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

Regional Workshop for the Arab Region on Guidelines on the smooth transition of existing mobile networks to IMT-2000 for Developing Countries

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The 3G/UMTS Proposition

A complete, end-to-end mobile SYSTEM

- **Already more than 25 million 3G/UMTS customers subscribing to over 70 networks globally with choice of 160+ terminals**
- **More than 40 million 3G customers worldwide (UMTS + CDMA/EVDO)**
- **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**

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 complementary to 3G, WiMAX will provide a data-centric overlay network for 3G, with:
  - Spectral efficiency
  - Optimizing spectrum allocation
  - Leveraging bandwidth
  - Supporting advanced RF techniques

Source: WiMAX Forum

WiMAX Application Areas

- Wireless backhaul for hotspots, e.g. WiFi, cellular
  - for rapid deployment, cost effectiveness
  - backhaul solution for WiFi hotspot cluster (or hotzones)
  - Backhaul solution for GSM/UMTS BTS and NodeB
- Metropolitan area extension of WiFi hotspots
  - Provided terminals can support both WiFi and IEEE 802.16a/d or e
- Residential broadband connectivity
  - Filling DSL 'gaps' / competing directly with DSL
- Business broadband connectivity, especially SME's
- ...or a combination of all these

ENTERPRISE
Mobile Worker Services
Hotspot & SME Access
Quick Install
Private Networks

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

PUBLIC SERVICE
Government and
Emergency Services

EMERGING
Data Last Mile
Fixed and Wi-Fi Backhaul
Lowest Cost Broadband

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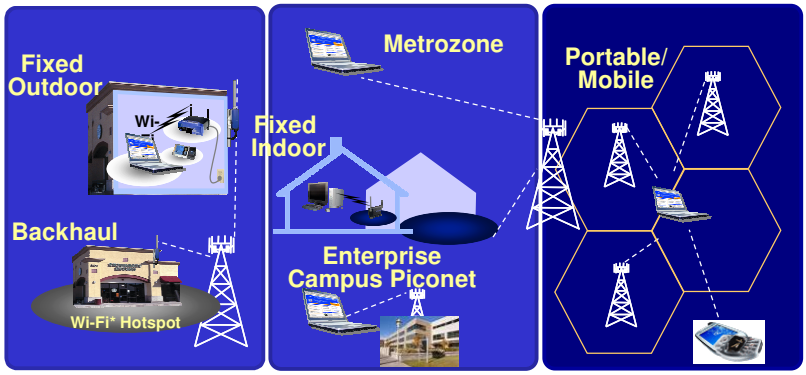
WiMAX Services & Applications Roadmap

2005: Fixed Outdoor
- –E1/T1 level service for enterprises
- –Backhaul for hotspots
- –Limited residential broadband access

2006 (16d): Fixed Indoor
- –Indoor 'last mile' access for consumers
- –Wireless DSL
- –Metrozone / Enterprise campus piconet

2007/2008 (16e): Portable/Mobile
- - 'Portable' broadband access for consumers
- - Always best connected



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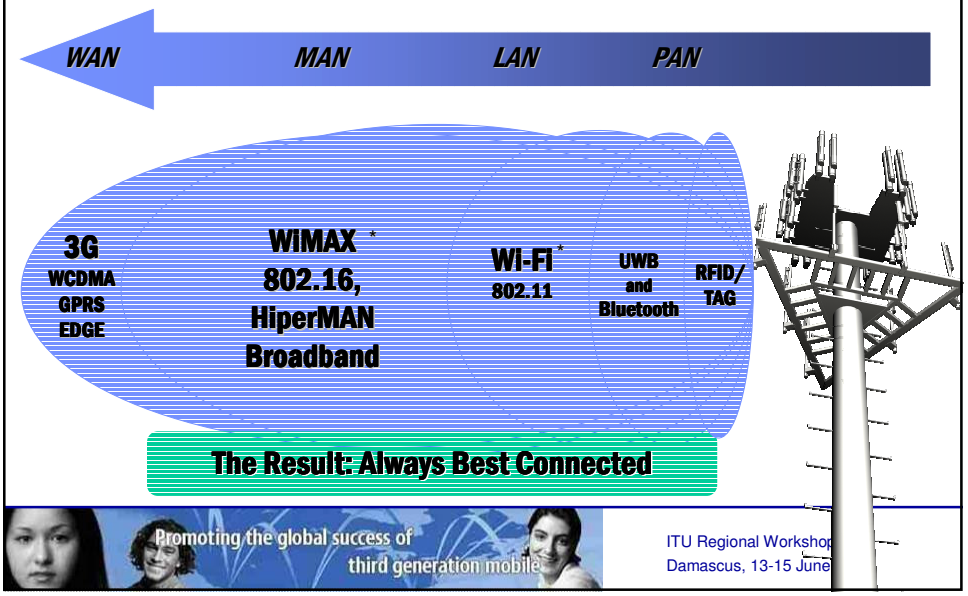
Wireless Networks Will Co-Exist

