Meru Access Point

Installation Guide

Revision History

Revision Date	Revision
December 2004	0006
November 2004	0005
October 2004	0004
August 2004	0003
June 2004	0002
May 2004	0001

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About This Guide

This guide describes the features of the Meru Access Point family, which includes the AP200 and AP100 models. This guide also includes the hardware installation for both access points. The term access point is used interchangeably throughout this document to apply to either model when there are no differences between the models.

Audience

This guide is intended for persons installing the Meru Access Point (AP).

In This Guide

This guide includes the following chapters:

- **Chapter 1, "About Meru Access Points"**
- **Chapter 2, "Installing the AP100"**
- **Chapter 3, "Installing the AP200"**

Other Sources of Information

Additional information is available in the following Meru publications and external references.

Meru Publications

- *Meru Wireless LAN System Release Notes*
- *Meru Wireless LAN System Getting Started Guide*
- *Meru Controller Installation Guide*
- *Meru Wireless LAN System Configuration Guide*
- *Meru Wireless LAN System Command Reference*

External References

- Stevens, W. R. 1994. *TCP/IP Illustrated, Volume 1, The Protocols.* Addison-Wesley, Reading, Mass.

- Gast, M.S. 2002. *802.11 Wireless Networks, The Definitive Guide.* O'Reilly and Associates, Sebastopol, Calif.

Typographic Conventions

This document uses the following typographic conventions to help you locate and identify information:

Note: Provides extra information, tips, and hints regarding the topic.

Caution!   Identifies important information about actions that could result in damage to or loss of data, or could cause the application to behave in unexpected ways.

Warning!   Identifies critical information about actions that could result in equipment failure or bodily harm.

Contacting Meru

You can visit Meru Networks on the Internet at this URL:

http://www.merunetworks.com

Click the Support menu button to view Meru Customer Services and Support information.

Customer Services and Support

For assistance, contact Meru Customer Services and Support 24 hours a day at 1-888-637-8952 (1-888-Meru-WLA(N)) or 1-408-215-5305. Email can be sent to support@merunetworks.com.

Meru Customer Services and Support provide end users and channel partners with the following:

- Telephone technical support

- Software update support

- Spare parts and repair service

RMA Procedures

Contact Meru Customer Services and Support for a Return Material Authorization (RMA) for any Meru equipment.

Please have the following available when making a call:

- Company and contact information
- Equipment model and serial numbers
- Meru software release and revision numbers (for example, 3.0.0-35)
- A description of the symptoms the problem is manifesting
- Network configuration

FCC Compliance

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.

! **Caution!** Changes or modifications to the Meru Access Point that are not expressly approved by Meru Networks will void your warranty and could void your authority to operate this equipment.

Declaration of Conformity

The AP100 complies with the requirements of the *Low Voltage Directive 73/23/EEC* and the *EMC Directive 89/336/EEC* by conforming to the following standards:

- Safety: EN 60950:1992 + A1, A2
- EMC: EN 55022, EN 50082-1

The AP200 complies the with following standards:

- Radio: EN 301.893
- EMC: EN 301.489-1, EN 489-17
- Safety: EN 60950

The following CE mark is affixed to the AP100 802.11b with 100 mW radios:

CE ①

✓ **Note:** This equipment can be used in all EU and EFTA countries. Outdoor use may be restricted to certain frequencies and/or may require a license for operation. For more details, contract Meru Networks.

✓ **Note:** Combinations of power levels and antennas resulting in a radiated power level above 100 mW equivalent isotropic radiated power (EIRP) are considered as not compliant with the above mentioned directive and are not allowed for use with the European community and other countries that have adopted the European R&TTE directive 1999/5/EC or the CEPT recommendation Rec 70.03 or both.

The following CE mark is affixed to the AP200 802.11a with 40 mW radios:

C E 0682 ①

Chapter 1
About Meru Access Points

The Meru Access Point radio devices communicate with the Meru Controller and form the Wireless LAN (WLAN). The Meru Controller and Access Points connect to the site's wired LAN through wired switches. Wireless clients associate with the Access Points as they roam throughout the WLAN. As such, the Meru WLAN is an extension of the wired LAN, providing the wireless benefits of client mobility, enhanced access, and dynamic network configuration.
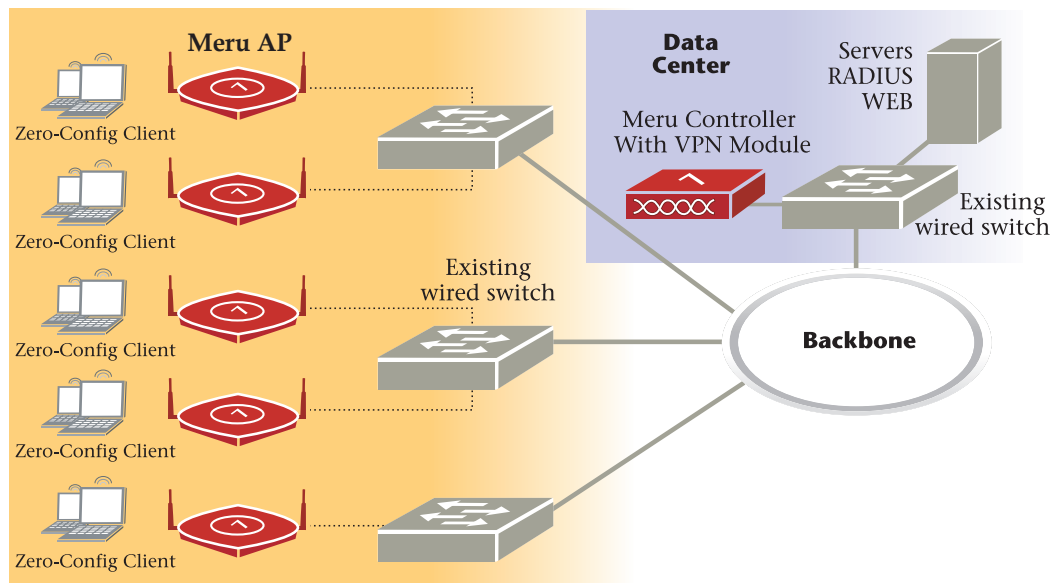
Figure 1: Meru Wireless LAN (WLAN)

Meru Access Point Features

All Meru Access Points provide the following features:

- Five times more voice calls per Access Point

  Meru Access Points use Over-The-Air QoS to provide fine-grained quality of service on a per-application, per-user, and per-flow basis providing a robust platform for enterprise-quality voice, plus streaming media and data applications. It provides both uplink and downlink QoS between the client and the access point, which is then integrated into the wired QoS mechanisms to provide

end-to-end QoS. Meru Access points deliver a 5-fold increase in voice carrying capacity from the current 5-8 calls per access point to over 30 calls per Meru Access Point with no change to the 802.11 client.

- Over five times the scalability of alternate Access Points

  Meru Access Points are unique in their ability to dramatically increase performance over alternate APs, even as client density increases. Meru Access Points, can serve over 100 standard 802.11 active data and voice clients per access point, whereas today's systems are limited to about 10-15 data-only clients. This scalability allows corporations to plan for a wireless usage growth without forklift upgrades to the WLAN infrastructure.

- Zero-loss handoff means applications are not interrupted

  Multiple Access Points can be aggregated into a Virtual AP, creating a single wireless network with a wide coverage area that can encompass the entire enterprise campus and provide unparalleled performance and manageability. This breakthrough technology works with any standard 802.11 client device and enables application and security policy persistence while roaming, without requiring the user to re-login or re-authenticate throughout the network coverage area.

- Embedded RF monitor for enhanced security

  Traditional approaches to wireless security involve separate devices to monitor the air or legacy APs, or access points that periodically become air monitors. Meru Access Points provide continuous RF monitoring, as well as capture information about all devices that the AP can hear, including clients associated with the access point. Meru WLAN Radar—a third generation rogue AP detection software, provides rogue detection and suppression continuously and without any interruption to the VPN sessions and time-sensitive voice applications that operate on the converged wireless LAN in an enterprise. This constant monitoring enables enhanced security with rogue device detection and prevention that is less disruptive and more cost effective than traditional approaches.

Meru Access Point Models

The Meru Radio Access Point is available in two model families: the Access Point 200 and the Access Point 100.

The Meru Dual Radio Access Point 200 family (AP200) provides models that conform to the specifications provided by the IEEE 802.11a and 802.11g protocols and also provide backward compatibility for the 802.11b protocol. The AP200 works with most standard WiFi clients. The Access Point houses two radio devices: one supplying 802.11a, b, g, or bg service and the other serving as an RF monitor to the Meru controller, providing real-time status of RF activity to optimize the wireless network.

The AP200 is housed in a metal case with a plastic removable cover. As such, it can be used for plenum installations when the plastic cover is removed.

00109
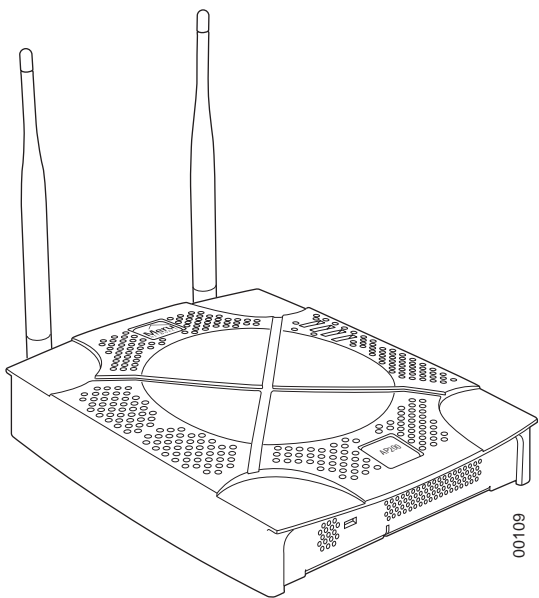
Figure 2: AP200

The Meru Access Point 100 family (referred to hereafter as the AP100, unless specifically referring to the AP100-P) consists of the non-plenum AP100 and plenum-rated AP100-P. Both models that conform to the specifications provided by the IEEE 802.11b protocol and work with all standard WiFi clients. The AP100 also serves as an RF monitor to the Meru controller and provides real-time status of RF activity to optimize the wireless network.

00134

Figure 3: AP100

Access Point 100-P

00117

Figure 4: AP100-P (Plenum Rated)

Chapter 2
Installing the AP100

This chapter describes how to physically install the Meru AP100 and AP100-P. It contains the following sections:

- **Safety Precautions**
- **Unpacking the Access Point**
- **Installation Requirements**
- **Installing the Access Point**
- **Checking LED Activity**

Safety Precautions

Follow the guidelines in this section to ensure proper operation and safe use of the access point.

FCC Safety Compliance Statement

The FCC with its action in ET Docket 96-8 has adopted a safety standard for human exposure to radio frequency (RF) electromagnetic energy emitted by FCC certified equipment. When used with approved Meru access point antennas, Meru AP100 products meet the uncontrolled environmental limits found in OET-65 and ANSI C95.1, 1991. Proper installation of this radio according to the instructions found in this manual will result in user exposure that is substantially below the FCC recommended limits.

