

Cisco Universal Small Cell 8718 and 8818



The Cisco[®] Universal Small Cell 8718 and 8818 (USC 8718 and USC 8818) modules are part of the Cisco Universal Small Cell Solution, an end-to-end platform that integrates 3G, LTE, and carrier-grade Wi-Fi with Cisco Self-Organizing Networks (SON) and backhaul for an efficient and highly secure heterogeneous network (HetNet). The Cisco USC Series provides the right solution for every indoor environment, from the home to enterprises of every size, up to large high-density environments such as airports, shopping malls, and campuses. These modules take advantage of the flexible, modular design of the Cisco Aironet[®] 3600 Series and Aironet 3700 Series Wi-Fi access points and are designed to operate in conjunction with the Cisco USC 8088 Controller.

Product Overview

The USC 8718 and 8818 modules offer improved licensed cellular coverage inside buildings. The modules can be rapidly deployed onto the footprint of the award-winning Aironet 3600 Series and 3700 Series Wi-Fi access points. The USC 8718 and 8818 modules are part of the Cisco Universal Small Cell 8000 Series architecture: an architecture that offers transparent and fully coordinated coverage for indoor environments by using a single, high-density, multitechnology controller for management and autoconfiguration of the in-building system. The deployed network consists of up to 100 USC 8000 Series small cells powered by Ethernet, providing coverage and capacity for more than 500,000 square feet (46,000 square meters) of office space.

Software-upgradable, these modules contain a dedicated 3G or LTE small cell access point that can efficiently deliver cellular coverage indoors while reducing dependency on poor or congested outdoor macro sites. The Aironet 3600 Series and 3700 Series Wi-Fi access points and the USC 8718 and 8818 modules (shown together in Figure 1) provide Wi-Fi infrastructure that supports both the 2.4- and 5-GHz bands along with 3G or LTE cellular infrastructure at the same site.

Figure 1. Cisco USC 8718 Installed in Cisco Aironet 3700



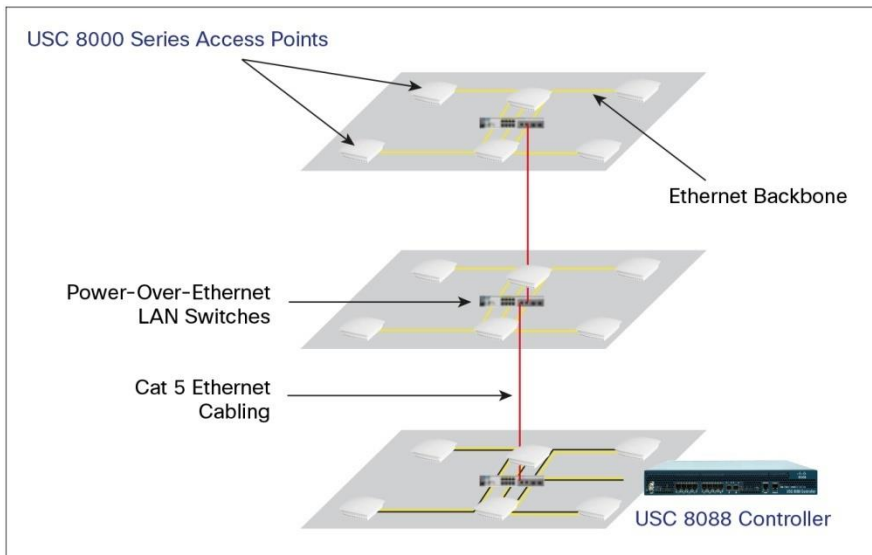
Cisco USC 8718 Features

The USC 8718 is a high-performance 3G or 4G (dual-mode configurable) small cell specially designed for scalable in-building deployments. In the 3G mode, the USC 8718 can support up to 32 simultaneous 3G voice and data channels. It is capable of a peak downlink rate of 21 Mbps and a peak uplink rate of 5 Mbps. Cisco MAC/PHY software implements receive diversity for superior uplink performance and provides the implementation of soft handover between small cells. In the LTE mode, the USC 8718 can support up to 32 active LTE users (up to 64 active LTE users from Solution Release SCS 5.0 onward) and 128 RRC connected users. When used with 20-MHz channel bandwidth, it supports a peak downlink rate of 150 Mbps and a peak uplink rate of 50 Mbps.

