

INSTALLATION GUIDE

DQ0266170/O.02

TERRAWIN

Release 1.0



RADWIN

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Chapter 1: Introduction

1.1 Scope of This Document

This document shows how to install TerraWIN radios, including Distribution Nodes and Client Nodes. For a detailed description of how to configure TerraWIN radios, see the TerraWIN Configuration Guide.

1.2 TerraWIN Overview

1.2.1 Basic Deployment

The TerraWIN system consists of a mesh of several *sites*, where each site has radio units, with each radio unit being called a “*node*”. The complete mesh is called a “*Network Segment*”.

- The nodes in the sites of the mesh provide broadband coverage from the backhaul network to the area that is to be served. Each site usually consists of 4 nodes (radio units), where each are installed pointing at right angles to the other (90 degrees), so that all 4 cover 360 degrees¹. Each of these nodes is called a “Distribution Node”.
- At least one site *must* be connected to the backhaul network. This site is called the POP Site. Other sites are usually not connected to the backhaul network.

Wireless traffic is brought to the end user from a Distribution Node to a “Client Node” - an additional radio unit that is installed at the end customer site, which communicates with the closest and most convenient Distribution Node.

1. Some sites may have fewer than 4 nodes, usually at the edge of the service area. Such a site need not cover a full 360 degrees. Some sites may have the radios installed at angles different from 90 degrees, depending on the circumstances.

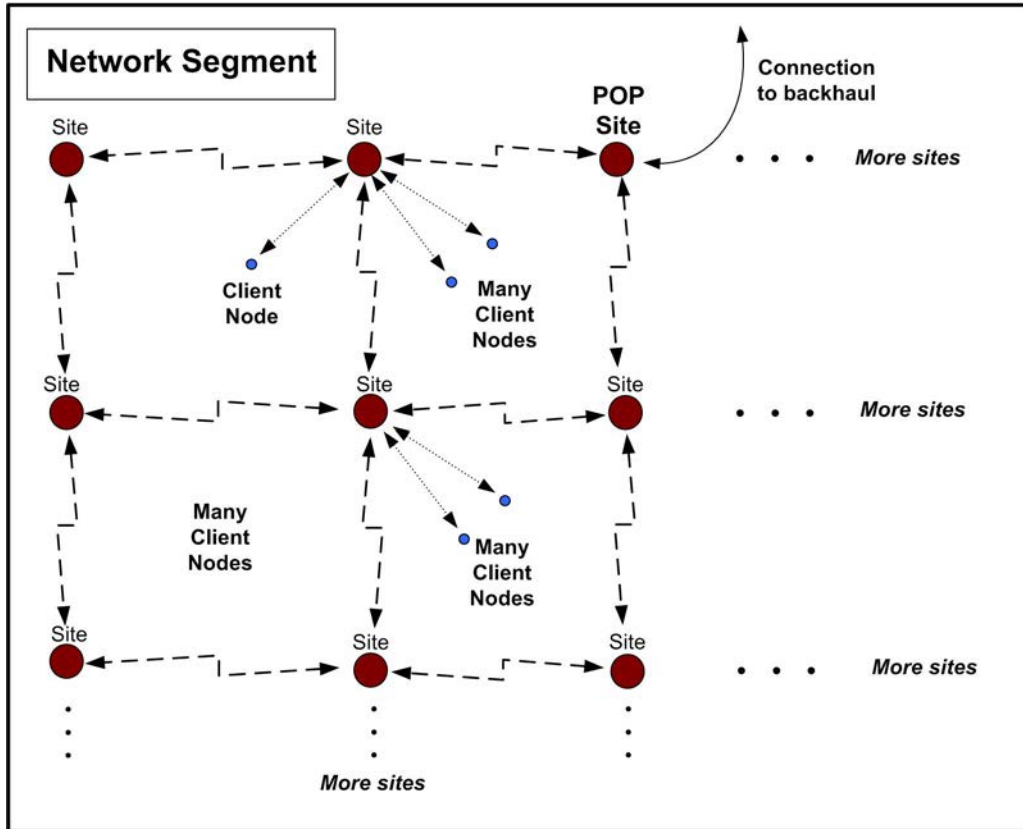


Figure 1-1: Basic TerraWIN deployment

A more detailed look at a site:

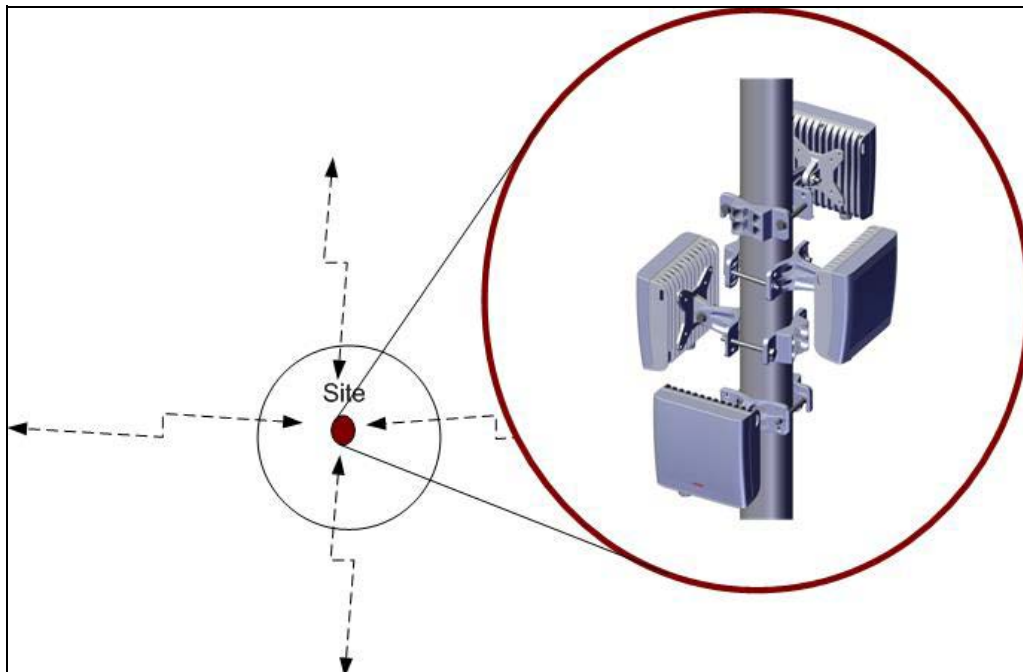


Figure 1-2: Nodes at Sites

Some sites are on the sides or edges of the network segment, and require only 3 nodes:

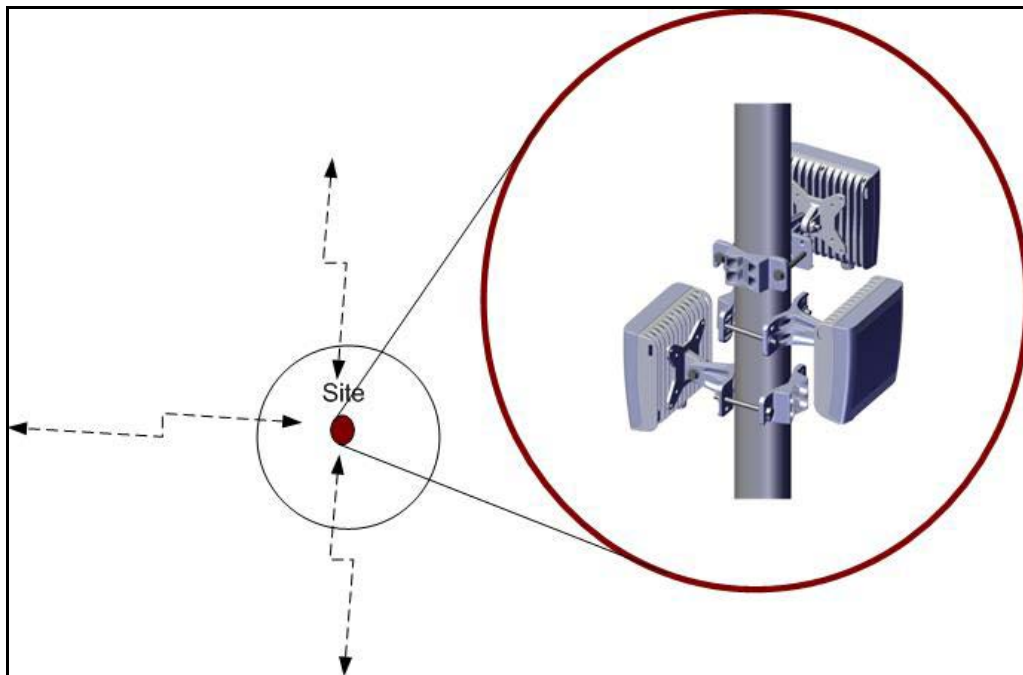


Figure 1-3: Three Nodes at side Sites

Some sites are at the corners of the network segment and require only 2 nodes:

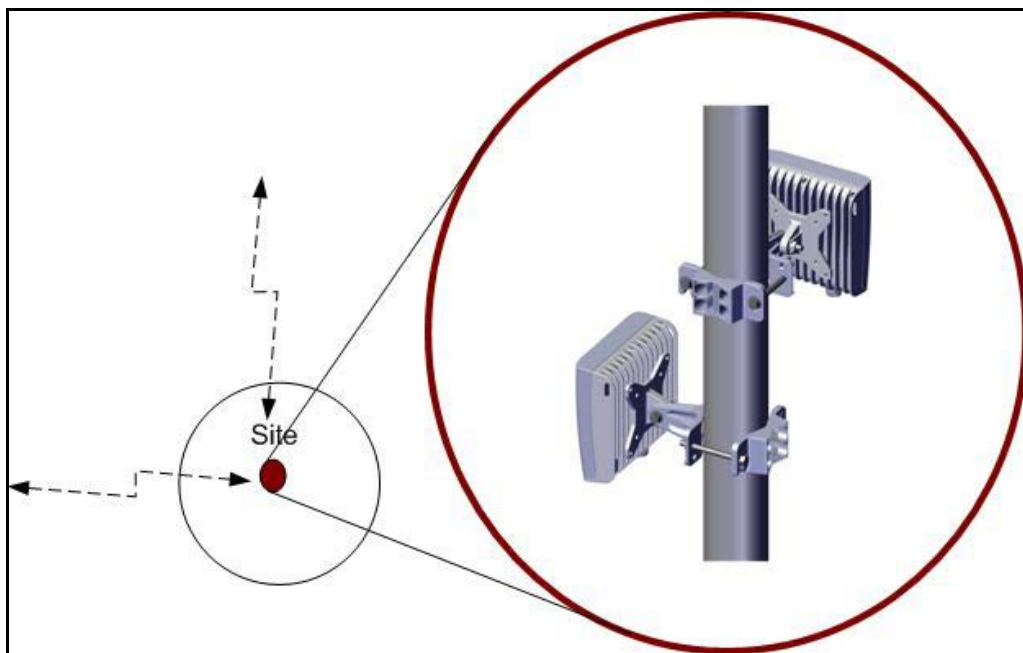


Figure 1-4: Two Nodes at Corner Sites

1.2.2 TerraWIN Radio Unit (Node)

The TerraWIN radio unit is shown below. Both Distribution Nodes, and Client Nodes are physically the same. The difference between the two is in the software.



