ETNO responses to RSPG Consultations on draft opinions on RSPP, Spectrum sharing, and Additional spectrum needs

As ETNO appreciates the opportunity to provide comments to the consultations on the RSPG draft opinions on RSPP, Spectrum sharing, and Additional spectrum needs and guidance on the fast rollout of future wireless broadband networks.

The Draft RSPG Opinion on a Radio Spectrum Policy Programme (RSPP)

As RSPP sets the spectrum policy goals and frames for EU Member States for the next 10 years, it should have sufficiently forward-looking elements. ETNO agrees that connectivity and technological advance are cornerstones of economic recovery, and that maximizing societal value should be the overarching target.

Spectrum Sharing (2.1)

ETNO notes that spectrum sharing should not be an objective as such, but an enabler for more efficient spectrum use. Also, it should not compromise the overarching target of maximizing societal value of spectrum.

Citizens and societies are increasingly relying on mobile and broadband connections. Exclusively licensed spectrum is necessary to support wide area services with high quality, as well as heavy network investments. Thus, exclusive licenses should remain the main method to assign spectrum for mobile network operators (MNOs). Even today MNOs share many mobile bands with other services, and protection of other use is typically addressed with appropriate license conditions. This is a feasible method to address sharing especially with existing use that is limited in a specific geographical area, or otherwise static and predictable. However, as it is becoming increasingly difficult to clear new spectrum bands for mobile use, more advanced sharing methods can play an important complementary role if the sharing framework is carefully designed. Consultations with all potential users are vital and should start well in advance. Operators appreciate clear plans and early decisions to bring stability and predictability for investment related decisions.

For providing services in urban and rural areas, indoor and outdoor use, and ensuring sufficient backhaul capacity, MNOs need to access a wide range of spectrum resources in order to have the needed flexibility in the deployment. Thus, we prefer nationwide exclusive licenses. If spectrum sharing means that an insufficient amount of licensed mobile spectrum is available where and when needed, sharing may limit mobile operators to meet the increased demands of society.

ETNO notes that MNOs use spectrum efficiently and provide great societal value. We deploy new technologies, and use dynamic spectrum sharing (DSS) to utilize efficiently our spectrum holdings. Many MNOs also have network sharing agreements with other MNOs, and provide services in shared networks, where feasible to best serve the customers. Additionally, MNOs provide services to various vertical users, including industries, health sector, transport actors etc.

ETNO is open for voluntary sharing, and spectrum leasing, based on commercial agreements, and deems the sharing e.g. based on "use it or share it" approach only acceptable in duly assessed and justified situations. The sharing approaches should always be considered on case-by-case basis, ensuring that provision of existing and new mobile services is not compromised, and that competition remains fair. However, voluntary sharing approaches should not be unduly restricted by competition regulation. This includes spectrum sharing between MNOs for the same service, but also between different spectrum users for different applications or services. For example, regionally non-utilized spectrum can be used for other applications and services until needed by the holder of the primary allocation.

ETNO supports the recommendation on developing feasible technical solutions for facilitating spectrum sharing in practice. We note that when developing such solutions, it should be taken into account that managing a mobile network operation with a large set of configurations in various mobile bands and technologies, and considering the timely capacity and quality demands, is not a simple process even within a single operator's network. Technical compatibility of the shared technologies must be taken into account, to minimize the required separation and risk for interference between uses (e.g. TDD synchronization requirements and agreements). The more users share a licensed spectrum, the more complex sharing management becomes. As various technical and regulatory solutions have already been developed for sharing, we propose a careful study on feasibility of those solutions for different sharing and traffic scenarios.

In some harmonised IMT bands, there are legacy users which cause restrictions for new use, and thus prevent the use of spectrum to its maximum value. In such cases, sharing can be instrumental in the transition to a more efficient use. ETNO supports RSPG, CEPT and the European Commission exploring possible harmonised approaches that, respecting the rights of incumbents, prevent fragmentation and foster possible voluntary agreements between legacy users and new licensees.

Finally, we note that increased guidance on competition considerations regarding spectrum sharing is needed at EU-level to ensure level-playing-field among all actors across Member States. Also, in addition to technical and regulatory enablers, clear incentives may foster spectrum sharing on voluntary basis.

