# Cisco Aironet 1500 Series Lightweight Outdoor Mesh Access Points

## Product Overview

Cisco[®] Aironet[®] 1500 Series Lightweight Outdoor Mesh Access Points (Figure 1) enable cost-effective, scalable, deployment of secure, metropolitan-scale wireless LANs. The Cisco Aironet 1500 Series is designed for municipal Wi-Fi deployments for public access, public safety, or managed services, and for enterprise campus outdoor Wi-Fi extensions.

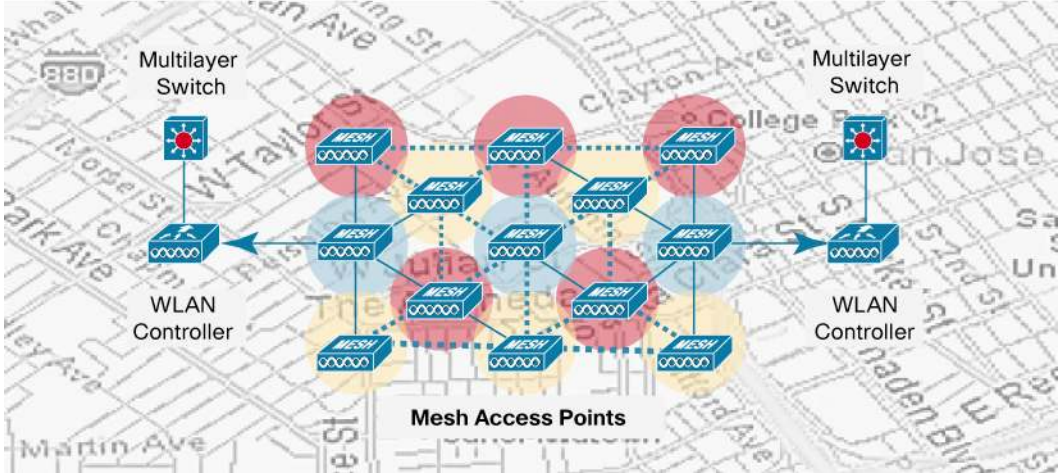**Figure 1.**    Cisco Aironet 1500 Series



The Cisco Aironet 1500 Series supports options for dual-band, simultaneous support for IEEE 802.11a and 802.11b/g standards with the 1510 model or single-band support for IEEE 802.11b/g with the 1505 model. Both models employ Cisco's patent-pending Adaptive Wireless Path Protocol (AWPP) to form a dynamic wireless mesh network between remote access points, while delivering secure, high-capacity wireless access to any Wi-Fi-compliant client device (Figure 2).

The Cisco Aironet 1510 lightweight outdoor mesh access point's dual-radio configuration dedicates the 802.11a radio to access-point-to-access-point communications, allowing the mesh network to maximize all available channels, minimize the occurrence of interference from unlicensed devices and minimize latency. The dual-radio configuration delivers high system capacity through
pico-cellular designs and support for real-time applications such as voice and video.

The Cisco Aironet 1505 lightweight outdoor mesh access point's single-radio configuration uses the 802.11b/g radio for data and access-point-to-access-point communications. The single-radio configuration is ideal for customers that have moderate capacity needs that can be met with a singe-band mesh solution. The single-radio configuration combines the deployment flexibility of a mesh network with the ease of management and mobility services delivered by the Cisco Unified Wireless Network.

**Figure 2.**    Cisco Wireless Mesh Network Solution

**Mesh Access Points**

## Architecture

The Cisco Aironet 1500 Series is a component of the Cisco Unified Wireless Network and the Cisco Wireless Mesh Networking Solution. The unified architecture centralizes key functions of the wireless LAN to provide scalable management, advanced security, seamless mobility, proven reliability, and mobility services, such as multiple Service Set Identifiers (SSIDs) and quality of service (QoS) for voice, video, and data applications. The Cisco Aironet 1500 Series is managed and monitored by Cisco wireless LAN controllers and the Cisco Wireless Control System (WCS). It supports zero-touch configuration deployment to easily and securely join the mesh network. Flexible, high-powered, high-sensitivity radio options, along with a selection of high-gain antennas, allow coverage to be scaled as capacity needs increase. The Cisco Aironet 1500 Series is compliant with Wi-Fi Protected Access 2 (WPA2) which employs hardware-based Advanced Encryption Standard (AES) encryption between wireless nodes to provide end-to-end enterprise-class security.

## Features and Benefits

Table 1 describes the features and benefits of Cisco Aironet 1500 Series Lightweight Outdoor Mesh Access Points.

