Review of the Radio Spectrum Policy Programme
GSMA Europe Policy Paper

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About the GSMA

The GSMA represents the interests of mobile operators worldwide, uniting more than 750 operators and nearly 400 companies in the broader mobile ecosystem, including handset and device makers, software companies, equipment providers and internet companies, as well as organisations in adjacent industry sectors. The GSMA also produces the industry-leading MWC events held annually in Barcelona, Los Angeles and Shanghai, as well as the Mobile 360 Series of regional conferences.

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1. Introduction

The Radio Spectrum Policy Program (RSPP) has been at the core of the EU communication framework since 2012, making it instrumental for the development of 4G networks across the continent. Most of its provisions are still relevant today and have therefore proven to be among the most forward-looking acts introduced in EU law, especially considering how little was drawn on of the Framework Directives (revised) 2009. Nevertheless, a revision of the RSPP Decision is now due, as EU Member States are licensing the 5G Pioneer Bands and mobile operators across the region are starting 5G deployments.

Europe is also facing COVID-19, the biggest societal and economic challenge of the century, leading to the de facto shut down of entire countries, severely limiting economic output for months, thus shedding light on the importance of connectivity and of mobile technology as a very powerful and essential enabler during months of quarantine.

Mobile networks have fared well, and around the clock efforts by the mobile industry have ensured that the step-change in demand for connectivity has been met, keeping the work lights on across the continent. However, despite the industry’s strong short-term response to the pandemic, even the very highest-level assessment of the European mobile sector indicates that it is in poor financial health. Return on capital employed, at 4-5%, is at a record low and is below the cost of capital. Global investment capital is taking flight from the European mobile sector, threatening a capital strike, depressing market capitalisation and risking credit downgrades for sector debt just as the new generation of mobile technology is being rolled-out.

In this context, it has become more important than ever that the new RSPP builds on the forward-looking spectrum policy elements of the European Electronic Communications Code (hereunder, the Code), complementing the new Directive in ways that would further enable the mobile industry to continue doing what it does best, connecting everyone and everything to a better future.
Over the last decade, the mobile telco sector in Europe has performed significantly worse from a financial perspective than in Asia and North America (see graphs below)\(^1\). Ahead of discussions on a new RSPP, it is worth analysing the extent to which spectrum policy has played a role in those developments, whether the experience of low returns to capital employed can impact investment perspectives in mobile connectivity in the next years, and how a new RSPP should be framed to foster not only the release of new spectrum, but also a sustainable business case for new investments.

\(^1\) www.deltapartnersgroup.com/state-european-telcos-what-left-europe-behind-race
With a short-term view, the figures can seem beneficial from an end user perspective. However, they are hardly sustainable in the long-term while being artificially sustained by regulatory interventions with the aim to “shape the market”. Looking forward, trends in EU telco share prices indicate that investors do not have confidence in mobile operators being able to extract returns from additional investments. In GSMA’s view, without that confidence it will be challenging for Europe to meet its ambitious connectivity goals, and it is here where a change of perspective is required.

A new RSPP can achieve investor confidence by making more spectrum available for wireless broadband and ensuring that fundamental policies and principles of spectrum best practice create the strong foundation Europe needs not only for 5G but beyond. How the spectrum is licensed is as important, or perhaps more so, as the amount of spectrum identified or when it is made available. Creating a European regulatory environment where Member States have incentives to use spectrum licensing as a way to foster investment rather than extract value from the sector should, in our view, be a core priority in the next RSPP.

In GSMA’s view, the provisions in article 6 of the RSPP were a valuable tool to release new spectrum for wireless broadband communications and liberalise IMT bands. In response, mobile operators have used their spectrum holdings to accommodate increasing traffic (usage per pop grew by four between Q1 2015 and Q4 2018) and reduced prices to end users by 75%.

2. GSMA Europe Public Policy Position: Award Best Practice, 18 January 2019.
3. The RSPP as an Instrument for Cooperation and Collaboration

The spirit of the current RSPP, something that permeates throughout the entire act, is how Member States, the Commission and other bodies are enticed and encouraged to work together on a multitude of spectrum issues. It is precisely this fundamental principle that makes this Decision such a critical instrument, because spectrum policy, and in particular licensing procedures, remain to a large extent a national competence.

Collaboration and cooperation among the different institutions and Member States is, in that context, the most efficient and conducive way to achieve good results for the long-term success of Europe.

