

**TECHNICAL MANUAL FOR  
ADVANCED ANTENNAS  
MICROWAVE HORN ANTENNA  
MWH-1826G  
18 - 26 GHz**



**Advanced Antennas**

ADVANCED ANTENNAS

10401 Roselle Street

San Diego, CA 92116

(800) 404-2832

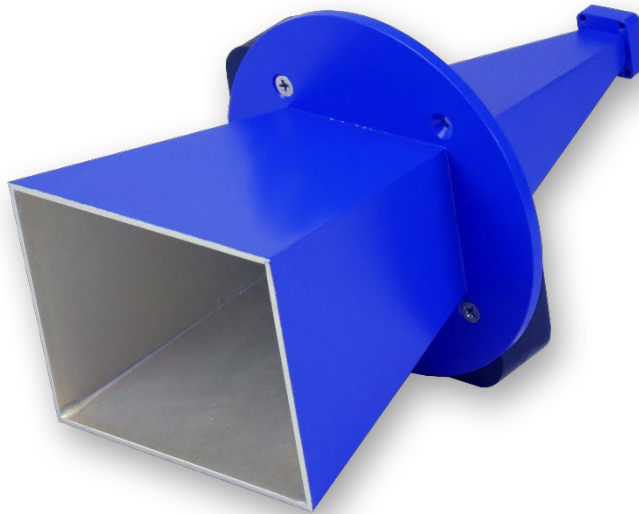
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## SECTION 1. GENERAL DESCRIPTION

The MWH-1826G is a linearly-polarized standard waveguide band Microwave Horn Antenna designed to transmit or receive in the frequency band from 18.0 GHz to 26.5 GHz with excellent VSWR, optimum antenna factor, high gain, uniform E-plane and H-plane radiation patterns, and medium transmit power capability. The antenna may be used with its typical antenna factor characteristic (see Figure 2-3) to make approximate field strength measurements. The MWH1826G outputs to a Type K Female connector on its waveguide transition, and it can handle 10 Watts CW. The antenna is suitable for EMC testing, direction finding, surveillance, and antenna gain and pattern measurements.

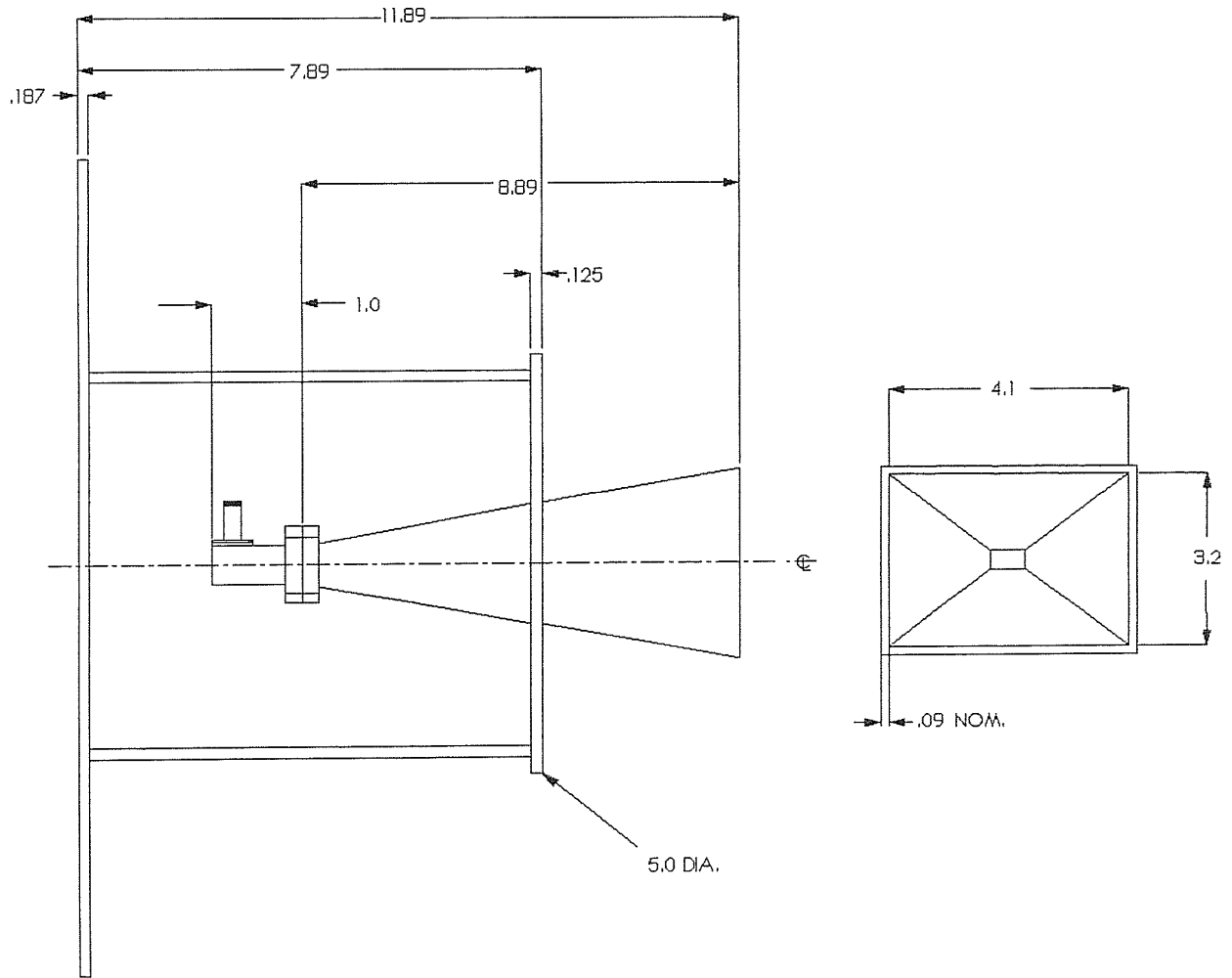
The MWH-1826G has the advantage of small size and light weight. The mounting plate includes a  $\text{Ø}5.50$ " B.C. of six  $\text{Ø}1/4$ " clearance holes and a  $\text{Ø}7.062$ " B.C. of eight  $\text{Ø}1/4$ " clearance holes, for mounting in various polarization planes (see Figure 1-4).



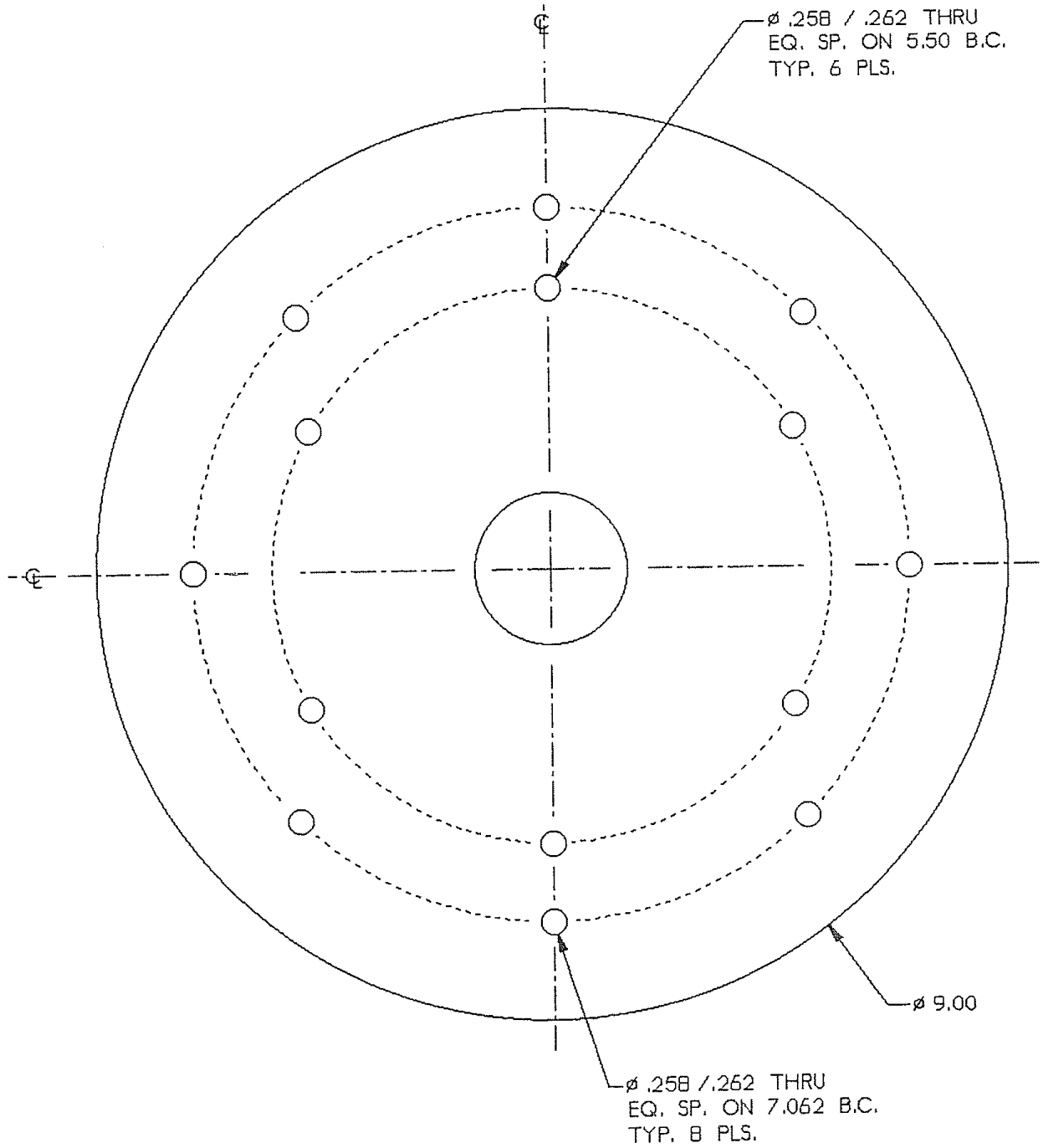
**Figure 1-1 The MWH-1826G (3/4 Side View)**



**Figure 1-2 The MWH-1826G (Front View)**



**Figure 1-3 MWH-1826G Outline**



**Figure 1-4 MWH-1826G Mounting Plate Outline**

## SECTION 2. TECHNICAL SPECIFICATIONS

### 2.1. Electrical Specifications

Frequency Range:	18.0 GHz to 26.5 GHz.
Polarization:	Linear.
Radiation Pattern:	Unidirectional Beam in E & H Planes (see Figures 2-4 to 221).
Impedance:	50 Ohms.
VSWR:	1.5 : 1 Typical (see Figure 2-1).
Gain:	23.5 dBi to 25.1 dBi Typical (see Figure 2-2).
Antenna Factor:	31.8 dB/m to 33.4 dB/m Typical (see Figure 2-3).
3 dB Beamwidth:	12° to 8° Nominal.
Waveguide Size:	WR-42.
Power Handling:	10 Watts CW.
Connector:	Type K Female.

## 2.2. Mechanical Specifications

### Aperture Dimensions:

Width: 4.1" (10.4 cm).

Height: 3.2" (8.1 cm).

Diagonal: 5.2" (13.2 cm).

### Overall Dimensions:

Length: 11.9" (30.2 cm).

Diameter: 9.0" (22.9 cm).

Weight: 2.5 lbs (1.1 kg).

Mounting: Mounting plate with a  $\text{Ø}5.50$ " B.C. of six  $\text{Ø}1/4$ " clearance holes  
AND a  $\text{Ø}7.062$ " B.C. of eight  $\text{Ø}1/4$ " clearance holes.

Material: Aluminum & Stainless Steel.

Finish: White Enamel & Gold Iridite.