Licensing and Spectrum Awards meeting nationwide and local needs (2.2)

Individually licensed spectrum for exclusive usage is the basis for ensuring widespread and high-quality mobile services, as it provides certainty for making the needed long-term investments for mobile networks. When the demand for spectrum is higher than supply, well defined auction is the best way to allocate spectrum efficiently. Other award mechanisms may be feasible in case the demand is less than supply or when the market is well-functioning and balanced. Direct assignment may be used if it is proven that there is no excess demand. This kind of approach might be feasible for example if the objective is to issue local licenses in part of the mmWave spectrum.

As brought up in the draft opinion there are various means to address the local demands. ETNO agrees that unlicensed spectrum has a role in addressing many local demands, and notes that additional 480 MHz is being assigned in the lower 6 GHz band, and 5 GHz in the 66 GHz band on general authorization basis in Europe. Spectrum leasing is also a feasible approach to address some local demands. ETNO supports leasing on voluntary basis. In addition, MNOs have increasingly better possibilities to address specific local and vertical demands within the mobile networks as addressed below.

ETNO is not supporting spectrum reservations for local licenses in the spectrum bands that are internationally harmonised for IMT. In case regulators decide to set-aside spectrum for local licensing, this needs to be clearly justified by a cost benefit analysis. In such cases, for all interested parties, the conditions to apply should be objective, transparent, non-discriminatory, and proportionate, this being the basis for a sustainable competition. Most importantly, MNOs should not be excluded from applying. We also remind that the European Commission Recommendation on Connectivity Toolbox (C(2020) 6270 final) recommends spectrum reservations in EU-harmonised radio spectrum for ECS *"only when duly justified".* A detailed objective analysis on costs and benefits, considering the various demands and competition aspects, should be carried out and published. Without an appropriate analysis, there is a risk for spectrum scarcity and irreversible fragmentation, inefficient spectrum use and competition[1]. This may impact for quality and cost

[1] For instance, Metcalfe's law states that the value of a telecommunications network is proportional to the square of the number of connected users of the system. Thus, a number of local licenses have far less value than a nation wide one encompassed the same amount of users.

of mobile services for years ahead. If local licensing approach is selected, local networks could also be provided by mobile operators.

MNOs have experience in providing secure and reliable services for various customers. MNOs already provide services to variety of sectors, ranging from industries, traffic, healthcare, etc., and including enterprise solutions and campus networks, and are continuously discussing with these customers on their specific demands. Various solutions for industries have been provided before 5G, e.g. local and privately integrated LTE-networks. With 5G and network slicing functionalities MNOs have even better possibilities to accommodate specific customer needs and requirements. Thus, ETNO does not see need to reserve internationally harmonised IMT spectrum for private networks serving different verticals, or for other players.

Spectrum needs for IMT (3)

ETNO supports efficient spectrum use and avoidance of spectrum fragmentation. ETNO notes that mobile operators contribute to innovation and enable other sectors to innovate on top of mobile networks. Mobile networks provided primarily voice services but are today used for large number of various of services. Such development is expected to continue, and new generation technologies enable supporting even more specific and tailor-made needs. This development continuously increases the amount of data in the mobile networks, and thus demand for additional mobile spectrum, despite the investments on upgrading the existing networks. For example, in the past years, streaming of audio-visual content has dramatically increased the data volumes in the mobile networks. Mobile data is increasingly being used also for supporting various transport services, machine-to-machine and Internet of Things (IoT) services.

ETNO agrees that a policy target of making 12 GHz available below 100 GHz for wireless services, including mobile and wireless access systems, is too generic, and does not address sufficiently the different needs. For reaching the objectives of digitalization and mobile connectivity, exclusive licensed spectrum is needed across the low, mid and high spectrum ranges to deliver widespread coverage and to support all use cases. ETNO supports RSPG's consideration to develop long term spectrum availability plans and encourages Member States to have aligned plans and make spectrum available in timely manner. It is important to recognize international processes on preparing allocations and harmonising spectrum. Particularly, to enable IMT use, the global/wide harmonisation of spectrum is necessary for equipment ecosystem development. As RSPP sets the spectrum policy goals for the next 10 years, ETNO notes that work is already ongoing in WRC-23 on spectrum bands that may help to address the increased IMT spectrum needs within this timeframe. ETNO supports agenda items 1.2, 1.3 and 1.5. Below, we explain briefly the spectrum needs for

different spectrum ranges. We address in more details the low and mid band additional spectrum needs in our reply to draft opinion on Additional spectrum needs.

