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Radio Spectrum Policy Group

GSA¹ Response to the Public Consultation on the Draft RSPG Opinion Strategy on the future use of the frequency band 470-694 MHz beyond 2030 in the EU

GSA appreciates the possibility to comment RSPG's draft Opinion on the Strategy on the future use of the frequency band 470-694 MHz beyond 2030 in the EU.

If any additional clarifications are required for this response, please do not hesitate to contact: Sverker Magnusson (sverker.magnusson@ericsson.com), Chair GSA CEPT Spectrum Group.

Introduction

The GSA (www.gsacom.com) welcomes the opportunity to provide its comments on the Draft RSPG Opinion "Strategy on the future use of the frequency band 470-694 MHz beyond 2030 in the EU".

GSA shares the 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.

A 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 taking into account the latest market/technology developments in both broadcast and mobile. GSA notes the large differences within CEPT in terms of DTT usage and believes that flexibility will allow

¹ The GSA (Global mobile Suppliers Association, <https://gsacom.com>) develops strategies and plans, and contributes studies and technical analysis to international, regional and individual country policymakers and regulators to facilitate the timely availability of spectrum for use by mobile network operators. GSA has a focus group for spectrum topics for technical and regulatory matters of radio spectrum pertaining to the successful evolution of International Mobile Telecommunication (IMT) and associated radiocommunication systems and comprises a team made up of spectrum and regulatory affairs specialists from GSA Executive Member and GSA Member companies. In addition, GSA reports regularly on global spectrum developments.

nations to use this spectrum asset as per national needs. A 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 neighbours. An IMT footnote is also important to help market development and ecosystem scale if Administrations subsequently decide to make spectrum available for IMT.

Consequently, GSA supports a primary allocation of the band 470-694 MHz to the Mobile Service at WRC-23.

GSA observes a strong trend towards increasing use of non-linear video across all age groups in all EU countries, c.f. e.g. CEPT draft brief and compendium on WRC-23 AI 1.5 stating that in certain countries daily non-linear video minutes have passed the linear ones. DTT can only deliver linear content while ever improving broadband connectivity to homes supported by the 2030 EU gigabit connectivity targets covers both non-linear and linear content delivery, eventually removing the need for dedicated linear content delivery in UHF spectrum to fixed locations and allowing for more efficient use of that precious spectrum resource. In some European countries, a large majority of TV use is already on alternative platforms such as satellite, cable and increasingly broadband. Consequently, some European countries have terminated DTT, some others consider such a step even before 2030 and some consider a reduction of the number of multiplexes and related spectrum needs.

GSA recommends to clearly separate a discussion on public service broadcast content from the one on the best suited distribution paths. Public service broadcast content is increasingly consumed in a non-linear manner via catch-up platforms or OTT offering, and also the linear program is offered in multiple ways on fixed and mobile broadband connections, either by public service broadcasters themselves, by broadband service providers or by 3rd parties. Consequently, public service broadcast can evolve independently of the preservation of the DTT platform. GSA rather sees opportunities in an evolution to all IP based video distribution and possibilities to better access mobile usage scenarios and mobile devices, improving the acceptance of public service broadcast content among younger audiences.

While large screens in homes have long life cycles, codec development and non-linear service offering evolve quickly. New codecs and new formats typically require more computational processing power, based on latest chip generations for cost and energy-efficient implementations. Thus, lack of pure software upgrade possibilities on legacy large screen devices may be seen hindering introduction of technology related enhancements, e.g. new codecs. There is, however, a wide adoption of small affordable devices (“set-top boxes” and “HDMI sticks”) processing signals from DTT or a broadband distribution platform and attached to the HDMI port of large screens covering the latest offerings also on legacy screens. Thus, protection of investment in a large screen need not necessarily prevent innovation on the codec and distribution side, but can be combined with affordability of latest and greatest in distribution technology, including positive effects on overall sustainability. As video codecs improve roughly by factor of 2 in efficiency per generation, use of latest codecs can lead to massive improvements of efficiency in the distribution paths, again supporting sustainability goals. The current standard HEVC (finalised in 2013 and introduced to DTT as early as 2015) can be expected to be superseded by at least one codec generation by 2030, with the next generation codec VVC finalised in late 2020 and is already entering the market in software and hardware products. Such distribution related technology enhancements can lead, among other effects, to a significant reduction of the associated DTT spectrum needs compared with the current situation.

