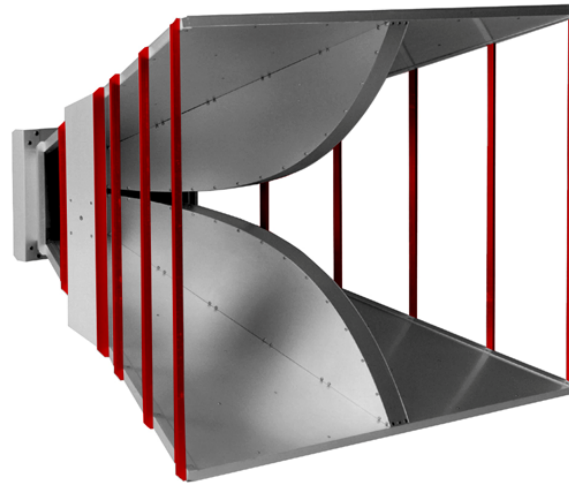


Model 3106B

Double-Ridged Waveguide Horn

User Manual



 **ETS-LINDGREN**[™]
An ESCO Technologies Company

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Revision Record | MANUAL, 3106B | Part #399785, Rev. B


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A	Initial Release	September, 2006
B	Added optional connectors information; rebrand	November, 2008

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Notes, Cautions, and Warnings

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

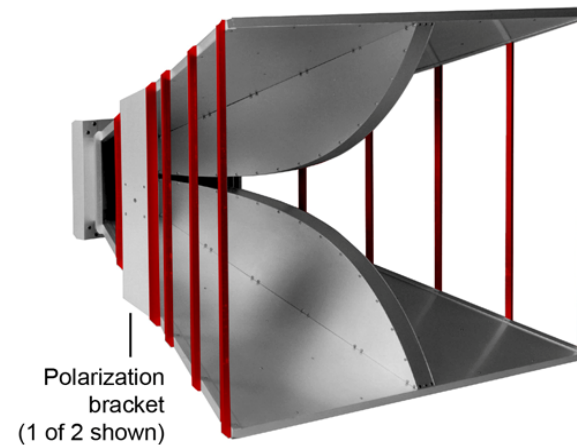
The **ETS-Lindgren Model 3106B Double-Ridged Waveguide Horn** is a linearly polarized broadband antenna covering a frequency range of 200 MHz to 2.5 GHz. The Model 3106B was designed and built specifically for EMI measurements and specification compliance testing.

Although rated to 2.5 GHz, measured antenna factor (AF) values are supplied to 3 GHz. The Model 3106B can be used for radiated emissions (RE) testing to 3 GHz, provided that an attenuator is used at the feed to reduce the high VSWR above 2.7 GHz.

The Model 3106B has high gain and excellent VSWR characteristics over its entire frequency range. It is especially effective for generating high electromagnetic fields with relatively low power input. The antenna is also useful for receiving low level signals where high gain characteristics are needed.

The Model 3106B is precision machined from aluminum, making it lightweight and durable. A 50 V Type N female connector is mounted on the base block of the antenna, providing increased power handling.

Two brackets are attached to the sides of the Model 3106B so it can be polarized either horizontally or vertically.

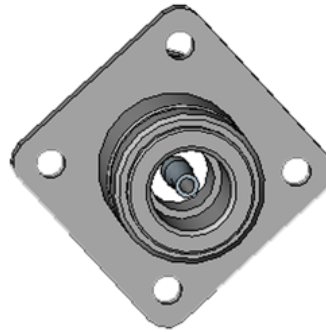


A variety of mounting options are available for the Model 3106B. For information, see *Mounting Instructions* on page 15.

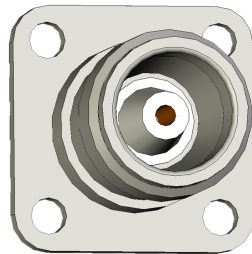
Optional Components

CONNECTORS

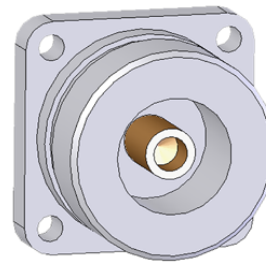
The standard Model 3106B provides a Type N connector. As an alternative, the Model 3106B may be ordered with an SC connector or with a 7/16 DIN connector.



