

# 3G/UMTS: Towards Mobile Broadband & Personal Internet- Perspectives for the Mediterranean

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# Summary

- About the UMTS Forum – key areas of activity
- 3G/UMTS market update – networks, terminals, services
- Towards mobile broadband and personal Internet:
  - HSDPA & IMS
  - Mobile TV and complementary technologies (WiFi, WiMAX...)
  - A look to the future: 3G/UMTS Long Term Evolution
- Perspectives for the Mediterranean



# About The UMTS Forum



**The UMTS Forum is an international, cross-sector industry body comprising operators, manufacturers, regulators, application developers, research organisations and IT industry players.**

## OBJECTIVES

**To promote a common vision of the development and evolution of 3G/UMTS and to ensure its worldwide commercial success:**

- by expressing a strong industry voice promoting 3G/UMTS technology and its evolutions through lobbying and promotional actions globally
- by forging dialogue between operators, manufacturers, administrations & regulators, and other market players that can ensure commercial success for all
- by providing market knowledge to aids rapid development and uptake of new services and applications

**To provide practical support to industry, administrations and policy-makers:**

- by offering guidance to governmental and financial communities, providing marketing input to technical standardization bodies (the Forum is a Market Representation Partner of 3GPP), and advising on spectrum requirements both for the present and future 3G systems
- through its membership of the three sectors of ITU, in the activities of which it participates regularly - such as the ITU-R WP8F – in view of preparation for the next World Radio Conference 2007 (WRC-07)

**The UMTS Forum serves the interests of all its members through educational and promotional activities in its role as the voice of the 3G mobile market.**



# UMTS Forum Key Focus Areas

## Work-plan 2006 in summary

Vision, Future Research & Market	Spectrum & Regulation	Technical Issues & Implementation
Evolution of 3G/UMTS	Global spectrum and spectrum arrangements for UMTS/IMT-2000 and its evolutions	Complementary technologies (mobile, Broadband Wireless Access...)
Services & Applications	Preparations for WRC-07	Mobile TV
Market forecasts, customer perspective and trends	Advice to industry and administrations on 3G licensing	3G standardisation and support to 3GPP
Relationships with international bodies (ITU, EC, CEPT/ECC...)		
Emerging markets action plan (including 'BRIC')		
Relationships with international media and financial community		
Visibility and participation at conferences, exhibitions, seminars and workshops		



# A world of 2.3 billion mobile users

**Mobile phones are one of the fastest-selling technology products of all time!**

**The number of subscribers to GSM mobile services grew by almost 235 million in the first eight months of 2005. The global GSM user base is now 1.8 billion: >77% of the world's total mobile population of 2.3 billion subscribers.**

**GSM provides the foundations for smooth, cost-effective migration to 3G/UMTS services in all world regions. Indeed, for operators UMTS/WCDMA means high and cost-effective capacity and revenue-growth, and is a natural extension of their GSM operations.**

**3G/UMTS offers a key enabler for global economic development over the next decade... and beyond**



# The mass market embraces 3G/UMTS

Some **big** numbers...

more than **60 million** 3G/UMTS subscribers worldwide

more than **105** W-CDMA networks launched commercially

more than **315** W-CDMA devices launched or announced

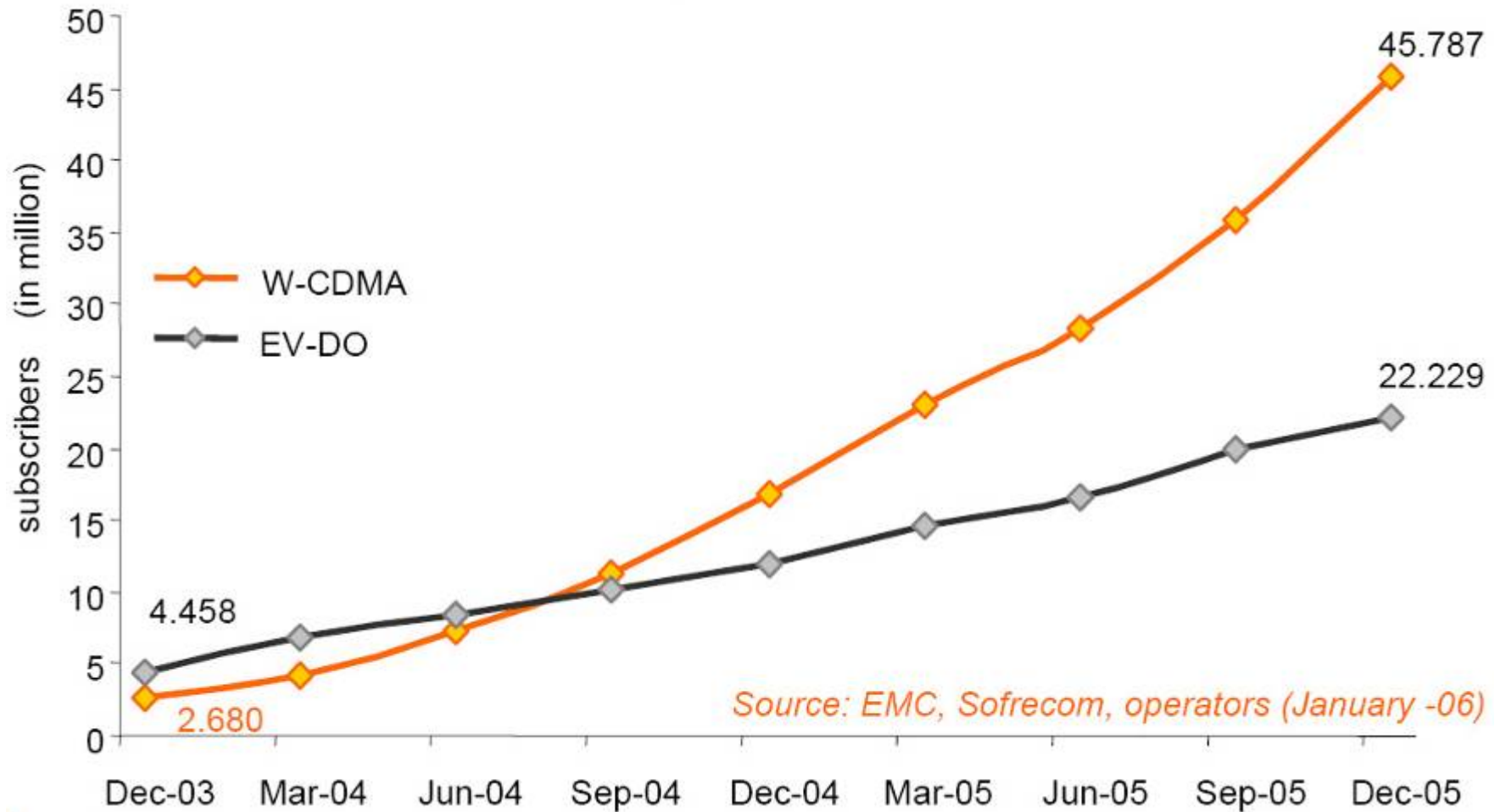
more than **2** times as many W-CDMA subscribers as EV-DO worldwide

