Cisco Aironet 3500p Access Point

Cisco Aironet® 3500p Access Point

- Ideal for high-density stadium and arena deployments
- Delivers more wireless capacity to enable a better fan experience, and 3G/4G cellular offload
- Purpose-built directional, narrow-beamwidth external antennas for targeted coverage and minimal interference
- Rugged metal housing and extended operating temperature

Cisco CleanAir Technology

Self-Healing and Self-Optimizing Wireless

- Classifies over 20 different types of interference, including non-Wi-Fi interference, within 5 to 30 seconds
- Automatic remedial action and less manual intervention

Troubleshooting Forensics for Faster Interference Resolution and Proactive Action

- Cisco CleanAir technology provides real-time, raw spectrum data to help with difficult-to-diagnose interference problems
- Air Quality Index provides a snapshot of network performance and the impact of interference
- Historic interference information for back-in-time analysis and faster problem solving
- 24/7 monitoring with remote access reduces travel and speeds resolution

Robust Security and Policy Enforcement

- Industry's first access point with non-Wi-Fi detection for off-channel rogues
- Supports rogue access point detection and detection of denial-of-service attacks
- Set policies to prohibit devices that interfere with the Wi-Fi network or jeopardize network security

Cisco® Aironet® 3500p Access Points are the newest members of the 3500 Series with Cisco CleanAir technology - the industry's first system to create a self-healing, self-optimizing 802.11n wireless network.

High-Density Deployments

The RF spectrum is limited, with mobile users demanding an increasing amount of capacity for video and other high-bandwidth applications. In environments such as stadiums and arenas, providing consistent and reliable Wi-Fi access can be challenging, especially as more mobile devices are packed into a confined area and high or nonexistent ceilings for access point installation.

The 3500p is designed with custom configuration settings and narrow-bandwidth, high-gain external antennas to provide targeted coverage for high-density deployments. This special system of directional antennas and power settings allow an organization to deploy more access points closer together, enabling more capacity, lower co-channel interference, and a better user experience. Because of the unique antenna and power settings, FCC regulations require the Cisco Aironet 3500p Access Point to be installed by a certified professional.

RF Excellence

Building on the Cisco Aironet heritage of RF excellence, the 3500p model delivers industry-leading performance for secure and reliable wireless connections. Enterprise-class chipsets and optimized radios deliver a robust mobility experience using Cisco M-Drive technology, which includes:

- Cisco CleanAir technology to intelligently detect and mitigate RF interference for high-performance 802.11n
- Cisco ClientLink technology to improve reliability and coverage for legacy clients

- Cisco BandSelect technology to improve 5-GHz client connections in mixed-client environments
- Cisco VideoStream technology, which uses multicast to improve rich-media applications

All of these features help ensure the best possible end-user experience on the wireless network.

Cisco also offers the industry's broadest selection of 802.11n antennas, delivering optimal coverage for a variety of deployment scenarios.

Scalability

The Cisco Aironet 3500p Access Point is a component of the Cisco Unified Wireless Network, which can scale up to 18,000 access points with full Layer 3 mobility across central or remote locations on the enterprise campus, in branch offices, and at remote sites. The Cisco Unified Wireless Network is the industry's most flexible, resilient, and scalable wireless network architecture, delivering secure access to mobility services and applications and offering the lowest total cost of ownership and investment protection by integrating seamlessly with the existing wired network.

Product Specifications

Table 1 lists the product specifications for Cisco Aironet 3500p Access Points.

Table 1.   Product Specifications for Cisco Aironet 3500p Access Points

Item	Specification
Part Numbers	**Cisco Aironet 3500p Access Point** **Controller-Based Access Point** **The Cisco Aironet 3500p: high-density environments, with narrow-beamwidth, high-gain, antennas** • AIR-CAP3502P-x-K9 - Dual-band controller-based 802.11a/g/n • AIR-CAP3502P-xK910 - Eco-pack (dual-band 802.11a/g/n) 10 quantity access points **Cisco SMARTnet® Service for the Cisco Aironet 3500p model with external antennas** • CON-SNT-CAP352Px - SMARTnet 8x5xNBD 3500p access point (dual-band 802.11 a/g/n) • Qty(10) CON-SNT-CAP352Px10 - SMARTnet 8x5xNBD 10 quantity eco-pack 3500p access point (dual-band 802.11a/g/n) **Cisco Wireless LAN Services** • AS-WLAN-CNSLT - Cisco Wireless LAN Network Planning and Design Service • AS-WLAN-CNSLT - Cisco Wireless LAN 802.11n Migration Service • AS-WLAN-CNSLT - Cisco Wireless LAN Performance and Security Assessment Service **Regulatory domains: (x = regulatory domain)** 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, visit: http://www.cisco.com/go/aironet/compliance. Not all regulatory domains have been approved. As they are approved, the part numbers will be available on the Global Price List.
Software	Cisco Unified Wireless Network Software Release 7.0 or later (autonomous IOS not supported)
802.11n Version 2.0 (and Related) Capabilities	• 2x3 multiple-input multiple-output (MIMO) with two spatial streams • Maximal ratio combining (MRC) • Legacy beamforming • 20- and 40-MHz channels • PHY data rates up to 300 Mbps • Packet aggregation: A-MPDU (Tx/Rx), A-MSDU (Tx/Rx) • 802.11 dynamic frequency selection (DFS) • Cyclic shift diversity (CSD) support

