Brussels, 10 February

RSPG21-005 FINAL

RADIO SPECTRUM POLICY GROUP

Progress Report of the RSPG Sub-Group on Spectrum Sharing

Progress Report to the Plenary

of the sub-group on Spectrum Sharing

Following the activities described in the previous progress reports (RSPG20-015 and RSPG20-030) to the Plenaries, the work of the sub-group has continued in the direction of finalizing the Opinion on Spectrum Sharing and, as approved during the last Plenary in October, the accompanying Report.

In line with the mandate in the RSPG Work Programme, the sub-group carried out work to investigate the means to improve spectrum sharing and to implement innovative sharing solutions, including trials (sandboxes), pioneer scenarios/bands and new forms of licensing. In particular, starting from the analysis of spectrum sharing in its various aspects and dimensions, and highlighting the relations and boundaries with infrastructure sharing and the importance of information availability on spectrum usage, the sub-group has deepened the investigation of the 'state-of-the-art' of the various technologies which can be used to enable/improve frequency sharing, focusing also on innovative sharing mechanisms able to facilitate broader and more sophisticated coexistence solutions. The sub-group has also analyzed the possible types of spectrum sharing approaches (e.g. 'single-tier' and 'multi-tiered' shared access) leveraging on such technologies, taking also into account and highlighting the concrete national experiences on implementing spectrum sharing solutions (e.g. geolocation database, LSA, club use, etc.). Moreover, the sub-group has considered the developments of technologies related to 5G, which are expected to enable new sharing opportunities and paradigms, as well as of other technologies of the broader ICT sector, that might be also employed to realize an ever innovative and more efficient spectrum sharing, such as Artificial Intelligence and Blockchain.

So this part of the work, which constitutes the accompanying Report[1], represents a (hopefully) solid section on the regulatory and technical framework that allows the development of Spectrum Sharing. In particular the section on technologies and approaches should be seen as a toolbox aimed at enabling various paradigms of spectrum sharing, both in licensed and unlicensed bands.

Based on the investigated technologies, approaches and best practices, described in the accompanying Report, the sub-group has elaborated on the possible policies and recommendations for increased spectrum sharing and for identifying key pioneer initiatives and bands, which are now finalized in the Opinion on Spectrum Sharing, structured in three main parts as follows:

1) As for the **options for promoting Spectrum Sharing**, the Opinion highlights that one of the guiding principle for spectrum regulators should be the *use-it-or-share-it*. Roaming, network slicing, and more in general access, could be considered complementary elements of sharing.
Sharing conditions play an important role in promoting the shared use of frequencies. Indeed, spectrum sharing should be pursued when assigning new rights of use of spectrum and when authorising market players agreements. Technical conditions should be transparent and can be defined on a case by case basis. Multi-tier approaches could be promoted. Sharing conditions should be targeted at specific objectives for a more efficient use of spectrum, such as increased coverage, faster roll-out, enhanced capacity, better QoS. Moreover, sharing solutions that help vertical industry could be considered. Competition issues are outside of the scope of this Opinion and should be assessed in the usual way when introducing spectrum sharing measures.
Another important aspect addressed in this part of the Opinion is about strengthening trust and confidence. Spectrum sharing should not be considered the answer to any shortage of frequencies. Some solutions can work well in some circumstances and bands and not in others. When introducing sharing solution long term developments should be anticipated and confidence of incumbent and prospective users should be preserved. Work of standard and regulatory bodies, i.e. ETSI and CEPT, for sharing solutions is fundamental and should be promoted, including in developing essential requirements and test specifications. Innovative transmitter and receivers should be developed; while

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[1] The Report includes some Annexes addressing, inter alia, background work from RSPG, relevant cases from worldwide regulators, and, particularly, EU national experiences and best practices on implementing sharing solutions (e.g. LSA, club use, etc.).

industry should play its role in developing more tolerant receivers. Another key aspect to increase spectrum sharing is to build trust among users, including by strengthening market surveillance.

2) Regarding the **identification of key pioneer initiatives and bands**, the Opinion firstly points out that today radio spectrum is already widely used on a shared basis. Actually innovative sharing solutions are mainly based on improving the autorisation process (e.g. by automating it via AI or DB) or on implementing advanced technical sharing conditions (e.g. by using a multi-tier approach). In this sense, all spectrum bands are in some way candidates for introducing innovative spectrum sharing solutions. In particular short term action can be taken on the new harmonised bands currently under consideration in CEPT (e.g. 5 GHz and bands above 24 GHz).

