

Cisco 3G Small Cell Module for Cisco Aironet

Product Overview

The Cisco 3G Small Cell Module for Cisco Aironet[®] 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 3G Small Cell Module delivers mobile operators a rapid-to-deploy licensed radio network extension onto the footprint of the award-winning Aironet 3600 Wi-Fi access point, creating a new platform for mobile broadband services.

The 3G Small Cell Module is field-upgradeable and contains a dedicated third-generation (3G) small cell base station that can efficiently deliver mobile services indoors while offloading the outdoor macro network. This not only provides a better mobile user experience, but it also reduces costs by eliminating the need for dedicated macro base station sites, the need for acquiring new small cell real estate and the backhaul infrastructure required to support small cell deployments.

Together, the Cisco Aironet 3600 Series access point and 3G Small Cell Module allow operators to concurrently provide state-of-the-art Wi-Fi infrastructure supporting both the 2.4-GHz and 5-GHz bands, and a modern 3G base station infrastructure at the same site (Figure 1).

Figure 1. Cisco 3G Small Cell Module for Cisco Aironet



Modular Flexibility and Efficiency Benefits

Three key challenges face mobile operators interested in deploying licensed small cells: where to hang 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 3600 Series delivers extreme flexibility with its modular configuration. The Cisco 3G Small Cell Module for Cisco Aironet is the first licensed radio module to take advantage of this flexibility by delivering a fully integrated, high-performance, low-cost 3G small cell. The benefits of the Cisco design include the following.

- **Reduced network costs and operations:** By integrating the 3G Small Cell Module into the 3600 Series, customers have the ability to replace up to two separate access points and their separate functions with a single, multipurpose 3600 Series access point.

- The capacity to reuse the single Ethernet connection (cable and port) from a wired network to deploy a licensed radio: This lowers the capital expenditures (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 3G Small Cell Module appears as a new device in the existing management infrastructure, reducing support costs.
- The capacity to install, power up, and go with zero-touch configuration: There are no extra steps required to enable the 3G Small Cell Module to run in a Dynamic Host Configuration Protocol (DHCP) environment. This approach can quickly provide 3G coverage to end users. The 3G Small Cell Module is simply inserted and secured into any Aironet 3600 Series access point. When the access point is powered the module is initialized, configured, and authorized in real time by the operator to immediately begin 3G voice, data, and messaging services.
- Secure, carrier-grade 3G base station technology: The 3G Small Cell Module provides the technology equivalent to an in-building mini cell tower. The device is secure on both the airlink from the module to the user and on the Ethernet-based wired link. It is fully managed by the mobile operator and provides for 3G signals inside the building for voice, data, and messaging services for up to 16 simultaneous users within a coverage area of approximately 7000 sq ft (800 sq m).
- Standards-based technology: The 3G Small Cell Module operates as a HNB (Home Node B) in the standard 3rd 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.

The Cisco 3G Small Cell Module for Cisco Aironet offers these additional 3G benefits.

- Superior indoor signal strength and capacity: The 3G Small Cell Module significantly increases signal strength throughout a building or site, resulting in excellent voice quality and call clarity, and 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 speeds on mobile devices 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 helps operators easily manage millions of devices so they do not cause interference with neighboring infrastructure devices such as other 3G Small Cell 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.

These benefits are in addition to the fundamental benefits from Cisco Service Provider (SP) Wi-Fi.

- The 3G Small Cell Module enables the host Aironet 3600 Series access point to continue its standard Wi-Fi services in parallel with the 3G base station.
- Cisco SP Wi-Fi 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.

Table 1 lists specific features and the accompanying benefits of the Cisco 3G Small Cell Module for Cisco Aironet.

Table 1. Features and Benefits

Feature	Benefit
Base Station Features	
3GPP Release 8 support for Wideband Code Division Multiple Access (WCDMA) and Evolved High Speed Packet Access (HSPA/HSPA+)	Supports standard handsets and dongles. This includes a wide range of global smartphone handsets, including Apple iPhone, Android devices, Blackberry, Microsoft Windows Phone, and dongles from a wide range of global suppliers including HTC, Samsung, Apple, RIM, Nokia, and Motorola.
R99 voice support	High-quality voice call 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	Capability to send a text message, set a voicemail icon, and send an emergency broadcast.
Emergency call support	Support for E911, 112, 999 or other national and international standards for emergency voice call services.
Adaptive 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 enables the 3G Small Cell Module to successfully interwork with local macro networks.
Network listen	Automatic radio environment monitoring of the licensed spectrum bands; the network listen features run at module start-up and continuously during operation to provide a real-time monitoring of the surrounding 2G and 3G networks and allow the 3G Small Cell Module to automatically adapt to environment changes.
Autoconfiguration	Zero-touch mechanism based upon the device pulling (through open standards) a data model containing instrumentation and configuration data from network autoconfiguration servers (alternatively, the same network autoconfiguration servers can push a data model to the 3G Small Cell Module).
Module	
Form factor	Fits neatly into the recess of the installed Aironet 3600 access point with no protruding wires and maintains the aesthetic appearance of the installation with the internal antenna option; with an external antenna, enables the end user to place the Aironet 3600 in a convenient place and use the external antenna to direct the signal to where it is needed.
Cisco accessory compatibility	Support for the popular Type 2 mounting clip in most circumstances and also the Type 1 mounting clip when attached to a flexible surface. The module is compatible with existing secure mounting solutions for the Aironet 3600 Series access point.
Power over Ethernet Plus (PoE+)	Operation within the spare power budget of the Aironet 3600 when PoE+ (IEEE 802.3at) is applied to input Ethernet port.
Rapid installation	Addition of the unit to the 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 Aironet 3600 with module installed, and automatic configuration for service provider operation.