- Low-bands (e.g. sub-1 GHz) support widespread coverage across urban, sub-urban and rural areas and help to support IoT services. Mobile demand is continuously growing also in rural areas. To achieve a more balanced situation between urban and rural broadband connectivity and to address the digital divide the mobile allocation of 470-694 MHz at WRC-23 provides Europe with a respective option. To support this, the RSPP should be more ambitious to take extended mobile usage in the UHF band into account. ETNO supports primary mobile allocation in the band 470-694 MHz in WRC-23.

- Mid-bands typically offer a good mix of coverage and capacity benefits. The majority of commercial 5G networks in Europe are initially relying on spectrum within the 3.4-3.8 GHz range. It is crucial to assign large contiguous spectrum blocks throughout Europe in the mid-bands to enable 5G services, at least 80-100 MHz per operator as indicated in (EU) 2019/235. Operators are refarming new technologies also in other mid-bands, i.e. 1800 MHz, 2100 MHz, 2300 MHz, and 2600 MHz when and where feasible. Within 5-10 years, additional mid-band spectrum is needed to maintain 5G quality of service and support growing demand. For example, 3.8-4.2 GHz and 6 GHz, as well as 2.3 GHz (where not assigned for mobile) offer the potential of meeting the urban coverage and capacity demands. ETNO supports identifying 6425-7125 MHz for IMT in WRC-23. In the short term and in some countries, it is important to preserve spectrum in this band for fixed-links as essential backhauling resource for mobile. In the long term, the band should be made available in Europe for 5G mobile services to provide high quality communication solutions, based on exclusive licenses.

- High-bands are needed to meet the ultra-high broadband speeds envisioned for 5G. Spectrum in 26 GHz and 40 GHz bands are expected to address this demand, provided that sufficiently large contiguous blocks with reasonable conditions are awarded with exclusive licenses. Also, the 66 GHz band may help to address some demands, even though ETNO disagrees with ECC decision to merely consider this band for general authorization without further studies.

A very important element in proving mobile broadband services to European citizen is a respective environment for wireless backhaul solutions. Whereas current backhaul bands will still play an important role but need support to maintain relevance in the 5G era – especially through wider channel sizes. In addition, new backhaul bands are needed to support evolving network requirements and growing traffic. The RSPP should support a timely availability of a sufficient amount of affordable backhaul spectrum under reasonable licensing approaches, terms and conditions.

ETNO welcomes the RSPG's view to encourage the development of innovative wireless services such as HAPS or HIBS as they may provide future option for an economical viable measure to deliver coverage and capacity to underserved areas.

Spectrum governance (4)

ETNO appreciates clear roadmaps on spectrum availability – Member States should reveal generic plans for spectrum availability and upcoming awards for years ahead, which could potentially be monitored at EU level through the governance of the Digital Compass recently proposed by the EC[2]. This increases predictability for investments as it enables MNOs to take these plans into account in their planning for spectrum acquisitions and deployment. ETNO agrees that there is no need to set dates for coordinated spectrum awards, however, the coordination of dates for spectrum availability could be a useful element to allow for early deployment of new innovative wireless services in Europe. Furthermore, it is important to carefully consider award-design, as badly designed awards and poorly justified decisions on award conditions and obligations distort the market for a long time.

ETNO notes that MNOs as key stakeholders in mobile awards, have currently no possibility to challenge the national award decisions in the European process. ETNO calls for possibility for MNOs to attend and contribute to the peer review process to provide valuable inputs. The EC should have a clearer role by facilitating the peer review process, and there should be real possibilities to address problems in the award design including license obligations already before the awards to guarantee legal certainty. Moreover, in line with the European framework, there should be possibilities to foster the independence of the national Competent Authorities. Additionally, the peer review reports should publish a summary of the discussions, reflecting all supportive and critical voices. A more open and transparent peer review process would help adopting the best practises in use throughout Europe and would focus spectrum awards on common EU digital goals, avoiding bias of short term national political agendas.

