

# BWA Product Application And Next Development

Mr. Bin Wang

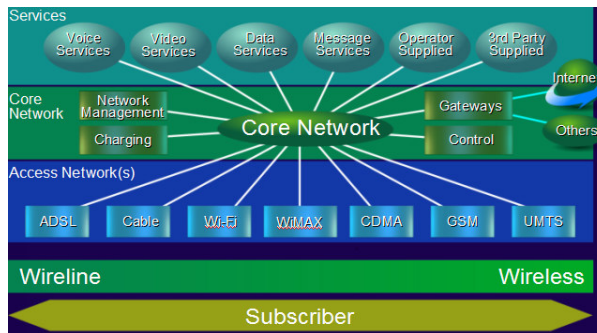
Sep, 2005

## Contents

- BWA Introduction
- BWA Standard
- BWA Product Application
- BWA Next Development

## What is BWA?

- Broadband Wireless Access
- Very high bandwidth with moderate mobility
- Wide range of services
- Complement to fixed broadband



## Broadband Defined



1.5 or 2.0 Mbps



Symmetric 200 Kbps

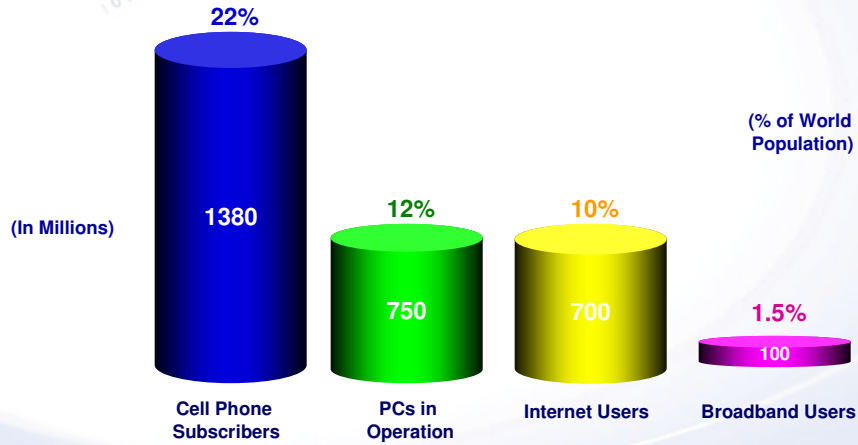


500 Kbps to 1Mbps At Least **Per User**

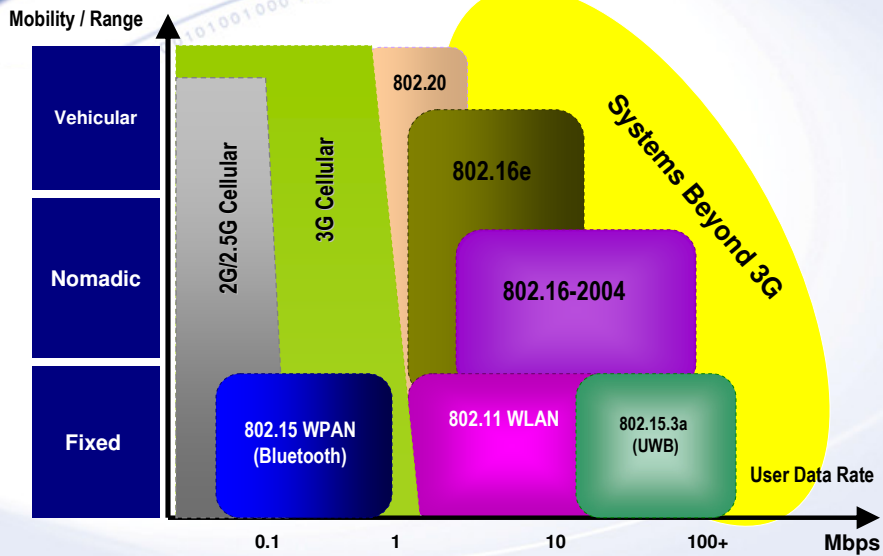
- ☛ More complicated applications
- ☛ Ever growing processing power

