Whether deployed as a single sector unit or as several interlinked sector units, the PacketWave 760 Access Point delivers high performance with minimum spectral usage, high reliability, and excellent QoS support.

PacketWave® 760

Single Sector Base Station

Multiservice wireless technology that scales

Key Benefits

Scalable, flexible, cost-effective
TDMA/TDD system with excellent spectral efficiency and advanced interference mitigation based on field-proven, bandwidth on-demand point-to-multipoint technology — delivering an unprecedented level of scalability and flexibility, while keeping entry-level infrastructure cost low.

Dynamic Per-Subscriber link optimization
OptimaLink® wireless link adaptation technology improves bandwidth, link robustness, and overall performance for each subscriber. OptimaLink automatically adapts various MAC and PHY parameters, including power, modulation, coding, and antenna polarization – to create the most robust link and highest data throughput, whether the path is line-of-sight, obstructed, or non-line-of-sight.

Multiservice delivery
ServiceQ® technology is unique in the industry. It allows service providers to set up different service classes, and deliver excellent Quality of Service for each subscriber on an application-by-application basis — making it possible to maximize revenue by providing multi-tiered data, voice, and video services using a single wireless platform.

Rapid deployment
Easy installation and configuration with built-in antenna alignment tools, automated and centralized subscriber provisioning, and end-to-end IP architecture.

Ease of management
Standards-based SNMP, Web, and Java-based tools lower expenses by simplifying the complex task of managing the network.

Complete system solution
The fully integrated PacketWave system provides a complete broadband wireless solution, including base station, subscriber units, radios, and antennas that accommodate a variety of frequency bands – 2.5, 3.5, 5.3, and 5.8 GHz.

The Aperto® Networks' PacketWave® system gives service providers a fully integrated, service-intelligent, entry-level platform for building low-density broadband wireless networks for personalized service delivery. PacketWave system architecture features an innovative multiservice design, highly scalable capacity and coverage, dynamic per-subscriber link optimization technology, rapid deployment, and ease of management.

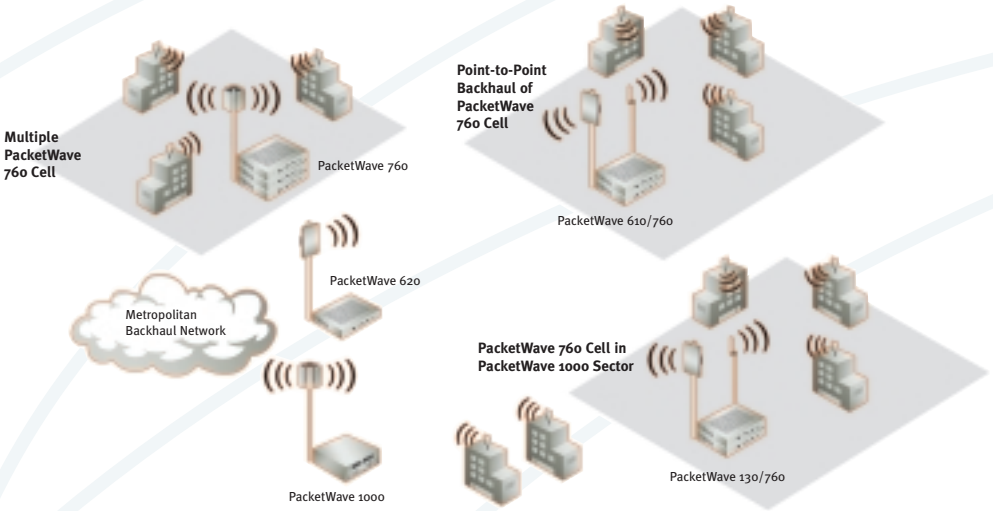
The PacketWave 760 Single Sector Base Station is based on Aperto's field proven architecture. The system is fully compatible with Aperto's flagship product — the highly scalable, PacketWave 1000 multi-sector base station. The PacketWave 760 is a stackable single-sector base station that offers highly flexible configurations, allowing service providers to quickly and easily deploy multiservice broadband wireless networks in multi-cell, multi-sector topologies. The PacketWave 760 unit is designed to deliver services to subscribers in areas where foliage and buildings can make line-of-sight access a problem. The unit easily integrates with wireline network infrastructures to maintain Quality of Service (QoS).

Scalable Architecture

The service-intelligent PacketWave system can handle hundreds of subscribers, whether they're spread out in rural areas and suburban neighborhoods, or located in densely populated urban areas.

Combining high-frequency reuse with advanced interference management and mitigation techniques, the PacketWave system conserves valuable spectrum by allowing the service provider to cover an extensive geographical area with a minimum number of narrow channels and minimal initial capital investment.

Multiple PacketWave 760 Single Sector Base Stations can be stacked and synchronized together to provide a complete multi-sector cellular deployment. Additional channels or sectors may be added at any time, effectively increasing the available capacity, while minimizing initial capital cost. The PacketWave 760 may also be deployed as a single cell, or it can be combined with Aperto's PacketWave 600 point-to-point solution and the PacketWave 1000 multi-sector base station solution to form a completely coherent network deployment, while maintaining QoS throughout.



