Statement on the RSPG questionnaire
„Long-term vision for the upper 6 GHz band"

THIS STATEMENT CONTAINS NO CONFIDENTIAL INFORMATION

EWE TEL GmbH is one of the largest regional providers of telecommunications in Germany: almost 700.000 households use the telecommunications products of EWE Group companies. As the largest broadband provider in north-west Germany, EWE TEL deploys fibre networks and provides internet and fixed line services to its customers; it also resells mobile services. With its solution-oriented proposals, EWE TEL is a competent partner for regional politics and business. With its activities in the telecommunications sector, EWE TEL contributes to meeting the connectivity targets and promotes the shift towards digitalisation in Germany and thus also in the EU.

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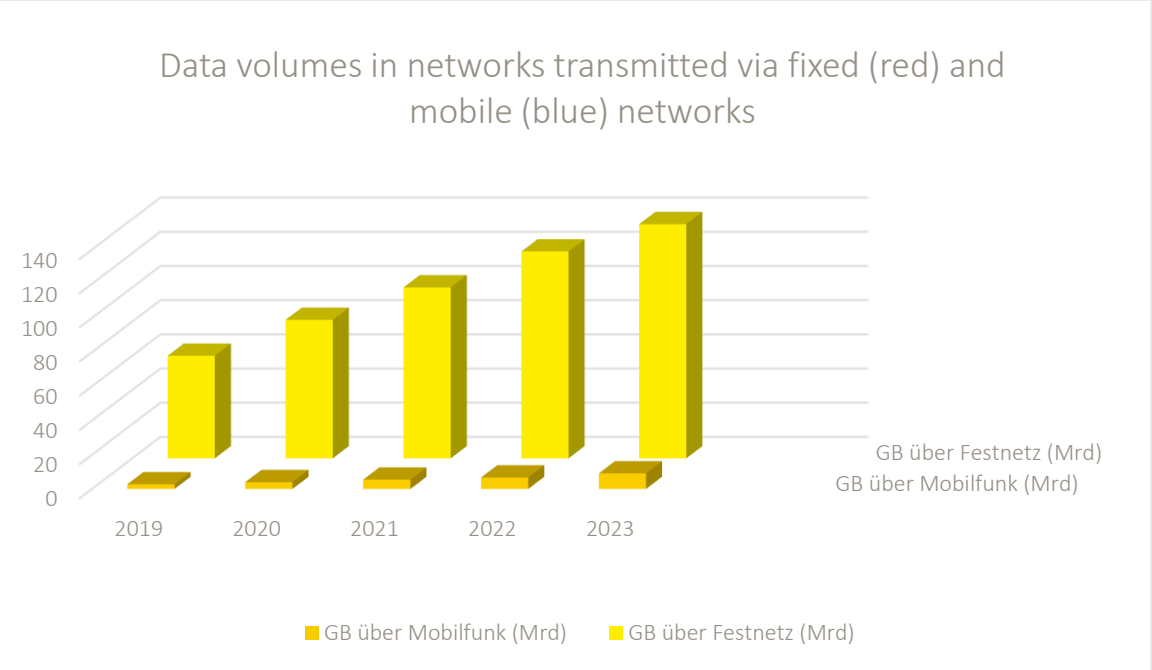
EWE TEL GmbH appreciates the opportunity to submit a response on the "Long-term vision for the upper 6 GHz band" questionnaire of the Radio Spectrum Policy Group. Before going into the questions below, we would like to stress the points which we consider crucial:

- There is broad consensus that access to the Internet for citizens and enterprises alike is the backbone of our society and essential for the future of Europe.
- At least 95% of data traffic is transmitted via fixed networks. Out of the 5 % mobile traffic, 80% are generated indoors, which means that only about 1 % of total data traffic is generated outdoors and transmitted by mobile networks.
- It is of paramount importance to secure the preconditions for transmitting 99% of data traffic with highest speed, stability and resilience.
- While download traffic is important for consumption and participation in a society, it is upload data traffic which is crucial for innovation and economic success of European firms.
- WiFi 7 allows for highest data speeds and short latencies in RLANs, if sufficient spectrum is available – also in upload scenarios.
- Spectrum shortage for WiFi means depriving Europeans of technological benefits facilitated by high-quality devices produced for the world market, and which are enjoyed in other world regions such as the Americas.
- Fibre network operators would face severe competitive disadvantages, should WiFi performance lag due to spectrum shortage.
- National regulatory authorities should investigate thoroughly whether IMT actually needs and is in a position to efficiently use the upper 6GHz band, and to what extent IMT could use alternative spectrum ranges.
- In case of such evidence, the political question which use of the upper 6Ghz-band will best serve society's future needs should be answered in an adequate political process.

I) Explain the demand for MFCN or WAS/RLAN in the upper 6GHz band before and beyond 2030

The relevance of WiFi becomes apparent when looking at the numbers: while an overwhelming share of data traffic uses fixed networks combined with WiFi, only a marginal proportion of data is carried via mobile networks instead. The diagram below shows data volumes transmitted via fixed and mobile networks according to the Bundesnetzagentur: the current proportion of data transmitted is between 4-6% in mobile networks (Mobilfunk) versus 94-96% in fixed networks (Festnetz). The total volume of data consumption has steadily increased over the past years. Studies predict similar growth rates in average data consumption of about 20% per year until 2030 in fixed networks - despite the already extremely high levels.

It is true that the share of mobile data traffic has been growing, albeit from a low level, to about 5 % of total data traffic today. However, there is evidence that growth rates in mobile data traffic might decline. The Ericsson Mobility Report 2024 adjusts its findings due to lower numbers reported by regulators and service providers for the second half of 2023. It states: "Yearly mobile data traffic growth rates are expected to slow at different paces in different regions up to 2029. The yearly net added data traffic volume is expected to increase up to 2027, whereafter it will be somewhat stable.[1]



In view of these facts and the technological advantages of WiFi, the Federal Communications Commission in the U.S. has decided to reserve the entire 6 GHz band for WiFi. This decision was subsequently approved by the U.S. Court of Appeals.[2] It is noteworthy that those countries providing for a large share of world wide innovation apparently find it necessary to reserve frequencies exclusively for WiFi 7. Also, there is no evidence that 5GSA-deployment has been hampered by the FCC decision.

The EU unfortunately appears to consider going down a different path, since it has decided to identify International Mobile Telecommunications as a candidate for co-use of the upper 6 GHz band at the World Radio Conference of 2023. A technical solution for bringing the competing interests of IMT and

[1] Ericsson Mobility Report, June 2024, p. 11 (https://www.ericsson.com/49ed78/assets/local/reports-papers/mobility-report/documents/2024/ericsson-mobility-report-june-2024.pdf)
[2] U.S. Court of Appeals (D.C. Circuit), AT&T Services, Inc. v. Federal Communications Commission and United States of America, No. 20-1190, 28.12.2021.

WiFi in line, however, is hard to perceive, since the use of a frequency at the same geographical location is mutually exclusive. In one hybrid scenario allowing both IMT and WiFi to use the upper 6 GHz band (which is also discussed, somewhat misleadingly, as the "indoor-outdoor solution"), the strength of the signal emitted by the mobile network's base station is the decisive parameter. But even with low signal strength, it is not possible to flatly avoid disturbances of indoor WiFi-networks, since it depends on parameters such as distance from cell tower or the type of walls and buildings in between. Since pilot signals force any WiFi devices within reach to switch channels from the upper 6 GHz band to any other spectrum that may be available for WiFi, even signals of low strength may practically render the band useless for WiFi in the surroundings.

Demand for WAS/RLAN in the lower and the upper 6GHz band stems from the increase of data consumption as shown in the diagram above. WiFi technology and spectrum used today have not been designed for transferring today´s large data streams or the even bigger data volumes expected over the next years. In consequence, WiFi 7 has been developed precisely to allow for much higher data volumes at highest speeds of beyond 5Gbit/s and low latency – provided that sufficient spectrum for the use of several 160 and/or 320MHz-channels is available.