End April 2006



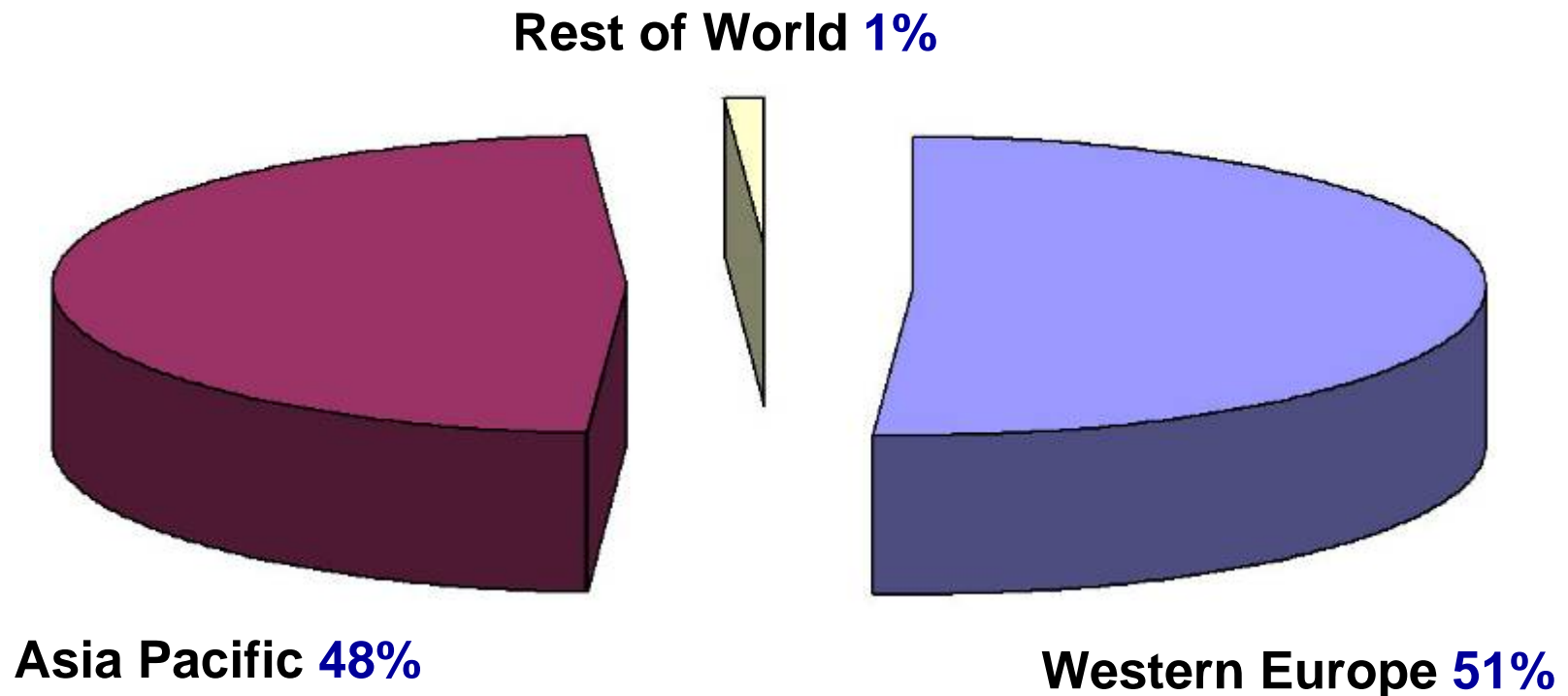


# W-CDMA growth outpaces EV-DO worldwide



# A regional view

## Western Europe now single largest WCDMA market



Source: Wireless Intelligence February 2006





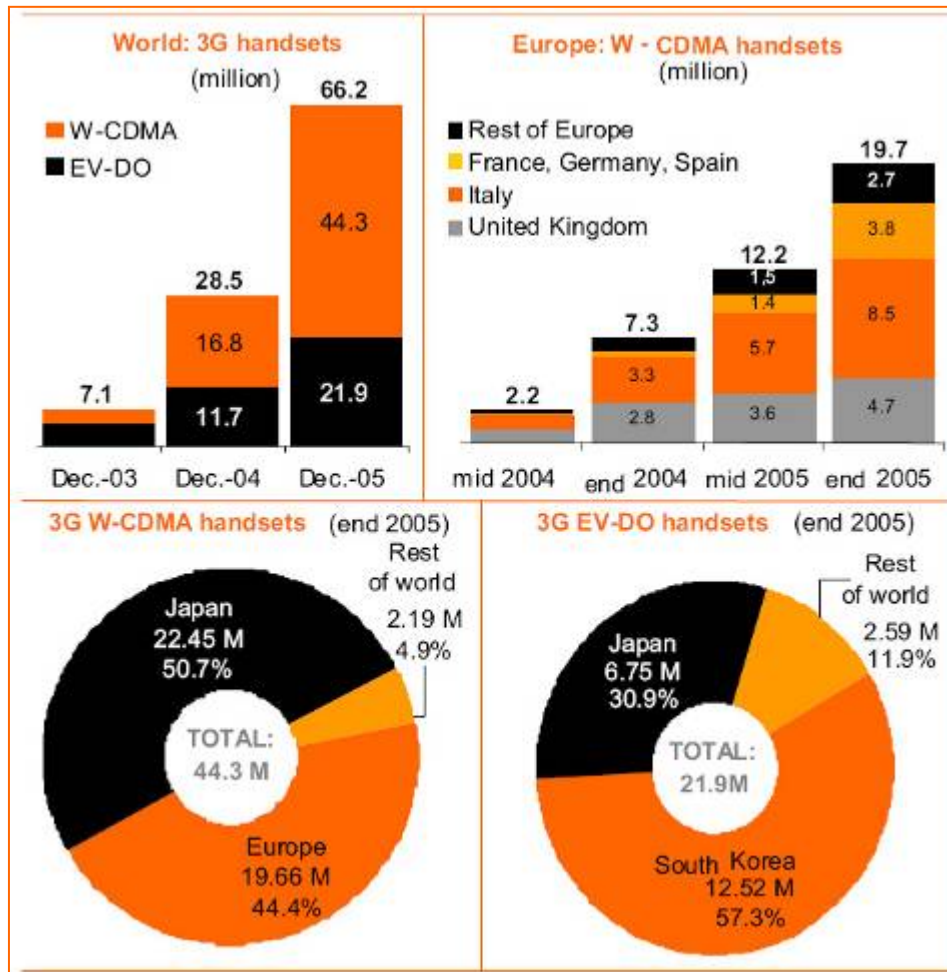
# Top 10 Countries in 3G/WCDMA Penetration

<b>Japan</b>	<b>30.0%</b>
<b>Italy</b>	<b>18.3%</b>
<b>Brunei</b>	<b>16.7%</b>
<b>Hong Kong</b>	<b>10.0%</b>
<b>Luxembourg</b>	<b>10.0%</b>
<b>Portugal</b>	<b>9.7%</b>
<b>UK</b>	<b>8.0%</b>
<b>Sweden</b>	<b>7.5%</b>
<b>Ireland</b>	<b>7.1%</b>
<b>Austria</b>	<b>6.0%</b>

**Source: UMTS Forum web site / Wireless Intelligence - 24 April 2006**



# Growth driven by an improved customer experience



Increased 3G/UMTS market uptake driven by:

- Increased choice of terminals
- Smaller size and lower weight
- Improved battery life
- Reduction in entry cost (e.g. Christmas promotional offers by operators)
- Strong customer incentives through attractive tariff plans (e.g. pre-pay and fixed-price packages) – often aligned with 2/2.5G pricing
- Better customer experience through improved network coverage



# 3G/UMTS network launches

## Several operators deploying W-CDMA & EDGE

EUROPE		
country	operator	launch
Austria	Mobilkom	Apr-03
	H3G Austria	May-03
	Connect / One	Dec-03
	Tele.ring	Dec-03
	T-Mobile	Jun-04
Belgium	Proximus	May-04
Croatia	VIPNet	Jan-05
Czech Rep.	T-Mobile	Jun-05
	Eurotel	Dec-05
Cyprus	Amreba	Dec-05
Denmark	H3G Denmark	Oct-03
	TDC	Oct-05
Estonia	EMT	Oct-05
Finland	Telia sonera	Oct-04
	Saunalahti	Jan-05
	Radiolinja/Elisa	Nov-04
	DNA	Dec-05
France	SFR	Jun-04
	Orange	Sep-04
Germany	Vodafone	May-04
	T-Mobile	May-04
	e-plus	Aug-04
	O2	Jul-04
Greece	Vodafone	Aug-04
	Cosmote	May-04
	TIM	Jan-04
Guernsey	Wave Telecom	Dec-04
Hungary	T-Mobile	Sep-05
	Pannon GSM	Oct-05
	Vodafone	Dec-05
Ireland	Vodafone	Jul-04
	H3G Ireland	Jul-05
Isle of Man	Manx	Nov-05