### 2.3. Typical Data

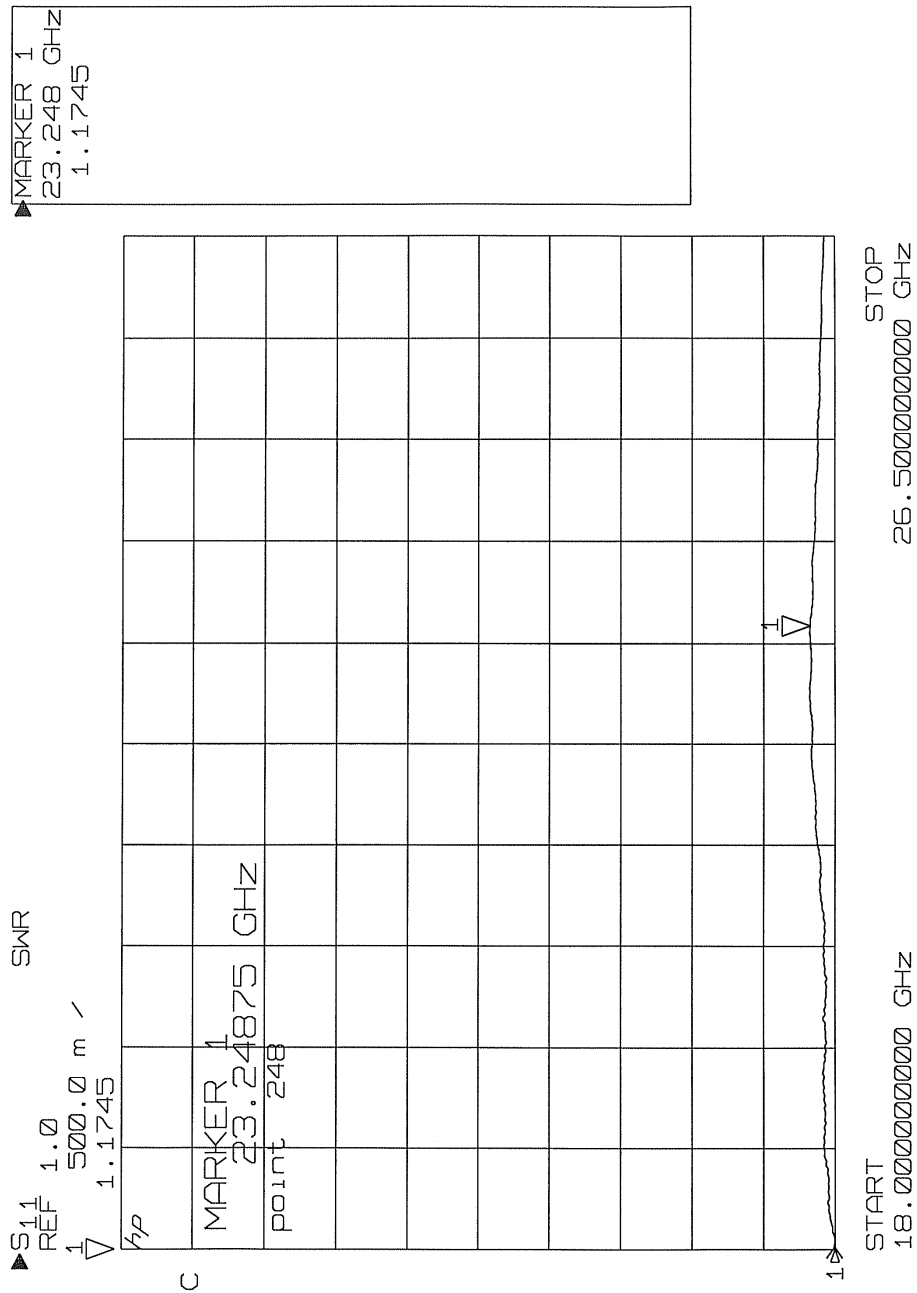
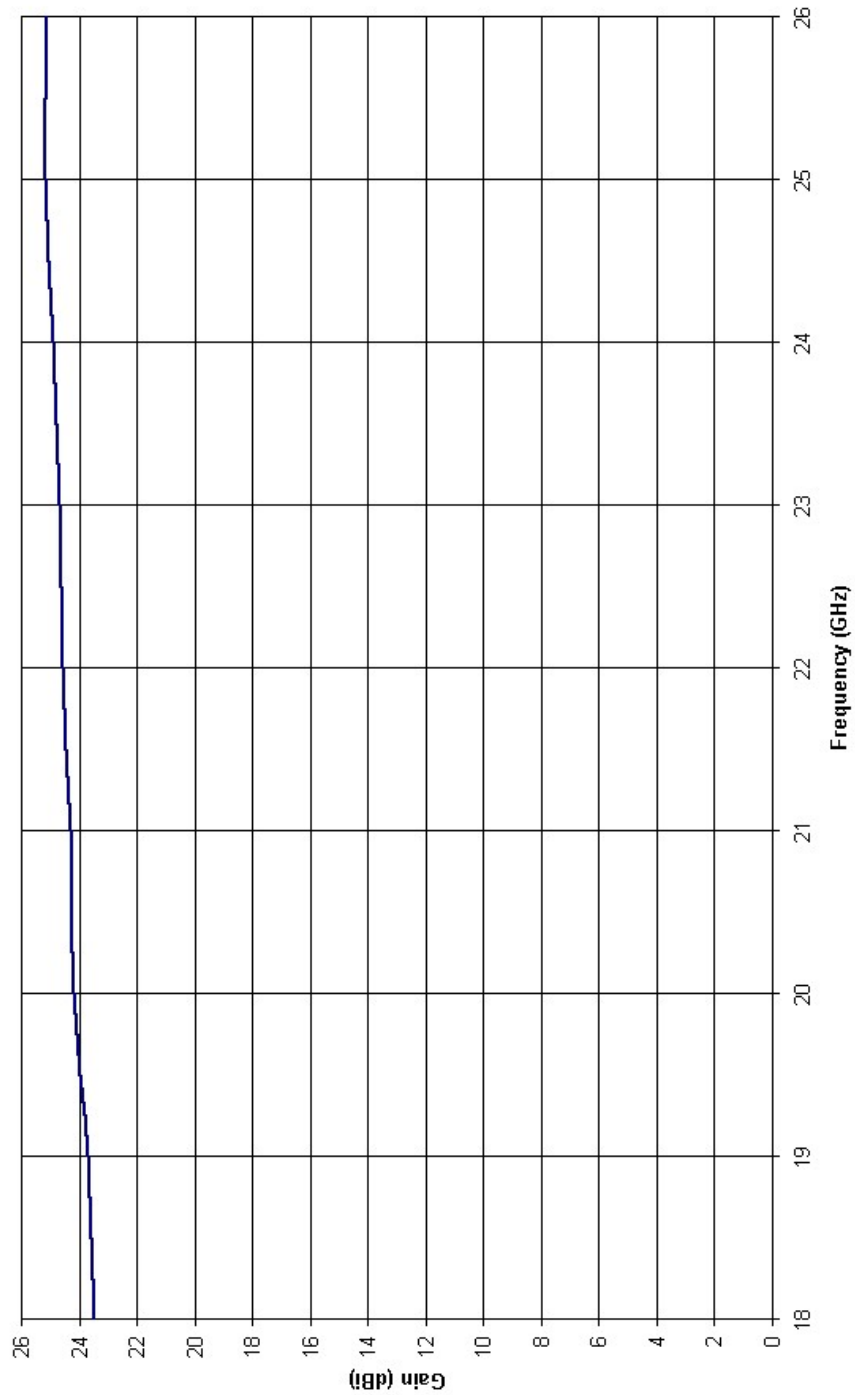