At the same time, GSA observes significant increase in demand for higher performance levels of mobile services in remote areas and hard-to-reach places including indoors. Comparable performance of mobile networks in rural and urban areas is required to avoid widening a digital divide. Improved levels of mobile network performance along transportation paths are required for connected and automated driving and in-car or in-train entertainment. Further, emerging services

like smart agriculture require coverage and substantial performance levels of networks in remote areas. Performance upgrades of mobile networks are most cost and energy efficient when upgrading existing site grids with additional spectrum to meet green targets as well as being able to offer affordable services to consumers and businesses. Around 2030, GSA expects the introduction of 6G which – besides re-farming of already assigned spectrum – will also need access to additional low band spectrum resources to bring 6G services at the right performance and cost levels to remote areas.

Thus, GSA sees the RSPG Draft opinion as not being sufficiently forward looking and not fully addressing trends in technology and in substantial shifts in consumer behaviour and expectations. All 3 options discussed for an EU position and a CEPT ECP on WRC-23 A1.5 include consideration of a primary mobile allocation effective 2030/31. Thus, any strategic considerations for the time after 2030 should consider mobile services in the band 470-694 MHz. The scenarios outlined for the time after 2030 could put more consideration on a large number of countries in Europe without DTT, given that countries like Switzerland have abandoned DTT and certain EU members consider such a step even before the next decade. Realistically, GSA would expect a migration from a DTT-heavy scenario like scenario 1 to something going even beyond scenario 3 over time at a different pace in different countries, leading during the migration to a mix of scenarios within the EU where different EU members could face countries closer to other scenarios at their borders.

Throughout the document, RSPG often uses the adjective “effective” for spectrum use, whereas often “efficient” spectrum use is the overarching target in spectrum regulation. Oxford Advanced Learners Dictionary gives the following definitions:

effective: producing the result that is wanted or intended; producing a successful result

efficient: doing something in a good, careful and complete way with no waste of time, money or energy

Thus, efficient spectrum use seems to be the more desirable and more ambitious goal, specifically for scarce spectrum resources like 470-694 MHz. GSA suggest RSPG to consider maintaining efficient spectrum use as the main guideline for regulatory decisions on bands like 470-694 MHz.

1. Existing technical solutions (and their potential evolution)

GSA would like to point out that the development of an advanced device ecosystem would require clear expression of political will and a supporting regulatory framework to justify the investments in R&D to build such a device ecosystem. Such expressions of political will and accordingly adaptations in the regulatory frameworks have been missing so far. Development of such an ecosystem enabling the efficient provision of high level performance mobile services in remote areas could be triggered by a change decision in WRC-23 adding a mobile allocation in 470-694 MHz.

Starting from the North American markets and increasingly gathering momentum in other regions, 3GPP band B71/n71 (663-698 MHz (UL) / 617-652 MHz (DL)) can already boast a mature device ecosystem and is seen by many mobile operators as a “low-hanging fruit” to launch a range of high-level performance services in remote areas in an efficient manner. APT decided on an additional harmonised regional frequency arrangement that has been specified in 3GPP as band n105 in the 600 MHz range that can be used for mobile communications as appropriate. GSA further notes that a number of duplex arrangements (FDD, SDL/DL etc) could be considered within the entire range 470-694 MHz and these should be studied after WRC-23, building on a primary mobile allocation in 470-694 MHz.

A 600 MHz band plan (i.e. B71/n71) implementation will require some border coordination, mainly when it comes to protect IMT UL from co-channel DTT signals. In the past, EU and CEPT for e.g. 800 MHz and 700 MHz agreed on timelines for a common clearing of the entire bands from DTT for the

entire region. Compared to that situation, GSA sees additional flexibility and reduced needs for alignment when primarily the 35 MHz UL range of 663-698 MHz instead of the full band and only affected DTT transmitters are considered. Such approaches may limit DTT re-planning to a limited number of DTT transmitters within certain corridors along national or sub-regional borders to e.g. ASMG where some countries have expressed clear intent to deploy 600 MHz B71 soon.

