



Cellular LAN Platform For Advanced Mobile Networking

The BelAir200 cellular LAN platform is a network-in-box, mobile networking solution designed to enable the immediate deployment of profitable public and cost-effective private WLAN networks by service providers and enterprises.

Designed for outdoor deployment, the BelAir200 beams signals into buildings from the outside. It is the first product to implement the patented BelAir Networks multiple point-to-point mesh architecture that, for the first time, integrates wireless access and backhaul. This cellular LAN architecture simplifies WLAN infrastructures and eliminates crippling T1 and DSL backhaul costs, which have so far stifled the deployment of economical, medium- and large-scale public WLAN networks.



A Completely Integrated Solution

The BelAir200 is built around a high-performance network processing core, multiple access and backhaul modules and an open embedded software environment.

The processing core provides 100 Mbps, Fast Ethernet wire speed routing capability per module. The software provides operator-class, network level operation, administration and maintenance (OAM) capabilities and a wealth of security, mobility and accounting services.

BENEFITS

- Eliminates the need for cables, extra switches and routers to interconnect wireless nodes.
- Requires five to ten times fewer access points compared to indoor solutions.
- Eliminates disruptive, in-building network deployment.
- Reduces WLAN capital expenditures by up to 70%.
- Reduces WLAN operating expenditures by up to 90%.
- Eliminates T1, DSL and other backhaul costs.
- Patented multiple point-to-point cellular LAN architecture, which provides five to ten times more capacity and five times more coverage compared to traditional wireless mesh architectures.

Combined, the processing core and software allow network operators to quickly and easily offer access to applications and services, such as:

- E-mail
- Web surfing
- Corporate VPN access
- File transfer
- Instant messaging

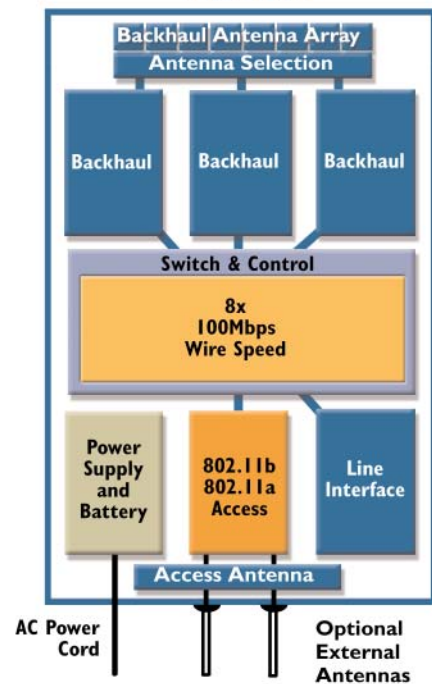
These applications can be provided in:

- **Hot zones** such as business districts, office parks, airports, hotels, conference centers, recreation areas, and shopping malls
- **Hot spots**, such as coffee shops, book stores, office buildings
- **Campuses**
- **Corporate offices, manufacturing centers, universities, hospitals, research parks, municipal centers**
- **Apartment buildings**
- **Complex shaped buildings**
- **Buildings where it is difficult to add cables**

Simplified Deployment

To enable unparalleled deployment flexibility the BelAir200 is encased in a compact, environmentally hardened outdoor package that allows for a variety of mounting options. It can be mounted on any type of pole or readily attached to the side or roof of a building. Installation can be completed by one person, in one trip—with no need for antenna pointing—thanks to BelAir Networks patent pending auto-antenna selection technology.

Outdoor Environmentally Hardened



Multiple backhaul radios in each BelAir200 are configured point-to-point with directional antennas. Each BelAir200 can connect to multiple others and the combined connections form a cellular LAN.

