

A. Questions directed to the MFCN and the WAS/RLAN stakeholders:

(Please limit your answers to maximum 4-5 pages and favour responding through associations as far as possible.)

The RSPG intends to build a long-term vision for the upper 6 GHz band by providing policy recommendations on how to best organise the future use of this band in Europe with the goal to maximise the contribution of this part of spectrum to the achievement of digital connectivity targets for Europe, as laid down in the Digital Decade Policy Programme 2030 (DDPP)⁵. The DDPP highlights the importance of connectivity infrastructure and accordingly sets political targets for 2030, including for the deployment of networks with gigabit speeds. All end users at a fixed location should be covered by a gigabit network up to the network termination point and all populated areas should be covered by a next-generation wireless high-speed network with performance at least equivalent to that of 5G. In this context, please answer the following questions:

- I. Explain the demand for MFCN or WAS/RLAN in the upper 6GHz band before and beyond 2030
- II. The digital transformation of societies and industries relies on mobile networks as key pillars in providing reliable, high-capacity, low-latency and wide-area connectivity. Achieving the European Digital Decade connectivity goals in an economic and sustainable manner cannot be done without timely access to suitable and affordable spectrum in the short to medium-term. As data volumes carried by the mobile networks continue to grow at an annual rate of ~25%-30%, the capacity of the European mobile networks will likely reach their limit by 2030, with some of the operators running out of network capacity before this. The additional spectrum in the upper 6 GHz band (U6, 6425-7125 MHz) is also needed by 5G-Advanced to address the service-impacting traffic load that macro base stations in urban areas will experience starting from 2027-2028. With spectrum allocated under technology neutral conditions, European mobile operators will equally be able to efficiently use the U6 for initial 6G deployments. The successful launch of a competitive 6G in Europe will need to start with at least 200 MHz assignments per MNO in the U6 band, in a harmonized and coordinated timely manner across Europe to cater for economies of scale and facilitate cross-border interoperability. Therefore, in Europe, the upper 6 GHz (6425-7125 MHz) band should be authorized exclusively for licensed use for macro-cellular mobile network deployments, noting that the lower 6 GHz band (5925-6425 MHz) is already assigned under a license-exempt regime, for use by WAS/RLAN applications. Considering that the lower portion of the 6 GHz band has already been harmonized on a European basis for Wi-Fi unlicensed use, we believe that there would be significant damage to the future development of public mobile networks in Europe if the entire 6 GHz band (5925-7125 MHz) was exclusively devoted to the development of local networks on an unlicensed basis.

In a nutshell, the main points supporting the above position are:

- Digital transformation requires fast, reliable, low-latency mobile networks for the benefit of consumers, industry and public administration.
- Data traffic growth (roughly doubling every two years)
- Recent GSMA study estimates total spectrum requirements in the 'mid bands' (1-7 GHz) for cities in the period 2025-2030: 2 GHz on average
- Need to plan now for future availability of additional spectrum
- The 6 GHz band represents a unique opportunity: 700 MHz contiguous, balancing coverage and capacity
- Good prospects for 5G ecosystem in 6 GHz: interest from industry (operators and equipment vendors) and administrations, specifications from 3GPP within the year
- Evolving macro-cellular networks while minimising costs and impacts on the environment.

- Studies and field tests in have demonstrated the possibility of achieving contiguous coverage with the 6 GHz band by reusing existing macro cell sites (performance and coexistence)

III. Provide information about the sustainability of the above explained demand, especially the:

1. Environmental impact assessment

Evolving macro-cellular networks while minimising costs and impacts on the environment. Studies and field tests have demonstrated the possibility of achieving contiguous coverage with the 6 GHz band by reusing existing macro cell sites (performance and coexistence) Sustainably meet demand in urban and other areas, including FWA connections in less covered, vertical areas.

In case of absence of 6425-7125 MHz for IMT & specifically 5G & 6G:

- Operators will have to densify in an extreme way: unsustainable from an implementation, economic, environmental point of view
- Significant damage to future network development

Italy falls below the EU27 average in renewable energy usage, making it crucial for telecom companies to adopt sustainable technologies. Without additional mid-band spectrum like the upper 6GHz, further network densification will be necessary, leading to a substantial rise in energy consumption for operators and negatively impacting environmental sustainability

2. Social economic impact

Thanks to the availability of 6 GHz, operators will be able to evolve their macro cellular networks minimizing costs and environmental impacts. Field studies and tests have shown the possibility of creating contiguous coverages with the 6 GHz band by reusing existing cellular macro sites both in terms of performance and in terms of coexistence with services that already use these frequencies. On the contrary, in the absence of such frequencies, operators will have to densify their networks in an extreme way: unsustainable from both the implementation and economic point of view, with energy consumption, CO2 emissions and environmental impacts significantly higher. In this regard, GSMA Intelligence has carried out an in-depth cost-benefit analysis that clearly shows how the allocation of the high part (6425-7125 MHz) for public mobile networks guarantees the highest socio-economic benefits in Italy as in Europe and in other regions. GSMA Intelligence performed an in-depth cost-benefit analysis: allocation of the high end (6425-7125 MHz) for public mobile networks guarantees the highest benefits