General Safety Guidelines

- Do not touch or move antenna(s) while the unit is transmitting or receiving.
- Do not hold any component containing a radio so that the antenna is very close to or touching any exposed parts of the body, especially the face or eyes, while transmitting.
- The use of wireless devices in hazardous locations is limited to the constraints posed by the local codes, the national codes, and the safety directors of such environments.

Warnings

Translated versions of the following safety warnings are provided in Appendix C.

Warning! In order to comply with FCC radio frequency (RF) exposure limits, dipole antennas should be located at a minimum of 7.9 inches (20 cm) or more from the body of all persons.

Warning! Do not operate your wireless network device near unshielded blasting caps or in an explosive environment unless the device has been modified to be especially qualified for such use.

Warning! Do not work on the system or connect or disconnect cables during periods of lightning activity.

Warning! Read the installation instructions before you connect the system to its power source.

Warning! This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that a fuse or circuit breaker no larger than 120 VAC, 15A U.S. (240 VAC, 10A international) is used on the phase conductors (all current-carrying conductors).

Warning! Inside antennas must be positioned to observe minimum separation of 20 cm. (~ 8 in.) from all users and bystanders. For the protection of personnel working in the vicinity of inside (downlink) antennas, the following guidelines for minimum distances between the human body and the antenna must be observed.

The installation of an INDOOR antenna must be such that, under normal conditions, all personnel cannot come within 20 cm. (~ 8.0 in.) from any inside antenna. Exceeding this minimum separation will ensure that the employee or bystander does not receive RF-exposure beyond the Maximum Permissible Exposure according to FCC CFR 47, section 1.1310 i.e. limits for General Population/Uncontrolled Exposure.

Warning! The Outside antenna must be positioned to observe minimum separation of 120 cm. (approximately 4 feet) from all users and bystanders. For the protection of personnel working in the vicinity of outside (uplink) antennas, the following guidelines for minimum distances between the human body and the antenna must be observed.

The installation of an OUTDOOR antenna must be such that, under normal conditions, all personnel cannot come within 120 cm. (~ 4 ft.) from the outside antenna. In all installations, the antenna should never be mounted such that the main beam is directed toward an area where workers or bystanders may be present. Exceeding this minimum separation will ensure that the worker or bystander does not receive RF-exposure beyond the Maximum Permissible Exposure according to FCC CFR 47, section 1.1310 i.e. limits for General Population/Uncontrolled Exposure.

Unpacking the Access Point

The AP100 shipping package contains the following items:

- Access point
- CD-ROM of Meru Wireless LAN System documentation

Confirm that the AP100-P shipping package contains the following items:

- Access point
- One mounting bracket
- Light-pipe extender
- Two small mounting screws
- CD-ROM of Meru Wireless LAN System documentation

Installation Requirements

The following recommended mounting locations provide the best reception for the AP:

- On a horizontal surface, such as a table or a desk
- On a vertical surface, usually a wall
- Underneath a horizontal surface, usually a ceiling
- Above a ceiling tile (this installation is supported only for the AP100-P)

  Suitable for use in environmental air space in accordance with the Section 300-22(c) of the National Electric Code and Sections 2- 128.12 - 010 (3) and 12 - 100 of the Canadian Electrical Code. Part 1. C22. 1. (For AP100-P model only.)

To complete this installation, you need the items listed in Table 1.

Table 1: AP100 Installation Items

Installation Type	Consumable Items Required
Horizontal mounting	None
Vertical mounting over a wall stud	● Two #6 x 2" wood screws for a wood stud; or ● Two #6 x 1½" metal screws for a metal stud
Vertical mounting on sheetrock	● Two #6 x 1" screws ● Two #4-6 x 7/8" ribbed plastic wall anchors
Horizontal mounting below a ceiling	● Two #6 x 1" screws ● Two #4-6 x 7/8" ribbed plastic wall anchors
Mounting above a ceiling tile (AP100-P only)	● Two #6 x 1" screws ● Mounting bracket ● Light-pipe extender

You need the tools listed in Table 2.

Table 2: AP100 Installation Tools

Installation Type	Tools Required
Horizontal mounting	None
Vertical mounting over a wall stud	● Drill ● 1/8" drill bit ● Screwdriver
Vertical mounting on sheetrock	● Drill ● 3/16" drill bit ● Screwdriver
Horizontal mounting below a ceiling	● Drill ● 3/16" drill bit ● Screwdriver
Mounting above a ceiling tile (AP100-P only)	● Drill ● 1¼" hole saw ● Screwdriver

Installing the Access Point

Selecting a Location

The AP requires a location that meets the following:

- Relatively unobstructed access to the stations the AP serves

- Power over Ethernet (PoE) connection to the network switch servicing the controller

APs obtain their power from 802.3af standard Power over Ethernet (PoE). The power can be supplied by a PoE-compatible network switch or PoE power injector installed between the switch and the AP. The Power LED on the AP100 (LED furthest from the RJ-45 connector) displays green if power is supplied correctly to the AP.

Select a location with minimal physical obstructions between the AP and the wireless stations. In an office with cubicles, mounting the APs on the ceiling or the wall near the ceiling provides the least obstructed communications path.

Most installations receive the best coverage using the following guidelines:

- For high throughput, place APs approximately 60 feet apart in a grid pattern.

- For adequate coverage, place AP100s approximately 200 feet apart.

- Install APs toward the center of the building.

- Do not install APs near metal objects, such as heating ducts, metal doors, or electric service panels.

- Relative to the ground, orient the antenna up or down, not sideways.

Note: The previous guidelines are general guidelines. Each site has its own unique environment. Place access points accordingly.

Attaching the AP Antennas

Attach the antennas to the connectors on the AP100 (see **Figure 5**). Rotate the knurled ring at the base of the antenna clockwise to attach the antenna, as shown in the following figure. The ring should be finger-tight.

Access Point 100

Antenna

Turn clockwise
to tighten

00135
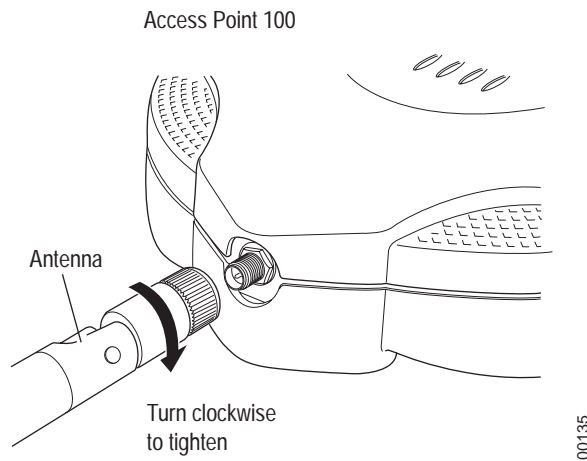
Figure 5: Attaching an Antenna to the AP100

Caution! When changing the orientation of the antennas, be sure to slightly loosen the knurled ring before moving the antenna. Retighten the ring afterward. Otherwise, you might damage the internal cabling in the AP.

Mounting the Access Point

You can mount the access point in the following ways:

- Horizontally, as described in the **"Horizontal Mounting"** section.

- Vertically, as described in the **"Vertical Mounting"** section.

- Below a ceiling, as described in the **"Mounting Below a Ceiling"** section.

- Above a ceiling tile, as described in the **"Mounting Above a Suspended Ceiling"** section.

Horizontal Mounting

To horizontally mount an AP100:

1. Place the AP flat on the horizontal surface.

2. For each antenna, loosen the knurled ring at the base of the antenna (see **Figure 5**), point the antenna straight up, then retighten the ring.

3. Connect the PoE 100BaseT Ethernet cable, as shown in **Figure 6**.

Ethernet cable

00128
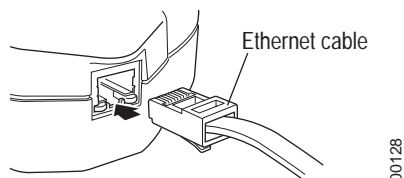
Figure 6: Attaching the Ethernet Cable to the AP100

Vertical Mounting

To vertically mount an AP100:

1. Mark the location for the two AP mounting screws. They must be 4 ½ inches apart, center-to-center, one above the other. If you are not using plastic wall anchors, you must center the mounting screws on a wall stud. If you do not center the mounting screws on a wall stud, you must use plastic wall anchors.

2. Drill holes at the locations you marked:
   — 3/16-inch holes if you are using plastic anchors
   — 1/8-inch holes if you are using only the screws

3. If you are using plastic anchors, install them in the holes.

4. Screw in the screws most of the way, so that the screw head is about 1/16 of an inch from the wall.

5. Mount the AP on the screws, placing the circular portion of the keyhole mounts over the screw heads and sliding the AP down.

6. For external antennas, loosen the knurled ring at the base of each antenna (see **Figure 5**), point the antenna straight up, then retighten the ring.

7. Connect the PoE 100BaseT Ethernet cable (see **Figure 6**).

Mounting Below a Ceiling

To mount an access point below a ceiling:

1. Mark the location of the two mounting screws. They must be 4 ½ inches apart, center-to-center.

2. Drill holes at the locations you marked:
   — 3/16-inch holes if you are using plastic anchors
   — 1/8-inch holes if you are using only the screws

3. If you are using plastic anchors, install them in the holes.

4. Screw in the screws most of the way, so that the screw head is about 1/16 of an inch from the wall.

5. Mount the AP to the wall screws by placing the circular portion of the keyhole mounts over the screw heads and sliding the AP down.

6. For each antenna, loosen the knurled ring at the base of the antenna (see **Figure 5**), point the antenna straight down, then retighten the ring.

7. Connect the PoE 100BaseT Ethernet cable (see **Figure 6**).

Mounting Above a Suspended Ceiling

The AP100-P meets the requirements for fire resistance and low smoke-generating characteristics required by Section 300-22(C) of the National Electrical Code (NEC) for installation in a building's environmental air space.

Note: Only the Meru AP100-P, enclosed in a plenum-rated metal case, can be installed above ceiling tiles. The Meru AP100 enclosed in a plastic case, must be installed below ceiling tiles.
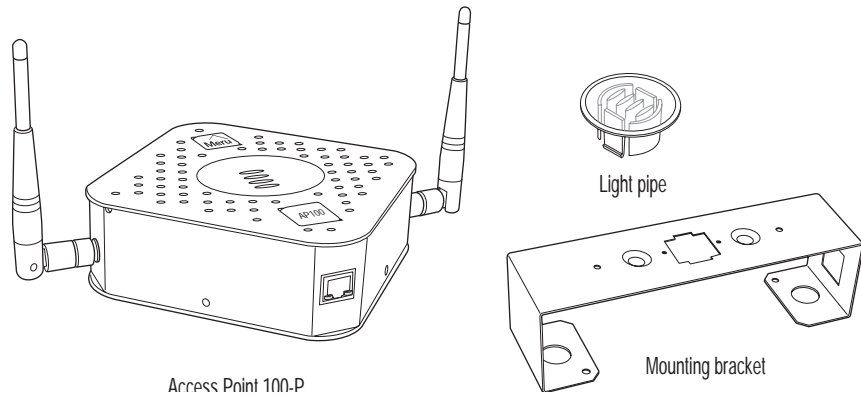
Figure 7: AP100-P Plenum Installation Items

To mount the AP100-P above a suspended ceiling:

1. Remove the ceiling tile where the AP100-P will be located.

2. Confirm that there is at least 6 inches of space above the ceiling tile to accommodate the AP antennas. If there is insulation above the ceiling tile, clear it for at least three inches to the side and three inches above the AP100-P.

