**3G/UMTS: an evolutionary path
to Next Generation Networks –
perspectives for the Arab Region**

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www.umts-forum.org

Summary

• **About the UMTS Forum**

• **3G/UMTS update – networks, terminals, services**

• **Towards next generation networks:**

  • **Complementary technologies**

  • **A look to the future: 3G/UMTS evolution**

• **Perspectives for the Arab Region**

About The UMTS Forum

Who are we?

➢ **An international, cross-sector industry body comprising operators, manufacturers, regulators, application developers, research organisations and IT industry players.**

Our mission…

➢ **To promote a common vision of the development of 3G/UMTS and of its evolutions, and to ensure its worldwide commercial success.**

Our publications

➢ **Since 1997, more than 40 reports on Spectrum & Regulation, 3G/UMTS vision, Customer behaviour, Market evolution & Forecasts, Technical studies & Implementation. Recent issues: Strategic Considerations for IMS – the 3G Evolution, Coverage Extension Bands for UMTS/IMT-2000 in the bands between 470-600 MHz, Magic Mobile Future 2010-2020…**

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2005: The year of mass-market commercialisation for 3G

Some **big** numbers…

more than **50 million** 3G subscribers worldwide (W-CDMA + CDMA2000 1xEV-DO) by Mid-Sept '05

more than **100** W-CDMA networks launched by Nov '05

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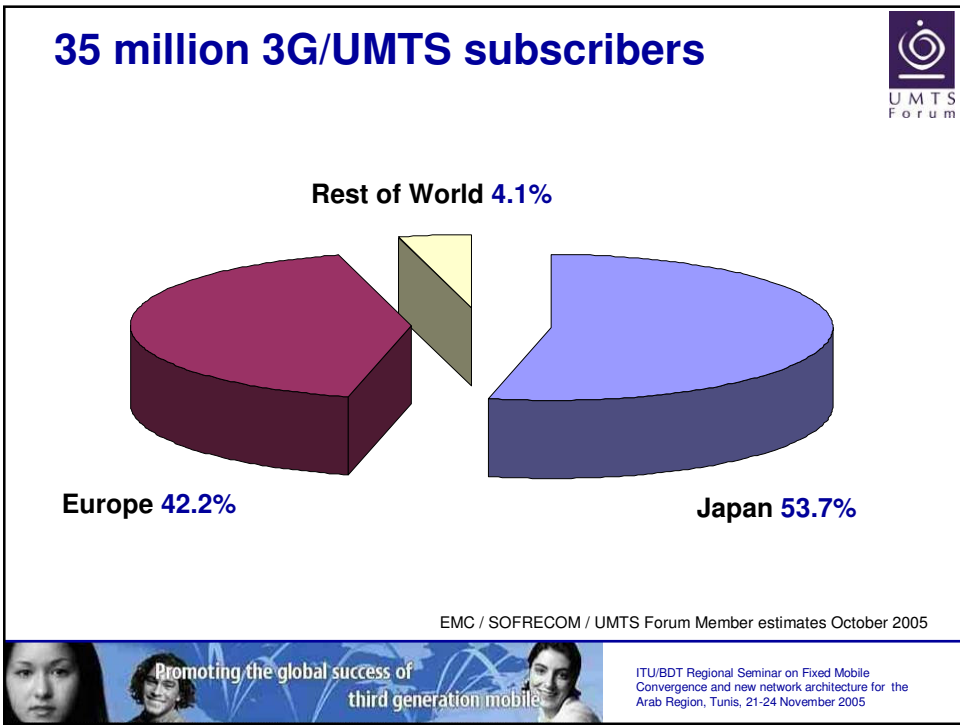
3G/UMTS global update

- 100+ W-CDMA networks in commercial service in over 40 countries with many others in trial/pre-launch (October 2005)
- Over 35 million 3G/UMTS subscribers (October 2005) out of a global total exceeding 50 million 3G customers (WCDMA + EV-DO)
- 130+ 3G/UMTS licenses awarded in 45 countries
- W-CDMA take-up faster than GSM at the same stage

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35 million 3G/UMTS subscribers

Rest of World 4.1%

Europe 42.2%

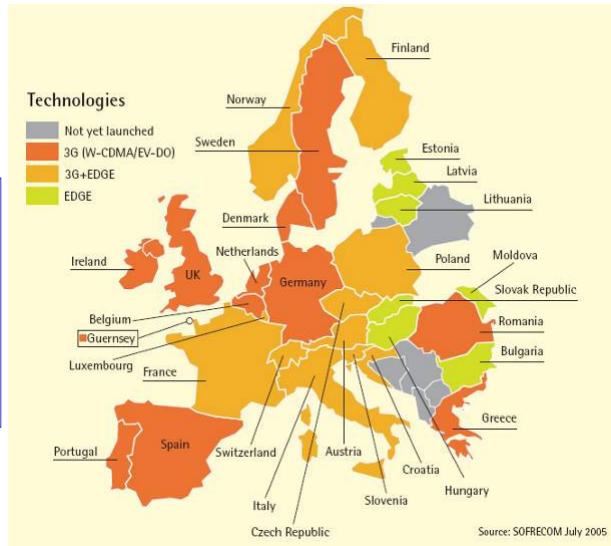**Japan 53.7%**

EMC / SOFRECOM / UMTS Forum Member estimates October 2005

Complementary strategies in Europe

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Several European operators are offering mobile broadband via a complementary mix of 3G/UMTS and other technologies including EDGE

