







**Enterprise Wi-Fi 7 Access Point** 



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## About this Guide

This chapter describes the following topics:

- Overview of Cambium Network products
- Intended audience
- Purpose
- · Related documents
- New hardware platforms
- Access Point (AP) management options
- Reporting problems
- Security advice
- Safety and regulatory information
- Human exposure to radio frequency energy
- USA and Canada specific information
- Specific expertise and training required for professional installers
- Avoidance of weather radars
- Ethernet networking skills
- Ethernet cabling types
- Pole or tower mount guidelines
- Wall mount guidelines
- Training
- · Power density exposure limit

## Overview of Cambium Networks products

This guide describes various features supported by Cambium Network's Access Point (AP). It also provides detailed instructions for setting up and configuring the AP.

### Intended audience

The guide is intended to assist system designers, system installers, and system administrators.

## **Purpose**

This guide intends to instruct and assist personnel in the operation, installation, and maintenance of Cambium Networks equipment and ancillary devices. It is recommended that all personnel engaged in such activities must be trained properly.

Cambium Networks disclaims all liability whatsoever, implied or expressed, for any risk of damage, loss or reduction in system performance arising directly or indirectly out of the failure of the customer, or anyone acting on the customer's behalf, to abide by the instructions, system parameters, or recommendations made in this document.

## **Related documents**

Table 1 provides support information for the AP (Enterprise Wi-Fi 6 and 7 products).

**Table 1** Related documents

Document Type	Link for Reference
Enterprise Wi-Fi AP product details	https://www.cambiumnetworks.com/products/wifi/
Enterprise Wi-Fi AP Hardware and Installation Guide (This document)	https://support.cambiumnetworks.com/files
Enterprise Wi-Fi AP User Guide	https://support.cambiumnetworks.com/files
Enterprise Wi-Fi AP Release Notes	https://support.cambiumnetworks.com/files
Software Resources	https://support.cambiumnetworks.com/files
Community	http://community.cambiumnetworks.com/
Support	https://www.cambiumnetworks.com/support/contact-support/
Warranty	https://www.cambiumnetworks.com/support/warranty/
Feedback	For feedback, e-mail to support@cambiumnetworks.com

## New hardware platforms

New hardware platforms introduced in Enterprise Wi-Fi 7 Access Points:

**Table 2** New hardware platforms

Hardware Platform	Description	Supported Software Version
X7-35X	2x2:2 802.11b/g/n/ac/ax/be Tri-Radio Indoor Wi-Fi 7 Access Point with BLE/Zigbee IoT radio	Release 7.0 and above

## Access Point (AP) management options

**Table 3** AP management options

Management Option	Description
On-Premises	AP can be onboarded to the cnMaestro <sup>TM</sup> network management system.
Cloud	AP can be onboarded to either cnMaestro <sup>TM</sup> Cloud at <a href="https://cloud.cambiumnetworks.com">https://cloud.cambiumnetworks.com</a> .



#### Note

For cloud and mobile application management, please ensure the AP has connectivity to the internet. Connectivity can be verified using tools such as ping from the **Troubleshooting** tab of the AP UI. Connection status can be monitored from the AP dashboard.

### cnMaestro<sup>TM</sup> Essentials and cnMaestro<sup>TM</sup> X

- 1. Go to cloud.cambiumnetworks.com and register as a new user or sign-in with the existing credentials.
- 2. Create a new cnMaestro<sup>TM</sup> account or select an existing account.
- 3. To add AP serial numbers, go to cnMaestro Home > Onboard Devices > Claim Device.
- 4. Connect the AP to the internet. It appears in the cnMaestro<sup>TM</sup> **Devices** page in a few minutes. Approve the device to complete onboarding.

### cnMaestro<sup>TM</sup> On-Premises

Refer to the user documentation to redirect the AP to an On-Premises cnMaestro management server.

For support, go to support.cambiumnetworks.com.



#### Note

Enterprise Wi-Fi 6 and 7 APs have a QR code that helps the customer to get to the quick start instructions.

