.3.1-1 and 6.1.3.1-2. Photo 6.1.3.1-1 is the setup for power line conducted.

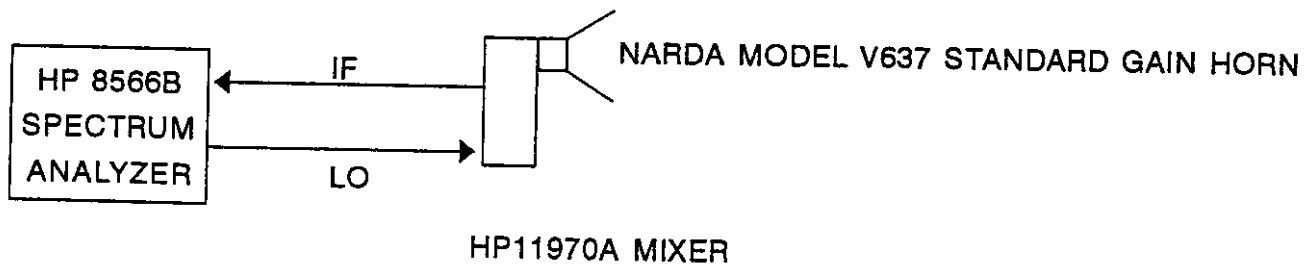
Results - No signals were measured within 18dB of the requirement.

18-26.5GHZ EQUIPMENT SETUP

JA-1578-1



26.5-40GHz EQUIPMENT SETUP



33-50GHz EQUIPMENT SETUP

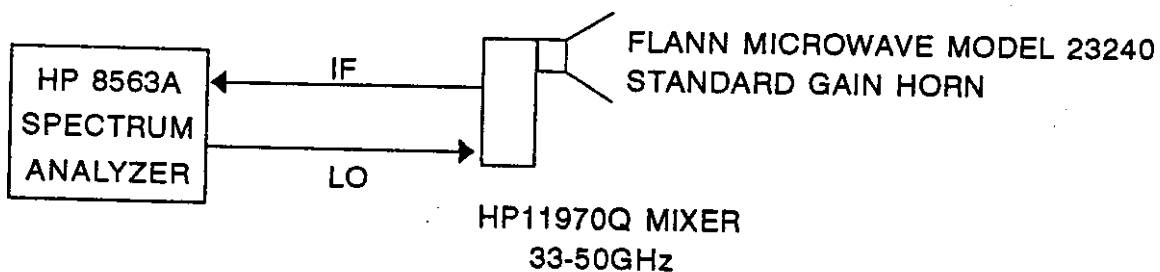
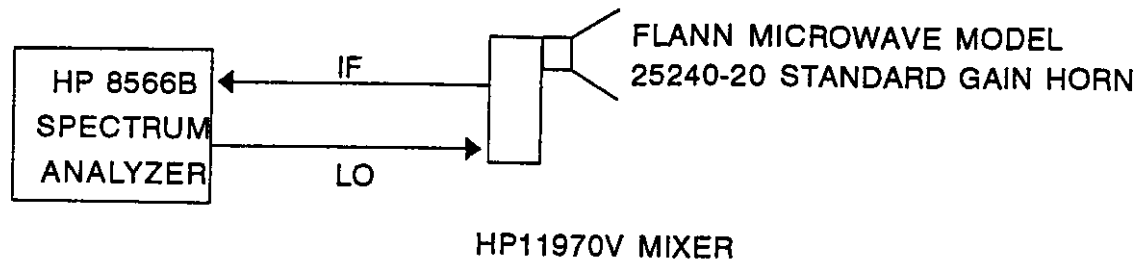


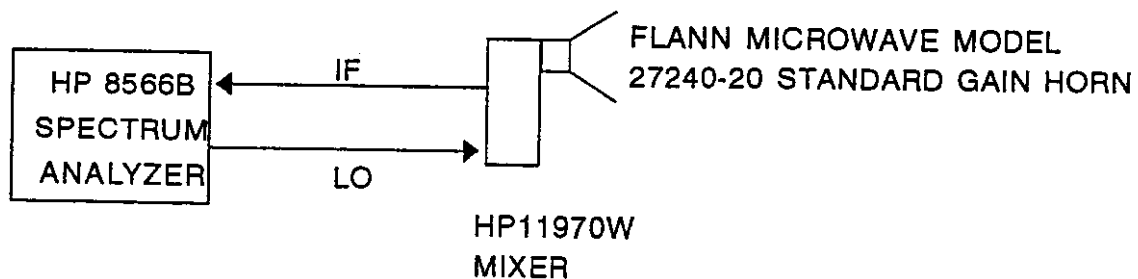
FIGURE 6.1.3-1

50-75GHz EQUIPMENT SETUP

JA-1578-1



75-110GHz EQUIPMENT SETUP



110-170GHz EQUIPMENT SETUP

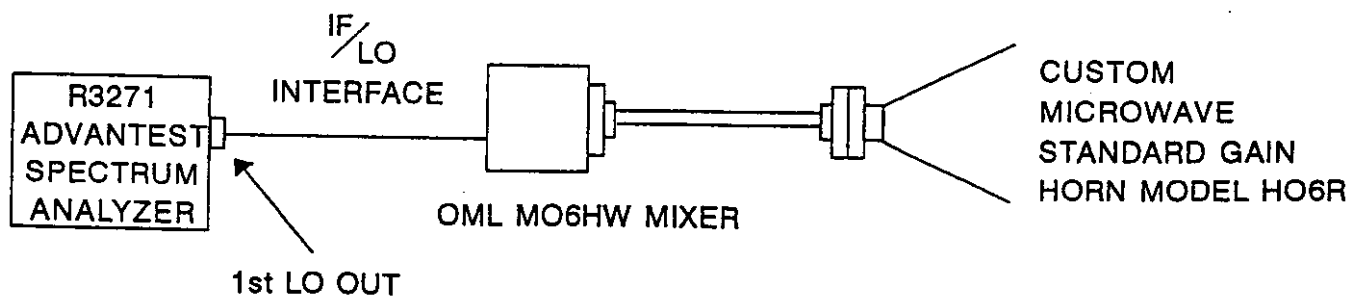
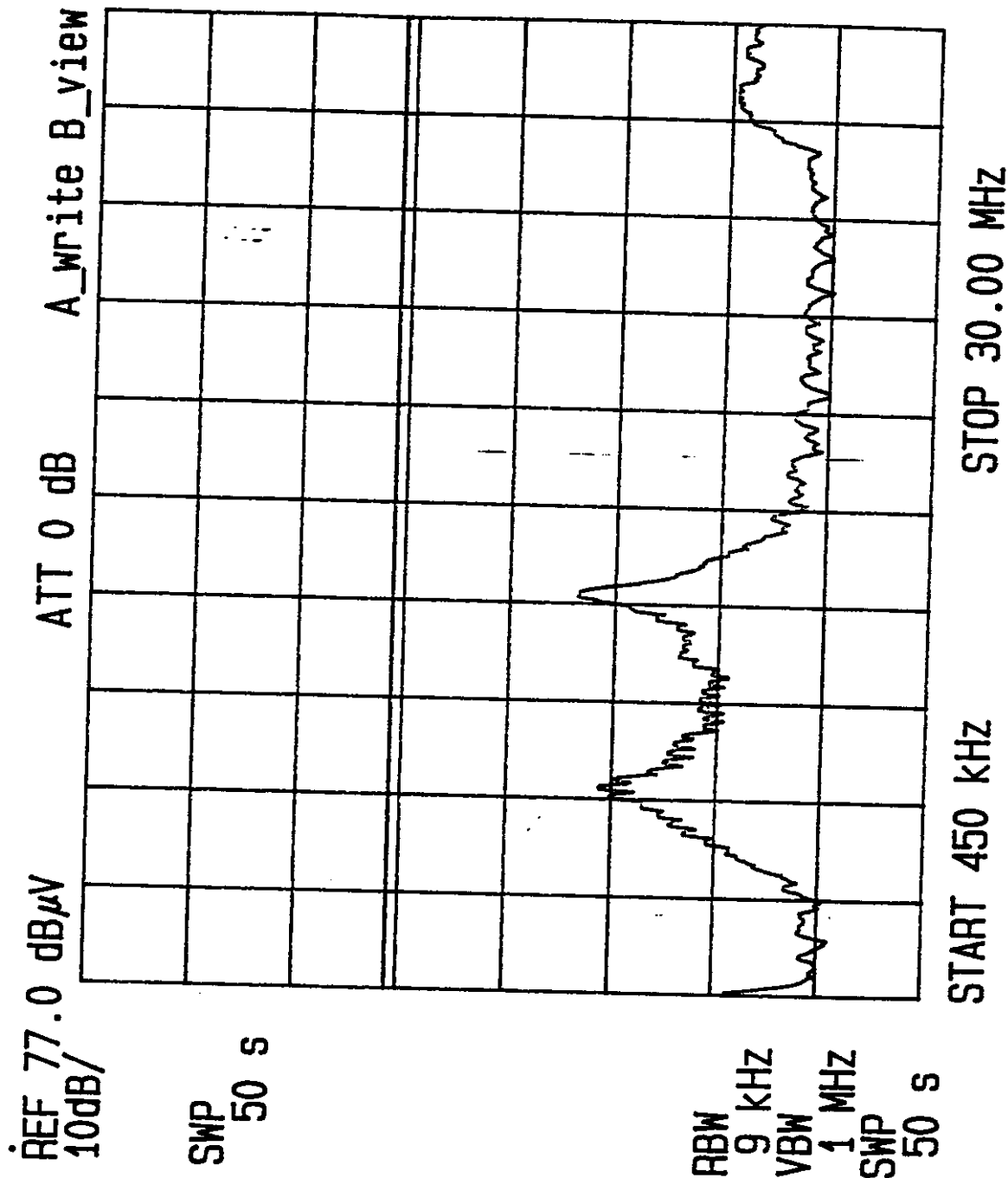


FIGURE 6.1.3-1 CONT.



TEST: FCC CONDUCTED EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 450K-30MHz SPEC: FCC 15.209A ANT.HT/POL: N/A
DETECTOR: Q-PEAK LINE UNDER TEST: PHASE EUT POSITION: FRONT
DATE: 12/22/97 TEST SITE: ROOM 1 TESTER: *[Signature]*

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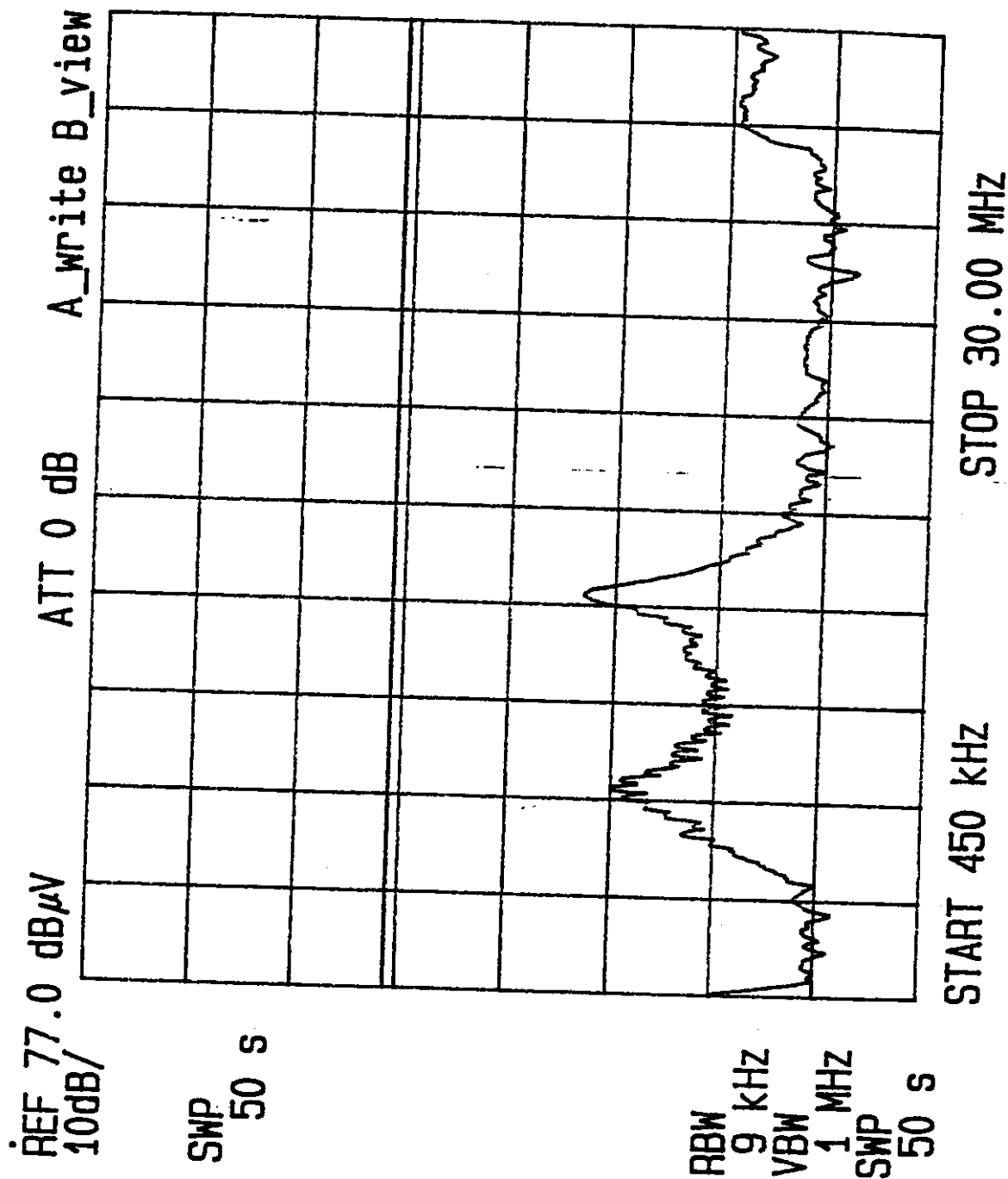


DATA SHEET 6.1.3.1-1



TEST: FCC CONDUCTED EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 450K-30MHz SPEC: FCC 15.209A ANT.HT/POL: N/A
DETECTOR: O-PEAK LINE UNDER TEST: NEUTRAL EUT POSITION: FRONT
DATE: / / TEST SITE: ROOM 1 TESTER: /

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DATA SHEET 6.1.3.1-2

JA-1578-1

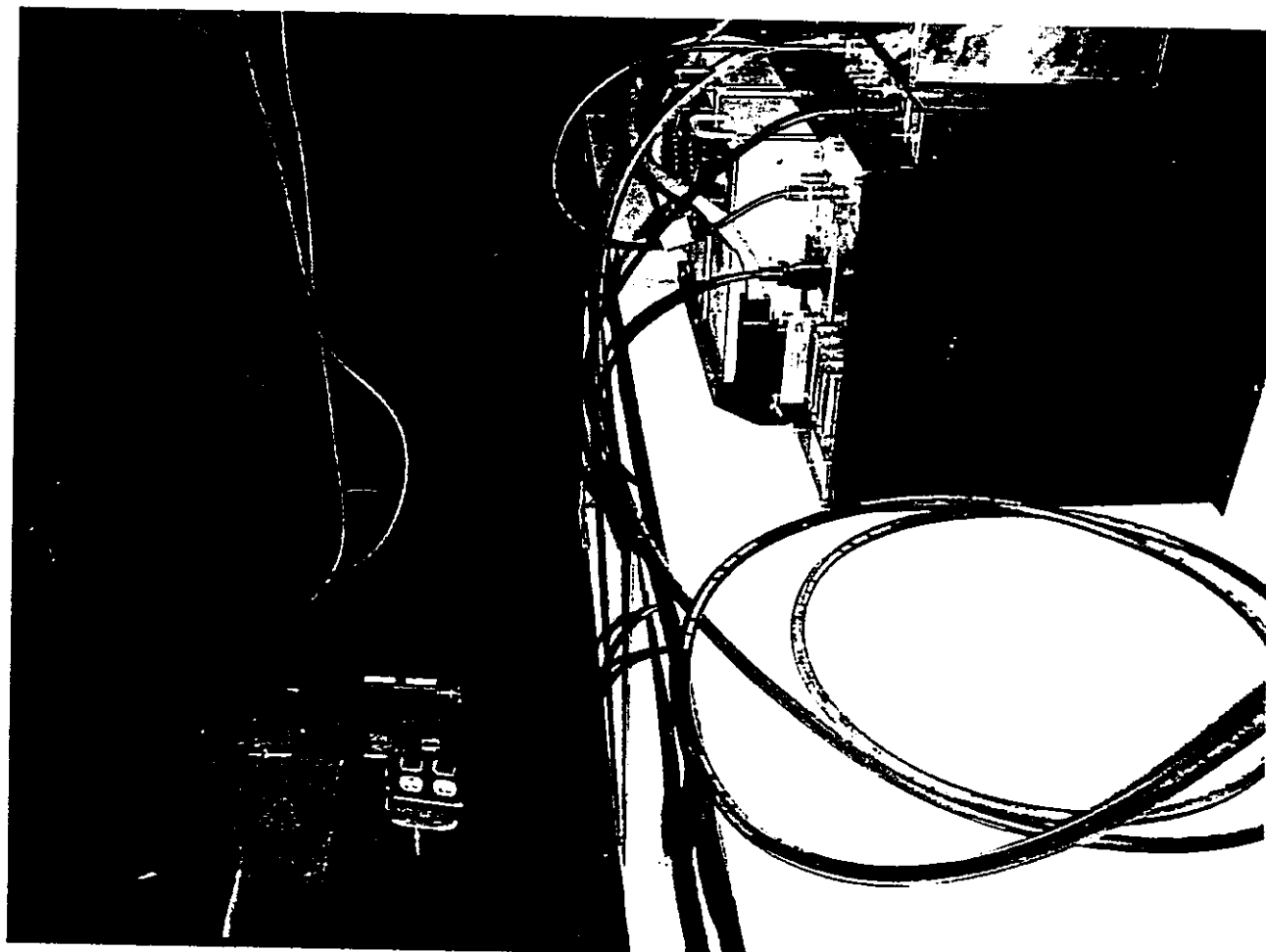


PHOTO 6.1.3.1-1

6.1.3.2 Radiated 15.209(a)/101.111)

Radiated measurements were performed starting at 30MHz and extended out to 200GHz to include the requirements for covering the 38GHz transmitter harmonics and spurious emissions. Quasi-peak detection was used from 30MHz to 1GHz and from 1GHz to 40GHz. Both peak and average measurements were performed. Above 40GHz the peak measurements at 1MHz bandwidth were measured. The harmonics were measured at the min, mid and max TX frequencies. A scan at mid frequency was performed to 200GHz for spurious content. Both vertical and horizontal polarization is included in the data.

Table 6.1.3.2-1 is a tabulated list of the signals detected including the transmitter frequency and harmonics.

Results - The terminal does not have signals that appear above the requirement of Part 15 or Part 101 as tested in this report. Best engineering practice was used in the 110GHz to 200GHz range. Absolute levels can not be determined due to lack of technology advances. The lower frequencies up to 110GHz were measured using standard receivers, mixers, filters and amplifiers with proven methods. The manufacturer of the 110GHz-170GHz mixer supplied an application note for guidance in this area. The range of 170GHz-200GHz was performed by using the same mixer but the 11th harmonic instead of the 10th. Hoping to extend the mixer by 20% the L.O. frequency was also increased by 800MHz (20%).

RSI is confident that the methods used show the unit compliant.

The MASK requirement of 101.111(2)(ii) is shown in Data Sheets 6.1.3.2-1 through 6.1.3.2-3. The maximum attenuation requirement of 56dB at the 250% points is applicable.

Outside the 250% bandwidth the limit was established at 33dB attenuation required below transmitter. The measurements were made using the radiated technique. The transmitter output for this application is approximately 50dB below the allowed 55dBw EIRP.

Plotted data for the peak scans over the entire 30MHz-200GHz range are presented on Data Sheets 6.1.3.2-4 through 6.2.3.2-27.

Average data plots to 40GHz are presented on Data Sheets 6.1.3.2-28 through 6.1.3.2-53.

Preliminary data is shown on Data Sheets 6.1.3.2-54 through 6.1.3.2-63.

TABULATED E-FIELD

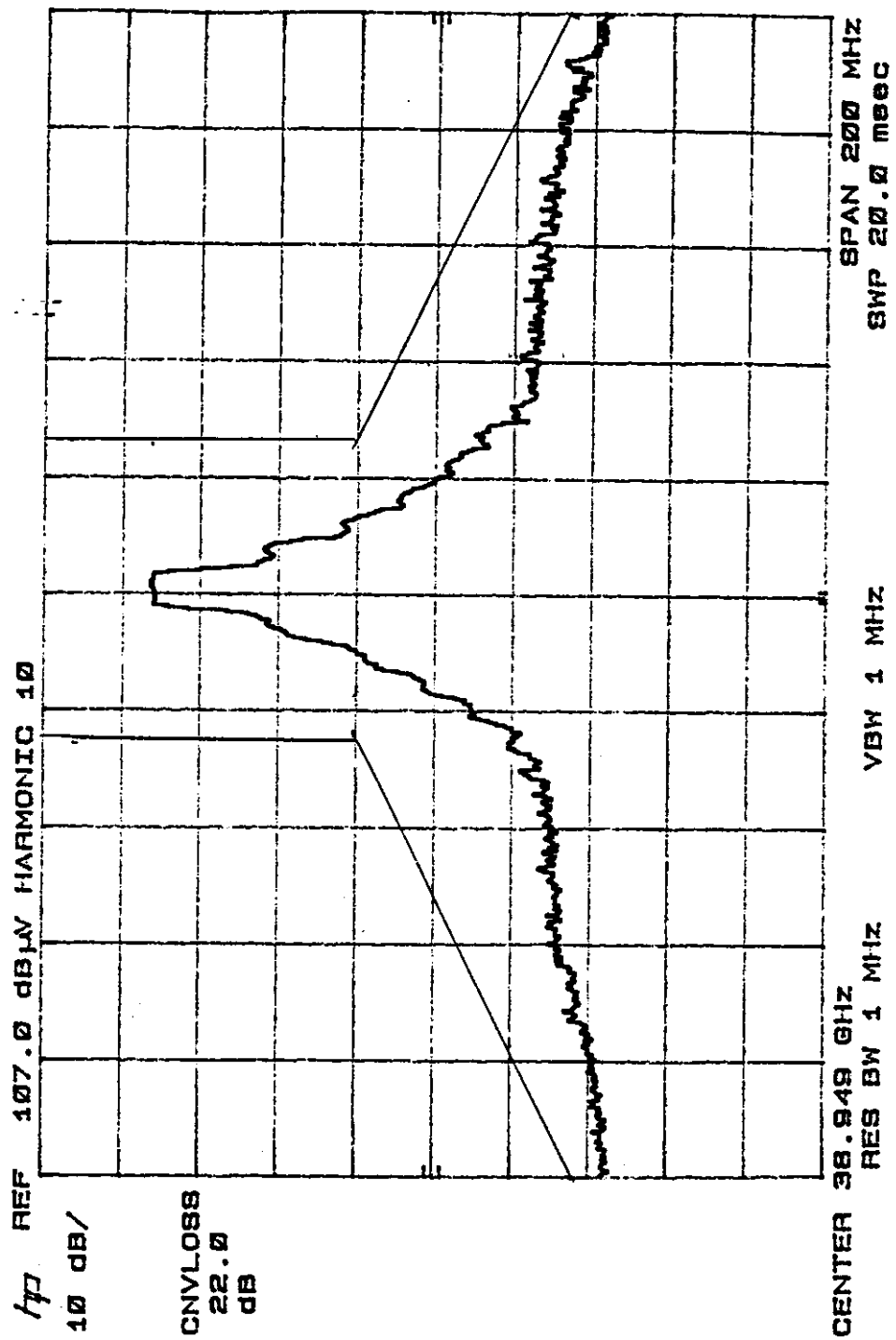
	<u>Frequency</u>	<u>Polarization</u>	<u>dBμV/m</u>	<u>Limit</u>	<u>Δ Limit</u>
	241MHz	H	39	46	-7
	281MHz	H	38	46	-8
	291MHz	H	40	46	-6
	301MHz	H	42	46	-4
	361MHz	H	44	46	-2
	469MHz	H	41	46	-5
First Harmonics	38.9GHz	H	74.9	156	-81.1
	38.9GHz	V	94.0	156	-62.0
	39.14GHz	H	72.7	156	-83.3
	39.14GHz	V	94.8	156	-61.2
	39.31GHz	H	72.0	156	-84.0
	39.31GHz	V	94.6	156	-61.4
Second Harmonics	77.9GHz	H	<92	123	-31
	78.3GHz	H	<92	123	-31
	78.6GHz	H	<92	123	-31
Third Harmonics	116.8GHz	H	<115	123	-8
	156.6GHz	H	<115	123	-8
	117.9GHz	H	<115	123	-8
Fourth Harmonics	155.8GHz	H	<110	123	-13
	156.6GHz	H	<110	123	-13
	157.2GHz	H	<110	123	-13
Fifth Harmonics	194.7GHz	H	<115	123	-8
	195.7GHz	H	<115	123	-8
	196.5GHz	H	<115	123	-8

TABLE 6.1.3.2-1



TEST: EMISSION MASK EUT: P-COM HUB UNIT/ODU S/N: 203/00001
FREQ: 38.949 GHz SPEC: FCC 101.111 ANT. IIT/POL:
DETECTOR: ANTENNA: EUT POSITION:
DATE: 12/31/98 TEST SITE: OATS/ROOM 1 TESTER: *JS*

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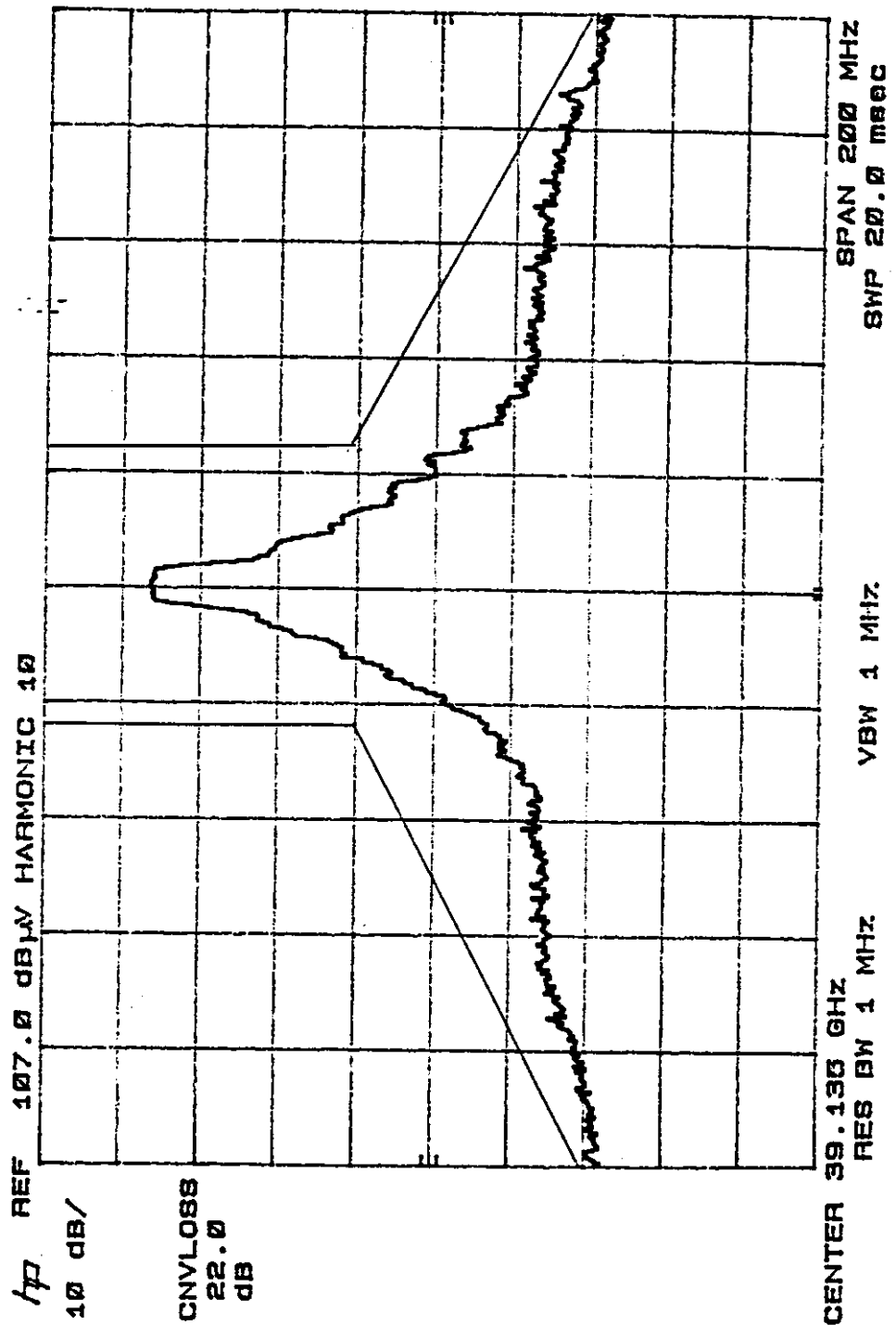


DATA SHEET 6.1.3.2-1



TEST: EMISSION MASK EUT: P-COM HUB UNIT/ODU S/N: 203/00001
FREQ: 39.135 GHz SPEC: FCC 101.111 ANT. HT/POL:
DETECTOR: ANTENNA: EUT POSITION:
DATE: 12/31/87 TEST SITE: OATS/ROOM 1 TESTER: *[Signature]*

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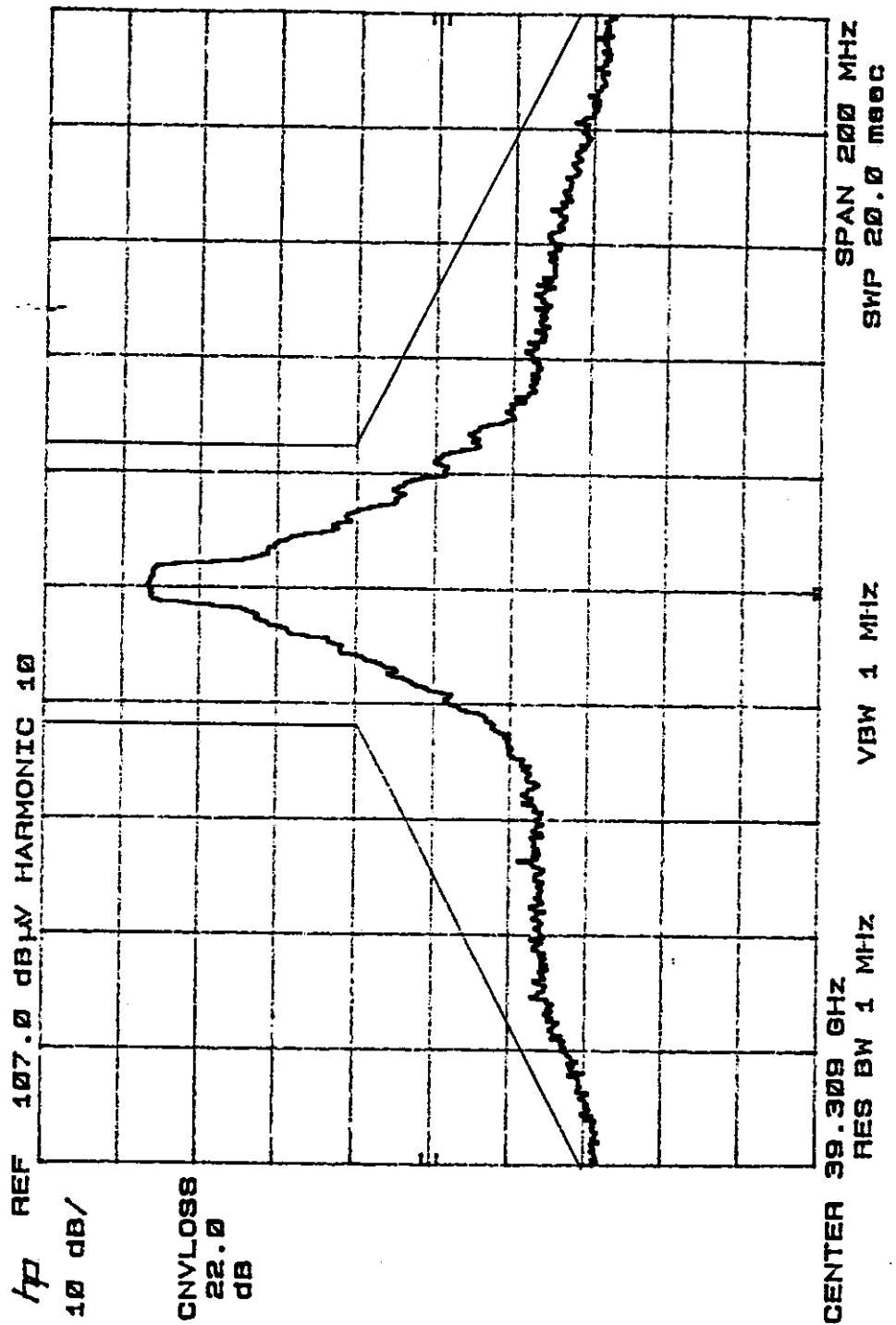


DATA SHEET 6.1.3.2-2



TEST: EMISSION MASK EUT: P-COM HUB UNIT/ODU S/N: 203/00001
FREQ: 34.3 GHz SPEC: FCC 101.111 ANT. HT/POL:
DETECTOR: ANTENNA: EUT POSITION:
DATE: 12/31/98 TEST SITE: OATS/ROOM 1 TESTER: *DB*

