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RADIO SPECTRUM POLICY GROUP

RSPG Opinion on the implementation of the current RSPP and its revision to address the next period

RSPG Secretariat, Avenue de Beaulieu 33, B-1160, Bruxelles, office BU33 7/55
Telephone: direct line (+32-2)29.21.261, switchboard 299.11.11; Fax: (+32.2)296.83.95
E-mail: cnect-rspg@ec.europa.eu Web-site: http://www.rspg-spectrum.eu
Web-site CIRCABC :http://forum.europa.eu.int/Public/irc/sg/Home/main
https://circabc.europa.eu/w/browse/f5b44016-a8c5-4ef6-a0bf-bc8d357debcb

RSPG Opinion on the future spectrum challenges

Implementation of the current RSPP and key issues to addressed in the next period

A Executive summary

This Opinion provides advice to the European Commission on the review of the Radio Spectrum Policy Programme (RSPP). The first Radio Spectrum Policy Programme (RSPP) was established by Decision 2012/243/EU of the European Parliament and the Council.

The RSPP focuses on strategic policy issues related to harmonisation of the use of spectrum to ensure the functioning of the internal market in the Union policy areas involving the use of spectrum, such as electronic communications, research, technological development and space, transport, energy and audio-visual policies. It sets out policy orientations and objectives for the strategic planning and harmonisation of the use of spectrum for the establishment and the functioning of the internal market. The current RSPP addresses in particular targeted actions in support of the roll out of high speed Wireless Broadband (Articles 3 and 6 of the RSPP) and for the establishment of the Spectrum inventory (Article 9 of the RSPP).

According to Article 15 of the current RSPP, by 10 April 2014 the European Commission shall report to the European Parliament and the Council on the activities developed and the measures adopted pursuant to this Decision and by 31 December 2015, conduct a review of its application The report from the European Commission on the implementation of the Radio Spectrum Policy Programme (COM/2014/228 final) published in 2014 highlights the key role of the Radio Spectrum Decision in European harmonisation and lists the relevant harmonisation Decisions entering into force during the 2006-2013 period.

The current RSPP contains the policy objective[1] to identify, based on the Radio Spectrum Inventory, at least 1200 MHz of suitable spectrum by 2015 for wireless data traffic. The RSPG Opinion 'on strategic challenges facing Europe in addressing the growing spectrum demand for wireless broadband' (RSPG 13-521 rev 1) provides practical guidance to the European Commission in assessing and dealing with the future demand for spectrum for wireless broadband and in meeting the "1200 MHz" goal.

- The RSPG concludes in this Opinion that the objectives of the first RSPP have been largely achieved. In particular the 1200 MHz target and the implementation of harmonised measures to support the internal market as requested by Article 6 are largely fulfilled.

An inventory of existing spectrum use was proposed as part of the RSPP. An implementing act has been published in 2013 (doc. 2013/195/EU). In 2014, the European Commission send a report to the European Parliament and the Council on the Radio Spectrum Inventory (COM(2014)536 final).

- The RSPG responded with a Position Paper (RSPG14-587). In summary, the RSPG does not believe that use of a data analysis tool on its own could properly reflect the technical, economical, operational, social and political complexity of

[1] See Article 3 of the RSPP

the use of spectrum and that making appropriate spectrum available for WBB services and other strategic applications within the range 400 MHz to 6 GHz, can best be achieved through actions targeted on specific frequency bands.

To continue the approach of multiannual policy programmes (RSPP)

The RSPP and the Spectrum Decisions of the European Commission are the two pillars to support the implementation of a Digital Single Market. Whilst the RSPP provides the directions, technical harmonisation measures are to be developed based on the Radio Spectrum Decision.

The RSPG recommends continuously reviewing the approach of multiannual policy programmes (RSPP). Such a programme provides political guidance to the activities under the Radio Spectrum Decision (focusing on technical harmonisation measures only).

For the period to come, the RSPG identifies a number of key issues to be addressed during the revision of the RSPP or during the review of Telecom package.

Increasing role of spectrum sharing

Due to a more intensive usage of the spectrum by various sectors, it will become more and more difficult to identify frequency bands for exclusive use. As a consequence, spectrum policy and national implementation will have to rely more and more on the shared use of bands. Spectrum sharing will tend to become the norm in the years ahead and national trials and efforts are expected to increase sharing in size and number.

Various spectrum sharing solutions are possible and highlighted by RSPG Opinions and reports such as geographical, temporary sharing, white spaces, geolocation database, etc.

In addition, the RSPG recognised that the LSA regulatory approach is a possible regulatory solution to increase the efficient usage of spectrum at national level. The relevant technology to implement this regulatory approach is still under development further to standardisation initiatives. Various trials are on-going in Member States in the band 2.3-2.4 GHz. The RSPG further recommends that the effort done by Member States at national level to ensure implementation of LSA should be recognised and encouraged as a possible voluntary regulatory approach compliant with the current EU legal framework. This has to be maintained as a voluntary tool in the future framework.

How to address future harmonisation needs including for WBB

The RSPG supports harmonisation of the radio spectrum when this leads to economies of scale for equipment, facilitates cross border use or reduces the complexity of cross border frequency coordination. However there may be occasions where harmonised spectrum is left unused or not heavily used because there are a variety of demands for wireless BB services among EU countries (i.e. because of significant penetration by wired or alternative wireless platforms rendering further

wireless services less important, because of variations in demand for services between Member States and/or size of the national market). Where demand for wireless services can already be satisfied within parts of the harmonised frequency bands, flexibility may be required in some Member States through variations in implementation. The need for some forms of national flexibility is a scenario of increasing significance that needs due consideration. This applies in particular to electronic communication services.

As a consequence, the RSPG prefers a band by band analysis and makes some recommendations in this Opinion for the 700 MHz, 1452-1492 MHz and 2.3-2.4 GHz bands.

- The RSPG welcomed the harmonisation of the band 1452-1492 MHz in line with its previous recommendations[2]. Expected future technical harmonisation measures for wireless broadband will be taken in the 700 MHz and the 2.3-2.4 GHz band to meet the current RSPP target of at least 1200 MHz spectrum for wireless broadband. Deadlines for making a band available are analysed in this Opinion on a case-by-case basis taking due account of the band specifics. RSPG recalled that the 2.3 – 2.4 GHz band should be addressed differently from other bands. RSPG recommends pursuing technical harmonisation while having a more cautious approach for the setting of deadlines for making new bands available, so that national implementation may differ due to variations in demand and in spectrum availability. The RSPG is of the view it is appropriate to review each harmonization measure to assess if the objectives have been achieved (e.g. assessing the relevant balance between the harmonisation objective and the flexibility responding to national needs).
- A new overall target should not be set in the new RSPP on how much spectrum should be made available for wireless broadband and various sectors supported by the European Policies.

The needs for spectrum for PMSE and PPDR may also differ between Member States due to differences in approach (e.g., PPDR via dedicated networks or via commercial networks or a mix of both, or as a result of a decision under national responsibility to organise and use spectrum for public security or defence purposes) or because of differences in demand or both.

- PMSE: Given the recent changes (i.e. 700 MHz, 2.6 GHz), this sector needs also certain forms of stability and certainty for investments. The RSPG will continue to carefully monitor the evolution of this sector in order to review, when appropriate, the strategic spectrum issues and long term vision and spectrum availability and to develop if needed, relevant recommendations.
- PPDR: EU Member States are involved in the future national implementation of Broadband PPDR to respond to their respective needs. As mentioned previously in a RSPG report[3], PPDR implementation (e.g. dedicated spectrum, hybrid or commercial services models) remains a national issue.

[2] See RSPG Opinion – RSPG doc 13-251rev1
[3] See RSPG report – RSPG doc 13-540rev2

In any case, the RSPG is ready to address the foreseeable needs of all the sectors that are part of general or specific EU Policy Objectives and to recommend concrete actions for those sectors.

The RSPG recommends that the European Commission notes specific EU policies other than electronic communication services (ECS), for which spectrum needs should be studied and to invite the RSPG to provide Opinions. The RSPG recommends following that approach identifying future bands to respond to sectoral needs in support of those EU Public Policies.

The RSPG has identified the need for coherence across various EU public policy objectives related to spectrum issues. There have been cases of conflicting interests (e.g. the EC mandate on the RLAN in the 5 GHz), of coexistence issues (e.g. Mobile Broadband and GSM-R) and examples of cases where the need for spectrum has not yet been sufficiently studied (e.g. Intelligent Transport Systems, Transport and Traffic Telematics devices, drones).

RSPG ready to address 5G challenges

The RSPG has already started to address 5G spectrum challenges in its recent deliverables. The RSPG will continue its effort and will develop recommendations to support the development of 5G. The RSPG recommends that already harmonised spectrum is reused to support the initial growth of 5G.

Various frequency bands above 6 GHz suggested for 5G are already in use by various applications (e.g. Satellites, Fixed links, Radars, Short Range Devices). These incumbent uses have to be carefully considered when investigating the possibility to use these bands for 5G. It will take a lot of time and effort to study all relevant aspects before a possible identification of European bands for 5G. The RSPG is prepared to develop before the end of 2017 an Opinion addressing suitable frequency bands for 5G above 6 GHz, focusing on those having the best potential for harmonization in Europe and worldwide.

International negotiations

The RSPG notes that Article 10 of the current RSPP deals with international negotiations relating to spectrum matters (such as ITU World Radio Conferences). Since the Radio Regulations relate to the right of individual administrations to access spectrum and not to harmonised technical conditions within the EU, the modifications of the Radio Regulations cannot, according to the RSPG, affect the EU common rules on spectrum. Therefore, according to the RSPG view, the common policy objectives have to be established in accordance with the requirements of the principle of sincere cooperation, as pointed out in the RSPP, Article 10.1 (b). This sincere cooperation between the European Commission and the Member States was successfully applied for several WRC cycles and should be maintained. Further to WRC 15, RSPG could develop an analysis of the results of WRC 15 on the common policy objectives and how best to preserve the EU interests in the preparation of WRC 19 (see RSPG Opinion on WRC 15).

Moreover RSPG is ready to provide support/recommendations on future agreements with others regions when spectrum issues are addressed.

To streamline the Radio Spectrum Inventory

The RSPG highlights that the radio spectrum inventory (identifying existing uses of spectrum) as established by the RSPP is only one element in building up a picture of the demand for and the supply of spectrum. An inventory alone is unlikely to provide a complete picture of spectrum use within a country.

Taking into account the lessons learnt from the first exercise, the RSPG recommends that the efforts of the European Commission and the Member States would be better targeted on those frequency bands identified as potential bands for WBB or for other strategic applications taking into account current demand. The RSPG provides concrete recommendations to streamline the radio spectrum inventory process

Spectrum regulation and radio equipment regulation supported by standardisation are complementary mechanisms

The RSPG believes that spectrum regulation and radio equipment regulation[4] supported by standardisation are complementary mechanisms that need to be co-ordinated closely in order to meet their joint objectives effectively and therefore recommends that the European Commission co-ordinates closely the content & timing of mandates to CEPT under the Radio Spectrum Decision and standardization requests to ETSI. The RSPG supports the promotion of adequate receiver performance and recognizes that specifying relevant radio receiver parameters, sharing mechanisms and interference mitigation techniques is becoming increasingly necessary to facilitate the introduction of future systems, to extend sharing opportunities and to ensure efficient spectrum management.

An enhanced role for the RSPG to support EU Public Policies and their implementation

The European Commission proposes enhancing the role of the RSPG to support the implementation of relevant Digital Single Market objectives[5]. When developing this Opinion, the RSPG already identified the benefits of enhancing its role:

- to support the implementation of the strategic objectives of the RSPP and of EU public policies when spectrum is used.
- to assist the European Parliament, the Council and the European Commission in relations, discussions and exchanges of views with third parties on spectrum issues
- to support dissemination of best practices on the implementation of regulatory principles supporting European spectrum harmonisation and on spectrum management

[4] See R&TTE Directive (Directive 98/13/EC) - Radio Equipment Directive (Directive 2014/53/EU)
[5] See DSM strategy – 6 /05/15 – section 3.1 page 10

- to deliver position papers on the communications, reports and draft regulations proposed by the European Commission on spectrum issues
- to advise the European Parliament and the Council, where needed.

Additional comments / Next Steps

During the drafting of this Opinion, the European Commission clarified that a renewed RSPP would not be put into force until after the completion of the forthcoming Telecoms Framework Review. However, there is a requirement in Article 15 of the RSPP for the European Commission to undertake a review of the RSPP and present this to the European Parliament and Council by the 31st December 2015.

The RSPG decided to continue with its work with the intention of providing advice to the European Commission when undertaking its review of the current RSPP and providing some initial thoughts on what might be included in a renewed RSPP once the Telecoms Framework Review has taken place. The RSPG would like to caveat that, for the latter purpose, given it is likely to be several years before a renewed RSPP is proposed and considered, the advice of the RSPG to the European Commission will need to be revisited to take account of developments.

However, RSPG invites the European Commission to attach this Opinion to its report to the European Parliament and Council.

The RSPG is the competent body to assist and advise the European Commission, the European Parliament and/or the Council on radio spectrum policy issues.[6] In its Communication to the European Parliament, the Council, the European economic and social Committee and the Committee of the Regions about "A Digital Single Market Strategy for Europe", the European Commission identified the need for strengthen and enhanced role of bodies in which the Member States' authorities are themselves represented such as the RSPG[7]. RSPG appreciates this. The RSPG proved its competences in spectrum policy issues in a number of deliverables[8] and will continue to do so. RSPG plans, in particular, to deliver an Opinion on the DSM and Telecom Framework Review[9].

This Opinion has been amended as a result of the public consultation held from 22 October to 21 December 2015. A summary of the responses is provided in Annex 4 and all responses can be found on the RSPG web site[10].

[6] Article 2 of European Commission Decision of 16 December 2009 amending Decision 2002/622/EC establishing a Radio Spectrum Policy Group; http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32009D0978

[7] COM(2015) 192 final, page 10; http://ec.europa.eu/priorities/digital-single-market/docs/dsm-communication_en.pdf

[8] See Annex 1: RSPG contributions to EU Policy linked with Spectrum Policy.

[9] See slide presentation of the public briefing session held at the end of the 37th RSPG plenary meeting: http://rspg-spectrum.eu/wp-content/uploads/2015/06/RSPGdebrief110615.pdf

[10] Link towards all responses - https://circabc.europa.eu/d/a/workspace/SpacesStore/ce6ae944-17da-4159-8c93-07cfbfc7c964/responses_RSPP.zip

When addressing the review of the Telecom Package regarding spectrum issues, the RSPG will take note, as appropriate, of the recommendations included in this Opinion. The RSPG intends to complement these initial recommendations covered by this Opinion accordingly.

B. Recommendations

The RSPG considers that the review of the RSPP is necessary and provides hereafter relevant recommendations

General aspects

- The RSPG recommends continuing with the approach of multiannual policy programmes (RSPP) for spectrum related policy objectives and targeted actions and reviewing/revising it when needed.

- The RSPG recommends that any future multiannual spectrum policy programme should be a policy programme broader than wireless broadband addressing the needs of various sectors supported by EU Public Policies.

- The RSPG recommends that the Commission, the Council and the European Parliament take note of specific strategic EU policies other than electronic communication services (ECS), for which spectrum needs should be addressed.

- The RSPG recommends that the identification of policy objectives must be consistent with other European policy objectives which tackle spectrum aspects. This consistency needs to be ensured by the actions proposed.

- The RSPG recommends maintaining a reference to the RSPP in the future framework Directive for electronic communications networks and services (Telecom Package).

The RSPG notes the envisaged review of the Telecoms package. RSPG observes that the current RSPP, in particular in its Articles 2.2 and 5, duplicates provisions already adopted in the Framework Directive or the Specific Directives.

- The RSPG recommends to clearly distinguishing between the review process and the content of the Telecoms Package (to be launched in 2016) and the revision of the RSPP.

The Radio Spectrum Decision

- The RSPG emphasizes that the Radio Spectrum Decision has been an efficient tool for the development of harmonised technical conditions in Europe, as recalled by the European Commission in its report on RSPP, by ensuring the right balance between more spectrum harmonisation and the need to take into account the variety of spectrum usages and needs amongst Member states.

Spectrum challenges for the next 5 years

Spectrum sharing

- The RSPG recommends that the efforts made by Member States at national level to ensure a more efficient usage of spectrum should be recognised and encouraged and be supported in the revised legal framework.
- The RSPG is of the view that the LSA regulatory approach is a possible tool to increase the efficient use of spectrum at national level and to enhanced efficiency.
- The RSPG invites the Member States:
  - to assess national solutions where needed to increase the efficient usage of spectrum.
  - to develop on a national basis new forms of sharing and to experiment with them.

Various sectors needs

The RSPG agreed that the next phase of the multiannual spectrum policy program should be more a generic programme addressing the spectrum needs of various sectors and not be mainly focussed on wireless broadband only

- The RSPG recommends that the Commission notes specific EU policies other than electronic communication services (ECS) as, at least, listed in the current RSPP for which spectrum needs should be studied and to invite the RSPG to provide Opinions.

- The RSPG plans to develop an Opinion on Internet of Things (IoT) (Machine 2 Machine, etc.) in its 2016 Work programme.

- The RSPG recommends that the European Commission, including its Directorate General JRC, consults the RSPG before developing specific sectoral policies using spectrum.

- In order to avoid the drafting of sectoral EU regulation before the proper spectrum studies have been done, the RSPG recommends that standardisation bodies (ETSI[11]) and CEPT are both involved early in the process via relevant EC mandates, as appropriate.

- In particular, before developing specifications, JRC should contribute to CEPT and ETSI. A mandate to CEPT should be developed in accordance with the Radio Spectrum Decision when there is a need to adopt harmonised technical conditions. In parallel, a standardisation request should be sent to ETSI.

Wireless Broadband including 5G

[11] ETSI is responsible for standards for radio spectrum access. CENELEC for EMC on non radio equipment and for safety

- The RSPG recommends that Member States and the European Commission, taking into utmost account the RSPG advice, should continue to develop new technical harmonisation measures for Electronic communications under the Radio Spectrum Decision even if the EU is facing diverging demands between EU Member States. National implementation may differ due to variations in demands or other nationally justified circumstances.

- The RSPG recommends that a new target should not be set in the new RSPP on how much spectrum should be made available for WBB and various sectors supported by the European Policies.

- The RSPG recommends maintaining the possibility to trade and lease the rights of spectrum use in the following frequency bands: 790-862 MHz, 880-915 MHz, 925-960 MHz, 1 710-1 785 MHz, 1 805-1 880 MHz, 1 920-1 980 MHz - 2 110-2 170 MHz, 2.5-2.69 GHz, and 3.4-3.8 GHz (see Article 6.8 of the current RSPP). The RSPG recommends adding any new ECS harmonised band to that list so that every new harmonised band can benefit from this regime.

The RSPG will continue its efforts and develop recommendations to support the development of 5 G.

- The RSPG recommends that already harmonised spectrum is reused to support the transition towards 5G.