### Reporting issues

If you encounter any issues when installing or operating this equipment, follow this procedure to investigate and report:

- 1. Search this document and the software release notes of supported releases.
- 2. Visit the Support website: http://www.cambiumnetworks.com/support
- 3. Ask for assistance from the Cambium product supplier.
- 4. Gather information from affected units, such as any available diagnostic downloads.
- Escalate the problem by emailing or telephoning support: https://www.cambiumnetworks.com/support/contact-support/

### Security advice

Cambium Network's systems and equipment provide security parameters that can be configured by the operator based on their particular operating environment. Cambium recommends setting and using these parameters following industry recognized security practices. Security aspects to be considered are protecting the confidentiality, integrity, and availability of information and assets. Assets include the ability to communicate, information about the nature of the communications, and information about the parties involved.

In certain instances, Cambium makes specific recommendations regarding security practices, however the implementation of these recommendations and final responsibility for the security of the system lies with the operator of the system.

Cambium Network's Enterprise AP equipment is shipped with default web management interface login credentials. It is highly recommended that the following default username and password should be modified prior to system installation.

· Username: admin

· Password: admin

### Safety and regulatory information

This section describes important safety and regulatory guidelines that must be observed by personnel installing or operating Enterprise Access Point equipment.

### Important safety information



#### Warning

To prevent loss of life or physical injury, observe the safety guidelines in this section.

### **Power lines**

Exercise extreme care when working near power lines.

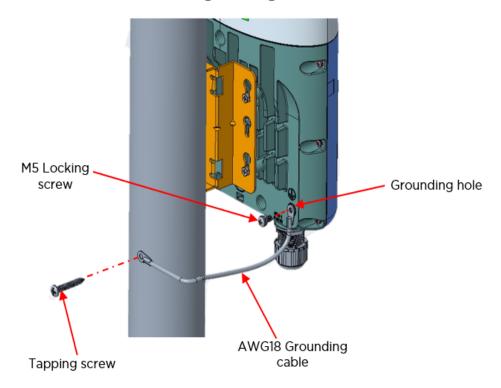
### Working at heights

Exercise extreme care when working at heights.

### Grounding and protective earth

Cambium Networks Enterprise Access Point (AP) devices must be properly grounded to protect against lightning. It is the responsibility of the user to install the equipment in accordance with national regulations. In the USA, follow Section 810 of the National Electric Code, ANSI/NFPA No.70-1984 (USA). In Canada, follow Section 54 of the Canadian Electrical Code. These codes describe correct installation procedures for grounding the outdoor unit, mast, lead-in wire and discharge unit, size of grounding conductors and connection requirements for grounding electrodes. Other regulations may apply in different countries and therefore it is recommended that installation be contracted to a professional installer.

### Recommendation for earth grounding



### For grounding hole:

- Use M5 screw with lock washer
- Use AWG18 grounding cable

The other side of the grounding cable must be permanently connected to the earth ground of the building.

## Powering down before servicing

Always power down and unplug the equipment before servicing.

### Primary disconnect device

The Enterprise AP power supply is the primary disconnect device.

### RF exposure near the antenna

Strong Radio Frequency (RF) fields will be present close to the antenna when the transmitter is ON. Always turn OFF the power to the AP device before undertaking maintenance activities in front of the antenna.

### Important regulatory information

The Enterprise Wi-Fi 6 and 7 APs are certified as an unlicensed device in frequency bands where it is not allowed to cause interference to licensed services (called primary users of the bands).

### Radar avoidance

In countries where radar systems are the primary band users, the regulators have mandated special requirements to protect these systems from interference caused by unlicensed devices. Unlicensed devices must detect and avoid co-channel operation with radar systems.

The Enterprise Wi-Fi 6 and 7 APs detect and avoid functionality for countries and frequency bands requiring protection for radar systems. The Enterprise Wi-Fi 6 and 7 APs are qualified for ETSI/FCC DFS certification (see Note) for radar detection and avoidance as per the law.



#### Note

Country-specific limits apply, some bands require Dynamic Frequency Selection (DFS). DFS bands operation subject to regulatory approval. Check Software release notes for details.

Installers and users must meet all local regulatory requirements for radar detection. To meet these requirements, users must set the correct country code during commissioning of the Enterprise Wi-Fi 6 and 7 APs equipment. If this is not done, installers and users may be liable to civil and criminal penalties.

Contact Cambium Networks helpdesk for support.

