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29 July 2026

Dear Ofcom

**Discussion paper: Mobile Connectivity You Can Count On:  
Scottish Government and Scottish Futures Trust Response**

The Scottish Government (SG) and the Scottish Futures Trust (SFT) welcome the opportunity to respond to Ofcom's mobile discussion paper: *Connectivity You Can Count On*. More widely, we also welcome Ofcom's intent to undertake further work to improve mobile connectivity flowing from the conclusions of this review.

This paper comes at a timely juncture, with the rollout of publicly funded mobile infrastructure coming to a conclusion, against the backdrop of a new round of mobile network operator (MNO) network investment to meet their 5G standalone coverage targets.

From a policy and regulatory perspective, this paper complements the UK Government's recent Mobile Market Review. Both of these consultations create an important opportunity for both Ofcom and the UK Government to take a clear leadership role and make fundamental changes and improvements to the policy and regulatory framework that will shape the next generation of mobile connectivity across Scotland and the UK.

SG and SFT bring a strong body of evidence to this paper. Through delivery of our award-winning Scottish 4G Infill (S4GI) programme, which extended 4G to 55 former "not spots", alongside investment in the Scotland 5G Centre (S5GC) and an active programme of advanced wireless trials, we have tested a range of technologies, delivery models and commercial approaches. We have also undertaken our own assessment of mobile coverage, centred on a number of Local Authority areas. We have shared these findings with Ofcom, highlighting the following challenges and opportunities from such data. These programmes and activities have provided valuable insights into what works and what does not; where the market alone is unlikely to deliver optimal outcomes; and, a view of how the reality of mobile coverage at a local level can differ substantially from current coverage mapping and prediction tools.

Many of the topics covered by this paper are of direct relevance to SG and SFT's existing workstreams including our ongoing policy development as we consider future priorities for mobile policy in Scotland and what further action we may need to take.

We are keen to work more closely with Ofcom (and the UK Government) as this work progresses, and to support Ofcom's ongoing work by contributing our evidence and practical experience. Ultimately, there is an opportunity to ensure the market shapes and delivers for everyone, regardless of where they are.

Within our response, we identify three key priorities for Ofcom's future work: improving the granularity and accuracy of mobile performance data; making resilience and operator preparedness an integral part of connectivity that people can count on; and setting out how Ofcom will use its regulatory, spectrum and convening powers to address persistent rural and island connectivity gaps.

At **ANNEX A**, we have responded to those discussion questions most pertinent to our interests, experience and where we can draw on our own deep evidence base – which we are willing to continue to share with Ofcom.

You can also access our published evaluations of S4GI and the S5GC here:

[Scottish 4G Infill Programme Evaluation - gov.scot](#)  
[Evaluation of the Scotland 5G Centre \(S5GC\) - gov.scot](#)

**Yours sincerely**

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## Section 2: The quality of mobile connectivity

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

**We believe that the Map Your Mobile (MYM) performance metric represents a meaningful step forward** in how Ofcom provides mobile network information to UK consumers, shifting emphasis from purely theoretical predictions toward real-world outcomes.

**Overall, we have found that the performance metric is a better barometer of actual user “lived” experience than the coverage checker alone.** By drawing on crowd-sourced data and defining success around practical thresholds—such as  $\geq 5$  Mbps download,  $\geq 1.5$  Mbps upload, and  $< 50$ ms latency for video streaming—it better captures what people actually encounter day-to-day, including the impact of congestion, backhaul, and local interference. This is more useful for decision-making than signal strength predictions that often diverge from on-the-ground reality, although still does require a level of caution as it is only based on a snapshot in time.

**The methodology itself seems sound**, grounding performance in empirical test results rather than models alone. However, the output visible on the website feels somewhat vague. It primarily communicates a likelihood (via dials/percentages) of successfully streaming video in a postcode district. While video streaming is a common high-demand activity, this **fails to cover all user use cases**—such as voice call reliability in low-signal areas, low-bandwidth IoT/M2M applications, gaming with stricter latency needs, large file uploads/downloads, or basic browsing in congested spots. Users with different priorities may misinterpret the results as a universal quality score.

