Airvine WaveCore™

Installation Guide

Part No:	800-00262-001
Revision:	Oct 2024 4.4

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Regulatory Compliance & Safety Information

For important regulatory compliance information for the WaveCore System, please refer to the **Airvine Regulatory and Safety Guide** which is available for download at www.airvine.com/support.

Important Safety Warnings

All products are intended to be installed, used, and maintained by experienced and trained professional personnel only.

When installing and using these products, safety precautions should always be carefully followed to reduce the risk of fire, electrical shock, injury to persons, and damage to the system.

Such safety precautions including the following:

- Read the installation instructions before using, installing, or connecting the system to the power source.
- Only skilled, instructed, and qualified personnel should be allowed to install, replace, or service this equipment. A skilled person has the relevant experience to be able to identify hazards and to take appropriate action to reduce risks of injury to themselves and others. An instructed person is one who is instructed or supervised by a skilled person regarding energy sources and who can responsibility use equipment and precautionary safeguards with respect to those energy sources.
- Devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation.
- Installation of these products in the end use environments must conform to all applicable national and local regulations and codes including all relevant electrical codes.
- Devices are to be used with and powered only by power sources that are either provided by Airvine or recommended by Airvine. Failure to properly power the unit, which includes using power sources that don't comply to the system's required input voltage or current ranges, or the use of unapproved power sources, or the failure to not properly connect the power sources to the system's power connector, can result in possible injury or permanent damage to the unit.
- Ultimate disposal of this product should be handled according to all national laws and regulations.
- No user-serviceable parts inside; all repairs and services must be handled by a qualified Airvine service center.
- To avoid the risk of electric shock or damage to the unit, do not open the unit or remove any covers.
- Do not insert any objects inside these devices while powered on. Such objects may contact hazardous energy parts that could result in a risk of fire, personal injury, or damage to the unit.
- Do not remove or alter the markings or labels affixed to these devices.

US and Canada Restrictions

- FCC and ISED regulations restrict and limit operation of these devices to indoor use only.
- FCC and ISED regulations prohibit operation of these devices on oil platforms, cars, trains, boats, and aircraft, except that operation of this device is permitted in large aircraft while flying about 10,000 feet only in the 5.925-6.425 GHz band.
- FCC and ISED regulations prohibit these devices to be used for control of or communications with unmanned aircraft systems, including drones.

Symbols on Equipment or Documentation

DANGER

DANGER statements indicate potentially hazardous situations including those that could cause loss of life or physical injury.

CAUTION

CAUTION statements alert a possibility of damage to the system, software, or individual items or parts of equipment withing a system. However, this damage presents no danger to a person.

NOTE

A NOTE provides a tip, guidance, or advice and can emphasize important information.

System Overview and Introduction

Airvine WaveCore devices are indoor wireless point-to-point (PPP) devices that provide wireless Layer 2 Ethernet bridge networking solutions for enterprise and business markets. WaveCore devices are sold in pairs, and wirelessly communicate through walls and ceilings (up to 8 inches of or more concrete), which allows through-wall and through-ceiling communications without having to drill holes or pull wiring.

A WaveCore pair includes a Controller Node and a Subordinate Node. The Controller Node starts broadcasting on a factory-set frequency band as soon as it is powered up, and the Subordinate Node starts searching for the Controller Node broadcast when it powers up, and then locks onto that broadcast so the pair is immediately communicating. Use the Controller Node as the primary device for configuring and monitoring the WaveCore pair.

Both WaveCore devices are configured and monitored through the Controller Node, using an on-board VineManager Web GUI HTTP website, accessible using a Wi-Fi or a wired connection. Selected changes made to the Controller Node are also automatically made to the Subordinate Node, so any changes made to the Web GUI parameters and the transmission frequency and bandwidth are made to both WaveCore devices.

WaveCore devices include internal high-gain directional antennas, using individual transmit and receive links. For optimized transmit and receive rates, the WaveCore antennas need to be aligned to within +/- 10 degrees of each other. This alignment not only assures maximum transmission rates, but also reduces any interference between the WaveCore pair and any other devices. To ensure optimized transmit and receive rates, the WaveCore devices include on-board signal diagnostics to ensure optimal results.

WaveCore devices come from the factory with standard 3-inch mounting brackets, and customers can order alternative 5-inch mounting brackets. Customers can also order other optional accessories listed later in this manual.

The WaveCore devices are powered by 12 VDC, PoE, or both. This allows for power supply redundancy to support failsafe operation. As an added benefit, WaveCore devices can be powered by WaveTunnel PoE output.

WaveCore Deployment Scenarios

There are many deployment scenarios that WaveCore is designed to handle, many of which involve making wireless connections through walls or ceilings.

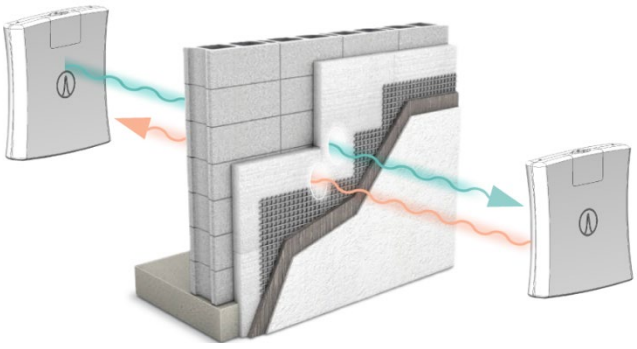
Cement/Concrete Walls and Floors are a fact of life in most commercial buildings. Deployment of new networks or expanding of networks in existing commercial buildings often require high cost and lengthy delays associated with laying wire networking cable through obstructions and across longer distance interior spans.

WaveCore was designed from the ground up to allow quick, easy, and cost-effective deployments of a high-speed internal wireless backbone that can "blast" through obstructions and avoid the cost and delays associated with rolling out networking cable within the enterprise that include labor cost, extensive permitting, core/wall drilling, need to contract licensed contractors, materials, x-rays).

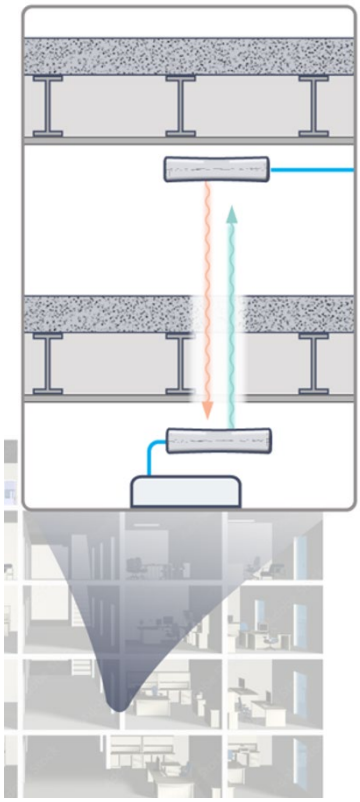
Connecting Wirelessly Through Walls and Ceilings

Specifically routing networks into or out of:

- HVAC and Fire Alarm rooms
- Networking Rooms, IDF/MDF
- Floors/ceilings



Connecting Through Walls



Connecting Through Ceilings Floor-to-Floor

WaveCore Models

There are currently two versions of the WaveCore product.

Part Number	Description
WC-1000RH-US	This is a complete point-to-point wireless bridge link that contains two 1000RH-US Wireless Radio Devices, and two SHORT Wall/Ceiling Mounting Brackets. This model is designed to be operated only in the US and Canada. Per FCC/ISED regulations, the country code of the model is fixed to "US". It is not possible for users to change the country code.
WC-1000RH-RW	This is a complete point to point wireless bridge link that contains two 1000RH-US Wireless Radio Devices and two SHORT Wall/Ceiling Mounting Brackets. This model cannot be operated in the US and Canada. With this model, users choose a country country code and the system will automatically conform to the relevant regulations covering power, spectrum and channel size.

* The country code can only be configured on the RW "world" model.

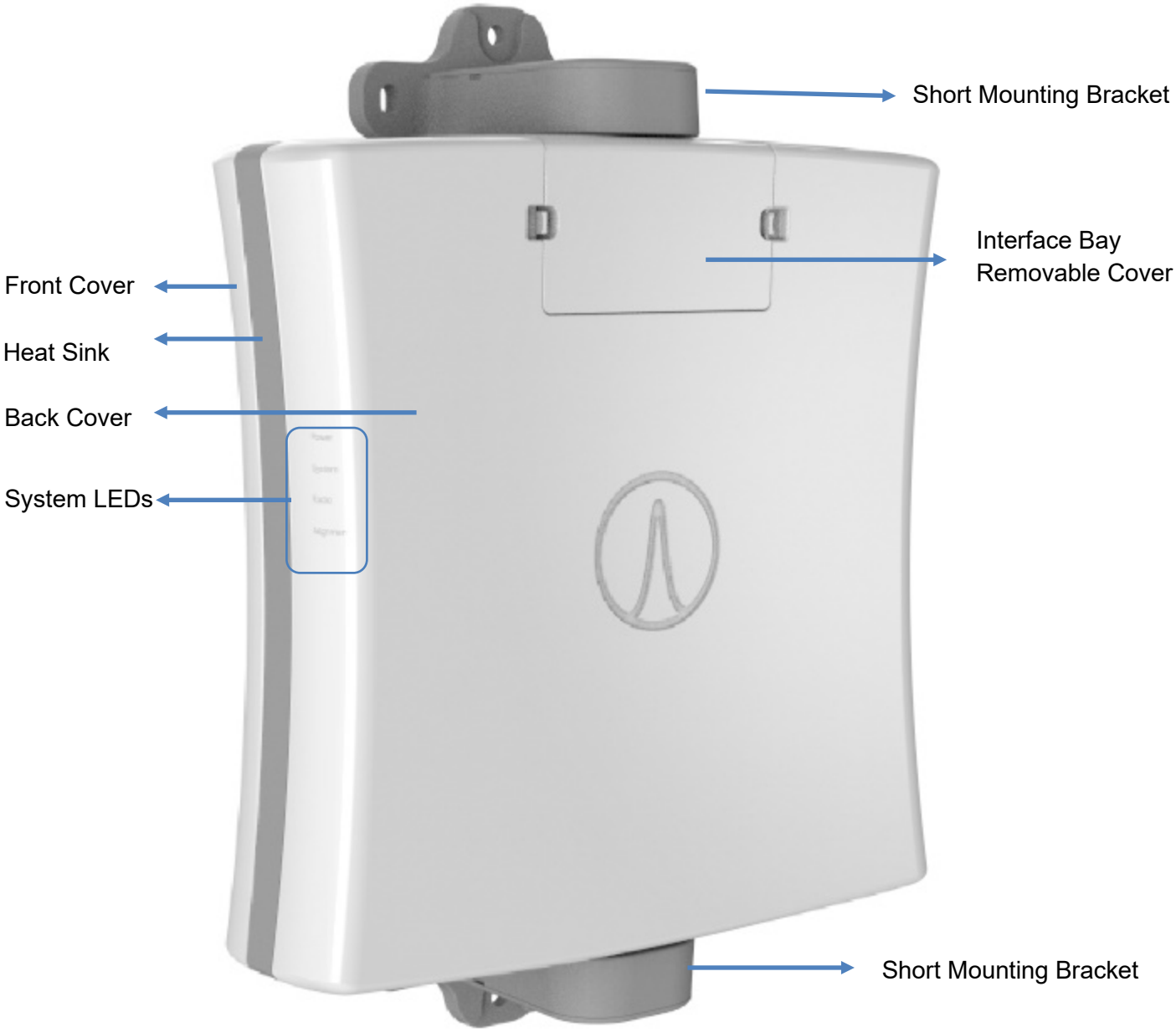
Node Types – Controller Node and Subordinate Node