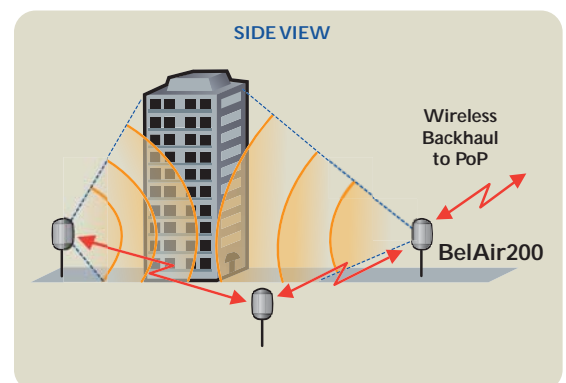
There are no extra switches, routers or cables required to connect multiple BelAir200 multi-service platforms. The fully meshed backbone provides carrier-class network level redundancy to ensure service availability without operator intervention. It also makes interconnecting BelAir200 platforms much simpler and more cost-effective than conventional point-to-point mesh architectures.

Scalability and reliability are enhanced because the cellular LAN supports multiple, full duplex, Fast Ethernet exit points. In addition, wireless routing with load balancing and alternate paths are used to enhance system availability and provide a self-healing network.

BelAir200 Reduces Capital and Operating Expenses

The true value of the BelAir200 is its ability to enable the deployment of medium- and large-scale WLANs that make business sense.

By integrating the access radio and the interconnection network between access points into a single, compact, outdoor package, the BelAir200 dramatically reduces capital and operating expenses. It goes beyond basic Wi-Fi to provide low-cost, mobile networking without limits for service providers, enterprises, and users.



BelAir200 Building Deployment

Specifications

Access Radio

Performance Enhanced 802.11b

Frequency Band (Rx/Tx)	2.4 to 2.4835 GHz	ISM Band
Supported Data Rates	1, 2, 5.5, 11 Mbps	Radios automatically select best data rate
Average Transmit Power	28 dBm	
Transmit Power Control	3dB steps over 24dB range	
Receive Sensitivity	-85dBm @ 11 Mbps -96dBm @ 1 Mbps	
Antenna Panel Azimuth Coverage (3 dB point)	65°	Dual slant linear polarized diversity antenna
Antenna Panel Elevation Coverage (3 dB point)	65°	
Elevation Tilt	22.5° / 0° / 22.5°	Up/no/down tilt
Antenna Panel Gain (along boresight)	8 dBi	
External Antenna	Optional	N-type connector

Future upgrade to 802.11g

Access Radio

Performance Enhanced 802.11a

Frequency Band (Rx/Tx)	5.25 to 5.35 GHz, 5.725 to 5.825GHz	U-NII2 and U-NII3 bands. Radios also support frequencies in between for future expansion
Supported Data Rates	6, 9, 12, 18, 24, 36, 48, 54 Mbps	Radios automatically select best data rate
Average Transmit Power	18dBm	
Transmit Power Control	3dB steps over 15dB range	
Receive Sensitivity	-70dBm @ 54 Mbps -89dBm @ 6 Mbps	
Antenna	External	N-type connector

Backhaul Radio

Optimized for mesh Point-to-Point operation

Frequency Band (Rx/Tx)	5.25 to 5.35 GHz, 5.725 to 5.825GHz	U-NII2 and U-NII3 bands. Radios also support frequencies in between for future expansion
Supported Data Rates	6, 9, 12, 18, 24, 36, 48, 54 Mbps	Radios automatically select best data rate
Average Transmit Power	18dBm	
Transmit Power Control	3dB steps over 15dB	
Receive Sensitivity	-70dBm @ 54 Mbps -89dBm @ 6 Mbps	
Antenna Panel Azimuth Coverage (3 dB point)	45° (+/- 22.5°)	8 antennas used in integrated array to provide 360° coverage
Antenna Panel Elevation Coverage (3 dB point)	20°(+/- 10°)	
Elevation Tilt	0°	
Antenna Panel Gain (along boresight)	15 dBi	
External Antenna	Optional	N-type connector

Line Interface

Interface	10/100Base-TX compliant to IEEE 802.3 CSMA/CD 10/100 autosense	Fast Ethernet with lightning protection.
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Future upgrade to 100FX optical interface

