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Comments to the Draft RSPG Second Opinion on 5G networks

Dear Ladies and Gentlemen,

we are *thankful* to have the opportunity to provide our comments to the **draft RSPG Second Opinion on 5G networks.**

About Sennheiser

Sennheiser is shaping the future of audio – a vision built on more than 70 years of innovation culture, which is deeply rooted within the family-owned company. Founded in 1945, Sennheiser is one of the world's leading manufacturers of headphones, microphones and wireless transmission systems. With 20 sales subsidiaries and long-established trading partners, the company is active in more than 50 countries and operates its own production facilities in Germany, Ireland and the USA. Sennheiser has about 2,800 employees around the world that share a passion for audio excellence. Since 2013, Sennheiser has been managed by Daniel Sennheiser and Dr. Andreas Sennheiser, the third generation of the family to run the company. www.sennheiser.com.

Sennheiser comments

With the allocation of the 700 MHz and 800 MHz bands to mobile services, PMSE applications has lost almost half of its spectrum. Potential bands suggested so far would partly not be technically suitable and therefore do not compensate for this loss. Suitable alternative spectrum for the loss of the 700 MHz and 800 MHz bands must be identified in 2020 and not later in 2025. This spectrum for the Culture and Creative Industry should harmonized worldwide.



DVB-T2 HD services and PMSE normally operate below the 700 MHz Band (470 - 694 MHz) and already had to be shifted because of the so-called "Digital Dividend". Therefore in order to ensure the long-term viability of PMSE and terrestrial TV, regulatory certainty and stability should be ensured in the remaining UHF spectrum below 700 MHz (470 - 694 MHz) at least until 2030 as also stated within the Lamy report^[1] "

With the currently available details of the still forming 5G standard Sennheiser has taken the initiative to investigate if 5G can become an additional standard under which PMSE can operate and fulfil the demanding quality aspects of wireless production tools. This initiative formed a consortium under the name PMSE-xG, PMSE next Generation.

The German Federal Ministry of Traffic and Digital Infrastructure supports this project as the Ministry sees this as the typical vertical industry with very strict quality measures.

Aspects developed in this project are, of course, our motivation to comment the RSPG document as we are very interested to use 5G for our customers applications. 5G would open new frequency ranges and can also ease the coordination of multichannel systems in one or adjacent locations. In a world of increasing complexity and increasing quality demands and resolution a major point to drive acceptance of 5G on a broad base for the steadily growing Culture and Creative Industry.

Our comments are given in-line to text proposed on page 4 and 5, but might as well impact the text given in the appendix of the draft.

"The RSPG recognises that 5G promises to enable the delivery of a diverse set of applications and new services in a number of different markets, going beyond the traditional mobile broadband market."

In general, we agree with this introductory statement, as 5G is a "work in progress technology", so no one knows what will be finally standardized and offered as 5G in the end. Nevertheless, we wonder how RSPG opinion can be based on a promise, being aware that RSPG opinions prepare decisions by the commission.

We therefore recommend to add:
RSPG recognizes that 5G technologies are still work-in-progress and that its opinions are based on current 5G working assumptions and preliminary information available.

^[1] <https://ec.europa.eu/digital-single-market/en/news/report-results-work-high-level-group-future-use-uhf-band>



Further, we would like to stress the point that 5G is a marketing term, which is not identical with IMT-2020, where the current candidates are 3GPP standards and DECT-2020.

- 1. "The RSPG is of the opinion that Member States will need flexibility in the way they authorise access to spectrum, for example: appropriate geographical areas (e.g. national, regional, city or hyper-local, e.g. for use in a factory), individual licencing or under a general authorisation framework."**

We agree, that Member States will need flexibility in the way they authorise access to spectrum and welcome the endeavours on a "European Spectrum Strategy" given in another RSPG public consultation running in parallel.

We recommend RSPG to consider that the fundamental vision of 5G is that 5G will be a network of networks (physical or virtual). Therefore, it is not envisioned as a nationwide 5G network deployment controlled by a few operators.

The integration of vertical industries (Media & Entertainment including PMSE, Industry 4.0, eHealth, Agriculture, and others) to the 5G ecosystem requires flexibility in the spectrum management and policy framework.

We are of the opinion that the interest of vertical industries in using new technologies is driven primarily by the wish to maintain their current applications, resulting in an at least equal or better technical and economic performance compared to currently deployed solutions.

Therefore, 5G has to prove both; its technical ability to fulfill the needs and requirements of vertical industries and the economic benefit that can be gained by shifting their applications into the 5G ecosystem.

An important obstacle to the successful integration of vertical use cases into the 5G ecosystem is currently the lack of viable and sustainable business models.

We agree that new spectrum management principles and a new thinking in spectrum management are key to enable the success of 5G and industries.

It is important to open a path for verticals to access affordable spectrum with Quality of Service guarantees.

The ability of verticals to deploy their own, local network infrastructure and also manage the operation will lower the entry level for the business models' development process and speed up the deployment of 5G technology for vertical use cases, while at the same time 5G public service network operators would avoid additional investments in infrastructure and could provide Spectrum as a Service as additional business. The benefit of this structure is that an overall



frequency/application coordination is done to get the risk of interference to a very low level while increasing the reliability to the demand of the vertical industries involved. Here, it is important to stress that verticals with their professional applications would expand the customer basis of 5G significantly. This will only be the case if the necessary adaptations of 5G technologies to meet the requirements of vertical use cases are implemented, and specific interfaces and chipsets are available for the vertical industries.

We would like to point out that ETSI TC RRS is already working on spectrum sharing and authorization solutions cutting across different bands based on the evolution of Licensed Shared Access (LSA) principles for Local High-Quality Wireless Networks.