3. Cut a hole in the tile, 1¼ inches in diameter, for the AP100-P light-pipe extender. The hole should be at least 6 inches from the edge of the tile.

4. Insert the light-pipe extender into the tile hole, with the 2-inch flange on the appearance side of the ceiling tile. Refer to **Figure 8** for mounting bracket placement orientation, and invert the extender.
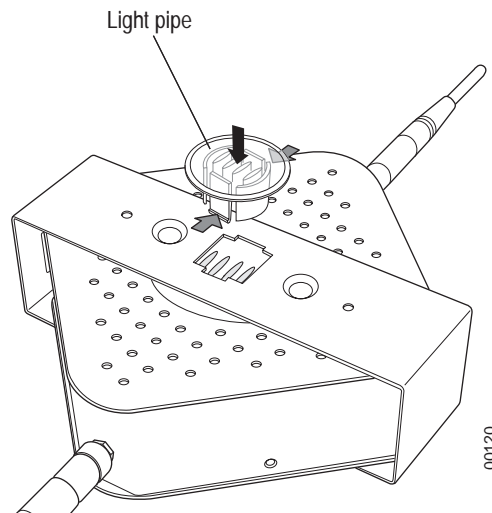
Figure 8: Light-Pipe Extender Attached to Bracket

5. Attach the mounting bracket to the light-pipe extender, with the two small pins on the light-pipe extender fitting into the small holes on the mounting bracket and the two hooked tabs fitting into the two notches in the mounting bracket hole. Note that the tabs are different widths and the wide tab fits only into the wide notch. Press the tabs in towards each other to clear the edges of the notch. They lock in place.

6. Slide the AP100-P into the mounting bracket. Slide the bracket's feet over the two feet of the AP100-P closest to the keyhole mounts.
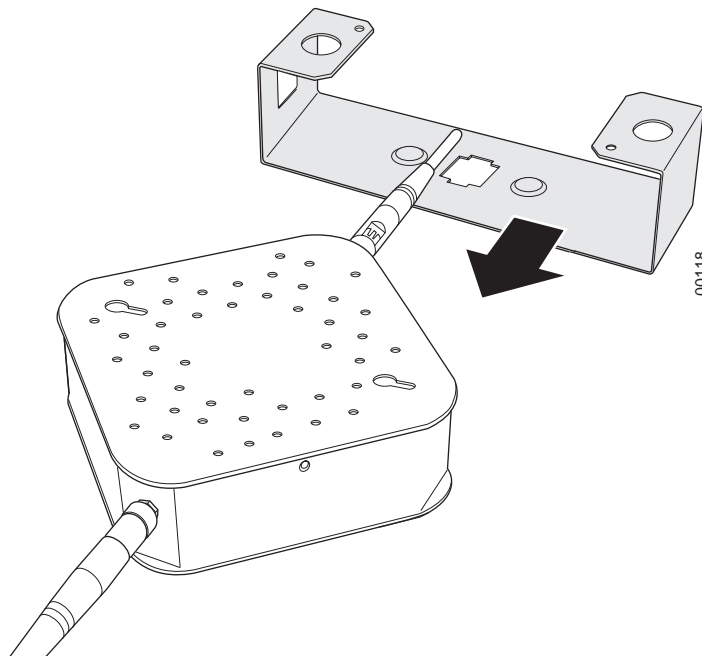
7. Attach the mounting bracket to the ceiling tile, using two #6 screws.

8. Position the small holes on the bracket over the small holes on the back of the AP100-P. Use two screws supplied to attach the bracket to the AP100-P.
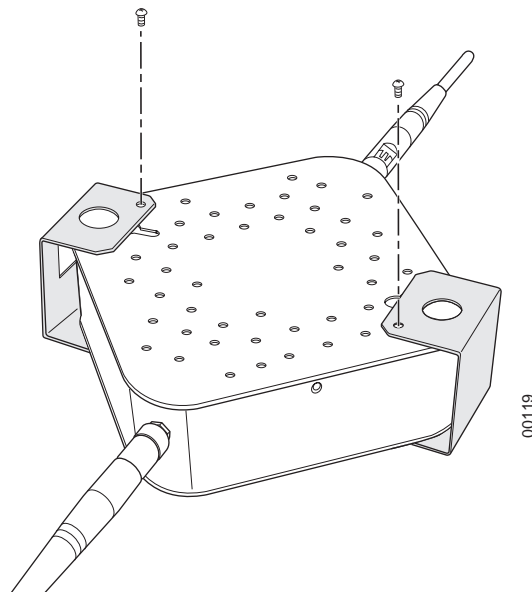
9. For each antenna, loosen the knurled ring at the base of the antenna (see **Figure 5**), point the antenna straight up, then retighten the ring.

10. Return the ceiling tile to the ceiling, but leave the tile loose.

11. Connect the PoE 100BaseT Ethernet cable to the AP100-P (see **Figure 6**).

12. If needed, reposition the antennas. Be sure to loosen the ring at the base of the antenna before repositioning, and retighten after.

13. Replace the ceiling tile in the ceiling brackets.

The AP100-P, with mounting bracket and light-pipe extender, installed above a ceiling tile is shown in **Figure 9**:

Side view
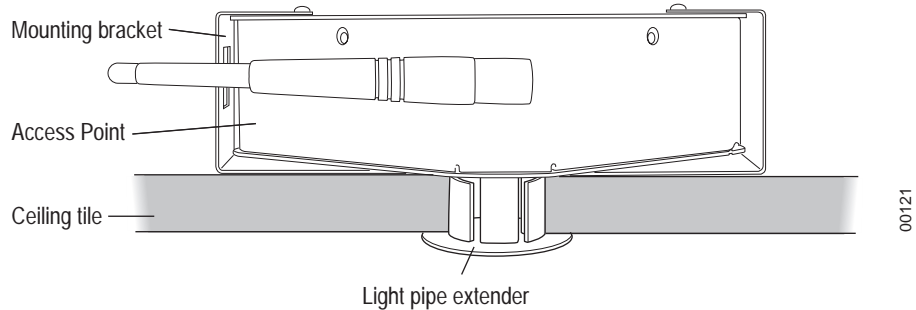
Figure 9: AP100-P Installed Above Ceiling Tile

Checking LED Activity

After the AP100 is connected, the LEDs near the RJ-45 connector should light, as shown in **Figure 10**.
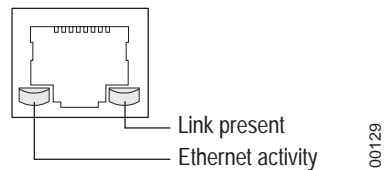
Figure 10: RJ-45 LEDs

The green LED on the left blinks if any Ethernet activity is taking place. If there is no Ethernet activity, the LED is off. The LED on the right is solid yellow if an Ethernet link is present. If no Ethernet link is present or connectivity is lost, the LED is off.

AP100 Status LEDs

Four status LEDs on the *face* of the AP100 also light, as shown in **Figure 11**.
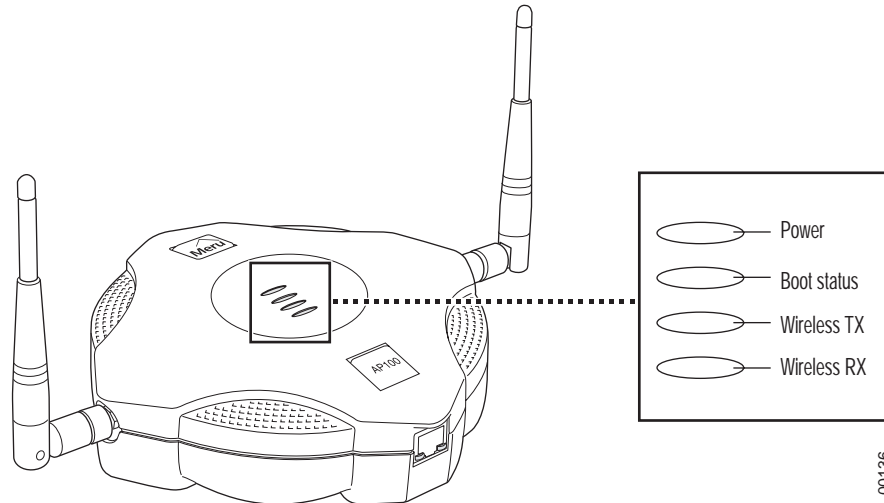
Figure 11: Access Point 100 Status LEDs

The Power LED, farthest from the Meru logo, displays green when power is on.

The functions of the LEDs are described in Table 3.

Table 3: AP100 LED Descriptions

LED	Function
LED1	Green: Presence of power
LED2	Boot status (see Table 4)
LED3	Green: Wireless transmit activity (TX)
LED4	Green: Wireless receive activity (RX)

When the AP is first connected to the controller and any time the access point is rebooted thereafter, the AP initializes with and then is programmed by the controller. LED 2 gives the status of the boot cycle. Table 4 lists typical successful boot information.

Table 4: AP100 Boot Status Information (LED 2)

AP100 LED activity	Boot Stage
Red, one second	Power on
Black, five seconds	Access point self-test
Yellow/Green, alternating for five seconds	Downloading image from the controller
Red, for one quarter second	Download complete
Varies	Operating status indicated by Table 5

After the boot is complete, LED 2 cycles to show the access point-controller runtime status. These LED states are shown in Table 5.

Table 5: AP100-Controller Runtime Status Information (LED 2)

State	Interpretation	AP100 LED Cycle
Initializing	In the process of initializing. The AP is connected but not authenticated.	Green/Yellow/Red/ Green/Red/ Green/Yellow/Red/ Green/Red
Connected	Normal operation without security	Green/Off/Green/Off
Authenticated	Normal operation with security	Green blink, blink, blink; Green long blink, Green long blink
Initialization failed	Configuration was downloaded, but AP initialization failed. AP automatically reboots.	Red/Off/Red/Off
Disconnected	Access point was once connected to a controller and configured by the controller, but can no longer find that controller	Green/Yellow/ Green/Yellow
Standalone	Access point is operating in a standalone mode	Green/Long Yellow/ Long Green/Yellow/ Green/Long Yellow/ Long Green/Yellow
Downloading	Downloading image or configuration from the controller	Off/Yellow/Off/Yellow/ Off/Green/Off/Green/ Off/Yellow/Off/Yellow/ Off/Green/Off/Green
Error State	Access point is in an error state. Call Meru technical support	Long Red/Off/Yellow/ Long Off/ Long Red/Off/ Yellow/ Long Off

Chapter 3
Installing the AP200

This chapter describes how to physically install the Meru AP200. It contains the following sections:

Safety Precautions

Follow the guidelines in this section to ensure proper operation and safe use of the access point.