3) As for the last part of the Opinion on **roadmap for increased Spectrum Sharing**, the document focused on the <u>investigation of more dynamic spectrum sharing options</u> and on the possible <u>coordinated actions</u>.

Concerning the options, the Opinion highlights the following ones: i) to define sharing conditions based on more realistic scenarios than worst case; ii) to update current and legacy technologies to more spectrally efficient ones (including by incentivising users); iii) to develop *proof-of-concept* systems with advanced sharing solution (such as those based on CR or ICT assisted system), also analysing the way to reuse those systems in other frequency bands; iv) to issue temporary "*innovation&trial*" or "*test&trial*" licences in order to foster innovation and allow non traditional users the possibility to get access to spectrum; v) to develop trials employing AI technologies in order to pave the way to their commercial use and build trust amongst users; vi) to involve CEPT and ETSI also on ICT or DB assisted solution (e.g. on technical interfaces and management functions) and to support the development of such systems able to operate with a multi-country footprint; vii) to exploit examples of light licensing regimes based on automated platforms in order to try to innovate authorisation processes. In terms of coordinated actions, the Opinion recommends: i) sharing experiences and best practices among Member States related to innovative spectrum sharing solutions, in particular those addressing interference concerns and coexistence issues and those with a multi-country/cross-border footprint, and collaborating in EU funded projects in such areas; ii) fostering EU research projects aimed at commercial development of solutions for enhancing spectrum sharing; iii) identifying use case scenarios and allowing the development of *proof-of-concept* systems where all the above policy views can converge (e.g. deliverable of ETSI and CEPT, ICT assisted sharing framework with AI functional blocks, automated authorisation processes, specifications for enhanced market surveillance and spectrum monitoring).

In October the co-Chairs took part in the Stakeholders Workshop organized by the Radio Spectrum Policy Programme (RSPP) sub-group, aimed at collecting expectations from stakeholders on issues supporting Union policies and identifying possible concrete strategic actions and policy initiatives to be included in the RSPG Opinion on RSPP. One of these policies is actually Spectrum Sharing. Within the dedicated session of the workshop the Co-chairs stimulated the discussion on Strategic Spectrum Sharing, mainly trying to investigate on what could stakeholders bring up to make spectrum sharing more beneficial for everyone. Some stakeholders expressed their views in favour of spectrum sharing, which is typically seen as a good approach as well as an opportunity, but basically preferring exclusive use of frequencies, which in their opinion can provide spectrum users with more guarantees on QoS. Other comments highlighted the need to preserve long term incentives for investment by all involved parties when considering to allow spectrum sharing in a band.

Other than the work on the own deliverables, the sub-group has also elaborated a contribution for the RSPG input for the "Toolbox" Special Group and a contribution for the RSPP Sub-Group in order to develop the relevant section in their Opinion. Both contributions have been integrated in the relevant RSPG documents.

The work has continued to be carried out by AVC meetings and written comments and ideas exchanged electronically. We would like to renew the thanks to the Commission for making the virtual rooms available and providing support, and to the members of the sub-group for their valuable input and active participation.

Next steps
The next meetings (probably in AVC again) are scheduled for the 19th April (optional, to note the results of the public consultation on the Opinion) and on the 17th May (to approve the summary of the

public consultation and any eventual proposed change to the Opinion). The objective is to deliver a draft final Opinion by 1st June, on time for the RSPG final approval on 16th June.

Requests to the Plenary
- To approve the proposed draft Opinion for public consultation.
- To approve the proposed draft Report for publication (proposal is to publish it as soon as possible after some language and editorial proof-reading).

The Rapporteurs

Mauro Martino (Italy)
Julia Inmaculada Criado Casado (Spain)

Annex

RSPG work item: Spectrum Sharing	
Work item	Spectrum sharing - Pioneer initiatives and bands
Rapporteurs	Mauro Martino (AGCOM, Italy), Julia Criado Casado (MINECO, Spain)
Rationale	Today, spectrum sharing is rather static and, in some cases, overly conservative. As also highlighted by the results of the working group on European Spectrum Strategy, spectrum sharing needs further action, especially regarding its potential to achieve more efficient use of radio spectrum, and to give incentives for innovation. The promotion of the shared use of radio spectrum is also a key objective of the European Electronic Communications Code (EECC), as in Articles 45 (2e) and 46 (1). New technologies create new opportunities for more dynamic and efficient spectrum sharing. However, before such new technologies can be introduced on a wider scale, there is a need to build trust among users as well as Member States. Strategically, it is therefore important to facilitate trials, exchange of experiences and collaboration among Member States. A proof of concept helps facilitate a change in the mind-set. Therefore, the means to improve spectrum sharing and to implement innovative sharing solutions should be investigated, especially by promoting trials (sandboxes), pioneer scenarios/bands, new forms of licensing and a strategic focus on take-up of methods using databases and LSA. In addition, the development and market opportunities for methods, including Artificial Intelligence, should be studied with a view to making concrete proposals for coordinated actions at EU level that bring added value to the Member States.
Scope	Building on the rationale and the previous relevant works from RSPG as well as taking into account different spectrum sharing options, this activity aims at investigating more dynamic spectrum sharing options, developing a roadmap for increased spectrum sharing and identifying key pioneer initiatives and bands.
Planned deliverable and timing	RSPG Opinion. Time schedule: • Draft Opinion: January 2021; • Final Opinion: June 2021.

