Seminar Closing

Conclusions and Closing Remarks

ITU-BDT Regional Seminar on Broadband Wireless Access (BWA) for rural and remote areas for Africa

Yaoundé, Cameroon, 18-21 September 2006

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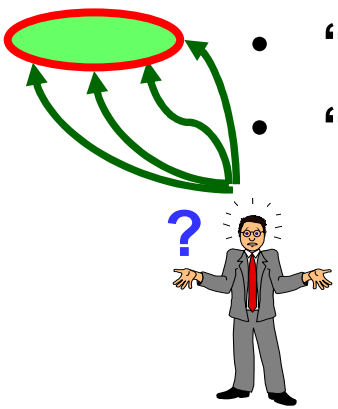
ITU, ITU-T, ITU-R, ITU-D **Sr. Mgr., Intl NW Stds** **WiMAX Forum RWG** **ETSI BRAN**

Introduction

- **This presentation, prepared during the seminar to reflect the key points in ~45 presentations totalling ~1160 slides, aims to provide a summary of the key points of this seminar, and to provide an aid to more in depth review of the material contributed by our volunteer speakers.**

Quotations

- **"We always over-estimate the change that will occur in the next two years, and underestimate the change that will occur in the next ten years." ***
- **"When you get to a fork in the road, take it!" ****
- **"Prediction is very difficult, especially about the future." *****



* *Bill Gates, Microsoft Corporation*
** *Yogi Berra, American baseball player*
*** *Neils Bohr, Danish Physicist*

Key Overall Messages (1/3)

- **Telecoms is a basic social need and an engine for economic growth: a national priority**
- **Broadband Wireless Access is a key technology for bridging the digital divide, but just a part**
- **There are multiple possible access solutions, so ...**

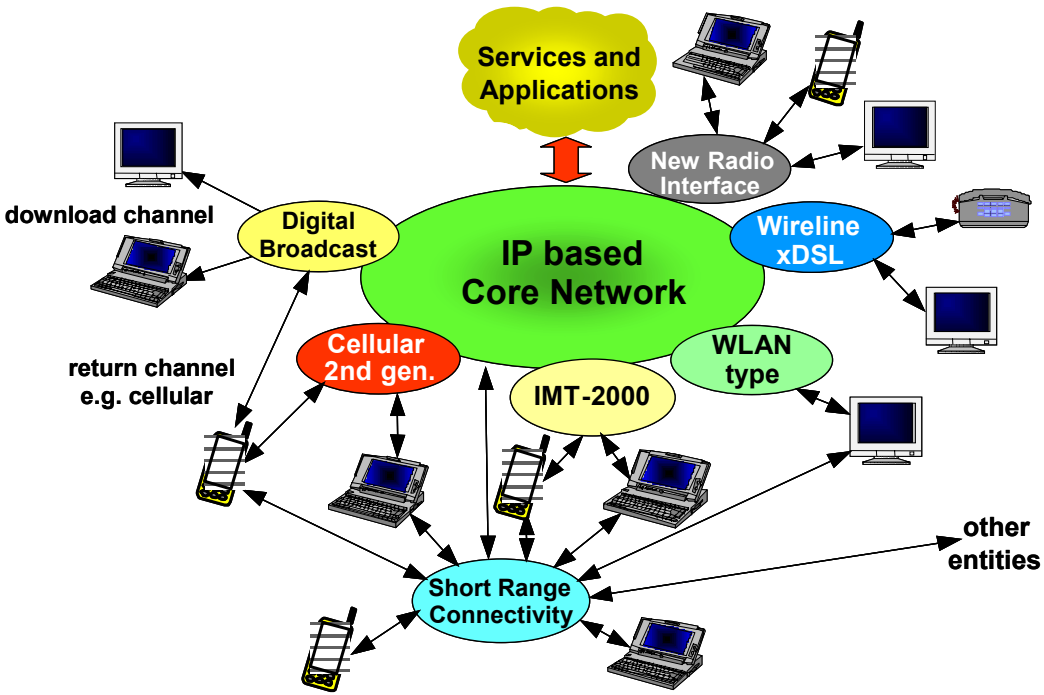
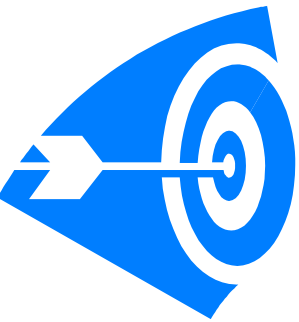


