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## **RADIO SPECTRUM POLICY GROUP**

### **RSPG Opinion**

**on a long-term strategy on the future use of the UHF band (470-790  
MHz) in the European Union**

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## 1 Introduction

Article 2 of the amended Commission Decision<sup>1</sup> establishing a Radio Spectrum Policy Group (RSPG) states that “the RSPG shall assist and advise the Commission on radio spectrum policy issues, on coordination of policy approaches, on the preparation of multiannual radio spectrum policy programmes and, where appropriate, on harmonised conditions with regard to the availability and efficient use of radio spectrum necessary for the establishment and functioning of the internal market”. RSPG Opinions should help in substantiating by qualitative and, wherever possible, quantitative indicators whether a European Union (EU) objective can be better achieved at EU level, taking into account the principle of subsidiarity<sup>2</sup>.

At the Commission’s request or at its own initiative, the Group shall adopt opinions to be addressed to the Commission<sup>3</sup>.

In its Work Programme “2014 and beyond”<sup>4</sup> RSPG planned to:

- Develop a long term strategy for the UHF band 470– 694 MHz including a realistic vision for the Digital Terrestrial Television (DTT) platform in the context of various technological evolutions of the terrestrial platforms taking into account current incumbent use including Programme Making and Special Events (PMSE) and related migration issues.
- Assess the possible implementation of Wireless Broadband (WBB) in the 700 MHz band in the EU, on the basis of the output of the current European Commission (EC) mandate 700 MHz, and develop relevant recommendations, also in the light of international developments.

In addition, the Commission issued a Request for Opinion to the 33<sup>rd</sup> RSPG meeting.

Considering this legal European framework, in their reasoning, this Opinion addresses the following matters and comprises recommendations based on the following investigations:

- whether a co-ordination of policy approaches of the RSPG Member States with regard to the particular radio spectrum policy issue under the scope of this opinion is needed and how this could best be achieved in case the Group identifies such a need;
- whether there is a need for the Commission to develop proposals on harmonised conditions with regard to the availability and efficient use of radio spectrum;
- the relevance of the radio spectrum policy issue in the context of sector-specific (e.g. electronic communications, broadcasting, transport, research and

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<sup>1</sup>2009/978/EU: Commission Decision of 16 December 2009 amending Decision 2002/622/EC establishing a Radio Spectrum Policy Group.

<sup>2</sup>Article 5(3) of the Treaty on European Union and Article 5 of the Protocol 30 to the European Community Treaty.

<sup>3</sup>Article 4 of Commission Decision 2002/622/EC of July 26<sup>th</sup> establishing a Radio Spectrum Policy Group.

<sup>4</sup>RSPG13-543 (Annex 1)

development) and/or horizontal (e.g. internal market, competition, trade) Community policies;

- the extent to which the policy approaches of the Member States to the issue are consistent;
- the extent to, and manner in which the public has been consulted with regard to the issue under consideration; a list of the consulted parties and of the documents considered.

## **2 Background**

After the World Radiocommunication Conference 2015 (WRC-15), the 694<sup>5</sup>-790 MHz ("700 MHz") frequency band will be effectively allocated on co-primary basis to the mobile service alongside the broadcasting service. Whereas in the EU this band is primarily used for digital terrestrial television, it has already been licensed for wireless broadband (WBB) in several Asian and American countries and is planned for use by WBB in large parts of the world. Like the 800 MHz band, it provides good coverage both indoor and outdoor and is therefore considered an attractive candidate band for WBB (See RSPG Opinion on WBB<sup>6</sup>).

In its opinion on WBB, adopted in June 2013, RSPG identified issues in relation to the 700 MHz band and published issues related to broadcasting in an additional report<sup>7</sup>. The need to explore the impact on existing usage of spectrum, including PMSE, was mentioned, noting that the long term spectrum need for broadcasting varies among Member States. However, several Member States are planning an increase in the number of programmes, an expansion of HDTV, additional mobility and the possible introduction of Ultra High Definition TV. Possible forms of convergence between various forms of content delivery (wireless broadband and broadcast) are currently being explored. RSPG Report on Wireless Broadband concluded that "The relative penetration is highly country dependent. However, most Member States consider that these platforms complement each other and most countries have stressed the importance of terrestrial TV for free-to-air services, for secondary TV sets, and that viability of DTV requires access to sufficient spectrum resources".

In 2012, the European Commission issued a mandate to CEPT to develop harmonised technical conditions for the 700 MHz band in the EU for the provision of WBB and other uses in support of EU-spectrum policy objectives ("EC mandate 700 MHz"). The results of this Mandate will constitute a technical input to the EU-level political process.

RSPG published a report on "proposed spectrum coordination approaches for broadcasting in the case of a reallocation of the 700 MHz band"<sup>8</sup>.

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<sup>5</sup> Lower edge to be defined at the WRC-15

<sup>6</sup> RSPG13-521 rev1 "Opinion on Strategic Challenges facing Europe in addressing the Growing Spectrum Demand for Wireless Broadband"

[https://circabc.europa.eu/d/a/workspace/SpacesStore/c7597ba6-f00b-44e8-b54d-f6f5d069b097/RSPG13-521\\_RSPG%20Opinion\\_on\\_WBB.pdf](https://circabc.europa.eu/d/a/workspace/SpacesStore/c7597ba6-f00b-44e8-b54d-f6f5d069b097/RSPG13-521_RSPG%20Opinion_on_WBB.pdf)

<sup>7</sup>RSPG13-522 "Report on Spectrum for Wireless Broadband and Broadcasting in the Frequency Range 400 MHz to 6 GHz" <http://rspg-spectrum.eu/rspg-opinions-main-deliverables/>

<sup>8</sup> [https://circabc.europa.eu/d/a/workspace/SpacesStore/614d3daf-76a0-402d-8133-77d2d3dd2518/RSPG13-524%20rev1%20Report\\_700MHz\\_reallocation\\_REV.pdf](https://circabc.europa.eu/d/a/workspace/SpacesStore/614d3daf-76a0-402d-8133-77d2d3dd2518/RSPG13-524%20rev1%20Report_700MHz_reallocation_REV.pdf)

In order to ensure a sustainable solution for sectors as well as consumer benefits, an EU strategy needs to be developed on the future use of the UHF band (470-790 MHz) taking into account the decisions and developments on the 700 MHz band as well as all political, economic, regulatory and technical elements. With the objectives of building elements for such an EU strategy, this RSPG opinion is considering the work already achieved within RSPG and CEPT (e.g. in ECC Task Group 6) together with several initiatives from the European commission in this area.

In particular, the European Commission created in February 2014 a high-level group chaired by Pascal Lamy, gathering industry representatives from both the mobile and broadcasting (including PMSE) sectors on future use of UHF spectrum for TV and wireless broadband. A study on the “challenges and opportunities of broadcast-broadband convergence” is also being conducted by Plum Consulting for the EC.

## ***2.1 EU regulatory framework and definitions***

Article 3 of the Radio Spectrum Policy Programme (RSPP)<sup>9</sup> defines the EU Policy objectives: “In order to focus on the priorities of this Decision, Member States and the Commission shall cooperate to support and achieve the following policy objectives:

- a) encourage efficient management and use of spectrum to best meet the increasing demand for use of frequencies reflecting the important social, cultural and economic value of spectrum;
- b) seek to allocate sufficient and appropriate spectrum in a timely manner to support Union policy objectives and to best meet the increasing demand for wireless data traffic, thereby allowing the development of commercial and public services, while taking into account important general interest objectives such as cultural diversity and media pluralism; to that end, every effort should be made to identify, based on the inventory established pursuant to Article 9, at least 1 200 MHz of suitable spectrum by 2015. That figure includes spectrum already in use;
- c) bridge the digital divide and contribute to the objectives of the Digital Agenda for Europe, fostering access to broadband at a speed of not less than 30 Mbps by 2020 for all Union citizens and making it possible for the Union to have the highest possible broadband speed and capacity; ...”

Article 167(4) of the Treaty of the Functioning of the European Union requires the Union to take cultural aspects into account in its action in particular, in order to respect and to promote the diversity of its cultures. Promotion of European cultural diversity and industry is therefore part of the Digital Agenda for Europe (action 82<sup>10</sup>).

Furthermore, Article 7 of the Radio Spectrum Policy Programme (RSPP) states that in order to support the further development of innovative audiovisual media and other services to Union citizens, taking into account the economic and social benefits of a digital single market, Member States shall, in cooperation with the Commission, aim at ensuring there is sufficient spectrum available for satellite and terrestrial provision of such services, if the need is clearly substantiated.

