

# **A Manufacturers' Perspective to Spectrum Management**

Lars BONDELIND,  
Vice President Huawei Technologies Sweden AB,  
[lars.b@huawei.com](mailto:lars.b@huawei.com)

Pablo BRITO,  
Vice Director Europe Wireless Marketing, Huawei Technologies,  
[pablo.brito@huawei.com](mailto:pablo.brito@huawei.com)

Zhu TAN,  
Director Europe Wireless Marketing, Huawei Technologies,  
[tanzhu@huawei.com](mailto:tanzhu@huawei.com)

## **ABSTRACT**

Mobile communications have known an incredible success worldwide, bringing not only voice services but also other services which make convergence possible. This convergence, the emergence of new technologies, and disappearance of former technologies, challenges spectrum policy makers. This paper suggests compromise options between cost/complexity, innovation and spectrum freedom that has to be reached in order to maximise society benefits as a whole.

## **INTRODUCTION**

Wireless devices and communications are changing everyday people's life. Radio and TV has been unprecedented suppliers of news and entertainment to almost all people of our world. We are now in the middle of the second revolution, where already half of the world's population can communicate with each other through wireless devices. Used to provide voice service at its debut, new services are now being used, bringing convenience, immediate access to information, and allowing internet services anywhere.

Key ingredients to these successes have been industry innovation and regulatory framework for those innovations. Regulatory policies are now being challenged by a convergent world, whereby new technologies blur the existing distinction between fixed/mobile/broadcast services. There is a need to define new spectrum management rules that accommodate former and newer technologies, and make communications and access to the new information society available to everybody in a fair and non-discriminatory way.

## **CONVERGENCE**

The convergence implies that same, or similar, services, will be available over several different networks. Mobile TV is now-days a reality in different countries where mobile users can enjoy pure broadcast services on their mobile terminals. Plain telephony or "voice service" as we call it today, is nowadays primarily wireless and sometimes even only available through mobile network services.

Huawei has the view that we cannot see one single winner among the new mobile broadband technologies such as WiMAX, LTE, HSPA+ or 802.11n just to mention a few. Huawei believes that all of these technologies each have their applications and therefore will co-exist for a long time, based on operators' business model and people's preferences.

A co-existence in future and existing mobile technologies however creates a challenge to manufacturers and operators on how to create sustainable cost-effective solutions.

## **TECHNOLOGIES CANNOT COMPENSATE A POOR SPECTRUM DISTRIBUTION**

Today's globally open research and technology environment, leads to that the different ongoing radio developments share similar state-of-the-art air interface principles. Most of them are based on OFDM technology which is now recognized in the industry as the best solution to fight a key wireless problem: interference created by re-using scarce spectrum resource.

Digital developments are making Software Define Radios technologies feasible. This will offer flexibility to adjust and optimise the actual radio and spectrum resource use in the already installed network.

Last but not least, as networks are growing larger and require more administration and maintenance, self-organizing networks techniques are also studied, in order to minimize network deployment and planning costs while maximizing spectrum utilization and efficiency.

While these techniques help us to maximise the efficient use of spectrum and introduce spectrum and deployment flexibility, wireless applications are constrained by the fact that the electromagnetic spectrum is a limited resource, and that different frequencies have different propagation characteristics, and there is no technology available that can compensate this.

Huawei is not confident that market forces will result in a good balance in the use of different frequencies under these constraints and is therefore of the strong opinion that spectrum cannot be totally left to an unregulated market.

The use of the limited electromagnetic spectrum must continue to be under regulations, securing society interest to make communications available to everybody under fair and affordable conditions, but we also believe this can be done with somewhat different and relaxed directives than formerly applied.

The physical laws that apply to radio communications make the lower frequencies more suitable for wide area broadcast and wide area communications.

It is necessary to secure that appropriate frequencies are assigned with regards to each application's reach and coverage needs, to be able to develop economical and affordable networks, both broadcast and interactive communications.

We must work ourselves away from today's situation where we use very high frequencies to transport high data speed communication aimed to reach a wide geographical area. This creates extraordinary expensive solutions where huge amount of equipment is required to achieve the wanted accessibility.

As we are in a technology shift where broadcast radio and TV are leaving spectrum which is very suitable for wide area reach, we want to say that we do not believe a suitable shift in everybody's interest, will happen without proper regulations.

## **COMPROMISE**

Regulators are moving with different answers posed by this challenge. Different answers are being provided and discussed by regulatory bodies and we are not asking to retain the formerly quite rigid regulations.

Compromise between cost/complexity, innovation options and spectrum freedom has to be reached. The aspects we ask to be considered are:

- Introduce consideration to the need for geographical coverage and physical distance to improve the cost-efficiency in implementing wide area coverage applications.
- Do not impose technology requirements, but secure that both broadcast and interactive services are offered and that geographical coverage is maintained with compatible technologies.
- Ensure balance between Licensed and Unlicensed spectrum that accommodate the need for secure and quality controlled solutions and best-effort un-controlled solutions for dedicated applications that may foster innovation. Identifying an un-licensed carrier within IMT-2000 band may help to provide innovative solutions in so-called home environment
- Define capacity impacts that may be introduced by a free spectrum trading. For example, frequency sharing rules between UMTS 900 and GSM 900 depends heavily on the accepted capacity loss, in both UMTS and GSM networks, and between technologies.
- For interactive applications: Identify Paired and Un-paired bands allocations in order not only to minimize industrial cost but also regulatory burden that would otherwise exist if a pure open market approach is used

## **CONCLUSION**

Use of spectrum requires planning by society in the same way as roads and railways. Not all roads are suitable for high speed long distance communication, and the planning need directions from society.

Considering spectrum scarcity and needs for the wide range of applications, future regulatory conditions should therefore consider society benefits as a whole.

We ask the regulator community to take into consideration the proposed aspects that can balance cost, flexibility and physical law constraints with the interest of society.