ITU-BDT Regional Workshop on Guidelines on the Smooth transition of Existing Mobile Networks to IMT-2000 for the Arab Region

"Mobile 2G/3G networks: a Universal Communication and Service solution "

Damascus, Syria
13-15/06/2005
Roland THIES

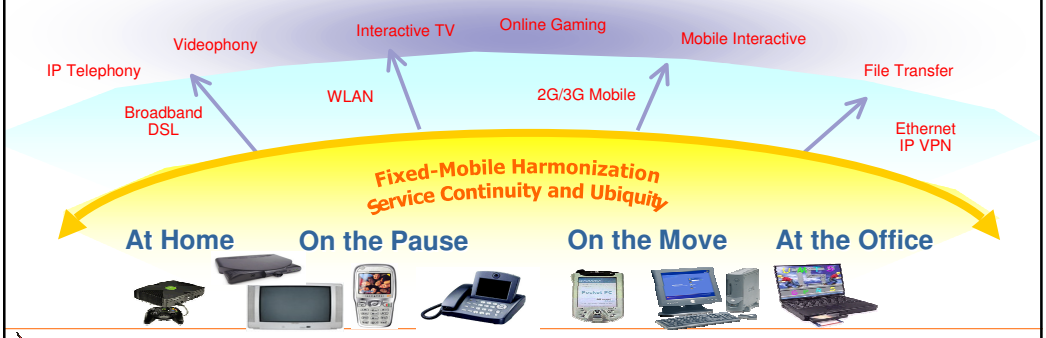
ARCHITECTS OF AN INTERNET WORLD ALCATEL

Presentation Outline

- What is FMC?
- Rational
- The Operator Opportunities
- From an Unsuccessful Past to A Promising Future
- Regulation Aspects

What is Fixed Mobile Convergence (FMC)? Principles

- Same Services available whatever the Access Network
- Services Subscriptions not linked to Access Networks
- Request from ETSI to 3GPP for Fixed being harmonised with Mobile under IMS umbrella



What is FMC? Back to the Basics: ETSI Definition

"Fixed Mobile Convergence (FMC) is concerned with the provision of **network capabilities** which are **independent of the access technique**.

This does not imply the physical convergence of networks. It is concerned with the development of a converged network architecture and supporting standards. This **set of standards** may be used to offer fixed, mobile or hybrid services.

An important feature of fixed mobile convergence is the **separation of the subscriptions and services** from individual access points and terminals and to allow users to access a **consistent set of services** from any fixed or mobile terminal via any compatible access point. An important extension of this principle is related to **inter-network roaming**, users should be able to roam between different networks and to be able to use the same consistent set of services through those visited networks".

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- What is FMC?
- **Rational**
- The Operator Opportunities
- From an Unsuccessful Past to A Promising Future
- Regulation Aspects

Rationale
End Users' Expectations - What do they get today?

Services Delivered in a network-centric way

- Multiple Subscriptions, Numbers, Profiles, Billings
- Multiple Customer interfaces
- Services Environment depending on Terminal and Access Network

… End Users' Frustrations

Rationale
End Users' Expectations - What do they want?

Services Delivered in an end user-centric way

- •Single Subscription, Profile, Billing,
- •Single Customer interface
- •Same Services Environment whatever the Terminal and Access Network
- •Seamless, Secured and Easy Service Access
- •Broadband, Quick Access & Rich Content Services
- •Optimised Charging

Rationale
Operators' Needs

	Fixed Operators	Mobile Operators	Fixed & Mobile Operators
•Reduce Churn	✓	✓	✓
•Avoid fixed to mobile line substitution	✓		✓
•Respond to FMC threat* from Fixed operators		✓	
•Increase Revenue	✓	✓	✓
•Increase Subscriber Base •Enlarge Service Offer •Limit Price Erosion			
•Reduce OPEX/CAPEX •Leverage and Unify Fixed, Mobile, Internet Services* •Limit platform diversity	✓	✓	✓

*:for some operators, this is achieved through bundle & partnership

Rationale
Drivers & Obstacles

Drivers

- End Users' Expectations
- Operators' Needs
- Standardisation (seamless inter-working between fixed/mobile/WLAN through UMA or IMS)

Obstacles

- Regulation (maintain fair competition)
- Revolution in Current Network Centric Operators' Organisation & Networks
- Mobile operator FMC means bundles and results in price reduction & service commoditisation (Flat rate Internet on Mobile…)

