

**Base Station and CPE Equipment Information**

**Exhibit 3**

TowerStream Corp.  
Chicago, IL

The following pages contain information provided by the manufacturer regarding the base station and CPE equipment to be utilized for the proposed tests. TowerStream and the equipment manufacturer, Aperto Networks, will reconfigure the PacketWave® system to operate in the 3650 - 3700 MHz band.



The easy-to-deploy PacketWave 1000 base station unit delivers scalable broadband wireless coverage that meets the performance, reliability, and QoS requirements of carriers serving a broad range of subscribers—even in challenging environments.

### Key Benefits

#### Scalable, flexible, cost-effective

TDMA/TDD system with industry leading cell coverage, excellent spectral efficiency, advanced interference mitigation based on RapidBurst® bandwidth-on-demand technology, which delivers an unprecedented level of scalability and flexibility at a low cost per subscriber.

#### Per-Subscriber link optimization

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

#### Multiservice delivery

ServiceQ® technology lets service providers set up different service classes for subscribers 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 subscriber provisioning, and end-to-end IP architecture.

#### Ease of management

Standards-based SNMP, Web and Java-based tools simplify 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, and 5.8 GHz.

## PacketWave® 1000 Base Station Unit

*Scalable, multiservice broadband wireless technology for service provider points of presence*

Aperto® Networks' PacketWave® system gives service providers a fully-integrated service intelligent platform for building high-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 1000 base station unit lets service providers quickly and easily deploy multiservice broadband wireless networks in multi-cell, multi-sector topologies. Located at each point of presence, the stackable PacketWave 1000 unit is designed to deliver services to subscribers in suburban and urban 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).

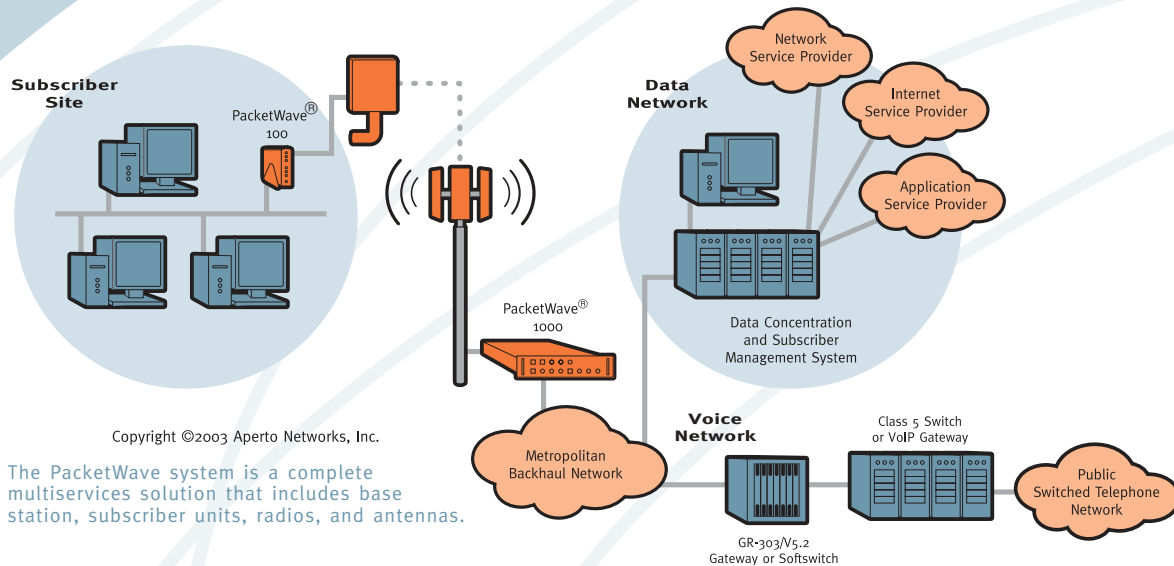
### Scalable Architecture

The service intelligent PacketWave system can handle thousands of subscribers, whether they're spread out in 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 channels.

As bandwidth and subscriber needs increase, network operators can easily add channels or new sectors within the cell. Multiple PacketWave 1000 base station units can be stacked to provide additional bandwidth using multiple channels per sector. And additional cells can be deployed to extend the service capacity and coverage footprint.