ETNO agrees that harmonised standards are important to facilitate sharing and compatibility in the same or adjacent bands. ETNO would like to emphasise that in this respect the treatment of receivers belonging to different services is a crucial element to allow for both the protection of services but also for a reasonable deployment.

[2] https://ec.europa.eu/commission/presscorner/detail/en/IP_21_983

Another important element to consider is that in case regulatory conditions are included in harmonised standards they should remain least restrictive. Locally needed regulatory restrictions should not be enlarged to all equipment.

External Relations (5)

ETNO supports efforts to facilitate cooperation and coordination with third countries. Many EU-harmonised mobile bands are used for other services outside EU, and this causes severe use restrictions in EU Member States neighboring those third countries.

Migrating regulatory service obligations and technology neutrality (6.1)

ETNO notes that technology neutrality is a key principle for providing mobile services efficiently. It enables MNOs to refarm spectrum towards new technologies when and where it best serves customer needs. Thus, we are happy to note that RSPG recognizes that any deviation from this principle has to be carefully analyzed. New services should be technologically neutral, and services that are being taken in use (e.g. eCall) throughout Europe should not be allowed to rely on older technologies which may be gradually phased out (e.g. 2G and 3G) in some Member States. Similarly, coverage obligations set by Member States in awarding procedures should always be technologically neutral and thus, neither prescribe use of specific bands nor prescribe specific technologies. Any policy must take technology neutrality as an indispensable prerequisite, in accordance with the fundamental principles and objectives of the EECC, and Union policy more broadly: a forward-looking approach that will enable easy upgrading to new technologies is needed. Concerning technology neutrality in TDD bands, it may be necessary to define conditions to ensure efficient use of spectrum and interference free operation for the users of the band. Such condition may set some limits to the possibilities to deploy different technologies.

Spectrum in support of Green New Deal / Climate change initiatives (6.2)

Digitalization and connectivity are the key instruments for dealing with the most pressing environmental challenges and therefore the telecommunications industry is a substantial enabler of the transition to the EU Green Deal. High-capacity, stable, energy-efficient networks are key enablers for sustainable digitalization in many different sectors (health, transport, logistics, etc.).

Besides this crucial role for the whole economy, and to take advantage of all the benefits of digitalization, telecom providers have taken decisive and continuous action to cut carbon emissions and increase energy efficiency in their own networks. In terms of spectrum, efficient spectrum policy also supports climate actions. Availability of sufficient spectrum resources in timely manner, large contiguous spectrum blocks, and avoidance of unnecessary deployment limitations allow effective provision of mobile services with fewer network equipment and thus, supports lower emissions both in operation and in manufacturing process.

ETNO agrees that EC and Member States should assess how mobile network operators could report on their emissions and contributions to the environmental targets. ETNO also recognizes that contributions through digitalization of various other sectors should also be considered. Reporting requirements should not introduce excess administrative burdens.

Furthermore, ETNO has covered extensively the issue and provided detailed input on the Questionnaire regarding the role of RSP to Help Combat Climate Change (January 2021).

EMF (6.3)

ETNO supports RSPG's recommendations on Electromagnetic Field (EMF) concerning collaboration and sharing information on best practices to address citizens' concerns.

ETNO requires that each Member State and municipality aligns with the EMF limits defined by ICNIRP. Stricter limits, not based on scientific evidence, lead to worse network capacity, and even difficulties fulfilling coverage obligations and deploying new technologies. They limit cell range and limit possibility to deploy new bands per site. This leads towards much denser networks, which may be challenging due to deployment restrictions. Moreover, this increases the cost of deployment, due to the higher number of network equipment, which also leads to higher emissions in manufacturing and in operation. The need to keep single antenna site emissions below stricter limits may also slow down the migration from a "stable" technology to an emerging one, due to the need to ensure the continuity of legacy services.

National security, Network security and Cyber security (6.4)

ETNO agrees with the RSPG position, and notes that as these issues concern communication networks more broadly, security conditions should not be defined as part of award and license conditions. It may risk delays in the award process, conflict with other security requirements, and trigger court process.