### Human exposure to radio frequency energy

Relevant standards (USA and EC) applicable when working with RF equipment are:

- ANSI IEEE C95.1-1991, IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.
- Council recommendation of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz) (1999/519/EC) and respective national regulations.
- Directive 2013/35/EU of the European Parliament and of the Council of 26 June 2013 on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields) (20th individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC) and repealing Directive 2004/40/EC.
- US FCC limits for the general population. See the FCC website at <a href="https://www.fcc.gov/">https://www.fcc.gov/</a>, and the policies, guidelines, and requirements in Part 1 of Title 47 of the Code of Federal Regulations, as well as the guidelines and suggestions for evaluating compliance in FCC OET Bulletin 65.
- Health Canada limits for the general population. See the Health Canada website at <a href="http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radio\_guide-lignes\_direct/index-eng.php">http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radio\_guide-lignes\_direct/index-eng.php</a> and Safety Code 6.
- BS EN 62232:2017: Determination of RF field strength, power density, and SAR in the vicinity of radiocommunication base stations for the purpose of evaluating human exposure (IEC 62232:2017).
- BS EN 50385:2017: Product standard to demonstrate the compliance of base station equipment with radiofrequency electromagnetic field exposure limits (110 MHz - 100 GHz), when placed on the market.

ICNIRP (International Commission on Non-Ionizing Radiation Protection) guidelines for the general
public. See the ICNIRP website at <a href="http://www.icnirp.de/">http://www.icnirp.de/</a> and Guidelines for Limiting Exposure to TimeVarying Electric, Magnetic, and Electromagnetic Fields.

## **USA** and Canada specific information

### Federal Communication Commission interference statement

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 radio/TV technician for help.



#### **Attention**

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

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

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired
  operation.

For products available in the USA and Canada markets, only channels 1 through 11 can be operated. Selection of other channels is not possible.

This device and its antennas(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.

### **CE** statement

This equipment complies with EU radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator and your body.

## Operation in the USA

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.

For product available in the USA market, only channels 1 to 11 for the 2.4 GHz band can be operated. Selection of other channels is not possible.

### **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 minimum distance of 62 cm (24.40 inches) between the radiator and your body. 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 device.
- Increase the separation between the equipment and receiver.
- · Connect the equipment into an outlet on a circuit different from that which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.
- The operation of this device is prohibited on oil platforms, cars, trains, boats, and aircraft, except that
  operation of this device is permitted in large aircraft while flying above 10,000 feet. Operation of
  transmitters in the 5.925 7.125 GHz band is prohibited for control of or Communications with
  unmanned aircraft systems.

### **Operation in Canada**

#### **ISED** statement

This device complies with 'Innovation, Science and Economic Development (ISED) Canada' license-exempt RSS standard(s). 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.

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.

For product available in the Canada market, only channels 1 to 11 can be operated. Selection of other channels is not possible. Pour les produits disponibles aux Canada du marché, seul le canal 1 à 11 peuvent être exploités. Sélection d'autres canaux n'est pas possible.

### **ISED Radiation Exposure Statement**

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 36 cm between the radiator and your body.

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 36 cm de distance entre la source de rayonnement et votre corps.

## Specific expertise and training required for professional installers

To ensure that the Enterprise Wi-Fi 6 and 7 APs are installed and configured in compliance with the requirements of Industry Canada and the FCC, installers must have the radio engineering skills and training described in this section. This is particularly important when installing and configuring an Enterprise Wi-Fi 6 or 7 AP system for operation in the 5 GHz band (5150 – 5250 MHz – FCC only, 5250 – 5350 MHz, 5470 – 5725 MHz, 5725 – 5850 MHz and 5925 - 6425 MHz).

### Avoidance of weather radars

The installer must be familiar with the requirements in FCC KDB 443999. Essentially, the installer must be able to:

- Access the FCC database of weather radar location and channel frequencies.
- Use this information to correctly configure the product (using the UI) to avoid operation on channels that
  must be avoided according to the guidelines that are contained in the KDB and explained in detail in
  this user guide.
- In ETSI regions, the band 5600 MHz to 5650 MHz is reserved for the use of weather radars.

## Ethernet networking skill

The installer must have the ability to configure IP addressing on a PC and to set up and control products using a web browser interface.

## Ethernet cabling types

Following are the recommended Ethernet cabling types for various APs which has Multi-gigabit capable Ethernet ports:

- 2.5 Gbps-
  - ° X7-35X

For 2.5 Gbps, Cambium Networks recommends CAT6 cable or better to cover the 100 m maximum cable length. For shorter lengths under 30 m, CAT5E cable is recommended. For high radio frequency electric fields environments, shielded CAT5E or CAT6 type cable is recommended.