## PacketWave Broadband Wireless System



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The PacketWave system is a complete multiservices solution that includes base station, subscriber units, radios, and antennas.

### 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, and 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 6 MHz channel.

In addition, RapidBurst dynamic bandwidth allocation enhances efficiency by assigning time slots and packet sizes according to actual demand and service levels. An advanced TDMA burst mode ensures maximum flexibility and bandwidth efficiency in both upstream and downstream transmissions. Time Division Duplexing (TDD) technology maximizes flexibility and enables adjustable allocations of upstream and downstream bandwidth depending on traffic requirements.

*OptimaLink technology* performs dynamic control of link parameters to optimize each subscriber's connection in a multiuser, 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 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 each PacketWave 100 Series subscriber unit. Each profile contains various QoS metrics (such as maximum and minimum bandwidth) based on Class of Service (CoS) requirements like Constant Bit Rate (CBR), Committed Information Rate (CIR), or Best Effort (BE). Using a highly advanced scheduling mechanism, the PacketWave system enforces the metrics in each profile. The result is that service providers can offer tiered services that help differentiate their offerings in the marketplace.

Some of the advanced technologies that are used to implement ServiceQ include:

- **Per Flow Queueing:** This enables separate buffering of voice and data, so that voice packets are not queued behind a line of data packets.
- **Weighted Fair Queueing:** Enables the system to provide minimum rate guarantees for business class data services.
- **Unsolicited Grant Service:** Enables the system to provide low jitter and latency service for voice.
- **Leaky Bucket Based Peak Rate Regulator:** Enables the system to throttle data flows to operator configured limits.

In addition, the intelligent ServiceQ packet classifier can associate end-user applications to QoS profiles by mapping existing indicators such as IP ToS, as well as data packet header information such as IP or MAC addresses and port numbers. Consequently, the PacketWave system can identify applications such as Web browsing, telephony, and video streaming – providing the appropriate QoS, resulting in a more personalized and valuable service to each subscriber.

### **Multiple Frequency Bands**

Because the PacketWave system can accommodate a variety of frequency bands, it gives service providers the flexibility to pursue opportunities across the globe using a single service intelligent platform, minimizing capital and operating costs. PacketWave 1000 base station units can simultaneously support Aperto radios and antennas operating in 2.5 GHz, 3.5 GHz, and 5.8 GHz frequency bands.

### **Comprehensive IP Functionality**

The PacketWave system provides a single platform for delivering converged data, voice, and video 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 provider's overall network architecture without altering the existing routing and server infrastructure.

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 1000 routing software supports multiple subnets on each wireless interface and allows IP addresses to be shared across interfaces through “clustering.” Routing information can be configured either statically or dynamically using the RIPv2 routing protocol. In addition, the PacketWave system can support subscriber units using basic routing, bridging, or Network Address Translation (NAT or VLANs). 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 now available.

### **Flexible Backhaul**

The PacketWave 1000 base station unit provides complete flexibility in connecting to backhaul networks. In its base configuration, the PacketWave 1000 is equipped with a 100 Base-T Fast Ethernet interface. This enables direct connection to a Gigabit or Fast Ethernet-based MAN, or to a variety of other broadband networks through an external router or switch.

### **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 highly scalable, 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 1000 Base Station Unit Specifications

## Interfaces

Radio – Four or six Wireless Subsystems (WSS), each with the following Interfaces:

- signal (F connector)
- transmit test (F connector)
- receive test (BNC connector)
- control (RJ-45 connector)

Backhaul Port: 100 Base-T Fast Ethernet

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

Alarm/Control: NO/NC/Common dry contact relay

External Clock Input: optional 10 MHz timing reference (BNC)

Multiple PacketWave 1000 Synchronization:  
2 main and 2 alternate ports (BNC)

Cable Length: up to 825 feet (250 meters)

## Operation

20 Mbps data rate, 14 Mbps net throughput

Frequency Bands Supported (using Aperto Networks' radios and antennas):