- The RSPG recommends the following actions to prepare Europe for new spectrum for 5G above 6 GHz:
  - The RSPG should develop before the end of 2017 an Opinion addressing bands suitable for 5G above 6 GHz, focusing on those having the best potential for harmonisation. In addition, the RSPG analysis could address the challenges such as: spectrum sharing, network densification, usage conditions, policy implementation, incentive regulation practices.
  - The RSPG should develop common policy objectives on 5G for WRC-19.
  - The European Commission, taking due account of the RSPG Opinion, may consider issuing a mandate to CEPT for some frequency bands where 5G may be introduced in Europe, with the objectives of having a response for the timely adoption of a possible EC Decision on technical harmonisation of additional bands.

Public security purposes and Defence

- The RSPG recommends that Member States and the European Commission consider Common Security and Defence Policy issues using spectrum when developing harmonisation measures supporting EU Public Policies using spectrum.

- The RSPG recommends that a future RSPP or similar legislative proposal on spectrum policy shall take into account the right of the Member States, individually or collectively, to organise and use their spectrum for public order

and public security purposes and for defence[12]. This shall be maintained. Any common defence policy shall be recognised as well.

- The RSPG recommends that the European Commission should recognise national initiatives from Member States to increase efficient use of spectrum when using their spectrum for public order and public security purposes and for defence.

- The RSPG recommends that the European Commission should recognise confidentiality aspects relative to spectrum usage for public order and public security purposes or defence.

- The RSPG recommends that Member States continue to investigate sharing opportunities between spectrum usage for public order and public security purposes or defence and "commercial" spectrum use.

- The RSPG recommends that the European Commission consider the above recommendations when revising the RSPP. The RSPG confirms the need to maintain references to public security and defence as a national competence as mentioned in Article 1 of the RSPP and Article1-4 of the Radio Spectrum Decision.

Streamlined approach to the radio spectrum inventory

- The RSPG recommends that the efforts of the European Commission and Member States would be better targeted on frequency bands identified by RSPG as potential bands for WBB or other strategic applications taking into account current demand.

- The RSPG recommends:
  - that Article 9 of the RSPP and the Commission implementing Decision on the Spectrum Inventory[13] to be reviewed accordingly.
  - that the European Commission and the Member States adopt a method for assessing spectrum use and availability which reduces the administrative burden and costs for the Member States and the European Commission;
  - that EFIS is used to collect information on usage (applications) of those frequency bands of interest for ECS.
  - that specific frequency bands identified as potential bands for WBB or other strategic applications as recommended by the RSPG deliverables (RSPG Opinion) are a focus of this work.

External relations

[12] see TEU, Article 42-2 "The policy of the Union in accordance with this Section shall not prejudice the specific character of the security and defence policy of certain Member States and shall respect the obligations of certain Member States, which see their common defence realised in the North Atlantic Treaty Organisation (NATO), under the North Atlantic Treaty and be compatible with the common security and defence policy established within that framework

[13] Decision 2013/195/EU on defining the practical arrangements, uniform formats and a methodology in relation to the radio spectrum inventory established by Decision No 243/2012/EU of the European Parliament and of the Council establishing a multiannual radio spectrum policy programme.

The sincere cooperation between the European Commission and the Member States was successfully applied for several WRC cycles and should be maintained.

- The RSPG recommends that the RSPP focusses on the procedure according to the principles reiterated in Article 10.1(b) RSPP, as the most efficient solution for international negotiation.

- The RSPG recommends to apply the principle of sincere cooperation by involving the Member States in the decision making process of cooperation agreements with other regions covering spectrum aspects in order to ensure a coherent EU strategic policy regarding the development of 5G.

Interaction between Spectrum regulation and standardisation

- The RSPG recommends that the Commission co-ordinates closely the content & timing of mandates to CEPT under the Radio Spectrum Decision and standardisation requests to ETSI. This is particularly important in the context of standardisation Regulation 1025/2012. Otherwise ETSI harmonised standards may be developed at a different time to harmonised spectrum decisions causing problems with equipment and spectrum availability in a timely manner.

- The RSPG therefore supports the promotion of adequate receiver performance and recognizes that specifying relevant radio receiver parameters becomes increasingly necessary to facilitate the introduction of future systems, to extend sharing opportunities and to ensure efficient spectrum management.

- The RSPG recommends that the Member States should contribute to the development of harmonised standards under the Directive 2014/53/EU by the European standardisation bodies (i.e. ETSI) in order to ensure that adequate values for radio receiver parameters are specified.

The reference to the key pillars of European harmonization: cooperation between CEPT and ETSI and CENELEC shall be recalled in the RSPP.

Role of the RSPG

The RSPG acknowledges and supports the goals and key actions outlined in the ‘Europe 2020 Strategy’ and in ’A digital agenda for Europe’. The RSPG is continuing to support these policy objectives by providing further relevant recommendations to the European Commission. In its Communication to the European Parliament, the Council, the European economic and social Committee and the Committee of the Regions about “A Digital Single Market Strategy for Europe”, the European Commission identified the need for strengthen and enhanced role of bodies in which the Member States' authorities are themselves represented such as the RSPG. The RSPG will also engage itself in the implementation of the Digital Single Market Strategy.

The RSPG will recommend strategic actions and deliver opinions to the European Parliament and the Council, when needed, on any matter within the RSPG competence.

The RSPG already identified the benefits of enhancing its role:

- to support the implementation of the strategic objectives of the RSPP and of EU public policies when spectrum is used.
- to assist the European Parliament, the Council and the European Commission in relations, discussions and exchanges of views with third parties on spectrum issues
- to support dissemination of best practices on the implementation of regulatory principles supporting European spectrum harmonisation and on spectrum management.
- to deliver position papers on the communications, reports and draft regulations proposed by the European Commission on spectrum issues
- to advise the European Parliament and the Council, where needed.

1. Introduction

The Radio Spectrum Policy Group (RSPG) assists and advises the European 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 and reports, approved by consensus by its Members, highlight strategic spectrum issues submitted for advice to the European Commission, the European Parliament and/or the Council and more widely to policy makers. In these opinions and reports due consideration is taken of the interests of various sectors that need access to radio spectrum. Since its establishment, the RSPG has published a number of Opinions, reports and position papers to contribute to the development of a spectrum policy that can help to ensure the realisation of specific EU policy objectives[14].

This Opinion analyses the implementation of the current Multi-annual Radio Spectrum Policy Programme RSPP (Section 3) and draws some conclusions. It addresses key issues to be considered in the next/reviewed RSPP (Section 4). It highlights the role of the RSPG and the possible enhancement of this role (Section 5) and it contains recommendations in relation to the key issues identified for the next RSPP, listed in Section 6.

When drafting proposals on multiannual radio spectrum policy programmes to be submitted to the European Parliament and the Council, the European Commission shall take utmost account of the opinion of the RSPG (Article 8a III Framework Directive). **The RSPG invites the European Commission to take utmost account of the recommendations provided in this Opinion.**

2. Background

The first Radio Spectrum Policy Programme (RSPP) was established by Decision 2012/243/EU of the European Parliament and Council for the period 2012-15. In particular, the RSPG published in June 2010 an Opinion and relevant recommendations for the first RSPP[15] (see RSPG 10-330). It served as the basis for the European Commission to draft its initial proposal on RSPP which has been published on the 20 September 2010 and further negotiated with Council and European Parliament before its adoption on the 14 March 2012.

The RSPP focuses on strategic policy issues related to harmonisation of the use of spectrum to ensure the functioning of the internal market in the Union policy areas involving the use of spectrum, such as electronic communications, research,

[14] See Annex 1: RSPG contributions to EU Policy linked with Spectrum Policy.
[15] http://rspg-spectrum.eu/wp-content/uploads/2013/05/rspg10_330_rspp_opinion.pdf

technological development and space, transport, energy and audio-visual policies. It sets out policy orientations and objectives for the strategic planning and harmonisation of the use of spectrum in accordance with the Directives applicable to electronic communications networks and services. Those policy orientations and objectives refer to the availability and efficient use of the spectrum necessary for the establishment and functioning of the internal market.

Although being a policy programme, the current RSPP is a legally binding decision for Member States, not only with regard to concrete targeted actions (as for example the target dates in article 6) but in its entirety, which might exceed the appropriate legal frame for a policy programme.

As required by the RSPP, the European Commission published a report on measures adopted pursuant to this Decision by mid-April 2014[16]. The RSPG noted

- that the European Commission highlighted the key role of the Radio Spectrum Decision[17] in European harmonisation and listed the relevant harmonisation Decisions entering into force during the 2006-2013 period[18]. Since the publication of this report, additional EC Decisions have been adopted under the Radio Spectrum Decision on harmonised technical conditions for the use of terrestrial electronic communications services in the 3.4-3.8 GHz and the 1452-1492 MHz frequency bands[19], for programme making and special events (PMSE)[20] and for Ultra Wide Band technology[21].

- a lack of recognition of the RSPG contributions[22] supporting the implementation of the current RSPP and the EU Public Policies. The European Commission mainly refers to the RSPG Opinion on Licensed Shared access[23].

- that, concerning sharing issues,

    - the relevant harmonisation measures for Short Range Devices under the Radio Spectrum Decision (6th update of the relevant EC Decision on the basis of the CEPT response to EC mandate is planned next year) supports economies of scale for equipment manufacturers,

[16] Report from the Commission to the European Parliament and the Council on the implementation of the Radio Spectrum Policy Programme /COM/2014/0228 final
[17] Decision 676/2002/EC of the European Parliament and of the Council on a regulatory framework for radio spectrum policy in the European Community (Radio Spectrum Decision)
[18] https://ec.europa.eu/digital-agenda/en/news/radio-spectrum-decisions
[19] Commission Implementing Decision 2014/276/EU amending the Decision 2008/411/EC on the harmonisation of the 3400-3800 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Community - Commission Implementing Decision (EU) 2015/750 on the harmonisation of the 1452-1492 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Union
[20] Commission Implementing Decision 2014/641/EU on harmonised technical conditions of spectrum use by programme making and special events (PMSE) equipment
[21] Commission Implementing Decision 2014/702/EU amending Decision 2007/131/EC on allowing the use of the radio spectrum for equipment using ultra-wideband technology in a harmonised manner in the Community
[22] http://rspg-spectrum.eu/rspg-opinions-main-deliverables/
[23] RSPG Opinion in Licensed Shared Access - RSPG13-538 - 12 November 2013

- the RSPG Opinion on License Shared Access is being considered by the European Commission as a starting point for a more generic application of the concept.

Furthermore, it is recognised that harmonisation of spectrum for wireless broadband as well as for SRD facilitates the growth of Internet of Things[24].

- that the European Commission refers to the harmonised implementation of the "*800 MHz band*" (Article 6 para 4 of the RSPP) and to the large number of derogations requested by Member States[25]. However, the RSPG recalled that the number of derogations has been largely the results of migration issues from analogue to digital broadcasting and of cross border coordination issues with third countries outside the EU.

- that the RSPG provides its "good offices" in relation to intra-EU cross border coordination issues when requested. In future harmonisation of the 700 MHz band, the RSPG highlighted that the need for derogation, if any, should be without prejudice to constraints arising from cross-border frequency coordination with third countries.[26]

According to the current RSPP (Article 15), the European Commission shall conduct a review of the application of this Decision before the end of 2015.

3. Implementation of the current RSPP (2012-2015) and key developments

3.1 Contribution from the RSPG to the implementation of the current RSPP

Member States cooperate with each other and with the Commission in a transparent manner, in order to ensure the consistent application of the general regulatory principles across the Union and policy objectives.

Based on contributions from Member States, the RSPG published a number of deliverables (Opinions, Reports)[27] supporting these regulatory principles and their applications, in particular:

- on the review of spectrum use. This Opinion advises the European Commission and Member States on the issues which need to be addressed in undertaking a radio spectrum inventory of existing uses and in assessing demand (trends and future needs for spectrum);
- on Common Policy Objectives for WRC 15. This Opinion identifies the main themes of WRC-15 where there is an EU policy in place and identifies

[24] RSPG Report on Strategic Sectoral Spectrum Needs – RSPG13-540rev2 - 12 November 2013 and its section on Internet of Things

[25] 14 derogations have been granted https://ec.europa.eu/digital-agenda/en/news/texts-derogations

[26] RSPG Opinion on a long-term strategy on the future use of the UHF band – RSPG15-595 - 19 February 2015

[27] http://rspg-spectrum.eu/rspg-opinions-main-deliverables/

common policy objectives for the WRC 15 which has been established in accordance with the requirements of the principle of sincere cooperation between the Member States and the EU;

- on spectrum for Wireless Broadband (WBB). This Opinion reviews the spectrum in the range 400 MHz to 6 GHz to identify the feasibility of various frequency bands for use by WBB. There is also an associated report which looks at the prospects of key frequency bands for WBB in more detail;
- on strategic sectoral spectrum needs. This report examines the spectrum needs of the non-ECS sectors including Galileo, GMES, intelligent transport management systems (ITS), smart energy grids and smart meters, safety services and public protection and disaster relief (PPDR), scientific services and programme making and special events (PMSE) and how to address them.
- on Licensed Shared Access. This Opinion paves the way for an innovative regulatory approach in Europe and provides clarification on this regulatory approach and how to implement it at national level.
- on furthering Interference Management through exchange of regulatory best practices concerning regulation and/or standardisation. This report describes proposals to ensure an efficient interference management including an improved role of standardisation and highlights in particular the increasing role of receiver parameters in spectrum management.
- on a proposed spectrum coordination approach for broadcasting in the case of a reallocation of the 700 MHz band. This report examines the best approach to be considered in spectrum coordination between EU countries, in case of use of the 700 MHz frequency band for wireless broadband communications, and the related timeline.
- on the increasing wireless data traffic and wireless backhaul, the RSPG published a report in June 2015[28] which identifies in particular, new general backhaul requirements to meet enhanced broadband mobile demand, review the potential frequency bands and highlight some 5G challenges.

3.2 Main targeted actions from the current RSPP: Wireless Broadband and Spectrum Inventory

The RSPG notes that the first RSPP focused largely on targeted actions to support the roll out of high speed Wireless Broadband (Articles 3 and 6 of the RSPP) and the Radio Spectrum inventory (Article 9 of the RSPP).

As mentioned in the report from the European Commission on the implementation of the Radio Spectrum Policy Programme[29], objectives for roll out of the program are implemented by Decisions adopted by the Commission pursuant to the Radio Spectrum Decision[30].

[28] RSPG report RSPG 15-607 - 11 June 2015

[29] Report from the Commission to the European Parliament and the Council on the implementation of the Radio Spectrum Policy Programme /COM/2014/0228 final

[30] Listed under https://ec.europa.eu/digital-agenda/en/news/radio-spectrum-decisions; Only one Commission Communication was issued (on 'Promoting the shared use of radio spectrum resources in the internal market').

3.2.1 Wireless Broadband / Electronic Communications Services

3.2.1.1 Implementation Article 6: Spectrum needs for wireless broadband communications

Article 6 of the RSPP requires Member States, in cooperation with the Commission, to take all steps necessary to ensure that sufficient spectrum for coverage and capacity purposes is available within the Union, in order to enable the Union to have the fastest broadband speeds in the world. In particular, to promote wider availability of wireless broadband services for the benefit of citizens and consumers in the Union, Member States shall make the bands: 800 MHz, 900 MHz, 1800 MHz, 2.50- 2.69 GHz, 3.4-3.8 GHz available under the harmonised technical conditions described in the relevant EC Decisions under Radio Spectrum Decision (Article 6.2 of the RSPP).

800 MHz

- The implementation of the target to carry out the authorisation process in order to allow the use of the 800 MHz band for electronic communications services before 1 January 2013 (Article 6.4 of the RSPP) was the source of a number of derogations (12 derogations[31] have been granted). Member States encountered practical difficulties in meeting the dates set for making the band available, mainly due to the time necessary for organizing the switchover from analogue to digital broadcasting or migrating digital broadcasting below 790 MHz and/or negotiations with countries outside the EU.

- Moreover, the authorisation process was impacted by differences in market demands between EU countries, leading to difficulties in carrying out the authorisation process by the deadline set of 1 January 2013. The short timescale for implementing this Decision and the relevant target was also a challenge for standardisation[32]. In addition, the RSPG recognised that a formal derogation procedure was not the proper tool to address this issue.

2.5-2.69 GHz, 3.4-3.8 GHz

- The RSPG notes that some parts of the 2.6 GHz and the 3.4-3.8 GHz [33] bands are not actively used in a number of EU countries due to the differences in market demands and to the lack of availability of wireless technology on a large scale. The expected technology did not emerge in the timescale as initially foreseen. Current technology trends in these frequency bands and the standards that are now evolving should better respond to market demands. In addition, as highlighted in the Wireless Broadband coverage report[34] the technical conditions for the 3.4-3.8 GHz band might not in all cases have been prescriptive enough (there was no harmonised band plan) to provide sufficient regulatory certainty to manufacturers and operators .This triggered an action

[31] 14 derogations were requested and 12 granted

[32] Request from European Commission to ETSI and CENELEC for additional work on EMC and radio standardisation supporting the implementation of the 800 MHz Decision (ENTR/F5/DP/MM/entr.f.5 (2013-43164) – 13 February 2013

[33] See ECO report 03 – see for example: 2570-2620 MHz with 2,6 GHz harmonised bands

[34] RSPG report of Wireless Broadband Coverage (11-393) section VII

from the European Commission to update the harmonised technical conditions under the Radio Spectrum Decision.

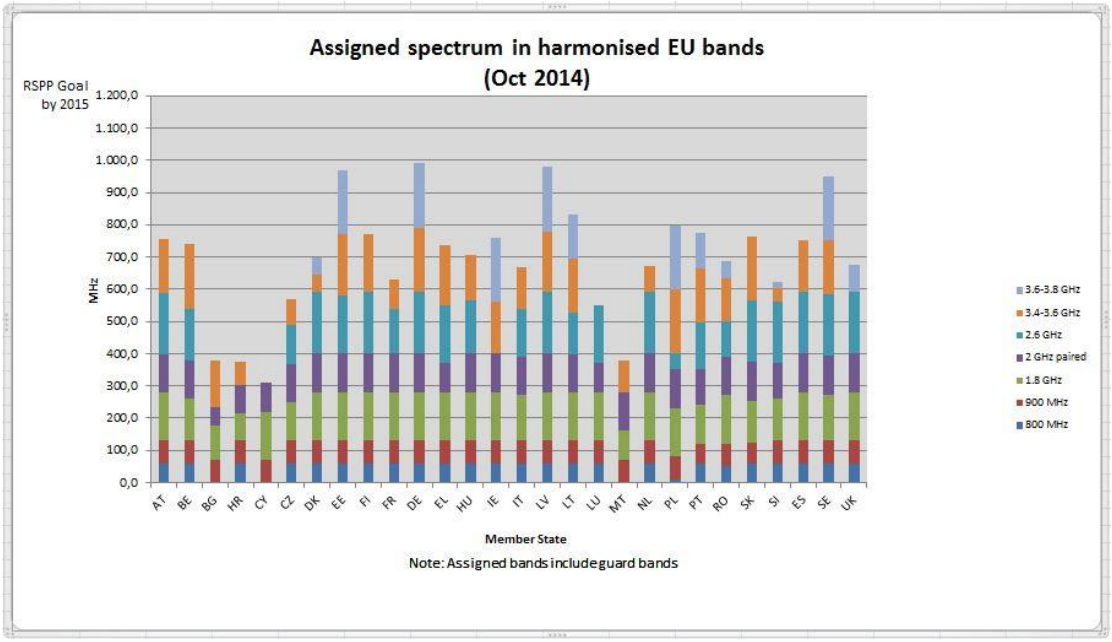
3.2.1.2 The "1200 MHz" objective

The RSPG Opinion 'on strategic challenges facing Europe in addressing the growing spectrum demand for wireless broadband' (RSPG 13-521 rev 1) provided practical guidance to the European Commission in assessing and dealing with the future demand for spectrum for wireless broadband in meeting the goals of the Digital Agenda and the "1200 MHz" policy objectives of the RSPP.