Figure 4/ITU-R Rec. M.1645
Figure 5.1/ITU-T Supp. 52

Future network of systems beyond IMT-2000 including a variety of potential interworking access systems

Key Overall Messages (2/3)



- **... with multiple solutions, how to "hit the target"?**
  - Know your market: your customer needs, market potential, deployment challenges, business case, etc.
  - Recognize that technologies are evolving, will continue to do so
  - Ensure well informed on ITU-R spectrum allocations
  - Consider what is, will be available, at time you want to deploy
  - Each technology has its pros and cons, each has its place: your situation may well require multiple complementary approaches
- **Voice is important, but need data for future services**
- **Remember the core network infrastructure!**
- **Bit rates up: media/telecom/data convergence, and service/device/network convergence: look forward!**
- **Strong industry alignment of visions, perspectives**
  - Individual technologies have their champions but, overall, there are highly consistent views on future directions

Key Overall Messages (3/3)

- **We have heard many points of view ...**
  - Sometimes conflicting ...
- **We need to manage our expectations:**
  - One size does not fit all. There is no panacea.
  - Users may need some education to get started, but will take services & usage in unexpected directions!
- **Be realistic:**
  - There are no simple answers.
  - You will need to do some work to find the right combination among the available options to match your specific needs.
  - There is a right combination among the available options to match your specific needs.

Opening

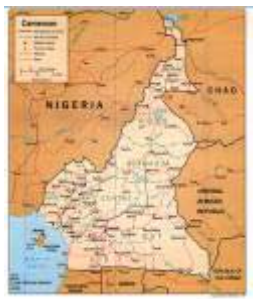
ITU-BDT Welcome

- **Chali Tumelo** (ITU/BDT Regional Office – Addis Ababa)

Introductory remarks/Keynote address/ITU Structure

- **John Visser** (ITU)
  - Today's technology literate young people are tomorrow's decision makers
  - Seminar outline; ITU structure and sector roles

Welcome Address

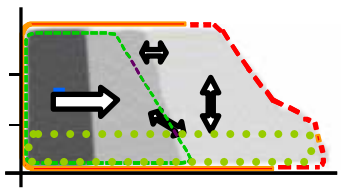


- **H.E. Bello Bouba Maïgari** (Minister of State, Minister of Posts and Telecommunications of the Republic of Cameroon)
  - Warm welcome, wishes for a very successful seminar
  - Telecoms a basic social need: internet, phone, TV
  - President's national priority: Cameroon part of info society
  - Cameroon is Africa in miniature, BWA enables Africa as a whole to win the battle of the last km

Session 1: Introduction to Wireless Broadband

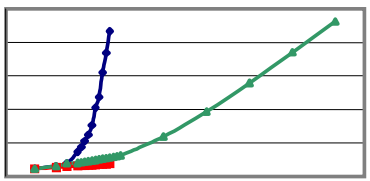
Session Chairman: John Visser (ITU, Nortel)

Global BWA Activities in ITU



- **Colin Langtry** (ITU-BR, presented by John Visser)
  - Overview of ITU activities and standards on BWA: Fixed and Mobile, IMT-2000, IMT-Advanced, and Satellite
  - ITU-R: Radio Regulations; ITU-T: NGN; SPU: workshops, publications, case studies; ITU-D: reports, seminars

ITU Development Activities on Wireless Communication



- **Riccardo Passerini** (ITU-BDT, presented by John Visser)
  - Digital divide is narrowing, BWA helping bridge
  - Shift to IP-based, mobile, portable Internet, having a positive effect: especially in developing countries: mobile >> fixed
  - Regulatory approach: strong influence on telecoms growth
  - Universal service: developing world need not follow Europe