- 2.5-2.689 GHz
- 3.4-3.7 GHz
- 5.725-5.925 GHz

Duplexing Mode: TDD and FDD option

Modulation: QPSK and 16 QAM

Error Correction:

- Reed Solomon FEC with variable block Length and correction factor
- Advanced MAC-layer ARQ

## Networking

Protocols: IP Routing RIPv2, VLSM, CIDR, DHCP (client and relay agent), VLAN, Bridge, PPPoE

Service Classes: CBR, CIR, BE

## Security

Multiple levels of password protection

Wireless signal scrambling

DES Encryption: 56, 112, 168 bit (planned)

## Management

Centralized provisioning using WaveCenter Configuration Manager on Windows 2000 Professional, and Linux

Embedded WaveCenter agent supporting SNMP and Web browser interfaces

SYSLOG interface and email alerts

Advanced installation and alignment tool

SNMP, MIB II (RFC 1213), Aperto Enterprise MIB

Software upgrade tool

## LED Indicators

Power

Radio: transmit, receive, status (for each WSS)

Ethernet: link, transmit, receive

Multi-unit Sync: main and alternate

## Power Requirements

AC Option: 85-265 VAC, 47-63 Hz

DC Option: 40-60 VDC

Power Consumption:

360 watts maximum (base configuration)

## Dimensions and Weight

Width: 16.5 in (41.9 cm)

Height: 5.25 in (13.3 cm)

Depth: 18 in (45.7 cm)

Mounting: standard 19 inch rack

Weight: 38 lbs (17 kg)

## Redundancy

2 load-sharing and hot-swappable power supplies

4 hot-swappable fans

2 power connectors for two separate power sources

## Environmental

Operating Temperature: 32° to 104° F (0° to 40° C)

Humidity: 10% to 90% noncondensing

## Regulatory Approvals

FCC Part 15 Class A, CE, EN

## Ordering Information

PacketWave 1000

4 WSS, AC power supply

PW1000-04-AC

6 WSS, AC power supply

PW1000-06-AC

4 WSS, DC power supply

PW1000-04-DC

6 WSS, DC power supply

PW1000-06-DC



## PacketWave<sup>®</sup> 3.5 GHz Radio Base Station Radio and Antenna

The Aperto<sup>®</sup> Networks PacketWave<sup>®</sup> 3.5 GHz base station radio works with the PacketWave base station and PacketWave subscriber units to provide a complete broadband wireless solution. With a PacketWave radio and antenna, the system is equipped to deliver optimal performance and flexibility.

### Link Optimization

The PacketWave system employs innovative OptimaLink<sup>®</sup> wireless link adaptation technology to optimize bandwidth, robustness, and overall performance to each subscriber. The base station radio and antenna support three key OptimaLink features: polarization diversity, spatial diversity, and radio power output control.

By rapidly adjusting polarization and automatically switching between antennas on a burst-by-burst basis, the PacketWave system ensures high performance on each link and maximizes coverage in challenging high-density and

non-line-of-sight environments. The radio controls transmit power for each burst, an important advantage in cellular deployments because it minimizes interference in adjacent cells. In addition, the radio transmits only when data is available, which reduces interference substantially compared to conventional systems that transmit continuously in the downstream direction.

### Radio Flexibility

The PacketWave radio covers the entire 3.4 to 3.7 GHz frequency band. This range of frequencies lets service providers change channel plans easily, and saves them from having to inventory multiple radio types.

The PacketWave base station antenna is flexible, and offers various beamwidth options—available with a 90° beamwidth for a four-sector cell, or a 60° beamwidth for a six-sector cell.

## 3.5 GHz Base Station Radio/Antenna Specifications

### Overall Parameters

Frequency Range: 3.4-3.7 GHz  
Modulation: QPSK and 16 QAM  
Channel Widths: (ETSI) 1.75, 3.5 and 7.0 MHz  
(Non ETSI) 1-6 MHz in 1 MHz steps  
Duplexing: TDD and FDD option  
Standard Range: up to 10.5 miles/16.9 kilometers  
Extended Range: up to 23 miles/37 kilometers with  
external subscriber antenna

### Transmitter

Maximum Power\*: 20 dBm  
Transmitter Overpower Accuracy:  $\pm 1$  dB  
Maximum Switching Time: 2  $\mu$ s  
\*The maximum power varies depending on  
country regulations.

