



GigaPro p6dx (GPR2022H) Installation Guide

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Chapter 1

GigaPro p6dx (GPR2022H) Product Overview

This chapter introduces the Calix GigaPro p6dx (GPR2022H) outdoor Wi-Fi access point (AP) system and provides an overview of installation considerations.

Topics Covered

This chapter covers the following topics:

- Introducing the GigaPro p6dx outdoor Wi-Fi AP system
- Product dimensions
- Exploring the access compartment
- Powering options
- Mounting options
- Installation considerations

Introducing the GigaPro p6dx outdoor Wi-Fi AP System

The Calix GigaPro™ p6dx is a Wi-Fi 6, dual-band, long range outdoor system. The p6dx offers 120° coverage for over 1.5 miles, bringing high-bandwidth services to buildings, equipment, devices, and sensors. This intelligent outdoor rated, high-performance system supports multi-Gigabit throughput for streaming video and data services.

CONNECTIVITY, PERFORMANCE AND COVERAGE

The GigaPro™ p6dx is a dual-band, outdoor Wi-Fi 6 system leveraging Wi-Fi 6 technology. Standard connectivity includes a 2.5 Gigabit Ethernet WAN/LAN port, a Gigabit Ethernet LAN port and an SFP cage capable of housing various SFP modules for WAN attachment. The GigaPro p6dx broadcasts a Wi-Fi signal at distances exceeding 1.5 miles accomplished through high-powered antennas and a focused signal covering 120° of territory. Calix engineered the GigaPro p6dx with simultaneous dual-band 2.4 GHz and 5 GHz operation and dynamic beamforming in all spectrums. Leveraging the latest Wi-Fi 6 standard and focused sector array antenna features, the GigaPro p6dx provides long range, higher efficiency with less interference compared to earlier generations of Wi-Fi technology. The GigaPro p6dx also supports Dynamic Frequency Selection (DFS) channels at 5GHz to maximize transmission. The system works in environments with a wide operating temperature range from -40° C to 70° C. The system is protected by a hardened case with an Ingress Protection (IP67) rating preventing dust and water penetration from damaging the system and shortening the system's life span.

The GigaPro p6dx enables rural residential and commercial businesses to connect to high-speed access services and support multi-gigabit broadband data, HD streaming video and connectivity from a growing number of devices over 6x6 streams of Wi-Fi (2x2 @ 2.4 GHz, 4x4 @ 5 GHz) using multi-user multiple-input and multiple-output (MU-MIMO) and beamforming to make it an ideal solution for farms, mobile home parks, marinas, athletic fields and more.

The GigaPro p6dx offers two power options for maximum flexibility in locating the ideal placement of the system to meet the application requirements. If standard AC power is unavailable, the 2.5 Gigabit port can accept an 802.3bt feed to energize the system at up to 100M from its source. For example, the Calix GigaPro Managed Switch (GPR8802x), can be used to source power to the GigaPro p6dx at locations not equipped for standard AC power.

Service providers will benefit from the GigaPro p6dx by filling a critical need to deliver cost-effective solutions. The result for the service providers and their subscribers is a shortened time to market and service activation.

EASY TO INSTALL, ACTIVATE, AND MAINTAIN

With the GigaPro p6dx integrated system, Calix has redefined how to install and activate services at a subscriber's premises or business. Using the Calix CommandWorx mobile app, and a phone or laptop, a field technician can install and apply the subscriber's service profile without special equipment or assistance from the central office.

Calix also provides the innovative Calix Support Cloud (Support Cloud), which allows the service provider to configure, activate and upgrade the GigaPro p6dx quickly from a remote location using in-band management or TR-069. Extensive troubleshooting capabilities, remote software downloads, and easy-to-use service activation features ensure that services are delivered and maintained without expensive truck rolls and hardware upgrades. Employing GigaPro p6dx systems allows BSPs to reduce their operational expenses while effectively delivering the Gigabit experience to their subscribers.

REVENUE EDGE PLATFORM

As part of the Revenue EDGE family, the GigaPro p6dx uses the world's only hardware independent, modular, standards-based, software platform. With the Revenue EDGE, service providers can use the containerized architecture to quickly deploy new services that leverage a range of pre-integrated value-added solutions (e.g., enhanced parental controls or home network security). This allows for additional recurring revenue and differentiated services while increasing subscriber satisfaction. Once integrated with your business and operations support systems (B/OSSs), adding additional GigaPro p6dx Wi-Fi systems is simple, taking days instead of weeks.

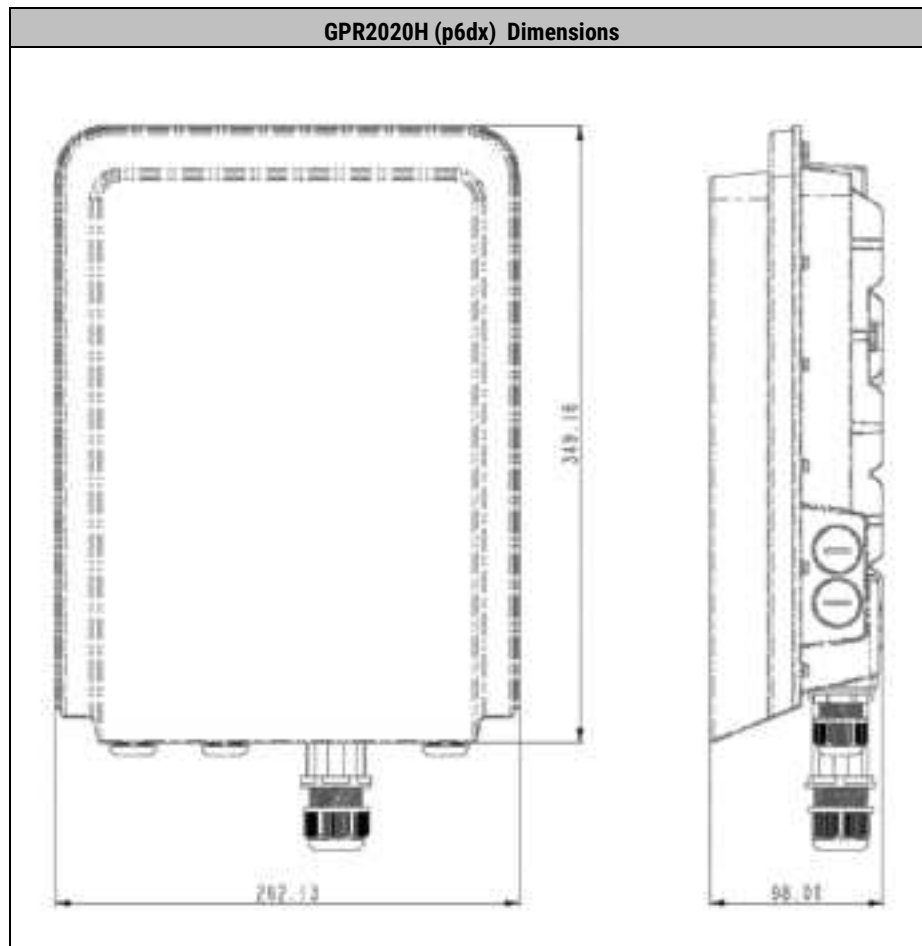


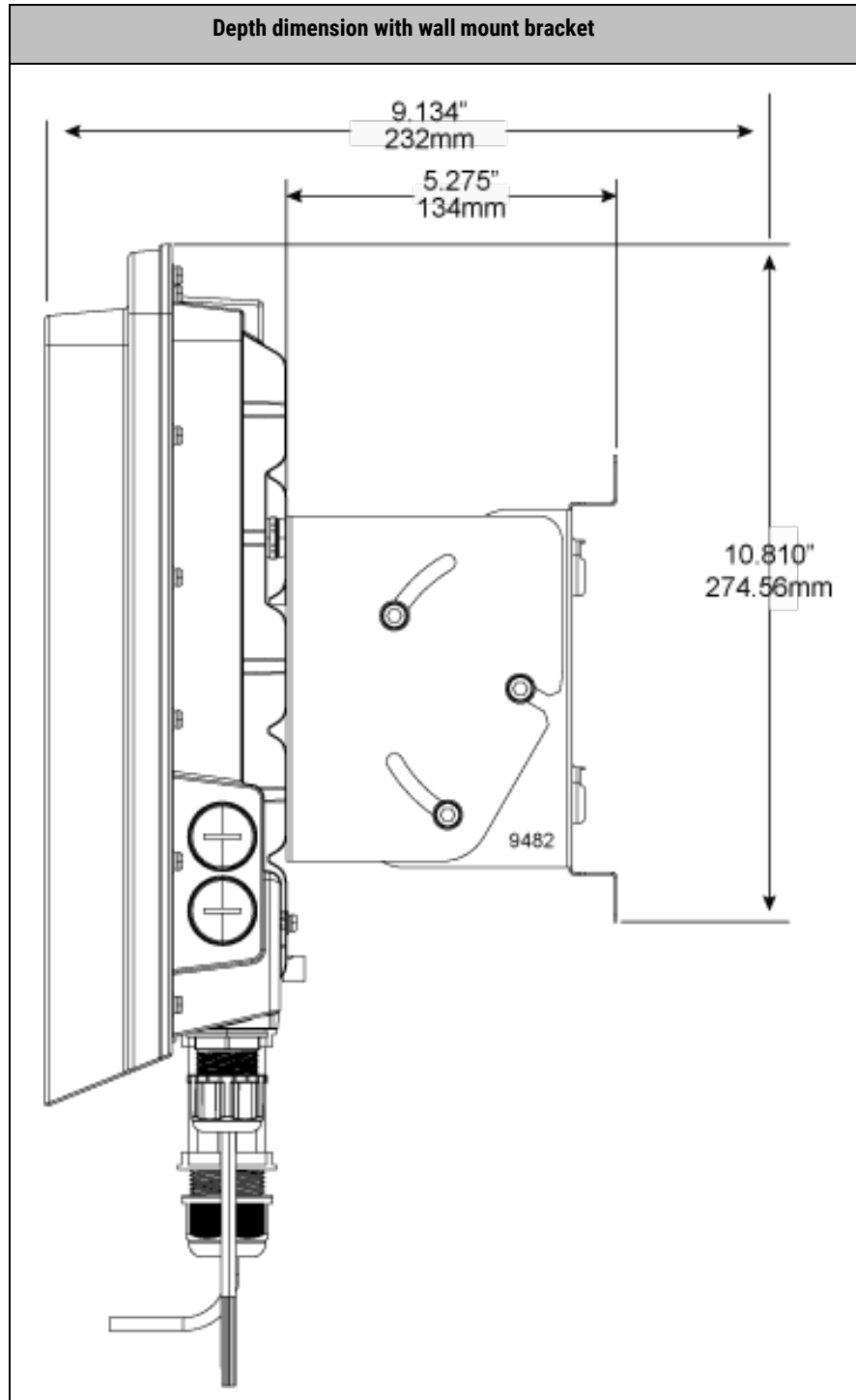
Product Dimensions

The GigaPro p6dx system's exterior dimensions are:

