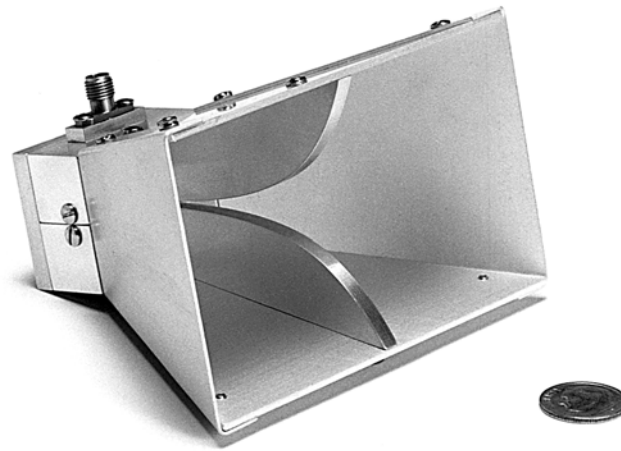


*Model 3116*

# **Double-Ridged Waveguide Horn**

**User Manual**



 **ETS-LINDGREN**<sup>™</sup>  
An ESCO Technologies Company

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**Revision Record | MANUAL 3116 | Part #399040, Rev. F**

<b>Revision</b>	<b>Description</b>	<b>Date</b>
A	Initial Release	April, 1997
B–E	Updates/edits	November, 1997 November, 2000 March, 2002
F	Updated Physical Specifications; rebrand	May, 2010


# Table of Contents

<b>Notes, Cautions, and Warnings</b> .....	<b>v</b>
<b>1.0 Introduction</b> .....	<b>7</b>
Tripod Options .....	8
ETS-Lindgren Product Information Bulletin .....	9
<b>2.0 Maintenance</b> .....	<b>11</b>
Annual Calibration .....	11
Service Procedures .....	11
<b>3.0 Specifications</b> .....	<b>13</b>
Electrical Specifications .....	13
Physical Specifications .....	13
<b>4.0 Mounting Instructions</b> .....	<b>15</b>
Using Included Mounting Adapters to Mount to a 4-TR.....	15
View of Mounting Bracket Attached to Model 3116.....	16
Attaching the Mounting Bracket to the Model 3116.....	17
Mounting to a 4-TR Tripod.....	17
Additional Mounting Options.....	18
7-TR and Mast Mounting Option.....	18
2x2 Boom Mounting Options .....	19
<b>5.0 Typical Data</b> .....	<b>21</b>
Typical Antenna Factor.....	22
Typical Gain.....	23
Typical VSWR.....	24
Typical Forward Power .....	25
<b>Appendix A: Warranty</b> .....	<b>27</b>

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## Notes, Cautions, and Warnings

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	<p><b>Note:</b> Denotes helpful information intended to provide tips for better use of the product.</p>
<p><b>CAUTION</b></p>	<p><b>Caution:</b> Denotes a hazard. Failure to follow instructions could result in minor personal injury and/or property damage. Included text gives proper procedures.</p>
<p><b>WARNING</b></p>	<p><b>Warning:</b> Denotes a hazard. Failure to follow instructions could result in SEVERE personal injury and/or property damage. Included text gives proper procedures.</p>



See the ETS-Lindgren *Product Information Bulletin* for safety, regulatory, and other product marking information.

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## 1.0 Introduction

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The **ETS-Lindgren Model 3116 Double-Ridged Waveguide Horn** is a linearly polarized broadband antenna covering the frequency range of 18 GHz to 40 GHz. The Model 3116 was designed and built specifically for emissions and susceptibility testing.

The antenna is precision machined from aluminum. A 50 Ω Type K female connector is mounted on the base block of the antenna for increased performance at high frequencies.

When using the Type K connector with an SMA connector, the high frequency performance is limited to the rating of the SMA connector. For optimal performance, use a cable with a Type K connector.

For the variety of mounting options available for the Model 3116, see *Mounting Instructions* on page 15.

## Tripod Options

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ETS-Lindgren offers the following non-metallic, non-reflective tripods for use at both indoor and outdoor EMC test sites.

- **4-TR Tripod**—Constructed of linen phenolic and delrin, designed with an adjustable center post for precise height adjustments. Maximum height is 2.0 m (80.0 in), and minimum height is 94 cm (37.0 in). This tripod can support up to an 11.8 kg (26.0 lb) load.



