# Cisco Aironet 3500 Series Access Point

**Indoor Access Points**

**Cisco Aironet® 3500i Model**

- Sleek design with internal antennas
- Ideal for carpeted offices

**Cisco Aironet 3500e Model**

- Rugged metal housing and extended operating temperature
- Ideal for factories, warehouses, and other indoor industrial environments
- Versatile RF coverage with external antennas
- UL 2043 plenum-rated for above-ceiling installation options or suspended from drop ceilings

**Self-Healing and Self-Optimizing Wireless**

- Classify 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**

- Spectrum Expert Connect 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 x 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
- Management frame protection detects malicious users and alerts network administrators
- Set policies to prohibit devices that interfere with the Wi-Fi network or jeopardize network security

Cisco® Aironet® 3500 Series Access Points with Cisco CleanAir technology are the industry's first 802.11n access points to create a self-healing, self-optimizing wireless network. CleanAir technology is a systemwide feature of the Cisco Unified Wireless Network that improves air quality by detecting RF interference that other systems can't recognize, identifying the source, locating it on a map, and then making automatic adjustments to optimize wireless coverage. These innovative access points provide the highest-performance 802.11n connectivity for mission-critical mobility. By intelligently avoiding interference, the 3500 Series offers performance protection for 802.11n networks to help ensure reliable application delivery.

## RF Excellence

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

- ClientLink improves reliability and coverage for legacy clients
- BandSelect improves 5-GHz client connections in mixed client environments
- VideoStream 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 3500 Series 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 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 3500 Series Access Points.

**Table 1.** Product Specifications for Cisco Aironet 3500 Series Access Points

| Item | Specification |
|---|---|
| **Part Numbers** | **Cisco Aironet 3500 Series Access Point**<br>**Controller-Based Access Point**<br>**The Cisco Aironet 3500i mode - Indoor environments, with internal antennas**<br>• AIR-CAP3502I-x-K9 - Dual-band controller-based 802.11a/g/n<br>• AIR-CAP3501I-x-K9 - Single-band controller-based 802.11g/n<br>• AIR-CAP3502I-xK910 - Eco-pack (dual-band 802.11a/g/n) 10 quantity access points<br>**The Cisco Aironet 3500e mode - Indoor, challenging environments, with external antennas**<br>• AIR-CAP3502E-x-K9 - Dual-band controller-based 802.11a/g/n<br>• AIR-CAP3501E-x-K9 - Single-band controller-based 802.11g/n<br>• AIR-CAP3502E-xK910 - Eco-pack (dual-band 802.11a/g/n) 10 quantity access points<br>**Cisco SMARTnet® Services for the Cisco Aironet 3500i model with internal antennas**<br>• CON-SNT-CAP352Ix - SMARTnet 8x5xNBD 3500i access point (dual-band 802.11 a/g/n)<br>• CON-SNT-CAP351Ix - SMARTnet 8x5xNBD 3500i access point (single-band 802.11 g/n)<br>• Qty(10) CON-SNT-CAP352Ix - SMARTnet 8x5xNBD 10 quantity eco-pack 3500i access point (dual-band 802.11a/g/n)<br>**SMARTnet Services for the Cisco Aironet 3500e model with external antennas**<br>• CON-SNT-CAP3502x - SMARTnet 8x5xNBD 3500e access point (dual-band 802.11 a/g/n)<br>• CON-SNT-CAP3501x - SMARTnet 8x5xNBD 3500e access point (single-band 802.11 g/n)<br>• Qty(10) CON-SNT-CAP3502x - SMARTnet 8x5xNBD 10 quantity eco-pack 3500e access point (dual-band 802.11a/g/n)<br>**Cisco Wireless LAN Services**<br>• AS-WLAN-CNSLT - Cisco Wireless LAN Network Planning and Design Service<br>• AS-WLAN-CNSLT - Cisco Wireless LAN 802.11n Migration Service<br>• AS-WLAN-CNSLT - Cisco Wireless LAN Performance and Security Assessment Service<br>**Regulatory domains: (x = regulatory domain)**<br>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.<br>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. |
| **802.11n Version 2.0 (and Related) Capabilities** | • 2x3 multiple-input multiple-output (MIMO) with two spatial streams<br>• Maximal ratio combining (MRC)<br>• Legacy beamforming<br>• 20- and 40-MHz channels<br>• PHY data rates up to 300 Mbps<br>• Packet aggregation: A-MPDU (Tx/Rx), A-MSDU (Tx/Rx)<br>• 802.11 dynamic frequency selection (DFS)<br>• Cyclic shift diversity (CSD) support |
| **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** |

