Comments to RSPG Opinion on Spectrum Sharing – Pioneer initiatives and bands

March 26th, 2021

Introduction & General remarks

The RSPG opinion starts by stating that spectrum sharing is today implemented in Europe in a rather static and conservative manner. Telefónica respectfully disagrees: spectrum sharing is actually very intense and dynamic in bands licensed to mobile operators. Cellular networks are continuously being upgraded to be able to serve an ever-larger number of heterogenous users that access the same frequencies simultaneously and in the same place. Recent innovations include Dynamic Spectrum Sharing, which allows the gradual introduction of 5G handsets in frequencies currently used for 4G[1]; Massive MIMO[2], which facilitates an exponential growth in the number of users in a cell; and RAN slicing[3], that makes it possible for users and services of a very different nature to share the same frequencies. All these innovations, driven by flexible spectrum licences with strong property rights, create large value for end users and prove that the dichotomy between property rights and sharing is a misconception.

The type of spectrum sharing that the RSPG opinion refers to is substantially different. It relates to a spectrum manager establishing rules and protocols that make co-existence between different property rights owners in the same frequency assignment. Looking forward, as described in the RSPG accompanying report, new technologies are being developed that make it possible to design and enforce more sophisticated spectrum usage rights. Telefónica acknowledges that those innovations can also be valuable, first as a tool for spectrum regulators to introduce rights and obligations that foster efficient sharing, but most importantly, as an enabler for voluntary agreements among licensees to find complementarities and increase the overall value of spectrum for society.

There is evidence, in sum, that speed of innovation around all types of spectrum sharing is a reality. Technology, however, does not solve basic trade-offs that need to be faced when deciding how to introduce sharing:

- Exogenous sharing rules, to the extent that they limit what licensees are allowed to do, constrain innovation within the remit of the licence. Power restrictions, for example, reduce the likelihood of interference and facilitate sharing among different authorised users. However, they also place a cap on the value of innovations that try to maximise the number of users that a transmitter can manage, or increase the number of transmitters required and which may have a negative impact on energy consumption.
- Implementing and enforcing rules can become cheaper, but it will not be free. Placing incentives in the right place is key to promote sharing in a cost-efficient way. Voluntary agreements or overlay licences work best in this respect. When there is an asymmetric

[1] Key breakthroughs to drive a fast and smooth transition to 5G standalone (qualcomm.com)
[2] How 5G massive MIMO transforms your mobile experiences (qualcomm.com)
[3] ericsson-5g-ran-slicing.pdf

component, as in multi-tier schemes, the cost burden should generally fall on those that benefit from opportunistic access, rather than on those that are imposed a "use it or share it" obligation. In that way, it will be less likely that resources are dedicated to build expensive solutions for which there is no demand. If, on the other hand, the rights and obligations are symmetric, as in one-tier schemes, costs should be shared, but the sharing framework should ideally be able to develop as demand picks up, with scope for authorised users to tailor the schemes to their evolving requirements, preventing unnecessary complexities.

- Fragmentation of usage rights makes agreements among users more difficult. That impacts negatively the chances of voluntary sharing deals that are value enhancing to everyone in the agreement: the larger the number of parties that need to be brought to the negotiating table, the more difficult it is to agree. For the same reason, it also affects the introduction of new innovations and technologies in the future, as agreeing on a change of technology is difficult among many users that hold stranded assets and have different valuations on present and future technologies.
- Spectrum is a scarce resource, and identifying frequencies for one particular type of sharing detracts them for other potentially more valuable sharing options. This is particularly relevant when a valuable ecosystem of handset and network equipment has already been developed for a particular band, and can be used in different sharing frameworks. That is the case for example of the 3.8-4.2 GHz band that is being featured as a possible pioneer band for introducing multi-tier sharing in Europe.