**Table 1.**     Features and Benefits

| Feature | Benefit |
|---|---|
| **Patent-pending Adaptive Wireless Path Protocol (AWPP)** | • Forms a wireless mesh network between nodes.<br>• Designed specifically for a multiradio platform to handle acute environmental interference as well as self-interference, optimizing system-level network performance.<br>• Dynamically optimizes traffic routes between nodes for high network resiliency and high system capacity.<br>• Self-heals from interference or outages, reducing management costs.<br>• Optimal Parent Selection scans all available channels to ensure that the mesh optimizes network capacity.<br>• Exclusion listing provides exponential backoff and advance intelligence at the access point to exclude as a parent any access point through which a link to the controller cannot be established. |
| **Bridging** | • Bridges remote networks over wireless in a point-to-point or point-to-multipoint configuration, eliminating leased lines or providing an alternative backhaul.<br>• Allows remote peripherals, such as security cameras, to be bridged to the network.<br>• Wireless link-distance adjustment allows the 802.11 protocols to be tuned for optimal performance over extended bridging distances. |

| Feature | Benefit |
|---|---|
| Flexible, integrated dual and single radio options | • Dual-radio option provides separate channels for the mesh infrastructure and client access, enabling pico-cellular design, minimizing system interference, and delivering high system capacity.<br>• Single-radio option is available for environments that require a single band solution.<br>• Complies with 802.11a and 802.11b/g standards for interoperability with any Wi-Fi-compliant client.<br>• Supports wireless backhaul over the 4.9-GHz band for reduced interference for public safety licensees,<br>• Single, integrated design simplifies deployment and management. |
| Standards-based LWAPP | • Centralizes functions of wireless LANs at Cisco wireless LAN controllers to enable intelligent, system-level device and RF management, security, and mobility across and between subnets.<br>• Provides a consistent WLAN architecture between indoor and outdoor deployments.<br>• Managed through easy-to-use and intuitive interfaces on Cisco wireless LAN controllers and Cisco WCS Software. |
| Security | • X.509 digital certification prevents unauthorized devices from joining the wireless mesh network.<br>• Hardware-based AES encrypts access-point-to-access-point traffic to help ensure privacy.<br>• The Cisco wireless LAN controllers define security policy for centralized applications.<br>• Supports 802.11i, WPA2, and WPA standard security authentication and encryption for interoperability with any Wi-Fi-compliant client. Supported EAP types include SIM, PEAP, TLS, TTLS, and Cisco LEAP. |
| Zero-touch Configuration deployment | • Allows access points to securely join the wireless mesh network without needing to be configured on site at installation, reducing deployment costs.<br>• Simplifies installations of new mesh access point when Bridge Group Names (BGN) are used. |
| Radio Resource Management (RRM) | • Interoperates with software at the controller to create an intelligent RF plane for self-configuration, self-healing, and self-optimization.<br>• Detects interference from existing, unrelated WLAN access points and adjusts the RF parameters to optimize network performance. |
| Quality of Service | • Support for 802.11e Wi-Fi Multimedia (WMM) provides quality of service and seamless roaming for high-priority traffic such as voice or video.<br>• Provides differentiated services for high-priority traffic.<br>• Enables public safety and enterprise voice over IP (VoIP) and video applications. |
| Guest Access | Support for guest user access through a webpage redirect to a login portal or to a public WLAN services gateway. |
| Multiple Broadcast Service Set Identifiers (BSSIDs) | 16 BSSIDs allow multiple virtual WLANs for different user types such as public access, municipal services, police, or fire departments as well as enable wholesale business models. |
| Web-authentication | Interfaces to remediation server to support third-party billing platforms. |
| Power over Ethernet (PoE) | Can be powered over the same cable that provides Ethernet connectivity, simplifying the need for a nearby AC power source and reducing deployment complexity. |
| Ruggedized Enclosure | Maximizes network uptime through reliability in severe weather conditions including rain, lightning, wind and vibration from storms or road traffic. |

## Summary

The Cisco Aironet 1500 Series is ideal for outdoor wireless deployments, scaling from enterprise extensions of indoor wireless LANs to metropolitan-sized deployments. It supports a dual-radio configuration that enables pico-cellular designs to deliver high system capacity and a single-radio configuration that supports moderate capacity needs. Cisco's patent-pending Adaptive Wireless Path Protocol (AWPP), designed specifically for wireless environments, provides dynamic path optimization and self-healing capabilities, making the Cisco Aironet 1500 Series easy to use and minimizing management costs.

The Cisco Aironet 1500 Series is part of the innovative Cisco Unified Wireless Network. It works with Cisco wireless LAN controllers and Cisco WCS to enable centrally, at a systems level, all management, security, and mobility services capabilities. This allows the network to smoothly operate across the indoor and outdoor wireless LAN.

