



RSPG public consultation related to the draft opinion on EU spectrum policy implications of the digital dividend

Vodafone comments

Vodafone welcomes the opportunity to comment on the draft RSPG Opinion on EU Spectrum Policy Implications of the Digital Dividend.

Spectrum efficiency

The switch-off of analogue systems following to the transition to full digital transmission of terrestrial television broadcast services will allow the release of valuable spectrum ("digital dividend") for other uses. This spectrum is located between 400MHz and 1 GHz, which is ideally suited to terrestrial cellular applications.

In most European markets today, traditional TV broadcasting uses up to 450 MHz of the spectrum below 1 GHz (VHF and UHF bands), whilst at most 70 MHz is assigned to mobile cellular services. A recent study commissioned by OFCOM from London Economics¹ shows that total producer and consumer surplus created by the mobile industry is more than £21 billion, whilst the surplus generated on an equivalent basis by the terrestrial TV broadcasting industry is less than £9 billion. The mobile industry generates about £150 million for each MHz in the 900 MHz band.² Terrestrial TV broadcasting generates £20 million/MHz.

Over the past 20 years, the mobile sector has achieved substantial gains in efficiency of spectrum use as it moved through successive generations of technology. However, improvements have not been seen in broadcasting until recently with the introduction of Digital Terrestrial Broadcasting. The spectrum efficiency of DVB-T is more than four times higher than analogue broadcasting and so less than one quarter of the spectrum is needed to maintain the same number of channels currently available with analogue transmission.

A much greater efficiency improvement could be achieved with single frequency networks (SFNs) instead of multi-frequency networks (MFNs). This option has not been widely adopted because of the potentially higher costs in network deployment due to the larger number of transmission sites and by the short-term constraints of the transition from analogue to digital. One "layer" of a digital multi-frequency networks needs a minimum of 5-6 UHF channels, whereas a single frequency network needs only one.

¹ Economic impact of the use of radio spectrum in the UK: A report by London Economics; 16 November 2006.

² This estimate is based on the assumption that half of the £21 billion surplus is generated on the 900 MHz band, while the rest is produced on the 1800 and 2100 MHz bands.

The current spectrum management framework lacks adequate incentives for a more efficient use of the spectrum, and fails to recognize the opportunity cost of allocating spectrum to an industry which generates less than one seventh the economic value per MHz of the cellular industry. Vodafone recognizes that other non-economic considerations may be relevant in this context, but there is still a need to ensure that spectrum is better exploited in future.

Digital dividend and RSPG proposals

The digital switchover will allow an increase in the number of TV channels offered in comparison to analogue TV, but it will also make possible the release of spectrum for other uses (i.e. the digital dividend).

The RSPG draft opinion defines the digital dividend as the spectrum made available over and above that required to accommodate the existing analogue television services in a digital form. With this definition, the amount of spectrum that could in principle be released is more than 300 MHz³. The European Commission estimates are between 300 and 375 MHz. In practice, part of this spectrum is already being used in European countries for the digital broadcasting services transmitted simultaneously with analogue broadcasting during the transition phase.

In most Member States, the major incentive provided for customers to migrate to digital is the availability of a wider selection of programs. However, it is not at all clear that these additional programs will be sufficient (or even necessary) to ensure that all customers migrate to digital platforms. Nor is it clear are they necessarily the best means of facilitating this - some customers may consider subsidies of receivers to be a better incentive to migrate than additional channels. Claims that additional spectrum is required to support additional programming should be carefully scrutinized – or the broadcasters forced to undertake such scrutiny themselves through appropriate spectrum pricing mechanisms.

Most Member States have not yet decided on the precise form of the digital dividend and its possible use. The fragmented model of spectrum planning used for broadcasting makes it difficult to estimate the bandwidth of spectrum that could be released nationally in each Member State for other applications. An exception is the UK where OFCOM has planned the digital broadcasting layers so that the digital dividend can be made available in the form of contiguous blocks of national channels (i.e. the same spectrum channels on whole national territory). According to current UK plans, the digital dividend will be 112 MHz. This estimate is lower than the one of the Commission because it excludes the channels already being used by digital terrestrial broadcasting (FreeView).

³ Commission Communication 461 - September 2005. This estimate is made on the assumption that only existing analogue program channels will be available on digital.

The RSPG consultation document considers three possible policies for the use of the digital dividend:

1. Release the digital dividend spectrum for new uses with the existing assignments defined by RRC-06 (i.e. fragmented spectrum for multi-frequency networks). This would effectively preclude any service other than broadcasting, such as mobile;
2. Define an harmonized sub-band in the UHF band for fixed/mobile applications (including up-links);
3. Define a common sub-band for high field strength downlink service (mainly mobile TV).

Under certain conditions, options 2 and 3 may coexist.

