Access Point

Hardware Installation Guide

LUMINATE

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Overview

Luminate's Enterprise Access Point (LEAP) is a new generation of services-ready LTE access points that is cloud activated for rapid deployment by enterprise. Each LEAP is connected to the Enterprise LAN using standard Cat.5 UTP cable and is powered by 802.3at Power-over-Ethernet. This cloud activated service significantly reduces deployment time by automating device provisioning and firmware upgrades. With Luminate cloud activation, LEAPs are factory shipped to any site, and configure themselves when powered up.

Package Contents

The following is shipped with the Luminate Wireless Access Point:

- LEAP-10 access point
- 9/16" and 15/16" Ceiling Rail Adapters
- Installation guide

Audience

This guide is intended for system administrators and personnel responsible for installing the Luminate Wireless Access Point.

Assumptions

This guide assumes administrators have a good understanding of networking and communication technologies.

Icons

The following icons are used in this guide:

Notes indicate helpful hints, or useful bits of information providing the reason for an action.

Cautions indicate something that might cause damage to or destroy your equipment, or result in a loss of data.

Warnings indicate something that might cause injury to you or someone else.

Typographic Conventions

The following typographic conventions are used in this guide:

- Important terms and the titles of books are indicated with *italic text*.
- Navigation items, such as dropdown menus, buttons, or windows, are indicated with **bold text**.
- Command syntax, examples, show output, and terminal displays are indicated with the `Courier` font.

Contacting Luminate

For technical support or service, contact Luminate Wireless Technical Support at support@luminatewireless.com.

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Hardware Overview

The following sections outline the hardware features of the Luminate Wireless Access Point. This chapter covers:

LEDs

The Luminate Wireless AP is equipped with five LEDs that indicate the status of the various components of the AP. The LEDs by default operate in quiet mode. Turn off approximately five minutes after the AP is powered on.