Cisco Aironet 1500 Series Lightweight Outdoor Mesh Access Points deliver industry-leading performance for wireless mesh networking.

## Product Specifications

Table 2 lists specifications for the Cisco Aironet 1500 Series.

**Table 2.** Cisco Aironet 1500 Series Product Specifications

| Item | Specification | | |
|---|---|---|---|
| Wireless standards | 1510 dual-radio configuration<br>• 802.11a<br>• 802.11b/g<br>1505 single-radio configuration<br>• 802.11b/g | | |
| Media Access Protocol | • Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA) | | |
| Date rates and modulation | • 802.11a (1510 Model only): 54, 48, 36, 24, 18, 12, 9, 6 Mbps, Orthogonal Frequency Division Multiplexing (OFDM)<br>• 802.11b: 11, 5.5, 2, 1 Mbps, Direct Sequence Spread Spectrum (DSSS)<br>• 802.11g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps, OFDM | | |
| 1510 Dual-Radio Option—Frequency band and operating channels | Regulatory version | 802.11a | 802.11b/g |
| | -A | 5.725–5.850 GHz<br>5 channels<br>4.940–4.990 GHz<br>2 channels | 2.412–2.462 GHz<br>11 channels |
| | -C | 5.725–5.850 GHz<br>5 channels | 2.412-2.472 GHz<br>13 channels |
| | -E | 5.470–5.725 GHz<br>11 channels | 2.412–2.472 GHz<br>13 channels |
| | -K | 5.470–5.630 GHz<br>7 channels | 2.412-2.472 GHz<br>13 channels |
| | -N | 5.725–5.850 GHz<br>5 channels | 2.412–2.462 GHz<br>11 channels |
| | -P | 4.910– 5.090 GHz<br>7 channels | 2.412-2.484 GHz<br>14 channels |
| | -S | 5.725–5.850 GHz<br>5 channels | 2.412-2.472 GHz<br>13 channels |
| 1505 Single-Radio Option—Frequency band and operating channels | Regulatory version | 802.11b/g | |
| | -A | 2.412–2.462 GHz<br>11 channels | |
| | -E | 2.412–2.472 GHz<br>13 channels | |
| | -P | 2.412-2.484 GHz<br>14 channels | |
| Transmit power<br>(Maximum transmit power will vary by channel, data rate, and individual country regulations) | Maximum:<br>• 802.11a: 26 dBm<br>• 802.11b: 24 dBm<br>• 802.11g: 24 dBm | | |

| Item | Specification | | |
|---|---|---|---|
| Receive sensitivity (typical) | **802.11a**<br>6 Mbps: –91 dBm<br>9 Mbps: –90 dBm<br>12 Mbps: –89 dBm<br>18 Mbps: –86 dBm<br>24 Mbps: –84 dBm<br>36 Mbps: –80 dBm<br>48 Mbps: –76 dBm<br>54 Mbps: –73 dBm | **802.11b**<br>1 Mbps: –98 dBm<br>2 Mbps: –96 dBm<br>5.5 Mbps: –91dBm<br>11 Mbps: –89 dBm | **802.11g**<br>1 Mbps: –98 dBm<br>2 Mbps: –96 dBm<br>5.5 Mbps: –91 dBm<br>6 Mbps: –91 dBm<br>9 Mbps: –91 dBm<br>11 Mbps: –89 dBm<br>12 Mbps: –91 dBm<br>18 Mbps:  –88 dBm<br>24 Mbps: –85 dBm<br>36 Mbps: –82 dBm<br>48 Mbps: –77 dBm<br>54 Mbps:  –76 dBm |
| Network interface | • 802.3u 10/100 Ethernet, autosensing | | |
| Networking features | • 16 Broadcast SSIDs<br>• HTTP Webpage redirect | | |
| Management | • LWAPP-based<br>• Managed by Cisco wireless LAN controller | | |
| Security | **Wireless bridging/mesh**<br>• X.509 digital certificates<br>• MAC address authentication<br>• Hardware-assisted AES encryption<br>**Wireless access**<br>• 802.11i<br>• 802.1X authentication, including EAP-SIM, EAP-PEAP, EAP-TLS, EAP-TTLS, Cisco LEAP<br>• Hardware-assisted AES, WPA, Temporal Key Integrity Protocol-Message Identity Check (TKIP-MIC) encryption<br>• VPN pass-through<br>• IP Security (IPsec), Layer 2 Tunneling Protocol (L2TP)<br>• MAC address filtering | | |
| Compliance | **Safety**<br>• UL 60950<br>• CAN/CSA-C22.2 No. 60950<br>• IEC 60950<br>• EN 60950<br>**Radio approvals**<br>• FCC Part 15.247, 90.210<br>• FCC Bulletin OET-65C<br>• RSS-210<br>• RSS-102<br>• AS/NZS 4268.2003<br>**EMI and susceptibility**<br>• FCC part 15.107, 15.109<br>• ICES-003<br>• EN 55022 | | |
| Dimensions | 15.0 in x 7.3 in x 5.7 in. (38 cm x 18.5 cm x 14.5 cm)<br>(including antenna mount) | | |
| Weight | 10 lbs (4.55 kg) | | |
| Operating temperature | –40 to 55℃ (–40 to 131℉) | | |
| Storage temperature | –50 to 85℃ (–58 to 185℉) | | |
| Environmental ratings | • IP66<br>• NEMA 4X | | |
| Humidity | 0 to 100% | | |