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<sup>9</sup> 243/2012/EU

<sup>10</sup> <http://ec.europa.eu/digital-agenda/en/pillar-vii-ict-enabled-benefits-eu-society/action-82-implement-audiovisual-media-services-directive>

There are different kinds of **video and audiovisual content**<sup>11</sup> which both may be provided as linear<sup>12</sup> or non-linear<sup>13</sup> services. For the purpose of this opinion, the following two categories have been identified:

1. **Audiovisual media service**, which falls under the Audiovisual Media Services (AVMS) Directive<sup>14</sup>. Today, in the European countries, the UHF band is used for television broadcasting, i.e. for linear audiovisual media service, and, in some countries, also for on-demand audiovisual media service.

Audiovisual media service means<sup>15</sup> a service ” ... which is under the editorial responsibility of a media service provider and the principal purpose of which is the provision of programmes, in order to inform, entertain or educate, to the general public by electronic communications networks within the meaning of point (a) of Article 2 of Directive 2002/21/EC. Such an audiovisual media service is either a television broadcast or an on-demand audiovisual media service.”

The regulatory framework for audiovisual media service applies to both audiovisual media linear services and audiovisual media non-linear services, irrespective of the technology used to deliver these services. The AVMS Directive encourages taking into account the evolution in technology when developing the audiovisual media service regulation.

In its Recital 5, the AVMS Directive recognises that “Audiovisual media services are as much cultural services as they are economic services. Their growing importance for societies, democracy — in particular by ensuring freedom of information, diversity of opinion and media pluralism — education and culture justifies the application of specific rules to these services.”

The measures, as set out in Articles 13, 16 and 17 of the AVMS Directive, constitute an efficient instrument to promote creative content in Europe, pursuing both an economic and cultural ambition:

- where practicable and by appropriate means, broadcasters reserve for European works a majority proportion of their transmission time ;
- where practicable and by appropriate means, to reserve at least 10% of their transmission time or 10% of their programming budget for European works created by producers who are independent of broadcasters.

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<sup>11</sup> Audiovisual content: data, which is intended and coded to be presented as video and/or sound .

<sup>12</sup> Audiovisual linear service: a service providing audiovisual content by which the service provider decides which content is offered and at which particular time. The user cannot influence the sequence of content.

<sup>13</sup> Audiovisual non-linear service: a service providing audiovisual content by which the user chooses for himself the time he wishes to call up and view the content based on a catalogue of programme content supplied by the service provider

<sup>14</sup> Directive 2010/13/EU (10 March 2010) on the coordination of certain provisions laid down by law, regulation or administrative action in Member States concerning the provision of audiovisual media services ([http://ec.europa.eu/avpolicy/reg/tvwf/index\\_en.htm](http://ec.europa.eu/avpolicy/reg/tvwf/index_en.htm))

<sup>15</sup> See Article 1 of the AVMS Directive

In the Recital 53 of the AVMS Directive, free television services are defined as programs broadcasted on either public or commercial channels accessible to the public without payment. The funding mechanisms of broadcasting that are widely prevailing in each Member State such as television licence fee/tax and/or the basic tier subscription fee to a cable network are however not considered as payment in this context.

Article 1, paragraph 3, of the Framework Directive<sup>16</sup> states that: *“This Directive as well as the Specific Directives are without prejudice to measures taken at Community or national level, in compliance with Community law, to pursue general interest objectives, in particular relating to content regulation and audiovisual policy.”*

2. **Other audiovisual content, e.g videos generated by private users** for the purposes of sharing and exchange within communities of interest, videos ancillary to certain website and posted on the web, etc. It falls under the general regulatory framework for electronic communications networks and services.

The Framework Directive provides the following definitions:

- Electronic Communications Network (ECN): *“electronic communications network means transmission systems and, where applicable, switching or routing equipment and other resources, including network elements which are not active, which permit the conveyance of signals by wire, radio, optical or other electromagnetic means, including satellite networks, fixed (circuit and packet-switched, including Internet) and mobile terrestrial networks, electricity cable systems, to the extent that they are used for the purpose of transmitting signals, networks used for radio and television broadcasting, and cable television networks, irrespective of the type of information conveyed”*. (Art. 2, Par. (a))
- Electronic Communications Service (ECS): *“electronic communications service means a service normally provided for remuneration which consists wholly or mainly in the conveyance of signals on electronic communications networks, including telecommunications services and transmission services in networks used for broadcasting, but exclude services providing, or exercising editorial control over, content transmitted using electronic communications networks and services; it does not include information society services, as defined in Article 1 of Directive 98/34/EC, which do not consist wholly or mainly in the conveyance of signals on electronic communications networks”* (Art. 2, Par.(c))

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<sup>16</sup> Directive 2002/21/EC (7 March 2002), on a common regulatory framework for electronic communications networks and services, as amended by Directive 2009/140/EC and Regulation 544/2009  
([http://europa.eu/legislation\\_summaries/information\\_society/legislative\\_framework/l24216a\\_en.htm](http://europa.eu/legislation_summaries/information_society/legislative_framework/l24216a_en.htm))

### **3 Scope of the work**

The requested opinion should specifically concentrate on the following tasks:

1. Assess the future role and spectrum needs of DTT platforms and provide an overview on the conditions and durations of DTT licenses in Member States;
2. Assess possible developments and related standardisation of DTT and WBB platforms for the provisions of audiovisual and data services as well as devices, and the potential of their convergence; assess resulting benefits and costs for existing spectrum users in the UHF band as well as consumers;
3. Propose regulatory and/or market-based options as well as a related roadmap for the long-term spectrum strategy for the whole UHF band assessing in particular:
  - a. the possible need for assigning the 700 MHz band for WBB before 2020 in the EU in the light of the spectrum assignment situation for WBB as well as the benefits in the coordinated release of the 700 MHz band for WBB across the EU (e.g. in terms of cross-border coordination effort including with respect to non-EU countries);
  - b. possibilities to ensure the operation of PMSE and PPDR in the UHF band, while noting other potential bands.
4. Indicate measures facilitating any migration (e.g. technology upgrades or economic implications) in support of the proposed spectrum strategy options including measures relating to TV receivers in order to mandate more efficient technologies and to minimize hurdles for consumers.

### **4 Current Overview in EU Member states**

In most EU Member States provision of linear television services and free-to-air programs rely currently on DTT, cable or satellite delivery platforms. The trend of delivering linear as well as non-linear television services (including PVR, VOD) over broadband networks is small but increasing due to internet enabled TV sets, tablets, smartphones and laptops.

Most of the administrations have stressed the importance of the DTT platform for delivering free-to-air television, notably for Public Service Broadcasting (PSB) content. Free-to-air is often associated with the ideas of universal, easy-to-use, high quality, high coverage and cheap means of TV reception. The usage of DTT compared to other distribution platforms e.g. satellite, cable, internet for delivery of such services varies widely between the European countries. This affects the European strategy for the UHF band.

#### ***4.1 Television platforms***

##### ***4.1.1 The DTT platform***

As many European countries have completed their analogue switch-off, fully digital platforms have been rolled out using DVB-T and / or DVB-T2 standard in the UHF band to broadcast audiovisual content. In those countries where digital roll out was made early DVB-T and DVB-T2 services may co-exist side-by-side for some time and in those where digital roll out is currently ongoing, direct transition to the more efficient standard, (DVB-T2,) is being planned. The use of more advanced coding

schemes like HEVC is also envisaged and some EU Member States have already announced its future roll-out. The digital roll-out and new technology transition of the broadcasting platform require significant public and private investments and always have an impact on the consumers. Therefore, it is noted, that for minimizing the economical and technical burden, the goal should be fulfilling the actual demand for DTT i.e. number of required television channels with the most spectrum efficient way with one technology transition instead of taking several steps.

#### ***4.1.2 The role of DTT platform for citizens and general interest objectives***

Due to other competing delivery platforms, mainly cable and satellite, the importance of DTT platform providing audiovisual media and free-to-air services varies greatly among the EU Member States.

DTT plays an important role for European citizens and has high cultural and social value, especially for those EU member states that rely mostly on DTT platform.

- According to article 14 of the AVMS Directive, Member States may take measures to ensure that events which are regarded by that Member State as being of major importance for society can be followed by the public through live coverage or deferred coverage on free television.<sup>17</sup>
- DTT free-to-air content can be received without any contract with a service provider or platform operator and without requiring a reverse channel. It can be accessed by -often already existing- roof-top antenna systems or through portable reception in reduced coverage areas around the transmitter sites using widely available receivers based on DVB-T/DVB-T2 standards.
- DTT can also distribute non-free-to-air services (end-to-end managed services), which usually apply Digital Rights Management (DRM), Conditional Access System (CAS) to protect the content normally requires a contract with the platform or service provider.

