

# 3G/UMTS

## An evolutionary path to Next Generation Networks

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

**Jean-Pierre Bienaimé**

Chairman, UMTS Forum

[www.umts-forum.org](http://www.umts-forum.org)



ITU/BDT Regional Seminar  
Nairobi 9-12 May 2005

## Summary

- What is the UMTS Forum?
- What is the global status of 3G/UMTS launches?
- What terminals, services and tariffs are available?
- 3G/UMTS evolution from launch through to Release 6
- A look to the future
- Viewpoint on spectrum
- Lessons learned in Europe



ITU/BDT Regional Seminar  
Nairobi 9-12 May 2005

# 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...



ITU/BDT Regional Seminar  
Nairobi 9-12 May 2005

# UMTS Forum Key Areas of Activity in 2005



## Spectrum & Regulation

Studies and contributions on harmonisation of global spectrum and additional spectrum arrangements for IMT-2000 and its evolutions, in the perspective of European decisions and in preparation of WRC-07

In particular, the UMTS Forum has contributed to the development of the European decision harmonizing the frequency band 2500-2690 MHz for IMT-2000/UMTS and defining the channelling arrangements

Guidance to regulatory authorities and national administrations on licensing and other 3G-related issues

## Promotion

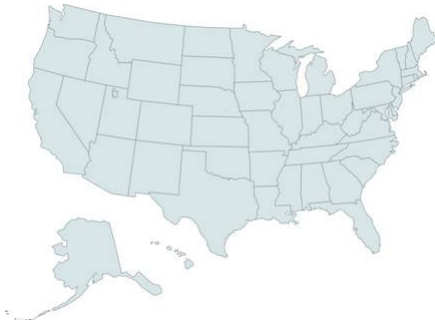
Dialogue with media, investment communities and public authorities; presence at leading industry events; partnerships with international standards institutions and other industry bodies (ITU, EC, 3GPP, ETSI, CEPT, GSMA, 3G Americas, A3G Russia,...)



ITU/BDT Regional Seminar  
Nairobi 9-12 May 2005

# Standardisation is key to market success

Multiple standards fragment the market and drive up the cost of interoperability



## USA:

Technological fragmentation across one nation with 5 wireless standards:

mobile penetration rate = 65.4%

## Western Europe:

Geographic fragmentation with 18+ nations and one wireless standard: mobile penetration rate (SIM) = 92.3%

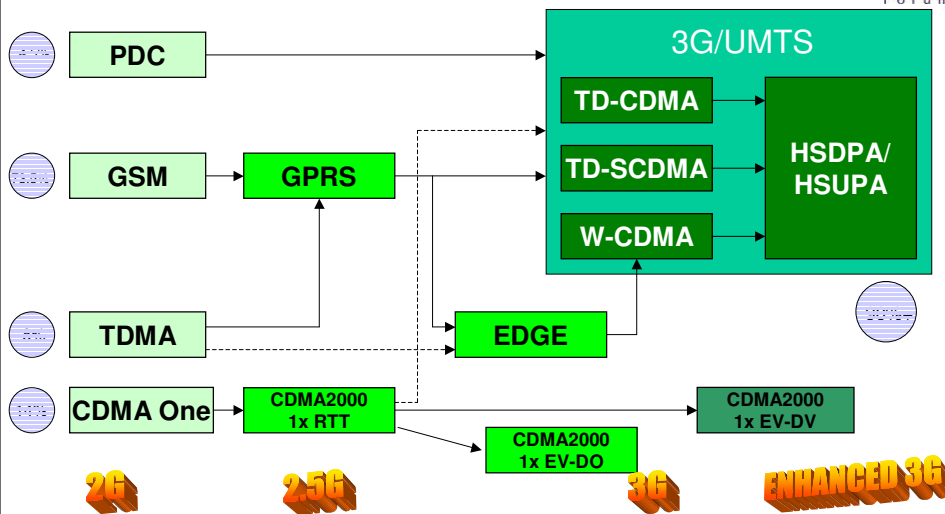


Status: February 2005



ITU/BDT Regional Seminar  
Nairobi 9-12 May 2005

# 3G Operator Evolution Options



ITU/BDT Regional Seminar  
Nairobi 9-12 May 2005

## 3G/UMTS Global Update



- Almost 70 networks in commercial service in 30 countries with many others in trial/pre-launch
- Over 22 million 3G/UMTS subscribers (April 2005), and growing fast
- 130+ 3G/UMTS licenses awarded in 45 countries
- WCDMA take-up faster than GSM at the same stage



