

RSPG

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ON

EU SPECTRUM POLICY IMPLICATIONS OF THE DIGITAL DIVIDEND

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1. Introduction

This paper represents the Radio Spectrum Policy Group's (RSPG) response to the Request for an Opinion on the EU spectrum policy implications of the digital dividend.

This opinion represents a follow-up and a complement to two opinions previously adopted by the RSPG, respectively on:

- **"Spectrum implications of the switchover to digital broadcasting"**¹ (23 November 2004), which highlighted, among other aspects, the importance of the prospect of a digital dividend.
- **"Spectrum for mobile multimedia services in the field of broadcasting"** (Mobile broadcasting), which addresses a particular case of potential use of the digital dividend, which may also rely on frequency bands different from within the scope of the digital dividend,

It is also a follow up of two recent Commission Communications: **"Accelerating the transition from analogue to digital broadcasting"**², which sets out the Community policy objectives for the transition, and **Radio spectrum availability in the context of the digital switchover and the upcoming ITU Regional Radiocommunication Conference 2006 (RRC-06)**³. The opinion also takes into account the European Parliament resolution on "the transition from analogue to digital broadcasting: an opportunity for European audiovisual policy and cultural diversity ?" (2005/2212(INI)).

This new RSPG opinion should be considered as a generic initiative to approach the issue of the digital dividend on a Community level, and not as an attempt to impose any particular solution on individual Member States for the sake of uniformity. It is intended to address the prospects of the digital dividend and to identify any need for coordination at EU level. In particular, the scope of this opinion encompasses virtually all potential uses of the digital dividend.

¹ Full text of the RSPG Opinions can be found at the following web address:
http://rspg.groups.eu.int/documents/meeting_documents/index_en.htm

² COM(2005) 204 (24 May 2005).

³ COM(2005) 461 (29 September 2005).

2. The digital dividend and its possible forms

In order to facilitate its task, an initial questionnaire was sent out by the RSPG to the Member States and administrations of countries adjacent to the EU. A summary of the responses received is provided in Annex 1

The responses received have pointed out different interpretations on the meaning of the digital dividend by various administrations. For the purpose of this opinion, consistent with the previous RSPG opinion on digital switchover, the digital dividend is understood as the spectrum made available over and above that required to accommodate the existing analogue television services in a digital form, in VHF⁴ (band III: 174-230 MHz) and UHF bands (bands IV and V: 470-862 MHz). It is expected to be fully available throughout Europe only after complete switchoff of analogue television (2012 EU objective, 2015 ITU deadline for protection of analogue), although some countries have announced availability of this digital dividend in certain areas prior to that date.

Potential uses of the digital dividend include:

- Broadcasting
 - Higher number of programmes
 - increased coverage
 - Local television
 - High definition television
 - Mobile or portable reception
 - Data broadcasting,
 - Enhanced TV
- Electronic communications
 - Mobile telephony/broadband
 - Broadband access to scarcely populated areas
 - Services Ancillary to broadcasting, which already coexist with broadcasting
 - Low power devices (licence exempt or not).
 - Private mobile radio
 - Military communications
 - Public Protection and Disaster Relief (PPDR)

Some of these possible forms might have the capability of exhausting the digital dividend. However, the impact of advance coding methods, such as MPEG4, should be taken into account as a mitigation element, which could at least partially compensate for the demand of additional spectrum.

⁴ Band I: 47-68 MHz, has been mentioned as offering a potential scope for digital dividend. This band however, has not been considered in this Opinion.

It should be noted that different interpretations currently exist as to regulatory fit of multimedia. Some administrations regard it as mobile TV and an extension of broadcasting, while others consider it as an extension of cellular 3G services.

3. The regulatory framework established by the Geneva 2006 Agreement, its limitations and possible scenarios

As pointed out in the RSPG opinion on multimedia services, the use of the frequency bands 174-230 MHz and 470-862 MHz by digital broadcasting has been planned by the GE06 Agreement, which has de facto harmonised the technical parameters for digital broadcasting and introduced flexibility for future systems. This situation enables administrations to satisfy their evolving spectrum requirements in these bands in many different ways.

