

Microsoft's response to the draft RSPG opinion on CUS

September 2008

Introduction

Microsoft welcomes the opportunity to respond to the draft RSPG opinion on the *Aspects of a European Approach to the Collective Use of Spectrum*¹.

Microsoft supports the European Commission's efforts to increase the supply of spectrum for new services and applications. We believe that spectrum is an increasingly critical and constraining factor in the development of the European digital economy. Alongside new licensing opportunities, the collective use of spectrum (CUS) is a potent but under-developed model with considerable potential².

Whilst exclusive licensing suits some types of services and applications, it can be a barrier to the development of emerging technologies and the services and applications they could enable. Thus we agree with the RSPG (expressed in its draft opinion) that the collective use model is a vital part of the spectrum management mix, with the potential to stimulate service and technology innovation. In particular, as the simplest framework for collective use, licence exemption is a powerful tool to encourage innovation³.

To gain the full potential of the CUS model, we believe it is necessary to:

- Extend the CUS model use across all bands
- Hold to an application and technology-neutral approach in regulating CUS
- Work for global harmonization of CUS spectrum

Sharing promotes more efficient use of spectrum

We agree with the RSPG view that spectrum sharing, facilitated by greater application of CUS, is likely to promote more efficient use of spectrum. In the same way that packet switching has replaced dedicated data connections, we believe that sharing spectrum is vital to meet the growing demand for communications capacity.

As device storage capacities increase, the application of opportunistic data transmission increases the value that service providers can extract from 'gaps' between other more continuity-critical services such as Voice over IP or live broadcasts.

¹ http://rspg.ec.europa.eu/doc/documents/meeting/rspg16/rspg08227_draftopinion_cus_final.pdf

² As highlighted in the draft RSPG opinion (p. 7)

³ As may be observed by the substantial investments in Bluetooth and 802.11 derivatives

Microsoft's response to the draft RSPG opinion on CUS

Advanced techniques such as politeness protocols and cognitive radio bring the potential to enable more dynamic and adaptable spectrum sharing -- increasing the social and economic value from spectrum applications. For example, in many geographies, the UHF bands contain considerable spectrum capacity which is left unused (called white space) to prevent interference to TV reception. The fragmented nature of this capacity and the sensitivity of the existing applications has compelled regulators to leave the white spaces fallow. Although at an early stage in their evolution, cognitive radio techniques already promise to enable regulators to unlock considerable benefits from this prime spectrum.

Importance of CUS availability in all bands

There is a need for spectrum managed under the CUS model to be available in all bands, to suit the wide range of applications which can benefit from it. Currently there is relatively little CUS spectrum available below 2 GHz.

We agree that the gradual increase in use of CUS for long range applications is good (p9) and feel that this would be assisted by making more CUS spectrum available at lower frequencies.

Application and technology neutrality

Microsoft agrees with the RSPG that application and technology neutrality is important to provide the maximum scope for innovation through CUS. This principle is no less important when considering the regulatory framework for CUS, which is specifically aimed at stimulating innovation and maximizing the efficiency of spectrum use. The only regulations that should apply should be those which ensure that existing users are protected against harmful interference – assuming they cannot easily be relocated.

Global harmonisation of CUS bands

We agree with the RSPG that the value from CUS is maximised when its application is harmonised across as many regions as possible. This provides the market scale necessary to interest device and silicon manufacturers. The market scale will also be key to sustaining the development needed for further efficiency gains.

Quality of service – a market speciality

We agree with the RSPG that quality of service can and should be high, even without imposing stringent rules. Rather than attempting to engineer quality of service through the spectrum regulatory framework, we think that regulators should allow manufacturers maximum freedom to innovate and differentiate. The intensely competitive consumer device market is likely to reward quality of service (at the application level) and therefore provide manufacturers with incentives to innovate. The heavy investment in technologies that exploit 2.4 GHz illustrates the impact of providing flexibility and global market potential⁴.

⁴ Including, for example, IEEE 802.11n implementations

Microsoft's response to the draft RSPG opinion on CUS

Multiple profiles rather than spectrum partitions

Rather than partitioning CUS spectrum for different types of application (p. 10), we would suggest considering alternatives such as classifying devices according to a few distinct profiles. These profiles would attract distinct privileges linked to corresponding responsibilities. For example, regulators might consider two initial categories for device profiles:

- Mainstream: the bulk of devices, which are likely to make regular and potentially intensive use of wireless communications
- Primitive: light, occasional users of wireless communications

Mainstream devices could include a mix of fixed and mobile devices, which may support CUS-based communications alongside other networks. Such devices would probably have a reasonable level of 'intelligence' and it might be reasonable to expect them to support politeness protocols, facilitating more efficient sharing.

Primitive devices might include distributed sensors whose main function requires only occasional, perhaps prompted, communications. In the case of these devices, it might be unreasonable and disproportionate to require implementation of sophisticated politeness protocols.

Other profiles might be defined in the future, as technology capabilities and application requirements evolve.

