

3G/UMTS & Evolution: Sharing experience and success gained in competitive markets *Perspectives for CIS, CEE & Baltic Countries*

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Chairman, UMTS Forum



Summary

(1) 3G / WCDMA / HSPA deployments

global panorama including operator case studies



(2) Mobile broadband evolution

a clear standards path to 3G LTE (Long Term Evolution)

(3) The promise for CIS, CEE & Baltic countries

looking to 3G and mobile broadband deployment



About The UMTS Forum: who are we?



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 Long Term 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 aid 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 contributing to the World Radio Conferences (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.



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UMTS Forum Key Focus Areas

Mission statement 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		

Through its work plan, the UMTS Forum is committed to defend, enrich and realise the full potential of 3G/UMTS and its evolution



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3G/UMTS: a mass market phenomenon...

More than **250 million** 3G subscribers worldwide, including
170+ million UMTS/WCDMA subs, and nearly **10 million**
HSPA subs

More than **2** times as many UMTS/WCDMA subscribers as
CDMA2000 EV-DO worldwide

Over **200** W-CDMA networks launched in around **85** countries
(including **105** networks in Europe)

Almost **150** HSDPA networks launched in around **70** countries

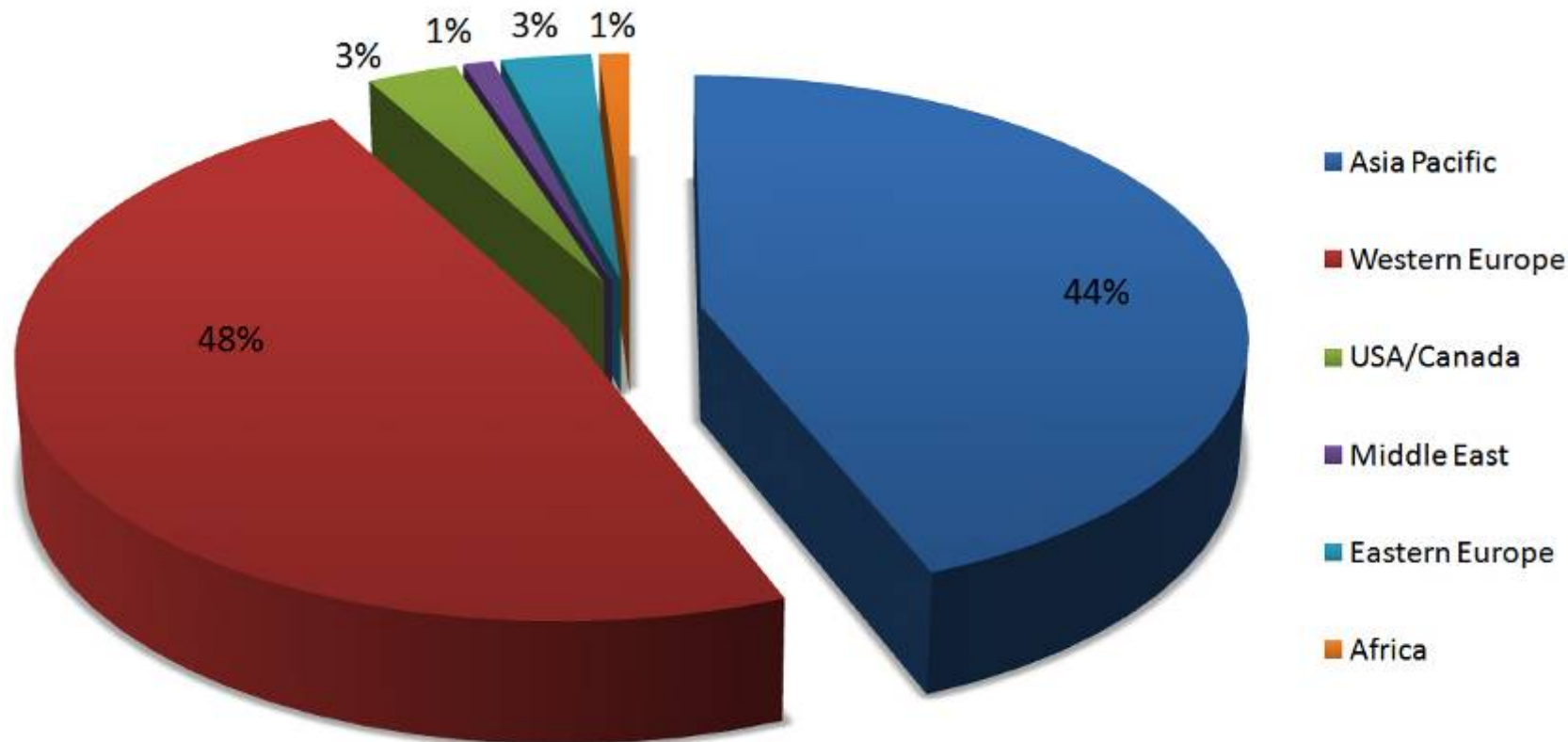
10+ HSUPA network deployments plus **130** operator commitments

Over **900** W-CDMA/HSDPA devices launched



WCDMA subscriptions % split by region

Global total 170m+ November 2007 (inc. HSPA)