Dimensions

- Width: 10.3 in (26.2 cm)
- Height: 13.8 in (35.0 cm)
- Depth: 3.86 in (9.8 cm)
- Weight: 7.3 pounds (3.3 kg)





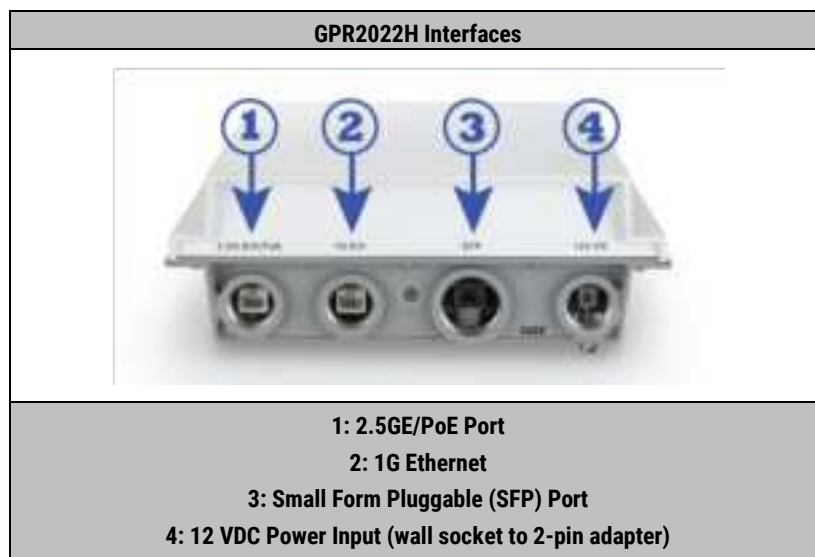
Pole Mount Dimensions - Fully Tilted

Asked Chris on 4/26 to provide this image.

Exploring the Access Compartment

The GigaPro GPR2022H (p6dx) has a recessed interface compartment located on the bottom of the unit. The interface panel includes:

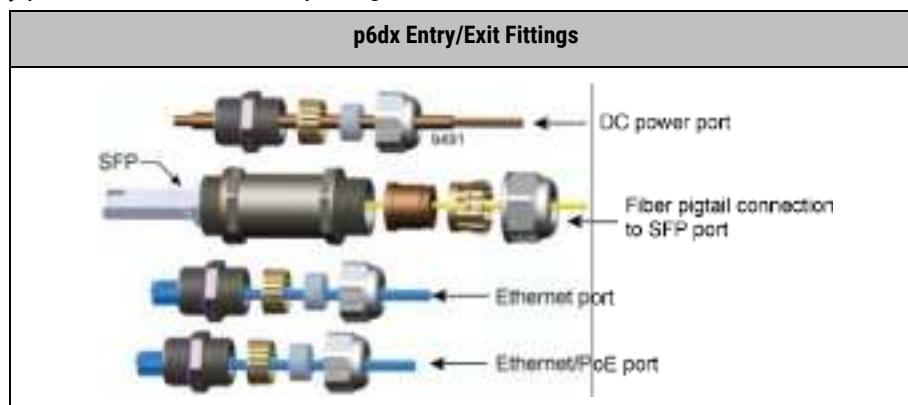
- 2.5GE/PoE port
- 1G Ethernet port
- Small Form Pluggable (SFP) interface port
- 12 VDC input from wall socket via voltage adapter



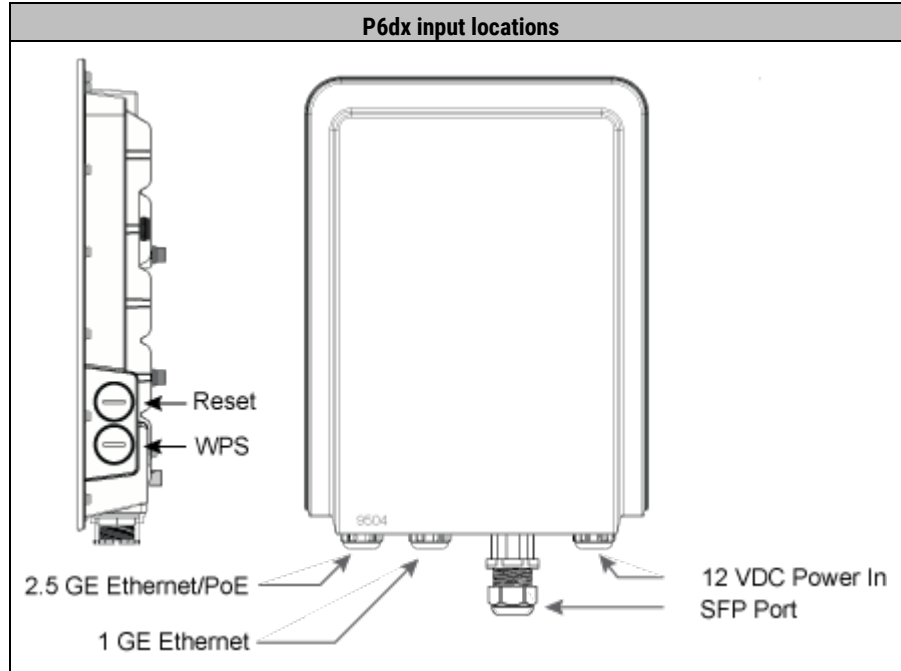
Interfaces are recessed at the bottom of the unit.

Note: To ensure the best possible performance, make sure the interfaces are pointing down after installation.

Fittings are provided that ensures the ONT remains watertight in an expected outdoor environment. Each port requires fittings to be assembled as shown below. Doing so ensures that cabling is properly protected and that the openings remain weather resistant.



The fittings shown above are attached to the bottom of the p6dx enclosure in the order shown.



Powering Options

The GigaPro p6dx system supports two options for power:

- **Local AC power:** You can power the system via a standard AC power outlet using a Calix power adapter cable.
- **Power over Ethernet (PoE):** You can line-power the system via the Ethernet uplink data cable using a PoE injector or PoE switch.

Note: You can use the local power or PoE option for each system, but not both at the same time.

Local Power Option

The GigaPro p6dx system accepts local power using a Calix-supplied adapter cable that plugs into any standard AC power outlet. The DC end of the adapter cable has a two-pin barrel connector to connect to the p6dx system's local power interface.

Note: Although the p6dx is designed for outdoor use, it is possible to install this device outdoors. The same power supply can be used in an outdoor environment.

PoE Power Option



Make sure the access point is powered using a UL-compliant PoE power source. Connect the access point to the PoE network without routing to the outside plant.



Assurez-vous que le Point d'accès est alimenté à l'aide d'une source d'alimentation PoE conforme à UL. Connectez le Point d'accès au réseau PoE sans routage vers l'usine extérieure

The GigaPro p6dx system includes an 802.3bt Power over Ethernet (PoE) Powered Device (PD). The system accepts PoE power via an Ethernet data cable connected to its WAN uplink port.

To employ the PoE option, you must provide the following:

1. Standard PoE power sourcing equipment¹ (PSE) –either a PoE injector¹ or PoE switch²– to apply power to the Ethernet cable. Install the PoE injector or switch at an outdoor location upstream of the p6dx system, between it and the ONT.²
2. An Ethernet data cable for dual-purpose use –as the network uplink connection and as the PoE power input. Use Cat 6 Ethernet cable; maximum 328-foot (100m) length.

¹ **Note:** To ensure the best possible performance, Calix recommends using a PSE offering from Calix because these devices have been thoroughly tested for all supported use cases. Calix PSE options include a PoE injector (100-06005) and a PoE++ switch (100-05774).

² **Note:** The Calix PoE switch option (GPR8802x) is also an ONT, so separate switch and ONT equipment is not required when using a GPR8802x for PoE power supply.

Note: Under powered PoE systems may experience a decrease in over-all CPU frequency to compensate for a lower power source. If the CPU cannot compensate appropriately, radio power may drop which will result in lower Wi-Fi performance.

Whether using a PoE injector or PoE switch, you must install an Ethernet Surge Protector (ESP) between the PSE and the PD. Ground the ESP to ensure proper safety, equipment protection, and performance.

Mounting Options

Calix provides a wall/pole mount bracket in the giftbox of the GigaPro p6dx. In either case, the installation steps are almost identical save for the medium the p6dx attaches to.

Installation Considerations

Review the following considerations and guidelines before starting installation activities.