- **7-TR Tripod**—Constructed of PVC and fiberglass components, providing increased stability for physically large antennas. The unique design allows for quick assembly, disassembly, and convenient storage. Allows several different configurations, including options for manual or pneumatic polarization. Quick height adjustment and locking wheels provide ease of use during testing. Maximum height is 2.17 m (85.8 in), with a minimum height of 0.8 m (31.8 in). This tripod can support a 13.5 kg (30 lb) load.





## **ETS-Lindgren Product Information Bulletin**

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See the ETS-Lindgren *Product Information Bulletin* included with your shipment for the following:

- Warranty information
- Safety, regulatory, and other product marking information
- Steps to receive your shipment
- Steps to return a component for service
- ETS-Lindgren calibration service
- ETS-Lindgren contact information

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## 2.0 Maintenance

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### CAUTION

Before performing any maintenance, follow the safety information in the ETS-Lindgren *Product Information Bulletin* included with your shipment.



Maintenance of the Model 3116 is limited to external components such as cables or connectors.

If you have any questions concerning maintenance, contact ETS-Lindgren Customer Service.

### Annual Calibration

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See the *Product Information Bulletin* included with your shipment for information on ETS-Lindgren calibration services.

### Service Procedures

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For the steps to return a system or system component to ETS-Lindgren for service, see the *Product Information Bulletin* included with your shipment.

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### 3.0 Specifications

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#### Electrical Specifications

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<b>Frequency Range:</b>	18 GHz–40 GHz
<b>VSWR Ratio (Average):</b>	<1.6:1
<b>Maximum Continuous Power:</b>	50 Watts
<b>Peak Power:</b>	70 Watts
<b>Impedance:</b>	50 $\zeta$
<b>Connector:</b>	Type K female
<b>Front-to-Back Ratio:</b>	20 dB
<b>Cross Polarization:</b>	20 dB minimum

#### Physical Specifications

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<b>Length:</b>	8.64 cm (3.40 in)
<b>Width:</b>	10.68 cm (4.20 in)
<b>Height:</b>	6.6 cm (2.60 in)
<b>Weight:</b>	0.14 kg ( 0.31 lb )

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## 4.0 Mounting Instructions

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### CAUTION

Before connecting any components, follow the safety information in the ETS-Lindgren *Product Information Bulletin* included with your shipment.

### CAUTION

The Model 3116 antennas are precision measurement devices. Handle your antenna with care.

### Using Included Mounting Adapters to Mount to a 4-TR

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### CAUTION

You must continuously support the Model 3116 when attaching or removing the mounting bracket or thumbscrews. Failure to provide support may result in damage to the antenna.

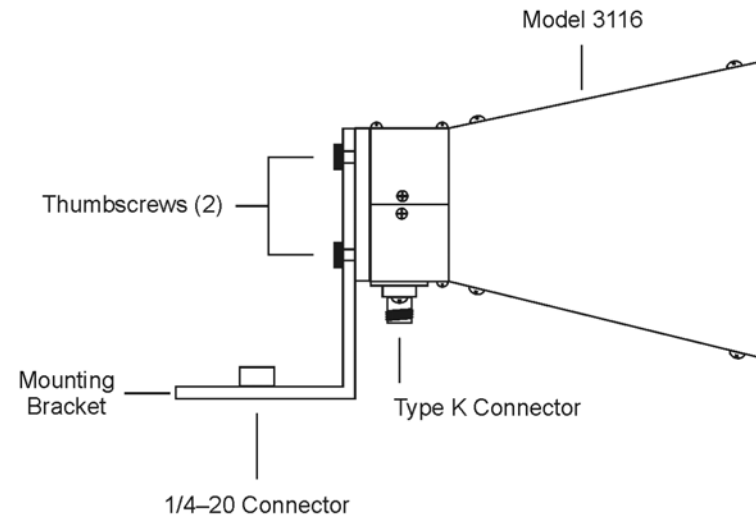
The Model 3116 Double-Ridged Waveguide Horn ships with the following mounting hardware:

- Mounting bracket drilled to accept ETS-Lindgren or other tripod mount with 1/4–20 threads.
- Thumbscrews (2) for attaching the Model 3116 to the mounting bracket.