Technologies
- Not yet launched
- 3G (W-CDMA/EV-DO)
- 3G+EDGE
- EDGE

Finland
Norway
Sweden
Estonia
Latvia
Lithuania
Denmark
Netherlands
Poland
Moldova
Ireland
UK
Germany
Slovak Republic
Belgium
Guernsey
Romania
Luxembourg
France
Bulgaria
Greece
Portugal
Spain
Switzerland
Austria
Croatia
Slovenia
Hungary
Italy
Czech Republic

Source: SOFRECOM July 2005

A global picture

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Ukraine
Canada
Russia*
USA
Kazakhstan
Tajikistan
Japan
South Korea
Barbados
Cayman Is.
Virgin Is.
Bermuda*
Puerto Rico*
EUROPE
Turkey
Israel
China
Algeria
Mexico
Guatemala*
Kuwait
UAE
Bahrain
Jordan
India*
Thailand
Hong Kong
Taiwan
Philippines
Venezuela*
Colombia
Ecuador
Peru
Bolivia
Brazil*
Sri Lanka
Bangladesh
Singapore
Malaysia
Indonesia*
Chile*
Paraguay
Australia
New Zealand*
Uruguay
South Africa
Mauritius
Argentine

technos
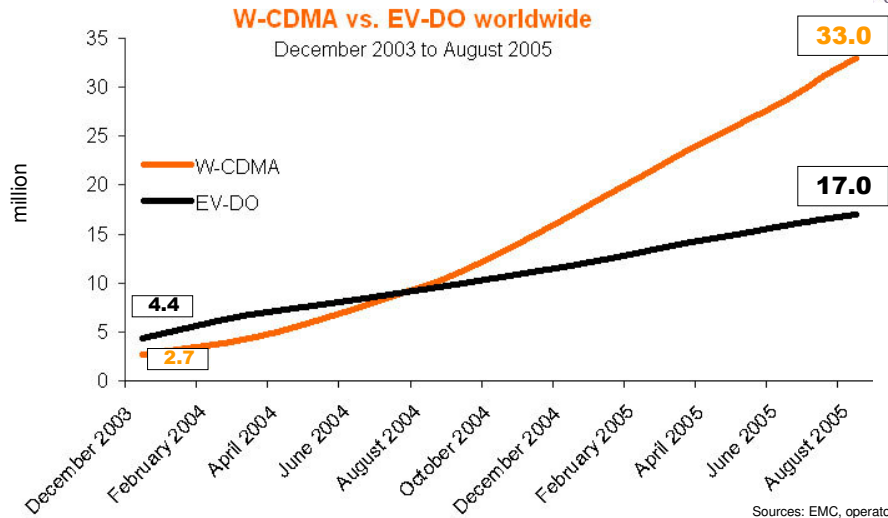- Not yet launched
- 3G (W-CDMA / EV-DO)
- EDGE
- 3G+EDGE

Source: Sofrecom (20th July 2005)
(*) 3G deployments are only based on CDMA2000 1x-EV-DO in these countries: Russia, India, Bermuda, Brazil, Chile, Guatemala, Indonesia, New Zealand, Puerto Rico and Venezuela.

50 million 3G customers worldwide
W-CDMA now exceeds EV-DO by a factor of 2 (Sep.05)

W-CDMA vs. EV-DO worldwide
December 2003 to August 2005

33.0

17.0

4.4

2.7

Sources: EMC, operators

3G/UMTS Terminals

- **Over 185 3G/UMTS terminals and PC cards (09.05) commercially available or announced by a growing range of European, Asian and US manufacturers**
- **Latest models compare with 2G handsets in terms of battery life, weight and size**
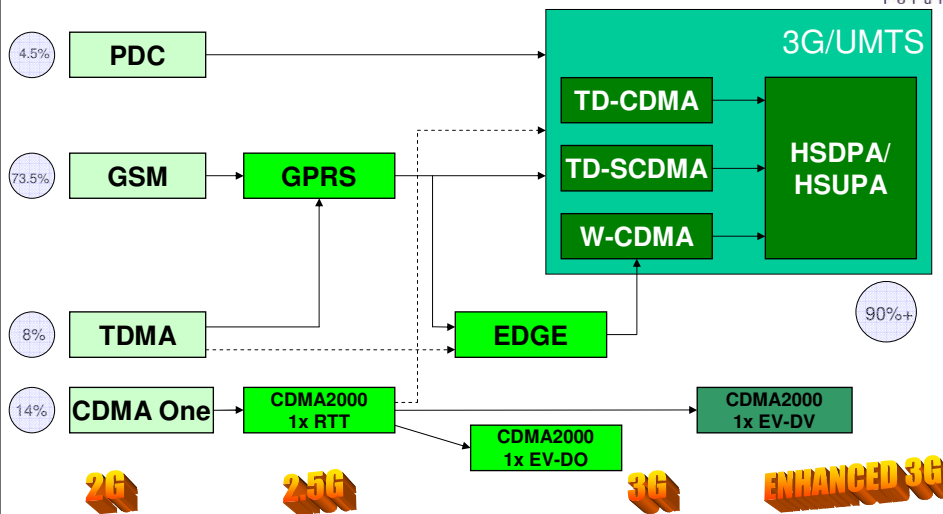
A clear roadmap

As a complete mobile *system* standardised in 3GPP, 3G/UMTS offers a clearly-defined evolutionary path to higher data speeds, greater capacity and increased functionality to support new services

• **3GPP Release 6** enhances earlier iterations to bring customers a step closer to the complete "3G experience"

