Refarming frequencies in rural areas: a regulatory perspective

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Purpose of policy paper

- Investigate “refarming” as a policy and regulatory option for a fast and cost effective deployment of wireless broadband
- Identify policy and regulatory contrains hampering the optimization of premium bands:
  - Objective: optimise the usage of premium frequencies for the provision of both voice and data services
- Provide recommendations on how to facilitate a conducive policy and regulatory environment for spectrum refarming
Research questions

- Central question: are radio frequencies optimised for a fast and cost effective deployment of wireless broadband services?

- Specific queries:
  - What are the challenges encountered to refarm frequencies from a regulatory perspective?
  - What are the benefits of a policy and regulatory intervention for the deployment of wireless broadband services over refarmed premium bands?
Methodology

- Multiple case study analysis: South Africa, Uganda and Kenya
- Factors identified to assess the effectiveness of spectrum allocation and assignment
  - Licensing system
  - Mobile market structure
  - Regulatory constraints that need to be overcome
- Main source: secondary data
  - ITU data
  - Regulators’ reports
  - SPRs by RIA researchers

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Research limitations

- Narrow focus: spectrum refarming
- It does not explore “digital dividend”
Problem statement

- **900MHz:**
  - Allocated and assigned by regulation for GSM services -> duopoly or oligopoly market structures
  - suitable for 3G services: in legislation with technology-neutral licensing, operators with GSM licence have a competitive advantage also on mobile broadband
  - The competitive advantage created artificial scarcity of premium frequencies not only in the voice market, but also in the wireless data and broadband market
  - Operators are sitting on utilised spectrum, especially in areas with low traffic demand
Refarming - Definition

- Reallocating frequencies that were previously used for a specific purpose, for a different use (infoDev and ITU, 2011)
- Regulatory process that changes basic conditions of frequency usage in a given spectrum band
- Clearance of bands for new applications and users
Rationale for refarming

The need for bands below 1GHz

Source: UMTS Forum, 2008
Rationale for refarming

In rural areas, UMTS900 offers continuous coverage; UMTS2000 is used for offering additional capacity

Source: UMTS Forum, 2008
Mobile users outnumber those using fixed line services

Number of **fixed lines** as a % of the population

- South Africa: 9.22, 8.91, 8.62
- Uganda: 0.54, 1.67, 0.71
- Kenya: 1.23, 1.67, 1.67

Number of **SIMs** as a % of the population

- South Africa: 48.65, 42.06, 30.06
- Uganda: 92.67, 90.6, 28.69
- Kenya: 27.02, 42.06, 48.65

Source: ITU World telecommunication/ICT indicators, 2010
Fixed-mobile substitution in broadband services

Source: ITU World telecommunication/ICT indicators, 2010
Uganda

Growth of 13.38% of fixed line connections between March 2009 and March 2010

Fixed line connections

Source: UCC 2010

Internet connections (thousands)

Wireless Internet users
Fixed Internet Users

June 2009
310,08
27,59

June 2010
510
31

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Kenya

Internet subscriptions

Source: CCK 2011

Mobile operators
Fixed operators

71.2% increase

2009: 930,247
2010: 3,230,023

99%
1%

38,761
3,191,262

Source: CCK 2011

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## Spectrum management

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<th>Licensing regime</th>
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<td>900MHz First come First served Technology neutral</td>
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<th>Mobile market structure</th>
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<td>Duopoly</td>
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<th>Regulatory constrains</th>
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<td>2.6GHz assignment does not satisfy technology-neutrality principle</td>
<td>Due to spectrum scarcity, most of new licensees have yet to start operations</td>
<td>WiMAX frequencies mostly occupied by govt agencies Spectrum usage fee: based on number of transmitters</td>
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South Africa - Refarming

2.6GHz allocation does not leave room for deployment in pairs

2.6GHz band - Comparison between ITU options and possible ICASA allocation
Uganda - Refarming

- 2007 - first attempt to refarm 900MHz
  - UCC was forced to review an agreement with the 3 operators - spectrum blocks in the 900MHz equally shared between 3 operators
  - Some frequencies in 900MHz reallocated to two new operators
- Sixth operator licensed but has yet to begin operations
- **Regulator has not taken action to refarm 900MHz to accommodate the new operator**
Kenya - Refarming

- 2006 national ICT policy: spectrum refarming as a strategic intervention to achieve spectrum efficiency - use it or loose it
- CCK 2008-2013 strategic plan: requires to review and release spectrum held by the government
- CCK does not have the capacity to assess spectrum usage
Conclusions

- Analysed regulatory environments implemented technology neutral licensing regime
  - *It created a competitive advantage for operators already holding premium frequencies*
  - *Kenya and Uganda: licensees increased, but spectrum scarcity to operate*
  - *South Africa: current assignment of 2.6GHz and the suggested allocation of spectrum blocks in this band does not satisfy this principle*

- Spectrum scarcity due to administrative allocation and assignment mechanisms represent a major bottleneck for market entry
Conclusions

- Delays in liberalising and refarming frequencies suitable for wireless broadband roll-out such as 2.6GHz and 3.5GHz
  
  - *Incumbents are merging with smaller telcos in order to access additional spectrum for the provision of wireless broadband services*
  
  - *Kenya: incumbent is merging with small operators holding spectrum in the 3.5GHz to access additional spectrum to provide wireless broadband services*

- Sub-optimal license pricing mechanisms are preventing operators from effectively rolling-out wireless broadband networks in rural and marginalised areas
  
  - *Kenya: mechanism based on the number of transmitters is considered a disincentive for rural network roll-out*
Recommendations to facilitate refarming

- Pursue an open consultative approach
  - Spectrum deregulation will lead to resistance by legacy users (incumbents) with full usage rights
- Technology neutrality and address interference issues
- Based on use-it or loose it policy, to avoid hoarding
- Evaluate the potential of sharing 900MHz and 1800MHz in rural areas
  - Need to address the impact of the co-existence of different technologies with the possible increase of traffic demand
Recommendations to facilitate refarming

- Adoption of different regulatory approaches between urban and low densely populated areas
  - geographic licensing areas, lower spectrum fees and secondary market in rural areas
  - Frequencies allocated on a national basis for specific usage could be used in different geographical areas for different purposes

- Licensing renewal
  - review of purpose, frequency band, transmission power and geographic location -> take into account the evolved technological landscape, variety of technologies and different traffic demand in different locations
Recommendations to facilitate refarming

- Mechanisms of compensation for operators loosing spectrum assets should be found
  - assignment of frequencies still available (Sri Lanka)
  - costs of migration should be covered through revenues generated from assigning the liberated frequencies through a market-based approach

- New pricing formulas for spectrum fees
  - License prices based on actual usage of spectrum

- Regulators need to acquire the necessary regulatory and technical skills to effectively evaluate spectrum usage