[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.

| Item | Specification | | | | |
|---|---|---|---|---|---|
| | | **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 |

| | | |
|---|---|---|
| **Frequency Band and 20-MHz Operating Channels** | **A (A regulatory domain):**<br>• 2.412 to 2.462 GHz; 11 channels<br>• 5.180 to 5.320 GHz; 8 channels<br>• 5.500 to 5.700 GHz, 8 channels (excludes 5.600 to 5.640 GHz)<br>• 5.745 to 5.825 GHz; 5 channels<br>**C (C regulatory domain):**<br>• 2.412 to 2.472 GHz; 13 channels<br>• 5.745 to 5.825 GHz; 5 channels<br>**E (E regulatory domain):**<br>• 2.412 to 2.472 GHz; 13 channels<br>• 5.180 to 5.320 GHz; 8 channels<br>• 5.500 to 5.700 GHz, 8 channels (excludes 5.600 to 5.640 GHz)<br>**I (I regulatory domain):**<br>• 2.412 to 2.472 GHz, 13 channels<br>• 5.180 to 5.320 GHz; 8 channels<br>**K (K regulatory domain):**<br>• 2.412 to 2.472 GHz; 13 channels<br>• 5.180 to 5.320 GHz; 8 channels<br>• 5.500 to 5.620 GHz, 7 channels<br>• 5.745 to 5.805 GHz, 4 channels | **N (N regulatory domain):**<br>• 2.412 to 2.462 GHz; 11 channels<br>• 5.180 to 5.320 GHz; 8 channels<br>• 5.745 to 5.825 GHz; 5 channels<br>**Q (Q regulatory domain):**<br>• 2.412 to 2.472 GHz; 13 channels<br>• 5.180 to 5.320 GHz; 8 channels<br>• 5.500 to 5.700 GHz; 11 channels<br>**S (S regulatory domain):**<br>• 2.412 to 2.472 GHz; 13 channels<br>• 5.180 to 5.320 GHz; 8 channels<br>• 5.745 to 5.825 GHz; 5 channels<br>**T (T regulatory domain):**<br>• 2.412 to 2.462 GHz; 11 channels<br>• 5.280 to 5.320 GHz; 3 channels<br>• 5.500 to 5.700 GHz, 11 channels<br>• 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. | | |
| **Maximum Number of Nonoverlapping Channels** | **2.4 GHz**<br>• 802.11b/g:<br>◦ 20 MHz: 3<br>• 802.11n:<br>◦ 20 MHz: 3 | **5 GHz**<br>• 802.11a:<br>◦ 20 MHz: 21<br>• 802.11n:<br>◦ 20 MHz: 21<br>◦ 40 MHz: 9 |
| **Note:** This varies by regulatory domain. Refer to the product documentation for specific details for each regulatory domain. | | |

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|---|---|---|---|
| **Receive Sensitivity** | **802.11b (CCK)**<br>-101 dBm @ 1 Mb/s<br>-98 dBm @ 2 Mb/s | **802.11g (non HT20)**<br>-92 dBm @ 6 Mb/s<br>-92 dBm @ 9 Mb/s | **802.11a (non HT20)**<br>-93 dBm @ 6 Mb/s<br>-93 dBm @ 9 Mb/s |

[2] GI: A guard interval (GI) between symbols helps receivers overcome the effects of multipath delays.