Figure 1 LED

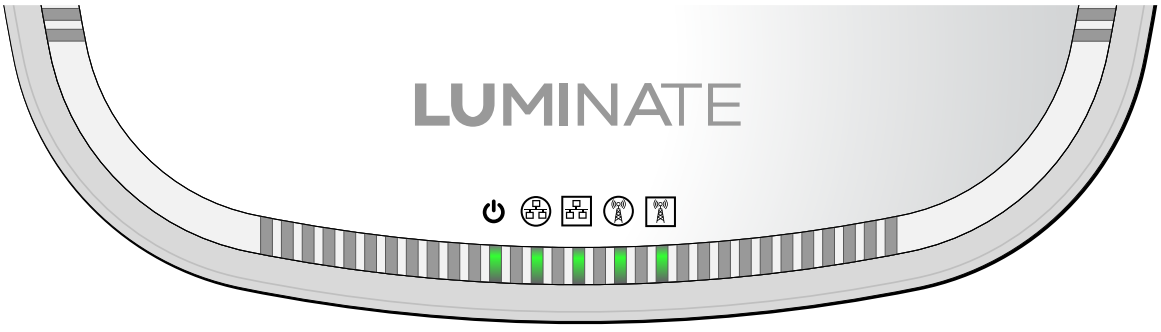


Table 1 LEDs

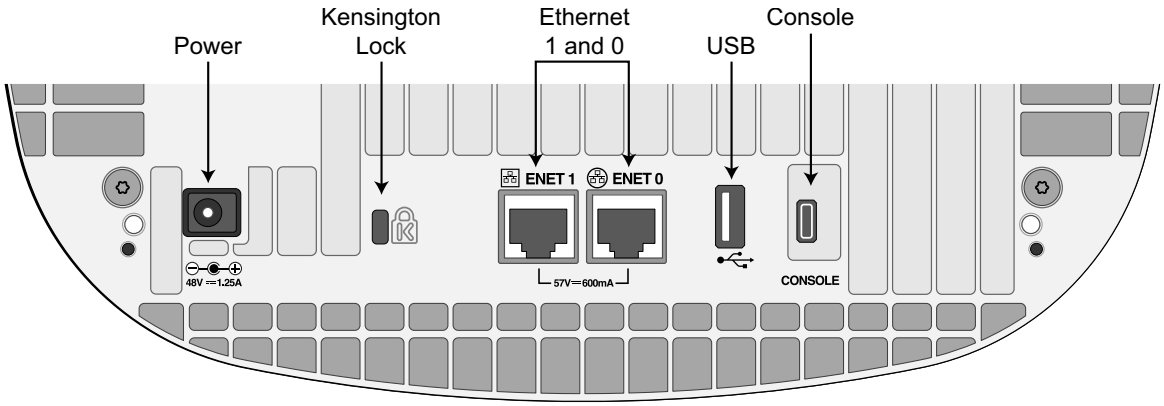
LED	Status	Definition
Power	On - Green Red Off*	Device Powered Initial Power up No Power up

Table 1 (Continued)LEDs

LED	Status	Definition
ENET 0	Off* On - Amber On - Green Flashing - Amber/Green	No Link 100Mbs Link 1000Mbps Link Activity
ENET 1	Off* On - Amber On - Green Flashing - Amber/Green	No Link 100Mbs Link 1000Mbps Link Activity
Radio 0	Off* On	Radio Disabled GreenRadio Enabled
Radio 1	Off* On	Radio Disabled GreenRadio Enabled

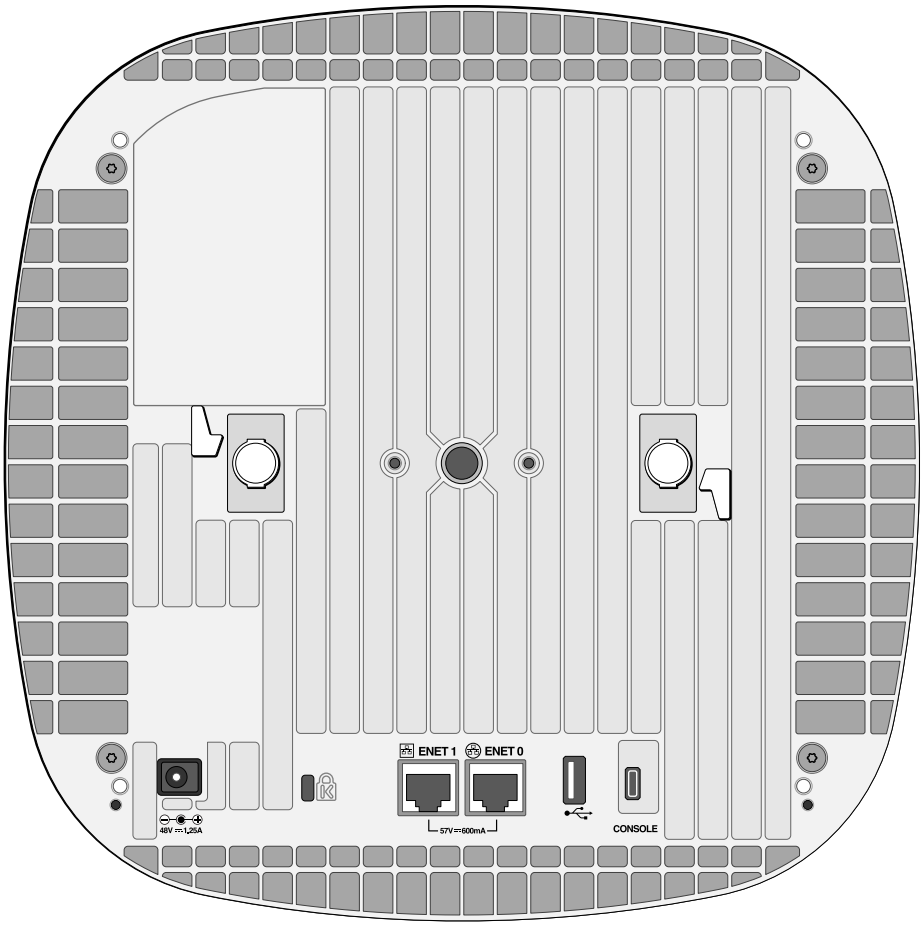
* All LEDs turn off after approximately five minutes after device power up.

