Commentary on RSPG23- 045: Draft Work Programme for 2024 and beyond

The European Utilities Telecom Council (EUTC), representing European electricity and gas generation, transmission and distribution companies welcomes the opportunity to comment on the draft RSPG Work Programme for 2024 and beyond.

EUTC is proud that some of its members have been closely engaged with Administrations that have recently recognized the essential need for utilities to have direct access to spectrum in order to accelerate the commitment to delivering ambitious climate targets by means of an energy transition from dependence on fossil fuels to zero emission technology, especially renewable energy. European utilities are totally committed to facilitating the move towards renewable energy and demand management in order to reduce the harmful emissions of greenhouse gasses, together with the greater electrification of society[1]. Recognition by RSPG of the role that telecommunications play in this transition is warmly welcomed.

Peer review and Member States cooperation

EUTC has no specific comments on this topic.

WRC (World Radio Conference)

EUTC draws to the attention of RSPG the recent ITU Report M2533-0 on Utility Radiocommunications Services (URS)[2]. Utilities are now focusing on a Draft Recommendation on preferred spectrum bands for Utility Radiocommunications to assist administration looking to harmonise spectrum for these Mission Critical Applications. Bearing in mind the Climate Emergency and the need for urgent action in response to UN and EU initiatives, it is to be hoped that the needs of utility radiocommunications will be recognized in some way at WRC27.

“Good offices” to assist in bilateral negotiations between Member States

EUTC is not aware of any areas relating to utilities’ use of spectrum where the RSPG “Good Offices” will need to be invoked.

Long-term vision for the upper 6 GHz band (2030 and beyond)

EUTC Members in some countries use 6 GHz fixed links for critical network operations. These links are often planned to 99.999% availability as is required when supporting critical national infrastructure. To place this in context, most EU citizens / consumers expect their electricity supply to have an availability in the region of 99.999% reliable[3], so it is

[1] https://www.cop28.com/en/

[2] [Utility radiocommunications operating in the land-mobile service (itu.int)]

[3] “The number and duration of interruptions in European networks is generally low, ranging from about 15 minutes to 400 minutes a year.” https://www3.eurelectric.org/powerdistributionineurope/

appropriate that the telecommunications underpinning the operation of these energy networks perform to a similar standard.

There are major challenges in assessing sharing between high availability and 'best endeavours' type services, especially involving mobile or itinerant services. Determining the level of reduction in the quality of the high availability service is very difficult, requiring accurate and detailed measurements over a long period of time. By the time any interference has been confirmed to the level required by regulatory certainty, the damage to the availability of the high quality critical service has already been caused.

In addition, enforcing operational constraints on widely deployed equipment, often installed or operated by consumers and non-telecoms specialists is a key challenge. If this includes restrictions on use of the spectrum for outdoor mobile services, such situations are difficult to define precisely and assess because of geography and weather dependent propagation conditions, especially when assessing interference into a service designed to operate at up to 99.999% availability.

For 'indoor use', the definition is difficult to determine precisely in regulatory terms, and variation in construction materials and formats of buildings result in propagation parameters being very indistinct.

The use of dynamic authorization databases is also problematic. Experience in the use of databases to determine times and conditions when a certain frequency can or cannot be used, and the associated conditions has not been very successful in the context of consumer or non-telecoms specialist users. The example of sharing UHF TV spectrum with other users in the 'White Space' initiative in the UK for example has not been deemed a widespread success.

Overall, the reduction in spectrum accessible for fixed services is becoming severe. The loss of spectrum at the lower end of the frequency spectrum is especially damaging for widely deployed critical services such as utilities as long link lengths are desirable to reach remote areas, and as an alternative resilient path in case of damage to copper or fibre cables. Because of the demanding latency requirements often required, satellite links are not an acceptable alternative.

As well as the lower frequencies being more suitable for long haul links, the propagation conditions are less susceptible to disruption from severe weather, especially intense rain episodes. With climate change generating ever more severe and frequent severe weather events, the loss of the lower frequency bands is especially concerning.