## VIEW OF MOUNTING BRACKET ATTACHED TO MODEL 3116



For illustration purposes, the Model 3116 is shown vertically polarized. Typically for testing you will mount the antenna for horizontal polarization.



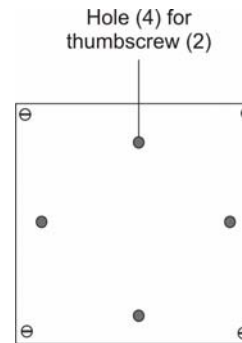


## ATTACHING THE MOUNTING BRACKET TO THE MODEL 3116

1. Hold the Model 3116 with the Type K connector pointing to the floor, and align the holes on the back of the antenna with the holes on the bracket.

Select set of holes for horizontal or vertical polarization, as desired.

2. Insert both thumbscrews and tighten.



**Back of Model 3116**

## MOUNTING TO A 4-TR TRIPOD

1. Attach the antenna to the mounting bracket by following the instructions in the previous section.
2. Attach the mounting bracket to the 4-TR tripod by aligning the 1/4-20 connector on the bracket with the 1/4-20 bolt on the tripod. Support the Model 3116 securely while turning the mounting bracket to tighten the connection.
3. To change polarization, support the Model 3116 securely and remove the thumbscrews.

Turn the Model 3116 to align the holes in the mounting bracket with the desired set of holes on the back of the antenna. Re-insert the thumbscrews and tighten.

## Additional Mounting Options

### 7-TR AND MAST MOUNTING OPTION



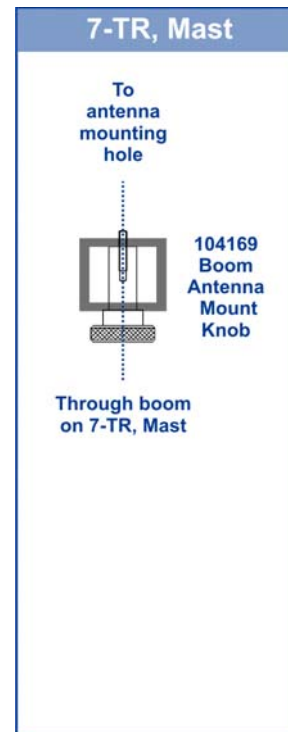
*Mast* refers to 2070 Series, 2075, and 2175 Antenna Towers.

*7-TR* refers to 109042, 106328, and 108197 booms:

- *109042 boom*—Straight boom; for general antenna mounting on a 7-TR
- *106328 boom*—Offset boom; for general antenna mounting on a 7-TR with pneumatic or manual polarization
- *108197 boom*—Center rotate boom; for rear-mount stinger-type antennas only

This option to mount the Model 3116 onto an ETS-Lindgren 7-TR Tripod or mast requires additional hardware.

Contact the ETS-Lindgren Sales Department for information on ordering optional mounting hardware.

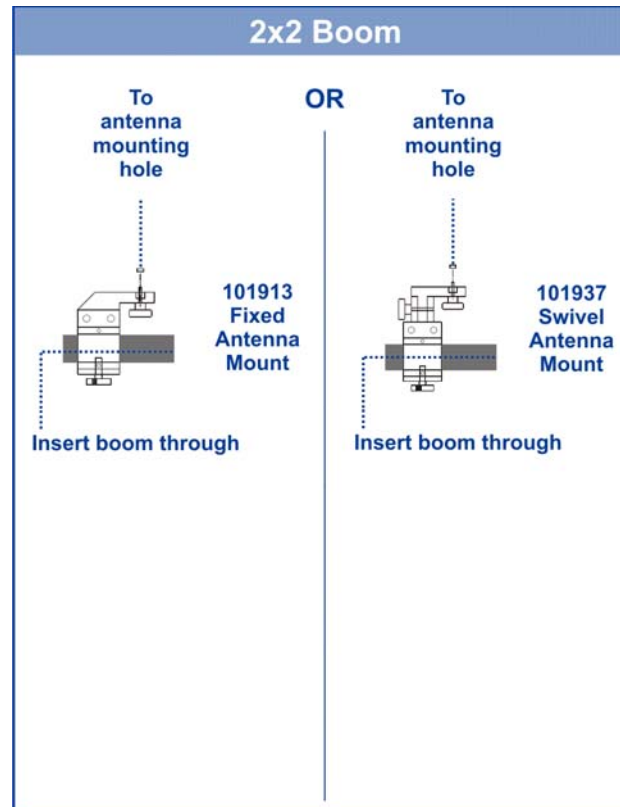


## 2x2 BOOM MOUNTING OPTIONS

Following are additional options for mounting the Model 3116 onto a 2x2 boom. Contact the ETS-Lindgren Sales Department for information on ordering optional mounting hardware.