Need to define price per MHz/year in clear discontinuity with the past, avoiding charging operators with huge spectrum fees, as happened during the last 5G auction

III. Provide information about:

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

As data volumes carried by the mobile cellular networks continue to grow at a significant pace year over year, it's important to secure additional spectrum to MFCN to sustain the increased traffic load that macro base stations will experience in a few years.

In the long term, additional spectrum will offer the opportunity to support new use cases and make possible to address IMT-2030 performance requirements.

For these reasons we believe that the additional spectrum in the upper 6 GHz (U6, 6425-7125 MHz) should be authorized for licensed use for MFCN, noting that the lower 6 GHz band (5925-6425 MHz) is already assigned under a licence-exempt regime for use by WAS/RLAN applications and that there is no evidence that today RLAN is capacity limited and requiring further unlicensed spectrum.

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

Video will continue to be the primary driver of mobile data usage, powering both wide-area applications like self-driving cars and smart cities, as well as more localized use cases such as augmented/virtual reality and connected urban environments. Hong Kong plans to begin the 6GHz assignment process in November 2024. The initial device ecosystem for 6GHz licensed use will likely be driven by larger markets such as China, which has already identified the upper 6GHz band for licensed allocation. We anticipate commercial devices supporting the upper 6GHz band to be available in the near future.

It's too early to anticipate number of deployed BTS, but it's clear that future deployment will need to re-use as much as possible existing macro cellular sites in order to be efficient. While some network limited densification could gradually happen over the time, extreme site densification is simply not sustainable for mobile operators.

IV) Provide information about standardization and technology impact

In preparation for 6 GHz deployment, 3GPP has standardised the lower 6 GHz band (5.925 – 6.425 GHz) for unlicensed use, enabling 5G NR-U deployments, while the upper 6 GHz band (6.425 – 7.125 GHz) is designated for licensed use. Additionally, IEEE Std 802.11ax-2021 has standardized the operation of unlicensed RLANs in the upper 6 GHz band (6.425 – 7.125 MHz). The introduction of 6 GHz will significantly enhance connectivity performance by alleviating network congestion.

Support for deployment of larger contiguous bandwidth carriers in addition to layer 1 technology advancements (active antennas, channel coding, interference rejection etc.) have been the primary means to improve spectrum efficiency and peak user bit-rate in the last years.

Additional mid-band spectrum will be required to address mid/long term MFCN needs, because mid-band spectrum offer a good balance between coverage and capacity. U6 GHz band is the only opportunity for large-enough spectrum block allocation to mobile operators in the mid-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?

Any eventual future allocation of the band must also safeguard the existing high-capacity point-to-point backhauling links, assigned by the MIMIT, which represent the only means of connecting BTS in the event of the absence of fiber connections, typically in rural areas of the country.

In general, there's a need to safeguard the long-haul MW connections that still use these frequencies through appropriate technical solutions. Operators may leverage solutions like integrated access and backhauling to utilise the same spectrum for both mobile access and site

backhauling. 6GHz is also used by other industries such as backhauling for utilities networks and different solution such as relocation of links may need to be considered. It is crucial to carefully evaluate all available technological options before deciding to clear and repurpose spectrum from its existing use.

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

Current allocations are paired, whereas both MFCN and WAS/RLAN operate in unpaired bands. Detailed coexistence and sharing studies are necessary to minimise the impact on existing services.

3) What measures could improve compatibility from your perspective

R: Appropriate methods of coordination between operators will therefore have to be identified to overcome, inter alia, any criticalities due both to spectrum saturation problems and to potential mutual interference. A framework for the gradual migration of existing spectrum use should be considered, including identifying alternative spectrum for relocating current users and assessing the hardware capabilities of existing backhaul deployments to allow for relocation within the band, enabling partial & gradual spectrum clearance.

Ref:

1. The Socio-Economic Benefits of Mid-Band 5G Services (February 2022 - GSMA Intelligence)
2. 6 GHz opportunity: licensed spectrum for mobile networks (White Paper June 2022)
3. The socioeconomic benefits of the 6 GHz band: Considering licensed and unlicensed options (June 2022 - GSMA Intelligence)
4. https://www.eea.europa.eu/data-and-maps/daviz/countries-breakdown-actual-res-progress-15#tab-googlechartid_chart_21

