Cisco Aironet 1524 Lightweight Outdoor Mesh Access Point

Product Overview

The Cisco Aironet 1520 Series consists of the 1522 dual-radio mesh access point and the 1524 multi-radio mesh access point.

Cisco® Aironet® 1524 Lightweight Outdoor Mesh Access Point (Figure 1) enables cost-effective deployment of secure outdoor wireless LANs that scales to meet current and future demands for mobility. The Cisco Aironet 1524 is a multi-radio mesh access point, designed for municipal Wi-Fi deployments for public access and public safety applications.

Figure 1.   Cisco Aironet 1524

The Cisco Aironet 1524 is preconfigured with three radios compliant with IEEE 802.11a, 802.11b/g and 4.9GHz public safety standards. Various uplink connectivity options are supported such as Gigabit Ethernet (10/100/1000BaseT), and small form-factor pluggable (SFP) for fiber interface. Power options supported include 480VAC, 12VDC, Power over Ethernet (POE), and internal battery backup. It also employs Cisco's 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).
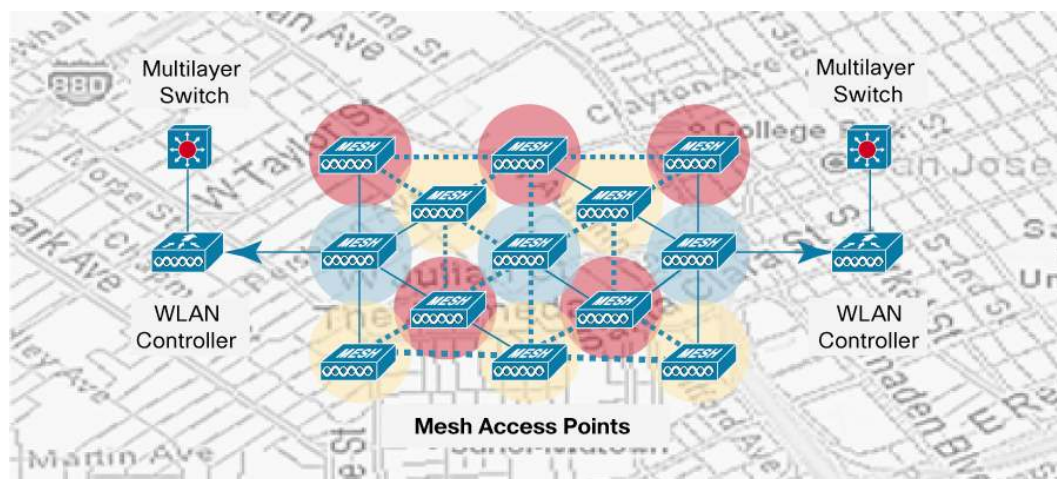
The Cisco Aironet 1524 Lightweight Outdoor Mesh Access Point's modular design creates a flexible platform that can enable separate mesh access networks within the device. By dedicating multiple separate radios to access, the Cisco Aironet 1524 creates the most robust and secure mesh infrastructure capable of supporting public and private applications simultaneously.

Key features of the Cisco Aironet 1524 are:

- Modular radio support (802.11a, 802.11b/g, licensed 4.9GHz public safety)
- Upgradeable to new radio technologies
- Improved 802.11g radio sensitivity and range performance with Maximal Ratio Combining (MRC)
- Multiple uplink options (Gigabit Ethernet-10/100/1000BaseT, Fiber SFP interface)

- Multiple power options (Power over Ethernet, 480 VAC Streetlight Power, 12 VDC, and internal battery backup power)
- 802.3af-compliant Power over Ethernet interface to connect IP devices
- NEMA 4X certified enclosure
- LED status indicators

Figure 2.　Cisco Wireless Mesh Network Solution

Architecture

The Cisco Aironet 1524 access point is a component of the Cisco Unified Wireless Network and Cisco Outdoor Wireless Networking Solutions. 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 1524 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. Uplink connectivity can be via Gigabit Ethernet or fiber. The Cisco Aironet 1524 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.

Self-Configuring and Self-Healing Mesh

The Cisco Aironet 1524 mesh access point can be installed anywhere power is available, without the need for a network connection. Intelligent wireless routing is based on the Cisco's Adaptive Wireless Path Protocol (AWPP), which is designed specifically for wireless environments. AWPP enables a remote access point to dynamically optimize the best route to the connected network within the mesh, mitigating interference and helping to ensure high network capacity.

Deployment and management costs for the Cisco Aironet 1524 are reduced through support of zero-configuration deployments and through the ability of the access points to self-heal in response to interference or outages. The mesh access point can act as a relay node and can associate 2.4-GHz clients at the same time.

