



CHAPTER 1

Overview

The Cisco Aironet 1552 Series Outdoor Mesh Access Point for Hazardous Locations (hereafter called the *access point* or *AP*) is a modularized wireless outdoor access point designed for use in a mesh network. The access point also supports wireless client access, point-to-point bridging, point-to-multipoint bridging, and point-to-multipoint mesh wireless connectivity.

About the Cisco 1552 Access Point

The 1552 access point supports two radios (2.4 GHz and 5 GHz) and provides client access without the need for a license. Depending on the radio, the access point can support 1 to 300 Mb/s data rates (for specific data rates, refer to [Appendix D, “Access Point Specifications”](#)).

The 1552 access point supports the modularity of the 1520 series and allows flexibility in radio configuration. In addition to full interoperability with 802.11n clients, the 1552 access point interoperates with legacy clients and offers enhanced backhaul performance. The 1552 access point can also be configured with an integrated ISA100 Wireless and WirelessHART Multiprotocol Radio or WirelessHART Gateway.

The access point is a standalone unit that can be attached with a bracket or pole mounted with an optional kit. The access point can also operate as a relay node for other access points not directly connected to a wired network. Intelligent wireless routing is provided by the patented Cisco Adaptive Wireless Path Protocol (AWPP). This enables each access point to identify its neighbors and intelligently choose the optimal path to the wired network by calculating the cost of each path in terms of signal strength and the number of hops required to get to a controller.

The access point is configured, monitored, and operated through a Cisco wireless LAN controller (hereafter called a *controller*) as described in the *Cisco Wireless LAN Controller Configuration Guide*. The *Cisco Wireless Mesh Access Points, Design and Deployment Guide* describes how to plan and initially configure the Cisco mesh network, which supports wireless point-to-point, point-to-multipoint, and mesh deployments. The controllers use a browser-based management system, a command-line interface (CLI), or the Cisco Prime Network Management tool to manage the controller and the associated access points. The access point supports hardware-based advanced encryption standard (AES) encryption between wireless nodes to provide end-to-end security.

This chapter provides information on the following topics:

- [Hardware Models, page 1-2](#)
- [Hardware Features, page 1-6](#)
- [Network Deployment Examples, page 1-21](#)

Hardware Models

The model numbers (or part numbers) and configuration for the Cisco Aironet 1552 Outdoor Mesh Access Points for Hazardous Locations are described in [Table 1-1](#). A detailed list of components supported by each 1552 access point model is shown in [Table 1-2](#).

For a detailed description of the declarations of conformity and regulatory information for the 1552 access points refer to [Appendix B, “Declarations of Conformity and Regulatory Information.”](#)

1552H Model



1552S Model




1552WU Model



Table 1-1 1552 Access Point Model Numbers and Descriptions

Model (or part number)	Configuration
AIR-CAP1552H-x-K9	<p>Two-radio (2.4 GHz and 5 GHz) Hazardous Location (Haz Loc) version. This AP supports 3 external dual-band omnidirectional antennas. The antennas can be ordered with the model. An optional Small Form Factor Pluggable (SFP) fiber module can be ordered with the AP. The AP has the capability to receive and use an SFP fiber module. Countries (regulatory domains) represented by the variable <i>x</i> are described at:</p> <p>http://www.cisco.com/en/US/prod/collateral/wireless/ps5679/ps5861/product_data_sheet0900aecd80537b6a.html</p> <p>For specific regulatory domains supported by this model, refer to the product data sheet at:</p> <p>http://www.cisco.com/en/US/prod/collateral/wireless/ps5679/ps5861/product_data_sheet0900aecd80537b6a.html</p>
AIR-CAP1552SA-x-K9 and AIR-CAP1552SD-x-K9	<p>Two-radio (2.4 GHz and 5 GHz) modular version. This model supports three (3) external dual-band omnidirectional antennas. The antennas can be ordered with the model. This model also supports two ISA100 Wireless and WirelessHART Multiprotocol radios with 2 additional external omnidirectional antennas for connections to 802.15.4 sensor network transceivers. Countries (regulatory domains) represented by the variable <i>x</i> are described at:</p> <p>http://www.cisco.com/en/US/prod/collateral/wireless/ps5679/ps5861/product_data_sheet0900aecd80537b6a.html</p> <p>SA models support AC power input, and SD models require DC power.</p> <p>For specific regulatory domains supported by this model, refer to the product data sheet at:</p> <p>http://www.cisco.com/en/US/prod/collateral/wireless/ps5679/ps5861/product_data_sheet0900aecd80537b6a.html</p>
AIR-CAP1552WU-x-K9	<p>Two-radio (2.4 GHz and 5 GHz) modular version. This model supports six (6) external Wi-Fi antennas (Three 2.4 GHz and Three 5 GHz). This model also supports a WirelessHART radio for connections to 802.15.4 sensor network transceivers via a cable-attached 2.4 GHz antenna. Countries (regulatory domains) represented by the variable <i>x</i> are described at:</p> <p>http://www.cisco.com/en/US/prod/collateral/wireless/ps5679/ps5861/product_data_sheet0900aecd80537b6a.html</p> <p>For specific regulatory domains supported by this model, refer to the product data sheet at:</p> <p>http://www.cisco.com/en/US/prod/collateral/wireless/ps5679/ps5861/product_data_sheet0900aecd80537b6a.html</p>

Table 1-2 Components of Each 1552 Access Point Model

	1552H	1552SA/1552SD	1552WU
Antennas	External	External	External
Fiber SFP	Yes	Yes	No
PoE Out Port 802.3af (For example, an IP video camera or VOIP Phone)	When powered with PoE, the PoE Out port is not active.	Yes	Yes
Hazardous Locations Class 1 Div2/Zone2	Yes	Yes	Yes
Power Options	AC and PoE	SA Model: AC SD Model: 24V DC	24 VDC
	 Note PoE In is not 802.3af. It cannot be powered by an IEEE 802.3af/at-based PoE Ethernet switch. It requires the dedicated Power Injector (AIR-PWRINJ1500-2=)		



Note All models support 12 VDC power input, but this feature cannot be used in hazardous locations.



Note There is no battery backup option for these models.

Regulatory Domains

The “-x” in the 1552 model numbers represent the domain. For example, in AIR-CAP1552H-x-K9 the -x represents a regulatory domain for a specific country.

For specific regulatory domains supported by each 1552 access point model, refer to the Wireless LAN Compliance Status at:

http://www.cisco.com/en/US/prod/collateral/wireless/ps5679/ps5861/product_data_sheet0900aecd80537b6a.html

To locate the 1552 access point models, click on **802.11abgn Mesh Access Points**.

