TRANZEO
WIRELESS TECHNOLOGIES INC.

PxP QUICK START GUIDE
TR-SL5-XX-48

REVISION 1.0
FIRMWARE 5.0.6
2010-08-13

SAFETY PRECAUTIONS

⚠ YOU MUST READ AND UNDERSTAND THE FOLLOWING SAFETY INSTRUCTIONS BEFORE INSTALLING THE DEVICE:

- The antenna's grounding system must be installed in accordance with Articles 810-15, 810-20, 810-21 of the National Electric Code, ANSI/NFPA No. 70-1993. If you have any questions or concerns about your antenna's grounding system, please contact a local licensed electrician for assistance.
- Never attach the grounding wire while the device is powered.
- Turn off the circuit before attaching any ground wires to an existing electrical circuit.
- Only use Tranzeo approved Power-over-Ethernet (PoE) injector for your device.
- Never install radio equipment, surge suppressors, or lightening protection during a storm.

LIGHTENING PROTECTION

The key to Lightening Protection is providing a harmless route for lightening to reach the ground. The system should not be designed to attract lightening, nor can it repel lightening. National, State, and Local codes are designed to protect life, limb and property, and must always be obeyed.

When in doubt, consult local and national electrical codes or contact a licensed electrician with expertise in the design and installation of grounding systems.

FCC INFORMATION

This equipment has been tested and found to comply with the limits for Class B digital devices pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed in accordance with the instructions in the user manual, may cause harmful interference to radio communication.

Operation of this equipment in residential areas is likely to cause harmful interference, in which case users will be required to correct the interference at their own expense. The users should not modify or change this device without written approval from Tranzeo Wireless. Modification will void warranty and authority to use the device.

For safety reasons, people should not work in a situation where RF exposure limits could be exceeded. To prevent this situation, the users should consider the following rules:
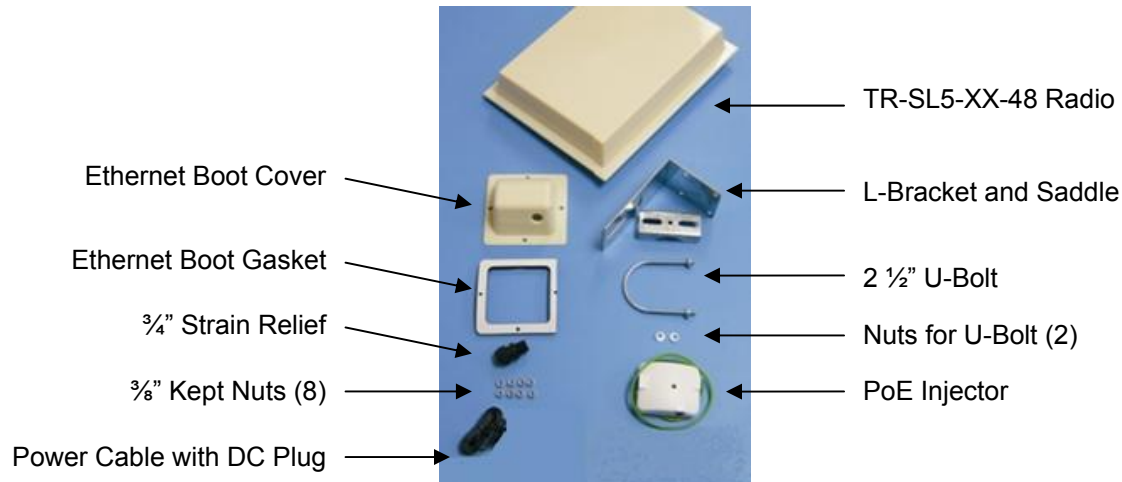
- Install the antenna so that there is a minimum of 100 cm (39.37 in) of distance between the antenna and people.
- Do not turn on power to the device while installing the antenna.
- Do not connect the antenna while the device is in operation.
- Do not collocate or operate the antenna used with the device in conjunction with any other antenna or transmitter.

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Hardware Installation

The TR-SL5 Series radio is easy to install. Please follow the instructions in this guide to install and set up your device. Before starting, please ensure that all the parts and tools listed below are available, and determine best location and orientation of the device. Once ready, follow the instructions on how to install the Ethernet cable, mount the device, ground the device, and take the necessary steps to properly install and configure your device.