In particular, the GE-06 Agreement leaves significant flexibility in implementing the Plan:

- the concept of allotment planning provides a high degree of flexibility regarding the location of broadcasting transmitters within the corresponding service area and interference envelope of the entry in the Plan.
- The concept of spectrum mask offers flexibility for implementing broadcasting services with different characteristics or other applications, provided the interference and the protection requirement are kept within the envelope of the corresponding entry in the Plan. If the proposed use exceeds the limits of this envelope, it requires prior agreement from affected administrations. Additional flexibility, with protection rights, is afforded by means of a Declaration, made at the time of signing the Final Acts of GE-06, by all Member States (and many other countries).

Limitations exist however, some of which have already been pointed out in the RSPG opinion on multimedia services, and may constrain the use of the digital dividend:

- The use of these bands for digital services will continue to be constrained until protection of analogue transmissions has ceased, which is generally expected in 2012, but sooner in some countries in the EU;
- The use of these bands by other existing services, including secondary services, may be a constraint.
- Although the plan modification procedure provides a suitable framework for administrations to adjust their entries in the plan as future requirements arise, it should be recognised that the flexibility left to administrations for developing the plan has already led to significant variations in the entries, hence in the ability of harmonising usage in the future.
- In many countries, the implementation of mobile multimedia services may require departing from the reference planning configuration adopted at RRC-06, hence entail delays and network costs.

- For reasons related to handset design and cost, a minimum frequency separation will be needed between the channels used for multimedia reception (“downlink”) and the frequency used for transmission by the mobile terminal (“uplink”).
- Although other services may be operated within the limits of the envelope of an entry in the Plan, hence receive indirect recognition and protection, it is not possible to notify to the ITU mobile uplink transmissions in this band. This situation may be perceived as a lack of full international regulatory recognition for such uplinks, and this may be alleviated by seeking an additional allocation to the mobile/fixed service in the entire UHF band at WRC-07 or 11, under conditions which ensure that the broadcasting service is not adversely impacted.
- Use of fixed/mobile uplinks would also require guardbands with television or sound broadcasting, hence make their coexistence and coordination difficult. This could be alleviated by harmonising a sub-band of the UHF band for fixed/mobile services, at the European level and preferably at the ITU level, without prejudice to administrations intending to continue to use the same sub-band for broadcasting services. Such harmonisation would also enable the design of terminals with improved antenna gain characteristics and the definition of a common channelling arrangement, hence reduce the cost of the fixed/mobile networks and facilitate their coexistence with broadcasting networks. However, given the commitment to digital switchover planning in most Member States, it could be difficult to identify a common sub-band and hence alternative approaches should also be considered.
- Harmonisation of part of the VHF band for mobile uplinks is less attractive, due to its small size. This does not prevent some types of communication networks to coexist successfully with broadcasting in this band, although not without inefficiencies. Therefore, no specific action seems necessary in that band at this stage. More studies may be required to assess the possibility of further sharing arrangements in the future.
- Technical constraints to the frequency planning could arise to ensure coexistence of broadcasting networks intended for fixed rooftop reception and broadcasting multimedia networks (including mobile or fixed networks) intended for indoor portable reception. Studies are urgently required to ensure that the appropriate measures are identified to overcome these constraints.

These limitations and the possible regulatory/harmonization decisions that could be taken to overcome them may be summarized in the following Table.

Table 1 – Possible regulatory/harmonisation steps beyond GE-06 Agreement in UHF/VHF bands and associated goals/advantages

Regulatory/ Harmonisation steps	Intended Service	
	Broadcasting, fixed, mobile (downlinks only)	Fixed/Mobile (including uplinks)
ITU Regulatory framework and possible changes	GE-06 Agreement sufficient	GE-06 preferably complemented by an additional allocation to the fixed/mobile service across the entire UHF band at WRC-07 or WRC-11 (perceived full recognition)
ITU harmonisation and possible changes	GE-06 Agreement provide sufficient de-facto harmonisation	GE-06 preferably complemented by identification of part of UHF band for specific applications/systems. (worldwide economies of scale)
Possible European harmonisation steps	<p>Non mandatory decision for administrations to make available one or more layers suited for high field strength downlink services (eg, RPC2 or 3) in a sub-band of UHF band.</p> <p>(Europe-wide availability of service for interactive services with uplink in 900 MHz band, Europe-wide market, improved terminal performance/reduced network costs and improved compatibility with fixed reception broadcasting through reduced bandwidth It is to be noted that within this harmonised sub-band, the channels used for high field strength downlink services may differ from area to area.)</p>	<p>Non mandatory decision to enable the use by fixed/mobile services (including uplinks) in a sub-band of UHF band.</p> <p>(Europe-wide availability or service and roaming, Europe-wide market, economies of scale for terminals and networks, improved terminal performance/reduced network costs through reduced bandwidth and common frequency arrangement, reduction of digital divide)</p>

Assuming that the regulatory/harmonisation steps described in Table 1 were to be taken, the question then arises of how the GE-06 Plan and procedures could be used by administrations to transition to the new situation with minimum efficiency losses.

