Dynamic Spectrum Alliance Limited
http://www.dynamicspectrumalliance.org

25 August 2023

EUROPEAN COMMISSION
DIRECTORATE-GENERAL FOR COMMUNICATIONS NETWORKS, CONTENT AND TECHNOLOGY
Digital Decade and Connectivity
Radio Spectrum Policy Group RSPG Secretariat
CNECT-RSPG@ec.europa.eu

Re: The development of 6G and possible implications for spectrum needs and guidance on the rollout of future wireless broadband networks.

Dear Radio Spectrum Policy Group,

The Dynamic Spectrum Alliance (DSA)[1] appreciates the opportunity to provide comments in response to the Draft Radio Spectrum Policy Group (RSPG) Opinion on "The Development of 6G and possible implications for spectrum needs and guidance on the rollout of future wireless broadband networks"[2].

As denoted in Annex 2 of the Draft Opinion, the DSA participated in the RSPG's September 2022 workshop on 6G development. Almost a year later, 6G remains in a formative stage, where unique 6G usage scenarios and corresponding spectrum needs are far from firm. Given the slower than anticipated availability and adoption of 5G, the focus would be better set on meeting the 2030 Digital Decade connectivity goals. It should not be assumed that a new generation of mobile technology is required every decade. This is an idea marketed by the mobile industry ecosystem that made more sense when the leaps in capabilities for user equipment between wireless generations were more distinct. Pursuing a premature introduction of 6G in 2030 will distract national regulatory agencies from focusing on meeting

[1] The DSA is a global, cross-industry, not for profit organization advocating for laws, regulations, and economic best practices that will lead to more efficient utilization of spectrum, fostering innovation and affordable connectivity for all. Our membership spans multinationals, small-and medium-sized enterprises, as well as academic, research and other organizations from around the world all working to create innovative solutions that will benefit consumers and businesses alike by making spectrum abundant through dynamic spectrum sharing. A full list of DSA members is available on the DSA's website at Members – Dynamic Spectrum Alliance.

[2] DRAFT RSPG Opinion on the development of 6G and possible implications for spectrum needs and guidance on the rollout of future wireless broadband networks, RSPG23-026 FINAL (Draft Opinion), available at https://radio-spectrum-policy-group.ec.europa.eu/consultations-0_en

Europe's 2030 Digital Decade goals and will adversely divert mobile network operators' limited resources.

Nevertheless, the DSA agrees that it is important for the RSPG (and Europe) to develop a longer-term 6G strategy. Given that 6G implementation is years away, with many technical and market unknowns, the RSPG should consider a strategic approach that is more directional than prescriptive.

In general, the DSA believes that 6G networks should:

- be heterogenous and include mobile, fixed, and satellite components,
- be both public and private,
- incorporate both licensed and licence-exempt technologies,
- be technology-neutral in a manner that promotes several advanced gigabit technologies, and
- rely on diverse spectrum sharing mechanisms that depend on the spectrum band and the incumbents.

Ideally, the extensive fibre investment and deployment for 5G can be leveraged for 6G. Without the necessary investment to deploy fibre widely throughout Europe, it is hard to imagine how 5G's goals for latency will be met for mobile consumers, let alone the still to-be-determined performance metrics for 6G.

After reviewing the Draft Opinion, the DSA feels obligated to bring to RSPG's attention two statements regarding Wi-Fi that we believe are inaccurate and should be deleted from the Draft Opinion.

> The first inaccurate statement is: "*Use of unlicensed spectrum is mainly targeted towards consumers use and non-critical systems and is less suited for enterprise customers*."[3] DSA members include companies that market enterprise Wi-Fi systems and companies that market services to enterprises that are built on Wi-Fi systems that sit at the edge of networks. The fact is that Wi-Fi systems are well suited for most enterprise use cases. The DSA recognizes that some 5G operators are looking to displace Wi-Fi systems in certain enterprise use cases. The market will determine whether the value proposition of Wi-Fi or 5G is better for a given use case. This sentence is not supported

[3] Draft Opinion @ Section 5.1, page 25.

by facts and could lead to misinterpretations favoring IMT for enterprise use over Wi-Fi. The DSA would appreciate it if RSPG could delete the sentence from the Draft Opinion.

