Cisco 6300 Series Embedded Services Access Points

Contents

Embed pervasive wireless throughout your industrial assets and make your city intelligent with the Cisco® 6300 Series Embedded Services Access Points (ESW6300). Flexible, scalable, and secure, the ESW6300 provides resilient wireless mesh solutions built directly into your own hardware or IT solutions.

Product overview

Cisco 6300 Series Embedded Services Access Points (ESW6300) integrate wireless mesh networking into heavy-industry and smart-city assets. Purpose-built with 802.11ac Wave 2, Cisco DNA Assurance, and Cisco Identity Services Engine (ISE), the ESW6300 provides a dependable and secure connectivity solution in almost any work environment. Dual Power over Ethernet (PoE) and PoE+ ports provide power and downlink connectivity to smart connected devices and sensors, and a single USB-out port allows for custom integrations.

The ESW6300 offers a scalable and secure mesh architecture for high-performance Wi-Fi services, and can also serve as an advanced static or mobile Workgroup Bridge (WGB). Its embeddable form factor adds connectivity almost anywhere it can fit–without compromising aesthetics or requiring cumbersome mounting solutions.

Features and benefits

Table 1.   ESW6300 access points features and benefits

Feature	Benefit
802.11ac Wave 2 radio	Provides up to 867-Mbps data rates with 2 x 2 Multiple-Input, Multiple-Output (MIMO) and up to two spatial streams.
Multiuser MIMO (MU-MIMO)	Allows transmission of data to multiple 802.11ac Wave 2-capable clients simultaneously to improve the client experience. Prior to the 802.11ac Wave 2 standard, access points could transmit data to only one client at a time, typically referred to as single-user MIMO.
Small Form-Factor Pluggable (SFP) port	Supports optical, fiber-based network connectivity for remote locations.

Feature	Benefit
Dual PoE-out	Send power to—and backhaul data directly from—local IoT assets, such as IP cameras, sensors, or tracking systems.
Flexible deployment modes	Allows for deployment in a variety of ways, including as traditional access points and in mesh networks. The access points can also be deployed with the Cisco Mobility Express Solution. This deployment is ideal for small to medium-sized networks that require 50 or fewer access points without a physical controller. All deployment modes are easy to set up and configure.
No enclosure	Enables deployment of the access point where it is needed. The 6300 Embedded Services Series easily integrates into larger hardware, like light poles, without disturbing the aesthetics of the area.

Flexible, embedded mesh networking

Cities and industrial environments were not designed for digital transformation. Flexibility is key to new connectivity deployments. Now you can remove constraints with the Cisco ESW6300. The embeddable form factor and wireless mesh capabilities allow for a myriad of successful deployment scenarios, without the requirement of cumbersome cabling. Create an expansive—and nearly invisible—network almost anywhere. You can configure the ESW6300 with:

- Cisco FlexConnect, a wireless solution for remote deployments. FlexConnect mode enables configuration and control of access points in a separate area through a WAN link, without having to deploy an additional controller.

- Bridge mode. The access point is configured to build a wireless mesh network where wired network cabling is not available.

- Flex+Bridge mode, which allows for both FlexConnect and Bridge mode to operate on the same access point.

Product specifications

Table 2.   ESW6300 product specifications

Item	Specifications
Radio type	2.4 GHz: 802.11b/g/n, 2x2 MIMO, 2 spatial streams 5 GHz: 802.11a/n/ac, 2x2 MIMO, 2 spatial streams
802.11ac Wave 2 capabilities	• 2x2 MIMO with two spatial streams • Multi- and single-user MIMO • Maximal-Ratio Combining (MRC) • 802.11ac beamforming (transmit beamforming) • 20-, 40-, and 80-MHz channels • PHY data rates up to 867 Mbps (80-MHz bandwidth in 5 GHz) • Packet aggregation: A-MPDU (Tx/Rx) and A-MSDU (Tx/Rx) • 802.11 Dynamic Frequency Selection (DFS) • Cyclic Shift Diversity (CSD) support

Item	Specifications
802.11n Version 2.0 (and related) capabilities	• 2x2 MIMO with two spatial streams • Maximal-Ratio Combining (MRC) • 20- and 40-MHz channels • PHY data rates up to 300 Mbps (40-MHz bandwidth in 5 GHz) • Packet aggregation: A-MPDU (Tx/Rx) and A-MSDU (Tx/Rx) • 802.11 Dynamic Frequency Selection (DFS) • Cyclic Shift Diversity (CSD) support
Data rates supported	2.4-GHz radio: 802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n data rates:

2.4-GHz radio 802.11n data rates:

MCS index	GI = 800 ns 20-MHz rate (Mbps)	GI = 400 ns 20-MHz rate (Mbps)
0	6.5	7.2
1	13	14.4
2	19.5	21.7
3	26	28.9
4	39	43.3
5	52	57.8
6	58.8	65
7	65	72.2
8	13	14.4
9	26	28.9
10	39	43.3
11	52	57.8
12	78	86.7
13	104	115.6
14	117	130
15	130	144.4

5-GHz radio:
802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
802.11n data rates:

MCS index	GI = 800 ns 20-MHz rate (Mbps)	GI = 400 ns 20-MHz rate (Mbps)	GI = 800 ns 40-MHz rate (Mbps)	GI = 400 ns 40-MHz rate (Mbps)
0	6.5	7.2	13.5	15
1	13	14.4	27	30
2	19.5	21.7	40.5	45

Item	Specifications				
	3	26	28.9	54	60
	4	39	43.3	81	90
	5	52	57.8	108	120
	6	58.8	65	121.5	135
	7	65	72.2	135	150
	8	13	14.4	27	30
	9	26	28.9	54	60
	10	39	43.3	81	90
	11	52	57.8	108	120
	12	78	86.7	162	180
	13	104	115.6	216	240
	14	117	130	243	270
	15	130	144.4	270	300

802.11ac data rates:

MCS index	Spatial streams	20-MHz rate (Mbps)		40-MHz rate (Mbps)		80-MHz rate (Mbps)	
		GI = 800 ns	GI = 400 ns	GI = 800 ns	GI = 400 ns	GI = 800 ns	GI = 400 ns
0	1	6.5	7.2	13.5	15	29.3	32.5
1	1	13	14.4	27	30	58.5	65
2	1	19.5	21.7	40.5	45	87.8	97.5
3	1	26	28.9	54	60	117	130
4	1	39	43.3	81	90	175.5	195
5	1	52	57.8	108	120	234	260
6	1	58.5	65	121.5	135	263.3	292.5
7	1	65	72.2	135	150	292.5	325
8	1	78	86.7	162	180	351	390
9	1	–	–	180	200	390	433.3
0	2	13	14.4	27	30	58.5	65
1	2	26	28.9	54	60	117	130
2	2	39	43.3	81	90	175.5	195
3	2	52	57.8	108	120	234	260
4	2	78	86.7	162	180	351	390
5	2	104	115.6	216	240	468	520
6	2	117	130	243	270	526.5	585

7	2	130	144.4	270	300	585	650
8	2	156	173.3	324	360	702	780
9	2	–	–	360	400	780	866.7

Item	Specifications
Frequency band and 20-MHz operating channels	**A (A 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 **B (B regulatory domain):** • 2.412 to 2.462 GHz; 11 channels • 5.180 to 5.320 GHz; 8 channels • 5.500 to 5.720 GHz; 12 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 **D (D regulatory domain):** • 2.412 to 2.462 GHz; 11 channels • 5.745 to 5.865 GHz; 7 channels **E (E regulatory domain):** • 2.412 to 2.472 GHz; 13 channels • 5.180 to 5.320 GHz; 8 channels (indoor use only) • 5.500 to 5.700 GHz; 8 channels (excludes 5.600 to 5.640 GHz) **F (F regulatory domain):** • 2.412 to 2.472 GHz; 13 channels • 5.745 to 5.805 GHz; 4 channels **G (G regulatory domain):** • 2.412 to 2.472 GHz; 13 channels • 5.745 to 5.825 GHz; 5 channels **H (H regulatory domain):** • 2.412 to 2.472 GHz; 13 channels • 5.745 to 5.825 GHz; 5 channels **I (I regulatory domain):** • 2.412 to 2.472 GHz; 13 channels **K (K regulatory domain):** • 2.412 to 2.462 GHz; 11 channels • 5.280 to 5.320 GHz; 3 channels • 5.500 to 5.620 GHz; 7 channels • 5.745 to 5.805 GHz; 4 channels **L (L regulatory domain):** • 2.412 to 2.472 GHz; 13 channels • 5.500 to 5.620 GHz; 7 channels

