Cisco 819 Integrated Services Routers with 3G and Wi-Fi

Enabling Machine-to-Machine Applications

The Cisco[®] 819 Integrated Services Router Family, designed in compact hardened and non-hardened form factors, is the smallest Cisco IOS[®] Software router with support for integrated third-generation (3G) wireless WAN (mobile broadband backhaul) and WLAN capabilities. The Cisco 819 ISR gateway provides a rapidly deployable, highly available, reliable, and secure solution designed specifically for machine-to-machine (M2M) applications. Markets that benefit from these applications include industrial automation, transportation, financial, health care, utility, and retail. Fully integrated with Cisco IOS Software, the Cisco 819 family delivers, enterprise-class features, including highly secure data, voice, and video communications to stationary and mobile network nodes across wired and wireless links. Figure 1 shows a Cisco 819 Integrated Services Router.

Figure 1.   Cisco 819 Integrated Services Router

The Cisco 819 ISR is available in both non-hardened (Cisco 819G) and hardened (Cisco 819HG) versions. Both models include support for 3G up to 3.7G wireless WAN (WWAN) speeds. Support for 3G offers cost-effective, rapidly deployable, reliable, and secure primary or backup connectivity. With support for industrial-grade components, the hardened Cisco 819HG extends the footprint and provides deployment flexibility. The Cisco 819HG is an ideal solution for stationary and mobile environments where space, heat dissipation, exposure to extreme temperatures, harsher environments, and low power consumption are critical factors.

For mobile applications, Cisco Mobile IP delivers transparent roaming across multiple wireless networks capable of covering wide geographic areas. Additionally, the Cisco 819 ISR supports enterprise class built-in Wireless LAN (WLAN) capability. The Cisco 819HGW platforms concurrently support both 3G for wireless WAN backhaul and

Cisco dual radio WLAN on the same platform as shown in Figure 2. The 802.11a/b/g/n 2X3 MIMO built-in Cisco 3500 Access Point (AP) in the Cisco 819, comes with Cisco's CleanAir technology, to create a self-healing, self-optimizing WLAN. Moreover, with the advantage of dual radio, the integrated AP can serve both as an access point and as a client to a wireless mesh network. This provides another source for WAN diversity along with Gigabit Ethernet, serial, and cellular. The AP ClientLink feature improves reliability and coverage for legacy devices and dynamic frequency selection (DFS allows detecting and avoiding interference with radar signals to comply with regulatory domains. Figure 2 shows the 819 ISR with integrated 3G and 802.11 a/b/g/n AP. More information on the Cisco 3500 Access Point is available at
http://www.cisco.com/en/US/prod/collateral/wireless/ps5678/ps10981/data_sheet_c78-594630.html

Figure 2.   Non-hardened Cisco 819GW Integrated Services Router with 3G and Wi-Fi

A critical component of the Cisco M2M architecture, the Cisco 819 ISR serves as the single, horizontal platform which enhances the Cisco implementation of "any device, anywhere, any place" across multiple industries, including banking, retail, healthcare, manufacturing, government. It also provides the ability to extend Cisco product-based networks to small branch offices with a relatively low incremental investment, as well as to enable managed services offerings based on Cisco architecture..

Product Overview

The Cisco 819 ISRs for M2M applications supports 3G High-Speed Packet Access Plus [HSPA+] and Evolution Data Optimized [EV-DO Rev A]), enabling up to 3.7G speeds. They are backward compatible with High-Speed Packet Access (HSPA), Universal Mobile Telecommunications Service (UMTS). Enhanced Data Rates for Global Evolution (EDGE), General Packet Radio Service (GPRS), and EV-DO Rev 0/1xRTT. The Cisco 819 3G includes an integrated WLAN access point and has two hardened and un-hardened variants:

- Global System for Mobile Communications (GSM) and UMTS models are based on the Third-Generation Partnership Project (3GPP), and they support HSPA+ (High-Speed Uplink Packet Access [HSUPA] and High-Speed Downlink Packet Access [HSDPA]), UMTS, EDGE, and GPRS.
- Code Division Multiple Access (CDMA) models are based on 3GPP2, and they support EV-DO Rev A and Rev 0 and 1xRTT.

The Cisco 819 ISR family includes a broad range of enterprise-class features including:

- Security services, including firewall, intrusion prevention, VPN and Cisco ISR Web Security with ScanSafe which require no additional hardware or client software, This enables branch offices, manufacturing sites,

hospitals, banks, and mobile fleets, for example to intelligently redirect web traffic to the cloud to enforce granular security and acceptable use policies over user web traffic. With this solution, you can deploy market-leading web security quickly and easily to protect branch office users from web-based threats, such as viruses, while saving bandwidth, money, and resources.

- Additional WAN options such as Serial and Gigabit Ethernet WAN interfaces and a 4-port 10/100 Fast Ethernet Managed switch for LAN connectivity. The Cisco 819 provides quality-of-service (QoS) features for optimizing voice and video applications.

- Cisco Configuration Professional is a web-based configuration tool that simplifies setup and deployment. Centralized management capabilities give network managers visibility and control of the network configurations at remote sites.