Session 2: BB Programs and System Implementation (1/3)

Session Chairman: John Visser (ITU, Nortel)

ITU/BDT Project in the Region

- **Chali Tumelo** (ITU/BDT Regional Office – Addis Ababa)
  - Access challenges: : infrastructure, especially rural and underserved areas, spectrum, training, ...
  - Described activities to address the challenges
  - WTDC-2006: Regional Initiatives for Africa

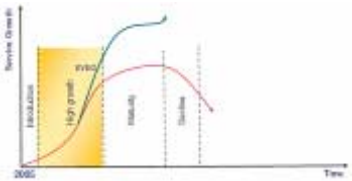
Utilisation du spectre de fréquence: Cas Orange Cameroun

- **Jean Le Bel Ngopnang** (Orange Cameroun)
  - Description of frequencies used and their applications
  - Radio engineering: Yaoundé traffic density variation
  - Emergence of data with demand for capacity and quality at fixed network levels; use of GPRS/EDGE for data services
  - Addressing coverage problems outside urban environment

Session 2: BB Programs and System Implementation (2/3)

CDMA Development in Cameroon

- **Fru Ane** (CAMTEL, Cameroon)
  - Coming from: Cu <optimal condition, Cu-based services
  - Today: deploying CDMA BWA, increasing range of services
  - Way forward: MMD, EVDO: internet access, e-Business, ...
  - Challenges: infrastructure, corporate culture, profitability



WiMAX Trial in Rural Canada - Case Study: Netago Wireless

- **John Visser** (Nortel)
  - Trial in rural Alberta, Canada; commercial summer 2006
  - Highly successful with satisfied operator and happy users
  - Spectrum: work closely with Regulator
  - Success factors: partnerships and relationships, site engineering and wireless experience are all important

Session 2: BB Programs and System Implementation (3/3)

Malawi's Rural ICT Development Programmes

- **Emily Heather Khamula** (MACRA, Malawi)
  - ICT development initiatives:
    - ICTs for Sustainable Rural Development (ISRD) Project: reduce poverty & isolation of rural communities thru ICT
    - Infrastructure Services Project (ISP): targets areas without ICT access, along with water, electricity, etc.
    - VSAT can provide coverage but high operating costs

Regulatory Process to Facilitate Wireless Access in Rural Areas of Tanzania

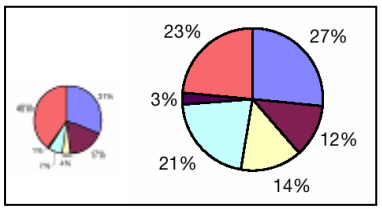
- **James M. Kilaba** (TCRA, Tanzania)
  - Aim: minimum level of communication available to all
  - Technology neutral licensing, and allow for small players
  - Results: new technologies rapidly deployed, new services, rural & remote areas becoming easy thru FWA, low tariffs
  - Challenges: security, power, spectrum, economics

Session 3: Regulatory aspects of Wireless Broadband (1/2)

Chairman: John Visser (ITU, Nortel)

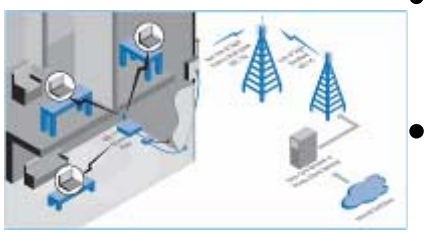
Key Messages on WRC-07 Agenda Items 1.4 & 1.9

- **Halina Uryga** (UMTS Forum)
  - Need to protect IMT-2000/UMTS from satellite interference
  - Need spectrum to meet high growth for evolving UMTS/ IMT-2000 mobile MM systems, mobile BB (IMT-Advanced)
  - Reduce digital divide through improving UMTS/IMT-2000 coverage in 470-600 MHz bands