From an Unsuccessful Past to a Promising Future
FMC - Opportunity Estimates

Reduce churn	> **Reduce mobile and fixed churn by bundling** > **Churn rate could be lowered by 5%* (from 20% to 35% in Mobile today)**
Grow revenues	> **Grow subscriber base** > **Cross-sell fixed & mobile services, Create new services** > **Create new end-user services**
Reduce OPEX	> **Potential of 10%-30%* OPEX savings** > **Integrating fixed-mobile-internet activities** > **Marketing, sales, OSS, BSS, network, …**

As well as:
- **Limit price erosion**
- **Respond to commoditization**
- **Expand market**
- **Cross sell bundling**

*source FCG

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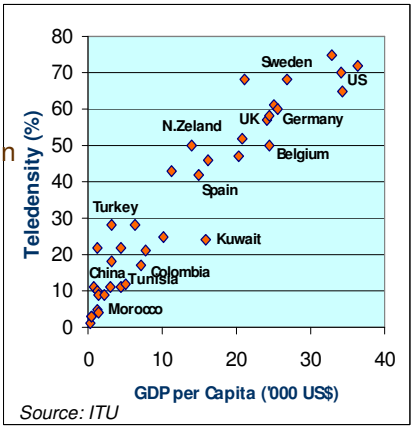
Developing Country Challenge: **Access to Information**

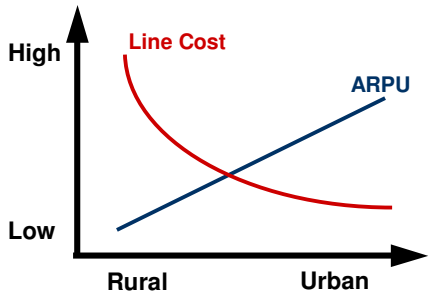
- **How Teledensity and economic growth are linked together?**
  - A key issue for economic and social development?
  - … to be urgently addressed, especially in rural (isolated) areas?
- **What kind of services?**
  - Telephone, Internet, …
  - Individual or community access
  - Prerequisites



Source: ITU

Universal Access to Telecom services

The famous dilemma!



How to take up the challenge?
- "Dream solution" for Rural Telephony
- dedicated subsidies
- obligation of services (incumbent operator)

Rural Telecom is not as unprofitable as … it is said !

> **Incoming call revenues** are not taking into consideration in the business model

> **Profitability issue must be reconsidered**, taking advantage of potential service Internet revenues

> **Population solvency** is much better than foreseen
- Community Access, Prepaid will improve population solvency
- Real population income is much higher than GDP (--> PPP)

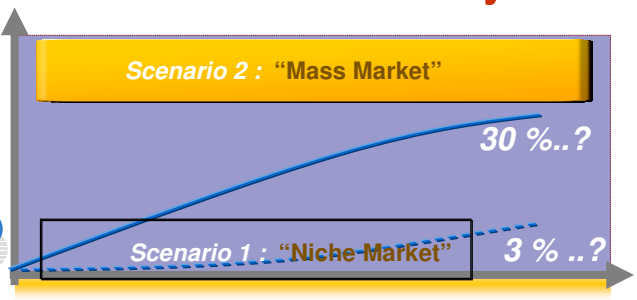
Still operator approach is ….
- **too much individual access oriented**
- **forgetting Internet opportunities**

Internet can leapfrog development, if ...

INTERNET, as Public Utility

Internet is seen
as a prime **Communication Tool**
offering **useful end-user services**
based on **local content**
via **Community Access**

Internet Penetration

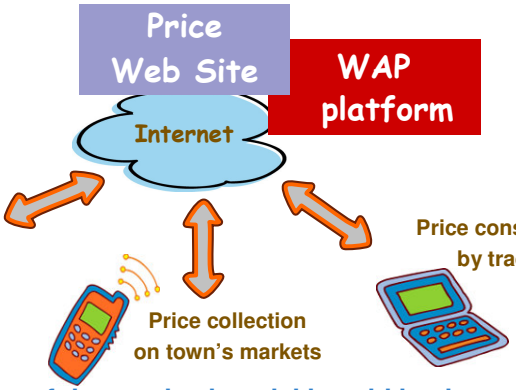


... to Reinvent Internet Usage !