EUROPE		
country	operator	launch
Italy	H3G Italy	Mar-03
	TIM	May-04
	Vodafone	May-04
	Wind	Oct-04
Luxembourg	Tango (Tele2)	Jun-04
	VOXmobile S.A	May-04
	LuxGSM (P&T)	May-04
Netherlands	Vodafone	Apr-04
	KPN Mobile	Jul-04
Norway	Telenor	Dec-04
	Telia Netcom	Mar-05
Portugal	Vodafone	May-04
	TMN	Apr-04
	Optimus	Jun-04
Poland	Poikontel	Sep-04
	PTC	Apr-05
Romania	MobiFon (Conex)	Apr-05
Slovakia	T-Mobile	Jan-06
Slovenia	MobilTel	Feb-04
Spain	Vodafone	May-04
	Telefonica Moviles	May-04
Sweden	Amnra	Oct-04
	H3G Sweden	Jun-03
	3GIS	Aug-03
	Vodafone	Apr-04
Switzerland	Telia Sonera	Mar-04
	Tele 2	Jun-04
	Swisscom	Oct-04
	Orange	Sep-05
UK	Sunrise	Dec-05
	H3G UK	Mar-03
	T-Mobile	Jun-04
	Orange	Jul-04
	Vodafone	Apr-04
	O2	Oct-04

Worldwide : 32 cellcos operate both EDGE and W-CDMA in 21 countries as of March 2006

Europe : 25 cellcos operate both EDGE and W-CDMA in 14 countries as of March 2006

ASIA-PACIFIC		
country	operator	launch
Australia	H3G Australia	Apr-03
	Optus	Apr-05
	Telstra	Aug-05
	Vodafone	Oct-05
Hong Kong	H3G HK	Jan-04
	CSL	Dec-04
	Smartone	Dec-04
	Sunday Comm.	Jun-05
Japan	NTT DoCoMo	Oct-01
	Vodafone KK	Dec-02
Malaysia	Maxis	Apr-05
	Telekom Malaysia	May-05
New Zealand	Vodafone	Aug-05
Singapore	SingTel mobile	Dec-04
	Mobile One	Dec-04
	StarHub	Apr-05
South Korea	SKT	Jun-05
	KTF	Sep-05
Taiwan	Taiwan Mobile	May-05
	VIBO Telecom	Dec-05
	FarEas Tone	Jul-05
	Chunghwa Telecom	Jul-05

W-CDMA in commercial operations		
	Countries	Operators
Worldwide	45	103
Europe	28	69

REST OF THE WORLD		
country	operator	launch
Bahrain	MTC Vodafone	Dec-03
Brunei	B-Mobile Comm	Sep-05
Israel	Celcom	Jun-04
	Partner	Aug-04
Kuwait	Watanya	Feb-06
Mauritius	Emtel	Nov-04
South Africa	Vodacom	Dec-04
	MTN	Jun-05
Tajikistan	TT-Mobile	Jun-05
	Babilon-Mobile	Jul-05
USA	Cingular Wireless	Jul-04
UAE	Etisalat	Jun-04

Operators that have deployed both W-CDMA and EDGE networks

In orange: New networks and countries since YE05

Source: Softcom (15th March 2006), GSA - W-CDMA deployments worldwide (8th March 2006)