• **High Speed Packet Access** (HSPA) maximises operators' available spectrum resources, offering high symmetrical data rates and reduced latency, while reducing delivery costs per bit

• **Phase II** of the IP Multimedia Subsystem (**IMS**) ensures smooth interworking with other core networks, and enables operators to offer multimedia services built on Internet applications, services and protocols

• **Interworking with WLAN** gives users the greatest flexibility in choosing how they communicate

• **plus MBMS, enablers for Push to talk over Cellular (PoC)** *and more…*

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3G Operator Evolution Options

3G/UMTS

4.5% — **PDC**

73.5% — **GSM** → **GPRS**

8% — **TDMA**

14% — **CDMA One** → **CDMA2000 1x RTT** → **CDMA2000 1x EV-DO** → **CDMA2000 1x EV-DV**

EDGE

TD-CDMA
TD-SCDMA
W-CDMA

HSDPA/ HSUPA

90%+

2G   **2.5G**   **3G**   **ENHANCED 3G**

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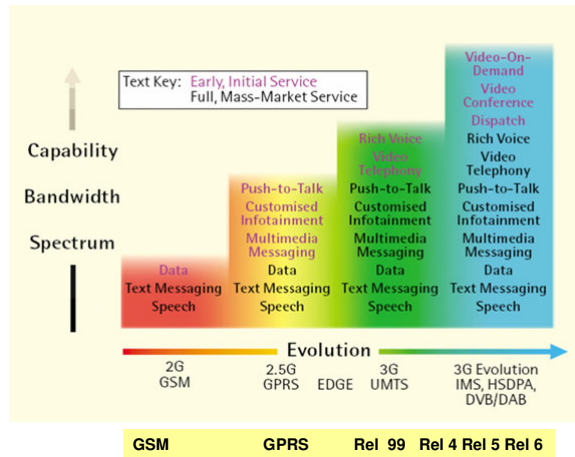
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3G/UMTS service evolution roadmap

Text Key: Early, Initial Service
Full, Mass-Market Service

Capability

Bandwidth

Spectrum

Video-On-Demand
Video Conference
Dispatch
Rich Voice
Video Telephony
Push-to-Talk
Customised Infotainment
Multimedia Messaging
Data
Text Messaging
Speech

Rich Voice
Video Telephony
Push-to-Talk
Customised Infotainment
Multimedia Messaging
Data
Text Messaging
Speech

Push-to-Talk
Customised Infotainment
Multimedia Messaging
Data
Text Messaging
Speech

Data
Text Messaging
Speech

Evolution

| 2G GSM | 2.5G GPRS | EDGE | 3G UMTS | 3G Evolution IMS, HSDPA, DVB/DAB |

| GSM | GPRS | | Rel 99 | Rel 4 Rel 5 Rel 6 |

Future enhancements to UMTS (3GPP Release 5 & 6):

• HSDPA (High speed downlink packet access) increases downlink speeds to 14.4 Mbps, and 5.8 Mbps for HSUPA (uplink)

• IP multimedia subsystem (IMS) provides advanced IP capabilities for mobile multimedia services

• Multimedia Broadcast / Multicast Service (MBMS)

• Interworking with other networks such as DAB and DVB will take advantage of content offerings that can be delivered efficiently to mobile devices

New services and applications are already being introduced on today's 2G and 2.5G networks, giving operators and customers an early taste of the capabilities of 3G/UMTS

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HSDPA

The next step in evolution of the 3GPP air interface

HSDPA = high speed mobile broadband, enabling a wide variety of high bandwidth multimedia services including:

- high quality streaming video,

- fast downloads of high resolution images and large files,

- interactive e-mails & gaming,

- telematics,…

Compared with WCDMA, HSDPA:

1. increases throughput ($2\rightarrow14.4$ Mbps): total and average per user

2. reduces latency

3. increases data capacity up to 5x in dense urban environments (micro-cells)

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HSDPA System Architecture

AMC = Adaptive Modulation and Coding
MAC = Medium Access and Coding

Core Network

Radio Network Controller (RNC)

To other RNCs

Base Station (NodeB)

Fast Layer1 Scheduling, AMC and H-ARQ

To other NodeBs

In UMTS Release 99, entire MAC resides in RNC (i.e. slow scheduling and feedback)

Fast Layer1 ACK/NACK and Channel Quality Feedback (CQI)

Terminal (UE)

In Release 5 HSDPA, key MAC functions (MAC-HS) reside in the NodeB (i.e. fast scheduling and feedback)

Upgrading from Release 99 WCDMA to HSDPA is smooth since – from an air-interface perspective – HSDPA can coexist on the same RF carrier with Rel.99 WCDMA; only Node B (base station) is affected.

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HSDPA: the evolutionary path towards mobile broadband services for 3G Operators

3G mobile operators face a number of challenges…

- **How to reduce costs per Megabyte**
- **How to unleash 3G W-CDMA business to achieve its full potential**
- **How to create attractive services for lucrative user segments**
- **How to compete against or complement other service providers, e.g. WLAN hot spot providers**

… that can be addressed by High Speed Downlink Packet Access

Source: Siemens/UMTSF workshop July '05

Market trend

Traffic

ARPU

Cost per bit

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Making the business case (1)

HSDPA reduces network delivery costs per bit

HSPA increases data capacity of 3G/UMTS networks by a factor of 5, offering a reduced network cost for data services. Average cost per Mbyte in USD (source Analysis Research):