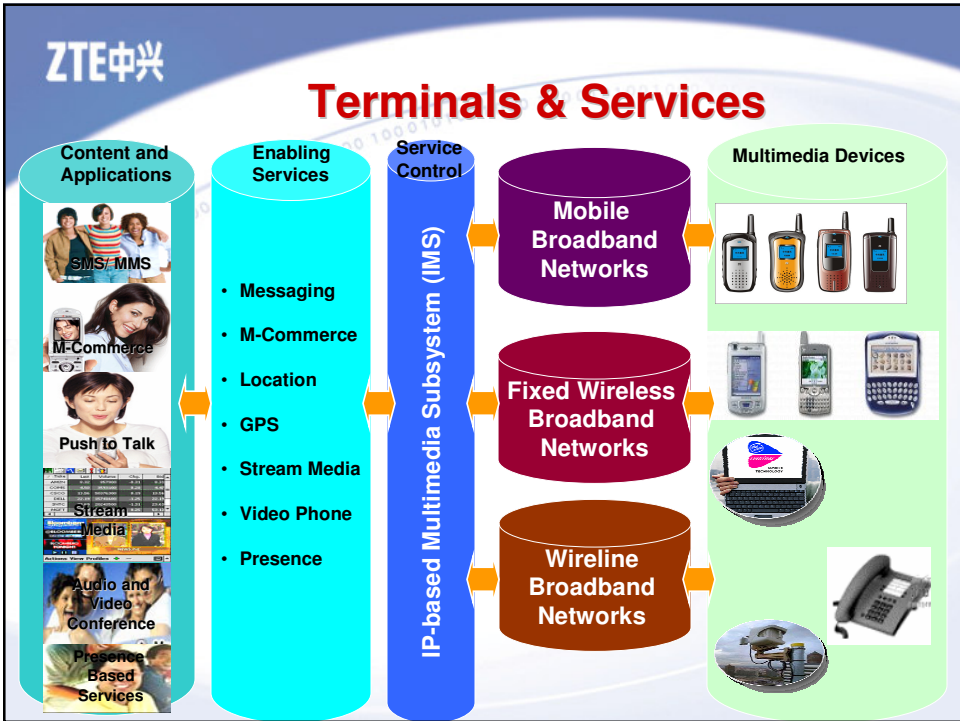
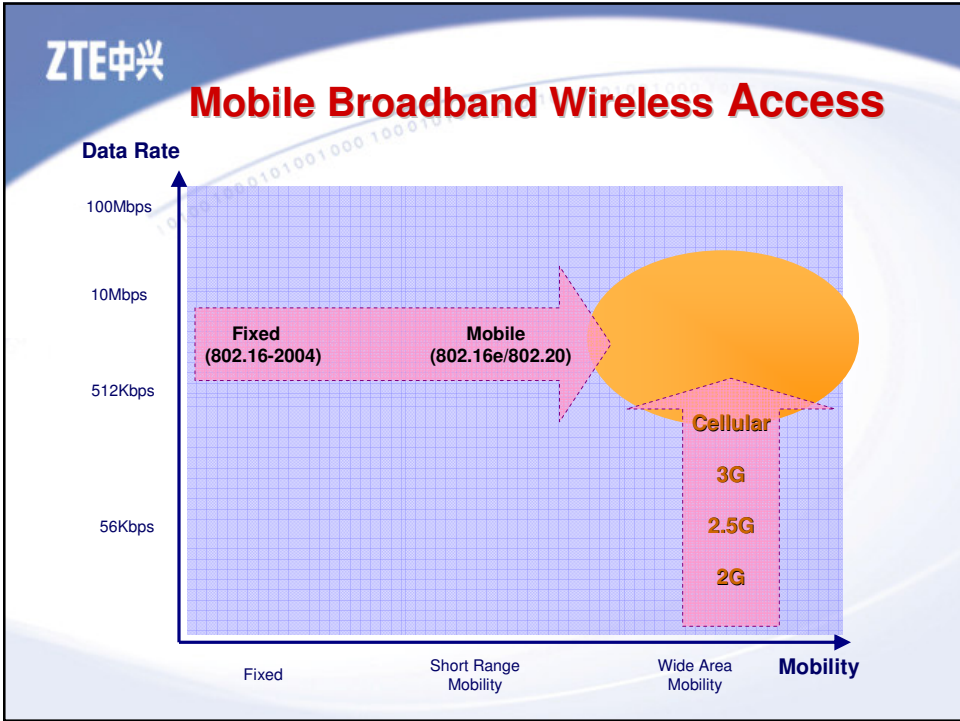
## 2004: Broadband Penetration