Shortage in WiFi spectrum can be observed even today, particularly in densely populated areas, e.g. in apartment buildings. Given that an average household uses between 10 and 20 devices connected to a WiFi network, with at least 5 devices using the Internet simultaneously, it becomes apparent that the lower 6GHz band with one 320MHz-channel is not sufficient. Especially in multi-storey buildings, there is a demand for at least three 320MHz-channels to avoid WiFi-disturbances.

Other customers, such as enterprises, schools, hospitals, football clubs with stadions or public institutions, such as libraries, with multiple users have an even higher demand for a large number of smaller channels. The high demand might even increase soon, with innovative applications based on VR-headsets becoming technically mature and with mixed reality hardware and high-end products becoming more affordable over time.

II) Provide information about the sustainability of the above explained demand, especially the:

1) Environmental impact assessment

There is evidence that Internet access via fixed and WiFi-networks have a smaller footprint than mobile networks. The German Federal Office for Environmental Matters (Umweltbundesamt) recommends the use of fixed networks, particularly fibre access networks. Given the short distance between router and end user device, WiFi-transmission needs comparably little energy. In a field test, greenhouse gas emissions per hour of video streaming in HD quality over fibre broadband were found to be 45 times lower than via UMTS transmission. While fibre access consumed 2g CO2e/h, transmission via 5G networks caused an amount of 5g CO2e/h.[3] Another study came to similar conclusions: a relatively high energy consumption was found for fixed wireless access (FWA). A study of March 2022 conducted in North Rhine-Westphalia, representing a typical proportion of rural to urban settlement for Germany, showed that FWA power consumption is much higher than for of a fibre connection. To deliver data at 50 Mbps, FWA consumes more than three times as much power as fibre. For 250 Mbps, FWA consumes more than five times as much power, and for 500 Mbps, more than nine times as much power.[4]

[3] Umwelt Bundesamt, Energie- und Ressourceneffizienz digitaler Infrastrukturen Ergebnisse des Forschungsprojektes „Green Cloud-Computing", 7. September 2020 (https://www.umweltbundesamt.de/sites/default/files/medien/376/publikationen/politische-handlungsempfehlungen-green-cloud-computing_2020_09_07.pdf)

[4] Europacable, White paper, Brussels 2022 https://europacable.eu/wp-content/uploads/2022/07/Europacable-Whitepaper-on-Energy-Efficiency-of-Fiber-networks-05-July-2022.pdf

There are a few other relevant aspects: Since next-generation Wi-Fi routers (6E and 7) already utilize the lower 6 GHz band, new devices would not be necessary. If more 160 MHz and 320 MHz channels were made available in the upper 6GHz band, devices would be able to transmit in much shorter periods, which would help improve service predictability, and, importantly, minimize transmission energy.

And finally, submitting data traffic via RLAN technology allows a relevant data offload, since direct connectivity of devices is possible. This provides for an enormous reduction of traffic to be carried via telecommunications networks. WiFi-networks are thus an important tool in reducing data traffic to and from data centers, which are widely known for their high energy consumption. Data traffic within LANs/RLANs is an indispensable factor to significantly reduce the carbon footprint of telecommunication networks. If WiFi-networks were no longer capable of delivering high amounts of data traffic due to spectrum shortage, the respective data traffic would have to be transported via mobile networks: in this case, data traffic would have to be transported from one end user device via backbone to a central data center, then via mobile backbone to an end user device or LAN storage (NAS), even though the geographical distance between such devices may be only meters. Whether it is a live video broadcast of a lecture from one overcrowded lecture hall to additional lecture halls on the same campus, or of other live events, or future applications: it is easy to imagine how large redundant data flows to data centers can be, and how big the impact of these additional amounts of traffic would be on mobile networks and on the environment.