Spectrum regulators cannot escape those issues and need to be clear, when assessing how a particular band should be managed, on the direction of travel. Neutral licences with strong property rights are the cornerstone on which mobile networks are built, benefiting millions of users. Substantial investments have been made on the assumption that our services are protected from interference and that, within the scope of our licences, it is possible for us to introduce new uses or technologies. If investment incentives in cellular networks are to be sustained, those premises should still hold under a "use it or share it" standard, in future licences. Complementing those core bands with access to additional spectrum on a shared basis is, an option that we are willing to explore, respecting the property rights of existing licensees when they exist.

Options for promoting sharing

Sharing Conditions

Paragraphs 5-7 of the draft opinion point in our view in the right direction, and we agree with RSPG that multi-tier sharing approaches should be considered where one or more incumbent user for services other than Electronic Communications services occupy a band. When doing so, we suggest these principles are followed:

- New licences in the second tier should be neutral and flexible to the largest extent possible, their technical conditions being the minimum necessary to prevent interference with incumbents. We warn in particular against sharing rules that put limits on the second tier in order to maximise opportunistic usage by a third tier. Such strategies, in our view, create new fragmentation and are not helpful in attaining the objective of transitioning the band to a more efficient use.
- There should not be any bias regarding the nature of the new licensees. The reference in paragraph 8 to helping verticals access the spectrum is concerning in this respect, as

it gives the impression that verticals will be favoured over other possible users, like for example telecom operators. We propose its substitution by a more neutral statement.

- Without undermining existing property rights, incentives should be created for incumbents to adapt their use of the band in the search for possible complementarities with new licensees. The incentives can be managed by the regulator, for example giving financial rewards to the incumbents in exchange for voluntarily granting new licensees a minimum guaranteed access to spectrum. They can also be the result of voluntary agreements between incumbents and new licensees.

A second area of interest is spectrum sharing among peers, or one-tier sharing as termed in the RSPG report. We agree with paragraph 10 that encourages Member States to favour such sharing agreements, including spectrum pooling, if necessary attaching conditions to address competition issues. Along the same lines, club licensing can also be of interest in bands where deployments from the different licensees are not likely to overlap.

Strengthening trust and confidence

Trust and confidence are key to give incumbents and priority access licensees certainty that their rights will be respected, and especially that they will not suffer harmful interference. Without that assurance, it will not be possible for them to offer reliable connectivity to end users. Whenever a conflict arises, a solution should be readily available. Polluters should be quickly identified, and administrative procedures, when required, should be swift. These concerns should feature prominently in the standardisation work referenced in paragraph 13.

In order to further build trust and confidence, and at the same time widen the scope for sharing, RSPG essentially proposes to base the sharing conditions on realistic scenarios, rather than worst-case (paragraphs 15 and 22), and to impose and enforce high performance requirements on transmitters and receivers (paragraphs 14-16 and 23). We would like to raise two caveats to this approach:

- Using realistic scenarios, as opposed to worst-case, increases spectrum usage but also the chances of interference and conflict. We do not necessarily see that as bad balancing act, and in fact the mobile industry has consistently argued for such an approach when technical limits are imposed in IMT bands to protect adjacent users. The problem arises when fragmentation makes the resolution of conflicts through negotiation and agreements more challenging or impossible. On the contrary, when the number of users is limited, it is usually relatively simple to identify the problem, take mitigating measures and potentially negotiate compensations. If realistic scenarios are used, it is therefore imperative to keep the number of potential parties impacted manageable.
- There is a substantial difference between usage rights that are liberalised and flexible, and usage rights that are service or technology specific. When licences are flexible, licensees in competitive markets have all the incentives and means to use spectrum in the best possible way, including through voluntary sharing or leasing. Imposing additional and potentially costly performance requirements on transmitters and receivers, to maximise the chances of opportunistic usage, amounts to trying to solve a problem that likely does not exist. When licences are service or technology specific, however, there is a good chance that other valuable services could be introduced on a shared basis. The mere fact that there is an opportunity cost in reserving a frequency for a specific use actually calls for imposing high performance requirements that would facilitate coexistence with others.