BWA in Italy – The WI-FI and WIMAX Experience

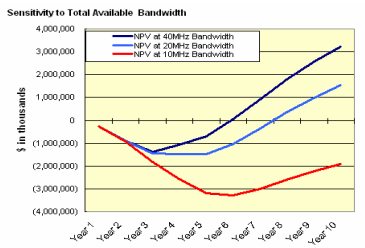
- **Fabrizio Savi** (Telecom Italia)
  - Review of Wi-Fi regulation, relaxed requirements from 2005
  - WiMAX trial launched Jul 2005: spectrum 'borrowed" from military; sensitive to interests of UMTS operators
  - Italian experience: WiMAX one of the elements contributing to integrated and converging networks



Session 3: Regulatory aspects of Wireless Broadband (2/2)

WiMAX and Regulatory Aspects

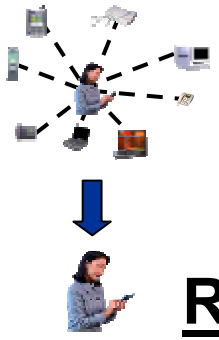
- **Turhan Muluk** (Intel Corporation)
  - WiMAX a real solution for true personal broadband mobile service, bringing BB to rural areas, bridge digital divide
  - "WiMAX friendly" technology neutral framework needed:
    - access to licensed spectrum: 2.5 GHz (mobile WiMAX)
    - greater access to licensed spectrum: 3.4 – 3.8 GHz
    - some license-exempt spectrum: 5.8 GHz



Session 4: International Wireless BB Standards (1/2)

Chairman: Nataša Gospić (ITU-D, U of Belgrade)

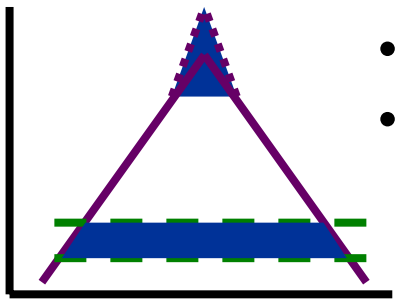
BWA Standards and Spectrum



- **José M. Costa** (Nortel); presented by John Visser
  - Overview of ITU activities: BWA, NGN, WMAN, RLAN, IMT
  - BB wireless MANs based on IEEE, ETSI standards, work on RLANs & IMT leading to ubiquitous BB wireless access
  - ITU spectrum allocations will enable global BB systems

Roadmap and Standards for continuing 3G evolution

- **Sachin Bhatmuley** (Qualcomm)
  - 3G technologies' data rates are increasing
  - CDMA offers spectral efficiency, low cost data
  - Handsets are affordable: costs declining
  - Affordable, ubiquitous coverage is crucial
    - lower frequencies contribute, but spectrum utilization is a challenge: look at refarming fallow spectrum



Session 4: International Wireless BB Standards (2/2)

WiMAX Forum RWG: Regulatory Issues and Progress in Support of WiMAX deployment

- **John Visser** (Nortel, on behalf of WiMAX Forum)
  - Summary of WiMAX Forum vision, charter, principles
  - Why "WiMAX Forum Certified™" and why it's valuable
  - Activities of RWG: emphasis on "WiMAX friendly regulation"

Standards Developed by ETSI BRAN

- **Bernd Friedrichs**, **Mariana Goldhamer** (Ericsson and Alvarion, presented by John Visser)
  - Wireless Broadband GLOBAL standards drive costs down
  - IEEE 802.16/WiMAX Forum/ETSI BRAN co-operation shows what can be done, mutual benefit
  - Provides important signal to market
  - Significant effort on test specs, basis for "WiMAX Forum Certified™"

Session 5: Broadband Technologies and Solutions (1/4)

Chairman: Kezias Mwale (Zambia)

3G/UMTS and Its Evolution: Worldwide Deployments and Services - Perspectives for Africa