Figure 2 Bottom Panel



CAUTION

ENET 0 connection is currently supported. Failure to connect to ENET 0 results in a failed connection to the AP.



DC Power Socket

An AC-to-DC adapter (or any DC source) can be used to power this device. It must comply with all applicable local regulatory requirements and the DC interface must meet the following specifications:

- 48 VDC (+/- 5%), 1.25 A
- Center-positive 2/5.6 mm circular plug, 10 mm length

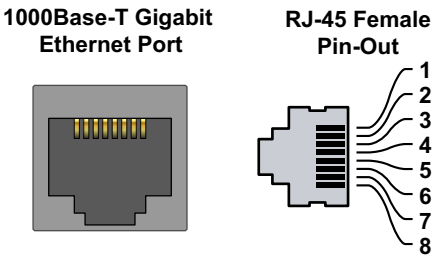
Kensington Lock Slot

The Luminate Wireless AP is equipped with a Kensington slot for additional security.

Ethernet Ports

The Luminate Wireless AP is equipped with two 100/1000Base-T (RJ-45) auto-sensing, MDI/ MDX wired-network connectivity ports. These ports require IEEE 802.3at Power over Ethernet (PoE+) compliance, accepting 57 VDC (nominal) as a standard defined Powered Device (PD) from a Power Sourcing Equipment (PSE) such as a PoE+ midspan injector, or network infrastructure that supports PoE+.

Figure 3 Gigabit Ethernet Port Pin-Out



Signal Name	Function
BI_DA+	Bi-directional pair +A, POE Negative
BI_DA-	Bi-directional pair -A, POE Negative
BI_DB+	Bi-directional pair +B, POE Positive
BI_DC+	Bi-directional pair +C, POE Positive
BI_DC-	Bi-directional pair -C, POE Positive
BI_DB-	Bi-directional pair -B, POE Positive
BI_DD+	Bi-directional pair +D, POE Negative
BI_DD-	Bi-directional pair -D, POE Negative

Console Port

The serial console port allows you to connect the AP to a serial terminal or a laptop for direct local management. This port is micro-AB USB. Connect it directly to the USB connector of a laptop using a standard Type A to micro Type A or Type B cable.

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Before You Begin

The following sections detail all the necessary steps to take before installing the Luminate Wireless Access Point. This chapter covers:

Pre-Installation Network Requirements

Once appropriate products and their placement have been determined, the LMCCs must be installed and the initial setup must be performed before the APs are deployed.

AP Pre-Installation Checklist

Before installing your Luminate Wireless AP, ensure that you have completed the following:

- Estimated and procured appropriate number of APs for your installation.
- Procured an Installation ID for your project.
- CAT5e or CAT6 UTP cable of required length.

Only ENET 0 is supported. Pay close attention during AP installation to ensure that only ENET 0 is connected to the network.

- IEEE 802.3at compliant Power over Ethernet (PoE+) source. PoE+ source can be any power source equipment (PSE), midspan PSE device, or a suitable AC to DC 48VDC adapter.
- The following Network services are available on the local LAN:
  - DHCP
  - DNS
- Network Connectivity
  - External Internet

- HTTPS (TCP port 443)
- IPSec (UDP port 500 and UDP port 4500 in case of NAT-T)
- NTP (UDP port 123)

- Internal
  - Precision-Time-Protocol (UDP ports 319, 320)
  - HTTP (Port 80)
  - SSH (Port 22)

Summary of the Installation Process

Successful setup of an Luminate Wireless AP consists of four tasks, which must be performed in this order:

1. Identify the specific installation location for each AP.
2. Physically install each AP.
3. Verify post-installation connectivity.
4. Verify the AP is receiving power.

