

The Effects of a Market-Based Approach to Spectrum Management of UHF and the Impact on Digital Terrestrial Broadcasting

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EXECUTIVE SUMMARY

27 February 2008

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Digital switch over – the transition from analogue to digital TV and digital radio – presents an important opportunity for spectrum regulators to review the overall use of the UHF (ultra-high frequency) band of the electromagnetic spectrum at 470-862 MHz. Historically, this band has been allocated across Europe for analogue terrestrial television.

As digital technology will allow existing broadcasting services to be supplied using less spectrum, there is scope to use some of the UHF spectrum for alternative applications. This 'extra' spectrum is commonly known as the '**digital dividend**'. The 'digital dividend' is so called due to the benefits to society that can potentially be realised in the form of direct financial exploitation of this 'spare' spectrum or indirect benefits associated with the launch of new services using the spectrum.

This report investigates the potential impact of European countries taking a market-based approach to spectrum management of the UHF band and the impact on digital terrestrial television and radio broadcasting. Our overall finding is that considerable caution is required in determining which market mechanisms are used and how they might be applied to different parts of the band; the optimal approach will also vary across European countries. This finding is based on four key observations:

- There are sound economic reasons why a market for UHF spectrum is likely to fail and not allocate a socially optimal amount of spectrum to terrestrial TV
- This is because terrestrial TV generates significant public value for society that would not be visible in any hypothetical contest for spectrum with other uses, and cannot easily be replicated through provision of TV using other platforms
- The medium-term value that could be created by other uses of UHF spectrum – including rural broadband - appears modest
- The situation in individual European countries is highly varied which severely constrains the scope for a pan-European approach to spectrum management of the UHF band

Markets for UHF spectrum are likely to fail

Used in the right circumstances, market mechanisms can encourage a more efficient use of spectrum and facilitate expansion, entry and innovation in services. However, if the price signals produced by a market mechanism are incorrect, then markets are likely to fail to identify the most valuable services, depriving consumers and society as a whole of large welfare gains. In this report, we identify three particular reasons why markets are likely to fail if applied to the management of the UHF band:

- **High public value** – Some services generate large benefits for society at large that are not reflected in their business value and thus the respective provider's willingness to pay for spectrum.
- **Differences in the business models** – Differences in business models means that some types of provider may be less able to monetise their use of spectrum than others, despite generating large amounts of consumer value
- **Network effects** – Network effects exist where different users' usage decisions are taken independently but affect each other. These impacts may not be captured in a private organisation's willingness to pay for spectrum.

As we explain below, all these factors are present in terrestrial broadcasting. Taken together, they strongly suggest that a hypothetical market contest for UHF spectrum would result in under-provision of spectrum for terrestrial television, which in turn provides a compelling case for intervention to set aside a proportion of UHF spectrum for digital TV.

Terrestrial broadcasting generates significant public value for society

European broadcasters employed over 2.2 million people¹ directly and indirectly, and invested around €19bn in original European commissioned TV programming² in 2006. This is founded on a stable but delicate equilibrium, or “Dual System”, where a number of key publicly or commercially funded broadcasters in each market have the scale to invest in high-quality local programming. In 2006 **major public service and commercial channels accounted for 87% of all investment in original European programming** (excluding news programmes). Imposing significant extra cost risks upsetting this equilibrium and **sharply reducing investment in European content.**

However, broadcasting's broader contribution to society dwarfs its size in simple business terms, generating high levels of positive externalities – or ‘public value’ – for society as a whole. There are two other key factors that would also put terrestrial broadcasters at a disadvantage in a market contest for radio spectrum:

- Most terrestrial broadcasters rely on public funding or advertising business models in order to meet public service objectives, and provide universal free-to-air access. While these funding models deliver high public and consumer value, the broadcasters are less able than alternative service providers, such as mobile operators, to directly monetise the consumer relationship
- The wider benefits of the digital terrestrial platform as a whole are not reflected in the ability of individual channels to pay for use of UHF spectrum

¹ Forge et al, 2007.