EUTC is keen to engage with RSPG on behalf of its members to discuss these issues. We hope that that the incremental erosion of the spectrum available for fixed services, particularly in the lower parts of the frequency spectrum will be factored into RSPG deliberation, especially in the light of society's increasing dependence on reliable utility services and the impact of climate change on the provision of these services.

6G Strategic Vision

EUTC's response focuses mainly on the lower frequency bands potentially being addressed by 5G, and subsequently 6G, and future wireless broadband networks. That is not to say that there will not be critical utility applications in the higher frequency bands (specifically the sub-THz bands mentioned in the Draft Opinion), simply that utility applications in these frequency ranges are not yet apparent. This response also focuses on licensed spectrum applications as critical utility communications are not well suited to licence-exempt spectrum where there is no guarantee of performance or interference-free operation.

Harmonisation of spectrum in 410-430 MHz and 450 - 470 MHz for mission critical services

EUTC's contribution to the Strategic Vision for 6G can bring a focus for one of the critical vertical sectors, and the Ultra Reliable Low Latency Communications (URLLC) vision which has arguably made the least progress in 5G.

EUTC has historically made a case for harmonisation of spectrum access for utilities in the 400 MHz bands as this is the 'sweet spot' blending coverage and capacity for mission critical applications. 6G may provide the impetus for rationalization of services in the 400 MHz bands to facilitate the harmonisation of spectrum access for mission critical services, especially in extending 6G into bands below 400 MHz and refarming of the UHF Broadcasting Bands.

Extending the lower frequency band to include 380-400 MHz

Following on from the above paragraph on 410-430 MHz and 450-470 MHz bands, it should be noted that the forecast timeline for the introduction of 6G technology is likely to coincide with the decommissioning of current Public Safety Tetra networks in 380-400 MHz spectrum across Europe. This may create an opportunity for the introduction of 6G services in this band for mission critical applications.

2 x 10 MHz of spectrum in 470-694 MHz identified for Mission Critical Services

Taking into account the complexity of spectrum access below 1 GHz for mission critical services, and the likelihood that the needs for these applications will continue to grow for the benefit of all of society, if spectrum in the band 470-694 MHz is to become available for IMT type services from 2035, it would be wise to reserve 2 x 10 MHz of this spectrum for mission critical applications.

Resilience of future wireless broadband networks

Mobile broadband connectivity has presented society with vastly more options and facilities than could ever have been imagined by previous generations, but one element of the former copper-wired networks has been lost almost imperceptibly. This is the regulation of the legacy Public Switched Telephone Networks (PSTN) to deliver 99.999% availability not only with the provision of independent power supplies, but also rudimentary low voltage Direct Current (DC) provision to enable simple powering of terminal equipment connected to the line. This delivered an exceptionally reliable means for connecting the Public Safety and utility services for all members of society. We are at risk of losing this beneficial universal service without an adequate replacement being available.

Integration of non-terrestrial networks

Utilities are interested in developments in integrating non-terrestrial elements into networks. This has the potential to enhance resilience and facilitate coverage in geographic areas which are difficult and/or expensive to provide coverage from terrestrial base stations. Utilities see particular challenges in use of hybrid networks when seeking to provide deterministic connectivity with low latency, minimal jitter and guaranteed asymmetry. This may provide opportunities for valuable research projects within the 6G program.

A secondary issue for satellite connectivity is the perceived security risk as the attack surface is potentially greatly increased for airborne elements, and utilities require security and resilience against attack up to and including hostile nation-state capabilities.

One final element where EUTC believes further research is needed for non-terrestrial networks (especially large LEO constellations) is the potential additional vulnerability due to space weather events. This is of great importance to utilities as these space weather incidents also cause major disruption to electricity networks. It could be catastrophic if the monitoring and switching operations required by utilities to minimize the potential impacts of space weather events could not be implemented due to loss of telecommunications connectivity.

Addressing security challenges

Telecoms faces an unprecedented level of security challenges from an ever increasingly diverse range of sources. The design of 6G networks must have security elements designed-in from the outset, including massive denial-of-service attacks.