JA-1578-1

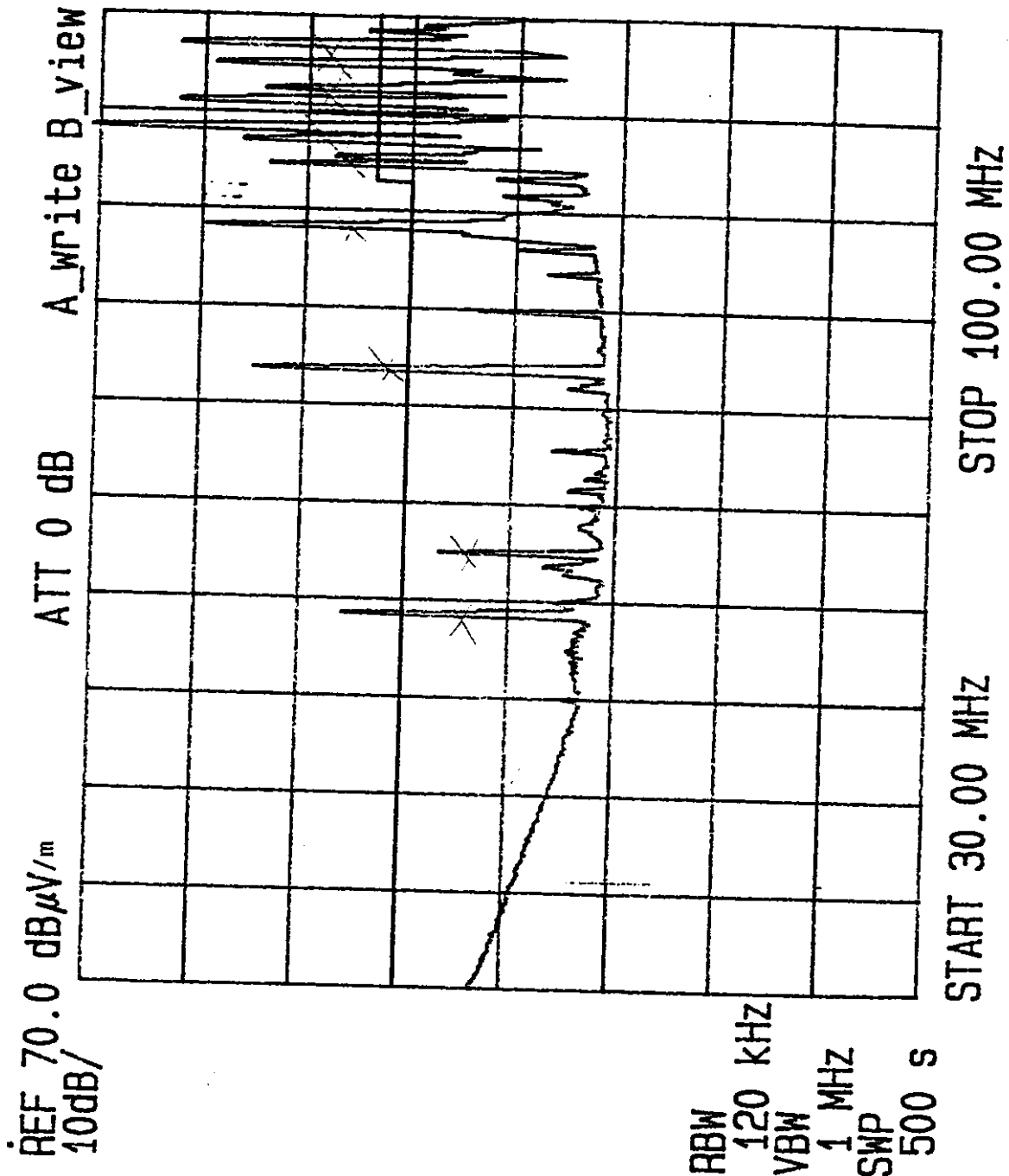


DATA SHEET 6.1.3.2-3



JA-1578-1

TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 30M-100MHz SPEC: 15.245(B)(3)/15.209(a) ANT.HT/POL: H / L
DETECTOR: Q-PEAK ANTENNA: EUT POSITION: 67°
DATE: 12/31/88 TEST SITE: QATS/ROOM 1 TESTER: [signature]

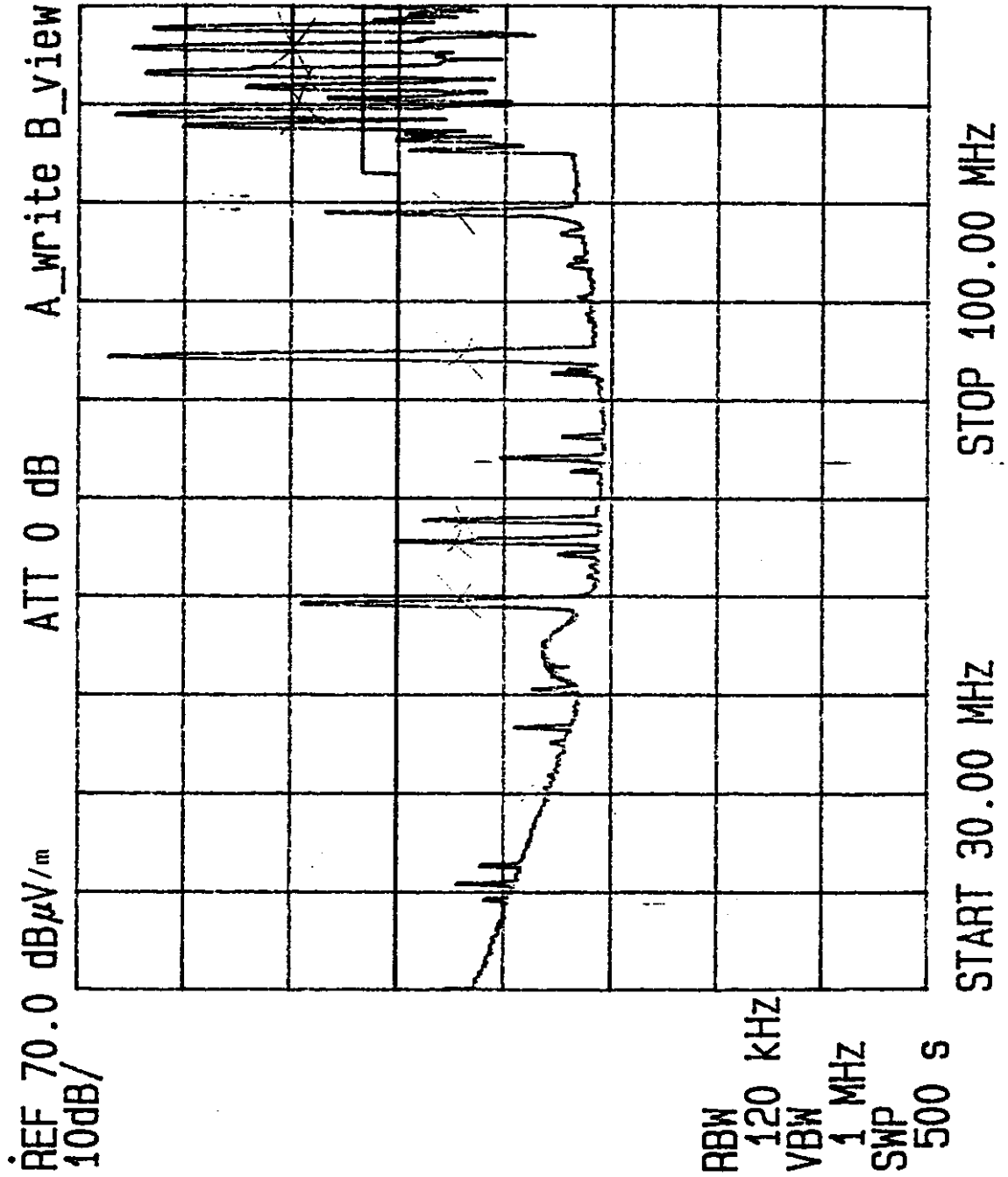


DATA SHEET 6.1.3.2-4



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 30M-100MHz SPEC: 15.245(B) (3)/15.209(a) ANT.HT/POL: V /LS
DETECTOR: O-PEAK ANTENNA: EUT POSITION: 67°
DATE: 12/31/98 TEST SITE: OATS/ROOM 1 TESTER: [signature]

JA-1578-1

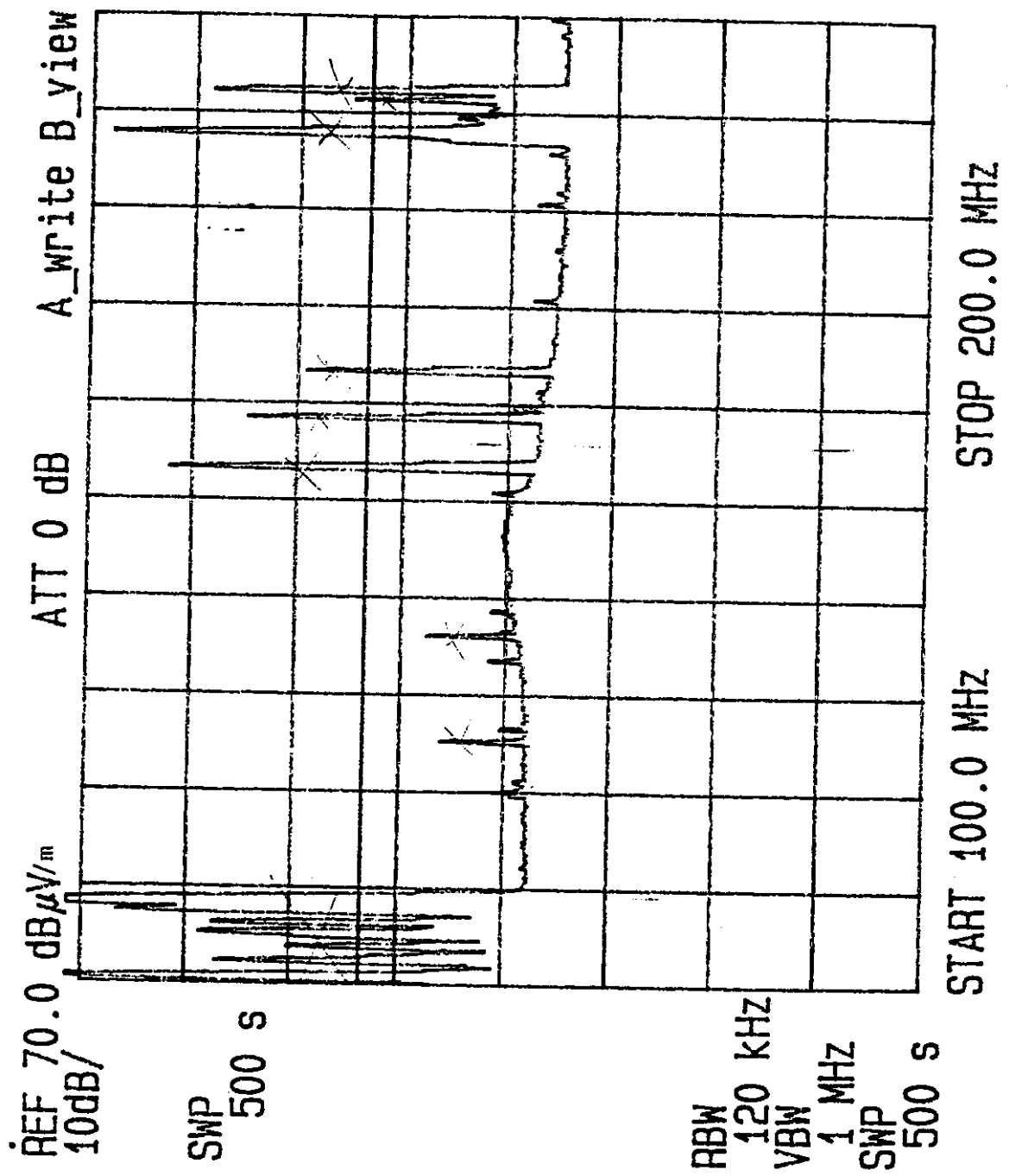


DATA SHEET 6.1.3.2-5



JA-1578-1

TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 100M-200MHz SPEC: 15.245(B)(3)/15.209(a) ANT.HT/POL: H /L
DETECTOR: Q-PEAK ANTENNA: EUT POSITION: 67
DATE: 12/1/11 TEST SITE: OATS/ROOM 1 TESTER:

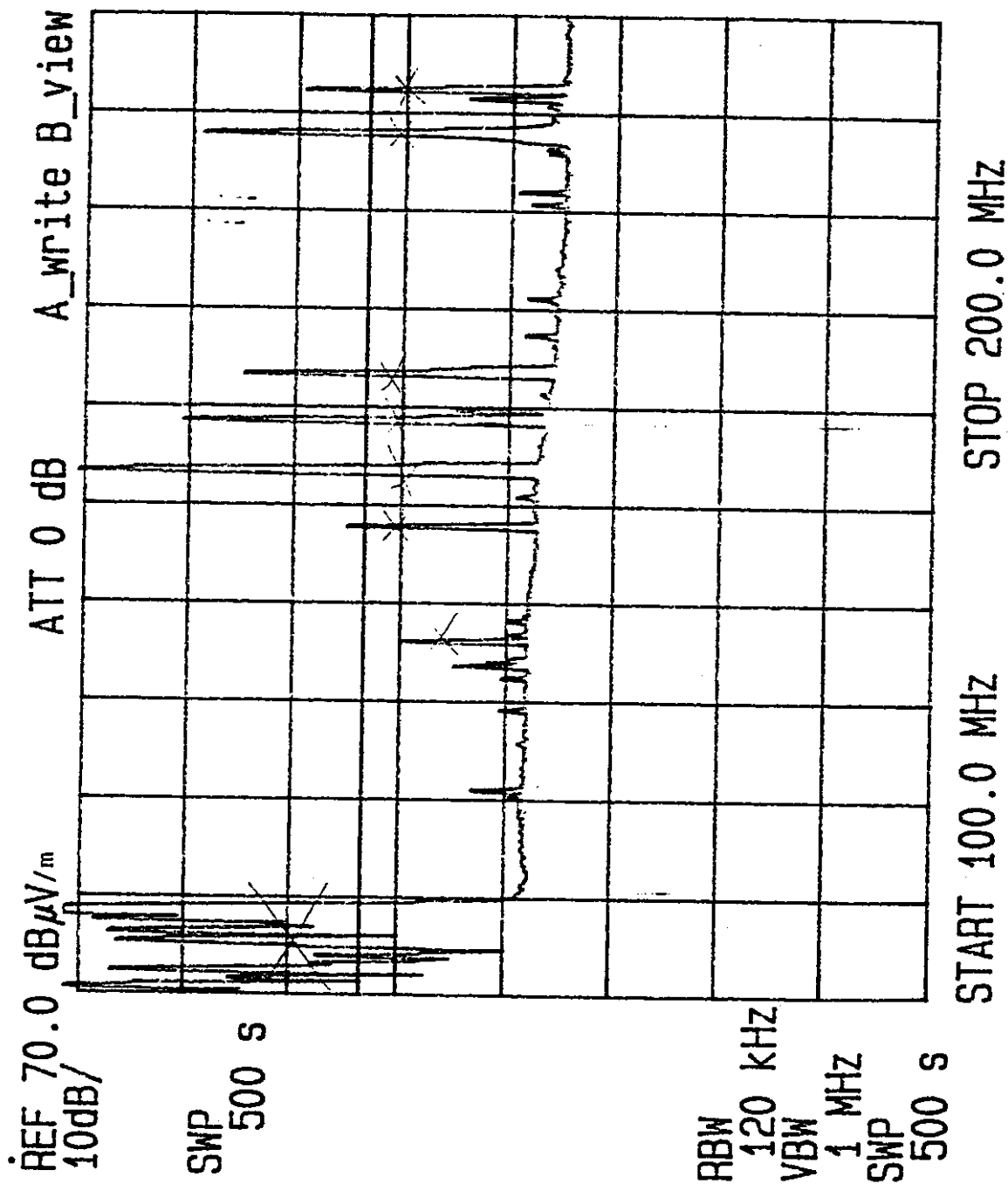


DATA SHEET 6.1.3.2-6



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 100M-200MHz SPEC: 15.245(B)(3)/15.209(a) ANT.HT/POL: V
DETECTOR: O-PEAK ANTENNA: EUT POSITION:
DATE: 12/3/12 TEST SITE: OATS/ROOM 1 TESTER:

JA-1578-1

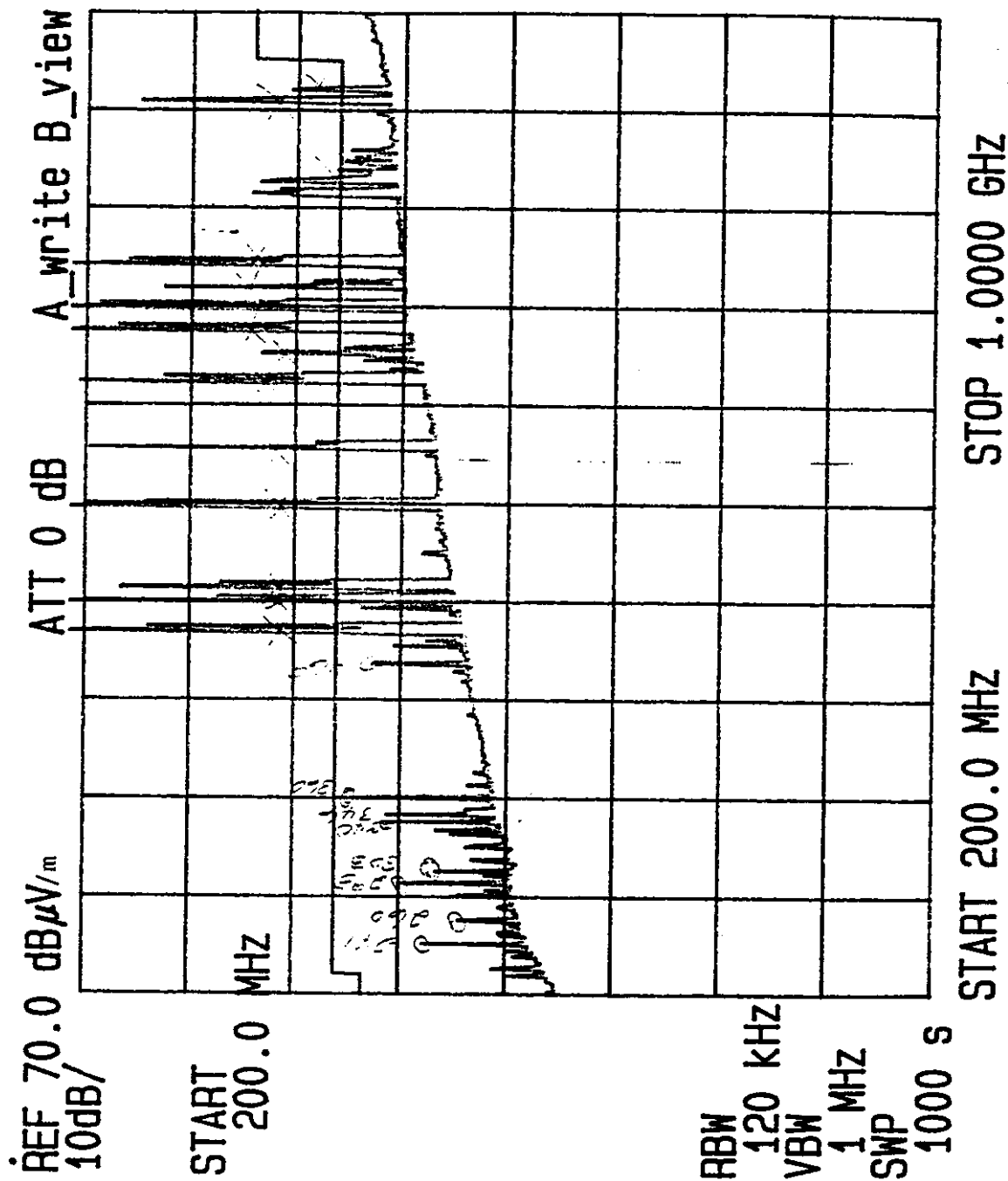


DATA SHEET 6.1.3.2-7



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 200M-1GHz SPEC: 15.245(B)(3)/15.209(a) ANT.HT/POL: H /L
DETECTOR: Q-PEAK ANTENNA: EUT POSITION: 67
DATE: 12/31/04 TEST SITE: OATS/ROOM 1 TESTER: JZ

JA-1578-1

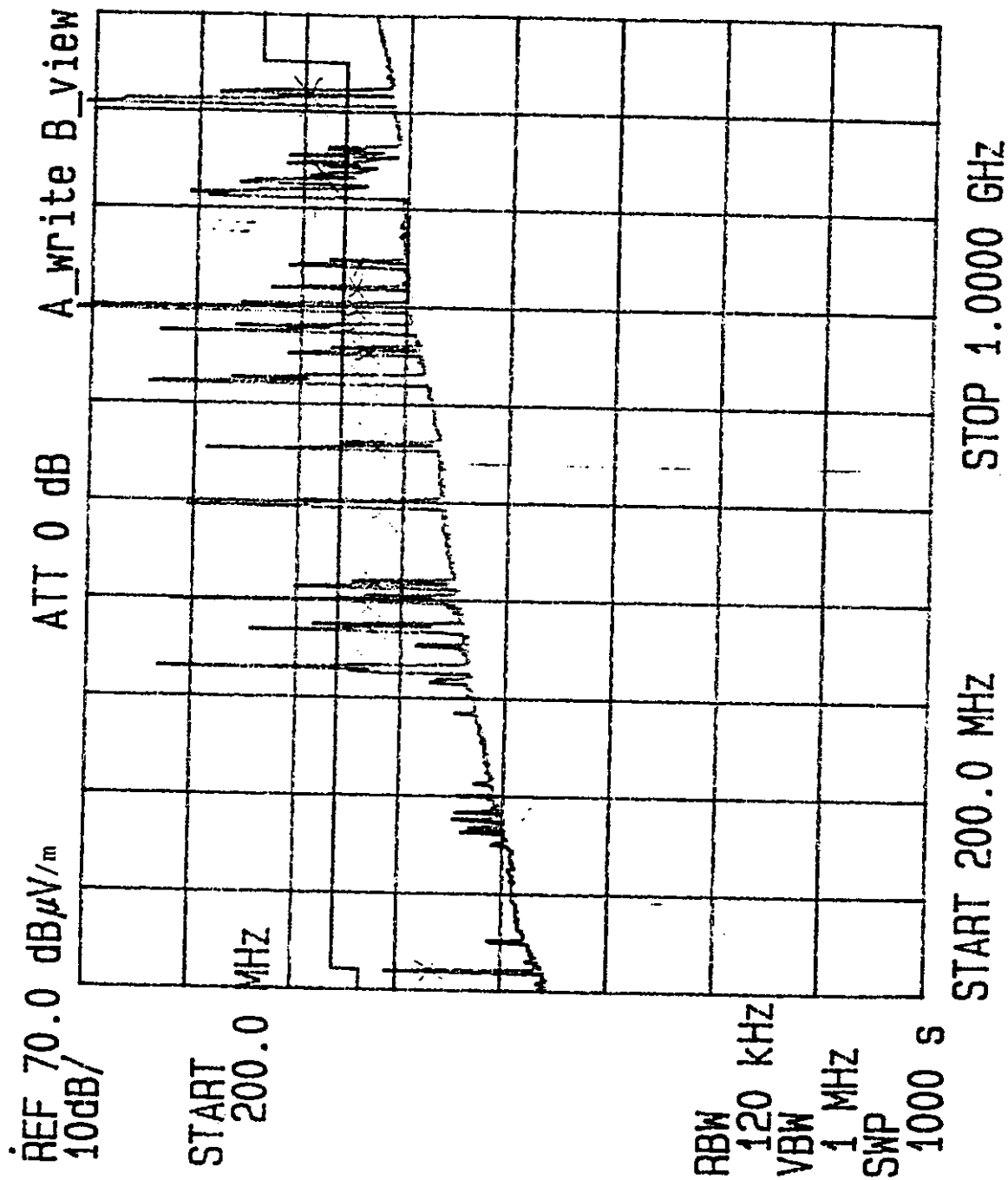


DATA SHEET 6.1.3.2-8



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 200M-1GHz SPEC: 15.245(B)(3)/15.209(a) ANT.HT/POL: V
DETECTOR: O-PEAK ANTENNA: INTERNAL EUT POSITION:
DATE: 12/31/98 TEST SITE: COATS/ROOM 1 TESTER:

JA-1578-1



DATA SHEET 6.1.3.2-9



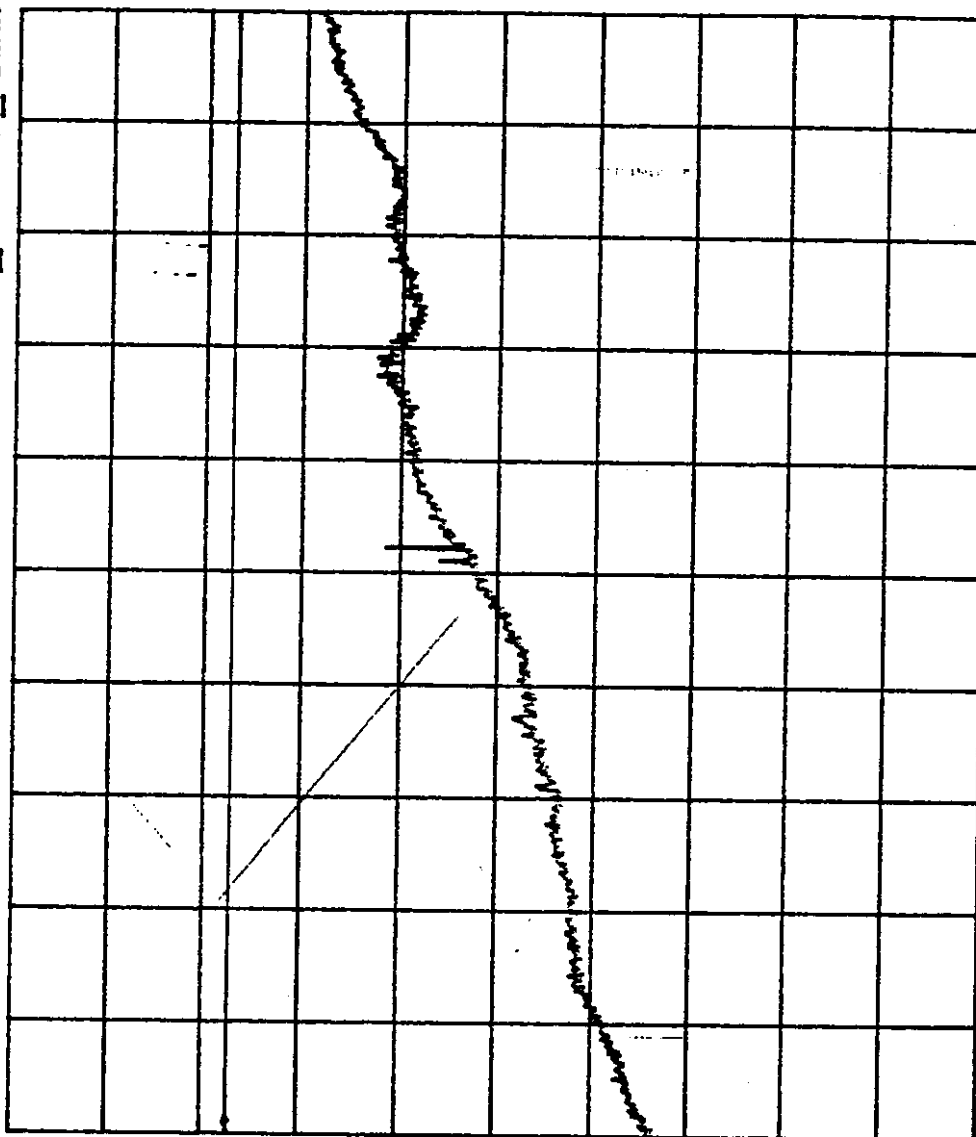
TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 1G-8GHz SPEC: FCC 15.209A ANT.HT/POL: H
DETECTOR: PEAK ANTENNA: EUT POSITION:
DATE: 12/20/98 TEST SITE: 3 METERS TESTER: JES

JA-1578-1

REF 97.0 dB μ V/m
10dB/

ATT 0 dB

A_write B_blank



START 1.000 GHz

STOP 8.000 GHz

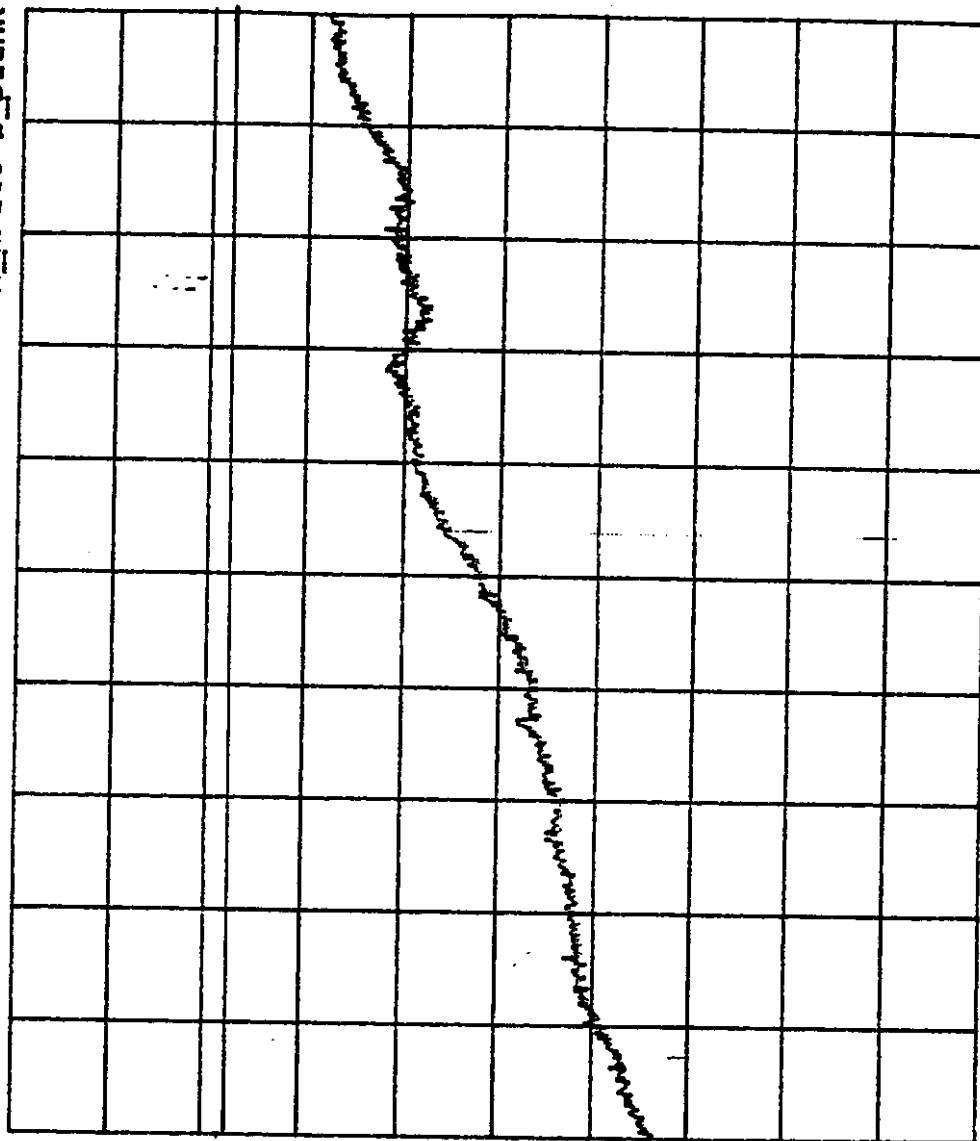
RBW 1 MHz
VBW 1 MHz
SWP 200 S

DATA SHEET 6.1.3.2-10



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 1G-8GHz SPEC: FCC 15.209A ANT.HT/POL: V
DETECTOR: PEAK ANTENNA: EUT POSITION:
DATE: 12/26/08 TEST SITE: 3 METERS TESTER: *h*

REF 97.0 dB μ V/m ATT 0 dB A_write B_blank
10dB/



RBW 1 MHz
VBW 1 MHz
SWP 200 S

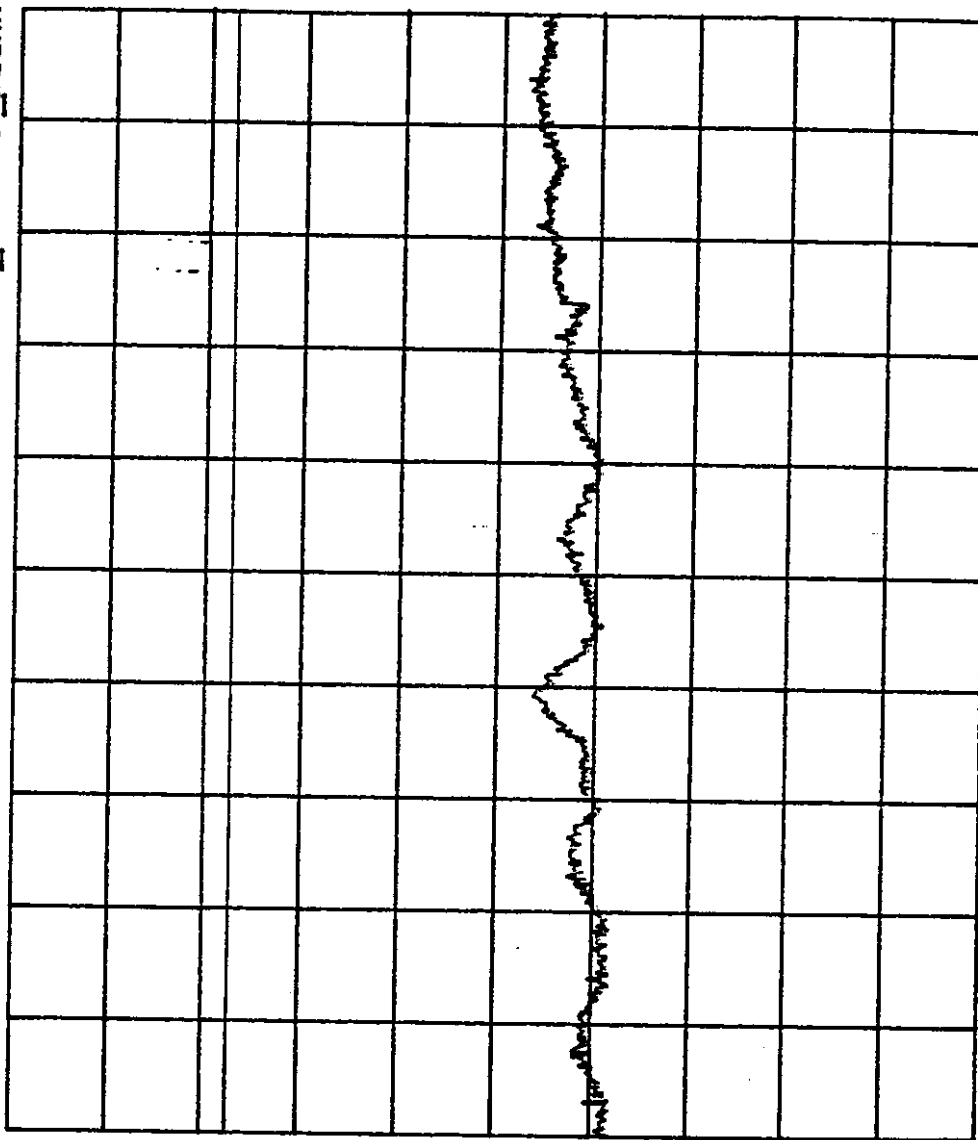
START 1.000 GHz STOP 8.000 GHz

JA-1578-1



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 8G-18GHz SPEC: FCC 15.209A ANT.HT/POL: V
DETECTOR: PEAK ANTENNA: EUT POSITION:
DATE: 12/12/18 TEST SITE: 3 METER TESTER: 33