A link is comprised of a Controller Node and a Subordinate Node. Both Node Types can be individually managed and monitored using the VineManager web-based management utility.

Node Types	Description
Controller Node:	Initiates and manages the link to the Subordinate Note The Controller Node can only connect to a Subordinate Node
Subordinate Node:	The Subordinate Node operates under the control of the Controller Node The Subordinate Node can only connect wirelessly to a Controller Node

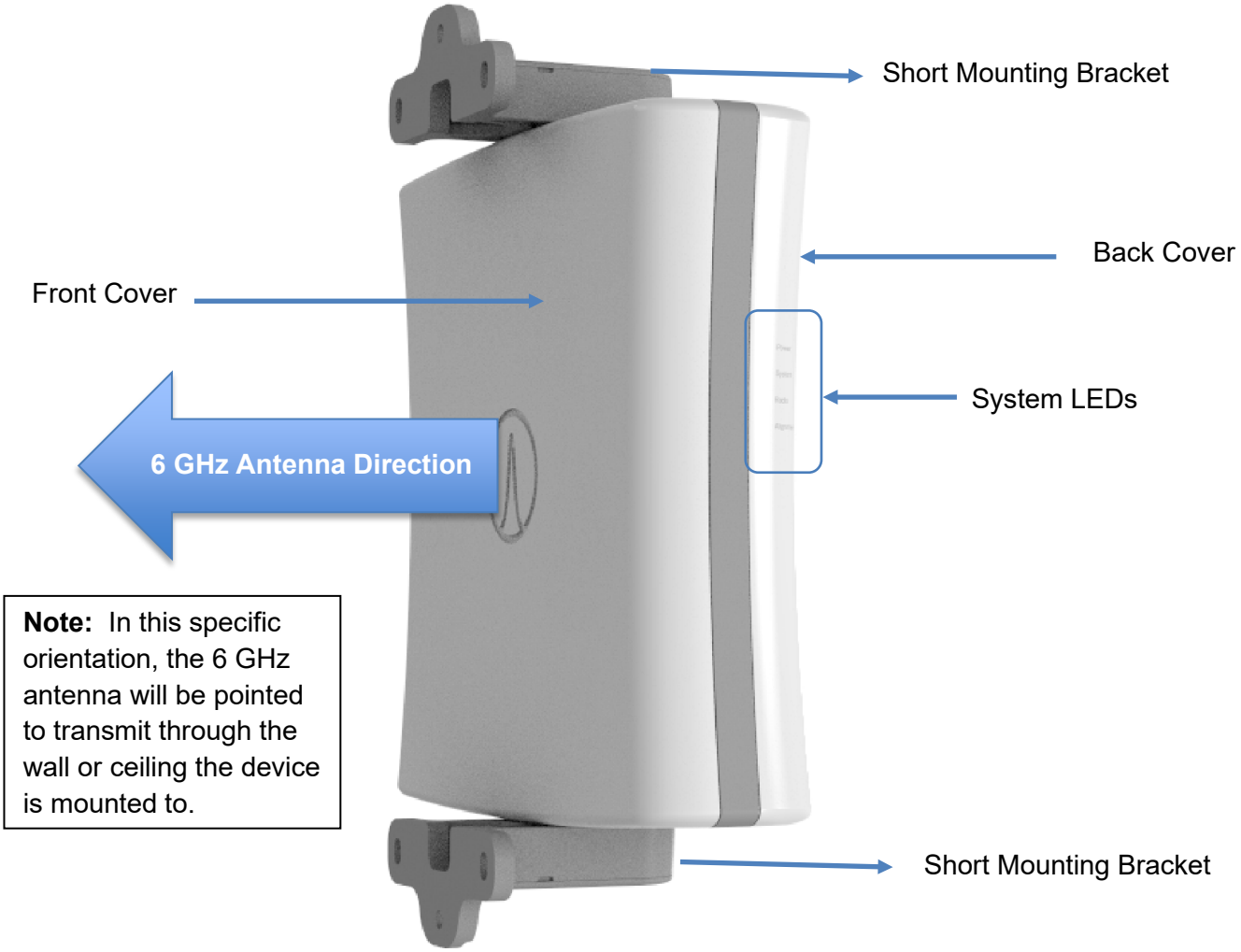
Controller Node **Subordinate Node**

WaveCore Key System Features – Back Side of Unit



WaveCore Key System Features – Front Side of Unit

The 6 GHz directional antenna is located under the front cover and points outwards away from the unit.



Note: In this specific orientation, the 6 GHz antenna will be pointed to transmit through the wall or ceiling the device is mounted to.

WaveCore Key System Features – Top Side of Unit

On the top of the unit, there is a mounting point for the bracket as well as the label that indicates important information such as:

- Ethernet MAC Address
- Device Type Initial Configuration (Controller Node or Subordinate Node)
- Direction of the antenna
- Production Registration QR Code (snap with mobile device camera to register your device).

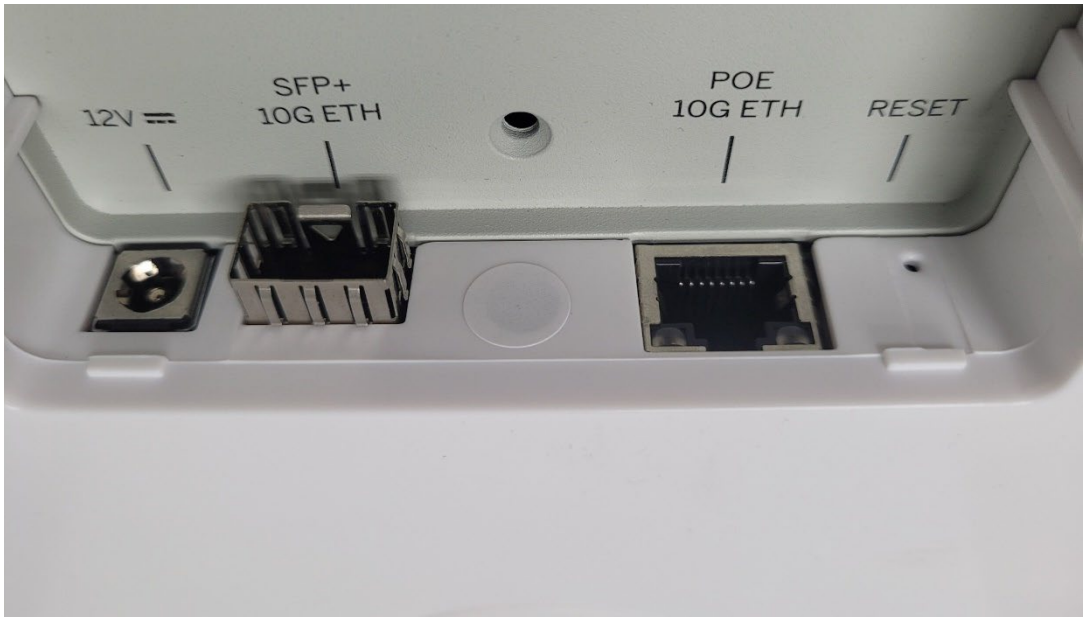
Key Specifications – Model 1000RH

Networking Interface	One 1 Gbps Ethernet port (RJ45) PoE 802.1at PD Power Input One 1 Gbps Ethernet Port (SFP+) Available only with optional feature license 10Gbps Ethernet operation on enabled wired ports available only with optional feature license
RF Connections	One 6 GHz high-capacity radio with directional antenna One 2.4 GHz Wi-Fi radio 802.11b/g with omni antenna for local management
Frequency Band*	5.925 MHz – 7.125 GHz
Bandwidth	320 MHz, 160 MHz, or 80 MHz
Power Consumption	25.5 Watts Maximum, 20 Watts Typical
Input Voltage/Current	Typical Power Input Values: 12V DC Power Input 12V ⎓ 2.1 A PoE Power Input 48V ⎓ 0.53 A Voltage Input Ranges: 12 VDC Input: 11 to 13 VDC Max Current: 2.32 A PoE Input Voltage: 42 to 57 VDC Max Current: 0.61 A
12V Power Input	Accepts circular 2.1mm ID / 5.5mm OD power connectors. Outside +, Inside -
Operating Temperature	-20 – 55 °C
Humidity	0 – 95%, Non-Condensing
Usage	For Indoor Use Only
Antenna	6 GHz High Gain Antenna, Elevation = 10 deg, Azimuth = 10 deg.