DTT is one of the platforms that allow competition on the TV receivers market, widen consumer choice and facilitate third parties initiatives and innovation.

#### ***4.1.3 Other platforms***

Free television services as well as subscription based services are also delivered via cable and satellite platforms. Television is also available via broadband platforms. Similar to DTT, there is large diversity in cable and satellite platform market shares across the Member States.

IPTV as defined by ITU as multimedia services, such as television/video/audio/text/graphics/data, delivered over IP based networks managed to provide quality of service and experience, security, interactivity and reliability. IPTV services contain live or

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<sup>17</sup>The list of such events shall be notified to the European Commission. Sports events are critical because of economic issues at stake.

time-shifted television and VOD. In Europe IPTV penetration is constantly increasing but still at much lower level compared to DTT, cable or satellite platforms.

At varying pace among Member States, households in Europe increasingly enjoy access to broadband with high bandwidth. The targets set out in the Digital Agenda for Europe<sup>18</sup> aim at providing the sufficient digital infrastructure in order to take advantage of the new digital possibilities and offers by 2020. The DAE objective, 30Mbit/s connection for all EU citizens, supports the availability of television service by improving broadband capacity.

Cable platform (DVB-C) relies on fixed distribution lines that need to be available at the consumers' location to have access to cable television. A separate contract is needed and it's usually made between the housing company or individual consumer and the operator. Cable television does not require a roof-top-antenna or aerial.

The satellite broadcasting platform uses radio spectrum. Access requires an aerial to be installed. For subscription based services a separate contract is needed. Commercial satellites are located in the outer space, which “*is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means*”, according to the Outer Space Treaty<sup>19</sup>. Regulators and Members States have limited power to set obligations (ie, content obligations) other than the ones derived from ITU-R technical frequency coordination rules and EU acquis.

Wireless broadband is currently not used as a broadcasting platform, although consumers use it as a platform for reception of linear and non-linear television services available in the internet.

The current WBB platform is not a viable solution for television delivery of free to air or commercial programs with high public interest which have to be delivered to large audiences and to wide geographical areas. In its current form WBB does not provide the required availability for all citizens and capacity for providing adequate quality of service. Therefore, to be considered as a competitive platform for television delivery, new standards and more effective ways of delivering data should to be implemented.

The addition of broadband to the above mentioned platforms could enable the development of new kind of bi-directional services facilitating both broadcasters and third parties initiatives and innovation as well as widen the consumer choice and capabilities to interact compared to traditional one-directional broadcasting.

#### ***4.1.4 Regulatory differences between DTT and other platforms***

Although there are various platforms used for the distribution of broadcasting services, there are some regulatory differences to be noted:

- DTT platform uses UHF radio spectrum (in particular 470-790 MHz), which is governed by national and European Union regulation. This enables Member States to

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<sup>18</sup> The entire EU should be covered by broadband above 30 Mbps by 2020 and 50 % of the EU to subscribe to broadband above 100 Mbps by 2020.

<sup>19</sup> which entered into force on 10 October 1967

combine the rights of use of spectrum with further obligations and conditions in order to pursue general interest objectives and to fulfil public cultural policies.

- On the other hand, the list of content obligations that can be imposed to wired-network operators is very limited<sup>20</sup> as stated in the EU “Telecom package” Directives. The same applies to the WBB networks. Consequently general interest objectives need to be regulated independently from distribution platform.
- The satellite broadcasting platform also uses radio spectrum, but regulators and Member States have limited power to set obligations (ie, content obligations) other than the ones derived from ITU-R technical frequency coordination rules and EU acquis.
- Cable and fixed broadband platforms do not rely on radio spectrum.
- WBB platform is increasingly used for AV media consumption in unicast mode. WBB relies on radio spectrum, which is governed by national and European Union regulation enabling Member States to combine the rights of use of spectrum with further obligations if general interest objectives need to be set.
- “Must carry” obligations can be applied when pursuing general interest objectives.

#### **4.2 Programme Making and Special Events**

The UHF band, including the 700 MHz band, is also used in most Member states for Programme Making and Special Event (PMSE) services, especially wireless microphones, on a secondary basis covered by footnote RR 5.296. This usage includes audio applications for Services Ancillary to Broadcast/Production (SAP/SAB) and applications used in meetings, conferences, cultural and education activities, trade fairs, local entertainment, sport, religious and other public or private events for perceived real-time presentation of audio information.

It is unlikely that the PMSE use can continue in the 700MHz sub-band if it is used for wireless broadband delivery, except for the possible centre duplex gap arising from the channelling arrangement of the band for wireless broadband.

#### **4.3 Overview of the current use of 700 MHz band**

For the preparation of this RSPG Opinion, a questionnaire was launched by RSPG, seeking the views of Member States in relation to the role of DTT platform, including the current and planned use of the spectrum in the 700 MHz band. The summary of the responses is found in **Annex 1**. The vast majority of responses have stated that the 700 MHz band is currently being used for DTT. Other types of usage, mainly PMSE, has also been mentioned too. Concerning the future/planned use of the band, the majority of the responses states that the existing rights of use for broadcasting should be taken into account. Many Member states are already considering, or have already decided, its use for wireless broadband.

The responses have also shown that, with a few exceptions, Member States have not announced formally a national decision concerning the future use of the 700 MHz band. Notwithstanding, many responses have highlighted that a possible implementation of WBB might be considered in the future, noting that in order to maintain the capacity of existing services, this would require migration to DVB-T2 and in some cases HEVC technologies in some countries. Many responses have

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<sup>20</sup> See Annex A of Authorization Directive

highlighted that this implementation for WBB is related to the expiry date of the current rights of use of frequencies for DTT in the band, which takes place around 2017-2025 time frame. It is noted also that in few countries the expiry date of the existing rights of use exceed this time frame (e.g. up to 2032), which will require a balanced approach taking into account the national legal framework, so as to enable the migration of broadcasting below the 700 MHz band.

The questionnaire supplemented the previous work of RSPG Opinion on the future spectrum requirements for Wireless Broadband, in which a questionnaire was prepared and circulated between the Administration to contribute to the analysis on the future use of the 700 MHz (694 -790 MHz) as well as on the evolution of the digital terrestrial platform (DTT) over the next decades. Responses received indicated that the 700MHz frequency band, based on the allocation to the broadcasting service on a primary basis, is currently used in Europe for terrestrial television and in many countries also for PMSE on secondary basis and represents approximately 30% of the total remaining UHF spectrum used by the television broadcasting. It was also indicated that the impact of an exclusive reallocation of this spectrum to wireless broadband will therefore be significantly more important for the broadcasting service than in the case of the 800 MHz band.

#### **4.4 Other radiocommunication services**

In addition to broadcast service and PMSE, currently the UHF band is also used as follows:

- Wind profiler radars (radiolocation service) are in operation on a secondary basis in the band 470-494 MHz in some European countries (RR 5.291A).
- Several European Radioastronomy sites operate radio astronomy service in the frequency band 608-614 MHz, which is also allocated to Radioastronomy on a secondary basis by RR No.5.306.
- Aeronautical radionavigation services are in operation in portions of the frequency band 645-790 MHz, which are allocated to aeronautical radionavigation service on a primary basis by RR No. 5.312 in one EU Member State (in Bulgaria the bands 646-686 MHz, 726-758 MHz and 766-814 MHz) and the band 645-790 MHz in neighbouring countries at the eastern border of EU.