- With enhanced data rates and improved latency (below 100 milliseconds), WWAN services are an ideal way to supplement traditional wire line services. Third- and fourth-generation WWAN data services offered today have average data rates well in excess of ISDN speeds, with theoretical limits in excess of 21 Mbps on the downlink and 5.76 Mbps on the uplink. The 3G and 4G LTE WWAN can be used as a primary link for sites with lower bandwidth requirements and for mobile applications. The 3G and 4G LTE WWAN data services can also be used as a cost-effective alternative in areas where broadband services are either not available or very expensive. Cisco is building on these performance milestones and adding support for wireless to our wide variety of WAN interface alternatives.

Business Benefits and Application Examples

Businesses are looking for ways to reduce costs, increase revenue, and improve business continuity. The 4G LTE wireless connectivity, which is 10 to 15 times faster and has 5 times lower latency than 3G links, allows a small enterprise branch office or remote office to set up comprehensive media services in a matter of hours, without worrying about availability of broadband services and the need for laying down the lines. Wireless carriers offer flexible, usage-based data plans that can be catered to meet the needs and price points of the business customer. As WAN backup alternatives, 3G and 4G LTE wireless offer greater WAN diversity and resiliency because they are independent of the local terrestrial infrastructure. The Cisco 819 enables businesses to stay productive during service provider downtime or a network failure.

Ability to Host Networks in Motion

The Cisco 819 uses standards-based Mobile IP features in Cisco IOS Software to host networks in motion. Transition to different wireless networks is transparent to the users and devices (such as laptops, smart devices, and surveillance cameras), and applications maintain continuous connectivity without the user's manual intervention as WAN links change. In addition to allowing a single node or device to stay connected, the Cisco 819 allows an entire mobile network or subnet to stay connected. The dual radio WLAN on the 819 can serve as both a client and an access-point. The mobile asset (truck, passenger bus, car) can communicate with either a localized WLAN network as in a bus or train dock or communicate with a city-wide WLAN deployment when in motion.

Retail VPN

Retail stores migrating from dialup connections for point-of-sale transactions can use the 3G, 3.5G or 3.7G (4G?) wireless WAN option on the Cisco 819 for low-cost broadband access with the required security to comply with payment-card-industry and other data security requirements. Multiple devices and applications can then be added

to the store network to take advantage of the increased bandwidth and to enable secure mobility and enhance productivity.

Managed Services

Service providers and value-added resellers can use the Cisco 819 as a platform to offer differentiated business-class security and wireless LAN (WLAN) services for small and medium-sized business (SMB) customers. Superior management capabilities such as Simple Network Management Protocol (SNMP) support with 3G MIB and Cisco Configuration Professional make remote management and provisioning easier.

Primary Features and Benefits

Table 1 lists the features and benefits of the Cisco 819 Integrated Services Router.

Table 1.   Features and Benefits of Cisco 819

Feature	Benefit
Smallest Cisco ISR in both Hardened and Non-hardened Form Factors	
Single platform for multiple applications	• This single architecture is uniquely designed for deployments in multiple remote applications such as ATM machines, kiosks, small branch offices, remote teleworker sites, gas stations, telemetry, etc. and across all industries. • Hardened models extend the ISR footprint into deployments wherein the router is exposed to extreme environmental conditions such as heat dissipation, exposure to extreme temperatures, dust, splash water, shock and vibration..
Hardened Router Industrial-grade components	• The hardened router supports extended temperature ranges from –13 to 140ºF (–25 to 60ºC). • Meets 95 percent of the Non-Condensing Humidity Requirements, IP 41 per IEC 60529 for Vertical Falling Water and Pollution 3 for Dust. The router meets MIL-STD-810, SAEJ1455, and ENG3396 for Shock and Vibe standards. • Supports a variety of mounting options, including 35-mm din-rail per EN60715, floor mount, and wall mount, and offers both AC and DC* power options allowing for deployment flexibility..
Lightweight, compact size with low power consumption	• Can be deployed in many different environments where space, heat dissipation, and low power consumption are critical factors.
Increased performance to run concurrent services	• Performance allows customers to take advantage of broadband network speeds while running secure, concurrent data, voice, video, and wireless services.
Enhanced security	• An integrated stateful and application inspection firewall provides network perimeter security and high-speed IP Security (IPsec); 3DES and AES encryption offer data privacy over the Internet. • Intrusion prevention enforces security policies in a larger enterprise or service provider network. • Content filtering offers category-based URL classification and blocking, thus providing increased productivity and better use of company resources. • ScanSafe web security and filtering solution that requires no additional hardware or client software. Enables remote locations to intelligently redirect web traffic to the cloud to enforce granular security and acceptable use policies over user web traffic.
Integrated WLAN Access Point	• Integrates the Cisco 3500 802.11 a/b/g/n Access Point for mission-critical applications. By intelligently avoiding interference, the WLAN feature offers performance protection for 802.11n networks to help ensure reliable application delivery. The 2X3 MIMO AP comes with Cisco's CleanAir technology, the industry's first to create a self-healing, self-optimizing wireless network. • With dual radios, the Cisco AP can serve both as an access point and as a client to a wireless mesh network concurrently, providing another source for WAN diversity. • The AP ClientLink feature improves reliability and coverage for legacy devices • Dynamic frequency selection (DFS) allows detecting and avoiding interference with radar signals to comply with regulatory domains. More information on the Cisco 3500 AP is available at: http://www.cisco.com/en/US/prod/collateral/wireless/ps5678/ps10981/data_sheet_c78-594630.html
Multiple WAN and LAN Connections	
Four-port 10/100-Mbps managed switch	• Allows for multiple Ethernet device connectivity in a small office or other remote location with the ability to designate a port as the network edge. • VLANs allow for secure segmentation of network resources. • Multiple LAN and WAN devices can be connected to standard 10/100/Ethernet or serial interfaces.
WAN diversity	• Support for multiple WAN links: Gigabit Ethernet, Serial, 3G provide for business continuity.