Figure 2-1 MWH-1826G Typical VSWR Plot



**Figure 2-2 MWH-1826G Typical Gain Plot**

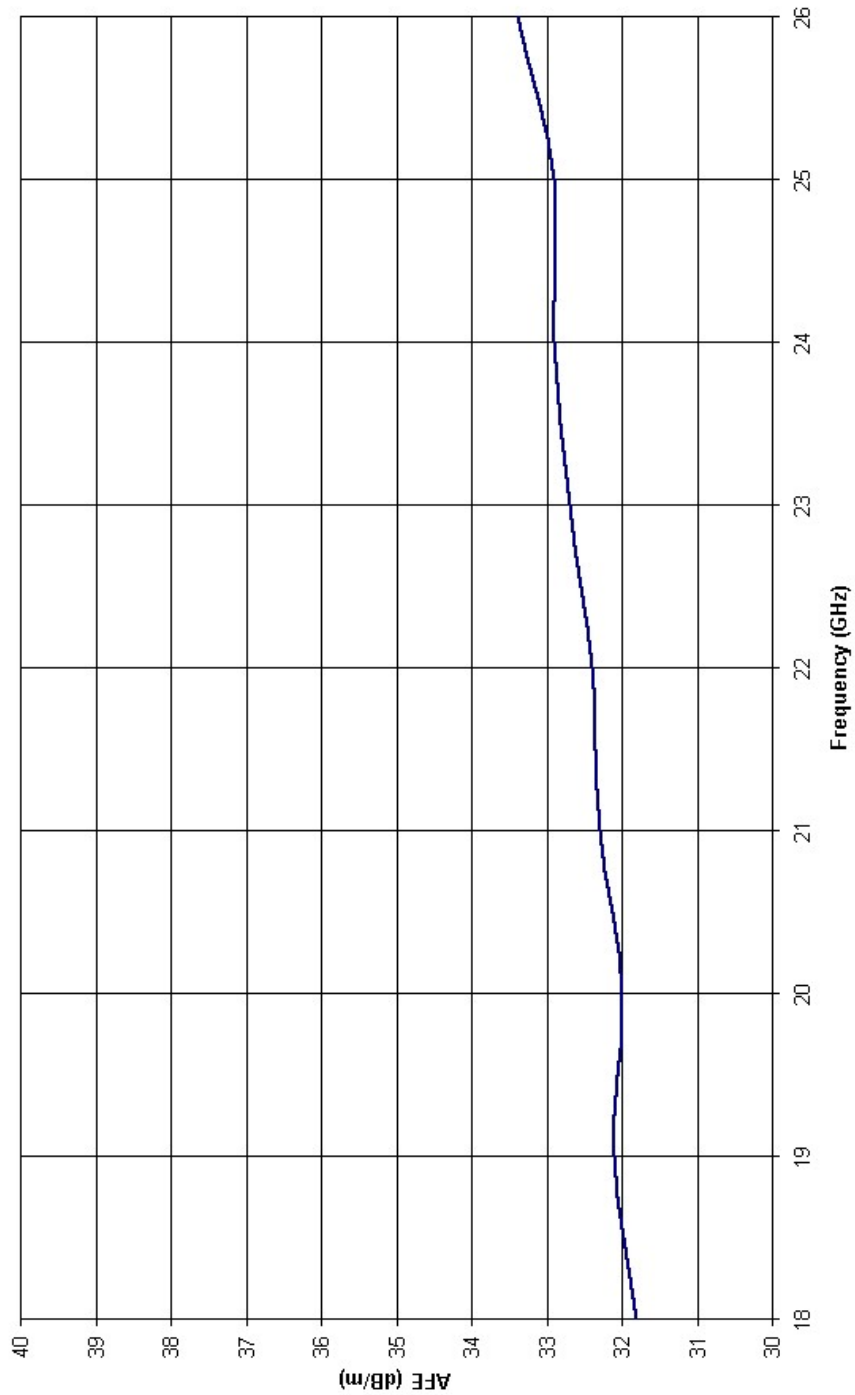


Figure 2-3 MWH-1826-G Typical Antenna Factor Plot

08/03/93 13:05:06  
PLOT: Channel 1  
Data: \_\_\_\_\_

FILENAME: 1826.010  
FREQ: 18.000 GHz  
POLARIZATION: Linear

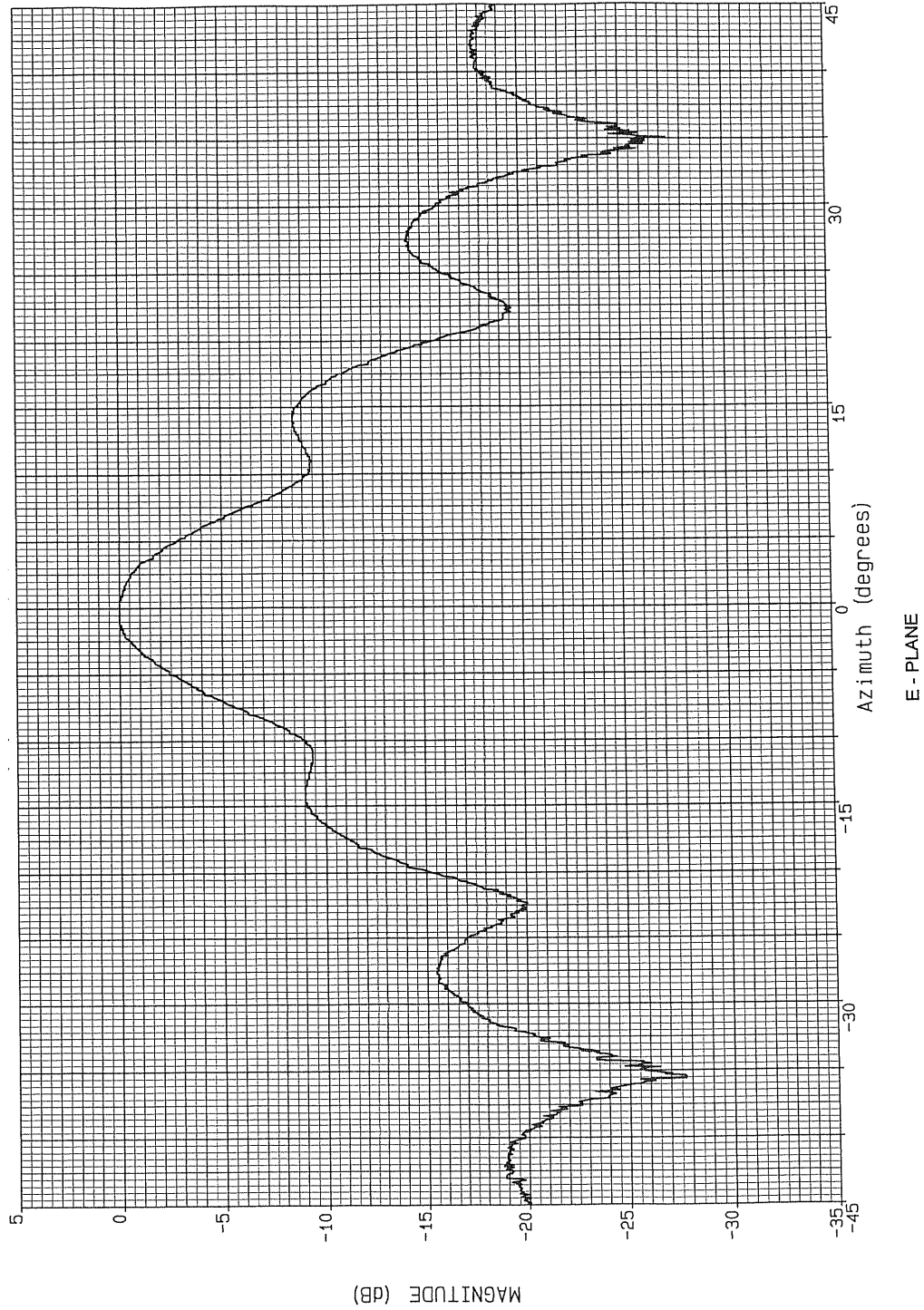


Figure 2-4 MWH-1826G Typical E-Plane Pattern Plot at 18.000 GHz

08/03/93 11:39:02  
PLOT: Channel 1  
Data: \_\_\_\_\_

FILENAME: 1826.001  
FREQ: 18.000 GHz  
POLARIZATION: Linear

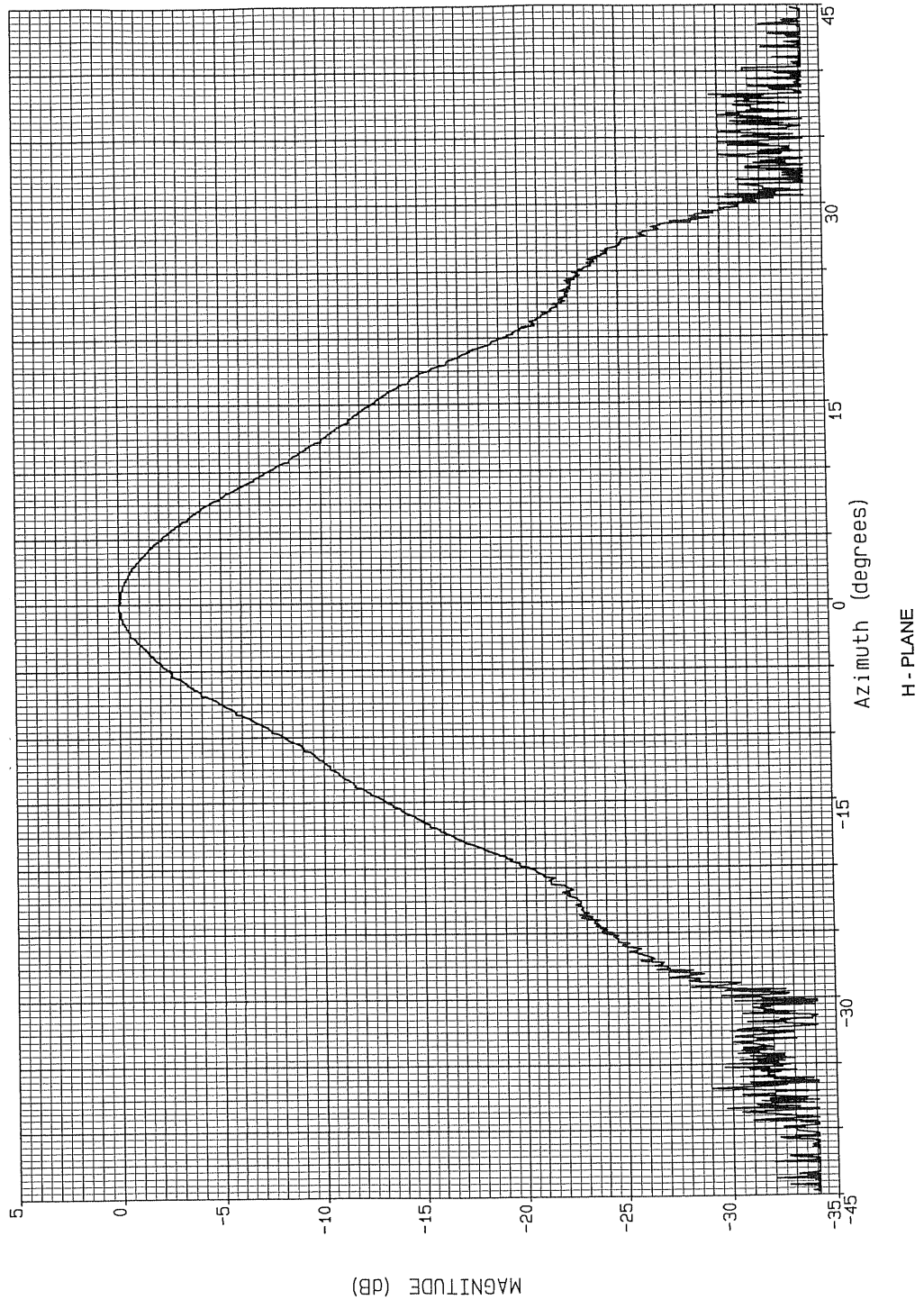


Figure 2-5 MWH-1826G Typical H-Plane Pattern Plot at 18.000 GHz

08/03/93 13:17:42  
PLOT: Channel 1  
Data: \_\_\_\_\_

FILENAME: 1826.011  
FREQ: 19.000 GHz  
POLARIZATION: Linear

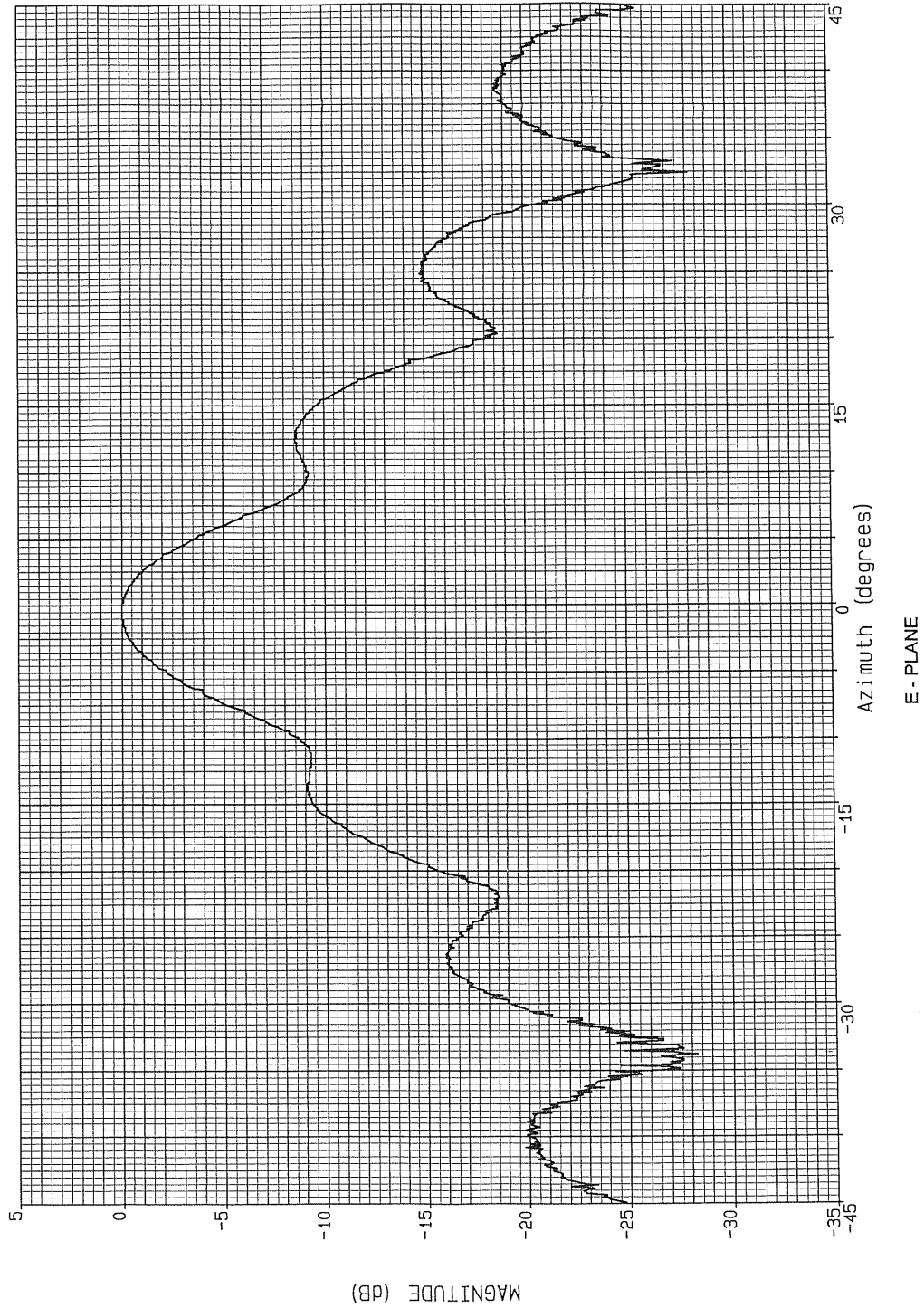


Figure 2-6 MWH-1826G Typical E-Plane Pattern Plot at 19.000 GHz

08/03/93 11:39:38  
PLOT: Channel 1  
Data: \_\_\_\_\_

FILENAME: 1826.002  
FREQ: 19.000 GHz  
POLARIZATION: Linear

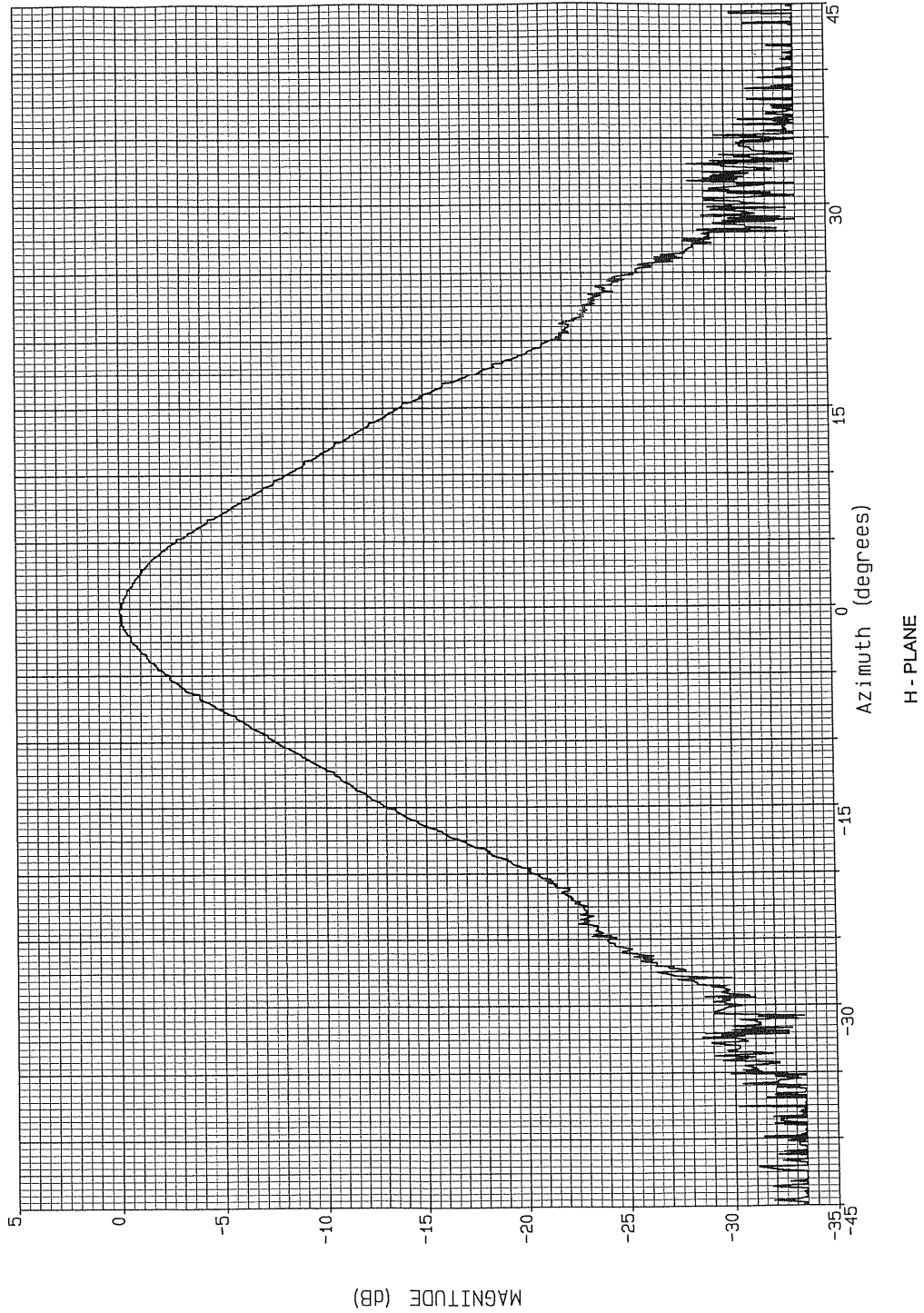


Figure 2-7 MWH-1826G Typical H-Plane Pattern Plot at 19.000 GHz

08/03/93 13:18:24  
PLOT: Channel 1  
Data: \_\_\_\_\_

FILENAME: 1826.012  
FREQ: 20.000 GHz  
POLARIZATION: Linear

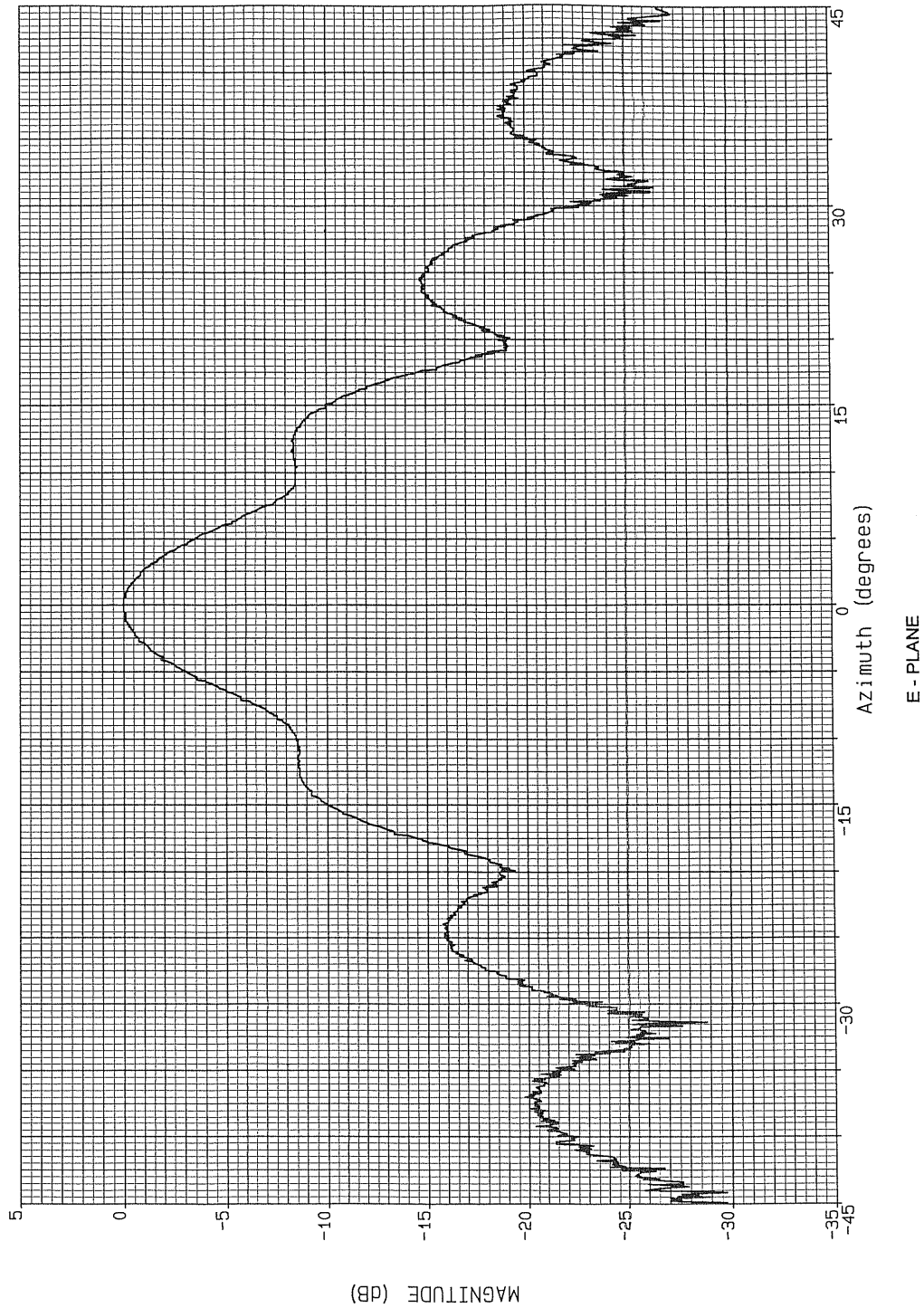


Figure 2-8 MWH-1826G Typical E-Plane Pattern Plot at 20.000 GHz



08/03/93 11:40:21  
PLOT: Channel 1  
Data: \_\_\_\_\_

FILENAME: 1826.003  
FREQ: 20.000 GHZ  
POLARIZATION: Linear

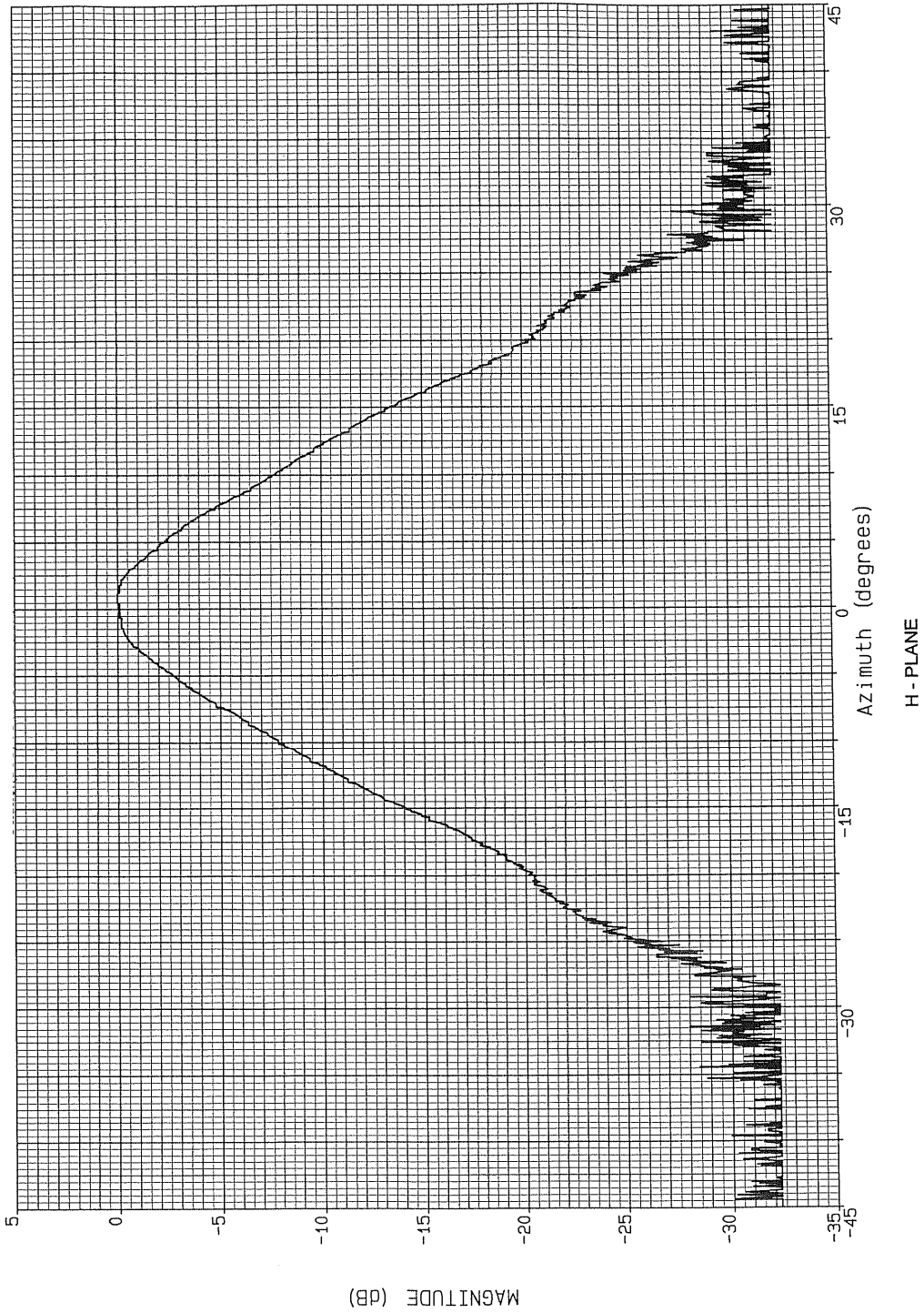


Figure 2-9 MWH-1826G Typical H-Plane Pattern Plot at 20.000 GHz

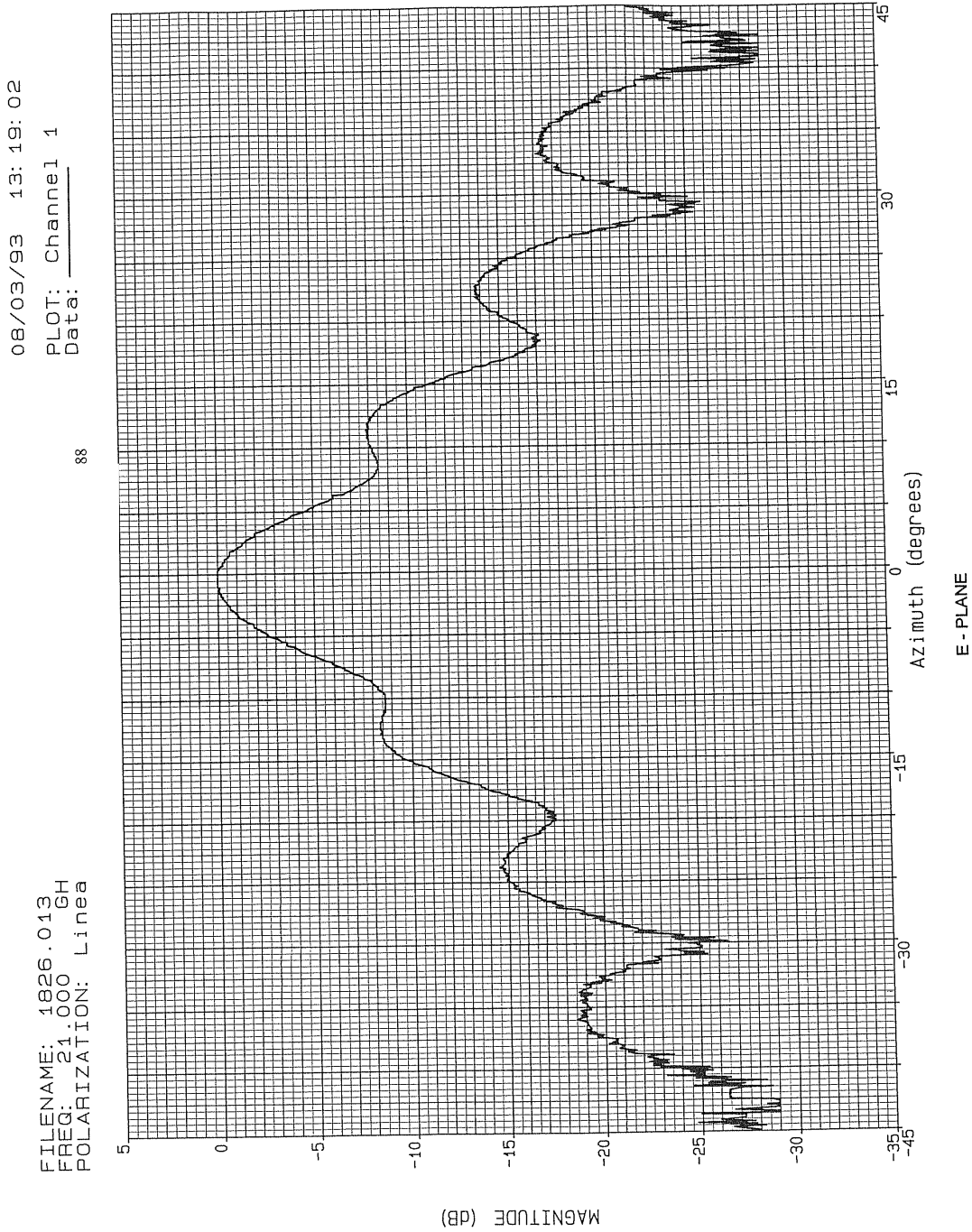


Figure 2-10 MWH-1826G Typical E-Plane Pattern Plot at 21.000 GHz

08/03/93 11:41:07  
PLOT: Channel 1  