Vodafone position

Vodafone believes that the top priority for Europe should be to identify a sub-band for mobile and fixed applications, which can be harmonised throughout Europe. This is the only way to achieve real flexibility in the use of the spectrum, because the RRC-06 plan does not enable the spectrum to be used effectively for any national service apart from broadcasting.

The task of identifying a harmonised sub-band will not be straightforward. However, it needs to be completed urgently, in order that it can be taken into account in the digital switchover plans of Member States. We are pleased that the European Commission plans to issue a Mandate to CEPT to undertake the necessary technical studies, and that CEPT has already initiated this work by establishing ECC TG4.

A harmonised sub-band will not be restricted only to mobile or to non-broadcast services. We believe both traditional broadcasting and mobile TV will increasingly employ single frequency networks, because of their far higher spectrum efficiency than multi-frequency networks⁴. These networks will also benefit from the definition of a harmonised sub-band. A harmonised sub-band therefore assures maximum flexibility in the future use of the spectrum. This is essential, because there is no certainty as to what service propositions will be most attractive after 2012, when the spectrum becomes available.

Any reservation of further spectrum for terrestrial broadcasting after the switch-off is very difficult to justify. The audience for terrestrial broadcasting is already declining, as viewers move to internet browsing and the wider service proposition offered by satellite, cable TV and IP-TV platforms. The case for MFNs is also weakening as local and regional advertising develops in other media, and as broadcast television moves towards subscription services.

⁴ Multi-frequency networks may be necessary during the switch-over period, to maintain the same direction of reception of rooftop antennas, for analogue and digital reception. They could also be needed to fulfil public service obligations for regional content and advertising. Neither of these would apply to new broadcast channels.



These trends are expected to continue, and possibly accelerate in the future. In some countries, terrestrial broadcasting is already a marginal means to deliver TV service given extremely high penetration levels of cable and satellite platforms.

It is important to emphasise that spectrum for terrestrial broadcasting must not be allocated on the basis that some consumers wish to consume such services. The opportunity cost of spectrum allocation needs to be carefully considered – the needs of a few TV consumers compared with the much greater benefits available to a large number of cellular users. Spectrum trading and flexibility will allow the market players, including broadcasters to properly assess these opportunity costs (provided that broadcasters have appropriate financial objectives, which may not always be the case for public service organizations). These opportunity costs should be considered when Member States develop their plans for digital television transmission – it may be better to buy out residual interests early rather than await full vacation of spectrum.

Even the prospects of a terrestrial provision of High Definition TV (HDTV) service are weak as the number of channels that could be offered for each multiplexer is very limited (about 1-2 program channels). In spectrum terms, the whole digital dividend could be exhausted by the provision of only 3-4 HDTV program channels.

In any case, if a harmonised sub-band is defined, potential HDTV providers could still have the option to bid for the released digital dividend spectrum and use it to deploy the more spectrum efficient single channel networks.

The release of a portion of the UHF band for non-broadcasting services could be the key to provide wireless broadband (fixed and mobile) to rural areas and to improve mobile indoor coverage. The propagation characteristics of the band could facilitate the deployment of networks reaching sparsely populated areas that are uneconomic to cover with networks operating at higher bands. Vodafone estimates that the number of sites required to achieve national coverage using the UHF TV band to handheld terminals is approximately 50% the number required at 2.1GHz. If the terminal is large enough to include a larger and better antenna (e.g. a laptop computer), then the coverage advantage of UHF is further increased.

The total bandwidth of the harmonised sub-band should be at least 120 MHz. Less spectrum than this would limit the number of competing networks using the spectrum. In addition, the advantages of the band could be greatly diminished if the spectrum is highly fragmented. Ideally, the harmonised sub-band should be split into two parts to allow the option of using of frequency Division Duplex communications.

Vodafone recognizes that the process related to the definition of a sub-band is complex and can be realised only in the long term as the analogue switch-off takes place. As stated in the draft RSPG Opinion, this will require changes to the GE-06 plan to make the spectrum available. Further studies are needed to evaluate the impact of these changes on



broadcasting. If the reasonable costs of broadcasters resulting from modifications to the GE-06 are reimbursed by the future users of the spectrum, this could easily remove most obstacles to the implementation of a harmonised sub-band.

It is important for CEPT to seek a Mobile Allocation in the ITU Radio Regulations at WRC-07 for the whole UHF TV band. The GE-06 Agreement (especially the spectrum mask concept) provides some flexibility on use of the spectrum within the GE-06 plan. However, this is not sufficient for a harmonised sub-band or for countries that border others that do not apply this flexibility.

The adoption of a specific Commission decision could follow to guarantee a coordinated implementation at EU level. In the mean time, Member States should refrain from taking steps that could undermine the future availability of the digital dividend spectrum on a pan-European basis.