Feature	Benefit
Transparent Roaming Between Wireless Networks	
Dual subscriber-identity-module (SIM) support	• Hardware readiness for Dual SIM provides for high reliability and cellular multi-homing support for HSPA-based networks.
Cisco IOS Mobile IP features	• Mobile IP offers transparent roaming for mobile networks, establishing a transparent Internet connection regardless of location or movement. This enables mission-critical applications to stay connected even when roaming between networks. • Assigned IP addresses to the home network are maintained in private or public networks.
Cisco IOS Mobile network features	• Allows an entire subnet or mobile network to maintain connectivity to the home network while roaming.
Multiple wireless WAN technologies	• Supports the best wireless (3G, 3.5G or 3.7G) technology or network available.
Advanced IP Services in Standards-Based Cisco IOS Software	
Advanced security features	• Authorization and authentication determines which individuals and devices have access to the network. • Firewall protection provides perimeter security when using public networks. • 3DES and AES encryption provides for highly secure VPNs when transmitting and receiving data over public networks. • Intrusion detection monitors potential malicious activity within the network.
QoS features	• Provides traffic precedence to delay-sensitive or prioritized applications. • Facilitates low-latency routing of delay-sensitive applications such as streaming video.
IP Multicast	• Allows efficient broadcast of data or video for increased situational awareness, multiuser communications, or surveillance applications.
Management and manageability	• Network managers can remotely manage and monitor networks with SNMP, Telnet, or HTTP, and locally through a console port. • Support for extensive 3G- and 4G LTE-based MIBs allows for centralized management of remote devices and gives network managers visibility and control of the network configurations at the remote site. • Network managers can reset to a pre-designated golden image as well as configure an ISR through Cisco IOS Software or through an external reset button. • Network managers can upgrade 3G, 3.5G and 3.7G (4G???) firmware and router configurations remotely and confirm enhancement verification. • Tight integration with Cisco IOS Software allows you to self-monitor the functions of the 3G, 3.5G and 3.7G (4G???) modems and auto-recover from a failure. • Cisco Configuration Professional provides a web-based tool that simplifies setup and deployment. • Intuitive network management tools such as CiscoWorks and HP OpenView are supported.

Table 2.

Cisco Router Platform	Recommended Number of Users	TCP Connections	Maximum WAN Bandwidth Supported
C819HG **C819G**[1]	3	30	512kbps
C819HGW **C819HWD** **C819H**	7-10	75	2Mbps

[1]The Date Redundancy Elimination is disabled on these platforms.

Product Specifications

Table 3 provides 3G specifications for the Cisco 819 Integrated Services Router.

Table 3. 3G Specifications

Item	Specification
3G modem form factor	Embedded (included with the router)
Important 3G features	• Auto-switch failover between primary and backup link • Multichannel-interface-processor (MIP) profile configuration • CDMA Data Retry • 3G SNMPv2 MIBs and traps • Remotely initiated data callback using voice • Remotely initiated data callback using Short Message Service (SMS) • Remote firmware upgrade over 3G • Virtual diagnostic monitoring • Mobile Equipment Personalization (MEP) lock and unlock capabilities • SIM lock and unlock capabilities

Dual SIM support	• High reliability and cellular multi-homing support for HSPA and HSPA+ based networks
	• Dual SIM card socket; compliant with ISO-7816-2 (SIM mechanical)
	• Two Internal SIM Card Slots:
	  ◦ C819(H)G-U-K9, C819(H)G+7-K9, C819HGW+-A-A-K9, C819HGW+7-E-K9,C819HGW+7-N-K9
	• No SIM Card Slot:
	  ◦ C819(H)G-V-K9, C819(H)G-S-K9, C819(H)G-B-K9, C819HGW-V-A-K9, C819HGW-S-A-K9

SMS and Global Positioning System (GPS)	• Ability to send and receive SMS (maximum of 160 characters) • Standalone GPS
MIBs	• 3G MIB • ENTITY MIB • IF MIB • 3G WWAN MIB persistence
3G network management and diagnostics	• In-band and out-of-band management using Telnet (Cisco IOS Software command-line interface [CLI]) and SNMP, including MIB II and other extensions • Industry-standard 3G diagnostics and monitoring tools (QUALCOMM CDMA Air Interface Tester [CAIT] and Spirent Universal Diagnostic Monitor [UDM])
Modem information	Modem form factor: Embedded Peripheral Component Interconnect (PCI) minicard • 819(H)G-U: Sierra Wireless MC8795V (non-U.S. market) support HSPA Release 6 • 819(H)G(W)+7: Sierra Wireless MC8705 supporting HSPA+ Release 7 • 819(H)G(W)-S: Sierra Wireless MC5728V • 819(H)G(W)-V: Sierra Wireless MC5728V • 819(H)G-B: Sierra Wireless MC5728V
Programming interfaces	Cisco IOS Software CLI