The Draft RSPG Opinion on Spectrum Sharing – Pioneer initiatives and bands

ETNO recognizes that the draft opinion provides an extensive list on options of promoting spectrum sharing, and that the background document "RSPG Report on Spectrum Sharing – A forward-looking survey" is a comprehensive overview on available technical and regulatory solutions. ETNO notes that it is important to remember that spectrum sharing should not be an objective as such, but an enabler for more efficient spectrum use. Also, it should not compromise the overarching target of maximizing societal value of spectrum.

ETNO prefers exclusive, nationwide licenses in all spectrum bands that are harmonised for IMT. This is necessary for providing good quality mobile services for even increasing societal demands everywhere. Operators are using their spectrum holdings efficiently and provide services to various customers sometimes with very specific needs and including also verticals. ETNO supports rather static than very dynamic spectrum sharing with other services. Thus, MNOs have been able to guarantee the quality of service they provide. Dynamic spectrum sharing with other services, does not allow that currently. Even though this may not be the focus in RSPGs scope for spectrum sharing, ETNO would like to highlight that MNOs already have implemented spectrum sharing approaches, e.g. network sharing between MNOs, and dynamic spectrum sharing (DSS) in their bands, e.g. 4G/5G in-band sharing.

It is crucial to underline that, despite the fact that spectrum sharing of also harmonized IMT spectrum has been discussed for a long time at the regulatory level, the market demand has not realized yet. A reason may be that the European mobile market is very competitive, and network operators survive thanks to their critical mass, both in terms of the coverage, number of customers and access to sufficient resources. The spectrum resources are efficiently used by the license holders to provide a high-quality connectivity services to the society, and to ensure a reasonable return of the huge investment made to acquire the rights of use as well as to deploy networks.

However, we understand that new spectrum sharing solutions may provide opportunities for the mobile industry, for example possibilities to access to harmonized IMT bands that are occupied by legacy users, and it seems impossible to refarm and/or clear them in the short term. In those cases, sharing can be a useful tool to increase the efficient use of spectrum. Voluntary deals between incumbents and new licensees could be fostered and incentivized, allowing them to find complementarities and increase the overall value of the spectrum.

Spectrum sharing could create opportunities also in terms of new business cases, cost efficiency measures or enhanced network management in bands harmonised for IMT. ETNO supports allowing sharing in IMT harmonized bands on a voluntary basis and based on commercial agreements. However, specific spectrum conditions could be set to stimulate efficient use of spectrum and to avoid spectrum hoarding. Moreover,

many spectrum licences (especially in the low bands) are subject to deployment obligations which make the use of the band compulsory in practice. Concerning bands without deployment obligations (e.g. higher bands), they can also be deployed later in the license period where capacity demand increases in areas where the band has not yet been deployed. Thus "under use" of the band may not be a sufficient reason to impose sharing with a "use it or share it" approach.

The draft opinion mentions considerations on sharing evaluated on a case-by-case basis. We consider this as a key principle for sharing, and ultimately increasing confidence and trust. If demand for spectrum sharing is identified, it may be good to consider how to encourage such on voluntary basis, e.g. incentives to share spectrum. Mandating spectrum sharing may not be feasible considering that some actors have paid a lot for having the access and taken the potential obligations linked to the spectrum access, and others could have possibility to get access "for free" or at least on more attractive terms.

ETNO agrees that developing feasible technical solutions for facilitating spectrum sharing in practice is needed. Different sharing scenarios require different technical solutions. The more users share a licensed spectrum, the more complex sharing management becomes.

Below we address typical sharing scenarios used by MNOs, and some opportunities and threats we currently see concerning spectrum sharing.

Typical sharing approaches applied by MNO

Even today MNOs share many mobile bands with other services, and protection of other use is typically addressed with appropriate license conditions. This continues to be a feasible method to address sharing especially with existing use that is limited in a specific geographical area, or otherwise static and predictable.

MNOs deploy new technologies, and use dynamic spectrum sharing (DSS) to utilize efficiently their spectrum holdings. DSS enables MNOs to support newer and older technology in a band in parallel and thus addressing best the needs of customers with different equipment. This enables faster take-off for new technology even though only a small portion of equipment supports it.