Members, stakeholders and resources

Members and Observers	Austria, RTR Austria, BMLRT Belgium, BIPT Czech Republic, CTU Denmark, ENS European Commission Finland, TRAFICOM France, ANFR France, ARCEP Germany, BNETZA Germany, BMVI Greece, EETT Hungary, NMHH Ireland, DCCAE

	Italy, AGCOM Latvia, SAM Malta, MCA Norway, KMD Portugal, ANACOM Romania, ANCOM Slovenia, AKOS Spain, MINECO Sweden, PTS The Netherlands, MINEZK Turkey, BTK
Key stakeholders	
Other resources	CEPT ECC ETSI

Work flow (internal and external milestones)

Date	Action / deliverable	Internal Work group only	External Plenary, Publication
Year 2020			
6th March (AVC meeting)	First meeting of the work group. Main items discussed: – scope and plan following the work item on Spectrum Sharing included in the new RSPG Work Programme; - organisation of the work for 2020; - draft index of the opinion; - collection of ideas on the main propositions of the opinion. Number of participants: 15 from 11 MS + EC	Work group	
7th May (AVC meeting)	Second meeting of the work group. Main items discussed: – overall structure of the circulated draft opinion; - draft text section-by-section. Number of participants: 26 from 15 MS + 1 Obs + EC	Work group	
9th June (Brussels, AVC)	Progress of the work presented to Plenary	Rapporteurs	Plenary
25th June (AVC meeting)	Third meeting of the work group. Main items discussed: - feedback of the GSMA roundtable; - progress of the circulated draft opinion; - draft text section-by-section; - focus on possible recommendations (e.g. which bands to consider, which sharing approaches, ideas for cross border sharing and trial bands/sandboxes, etc.). Number of participants: 24 from 14 MS +EC	Work group	

Date	Action / deliverable	Internal Work group only	External Plenary, Publication
14th September (AVC meeting)	Fourth meeting of the work group. Main items discussed: - progress of the circulated draft opinion; - draft text section-by-section; - focus on the draft recommendations; - proposal of moving some sections into an accompanying Report of the final Opinion; - possible participation in the workshop made by RSPP (15 October). Number of participants: 28 from 14 MS +EC	Work group	
7th October (Brussels, AVC)	Progress of the work presented to Plenary	Rapporteurs	Plenary
27th October (AVC meeting)	Fifth meeting of the work group Main items discussed: - comments on the circulated updated version of the draft Opinion; - discussion on what feedback to give to the RSPP SG based on the circulated draft text; - discussion on the draft contribution to the Commission "Toolbox"; - comments on the circulated updated version of the accompanying Report. Number of participants: 31 from 18 MS +EC	Work group	
16th November (AVC meeting)	Sixth meeting of the work group Main items discussed: - comments on the circulated updated version of the draft Opinion; - discussion on the updated contribution for the RSPP SG; - discussion on the updated contribution to the Commission "Toolbox"; - comments on the circulated updated version of the accompanying Report. Number of participants: 21 from 12 MS +EC	Work group	
15th December (AVC meeting)	Seventh meeting of the work group Main items discussed: - comments on the circulated updated version of the draft Opinion; - comments on the circulated updated version of the accompanying Report. Number of participants: 26 from 15 MS +EC	Work group	
Year 2021			
18th January (AVC meeting)	Eighth meeting of the work group Main items discussed: - finalize the Opinion; - finalize the accompanying Report. Number of participants: 23 from 16 MS +EC	Work group	

Date	Action / deliverable	Internal Work group only	External Plenary, Publication
10th February (Brussels, AVC)	Progress of the work presented to Plenary	Rapporteurs	Plenary
19th April (AVC meeting)	Ninth (optional) meeting of the work group - agenda to be defined.	Work group	
17th May (AVC meeting)	Tenth meeting of the work group - agenda to be defined.	Work group	
Future dates and actions to be decided in light of the work plan			