As part of the GE-06 Agreement, each country has been allocated a total of 7 to 8 full-coverage layers in the GE-06 digital Plan. This means the territory of each country has been divided in allotment/assignment areas, with each of them receiving 7 or 8 channels. To prevent interference, the channels used in one area are different from those used in neighbouring areas. RRC-06 has optimized the process of allocating channels to areas in a way which provides each country with the same number of full layers (the equitable access principle). This number was the maximum achievable at RRC-06, i.e. it entails a fair level of optimization, calculations and multi-lateral negotiations. Therefore leaving out parts of the UHF band for purposes other than broadcasting would entail the risk of leaving existing layers incomplete.

In the absence of significant GE-06 re-planning activities, it would in general be feasible to make available one or more layers per country for high field strength downlink services. However, the resulting channels would spread across a significant portion of the UHF band and would not be the same from country to country. This would not alleviate the potential coexistence difficulties mentioned above between fixed reception networks and portable indoor reception networks nor enable to take full benefits of optimized terminal costs and performance. Further studies are therefore required to address this issue.

However, identifying a sub-band dedicated for mobile applications (including or not uplinks) would create holes in most of the layers obtained at RRC-06. In order for a common set of frequencies to be available across much or all of the EU, for use by fixed and mobile services, Member States wishing to implement such services accordingly would need to ensure in their domestic plans that their use of UHF band would be consistent with it. This may require some changes in the use of frequencies compared to what is already envisaged and this in turn could require cross-border coordination. Depending on the size of the sub-band(s) considered and its location in spectrum, the extent to which this cross-border coordination could be carried out successfully without a global re-planning by a conference like RRC-06 or Chester 97 needs to be assessed.

Modifying the frequencies of existing or planned broadcasting networks could cause significant cost or disruption to the provision of broadcasting services, which may make such modifications extremely difficult if not impossible. Any coordination/re-planning activities should therefore aim at minimizing such effects. Member States wishing to implement fixed/mobile services may therefore consider setting up mechanisms which would ensure that the costs of the measures necessary to overcome such effects are borne by those who will benefit from those modifications (eg, fixed/mobile operators).

Another issue to be considered is that the use of the channels in the sub-band dedicated to mobile uplinks would be constrained by the use of broadcasting in other countries, should these countries prefer not to use it for mobile.

It should be noted that in several European countries, licences have been given for the provision of digital terrestrial television in the UHF bands for the next 15 to 20 years. Any decision on the use of the digital dividend will therefore need to take into account the spectrum requirements associated to these licences.

4. Outcome of the Public Consultation

Acknowledging that the digital dividend is a resource of fundamental importance for current and future wireless services, with significant industrial and economic impact, the RSPG undertook a public consultation on the draft version of the Opinion in reference, as part of the process of preparing this Opinion. The consultation was conducted according to Article 5 of the Radio Spectrum Policy Group Decision⁵, via the RSPG website, from 30 October to 15 December 2006. There were 35 external responses to the consultation, representing a balanced distribution of contributions between interested sectors, in particular between broadcasters and the telecommunications sector⁶. The full text of the responses is available on the public RSPG web site⁷.

The main conclusion of the public consultation is that each of the most important recommendations included in the proposed Opinion find a substantial support from a sizeable community (usually the broadcasting sector and/or the telecommunications sector). Some proposals are supported by a clear majority such as the need for technical studies on the possible co-existence of downlinks and uplinks as well as high and low power density networks. Many respondents stressed the importance of a fast decision making process at EU level (to agree or reject the proposed approaches) in order to reduce the period of uncertainty for operators and investors. Several respondents acknowledged the advantage of EU coordination.