Symmetry and latency requirements for specialist services

Specialist industry applications sometimes require demanding symmetry and latency requirements of no particular value to the majority of users. These requirements can make demands on the architecture of the network, increasing its cost or limiting its flexibility for other users. It may be that the optimum solution for delivering these highly specialized services is separate dedicated networks for which suitable and sufficient spectrum needs to be made available.

Implications of carbon reduction targets.

The overriding requirement to reduce carbon emissions associated with future wireless broadband networks may conflict with the development of 6G and associated spectrum allocations. Ever higher frequency networks implies densification of infrastructure, potentially leading to increased energy consumption. Innovative strategies may be beneficial to address this need, ranging from closer collaboration between utility energy networks and telecommunications networks, to offloading data from 6G mobile networks to local WiFi networks.

Effect of climate change

The physical effects of climate change will need to be taken into account in the construction of future wireless networks, such as the increasing potential flooding risk and higher wind loading on antenna structures.

As well as the above, there may also be effects on radio propagation modeling and radio channels particularly due to more intense rainfall events which are especially relevant at the higher frequencies being contemplated for 6G. Propagation modeling for 6G must incorporate parameters adapted to climate change which may differ from historic scenarios.

Environmental impact of 6G infrastructure

Although most European citizens consider the environmental impact of base station infrastructure is justified on the basis of improved connectivity and services, there remains significant public hostility to the potential adverse visual intrusion of antenna structures on the environment. The move to higher frequencies may mitigate the impact to some degree because of smaller elements required at the higher frequencies, but the increase in MIMO (Multiple Input Multiple Output) densities may counterbalance this reduction in individual element size. Reducing any detrimental impact of visual intrusion from future wireless networks should be a priority.

Research into any potential adverse health effects from the use of higher radio frequencies in close proximity to humans must be included in 6G research to reassure the public that this element is being adequately addressed.

Backwards compatibility

As we move forward to 6G, backwards compatibility for legacy equipment ensures long life cycles of equipment which enhances sustainability and avoidance of stranded assets. Utility systems are often 5-10 years in planning and rollout, and are then expected to operate for at least 15 years, ideally 25 years before replacement. This not only enhances sustainability through minimizing waste and consumption of new raw materials, but also ensures that energy consumers do not have to pay for costly upgrades of technology solely to ensure continuity of operations and provision of utility services.

Assessment of future usage of frequency band 470-694 MHz within the EU

Comments on future usage of the frequency band 470-694 MHz have been included under the previous heading of 6G Strategic Vision.

Strategic Spectrum Matters

EUTC's concerns in terms of strategic spectrum matters include three major policy areas where spectrum policy must support other EU objectives, specifically:

- Energy Transition and Climate Change: as outlined in previous consultations, the energy transition envisages major changes in the sources of energy supply, especially in the volume of intermittent and unpredictable generation and the whole architecture of the energy network. At the same time, electrification of heat and transport require massive growth in the amount of energy which must be supplied. Climate change also places greater strains on the energy networks due to severe weather events both affecting energy supply and demand, together with a greater potential for physical damage to energy network infrastructure.
- Resilience: as society becomes more interconnected and reliant on a secure supply of electricity, energy network resilience becomes increasingly vital, but energy network

operations are themsleves critically dependent on reliable operational telecommunications.

- Cyber Security: although physical security is an important element in securing energy networks, the increasingly connected nature of these network by means of advanced telecommunications creates opportunity for hostile forces to disrupt energy supplies on a potentially a massive scale, and also undermine stable and fair energy markets.

The European Utilities Telecom Council (EUTC)

The European Utilities Telecom Council (EUTC) is the leading European Utilities trade association dedicated to informing its members and influencing policies on how telecommunication solutions and associated challenges can support the future smart infrastructures and the related policy objectives through the use of innovative technologies, processes, business insights and professional people.

This is combined with sharing best practices and learning from across the EUTC and the UTC global organization of telecommunication professionals within the field of utilities and other critical infrastructure environments and associated stakeholders.

CONTACT DETAILS:
Dr. Jürgen Tusch
Chief Technology Officer
European Utilities Telecom Council AISBL (EUTC)
EUTC, 22 avenue de la Toison d'Or, 1050 Brussels, Belgium
email: juergen.tusch@EUTC.org
www.eutc.org