Please refer to:

https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=50966

https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=54041

Furthermore, the adoption of the therein proposed architectures would enable vertical industries to roll-out private 5G networks when needed and with the capabilities required.

Hence, this approach fosters vertical industries to put themselves as independent actors in the wireless business value chain, perhaps leading to changes in conventional role models.

We welcome the proposal currently discussed in Germany to make 100 MHz of spectrum (3.7-3.8 GHz) available for (hyper-)local and regional network deployments operated by e.g. vertical industries.

We believe that the majority of 5G applications by verticals industries will be either (hyper-)local or regional and will be implemented as small cell networks. Considering the current uses of 3.4 to 3.8 GHz in CEPT region and that majority of 5G applications of verticals are dense and in a local area, we believe that 200 MHz of available spectrum would be more adequate for the benefit of (hyper-)local and regional network deployments operated by e.g. vertical industries.

We believe that a flexible, data-base driven site licensed regime – such as proposed in ETSI TC RRS - would be beneficial to avoid fragmentation. We therefore, propose to reissue and update EC mandates on spectrum sharing and RRS in these directions but in a manner initially agnostic to technology, service, and frequency band.

2. **"The RSPG is of the opinion that the Commission, together with Member States, should take actions to fully support 5G related policy objectives in rural areas**



and wide coverage, taking into account the role of satellite in achieving ubiquitous connectivity.”

We agree that ubiquitous connectivity is required, but this should be maintained by all means considering application requirements in regard to data-rate, latency, synchronicity, and reliability. Currently Satellite will not be able to provide this.

Referring to our comments to point 1, we would like to point out that enabling own, local 5G networks (physical not only virtual) by verticals and by regional or local operators can significantly speed-up 5G deployment in the area, while sharing the required investments among multiple stakeholders. The roll-out of local 5G networks happens then when needed and with the capabilities required. Concepts and tools like spectrum as a service, shared spectrum, local network densification, network slicing, MVNO, and crossholding of resources including infrastructure can facilitate enabling and developing of businesses.

This needs of course to be attended by a flexible spectrum management and policy framework fostering different markets in the 5G ecosystem.

- 3. “The RSPG recommends that the Commission, in its research work-programs, study solutions for improving 5G connectivity and wide area coverage, especially in rural areas, thereby facilitating and progressing technology developments targeting the fulfilment of 5G related policy objectives.”**

We agree, and would like to add especially own, local 5G network deployments for the benefit of verticals. It is our understanding that policy and spectrum management frameworks have seen already a lot of research and innovation actions under various research work-programs, specifically in regard to Licensed Shared Access and Spectrum as a Service. We recommend endeavours to bring more of these innovations into real life instead of just researching them.

- 4. “The RSPG is of the opinion that service performance and availability requirements may be relevant for some 5G cross border services to fully function and would need to be defined by the industry in a timely manner. In some cases, an EU coordinated approach could be helpful in this regard to support a common European solution.”**

Under the perspective of a European manufacturer we are interested in a common European solution and are engaged in standardisation by ETSI and 3GPP in this regard. We support this EU coordinated approach to allow cross border usage and operations for various productions.



5. **"The RSPG is of the opinion that coverage obligations can only be derived as a consequence of national policy objectives and characteristics (i.e. population distribution, geographical morphology, industrial and societal needs) and therefore cannot be harmonised on a EU-level."**

In our perspective coverage obligations are valid and required for nation-wide mobile services. Not following this approach is in contradiction to other EU activities and may be seen as discrimination. To our view additional obligations to provide connectivity and interworking to own, local 5G networks are required to facilitate 5G deployment in different markets of European industries. Further an obligation to offer Spectrum as a service, should be considered to maintain a nation-wide frequency network planning.

6. **"The RSPG notes that solving issues relating to facilitating the efficient deployment of ultra-dense networks is expected to be of high importance for the rollout of 5G in dense urban areas. The RSPG is of the opinion that Member States should assess the need for national actions that will enable easier site authorisation and installation, in particular for small cells, in order to make timely 5G deployment possible."**

We welcome any measure improving coverage and easing installation of network infrastructure and would like to stress the point that 5G network densification by anyone and own, local 5G network deployment and operation by verticals should be considered as well.

7. **"The RSPG is of the opinion that all commercial licences in frequency bands identified for 5G within the Member States should be subject to trading or leasing to enable new market opportunities."**

We agree, as long as the trading and leasing is under Fair, Reasonable and Non-Discriminatory (FRAND) conditions considering also own investments in local infrastructure and resources. Commercial licences should be subject also to shareholding to lower entry levels for communities and industries.

8. **"The RSPG is of the opinion that Member States should consider appropriate measures to defragment the 3.6 GHz band, the primary 5G band, in time for authorising sufficiently large blocks of spectrum by 2020."**



We agree and would like to stress the point that spectrum sharing and authorization solutions cutting across different bands based on the evolution of Licensed Shared Access (LSA) principles would be beneficial for defragmentation in many Member States.

9. **"The RSPG is of the opinion that in relation to the 26 GHz pioneer band (24.25 - 27.5 GHz):**
- **(...)"**

We would recommend considering spectrum sharing and authorization solutions cutting across different bands based on the evolution of Licensed Shared Access (LSA) principles at least for parts of the 26 GHz band. Further we recommend neutrality regarding technology and service as underlying principle.

10. **"The RSPG is of the opinion that general authorised frequency use can be an important breeding ground for innovation and contributes towards a dynamic market environment. The application of a general authorisation regime is foreseen in the 66-71 GHz band which could be an important band for 5G."**

We have currently no strong opinion on that. We recommend technology and service neutrality as underlying principle.

Wedemark, Germany, January 4th, 2018

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