A large number of responses insisted on the need to preserve the flexibility for member states to allocate the digital dividend in their respective countries according to their particular requirement. This supports the RSPG approach of not attempting to impose any particular solution on individual Member States for the sake of uniformity.

There were however clearly diverging views on a number of aspects, mainly:

- The potential size of the digital dividend. A majority of broadcasters were of the opinion that many candidate uses for the dividend are either natural evolutions of existing broadcasting services or new applications which deserve priority over other services in the allocation of the

⁵ 2002/622/EC

⁶ There were 13 responses from the broadcasting sector (or assimilated), 16 from the telecommunications sector or assimilated (7 from mobile operators and 9 from equipment manufacturers), 4 from transmission network operators and 2 from the wireless microphones community. One contribution originated from an administration (Ofcom, UK) but was not counted as Ofcom did participate in the working group elaborating the Opinion..

⁷ Web address where responses can be consulted on-line:
http://rspg.groups.eu.int/consultations/responses_dig_div/index_en.htm

dividend. A few argued that there will be no spectrum left for non-broadcasting applications or such applications should be given a secondary status or should have access to spectrum only once all broadcasting requirements have been satisfied.

- The need to foresee the co-allocation of the UHF band to mobile services via the ITU WRC process. Consistently, the telecommunications industry is in favour while the broadcasting industry is against it.
- The need to identify a sub-band for mobile multimedia. The industry generally supports identifying a sub-band for mobile multimedia services while some broadcasters question whether mobile multimedia requires such a harmonised sub-band taking into account that different frequencies in the whole UHF band or at least in channels below 55 can be exploited in different geographical areas. There is a general desire not to delay the introduction of such mobile multimedia services.).
- The need to identify a sub-band for broadband fixed/mobile services including uplink. The telecommunications industry wishes that such services be allocated a sub-band while the broadcasting industry generally rejects this idea.
- Relevance of (partial) re-planning of the UHF band to accommodate other services than digital TV and radio. The telecommunication industry indicated that the consequence of replanning would be outweighed by the economic benefits of introduction of such services in the UHF band and in some cases were prepared to pay for it. The broadcasting industry showed great concerns on the economic and disruptive consequences of such replanning.
- A large number of respondents supported accelerating the shift to MPEG-4 but many indicated that difficulties in doing that should not be underestimated in situations where MPEG-2 is already widely deployed.

Finally, the community of analogue wireless microphone users and manufacturers responded to this consultation to warn against the lack of awareness existing in Europe on the importance of PMSE (Program Making and Special Event) which require continued use of this band for wireless microphone given the absence of suitable alternative at this point in time.

5. The Opinion of the RSPG

The purpose of this Opinion is to address the EU spectrum policy implications of the digital dividend.

- 5.1 The RSPG notes that, before switchover, which is generally expected to occur in the period 2008-2012, many Member States intend to give priority to broadcasting services, taking into account the constraints arising from the transition from analogue terrestrial television. After switchover, some Member States indicate a preference for using the digital dividend for enhancing the broadcasting service, while other express a preference for keeping the choice open or have not formulated an approach as to the foreseen use of the digital dividend.
- 5.2 The RSPG considers that there should be no mandatory decision to require implementation of any aspect of the digital dividend..
- 5.3 The RSPG considers that any approach for the implementation of the digital dividend should take into account the Opinion adopted by the RSPG on WAPECS.
- 5.4 The RSPG considers that many promising new services fostering growth and innovation are seeking urgent and easy access to the UHF and VHF spectrum, among other bands. In this context, European action to enable the development of such services in these bands must be taken in a way that optimizes the use of spectrum as a whole, promotes and does not distort competition, encourages innovation, maximises benefits across the European Union, and does not conflict with national and European content legislation aiming at promoting cultural diversity and media pluralism.
- 5.5 The RSPG considers that the economic and societal merits of the various alternatives proposed for the use of the digital dividend should be taken into account. Moreover, technical and legislative options involved in the switchover should not be determined by economic factors alone but ought also to take account of social, cultural and political factors.
- 5.6 The RSPG considers that this opinion complements the opinions it has previously adopted on “the spectrum implications of switchover to digital broadcasting” and on “the development of multimedia services”.
- 5.7 The RSPG considers that existing licences to provide analogue and digital broadcasting services along with legal decisions taken at national level concerning the licensing regime in digital terrestrial television or sound broadcasting may affect the ability to find spectrum to deploy other new services. In particular, it may be difficult in some countries to gather substantial and coherent amount of spectrum for the digital dividend for use by services other than broadcasting before 2012.