General Guidelines

Follow these general guidelines and practices:

- Read this document completely before starting any installation activities.
- Determine the system powering method to use for your installation, from among two options. See Powering Options and Selecting an Installation Location for details and guidance.
- Determine the system mounting method to use for your installation, from among two options (wall mount). See Mounting Options and Selecting an Installation Location for details and guidance.
- Follow standard safety precautions when performing installation tasks.
- Keep all cabling neat and secure for safety and strain relief. Use cable ties, screw clips, and velcro straps for dressing cables as needed.

Network Uplink

The GigaPro P6dx system is equipped with a 2.5GE WAN Ethernet port for uplink connections to the network. Connect the system to the network following these guidelines:

- **RG mode:** Connect to an ONT LAN port for network access using a standard Ethernet data cable (up to 328 feet/100 m long). If the system will use PoE power, connect to a PoE injector's PD port instead.

Note: Calix recommends connecting the p6dx system to an ONT equipped with a 2.5GE LAN port to provide maximum uplink bandwidth. Typically, this means using an XGS-PON ONT (many equipped with 2.5GE LAN ports) or 10GE AE ONT. For example, the Calix GP4200A outdoor ONT is commonly used for this application. For outdoor applications, a Calix p6he or p6dx ONT should be used.

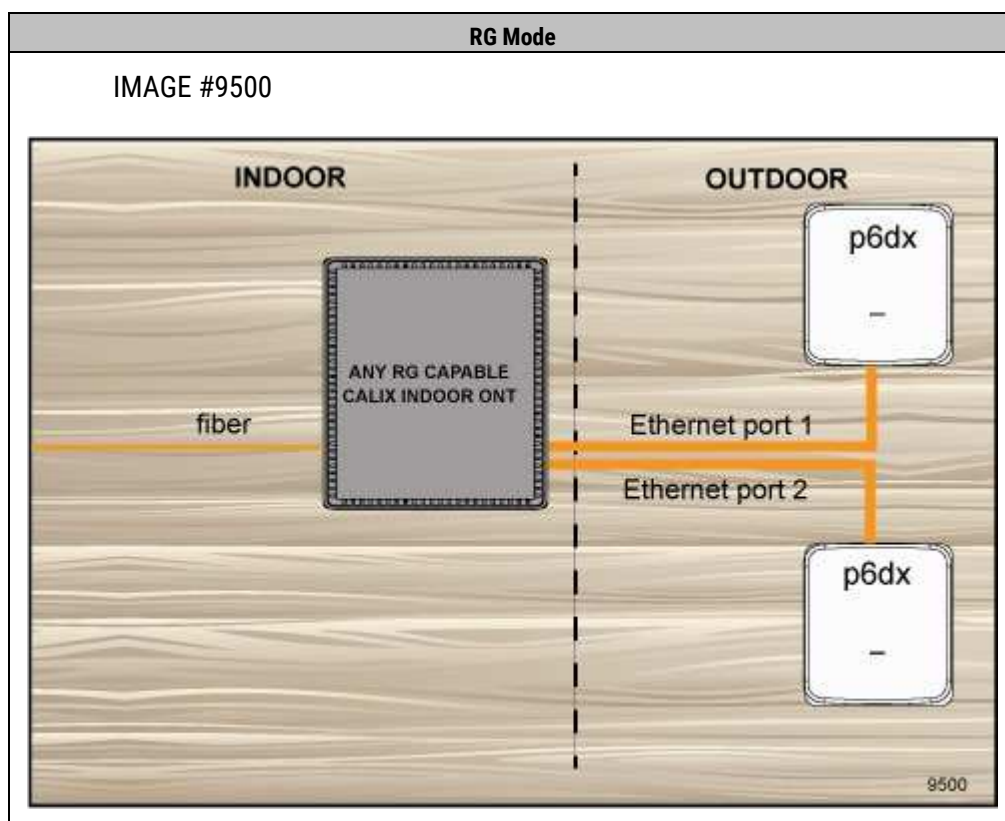
- **Satellite mode (Mesh):** Use either a wired (Ethernet) or wireless backhaul link to connect to the RG system.

Supported Topologies

The GigaPro p6dx Wi-Fi AP system can operate in either RG mode or satellite mode. Supported deployment topologies depend on the operating mode.

RG mode

When operating as an RG, the p6dx system must connect to an ONT for its network uplink (point-to-point topology). If the ONT has multiple LAN ports, it can serve multiple p6dx RG systems in a star topology.





Chapter 2

Installing the GigaPro System

This chapter describes how to install the GigaPro p6dx system hardware in an outdoor location. This process includes guidance for identifying an appropriate installation location, system hardware installation instructions, and cabling instructions.

Topics Covered

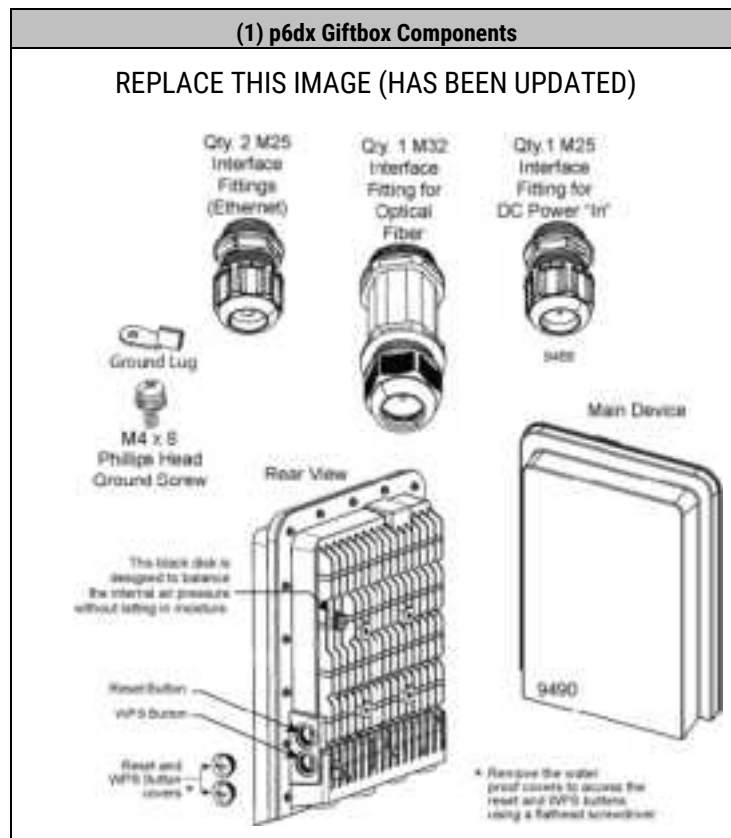
This chapter covers the following topics:

- Unpacking the system
- Selecting an installation location
- Installing the system on a wall
- Grounding the unit
- Installing power and network cables

Unpacking the System

Each GigaPro p6dx system ships in a box that contains the following items:

- (1) GigaPro p6dx (GPR2022H) system
- (2) M25 interface fittings
- (1) M32 interface fitting
- (1) Ground Lug
- (1) M4 x 8mm ground lug screw

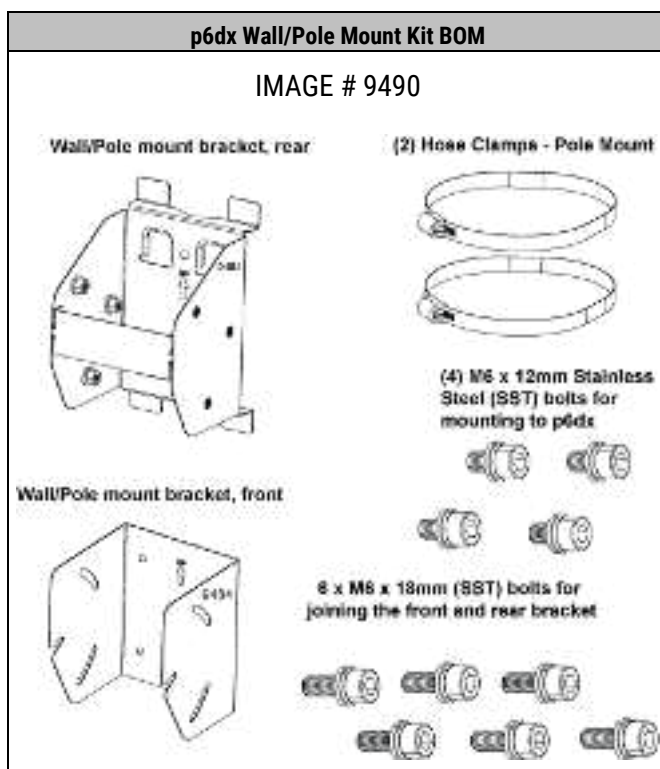


In addition, the giftbox includes:

- (1) Safety and regulatory statements guide
- (2) Spare product identification labels (shows default Wi-Fi SSID and RG login credentials)

The included wall/pole mount bracket is located inside the giftbox with the p6dx resting over the top of the bracket. The kit includes:

- Wall/Pole Mount Installation Kit
 - A front mounting bracket that attaches to the back of the ONT.
 - A rear mounting bracket that attaches to the front mounting bracket.
 - Qty. 6 Bolts, M6 X 18mm Stainless Steel (SST) (for attaching front bracket to rear bracket).
 - Qty. 4 bolts, M6 x 12mm SST for attaching rear bracket to the back of the p6dx.