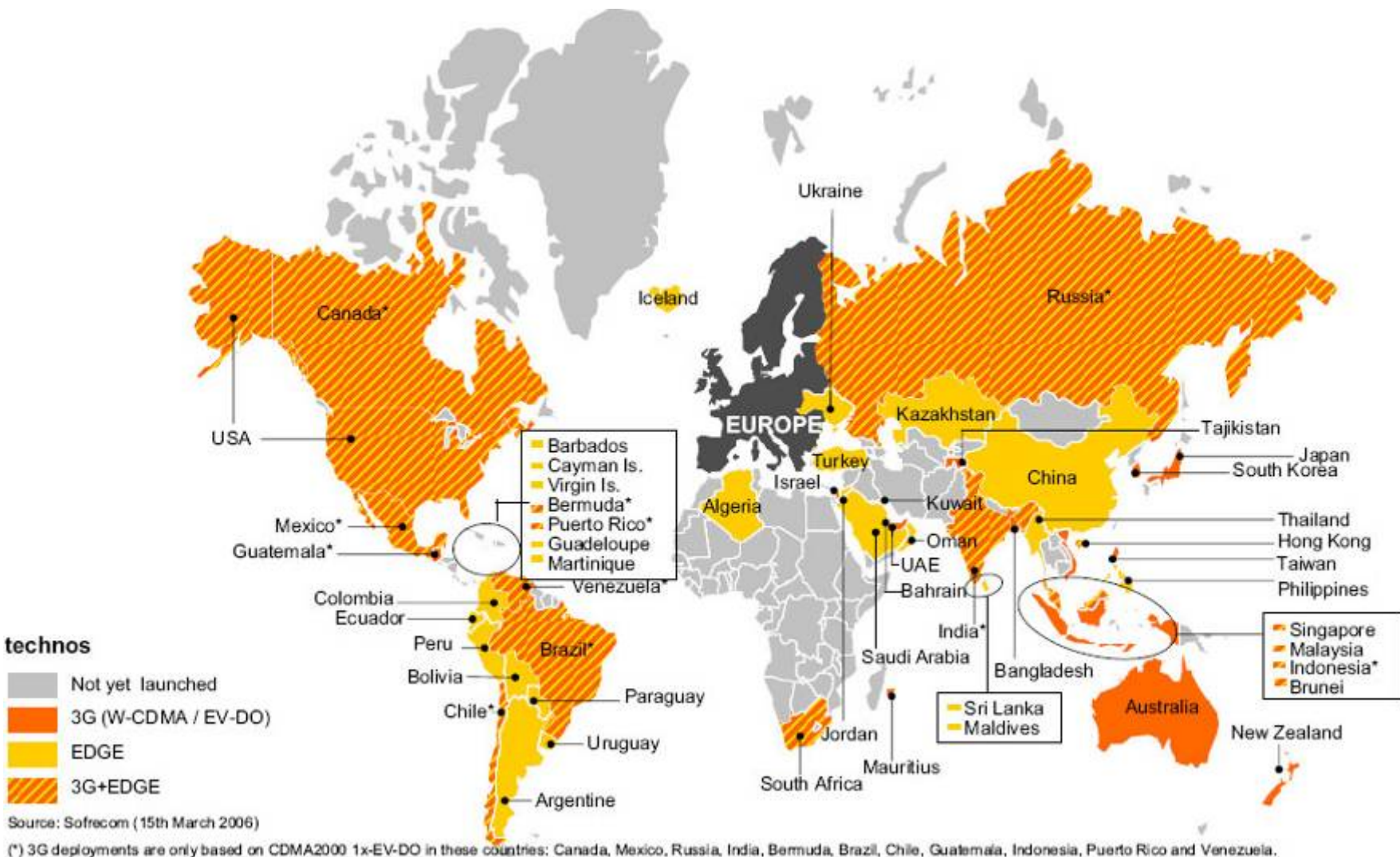


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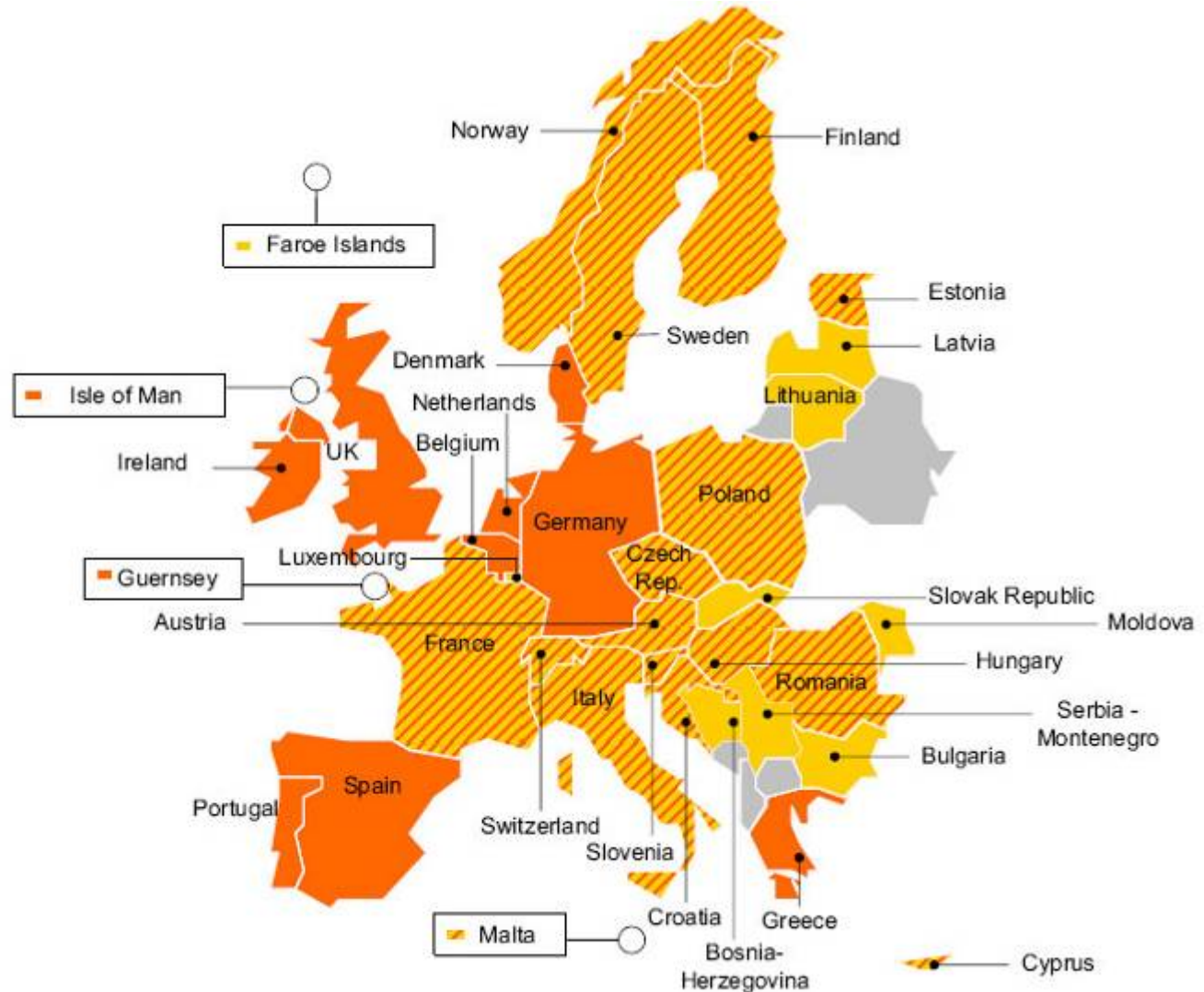


# 3G/UMTS deployments: a global picture



# Complementary strategies in Europe

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



# 3G operator service offerings: “TV and video lead broadband uses”...

## MOBILE TV

### Sport is the most popular content:

- Orange proposed Eurosport TV channel in France and UK (followed by Vodafone in Germany and Netherlands).
- Vodafone Germany proposed ‘Bundesliga Show’ analysis and interviews on day’s football matches, combined with alert services
- T-Mobile proposed ‘DSF mobile TV’ including German domestic league and UEFA Champions League football matches

### Adapted format for a different use – operators forge deals with media companies and create specially-adapted content (e.g. 2-3 min clips):

- Vodafone launched the ‘24: Conspiracy’ streaming programme in arrangement with Fox Entertainment. In partnership with national RAI TV (Italy) and Sky (UK), totalling more than 1 million streams of its exclusive Sky Mobile TV offer in 2 wks
- Amena launched in November special series for mobile viewers ‘Los SuperVillanos’
- Three signed contract with Disney to use clips from hit series ‘Lost’

### Operators give free unlimited access to encourage users:

- In Germany, Vodafone and T-Mobile include free mobile TV in tariff plans for initial period; Vodafone UK included free viewing of Sky Mobile TV





# Orange France: 53 Live TV channels ...

Orange  
exclusivity



Other channels



# 3G operator service offerings

## MOBILE MUSIC

### New music portals and music catalogues extended:

- TIM Italy launched its i.music store and T-Mobile launched 'Musicload' in Germany.

### Exclusive content adds value:

- T-Mobile signed 18-month deal and France Telecom Group signed deal with Madonna to exclusively offer their music.
- Three signed deal with EMI Music UK to include exclusive content from Robbie Williams, Kylie Minogue and Coldplay in its 'Video Jukebox' service. 10 million full-length video downloads in 6 months following service launch in 2004.
- Three also announced in June 2005 that 30 million music tracks have been downloaded or streamed on its networks in 9 global markets since service launched.

### The phone becomes a music player:

- Phones now integrate music players... internal memory now facilitates adoption of this service



# 3G/UMTS drives ARPU: the evidence

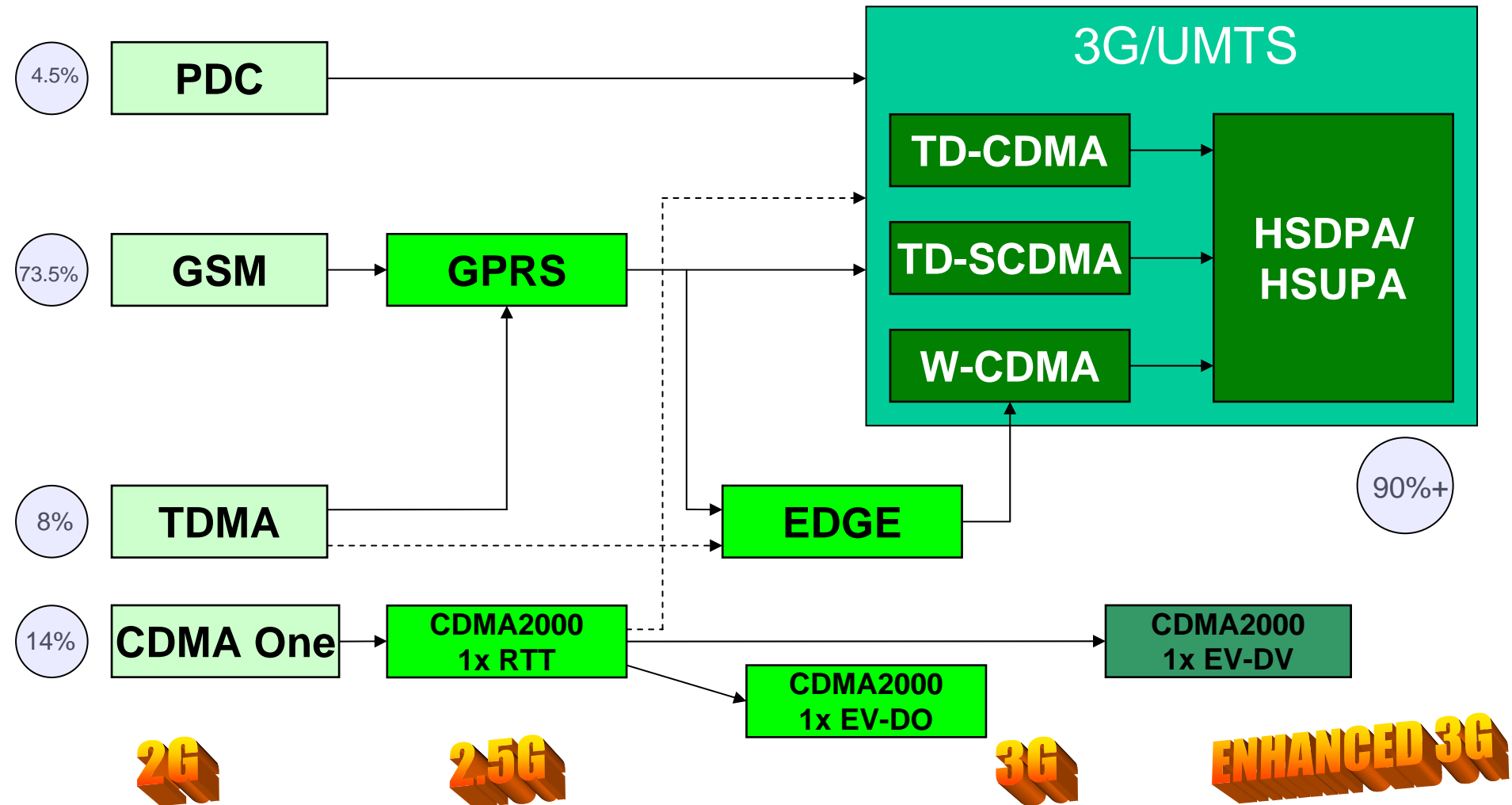
**3G customers at NTT DoCoMo in Japan spend €21 each month more than DoCoMo's 2G customers, i.e. an ARPU of €65 for 3G compared with €44 for 2G [September 2005]**

