

Ofcom Discussion Paper: Connectivity you can count on – A discussion paper on achieving good, reliable mobile performance

1.0 Executive Summary

JRC welcomes the opportunity to respond to Ofcom's *Connectivity you can count on* discussion paper.

While we recognise that public mobile does have a role to play within the utility sector, there is not currently a network which provides the required coverage, resilience, latency, guaranteed availability and security for the mission critical operational telecommunications use cases which underpin the safe and secure operation of the energy network. Utilities also do not currently have access to spectrum to allow them to develop solutions that meet the performance requirements they need, to support the transformation of the energy networks with the inclusion of an increasing number of distributed low carbon energy resources.

JRC supports Ofcom's proposed shift towards assessing mobile connectivity using real-world performance rather than predicted coverage alone and welcomes the continued development of the Map Your Mobile platform. We recognise that the platform is primarily intended to help consumers make informed choices, but believe it also presents an opportunity to provide greater value to organisations responsible for operating and maintaining Critical National Infrastructure (CNI).

While public mobile networks are increasingly used to support non-mission-critical operational activities, industrial users often require greater confidence in service availability, reliability and consistency than can be conveyed through consumer-focused performance metrics alone. JRC therefore encourages Ofcom to broaden its evidence base by complementing crowdsourced performance data with additional operational and resilience information, particularly in rural and strategically important locations where crowdsourced data is inherently limited.

JRC also encourages Ofcom to recognise that the importance of mobile connectivity extends beyond consumer use. Reliable public mobile networks increasingly support the operation and maintenance of essential services across the UK, particularly in rural areas where critical infrastructure is often located. Future policy should therefore consider not only the extent of geographic coverage, but also the quality, reliability and resilience of that connectivity.

Finally, JRC supports continued collaboration between Ofcom, Government, mobile network operators and operators of CNI to ensure future policy and reporting frameworks reflect the increasingly diverse ways in which public mobile networks are used.

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 network operators created to manage the radio spectrum allocations and coordinate planning to support operational, safety and emergency communications.

Communications are a fundamental part of the energy networks; they provide the visibility required for monitoring and control of the equipment, which is essential for the safe and secure running of the energy network as a whole. Low carbon generation is now overtaking traditional coal and gas, this creates increased complexity in the network, as more active participants contribute to the network, but also enables a new level of flexibility. However, the low carbon generation also delivers an increased layer of unpredictability and new challenges managing the power quality of the network. Greater visibility to allow effective monitoring and control is key to the resilient and secure energy provision from generation through to point of consumption. Operational telecommunication enables the monitoring and control which is essential to ensure the resilience, security and stability of the energy network.

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 assets throughout the country. These networks provide resilient and reliable communications at all times to unmanned sites and assets in remote locations to maintain the integrity of the UK's energy transmission and distribution. JRC also manages microwave fixed link and satellite licences on behalf of UK energy networks.

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 is an active member of the Energy Networks Association Strategic Telecoms Task Group and is an acknowledged knowledge source for cyber-security in respect of radio networks.

Fixed links have been utilised for many decades in order to provide backbone transmission capability to support existing, application specific networks such as SCADA, Scanning Telemetry and push to talk voice. Increasingly, as these multiple applications convene in the IP domain, growth in backhaul bandwidth requirements are essential. So too is the number of links required, as connectivity is required to push further and further towards the periphery of the energy networks. In addition, fixed links are used to provide teleprotection services which are circuits designed to enable rapid isolation of the energy networks in the case of a fault which is vital for preventing cascading power outages, protecting equipment and maintaining grid stability.

As the energy networks develop to meet the demand for greater carbon neutral generation, and as demand increases, there will be a requirement for the introduction of more fixed links in order to provide the necessary backhaul and protection circuits necessary to manage these more unpredictable generation sources. .

3.0 Detailed Responses to Questions

Section 2: The quality of mobile connectivity we want to see

- What are your views on the use of the Map Your Mobile good performance metric and how should the measure evolve over time?

What are your views on the usefulness of:

- the 90% figure as a benchmark applicable across geographies and based on crowdsourced data?, and

Whether the 90% benchmark is realistic and sufficiently ambitious?

JRC Response

Confidential? No.

JRC welcomes Ofcom's proposed shift towards assessing mobile connectivity using real-world performance rather than predicted coverage alone. We appreciate that the effort in improving the reporting of mobile connectivity is focused mostly on providing the right information that reflect how consumers use mobile services and not industry players.