- Further to this Opinion, the European Commission issued mandates to CEPT on the 1452-1492 MHz and 2.3-2.4 GHz bands and on RLANs in the 5 GHz bands.

- Based on the analysis of spectrum supply and demand, the European Commission believes – according to its Report to the European Parliament and the Council on the Radio Spectrum Inventory (COM/2014/0536 final) – that, within the range 400 MHz-6 GHz, there is currently no need for additional spectrum harmonisation beyond the "1200 MHz" for wireless broadband.

The RSPG recognises the differences on assigned spectrum between Member States in harmonised bands and the need to maintain a focus on harmonisation of relevant frequency bands in order to achieve the European Public Policy objectives. According to the Spectrum inventory report, 30 % of the harmonised spectrum resources are not assigned for ECS (see table hereafter). These differences are resulting from various factors, in particular inter alia: the differences in national demands, in the characteristic of the band itself, in usages relative to public security and defense and in the need to protect existing services different from electronic communication.



Source European Commission[35]

The amount of expected 1260 MHz European harmonised spectrum for mobile cellular networks to support the growth of the wireless broadband market is higher than in other parts of the world (See Annex 3, Table 1). This includes 230 MHz which are foreseen for near/medium term for harmonisation. It has been pointed out that there is currently less harmonised spectrum below 2.5 GHz in Europe, compared to other regions. Future harmonised spectrum for WBB below 2.5 GHz (700 MHz, 1.5 GHz, 2.3 GHz) will reverse this situation. In addition, the existing harmonised spectrum in the band 3.4-3.8 GHz provides a large amount of spectrum which will ensure European leadership in providing harmonised spectrum. This European asset is a key enabler for the European Digital Economy, the single market and mobile broadband development. The Member States and the European Commission should continue to maintain this European leadership. The RSPG makes specific recommendations on Wireless Broadband later in this Opinion and on how to pave the way for future spectrum resources, in particular for 5 G.

As demonstrated in Table1 of Annex 3, the objective to identify "1200 MHz"; of suitable spectrum has been achieved taking into account near/medium term resources.

Furthermore, the RSPG observes the diverging views expressed on the validity of forecasts describing future developments in mobile data traffic. Reliable data are hard to find and are often based on assumptions of user density and user behaviour that can vary widely from one scenario/situation to another. Such forecasts may lead to tensions between those defending "their spectrum", those claiming the need for that spectrum and administrations.

The RSPG recommends that future discussions on spectrum management decisions avoid setting an arbitrary amount of spectrum to be harmonised. A less controversial starting point should be established.

3.2.2 Radio Spectrum Inventory

An inventory of existing spectrum use was proposed as part of the RSPP with the following objectives; to allow identification of frequency bands where efficiency of existing spectrum use could be improved, to help to identify frequency bands suitable for reallocation and sharing opportunities to support Union policies, to help to analyse various types of use of spectrum in order to help to identify frequency bands that could be (re)allocated to improve their efficient use, to promote innovation and to enhance competition (see Article 9 (1) RSPP).

- Article 9(2(b)) of the RSPP requires the European Commission to develop a methodology for the analysis of technology trends, future needs and demand for spectrum, in particular for those services which could operate in the frequency range from 400 MHz to 6 GHz. A Commission Implementing

[35] The table was created and is regularly updated by the Commission on the basis of EFIS database, additional info provided by MS (e.g. replies to Pilot), public info available on NRAs/Ministries' website and/or press.

Decision was adopted in 2013[36] and Member States contributed to the provision of data according to the requirements of this Decision.

- Article 9(4) of the RSPP requires the Commission to report to the European Parliament and the Council on the inventory, in particular on the above analysis. In addition, Article 6(5) of the RSPP requires the European Commission to report by 1 January 2015 on the basis of that analysis whether there is a need for additional frequency bands to be harmonised for wireless broadband. The European Commission delivered a report in September 2014.[37]

The RSPG responded to the European Commission's Report on the Radio Spectrum Inventory with a Position Paper[38].

The RSPG shares the objective of the European Commission to ensure that spectrum is used efficiently and therefore acknowledges the European Commission efforts to undertake a spectrum inventory, noting that it is a challenging and multi-faceted task.

The RSPG noted that such an inventory can only be one element in building up a picture of the demand for and supply of spectrum and the 'tool' devised by the European Commission Joint Research Centre is unlikely to provide a complete picture of spectrum use within a country when used in isolation.

The RSPG proposed that the ultimate objective, making the appropriate spectrum (in terms of propagation, bandwidth and other relevant characteristics) available for WBB services and other strategic applications within the range 400 MHz to 6 GHz, can best be achieved through actions targeted on specific bands.

The RSPG does not believe that the use of a data analysis tool on its own could properly reflect the technical, economical, operational, social and political complexity of the use of spectrum and of the possibility of sharing and migration.

In Section 4.4 of this Opinion, the RSPG addresses proposals for an efficient and cost-effective approach to respond to the policy objectives of the spectrum inventory.

3.3 Conclusion on the implementation of the first RSPP

Further to the assessment of the current RSPP, the RSPG considers that the objectives of the first RSPP have been largely fulfilled. In particular the 1200 MHz objective and the implementation of harmonisation measures to support the internal market as requested by the article 6 of the RSPP, are largely fulfilled. The European Commission published additional harmonisation measures and, taking into account

[36] Commission Decision 2013/195/EU; OJ L 113, 25.4.2013, p. 18-21.
[37] Report from the Commission to the European Parliament and the Council on the Radio Spectrum Inventory, COM(2014)536 final.
[38] RSPG14-587; http://rspg-spectrum.eu/wp-content/uploads/2013/05/RSPG14-587-RSPG-Response-Spectrum-Inventory.pdf

the recommendations from the RSPG, developed and initiated additional harmonisation measures.

As to the timing period covered by the RSPP, recital 10 of the current RSPP mentions that "*the RSPP should specify guiding principles and objectives up to 2015 and set out specific implementation initiatives*". Even if the Decision itself does not specify a time period for the RSPP, the current RSPP should at least be reviewed in order to take into account the lessons learned from the years gone by including the increasing role of the RSPG in support of EU policy, to identify new ambitious objectives for the coming years and to review the spectrum inventory approach. Furthermore, it would be appropriate to set new objectives and targeted actions for the years ahead.

Taking into account the foreseen review of the Telecom Framework to be launched in 2016 as expected by the European Commission in its Digital Market Strategy published on the 6 May 2015, two main options were considered during the drafting of the Opinion:

- **A focused and targeted RSPP without delay:** To develop a more focused and targeted RSPP for a short time frame, covering the period up to the implementation of the future Telecom package resulting from the review to be launched sometime in 2016. The RSPP anticipates that another RSPP will be developed further to the adoption of the reviewed Telecom package (somewhere between 2018/2020).

- **Targeted policy Decisions until a new RSPP after the finalisation of the Telecom review:** To wait until the end of the Telecom review before developing a new RSPP around 2019/2020 and to address particular targeted actions with individual Decision(s) from European Parliament and the Council.

In Section 4.2 of this Opinion some relevant single market issues are already identified for a revised RSPP. In addition, the RSPG will develop further recommendations regarding the Digital Single Market/Telecom Framework Review under its successor Work Program 2016[39].

The RSPG is the view that the current RSPP needs to be reviewed and is hereafter providing recommendations on objectives and targets to be included in a next/revised RSPP.

Nevertheless the European Commission is currently focusing on the review of the Telecom package, including spectrum issues, to be launch in 2016[40] and informed RSPG that no revision of the RSPP will take place in the short term[41].

[39] See slide presentation of the public briefing session held at the end of the 37th RSPG plenary meeting: http://rspg-spectrum.eu/wp-content/uploads/2015/06/RSPGdebrief110615.pdf
[40] See DSM strategy from EC – 6 May 2016
[41] See Chairman's report RSPG#37

4 Key issues to be considered by the next RSPP

4.1 General aspects

The current regulatory framework for electronic communications in the Union ("Telecommunications Package) sets a harmonised regulatory framework for the regulation of electronic communications services and networks, associated facilities and services and establishes a set of common regulatory principles. According to Article 8a of the Framework Directive, the European Commission, taking utmost account of the Opinion of the RSPG, may submit legislative proposals to the Council and the European Parliament for establishing multiannual radio spectrum policy programmes.

A review of this Package will be initiated by the European Commission and should provide a more appropriate basis for the further establishment of the Digital Internal Market.

The RSPG recommends continuously reviewing the multiannual policy programme (RSPP).

The RSPG recommends maintaining a reference to the RSPP in the future framework Directive for electronic communications networks and services (Telecom Package).

Moreover, the Radio Spectrum Decision (676/2002/EC) establishes a policy and legal framework in order to ensure coordination of policy approaches and, where appropriate, harmonised conditions with regard to the availability and efficient use of radio spectrum necessary for the establishment and functioning of the internal market in Community policy areas, such as electronic communications, transport and R & D. So, the focus of the Radio Spectrum Decision is on the establishment of common technical requirements for the use of a harmonised band.

The RSPG emphasises that the Radio Spectrum Decision has been an efficient tool for the development of harmonised technical conditions in Europe, as recalled by the European Commission in its report on RSPP[42], by ensuring the right balance between more spectrum harmonisation and the need to take into account the variety of spectrum usages and needs amongst Member states..

Nevertheless, it has to be noted that the Radio Spectrum Decision addresses technical harmonisation measures only and that further national implementation measures, such as re-allocation and authorisation, are needed to complete the objective of EU wide harmonisation.

[42] Report From the Commission to the European Parliament and the Council on the implementation of the Radio Spectrum Policy Programme (COM(14)228 final – 22.04.14)

The RSPG recommends that a streamlined and targeted RSPP as an action programme should be approved in a reasonable time frame.

The RSPG notes the envisaged review of the Telecoms package. RSPG observes that the current RSPP, in particular in its Articles 2.2 and 5, duplicates aspects already adopted in the Framework Directive or the Specific Directives. For the sake of clarity and legal certainty it is recommended that a clear distinction between the review process and the content of the Telecoms Package (to be launched in 2016) and the revision of the RSPP be made.

4.2 Single Market issues

Radio spectrum is a finite public resource that should be managed in an effective and efficient way. Spectrum management remains to a large extent within the competence of the Member States, but strategic planning, coordination and, where appropriate, harmonisation at EU level can help ensure that users get the full benefits of the internal market. Harmonisation of spectrum is not a goal in itself, but should be instrumental in the realisation of national and EU political objectives.

4.2.1 Spectrum Regulatory Framework

Spectrum is a strategic resource which facilitates the functioning of the internal market related to radio in several areas: communication, transport, research, etc. supporting EU Public Policies using spectrum.

The RSPG acknowledges and supports the goals and key actions outlined in the 'Europe 2020 Strategy' and in 'A digital agenda for Europe'. The RSPG is continuing to support these policy objectives by providing further relevant recommendations to the European Commission. The RSPG will also engage itself in the implementation of the Digital Single Market Strategy.

The RSPG will recommend strategic actions and deliver opinions to the European Parliament and the Council, when needed, on any matter within the RSPG competence.

T**he RSPP and the Radio Spectrum Decisions are the two pillars to develop harmonisation measures supporting implementation of a Digital Single Market.**

On the basis of RSPG Opinions, the European Commission may develop further policy initiatives and request CEPT, where appropriate, to propose harmonised technical conditions (under the Spectrum Decisions).

As recommended by the RSPG, in the last decade, EC Decisions for harmonisation of technical conditions have been published, all supporting the creation of the single market. Member States are required to implement these decisions according to market demand, utilising the harmonised technical conditions in a given time frame.

4.2.2 Technical harmonisation, technology and service neutrality

Spectrum harmonisation brings many potential benefits including: economies of scale in equipment manufacturing leading to competitive services and prices for consumers, and to greater technical efficiency and international mobility.

The RSPG supports technical harmonisation of the radio spectrum which leads to economies of scale for equipment and facilitates cross border use or when needed to reduce the complexity of cross border frequency coordination. The need for a common deadline for the implementation of the European technical harmonisation is justified.

The RSPG supports the promotion of the principle of technology and service neutrality in spectrum rights of use, where possible (see Article 2.1.e of the RSPP).

4.2.3 Making the band available

4.2.3.1 Deadline for making the band available in an EC implementing Decision and deadline for carrying out the authorisation process as requested by the RSPP

The RSPG analysed if there is a difference in practical effect between a deadline for making the band available in an EC implementing decision and in the deadline for carrying out the authorisation process as requested by the RSPP and hence whether deadlines for both are needed.

The European Commission has clarified in document RSCOM 08-84[43] the concept of "*making a band available*" in an EC implementing decision under Spectrum Decision: "*Making available a spectrum band* means *preparing all the necessary steps so that the authorisation process can start if a potential user so requests*". The European Commission specified the steps which are deemed necessary to fulfil this obligation, in particular:

1. "*Freeing the band if individual rights of use were granted for another application than the one foreseen by the harmonisation Decision to the extent that such rights would prevent any use of the band in line with the Decision"*
2. *"In case of general authorization, adopt "the national legal text which submits a category of applications to general authorization and includes the relevant technical conditions of use". In case of individual rights, launch "the public consultation on a possible limitation of the number of rights of use*"

The first bullet means that the designation of the band is non-exclusive provided that sharing is possible between the harmonised applications and other uses of the band. This has been explicitly recognised in the C band (3.4-3.8 GHz) where satellite earth stations will coexist with Wireless Broadband systems (see Decision 2014/276/EU amending the Decision 2008/411/EC).

The process of freeing the band raises legal challenges for Members states, when existing rights of use have previously been delivered in the harmonized frequencies.

[43] See RSCOM 08-84 : interpretation of implementation, https://circabc.europa.eu/sd/a/f83946f6-df06-48f6-8534-ba779e64f984/RSCOM08-84%20Implementation%20background%20Rev%201.doc

The RSPG is considering in other RSPG reports the issue of under-utilisation of spectrum[44].

According to the European Commission's clarification, Member States shall check whether there is market demand for the newly harmonised service. The RSPG noted that fulfilling the first obligation above may not be necessary if there is no market demand and as long as the Member States does not constrain the use of services in those Member States who have harmonised their spectrum according to EC Decision.

In addition, Article 6, paragraph 2. of the RSPP "requests Member states "*subject to market demand, to carry out the authorization process*" by 31 December 2012 for the specific bands there mentioned (i.e. 3.4-3.8 GHz, 2.5-2.69 GHz and 900-1800 MHz) . Moreover, article 6 paragraph 4 requires Member States "*by 1 January 2013, [to] carry out authorisation process (…)*" in the 800 MHz band.

In the cases where technical harmonisation decisions set out a deadline for designating and making the band available, RSPG noted that there seems to be no need to set an additional deadline for carrying out the authorisation process as the practical difference in terms of what Member States need to undertake is very limited. There is no reason to consider that if a Member State has freed the band and concluded positively about the market demand as a result of the public consultation carried out in application of its obligation under the EC implementing decision, this Member State will not carry out this authorisation process in due time.

Moreover, there are situations where a political decision from the Council and the European Parliament might be deemed necessary: for example as was the case for the 800 MHz (and possibly for the 700 MHz decision) where Member States might want to ensure a common deadline for assigning the band and ensuring the provision of services across the EU.

4.2.3.2 Criteria for deciding on a deadline on "*making the band available*"

The above criteria (see 4.2.3) need to be more deeply reviewed on a case by case basis (band by band) before deciding on whether or not a common deadline on making the band available is necessary:

- **Cross-border issues**: A lack of coordination in reallocation of the band could seriously limit in some cases the possibility of deployment of wireless broadband in a country if the neighbouring country continues to operate another application, for example in the 700 MHz and 800 MHz bands, justifying the migration of broadcasting below 694 MHz across the whole EU.

- **Economies of scale**: when it is demonstrated that the development of equipment able to operate in the band relies on the existence of a European-wide market. Technology will not simply emerge to support a few operator's

[44] See RSPG report on "Improving Broadband Coverage" (RSPG11-393), RSPG draft report on "Efficient use of spectrum and Spectrum Awards" (also posted for public consultation at: http://rspg-spectrum.eu/category/news/)

business plans. However, the need to ensure economies of scale should not preclude flexibility for an administration to maintain or introduce other services in a portion of the band.

- **The development of telecoms services provided EU wide**: if some services rely on the availability of a frequency band, this may justify making this band available across Europe in order to enable telecoms services that are provided EU wide. For example, the introduction of 5G services in frequency bands above 6 GHz during the next decade will require European harmonisation to support the pan-European implementation and provision of such services.

4.2.4 Demands could differ from country to country

There is a need to investigate the unintended effects of the harmonisation measures on principles such as effective use of spectrum. There are arguments for introducing greater flexibility in harmonisation measures to meet differences in demand for spectrum-based services. This applies both to wireless broadband services and to other services when the demand differs.

At present, EU harmonisation measures apply to all Member States to ensure that the greatest value of spectrum can be realised for citizens, consumers and industry. This harmonisation is based on setting conditions for all Member States based on the level of demand within the wider Union. However, **there may be occasions where spectrum is technically harmonised for wireless services[45] across all Member States and the spectrum is left unused or not heavily used because there is a lack of demand for the wireless services in some countries** (i.e. significant penetration by wired or alternative wireless platforms rendering further wireless services less important, variations in demand for services between Member States; size of national market).

Where demand for wireless services can already be satisfied within parts of harmonised frequency bands, then it can be questioned whether significant value is being added by mandating use of further harmonised bands in that Member State: it is already the case in some Member States where a harmonised ECS band is licensed but not used due to lack of demand. There are concerns about the risk of sterilising spectrum in some countries. Flexibility may be required in some Member States through variations in the implementation of Commission Decisions.

This is even more relevant when harmonised spectrum for public use is left unused and spectrum for (local) private or public electronic communications based on the use of standard equipment is unavailable.

Overall, policy makers should consider whether harmonisation should apply to a Member State where the above situation is occurring.

[45] See EC Decisions on Electronic Communication Services https://ec.europa.eu/digital-agenda/en/news/radio-spectrum-decisions

Where there is evidence that spectrum harmonisation would lead to spectrum underutilisation on a temporary and/or geographical basis a more nuanced approach should be taken. National implementation may differ due to variations in demands or other nationally justified circumstances. Nevertheless technical harmonisation measures should remain a goal.