There are 6.4 Billion People on Earth



## Multiple Wireless Broadband Technologies





## Conclusion

- Huge Potential for Broadband Market Growth
- Multiple Broadband Access Technologies
  - DSL
  - Cable Modem
  - Wireless Broadband
  - Satellite
- Integrated Terminals & Services

## Contents

- BWA Introduction
- **BWA Standard**
- BWA Product Application
- BWA Next Development

## IEEE LMSC Working Groups

- Some of the best known IEEE Standards developed by the IEEE LAN/MAN Standards Committee (LMSC)
- Active LMSC Working Groups and Study Groups
  - 802.1 Higher Layer LAN Protocols Working Group
  - 802.3 Ethernet Working Group
  - 802.11 Wireless LAN Working Group
  - 802.15 Wireless Personal Area Network (WPAN) Working Group
  - **802.16 Broadband Wireless Access (BWA) Working Group**
  - 802.17 Resilient Packet Ring Working Group
  - 802.18 Radio Regulatory TAG
  - 802.19 Coexistence TAG
  - 802.20 Mobile Broadband Wireless Access (MBWA) Working Group
  - 802.21 Media Independent Handoff Working Group

## 802.16 Standard Status

Working Group	Task	Status
TG1	802.16-2001	Finished
TG2	802.16.2-2001	Finished
TG3		Combined with TGa
TG4		Combined with TGd
TGa	802.16a	Finished
TGc	802.16c, 802.16/conf01~04	802.16/conf04 under way; Others have been finished.
TGd	802.16-2004	released at 2004.10, substitute for 802.16-2001,16a,16c
TGe	802.16e	Estimate to be released in 2005.10
Network Management TG	802.16f and 802.16g	Under way
Coexistence TG	802.16.2-2004	released at 2004.3, substitute for 802.16.2-2001
Maintenance TG	802.16-2004/cor1	Estimate to be released in 2005.10

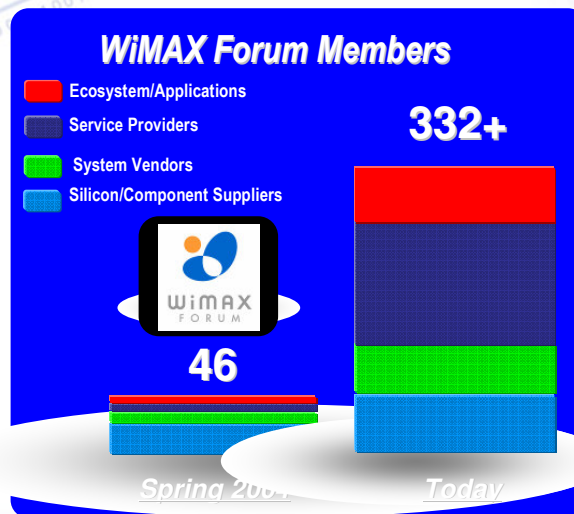
## WiMAX : Promoting the Next Broadband Technology

- WiMAX is an industry consortium formed in April 2001
- Mission is to ensure interoperability of IEEE 802.16 systems from different vendors
  - Develop Conformance Test Specification suites
  - Set up certification labs for testing
  - Provide WiMAX-Certified stamp of approval
- WiMAX is organized in two functional areas
  - Marketing Group
  - Technical Working Group
  - Certification Group
  - Service Provider Group
- Marketing Group has focus on promoting IEEE 802.16 based technology
- Technical Working Group has the charter to specify and conduct interoperability testing, and certify systems as WiMAX Certified

Standards and integration are changing economies of BWA

WiMAX is to 802.16 as Wi-Fi is to 802.11

## Global WiMAX Momentum!



# Contents

- BWA Introduction
- BWA Standard
- **BWA Product Application**
- BWA Next Development

