Cisco Aironet 1600 Series Access Point

Industrial Design

- Sleek design with internal antennas, ideal for office environments
- Extended operating temperature, ideal for factories, warehouses, and other indoor industrial environments
- Versatile RF coverage with optional external antennas
- UL 2043 plenum-rated for above-ceiling installation options or suspended from drop ceilings

Easy Installation and Power Efficient

- 802.11n performance with existing PoE switches
- Sleek design blends into a variety of indoor environments

Easy-to-Install Multipurpose Mounting Bracket

- Designed for easy replacement of existing access points
- Locks for theft protection

Deployment Options

- Controller-based or standalone deployment options

Secure Connections

- Supports rogue access point detection and denial-of service attacks
- Management frame protection detects malicious users and alerts network administrators

Cisco ClientLink 2.0 Beamforming

- Faster mobile client connections
- Support for all client types without any client requirements or dependencies
- More efficient use of mobile device batteries

Cisco CleanAir Express* Spectrum Intelligence

- Identifies, classifies and provides automatic remedial actions for different types of interference
- Locates and visualizes sources of interference

Cisco VideoStream Technology

- Efficient multicast-to-unicast conversion
- Video call admission control to prevent oversubscription
- Queue prioritization to help ensure best user experience for corporate videos

The new Cisco Aironet® 1600 Series Access Point is an enterprise-class, entry-level, 802.11n-based access point designed to address the wireless connectivity needs of small and medium-sized enterprise networks.

The Aironet 1600 Series delivers great performance at an attractive price for customers while providing advanced functionality such as CleanAir Express* for better cover through spectrum intelligence and Clientlink 2.0 for entry level networks that have a mixed client base. In addition to these features, the Aironet 1600 series includes 802.11n-based 3x3 multiple-input multiple-output (MIMO) technology with two spatial streams, making it ideal for small and medium-sized enterprises.

The Aironet 1600 Series also provides at least six times the throughput of existing 802.11a/g networks. As part of the Cisco® Aironet Wireless portfolio, the Cisco Aironet 1600 Series access point provides low total cost of ownership and investment protection by integrating seamlessly with the existing network. With an entry-level path to 802.11n migration, the Aironet 1600 Series can add capacity to the network for future growth for expanding applications and bandwidth.

Designed with rapidly evolving mobility needs in mind, the Cisco Aironet 1600 Series Access Point addresses the bring-your-own-device (BYOD) trend by providing advanced functionality at the right price point.

* Available via future release.

RF Excellence

Building on the Cisco Aironet heritage of RF excellence, the Cisco Aironet 1600 Series delivers secure and reliable wireless connections. Enterprise-class chipsets and optimized radios deliver a robust mobility experience with:

- 802.11n with 3x3 multiple-input multiple-output (MIMO) technology with two spatial streams, which sustains 300-Mbps rates over a greater range for more capacity and reliability than competing access points
- Radio resource management (RRM): Automated self-healing optimizes the unpredictability of RF to reduce dead spots and help ensure high-availability client connections
- CleanAir Express: Effectively detects RF interference and provides basic spectrum analysis capability while simplifying ongoing operations
- Cisco ClientLink 2.0 technology: Improves downlink performance to all mobile devices including 802.11n while improving battery life on mobile devices such as smartphones and tablets
- Cisco BandSelect technology: Improves 5-GHz client connections in mixed-client environments

  Cisco VideoStream technology: Uses multicast to improve rich-media applications
- Building on the Cisco 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 1600 Series is a component of the Cisco Unified Wireless Network, which can scale to 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

Cisco Network Assistant

For quick and easy setup of your access points, Cisco Network Assistant provides a centralized network view with a user-friendly GUI that simplifies configuration, management and troubleshooting. Using Cisco Network Assistant you can easily discover and initialize your network of stand-alone access points.

Cisco Network Assistant is available free, and can be downloaded here: http://www.cisco.com/go/cna.

Product Specifications

Table 1 lists the product specifications for Cisco Aironet 1600 Series Access Points.