Many MNOs have network sharing agreements with other MNOs, and provide services in shared networks, where feasible to best serve the customers. Welcoming full MVNOs on operators' network can also be seen as a form of spectrum sharing. We note that additional guidance on competition considerations is needed at EU-level to ensure level-playing-field across Member States and clear incentives to foster sharing between MNOs.

MNOs provide services to various vertical users, including industries, health sector, transport actors etc. Network slicing functionalities provide even better possibilities to address specific customer needs.

Unlicensed spectrum is also an important building block for MNOs to provide connectivity to customers. Operators utilize unlicensed spectrum e.g. in business networks, and many customers distribute their fixed connection at home using wireless routers.

Opportunities of spectrum sharing for MNOs

As it is becoming increasingly difficult to find completely clear new spectrum bands, ETNO acknowledges that shared spectrum can play an important complementary role if the band and sharing framework is carefully designed. Consultations with all potential users are vital and should start well in advance. Operators appreciate clear plans and early decisions since it brings stability and predictability for investment related decisions.

Club licensing may provide a possibility for an operator to deploy more spectrum in a band than it holds. It enables sharing among those in the club. This approach may be considered in cases where it is not possible to assign sufficient amount of spectrum for operators in some spectrum bands, e.g. Italy has applied this in 26 GHz. It remains to be seen how it works in practise.

Spectrum sharing may provide a possibility to address some vertical needs. We consider this as better approach for addressing vertical needs than set-asides or reservations in the auctions, as it may create less scarcity in auction and prevent nationwide spectrum fragmentation.

Threats of spectrum sharing for MNOs

While bringing potential benefits, sharing can also reduce predictability for MNOs, hampering the provision of high-quality mobile services when and where needed by society. It may make it more difficult to get access to exclusive spectrum. Also, potential "use it or share it" approach may reserve the spectrum to a secondary user, and prevent MNO to use the spectrum in a specific area when demand appears. It may be difficult for an MNO to estimate all new demands for long time ahead.

Network management and operation becomes increasingly complex. Managing a mobile network operation with a large set of configurations in various mobile bands and technologies is not a simple process even within a single operator's network.

There exists a risk of distorting fair competition, especially when spectrum sharing is foreseen on mandatory basis. The primary and secondary user may compete in the same market. The sharing obligations may also have impacts between primary users. The conditions of sharing should prevent hoarding of shared spectrum and be fair and reasonable. The competition aspect should be carefully considered for each spectrum sharing scenario.

Inefficient spectrum use can occur, if technical feasibility and conditions have not been appropriately considered and defined. This can increase the risk of interference, and the need for large separation distances (e.g. TDD synchronization requirements and agreements). EMF limits and compliance assessment should also be met by new and shared users.

The Draft RSPG Opinion on Additional spectrum needs and guidance on the fast rollout of future wireless broadband networks

As indicated in the response to RSPG draft opinion on RSPP, for meeting the societal demands for digitalization and connectivity, exclusive licensed spectrum is needed for mobile across low, mid and high spectrum ranges to deliver widespread coverage and to support all use cases.

ETNO notes that the draft opinion does not yet provide detailed guidance to facilitate fast rollout of wireless broadband networks. ETNO has provided inputs to the ongoing work on European Commission Recommendation on a Connectivity Toolbox (C(2020) 6270 final), which we hope will help to boost 5G services throughout Europe.

Additional Mid-band spectrum needs

ETNO agrees that there is additional demand for mid-band spectrum. The 3.6 GHz band is a pioneer 5G band in the EU, and a key band for initial 5G deployments. In the countries where the band has been awarded, more and more citizens can enjoy high-speed 5G services. In addition, operators are refarming or planning to refarm spectrum towards 5G also in other mid-bands, i.e., 1800 MHz, 2100 MHz, 2300 MHz, and 2600 MHz, when and where feasible considering the traffic demand for 2G, 3G, 4G, and 5G in these bands.

ETNO notes that all EU Member States have not or are not making available the full 3.6 GHz band for nationwide use. In some countries the spectrum in the band is fragmented due to existing licenses or set-asides. Some countries, bordering to non-EU countries, suffer heavy coordination restrictions in the band. These limitations may prevent enabling sufficient contiguous spectrum portions of 80-100 MHz per operator, which is necessary for efficient deployment of 5G wireless broadband services, with high throughput, high reliability and low latency in line with the policy objective of gigabit connectivity, as indicated also in EC implementing decision ((EU) 2019/235). ETNO calls for immediate actions to address these issues.