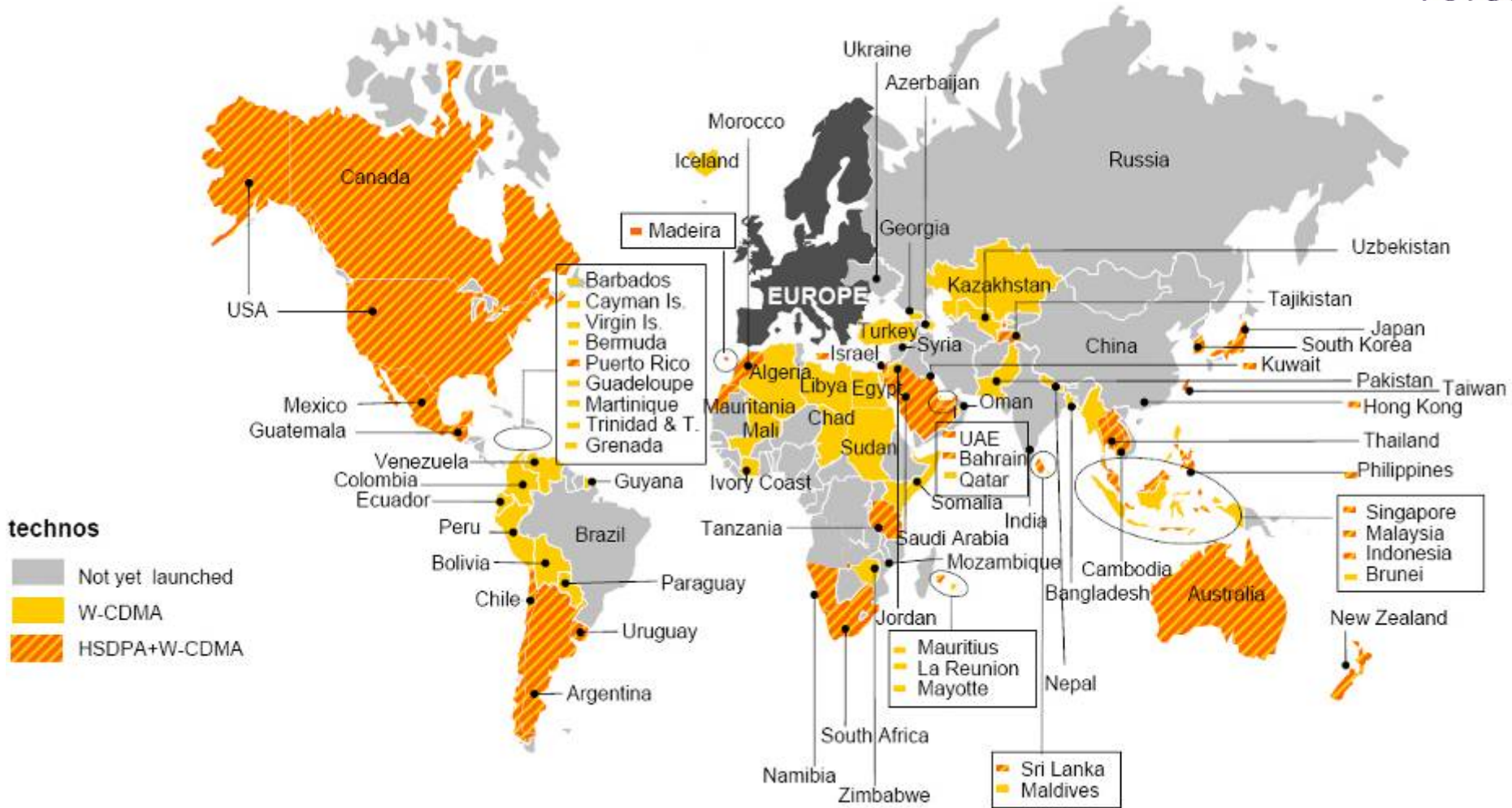


Source: Wireless Intelligence



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HSDPA and WCDMA global deployments



SOFRECOM and industry sources inc. 3G Americas and GSA



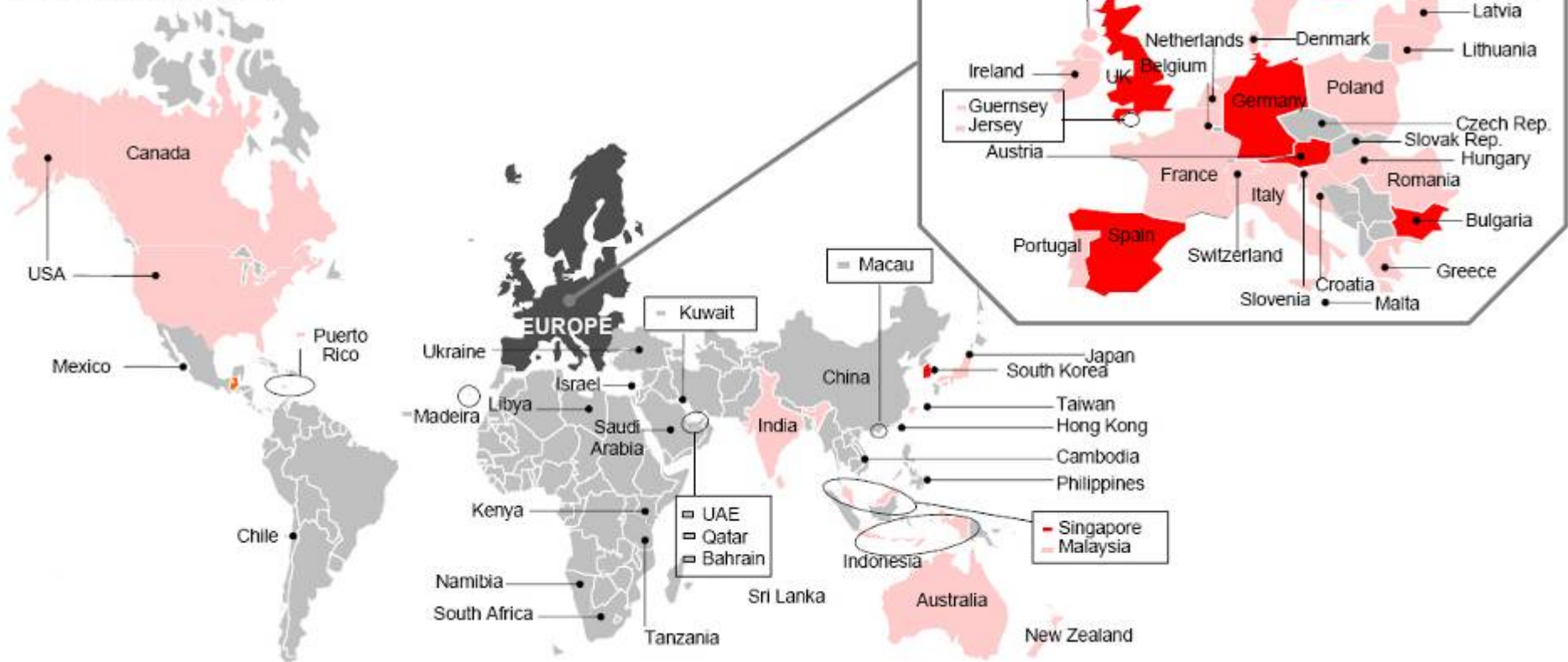
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HSUPA: 10+ commercial launches, approx 30 deployments and 130 operator commitments