Source: WiMAX Forum



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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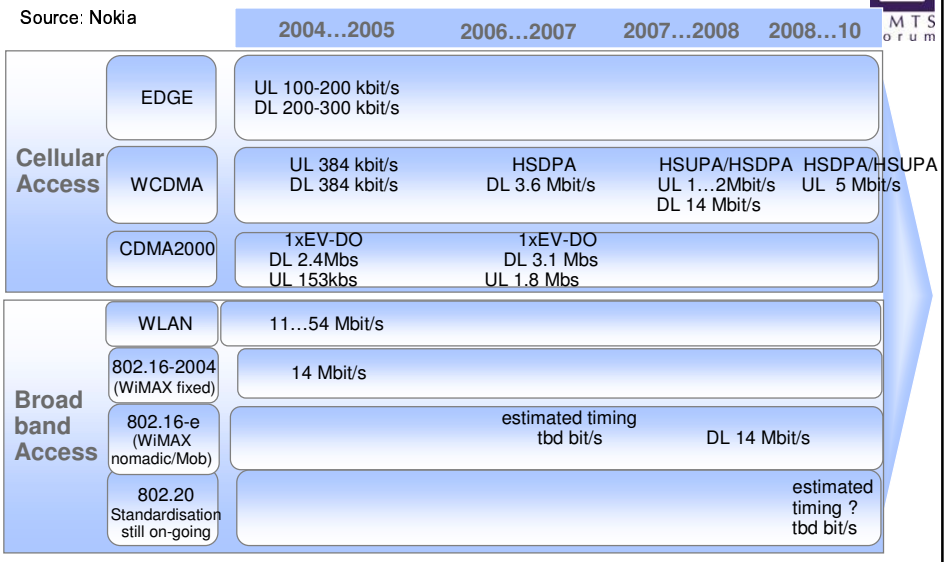
Visions of maximum bitrate evolution

Source: Nokia



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**

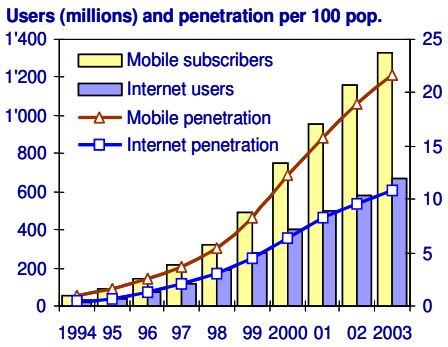
WLAN & WiMAX coupled/combined with 3G/UMTS/HSDPA will offer mobile broadband for EVERYBODY and EVERYWHERE, whatever the technology and access mode

FWA: a complement to operator portfolios

- 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.

Portable Internet characteristics

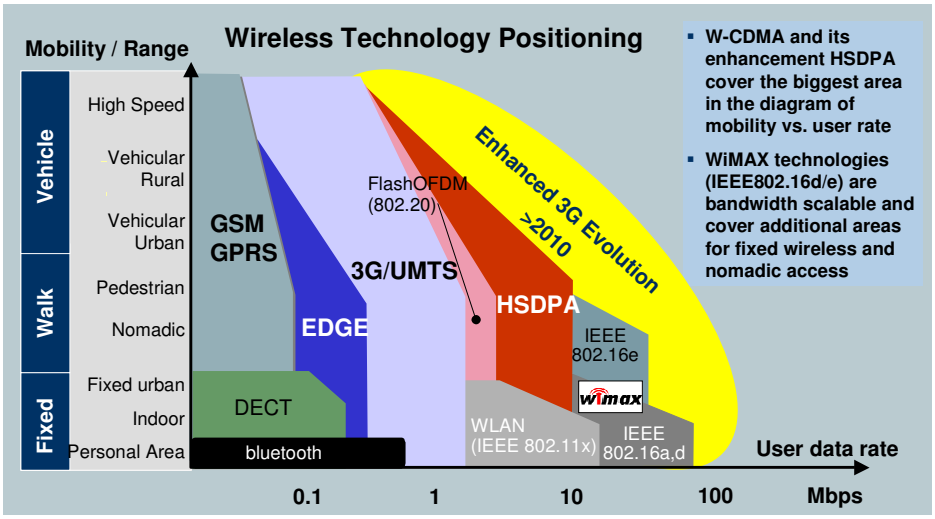
- Portable
  - Based on advanced wireless technologies, including 3G mobile and Wireless LAN
- High-Speed
  - Providing speeds of at least 256 kbit/s up to >50 Mbit/s
- Large Storage
  - Multi-gigabyte storage capacity allowing storage of movies, music, files etc
- Everything over IP
  - Allowing digital data exchange between services and apps



"Virtually all of the growth in the global telecoms sector over the past decade has come from mobile communications and the Internet"

Source: ITU

WiMAX as standardized solution is a promising complementary technology to UMTS / HSDPA



- W-CDMA and its enhancement HSDPA cover the biggest area in the diagram of mobility vs. user rate
- WiMAX technologies (IEEE802.16d/e) are bandwidth scalable and cover additional areas for fixed wireless and nomadic access

Conclusions

- 3G/UMTS is already a commercial reality with more than 25 million subscribers on over 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 2006, in advance of commercialisation from 2007/2008

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