| Item | Specification |
|---|---|
| **Wind resistance** | • Up to 100 MPH sustaining<br>• Up to 165 MPH gusts |
| **Immunity** | • <= 5 mJ for 6kV/3kA @ 8/20 ms waveform<br>• ANSI/IEEE C62.41<br>• EN61000-4-5 Level 4 AC Surge Immunity<br>• EN61000-4-4 Level 4 Electrical Fast Transient Burst Immunity<br>• EN61000-4-3 Level 4 EMC Field Immunity<br>• EN61000-4-2 Level 4 ESD Immunity<br>• EN60950 Overvoltage Category IV |
| **Power** | • 95–260 VAC, 47–63 Hz<br>• Power over Ethernet: 48 VDC, +/–10 percent |
| **Warranty** | 1 year |
| **Wi-Fi Certification** | WiFi CERTIFIED |

## Ordering Information

The Cisco Aironet 1500 Series part numbers distinguish the regulatory domains for which the access points are designed. Customers are responsible for verifying approval for use in their individual countries. To verify approval and to identify the regulatory domain that corresponds to a particular country, please visit: http://www.cisco.com/go/aironet/compliance

Table 3 lists the part numbers available for the Cisco Aironet 1500 Series.

**Table 3.**　　Part Numbers for the Cisco Aironet 1500 Series

| Part Number | Description |
|---|---|
| AIR-LAP1510AG-A-K9 | Cisco Aironet 1510AG Lightweight Outdoor Mesh Access Point, Dual Radio, FCC configuration |
| AIR-LAP1510AG-C-K9 | Cisco Aironet 1510AG Lightweight Outdoor Mesh Access Point, Dual Radio, China configuration |
| AIR-LAP1510AG-E-K9 | Cisco Aironet 1510AG Lightweight Outdoor Mesh Access Point, Dual Radio, ETSI configuration |
| AIR-LAP1510AG-K-K9 | Cisco Aironet 1510AG Lightweight Outdoor Mesh Access Point, Dual Radio, Korea configuration |
| AIR-LAP1510AG-N-K9 | Cisco Aironet 1510AG Lightweight Outdoor Mesh Access Point, Dual Radio, non-FCC configuration |
| AIR-LAP1510AG-P-K9 | Cisco Aironet 1510AG Lightweight Outdoor Mesh Access Point, Dual Radio, TELEC configuration |
| AIR-LAP1510AG-S-K9 | Cisco Aironet 1510AG Lightweight Outdoor Mesh Access Point, Dual Radio, Singapore configuration |
| AIR-LAP1505G-A-K9 | Cisco Aironet 1505G Lightweight Outdoor Mesh Access Point, Single Radio, FCC configuration |
| AIR-LAP1505G-E-K9 | Cisco Aironet 1505G Lightweight Outdoor Mesh Access Point, Single Radio, ETSI configuration |
| AIR-LAP1505G-P-K9 | Cisco Aironet 1505G Lightweight Outdoor Mesh Access Point, Single Radio, TELEC configuration |

## Antennas

The Cisco Aironet 1500 Series provides N-type connectors for the 2.4-GHz and 5-GHz antennas. It is certified for use with antenna types up to the gains listed in Table 4.

**Table 4.** Maximum Allowable Antenna Gains

| Frequency Band | Antenna Type | Maximum Gain |
|---|---|---|
| 2.4 GHz | Omnidirectional | 8 dBi |
| 5 GHz | Omnidirectional | 7 dBi |
| 5 GHz | Patch | 17 dBi |

Use with certain antennas requires transmit power to be reduced. Please see the Cisco Aironet 1500 Series Quick Start Guide for power limitations.

Table 5 lists the antennas that are available for ordering from Cisco for the Cisco Aironet 1500 Series.

