Norwegian Communications Authority - Nkom

Consultation on the future use of available frequency resources in 410-430 MHz

Executive Summary

The Joint Radio Company (JRC) welcomes the opportunity to respond to this consultation and note that spectrum within the frequency bands identified, Bands 87 & 88, have the potential to deliver the enhanced operational control capability that Energy Networks need to facilitate 'Smart Grid' initiatives. Furthermore, it is worth recognising that the Radio Spectrum Policy Group has identified a work item entitled "Role of Radio Spectrum to help combat Climate Change." To this end, European Economic Development is predicated on robust and resilient energy supplies – for an increasingly dynamic energy supply system communication networks will have a crucial role in balancing supply and demand and ensuring stability of the energy networks. This functionality will be enabled by the widespread deployment of active, resilient control systems with communications capability key to managing these dynamic energy flows. To this end secure and expanded access to radio spectrum for Energy Utility Networks will become a critical component of their future operating model to enable the 'Smart Grid Future' that will be central to the ambitions of European Governments to combat climate change and deliver against the Net zero emission pledges made - Spectrum access has the potential to be an enabler of the climate change ambitions of European Governments.

Background

Joint Radio Company Ltd is a wholly owned joint venture between the UK electricity and gas industries specifically created to manage the radio spectrum allocations for these industries used to support operational, safety and emergency communications.

JRC manages blocks of VHF and UHF spectrum for Private Business Radio applications, telemetry & telecontrol services and network operations. JRC created and manages a national cellular plan for co-ordinating frequency assignments for several large radio networks in the UK.

The VHF and UHF frequency allocations managed by JRC support telecommunications networks to keep the electricity and gas industries in touch with their field engineers. These networks provide comprehensive geographical coverage to support installation, maintenance and repair of plant in all weather conditions on 24 hour/365 days per year basis.

JRC's Scanning Telemetry Service is used by radio based Supervisory Control And Data Acquisition (SCADA) networks which control and monitor safety critical gas and electricity industry plant and equipment throughout the country. These networks provide resilient and reliable communications at all times to unmanned sites and plant in remote locations to maintain the integrity of the UK's energy generation, transmission and distribution.

JRC supports the European Utility Telecommunications Council's Radio Spectrum Group, and participates in other global utility telecom organisations. JRC participates in European Telecommunications Standards Institute (ETSI) working groups developing new radio standards, and European telecommunications regulatory groups and workshops.

JRC also manages microwave fixed link and satellite licences on behalf of the utility sector.

JRC works with the Energy Networks Association's Future Energy Networks Groups assessing ICT implications of Smart Networks, Smart Grids & Smart Meters and is an acknowledged knowledge source for cyber-security in respect of radio networks.

JRC's Perspective on the Potential Use of the Spectrum under Consideration to enable 'Smart Grid' developments Observations on the RSPG Draft Work Programme

Introduction

The JRC response is informed by the needs of the European Energy Network Operators both Electricity and Gas where the changing supply / demand context is requiring the industry to adjust their operating model to ensure that their networks can be dynamically controlled – such increased functionality is subject to the deployment of enhanced operational telecommunications capability. In recognition of this the Irish regulator ComReg in late 2019 has released through an award process Band 87 spectrum to enable 'Smart Grid' developments in Ireland.

Spectrum's Role in Supporting the Energy Networks of the Future

Historically energy networks have largely been passive networks with active control components very limited in number and at the High Voltage layer. The systems used have typically been narrowband and as such employed relatively limited amounts of spectrum. However, as energy networks become more dynamic both from a supply and demand perspective, i.e. distributed generation and also the adoption of Electric Vehicles, there is an enhanced need to more actively control the energy networks. This will result in active control components being deployed within the Medium and Low Voltage layers with the number of active units increasing by several orders of magnitude. This significant increase in the number of control units and resulting dramatic increase in data flows will lead to a significant expansion in the need for spectrum access to underpin these critical communications. The role of spectrum in supporting 'Smart Energy' has been acknowledged in a recent article from the ECC[1]. In addition, the recent actions of National Regulatory Authorities[2,3] to facilitate spectrum access for 'Smart Grid' developments recognises this need. To this end, it is worth reflecting on the basis for the spectrum award in the Republic of Ireland with extracts[4] from the consultation process which resulted in the award reproduced below;