For services other than electronic communications, similar considerations apply. The needs for spectrum for PPDR and PMSE may also differ between Member States due to differences in approach (e.g. PPDR via dedicated networks or via commercial networks or a mix of both, or as a result of a decision under national responsibility to organise and use spectrum for public security or defence purposes) or differences in demand (PMSE, PPDR,...) or both. Often, concerning PMSE, the solution would be to define spectrum tuning ranges within a band or bands for equipment based on common technical conditions, and allow the actual designation of spectrum to those services to differ between Member States depending on the required approach (e.g. depending on the size of the entertainment industry) in that country.

As mentioned previously by the RSPG[46], PPDR implementation (dedicated spectrum, hybrid, commercial services) remains a national issue. The European Commission in cooperation with the Member States shall seek to ensure that sufficient spectrum is made available to support the development of PPDR networks and services according to national needs.

The subsidiarity principle, which also requires that constant checks are made to verify that action at Union level is justified in light of the possibilities available at national, regional or local level, should be applied in respect of the question whether strict harmonisation measures are still required or whether some flexibility should be granted to the Member States.

4.2.5 Spectrum Sharing and coexistence between applications

Due to a more intensive usage of the spectrum by various sectors, it will become more and more difficult to identify frequency bands for exclusive usage. As a consequence, spectrum users will have to rely more and more on the shared use of bands. The RSPG has already published a number of Reports and Opinions on sharing issues:

- Opinion on Collective use of Spectrum
- Report and Opinion on Cognitive radio
- Report on CUS and other spectrum sharing approaches
- Opinion on Licensed Shared Access

Others innovative solutions could be implemented according to national needs. The RSPG recalls in the section hereafter that sharing will remain a strategic challenge for the coming years. These sharing issues are addressed at the national level in order to ensure a more efficient usage of the spectrum and providing more opportunities of spectrum usage in the context of the internal market.

[46] See RSPG report on sectoral needs RSPG 13-540rev2 - Nov 13

Moreover, to ensure coexistence between services either operating in adjacent bands or in the same bands, Member States shall develop additional coexistence solutions in the frequency bands 3.6-3.8 GHz, and between Mobile ECS and GSM-R to support implementation of the European harmonised framework and usage in the context of internal market

4.3 Spectrum challenges for the next 5 years

4.3.1 Spectrum sharing

As mentioned in the previous sections, Member states are already deeply involved in developing national sharing and coexistence solutions supporting the implementation of the Internal market by ensuring a more efficient usage of spectrum. Sharing tends to become the norm for the years ahead and national trials and efforts are expected to increase in size and number.

The RSPP already includes several elements on spectrum sharing. Article 4 of the RSPP asks Member States and the Commission to

- "*foster the collective use of the spectrum as well as the sharing use of spectrum*",
- "*foster the development of current and new technologies, for example, in cognitive radio, including those using 'white spaces'* "
- or more generally to "*enhance flexibility in the use of spectrum*".

As pointed by the Commission in its Report to the European Parliament and the Council on the spectrum inventory, several actions have already been initiated by Member States as well as by the Commission to respond to these objectives.

In terms of technological development, attention has been paid during the first RSPP period to geo-location databases used to assign "specific channels at specific locations to secondary users in such a way that the primary user of the band does not experience interference". The Commission has issued a mandate to ETSI on common formats for data exchange between devices and geo-location databases.

4.3.1.1 White space device in the TV spectrum

The example generally used to illustrate such technological solution is the white space device in the TV spectrum, which has been allowed by FCC in the United States and promoted by industry (e.g. Google and Microsoft), in various part of the world. In Europe, ETSI has adopted the harmonised standard ETSI EN 301 598 and CEPT has developed several technical reports detailing the technical conditions to protect broadcasting and PMSE (e.g. ECC Report 159) and ECC Report 236 on " Guidance for national implementation of regulatory framework for TV WSD using geolocation database".

There is clearly not much interest in Europe.

- One obvious reason might be that the UHF TV band has attracted strong interest from network operators and has been subject to an RSPG opinion, recommending the 700 MHz band to be allocated to mobile service and the broadcasting having to be migrated to the band 470-694 MHz. The RSPG Opinion also recognizes that, while the remaining band should remain available for DTT in the foreseeable future, some flexibility is recommended to allow some Member States to introduce WBB downlink (which includes LTE eMBMS or LTE broadcast) provided that such use is compatible with the broadcasting needs in the relevant Member State and does not constrain operations of DTT in neighbouring countries. It should also be noted that the PMSE application will have less spectrum within the UHF white spaces due to the consecutive mobile allocations in the 800 MHz and the 700 MHz bands and the future contraction of the DTT into the remaining UHF band. These evolutions may create some reluctance to introduce white space devices in the same band, as doing that would add complexity to the situation.

In addition, technological development and trials for white space devices have demonstrated that flexibility has an impact on the cost and complexity of the equipment, in particular the user equipment for which energy saving or sensitivity (i.e. coverage) is essential. White space device use in the UHF TV band means that the user equipment operation is adjacent to TV reception in the same area and technical conditions to protect TV reception whilst also avoiding large frequency separation has made it extremely difficult to use "standard" technology such as LTE or OFDM signals at a reasonable cost and complexity for the white space device.

4.3.1.2 Others solutions

However, cognitive radio systems, including geolocation-database solutions, are not limited to white space devices in the TV band. They may be deployed in all frequency ranges and in licensed or unlicensed spectrum.

It should be noted that some technological solutions and other mitigation techniques to facilitate spectrum sharing and coexistence with services may increase the equipment costs. In addition, increasing sharing complexity may also introduce administrative challenges.

Another example of the use of the white space, which is being studied by CEPT, is to allow cordless cameras to operate in the white space of the radars operating in the 2.7-2.9 GHz band. This is a "simplified" version of the TV white space case, since the cordless cameras are individually assigned, so that it is "only" necessary for the administration assigning the spectrum to have knowledge of the available radar white space (the channels in which the camera may operate in a given area / for a specific event). The European Commission granted a mandate to CEPT in July 2015 to study this.

A third example is the current sharing scheme between the fixed service and uncoordinated Earth stations of the fixed satellite service in the 17.7-19.7 GHz where earth stations used for internet access can operate on a non-protection basis from radio relays, which are intensively deployed by MNOs within Europe. In response to a request from the satellite operators, CEPT is studying the possibility to improve the

use by uncoordinated FSS Earth stations of the 18 GHz band through dynamic access solutions design to avoid interference from fixed links either based on the use of information on existing fixed links parameters (i.e. location, channel, power …) or on dynamic access to spectrum implemented in uncoordinated FSS terminal equipment. The specificity of the sharing scheme where the secondary user is only receiving enables a kind of "self-management" of the white space without the need for detailed regulation.

These are examples of pragmatic sharing approaches based on specific sharing solutions, including cognitive technologies.

In addition, sharing is sometimes based on more conventional approaches, such as power and duty cycle restrictions, as illustrated by the new CEPT soft-harmonisation for the use of the band 870-876 MHz and 915-921 MHz by Short Range Devices (SRDs) in addition to the harmonisation in the respective EC Decision on SRD.

4.3.1.3 Licensed Shared Access

Efficient usage of spectrum is to a large extent dependent on national spectrum decisions and usage and on technical conditions defined for that usage.

The RSPG recalled that one of the major recent regulatory developments in fostering sharing has been the development of the LSA regulatory approach (see RSPG Opinion on LSA). This regulatory approach aims to facilitates the introduction of radiocommunication systems operated by a limited number of licensees under an individual licensing regime in a frequency band already assigned or expected to be assigned to one or more incumbent users. The additional users are authorised to use the spectrum (or a part of the spectrum) in accordance with sharing rules included in their rights of use of spectrum, thereby allowing all the authorised users, including incumbents, to provide a certain Quality of Service. The RSPG recommended in its Opinion that Member States should actively promote discussions and define the possibilities for LSA.

This new regulatory concept is being supported by standardisation initiatives in ETSI and actions in CEPT and by various trial initiatives in Member States (Finland, The Netherlands, France, Lithuania, and Spain) in the band 2.3-2.4 GHz. This band is intended to be harmonised for WBB sharing with various applications ranging from aeronautical telemetry, to video cameras including usage for governmental purposes. As a consequence, the sharing scheme which will have to be put in place by individual administration will vary, from implementation of the LSA approach, to static or dynamic sharing, use of geolocation/database or geographical sharing/geographical restriction or others.

There is certainly still a long way to go before the LSA approach becomes successful. Mobile operators are still deploying in frequency bands in which they have exclusive rights and may be reluctant to evolve towards a new model where incumbents have rights to be protected, until they have a shortage of spectrum.

4.3.1.4 Sharing remains a strategic challenge

The RSPG recalls the strategic opportunities of usage of spectrum in a sharing environment (e.g. the EC Decision on SRD). This approach may imply complexity

and more stringent technical conditions limits. Coherence between spectrum regulation and harmonised standards is absolutely necessary.

A large development is foreseen within the sector of IoT and M2M, with potential for a significant sector contribution to socio economic benefits. Some of these services could be provided by Short Range Devices The typical low power and low duty cycle behaviour makes many applications suitable for non-specific SRD frequency bands. Other applications where for example longer range end-to-end connectivity is required may use commercial mobile networks, and many mobile operators are already offering services for M2M communications and control.

The RSPG is of the view that the LSA regulatory approach is a possible solution to increase the efficient use of spectrum at national level and solution to enhanced efficiency[47].

The RSPG invites the Member States to assess national solutions where needed to increase the efficient usage of spectrum and to develop on a national basis new form of sharing and to experiment them.

The RSPG recommends that the efforts made by Member States at national level to ensure a more efficient usage of spectrum should be recognised and encouraged and be supported in the revised legal framework.

4.3.2 Wireless Broadband including 5G

4.3.2.1 WBB harmonisation

In line with the RSPG Opinion on "Strategic Challenges facing Europe in addressing the Growing Spectrum Demand for Wireless Broadband"[48], the European Commission highlighted in its report on the spectrum inventory that the future harmonisation measures in the following frequency bands: 700 MHz, 1452-1492 MHz, 2.3-2.4 GHz will meet the current RSPP target of at least 1200 MHz spectrum for wireless broadband.

Taking those recommendations into account, the European Commission launched harmonisation initiatives under the Spectrum Decision for the bands 1452 -1492 MHz and 2.3 – 2.4 GHz (EC Decisions under discussion in RSCOM).

4.3.2.1.1 Deadlines for making a band available

Deadlines for making a band available are addressed on a case-by-case basis taken due account of the band specifics. The RSPG recommends maintaining such an approach.

[47] See art 4 RSPP
[48] RSPG 13-521

700 MHz

Some Member States already launched or plan to launch spectrum auctions in that band in a short time frame.

As mentioned within the RSPG Report 'on proposed spectrum coordination approach for broadcasting in the case of an allocation of the 700 MHz band', the interference from broadcasting stations into the base stations of the mobile service can reach 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. In consequence, the reallocation of the 700 MHz shall be done in a timely and coordinated manner. The RSPG published an Opinion on a long-term strategy on the future use of the UHF band addressing the issue and making relevant recommendations.

A timely, coordinated release should comprise the following steps:

- The adoption of the technical harmonisation measures at a European level
- The adoption and publication of the European release measure (i.e. a binding legislative measure such as in 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 noted that the European Commission intends to develop in 2016 under the Spectrum Decision the technical conditions for the harmonised usage of the 700 MHz by ECS on the basis of the CEPT report in response to an EC mandate.

As recommended in its Opinion of UHF band, the RSPG supports making the band 703-733 paired with 758-788 MHz 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**[49].

1452-1492 MHz

The RSPG mentioned previously that only a few countries have introduced digital sound broadcasting services using T-DAB or S-DAB in this band and, where these services have been introduced, take-up has been limited. Further to the recommendations from the RSPG (RSPG WBB Opinion) and on the basis of the response to the CEPT to an EC mandate under the Spectrum Decision, the European Commission adopted in May 2015 a Decision harmonising the technical conditions for the usage of the band 1452-1492 MHz[50].

[49] RSPG Opinion on « *the future of the UHF band* »
[50] EC Decision 2015/750

As mentioned in its Opinion on "Strategic Challenges facing Europe in addressing the Growing Spectrum Demand for Wireless Broadband", the ECC harmonisation measure for the band 1452-1492 MHz, designating it for MFCN Supplemental Downlink, earmarks that band as an early candidate for WBB.

According to the above mentioned criteria (see Section 4.2.3), concerning this frequency band, the following aspects need to considered;

By being the first area in the world to harmonise and designate this frequency band for supplemental downlink for mobile networks, Europe has taken the lead, stimulating industry standardization (in 3GPP) and terminals manufacturing. Countries outside Europe, such as Canada, Brazil, Australia, etc. are analysing this development and are also considering making this frequency band available for SDL mobile broadband.

The European success relies on the support from industry. Making the band available across Europe will establish a substantial market size. Industry made relevant efforts in standardisation to support this initiative. This effort should be pursued to create the relevant economy of scale with European market.

Cross border coordination is less relevant for this frequency band due to the current agreement in place which sets out procedures for cross-border coordination between T DAB and wireless broadband electronic communications services.

In that context on the basis of the relevant guidance from the European Commission (see RSCOM 08-84 and section 4.2.3.1), the RSPG considers that the current EC Decision adopted in 2015 requiring the Member States to make the band[51] 1452-1492 MHz available 6 months after the notification of the Decision is sufficient to achieve the above objectives.

2300-2400 MHz

The Radio Spectrum Policy Group recommended to the Commission in its Opinion on strategic challenges facing Europe in addressing the growing spectrum for wireless broadband the development of harmonised implementation measures and the adoption of complementary measures to promote shared use of the band between wireless broadband applications and other services for the 2.3-2.4GHz band based on LSA approach.

The RSPG notes that the use of the 2.3-2.4 GHz band varies among the Member States.

- In some EU countries the band is used for defence or security purposes including aeronautical telemetry and thus according to the Lisbon Treaty and the RSPP subject to autonomous national decision.
- In others, the band is also used for wireless cameras and video links as part of SAP or SAB applications. In other EU countries the band is also used for wireless

[51] See RSCOM 08-84 : interpretation of implementation

cameras and video links as well as for defence or security purposes and, in this regard, subject to autonomous national decision according to the Lisbon Treaty and the RSPP.

- In very few EU countries, this band is already available for wireless Broadband

According to the above mentioned criteria (see Section 4.2.3.2), concerning this frequency band, the following aspects need to considered

- There is no expected cross-border coordination difficulty with existing applications.
- Equipment, including terminals equipment, are already available since this band is already licensed, e.g. in India, China
- In addition, at this stage, this band is expected to provide extra-capacity to mobile operators which are dependent on the national market requirement.

In consequence, the RSPG considers that this frequency band should be addressed differently from the others band with the following approach.

- Any EU harmonisation measure shall not affect the continuation of current usages of that frequency band, including for public security and defence purposes by a Member State according to its national decision.
- All EU Member States should make the best endeavour to respond to the market demand by applying these national sharing conditions in coherence with various national demands in that band .
- The EU Member States are invited to inform the European Commission about the implementation of sharing conditions, including those based on the LSA regulatory approach, set up at national level and the resulting spectrum availability for Wireless Broadband under the harmonised technical conditions.

The RSPG recommends that Member States and the European Commission, taking into utmost account the RSPG advice, should continue to develop new technical harmonisation measures for Electronic communications under the Radio Spectrum Decision even if the EU is facing diverging demands between EU Member States. National implementation may differ due to variation in demands or other nationally justified circumstances.

4.3.2.1.2 Forecasts

The RSPG observes the diverging views expressed on the validity of forecasts describing future developments of mobile data traffic. Reliable data are hard to find and are based on assumptions of user density and user behaviour which can vary widely from one scenario to another.

The RSPG recommends that a new target should not be set in the new RSPP on how much spectrum should be made available for WBB and various sector supported by the European Policies.

4.3.2.2 WBB Coverage: Evolution of the coverage requirements and new approaches

One of today's political priority issues at national levels and in the EU is ubiquitous broadband connectivity. In some member states the focus is on geographical coverage (in particular outside urban areas), in other cases it is indoor coverage (in urban areas or shopping malls or underground parking's). Overall it is the ambition that every inhabitant of a Member State is always and anywhere connected to a fixed or mobile network.

Coverage issues could be addressed by incorporating obligations in the license conditions. In areas suffering from a lack of coverage, particular national initiatives through potential State funding could address the issue.

These evolving coverage requirements may also require novel approaches. In one example, within one Member State, the DECT guard-band has been made available for license exempt, low power use for indoor coverage. The available of this band for private mobile, low power networks gives the users the possibility to set up small mobile networks for own use. This could reduce cost for the user (smaller communications bills), but it also could provide more functionalities and better indoor coverage. There are various possibilities for the setting up and use of a private network. Femtocells could be used or pico-cells for the roll-out of a somewhat bigger network.

The traditional mobile operators may of course step in and try to improve the indoor coverage and indoor capacity, but there are also other business models:

- a cooperation between the property owner and the traditional MNO where the property owner takes care of the passive and active infrastructure, site access, the implementation, etc. and the operator provides an integrated solution towards his macro network.
- A dedicated company specialised in offering in building services and coverage, in cooperation with the property owner and the mobile operator.

This last solution (private network operators) may require access to frequency resources. WiFi is an option, but in some cases it could be desirable, where needed and, in case of lack of demand for ECS, to use spectrum which is part of the harmonised bands for ECS. So, spectrum access should also be considered for innovative, non-public solutions.

The RSPG further developed coverage obligations issues in its RSPG report on "improving Broadband Coverage"[52] and RSPG report on "Efficient Use of Spectrum and Spectrum Awards"[53].

4.3.2.3 Trading or leasing of Spectrum rights of use

Based on the RSPP, Member States allow the transfer or leasing of rights of use of spectrum in the harmonised bands 790-862 MHz, 880-915 MHz, 925-960 MHz, 1

[52] RSPG 11-393

[53] Currently in draft form and posted for public consultation at: http://rspg-spectrum.eu/category/news/

710-1 785 MHz, 1 805-1 880 MHz, 1 900-1 980 MHz, 2 010-2 025 MHz, 2 110-2 170 MHz, 2.5-2.69 GHz, and 3.4-3.8 GHz supporting the growth of wireless Electronic Communications services (ECS) (see Article 6 – RSPP)

These harmonised spectrum resources in Europe as described in Annex 3 - table 1- is a strategic asset of the European Digital Economy and Digital Single Market.

The scarcity of the spectrum could be a driver to stimulate the trading of spectrum rights of use. Nowadays, trading of spectrum rights of use is mainly taking place in case of mergers of mobile operators at national level or in case of take-overs.

A fragmented spectrum market and segmented markets between various mobile systems as is the case in the US, increases the scarcity of the spectrum and therefore the strategic interests in trading /leasing of spectrum rights to increase the spectrum footprint. This is a tool widely used (aggregation of regional rights to extend the national footprint) and explains the higher number of trading of spectrum rights in the US compared to Europe.

