Ofcom Consultation – Resilience Guidance and CFI on mobile RAN power back up

1.0 Executive Summary

We welcome this consultation and CFI as it acknowledges that public communications services in the UK have very little if any resilience to mains power failure. This is not surprising as these networks are commercial networks with their business models defined by market competition where service availability subject to mains power resilience has not been a regulatory requirement or valued by the consumer.

With the withdrawal of the Public Switched Telephone Network (PSTN) there will no longer be a commercially available power resilient (end-to-end) telecommunications service in the UK. In light of this it is helpful that Ofcom has outlined the power autonomy of fixed networks post PSTN withdrawal. However, we note going forward that for fixed networks where Ofcom has advised that there will be 4 hours battery back-up for 'active cabinets' this is as manufactured and will deteriorate over the life of the cabinet and furthermore vary across the year as a function of temperature. Moreover, the emphasis being placed on the importance of power autonomy of 4 hours at the 'active cabinet' seems strange when the household equipment (handset and router) will be dead as very few households have power autonomy.

We acknowledge that Ofcom has identified the physical, infrastructure and cost aspects associated with battery back-up roll-out to the Radio Access Network sites and accept that the scale of the investment is probably not proportionate in light of the operators' inability to pass the cost back to the consumer. Moreover, from a spectrum pricing perspective it is highly likely that the MNOs would have paid less for spectrum access in the auction processes if the licences included a regulatory obligation for guaranteed service availability based on power autonomy.

We encourage Ofcom and Government to consider a broader policy perspective ensuring that interventions are appropriately targeted, in particular the potential to significantly enhance the operational performance of the Energy Networks through enabling spectrum access that will lead to a more robust and resilient energy system. The enhanced operational control capability that would result from dedicated spectrum access will enable enhanced digitalisation of the energy system facilitating more rapid restoration of power during an outage and hence an increase in service availability for all users, including telecommunication network operators.

2.0 Background

The Joint Radio Company (JRC, www.jrc.co.uk)

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 and remote assets. These networks provide comprehensive geographical coverage to support installation, maintenance, operation 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 also manages microwave fixed link and satellite licences on behalf of the utility sector.

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

3.0 Detailed Responses to Questions

Question 1: Do you consider the measures in the proposed guidance relating to the resilience of the physical infrastructure domains to be appropriate and proportionate?

Question 1. Response

Confidential? No.

We encourage Government and Regulators to consider the broader policy context and whether the costs associated with an intervention limited to enhancing commercial communications network operational performance might be better addressed through alternative strategies, i.e. enabling spectrum access to the Energy Network Operators to deliver enhanced operational control capability which will result in more dynamic control of the energy system which will positively impact electricity network performance and increase availability.

More specifically in the context of the power autonomy of fixed networks it is suggested that 'active cabinets' are able to maintain service for 4 hours, whilst it is correct that these cabinets are designed and deployed with 4 hours of battery back-up there is no programme of maintenance of these batteries and hence performance will deteriorate over time. Furthermore, battery performance over the course of the year will fluctuate in line with the external weather conditions as the cabinets are not temperature controlled. More fundamentally though with the withdrawal of the PSTN solution there is no longer power to the household telephone / device via the line (fibre / copper) and if the cabinet is off mains power the household device is likely to be unusable and the fixed network no longer viable. The anticipated fall back option in this scenario is to be the mobile alternative however with the mains power off the nearest RAN site is also likely to be off power and also not viable.

Question 2: Do you consider the measures in the proposed guidance relating to the resilience at the Control Plane to be appropriate and proportionate?

Question 2. Response

Confidential? No.

No Comment

Question 3: Do you consider the measures in the proposed guidance relating to the resilience of the Management Plane to be appropriate and proportionate?

Question 3. Response

Confidential? No.

No Comment

Question 4: Do you consider the measures in the proposed guidance relating to communications providers' own managed services to be appropriate and proportionate?

Question 4. Response

Confidential? No.

No Comment.

Question 5: Do you consider the measures in the proposed guidance relating to communications providers' arrangements for preparing for adequate process, skills and training to be appropriate and proportionate?

Question 5. Response

Confidential? No.

No Comment

Call for Input: ensuring power resilience in mobile radio access networks

Detailed Responses to Questions

Introduction

Considering that the operational characteristics of the Mobile Networks have been defined by the competitive market and regulatory context in which they have been established and that there is no regulatory requirement for the mobile networks to have power autonomy it is unsurprising that they have not been designed with this capability. Furthermore, Ofcom's recent consultation and statement[1] recognised that the market dynamic and regulatory framework has driven both price competition and innovation. However, as service availability based on power autonomy has not been an operational imperative of consumers the MNOs have not been able to monetise it and have therefore not prioritised it. Finally, it is worth considering the likely impact on the pricing of spectrum at auction if there had been service availability obligations this would have translated directly to an additional capital expenditure requirement for network roll-out which would have reduced the proceeds generated in the spectrum award mechanism. To this end the operational capability of the Mobile Networks is a direct consequence of the regulatory context and we anticipate that this would be profoundly challenging to address from an investment and commercial model perspective 'after the event'.

CFI question 1: Does this framework accurately capture the factors relevant to assessing what is an appropriate and proportionate measure for MNOs to take with regards to power resilience for RAN cell sites?

Question CFI 1: Response

Confidential? No.