### Receiver

Maximum Receiver Noise Figure: 3.0 dB  
Receiver Gain: 36  $\pm$  3 dB

### Synthesizer

Maximum Phase Noise: -83 dBc/Hz at 10 KHz offset  
Frequency Stability with System 10 MHz  
Reference:  $\pm 0.25$  ppm

### Antenna Options

Minimum Gain: 17.5 dBi (60°), 16 dBi (90°)  
Maximum VSWR: 2.0:1  
Polarization: horizontal and vertical  
Minimum Cross-Polarization Isolation: 20 dB  
Minimum Front-to-Back Isolation: 30 dB  
Maximum Sidelobe Level: -30 dB at 90°  
(60° antenna); -30 dB at 135° (90° antenna)  
3dB Beamwidth: 60° or 90° azimuth;  
8° elevation  
Connectors: 2 N-type female  
Pole Diameter for Mounting Kit: 2.5 to 4.5 inches  
Wind Speed: 75 mph operational (120 km/hr);  
125 mph survival (200 km/hr)

### IF Port

Connector: F-type female  
Impedance: 75 ohm  
IF Signal: 44 MHz  
Voltage Range: 10 to 22 VDC  
Power: 12 watts  
Maximum RG-6 Cable Length: 164 feet  
(50 meters); option available for up to 825 feet  
(250 meters)

### IF Control Port

Connector: RJ-45  
Maximum CAT-5 Cable Length: 164 feet (50 meters);  
option available for up to 825 feet (250 meters)

### RF Port

Connector: 4 N-type female

### Alarms and Status

VCXO Lock  
Synthesizer Lock  
Under Voltage Alarm: voltage < 9.5 V

### Environmental and Certification Requirements

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%  
Certifications: EN 301 753, EN 301 021,  
EN 60950:2000, ETS 301 489 -1

### Ordering Information

PacketWave 3.5 GHz base station radio	PWR3500
PacketWave 3.5 GHz base station antenna (60 degree sector)	PWA3500-60
PacketWave 3.5 GHz base station antenna (90 degree sector)	PWA3500-90

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The PacketWave 100 Series subscriber units provide “always-on” multi-megabit IP services and Internet access to subscribers.



## PacketWave® 100 Series Subscriber Units

*Multiservice broadband wireless access for small to midsize businesses, SOHOs, and homes*

### Key Benefits

#### High-speed Internet access

The PacketWave system delivers data rates from 64 Kbps, with burst speeds up to 20 Mbps upstream and downstream.

#### Increased coverage

Supports line-of-sight (LOS), obstructed LOS, and non-LOS installations.

#### High spectrum efficiency

Variable channel width from 1-7 Mhz for scalable deployment and interference resiliency.

#### Easy to install

Simple setup reduces service provisioning time. The radio with integrated antenna is as easy to install as a satellite dish. An antenna alignment tool makes antenna pointing easy.

#### Support for SLA, multiple services

PacketWave 100 Series units connect directly to a PC or Ethernet LAN, and support enhanced applications such as SLA, voice and streaming video.

#### 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, and 5.8 GHz.

Aperto® Networks' PacketWave® system gives service providers a fully-integrated service intelligent platform for building high-density broadband wireless networks for personalized service delivery. PacketWave system architecture supports multiservice applications, scales easily for more capacity and coverage, and provides dynamic link optimization on a per-subscriber basis. It also features fast deployment and simplified management.

Working with the PacketWave 1000 base station unit, PacketWave 100 Series subscriber units deliver high-speed, always-on Internet access for small to midsize businesses, small office/home office (SOHO) customers, and residential users. With a PacketWave 100 Series unit installed at the subscriber's site, users can browse Web pages, handle voice calls, view streaming video, and download files—all at multimegabit data rates.

The PacketWave 100 subscriber equipment consists of an indoor bridge/router unit and an outdoor radio/antenna unit. Configurable as a bridge, or a router that supports up to 250 hosts. The PacketWave system delivers data rates from 64 Kbps with burst speeds up to 20 Mbps in a 6 MHz channel—enabling the most efficient use of aggregate bandwidth, so greater numbers of users can enjoy simultaneous access.