Data: \_\_\_\_\_

FILENAME: 1826.004  
FREQ: 21.000 GHz  
POLARIZATION: Linear

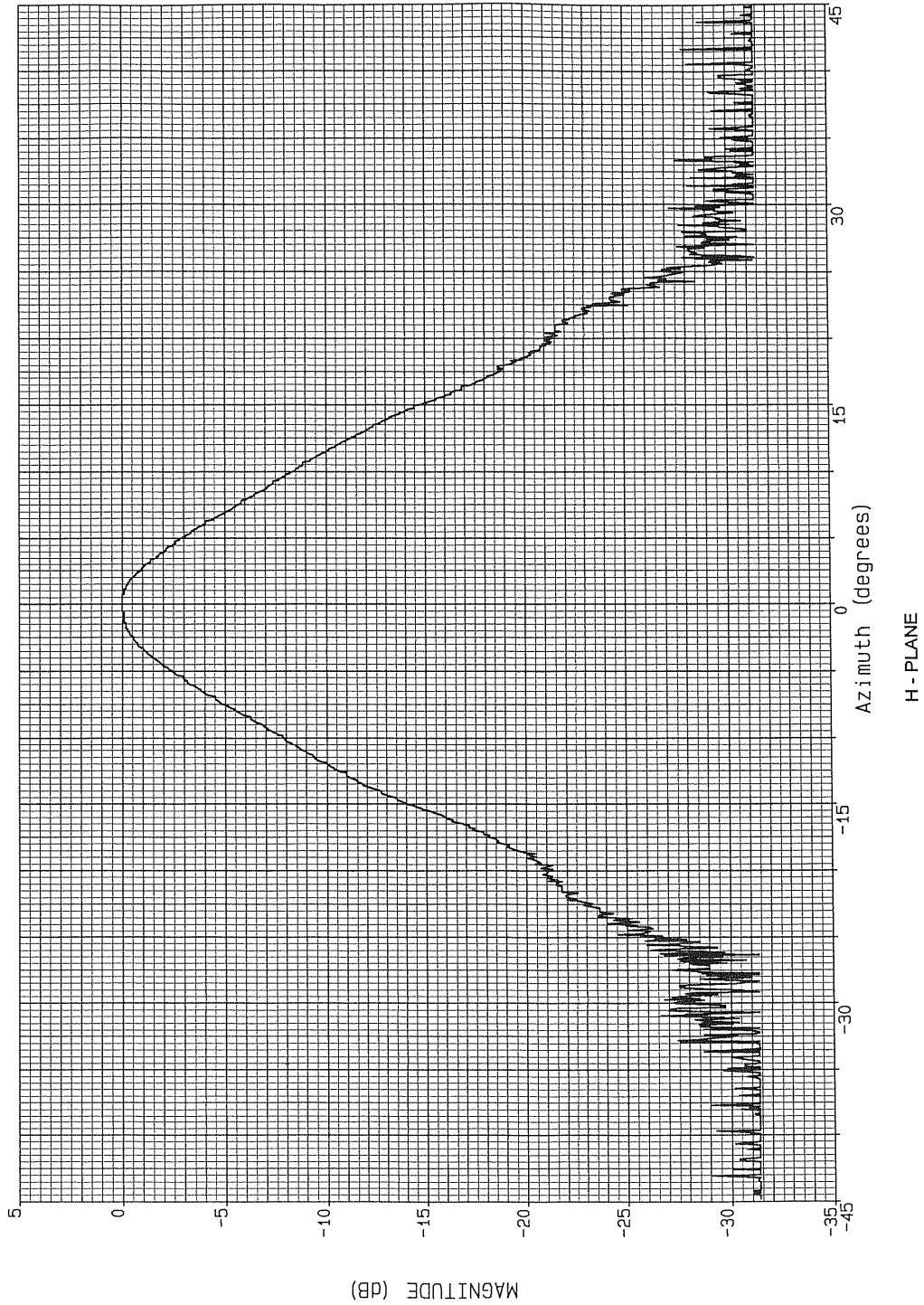


Figure 2-11 MWH-1826G Typical H-Plane Pattern Plot at 21.000 GHz

08/03/93 13:19:43

PLOT: Channel 1  
Data: \_\_\_\_\_

FILENAME: 1826.014  
FREQ: 22.000 GHz  
POLARIZATION: Linear

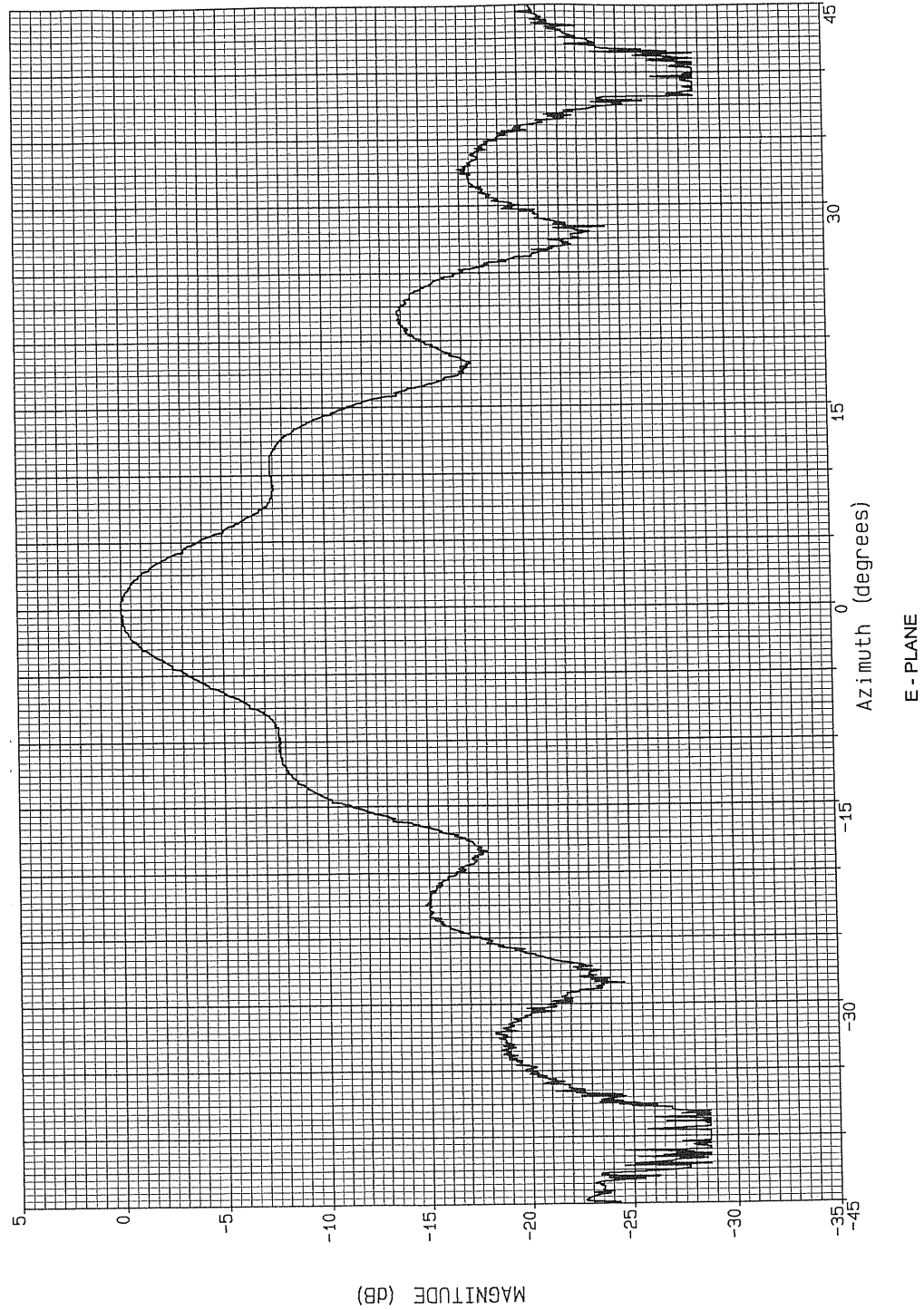


Figure 2-12 MWH-1826G Typical E-Plane Pattern Plot at 22.000 GHz

08/03/93 11:41:48  
PLOT: Channel 1  
Data: \_\_\_\_\_

FILENAME: 1826.005  
FREQ: 22.000 GHz  
POLARIZATION: Linear

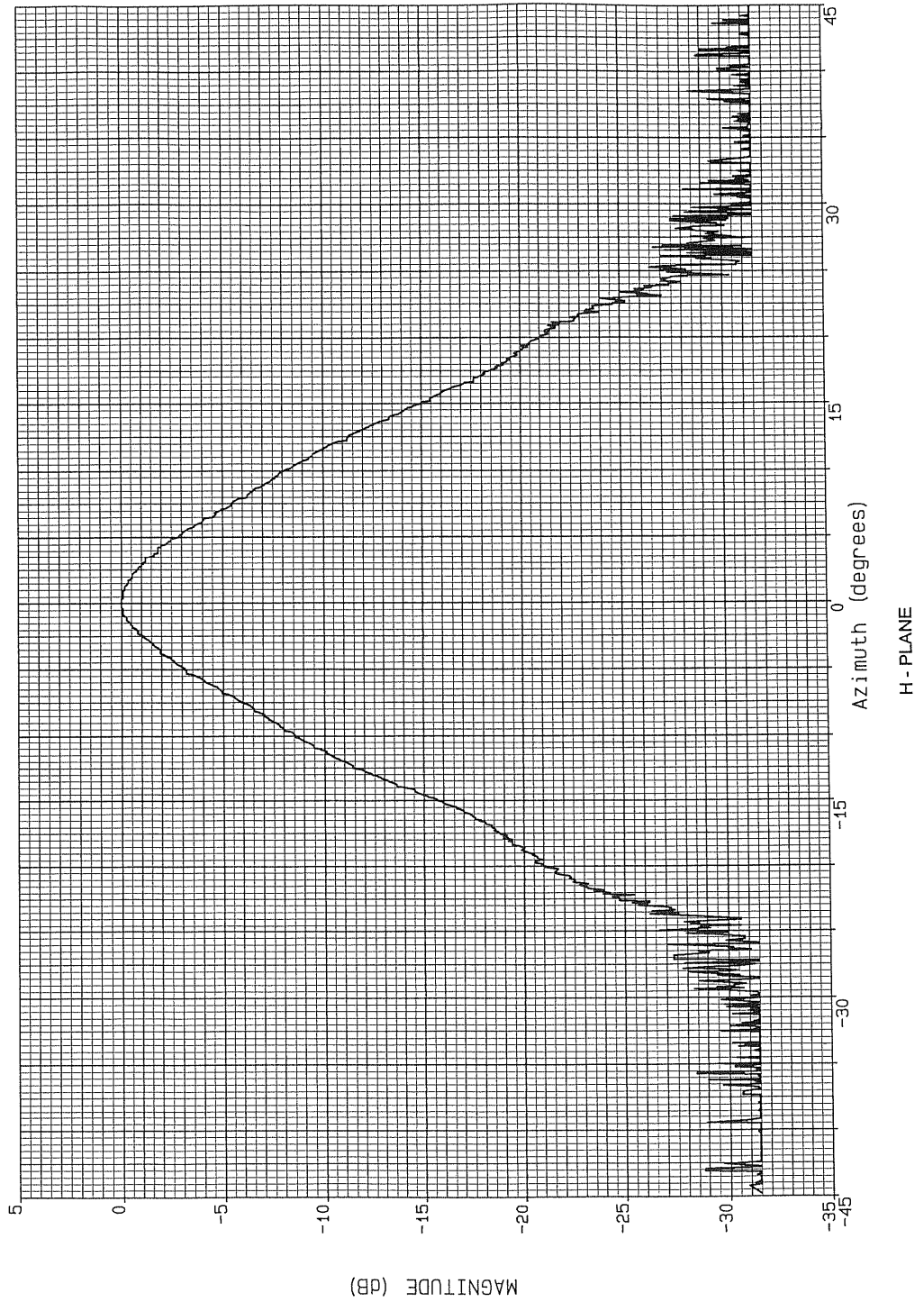


Figure 2-13 MWH-1826G Typical H-Plane Pattern Plot at 22.000 GHz

08/03/93 13: 20: 21  
PLOT: Channel 1  
Data: \_\_\_\_\_

FILENAME: 1826.015  
FREQ: 23.000 GHz  
POLARIZATION: Linear

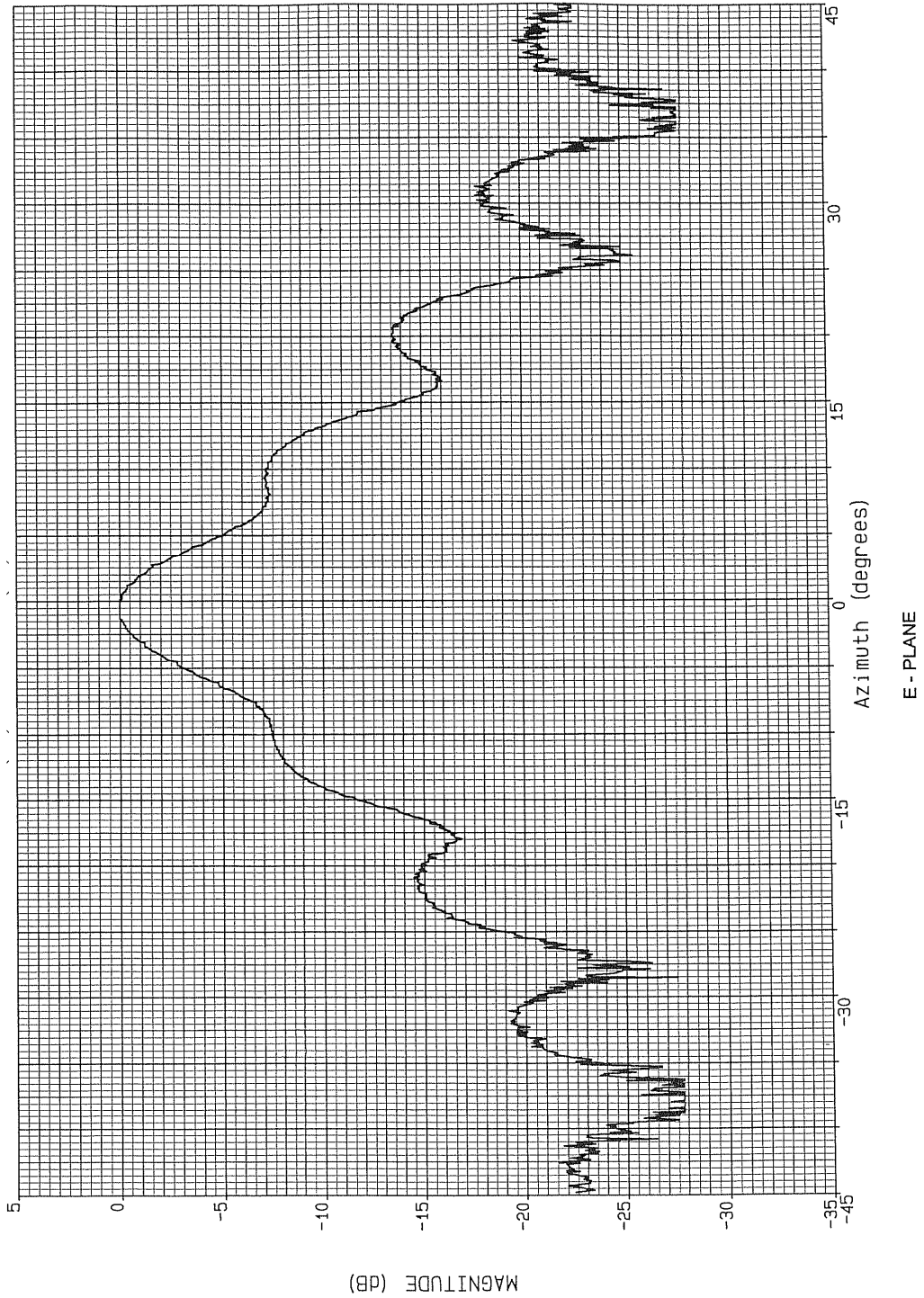


Figure 2-14 MWH-1826G Typical E-Plane Pattern Plot at 23.000 GHz

08/03/93 11:42:34

PLOT: Channel 1  
Data: \_\_\_\_\_

FILENAME: 1826.006  
FREQ: 23.000 GHz  
POLARIZATION: Linear

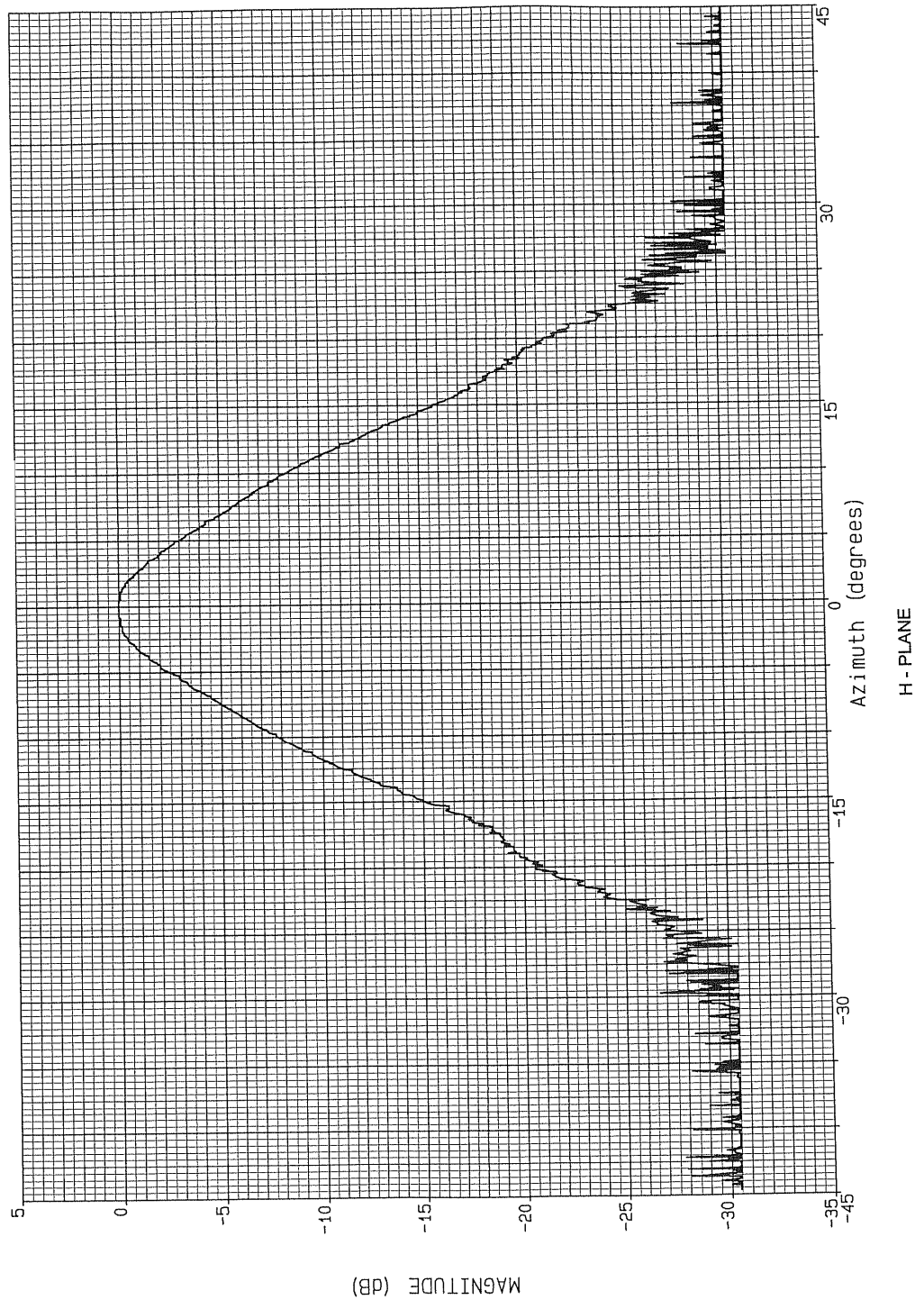


Figure 2-15 MWH-1826G Typical H-Plane Pattern Plot at 23.000 GHz

08/03/93 13:20:56  
PLOT: Channel 1  
Data: \_\_\_\_\_

FILENAME: 1826.016  
FREQ: 24.000 GHz  
POLARIZATION: Linear

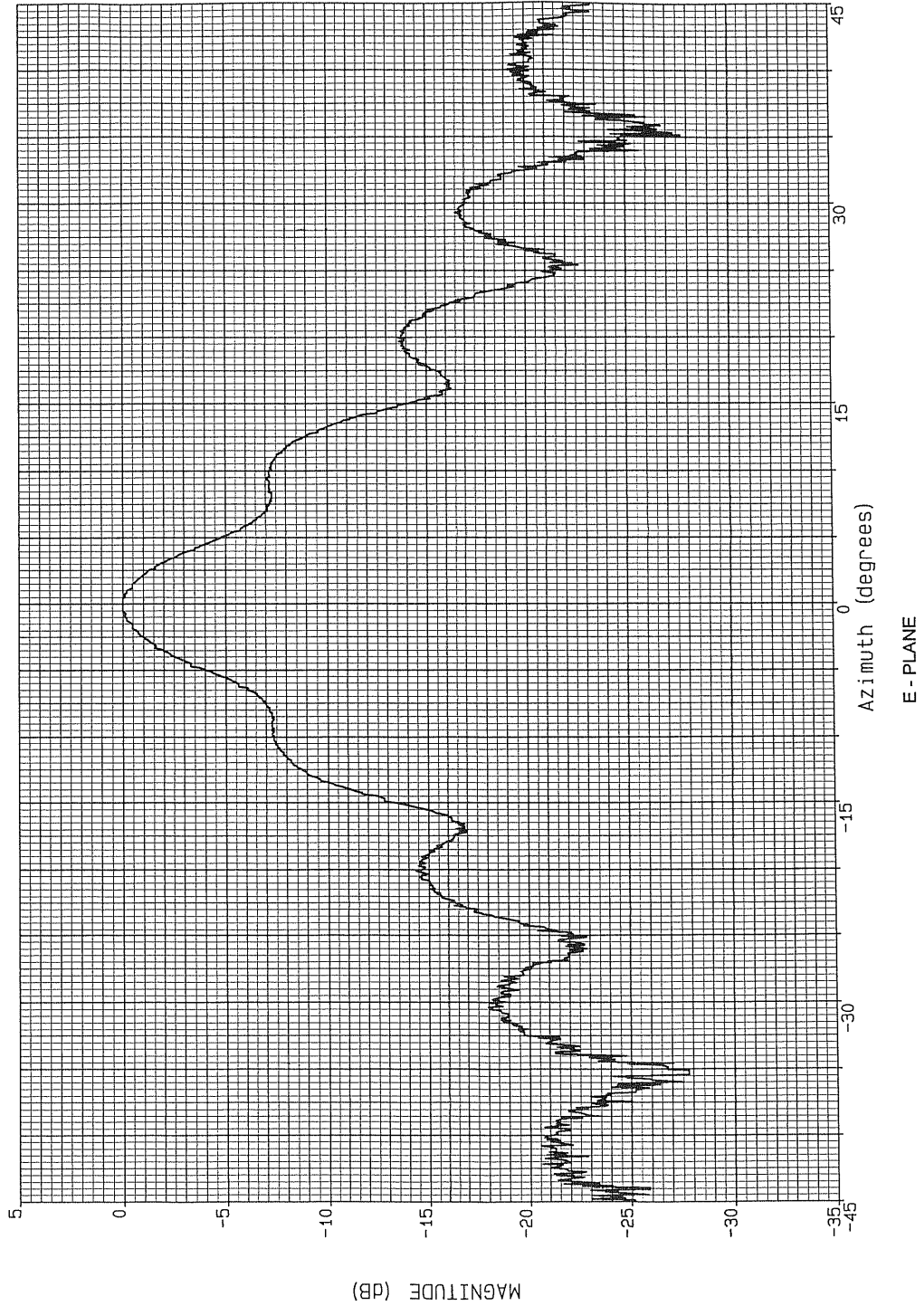


Figure 2-16 MWH-1826G Typical E-Plane Pattern Plot at 24.000 GHz



08/03/93 11:43:02

PLOT: Channel 1  
Data: \_\_\_\_\_

FILENAME: 1826.007  
FREQ: 24.000 GHz  
POLARIZATION: Linear

38

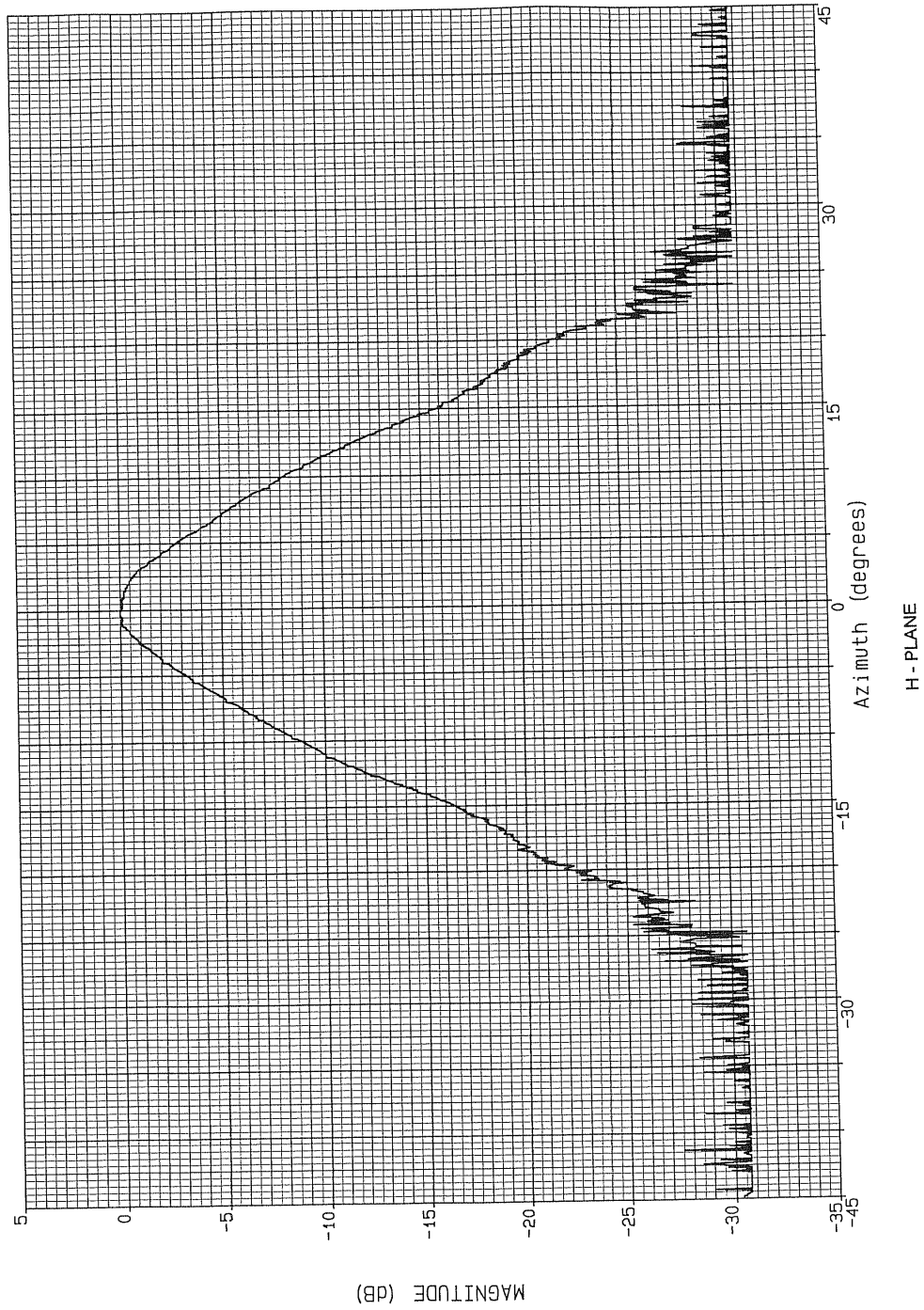


Figure 2-17 MWH-1826G Typical H-Plane Pattern Plot at 24.000 GHz

08/03/93 13:24:12  
PLOT: Channel 1  
Data: \_\_\_\_\_

FILENAME: 1826.017  
FREQ: 25.000 GHz  
POLARIZATION: Linear