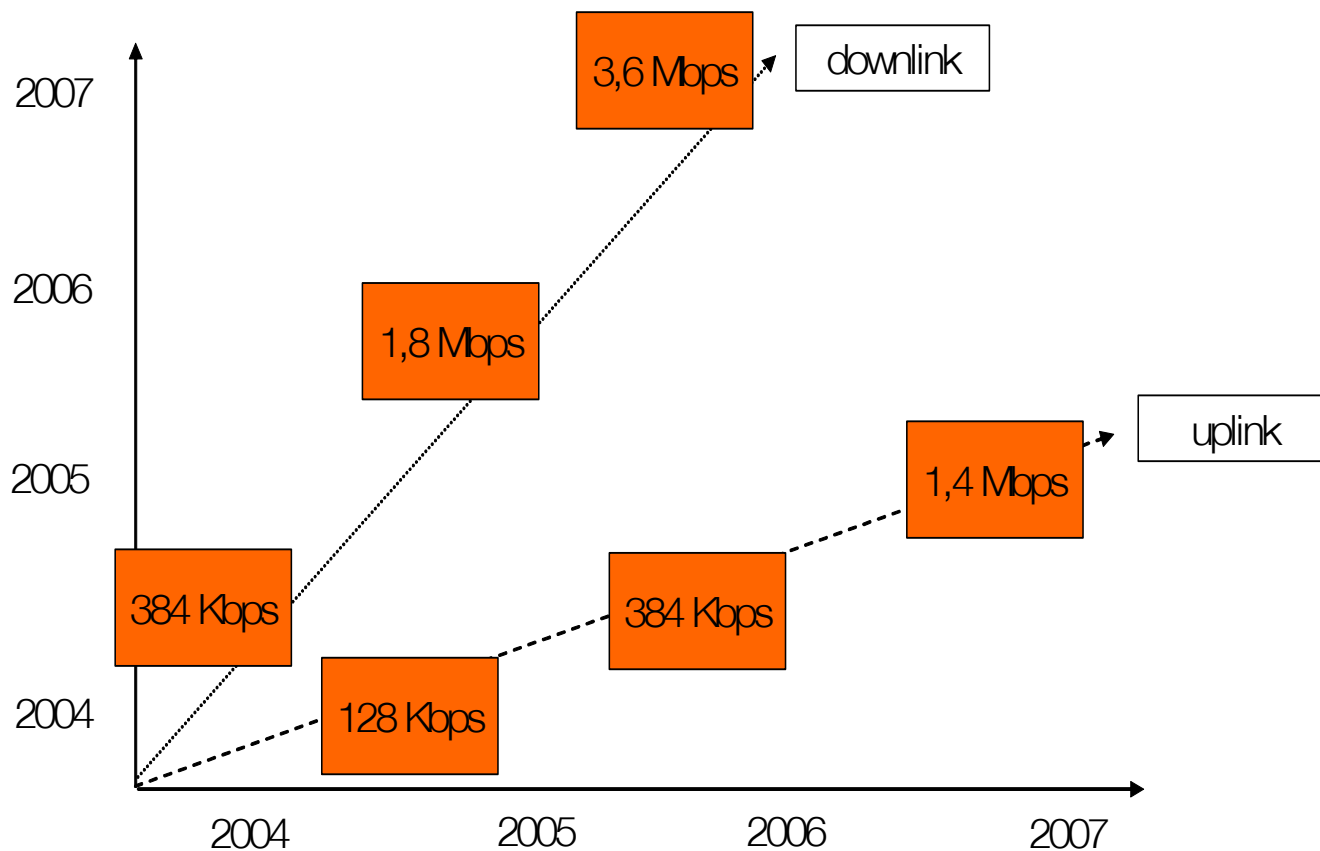
- Not yet in deployment
- HSUPA in deployment
- HSUPA launched

Source : Sofrecom (September 10, 2007)

Source: 3G Americas, Sofrecom (September 10, 2007)



Mobile broadband enables new services



Since mid-2004, mobile data speeds have increased dramatically to deliver megabit-plus performance on downlink AND uplink



Mobile broadband usages for business customers...

- Sending attachments via own messaging
- Business applications (SAP, Lotus, Salesforce.com,...)
- Working as in the office on works areas (construction & real estate building,...)
- Sending videos from the event's site (media,...)
- Tele-medicine, tele-security
- Video-surveillance/Tele-monitoring (public transportation,...)



...and also expected by consumers

- **Sending of attachments via one's own messaging**
- **Social Network Services: « feeding » of highly demanded community web sites (YouTube, mazonvideo, pikeo, myspace.com, flickr,...)**
- **User-generated contents: online update of one's personal blog**
- **Interactive networks gaming**
- **Interpersonal video-communications via MSN Messenger,...**



Mobile broadband enables new partnerships between operators, traditional media brands and leading Internet players

Partnerships between mobile operators and media players

Vodafone, 3, Tim, SFR, O2



Orange, 3, O2



Vodafone, 3, T-Mobile
Orange, Movistar, O2



Vodafone, TIM,
Orange, O2

Partnerships between mobile operators and Internet leaders



Source: Estimations Exane BNP Paribas, Arthur D. Little, March 2007

Promoting the global success of
third generation mobile

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New uses and contents

Mobile Music



“More than 700,000 tracks on Orange World Music” (France)

Napster Mobile on Natel (Switzerland)



Exclusive partnerships with artists and record labels (Vodafone Spain)



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New uses and contents Mobile Video & TV

Mobile TV offerings in France (SFR & Orange)

3G

REGARDEZ LA TV SUR VOTRE MOBILE SFR

Une multitude de chaînes TV et programmes : info, musique, sports, cinéma en qualité Haute Définition 3G+!



