Model 3127

Resonant Loop Antenna

User Manual

ETS·LINDGREN®
An ESCO Technologies Company

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Revision Record | Model 3127, MANUAL | Part #399277, Rev. C

Revision	Description	Date
A	Initial Release	January, 2004
B	Updated branding: Revised to meet Style Guide specifications; PIB included with release; Added list of available frequencies	July ,2009
C	Added Model 3127-5500	July, 2014

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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.

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

General Safety Considerations

WARNING	It has been determined through testing that the application of additional labels of any kind (i.e. calibration labels, asset labels, etc.) will adversely affect the characteristics of these loop antennas.

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1.0 Introduction

ETS-Lindgren Model 3127 Resonant Loop Antennas are magnetic dipole antennas designed to meet the Cellular Telecommunication and Internet Association's (CTIA)) +/- 0.1 dB symmetry requirement for ripple test measurements at the labeled center frequency. These omni-directional antennas have a magnetic dipole pattern approaching that of a half wave resonant electric dipole. The pattern produced has the same peak and null orientation as that of a sleeve dipole oriented along the same axis, but with the directions of the electric and magnetic fields reversed. That is, the electric field vector along the azimuth is perpendicular to the axis and the magnetic field vector is parallel to the axis.

The loop design allows the antenna to be end-fed to avoid cable and feed-point interactions that interfere with the symmetry of the antenna. Integral quarter-wave chokes and/or ferrite loading (depending on frequency range) also help to reduce cable interaction. This design also provides exceptional symmetry to meet the CTIA criteria for ripple test antennas.

All Model 3127 antennas are designed with better than +/- 0.1 dB symmetry (0.2 dB peak-to-null) in at least a +/- 5 MHz band around the labeled center frequency. VSWR is less than 5:1 at the resonant frequency, which is slightly higher than the labeled symmetry frequency. For reference purposes, gain and symmetry values are provided for a 200-300 MHz band, depending on model, centered about the labeled frequency. The loops have nominal 50 ohm impedance, a maximum continuous transmit power of one watt, and are equipped with a female SMA connector.

The loops are calibrated using an A2LA accredited process with a typical measurement uncertainty on the order of +/- 1.0 dB at the center frequency. During the calibration process, the dipoles are also certified to meet ± 0.1 dB symmetry required for use in the ripple test specified in the CTIA's Over-The-Air Performance Test Plan, in a +/- 5 MHz band around the labeled center frequency. Maximum ripple, VSWR, and approximate gain values are provided with each calibration. Note that the gain values provided with this calibration are for diagnostic reference purposes only. For accurate gain values to perform range calibration, the Model 3126 Precision Reference Sleeve Dipoles are recommended. Individual calibration data is included with each dipole.

The Model 3127 antenna family covers a range of frequencies intended for characterization of wireless chambers including, but not limited to, the following models:

3127-450	3127-1800
3127-700	3127-1868
3127-836	3127-1880
3127-880	3127-1950
3127-897	3127-2140
3127-920	3127-2450
3127-1747	3127-2535
3127-1768	3127-2655
	3127-5500

The digits following the hyphen in the model name note the center frequency of the antenna. For example, Model 3127-450 has a center frequency of 450 MHz. This manual applies to the frequencies listed as well as any custom frequencies.

Standard Configuration

- Loop antenna
- A2LA accredited precision calibration and symmetry certification included signed certificate of calibration

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 loop antenna is limited to external components such as cables or connectors.

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

Maintenance Recommendations

Use a clean soft cloth moistened with water should the Model 3127 require cleaning. Do not use any harsh or abrasive chemicals to clean the loop antenna as they may damage the components.

Annual Calibration

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

Replacement and Optional Parts

Following are the part numbers for ordering replacement or optional parts for the Model 3127.

Part Description	Part Number
Model 3127 Loop Antenna	3127-xxxx (xxxx=center frequency)

Upgrade Policies

Periodically, Field Probes are upgraded to enhance functionality. Contact ETS-Lindgren Customer Service for the upgrade status of your Field Probe.

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

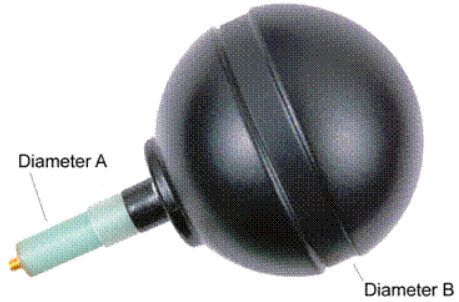
Electrical Specifications

VSWR Ratio (Average)	<5:1 Typical
Max. Continuous Power	1 Watt
Impedance (Nominal)	50 Ohms
Connector	SMA

The symmetry is guaranteed over a 10MHz span less than 1880 MHz, above that frequency the symmetry is only guaranteed at the nominal frequency.

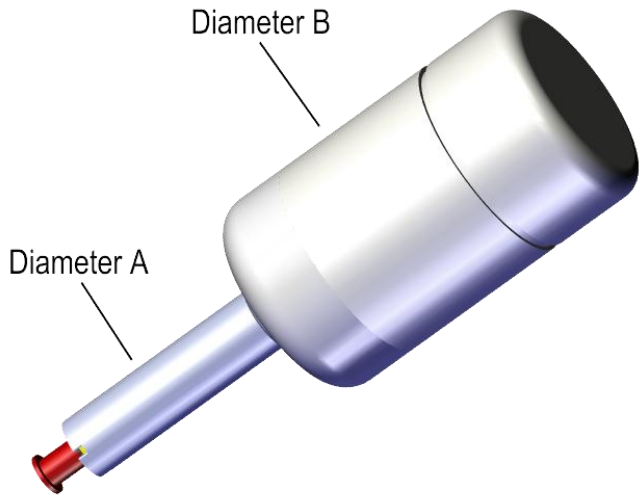
Physical Specifications

Diameter A:	1.9 cm (0.75 in)
Diameter B:	12.7 cm (5.0 in)
Length:	21.6 cm (8.5 in)



All units are the same size except for those units under 700 MHz.

Physical Specifications 3127-5500 Only



Diameter A:	1.9 cm (0.75 in)
Diameter B:	6.4 cm (2.5 in)
Length:	18.7 cm (7.38 in)

4.0 Operation

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

Mounting

All items mentioned in the Mounting section are options. Please contact ETS-Lindgren Customer Service for additional information.

The Model 3127 Resonant Loop Antennas should 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 3.81cm (1.5 inch) 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 are 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 Model 3127 to minimize the interaction with the loop. 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 as far as practical to minimize the interaction of the cable with the antenna, and to avoid distortion of the antenna pattern.

Operational Considerations

For the purpose of ripple test measurements, the loop may normally be used without any additional considerations. However, should large standing wave effects be noticed, it is recommended that a 3 to 10 dB pad/attenuator be used at the input end of the antenna to minimize standing waves on the transmit cable.

The magnetic field of the antenna is polarized perpendicular to the antenna axis. The specified symmetry is realized along the plane perpendicular to the antenna axis and centered at the location of the loop element. The location of the loop (bore sight location) is indicated by the centerline of the plastic radome covering the antenna, approximately 15 cm (5.9 inches) from the base, connector end, of the antenna mounting.

It is required that a 10dB pad/attenuator be used at the input end of the 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.

Appendix A: Warranty

See the *Product Information Bulletin* included with your shipment for the complete ETS-Lindgren warranty for your Model 3127.

DURATION OF WARRANTIES FOR MODEL 3127

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 3127 Resonant Loop Antenna	2 Years