Ethernet Boot Cover
Ethernet Boot Gasket
¾" Strain Relief
⅜" Kept Nuts (8)
Power Cable with DC Plug

TR-SL5-XX-48 Radio
L-Bracket and Saddle
2 ½" U-Bolt
Nuts for U-Bolt (2)
PoE Injector

Product Kit

Before installation, make sure that you have the following items:

- 1 x TR-SL5-XX-48 Radio
- 1 x Power over Ethernet (PoE) Injector
- 1 x Power Cable with DC Plug
- 1 x Ethernet Boot Cover
- 1 x Ethernet Boot Gasket
- 1 x ¾" CAT5t Cable Strain Relief
- 1 x L-Bracket
- 8 x 3/8" Kept Nuts
- 1 x 2 1/2" U-Bolt
- 2 x Nuts for U-Bolt

If any of the above items is not included or damaged, please contact your local dealer for support.

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Required Tools

- One 3/8" wrench
- One 1/2" wrench
- One 7/8" wrench
- One TJ-45 Crimper
- CAT5 cable that is long enough to connect the radio to the Power-over-Ethernet (PoE) injector
- 2 RJ-45 Jacks
- #6 Green wire that is long enough to connect the radio to building ground

Site Selection

Before proceeding with the installation, determine the best placement of the device to ensure optimum RF performance and maximum range. A site survey should be performed to determine optimal location. For best results, please ensure that the CPE is within line-of-site of the Access point. **Obstructions may impede the performance of the device.**
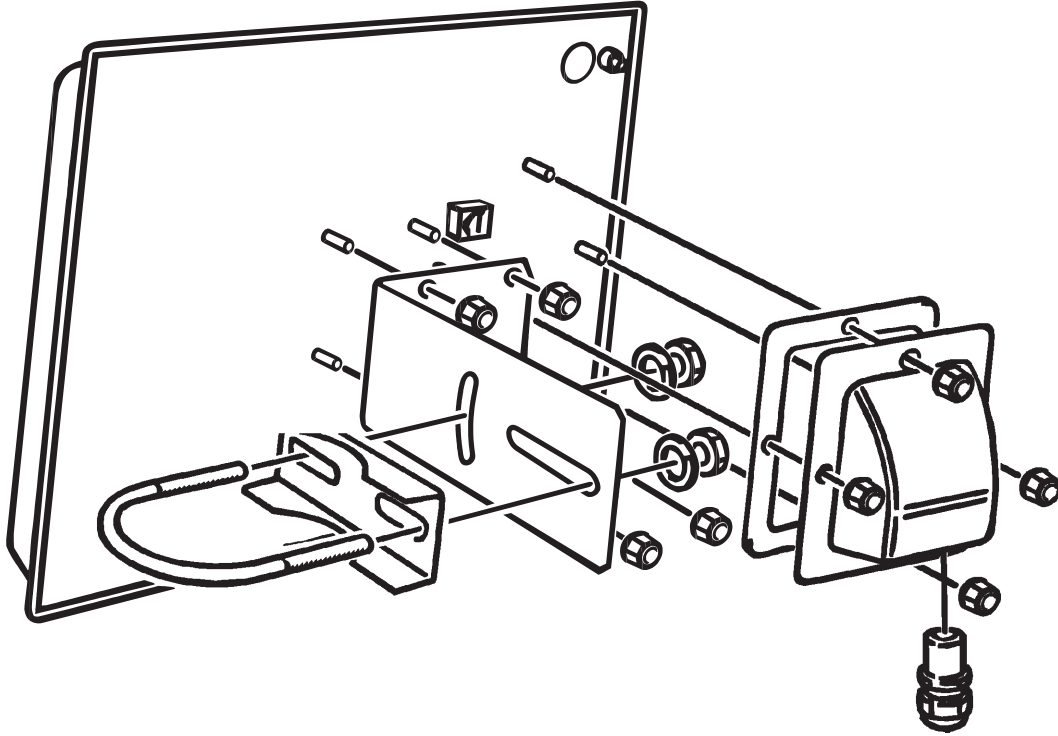
Polarity

Determine if the antenna's polarization will be horizontal or vertical before installation. The TR-SL5 series radio can be used in either polarity. The Ethernet boot cover should always be placed so that the cable runs toward the ground for maximum environmental protection.