- The possibility to trade / lease the rights of use of ECS has less importance in a context of a stronger harmonised framework as it is in Europe where the authorisations are nationwide.

- When authorizations are granted on a regional / local level (case of 3.5 GHz FBWA in France, Ireland) the trading of spectrum rights can be used to make a national footprint (see RSPG position paper on Wireless Broadband[54] published in 2009).

In case of mergers or take-overs of mobile operators as is the trend in many European markets, the current framework makes the trading of the relevant rights of spectrum use possible, but is always subject to competition assessment at national level, and even, in some cases at European level.

- The harmonised technical conditions in Europe for terrestrial bands of the Electronic Communications networks and services 790-862 MHz, 880-915 MHz, 925-960 MHz, 1 710-1 785 MHz, 1 805-1 880 MHz, 1 900-1 980 MHz, 2 010-2 025 MHz, 2 110-2 170 MHz, 2.5-2.69 GHz, and 3.4-3.8 GHz increase these market opportunities. In that context, the common experience is that most transactions are done within the same use and with the same user conditions as the original assignment. The reason for turning down a spectrum transaction could be competition, (to make it more difficult for a potential competitor to establish) or transaction costs (the value of the frequencies is lower than the costs for the license holder to administer the leasing).

- In some cases, license holders give back their licenses to the authority and then another party immediately applies for licenses with other conditions in that frequency range.

[54] RSPG 09-284

The national approaches and legislation regarding trading/leasing of spectrum rights of use lightly differ from country to country. The current RSPP reiterates the provisions laid down in the Telecoms Framework that the transfer or leasing of rights of use is possible in the bands supporting the growth of wireless broadband.

The RSPG supports the extension of the article 6.8 of the RSPP to the future harmonised bands to the ECS: i.e. 700 MHz, 1452-1492 MHz and 2.3-2.4 GHz. To avoid any limitation on future ECS bands, the RSPG supports the reference to transfer and leasing to any ECS bands harmonised under the spectrum Decision.

The RSPG recommends maintaining the possibility to trade and lease the rights of spectrum use in the following frequency bands: 790-862 MHz, 880-915 MHz, 925-960 MHz, 1 710-1 785 MHz, 1 805-1 880 MHz, 1 920-1 980 MHz - 2 110-2 170 MHz, 2.5-2.69 GHz, and 3.4-3.8 GHz (see art 6.8 of the current RSPP).

The RSPG recommends adding any new ECS harmonised band to that list, so that every new harmonised band can benefit from this regime.

4.3.2.4 How to address 5 G challenges

The RSPG notes various current definitions of 5G. Furthermore, the RSPG notes that 5G deployment is envisaged from 2020 onwards (see 5G PPP – vision) and that various views are expressed on what we might expect from 5G within standardisation research and other fora (ITU-R, ETSI (Millimetre Wave Transmission Industry Specification Group, mWT ISG), Next Generation Mobile Networks (NGMN) Alliance, CEPT, etc.).

CEPT and ETSI cooperate closely in the development of relevant ECC decisions to address early operator/industry demands and 5G developments may trigger further harmonisation needs under the Spectrum Decision process in the years to come.

4.3.2.4.1 Research

The RSPG welcomes the European Research and development Initiatives and the European funding of the various research projects:[55]

- The RSPG notes the on-going work of the METIS (Mobile and wireless communications Enablers for Twenty-twenty Information Society) under the 7th Framework Programme. 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[56]. Others initiatives[57] are on-going.
- Within the Horizon 2020 Programme the 5G Partnership Project 5G PPP is set up between the EU and the private industry. The 5G PPP is expected to fund many projects over the next years. The 5G PPP will deliver solutions, architectures, technologies and standards for the ubiquitous next generation communication infrastructures of the coming decade.

The RSPG recognises the role of industry in defining the future requirements of 5G in particular in the international and the European standardisation process (e.g. in ITU and ETSI).

Bridging the gap between research and standardisation is a major challenge for the industry in order to provide to administrations relevant requirements for access to spectrum.

The RSPG notes that a long process for international standardisation and spectrum harmonisation is ongoing in ITU (5G as IMT 2020) and that industry needs a stable regulatory and spectrum framework for long term investment in any technology (see also 5 GPPP on 5G)[58].

4.3.2.4.2 The RSPG has already moved to support the development of 5 G

The RSPG has already started to address 5G spectrum challenges in its recent deliverables published in 2015:

- The RSPG Opinion on the future of the UHF band: within this Opinion the RSPG stated that it is too early to assess the effect of the current research projects on the ability of 5G networks to enable efficient delivery of broadcast services in the UHF band.

- The RSPG Opinion on WRC 15 invited Member States to support generally a future Agenda item addressing "*the spectrum needs for the fifth generation of mobile networks (commonly known as 5G) with the focus above 6 GHz*".

[55] €50 million were invested in research projects such as METIS, 5GNOW, iJOIN, TROPIC, Mobile Cloud Networking, COMBO, MOTO and PHYLAWS 5 GPP EU investment amounts to €700 million while private contribution is expected to reach at least €3.5 billion by 2020.
[56] METIS presented its work to RSPG#33 – February 2014
[57] See RSPG report on Wirelesss Backhaul
[58] See 5 GPPP vision brochure https://5g-ppp.eu/roadmaps/

- The RSPG report on awards and efficient usage of spectrum highlights how the current harmonised spectrum in Europe could respond to some early and future 5G challenges. Europe benefits from a strategic opportunity of already 1 GHz of harmonised spectrum and near the mid of the decade of 1200 MHz of harmonised spectrum to support further ECS evolution.

- The RSPG report on wireless backhaul recognises that some frequency bands that might be considered for 5G mobile radio access are currently used or targeted to be used for fixed links. Sufficient backhauling spectrum is needed to support the growth of 5G. The possible future usage of the same spectrum for access and backhauling appears as a major challenge and shall be addressed by the European Commission and Member States during the coming years.

The RSPG will continue its efforts and develop recommendations to support the development of 5 G

The RSPG recommends that already harmonised spectrum is reused to support the transition towards 5G.

4.3.2.4.3 Higher carrier frequencies and wide contiguous bandwidth

The RSPG notes that various frequency bands already suggested to respond to 5G above 6GHz/10 GHz[59] are already used by various applications (e.g. Satellites, Fixed links, in particular for providing wireless backhauling of mobile networks, Radars, Short Range Devices). These services/applications support EU policy objectives and are contributing also to the further development of the European economy and supporting several European policies. These incumbent usages have to be carefully considered and, where appropriate, managed, according to results of studies, with sharing and refarming issues. It will take a lot of time and effort to study all relevant aspects before possible identification of European bands for 5G can be considered. The same applies for designating additional frequency bands for 5G.

4.3.2.4.4 Regulatory framework

Traditionally WBB-networks are operated on the basis of individual authorisations with exclusive spectrum rights for each operator. More recently, the focus has shifted to spectrum sharing. Under the current regulatory framework and as encouraged by the RSPP, some infrastructure and spectrum sharing has been used in some Member States. Nevertheless it will become more and more difficult to find new bands for exclusive use for WBB. So, with the increasing need for spectrum for WBB and the current requirements, initial assumptions and expected demand for spectrum for future 5G networks, there is a need to look for new approaches, where appropriate.

For instance, it is not unlikely that 5G networks may use the same frequencies for both the access and the backhaul network. This trend will impact spectrum

[59] See METIS https://www.metis2020.com/

management and there may be a need to review current licence conditions for the backhaul and to develop new ones. Technology evolutions could drive these needs. Due to the inherent complexity of an access/backhaul convergence, relevant commercial development may appear later in the relevant frequency bands than in others 5 G bands targeting access only.

Another trend we already see for 4G networks is the possibility to enhance the capacity of networks by using frequency bands under general authorisation (i.e. LAA - Licensed Assisted Access – and LTE Unlicensed).

This trend will continue or even increase in 5G. Another possible difference between 5G compared and existing WBB networks is that operators could use or share the same frequencies. The higher frequency bands, for instance the 60 GHz band, are already used in many countries on a licensed exempt basis. Therefore, it is also likely that some of the 5G spectrum could be used under general authorisation (licence exempt), For small cells operating in high frequencies bands, with limited reach, the same frequencies could be used or shared (including under the LSA regulatory approach) by different 5G operators without causing Interference.

At the higher frequencies, radio waves do not propagate very well, limiting also the potential interference to other users to a relatively small geographical area. This would ease the sharing of spectrum with other applications or with stations in other countries. The propagation properties also make it unlikely that these higher frequencies are used over a whole territory when operators build their network. They are likely to be used in geographically limited areas providing very high bitrates to end users with very small cell sizes. LSA may provide a regulatory approach for facilitating spectrum sharing in that context. In particular, incumbent usage could continue to operate in the band, and usage could evolve over time as needed according to conditions defined under the national LSA sharing framework Other form of sharing could emerge during next years.

Given these different possibilities of use of spectrum in 5G-networks, there could be different approaches taken by individual Member States on how to regulate such spectrum use. To prepare for possible scenarios and to have better visibility on how things could be in future 5G networks, it would be beneficial to study how possible changes in the way frequencies are used could impact on regulation.

The RSPG recommends developing an RSPG report on possible approaches to 5G spectrum usage conditions. This analysis could also be part of the future RSPG Opinion on 5G as a guidance document for Member States.

4.3.2.4.5 Recommendations

The RSPG recommends the following actions to prepare Europe for new spectrum for 5G above 6 GHz:

- **The RSPG should develop before the end of 2017 an Opinion addressing bands suitable for 5G above 6 GHz, focusing on those having the best potential for harmonisation. In addition, the RSPG analysis could address the challenges such as spectrum sharing, network densification, usage conditions, policy implementation, incentive regulation practices.**
- **The RSPG should develop common policy objectives on 5G for WRC-19.**
- **The European Commission, taking due account of the RSPG opinion, may consider issuing a mandate to CEPT for some frequency bands where 5G may be introduced in Europe, with the objectives of having a response for the timely adoption of a possible EC Decision on technical harmonization of additional bands.**

4.3.3 Various EU Policies

4.3.3.1 Sectoral needs

Any future multiannual spectrum policy programme should address the foreseeable needs of all the sectors that are part of general or specific EU Policy Objectives and should identify concrete actions foreseen for those sectors at the time of its adoption.

The RSPG has provided recommendations in its Report[60] on Strategic Sectoral Spectrum Needs (other than electronic communication services), for which spectrum needs should be studied and protected, in particular:

- Galileo
- Global monitoring for environment and security (GMES)
- Intelligent transport management systems (ITS)
- Smart energy grids and smart meters
- Safety services and public protection and disaster relief (PPDR)
- Scientific services
- Programme making and special events (PMSE)
- The Internet of things (IoT) including RFIDs

Civil aeronautical and maritime communications and Professional mobile radio (PMR) are also interrelated with Union policies.

In its Opinion on "Wireless Broadband", the RSPG reported that Broadband via satellites is a solution that economically covers entire regions irrespective of their topography. It is thus a means towards achieving 100% geographical coverage including those areas that are remote or sparsely populated where there is no business case for other technologies. The RSPG opinion highlighted that Europe benefits from harmonized resources for broadband via satellite responding to the demands. As

[60] RSPG Report on Strategic sectoral spectrum needs (RSPG 13-540rev2)

mentioned in the RSPG report on sectoral needs, the ITU process is used for the satellite sector due to its ITU regional and worldwide footprint.

Since the publication of this report, in the context of IoT, the RSPG highlights the following issues:

- Current harmonised approach since years on short range devices supported in particular the growth of some forms of Internet of Things.
- The RSPG noted that spectrum requirements for connected vehicles (including vehicle to vehicle communications and (mobile) infrastructure to vehicles) – with a high demand for road infrastructure coverage is an emerging topic which needs to be carefully studied in order to identify EU objectives and initiatives and translate this into spectrum requirements .
- The RSPG recognises also that M2M may be used for a range of applications, including remote monitoring, asset management and stock control in warehouses, remote control, telemedicine and telemetry. It involves use of sensors, RFID, Wi-Fi or cellular links. This sector benefits from harmonised spectrum for Short Range Devices, Wi-Fi and mobile systems. The RSPG intends to address IoT (M2M, etc.) in its next Work programme.

The RSPG members agreed that the next phase of the multiannual spectrum policy program should be more a generic programme addressing the spectrum needs of various sectors and not be focussed on Wireless Broadband (WBB) only.

Thus, the RSPG recommends that the European Commission takes note of specific EU policies other than electronic communication services (ECS) as, at least, listed in the current RSPP for which spectrum needs should be studied and to invite the RSPG to provide Opinions.

4.3.3.2 Broadcasting in UHF band

The RSPG produced a first analysis in 2013 on the future evolution of the DTT platform, the convergence between terrestrial mobile and (evolved) DTT platforms, long-term DTT multiplex requirements (see Report on "Spectrum for Wireless Broadband and Broadcasting in the Frequency Range 400 MHz to 6 GHz[61]"). Then the RSPG published an Opinion on a long-term strategy on the future use of the UHF band (470-790 MHz) in the European Union[62]. This Opinion provides strategic recommendations on the future use of the UHF band including the 700 MHz band.

Concerning the 470-694 MHz frequency bands, the RSPG recommends that

- The 470-694 MHz band shall remain available for DTT in the foreseeable future, i.e. 2030

- Member States should have the flexibility to use the 470-694 MHz band for WBB downlink provided that such use is compatible with DTT needs in the

[61] See RSPG 13-522
[62] See RSPG 15-595

relevant Member States and does not create a constraint on the operations of DTT in neighbouring countries.

The RSPG invites the European Commission to allow national measures supporting the inclusion of more efficient DVB technologies in TV receivers and to clarify the status of possible national compensation with respect to State Aid rules.

4.3.3.3 PMSE

The RSPG made a careful analysis of the PMSE (Programme Making and Special Events applications) spectrum needs in its report on "sectoral needs". PMSE includes 'PMSE audio applications', as various forms of wireless microphones, and 'PMSE video applications', as mobile video cameras.

The spectrum needs for PMSE use vary greatly in time and location, depending of the scale of the event or programme and between countries and applications. Some spectrum resources are required for daily usage (e.g. theatres), while other usages are more temporary in nature. For planned events, suitable frequencies are identified on a case-by-case basis at national or local level using spectrum available for that time and location. For unplanned events, the spectrum resources need to be available without prior coordination. A reliable regulatory environment is a prerequisite to give users the confidence needed to make the necessary investments associated with new conditions.

The RSPG noted in its previous analysis that the overall trend is a steady increase of PMSE demand in most areas. In consequence, the spectrum demand considerations for future PMSE spectrum opportunities need consultation at the national level with subsequent national contribution to on-going studies in the CEPT/ECC. New spectrum opportunities for PMSE need also to be reflected in the harmonised European standards for PMSE equipment and this should be coordinated via the existing ETSI-CEPT coordination process.

- **'PMSE audio applications'**

Concerning 'PMSE audio applications', in its Opinion on the long term evolution of UHF band, the RSPG stressed that the UHF band, including the 700 MHz band, is also used in most Member states for PMSE applications, especially wireless microphones. 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.

The RSPG underlined in its Opinion that there is a need to have technically appropriate and sufficient spectrum for PMSE and considered that depending on the developments and requirements of such services, there could be a need to identify additional spectrum.

The RSPG mentioned that it is unlikely that the PMSE use can continue in the 700MHz sub-band if it is used for wireless broadband (WBB) delivery except eventually for the possible centre duplex gap arising from the channelling arrangement of the band for wireless broadband. It should be noted that a large

number of Member States are studying also the possibility to use the remaining spectrum in 700 MHz not used by WBB for PPDR usage subject to national decision.

The RSPG is of the opinion that increased attention should be given to these needs in a timely manner. As mentioned above the spectrum requirements for PMSE vary significantly between Member States but 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. Member States already involved in the allocation of 700 MHz to WBB have already started to study the relevant impact on PMSE and are developing appropriate measures during any transition period and for long term, including to make available WBB downlink capacities for audio PMSE on a shared basis.. The RSPG will continue to monitor the evolution of this sector. The PMSE community should be encouraged to develop more efficient spectrum usage and technologies towards digital ones.

- **'PMSE video applications'**

Concerning 'PMSE video applications', the RSPG noted that, in accordance with the recommendations from CEPT in response to the EC mandate on video cameras and as announced in the report on Spectrum Inventory, the European Commission granted a mandate to CEPT to "study and identify harmonised compatibility and sharing conditions for Video PMSE in the 2.7 – 2.9 GHz frequency band, taking into account radar use". As mentioned in the RSPG report on "sectoral needs", Member States are using various frequency bands for video links and cordless cameras as for example 2.3-2.4 GHz and/or 2.7-2.9 GHz.

Given the recent changes (i.e. 700 MHz, 2.6 GHz), the PMSE sector needs also certain forms of stability and security for investment. The RSPG will continue to carefully monitor the evolution of this sector in order to review, when appropriate, the strategic spectrum issues and long term vision and spectrum availability and to develop if needed relevant recommendations.

4.3.3.4 Coherence of various EU public policy objectives

A need for coherence across various EU public policy objectives has been identified by the RSPG when addressing spectrum needs and requests for harmonisation.

- The RSPG notes that the EC mandate on the RLAN in the 5 GHz bands addresses frequency bands where the EU has invested and supported initiatives:
  - Copernicus in the 5350-5470 MHz band,
  - ITS in the 5.9 GHz band.
  - In some Member States in the bands 5350-5470 MHz and 5725-5850 MHz various types of radars are operating for aeronautical and defence purposes in support of Common Security and Defence Policy (CSDP)[63].

- Any conflict between various EU public policy objectives should be identified and addressed at an early stage.

[63]See next section on „Public security purposes and Defence"

- ITS (intelligent transport systems) and TTT (Transport and Traffic Telematics), are both supported by EU public policies. Spectrum harmonisation is in place for ITS as well as for road tolling systems and standardisation has implemented efficient mitigation techniques. ECC Report 228 provides the outcome of the compatibility studies between the unwanted emissions of ITS in the 5.9 GHz band and road tolling systems in the 5.8 GHz band. However, those studies have so far neither been carried out for mobile TTT road side units nor for tachographs, which are expected in the future. Regulation (EU) No. 165/2014 on tachographs in road transport requires in Article 9 that all heavy vehicles in Europe be equipped with a tachograph communication module for compliance checking purposes. Tachographs are mandatory equipment in all European trucks for recording compliance with work and rest hour regulations. Research is being carried out in the European Commission Joint Research Centre (JRC). Nevertheless, this research should be submitted for standardisation in order to ensure public scrutiny, to develop an industry consensus and to allow conformity with Directive 2014/53/EU to be presumed. In addition any new demand to access spectrum shall be submitted to CEPT either by ETSI and/or by the administrations. Concerning the tachographs under study by JRC, no formal demand to access to spectrum has been submitted. Description of the systems and scenario of deployment are prerequisite to any demand of access to spectrum. The RSPG recommends that the proponents of the technology developed by JRC should propose to ETSI to develop a System Reference Document to allow necessary spectrum-sharing studies in CEPT to proceed in the most efficient manner. The future development/deployment of applications in the 5.8 GHz band, which is a worldwide SRD and ISM band, based on the spectrum regulation already in force (EC Decision 2006/771/EC and its latest amendment according to Decision 2013/752/EU) and its possible impact on new applications, such as eTachograph, should also be investigated.