Table 1. Product Specifications for Cisco Aironet 1600 Series Access Points

Item	Specification
Part Numbers	**The Cisco Aironet 1600i Access Point: Indoor environments, with internal antennas** • AIR-CAP1602I-x-K9 Dual-band controller-based 802.11a/g/n • AIR-CAP1602I-xK910 Eco-pack (dual-band controller-based 802.11a/g/n) 10 quantity access points • AIR-SAP1602I-x-K9 Dual-band stand-alone 802.11a/g/n • AIR-SAP1602I-xK9-5 Eco-pack (dual-band stand-alone 802.11a/g/n) 5 quantity access points **The Cisco Aironet 1600e Access Point: Indoor, challenging environments, with external antennas** • AIR-CAP1602E-x-K9 Dual-band controller-based 802.11a/g/n • AIR-CAP1602E-xK910 Eco-pack (dual-band 802.11a/g/n) 10 quantity access points • AIR-SAP1602E-x-K9 Dual-band stand-alone 802.11a/g/n • AIR-SAP1602E-xK9-5 Eco-pack (dual-band stand-alone 802.11a/g/n) 5 quantity access points

<table>
<tr><th>Item</th><th>Specification</th></tr>
<tr><td></td><td>Cisco SMARTnet® Service for the Cisco Aironet 1600 Series Access Point with internal and external antennas
CON-SNT-C1602Ix - SMARTnet 8x5xNBD 1600i access point (dual-band 802.11 a/g/n, Controller-based), (e.g. CON-SNT-C1602IE for AP1600 internal antenna for E Domain, Controller based)
CON-SNT-C1602Ex - SMARTnet 8x5xNBD 1600e access point (dual-band 802.11 a/g/n, Controller-based), (e.g. CON-SNT-C1602EA for AP1600 external antenna for A Domain, Controller based)
CON-SNT-S1602Ix - SMARTnet 8x5xNBD 1600i access point (dual-band 802.11 a/g/n, Stand-alone), (e.g. CON-SNT-S1602IE for AP1600 internal antenna for E Domain, stand-alone)
CON-SNT-S1602Ex - SMARTnet 8x5xNBD 1600e access point (dual-band 802.11 a/g/n, Stand-alone), (e.g. CON-SNT-S1602EA for AP1600 external antenna for A Domain, Stand-alone)
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, please 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.</td></tr>
<tr><td>Software</td><td>Cisco Unified Wireless Network Software (available in Q4CY12)
Cisco IOS® Software Release (available in Q4CY12)</td></tr>
<tr><td>802.11n</td><td>3 x 3 multiple-input multiple-output (MIMO) with two spatial streams
Maximal ratio combining (MRC)
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) (Bin 5)
Cyclic shift diversity (CSD) support</td></tr>
<tr><td>Data Rates Supported</td><td>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[1] and 5 GHz):
<table>
<tr><th rowspan="2">MCS Index[2]</th><th colspan="2">GI[3] = 800ns</th><th colspan="2">GI = 400ns</th></tr>
<tr><th>20-MHz Rate (Mbps)</th><th>40-MHz Rate (Mbps)</th><th>20-MHz Rate (Mbps)</th><th>40-MHz Rate (Mbps)</th></tr>
<tr><td>0</td><td>6.5</td><td>13.5</td><td>7.2</td><td>15</td></tr>
<tr><td>1</td><td>13</td><td>27</td><td>14.4</td><td>30</td></tr>
<tr><td>2</td><td>19.5</td><td>40.5</td><td>21.7</td><td>45</td></tr>
<tr><td>3</td><td>26</td><td>54</td><td>28.9</td><td>60</td></tr>
<tr><td>4</td><td>39</td><td>81</td><td>43.3</td><td>90</td></tr>
<tr><td>5</td><td>52</td><td>108</td><td>57.8</td><td>120</td></tr>
<tr><td>6</td><td>58.5</td><td>121.5</td><td>65</td><td>135</td></tr>
<tr><td>7</td><td>65</td><td>135</td><td>72.2</td><td>150</td></tr>
<tr><td>8</td><td>13</td><td>27</td><td>14.4</td><td>30</td></tr>
<tr><td>9</td><td>26</td><td>54</td><td>28.9</td><td>60</td></tr>
<tr><td>10</td><td>39</td><td>81</td><td>43.3</td><td>90</td></tr>
<tr><td>11</td><td>52</td><td>108</td><td>57.8</td><td>120</td></tr>
<tr><td>12</td><td>78</td><td>162</td><td>86.7</td><td>180</td></tr>
<tr><td>13</td><td>104</td><td>216</td><td>115.6</td><td>240</td></tr>
</table></td></tr>
</table>

[1] 2.4 GHz: 2 GHz does not support 40 MHz.