Identifying Specific Installation Locations

The Luminate Wireless AP antenna patterns are optimized for mounting in an elevated ceiling location with the plastic housing pointed downward to the floor. A high mounting location reduces the amount of RF absorption from objects such as furniture and office equipment in the path between the APs and mobile phones. The antennas are located under the plastic housing and provide a uniform horizontally-directed (Omni) pattern of cross-polarized RF coverage with a slight down tilt.

Identifying RF Absorbers/Reflectors/Interference Sources

Metal objects in close proximity (10cm or 4") in front of or just to the side of the plastic housing can significantly alter or impair the antenna performance and should be avoided.

Examples of items that degrade RF performance are:

- Concrete, brick, and masonry walls
- Exterior walls clad with metal or metal lathe wires supporting stucco
- Modern, low "E" glass windows
- Objects containing water
- Large metal objects in a building can reflect and re-radiate RF energy and can change the antenna patterns
- Other LTE radiating devices or DAS antennas, especially if operating on the same band

LTE APs do not operate in the same RF bands as Wi-Fi, Bluetooth, or microwave ovens, so the risks of interference are lower. The AP, however, should be located as far as possible from these potential interference sources while still meeting the other placement goals for optimal performance.

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Installing the Access Point

The following sections detail the steps needed to install the Luminate Wireless Access Point. This chapter covers:

Installing the Access Point

Before you mount the AP, perform the following step(s) to ensure successful installation. For each AP you're installing:

1. Manually note and record the serial number of each AP you are installing onto a hard copy floor plan.
2. Enter the AP serial number in the installer tool.

NOTE

When the AP is powered on, it contacts the cloud Public Provisioning Server and gets its initial image package and configuration.

Using the Ceiling Tile Rail Adapter

The Luminate Wireless AP ships with two ceiling rail adapters for 9/16" and 15/16" ceiling tile rails. Additional wall mount adapters and ceiling rail adapters for other rail styles are available as accessory kits. To install the AP using a rail adapter, do the following:

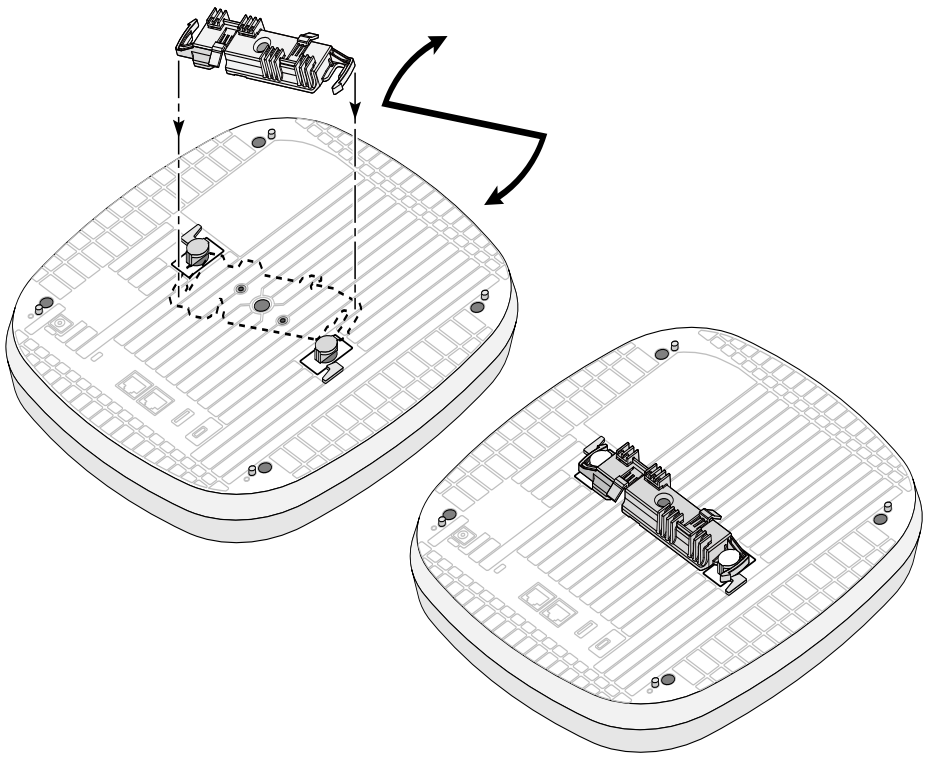
1. Pull the necessary cables through a prepared hole in the ceiling tile near where the AP will be placed.

