

## RSPG public consultation on UHF

### Qualcomm response

Qualcomm would like to thank RSPG for the opportunity to provide our comments to the Draft Opinion on the “Strategy on the future use of the frequency band 470-694 MHz beyond 2030 in the EU.”

Qualcomm shares RSPG view on a quite diverse situation in the EU member states regarding use of the 470-694 MHz band leading to a need for more flexibility to serve the needs of all EU countries.

GSA (Global Supplier mobile Association) has recently commissioned an independent report to Plum Consulting looking at the future of the UHF spectrum in Region 1<sup>1</sup>. The study investigates the various uses and respective usage trends of different services including mobile, broadcast, PMSE, PPDR and Radio Astronomy in UHF. The study indicates the need to review some assumptions on the prospects of spectrum use by existing services and it also investigates and reviews the spectrum use of existing services and the highly diverse situations country by country specifically in terms of broadcast use, one dimension being the declining share of the population using DTT, another one being the number of channels offered and thus the amount of spectrum actually used for DTT. The study clearly identifies additional spectrum needs for mobile in low bands in order to cost-efficiently provide the mobile broadband service performance levels required in remote and rural areas, deep indoor or underground areas and along the transportation paths. This would help to reduce the digital divide between urban and rural areas. Given that diversity, the study concludes that under careful consideration of existing services, additional flexibility should be given to national Administrations in the form of a co-primary mobile allocation in 470-694 MHz at WRC-23 in ITU Region 1.

#### **Qualcomm concurs with the need of additional spectrum for mobile and supports the study conclusions.**

Qualcomm believes that Broadcast and Mobile industries / technology will continue to evolve and are likely to integrate &/or work more closely in the future. Several duplex arrangements exist (FDD, TDD, SDL/DL etc.) and Qualcomm suggests that these should be studied after WRC-23 if a co-primary mobile allocation / IMT footnote is agreed at the WRC-23. A co-primary mobile allocation at WRC-23 keeps the options open and provides future flexibility for Administrations to decide within the 2025 – 2030 timeframe what to do with the UHF spectrum considering the latest market/technology developments in both broadcast and mobile. In addition, a co-primary mobile allocation would also provide additional flexibility for some Administrations to enable mobile technology within a country/sub-region subject to coordination arrangements with neighbors. Many Administrations in Region 2 have identified 470-608 MHz (RR No. 5.295) and 614-698 MHz (RR No. 5.308A) for IMT. Similarly, many Administrations of Region 3 have 470-698 MHz (or portions thereof) identified for IMT (RR No. 5.296A). Region 3 has also recently announced 610-703 MHz band as APT600 MHz band (APT/AWG/REP-79(Rev.1)). An IMT footnote

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<sup>1</sup> <https://plumconsulting.co.uk/the-future-use-of-uhf-in-itu-region-1>

is also important to help market development and ecosystem scale if Administrations subsequently decide to make spectrum available for IMT.

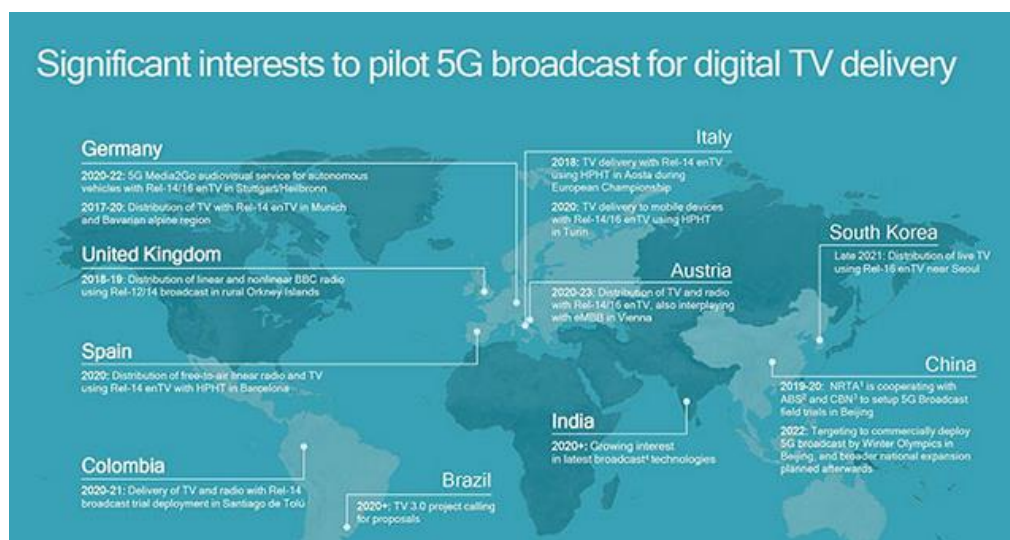
**Qualcomm believes that flexibility will allow nations to use this spectrum asset as per national needs.**

Furthermore, additional UHF spectrum will provide a good opportunity in rural areas for delivering AV media e.g., along the transport paths as well as helping reduce the digital divide for home and enterprise broadband and providing deep indoor coverage. 470-694 MHz has excellent propagation characteristics allowing to cost-efficiently upgrade existing site grids with minimum environmental footprint in terms of energy consumption and visual impact.

