EUTC Response to the Public Consultation on the Draft RSPG Work Programme for 2020 and beyond

The European Utilities Telecoms Council (EUTC) welcomes the opportunity to contribute to the development of the EU Radio Spectrum Policy Group (RSPG) Work Programme for 2020 and beyond. The RSPG is to be congratulated on their approach to highlighting work items which they perceive to be important in future years, and inviting comment on them.

This response focuses on the work item "Role of Radio Spectrum to help combat Climate Change". The UN Climate Action Summit in New York on 23 September 2019 declared that "Climate change is the defining issue of our time and now is the defining moment to do something about it. There is still time to tackle climate change, but it will require an unprecedented effort from all sectors of society."

Secretary-General António Guterres speaks with youth attendees at high-level event on Youth2030 in September 2018.

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Following the Summit, several European nations committed to some form of net zero carbon emissions by 2050. The EU itself has identified preventing dangerous climate change as a key priority for the European Union. Europe is working hard to cut its greenhouse gas emissions substantially while encouraging other nations and regions to do likewise.

Energy production and use, including the energy used in transport, account for some 80% of the EU's greenhouse gas emissions. Thus, to tackle climate change effectively, Europe will have to largely 'decarbonise' its energy systems by moving away from fossil fuels.

An illustrative example from an EU Member State

Taking Ireland as an example following their recent award of spectrum in the 400 MHz band to facilitate telecommunications in support of SMART utility networks, the Irish National Development Plan 2018—2027 'Project Ireland 2040'[1] declared "The national objective of transitioning by 2050 to a competitive, low-carbon, climate-resilient and environmentally sustainable economy and society must influence public capital investment choices over the next ten years." (page 74). The report identified that "In addition to the public investment measures … a range of major commercial state sector energy projects will be undertaken over the period of the plan. State owned enterprises are expected to invest in excess of €13 billion in energy related investments, with a particular focus on investment in regulated energy network infrastructure to provide smart reliable electricity networks to support security of electricity supply, SMART metering and enable increased renewable generation." (page 78).

[1] https://assets.gov.ie/19240/62af938dce404ed68380e268d7e9a5bb.pdf

The allocation of radio spectrum to utilities is a practical commitment by the Irish Government to facilitate the achievement of these policy goals through the application of advanced telecommunications to the energy network.

The Government's National Development Plan complemented the Commission for Communications Regulation Consultation on the Release of the 410 – 415.5 / 420 – 425.5 MHz Sub-band (ComReg 18/92) published on 24 October 2018.[2]


Further Consultation on the Release of the 410 – 415.5 / 420 – 425.5 MHz Sub-band

Consultation

Reference: ComReg 18/92

Date: 24/10/2018

The most relevant part of this consultation is reproduced below for convenience as this analysis applies to most European countries.

> 3.27 Smart Grids are a key component of government efforts to meet demand for increased energy requirements in a cost effective and secure way while reducing the environmental impact of consumption and associated carbon emissions. Different functions of the Smart Grid could provide substantial reductions in energy use and carbon emissions by using new technology and making renewable energy and efficiency programs more affordable and potentially more accessible.
>
> 3.28 In particular, greater integration of renewable energy into electricity and gas grids is key to lowering the environmental impacts of generation and meeting climate change targets. For example:
> - The ITU has outlined how Smart Grids can help to mitigate climate change by building more controllable and efficient energy systems;
> - The United Nations (UN) has outlined that the demands of climate change requires the development of a Smart Grid which is founded upon communications networks that can deliver centralised real time monitoring and control, eventually across the entire power distribution domain.
>
> 3.29 A number of seminal international and national studies have estimated the potential carbon reductions arising from the use of Smart Grids:
> - the Electrical Power Research Institute (EPRI) has estimated that Smart Grid enabled electrical distribution could reduce electrical energy consumption by 5% to 10% and carbon dioxide emissions by 13% to 25%;
> - a smart electrical power grid could decrease annual electric energy use and utility sector carbon emissions by at least 12% by 2030; and
> - the Sustainable Energy Authority of Ireland estimates that by 2050, Smart Grids will see an accumulated reduction in energy related CO2 emissions of 250 million tonnes.
>
> 3.30 At a European Level, the European Commission has been encouraging the use of Smart Grids in order to encourage more efficient energy generation and consumption. For example, under the Electricity Directive:
> - *"Member States should encourage the modernisation of distribution networks, such as through the introduction of **smart grids**, which should be built in such a way that encourages decentralised generation and energy efficiency*.

