Cisco Universal Small Cell 5310

Product Overview

The Cisco® Universal Small Cell (USC) 5310 takes advantage of the flexible, modular design of the Cisco Aironet 3600 Series and is part of the end-to-end Cisco® Small Cell Solution. The Cisco USC 5310 offers mobile operators a licensed radio network extension that can be rapidly deployed onto the footprint of the award-winning Cisco Aironet 3600 Series Wi-Fi access point, creating a new platform for mobile broadband services.

The Cisco USC 5310 is field-upgradeable and contains a dedicated third-generation (3G) small cell base station that can efficiently deliver mobile services indoors while offloading traffic from the outdoor macro network. This approach not only improves the mobile user experience, but it also reduces costs by eliminating the need for dedicated macro base station sites, reducing the need to acquire new small cell real estate and decreasing the backhaul infrastructure required to support small cell deployments.

Together, the Cisco Aironet 3600 Series access point and the Cisco USC 5310 allow operators to provide state-of-the-art Wi-Fi infrastructure that supports both the 2.4GHz and 5GHz bands, along with a modern 3G base station infrastructure at the same site (Figure 1). The Cisco USC 5310 is available in two RF band variants to address the global market: Band 2/5 for the Americas and Band1 for the rest of the world.

Figure 1. Cisco USC 5310 for the Cisco Aironet 3600 Series

Modular Flexibility and Efficiency

Three key challenges face mobile operators interested in deploying licensed small cells: where to install them, how to power them, and how to backhaul the traffic. Cisco solves these problems with innovation. Building on the Cisco Aironet heritage of robust, award-winning Wi-Fi access point design, the Cisco Aironet 3600 Series delivers extreme flexibility with its modular configuration. The Cisco USC 5310 is the first licensed radio module to take advantage of this flexibility by delivering a fully integrated, high-performance, low-cost 3G small cell. This Cisco design includes the following benefits.

- Reduced network costs and operations: By integrating the Cisco USC 5310 into the Cisco Aironet 3600 Series, customers can replace up to two separate access points and their separate functions with a single, multipurpose Cisco Aironet 3600 Series access point.
- Reduced capital expenditures: A single Ethernet connection (cable and port) from a wired network to deploy a licensed radio can be reused, which lowers the capital expenditure (CapEx) that would be required if two separate cable runs were needed. By integrating all these features into a single access point, customers also simplify the day-to-day management and monitoring of their wireless infrastructure and network with a greatly reduced number of access points. The Cisco USC 5310 appears as a new device in the existing management infrastructure, reducing support costs.
- Easier installation and power up with zero-touch configuration: Fewer steps are required to enable the Cisco USC 5310 to run in a Dynamic Host Configuration Protocol (DHCP) environment. This approach can quickly provide 3G coverage to end users. The Cisco USC 5310 is simply inserted and secured into any Cisco Aironet 3600 Series access point. When the access point is powered, the module is initialized, configured, and authorized in real time by the operator and can immediately begin 3G voice, data, and messaging services.
- Secure, carrier-grade 3G base station technology: The Cisco USC 5310 provides the technology equivalent to an in-building mini cell tower. The device is secure on the air link from the module to the user, as well as on the Ethernet-based wired link. It is fully managed by the mobile operator and provides 3G signals inside the building for voice, data, and messaging services for up to 16 simultaneous users within a coverage area of approximately 7000 square feet (800 square meters).
- Standards-based technology: The Cisco USC 5310 operates as a Home Node B (HNB) in the standard Third Generation Partnership Project (3GPP) architecture for small cells and is connected to the network using the specified Iuh interface. This architecture provides a rapid-deployment model for the operator reusing an existing HNB network infrastructure.

Additional Cisco USC 5310 3G Benefits

- Superior indoor signal strength and capacity: The Cisco USC 5310 significantly increases signal strength throughout a building or site, resulting in excellent voice quality and call clarity, as well as consistent connectivity with high-capacity call handling.
- High data speeds for an enhanced multimedia experience: By providing a tailored local base station, operators can support data throughput on mobile devices at speeds that outpace what is available from the macro network in the poor signal conditions typically found indoors.
- Self-optimization based on back-end network intelligence: This intelligent self-optimization helps operators manage millions of devices easily, so they do not cause interference with neighboring infrastructure devices such as other Cisco USC 5310 modules, residential and enterprise small cells, picocells, and macrocell towers.
- Simplicity and convenience: Subscribers can use their existing mobile phones and applications, and standards-based, zero-touch provisioning allows end users to “plug and play.”
- New enterprise services: The module supports next-generation services such as enterprise voice services.