Figure 1-5: TerraWIN radio unit (node)

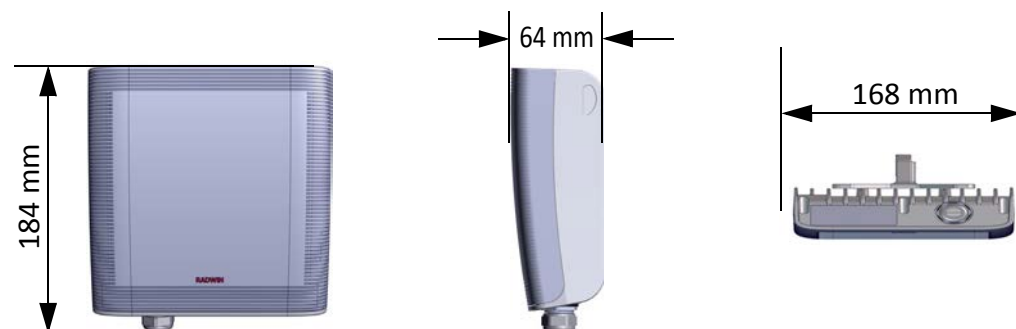


Figure 1-6: TerraWIN radio unit (node) external dimensions

1.2.3 TerraWIN Power Supply

The TerraWIN Distribution Nodes can be supplied by either a PoE or by the ODU-S. Client Nodes are supplied by a PoE.

PoE

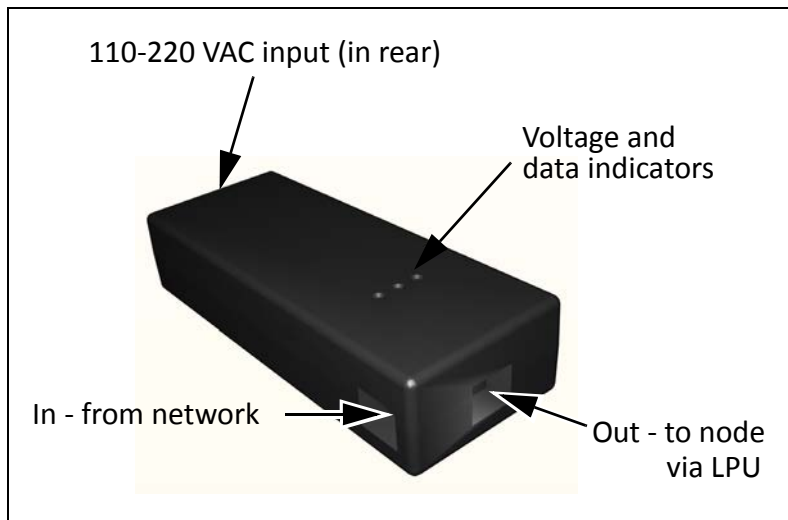


Figure 1-7: PoE

ODU-S

The TerraWIN ODU-S is shown below.

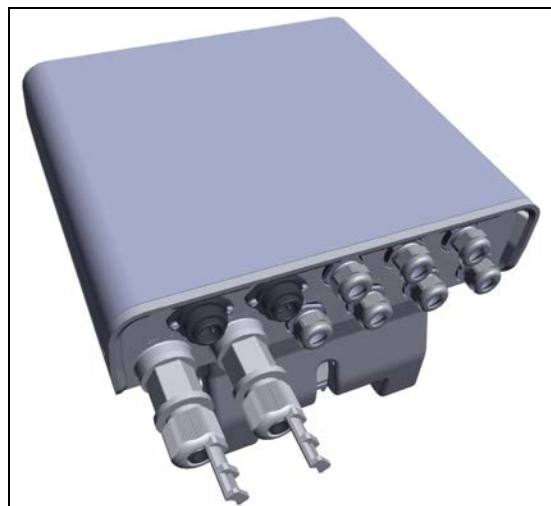


Figure 1-8: TerraWIN Power Supply (ODU-S)

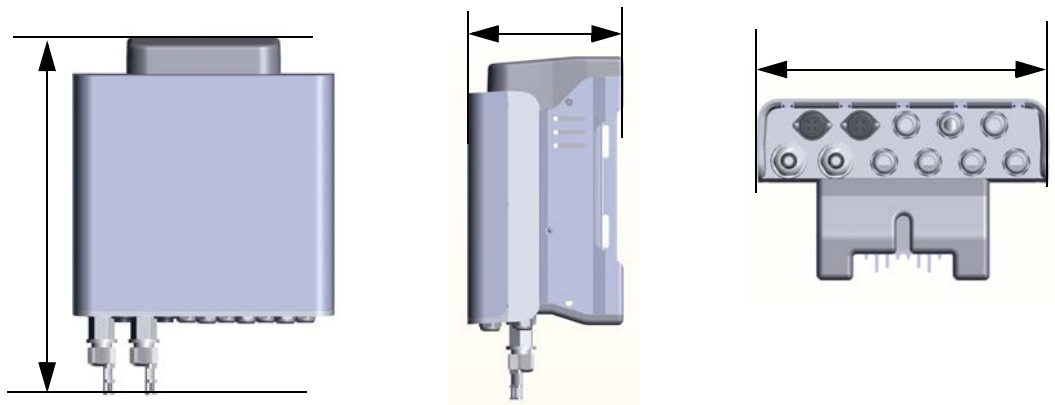


Figure 1-9: ODU-S external dimensions

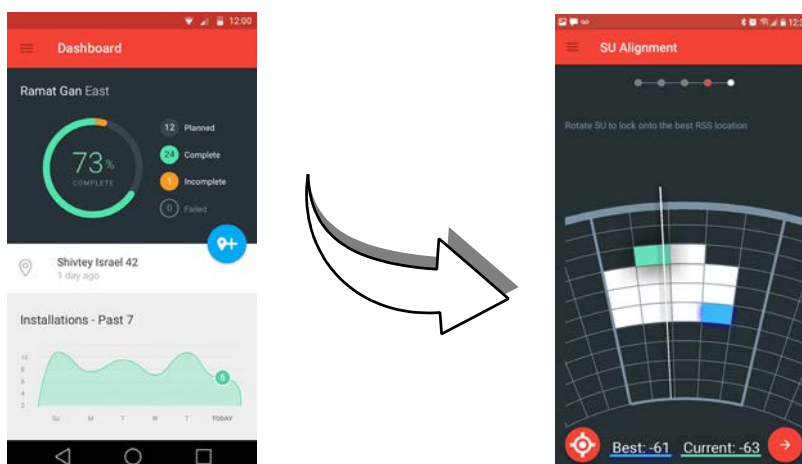


The ODU-S is optional. It is also possible to use standard PoE units to supply power and connectivity to the nodes.

1.2.4 Management Tools

WINTouch

WINTouch is a mobile application that guides you in installing and aligning distribution and client nodes. Connection to the nodes are via bluetooth.



Controller

The Controller is a cloud-based management application which manages a complete sector over a single IP address.

1.3 Key Features of TerraWIN

- » 57-66 GHz operation
- » Ethernet connectivity up to 2.5Gbps
- » Sector capacity - up to 3.6 Gbps
- » Topologies - Mesh/PtMP/PtP
- » Self-organizing, self-healing, self-optimizing
- » Beam-forming, integrated antenna
- » Enhanced interference mitigation capability
- » Inter & intra site sync to reduce self interference
- » Regulations supported - FCC/ETSI
- » Up to 15 Client Nodes per Distribution Node

1.4 Notifications

Notifications consist of Notes, Cautions, and Warnings:



Note: Draws your attention to something that may not be obvious



Caution: Risk of damage to equipment or of service degradation



Warning: Risk of danger to persons operating near the equipment

Chapter 2: Installation Steps

To install and establish a basic connection with a radio unit, carry out the steps shown below. Print out this list, and place a checkmark next to a completed task.

Table 2-1: Installation Check-List

Step	Action	Page	Done?
	Before deploying at installation site		
1.	<i>Verify Controller Existence</i>	page 2-2	
2.	<i>Install WINTouch</i>	page 2-2	
3.	<i>Configure Connectivity Parameters for Nodes in POP Site</i>	page 2-2	
4.	<i>Check Connectivity to Nodes in POP Site</i>	page 2-4	
5.	<i>Check items to be installed</i>	page 2-4	
6.	<i>Prepare Tools</i>	page 2-4	
	Installation		
7.	<i>Install Standard Mounting Kit</i>	page 2-5	
8.	<i>Mount Nodes</i>	page 2-8	
9.	<i>Mount the ODU-S (optional)</i>	page 2-12	
10.	<i>Ground Nodes</i>	page 2-13	
11.	<i>Ground the ODU-S</i>	page 2-13	
12.	<i>Mount the Lightning Protection Units</i>	page 2-14	
13.	<i>Connect Node (External Connections)</i>	page 2-16	
14.	<i>Connect PoE (optional)</i>	page 2-17	
15.	<i>Waterproofing</i>	page 2-18	
16.	<i>Mount and Connect Client Nodes</i>	page 2-19	
17.	<i>Align Client Node</i>	page 2-19	

2.1 Verify Controller Existence

The TerraWIN Controller is a cloud-based application that allows access to all units.

- To configure TerraWIN nodes and sites completely, and to perform even rudimentary configuration on all nodes except the first one, use the TerraWIN Controller.
- Verify that the TerraWIN Controller is accessible, and that you know its IP address.

2.2 Install WINTouch

- Download and install WINTouch from Google play.
- WINTouch only works on android smartphones.

2.3 Configure Connectivity Parameters for Nodes in POP Site

Do this in the depot before deploying on site.

This is only required for the Distribution Nodes in the POP (point of presence) Site. This is the site that is connected to the external backhaul via copper or fiber. Nodes in subsequent sites, and Client Nodes will get their connectivity parameters from the Controller.

2.3.1 Connect Nodes in POP Site to Power

For the initial configuration, connect the nodes in the POP Site to power using a PoE, as shown. Note that the “In” socket on the PoE is not needed, as the management connection to the node will be via bluetooth.

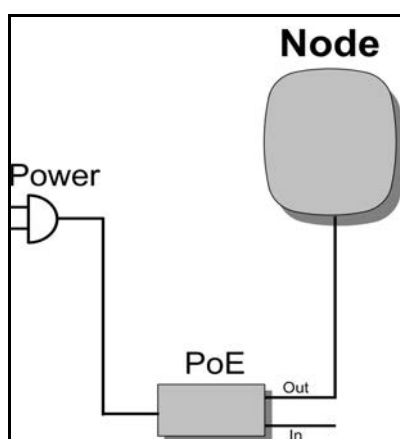


Figure 2-1: Basic power connection to node

2.3.2 Connect Smartphone to Nodes via Bluetooth

Open WINTouch on your smartphone, and follow its instructions to discover the node you have connected.

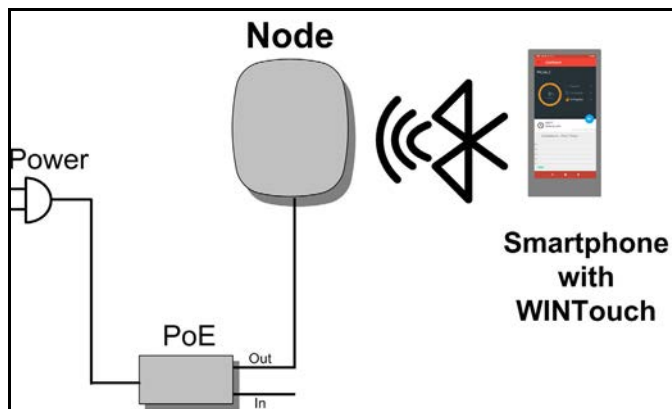


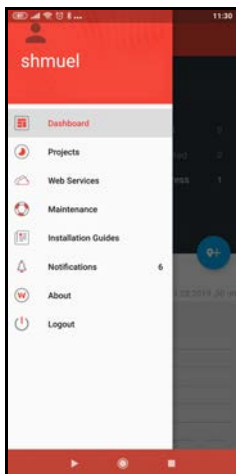
Figure 2-2: Connecting to node

2.3.3 Update Connectivity Parameters of Nodes

Once you have established connection with the node, continue to use the instructions in WINTouch to change the node's IP address to the IP address according to the radio plan.



2.3.4 Teach Nodes IP Address of the Controller



2.4 Check Connectivity to Nodes in POP Site

1. Connect to each node in turn:
 - From a smartphone in the field: Via bluetooth.
 - From the NOC: Via the LAN.
2. From a command line, ping radio using node's new IP address.
3. This is only needed for nodes in the POP Site. Other nodes will be connected automatically by the Controller.