* Frequency Band Support will vary based on system part number and country of operation.

Electrical and Mechanical Interfaces

The following Electrical and Mechanical Interfaces are located on the back side of the radio device under the Interface Bay Removeable Cover.



- **12 DC Power Input** — Center Pin: 1.2mm / Outer 5.5 mmm Circular Connector
- **SFP+ Ethernet Port** — Enabled with optional SW Feature License Key
- **10G Ethernet Port (PoE PD)** — RJ45, (POE PD Input, 802.11at, 25.5Watt), upgradeable to 10G with optional SW Feature License Key.
- **System Reset Button** — Pin Hole Access

Press once	Resets/Reboots the unit, uses prior configured parameters.
Press and hold 5 seconds	Resets unit to factory defaults, all configuration information will be lost.

Caution:

If you are using the 12VDC Power Input, maintaining compliance with IEC 62368-1 safety standard requires the use of the Airvine AC/DC 36-Watt Power Adapter, PN: ACC-PS-ACDC-XX00.

Airvine recommends usage of the Airvine ACC-POE-10G-XX00 801.3at PoE Injector: 30-Watt, 53-Volt, 0.75A, AC Input (100-240V). If a different 801.3at PoE power source is used, such power source must be a limited power source that will not exceed 56-Volts, 30-watts, or 0.75A. Passive PoE injectors should never be used.

Ethernet RJ45 Interface LEDs

The RJ45 Ethernet Connector has two LEDs to help indicate connectivity status and traffic activity on the Ethernet Interface. The LED on the left side of the connector is Green. The LED on the right side of the connector is dual color (Green / Amber).

The following table indicates the connection status.

RJ45 Connector State	Green LED	Green/Amber LED*
No Connection	Green	Off
10 Gbps	Green	Green
5 Gbps	Green	Amber
2.5G	Off	Amber
1G	Off	Green
100M	Off	Off

*The Green/Amber LED will blink when traffic is detected.

External System LEDs

On the left side of the WaveCore contains 4 System Indicator LEDs.

Power Provides status of power to the system

System Provides important system and alarm status

Radio Indicates if radio is enabled, trying to make a connection, or has made a connection to a far-end WaveCore device.

Alignment When in "Alignment Mode", indicates how well the near-end and far-end radio are mutually aligned.

Power LED	Behavior
Off	No power source detected
Green On	Power source detected; unit has power

System LED (dual color)	Behavior
Off	System Not Powered On
Green Blinking	System Booting Up and Being Initialized
Green Solid	System Operating Normally
Red Solid	System Not Functioning Normally (Major Alarm)

Radio LED	Behavior
Off	Radio Disabled
Green Blinking	Radio powered on, trying to make a connection to another WaveCore device
Green On Solid	Radio powered on and connected to another WaveCore device

Alignment LED – dual color Green	 Yellow	Receiver SNR Level (the higher the stronger the signal).	Approximate Over-the-Air Data Rate
Off	Off	No Connection or Alignment Mode Not Enabled	No Connection or Alignment Mode Not Enabled
Off	Blinking Slow	Align Mode Enabled – SNR <=11	500 to 1100 Mbps
Off	Blinking Fast	Align Mode Enabled – SNR 12 – 15	1000 to 1700 Mbps
Off	On Solid	Align Mode Enabled – SNR 16 – 19	2300 to 3400 Mbps
Blinking Slow	Off	Align Mode Enabled – SNR 20 – 24	4600 to 5100 Mbps
Blinking Fast	Off	Align Mode Enabled – SNR 25 – 32	5700 to 7600 Mbps
On Solid	Off	SNR >32	8600+ Mbps

WaveCore System Accessories

Short Mounting Bracket Kit (ACC-220S)

The Short Mounting Bracket Kit contains two mounting brackets, plastic covers, and screws/ washers to mount the bracket to the top and bottom of the WaveCore unit. Three mounting holes in each bracket can accommodate 1/4" or M7 screws (not included) to secure it to a ceiling or wall.

Note: Two Short Mounting Bracket Kits (ACC-220S) are included in the WaveCore Complete Wireless Link: PN: WC-1000RH-US and WC-1000RH-RW

Short Mounting Bracket Kit Contains:

Qty	Description
2	Short Metal Mounting Brackets
2	Short Plastic Mounting Bracket Cable Covers
2	Stainless Steel Hex Head Screw, 1/4"-20 Thread Size, 3/4" Long
2	Stainless Steel Split Lock Washer for 1/4" Screw Size, 0.26" ID, 0.487" OD
2	Stainless Steel Washer for 1/4" Screw Size, 0.281" ID, 0.625" OD
2	Stainless Steel External-Tooth Lock Washer for M6 Screw Size, 6.4 mm ID, 11 mm OD

Optional Long Mounting Bracket Kit (ACC-220L)

The optional long mounting bracket kit is sold separately. Each kit contains two long mounting brackets, plastic covers, and screws/ washers to mount the bracket to the top and bottom of the WaveCore unit. Three mounting holes in each bracket can accommodate 1/4" or M7 screws (not included) to secure it to a ceiling or wall.

The long bracket allows the WaveCore radio to rotate 360 degrees allowing improved capabilities to point the WaveCore radio antenna in virtually any direction including towards a wall/ceiling or away

Qty	Description
2	Long Metal Mounting Bracket
2	Long Plastic Mounting Bracket Cable Covers
2	Hex Head Screw, 1/4"-20 Thread Size, 3/4" Long
2	Split Lock Washer for 1/4" Screw Size, 0.26" ID, 0.487" OD
2	Washer for 1/4" Screw Size, 0.281" ID, 0.625" OD
2	External-Tooth Lock Washer for M6 Screw Size, 6.4 mm ID, 11 mm OD

Optional AC/DC Power Adapter (ACC-PS-ACDC-XX00)

Airvine highly recommends using the Airvine AC/DC 36 Watt AC/DC Power Adapter. Non-Airvine power adapters should have current limiting capability to not exceed 3A to protect the system from potential damage.

This AC/DC Power Adapter includes a 1.8-meter AC Power Cord where XX = Country AC Power Cord to be included in the unit (i.e. US, EU, ZA, UK).

Specifications:

Input	100-240 VAC, 50/60 Hz
Output	12VDC / 3A
Regulatory	FCC, CE, UKCA, EAC
Energy Efficiency	VI
Operating Temp	-25C to +60C
Power Class	ClassII
AC Connector Plug	Use C7 Plug, 2.1mm (ID) x 5.5mm (OD) x 11mm

Outside ⊖—●—⊕ Inside

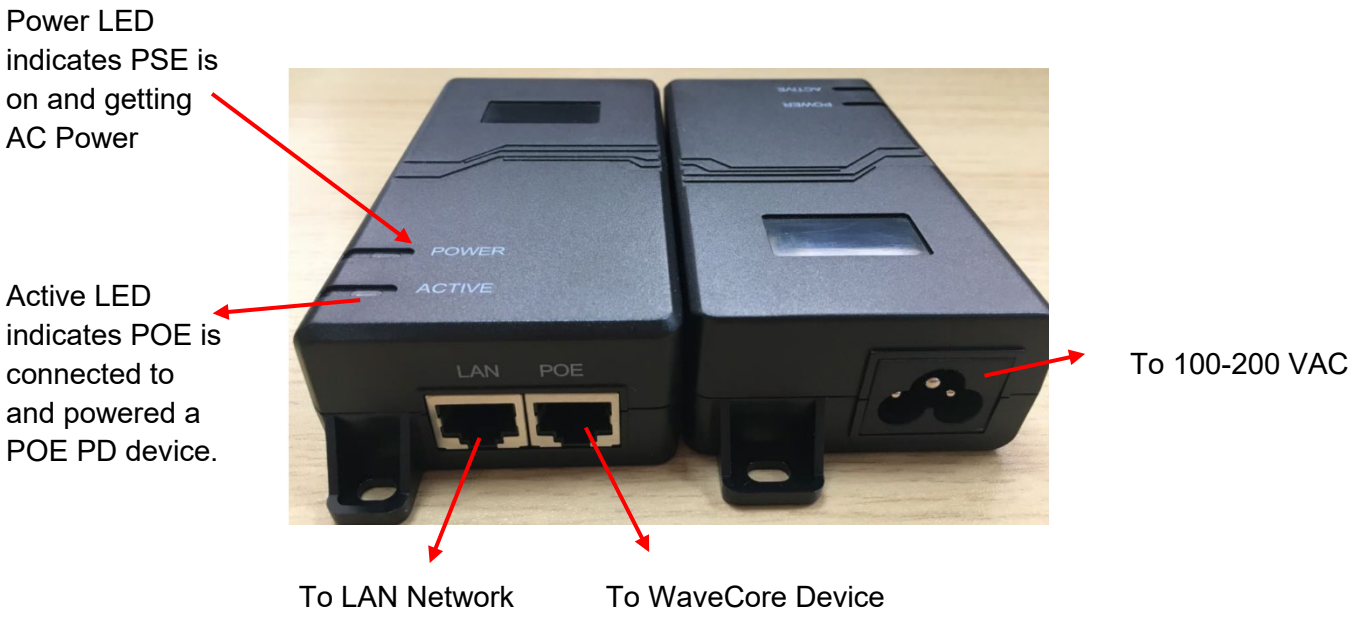
Caution:

If you are using the 12VDC Power Input, maintaining compliance with IEC 62368-1 safety standard requires the use of the Airvine AC/DC 36 Watt Power Adapter, PN: ACC-PS-ACDC-XX00.

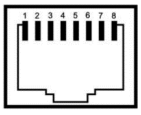
Optional PoE Injector (ACC-POE-10G-XX00)

Airvine highly recommends using the Airvine 802.1at 10Gbps POE Power Adapter. If using non-Airvine power adapters should have current limiting capability to not exceed 3A. Passive POE Injectors are not recommended.

This POE Injector includes a 1.8-meter AC Power Cord where XX = Country AC Power Cord to be included in the unit (i.e. US, EU, ZA, UK).