[2] MCS Index: The Modulation and Coding Scheme (MCS) index determines the number of spatial streams, the modulation, the coding rate, and data rate values.

[3] GI: A Guard Interval (GI) between symbols helps receivers overcome the effects of multipath delays.

Item	Specification				
	14	117	243	130	270
	15	130	270	144.4	300
Frequency Band and 20-MHz Operating Channels	**A Regulatory Domain:** • 2.412 to 2.462 GHz; 11 channels • 5.180 to 5.320 GHz; 8 channels • 5.500 to 5.700 GHz; 8 channels (excludes 5.600 to 5.640 GHz) • 5.745 to 5.825 GHz; 5 channels **C Regulatory Domain:** • 2.412 to 2.472 GHz; 13 channels • 5.745 to 5.825 GHz; 5 channels **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) **F Regulatory Domain:** • 2.412 to 2.472 GHz; 13 channels • 5.745 to 5.805 GHz; 4 channels **I Regulatory Domain:** • 2.412 to 2.472 GHz; 13 channels • 5.180 to 5.320 GHz; 8 channels **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 Regulatory Domain:** • 2.412 to 2.462 GHz; 11 channels • 5.180 to 5.320 GHz; 8 channels • 5.745 to 5.825 GHz; 5 channels **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 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 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 • 5.745 to 5.825 GHz; 5 channels **T Regulatory Domain:** • 2.412 to 2.462 GHz; 11 channels • 5.280 to 5.320 GHz; 3 channels • 5.500 to 5.700 GHz; 8 channels (excludes 5.600 to 5.640 GHz) • 5.745 to 5.825 GHz; 5 channels **Z Regulatory Domain:** • 2.412 to 2.462 GHz; 11 channels • 5.180 to 5.320 GHz; 8 channels • 5.500 to 5.700 GHz; 8 channels (excludes 5.600 to 5.640 GHz) • 5.745 to 5.825 GHz; 5 channels	
Note: This varies by regulatory domain. Refer to the product documentation for specific details for each regulatory domain.					
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: 24 • 802.11n: ◦ 20 MHz: 24 ◦ 40 MHz: 11		
Note: This varies by regulatory domain. Refer to the product documentation for specific details for each regulatory domain.					
Receive Sensitivity	**2.4 GHz** **802.11b** -101 dBm @ 1 Mb/s -99 dBm @ 2 Mb/s -92 dBm @ 5.5 Mb/s -89 dBm @ 11 Mb/s	**2.4 GHz** **802.11g** -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 -85 dBm @ 36 Mb/s -80 dBm @ 48 Mb/s -79 dBm @ 54 Mb/s	**5 GHz** **802.11a** -92 dBm @ 6 Mb/s -91 dBm @ 9 Mb/s -91 dBm @ 12 Mb/s -89 dBm @ 18 Mb/s -86 dBm @ 24 Mb/s -83 dBm @ 36 Mb/s -79 dBm @ 48 Mb/s -78 dBm @ 54 Mb/s		