The GSMA understands that it is important to accept that there are individual differences between Member States, after all, Europe is about unity in diversity. This diversity is especially needed for spectrum as different countries will face different challenges. But it is crucially important to learn from the challenges other Member States have faced and we must encourage the opportunity to share these experiences.

It is also true that there is not, in most cases, a one-size-fits-all solution. This, however, should not be used as an excuse when something difficult can and must be done – especially if it will be for the benefit of European citizens and the economy in the long-term. Constantly catering to all individual differences, as we have seen in the past, creates fragmentation, division and destroys the fabric and the benefits a Digital Single Market can offer. In the end, the decision on whether or not to work together, collaborate and be stronger together, rests entirely in the hands of governments across Europe and the level of ambition and leadership they have. The DNA of the mobile industry, at its core, is connecting everyone and everything, so the only option for Europe to be successful in the digital age is to work closer together.
4. Application and Enforcement of the RSPP

The RSPP has been forward looking, trying to foster regulatory predictability, certainty and encouraging collaboration among Member States and the different bodies that deal with spectrum. However, despite those provisions and the legal nature of the document, many, if not all, of the policy provisions were disregarded by a multitude of EU Member States and unenforced by the European Commission.

The few elements within RSPP articles 3 and 6 on making available 1200 MHz total and the 800 MHz frequency band specifically, were the only ones that were broadly applied. Even in those two cases, nearly three quarters of EU Member States asked for derogations, eliminating the purpose of this document on nearly all spectrum policy accounts.

The Mobile industry understands the difficulties of cross-border coordination and differences at the national level, some of which did prevent some administrations from complying with the deadlines and objectives. However, almost none of the articles on cooperation between Member States or with the EC were actually respected and this brought the failure of the spectrum policy measures within the RSPP, which now, in hindsight, would have had a very big impact on 4G then and prepared the continent for 5G now.

Award best practice has been mentioned on a number of occasions throughout the RSPP Decision. It is worth noting that despite a provision existing within article 4 of the RSPP, it was not until the peer-review article was proposed within the Code – some 5 years later, that the RSPG created a peer-review stream and platform. Yet such provision already existed within article 4 of the RSPP already.

In many respects, the RSPP was the right document at the right time. It included all the right elements and provisions to help Europe catch-up with the US and China on 4G and start on the same foot with 5G. In fact, the GSMA and its members requested through the legislative cycle of the Code the same provisions that had already been introduced by the RSPP many years ago. Had the RSPP simply been applied and enforced, Europe would have been much better off.
5. Strategic Spectrum Issues

The COVID-19 crisis has demonstrated the vital nature and importance of fixed and wireless Electronic Communication services availability – with adequate capacities – across the continent. Whereas wireless services may have been considered as “good to have” services up to the 2010s, the crisis proved they are now in the short list of “must have services” for all citizens. The COVID-19 crisis has also led to a significant shift in population density where more users are opting to live in and work remotely from less-dense rural areas where traditionally demand, in terms of capacity as well as coverage, has been relatively low. In this respect, it is more crucial than ever to ensure the mobile industry has the right mix of frequencies at its disposal to provide the best coverage and capacity to everyone.

Over the next ten years, the availability of reliable high-capacity networks will become even more important to Europeans. People and businesses are relying more heavily on current services (such as video streaming and video-conferencing), and increasingly on emerging services (such as virtual reality and e-health). These advanced networks will also serve as a platform for Europe to achieve its broader policy goals of becoming a technology industry leader and, as we describe in the section on climate change below, helping to cut down on carbon emissions. The GSMA and its members are ready to do our part to deliver this vision, but can only succeed if government does its part to put in place policies that promote a sustainable, predictable, certain and consistent competitive investment environment.

Spectrum policy has a critically important role to play in this context. It is important that more spectrum be made available in different ranges (low-, mid-, and high-bands) in due time, with comfort margins for crisis, but there needs to be a more fundamental re-think of the policy-setting framework and how it can help or hinder the delivery of this vision. Specifically, we believe there should be two fundamental changes in the process for setting spectrum policy in Europe:

- First, policymakers need to clearly outline their policy objectives, prioritise them and acknowledge any trade-offs between them. For example, if a primary objective is to incentivise investment and reduce the digital divide, it will not be possible to also pursue a policy of high revenue from an award.

- Second, there needs to be a structured and transparent process to make spectrum policy decisions. While in the fixed sector there are clear guidelines about how market assessments need to be carried out (when and how any potential remedies need to be implemented), there is no such standardised process for spectrum policy, which means that each European administration approaches the spectrum policy-making process with a different level of rigour, transparency and openness.

