



PacketMAX License-Exempt WiMAX

Solution Brief

License-Exempt Spectrum

The majority countries around the world have embraced the 5GHz spectrum for license-exempt communications. The costs associated with acquiring licensed bands are leading many WISPs to consider license-exempt solutions for niche markets such as rural areas, large underserved campuses and “hotspot” applications. Other advantages to the operator include availability of large blocks of free spectrum, common band for use in much of the world (read, less complex and less expensive equipment), faster roll-outs and extremely cost-effective applications, for example, point-to-point links for secondary backhaul solutions.

Benefits of License-Exempt WiMAX Solution

WiMAX technology, based on the 802.16 family of wireless access standards, which uses Orthogonal Frequency Division Multiplexing (OFDM) in the Physical (PHY) layer, provides benefits such as increased signal to noise ratio of CPE and improved resilience to multipath interference and outdoor environments. The use of Time Division Duplexing (TDD) provides higher spectral efficiency for Internet and VoIP applications (increasing data asymmetry). WiMAX request-grant media-access mechanism inherently allows a more scalable, reliable and profitable network roll-out versus Wi-Fi and proprietary BWA. Unlike 802.11 based solutions that use contention-based media-access, operators using WiMAX in the 5GHz band are able to offer differentiated quality of service guarantees to their customers.

COMPONENTS

- PM3000 Carrier-Grade Single-Sector Base Station
- PM5000 Carrier-Grade 1-12 Sector Base Station
- Base Station Radio (5.15 - 5.35 GHz) (5.470 - 5.725 GHz) (5.725 - 5.925 GHz)
- PM120 and PM320 CPE (5.15 - 5.925 GHz)



802.16d	802.11n
• Grant-request MAC	• Contention-based MAC (CSMA/CA)
• Service to those who need	• No guaranteed QoS
• Supports real-time applications	• No guaranteed latency
• Optimized for up to 50 Km	• Optimized for ~100 meters
• Handles users spread over kilometers	• No “near-far” compensation
• Designed to tolerate greater multi-path delay spread (signal reflections) up to 10.0μ seconds	• Designed to handle indoor multi-path (delay spread of 0.8μ seconds)

Benefits of WiMAX	
OFDM 256 FFT PHY	• Enhanced multi-path functionality • Enhanced link budget
Scheduled MAC	• Assign bandwidth to users who need it
US and ETSI compliant DFS	• Robust link-reliability under interference
Built-in QoS	• Support business-grade service level agreements • Offer differentiated services and tiered pricing



Wireless to the MAX

Aperto PacketMAX™ 5GHz Base Station Radio

Aperto Networks expands the industry-leading PacketMAX product family with the introduction of an economical series of base stations and subscriber units ideal for license-exempt WiMAX deployments. Service providers and network operators can generate aggressive return of investment (RoI) by delivering premium WiMAX service plans on freely available spectrum.

License-free 5GHz band PacketMAX products are offered in multiple form-factors. The PacketMAX 3000 series Base Station is designed specifically for supporting large number of subscribers in a single-sector. For large-scale deployments, Aperto's PacketMAX 5000 is the only ATCA-chassis based WiMAX system available in the license-exempt frequencies supporting up to 12 sectors.

PacketMAX 5 GHz WiMAX System Specifications

Frequency Range	5.15 - 5.35 GHz 5.725 to 5.925 GHz 5.470 to 5.725 GHz
WiMAX Standards	IEEE 802.16-2004
Channel Bandwidth	3.5, 5, and 7 MHz
QoS	Yes
Access Method	TDD; OFDM 256 FFT

PacketMAX Base Station radios and CPE are available in both license-free frequencies of 5.4GHz and 5.8GHz. PacketMAX 5GHz systems are also suitable for deployment in countries where one or both of these frequencies are licensed.

Improving License-Exempt Wireless with PacketMAX™ WiMAX

At the core of all PacketMAX systems is WiMAX standard OFDM 256 FFT platform. Aperto's industry-leading Quality of Service (QoS) provides classification on L2, L3, L4 for rich IP networking. In order to support the large number of subscribers, PacketMAX allows provisioning of up to 8192 service-flows per sector. Tunable ARQ per flow and per flow queuing scheduler allocate granular bandwidth control to users who need it. This, in turn, translates into higher revenue for higher value business-grade services.

TYPICAL APPLICATIONS

- Service Provider (WiSP) in Emerging Markets
- Campus/Enterprise Connectivity
- State/Local/Municipal Communication
- Public Safety Networks

All PacketMAX systems seamlessly integrate with existing WiMAX deployments and have common management and provisioning from the powerful WaveCenter EMS Pro® console.

Typical PacketMAX License-Exempt WiMAX Deployment