NOTE

The template for this is located in the back of this installation guide, in Appendix A.

2. Place the adapter against the back of the AP with the adapter at an angle of approximately 30 degrees to the tabs (see Figure 4).

Figure 4 Attaching the Ceiling Rail Adapter



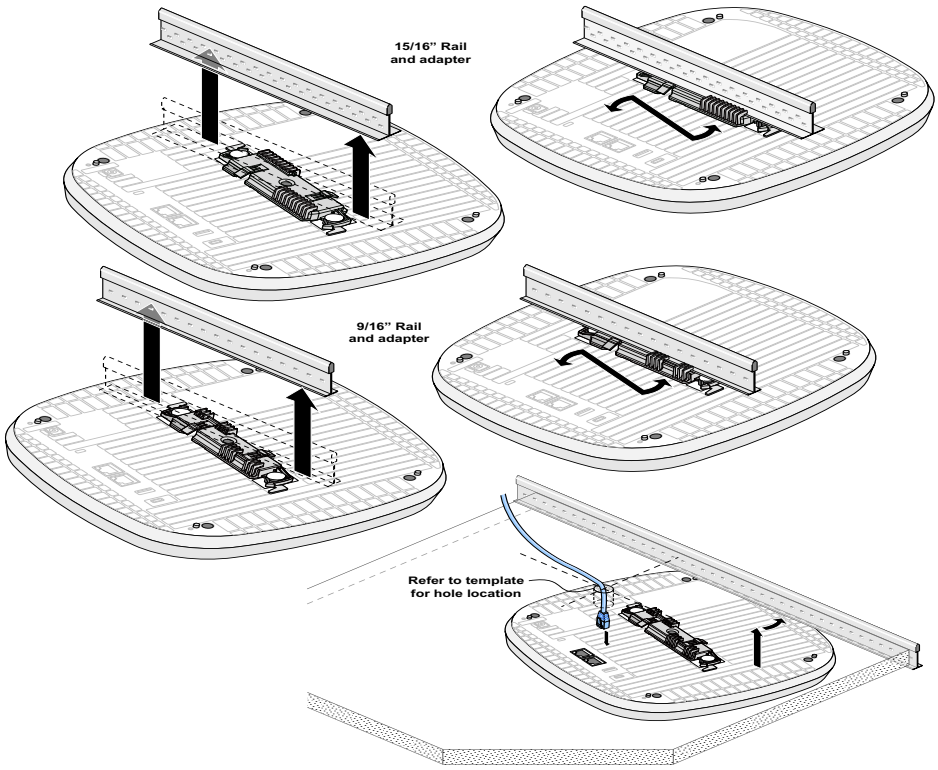
3. Twist the adapter clockwise until it snaps into place in the tabs (see Figure 4).
4. If necessary, connect the console cable to the console port on the back of the AP.

NOTE

Depending on local building practices, some AP installations may require an additional tile suspension system to secure the access point. In such cases, use a M3 eye bolt to hook to a 12 inch (or larger) suspension wire with limited slack to the structure above. Note, two pre-tapped M3 holes on both sides of the AP for this utility.

5. Hold the AP next to the ceiling tile rail with the ceiling tile rail mounting slots at approximately a 30-degree angle to the ceiling tile rail (see Figure 5). Make sure that any cable slack is above the ceiling tile.