- **Jean-Pierre Bienaimé** (Chairman, UMTS Forum)
  - Widespread deployment: seeing high speed mobile BB, high b/w services (mobile TV, music, maps) a market reality
  - Key success factors: meet needs, content and platform integration, coverage, economies of scale, low cost handsets, revenue models that drive demand and encourage usage: all lead to high data service uptake

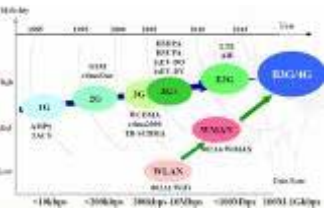
Wireless Broadband Access with CDMA2000

- **George Mansho** (CDG)
  - Telephone and Internet connectivity ➔ economic growth
  - CDMA2000 offers clear evolution path, forward/backward compatibility; supports mobile and WLL, low ownership cost
  - Need affordable handsets that offer value, not just cheapest

Session 5: Broadband Technologies and Solutions (2/4)

An integrated solution for developing broadband wireless networks in Africa

- **Chongwei Zhang** (ZTE Corporation)
  - Urban: use Mobile WiMAX; complements 3G
  - Rural: start with fixed WiMAX, migrate to Mobile
  - Advantages: spectral efficiency, flexibility, designed for IP, can access mobile or IP core network



How WiMAX Can Bring Broadband for All

- **Stéphane Lecomte** (Alcatel)
  - Africa: demand > supply, BB in its infancy, competing technologies
  - Access going BB & wireless: need to leapfrog technologies
  - WiMAX addresses wide range of rural-urban markets
  - National BB policy: public initiatives, relevant content, education and awareness, affordable & accessible service
  - “WiMAX is to broadband what GSM is to telephony”

Session 5: Broadband Technologies and Solutions (3/4)

The applications of Satellite BWA technology for Rural and Remote Areas in Africa

- **Jones A. Killimbe** (RASCOM)
  - Africa Policy and Regulatory frameworks changing to sustain implementation of these technologies
  - RASCOM provides continental voice and BB data simultaneously using Rural Multimedia Terminal
  - RASCOM is a complementary solution for BWA in Africa

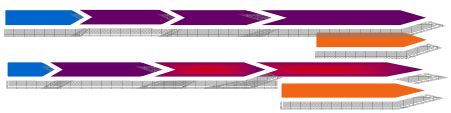
IMT-2000 networks delivering BWA

- **Sachin Bhatmuley** (Qualcomm)
  - IMT-2000 BWA technologies and evolution, applications
  - Examples of empowering solutions in emerging markets:
    - MTN@ccess with HSDPA: Alexandra Township, S.A.
    - Biamba Marie Mutombo Hospital, Kinshasa, Congo
    - “Every Village a Knowledge Center”, India
    - ... and Indonesia, Thailand, Viet-Nam, China, USA!

Session 5: Broadband Technologies and Solutions (3/4)

IMT-2000 Wireless Broadband assessment

- **Herns Pierre-Jerome** (Qualcomm)
  - Multi-dimension evolution: network, mobile device, service
    - Most devices evolving toward mobility and connectivity: wireless broadband, mobility increasingly important
    - Different air interfaces on common IP-based backbone
  - Trade-offs: range<->throughput, frequency<->propagation
  - BWA success: compelling products and services, spectrum, standards compliance (compatibility), scale, full ecosystem

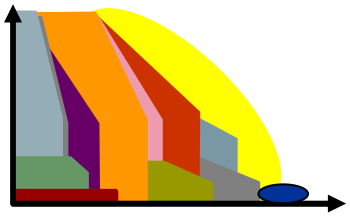


Session 6: BWA Planning and Implementation (1/3)

Chairman: Bosco Eduardo Fernandes (UMTS Forum, Siemens)