FCC Safety Compliance Statement

The FCC with its action in ET Docket 96-8 has adopted a safety standard for human exposure to radio frequency (RF) electromagnetic energy emitted by FCC certified equipment. When used with approved Meru access point antennas, Meru AP200 products meet the uncontrolled environmental limits found in OET-65 and ANSI C95.1, 1991. Proper installation of this radio according to the instructions found in this manual will result in user exposure that is substantially below the FCC recommended limits.

General Safety Guidelines

- Do not touch or move antenna(s) while the unit is transmitting or receiving.
- Do not hold any component containing a radio so that the antenna is very close to or touching any exposed parts of the body, especially the face or eyes, while transmitting.
- The use of wireless devices in hazardous locations is limited to the constraints posed by the local codes, the national codes, and the safety directors of such environments.

Warnings

Translated versions of the following safety warnings are provided in Appendix C.

Warning! In order to comply with FCC radio frequency (RF) exposure limits, dipole antennas should be located at a minimum of 7.9 inches (20 cm) or more from the body of all persons.

Warning! Do not operate your wireless network device near unshielded blasting caps or in an explosive environment unless the device has been modified to be especially qualified for such use.

Warning! Do not work on the system or connect or disconnect cables during periods of lightning activity.

Warning! Read the installation instructions before you connect the system to its power source.

Warning! This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that a fuse or circuit breaker no larger than 120 VAC, 15A U.S. (240 VAC, 10A international) is used on the phase conductors (all current-carrying conductors).

Warning! Inside antennas must be positioned to observe minimum separation of 20 cm. (~ 8 in.) from all users and bystanders. For the protection of personnel working in the vicinity of inside (downlink) antennas, the following guidelines for minimum distances between the human body and the antenna must be observed.

The installation of an INDOOR antenna must be such that, under normal conditions, all personnel cannot come within 20 cm. (~ 8.0 in.) from any inside antenna. Exceeding this minimum separation will ensure that the employee or bystander does not receive RF-exposure beyond the Maximum Permissible Exposure according to FCC CFR 47, section 1.1310 i.e. limits for General Population/Uncontrolled Exposure.

Warning! The Outside antenna must be positioned to observe minimum separation of 120 cm. (approximately 4 feet) from all users and bystanders. For the protection of personnel working in the vicinity of outside (uplink) antennas, the following guidelines for minimum distances between the human body and the antenna must be observed.

The installation of an OUTDOOR antenna must be such that, under normal conditions, all personnel cannot come within 120 cm. (~ 4 ft.) from the outside antenna. In all installations, the antenna should never be mounted such that the main beam is directed toward an area where workers or bystanders may be present. Exceeding this minimum separation will ensure that the worker or bystander does not receive RF-exposure beyond the Maximum Permissible Exposure according to FCC CFR 47, section 1.1310 i.e. limits for General Population/Uncontrolled Exposure.

Unpacking the AP200

The AP200 ships with a mounting bracket and mounting hardware for standard wall mounting. Optional mounting kits are available for mounting the AP200 above or below a hanging ceiling. The AP200 mounting studs are placed so they can be used with brackets supplied by other vendors or to replace an AP100.

✔ **Note:** The AP200 has a security cable slot so you can secure the AP200 with a standard security cable, such as those used to secure laptop computers.

An array of holes on the mounting bracket (see **Figure 12**) allow it to be mounted on the wall and over junction boxes or molly bolts. There are also holes for passing the PoE Ethernet or external power supply cable through the bracket if the bracket is mounted on a junction box or over the ceiling T-bar box hanger.

Confirm that the AP200 shipping package contains the following items:

- Access point
- Mounting bracket with two mounting screws
- CD-ROM of Meru Wireless LAN System documentation
- Optional suspended ceiling mounting hardware kit
- Optional T-bar box hanger hardware kit for mounting above a suspended ceiling
- Optional 3.3V DC external power supply connector
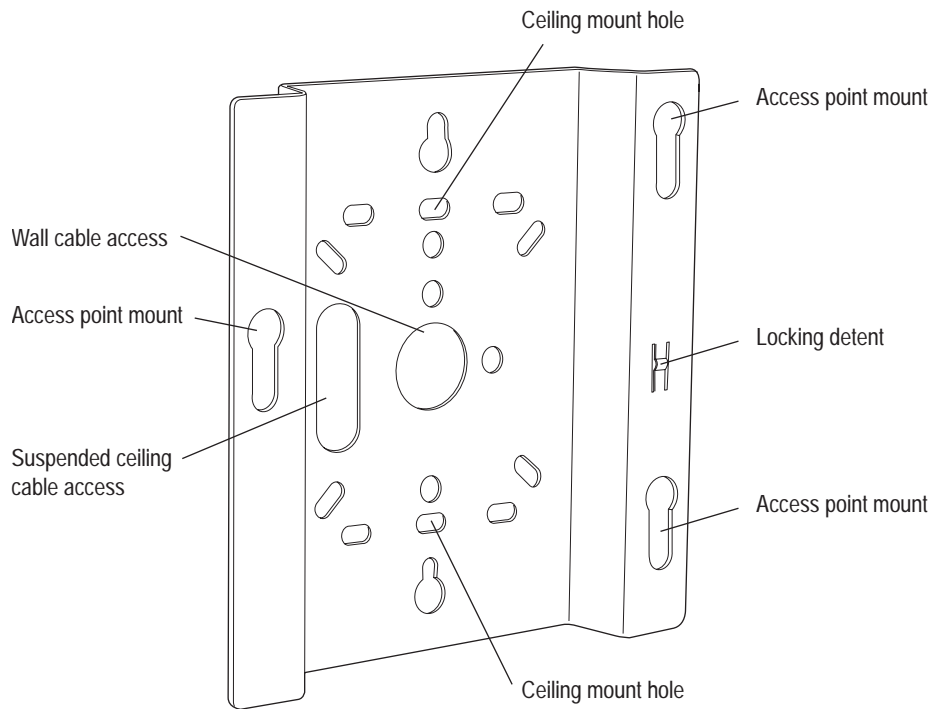
Figure 12: AP200 Mounting Bracket

Installation Requirements

The following recommended mounting locations provide the best reception for the AP200:

● On a horizontal surface, such as a table or a desk

● On a vertical surface, usually a wall

● Below a hanging ceiling

● Above a hanging ceiling tiles (this installation is supported only for the AP200 with the plastic enclosure removed)

   Suitable for use in environmental air space in accordance with the Section 300-22(c) of the National Electric Code and Sections 2- 128.12 - 010 (3) and 12 - 100 of the Canadian Electrical Code. Part 1. C22. 1. (For AP200 with plastic enclosure removed.)

To complete this installation, you need the items listed in **Table 6**.

Table 6: AP200 Installation Items

Installation Type	Consumable Items Required
Horizontal mounting	None
Vertical mounting over a wall stud	• Two #6 x 2" wood screws for a wood stud; or • Two #6 x 1½" metal screws for a metal stud • Mounting bracket
Vertical mounting on sheetrock	• Two #6 x 1" screws • Two #4-6 x 7/8" ribbed plastic wall anchors • Mounting bracket
Horizontal mounting below a hanging ceiling	• Two caddy fasteners • Two plastic spacers • Two keps nuts (with attached lock washer) • Mounting bracket
Mounting above a ceiling tile (AP200 metal enclosure only)	• Two T-rail clips • One T-box hanger • One bracket mounting clip • Mounting bracket

You need the tools listed in **Table 7**.

Table 7: AP200 Installation Tools

Installation Type	Tools Required
Horizontal mounting	None
Vertical mounting over a wall stud	• Drill • 1/8"drill bit • Screwdriver
Vertical mounting on sheetrock	• Drill • 3/16" drill bit • Screwdriver

Installation Type	Tools Required
Horizontal mounting below a hanging ceiling	● Screwdriver ● Wrench or pliers
Mounting above a hanging ceiling (AP200 metal enclosure only)	● Wrench or pliers ● Screwdriver

Installing the Access Point

Selecting a Location

The AP200 requires a location that meets the following:

● Relatively unobstructed access to the stations the AP serves

● Power over Ethernet (PoE) connection to the network switch servicing the controller or optional nearby power supply for external power supply connector

APs can obtain their power from 802.3af standard Power over Ethernet (PoE) or external power supply. For PoE, the power can be supplied by a PoE-compatible network switch or PoE power injector installed between the switch and the AP200. For an external power supply connection, ensure the power source is near to where the AP200 will be mounted.

Select a location with minimal physical obstructions between the AP and the wireless stations. In an office with cubicles, mounting the APs below a hanging ceiling or the wall near the ceiling provides the least obstructed communications path.

Most installations receive the best coverage using the following guidelines:

Install APs toward the center of the building.

● Do not install APs near metal objects, such as heating ducts, metal doors, or electric service panels.

● Relative to the ground, orient the antenna up or down, not sideways.

Note: The previous guidelines are general guidelines. Each site has its own unique environment. Place access points accordingly.

Attaching the AP200 Antennas

If the AP200 does not have external antennas, attach the antennas to the connectors on the AP200 (see **Figure 13**). Rotate the knurled ring at the base of the antenna clockwise to attach the antenna. The ring should be finger-tight.

Caution! When changing the orientation of the antennas, be sure to slightly loosen the knurled ring before moving the antenna. Retighten the ring afterward. Otherwise, you might damage the internal cabling in the AP.

Mounting the Access Point

You can mount an AP200 in the following ways:

- Horizontally, as described in the **"Horizontal Mounting"** section.

- Vertically, as described in the **"Vertical Mounting"** section.

- Below a hanging ceiling, as described in the **"Mounting Below a Suspended Ceiling"** section.

- Above a tiled hanging ceiling, as described in the **"Mounting Above a Suspended Ceiling"** section.

Horizontal Mounting

To horizontally mount an AP200:

1. Place the AP200 flat on the horizontal surface.

2. For each antenna, loosen the knurled ring at the base of the antenna (see **Figure 13**), point the antenna straight up, then retighten the ring.