CUS capacity needs to be increased at lower as well as higher frequencies

We welcome moves to increase spectrum for CUS at higher frequencies, which are underexploited at present and offer attractive capacity, even if rather limited reach. However we think that allocation of CUS to higher frequencies is not a substitute for applying the model to bands below 2 GHz.

Given the particular strength of demand for spectrum under 2 GHz, increasing collective use in that part of the spectrum seems a logical step.

In particular, we think that sub 1 GHz frequencies are useful for a range of applications. RLAN, for example, should be explicitly included in the list of example applications for this part of the spectrum (see p. 6, as well as recommendation (a) in section 6.1 (p. 9)).

We agree with RSPG that CUS allocations are likely to be needed across the entire frequency range (page 11)

A powerful example of the value of having a spread of CUS bands may be found in mesh networking where lower frequencies can enable a mesh network to operate with a sparser penetration than would be possible at the frequencies typically allocated for wireless broadband using licence-exempt equipment.

Microsoft's response to the draft RSPG opinion on CUS

Enabling a diversity of access, though multiple CUS bands, should also assist quality of service, by increasing the opportunities for services and applications to access the communication capacity they need.

Encouraging manufacturers to increase efficiency of spectrum use

The desire to minimise cost is a powerful incentive to trim device performance in areas where it will not be noticed by potential customers. This applies across communications and especially in consumer electronics, where fractional cost savings can yield large returns.

Manufacturers of communication devices, such as television receivers, for example, can save costs by using inexpensive filtering which takes advantage of adjacent channels being left vacant. However this cost saving is at the expense of much reduced spectrum efficiency.

Regulators should consider how they might encourage manufacturers to improve device specifications to allow greater spectrum occupation.

Power constraints should be established with care

We accept that regulators will want to set transmission power limits on licence-exempt devices, which may vary according to the part of spectrum the devices use. These limits should be set with care to ensure that innovation benefits to consumers are not unduly constrained. Prevention of harmful interference should be the guiding principle, after health and safety requirements are met.

Device manufacturers have incentives to minimise power output, particularly for battery-operated products, and can take advantage of the flexibility provided by digital communication to trade off data capacity against power output requirements.

Whilst much of the economic and social benefits might arise from applications fitting within the 'standard' power limit, regulators should keep the limit under review and consider raising the limit as technological advances offer the potential to yield additional benefits from higher power whilst mitigating interference. Such advances might include the implementation of politeness protocols, beam-forming, and steering techniques, etc.

Opportunities for increasing spectrum efficiency

The rapid advances in wireless technology, which we anticipate that CUS will help accelerate, also make it important to review the CUS framework from time to time. The key requirement is to roll back regulatory requirements as the market provides ways to meet the original aims of the regulation.

Microsoft's response to the draft RSPG opinion on CUS

Consumer communication devices, which can take many forms⁵, are at the intersection of multiple rapidly evolving technologies -- which tends to shorten their useful life. For example, advances in wireless communication technology, content encoding and application requirements mean that user expectations rapidly outgrow device capabilities and are thus likely to be replaced sooner than other more mature types of product. This shortened half-life enables regulators to 'ratchet up' the spectrum efficiency requirements on devices that can benefit from CUS, with comparatively rapid translation into the active device population.

Creating space for innovation

Regulators should continually monitor the use of spectrum and actively seek to release under-exploited spectrum to stimulate innovation and allow the market to find the optimum use for this vital economic input. Given the relative under-provision of CUS spectrum in the present management mix, priority should be given to CUS especially in spectrum below 2 GHz.

We agree with the RSPG that more UWB-type allocations should also be explored (p. 11).

We also agree with RSPG that areas with low population density can be useful for trial zones, such as Ireland is offering.

Applying cost/benefit analysis to the application of CUS

We note an apparent contradiction between the stated need for cost benefit analyses to underpin allocation decisions (see pp. 7, 9, 11) and the acknowledgement (p. 8) that "we cannot" know "exactly what technologies will emerge nor how markets will develop." This clearly reduces the value of cost-benefit analysis in determining the right allocation to CUS.

We suggest that the historically large benefits from CUS for society and the economy alongside the growing importance of wireless technologies favour a bias towards allocation under CUS, except where harmful interference would justify an alternative course.

Summary

We agree with the RSPG that the Collective Use of Spectrum is an important aid to innovation because it lowers the barriers to spectrum access. We also agree that CUS needs to be applied across multiple bands and we suggest that more is needed particularly below 2 GHz.

Higher frequencies provide useful additional capacity and further incentives to innovation in wireless technologies, but are not a substitute for spectrum at lower frequencies.

We urge European regulators to keep to the principle of application and technology neutrality in applying CUS, avoiding the partitioning of spectrum.

⁵ Such as digital cameras that have Bluetooth and WiFi interfaces.

Microsoft's response to the draft RSPG opinion on CUS

Finally, we think that the CUS model together with emerging access technologies such as cognitive radio, hold much promise for extracting greater social and economic value from spectrum in the future.

Microsoft would be pleased to further discuss its position on the draft RSPG opinion on CUS. Please contact:

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