Under a clear, transparent and structured process, based on article 52 and 67 of the Code, policy makers in Europe can provide the much needed predictability and certainty for the market. Having such a process, applied across EU Member States, would raise the bar on the quality of spectrum awards, allow market players the opportunity to share their views and crucially, allow the governments to achieve the political objective(s) with the collaboration of industry rather than working against it, thereby creating much better results for the market. A more detailed proposal can be found in the section on Spectrum Awards and Conditions.

The GSMA is grateful for the opportunity to have its views considered and hopes the sections that follow provide helpful details on how to create a strong, impactful and resilient Single Digital Market in Europe through a second Radio Spectrum Policy Programme.

6.1 Introduction

The GSMA strongly advocates for exclusively licensed spectrum as it remains the best way to ensure quality of service to customers for 5G. In order to meet demands of different use cases and in different areas, sufficient spectrum is needed in all spectrum ranges, low (below 1GHz), mid (1GHz-6GHz) and high bands (above 6GHz). We also see a role for unlicensed spectrum to efficiently manage indoor traffic, increase capacity for hotspots through WiFi or the 3GPP NR-U, and to possibly add complementary capacity outdoor.

However, going forward we understand that additional spectrum will be harder to fully and easily clear as there are an increasing number of spectrum users and only a finite amount of frequencies available. Therefore, while the ideal scenario would be one where full clearance and national licences are achieved, the mobile industry is exploring innovative ways to share spectrum between incumbents and new users.

In terms of managing the introduction of new generations of mobile service, like 5G, new technology will allow mobile operators to dynamically allocate bandwidth to different technologies (i.e. 4G and 5G) as a spectrally efficient way to introduce 5G in existing mobile bands, especially in the initial stages of 5G deployment. We support further studies that look at fostering coexistence in this respect.

For the spectrum bands already identified for IMT across Europe, the regulatory process to make them suitable for 5G use is on its way, but there are significant obstacles generated by commercial and regulatory obligations to maintain legacy services, e.g. eCall requirements, which could leave MNOs saddled with 2G networks for decades to come. This means maintaining old technology and tying up valuable spectrum resources to support networks that are several generations old.

The bands in Europe that are the most relevant for the industry will vary by operator, based on the amount of spectrum they can use in specific markets and the need to support earlier generations (2G, 3G, 4G). It will be essential that a revised RSPP encourages and incentivises, but does not mandate, the straightforward repurposing of existing spectrum for newer technologies, thereby allowing for more efficient spectrum use, avoiding a fragmented use as much as possible.

Reframing will also be made smoother with the equipment that supports 4G and 5G through dynamically sharing bandwidth among the two technologies. CEPT has been working on enabling 5G and AAS in the existing bands, and licenses should be technology neutral, so it is difficult to see severe obstacles for refarming from the regulatory perspective.

Finally, harmonised spectrum beyond the pioneer bands will be required and innovative ways of licensing will be needed (e.g. administrative assignments or different block sizes), if the 5G vision is to become a reality.
6.2 Need for additional spectrum harmonisation within the RSPP

While spectrum is needed across different ranges, for Europe, the GSMA believes the RSPP should initially focus on spectrum for mobile within the low and mid-range spectrum bands.

For previous mobile generations, the sweet spot between coverage and capacity was predominantly below 2GHz and specifically within the UHF and 1800MHz bands. With 5G NR, the sweet spot for new spectrum has moved to a higher frequency range, between 3 GHz to 6 GHz. In that respect, the 3.8 GHz to 4.2 GHz will be perhaps the most interesting, along with the 6425-7125 MHz, which can be a substitute or in addition to it depending on the capacity and coverage needs across Europe. The other potential candidate for further harmonisation is 2.3 GHz where wide support in handsets makes the band intrinsically valuable for IMT services. Improved sharing technologies and increasing demand from uses that could more easily coexist with incumbents make it worth exploring.

The 3.8-4.2 GHz, 6425-7125 MHz and the 2.3 GHz bands have very big potential to provide added capacity in the medium term and long-term if, of course, there is sufficient amount of spectrum per operator to deliver the 5G QoS. In this respect, it would be critical to increase the mid-range frequencies for the mobile industry within the RSPP beyond those that have been selected as Pioneer Band for Europe.