    - The RSPG notes the coexistence issues between mobile networks and the railways communications systems (GSM-R). This is managed at national level. Nonetheless coexistence issues can occur even though both public and railway communication systems are fulfilling their respective obligations which has contributed, in some locations, to a delay the deployment and usage of GSM-R and mobile networks. ETSI and CEPT contributed actively to the process to clarify the solutions to be implemented at national level (coordination) and by the standardisation (GSM-R receivers). Efforts are on-going also at national level. Currently, the role of various entities has now been identified. In practice, the improvement of GSM R receivers is part of the solution which could solve a large amount of coexistence issues.

- The RSPG noted the Riga Declaration on Remotely Piloted Aircrafts (drones) „Framing the Future of Aviation" from 6 March 2015 as well as the EC Communication (COM(2014)207) on opening the Remotely Piloted Aircraft Systems (RPAS). In addition also the establishment of the European RPAS Steering Group (ERSG) by DG GROW and DG MOVE was highlighted. Within these documents as well as the related ones it is stated that the data link and/or the control and communication link is of high importance. However, until now no

information on requirements or spectrum availability has been forwarded to the relevant bodies within the European Commission (i.e. DG CNECT) or CEPT. Any new demand to access spectrum shall be submitted in due time to CEPT and to ETSI in order to find a suitable solution for the operation of RPAS.

- Furthermore, there is a certain need to clarify the legal scope of Regulation (EC) No 216/2008 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency (EASA Regulation) with regard to aeronautical communications equipment in relation to Directive 2014/53/EU on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC (RE-D) and the respective implications for spectrum management.

- Some activities under the Single Sky or other transport initiatives affecting spectrum use has been launched recently without consulting the spectrum management and radio standardisation makers.

The RSPG recommends that the identification of policy objectives must be consistent with other European policy objectives and initiatives which impact spectrum aspects. This consistency needs to be ensured by the actions proposed.

The RSPG recommends that the European Commission, including JRC, consults the RSPG for advice when developing specific sectoral policies using spectrum to assess the need.

In order to avoid the drafting of sectoral EU regulation before the proper spectrum studies have been done, the RSPG recommends that standardisation (ETSI[64]) and CEPT are both involved early in the process via relevant EC mandates, as appropriate.

The RSPG recommends that the European Commission, when developing specifications via its Directorate General JRC should contribute to CEPT and ETSI. A mandate to CEPT should be developed in accordance with the Spectrum Decision when there is a need to adopt harmonised technical conditions. In parallel, a standardisation request should be sent to ETSI and an ETSI System Reference Document should be developed to enable the necessary co-ordination between CEPT and ETSI to proceed in the most efficient manner.

4.3.3.5 Public security purposes and Defence

The current RSPP is without prejudice to the right of the Member States to organise and use their spectrum for public order and public security purposes and for defence (Recital (2) and Article 1 of the RSPP). The RSPG notes also that the Spectrum Decision in its Article 1-4, refers to the right of Member States to organise and use their radio spectrum for public order and public security purposes and defence.

[64] ETSI is responsible for standards for radio spectrum access. CENELEC for EMC on non radio equipment and for safety

In a rapidly changing world, the EU is faced with security challenges both in its immediate neighbourhood and further afield. The Common Security and Defence Policy (CSDP) enables the Union to take a leading role in peace-keeping operations, conflict prevention and in the strengthening of the international security. It is an integral part of the EU's comprehensive approach towards crisis management, drawing on civilian and military assets. Since 2003 the EU has launched some 30 peace missions and operations contributing to stabilisation and security in Europe and beyond. CSDP addresses also security and defence in Europe and the mutual assistance clause introduced by the Lisbon Treaty. The CSDP allows EU Member States to pool their resources and to build stronger defence capabilities to act rapidly and effectively.

Defence capabilities are critically driven on sufficient access to radio spectrum that constitutes a key enabler for proper functioning of military equipment and for the robustness and effectiveness of operations. Radio spectrum is required not only during operations, but is also essential for keeping high readiness and for the training of European nations' forces.

Militarily used frequency bands are already shared and used nationally by both civil and military wherever possible to a wide extent.

During the drafting of this Opinion, the European Defence Agency highlighted some strategic issues to be taken into due consideration when developing the European Spectrum Policy, in particular, the necessary availability of spectrum for military utilisation within the framework of CSDP, or within the framework of the UN, NATO or others coalitions and the support to the current RSPP (art.1 and recital 2).

The RSPG noted that NATO updated the NJFA (civil-military NATO Joint Frequency Agreement). This deliverable exists since the 1980s and seeks recognition of military use of radio spectrum by the civil authorities of the signatory nations of the North Atlantic Treaty in Europe. The NJFA does not cover extended military requirements and the conditions of spectrum use during states of emergency and in times of crisis or war. NJFA is regularly used by the Member States of the Alliance or by the same representatives of NATO Headquarters to highlight the existence and importance of military uses in certain bands, including possible future use. For example, the European Commission adopted a mandate to CEPT "*to study and identify harmonised compatibility and sharing conditions for Video PMSE in the 2.7 – 2.9 GHz frequency band, taking into account radar use*"[65] which refers to NJFA reference and essential NATO radars usage in the 2.7-2.9 GHz.

In practice, Member States interact with their national Defence Sector at the national level when developing contributions to the RSPG. During a Workshop with the defence sector[66], the RSPG identified the need to better anticipate the evolution in spectrum usage from various sectors, in particular due to the high degree of spectrum sharing between the defence sector and other stakeholders[67]. This should be done via

[65] See minutes and output documents of RSCOM#52
[66] see RSPG 14-158
[67] 2,7-2,9 GHz : Radars from Defence are using the same spectrum resources as civil aviation radars

the national reviews of spectrum usage and needs and by the RSPG itself when developing recommendations on other sectoral needs (see above).

The RSPG recommends that Member States and the European Commission consider Common Security and Defence Policy [68] issues using spectrum when developing harmonisation measures supporting EU Public Policies using spectrum.

The RSPG recommends that a future RSPP or similar legislative proposal on spectrum policy shall take in account the right of the Member States, individually or collectively, to organise and use their spectrum for public order and public security purposes and for defence[69]. This shall be maintained. Any common Defence policy shall be recognised as well.

The RSPG recommends that the European Commission should recognise national initiatives from Member States to increase efficient use of spectrum when using their spectrum for public order and public security purposes and for defence.

The RSPG recommends that the European Commission should recognise confidentiality aspects relative to spectrum usage for public order and public security purposes or Defence.

The RSPG recommends that Member States continue to investigate sharing opportunities between spectrum usage for public order and public security purposes or Defence and "commercial" spectrum use.

The RSPG recommends that the European Commission consider the above recommendations when revising the RSPP. The RSPG confirms the need to maintain references to Public security and Defence as a national competence as mentioned in art 1 of the RSPP and art.1 of the Spectrum Decision.

4.4 Streamlined approach to spectrum inventory

Article 9(2(b)) of the RSPP requires the European Commission to develop a methodology for the analysis of technology trends, future needs and demand for spectrum, in particular for those services which could operate in the frequency range from 400 MHz to 6 GHz. As discussed in Section 3, for the purpose of ensuring the uniform implementation of Article 9 (1) of the RSPP, on 23 April 2013 the European Commission issued an Implementing Decision[70] addressing the process to be adopted by Member States in delivering the radio spectrum inventory.

[68] Common Security and Defence Policy

[69] see TEU, Article 42-2 "The policy of the Union in accordance with this Section shall not prejudice the specific character of the security and defence policy of certain Member States and shall respect the obligations of certain Member States, which see their common defence realised in the North Atlantic Treaty Organisation (NATO), under the North Atlantic Treaty and be compatible with the common security and defence policy established within that framework

[70] Commission Decision 2013/195/EU: Implementing Decision defining the practical arrangements, uniform formats and a methodology in relation to the radio spectrum inventory established by Decision No 243/2012/EU of the European Parliament and of the Council establishing a multiannual radio spectrum policy programme

In this context, two RSPG deliverables of particular relevance should be noted:

- the **RSPG Report on strategic sectoral spectrum needs** describes in a comprehensive way the technology trends, challenges and future demand of spectrum of other applications such as Galileo, GMES/Copernicus, intelligent transport management systems (ITS), smart energy grids and smart meters, safety services and public protection and disaster relief (PPDR), and scientific services.

- In the **RSPG Opinion on WBB** various frequency bands in the range 400 MHz to 6 GHz are identified as *unsuitable* as candidate bands for WBB (see Annex 1 of the Opinion), with other bands clearly identified as already in use or available, or with potential in the near or medium terms and one band (470-694 MHz currently used for DTT) identified as only having potential in a very long timeframe.

The RSPG is of the view that such an inventory (identifying existing uses of spectrum) can be only one element in building up a picture of the demand for and supply of spectrum and an inventory alone is unlikely to provide a complete picture of spectrum use within a country.

It should also be noted that providing access to information on spectrum usage has presented particular challenges to some Member States, including the format and availability of data and issues surrounding confidentiality of such information.

Therefore, rather than relying on an inventory to identify potential bands:

- **the RSPG recommends that the efforts of the European Commission and Member States would be better targeted on frequency bands identified by the RSPG as potential bands for WBB or other strategic applications taking into account current demand.**

Issues such as timely availability of those bands, compatibility with other services, etc., could then be addressed. In this way the overall objective could be achieved more effectively and efficiently to the benefit of all stakeholders.

The RSPG recommends:

- **that Article 9 of the RSPP and the EC Implementing Decision on the Spectrum Inventory be reviewed accordingly;**
- **that the European Commission and the Member States adopt a method for assessing spectrum use and availability which reduces the administrative burden and costs for the Member States and the European Commission;**
- **that EFIS is used to collect information on usage (applications) of those frequency bands of interest for ECS;**
- **that specific frequency bands identified as potential bands for WBB or other strategic applications as recommended by the RSPG deliverables (RSPG Opinion) are a focus of this work.**

4.5 External relations

4.5.1 ITU-World Radiocommunication Conferences (WRC)

The legal basis for the Union to act internationally, such as in WRCs, is provided in Article 3.2 TFEU[71] ("The Union shall also have exclusive competence for the conclusion of an international agreement when its conclusion is provided for in a legislative act of the Union or is necessary to enable the Union to exercise its internal competence, or in so far as its conclusion may affect common rules or alter their scope.") in conjunction with Article 218.9 TFEU ("The Council, on a proposal from the European Commission or the High Representative of the Union for Foreign Affairs and Security Policy, shall adopt a decision (…) establishing the positions to be adopted on the Union's behalf in a body set up by an agreement, when that body is called upon to adopt acts having legal effects (…).").

The RSPG notes that Article 10 of the RSPP reiterates the content of these provisions of the primary law.

Since the Radio Regulations relate to the right of individual administrations to access spectrum and not to harmonised technical conditions within the EU, the modifications of the Radio Regulations cannot affect the EU common rules on spectrum. Therefore, the common policy objectives have to be established in accordance with the requirements of the principle of sincere cooperation, as pointed out in the RSPP, Article 10.1 (b) RSPP[72].

The RSPG recalls its various Opinions on Common Policy Objectives for WRCs, most recently the RSPG Opinion on Common Policy Objectives for WRC-15[73]. The aim of those Opinions is to

- assist the European Commission in proposing Common Policy Objectives in an EC communication;
- offer guidance to Member States in developing European Common Proposals (ECPs) within CEPT;
- identify actions for the European Commission in order to provide political support to promote common policy objectives in regular meetings between EU and non-EU countries.

This sincere cooperation between the European Commission and the Member States was successfully applied for several WRC cycles and should be maintained, i.e. with reference only to **the procedure according to the principles reiterated in Article 10.1(b) RSPP, as the most efficient solution for international negotiation.**

4.5.2 International agreements covering Spectrum

A recent joint declaration from the European Commission and the South Korea's Minister of Science on strategic cooperation on ICT and on 5G[74] is covering specific

[71] Treaty on the Functioning of the European Union
[72] See RSPG Opinions on Common Policy Objectives for WRC 15 (RSPG 15-593)
[73] See RSPG 15-593 Final,

international spectrum issues, inter alia "*To cooperate to facilitate the identification of globally harmonised radio frequency band to meet the additional spectrum requirements for 5G, and to reinforce cooperation in the context of ITU and WRC*."

A possible cooperation between China and EU on 5G[75] will be considered during the next months: "*China-EU believes that Europe and China should make progress to Cooperate to facilitate the identification of globally harmonised radio frequency band to meet the additional spectrum requirements for 5G, reinforcing cooperation in the context of ITU and World Radio Conference (WRC).*"

The European Commission and the Commission for Research, Science and Innovation from Japan step up cooperation on 5G mobile technology and strengthen research and innovation collaboration.[76] "*The agreement will allow EU and Japan to work towards a common understanding and standards of 5G, identify new harmonised radio band frequencies for 5G spectrum and cooperate on future 5G applications in areas like connected cars or e-health.*"

The RSPG recommends to apply the principle of sincere cooperation by involving the Member States in the decision making process of agreements covering spectrum aspects in order to ensure a coherent EU strategic policy, in particular, regarding the development of 5G.

4.6 Interaction between Spectrum regulation and standardisation

The RSPP notes that "strategic planning and harmonisation of spectrum use at Union level should enhance the internal market for wireless electronic communications services and equipment as well as other Union policies requiring spectrum use… (recital (5))" and the "harmonisation of appropriate spectrum use can also be beneficial to the quality of the services and is essential in order to create economies of scale, lowering both the cost of deploying wireless networks and the cost of wireless devices for consumers" (recital 6)). These policy objectives are also served by equipment regulation, e.g. the existing Radio & Telecommunication Equipment Directive 1999/5/EC which is being replaced by the recently-adopted Radio Equipment Directive 2014/53/EU (to be applied in the EU from 13 June 2016).

T**he RSPG believes that spectrum regulation and equipment regulation supported by standardisation are complementary mechanisms that need to be co-ordinated closely in order to meet their joint objectives effectively.**

The RSPG provided recommendations on the interactions between Spectrum regulation and standardisation in the RSPG Opinion on "Streamlining the Regulatory Environment"[77]. During the last year, the RSPG analysed the evolution of the

[74] http://europa.eu/rapid/press-release_IP-14-680_en.htm?locale=FR
[75] see http://www.chinaeu.eu/china-and-the-eu-to-engage-in-strategic-cooperation-to-pull-5g-development/ and https://ec.europa.eu/digital-agenda/en/news/5g-european-research-and-vision-showcased-blueprint-showcased-mobile-world-congress-2015
[76] See 1P-15-5069-EN europa.eu/rapid/press-release_IP-15-5069_en.pdf
[77] See RSPG 08-146

European standardisation and analysed the various interactions with efficient interference management. It demonstrated that Member States and the European Commission cooperated successfully in achieving the policy goal *"to avoid harmful interference or disturbance by other radio or non-radio devices, inter alia, by facilitating the development of standards which contribute to the efficient use of spectrum, and by increasing immunity of receivers to interference, taking particular account of the cumulative impact of the increasing volumes and density of radio devices and applications"*

Published before the adoption of the Directive 2014/53/EU, the RSPG Report on Interference management (RSPG 13-527 rev 1) mainly focuses on:

- Identification of the basic principles and approaches of efficient Interference Management as well as Member States' best practices in managing interference taking into account increasingly flexible conditions of use in spectrum rights;
- Examination through the analysis of best practices, what role EU spectrum policy and specifically the R&TTE and EMC Directives, could play for improved receiver standards;
- Ways to improve receiver standards within the current ETSI, CENELEC and EU processes as well as to indicate how the European institutions could facilitate such a breakthrough; It highlights the key role of receivers in spectrum regulation and harmonised standards

The Radio Equipment Directive (Directive 2014/53/EU) was published in May 2014 and is required to be implemented by all Member States by 13 June 2016. Compared to the R&TTE Directive, its scope includes, in particular, receivers (including Broadcast receivers), as recommended by the RSPG report.

Directive 2014/53/EU regulates the requirements that products must meet in order to be placed on the market and put into service (without prejudice to conditions attached to authorisations). The usual way for manufacturers to comply with these requirements is to apply Harmonised Standards developed by ETSI on radio and EMC issues for radio equipment and by CENELEC on safety.

Directive 2014/53/EU relies for its operation on Harmonised Standards which enable the conformity of equipment with the essential requirements to be presumed. **ETSI Harmonised Standards and CEPT deliverables are developed according to the CEPT-ETSI MoU, which ensures the necessary timing and technical coherence between spectrum regulations and Harmonised Standards.**

Harmonised Standards are developed in response to Standardisation Requests issued under Regulation 1025/2012, which has replaced the system of mandates under 98/34/EC. In order to maintain the coherence of the regulatory framework and to enable it to achieve its policy objectives, it is important to establish coherence on the timescales & content of mandates between Standardisation requests and those issued to the CEPT under the Radio Spectrum Decision

The RSPG recommends that the European Commission co-ordinates closely the content & timing of mandates to CEPT under the Radio Spectrum Decision and standardisation requests to ETSI. This is particularly important in the context of

Standardisation Regulation 1025/2012. Otherwise ETSI harmonised standards may be developed at a different time to harmonised spectrum decisions causing problem with equipment and spectrum availability in a timely manner.

The Directive is implemented at national level by Member States, in particular by Market Surveillance Authorities. The Commission (DG GROWTH) is assisted, in particular, by the Telecommunications Conformity Assessment and Market Surveillance (TCAM) Committee in its work related to the operation of the Directive.

Inclusion of receiver performance specifications in spectrum planning and regulation serve to promote more efficient utilization of the spectrum and create opportunities for new and additional use of radio communications. Nevertheless this framework is only applicable in Europe and our industry is subject to more administrative requirements to put equipment on the market in other regions.

The RSPG therefore supports the promotion of adequate receiver performance and recognizes that specifying relevant radio receiver parameters becomes increasingly necessary to facilitate the introduction of future systems, to extend sharing opportunities and to ensure efficient spectrum management.

The RSPG recommends that the Member States should contribute to the development of harmonised standards under the Directive 2014/53/EU by the European standardisation bodies (i.e. ETSI) in order to ensure that adequate values for radio receiver parameters are specified.

Experience has shown that new uses of radio spectrum could modify the EMC environment and cause disturbance to non-radio equipment. In such cases time needs to be allowed for revised EMC standards to be developed and legacy equipment reaching the end of its operational life if unacceptable disturbances to existing equipment are not to be generated.

The reference to the key pillars of European harmonisation, cooperation between CEPT and ETSI and CENELEC shall be recalled in the RSPP.

5 Role of the RSPG to support EU Policy Objectives

The RSPG develops Opinions and Reports in a forward-looking manner on technological, market and regulatory developments relating to the use of radio spectrum with all radio spectrum users involved both commercial and non-commercial sectors. RSPG Opinions and Reports, approved by consensus by Member States, highlight strategic spectrum issues to European Commission, the European Parliament and the Council and more widely to policy makers. They should be taken also in due consideration by spectrum managers from various sectors.