In the last few months, substantial progress has been made in 3GPP on broadcast technologies (including LTE based 5G terrestrial broadcast and NR broadcast) targeting cost-efficient delivery of linear content to mobile devices and in mobile reception scenarios, including in-car and in-train entertainment requiring contiguous high-performance coverage along transport paths.

In this context, opportunities for a new global device ecosystem with receivers in mobile devices supporting 470-694/8 MHz and the respective carrier bandwidth driven out of European innovation have the potential to emerge in the near future, and also the opportunity for global devices to support NR broadcast with relatively limited changes to the existing 3GPP specifications to support the required functionalities.

Qualcomm do support cellular broadcast technologies and continue to lead the 5G broadcast evolution. In the last few months, we have been working with broadcasters and engaged in several trials directly or as external technology providers. 5G broadcast trials are proliferating in Europe (ex: Roland Garros<sup>2</sup>) and around the world (please see image below)



<sup>2</sup> <https://www.ateme.com/fr/press/a-loccasion-de-ledition-2022-de-roland-garros-france-televvisions-experimente-de-nouveaux-modes-de-distribution-des-matches-en-direct-grace-a-la-5g-3/>

## Specific comments on the RSPG recommendations

1. While IMT UL protection in a DTT environment certainly leads to some complexity, Qualcomm believes that there are opportunities for introducing additional UL in the 600 MHz range even before 2030, considering mainly DTT transmitters using that intended UL range near country borders, which may limit the number of affected transmitters substantially. Also, certain impairments e.g. by a partly overlapping TX channel may be considered in IMT UL operation as done today along some borders to non-EU members e.g. in the 700 MHz range.
2. Qualcomm welcomes any options to explore possibilities within the existing flexibility options, given e.g., latest standards development addressing the band 470-694 MHz.
3. In the case of any migration in EU happening at different pace in different member states, Qualcomm believes that technology can provide for certain flexibility for co-existence along country borders and even within a given country.
4. Qualcomm supports that, in the border areas of EU, successful coordination negotiations could rely on spectrum regulation at ITU-R level.
5. PPDR has multiple options for implementing highly available and resilient broadband communications below 1 GHz.

Mission critical communication as of today is covered in many European countries by narrow-band, 2G-like systems in 380-400 MHz which may eventually be upgraded to 4G/5G/6G for dedicated PPDR purposes. While this will allow for the use of state-of-the-art technology, broadband mission supportive communications might be hindered by the limited amount of typically 2x5 MHz in that band.

In CEPT, 410-430 MHz (2x5 MHz typ.), 450-470 MHz (2x5 MHz typ.) and options in the 700 MHz with 2x3 MHz and 2x5 MHz outside bands relevant for European MNOs are harmonized for potential PPDR use. These can be considered for dedicated PPDR networks or – specifically for the 700 MHz options – shared RAN with MNOs but exclusive use of the PPDR resources for PPDR purposes.

Multiple countries in Europe have decided to use MNO networks in MNO bands on a shared basis with priority for their communication, both mission critical and mission supportive. Where such agreements have not been made and implemented, due to lack of bandwidth on today's dedicated PPDR networks, mission supportive communication is handled without specific priority on MNO networks, partly under certain frame contracts for official devices, partly even over private devices under private contracts of the PPDR service personnel.

Overall, today's harmonized spectrum resources for PPDR and possibilities to cooperate with MNOs, allow for dedicated, fully shared or hybrid options, where hybrid solution can be considered in a combination of dedicated and shared spectrum resources, in different approaches in different geographies (e.g., stadium scenarios vs. urban vs. rural) and in terms of dedicated or shared infrastructure.

Qualcomm believes that additional spectrum in 470-694 MHz for mobile broadband purposes further enhances options for broadband PPDR communication in dedicated, hybrid or shared modes with MNOs.

6. Qualcomm acknowledges certain needs for PMSE in low band spectrum, benefiting from large “white spaces” in the current DTT spectrum use. Qualcomm sees opportunities for continued shared use of spectrum for PMSE where and when needed also with additional mobile broadband use in 470-694 MHz.
7. Qualcomm acknowledges a need to consider Radio Astronomy and in some countries Wind Profiler Radars in the band.
8. Qualcomm agrees that the further evolution of DTT use will play a significant role and expects a further steady decline in favor of other distribution paths with an increased share of broadband connections for fixed reception scenarios, eventually eliminating the need for distribution in UHF spectrum for fixed reception scenarios. Qualcomm recommends considering codecs more recent than HEVC like VVC or even newer for a 2030+ timeframe, as HEVC needs to be considered by far outdated by then.
9. Qualcomm has a neutral position regarding possible regulatory actions in the UHF band in region 1 under agenda item 1.5 for the next WRC-23.
10. Qualcomm welcomes any activities for more efficient UHF use within the Council and EP decision on UHF and its review before 2030 and is willing to contribute.