## **5 Activities in ITU, CEPT and EC**

Several activities at international and European levels, relevant in the context of this Opinion, have been recently carried out in relation to the UHF band. Among these, the following needs to be underlined:

- The response from CEPT to the European Commission Mandate to develop harmonised technical conditions for the 694-790 MHz ('700 MHz') frequency

band in the EU for the provision of wireless broadband and other uses in support of EU spectrum policy objectives<sup>21</sup>;

- The launch of a dedicated task group (ECC/TG6) in June 2013, in CEPT framework, to address the studies aiming at the development of a long term vision for the UHF broadcasting band (focusing on the band 470-694 MHz) in Europe. ECC TG6 was requested to identify and analyse possible scenarios for the development of the band 470 – 694 MHz in the long term starting from the existing situation. TG6 has produced an ECC Report 224;
- A study by Plum Consulting initiated by the European Commission on the “challenges and opportunities of the broadcast- broadband convergence” conducted by Plum Consulting for the EC. The goal of the study is to explore future developments of the delivery of audio-visual (media) and internet (or data) services and the related implications for the evolution of terrestrial wireless access networks (platforms), related business models and spectrum management, in particular in the frequency range below 1 GHz;
- A High Level Group, created in February 2014 by the EC and chaired by Pascal Lamy, gathering industry representatives, both from the mobile and broadcasting (including PMSE) sectors, to provide a strategic advice to the Commission on the future use of the UHF band<sup>22</sup>. The chairman presented his report to the European Commission on September the 1<sup>st</sup>, proposing a future scenario based on platforms coexistence (excluding convergence), possible measures to be implemented at national level when releasing the 700 MHz, a transition roadmap, and the need to respond to the spectrum requirement for radiomicrophones. He proposes a three-step formula “2020-2030-2025” to reallocate the 700 MHz for wireless broadband and to secure investment for terrestrial television broadcasting below 694 MHz in a balanced way.
- A [draft] ECC Decision on harmonised technical conditions for MFCN in the 700 MHz band. This Decision will enable any country wishing to do so to have a deliverable to be used in the context of the authorization process. It is limited to harmonised technical conditions, without designating this band for MFCN, taking into account the different timing of administrations. In order to take into account that WRC-15 will address this band and that the allocation is only effective after WRC-15, the date of implementation is proposed to be 1st April 2016.
- The ITU-R WRC-15 preparation process at CEPT level, namely in relation to agenda items 1.1<sup>23</sup> and 1.2<sup>24</sup>.

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<sup>21</sup> Part A of the response is contained in CEPT Report 53

<sup>22</sup> This activity resulted in a Report of the chairman of the High Level Group since the group could not reach consensus (see: (<https://ec.europa.eu/digital-agenda/en/news/report-results-work-high-level-group-future-use-uhf-band>))

<sup>23</sup> Agenda Item 1.1: to consider additional spectrum allocations to the mobile service on a primary basis and identification of additional frequency bands for International Mobile Telecommunications (IMT) and related regulatory provisions, to facilitate the development of terrestrial mobile broadband applications, in accordance with Resolution 233 (WRC-12)

<sup>24</sup> to examine the results of ITU-R studies, in accordance with Resolution 232 (WRC-12), on the use of the frequency band 694-790 MHz by the mobile, except aeronautical mobile, service in Region 1 and take the appropriate measures

## 6 Developments and related standardisation activities

Section 6 addresses developments in terms of technologies and supporting Standards. There is also a need for Standards covering both TV receiver equipment and the corresponding installation to evolve; this topic is addressed in Section 8 (“Migration issues”).

### 6.1 DTT technologies

Current DVB-T and DVB-T2 technologies are optimized for delivery of television (AV media service) for large audiences and areas. They can be implemented using High Power High Tower (HPHT) and/or Low Power Low Tower (LPLT) networks. The overall transport capacity of DTT networks depend on the technology, configuration of the system and the chosen technical parameters e.g. modulation, multi frequency networks or size of single frequency networks (SFN), reception mode, error correction, etc.

DVB-T2 technology increases the transport capacity of a multiplex by around 50% enabling larger number of programs in the multiplex and/or provision of programs with higher quality, e.g. high definition (HD), compared to DVB-T technology. In addition DVB-T2 enables more frequency efficient network planning, for example the size of SFN areas can be larger, even nationwide.

Next generation video coding techniques e.g. High Efficiency Video Coding (HEVC) increase the transport capacity of a multiplex further. HEVC is expected to progressively double the data compression ratio compared to its predecessor MPEG4 at the same video quality level<sup>25</sup>.

Transition to more efficient transmission technology and/or enhanced video coding schemes enable to deliver the current number of programs in fewer multiplexes and/or services to be provided with higher picture quality. This could also help in the introduction of mobile services in the 700 MHz band and also allow the introduction of new programs and services or transition to higher picture resolution such as UHD TV.

#### 6.1.1 Evolution of the DTT platform in the Member States

The majority of responding RSPG Member States (but none of the RSPG observers) either already provide, envisage or are considering measures on a national level for facilitating the transition to new broadcasting technologies in the UHF band, mainly in relation to the introduction of DVB-T2 but in the case of one third of the responding countries, possibly also HEVC. Where no provisions on national level are envisaged and a reason for that was given, the rationale was market related, in particular because of the not yet amortised costs for the transition to DTT.

The majority of the RSPG Member States, including Observers, see a shift to other distribution platforms in the future or expect the coexistence of other distribution platforms and DTT.

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<sup>25</sup> This is dependent on some assumptions such as the image resolution. See also Table D.3.12 of Annex D in TR 100 028 v 1.4.1 Part 2

Two RSPG Member States noted possible future migration to hybrid/integrated distribution platforms. Some Member States did not see a shift to other distribution platforms and a few expect even an increase of DTT usage.

## **6.2 WBB technology**

Today's increasing demand for spectrum for WBB is primarily substantiated by the increasing consumption of linear or non-linear audio-visual content via mobile-phones, tablets and other portable devices. This content may fall under the AudioVisual Media Service directive or be user generated content and other internet videos.

The same audiovisual content (e.g. a video) uploaded once, may be distributed many times to the consumers. As far as such content is delivered as non-linear content, this would result in a significant asymmetry of traffic in WBB networks which are originally based on a symmetric point to point delivery mechanisms. Therefore spectrum requirement for wireless services will be higher for the downlink than for the uplink.

Due to this asymmetry of traffic, new standards are being developed to enable point-to-multipoint distribution of data on a multicast or broadcast basis, and mainly intended for deployment in cellular LPLT networks.

Originally LTE has been developed for cellular digital mobile radio and standardised by ETSI. Within the LTE technology family, a standard known as evolved Multimedia Broadcast Multicast Service (eMBMS) has been developed and LTE Broadcast is a further evolution being considered to enable more efficient point-to-multipoint distribution and multiple users to receive the same content simultaneously. LTE Broadcast differs from LTE eMBMS through the use of longer cyclic prefixes, a dedicated downlink channel and no limit on the proportion of the channel that can be dedicated to broadcast.

The technology is mainly intended for deployment in cellular LPLT networks. It is expected, that the area covered by the LTE SFNs can be small (a few cells) or can be very large, e.g. covering an entire country.

## **6.3 Convergence between DTT and WBB**

DTT platform is more and more combined and used with other communication platforms, e.g. via internet enabled TV sets. Such development may also be expected in mobile environment.

Currently consumers can receive AVMS content via different platforms without convergence in the technology itself, noting that there are different constraints (e.g. mobility and quality) associated with each platform. Both linear and non-linear media content is increasingly provided independent of the platform i.e. consumer may choose whether to receive the content via WBB or DTT platform. On the platform point of view, there is no convergence expected between DTT and WBB in the foreseeable future.

The actual convergence may happen between traditional broadcasting and WBB and other delivery platforms on the service level.

### ***6.3.1 Prerequisites for the service level convergence***

Several prerequisites would need to be in place, before AV media services may be provided to mass audiences and to large areas by broadband platforms and service convergence may be realised. The main requirements for the extensive AV media service delivery are the coverage, capacity, reliability of delivery and quality of service.

For citizens access to free television services is essential. Therefore, the provision of free AV media services would require adequate operational business models to be developed.

On the regulatory point of view convergence may be supported by combining the rights of use of spectrum with further obligations and conditions in order to fulfil public cultural policies and general interest objectives.

## ***6.4 5G initiatives within Europe***

The European Union has funded and established research projects for the development and promotion of the next generation wireless broadband, commonly known as 5G. Projects on 5G are funded within both the 7<sup>th</sup> Framework Program (FP7) and the 8<sup>th</sup> Framework Program, named Horizon 2020.

The METIS (Mobile and wireless communications Enablers for Twenty-twenty Information Society) is considered the 5G flagship project under the 7<sup>th</sup> Framework Program. METIS' objective is to lay the foundation for the 5G mobile and wireless communications system. The project builds on the assumption that a single new radio access technology will not be able to satisfy all the requirements or replace today's networks. Instead, METIS' vision is that 5G networks will respond to the expected traffic volume explosion and to the new and diverse requirements through a flexible combination of evolved existing technologies and new radio concepts. METIS developed scenarios for the use of mobile communications for the years 2020 and beyond. Research on the required technology components is carried out to target these use cases. The METIS overall approach towards 5G is to build on the evolution of existing technologies complemented by the integration of complementary concepts and, when needed, new radio access technologies.