### How the measure should evolve

To remain relevant as mobile usage diversifies, we would like to see MYM develop greater **granularity in the results**. For instance:

- Breaking down performance by technology (4G vs. 5G) would be particularly helpful. Many users do not have a 5G-capable handset or SIM, so they won't experience the same outcomes even in areas flagged as strong for 5G. Without this visibility, people may struggle to understand why their results differ from the tool's indications.
- Additional metrics could include: voice reliability, average speeds under varying loads, or success rates for specific scenarios (e.g., indoor vs. on-the-move).

As **satellite services** (direct-to-device) enter the market more fully, the tool will need to incorporate these hybrid experiences explicitly. Users should be able to see whether reliable connectivity in an area relies on traditional terrestrial networks, satellite augmentation, or both—so they can assess compatibility with their device and plan accordingly.

Finally, we recommend that **the MYM portal carries a more prominent caveat** noting that results (especially performance dials) may not be indicative in areas near stadiums, large

public gatherings, festivals, or major events. Peak congestion can dramatically degrade experience in ways that baseline crowd-sourced data—often averaged across times—does not fully reflect.

## Broader recommendations

Looking ahead, Ofcom could consider evolving the tool by:

- Offering customisable views or multiple use-case profiles (e.g., “commuter,” “rural resident,” “heavy streamer”).
- Increasing geographic resolution for performance data where sample sizes allow.
- Regularly updating thresholds as average user expectations rise (e.g., higher speeds for 5G standalone or emerging applications).
- Integrating planned future coverage and technology layers for forward-looking insights.

**In summary**, the performance metric is a valuable improvement that better aligns with lived experience, but enhancing its granularity, use case coverage, transparency around technologies (including satellite), and contextual caveats would make it significantly more robust and user-friendly over time. This evolution would better empower consumers and businesses to choose networks that truly fit their needs.

*What are your views on the usefulness of:*

- A) the 90% figure as a benchmark applicable across geographies and based on crowdsourced data?, and*
- B) Whether the 90% benchmark is realistic and sufficiently ambitious?*

## Usefulness as a benchmark

### Strengths:

- **Pragmatic realism:** Perfect (100%) reliability is impossible due to variables including location, time of day, congestion, device differences, and environment. A 90% threshold acknowledges real-world variability while pushing for substantial improvement over current levels (where UK performance often lags international peers in consistent quality metrics). However, we do see that the Ofcom coverage predictions are more optimistic than the “lived” experience and this could result in the 90% benchmark giving a false view of the mobile coverage performance, particularly in Scotland’s more rural locations. Through SG and SFT’s own work with Streetwave centred on a number of local authority areas, data we have collected shows evidence of greater variability and weaker performance compared to the MYM data, which reinforces the benefits of validating national modelled datasets with locally collected measurements.

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[REDACTED]

[REDACTED]

- **User-centric shift:** We see this as a positive as it focuses on experienced performance rather than theoretical peak speeds or "up to" marketing claims. Crowdsourced data (from real users via apps) captures actual conditions better than lab tests or operator-reported figures.
- **Actionable for regulation:** It provides a clear, measurable target for enforcement, incentives, or penalties - although it is not clear how, or if, this will be used to ensure that the MNOs meet their licencing commitments, or how it will be increased going forward.

#### Limitations and caveats:

- **Crowdsourced data biases:** These datasets almost always rely on self-selecting users who run tests, often in populated/urban areas or during specific activities. This

can under-represent rural, indoor, or low-usage scenarios (particularly in Scotland), skew toward certain devices/network conditions, and introduce sampling biases. It's not a perfect random sample of all users or locations.

- **Measurement challenges:** Crowdsourced tests don't perfectly replicate all real usage (e.g., background apps, handoffs, indoor penetration). Aggregation at scale helps, but edge cases and statistical validity require scrutiny. Ofcom's own data shows significant gaps on trains and in some regions.
- **Threshold arbitrariness:** The "good" definition (5/1.5 Mbps, 50ms) is modest for 2026+ expectations—adequate for basic use but marginal for high-quality 4K streaming, gaming, or future apps. It risks setting a low bar that doesn't drive innovation/deployment aggressively enough.

