ETS·LINDGREN
An ESCO Technologies Company

3126 Series

Sleeve Dipole Antenna

Product Manual

PN: 399155

March, 2023

Rev E

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Revision Record

MANUAL, 3126 | Part # 399155 Rev E

Revision	Description	Date
A	Initial Release	January, 2004
B	Addition of new model data	March, 2006
C	Updated Specifications; rebrand	November, 2010
D	Minor corrections/edits	October, 2014
E	Corrected VSWR; re-format	March, 2023

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NOTES, CAUTIONS AND WARNINGS

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

*All notes, cautions, and warnings will be located on the left column area of the page.

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

INTRODUCTION

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

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.

Only qualified personnel should operate (or service) this equipment. If you have any questions concerning maintenance, contact ETS-Lindgren Technical Support. Warranty may be voided if housing is opened.

The ETS-Lindgren 3126 Series sleeve dipole antenna is designed as precision gain references for antenna range calibration and to meet the Cellular Telecommunication and Internet Association (CTIA) ±0.1 dB symmetry requirement for ripple test measurements.

These antennas are truly omni-directional, having an electric dipole pattern approaching that of a half-wave resonant dipole with typical gains between 1.5 dB and 2.0 dB.

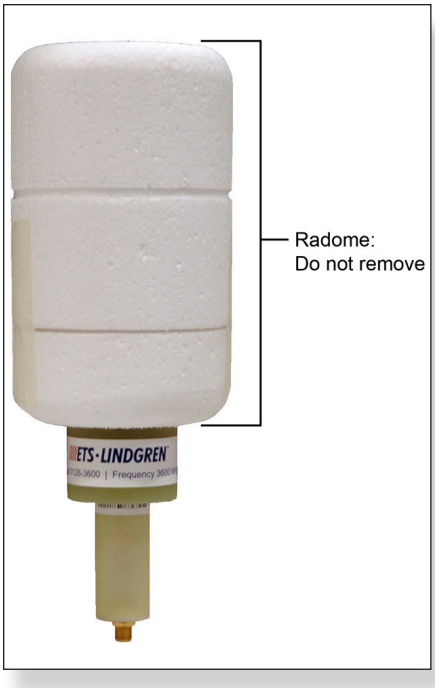
The sleeve dipole design allows the antenna to be end-fed to avoid cable and feed-point interactions that interfere with the performance of the antenna. Integral quarter-wave chokes and/or ferrite loading (depending on frequency range) also helps to reduce cable interaction. This design also provides exceptional symmetry (better than ±0.1 dB, 0.2 dB peak-to-null) to meet or exceed CTIA criteria for ripple test antennas.

Each 3126 Series sleeve dipole antenna is designed with a VSWR less than 1.25:1 at the center frequency. Gain values and ±0.1 dB symmetry certification are provided for a 200 MHz to 300 MHz band (depending on the specific model) centered about the labeled frequency. The dipoles have a typical VSWR <3:1 across this entire band, and may be used for precision range calibrations across the entire band provided appropriate padding (~10 dB) is used to minimize possible standing wave effects on cables. The dipoles have nominal impedance of 50 Ω, a maximum continuous transmit power of one watt, and are equipped with a female SMA connector.

3126-2450

The higher frequency antennas include a radome, and are characterized with the radome in place. The radome provides improved dielectric properties for superior high frequency performance. Do not remove the radome for any reason.

The dipoles are calibrated using an A2LA accredited process with a typical measurement uncertainty on the order of ±0.2 dB. During the calibration process, the dipoles are also certified to meet the ±0.1 dB symmetry required for use in the ripple test specified in the CTIA Over-The-Air Performance Test Plan. Gain, VSWR, maximum ripple, and measurement uncertainty values are provided with each calibration.



3126-3600

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All 3126 Series sleeve dipole antennas are not listed in this manual; contact ETS-Lindgren Sales for a list of available 3126 Series sleeve dipole antennas.

Standard Configuration

- 3126 Series Sleeve Dipole Antenna
- A2LA accredited precision calibration and symmetry certification including signed Certificate of Calibration

ETS-Lindgren Product Information Bulletin

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

- 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

Optional Items

Contact ETS-Lindgren Sales for information on ordering optional items.

CTIA Ripple Test Mounting Kit

This optional ripple test mounting kit is available to attach the dipole to an ETS Lindgren Multi Axis Positioning System (MAPS™). The mounting kit provides the adapters necessary to position dipole and loop antennas at each offset geometry required to perform the ripple test, as specified in the CTIA test plan. The center position mount can also be used for performing range calibrations (CTIA Substitution Part) and is the same mount design used for calibrating the antenna, thereby reducing measurement uncertainty.