² Oliver & Ohlbaum, *Prospects for the European TV content sector to 2012*, October 2007.

The value that other uses of UHF spectrum would create is modest

Some studies sponsored by mobile operators and equipment makers have claimed that use of UHF spectrum for mobile broadband could generate benefits worth billions of Euros.³ We call this the '**mobile myth**'. In fact, a closer investigation of the business case behind deploying mobile networks in UHF spectrum suggests there is little substance to these claims and the economic case for mobile in the UHF band in Europe is dubious:

- There is already a large amount of spectrum available to mobile network operators to offer voice and broadband services, including a further 190 MHz at 2600 MHz being made available across Europe.
- Predictions of large benefits from allocating more spectrum to mobile are based on aggressive forecasts for growth in demand for mobile broadband.
- UHF spectrum could be useful for rolling out mobile broadband to rural areas, where distance matters more than capacity, or for improving signal penetration through buildings. However, spectrum available at 450 MHz and 890-900 MHz may be sufficient for these purposes.
- In the mobile industry, the most important factors determining the viability of a spectrum band are the availability of cost-effective network equipment and a large choice of handsets. The economies of scale necessary to make this happen can only be achieved if there is harmonised availability of spectrum across Europe, but there is little prospect of this happening in the UHF band given pre-existing national decisions on the planning of digital TV.
- Cellular and broadband devices, if deployed in UHF spectrum, could cause significant interference to digital terrestrial TV reception.

The case for rural broadband is weak

The other widely proposed use of the UHF band is 'rural broadband', a stand-alone wireless service for communities that cannot access fixed services. Although the UHF band permits large service area coverage, the available bandwidth will not be sufficient to deliver "true" broadband (e.g. 2 Mbit/s or more) to many simultaneous users, whereas spectrum above 2000 MHz delivers much greater bandwidth and is already available to mobile operators.

³ For example, a preliminary report by Spectrum Value Partners in October 2007, sponsored by a group of mobile operators and equipment makers, predicts benefits of €20bn from opening up the UHF band to mobile telephony and broadband.

Differences in national markets limit the scope for a pan-European approach

Policy makers hope to identify a common sub-band within the UHF band that could be made available for non-broadcasting services across Europe. However, there are two significant obstacles to undertaking such an approach in the UHF band:

- **Existing planning commitments** – Digital terrestrial television's use of UHF spectrum has been laid down by the ITU's GE06 plan that minimises the interference between signals across 108 countries. This plan uses all channels from 21-69 of the UHF spectrum in various parts of the European Union making it very difficult to harmonise any sub-bands across Europe without a major re-planning exercise
- **Requirements for DTT vary** – The requirements for DTT services vary hugely across Europe, reflecting differences in market structures and different social, regional and political priorities

These differences mean that it is almost certainly unrealistic to identify a homogenous digital dividend across Europe in the medium term. Further, if too much emphasis is placed on making spectrum available for hypothetical new uses, there is a real risk that policymakers could lose sight of the need to provide a critical mass of spectrum to support DTT, even though this is an existing service with proven value. Any initiative at the EU level should ideally take a long-term perspective, so as to ensure that each member state can allocate sufficient spectrum to DTT to provide adequate television channel capacity and flexibility to support technology upgrades to HD programming and beyond.

In summary, we would make the following recommendations:

- **Individual national markets need a critical mass of digital terrestrial broadcasting to ensure a fully functioning, vibrant, universal broadcasting market;**
- **Broadcast markets are radically different – national regulators should be able to decide exactly what this critical mass of DTT is in their respective market;**
- **Spectrum planning must allow the flexibility for the future technical evolution of DTT platforms and switch-over phases from old technologies to new, and;**
- **Regulators should take account of the differing business models of potential bidders, their overall value to society and their ability to monetise consumers – otherwise market mechanisms are likely to fail.**

ABOUT THE AUTHORS

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