**Table 5.** Orderable Antennas for the Cisco Aironet 1500 Series

| Part Number | Description |
|---|---|
| AIR-ANT2455V-N= | 2.4-GHz, 5.5-dBi omnidirectional antenna with N connector |
| AIR-ANT5175V-N= | 5-GHz, 7.5-dBi omnidirectional antenna with N connector |
| AIR-ANT58G10SSA-N | 5.8-GHz, 9.5-dBi sector antenna with N connector |

Additional antennas not provided by Cisco are listed in the Cisco Aironet 1500 Series Quick Start Guide.

## Accessories

Table 6 lists the accessories that are available for the Cisco Aironet 1500 Series.

**Table 6.** Cisco Aironet 1500 Series Accessories

| Part Number | Description |
|---|---|
| AIR-ACCPMK1500= | Cisco Aironet 1500 Series Pole-Mount Kit |
| AIR-PWR-ST-LT-TAP= | Cisco Aironet 1500 Series streetlight power tap , 105-260 VAC |
| AIR-CORD1500-15NA= | Cisco Aironet 1500 Series power cord, 15ft, North American plug |
| AIR-CORD1500-40NA= | Cisco Aironet 1500 Series power cord, 40ft, North American plug |
| AIR-CORD1500-40UE= | Cisco Aironet 1500 Series power cord, 40ft, ETSI harmonized, unterminated |
| AIR-PWRINJ1500= | Cisco Aironet 1500 Series power injector, In: 100–240 VAC, Out: 48 VDC |
| AIR-ETH1500-150= | Cisco Aironet 1500 Series outdoor Ethernet cable, 150-ft |

## Bundles

Table 7 lists the accessory bundles that are available for the Cisco Aironet 1510 dual-radio option for the FCC configuration of the access point.

**Table 7.** Cisco Aironet 1510 Dual-Radio Option—Bundles for the FCC Configuration

| Part Number | Description |
|---|---|
| AIR-LAP1510KITP-A | **Cisco Aironet 1500 Series Pole-Top Kit, with 2.4-GHz and 5-GHz omnidirectional antennas**<br>Includes:<br>• Cisco Aironet 1510 Access Point, FCC configuration (AIR-LAP1510AG-A-K9)<br>• Cisco Aironet 1500 Series Pole Mount Kit (AIR-ACCPMK1500)<br>• Streetlight power tap (AIR-PWR-ST-LT-TAP)<br>• 2.4-GHz, 5.5-dBi omnidirectional antenna with N connector (AIR-ANT2455V-N)<br>• 4.9–5.8 GHz, 7.5-dBi omnidirectional antenna with N connector (AIR-ANT5175V-N) |

| Part Number | Description |
|---|---|
| AIR-LAP1510KITRO-A | **Cisco Aironet 1500 Series Roof Top Kit, with 2.4-GHz and 5-GHz omnidirectional antennas**<br>Includes:<br>• Cisco Aironet 1510 Access Point, FCC configuration (AIR-LAP1510AG-A-K9)<br>• Power injector (AIR-PWRINJ1500)<br>• Outdoor Ethernet cable (AIR-ETH1500-150)<br>• 2.4-GHz, 5.5-dBi omnidirectional Antenna with N Connector (AIR-ANT2455V-N)<br>• 4.9–5.8 GHz, 7.5-dBi omnidirectional antenna with N connector (AIR-ANT5175V-N) |
| AIR-LAP1510KITRS-A | **Cisco Aironet 1500 Series Roof Top Kit with 2.4-GHz omnidirectional antenna and 5-GHz sector antenna**<br>Includes:<br>• Cisco Aironet 1510 Access Point, FCC configuration (AIR-LAP1510AG-A-K9)<br>• Power injector (AIR-PWRINJ1500)<br>• Outdoor Ethernet cable (AIR-ETH1500-150)<br>• 2.4-GHz, 5.5-dBi omnidirectional antenna with N connector (AIR-ANT2455V-N)<br>• 5.8 GHz, 9.5-dBi sector antenna with N connector (AIR-ANT58G10SSA-N) |
| AIR-LAP1510BUN0501 | 5 Access Point Starter Kit (with accessories, Cisco 2000 Series Wireless LAN Controller and Cisco Wireless Control System) |
| AIR-LAP1510BUN2501 | 25 Access Point Starter Kit (with accessories, Cisco 4404 Series Wireless LAN Controller and Cisco Wireless Control System) |

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For more information about Cisco Aironet 1500 Series Lightweight Outdoor Mesh Access Points, contact your local account representative or visit: http://www.cisco.com/go/wirelessmesh