Hardware Features

This section describes the hardware features of the 1552 access point models. The following hardware features are described in this section:

- [Connectors, page 1-7](#)

- [Multiple Radio Operation](#), page 1-14
- [Antenna Configurations](#), page 1-15
- [Multiple Power Sources](#), page 1-19
- [Ethernet \(PoE\) Ports](#), page 1-20
- [Fiber Option](#), page 1-20
- [Metal Enclosure](#), page 1-21
- [Optional Hardware](#), page 1-21

Connectors

Figure 1-1 through Figure 1-6 show the access point connectors for each model. Figure 1-7 through Figure 1-9 show the external antenna Type N connectors.



Note

The illustrations in this document show all available connections for the access point. Unused connections are capped with a connector plug to ensure the watertight integrity of the access point. Liquid-tight adapters are provided for connector openings, which can be installed before or after deploying the access point.

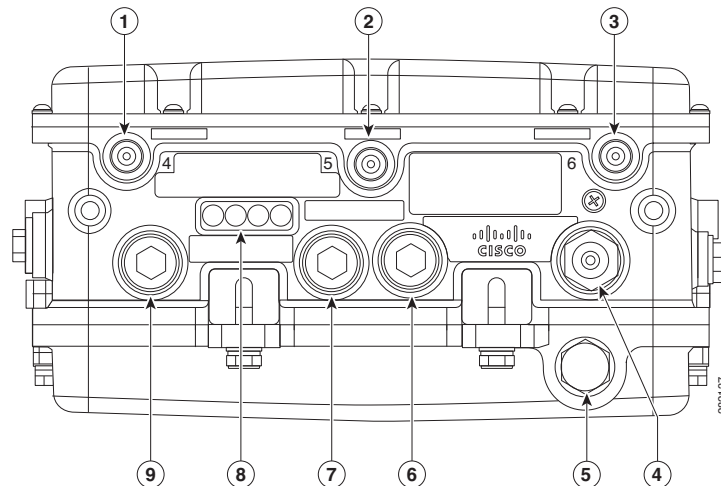


Caution

The liquid-tight adapter(s) supplied in the kit are IP68/69 certified with .200 to .350 diameter cables but not ATEX certified or hazardous locations compliant. The installer must use cable glands appropriate to the installation.

1552H

Figure 1-1 Access Point Model AIR-CAP1552H-x-K9 Bottom Connectors



1	Antenna port 4	6	Fiber port (PG 13.5 thread)
2	Antenna port 5	7	PoE Out port (PG 13.5 thread)
3	Antenna port 6	8	LEDs (Status, Up Link, RF1, RF2)
4	AC power entry port (1/2-NPT thread) for model AIR-CAP1552H-x-K9 only or Cable Gland entry (1/2-NPT thread)	9	PoE In port (PG 13.5 thread) for data cable (outdoor cat 5 STP cable)
5	Not used		

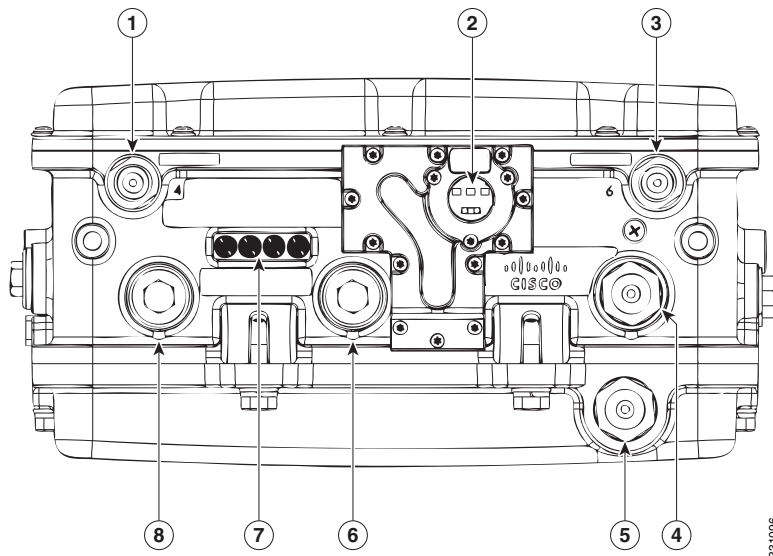


Note

Antenna ports 1, 2, and 3 are not shown in [Figure 1-1](#). These ports are reserved for future use and are located on the top of the access point.

1552SA/SD

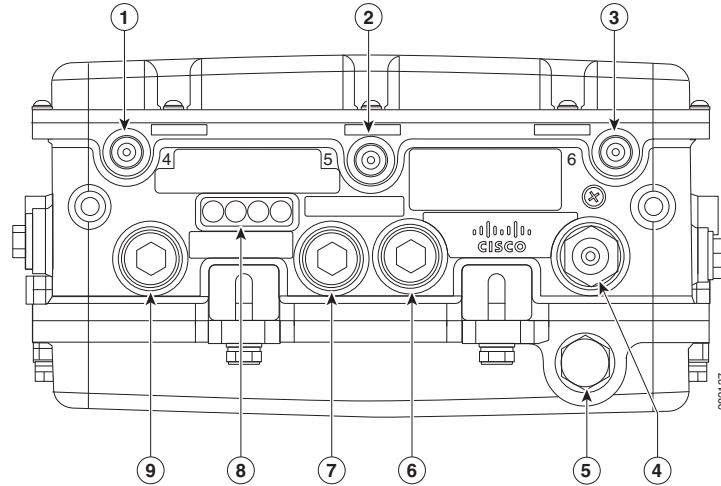
Figure 1-2 Access Point Model AIR-CAP1552SA/SD-x-K9 Bottom Connectors



1	Antenna port 4 (ISA100 Wireless and WirelessHART)	5	Not used
2	IR window	6	PoE Out port - (PG13.5 Thread)
3	Antenna port 6 (ISA100 Wireless and WirelessHART RX)	7	LEDs (Status, Up Link, RF1, RF2)
4	AC (1552SA) or 24 VDC (1552SD) power input port and fiber backhaul port - (1/2NPT thread)	8	Copper Ethernet - (PG13.5 Thread)