Figure 5 Mounting the AP



6. Pushing toward the ceiling tile, rotate the AP clockwise until the device clicks into place on the ceiling tile rail.

NOTE

Install cables in accordance with all applicable local and national regulations and practices.

Confirming Power Connection

The integrated LEDs on the AP are used to verify that the AP is receiving power and initializing successfully See Table 1 for specific LED patterns.

NOTE

If both PoE + and DC power sources are available, the AP draws power from the PoE+ source.

Configuring the Access Point

APs are identified by their serial number and provisioned on the Luminate Mobile Cloud Controller (LMCC). Once provisioned, the LMCC pushes the configuration info to the AP.

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Specifications, Safety, and Compliance

The following section details Luminate Wireless specifications and outlines safety and regulatory compliance:

Product Specifications

Electrical

- Ethernet:
  - 2 x 100/1000Base-T auto-sensing Ethernet RJ-45 Interfaces
  - MDI/MDX
  - IEEE 802.3u (100Base-T), IEEE 802.3ab (1000Base-T)
  - Power over Ethernet+ (IEEE 802.3at compliant), 48V DC (nominal) and 57V DC (maximum)/ 650mA (see Figure 3 for pin configuration)
- Power:
  - 48 VDC power interface, supports powering through an AC-to-DC power adapter
  - PoE+ support on Ethernet ports: 802.3at-compliant PoE+ sourcing devices

Environmental

- Operating:
  - Temperature: 0° C to +50° C (+32° F to +122° F)
  - Humidity: 5% to 95% non-condensing
- Storage and transportation:
  - Temperature: -40° C to +70° C (-40° F to +158°)
  - Humidity: 5% to 95% non-condensing

For additional specifications on this product, please refer to the data sheet. The data sheet can be found at www.luminatewireless.com.

FCC

This device is electronically labeled. To view the FCC ID:

FCC ID is printed on the regulatory label on the back of the AP.

CAUTION

RF Radiation Exposure Statement: This equipment complies with FCC RF radiation exposure limits. This equipment should be installed and operated with a minimum distance of 7.9 inches (20 cm) between the radiator and your body for LTE operations. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

FCC Class B Part 15

This device complies with Part 15 of the Federal Communications Commission (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.

CAUTION

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

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. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the manufacturer's instructions, may cause interference harmful to radio communications.

If this equipment does cause interference, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or TV technician for help.

Complies with the Class B limits for radio noise emissions as set out in the interference-causing equipment standard entitled "Digital Apparatus," ICES-003 of Industry Canada.

Cet apareil numerique de la classe B respecte toutes les exigencies du Reglement sur le materiel brouilleur du Canada

EU Regulatory Model Numbers

Luminate Wireless, Inc. hereby declares that model #s are in Compliance with the essential requirements of CE marking under the requirements outlined in Directives: RTT&E 1999/5/EC, RED 2014/53/EU, LVD 2014/53/EU, WEEE 2012/19/EC, RoHS 2011/65/EU. The Declaration of Conformity to CE marking is available for viewing at www.luminatewireless.com.

Medical

- Equipment not suitable for use in the presence of flammable mixtures.
- End product system, including power supply, must be evaluated to IEC 60601-1-1 and IEC 60601-1 by the end user.
- Wipe with a dry cloth, no additional maintenance required.
- No serviceable parts, the unit must be sent back to the manufacturer for repair.
- No modifications are allowed without approval.