# Broadband Makes the Difference

**CONSUMER:**  
Personal Broadband Services  
Streaming Video/ Online Gaming  
Video Messaging  
Location Based Services

**ENTERPRISE:**  
Mobile Worker Services  
Hotspot & SME Access  
Quick Install  
VoIP over WLAN  
Private Networks

**PUBLIC SERVICE:**  
Government and  
Emergency Services

**EMERGING:**  
Data/VoIP Last Mile  
Fixed and Wi-Fi\* Backhaul  
Lowest Cost Broadband



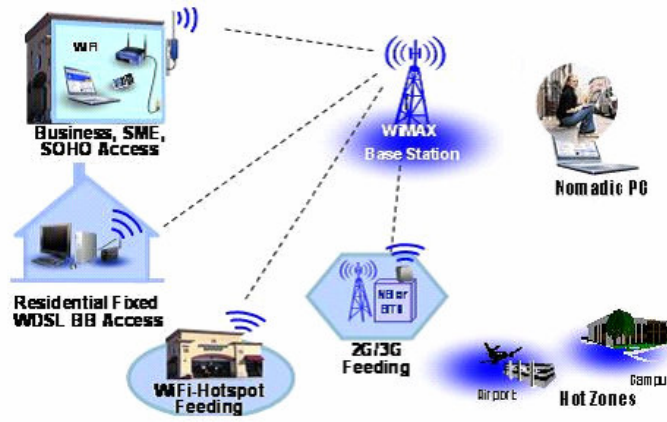
## Multiple Application Classes

- **Interactive Gaming**
  - ▶ Scenario – Play a handheld game in a session with multiple players while chatting at the same time on the same device (while moving on a train)
- **VOIP & Video Conferencing**
  - ▶ Scenario – Service provider offers voice telephony service with best effort data services
- **Streaming Media (Real Time)**
  - ▶ Scenario – Enterprise road warrior watches broadcast TV clip on the laptop while downloading files at an airport
- **Web Browsing & Instant Messaging**
  - ▶ Scenario – Best effort data services with enhanced performance and innovative apps like video IM
- **Media Content Download (Store & Forward)**

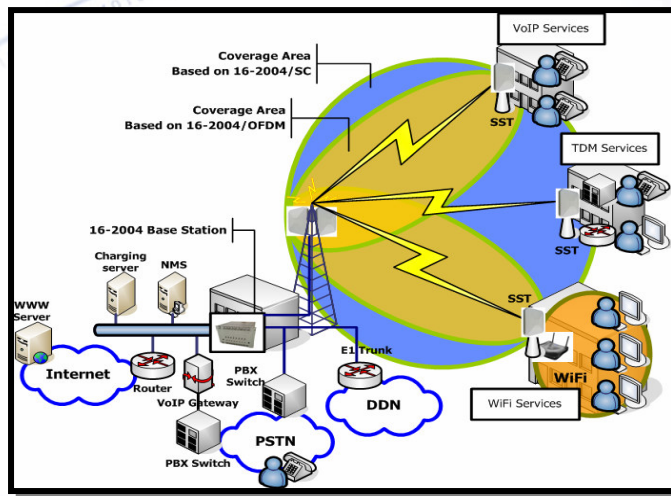
## BWA Product Portfolio

- **Broadband wireless access solutions to meet carrier requirements**
  - Infrastructure equipment
  - Subscriber equipment
- **Complete suite of BWA Products**
  - Backhaul Solutions
  - Residential and SOHO Solutions
  - Mobile Broadband Access Solutions

