SkyPilot™ NETWORKS

SkyExtender

Key Benefits

- 5 GHz backhaul combines benefits of mesh networking and point-to-point links
  - Mesh networking: 360° coverage, multiple links with optimized routing and link redundancy, load balancing capabilities
  - Point-to-point links: high-power (up to 28.2 W/44.5 dBm EIRP) focused beams and eight 18 dBi antennas improve penetration and extend range up to 10 miles/16 km
- Auto-discovery function searches all channels throughout entire 360° to find all available SkyPilot equipment (no antenna point required)
- Rapid provisioning minimizes deployment expenses
- Multi-service network capable of providing end-to-end security and quality of service for VoIP
- Multiple topology options and network scalability enables growth capabilities
- Integrated Ethernet port provides CPE functionality for residential or business subscribers
- Non-line of sight (NLOS) capabilities achieved through OFDM modulation (multipath), high-power transmissions (boring through trees), and routing around obstacles (via mesh)

SkyExtender – High-Capacity Mesh Backhaul with CPE

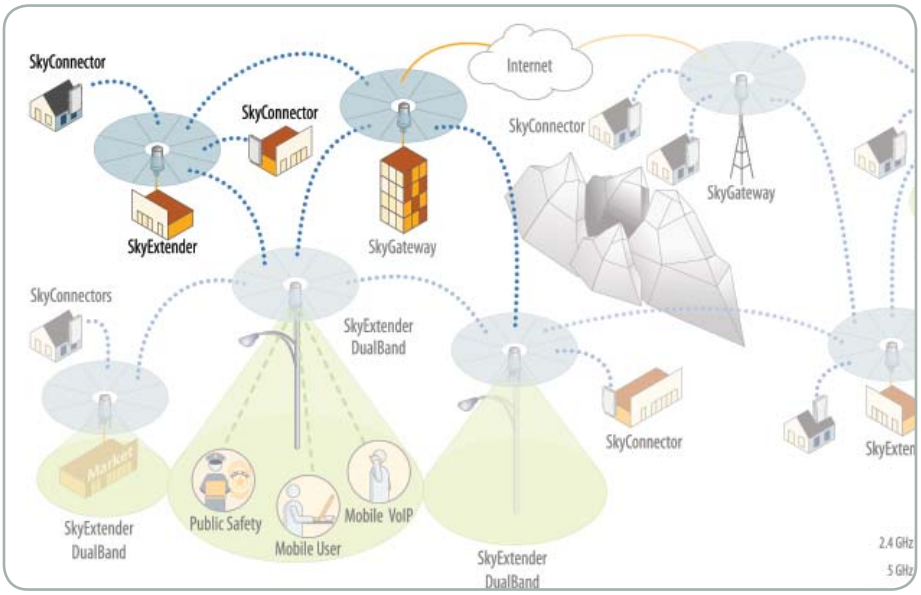
The SkyExtender™ is a wireless networking device in a class by itself since it combines seemingly incompatible wireless topologies: point-to-point and mesh networking. Within a single system, the SkyExtender combines the range and penetration benefits of directional point-to-point links with the redundancy, capacity, and scalability benefits of mesh networking. The secret behind the SkyExtender's capabilities is its innovative 8-antenna array and high-power radio technology.

The SkyExtender's integrated antenna array features eight separate 45° sectorized antennas, which gives it 360° coverage. However, unlike traditional 360° omnidirectional systems, this 8-antenna array falls under point-to-point FCC regulations due to its focused, directional antennas. Therefore, instead of being limited to the 4 W EIRP of omnidirectional systems, SkyExtender is capable of over 28 W EIRP. This gives it greatly improved penetration and tremendous range, with the ability to provide wireless connectivity over distances up to 10 miles/16 km.