- GSM/GPRS:	**0.09**
- EDGE:	**0.04**
- UMTS/WCDMA:	**0.02**
- UMTS/HSDPA:	**0.01**

Smooth, seamless upgrade at incremental cost

• **Implementation of HSDPA is achieved via a simple overlay, which in most cases is only a software upgrade in the RAN with no additional sites, plus use of same carrier for voice and data.**

• **HSDPA can be smoothly implemented in co-existence with already deployed UMTS/WCDMA networks.**

• **Most equipment shipped today is already HSDPA compliant.**

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Making the business case (2)

- **Deploying HSDPA requires:**
    - **New Node B and RNC software**
    - **Additional Node B processing hardware**

- **Deploying HSDPA _does not_ require:**
    - **Changes to network architecture**
    - **Introduction of new network elements**
    - **Equipment to be changed out**
    - **New frequency allocations**

- **The cost of upgrading an existing 3G network with HSDPA is << than the cost of deploying a new network to support Wireless Broadband services**

> **_"HSDPA is the most cost effective network for the delivery of Mobile Broadband services" – O2_**

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The first wave…
Operators in Europe, Asia Pacific and USA that have announced their HSDPA plans

EUROPE
- Orange (France, UK)
- T-Mobile
- Mobilkom Austria
- Hutchison 3G
- O2
- Vodafone
- SFR
- Bouygues
- Telenor
- Telfort
- TEM
- TIM

ASIA PACIFIC
- NTT DoCoMo
- Vodafone KK
- KTF
- SKT
- Telstra

NORTH AMERICA
- Cingular AT&T

Announcements suggest HSDPA launches in 2006… plus HSUPA launches from 2007

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IMS (IP Multimedia Subsystem)

✓ **REAL TIME…**

✓ **PERSON TO PERSON…**

✓ **MULTIMEDIA…**

✓ **MULTIPLE, SYNCHRONISED SERVICES**

- Simultaneous delivery of multiple real-time services

- An enhanced person-to-person communication experience with interactivity and integration of services

- A standardized solution across fixed and mobile networks

- A cost-effective enabling technology for service differentiation and new revenue opportunities

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Why IMS?

• IMS provides a **flexible architecture** for the rapid deployment of innovative features. It enables users to communicate with video/voice/text via a **single client on the handset**

• Vision for the IMS core network is **maximum flexibility and independence** from the access technologies. This is accomplished in part via the **separation of access, transport and control**
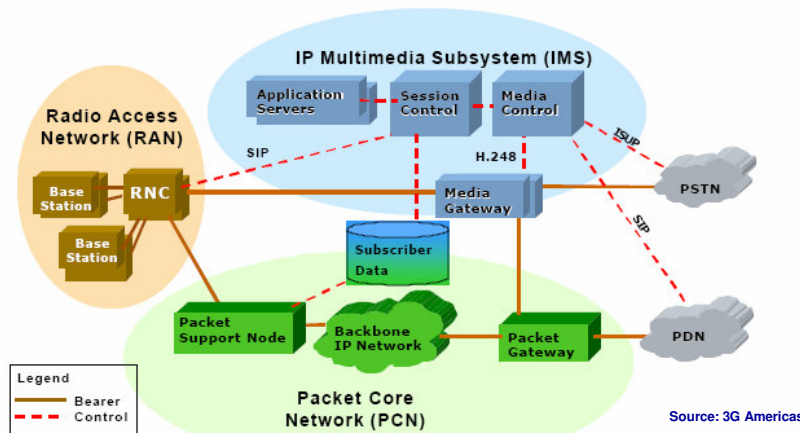
• IMS enables support for IP multimedia applications within the 3G/UMTS system

• IMS enables mobile operators to offer their subscribers multimedia services, built upon Internet applications, services and protocols, including SIP (Session Initiation Protocol), which is used to manage IP multimedia sessions

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Upgrading to IMS

IP Multimedia Subsystem (IMS)

Application Servers — Session Control — Media Control

Radio Access Network (RAN)

SIP — H.248 — ISUP

Base Station — RNC — Media Gateway — PSTN

Base Station

Subscriber Data

SIP

Packet Support Node — Backbone IP Network — Packet Gateway — PDN

Legend
— Bearer
- - - Control

Packet Core Network (PCN)

Source: 3G Americas

IP -Internet Protocol
ISUP -Integrated Services digital network User Part
PDN -Packet Data Network

PSTN -Public Switched Telephone Network
RNC -Radio Network Controller
SIP -Session Initiation Protocol

Upgrading to IMS separates radio access, transport and control elements, with the IMS handling control of applications, control of sessions, and media conversion

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IMS: The Platform for Convergence

- **IMS offers the platform for 3G evolution and mobile-fixed convergence**
- **Mobile SIP-based IMS is at the heart of both 3GPP (GSM evolved) and 3GPP2 (CDMA evolved) networks…**
- **… so this is not simply a European view …**
- **… tomorrow's _entire_ multimedia mobile world will be IMS-based**
- **SIP based IMS means IP end-to-end:**
  - **Applications and services can be supported seamlessly across all networks**
- **SIP is also at the heart of the Internet**