The second inaccurate statement is: *"[d]ue to the license exempt spectrum usage, limited coverage, limited power to provide the last few meters link, the spectrum needs for license exempt are covered already with the identified spectrum in Europe*."[4] Wi-Fi is a ubiquitous affordable technology used to distribute broadband from fibre, fixed wireless, fixed satellite, and mobile sources to end user devices. Wi-Fi is utilized within residences, apartments buildings, businesses large and small, universities and schools, hospitals, stadiums, and government facilities, among other locales. Additional licence-exempt spectrum is required in Europe to support the current generation of Wi-Fi, Wi-Fi 6E, and the next generation of Wi-Fi, Wi-Fi 7 that will rely on up to 320 MHz wide channels, especially in areas where there are more dense deployments. Having sufficient frequency diversity in these environments is vitally important to deliver the best user experience. There is a demonstrable need for additional licence-exempt spectrum within the whole 6 GHz band (5925-7125 MHz) in Europe which is last but not least created by the European Commission's Digital Decade initiative which aspires to provide 1 Gbps Fiber-to-the Home coverage for each home in the EU by 2030.

Specific comments to the RSPG Draft Opinion are provided below:

1. **Recognises that 5G implementation is ongoing in the primary and pioneer bands identified for 5G.**

   The DSA agrees that 5G implementation is ongoing and it would be helpful for RSPG to include some brief text describing the status of 5G implementation across Europe in the primary and pioneer bands. Certain publicly available on-line tools such as the European 5G Observatory[5] would seem to indicate that 5G implementation is slower than anticipated in many parts of Europe. The Draft Opinion sparsely covers this issue in the background section, but only for the 26 GHz band. Such text could help the EC better understand the current state of 5G implementation and the gap to reach the 2025 and 2030 European-wide objectives, and possibly consider a more realistic timeline for 6G introduction.

[4] Draft Opinion @ Section 6.3, page 32.

[5] The European 5G Observatory examines issues including 5G coverage; spectrum awards; adoption by new vertical industries like factories and agriculture; and public policies to stimulate 5G's growth. 5G Observatory – Tracking 5G developments

2. **Recognises that new solutions for more dynamic and shared use of spectrum have been introduced with the uptake of 5G. This need is expected to increase with 5G development and the uptake of 6G and could require more flexibility in spectrum access.**

   Dynamic Spectrum Sharing (DSS) allows mobile network operators to aggregate 4G and 5G spectrum. It is likely that 6G will allow mobile network operators to aggregate 4G, 5G, and 6G spectrum in the future.

   The DSA, though, envisions that spectrum sharing in 6G will go beyond DSS. Depending on the specific frequency band(s) identified in the future for 6G services, the specific component of 6G (mobile, terrestrial, or satellite), and the frequency band's incumbents, DSA foresees that a variety of Dynamic Spectrum Management Systems (DSMS) techniques could be required.

3. **Recognises the increasing needs for vertical and local spectrum.**

   The DSA supports standalone low- and medium power locally licensed private 4G, 5G, and future 6G networks in the 3.8-4.2 GHz band. While licence-exempt deployments can more than meet most enterprises' needs, there may be some specific use cases where the advertised features of 5G private networks will be of interest (e.g., URLLC). As these standalone locally licensed networks are a relatively new phenomenon, the market is still figuring out what these specific use cases will be.

   DSA members providing 4G and 5G private networks today believe that local control of the private network is essential to making the model work. It is where the enterprise, facility operator, landlord, etc. holds the license. Private networks deployed jointly with the mobile network operator (MNO) or a private network hosted by the MNO can be achieved through a wide-area license for the MNO and a secondary market mechanism, if required, for the enterprise – but this is not really local licensing.

   The Draft Opinion refers to the 26 GHz and 42 GHz bands. The DSA can envision these bands being utilized for privately licensed standalone indoor 6G networks. At these relatively high millimetre wave frequencies, inside-to-outside and outside-to-inside use is not practical, but within an enterprise, large channel sizes would be available. Given the larger building entry loss and path loss at these frequencies, other radiocommunication services can potentially share the spectrum outdoors.