From the perspective of the UK utility sector however, the Map Your Mobile performance metric should be viewed as the foundation of a broader assessment of mobile connectivity rather than a complete measure in itself. JRC recognises that public mobile networks are playing an increasingly important role in supporting a range of non-mission-critical utility activities, particularly those undertaken by mobile workforces. However, current public mobile networks do not provide the levels of coverage, resilience, latency, availability and security required to support mission-critical operational telecommunications. Utilities therefore continue to require dedicated communications solutions, while also making increasing use of public mobile services where they are operationally appropriate.

Whilst public mobile services can be used to meet the less stringent and critical use utilities use case, consistency, reliability and service continuity are often of greater operational importance than headline download or upload speeds.

JRC therefore supports the continued development of the performance metric over time to incorporate additional indicators that better reflect operational resilience. Consideration could be given to measures such as connection reliability, session continuity, performance during periods of network congestion, and service availability during major incidents or severe weather events. This would align with Ofcom's wider resilience framework, which recognises that network resilience extends beyond throughput to include the availability, performance and functionality of communications services, informed by resilience incidents reported by communications providers. Integrating this broader resilience context alongside consumer performance metrics would provide a more complete understanding of how public mobile networks perform, particularly for organisations responsible for maintaining essential services.

While JRC considers the proposed 90% benchmark to be both understandable and appropriately ambitious as a national indicator of mobile performance for consumers, caution should be exercised in applying a single national benchmark across all environments. Locations of strategic importance to the operation of CN1 warrant additional consideration even where they represent relatively small populations. Commercial investment is naturally driven towards areas of highest consumer demand, but the societal and economic consequences of poor connectivity where critical assets are located, can be disproportionately significant.

JRC therefore supports the use of a national benchmark while encouraging Ofcom to supplement it with more granular reporting that can help industrial users better understand the quality of the public mobile networks, with better data quality in rural infrastructure locations and key transport corridors. This would provide a more complete understanding of how mobile networks support both consumers and the organisations responsible for delivering essential public services.

Additionally, the limitations of performance metrics based on crowdsourced data affect their usefulness for industrial users. Crowdsourced datasets are naturally richest in densely populated areas where consumer activity is greatest. However, many industrial users, including utility organisations, rely on public mobile networks in remote and sparsely populated locations where comparatively little crowdsourced data is available. JRC therefore encourages Ofcom to consider how operational resilience information, including trends derived from resilience incident reporting and other network performance data already available to Ofcom, could complement crowdsourced performance metrics in these areas. This would provide greater confidence in the assessment of mobile connectivity where reliable communications are operationally important, but consumer data is inherently limited.

Section 3: Market-led improvements in mobile network quality

What information do customers need about network quality to choose the best network for their needs, and where are the main gaps in current provision of that information?

How well does Map Your Mobile currently meet customer and stakeholder needs, and what specific improvements would make it more useful?

JRC Response

Confidential? No.

We recognise the primary objective of map your mobile is to provide information to help consumers make the most appropriate choice in terms of mobile network provider. Industrial users, such as utilities, are less likely to benefit from Map your Mobile, even with a new threshold, due to the limitations of performance information based on crowdsource data due to the smaller sample sizes in less dense areas, where industrial users/assets are located.

To better support industrial users as they select their solution providers, additional information such as reliability, resilience, predictability of service and measured signal strength in given areas

become important aspect driving decision making processes. We understand many industrial users select private mobile solutions to be able to build networks that deliver guaranteed quality of service and defined performance parameters. This aligns with Ofcom's wider resilience guidance, which recognises that the availability, performance and functionality of communications services are all key components of resilient networks and that resilience should be informed by evidence from reported network incidents as well as day-to-day performance. Utilities do not currently have access to spectrum to allow them to develop solutions that meet the performance requirements they need to support the transformation of the energy networks with the inclusion of an increasing number of distributed low carbon energy resources.

Map Your Mobile represents a significant step forward by combining predicted coverage with crowdsourced performance data to provide a more realistic picture of user experience but will still be subject to the limitations of crowdsourced data in low density populated areas. As the platform evolves, Map Your Mobile has the potential to become a valuable decision-support tool for organisations considering the appropriate use of public mobile networks alongside other communications technologies.