ITU/BDT Regional Seminar  
Nairobi 9-12 May 2005

## UMTS: The Leading 3G Choice



**8 of the world's 10 biggest operators have already selected UMTS/WCDMA...**

Operator	2G technology	3G choice
China Mobile	GSM	UMTS/ WCDMA
Vodafone Group	GSM	UMTS/ WCDMA
China Unicom	GSM/CDMA	to be confirmed
T-Mobile International	GSM	UMTS/ WCDMA
Orange SA	GSM	UMTS/ WCDMA
TIM Group	GSM	UMTS/ WCDMA
Telefonica (TEM + BellSouth)	GSM	UMTS/ WCDMA
Cingular / ATT Wireless	GSM/TDMA	UMTS/ WCDMA
NTT DoCoMo	PDC	UMTS/ WCDMA
Verizon Wireless	CDMA	CDMA2000



ITU/BDT Regional Seminar  
Nairobi 9-12 May 2005

# A world of 3G/UMTS services



The collage displays several mobile service interfaces:
 

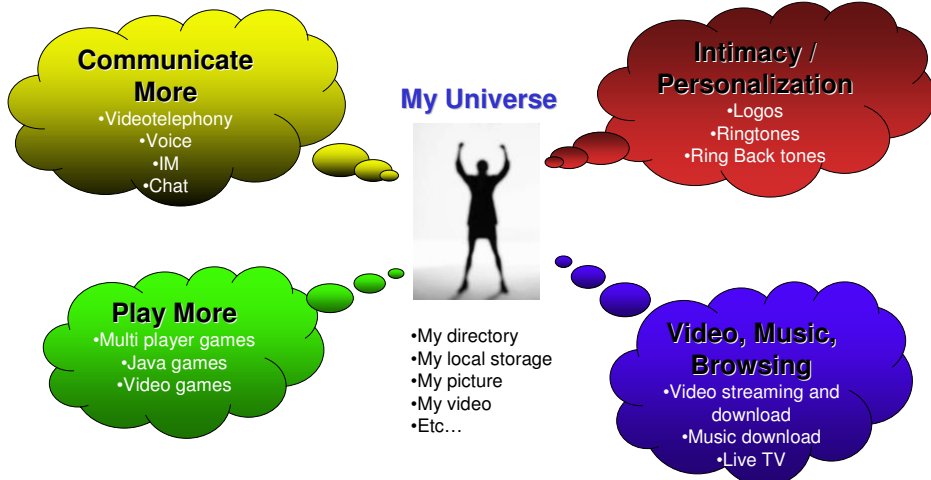
- Orange World Video:** A grid of video thumbnails with text like "Sounds like fun" and "Let's go to the sea!".
- Music:** A section for "MTV Home" featuring a music player interface.
- Games:** A "Games home" screen with options like "Alien Swarm" and "Play Golf".
- News/Info:** A "Sport" section with "What's New Headline" and "Celebrity Gossip".
- Other services:** "Find the perfect restaurant now!", "break free!", "Lose yourself on the links Play Golf", and "Horoscopes".

Information, entertainment, news, interactive games, video & movie clip downloads, high quality streaming video, video telephony and conferencing, mobile TV, video messaging, sports highlights, audio, ringtones, location-based services, mobile Internet & email, voice... **AND MORE**

Promoting the global success of third generation mobile

ITU/BDT Regional Seminar  
Nairobi 9-12 May 2005

# The 3G/UMTS Customer Universe



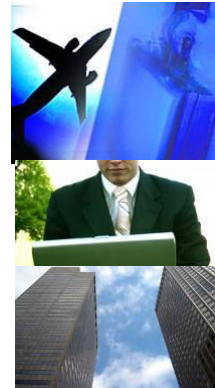
Promoting the global success of third generation mobile

ITU/BDT Regional Seminar  
Nairobi 9-12 May 2005

## 3G/UMTS for business

### Broadband mobile supports corporate IT systems

- Internet and intranet access up to 384 Kbit/s with 3G/UMTS/GPRS PC card or via handheld terminal
- Examples of new high performance services enhanced by broadband wireless:
  - intranet, email with attachments
  - office access (email, diary)
  - photo/video multimedia messaging
  - web conferencing
  - mobile and fixed-line live video telephony



ITU/BDT Regional Seminar  
Nairobi 9-12 May 2005

## 3G Portals: driving the mass market

### Asian feedback and European launches...

• **JAPAN:** 2G portals have already been widely adopted, and now operators are encouraged to add 3G services and content – sometimes tailored to specific handsets. E.g. FOMA has accelerated uptake through launch of more attractive handsets coinciding with 'all you can eat' flat-rate tariffs and compatibility with 2G services