## Pole or tower mount guidelines

If you need to install AP to a metal tower or pole, then in addition to the general protection requirements, follow the below requirements:

- Ensure that the position of the equipment is lower than the top of the tower or its lightning air terminal.
- Ensure that the metal tower or pole is correctly grounded.
- Install a grounding kit at the first point of contact (top), between the drop cable and the tower.
- Install a grounding kit at the bottom of the tower, near the vertical to horizontal transition point.

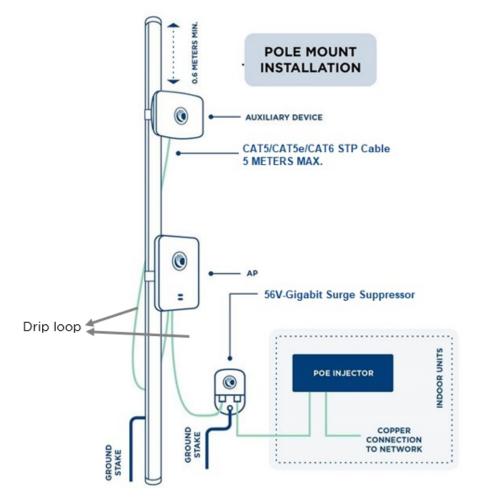


#### Note

If grounding kit is installed, ensure the grounding kit is bonded to the tower or Tower Ground Bus Bar (TGB).

Connection examples of pole or tower installations are shown in below figure.

Figure 4 Grounding and lightning protection on pole or tower



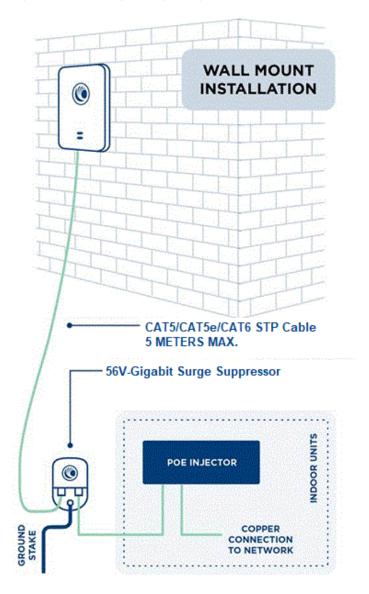
## Wall mount guidelines

If you need to install AP on the wall of a building, then in addition to the general protection requirements, follow the below requirements also:

- Ensure that the position of the equipment is lower than the top of the building or its lightning air terminal.
- Ensure that the building is correctly grounded.

Connection examples of wall installations are shown in below figure.

Figure 5 Grounding and lightning protection on wall





#### Note

There should be a drip loop immediately at the Ethernet port entrance going to the AP.

### **Training**

The installer needs to have basic competence in radio and IP network installation. The specific requirements applicable to the Cambium Networks Enterprise Wi-Fi 6 and 7 APs must be gained by reading this guide and by performing sample setups at base workshop before live installments.

### Power density exposure limit

This section includes the following topics:

- Calculation of power density and distance
- Calculated distances and power compliance margins

Install the radios for the platform family of wireless solutions so as to provide and maintain the minimum separation distances from all persons.

The applicable FCC power density exposure limit for RF energy in the 2.4 and 5 GHz frequency bands is 1 mW/cm2.

The applicable ISEDC power density exposure limit for RF energy in unlicensed bands is  $0.02619 * (f^{\land} (0.6834))$ , where f is the lowest frequency of the supported band. For licensed bands, the power density exposure limit is  $0.6455 * (f^{\land} (0.5))$ , where f is the lowest frequency of the supported band.

### Calculation of power density and distance

The following calculation is based on the ANSI IEEE C95.1-1991 method, as that it provides a worst-case analysis. Details of the assessment to EN50383:2002 can be provided, if required.

Peak power density in the far field of a radio frequency point source is calculated using the following formula:

$$S = \frac{P.G}{4\pi d^2}$$

#### Where:

- P—Maximum average transmit power capability of the radio in watt (W)
- G—Total transmit gain as a factor, converted from dB
- S—Power density in W/m<sup>2</sup>
- d—Minimum safe separation distance from point source, in centimeters (cm)

#### Table 6 Antenna details

AP	Antenna	Gain (for 2.4 GHz in dBi)	Gain (for 5 GHz in dBi)	Gain (for 6 GHz in dBi)
X7-35X	Omnidirectional	3	6	6

For details on minimum safe distance value, see Table 7.