**Average 3G customers in the UK also spend €21 each month more than 2G customers, i.e. an ARPU of €64 for 3G compared with €43 for 2G [September 2005]**

**Source: Orange / SOFRECOM / survey by Telephia.**

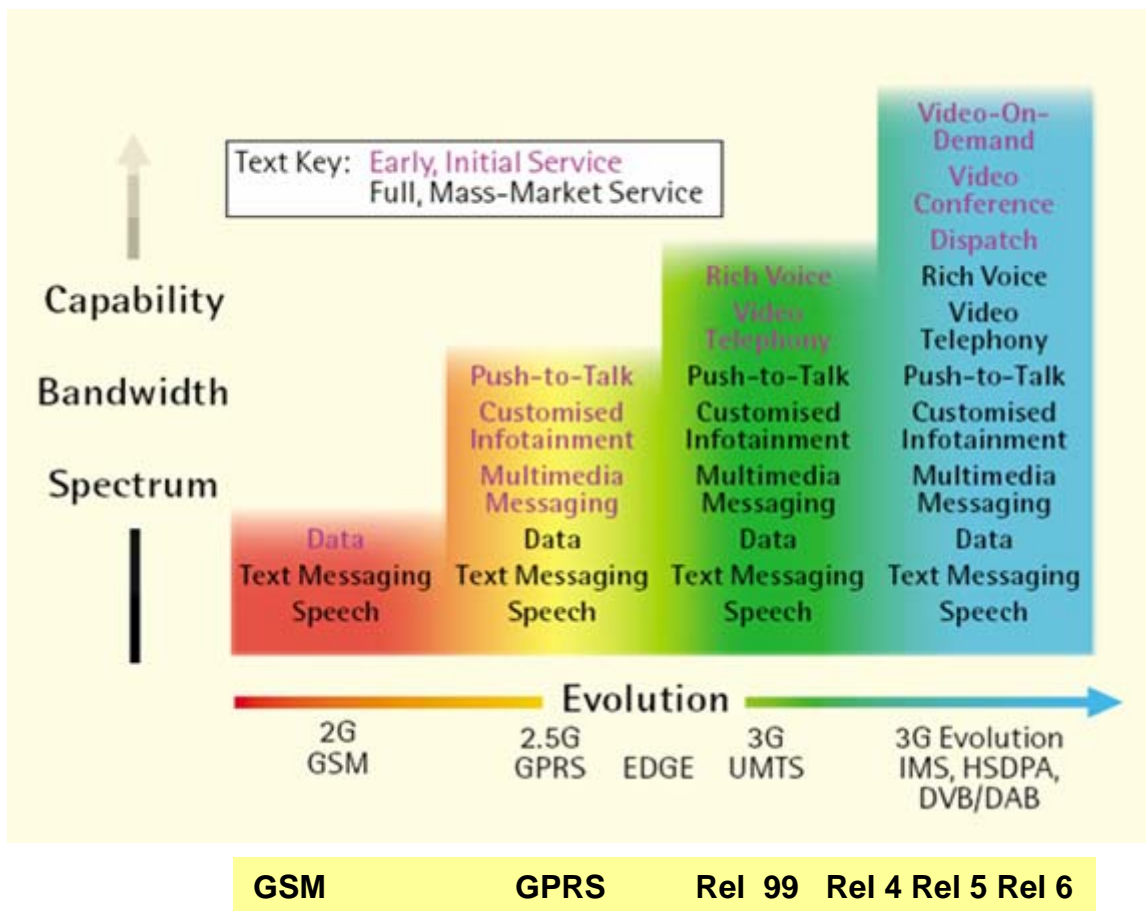


# 3G Operator Evolution Options (Mid 2004)





# 3G/UMTS service evolution roadmap



## 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



# 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→14.4 Mbps): total and average per user
2. reduces latency
3. increases data capacity up to 5x in dense urban environments (micro-cells)





# HSDPA

## A new paradigm for packet data

- Integrated voice on a dedicated channel (DCH)
- High Speed Data (up to 14.4 Mbps) on downlink shared channel on the same carrier (HS-DSCH) and can be deployed in both FDD & TDD modes