A "virtual" market place

Professional Tool to manage Food price on real time

Price consultation by small producers



The cost of the service is quickly paid back by the increase of producers' margins

Access Network Technologies

Use standard widespread technologies in innovative arrangements

IP/@

B-WLL

ADSL

- Fixed or Mobile
  - Wireline or Wireless
    - Narrowband or Broadband
      - Voice or Data

2.5G Solutions with Restricted Mobility A Key Opportunity for Carriers

Deregulation
Removing last barriers to global competition

Operators looking for new opportunities:
Attract new subscribers

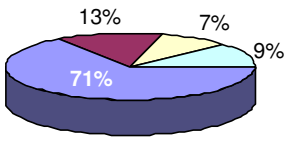
2.5G solutions with restricted mobility

End-users' demand
Universal Access:
Fixed telephony for "moving" people
Community Internet Access

GSM global reach
Large deployment & roaming
Economy of scale & flexibility of deployment

Why 2.5G technology in the Local Loop?

Advantages over other wireless technologies



2.5G: 84% of the world mobile market

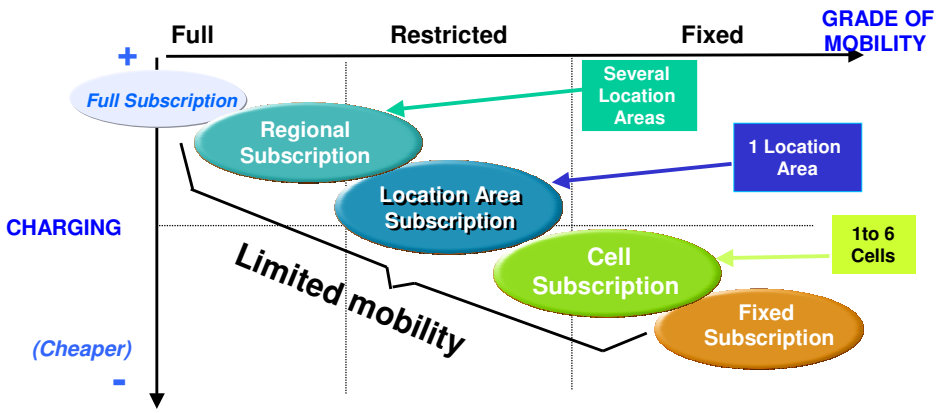
- GSM
- CDMA One
- TDMA
- PDC and others

Source: MCG, May 2004

- the most wide-spread technology
- the solution to reduce operational costs
- the Data inside capability
- the SIM concept
- the larger coverage
- the failure of previous WLL technologies

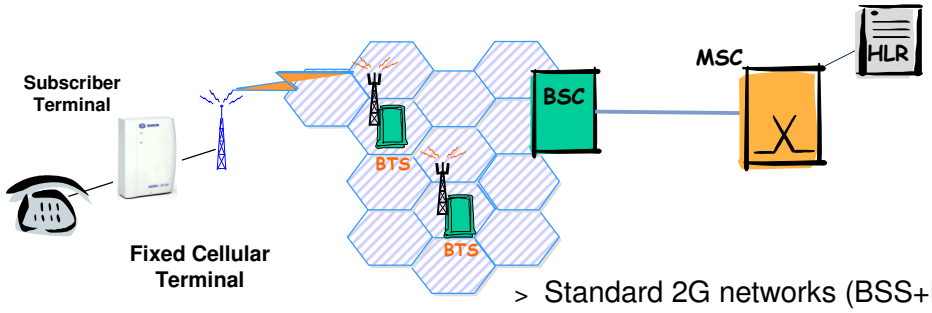
Allows the restricted mobility solution

Business Standpoint



Segmenting the market with a PAY AS YOU MOVE adapted charging

2G Local Loop
Fixed subscribers: No mobility



- Standard 2G networks (BSS+NSS)
- Quick installation
- Rapid deployment in remote areas
- PSTN-like environment
- Specific terminals: Fixed 2G

2GLocal Loop
Fixed subscribers : Fixed 2G Terminals

- **Strengths of fixed 2G terminals**
  - Different types of fixed 2G terminals:
    - 2G adapter + standard fixed telephone Sockets for other devises: PC, fax..
    - Fixed 2G telephone handset
    - 2G payphones (e.g. Ascom, Schlumberger,...)
  - Compliant with fixed licenses terms