Item	Specifications
	● 5.745 to 5.865 GHz; 7 channels
	M (M regulatory domain):
	● 2.412 to 2.472 GHz; 13 channels
	● 5.500 to 5.700 GHz; 8 channels (excludes 5.600 to 5.640 GHz)
	● 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
	● 5.500 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 5.825 GHz; 9 channels
	S (S regulatory domain):
	● 2.412 to 2.472 GHz; 13 channels
	● 5.500 to 5.700 GHz; 11 channels
	● 5.745 to 5.825 GHz; 5 channels
	T (T regulatory domain):
	● 2.412 to 2.462 GHz; 11 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 (Z regulatory domain):
	● 2.412 to 2.462 GHz; 11 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: Customers are responsible for verifying approval for use in their individual countries. Not all regulatory domains are available for the ESW6300. To verify approval and to determine availability of the regulatory domain that corresponds to a particular country, visit https://www.cisco.com/c/dam/assets/prod/wireless/wireless-compliance-tool/index.html.
Maximum number of nonoverlapping channels	2.4 GHz ● 802.11b/g: 　◦ 20 MHz: 3 ● 802.11n: 　◦ 20 MHz: 3 　◦ 40 MHz: 1 (hardware-capable) 5 GHz ● 802.11a: 　◦ 20 MHz: 27 ● 802.11n: 　◦ 20 MHz: 27

Item	Specifications
	◦ 40 MHz: 13 • 802.11ac: ◦ 20 MHz: 27 ◦ 40 MHz: 13 ◦ 80 MHz: 6 Note: This number varies by regulatory domain. Refer to the product documentation for specific details for each regulatory domain.
Receive sensitivity	2.4-GHz radio, 20-MHz channel bandwidth 802.11b

802.11b

Data rate (Mbps)	Typical sensitivity (dBm)
1	-97
2	-94
5.5	-90
11	-87

802.11g

Data rate (Mbps)	Typical sensitivity (dBm)
6	-89
9	-89
12	-87
18	-85
24	-83
36	-80
48	-75
54	-74

802.11n HT20

MCS index	Spatial streams	Typical sensitivity (dBm)
0	1	-89
1	1	-89
2	1	-87
3	1	-85
4	1	-83
5	1	-80
6	1	-75
7	1	-74
8	2	-88
9	2	-85

Item	Specifications		
	10	2	–83
	11	2	–80
	12	2	–76
	13	2	–72
	14	2	–71
	15	2	–69

5-GHz radio
802.11a

Data rate (Mbps)	Sensitivity (dBm)
6	–90
9	–88
12	–87
18	–84
24	–81
36	–77
48	–75
54	–74

802.11n/ac

MCS index	Spatial streams	Typical sensitivity, HT/VHT20 (dBm)	Typical sensitivity, HT/VHT40 (dBm)	Typical sensitivity, VHT80 (dBm)
0	1	–90	–87	–84
1	1	–88	–86	–83
2	1	–87	–84	–82
3	1	–84	–81	–79
4	1	–81	–78	–76
5	1	–77	–74	–72
6	1	–75	–73	–70
7	1	–74	–71	–68
8	1	–69	–67	–64
9	1	–	–65	–62
0	2	–89	–86	–84
1	2	–86	–84	–81
2	2	–83	–82	–78
3	2	–80	–78	–74

Item	Specifications				
	4	2	–77	–75	–71
	5	2	–73	–70	–67
	6	2	–71	–68	–65
	7	2	–70	–67	–64
	8	2	–65	–62	–59
	9	2	–	–60	–58

Item	Specifications
Maximum conducted transmit power	2.4-GHz radio: 27 dBm with 2 antennas at all data rates 5-GHz radio 802.11a

Data rate (Mbps)	Maximum conducted transmit power with two antennas (dBm)
6	27
9	27
12	27
18	27
24	26
36	26
48	25
54	24

802.11n/ac

MCS index	Spatial streams	Maximum conducted transmit power with two antennas (dBm)		
		20-MHz bandwidth	40-MHz bandwidth	80-MHz bandwidth
HT/VHT MCS0	1	27	27	27
HT/VHT MCS1	1	27	27	27
HT/VHT MCS2	1	27	27	27
HT/VHT MCS3	1	27	27	27
HT/VHT MCS4	1	26	26	26
HT/VHT MCS5	1	25	25	25
HT/VHT MCS6	1	24	24	25
HT/VHT MCS7	1	23	23	23
VHT MCS8	1	23	23	23
VHT MCS9	1	–	22	22
HT MCS8/VH MCS0	2	27	27	27