Power Supply

Only use supplied PoE injector and **–48VDC** supply to power the TR-SL5-XX-48 radio. Otherwise, the product may be damaged and will not be covered by the Tranzeo warranty.

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INSTALLATION GUIDE
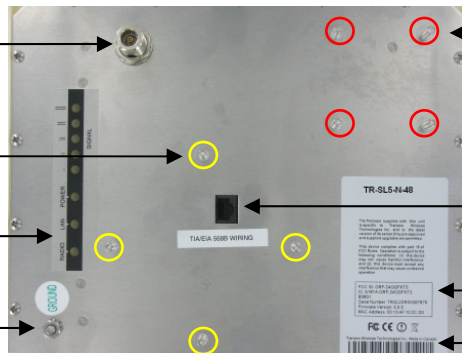

Product Description

Back Panel

N-Type Female Antenna Connector
(TR-SL5-N-48 model only) ⟶

Studs for Boot Cover (4) ⟶

LED Indicators Panel ⟶

Ground Lug ⟶

⟵ Studs for L-Bracket (4)

⟵ RJ-45 Ethernet Jack

⟵ MAC Address

⟵ Serial Number

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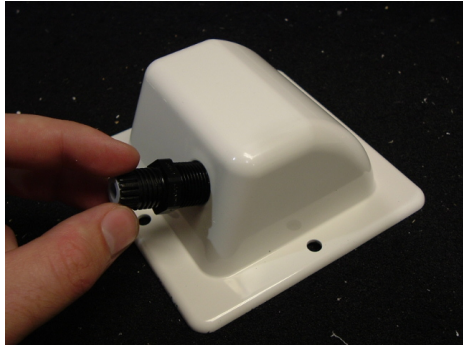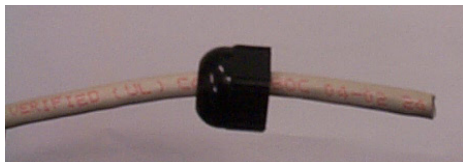
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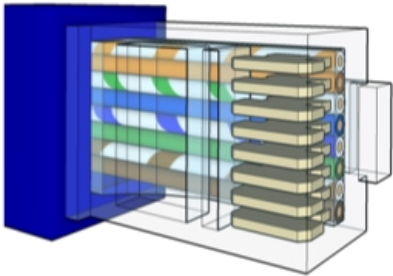
LED Indicators Operation

LED(s)	Color	Indicators
Radio	● Red	**On:** Radio link **Flashing:** Radio activity **Off:** No radio link
LAN	● Red	**On:** Ethernet link **Flashing:** Ethernet traffic **Off:** No Ethernet link
Power	● Red	**On:** Powered on **Off:** No power or LED's Disabled
Signal (CPE or PxP Mode) In CPE mode, LEDS will turn on sequence to indicate signal strength based on Signal-to-Noise level.	● Amber	1 to 10 db above noise
	● Amber	11 to 15 db above noise
	● Amber	16 to 20 db above noise
	● Amber	21 to 30 db above noise
	● Amber	31 or more db above noise

LED(s)	Color	Indicators
Signal (AP Mode)	● Amber	**On:** Radio link **Flashing:** Radio activity **Off:** No radio link
	● Amber	**On:** Ethernet link **Flashing:** Ethernet traffic **Off:** No Ethernet link
	● Amber	**On:** Powered on **Off:** No power or LED's Disabled
	● Amber	**On:** ACL enabled **Off:** ACL off
	● Amber	**On:** WDS enabled **Off:** WDS off

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Installing the Ethernet Cable
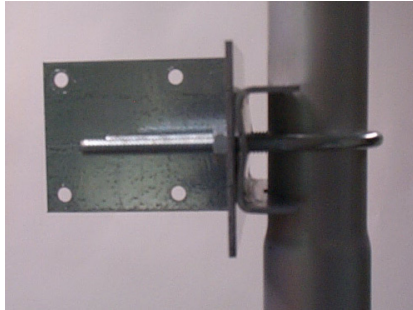
Step	Illustration	Details
1		Insert the CAT5 cable strain relief without the cap nut into the port opening of the Ethernet boot cover.
2		Using a 3/4" wrench, tighten the strain relief until it touches the boot cover. IMPORTANT: Use hand tools only. Do not over tighten.
3		Insert the end of the CAT5 cable through the cap nut of the strain relief.
4		Pull the end of the CAT5 cable through the strain relief, and then attach the RJ-45 connector as per the following **EIA/TIA-T568B** wiring standards. W/Orange Orange W/Green Blue W/Blue **Green** W/Brown Brown