REF 97.0 dB μ V/m ATT 0 dB A_write B_blank
10dB/



RBW 1 MHz
VBW 1 MHz
SWP 200 S

START 8.000 GHz STOP 18.000 GHz

JA-1578-1

DATA SHEET 6.1.3.2.-12

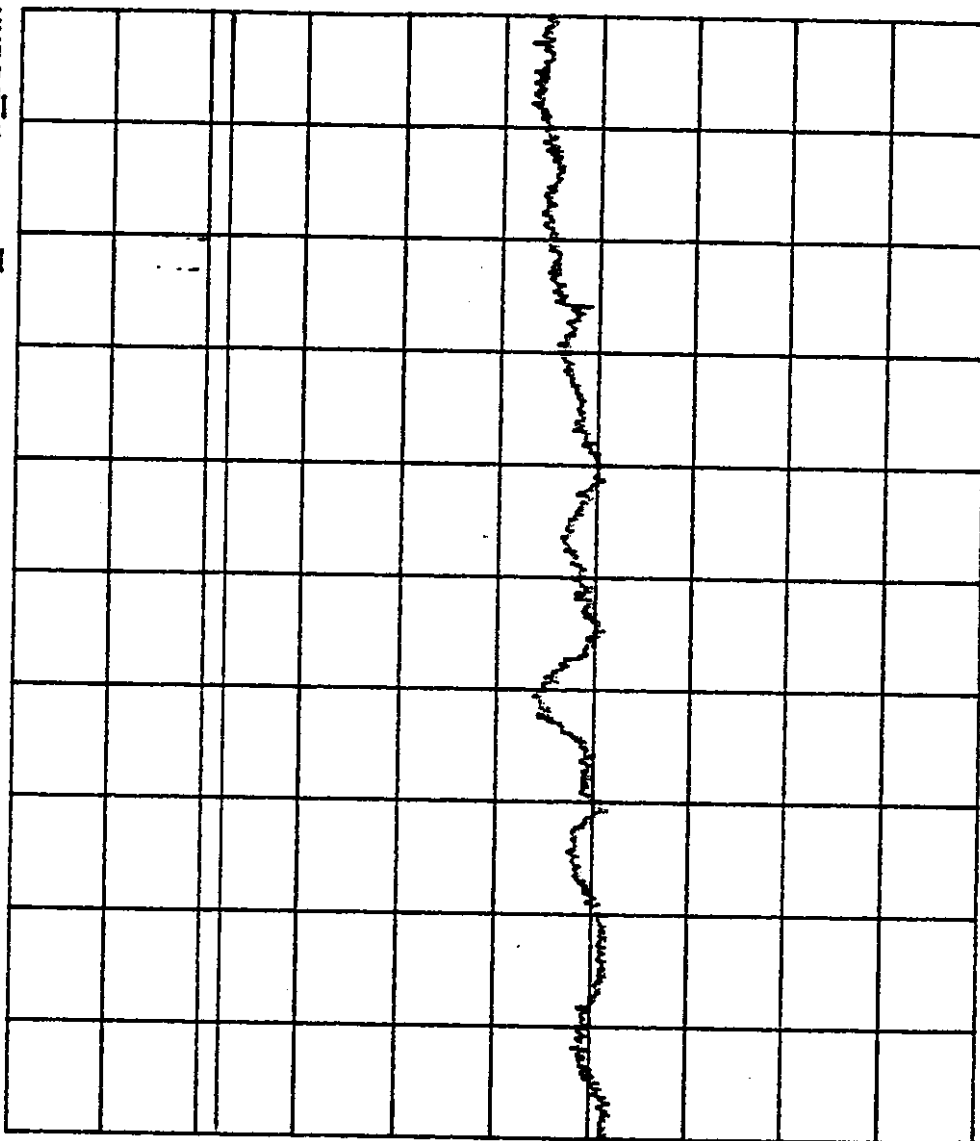


TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 8G-18GHz SPEC: FCC 15.209A ANT.HT/POL: H
DETECTOR: PEAK ANTENNA: EUT POSITION:
DATE: 12/18/03 TEST SITE: 3 METER TESTER: J

JA-1578-1

REF 97.0 dB μ V/m ATT 0 dB A_write B_blank
10dB/

RBW 1 MHz
VBW 1 MHz
SWP 200 S



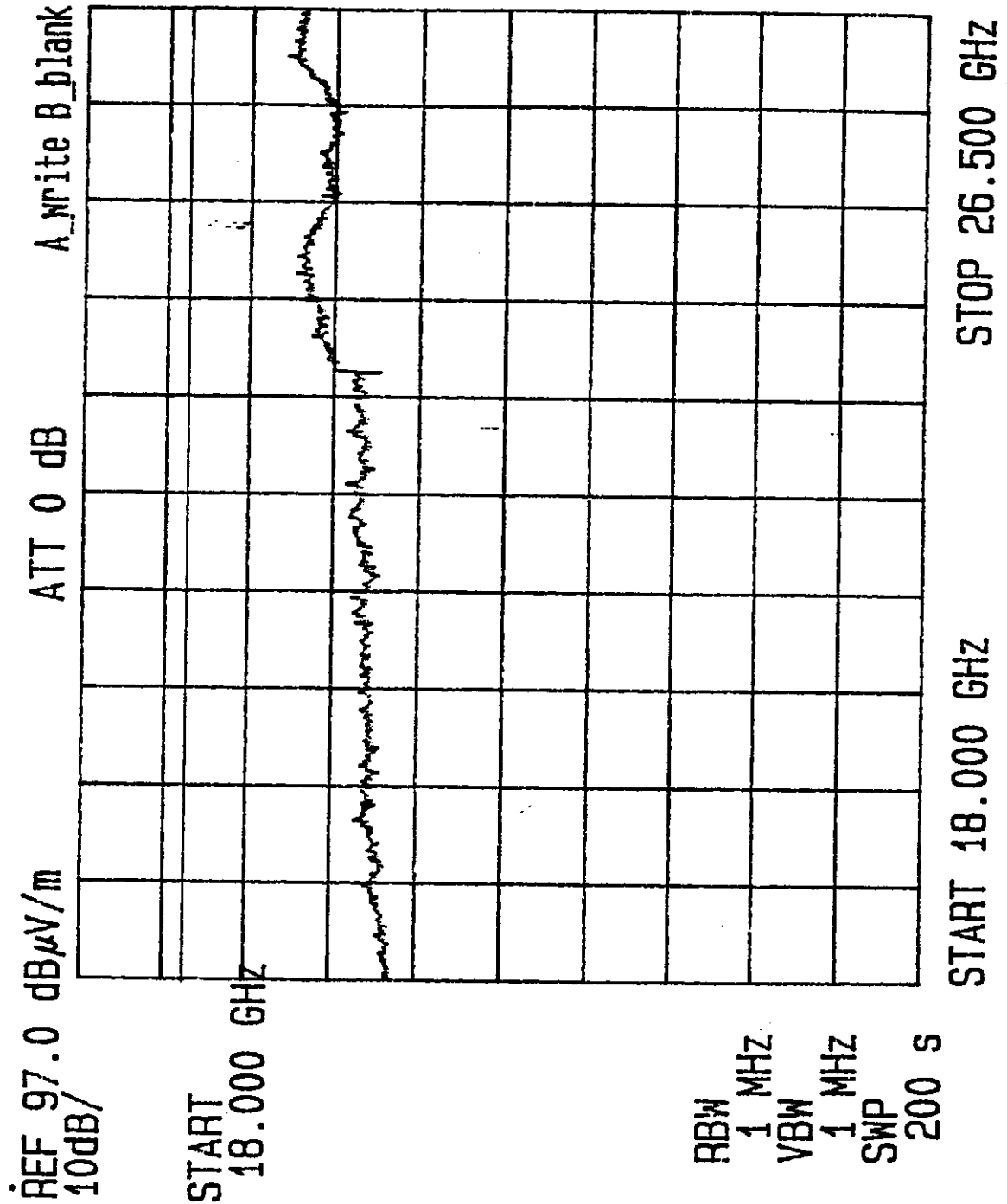
START 8.000 GHz STOP 18.000 GHz

DATA SHEET 6.1.3.2-13



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 18G-26.5GHz SPEC: FCC 15.209A ANT.HT/POL: H
DETECTOR: PEAK ANTENNA: EUT POSITION:
DATE: 12-30-98 TEST SITE: 1 METER TESTER:

JA-1578-1



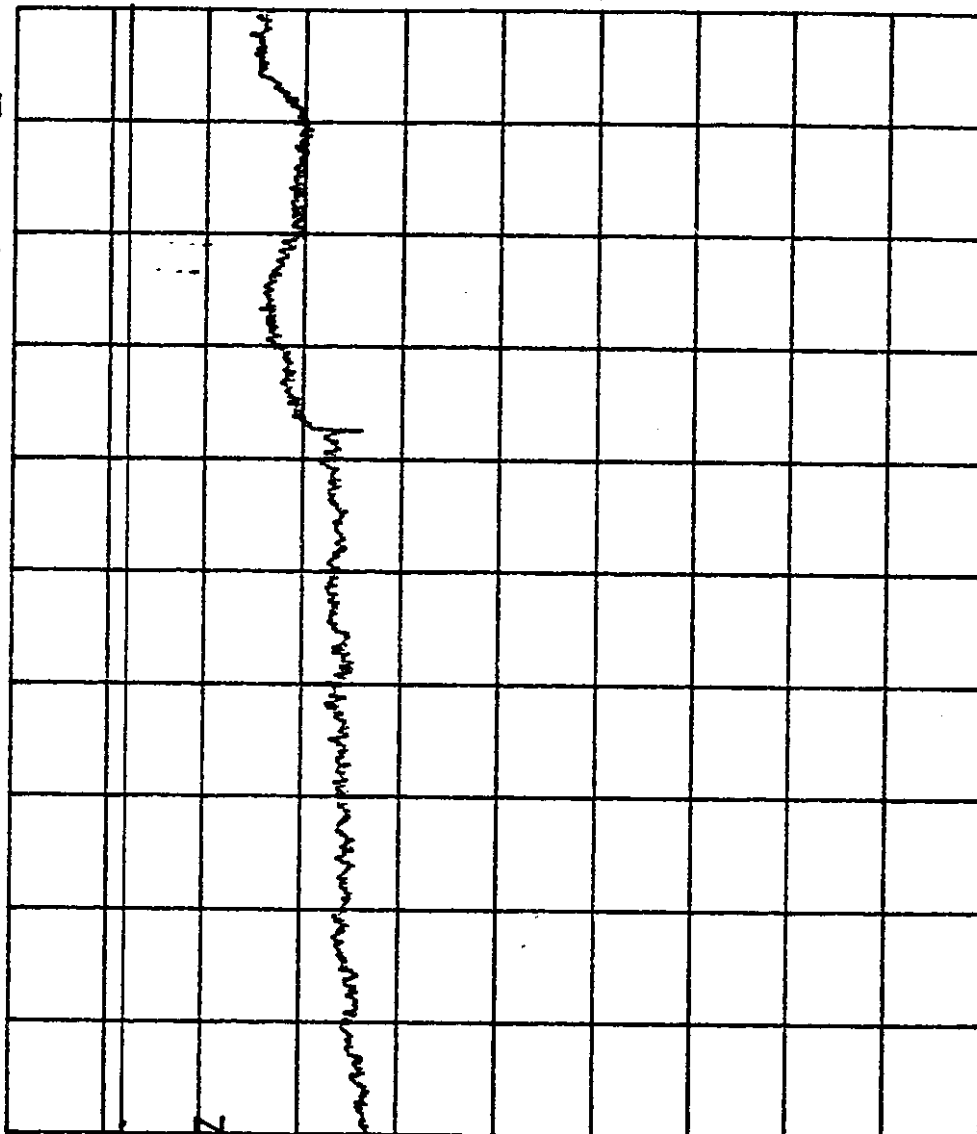
DATA SHEET 6.1.3.2-14



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 18G-26.5GHz SPEC: FCC 15.209A ANT.HT/POL: V
DETECTOR: PEAK ANTENNA: EUT POSITION:
DATE: 12-30-98 TEST SITE: 1 METER TESTER: *[Signature]*

REF 97.0 dB μ V/m ATT 0 dB A_write B_blank
10dB/

START
18.000 GHz



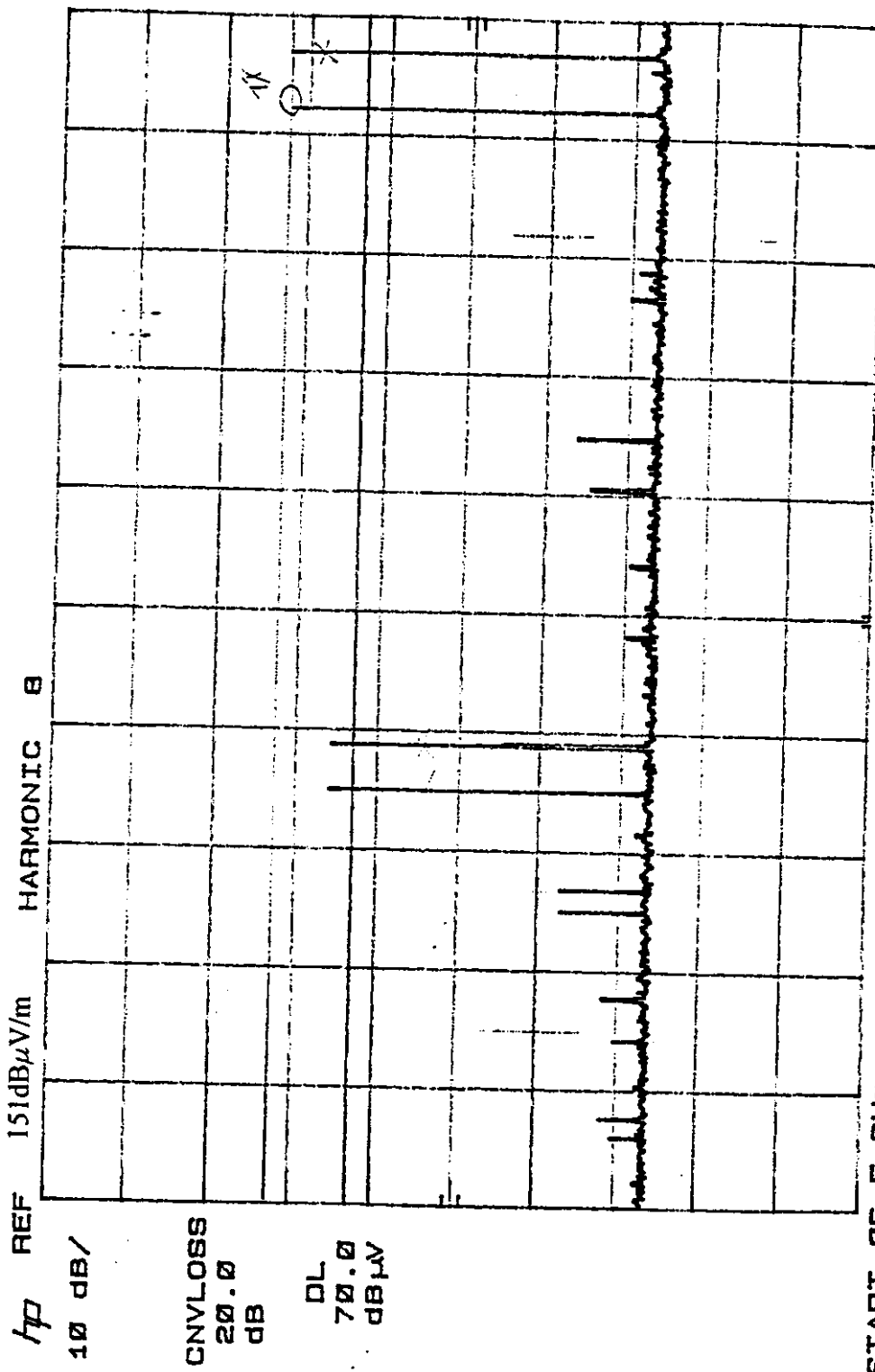
START 18.000 GHz STOP 26.500 GHz

RBW 1 MHz
VBW 1 MHz
SWP 200 S

DATA SHEET 6.1.3.2-15



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 26.5G-40GHz SPEC: FCC 15.209A ANT. HT/POL: H
DETECTOR: PEAK ANTENNA: EUT POSITION:
DATE: 12-24-98 TEST SITE: OATS/ROOM 1.3 M TESTER: *W*

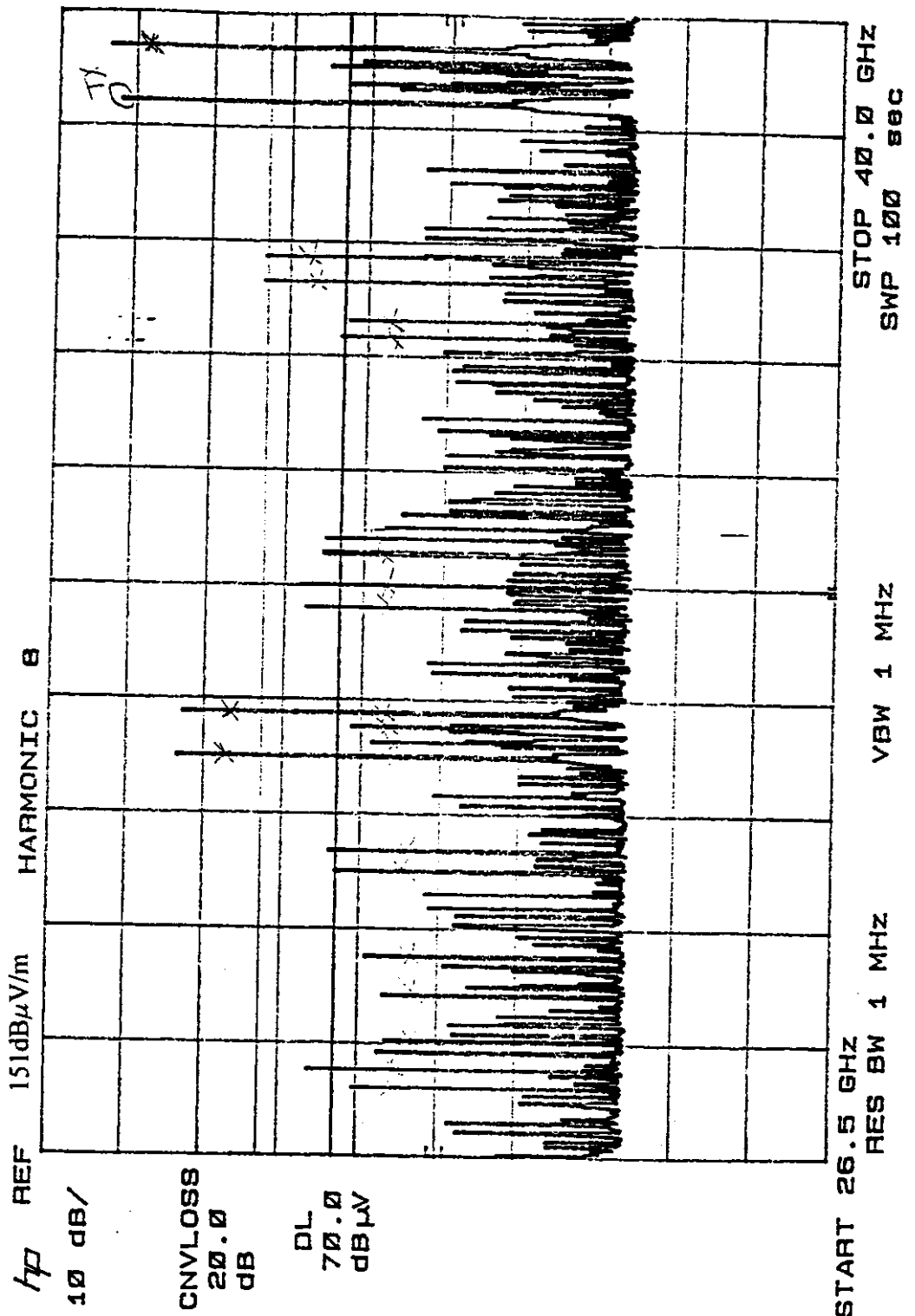


JA-1578-1

DATA SHEET 6.1.3.2-16



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 26.5G-40GHz SPEC: FCC 15.209A ANT.HT/POL: V
DETECTOR: PEAK ANTENNA: EUT POSITION:
DATE: 11-29-98 TEST SITE: OATS/ROOM 1.3 M TESTER: [signature]



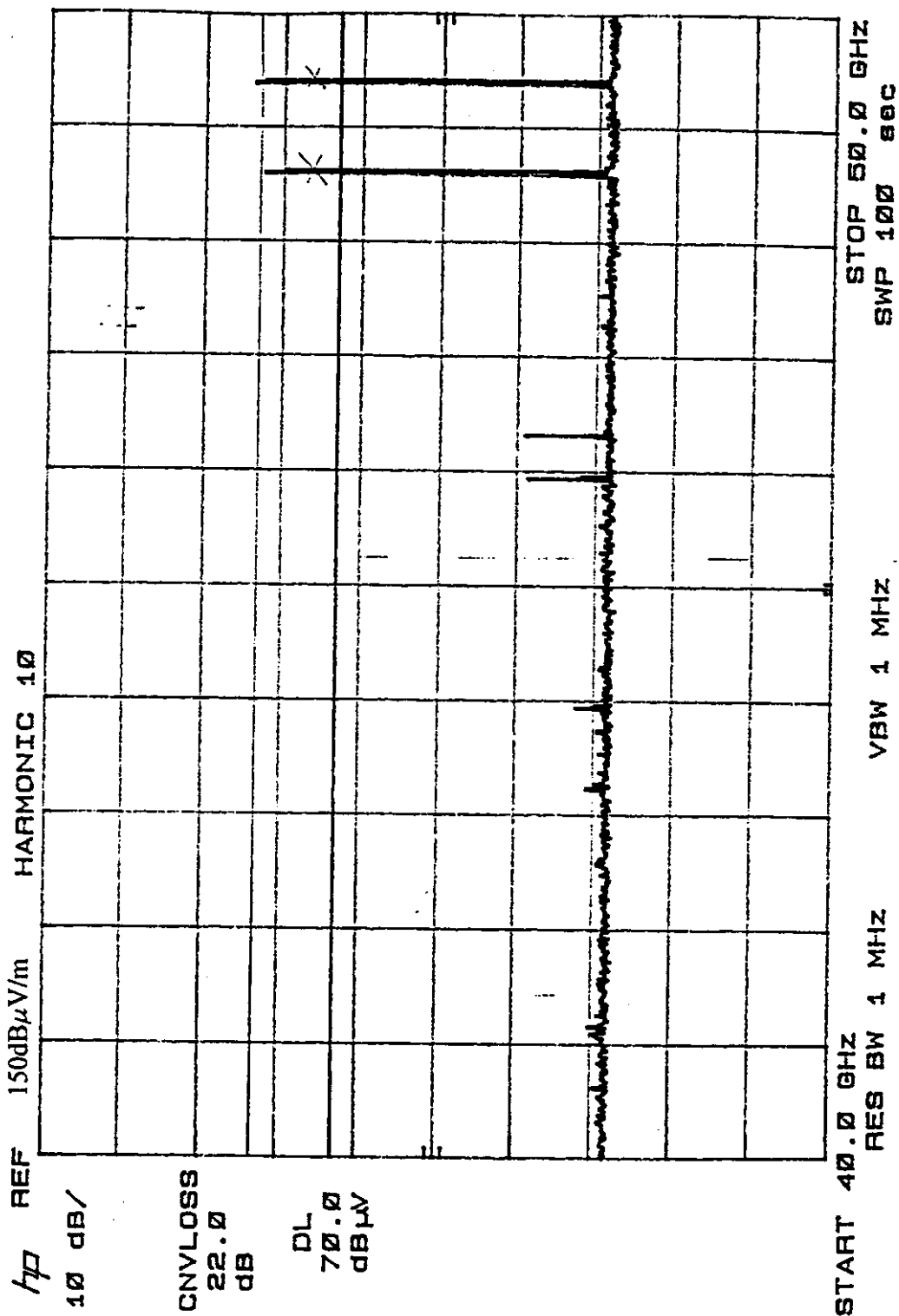
JA-1578-1

DATA SHEET 6.1.3.2-17

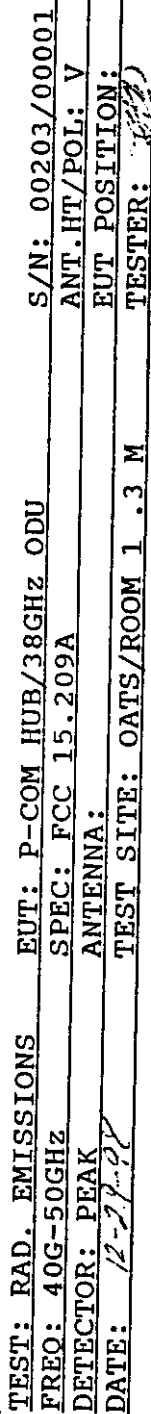


TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 40G-50GHz SPEC: FCC 15.209A ANT.HT/POL: H
DETECTOR: PEAK ANTENNA: EUT POSITION:
DATE: 12-24-98 TEST SITE: OATS/ROOM 1 .3 M TESTER: [signature]

JA-1578-1



DATA SHEET 6.1.3.2-18



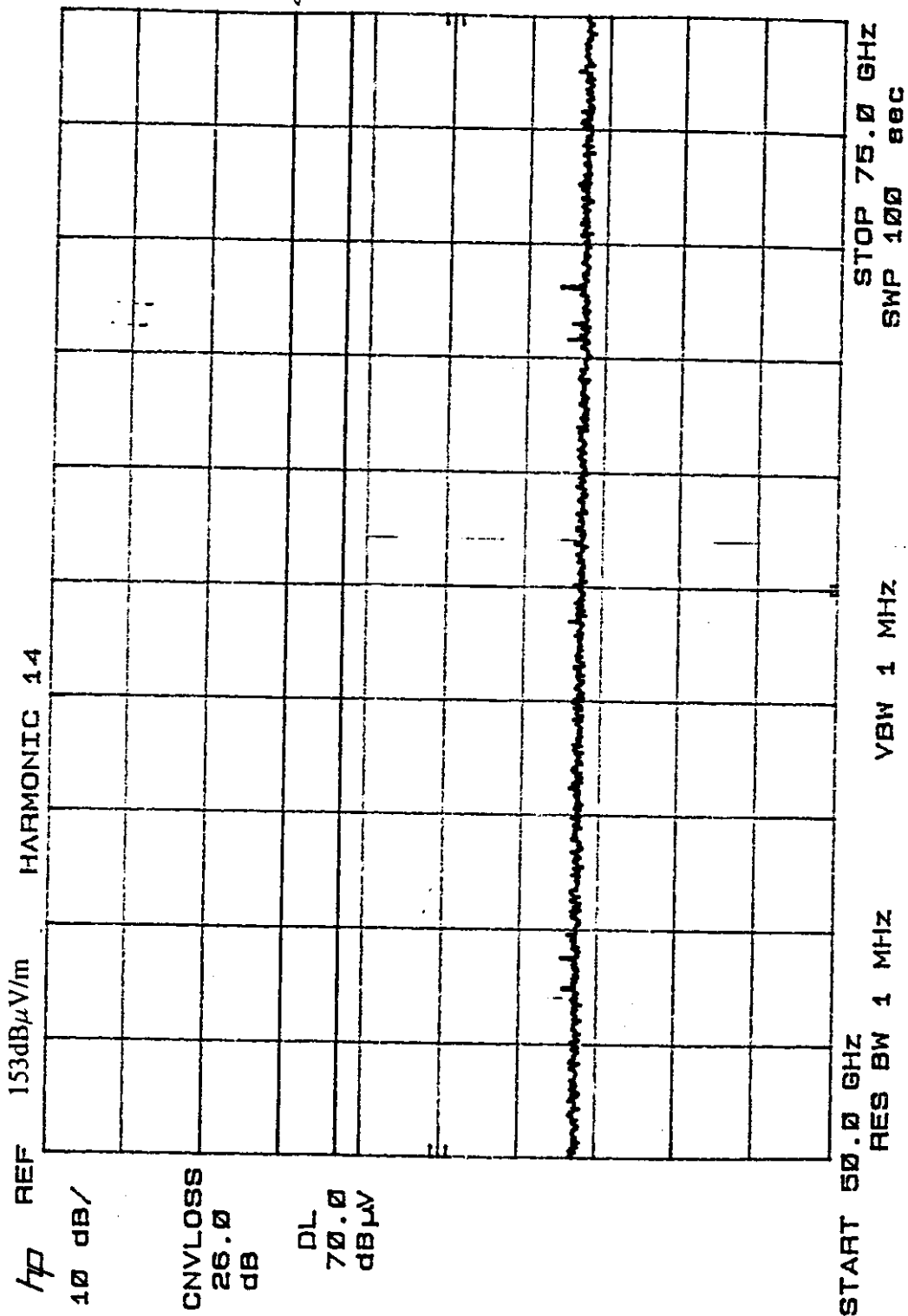
HP REF 150dBμV/m HARMONIC 10
 10 dB/
 CNVLOSS 22.0 dB
 DL 70.0 dBμV
 START 40.0 GHz RES BW 1 MHz VBW 1 MHz STOP 50.0 GHz SWP 100 BPC

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TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 50G-75GHz SPEC: FCC 15.209A ANT. HT/POL: H
DETECTOR: PEAK ANTENNA:
DATE: 12-29-97 TEST SITE: OATS/ROOM 1 .3 M EUT POSITION:
TESTER: *[Signature]*

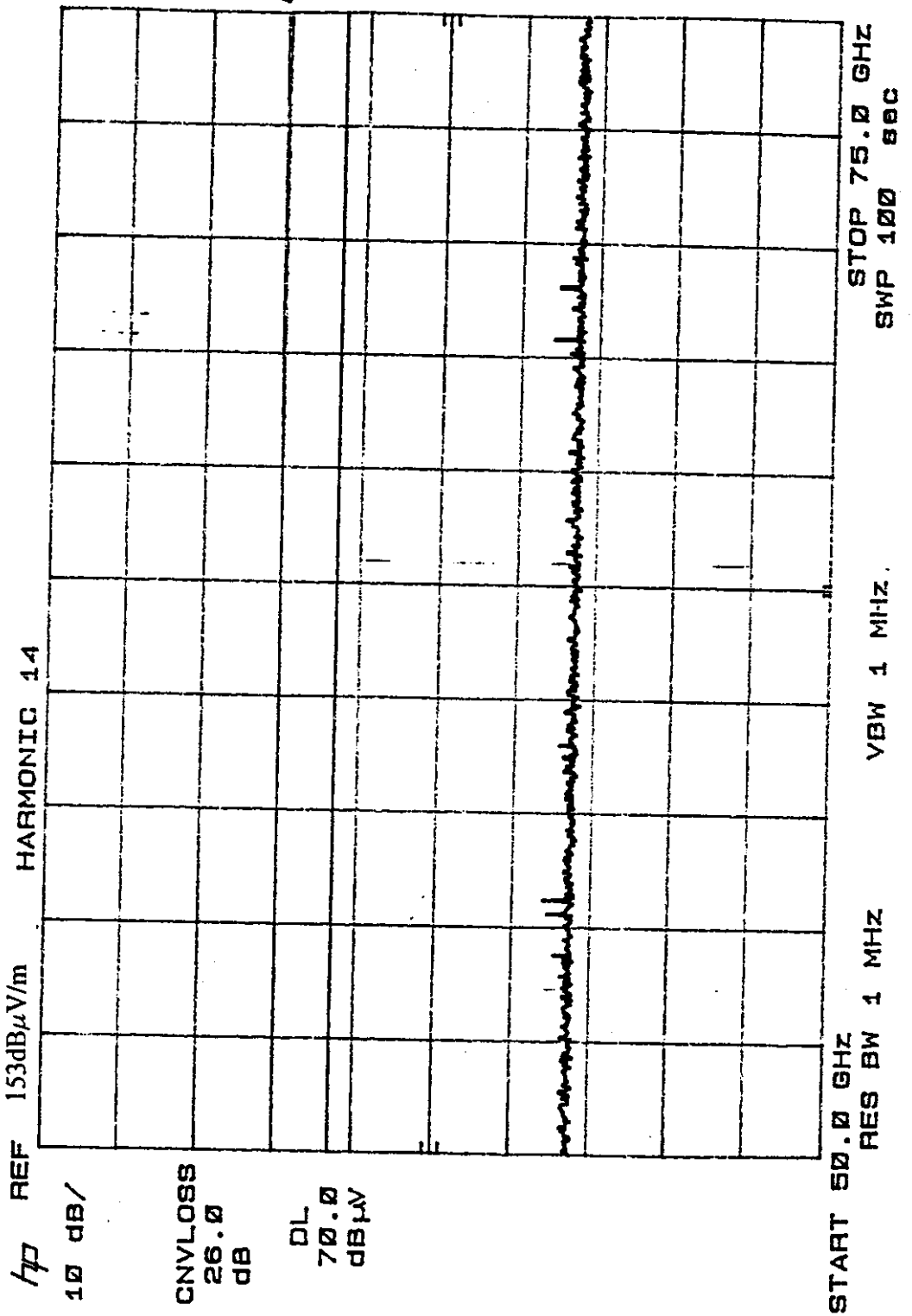
JA-1578-1



DATA SHEET 6.1.3.2-20



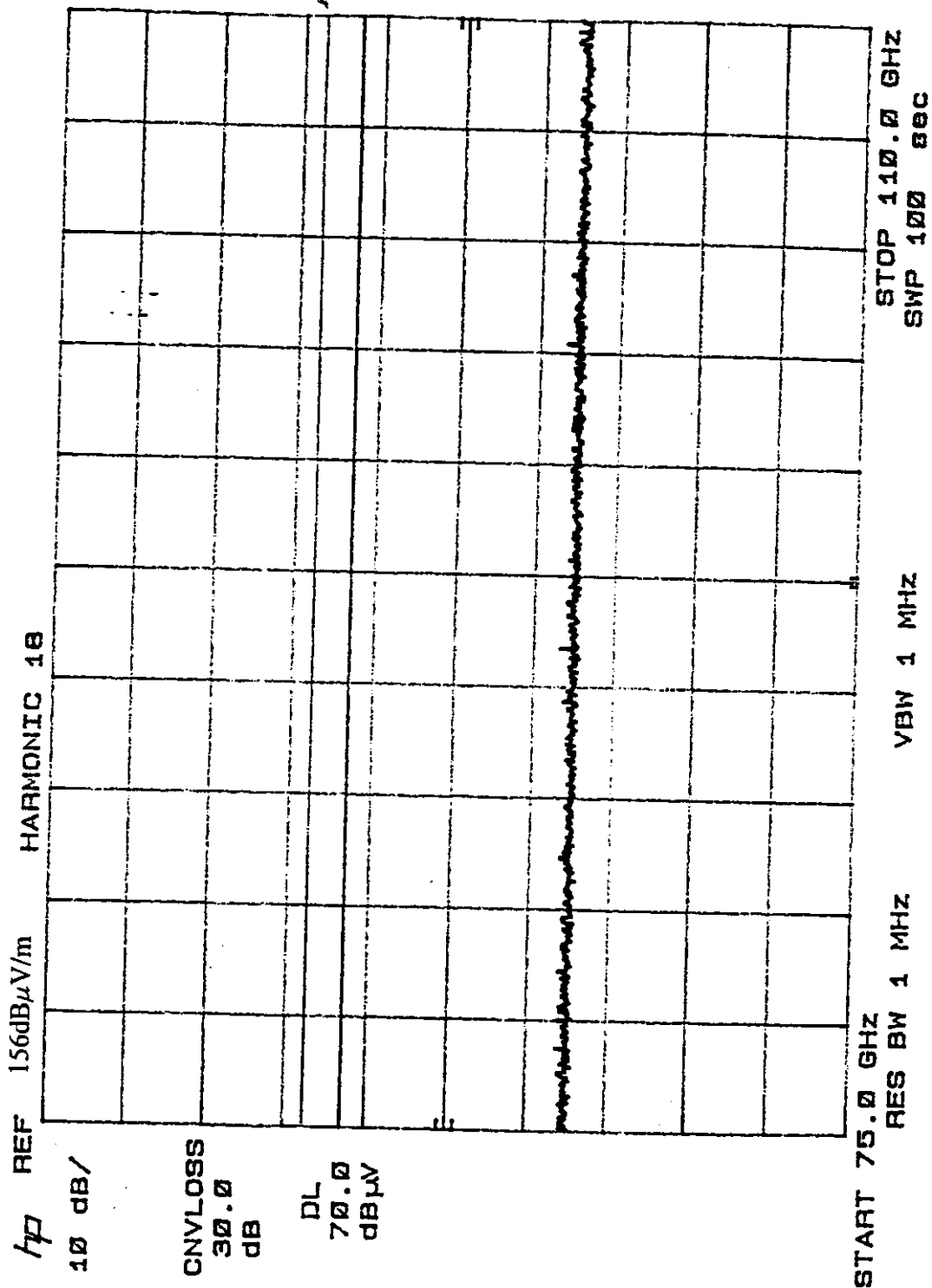
TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 50G-75GHz SPEC: FCC 15.209A ANT.HT/POL: V
DETECTOR: PEAK ANTENNA: EUT POSITION:
DATE: 2-27-18 TEST SITE: OATS/ROOM 1 .3 M TESTER: [Signature]



