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Radio Spectrum Policy Group

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RADIO SPECTRUM POLICY GROUP

STRATEGIC ROADMAP TOWARDS 5G FOR EUROPE

**Spectrum related aspects for next-generation wireless systems (5G)
and 5G implementation challenges**

**Final progress report of RSPG Working Group 5G (2016-2019) on
the Strategic Roadmap towards 5G for Europe to the RSPG Plenary**

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1 Background and scope of work

The European Commission launched in December 2013 the 5G Infrastructure Public Private Partnership (5G-PPP)¹ to deliver solutions, architectures, technologies and standards for the ubiquitous next generation (wireless and wireline) communication infrastructures thereby ensuring Union's leadership within the global context. The 5G-PPP released in February 2015 its 5G vision², that also contained considerations on spectrum requirements for access and backhaul, including for wireless broadband above 6 GHz as well as spectrum management methods. Work on 5G specifications has gained global momentum within the ITU (on network standards and spectrum regulation)³ and the 3GPP (on wireless/mobile standards)⁴ with the participation of Member States and 5G-PPP members. The agenda of WRC-15 addressed spectrum for IMT-2020 (5G) systems, and the follow-up activity leading up to WRC-19 has assessed spectrum needs and identified appropriate frequency bands on a global scale. In this regard, it was important that Europe developed and proposed its own spectrum strategy to respond to the 5G challenges. Therefore, a coherent spectrum strategy including a roadmap was needed, to address human and IoT communications at various levels (connection speed, mobility, latency, duty cycle, reliability etc.), and ensure a smooth transition from evolving wireless systems and spectrum usage.

The RSPG outlined initial consideration on 5G spectrum issues in its Opinion on the Radio Spectrum Policy Program. The RSPG noted that 5G deployment was envisaged from 2020 onwards. It has published the following deliverables in 2015 which have already addressed spectrum challenges arising from the development towards 5G:

- 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 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”.
- 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” recognised 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.

¹ www.5g-ppp.eu

² <https://5g-ppp.eu/wp-content/uploads/2015/02/5G-Vision-Brochure-v1.pdf>

³ <http://www.itu.int/en/ITU-R/study-groups/rsg5/rwp5d/imt-2020/Pages/default.aspx> ,

<http://www.itu.int/en/ITU-T/focusgroups/imt-2020/Pages/default.aspx>

⁴ http://www.3gpp.org/news-events/3gpp-news/1614-sa_5g

Establishing the Working Group 5G in 2016, the RSPG aimed to develop a strategic roadmap towards 5G for Europe and make recommendations where appropriate focusing on the services to be offered and the goals to be achieved by the deployment of 5G systems.

In developing the strategic roadmap towards 5G for Europe the RSPG was requested to:

- Assess the spectrum related aspects for 5G in the long term, starting from the point of view of specific goals. (Such as how to ensure that the benefits of 5G-based services are available to all European citizens).
- Consider aspects related to system architecture (such as wireless network densification, network resilience and convergence), technology enablers and the variety of services and invite 5G-PPP to present the status of its work.
- Identify and analyse spectrum related challenges such as: spectrum sharing, usage and licence conditions, rural areas, policy implementation, incentive regulation, the principle of technology and service neutrality and the reuse of already harmonised spectrum to support the transition towards 5G.
- Assess appropriate frequency bands for 5G, in particular additional bands above 6 GHz.

2 1st RSPG opinion on 5G (November 2016)

The RSPG resolved to deliver an early 1st opinion as a first stage in order to give guidance and an early input to other associated European activities, such as the development of the European Commission 5G Action Plan and industry more generally to enable the early development of 5G in Europe, to be followed by a subsequent detailed opinion addressing the above requests.

The Working Group 5G conducted a survey between Member States focusing on the frequency bands proposed by Europe at WRC-15, and in particular the bands 24.5-27.5 GHz, 31.8-33.4 GHz, and 40.5-43.5 GHz, with the aim to decide which of the 26 GHz, 32 GHz, 42 GHz bands, Europe will prioritise for 5G and to identify what would be needed in making these candidate bands available in every country.

In November 2016 a strategic roadmap for 5G was first established when the RSPG adopted and published its first “Opinion on spectrum related aspects for next-generation wireless systems (5G)⁵”, where it was outlined what spectrum will be needed for next-generation wireless systems.