Wireless Networks Will Co-Exist

Source: WiMAX Forum
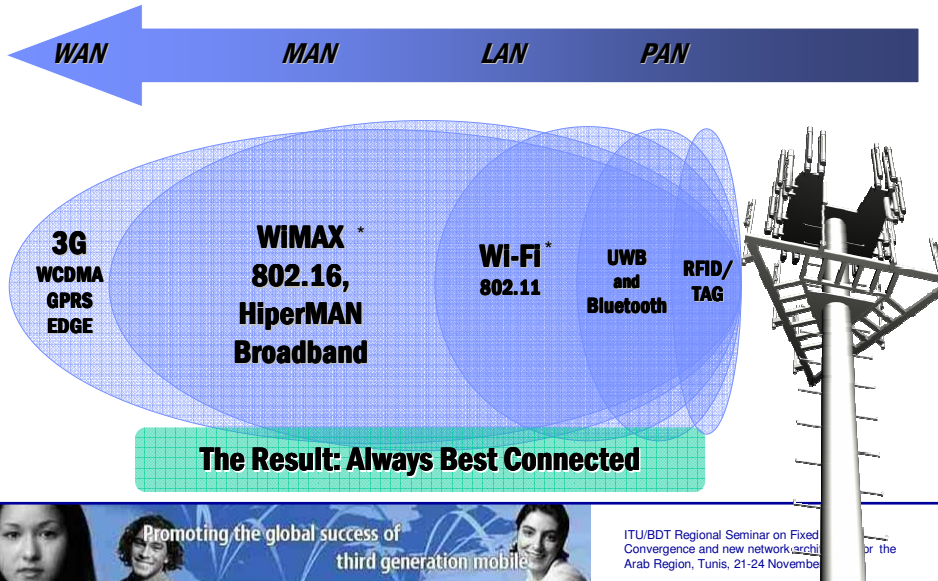
WAN   MAN   LAN   PAN

3G
WCDMA
GPRS
EDGE

WiMAX *
802.16,
HiperMAN
Broadband

Wi-Fi *
802.11

UWB
and
Bluetooth

RFID/
TAG

The Result: Always Best Connected

Technologies by range

FIGURE 1 Technologies By Range

Sensing	Synchronization USB Replacement	Voice Data	Bridging Access	Voice Data Messaging
Sensor Networks — RFID Near-Field	WPANs — Bluetooth	WLANs — 802.11a/b/g 802.11n	WMANs — Proprietary	WWANs — 1XRTT 1xEV-DO/DV UMTS

802.15.4 Zigbee — UWB — Metro-Mesh Networking — WiMAX 802.16e

Increasing Distance →
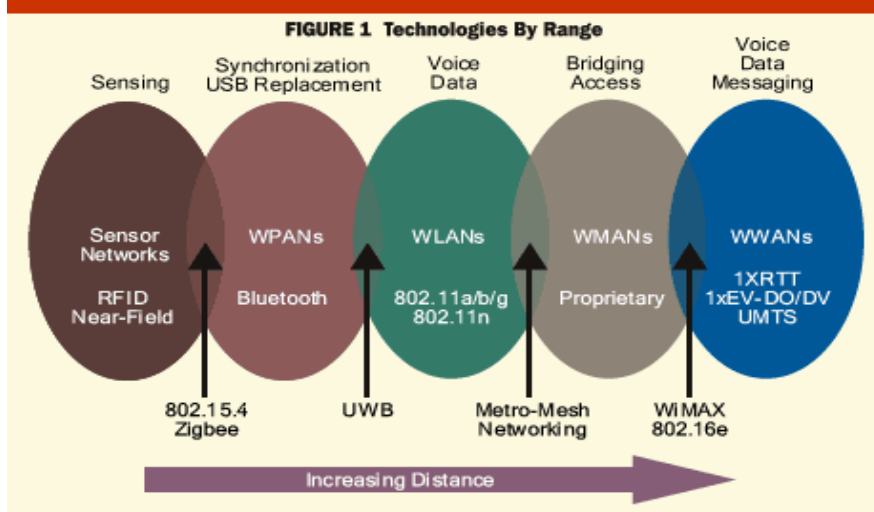
How do they compare?

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

WiMAX Services & Applications Roadmap

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

2006 (802-16d): Fixed Indoor
- Indoor 'last mile' access for consumers
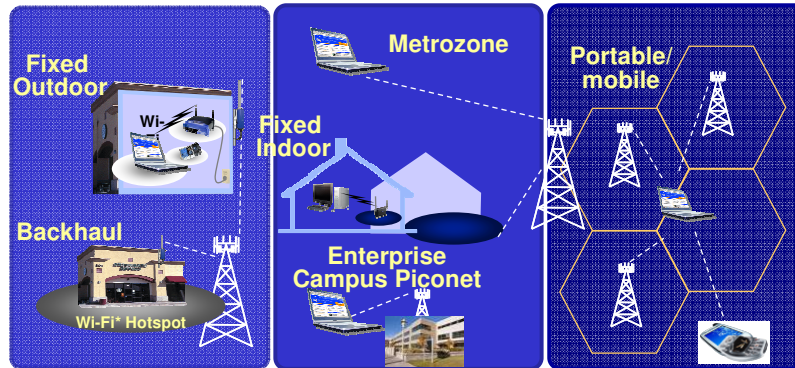- Wireless DSL
- Metrozone / Enterprise campus piconet

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

Fixed Outdoor

Metrozone

Portable/ mobile

Wi-

Fixed Indoor

Backhaul

Enterprise Campus Piconet

Wi-Fi* Hotspot

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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/HSPA will offer mobile broadband for EVERYBODY and EVERYWHERE, whatever the technology and access mode