[2] https://www.comreg.ie/publication/further-consultation-on-the-release-of-the-410-415-5-420-425-5-mhz-sub-band/

- "*In order to promote energy efficiency, Member States or, where a Member State has so provided, the regulatory authority shall strongly recommend that electricity undertakings optimise the use of electricity, for example by providing energy management services, developing innovative pricing formulas, or introducing intelligent metering systems or* ***smart grids****, where appropriate*.

3.31 The European Commission has an existing policy framework for climate and energy from 2020 to 2030 which proposes new targets and measures to make the EU's economy and energy system more competitive, secure and sustainable. It includes targets for reducing greenhouse gas emissions and increasing use of renewable energies noting that "*the EU and Member States will need to develop further their policy frameworks to facilitate the transformation of energy infrastructure with more cross-border interconnections, storage potential and* ***smart grids*** *to manage demand to ensure a secure energy supply in a system with higher shares of variable renewable energy*".

3.32 In that regard, at a national level the Department of Communications, Climate Action and Environment is currently developing a National Energy and Climate Plan (NECP) as one of the key provisions of the proposed Governance of the Energy Union Regulation. The plan, which is due to be submitted to the European Commission by the end of 2018, will include trajectories for renewable energy, energy efficiency, and national emissions, and measures required to achieve these trajectories. The plan must set out how Ireland is going to achieve targets on reducing carbon emissions and increasing renewable energy up to 2030. The then Minister for Communications, Climate Action and Environment, Denis Naughten TD noted that this will be facilitated by existing work streams such as the National Development Plan (NDP). The NDP includes measures such as Smart Grid to transition to a low-carbon economy.

3.33 Such requirements are also broadly in line with State policy to encourage the provision of Smart Grid and other related technologies. For example:

- The Project Ireland 2040 National Planning Framework promotes a transition to a low carbon energy future which requires decisions around development and deployment of new technologies relating to areas such as wind, **smart grids**, electric vehicles, buildings, ocean energy and bio energy.
- It also commits to a roll-out of the National Smart Grid Plan enabling new connections, grid balancing, energy development and micro grid development.
- The Department of Communications, Climate Action and Environment National Mitigation Plan observes that smart operation of the power system at both transmission and distribution level and energy efficiency will enable maximisation of the existing grid.
- The National Development Plan 2018-2027 foresees the piloting of "climatesmart countryside" projects to establish the feasibility of the home and farm becoming net exporters of electricity through the adaptation of smart metering, **smart grids** and small-scale renewable technologies, for example, solar, heat pumps and wind.
- The Sustainable Energy Authority of Ireland "Smart Grid" Roadmap to 2050 notes that Smart Grid can maximise our use of indigenous low carbon renewable energy resources which is central to ensuring Ireland meets its long term target of a secure and low carbon future.

Background perspective

Historically, a relatively small number of large power stations, mainly fossil-fuelled, fed into a transmission network at extremely high voltages – around 400,000V, gradually being transformed to lower voltages before the power finally emerged from the power sockets in homes, offices and factories at 400V/230V. The transition of the electricity network into cleaner, greener more sustainable power is leading to lots of smaller power sources being connected into the electricity distribution system at intermediate voltages, usually between 100,000V and 10,000V.


Substation connecting wind farm into an electricity distribution network showing multiple terrestrial UHF and satellite radio links to monitor and control the associated switchgear.

Many of these new power sources are renewable – wind and solar being the most common - but these supplies are intermittent and often unpredictable. As we target a zero-carbon economy, transport and home heating are being converted to electricity, creating large new demands on electricity networks.

These new sources of generation and demand are creating a two-way flow of electricity through a network designed for a one-way flow, something never envisaged when it was constructed. There are two ways to meet this challenge.

One way is to build lots more capacity into the network to accommodate power plants which only generate intermittently. This would require a much bigger power network, be very expensive to build, take a long time to achieve, and be highly disruptive.

However, the industry is following a better alternative by progressively convert the existing electricity network into a more intelligent system, often referred to as a **'smart grid'**.

By applying advanced telecommunications to monitor and control the system, utilities can use existing electricity cables and transformers more efficiently and avoid wholesale re-enforcement of the electricity network. Real-time monitoring of assets such as cables and transformers can also permit higher ratings of equipment when operating parameters permit, such as allowing overhead cables to carry more power when they are being cooled by the wind.

To match these intermittent power sources, demand management – switching loads on and off to try to match demand to supply - on a second by second basis, can be introduced all without disrupting consumers and industry.

Finally, storage systems such as batteries can be placed strategically around the network to absorb excess power when not needed, and top-up supplies at times of high demand.

This new requirement for monitoring and control increases the number of telecommunications connections on electricity distribution networks from hundreds of points to ultimately millions.