2. Scenario 1 (Prevalent Broadcasting)

As outlined above, GSA does not believe that going forward towards the end of this decade, DTT will maintain a central role in delivery of audio-visual content in most EU countries. Even today, most DTT households use additional distribution paths both for linear and for non-linear content, with the number of DTT-only households slowly but steadily decreasing. Stated benefits like ease of access, inexpensive, free access, non-traceable access, resilience etc. also hold for other distribution paths even today or can be implemented as needed. Energy efficiency of DTT distribution highly relies on the relevant share of the population using it – single digit percentages of use in some EU countries and secondary use in parallel to other distribution paths are most likely not energy efficient. From a 2030 and beyond perspective, DVB-T2 and HEVC cannot be seen as innovative. Specifically, on the codec side, there should be ambition to use at least VVC by that date (see above). While GSA recognises that some countries in EU still depend on DTT as of today, we expect that to change substantially until 2030. GSA therefore does not see evidence that Scenario 1 will remain prevailing and recommends that it should not be assumed as reference in the EU discussion on the future use of the UHF band.

3. Scenario 2 (Broadcasting (DTT and 5G Broadcast), Mobile limited (SDL))

GSA agrees that scenario 2 can co-exist with scenario 1 along country borders. However, we neither see this scenario as dominant by 2030 (for the same reasons as scenario 1) nor would we welcome a situation where the full potential of 5G and later 6G may be limited due to the DL-restricted use of spectrum associated with this scenario. Any additional DL use could consider future UL use above 663 MHz to allow for B71/n71 implementation.

4. Scenario 3 (Broadcasting limited, Mobile (Full FDD band plan))

GSA sees some evolution over the next decade to something close to scenario 3 with reduced DTT or even abolishment of DTT, at least for the long term. GSA would like to point out, that the introduction of mobile in 600 MHz in a country may not necessarily require clearing the 600 MHz range entirely from DTT in the region and may not affect all DTT transmitters in neighbouring countries even in the 600 MHz range (see above). This may open options for EU members to consider 600 MHz implementation with some, but limited need to ask for coordination with their neighbours (see above) and/or certain limitations along certain country borders where agreements cannot easily be reached. Examples of reduced uplink bandwidth operation exist in some EU countries with borders to non-EU countries even today. Thus, GSA believes, that with regulatory flexibility based on a primary mobile allocation likely effective from 2031 onwards, migration into scenarios with 600 MHz UL utilisation within a country is possible even with neighbour countries maintain DTT in large parts of the 470-694 MHz band. At the same time an EU-level harmonisation measure repurposing the 600 MHz band for mobile at certain date, e.g. soon after 2030, would give more certainty to the market and ensure investment.

5. Specific comments on the RSPG recommendations

1. While IMT UL protection in a DTT environment certainly leads to some complexity, GSA 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. GSA welcomes any options to explore possibilities within the existing flexibility options, given e.g. latest standards development addressing the band 470-694 MHz.
3. GSA agrees with the view that any migration in EU will happen at different pace in different member states. GSA believes that technology can provide for certain flexibility for co-existence along country borders and even within a given country.
4. GSA supports a primary mobile allocation in 470-694 MHz which would lay the foundation for coordination negotiations both inside EU as well as at EU borders.
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 harmonised 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 harmonised 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.

GSA 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. GSA acknowledges certain needs for PMSE in low band spectrum, benefiting from large "white spaces" in the current DTT spectrum use. GSA would like to point out, however, that most of the PMSE use is very local, often indoors, and often limited to the duration of a specific event. Thus, their use cannot compensate for the inefficiencies in spectrum use by DTT. Nationwide reservation of large swaths of spectrum in 470-694 MHz does not seem to be appropriate in the sense of efficient spectrum use. GSA 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. GSA acknowledges a need to consider Radio Astronomy and in some countries Wind Profiler Radars in the band.
8. GSA agrees that the further evolution of DTT use will play a significant role and expects a further steady decline in favour 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. GSA 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. GSA strongly supports a primary mobile allocation in 470-694 MHz in order to provide additional flexibility to EU and its member states and provide choices for better audio-visual content delivery to consumers, including mobile use cases, and more efficient spectrum use in the band.
10. GSA 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.

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