During the last decade, the RSPG has played a major role in supporting EU Policy Objectives in a number of domains:

- RSPP 2012-15
- WRC issues
- UHF band including 800 MHz, 700MHz bands

- Wireless Broadband
- Sharing issues
- Spectrum review
- Improvement of European Framework
- Cross border issues
- strategic spectrum issues from various sectors.

Since the publication of the RSPP, the RSPG has published a number of deliverables supporting the implementation of the objectives of the strategic plan, including Wireless Broadband, International frequency coordination, spectrum inventory, sectoral needs, and innovation in sharing (see Annex 2).

The RSPG updated its work programme in the beginning of 2014 addressing strategic spectrum issues paving the way for future developments and with a forward looking approach: A Long-term strategy on the future of the UHF band in the EU, Efficient awards and use of the spectrum bands harmonised for Electronic Communications Services, WRC-15 preparation (common policy objectives for WRC-15), "Good offices" to assist in bilateral negotiations between EU countries, The review of the Radio Spectrum Policy Programme, Spectrum issues on wireless backhaul.[78]

These activities during the last year demonstrate that the RSPG is deeply involved not only in the preparation of an RSPP but also in its implementation.[79]

Moreover, the RSPG develops and disseminates among Spectrum Management authorities and NRAs best practices, such as common approaches, methodologies or guidelines on the implementation of the Spectrum management to support implementation of EU public policies (Reports on Interference management, efficient use of spectrum and spectrum awards).

A comprehensive overview about the RSPG is provided in the RSPG Manifesto.[80]

The RSPG is the competent body to assist and advise the European Commission, the European Parliament and/or the Council on radio spectrum policy issues.[81] In its Communication to the European Parliament, the Council, the European economic and social Committee and the Committee of the Regions about "A Digital Single Market Strategy for Europe" the European Commission identified the need for strengthen and enhanced role of bodies in which the Member States' authorities are themselves represented such as the RSPG[82].

[78] see RSPG Work Program 2014 and beyond; http://rspg-spectrum.eu/wp-content/uploads/2013/05/RSPG14-553-RSPG-WorkProgramme-2014rev1.pdf
[79] Annex 2 lists the respective RSPG deliverables.
[80] http://rspg-spectrum.eu/wp-content/uploads/2015/06/RSPG15-615-Manifesto.pdf
[81] Article 2 of Commission Decision of 16 December 2009 amending Decision 2002/622/EC establishing a Radio Spectrum Policy Group; http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32009D0978
[82] COM(2015) 192 final, page 10; http://ec.europa.eu/priorities/digital-single-market/docs/dsm-communication_en.pdf

The RSPG will contribute to the strengthening of the institutional framework and will develop an Opinion on the Digital Single Market – Telecoms Regulatory Framework issues including on how to enhance its role.[83]

The RSPG already identified the benefits of enhancing its role:

- **to support of implementation of the strategic objectives of the RSPP and of EU public policies when spectrum is used.**
- **to assist the European Parliament, the Council, the European Commission in relations, discussions and exchanges of views with third parties on spectrum issues**
- **to support dissemination of best practices on the implementation of regulatory principles supporting European spectrum harmonisation and on spectrum management**
- **to deliver position papers on the communications, reports, draft regulation proposed by the European Commission on spectrum issues**
- **to advise the European Parliament and the Council, where needed.**

[83] See slide presentation of the public briefing session held at the end of the 37th RSPG plenary meeting: http://rspg-spectrum.eu/wp-content/uploads/2015/06/RSPGdebrief110615.pdf

Annexes

- **1** : RSPG Deliverables supporting EU Policy Objectives
- **2 :** RSPG deliverables supporting implementation of the current RSPP
- **3 :** Harmonised spectrum for electronic communications services (mobile broadband)
- **4:** Summary of responses to the public consultation

Annex 1 RSPG Deliverables supporting Policy Objectives

RSPG Doc No.	RSPG deliverables	Strategic recommendations on EU spectrum policy	Impact on EU (and beyond) spectrum policy
UHF band			
04-55 06-143	Opinion on Spectrum Implications of Switchover to Digital Broadcasting. Opinion on the Introduction of Multimedia Services	The RSPG recommended that the work in preparation for the second session of the RRC in 2006 should, among others, be aimed at creating maximum flexibility in order to allow future technological and commercial developments. The work should be aimed at reaching a decision on a plan that that is flexible enough to allow the introduction of both digital broadcasting services and other ECS. The later Opinion in 2006 (post-GE06) reviewed the regulatory landscape with the objective of facilitating the introduction of multimedia services. The Opinion identified and addressed various ways in which the introduction of multimedia services could be facilitated, in particular in the frequency bands allocated to the broadcasting services. The RSPG also identified various constraints applying to those bands and possible means of alleviating them. This was a precursor to the creation of the Digital Dividend in the 800 MHz band	GE06 facilitates flexibility in use of the UHF broadcasting band.
09-291	Opinion on the Digital Dividend	A series of recommendations focused on facilitating release of the 800 MHz band (790-862 MHz) in Member States in a timely manner.	The RSPP 2011-15 requested Member States to carry out authorisation process in order to allow the use of the 800 MHz band for electronic communications services (art 6-4)
15-593final	Opinion on a long-term strategy on the future use of the UHF band (470-790 MHz) in the European Union	This Opinion provides strategic recommendations on the future use of the UHF band including the 700 MHz, in particular 694-790 MHz • MS to reallocate the 700 MHz for WBB as early as possible ; RSPG supports end of 2020 for the availability of the band for ECS; MS may decide for duly justified reasons and without the need for derogation to delay the availability of the band by up to two years. • Cross border coordination to be completed by 2017 470-694 MHz • The 470-694 MHz band shall remain available for DTT in the foreseeable future, i.e. 2030 • MS should have the flexibility to use the 470-694 MHz band for WBB downlink, if compatible with	European Commission announced its intention to start discussion on harmonisation of ECS under spectrum Decision during Q3/Q4 2015 – possible harmonisation measures in S1 2016

RSPG Doc No.	RSPG deliverables	Strategic recommendations on EU spectrum policy	Impact on EU (and beyond) spectrum policy
		DTT needs and do not create constraints on neighbouring countries European Commission • to allow national measures supporting the inclusion of more efficient DVB technologies in TV receivers • to clarify the status of possible national compensation with respect to State aid rules	
WRC Issues			
05-103 09-294 09-295 10-350 15-595final	Opinion on WRC-07. Opinion on the preparation of ITU World Radiocommunication conferences. Opinion on the main themes of WRC-12 of interest for EU-wide support. Opinion on common policy objectives for WRC-12 Opinion on Common Policy Objectives for WRC-15	A series of RSPG Opinions prepared in the run-up to WRCs have established common EU-wide objectives for WRCs on relevant policy areas. These are used to identify actions for the European Commission in order to provide political support to those objectives. Policy areas impacted include information society, the internal market, environment, transport, space policy, audiovisual policy and research and development. They are paving the way for proposals submitted to the Council of the European Union Since the RR relates to the right of individual administrations to access spectrum and not to harmonised technical conditions within EU, the modifications of the RR cannot affect the EU common rules on spectrum. Therefore, the common policy objectives have to be established in accordance with the requirements of the principle of sincere cooperation, as pointed out in the RSPP, Art. 10.1 (b).	See Conclusions of the Council of the European Union on the Communication from the European Commission on "The ITU World Radiocommuni cation Conference 2007 (WRC-07)" 21 September 2011 See Conclusions of the Council of the European Union on the World Radiocommunication Conference 2012 (WRC-12) of the International Telecommunication Union (ITU) – Brussels – 27 may 2011
15-616	Position Paper	RSPG views on defining European positions and negotiating at WRC-15	
RSPP 2010-15			
10-330	Opinion on Radio Spectrum Policy Programme	Described key spectrum policy objectives for consideration in developing the RSPP, including: • Ensuring that sufficient spectrum for coverage and capacity purposes is allocated within the EU so that all citizens could have access to ubiquitous high-speed broadband; • Achieving coordinated availability of the 800 MHz band for ECS other than broadcasting in all the EU Member States by 2015; and • Identifying developing and potential future significant uses of spectrum taking into account demand and technology trends.	see RSPP (Decision 243/2012/UE) and recital 40
Review of Spectrum : national inventories / managing demand in the context of RSPP			
12-408	Opinion on review of spectrum use	Provided guidelines to the European Commission and Member States on assessing spectrum demand and potential availability of spectrum in the context of the RSPP.	This Opinion has been published before the adoption of the RSPP and paved the way towards national

RSPG Doc No.	RSPG deliverables	Strategic recommendations on EU spectrum policy	Impact on EU (and beyond) spectrum policy
			spectrum inventory, spectrum inventory and its implementing Decision (Decision 2013/195/UE) European Commission granted two mandates to CEPT on Spectrum Inventory and EFIS (2012) – see CEPT reports 45 and 46 in response
Cross border issues			
08-232	Opinion on Spectrum Issues concerning Outer EU Borders	Outlined the issues which needed to be addressed by the European Commission and Member States in resolving frequency coordination issues with non-EU countries bordering the EU	Processes have been used successfully a number of times to resolve challenging cross-border frequency coordination issues. RSPG "bons Offices" is active
12-409	Opinion on the process for EU assistance in bilateral negotiations with third countries and between EU countries	Described a) a process for assistance from the EU at the political level to support bilateral negotiations in cases where one or more Member States have difficulties in cross-border coordination or from harmful interference with third countries which prevents them reaching the envisaged benefits of the implementation of an EU policy or where there is a strong EU interest; a) a process to assist one or more Member States, with "good offices" from the RSPG, in finding a solution for cases of harmful interference or unresolved coordination issues with other Member States	Both processes have been used successfully a number of times to resolve challenging cross-border frequency coordination issues. RSPG "bons Offices" is active
13-524	Report on proposed spectrum coordination approach for broadcasting in the case of a reallocation of the 700 MHz band	This Report examines the best approach which could be considered in spectrum coordination between EU countries, in case of use of the 700 MHz frequency band for wireless broadband communications, and the related timeline.	It provides visibility to Policy makers – see Lamy Report (Compromise proposal - point 5)
Wireless Broadband			
05-102	Opinion on Wireless Access Policy for Electronic Communication Services (WAPECS)	Established the framework for technology and service neutral designation of spectrum, now a core feature of all ECS related spectrum regulations.	EC granted number of mandates to CEPT (2006, 2008, and 2009) to implement the WAPECS approach. Relevant CEPT reports in response served as the basis for EC Decisions 2,6 GHz, 3,4-3,8 GHz, 900-1800 MHz See also RSPP art. 6-2
13-521 rev 1	Opinion on strategic challenges facing Europe in addressing the	Provides guidance to the European Commission on assessing and dealing	EC granted two EC mandates to CEPT :

RSPG Doc No.	RSPG deliverables	Strategic recommendations on EU spectrum policy	Impact on EU (and beyond) spectrum policy
	growing spectrum demand for wireless broadband	with the future demand for spectrum for wireless broadband in meeting the goals of the Digital Agenda. This Opinion focuses on the problems associated with the provisioning of wireless broadband in general and specifically with the spectrum requirements for terrestrial wireless broadband. Sets out a roadmap for making spectrum available for WBB including meeting the interim target of at least 1200 MHz for WBB. Proposes, with guidelines, the development of a long-term strategic policy on the future use of the UHF band (470-790 MHz).	1452-1492 MHz and 2,3 – 2, 4 GHz (April 2014)
RSPG15-607	RSPG report on Wireless backhaul	This Report identifies and analyses strategic spectrum issues relative to wireless backhaul for mobile networks(lessons learnt, various types of backhaul, trends, needs, etc.) due to: • higher capacity needs for existing macro-cellular sites • the densification of base stations and the small cells approach (trends, foreseen impact on spectrum management, non-line of sight wireless backhaul issues) in mobile networks infrastructures	Some of the elements of the report, e.g. in relation to 5G, could be the basis for further development in the context a new work item to be discussed in the context of the RSPG work programme for 2016.
10-351rev1	RSPG BEREC report on Mobile transition	Member States are experiencing an increasing usage and demand for mobile data services and broadband applications / services. This report highlights various issues dealing with national mobile transition – the 800 MHz and 2,6 GHz cases are highlighted.	See relevant EC Decisions on ECS bands (800 MHz, 2,6 GHz)
11-393	Report on Improving WBB coverage	This Report sets out some of the key issues facing EU Member States in the challenges they face in providing high speed broadband services to all citizens and consumers The scope of this Report covers the wider context of both wired and wireless approaches to meeting public policy coverage goals before focussing on the role of wireless solutions. It looks at the various different methods that Member States have employed with wireless platforms and summarises the success that these approaches have achieved. Finally, with direct reference to the request for this Report, it considers two discrete issues of concern relating to competition in the wireless broadband market and the potential for under-utilisation of spectrum bands that are harmonised at a European level. The Report also provides particular focus on the role of coverage obligations on mobile broadband services.	The report highlighted various methods that Member States have employed with wireless platforms and summarises the success that these approaches have achieved This report has been published during the negotiation of the RSPP between Council and EP (by end of 2011) EC granted mandates to CEPT March 2012 3,4-3,8 GHz : *to undertake studies on amending the technical conditions regarding spectrum harmonisation in the 3400-3800 MHz frequency band* Paired 2 GHz bands: *on the harmonisation of the frequency bands 1920-*

RSPG Doc No.	RSPG deliverables	Strategic recommendations on EU spectrum policy	Impact on EU (and beyond) spectrum policy
			1980 MHz and 2110-2170 MHz ('paired terrestrial 2 GHz band') for terrestrial systems capable of *providing electronic communications services in the European Union* July 2012 1900-1920 MHz and 2010-2025 MHz: *to undertake studies on the harmonised technical conditions for the 1900-1920 MHz and 2010-2025 MHz frequency bands in the EU primarily in support of uses other than electronic communications services*
11-374	RSPG BEREC Report on Infrastructure and spectrum sharing in mobile/wireless networks	The report provides definitions based on the types of current sharing agreements in Europe, including the available technical choices, provides a survey of existing agreements and their scope, illustrates the financial implications and key competitive issues, together with an analysis of existing regulation.	
12-410rev2	BEREC RSPG report on competition issues	This report explored the social value of spectrum (WAPECS bands : 800, 900, 1800 MHz, 2 GHz 2,6 GHz, 3,5 GHz) and highlighted the role of spectrum harmonisation and various national approaches concerning frequency assignment procedure	This report has been referenced in OECD report on "new approaches to Spectrum management" 2013
Sharing Spectrum			
08-244	Opinion on Collective use of Spectrum	This Opinion focused on the Collective Use of Spectrum model to be considered in the context of identifying the right mix between the different licensing models and approaches to spectrum management. The WAPECS focused specifically on Electronic Communications Services (ECS), whereas CUS is broader covering both ECS and non-ECS.	See EC mandates to CEPT under Spectrum Decision and relevant CEPT reports which served as the basis for EC Decisions on SRD, UWB, SRR 24 GHz) See also RSPP art.4
10-306	Report and Opinion on Cognitive radio	This report provided background on Cognitive radio re issues	This Opinion paved the way for a mandate to ETSI on Cognitive radio (mandate M/512) 2013 See also RSPP art.4 This report has been referenced in OECD report on "new approaches to Spectrum management" 2013
11-392	Report on CUS and other spectrum sharing approaches	This report proposed a set of recommendations to the European Commission in a view to facilitate shared access to spectrum in Europe: • strengthen cooperation between CEPT and ETSI in the Collective Use of Spectrum domain, • in-depth assessment of the	See recent EC mandates to CEPT on SRD (5th update under process), on 5 GHz (2013) under Spectrum Decision See also RSPP ar*t*.4 This report has been

RSPG Doc No.	RSPG deliverables	Strategic recommendations on EU spectrum policy	Impact on EU (and beyond) spectrum policy
		concept of LSA so as to explore the viability of this approach and carry out a consultation amongst EU Member States,	referenced in OECD report on "new approaches to Spectrum management" 2013
13-538	License Shared Access	A RSPG response to the European Commission's Request for an Opinion on spectrum regulatory and economic aspects of Licensed Shared Access This Opinion defines LSA and considers how it could be implemented, in particular focusing primarily on unlocking bands used by incumbents, in which sharing opportunities which could improve the efficiency of the spectrum use are identified for additional licensed users.	This Opinion paved the way for efficient usage of spectrum in some national circumstances See EC report on Spectrum inventory – 1 September 2014 This report has been referenced in OECD report on "new approaches to Spectrum management" 2013
Improving the European Framework			
08-246	Opinion on Streamlining the regulatory environment for the use of spectrum	Objective of the Opinion was to assist the EC in identifying solutions to ensure consistency between various regulations affecting spectrum and to improve the cooperation between bodies involved in spectrum policies, in order to facilitate making spectrum available for new applications and improve the efficient use of radio spectrum and the avoidance of harmful interference. The Opinion provided a number of short-term and long-term recommendations to achieve that objective.	See RSPG report on Interference management – section 5 'Analysis and Impact of the current Regulatory Framework of Member States, the CEPT and the EU Institutions on Efficient Interference Management' describing concrete follow up actions
13-527 rev 1	Report on Interference management	The Report mainly focuses on: • Identification of the basic principles and approaches of efficient Interference Management as well as Member States' best practices in managing interference taking into account increasingly flexible conditions of use in spectrum rights; • Examination through the analysis of best practices, what role EU spectrum policy and specifically the R&TTE and EMC Directives, could play for improved receiver standards; • Ways to improve receiver standards within the current ETSI, CENELEC and EU processes as well as to indicate how the European institutions could facilitate such a breakthrough; This Report has been drafted further to the publication of the European Commission proposals for a Radio Equipment Directive (Directive 2014/53/EU) in October 2012 which is under negotiations at the Council and the European Parliament at the time of writing. It highlights the key role of receivers in spectrum regulation and harmonised standards	The Radio Equipment Directive (Directive 2014/53/EU has been published in May 2014. Compare to R&TTE Directive, its scope includes receivers as recommended by this report.
Highlighting strategic spectrum issues from various sectors			
06-144	Opinion on Scientific Use of Spectrum	In this Opinion the RSPG urged Member States to respect their obligations under No. **5.340** of the	See RSPP article 8

RSPG Doc No.	RSPG deliverables	Strategic recommendations on EU spectrum policy	Impact on EU (and beyond) spectrum policy
		Radio Regulations and recommended that the EC, when preparing spectrum measures, should support the needs of the scientific services in these particular bands. For other bands, the RSPG emphasised the need to assess the impact of a potential decision on both scientific uses and other services when increased levels of sharing are being considered.	
09-258	Opinion on Public Use of Spectrum	In this Opinion RSPG identified best practices for a more efficient use of spectrum by public sector bodies in the areas of defence, emergency and public safety and public transport, with a view to assist spectrum management authorities in Member States to ensure that such public sector bodies have sufficient and appropriate spectrum resources to perform their tasks effectively and that scarce radio frequencies are not underutilised.	See RSPP article 8
13-540rev2	Report on Strategic sectoral needs	This report is focusing on Article 8 of the RSPP which highlights specific EU policies other than electronic communication services (ECS), for which spectrum needs should be studied and protected, in particular: • Galileo • Global monitoring for environment and security (GMES) • Intelligent transport management systems (ITS) • Smart energy grids and smart meters • Safety services and public protection and disaster relief (PPDR) • Scientific services • Programme making and special events (PMSE) • The Internet of things (IoT) including RFIDs This report is covering also others sectors such as civil aeronautical and maritime communications and Professional mobile radio (PMR) are also interrelated with Union policies.	See RSPP article 8

Annex 2 RSPG deliverables supporting implementation of the current RSPP

1. **RSPG Opinion on spectrum review** which advised the European Commission and Member States on the issues which needed to be addressed in undertaking a spectrum inventory and in assessing demand for future significant uses of spectrum; (published before final approval of RSPP)

2. **RSPG interim and final Opinion on Common Policy Objectives for WRC 15** which identified the main themes of WRC-15 where there is an EU policy in place and which is recommending a sincere cooperation between the European Commission and the Member States

3. **RSPG Opinion on spectrum for WBB** which reviewed the spectrum in the range 400 MHz to 6 GHz to identify the feasibility of various frequency bands for use by WBB. There is also an associated report84 which looks at the prospects of key frequency bands for WBB in more detail;

4. **RSPG Opinion on the future of UHF band including 700 MHz** provides strategic recommendations on the future use of the UHF band including the 700 MHz,

5. **RPSG report on proposed spectrum coordination** approach for broadcasting in the case of a reallocation of the 700 MHz band. This report examined the best approach which could be considered in spectrum coordination between EU countries, in case of use of the 700 MHz frequency band for wireless broadband communications, and the related timeline.