The Cisco Aironet 1524 dedicates radios for the backhaul and access, allowing mesh networks to maximize use of the total available channels. This results in more capacity than is available with solutions that use only a single radio. When more capacity is needed, additional sectors can be enabled—for example, by provisioning a network connection to additional access points. The mesh dynamically re-optimizes itself when this is done

Zero-Touch Configuration

Using the Cisco Lightweight Access Point Protocol (LWAPP) features, the Cisco Aironet 1524 mesh access point can discover its LWAPP controller and automatically download the correct configuration and software for its role in the wireless mesh network.

Cisco Adaptive Wireless Path Protocol (AWPP)

Wireless mesh networks have unique features and requirements, and to address these features and requirements, Cisco has built a new protocol that allows each node to determine its neighbor or parent intelligently, choosing the optimal path toward the controller. Unlike traditional routing protocols, AWPP takes RF details into account.

AWPP automatically determines the best path back to the LWAPP controller by calculating the cost of each path in terms of signal strength and number of hops. After the path is established, AWPP continuously monitors the best path conditions and changes routes if necessarily to optimize performance. AWPP also performs a smoothing function by signaling condition information to help ensure that the ephemeral nature of RF environments does not impact network stability.

Robust Embedded Security

A core component of the Cisco Unified Wireless Solution is the use of X.509 certificates and AES encryption for LWAPP transactions. This X.509 and AES encryption is embedded into the wireless mesh solution with LWAPP transactions and by AES encrypting all traffic between mesh nodes. The complete packet path is from the Cisco controller to the access points and eventually to the users. The controller encapsulates user packets and forwards them to the correct root access point (RAP) over Ethernet. The RAP has a wired connection to the backhaul, and it wirelessly connects mesh access points (MAPs) at locations without a wired connection. The RAP then encrypts the user data packets and transfers them over the backhaul. Data packets may travel through multiple mesh access points before reaching the destination MAP. After receiving the encrypted user data, the destination MAP decrypts them and sends them over the air to the client using the encryption method specified by the client.

For mutual authentication, Extensible Authentication Protocol / Pre-Shared Key (EAP / PSK) is now supported between the mesh access point nodes.

Seamless Mobility

The same seamless mobility features delivered through the Cisco Unified Wireless Solution are delivered in the Cisco Outdoor Wireless Networking solution. Users can seamlessly roam in outdoor environments between the various Cisco Aironet 1520 Series mesh access points at different locations. If there is a Cisco indoor wireless network infrastructure, the user can also roam between the indoor and outdoor environments.

Layer 2 or Layer 3 Network Operation

Just as the Cisco Unified Wireless Network solution allows the LWAPP access points to communicate with the controller via a Layer 2 (L2) or Layer 3 (L3) network, this flexibility is extended to the outdoor wireless mesh network.

Highly Scalable Mesh

The Cisco Outdoor Wireless Networking solution can scale to a few thousand mesh access points with a cluster of up to 24 controllers each with up to 16 multiple Basic Service Set Identifiers (BSSIDs). For large deployment, a Cisco 4400 Series Wireless LAN Controller can support up to 100 Cisco Aironet 1520 Series mesh access points. Capacity in a mesh network can be increased conveniently by adding the mesh access points at the edge of the network or by configuring more root access points in the network. As with all large scale deployments, a professional site survey is required to determine the optimal number of access points needed for best performance.

Applications

The Cisco Aironet 1524 is designed specifically for outdoor environments. It features antenna connectors for extended range or coverage versatility and more flexible installation options. In outdoor municipal wireless applications, for example, network operators can place Cisco Aironet 1524 mesh access points on buildings, or mount them on lampposts and antenna towers connected with a wired connection. Uplink connectivity options such as Gigabit Ethernet and fiber are supported on the Cisco Aironet 1524. This provides flexibility for deploying the mesh access point anywhere in the community. The access point without wired connection will use the 5.8-GHz radio to wirelessly connect to the other mesh access point.

Specifically designed with the needs of public safety customers in mind, the Cisco Aironet 1524 can accommodate a mixed public safety and public service network with three radios: 5.8-GHz for backhaul and 2.4-GHz and 4.9GHz for access. In this deployment scenario, public safety applications can be accessed on the 4.9-GHz licensed network by first responders, while at the same time a municipality can provide 2.4-GHz access to city workers, inspectors, or for public access.

The metal housing enclosure of the Cisco Aironet 1524 provides the rugged and extended operating temperature range required in harsh outdoor environments. The rugged enclosure allows the mesh access point to maximize network uptime, remaining available and reliable even in severe weather conditions.