Item	Specification		
Wireless technologies supported (performance and throughput) **For more detail such as Wi-Fi domains, please see the Cisco Aeronet 3500 AP Data Sheet:** **http://www.cisco.com/en/US/ prod/collateral/wireless/ps56 78/ps10981/data_sheet_c78- 594630.html**	• Part Number: C819(H)G-U-K9 • HSPA: 850, 900, 1900, and 2100 MHz (forward link up to 7.2 Mbps; reverse link up to 5.76 Mbps) • Backward compatibility: ◦ HSDPA: 850, 900, 1900, and 2100 MHz (forward link up to 7.2 Mbps; reverse link up to 384 kbps) ◦ UMTS: 850, 900, 1900, and 2100 MHz (forward link up to 2.0 Mbps; reverse link up to 384 kbps) ◦ EDGE: 850, 900, 1800, and 1900 MHz (forward link up to 236 kbps; reverse link up to 124 kbps) ◦ GPRS: 850, 900, 1800, and 1900 MHz (forward link up to 80 kbps; reverse link up to 42 kbps)	• Part Number: C819(H)G+7-K9 and C819HGW+7-E-K9 and C819HGW+7-A-A-K9 and C819HGW+7-A-N-K9 • HSPA+: 850, 900, 1900, and 2100 MHz (forward link up to 21Mbps; reverse link up to 5.76 Mbps) • Backward compatibility: ◦ HSDPA: 850, 900, 1900, and 2100 MHz (forward link up to 21 Mbps; reverse link up to 384 kbps) ◦ UMTS: 850, 900, 1900, and 2100 MHz (forward link up to 2.0 Mbps; reverse link up to 384 kbps) ◦ EDGE: 850, 900, 1800, and 1900 MHz (forward link up to 236 kbps; reverse link up to 124 kbps) ◦ GPRS: 850, 900, 1800, and 1900 MHz • WiFi Domain: Please see the 3500 AP Data Sheet:	• Part Number: C819(H)G-S-K9 and C819(H)G-V-K9 and C819(H)G-B-K9 and C819HGW-S-A-K9 and C819HGW-V-A-K9 • CDMA 1xEV-DO Rev A (forward link up to 3.1 Mbps; reverse link up to 1.8 Mbps) • Backward compatibility: ◦ CDMA 1xEV-DO Rev 0 (forward link up to 2.4 Mbps; reverse link up to 153.6 kbps) ◦ CDMA 1xRTT (forward link up to 153.6 kbps; reverse link up to 153.6 kbps) • x: S = Sprint networks; V = Verizon wireless networks; B = Bharat Sanchar Nigam Limited (BSNL) networks
Wireless technologies supported (performance and throughput)	• Part Number: C819HWD-E-K9	• Part Number: C819HWD-A-K9	• Part Number: C819H-K9
Frequency bands supported	Part Number: C819(H)G-U-K9 • 850, 900, 1900, and 2100MHz WCDMA bands (HSUPA, HSDPA, and UMTS) • 850, 900, 1800, and 1900 MHz GSM bands (EDGE and GPRS)	Part Number: C819(H)G+7-K9 and C819HGW+7-E-K9 and C819HGW+7-A-A-K9 and C819HGW+7-A-N-K9 • 850, 900, 1900, and 2100MHz WCDMA bands (HSUPA, HSDPA, and UMTS) • 850, 900, 1800, and 1900 MHz GSM bands (EDGE and GPRS)	Part Number: C819(H)G-x-K9 and C819(H)G-V-K9 and C819(H)G-B-K9 and C819HGW-S-A-K9 and C819HGW-V-A-K9 • 800 MHz: North American cellular band • 1900 MHz: North American PCS band • x: S = Sprint networks; V = Verizon wireless networks; B = BSNL networks
Included antenna	Cellular Access: Two multiband swivel-mount dipole antennae (3G-ANTM1919D) are included for all 819 SKUs that have 3G Cellular functionality WLAN: Three Cisco Multiband Swivel-Mount Dipole Antennae. (AIR-ANTM2050D-R) are included for all 819 SKUs that have WLAN functionality.		
LED indicators for 3G	• Received signal strength indication (RSSI) (green) • WLAN(green/blue/red/white) • WWAN (green) • SIM status (green/yellow) • 3G service (green) • GPS (green/yellow) • SYS(green/yellow) • ACT(green) For detailed LED Description including for WLAN please see the 819 Deployment Guide.		
Carrier support	For an updated list of carriers that offer services on the Cisco 819(H)G Series, please visit: http://www.cisco.com/go/m2m.		

Table 4 lists the software features supported on the Cisco 819 Integrated Services Router.