6. **RSPG Report on strategic sectoral spectrum needs** which examined the spectrum needs of the non-ECS sectors including Galileo, GMES, intelligent transport management systems (ITS), smart energy grids and smart meters, safety services and public protection and disaster relief (PPDR), scientific services and programme making and special events (PMSE).

7. **RSPG Opinion on Licensed Shared Access** which paved the way for innovative regulatory approach in Europe and provides clarification on this regulatory approach and how to implement it at National level.

8. **RSPG report on furthering Interference Management** through exchange of regulatory best practices concerning regulation and /or standardisation. This report described proposals to ensure an efficient interference management including improving the role of standardisation and highlighted in particular the increasing role of receiver parameters in spectrum management.

[84] RSPG 13-522: Report on Spectrum for Wireless Broadband and Broadcasting in the Frequency Range 400 MHz to 6 GHz.

9. **RSPG report on Wireless backhaul** identifies and analyses strategic spectrum issues relative to wireless backhaul for mobile networks(lessons learnt, various types of backhaul, trends, needs, etc.) due to:
    - higher capacity needs for existing macro-cellular sites
    - the densification of base stations and the small cells approach (trends, foreseen impact on spectrum management, non-line of sight wireless backhaul issues) in mobile networks infrastructures

10. **RSPG report on Efficient Use of Spectrum and Spectrum Awards** shares, in particular, some best practices on those issues

Annex 3 Harmonised spectrum for electronic communications services (mobile broadband)

Harmonised Spectrum resources for electronic communications services (compared to other regions)

Table 1 below summarizes the spectrum resources available for mobile network operators, including spectrum identified for future availability, in Europe, the United States, Japan, Australia and South Korea, which have adopted different plans. It appears that the EU is not lagging behind other regions and - although a Union of 28 countries with very different requirements and circumstances – not lagging behind individual states elsewhere in the world in terms of spectrum availability to support the growth of mobile broadband, rather, Europe is at the leading edge.

- Spectrum resources have been already identified for further study at the European level in the RSPG Wireless Broadband Opinion published in 2013 and this provides a strategic element of visibility to the industry.
- The overall harmonised spectrum which is envisaged for Europe exceeds the objective of the first RSPP of 1200 MHz, although some of this spectrum may not be fully available in all EU countries (i.e. the 100 MHz in 2.3 GHz and the SDL bands in 700 MHz and 1.5 GHz).
- Moreover, It should be noted that the frequency arrangements in the bands currently used in Europe are widely used worldwide and that terminals on the market encompass them all (i.e. enabling portability since they are independent from the operator), which is not the case in some other countries (e.g. US).

The harmonised spectrum resource in Europe as described in Table 1 is a strategic asset of the European Digital Economy and Digital Single Market. It has been pointed out that there is currently less harmonised spectrum below 2.5 GHz in Europe, compared to other regions. Future harmonised spectrum for WBB below 2.5 GHz (700 MHz, 1.5 GHz, 2.3 GHz) will reverse this situation. In addition, the existing harmonised spectrum in the band 3.4-3.8 GHz provides a large amount of spectrum which will ensure European leadership in providing harmonised spectrum.

TABLE 1: Spectrum available in EU, USA, Australia, Japan and South Korea

	EU[85] MHz	USA[86] MHz	Australia MHz	Japan MHz	South Korea MHz	COMMENTS
600 MHz		[ex : 70]				USA : incentive auctions planned in 2016
700 MHz	[80]	70	60+[30]	60	[40]	EU : including possible20 MHz SDL under national option, Aus. : 30 MHz not granted
800/850 MHz	60	64	40	60	60	US : including 14 MHz of SMR spectrum
900 MHz	70		50	30	20	
1.5 GHz	(40) + [50]			70	[51]	EU : 40 MHz "SDL" , 50 MHz candidate after WRC-15 Korea: not included in the Mobile Gwanggaeto Plan 2.0, but APG common proposal to WRC15 to have the bands 1427 - 1452 MHz and 1492 - 1518 MHz identified for IMT
1.7 to 2.2 GHz	270	335	270	220	210+[230]	US : including the AWS-3 spectrum
2.3 GHz	[100]	20	98		60	EU : planned for harmonisation under the LSA approach according to national needs
2.6 GHz	190	156.5 + (49.5)	190	80	40+[70]+[40]*	USA : 112.5 MHz for EBS (Educational) may be leased under special conditions for WBB usage * Korea: 40MHz in 2500MHz band
3.4-3.8 GHz	(400)	[70]	[400]	120 + [280]	[160]	USA : 70 MHz could be licensed (PAL) for mobile broadband under sharing rules Japan/Aus. : this band has been proposed for consideration at WRC-15 amongst other, without implementation plan so far
Existing network deployment in the relevant bands	590 [35]	645.5	708	640	390	
Limited network deployment in the relevant bands	(440) [35]	(49.5)				

[85] Harmonised bands and candidate bands for harmonization according to EC Decisions under Spectrum Decision. Bands in (*round brackets*) have been harmonized at EU level but not yet fully authorized in some EU countries (see section 3.2.1.2). Bands in [s*quare brackets*] are targeted for possible EU harmonization measures potentially up to the number of MHz indicated.

[86] Fragmented approach between technologies : Cellular, Personal Communications Service, Advanced Wireless, 4G – see FCC presentation at the 5 G Workshop – 13 Nov 14

Possible in near/medium term	[230] [35]	[140]	[430]	[280]	[591][87]	Korea : only 110 MHz are « secured » additional bandwidth according to the Mobile Gwanggaeto Plan 2.0 (40MHz in 700MHz band, 30 MHz in 1800MHz band and 40MHz in 2600MHz band for FDD)
Total	**1260**	**835**	**1138**	**920**	**981**	

[87] Including future spectrum resources for Wifi

Annex 4 Summary of the responses to the public consultation

A public consultation on the draft version of this Opinion was held from 22 October until 21 December 2015. In all 13 responses were received. The RSPG is grateful to all respondents for their input. The comments are made available on the RSPG website [to add the web Link]

Comments received are summarised in this Annex; RSPG identified common elements in the responses as:

- Broad support for updating/revising the current RSPP
- Each respondent is advocating that sufficient, suitable spectrum is made available for the sector it is representing (in a timely manner)
- Spectrum sharing is being supported, but at the same time caution is being expressed: sharing must be based on real, proven technical means, with proof that harmful interference will be avoided.

Some comments deal with issues outside the RSPG competence: e.g. EchoStar Mobile Ltd on 2 GHz MSS.

Others comments on European harmonization and implementation of harmonization measures. It is noted that future harmonised spectrum for WBB below 2,5 GHz (700 MHz, 1,5 GHz, 2,3 GHz) will bridge the gap with other regions. Europe will maintain its leadership compare to the others regions.

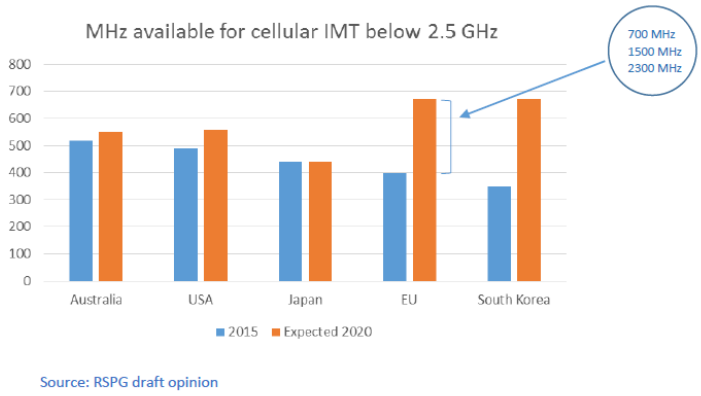


Figure : Source GSM A's comment

Concerning the implementation of harmonization measures, one comment refers to first deadline (first country movers in line with the analysis of RSPG), and second deadline to ensure that the harmonized measure could benefit from economy of scale. Others comments as densification of networks have been made available to other RSPG ad hoc group (RSPG group on 5G).

Comments on 5 G will be further considered in the future Opinion to be developed by RSPG in 2016/2017.

The draft Opinion has been slightly improved further to PC to clarify the section on GSM R issues, the issue of flexibility and harmonization and on the future leadership of Europe on harmonized spectrum below 2,5 GHz. Table in Annex 3 has been also improved.

Each response has been summarized hereafter.

1. José Bruno Fevereiro - Portugal

He fully agrees with the assessment made by RSPG and with its Opinion "on the implementation of the current RSPP and its revision to address the next period". He considers appropriate to revise the current RSPP and not to wait for the conclusion of the review of the Telecom Framework. Article 8a of Framework Directive should be modified so that RSPG opinions become binding to the European Commission ("entrust the new RSPG with decision powers and binding opinions").
Favours some degree of flexibility to Member States, but thinks that some harmonised bands are left unused or not heavily used because the principle of service neutrality is not fully implemented.

Making a band available is a national responsibility and competence.
RSPG should be more ambitious and propose to the next WRC to allocate the 470 – 694 MHz frequency band to broadcast and mobile services on a co-primary basis.

2. SOS – Save Our Spectrum

SOS – Save our Spectrum is an initiative aimed at securing spectrum for the cultural and creative industries. It welcomes that RSPG stresses the importance of PMSE and the need for suitable spectrum. Regrets that this position has found its place only after the decision has been taken to reallocate the 700 MHz band to IMT. This is damaging the cultural and creative industries due to the lack of frequencies. The freezing of the 470 – 694 MHz until 2026 by WRC-15 for TV and PMSE should be used to identify suitable spectrum to compensate for the losses. In conjunction with the envisaged revision at WRC-23 of the whole UHF-spectrum RSPG should further review to return frequencies between 694 – 862 MHz to PMSE. As to spectrum sharing SOS proposes firstly that RSPG makes detailed analysis of spectrum needs of each service (incl. PMSE) and secondly about the need for protection. Only then decisions can be taken which service might share spectrum with PMSE.

3. GSM A

The GSMA considers that the RSPP fills two important gaps: First, it provides the EU institutions with a powerful tool to adopt concrete harmonizing measures that go beyond technical harmonization; second, it addresses all spectrum uses, including services not categorized as ECS. In theory, therefore, the RSPP is the legal vehicle best placed to extend the principles of service and technology neutrality to all spectrum bands, steering the transition from a command-and-control regime to a market-based regime. The GSMA believes that in this respect the first RSPP has been a lost opportunity and is disappointed that the RSPG consultation is also too timid.
It is important not to focus the Framework Review exclusively on spectrum policy principles for ECS. ECS competes with other uses for spectrum resources.

According to GSMA Europe has less harmonised spectrum in use and available below 2.5 GHz than other regions. An increase is critical for Europe. Furthermore, Europe has higher barriers to densification due to planning restrictions and excessive fees charged by local authorities. It is critical that spectrum in the pipeline (700MHz, 1.5 GHz and 2.3 GHz) is harmonised and made timely available. The GSMA warns for the risk of fragmentation if flexibility in the national implementation of spectrum harmonizing measures is too high. It sees a clear need for harmonizing EU legislation in respect to sharing definitions and possibilities.

4. DIGITAL EUROPE

White Space attractiveness in the TV spectrum may be limited if access is opportunistic and uncertain. Studies should be done on the supplemental downlink to address white spaces in the lower UHF range. There is a need for flexibility in the 470-694 MHz band. Following the WRC-15, now that clarity has been achieved for the utilization of the 470-694 MHz band in the period until at least 2023, it is time to open studies on the practical introduction of flexibility in the band. Such studies can trigger positive collaboration between mobile and broadcast sectors and pave the way to practical experiments to identify convergence scenarios for both sectors. When the utilization of the band is reviewed during WRC-23, Europe needs to have a fully developed strategy for the long term evolution of the band.

As to 5G, DIGITALEUROPE has already published a White Paper on 5G spectrum (Aug 2015) and has published further recommendations for spectrum above 6 GHz (October 2015). WRC-15 has identified an agenda item for WRC-19 for the identification of new higher frequency bands for 5G mobile broadband. Therefore the RSPG recommendation to prepare Europe for new spectrum for 5G above 6GHz is fully supported. In addition DIGITALEUROPE fully supports the development of a second RSPP phase that takes the recommendations above into account to drive forward the developments.

5. JRC Ltd

JRC requests RSPG to consider the increasing need for reliable electricity and gas supplies and their dependence on suitable and sufficient radio spectrum to support these services in a situation where other commercial telecommunications networks are unable to meet the demanding and exacting requirements of utility telecommunications.

6. Samsung Electronics Research UK

It comments the outcome of the first RSPP and the measures developed under the Radio Spectrum Decision. These have been successful in bringing new spectrum for wireless broadband to the market.

5G technology will enable a wide range of future services and applications which are becoming essential for an increasingly ‘digital future’. Identifying the most suitable spectrum for higher frequency 5G deployments should be a priority item for the RSPP over the next period. Samsung Electronics fully supports the recommendation to

develop an Opinion before the end of 2017. RSPG will need to fully engage with the expertise of the CEPT in developing this Opinion.

7. EchoStar Mobile Ltd (EML)

The draft opinion marks a comprehensive assessment of the achievements of the first multiannual RSPP. However, the opinion stops short of making some much needed recommendations to the European Commission (EC) to improve the implementation of spectrum harmonization decisions. The existing European regulatory framework has failed to produce the harmonization required to facilitate the deployment of our mobile satellite service (MSS) applications. The RSPG is being asked to include in its opinion specific recommendations to the EC that will help the practical implementation of the 2 GHz MSS/CGC harmonization decision.

8. EMEA Satellite Operators Association (ESOA)

Satellite broadband, identified as a wireless solution in the Digital Agenda for Europe, is integral to the guarantee of Broadband For All. ESOA strongly supports a flexible multi-system future view as seen in the RSPG assessment that "the next phase of the multiannual spectrum policy program should be more a generic programme addressing the spectrum needs of various sectors and not be focused on Wireless Broadband (WBB) only". It is stated in the RSPG Opinion that spectrum sharing should be the "norm", but ESOA advises caution: sharing must be based on real, proven technical means, with proof that harmful interference will be avoided; sharing must not undermine regulatory predictability and certainty. On 5G, ESOA supports the following aspects: spectrum cannot be allocated for wireless broadband purposes without transitional efforts to use what the industry already has; specific frequency bands for wireless broadband or other uses should be identified "taking into account current demand"; sharing feasibility should be ensured not only with incumbent services, but also without constraining future growth of other services in higher frequency bands.

9. BBC

The critical matter for broadcasters remains stability and security of tenure. Stability is critical for both the DTT platform and for PMSE equipment users. BBC welcomes the draft RSPG Opinion on the Review of the RSPP. This addresses important matters for broadcasters. There will however need to be robust consideration of the proposal for use of sub-700 MHz spectrum for downlink only technologies even if priority is given to broadcasting networks. How should 'flexibility' in sub-700 MHz be done without undermining the stability and certainty required for continued investment in existing uses including DTT and PMSE.

10. Pearle – Live Performance Europe

The RSPP is an important pillar for the guidance to Member States to manage radio spectrum in the respective countries whilst taking into account strategic goals to which they adhered at a European level. Pearle welcomes the fact that the RSPG intends to propose to address foreseeable needs of all sectors. The opinion should be updated in including the WRC-15 agreement to maintain present UHF allocation to

broadcasting and audio PMSE. Pearle stresses again that the regulators in the Member States have under-resourced information on the use of radio spectrum by the live performance sector, since it concerns not always licensed use. This results in a situation that some Member States belief there is only a minimum demand by audio PMSE. A solution to identify the demand is to consider as a basis the total number of performances given per year in different venues, instead of limiting it to the number of licenses given for audio PMSE use.

11. UIC and 12. ETSI TC-RT

Welcome the attention that the RSPG pays to coexistence issues such as those between Mobile Broadband and GSM-R. However, the railway sector objects to the current text in section 4.3.3.4 Coherence of various EU public policy objectives on page 47, as this is factually incorrect. The EC decision to use GSM technology in the 876-880 MHz + 921-925 MHz band for railways has already been taken in 1999, as documented in 1999/569/EC. At that time, no knowledge of 3G or 4G technologies existed at CEPT, the EC or railways / UIC, and thus it was not possible to take into consideration the coexistence between 2G/GSM and 3G or 4G technologies. Proposed alternative text:
"The RSPG notes the coexistence issues between mobile/fixed communications networks (MFCN) and GSM-R, which are expected to be managed at national level under a European Framework. Due to lack of mutual awareness and understanding of specific spectrum issues at the times of drafting both the initial railways regulation and the more recent technology-neutral harmonisation of the 900 MHz frequency band for terrestrial systems, coexistence issues can occur even though both public and railway communication systems are fulfilling their respective obligations. ETSI and CEPT contributed actively to the process to clarify the solutions to be implemented at national level (coordination) and by standardisation (improved GSM-R receivers). Efforts are ongoing also at national level. Currently, the role of various entities has been identified".

13. Telecom Italia

Considering that the spectrum required for wireless use is intensively increasing, a revision of the RSPP is important in addressing the requested harmonisation. Spectrum sharing had not demonstrated so far, the ability to significantly transform the access regime to wireless broadband. Exclusive access licenses have well known benefits. Speeding up the standardisation activities, following the usual procedures, is important to meet the time-schedule for 5G services. Extensive studies needed on the broadcast services in the 470 – 694 MHz band. It should be made an effort to monitor the actual utilization of spectrum bands not allocated to WBB services to reassign them to telecom operators in case of underutilization. Relations with bodies like CEPT and ITU are a key issue.