Where copper and fibre cables connectivity exists, this can be exploited, but in many cases radio is the only means to deliver this sophisticated connectivity quickly and cost-effectively. However, supporting electricity networks usually operating in the region 99.999% availability requires these radio solutions to be exceptionally reliable and reach locations often currently unserved by existing telecommunications networks.

Gas and water networks are also in their own way transitioning towards more intelligent and smarter networks by employing similar technological innovations.

<u>Why not use existing commercial telecommunications networks?</u>

Utility radio solutions are often separate from the public phone network for security and reliability purposes. In 2012, the European Commission, keen to understand the potential for three mission critical sectors – public protection and disaster relief (PPDR), utilities and intelligent transport services (ITS) for road and rail to migrate to commercial broadband networks commissioned a study by Simon Forge Associates (SFA).[3]

Utility telecommunications are most needed when their networks are under stress, such as in extreme weather conditions when utility services have to be restored as quickly as possible for the health and welfare of consumers.

The study concluded that there was reluctance within the mission critical sectors to employ commercial mobile services exclusively. Their major reservation was whether commercial operators were willing and able to provide long-term reliable and resilient services with the needed coverage and quality. The key conclusion was that commercial LTE networks could support mission critical needs but only if certain conditions are met, but these conditions would fundamentally change the operating environment for the commercial mobile networks.

In summary, the five conditions – <u>**which had to be met in full**</u> – were:

1. The behaviour of commercial MNOs must be constrained to provide the services needed by mission critical users while preventing the use of “lock in” techniques to take unfair advantage of this expansion of the MNOs’ market power and social responsibility. Such changes include not just stronger commitments to network resilience, but the acceptance of limits on price increases and contract condition revisions, ownership continuity assurances, and a focus on quality of service for priority mission critical traffic. Equally important for long-term relationships will be

[3] “Is Commercial Cellular Suitable for Mission Critical Broadband?” Study on use of commercial mobile networks and equipment for "mission-critical" high-speed broadband communications in specific sectors: A study prepared for the European Commission DG Communications Networks, Content & Technology: ISBN: 978-92-79-38679-4.

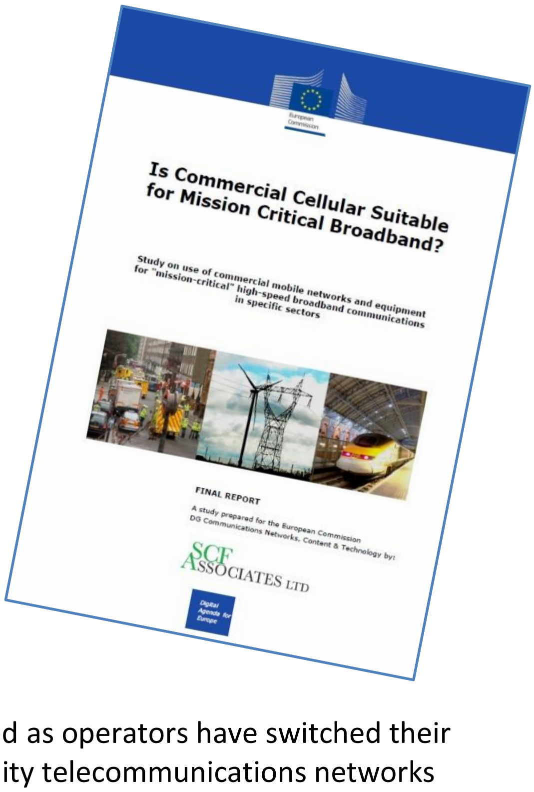
the mission critical services' perception of MNO behaviour and performance. For that, measures will be needed that go beyond service level agreements (SLAs) at a commercial contract level: new regulations regarding commercial MNOs services must be enforced by each Member State's national regulatory agency (NRA).

2. Commercial networks have to be "hardened" from RAN to core and modified to provide over 99% availability – with a target of "99.999%". Geographic coverage must also be extended as needed for mission critical purposes and indoor signal penetration improved.

3. All this network hardening and extended coverage, along with the addition of essential mission critical functions and resilience, must be accomplished at reasonable cost. No more should be spent on the selective expansion and hardening of commercial networks for mission critical use than it would cost to build a dedicated national LTE network for that purpose.

4. Hardened LTE networks must be able provide the different types of service required by each of the three sectors. Each sector uses broadband in quite different ways. That is, not just for streaming video, image services and database access, as in PPDR, but for very low-latency telemetry and real-time control for utilities and transport.