6.3 Spectrum Bands and Availability

How the licensing – the conditions and many technical elements are subject to national decisions – is done at national level has led to a wide spectrum of approaches and fragmentation across Europe. It is the case right now that there are some frequencies that are harmonised, but remain unused. From our perspective this happens for number of reasons:

- For spectrum to be put to use in Europe, a critical mass of European countries need to make the band available, under similar conditions within a similar time frame at the lowest possible price to create enough market size and confidence to incentivise capital to be invested in the roll-out of those frequencies.

- Licence conditions and costs associated with award prices and annual fees are critical to ensure that any band is commercially viable.

A good example is the 700 MHz SDL option, where only a very small number of EU Member States have made it available, thereby putting into question whether there will be sufficient economies of scale to develop the band.

Another example is the TDD portion of the 2100 MHz band. Those frequencies have generally not been actively used, especially since many policy makers across Europe have chosen to divide the band between FDD license holders, making it effectively useless in any meaningful way for 5G.

If bands are harmonised and made available throughout Europe under similar conditions, there is much more likelihood that an ecosystem will develop – avoiding future missed opportunities and wasted spectrum. The RSPP should aim to find a solution to address these failures and prevent others from occurring in the future.
6.4 mmWave spectrum

In the short term, the mobile industry is focusing 5G deployment efforts mainly in the range of 700 MHz to 6 GHz, as it is able to provide 5G services over larger areas than mmWaves can deliver. In this respect, the harmonised 3.4 GHz-3.8 GHz band in Europe has been the prime spectrum for the first wave of deployment – provided the entire 400MHz is made available.

The use cases for mmWave frequencies will develop over time especially once the initial wave, using mid-band spectrum, showcases some of what 5G can bring to consumers and business across Europe. Following this first wave, depending on market demand in terms of capacity, and the emergence of new and innovative services, the need for mmWave will crystallise. To justify the use of higher frequencies, both at commercial and technical levels, it is critical that there is sufficient amount of spectrum (e.g. 800 to 1000 MHz per operator in the 26 GHz band) to make it attractive and investment-worthy. This approach would help avoid repeating the same situation as the 2100 MHz where blocks were too small to be useful or the 2300 MHz where incumbents made it impractical for the mobile industry to use it.

The Mobile industry expects that mmWave frequencies will see some limited used in two to three years’ time taking into account the different demands, availability and general market dynamics across Europe. Their use also depends on whether the 26 GHz band is available within a reasonable time in the Member States that must clear it from incumbents, or whether alternative bands like the 42 GHz take its place to help with hot-spot capacity needs.

While the 26GHz will be used in the near future, higher frequencies like 42 GHz are bands that will have more widespread use in the much more distant future, given they have an even smaller coverage potential. In this respect, the first stage of mmWave deployment with the 26 GHz will be the test-bed for what would be possible and needed across Europe in the long-term. We hope that also, with higher frequencies, other very specific use-cases will emerge with time – making their use and need wider than city hot-spots.

The interest and therefore demand of mmWaves will largely depend on how successful the first stages of 5G deployment, uptake and innovation will be from these new 5G networks. As such, all of this will depend on the sequential deployment starting with the C-band and refarming of existing frequencies followed by higher, mmWave bands.

mmWave bands above 26GHz

The GSMA believes that starting work in bands above 26 GHz bands is important. We support the ongoing ECC activities to harmonise the 42 GHz band. Collaboration with the mobile industry will be essential to be ready to have those bands available when the market demand will be there, ensuring a constant, steady and predictable supply of spectrum.

At this stage, this is not urgent, especially given the limited capacity of the ECC and the higher priority on work on other, more critical bands. In this respect, the industry believes that the 66-71 GHz is a key band that should be licensed in Europe and thus it would be useful to work on the conditions that would enable 5G (with higher power than SRDs) in the band, at the same time guaranteeing the necessary protection from interference.
Coexistence in mmWave

For the mobile industry to deliver the QoS users expect from 5G, having access to contiguous cleared spectrum is the best option. We are open to considering ways in which the mobile industry may be able to migrate themselves if they are the incumbent users or help migrate others. However, given the low propagation in mmWave spectrum, sharing may be more suitable than in other bands (although a clear definition of required sharing parameters would be needed to provide certainty and predictability).

We also want to note that mmWaves will not be used throughout the geography of a given country, which means that a potential mixed solution for assignment could be possible depending on the specific needs of the market and the players. In addition, there are some cases where there are potential concerns with incumbents in the 28 GHz band, e.g. links possibly getting interference from 26 GHz mobile.

mmWave licensing

Given the importance of finding the best way to license frequencies, the GSMA developed a separate position paper on the topic that we would like to refer you to, GSMA Europe 26 GHz Spectrum Policy Paper3.