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14

Mobile Broadcast Service Categories

Passive Mobile TV	Interactive Mobile TV	Buffered Personalised Infotainment	Multiplayer Online Games	Location Based Traffic Guide
Scheduled TV Programme Video Streaming	Scheduled Programme with Return Channel for Interactivity	News, Magazine, Learning Lessons, Movie Guide, Local Event Guide	Quiz, Role-play, Strategy-, Sport-, Adventure-Games	Car Navigation Support with Real-time Traffic Information
No Interactivity	Interactivity enabled	Interactivity enabled	Interactivity enabled	Interactivity enabled

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Mobile broadcast technologies (1)

Technologies overview

- **Mobile TV and video services, which allow users to watch digital TV channels and video clips on their mobile phones, raise increasing interest & market appeal**
- **Wireless networks will be improved with broadcasting capability in the future. There are several options to deliver broadcast content**

- **Terrestrial technologies**
    - **MBMS (Multicast & Broadcast Multimedia Services): IP DataCast type services, offered via existing GSM/UMTS networks, enabling the provisioning of multimedia download services and video streaming**
    - **DVB-H (Digital Video Broadcasting – Handheld): new digital broadcast standard for the transmission of broadcast content to handheld terminal devices, adopted as an ETSI standard**
    - **T-DMB (Terrestrial Digital Multimedia Broadcast): developed in Korea to deliver mobile television services**
    - **MediaFLO: proprietary system developed by Qualcomm, as an end-to-end solution to deliver broadcast services to handheld receivers using OFDM**

- **Satellite based technologies**
    - **S-DMB (Korean system): same target as T-DMB, utilizing networks built with satellites, but requiring Gap Fillers in addition, to provide in-building coverage**
    - **S-DMB (European system): innovative S-DMB technology focusing on an architecture based on a satellite broadcast layer to enhance 3G and evolved 3G systems in the delivery of MBMS**

Mobile broadcast technologies (2)
Adding value to the 3G/UMTS user experience

- **3G/UMTS launches are stimulating greater demand for live TV and video downloads**
- **'One to many' broadcast transmission of multimedia content promises to deliver an enhanced 3G/UMTS user experience, with more efficient use of finite spectrum resources**
- **'MBMS' enabling Broadcast and Multicast modes is specified in 3GPP**
- **In parallel with this, trials based on the DVB-H standard (proposed by ETSI and based on existing terrestrial broadcasting standards) are already underway**
- **First DVB-H handsets expected within next 12 months**

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DVB-H and MBMS Serve Complementary Needs

MBMS	DVB-H
0-64 kbps	**64-512 kbps**
"Cost optimizing"	**"Service enabling"**
MMS info & streaming Goal of the Day, mLearning, Real-time traffic info, News, Weather,..	**TV with/without interaction / Pervasive multiplayer games Movie Trailers / City Guide**

- **MBMS is a feature for GERAN/UTRAN**
- **DVB-H-operates within 174-862 MHz**

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3G/UMTS Evolution: basic principles

- **HSPA is the first progressive step toward delivering 'triple play' (telephony, broadband and TV) in a mobile broadband environment**
- **Likely acceptance of mobile broadband and mobile triple play will raise the need for evolved UMTS; therefore it is vital that operators ensure the long term competitiveness of 3G infrastructure**
- **The 3GPP RAN long term evolution task force was created at end 2004, notably considering the 'Super 3G' proposal of NTT DoCoMo**
- **The proposed RAN architecture, placing increasing functionality within the NodeB, will be based on IP routing with existing 3G spectrum, providing speeds up to 100 Mbps by using channel – transmission bandwidth between 5MHz and 20MHz**
- **3GPP Evolved UMTS specifications should target availability of commercial products around 2010**

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3G/UMTS Evolution (1)
A look to the future

	3G and Enhanced 3G			4G
	R'99/R'4	**Midterm evolution**	**Super 3G**	**New mobile access**
Spectrum	3G spectrum (2GHz band and the additional bands)			New spectrum
Radio aspect	WCDMA	HSDPA, EDCH, etc.	Ultimate enhancement	New radio interface
Radio access	Direct-sequence CDMA		New access such as OFDM, MIMO, etc.	New access technology
Min. TTI (latency)	10ms	2ms	<0.5ms	<0.5ms
Carrier bandwidth	5MHz		5-20MHz, Fit in 5MHz	100MHz
Data rate	384Kbps-2Mbps	14Mbps	30-100Mbps	100Mbps-1Gbps
Network aspect	CS and PS		PS only	
	GTP (tunneling) [IP routing in core network]		IP routing in core network and RAN	

Source: NTT DoCoMo

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Slide 1

3G/UMTS Evolution (2)
UMTS / HSDPA in context of other wireless technologies

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Wireless Technology Positioning

Mobility / Range

- Vehicle
  - High Speed
  - Vehicular Rural
  - Vehicular Urban
- Walk
  - Pedestrian
  - Nomadic
- Fixed
  - Fixed urban
  - Indoor
  - Personal Area

GSM GPRS

EDGE

DECT

bluetooth

FlashOFDM (802.20)

3G/WCDMA

HSDPA

Enhanced 3G Evolution >2010

IEEE 802.16e

wimax

WLAN (IEEE 802.11x)