On the whole YES recognising that the mobile networks are commercially operated and have no regulatory obligation for service availability. However, the aspect that has been overlooked is the extent to which infrastructure sharing is having a detrimental impact on the resilience of access to the 'Emergency Voice Services' via roaming. Originally the mobile networks were discrete networks largely deployed independently and therefore if a local RAN site was down due to mains power failure there was likely to be an alternative site with another active MNO to facilitate emergency voice roaming. However, with the consolidation of Mobile RANs (O2&Vf, EE&3) over the last 15 years five networks have become two limiting the options for emergency voice roaming which would be detrimentally impacted by any further industry consolidation. In a similar context the Government intervention that is the shared rural network (SRN) is effectively establishing RAN sites that would be single points of failure from an emergency voice calling perspective and hence would warrant enhanced power autonomy being deployed.

CFI question 2: Do you agree that at a minimum MNO's networks should be able to operationally withstand short term power-related incidents?

Question CFI 2: Response

Confidential? No.

Yes, but only in the context of the MNOs acting as commercial operators in the existing market based regulatory framework.

CFI question 3: What mobile services should consumers be able to expect during a power outage, what consumer harms should power backup up focus on mitigating and does this vary depending on the type or duration of the outage?

[1] https://www.ofcom.org.uk/__data/assets/pdf_file/0027/231876/mobile-strategy-discussion.pdf

Question CFI 3: Response

Confidential? No.

As a minimum we would anticipate access to 'Emergency Voice Call' capability where network roaming potentially allows the individual to access adjacent cells subject to those cells being active and in range. However, as has already been noted above the move towards infrastructure consolidation over the last 15 years has negatively impact the scope for diversity of cell coverage.

Separately in the context of reference 140 it is worth noting that the UK Energy Network Operators have their own private internal operational telecommunications capability, designed to be power autonomous and which affords the operators the ability to maintain their operational capability independent of mains power which has been demonstrated during recent storms.

CFI question 4: What technical choices are available to MNOs to reduce power consumption, and should be considered as part of assessment of appropriate and proportionate measures?

Question CFI 4: Response

Confidential? No.

No Comment

CFI question 5: How many sites would it be feasible to upgrade and maintain and why?

Question CFI 5: Response

Confidential? No.

No Comment

CFI question 6: Do you consider that providing a minimum of 1 hr backup to all RAN cell sites would to be proportionate to meet the security duties under s.105A to D of the Communications Act 2003?

Question CFI 6: Response

Confidential? No.

No as not all RAN sites would be capable of having 1hr power back up and therefore if the need is to enable short term power autonomy to RAN sites, then the proposed approach doesn't address the requirement, i.e. only a subset of RAN sites would be physically deployable.

In a broader policy context we do note that a study undertaken by Gemserv [2] demonstrates that the cost for the deployment of an enhanced operational control capability to the whole GB energy system would be £0.96bn, subject to spectrum access. Such a solution would deliver in excess of £12bn of benefit to the energy system alone. In addition, the resulting digitalisation of the energy system would facilitate greater system resilience and more rapid restoration of the energy system delivering a win-win in terms of the resilience of the communications networks under consideration here and more cost effectively than the estimated cost of 1 hr of power back-up for a subset of RAN sites.

CFI question 7: What cost effective solutions do you consider could meet consumers' needs during a power outage?

Question 7: Response

Confidential? No.

[2] https://www.jrc.co.uk/Plugin/Publications/assets/pdf/ICT-Economic-rationale-for-enabling-Smart.pdf

As has been noted in the Gemserv study[3], subject to spectrum access, it would be far more cost effective to implement a more sophisticated monitoring and control system to reduce the occurrence and duration of outages on the energy networks. This would have the simultaneous benefit of improving reliability and resilience of all energy users (not just MNOs) and would also leverage the existing investment made in power back up by all UK DNOs (typically a minimum of 72 hours at all Operational Telecoms Sites). Allocation of a dedicated spectrum band for such a network, we welcome the recent Ofcom CFI considering spectrum options for Utilities[4], would be far more cost effective as has been recognised in Germany, Spain, Ireland and Netherlands.

CFI question 8:

a) Is it more cost efficient to increase power backup up to any space, weight, or planning limitations, i.e., increasing power backup as much as is feasible provides the lowest £ per hour?

Question CFI 8a: Response

Confidential? No.

No Comment

b) do the benefits of any power backup solution have diminishing returns, i.e., the benefit per hour decreases as you increase the amount of power backup?

Question CFI 8b: Response

Confidential? No.

No Comment

CFI question 9: Does the mobile market fail to capture the value or importance of power backup, and if so, why?

Question CFI 9: Response

Confidential? No.

Yes - the Mobile Operators do not have a mechanism of monetising service availability as a consequence of mains power failure and as such this aspect would not appear to be valued by the consumer.

CFI question 10: Should improvements in power backup be focused on solutions at sites which are identified as higher risk of outages?

Question CFI 10: Response

Confidential? No.

As has been noted and in the context of enabling emergency voice calls as a minimum it would seem appropriate to prioritise power back-up deployment to those RAN sites that are not well served by adjacent sites in the event of mains power failure. To this end the Shared Rural Network RAN sites are likely to be a single point of failure without adjacent sites which would warrant enhanced power autonomy to be deployed.

[3] https://www.jrc.co.uk/Plugin/Publications/assets/pdf/ICT-Economic-rationale-for-enabling-Smart.pdf
[4] https://www.ofcom.org.uk/consultations-and-statements/category-1/potential-spectrum-bands-to-support-utilities

CFI question 11: Why would any requirement lower than a minimum of 1 hour be sufficient in future? What duration do you consider would be sufficient and why?

Question CFI 11: Response

Confidential? No.

We anticipate that Ofcom would undertake a CBA to establish what might be appropriate taking into account the physical / structural limitations associated with RAN sites.

CFI question 12: Over what time period could industry make upgrades to provide a minimum of 1 hour at every cell site or other cost-effective solutions to address potential consumer harm?

Question CFI 12: Response

Confidential? No.

No Comment.