**Overall, we consider the benchmark to be a useful, pragmatic step forward** for accountability in the UK context—better than vague "coverage" claims and a solid way to leverage abundant crowdsourced data for transparency and competition. It encourages operators to focus on consistency rather than just peaks. However, as a benchmark, we feel it has clear limits due to geographic, demographic, and infrastructural differences. Crowdsourced foundations are strong for scale but demand careful validation against biases and local conditions.

**In summary**, we regard Ofcom's 90% performance benchmark as a useful starting point that could be developed further. Ofcom itself describes the figure as a general reference point rather than a target that must be met everywhere or a guarantee of usable service in every location. That framing creates a clear risk: strong performance in urban areas can mask persistent failure in rural, island and remote communities. We therefore urge Ofcom to adopt explicit mitigations—national and nation-level reporting accompanied by rural, island and route-level analysis; systematic identification of persistently underperforming places rather than reliance on national averages; and separate reporting of individual MNO performance.

We would also welcome further discussion with Ofcom on its willingness to incorporate more diverse data sources. This includes the coverage data we have collected via sensors mounted on bin lorries across a number of local authorities. We are ready to collaborate with Ofcom on how this approach—and our data—could be integrated into the national coverage model.

Looking ahead, we seek a clearer conversation with Ofcom on how the 90% benchmark will be applied in practice, including its role in assessing MNO compliance with licence obligations. While we welcome Ofcom taking a bold step, we would value sight of the supporting analysis that led to the selection of 90%, evidence of how realistic the level is across the whole of the UK (particularly given Scotland's significant rurality).

### 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?*

**Customers need comprehensive, reliable, location-specific, and forward-looking information on mobile network quality to make informed choices.** This includes current coverage (outdoor/indoor, voice, 4G/5G data, road and rail routes), real-world performance (speeds, reliability, congestion), future rollout plans (new masts, upgrades, or potential reductions through switch offs and/or network consolidation), and visibility into which operators are actively providing strong service in their specific area.

#### **Key information customers need:**

- **Accurate current coverage and performance at a granular level:** Postcode or even street-level details on signal strength for calls, texts, and data (4G/5G), distinguishing between outdoor and indoor performance. Real-world metrics like the ability to stream video reliably or handle peak-time congestion matter more than theoretical "coverage."
- **Factors affecting experience:** Acknowledgment of variables such as terrain, buildings, weather, device quality, and network load.
- **Comparative data across operators:** Easy side-by-side views of EE, O2, Vodafone, Three (and MVNOs) to identify the best fit for home, work, commute, or travel.
- **Future-oriented insights:** Planned improvements (e.g., new masts, spectrum upgrades, 5G standalone rollout) or any potential service changes/reductions as networks evolve (e.g., 2G/3G switch-offs) – with associated timescales.
- **Transparency on "live" operators:** Clear indication of which networks are delivering strong, reliable service **right now** in a given area, beyond modelled predictions.

This information would empower consumers and businesses to choose networks that actually work where they need them, switch providers more easily, and negotiate better deals (e.g. highlighting limited local competition to push for discounts or incentives).

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

**Ofcom's "Map Your Mobile" tool** represents progress by incorporating crowd-sourced real-user data alongside operator predictions, providing postcode-level insights and performance metrics (e.g., video streaming likelihood) at a finer 50m grid resolution. However, significant limitations persist:

- **Poor accuracy of Ofcom's maps:** Despite improvements, the checker relies partly on predictive modelling from operators, which often fails to match real-world experience due to local factors (hills, buildings, trees, indoor materials, congestion). Users and local authorities frequently report discrepancies—areas shown as well-covered prove to be not-spots, or vice versa. Councils have resorted to their own drive/walk testing (e.g., via firms like Streetwave) because Ofcom data isn't reliable

enough for planning. Ofcom itself notes that results “may not always reflect what you receive on the ground.”