IEEE 802.16a,d

User data rate

0.1   1   10   100   Mbps

- 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

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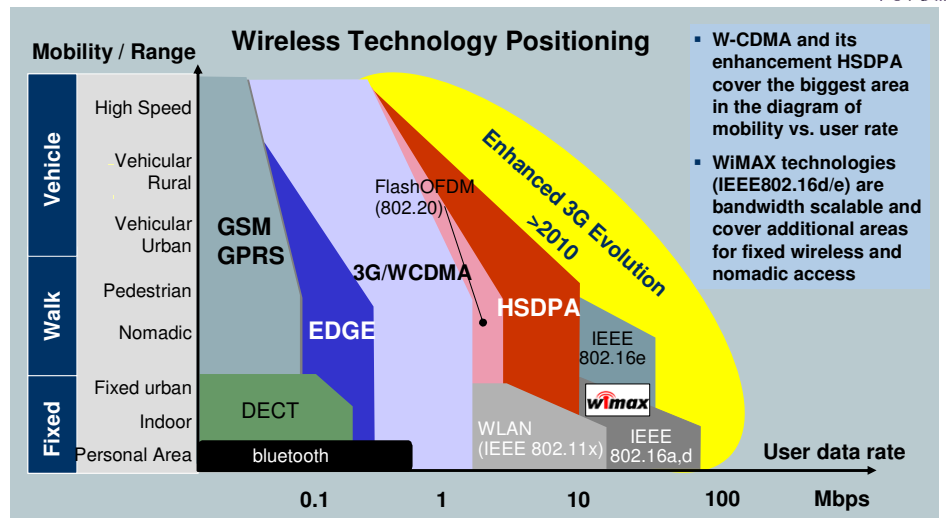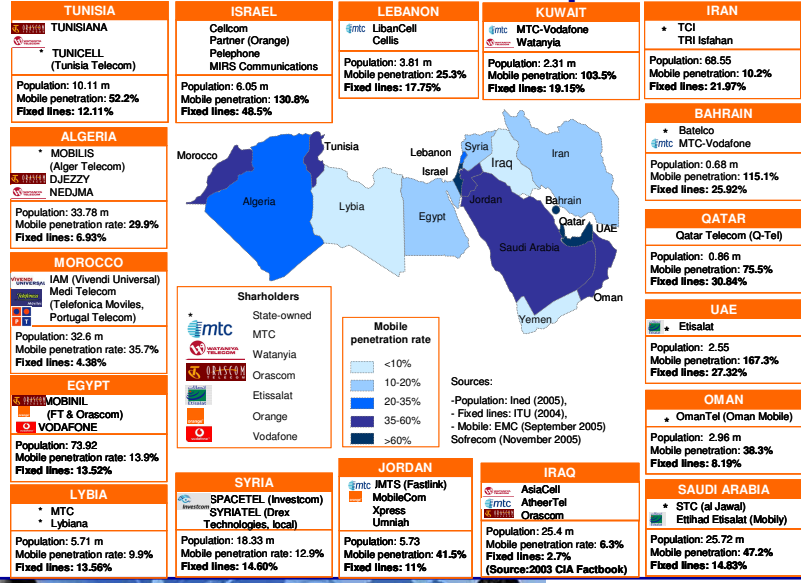
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Slide 2

MENA – the mobile landscape (Sept 2005)

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TUNISIA
TUNISIANA
* TUNICELL (Tunisia Telecom)
Population: 10.11 m
Mobile penetration: 52.2%
Fixed lines: 12.11%

ALGERIA
* MOBILIS (Alger Telecom)
DJEZZY
NEDJMA
Population: 33.78 m
Mobile penetration rate: 29.9%
Fixed lines: 6.93%

MOROCCO
IAM (Vivendi Universal)
Medi Telecom (Telefonica Moviles, Portugal Telecom)
Population: 32.6 m
Mobile penetration rate: 35.7%
Fixed lines: 4.38%

EGYPT
MOBINIL (FT & Orascom)
VODAFONE
Population: 73.92
Mobile penetration rate: 13.9%
Fixed lines: 13.52%

LYBIA
* MTC
* Lybiana
Population: 5.71 m
Mobile penetration rate: 9.9%
Fixed lines: 13.56%

ISRAEL
Cellcom
Partner (Orange)
Pelephone
MIRS Communications
Population: 6.05 m
Mobile penetration: 130.8%
Fixed lines: 48.5%

SYRIA
SPACETEL (Investcom)
SYRIATEL (Drex Technologies, local)
Population: 18.33 m
Mobile penetration rate: 12.9%
Fixed lines: 14.60%

LEBANON
LibanCell
Cellis
Population: 3.81 m
Mobile penetration: 25.3%
Fixed lines: 17.75%

JORDAN
JMTS (Fastlink)
MobileCom
Xpress
Umniah
Population: 5.73
Mobile penetration: 41.5%
Fixed lines: 11%

KUWAIT
MTC-Vodafone
Watanya
Population: 2.31 m
Mobile penetration: 103.5%
Fixed lines: 19.15%

IRAQ
AsiaCell
AtheerTel
Orascom
Population: 25.4 m
Mobile penetration rate: 6.3%
Fixed lines: 2.7%
(Source:2003 CIA Factbook)

IRAN
* TCI
TRI Isfahan
Population: 68.55
Mobile penetration: 10.2%
Fixed lines: 21.97%

BAHRAIN
* Batelco
MTC-Vodafone
Population: 0.68 m
Mobile penetration: 115.1%
Fixed lines: 25.92%

QATAR
Qatar Telecom (Q-Tel)
Population: 0.86 m
Mobile penetration: 75.5%
Fixed lines: 30.84%

UAE
* Etisalat
Population: 2.55
Mobile penetration: 167.3%
Fixed lines: 27.32%

OMAN
* OmanTel (Oman Mobile)
Population: 2.96 m
Mobile penetration: 38.3%
Fixed lines: 8.19%

SAUDI ARABIA
* STC (al Jawal)
Ettihad Etisalat (Mobily)
Population: 25.72 m
Mobile penetration: 47.2%
Fixed lines: 14.83%