### HSDPA introduces:

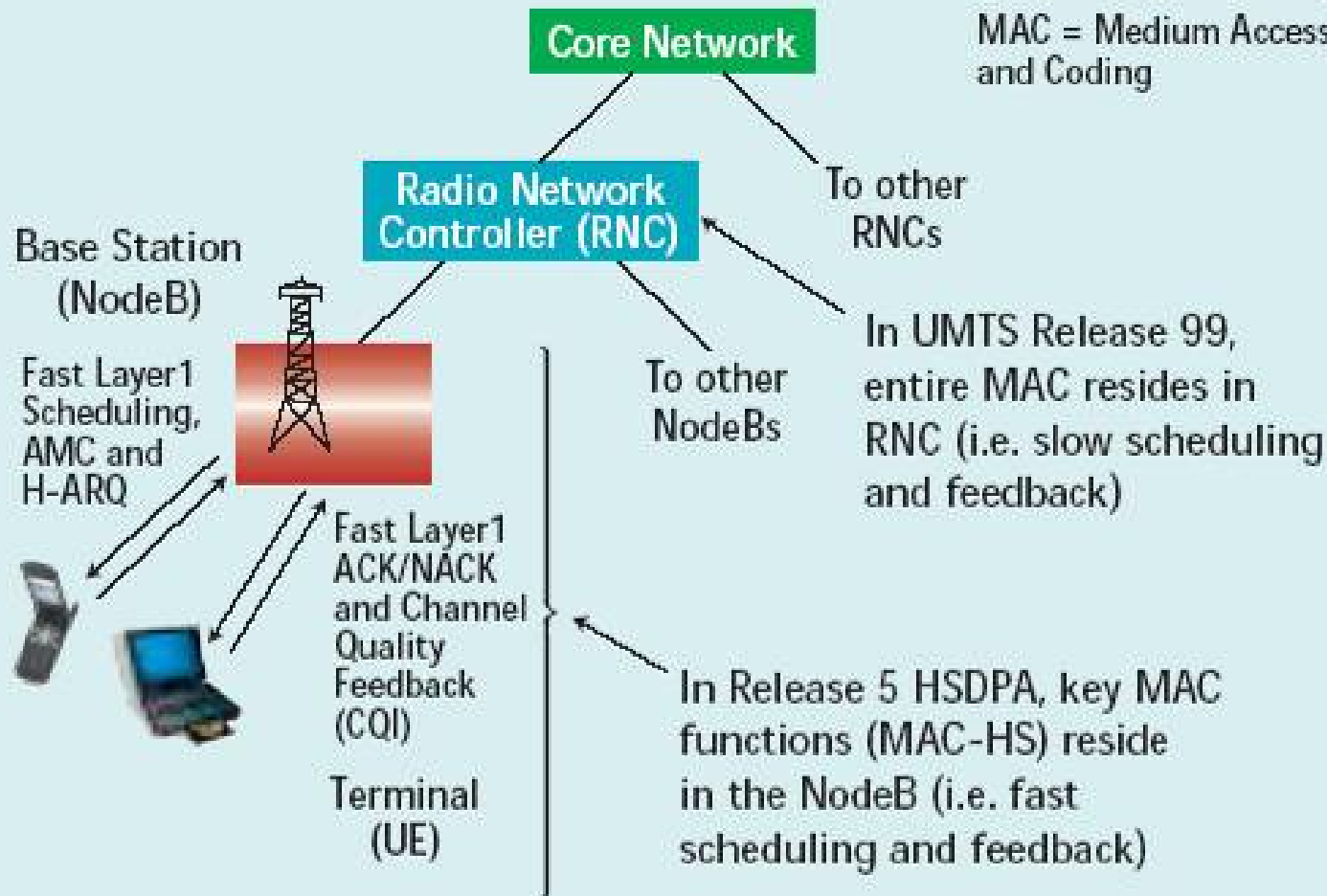
- Dynamic adaptive modulation & coding, multicode operation,
- Fast scheduling of packet data, fast physical layer retransmission of data packets.

...This is accomplished by incorporating many of the key scheduling & control processes at the base station – as opposed to the Radio Network Controller (RNC) – and thus closer to the air interface.



# HSDPA System Architecture

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



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.



# HSDPA: Now a market reality

- 10+ HSDPA networks already in service
- 60+ HSDPA networks planned, in trial or in deployment...

## EUROPE

- Orange France **in trial**
- T-Mobile (Germany & Austria) **launched March 06**
- Mobilkom Austria **launched Jan 06**
- H3G Italy **launched Feb. 06**
- O2 / Manx Telecom **launched Nov 05**
- Vodafone Germany **launched Mar. 06**
- SFR & Bouygues Telecom (France)
- Optimus Madeira **launched Feb. 06**
- Telenor
- Telfort
- TEM
- TIM
- Mobiltel Bulgaria **launched March 06**

## ASIA PACIFIC

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

## MIDDLE EAST

- Wataniya Kuwait **launched Feb. 06**
- MTC Vodafone Bahrein

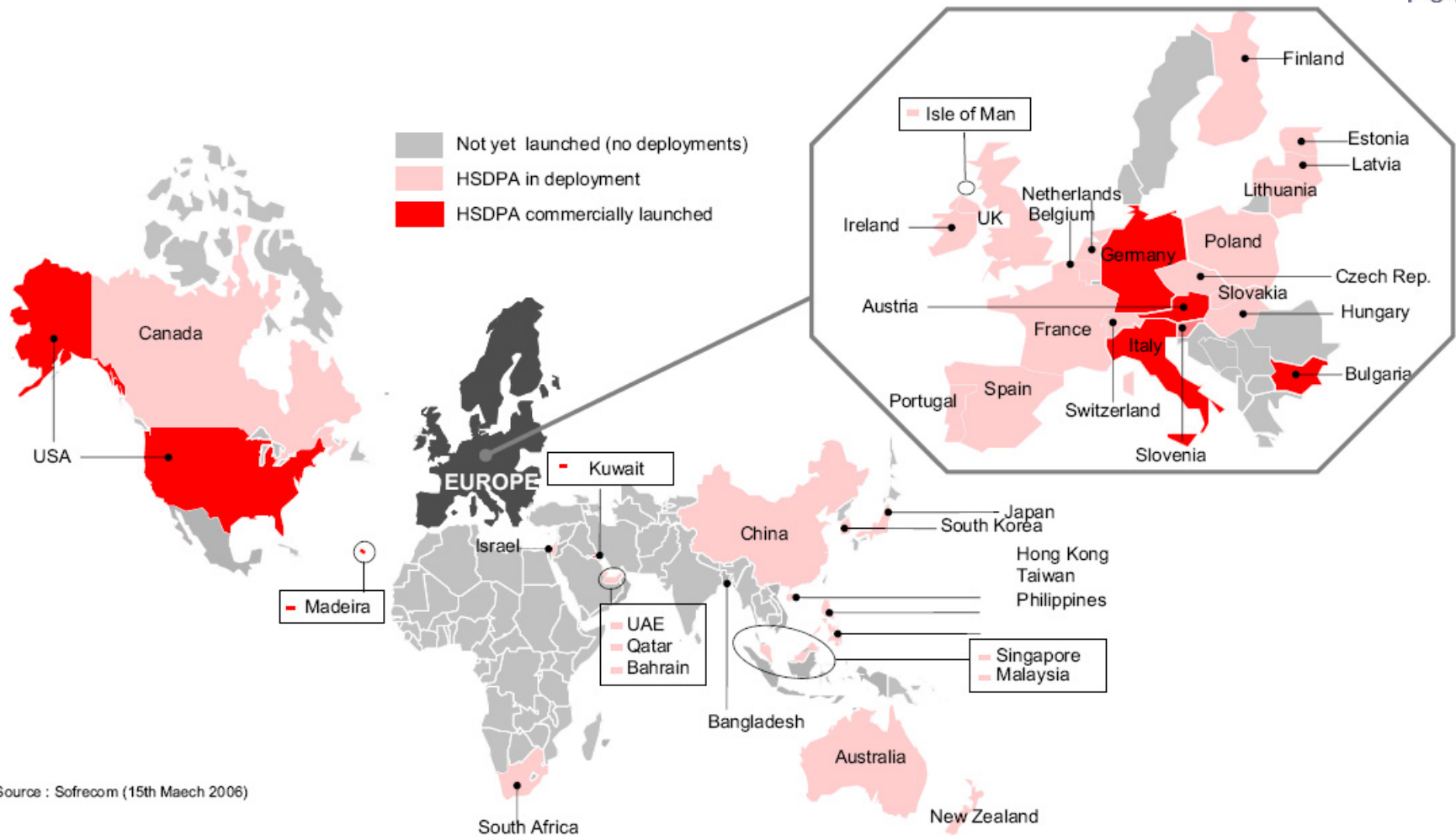
## NORTH AMERICA

- Cingular AT&T **launched Dec 05**
- Rogers Wireless Canada

**...plus HSUPA launches from 2007**



# HSDPA: Global deployment status



Source : Sofrecom (15th March 2006)