Product Specifications

Table 2 lists the detailed product specifications and part numbers for the Cisco 3G Small Cell Module for Cisco Aironet.

Table 2. Product Specifications and Part Numbers

Item	Specification
Part numbers	Cisco 3G Small Cell Module: Indoor environments with integrated module antennas USC5101-AI-AIR-K9
Software	Cisco Unified Wireless Network Software Release 8.1 or later Cisco Small Cell System Software Release 2.0 or later
Supported wireless LAN controllers	Per the latest data sheet for Cisco Aironet 3600 Series

Item	Specification
Frequencies supported	3GPP Band 1 BS Receive 1920-1980 MHz BS Transmit 2110-2170 MHz
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 per 3GPP TS 25.467 Release 8
Radio access bearers (RABs) supported	<p>Signaling Radio Bearer (SRB)</p> <ul style="list-style-type: none"> Standard 3.4 kbps <p>R99 Circuit-Switched (CS) Channel</p> <ul style="list-style-type: none"> 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 <p>PS data: R99 CS packet mode</p> <ul style="list-style-type: none"> Up to 16 DCH Upload/download (UL/DL) <ul style="list-style-type: none"> 64/64 kbps 64/128 kbps 64/384 kbps 128/64 kbps 128/128 kbps 128/384 kbps 384/384 kbps <p>PS data: R99 CS uplink plus High-Speed Downlink Packet Access (HSDPA)</p> <ul style="list-style-type: none"> Up to 16 DCH plus High-Speed Dedicated Channel (HS-DCH) HSDPA support up to 14.4 Mbps peak rates supported UL/DL <ul style="list-style-type: none"> 64 kbps/HSDPA 128 kbps/HSDPA 384 kbps/HSDPA <p>PS data: HSPA</p> <ul style="list-style-type: none"> 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 <p>PS data: HSDPA+</p> <ul style="list-style-type: none"> Up to 16 active, scheduled high-speed users Up to 19 Mbps HSDPA+ peak rates supported <ul style="list-style-type: none"> 14 codes supported 5.76 Mbps HSUPA peak rates supported <p>Multiple RAB (mRAB) combinations supported</p> <ul style="list-style-type: none"> 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 <p>Realistic data rates: Cisco notes that the rates above for HSPA and HSDPA+ are peak, theoretical rates.</p>
HSPA Support	Yes: HSDPA and HSUPA
HSDPA+ support	Yes
R99 voice support	Yes
R99 video support	Yes
R99 data support	Yes
Data model	Broadband Forum TR-069 Amendment 2 with TR-196v1
Data model protection	Yes: Transport Layer Security (TLS)
Data model extensions	Yes; certain extensions are available to simplify operation and address missing features from the TR-196v1 data

Item	Specification
	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 is 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 mode deployments
Software upgrade	Yes
3G airlink cipher	3GPP UEA1 and UIA1 (also known as Kasumi cipher)
Backhaul	IPsec Tunnel Mode
Backhaul tunnel management	IKEv2
Periodic network listen	3G and GSM
Continuous service network listen	3G
Network listen bands	USC5101-AI-AIR-K9 <ul style="list-style-type: none"> • 3G Band 1 • 2G GSM 900 and GSM 1800
3G RF configuration	1 x 1 single-input single-output (SISO) antenna configuration
Receiver sensitivity	-114 dBm
3G RF Noise figure	8 dB
Interface	Connection 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 3G Small Cell Module
Power draw	3600i and 3600e with the 3G Small Cell Module requiring full PoE+ (25.5 W) at the egress switch port and a cable run of less than 300 ft (100m)
Weight	1 lb (<500g)
Size	8.46 x 2.5 x 1.97 in (21.48 x 6.35 x 5 cm)

Licensing

The software for the 3G Small Cell Module is only licensed by Cisco 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 3G Small Cell Module for Cisco Aironet.

Table 3. System Requirements

Host access point	Cisco Aironet 3600 Series
Controller	Cisco 8500 Series Wireless Controller
Powering options	Power Ethernet Plus (PoEP) is required <ul style="list-style-type: none"> • IEEE 802.3at PoE+ 25.5W delivered from the Ethernet switch - example Cisco Catalyst 4500 46xx E-Series/47xx 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 8.1 or later Cisco Small Cell System Solution (SCS) Software 2.0

Limited Lifetime Hardware Warranty

The Cisco 3G Small Cell Module 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. Find warranty information on Cisco.com at the [Product Warranties](#) page.

Ordering Information

The Cisco 3G Small Cell Module for Cisco Aironet is available for sale to service providers that have WCDMA, HSPA, and HSPA+ technology and spectrum assets in the 3G Band I (2100 MHz). For part numbers, refer to Table 2.

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.

For More Information

For more information about the Cisco 3G Small Cell Module, visit <http://www.cisco.com/go/smallcell> or contact your local account representative.



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