Within the Horizon 2020 Program the 5G Partnership Project 5G PPP is set up between the EU and private industry. The 5G PPP is expected to fund many projects over the next several years. The 5G PPP will deliver solutions, architectures, technologies and standards for the ubiquitous next generation communication infrastructures of the coming decade.

At this stage, the relevance of the UHF band in the context of 5G initiative is not clear. However, it is too early to assess the effect of these projects on the ability of 5G networks to enable efficient delivery of broadcast services.

## **7 Elements for the Long term strategy**

### **7.1 The overview**

Different elements are considered essential when assessing the strategy for a future framework for the UHF band (470-790 MHz) noting that this band is currently being used for DTT. In particular, this framework needs to take into account aspects such as actual and short/medium term usages and developments (e.g. possible IMT in 700 MHz), cross-border coordination, impact on broadcasters, consumers and general interest objectives.

Due to its attractive propagation characteristics, the UHF band is suitable spectrum to provide good coverage for delivery of radio based services by using HTHP or LTLP networks and other applications such as PMSE, PPDR, radiolocation, radioastronomy and radionavigation.

#### **Spectrum for DTT**

RSPG believes that DTT will continue to play an essential role for the foreseeable future due to its characteristics of delivering high-quality linear services to mass audiences and ensuring universal and free-to-air access for citizens. Regulatory clarity and certainty are required for the DTT platform to evolve and innovate, and for broadcasters, the associated industry, and the public to make the significant long term investments into future technologies and services. Furthermore, some significant infrastructure investment decisions may have to be made in the coming years. Certainty over the future spectrum availability for DTT is a prerequisite for any investment decisions needed to develop and upgrade the networks. The UHF band is the only spectrum available for the evolution of DTT platform in some countries. Even where the VHF Band III is available for DTT, it is often shared with digital radio broadcasting or other (non-broadcasting) services and requires specific roof-top antenna systems. European spectrum policy should ensure that DTT has sufficient spectrum in the UHF band to evolve and innovate.

#### **Spectrum for PMSE**

While the PMSE industry lost access to the 800 MHz band when this was reallocated to mobile services, it is widely recognised that this loss was mitigated. However, a further loss of access to spectrum in the 700MHz band could have a detrimental impact on the ability of PMSE industry to continue delivering a service. It is important that the spectrum requirements of all stakeholder affected by a change of use of the 700MHz band are carefully considered. In addition to the loss off 700MHz, it is also expected that the re-planning of remaining broadcasting services below 700 MHz will further reduce the usability of this remaining band for PMSE. However, the PMSE does not only support the broadcasters, by also plays an important and indispensable role in countless events, be it for cultural, societal or business purposes. There is a need to find a solution for the continuation of PMSE service delivery. Little

headway having been made in the search for alternative frequency bands for PMSE up to now, the RSPG is of the opinion that increased attention should be given to these needs in a timely manner. The RSPG recognises that spectrum requirements for PMSE vary significantly between Member States but notes that new bands above 1 GHz are being explored within CEPT in the context of harmonisation as well as possibilities to use duplex gaps in bands below 1 GHz. In addition Member States should also seek to promote sharing and ensure that licence conditions in bands currently used are as flexible as possible.

Additionally the RSPG is of the opinion that PMSE community should be encouraged to develop more efficient spectrum usage and technologies.

### **Spectrum for PPDR**

In addition to the narrow band PPDR networks in the harmonised frequency band below 400 MHz, PPDR agencies are seeking access also to wireless broadband services. Two candidate frequency bands have been identified by CEPT for BB PPDR: 700 MHz and 400 MHz. If the BB PPDR services are to be introduced in the 700 MHz band three main deployment scenarios have been identified:

1. Dedicated networks and dedicated equipment
2. Commercial MNO networks and commercial equipment
3. Hybrid networks

However, spectrum needs for broadband PPDR services differ largely between Member States. The adoption of a ECS channelling plan for the 700 MHz band and the possibility of national options to allow Member States to deploy BB PPDR at 700 MHz according to their needs, if they wish so<sup>26</sup>. Other Member States might be more inclined to implement other solutions for PPDR such as a dedicated network at 400 MHz or the use of the commercial mobile network with priority rights or hybrid networks. Since the decision on a deployment of broadband PPDR networks is a national matter, it does not require a measure on EU level. However, it should be noted that there might be a requirement for international assistance in case of a large scale emergencies and emergencies near the border area.

### **Spectrum for other radiocommunication services**

Radiolocation, radioastronomy and radionavigation services are operating in parts of the UHF band due to physical conditions and characteristics of the spectrum. RSPG notes that operation of radioastronomy needs to be ensured in the long term. In addition, given the operation of Radiolocation (wind profiler) in some countries the RSPG recognizes that the long term strategy for the UHF band has to respect this service.

## **7.2 Approach for the 700 MHz band**

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<sup>26</sup> See the CEPT Report 53 on the Response to EC Mandate on 700 MHz band

Whereas it is recognized that some member states have already announced that the 700 MHz band will be made available for WBB, it is of particular importance to consider, taking into account the different situations among Member States, if the band should be released in the EU in a way comparable with the 800 MHz authorization process (i.e. technical harmonisation measure followed by an authorization deadline through a binding legislative measure such as an RSPP).

It is also important that elements for the long term policy are considered when developing remaining broadcasting use and other new or incumbent users of this band, such as the international harmonisation and band plan.

### **7.2.1 Assess the benefits in the coordinated release of the 700 MHz band for WBB**

RSPG Report on proposed spectrum coordination approach for broadcasting in the case of a reallocation of the 700 MHz band stated that “the interference from broadcasting stations into the base stations of the mobile service can reach few hundreds of kilometres and the interference from base station to broadcasting reception at the border can also be significant. Therefore, cross-border coordination issues between mobile and broadcasting have to be taken into account by Member states when determining the timeline for the introduction of mobile service in the 700 MHz band together with other elements such as national situations and coordination challenges.”

Even if these large interfering distances could be reduced by mitigation techniques, it illustrates the interference potential and the significant cross-border coordination issue.<sup>27</sup>

This is also demonstrated by the practical situation in the 800 MHz where some administrations have not yet switched off broadcasting.

Small time differences between the release of the 700 MHz band in neighbouring countries would result in a shorter transition period when different services are in operation in neighbouring countries. Furthermore this would also reduce the complexity of frequency coordination between countries.

Considering the various national considerations amongst Member states, there will be different implementation dates and, therefore, transitional period. Member states will have to cooperate to minimize the impact of such time differences on both mobile and broadcasting services and to define transitional plans, in particular to take into account cross-border issues.

RSPG also believes that the problems which arose in the 800 MHz case should be avoided. A situation in which a very large number of Member states apply for a derogation should be avoided. One of the main reasons for this was that the time between the adoption and publication of the RSPP (April 2012) and the authorisation deadline of 1/1/2013 was too short. Member states were simply not in the position to

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<sup>27</sup> Bilateral cross-border frequency coordination between Member States can be satisfying in certain circumstances (e.g. UK/Ireland) but does not address more complex geographic situations such as around Benelux, Adriatic or in the Central-East European region.

adopt the necessary legislation (including the necessary consultations on the draft legislation), prepare and complete the authorisation process in a period of 8 months. Only those Member States which had already started the preparation in advance were able to meet the deadline. Additionally, the implementation was delayed in some Member States because of the spectrum coordination with the neighbouring non-EU countries.

A timely coordinated release should comprise of the following steps:

- The adoption of the technical harmonisation measures on a European level
- The adoption and publication of the European release measure (i.e. a binding legislative measure such as an RSPP for the 800 MHz band) including the deadline by which the band can effectively be used by ECS-services and the deadline by which the national authorisation process should be finalised.

The RSPG believes that, due to different national situations, the dates of the authorisation and implementation processes for introduction of WBB will differ between Member States. This means that, in case of different implementation dates chosen by neighbouring countries, there will be a transitional period. The neighbouring countries will have to agree bilaterally on detailed coordination agreements between the involved countries to avoid interference during this transitional period.

The same applies also for the implementation and coordination with the non-EU countries which may use the frequency band for other services for the foreseen future.

### ***7.2.2 Assess the possible need for assigning the 700 MHz band for WBB before 2020***

The exact timing for a complete release of the band for WBB is difficult to assess.