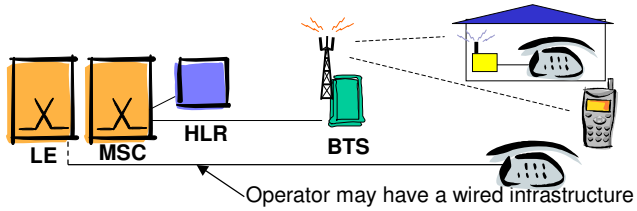
Fixed GSM handset

- **Weaknesses of fixed 2G terminals:**
  - Less economical terminals compared to standard 2G terminals
  - Permanent local AC power supply is required
  - Installation of an outdoor antenna may be required

Scenario n°1: Fixed Operator

Incumbent Fixed operator deploying a 2G Local Loop network

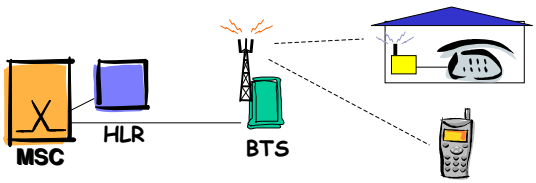
- **For rural and suburban areas**, wireless solutions are less costly than wired when subscribers are spread
- **Quick deployment** and easy installation
- **Capacity to evolve to a full mobile solution Pre-paid** (public phones & mobile pre-paid) for all users through the same IN platform



Scenario n°2: Mobile Operator

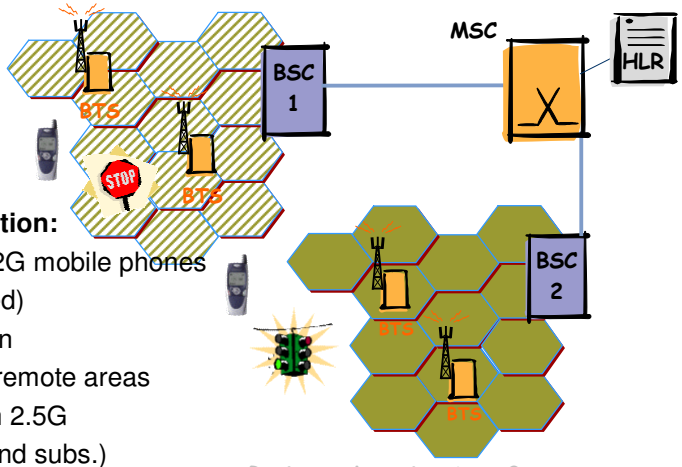
Mobile operator starting to provide 2G restricted mobility services

- The **mixed 2G fixed/mobile solution** has synergies like:
  - Very limited investments: **infrastructure is shared**
  - Increase revenues: by doing **attractive packaged fixed/mobile rates**
  - **Pre-paid (public phones & mobile pre-paid)** for all users through the same IN platform



2G Local Loop
"Semi-mobile" subscribers

Region or Location Area 1:
Barred for semi-mobile subscribers



Region or Location Area 2:
Allowed for semi-mobile subscribers

> **Advantages of the solution:**
- Lower cost standard 2G mobile phones
- Mobility (though limited)
- No terminal installation
- Rapid deployment in remote areas
- Data functionality with 2.5G (2.5G term. for high-end subs.)
- Subs. Taxed differently in "Home Zone"

The Telephone and Internet in isolated areas

… at affordable costs

2G, offers phoning with mobility limited to zones with long distance activity.

2.5G, for access to information individually, or collectively

by extension of the mobile infrastructure (at a marginal cost) with optimised connection solutions :
Cable, broadband radio, microwaves, satellite, ….

The solution for universal access

Main advantages for End Users

> **Mobility :** “nomadism”

> **Prepaid :** solvency

> **Virtual leased line to access Internet :** cybercafés

> **Mobile platform services :** added revenue

Main advantages for Operators

> **CAPEX**
- Extension of existing 2.5G Network **at marginal cost**

> **OPEX**
- Neither specific operation, nor maintenance, nor training
- No “at home” installation
- No billing, bad debt

> **Revenue**
- significant growth [thanks to increased user base]
- added value services [over a unique infrastructure]