Table 4. Cisco IOS Software Features on Cisco 819: Advanced IP Features Set (Default)

Feature	Description
Cisco IOS Software requirement	Cisco IOS Software Release 15.2(4)M1 or later for 819H, 819HW and 819HGW SKUs. Cisco IOS Software Release 15.1(4)M1 or later for 819(H)G SKUs
IP and IP services features	• Routing Information Protocol Versions 1 and 2 (RIPv1 and RIPv2) • Generic routing encapsulation (GRE) and multipoint GRE (MGRE) • Cisco Express Forwarding • Standard 802.1d Spanning Tree Protocol • Layer 2 Tunneling Protocol (L2TP) • Layer 2 Tunneling Protocol Version 3 (L2TPv3) • Network Address Translation • Dynamic Host Configuration Protocol (DHCP) server, relay, and client • Dynamic Domain Name System (DNS) • DNS Proxy • DNS Spoofing • Access control lists (ACLs) • IPv4 and IPv6 Multicast • Open Shortest Path First (OSPF) • Border Gateway Protocol (BGP) • Performance Routing (PfR) • Enhanced Interior Gateway Routing Protocol (EIGRP) • Virtual Route Forwarding (VRF) Lite • Next Hop Resolution Protocol (NHRP) • Bidirectional Forwarding Detection (BFD) • Web Cache Communication Protocol (WCCP)
Switch features	• Auto Media Device In/Media Device Cross Over (MDI-MDX) • 8 802.1Q VLANs • MAC filtering • Switched Port Analyzer (SPAN) • Storm control • Smart ports • Secure MAC address • Internet Group Management Protocol Version 3 (IGMPv3) snooping • 802.1x

Feature	Description
Security features	Secure connectivity: • Secure Sockets Layer (SSL) VPN for secure remote access • Hardware-accelerated DES, 3DES, AES 128, AES 192, and AES 256 • Public-key-infrastructure (PKI) support • 20 IPsec tunnels • Cisco Easy VPN Client and Server • NAT transparency • Dynamic Multipoint VPN (DMVPN) • Tunnel-less Group Encrypted Transport VPN • IPsec stateful failover • VRF-aware IPsec • IPsec over IPv6 • Adaptive control technology • Session Initiation Protocol (SIP) application layer gateway Cisco IOS Firewall: • Zone-Based Policy Firewall • VRF-aware stateful inspection routing firewall • Stateful inspection transparent firewall • Advanced application inspection and control • Secure HTTP (HTTPS), FTP, and Telnet Authentication Proxy • Dynamic and static port security • Firewall stateful failover • VRF-aware firewall Content filtering: • Subscription-based content filtering with Trend Micro • Support for Websense and SmartFilter • Cisco IOS Software black and white lists Integrated threat control: • Intrusion prevention system (IPS) • Control Plane Policing • Flexible Packet Matching • Network foundation protection Scansafe: • Web security and web filtering solution that requires no additional hardware or client software . • Cisco ScanSafe enables branch offices to intelligently redirect web traffic to the cloud to enforce granular security and acceptable use policies over user web traffic. With this solution, you can deploy market-leading web security quickly and easily to protect branch office users from web-based threats, such as viruses, while saving bandwidth, money, and resources.
QoS features	• Low Latency Queuing (LLQ) • Weighted Fair Queuing (WFQ) • Class-Based WFQ (CBWFQ) • Class-Based Traffic Shaping (CBTS) • Class-Based Traffic Policing (CBTP) • Policy-Based Routing (PBR) • Class-Based QoS MIB • Class of service (CoS)-to-differentiated services code point (DSCP) mapping • Class-Based Weighted Random Early Detection (CBWRED) • Network-Based Application Recognition (NBAR) • Link fragmentation and interleaving (LFI) • Resource Reservation Protocol (RSVP) • Real-Time Transport Protocol (RTP) header compression (cRTP) • Differentiated Services (DiffServ) • QoS preclassify and prefragmentation • Hierarchical QoS (HQoS)

Feature	Description
Management features	• Cisco Configuration Professional • Cisco Configuration Express • Cisco Configuration Engine support • Cisco AutoInstall • IP service-level agreement (IP SLA) • Cisco IOS Embedded Event Manager (EEM) • CiscoWorks • Cisco Security Manager • Telnet, SNMPv3, SSH, CLI, and HTTP management • RADIUS and TACACS+ • Out-of-band management with external modem through virtual auxiliary port
High-availability features	• Virtual Router Redundancy Protocol (VRRP) (RFC 2338) • Hot Standby Router Protocol (HSRP) • Multigroup HSRP (MHSRP) • Dial backup with external modem through virtual auxiliary port • Dual SIM support for cellular multihoming
Metro Ethernet features	• Ethernet operations, administration, and maintenance (OAM) • Ethernet Local Management Interface (LMI) • IP SLA for Ethernet
IPv6 features	• IPv6 addressing architecture • IPv6 name resolution • IPv6 statistics • IPv6 translation: Transport packets between IPv6-only and IPv4-only endpoints (NAT-PT) • Internet Control Message Protocol Version 6 (ICMPv6) • IPv6 DHCP
Number of recommended users	20

Table 5 lists the system specifications, and Table 5 lists antenna specifications for the Cisco 819 Integrated Services Routers.