3127 Resonant Loop Antenna

Magnetic dipole antennas designed to meet the CTIA +\-0.1 dB symmetry requirement for ripple test measurements at the labeled center frequency.

MAINTENANCE

CAUTION

3126 Series sleeve dipole antennas are precision measurement devices. Handle your antenna with care.

CAUTION

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

Only qualified personnel should operate (or service) this equipment. If you have any questions concerning maintenance, contact ETS-Lindgren Technical Support. Warranty may be voided if housing is opened.

Cleaning

Maintenance of the 3126 Series sleeve dipole antenna is limited to external components such as cables or connectors.

If the 3126 requires cleaning, use a clean soft cloth moistened with water. Do not use any harsh or abrasive chemicals; they may damage the components.

Service Procedures

Contacting ETS-Lindgren

Please see ets-lindgren.com for a list of ETS-Lindgren offices, including phone and email contact information.

Sending a Component For Service

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

Calibration Services and Annual Calibration

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

SPECIFICATIONS

All 3126 sleeve dipole antennas are not listed in this manual; contact ETS-Lindgren Sales for a list of available 3126 dipole antennas.

Performance Specifications

Band	% Band 1.2:1 VSWR	% Band 2:1 VSWR	Calibration Range (MHz) Centered at f_0 (dB)	Min. Gain at f_0 (dB)	Pass/Fail Criteria
400—600 MHz	1.5%	10%	200 MHz*	1.5	· 1.2:1 VSWR on a 1.5% band centered at f_0 · Symmetry <0.2 dB · Meet minimum gain at f_0
600—836 MHz	2%	15%	200 MHz	1.5	· 1.2:1 VSWR on a 2% band centered at f_0 · Symmetry <0.2 dB for 2:1 VSWR band · Meet minimum gain at f_0
836—1000 MHz	2.5%	15%	200 MHz	1.5	· 1.2:1 VSWR on a 2.5% band centered at f_0 · Symmetry <0.2 dB for 2:1 VSWR band · Meet minimum gain at f_0
1000—1800 MHz	3%	15%	300 MHz	1.5	· 1.2:1 VSWR on a 3% band centered at f_0 · Symmetry <0.2 dB for 2:1 VSWR band · Meet minimum gain at f_0
1800—1920 MHz	3%	15%	300 MHz	1.5	· 1.2:1 VSWR on a 3% band centered at f_0 · Symmetry <0.2 dB for 2:1 VSWR band · Meet minimum gain at f_0
1920—2150 MHz	4%	15%	20% of band	1.5	· 1.2:1 VSWR on a 4% band centered at f_0 · Symmetry <0.2 dB for 2:1 VSWR band · Meet minimum gain at f_0
2150—2840 MHz	4%	15%	20% of band	1.5	· 1.2:1 VSWR on a 4% band centered at f_0 · Symmetry <0.2 dB for 2:1 VSWR band · Meet minimum gain at f_0
2840—4500 MHz	2%	10%	500 MHz	1.4	· 1.2:1 VSWR on a 2% band centered at f_0 · Symmetry <0.2 dB for 2:1 VSWR band · Meet minimum gain at f_0
4500—6000 MHz	3%	15%	1000 MHz#	1.0	· 1.25:1 VSWR at f_0 (center frequency) · Symmetry <0.2 dB for 200 MHz band · Meet minimum gain at f_0

*The lower frequency of the calibration band cannot be less than 400 MHz.

#The upper frequency of the calibration band cannot exceed 6000 MHz.

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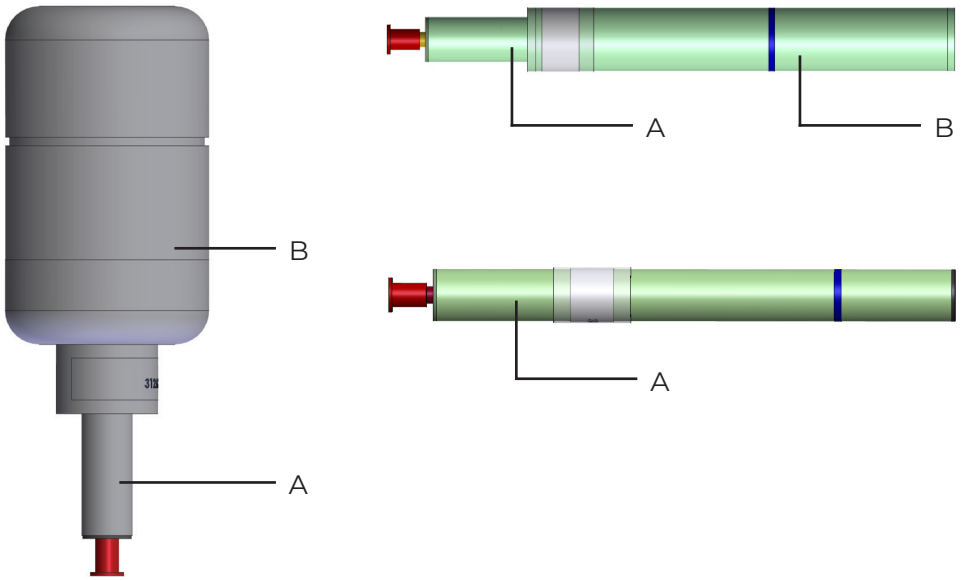
Electrical Specifications