2x2 boom refers to a typical 2-inch by 2-inch boom.



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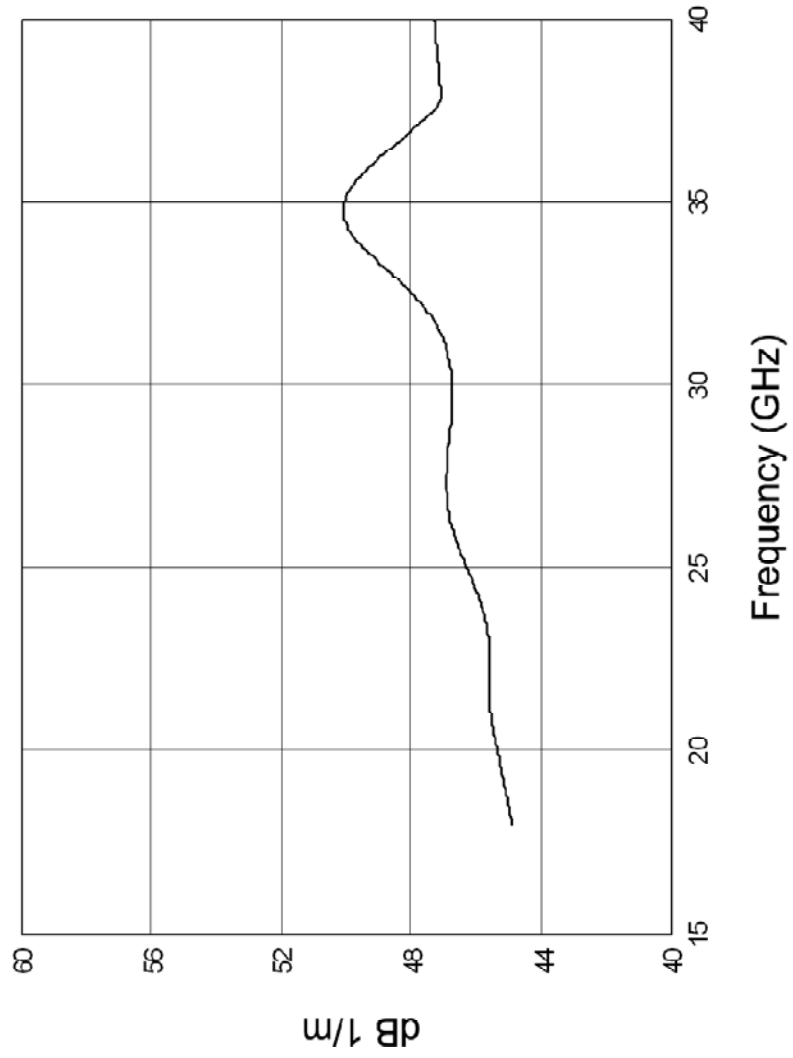
## 5.0 Typical Data

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The Model 3116 Double-Ridged Waveguide Horn is individually calibrated during the manufacturing process. Apparent gain at one meter from the end of the antenna is determined and included in the data. This factor should be used in specification compliance testing to convert receiver reading (dBuV) to field intensity units (dBuV/M). This conversion is accomplished by adding the antenna factor in dB to the receiver reading in dB above one microvolt. To produce specific field strengths at one meter spacings, see *Typical Forward Power* on page 25.