Each USC 8718 includes SON functions to enhance smooth coordination among cells inside its environment, as well as with 2G and 3G macro cells in multiple frequency bands. In addition, each access point performs continuous self-optimization to help provide high-quality radio coverage and mobility. The USC 8718 has no fan and is convection-cooled, with antennas built in.

All communication between small cells and the USC 8088 Controller occurs through an IP Security (IPsec) tunnel to provide exceptional network security to the enterprise (Figure 2). Encryption keys and device certificates are securely stored using on-chip Trusted Platform Module (TPM) functions, allowing support for a highly secure boot process and certificate-based authentication. The USC 8718 has no management or console port, and the unit can be locked to prevent theft or removal from premises.

Figure 2. USC 8000 Series Architecture Overview



Cisco USC 8818 Features

The Cisco USC 8818 is a high-performance dual carrier 4G (software configurable) small cell that shares many of the same features as the USC 8718. The 8818 can support up to 32 active LTE users on one of its two LTE radios (up to 64 active LTE users from Solution Release SCS 5.0 onward) and 128 RRC connected users on each band variant. When used with 20-MHz LTE channel bandwidth, it supports a peak downlink rate of 150 Mbps and a peak uplink rate of 50 Mbps.

Modular Flexibility and Efficiency

Four key challenges must be addressed when deploying licensed small cells: where to install them, how to power them, how to backhaul the traffic, and how to facilitate future evolution. Cisco solves these problems with innovation. The USC 8718 and 8818 modules use the flexibility of the Aironet 3600 and Aironet 3700v2 to provide a fully integrated, high-performance, low-cost 3G or LTE small cell while the host access point continues Wi-Fi services in parallel.

This Cisco design includes the following benefits:

- **Reduced operational costs:** By integrating either the USC 8718 or USC 8818 modules into the Aironet 3600 and Aironet 3700v2 access points, customers can combine two separate access points and their separate functions into a single footprint, using common network connectivity, power, and backhaul over Ethernet. This setup greatly reduces the capital expenditures 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 USC 8718 and USC 8818 appear as new devices in the existing management infrastructure, reducing support costs.

- Easier installation and power-up with zero-touch configuration: The USC 8718 and USC 8818 modules can be installed on the Aironet 3600 and Aironet 3700v2 access points in less than 10 minutes, requiring no additional cable runs and operating on the existing footprint. This approach can quickly provide 3G or LTE coverage to end users. The USC 8718 or 8818 is simply inserted and secured into any Aironet 3600 and Aironet 3700v2 access point. When the Aironet access point is powered, the USC 8718 or USC 8818 cellular module is initialized, configured, and authorized to immediately offer 3G or LTE voice, data, and messaging services.
- Secure, carrier-grade technology: The USC 8718 and USC 8818 provide the technology equivalent to an in-building mini cell tower. The device is highly secure on the air link from the module to the user, as well as on the Ethernet-based wired link (IPSec).
- Standards-based technology: The modules operates in the standard Third Generation Partnership Project (3GPP) architecture for small cells and is connected through the Cisco USC 8088 Controller to the mobile operator's network using the specified interface (Iuh with 3G and S1 with LTE). This architecture provides for rapid deployment.
- 3G and then LTE: The USC 8718 supports either 3G or LTE operating mode with a simple software configuration, allowing for deployment of a single access point that allows for smooth migration from 3G to LTE as user demands shift.

Additional USC 8718 and 8818 Benefits

- Superior indoor signal strength and capacity: The USC 8718 and USC 8818 modules significantly increase 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.
- Self-optimization reduces interference with neighboring infrastructure to provide a reliable and trusted cellular experience.
- Simplicity and convenience: Subscribers can use their existing mobile phones (in bring-your-own-device [BYOD] environments) 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.