Mobile data traffic is continuously increasing. Mid-bands offer a good mix of coverage and capacity benefits and enable feasible outdoor to indoor propagation. Thus, mid-band spectrum addresses well the coverage and capacity demands in densely populated areas, but also local high-capacity demands outside the urban and sub-urban areas, such as centers of villages, ski-centers, industry facilities, etc., with so called "rural hot-spots". Additional mid-band spectrum is needed for IMT in many areas in 2025-2030 timeframe. Coleago Consulting has made a detailed estimate analysis considering the possibility to fulfill user experienced data

rates of 100 Mbit/s on the downlink, and 50 Mbit/s on the uplink with IMT-2020.[3] It concludes that additional 1000-2000 MHz mid-band spectrum would make a major contribution to achieve European Union's 2025 connectivity goal.

ETNO is of the view that possibilities of assigning additional spectrum in 6425-7125 MHz and in 3800-4200 GHz for licensed mobile use should be carefully considered in Europe. We believe that these bands have opportunities on fulfilling the increasing demand. Also, we believe that sharing with existing use is manageable with license conditions when and where sharing is necessary.

In addition of providing the needed service-level to the society, additional spectrum contributes to the climate goals. Without sufficient spectrum resources, significant network densification is foreseen. This increases emissions both in operation and in manufacturing the network equipment because of the increased power consumption and material use.

Additional Low-band spectrum needs

While RSPG draft opinion recognized the need for additional spectrum demand in mid-bands, it does not bring up the additional low-band spectrum needs. Mobile capacity demands are continuously increasing also in sparsely populated areas. Higher speed internet access is also required by travelers on road and rail networks, also outside populated areas. Additionally, in urban areas there are use cases calling for deeper into building penetration, higher capacity and performance for indoor users.

Additional low-band spectrum allows improved performance of IMT networks in areas where higher frequencies have less effective propagation characteristics. In areas, which have been already served by a certain sub-1 GHz frequency band, capacity and performance improvements towards true IMT-2020 user experience can be achieved where appropriate with fewer base station sites using additional sub-1 GHz bandwidth. This helps to reduce network deployment and operation costs, but also impacts to other costs, such as those of power and road infrastructure and maintenance.

[3] IMT spectrum demand, Estimating the mid-bands spectrum needs in the 2025-2030 timeframe, Coleago Consulting Ltd, December 14, 2020, (http://www.coleago.com/app/uploads/2021/01/Demand-for-IMT-spectrum-Coleago-14-Dec-2020.pdf)

Thus, additional low-band spectrum enables providing consistent customer experience, and digital inclusion, comparable to that in cities, for citizens living in sparsely populated areas, as well as for travelers. Digital inclusion covers services such as healthcare, education and entertainment. ETNO notes that consumptions of streamed audio-visual content (both on-demand and live) have dramatically increased data usage in mobile networks. Additional low-band spectrum would allow streamed video to better reach wider audiences also outside of fiber footprints and when on the move.

ETNO requests that RSPG opinion covers the need for additional low-band spectrum, in particular possibilities to use spectrum in 470-694 MHz band. ETNO supports adding co-primary mobile allocation in Radio Regulations in this band also for Region 1. It would support creating wide mobile equipment ecosystem in the band and provide flexibility for countries to allow use based on national demands, provided that the technical and regulatory solutions enable addressing the coordination with potentially different use in neighboring countries.

Spectrum needs for vertical and local use, and authorization

ETNO notes that half of the "recognizes" and "recommendations" in this draft opinion concern the spectrum demands for verticals, local use, and innovation. As brought up in the response to the draft opinion on RSPP, ETNO highlights that MNOs already provide services to variety of verticals, ranging from various industries, traffic, healthcare, etc., and are continuously discussing with various business customers on their specific demands. With 5G network slicing functionality MNOs have even better possibilities to accommodate specific customer needs. MNOs have long experience on providing secure and reliable services. MNOs have contributed to innovations and enabled efficiency and innovations in various other sectors and continues to do so.