Item	Specification				
Data Rates Supported	**802.11a: 6, 9, 12, 18, 24, 36, 48, and 54 Mbps**				
	802.11g: 1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, and 54 Mbps				
	802.11n data rates (2.4 GHz and 5 GHz):				
	MCS Index[1]	**GI[2] = 800ns**		**GI = 400ns**	
		20-MHz Rate (Mbps)	**40-MHz Rate (Mbps)**	**20-MHz Rate (Mbps)**	**40-MHz Rate (Mbps)**
	0	6.5	13.5	7.2	15
	1	13	27	14.4	30
	2	19.5	40.5	21.7	45
	3	26	54	28.9	60
	4	39	81	43.3	90
	5	52	108	57.8	120
	6	58.5	121.5	65	135
	7	65	135	72.2	150
	8	13	27	14.4	30
	9	26	54	28.9	60
	10	39	81	43.3	90
	11	52	108	57.8	120
	12	78	162	86.7	180
	13	104	216	115.6	240
	14	117	243	130	270
	15	130	270	144.4	300

Item	Specification	
Frequency Band and 20-MHz Operating Channels	**A (A regulatory domain):** • 2.412 to 2.462 GHz; 11 channels • 5.180 to 5.320 GHz; 8 channels • 5.500 to 5.560 GHz, 4 channels • 5.680 to 5.700 GHz, 2 channels • 5.745 to 5.825 GHz; 5 channels **C (C regulatory domain):** • 2.412 to 2.472 GHz; 13 channels • 5.745 to 5.825 GHz; 5 channels **E (E regulatory domain):** • 2.412 to 2.472 GHz; 13 channels • 5.180 to 5.320 GHz; 8 channels • 5.500 to 5.700 GHz, 8 channels (excludes 5.600 to 5.640 GHz) **I (I regulatory domain):** • 2.412 to 2.472 GHz, 13 channels • 5.180 to 5.320 GHz; 8 channels **K (K regulatory domain):** • 2.412 to 2.472 GHz; 13 channels • 5.180 to 5.320 GHz; 8 channels • 5.500 to 5.620 GHz, 7 channels • 5.745 to 5.805 GHz, 4 channels	**N (N regulatory domain):** • 2.412 to 2.462 GHz; 11 channels • 5.745 to 5.825 GHz; 5 channels **Q (Q regulatory domain):** • 2.412 to 2.472 GHz; 13 channels • 5.180 to 5.320 GHz; 8 channels • 5.500 to 5.700 GHz; 11 channels **R (R regulatory domain):** • 2.412 to 2.472 GHz; 13 channels • 5.180 to 5.320 GHz; 8 channels • 5.660 to 5.700 GHz, 3 channels • 5.745 to 5.805 GHz; 4 channels **S (S regulatory domain):** • 2.412 to 2.472 GHz; 13 channels • 5.180 to 5.320 GHz; 8 channels • 5.745 to 5.825 GHz; 5 channels **T (T regulatory domain):** • 2.412 to 2.462 GHz; 11 channels • 5.280 to 5.320 GHz; 3 channels • 5.500 to 5.580 GHz; 5 channels • 5.660 to 5.700 GHz; 3 channels • 5.745 to 5.825 GHz; 5 channels

Note: 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.

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[1] MCS Index: The Modulation and Coding Scheme (MCS) index determines the number of spatial streams, the modulation, the coding rate, and data rate values.
[2] GI: A guard interval (GI) between symbols helps receivers overcome the effects of multipath delays.