6.5 Beyond 5G

The GSMA believes that academic and research discussion needs to start in due course without diverting or preventing the successful development and rollout of 5G in the coming years. Beyond 5G systems (B5G) and 6G should not be considered in the same way as previous generations, as it would be better to break the link between a new ‘G’, new radio hardware and spectrum.

It is therefore too soon to be rushing towards a new generation of mobile system before the investments operators have and will be doing on 5G will demonstrate the true transformational power of 5G.

6.6 5G Deployment Challenges

Synchronisation

The GSMA believes synchronisation is a real challenge to 5G deployment, coverage and ability of the industry to provide high quality of services to Europeans across the continent. New and innovative services will require different frame structures depending on the type of service being offered (e.g. consumer mobile vs industrial services). The issue is compounded further by the different demands, players and dynamics of each European market. As a result, the border areas between countries that decide, for example, to have 4G-friendly frame structures due to legacy licenses and networks and those that chose 5G-only frame structures focused on latency, will not be compatible in a TDD band.

A key issue in these national decisions is whether and how to protect existing legacy services (e.g. WiMax or TDD LTE technology). France, Italy and Romania have adopted a 5G frame structure which is compatible with these legacy systems, whereas countries like Germany did not consider legacy constraints and adopted a 5G-optimal frame structure.

As a result, the implications are quite severe as exclusion zones at the borders can be tens of kilometres wide on each side to ensure there is no interference. For example, if there are vertical players with campuses close to cities which chose different frame structures as a result of their specific vertical needs, it would mean that similar exclusions zones around those campuses would have to be created within a given market creating a very significant problem for deploying 5G networks.

While the mobile industry has been hard at work to manage synchronisation between mobile operators, where differences can exist given different business models and competition, synchronising MNOs with non-MNOs in addition to cross-border coordination in the EU will be a daunting task. This will be even more complex for those Member States bordering non-EU countries.

It is for this reason that the mobile industry in Europe encourages policy makers to allocate spectrum in separate bands for local use, if there is justified demand, instead of setting aside spectrum - in the 3.6 GHz band or any other pioneer band - or at a very minimum set clear conditions before the award, if local and national or regional licences coexist in a band. This way the synchronisation issues related to vertical users can be limited significantly if not eliminated entirely.

Synchronisation also risks creating severe fragmentation for the underlying structure of Europe’s Digital Single Market. When one or more countries choose a frame structure that is 4G-compatible as opposed to 5G-focused, the ability of innovative services to emerge or take advantage of the entire EU scale is greatly diminished. This creates a situation where some networks are capable of offering those services while others would not. At the moment, some markets like Germany and the Nordic and Baltic countries have opted for the 5G-only frame while some other markets have not, thus laying the potential ground for this level of divergence in the short and medium-term.

It is critical to find a solution to this forthcoming problem within the RSPP as 5G deployments mature and coverage increases exponentially. Member States, stakeholders and experts should collaborate and coordinate both at the national and European levels to ensure that synchronisation does not create very real deployment bottle neck, or completely stop it, in the next few years.
Siting policy

The recent Connectivity Recommendation by the European Commission has a series of great measures and policies that would significantly simplify and streamline the deployment process for macro-site across Europe if applied in the coming months by EU Member States. There is currently a patchwork of policies across Europe, many of which are significantly outdated, making the time to put up a new mobile site anywhere between 18 to 24 months and often similar time frames for simply upgrading existing sites4.

Deployment stages and technologies

Mobile operators are deploying 5G through a mix of technologies and bands, depending on the spectrum portfolio and service needs of each of our operating companies. In this respect, some countries are ahead of others based on the availability of spectrum, the conditions and other market specific factors. Spectrum requirements differ, but the overall pattern is that existing mobile bands (including 5G pioneer bands) need to be complemented with new frequencies for an efficient future 5G deployment.

In addition, mobile operators are deploying 5G in parts or in markets where the spectrum is available while others are in the planning stages pending the awards – especially in those that have not made the pioneer bands available yet.

Small cells policy and deployment strategy

Mobile operators will predominantly focus on the 3.5 GHz and 26 GHz bands for initial small cell deployments. Deployments are currently limited and localised in Europe and the GSMA expects them to remain so for some years, especially given the cost of deployment across Europe as outlined in the above point on siting policy.