Morocco, Tunisia, Lebanon, Syria, Iran, Israel, Iraq, Algeria, Lybia, Egypt, Jordan, Bahrain, Qatar, UAE, Saudi Arabia, Oman, Yemen

Sharholders
* State-owned
MTC
Watanya
Orascom
Etissalat
Orange
Vodafone

Mobile penetration rate
<10%
10-20%
20-35%
35-60%
>60%

Sources:
-Population: Ined (2005),
- Fixed lines: ITU (2004),
- Mobile: EMC (September 2005)
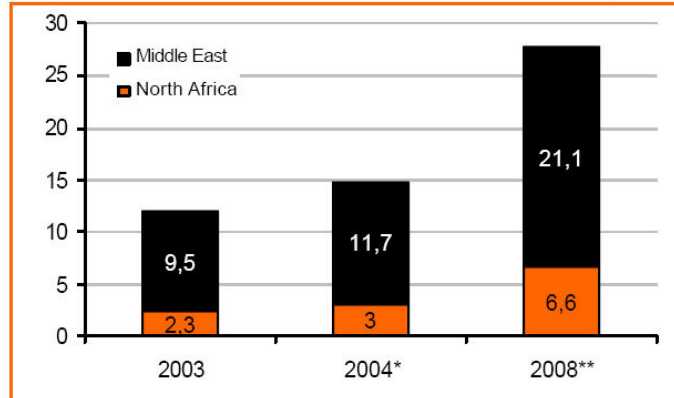Sofrecom (November 2005)

Promoting the global success of third generation mobile

ITU/BDT Regional Seminar on Fixed Mobile Convergence and new network architecture for the Arab Region, Tunis, 21-24 November 2005

A growing market

Trends in MENA mobile service revenues, 2001-2008 (US$bn)

- Middle East
- North Africa

Year	North Africa	Middle East
2003	2,3	9,5
2004*	3	11,7
2008**	6,6	21,1

Source: IDATE (* estimate ** forecast)

- **MENA mobile market anticipated to more than double between 2004 & 2008**
- **Growth in terms of volume and subscribers**

Towards 3G – country status (Nov 2005)

Middle East	Technology	3G status	Comments
Bahrain	GSM / EDGE	MTC-Vodafone EDGE / WCDMA (Dec-03) Batelco deploying EDGE / WCDMA	No launch date released for Batelco
Israel	GSM / GPRS CDMA iDEN	Peplephone CDMA 2K EV-DO (September-04) Cellcom WCDMA (June-04) Partner WCDMA (December-04)	MIRS operates an iDEN network. No information released about 3G upgrade
Jordan	GSM iDEN	Mobilcom EDGE in deployment	Fastlink has applied for a 3G licence
Kuwait	GSM/EDGE	MTC-Vodafone EDGE (end-04) WCDMA trials Wataniya EDGE launch (March-05)	MTC & Motorola 3G trials
Qatar	GSM	Roll-out WCDMA (end 2005)	Monopoly
Saudi Arabia	GSM	Etilsalat EDGE trials (March-05) WCDMA in deploylment	STC state owned is autorisied to deploy a 3G network
Syria	GSM	no lience attribution project for the moment	-
UAE	GSM	Etilsalat WCDMA (December-04)	Monopoly

North Africa	Technology	3G status	Comments
Morrocco	GSM	Call bid 3G 24 february 2005. 2 licences for current WCDMA operators. Another 3G WLL to be awarded	To be granted in June 2005
Algeria	GSM/EDGE CDMA WLL	Huawei bulding a CDMA WLL network for Mobilis (Alger Telecom) Orascom EDGE roll out	Licences to be awarded in 2007
Tunisia	GSM	Experimental 3G network for the ITU's 2nd phase of the World Summit on the Information Society	Commercial services to be launched during 2H 05
Lybia	GSM	Alcatel to deliver GSM/EDGE solution and WCDMA	Monopoly
Egypt	GSM CDMA 2000 1x WLL	Telecom Egipt deploying CDMA 2000 WLL Mobile 3G licences to be awarded from 2006 on	Telecom Egypt is moving to access the mobile market

Source: Sofrecom, operators / Regulation Authorities (November 2005)

Selected 3G/UMTS operator focus
Examples of growth strategies in Arab region

ETISALAT
UAE

- **Exploring new value-added service options to attract customers**
- **Enhanced offering will potentially include upgraded content, MMS and other new features**
- **Feasibility studies currently underway: launch of new services by end 2005**

MTC-Vodafone
Bahrain

- **3G roaming agreements signed with seven global mobile operators in Middle East and Asia**
- **Enables automatic non-voice roaming for customers in UAE, Singapore, Hong Kong and Japan**

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The Arab Region – preparing for 3G/UMTS

- **The Arab Region has already commercially entered the mobile broadband world with EDGE (Algeria, Bahrain, Jordan, Kuwait, Oman, UAE) and 3G/UMTS (Bahrain, UAE) – 3G licensing under process in Morocco, Saudi Arabia, Qatar, Tunisia…**

- **With the timely licensing and introduction of 3G/UMTS, the region will have the opportunity to maintain alignment with the GSM/UMTS world and enjoy the benefits of:**

  - **greater economies of scale**

  - **simplified international roaming**

  - **IPR export opportunities for services and applications**

  - **wider choice of cost-effective terminals**

Arab region's operators, end users and equipment manufacturers will all benefit from 3G/UMTS

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For more information…

www.umts-forum.org

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