



Motorola

WiMAX



Definition

WiMAX (Worldwide Interoperability for Microwave Access) provides advanced wireless broadband access in fixed, portable, and mobile environments. Motorola's WiMAX solutions are based on the Institute of Electrical and Electronic Engineers (IEEE) 802.16e-2005 standard for fixed and mobile applications. Focused on licensed bands, primarily 2.5GHz, 3.5GHz and 2.3GHz, WiMAX is a wireless alternative to wired broadband access with greater range and bandwidth than Wi-Fi and a roadmap to mobility. An industry consortium known as the WiMAX Forum® manages the certification program for the WiMAX standard and is building an ecosystem to support an end-to-end solution.

WiMAX untethers broadband and makes it accessible and reliable in all regions of the world for fixed, portable and mobile users. Motorola's shared deployment success with our customers stems from leadership in delivering end-to-end solutions that enable the delivery of broadband services with low total cost of ownership and paid time-to-market.

In mature markets populations are being given access to the information superhighway – the mass market will soon have access to multi-megabit speeds on the go. Emerging markets are further capitalizing on WiMAX by connecting entire populations to more robust and reliable broadband nationwide, enabling residential, enterprise and governmental applications. And according to the WiMAX Forum, in the United States WiMAX accounts for more than 25 percent of Last Mile applications for US broadband stimulus funds.

Operators and their WiMAX business plans vary widely. Telcos, cable and new entrant operators find WiMAX as a way to spread broadband and provide a path to mobility. Cellular operators are also finding WiMAX as a useful technology to capitalize on underutilized spectrum, enter the fixed broadband market, or execute innovative business strategies.

WiMAX has proven to be a key all-IP mobile broadband access technology and is driving the success of operators worldwide with a diverse range of diverse business models including both retail and wholesale access, smart grid applications, low teledensity, or retail only broadband connectivity for users at home or on the go. Examples include Motorola customers SP AusNet, which is using WiMAX for its smart metering program; Clearwire, which is providing WiMAX for both the retail and wholesale distribution; CaribServe that is using the ASN 1000 for its low teledensity deployment; and Imagine in Ireland which is deploying an end-to-end Motorola WiMAX network to replace its existing wireless infrastructure across Ireland.

Motorola's WiMAX Commitment; Delivering Today and Investing for the Future with Open Retail and WiMAX 2

Motorola is a committed leader in 802.16e mobile WiMAX solutions and will continue to expand into 802.16m in line with customer demand. Motorola is driving its WiMAX roadmap with 802.16e Enhanced feature capabilities and benefits, including functionalities aimed at increasing coverage, reducing interference, improving single-user

WiMAX is Delivering Carrier-grade Services Worldwide

WiMAX commercial deployments are going live all over the world in increasing numbers, with 592 WiMAX network deployments in 148 countries worldwide according to the WiMAX Forum®. These new networks now are connecting millions of people, many for the first time, and surpassing high thresholds for reliable broadband and voice services in demanding markets. Motorola is leading this charge with a portfolio of WiMAX Forum Certified™ devices and access points for 2.3GHz, 2.5GHz and 3.5GHz.

throughput, as well as enabling a reuse of one for WiMAX. The WiMAX Forum estimates these new features have the potential to double peak data rates and increase average and cell edge end-user performance by up to 70 percent while still remaining compliant with the 802.16e standard.

Motorola's WiMAX Solution

Motorola is a global leader in mobile WiMAX that has trials and contracts for commercial WiMAX systems with customers in all regions around the world. Motorola has shipped more than two million CPE to-date. Motorola provides a full end-to-end WiMAX solution that extends beyond just the infrastructure to the IP core, operations and maintenance, full services portfolio, and customer premises equipment (CPE).

Motorola's WiMAX solution enables service providers to provide high-speed communications to customers whether they are at home, in the office, or on the move, and gives them opportunities to blend their traditional lines of business and position themselves to deliver full suites of voice, video and data wirelessly to fixed, portable and mobile users.

Motorola's Award-winning WiMAX End-to-End Portfolio:

- WiMAX solutions that support diverse deployment scenarios and business models
- System design centered around lowering OpEx and total cost of ownership - An access point (AP) – CPE combination that reduces the number of AP sites needed
- Access points that include tower-top, remote radio head solutions with zero footprint, remote RF head for zero path loss
- High performance CPE and USB devices with greater receive sensitivity than WiMAX standard
- Comprehensive professional services that deliver optimal networks
- Fast hand-offs between base stations for high quality mobile voice connectivity
- Efficient, flat IP-based network architecture, with capabilities to disaggregate bearer and control traffic
- Advanced antenna technologies such as MIMO and dynamic beam-forming for better capacity, coverage and throughput
- Flexible hardware and software defined radios
- Best-of-breed core components tightly integrated for superior performance of end-to-end system
- Carrier-grade device, element and network management systems

The Future of WiMAX

Industry Leaders Announce Initiative to Accelerate Interoperable WiMAX 2 Solutions built upon IEEE 802.16m

April 11, 2010 - Leading WiMAX silicon suppliers, equipment makers and research organizations have announced a new initiative to accelerate interoperability of the next release of WiMAX technology, WiMAX 2, based upon the IEEE 802.16m standard.

"Motorola's WiMAX leadership is driven by our commitment to WiMAX, proven by our extensive portfolio of access points and customer premises equipment," said Bruce Brda, senior vice president and general manager, Motorola Networks. "Motorola Networks will continue to provide technology choice to operators by advancing to 802.16m while assuring investment protection, unprecedented 4G performance enhancements and a robust ecosystem."

