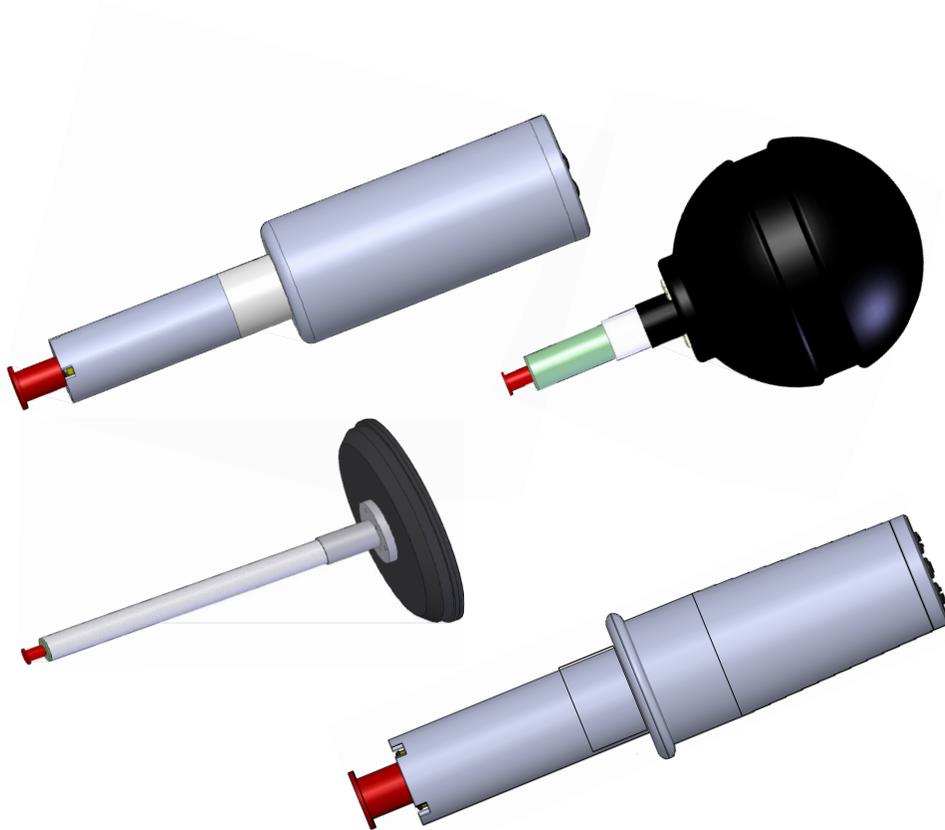


Model 3127 Resonant Loop Antenna

User Manual



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Revision Record
MANUAL, 3127 | Part # 399277 Rev E

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
D	Revised design of Model 3127 5500.	May, 2016
E	Updated Gain information in Introduction; updated model list; added 3127-450 and 3127-3600 models physical specs	April, 2020

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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>

SAFETY INFORMATION

	<p>Refer to Manual: When product is marked with this symbol, see the instruction manual for additional information. If the instruction manual has been misplaced, download it from www.ets-lindgren.com, or contact ETS Lindgren Customer Service.</p>
	<p>High Voltage: Indicates presence of hazardous voltage. Unsafe practice could result in severe personal injury or death.</p>
	<p>High Voltage: Indicates presence of hazardous voltage. Unsafe practice could result in severe personal injury or death.</p>
	<p>Protective Earth Ground (Safety Ground): Indicates protective earth terminal. You should provide uninterruptible safety earth ground from the main power source to the product input wiring terminals, power cord, or supplied power cord set.</p>



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

GENERAL SAFETY CONSIDERATIONS



Before power is applied to this instrument, ground it properly through the protective conductor of the AC power cable to a power source provided with the protective earth contact. Any interruption of the protective (grounding) conductor, inside or outside the instrument, or disconnection of the protective earth terminal could result in personal injury.



Before servicing: contact ETS-Lindgren – servicing (or modifying) the unit by yourself may void your warranty. If you attempt to service the unit by yourself, disconnect all electrical power before starting. There are voltages at many points in the instrument which could, if contacted, cause personal injury.



Only trained service personnel should perform adjustments and/or service procedures upon this instrument. Capacitors inside this instrument may still be CHARGED even when instrument is disconnected from its power source.



Only qualified personnel should operate (or service) this equipment.

WARNING

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 Model 3127.

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. For reference purposes, gain and symmetry values are provided for a 10 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. Gain value is not provided with the 3127-3600 and 3127-5500 Loops. Any gain data provided for any 3127 loop is for reference only.