HEROES



SONY ERICSSON
KB101

EXCLUSIF !
RETROUVE-MOI ET MES BUDDYS* EN EXCLUSIVITÉ SUR TON MOBILE SFR

EXCLUSIVITÉ SFR
RETROUVEZ LES VIDÉOS TÊTES À CLAQUES SUR LE PORTAL VODAFONE LIVE+ RUMORQUER TV

TÊTES À CLAQUES TV

Toutes les offres et services détaillés sur www.sfr.fr
*N'oubliez pas d'insérer votre combiné SFR.

au programme sur votre TV mobile

sport, info, musique, ciné, humour... toute la TV et deux millions de vidéos disponibles sur Orange World®

août, septembre, octobre...

sport

- À partir du 7 septembre, vivez le Coupe du Monde de Rugby 2007 en exclusivité sur votre mobile.
- Suivez tous les matchs de la Ligue 1 Orange.
- Dès le 24 août, regardez les championnats du monde d'athlétisme en direct et en intégralité sur Eurosport.

real TV

- En exclusivité sur votre mobile, vivez en live les derniers moments de "Secret Story" et découvrez le nom du gagnant.

ciné

- Découvrez le série fantastique de l'année : "Surface", sur TMC.

magazines

- Retrouvez "Parlez-moi d'ailleurs", le magazine d'actualité internationale de La Chaine Parlemoi, présente par Audrey Pfluer.



- 1 Surface sur TMC
- 2 Championnat du monde d'athlétisme TV sur Eurosport
- 3 Ligue 1 Orange Vidéo sport
- 4 Parlez-moi d'ailleurs TV sur LCP
- 5 Secret Story Vidéo/TV Série
- 6 Coupe du Monde de Rugby 2007 Vidéo sport

pour profiter de ces programmes, réactivez toutes les options multimédia page 53



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New uses and contents

Social Networking and User Generated Content

are growing fast on mobile

SFR ad on 'dailymotion' website (August 07)



Online community Kwick! now available for O2 Germany customers (August 07)

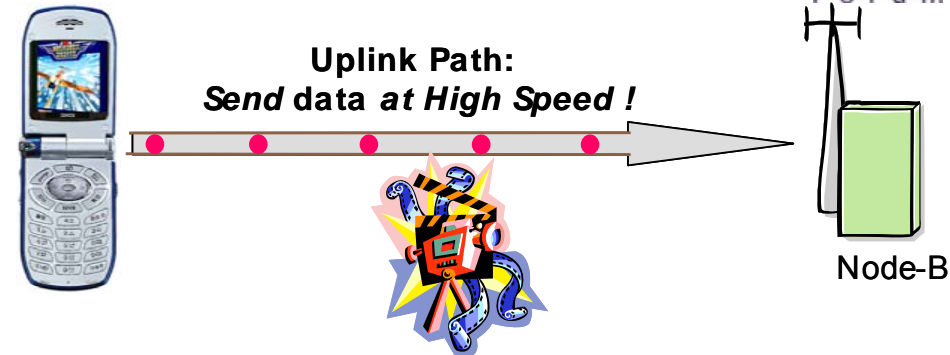


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HSUPA: 3GPP Standard Release 6

- **Objectives ...**

In complement to HSDPA, HSUPA balances **Uplink** traffic **up to 5.76 Mbps**



▶ **Main Operators' benefits:**

- > Increase system capacity with More efficient usage of Resources:
 - > Result = Higher cell capacity: **from 40 to 90% !**
- > Data applications booster ...

▶ **End-users' benefits:**

- > Improve throughput and Reduce delay to access Multimedia Services (upload time drastically improved): **average UL throughput: 1.3 Mb/s**
- > Reduce RTT: **60ms** instead of 180 ms for DCH only !

• **... and a mandatory step for VoIP**

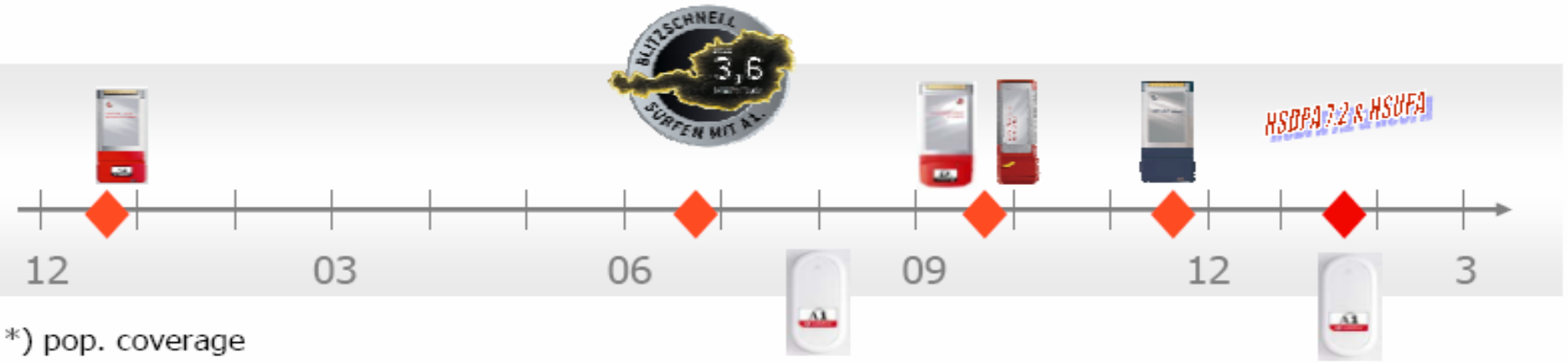
Source: Alcatel



HSPA – operator case studies

HSUPA launch in Austria – Feb.07

- **January 2006:** HSDPA - first in Europe
- **June 2006:** HSDPA 3.6 - in metropolitan areas
- **September 2006:** HSDPA - nationwide rollout (>75% *)
- **November 2006:** HSUPA - live Demo in Vienna
- **February 2007:** integrated HSDPA 7.2 and HSUPA



*) pop. coverage



HSPA – operator case studies

Preparing for future multimedia applications

Challenge:

- Most of the multimedial content is generated while on the go
 - Photographing
 - Filming

Customer requirements of today and tomorrow:

- Easy and fast content publishing in internet
- Sending photos and presentations outside the office

Solution: HSUPA and HSDPA for high speed content up and down load

- Immediate publishing of images and video clips
- Video Streaming and content retrieval in real time