| Item | Specification | | | |
|---|---|---|---|---|
| | -92 dBm @ 5.5 Mb/s<br>-89 dBm @ 11 Mb/s | -92 dBm @ 12 Mb/s<br>-90 dBm @ 18 Mb/s<br>-86 dBm @ 24 Mb/s<br>-84 dBm @ 36 Mb/s<br>-79 dBm @ 48 Mb/s<br>-78 dBm @ 54 Mb/s | -92 dBm @ 12 Mb/s<br>-90 dBm @ 18 Mb/s<br>-87 dBm @ 24 Mb/s<br>-84 dBm @ 36 Mb/s<br>-79 dBm @ 48 Mb/s<br>-79 dBm @ 54 Mb/s | |
| | **2.4-GHz**<br>**802.11n (HT20)**<br>-92 dBm @ MCS0<br>-90 dBm @ MCS1<br>-88 dBm @ MCS2<br>-85 dBm @ MCS3<br>-82 dBm @ MCS4<br>-77 dBm @ MCS5<br>-76 dBm @ MCS6<br>-74 dBm @ MCS7<br>-92 dBm @ MCS8<br>-90 dBm @ MCS9<br>-87 dBm @ MCS10<br>-85 dBm @ MCS11<br>-82 dBm @ MCS12<br>-77 dBm @ MCS13<br>-75 dBm @ MCS14<br>-74 dBm @ MCS15 | | **5-GHz**<br>**802.11n (HT20)**<br>-93 dBm @ MCS0<br>-91 dBm @ MCS1<br>-89 dBm @ MCS2<br>-86 dBm @ MCS3<br>-83 dBm @ MCS4<br>-78 dBm @ MCS5<br>-77 dBm @ MCS6<br>-75 dBm @ MCS7<br>-87 dBm @ MCS8<br>-87 dBm @ MCS9<br>-85 dBm @ MCS10<br>-83 dBm @ MCS11<br>-79 dBm @ MCS12<br>-75 dBm @ MCS13<br>-73 dBm @ MCS14<br>-72 dBm @ MCS15 | **5-GHz**<br>**802.11n (HT40)**<br>-91 dBm @ MCS0<br>-89 dBm @ MCS1<br>-87 dBm @ MCS2<br>-83 dBm @ MCS3<br>-80 dBm @ MCS4<br>-75 dBm @ MCS5<br>-74 dBm @ MCS6<br>-72 dBm @ MCS7<br>-86 dBm @ MCS8<br>-85 dBm @ MCS9<br>-84 dBm @ MCS10<br>-80 dBm @ MCS11<br>-77 dBm @ MCS12<br>-72 dBm @ MCS13<br>-71 dBm @ MCS14<br>-70 dBm @ MCS15 |
| **Maximum Transmit Power** | **2.4 GHz**<br>• 802.11b<br>◦ 23 dBm with 2 antennas<br>• 802.11g<br>◦ 20 dBm with 2 antennas<br>• 802.11n (non-HT duplicate mode)<br>◦ 20 dBm with 2 antennas<br>• 802.11n (HT20)<br>◦ 20 dBm with 2 antennas | | **5 GHz**<br>• 802.11a<br>◦ 20 dBm with 2 antennas<br>• 802.11n non-HT duplicate mode<br>◦ 20 dBm with 2 antennas<br>• 802.11n (HT20)<br>◦ 20 dBm with 2 antennas<br>• 802.11n (HT40)<br>◦ 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**<br>23 dBm (200 mW) CCK Only<br>20 dBm (100 mW)<br>17 dBm (50 mW)<br>14 dBm (25 mW)<br>11 dBm (12.5 mW)<br>8 dBm (6.25 mW)<br>5 dBm (3.13 mW)<br>2 dBm (1.56 mW)<br>-1 dBm (0.78 mW) | | **5 GHz**<br>20 dBm (100 mW)<br>17 dBm (50 mW)<br>14 dBm (25 mW)<br>11 dBm (12.5 mW)<br>8 dBm (6.25 mW)<br>5 dBm (3.13 mW)<br>2 dBm (1.56 mW)<br>-1 dBm (0.78 mW) | |
| **Note:** The maximum power setting will vary by channel and according to individual country regulations. Refer to the product documentation for specific details. | | | | |
| **Integrated Antenna** | • 2.4 GHz, Gain 4 dBi, internal Omni, horizontal beamwidth 360°<br>• 5 GHz, Gain 3 dBi, internal Omni, horizontal beamwidth 360° | | | |
| **External Antenna (sold separately)** | • 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)<br>• 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) | | | |