2.5 Check items to be installed

- Nodes (radio units) + mounting kit for each distribution node
- Power Supply source:
 - PoE - one for each node (if outdoor, requires mounting kit)
 - 2 LPUs for each node that uses a PoE (recommended)or
 - ODU-S - one unit for each site
- CAT-5e cables
- Power cables (for PoEs or ODU-S)
- Grounding cables (10 AWG)

2.6 Prepare Tools

- Crimping tool
- Spanner/wrench 13mm (1/2")

- Cable ties
- Sealing material
- Waterproofing tape (like Scotch 23)

2.7 Install Standard Mounting Kit

Each Distribution Node requires a mounting kit. Client Nodes can use a standard mounting kit, or not, depending on exactly where it is placed.

Each Distribution Node must be installed on a pole or wall, 90° from each other.

2.7.1 Standard Mounting Kit

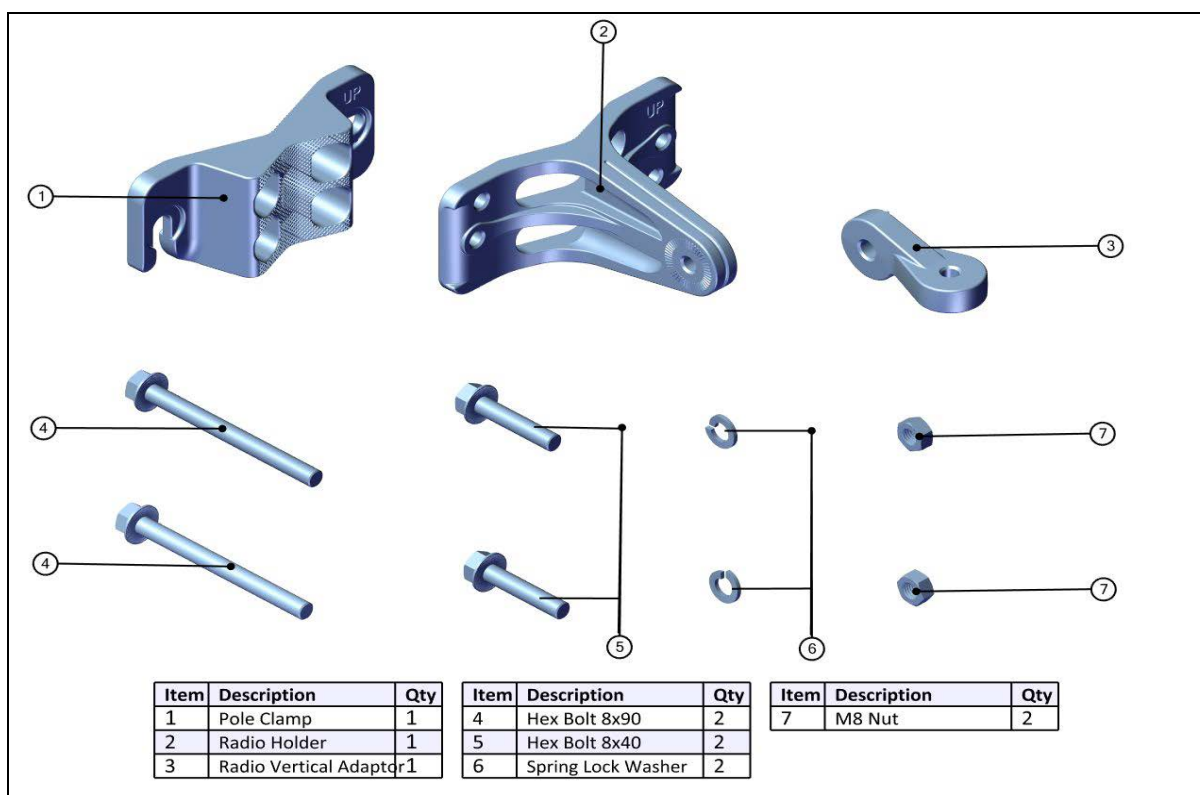


Figure 2-3: Mounting Kit Contents



Tighten all bolts with a torque of 15Nm.

The mounting kit can be used on a vertical pole or on a wall:

Pole	page 2-6
Wall	page 2-8

2.7.2 Pole

The mounting kit can be used on a thin, medium, or thick pole.

<i>Thin Pole</i>	Dia. 3/4" -1 1/2"	page 2-6
<i>Medium Pole</i>	Dia. 2 - 3	page 2-7
<i>Thick Pole</i>	Dia. > 3	page 2-7

Thin Pole

1. Diameter 3/4" to 1 1/2" (2cm to 4cm): Position the pole clamp as shown in the following figures. Do not tighten the bolts all the way.

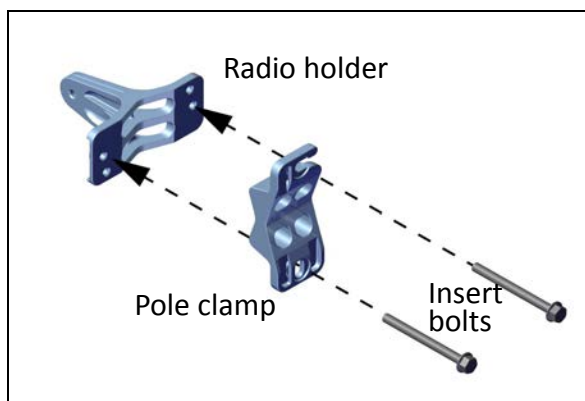


Figure 2-4: Connect Pole Clamp to Radio Holder

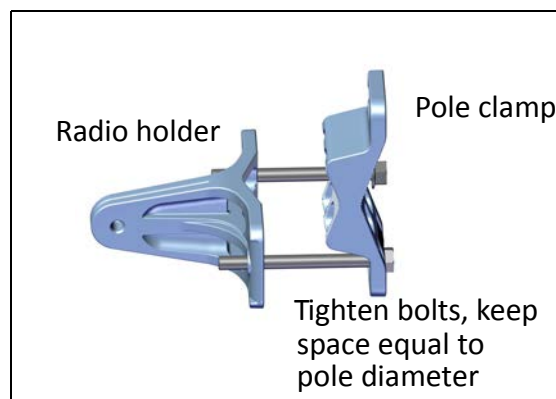


Figure 2-5: Partially tighten bolts

2. Place this assembly on the pole where you want to mount the device. Once it is in place, rotate the pole clamp as shown, then tighten both bolts.

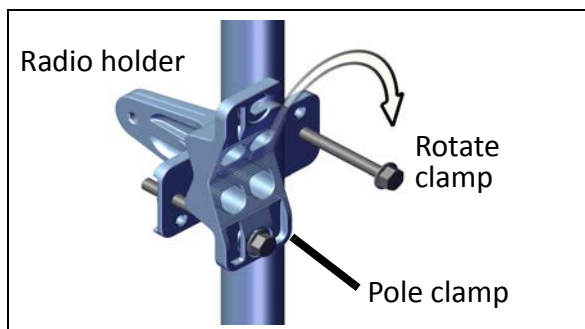


Figure 2-6: Rotate Clamp and tighten bolts

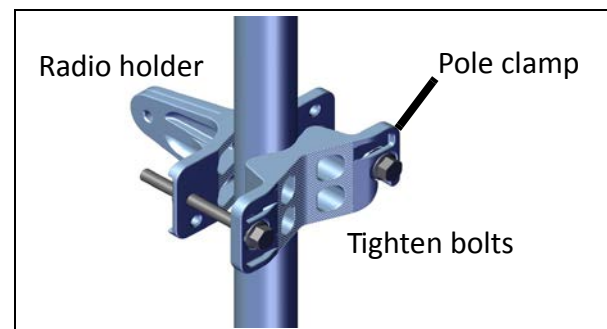


Figure 2-7: Completely tighten bolts

Medium Pole

1. Diameter 2" to 3" (5cm to 7.5cm): Position the pole clamp as shown in the following figures. Do not tighten the bolts all the way.

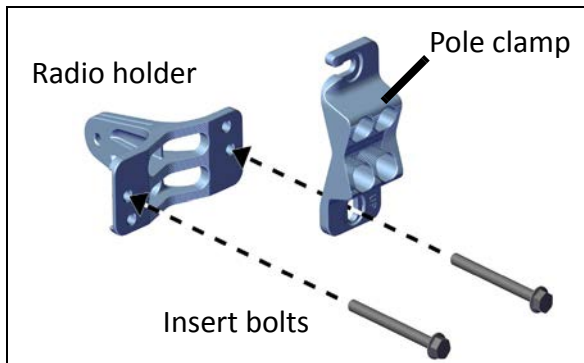


Figure 2-8: Connect Pole Clamp to Radio Holder

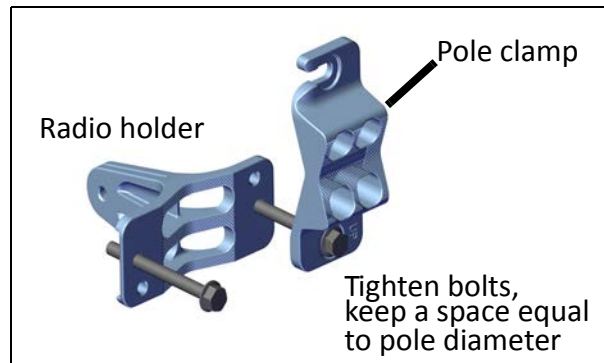


Figure 2-9: Tighten bolts

2. Place this assembly on the pole where you want to mount the device. Once it is in place, rotate the pole clamp as shown, then tighten both bolts.

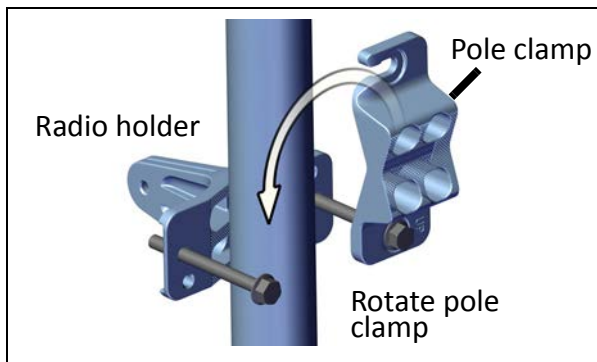


Figure 2-10: Rotate Clamp

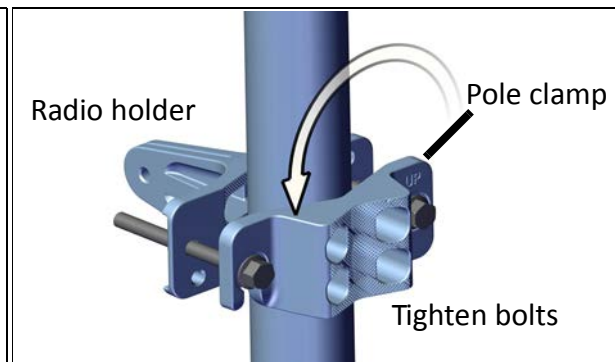


Figure 2-11: Completely tighten bolts

Thick Pole

1. Diameter larger than 3" (7.5cm) : Use worm drive clamps (not supplied), threaded through the holes as shown:

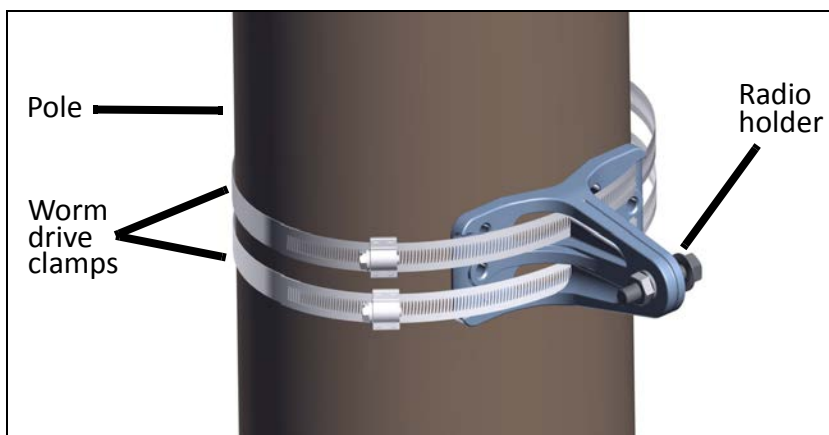


Figure 2-12: Mounting kit on a thick pole

The pole clamp is not needed.