To date, in administrations authorizing locally licensed spectrum, the process for spectrum assignment is manual and spectrally not as efficient as it could be. The DSA understands the rationale for administrations initially taking such a conservative approach. Over time though, as regulators gain more experience with locally licensed spectrum, the DSA expects regulators in Europe and elsewhere will gain more confidence to the point where they can support a DSMS approach to sharing spectrum for local licensing.

4. **Recognises, further to RSPG Opinion 21-024, that, prior to the introduction of 6G, additional capacity needs for mobile networks may arise on the national level during this decade. These do not require additional EU harmonisation and can be met at a national level either by firstly using the current spectrum more efficiently (e.g. by densifying the network) or introducing additional spectrum for terrestrial mobile broadband.**

The DSA believes the facts regarding the status of current 5G implementation do not support the statement that prior to the introduction of 6G, additional capacity needs for mobile networks may arise on the national level during this decade. Indeed, it is the undemonstrated assertion that additional 5G capacity is needed before 2030 for 5G Advanced by certain parties that has needlessly been driving activity at CEPT to identify 6425-7125 MHz (upper 6 GHz) band for an IMT identification under WRC-23 Agenda Item 1.2. It is worth noting that the mobile broadband ecosystem has been advocating for spectrum between 7-24 GHz for 6G, not the 6 GHz band.

5G implementation and adoption have been slower than planned across Europe, and as the Draft Opinion acknowledges, in some administrations there is concern about meeting the 5G implementation goals along major transport paths. If there are administrations that believe additional 5G capacity is required prior to 2030, they should consider network densification both in the 3.5 GHz and in the relatively fallow 26 GHz band. An obvious solution to relieve capacity issues is for MNOs to upgrade their existing 4G networks to 5G. In the first quarter of 2023, the number of 5G base stations in the 3.6 GHz band was a mere 8.3% of the number of 4G base stations, according to the EU 5G Observatory[6]. Another idea can be found in the 2018 RSPG Second Opinion on 5G networks, ““*In due course, the mobile*

[6] https://5gobservatory.eu/observatory-overview/interactive-5g-scoreboard/#5G-base-stations .

operators could perform transition of lower frequency mobile spectrum (800, 900, 1800, 2100, 2600 MHz) to 5G"[7]

The DSA urges the RSPG to revise the last sentence of the first paragraph to read, "*These do not require additional EU harmonisation and can be met at a national level ~~either~~ by ~~firstly~~ using the current spectrum more efficiently (e.g. by densifying the network)* ~~or introducing additional spectrum for terrestrial mobile broadband~~.

5. **Recognises that technology neutrality and spectrum sharing are applicable and the existing harmonised bands for ECS will be also made available for 6G. Further, there is a need to assess the suitability of harmonised technical conditions to support the long-term development of 6G in the bands as it has been done for 5G.**

   The Draft Opinion defines 'technology neutrality' narrowly, in terms of mobile network operators. The DSA proposes the RSPG consider a broader definition of 'technology neutrality' that includes all terrestrial, mobile, and satellite multi-gigabit technologies. The DSA believes that 6G should be more than just 3GPP technologies.

   Additionally, the DSA believes that spectrum sharing for 6G will go beyond DSS. As stated in DSA's response in 2., the nature of the spectrum sharing required will depend on the nature of the incumbents in spectrum band(s) that will be considered for 6G and the nature of the 6G service (i.e., IMT component),

6. **Recognises, as for 5G, the role and need of license exempt or light-licensed spectrum for offloading some of the 6G traffic and to provide private and personal networks. This spectrum supports improved end-user connectivity, machine-to-machine and other applications, which do not require a predictable quality of service.**