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	3127-1575	3127-2132
3127-617	3127-1732	3127-2140
3127-700	3127-1747	3127-2450
3127-722	3127-1768	3127-2535
3127-836	3127-1800	3127-2655
3127-880	3127-1868	3127-3600
3127-897	3127-1880	3127-5500
3127-920	3127-1950	

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

- Model 3127 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

MAINTENANCE

CAUTION

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

WARNING

WARNING: Maintenance of the Model 3127 is limited to external components such as cables or connectors.



Only qualified personnel should operate (or service) this equipment. 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 Resonant Loop Antenna require cleaning. Do not use any harsh or abrasive chemicals to clean the Model 3127 as they may damage the components.

Replacement Parts

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

Part Description	Part Number
Model 3127 Resonant Loop Antenna	3127-XXXX (XXXX=Center Frequency)

Service Procedures

Contacting ETS-Lindgren

Note: 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

Electrical Specifications

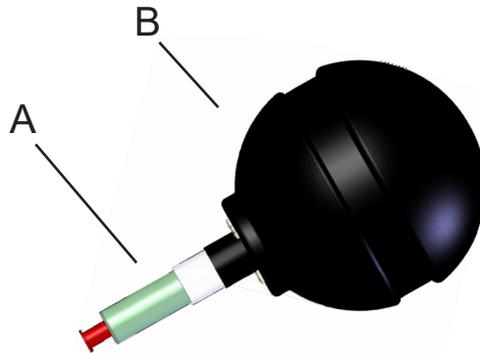
VSWR Ratio (Average)	<5:1 Typical
Max. Continuous Power	1 Watt
Impedance (Nominal)	50 Ohms
Connector	SMA

Note: All loops are tested to ensure the symmetry is less than 0.2 dB over a 10 MHz span from the center frequency.

Physical Specifications (General)

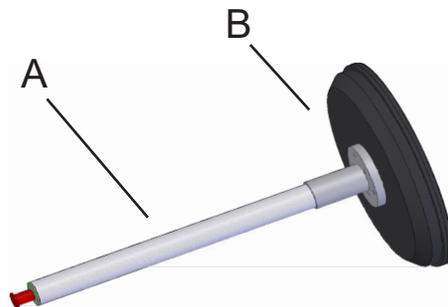
Diameter A	1.9 cm (0.75 in)
Diameter B	12.7 cm (5.0 in)
Length	21.6 cm (8.5 in)

Note: Unless otherwise noted, all units are the same size except for those units under 600 MHz.



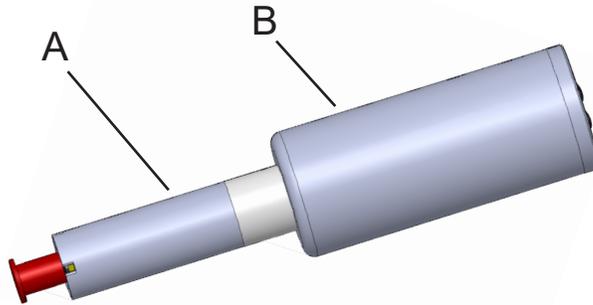
Physical Specifications 3127-450

Diameter A	1.9 cm (0.75 in)
Diameter B	16.87 cm (6.64 in)
Length	16.3 cm (6.43 in)



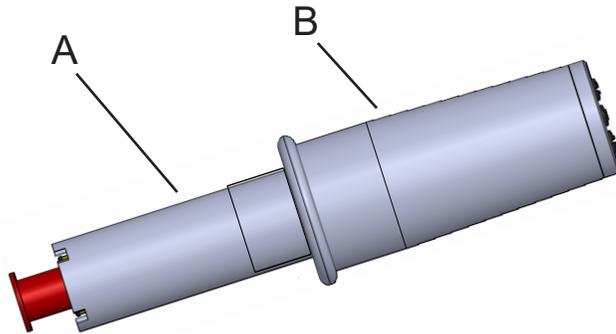
Physical Specifications 3127-3600

Diameter A	1.9 cm (0.75 in)
Diameter B	3.69 cm (1.46 in)
Length	16.2 cm (6.36 in)



Physical Specifications 3127-5500

Diameter A	1.9 cm (0.76 in)
Diameter B	3.3 cm (1.30 in)
Length	16.8 cm (6.62 in)



OPERATION

CAUTION

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

Mounting



Note: All mounting items mentioned in this 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 3.81 cm (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.
- 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 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 Model 3127 may normally be used without any additional considerations. However, should large standing wave effects be noticed, it is recommended that a 3 dB 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 feed 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. For the 3127-3600 and 3127-3700, the centerline is the seam where the end cap (with the "Calibration Void" label) meets the stem.

It is recommended that a 10 dB 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.

All product warranties, except the warranty of title, and all remedies for warranty failures are limited to the duration specified in the table.

Duration of Warranty for 3127 Resonant Loop Antenna

Product Warranted	Duration of Warranty Period
Model 3127 Resonant Loop Antenna	2 Years