It is recognized that the 700 MHz band has been licensed in many European countries for use by DTT. Those licenses constitute acquired rights until the expiry date for the broadcasting operators whose business models may have been elaborated for a given license duration. In some countries, it may also be the case that there is no alternative platform to deliver the programs. As in the case of the 800 MHz band, a binding decision by the European Parliament and Council could require member states to complete the authorization process of this band to WBB by a given date, but member states need sufficient time to rearrange broadcasting assignments, including frequency coordination, in the band below 694 MHz.

The RSPG Report on proposed spectrum coordination approach for broadcasting in the case of a reallocation of the 700 MHz band gives an indication that a period of more than 3 years after WRC-15 would be required to achieve the necessary cross border coordination agreements, in particular in geographical areas with many countries bordering each other.

It has to be noted that there would be a need for each country to redefine rights below 694 MHz based on the equitable access principle and the requirements of a country. The usage level of the UHF band and especially the upper part for DTT is very different among European countries. For some countries and in some areas, most

GE06 existing rights are allocated in the 700 MHz band. In this case, also a possible reduced number of DTT coordinated spectrum rights among neighbouring countries should be a consequence of the 700 MHz vacation. That aspect resulting from a possible necessary re-planning process should involve the whole remaining UHF band below 700 MHz band. However, the achievement of cross-border coordination is essential before the 700 MHz band can be released for WBB.

It is predicted that a significant growth in mobile data will take place in next few years as explained in the RSPG Report on “Spectrum for Wireless Broadband and Broadcasting in the Frequency Range 400 MHz to 6 GHz”. Further details on these forecasts for the mobile traffic growth is addressed in Report ITU-R M.2243. As a consequence, in order to meet those needs, additional spectrum has to be made available.

The ITU-R<sup>28</sup> has estimated the global spectrum requirements for IMT to be in the range of 1 340 MHz to 1 960 MHz in the year 2020. The 700 MHz band constitutes a limited but necessary contribution to this expected growth. Whereas the capacity increase in dense urban areas will mainly be met in bands above 2 GHz, the 700 MHz band is essential for provision of extra capacity for rural areas as well as improved indoor coverage in urban areas. The 700 MHz band could and can also contribute to realize advanced wireless broadband speeds using inter-band carrier aggregation.

Some other elements have also to be taken into account:

- Not all of the currently available spectrum has been licensed and there is still some licensed but unused spectrum in other bands for mobile services in most Member States.
- In some countries operators are still in the process of rolling out their networks in the 800 MHz band.
- A large part of the requirements for additional capacity needs come from implementation of techniques such as small cells, WIFI-offloading, smart antenna as well as from the densification of the infrastructure and more spectrum efficient technologies in the bands already assigned for WBB.

The RSPG therefore believes that there is no need to mandate making available the 700 MHz band for WBB before 2020. This does not preclude the use of band before this date at a national level for WBB.<sup>29</sup> Member States are urged to review their national requirements for WBB, especially for the extra capacity required for the rural areas and requirements for indoor coverage.

### ***7.3 Approach for the Long term strategy for the band 470-694 MHz***

The RSPG recognises the difficulties broadcasters are faced with after the release of the 800 MHz band and the expected release of the 700 MHz band, not only in terms of frequency resources, but also in terms of confidence in the stability of this band for the DTT platform.

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<sup>28</sup> ITU-R Report M.2290

<sup>29</sup> Such a coordinated release should not prevent Member States from releasing the 700 MHz band in advance of this time frame. Any such release should take due consideration of any future EC technical harmonised decision(s).

The result of the questionnaire (section 4.3) indicates that a number of countries are demanding access to this band for broadcasting for the coming decades. Others may decide to rely on alternative platforms, but in the majority of cases terrestrial broadcasting remains the preferred platform for free to air services. In those countries the political will is there to maintain a base line offer of television broadcasting services in order to fulfil the socio-economic and cultural role of television. Furthermore, if broadcasters are planning substantial investments, they are entitled to enjoy a high level of certainty to be able to invest in the band,

The approach the RSPG has chosen is one of flexibility and certainty. Certainty should be provided for those Member States using this band for broadcasting. On the other hand flexibility could be afforded to Member States to introduce different services in the band 470-694 MHz, if compatible with broadcasting needs in the relevant Member State, while ensuring no constraint to other Member States using this band for broadcasting in order to maintain the potential cross-border coordination problems to a minimum.

The RSPG further recognises the need to give certainty to the PMSE community about the future bands in which the PMSE applications can operate. In the case the capacity in the available bands will not be sufficient to address the requirements of the PMSE applications, a timely identification of additional spectrum for PMSE is required as part of this long term strategy.

The broadcasters (public and commercial) may wish to be able to reach all devices in the future. In order to meet this need, the technology developments, service and platforms evolution as well as changes in consumer habits should be followed and taken into account when planning the future of the band below 694 MHz.

### ***7.3.1 Description of options for the band 470-694 MHz***

According to CEPT, potential different options can be foreseen concerning the usage of the 470-694 MHz, based on possible future scenarios which can be described as a combination of the following elements:

- Service: content/information and/or functions provided to/from a user (e.g. audio/video linear, audio/video non-linear, interactive/on-demand services, data, PMSE, etc);
- Terminal/user device: receiving/transmitting equipment for the above service (e.g. large flat screen, portable TV sets, PC, laptop, smartphone, game console, tablets, etc);
- Usage environment: description of the radio propagation environment (e.g. rural, dense urban) as well as the receiving mode (fixed, portable/mobile) and location (e.g. at home, in public places, and vehicles);
- Delivery mechanism: the means to provide the service (e.g. technology used, network architecture, etc).

Taking into account expected service and traffic characteristics as well as recent and supposable developments and long term scenarios, three main options for the future usage can be conceived:

- I. Primary usage of the band for distribution of audiovisual content assuming a natural evolution of the DTT platform taking into account the ongoing technological and service developments, and assuming a stable regulatory environment and access to the spectrum.
- II. Usage of the band for distribution of audiovisual content by either a combination of DTT platforms and/or cellular terrestrial networks (hybrid) or evolved/new cellular networks only, in which broadcast and mobile broadband services are provided through additional downlink capacity.
- III. Usage of the band by either a combination of DTT platforms and cellular terrestrial networks (hybrid) or only by evolved/new cellular networks, in which broadcast and mobile broadband services are provided through both uplink and downlink.

Currently, the band is used for the delivery of television which can be expected to continue in the foreseeable future.

The main reason for the forecasts of future traffic for mobile broadband services, are growing services providing audiovisual content downstream to the end-user. Therefore it seems to be appropriate to foresee the UHF band (470-694 MHz) mainly for the downstream transmission/distribution of audiovisual content for the long term.

The present regulation for the lower part of the UHF band (470-694 MHz) allows the delivery of audiovisual service via DTT networks. Some flexibility is given by the GE06 Agreement through its mask concept that enables other applications to use the broadcasting Plan entries under certain conditions.

Concerning the future usage of the band 470-694 MHz it has to be taken into account that coexistence between downlink systems is less difficult and challenging than between cellular uplink and broadcasting or cellular downlink systems. Any option that introduces uplink in the band, such as option III requires a consensus among all the involved administrations as well as a Region-wide agreement in order to synchronise different implementations, even during transition periods. Noting the diversity of needs and situations encountered across the EU Member States it will be challenging to agree on all the elements necessary to reach such an agreement e.g. the minimum amount of downlink capacity and the specification of the uplink part.

Moreover, taking into account the effort needed to coordinate bi/multi laterally the spectrum use in cross-border regions (with EU and non-EU countries) and the likelihood of success in these negotiations for options I and II it seems that these options are best suited to provide the necessary certainty and stability for all the stakeholders concerned.

The Public Service Media obligations concerning the availability and coverage, i.e. to be available at the point of access for all and for free, are generally defined in the law. Therefore, if option II or III is to be considered for the delivery of public service

broadcasting and other free-to-air programs in the long term, the prerequisites of the platforms concerned and cost effects should be thoroughly investigated. These prerequisites might include interalia, regulatory and legal factors (e.g. “must carry” rules, rules for general interest content, net neutrality ...) economic factors affecting the delivery costs for television market players and individual citizens, as well as technological matters such as quality, availability and reliability of networks.

## **8 Migration issues**

- a. Opportunity of EU measures relating to TV receivers in order to mandate more efficient technologies (e.g., DVB-T2, HEVC)

Member States may need to take actions to transition of networks and the TV receiver market towards more efficient technologies (e.g. DVB-T2, HEVC).

Such actions were already taken in the past for the migration towards MPEG-4 and consist in mandating the compatibility of TV receivers placed on the market with the future TV transmission technology and coding format. It reduces the impact on consumer by ensuring that, at the time of switching off the out-of-date technology, the TV viewers will be able to receive, as before, their TV programmes. It enables faster transition to new technologies, reduced cost and more efficient use of spectrum.