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5		Place the gasket over the 4 studs around the Ethernet port.
6		Plug the CAT5 cable into the Ethernet port, and fit the boot cover over the 4 studs and gasket. Secure with 4 kept nuts and tighten using a 3/8" wrench until the gasket is at least 50% compressed. Do not over tighten. Remember to place the boot cover according to the desired polarization, so that the strain relief is pointing down towards ground.
7		Place the cap nut over the strain relief and tighten.

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Mounting the Radio

Step	Illustration	Details
1		Attach the mounting bracket to the pole using the U-bolt, and secure the U-bolt with the lock washers and nuts. Align if necessary, and then tighten the nuts enough to prevent any movement.
2		Down or up tilt can be adjusted by swinging the unit before tightening the U-Bolt.
3		Fit the radio to the mounting bracket, and secure the radio with the kept nuts. IMPORTANT! The strain relief must always be pointing downwards for maximum environmental protection.
4		Using #6 green grounding wire, connect the grounding lug on the radio to a proper ground. Refer to Appendix A for more information on Grounding and Lighting Protection.

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Connecting the Radio
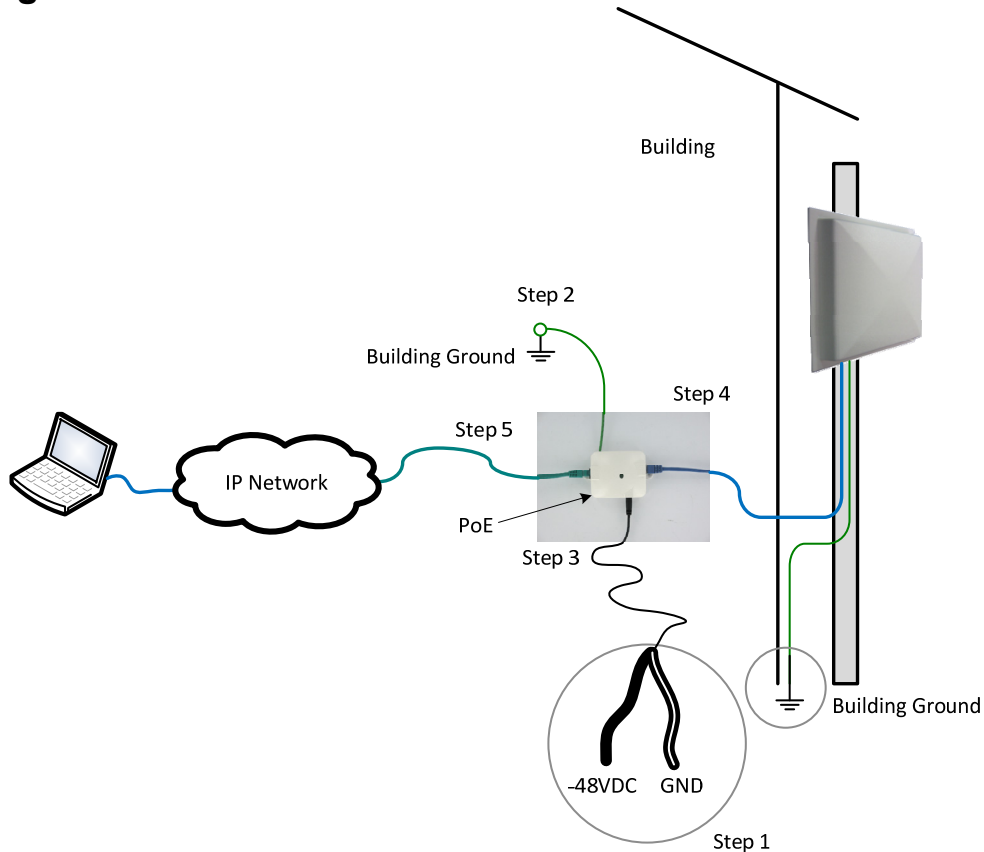
Step 1: Connect the power wires to –48VDC supply by connecting the solid black wire to the –48VDC terminal and the black wire with white stripe to the GND terminal.