Item	Specifications				
	HT MCS9/VH MCS1	2	27	27	27
	HT MCS10/VH MCS2	2	27	27	27
	HT MCS11/VH MCS3	2	27	27	27
	HT MCS12/VH MCS4	2	25	25	25
	HT MCS13/VH MCS5	2	24	24	24
	HT MCS14/VHT MCS6	2	23	23	23
	HT MCS15/VHT MCS7	2	22	22	22
	VHT MCS8	2	22	22	22
	VHT MCS9	2	–	21	21
	Note: The maximum power setting will vary according to individual country regulations and antenna gain. Refer to the product documentation for specific details.				
Interfaces	- x1 10/100/1000BASE-T auto-sensing PoE+ in (802.3at),Cisco Universal Power over Ethernet (UPOE) in - x2 10/100/1000BASE-T auto-sensing PoE out (802.3af), PoE+ out (802.3at) - x1 fiber SFP (fiber or electrical) - Management console port (RJ-45) - USB 3.0 port - Multicolor system LED, port LED - DC power input - Reset button				
Uplink options	Ethernet, SFP, and wireless mesh				

Antennas	Dual band			
		2.4-GHz peak gain (dBi)	5-GHz peak gain (dBi)	Antenna type
	AIR-ANT2547V-N AIR-ANT2547VG-N AIR-ANT2547V-N-HZ	4	7	Omnidirectional
	AIR-ANT2568VG-N	6	8	Omnidirectional
	AIR-	8	8	Directional, dual

Item	Specifications			
	ANT2588P3M-N=			polarization, 3 port
	AIR-ANT2513P4M-N=	13	13	Directional, dual polarization, 4 port
	2.4-GHz single band			
		Peak gain (dBi)		Pattern
	AIR-ANT2450V-N= AIR-ANT2450VG-N=	5		Omnidirectional, vertical polarization
	AIR-ANT2450HG-N=	5		Omnidirectional, horizontal polarization
	AIR-ANT2480V-N=	8		Omnidirectional
	AIR-ANT2413P2M-N=	13		Directional, dual polarization, 2 port
	5-GHz single band			
		Peak gain (dBi)		Pattern
	AIR-ANT5150VG-N=	5		Omnidirectional, vertical polarization
	AIR-ANT5150HG-N=	5		Omnidirectional, horizontal polarization
	AIR-ANT5180V-N=	8		Omnidirectional
	AIR-ANT5114P2M-N=	13		Directional, dual polarization, 2-port
	Note: For antenna details refer to the [Cisco Industrial Routers and Industrial Wireless Access Points Antenna Guide](#).			
RF ports	4x MMCX female			
Power input	• 44-57 VDC • PoE+ and UPOE			
Power consumption				
Compliance	Information technology equipment: UL/CSA 60950-1 UL/CSA 62368-1 IEC/EN 60950-1 IEC/EN 62368-1 CB report and certificate to IEC 60950-1 with all country deviations CB report and certificate to IEC 62368-1 with all country deviations Immunity • Less than or equal to 5 mJ for 6kV/3kA @ 8/20 ms waveform • ANSI/IEEE C62.41 • IEC/EN61000-4-5 Level 4 AC Surge Immunity			

Item	Specifications
	• IEC/EN61000-4-4 Level 4 Electrical Fast Transient Burst Immunity
	• IEC/EN61000-4-3 Level 4 Radiated Field Immunity
	• IEC/EN61000-4-2 Level 4 ESD Immunity
	• IEC/EN 61000-4-3 10vrms Conducted Immunity
	• IEC/EN 61000-4-8 – Power-Frequency Magnetic Field Immunity
	• IEC/EN 61000-4-11 – VDI
	• EN60950 Overvoltage Category IV
	• CISPR24/CISPR 35
	• KN 35
	Emissions
	• FCC part 15.107, 15.109
	• FCC Part 15B, Class A
	• EN 55032
	• CISPR 32 /CISPR22
	• KN32
	• ICES-003
	• EN 61000-3-2 – Harmonics emissions for up to 16amp
	Radio approvals
	• FCC Part 15.247, 15.407
	• FCC 2.1091
	• RSS – 247
	• RSS-102
	• AS/NZS 4268 2017
	• MIC Article 2 paragraph 1 item (19)-2,3,3-2
	• KCC Notice No. 2013-1
	• EN 300 328 v2.1.1
	• EN 301 893 v2.1.1
	• EN 62311
	• LP0002: 2018
	• Regulatory domain support
	◦ FCC (Americas, parts of Asia, and the Middle East)
	◦ ETSI (Europe, Middle East, Africa, and parts of Asia)
	◦ TELEC (Japan)
	◦ KCC (Korea)
	Radio EMC
	• EN 301 489-1 -17
	• KN 301 489-1 -17
	Security
	• Wireless Bridging / mesh
	◦ X.509 digital certificates
	◦ MAC address authentication
	◦ Advanced Encryption Standards (AES), Temporal Key Integrity Protocol (TKIP)
	• Wireless access
	◦ 802.11i, Wi-Fi Protected Access (WPA2), WPA
	◦ 802.1X authentication, including Extensible Authentication Protocol and Protected EAP (EAP-PEAP), EAP Transport Layer Security (EAP-TLS), EAP-