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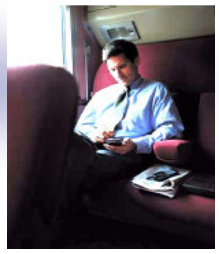
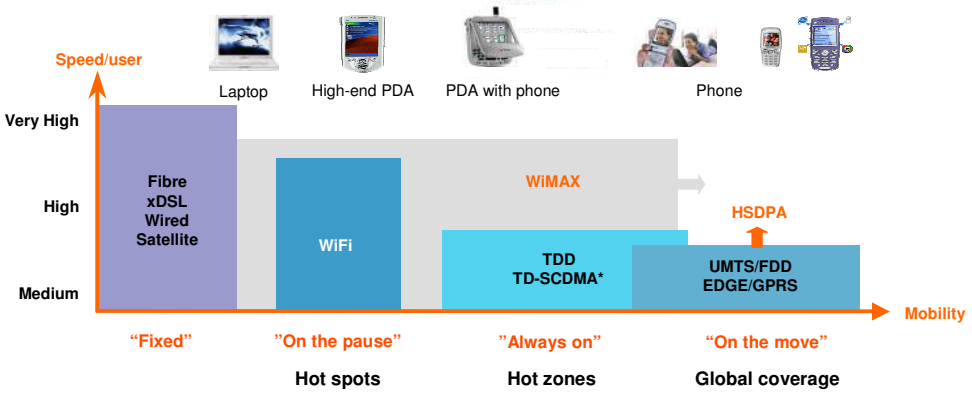
The Wireless Mobility Services Opportunity

- Mobile office is considered as the **most important Mobile applications for the Enterprises**
- In US :
  - 45 million business travellers
  - 75% carry laptops.
  - **62% access the Internet from hotels**
  - **30 minutes each log on, 2.3 times per day, 75 minutes per day**
- In France : IDC Survey
  - 56% of companies invested in mobility
  - 20% of access will be wireless in 2005



Make the right technology choice

Complementary access solutions for different mobility and nomadic needs



Future of communication is *Broadband* and *Wireless… IP*

- *Fixed* services access (ADSL/FTTx/WiMAX…)
- *Local* area networks (WiFi/WiMAX in Backhaul)

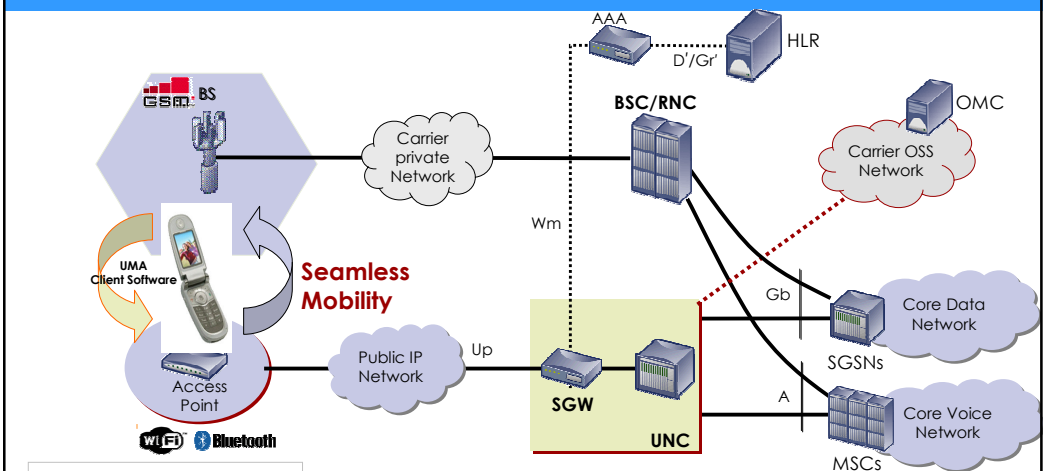
New Market → *Nomadic & Metro* services access (WiMAX)

- Private HotZones & Vertical Markets for Airpots, Ports, Highways…
- *Full mobile* services access (UMTS/HSDPA, CDMA EVDx, WiMAX?)

What is UMA (**Unlicensed Mobile Access**) ?

- Introduce unlicensed radio technology access to provide GSM/GPRS/EDGE services **at very low cost**
- Primary **target is home coverage** using Bluetooth or WiFi
- End user remains a **customer of a mobile operator** (or MVNO)
- Services are **identical** to existing GSM/EDGE **mobile services**
- UMA is a **RADIO centric fixed-mobile convergence (FMC)**
- Boundaries between fixed, mobile, VoIP will disappear
- Focus must be the set of services delivered to the end-user
- Delivers the promise of Fixed-Mobile convergence now
- Broad support from the handset industry
- Compelling business case for the mobile & fixed carrier

UMA E2E Solution



What is WiMAX (Worldwide Interoperability for Microwave Access) ?