| Item | Specification |
|---|---|
| **Environmental** | **Cisco Aironet 3500i**<br>• Nonoperating (storage) temperature: -22 to 185°F (-30 to 85°C)<br>• Operating temperature: 32 to 104°F (0 to 40°C)<br>• Operating humidity: 10 to 90% percent (noncondensing)<br>**Cisco Aironet 3500e**<br>• Nonoperating (storage) temperature: -40 to 185°F (-40 to 85°C)<br>• Operating temperature: -4 to +131°F (-20 to +55°C)<br>• Operating humidity: 10 to 90 percent (noncondensing) |
| **System Memory** | • 128 MB DRAM<br>• 32 MB flash |
| **Input Power Requirements** | • AP3500: 44 to 57 VDC<br>• Power Supply and Power Injector: 100 to 240 VAC; 50 to 60 Hz |
| **Powering Options** | • 802.3af Ethernet Switch<br>• Cisco AP3500 Power Injectors (AIR-PWRINJ4=)<br>• Cisco AP3500 Local Power Supply (AIR-PWR-B=) |
| **Power Draw** | • AP3500: 12.95 W<br>**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:<br>◦ UL 60950-1<br>◦ CAN/CSA-C22.2 No. 60950-1<br>◦ UL 2043<br>◦ IEC 60950-1<br>◦ EN 60950-1<br>• Radio approvals:<br>◦ FCC Part 15.247, 15.407<br>◦ RSS-210 (Canada)<br>◦ EN 300.328, EN 301.893 (Europe)<br>◦ ARIB-STD 33 (Japan)<br>◦ ARIB-STD 66 (Japan)<br>◦ ARIB-STD T71 (Japan)<br>◦ EMI and susceptibility (Class B)<br>◦ FCC Part 15.107 and 15.109<br>◦ ICES-003 (Canada)<br>◦ VCCI (Japan)<br>◦ EN 301.489-1 and -17 (Europe)<br>◦ EN 60601-1-2 EMC requirements for the Medical Directive 93/42/EEC<br>• IEEE Standard:<br>◦ IEEE 802.11a/b/g, IEEE 802.11n 2.0, IEEE 802.11h, IEEE 802.11d<br>• Security:<br>◦ 802.11i, Wi-Fi Protected Access 2 (WPA2), WPA<br>◦ 802.1X<br>◦ Advanced Encryption Standards (AES), Temporal Key Integrity Protocol (TKIP)<br>• EAP Type(s):<br>◦ Extensible Authentication Protocol-Transport Layer Security (EAP-TLS)<br>◦ EAP-Tunneled TLS (TTLS) or Microsoft Challenge Handshake Authentication Protocol Version 2 (MSCHAPv2)<br>◦ Protected EAP (PEAP) v0 or EAP-MSCHAPv2<br>◦ Extensible Authentication Protocol-Flexible Authentication via Secure Tunneling (EAP-FAST)<br>◦ PEAPv1 or EAP-Generic Token Card (GTC)<br>◦ EAP-Subscriber Identity Module (SIM)<br>• Multimedia:<br>◦ Wi-Fi Multimedia (WMM™)<br>• Other:<br>◦ FCC Bulletin OET-65C<br>◦ RSS-102 |

### Limited Lifetime Hardware Warranty

This Cisco Aironet 3500 Series 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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Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco Website at **www.cisco.com/go/offices.**



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