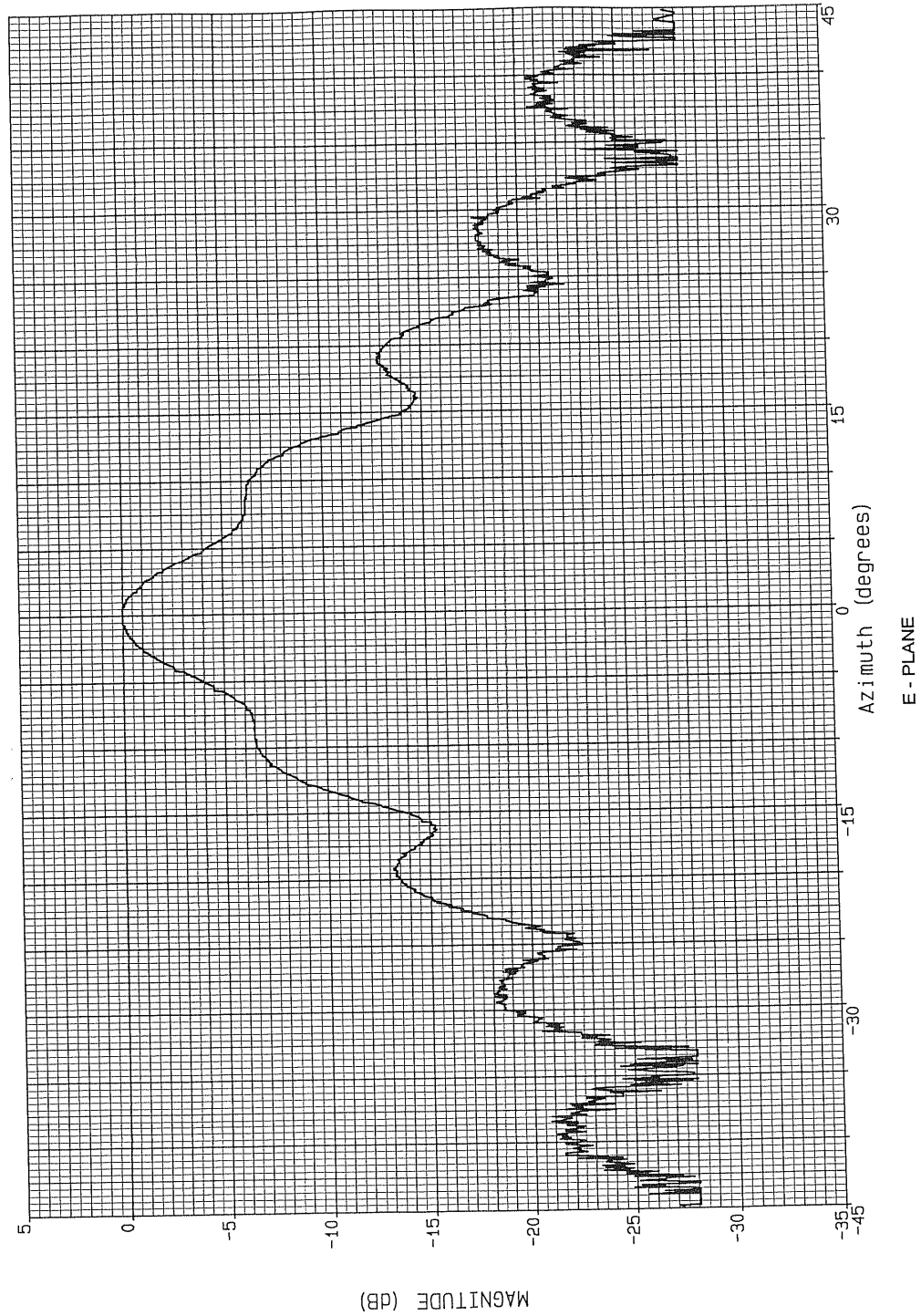


Figure 2-18 MWH-1826G Typical E-Plane Pattern Plot at 25.000 GHz

08/03/93 11:43:31  
PLOT: Channel 1  
Data: \_\_\_\_\_

FILENAME: 1826.008  
FREQ: 25.000 GHz  
POLARIZATION: Linear

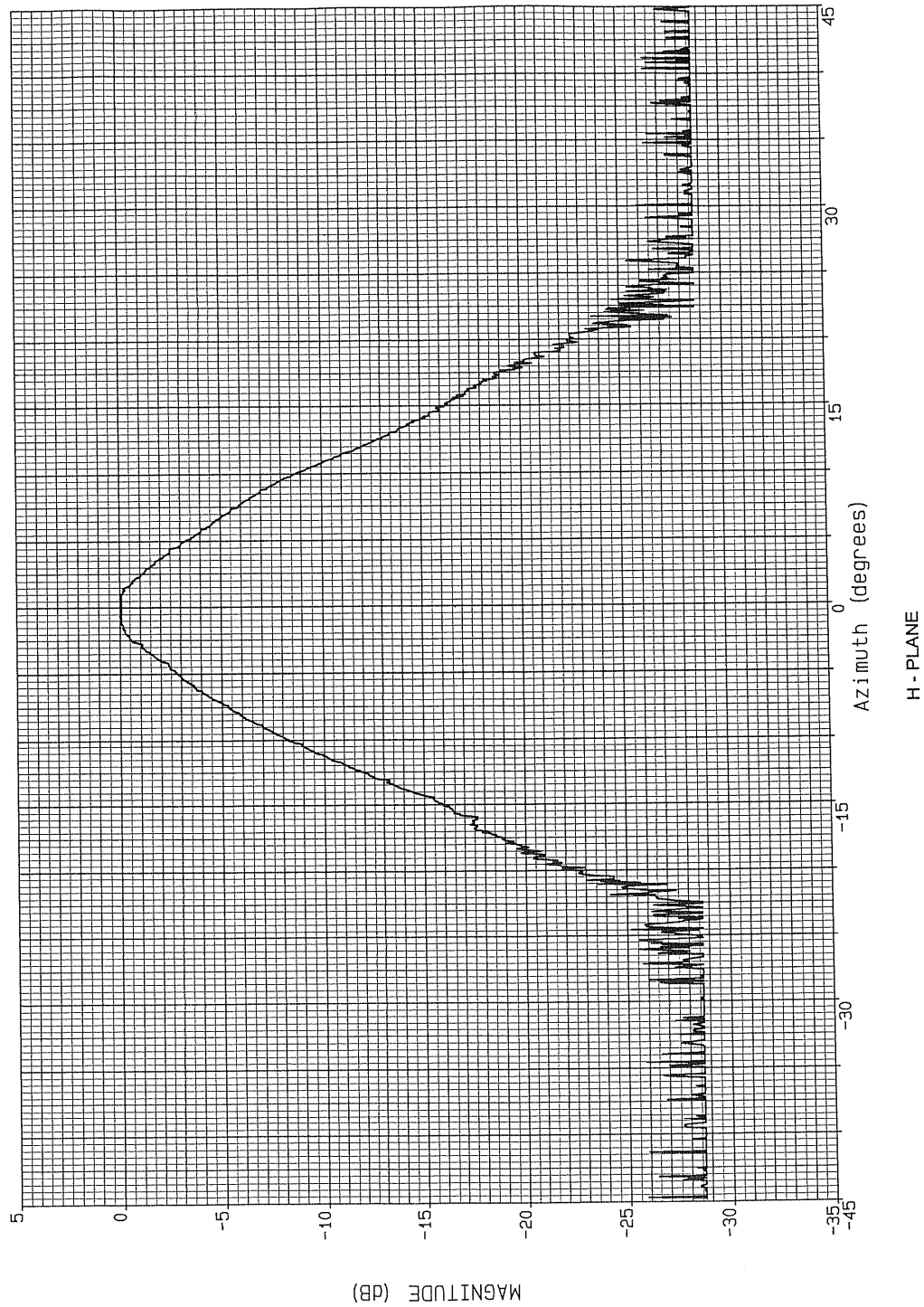


Figure 2-19 MWH-1826G Typical H-Plane Pattern Plot at 25.000 GHz

08/03/93 13:25:15  
PLOT: Channel 1  
Data: \_\_\_\_\_

FILENAME: 1826.018  
FREQ: 26.000 GHz  
POLARIZATION: Linear

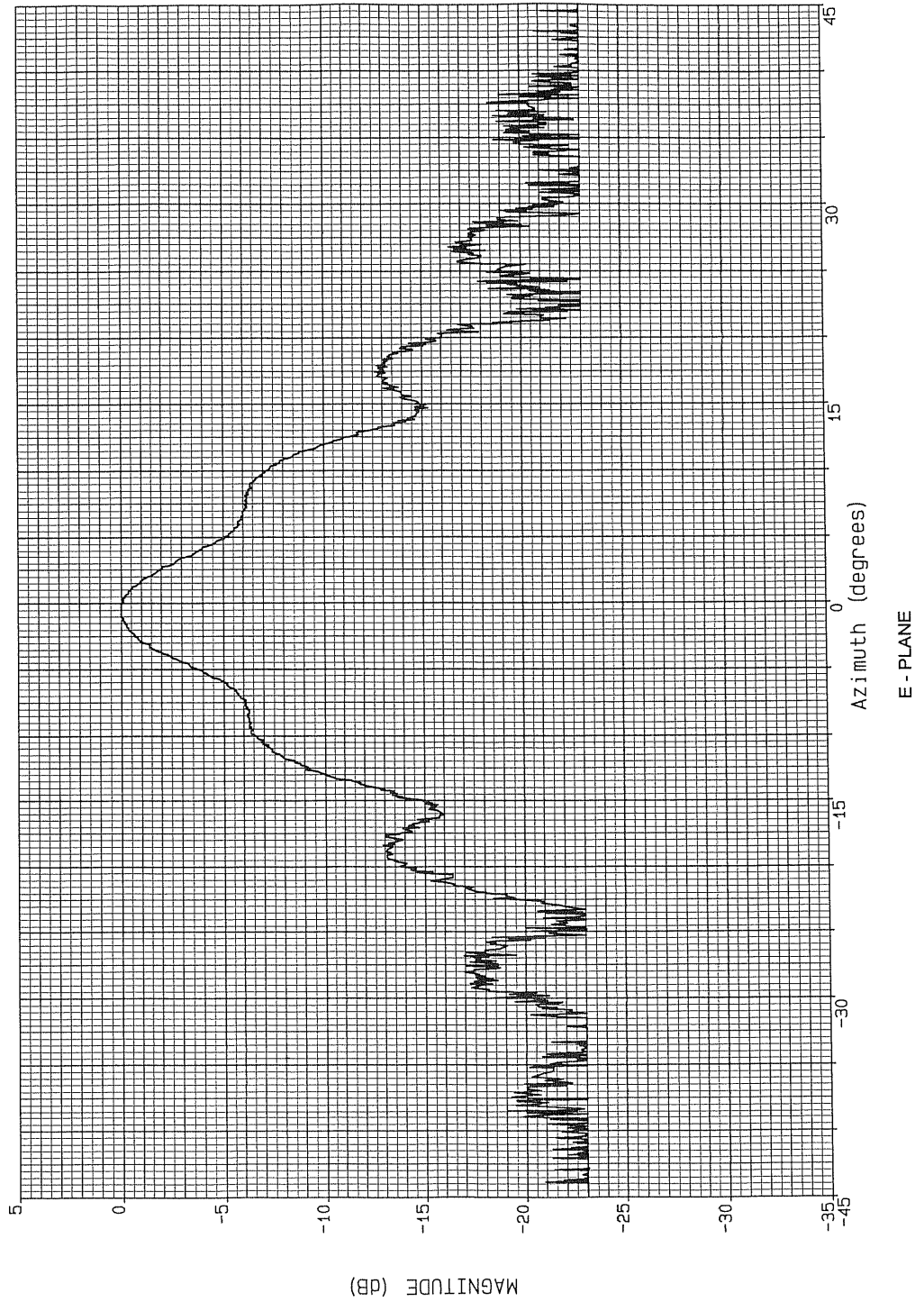


Figure 2-20 MWH-1826G Typical E-Plane Pattern Plot at 26.000 GHz

08/03/93 11:43:59  
PLOT: Channel 1  
Data: \_\_\_\_\_

FILENAME: 1826.009  
FREQ: 26.000 GHz  
POLARIZATION: Linear

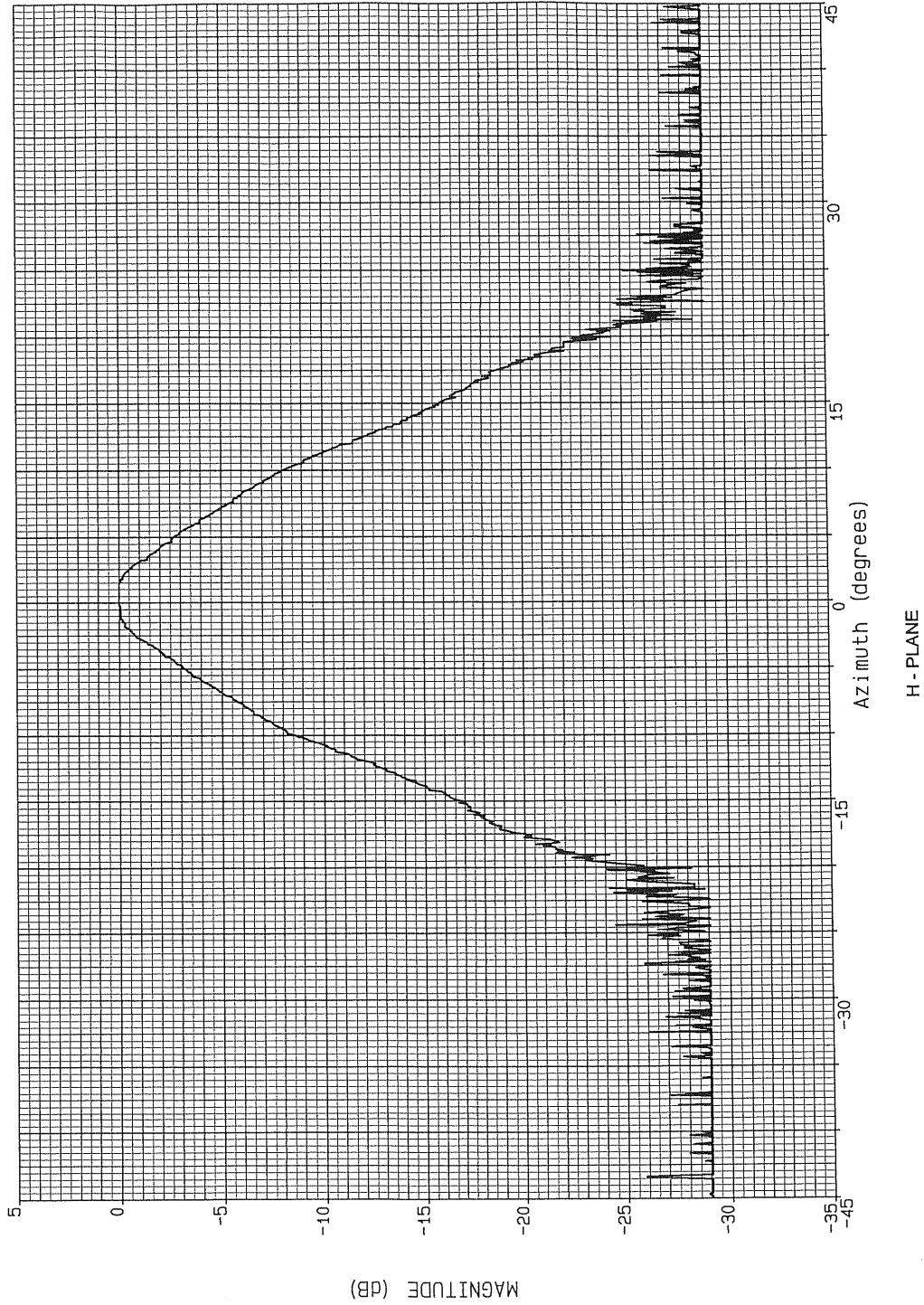


Figure 2-21 MWH-1826G Typical H-Plane Pattern Plot at 26.000 GHz

## SECTION 3. THEORY

### 3.1. General

The MWH-1826G is a linearly-polarized standard waveguide band Microwave Horn Antenna designed to transmit or receive in the frequency band from 18.0 GHz to 26.5 GHz with excellent VSWR, optimum antenna factor, high gain, uniform E-plane and H-plane radiation patterns, and medium transmit power capability. The MWH-1826G outputs to a Type K Female connector on its waveguide transition, and it can handle 10 Watts CW. The antenna is suitable for EMC testing, direction finding, surveillance, and antenna gain and pattern measurements.

### 3.2. Field Measurement

The Power gain  $G$ , relative to an isotropic antenna, and the E-Field antenna factor  $A_{FE}$  are related by

$$A_{FE} \text{ (dB/m)} = 20 \cdot \log_{10} f - G \text{ (dBi)} - 29.78 \text{ (Equation 3-1)}$$