Specifications:

Data Rate	Up to 10 Gbps Ethernet
Ethernet Connector	RJ45 shielded
Input	100 VAC – 240 VAC, 50/60Hz, Max 0.75A
Output:	53VDC ± 2V, 0.6 A
Regulatory	FCC, CE, UKCA, NOM/NYCE, EAC, CCC, India BIS
AC Connector Plug	C5 AC Plug
Operating Temp	-10C to +45C
Operating Humidity	10% to 90%, Non-Condensing
Weight	210g (7.4 oz)
Dimensions	139mm x 63mm x 36mm
Pin Assignments	 +(1,2) Pins; - (3,6)

Device Installation

This section provides installation information for the WaveCore system.

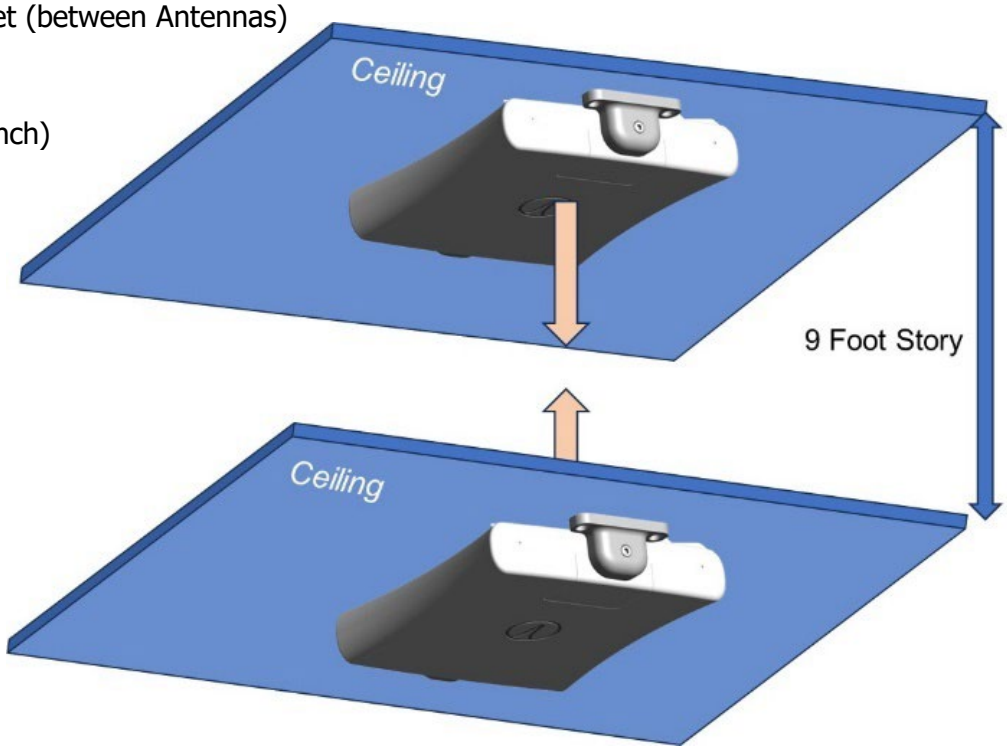
Step 1: Plan for Installation

Decide where to install the units and determine the spacing between them. Consider the types of materials the signal will need to penetrate. Plan how the units will be powered and connected to the network. A site survey is always recommended to confirm the distances and desired installation locations.

For example, you might plan a floor-to-floor link where both radios are mounted on the ceiling. You determine that ceiling consists of 4 inches of concrete, with a 6-inch gap for utilities between the concrete and the lower ceiling structure, which includes drywall, wood framing, and a plywood floor above the concrete. You determine the distance between floors is 9 feet.

In this scenario, you can then evaluate the link using:

Link Distance of 9 feet (between Antennas)
4 inches on concrete
5.8 inch of drywall
Wood Flooring (1/2 inch)



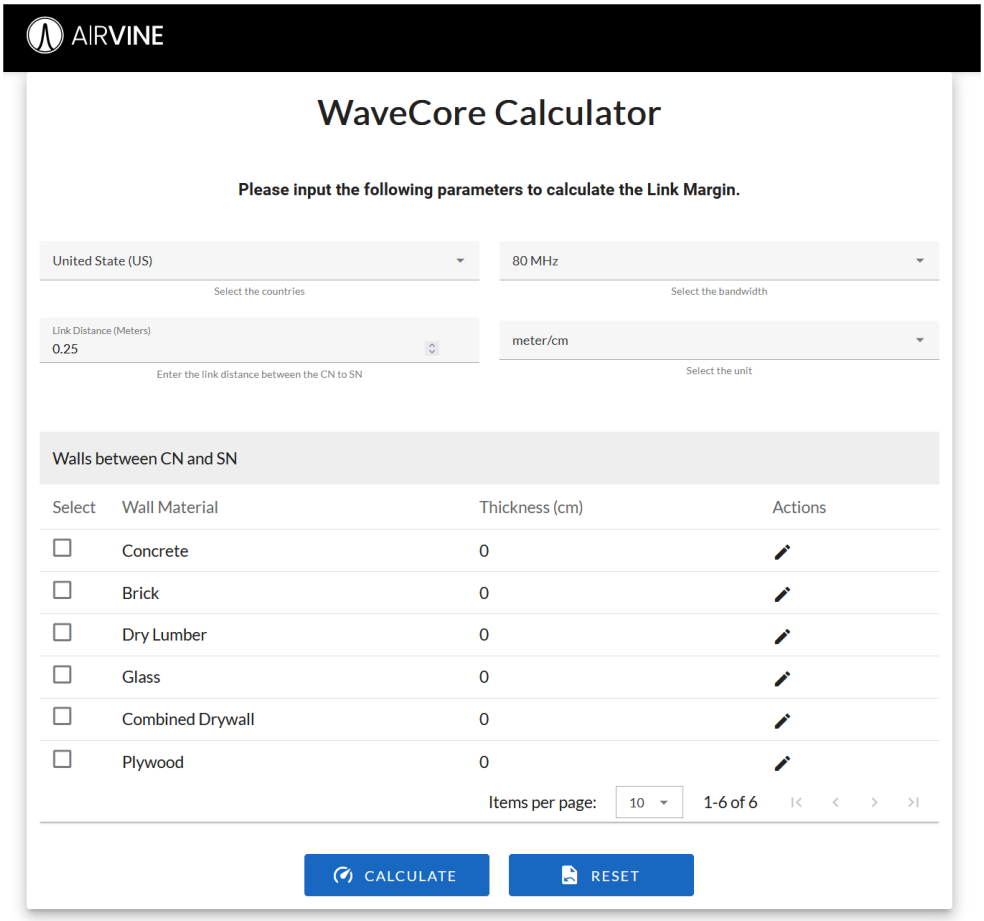
Calculate Link Performance

Use the Airvine VineCalculator to get an estimate of the connection quality and potential throuput of a WaveCore link before implementation.

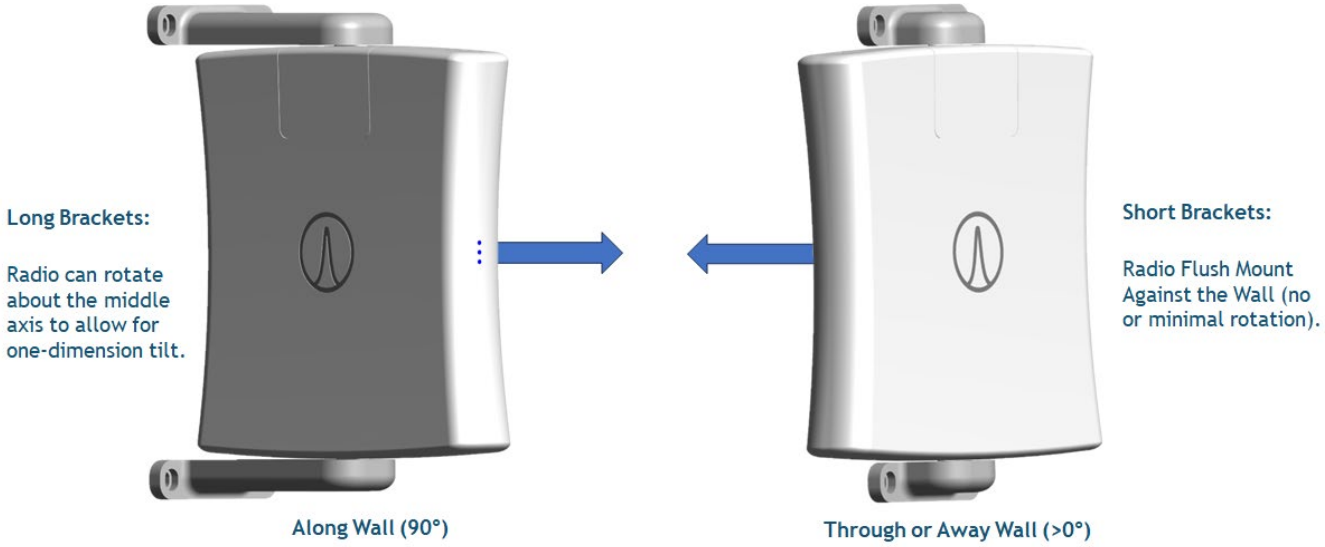
The VineCalculator tool, available at https://services.airvine.com/calculator/vbcalc, allows users to input link parameters such as country of operation, frequency band, channel bandwidth, and the type and thickness of materials the signal will need to penetrate (e.g., drywall, concrete, glass, wood). It then provides an estimate of the achievable link margin.

The country of operation is important because different countries have regulatory limits on the maximum transmit power each radio can produce. Higher transmit power enables better material penetration, greater distance, and increased throughput.