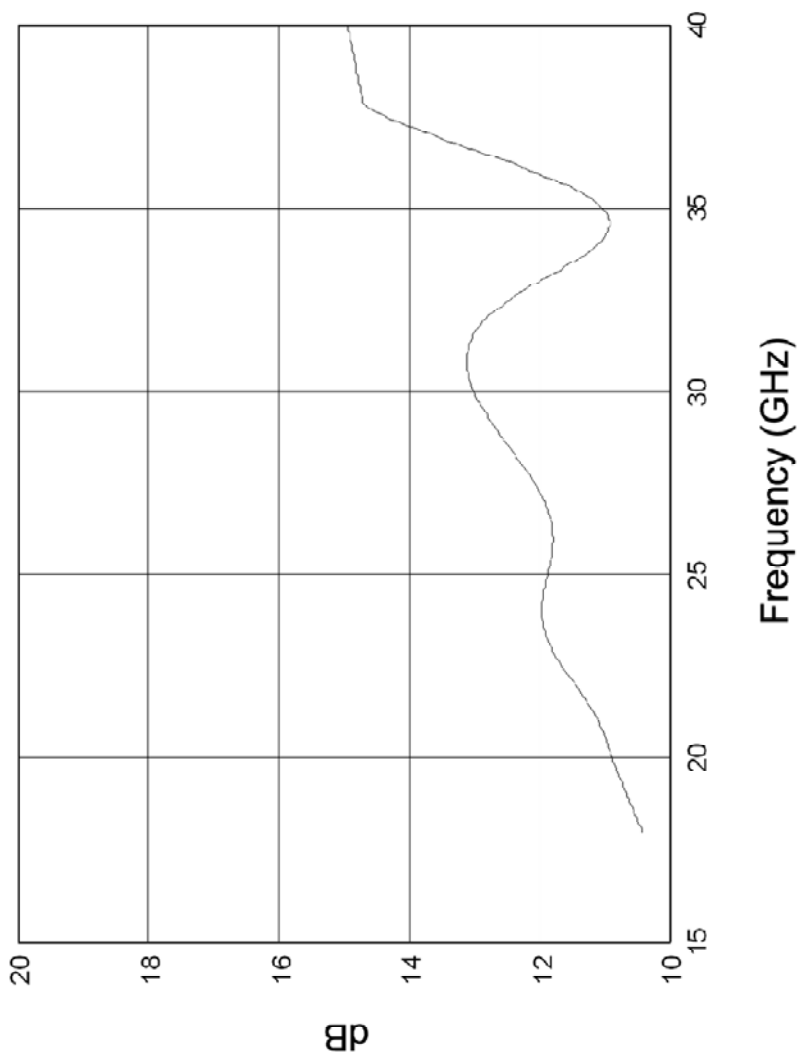
## Typical Antenna Factor

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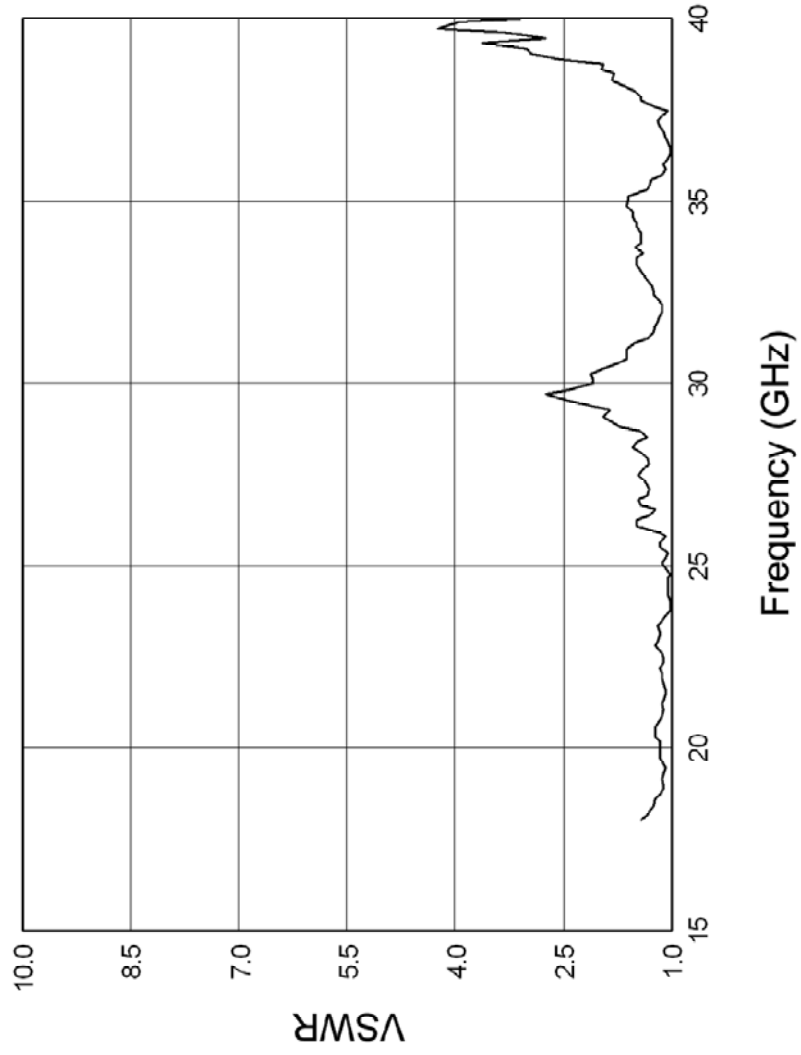
### Typical Gain