The GSMA believes that the EECC, if transposed in a forward looking way across Europe, provides a good framework to facilitate that. In particular, the SAWAP implementing act that was completed in summer 2020 will be particularly useful. Although volume in terms of litres is good, the power levels still remain low. While those technical conditions might be a limiting factor, the critical bottle neck for mass-small-cell deployment will be the cost – in terms of rent charges by private landlords.

It is important to consider that there are a number of EU countries which have more relaxed and forward-looking small cell policies in place – making them great candidates for best practices that can and should be encouraged within the next RSPP.

6.7 Spectrum Awards and Conditions

The GSMA believes that the conditions of spectrum awards should reflect the policy priorities of the government whilst acknowledging the trade-offs of those decisions. Policy makers have traditionally aimed to have it all – investment, competition, coverage and revenues from auctions – but it is critical to acknowledge that the current system doesn’t work. If, for example, the prime policy objective is increasing coverage, then more targeted, coherent and collaborative deployment alternatives such as the UK Shared Rural network may be considered. Such commitments could also be made as part of a competitive process in which licensees take additional commitments in exchange for discounts in spectrum fees, following recent experiences in Austria and Denmark. If on the other hand the objective is to maximise competition and/or revenues, investment and coverage will necessarily suffer.

Given the implication of those decisions and the market-shaping power that awarding spectrum has, a transparent, clear and detailed framework outlining the political choices of each government and regulator for their market are critically important. The GSMA requests the RSPP adopt a structure, complementing article 52 and 67 of the Code, for Member States to apply nationally.

Specifically, the RSPP should require member states to:

1. Clearly and explicitly set out the policy objectives, their prioritization and rationale for those choices, including empirical evidence, well in advance of the award. A Clear choice and strategy would not only provide certainty and predictability in the market, but it would allow those policy decisions to be assessed after the award and demonstrate whether they are achieving those same policy goals. The prioritisation of certain objective vs. others, especially when policy objectives are contradictory – coverage vs. state revenue to name one – would allow the industry to be ready for the award and subsequent deployment.

2. Only address a perceived market failure with a market intervention after they:
   a. Publish an assessment, supported by empirical evidence that takes into account the impact on all relevant stakeholders:
      i. Demonstrate due consideration to other alternative measures, why those alternatives are not sufficient and why the current situation requires a remedy.
      ii. Crucially, the assessment should also demonstrate that the proposals are in line with the policy priorities of the policy makers.
   b. Open the assessment document to a public consultation where stakeholders can provide their input. The consultation process should be timely and in line with EU standards.
   c. When making the final decision, and after receiving the responses to the consultation process, the policy makers should:
      i. Set out a detailed statement where they explain why changes have been made to their decision compared with the original consultation – as a result of incorporating evidence received during the consultation.
      ii. Policy makers should also provide a summary of the responses made during the consultation to be transparent and, where they have not incorporated evidence or arguments provided by stakeholders, they should explicitly set out why those were not considered to be valid or relevant – refuting the analysis provided by the stakeholder(s).

The adoption of such a process would benefit the mobile industry as the priorities, rational and evidence of the policy makers would be made available well ahead of the planned award providing predictability. Moreover, the openness and transparency of the consultation process would allow a fruitful exchange of views for the policy makers to help understand the market players, their needs and visions for the future. Ultimately, and independent of whether or not there is agreement, this kind of discussion and engagement with stakeholders at the national level would build trust and confidence and foster cooperation between policy makers and the industry.

### Measuring QoS

The GSMA does not believe that the RSPP is the right place to deal with harmonised instruments on assessing QoS/QoE. We believe that measurements in the field coupled with transparent reporting on coverage and data speeds that have been done so far have been adequate in this respect. These look at:

- Throughput and e2e latency (min, average and max) performance of user data; number of data sample greater than targeted throughput.
- Radio resource utilisation and associated highly loaded and congested cells statistics.
- Voice: Call setup delay and failures; Drop calls and handover failures etc.

### 6.8 5G FWA

The GSMA believes that 5G FWA is a valuable option where FTTH is not cost effective. This heavily depends on the conditions of each national market, and in particular on the price per connected household as well as the related operational costs. From the quality point of view, fibre can sometimes be more stable and reliable than FWA in particular in the mmWave range. Therefore, some municipalities should look to incentivise fibre rollout through different policy measures.