Table 5.   System Specifications

Feature	Specification
Memory	
Default and maximum DRAM	819(H)G(with 3G only): 512 MB 819HGW, 819HWD (with WiFi) and 819H: 1GB
Default and maximum flash memory	819(H)G: 256 MB 819HGW and 819HWD (with WiFi) and 819H: 1GB
Interface Support	
Console or auxiliary port	RJ-45: Single dual-purpose port, which provides direct connection to a console or external modem for management or backup access point
Mini-USB port (RSVD)	Mini-USB port to support remote 3G diagnostics and monitoring tools (QUALCOMM CAIT and Spirent UDM)*
WAN interfaces	• Wireless WAN with 3G, 3.5G and 3.7G speeds • 10/100/1000 Gigabit Ethernet port • Cisco Smart Serial Interface (sync/async/bisync)

Feature	Specification
WLAN Features	2x3 multiple-input multiple-output (MIMO) with two spatial streams - Maximal ratio combining (MRC) - Legacy beamforming 20- and 40-MHz channels - PHY data rates up to 300 Mbps - Packet aggregation: A-MPDU (Tx/Rx), A-MSDU (Tx/Rx) 802.11 dynamic frequency selection (DFS) - Cyclic shift diversity (CSD) support
LAN interfaces	Four 10/100 Fast Ethernet ports
LEDs	- System OK (green/amber) - Activity (green) - WWAN (green/amber) - SIM status (green/amber) - RSSI (green) 3G service (green/amber) - GPS (green/amber) - Speed and link for Gigabit Ethernet WAN port (green) - Speed and link for all Fast Ethernet LAN ports (green)
Serial WAN interface	- Support for both synchronous and asynchronous modes - Synchronous maximum speed of up to 8 Mbps - Asynchronous maximum speed of up to 115.2 kbps - Support for bisync modes - Support for network clock synchronization
Serial protocol support	EIA-232, EIA-449, EIA-530, EIA-530A, V.35, and X.21

Cisco Smart Serial Cabling — Cisco Smart Serial connectors and supported cables:

Product Number	Cable Type	Length	Connector Type
CAB-SS-V35MT	V.35 DTE	10 ft (3m)	Male
CAB-SS-V35FC	V.35 DCE	10 ft (3m)	Female
CAB-SS-232MT	EIA/TIA-232 DTE	10 ft (3m)	Male
CAB-SS-232FC	EIA/TIA-232 DCE	10 ft (3m)	Female
CAB-SS-449MT	EIA/TIA-449 DTE	10 ft (3m)	Male
CAB-SS-449FC	EIA/TIA-449 DCE	10 ft (3m)	Female
CAB-SS-X21MT	X.21 DTE	10 ft (3m)	Male
CAB-SS-X21FC	X.21 DCE	10 ft (3m)	Female
CAB-SS-530MT	EIA/TIA-530 DTE	10 ft (3m)	Male
CAB-SS-530AMT	EIA/TIA-530A DTE	10 ft (3m)	Male

Physical Characteristics

Physical dimensions (H x W x D)	Cisco 819G 1.67 x 7.7 x 7.2 in. (42 x 196 x 183 mm)	Cisco 819HG and Cisco 819H 1.73 x 7.7 x 8.1 in. (44 x 196 x 206 mm)	C819HGW and C819 HWD 1.73 x 7.7 x 9.0 in (44 x 186 x 229 mm)
Weight	2.3 lb (1.0 kg)	3.2 lb (1.5 kg)	3.4lb(1.54 kg)

Mean time between failure (MTBF – Ground Benign)	SKUs	MTBF Hours
	C819(H)G-U-K9	380,000
	C819(H)G+7-K9	420,000
	C819(H)G-x-K9 where x=S, V, B	280,000
	C819HGW-S-A-K9 and C819HGW-V-A-K9	220,000
	C819HGW+7-E-K9, C819HGW+7-N-K9, C819HGW+7-A-A-K9	293,000
	C819HWD-E-K9, C819HWD-A-K9	630,000
	C819H-K9	1,000,000

Maximum platform power consumption	Cisco 819G 11 watts	Cisco C819H(G)(W) 20 watts

Feature	Specification		
Environmental operating range	C819G	C819 HG	C819HGW and C819HWD
	32 to 104℉ (0 to 40℃)	−13 to 140℉ (−25 to 60℃)	−13 to 140℉ (−25 to 60℃)
Operating altitude	Above 5000 ft derate maximum operating temperature 1.50C per 1000 feet Maximum altitude: 10,000 ft		
Standard safety certifications	• UL 60950-1, 2nd edition • CAN/CSA C22.2 No. 60950-1, 2nd edition • EN 60950-1, 2nd edition • CB to IEC 60950-1, 2nd edition with all group differences and national deviations		
EMC emissions	EN55022/CISPR22, CFR 47 Part 15, ICES003, VCCI-V-3, AS/NZS CISPR22, CNS13438, EN300-386, EN61000-3-2, EN61000-3-3, and EN61000-6-1		
EMC immunity	EN55024/CISPR24, (EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-11), and EN300-386		
Radio Immunity	EN301 489-1, EN 301 489-7, and EN301 489-24		
Cellular radio	EN 301 908-1, EN 301 908-2, EN 301 511, 47 CFR Part 22, and 47 CFR Part 24		
Humidity	C819G Maximum 85% non-condensing RH	C819 HG Maximum 95% non-condensing RH	C819HGW and C819HWD Maximum 95% non-condensing RH
Operating conditions (Cisco 819HG C819HGW and C819HWD)	• IP 41 per IEC 60529 for Vertical Falling Water • Pollution 3 for Dust Operational Vibration • MIL-STD-810G 2.2.1 Category 4; truck transportation over U.S. highways-restrained cargo • EN61373 functional random vibe - category 1, class B • SAE J1455 operating random vibe cap mounted truck • SAE J1455 Operating Sinusoidal Vibration, Category 3 Nonoperational Vibration • MIL-STD-810G 2.3.9 Category 20 - Ground vehicles • EN61373 simulated non-op long-life vibe - category 1, class B • SAE J1455 Non-operating Sinusoidal Vibration, Category 3 Operational Shock • MIL-STD-810G 2.2.2 Procedure 1, Functional Shock Nonoperational Shock • MIL-STD-810G 2.2.2 Procedure 5, Crash Hazard • MIL-STD-810G 2.2.2 Procedure 6, Bench Handling • EN61373 non-op shock class B • SAE J1455 4.11.3.1 Handling test		
Vibration and Shock (Railway Vehicles)	• EN61373 Functional Random Vibe - Category 1, Class B • EN61373 Simulated Non-op Long-life Vibe - Category 1, Class B • EN61373 Non-op Shock, Class B		
Power specifications	The default configuration includes an external AC adapter that supplies up to 20 W of power. The AC power connection is a two-pin IEC 320 C8 receptacle. A mating AC power cord is supplied. The AC adapter does not provide chassis grounding to the router. A 1.3 meter long output cable connects to the router. AC Power Adapter • Input Voltage: 85-264 VAC 100-240 VAC nominal • Maximum Power Consumption: 25W • Maximum Output Power Rating: 20 W (5VDC, 4 Amps) Optional external DC power adapters are available for 12 VDC and 24 VDC nominal vehicle power. • 12 VDC vehicle adapter has a 10 VDC to 36 VDC operating range • 24 VDC vehicle adapter has an 18 VDC to 75 VDC operating range* The vehicle power adapters may be used for fixed or mobile installations. They do not provide electrical isolation; the input negative is connected to the output negative (chassis ground). Input cable is 1 meter long with stripped and tinned bare wire connections. The input positive connection is a white wire and the input negative is a black wire.		