- 5.8 The RSPG notes that the use of the frequency bands 174-230 MHz and 470-862 MHz by digital broadcasting has been planned by the GE06 Agreement, which has de facto harmonised the technical parameters for digital broadcasting and created a global market for digital broadcasting equipment.
- 5.9 The RSPG considers that technical constraints to frequency planning could arise between broadcast networks (RPC-1, 2 and 3), multimedia networks and fixed/mobile networks in the same band and considers that studies should urgently be undertaken to identify and address these constraints so as to facilitate the effective use of spectrum. Noting the immediacy of switchover in some countries and the consequential narrow window of opportunity for decisions on the use of the digital dividend in Europe, studies are urgently required within CEPT to assess the technical feasibility of the various options to be considered.
- 5.10 In the band 174 – 230 MHz, the RSPG notes that various alternative services may already be deployed under the GE06 Agreement, using various technologies. Hence no action appears to be necessary at EU level at this stage. More studies may be required to assess the possibility of further sharing arrangements in the future.
- 5.11 In the band 470 – 862 MHz, the RSPG notes that there may be EU-wide benefits to the use of the digital dividend by broadcasting services. The current international regulatory framework, as settled by the Radio Regulations and the GE-06 Agreement, provides an appropriate framework for this development. Within this framework:
- 5.11.1 It would in general be feasible to make available one or more layers per country suited for high field strength downlink services without significant re-planning activities.
- 5.11.2 A common (but not dedicated) sub-band of the UHF band for high field strength downlink services could permit improved terminal performance/reduced network costs and improved compatibility with fixed reception broadcasting, and facilitate interactive services using the 900 MHz band for the return channel.
- 5.11.3 Studies should therefore be urgently undertaken by CEPT in order to consider these two approaches and identify an optimum way forward for high field strength downlink services, enabling the availability of one or more layers per country while avoiding the need for significant replanning.
- 5.12 The RSPG considers that there may be EU-wide benefits to the use of the digital dividend by fixed/mobile applications (including uplinks) in a harmonised sub-band of the UHF band and that this would be facilitated by:
- 5.12.1 Seeking an additional allocation to the fixed/mobile service in the entire UHF band at WRC-07 or WRC-11, under conditions which ensure that the broadcasting service is not adversely impacted.
- 5.12.2 In parallel, without further delay and irrespective of any WRC-07 decisions, pursue within CEPT the studies required to consider and possibly identify sub-band(s)

with the objective of developing a non-mandatory decision at European level to facilitate the use of fixed/mobile applications (including uplinks), under certain harmonized conditions to be defined and adopted in the 2007-2010 timeframe.

5.12.3 Seeking endorsement of this non-mandatory harmonisation at ITU level at WRC-11, through identification of part of UHF band for specific applications/systems.

- 5.13 The RSPG notes that identifying one or more sub-bands available for fixed or mobile services (including or not uplinks) would create holes in most of the layers obtained at RRC-06. Member States wishing to implement such services accordingly may need to change the use of frequencies compared to what is already envisaged and this in turn may require cross-border coordination. It would not be desirable to undertake a global replanning by a conference like RRC-06. Given this, it is necessary to assess the extent to which this cross-border coordination could be carried out successfully without such global re-planning. . Modifying the frequencies of existing or planned broadcasting networks could cause significant cost or disruption to the provision of broadcasting services, which may make such modifications extremely difficult if not impossible. Any coordination/re-planning activities should therefore aim at minimizing such effects. Member States wishing to implement fixed/mobile services may therefore consider setting up mechanisms which would ensure that the costs of the measures necessary to overcome such effects are borne by those who will benefit from those modifications (eg, fixed/mobile operators).
- 5.14 The RSPG notes that Member States in implementing digital dividend may wish to consider the impact on existing other services, including secondary services such as SAB/SAP.
- 5.15 The RSPG considers that there may be EU-wide benefits to the use of more advanced television coding and transmission systems (such as MPEG-4 and DVB-T2) but recognises that this may cause compatibility problems with existing equipment. In particular, there is already a high installed base of MPEG-2 consumer equipment in some Member States, which would make the transition to MPEG-4 or other systems complex.