Aperto's Packetwave 760 operates as a multi or single sector base station or as a component of Aperto's integrated family of products.

Flexible Topologies

The PacketWave 760 provides solutions for multi-unit or single unit topologies. Providers can buy what they need with confidence, and the system can grow as their application grows. The internal, automated synchronization allows from 2 to 32 PacketWave 760's to be linked together at a cell site without additional synchronization equipment. As a component of Aperto's integrated family of products, the PacketWave 760 performs as a high-capacity access point that may be backhauled to a central site using PacketWave 600 Series point-to-point links, or function as a cell-within-a-sector of a PacketWave 1000. Frame synchronization is extended from the central location for unparalleled spectrum efficiency. The PacketWave 760 can function in obstructed line-of-site topologies to extend the reach of a centralized wireless system.

Breakthrough Technologies

Aperto Networks' PacketWave products feature three market-leading technologies: RapidBurst® advanced Time Division Multiple Access (TDMA) protocol, OptimaLink dynamic per-subscriber link optimization, ServiceQ per-flow QoS, and bandwidth management.

RapidBurst technology enables the PacketWave system to achieve low latency and unprecedented spectral efficiency. With RapidBurst, the PacketWave system delivers burst rates up to 20 Mbps over a narrow 6 MHz channel. RapidBurst dynamically adjusts time slots and packet sizes to the actual demand and service levels, providing extremely efficient use of bandwidth.

OptimaLink technology performs dynamic control of link parameters to optimize each subscriber's connection in a multi-user, cellular network. The OptimaLink adaptive algorithm dynamically selects and adjusts PHY- and MAC-layer parameters, including antenna diversity, modulation, transmit power, retransmission policy, and frame size. The benefit to network operators is increased capacity, link robustness, and broader coverage that includes obstructed-line-of-sight and non-line-of-sight subscribers.

ServiceQ technology provides different service classes to subscribers on an application-by-application basis. This means personalized services can be delivered intelligently, allowing the service provider to maximize revenue opportunities with differentiated service offerings and effective management of Service Level Agreements (SLAs).

With ServiceQ, service providers can set up multiple QoS profiles for subscriber units. Each profile contains various QoS metrics such as speed, timing, and ARQ to implement Class of Service (CoS), guaranteed SLAs requiring burst and constant traffic flows to support voice, video, and

data simultaneously. Virtually any field in layer 2 or 3 IP header or port number of layer 4 may be used to identify which packets belong to which QoS flow. Consequently, the PacketWave system can identify applications such as Web browsing, telephony, and video streaming — and provide the appropriate QoS, resulting in a more personalized and valuable service to each subscriber.

Using a highly advanced scheduling mechanism, the PacketWave system enforces the metrics in each profile. This same advanced technology enables Aperto to provide Constant Bit Rate (CBR) and Constant Information Rate (CIR) QoS on an occurrence-request basis allowing the overbooking of wireless bandwidth, which is only reserved when necessary.

Multiple Frequency Bands

Because the PacketWave system can accommodate a variety of frequency bands, whether licensed or unlicensed, it gives service providers the flexibility to pursue opportunities across the globe using a single service intelligent platform, minimizing capital and operating costs.

Automatic Frequency Selection

Among the powerful interference-avoidance features provided by PacketWave is Automatic Frequency Selection (AFS), which switches frequencies to continue business-quality service in an unlicensed spectrum. AFS supports five times more frequencies, up to 20, than competing products. AFS may also be used to provide redundancy in licensed or unlicensed channel bands. In the event of scheduled maintenance or failure of a base station radio, the subscriber unit will automatically switch to an alternate radio or base station.

Comprehensive IP Functionality

The PacketWave system provides a single platform for delivering converged services over an IP network. The IP-based system design allows service providers to develop end-to-end applications, such as virtual private networks (VPNs) and web hosting, without the complexity of intervening transport protocols. And, it fits seamlessly into the service providers overall network architecture without altering the existing routing and server infrastructure. Integrated IP networking provides functionality without the burden of adding external equipment that would add to the complexity of network maintenance at customer sites and be prone to security breaches.

The PacketWave system leads the industry in implementing advanced IP features and services. Packet filtering, Dynamic Host Configuration Protocol (DHCP), and Trivial File Transfer Protocol (TFTP) configuration download give service providers maximum flexibility in provisioning secure services for customers.

The PacketWave 760 Single Sector Base Station performs bridging, routing, or VLAN to offer a complete set of IP networking with QoS. In conjunction with Aperto subscriber units, the PacketWave 760 enables the following IP networking applications.

Routing of multiple subnets on the wireless port provides efficient utilization of wireless bandwidth and additional security. Routing information can be configured either statically or dynamically using the RIPv2 routing protocol.

NAT/PPPoE protocol on subscriber units conserves the number of public IP addresses necessary to implement large-scale networks, while providing security and control for billing.

