IMT-2000 vs. Fixed Wireless Access (FWA) systems

ITU/BDT Regional Seminar on Fixed Mobile Convergence and Guidelines on the smooth transition of existing mobile networks to IMT-2000 for Developing Countries for Africa

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Summary

- **There has been much speculation about the potential role of other wireless access technologies in tomorrow's communications landscape.**

- **Offering high user data rates over relatively short distances and operating mainly in license exempt radio spectrum, Fixed Wireless Access (FWA) systems provide operators with the opportunity to offer their customers 'unwired' access at true broadband speeds in situations of restricted or no mobility.**

- **While FWA systems present an attractive complement to cellular operators' service portfolios, they do not replace the unique combination of benefits offered by IMT-2000 systems that have been designed for full mobility.**

The 3G/UMTS Proposition

A complete, end-to-end mobile SYSTEM

- **Already more than 22 million 3G/UMTS customers subscribing to almost 70 networks globally with choice of 150+ terminals**

- **3G/UMTS delivers cost efficient, WIDE AREA network coverage, supporting a rich choice of services and applications optimised for fully mobile environments**

- **Universally standardised via 3GPP, using globally harmonised spectrum in common bands (paired and unpaired)**

- **Support for international roaming, plus integral security and billing**

- **Bit rates up to 384 kbps in wide area / 2 Mbps stationary**

- **Clearly defined roadmap to >14 Mbps and higher capacities, with HSDPA/HSUPA**

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The WiMAX Proposition

Enabling broadband wireless access

- **The original 802.16 specification described broadband wireless access systems using point-to-multipoint infrastructure operating at radio frequencies between 10 GHz and 66 GHz.**

- **802.16 specifies a metropolitan area networking (MAN) protocol to enable a wireless alternative for 'last mile' broadband access, as well as providing backhaul for 801.11 hotspots.**

- **Subsequent 802.16a standard supports low latency applications such as voice and video, and provides broadband connectivity without requiring direct line of sight between terminal and BTS**

- **Fixed WiMAX chipsets now launched (Intel/Fujitsu) – certified equipment available in volume from end 2005**

- **802.16e enhancement adds some mobility: full commercialisation not expected before 2007**

WiMAX Forum / industry sources

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Why WiMAX?

- **Low-cost, high-performance solution to deliver broadband wireless data:**
  - **One standard**
  - **Licensed & license-exempt spectrum**
  - **Global deployment**

- **New business opportunities for broadband services reaching developed, emerging and rural markets**

- **Designed to operate as a complementary network to 3G**

Source: WiMAX Forum

WLAN / WiMAX: complementary to 3G/UMTS

- **WLAN gives "hot spot" coverage**
- **WiMAX extends coverage to metropolitan area networks**
- **3G/UMTS gives full mobility**

• WLAN is useful for high-speed Internet/Intranet access for low mobility & stationary users (especially corporates)

• WLAN coverage of a major city may require typically approx 100:1 as many access points compared with number of UMTS base stations for equivalent coverage; WLAN also requires substantial investment in backhaul capacity

• Concerns regarding WLAN performance when hot spot capacity is shared by a large number of simultaneous users

• WiMAX – broadband wireless access (BWA) system for metropolitan area networks

•3G/UMTS offers benefits of wide area coverage, full mobility, integral security, roaming, full integration with charging/billing systems
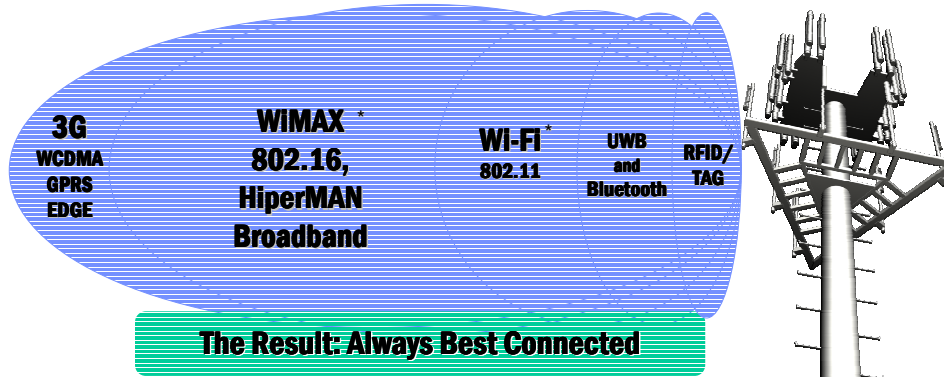
WLAN & WiMAX coupled/combined with 3G/UMTS/HSDPA will offer mobile broadband for EVERYBODY and EVERYWHERE, whatever the technology and access mode

Wireless Networks Will Co-Exist

Source: WiMAX Forum

WAN   MAN   LAN   PAN

3G
WCDMA
GPRS
EDGE

WiMAX *
802.16,
HiperMAN
Broadband

WI-FI *
802.11

UWB
and
Bluetooth

RFID/
TAG

The Result: Always Best Connected

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How do they compare?