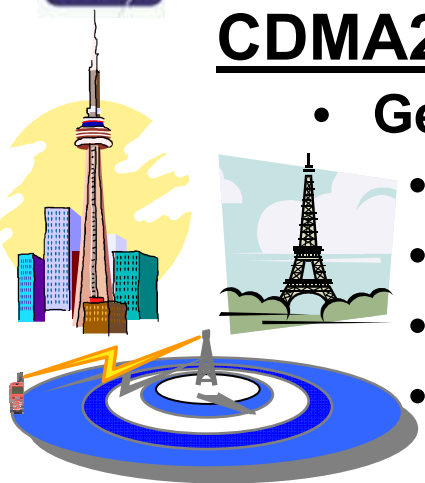
From GSM to IMT-2000/UMTS and HSPA: Delivering full BWA

- **Jean-Pierre Bienaimé** (Chairman, UMTS Forum)
  - Evolving 3G/UMTS offer optimal solution for BWA
  - Evolution aims to protect investment, migrate smoothly
  - Provide basic services and BB: up to 14.4 Mb/s with HSDPA
  - Bands <600 MHz provide coverage advantages



Wireless Village-Providing Rural Connectivity with CDMA2000

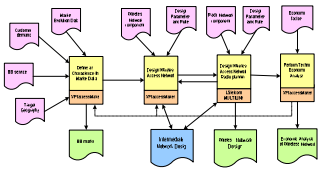
- **George Mansho** (CDG)
  - CDMA2000 provides wide coverage at 450, 800 MHz
  - Bridging digital divide: affordable telephony, internet access
  - Flexible, scalable: sparsely and densely populated areas
  - Forward and backward compatibility: performance and economic advantages, preserves existing investments



Session 6: BWA Planning and Implementation (2/3)

Planning of Broadband Wireless Access for Rural and Remote Areas

- **Riccardo Passerini** (ITU-BDT)
  - BWA planning in rural areas requires service/market forecasting, access network optimization, etc., as elsewhere
  - BWA planning requires additional analysis: terrain coverage
  - Effective planning: apply appropriate planning tools



Deploying 3G/HSDPA at Lowest Cost

- **Pierre Baillot** (Alcatel/UMTS Forum)
  - Need to meet variety of needs
    - Entry users (increase penetration): affordability, accessibility
    - Internet users (mass market BB): affordability, accessibility
    - Advanced users (user-centric experience)
  - Next 1B voice & 1B internet users: affordability, accessibility
  - Challenge: low cost infrastructure profitable with low ARPU

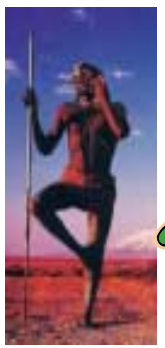
Session 6: BWA Planning and Implementation (3/3)

Telkom's BWA Experience in the South African Marketplace

- **Mario J. Paes** (Telkom SA Limited, South Africa)

  - Access enables performance of knowledge workers
  - Focus on service evolution and business model
    - Technology solution becoming rural/urban agnostic
    - Cover technology, commercial, regulatory (spectrum)!
  - Services, standards, scalable, cost effective, converging
  - WI-FI not suited for WAN; VSAT not for "always connected"
  - Successful WiMAX trials; radio planning is critical

Session 7: Fixed Mobile Convergence (1/2)



Chairman: Denis Ngae (Ministry of P&T, Cameroon)

Mobile Next Generation Service Offering and Concepts

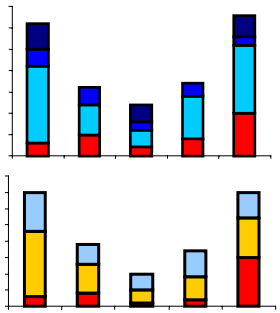
- **Bosco Eduardo Fernandes** (UMTS Forum)
  - NGN integrating SIP, IPv6, IMS evolving to meet demand for multimedia, VoIP, access independence, convergence
    - WI-FI & WiMAX complement cellular portfolios
  - Global spectrum harmonization for roaming, economies of scale

Wireless Access: A Regional Perspective for Africa

- **William Hearmon** (African CDMA Forum)
  - 30M sq. km with 800M people: 60% don't know about telecoms
  - Best tool for social change: knowledge. Study on connectivity:
    - 1% more mobile = US$240, 1% data: US$593 GDP p.c.
  - Mobile phones do more to help Africans than anything else
  - CDMA offers means to leverage telecoms toward a better life