In particular, greater visibility of network performance in operational environments would assist organisations in assessing communications risk and selecting providers that best meet their operational requirements. Useful enhancements could include improved reporting of performance in rural and industrial locations, information on network performance during periods of congestion, historical performance trends, and access to downloadable datasets or APIs to support organisations undertaking their own analysis. Where appropriate, Ofcom could also consider how insights derived from resilience incident reporting and other operational data already available to the regulator might complement crowdsourced performance metrics, particularly in areas where limited user density restricts the availability of representative crowdsourced data.

JRC welcomes Ofcom's commitment to further develop Map Your Mobile and encourages continued engagement with organisations responsible for CNI to ensure that future enhancements reflect the diverse ways in which mobile connectivity is now used across the UK.

Section 4: Connectivity in busy areas

What do you think are the biggest barriers to achieving better mobile performance in town and city centres and why?

What do you think should be Ofcom's main priorities for our future work in this area?

What information would stakeholders, especially local authorities / planning authorities find useful for Ofcom to provide further insights on and why?

JRC Response

Confidential? No.

JRC considers that the greatest challenge is ensuring that network capacity keeps pace with increasing dependence on mobile connectivity by both people and operational systems. While significant progress has been made in extending geographic coverage, the rapid growth in data consumption, AI-enabled applications, connected devices and the wider digitalisation of industry will continue to place increasing demands on network capacity. Ensuring sufficient capacity is available where and when it is needed will become just as important as extending coverage.

From the perspective of the utility sector, this is particularly important because public mobile networks are increasingly being considered for a range of non-mission-critical operational applications. However, as demand grows, network congestion has the potential to reduce service quality or prevent devices from accessing the network when capacity is constrained. The inability to provide predictable access to the network under these conditions reduces the attractiveness of public mobile services for OT applications and reinforces the importance of continuing to improve both network capacity and resilience.

JRC supports Ofcom's recognition that local authorities have an important role in enabling improved connectivity through planning decisions and access to publicly owned assets. Looking ahead, we consider that Ofcom's priorities should include improving the evidence available to support local investment decisions and ensuring that performance data reflects the locations where reliable connectivity delivers the greatest societal and economic benefit. This should include not only areas of high population density, but also busy areas supporting CNI, emergency response and key transport routes.

Additional information that would assist local authorities and other stakeholders includes more granular reporting of network performance at a local level; identification of persistent capacity constraints or analysis of peak statistics vs capacity to assess how many areas of the UK might be affected by congestion as a result of capacity constraint rather than just poor coverage. Such information would support more targeted investment decisions and provide a clearer understanding of where additional infrastructure or spectrum is likely to deliver the greatest benefit.

JRC also believes greater transparency around mobile network infrastructure would support more effective planning by infrastructure owners and other stakeholders. Information such as mast locations and the spectrum bands deployed at individual sites would improve understanding of existing network capability and help identify opportunities for collaboration, infrastructure sharing and future investment. Where appropriate, additional technical information that improves understanding of network performance characteristics would further support informed decision-making by organisations that increasingly depend on public mobile connectivity. Finally, JRC encourages Ofcom to continue improving public understanding of the factors that influence mobile performance. Coverage is only one aspect of user experience; network capacity and congestion also play a significant role in determining the quality and consistency of mobile connectivity experienced by both consumers and business users.

Section 5: Connectivity in indoor, shared public places

What do you think are the biggest barriers to achieving better mobile performance indoors and why?

What do you think should be Ofcom's main priorities for our future work in this area?

What information would you find useful for Ofcom to provide further insights on in relation to connectivity indoors and why?

JRC Response

Confidential? No.

Reliable indoor mobile connectivity is important not only within publicly accessible buildings but also across a wide range of operational facilities. While the discussion paper focuses on environments such as shopping centres and transport hubs, similar challenges exist within operational and industrial buildings where building construction can present equally demanding radio environments and where mobile workers increasingly rely on public mobile connectivity to access work management systems, asset information and communicate during operational activities. These sites increasingly depend upon mobile communications to support field operations, digital maintenance systems, asset inspections and incident response.

JRC supports Ofcom's recognition that improving indoor connectivity will require greater collaboration between MNOs, building owners, developers and infrastructure managers. Connectivity should increasingly be considered as part of building design, refurbishment and long-term asset management, rather than being addressed only after occupancy. This approach is likely to deliver better outcomes for both consumers and organisations operating within these environments.