To unpack the system

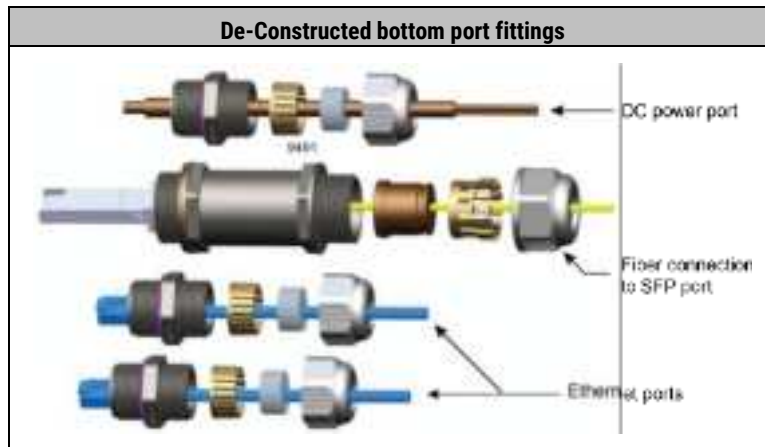
- Open the box for the GigaPro p6dx system
- Remove the p6dx ONT from the carton and set aside
- Remove the cardboard that secures the mounting bracket inside the carton
- Remove the mounting bracket and set aside

- Locate the product identification label and store it in a safe place for use during initial start-up

About the port fittings on the bottom of the chassis

In order to ensure a tight seal on the fittings exiting the bottom of the p6dx, the connections must be installed per the illustration below.

Note: When installing these fittings, make sure all connections are fully seated and that no connections are cross-threaded.



Selecting an Installation location

Based on the information provided in the Installation Considerations topic, consider several factors when selecting an installation location:

- Proximity to the network termination point
 - **Distance from the ONT (RG systems):** All systems operating in RG mode must use a wired Ethernet uplink. The maximum distance from the ONT providing the network termination must be 328 feet / 100 meters (the maximum supported length of Ethernet cables). This total span length could potentially double for systems using PoE power, where that cable span length can be used on *both* sides of a PoE injector.
 - **Distance from the RG (Satellite systems):** Systems operating in satellite mode can use either a wired (Ethernet) or wireless backhaul link to the RG system. For wired connections, the maximum distance from the RG must be 328 feet / 100 meters (the maximum supported length of Ethernet cables). For wireless connections, the maximum distance from the RG may vary from site to site based on environmental factors that affect signal strength. As a general rule of thumb, Calix recommends locating satellites at a distance where they can receive a signal of -60 dBm or better.

Proximity to power

- **Distance from AC power outlet (local power option):** The Calix outdoor power adapter cable is 10 feet long. Therefore, unless you use an outdoor rated (and user supplied) power extension cord to extend the reach for power, you must locate the system within 10 feet of an AC power outlet.
- **Distance from PoE injector (PoE power option):** The same distance limits for the wired Ethernet cable described above apply here. If the ONT's LAN Ethernet port providing the link is PoE powered (for example, from a Calix GP4200A ONT's 2.5GE port), the maximum distance must be 328 feet / 100 meters. If using a PoE injector, that distance can be up to twice as far.
- **Mounting type:** The system must be installed on a high vertical surface using the wall mount bracket included with the p6. Is there a suitable wall, pole, or header of sufficient height at the targeted location? The answers to this question should help identify an appropriate location for AP placement.
- **Location within targeted Wi-Fi serving area:** Several environmental factors, including proximity to the center of a coverage space, elevation above the ground, and the composition of surrounding structures should also factor into AP placement selection. See the section below for additional details to consider.

Consider all factors above before selecting a location and proceeding with installation.

Wi-Fi AP placement

In a Wi-Fi serving area, direct line-of-sight to the AP is not essential for signal quality, thanks to MIMO technology and an omni-directional antennae array. However, to achieve the best possible Wi-Fi coverage and performance, Calix recommends the following:

- Prioritize a centralized location; the closer the AP system is to the center of the target area, the better.
- Elevate the system as high up as possible; higher elevation helps the signal clear lower/ground-level obstructions.

Some building materials block Wi-Fi signals more than others. See the table below for reference; lower attenuation yields better performance. Consider the materials in surrounding structures when selecting an installation location for the system.

Building Materials: Effect on Wi-Fi Signals	
Material	Wi-Fi Attenuation
<ul style="list-style-type: none"> • Wood, Drywall, Particle Board, Tile • Glass 	Low
<ul style="list-style-type: none"> • Bricks, Cinder Block • Water 	Medium
<ul style="list-style-type: none"> • Plaster, Stucco • Concrete 	High
<ul style="list-style-type: none"> • Metal • Tinted or Low-E Glass (metalized) 	Very High



CAUTION! Use of controls or adjustments or performance of procedures other than those specified in this document may result in hazardous radiation exposure.

MISE EN GARDE! L'utilisation de commandes ou de réglages ou l'exécution de procédures autres que celles spécifiées ici peuvent entraîner une exposition à des rayonnements dangereux.

Installing the System on a Wall/Pole

Use the Calix wall/pole mount bracket to install the GigaPro p6dx system on a wall or pole, or other vertical flat surface.

Installing the mounting brackets involves first attaching the front bracket to the p6dx and then attaching the wall mount bracket to the front bracket. Finally, you can attach the p6dx to the wall or pole, depending on the application. Refer to "Mounting Options" for additional information. For required tools, see "Installation Considerations."

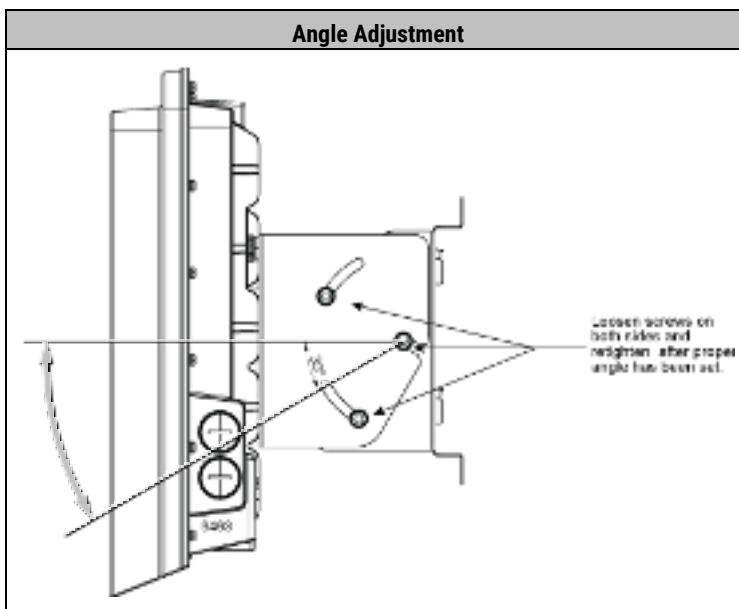
Note: The wall or pole mount bracket kit is sold separately. PART NUMBER?

Most of the fasteners used in the wall/pole mount kit use a hex head pattern for removing and tightening fasteners. The following chart shows the metric value with the corresponding imperial value.

Hex Key Wrench Sizes*		
Fastener Designation	Metric Value	Imperial Value
M4	4mm	5/32"
M5	5mm	3/16"
M6	6mm	7/32"
M8	8mm	5/16"
*Hex Key & Allen Wrench are Equivalent Size		

Adjusting the Installation Angle of the p6dx

Note that the front mounting bracket swings up and down from 0 to 30°. This is offered to allow the p6dx to be mounted at an angle. The slots in the rear mounting bracket allow for this variation in angle and can be set based on your environment.



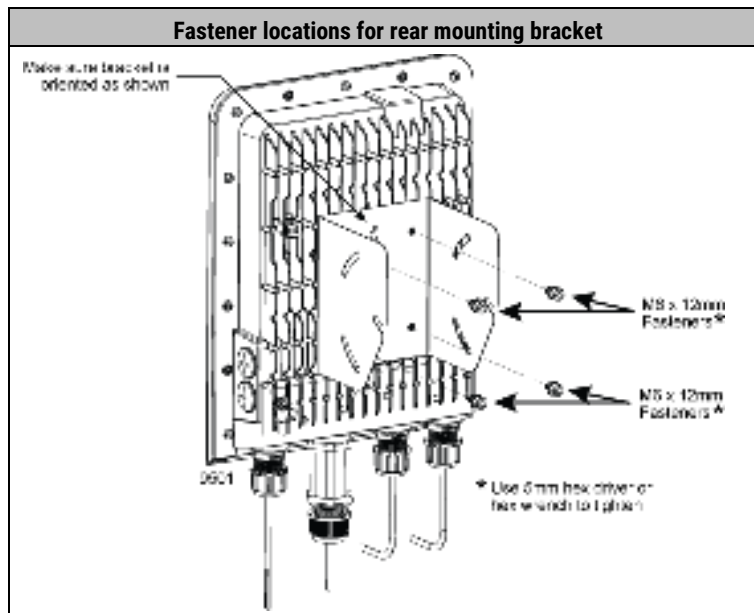
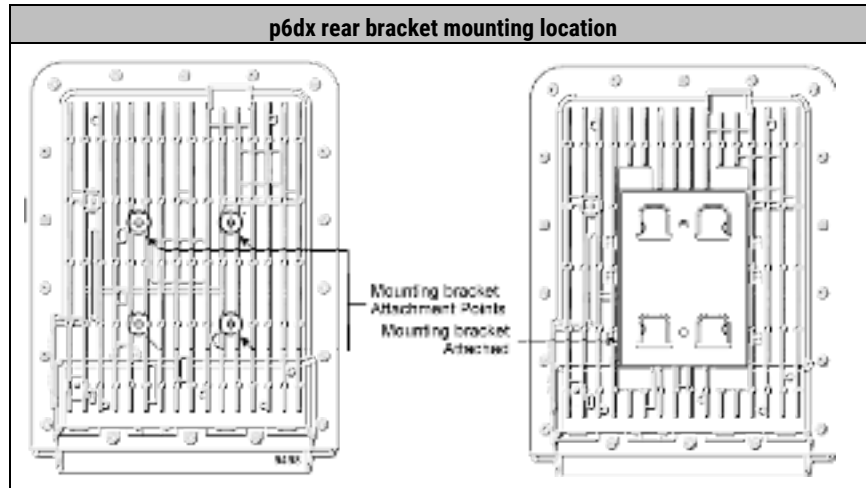
Wall Mounting the p6dx

Installing the system on a wall

Follow the instructions below to install the p6dx system using the supplied bracket.