Step 2: Connect POE Green wire for data line protection to building ground.

Step 3: Plug the power cable into the POE. The POE adapter will be powered on and the power indicator LED on the top panel will turn on.

⚠ **IMPORTANT:** If the LED doesn't turn on, then unplug the power cable immediately and double check wiring and power supply polarity.

Step 4: Connect the CAT5 cable from the radio into the RJ-45 jack marked "CPE" on the POE adapter. The POE adapter is not weather-proof and should be installed indoors.

Step 5: To configure the TR-SL5 Series radio, connect the Ethernet cable into the RJ-45 jack marked "PC" on the POE adapter and to the computer network. Ensure that the distance between the computer and the radio does not exceed 300 ft (90 m).

Note: If connecting to a hub or switch, a crossover cable may be required.

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Best Practices

1. Always try to run the CAT5 or LMR cable inside the mounting pole whenever possible to help insulate the cable from air surges.

2. Keep all cable runs as straight as possible. Never put a loop into the cables.

3. Test all grounds to ensure that you are using a proper Ground. If using an electrical socket for Ground, use a socket tester, such as Radio Shack 22-141.

4. Follow the guidelines in the National Electrical Code Guide.

5. If you are uncertain about the grounding at this location, then drive your own rod and bond it to the building ground to ensure proper grounding.

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Configuring the Radio

The TR-SL5 Series radio can be configured through the HTML configuration interface, which is accessible using any Internet browser.

Before accessing the configuration interface, you have to change the network connection settings in your computer to be on the same subnet as the radio.

Use the following default values to initially access the radio.

Default IP address: **192.168.1.100**

Default User Name: **admin**

Default Password: **default**

Passwords

When you access the Web Interface for the first time, you will be required to enter new administrator and recovery passwords. The recovery password must be different than the administrator password. Neither of these passwords can be left as **default**. These passwords must be changed to access the device. If you do not enter new passwords, you will be returned to this page.

Password Set/Reset

Use this screen to set or reset the passwords to your device if they've been lost or inadvertently changed. For security reasons, you must set both the normal administration password and the recovery passwords before accessing the administration interface.

The recovery password is available for 5 minutes after powering the device on. After 5 minutes the device must be power-cycled to reactivate the recovery password; this helps prevent abuse of the recovery password by users without physical access to the device.

Note: You must set both the normal administration and recovery passwords before using the administration interface.

Administration Password

Username: admin — This is the normal account used to administer the device.

Password: — This password is currently set to the factory default. You must set this password before using the administration interface.

Confirm:

Recovery Password

Username: recover — This is a special account used to recover the administration password if it has been lost or inadvertently changed.

Password: — This password is currently set to the factory default. You must set this password before using the administration interface.

Confirm:

[Apply]

Network Configuration

By default, Bridge network mode is selected, so all you need to do is specify IP settings for each radio. If **Static** IP mode is selected, then ensure that each radio is assigned a unique IP address. Or, set IP mode to DHCP Client, if necessary.

Network Configuration

Mode | Advanced | Shaping / QoS

Select Mode: Bridge

IP Mode: ● Static ○ DHCP Client
IP Address: 192.168.1.50
Subnet Mask: 255.255.255.0
Gateway: 192.168.1.1
DNS1: 64.114.87.10
DNS2: 0.0.0.0
Domain Name:

☐ Block Reverse DHCP

[Apply] [Back to Information Page]

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Wireless Settings for PxP Mode

Point-to-Point (PxP) mode is a Layer 2 transparent protocol optimized for backhaul use. PxP mode is recommended whenever two network segments are to be bridged.

Wireless Mode ❶
Set one radio to Access Point (AP) and the other radio to Infrastructure Station (CPE).

SSID ❷
Enter the **same** SSID on both AP and CPE. Both radios must have the same SSID to associate. The SSID can have up to 32 characters.

Visibility Status
Make the AP visible or invisible to clients.

Location
Set the location of the radio to Outdoor or Indoor.

Channel Width
Select the channel width to be used. This value must match on both AP and CPE.

Channel ❸
Select the channel to be used on the AP.