HSPA+

- Requested by operators to get maximum return from their UMTS networks

Radio Interface
optimisation



Network
architecture
evolution

- MIMO (average * 1.2+)
- 64 QAM (average * 1.2+)
- VoIP improvements (CPC)

- Stand Alone Node B that incorporates RNC functions and connects to the CN or directly to the Internet

- **Part of 3GPP Rel. 7**

Source: Alcatel



3G Long Term Evolution (LTE)

Key industry objectives

→ Mobile broadband is an evolutionary process to optimise current assets, before moving towards new systems, network radio interfaces and spectrum

- **LTE** describes initiatives co-ordinated by the Third Generation Partnership Project (3GPP) to define a new generation of mobile communications systems.
- **LTE** offers a smooth evolutionary path to higher speeds, with more efficient use of operators' finite spectrum assets and a richer, more compelling mobile service environment.
- **LTE** protects operator investments in GSM/WCDMA/HSPA systems, allowing smooth migration according to market requirements while retaining the benefits of 3GPP family technologies (security, worldwide coverage and roaming etc)



How will 3G LTE achieve its characteristics ? *Key Principles*

OFDM

Larger peak rates and **average throughput**

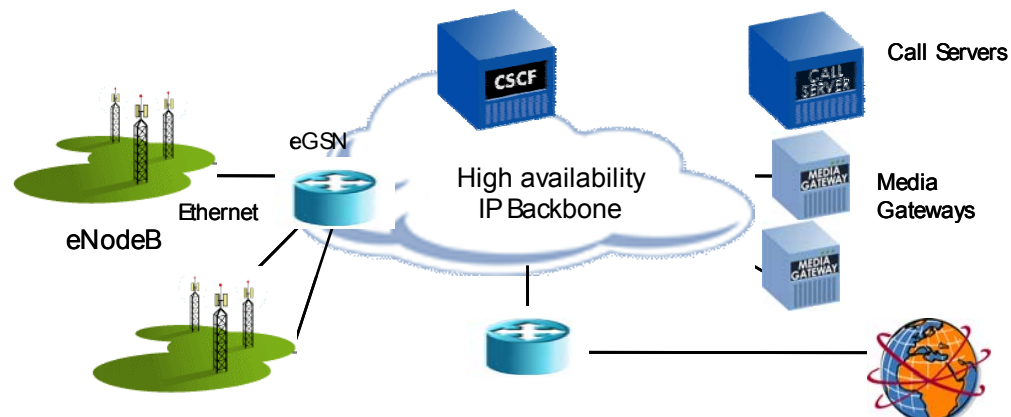
- > 2 * HSPA+ through better propagation and error correction, subfrequency selective allocation, interference mitigation at cell edge
- More powerfull and performant MIMO algorithms
- Macro diversity no more needed



Flat
Architecture

Ultra Low latency (10 ms instead of 60 ms for HSPA)

- Short TTI (0.5 ms instead of 2ms for HSPA) and the flat architecture
- Backhaul based from day 1 on IP / MPLS transport



Source: Alcatel



in BWA for
as 22

20-23 NOV. 2007, MOSCOW, RUSSIA

Towards 3G LTE...

- 3G LTE is a **NEW TECHNOLOGY** that will provide:

New services



Increased Support of
existing services

Possible thanks to 3G LTE performances

- *... To many more users than existing technologies*
- *... At a lower cost*
- *... And via by a simple upgrade of 3G networks*



What will LTE deliver?

New RAN delivers increased data rates

All-new radio access network combining OFDMA for downlink with Single Carrier FDMA (SC-FDMA) for uplink. Downlink peak speeds up to theoretical 100 Mbps per 20MHz of spectrum and uplink up to 50 Mbps per 20 MHz of spectrum.

Improved use of existing and future spectrum resources

LTE can be deployed in as little as 1.25 MHz of contiguous spectrum, in contrast with WCDMA that requires a minimum carrier width of 5MHz. Optimum performance in cell size of up to 5 km. It is still capable of delivering effective performance in cell sizes of up to 30 km radius, with more limited performance available in cell sizes up to 100 km radius.

Reduced latency

Round-trip latency times as low as 10ms or even less (compared with 60ms for HSPA), for a more responsive user experience, allowing more interactive, real-time services such as audio/videoconferencing and multi-player gaming.

All-IP environment

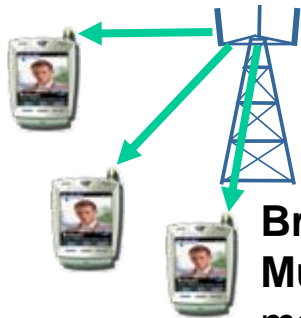
Transition to 'flat' all-IP based core network with a simplified architecture and open interfaces. Systems Architecture Evolution (SAE) targets more flexible service provisioning plus simplified interworking with fixed networks

Co-existence with legacy standards

Allows smooth, seamless call handover in areas of HSPA, WCDMA or GSM/GPRS/EDGE coverage with access to a limited service set.



3G LTE enables new services and enriches existing 3G applications



Broadcast and Multi-cast Services: one-to-many transmission of high-quality video and audio



**Video Telephony
Multimedia conferencing & net meeting:** videoconference plus real time office applications

Gaming: real-time P2P and multiplayer gaming with console quality and performance

Industrial: Maintenance, Military, 3D CAD



Location Based Services: user or device-based



AV/multimedia: enhanced performance with legacy download and streaming applications

E-commerce: Travel services, electronic ticketing & stock trading with assured QoS and security