The following benefit adds to the advantages provided by Cisco Service Provider (SP) Wi-Fi, which is a proven carrier-grade solution that scales to support exponential traffic growth from millions of users, delivers a transparent mobility experience for the end user, and is built on open standards, including Wi-Fi Certified Passpoint.

- With the Cisco USC 5310, the host Cisco Aironet 3600 Series access point can continue its standard Wi-Fi services in parallel with the 3G base station.

Features

Table 1 lists features of the Cisco USC 5310 base station and module.

Table 1. Features

Base Station Features	Description
3GPP Release 8 support for Wideband Code Division Multiple Access (WCDMA) and High-Speed Packet Access (HSPA) and Evolved High-Speed Packet Access (HSPA+)	Support for standard handsets and dongles, including a wide range of global smartphone handsets, such as Apple iPhones, Android devices, Blackberry, Microsoft Windows Phone, and handsets and dongles from a wide range of global suppliers, including HTC, Samsung, Apple, RIM, Nokia, and Motorola
R99 voice support	High-quality voice calling on mobile devices using global mobile standards
HSPA and HSDPA+	Packet data support for high-speed Internet and intranet communications using packet data upload and download
Messaging and supplementary service support	Support capabilities that include sending text messages, setting up voicemail icons, and sending emergency broadcasts
Emergency call support	Support for E911, 112, 999, and other national and international standards for emergency voice call services
Adaptive power output	Power output matched to the coverage needs inside a building
Mobility	Support for user mobility between small cells and between small cells and the macro network
Timing support	High-stability oscillator and network timing interface that allow the Cisco USC 5310 to successfully interwork with local macro networks
Network listen	Automatic radio environment monitoring of the licensed spectrum bands, running continuously during operation to provide real-time monitoring of the surrounding 2G and 3G networks and allow the Cisco USC 5310 to automatically adapt to environment changes
Autoconfiguration	Zero-touch mechanism that can use open standards to pull a data model containing instrumentation and configuration data from network autoconfiguration servers (or the network autoconfiguration servers can push a data model to the Cisco USC 5310)
Module Features	**Description**
Form factor	• Internal antenna option that provides a neat fit in the recess of the installed Cisco Aironet 3600 access point and maintains an aesthetic appearance • External antenna that allows end users to place the Cisco Aironet 3600 in a convenient place and direct the signal to where it is needed
Cisco accessory compatibility	• Support for the popular Type 2 mounting clip in most circumstances • Support for the Type 1 mounting clip when attached to a flexible surface • Compatible with existing secure mounting solutions for the Cisco Aironet 3600 Series access point
Power over Ethernet Plus (PoE+)	Operation within the spare power budget of the Cisco Aironet 3600 when PoE+ (IEEE 802.3at) is applied to an input Ethernet port
Rapid installation	Addition of the unit to the Cisco Aironet 3600 in less than 10 minutes, requiring no additional cable runs and operating on the existing footprint
Part of the Cisco SP Wi-Fi infrastructure	Cisco Prime™ Network Control System (NCS) identification of the Cisco Aironet 3600 with the module installed, as well as automatic configuration for service provider operation

Product Specifications

Table 2 lists the detailed product specifications and part numbers for the Cisco USC 5310.