Supported Tx Rates
Select the data rates at which the radios will transmit. Basic rates are indicated with an "*". All Basic rates supported by the AP must also be supported by the CPE; otherwise, it may not associate.

Using TX Rate
Set the data rate that the AP and CPE will use to communicate.

Link Distance ❹
Set the distance between the AP and CPE on both radios. This setting is necessary to define the correct ACK timing. Setting this value too low or too high will result in low throughput and high retries.

PxP Mode Enabled ❺
Select on both AP and CPE to enable PxP mode.

PxP MAC Address ❻
Enter the MAC address of the CPE on the AP, and the MAC address of the AP on the CPE.

Block Inter-client Traffic
Select on AP to block direct wireless communications between clients in a point-to-multi-point network.

Power Cap
Set the maximum output power for each radio.

Country ❼
Select the country where the device is located. Setting an incorrect country may be considered a violation of applicable laws, as local rules differ in each country.

Antenna Gain ❽
Specify the gain of the antenna. This information must be set by the installer at the time of installation.

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Notes:

1. In PxP mode, the Signal LEDs on the radios will operate the same way as in **Infrastructure Station** mode on both the AP and CPE, indicating signal strength. See Page 6 for description of signal LEDs operation.

2. Link distance must be set on both AP and CPE, and needs to be within +/-10% of the actual distance to avoid negative impact on throughput.

3. For optimum performance, at least 4 signal LED's should be on.

4. Perform Tx and Rx throughput tests across the link using Tranzeo's **ipThroughput** program.

5. Set visibility status to **Visible** during installation for troubleshooting, then change it to **Invisible** for normal operation.

6. If encryption is required, use AES encryption to minimize impact on throughput. It's the most secure and the device has built-in assist engine for it.

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APPENDIX A: Lighting Information

What is a proper Ground?

This antenna must be grounded to a proper Earth Ground. According to the National Electrical Code Sections 810-15s and 810-21, the grounding conductor shall be connected to the NEAREST accessible locations of the following:

      a) The building / structure grounding electrode
      b) The grounded interior metal water piping system
      c) the power service accessible means external to enclosure
      d) the metallic power service raceway
      e) the service equipment enclosure
      f) the grounding electrode conductor

The important thing is to connect to ground at the nearest point.

Why is coiling the LMR or CAT5 bad?

The myth is that lighting follows the path of least resistance. It actually follows the path of least impedance. Coiling cables creates an air-wound transformer, which lowers the impedance. This means you are in fact making your radios a more appealing target for surges.

What standard does Tranzeo Wireless equipment meet?

This radio exceeds International Standard IEC 61000-4-5 when properly grounded. For a copy of the full testing report, see *Report Number TRL090904 - Tranzeo Surge Protection board* located on the Tranzeo website.

Is lightning damaged covered by the Warranty?

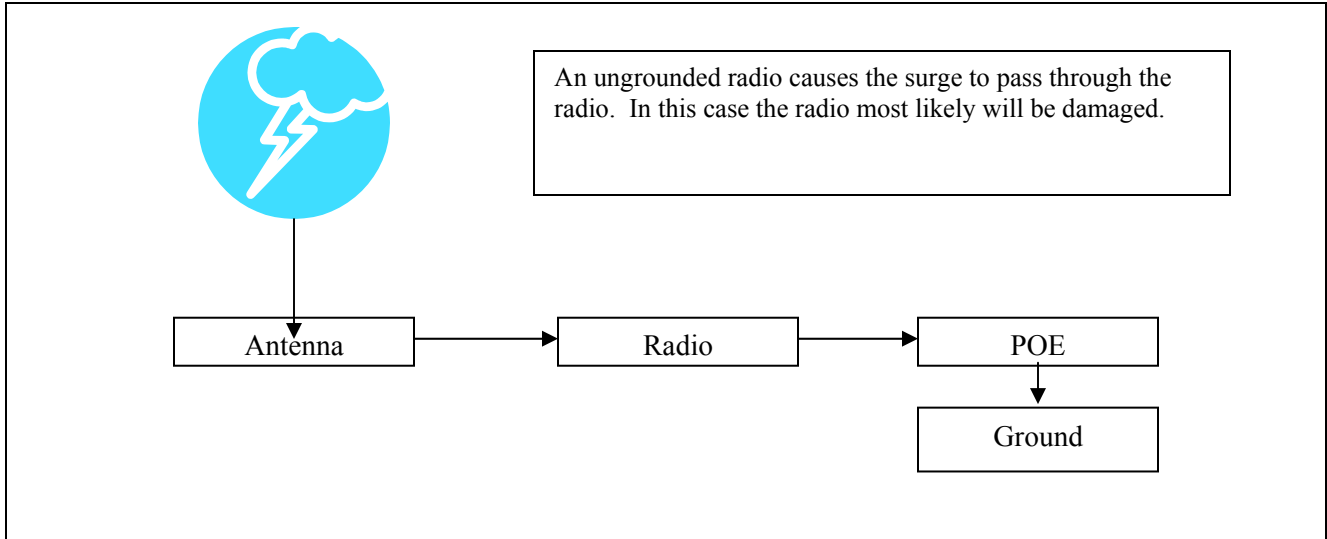No. Lightning is not covered by the warranty. If you follow the instructions, you chances of lightning damage are greatly reduced, but nothing can protect a radio from a direct lightning strike.