Aperto Networks offers three PacketWave models designed to meet a variety of subscribers and network requirements:

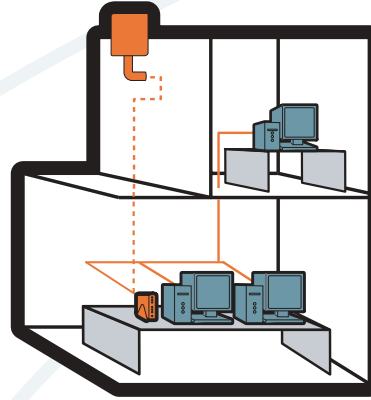
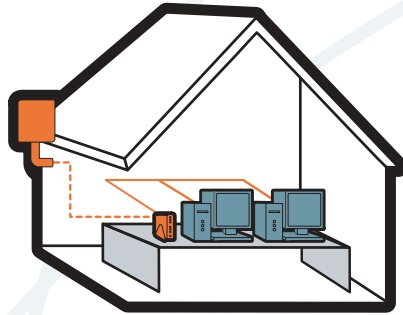
- PacketWave 110 model provides bridging, with support for up to five hosts.
- PacketWave 120 model provides bridging and Network Address Translation (NAT), with support for up to 20 hosts.
- PacketWave 130 model provides bridging, NAT, and IP routing, with support for up to 250 hosts.



## PacketWave Broadband Wireless System

### Complete Package

The Aperto Networks' PacketWave 100 Series provides a complete subscriber package for fast Internet access. The easy-to-install radio unit with integrated antenna is mounted on the outside of the subscriber's office building or home. The indoor bridge/router connects to either a PC or an Ethernet/Fast Ethernet LAN.



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### Scalable Architecture

The PacketWave system can handle thousands of wireless subscribers, whether they're spread out or live in densely populated neighborhoods.

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 channels.

As bandwidth and subscriber needs increase, network operators can easily add channels or new sectors within the cell. Multiple PacketWave 1000 base station units can be stacked to provide additional bandwidth using multiple channels per sector. Operators can also economically deploy additional cells to extend the service capacity and coverage footprint.

### Rapid Service Provisioning

The PacketWave 100 Series is easy to install and configure. The outdoor radio/antenna component can be installed on the roof or roofline, while the compact indoor unit connects to a personal computer or Ethernet network. Once the two components have been cabled together, the

indoor unit automatically obtains an IP address from the network and downloads the configuration parameters.

### Service Flexibility

The PacketWave system makes it easy to customize broadband access to fit customers' requirements. The PacketWave 100 Series subscriber unit supports remote provisioning for a variety of speeds, eliminating the need for costly truck rolls. What's more, it gives service providers the flexibility to offer multiple flows with different service classes for residential and business applications.

### Simple LAN Configuration

For business users, the PacketWave 100 Series provides additional features that streamline LAN configuration. Integrated in the PacketWave 120 and 130, a Dynamic Host Configuration Protocol (DHCP) server allocates IP addresses for each workstation. And Network Address Translation (NAT) enables users to share a single public IP address while providing enhanced security. The PacketWave 110 model provides simple plug-and-play bridging for residential applications.

## 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, and ServiceQ® per-flow Quality of Service (QoS) and bandwidth management.

*RapidBurst technology* enables the PacketWave system to achieve exceptionally low latency and unprecedented spectral efficiency. With RapidBurst, the PacketWave system delivers burst rates up to 20 Mbps over a 6 MHz channel.

In addition, RapidBurst dynamic bandwidth allocation enhances efficiency by assigning time slots and packet sizes according to actual demand and service levels. An advanced TDMA burst mode ensures maximum flexibility and bandwidth efficiency in both upstream and downstream transmissions. Time Division Duplexing (TDD) technology maximizes flexibility and enables adjustable allocation of upstream and downstream bandwidth depending on traffic requirements.