Item	Specification					
	2.4 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 -76 dBm @ MCS7 -93 dBm @ MCS8 -90 dBm @ MCS9 -88 dBm @ MCS10 -85 dBm @ MCS11 -81 dBm @ MCS12 -77 dBm @ MCS13 -76 dBm @ MCS14 -74 dBm @ MCS15		**5 GHz** **802.11n (HT20)** -92 dBm @ MCS0 -89 dBm @ MCS1 -88 dBm @ MCS2 -85 dBm @ MCS3 -82 dBm @ MCS4 -77 dBm @ MCS5 -76 dBm @ MCS6 -75 dBm @ MCS7 -91 dBm @ MCS8 -88 dBm @ MCS9 -87 dBm @ MCS10 -84 dBm @ MCS11 -81 dBm @ MCS12 -76 dBm @ MCS13 -75 dBm @ MCS14 -73 dBm @ MCS15	**5 GHz** **802.11n (HT40)** -88 dBm @ MCS0 -87 dBm @ MCS1 -85 dBm @ MCS2 -82 dBm @ MCS3 -79 dBm @ MCS4 -74 dBm @ MCS5 -73 dBm @ MCS6 -72 dBm @ MCS7 -88 dBm @ MCS8 -86 dBm @ MCS9 -84 dBm @ MCS10 -81 dBm @ MCS11 -78 dBm @ MCS12 -73 dBm @ MCS13 -72 dBm @ MCS14 -70 dBm @ MCS15
Maximum Total Transmit Power	**2.4 GHz** • 802.11b ◦ 22 dBm (3 antennas enabled) • 802.11g ◦ 22 dBm (3 antennas enabled) • 802.11n (HT20) ◦ 22 dBm (3 antennas enabled)		**5 GHz** • 802.11a ◦ 22 dBm (3 antennas enabled) • 802.11n non-HT duplicate mode ◦ 22 dBm (3 antennas enabled) • 802.11n (HT20) ◦ 22 dBm (3 antennas enabled) • 802.11n (HT40) ◦ 22 dBm (3 antennas enabled)			
Note: The maximum power setting will vary by channel and according to individual country regulations. Refer to the product documentation for specific details.						
Available Total Transmit Power Settings	**2.4 GHz**			**5 GHz**		
	Enabled antennas:			Enabled antennas:		
	1	2	3	1	2	3
	17 dBm 14 dBm 11 dBm 8 dBm 5 dBm 2 dBm	20 dBm 17 dBm 14 dBm 11 dBm 8 dBm 5 dBm	22 dBm 19 dBm 16 dBm 13 dBm 10 dBm 7 dBm	17 dBm 14 dBm 11 dBm 8 dBm 5 dBm 2 dBm	20 dBm 17 dBm 14 dBm 11 dBm 8 dBm 5 dBm	22 dBm 19 dBm 16 dBm 13 dBm 10 dBm 7 dBm
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 4.0 dBi, horizontal beamwidth 360° • 5 GHz, gain 4.0 dBi, horizontal beamwidth 360°					
External Antenna (Sold Separately)	• Certified for use with antenna gains up to 6 dBi (2.4 GHz and 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	• 1.9 lbs. (0.86 kg)					

Item	Specification
Environmental	**Cisco Aironet 1600i** • Nonoperating (storage) temperature: -22 to 158°F (-30 to 70°C) • Nonoperating (storage) Altitude Test -25°C, 15,000 ft. • Operating temperature: 32 to 104°F (0 to 40°C) • Operating humidity: 10 to 90% percent (noncondensing) • Operating Altitude Test -40°C, 9843 ft. **Cisco Aironet 1600e** • Nonoperating (storage) temperature: -22 to 158°F (-30 to 70°C) • Nonoperating (storage) Altitude Test - 25°C, 15,000 ft. • Operating temperature: -4 to 122°F (-20 to 50°C) • Operating humidity: 10 to 90 percent (noncondensing) • Operating Altitude Test -40°C, 9843 ft
System Memory	• 256 MB DRAM • 32 MB flash
Input Power Requirements	• AP1600: 44 to 57 VDC • Power Supply and Power Injector: 100 to 240 VAC; 50 to 60 Hz
Powering Options	• 802.3af Ethernet Switch • Cisco AP1600 Power Injectors (AIR-PWRINJ4=, AIR-PWRINJ5=) • Cisco AP1600 Local Power Supply (AIR-PWR-B=)
Power Draw	• AP1600: 12.95 W **Note:** When deployed using 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) ◦ AS/NZS 4268.2003 (Australia and New Zealand) ◦ 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, 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) ◦ Protected EAP (PEAP) v0 or EAP-MSCHAPv2

Item	Specification
	◦ 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

The Cisco Aironet 1600 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

Realize the full business value of your technology investments faster with intelligent, customized services from Cisco and our partners. Backed by deep networking expertise and a broad ecosystem of partners, Cisco Wireless LAN Services enable you to deploy a sound, scalable mobility network that enables rich media collaboration while improving the operational efficiency gained from a converged wired and wireless network infrastructure based on the Cisco Unified Wireless Network. Together with partners, we offer expert plan, build, and run services to accelerate your transition to advanced mobility services while continuously optimizing the performance, reliability, and security of that architecture after it is deployed. For more details, visit: http://www.cisco.com/go/wirelesslanservices.

For More Information

For more information about the Cisco Aironet 1600 Series, visit http://www.cisco.com/go/wireless or contact your local account representative.

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