2.7.3 Wall

Use two mounting screws (not included) appropriate for the type of wall.

- Make sure you use the indicated holes
- You may need to use the vertical adaptor

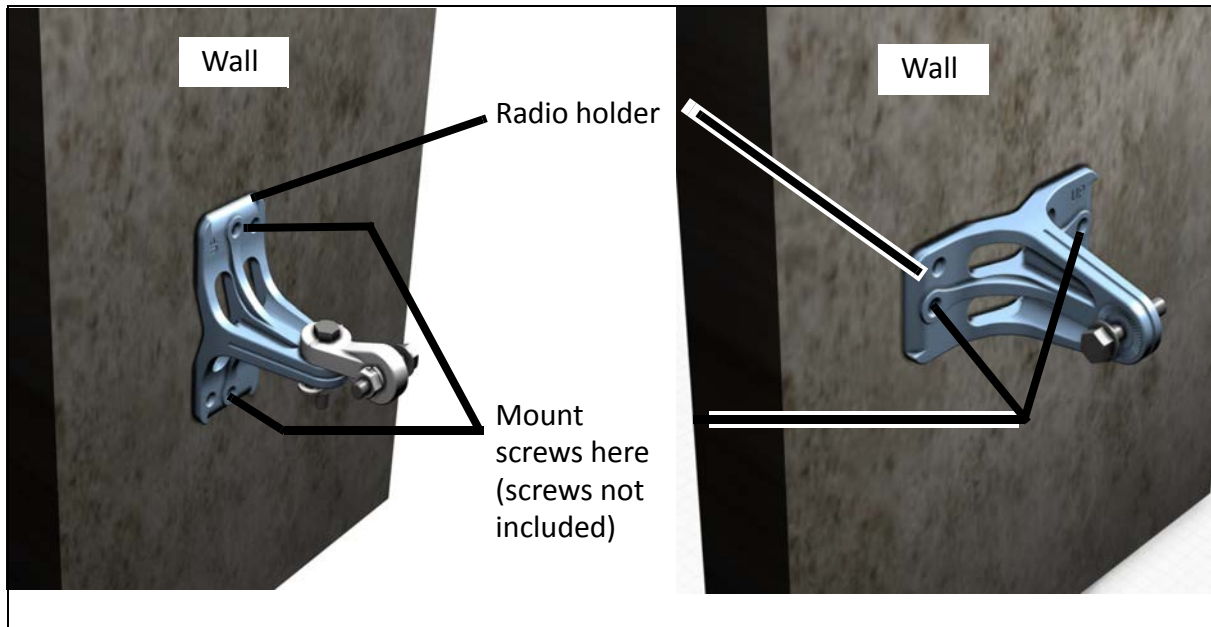


Figure 2-13: Mounting kit on a wall

2.8 Mount Nodes

Each site typically has 4 Distribution Nodes. In some cases (for instance if a site is at the edge of the operational zone), you may want to mount 3 or 2 nodes. Mount each node using the standard mounting kit on a pole or a wall. The figures below show 1, 2, 3 and 4 nodes mounted on a pole.

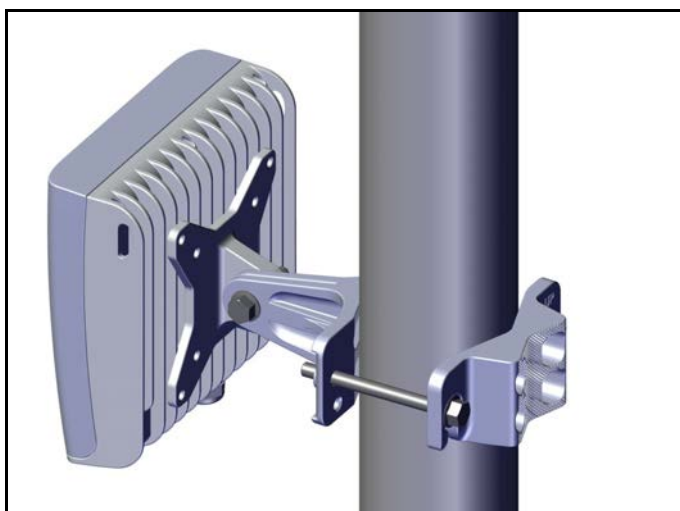


Figure 2-14: A Distribution Node mounted on a pole

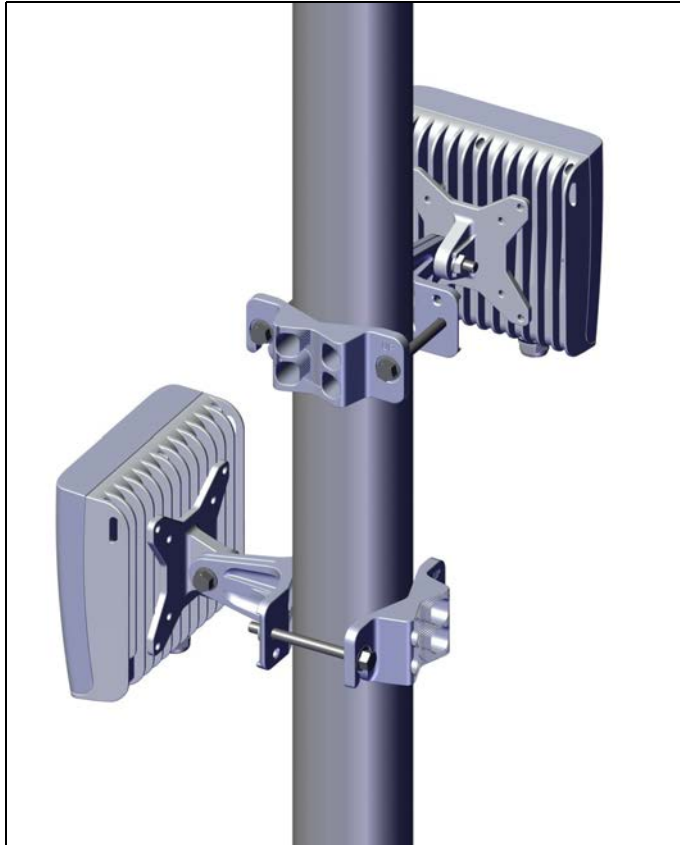


Figure 2-15: Two Distribution Nodes mounted on a pole

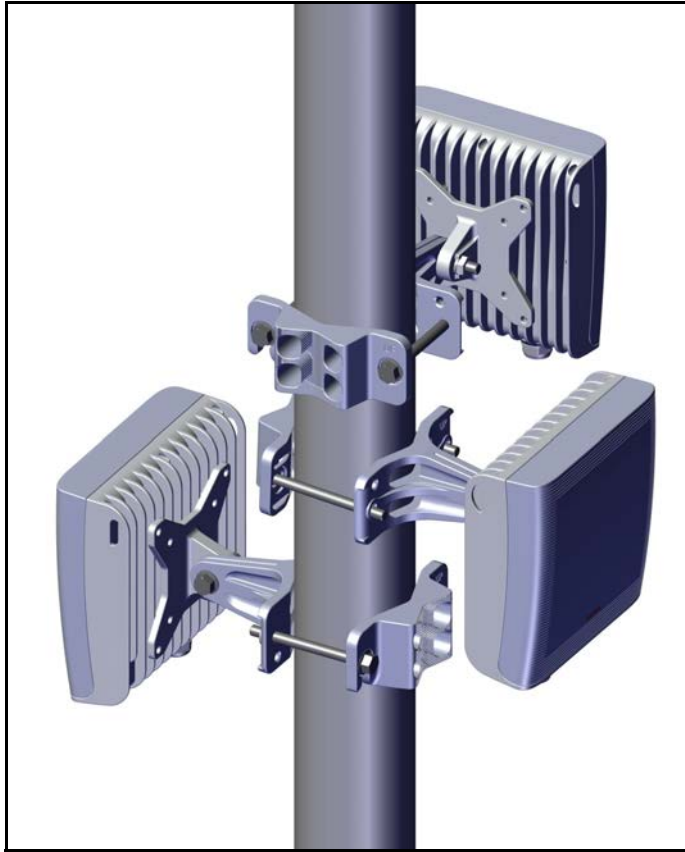


Figure 2-16: Three Distribution Nodes mounted on a pole

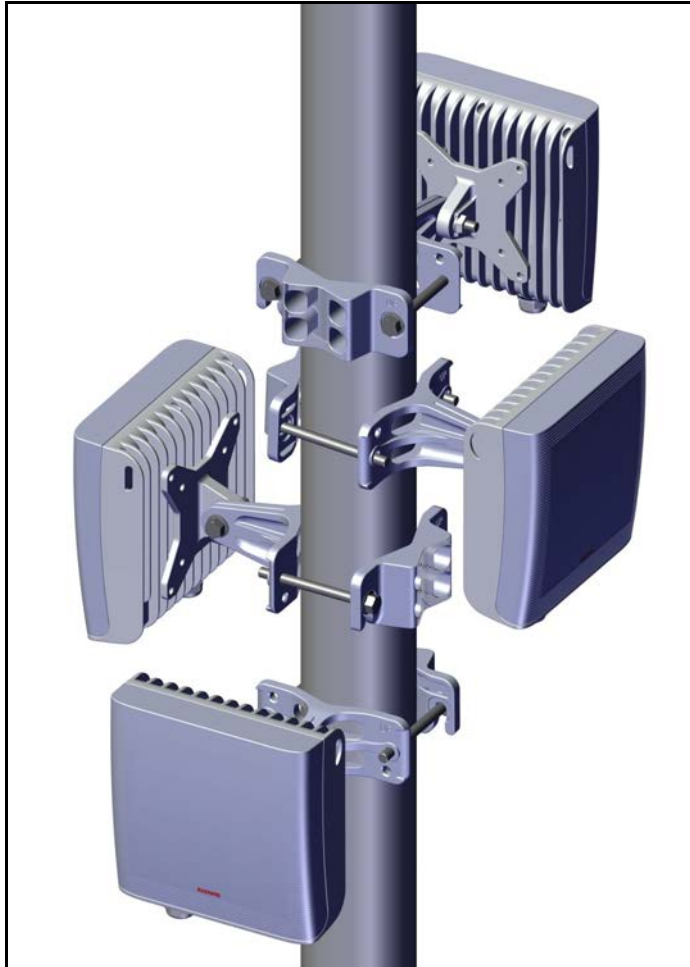


Figure 2-17: Four Distribution Nodes mounted on a pole

2.9 Mount the ODU-S (optional)

The ODU-S is shown mounted with four Distribution Nodes:

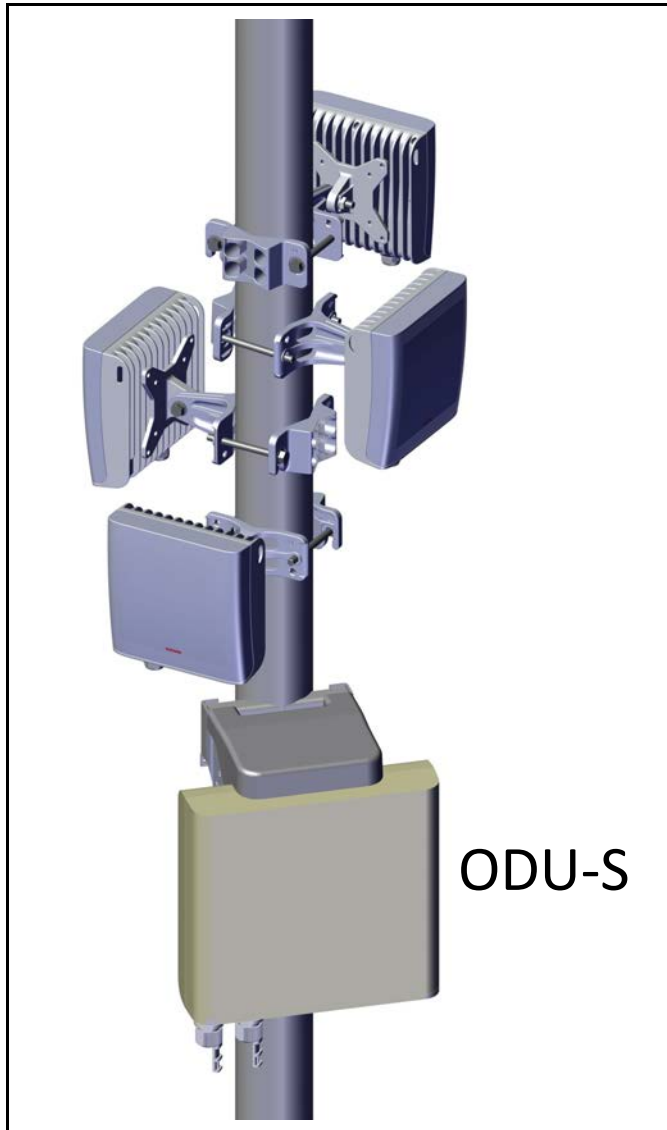


Figure 2-18: ODU-S Mounted with 4 nodes

2.10 Ground Nodes

Connect a ground cable to the indicated ground connection on the node as shown in the section below:

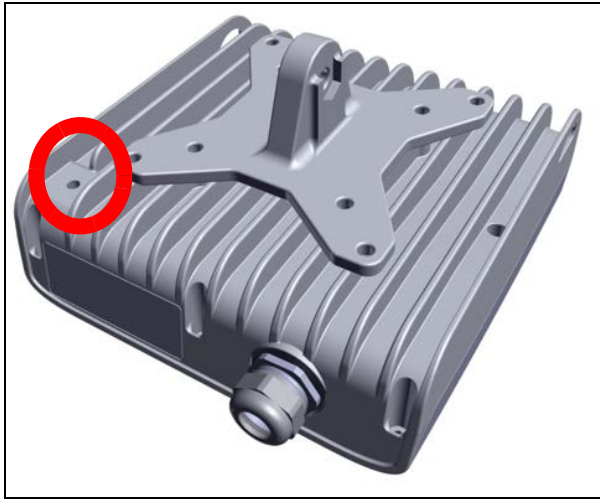


Figure 2-19: Ground connection on a Node

2.11 Ground the ODU-S

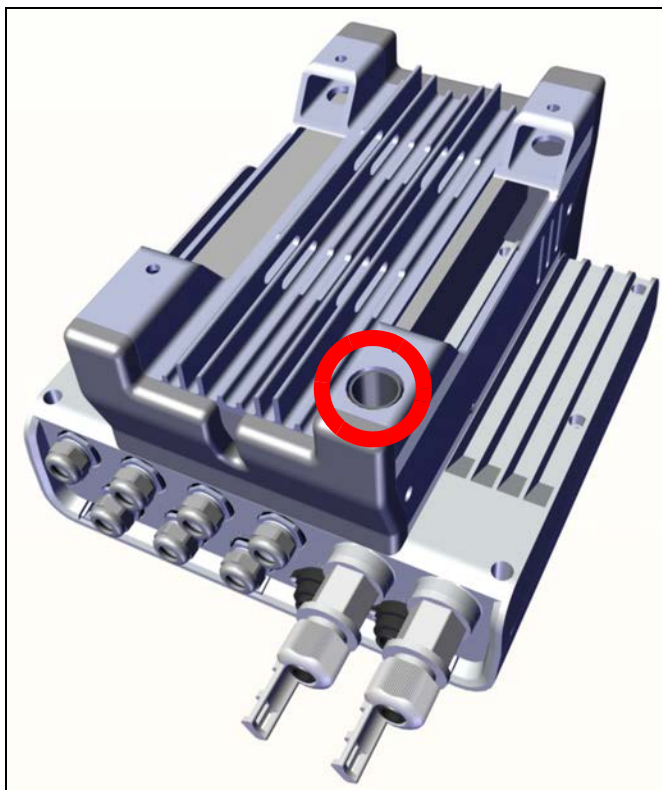
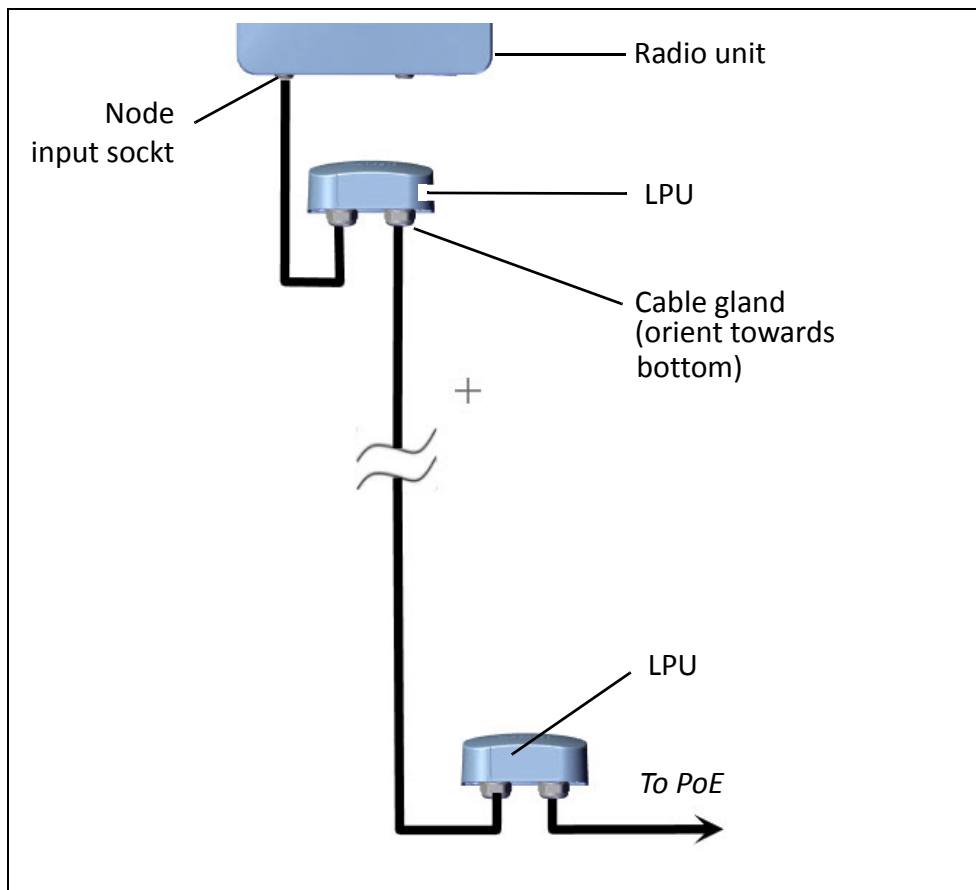


Figure 2-20: Ground connection on the ODU-S

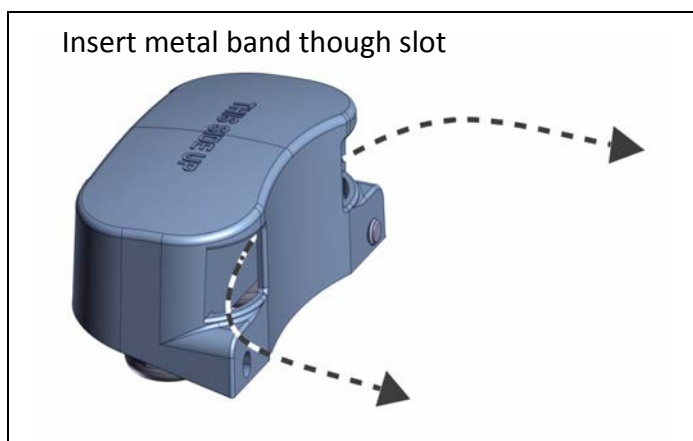
2.12 Mount the Lightning Protection Units

If you are using PoE units to supply power and connectivity for the nodes (as opposed to the ODU-S), use Lightning Protection Units (LPUs) according to the guidelines here.

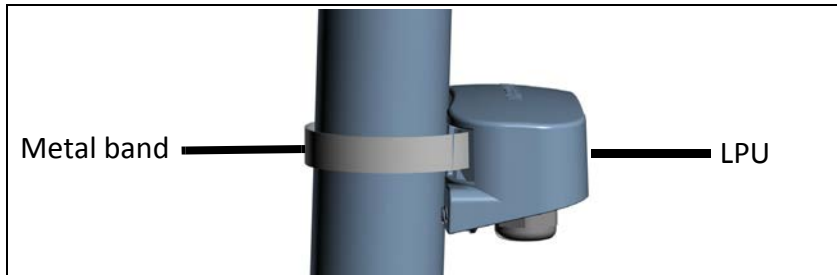
- We recommend using two lightning protection units (LPUs) for each node installation: One near the node and one near the PoE.
- The LPU can be mounted on a pole or on a wall.
- Make sure the LPU is oriented with the cable glands oriented towards the bottom.
- Mount one LPU near the node, and the second near the PoE:



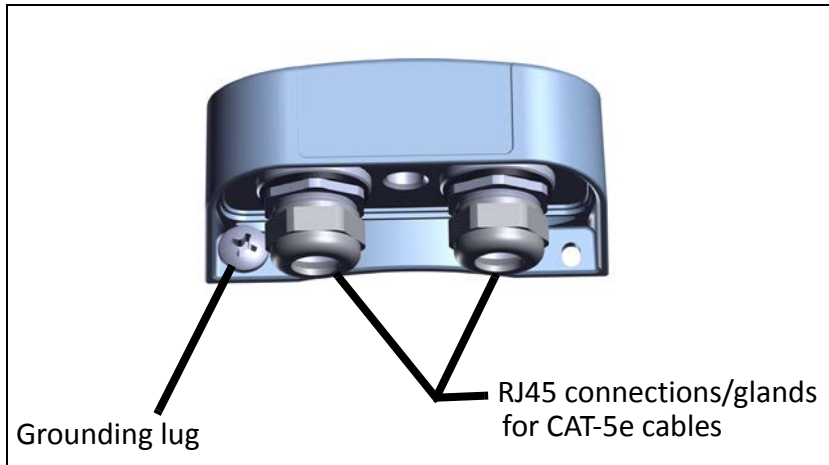
1. Insert the metal band through the slots on the LPU as shown:



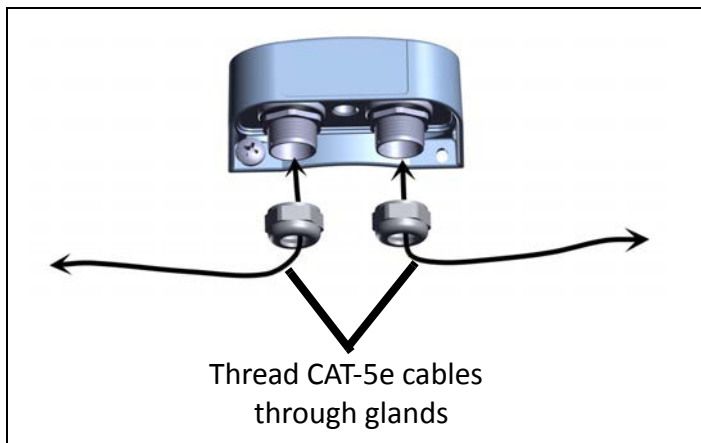
2. Tighten the metal band.