With the 802.3af-compliant PoE feature, mesh access points can connect and power other IP devices such as video surveillance cameras and IP sensors. This allows easy and quick deployment of mission-critical monitoring applications at locations where infrastructure does not exist. Video cameras and monitor sensors can take advantage of the mesh access point to connect to the network, and data can be transmitted via secure Wi-Fi. With internal battery power backup, the mesh access point will continue to function reliably even when the power is temporarily down. This allows the network operator to continue to monitor any incident while the power is being restored.

Features and Benefits

Table 1 describes the features and benefits of Cisco Aironet 1524 Lightweight Outdoor Mesh Access Points.

Table 1.   Features and Benefits

Feature	Benefit
Adaptive Wireless Path Protocol (AWPP)	• Forms a wireless mesh network between nodes. • Designed specifically for a multi-radio platform to handle acute environmental interference as well as self-interference. • Dynamically optimizes traffic routes between nodes for high network resiliency and high system capacity. • Self-heals from interference or outages, reducing management costs. • Optimal Parent Selection scans all available channels to help ensure that the mesh optimizes network capacity. • Exclusion listing provides 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. • Allows remote peripherals, such as security cameras, to be bridged to the network. • Wireless link-distance adjustment allows the 802.11 protocols to be tuned for optimal performance over extended bridging distances.
Modular radio design	• Multi-radio support provides separate channels and/or frequencies for the mesh infrastructure and client access, enabling pico-cell design, minimizing system interference, and delivering high system capacity. • Complies with 802.11a and 802.11b/g standards for interoperability with any Wi-Fi-compliant client. • Supports dedicated radios for mesh backhaul and radios for public safety 4.9-GHz and 802.11 b/g public access. • 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. • Provides a consistent WLAN architecture between indoor and outdoor deployments. • 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. • Hardware-based AES encrypts access-point-to-access-point traffic to help ensure privacy. • The Cisco wireless LAN controllers define the security policy for centralized applications. • Supports 802.11i, WPA2, and WPA standard security authentication and encryption for interoperability with any Wi-Fi-compliant client. Supported EAP types include subscriber identity module (SIM), Protected EAP (PEAP), Transport Layer Security (TLS), Tunneled Transport Layer Security (TTLS), and Cisco LEAP. • EAP / PSK is supported for mutual authentication between mesh access point nodes
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. • 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. • 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. • Provides differentiated services for high-priority traffic. • Enables public safety and enterprise voice over IP (VoIP) and video applications.
Multiple Basic Service Set Identifiers (BSSIDs)	• 16 BSSIDs allow multiple virtual WLANs for different user types, such as public access, municipal services, police, or fire departments, and also enable wholesale business models.
Uplink options	• Provides a flexible, cost-effective, and speedy deployment using various uplink connectivity options (1000BaseT Gigabit Ethernet, SFP fiber interface).

Feature	Benefit
Internal battery backup option	● Increased availability and reliability of network during power outages.
802.3af compliant Power-over-Ethernet (PoE) out	● Provides flexibility and speedy deployment of IP devices in the field that connect to the mesh access point.
Rugged 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 1524 Lightweight Outdoor Mesh Access Point is ideal for outdoor wireless deployments supporting a multi-radio configuration for public access and public safety in the same network. Cisco's Adaptive Wireless Path Protocol (AWPP), designed specifically for wireless environments, provides dynamic path optimization and self-healing capabilities, making the Cisco Aironet 1524 easy to use and minimizing management costs.

The Cisco Aironet 1524 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 1524 Lightweight Outdoor Mesh Access Points deliver industry-leading performance for wireless mesh networking.

Product Specifications

Table 2 lists specifications for the Cisco Aironet 1524.

Table 2. Cisco Aironet 1524 Product Specifications

Item	Specification			
Wireless standards	Multi-radio configuration ● 802.11a ● 802.11b/g ● Public safety 4.9 GHz (5, 10, 20 MHz channels)			
Media Access Protocol	● Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA)			

Data rates and modulation	● 802.11a 5.8 GHz: 54, 48, 36, 24, 18, 12, 9, 6 Mbps, Orthogonal Frequency Division Multiplexing (OFDM)
	● 802.11b: 11, 5.5, 2, 1 Mbps, Direct Sequence Spread Spectrum (DSSS)
	● 802.11g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps, OFDM
	● 802.11a 4.9 GHz:
	    5 MHz: 13.5, 12, 9, 6, 4.5, 3, 2.25, 1.5 Mbps
	    10 MHz: 27, 24, 18, 12, 9, 6, 4.5, 3 Mbps
	    20 MHz: 54, 48, 36, 24, 18, 12, 9, 6 Mbps			

