

A NEW ERA FOR RADIO RESOURCES MANAGEMENT AND SPECTRUM EFFICIENCY

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ABSTRACT

The future adoption and integration of a variety of wireless technologies pose challenges to the industry and policy makers. The sustainability of these new technologies is still uncertain. Due to their peculiar nature, wireless technologies challenge business models and more importantly long-established regulation schemes in terms of spectrum allocation and management.

New wireless broadband technologies emerge from distinct technology paths and actors. In order to understand their impact, we will propose a taxonomy, which could provide a framework to analyze their impact on business models and regulation schemes considering the joint objectives of:

- Flexibility;
- Harmonisation;
- Innovation incentives.

INTRODUCTION

The future adoption and integration of a variety of wireless technologies and services, and the diminishing market barriers between them, pose challenges to the industry and policy makers. The sustainability of envisaged new technologies is still uncertain. However, due to their peculiar nature, converging wireless technologies and blurring market limits, challenge business models and long-established regulation schemes in terms of spectrum allocation and management. In order to be able to define business models and set-up a policy framework for the development of these post 3G technologies, it is important to understand the impacts of these technologies, and how to exploit their innovative potential in the interest of consumers and citizens. It is necessary to assess the future and impacts of new wireless technologies and how these technologies will affect the supply of wireless networks and services and improve the usage, planning and management of the radio spectrum.

New wireless broadband technologies emerge from distinct technology paths and actors. In order to understand their impact, we will propose a taxonomy, which could provide a framework to analyze their impact on business models and regulation schemes. Moreover, we will analyze how some of these new technologies can provide or require new methods for spectrum management. We will look into possible migration strategies with respect to spectrum policy and current business aspects.

The following goals are generally recognised as desirable:

FLEXIBILITY

Flexibility is recognised to be desirable to achieve a continuous improvement in spectrum usage and accommodate rapidly changing technologies and services.

Three sets of flexibility tools can be considered:

- Market mechanisms: primary and secondary assignment of property rights;
- Technologies allowing varied forms of spectrum sharing;
- Commons approach: unlicensed and experimental spectrum.

HARMONISATION

Harmonisation can take place at technical and institutional level, in order to achieve consistency at international and regional level in preventing interferences. It conforms to the objective of achieving economies of scales in services and equipment. It can be considered as part of a consistent management across the spectrum to conform to technology convergence realities, as exemplified in the EU proposed WAPECS: Wireless Access Platforms for Electronic Communication Services.

INNOVATION INCENTIVE and REGULATION

The innovation objective is essential to an efficient regulation.

It should consist in a dynamic regulatory mix:

- Minimising time to market for innovations vs. certainties to deploy sustainable networks;
- Consistent with the European perspective of seamless, efficient, reconfigurable, multi-standard access (WAPECS);
- Consistent with electronic communications and competition frameworks.

THE WAY TO HARMONISED FLEXIBILITY

- Flexibility can be achieved through various ways:
- Technology Flexibility: the question being the feasibility and timeframe of future radio technologies
- Flexibility by regulation: the Policy way-Spectrum management methods
- Some even advocate “Administered flexibility”, emphasising the ability of government regulation agencies in meeting the demands of the market.

A multiplicity of questions bear upon the future of spectrum policy:

Is a policy mixing the various Regimes sustainable, in a context of rapid and hardly foreseeable evolutions?

How far can the implementation of Dynamic Spectrum Access go?

Potential competition between Wireless services of all sorts in the various frequency bands benefiting from diverse regimes corresponding to low or high fees.

Potential competition between Wireless services of all sorts and services in the same market(s) provided on other platform, of the UMTS vs. WiFi (or WIMAX) kind.

At this time (Q2/2005), spectrum policy is very much under the influence of a cultural ecology. A cultures clash is apparent between:

- Engineers, confident in their ability to run the whole thing from their keyboard;
- Economists, with a division between Planners (some left), and Born again Market believers;

- Policy decisions however, are mostly taken by Government, themselves functionally composed of cash-strapped Ministers of Finance, and Technical agencies prone to micro managing.

The Table I provides a summary of the positions held by these various groups, adding a disputed “grey zone”.

Table I

Spectrum Management Methods	Extension
Administration	Public services/Policy determination
Grey Zone	Debates about nature of service
Market mechanisms	Possible encroachment by SDR
Unlicensed	Extent assumptions (High or low)

Depending on the relative strength of these groups and on the pressure by operators and equipment vendors to market new spectrum-hungry systems, various configurations may appear. One expected outcome of this session is to provide clues as to the main drivers of the evolution of spectrum management in different environments: developed and emerging nations; mature and emerging technologies. Moreover, the question of the transition between “old” and “new” regulatory regimes should not be underestimated: it is a key issue if we want to avoid bringing chaos to an already unstable world.