Combined with this tremendous range is the SkyExtender sophisticated mesh networking capabilities. Since it continuously monitors all 360°, it knows of all other SkyPilot™ systems within range and maintains multiple links throughout the network. This allows the SkyExtender to use an advanced algorithm to provide optimized best-path routes based on capacity, link quality, and number of hops. With link redundancy, the SkyExtender provides self-healing and failover re-routing capabilities in case of link degradation or failure. In addition, SkyPilot developed a dynamic bandwidth allocation protocol that synchronizes all SkyPilot equipment and schedules transmissions throughout the network to enable frequency reuse, mitigate self-interference, and increase overall capacity and reliability.

By combining the benefits of point-to-point and mesh networking, the SkyExtender provides an economical way of deploying sophisticated wireless broadband systems that provide true carrier-class functionality.

Extend the wireless mesh backhaul while also connecting to CPE with the SkyExtender



The SkyExtender mesh backhaul allows service providers to extend the reach of their broadband services while also providing high-speed, redundant networking.

Carrier-Class Broadband Wireless

SkyExtender System Specifications

Traffic Management

- VLAN support: IEEE 802.1q
- Traffic Prioritization: IEEE 802.1p, protocol type, IP port, IP ToS field, and IP address list
- Traffic Filtering: protocol type, IP port, and IP address list
- Traffic Shaping: upstream and downstream per-user rate control

Topology

- Mesh, point-to-multipoint, and point-to-point, in any combination and with multiple hops between base station and subscriber nodes
- Layer 2 transparent bridge

Configuration, Management, & Monitoring

- NMS integration: SNMPv2c
- EMS: SkyProvision and SkyControl
- IP address: DHCP or static
- Firmware: Multiple versions stored in nonvolatile memory; updated over the air via FTP
- Provisioning: Manual or automated
- Configuration file: XML over HTTP
- Support for: MIB-II (RFC 1213); EtherLike (RFC 2665); Bridge (RFC 1493); SkyPilot private MIB
- Remote management: CLI via Telnet, SNMPv2c
- Local management: RS-232 serial console port

Wireless

Frequency band	4.940-5.150, 5.150-5.450, 5.450-5.725, or 5.725-5.850 GHz
EIRP	44.5 dBm/28.2 W peak, 36 dBm/4 W average, 33 dBm/2 W average, 30 dBm/1 W average, or 36 dBm / 4 W peak (EIRP selected for country-specific regulations)
Media access	Time Division Duplex (TDD)
Modulation technique	OFDM with adaptive modulation
Modulation rates	6 to 54 Mbps
Throughput	Up to 20 Mbps
Latency	8-10 ms roundtrip per hop
Antennas	8-antenna array (360° coverage), each antenna 45° horizontal x 6° vertical, 18 dBi
Channel width	5, 10, 20 MHz
Channel resolution	5 MHz
Receive sensitivity	-90 dBm at 6 Mbps modulation
Connectivity	Connects with SkyGateways, SkyExtenders, SkyExtender DualBands, and SkyConnectors
Authentication	MD5-based certificates
Encryption	128-bit AES on all wireless links

Product Specifications

Connectors	RJ-45: subscriber access (10/100Base-T) and power (Power over Ethernet) RJ-45: RS-232 serial for local management
Mounting	Tower, utility pole, building or other infrastructure Outside diameter up to 2.0"
Range	Up to 10 miles/16 km
LEDs	Wireless activity, wireless link
Dimensions	18.0" (45.7 cm) H x 12.2" (31.0 cm) diameter; 25.0" (63.5 cm) H with mounting bracket
Weight	14.0 pounds (6.3 kg)
Operating temperature	-40° to 131° F (-40° to 55° C)
Wind loading	Up to 150 mph (240 km/h)
Enclosure/humidity	NEMA-4X
Power	110-230 VAC, 50-60 Hz input; 10 Watts
Certifications	FCC Part 15, FCC 47 CFR Part 15, Class B USA; compliance with UL safety standards, CE, C-Tick, IC RSS210 Issue 5
EMI and susceptibility	FCC Part 15.107 and 15.109
Warranty	One-year limited warranty on hardware; 90-day limited warranty on software

SkyPilot™ NETWORKS

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For more information about the SkyPilot System:
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