VLAN is provided in multiple modes: tagged, double-tagged, and pass-through, with three separate VLANs per CPE for management, NAT/PPPoE, and bridged IP traffic. Special modes enable reselling of wireless bandwidth and VoIP bridging in conjunction with NAT/PPPoE.

Advanced bridging with thousands of MAC addresses per subscriber unit easily handles IPv4 traffic in conjunction with the extended packet sizes necessary for pass-through of VLAN, PPPoE, MPLS, and IPv6. Additionally, layer 2 and 3 classification may be made for QoS and filtering.

This array of IP capabilities, together with the innovative RapidBurst, OptimaLink, and ServiceQ technologies, make the PacketWave system the most flexible broadband wireless service delivery platform available today.

Full-Featured Management

The PacketWave system simplifies subscriber provisioning and network management with GUI-based tools, standard protocols, and industry-standard platforms. Among these tools is the Java-based WaveCenter Configuration Manager, which automates the subscriber provisioning process. The PacketWave system also includes Web-based HTML and SNMP-compliant network management software for configuration, fault, performance, and security management.

PacketWave 760 Base Station Unit Specifications

Interfaces

Radio Interfaces:
- IF signal (F connector)
- Control (RJ-45 connector)

Cable Length: 164 feet (50 meters) or up to 328 feet (100 meters) with specified cable

Backhaul Port: 10/100Base-T Fast Ethernet

Local Craft Interface: RS-232 serial port (DB9)

Multiple PacketWave 760 Synchronization (BNC)

Operation

20 Mbps raw data rate, 12-14 Mbps net throughput

Frequency Bands Supported (using Aperto Networks radios and antennas):
- 2.5-2.689 GHz
- 3.4-3.7 GHz
- 5.25-5.35 GHz
- 5.725-5.925 GHz

Duplexing Mode: TDD

Modulation: QPSK and 16 QAM, adaptive

Error Correction:
- Reed Solomon FEC with variable block length and correction factor
- MAC-layer ARQ with up to 6 retransmissions

Frequency Switching: Automatic Frequency Selection (AFS), up to 20 channels, switching manually or based upon interference criteria; provides interference avoidance and redundancy

Networking

Protocols: IP Routing RIPv2, VLSM, CIDR,
- DHCP (client and relay agent),
- VLAN 802.1Q, 4095 pass-through, tagged and double tagged.
- Bridge up to 21,000 hosts (MAC addresses)

Service Classes: CBR, CIR, BE with minimum guaranteed and/or peak rate; 4 service flows per CPE are supported

Management

Provisioning: Centralized or embedded provisioning using WaveCenter Configuration Manager on Microsoft Windows 2000 Professional and Linux.

Fault Management: Embedded WaveCenter agent supporting SNMP and Web browser interfaces, SYSLOG interface, and email alerts

Installation: Advanced Installation Manager (AIM) and alignment tool for setup, diagnostics, and testing

SNMP: version 2, MIB II (RFC 1213), Aperto Enterprise MIB

Upgrade Tool: System Upgrade Manager (SUM)

Radio Diagnostics: Tx & Rx testing, cabling diagnostics, remote and local power levels. Frequency Scanning Algorithm (FSA) detects radio power levels in channel band

LED Indicators

Power
Radio: transmit, receive, status
Ethernet: link, transmit, and receive
Multi-unit Sync

Power Requirements

AC Option: 100-240 VAC; 47-63 Hz; 30 watts
DC Option: 40-60 VDC

Dimensions and Weight

Width: 16.5 in (41.9 cm)
Height: 1.75 in (4.4 cm)
Depth: 8.5 in (21.6 cm)
Mounting: standard 19 inch rack or wall
Weight: 4.4 lbs (2.0 kg)

Environmental

Indoor Unit
- Operating Temperature: 32° to 104° F (0° to 40° C)
- Humidity: 10% to 90% noncondensing

Outdoor Unit
- Operating Temperature: -31° to 140° F (-35° to 60° C)
- Storage Temperature: -40° to 257° F (-40° to 125° C)
- Relative Humidity: 0% to 100%

Regulatory Approvals

Certifications: FCC Part 15 Class B, CE, EN 301 753, EN 01 489-4, EN 60950, EN 55022

Ordering Information

PW760-yyzz-m-p-ox

yy	Frequency	
	58 – 5.8 GHz	
	35 – 3.5 GHz	
	25 – 2.5 GHz	
	53 – 5.3 GHz	
zz	Antenna	
	90 – 90˚ antenna	
	60 – 60˚ antenna	
	OM – omni antenna	
	00 – no antenna	
m	Subscriber Unit Capacity	
	Mode	Possible Subscriber Units
	A	8
	B	16
	C	32
	D	64
	E	128
	F	Product Maximum
p	Power Option	
	A – A/C	
	D – D/C	
x	Power Cord	
	1 – US	
	2 – European	
	3 – Italian	
	4 – UK	
	5 – Australia	

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