Item	Specifications
	Tunneled TLS (EAP-TTLS), EAP-Subscriber Identity Module (EAP-SIM), and Cisco Lightweight Extensible Authentication Protocol (LEAP) ◦ Advanced Encryption Standards (AES), Temporal Key Integrity Protocol (TKIP) ◦ VPN pass-through ◦ IP Security (IPsec) ◦ Layer 2 Tunneling Protocol (L2TP) • MAC address filtering
PoE output	35.3 W total Maximum 30W per PSE port
USB interface	USB 2.0 / USB 3.0 supported
Dimensions (H x W x L)	8.5 in. x 7.55 in. x 1.9 in.
Weight	3.1 lbs.
Environmental (operating temperature range)	• Non-operating (storage) temperature: -40° to 185°F (-40° to 85°C) • Non-operating (storage) altitude test: 25°C, 15,000 ft. • Operating temperature: -40° to 185°F (-40° to 85°C) as measured at the center top surface of thermal plate • Operating humidity: 10% to 90% (noncondensing) • Operating altitude test: 40°C, 10,000 ft.
Mounting options	DIN rail
Warranty	1 year

Ordering information

Table 3.   Ordering information

Part number	Product description
ESW6300 Series	• ESW-6300-CON-X-K9 (USB-enabled) • ESW-6300-CON-X-K9 (USB-disabled) Regulatory domains: (x = regulatory domain) Customers are responsible for verifying approval for use in their individual countries. To verify approval that corresponds to a particular country or the regulatory domain used in a specific country, visit https://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 Cisco Global Price List (GPL). Cisco Smart Net Total Care® Service for the ESW6300 Series Refer to the service part numbers on Cisco Commerce Workspace for available service offerings.

Warranty information

The Cisco 6300 Series Embedded Services Access Points come with a 1-year limited warranty that provides full warranty coverage of the hardware. The warranty includes 10-day advance hardware replacement and

helps ensure that software media are defect-free for 90 days. For more details, visit
https://www.cisco.com/go/warranty.

Cisco environmental sustainability

Information about Cisco's environmental sustainability policies and initiatives for our products, solutions, operations, and extended operations or supply chain is provided in the "Environment Sustainability" section of Cisco's Corporate Social Responsibility (CSR) Report.

Reference links to information about key environmental sustainability topics (mentioned in the "Environment Sustainability" section of the CSR Report) are provided in the following table:

Sustainability topic	Reference
Information on product material content laws and regulations	Materials
Information on electronic waste laws and regulations, including products, batteries, and packaging	WEEE compliance

Cisco makes the packaging data available for informational purposes only. It may not reflect the most current legal developments, and Cisco does not represent, warrant, or guarantee that it is complete, accurate, or up to date. This information is subject to change without notice.

Cisco Wireless LAN Services

Realize the full business value of your technology investments faster with intelligent, customized services from Cisco. Backed by deep networking expertise, 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. We offer expert advisory, implementation and optimization services to accelerate your transition to advanced mobility services while continuously optimizing the performance, reliability, and security of that architecture after it is deployed. In addition, Smart Net Total Care service helps you protect your investment and derive maximum value from your Cisco products. Delivered by Cisco and backed by your trusted partner, this comprehensive service includes access to the Cisco Technical Assistance Center 24 hours a day, 365 days a year, IOS software updates, online resources, and expedited hardware replacement when needed. The Smart Net Total Care service helps you solve problems faster, improve operational efficiency, and reduce the risk of downtime. For more details, visit:
https://www.cisco.com/c/en/us/products/wireless/service-listing.html.

Cisco Capital

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Embed Cisco Wi-Fi into your industrial networking solutions

Does your product or solution have the wireless connectivity in place to guarantee secure wireless backhaul of your IoT devices, while in a ruggedized, embeddable form factor? The Cisco 6300 Series Embedded Services Access Points is flexible enough to connect your autonomous vehicle solutions as well as fully industrial or outdoor use cases to the network, where it can seamlessly integrate into an existing Cisco network or be the backbone of a new network altogether.

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