1552WU

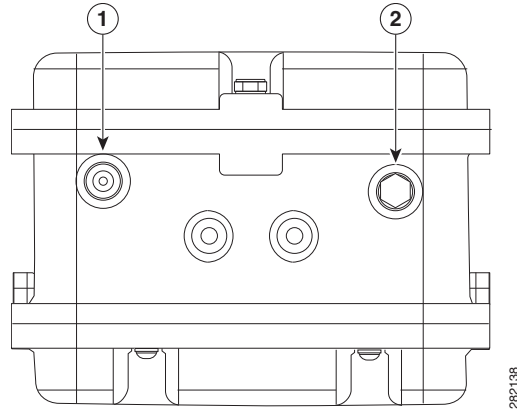
Figure 1-3 Access Point Model AIR-CAP1552WUx-K9 Bottom Connectors



1	Antenna port 4 - 2.4 GHz Tx/Rx	6	Not Used
2	Antenna port 5- 2.4 GHz Rx	7	PoE Out port (PG 13.5 thread)
3	Antenna port 6- 2.4 GHz Tx/Rx	8	LEDs (Status, Up Link, RF1, RF2)
4	24 VDC power input port or Cable Gland entry (1/2-NPT thread)	9	Ethernet (PG 13.5 thread) for data cable (outdoor cat 5 STP cable)
5	Not used		

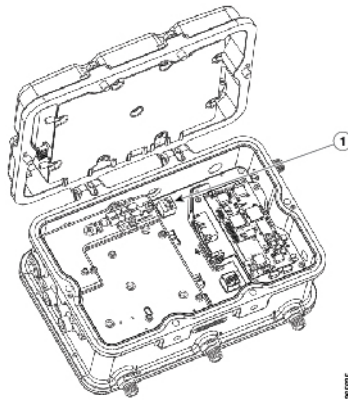
Console Connector

Figure 1-4 Console Port for Access Point Model AIR-CAP1552H-x-K9 and AIR-CAP1552SA/SD-x-K9



1	Console port	2	Not used on the H model, Fiber port on the S model. (5/8-24UNEF-2B)
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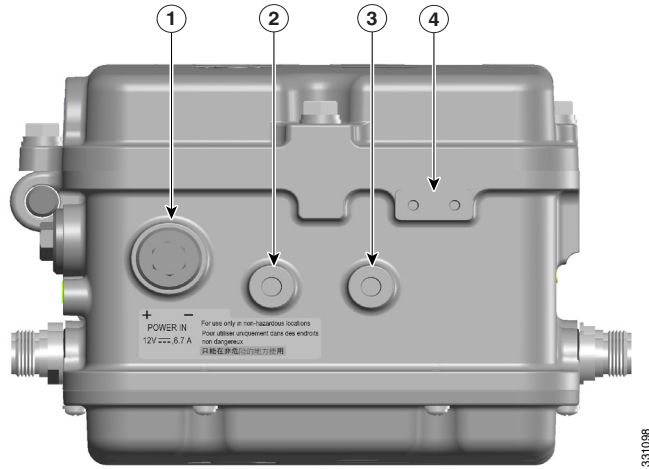
Figure 1-5 Console Port for Access Point Model AIR-CAP1552WU-x-K9



1	Console port (internal on the 1552WU)
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DC Power Connector

Figure 1-6 Access Point DC Power Connector and Ground Lug (All Models)

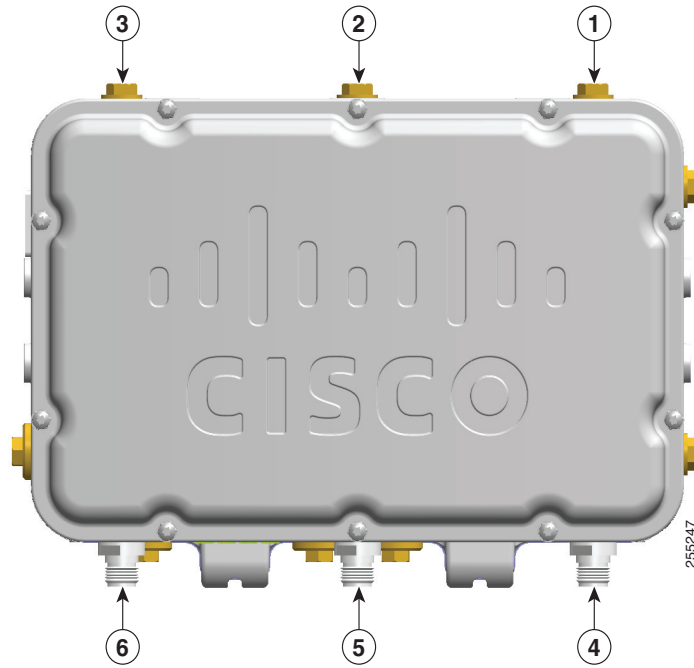


1	12 VDC non-hazardous locations input port (PG 13.5 thread size)	3	Bracket mounting hole (M8x1.25 x 12mm dp)
2	Bracket mounting hole (M8x1.25 x 12mm dp)	4	Ground lug location (connection for earth grounding (minimum VD 16 mm, 6 awg) (M4x.7 .30 THD Depth)

1552 Antenna Ports

Figure 1-7 shows the antenna port locations for model AIR-CAP1552H-x-K9.

Figure 1-7 External Antenna Port Locations for Access Point Model AIR-CAP1552H-x-K9

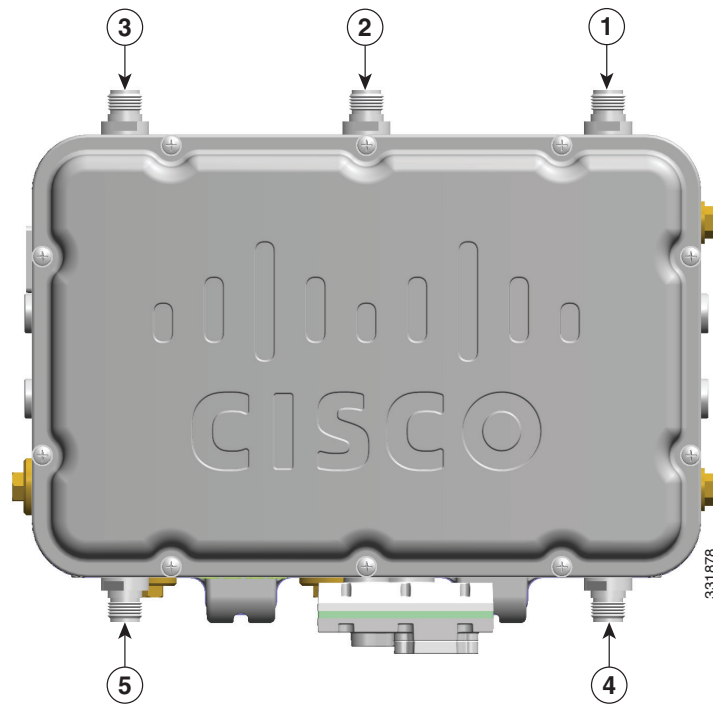


1	Not used	4	Antenna port 6- Type N connector 2.4/5 GHz Tx/Rx
2	Not used	5	Antenna port 5 - Type N connector 2.4/5 GHz Rx
3	Not used	6	Antenna port 4- Type N connector 2.4/5 GHz Tx/Rx

1552SA/SD Antenna Ports

Figure 1-8 shows the antenna port locations for model AIR-CAP1552SA/SD-x-K9.