VineCalculator for WaveCore



Determine which Mounting Brackets are Needed (short or long)



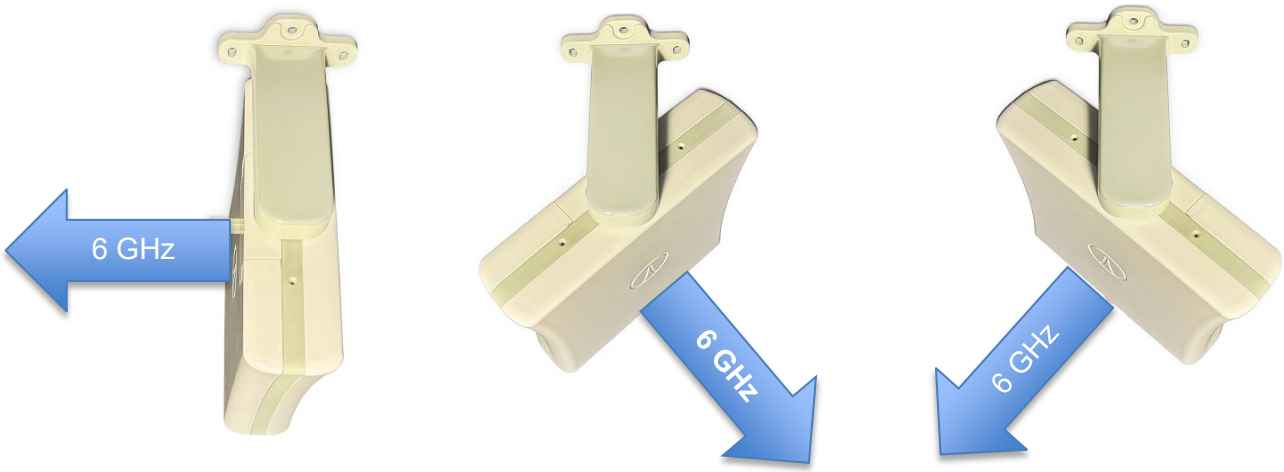
WaveCore units are shipped with Short Mounting Bracket Kits (ACC-220S). The short mounting kit enables the WaveCore device to be flush-mounted directly against a wall or ceiling, enhancing visual appeal. However, it offers limited flexibility for adjusting or aligning the antenna.

WaveCore Ceiling Mount with Short Mounting Bracket

The short bracket allows the antenna to be angled up to 4 degrees from parallel to the wall or ceiling, while the antenna itself has an approximate 10-degree ± azimuth/elevation beamwidth. In many cases, short brackets are adequate, as the far-end radio antenna can be mounted directly in alignment and within the beamwidth of the antenna's path.

If the antenna needs to be pointed beyond the limits of the Short Mounting Bracket, the optional Long Mounting Bracket Kit (ACC-220L), which must be purchased separately, should be used. The Long Mounting Bracket allows the radio unit to rotate a full 360 degrees, providing complete flexibility to aim

the antenna in any direction. When installing multiple radios, it is recommended to keep a few Long Bracket Kits available during installation in case adjustments or repositioning of the radio devices are necessary.



If there is a need to replace the Small Mounting Bracket with the Large Mounting Brackets, please see Installation Tips – Working with Mounting Brackets

Determine how each device will be powered and connected to its network

Please refer to Installation Tips – Powering and Connecting Units that indicates the supported power and connection options available with the WaveCore unit.

The WaveCore has two ways to power the device:

- 12 Volt DC Input Connector
- PoE 802.1at-compliant Ethernet

The WaveCore features two Ethernet interfaces (an RJ45 port and an optional SFP+ port), providing flexible connectivity options for networking equipment using different cable types, including copper Cat5/6/7 cables and fiber optic cables.

Step 2: Pre-Staging / Pre-Configuring the Unit

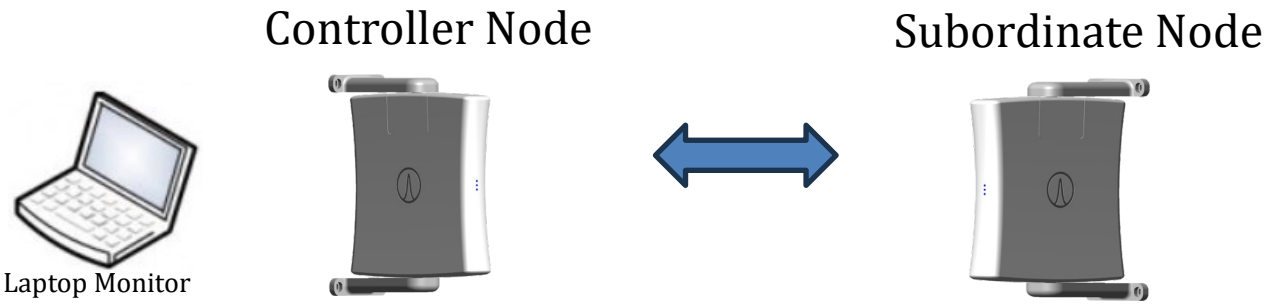
Once the equipment is delivered and available at the site for installation, it is highly recommended (but not mandatory) to pre-stage and/or pre-configure the unit and to validate the equipment link is fully operational.

1) Unpack the radios

Ensure all brackets and materials (cables, power supplies, etc.) are available.

2) Collect the following equipment and power on the radios

- Laptop or computer running a standard internet browser
- Ethernet cable to connect to one of the WaveCore node or network
- Or a Wi-Fi 2.5 GHz wireless connection to connect locally to the WaveCore's 2.4GHz wireless interface.



Locate the equipment on a desk or location where you can power both radios and confirm a link can be established. This should be done prior to the physical installation of the radios.

Caution

Before powering on the equipment, ensure the radio antennas are not positioned directly back-to-back to avoid overloading the receivers and reducing the risk of damage.

Be sure to keep the radios several feet apart from one another as each radio has very high gain antennas and multiple transmitters.

3) Logon to the Controller Node (CN) and Validate Link to Subordinate Node (SN)

Before installing the radios, it is recommended for first logon to the units and validate that the link is performing properly.

Using a browser on a laptop or mobile device, log onto the radios by entering the following IP Address in the browser window.

Wired Ethernet Management Parameters:
The following are the factory-default parameters to manage the WaveCore using the VineManager HTTP Web GUI **over a wired Ethernet connection**:

WaveCore Wired Ethernet default IP address:	**192.168.0.250**
WaveCore Management default user login and password:	**admin/admin**

Wi-Fi Management Parameters:
The following are the factory-default parameters to manage the WaveCore using the VineManager HTTP Web GUI **over a Wi-Fi connection**:

WaveCore Management Wi-Fi SSID:	**avb_[device MAC addr]**
WaveCore Management Wi-Fi WPA2 passcode:	**airvine!**
WaveCore Management Wi-Fi IP address:	**192.168.3.1**
WaveCore Management default user login and password:	**admin/admin**

With the WaveCore US version, the two radios will automatically pair and establish a link upon power up of both radios.

With the WaveCore RW (world) version, before the radio can start transmitting, user must first log onto the CN and also the SN and configure the **Country Code** of the country the two devices will operate in. This is needed in order to comply to local regulatory requirements.

When the Radio LED is blinking Green, the CN and SN are "searching" attempting make a connection.

When the Radio LED is lit solid GREEN, the SN/CN Link is established.

Step 3: Mount the equipment and align the antenna

Mount the Controller Node

- Decide on the location for the CN

  It is recommended to mount the CN and the SN at locations where both units will be best aligned. The CN should be deployed closest to the core/distribution domain of the network while the SN should be closest to the access/end-device domain of the network.

- Mount the CN in place in a solid, secure structure that can safely accommodate the weight of the unit.

Use the appropriate type and size of screws that are suitable to attach the radio unit to the intended wall or ceiling.
The bracket's center mounting hole has a diameter of 0.28 inch / 7.2 mm
The bracket's two side mounting holes have a diameter/width of 0.28 / 7.2 mm

Caution:
Be sure to use two brackets to attach the WaveCore device with 6 screws or bolts (and all 6 mounting holes in the bracket) to firmly secure it to a ceiling or wall to minimize any risk of the device coming loose or falling which can be a hazard that can cause injury or death.

- Attach networking cables to the unit.

- Attach a 12 Volt Power Source or PoE Power Source (or both) and power on the device.

Mount the Subordinate Node

- Decide on the location for the SN

  It is recommended that the Subordinate Node be mounted closer to the access domain of the network.

Note
If it is safe to do so, you can validate the link connection prior to mounting the SN by holding a powered-on SN near the mounting location and point the SN in the direction of the CN and use the **ALIGN** LED to check/validate the connection and improve its performance/throughput.

Sometimes, a suboptimal connection can be easily fixed by moving the SN to a slightly different location to clear an unforeseen obstruction between the path of the RF signal. For example, in raised ceilings, there could be HVAC ventilation, equipment, or other obstructions that a minor adjustment in the radio location would address.

- Mount the CN onto a solid, secure structure that can safely accommodate the weight of the unit.

Use the appropriate type and size of screws that are suitable to attach the radio unit to the intended wall or ceiling.
The bracket's center mounting hole has a diameter of 0.28 inch / 7.2 mm
The bracket's two side mounting holes have a diameter/width of 0.28 / 7.2 mm

Caution:
Ensure the WaveCore device is securely mounted using two brackets and all six screws or bolts, utilizing all six mounting holes in the brackets. This will firmly secure the device to the ceiling or wall, minimizing the risk of it coming loose or falling, which could pose a serious safety hazard and potentially cause injury or death.

- Attach networking cables to the unit.
- Attach a 12 Volt Power Source or PoE Power Source (or both) and power on the device.

Validate Radio Connection

- When both radios are powered up and paired, they can establish a secure wireless link with one another.
- Use the system **RADIO LED** to check if the radios are connected.
- When the **Radio LED** is blinking Green, the CN and SN are "searching" and attempting make a connection. While the Radios are "searching" the **Align LED** is Off.
- When the **Radio LED** is lit solid GREEN, the SN/CN Link is established. At this time, the Align LED will light up.

Align Antennas

Performing the antenna alignment process is important to increase the performance and reliability of the wireless link.

Use the system **ALIGN LED** to fine tune and align the antennas to increase the performance and reliability of the link.