Session 7: Fixed Mobile Convergence (2/2)

A New Regulation for Converging Services



- **Fabrizio Savi** (Telecom Italia)
  - Regulatory frameworks must adapt to fast technical evolution, with improved linkage to competition regulation
  - Liberalized markets going to technology neutral light regulation, from applying *ex ante* to *ex post* competition law
  - Cost effective regulation: do not exceed economic benefits

TV Goes Mobile

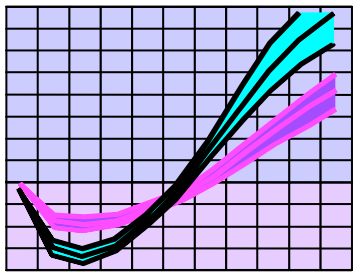
- **Bosco Eduardo Fernandes** (UMTS Forum)
  - Mobile TV has great potential but will be hard to get right
    - Convergence of value chain may create tensions
    - Cooperation will enable reaching critical mass faster
    - Return channel offers interactivity and personalization
  - Content will be king, but needs to be adapted to form factor
  - Right spectrum (bandwidth, frequency) will be essential
    - Compression techniques will mitigate spectrum needs

Session 8: 2G → 3G Guidelines for Developing Countries (1/5)

Chairman: Mario J. Paes (Telkom SA Ltd, South Africa)

Guidelines on smooth transition from the existing mobile networks to IMT-2000 for Developing Countries

- **Nataša Gospić** (ITU-D Rapporteur Q.18/2)



- Telecom was technology driven, → end user, market driven
- Q.18/2 outputs: "Mid Term Guidelines" & "Guidelines for Smooth Transition ... to IMT-2000 for developing countries"
- Case studies (incl. Serbia), key questions, business cases

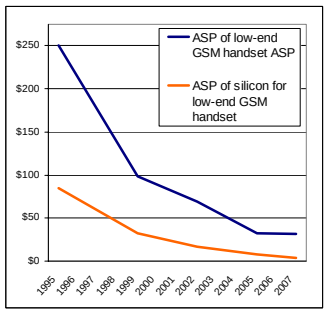
Spectrum Considerations and Licensing Aspects

- **Elizabeth Migwalla** (Qualcomm)
  - Spectrum demand growing exponentially, availability is not!
  - Regulators are key: efficient usage, technology neutrality, licensing, adequate for business case, level playing field, ...
  - IMT-2000 offers broadband opportunities for Africa, especially with coverage at lower frequency bands
  - Assignment: what can <u>you</u> do to make BWA a reality?

Session 8: 2G → 3G Guidelines for Developing Countries (2/5)

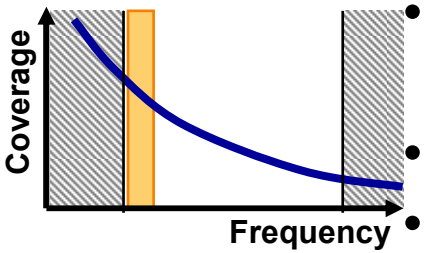
Refarming spectrum from 2G to 3G

- **Roberto Ercole** (GSMA) presented by Colin Thompson
  - Refarm 850/900 MHz for increased 3G coverage, leverage link between mobile penetration and economic growth
  - Coordination needed - regulators, operators, vendors - for optimal results for end users: need a complete "ecosystem"!
  - Need a complete "ecosystem": handsets must be available



Current issues and long term perspectives for 3G/UMTS spectrum

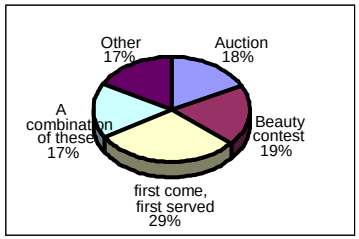
- **Rauno Ruismaki** (UMTS Forum) presented by Halina Uryga
  - Existing GSM, IMT-2000 bands enough for next decade
  - ~1 GHz more needed for IMT-Advanced <5 GHz by ~2020
    - Increased data demand: users want DSL equivalence
  - Coverage an issue with higher bands
  - Promote bands <1 GHz in Europe: 470-600 MHz a potential global band, if freed from broadcasting