Figure 1-8 External Antenna Port Locations for Access Point Model AIR-CAP1552SA/SD-x-K9

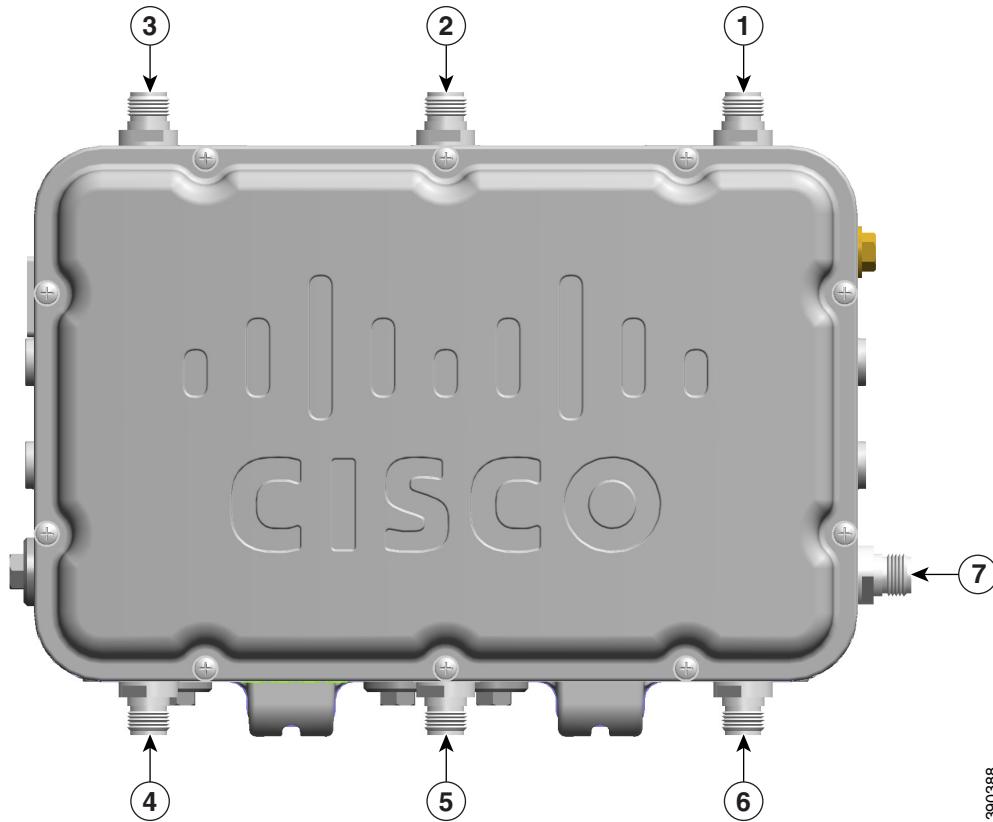


1	Antenna port 1- Type N connector Wi-Fi 2.4/5 GHz TX/RX	4	Antenna port 6- Type N connector ISA100 Wireless and WirelessHART 2.4 GHz TX/RX
2	Antenna port 2- Type N connector Wi-Fi 2.4/5 GHz RX	5	Antenna port 4- Type N connector ISA100 Wireless and WirelessHART 2.4 GHz RX
3	Antenna port 3- Type N connector Wi-Fi 2.4/5 GHz TX/RX		

1552WU Antenna Ports

Figure 1-9 shows the antenna port locations for model AIR-CAP1552WU-x-K9.

Figure 1-9 External Antenna Port Locations for Access Point Model AIR-CAP1552WU-x-K9



1	Antenna port 1 - Type N connector Single Band 5 GHz TX/RX	4	Antenna port 4 - Type N connector Single Band 2.4 GHz TX/RX
2	Antenna port 2 - Type N connector Single Band 5 GHz RX	5	Antenna port 5 - Type N connector Single Band 2.4 GHz RX
3	Antenna port 3 - Type N connector Single Band 5 GHz TX/RX	6	Antenna port 6 - Type N connector Single Band 2.4 GHz TX/RX
		7	WirelessHART Antenna port - Type N connector Single Band 2.4 GHz Omnidirectional WirelessHART Antenna TX/RX

Multiple Radio Operation

The 1552 access point supports simultaneous dual-radio operation using a 2.4 GHz 802.11b/g/n multiple input/multiple output (MIMO) radio and a 5 GHz 802.11a/n MIMO radio. The 2.4 GHz radio supports channels 1 to 11 in US, 1 to 13 in Europe, and 1 to 13 in Japan. It has two transmitters with a maximum total output power of 28 dBm for 802.11b/g/n operation. Output power is configurable to 5 levels. It has three receivers that enable maximum-ratio combining (MRC).

The 5 GHz radio operates in the UNII-2 band (5.25 – 5.35 GHz), UNII-2 Extended/ETSI band (5.47 – 5.725 GHz), and the upper ISM band (5.725 – 5.850 GHz). It has two transmitters with a maximum total output power of 22 dBm for the UNII-2 and UNII-2 Extended/ETSI bands. The total maximum output power for the upper UNII-3 band is 28 dBm. Output power is configurable for 5 power levels in 3 dB steps. The three receivers enables maximum-ratio combining (MRC).

Antenna Configurations

The 1552H, 1552SA/1552SD, and 1552WU models must always be operated with all the external antennas attached or the antenna connectors sealed with plugs. [Figure 1-7](#), [Figure 1-8](#), and [Figure 1-9](#) show the antenna port locations.

