

Radio Spectrum Management

Executive Level Training for Regulators and Policy-Makers
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Introducing Spectrum Trading

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Introducing Spectrum Trading

- ◆ What is Spectrum Trading?
- ◆ Why is it Important?
- ◆ How does it work – are there examples?
- ◆ How do we build support?
- ◆ What laws and regulations will need to change?

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Background: Issues

- ◆ Scarcity due to real congestion, inefficient use, underutilization and artificial scarcity since incentives for efficient use of the resource are not sufficient.
- ◆ Excessive administrative rigidity and failure to incorporate innovation.
- ◆ Control and use of the spectrum lies with the regulator – not the licensee.
- ◆ Economic costs due to inefficient use claimed to be enormous (Economist).



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Trends in Reform

- ◆ Reforming the Traditional System:
 - Move toward the Use of Market Mechanisms and Forces in the Management and Assignment of Spectrum
 - ◆ Property-rights, exclusive rights
 - ◆ Flexibility of use/unified licensing
 - ◆ Spectrum trading and secondary markets



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Trends in Reform

- ◆ Unlicensed or Spectrum Commons Approach
 - No exclusive rights – anyone can use certain blocks of spectrum subject only to certain basic rules (e.g., maximum power) and for any lawful purpose using any technology
 - ◆ Examples of commons approach include early examples from radio (e.g., amateur radio service)



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How is Spectrum Assigned?

- ◆ Common mechanisms for primary assignment of spectrum:
 - First-come, First-Served;
 - Comparative Administrative Review (some kind of bid process);
 - Auctions.
- ◆ Spectrum Trading is a secondary mechanism.



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What is Spectrum Trading?

- ◆ Secondary trading of spectrum permits the purchaser to change spectrum while maintaining the right to use – “property rights”.
- ◆ It is viewed as the key step in the spectrum management regulatory reform, capable of unlocking the potential of new technologies and of eliminating artificial scarcities of spectrum which find expression in inflated prices for spectrum-using services.



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Why is Spectrum Trading Important?

- ◆ Improves upon the efficiency and economy of assigning spectrum through administrative means.
- ◆ More responsive to fluctuating and changing spectrum needs and uses over time.



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What are Property Rights?

- ◆ Where trading occurs, buyer and seller share the same understanding of the bundle of rights and obligations which are changing hands. This is true of land, for example, and also of a spectrum licence. Clearly defined property rights are thus a precondition for efficient spectrum markets.
- ◆ The dimensions of rights and obligations in a spectrum licence include:
 - The band which is available for use;
 - The geographical area in which it can be used;
 - The period for which the licence is entitled;
 - The uses to which it can be put;
 - The licensee's degree of protection from other users;
 - The licensee's obligation not to interfere with other spectrum user's rights.



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Recommendations for Property Rights

- ◆ Where existing licences become tradable and subject to change of use, rights should be established consistent with current uses; this will avoid conflicts of rights and permit parties to renegotiate rights when circumstances change;
- ◆ Easements should not usually be allowed, but rights should be allocated in ways which take account of the economic value, and interference potential, of new technologies such as Ultra Wide Band;
- ◆ Licences should be perpetual;
- ◆ Vacant spectrum should be placed in the market place (subject to international agreements);
- ◆ A compulsory purchase power for spectrum should be confined to national security needs;
- ◆ Spectrum licensees should not pay a perpetual annual charge, nor any charge which discourages efficient trading.



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A Checklist for Implementing Spectrum Markets

- ◆ The rights and obligations of tradable licence must be sufficiently clear: duration, area and interference restrictions.
- ◆ Where licensees can change spectrum use interference needs to be regulated (e.g. one which limits emissions at the boundary) to protect other licensees from changes.
- ◆ Potential traders access to information in a public register about adjacent licensees. This is needed to accurately evaluate the consequences of the trades.
- ◆ A simple and clear procedure for registering licensee changes with the spectrum regulator.
- ◆ Procedures for scrutiny and reaction by the regulator responses must be in place to prevent or avert the consequences of trades which confer high levels of market power on firms acquiring licenses.