LTE Market Potential UMTS Forum Report: new services classification

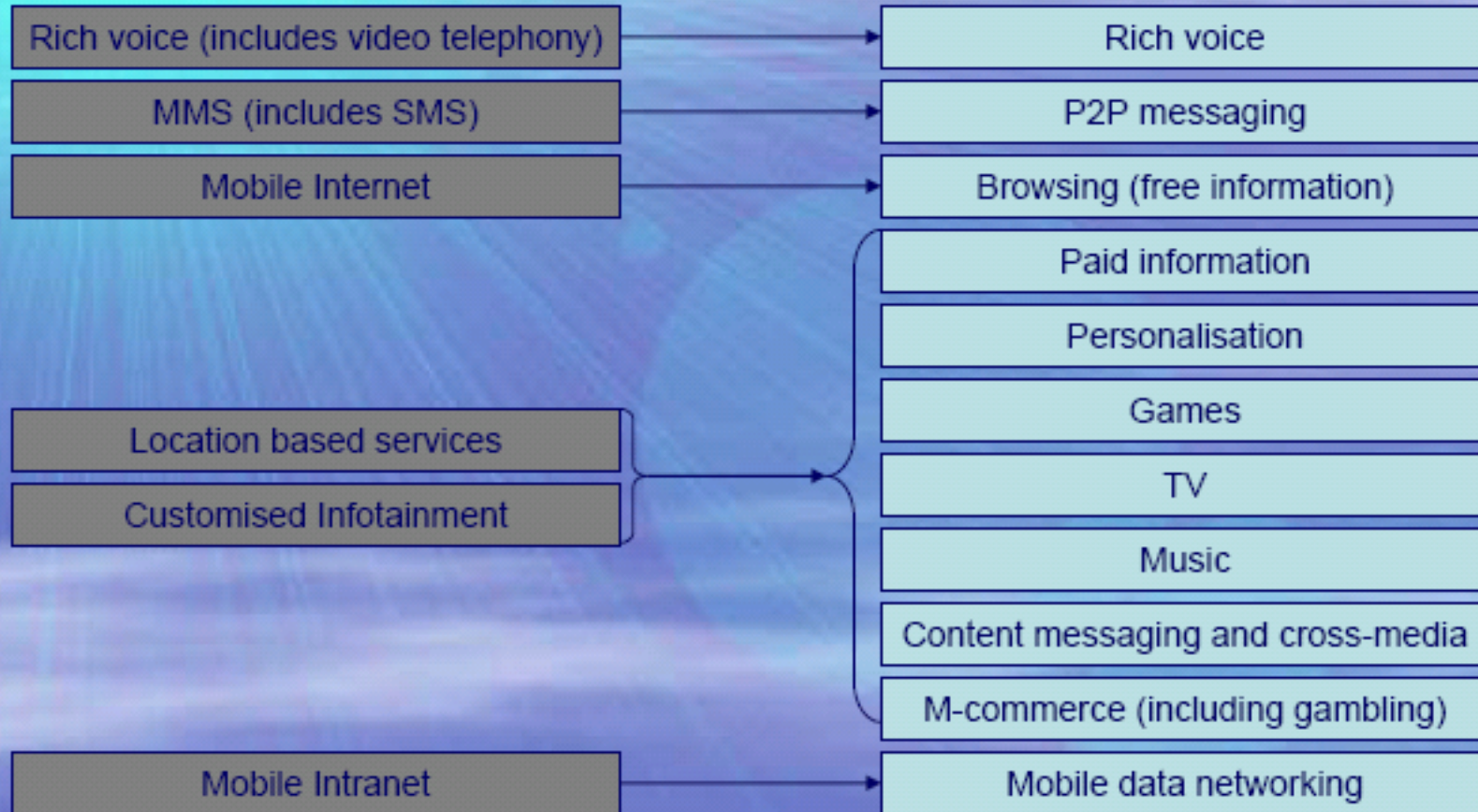


UMTS
Forum

Forum

UMTS Forum existing classification:

Proposed new classification:



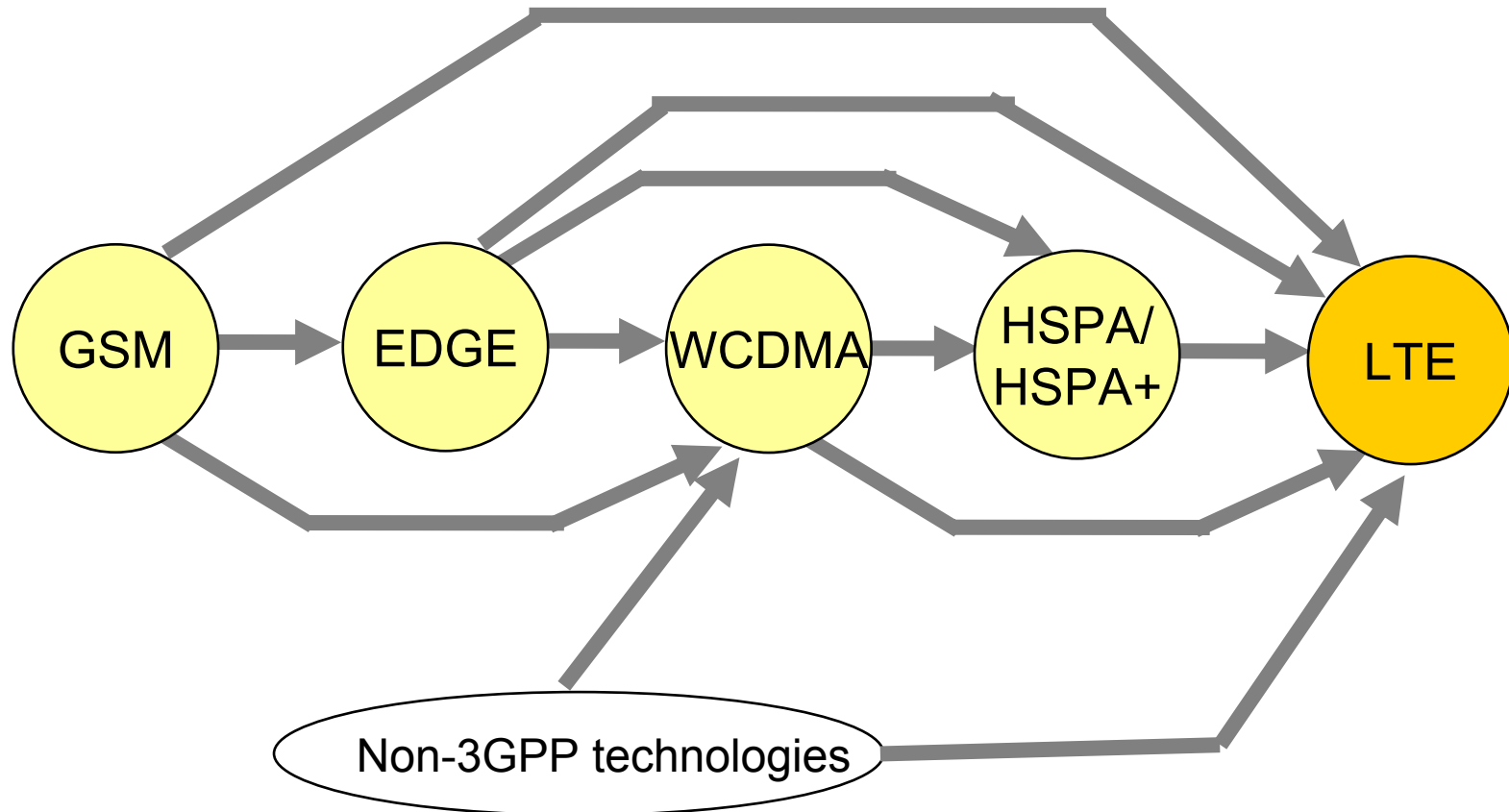
LTE key parameters compared

Generation : RAT	Spectrum	Carrier- Bandwidth	Radio- Principle	RAN (other than air-if)
2G : GSM [HSCSD] GPRS EDGE	900+1800 850+1900 [450 refarmed]	200 kHz	TDMA	GERAN
3G / IMT2000 (UMTS) : Rel.99 W-CDMA HSDPA HSUPA	1920-21xx (coreband) 2500-2690 (ext. band)	5 MHz	CDMA	UTRAN
LTE	[+2G refarmed]	"n"*5 MHz n=(1/3,)1,2,3,4	OFDM(A) (expected)	evolved UTRAN
" IMT Advanced" (beyond IMT2000) :	NEW, t.b.d. (expected)	Up to 100 MHz (expected)	OFDM(A) (expected)	NEW, t.b.d. (expected)

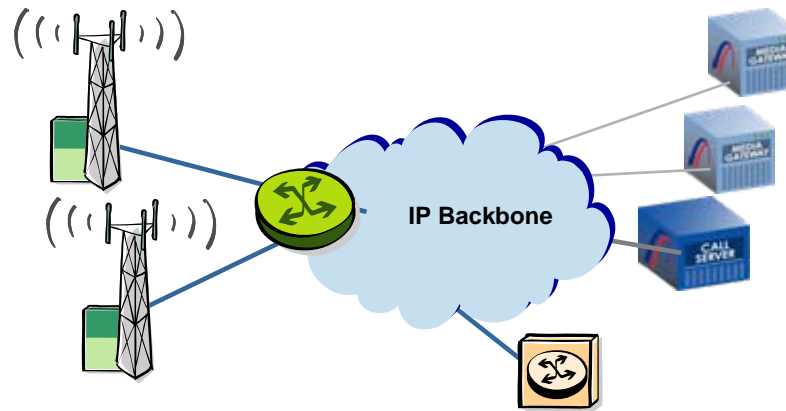


A choice of upgrade paths

LTE gives operators flexibility to migrate from current and legacy 3GPP and non-3GPP systems



How will 3G LTE and HSPA+ co-exist ?



- ➔ The backhaul used for 3G LTE will be based on IP/MPLS
- ➔ It will be easily integrated with the backhaul of GSM and UMTS
 - that will either have been migrated to IP/MPLS transport or that will be possible to emulate over an IP/MPLS network

Source: Alcatel

Finally .. the impact on existing networks will be minimized !



LTE timeline

- 3GPP LTE RAN Task Force created at end 2004
- First technical demonstration in 2006, when Siemens (now Nokia Siemens Networks) presented viability of HDTV streaming at bitrates of more than 30Mbit/s
- Nortel publicly demonstrated first complete LTE air interface implementation in February 2007 – including OFDM-MIMO, SC-FDMA and multi-user MIMO uplink – at 3GSM World Congress
- With 3GPP Release 8 now stable, commercial launch of first LTE networks and terminal devices expected around 2010
- Study by ABI Research suggests LTE will dominate the world's mobile infrastructure markets after 2011