2) Socio-economic impact

WiFi is delivering its vast socioeconomic benefits every day, making sure hundreds of millions of European households and businesses with all their end user devices have access to the internet. Mobile network operators claim they need the upper 6 GHz band to improve their capacity to serve densely populated areas, e.g. pedestrian zones or football stadiums. However, it is worth asking whether the potential societal benefit through greater capacity for IMT is worth the corresponding cost in terms of damaging WiFi:

A large amount of data traffic in pedestrian zones or football stadiums are transported via free WLANs - provided e.g. by the local football club, cafes, public libraries, large stores and even municipalities. This is for a good reason: public WLANs offer free access for all end user devices – whether or not the device's owner is under contract with the locally available mobile network provider. Obviously, this situation is highly valuable for making equal digital participation of all social groups possible - whether in cultural, social, commercial or other aspects of society. Ensuring the regulatory conditions for unhampered WiFi is in these cases an important contribution to a functioning democratic society. If public WiFi becomes unattractive due to severe lack in poor performance resulting from limited access to bandwidth, costs in terms of socio-economic impact would be huge.

III) Provide information about:

1) the possible role of the upper 6GHz for MFCN or WAS/RLAN

For our company, it is essential to look at the possible role of the upper 6GHz-band from the point of view of our customers: The vast majority of households and businesses in the EU rely on WiFi to distribute broadband data traffic to a variety of mobile and stationary end user devices. WiFi also serves as the back channel for all these devices to upload data to the internet. WiFi at the top of its performance is key for end users to actually experience gigabit speeds in their homes and particularly on company premises, where upload capacities are essential. If WiFi's performance is hampered by lack of bandwidth, a lagging WiFi is set to become the bottleneck for gigabit access to the internet.

This would not only be a huge blow to the multi-billion investment that is currently poured into fibre connectivity for all citizens and companies in the EU. Connectivity bottlenecks may easily become a severe obstacle to innovation and value added by the European economy. Given the small amount of outdoor traffic, it is difficult to perceive gains from co-use of the upper 6 GHz band by IMT that could offset these disadvantages.

2) use cases, expected deployments (e.g. number of BS for MFCN) and timeframe

For various use cases, please see the sections above.

Low and unstable WiFi performance at our customers' premises is of great concern to our company: If WiFi is lagging, customers cannot extract the full potential from their high-quality fibre optic internet access. Fibre optic network operators as well as their customers would never know where undisturbed connectivity is available and where internet access would be impaired by co-use of the upper 6 GHz band for mobile telecommunication. It is important to bear in mind that a policy decision to reduce available spectrum for WiFi would create a competitive disadvantage for fixed network operators that immediately translates into a competitive advantage for mobile network operators. Since there is consensus that fibre optic internet access is a superior technology in terms of highest speeds and capacities, a policy decision hampering fibre optic networks seems paradoxical.

Regarding the timeframe, in our view planning reliability is urgently needed in order to prepare the ground for WiFi 7. While countries like the USA, Canada, and others have already opened the entire band for Wi-Fi, European companies observe the search for a hybrid solution for the upper 6 GHz band. In the meantime, Europeans are losing competitiveness and slowing the innovative momentum which the deployment of fibre infrastructure has created.

IV) Provide information about standardization and technology impact

As the most recent WiFi standard 7 is catching on throughout the world, bolstered by the FCC's decision to reserve the entire 6 GHz band for WiFi, vendors are now producing WiFi routers that are optimized to make use of both. There is a narrow correlation between WiFi 7 and the upper 6 GHz band: the new standard relies on 320 MHz channels (rather than 160 MHz under the current WiFi 6 standard) and draws on the entire 6 GHz band to look for unused channels.

Unlike WiFi, mobile telephony and data services are not exclusively bound to the upper 6 GHz band if they should need additional capacity frequencies for their purposes, because IMT has been identified as a potential use case for other hitherto unused frequency ranges.

The EU should abstain from making policy choices that would severely limit the potential performance for WiFi to be derived from the upper 6 GHz band. Otherwise, it would prevent millions of household and business customers from drawing the fullest possible benefit from the WiFi 7 standard, thereby squandering the potential of an entire hardware generation.

Finally, the decision envisaged by RSPG is highly political: European citizens, enterprises and institutions rely on WiFi-networks every day, and they take them for granted. A decision which may in future hamper or even preclude connectivity must be referred to the political decision-making process.