

SILVER SPRING Gen5 NETWORK

MicroAP 5

A WAN-ENABLED NETWORK INTERFACE CARD (NIC)

The Silver Spring® MicroAP™ 5 is a unique implementation of cellular connectivity for meters and other devices. Unlike any other point-to-point cellular device, the Silver Spring MicroAP 5's network interface card (NIC) supports cellular/mobile, RF mesh, and HAN communications simultaneously. Initially designed to reside in our partners' meters, a MicroAP leverages cellular communications for backhaul connectivity and can use the Radio Frequency (RF) mesh communications to connect with other nearby Silver Spring devices using Silver Spring's innovative Micromesh® technology.

OVERVIEW

The MicroAP 5 uses 4G LTE technology. It supports multiple carriers and RF mesh communications. Each MicroAP 5 can provide backhaul connectivity on behalf of up to 250 Silver Spring-enabled endpoints, connected in a Micromesh deployment.

KEY BENEFITS

The MicroAP 5 provides high performance, deployment flexibility, and operational savings as utilities connect remote or "hard-to-hear" locations across the service territory.

Cost Savings

Because a MicroAP can host nearby devices on the mesh network, it sharply reduces operating costs compared with having a discrete cellular connection for each of the remote devices. As the mesh expands, MicroAP devices can connect to the back office through a standard Access Point (AP). This allows the utility to disable the cellular connection on the MicroAP, driving even more cost out of the deployment.



A MicroAP provides communications to AMI applications and connects with other nearby meters through Silver Spring's innovative Micromesh technology.

Flexibility and Business Agility, with Lower Risk of Stranded Assets

The MicroAP cost-effectively addresses deployment conditions in environments such as rural communities, urban hard-to-serve locations, and opt-in programs. As service providers upgrade their networks, the Micromesh capability mitigates the risk of stranded assets. Simply upgrade one endpoint to a MicroAP and all devices within the Micromesh area will be backhauled. Or, if the mesh area has filled in more, and all the meters have connectivity to a standard AP, you can turn off the cellular capability in the MicroAP and save on operating expense.

Improved Performance and Resiliency

Gen™5-based networking technology with adaptive gear-shifting enables faster data transfer and lower latency, speeding field operations, as well as the ability to maximize range. Support for data rates from 6.25 kbps to 2.4 Mbps not only delivers application performance and backward compatibility but also enables devices to dynamically optimize between range and performance. Gen5 also includes a dual-band mesh capability that nearly doubles network capacity as devices can transmit and receive on the 900 MHz and 2.4 GHz bands simultaneously.

Seamless Integration

Rather than force separate network management or data collection, the MicroAP integrates with Silver Spring's firmware and Silver Spring applications, including Advanced Metering Manager.

DEPLOYMENT SCENARIOS

Isolated Groups of Meters

Where population density is unlikely to reach critical mass for a typical mesh deployment, MicroAP provides a cost-effective solution. Later, if density increases sufficiently to build out the network with traditional APs and Relays, operators can simply disable the cellular connectivity of a MicroAP and have it join the RF mesh network. This transition is managed from the utility's back office.

Opt-In Only Deployments

The MicroAP approach is useful for utilities offering an opt-in approach to smart meters. The first customers that enroll receive a MicroAP-based meter. Later, when other customers within range sign up, their meters mesh with the MicroAP to form a Micromesh community, leveraging the MicroAP for their cellular backhaul. The opt-in network works immediately and grows over time.

Hard-to-Serve Locations

When a group of meters cannot mesh effectively with Access Points or Relays, a properly placed MicroAP serves as a self-contained AP. For example, some large structures contain many meters in the building core. If these meters cannot be reached with traditional network gear, a MicroAP can be installed to serve as the take-out point for the building.

About Silver Spring Networks

Silver Spring Networks is a leading networking platform and solutions provider for smart energy networks. Silver Spring's pioneering IPv6 networking platform, with over 22 million Silver Spring enabled devices delivered, is connecting utilities to homes and businesses throughout the world with the goal of achieving greater energy efficiency for the planet. Silver Spring's innovative solutions enable utilities to gain operational efficiencies, improve grid reliability, and empower consumers to monitor and manage energy consumption. Silver Spring Networks' customers include major utilities around the globe such as Baltimore Gas & Electric, CitiPower & Powercor, Commonwealth Edison, CPS Energy, Florida Power & Light, Jemena Electricity Networks Limited, Pacific Gas & Electric, Pepco Holdings, Progress Energy, and Singapore Power, among others. For more information please visit www.silverspringnet.com. Rev. 4/07/2016

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FEATURES

- » Gen5-based networking technology with gear-shifting
Supports 6.25 kbps to 2.4 Mbps raw data rates.
Provides link-by-link adaptive gear-shifting for backward compatibility and dynamic optimization between range and performance.
- » Cellular support
Incorporates a cellular modem along with standard 900 MHz NAN and 2.4 GHz HAN radios. Supports 4G LTE cellular.
- » Micromesh support
Enables MicroAP to form a mesh with neighboring devices and provide cellular backhaul to AMI applications.
- » Flexible, cost-effective NAN communications
One-watt transmitter supports two-way communications including remote management and firmware upgrades.
- » System-on-Chip (SOC) security
Accelerates security key setup and verifies secure bootloader supporting authentication and encryption.
- » Advanced watchdog
Enables full power cycle of the device, eliminating truck rolls.

MICROAP 5 SPECIFICATIONS

Platform	RAM/Flash: 32/32 MB
NAN Communications	Data rates: 6.25 kbps to 2.4 Mbps Spread spectrum technology: FHSS Radio Frequency: 902 – 928 MHz, 2400-2483.5 MHz Modulation: FSK, O-QPSK, or OFDM – Adaptive gear shifting technology Transmitter output: 27 to 30 dBm (500 mW to 1W)
Cellular Communications	4G LTE
HAN Communications	Protocols: IEEE 802.15.4 ZigBee® Smart Energy Profile 1.1 Frequency: 2.4 GHz ISM Band Transmitter output: 20 to 23 dBm (100 to 200 mW) Receive sensitivity: -97 dBm for 1% PER
Security	Addressing: IPv6 Encryption: Advanced Encryption Standard (AES-128 or AES-256) Security: Secure Hash Algorithm 256-bit (SHA-256) and RSA-1024 or ECC--256 Key storage: Secure NVRAM with tamper-detection and key erasure
Environmental	Operating temperature: -40°C to +85°C (-40°F to +185°F) Humidity: 0% to 95%, non-condensing
North America	Radio frequency: 902 – 928 MHz, and 2.4000 – 2.4835 GHz Approvals: FCC 15.247, FCC Part 22, FCC Part 24, Industry Canada RSS-210
International	Radio frequency: 902 – 928 MHz, or 865-880 MHz and 2.4000 – 2.4835 GHz Approvals: ETSI, A-Tick, IEC 60950-1 Interface: Meter ANSI C.12.18/C12.19, serial, DLMS-COSEM

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