1. Temporarily place the rear mounting bracket against the wall or pole and mark the locations of the two mounting holes. Set this bracket aside.
2. Install the rear mounting bracket to the back of the p6dx using the (4) M6 x 12mm mounting bolts.

Note: Ensure the location you select accommodates the length of the power cord with respect to the power outlet.



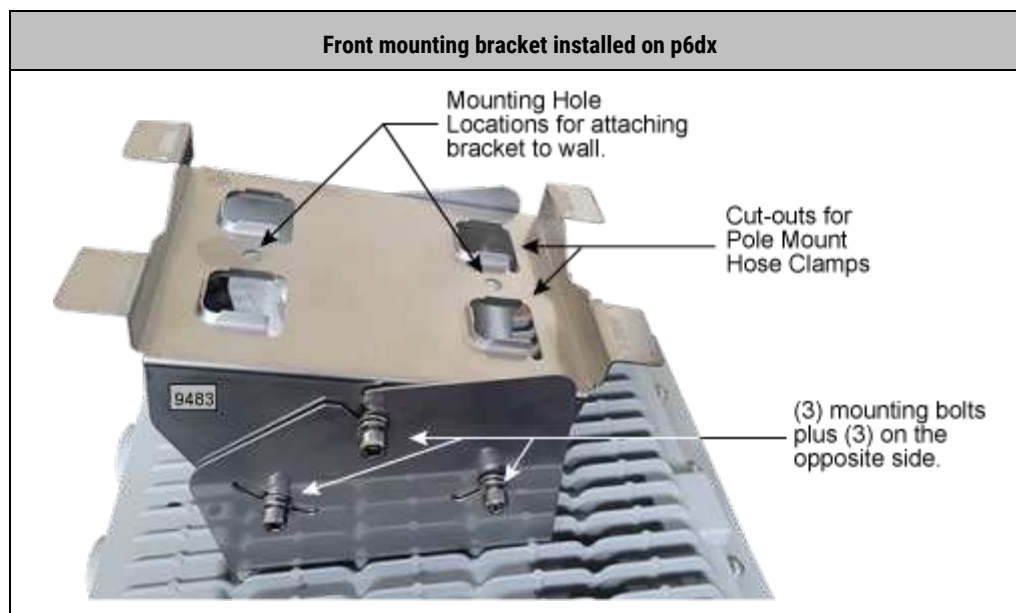
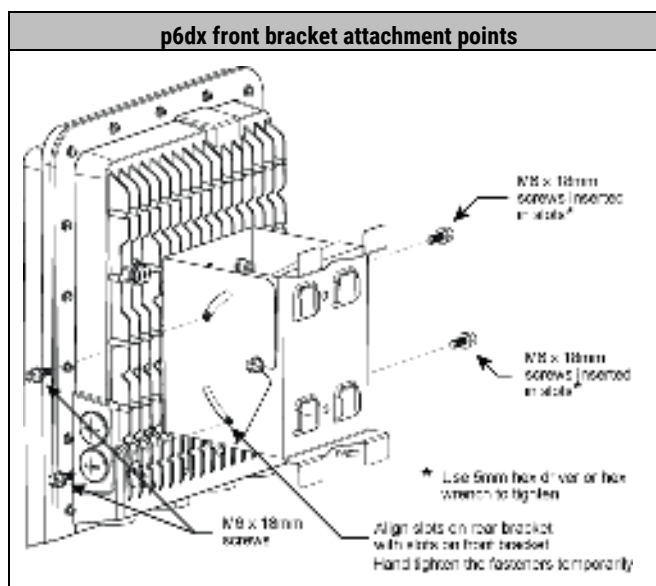
3. Install the front mounting bracket to the rear mounting bracket using the (6) M6 x 18mm mounting screws.

Note: When securing the bracket to the wall, #14 screw at least 2-1/2" long (M6 expansion screw at least 65mm long) is required. In addition, appropriately sized wall anchor or the like must be used to provide enough strength in cases where no mounting stud is available.

Four (4) fasteners to physically attach the p6dx with the bracket are provided. However, fasteners are not provided when attaching the bracket to a wall.

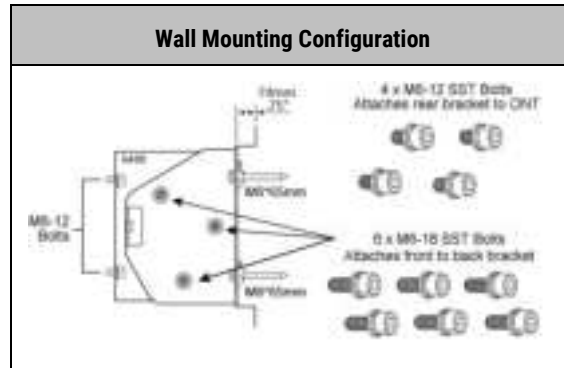
Note: In the example shown below, the rear bracket is attached to the ONT using (4) M6 x 12mm screws.

With the rear bracket attached to the ONT, the front bracket can now be attached.

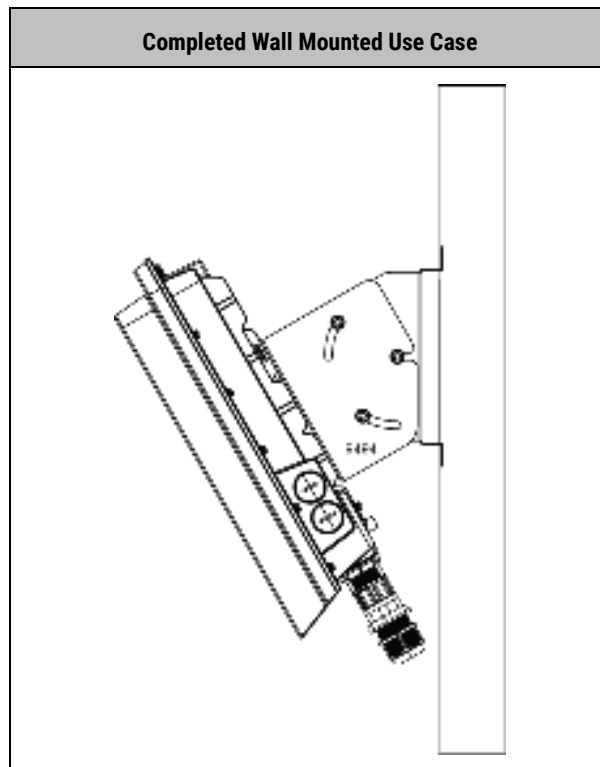


4. Attach the completed assembly to the wall using fasteners appropriate to your environment.

Note: A gap exists between the wall and the mounting holes on the front bracket as shown below.



An example of a completed installation is shown below for reference.



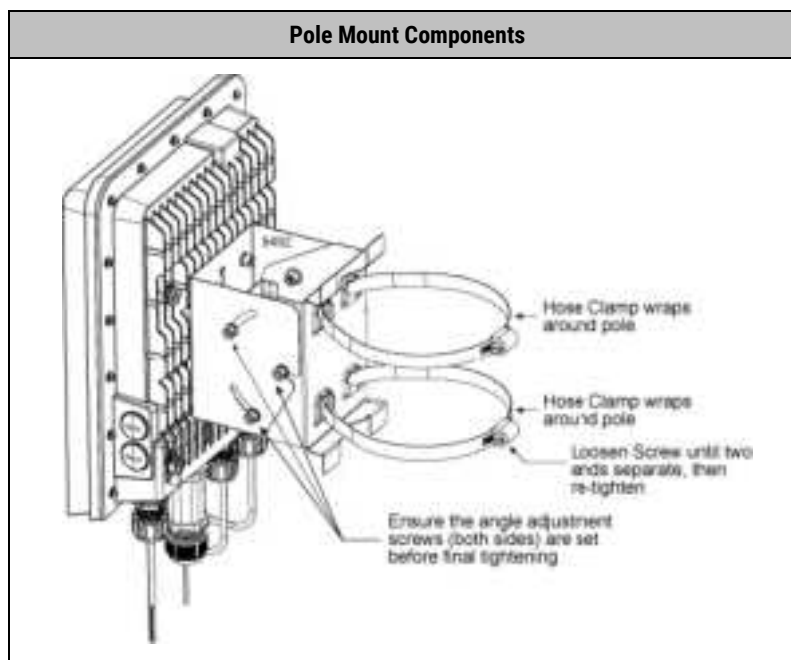
Pole Mounting the p6dx

Installing the p6dx on a pole follows many of the same procedures as detailed in the previous topic.

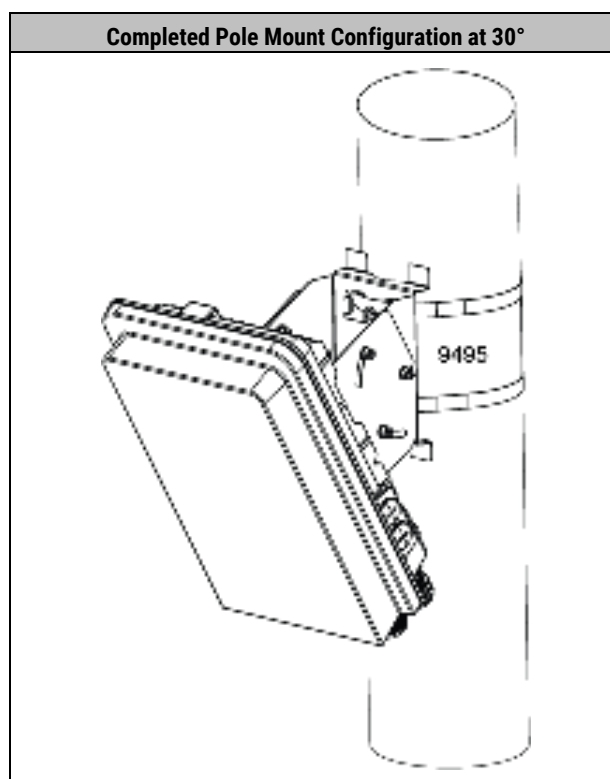
Of particular note are the following changes from a wall mount deployment:

- For optimal distance and bandwidth performance, the p6dx should be installed at least 25 feet high without any nearby obstructive object.
- The provided hose clamps will secure the p6dx to any pole between x and x inches. To mount the unit, unscrew each hose clamp until the ends separate. Slip the hose clamp around the pole, and then re-tighten the hose clamps until tight.