Table 1-3 Cisco Aironet Dual-Band Omnidirectional Antenna Supported Models and configuration information

Part Number	Description	Gain	Number of Antennas		
			1552H	1552SA/ 1552SD	1552WU
AIR-ANT2547V-N-HZ	Dual Band 2.4/5 GHz Omnidirectional Wi-Fi Antenna	2.4 GHz: 4 dBi 5 GHz: 7 dBi	3	3	
AIR-ANT2450V-N-HZ	Single Band 2.4 GHz Omnidirectional ISA100 Wireless and WirelessHART Antenna	5 dBi		2	
AIR-ANT2480V-N	Single Band 2,4 GHz Omnidirectional Wi-Fi Antenna	8 dBi			3
AIR-ANT5180V-N	Single Band 5 GHz Omnidirectional Wi-Fi Antenna	8 dBi			3 See Note below
AIR-ANT5114P2M-N=	Single Band 5 GHz Directional Dual Polarized Patch Antenna	14 dBi			1 See Note below
(separately available from Emerson)	Single Band 2.4 GHz Omnidirectional WirelessHART Antenna	6 dBi			1



Note Either the AIR-ANT5180V-N or the AIR-ANT5114P2M-N= antenna must be used, but not both on the 1552WU.



Note

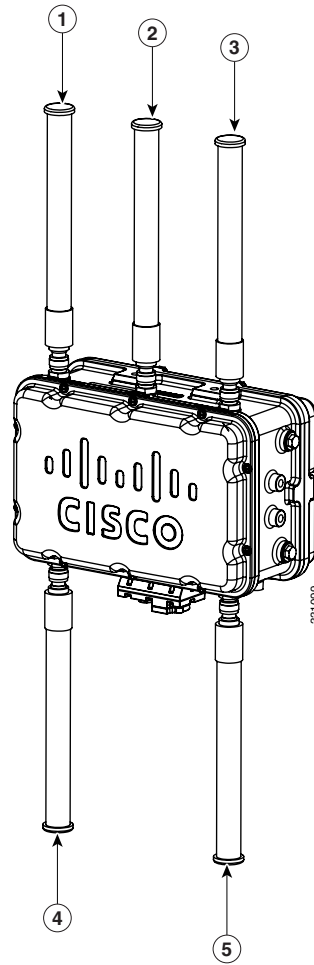
- The WirelessHART Antenna must be installed a minimum of 3 feet from any other antenna, including the other Wi-Fi antennas attached to the Access Point.
- Follow all safety precautions when installing the antennas. For information on safety, refer to [“Safety Precautions” section on page 1-18](#).

Figure 1-10 Cisco Aironet Dual-Band Omnidirectional Antenna - Installed on Model AIR-CAP1552H-x-K9



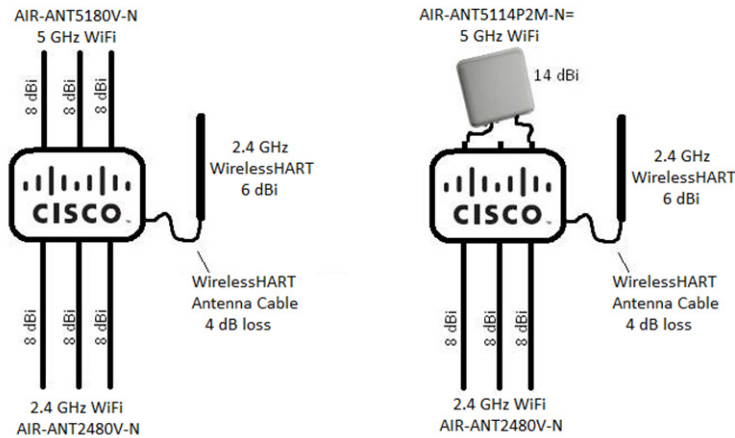
1	Antenna connected to antenna port 4 (Type N connector) (Wi-Fi TX/RX)
2	Antenna connected to antenna port 5 (Type N connector) (Wi-Fi RX)
3	Antenna connected to antenna port 6 (Type N connector) (Wi-Fi TX/RX)

Figure 1-11 Cisco Aironet Dual-Band Omnidirectional Antenna and Cisco Aironet 2.4 GHz Omnidirectional Antenna - Installed on Model AIR-CAP1552SA/SD-x-K9



1	Antenna port 1- Type N connector Wi-Fi 2.4/5 GHz TX/RX	4	Antenna port 6- Type N connector ISA100 Wireless and WirelessHART 2.4 GHz TX/RX
2	Antenna port 2- Type N connector Wi-Fi 2.4/5 GHz RX	5	Antenna port 4- Type N connector ISA100 Wireless and WirelessHART 2.4 GHz RX
3	Antenna port 3- Type N connector Wi-Fi 2.4/5 GHz TX/RX		

Figure 1-12 AIR-CAP1552WU-x-K9 Antenna Configurations.



Safety Precautions



Warning

Do not locate the antenna near overhead power lines or other electric light or power circuits, or where it can come into contact with such circuits. When installing the antenna, take extreme care not to come into contact with such circuits, as they may cause serious injury or death. For proper installation and grounding of the antenna, please refer to national and local codes (e.g. U.S.: NFPA 70, National Electrical Code, Article 810, Canada: Canadian Electrical Code, Section 54). Statement 280

For your safety, read and follow these safety precautions.

1. Before you install an antenna, contact your Cisco account representative to explain which mounting method to use for the size and type of antenna that you are about to install.
2. Select your installation site with safety, as well as best performance, in mind. Remember that electric power lines and phone lines look alike. For your safety, assume that any overhead line can kill you.
3. Contact your electric power company. Tell them your plans and ask them to come look at your proposed installation.
4. Plan your installation carefully and completely before you begin. Each person involved in an installation should be assigned to a specific task and should know what to do and when to do it. One person should be in charge of the operation to issue instructions and watch for signs of trouble.
5. When installing your antenna, follow these guidelines:
 - Do not use a metal ladder.
 - Do not work on a wet or windy day.
 - Do dress properly—wear shoes with rubber soles and heels, rubber gloves, and a long-sleeved shirt or jacket.
6. If the assembly starts to drop, move away from it and let it fall. Because the antenna, mast, cable, and metal guy wires are all excellent conductors of electrical current, even the slightest touch of any of these parts to a power line completes an electrical path through the antenna and the installer.

7. If any part of the antenna system should come in contact with a power line, do not touch it or try to remove it yourself. Call your local power company to have it removed safely.
8. If an accident should occur with the power lines, call for qualified emergency help immediately.

Multiple Power Sources

The 1552 series access point for hazardous locations support multiple power options. All models support 12 VDC, but not in a hazardous locations environment.

1552H and 1552SA

100 to 240 VAC, 50-60Hz

1552H

Power-over-Ethernet (PoE)—56 VDC power injector (AIR-PWRINJ1500-2=)



Caution

Caution: Power injector (AIR-PWRINJ1500-2=) is not certified for installation within hazardous locations environments.

