Cisco Universal Small Cell 5310

The Cisco® Universal Small Cell (USC) 5310 is part of the Cisco Small Cell Solution, an end-to-end platform that integrates 3G, LTE and carrier-grade Wi-Fi with SON and backhaul for an efficient and secure HetNet. The USC Series provides the right access point for every environment, from the home to the enterprise to high density urban environments such as venues (Figure 1). This product is designed to operate in the Enterprise environment.

Figure 1. Cisco Universal Small Cell Series



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Product Overview

The USC 5310 takes advantage of the flexible, modular design of the Cisco Aironet 3600 Series, Cisco Aironet 3700* Series, and Cisco USC 5030, 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 and 3700v2* Series Wi-Fi access points, creating a new platform for mobile broadband services.

Note that this product needs to have a Service Provider agreement and Cisco SCS solution in place before it can operate as it relies on the Service Provider back-end (Home NodB Gateway and Core Network) to operate.

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 or 3700v2* Series access points 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 2). The Cisco USC 5310 is available in two RF band variants to address the global market: Band 2/5 for the Americas and Band 1 for the rest of the world.

***Note that the USC 5310 requires Aironet 3700v2 for compatibility.**

Figure 2. Cisco USC 5310 with the Cisco Aironet 3600 Series



Deployment Options

The USC 5310 can be deployed in one of two ways:

- As a service provider overlay where the LAN is provided by the service provider and connectivity is directly back to a service provider environment, and effectively sits outside the enterprise firewall.
- Integrated into the enterprise IP infrastructure. In this configuration there are a number of IP and LAN configuration factors that have to be taken into account. These are described in the Cisco Enterprise deployment guidelines.

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Self-Organizing Network (SON)

The USC 5310 features ActiveSON, an intelligent and automatic method for improving the installation and performance of a grid of cells in a location. Using peer to peer discovery and signalling, cells are able to discover each other, set key parameters such as neighbor lists, and dynamically adjust their configuration as the environment changes.

Cisco SON is fully integrated with our Universal Small Cell portfolio, to seamlessly integrate the small cells into the macro network and create a truly heterogeneous multi-vendor multi-technology RAN. With SON built into every USC access point, orchestrated and delivered at the network layer through SON, Cisco SON provides resilient, automatic operation, with self-installation, self-optimization, and self-healing, even in shared frequency indoor environments. The result is reduced opex and improved quality of experience.

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 and 3700* Series deliver extreme flexibility with their modular configuration. The Cisco USC 5310 takes advantage of this flexibility by delivering a fully integrated, high-performance, low-cost 3G licensed 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 or 3700* Series, customers can replace up to two separate access points and their separate functions with a single, multipurpose Cisco Aironet 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 or 3700* 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.

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Additional Cisco 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.
- With the Cisco USC 5310, the host Cisco Aironet 3600 or 3700* Series access point can continue its Wi-Fi services in parallel with the 3G base station. Cisco Service Provider (SP) Wi-Fi, is a proven 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.

Product Features

Table 1 lists features of the Cisco USC 5310.

Table 1. Product 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)

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Module Features	Description
Form factor	• Internal antenna option that provides a neat fit in the recess of the installed Cisco Aironet 3600 or 3700 access point and maintains an aesthetic appearance • External antenna that allows end users to place the Cisco Aironet 3600or 3700 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 or 3700 Series access point
Power over Ethernet Plus (PoE+)	Operation within the spare power budget of the Cisco Aironet 3600 or 3700 when PoE+ (IEEE 802.3at) is applied to an input Ethernet port
Rapid installation	Addition of the unit to the Cisco Aironet 3600 or 3700 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 0r 3700 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 Number

Item	Specification
Transmit Power	100mw (20dBm)
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 Circuit-Switched (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/download (UL/DL) ◦ 64/64 kbps ◦ 64/128 kbps ◦ 64/384 kbps

