The Digital Dividend

Challenges in Implementing the Digital Transition To the Information Society

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Overview

- What is the Digital Dividend?
- Expanding Demand for Info Society services
- Internet & Broadcasting
- Repacking and Relocation
- Spectrum “white spaces”
- Voluntary Incentive Auctions

The Digital Dividend

- **What is the "digital dividend"?**
  - Transition to digital broadcasting
  - Consolidation of broadcasting channels
  - Allowing BWA networks in UHF range
- **What are the bands?**
  - 698-862 MHz in Regions 2 & 3
  - 790-862 MHz in Region 1, including Africa
- **Why is this spectrum important?**
  - These bands have excellent propagation characteristics
- **What is the development potential for BWA**
  - Enormous ability to use WiMAX, LTE to reach rural markets

The days of "Uncle Miltie" are over.

Context: The Info Society

- Affordable and ubiquitous access to the Internet is increasingly available through mobile and fixed broadband networks
  - This enables more use of smart phones and mobile applications
    - Today's innovations are in smart phones and social networking
    - Intelligence and computing power are at the edge of networks
- Growth markets are broadband and mobile – and their nexus
- The Information Society is driven by:
  - **Networks**: NGNs, 3G & 4G BWAs
  - **Devices**: laptops, netbooks & smart phones
  - **Applications**: social networking, `augmented reality'

Which platform will capture the video market?

Nets, Dongles & Apps

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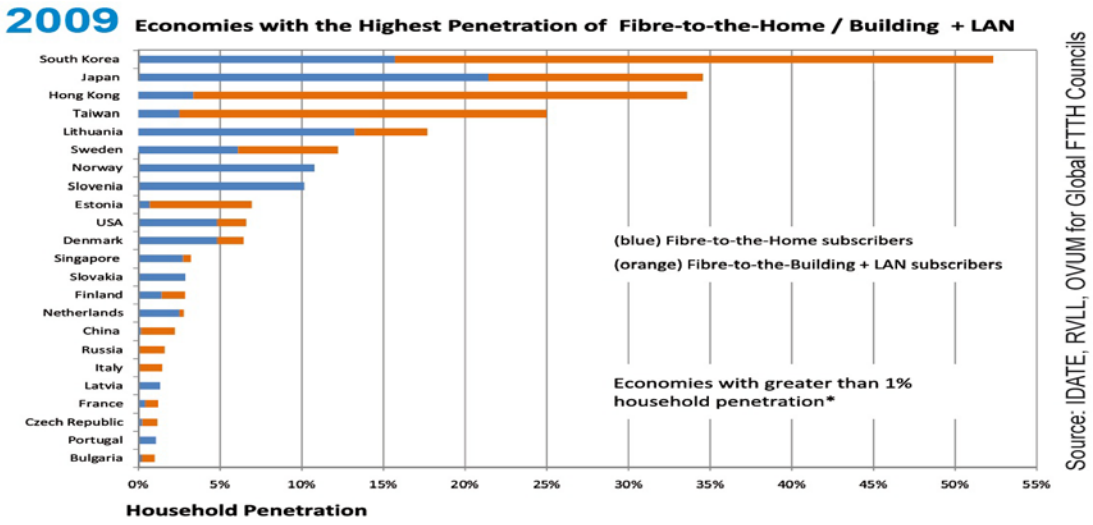
  - **Applications**: social networking, location & `augmented reality'

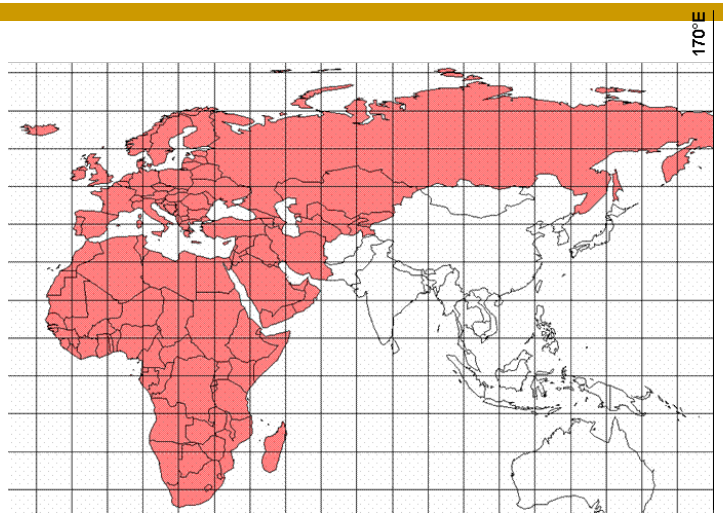


Convergence

- Platform convergence – one device providing many services  
- Service convergence – one company, providing many services (i.e., triple play) 
- Industry convergence – vertical or horizontal integration
- Addressing convergence through economic regulation:
  - Do you regulate the company, the service or the platform/device?
  - Considering possible taxonomies for regulation:
    - Regulating by **provider** (existing paradigm)
    - Regulating by **service or functionality** (technology neutrality)
    - Regulating by **responsibility for content** (dividing common carriers from content generators)
    - Regulated v. "**not regulated**" (e.g., license-exempt or consumer devices)