The transition to new broadcasting technologies will also strengthen the Internal Market for potential mass market TV receiver equipment embedding these new technologies, and economies of scale minimizing the cost of new equipment for TV viewers.

The Commission should therefore support such national measures.

- b. Possible economic consequences of migration (including cost of technology upgrades)

The migration of television below 694 MHz might result in economic impact for broadcasters (such as change of transmitting frequency, reconfiguration of the DTT networks, technology upgrade) and potential costs for consumer (impact on TV installation, loss of coverage ...).

The relation between technology upgrade and migration of television below 694 MHz will depend on national circumstances. Technology upgrade will also normally enable to offer new programs and services or higher picture resolution (HD, UHD ...). However, technology upgrade incurs also some costs for broadcasters (buying new equipment) and for consumers (buying receivers compatible with the new technology).

In addition, any change in television plan, which implies rescan of the TV receivers and can necessitate technical intervention (antenna re-orientation,...) or alternative reception mean (loss of DTT coverage), requires communication campaign, financial support and assistance measures.

Compensation issues might arise at a national level. If Member states consider to provide compensation they should be supported by the Commission which could clarify in advance conditions under which it would be compatible with the state aid rules.

c. Impact of 700 MHz development on TV receivers harmonised standards

The introduction of LTE in the 800 MHz band has created new operating conditions for the TV receivers which require them to adapt to this new situation. At that time, measurement had shown that a small proportion of TV receivers were particularly sensitive to time-varying signal such as LTE terminals or LTE bases stations in idle mode.

As explained in the RSPG Report on interference management, “when interference occurs in sound or TV broadcast receivers, the equipment (or at least some channels) is not usable for the consumer. In such a case, the consumer cannot be expected to make an informed choice when purchasing equipment that will not be susceptible to interference, at least not without guidance. Therefore it is necessary to ensure a minimum performance standard for sound and TV broadcast receivers responding to the future radio environment via Harmonised Standards. There is a need to improve the performance of all broadcast receivers and other equipment used in the installations for the reception of broadcast services, i.e. amplifiers, cables and filters.”

In addition, when DTT will have migrated below 694 MHz, the TV receiver selectivity may be improved in order to better filter out interfering signal from the bands 700 MHz and 800 MHz. More precisely, there are two migrations to be taken into account, one to consider the ongoing release of the 800 MHz band and another the release of the 700 MHz band.

The Commission has requested ETSI and CENELEC to undertake additional EMC and radio standardization work supporting the implementation of the 800 MHz Decision. The Joint Working Group (JWG) between ETSI and CENELEC is currently carrying out this activity and is expected to modify the relevant harmonised standards accordingly.

The letter from the Commission, 13<sup>th</sup> February 2013, was already making reference to the possible introduction of WBB in the 700 MHz band. The JWG is to be made aware by the Commission of the new development concerning the 700 MHz band in order to take into account the progressive introduction of WBB in this band in the next few years.

## **9 Responses to the Consultation**

A public consultation on a draft version of this Opinion was held from 14th of November 2014 until 12nd of January 2015. In all, 54 responses were received. The

RSPG is grateful to all respondents for their input. All responses can be found on the RSPG website <http://rspg-spectrum.eu/public-consultations/>.

The responses received can be classified in the following groups:

1. Member States
2. Manufacturers
3. Broadcasting sector
4. Mobile Sector
5. Specific interest group

The RSPG is pleased to note the high number of responses received to the public consultation on the draft Opinion as well as the positive and constructive character of the contributions.

In general, the responses are supportive of the Opinion, have welcomed the timeliness and the opportunity to express their views on the different issues at stake. As an overall remark, the responses received from a variety of stakeholders, have shown the complexity of the topics under discussion as well as the fact that the Opinion addresses many and intrinsically interrelated issues. A wide range of topics have been referred by the contributors among which, those that have captured more attention are related to the 700 MHz band clearance process (including the transition/migration phase) and the long term view on the sub-700 MHz spectrum. Other issues such as the sector specific spectrum requirements (e.g. PMSE, PPDR, SRDs, Railways, WSD), platform convergence/cooperation between DTT and wireless broadband, TV receiver specification, compensation issues and technology developments have also been mentioned.

Concerning the approach proposed in the draft opinion for the 700 MHz band, a number of comments have addressed in particular the deadline for the availability of the band for WBB. Opposing views have been expressed concerning the suitability of the dates, i.e. 2020/2022, which have been included in the draft opinion, as possible deadlines. On one side, stakeholders representing the interests of the mobile sector (e.g. network operators and manufacturers) envisage a more ambitious deadline of 2020 (compared to 2022). It was also noted by some respondents that, even though a deadline of 2020/22 could be feasible in some countries, in many other countries such date(s) would not be realistic.

On the other hand, other stakeholders have emphasized the complexities and challenges associated with the 700 MHz band clearance process, underlining that the deadline of 2020 (or 2022) would not allow for both frequency coordination and migration processes to be completed. Some responses linked this matter to the need to consider the current TV equipment lifecycle and the readiness/widespread availability

of more efficient technologies (e.g. receivers equipped with DVB-T2, HEVC) which makes 2020 (or 2022) premature.

Six Member States replied to the public consultation, of those 5 underlined that the 700 MHz can only be made available for WBB after 2022, in particular considering the current usage of the band as well as due to cross border coordination issues; one Member State has proposed 2020 at the latest.

Concerning the 470-694 MHz band, the responses received on this topic suggests that the recommendations of RSPG to maintain it for downstream audiovisual content for the long term (even beyond 2030) as well as for this band to remain available for DTT in the foreseeable future (i.e. 2030) is appropriately well balanced noting that many responses have highlighted the need to study in more detail the sharing / compatibility scenarios arising from its flexible use namely for WBB downlink. In addition, it was pointed out that the WBB traffic demand forecasts need to be scrutinised in order to promote a more effective and efficient use of the spectrum.

**10 The Opinion of the RSPG**

1. RSPG supports the provision of wireless broadband services in the 700 MHz band, and recommends that the Commission, in cooperation with the Member States, strive towards a coordinated approach, including:
  - Defining, as early as possible the harmonised technical conditions for the use of 700 MHz by wireless broadband services.
  - Proposing in a binding legislative measure such as an RSPD, the deadline by which the national authorisation process should be finalised and the deadline for making the band available for effective use by ECS in line with harmonized technical conditions.
2. Recognising the importance of the 700MHz band in the provision of wireless broadband across the EU, the RSPG recommends that Member States should undertake the transition as soon as possible, noting that there are numerous challenges to overcome but urging Member States to move quickly.
3. RSPG recommends that Member States make the 700 MHz band available for WBB as early as possible. RSPG supports making the band available for effective use by ECS by the end of 2020, noting that Member states may decide for duly justified reasons and without the need for derogation to delay the availability of the band by up to two years. This is without prejudice to constraints arising from cross border frequency coordination with third countries.
4. RSPG recommends that Member States should develop and communicate to stakeholders and neighbouring countries in due time, a framework for the migration of broadcasting services towards the frequencies below the 694 MHz band and also to take into consideration all practicable efforts to accommodate the various timelines of their neighbours for migration.
5. In order to facilitate adequate time for implementation of the necessary provisions to facilitate all Member States meeting the final deadline and noting that some Member States have already started cross-border negotiations, RSPG recommends that the remaining Member States begin negotiations as early as possible to ensure that all necessary cross-border coordination agreements, including transitional arrangements, will be finalized at the latest by the end of 2017, taking into account the 3 year period envisaged by the RSPG Report “on proposed spectrum coordination approach for broadcasting in the case of a reallocation of the 700 MHz band”. Member States should apply guidelines of the RSPG Report referenced above.
6. RSPG recommends that those Member States with non-EU neighbouring countries to start, with the support of the Commission if necessary, bilateral negotiations with those countries as early as possible to reach the necessary cross-border coordination agreements.
7. RSPG recognizes that the DTT platform evolves to new broadcasting technologies in the UHF band (i.e. DVB-T2 and/or possibly HEVC) and recommends that the European Commission should, in cooperation with Member States support

national measures to facilitate transition to more spectrum efficient technology, including those mandating the inclusion of such technologies in the TV receivers;