ETNO is not supporting spectrum reservations for local and vertical licenses in the spectrum bands that are internationally harmonised for IMT. Spectrum reservations should only be allowed if clearly justified after detailed and objective analysis, as also recommended in European Commission Recommendation on a Connectivity Toolbox. Without such analysis, there is a risk for spectrum scarcity, irreversible fragmentation, inefficient spectrum use, and competition distortions for years ahead. This may have impact on cost and quality of public mobile services, and thus societal value of spectrum. For all interested parties, the conditions set by the NRA should be objective, transparent, non-discriminatory, and proportionate, in being the only basis for sustainable competition.

As is noted in the draft opinion, different European countries have addressed the vertical demands in mid-bands differently. Some countries have set-aside spectrum for so-called verticals without clear justification.

In some awards, this has led to spectrum scarcity and contributed to higher spectrum prices. Unfortunately, this may also impact on possibilities to provide high-quality 5G services for digitalization and societal demands equally throughout Europe. Some countries have addressed the vertical demands by setting license obligations to offer service or lease spectrum for special needs on reasonable and non-discriminatory terms. Even though ETNO believes that MNOs will address vertical demands on commercial basis also without such license obligations, we consider this approach as more forward-looking than set-asides. Also, it does not fragment the spectrum in the whole country for several years in case that the vertical demand is low or very local.

In addition to providing services for verticals in mobile networks, there are possibilities to address vertical and local use with unlicensed, and shared spectrum. ETNO notes that additional 480 MHz is being assigned in the lower 6 GHz band, and 5 GHz in the 66 GHz band on general authorization basis in Europe. Some countries have allowed local licenses for example in parts of 2300 MHz band on shared basis with existing national use such as wireless cameras. As wireless cameras may be moving, sharing with nationwide mobile licenses for public networks may not be feasible with currently available technology, but sharing with local licenses for private use may be addressed considering that the wireless cameras are typically used for making video programs and local vertical licenses are typically issued for closed premises where filming is not allowed without a permission. ETNO notes that sharing with many other existing uses is more static, and sharing could be addressed also in nationwide licenses with appropriate license conditions.

ETNO supports considering the band 3.8-4.2 GHz for mobile use. However, we disagree that it should only be considered for addressing local vertical applications. We believe that conditions for sharing with existing use could be addressed also in the nationwide licenses with appropriate license conditions, as needed.

Concerning the vertical demand in the mmWave bands, ETNO notes the 66-71 GHz band is being allowed for mobile use on general authorization basis in Europe. This enables wider bandwidth than 26 GHz and 40 GHz bands and thus very high-capacity services in limited areas. We believe 66-71 GHz band will be a very good opportunity for various vertical demands in mmWave bands.

Exclusive nationwide licenses are our preference in all spectrum bands that are harmonised for IMT. Nationwide licenses enable flexibility and certainty to provide services when and where needed. Also, mmWave spectrum may be used for different kind of uses, such as hotspots and FWA, that was also recognized in the draft opinion. Such needs may appear in cities and in the countryside. We understand that some countries are planning to assign local licenses with an administrative process in some spectrum bands. We believe, this may lead to artificial spectrum scarcity in the market. Also, the technical coordination and management of networks become more complex if licenses are issued to large number of various users.

These issues, as well as, fair competition, network security issues, and interoperability should be addressed when considering the licensing approach. When spectrum awards are being planned, the potential appropriate mechanisms should be evaluated and inputs from stakeholders considered. In case, procedure for local licenses is adopted, MNOs should be allowed to apply at same conditions.

EMF

ETNO supports the RSPG recommendations on publishing for transparency any available results of EMF and SAR measurements. We believe transparency and information sharing may help to address potential citizens' concerns.

ETNO also supports update of EU Council Recommendation 1999/519/EC in order to take into account the revision of the ICNIRP guidelines. In addition, we propose that each Member States applies this recommendation and does not require more stringent limits than recommended by ICNIRP. We elaborate this in more details in the response to the draft opinion for RSPP.

ETNO (European Telecommunications Network Operators' Association) represents Europe's telecommunications network operators and is the principal policy group for European e-communications network operators. ETNO's primary purpose is to promote a positive policy environment allowing the EU telecommunications sector to deliver best quality services to consumers and businesses.

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