DATA SHEET 6.1.3.2-21



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 75G-100GHz SPEC: FCC 15.209A ANT.HT/POL: H
DETECTOR: PEAK ANTENNA: EUT POSITION:
DATE: 11-29-98 TEST SITE: OATS/ROOM 1.3 M TESTER: *[Signature]*



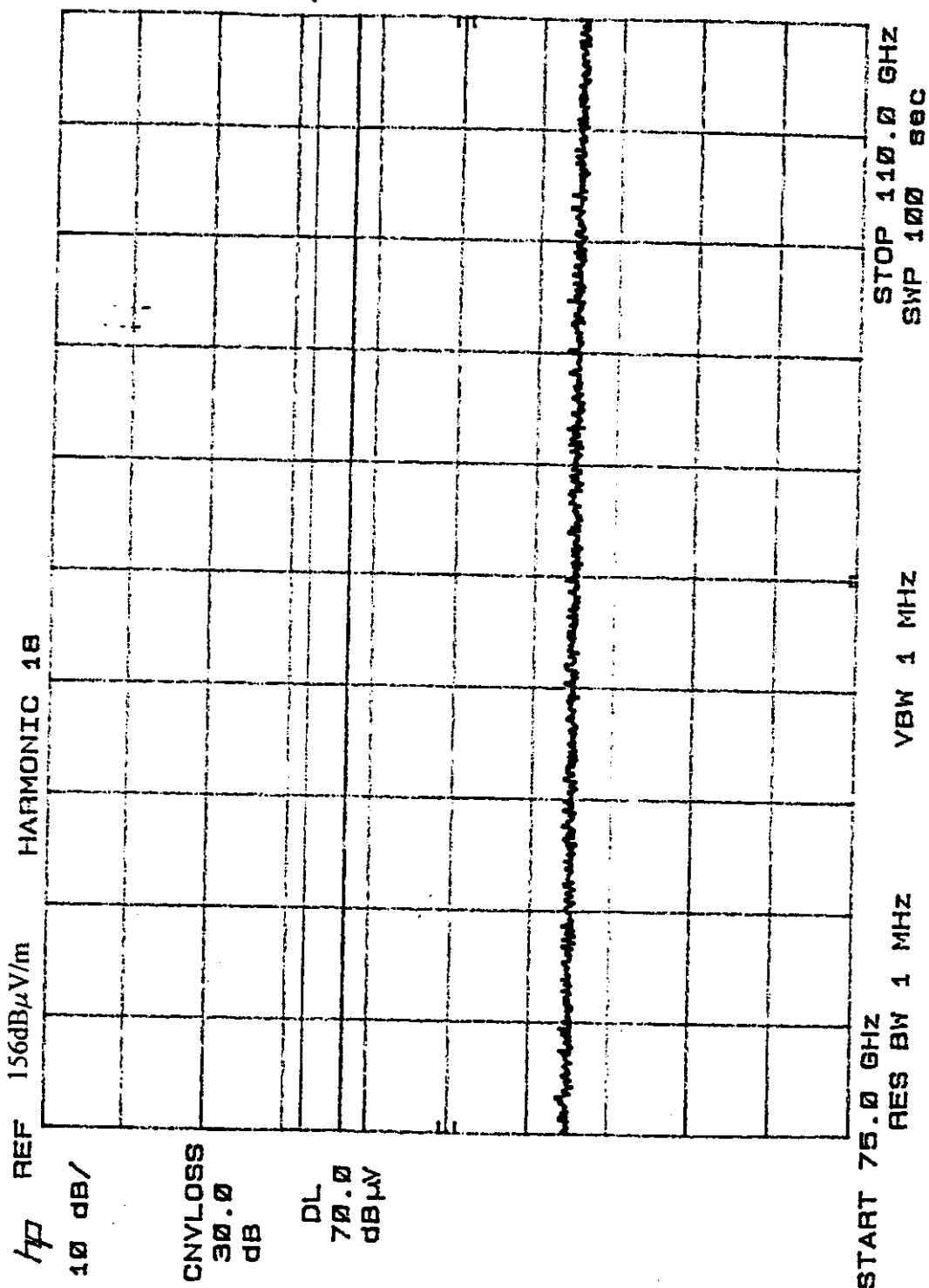
JA-1578-1

DATA SHEET 6.1.3.2-22



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 75G-100GHz SPEC: FCC 15.209A ANT.HT/POL: V
DETECTOR: PEAK ANTENNA: EUT POSITION:
DATE: 12-24-98 TEST SITE: OATS/ROOM 1.3 M TESTER: *[Signature]*

JA-1578-1



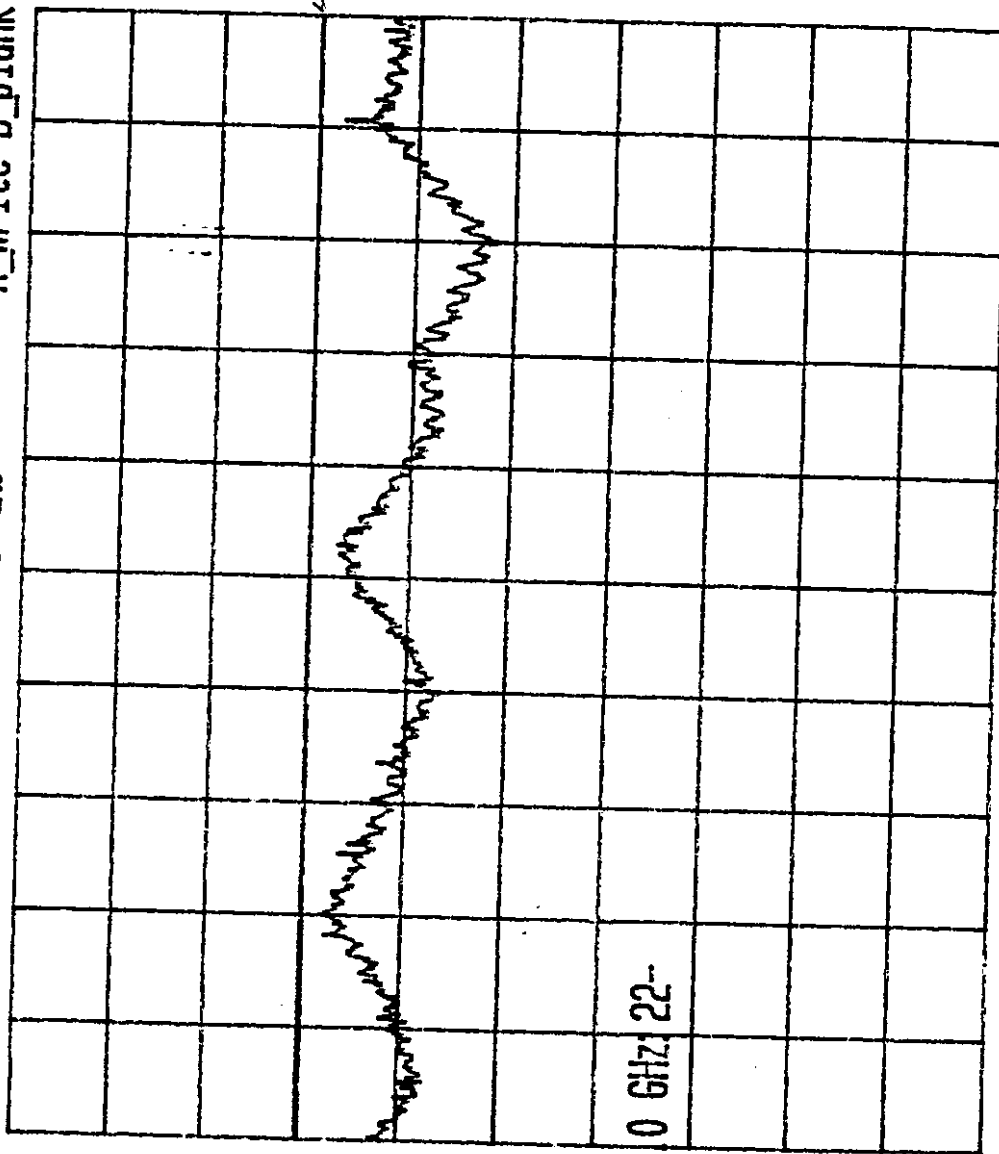
DATA SHEET 6.1.3.2-23



TEST: RAD. EMISSIONS EUT: HUB/38GHz ODU S/N: 00203/00001
FREQ: 110-170GHz SPEC: FCC 101.111 ANT.HT/POL: H
DETECTOR: PEAK ANTENNA: EUT POSITION:
DATE: 11-03-99 TEST SITE: OATS/ROOM 1 .3 M TESTER: *[Signature]*

REF 153dB μ V/m
10dB/

ATT 70 dB A_write B_blank



EXT 110.0~170.0 GHz 22--

RBW 1 MHz
VBW 1 MHz
SWP 200 S

START 110.000 GHz STOP 170.000 GHz

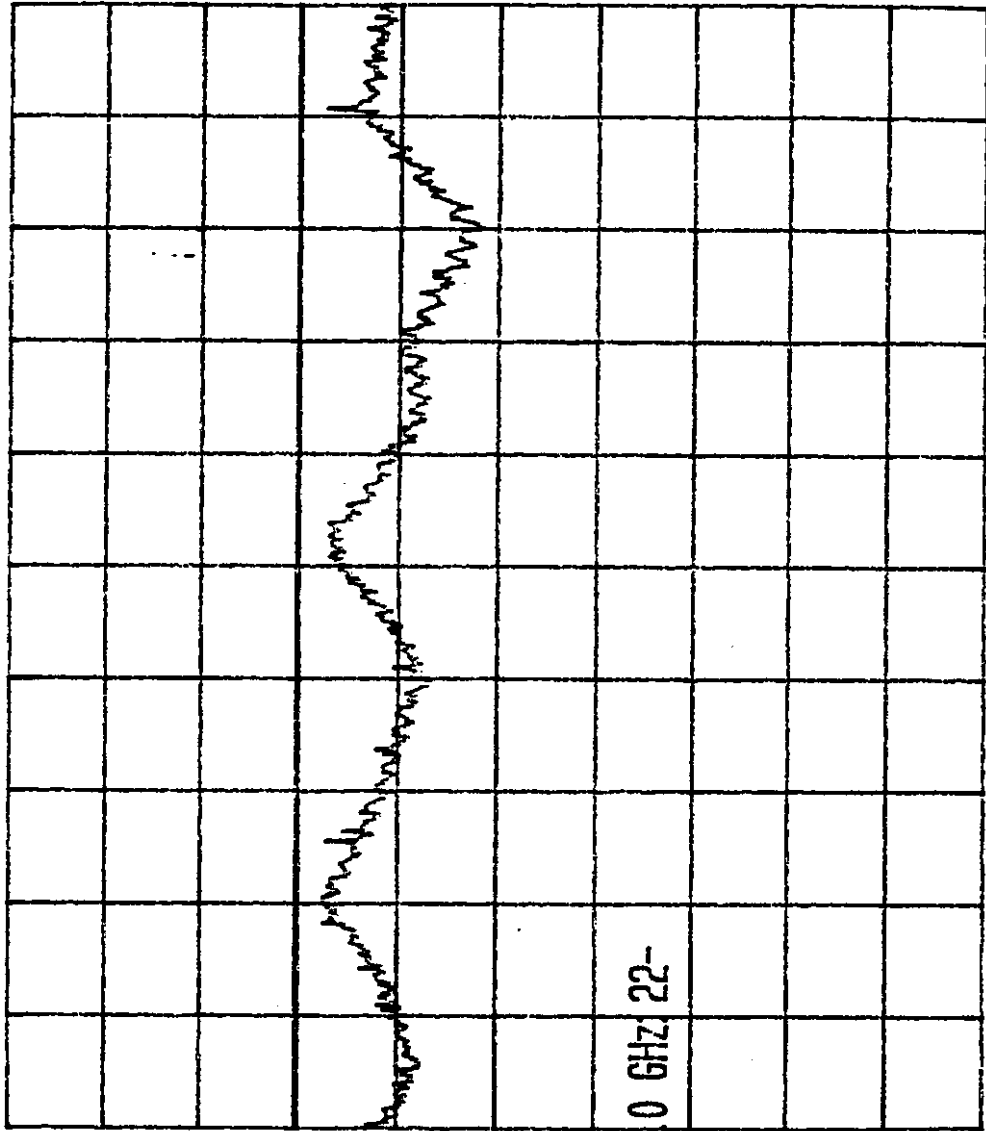
JA-1578-1



TEST: RAD. EMISSIONS EUT: HUB/38GHz ODU S/N: 00203/00001
FREQ: 110-170GHz SPEC: FCC 101.111 ANT.HT/POL: V
DETECTOR: PEAK ANTENNA: EUT POSITION:
DATE: 01-05-99 TEST SITE: OATS/ROOM 1.3 M TESTER: *[Signature]*

REF 153dB μ V/m
10dB/

ATT 70 dB A_write B_blank



EXT 110.0~170.0 GHz 22-

RBW 1 MHz
VBW 1 MHz
SWP 200 S

START 110.000 GHz STOP 170.000 GHz

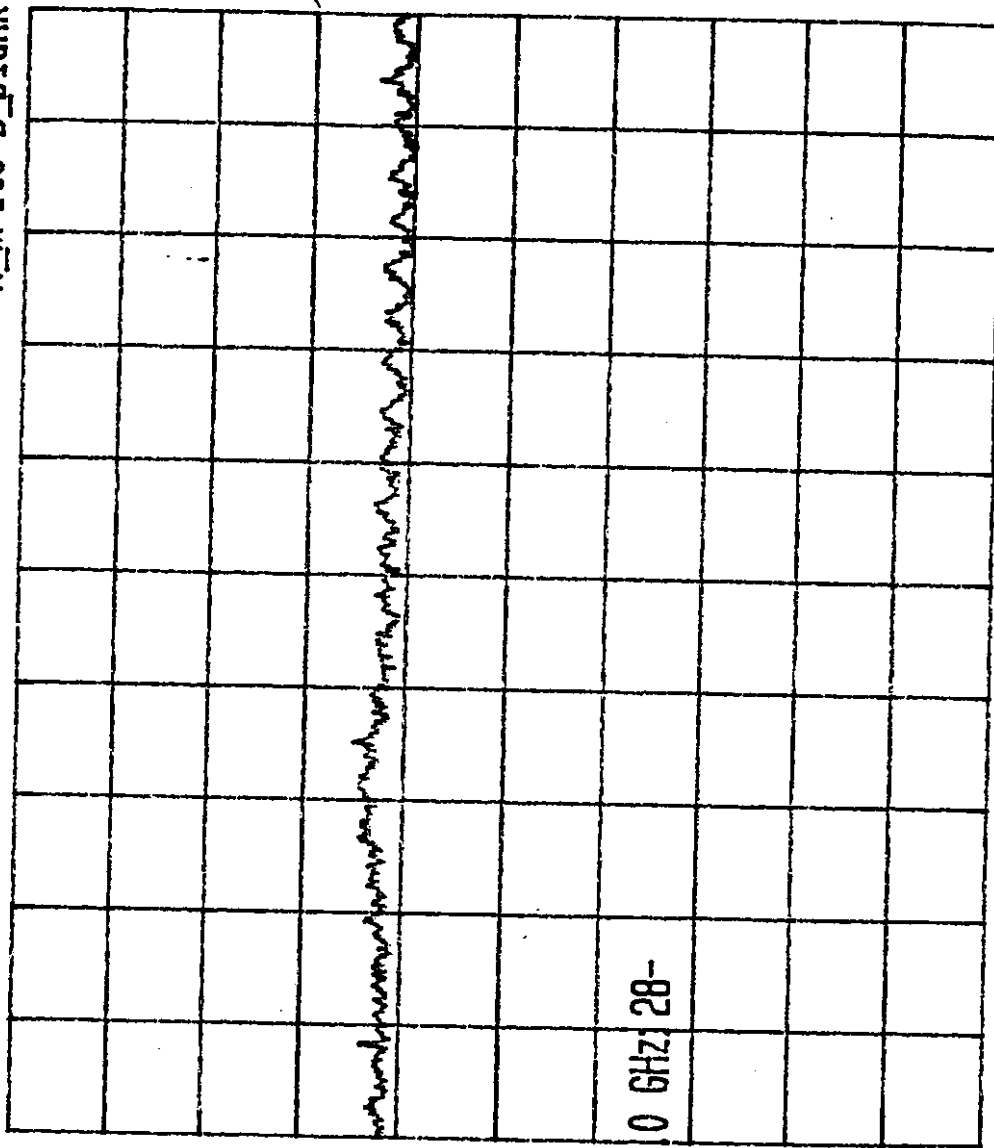
JA-1578-1



TEST: RAD. EMISSIONS EUT: HUB/38GHz ODU S/N: 00203/00001
FREQ: 170-200GHz SPEC: FCC 101.111 ANT.HT/POL: H
DETECTOR: PEAK ANTENNA:
DATE: 01-05-94 TEST SITE: OATS/ROOM 1 .3 M EUT POSITION:
TESTER:

REF 153dB μ V/m
10dB/

ATT 70 dB A_write B_blank



EXT 140.0~220.0 GHz 28-

RBW 1 MHz
VBW 1 MHz
SWP 200 S

START 169.000 GHz STOP 200.000 GHz

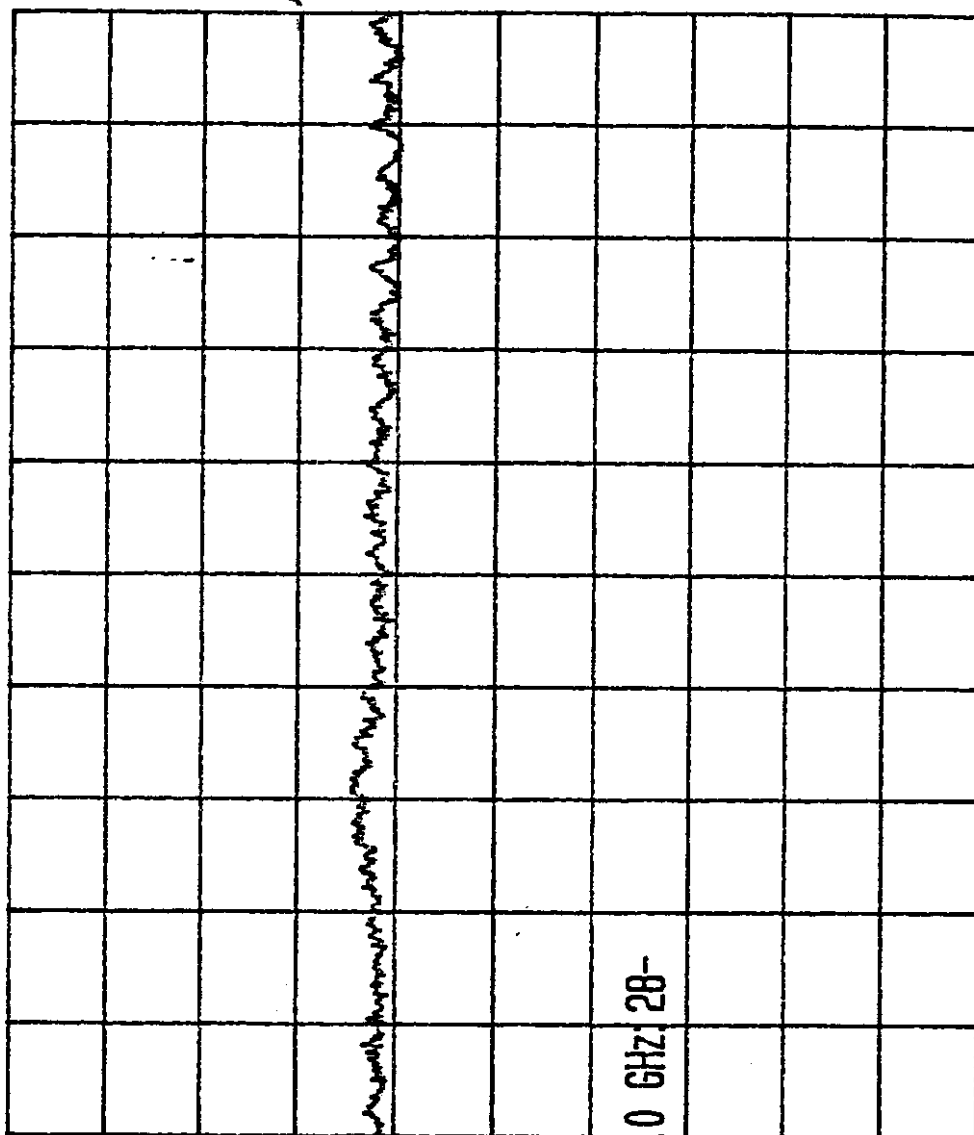
JA-1578-1



JA-1578-1

TEST: RAD. EMISSIONS EUT: HUB/38GHz ODU S/N: 00203/00001
FREQ: 170-200GHz SPEC: FCC 101.111 ANT.HT/POL: V
DETECTOR: PEAK ANTENNA: EUT POSITION:
DATE: 01-05-99 TEST SITE: OATS/ROOM 1.3 M TESTER: *[Signature]*

REF 153dB μ V/m
10dB/ ATT 70 dB A_write B_blank



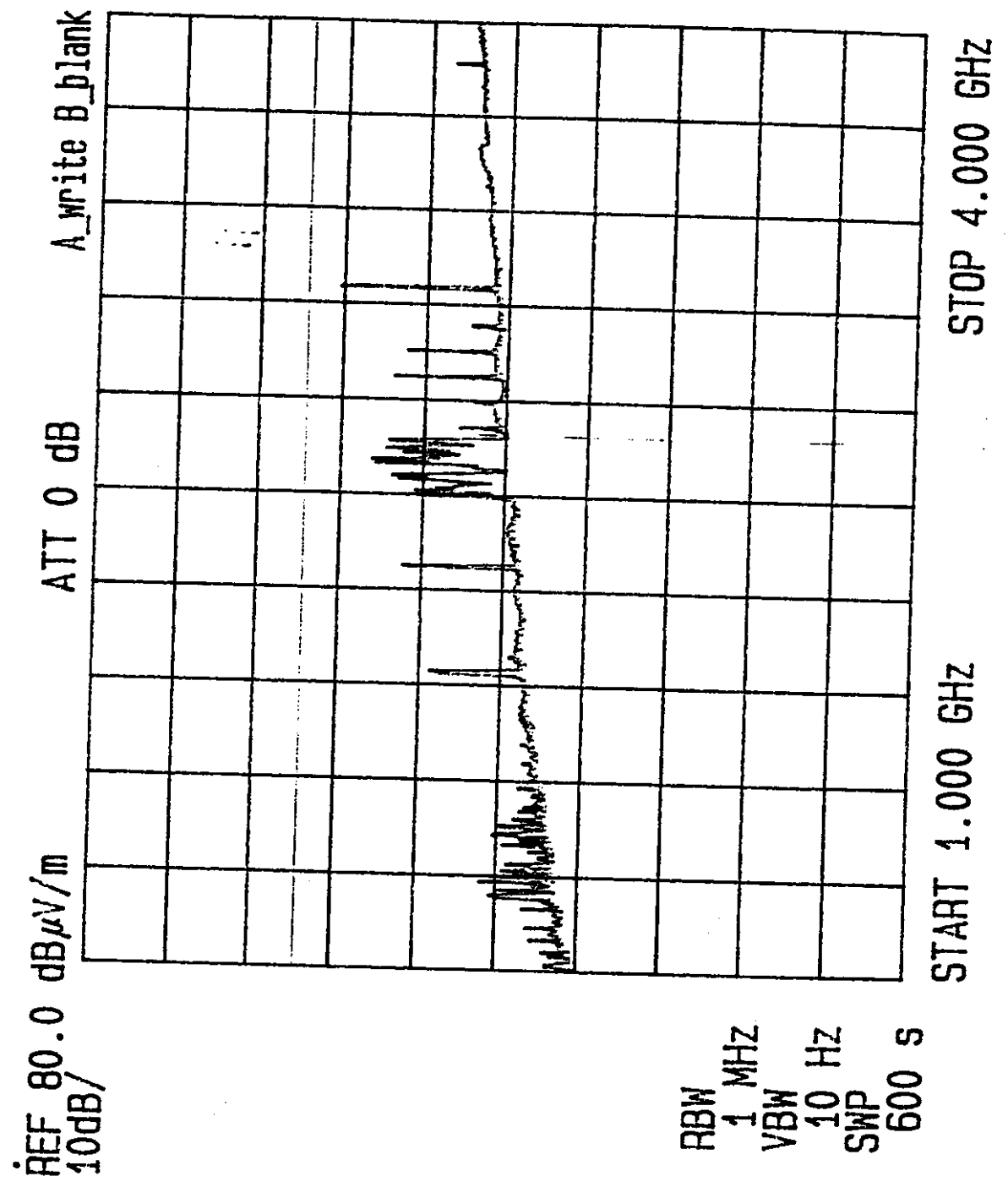
EXT 140.0~220.0 GHz: 28-

RBW 1 MHz
VBW 1 MHz
SWP 200 S

START 169.000 GHz STOP 200.000 GHz



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 1G-4GHz SPEC: FCC 15.209A ANT. HT/POL: H
DETECTOR: AVERAGE ANTENNA: EUT POSITION:
DATE: 12/30/01 TEST SITE: 3 METER TESTER:

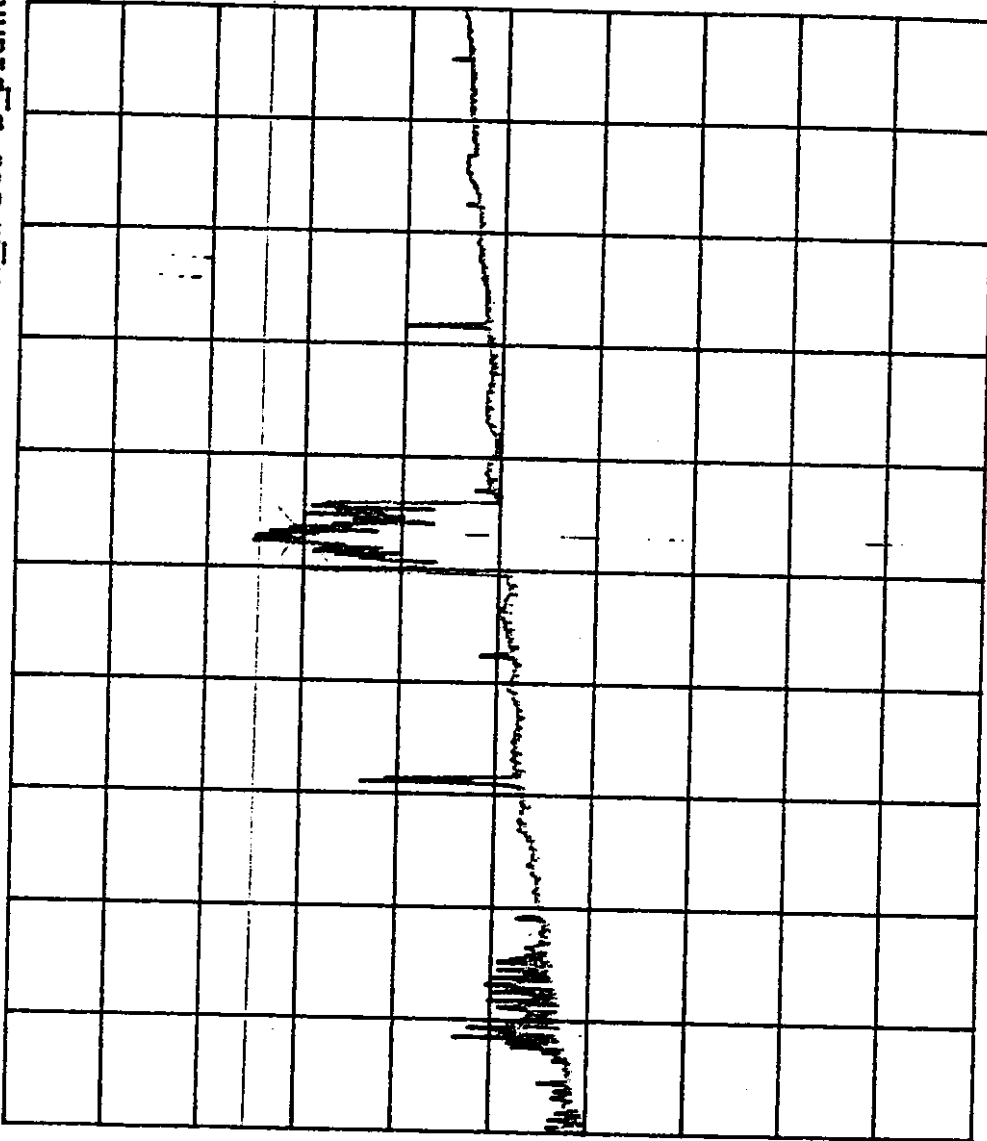




JA-1578-1

TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 1G-4GHz SPEC: FCC 15.209A ANT. HT/POL: V
DETECTOR: AVERAGE ANTENNA: EUT POSITION:
DATE: 12/30/02 TEST SITE: 3 METER TESTER:

REF 80.0 dB μ V/m ATT 0 dB A_write B_blank
10dB/



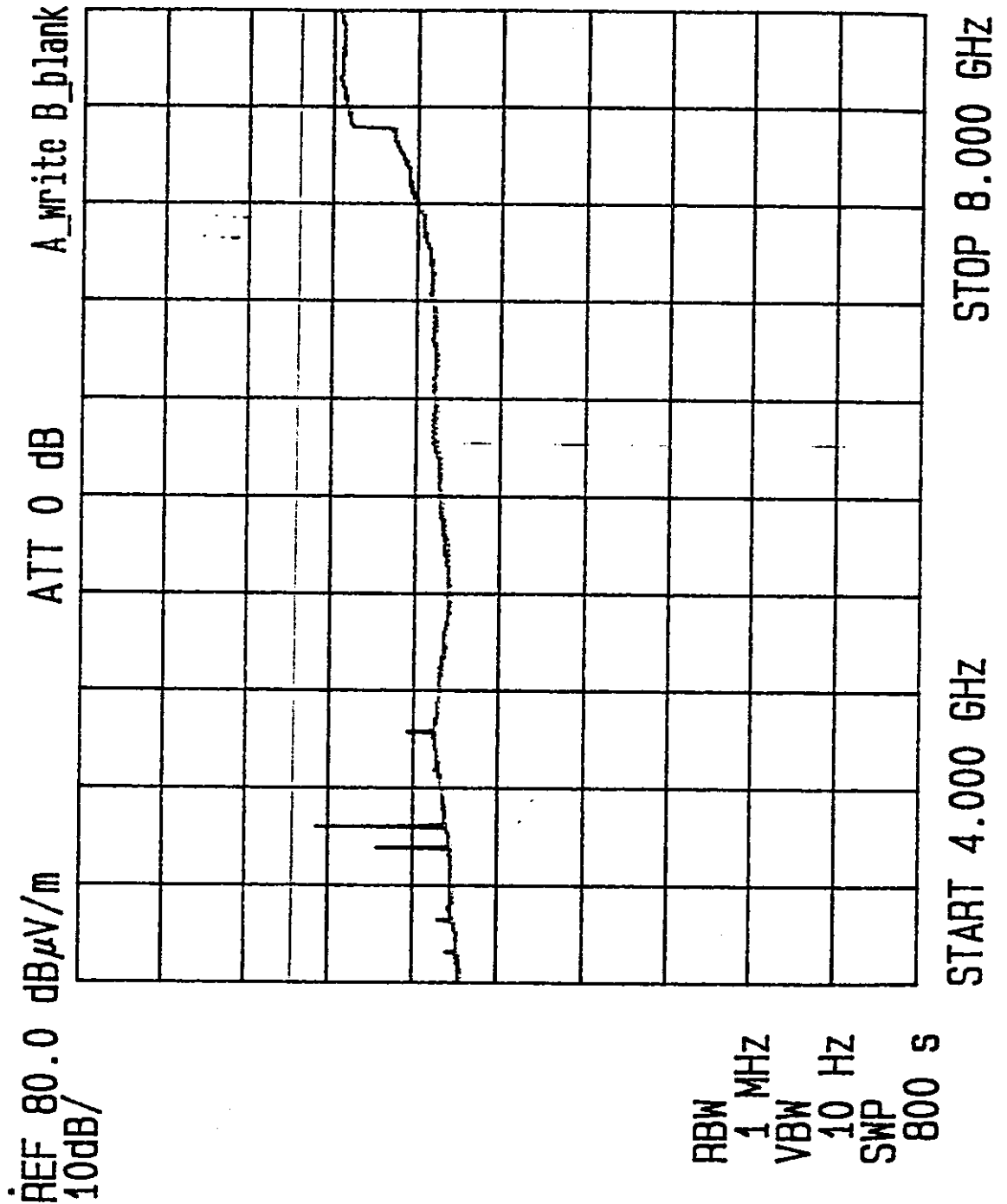
START 1.000 GHz STOP 4.000 GHz

RBW 1 MHz
VBW 10 Hz
SWP 600 S



JA-1578-1

TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 4G-8GHz SPEC: FCC 15.209A ANT.HT/POL: **H** / **2 S**
DETECTOR: AVERAGE ANTENNA: EUT POSITION: **67**
DATE: **12/10/11** TEST SITE: 3 METER TESTER:



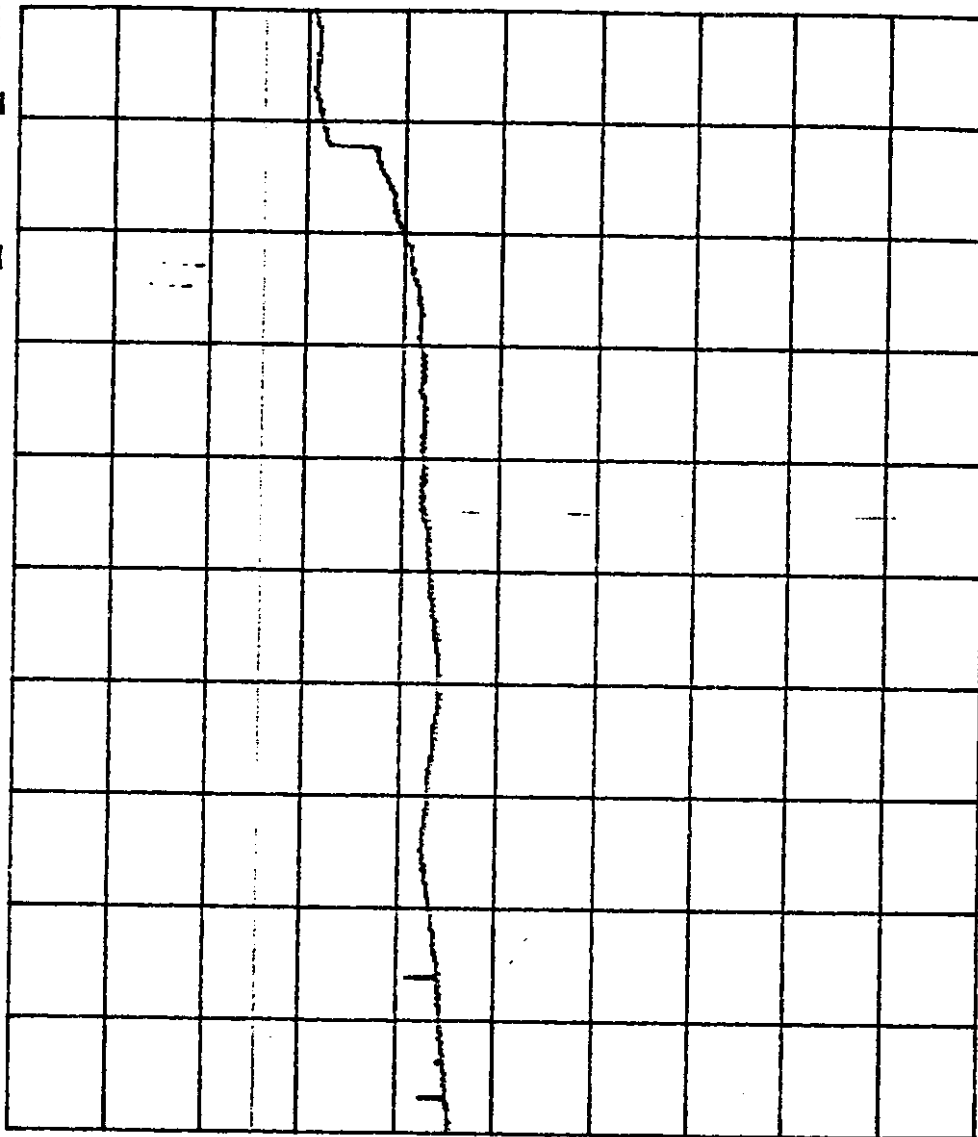
DATA SHEET 6.1.3.2-30



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 4G-8GHz SPEC: FCC 15.209A ANT.HT/POL: V
DETECTOR: AVERAGE ANTENNA: EUT POSITION:
DATE: 12/20/08 TEST SITE: 3 METER TESTER:

JA-1578-1

REF 80.0 dB μ V/m ATT 0 dB A_write B_blank
10dB/



START 4.000 GHz STOP 8.000 GHz

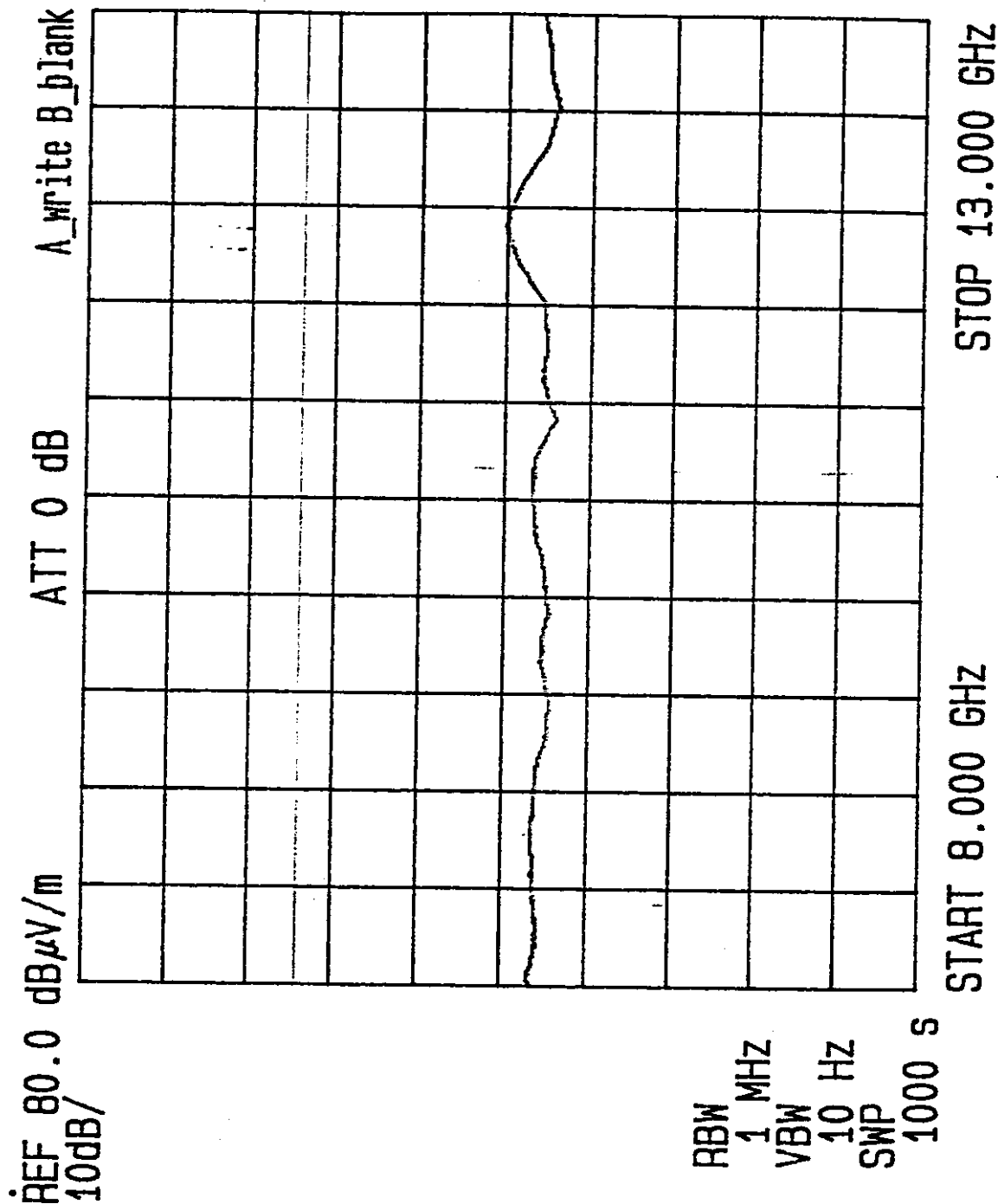
RBW 1 MHz
VBW 10 Hz
SWP 800 S

DATA SHEET 6.1.3.2-31



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 8-13GHz GHz SPEC: FCC 15.209A ANT.HT/POL: H
DETECTOR: AVERAGE ANTENNA: EUT POSITION: 1M
DATE: 12/30/21 TEST SITE: 3 METER TESTER:

JA-1578-1



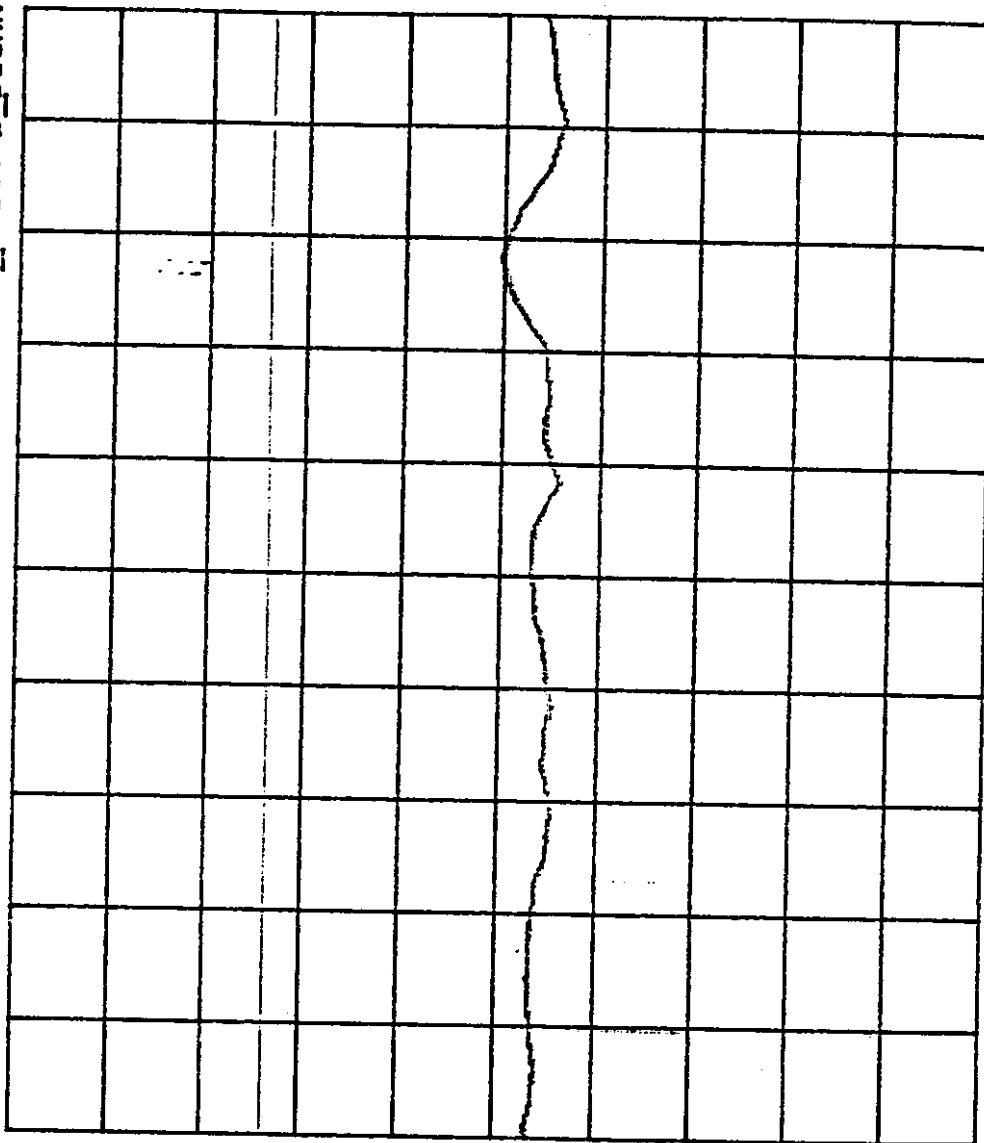
DATA SHEET 6.1.3.2-32



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 8-13GHz GHz SPEC: FCC 15.209A ANT.HT/POL: V
DETECTOR: AVERAGE ANTENNA: EUT POSITION: 1M
DATE: 12/15/15 TEST SITE: COATS/ROOM 1 TESTER:

JA-1578-1

REF 80.0 dB μ V/m ATT 0 dB A_write B_blank
10dB/



RBW 1 MHz
VBW 10 Hz
SWP 1000 S

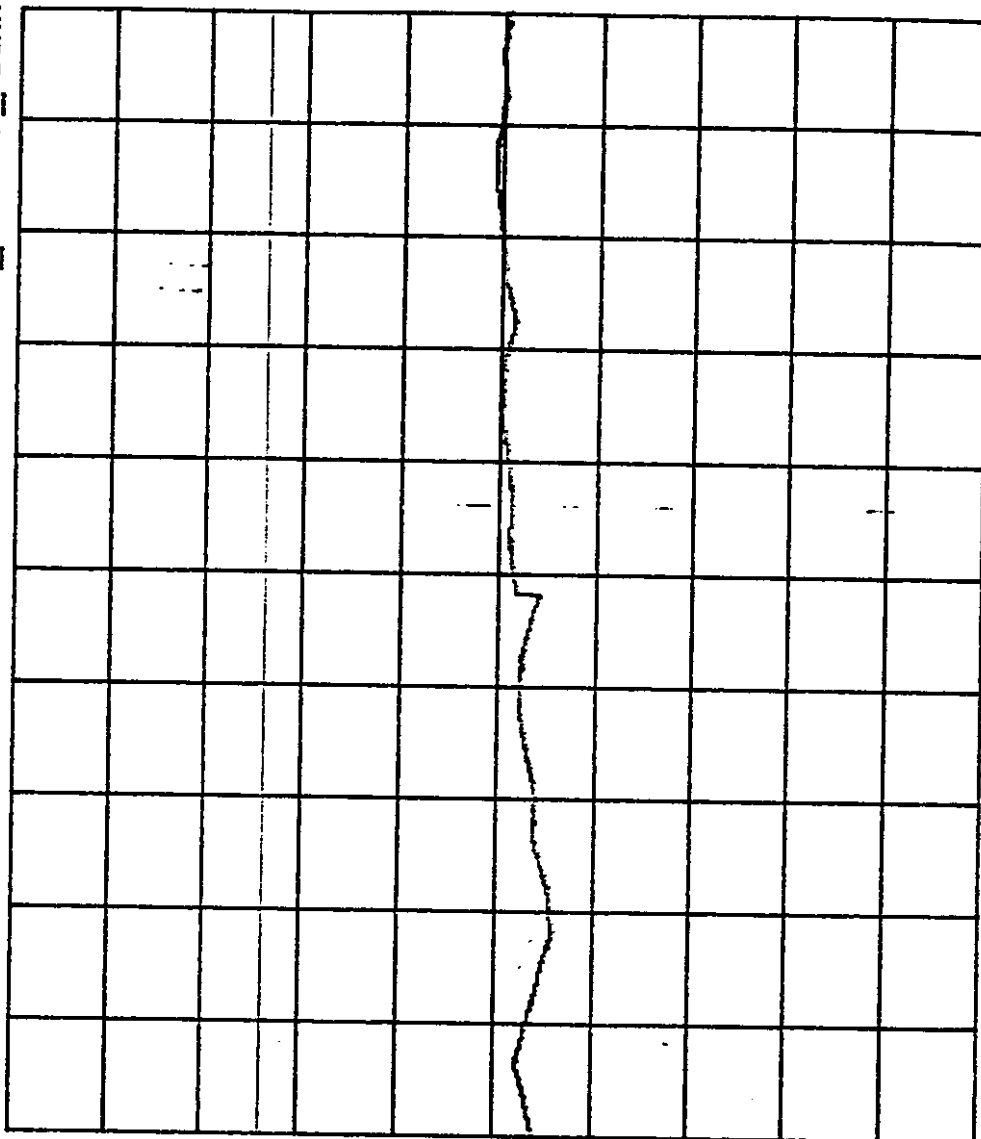
START 8.000 GHz STOP 13.000 GHz

DATA SHEET 6.1.3.2-33



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 13G-18GHz SPEC: FCC 15.209A ANT.HT/POL: V
DETECTOR: AVERAGE ANTENNA: EUT POSITION:
DATE: TEST SITE: 3 METER TESTER:

REF 80.0 dB μ V/m ATT 0 dB A_write B_blank
10dB/



RBW 1 MHz
VBW 10 Hz
SWP 1000 S

START 13.000 GHz STOP 18.000 GHz

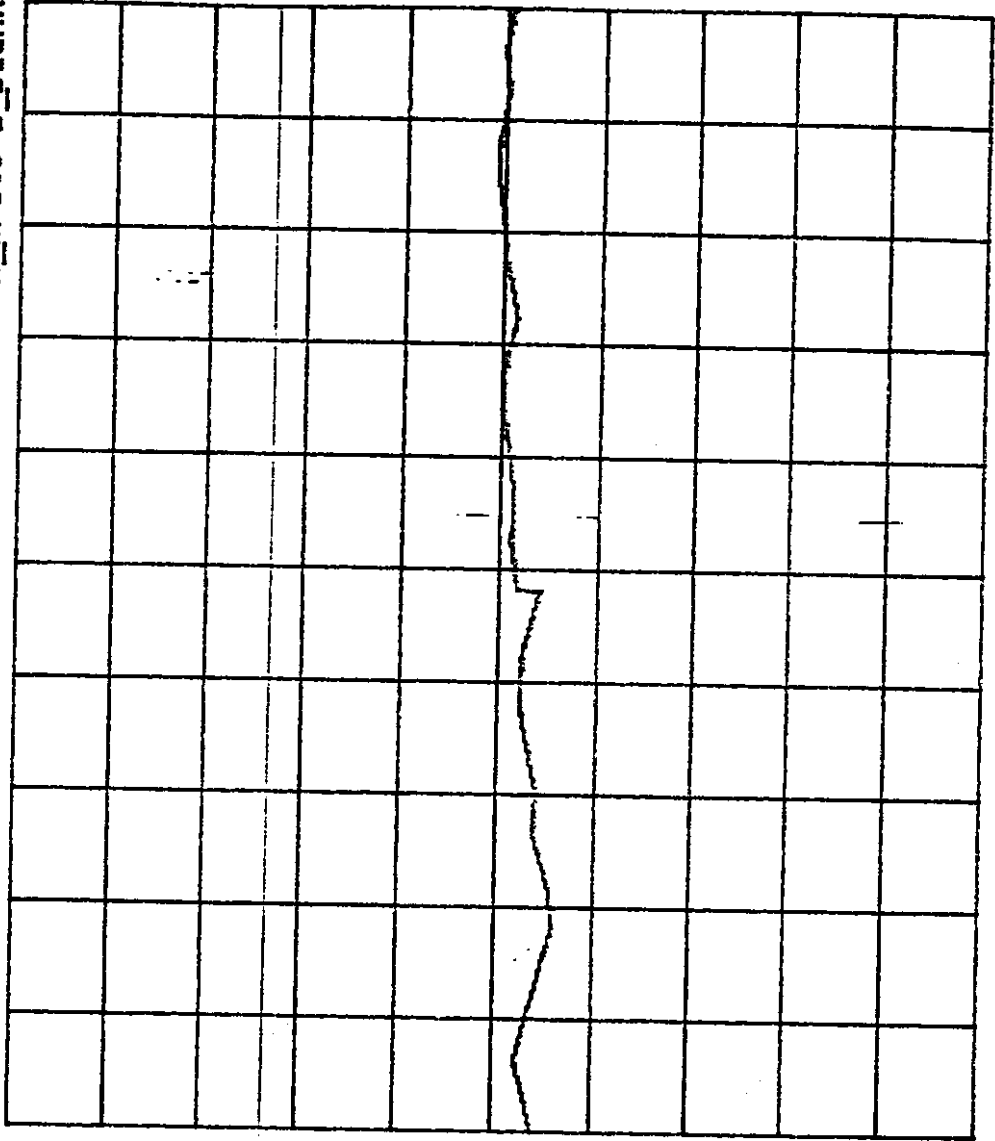
JA-1578-1



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 13G-18GHz SPEC: FCC 15.209A ANT.HT/POL: H
DETECTOR: AVERAGE ANTENNA: EUT POSITION:
DATE: 12/30/95 TEST SITE: 3 METER TESTER: J

JA-1578-1

REF 80.0 dB μ V/m ATT 0 dB A_write B_blank
10dB/



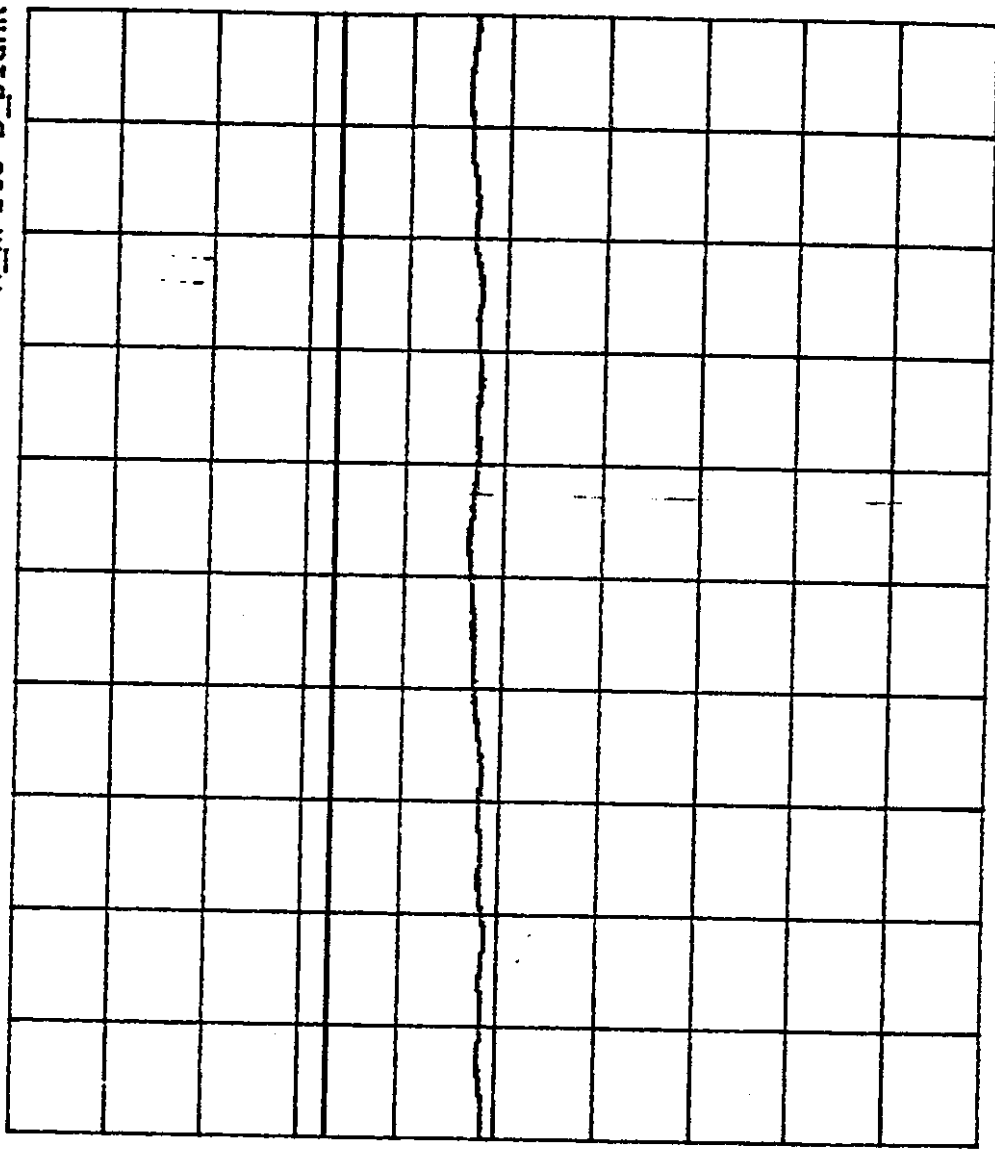
START 13.000 GHz STOP 18.000 GHz

RBW 1 MHz
VBW 10 Hz
SWP 1000 S



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 18G-19.5GHz SPEC: FCC 15.209A ANT. HT/POL: H
DETECTOR: AVERAGE ANTENNA: EUT POSITION:
DATE: 12-30-98 TEST SITE: OATS/ROOM 1 10 M TESTER:

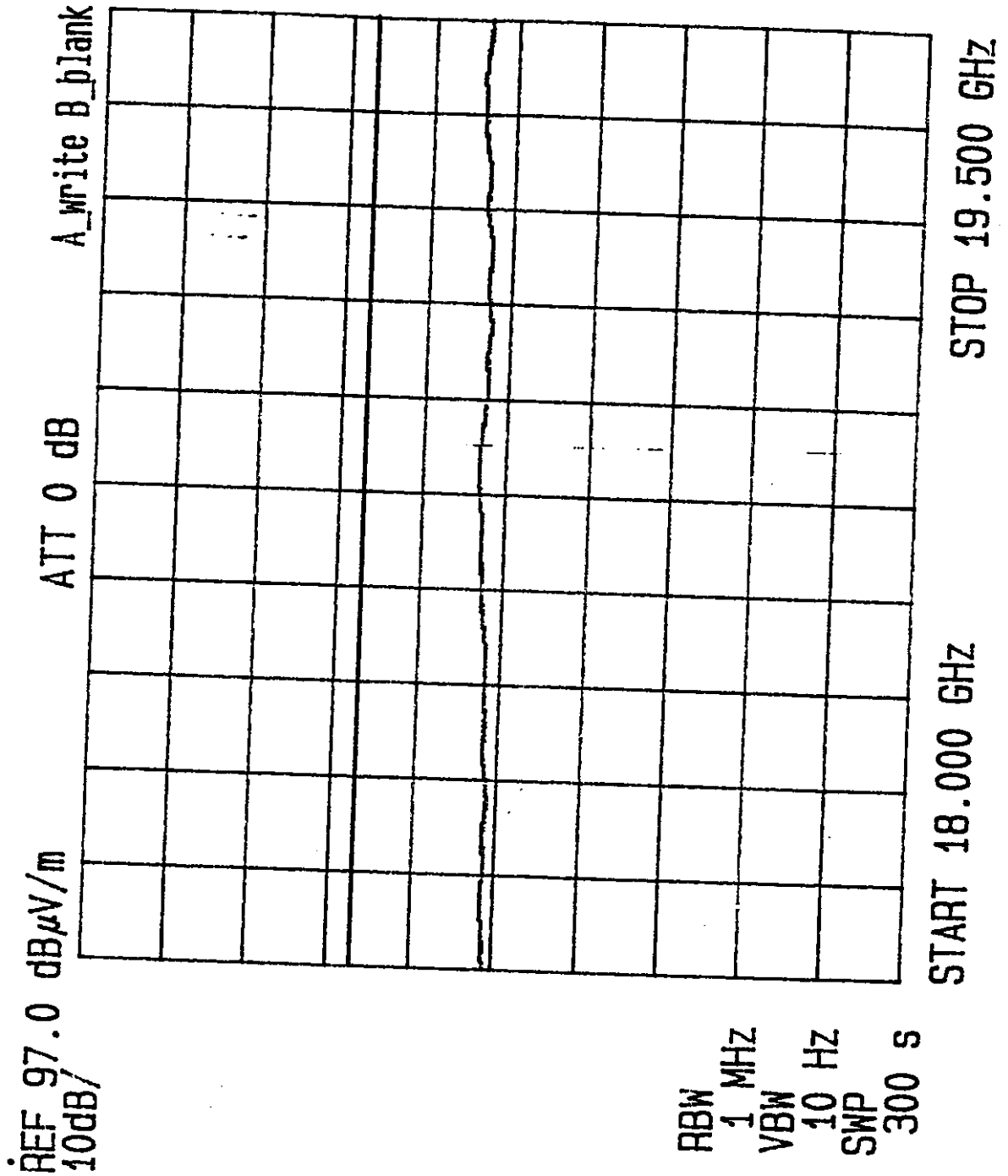
REF 97.0 dB μ V/m ATT 0 dB A_write B_blank
10dB/



START 18.000 GHz STOP 19.500 GHz

RBW 1 MHz
VBW 10 Hz
SWP 300 S

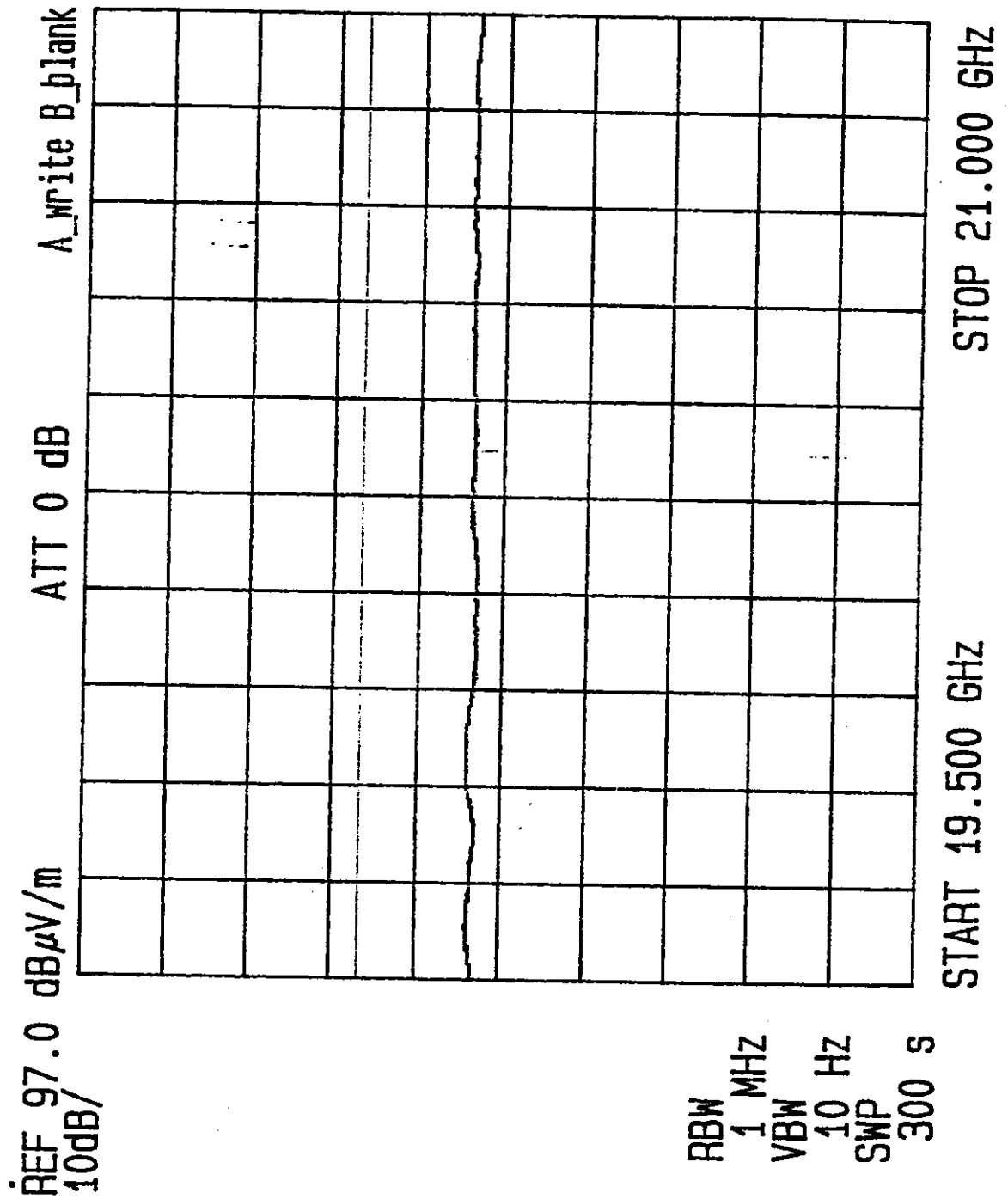
TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
 FREQ: 18G-19.5GHz SPEC: FCC 15.209A ANT.HT/POL: V 1.5
 DETECTOR: AVERAGE ANTENNA: EUT POSITION: 1.1
 DATE: 12-30-98 TEST SITE: OATS/ROOM 1 ~~101~~ / 101 TESTER: *[Signature]*





TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 19.5G-21GHz SPEC: FCC 15.209A ANT. HT/POB: H 1.25
DETECTOR: AVERAGE ANTENNA: EUT POSITION: 0.0
DATE: 12-30-98 TEST SITE: OATS/ROOM 1 3-M 1M TESTER: *[Signature]*

JA-1578-1

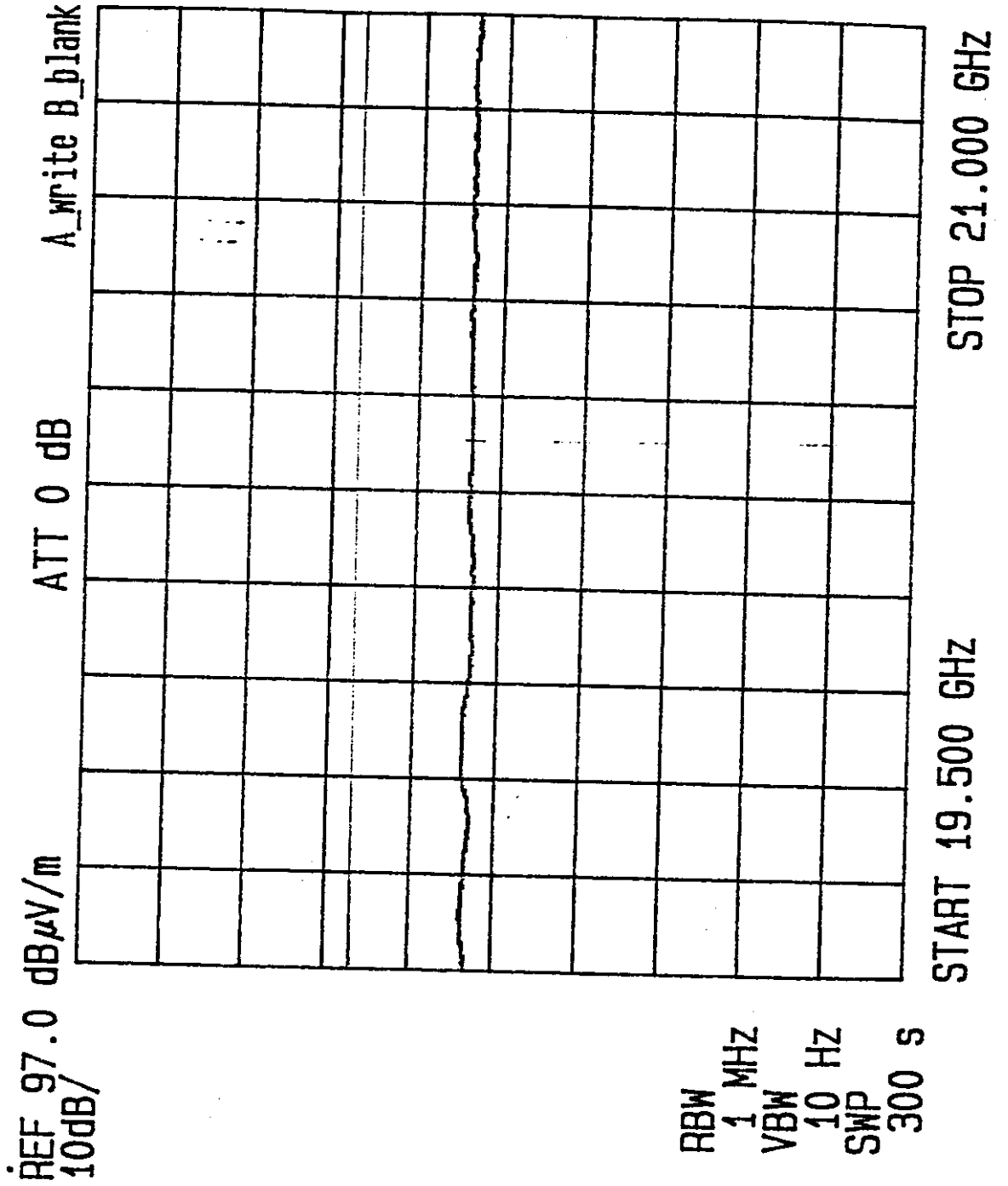


DATA SHEET 6.1.3.2-38



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 19.5G-21GHz SPEC: FCC 15.209A ANT. HT/POL: V
DETECTOR: AVERAGE ANTENNA: EUT POSITION:
DATE: 2.30.98 TEST SITE: OATS/ROOM 1.3 M TESTER:

JA-1578-1

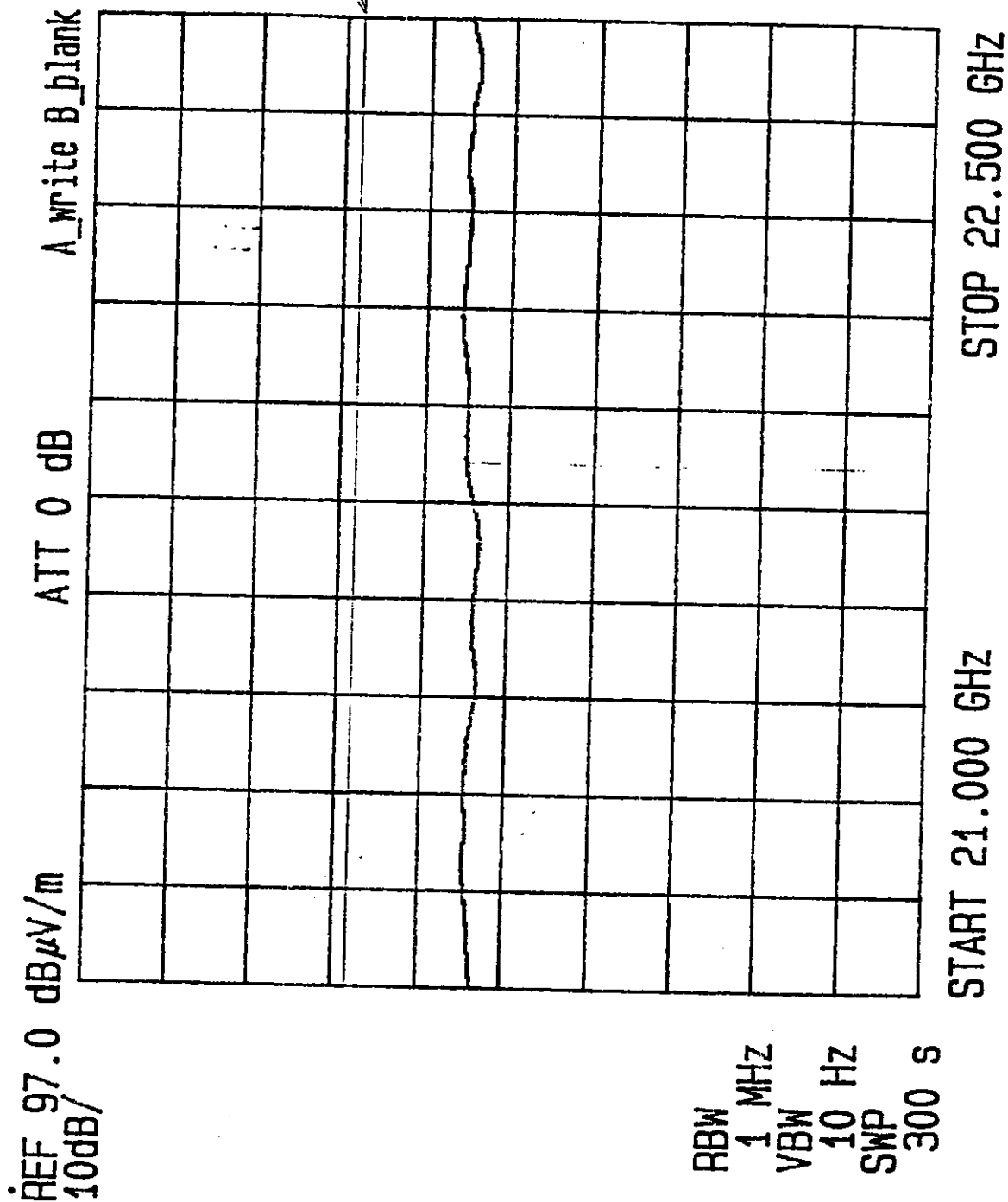


DATA SHEET 6.1.3.2-39



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 21G-22.5GHz SPEC: FCC 15.209A ANT.HT/POL: H / L
DETECTOR: AVERAGE ANTENNA: EUT POSITION: 6.00
DATE: 12-30-20 TEST SITE: OATS/ROOM 1 .3 M TESTER: [signature]

JA-1578-1



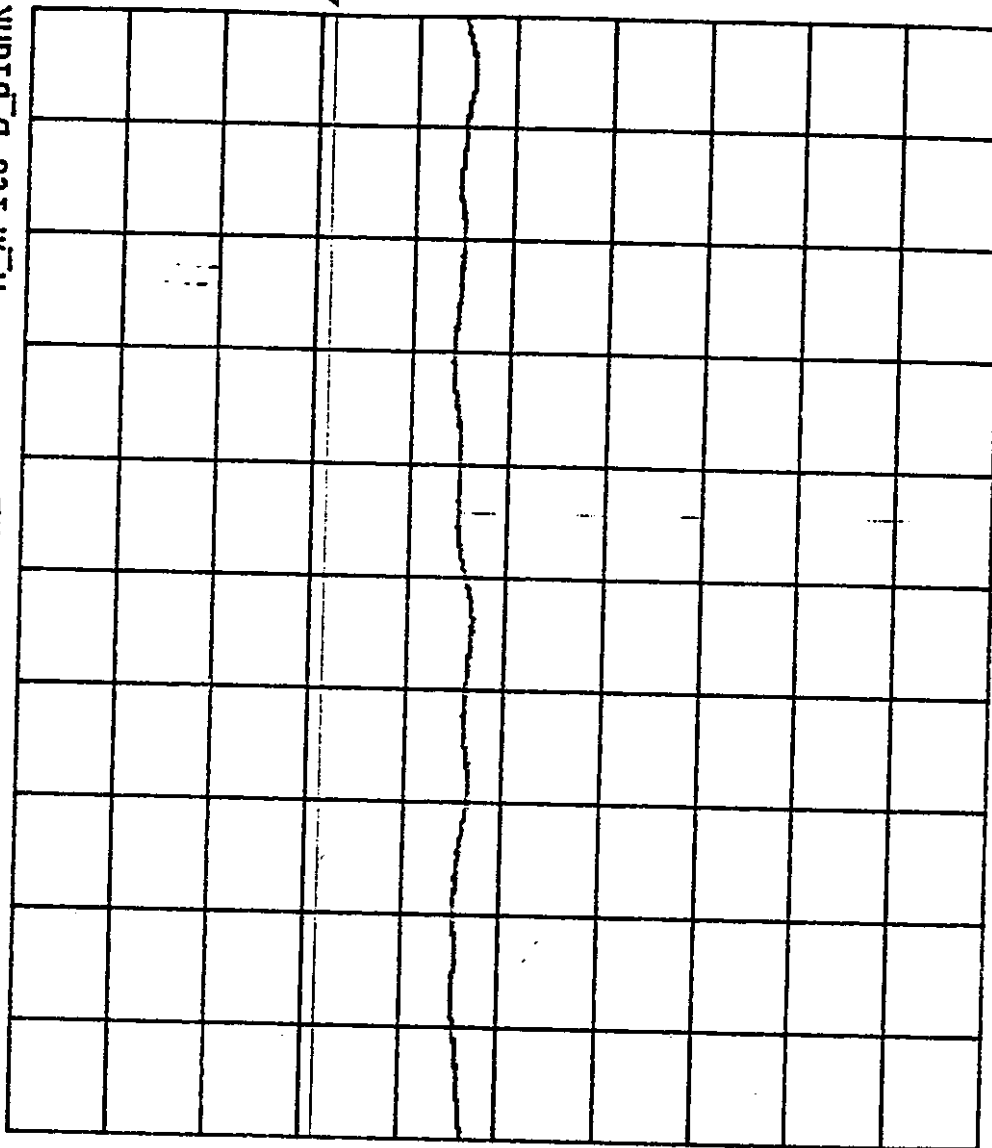
DATA SHEET 6.1.3.2-40



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 21G-22.5GHz SPEC: FCC 15.209A ANT. HT/POL: V / S
DETECTOR: AVERAGE ANTENNA: EUT POSITION: 6.9°
DATE: 12-30-88 TEST SITE: OATS/ROOM 1 3# / M TESTER: (278)

JA-1578-1

REF 97.0 dB μ V/m ATT 0 dB A_write B_blank
10dB/



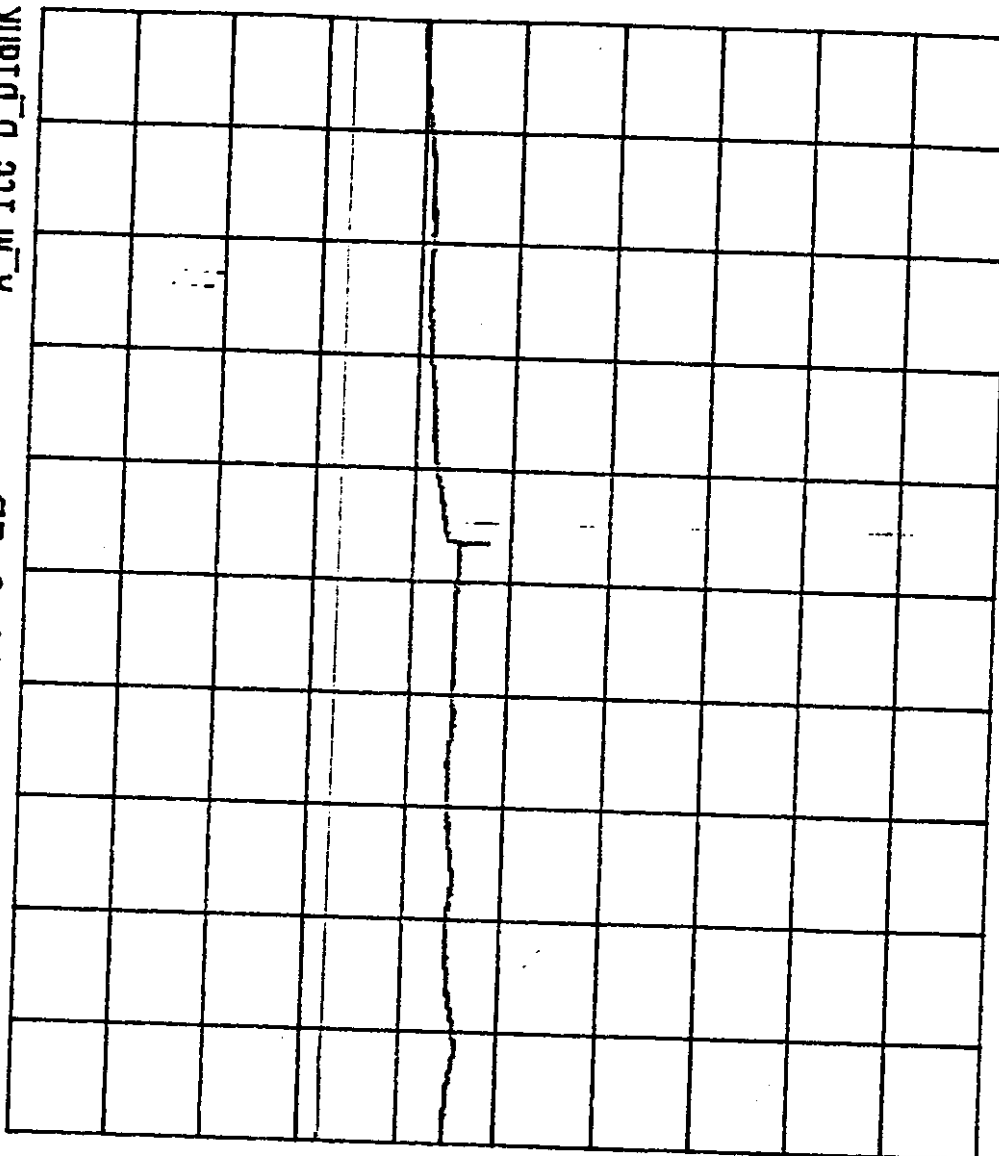
START 21.000 GHz STOP 22.500 GHz

RBW 1 MHz
VBW 10 Hz
SWP 300 S

DATA SHEET 6.1.3.2-41

TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
 FREQ: 22.5G-24GHz SPEC: FCC 15.209A ANT.HT/POL: H
 DETECTOR: AVERAGE ANTENNA: EUT POSITION: 100
 DATE: 12-20-98 TEST SITE: OATS/ROOM 1 3A 14m TESTER: (signature)

REF 97.0 dB μ V/m ATT 0 dB A_write B_blank
 10dB/



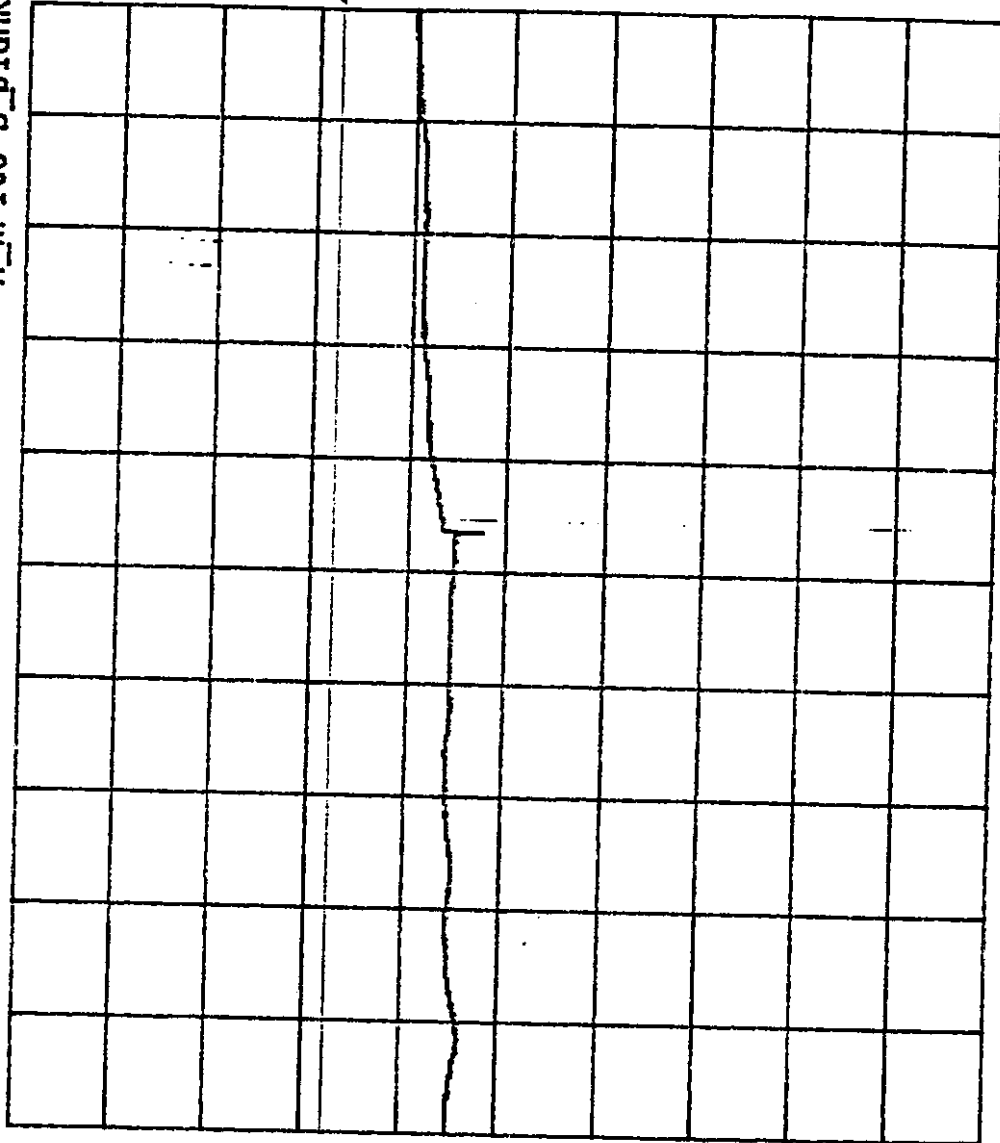
START 22.500 GHz STOP 24.000 GHz

RBW 1 MHz
 VBW 10 Hz
 SWP 300 s



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
 FREQ: 22.5G-24GHz SPEC: FCC 15.209A ANT. HT/POL: V / N
 DETECTOR: AVERAGE ANTENNA: EUT POSITION: 6
 DATE: 12-30-77 TEST SITE: OATS/ROOM 1 3-M / ~~Antenna~~ TESTER: ~~2~~

REF 97.0 dB μ V/m ATT 0 dB A_write B_blank
 10dB/



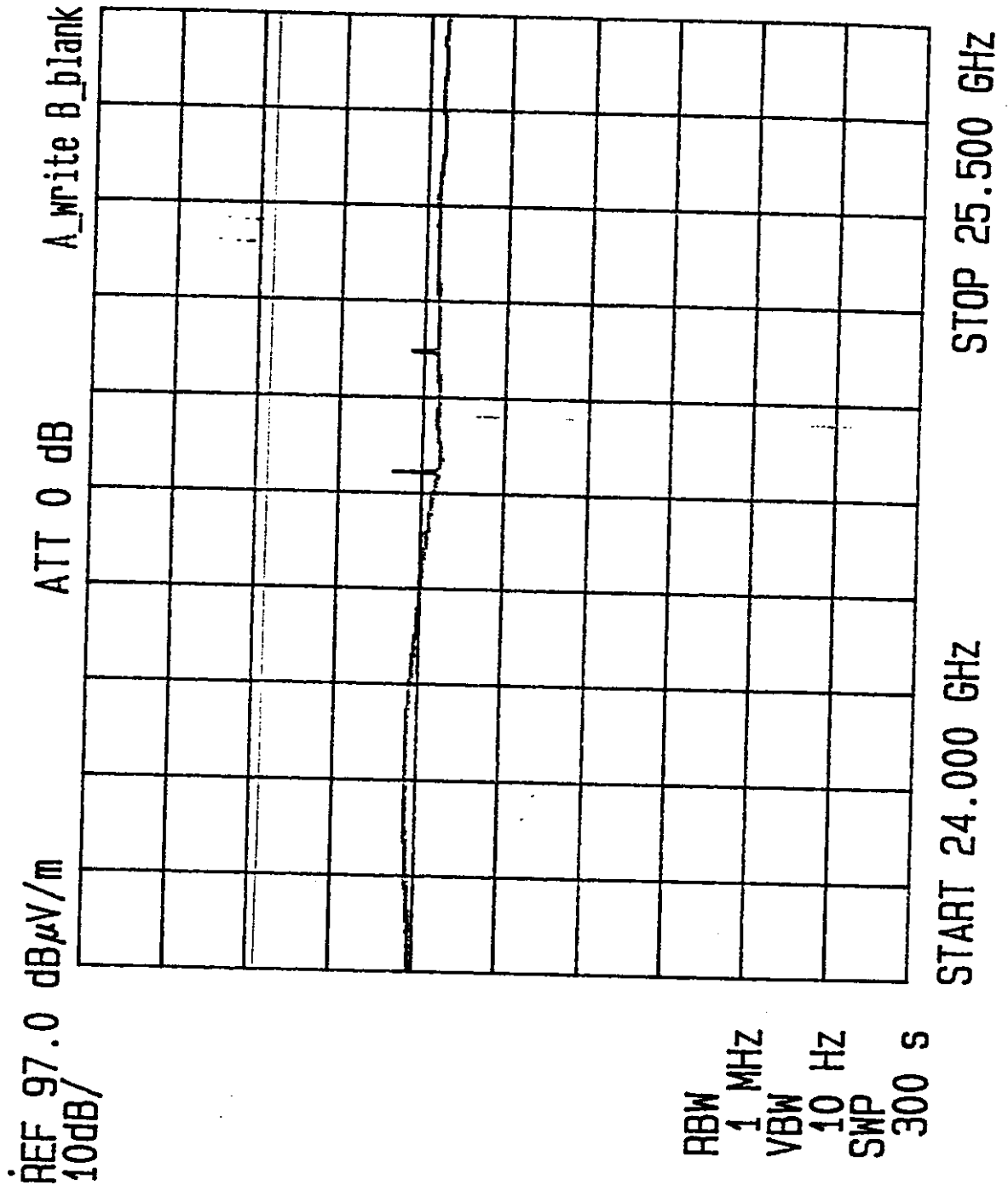
RBW 1 MHz
 VBW 10 Hz
 SWP 300 S

START 22.500 GHz STOP 24.000 GHz



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 24G-25.5GHz SPEC: FCC 15.209A ANT. HT/POL: H 1.25
DETECTOR: AVERAGE ANTENNA: EUT POSITION: 0.2
DATE: 12-30-78 TEST SITE: OATS/ROOM 1 .3 M TESTER: [signature]

JA-1578-1

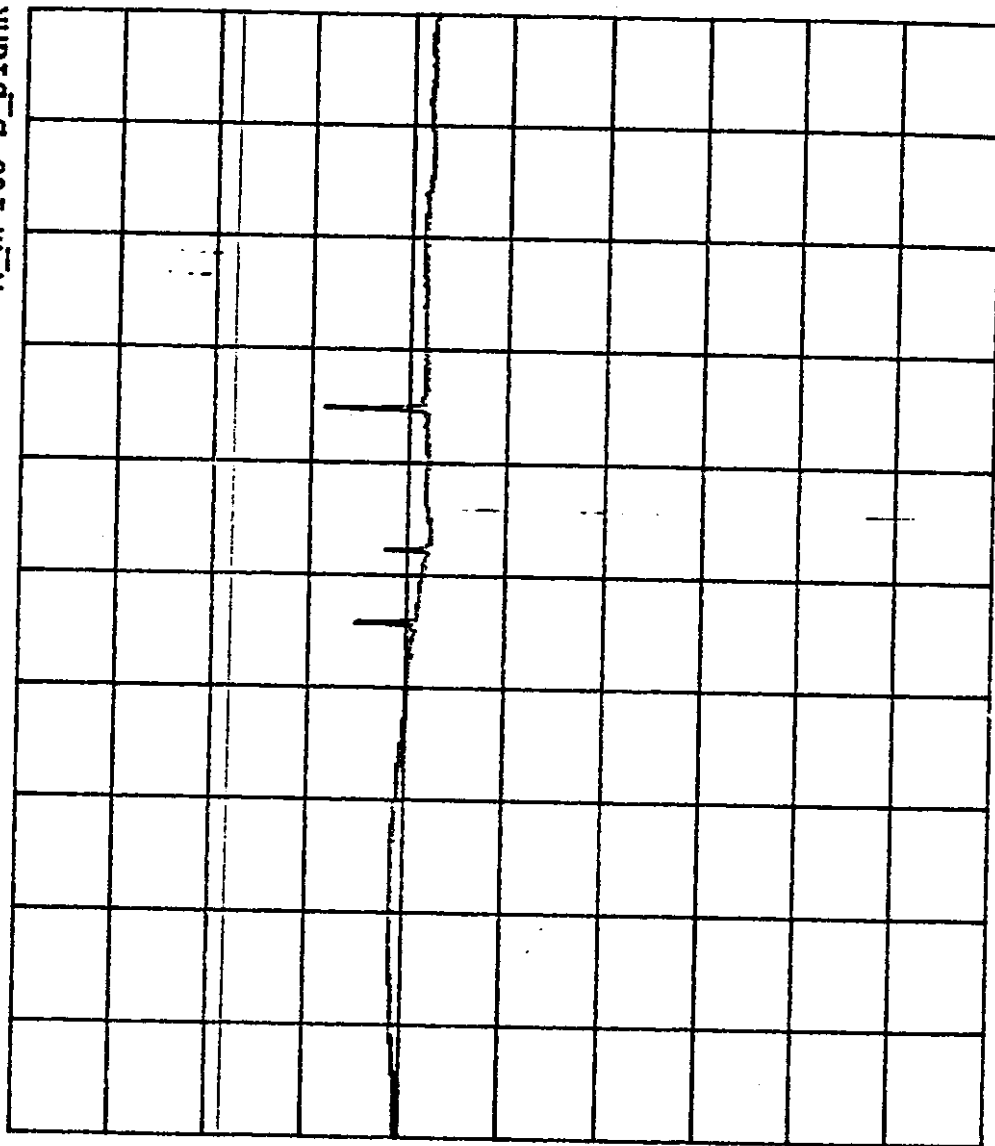


DATA SHEET 6.1.3.2-44



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 24G-25.5GHz SPEC: FCC 15.209A ANT.HT/POL: V / /
DETECTOR: AVERAGE ANTENNA: EUT POSITION: / /
DATE: 12-30-97 TEST SITE: OATS/ROOM 1.3 M TESTER: /

REF 97.0 dB μ V/m ATT 0 dB A_write B_blank
10dB/



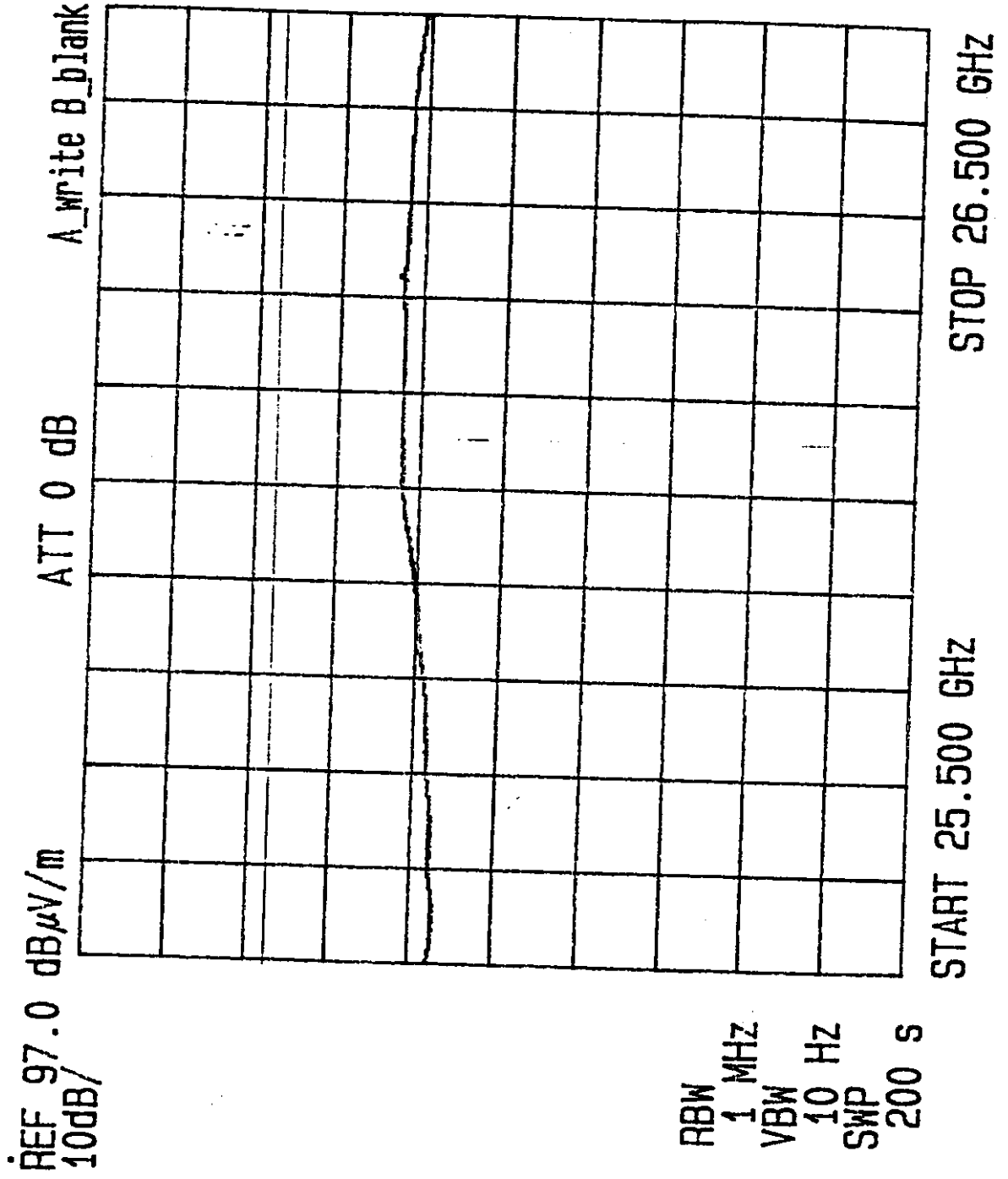
RBW 1 MHz
VBW 10 Hz
SWP 300 S

START 24.000 GHz STOP 25.500 GHz

JA-1578-1

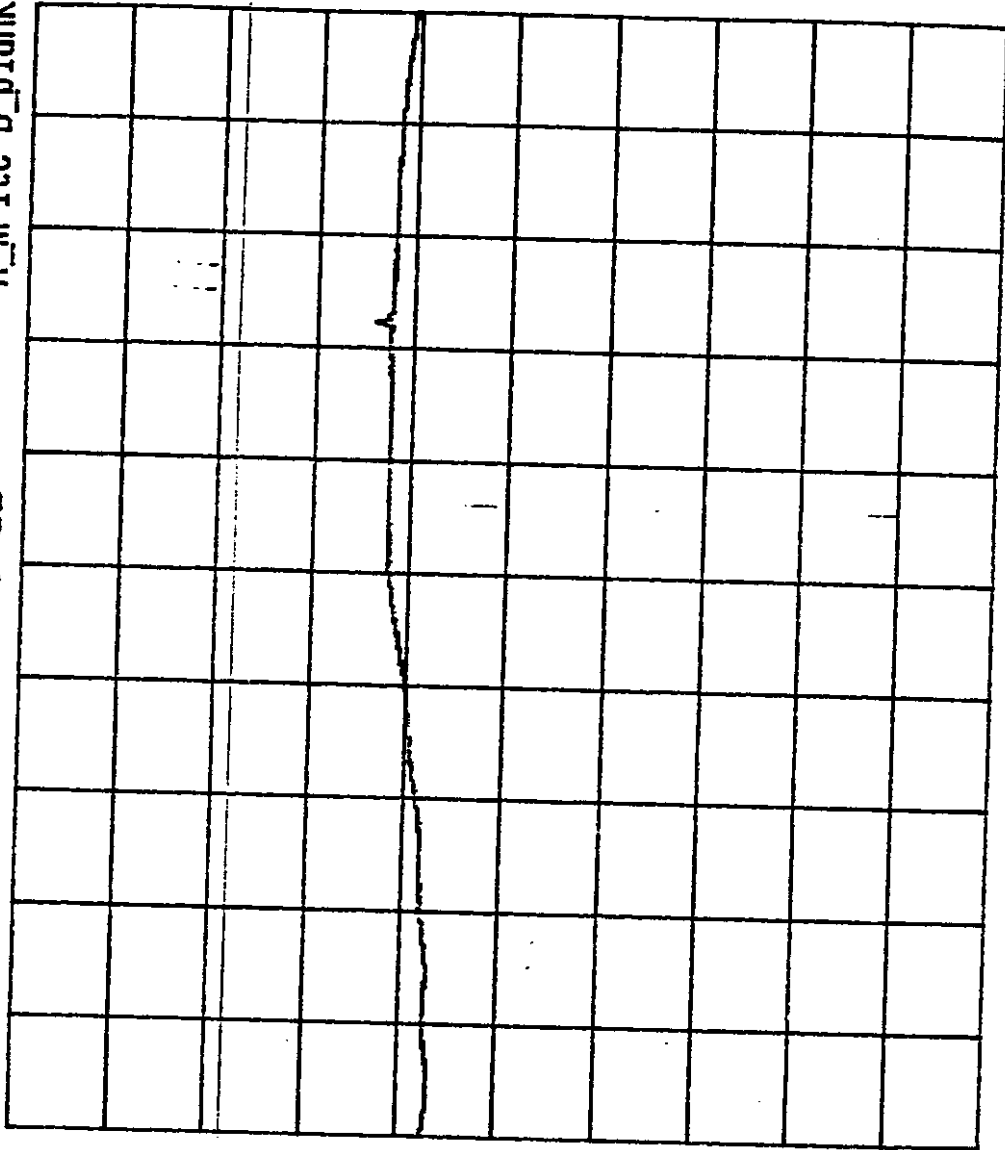
DATA SHEET 6.1.3.2-45

TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
 FREQ: 25.5G-26.5GHz SPEC: FCC 15.209A ANT.HT/POL: H 1.2m
 DETECTOR: AVERAGE ANTENNA: EUT POSITION: 6.7m
 DATE: 12-30-98 TEST SITE: OATS/ROOM 1 .3 M TESTER: [Signature]