> 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.
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> 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:

[1] Providing Spectrum to support machine-to-machine communications, ECC Newsletter, December 2017, http://apps.cept.org/eccnews/dec-2017/index.html

[2] Spectrum released in the 450MHz band by the Polish Regulator for Smart Grid, https://450alliance.org/smart-energy-powered-by-lte450-summit-in-warsaw-by-pge-systemy/

[3] ESBN has been awarded Spectrum for Smart Grid network deployment in Ireland, https://www.comreg.ie/publication-download/results-of-the-400-mhz-band-spectrum-award

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

- 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*.
- "*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[58]. 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 T.D 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.

This strategic intervention by ComReg and the Irish Government to acknowledge and facilitate spectrum access in Band 87 for Smart Grid developments to address climate change objectives has been informed by a thorough appraisal of the changing energy supply-demand context.

This changing context is not unique to the Republic of Ireland but is playing out across Member States, for example the German utilities[5] have requested spectrum access, whilst in the UK there is an ongoing study underway by Ofcom to consider the spectrum access needs of the UK Energy Utilities. We therefore note that spectrum within Bands 87 & 88 have the potential to enable / facilitate 'Smart Grid' developments for Norway leveraging the benefits of equipment deployment / network roll-out in other territories across Europe.

[5] 200 utility companies in Germany have called for the opening of award procedure for 450MHz spectrum by the Federal Network Agency, https://www.bdew.de/presse/presseinformationen/offener-brief-der-energie-und-wasserwirtschaft-zum-dringenden-bedarf-zuteilung-der-450-mhz-frequenzen/

JRC's Response to Questions Raised

Q 1. What will such a provision to mobile communication enable services? Could a smaller bandwidth for mobile communications, such as NB-IoT and 200 kHz channel bandwidths, be appropriate?

JRC Response

In light of our expectations that the spectrum would be ideally suited to facilitate / enable resilient & robust 'Smart Grid' developments in a Fixed Wireless Access context, our analysis indicates that as a minimum 2 x 3 MHz of spectrum will be required to address the critical operational telecommunications needs of Energy Network Operators. This observation has been informed by detailed exploratory analysis[6] undertaken by JRC on behalf of Western Power Distribution, a UK Distribution Network Operator. In addition, further analysis is underway with other UK Distribution Network Operators to further develop the understanding of UK Operator requirements.

Q 2. Will it be appropriate to divide the frequency band and regionalize resources? What prevalence (local, regional or national) will be applicable to achieve?

JRC Response

To enable visibility of and dynamic control of energy networks in a robust and resilient way it is anticipated that a wide range of assets will need to be communicated with across the Transmission & Distribution networks including both household systems and supply side equipment, e.g. Photovoltaic Cells, Electric Vehicles, Distributed Energy Resources, etc.. Noting the above it is anticipated that the frequencies would best be deployed on a National basis assuming that assets are widely deployed across the geographic area of Norway.

Q 3. Status of availability of equipment (ecosystem) and in case of any inaccessibility, when will equipment be commercially interesting and mature?

JRC Response

It has been noted that there is a broad push developing across Europe to mobilise 'Smart Grid' developments within the Bands identified which will be underpinned by a supply chain that can leverage the technical standards that have been established. On this basis it is anticipated that the equipment will be commercially available over the next 12 – 18 months to facilitate such 'Smart Grid' initiatives.

Q 4. In the event of a lack of interest and ecosystem at this time, when should any new interest hearing take place?

JRC Response

Noting the expectation that equipment will be available on a commercial basis in the next 12-18 months and in the event that there is no immediate demand for such developments in Norway it would seem appropriate to revisit progress in 2 years.

[6] https://www.jrc.co.uk/Plugin/Publications/assets/pdf/ICT-Final-Report-published-after.pdf