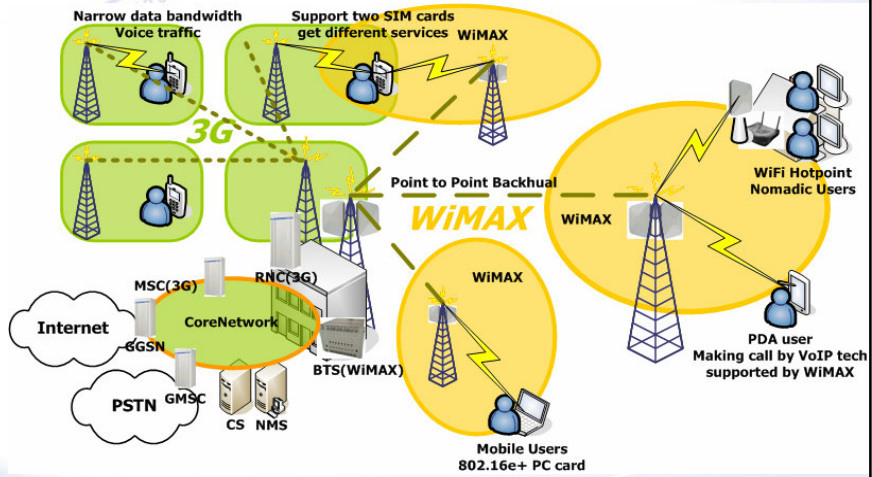
# BWA Backhaul Solution



# Integrated Wireless Access Solution



## Mobile Wireless Access Solution



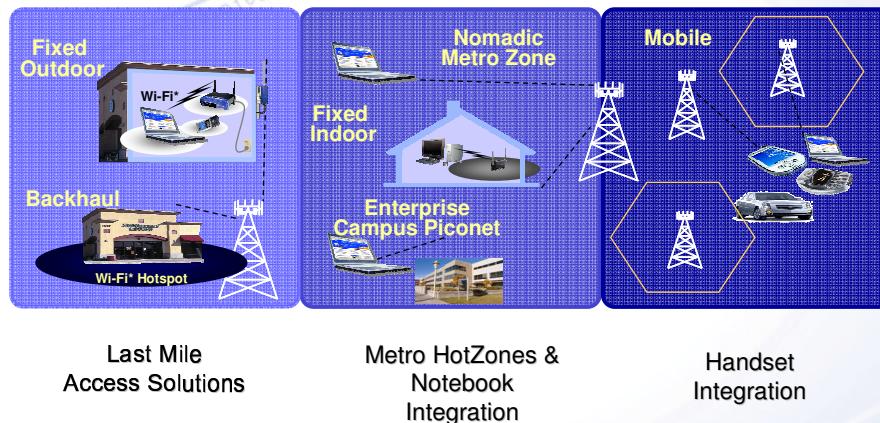
## Contents

- BWA Introduction
- BWA Standard
- BWA Product Application
- **BWA Next Development**

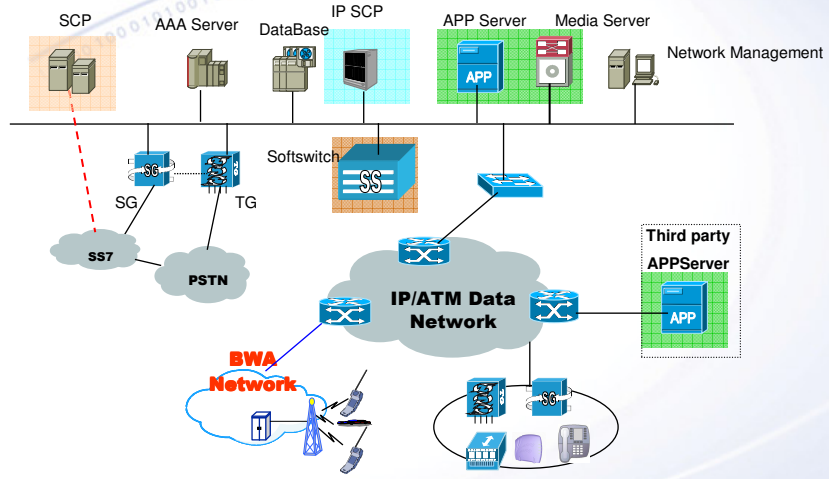
## BWA Network Evolution

Network Type Air Interface	Description	Network Clients	Services
<b>Fixed</b> 802.16d (256QOFDM)	Traditional BWA network providing fixed broadband data and voice services to SMB and consumers	<ul style="list-style-type: none"> <li>Outdoor CPE</li> <li>Indoor CPE</li> </ul>	<ul style="list-style-type: none"> <li>QoS data service (SMB)</li> <li>Best efforts data services (consumers)</li> <li>Fixed voice services</li> </ul>
<b>Fixed + Portable</b> 802.16e (SOFDMA)	Next generation wireless broadband enabling battery powered clients and improved indoor performance - break-before-make cell handoff	<ul style="list-style-type: none"> <li>Outdoor CPE</li> <li>Indoor CPE</li> <li>Residential Gateways</li> <li>Notebook computers</li> <li>Handhelds (data)</li> </ul>	<ul style="list-style-type: none"> <li>QoS data service (SMB)</li> <li>Best efforts data services (consumers)</li> <li>Fixed voice services</li> <li>Portable data services</li> </ul>
<b>Fixed + Mobile</b> 802.16e (SOFDMA)	Backend infrastructure enables mobile voice services with make-before-break cell handoff	<ul style="list-style-type: none"> <li>Outdoor CPE</li> <li>Indoor CPE</li> <li>Residential Gateways</li> <li>Notebook computers</li> <li>Handhelds (data + VoIP)</li> </ul>	<ul style="list-style-type: none"> <li>Roaming</li> <li>QoS data service (SMB)</li> <li>Best efforts data services (consumers)</li> <li>Fixed voice services</li> <li>Portable data services</li> <li>Portable voice services</li> </ul>

## BWA Next Development



## BWA Integration Existing network



# Thanks !