Feature	Specification					
	Power Adapter	Nominal Input Range	C819HG+7-K9 C819HG-B-K9 C819HG-S-K9 C819HG-U-K9 C819HG-V-K9 (3G SKUs)	C819HGW-S-A-K9 C819HGW-V-A-K9 C819HGW+7-E-K9 C819HGW+7-N-K9 C819HGW+7-A-A-K9 (3G+WiFi SKUs)	C819HWD-E-K9 C819HWD-A-K9 (WiFi SKUs)	C819H-K9 (Serial SKU)
	PWR1-20W-AC	100-240VAC	Yes	—	—	—
	PWR2-20W-AC	100-240VAC	—	Yes	Yes	Yes
	PWR1-20W-12VDC	12VDC	Yes	—	—	—
	PWR2-20W-12VDC	12VDC	—	Yes	Yes	Yes
	PWR1-20W-24VDC	24VDC	Q1CY2013	—	—	—
	PWR2-20W-24VDC	24VDC	Q1CY2013	—	Q1CY2013	Q1CY2013
	Martek MBRH 0500-B/V1	24VDC	Q1CY2013	—	—	—
	Martek MBRH 0500-C/V1	52VDC	Q1CY2013	—	—	—
	Martek MBRH 0500-D/V1	72VDC	Q1CY2013	—	—	—
	Martek MBRH 0500-B/V2	24VDC	—	Q1CY2013	Q1CY2013	Q1CY2013
	Martek MBRH 0500-C/V2	52VDC	—	Q1CY2013	Q1CY2013	Q1CY2013
	Martek MBRH 0500-D/V2	72VDC	—	Q1CY2013	Q1CY2013	Q1CY2013

*Available Q1CY2012

Ordering Information

For Cisco ISR 819 3G ordering information, please visit the [Cisco Ordering Home](#) Page and refer to Table 6.

Table 6.   Cisco 819 Integrated Services Router Ordering Information

Product	Description
Cisco 819H Hardened Integrated Services Routers 3G only	
C819HG-U-K9	Compact Hardened 3G IOS Router with GLOBAL HSPA Release 6 based on MC8795V
C819HG-S-K9	Compact Hardened 3G IOS Router with SPRINT EVDO Rev A based on MC5728V
C819HG-V-K9	Compact Hardened 3G IOS Router with VERIZON EVDO Rev A based on MC5728V
C819HG-B-K9	Compact Hardened 3G IOS Router with BSNL EVDO Rev A based on MC5728V
C819HG+7-K9	Compact Hardened 3G IOS Router with GLOBAL HSPA+ Release 7 based on MC8705
Cisco 819 Non-hardened Integrated Services Router 3G only	
C819G-U-K9	Compact 3G IOS Router with GLOBAL HSPA Release 6 based on MC8795V
C819G-S-K9	Compact 3G IOS Router with SPRINT EVDO Rev A based on MC5728V
C819G-V-K9	Compact 3G IOS Router with VERIZON EVDO Rev A based on MC5728V
C819G-B-K9	Compact 3G IOS Router with BSNL EVDO Rev A based on MC5728V
C819G+7-K9	Compact 3G IOS Router with GLOBAL HSPA+ Release 7 based on MC8705