In summary, the USC 8718 and USC 8818 are integrated multiaccess 3G and LTE small cell with SON capability that provides these features (refer to Tables 1 through 3 for detailed specifications):

- Multiple FDD band combinations
- 32 UMTS channels (USC 8718 only), 32 active LTE users (64 active from SCS 5.0 onward), 128 LTE RRC connected users
- Peak DL/UL UMTS throughput of 21 or 5 Mbps
- Peak DL/UL LTE throughput of 150 or 50 Mbps
- Ability to deploy over existing Ethernet switching infrastructure (VLAN)
- Power over Ethernet Plus (PoE+), powered within the spare power budget of the Cisco Aironet access point when PoE+ (IEEE 802.3at) is applied to an input Ethernet port
- Clip-on mountable on the Aironet 3600 or Aironet 3700 Version 2
- Certificate-based authentication with USC 8088 Controller

Product Specifications

Table 1 gives specifications of the USC 8718 and USC 8818, Table 2 gives Wideband Code Division Multiple Access (WCDMA) radio specifications, and Table 3 gives LTE radio specifications.

Table 1. Specifications of Cisco USC 8718/8818

Item	Specification
Enterprise installation	<ul style="list-style-type: none"> • Clip-on mount compatible with existing secure mounting solutions for the Cisco Aironet 3600 Series and Aironet 3700v2 Series Access Points • PoE: 802.3 at (from and within the spare power budget of Cisco Aironet access point) • Maximum power consumption: 23W when mounted. USC 8718 consumes 10W
Physical and environment	<ul style="list-style-type: none"> • Dimensions: 341 x 143 x 54 mm (13.4 x 5.6 x 2.1 in) • Weight: 1.22lbs (0.55kg) • One 100- or 1000-Mbps Ethernet (RJ-45) • Operating temperature <ul style="list-style-type: none"> • 32 to 104°F (0 to 40°C) (horizontally mounted) • Storage temperature: 32 to 185oF (0 to 85oC) • Operating humidity: 0 to 90% noncondensing • Storage humidity: 0 to 90% noncondensing • Ingress protection rating: IP30
MTBF	<ul style="list-style-type: none"> • 1,287,508 hours (147 years @ 40°C)
Security	<ul style="list-style-type: none"> • Secure boot and secure key storage using Trusted Platform Module (TPM) functions • IPsec tunneling to USC 8088 Controller • X.509 certificate-based authentication
Timing and synchronization	<ul style="list-style-type: none"> • IEEE 1588-based (PTP) • Real-time synchronization to USC 8088 Controller
Product options	<ul style="list-style-type: none"> • USC8718-M13-K9: <ul style="list-style-type: none"> ◦ LTE Band 3 (2x50 mW) or UMTS Band 1 (1x100 mW) (configurable) ◦ GSM monitor at 925-960 MHz & 1805-1880 MHz ◦ UMTS monitor at Bands 1, 8 ◦ LTE monitor at Bands 3, 7, 20 • USC8718-M24-K9: <ul style="list-style-type: none"> ◦ LTE Band 4 (2x50 mW) or UMTS Band 2 (1x100 mW) (configurable) ◦ GSM monitor at 869-894 MHz ◦ UMTS monitor at Bands 2, 5 ◦ LTE monitor at Bands 2, 4 • USC8718-M17-K9: <ul style="list-style-type: none"> ◦ LTE Band 7 (2x50 mW) or UMTS Band 1 (1x100 mW) (configurable) ◦ GSM monitor at 925-960 MHz & 1805-1880 MHz ◦ UMTS monitor at Bands 1, 8 ◦ LTE monitor at Bands 3, 7, 20 • USC8818-C13-K9: <ul style="list-style-type: none"> ◦ LTE Band 3 or Band 1 (2x50 mW) (configurable) ◦ GSM monitor at 925-960 MHz & 1805-1880 MHz ◦ UMTS monitor at Bands 1, 8 ◦ LTE monitor at Bands 3, 7, 20 • USC8818-C24-K9: <ul style="list-style-type: none"> ◦ LTE Band 2 or Band 4 (2x50 mW); or UMTS Band 2 (1x50 mW) (configurable) ◦ GSM monitor at 850 MHz & 1900 MHz ◦ UMTS monitor at Bands 2, 5 ◦ LTE monitor at Bands 2, 4, 5, 12, 13, 17, 66 • USC8818-C412-K9: <ul style="list-style-type: none"> ◦ LTE Band 4, 12, or 17 (2x50 mW) (configurable) • GSM monitor at 850 MHz & 1900 MHz ◦ UMTS monitor at Bands 2, 5 ◦ LTE monitor at Bands 2, 4, 5, 12, 17, 66