In this 1st opinion, the RSPG focused on identifying the building blocks needed for a rapid launch of new wireless services in the next generation wireless systems:

- 3.4-3.8 GHz (3400-3800 MHz) will be the first primary band for 5G and bring the necessary capacity for new 5G services;
- 26 GHz (24,25-27,5 GHz) will be the pioneer band in Europe above 24 GHz to give ultra-high capacity for innovative new services, enabling new business models and sectors of the economy to benefit from 5G;

⁵ http://rspg-spectrum.eu/wp-content/uploads/2013/05/RSPG16-032-Opinion_5G.pdf

- 5G can be launched over the existing EU harmonised mobile bands, including in particular bands below 1 GHz which can enable 5G coverage to all areas (e.g. 700 MHz) ensuring that everyone benefits, while enabling the transition from the current to the next generation of networks.

3 2nd RSPG opinion on 5G (February 2018)

For 2017 the RSPG worked on spectrum strategic questions and recommendations and issued a supplementary opinion focusing on areas set out in the first Opinion, relevant issues brought up in the public consultation⁶ and other relevant areas from an RSPG perspective.

The Working Group 5G met with the RSPG Working Groups on IoT and ITS as well as with 5G PPP representatives to exchange ideas on the above topics and take in possible demands from specific business sectors and academia.

The RSPG, in its second Opinion (February 2018)⁷, adopted further recommendations for policymakers on strategic issues related to 5G:

- Large blocks of 3.4-3.8 GHz made available by 2020;
- Flexibility in authorisation (for example concerning geography);
- Cross border service performance needs to be defined;
- Coverage requirements set according to national needs;
- Sufficiently large portion (e.g. 1 GHz) of the 26 GHz band made available (locally) in response to market demand by 2020; and
- General authorisation in 66-71 GHz.

4 3rd RSPG opinion on 5G implementation issues (January 2019)

For 2018 the RSPG, following the feedback received from the stakeholders during Workshops and building on the work of CEPT, presented an analysis with a view on how to defragment the 3.4-3.8 GHz band in EU.

Furthermore, the RPSG 5G working group invited experts from verticals associations to exchange views about the possible verticals requirements regarding spectrum use in other areas than mobile broadband (internet of things, intelligent transportation and other verticals) and presented a proposal for a categorization of verticals engagement in 5G spectrum

The RSPG, in its third Opinion (January 2019)⁸, adopted recommendations:

- concerning the Defragmentation of the 3.4-3.8 GHz frequency band, recommending that Member States (MS) design spectrum award mechanisms that provide the opportunity to obtain sufficiently large contiguous spectrum blocks to facilitate high throughput multi-Gb/s 5G services such as enhanced mobile broadband;

⁶https://circabc.europa.eu/d/a/workspace/SpacesStore/4ed94c29-182f-418a-b202-6861f69a4f3a/Responses_5G.pdf

⁷ https://circabc.europa.eu/sd/a/fe1a3338-b751-43e3-9ed8-a5632f051d1f/RSPG18-005final-2nd_opinion_on_5G.pdf

⁸ https://rspg-spectrum.eu/wp-content/uploads/2013/05/RSPG19-007final-3rd_opinion_on_5G.pdf

- related to ensuring connectivity for vertical industries, recommending that Member States consider other spectrum solutions including dedicated or shared spectrum for the business/sectoral needs (“verticals needs”) that may not be met by mobile operators.

The Work of the RSPG on 5G related matters will likely be continued the next years within a new work programme.

5 Annex

Work flow (internal and external milestones)

<u>Date</u>	<u>Action / deliverable</u>	Internal Work group only	External Plenary, Publication
Year 2016			
25 April (Brussels)	First meeting of work group – discuss scope and plan	Work group	n/a
2 June (Stockholm)	Second meeting of work group – discuss Roadmap, First Opinion draft and possible Press Release regarding 5G.	Work group	n/a
8 June	Update to Plenary	Rapporteur	Plenary
13 July (Dublin)	Third meeting of work group – discuss feedback from Plenary and emerging Roadmap and First Opinion	Work group	5G-PPP representative invited to present to the group
8 September (London)	Fourth meeting of work group – Drafting of final First Opinion following public consultation of draft First Opinion and results of survey of present use in member states.	Work group	
1 November (Athens)	Fifth meeting of work group – Update of prioritised Roadmap following input from public consultation of draft First Opinion and objectives put forward in First Opinion.	Work group	
9 November	Update to Plenary – Final Opinion and updated Roadmap presented	Rapporteur	Plenary
Year 2017			
12 January (Brussels)	Sixth meeting of work group - Further discussion on the Roadmap for a supplementary opinion - Drafting of the Table of contents of the supplementary opinion - Allocation of the drafting work among the participating Member States	Work group	
7 February	Progress of Supplementary Opinion work presented to Plenary	Rapporteur	Plenary
23 February (Mainz)	Seventh meeting of work group - Discussion on the first Draft of supplementary opinion, further drafting of text	Work group	
23 March (Brussels)	Eighth meeting of work group - Discussion of draft of supplementary opinion - Draft of key messages	Work group	5G-PPP representative invited to present to the group