Type N Connector (Standard)



SC Connector (Optional)

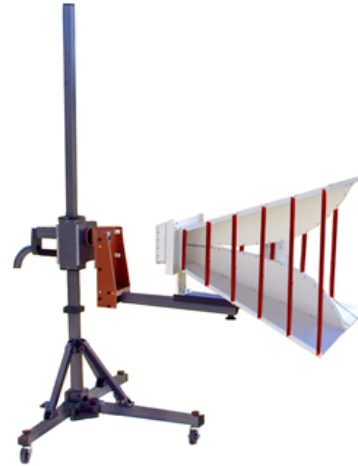


7/16 DIN Connector (Optional)

TRIPOD OPTIONS

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

- **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 .8 m (31.8 in). This tripod can support a 13.5 kg (30 lb) load.



*Model 3106B
shown mounted onto 7-TR
with 3106B centerline rotation boom*



The following 7-TR booms are available for the Model 3106B:

- *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
- *108507 boom*—Centerline rotation boom; when changing polarization, maintains centerline rotation (for Model 3106B only)

ETS-Lindgren Product Information Bulletin

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

2.0 Maintenance

CAUTION

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



Maintenance of the Model 3106B is limited to external components such as cables or connectors.

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

Annual Calibration

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

Optional Parts

Following are the part numbers for ordering optional parts for the Model 3106B Double-Ridged Waveguide Horn.

Part Description	Part Number
7-TR Tripod, 3106 Mount, Pneumatic	7-TR/POL-3106
Boom Assembly, 3106 Antenna Mounting	108507

Service Procedures

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

Electrical Specifications

Frequency Range:	200 MHz – 2.5 GHz
VSWR Ratio (Average):	<1.6:1
Maximum Continuous Power:	800 W
Peak Power:	800 W
Impedance:	50 ζ
Connector:	Type N female
Front-to-Back Ratio:	20 dB
Cross Polarization:	20 dB minimum

Physical Specifications

Height:	72.9 cm (28.7 in)
Width:	93.3 cm (36.7 in)
Depth:	97.8 cm (38.5 in)
Weight:	11.8 kg (26.0 lb)

Power Rating

Type N Connector:	< 300 MHz 1 kW 300 MHz–1 GHz 500 W 1 GHz–2 GHz 300 W
SC Connector:	< 300 MHz 1 kW 300 MHz–1 GHz 500 W 1 GHz–2 GHz 300 W
7/16 DIN Connector:	< 300 MHz 1.5 kW 300 MHz–1 GHz 750 W 1 GHz–2 GHz 500 W

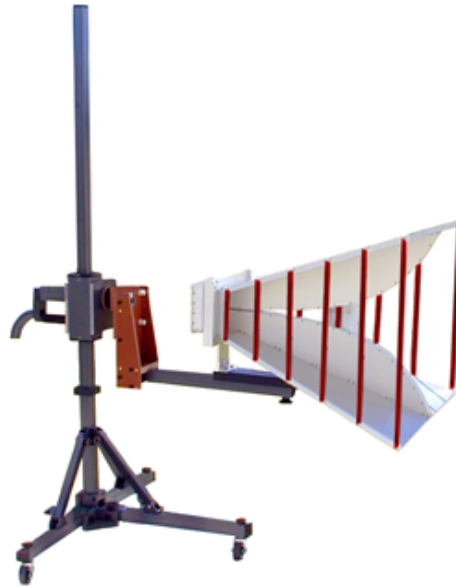
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4.0 Mounting Instructions

CAUTION

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

Mount the antenna to an ETS-Lindgren 7-TR Tripod with a standard 1/4-20 mounting stud.



Model 3106B shown mounted onto 7-TR with 3106B centerline rotation boom

CAUTION

Due to the size of the Model 3106B, do not mount the antenna onto a 4-TR tripod.

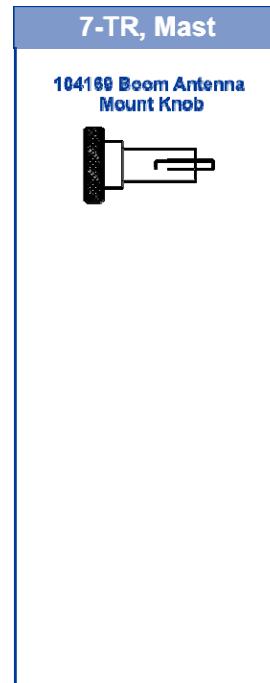
Additional Mounting Options

7-TR AND MAST MOUNTING OPTIONS

Following are additional options for mounting the Model 3106B onto a 7-TR tripod. Contact the ETS-Lindgren Sales Department for information on ordering optional mounting hardware.