Table 2. Product Specifications and Part Numbers

Item	Specification
Part numbers	Cisco USC 5310: Indoor environments with integrated module antennas (part codes are dependent on deployment location) • For Band 1 deployments, typically outside the Americas: USC5310-AI-K9 • For Band 2/5 deployments, typically Americas - USC5310-BI-K9
Software	• Cisco Unified Wireless Network Software Release 7.6 or later • Cisco Universal Small Cell Software Release 3.4 or later • Cisco Small Cell Solution Release 2.0 or later
Supported wireless LAN controllers	Refer to the latest data sheet for Cisco Aironet 3600 Series
Frequencies supported	3GPP Band 1 BS Receive 1920-1980 MHz BS Transmit 2110-2170 MHz 3GPP Band 2 or 5 (configured at boot; reboot required to change band) • BS Receive (Band 2) 1850-1910 MHz • BS Transmit (Band 2) 1930-1990 MHz • BS Receive (Band 5) 824-849 MHz • BS Transmit (Band 5) 869-894 MHz
UARFCN supported	3GPP Band 1 • Uplink 9612 to 9888 • Downlink 10562 to 10838 3GPP Band 2 • Uplink 9262 to 9538 • Downlink 9662 to 9938 3GPP Band 5 • Uplink 4132 to 4233 • Downlink 4357 to 4458
Bandwidth supported	5 MHz, in accordance with 3GPP Standards for WCDMA Release 8
User count	16 in a variety of combinations, including circuit-switched (CS) voice (R99) or packet-switched (PS) data
3GPP standards	3GPP Release 8
3GPP standard Interfaces	Iuh in accordance with 3GPP TS 25.467 Release 8
Radio access bearers (RABs) supported	Signaling Radio Bearer (SRB) • Standard 3.4 kbps R99 CS Channel • 16 Dedicated Channel (DCH) with adaptive multi-rate (AMR) 12.2 kbps codec • 16 DCH plus 8 users in Fast Access Channel (FACH) • 10 DCH with CS video PS data: R99 CS packet mode • Up to 16 DCH • Upload and download ◦ 64 kbps upload and 64 kbps download ◦ 64 kbps upload and128 kbps download ◦ 64 kbps upload and 384 kbps download ◦ 128 kbps upload and 64 kbps download ◦ 128 kbps upload and 128 kbps download ◦ 128 kbps upload and 384 kbps download ◦ 384 kbps upload and 384 kbps download PS data: R99 CS uplink plus High-Speed Downlink Packet Access (HSDPA) • Up to 16 DCH plus High-Speed DCH (HS-DCH)

Item	Specification

	• Up to 14.4-Mbps HSDPA peak rates supported
	• Uplink and downlink
	  ◦ 64 kbps uplink and HSDPA downlink
	  ◦ 128 kbps uplink and HSDPA downlink
	  ◦ 384 kbps uplink and HSDPA downlink
	PS data: HSPA
	• Up to 16 active, scheduled high-speed users
	• Up to 14.4-Mbps HSDPA peak rates supported
	• 5.76 High-Speed Uplink Packet Access (HSUPA) peak rates supported
	PS data: HSDPA+
	• Up to 16 active, scheduled high-speed users
	• Up to 19 Mbps HSDPA+ peak rates supported
	• 14 codes supported
	• 5.76-Mbps HSUPA peak rates supported
	Multiple RAB (mRAB) combinations supported
	• Up to 8 MRAB users (3GPP code tree dependencies)
	• One HSPA/HSDPA+ channel and one R99 AMR channel active
	• Dual HSPA/HSDPA+ channels active
	• Dual HSPA/HSDPA+ channels and one R99 channel active
	Realistic data rates: The rates noted for HSPA and HSDPA+ are peak, theoretical rates.

HSPA support	Provided: HSDPA and HSUPA
HSDPA+ support	Provided
R99 voice support	Provided
R99 video support	Provided
R99 data support	Provided
Data model	Broadband Forum TR-069 Amendment 2 with TR-196v1
Data model protection	Transport Layer Security (TLS)
Data model extensions	Certain extensions are available to simplify operation and address missing features from the TR-196v1 data model (for example, timers and thresholds for improved operation)
Data model provisioning	• TLS through a separate tunnel preferred • TR-069 and optional TLS through IP Security (IPsec) link supported (Cisco does not recommend this configuration due to loss of management communication if IPsec fails or is unreliable)
Access method	Support for open and closed modes of deployment
Software upgrade	Yes
3G airlink cipher	3GPP UEA1 and UIA1 (also known as Kasumi cipher)
Backhaul	IPsec tunnel mode
Backhaul tunnel management	IKEv2
Security model	Subscriber identity module (SIM) card (optional), Secure boot and signed software image
Periodic network listen, also known as downlink monitor mode (DLMM)	3G and GSM
Continuous service network listen	3G
Network listen bands	USC5310-AI-K9 • 3G Band 1 (2100 MHz BS TX) • 3G Band 8 (900 MHz BS TX) • 2G GSM 900 and GSM 1800 USC5310-BI-K9 • 3G Band 2 (1900 MHz BS TX) • 3G Band 5 (850 MHz BS TX) • 2G GSM 850 and GSM 1900
3G RF configuration	1 x 1 single-input single-output (SISO) antenna configuration