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### Typical VSWR

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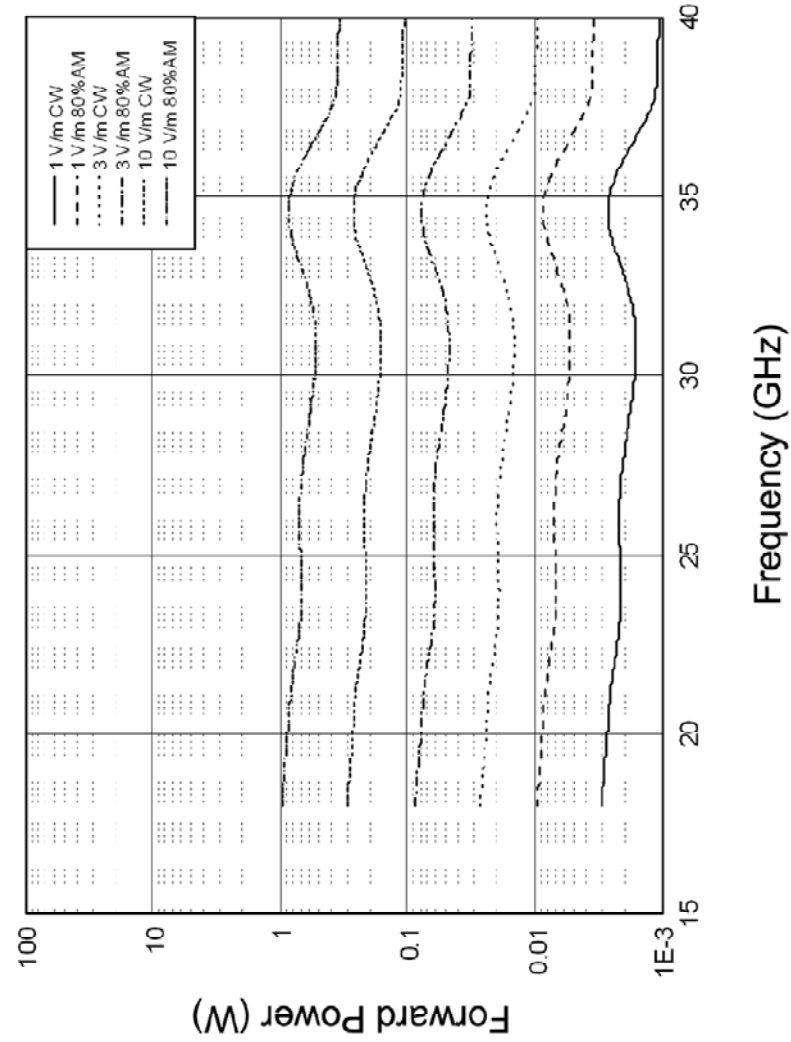




## Typical Forward Power



- Forward Power at 1 meter 1 V/m to 10 V/m.
- Maximum Continuous Power is 50 Watts.
- Maximum Peak Power Rating for the Model 3116 is 70 Watts.



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## Appendix A: Warranty

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See the *Product Information Bulletin* included with your shipment for the complete ETS-Lindgren warranty for your Model 3116.

### DURATION OF WARRANTIES FOR MODEL 3116

All product warranties, except the warranty of title, and all remedies for warranty failures are limited to two years.

Product Warranted	Duration of Warranty Period
Model 3116 Double-Ridged Waveguide Horn	2 Years