Models 3165-01, 3165-02

Absorber Nested Dual-Polarized Dual-Vivaldi Array Antenna

User Manual

Model 3165-01-SQ

Model 3165-02-MG

ETS-LINDGREN
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<table>
<thead>
<tr>
<th>Revision</th>
<th>Description</th>
<th>Date</th>
</tr>
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<tbody>
<tr>
<td>A</td>
<td>Initial Release</td>
<td>January, 2011</td>
</tr>
<tr>
<td>B</td>
<td>Added Model 3165-02 content</td>
<td>October, 2013</td>
</tr>
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</table>
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# Notes, Cautions, and Warnings

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Note:</strong></td>
<td>Denotes helpful information intended to provide tips for better use of the product.</td>
</tr>
<tr>
<td><strong>Caution:</strong></td>
<td>Denotes a hazard. Failure to follow instructions could result in minor personal injury and/or property damage. Included text gives proper procedures.</td>
</tr>
<tr>
<td><strong>Warning:</strong></td>
<td>Denotes a hazard. Failure to follow instructions could result in SEVERE personal injury and/or property damage. Included text gives proper procedures.</td>
</tr>
</tbody>
</table>

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 3165 Series Absorber Nested Dual-Polarized Dual-Vivaldi Array Antenna is designed for applications that require minimum effect from the source antenna, such as in chambers where the Equipment Under Test (EUT) is illuminated from different directions.

Model 3165-01-SQ

Each antenna in the 3165 Series is dual-linearly polarized and capable of simultaneously measuring two orthogonal components in the field.

The 3165 Series possesses low VSWR while maintaining high directivity. This allows use in the illumination of the EUT without affecting adjacent antennas in a multi-antenna installation.

Model 3165-02-MG
**Model 3165-01**

The Model 3165-01 has a frequency range of 700 MHz to 6 GHz, which covers most cell phone, Wi-Fi, WiMAX™, and GPS bands. It is designed to be nested in the anechoic absorber lining of a chamber, and when installed in this configuration, will exhibit very low reflectivity, even when the input ports are mismatched. The normal incidence reflectivity is approximately -40 dB for a majority of the frequency range.

**Model 3165-02**

The Model 3165-02 has a frequency range of 400 MHz to 6 GHz, although it is usable to 7 GHz. The VSWR is less than 3:1 for more than 90% of the range. The 3165-02 exhibits positive gain from around 500 MHz and above, reaching gain levels of over 8 dBi above 2 GHz; the difference in gain between the two ports is extremely small (less than 0.25 dB for over 90% of the range).
Mounting Options

Following are the mounting options available for the 3165-01/3165-02; for more information on mounting, contact ETS-Lindgren Sales.

3165-01-MG / 3165-02-MG

The MG Series allows you to magnetically attach the antenna to a positioning system, existing bracket, or shielding.
3165-01-SQ / 3165-02-SQ

The SQ Series includes brackets that allow you to manually adjust the pan and tilt of the antenna. These brackets mount to a 50-mm square tube.

3165-01-SQ / 3165-02-SQ

3165-01-RD / 3165-02-RD

The RD Series includes a fixture that allows you to manually adjust the pan and tilt of the antenna. The fixture is designed to be attached to a 50-mm (diameter) round tube.

3165-01-RD / 3165-02-RD
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 3165-01/3165-02 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.
Replacement and Optional Parts

ETS-Lindgren may substitute a similar part or new part number with the same functionality for another part/part number. Contact ETS-Lindgren for questions about part numbers and ordering parts.

Following are the part numbers for ordering replacement or optional parts for the 3165 Series Absorber Nested Dual-Polarized Vivaldi Array Antenna.

<table>
<thead>
<tr>
<th>Part Description</th>
<th>Part Number 3165-01</th>
<th>Part Number 3165-02</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnetic Attachment Mounting Option</td>
<td>3165-01-MG</td>
<td>3165-02-MG</td>
</tr>
<tr>
<td>Pan and Tilt Manual Adjustment Brackets (50-mm Square Tube Mounting Option)</td>
<td>3165-01-SQ</td>
<td>3165-02-SQ</td>
</tr>
<tr>
<td>Pan and Tilt Manual Adjustment Fixture (50-mm Round Tube Mounting Option)</td>
<td>3165-01-RD</td>
<td>3165-01-RD</td>
</tr>
</tbody>
</table>

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.
3.0 Specifications

Electrical Specifications

<table>
<thead>
<tr>
<th></th>
<th>Model 3165-01</th>
<th>Model 3165-02</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Range:</td>
<td>700 MHz–6 GHz</td>
<td>400 MHz–7 GHz</td>
</tr>
<tr>
<td>Cross Polarization</td>
<td></td>
<td>&gt;25 dB</td>
</tr>
<tr>
<td>Isolation:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Continuous</td>
<td>5 Watts</td>
<td></td>
</tr>
<tr>
<td>Power:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impedance (Nominal):</td>
<td>50 Ω</td>
<td></td>
</tr>
<tr>
<td>Connectors:</td>
<td>SMA female (2)</td>
<td></td>
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</tbody>
</table>