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Spectrum Trading In Practice

- ◆ There are two often referred to examples of countries where spectrum trading has been established and is taking place: these are New Zealand and Guatemala. Broad observations from a comparison of these two examples:
 - Spectrum trading is restricted to certain frequencies of general commercial application such as radio and television broadcast and personal mobile radio services. In other words, the government's policy is to reserve certain frequencies for important public uses and services.
 - Once a spectrum property or management right has been established, trading of spectrum is subject to several requirements: administrative and technical. The owner of the spectrum right is required to register information with the spectrum manager. From a technical standpoint, the operation of radio equipment must conform to approved technical standards, comply within established operating parameters, and avoid harmful interference.



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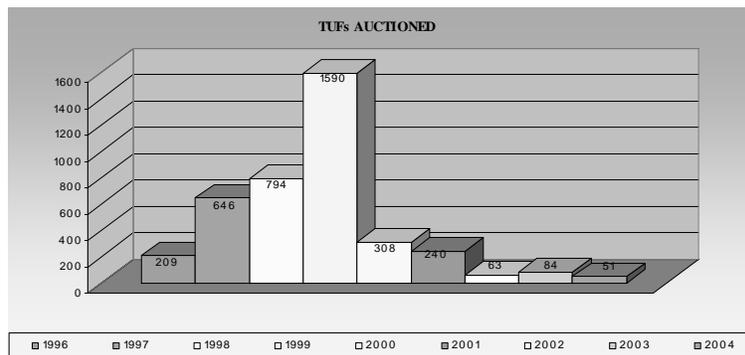
Spectrum Trading in Guatemala

- ◆ Spectrum Trading:
 - Users receive a TUF – Título de Usufructo de Frecuencia – which can be traded and has flexibility under technical constraints;
 - Whereas a Spectrum Licence is a right for a particular use, a TUF is a property right, with the freedom to use the spectrum as one sees fit, subject to technical restrictions;
 - TUFs describe: Maximum transmission power, Coverage area, Maximum interference at border of coverage area and schedule of operation.



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More on Guatemala



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Spectrum Trading Today

Countries	Spectrum Trading is allowed	Change in spectrum use permitted on transfer
Australia	☑	☑
Bulgaria	☑	
El Salvador	☑	
France	☑	
Guatemala	☑	☑
Hungary	☑	
Ireland	☑	
New Zealand	☑	
Poland	☑	☑
Slovenia	☑	
Spain	☑	
Sweden	☑	
United Kingdom	☑	☑
Source: ITU World Telecommunications Regulatory Database 2005		



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Building Support

- ◆ Considerable resistance to introducing unconventional market-based assignment approaches such as spectrum trading. Typical reasons given by regulators in developing countries include
 - a lack of capacity within the regulator,
 - Weaknesses (abuses) in existing systems to assign frequencies,
 - avoiding interference and ensuring license and operational compliance on the part of users.
- ◆ Even so, there are examples where spectrum trading is being encouraged on a regional basis in developing countries.
 - ECOWAS Spectrum Management Guideline 16 – Spectrum Trading Spectrum trading could be considered in the ECOWAS/UEMOA states. Trading would likely be limited to a few frequency blocks in the first instance. Any trading mechanism designed should minimize transactions costs and allow operators to change the use of traded spectrum within international allocations and the national interference management framework.



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ECOWAS – Harmonization of Policy

ECOWAS - ICT regulatory framework

- ◆ Regulators from fifteen West African countries agreed to a set of guidelines to establish a common regulatory framework, a vital step towards the establishment of an integrated ICT market in the region.
- ◆ The regulatory guidelines, addressing interconnection, licensing, numbering, *spectrum management*, universal access and ICT policy and legislation were formally approved by WATRA members on 9 September 2005 and will be submitted to the communication ministers and heads of State of the ECOWAS Member States for approval as directives to be applied within the ECOWAS region.



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What Laws and Regulations need to be changed?

- ◆ Legislation
 - Creation and registration of property rights for tradable spectrum
 - License duration
 - Competition rules
- ◆ Regulation
 - Management of Interference: technical parameters and standards;
 - Maintaining existing standards for conventional non-tradable spectrum;
 - Authorization procedures.



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ICT Regulation Toolkit References

- ◆ <http://www.ictregulationtoolkit.org>
- ◆ Radio Spectrum Management
- ◆ Legal and Institutional Framework
- ◆ New Technologies and Impact on Regulation



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Other ITU References

- ◆ ITU Strategy and Policy Unit workshop on Spectrum Trading January 2007.
- ◆ Spectrum Trading resources are available at <http://www.itu.int/osg/spu/stn/spectrum/resources.html>



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Discussion and Questions