Mast refers to 2070 Series, 2075, and 2175 Antenna Towers. See page 9 for a description of 7-TR booms available for the Model 3106B.

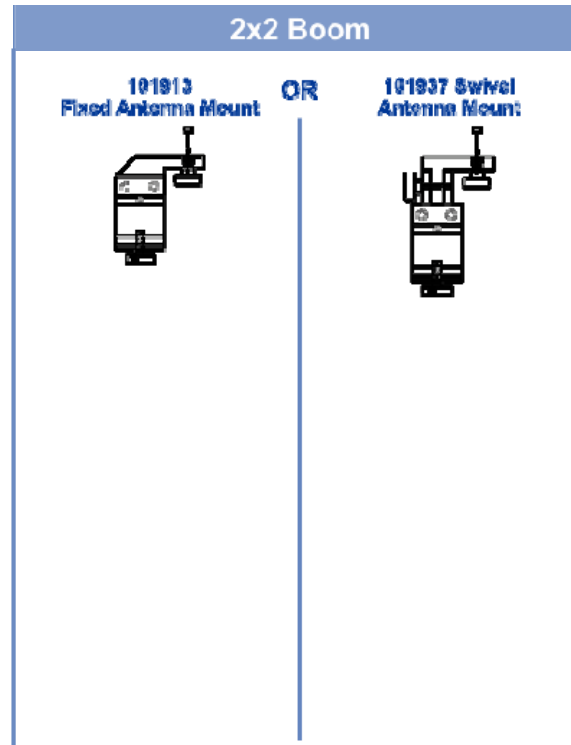


2x2 BOOM MOUNTING OPTIONS

Following are additional options for mounting the Model 3106B 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 Application

Each Model 3106B Double-Ridged Waveguide Horn is individually calibrated during the manufacturing process. Using the three-antenna method of calibration per specification ARP-958, apparent gain at 1.0 meters from the end of the antenna is determined and used to check conformance to the antenna factor (AF).

The antenna factor should be used in specification compliance testing to convert receiver reading (dBuV) to field intensity units (dBuV/m). The conversion is accomplished by adding the antenna factor in dB to the receiver reading in dB above 1 microvolt. To produce specific field strengths at 1-m spacings, use the following equation:

$$E(\text{V / m}) = \frac{\sqrt{30Pg}}{d}$$

d = distance, in meters

g = numeric gain ($10^{G[\text{dB}]/10}$)

P = antenna net input power, in watts

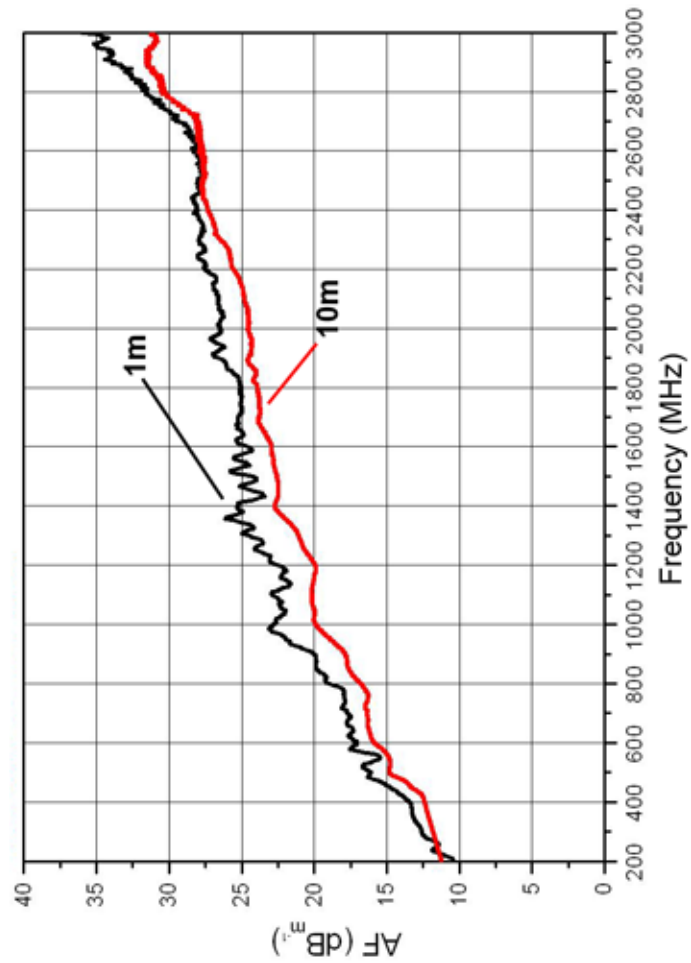
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6.0 Typical Data