### Calculated distances and power compliance margins

<u>Table 7</u> displays power density and minimum safe separation distance from point source for each frequency band and antenna combination for the USA and Canada. These are conservative distances that include compliance margins.

Cambium Networks Enterprise Wi-Fi 6 and 7 APs adhere to all applicable EIRP limits for transmit power when operating in MIMO mode. Separation distances and compliance margins include compensation for both transmitters. The minimum safe separation distance from point source is calculated using the following formula:

$$d = \sqrt{\frac{P.G}{4\pi . S}}$$

Explanation of terms used in the following tables:

- P—Maximum average transmit power capability of the radio in watt (W)
- G—Total transmit gain as a factor, converted from dB
- S—Power density in W/m<sup>2</sup> (For FCC and IC) or mW/cm<sup>2</sup> (For CE)
- d—Minimum safe separation distance from point source, in centimeters (cm)

**Table 7** Power density and distance

Product	Regulatory Domain	Power density (S)	Distance (d) in cm
X7-35X	FCC	0.09/0.11/0.03 mW/cm <sup>2</sup> (2.4 GHz/5 GHz/6 GHz)	41
	IC	2.50/3.30/0.75 W/m² (2.4 GHz/5 GHz/6 GHz)	24
	CE	0.19/2.74/0.39 W/m <sup>2</sup> (2.4 GHz/5 GHz/6 GHz)	20

# Packaging and Installation of Access Point

This chapter describes the following topics:

- Unpacking the Access Point
- Package contents
- · Mounting the device

### **Unpacking the Access Point**

After you purchase a Cambium Networks Enterprise Wi-Fi AP, unpack the AP and check the package contents.

- 1. Open the AP package, and then carefully remove the contents.
- 2. Verify that all items listed in Package contents below are included in the package. Check each item for damage. If any item is damaged or missing, notify your authorized Cambium Networks Enterprise Wi-Fi AP sales representative.

## Package contents

A complete Cambium Networks Enterprise Wi-Fi AP package contains all the items listed below:

- 1. Cambium Networks Enterprise Wi-Fi AP
- 2. Quick Start Guide (QSG)
  - · Specifications
  - · Safety Notice
  - Compliance
- 3. Hardware Accessories (Based on SKU/Model)
  - Mounting Kits

## Mounting the device

This section includes the following topics:

Enterprise Wi-Fi APs feature an attractive design with flexible mounting options that allows the APs to smoothly blend into any business environment. Enterprise Wi-Fi APs are mounted in the following methods:

- Wall Mount
- Celling Mount
- T-bar Mount
- Pole Mount

- Gang mount
- Table mount
- Single gang mount
- General wall mount

<u>Table 8</u> provides an overview of the type of mountings each Enterprise Wi-Fi APs support.

**Table 8** Types of mounting the device

Access	Wall	Ceiling	T-bar	Pole	Table	Single Gang
Point	Mount	Mount	Mount	Mount	Mount	Mount
X7-35X	✓	✓	✓			

This section describes the following topics:

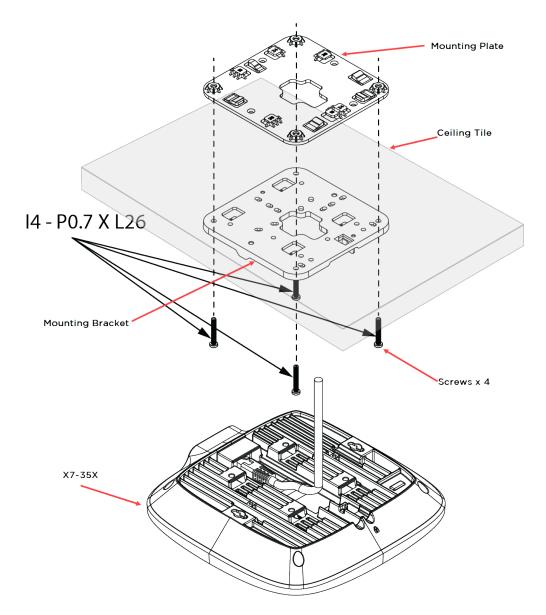
• Mounting X7-35X

## Mounting X7-35X

The X7-35X units are mounted by using one of the following mounting techniques:

- · Ceiling mount,
- · Wall mounting, or
- T-bar mounting.