Product	Description
Cisco 819 Hardened Integrated Services Routers 3G+WiFi	
C819HGW+7-E-K9	C819 Secure Hardened M2M GW (non-US) 3.7G HSPA + Release 7 with SMS/GPS and Dual WiFi Radio with ETSI
C819HGW+7-N-K9	C819 Secure Hardened M2M GW (non-US) 3.7G HSPA + Release 7 with SMS/GPS and Dual WiFi Radio with ANZ
C819HGW+7-A-A-K9	C819 Secure Hardened M2M GW (North America) 3.7G HSPA + Release 7 with SMS/GPS and Dual WiFi Radio with FCC for ATT
C819HGW-V-A-K9	C819 Secure Hardened Router for Verizon EV-DO Rev A with SMS/GPS and Dual WiFi Radio with FCC C819HGW-S-A-K9
C819HGW-S-A-K9	Cisco 819 Secure Hardened Router for Sprint EV-DO Rev A with SMS/GPS and Dual WiFi Radio with FCC
Cisco 819 Hardened Integrated Services Routers WiFi only	
C819HWD-E-K9	C819 Secure Hardened Router and Dual WiFi Radio with ETSI. 3G is not supported
C819HWD-A-K9	C819 Secure Hardened Router and Dual WiFi Radio with FCC. 3G is not supported
C819 Secure Hardened routers with Dual WiFi radio	
C819H-K9	Cisco 819 Secure Hardened Router with Serial
Power Supplies and Mounting Brackets	
PWR1-20W-AC	AC Power Adapter for C819(H)G SKUs
PWR2-20W-AC	AC Power Adapter for C819H, C819HW and C819HGW SKUs
PWR1-20W-12VDC	12VDC Power Adapter for C819(H)G SKUs
PWR2-20W-12VDC	12VDC Power Adapter for C819H, C819HW and C819HGW SKUs
PWR1-20W-24VDC	24VDC Power Adapter for C819(H)G SKUs
PWR2-20W-24VDC	24VDC Power Adapter for C819H, C819HW and C819HGW SKUs
ACS-810-DM	Desktop Mounting Kit for the Cisco 810 Series ISR
ACS-810-FWM	Floor Mount and Wall Mount Kit for the Cisco 810 Series ISR
IOS SW and Licenses	
S81UK9-15104M	Cisco 810 Series IOS Universal Data (Default)
S81NPEK9-15104M	Cisco 810 Series IOS Universal Data with No Payload Encryption
SL-810-AIS	Cisco 810 Advanced IP Services License (Default)
SL-810-ADVSEC	Cisco 810 Advanced Security Software License (Default)
SL-810-AIS-NPE	Cisco 810 Advanced IP Services License with No Payload Encryption (Default with NPE IOS Image)
SL-810-ADVSEC-NPE	Cisco 810 Advanced Security Software License with No Payload Encryption (Default with NPE IOS Image)
S802W7K9-12425JAX	Cisco 802 Series IOS WIRELESS LAN LWAPP
S802RK8W8-15202JA	Cisco 802 Series IOS WIRELESS LAN LWAPP RECOVERY
FL-C810-WAASX	Cisco 810 WAAS Express (Default for all H SKUs). Not included in non-hardened SKUs and needs an upgrade.

For More Information

For more information about the Cisco 819 products, visit http://www.cisco.com/go/m2m or contact your local Cisco account representative.

For more information regarding Cisco 800 Series Integrated Services Routers and options, contact your Cisco representative or go to http://www.cisco.com/go/isr.

Cisco and Partner Services for the Borderless Network Architecture

Enable the Cisco Borderless Network Architecture and the business solutions that run on it with intelligent, personalized services from Cisco and our partners. Backed by deep networking expertise and a broad ecosystem of partners, these services can help you plan, build, and run a network that enables you to expand geographically,

embrace new business models, and promote business innovation. Whether you are looking to transition to a Cisco Borderless Network Architecture, solve specific business problems, or improve operational efficiency, we have a service that can help you get the most from your IT environment. For more information, please visit http://www.cisco.com/go/services.

Warranty Coverage and Technical Service Options

The Cisco 819 Integrated Services Router comes with the Cisco 1-year limited hardware warranty. Adding a contract for a technical service offering such as Cisco SMARTnet® Service provides benefits not available with warranty, including access to OS updates, Cisco.com online resources, and Cisco Technical Assistance Center (TAC) support services. Table 6 shows the available technical services.

For information about Cisco warranties, visit http://www.cisco.com/go/warranty.

For information about Cisco Technical Services, visit http://www.cisco.com/go/ts.

Table 7.   Cisco Technical Services for Cisco 819 Integrated Services Routers

Technical Services
Cisco SMARTnet Service • Global access to the Cisco TAC 24 hours a day • Unrestricted access to the extensive Cisco.com resources, communities, and tools • Next-business-day, 8 x 5 x 4, 24 x 7 x 4, and 24 x 7 x 2 advance hardware replacement[1] and onsite parts replacement and installation available • Ongoing operating system software updates within the licensed feature set[2] • Proactive diagnostics and real-time alerts on Smart Call Home-enabled devices
Cisco Smart Foundation Service • Next-business-day advance hardware replacement as available • Business-hours access to SMB Cisco TAC (access levels vary by region) • Access to Cisco.com SMB knowledge base • Online technical resources through Smart Foundation Portal • Operating system software bug fixes and patches

[1]Advance hardware replacement is available in various service-level combinations. For example, 8 x 5 x Next business day (NBD) indicates that shipment will be initiated during the standard 8-hour business day, 5 days a week (the generally accepted business days within the relevant region), with NBD delivery. Where NBD is not available, same-day shipment is provided. Restrictions apply; please review the appropriate service descriptions for details.

[2]Cisco operating system updates include maintenance releases, minor updates, and major updates within the licensed feature set.

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