• **SOUTH KOREA:** operators have opted for dedicated 3G portals with specific branding, personalised handsets and 3G tariffs backed by aggressive marketing to drive ARPU



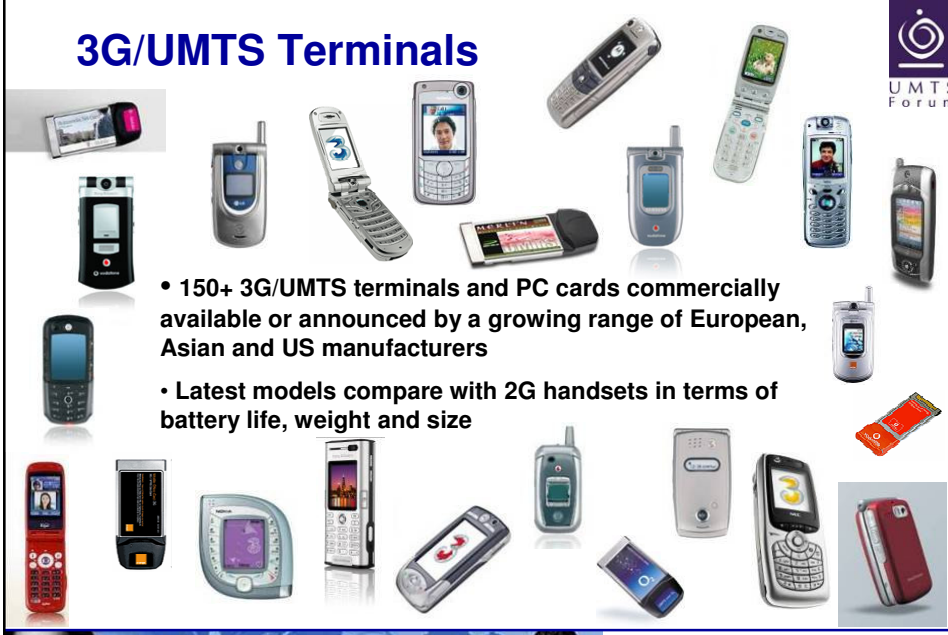
• **EUROPE:** 3G/UMTS portals offering a variety of video content are now in launch (Orange, Vodafone, Hutchison 3G, TIM etc) supported by growing choice of handsets



ITU/BDT Regional Seminar  
Nairobi 9-12 May 2005



## 3G/UMTS Terminals



- 150+ 3G/UMTS terminals and PC cards 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



ITU/BDT Regional Seminar  
Nairobi 9-12 May 2005

## 3G/UMTS Tariff Examples



New networks... new services... new charging models

**O2 Germany:**  
Connection Manager combines Mobile and WiFi. Card priced from €99.95 with connection to 'Active UMTS Data' tariff

	Basic monthly charges	Communications allowance <sup>1</sup>
FOMA Plan €7	¥6,700 (¥7,035 incl. tax)	¥4,050
Peak-Hourly	¥3,900 (¥4,095 incl. tax)	—
i-mode	¥150 (¥157 incl. tax)	—
<b>Total</b>	<b>¥10,750 (¥11,287 incl. tax)</b>	<b>¥4,050</b>

Combining Kihnen Discount and Family Discount<sup>2</sup> ↓  
**Total ¥8,400**  
 (+8,820 incl. tax)

FOMA includes price plans optimised for heavy i-mode and e-mail users. To access portal and video content, customers pay for a monthly "packet pack" of at least ¥3,000 (€22.6) plus per-event charges. Customers must also have an i-mode subscription



**Orange France** announced 4 'Orange Intense' bundles priced from €55 to €195 per month with up to 20 hours/month included + free unlimited voice calls beyond 3 minutes