Item	Specification		

Maximum Number of Nonoverlapping Channels	**2.4 GHz**
	• 802.11b/g:
	  ◦ 20 MHz: 3
	• 802.11n:
	  ◦ 20 MHz: 3
			5 GHz
			• 802.11a:
			  ◦ 20 MHz: 19
			• 802.11n:
			  ◦ 20 MHz: 19
			  ◦ 40 MHz: 9

Note: This varies by regulatory domain. Refer to the product documentation for specific details for each regulatory domain.			
Receive Sensitivity	**802.11b (CCK)** -101 dBm @ 1 Mb/s -98 dBm @ 2 Mb/s -92 dBm @ 5.5 Mb/s -89 dBm @ 11 Mb/s	**802.11g (non HT20)** -92 dBm @ 6 Mb/s -92 dBm @ 9 Mb/s -92 dBm @ 12 Mb/s -90 dBm @ 18 Mb/s -86 dBm @ 24 Mb/s -84 dBm @ 36 Mb/s -79 dBm @ 48 Mb/s -78 dBm @ 54 Mb/s	**802.11a (non HT20)** -93 dBm @ 6 Mb/s -93 dBm @ 9 Mb/s -92 dBm @ 12 Mb/s -90 dBm @ 18 Mb/s -87 dBm @ 24 Mb/s -84 dBm @ 36 Mb/s -79 dBm @ 48 Mb/s -79 dBm @ 54 Mb/s
	2.4-GHz **802.11n (HT20)** -92 dBm @ MCS0 -90 dBm @ MCS1 -88 dBm @ MCS2 -85 dBm @ MCS3 -82 dBm @ MCS4 -77 dBm @ MCS5 -76 dBm @ MCS6 -74 dBm @ MCS7 -92 dBm @ MCS8 -90 dBm @ MCS9 -87 dBm @ MCS10 -85 dBm @ MCS11 -82 dBm @ MCS12 -77 dBm @ MCS13 -75 dBm @ MCS14 -74 dBm @ MCS15	**5-GHz** **802.11n (HT20)** -93 dBm @ MCS0 -91 dBm @ MCS1 -89 dBm @ MCS2 -86 dBm @ MCS3 -83 dBm @ MCS4 -78 dBm @ MCS5 -77 dBm @ MCS6 -75 dBm @ MCS7 -87 dBm @ MCS8 -87 dBm @ MCS9 -85 dBm @ MCS10 -83 dBm @ MCS11 -79 dBm @ MCS12 -75 dBm @ MCS13 -73 dBm @ MCS14 -72 dBm @ MCS15	**5-GHz** **802.11n (HT40)** -91 dBm @ MCS0 -89 dBm @ MCS1 -87 dBm @ MCS2 -83 dBm @ MCS3 -80 dBm @ MCS4 -75 dBm @ MCS5 -74 dBm @ MCS6 -72 dBm @ MCS7 -86 dBm @ MCS8 -85 dBm @ MCS9 -84 dBm @ MCS10 -80 dBm @ MCS11 -77 dBm @ MCS12 -72 dBm @ MCS13 -71 dBm @ MCS14 -70 dBm @ MCS15

Maximum Transmit Power	**2.4 GHz**
	• 802.11b
	  ◦ 23 dBm with 2 antennas
	• 802.11g
	  ◦ 20 dBm with 2 antennas
	• 802.11n (non-HT duplicate mode)
	  ◦ 20 dBm with 2 antennas
	• 802.11n (HT20)
	  ◦ 20 dBm with 2 antennas
			5 GHz
			• 802.11a
			  ◦ 20 dBm with 2 antennas
			• 802.11n non-HT duplicate mode
			  ◦ 20 dBm with 2 antennas
			• 802.11n (HT20)
			  ◦ 20 dBm with 2 antennas
			• 802.11n (HT40)
			  ◦ 20 dBm with 2 antennas

Note: The maximum power setting will vary by channel and according to individual country regulations. Refer to the product documentation for specific details.			
Available Transmit Power Settings	**2.4 GHz** 20 dBm (100 mW) 17 dBm (50 mW) 14 dBm (25 mW) 11 dBm (12.5 mW) 8 dBm (6.25 mW) 5 dBm (3.13 mW) 2 dBm (1.56 mW) -1 dBm (0.78 mW)		**5 GHz** 17 dBm (50 mW) 14 dBm (25 mW) 11 dBm (12.5 mW) 8 dBm (6.25 mW) 5 dBm (3.13 mW) 2 dBm (1.56 mW) -1 dBm (0.78 mW)