# 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



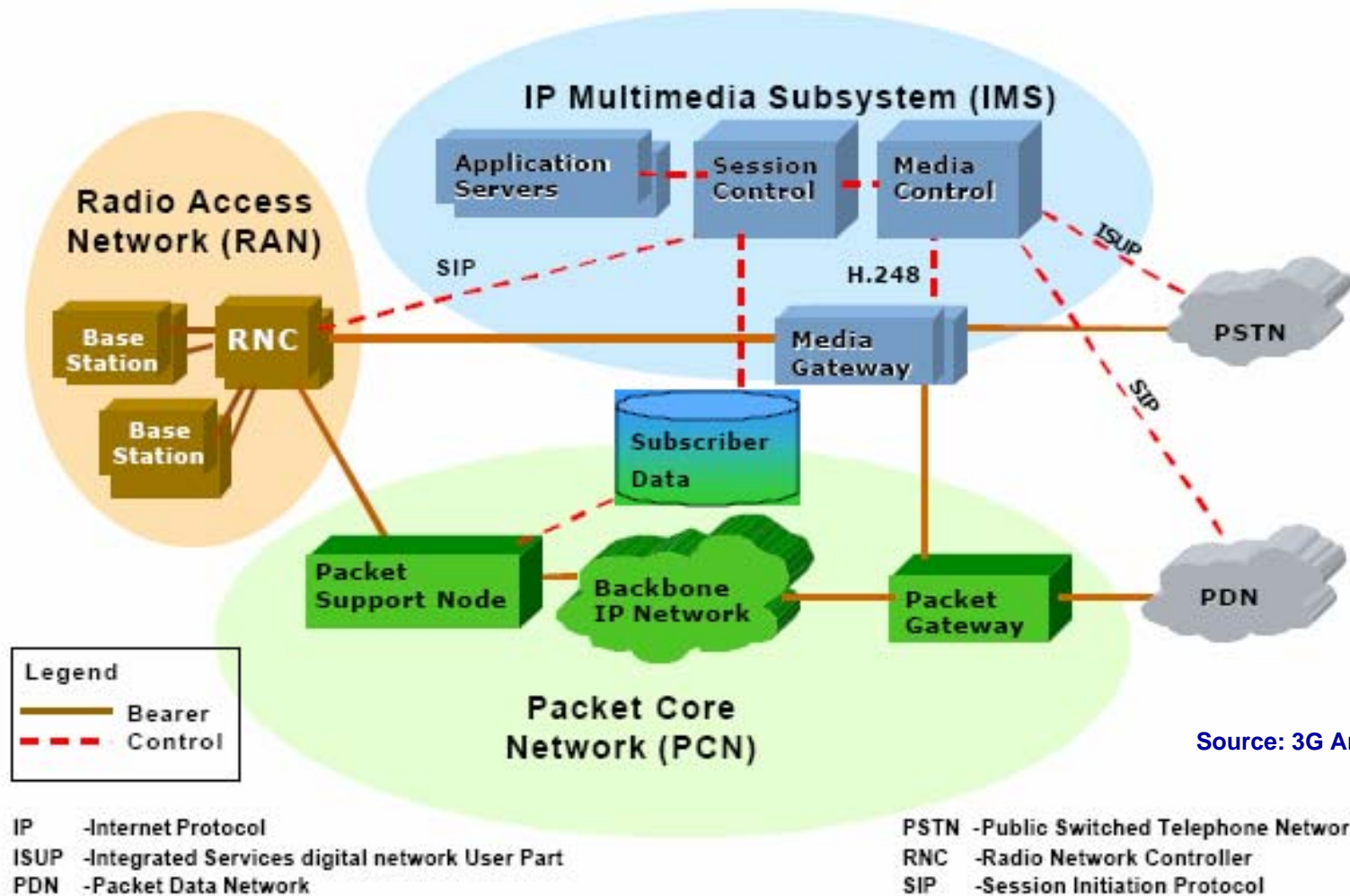
# Why IMS?

- 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





# Upgrading to IMS



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



# IMS: The Platform for Convergence

- IMS offers the platform for 3G evolution and mobile-fixed-broadcast 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

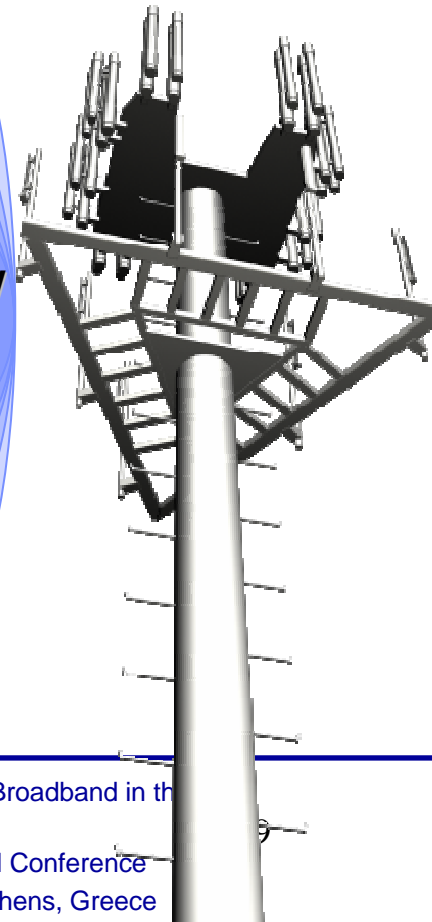
**WiMAX**  
802.16,  
HiperMAN  
Broadband

**Wi-Fi\***  
802.11

**UWB  
and  
Bluetooth**

**RFID/  
TAG**

**The Result: Always Best Connected**



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# WiMAX Services & Applications Roadmap

## 2005: Fixed Outdoor

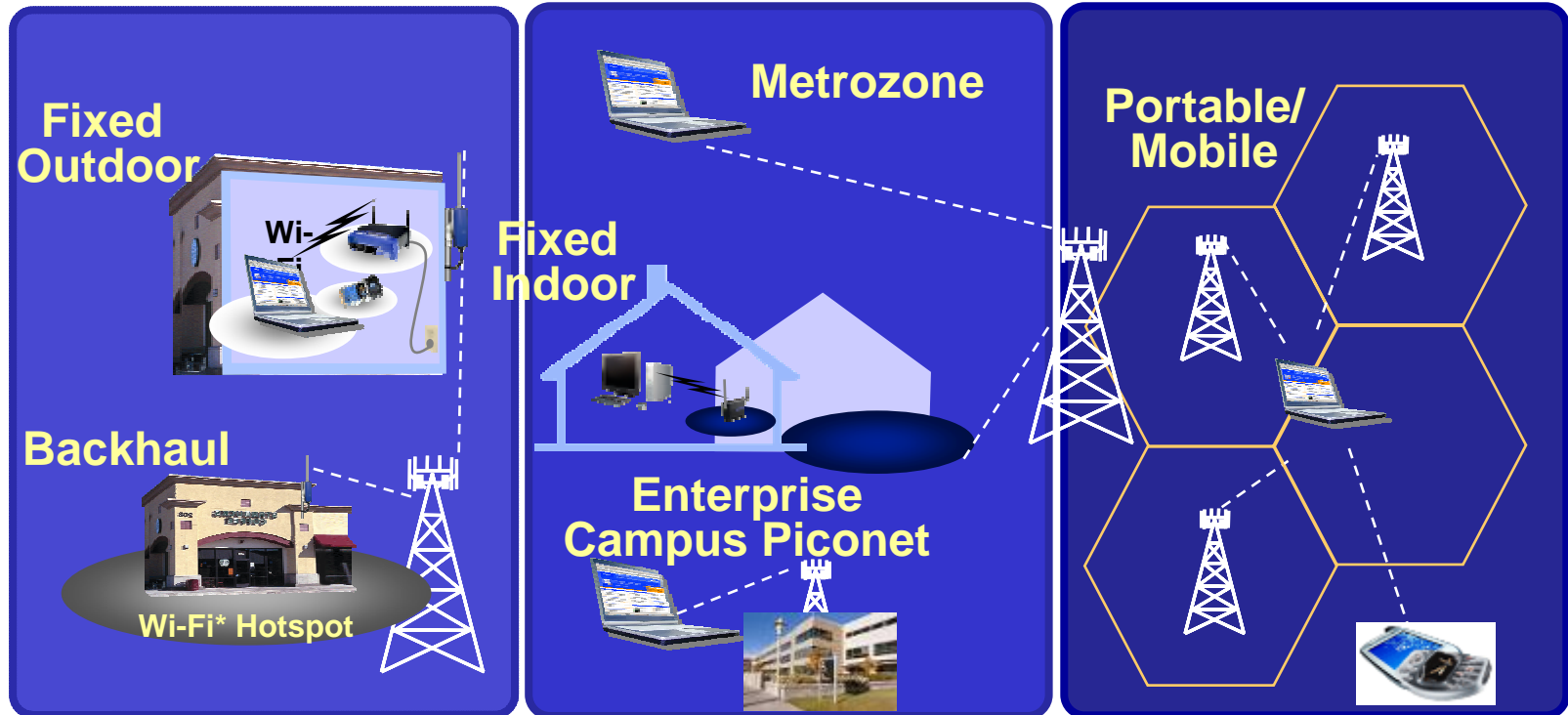
- E1/T1 level service for enterprises
- Backhaul for hotspots
- Limited residential broadband access