Access Point 200
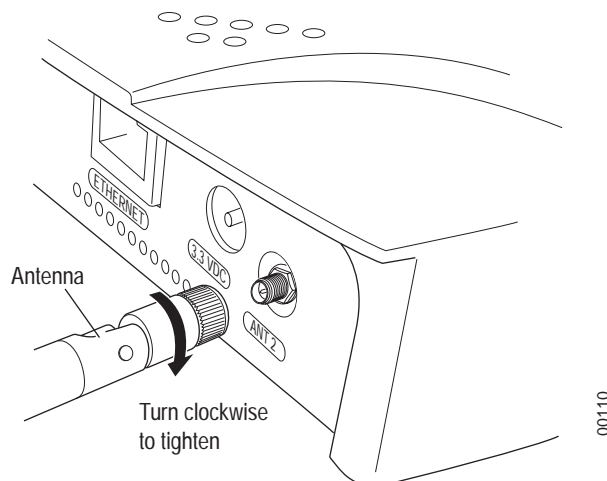
Figure 13: AP200 Antenna Connection

3. Connect the PoE 100BaseT Ethernet cable to the 100/1000 Ethernet connector, shown in **Figure 14**.

Caution! Be sure to connect the Ethernet cable to the Ethernet port; the cable can mistakenly be plugged into the Console port.

4. If using a separate power supply, connect the power cable to the power inlet connector shown in **Figure 14**.
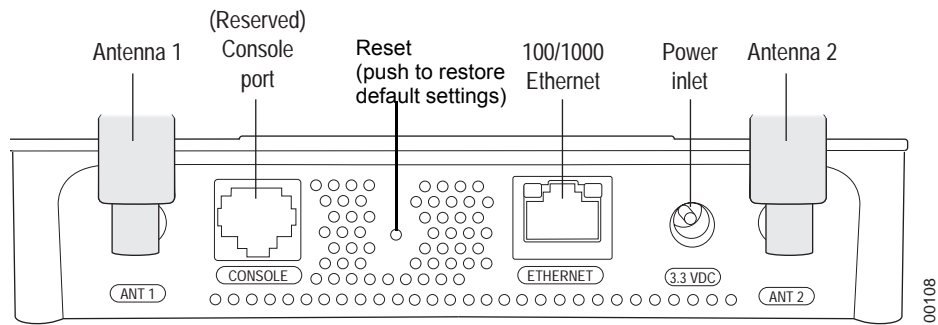
Figure 14: AP200 Connector Panel

Vertical Mounting

To vertically mount an AP:

1. Using the bracket holes as a template, mark the location on the wall for the two AP bracket mounting screws. They are placed 4 ½ inches apart, center-to-center, one above the other. If you are not using plastic wall anchors, you must center the mounting screws on a wall stud. If you do not center the mounting screws on a wall stud, you must use plastic wall anchors.
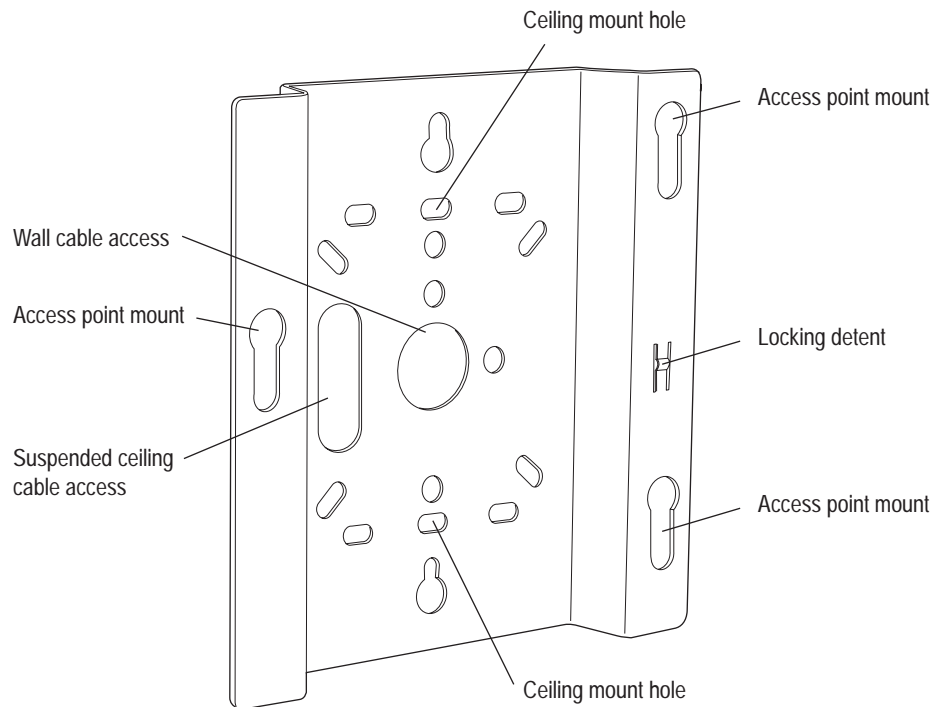
Figure 15: AP200 Bracket

2. Drill holes at the locations you marked:
   — 3/16-inch holes if you are using plastic anchors
   — 1/8-inch holes if you are using only the screws

3. If you are using plastic anchors, install them in the holes.

4. Screw in the screws most of the way, so that the screw head is about 1/16 of an inch from the wall.

5. Mount the bracket on the screws, placing the circular portion of the keyhole mounts over the screw heads and sliding the bracket down.

6. Tighten the screws to secure the bracket.

7. Align the AP200 mounting posts over the circular portion of the keyhole mounts, push the AP in and slide the AP down until it engages with the locking detents. You should hear it snap in place.
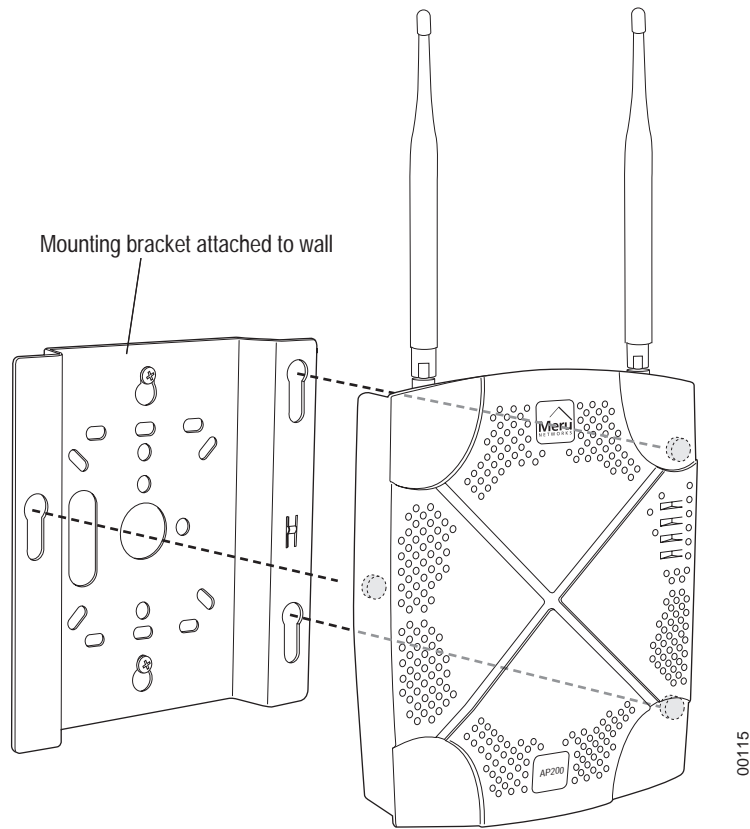
Figure 16: Aligning the AP200 with the Bracket
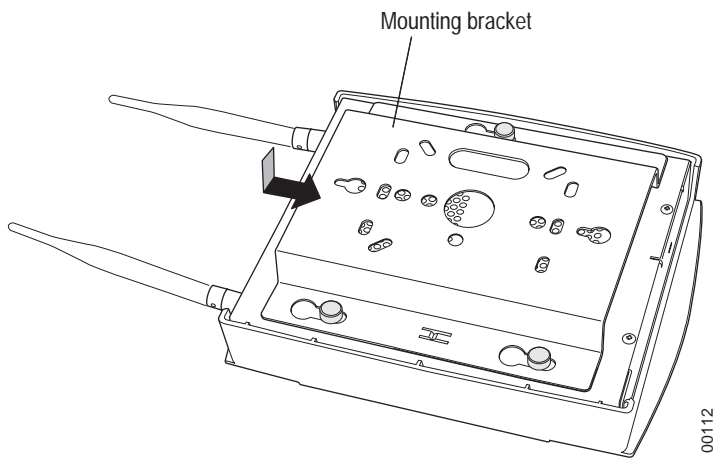
Figure 17: Sliding the AP200 into the Bracket

8. For external antennas, loosen the knurled ring at the base of each antenna (see **Figure 13**), point the antenna straight up, then retighten the ring.

9. Connect the PoE 100BaseT Ethernet cable or 100BaseT Ethernet cable to the 100/1000 Ethernet connector shown in **Figure 14**.

Caution! Be sure to connect the Ethernet cable to the Ethernet port; the cable can mistakenly be plugged into the Console port.

10. Optionally connect the external power source connector to the AP power inlet connector (shown in **Figure 14**) and to the power source.

Mounting Below a Suspended Ceiling

The optional suspended ceiling mounting kit allows the AP200 mounting bracket to attach to suspended ceiling T-rails (see **Figure 18**).

Note: To comply with NEC code, attach a grounding wire to any of the screws used to attach the AP200 to the mounting bracket.
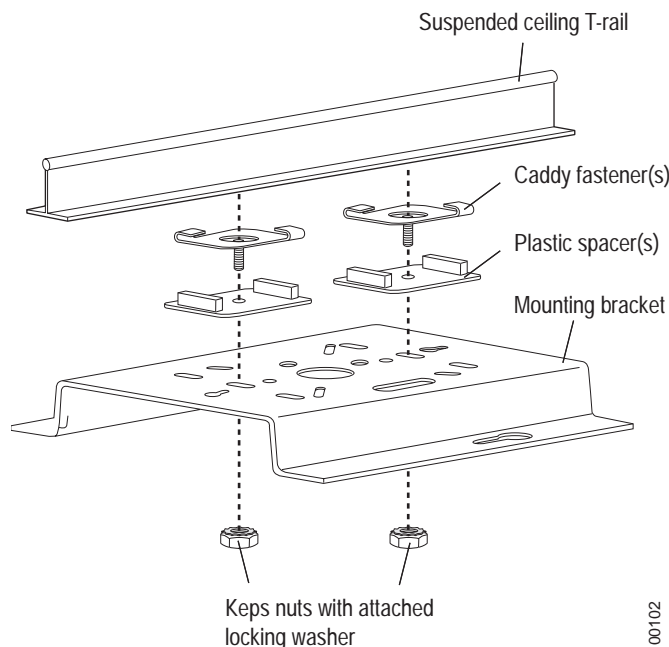
Figure 18: Mounting the AP200 to a Suspended Ceiling Rail

To mount an AP200 below a suspended ceiling:

1. Determine the location on the ceiling rail where the AP will be mounted and remove the ceiling tiles.
2. Place each of the two caddy fasteners on the ceiling T-rail and twist to attach to the rail.
3. Adjust the distance between the caddy fasteners by using the mounting bracket holes as a guide.
4. Tighten the caddy fasteners in place using a standard screwdriver. Do not overtighten.