Maximum Continuous Power	1 Watt
Impedance (Nominal)	50 Ohms
Connector	SMA

Physical Specifications

All 3126 Series sleeve dipole antennas weigh approximately .23 kg (0.5 lbs) or less.

Model	Diameter A	Diameter B	Overall Length
3126-700	1.9 cm (0.75 in)	2.69 cm (1.06 in)	39.4 cm (15.5 in)
3126-836	1.9 cm (0.75 in)	2.69 cm (1.06 in)	24.46 cm (9.63 in)
3126-880	1.9 cm (0.75 in)	2.69 cm (1.06 in))	24.46 cm (9.63 in)
3126–920	1.9 cm (0.75 in)	2.69 cm (1.06 in))	24.13 cm (9.50 in)
3126–1225	1.9 cm (0.75 in)	2.69 cm (1.06 in))	22.86 cm (9.00 in)
3126–1575	1.9 cm (0.75 in)	2.69 cm (1.06 in))	21.59 cm (8.50 in)
3126–1845	1.9 cm (0.75 in)	NA	19.51 cm (7.68 in)
3126–1880	1.9 cm (0.75 in)	NA	19.30 cm (7.60 in)
3126–2140	1.9 cm (0.75 in)	NA	19.05 cm (7.50 in)
3126–2450	1.9 cm (0.75 in)	NA	18.75 cm (7.38 in)
3126–3600	1.9 cm (0.75 in)	7.62 cm (3.00 in)	21.11 cm (8.31 in)
3126–5500	1.9 cm (0.75 in)	7.62 cm (3.00 in)	21.11 cm (8.31 in)



MOUNTING

CAUTION

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The 3126 Series sleeve dipole antenna must be mounted to a support at the connector end of the antenna. An ETS-Lindgren mounting kit is recommended to support the antenna.

Under no circumstances should any mounting structure extend inward more than 1.5 inches (38 mm) past the connector end of the antenna. This area approaches the radiating element of the antenna and any material in this region will significantly change the performance of the antenna and affect the accuracy of the measurement. The mounting structure should have a low dielectric and a minimum amount of mass in the region of the antenna.

When mounting to an ETS-Lindgren mounting kit:

- The antenna mount consists of a Teflon® sleeve with small clamp screws to hold the antenna in place.
- Fixed length spacers are then attached to the mounting sleeve to position it at each test position. For repeatable positioning, the antenna must be inserted into the sleeve until it bottoms out in the socket, then the clamp screws should be tightened symmetrically around the antenna to ensure that the axis of the antenna is along the axis of the mount.
- Note that an RF cable must be attached to the antenna prior to inserting it into the mounting socket.
- An optional blind mate socket and adaptor combination is available to allow attaching the cable to the Teflon socket adapter and sliding the antenna with blind mate connector adaptor into the RF socket.

Ferrite loaded RF cables are recommended for use with the 3126 to minimize the interaction with the dipole. ETS-Lindgren offers a line of ferrite loaded cables for this application. Lightweight RF cabling should be used and properly supported to avoid putting unnecessary load on the SMA connector of the antenna. Route cabling away from the antenna along the antenna axis for as far away as is practical to minimize the interaction of the cable with the antenna and to avoid distortion of the antenna pattern.

OPERATION

CAUTION

Before placing into operation, follow the safety information in the ETS-Lindgren *Product Information Bulletin* included with your shipment.

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It is recommended that a 10 dB pad/attenuator be used at the input end of the 3126 Series sleeve dipole antenna to minimize standing waves on the transmit cable. This is especially important for frequencies where the input VSWR is greater than 1.2:1.

The electric field of the antenna is polarized parallel to the antenna axis. The specified antenna gain is realized along the plane perpendicular to the antenna axis and centered at the center of the dipole elements. The center of the dipole elements (bore sight location) is indicated by a line marked on the dipole, approximately 5.9 inches (15 cm) from the base (connector end) of the antenna housing.