## 2006 (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



Promoting the global success of  
third generation mobile

# 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**





# 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

No  
Interactivity

Scheduled  
Programme  
with Return  
Channel for  
Interactivity

Interactivity  
enabled

News,  
Magazine,  
Learning  
Lessons, Movie  
Guide, Local  
Event Guide

Interactivity  
enabled

Quiz,  
Role-play,  
Strategy-,  
Sport-,  
Adventure-  
Games

Interactivity  
enabled

Car Navigation  
Support with  
Real-time  
Traffic  
Information

Interactivity  
enabled





# Mobile broadcast technologies

## 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



# DVB-H and MBMS Serve Complementary Needs

## MBMS

**0-64 kbps**

**“Cost optimizing”**

**MMS info & streaming**

**Goal of the Day, mLearning, Real-time traffic info, News, Weather,...**



## DVB-H

**64-512 kbps**

**“Service enabling”**

**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 Long Term Evolution (LTE): basic principles

- HSDPA 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 (LTE) 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 downlink data rate up to 100 Mbps and uplink up to 50Mbps, by using channel – transmission bandwidth between 1.25MHz and 20MHz
- 3GPP Evolved UMTS specifications should target availability of commercial products around 2008-2010



# 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 technology
	Min. TTI (latency)	10ms	2ms	<0.5ms
	Carrier bandwidth	5MHz		100MHz
	Data rate	384Kbps-2Mbps	14Mbps	30-100Mbps
Network aspect	CS and PS		PS only	
	GTP (tunneling) [IP routing in core network]		IP routing in core network and RAN	

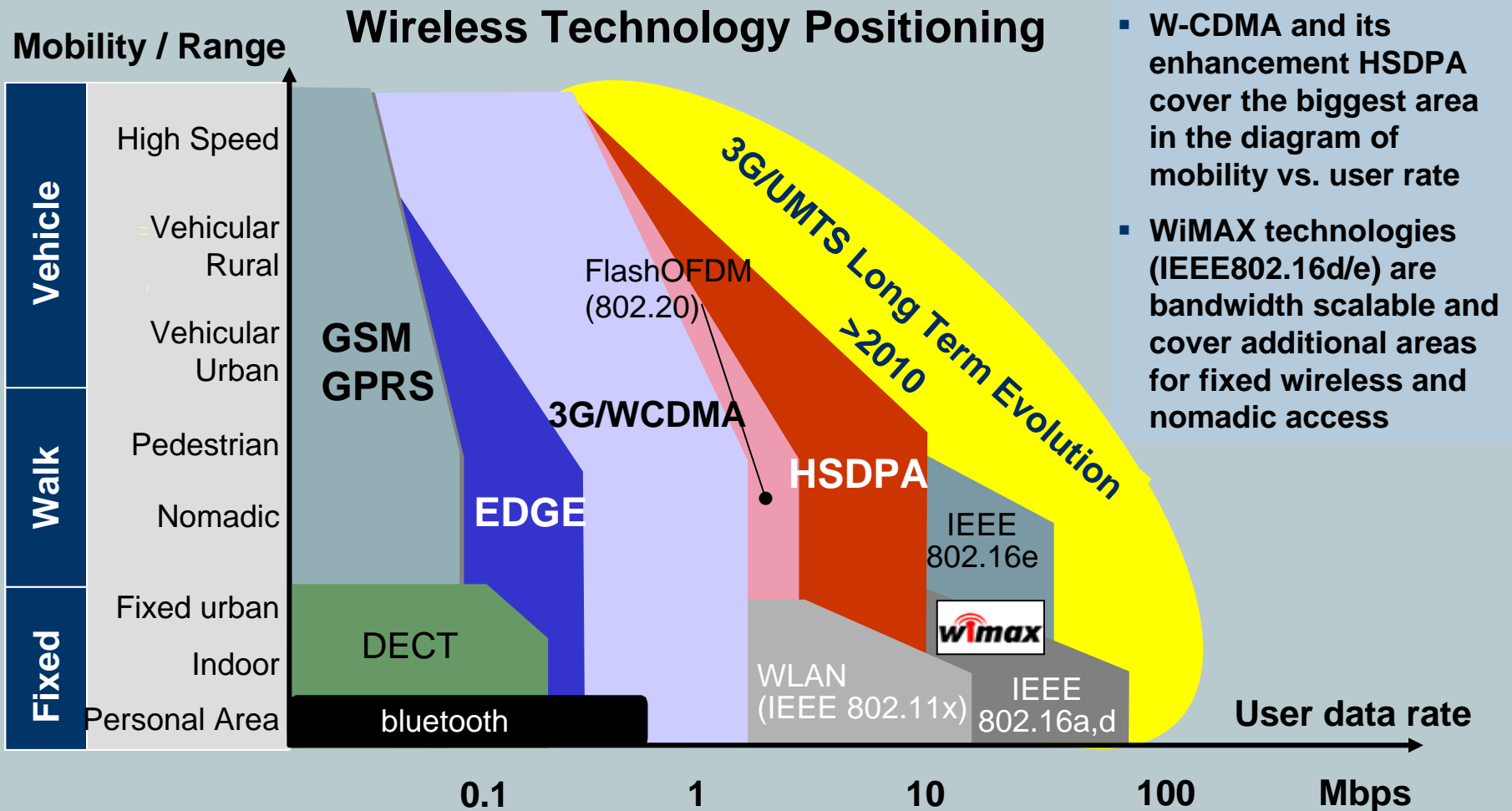
Source: NTT DoCoMo





# 3G/UMTS Evolution (2)

## UMTS / HSDPA in context of other wireless technologies



# The Mediterranean – deploying 3G/UMTS and mobile broadband (1)

Mobile broadband already commercially launched in 13 countries of the Mediterranean:

→ **Edge:** *Bosnia, Croatia, France, Italy, Malta, Slovenia, Algeria, Israël, Turkey*

→ **3G/WCDMA:** *Croatia, Cyprus, France, Greece, Italy, Portugal, Slovenia, Spain, Israël*

→ **3G/HSDPA:** *Italy, Portugal, Israël, Slovenia*



# The Mediterranean – deploying 3G/UMTS and mobile broadband (2)

With the quick licensing and/or introduction of 3G/UMTS, the whole Mediterranean has the opportunity to join the GSM/UMTS & mobile broadband 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
- Interactive multimedia mobile services & applications
- High speed, Quality of Service, Capacity, Reduced latency

**The Mediterranean's operators, equipment manufacturers and end users will all benefit from 3G/UMTS, mobile broadband and their enhancements & evolution**



**For more information**  
**[www.ums-forum.org](http://www.ums-forum.org)**