This pole mount use case is water-tight. To ensure this remains fully sealed, tighten the outside fittings on the bottom of the unit.



Once complete, the completed pole mount installation will look similar to the below drawing.



Grounding the p6dx

In a wall or pole mount configuration, the p6dx is grounded through the metal attachment posts. The bracket itself is grounded via a ground wire that is routed to the buildings grounding system.

The GigaPro™ p6dx grounding kit includes a ground lug and mounting screw (8-32 phillips head screw with pawl washer) to attach the cable to the p6dx chassis ground terminal.

Note: Ensure you ground the system before putting it into service.

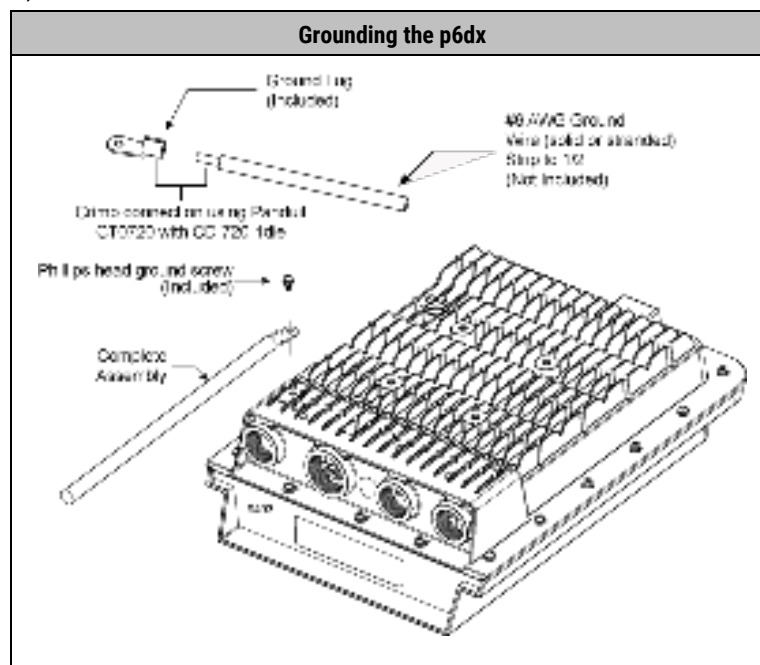
Note: The #6 ground cable is not included in the p6dx giftbox. The p6dx allows for a stranded or solid copper wire. When sourcing the ground cable, make sure the cable is long enough to reach the main external ground termination or an intermediate grounding convergence point that routes back to the main ground.



ALERT! Beware of electrostatic discharge. Follow standard ESD precautions. Always wear a grounded ESD wristband to avoid damaging the electronic equipment.

To ground the p6dx chassis

1. Get the ground cable and hardware from the mounting kit.
2. Connect the ground cable to the p6dx chassis as follows:
 - a. Position the ground lug against the p6dx chassis ground terminal (located on the back of the unit).



- b. Insert the ground screw through the ring lug into the chassis ground terminal.
 - c. Using a Phillips screwdriver, turn the screw until fully tightened using 27 inch-pounds of torque.
3. Route and connect the ground cable to the external ground termination location.

Note: See guidelines below for establishing and connecting to an earth ground system.

Additional Grounding Considerations

The National Electric Code (NEC), the Rural Electric Association (REA), and state and local codes require that this equipment (aka "the system") be properly grounded. The system must be installed using the ground lug supplied with the system to be compliant with UL listings. A proper ground bonds the system to the building's primary earth electrode. The bonding conductor used must be a #6 AWG copper or equivalent. The NEC grounding requirement stipulates that earth electrodes must conduct to earth with no more than 25 ohms of resistance. If 25 ohms cannot be achieved with a single electrode, a secondary electrode must be used and bonded together using a #6 AWG copper conductor or equivalent.

The system must be installed to an auxiliary ground source to be compliant with UL listings. The primary method of grounding in this application will be to bond the Main p6dx chassis to the building's electrical ground circuit. The bonding conductor used must be a #6 AWG copper or equivalent fastened to the MEM using a #8-32 phillips head screw with external tooth washer.

For installations requiring a bonding conductor of #6 AWG copper or equivalent, Calix offers a Ground Lug Kit (included). This kit includes a ground lug and a #8-32 x 7/16-inch phillips head screw and external tooth washer.

Ground electrode requirements

The secondary ground electrode must be spaced at least 8 feet away from the primary electrode. The primary and secondary electrodes, once bonded together, become the building's primary ground point. Neither UL, NEC, nor REA require any additional electrodes to be installed unless the system is located more than 20 feet away from the building's earth electrode.

If the system cannot be installed within 20 feet of the building's primary earth electrode, an additional ground electrode must be provided and bonded to the primary ground point of the building. A #6 AWG copper conductor or equivalent bonding jumper must be used between the earth electrodes and the system.

A suitable earth electrode is a copper clad steel rod that is driven into the earth at least 8 feet deep or a metallic cold water pipe that is under ground for a distance of at least 10 feet. If a water pipe is used as an earth electrode, it must be no more than 5 feet from the outer wall where the system is mounted.

All ground conductors are required to provide a low impedance path to the earth electrode. The conductor must take the shortest and most direct path to the earth electrode and be free of any

sharp bends. If ground conductors are to be placed inside metallic conduit they must be bonded to the conduit at both ends using a UL listed bonding type connector.

Important: Extreme care must be taken when attaching the ground connectors to the utility (earth) ground rod. If the ground is interrupted or disturbed in any way, an unsafe condition will exist.

Calix best practice

Calix requires use of an earth ground circuit (earth electrode) at the installation site to provide protection from electric shock for equipment and personnel. The ground circuit may consist of a simple copper rod driven into the earth or a complex system of buried rods and wires. The lower the resistance of the electrode-to-earth connection, the more effective the ground system is for safety and lightning protection.

Proper grounding conditions and requirements vary per site. BICSI (Building Industry Consulting Service International) calls for a 5 ohm maximum standard based on IEEE 142-2007 (aka the Green Book, *Recommended Practice for Grounding of Industrial and Commercial Power Systems*), Chapter 4 ("Connection to Earth"), Section 4.1.3 ("Recommended Acceptable Values"). **Calix recommends achieving a ground impedance of no greater than 5 ohms**, wherever practical, to facilitate proper operation of high-speed services and for safety during surge events. Consult IEEE 142-2007 Chapter 4 for considerations and guidance on how to achieve no more than 5 ohms impedance when connecting to a given ground field.



ALERT! Failure to achieve ground circuit impedance within the recommended range limits the site's potential safety from risk of shock and can adversely affect performance of broadband services.

Additionally, when using PoE power, be sure to install an Ethernet surge protector (ESP) between the PSE and PD and connect it to the local ground system. Terminate the PoE Ethernet cable segments to the ESP to ensure proper grounding of the PoE line for safety and equipment protection.

Installing Power and Network Cables

After mounting the GigaPro p6dx system on a wall or pole, and after establishing a ground connection for the system, you must connect power and/or network cables to the system before completing the installation.

The type and count of cables to install for the p6dx system may vary from site to site depending on several factors, including the powering option selected and the operating mode of the Wi-Fi AP. Each p6dx installation site requires from one to three cables installed based on these factors.

Determine the type and count of cables to install:

If ...	and ...	and ...	and ...	then ...	with ...
Wi-Fi AP mode =	Network uplink =	Power option =	Will link a wired satellite =	Cable count =	Cable types ¹ =
RG	Wired	Local	<i>not supported</i> ²	x	n/a
			No	2	Power, Eth. 1
		PoE	<i>not supported</i> ²	x	n/a
			No	1	Eth. 1
Satellite	Wired	Local	<i>not supported</i> ²	2	Power, Eth. 1
	Wireless	Local	<i>not supported</i> ²	1	Power
		PoE	<i>not supported</i> ²	1	Eth. 1

¹ Where 'Eth. 1' = WAN Ethernet cable, and 'Eth. 2' = LAN Ethernet cable

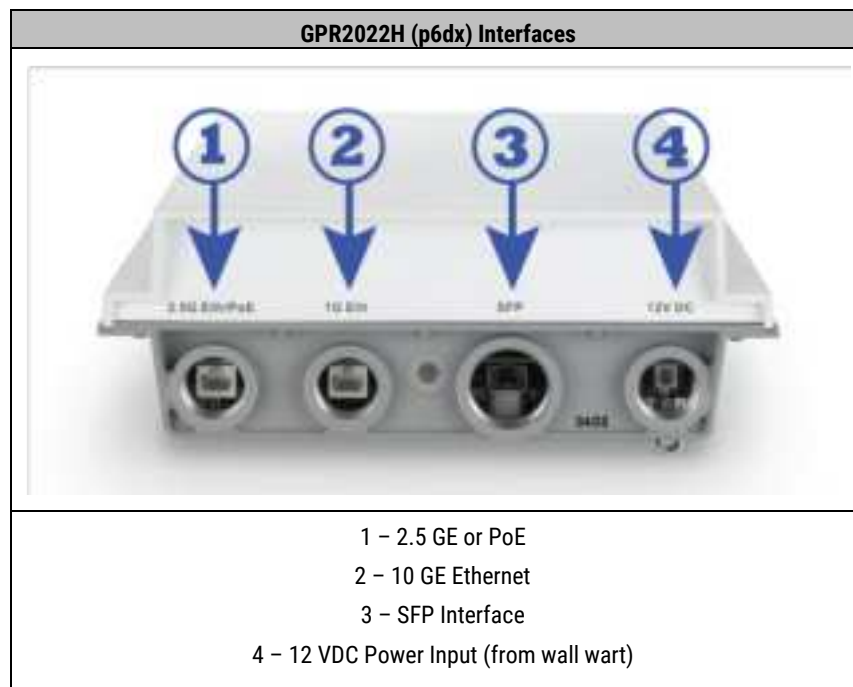
² Daisy-chained satellites are supported, but only with wireless connections between satellites.