Airvine uses Signal to Noise Ratio (SNR) and Received Signal Strength Indicator (RSSI) parameters to align antennas and determine link quality and performance.

Align LED – dual color		Receiver SNR Level (the higher the stronger the signal)	Approximate Over-the-Air Data Rate
Green	Yellow		
Off	Off	No Connection or Alignment Mode Not Enabled	No Connection or Alignment Mode Not Enabled
Off	Blinking Slow	Align Mode Enabled – SNR <=11	500 to 1100 Mbps
Off	Blinking Fast	Align Mode Enabled – SNR 12 – 15	1000 to 1700 Mbps
Off	On Solid	Align Mode Enabled – SNR 16 – 19	2300 to 3400 Mbps
Blinking Slow	Off	Align Mode Enabled – SNR 20 – 24	4600 to 5100 Mbps
Blinking Fast	Off	Align Mode Enabled – SNR 25 – 32	5700 to 7600 Mbps
On Solid	Off	SNR >32	8600 Mbps and above

Installation Tips – Working Mounting Brackets

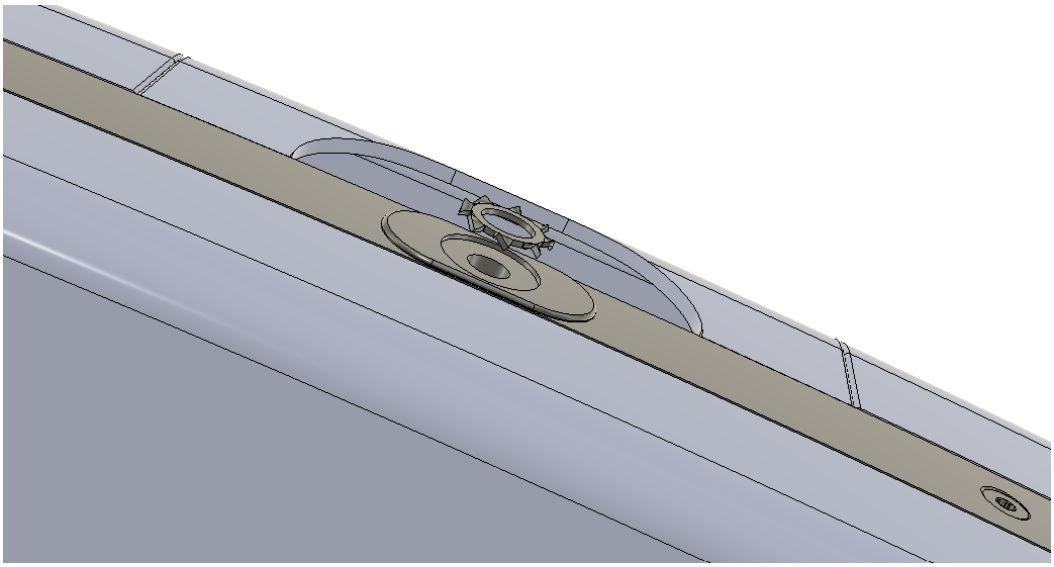
Attaching mounting brackets to a WaveCore Device

Follow these steps to attach a bracket to a WaveCore device.

Note

WaveCore links come shipped with the Short Brackets attached and bracket covers unattached. As such, some of these steps may not apply to newly purchased WaveCore links.

Step 1: Place the lock washer that has "teeth" into round inset located on the top or bottom side.

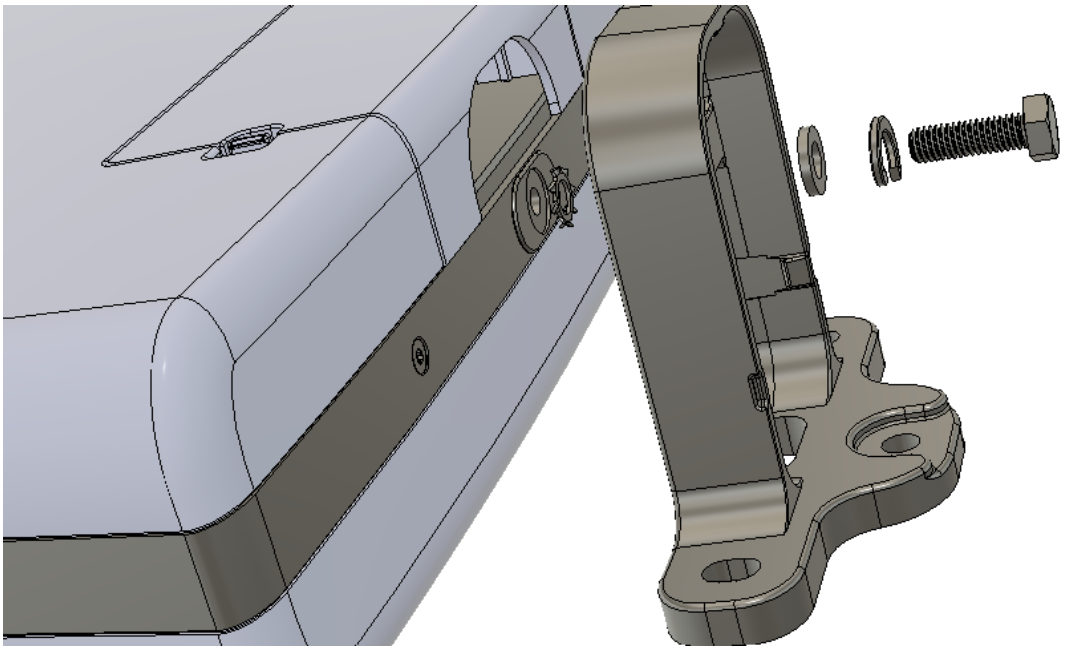


Step 2: Attach both brackets to the WaveCore device

Position the bracket onto the mounting hole in the right orientation depending on in which direction the antenna (located on the front of the radio) should point. For example, you may want to antenna pointed (front side of the device) towards the wall or ceiling that you want to connect through, or you may want to have the antenna (back side of the device) pointed away from the wall or ceiling.

Once you have the intended orientation, assemble the bolt such that the lock washer is in contact with the bolt head and then the smooth washer (see picture below). Insert the bolt containing the washers through the bracket mounting hole and into the WaveCore device threaded mountain hole located on the top or the bottom of the wave core unit and hand tighten. Then use a 7/16 socket wrench to secure and

attach the bracket firmly against the WaveCore device. Be sure to mount both brackets to the tome and bottom of WaveCore device

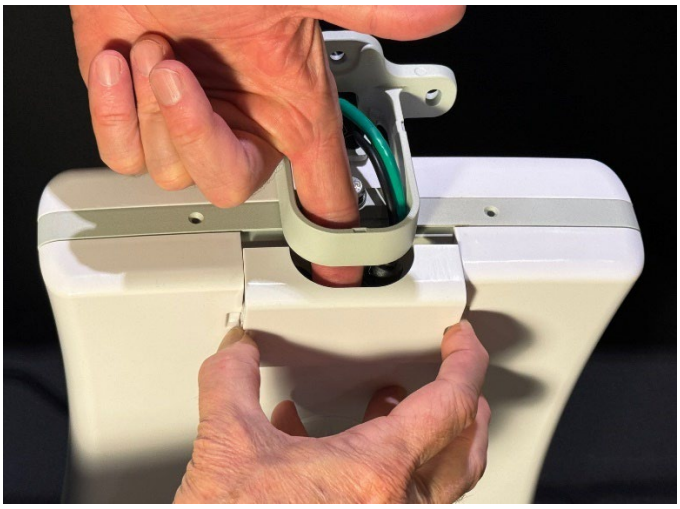


Step 3: Remove the Plastic Interface Bay Cover

When the radio is unpacked, the Removeable Interface Bay Cover will be attached to the device.

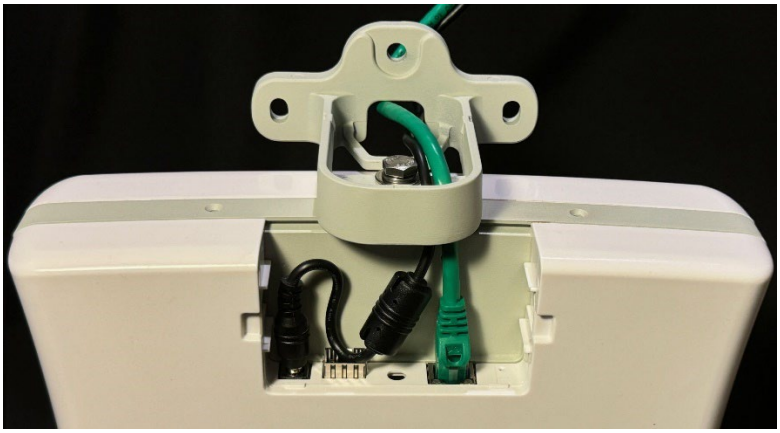
This cover must first be removed before power and network cables can be connected to the device. It's easiest to use two hands for this task.

First, insert a finger into the interface Bay and press lightly against the removeable cover. Next, using your other hand, grip and press in the two interface cover locking tabs located on both sides of the cover and gently remove the cover, pulling straight out, directly away from the WaveCore device.



Step 4: Route and attach the cables

One the top-side bracket, route the networking and power cables through the bracket. Feed the cable through the rear cable hole of the bracket then feed the cables down through the front of the bracket attach the cables to their respective interfaces.