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
 FREQ: 25.5G-26.5GHz SPEC: FCC 15.209A ANT.HT/POL: V
 DETECTOR: AVERAGE ANTENNA: EUT POSITION:
 DATE: 12-30-98 TEST SITE: OATS/ROOM 1.3 M TESTER: *[Signature]*

REF 97.0 dB μ V/m ATT 0 dB A_write B_blank
 10dB/



START 25.500 GHz STOP 26.500 GHz

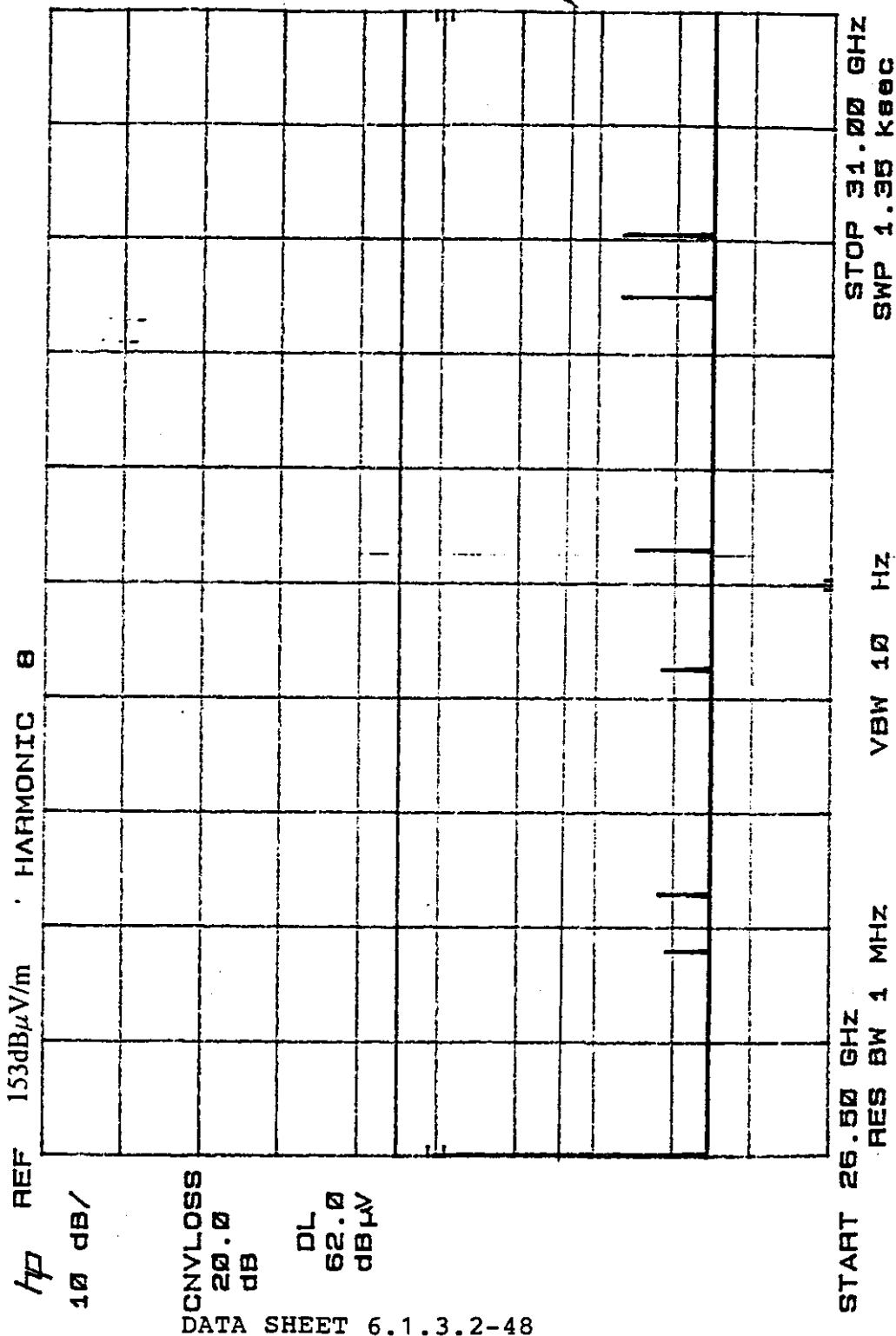
RBW 1 MHz
 VBW 10 Hz
 SWP 200 S





TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 26.5G-31GHz SPEC: FCC 15.209A ANT. HT/POL: H 1.2 m
DETECTOR: AVERAGE ANTENNA: EUT POSITION: 0
DATE: 12-29-98 TEST SITE: OATS/ROOM 1.3 M TESTER: [signature]

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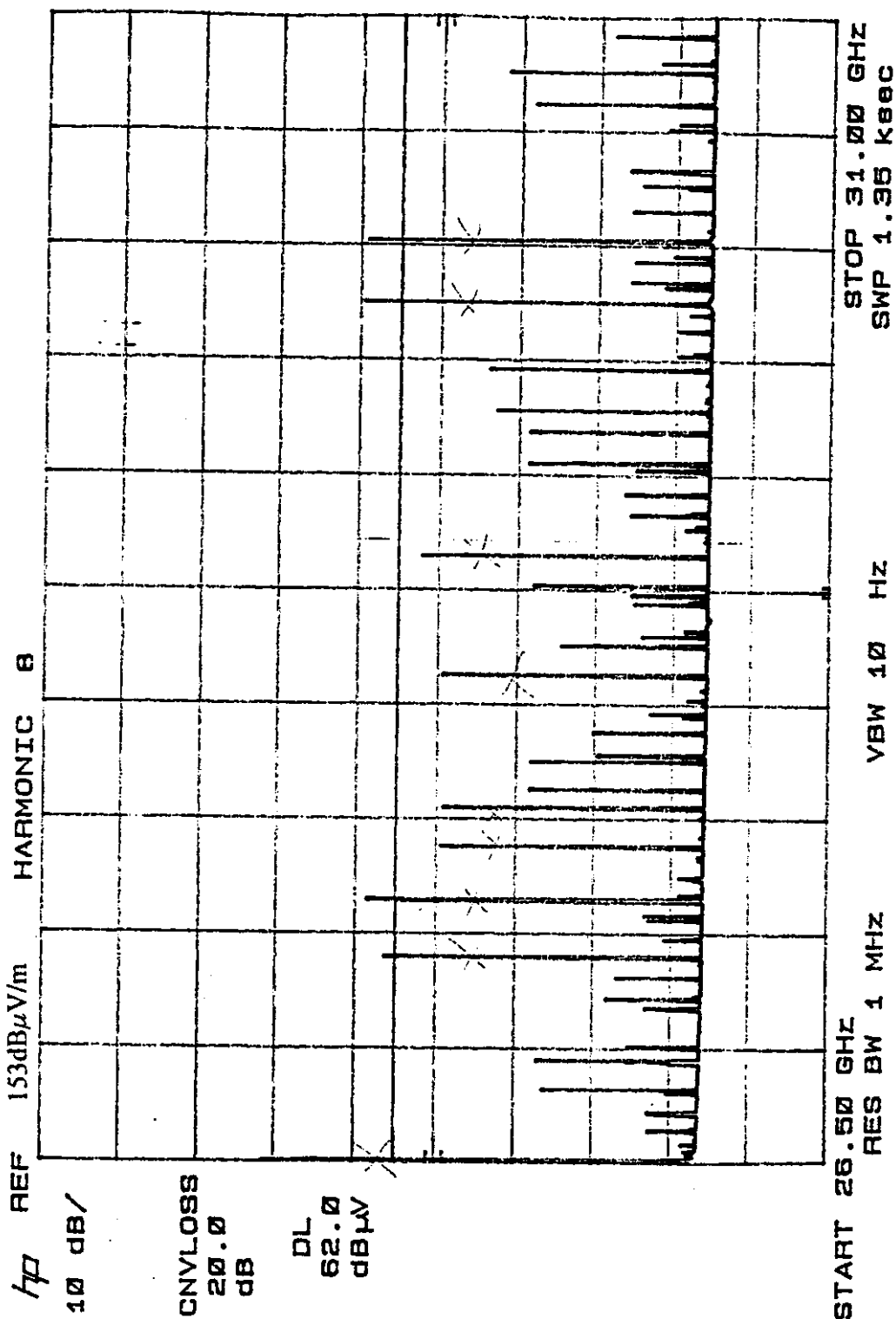


DATA SHEET 6.1.3.2-48



JA-1578-1

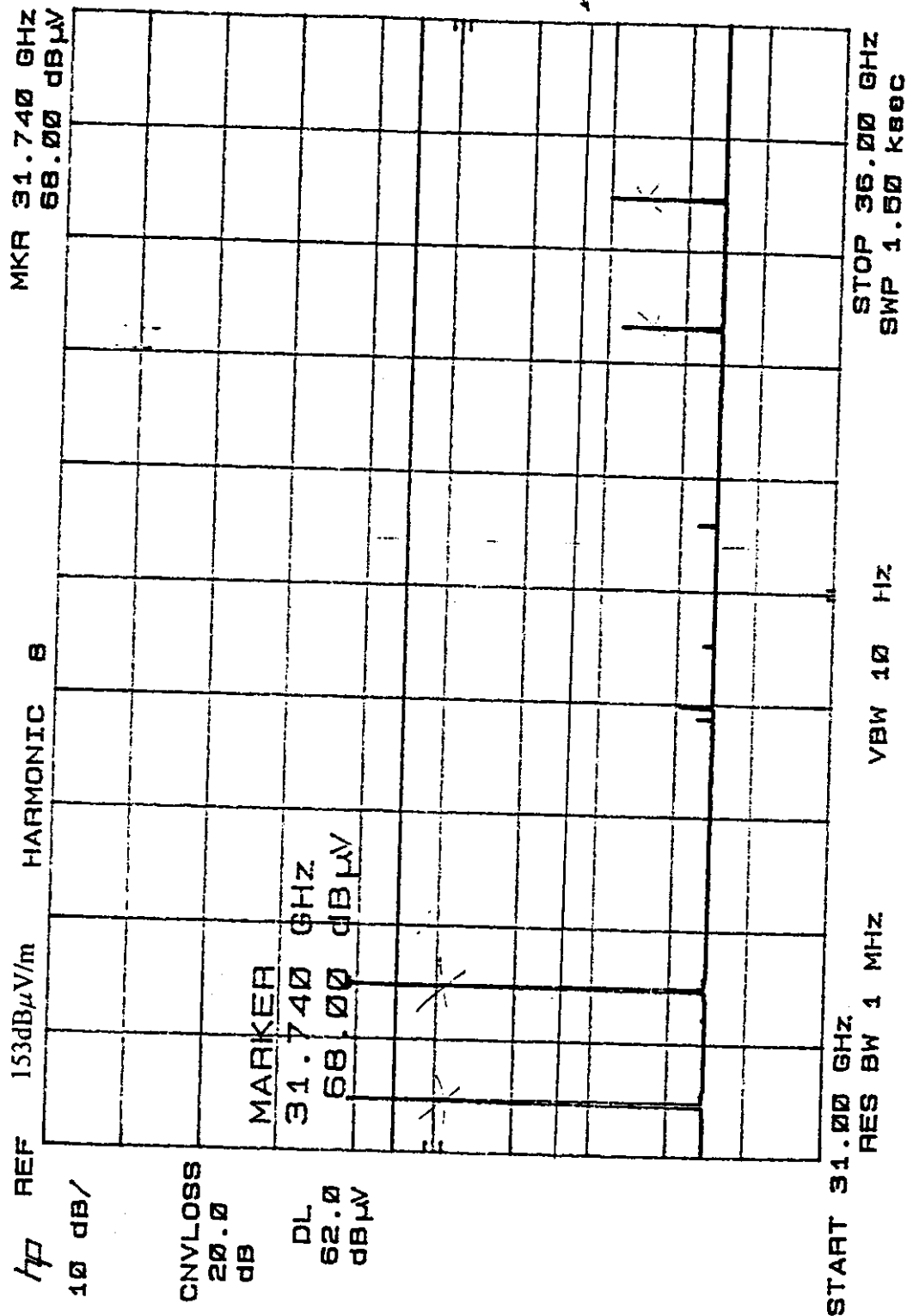
TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 26.5-31GHz SPEC: FCC 15.209A ANT.HT/POL: V
DETECTOR: AVERAGE ANTENNA: EUT POSITION:
DATE: 12-29-98 TEST SITE: OATS/ROOM 1.3 M TESTER: [signature]



DATA SHEET 6.1.3.2-49



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 31G-36GHz SPEC: FCC 15.209A ANT. HT/POL: H 1.2
DETECTOR: AVERAGE ANTENNA: EUT POSITION: 1
DATE: 12-29-98 TEST SITE: OATS/ROOM 1.3 M TESTER: *JD*



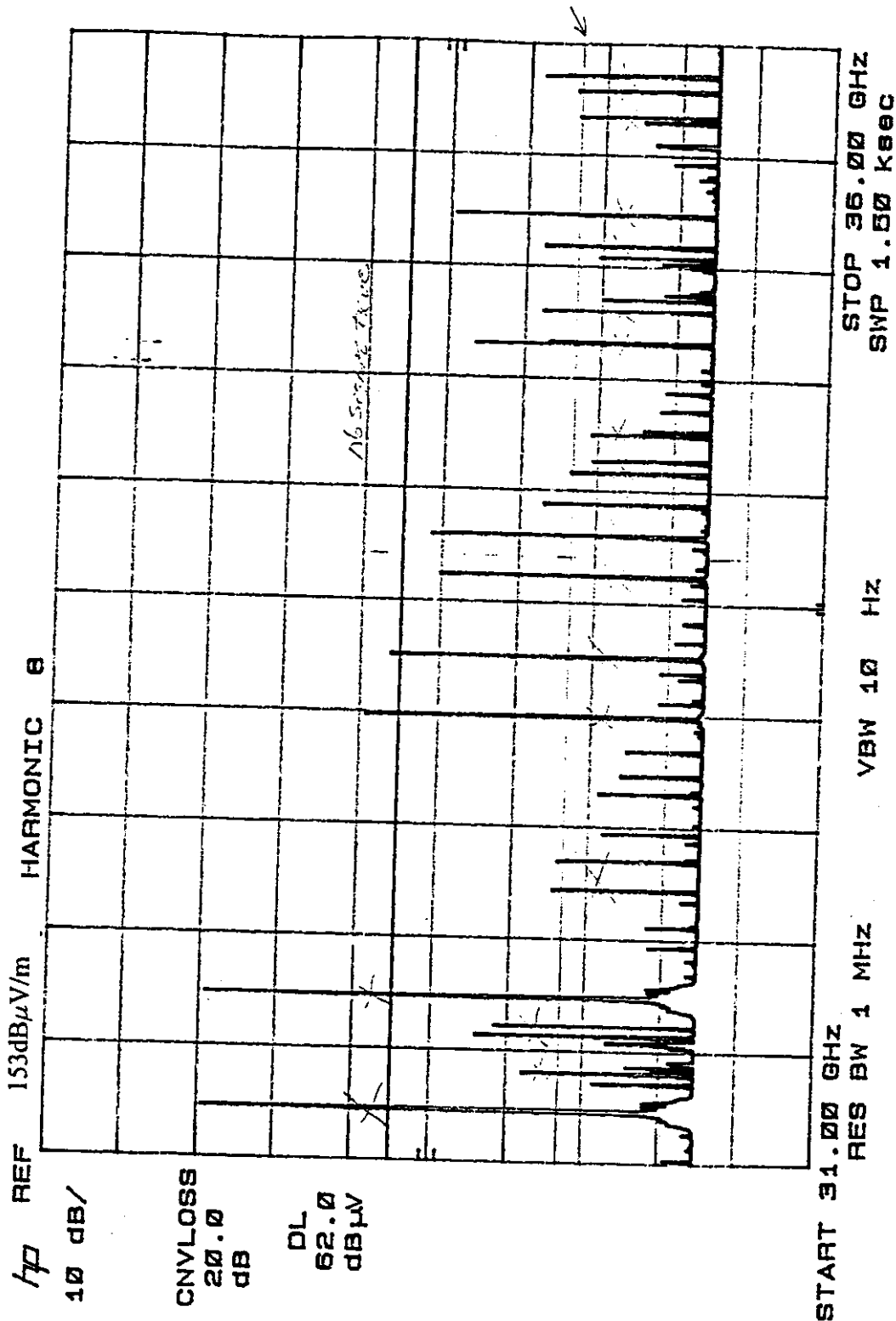
JA-1578-1

DATA SHEET 6.1.3.2-50



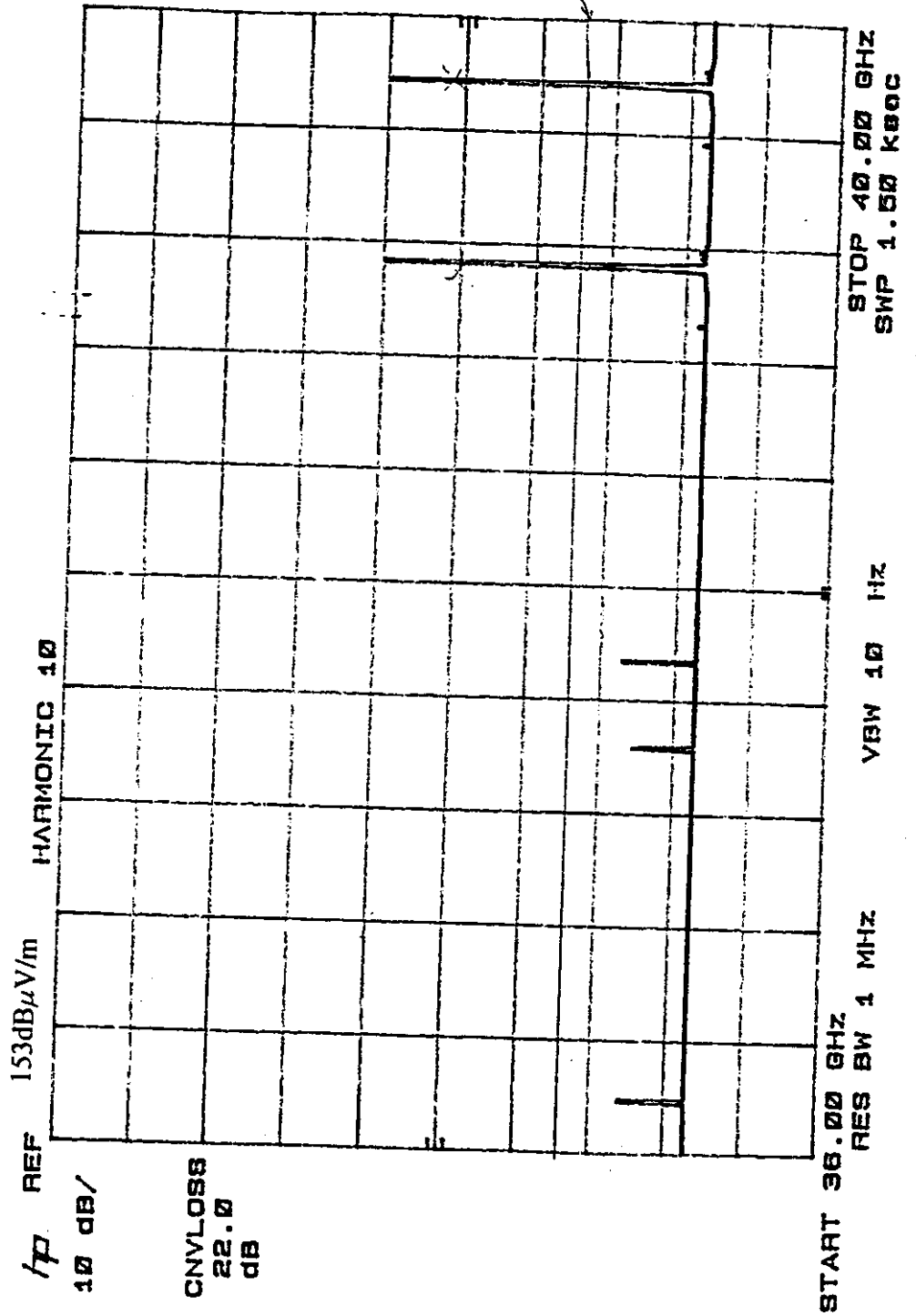
TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 31G-36GHz SPEC: FCC 15.209A ANT.HT/POL: V 1.2
DETECTOR: AVERAGE ANTENNA: EUT POSITION:
DATE: 10-29-98 TEST SITE: OATS/ROOM 1.3 M TESTER: A

JA-1578-1



DATA SHEET 6.1.3.2-51

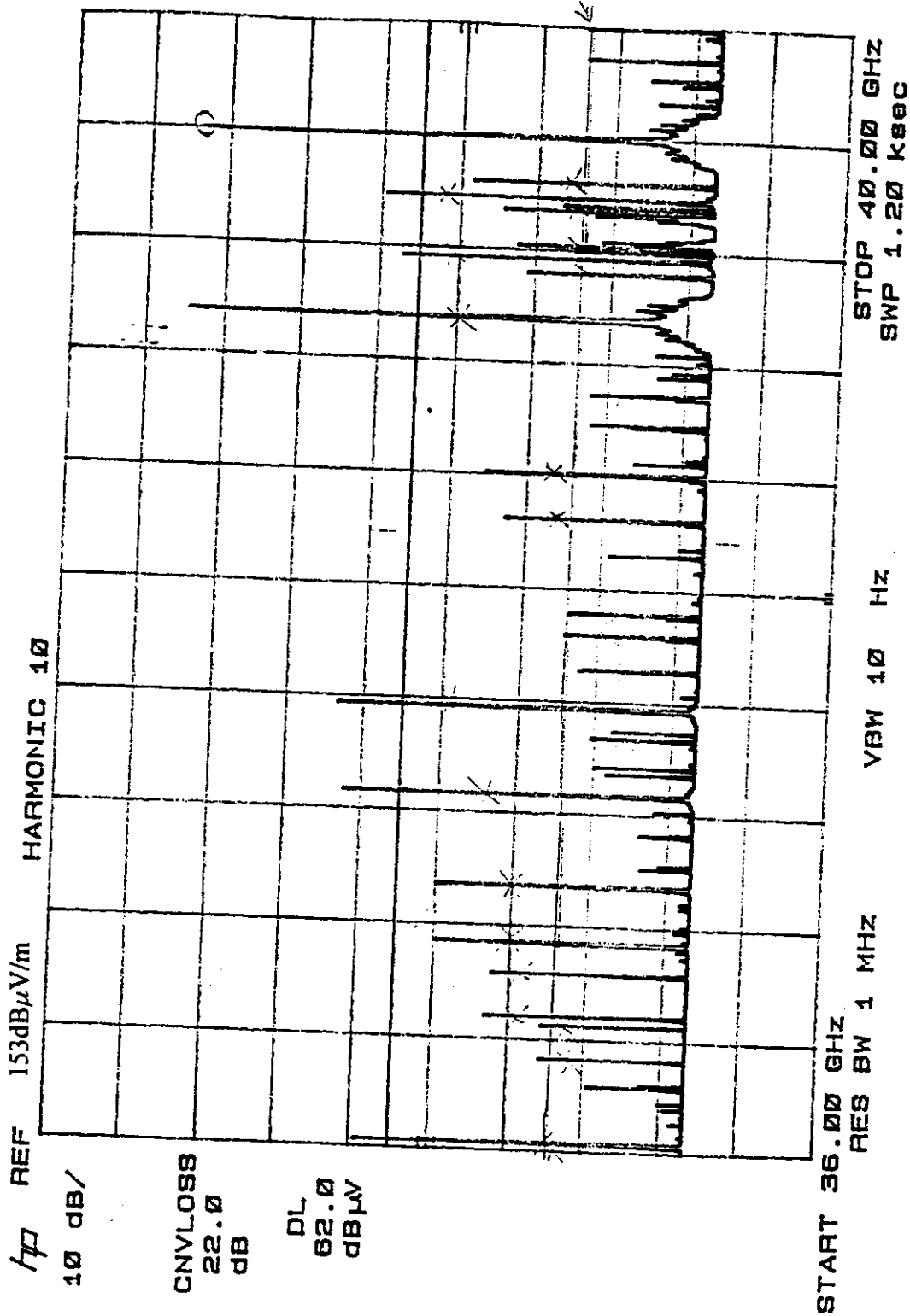
TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
 FREQ: 36G-40GHz SPEC: FCC 15.209A ANT. HT/POL: H 1.2
 DETECTOR: AVERAGE ANTENNA: EUT POSITION: 0
 DATE: 12-30-98 TEST SITE: OATS/ROOM 1.3 M TESTER: *[Signature]*



DATA SHEET 6.1.3.2-52



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 36G-40GHz SPEC: FCC 15.209A ANT.HT/POL: V
DETECTOR: AVERAGE ANTENNA: EUT POSITION:
DATE: 12-30-98 TEST SITE: OATS/ROOM 1 .3 M TESTER: *[Signature]*

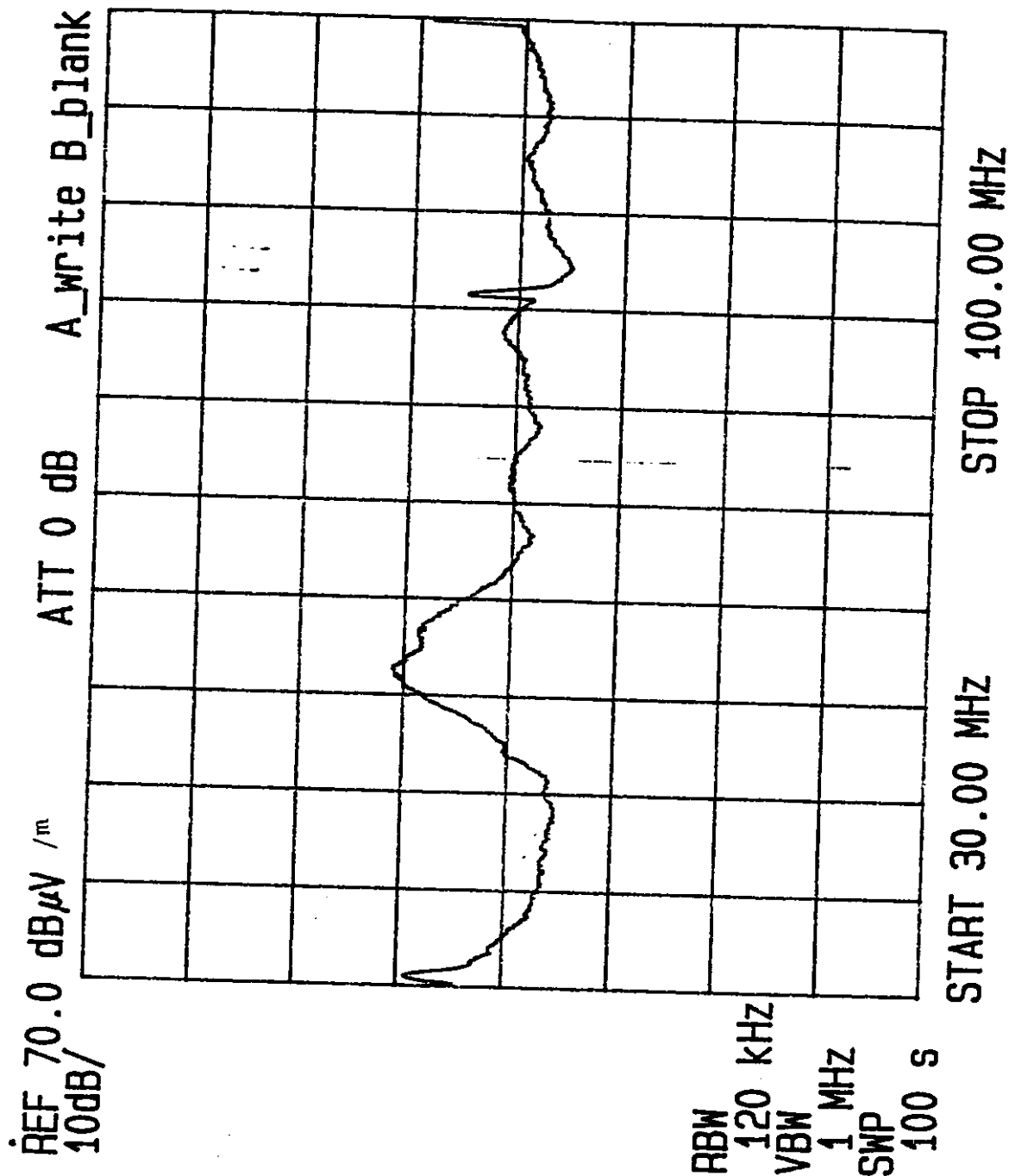


DATA SHEET 6.1.3.2-53



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 30M-100MHz SPEC: 15.245(B)(3)/15.209(a) ANT.HT/POL: H
DETECTOR: O-PEAK ANTENNA: EUT POSITION:
DATE: 12/22/88 TEST SITE: OATS/ROOM 1. TESTER: J

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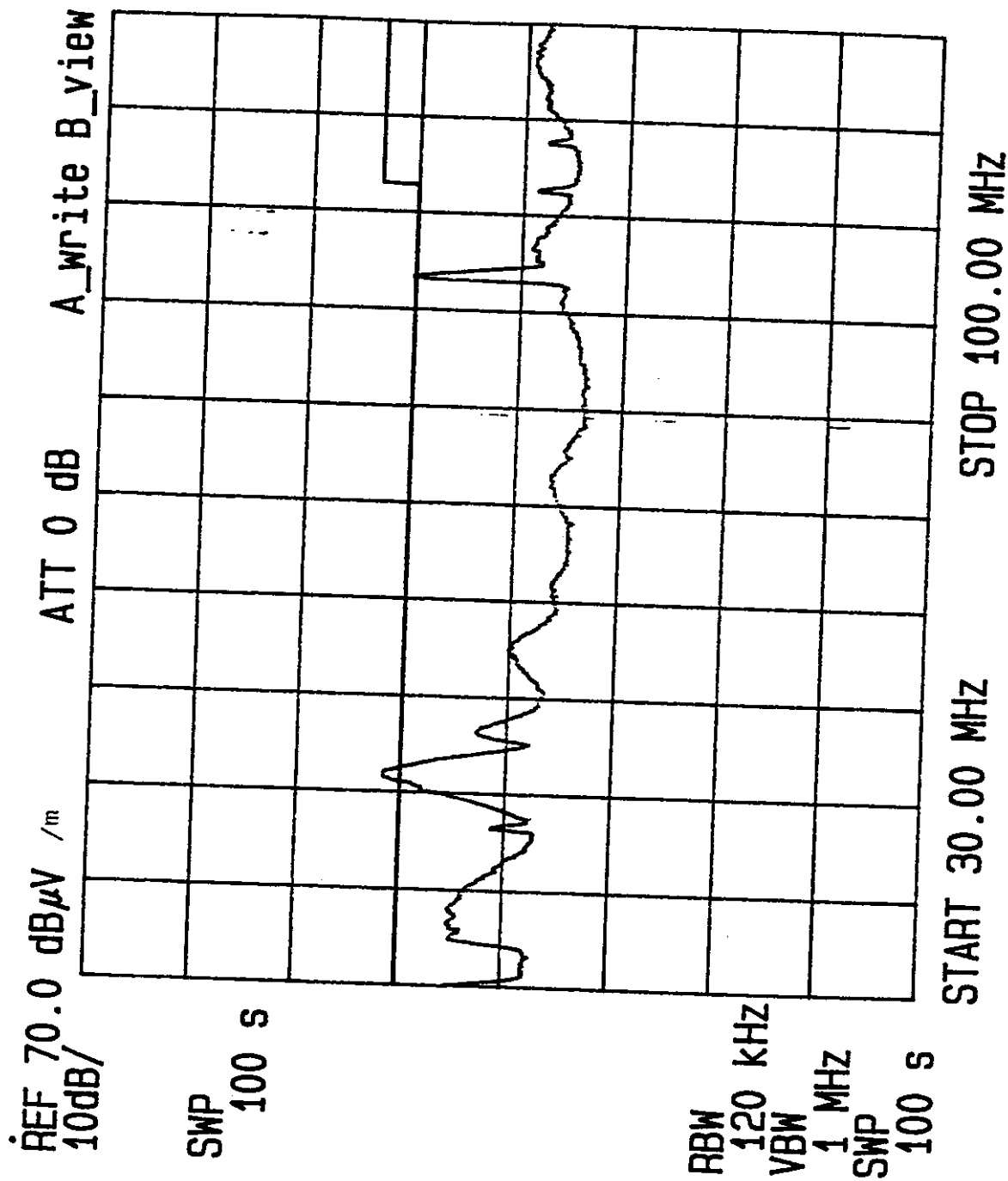