where  $f$  is frequency in MHz. The E-field antenna factor is the ratio of the incident E-field in volts/meter to output voltage  $V_O$  of the antenna across a termination resistor of stated value. The formula given above is valid only for a 50 Ohm termination.

Individually calibrated Antenna Factor curves can be provided as an option and can be used to measure electric field strengths. To measure the electric field strength, first set up the antenna (see Section 4). The incident electric field strength seen by the antenna, denoted by  $E$ , is then determined from the voltage level  $V_O$  at the receiver (when the output connector of the antenna is matched to 50 Ohms). These two quantities are related through the frequency-dependent electric field antenna factor ( $A_{FE}$ ) by

$$E \text{ (V/M)} = A_{FE} \text{ (1/m)} \times V_O \text{ (V)}. \text{ (Equation 3-2)}$$

Converting Equation 3-2 into decibel form gives

$$E \text{ (dB V/m)} = A_{FE} \text{ (dB/m)} + V_O \text{ (dB V)}. \text{ (Equation 3-3)}$$

## **SECTION 4. SETUP & OPERATION**

### **4.1. Setup**

The MWH-1826G, by itself, requires no assembly. Mount the MWH-1826G to a tripod or flat surface, in the desired polarization, using the Ø5.50" B.C. of six Ø1/4" clearance holes or the Ø7.062" B.C. of eight Ø1/4" clearance holes included on the mounting plate (see Figure 1-4). Connect the RF connector of the MWH-1826G (Type K Female) to the receiver, transmitter, or test equipment using an appropriate coaxial cable. The antenna is then ready for use. For field measurement instructions, see Section 3.2.

### **4.2. Factors Affecting Operation**

Factors affecting the antenna operation include:

- the distance between the antenna and the source or receiving system,