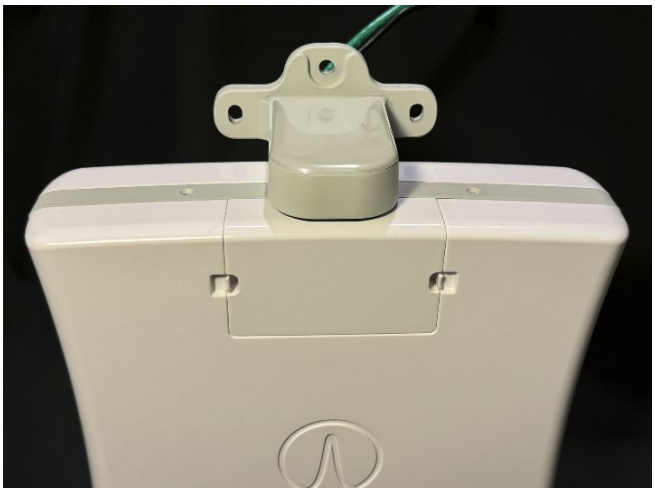


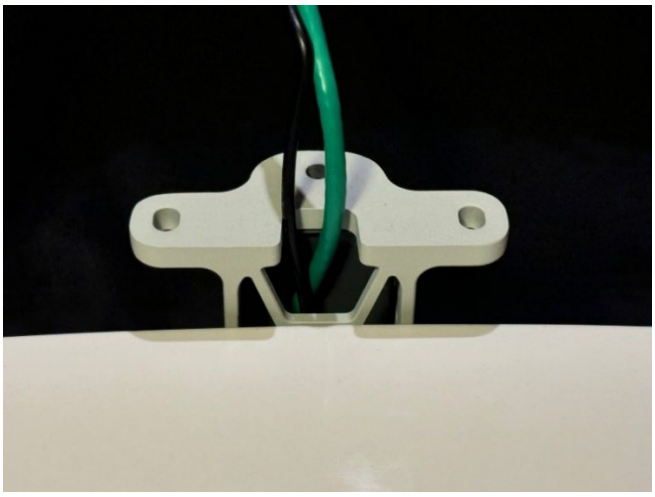
Step 5: Re-attach the removable interface bay cover

Re-attach the removable interface bay cover by sliding it straight down along the two side guide rails until the two locking tabs snap into place.

Step 6: Attach the plastic bracket cover by snapping it into the top of the bracket.

After completing all these steps, the attached bracket should look like the following.





Note

In many cases, it may be required to first install the cables in the wall such that the cables will protrude out of the wall or ceiling hole.

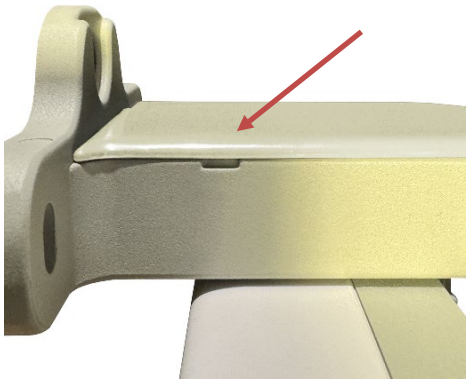
In this case, it will be required to carefully position the bracket against the wall hole containing the cable strands, then mount the device onto the wall. After this is done, the cables can be routed through the bracket, plugged into the interfaces. After this, both bracket cover and interface bay covers will be snapped into place.

Removing Mounting Bracket Plastic Cover

Occasionally, once the bracket is fully assembled, there may be a need to change or modify cable connections requiring removal of the bracket cover.

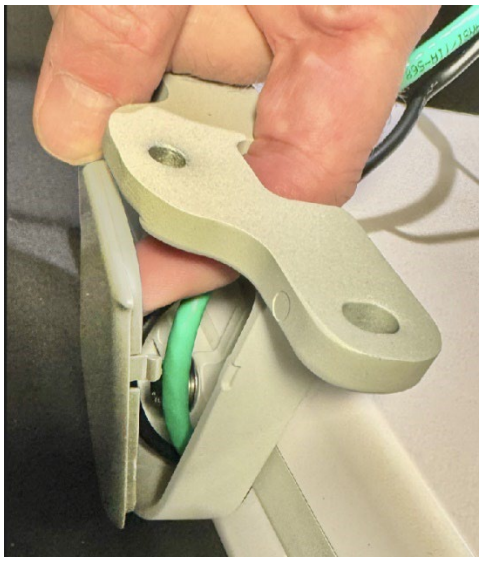
There are two ways to do this:

1) On each side of the bracket, there is a small indentation that allows the use of a tool like a screwdriver to gently push the cover up and remove it from the bracket.



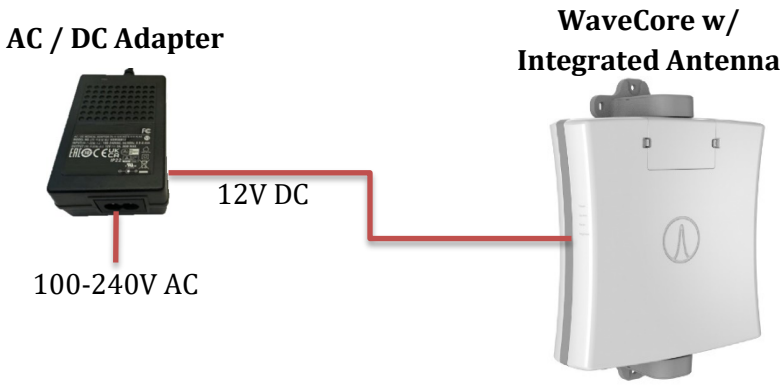
2) Using your finger, insert it into the cable routing hole located on the rear of the bracket and press gently up against the plastic cover to remove it.

   This method only works if the radio unit is not mounted already to a wall or ceiling.

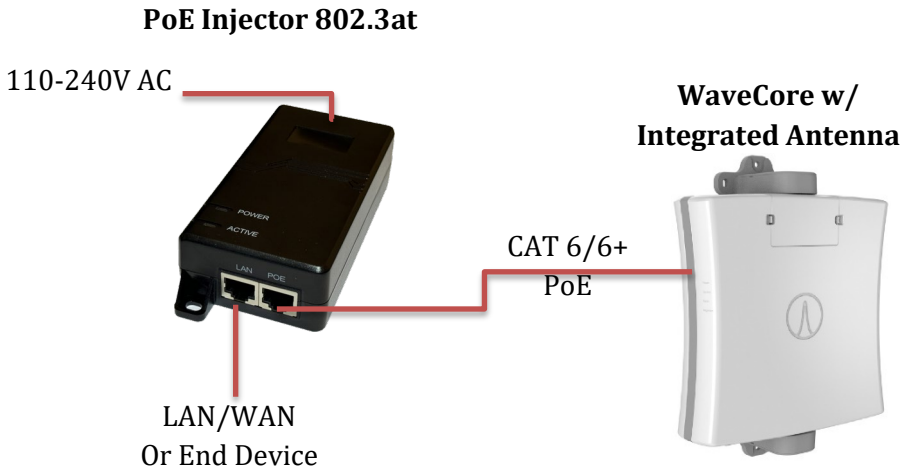


Installation Tips – Powering and Connecting Units

Installation Power/Cabling Options – WaveCore Powered by AC Adapter

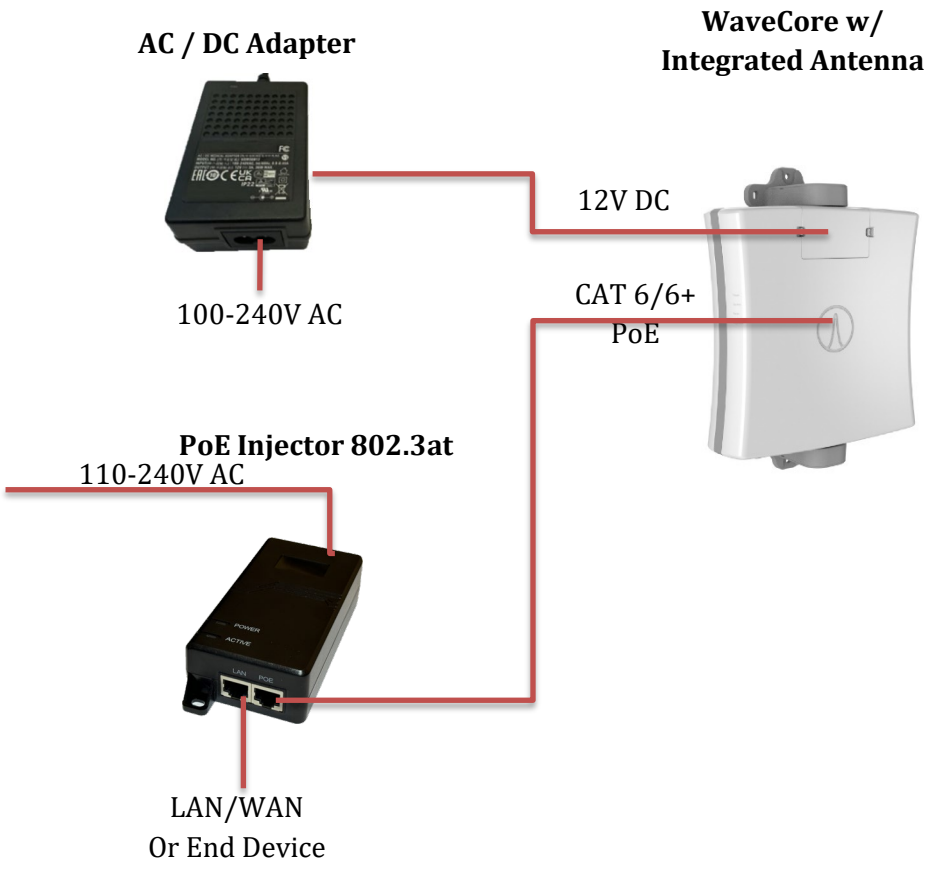


Installation Power/Cabling Options – WaveCore Powered by PoE Injector

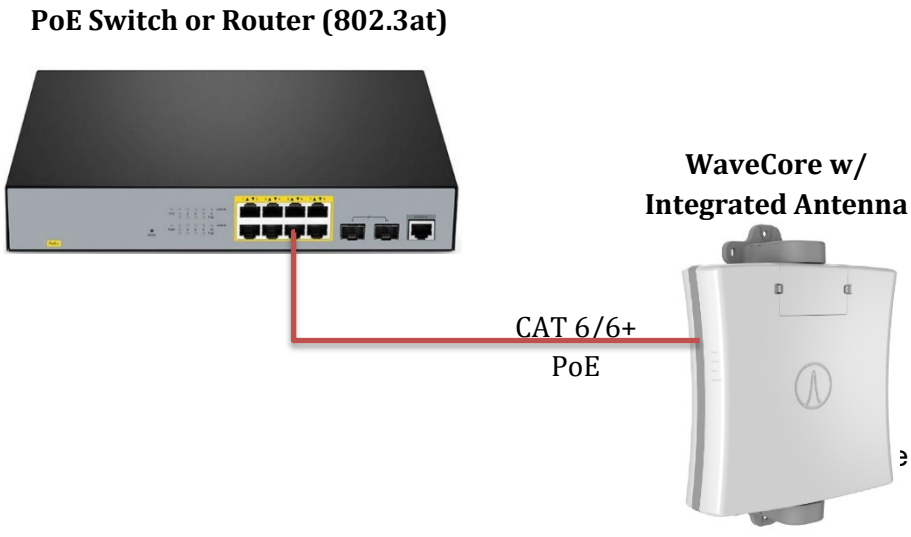


Installation Power/Cabling Options – WaveCore with Redundant Power Sources (12V and PoE)

The WaveCore device can be powered both by a 12V DC and a PoE power source to provide power redundancy for the radio.