5. Commercial mobile networks must overcome ingrained Member State preferences for state-controlled networks for applications that implicate public safety. This is not simply a legal, regulatory or economic question. Some Member States have specific histories of state control as part of their culture, traditions and politics. Thus some Member States may want to continue using dedicated networks in the short and medium term even if they cost more.


European Commission

Is Commercial Cellular Suitable for Mission Critical Broadband?

Study on use of commercial mobile networks and equipment for "mission-critical" high-speed broadband communications in specific sectors

FINAL REPORT

A study prepared for the European Commission DG Communications Networks, Content & Technology by:

SCF Associates Ltd

Digital Agenda for Europe

Since the publication of the SFA report in 2013, there has been no progress in changing public cellular network license conditions, nor the infrastructure deployed by commercial telecoms operators to provide the priority, guaranteed access, service level agreements and the resilience essential for Smart Grids. If anything, the interest of the commercial broadband operators and the utility sector have diverged as operators have switched their focus to 5G, making the case for private provision of utility telecommunications networks even more compelling.

Access to radio spectrum

However, it must be observed that if utilities are to construct their own private radio networks, it will be essential for them to be guaranteed access to a small amount of dedicated radio spectrum for their operations.

The 2 x 3 MHz of spectrum in the 400 MHz region currently being sought by many utilities around Europe is only ½% of the 1200 MHz of spectrum which was identified for broadband radio services in the 2012 EU Radio Spectrum Policy Programme.

EUTC Spectrum Proposal

Within Europe, multiple small allocations within harmonised bands:

LESS INTENSE APPLICATIONS

- **VHF spectrum (50-200 MHz)** for resilient voice comms & distribution automation for rural and remote areas. [2 x 1 MHz]

ANCHOR BAND

- **UHF spectrum (400 MHz bands)** for SCADA, automation, smart grids and smart meters. [2 x 3 MHz]

MORE DENSE APPLICATIONS

- **Lightly regulated or licence-exempt shared spectrum** for smart meters and mesh networks. (870-876 MHz)
- **L-band region (1500 MHz)** for more data intensive smart grid, security and point-to-multipoint applications. [10 MHz]

FOUNDATION BANDS

- **Public microwave bands (1500 MHz – 58 GHz)** for access to utilities' core fibre networks/strategic resilient back-haul.
- **Public satellite bands** to complement terrestrial services for particular applications.

5G

Developments in the 5G ecosystem offer the prospect that if utilities construct their own new private networks using LTE technology, there will be an upgrade pathway to 5G. This aligns with growing interest in private 5G networks in other sectors. If the concept of heterogeneous networks also becomes a reality, the vision is that utilities may be able to take advantage of the benefits of both commercial and private 5G networks integrated into one seamless telecommunications environment.

Security

Tempering this vision however, it would be remiss if we did not mention the increasingly hostile cyber security environment in which utilities must operate. The European Union Agency for Cybersecurity (ENISA), has recently published a study 'ENISA THREAT LANDSCAPE FOR 5G NETWORKS,'[4]. In their report, the authors observe, 'With the advent of the fifth generation (5G) of mobile networks, security threat vectors will expand, in particular with the exposure of new connected industries (Industry4.0) and critical services (connected vehicular, smart cities etc.). The 3G revolution, introducing internet connectivity into the mobile network infrastructure, is replicated in 5G connected services and vertical infrastructures. The integration with and exposure to the data network, is even more prevalent across the 5G network.'

The increased exposure to security threat vectors identified in the ENISA report can be addressed more effectively if utilities are able to deploy private networks.

[4] https://www.enisa.europa.eu/publications/enisa-threat-landscape-for-5g-networks

<u>Climate change and the weather</u>

The focus of this response has been to highlight the role that radio can play in assisting utilities to reduce carbon emissions that contribute to climate change, but it is important not to forget the impact that climate change is already having on utility operations, and the role that utilities must play in helping citizens survive the damaging effects already being experienced.

The Walham electricity substation inundated during the 2013 winter floods in the UK

Water utilities play a key role in flood prevention and mitigation, while electricity and gas resources must be able to survive increasingly severe storms with more severe rain events, higher winds, droughts, wildfires and excessive summer temperatures.

Utility telecoms systems serve a vital purpose in aiding the combatting of all these detrimental impacts of climate change, safeguarding citizens lives and property, and helping them rebuild their lives in the sad cases where the environment overwhelms them.

Summary

The utility sector is keen to work with the RSPG to identify areas where European Spectrum Policy can make a significant contribution to reducing carbon emissions as we work towards a net-carbon zero European economy, and to combat the effects of climate change to minimize their impact on European citizens.

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.

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