Item	Specification
Receiver sensitivity	-114 dBm
3G RF noise figure	8 dB
Compliance	• Safety in accordance with EN IEC60950-1 and UL/CSA 60950 • EMC Exposure in accordance with EN62311 • Meets 3GPP 25.141 for both USC5310-AI-K9 and USC5310-BI-K9 • RF regulations (Compliance currently pending approvals in 2H2013) • CE Mark for USC5310-AI-K9 • FCC Part 15B Class B, Part 22 and Part 24 for USC5310-BI-K9
Interface	Connected through Cisco Aironet 3600 Series access point connector that provides Ethernet, conditioned power supply, and module-to-host communications
Power consumption	6W for the Cisco USC 5310
Power draw	3600i and 3600e with the Cisco USC 5310 requiring full PoE+ (25.5 W) at the egress switch port and a cable run of less than 300 ft (100m)
Weight	1 lb (less than 500g)
Size	8.46 x 2.5 x 1.97 in. (21.48 x 6.35 x 5 cm)

Licensing

Cisco Universal Small Cell Software Version 3.4 or later (R-USC53-BL16-K9 or R-USC53-BL16-K9=) for the Cisco USC 5310 is licensed by Cisco only to service providers and others that have rights and authority to deploy and radiate in the licensed spectrum bands.

System Requirements

Table 3 lists the system requirements needed for successful deployment of the Cisco USC 5310.

Table 3. System Requirements

Host access point	Cisco Aironet 3600 Series
Controller	Cisco 8500 Series Wireless Controller Cisco 5500 Series Wireless Controller
Power options	Power Ethernet Plus (PoEP) is required • IEEE 802.3at PoE+ 25.5W delivered from the Ethernet switch, such as the Cisco Catalyst 4500 4600 E-Series/4700 E-series/Classic line cards • Cisco 3600 Series Power Injector (AIR-PWRINJ4=) • Cisco 3600 Series local power supply (AIR-PWR-B=)
Software	• Cisco Unified Wireless Network Software Release 7.6 or later • Cisco Universal Small Cell Software Release 3.4 or later • Cisco Small Cell Solution Release 2.0 or later

Limited Lifetime Hardware Warranty

The Cisco USC 5310 includes a Limited Lifetime Warranty that provides full warranty of the hardware for as long as the original end user continues to own or use the product. For additional warranty information, visit the Product Warranties page on Cisco.com.

Ordering Information

The Cisco USC 5310 is available for sale to service providers that have WCDMA, HSPA, and HSPA+ technology and spectrum assets in the 3G Band I (2100 MHz). To place an order, visit the Cisco Ordering homepage. To download software, visit the Cisco Software Center. For part numbers, refer to Table 2.

Cisco Small Cell Services

The Cisco Small Cell Solution is delivered by Cisco Services, an organization with exceptional experience and expertise in implementing large commercial small cell deployments and providing world-class systems service integration. With specialized tools, knowledge, methodologies, best practices, and a collaborative delivery model that combines Cisco expertise with our partners' and customers' capabilities, Cisco Services achieves superior results.

We help service providers mitigate risk, accelerate time to market for new revenue-generating services, lower total cost of ownership, maximize the value of investments, and improve the customer experience through service assurance. The Cisco Services team delivers comprehensive support across the service provider's entire network lifecycle. Through a lifecycle approach to services, Cisco has developed consistent and proven methodologies to help service providers successfully design and deliver new service offerings. These services are customized to an operator's needs and are delivered through an extensive global support infrastructure, which includes the award-winning Cisco Technical Assistance Center (TAC), Cisco Services resources, Cisco Centers of Excellence, small cell interoperability testing (IOT) and system verification test (SVT) labs, and ecosystem partners.

For More Information

For more information about the Cisco USC 5310, visit http://www.cisco.com/go/smallcell or contact your local account representative.

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