### **Ceiling mount**



To mount the X7-35X unit by using the ceiling mount technique, perform the following steps:

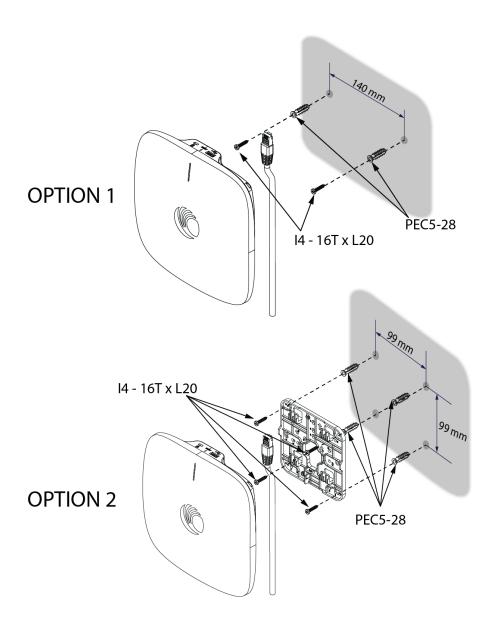
- 1. Determine a place or location where you want to mount the X7-35X unit.
- 2. Remove the ceiling tile.
- 3. Using the hole template, mark the hole locations.
- 4. Drill the holes for the four mounting screws using a 5mm (3/6") diameter drill bit.
- 5. Drill the RJ45 cable hole using a 15 mm (5/8") diameter bit.
- 6. Hold the mounting plate on the top side of the ceiling tile and screw it on the mounting bracket.

- 7. Run the RJ45 cable(s) through the 15mm hole and remount the ceiling tile.
- 8. Attach the RJ45 cable(s) to the X7-35X unit.
- 9. Slide the X7-35X unit into the mounting bracket.

### Wall mounting

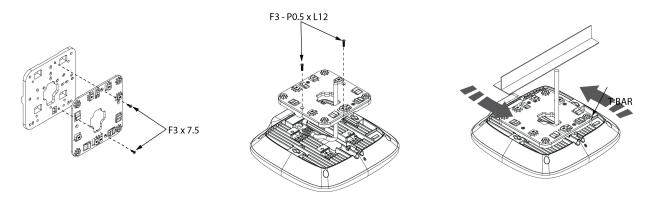
You can mount X7-35X to any wall by one of the following two options:

- Option 1—By using two screws with corresponding wall anchors. The ceiling mount bracket can be used as a template to align the screws with the unit.
- Option 2—By using the mounting bracket and four screws with corresponding wall anchors.



## **T-bar mounting**

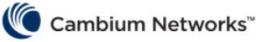
The X7-35X unit can be secured to a XXmm ceiling T-bar rail by using the ceiling mount bracket. The  $\bf A$  marking on the bracket must be used for T-bar rail with this width.



## Cambium Networks

Cambium Networks delivers wireless communications that work for businesses, communities, and cities worldwide. Millions of our radios are deployed to connect people, places, and things with a unified wireless fabric that spans multiple standards and frequencies of fixed wireless and Wi-Fi, all managed centrally via the cloud. Our multi-gigabit wireless fabric offers a compelling value proposition over traditional fiber and alternative wireless solutions. We work with our Cambium certified Connected Partners to deliver purpose built networks for service provider, enterprise, industrial, and government connectivity solutions in urban, suburban, and rural environments, with wireless that just works.

Support website	https://support.cambiumnetworks.com
Support enquiries	
Technical training	https://learning.cambiumnetworks.com/learn
Main website	http://www.cambiumnetworks.com
Sales enquiries	solutions@cambiumnetworks.com
Warranty	https://www.cambiumnetworks.com/support/standard-warranty/
Telephone number list	http://www.cambiumnetworks.com/contact-us/
User Guides	http://www.cambiumnetworks.com/guides
Address	Cambium Networks Limited,
	Unit B2, Linhay Business Park, Eastern Road, Ashburton,
	Devon, TQ13 7UP
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