- the orientation of the horn polarization with respect to the desired polarization,
- the position of the antenna with respect to any large conducting objects, and
- the background noise of the environment.

## **SECTION 5. MAINTENANCE**

Little or no maintenance will be required if care is exercised in handling the system. The antenna itself is fabricated of aluminum, which can dent or scratch if handled in a rough manner, or otherwise abused. However, it should be recognized that small dents and scratches usually do not alter the performance of the antenna. It is recommended to periodically clean the inside of the horn aperture with compressed air.

If the antenna fails to provide satisfactory performance, it is recommended that it should be returned to Advanced Antennas for service. Address requests for replacement parts or service to:

ADVANCED ANTENNAS

10401 Roselle Street

San Diego, CA 92121

(800) 404-2832



## SECTION 6. REPLACEABLE PARTS LIST

Customers should place orders directly to Advanced Antennas. When placing orders, please include the following information: Model Number, Part Number, Serial Number, Color, and Description of the item.

Example:	Model Number:	MWH-1826G
	Part Number:	AA-MWH-1826G
	Serial Number:	000
	Color:	White
	Description:	MICROWAVE HORN ANTENNA, 18.0 GHz TO 26.5 GHz

There are no field-replaceable parts for the MWH-1826G. Any damage that may occur to the unit will require returning the unit to Advanced Antennas for servicing. All assembly hardware is American Standard for Unified Screw Threads.

<b>Part Number</b>	<b>Description</b>
AA-MWH-1826G	MICROWAVE HORN ANTENNA, 18.0 GHz TO 26.5 GHz