1552SD and 1552WU

24 VDC



Warning

Connect the unit only to DC power source that complies with the safety extra-low voltage (SELV) requirements in IEC 60950 based safety standards. Statement 1033



Note

This warning only applies to DC input sources and is not applicable if an AC power source is used.

The 1552 access point for hazardous locations can be connected to more than one power source. The access point detects the available power sources and switches to the preferred power source using the following priority:

1. AC power or 24 VDC, either but not both at the same time.
2. 12 VDC (not supported in hazardous locations environments)
3. Power over Ethernet (1552H only)



Warning

This unit might have more than one power supply connection. All connections must be removed to de-energize the unit. Statement 1028



Caution

To provide inline PoE, you must use the 1500 power injector (AIR-PWRINJ1500-2=). Other power injectors, PoE switches, and 802.3af/at power sources cannot provide adequate power, which can cause the access point to malfunction and cause over-current conditions at the power source.



Caution

The 1500 power injector (AIR-PWRINJ1500-2=) must be used in an indoor environment only, and is not certified for installation within hazardous locations environments.

**Note**

The Ethernet cable from the power injector to the access point (PoE In port) must be at least 10 ft (3.1 m) in length.

**Caution**

When the access point is installed outdoors or in a wet or damp location, the AC branch circuit that is powering the access point should be provided with ground fault protection (GFCI), as required by Article 210 of the National Electrical Code (NEC). (1552H and 1552SA, not for 1552SD and 1552WU)

Ethernet (PoE) Ports

**Caution**

Power injector (AIR-PWRINJ1500-2=) is not certified for installation within hazardous locations environments.

**Note**

The 1552SA, 1552SD, and 1552WU access points do not support the PoE In port.

The 1552 hazardous location access points support an Ethernet uplink port and a downlink port (PoE Out). The 1552H access point also supports PoE In. The access point Ethernet ports use RJ-45 connectors (with a liquid tight adapter) to link the access point to the 10/100/1000BASE-T network. The Ethernet cable is used to send and receive Ethernet data and to optionally supply inline 56 VDC power from the power injector.

**Note**

When a 1552H access point is powered by PoE, the PoE Out port is not active.

The access point PoE Out (10/100/1000BASE-T) port uses an RJ-45 connector to provide LAN connectivity and IEEE 802.3af power to a single peripheral customer device, such as a camera or sensor gateway. The PoE Out port should not be connected to a switch or hub. The Ethernet MAC addresses are printed on the bottom of the access point under the LEDs.

**Warning**

To reduce the risk of fire, use only No. 26 AWG or larger telecommunication line cord. Statement 1023

The Ethernet cable must be a shielded outdoor rated Category 5e (CAT5e) or better cable. The access point senses the Ethernet and power signals and automatically switches internal circuitry to match the cable connections.

**Caution**

To provide inline PoE, you must use the 1500 power injector (AIR-PWRINJ1500-2=). Other power injectors, PoE switches, and 802.3af/at power sources cannot provide adequate power, which may cause the access point to malfunction and cause possible over-current conditions at the power source.

Fiber Option

**Note**

The 1552WU access point does not support Fiber.

**Warning****Class 1 laser product.** Statement 1008

The factory-orderable fiber option provides a fiber input and output capability. Fiber data is transmitted and received over a single or dual-strand fiber cable, depending on the SFP, which is connected to the access point using these SFP modules:

- 100BASE-BX10-U fiber rugged small-form factor pluggable (SFP) module
- 1000BASE-LX single-mode rugged SFP module
- 1000Base-SX multimode Rugged SFP module

**Note**

SFP modules are not hot-swappable.

The 1552H and 1552S have one SFP port for fiber use, located on the bottom of the unit. The 1552H is shown on [Figure 1-1](#), and the 1552S is shown in [Figure 1-2](#). Client data is passed to the network controller through the fiber connection via a fiber-capable switch or controller. Configuration information can be found in the controller configuration guide of the switch or controller you are using.

Metal Enclosure

The access point uses a metal enclosure that can accommodate both indoor or outdoor operating environments and an industrial temperature operating range of -40 to 131°F (-40 to 55°C). The access point complies with NEMA 4 and IP67 requirements.

Optional Hardware

Depending on the order configuration, the following optional access point hardware may be part of the shipment:

- Cisco Aironet Antennas
- Pole mount kits (AIR-ACCPMK1550=, AIR-ACCPMK1550HZM=)
- Band installation tool for pole mount kit (AIR-BAND-INS-TL=)
- Power injector (AIR-PWRINJ1500-2=)

**Caution**

Caution: Power injector (AIR-PWRINJ1500-2=) is not certified for installation within hazardous locations environments.

- 1000BASE-LX single-mode rugged SFP (GLC-LX-SM-RGD=)
- 1000BASE-SX multimode rugged SFP (GLC-SX-MM-RGD=)

Network Deployment Examples

The access point is a wireless device designed for wireless client access and point-to-point bridging, point-to-multipoint bridging, and point-to-multipoint mesh wireless connectivity. The access point provides 5 GHz backhaul capability to link with another access point to reach a wired network connection or to provide repeater operations for other access points.

The access point plays two primary radio roles: a root access point (RAP) or a mesh (non-root) access point (MAP), which is the default role of all access points. When the access point has a fiber or wired Ethernet or cable connector connection to the controller (through a switch), the radio role is called a

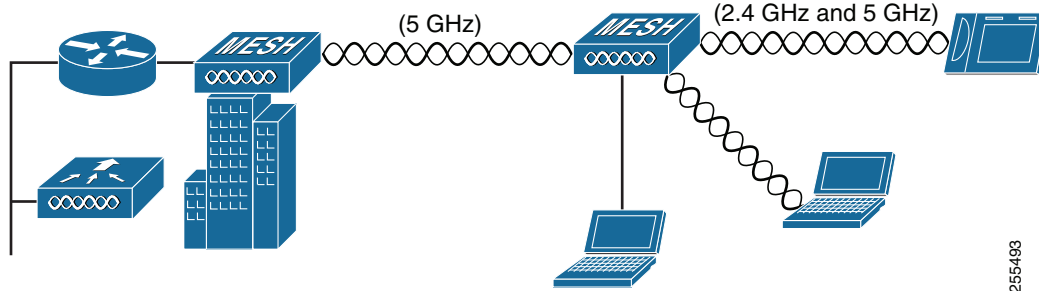
RAP. In order to be considered a RAP, the access point must be configured as a RAP. A RAP is a parent node to any bridging or mesh network. A controller can support one or more RAPs, each one parenting the same or different wireless networks. There can be more than one RAP for the same mesh network for redundancy. RAPs and MAPs can support wireless clients on the 2.4 GHz and 5 GHz band. Client access on 5 GHz is called universal client access.