### 6.9 Unlicensed 5G

The GSMA believes that non-standalone NR-U deployments can be useful to add capacity in the long term. While at the moment there is less interest in this topic, it is important that the RSPP does not unnecessarily narrow the possible use of unlicensed spectrum to Wifi. Rules should be neutral and not favour indoor over outdoor or Wifi over NR-U for example.
6.10 Dynamic Spectrum Access

Dynamic sharing, where there is uncertainty about the timing and location of incumbent usage, is very complicated from a mobile perspective, especially when usage is intensive or unpredictable. It greatly reduces the value of spectrum for mobile use and makes its use difficult for mobile operators when it comes to ensuring a certain quality of service.

Sharing, however, may increase the overall supply of spectrum available for mobile demands. Thus, bands which can be made available with a static sharing approach, or at least a limited dynamic way, may be worth exploring.

In situations where this might be an option to increase spectrum availability, it would be essential to have a dedicated spectrum management system whose costs are shared among all users. Such an approach needs to be carefully assessed, taking into account whether these costs and the related efforts in network management implementation are worth it. Therefore, the GSMA would consider such an approach as least preferred and to be used only in special or exceptional circumstances.

7. Spectrum Governance

7.1 Radio Spectrum Policy Group

The GSMA would also like to note that the RSPG and its sub-groups have increased their engagement with stakeholders since the days of the first RSPP. The GSMA commends the current and past two chairs of the RSPG for their continued approach to openness, transparency and collaboration with the mobile industry.

The revised RSPP should take stock of the Peer-Review process and in particular make it open to the participants of those awards. The collaboration, cooperation and critical exchange of good practices between Member States cannot be understated and this is an area where the GSMA believes further progress can be made.

Understanding the sensitivities, limiting the peer-review process only for Member States does have merits. At the same time, including the concerned market players in an open, transparent and honest discussion about the immense impact that spectrum awards have on the market for decades, is absolutely essential. We suggest that the RSPG hold bi-annual meetings with stakeholders; one where the industry can provide its detailed analysis of forthcoming awards across Europe and a second one reviewing past awards and the lessons that can be learned from them.

The GSMA firmly believes that an open and frank discussion between spectrum policy makers and the market players directly concerned would be not only be in the spirit of what Europe stands for, but the only way to find common solutions to the challenges Europe is facing whilst avoiding repeating past mistakes.

7.2 Member State Governance

The GSMA believes that the new RSPP should encourage more consistency across EU Member States with regard to national preparatory meetings and sharing information with market players. This practice is not universally applied, and doing so would increase the level of transparency and collaboration with the industry.

7.3 CEPT

The GSMA is happy with the level of transparency within CEPT and how the group has engaged with stakeholders in its meetings.

7.4 Radio Spectrum Committee

The Radio Spectrum Committee should be more transparent and involve stakeholders in its work to some degree, similar to how CEPT organises its meetings or like the RSPG engages with stakeholders.
7.5 Coordination with military and NATO

The GSMA encourages collaboration with NATO and military users. We have seen that CBRS technology is working to show that a sensor network may be able to ensure protection for military uses. We therefore believe that discussions on how military frequencies might also be open to relocation or sharing should begin. These discussions should include how protection can be ensured and if/how they can upgrade their technology or be incentivised in other ways to optimise their spectrum use.

The GSMA supports exploring studies and cooperation with NATO and ministries of defence.
8. External Relations

The GSMA believes that the current European internal preparation process is well suited to develop EU positions while the CPG is a recognised body in the other ITU-R Regions. At the same time, there are significant difficulties, sometimes, in dealing with 3rd countries when having bilateral discussions. In this respect the EC can and should play a greater role to support those countries in greater difficulty. The sharing of best practice in this area could be of particular use, especially throughout the good offices of the RSPG.

9. Other Strategic Topics

9.1 EMF

Equipment manufacturers like Ericsson and Nokia have provided demonstrations on the basis of the IEC 62232/62669 work that led to the new methodology for AAS and mMIMO. These simulations included 6min averaging before the updated ICNIRP guidelines were published and we would expect that can be easily extended to 30min per the ICNIRP’20 guidelines.

5G EMF Measurement

The GSMA believes that a European-wide measuring campaign with sufficient incentives and specific cases, designed and suggested by a European body could be a good opportunity to assuage the doubts on 5G operations. Conditional, of course, on a framework of techniques, costs and communication that is discussed and approved.

An alternative would be to take dedicated measurements in typical scenarios, focusing on massive-mimo and realistic output power levels.