Key Pioneer bands

In our opinion, innovative spectrum sharing solutions and authorisation methods can be most valuable in bands occupied in Europe by legacy service-specific licences, and in which a global ecosystem for Electronic Communication Services has emerged in other regions. In those bands, incentives for incumbents to use the spectrum in the best possible way are constrained by the boundaries of their licence, and sharing can be instrumental in enhancing the overall value of the frequencies to end users.

Demand for mid-band spectrum for Electronic Communications Services is likely to continue to be strong. A recent report by Coleago Consulting, endorsed by GSMA[4], describes the benefits of allocating an additional 1,000 -2,000 MHz of upper mid-band spectrum to ECS: in dense cities, it is the only feasible way to build networks that allow mobile users to experience in peak hour the data rates defined by ITU for IMT 2020 (100 Mbps downlink and 50 Mbps uplink); in suburban areas, it would reduce the need for cell-site densification providing substantial cost savings and environmental benefits; in rural areas, it would make Fixed Wireless Access solutions a more economical solution than FTTH for connectivity needs of up to 300 Mbps per household, potentially saving the EU 12 billion in subsidies for network investments[5]; finally, they would be instrumental in providing 100 Mbps peak hour connectivity in motorways, where low bands do not provide sufficient bandwidth and high band deployments would be economically unsustainable even with Public support.

The 3800-4200 MHz band, in which 5G deployments are foreseen in the short and mid-term in Japan, Korea and North America[6] holds, in our view, the highest potential to provide in Europe those additional valuable mid-band frequencies for Electronic Communications Services, on a shared basis with incumbents and with a view to provide a swift transition to a more efficient overall use of the band. We encourage RSPG and the EC to explore new authorisation methods for this band, taking account of the remarks made in the previous sections of this response.

The 2300 MHz band has been the subject of previous EU harmonisation initiatives to promote spectrum sharing, under the umbrella of the Licensed Shared Access concept. Those efforts did not have a large material impact, but we think it is still a band well suited for the introduction of spectrum sharing: first of all, it benefits from a global ecosystem for the provision ECS; secondly, the pilots undertaken in the past provide a solid foundation for the introduction of the more powerful sharing technologies available today. We therefore suggest RSPG to identify it as a second possible key pioneer band.

Roadmap

Investigation of more dynamic spectrum sharing options

As a first step, Telefónica agrees with the approach suggested by RSPG of gathering knowledge on incumbent usage in identified pioneer bands, and performing measurements and pilots to better understand the impact of real case interference (paragraphs 22 and 30 of the draft opinion). We also agree with the need to provide incentives for incumbents in those bands to

[4] https://www.gsma.com/gsmaeurope/resources/imt-spectrum-demand/

[5] Calculated as the savings in CAPEX in the provision of 100 Mbps FWA to rural homes if an additional 2 GH mid-band spectrum were available.

[6] https://www.qualcomm.com/media/documents/files/spectrum-for-4g-and-5g.pdf

update their technologies to more spectrally efficient ones (paragraph 23), and cooperate voluntarily in finding complementarities with possible new uses.

We see value as well in the suggestion to develop initial "proof of concept" systems in bands where advanced sharing solutions have been developed at least at the experimental level and are under the control of the regulator (paragraph 24). We understand that is the case of the 2300 MHz band. Exporting those systems to other bands, however, is in our view not only a question of technical feasibility, but of economic logic. When evaluating this option, the incentives of incumbents to maximise efficient use and complementarities with new valuable uses should be considered.

Finally, work in CEPT and ETSI to standardise sharing solutions would be helpful with a view to benefit from EU economies of scale (par 27). The standards should be driven by spectrum managers and industry players that will be the likely users, and remain voluntary for Member States.

Coordinated actions

We agree that information sharing practices among Member States (par 32-35) can be helpful in raising awareness of the potential benefits and challenges of the different sharing approaches.

Public funding can also be considered to finance the commercial development of sharing technologies (paragraph 36), but only when a market failure is identified, and without giving undue preference to some sharing solutions over others.

Finally, we see value in the joint identification at EU level of use scenarios that require spectrum sharing, and on the development of "proof of concept" sharing frameworks for those uses (paragraph 38), and look forward to discuss them with RSPG.