Wireless Networks Will Co-Exist

Source: WiMAX Forum

WAN

MAN

LAN

PAN

3G/3G+

LTE
HSPA
WCDMA
EDGE
GPRS

WiMAX*
802.16,
WiBro

Wi-Fi*
802.11

UWB
and
Bluetooth

RFID/
TAG

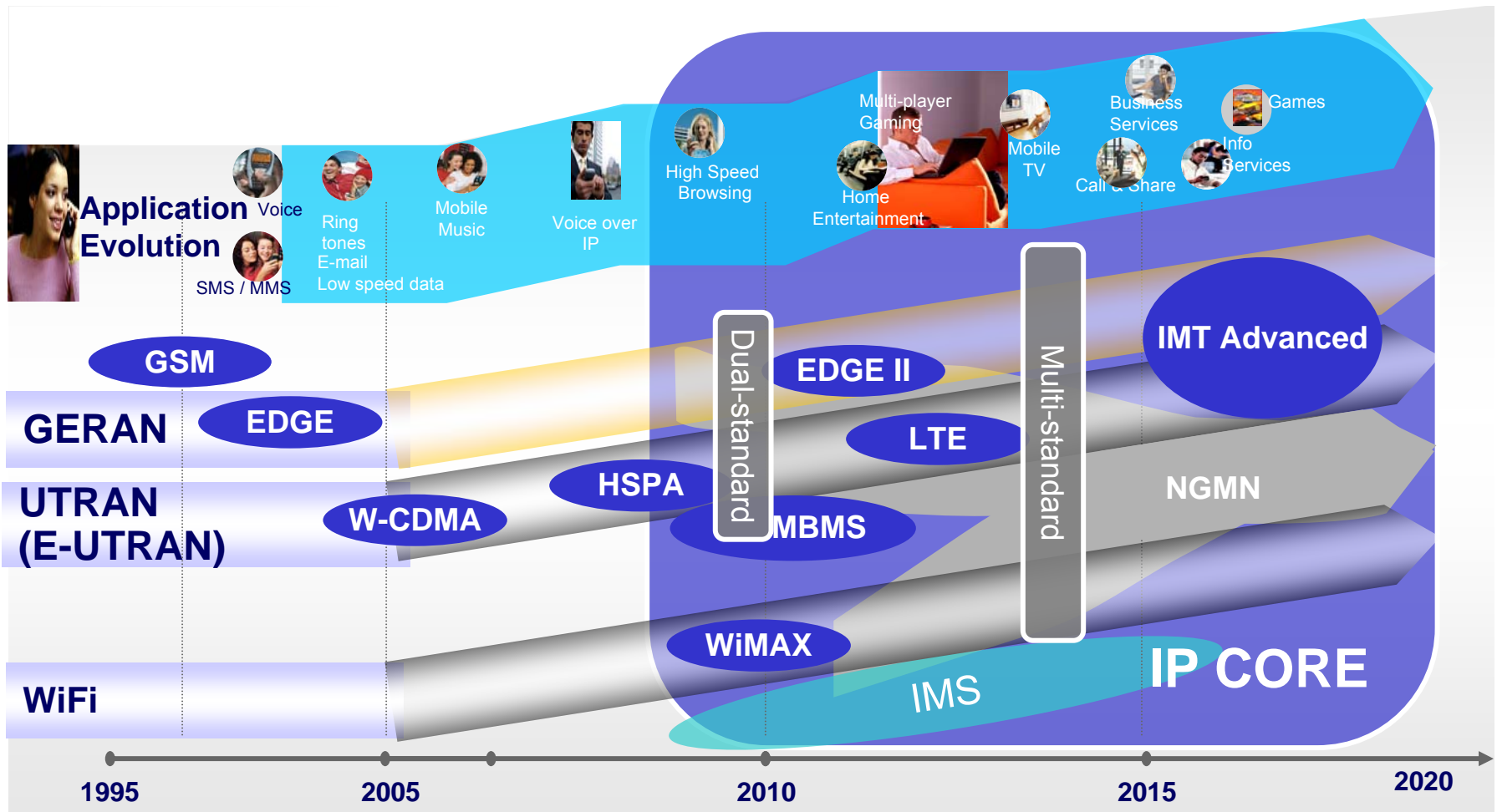
The Result: Always Best Connected



Promoting the global success of
third generation mobile

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IP centric and multiple access evolution



Towards IMT-Advanced and 4G

- ITU-R has now confirmed that ‘IMT-Advanced’ will be used officially to designate 4G technologies
- IMT-Advanced infers ubiquitous access to broadband services
- Core requirements include all-IP architecture and improved radio efficiency to deliver higher data rates and lower latency with advanced mobility management and interworking with other networks... *at realistic cost for industry and end users*
- Various OFDMA-based candidate technologies already on table
- Detailed technical requirements expected around 2009, with first market-ready solutions available from around 2012

At WRC-07, UMTS Forum has called on administrations to allocate sufficient additional spectrum below 5 GHz on globally harmonized basis to meet future market demand for IMT-Advanced services in 2015-2020 timeframe, with a particular emphasis on UHF band for coverage and C-band for capacity needs



Russia/CIS... on the road to 3G/3G+

The "Big Three" win 3G licenses in Russia:

➔ MegaFon, Mobile TeleSystems and VimpelCom were named as winners of the IMT-2000/UMTS licenses on 20th April 2007

- The three operators are expected to work on clearing of the allocated radio-frequency bands necessary for 3G networks
- They will begin network roll out in Moscow & St Petersburg, targeting at first the business customers:



- MTS plans to roll out a UMTS/HSDPA network in the big cities in 1H 2008



- VimpelCom has announced it will invest 350M\$ in a WCDMA network by end 2008

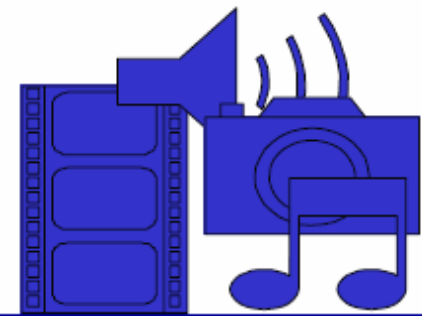
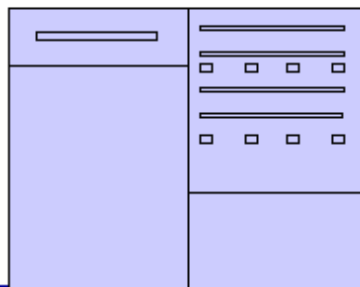
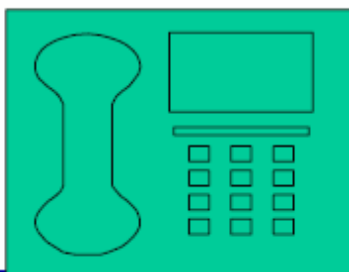


In Ukraine, Astelit has conducted its first 3G trials calls, including HSDPA, and Ukrtelecom plans to launch 3G+ network by end 2008



Russia/CIS' future lies in the next mobile broadband technologies

- 3G deployment fueled by opportunity to increase spectrum efficiencies, alleviate network capacity constraints, and lower operating costs:
 - Higher voice capacity of 3G spectrum (4-5x) will:
 - mitigate spectrum availability issues in big cities
 - be the platform to deliver low cost voice telephony, due to the high network cost gain per traffic unit brought by UMTS/WCDMA/HSDPA vs. 2G
 - Mobile operators will leverage spectrum efficiencies to improve voice QoS
- 3G will help achieve broadband penetration, as a valuable tool to reach out into rural areas



CEE and Baltic Countries in the right track...

- **WCDMA** and **HSDPA** already launched in Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Serbia, Slovak Republic, Slovenia,
- **HSUPA** launched in Bulgaria in summer 07 and under deployment in Croatia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania and Slovenia...



Russia/CIS/CEE/Baltic – deploying mobile broadband...

With the timely licensing and deployment of 3G/WCDMA/HSPA, Russia/CIS have the opportunity to maintain alignment with the GSM/UMTS world and enjoy the benefits of:

- *one network, one technology and one complete service offering*
- *greater economies of scale → lower prices for terminals & infrastructure, wider choice of cost-effective handsets*
- *chipsets now available as PC cards, as embedded modules in laptops and in 3G modems for fixed-wireless broadband access*
- *simplified international roaming and IPR export opportunities for services and applications*

3G/UMTS/HSPA wireless technology & Long Term Evolution will bring advanced broadband & communication services to Russia, CIS, CEE & Baltic



For more information
www.umts-forum.org