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Date	Action / deliverable	Internal Work group only	External Plenary, Publication
4 May (Helsinki)	Ninth meeting of work group - Drafting of supplementary opinion	Work group	
6 June (Brussels)	Update to Plenary - Progress of Supplementary Opinion work presented to Plenary	Rapporteur	Plenary
14 July (Brussels)	Tenth meeting of work group	Work group	
14 September (Bonn)	Eleventh meeting of work group	Work group	GSA representatives invited to present to the group
17 October (Brussels)	Twelfth meeting of 5G working group	Work group	GSMA representatives invited to present to the group
21 November (Brussels)	Update to Plenary – Drafting of Supplementary Opinion presented to plenary for approval of publication for public consultation.	Rapporteurs	2nd Draft RSPG Opinion on 5G networks on public consultation 23 November 2017 -> 7 January 2018
Year 2018			
17 January (Dublin)	Thirteenth meeting of work group – Editing of draft Supplementary Opinion following input from public consultation before submission to plenary.	Work group	
30 January (Brussels)	Update to Plenary – Second Opinion on 5G presented to plenary for approval of publication.	Rapporteurs	Plenary, Second Opinion submitted for publication
15 March (Brussels)	First meeting of work group following new RSPG Work Programme – discuss scope and plan following new work item on 5G Implementation Challenges, - discuss on Member States plans for launching 5G trials, and authorizing 5G frequency bands	Work group	
11 April (Brussels)	Second meeting of work group – discuss possible survey to member states on defragmentation. Discussion on future needs of different verticals and shared information on present 5G activities in EU.	Work group	TCCA representative invited to present challenges in critical mobile communication from the perspective of verticals
24 May (Brussels)	Third meeting of work group – discuss survey on defragmentation to member states and possible alternative methods of collecting and sharing data and experiences to analyse defragmentation. Continued work on future needs of different verticals.	Work group	5GAA representatives invited to present spectrum challenges from the perspective of the automotive industry
5 June	Progress of work presented to Plenary	Rapporteur	Plenary

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Date	Action / deliverable	Internal Work group only	External Plenary, Publication only
10 July (Brussels)	Fourth meeting of work group – Continued work on future needs of different verticals. Discussion on draft opinion text on defragmentation of the 3.4-3.8 GHz band and on connectivity for vertical industries.	Work group	Representative from Bosch invited to present possible spectrum challenges and demands from the perspective of the industry
11 September (Paris)	Fifth meeting of work group – Continued discussion on draft opinion text on defragmentation of the 3.4-3.8 GHz band and on connectivity for vertical industries. - Agreed on key messages that should be published for public consultation by the RSPG.	Work group	
3 October	Progress of work presented to Plenary. - Draft opinion submitted for public consultation after plenary	Rapporteur	Plenary, Draft Opinion on public consultation
18 December (Brussels)	Sixth meeting of work group Follow up of responses received from public consultation. Continued discussion on opinion text following the public consultation.	Work group	
Year 2019			
30 January (Brussels)	Progress of work presented to Plenary. - Third opinion submitted for publication	Rapporteur	Plenary, Third Opinion submitted for publication
7 May (Dublin)	Sixth meeting of work group – discuss scope and plan following publication of third opinion and RSPG Work Programme on work item on 5G Implementation Challenges, - discussion on experiences in Member States, current implementation challenges, and status on authorizing 5G frequency bands	Work group	
11 June (Brussels)	Seventh meeting of work group	Work group	Presentation of work on Small Cells that is undergoing in the Commission
12 June (Brussels)	Progress of work presented to Plenary.	Rapporteur	Plenary
9 October (Brussels)	Progress of work presented to Plenary. - Final report of WG submitted for publication	Rapporteur	Plenary, Final report submitted for publication

Members in WG

Members	Austria Croatia Denmark EU Finland France Germany Greece Ireland Italy Luxembourg Malta Poland Serbia Slovenia Spain Sweden The Netherlands United Kingdom
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