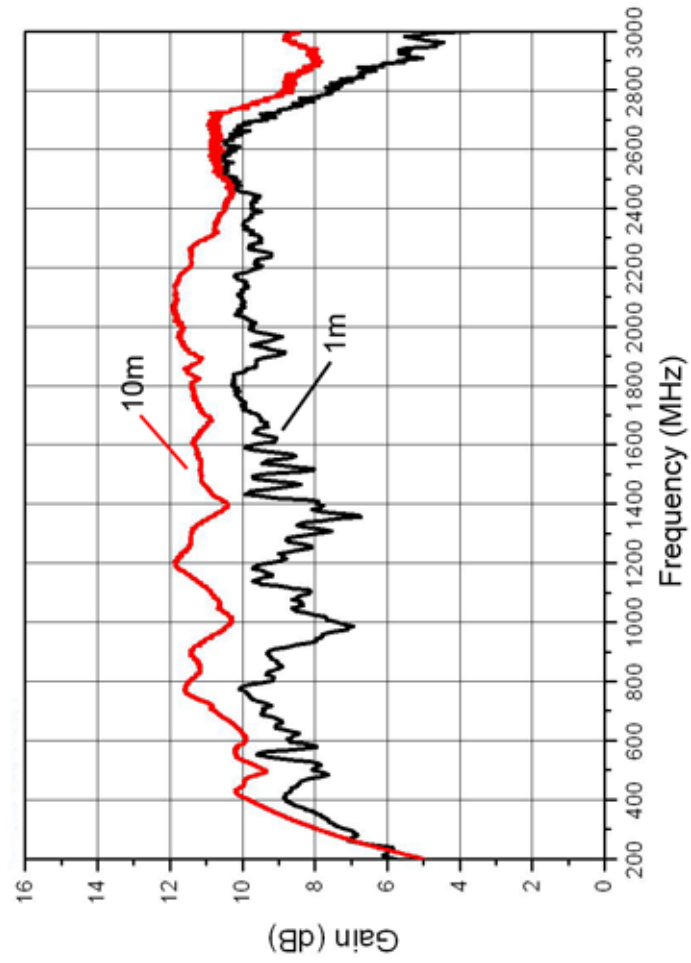


The photo on the title page of this manual shows the antenna in the vertically polarized position. The typical data in this manual is based on horizontal polarization.