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Item	Specification
	◦ 128/64 kbps ◦ 128/128 kbps ◦ 128/384 kbps ◦ 384/384 kbps PS data: R99 CS uplink plus High-Speed Downlink Packet Access (HSDPA) • Up to 16 DCH plus High-Speed Dedicated Channel (HS-DCH) • HSDPA support up to 14.4 Mbps peak rates supported • UL/DL ◦ 64 kbps/HSDPA ◦ 128 kbps/HSDPA ◦ 384 kbps/HSDPA 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 15 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: Cisco notes that the rates above for HSPA and HSDPA+ are peak, theoretical rates.
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 or 3700 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, 3600e, 3700i, 3700e with the Cisco USC 5310 requiring full PoE+ (30 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)

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System Requirements

Table 3 lists the technical system requirements needed for successful deployment of the Cisco USC 5310. Note that in addition there needs to be an existing agreement in place with a mobile service provider to support the licensed radio module and incorporate it into their network.

Table 3. System Requirements

Host access point	Cisco Aironet 3600 Series. Refer to the latest data sheet for Cisco Aironet 3600 Series Cisco Aironet 3700 Series version 2 - V02. Refer to the latest data sheet for Cisco Aironet 3700 Series Cisco USC 5030. Refer to the latest datasheet for the Cisco USC 5030
Controller	Cisco 8500 Series Wireless Controller Cisco 5500 Series Wireless Controller, Cisco 2500 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 or 3700 Series Power Injector • **Note the Cisco 3600 or 3700 Series local power supply cannot be used with the module**.
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

Ordering Information

The Cisco USC5310 is available for sale to service providers. It can be ordered using the part numbers listed in Tables 4 and 5. Note that to allow the product to provide service when the software is activated it will be automatically associated with the mobile service provider through Cloudbase.

Table 4. Hardware Ordering Information

Title	Description	Order Code
Cisco Universal Small Cell 5310 (EU Version)	3G Module Band 1; 100mW 1x1 SISO, Closed and Open Access ready, HSDPA+ ready, High Data Mobility ready, options.	USC5310-AI-K9
Cisco Universal Small Cell 5310 (USA Version)	3G Module Band 2/5; 100mW 1x1 SISO, Closed and Open Access ready, HSDPA+ ready, High Data Mobility ready, options.	USC5310-BI-K9

Table 5. Software Ordering Information

Title	Description	Order Code
Cisco Universal Small Cell 5000 CloudBase 16 User 3G Software	USC5000 Base Load 16 users, 3G, HSPA, 100mW, 3GPP R8 inc EULA/SULA delivered via CloudBase	R-USC53-BL16C-K9
Cisco Universal Small Cell 5000 CloudBase 3G Activation	Cloudbase USC5000 3G Activation	L-USC53-ACTV
Cisco Universal Small Cell 5000 Open Mode 16 Users 3G License	Open Access mode	L-USC53-OPMO
Cisco Universal Small Cell 5000 Enhanced Mobility Licence	Increased rate of user camp on	L-USC53-EMOB
Cisco Universal Small Cell 5000 HSDPA+ License	HSDPA+ upgrade from the base load	L-USC53-HSPP
Cisco Universal Small Cell 5000 Iuh Hand-in from Macro License	Hand in on Iuh network	L-USC53-HNDN
Cisco Universal Small Cell 5000 Cell Broadcast License	Cell Broadcast	L-USC53-CBRC

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Warranty

The Cisco USC 5310 includes one year limited hardware warranty with a 30 day return for repair. More detailed warranty information is available on Cisco.com at the Product Warranties page.

Cisco Small Cell Services

The Cisco Small Cell Solution is delivered by Cisco Services, an organization with unparalleled experience and expertise 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's expertise with our partners' and customers' capabilities, Cisco Services achieves superior results. We help service providers to 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, encompassing 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 operator needs and are delivered through an extensive global support infrastructure, which includes Cisco's award-winning Technical Assistance Center (TAC), Cisco Services resources, Centers of Excellence, Small Cell IOT/SVT labs, and ecosystem partners.

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For More Information

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

Americas Headquarters
Cisco Systems, Inc.
San Jose, CA

Asia Pacific Headquarters
Cisco Systems (USA) Pte. Ltd.
Singapore

Europe Headquarters
Cisco Systems International BV Amsterdam,
The Netherlands

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