**Table 6-1 MWH-1826G Replaceable Parts List**

## WARRANTY

All equipment manufactured by **Advanced Antennas** is warranted against defects in materials and workmanship for a period of one year from the date of shipment. **Advanced Antennas** will repair or replace any defective item or material if notified within the warranty period.

You will not be charged for warranty services performed at our factory. You must, however, prepay inbound shipping costs. This warranty does not apply to:

- a) Products damaged during shipment EX-WORKS our plant
- b) Products which have been improperly installed
- c) Products which have been improperly used (operated outside the specification)
- d) Products which have been improperly maintained
- e) Consumable items such as batteries, lamps, fuses, customer replaceable solid-state components, etc.
- f) Products which have been modified
- g) Normal wear of materials
- h) Calibration of products

Any warranties or guarantees, whether expressed or implied, that are not specifically set forth herein, will not be considered applicable to any equipment sold or otherwise furnished by **Advanced Antennas**. Under no circumstances does **Advanced Antennas** recognize or assume any liability for any loss, damage or expense arising either directly or indirectly from the use or handling of products manufactured by **Advanced Antennas**, or any inability to use them separately or in combination with other equipment or materials.

The warranty is void if items are shipped outside the U.S.A. without prior knowledge of **Advanced Antennas**.

A return authorization is required for repairs under warranty. Please contact **Advanced Antennas** for additional information.

TM-1826G-042020