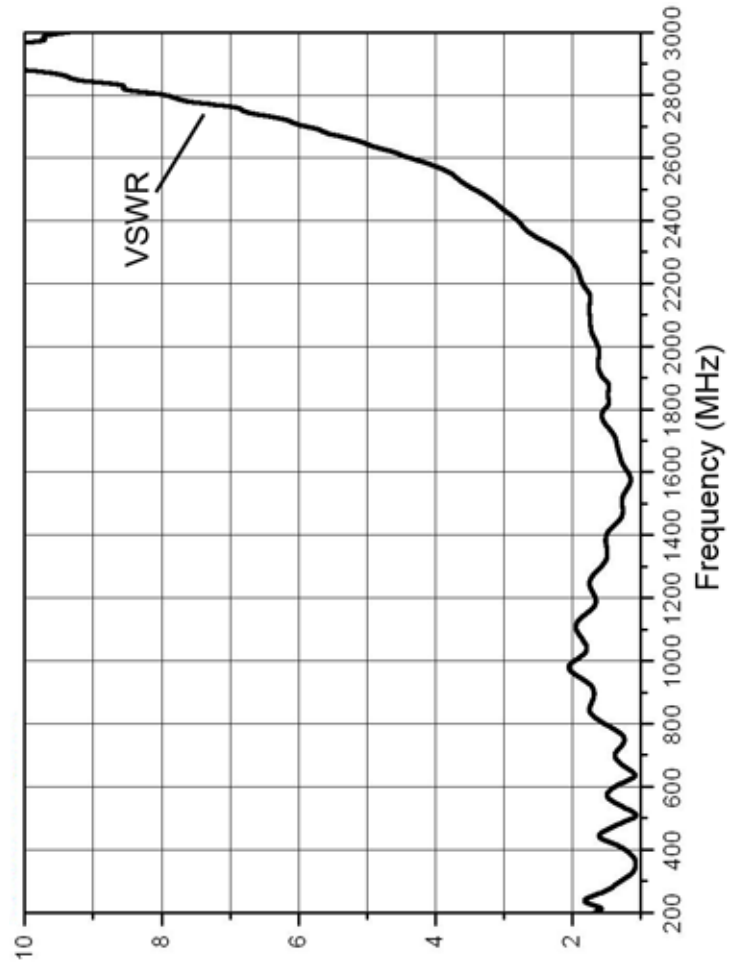
Model 3106B Typical Antenna Factor



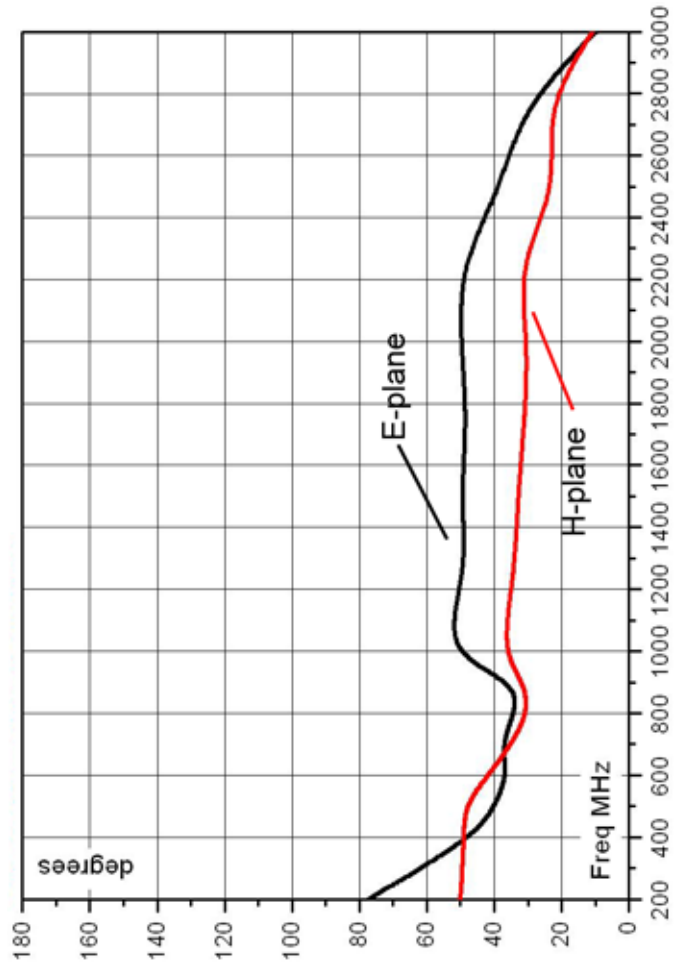
Model 3106B Typical Gain



Model 3106B Typical VSWR

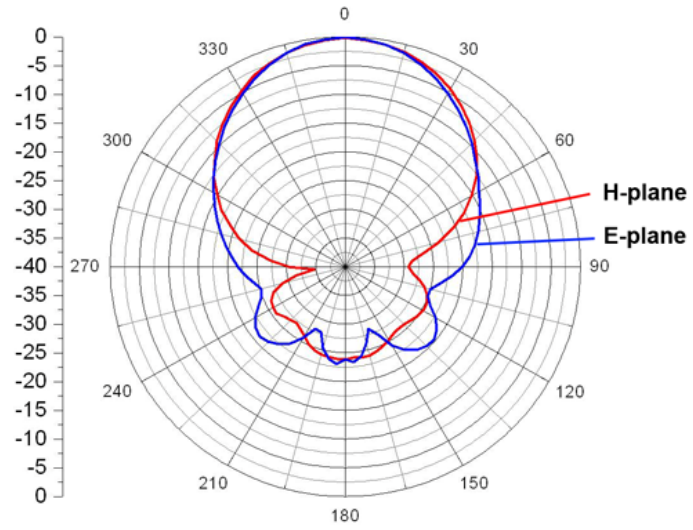


Model 3106B Typical Half-Power Beamwidth



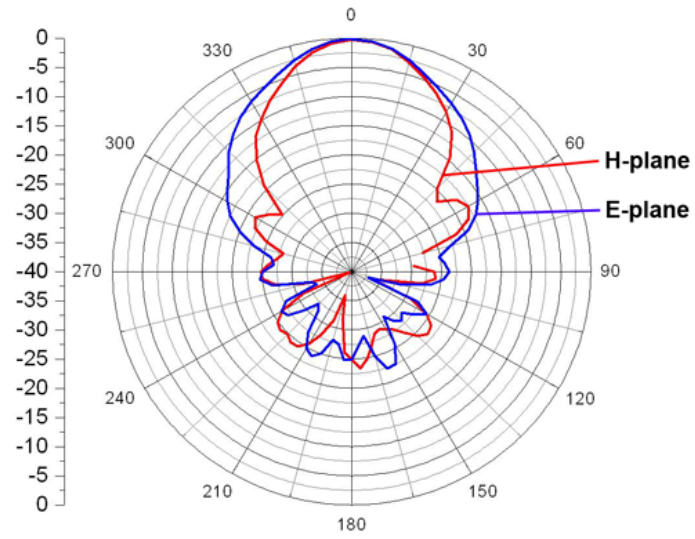
Model 3106B Typical Measured Radiation Patterns

400 MHz



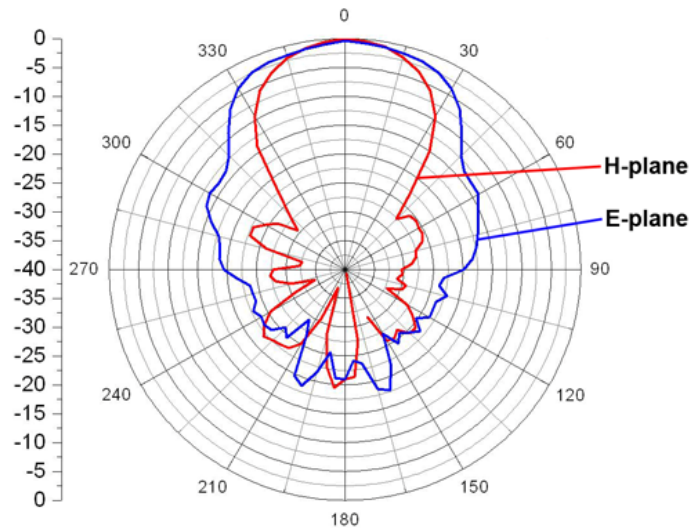
400 MHz

800 MHz