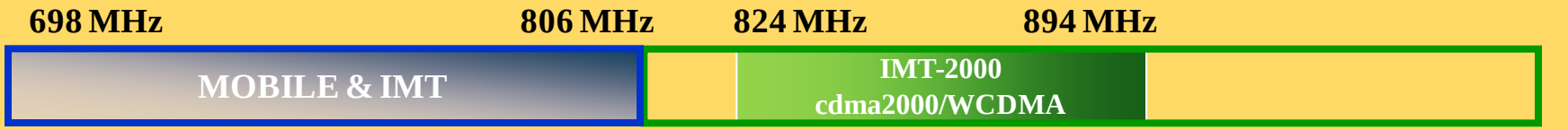
GE06 &WRC-07

- GE06 Agreement
  - Set a plan for broadcasting service in Region 1
  - Covered terrestrial digital broadcasting in 174-230 MHz (Band III) & 470-862 MHz (Bands IV & V)
  - Digital transition to last until 17 June 2015
- WRC-07
  - 698-862 MHz proposed for identification as an IMT band
  - Favored by some Region 2 and 3 countries (e.g., U.S.)

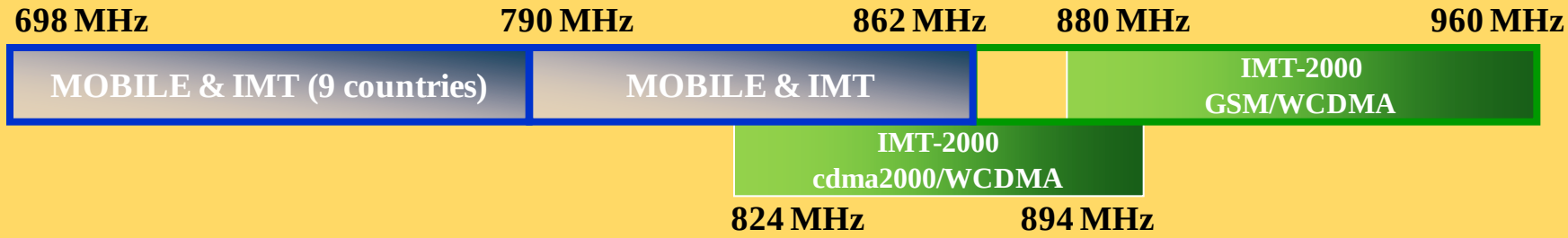


The Digital Dividend Bands 700-800 MHz

REGION 1 (EMEA)



REGION 2 (Americas)



REGION 3 (APAC)

Broadcasting V. Internet

- **Turning up the Contrast**
  - BWA (streaming video, downloads) already is already in the market (e.g., YouTube, Facebook)
  - Mobile TV, IPTV slower to market
  - Efficiency argument – P2P or P2MP?

- **Digital Dividend = negotiating coexistence**
  - IMT will enter upper bands (i.e., 790-862 MHz or 698-862 MHz)
  - Digital transmission allows more efficient broadcasting in Bands III, IV

- **Spectrum remains a contested terrain**

Spectrum Repacking

- DTV can be "repacked" into smaller segment of the band (i.e., lower UHF band)
  - Stations could multi-cast across existing channels
  - Stations could share channels & infrastructure
- There are alternatives:
  - "White spaces" being implemented by US and UK
  - "Incentive Auctions" for spectrum discussed in US

Note: In US, only estimated 15% of population relies on terrestrial, over-the-air broadcasting to receive video service - even after DTV transition. So there is strong pressure to auction remaining broadcasting spectrum for BWA

White Spaces

- **"White Spaces" = unused spectrum or channels that lie fallow in some or all geographic areas**
  - Unused spectrum can be utilized through overlay sharing
- **Dynamic Spectrum Access**
  - Can allow "opportunistic" and **unlicensed** access on non-interference basis
  - Current uses employ geographic frequency databases
  - Would eventually employ cognitive sensing technology
- **Authorized in the US, considered elsewhere (e.g. UK)**
  - US completed DTV transition in June 2009, after extended period
    - Upper part of UHF band (698-806 GHz) was auctioned in March 2008
    - US transition involved subsidized coupons for digital converter boxes

Voluntary Incentive Auctions

- **Would provide incentives for broadcasters to voluntarily clear spectrum**
  - They would get a "cut" of auction proceeds
  - Results could pay for broadcasting station changes
- **Idea developed in US**
  - Wireless industry driving spectrum reclamation
- **The challenge:**
  - How much should be retained by broadcasters to induce "voluntary" spectrum release
  - Inherently involves a valuation exercise of the spectrum

Digital Dividend -- Africa

- Possibilities for African nations
  - UHF propagation = reach to areas with lower population density
- Digital transition scheduled for 2015
  - Some countries (e.g., Kenya, Uganda, Nigeria, South Africa, Tanzania)
  - CDMA 800 allocations could pose a problem for 790-862 MHz band
  - Choice: Follow Region 1 approach (790-862 MHz), or Region 3 (698-802 MHz)

Issues To Discuss

- Is the spectrum "crisis" for broadband universal?
- What is the difference between *spectrum* and *network capacity* ?
  - Can technologies such as femtocells and picocells, plus WiFi overflow, handle spot capacity shortages?
- Infrastructure issues
  - Are backhaul and international connectivity the real issues for developing economies?
  - Need for developed power sources and efficient grid

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