Motorola's WiMAX CPE and USB Devices Portfolio

Model:	USBw 100	USBw 200	USBw 200 Docking Station	CPEi 150	CPEo 450	CPEi 725	CPEi 750	CPEi 775	CPEi 800	CPEi 825	CPEi 885
Frequency (GHz)	2.3 2.5 3.5	2.3 2.5 3.5	2.3 2.5 3.5	2.5	2.5 3.5	2.5	2.3 3.5	3.5	2.3 2.5 3.5	2.3 2.5 3.5	3.5
Tx Power (dBm)	23	23	N/A	26	26	25	25.5	25.5	27	27 (26.5 for 2.3GHz)	27
Antenna Gain (dBi)	2	2	6	7	13 (14 for 3.5GHz)	7	7	7	5 (4.5 for 2.3GHz)	5 (4.5 for 2.3GHz)	5
Ethernet Ports	USB	USB	USB	1	1	1	1	1	1	1	2
VoIP Ports	0	0	0	0	2	1	2	1	0	1	2
WiFi	N	N	N	N	N	N	N	802.11 b/g	N	N	802.11 b/g/n

Motorola's WiMAX Network Deployments*

- Wateen (Pakistan)
- Clearwire (USA) (including the former Sprint XOVM)
- VTR (Chile)
- Agni Systems (Bangladesh)
- NeckarCom (Germany)
- Mena Telecom (Bahrain)
- Warid Telecom (Uganda)
- Taiwan Far EasTone Telecom
- Mobilink (Pakistan)
- Atheeb (Saudi Arabia)
- First International Telecom (Taiwan)
- TDF (France)
- REDtone (Malaysia)
- wi-tribe (Pakistan)
- MADA Communications (Jordan)
- Axtel (Mexico)
- Craig Wireless (Greece)
- Unwired (Fiji)
- Northern Michigan University (United States)
- Craig Wireless (Canada)
- Imagine (Ireland)
- SP AusNet (Australia)
- du (UAE)
- CaribServe (St. Maarten)
- Vee (Taiwan)
- Embratel (Brazil)

(*) Motorola's publicly announced engagements as of August 2010.



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Motorola Continues to Provide Innovative New Products

Recently, we announced several new products including the [WiMAX single RAN \(Radio Access Network\) solution](#) that provides operators with a cost-effective way to upgrade their network offerings, preserve capital and protect investments. The [CPEi 800](#), offered in 2.3GHz, 2.5GHz and 3.5GHz frequency bands, is a basic, low-cost data-only wireless modem for fast market entry into low teledensity markets or markets where operators are otherwise challenged to deliver high-speed Internet access. The [WiMAX USBw 200 Docking Station](#) is a simple, low-cost accessory that provides the WiMAX USBw200 dongle with increased range, allowing the subscriber to use this convenient device for fixed and mobile service.

Motorola's WiMAX Solution

- Deliver the "wireless broadband pipe," enabling rich-media, bandwidth-intensive applications including voice, data and video for fixed, portable and mobile users.
- Interoperate with a vast ecosystem of WiMAX networks, applications, devices and consumer electronics to deliver pervasive coverage and a true "personal broadband" experience.
- Give service providers the opportunity to extend coverage and capabilities with a high-performing, standards-based wireless broadband access portfolio to meet the needs of residential, enterprise and government.
- Are cost-effective and go where teledensity has historically been low.

Key Benefits

- Motorola's end-to-end infrastructure, devices and professional services ensure on-time deployment, low total cost of ownership, and reliable end-user services.
- Motorola's WiMAX single RAN solution makes operators' 4G choice easy by reusing most of a base station for various migration scenarios and reusing up to 100 percent of other major network components such as IP/MPLS core, backhaul and device management. It also offers a 4x higher processing power baseband than currently available industry basebands.

Motorola's WiMAX Device Partnership Program

Motorola's global presence and leadership in WiMAX deployments positions us to connect network operators and device manufacturers to the worldwide WiMAX ecosystem. Motorola's WiMAX Device Partnership Program is designed to accelerate time to market with consistent testing through Motorola's award-winning Interoperability Test Program (IOT) and to further enable the WiMAX ecosystem with additional marketing and sales support through our Reference Program. Both device vendors and 4G operators can benefit by utilizing these programs to help deliver a wider range of devices to end users.

Interoperability Test Program (IOT)

The Interoperability Test Program was developed to accelerate the time to market and reduce the costs related to launching new devices. The program is open to all WiMAX device vendors. Once a device passes Motorola's IOT program, operators can be confident that the device is compliant with a Motorola system and able to operate in a commercial environment. Motorola's IOT program is open to all WiMAX device manufacturers and provides a means to validate products on a true Motorola WiMAX network.

Motorola has two dedicated IOT labs – one in North America and one in Taiwan. Each lab can support simultaneous testing by multiple devices.

WiMAX Device Reference Program

The WiMAX Device Reference Program adds to the IOT Test Program to deliver a more comprehensive approach to drive a wider array of devices to market. In addition to the benefits of IOT, the WiMAX Device Partnership Program helps operators gain access to a greater device selection with higher quality, no cost to implement certification, and reduced operating costs related to new device qualification. For device manufacturers, the program offers marketing support for device launches and reduced launch cycle times with consistent testing and IOT certification support.

Empowering the Personal Broadband Revolution

Motorola is supporting both WiMAX and LTE as the next generation of wireless technologies in the evolution to 4G wireless broadband. Motorola WiMAX is already showing the possibilities that widespread wireless broadband enables. These technologies will help accelerate the delivery of the personal media experience in the home, and enable new productivity in enterprise environments.

For more information on Motorola WiMAX, visit www.motorola.com/wimax. To learn more about our WiMAX deployments around the world, please visit: www.firstcommu-nicate.com/motorola/wimax/download/worldTour/.