Multi-radio option— Frequency band and operating channels	Regulatory version	802.11a 5.8GHz	802.11b/g	4.9 GHz
	-A	5.725–5.850 GHz 16 channels (five nonoverlapping channels)	2.412–2.462 GHz 11 channels (three nonoverlapping channels)	4.940 – 4.990 GHz 5 MHz channel width ● 10 channels (10 nonoverlapping channels) 10 MHz channel width ● 5 channels (five nonoverlapping channels) 20 MHz channel width ● 2 channels (two nonoverlapping channels)

Item	Specification			
Transmit power **(Maximum transmit power will vary by channel, data rate, and individual country regulations)**	**Maximum:** • 2.4 GHz: 28 dBm • 4.9 GHz: 26 dBm • 5.8 GHz: 28 dBm			
Receive sensitivity (typical)	**802.11a 5.8 GHz** 6 Mbps: −91 dBm 9 Mbps: −90 dBm 12 Mbps: −89 dBm 18 Mbps: −86 dBm 24 Mbps: −84 dBm 36 Mbps: −80 dBm 48 Mbps: −76 dBm 54 Mbps: −73 dBm	**802.11b** 1 Mbps: −96 dBm 2 Mbps: −96 dBm 5.5 Mbps: −95dBm 11 Mbps: −92 dBm	**802.11g with MRC** 1 Mbps: −96 dBm 2 Mbps: −96 dBm 5.5 Mbps: −95 dBm 6 Mbps: −91 dBm 9 Mbps: −91 dBm 11 Mbps: −92 dBm 12 Mbps: −91 dBm 18 Mbps: −90 dBm 24 Mbps: −89 dBm 36 Mbps: −86 dBm 48 Mbps: −80 dBm 54 Mbps: −80 dBm	**802.11a 4.9 GHz, 5MHz** 1.5 Mbps: −93 dBm 2.25 Mbps: −93 dBm 3 Mbps: −93 dBm 4.5 Mbps: −92 dBm 6 Mbps: −88 dBm 9 Mbps: −85 dBm 12 Mbps: −80 dBm 13.5 Mbps: −79 dBm
				802.11a 4.9 GHz, 10 MHz 3 Mbps: −92 dBm 4.5 Mbps: −92 dBm 6 Mbps: −91 dBm 9 Mbps: −89 dBm 12 Mbps: −86 dBm 18 Mbps: −82 dBm 24 Mbps: −78 dBm 27 Mbps: −77 dBm
				802.11a 4.9 GHz, 20 MHz 6 Mbps: −89 dBm 9 Mbps: −89 dBm 12 Mbps: −88 dBm 18 Mbps: −86 dBm 24 Mbps: −83 dBm 36 Mbps: −80 dBm 48 Mbps: −75 dBm 54 Mbps: −74 dBm
Network interface	• 10/100/1000 Gigabit Ethernet, autosensing • Fiber SFP			
Networking features	• 16 Basic SSIDs • HTTP Webpage redirect			
Management	• LWAPP-based • Managed by Cisco wireless LAN controller and Cisco Wireless Control System (WCS)			
Security	**Wireless bridging/mesh** • X.509 digital certificates • MAC address authentication • Hardware-assisted AES encryption **Wireless access** • 802.11i • 802.1X authentication, including EAP-PEAP, EAP-TLS, EAP-TTLS, Cisco LEAP • Hardware-assisted AES, WPA, Temporal Key Integrity Protocol-Message Identity Check (TKIP-MIC) encryption • VPN pass-through • IP Security (IPsec), Layer 2 Tunneling Protocol (L2TP) • **MAC address filtering**			

Item	Specification
Compliance	**Safety** • UL 60950 • CAN/CSA-C22.2 No. 60950 • IEC 60950 • EN 60950 **Radio approvals** • FCC Part 15.247, 90.210 • FCC Bulletin OET-65C • RSS-210 • RSS-102 • AS/NZS 4268.2003 **EMI and susceptibility** • FCC part 15.107, 15.109 • ICES-003
Dimensions	12.0 in x 7.8 in x 6.4 in. (30.48 cm x 19.81 cm x 16.26 cm) (including antenna mount)
Weight	18 lbs. (8.20 kg) for basic access point to 26 lbs. (11.8 kg) for fully configured access point and mounting bracket
Operating temperature	–40 to 55°C (–40 to 131°F) plus Solar Loading
Storage temperature	–50 to 85°C (–58 to 185°F)
Environmental ratings	• IP67 • NEMA 4X
Wind resistance	• Up to 100 MPH sustained winds • Up to 165 MPH wind gusts
Immunity	• <= 5 mJ for 6kV/3kA @ 8/20 ms waveform • ANSI/IEEE C62.41 • EN61000-4-5 Level 4 AC Surge Immunity • EN61000-4-4 Level 4 Electrical Fast Transient Burst Immunity • EN61000-4-3 Level 4 EMC Field Immunity • EN61000-4-2 Level 4 ESD Immunity • EN60950 Overvoltage Category IV
Power options	• 90 - 480 VAC, 47–63 Hz • Power over Ethernet: 48 VDC, +/–10 percent • 12 VDC • Internal battery backup
Warranty	90 days
Wi-Fi certification	WiFi CERTIFIED