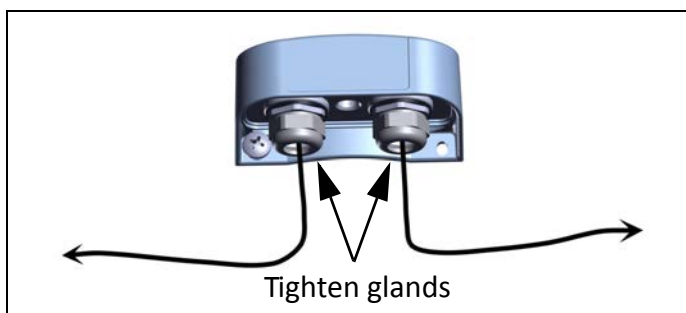
3. Connect the grounding lug to a ground source.



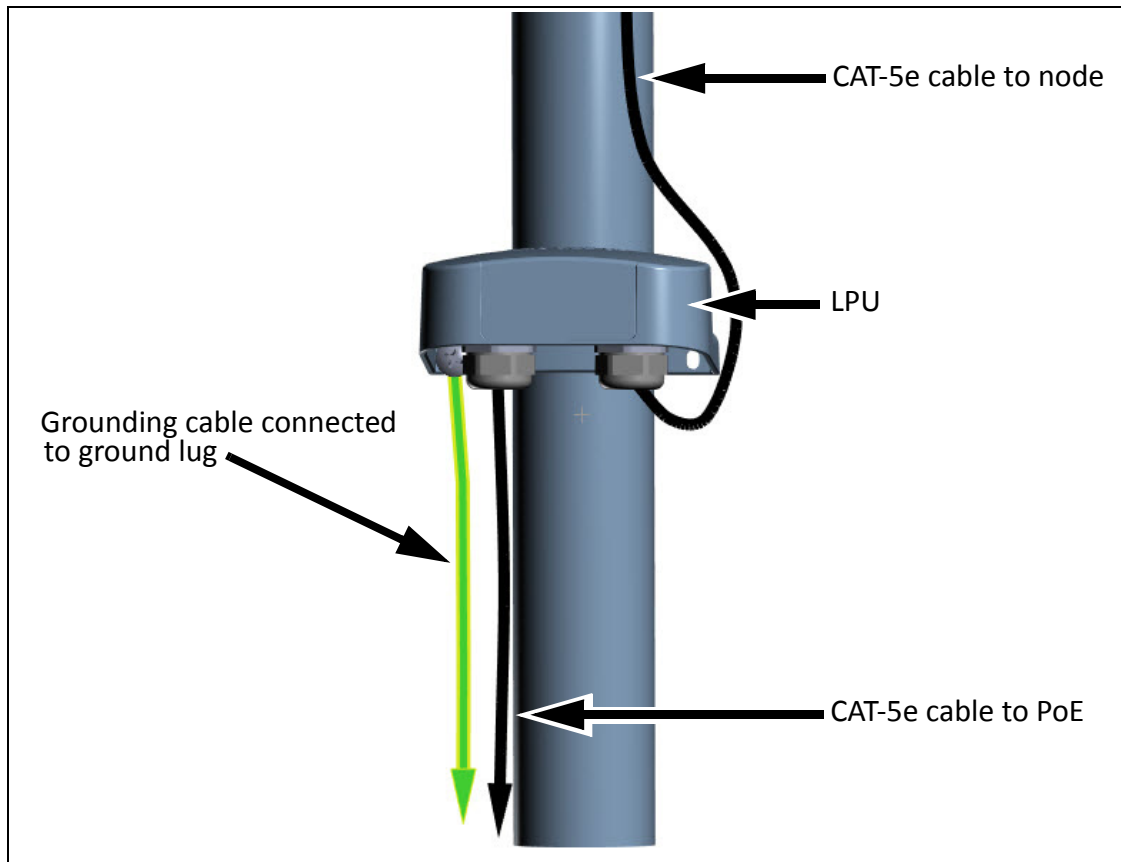
4. Remove the cable glands, and thread the CAT-5e cables through them:



5. Connect the cables to the LPU's sockets, and the glands around the cables as shown:



6. Route one CAT-5e cable up to the node, and the other down to the PoE (via the lower LPU). An LPU installed on a pole is shown below:



2.13 Connect Node (External Connections)

1. Connect a CAT-5e cable to the port of the radio as shown ([Figure 2-21, Node input connection](#)). This connection provides power, traffic, and management connection.
2. Add sealant tape to the connections (see "[Waterproofing](#)" on page 2-18.)
3. Route the CAT-5e and ground cables down from the radio to the ODU-S or to a PoE via 2 LPUs: one near the radio, one near the PoE.
4. Fasten CAT-5e cable connections with a cable gland, add sealant tape.
5. Connect ground cable to ground.

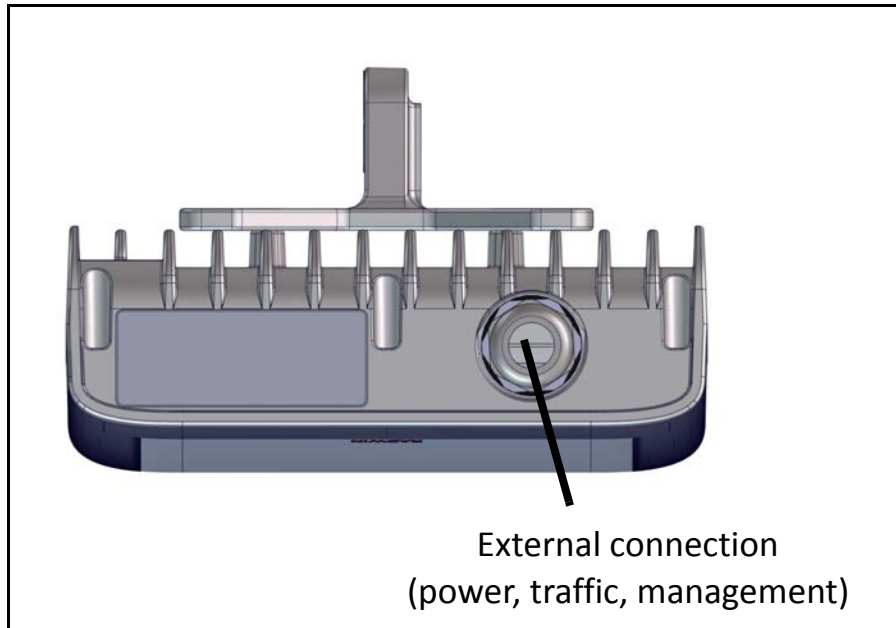


Figure 2-21: Node input connection

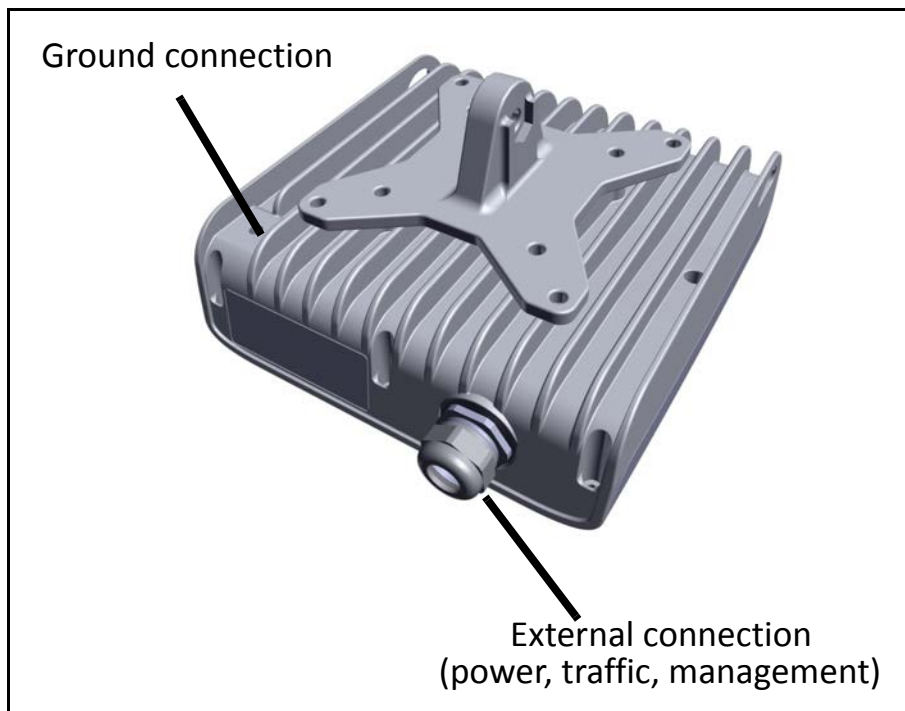


Figure 2-22: Node external and ground connection

2.14 Connect PoE (optional)

If you are not using the ODU-S, connect each Distribution Node via a PoE.

Client Nodes need a PoE in any event.

6. Perform final connections via a PoE, depending on the type of PoE you are using, as follows:

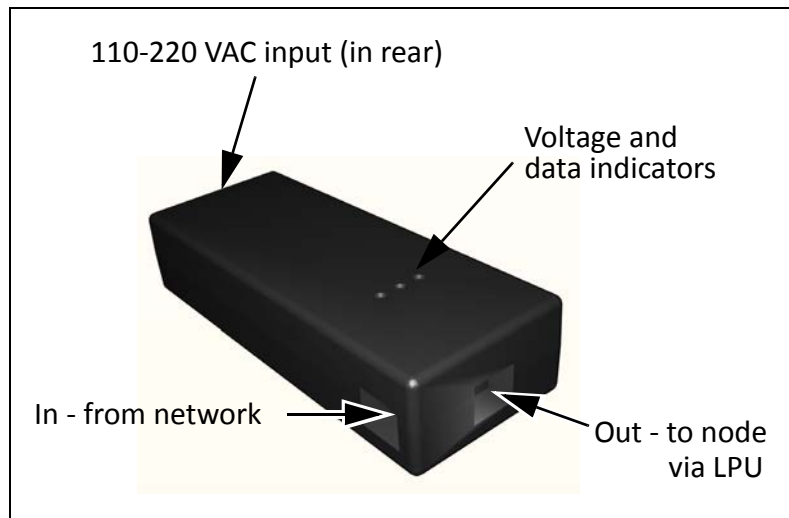


Figure 2-23: PoE connections

- a. Connect CAT-5e cable from lower LPU to “Out” port
- b. Connect LAN cable to “In” port.
- c. Connect power cable

2.15 Waterproofing

Protect all outdoor connections from rain, dust, moisture and salt by taping the cable/gland connection with an appropriate sealant tape. We recommend using Scotch™ 23 splicing tape or similar.

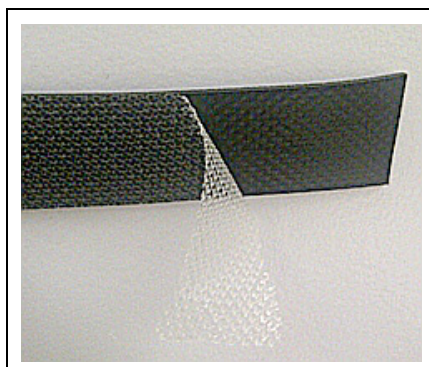


Figure 2-24: Sealant tape

Add tape as shown below.



Figure 2-25: Applying sealant tape to an external connection

2.16 Mount and Connect Client Nodes

Client Nodes are physically identical with Distribution Nodes. They are mounted and connected to power and communications in the same manner.

- To mount a Client Node, See [Mount Nodes](#) on page 2-8
- To connect a Client Node to power, See [Connect Node \(External Connections\)](#) on page 2-16

2.17 Align Client Node

- Connect to the unit via bluetooth using WINTouch.
- Point the Client Node in the general direction of the closest Distribution Node.
- Follow the directions in WINTouch to align the Client Node. This will consist of doing the following:
 - a. Swivel the unit to the left slowly, to the right, and then back towards the Distribution Node.