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

*ServiceQ technology* can provide different service classes to each subscriber 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 each PacketWave 100 Series subscriber unit. Each profile contains various QoS metrics (such as maximum and minimum bandwidth, latency, and jitter) based on Class of Service requirement like Constant Bit Rate (CBR), Committed Information Rate (CIR), or Best Effort (BE). Using a highly advanced scheduling mechanism, the PacketWave system enforces the metrics in each profile. The result – service providers can offer tiered services that help differentiate their offerings in the marketplace.

In addition, the intelligent ServiceQ packet classifier can associate end-user applications to QoS profiles by mapping existing indicators such as IP ToS and DiffServ fields, as well as data packet header information such as IP or MAC addresses and port numbers. Consequently, the PacketWave system can identify applications such as web browsing, telephony, and video streaming – providing the appropriate QoS, resulting in a more personalized and valuable service to subscribers.

## PacketWave 100 Series Subscriber Unit Specifications

### Models

	PW110	PW120	PW130
Number of hosts	5	20	250
Networking	Bridge	NAT/Bridge	Router/NAT/Bridge
Number of service flows and VLAN	8	8	16
DHCP clients supported with built-in server	N/A	20	100

### Indoor Bridge/Router Unit

#### Interfaces

10/100 Base-T Ethernet: RJ-45 connector  
IF Port (Radio Connection): F connector  
IF Control Port (Radio Connection): RJ-45 connector  
Cable Length: 164 feet (50 meters) or 328 feet (100 meters) with specified cable

#### Modem

Modulation: QPSK, 16 QAM

#### Power Requirement

100-240 VAC; 47-63 Hz; 30 watts

#### Networking

(Support Depends on Model)

Bridging, 802.1Q VLAN  
DHCP Server and Client  
NAT  
IP Routing

#### Security

DES Encryption: 56, 112, 168 bit (planned)

#### Management

##### Service Provider

Subscriber Provisioning using Java-based WaveCenter Configuration Manager on Windows 2000 Professional, and Linux  
Embedded WaveCenter agent supporting SNMP and Web browser interfaces  
SNMP, MIB II (RFC 1213), Aperto Enterprise MIBs  
Software upgrade tool

##### Subscriber

Web-based interface for subscriber side DHCP server and NAT configuration

##### Installation Manager

Align antenna and perform throughput test; runs on multiple platforms

### LED Indicators

#### Power

Wireless: transmit, receive, status  
LAN: transmit, receive, link

### Dimensions and Weight

Width: 1.5 in (3.8 cm)  
Height: 6.6 in (16.8 cm)  
Depth: 9.1 in (23.1 cm)  
Weight: 2.2 lbs (1.0 kg)

### Environmental

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

### Regulatory Approvals

FCC Part 15 Class B, CE, EN

### Outdoor Radio/Antenna Unit

#### Environmental

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

#### Radio/Antenna Options

##### 2.5-2.686 GHz Unit

Standard Range: up to 11.6 miles/18.7 kilometers  
Extended Range: up to 26 miles/42 kilometers with external subscriber antenna

Width: 13.4 in (34 cm)  
Height: 13.4 in (34 cm)  
Depth: 1.9 in (4.8 cm)

3 dB Beamwidth: azimuth 20°; elevation 20°  
Horizontal and vertical polarization

##### 3.4-3.7 GHz Unit

Standard Range: up to 10.5 miles/16.9 kilometers  
Extended Range: up to 23 miles/37 kilometers with external subscriber antenna

Width: 11.8 in (30 cm)  
Height: 11.8 in (30 cm)  
Depth: 1.9 in (4.8 cm)

3 dB Beamwidth: azimuth 20°; elevation 20°  
Horizontal and vertical polarization

##### 5.725-5.925 GHz Unit

Standard Range: up to 8.2 miles/13.2 kilometers  
Extended Range: up to 13 miles/20.8 kilometers with external subscriber antenna

Width: 8.1 in (20.5 cm)  
Height: 8.1 in (20.5 cm)  
Depth: 1.9 in (4.8 cm)

3 dB Beamwidth: azimuth 17°; elevation 17°  
Horizontal and vertical polarization

\* The maximum EIRP varies depending on country regulations. Contact your Aperto Networks sales representative for details.

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