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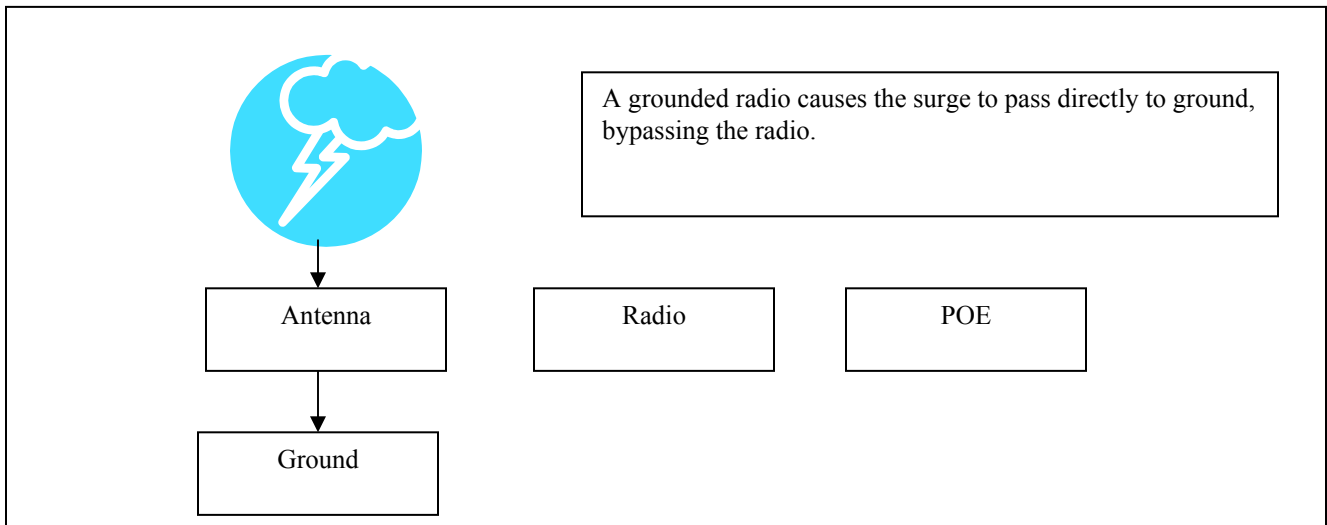**TRANZEO**
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Where to Ground the device

This radio must be grounded at the Pole **AND** at the POE. This is because the radio is between the Exterior Antenna and the POE ground. See the examples below

Ungrounded Radio

An ungrounded radio causes the surge to pass through the radio. In this case the radio most likely will be damaged.

Antenna → Radio → POE → Ground

Grounded Radio

A grounded radio causes the surge to pass directly to ground, bypassing the radio.

Antenna → Ground   Radio   POE

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Ungrounded POE

Mounting Pole

POE

Cat 5 Cable

In this case, the surge will be picked up by the Cat 5 cable, and since the POE is not grounded, the route for the surge is through the radio to the antenna, and out through the building.

Grounded POE

Mounting Pole

Ground ← POE

Cat 5 Cable

In this case, the surge will be picked up by the Cat 5 cable, and since the POE is grounded, the route for the surge is through the POE to ground.

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