Layer 2 Switching

802.1D Bridging	Spanning Tree Protocol (STP) Multiple Spanning Trees
802.1Q VLAN	4096 tags Independent VLAN learning
Traffic Optimization	Load Balancing Multi-Homing
Class of Service	4 priority classes
Packet Filtering	Upstream and downstream Configurable MAC address filtering
Authentication Based VLANs	VLAN allocation based on 802.1x (port, MAC address) Multiple VLANs

Layer 3 Routing

DHCP	DHCP Client & Server (RFC2131) DHCP Relay (RFC 3046)
Routing Protocol	Static routing OSPF (RFC 2178, 2328)
OSPFv2 Routing	NSSA Data Overflow (RFC 1765) Opaque LSA (RFC 2370) Multi-Homing Load Balancing
Packet Filtering	Upstream and downstream Configurable IP address filtering
DiffServ	RFC 2474, 2475
Network QoS	Map 4 pre-defined priority queues to DiffServ ToS field or 802.1p CoS

Security (Fully WPA compliant)

Authentication	802.11 Open Key 802.1x EAP (RFC 2284) EAP - TLS (RFC 2716) EAP - TTLS EAP - MD5 PEAP
VPN Tunnelling	PPTPv2 (GRE) (RFC 2637) L2TP (RFC 2661) IPSec (RFC 2401)
Encryption	WEP 64 and 128 bit RC4 (24 bit IV) TKIP / MIC per 802.1x Future 802.11i AES
Key Management	Per STA Unicast Key Refresh Broadcast Key Refresh Weak Key Avoidance
HTTP Redirect	Redirect all unauthenticated UDP/TCP traffic to specified address

Accounting

RADIUS Accounting	RFC 2866
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Mobility

Layer 2	802.11f IAPP including authentication security context transfer
Layer 3	Transparent to external Client / Server mobility solutions

Device Management and Other Protocols

Monitoring and MIBs	
MIB-II	RFC 1213
SNMPv2 MIB	RFC 3418
802.11 MIB	IEEE 802.11 - 1999
802.1x MIB	IEEE 802.1x - 2001
RADIUS MIB	RFC 2618, 2620
Ethernet-like MIB	RFC 2665
Interface Group MIB	RFC 2863
IP Forwarding Table MIB	RFC 2096
OSPFv2 MIB	RFC 1850
RMON v1/v2	RFC 2819, 2895, 2896
Interfaces	
Command Line	Industry Standard CLI
Web GUI	HTTP and HTTPS
SNMP	v1 / v2 RFC 3416, 3417
SSHv2	IETF Draft
Access	
	Locally via RJ45 connection Locally via access radio Remotely via backhaul interface to NOC
Firmware Upgrade	
	Secure FTP over access or backhaul links Support for automatic rollback on download failure
Other Protocols	
NTP	RFC 1305
ICMP	RFC 792
HTTP	RFC 2616
ARP	RFC 826
TCP	RFC 793
UDP	RFC 768
Telnet	RFC 854
FTP	RFC 959
TFTP	RFC 1350
IP	RFC 791

Deployment Tools

Site Survey Utility	Use off the shelf devices
LoopBack	Internal backhaul link loopback

Environmental, Physical and Regulatory

Operating temperature range	-40°C to +50°C	
Storage temperature range	-40°C to +85°C	
Operating Humidity	5 to 95%	Non-condensing at 40°C
Typical Power Consumption	79 Watts	Full configuration and transmitting at 50% duty cycle
Power supply	95 to 264 V ac 47-63 Hz	110 or 220V nominal, 50/60Hz
Nominal Battery voltage	12V	
Battery Backup time	15 minutes	At 25°C, full configuration
Outdoor Plant	Meets IP56/NEMA4	Unit operates under wet and dusty conditions
Size	11.5" diameter by 16" high	Including mounting brackets
Weight	28 lbs	Including battery
Mounting	Standard 1.5" collar on top and bottom	Compatible with pole or wall mounting
Safety	UL60950 CAN/CSA-C22.2 No.60950-1-03	
RF Safety	FCC OET Bulletin 65 Health Canada Safety Code 6	Compliant with FCC Guidelines
EMI	FCC Part 15	
Radio	FCC Part 15 Industry Canada RSS210	



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