Physical Specifications

3165-01 SERIES

<table>
<thead>
<tr>
<th></th>
<th>3165-01-MG</th>
<th>3165-01-SQ</th>
<th>3165-01-RD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length:</td>
<td>19.0 cm</td>
<td>36.3 cm</td>
<td>36.3 cm</td>
</tr>
<tr>
<td></td>
<td>7.5 in</td>
<td>14.3 in</td>
<td>14.3 in</td>
</tr>
<tr>
<td>Aperture Height:</td>
<td>17.8 cm</td>
<td>35.5 cm</td>
<td>35.5 cm</td>
</tr>
<tr>
<td></td>
<td>7.0 in</td>
<td>14.0 in</td>
<td>14.0 in</td>
</tr>
<tr>
<td>Aperture Width:</td>
<td>17.8 cm</td>
<td>35.5 cm</td>
<td>35.5 cm</td>
</tr>
<tr>
<td></td>
<td>7.0 in</td>
<td>14.0 in</td>
<td>14.0 in</td>
</tr>
<tr>
<td>Weight:</td>
<td>1.3 kg</td>
<td>2.6 kg</td>
<td>2.6 kg</td>
</tr>
<tr>
<td></td>
<td>2.9 lb</td>
<td>5.8 lb</td>
<td>5.8 lb</td>
</tr>
</tbody>
</table>
### 3165-02 SERIES

<table>
<thead>
<tr>
<th></th>
<th>3165-02-MG</th>
<th>3165-02-SQ (with absorber and mounting bracket)</th>
<th>3165-02-RD (with absorber and mounting bracket)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LENGTH</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Absorber:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25 cm (9.8 in)</td>
<td></td>
<td>58 cm (22.8 in)</td>
<td>66 cm (26 in)</td>
</tr>
<tr>
<td>With Absorber:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42 cm (18.5 in)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>HEIGHT</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Absorber:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24 cm (9.4 in)</td>
<td></td>
<td>27 cm (10.6 in)</td>
<td>27 cm (10.6 in)</td>
</tr>
<tr>
<td>With Absorber:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27 cm (10.6 in)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>WIDTH</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Absorber:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24 cm (9.4 in)</td>
<td></td>
<td>27 cm (10.6 in)</td>
<td>27 cm (10.6 in)</td>
</tr>
<tr>
<td>With Absorber:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27 cm (10.6 in)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>WEIGHT</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.3 kg (2.9 lb)</td>
<td>2.6 kg (5.8 lb)</td>
<td></td>
<td>2.6 kg (5.8 lb)</td>
</tr>
</tbody>
</table>
4.0 3165-01 Typical Data

**3165-01 Typical Gain**

![Graph showing typical gain versus frequency for X-port and Y-port.](image-url)
3165-01 Typical VSWR

- Graph showing VSWR vs. frequency (GHz) for different ports (X-port, Y-port).

Frequency (GHz): 0.5 to 6.0
VSWR: 1.0 to 10.0
3165-01 Typical Cross-Port Isolation

![Cross-Port Isolation Graph]

- **Frequency (GHz):** 0.5 to 6.0
- **Cross-Port Isolation (dB):** 0 to 70.0

The graph shows the typical cross-port isolation for different frequencies, indicating a generally high level of isolation across the specified range.
3165-01 Typical H-Plane

Pattern (dB)

700 MHz
920 MHz
1880 MHz
2400 MHz
3800 MHz
5800 MHz

Max: 0
Min: -60
Scale: 10/div
Angle (degrees)
5.0  3165-02 Typical Data

3165-02 Typical Gain

![3165-02 Gain Diagram]
3165-02 Typical VSWR

![3165-02 VSWR Graph](image)
3165-02 Typical Cross-Port Isolation

3165-02 cross-port coupling

Cross-port coupling (dB)

Frequency (MHz)

X-port coupling
3165-02 Typical Radiation Patterns

3165-02 AT 400 MHz AND 500MHz
3165-02 Radiation Patterns
with antenna inserted in absorber treatment

H plane 600 MHz
H plane 700 MHz
E plane 600 MHz
E plane 700 MHz
3165-02 AT 800 MHz AND 900 MHz

3165-02 Radiation Patterns
with antenna inserted in absorber treatment
3165-02 AT 1000 MHz AND 1250 MHz

3165-02 Radiation Patterns
with antenna inserted in absorber treatment

H plane 1000 MHz
H plane 1250 MHz
E plane 1000 MHz
E plane 1250 MHz
3165-02 AT 1500 MHz AND 1750 MHz

3165-02 Radiation Patterns
with antenna inserted in absorber treatment

H plane 1500 MHz
H plane 1750 MHz
E plane 1500 MHz
E plane 1750 MHz
3165-02 AT 2000 MHZ AND 2500 MHZ

3165-02 Radiation Patterns
with antenna inserted in absorber treatment

- H plane 2000 MHz
- H plane 2500 MHz
- E plane 2000 MHz
- E plane 2500 MHz
3165-02 AT 3000 MHz AND 3500 MHz

3165-02 Radiation Patterns
with antenna inserted in absorber treatment
3165-02 AT 4000 MHz AND 4500 MHz

3165-02 Radiation Patterns
with antenna inserted in absorber treatment
3165-02 AT 5000 MHZ AND 6000 MHZ

3165-02 Radiation Patterns
with antennas inserted in absorber treatment
Appendix A: Warranty

See the Product Information Bulletin included with your shipment for the complete ETS-Lindgren warranty for your Model 3165-01/3165-02.

DURATION OF WARRANTIES FOR MODEL 3165-01/3165-02

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

<table>
<thead>
<tr>
<th>Product Warranted</th>
<th>Duration of Warranty Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 3165-01/3165-02 Absorber</td>
<td>2 Years</td>
</tr>
<tr>
<td>Nested Dual-Polarized Dual-Vivaldi Array Antenna</td>
<td></td>
</tr>
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</table>