Item	Specification
Note: The maximum power setting will vary by channel and according to individual country regulations. Refer to the product documentation for specific details.	
External Antenna (sold separately)	• Certified for use with antenna gains up to 13 dBi (2.4 GHz) and 7 dBi (5 GHz). • Cisco offers the industry's broadest selection of 802.11n antennas delivering optimal coverage for a variety of deployment scenarios.
Interfaces	• 10/100/1000BASE-T autosensing (RJ-45) • Management console port (RJ-45)
Indicators	• Status LED indicates boot loader status, association status, operating status, boot loader warnings, boot loader errors.
Dimensions (W x L x H)	• Access point (without mounting bracket): 8.7 x 8.7 x 1.84 in. (22.1 x 22.1 x 4.7 cm)
Weight	• 2.3 lbs (1.04 kg)
Environmental	• Nonoperating (storage) temperature: -40 to 185°F (-4 0 to 85°C) • Operating temperature: -4 to +131°F (-20 to +55°C) • Operating humidity: 10 to 90 percent (noncondensing)
System Memory	• 128-MB DRAM • 32-MB flash
Input Power Requirements	• AP3500: 44 to 57 VDC • Power Supply and Power Injector: 100 to 240 VAC; 50 to 60 Hz
Powering Options	• 802.3af Ethernet Switch • Cisco AP3500 Power Injectors (AIR-PWRINJ4=) • Cisco AP3500 Local Power Supply (AIR-PWR-B=)
Power Draw	• AP3500: 12.95 W **Note:** When deployed using Power over Ethernet (PoE), the power drawn from the power sourcing equipment will be higher by some amount dependent on the length of the interconnecting cable. This additional power may be as high as 2.45W, bringing the total system power draw (access point + cabling) to 15.4W.
Warranty	Limited Lifetime Hardware Warranty

Compliance Standards	• Safety:
	  ◦ UL 60950-1
	  ◦ CAN/CSA-C22.2 No. 60950-1
	  ◦ UL 2043
	  ◦ IEC 60950-1
	  ◦ EN 60950-1
	• Radio approvals:
	  ◦ FCC Part 15.247, 15.407
	  ◦ RSS-210 (Canada)
	  ◦ EN 300.328, EN 301.893 (Europe)
	  ◦ ARIB-STD 33 (Japan)
	  ◦ ARIB-STD 66 (Japan)
	  ◦ ARIB-STD T71 (Japan)
	  ◦ EMI and susceptibility (Class B)
	  ◦ FCC Part 15.107 and 15.109
	  ◦ ICES-003 (Canada)
	  ◦ VCCI (Japan)
	  ◦ EN 301.489-1 and -17 (Europe)
	  ◦ EN 60601-1-2 EMC requirements for the Medical Directive 93/42/EEC
	• IEEE Standard:
	  ◦ IEEE 802.11a/b/g, IEEE 802.11n 2.0, IEEE 802.11h, IEEE 802.11d
	• Security:
	  ◦ 802.11i, Wi-Fi Protected Access 2 (WPA2), WPA
	  ◦ 802.1X
	  ◦ Advanced Encryption Standards (AES), Temporal Key Integrity Protocol (TKIP)
	• EAP Type(s):
	  ◦ Extensible Authentication Protocol-Transport Layer Security (EAP-TLS)
	  ◦ EAP-Tunneled TLS (TTLS) or Microsoft Challenge Handshake Authentication Protocol Version 2 (MSCHAPv2)

Item	Specification
	◦ Protected EAP (PEAP) v0 or EAP-MSCHAPv2
	◦ Extensible Authentication Protocol-Flexible Authentication via Secure Tunneling (EAP-FAST)
	◦ PEAPv1 or EAP-Generic Token Card (GTC)
	◦ EAP-Subscriber Identity Module (SIM)
	• Multimedia:
	◦ Wi-Fi Multimedia (WMM™)
	• Other:
	◦ FCC Bulletin OET-65C
	◦ RSS-102

Limited Lifetime Hardware Warranty

This Cisco Aironet 3500p Access Point comes with a Limited Lifetime Warranty that provides full warranty coverage of the hardware for as long as the original end user continues to own or use the product. The warranty includes 10-day advance hardware replacement and ensures that software media is defect-free for 90 days. For more details, visit: http://www.cisco.com/go/warranty.

Cisco Wireless LAN Services

Seamlessly integrate mobile services and take full advantage of the systemwide capabilities of the Cisco Unified Wireless Network with services from Cisco and our partners. Better utilize the self-healing, self-optimizing features built into the silicon-level intelligence of CleanAir technology and the increased performance of the 802.11n standard while simplifying the transition to these new technologies. For more details, visit http://www.cisco.com/go/wirelesslanservices.

For More Information

For more information about the Cisco Aironet 3500 Series, visit http://www.cisco.com/go/wireless or contact your local account representative.

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