Ordering Information

To place an order, visit the Cisco Ordering Website at:
http://www.cisco.com/en/US/ordering/index.shtml

For detail parts lists and order information, please review the ordering guide at:
http://www.cisco.com/en/US/products/hw/wireless/index.html

The Cisco Aironet 1524 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 1524.

Table 3.   Part Numbers for the Cisco Aironet 1524

Part Number	Description
AIR-LAP1524PS-A-K9	Cisco Aironet 1524AG Lightweight Outdoor Mesh Access Point, Public Safety (4.9 GHz, 5.8 GHz, 2.4 GHz), FCC configuration

Antennas

The Cisco Aironet 1524 provides N-type connectors for the 2.4-GHz, 5.8-GHz and 4.9-GHz antennas.

It is certified for use with antenna types listed in Table 4.

Table 4.   Antennas for Cisco Aironet 1524

Part Number	Product Name
2.4-GHz antenna	
AIR-ANT2450V-N =	2.4-GHz, 5-dBi Omnidirectional Antenna with N Connector
AIR-ANT2480V-N =	2.4-GHz, 8.0-dBi Omnidirectional Antenna with N Connector
4.9 / 5-GHz antenna	
AIR-ANT5180V-N =	4.9 to 5.8-GHz, 8.0-dBi Omnidirectional Antenna with N Connector
AIR-ANT5114P-N =	4.9 to 5.8-GHz, 14.0-dBi Patch with N Connector
AIR-ANT5117S-N =	4.9 to 5.8-GHz, 17.0-dBi 90 degree sector with N Connector
AIR-ANT58G10SSA-N =	5.8-GHz, 9.5-dBi Sector Antenna with N Connector

Configurable Options

Cisco Aironet 1524 provides internal backup power option. Table 5 shows the part numbers for the battery options.

Table 5.   Cisco Aironet 1524 Battery Options

Part Number	Product Name
AIR-1520-BATT-6AH	Cisco Aironet 1520 Series Battery
AIR-1520-BATT-6AH=	Cisco Aironet 1520 Series Battery, spare

Accessory Options

Table 6 shows the accessory options that are available for the Cisco Aironet 1524.

Table 6.   Cisco Aironet 1524 Series Power Supply Options and Part Numbers

Part Number	Product Name
GLC-FE-100BX-URGD=	100BASE-BX10-U Rugged SFP
GLC-LX-SM-RGD=	1000-Mbps LX single-mode SFP module
GLC-SX-MM-RGD=	1000-Mbps SX multimode SFP module
AIR-ACCPMK1520=	Cisco Aironet 1520 Series Pole Mount Kit
AIR-BAND-INST-TL=	Cisco Aironet 1520 Series Band Installation Tool for the Pole Mount Kit
AIR-PWR-ST-LT-R3P=	Cisco Aironet 1520 Series Street Light Power Tap, 4 ft.
AIR-CORD-R3P-40UE=	Cisco Aironet 1520 Series AC Power Cord, 40 ft., Unterm, EU Harmonized
AIR-CORD-R3P-40NA=	Cisco Aironet 1520 Series AC Power Cord, 40 ft. N. Amer Plug
AIR-PWRINJ1500-2=	Cisco Aironet 1520 Series Power Injector

Service and Support

Cisco offers a wide range of services programs to accelerate customer success. These innovative programs are delivered through a unique combination of people, processes, tools, and partners, resulting in high levels of customer satisfaction. Cisco services help you protect your network investment, optimize network operations, and prepare your network for new applications to extend network intelligence and the power of your business. For more information about Cisco services, visit Cisco Technical Support Services or Cisco Advanced Services.

For more information about Cisco Aironet 1524 Lightweight Outdoor Mesh Access Points, contact your local account representative or visit: http://www.cisco.com/go/outdoorwireless

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