Proper Disposal

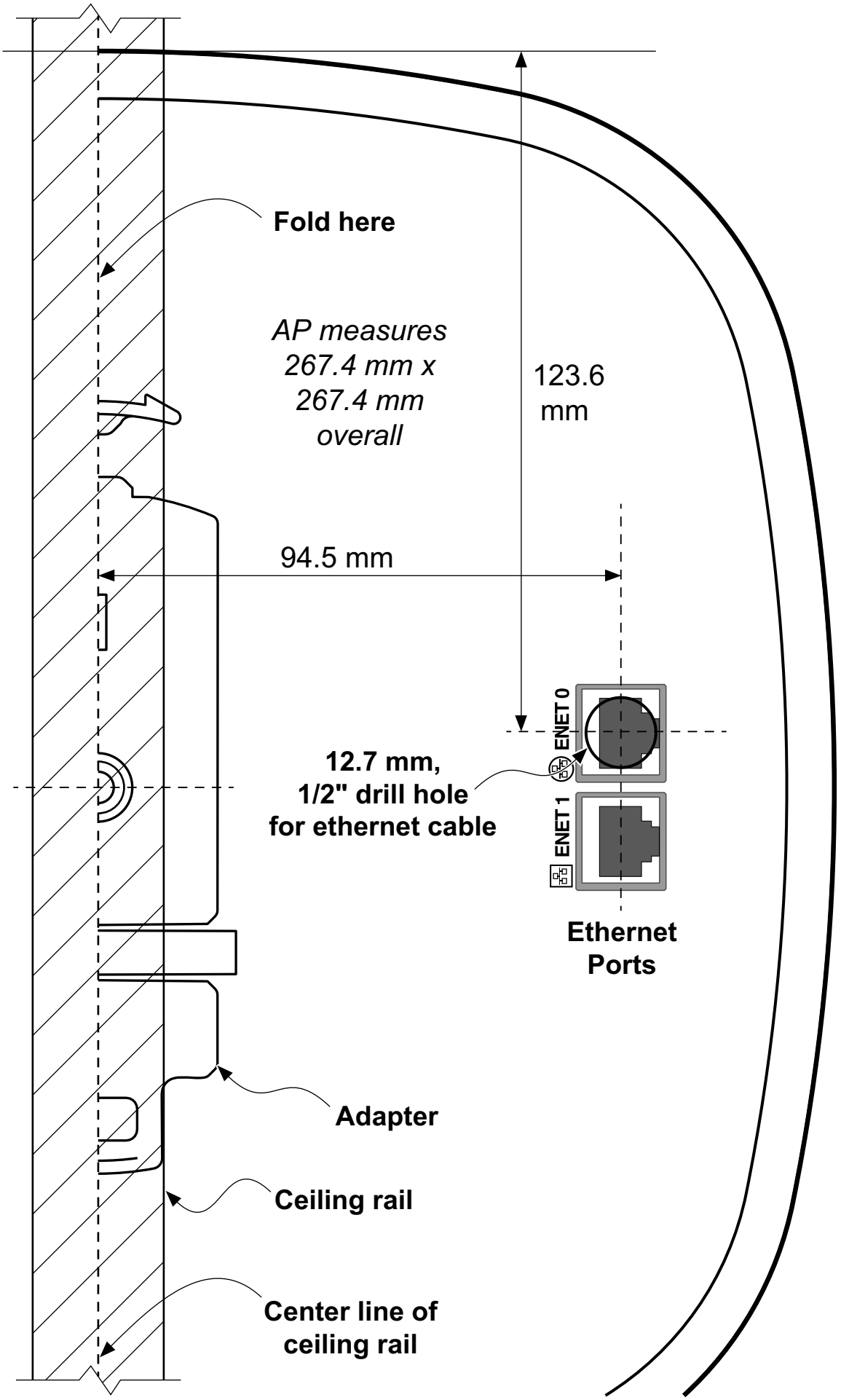
Dispose of Luminate products per local regulations.

A

Appendix I: Using the Installation Template

The following is the base template used for installing the Access Point.

Figure 6 Access Point Installation Template


Fold here
AP measures
267.4 mm x
267.4 mm
overall
123.6
mm
94.5 mm
ENET 0
ENET 1
12.7 mm,
1/2" drill hole
for ethernet cable
Ethernet
Ports
Adapter
Ceiling rail
Center line of
ceiling rail