Possible measurements include those based on the following examples:

- UK - measurements are conducted annually by Ofcom with the 5G measurements being made public.
- Italy - measurements are done by Regional Environmental Agencies, where they are doing a lot of measurements close to 5G sites with some results published

7. www.snpambiente.it/category/temi/campi-elettromagnetici/
EMF Education and Misinformation

The mobile industry supports public education programmes and clear, science-based information and public statements such as during the coronavirus 5G misinformation campaigns. In addition, we welcome fighting fake news and misinformation, as it unsettles the population and leads to rising but unjustified concerns regarding the health of 5G. According to experiences with mobile networks the overall levels will remain well below the international safety guidelines, which apply for all frequency bands currently envisaged for 5G.

The GSMA supports the measures suggested in the Democracy Action Plan consultation to help stop the propagation of disinformation through social media.

New ICNIRP Guidelines

For the first time in 20 years, ICNIRP has updated the international safety guidelines for electromagnetic field exposure (EMF) from smartphones, mobile devices and network antennas. The sweeping review of research concluded that the health risk assessment is unchanged and only small adjustments were made. The review found no established health risks to anyone, including children, using mobile phones or living near base stations.

New ICNIRP Guidelines

After a proper review by SCHEER and other EU Scientific Committees an update of the EC Recommendation on the limitation of exposure of the general public to electromagnetic fields (1999/519/EC) should be driven forward. Member States should review and align their policies along science-based limits.

9.3 Climate

The GSMA supports the efforts to achieve the Paris agreement climate objectives. The consistent use of the latest mobile technologies and the decisions of mobile operators to transition to green energy have been a testament to the importance of the industry to reduce its carbon footprint and completely eliminate it by 2050.

The mobile industry has also had tremendous impact on reducing the carbon emission of other industries through digitisation. A recent report by The Carbon Trust and the GSMA provides a global overview of the enablement impact that mobile communications technologies currently have on reducing Green House Gas (GHG) emissions, across various sectors. The report looks at a high-level analysis of six categories of enabling mechanisms, along with case studies. It concludes that by increasing connectivity, improving efficiency and impacting behaviour change, mobile network enabled technologies are helping avoid emissions. In 2018, the enabling impact of mobile communication technologies globally was estimated to be around 2,135 million tons of CO2.

The total annual emissions of the mobile sector are approximately 0.4% of total global emissions. Compared to the global carbon footprint of mobile networks themselves, the level of avoided emissions enabled by mobile communications technologies is 10 times greater – a tenfold positive impact. The majority of these avoided emissions result from a decrease in electricity, gas, and fuel consumption. In 2018, mobile communications technologies enabled a decrease in 1.44 billion MWh of electricity and gas, and 521 billion litres of fuel, globally. These totals would be enough electricity and gas to power more than 70 million houses for an entire year and enough fuel for all 32.5 million registered UK passenger cars to drive for 19 years.

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Digitisation is expected to disrupt all parts of the economy over the next decade and, if sufficient policy and investment is received, it has the potential to be a key driver of low carbon development.

A similar 2015 report with a European and North American scope concluded that mobile technologies had a 5:1 enablement ratio compared to the footprint of the industry.\(^{10}\) Published four years later, this report has seen a doubling in enablement savings, to 10:1. By 2025, estimates based on projections of smartphone users and increases in number of IoT connections could result in a further doubling of the avoided emissions enabled by mobile technologies.

The world needs to halve emissions by 2030 to limit global overheating to 1.5°C. Mobile network enabled technologies form an important part of the de-carbonization solution, enabling rapid emission reductions while improving quality of life and supporting economic growth.

The fact that the enablement effect of mobile technologies far outweighs its direct impact has very important implications for the climate related provisions in the RSPP. We would like to point to two concrete issues:

- Incentives on the mobile sector to be energy efficient should be designed in a way that does not have an indirect negative impact on end users through increased prices, lower coverage or worse quality of service. The GSMA strongly encourages spectrum policy makers to explore instead positive incentives, such as for example a reduction in spectrum fees in exchange for the introduction of energy efficiency measures that are carbon neutral or beneficial from the end user perspective.

- Reserving spectrum for verticals that are relevant for the fight against climate change, such as for example smart electricity grids or connected cars, can be well intended but have negative consequences if it creates scarcity of spectrum for public networks or compromises economies of scale.

- The principles of technology and service neutrality should be respected to the largest possible extent.