Session 8: 2G → 3G Guidelines for Developing Countries (3/5)

Licensing Aspects

- **Riccardo Passerini** (ITU-BDT)
  - Background on licensing options and issues
  - Described hybrid approach: combination of "beauty contest" and auction, tools for decision process
  - Emphasized need to tailor approach to local circumstances



New ITU-D Q.18/2 "Implementation aspect of IMT-2000 and systems beyond ... for developing countries"

- **Nataša Gospić** (ITU-D Rapporteur Q.18/2)
  - Provided description of new Question 18-1/2: "Implementation aspects of IMT 2000 and information sharing on systems beyond IMT-2000 for developing countries", including
    - Issues to be addressed
    - Expected Outputs, sources of Input
    - Schedule of meetings, etc: http://www.itu.int/ITU-D

Session 8: 2G → 3G Guidelines for Developing Countries (4/5)

Lessons Learned from UMTS Deployments in Europe

- **Halina Uryga** (UMTS Forum)

- UMTS: for GSM operators, offers common core network, cositing, dual mode terminals, retention of GSM roaming
- UMTS 2GHz: higher data rates →higher usage, new services; UMTS900 improves coverage, UMTS500 more so
- UMTS evolution: improvements in same network, bands

Special needs of Operators, Regulators and Users in Developing Countries

- **Albert Kamga** and **Denis Ngae** (Ministry of P&T, Cameroon)
  - IMT-2000 can reduce digital divide, but must account for specifics, important to meet needs
  - Important to meet needs of operators, regulators, users
    - Operators: flexibility, low investment, stable regulation
    - Regulators: good, clear vision; learn from others
    - End users: low cost, compatible technologies

Session 8: 2G → 3G Guidelines for Developing Countries (5/5)

Evolution to 3GSM: A Foundation for Future Broadband Growth in Africa

- **Vitalis Olunga** (GSM Association, Africa)
  - "The one constant in our lives is change: manage it!"
  - Smooth evolution fundamental for BB uptake in Africa
  - Policies, regulations need to support creativity, innovation, growth, profitability
  - IMT-2000 & IMT-Advanced spectrum policies a prerequisite to mobile growth, uptake of broadband services in Africa
  - Bottom-line for Africa: reduced CapEx and OpEx costs: accessible, available, and affordable services

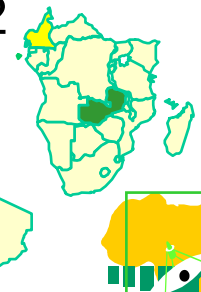
Panel Discussion

Topic: How to foster the development of Broadband Wireless Access in the Region?

Moderator: John Visser, ITU / Nortel

Panellists:

Fabrizio Savi, Telecom Italia
George Mansho, CDG
Nataša Gospić, ITU-D Rapporteur Q.18/2
Kezia Mwale, Regulator of Zambia
Jean-Pierre Bienaimé, UMTS Forum
Khalilou Niane, ARTP, Senegal
James A. Killimbe, RASCOM
Mario J. Paes, Telkom SA Ltd., South Africa
Turhan Muluk, Intel
Albert Kamga, Ministry of P&T, Cameroon



A few last points:

- **All the presentations, including updates, will be made available on the ITU-BDT web site at http://www.itu.int/ITU-D/imt-2000/BDTActivities.html**
  - Please allow a few days for the necessary work to be done
- **The material presented has been provided by volunteers: it reflects their own views**
- **Do you want to influence the decisions ITU takes? Get involved! The ITU welcomes your participation!**
  - Please see your national regulator for details
- **More information? Contact ITU and the speakers**
  - Email addresses, other contact information, has been provided

Thank you!