Looking ahead, JRC believes Ofcom's priorities should include improving understanding of where indoor connectivity remains a persistent issue and continuing to support measures that improve the quality and consistency of indoor mobile coverage. As public mobile networks continue to evolve, enhanced indoor performance will make them a more practical communications platform for a wider range of industrial and operational use cases that can appropriately utilise public mobile services. Improving indoor connectivity therefore has the potential to deliver benefits beyond consumer experience by increasing the range of environments in which organisations can confidently make use of public mobile connectivity.

Additional information that would be valuable includes more detailed reporting on indoor mobile performance across different building types, practical guidance on effective in-building connectivity solutions, and case studies demonstrating successful collaboration between property owners, infrastructure operators and MNOs. Recognising that indoor connectivity challenges extend beyond retail and commercial premises to include operational and industrial environments would help ensure that future guidance reflects the diverse range of buildings where public mobile connectivity is increasingly supporting both consumer and operational activities.

Section 6: Connectivity on trains

What do you think are the biggest barriers, technical and commercial, to achieving better mobile performance on trains? Which are most significant and why?

Do you agree with our proposal to work with government to support improvements in train connectivity?

What information would you find useful for Ofcom to provide further insights on in relation to connectivity on trains and why?

JRC Response

Confidential? No.

JRC supports Ofcom's proposal to continue working with Government and industry to improve mobile connectivity on the rail network. Given the number of organisations involved, including MNOs, transport authorities and infrastructure managers, a collaborative approach will be essential to delivering practical and cost-effective improvements.

JRC would highlight that rail corridors frequently coincide with other nationally significant infrastructure, including electricity transmission networks, fibre infrastructure and other utility assets. Where opportunities arise, greater coordination between infrastructure owners and MNOs may reduce deployment costs, minimise disruption and deliver broader public value. Encouraging collaboration across infrastructure sectors should therefore form part of any long-term strategy for improving connectivity along transport corridors.

JRC would also welcome the continued publication of independently measured information on mobile performance across the rail network, together with evidence demonstrating the effectiveness of different approaches to improving connectivity. This will help stakeholders better understand where future investment is likely to deliver the greatest benefit.

Section 7: Connectivity in rural areas

What do you think are the biggest barriers to achieving better mobile performance in rural locations and why?

What do you think should be Ofcom's main priorities for our future work in rural locations and what outcomes should we aim to achieve?

What solutions (technical, commercial, policy or delivery) could improve rural mobile performance?

What information would you find useful for Ofcom to provide further insights on in relation to rural connectivity and why?

JRC Response

Confidential? No.

While commercial investment has delivered substantial improvements to mobile connectivity across much of the UK, the combination of lower population densities, challenging terrain and

higher deployment costs means that market-led investment alone is unlikely to deliver consistently high levels of mobile performance across many rural locations.

However, rural mobile connectivity is important not only for the communities and businesses that live and operate in these areas, but also for the organisations responsible for maintaining the UK's CNI. Public mobile networks have a role to play in supporting some (not mission-critical) utilities use cases; but the high availability, high reliability, low latency and consistent quality coverage requirements of the utility sectors is costly to be guaranteed. JRC believes that Ofcom's future work should continue to recognise that improving rural connectivity is not solely a question of extending geographic coverage, but of ensuring that the coverage that is available can be relied upon. Ofcom's continued emphasis on real-world performance, rather than coverage alone, is therefore welcomed.

Addressing these challenges will require a combination of technical innovation, supportive policy and greater collaboration between sectors. JRC supports Ofcom's exploration of approaches such as spectrum sharing and other measures that encourage efficient use of spectrum where they can improve rural connectivity.

JRC considers that Ofcom also has an important role in strengthening the evidence available to support future investment decisions. In addition to reporting geographic coverage, further insight into consistently usable mobile performance, network resilience and areas where poor connectivity persists (despite existing interventions) would help identify where additional measures are most likely to deliver lasting public benefit. Ofcom's recently published resilience guidance recognises that the availability, performance and functionality of communications services are all fundamental aspects of resilient networks and that those expectations should be informed by evidence from reported resilience incidents. JRC therefore encourages Ofcom to consider how insights derived from this wider resilience evidence base could complement consumer performance metrics, particularly in rural areas where crowdsourced data is inherently limited. Publishing information that supports collaboration between MNOs, infrastructure owners and public authorities would also help encourage more coordinated approaches to improving rural connectivity.

Ultimately, rural mobile connectivity should be considered not only as a service for rural communities, but also as enabling infrastructure supporting other industrial sectors. Continued collaboration between Government, Ofcom, MNOs and infrastructure owners will be essential to delivering resilient, dependable mobile connectivity across rural Britain.

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