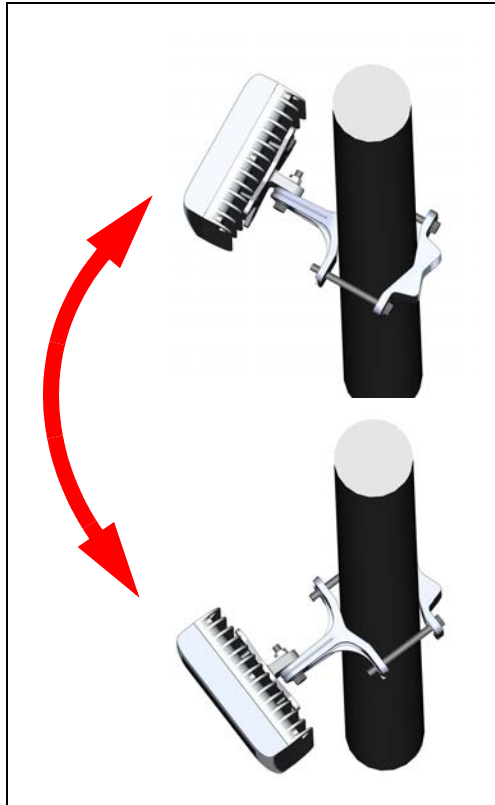


Figure 2-26: Swivel horizontally

- b. Repeat the above in elevation:

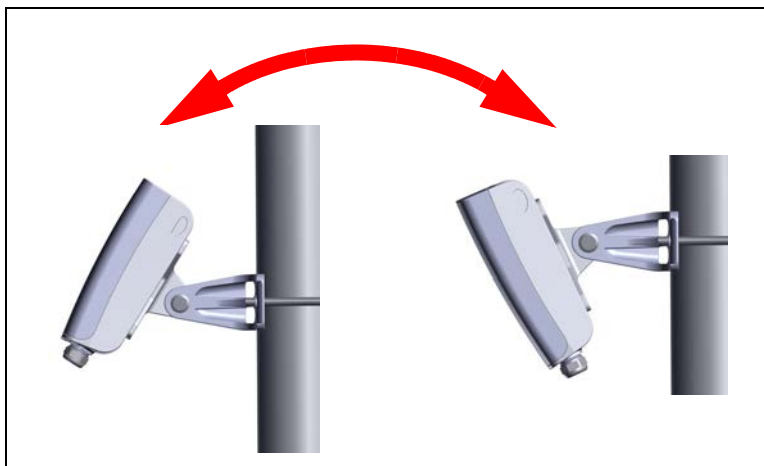
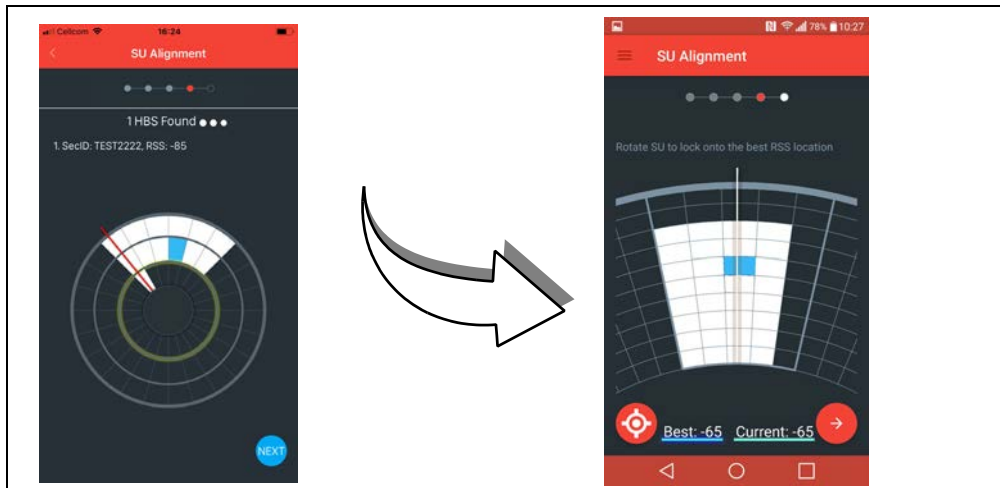
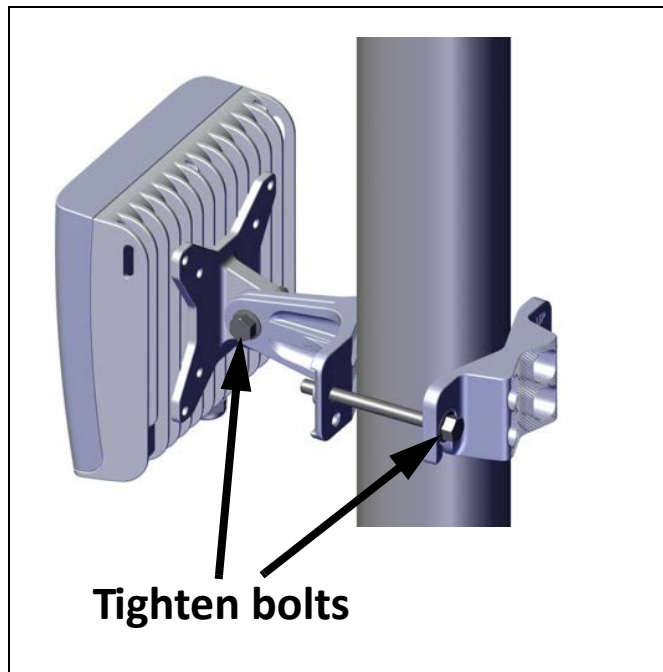


Figure 2-27: Swivel vertically

- c. WINTouch will give an indication when the best alignment is achieved.



- d. Once alignment is complete, tighten the bolts holding the radio on the mounting kit.



Chapter 3: Safety Practices and Provisions

3.1 Scope of this Chapter

This chapter describes various safety practices.

3.2 Practices and Provisions

3.2.1 Preventing Overexposure to RF Energy

To protect against overexposure to RF energy, install the radio units so as to provide and maintain minimal separation distances from all persons.

When the system is operational, avoid standing directly in front of the antenna. Strong RF fields are present when the transmitter is on. The radio unit must not be deployed in a location where it is possible for people to stand or walk inadvertently in front of the antenna.

3.2.2 Grounding

All OEM_Name products should be grounded during operation. In addition:

- All radio units should be grounded by a wire with diameter of at least **10 AWG**.
- Rack-mounted equipment should be mounted only in grounded racks and cabinets.

Further, you should -

- Always make the ground connection first and disconnect it last
- Never connect telecommunication cables to ungrounded equipment
- Ensure that all other cables are disconnected before disconnecting the ground

3.2.3 Protection against Lightning

The use of lightning protection is dependent on regulatory and end user requirements. All OEM_Name outdoor units are designed with surge limiting circuits to minimize the risk of

damage due to lightning strikes. OEM_Name recommends the use of additional surge arrester devices to protect the equipment from nearby lightning strikes.

3.2.4 General

- Installation of outdoor units must be contracted to a professional installer
- Before working on equipment connected to power lines or telecommunication lines, remove jewelry or any other metallic object that may come into contact with energized parts
- Use extreme care when installing radios or antennas near power lines
- Use extreme care when working at heights
- When using an AC power source for OEM_Name devices, always use the AC power adapter supplied by OEM_Name
- Use the right tools!
- Do not mount a radio unit upside down or horizontally. Doing this may void your product warranty.

3.2.5 Internal ESD Protection circuits

OEM_Name equipment is designed to meet the ETSI/FCC/Aus/NZ/CSA EMC and Safety requirements. To fulfill these requirements, the system's Telecom lines at the radio unit/PoE are Transformer-isolated and include internal ESD (Electro-Static-Discharge) Protection circuits.



When installing an AC powered Client Node: To maintain Overvoltage (Installation) Category II, install a suitable surge suppressor device in the branch circuit to limit expected transients to Overvoltage Category II values.

The limits are based on IEC60664 and are also located in Table 2H of UL60950 (for mains $\leq 150V$, the transient rating is 1500V; for $150V < \text{mains} \leq 300V$, the transient rating is 2500V; and for $300V < \text{mains} \leq 600V$, the transient rating is 4000V).

Appendix A: Terminology

Table A-1: Terminology (Sheet 1 of 3)

Term	Description
ACS	Automatic Channel Selection. Option that instructs the radio to choose which frequency to use. Enabling or disabling this option has various ramifications as shown in the documentation.
API	Application Program Interface
Assured throughput	Actual number of timeslots allocated to a radio unit.
ATPC	Automatic Transmit Power Control
BE	Best Effort: A level of priority for traffic in which users receive dynamic resource allocation according to overall demand. They are not guaranteed resources. See also CIR .
BFD	Bidirectional Forwarding Detection. A network protocol used to detect faults between two forwarding engines connected by a link.
CIR	Committed Information Rate: A level of priority for traffic in which users receive a guaranteed percentage of resources in addition to dynamic resources if available. See also BE .
CN	Client Node
CPE	Customer Premises Equipment
DBA	Dynamic Bandwidth Allocation: a method that allocates bandwidth between the various users of that same bandwidth in the network.
DBS	Dynamic Bandwidth Selection: When activating a base station, or when changing its bandwidth, if you choose the maximum value available for the bandwidth, the link may dynamically switch between the maximum value and values as low as 20MHz to ensure the best throughput.

Table A-1: Terminology (Sheet 2 of 3)

Term	Description
DFS	Dynamic Frequency Selection
DHCP	Dynamic Host Configuration Protocol: a protocol that automatically assigns IP addresses and other network configuration parameters.
DN	Distribution Node
Downlink	Data traffic from an DN to an CN
EIRP	Equivalent (or Effective) Isotropically Radiated Power: The power that an antenna must emit to produce the peak power density in the direction of maximum antenna gain. In our cases, this is usually: System Tx Power + Antenna Gain - Cable Loss.
GHSS	GPS Hub Site Synchronization
GRE	Generic Routing Encapsulation. A communication protocol used to establish a direct, point-to-point connection between network nodes. GRE lets two peers share data they wouldn't be able to share over the public network itself.
GRE Tunnel	A virtual point-to-point connection between two networks, using the GRE protocol to carry this out.
HSC	Hub Sync Client: When using Hub Site Synchronization, one unit is a master (generates the sync pulses), and the other units are clients.
HSM	Hub Sync Master: When using Hub Site Synchronization, one unit is a master (generates the sync pulses), and the other units are clients.
IGMP	Internet Group Management Protocol
MIMO	Multiple In, Multiple Out. A technique by which the capacity of a radio link is increased using multiple transmitting and receiving antennas, transmitting a different signal on all antennas.
MIR	Maximum Information Rate
ODU	Outdoor Unit: a generic term for any radio, and can usually be exchanged for DN or CN.
PNAM	Predecessor Neighbor Advertisement Message
PPPoE	Point-to-Point Protocol over Ethernet
PtMP	Point to Multi-Point: link from an DN to several CNs

Table A-1: Terminology (Sheet 3 of 3)

Term	Description
PtP	Point to Point
QoS	Quality of Service
RADIUS	Remote Authentication Dial-In User Service
RSS	Radio Signal Strength
SBM	Smart Bandwidth Management
Sector	A group of radios that consists of one DN and several CNs that communicate with the DN.
SHA1	Secure hash algorithm: an authentication type for SNMPv3 connections.
SLA	Service Level Agreement - the basic agreement between the service provider and its customer regarding certain aspects of the service provided. For example, what should be the data rate, throughput, jitter of the line, who should pay what fees, the mean time between failure (MTBF) of the equipment, and so forth,
SSM	Synchronization Status Message: Provides traceability of synchronization signals, and is used in the Synchronous Ethernet standard of communication.
Sync E or SyncE	Synchronous Ethernet: A standard of communication for ethernet that provides a synchronization signal to network elements that need such a signal.
TSN	Time Sensitive Network
Uplink	Data traffic from an CN to an DN
VRRP	Virtual Router Redundancy Protocol - a networking protocol that provides for automatic assignment of available IP routers to participating hosts.
WI	Web Interface: web-based application that provides simple configuration capabilities for the radio units.
WISPA	Wireless Internet Service Provider Association. An organization that manages registration of wireless devices that operate close to TDWR facilities run by the FAA.