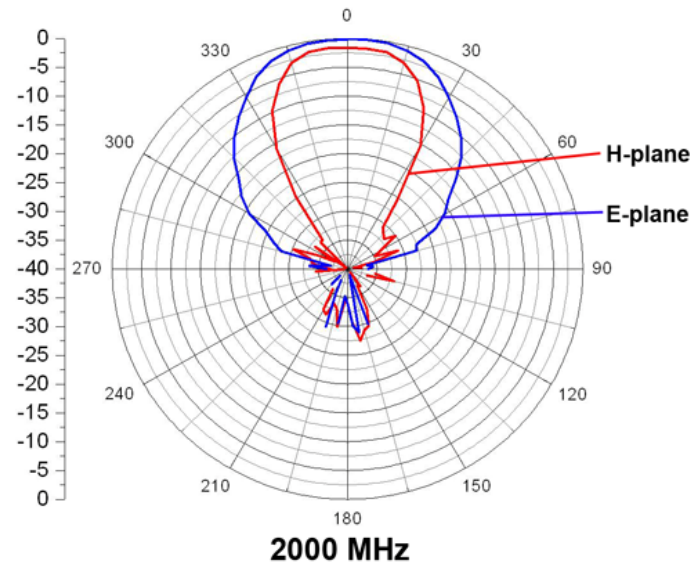
800 MHz

1000 MHz



1000 MHz

2000 MHz



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Appendix A: Warranty



See the *Product Information Bulletin* included with your shipment for the complete ETS-Lindgren warranty for your Model 3106B.

DURATION OF WARRANTIES FOR MODEL 3106B

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 3106B Double-Ridged Waveguide Horn	2 Years