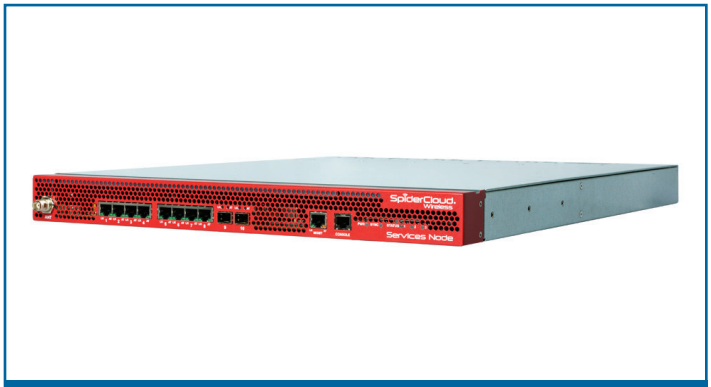
Corning SpiderCloud Services Node 9000 4G LTE Air Interface Technology

Features and Benefits

Capacity	Up to 100 dual-band 4G LTE radio nodes
Privacy	Carrier-grade security
Installation	Enterprise-optimized easy installation
	Synchronization with macro network
	Self-optimizing networks (SON)
	Automatic RF planning
Performance	VoLTE and carrier aggregation
	Ongoing RF optimization
Backhaul	Sharing between applications
	User and traffic prioritization
	Core network integration



Services Node | Figure 1

Scalable small-cell services node for enterprises and venue deployments | 4G LTE air-interface technology | Multiple small-cell applications | One powerful enterprise services platform

The SpiderCloud® enterprise radio access network (E-RAN) is an innovative solution for delivering cellular coverage, capacity and services inside buildings. E-RAN consists of a services node, which controls, configures, and manages up to 100 UMTS and LTE SpiderCloud radio nodes, providing UMTS and LTE coverage in buildings and campuses as large as 1,000,0000 ft^2. Using a services node, operators and enterprises can deploy an indoor cellular solution within days.

The enterprise-optimized design provides the same ease of installation as that of traditional Wi-Fi equipment, and greatly reduces the time to bring up new small-cell sites. Using a common backhaul connection via any Ethernet LAN and an integrated network management system, operators can manage multiple access networks.

The SpiderCloud E-RAN architecture allows up to 100 small cells to appear as a multisector eNodeB, with the services node anchoring a single S1 interface with the core network. The services node provides a single touchpoint in terms of control, data, and management traffic. This architecture enables a number of unique performance-enhancing features, such as fast intra-E-RAN handovers and centrally coordinated interference mitigation schemes. This architecture enables the flexibility of direct connection to the EPC over an S1, or through a HeNB gateway.

With rapid adoption of mobile and cloud computing, the evolving enterprise is shifting rapidly from traditional CapEx-oriented IT infrastructure to more OpEx-oriented business models that deliver new applications across smartphone and tablet platforms, using virtualized infrastructure. Operators and enterprises are in a position to enable the E-RAN platform to address demand for reliable coverage and capacity.

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System Specifications

Key Features	Intra-E-RAN fast handover
	Centrally coordinated dynamic fractional frequency reuse for ICIC
	Handover to and from macro LTE (S1 and X2)
	Circuit-switched fallback (CSFB)
	Voice over LTE (VoLTE)
	Single radio voice call continuity (SRVCC)
	Public warning system (CMAS and EU-ALERT)
	LTE positioning protocol annex (LPPa)
	Dual-LTE idle mode load balancing
	Dual-LTE inter-band active call handover
	Connected mode DRX
	Equivalent PLMN-based mobility support
	Call performance event reporting (CPER)
	eMBMS interference mitigation
Capacity	100 dual carrier LTE radio nodes
	16000 simultaneous sessions
	2000 session setups per minute
	1 Gbps aggregate 4G throughput
SON Self-Configuration	Software download
	Node authentication
	IP address allocation
	PCI assignment

System Specifications (cont.)

SON Self-Configuration (cont.)	Transmit power assignment
	Neighbor relation tables
	Automated neighbor relation (ANR)
	Mobility robustness optimization (MRO)
SON Self-Optimization	PCI conflict detection and resolution
	Overlay macro cell discovery
	Coverage hole detection
	Coordinated radio environment monitoring (REM)
Core Network Interfaces	S1 (S1-C and S1-U)
	S1-Flex (connectivity to MME/SGW pools)
	Multioperator core network
Security	Trusted platform module (TPM)
	Secure boot and secure key storage
	Encrypted file system
	IPSec encryption
	SNOW 3G and AES encryption
	X.509 certificate-based authentication (core network and small cells)
	Perfect forward secrecy (PFS)

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System Specifications (cont.)

HW Features	300K+ hours overall system MTBF
	Component redundancy
	VLAN traffic separation
Synchronization	IEEE 1588v2 PTP-based synchronization
	Synchronization with macro network
	Multiple synchronization clock options - Onboard high precision OCXO - Core network master PTP server - Cellular network listen (Over the air)
Networking Protocols	DHCP server, DHCP proxy
	IPv4, IPv6, UDP, TCP, RTP, GTP, IPSec
System Management	Configuration: remote management and auto configuration using TR-069
	Faults and events: TR-069, SNMPv2c, SNMPv3, Syslog
	Performance: 3GPP counters, KPIs, standard MIBs, and SpiderCloud MIBs
	Command line interface (CLI) via console port and remotely using SSH

Physical Specifications

Interfaces	8 x Gbps Ethernet ports
	2 x Gbps SFP Ethernet ports
	1 x RJ45 console port (RS-232)
	1 x 10/100 management port
	1 x TNC connector for GNSS antenna
Mounting	1RU (standard 19-in rack)
Physical and Environmental	Dimensions: 603 x 448 x 44 mm (23.7 x 17.6 x 1.7 in)
	Weight: 10.7 kgs (23.5 lbs)
	Power: 450 W rated
	Voltage: 100-240 V
	Max current: 4.5 A
	Altitude: 0 to 3000 meters (0 to 9843 ft.)
	Operating temp: 0 to 40°C
	Storage temp: -40 to 70°C
	Humidity: 7 to 93% noncondensing
	Cooling: 5 x speed controlled, hot-swappable fans
LEDs	1 x power
	3 x status
	1 x synchronization

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Regulatory Compliance and Certification

Regulatory Compliance	CISPR 22:2008 Class A
	EN 55022:2010/AC:2011
	EN 55024:2010
	EN 61000-3-2:2006/A2:2009
	EN 61000-3-3:2008
	EN 60950-1:2006/A12:2011
	VCCI V-3/2012.04
	CAN/CSA-C22.2 NO. 60950-1A-07 (R2012)

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