When the access point does not have a wired Ethernet, fiber-optic, or cable connection to the controller, the radio role is called a MAP. The MAPs have a wireless connection (through the backhaul interface) to other MAPs and finally to a RAP with an Ethernet or cable connection through a switch to the controller. MAPs can also have a wired Ethernet connection to a local LAN and serve as a bridge endpoint for that LAN (using a point-to-point or point-to-multipoint bridge connection).

Wireless Backhaul

The access point supports wireless backhaul capability. Depending on the version of software being used, these links can utilize either 2.4 GHz or 5 GHz as of (8.2.100 and above) to bridge to another access point to reach a wired network connection to a controller (see [Figure 1-13](#)). The access point connected to the wired network is considered a RAP in this configuration. The remote access point is considered a MAP and transfers wireless client traffic to the RAP for transfer to the wired network. Control And Provisioning of Wireless Access Points (CAPWAP) control traffic is also transferred over this bridged link.

Figure 1-13 Access Point Backhaul Example



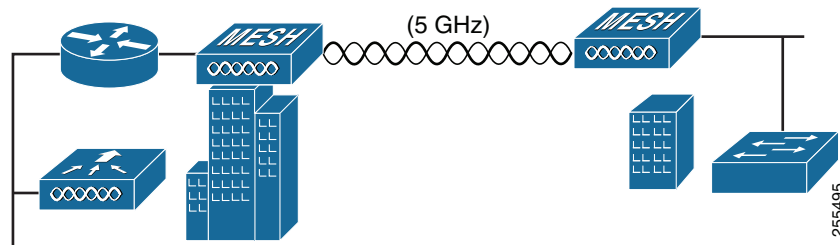
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Point-to-Point Bridging

The access points can be used to extend a remote network by using the 2.4 GHz or 5 GHz backhaul radio to bridge the two network segments as shown in [Figure 1-14](#). To support Ethernet bridging, you must enable bridging on the controller for each access point. By default this capability is turned-off for all access points.

Wireless client access is supported; however, if bridging between tall buildings, the 2.4 GHz wireless coverage area may be limited and possibly not suitable for direct wireless client access.

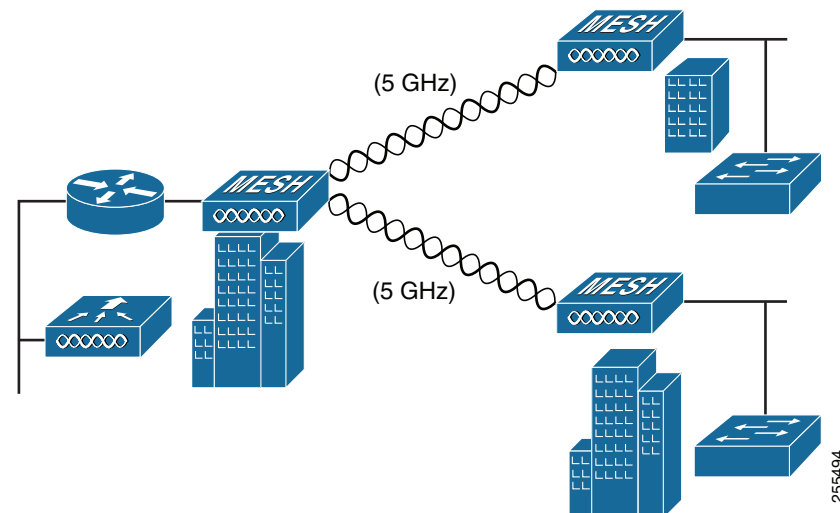
Figure 1-14 Access Point Point-to-Point Bridging Example



Point-to-Multipoint Bridging

The access points can be used as a RAP to connect multiple remote MAPs with their associated wired networks, or with 2.4 GHz or 5 GHz radio. By default this capability is turned-off for all access points. To support Ethernet bridging, you must enable bridging on the controller for each access point. Wireless client access can be provided over the bridging link; however, if bridging between tall buildings, the 2.4 GHz wireless coverage area may be limited and possibly not suitable for direct wireless client access. [Figure 1-15](#) illustrates an example of access point-to-multipoint bridging.

Figure 1-15 Access Point to Multipoint Bridging Example



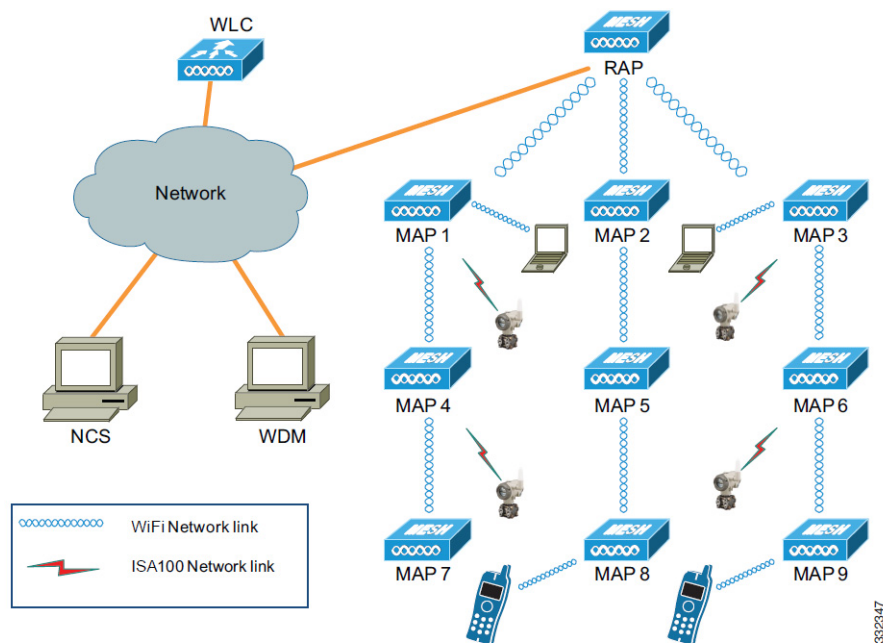
Point-to-Multipoint Mesh Network

The access point is typically deployed in a mesh network configuration. In a typical mesh deployment, one or more RAPs have a wired network connection through a switch to a controller. Other remote MAPs without wired network connections use the backhaul feature to optimally link to a RAP that is connected to the wired network. In the mesh network, the links between the access points are referred to as the *backhaul links*. Depending on the version of software being used, these links can utilize either 2.4 GHz or 5 GHz as of (8.2.100 and above).