Appendix B: About Antennas

B.1 Scope of this Appendix

This appendix provides some basic information and considerations regarding antennas and what you need to take into account when configuring antenna parameters.

B.1 Antenna Issues

The choice of Tx Power, antenna gain and cable loss (between the radio and the antenna) determines the EIRP and is affected by such considerations as radio limitations and regulatory restrictions.

Before proceeding to antenna installation details, the following background information should be considered:

B.2 Considerations for Changing Antenna Parameters

Let:

max Available Tx Power denote the maximum Tx Power practically available from an ODU. (It appears as **Tx Power per Radio**.)

maxRegEIRP denote the maximum EIRP available by regulation. It will be determined by three factors:

- per band/regulation
- per channel bandwidth
- antenna gain

maxRegTxPower denote the maximum regulatory Tx Power for the equipment, also having regard the above three points.

Then, the following relationship must be satisfied:

$$\text{maxAvailableTxPower} \leq \min(\text{maxRegEIRP} - \text{AntennaGain} + \text{CableLoss}, \text{maxRegTxPower}) \quad \dots (*)$$

The Tx Power (per radio) indicates the power of each radio inside the ODU and is used for Link Budget Calculations. The Tx Power (System) shows the total transmission power of the radio and is used to calculate the EIRP according to regulations.



- The Max EIRP level will be automatically set according to the selected band and regulation.

The inequality (*) above is always satisfied by the system in accordance with the relevant regulation.

The precise relationship between the items in inequality (*) is as follows: Required Tx Power (per radio) will be adjusted down to the lesser of the value entered and **maxAvailableTxPower**

- Tx Power (system) is **maxAvailableTxPower + 3** (for 2 radios)
- Max EIRP is **maxRegEIRP**.
- EIRP is **maxAvailableTx Power + Antenna Gain - Cable Loss**

Appendix C: Certified Antennas

TerraWIN bears the following FCC/IC IDs on the label, and refer to [Table C-1](#) below:

FCC ID: Q3K-TRWN600G

IC: 5100A-TRWN600G

TerraWIN must be installed so as to provide a minimum separation distance from bystanders as specified in the table below:

Table C-1: Frequency Band 60 GHz

Gain (dBi)	Dir BW	EIRP (dBm)	Min. Safe Distance (cm)
27	3°	42.0	37

Appendix D: Revision History

Table D-1: Revision History: TerraWIN Installation Guide: DQ0266170/O.00

Cat.No.	Date	Description
DQ0266170/O.02	May, 2020	<ul style="list-style-type: none">• First revision for regulatory purposes

Regulatory Compliance

General Note

This system has achieved Type Approval in various countries around the world. This means that the system has been tested against various local technical regulations and found to comply. The frequency bands in which the system operates may be “unlicensed” and in these bands, the system can be used provided it does not cause interference.

For information on the restrictions on putting the device into service please contact your national telecommunication authorities.

FCC/ISED - Compliance

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications to this equipment not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

RF Exposure

For the safety of the general public it is recommended to keep a minimum safe distance from radiating antennas according to [Table C-1](#).

Pour la sécurité du grand public, il est recommandé de respecter une distance de sécurité minimale par rapport aux antennes rayonnantes, conformément au tableau [Table C-1](#)

Indoor Units comply with part 15 of the FCC rules. Operation is subject to the following two conditions:

(1) These devices may not cause harmful interference.

(2) These devices must accept any interference received, including interference that may cause undesired operation.



Outdoor units and antennas should be installed **ONLY** by experienced installation professionals who are familiar with local building and safety codes and, wherever applicable, are licensed by the appropriate government regulatory authorities. Failure to do so may void the product warranty and may expose the end user or the service provider to legal and financial liabilities. Resellers or distributors of this equipment are not liable for injury, damage or violation of regulations associated with the installation of outdoor units or antennas. The installer should configure the output power level of antennas according to country regulations and antenna type.



Les unités extérieures et les antennes doivent être installées **UNIQUEMENT** par des les professionnels de l'installation qui connaissent le bâtiment et la sécurité locaux codes et, le cas échéant, sont autorisés par les autorités compétentes autorités de réglementation gouvernementales. Ne pas le faire peut annuler le produit garantie et peut exposer l'utilisateur final ou le fournisseur de services à des passifs financiers. Les revendeurs ou distributeurs de cet équipement ne sont pas responsable des blessures, des dommages ou de la violation de la réglementation installation d'unités extérieures ou d'antennes. L'installateur doit configurer le niveau de puissance de sortie des antennes selon les réglementations du pays et type d'antenne.



- Where Outdoor units are configurable by software to Tx power values other than those for which the product is certified, it is the responsibility of the Professional Installer to restrict the Tx power to the certified limits.
- This product was tested with special accessories - indoor unit (IDU or PoE), FTP CAT-5e shielded cable with sealing gasket, 10 AWG grounding cable - which must be used with the unit to insure compliance.



The system must be professionally installed to ensure compliance with the Part 15 certification. It is the responsibility of the operator and professional installer to ensure that only certified systems are deployed in the United States. The use of the system in any other combination (such as co-located antennas transmitting the same information) is expressly forbidden. The radio must be installed and used in strict accordance with the manufacturer's instructions as described in this guide. Any other installation or use of the product violates FCC Part 15 regulations.



Le système doit être professionnellement installé pour assurer la conformité avec Certification de la partie 15 Il est de la responsabilité de l'opérateur et de l'installateur professionnel que seuls les systèmes certifiés sont déployés aux États-Unis. L'utilisation du système dans toute autre combinaison (p. antennes transmettant la même information) est expressément interdite. La radio doit être installée et utilisée en stricte conformité avec les instructions du fabricant décrites dans ce guide. Toute autre installation ou utilisation du produit enfreint les règlements de l'ISDE règlements.



It is the responsibility of the installer to ensure that when using the outdoor antenna kits in the United States (or where FCC rules apply), only those antennas certified with the product are used. The use of any antenna other than those certified with the product is expressly forbidden by FCC rules 47 CFR part 15.204. A list of approved external antennas can be found in the Certified Antennas appendix .



Le système doit être professionnellement installé pour assurer la conformité avec Certification de la partie 15 Il est de la responsabilité de l'opérateur et de l'installateur professionnel que seuls les systèmes certifiés sont déployés aux États-Unis. L'utilisation du système dans toute autre combinaison (p. antennes transmettant la même information) est expressément interdite. Il est de la responsabilité de l'installateur de s'assurer que lors de l'utilisation du kits d'antenne extérieure aux États-Unis (ou lorsque les règles de la FCC s'appliquent), seulement les antennes certifiées avec le produit sont utilisées. L'utilisation de tout l'antenne autre que celles certifiées avec le produit est expressément interdite par les règlements ISED. Une liste d'antennes externes approuvées peut se trouve à l'annexe Antennes Certifiées



It is the responsibility of the operator and professional installer to ensure that when configuring the radio in the United States (or where FCC rules apply), the Tx power is set according to the values for which the product is certified. The use of Tx power values other than those, for which the product is certified, is expressly forbidden by FCC rules 47 CFR part 15.204



Il est de la responsabilité de l'opérateur et de l'installateur professionnel que lors de la configuration de la radio au Canada (ou lorsque les règles canadiennes s'appliquent), la puissance Tx est définie en fonction des valeurs pour lesquelles le produit est agréé. L'utilisation de valeurs de puissance Tx autres que celles pour lesquelles le produit est certifié, est expressément interdit par les règlements de l'ISDE



Under regulatory environments supporting other than FCC/ISED rules: Where Outdoor units are configurable by software to Tx power values other than those for which the product is certified, it is the responsibility of the Professional Installer to restrict the Tx power to the certified limits.

This product was tested with special accessories indoor unit (IDU or PoE), FTP CAT-5e shielded cable with sealing gasket, 10 AWG grounding cable - which must be used with the unit to insure compliance.



Dans des environnements réglementaires prenant en charge d'autres règles que celles de la FCC / ISED: Où les unités extérieures sont configurables par logiciel aux valeurs de puissance Tx autres que ceux pour lesquels le produit est certifié, c'est le la responsabilité de l'installateur professionnel de restreindre la puissance Tx à les limites certifiées.

Ce produit a été testé avec des accessoires spéciaux - unité intérieure (UDI ou PoE), câble blindé FTP CAT-5e avec joint d'étanchéité, mise à la terre 10 AWG câble - qui doit être utilisé avec l'unité pour assurer la conformité.

Canadian Emission Requirements for Indoor Units

This Class B digital apparatus complies with Canadian ISED-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

EU – Compliance





Warning

The radio devices in this manual have been approved by Industry Canada to operate with the antenna types listed in the Certified Antennas appendix with the maximum permissible gain and required antenna impedance for each antenna type indicated.

Antenna types not included in this list, having a gain greater than the maximum gain indicate for that type, are strictly prohibited for use with this device.

Les appareils de radio dans ce manuel ont été approuvés par Industrie Canada pour fonctionner avec les types d'antenne énumérées à l'annexe Antennes Certifiées avec le gain maximal admissible et l'impédance d'antenne requise pour chaque type d'antenne indiquée.

Types d'antennes non inclus dans cette liste, ayant un gain supérieur au gain maximum indiqué pour ce type, sont strictement interdits par une utilisation avec cet appareil.

For Norway and Sweden only

Equipment connected to the protective earthing of the building installation through the mains connection or through other equipment with a connection to protective earthing - and to a cable distribution system using coaxial cable, may in some circumstances create a fire hazard. Connection to a cable distribution system has therefore to be provided through a device providing electrical isolation below a certain frequency range (galvanic isolator, see EN 60728-11).

Norway

Utstyr som er koplet til beskyttelsesjord via nettplugg og/eller via annet jordtilkoplet utstyr - og er tilkoplet et kabel-TV nett, kan forårsake brannfare. For å unngå dette skal det ved tilkopling av utstyret til kabel-TV nettet installeres en galvanisk isolator mellom utstyret og kabel-TV nettet

Sweden

Utrustning som är kopplad till skyddsjord via jordat vägguttag och/eller via annan utrustning och samtidigt är kopplad till kabel-TV nät kan i vissa fall medföra risk för brand. För att undvika detta skall vid anslutning av utrustningen till kabel-TV nät galvanisk isolator finnas mellan utrustningen och kabel-TV nätet.


Unregulated

In countries where the radio is not regulated the equipment can be operated in any regulation configuration, best results will be obtained using Universal regulation configuration.

Safety Practices

Applicable requirements of National Electrical Code (NEC), NFPA 70; and the National Electrical Safety Code, ANSI/IEEE C2, must be considered during installation.

NOTES:



1. A Primary Protector is not required to protect the exposed wiring as long as the exposed wiring length is limited to less than or equal to 140 feet, and instructions are provided to avoid exposure of wiring to accidental contact with lightning and power conductors in accordance with NEC Sections 725-54 (c) and 800-30.

In all other cases, an appropriate Listed Primary Protector must be provided. Refer to Articles 800 and 810 of the NEC for details.

2. For protection of ODU against direct lightning strikes, appropriate requirements of NFPA 780 should be considered in addition to NEC.

3. For Canada, appropriate requirements of the CEC 22.1 including Section 60 and additional requirements of CAN/CSA-B72 must be considered as applicable.

4. Only UL Listed parts and components will be used for installation. Use UL Listed devices having an environmental rating equal to or better than the enclosure rating to close all unfilled openings.

5. Use min. 10AWG external protective earthing conductor.



Other product names are trademarks of their respective manufacturers.

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