**UK: 'ThreePay'** combines voice calls with inclusive allowance for other '3' services

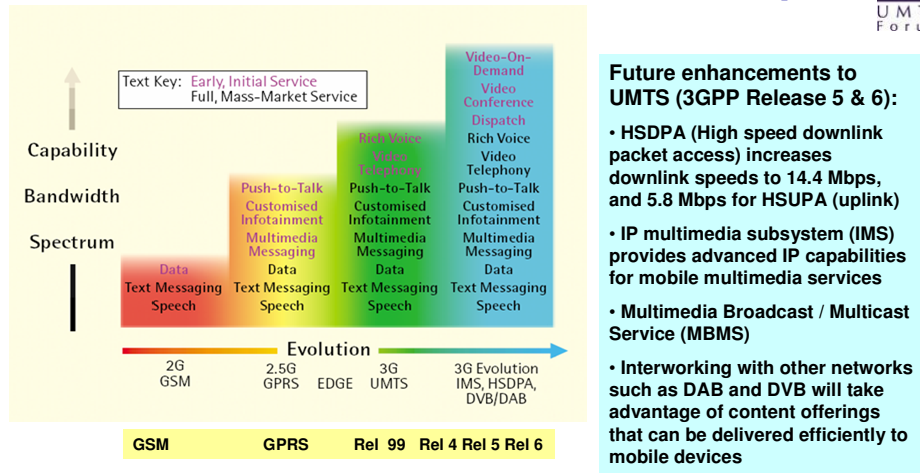


**Vodafone UK** offers 3G/UMTS datacard from £99, plus £88 monthly access inclusive of 1,000 MB data



ITU/BDT Regional Seminar  
Nairobi 9-12 May 2005

# 3G/UMTS service evolution roadmap



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



ITU/BDT Regional Seminar  
Nairobi 9-12 May 2005

## HSDPA

The next step in evolution of the 3GPP air interface



**HSDPA = true 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.

Compared with WCDMA, HSDPA:

1. increases throughput (2→14.4 Mbps)
2. reduces latency
3. increases data capacity up to 5x in dense urban environments (micro-cells)



ITU/BDT Regional Seminar  
Nairobi 9-12 May 2005



# 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:

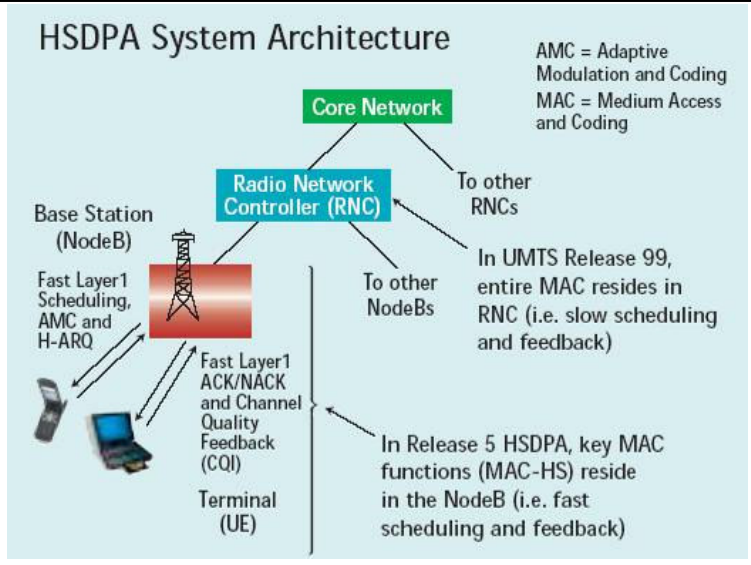
- Dynamic adaptive modulation & coding, multicode operation,
- Fast scheduling of packet data, fast physical layer retransmission of data packets.

...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.



ITU/BDT Regional Seminar  
Nairobi 9-12 May 2005

## HSDPA System Architecture



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.



ITU/BDT Regional Seminar  
Nairobi 9-12 May 2005

## 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



ITU/BDT Regional Seminar  
Nairobi 9-12 May 2005

## 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



ITU/BDT Regional Seminar  
Nairobi 9-12 May 2005

# IMS separates RAN, transport and control functions

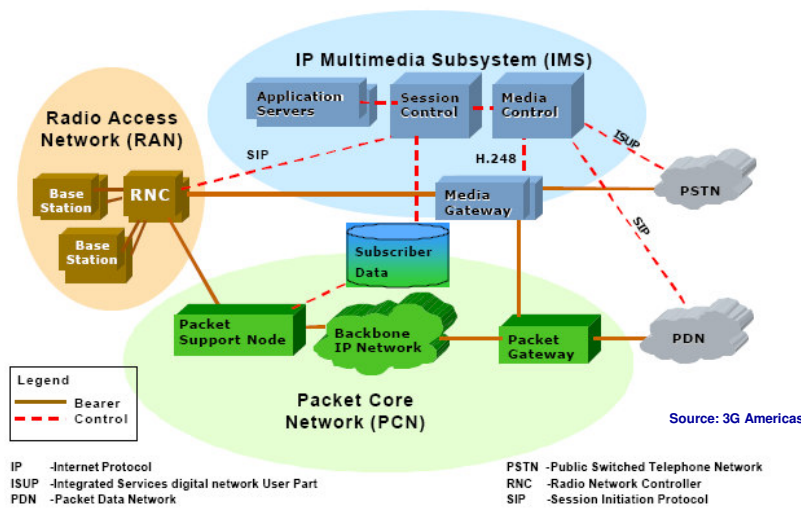


- The Radio Access Network provides the over-the-air **connection** from user equipment to core network plus low level mobility management
- The Packet Core Network provides **transport** for signaling and bearer plus high level mobility management
- The IMS provides **control** of applications, plus control of session and media conversion.