5. Place each spacer on the caddy fastener stud. The spacer legs should contact the ceiling T-rail.

6. Align the mounting bracket keyholes with the caddy fastener studs and slide the AP200 to the narrow end of the hole.

7. Attach a keps nut to each caddy fastener stud and hand tighten. Do not overtighten.

8. Align the AP200 mounting posts over the circular portion of the keyhole mounts, push the AP in and slide the AP down until it engages with the locking detents (see **Figure 17**). You should hear it snap in place.

9. For each antenna, loosen the knurled ring at the base of the antenna (see **Figure 13**), point the antenna straight down, then retighten the ring.

10. Connect the PoE 100BaseT Ethernet cable to the 100/1000 Ethernet connector (see **Figure 14**).

Caution!   Be sure to connect the Ethernet cable to the Ethernet port; the cable can mistakenly be plugged into the Console port.

11. Optionally connect the external power supply cable to the AP power inlet (see **Figure 14**) and to the power source.

Mounting Above a Suspended Ceiling

The optional T-bar box hanger mounting kit allows the AP200 to be mounted above suspended ceiling T-rails (see **Figure 19**). The installation attaches the T-bar box hanger to the ceiling rails using clips. The AP200 attaches to the mounting bracket that is attached to the T-bar box hanger.

The AP200 antennas should point straight down for this type of installation. You may need to modify thicker tiles to support this installation.

Note: The AP200 with the metal enclosure exposed meets the requirements for fire resistance and low smoke-generating characteristics required by Section 300-22(C) of the National Electrical Code (NEC) for installation in a building's environmental air space. You must remove the plastic enclosure to reveal the plenum-rated AP200 metal case for installations above a suspended ceiling.

Additionally, you must use Ethernet cable that meets the requirements for operating in environmental air space (in accordance with Section 300-22(C) of the NEC).
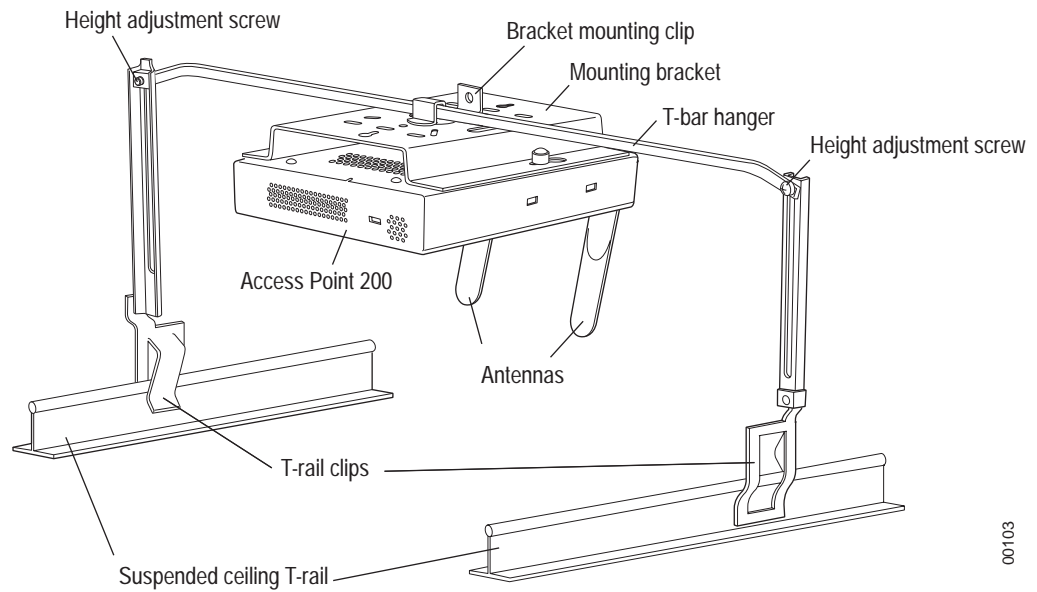
Figure 19: Mounting the AP200 Above a Suspended Ceiling

To mount an AP200 above suspended ceiling rails:

1. Determine the location on the ceiling rails where the AP will be mounted and remove the ceiling tile.

2. Unpack the T-bar hanger kit and unfold the legs of the T-bar hanger.

3. Locate the bracket mounting clip holes on the mounting bracket (see **Figure 20**). One hole attaches the bracket perpendicular to the box hanger. The other mounts the bracket parallel to the box hanger.
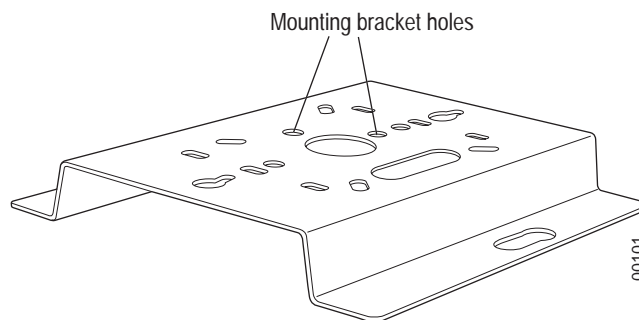
Figure 20: Box Hanger Mounting Bracket Holes

4. Attach the U-joint of the clip to the T-bar and snap in place (see **Figure 21**).
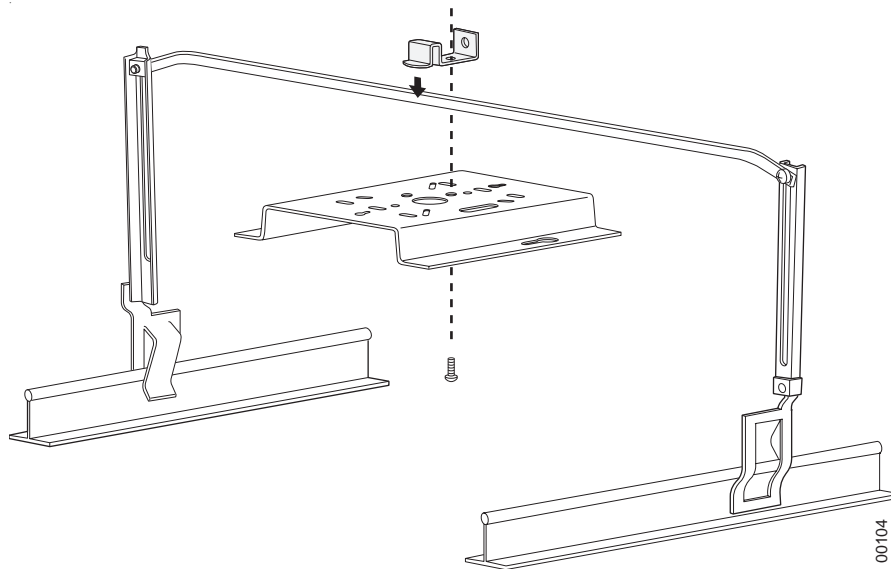
Figure 21: Attaching the Mounting Bracket to the Box Hanger

5. Pass the long end clip through the large center hole to the underside of the the mounting bracket clip and then attach the bracket to the clip using the supplied screw (see **Figure 21** for orientation).

6. Hold the AP200 next to the mounting bracket to estimate the height of the T-bar box hanger to provide enough clearance for the external antennas, which should be pointing down.

7. Adjust the height of the box hanger using the height adjusting screws (see **Figure 18**).

8. Clip the box hanger T-rail clips to the ceiling rails, making sure they are securely attached.

9. Connect a drop wire to a building structural element and through the hold provided in the bracket mounting clip. The U.S. National Electrical Safety Code requires this additional support.

10. Connect the posts of the AP200 to the three keyholes of the mounting bracket and slide into the keyhole (see **Figure 17**), ensuring the locking detent is engaged. You will hear a click.

11. For each antenna, loosen the knurled ring at the base of the antenna (see **Figure 13**), point the antenna down, then retighten the ring.

12. Connect the Ethernet cable to the AP200 (see **Figure 14**).

Caution!   Be sure to connect the Ethernet cable to the Ethernet port; the cable can mistakenly be plugged into the Console port.

13. Check that the AP200 is operating correctly before replacing the ceiling tile to the ceiling. Verify correct operating using the LEDs, as shown in the next section.

Checking LED Activity

Access point status LEDs are provided on the Ethernet connector and on the face of the AP200.

Ethernet Connector LEDs

After the AP200 is connected, the LEDs near the RJ-45 connector should light, as shown in **Figure 22**.

— Link present
— Ethernet activity   00129
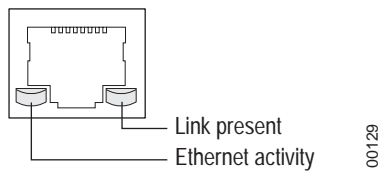
Figure 22: RJ-45 LEDs

The green LED on the left blinks if any Ethernet activity is taking place. If there is no Ethernet activity, the LED is off. The LED on the right is solid yellow if an Ethernet link is present. If no Ethernet link is present or connectivity is lost, the LED is off.

AP200 Status LEDs

Four status LEDs on the *face* of the AP200 also light, as shown in **Figure 23**.
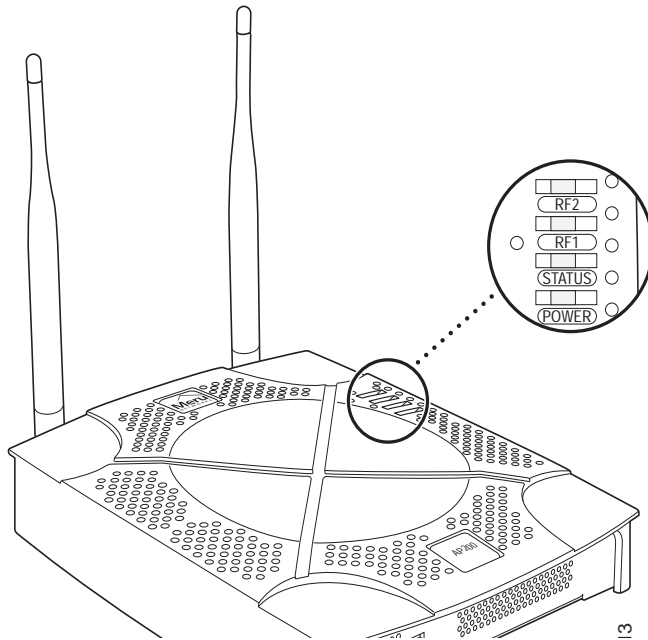
Figure 23: AP200 Status LEDs

The functions of the status LEDs are described in **Table 9**.

When the AP200 is first connected to the controller and any time the access point is rebooted there-after, the AP initializes with and then is programmed by the controller. When the AP is first powered up, all LEDs are green. Thereafter, the Status LED (see **Figure 23**) color reflects the various operating states (**Table 9**).