Item	Specification
Regulatory compliance (planned)	<ul style="list-style-type: none"> • USC8818-C25-K9: <ul style="list-style-type: none"> ◦ LTE Band 2 or Band 5 (2x50 mW); or UMTS Band 2 or Band 5 (1x50 mW) (configurable) ◦ GSM monitor at 850 MHz & 1900 MHz ◦ UMTS monitor at Bands 2, 5 ◦ LTE monitor at Bands 2, 4, 5, 12, 13, 17, 66
	<ul style="list-style-type: none"> • Safety EN 60950, CB certification (IEC 60950) • EMI Directive 1999/5/EC on R&TTE: <ul style="list-style-type: none"> ◦ EN 50385 ◦ EN 301 489-1 and 301 489-23 ◦ EN 301 908-1 and 301 908-3 • FCC Part 15, Class A • Industry Canada: ICES-003 (Class A) • Materials: Directive 2002/95/EC on RoHS • General: CE and NRTL marking • FCC Part 24 (UMTS band 2) • FCC Part 27 (UMTS band 4) • Industry Canada: RSS-133 and RSS-139

Table 2. WCDMA Radio Specifications (USC 8718 or USC8818 Where Applicable)

Item	Specification
Performance	<ul style="list-style-type: none"> • Up to 32 simultaneous voice and data channels • Peak rates: 21-Mbps DL; 5-Mbps UL
Radio and antenna	<ul style="list-style-type: none"> • Peak transmit power: One 100-mW (20 dBm) • Receive diversity • Two internal antennas • Antenna gain: 2 dBi (nominal)
RF management	<ul style="list-style-type: none"> • UMTS network monitor • Inter- and intrafrequency neighbor-cell detection • Global System for Mobile Communications (GSM) network monitor • Autodetection of primary scrambling codes
Mobility management	<ul style="list-style-type: none"> • Inter-small-cell soft handover • Handover from small-cell to/from macro (inter-RAT, interfrequency)
Supported RAB	<ul style="list-style-type: none"> • CS: 12.2-kbps AMR; WB-AMR • R99 PS: 64 kbps; 384 kbps • HSPA+: Release 7, all categories • Multi-RAB: 1 x CS, up to 3 x PS
3GPP Release	<ul style="list-style-type: none"> • Release 7 with support for some higher Release 8 functions
Ciphering	<ul style="list-style-type: none"> • 3G Kasumi

Table 3. LTE Radio Specifications

Item	Specification
Performance	<ul style="list-style-type: none"> • Peak rates: 150-Mbps DL and 50-Mbps UL (with 20 MHz) • 32 standard users (up to 64 active users with capacity upgrade license) • 128 RRC connected users
Channel bandwidth	<ul style="list-style-type: none"> • 5 MHz • 10 MHz • 15 MHz • 20 MHz
Radio and antenna	<ul style="list-style-type: none"> • 2 x 2 MIMO • Maximum transmit power: 2x50 mW (2x17dBm) • Two internal antennas • Antenna gain: 2 dBi (nominal)

Item	Specification
Mobility	<ul style="list-style-type: none"> • Inter Cisco USC 8000 Series small cell handover anchored at USC 8088 Controller • Handover to/from macro (interfrequency and intrafrequency) • Inter-RAT handover to UMTS
RF management	<ul style="list-style-type: none"> • LTE and UMTS network monitor • Inter- and intrafrequency neighbor-cell detection • Autodetection of Physical Cell Identities (PCI) • Automatic Neighbor Relation (ANR) management
Voice services	<ul style="list-style-type: none"> • Voice over LTE (VoLTE) • Circuit-switched fall back
Quality-of-service (QoS) features	<ul style="list-style-type: none"> • Support for LTE QClS • Multiple Data Radio Bearers (DRB) per UE • Guaranteed bit rate (GBR) • Maximum bit rate (MBR) • Aggregate maximum bit rate (AMBR)
3GPP Release	<ul style="list-style-type: none"> • Release 8 with support for some higher release 9 functions
Ciphering	<ul style="list-style-type: none"> • SNOW 3G and Advanced Encryption Standard (AES) air-interface encryption

Ordering Information

The USC 8718 and USC 8818 are available for sale in the bands per Table 4. For part numbers and 3G and LTE band combinations, refer to Tables 4 and 5.