DATA SHEET 6.1.3.2-54



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 30M-100MHz SPEC: 15.245(B)(3)/15.209(a) ANT.HT/POL: V
DETECTOR: Q-PEAK ANTENNA:
DATE: 12/22/95 TEST SITE: OATS/ROOM 1) EUT POSITION:
TESTER: *[Signature]*

JA-1578-1

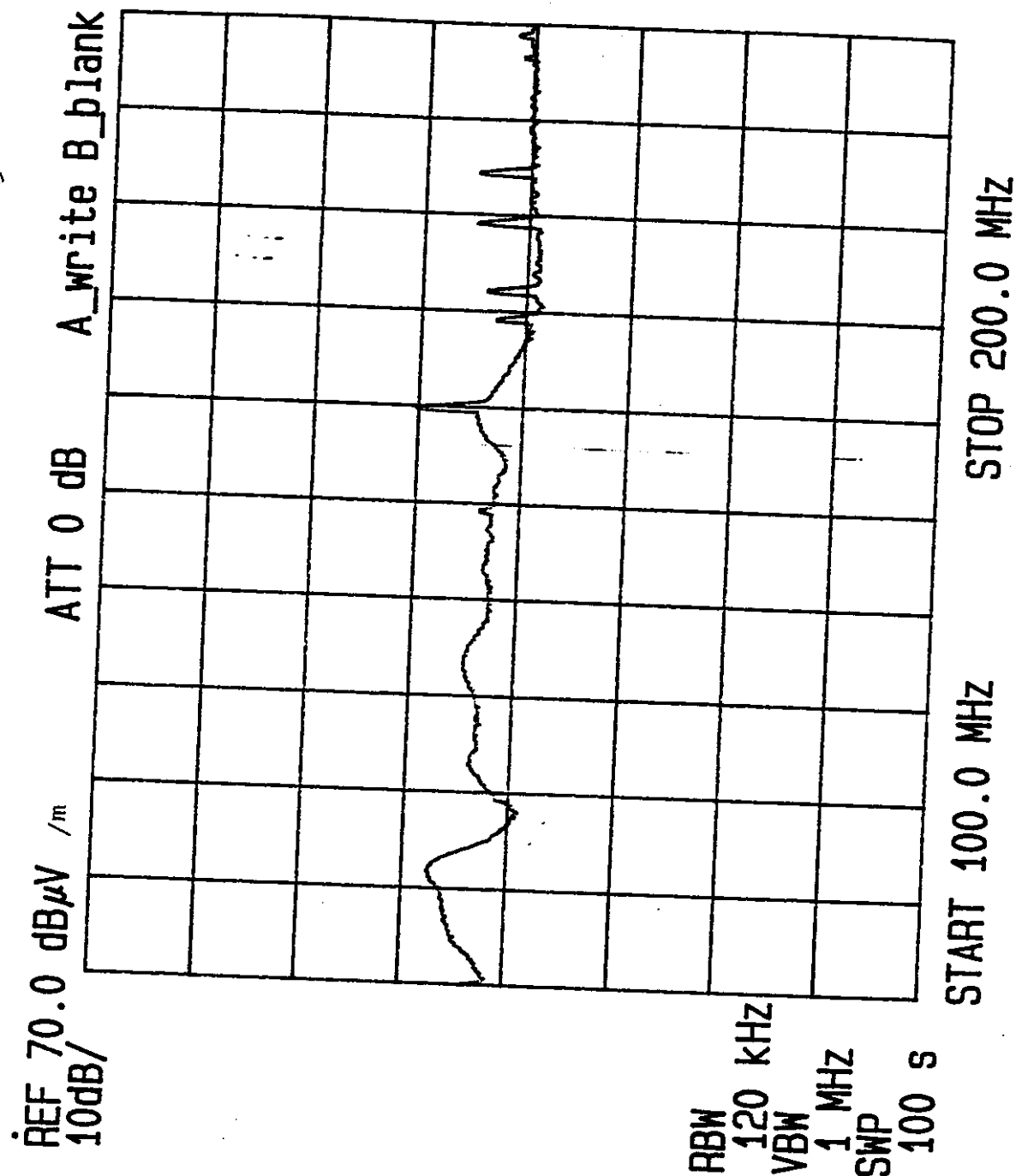


DATA SHEET 6.1.3.2-55



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 100M-200MHz SPEC: 15.245(B)(3)/15.209(a) ANT. HT/POL: H
DETECTOR: Q-PEAK ANTENNA: EUT POSITION:
DATE: 12/1/98 TEST SITE: OATS/ROOM 1, TESTER: *[Signature]*

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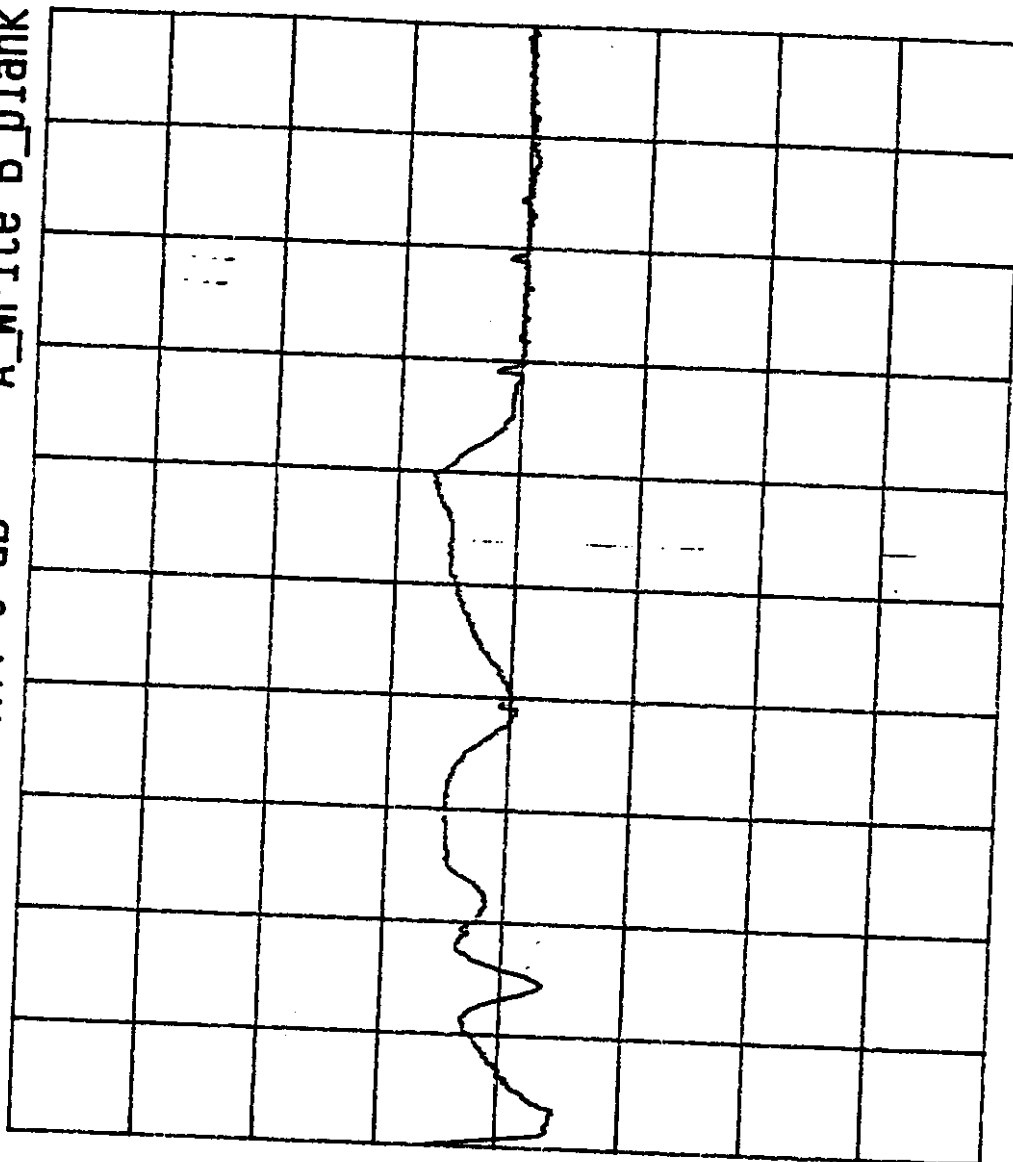
DATA SHEET 6.1.3.2-56



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/000001
FREQ: 100M-200MHz SPEC: 15.245(B)(3)/15.209(a) ANT.HT/POL: V
DETECTOR: Q-PEAK ANTENNA: EUT POSITION:
DATE: 12/22/4X TEST SITE: OATS/ROOM 1 TESTER: J

JA-1578-1

REF 70.0 dB μ V /m ATT 0 dB A_write B_blank
10dB/



RBW 120 KHz
VBW 1 MHz
SWP 100 S

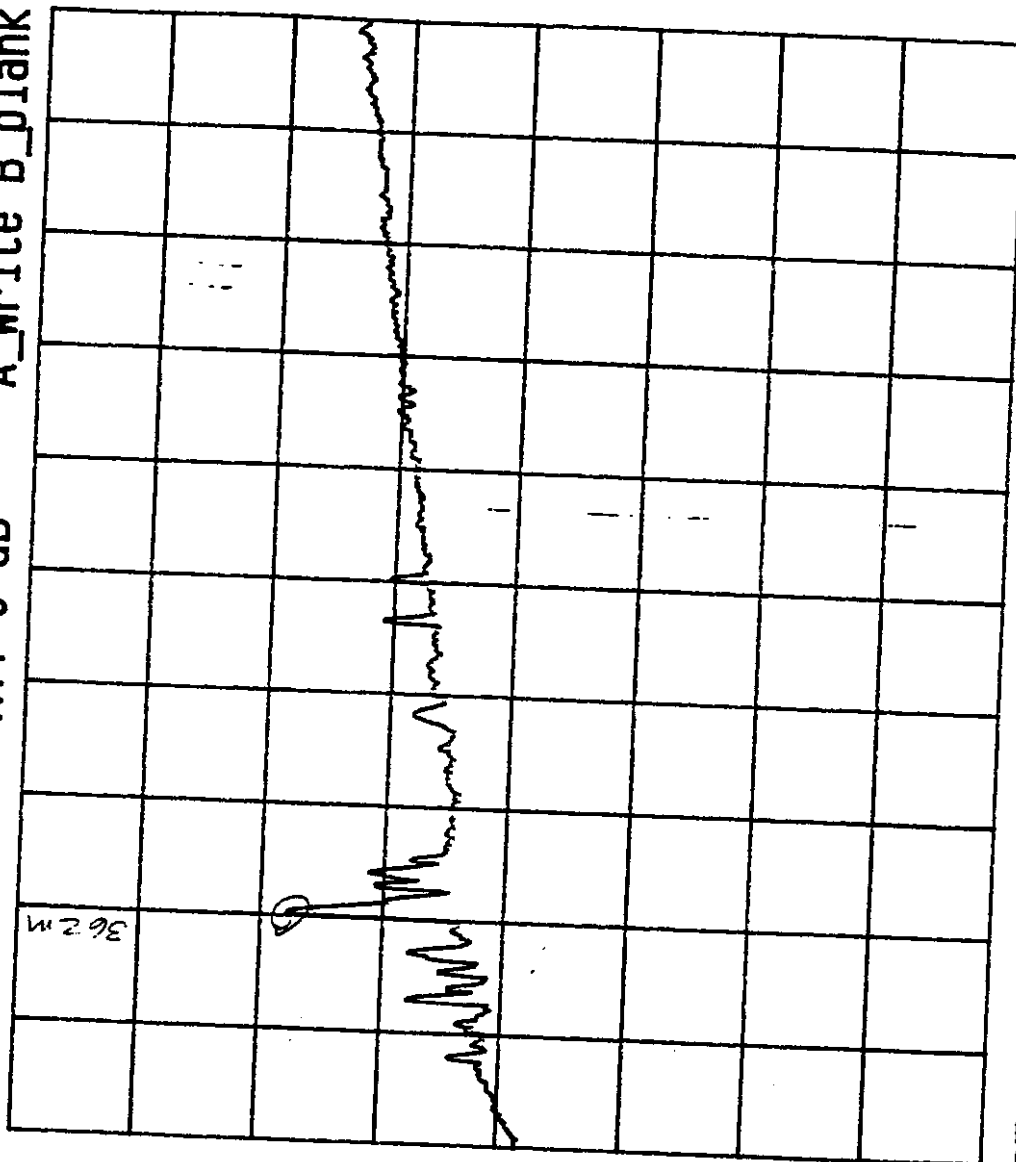
START 100.0 MHz STOP 200.0 MHz

DATA SHEET 6.1.3.2-57



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 200M-1GHz SPEC: 15.245(B)(3)/15.209(a) ANT.HT/POL: H
DETECTOR: Q-PEAK ANTENNA: EUT POSITION:
DATE: 12/22/95 TEST SITE: OATS/ROOM 1/ TESTER: J

REF 70.0 dB μ V /m
10dB/ ATT 0 dB A_write B_blank



RBW 120 KHz
VBW 1 MHz
SWP 100 S

START 200.0 MHz STOP 1.0000 GHz

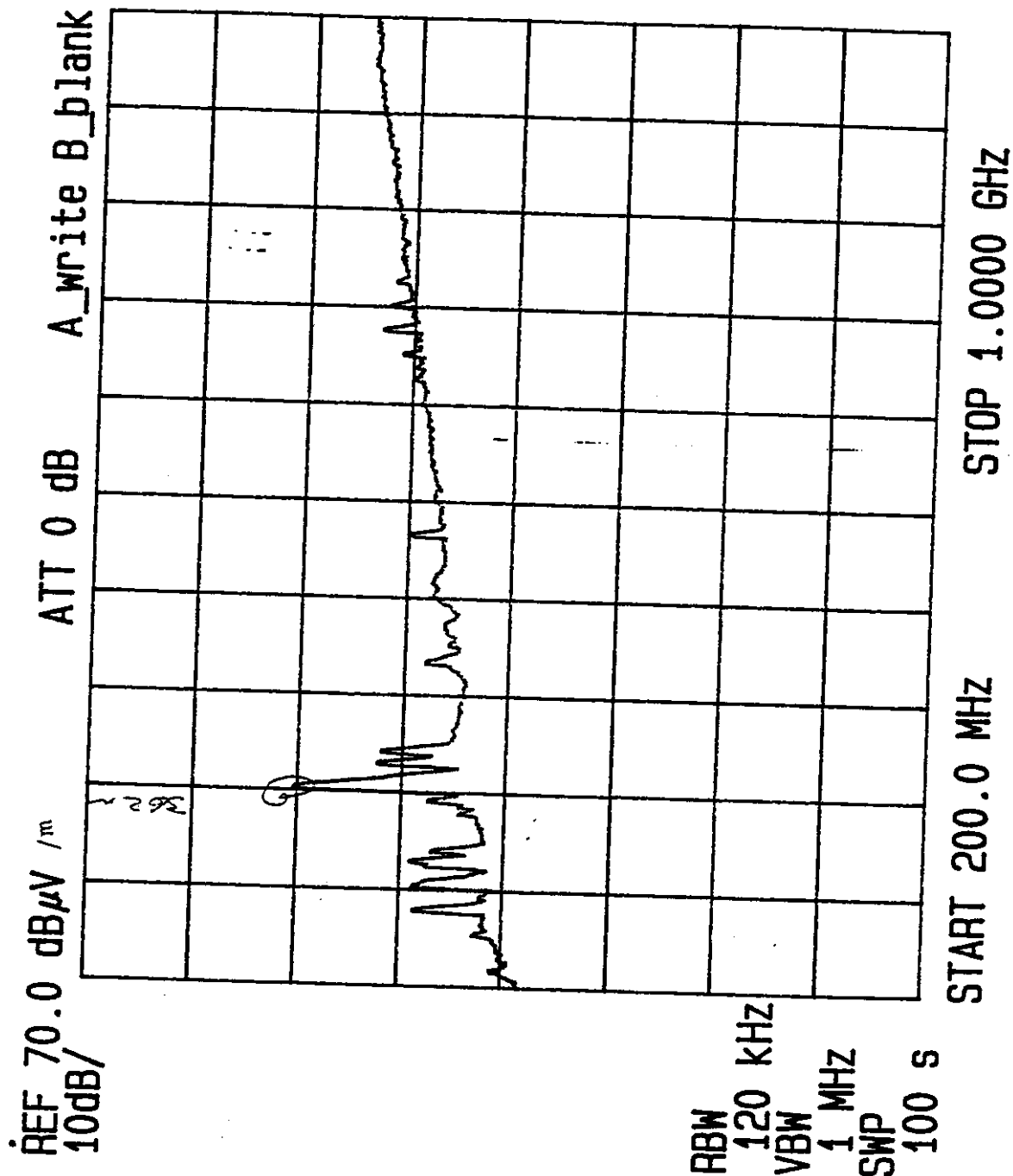
JA-1578-1

DATA SHEET 6.1.3.2-58



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 00203/00001
FREQ: 200M-1GHz SPEC: 15.245(B)(3)/15.209(a) ANT.HT/POL: V
DETECTOR: Q-PEAK ANTENNA: INTERNAL EUT POSITION:
DATE: 12/22/99 TEST SITE: OATS/ROOM 15 TESTER: 25

JA-1578-1



DATA SHEET 6.1.3.2-59



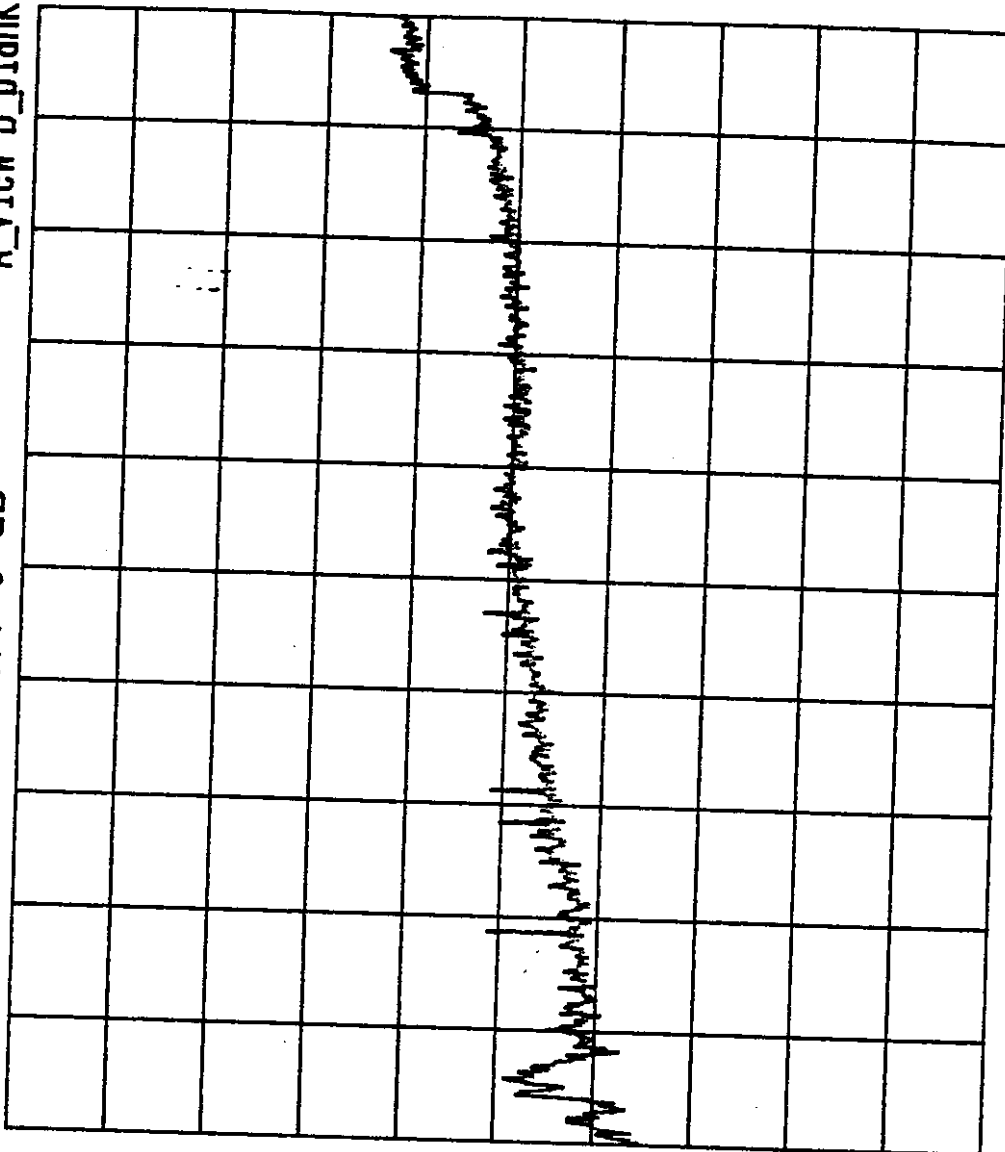
TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 109/00002
FREQ: 1G-8GHz SPEC: FCC ANT. HT/POL: H
DETECT: PEAK ANTENNA: EUT POSITION:
DATE: 12/22/88 TEST SITE: ROOM 1 TESTER: *[Signature]*

JA-1578-1

REF 97.0 dB μ V/m
10dB/

ATT 0 dB

A_view B_blank



RBW 1 MHz
VBW 1 MHz
SWP 110 ms

START 1.000 GHz

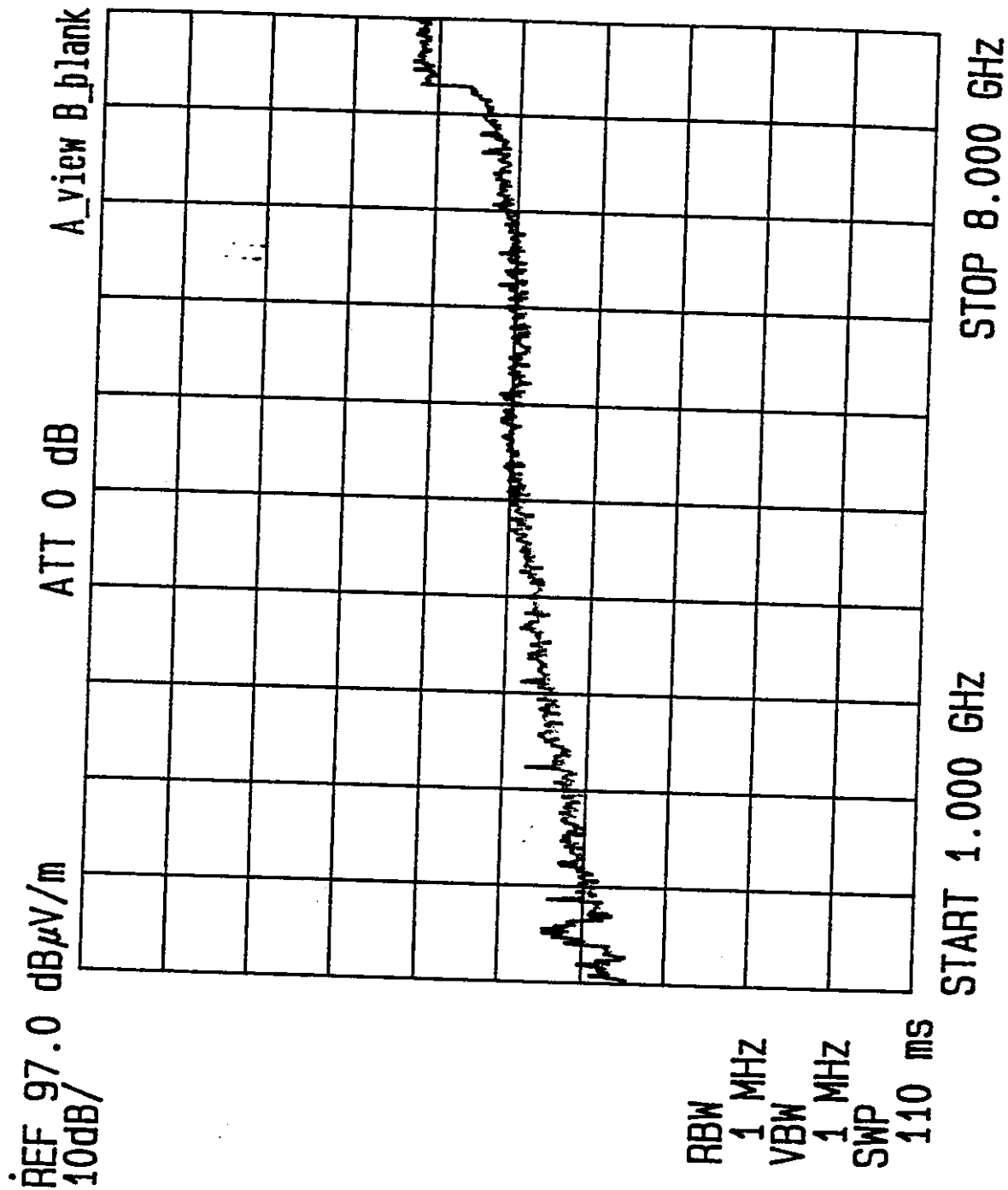
STOP 8.000 GHz

DATA SHEET 6.1.3.2-60



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 109/00002
FREQ: 1G-8GHz SPEC: ANT. HT/POL: V
DETECT: PEAK ANTENNA: EUT POSITION:
DATE: 12/22/97 TEST SITE: ROOM 1 TESTER: JF

JA-1578-1



DATA SHEET 6.1.3.2-61



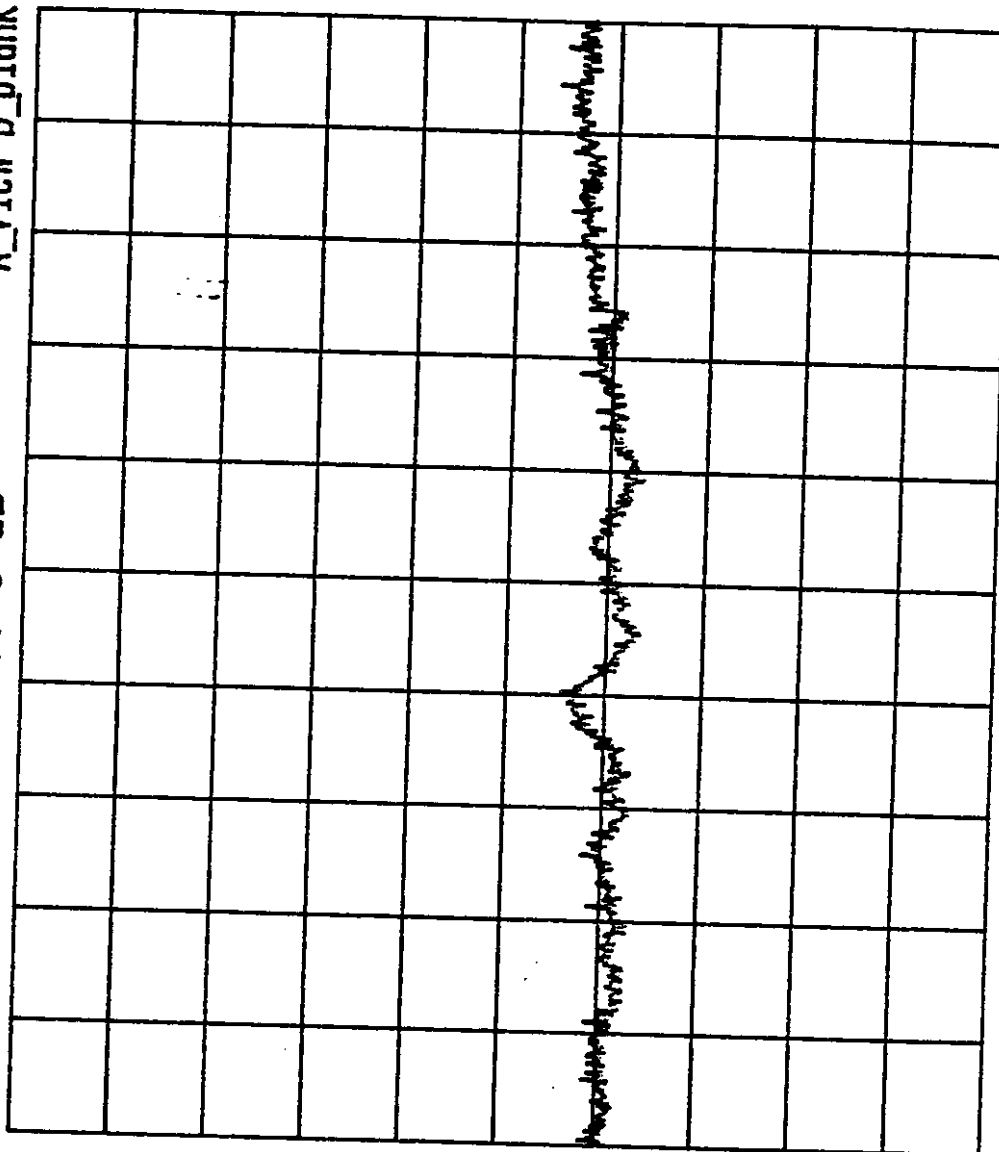
JA-1578-1

TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 109/00002
FREQ: 8G-18GHz SPEC: FCC ANT.HT/POL: H
DETECT: PEAK ANTENNA:
DATE: 12/22/91 TEST SITE: ROOM 1 EUT POSITION:
TESTER: J3

REF 97.0 dB μ V/m
10dB/

ATT 0 dB

A_view B_blank



RBW 1 MHz
VBW 1 MHz
SWP 150 ms

START 8.000 GHz

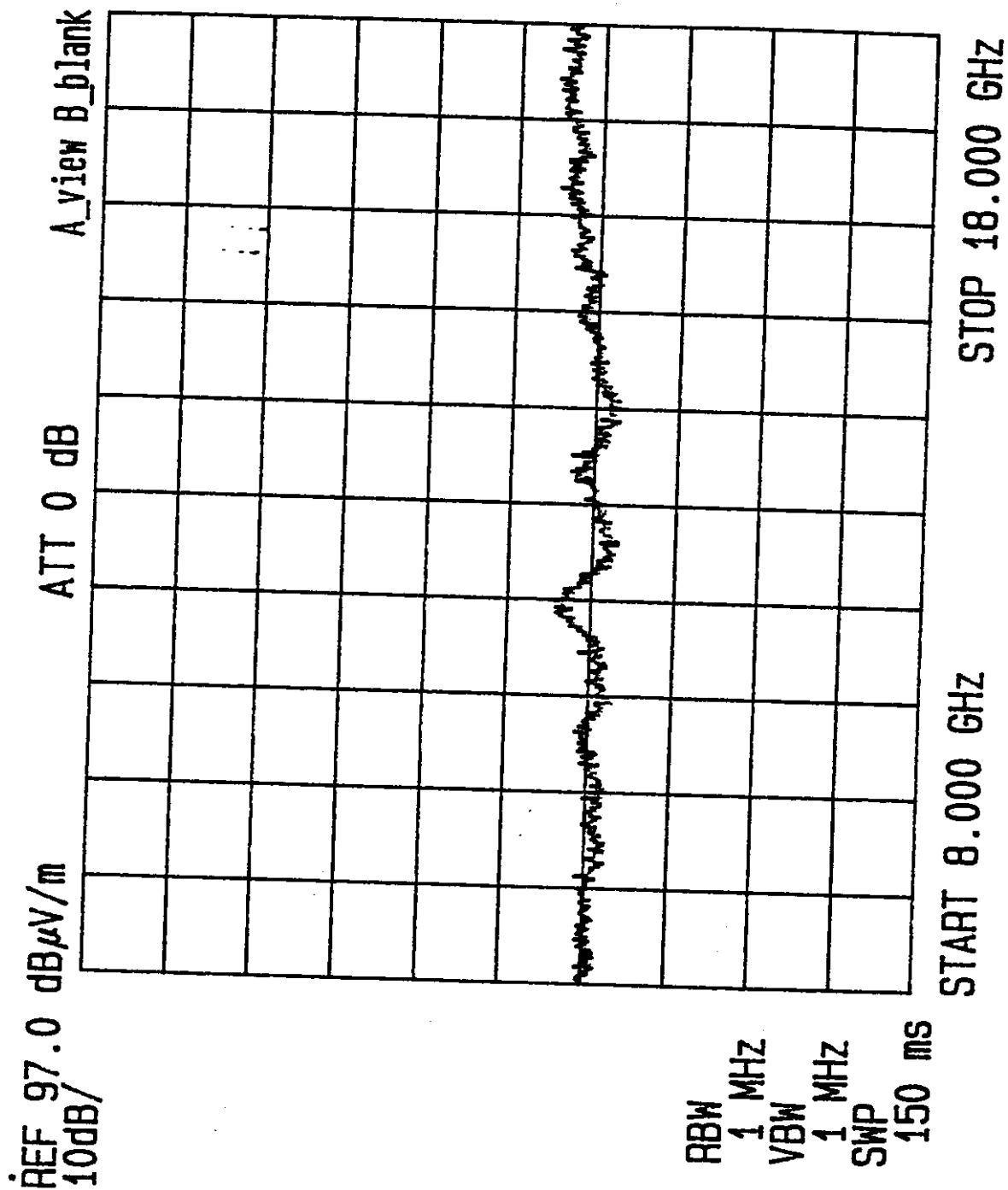
STOP 18.000 GHz

DATA SHEET 6.1.3.2-62



TEST: RAD. EMISSIONS EUT: P-COM HUB/38GHz ODU S/N: 109/00002
FREQ: 8G-18GHz SPEC: FCC ANT.HT/POL: V
DETECT: PEAK ANTENNA: EUT POSITION:
DATE: 12/21/28 TEST SITE: ROOM 1 TESTER: *[Signature]*

JA-1578-1



DATA SHEET 6.1.3.2-63