Table 8: AP200 LED Descriptions

LED	Function
RF 2	The status LED for Radio 2 is a follows: off—no radio present yellow—radio initializing red—radio failure solid green—radio OK blinking green—radio activity
RF 1	The status LED for Radio 1 is a follows: off—no radio present yellow—radio initializing red—radio failure solid green—radio OK blinking green—radio activity
Status	AP-Controller operational status (see **Table 9**)
Power	green—presence of power

Table 9: AP200-Controller Status Information

State	Interpretation	AP200 LED Cycle
Attempting to discover Controller	In the process of discovering the controller. The AP is connected but not associated with the controller. If the AP does not associate with the controller after a period of time, verify that the connection between the AP and the switch or the switch and the controller is unbroken.	Green/Red/Blue/Red
Connected	Normal operation without security.	Blue/Blue/Blue/Red Blue/Blue/Blue/Red, for 2 seconds.
Authenticated	Normal operation with security.	Blue blink[a]
Disconnected	Access point was once connected to a controller and configured by the controller, but can no longer find that controller	Green/Purple/ Green/Purple
Standalone	Access point is operating in a standalone mode	Purple blink

State	Interpretation	AP200 LED Cycle
Downloading	Downloading image or configuration from the controller	Green/Blue Green/Blue
Error State	Access point is in an error state. Call Meru technical support	Red (blinking or solid)

a. The AP200 LEDs cycle from bright to dim for each "blink."

Appendix A
Specifications

This chapter provides specifications for the Meru Access Points and contains the following sections:

- FCC Compliance
- Wireless Interface
- Ethernet Interface
- Physical

FCC Compliance

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.

Caution! Changes or modifications to the Meru Access Point that are not expressly approved by Meru Networks will void your warranty and could void your authority to operate this equipment.

Wireless Interface

Table 10: AP100 Wireless Interface Specifications

Feature	Details
Wireless Standards	● 802.11b
Antennas	● Two external antennas. Omnidirectional and directional antennas for specific coverage requirements
Wireless Medium Access	● WiFi Compliant 802.11 MAC standard
Power Management	● Power-save mode for clients in both QoS mode and non-QoS mode ● Power control on transmit power to minimize co-channel interference of QoS traffic
Frame Size	● Peak frame size of > 2250 bytes ● Fragmentation and reassembly of 802.11/Ethernet frames
Client Activities Supported	● Active scanning and passive scanning ● Pre-authentication ● Power-save mode supported

Table 11: AP200 Wireless Interface Specifications

Feature	Details
Wireless Standards	● 802.11a, 802.11b, 802.11g
Antennas	● Two external antennas. Omnidirectional and directional antennas for specific coverage requirements
Wireless Medium Access	● WiFi Compliant 802.11 MAC standard
Power Management	● Power-save mode for clients in both QoS mode and non-QoS mode ● Power control on transmit power to minimize co-channel interference of QoS traffic
Frame Size	● Peak frame size of > 2250 bytes ● Fragmentation and reassembly of 802.11/Ethernet frames
Client Activities Supported	● Active scanning and passive scanning ● Pre-authentication ● Power-save mode supported

Ethernet Interface

Feature	Detail
Wireline Standard	• One 10/100/1000 Mbps Ethernet (IEEE 802.3) interface, supporting half-duplex and full-duplex modes • Supports the Power over Ethernet (PoE) IEEE 802.3af standard

Physical

Physical specifications for Meru Access Points are provided in the access point Data Sheet. Contact your Meru sales engineer for a copy of the document.

Physical

Appendix B
Declarations of Conformity and Regulatory Information

This appendix provides declarations of conformity and regulatory information for Meru Access Points. This appendix contains the following sections:

- Manufacturers Federal Communication Commission Declaration of Conformity Statement

- Department of Communications—Canada

- European Community, Switzerland, Norway, Iceland, and Liechtenstein

- Declaration of Conformity for RF Exposure

- Guidelines for Operating Meru Access Points in Japan

Manufacturers Federal Communication Commission Declaration of Conformity Statement

Models: AP100, AP100-P, AP200
FCC Certification number:
Manufacturer: Meru Networks, Inc.
1309 S. Mary Avenue
Sunnyvale, CA 94087
USA

This device complies with Part 15 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 of a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and radiates radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference. However, there is no guarantee that

interference will not occur. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.

- Increase separation between the equipment and receiver.

- Connect the equipment to an outlet on a circuit different from which the receiver is connected.

- Consult the dealer or an experienced radio/TV technician.

! **Caution!** The Part 15 radio device operates on a non-interference basis with other devices operating at this frequency when using integrated antennas or external antennas. Any changes or modification to the product not expressly approved by Meru could void the user's authority to operate this device.

! **Caution!** Within the 5.15-5.25 GHz band (5 GHz radio channels 34-48) the U-NII devices are restricted to indoor operations to reduce any potential for harmful interference to co-channel Mobile Satellite System (MSS) operations.

Department of Communications—Canada

Canadian Compliance Statement

This Class B Digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numerique de la classe B respecte les exigences du Reglement sur le material broilleur du Canada.

This device complies with Class B Limits of Industry Canada. 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.

Meru 11-Mbps, 2.4-GHz AP100 Access Points are certified to the requirements of RSS-210 for 2.4-GHz spread spectrum devices, and Meru 54-Mbps, 5-GHz AP200 Access Points are certified to the requirements of RSS-210 for 5-GHz spread spectrum devices.The use of this device in a system operating either partially or completely outdoors may require the user to obtain a license for the system according to the Canadian regulations. For further information, contact your local Industry Canada office.

European Community, Switzerland, Norway, Iceland, and Liechtenstein

Declaration of Conformity with Regard to the R&TTE Directive 1999/5/EC

English: This equipment is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

Deutsch: Dieses Gerät entspricht den grundlegenden Anforderungen und den weiteren entsprecheneden Vorgaben der Richtlinie 1999/5/EU.

Dansk: Dette udstyr er i overensstemmelse med de væsentlige krav og andre relevante bestemmelser i Directiv 1999/5/EF.

Español: Este equipo cumple con los requisitos esenciales asi como con otras disposiciones de la Directive 1999/5/EC.

Français: Cet appareil est conforme aux exigencies essentialles et aux autres dispositions pertinantes de la Directive 1999/5/EC.

Íslenska: essi búna ur samr mist lögbo num kröfum og ö rum ákvæ um tilskipunar 1999/5/ESB.

Italiano: Questo apparato é conforme ai requisiti essenziali ed agli altri principi sanciti dalla Direttiva 1999/5/EC.

Nederlands: Deze apparatuur voldoet aan de belangrijkste eisen en andere voorzieningen van richtlijn 1999/5/EC.

Norsk: Dette utstyret er i samsvar med de grunnleggende krav og andre relevante bestemmelser i EU-directiv 1999/5/EC.

Português: Este equipamento satisfaz os requisitos essenciais e outras provisões da Directiva 1999/5/EC.

Suomalainen: Tämä laite täyttää direktiivin 1999/5/EY oleelliset vaatimukset ja on siinä asetettujen muidenkin ehtojen mukainen.

Svenska: Denna utrustning är i överensstämmelse med de väsentliga kraven och andra relevanta bestämmelser i Direktiv 1999/5/EC.

For 11 Mbps, 2.4 GHz access points with 100 mW radios, the following standards were applied:
Radio: EN 300.328-1, EN 300.328-2
EMC: EN 301.489-1, EN 301.89-17
Safety: EN 60950

The following CE mark is affixed to the 11 Mbps, 2.4 GHz access points with 100 mW radios:

Note: This equipment is intended to be used in all EU and EFTA countries. Outdoor use may be restricted to certain frequencies and/or may require a license for operation. For more details, contact Meru Corporate Compliance.

Note: Combinations of power levels and antennas resulting in a radiated power level above 100 mW equivalent isotropic radiated power (EIRP) are considered as not compliant with the above mentioned directive and are not allowed for use within the European community and other countries that have adopted the European R&TTE directive 1999/5/EC or the CEPT recommendation Rec 70.03 or both.

For 54 Mbps, 5 GHz access points with 40 mW radios, the following standards were applied:

Radio: EN 301.893

EMC: EN 301.489-1, EN 301.489-17

Safety: EN 60950

The following CE mark is affixed to the 54 Mbps, 5 GHz access points with 40 mW radios:

Declaration of Conformity for RF Exposure

The radio module has been found to be compliant to the requirements set forth in CFR 47 Sections 2.1091, 2.1093, and 15.247 (b) (4) addressing RF Exposure from radio frequency devices as defined in Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields.

The access point (with 5 GHz integrated antenna) must be installed to maintain a minimum 20 cm (7.9 in) co-located separation distance from other FCC approved indoor/outdoor antennas used with the access point. Any antennas or transmitters not approved by the FCC cannot be co-located with the access point antennas. The access point's co-located 2.4 GHz (4 dBi) and 5 GHz (5 dBi) dual-band standard dipole antennas support a minimum separation distance of 10 cm (3.9 in) and are compliant with the applicable FCC RF exposure limit when transmitting simultaneously.

Note: Dual antennas used for diversity operation are not considered co-located.

Guidelines for Operating Meru Access Points in Japan

This section provides guidelines for avoiding interference when operating Meru Access Points in Japan. These guidelines are provided in both Japanese and English.

Japanese Translation

　この機器の使用周波数帯では、電子レンジ等の産業・科学・医療用機器のほか工場の製造ライン等で使用されている移動体識別用の構内無線局（免許を要する無線局）及び特定小電力無線局（免許を要しない無線局）が運用されています。
1　この機器を使用する前に、近くで移動体識別用の構内無線局及び特定小電力無線局が運用されていないことを確認して下さい。
2　万一、この機器から移動体識別用の構内無線局に対して電波干渉の事例が発生した場合には、速やかに使用周波数を変更するか又は電波の発射を停止した上、下記連絡先にご連絡頂き、混信回避のための処置等(例えば、パーティションの設置など)についてご相談して下さい。
3　その他、この機器から移動体識別用の特定小電力無線局に対して電波干渉の事例が発生した場合など何かお困りのことが起きたときは、次の連絡先へお問い合わせ下さい。

連絡先：03-5549-6500

English Translation

This equipment operates in the same frequency bandwidth as industrial, scientific, and medical devices such as microwave ovens and mobile object identification (RF-ID) systems (licensed premises radio stations and unlicensed specified low-power radio stations) used in factory production lines.

1. Before using this equipment, make sure that no premises radio stations or specified low-power radio stations of RF-ID are used in the vicinity.

2. If this equipment causes RF interference to a premises radio station of RF-ID, promptly change the frequency or stop using the device; contact the number below and ask for recommendations on avoiding radio interference, such as setting partitions.

3. If this equipment causes RF interference to a specified low-power radio station of RF-ID, contact the number below.

Contact Number: 03-5549-6500

Appendix C
Translated Safety Warnings

This appendix provides translations of the safety warnings that appear in this publication. These translated warnings apply to other documents in which they appear in English. The following safety warnings appear in this appendix:

- Dipole Antenna Installation Warning
- Explosive Device Proximity Warning
- Installation Warning
- Circuit Breaker (15A) Warning

Dipole Antenna Installation Warning

Warning! In order to comply with FCC radio frequency (RF) exposure limits, dipole antennas should be located at a minimum of 7.9 inches (20 cm) or more from the body of all persons.