For details about power options, see Powering Options. For details about network uplink options and requirements, see Installation Considerations.

Preparing the access panel for cable entry

The access panel has four possible ports for cable entry. Follow this guidance when attaching cables:

- Refer to "Exploring the Access Compartment" for complete details about which entry ports to use. As a quick reference:
 - 2.5 GE or PoE entry
 - GE Ethernet entry
 - Fiber pigtail to SFP entry
 - Local power cable entry



1. Route the cable(s) down and away from the p6dx0. mounting location toward the far-end termination point.
2. Dress and secure the cable(s) using cable ties or velcro straps.

***Note:** Before proceeding, Calix recommends verifying that the p6dx system powers up properly and comes into service as expected. Continue to the next chapter "Final Setup and Activation" to perform these tasks before completing the installation.



Calix Safety and Regulatory Statements - GigaPro

NOTE: This *Safety and Regulatory Statements Guide* applies to all GigaPro devices that may or may not include a Wi-Fi radio. Disregard any statements made here if the feature or function is not present on any particular model.

Before you Begin

IMPORTANT SAFETY INSTRUCTIONS

When using your equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock, and injury to persons, including the following:

- Professional installation is required.
- Read all the instructions listed here and/or in the user manual before you operate this device. Give attention to all safety precautions. Retain the instructions for future reference.
- Always use caution when handling live electrical connections.
- Do not install electrical equipment in wet or damp conditions.
- Ensure that the power source for the system is adequately rated to assure safe operation and provides current overload protection.
- Do not allow anything to rest on the power cable, and do not place this product where people will stand or walk on the power cable.
- To avoid electric shock caused by over-voltage from the PSTN, DO NOT connect the POTS port on this unit directly to any external PSTN line.
- **Children:** Do not allow children to play with the GigaSpire. It contains small parts that could become detached and create a choking hazard.
- This unit must only be used with the certified power adapter model inside the package, which complies with the requirement of a limited power source.
- Installation of this device must be in accordance with national wiring codes and conform to local regulations and electrical codes.
- Do not use any accessories other than those approved by the manufacturer or your service provider. Use of non-original or non-approved accessories may result in loss of performance, damage to the product, fire, electric shock or injury, and may violate regulations. The warranty does not cover product failures that have been caused by use of non-original or non-approved accessories.
- It is recommended that the customer install an AC surge protector in the AC outlet to which this device is connected. This is to avoid damaging the device by local lightning strikes and other electrical surges.
- The pluggable external power supply provided with the unit should be mounted outdoors. If other power supplies are employed, they should be LISTED ITE with a Limited Power Source (LPS) output or LISTED with a National Electric Code (NEC) Class 2 output.
- All installation methods shall be in accordance with national and local regulations and practices. The wiring method should include the use of Listed wire/cable acceptable for the application per the National Code, and should be one that an Authority Having Jurisdiction (AHJ) can approve per the Code.
- For US products, no wiring to the product should be exposed in lengths beyond 140 feet, as the circuits should avoid exposure to accidental contact with lightning and power conductors in accordance with NEC Article 725-57 (NEC 2005). The installer should also consider Articles 210, 240, 250, 770, and 810 of the NEC.

ENVIRONMENTAL CONDITIONS

- Maximum environmental values during use:
 - Outdoor ambient temperature with Calix enclosure -22 to 158° F, (-30° C to +70° C), 5%-95% non-condensing, Altitude: -200 to 6,000 feet (@40° C) and 6,000 ft to 10,000 ft (@30° C)

REQUIRED SAFETY STATEMENTS

- **Potentially Explosive Atmosphere:** Do not use the GigaSpire in an area where a potentially explosive atmosphere exists.
- **Atmosphère potentiellement explosive:** N'utilisez pas le GigaSpire dans un endroit où existe une atmosphère potentiellement explosive.
- **Intended Use:** This product is classified as telecommunication equipment not intended for direct purchase by the public.
- This product is designed and approved for use in an outdoor location only.



CAUTION! Use of any controls, adjustments, or procedures other than those specified herein may result in hazardous radiation exposure.

- **Utilisation prévue:** Ce produit est classé comme équipement de télécommunication non destiné à l'achat direct par le public. Ce produit est conçu et approuvé pour utilisation en intérieur uniquement.



MISE EN GARDE ! L'utilisation de contrôles, réglages ou procédures autres que ceux spécifiés dans ce manuel peut entraîner une exposition dangereuse à des rayonnements.

- Connect the power supply cord only to an AC power outlet that meets GigaSpire specifications.
- Never alter the AC power cord. If necessary, have the correct outlet installed by a qualified electrician or call your service provider for assistance.
- To reduce the risk of damage to the electric cord, remove it from the outlet by holding onto the AC power adapter rather than the cord.
- Make sure the cord is positioned so that it will not be stepped on, tripped over, or otherwise subjected to damage or stress.



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WARNING! Do not use any other power adapter except the one that accompanies this unit or a power supply identified in the list below. Use of another adapter could result in damage to the unit. To prevent electrical shock, please do not open the cover. The following power adapter is qualified for use with this GigaSpire.

ALIMENTATION ÉLECTRIQUE

- Connectez le cordon d'alimentation uniquement à une prise d'alimentation CA conforme aux spécifications GigaSpire.
- Ne modifiez jamais le cordon d'alimentation CA. Si nécessaire, faites installer la bonne prise par un électricien qualifié ou appelez votre fournisseur de service pour obtenir de l'aide.
- Pour réduire le risque d'endommager le cordon électrique, retirez-le de la prise en le tenant par la fiche moulée de l'adaptateur secteur plutôt que par le cordon.
- Assurez-vous que le cordon est positionné de sorte qu'il ne puisse pas marcher dessus, trébucher ou subir d'autres dommages ou contraintes.



Attention ! N'utilisez pas d'autre adaptateur secteur que celui qui accompagne cet appareil ou une alimentation électrique autre que celle identifiée dans la liste ci-dessous. L'utilisation d'un autre adaptateur pourrait endommager l'appareil. Pour éviter les chocs électriques, n'ouvrez pas le couvercle. L'adaptateur électrique suivant est qualifié pour être utilisé avec le GigaSpire.

Federal Communications Commission (FCC)

Note: Professional Installation is required.

INTERFERENCE STATEMENT

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

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 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 technician for help.

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

CAUTION: This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter except in accordance with FCC multi-transmitter product procedures.

ADDITIONAL CONSIDERATIONS

The country code selection is for non-US models only and is not available on any US models. Per FCC regulations, all Wi-Fi products marketed in the US must be fixed to US operational channels only.

FCC RADIATION EXPOSURE STATEMENT

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 51cm between the radiator & your body.

* - Distance to be determined once all values are known.

Industry Canada Requirements - English

Note: Professional Installation is required.

Conformity with the requirements and other relevant provisions of the following Canadian standards:

- CAN ICES-3 (B)/NMB-3(B)
- This device complies with ISED's licence-exempt RSS standards. Operation is subject to the following two conditions:
 - (1) This device may not cause interference, and
 - (2) This device must accept any interference, including interference that may cause undesired operation of the device.

RADIATION EXPOSURE STATEMENT

This equipment complies with ISED radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 51cm between the radiator & your body.

Industrie Canada Exigences - français

Note: Une installation professionnelle est requise.

The manufacturer declares that this product is in co

Le fabricant déclare que ce produit est conforme aux exigences et autres dispositions pertinentes des normes canadiennes suivantes :

- CAN-ICES-3 (B)/NMB-3(B)
- Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :
 - (1) L'appareil ne doit pas produire de brouillage, et
 - (2) L'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

DECLARATION D'EXPOSITION AUX RADIATIONS

Cet équipement est conforme aux limites d'exposition aux rayonnements ISED établies pour un environnement non contrôlé.
Cet équipement doit être installé et utilisé avec un minimum de 31cm de distance entre la source de rayonnement et votre corps.

* - Distance à déterminer une fois que toutes les valeurs sont connues.

European Union

DISPOSING OF AND RECYCLING YOUR PRODUCT

WEEE DIRECTIVE: REQUIREMENT ACCORDING TO WEEE DIRECTIVE 2012/19/EU

Disposal of old electrical and electronic equipment (Applicable in the European countries with separate collection systems).



This symbol on the product indicates that this product shall not be treated as household waste. Instead it shall be handed over to the applicable collection point for the recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product. The recycling of materials will help to conserve natural resources. Calix offers take-back and recycling services for products in many locations around the world. Customers are advised to contact the local Calix representative for further information.

CALIX, INC. AND THE ENVIRONMENT

At Calix Inc., we understand and are committed to reducing any impact our operations and products may have on the environment. To minimize this impact, Calix Inc. designs and builds its products to be as environmentally friendly as possible, by using recyclable, low toxic materials in both products and packaging.

ROHS COMPLIANCE

This equipment meets the requirements detailed in the European RoHS Directive 2011/65/EU.

FOR RADIO EQUIPMENT ONLY



You must set the correct country code with the set WLAN country-code command to avoid violating local radio spectrum laws. This command sets the selectable channel range and transmit power level so that a WLAN connection can be established. For more information about country codes, see the hardware guide for your device.