8. RSPG recognises that the band 470-694 MHz is mainly used for downstream audiovisual content distribution and recommends that it remains as such for the long term, even beyond 2030;
9. RSPG recognises the importance of the DTT platform and the need to provide certainty for investments in broadcasting infrastructure. Therefore RSPG recommends that the frequency band 470-694 MHz shall remain available for DTT in the foreseeable future, i.e. 2030.
10. Notwithstanding, the RSPG recommends that Member States should have the flexibility to use the 470-694 MHz band for WBB downlink, provided that such use is compatible with the broadcasting needs in the relevant Member State and does not create a constraint on the operations of DTT in neighbouring countries. This is without prejudice to coordination agreements with the neighbouring countries
11. RSPG recommends that, when considering any options for the future usage of the frequency band 470-694 MHz, aspects such as the requirements, technological developments, consumer behaviour, the importance of delivering free-to-air television and the various political, social, cultural and economic general interest objectives, should be taken into account.
12. The RSPG believes that there is a need to have technically appropriate and sufficient spectrum for PMSE and considers that depending on developments and requirements of such services, there could be a need to identify additional spectrum. RSPG recommends that the PMSE industry develops more advanced and spectrum efficient technologies. In addition Member States should also seek to promote spectrum sharing and ensure that licence conditions in bands currently used are as flexible as possible;
13. RSPG recognises that the scope and mechanism of possible compensation is a national issue. RSPG recommends that the Commission assists the transition by providing early guidance to the relevant Member States, in particular clarifying cases where it may or may not be compatible with state aid rules.
14. RSPG recognises that implementation of broadband PPDR networks is a national issue.
15. RSPG notes that TV receiver standards should take full account of the evolution of the 700 MHz band and include as early as possible appropriate receiver parameters (e.g. selectivity and blocking). Therefore, RSPG recommends that the Commission liaises with ETSI and CENELEC to ensure that the introduction of WBB in the 700 MHz band will be fully taken into account when writing or revising EMC and “radio” harmonized standards for TV receivers and for any other electronic products (such as antenna mast amplifiers) intended for TV installations.

**ANNEX 1**

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**Summary of responses to the questionnaire on  
long-term strategy on the future use of the UHF band (470-790 MHz) in the  
European Union**

## Questionnaire

### “long-term strategy on the future use of the UHF band (470-790 MHz) in the European Union”

#### 1. Introduction

Following a questionnaire launched in May 23rd, seeking the views of Member States in relation to the role of DTT platform, including the current and planned use of the spectrum in the 700 MHz, the RSPG received answers from the following Member states of the EU<sup>30</sup>:

Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden and United Kingdom,

Responses has also been received from Iceland, Liechtenstein, Norway<sup>31</sup> and Switzerland.

#### 2. Summary of Responses Received

##### Question 1

##### 700 MHz band (694-790 MHz):

- What is the current and planned spectrum usage of the 700 MHz band?

The vast majority of responses has stated that the 700 MHz band is currently being used for DTT. Other types of usage, mainly PMSE, has also been referred. Concerning the future/planned use of the band, the majority of the responses takes into account that, according to the existing rights of use, this band is envisaged to be used for the operation of DTT (see also bullet below). In any case, many Member states are considering (or have already decided) its use for wireless broadband.

- Has your country already adopted national decisions on the implementation of WBB in the 700 MHz band? In case that a national decision has not yet been taken, what is your preliminary view on the possible implementation of WBB in the 700 MHz band?

The responses have shown that, with few exceptions, Member States have not announced formally a national decision concerning the future use of the 700 MHz band. Notwithstanding, many of the responses have highlighted that a possible implementation might be considered in the future, noting that several difficulties may arise in such case. Many responses have highlighted that this implementation for WBB is related to the expiry date of the current rights of use of frequencies in the

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<sup>30</sup> hereinafter RSPG Member States

<sup>31</sup> hereinafter RSPG Observers

band for DTT, which takes place around 2017-2025 time frame. It is noted also that in few countries the expiry date of the existing rights of use exceed this time frame (e.g. up to 2032).

- Did you already make an assessment of advantages and disadvantages of having a coordinated approach on the implementation of WBB in the 700 MHz band (long term different use of the spectrum MOBILE vs. BC, or only a limited different use, i.e. when 2 different dates are chosen by 2 neighboring countries)?

The clear trend of the responses shows that detailed assessment has not been done yet. Nevertheless, it is apparent for the overwhelming number of respondents that coordination is key in many aspects such as on cross-border agreements, timing and cost. Consumer and migration issues has also been pointed out.

## **Question 2**

### **Evolution of the DTT platform:**

- Do you envisage some provisions on a national level for facilitating the transition to new BC technologies in the UHF band (i.e. DVB-T2, HEVC)?

The majority of RSPG Member States (but none of the RSPG observers) responding to the questionnaire confirmed either already to provide, to envisage or to consider measures on a national level for facilitating the transition to new BC technologies in the UHF band, mainly in relation with the introduction of DVB-T2.

Where no provisions on national level are envisaged and a reason for that was given, the rational was market related, in particular because of the not yet amortised costs for the transition to DTT.

- Do you see a shift to other distribution platforms in the future?

Some respondents do not see a shift to other distribution platforms in the future; a few expect even an increase of DTT usage.

The majority of the responding RSPG Member States including the responding RSPG Observers see such a shift or expects the coexistence of other distribution platforms and DTT in the future.

Two RSPG Member States noted possible future migration to hybrid/integrated distribution platforms.

**Question 3****Long term strategy for the UHF band:**

To what extent does the DTT platform play a specific role in your country to achieve general interest objectives (regulation, political, social<sup>32</sup>, cultural/economic<sup>33</sup>, etc.)? Are these objectives attached to the spectrum rights of use? If not, where are these objectives laid down? Are DTT rights of use granted to media service providers (i.e. the entity which has editorial responsibility)?

Most of the administrations have stressed the importance of the DTT platform for delivering free-to-air television, notably for Public Service Broadcasting (PSB) content. Free-to-air is often associated with the ideas of universal, easy-to-use, high quality, high coverage, cheap means of TV reception.

Spectrum rights of use are sometimes granted to the DTT network operator(s) (i.e. DTT electronic communication operators), sometimes to the DTT multiplex operator(s), sometimes to the audiovisual media service providers (i.e. content providers which have editorial responsibility). The regulatory objectives concerning the content may be decoupled from the transmission by granting spectrum rights to the DTT network or multiplex operator(s), and granting the rights to use a capacity resulting from the usage of a frequency to the content providers. Sometimes, different regulations apply to different cases, e.g., rights of use given to the service provider in the case of local/regional programmes or PSB and rights of use given to network or multiplex operators for other TV programmes.

In most cases, the general interest objectives are defined through a dedicated national media law, which also allows implementation of the AVMS directive. However, in some countries the general interest objectives is attached to the network licences or to the service licences. The general interest objectives may be specific to PSB content and then defined in the related law.

Political, social, cultural and economic general interest objectives which have been mentioned are:

- Access to information
- Plurality of opinions
- Access to local/regional programmes
- Culture, including financing and audiovisual production requirements
- Security/Emergency (distributing messages, cybersecurity)
- Coverage and service quality requirements

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<sup>32</sup> Provide details, if available, in relation to the implementation of Article 14 of Audiovisual Media Services Directive.

<sup>33</sup> Action 82 of the Digital Agenda for Europe, Promotion of European cultural diversity and industry.

- Education
- Accessibility

Two administrations have mentioned that Article 14 of the AVMS directive is implemented through DTT free-to-air broadcasting.

Several responses have also indicated the importance of competition between platforms justifying the need for continuing development of DTT. This also reduces the risk of powerful gatekeepers, providing an additional safeguard of media plurality.

### **3. Conclusions**

The following conclusions can be drawn:

- The vast majority of RSPG Member States are considering (or has already decided) the possible release of 700 MHz in order to support the provision of wireless broadband services. Most of the responses highlighted the challenges that this might pose in terms of a coordinated approach, in particular, related to the timing, cross border coordination and consumer issues as well as the existing rights of use.
- On national level an appropriate frame is set to allow the DTT platform to evolve. RSPG Member States facilitate / facilitated / will facilitate the transition to new BC technologies in the UHF band (i.e. DVB-T2 and, in the case of one third of the responding countries, possibly, HEVC) according to their national situation.
- Although some administrations have noted a shift to some other distribution platforms, the importance of the DTT platforms for delivering free-to-air television, is stressed by most of the administrations. The coexistence of DTT with other distribution platforms is expected by the majority of respondents.
- There are various political, social, cultural and economic general interest objectives which are achieved through the DTT platform. There is a large diversity in the regulation applying to DTT and in the implementation of these general interest objectives.