Wireless broadband technologies

Technology	Availability	Standard	Total capacity (Mbps)	Typical capacity/speed per user (Mbps)	Typical maximum range (km)	Line of sight required?
Fixed WiMAX	End-05	IEEE 802.16-2004	70	2-10	10	Yes
Mobile WiMAX	End-06	IEEE 802.16e (draft standard)	70 per channel	2-3 portable, 1-2 mobile	5	Depends on band and application
HSDPA	End-05	3GPP	14	1-2	5	No
TDD	Deployed	3GPP	12	1-2	5	No

Sources: Ovum, 3G Mobile

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Visions of maximum bitrate evolution

Source: Nokia

		2004…2005	2006…2007	2007…2008	2008…10
Cellular Access	EDGE	UL 100-200 kbit/s DL 200-300 kbit/s			
	WCDMA	UL 384 kbit/s DL 384 kbit/s	HSDPA DL 3.6 Mbit/s	HSUPA/HSDPA UL 1…2Mbit/s DL 14 Mbit/s	HSDPA/HSUPA UL 5 Mbit/s
	CDMA2000	1xEV-DO DL 2.4Mbs UL 153kbs	1xEV-DO DL 3.1 Mbs UL 1.8 Mbs		
Broad band Access	WLAN	11…54 Mbit/s			
	802.16-2004 (WiMAX fixed)	14 Mbit/s			
	802.16-e (WiMAX nomadic/Mob)		estimated timing tbd bit/s	DL 14 Mbit/s	
	802.20 Standardisation still on-going				estimated timing ? tbd bit/s

M T S o r u m

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Comparative assessment of data rates and mobility for coexisting and complementary wireless access technologies
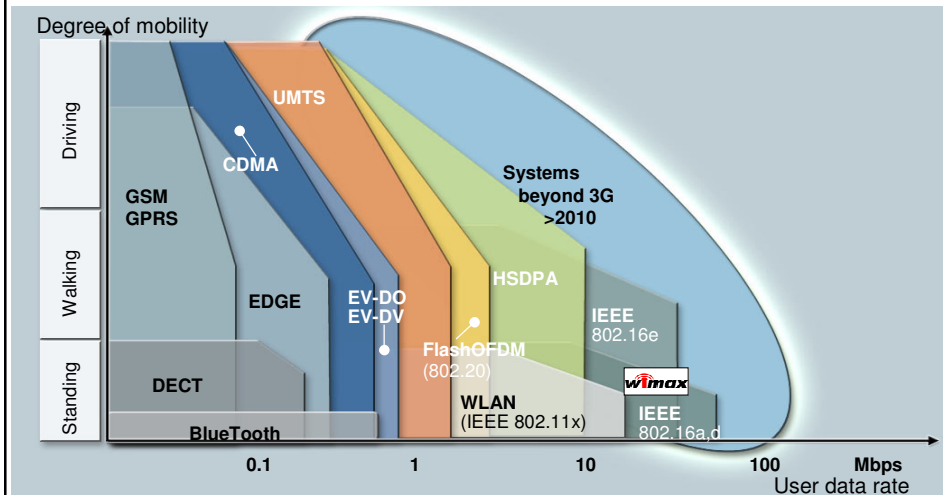
U M T S F o r u m

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Example strategy for integrated operator
(e.g. France Telecom / Orange)

- **Mobile/fixed integration**
  - **E.g. WiFi : hot spots Orange, pack WiFi Wanadoo**
  - **E.g. enterprise: 'Business Everywhere'**
  - **E.g. consumer: Videophone (fixed-mobile-internet)**

- **Continuing evaluation of future technologies…**
  - **after WiFi, WiMax with mobile?**
  - **DVB-H for receiving TV on mobile?**

Conclusions

- **3G/UMTS is already a commercial reality with more than 22 million subscribers on almost 70 networks worldwide**
- **3G/UMTS uses globally harmonised spectrum and builds on economies of scale of global GSM market (>1.3 billion customers), as well as offering clear future roadmap to higher bitrates via standardisation within 3GPP**
- **With HSDPA, mobile operators can significantly boost performance of WCDMA to achieve speeds comparable with FWA**
- **FWA systems such as WiMAX present a potentially valuable complement to operators' pure cellular portfolios**
- **WiMAX already enjoys significant vendor and operator interest, but:**
- **Globally harmonised spectrum for WiMAX has not yet been secured, and…**
- **Timing is everything: 802.16e specifications for WiMAX with some mobility will not be standardised before late 2005, in advance of commercialisation from 2006/2007**

For more information…

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