† This device complies with the essential requirements of the Radio Equipment directive: 2014 / 53 / EU. The following test methods have been applied to prove presumption of conformity with the essential requirements of the Radio Equipment directive: 2014 / 53 / EU: EN 300 328 (2.4 GHz), EN 301 893 (5 GHz), EN 62311:2008, EN 50385, EN 301489-1, EN 301489-17, EN62368-1.

FREQUENCIES	MAX POWER OF REGULATORY DOMAIN		OUTDOOR
	US	CAN	
2400-2483.5	1000 mW	1000 mW	Outdoor
5150-5250	1000 mW	N/A	Outdoor
5250-5350	250 mW	200 mW	Outdoor
5470-5725	250 mW	1000 mW	Outdoor
5725-5850	1000 mW	1000 mW	Outdoor

RADIATION EXPOSURE STATEMENT

The minimum distance between the user and/or any bystander and the radiating structure of the transmitter is 20 cm.

!			NOTICE OF WIRELESS RADIO LAN USAGE IN THE EUROPEAN COMMUNITY
BE	BG	CZ	This device is restricted to outdoor use when operated in the European Community using channels in the 5.15-5.35 GHz band to reduce the potential for interference.
DK	DE	EE	
IE	EL	ES	This device is a 2.4 GHz wideband transmission system (transceiver), intended for use in all EU member states and EFTA countries, except in France where restrictive use applies. This device may not be used for setting up outdoor radio links in France and in some areas, the RF output power may be limited to 10 mW EIRP in the frequency range of 2454 ~ 2483.5 MHz. For detailed information, the end-user should contact the national spectrum authority in France.
FR	HR	IT	
CY	LV	LT	This equipment may be operated in AL, AD, BE, BG, DK, DE, FI, FR, GR, GW, IS, IT, HR, LI, LU, MT, MK, MD, MC, NL, NO, AT, OL, PT, RO, SI, SM, SE, RS, SK, ES, CI, HU, CY
LU	HU	MT	
NL	AT	PL	
PT	RO	SI	
SK	FI	SE	
UK	LI	IS	
NO	TR	CH	

USAGE NOTES

- To remain in conformance with European National spectrum usage regulations, frequency and channel limitations will be applied on the products per the country where the equipment is deployed.
- Access points will support DFS (Dynamic Frequency Selection) and TPC (Transmit Power Control) functionality as required when operating in 5 GHz within the EU.

5 GHZ WIRELESS FREQUENCY AND CHANNEL OPERATION IN EEC COUNTRIES

The table below provides a list of allowable frequency ranges and channels in various EEC countries.

Allowable 802.11a Frequencies and Channels	Countries
5.15-5.25 GHz (Channels 36, 40, 44, 48)	Liechtenstein
5.15-5.25 GHz and 5.725-5.875 GHz (Channels 36, 40, 44, 48, 149, 153, 157, 161, 165, 169)	Austria
5.15-5.35 GHz (Channels 36, 40, 44, 48, 52, 56, 60, 64)	France
5.15-5.35 and 5.47-5.725 GHz (Channels 36, 40, 44, 48, 52, 56, 60, 64, 100, 104, 108, 112, 116, 120, 124, 128, 132, 136, 140)	Denmark, Germany, Iceland, Finland, Netherlands, Norway, Poland, Sweden, Slovenia, Luxembourg, U.K., Ireland, Slovak, Switzerland, Hungary, Italy
5.15-5.35 GHz and 5.725-5.875 GHz (Channels 36, 40, 44, 48, 52, 56, 60, 64, 149, 153, 157, 161, 165, 169)	Czech Republic

License Information

OPEN SOURCE SOFTWARE UTILIZATION NOTICE

The GigaSpire family uses Open Source software programs. Such software programs are made available subject to certain third-party terms and conditions.

The fact that you are about to begin using or have purchased this product requires that you be informed of the use of these software packages and/or libraries and in some cases, the third-party terms and conditions applicable to such software. This information can be found on the manufacturer's support portal. Refer to the appropriate software release notes for additional information on Open Source software programs used by this product.

Declaration of Conformity

Language	Declaration of Conformity
български [Bulgarian]	С настоящото Calix Inc. Това декларира тази Wireless Broadband Терминал за достъп е в съответствие с Директива 2014/53 / ЕС. Пълният текст на ЕС декларацията за съответствие е достъпна онлайн от сайта на декларациите на Calix (https://www.calix.com/declarations).
hrvatski [Croatian]	Ovimе Calix Inc. To izjavljuje ovaj bežični širokopojasni pristup terminala u skladu s Direktivom 2014/53 / EU. Puni tekst izjave o sukladnosti za EU je dostupan online od kalix web deklaracije (https://www.calix.com/declarations).
English	Hereby, Calix Inc. declares that this Broadband wireless Access Terminal is in compliance with Directive 2014/53/EU. The full text of the EU declaration of conformity is available online from the Calix Declarations site (https://www.calix.com/declarations).
český [Czech]	Tím Calix Inc. Která deklaruje toto Wireless Broadband Access Terminal je v souladu se směrnicí 2014/53 / EU. Uplně znění EU prohlášení o shodě je k dispozici online na webové stránce prohlášení kalichu (https://www.calix.com/declarations).
Deutsch [German]	Hiermit Calix Inc. Das erklärt der Wireless Broadband Access Terminal in Übereinstimmung mit der Richtlinie 2014/53 / EU. Der vollständige Wortlaut der EU-Konformitätserklärung wird online von den Calix Website Erklärungen zur Verfügung (https://www.calix.com/declarations).
Eesti [Estonian]	Käesolevaga Calix Inc. See kinnitab seda traadita lairibaühenduse Terminali koostöös direktiivi 2014/53 / EL. Tervikteksti ELi vastavusdeklaratsiooni on saadaval võrgus Calix veebilehel deklaratsioonid (https://www.calix.com/declarations).
español [Spanish]	Por la presente, Calix Inc. Que declara esta Terminal de banda ancha de acceso inalámbrico está en conformidad con la Directiva 2014/53 / UE. El texto completo de la declaración de conformidad de la UE está disponible en línea desde el sitio web Declaraciones de Calix (https://www.calix.com/declarations).
Ελληνική [Greek]	Δια του παρόντος, Calix Inc. Αυτό δηλώνει αυτό το Wireless Terminal Ευρυζωνική πρόσβαση είναι σε συμμόρφωση με την οδηγία 2014/53 / ΕΕ. Το πλήρες κείμενο της δήλωσης συμμόρφωσης ΕΕ είναι διαθέσιμο στο διαδίκτυο από την ιστοσελίδα Calix Δηλώσεις (https://www.calix.com/declarations).
français [French]	Par la présente, Calix Inc. Cet accès qui déclare haut débit sans fil terminal est conforme à la directive 2014/53 / UE. Le texte intégral de la déclaration de conformité C'est disponible en ligne à partir des déclarations de site Calix (https://www.calix.com/declarations).
Italiano [Italian]	Con la presente, Calix Inc. Che dichiara questo terminale di accesso wireless a banda larga è conforme alla Direttiva 2014/53 / UE. Il testo integrale della dichiarazione di conformità UE è disponibile online dal sito Dichiarazioni Calix (https://www.calix.com/declarations).
Latvijas [Latvian]	Ar šo, Calix Inc. Tas paziņo, šis bezvadu platjoslas piekļuves termināls atbilst Direktīvas 2014/53 / ES. Pilns teksts ES atbilstības deklarācijas ir pieejama tiešsaistē no Calix tīmekļa deklarācijas (https://www.calix.com/declarations).
Lietuvos [Lithuanian]	Šiuo dokumentu Calix Inc. Tai deklaruojai tai bevielės plačiajuostės prieigos terminalas atitinka Direktyvos 2014/53 / ES. Visą tekstą ES atitikties deklaraciją galima rasti internete nuo CALIX svetainės deklaracijos (https://www.calix.com/declarations).
Magyar [Hungarian]	Ezzáltal Calix Inc. Hogy kijelenti ezt Wireless Broadband Access Terminal irányelvnek megfelelően 2014/53 / EU. A teljes szöveg az EU-megfelelőségi nyilatkozat elérhető online az Calix honlapon Nyilatkozatok (https://www.calix.com/declarations).
Polski [Polish]	Niniejszym, Calix Inc. Deklaruję, że ten Szerokopasmowy dostęp bezprzewodowy terminal jest zgodny z dyrektywą 2014/53 / UE. Pełny tekst deklaracji zgodności UE jest dostępna on-line ze strony internetowej calix deklaracji (https://www.calix.com/declarations).
português [Portuguese]	Por este meio, Calix Inc. Que declara esta Terminal de Acesso de Banda Larga sem fios está em conformidade com a Directiva 2014/53 / UE. O texto completo da declaração UE de conformidade está disponível online a partir de declarações do Web site da Calix (https://www.calix.com/declarations).
român [Romanian]	Prin prezenta, Calix Inc poate declara ca acces de bandă largă fără fir Terminal este în conformitate cu Directiva 2014/53 / UE. Textul integral al declarației de conformitate UE este disponibilă online din calix declarațiile site-ului (https://www.calix.com/declarations).
slovenščina [Slovenian]	S tem lahko Calix Inc. razglasi da širokopasovnega brezžičnega dostopa Terminal je v skladu z Direktivo 2014/53 / EU. Celotno besedilo izjave EU o skladnosti je na voljo na spletni strani izjavami calix (https://www.calix.com/declarations).
slovenský [Slovak]	Týmto Calix Inc. môže vyhlásiť tento Broadband Wireless Access Terminal je v súlade so smernicou 2014/53 / EU. Uplně znění vyhlášení o zhode EU je k dispozici online na webové stránke vyhlášení kalichu (https://www.calix.com/declarations).