   Affordable Wi-Fi devices operating over licence-exempt spectrum complement fibre, satellite, and mobile broadband networks distributing broadband to a myriad of user devices. While policy makers continue to focus on speed to the network termination point at the outside of the residence, school, or enterprise, for end users, the important metric is the speed to the device. There needs to be sufficient Wi-Fi capacity between the network termination point and the licence-exempt devices operating inside, to prevent a network bottleneck and poor user experience. Where there are multiple Wi-Fi 6E and future Wi-Fi 7

[7] RADIO SPECTRUM POLICY GROUP STRATEGIC SPECTRUM ROADMAP TOWARDS 5G FOR EUROPE, RSPG Second Opinion on 5G networks, RSPG18-005 FINAL @ page 6.

devices operating in a contained area such as a classroom, lecture hall, meeting room, etc., with each device seeking to utilize the large channels sizes made possible by the technology, Wi-Fi channel diversity is required to ensure each device can fully take advantage of the large channels. This requires that the entire 6 GHz band be made available for licence-exempt use.

The DSA is of the view that the term "offloading", as used in the Draft Opinion is misleading and should be avoided because it incorrectly implies that cellular networks are the primary means for providing wireless broadband connectivity. When it comes to wireless connectivity, Wi-Fi is the technology of choice for billions of users because it is more convenient, more reliable, more affordable, and more performant than cellular.

The DSA disagrees with how the RSPG chooses to characterize licence-exempt devices which seems to focus on only deploying 4G/5G/6G networks in enterprises for verticals. For the majority of consumer and enterprise use cases, affordable licence-exempt Wi-Fi networks provide a similarly high quality of service.

7. **Recognises the role of and need for non-terrestrial networks to support 6G development further current initiatives on 5G. Non-terrestrial networks could become an important additional connectivity layer to terrestrial connectivity services, e.g. to provide coverage in underserved areas, provide global connectivity to logistics and transport, support disaster relief and serve as a fallback layer or backhaul for terrestrial networks.**

   The DSA agrees that non-terrestrial networks (NTNs) will have a role in 6G. Administrations are just beginning to contemplate some of the regulatory issues surrounding NTNs. There is a question of whether NTNs will be a satellite component of IMT, if it will be part of the Mobile Satellite Service, or both. There are several scenarios where Dynamic Spectrum Management Systems (DSMS) may be required, particularly if the intent is to limit coverage within certain (less densely populated) areas, while also permitting roaming across these areas.

8. **Recognises that a proactive position is essential for supporting the development and deployment of 6G. This includes further work by RSPG on early recognition of spectrum needs, so that the initial launch and operation of 6G networks/services can start in 2030. In due time, this early recognition of spectrum needs should be based on a proper evaluation of coverage and capacity needs for 6G use cases and usages scenarios and of the challenge of launching 6G at a time where most terminals will not be 6G-compatible, taking into account, among others, the results of projects in 6G Research and Development. RSPG will consider in 2024 or later a 6G spectrum roadmap.**

The DSA agrees that RSPG should identify 6G spectrum needs based on use cases, etc., and once these spectrum needs have been identified, the discussion should focus on which potential spectrum bands are most suitable which may include bands already identified for IMT. In the Draft Opinion, RSPG indicates it will consider a 6G spectrum roadmap in 2024 or later, but the RSPG opinion regarding WRC-23 Agenda Item 1.2 already focused on the upper 6 GHz (bands 4 and 5), plus certain European administrations have been actively advocating for an IMT identification in the upper 6 GHz. The DSA suggests that this seems highly premature given that current 6G efforts seem to be in the research phase.

9. **Recommends to the European Commission, taking into account RSPG recommendations, with the help of Member States, to work towards a strategy, involving all active stakeholders (research institutes, manufacturers, MNOs, spectrum users' associations, etc.), to facilitate the timely launch of 6G services across the EU.**

   Considering the lack of progress on the implementation of 5G, and the nascent state of 6G development, the DSA believes that the timely launch of commercial 6G services will be closer to 2035 than 2030. The DSA is concerned that with these protracted 5G/6G timescales there could be a detrimental effect on other technologies in accessing spectrum to meet their use case needs; this needs to be avoided and fairer treatment provided to non-IMT technologies.

Respectfully submitted,

Martha SUAREZ
President
Dynamic Spectrum Alliance