GSOA response to questionnaire on Long-term vision for the upper 6 GHz band

B. Questions directed to the stakeholders providing incumbent services in the upper 6 GHz band, such as:

- Fixed service
- Fixed satellite service
- Radio astronomy service
- SST (Sea Surface Temperature) sensors
- UWB

Please limit your answers to maximum 2-3 pages and favour responding through associations as far as possible.

I) Explain impact of possible future usage of the upper 6GHz for MFCN and/or WAS/RLAN on existing services:
   1) What are your current and future spectrum needs (before and beyond 2030) in the upper 6GHz band?
   2) What impact on your service do you expect from the introduction of MFCN and/or WAS/RLAN in the upper 6GHz band?
   3) What measures could improve compatibility from your perspective?

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1. Current and future spectrum needs

The 6425-7075 MHz band is a crucial resource, utilized by FSS uplinks to serve a diverse range of satellite applications. This includes telecommand links for a large number of systems and this band is a key component of the Appendix 30B plan, serving a multitude of GSO FSS networks, in particular for developing countries.

The band is also used for FSS feeder uplinks, supporting L-band MSS systems crucial for maritime and aeronautical communications. In the maritime community, it facilitates operational and safety-related communications, meeting the International Maritime Organisation (IMO) Safety-of-Life At Sea (SOLAS) communications requirements, including Global Maritime Distress and Safety System (GMDSS) requirements that are mandatory for many vessels in Europe and globally.

In aviation, the 6425-7075 MHz band plays a crucial role in supporting L-band MSS satellite communications for the Aeronautical Mobile Satellite (Route) Service (AMS(R)S). These communications are essential for ensuring flight safety. The L-band MSS systems also form a key component of the Iris programme for European aviation operations[1].

The upper 6 GHz band is also used for the uplinks for GNSS augmentation signals, which enhance the precision of GNSS systems such as GPS and Galileo. This provides enhanced precision and security to specialist users and applications, including aircraft navigation and landing.

[1] https://connectivity.esa.int/iris-satellite-communication-air-traffic-management

The feeder uplinks for these L-band MSS/RNSS systems operate from a number of earth stations in Europe. Any harmful interference to satellites operating in the upper 6 GHz band could disrupt their operations and the critical services they support.

Furthermore, the 6700-7075 MHz band is used for non-GSO MSS feeder downlinks. Earth stations used for these downlinks could receive interference from terrestrial stations unless protected by geographical separation.

The current FSS uses of the upper 6 GHz band are not expected to change significantly for the foreseeable future. While the satellite industry continues to develop new broadband systems in higher frequency bands, it will continue to require access to C-band, particularly for safety and security applications demanding the highest reliability. Some new earth stations (transmitting and receiving) will likely be needed in Europe.

2. Impact of MFCN and/or WAS RLAN

The main interference concern for satellite operations is the aggregate interference from terrestrial mobile systems into receivers onboard the satellites. Geostationary satellites can receive interference from around one-third of the Earth's surface. There are also interference concerns regarding coexistence with FSS earth stations, which may transmit or receive in this frequency band, but such issues can typically be handled through a national coordination mechanism.

Regarding inference to satellite receivers, incumbent FSS satellite receivers can only coexist with outdoor MFCN deployment with significant constraints on MFCN base station radiated power and limited density of base station geographical deployment.

WRC-23 adopted an IMT identification for the upper 6 GHz band in Region 1, with "expected EIRP limits" intended to protect FSS receivers. Before WRC-23, CEPT agreed on limits that, in GSOA's view, were inadequate to protect FSS satellite receivers from a realistic density of MFCN base station deployment. However the WRC adopted even higher limits than those proposed by CEPT, weakening further the protection provided to incumbent FSS operations. Furthermore, the complexity of the "expected EIRP limits" means that compliance cannot be checked by regulators and hence, in practice, there can be little confidence that the limits – weak as they are – will be complied with.

Since WRC-23, technical studies related to WiFi and MFCN coexistence have taken place in CEPT ECC project team PT1. We have noticed that the IMT industry is already pushing to allow the operation of MFCN base stations in the upper 6 GHz band, with EIRP around 10 dB higher than values put forward by the same industry in the ITU-R studies before WRC-23.

All in all, GSOA cannot be confident that the limits adopted by WRC-23 in the Radio Regulations will protect satellite receivers or provide security of operations for the foreseeable future. Hence, we look to the RSPG to consider FSS coexistence issues in its choices for terrestrial services the upper 6 GHz band in Europe.

Based on the precedent in the lower 6 GHz and recent studies conducted by CEPT in project team SE45, coexistence between FSS uplinks and WAS/RLAN is potentially feasible, with constraints on WiFi powers that seem to be acceptable to the WiFi industry. GSOA would be concerned, however, if WAS/RLAN operation in the upper 6 GHz band was to be authorised with more relaxed constraints than those currently applied in the lower 6 GHz band. Any such relaxation of the constraints on WAS/RLAN could result in harmful interference to satellite receivers in the upper 6 GHz band.

WAS/RLAN systems should operate on a non-protected basis with respect to FSS earth stations.

3. Measures to improve compatibility

As noted above, using MFCN in Europe in the upper 6 GHz bands would require significant power/deployment constraints, such as low power micro-cell use or indoor limitations, to adequately protect FSS uplinks. It is apparent, however, that the IMT industry is not interested in accepting such constraints and is instead pushing for a relaxation of constraints. We, therefore, do not see a realistic scenario where FSS and MFCN can operate on the same frequencies. The uppermost part of the band, 7075-7125 MHz, is not allocated to the FSS and, hence, could be used by MFCN systems without significant issue. While this is only 50 MHz, it may be possible to identify additional spectrum in the adjacent band (e.g. 7125-7250 MHz) for IMT through WRC-27 agenda item 1.7 to make a useful quantity of spectrum for MFCN.

Regarding the use of the upper 6 GHz band by WAS/RLAN systems, provided the limits as currently adopted by Europe for the lower 6 GHz band are also adopted here, there should be an acceptable risk of interference to FSS receivers. WAS/RLAN systems should operate on a non-protected basis with respect to FSS uplink earth stations, and some separation may be needed with respect to non-GSO MSS feeder downlink stations. With these conditions, no further compatibility measures for WAS/RLAN systems should be necessary.

GSOA is the CEO-lead Global Industry Association representing over 70 Members from the satellite ecosystem. It provides a platform for collaboration between companies involved in the satellite ecosystem globally and a unified voice for the sector. Our vision is to help policymakers improve the state of the world by continuously bridging digital, education, health, social, gender and economic divides across diverse geographies and across mature and developing economies.