Waarschuwing	Om te voldoen aan de FCC radiofrequentie (RF) blootstellingslimieten dienen dipoolantennes zich minstens 20 cm of meer van de lichamen van alle personen bevinden.
Varoitus	FCC:n antamien radiotaajuuksille altistumista koskevien rajoitusten mukaan dipoliantennien on sijaittava vähintään 20 cm:n päässä kaikista henkilöistä.
Attention	Pour se conformer aux limites d'exposition à la fréquence radio préconisées par la FCC (Federal Communications Commission), les antennes dipôles doivent se situer à un minimum de 20 cm de toute personne.
Warnung	Um die in den FCC-Richtlinien festgelegten Expositionshöchstgrenzen für Radiofrequenzen (RF) nicht zu überschreiten, sollten Dipolantennen mindestens 20 cm (7,9 Zoll) vom Körper aller Person entfernt aufgestellt werden.
Avvertenza	Per conformarsi ai limiti FCC di esposizione a radiofrequenza (RF), le antenne a dipolo devono stare ad una distanza minima di 20 cm dal corpo di ogni persona.
Advarsel	I henhold til eksponeringsgrensene for radiofrekvenser (RF), skal dipole antenner befinne seg på en avstand av minst 20 cm eller mer fra mennesker.
Aviso	Para estar de acordo com as normas FCC de limites de exposição para freqüência de rádio (RF), as antenas dipolo devem estar distantes no mínimo 20 cm (7,9 pol) do corpo de qualquer pessoa.
¡Advertencia!	Para cumplir con los límites de exposición de radio frecuencia (RF) de la Comisión Federal de Comunicaciones (FCC) es preciso ubicar las antenas dipolo a un mínimo de 20 cm (7,9 pulgadas) o más del cuerpo de las personas.
Varning!	För att följa FCC-exponeringsgränserna för radiofrekvens (RF), bör dipolsantenner placeras på minst 20 cm avstånd från alla människor.

Explosive Device Proximity Warning

Warning! Do not operate your wireless network device near unshielded blasting caps or in an explosive environment unless the device has been modified to be especially qualified for such use.

Waarschuwing	Gebruik dit draadloos netwerkapparaat alleen in de buurt van onbeschermde ontstekers of in een omgeving met explosieven indien het apparaat speciaal is aangepast om aan de eisen voor een dergelijk gebruik te voldoen.
Varoitus	Älä käytä johdotonta verkkolaitetta suojaamattomien räjäytysnallien läheisyydessä tai räjäytysalueella, jos laitetta ei ole erityisesti muunnettu sopivaksi sellaiseen käyttöön.oen.
Attention	Ne jamais utiliser un équipement de réseau sans fil à proximité d'un détonateur non blindé ou dans un lieu présentant des risques d'explosion, sauf si l'équipement a été modifié à cet effet.
Warnung	Benutzen Sie Ihr drahtloses Netzwerkgerät nicht in der Nähe ungeschützter Sprengkapseln oder anderer explosiver Stoffe, es sei denn, Ihr Gerät wurde eigens für diesen Gebrauch modifiziert und bestimmt.
Avvertenza	Non utilizzare la periferica di rete senza fili in prossimità di un detonatore non protetto o di esplosivi a meno che la periferica non sia stata modificata a tale proposito.
Advarsel	Ikke bruk den trådløse nettverksenheten nært inntil uisolerte fenghetter eller i et eksplosivt miljø med mindre enheten er modifisert slik at den tåler slik bruk.
Aviso	Não opere o dispositivo de rede sem fios perto de cápsulas explosivas não protegidas ou num ambiente explosivo, a não ser que o dispositivo tenha sido modificado para se qualificar especialmente para essa utilização.
¡Advertencia!	No utilizar un aparato de la red sin cable cerca de un detonador que no esté protegido ni tampoco en un entorno explosivo a menos que el aparato haya sido modificado con ese fin.
Varning!	Använd inte den trådlösa nätverksenheten i närheten av oskyddade tändhattar eller i en explosiv miljö om inte enheten modifierats för att kunna användas i sådana sammanhang.

Installation Warning

Warning! Read the installation instructions before you connect the system to its power source.

Waarschuwing	Raadpleeg de installatie-aanwijzingen voordat u het systeem met de voeding verbindt.
Varoitus	Lue asennusohjeet ennen järjestelmän yhdistämistä virtalähteeseen.
Attention	Avant de brancher le système sur la source d'alimentation, consulter les directives d'installation.
Warnung	Lesen Sie die Installationsanweisungen, bevor Sie das System an die Stromquelle anschließen.
Avvertenza	Consultare le istruzioni di installazione prima di collegare il sistema all'alimentatore.
Advarsel	Les installasjonsinstruksjonene før systemet kobles til strømkilden.
Aviso	Leia as instruções de instalação antes de ligar o sistema à sua fonte de energia.
¡Advertencia!	Ver las instrucciones de instalación antes de conectar el sistema a la red de alimentación.
Varning!	Läs installationsanvisningarna innan du kopplar systemet till dess strömförsörjningsenhet.

Circuit Breaker (15A) Warning

Warning! This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that a fuse or circuit breaker no larger than 120 VAC, 15A U.S. (240 VAC, 10A international) is used on the phase conductors (all current-carrying conductors).

Waarschuwing
Dit produkt is afhankelijk van de installatie van het gebouw voor kortsluit- (overstroom)beveiliging. Controleer of er een zekering of stroomverbreker van niet meer dan 120 Volt wisselstroom, 15 A voor de V.S. (240 Volt wisselstroom, 10 A internationaal) gebruikt wordt op de fasegeleiders (alle geleiders die stroom voeren).

Varoitus
Tämä tuote on riippuvainen rakennukseen asennetusta oikosulkusuojauksesta (ylivirtasuojauksesta). Varmista, että vaihevirtajohtimissa (kaikissa virroitetuissa johtimissa) käytetään Yhdysvalloissa alle 120 voltin, 15 ampeerin ja monissa muissa maissa 240 voltin, 10 ampeerin sulaketta tai suojakytkintä.

Attention
Pour ce qui est de la protection contre les courts-circuits (surtension), ce produit dépend de l'installation électrique du local. Vérifier qu'un fusible ou qu'un disjoncteur de 120 V alt., 15 A U.S. maximum (240 V alt., 10 A international) est utilisé sur les conducteurs de phase (conducteurs de charge).

Warnung
Dieses Produkt ist darauf angewiesen, daß im Gebäude ein Kurzschluß- bzw. Überstromschutz installiert ist. Stellen Sie sicher, daß eine Sicherung oder ein Unterbrecher von nicht mehr als 240 V Wechselstrom, 10 A (bzw. in den USA 120 V Wechselstrom, 15 A) an den Phasenleitern (allen stromführenden Leitern) verwendet wird.

Avvertenza
Questo prodotto dipende dall'installazione dell'edificio per quanto riguarda la protezione contro cortocircuiti (sovracorrente). Verificare che un fusibile o interruttore automatico, non superiore a 120 VCA, 15 A U.S. (240 VCA, 10 A internazionale) sia stato usato nei fili di fase (tutti i conduttori portatori di corrente).

Advarsel
Dette produktet er avhengig av bygningens installasjoner av kortslutningsbeskyttelse (overstrøm). Kontroller at det brukes en sikring eller strømbryter som ikke er større enn 120 VAC, 15 A (USA) (240 VAC, 10 A internasjonalt) på faselederne (alle strømførende ledere).

Aviso
Este produto depende das instalações existentes para protecção contra curto-circuito (sobrecarga). Assegure-se de que um fusível ou disjuntor não superior a 240 VAC, 10A é utilizado nos condutores de fase (todos os condutores de transporte de corrente).

¡Advertencia!
Este equipo utiliza el sistema de protección contra cortocircuitos (o sobrecorrientes) deló propio edificio. Asegurarse de que se utiliza un fusible o interruptor automático de no más de 240 voltios en corriente alterna (VAC), 10 amperios del estándar internacional (120 VAC, 15 amperios del estándar USA) en los hilos de fase (todos aquéllos portadores de corriente).

Varning!
Denna produkt är beroende av i byggnaden installerat kortslutningsskydd (överströmsskydd). Kontrollera att säkring eller överspänningsskydd används på fasledarna (samtliga strömförande ledare) för internationellt bruk max. 240 V växelström, 10 A (i USA max. 120 V växelström, 15 A).

Circuit Breaker (15A) Warning

Appendix D
Channels

This appendix provides the access point radio channels supported by the world's regulatory domains. This appendix contains the following section:

- Channels

Channels

IEEE 802.11a

The channel identifiers, channel center frequencies, and regulatory domains of each IEEE 802.11a 20-MHz-wide channel are listed in Table 12.

✔ **Note:** All channel sets are restricted to indoor usage except the Americas, which allow for indoor and outdoor use on channels 52 through 64 in the United States.

Table 12: IEEE 802.11a Channels

Channel Number	Frequency in MHz	Regulatory Domains			
		Americas	Japan	Singapore	Taiwan
34	5170	-	X	-	-
36	5180	X	-	X	-
38	5190	-	X	-	-
40	5200	X	-	X	-
42	5210	-	X	-	-

Table 12: IEEE 802.11a Channels (Continued)

Channel Number	Frequency in MHz	Regulatory Domains			
		Americas	Japan	Singapore	Taiwan
44	5220	X	-	X	-
46	5230	-	X	-	-
48	5240	X	-	X	-
52	5260	X	-	-	X
56	5280	X	-	-	X
60	5300	X	-	-	X
64	5320	X	-	-	X
149	5745	-	-	-	-
153	5765	-	-	-	-
157	5785	-	-	-	-
161	5805	-	-	-	-

IEEE 802.11b/g

The channel identifiers, channel center frequencies, and regulatory domains of each IEEE 802.11b/g 22-MHz-wide channel are listed in Table 13.

✔ **Note:**   Mexico is included in the Americas regulatory domain; however, channels 1 through 8 are for indoor use only while channels 9 through 11 can be used indoors and outdoors. Users are responsible for ensuring that the channel set configuration complies with the regulatory standards of Mexico.

Table 13: IEEE 802.11b/g Channels

Channel Number	Frequency in MHz	Regulatory Domains				
		Americas	EMEA	Israel	China	Japan
1	2412	X	X	-	X	X
2	2417	X	X	-	X	X
3	2422	X	X	X	X	X

Table 13: IEEE 802.11b/g Channels (Continued)

Channel Number	Frequency in MHz	Regulatory Domains				
		Americas	EMEA	Israel	China	Japan
4	2427	X	X	X	X	X
5	2432	X	X	X	X	X
6	2437	X	X	X	X	X
7	2442	X	X	X	X	X
8	2447	X	X	X	X	X
9	2452	X	X	X	X	X
10	2457	X	X	-	X	X
11	2462	X	X	-	X	X
12	2467	-	X	-	-	X
13	2472	-	X	-	-	X
14	2484	-	-	-	-	X

Channels

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