- It's Broadband : typically 25 Mbps/cell
- It's IP native
- It's Point-to-Multipoint Microwave : up to 15km
- It's Non Line of Sight
- It's like Cellular coverage design
- It's Standard-based : IEEE 802.16
- It's cost-effective : CPE at $300
- It's supported by more than 150 industry players to make it interoperable

BOARD MEMBER

WiMAX

Definition of Services

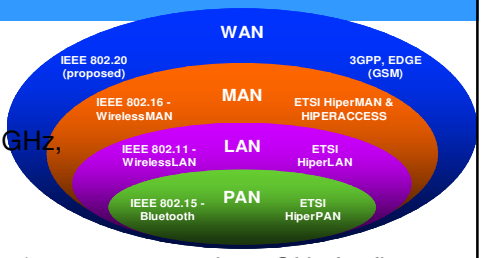
- **Fixed Wireless DSL**
  - DSL Services for fix end user location (home, office)
  - Indoor or Outdoor CPE (Customer Premise Equipment)
  - *Main Features Improvements : NLOS, Indoor Applications and Full Plug & Play Modem*

- **Internet in The Pocket**
  - *Main Features Improvements : PCMCIA and embedded chipsets*
  - **Nomadicity**
    - User authentication and service authorization across multiple base stations.
    - No support for application or session continuity (no handovers/no resources reservation)

Wifi Like

  - **Portability**
    - User authentication and service authorization across multiple radio access technology
    - Supports session continuity (no real time applications)
    - Reservation of resources in nomadicity
- **Full Mobility**
  - Support for real-time applications such as voice via session continuity.

802.16 IEEE standard overview

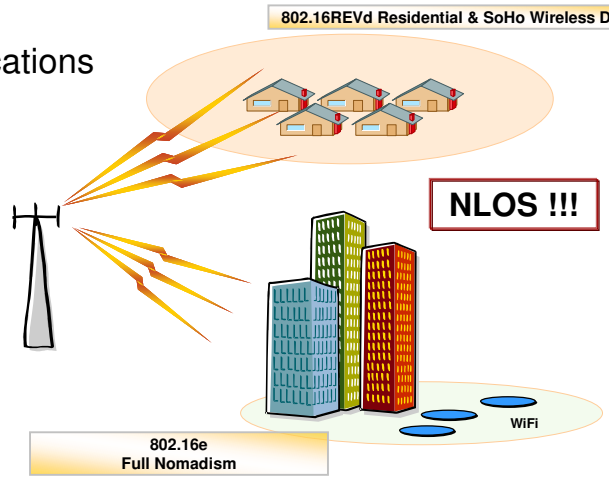


- 802.16 covers Fixed Wireless Access
  - known as LMDS with radio from 10 to 66 GHz,
  - known as WIP with radio below 10 GHz
- 802.16a (released Jan. 2003)
  - known as WiMAX with radio below10 GHz (2.4, 2.5, 3.5 and 5.8 GHz for first products)
  - One MAC layer, three Physical layers: OFDM, OFDMA and Single Carrier
- 802.16d (released June 24, 04) improves 802.16a
  - beam forming, OFDM sub-channeling, …ideal for Fixed Wireless Access
- **802.16e** (1H 05) will add Nomadicity to 802.16d (Provides Handoff and power-save mechanisms)