**With IMS, media control, session control and application control are separated as distinct entities.**



# 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 benefits to operators...



- Standards-based implementation enables interoperability between mobile and other IP networks
- Infrastructure and administrative cost savings which decrease the investment threshold for new services deployment
- Standard network elements (e.g. routers) are used, thereby reducing infrastructure deployment and expansion costs



ITU/BDT Regional Seminar  
Nairobi 9-12 May 2005

## 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



ITU/BDT Regional Seminar  
Nairobi 9-12 May 2005

## Tomorrow... mobile broadcast (DVB-H)



- Complementary to EDGE and 3G/UMTS, DVB-H brings “broadcast” services to handheld devices:
  - From « one-to-one » to « one-to-many »
  - Simultaneity, speed and capacity
  
- What mobile operators bring to DVB-H:
  - True interactivity via cellular networks
  - Access to a new range of customers and their mobility usage
  - Controlled content distribution to mobile users
  - Mass market distribution of UMTS/DVB-H handsets

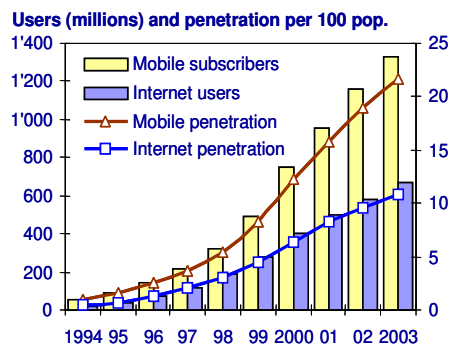


ITU/BDT Regional Seminar  
Nairobi 9-12 May 2005

## 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



ITU/BDT Regional Seminar  
Nairobi 9-12 May 2005

## UMTSF Viewpoint on Spectrum



### Recommendations on use of other bands for IMT-2000

- Requirement for roaming and interoperability means that **globally harmonised frequency bands** will minimise requirements for multi-mode/multi-band terminals
- Further studies within ITU, as stated in WRC 03 Resolution 228, will be the basis for additional identification of spectrum for the development of IMT-2000, in particular for rural areas... typically in the 470-600 MHz (cf. UMTS Forum Report 38 "Coverage Extensions Bands for UMTS/IMT-2000 in the bands between 470-600 MHz")
- "Unique" national allocations or mixed band plans will not serve the interest of mobile users and the market as a whole, e.g. 1900 MHz issue in India
- Technology Neutrality = open to technologies within an harmonized radio-spectrum band allocation

**UMTS Forum recommends that new frequencies for 3G/UMTS services must be proposed to all operators on a transparent basis and globally harmonised**



ITU/BDT Regional Seminar  
Nairobi 9-12 May 2005

## Lessons learned so far in Europe...



- Market growth for 3G/UMTS depends on ALL elements (network coverage and quality, terminals, services, customer care...) being successfully in place.
- High licensing costs in some territories have imposed a major financial burden on operators to deploy 3G/UMTS. Further licensing should thus be conducted in a way that creates a fertile market rather than placing undue constraints on operators to launch services.
- Large-scale availability of attractive, competitively priced terminals is a key enabler for market acceptance of 3G/UMTS.
- Operators must offer services to customers that provide a smooth evolution from their current 2G experience.
- Appealing data and multimedia services are demonstrated to increase operator ARPUs: customers love 3G/UMTS when they experience it for themselves!
- Operators must assess the role of other complementary technologies (WiFi, WiMAX etc) and future enhancements to 3G/UMTS as part of their overall service proposition to customers.



ITU/BDT Regional Seminar  
Nairobi 9-12 May 2005

## Africa – preparing for 3G/UMTS



Africa has already entered the 3G/UMTS world:

- South Africa (Vodacom) and Mauritius (Emtel) launched in December 2004
- Some 3G networks in trial in Northern Africa (Algeria, Tunisia, Libya,...)

With the timely licensing and introduction of 3G/UMTS, Africa will have the opportunity to join 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

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



ITU/BDT Regional Seminar  
Nairobi 9-12 May 2005



**For more information...**

**[www.umts-forum.org](http://www.umts-forum.org)**



ITU/BDT Regional Seminar  
Nairobi 9-12 May 2005