Table 4. Hardware Ordering Guide

Product Name	Description	Order Code
Universal Small Cell 8718, Band 1/3	Dual-band Switchable Multimode Module, band 3 for LTE with 2x50 mW MIMO, band 1 for 3G with 100 mW transmit and receive diversity. Software configurable to operate as UMTS and LTE. Band 1/3	USC8718-M13-K9
Universal Small Cell 8718, Band 1/7	Dual-band Switchable Multimode Module, band 7 for LTE with 2x50 mW MIMO, band 1 for 3G with 100 mW transmit and receive diversity. Software Configurable to operate as UMTS and LTE. Band 1/7	USC8718-M17-K9
Universal Small Cell 8718, Band 2/4	Dual-band Switchable Multimode Module, band 4 for LTE with 2x50 mW MIMO, band 2 for 3G with 100 mW transmit and receive diversity. Software configurable to operate as UMTS and LTE. Band 2/4	USC8718-M24-K9
Universal Small Cell 8818, Band 1/3	Dual-carrier Switchable Multimode Module, both bands for LTE with 2x50 mW MIMO with 50 mW transmit and receive diversity. Software configurable to operate as LTE. Bands 1/3	USC8818-C13-K9
Universal Small Cell 8818, Band 2/4	Dual-carrier Switchable Multimode Module, both bands for LTE with 2x50 mW MIMO. 3G support on Band 2, 50 mW SISO with receive diversity. Software configurable to operate as LTE or 3G on band 2 or LTE on band 4. Bands 2/4	USC8818-C24-K9
Universal Small Cell 8818, Band 2/5	Dual-carrier Switchable Multimode Module, both bands for LTE with 2x50 mW MIMO. 3G support on Band 5, 50 mW SISO with receive diversity.	USC8818-C25-K9
Universal Small Cell 8818, Band 4/12	Dual-carrier Switchable Multimode Module, support for LTE on Band 4, 12, or 17 with 2x50 mW MIMO.	USC8818-C412-K9
Universal Small Cell 8088 Controller	Controller hardware capable of supporting 50 dual-band (UMTS + LTE or dual-LTE) small cells.	USC8088-LC-K9
Universal Small Cell 8088 Controller (High Capacity)	Controller Hardware capable of supporting 100 dual-band (UMTS + LTE or dual-LTE) small cells.	USC8088-HC-K9

Table 5. Software Ordering Guide

Product Name	Description	Order Code
Small Cell Activation Software	Activation software for each 8718 small cell	USC8718-ASW-K9
Small Cell Activation Software	Activation software for each 8818 small cell	USC8818-ASW-K9
Controller Software License	Controller capacity expansion software license for each small cell	USC8088-CSW-K9
Enterprise Management System License	Management software license for each small cell	USC8050-MSW-K9
LTE Single Band High-Capacity Upgrade License (optional)	License to increase the number of active LTE users from 32 users to 64 users on a single carrier LTE radio APs	L-8k-LTE-CUx1-K9
Enterprise Management System Platform License	Enterprise management platform license. Licensed per server instance. Two platform licenses needed for redundant deployment.	L-USC8050-PL-K9
Controller Activation Software	Activation software for controller	USC8088-LC-ASW-K9
High Capacity Controller Activation Software	Activation software for high-capacity controller	USC8088-HC-ASW-K9

Product Warranty

The USC 8718 and 8818 include a 1-year limited hardware warranty and a 90-day software warranty, with 30-days return for repair. More detailed warranty information is available on Cisco.com at the [Product Warranties](#) page.

Cisco Small Cell Services

The Cisco Universal Small Cell Solution can be 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 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. 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 and 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 IOT/SVT labs, and ecosystem partners.

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For More Information

For more information about the Cisco USC 8718 and 8818 modules, visit <http://www.cisco.com/go/smallcell> or contact your local Cisco account representative.




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