Intelligent wireless routing is provided by the Adaptive Wireless Path protocol (AWPP). This enables each MAP to identify its neighbors and intelligently choose the optimal path to the RAP with the wired network connection by calculating the cost of each path in terms of signal strength and the number of hops required to get to a controller with signal strength given priority since signal strength determines the data rate available for backhaul.

Figure 1-16 illustrates a typical mesh configuration using MAPs and RAPs.

Figure 1-16 Typical Mesh Configuration Using Cisco 1552SA/1552SD Access Points with Sensors



The Cisco 1552SA/1552SD is a universal and multifunctional outdoor wireless mesh network that supports not only Wi-Fi devices and applications, but also supports wireless field I/Os and actuators on both ISA100 Wireless and WirelessHART protocols.

Along with robust and reliable Cisco Outdoor Wi-Fi wireless mesh, it also creates parallel Industrial Wireless Automation Network to support field sensors and actuators running on either or both of the two protocols. The Multiprotocol Radio module manages and aggregates Industrial Wireless Data and passes it over to the Cisco Wireless Mesh backbone

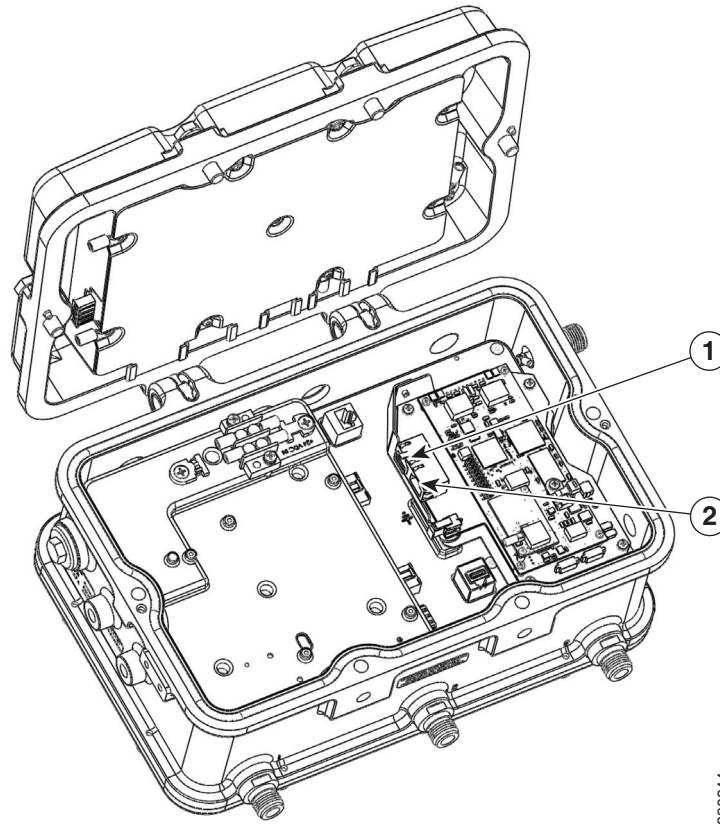
Refer to [Cisco Documentation](#) for installation, configuration, best practices and troubleshooting guides.

Refer to to [Honeywell OneWireless Network](#) - Multiprotocol Wireless IO & System documentation for further details.

WirelessHART Gateway Configuration

This following information is abbreviated and is intended only to serve as an introduction. Refer to Emerson's WirelessHART Gateway documentation for complete details.

Figure 1-17 Typical Mesh Configuration Using Cisco 1552WU Access Points with Sensors



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Table 1-4 The default IP addresses for the WirelessHART Gateway are:

	IP Address	Netmask	Notes
Ethernet 1	192.168.1.10	255.255.255.0	Connected to 1552WU internal interface GigabitEthernet2
Ethernet 2	192.168.2.10	255.255.255.0	User accessible. Can be used for connecting redundant WirelessHART Gateways.

The WirelessHART Gateway can be configured using a standard web browser and accessing the Gateway's internal webpage URL (<https://192.168.1.10>). For this to work, the 1552WU must be configured to pass traffic to the WirelessHART Gateway's IP address.

Table 1-5 Security Passwords

There are four role based user accounts for the gateway with varying levels of access. The table below describes this access.

Role	User Name	Web Interface Access
Executive	exec	Read-only access
Operator	oper	Read-only access
Maintenance	maint	Configure HART® device settings Configure Modbus communications Configure Modbus register mapping Configure OPC browse tree Configure Active Advertising
Administrator	admin	Includes all maintenance privileges Configure Ethernet network settings Configure WirelessHART network settings Set passwords Set time settings Set home page options Configure custom point pages Restart applications

**Note**

Each of the initial passwords for the user accounts is “default.” It is recommended, for security purposes, that these passwords are changed. The administrator password should be appropriately noted when changed. If it is lost, please contact Emerson Process Management for technical support.

To change the User Accounts Passwords:

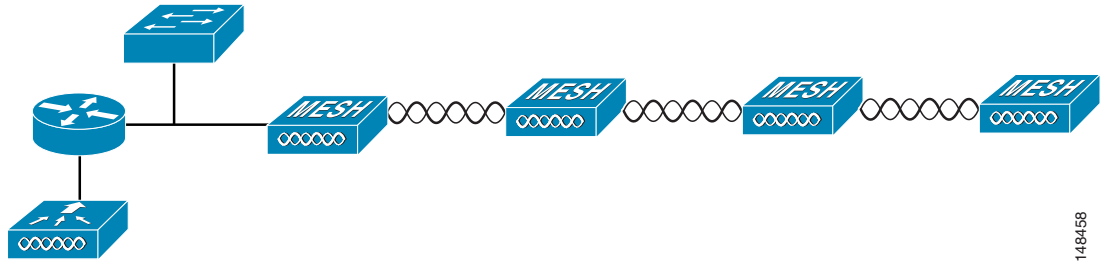
-
- Step 1** Navigate to Setup>Security>User accounts.
 - Step 2** Set the new password for each role based user account, and confirm.
 - Step 3** Click Submit.

Layer 3 Network Operation

The access points support Layer 3 network operation. Access points and controllers in Layer 3 configurations use IP addresses and UDP packets, which can be routed through large networks. Layer 3 operation is scalable and recommended by Cisco.

Figure 1-18 illustrates a typical Layer-3 wireless network configuration containing access points and a controller.

Figure 1-18 Typical Layer 3 Access Point Network Configuration Example



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