

RSPG Questionnaire on Long-term vision for the upper 6 GHz band

Teracom is a Swedish operator of broadcasting, fixed and mobile networks. We are responsible for the national terrestrial radio and television broadcasting network in Sweden for Public Service and major commercial broadcasters. We also provide high-capacity fixed communication services to users vital for society and a mobile network based on frequencies in the 450 MHz and 2.3 GHz bands for various society critical applications.

Teracom welcomes the opportunity to provide information to the RSPG on our usage of the upper 6 GHz band for long range fixed links in Sweden and explain the impact on existing services of potential future usage of the upper 6 GHz for MFCN and/or WAS/RLAN.

The upper 6 GHz band is heavily used in all parts of Sweden for long range fixed links in the backbone network, for transport and distribution, for redundancy and where fibers are not feasible. This usage is very important for a large number of vital society services and applications, and it is of paramount importance that the fixed links can be maintained and offered relevant protection in any sharing scenario with new usages such as MFCN or WAS/RLAN.

Teracom's response addresses section B of the questionnaire, Questions directed to the stakeholders providing incumbent services in the upper 6 GHz band. The answers to the posed questions are given below.

1) What are your current and future spectrum needs (before and beyond 2030) in the upper 6GHz band?

Teracom extensively uses fixed links in the upper 6 GHz band in its nationwide high-capacity backbone network in Sweden. This network is used for transport and distribution, to connect broadcasting transmitter sites, for fixed communication to users vital for society, and to connect sites in the nationwide mobile network. All these applications require very robust and stable connections, with high capacity, high availability and very high security requirements. Fixed radio links play an essential part to meet these requirements. To fully meet all requirements, it is necessary to use a combination of fixed radio links and optical fibers,

Stations in the existing radio link network are located nationwide, in city sites as well as in rural areas, and all available fixed service radio channels in the upper

6 GHz are used. Hop lengths are generally quite long and relatively low frequencies are therefore necessary.

Teracom does not expect the spectrum demand for fixed services in the upper 6 GHz band in Sweden to decrease for the foreseeable future. At least for the next 20-25 years the spectrum requirements are still expected to apply. We even see a possibility for increasing requirements due to increasing demands for capacity and coverage for services in the fixed and mobile networks to vital society users. This could result in a need for expansion of the network and additional sites. It is therefore also important that further development of the fixed service is possible.

In summary, the whole upper 6 GHz band must continue to be available for fixed services in all geographical areas also in the future. If the band is to be shared with new other services, existing fixed services and their developments must afford adequate protection.

2) What impact on your service do you expect from the introduction of MFCN and/or WAS/RLAN in the upper 6GHz band?

If one or both of the considered new services are introduced in the band, there is still a need to maintain the band for fixed links, and coexistence issues will need to be carefully analysed and mitigated.

In particular, any MFCN in the band needs to be geographically separated from the fixed links, since radio links and MFCN base stations cannot be expected to be able to coexist in the same area. It is essential to be able to retain all existing fixed links without harmful interference, also in non-rural areas. Clear and technically viable sharing criteria needs to be specified.

RLAN usage can probably not be limited to certain areas but may generally be somewhat easier to coexist with for fixed links. However, if RLAN usage in the band is widely spread, there is a clear risk for harmful interference to fixed links. If the interference/noise level in the band is increased, capacity in the fixed links may be considerably reduced. Therefore, technical parameters and operational requirements for any RLAN in the band in Europe should be developed to minimize the risk for such interference.

It should also be noted that in practice it is very difficult and very costly to migrate existing radio links in the 6 GHz band to another frequency band. The fixed service infrastructure is optimized for the existing frequency range and higher bands are not feasible. Furthermore, all existing lower frequency bands for fixed services are already heavily used and are not available unless a major reshuffling of existing radio links in those bands are performed.

3) What measures could improve compatibility from your perspective

Coexistence issues between fixed services and any new services in the upper 6 GHz band will need to be carefully analysed and handled. Technical parameters and operational requirements need to be developed with the aim of minimizing harmful interference to fixed and other incumbent services.

There should be clear and technically viable sharing conditions defined for MFCN interfering with fixed links, and it should be clearly stated in any regulatory provisions that incumbent services, including their developments, should be protected. Detailed national regulation providing such protection needs to be implemented if MFCN should be introduced in the band.

Any RLAN technical parameters should be developed so that the risk of interference to fixed links is minimized. Any RLAN in the band in Europe should preferably be low power and limited to indoor usage.