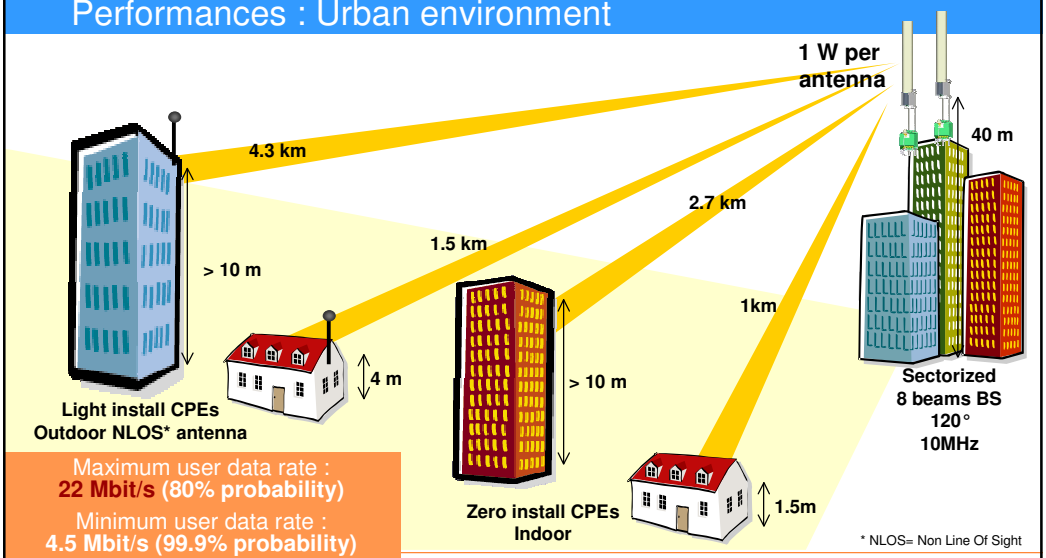
(*) Worldwide Interoperability for Microwave Access

WiMAX Applications

- Two families of applications
  - Wireless DSL
    - Indoor / Outdoor
    - Fixed
    - Also outdoor for roaming users
  - Nomadic
    - On the move
    - Outdoor and Indoor
  - **Non Line of Sight**



WiMax used as W-DSL
Performances : Urban environment



Maximum user data rate :
22 Mbit/s (80% probability)
Minimum user data rate :
4.5 Mbit/s (99.9% probability)

* NLOS= Non Line Of Sight

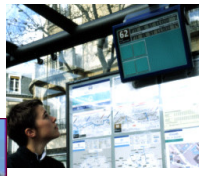
WiMAX : Private Environment


Ports


Emergency fleet Services

Intelligent Transport Systems

Metros


Buses


Metropolitan Security


Airports Staff


Highways


Data Acquisition & control

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Regulatory issues

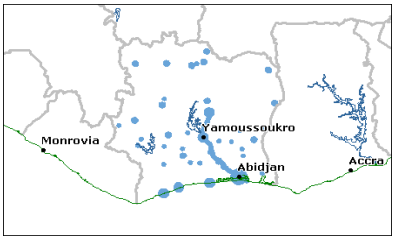
- Two main areas of concern for regulators regarding 2.5G-LL
  - 2.5G spectrum availability, particularly in the 900 MHz band for GSM and 850 MHz band for CDMA (in many countries was already allocated to mobile operators)
  - Additional competition to existing mobile operators, i.e. an unfair change of the mobile market structure

2.5G Spectrum Availability ?

- **No real shortage of spectrum in rural zones**
  - Mobile networks are first of all deployed in urban areas and along main roads (highest business potential)
  - Rural coverage is the last investment priority for commercial 2.5G operators (lowest business potential)
  - Many rural areas will remain without radio coverage for many years ⇒ a lot of unused spectrum !
- **Little spectrum is needed to meet rural demand**
  - Subscriber density is low (usually below 10 users per sq.km)
  - 2 x 5 MHz should be sufficient in most cases
    - 2 TRX, 8.20 Erlang per sector (GoS 2%)
    - 492 subscribers per 3-sector base station at 50 mErl/subscriber

Competition with mobile operators ?

- **Big differences with a commercial mobile service**
  - Communication services are to be provided at regulated, PSTN-like tariffs (universal access context)
  - End-user mobility
    - either no mobility at all (fixed 2.5G terminals)
    - or a cordless phone-like mobility (with a standard 2.5G handset)
- In most emerging economies, **mobile operators have a very small subscriber base among rural** population which is not covered by the network



GSM network coverage of Ghana and Ivory Coast

2.5G in the Local Loop should be authorised

Use of 2.5G technology in rural WLL projects will not create any regulatory problems, provided that

- 2.5G spectrum is **allocated on a limited geographical** basis, i.e. only to a clearly identified rural area
- Services are provided at **regulated, PSTN-like tariffs**
- The operator complies with the **restriction of mobility**
  - This can be easily controlled by allowing only fixed 2.5G terminals
  - But mobile handsets give a more economical solution for the operator

A relevant technology is available…..

Universal Access development is frozen by regulation !

www.ltu.lmt/ITU-BDT

Thank you for your attention….