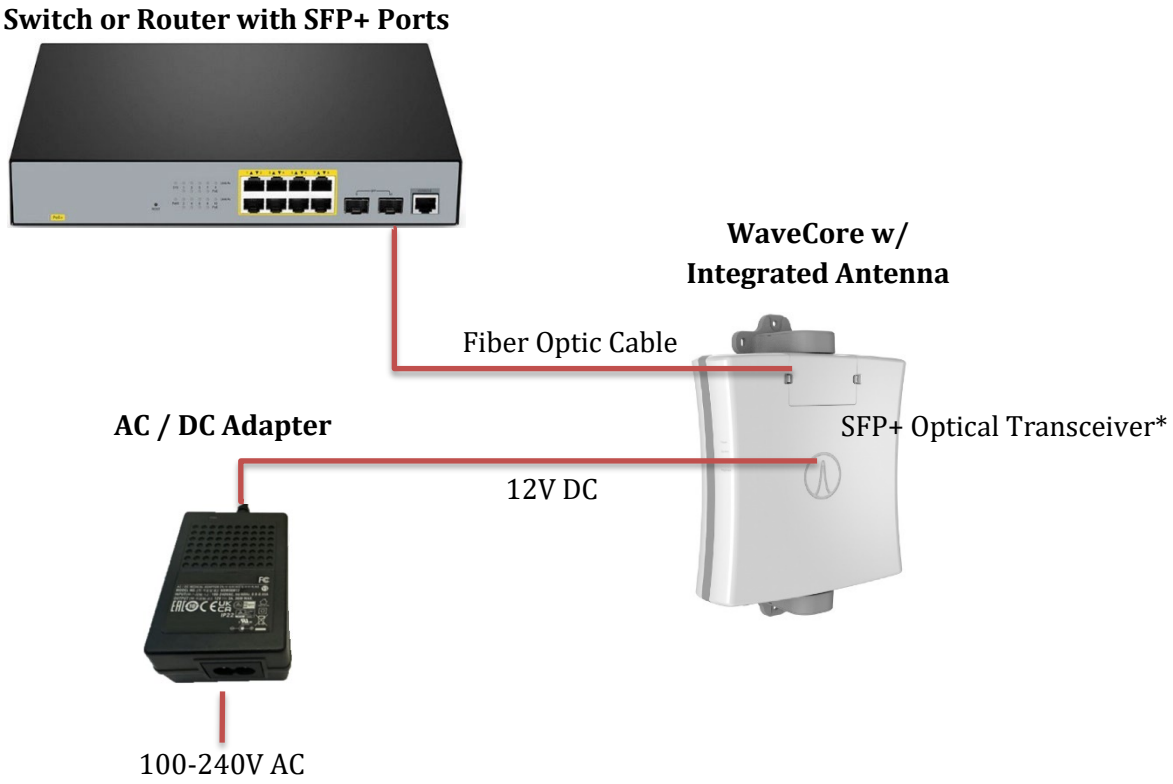
Installation Power/Cabling Options – PoE Switch or Router



Installation Power/Cabling Options – Switch/Router with Optical Interface

An optional SFP+ port is available, with optional SW license key, to provide a second Ethernet Port up to 10 Gbps.

The SFP+ cage can accommodate Airvine-tested modules SFP+ modules including optical/fiber transceivers (single mode, multi-mode) to allow long distance links over a fiber-optic cable up to 10 Gbps.



* SFP+ license is required to enable SFP+ port. SFP+ transceiver modules sold separately.

Appendix A – VineManager HTTP GUI

VineManager is the management interface Web GUI supported that is used to remotely or locally manage WaveCore devices.

A summary of how to access and logon to VineManager in this section.

For more details on using VineManager a please consult the following documents that can be downloaded on www.airvine.com/support:

Airvine WaveCore Getting Started Guide
Airvine WaveCore Configuration Manual

Factory Default IP Address and User Login

When shipped from the factory, the WaveCore device will be configured with the following default Management IP Addresses and user login and passwords.

Wired Ethernet Management Parameters:
The following are the factory-default parameters to manage the WaveCore using the HTTP Web GUI or the CLI/SSH **over a wired Ethernet connection** to the WaveCore:

WaveCore Wired Ethernet default IP address:	**192.168.0.253**
WaveCore Management default user login and password:	**admin/admin**

Wi-Fi Management Parameters:
The following are the factory-default parameters to manage the WaveCore using the AirvineMobile App, HTTP Web GUI, or CLI SSH **over a Wi-Fi connection** to the WaveCore:

WaveCore Management Wi-Fi SSID:	**avb_[device MAC address]**
WaveCore Management Wi-Fi WPA2 passcode:	**airvine!**
WaveCore Management Wi-Fi IP address:	**192.168.3.1**
WaveCore Management default user login and password:	**admin/admin**

Accessing the VineManager Web GUI

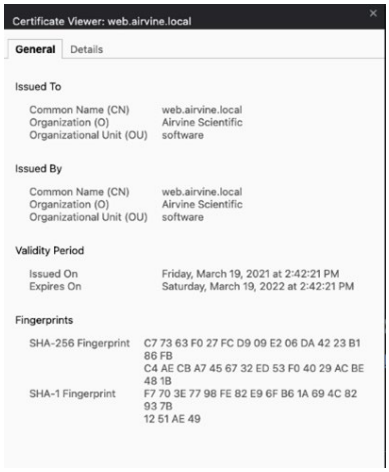
The WaveCore uses an intuitive Web-Based GUI to configure and monitor the WTs. A standard internet browser running on a PC, Notebook, or mobile device is all that is needed to manage a WaveCore device. To access the VineManager Web GUI, enter the applicable Management IP Address into the browser address bar.

VineManager can be accessed device via the following WaveCore interfaces:

- A WaveCore Wired Ethernet port
- A WaveCore 2.4GHz Local Wi-Fi management interface
-

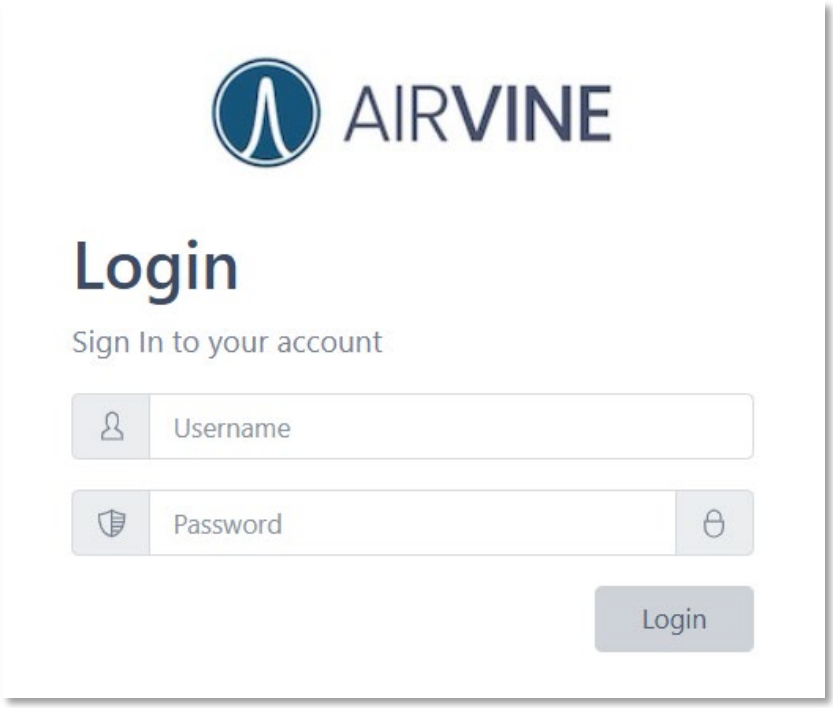
Supported Management Interfaces over Wired Ethernet	VineManager, a browser-based Web GUI using HTTP and HTTPS.
Supported Management Interfaces over the WaveCore Wi-Fi Interfaces (Note 1)	VineManager, a browser-based Web GUI using HTTP and HTTPS.
Supported Wi-Fi Browsers	Google Chrome Microsoft Edge Safari Firefox

Note 1: The Web GUI supports both http and https connections. For https connections, the web server of the WaveCore device uses a self-signed certificate. Thus, you need to ignore the security warnings on the browser to bypass the validation.



Logging Into VineManager

When first connecting to the management IP address on your web broswer, log onto the VineManager GUI using the default user login and password (admin / admin).



Note

For enhanced security, it is recommended to change the password after the first login. To do this, when logged into VineManager, navigate to Configuration-User-Change Password.

Graphical User Interface Overview

After logging in, the GUI title bar will display at the top of the browser screen along with a **Navigation Pane** on the left of the browser screen, and a main **Content Pane** in the center right of the browser screen.

The Dashboard provides a high-level summary of the link performance and connection status.