- **No clear view of future coverage:** There is limited public information on upcoming rollouts, new infrastructure, or potential reductions. Operators are investing billions (e.g., in 5GSA, small cells, and Shared Rural Network rollout), with ambitions of near-100% population coverage, but consumers lack accessible, centralised maps showing planned changes. This leaves people unable to anticipate improvements or disruptions. It is assumed that the VodafoneThree merger will improve coverage however as we have seen historically with the T-Mobile and Orange merger (to become EE), when two networks are rationalised<sup>1</sup> and sites are decommissioned, there could be a detrimental impact to some users as a result.
- **Limited transparency on active/live operators:** While the tool allows comparisons, it doesn’t always highlight which networks are *truly delivering* strong service locally in a way that builds competitive pressure. Greater awareness of which MNOs have robust masts and capacity in an area could encourage switching, foster competition, and give residents/businesses leverage to negotiate better tariffs or service commitments.

Other gaps include inconsistent data across MNO-specific maps (which use varying methodologies), limited focus on emerging tech (e.g., satellite direct-to-device), and challenges in capturing dynamic factors like peak congestion or device-specific performance. Real-world UK mobile rankings (e.g., lower global standings despite official coverage claims) underscore the gap between maps and daily experience.

### Why these gaps matter and potential improvements

Poor information hinders competition: consumers stick with suboptimal networks, and businesses can’t effectively advocate for better local infrastructure. Enhanced transparency—more accurate crowd-sourced/verified data, future rollout overlays, and clearer “live operator” indicators—would drive better consumer outcomes, investment, and negotiation power. Ofcom and operators could build on existing tools by mandating more frequent independent testing, publishing planned infrastructure data, and integrating user feedback more dynamically.

We note that the MYM webpage does have the ability for a user to log a discrepancy between their actual mobile experience and that which is reported by the portal. We feel this is a very important feature that perhaps is not publicised widely enough. We are keen to have sight of the number of and locations of responses to this section (with the obvious requirements to anonymise sensitive data) with a view to enhancing our understanding the scale of the connectivity challenges across Scotland.

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<sup>1</sup> [Anger over mobile mast turn-off in Glenariff - BBC News](#)

**In summary**, while the MYM checker does help, the combination of accuracy shortfalls, absent future visibility, and opaque active competition limits informed choice and a blended view has to be taken with operator maps and deeper more varied crowdsourced datasets. Addressing these challenges would better inform users of the “lived” experience that would be expected in a specific location and help understand the scale of the problem and key areas to address for any potential future intervention.

## 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?*

The biggest barriers to better mobile performance in town and city centres are capacity constraints, physical and regulatory hurdles to infrastructure deployment, and economic pressures — rather than a simple lack of outdoor coverage.

- **Site acquisition and planning restrictions:** Finding suitable locations for small cells, street furniture, or new masts can be challenging due to aesthetics, heritage protections, local opposition, and complex permissions. Many city buildings are tall and dense, creating “canyon effects” that block or reflect signals. Sensitive (and similar) areas often have complex and lengthy processes that deter MNOs and neutral hosts from attempting deployments whilst equally having limited or no digital expertise in-house to process any requests for acquisition, space and power.
- **High deployment costs:** Installing and connecting small cells or Distributed Antenna Systems (DAS) in busy urban environments is expensive, especially with backhaul requirements and maintenance in public spaces. There are examples of neutral host providers who have exclusive rights to using local authority assets but their commercial proposal towards the MNOs is such that it is unattractive for the latter to deploy on them. Finally, not all street furniture has a permanent power supply which is critical for telecoms equipment. MNOs therefore often need to address the power supply challenges as part of their deployments.
- **Even though infrastructure sharing between MNOs is prevalent, we have nevertheless seen evidence of MNOs seeming to have a preference against this approach:** This leads to duplicated deployments and increased street clutter from multiple separate small cells or antennas rather than consolidated neutral-host solutions. It also leads to more requests/workload for public sector teams who manage the planning and delivery teams.
- **Public/community reluctance to additional infrastructure:** This is often overlooked but in some cases, there has been huge reluctance to allow new telecoms equipment (e.g. aesthetic or perceived health concerns).
- **Managing risk is a lengthy process:**
  - Rigorous due diligence and third-party structural engineering sign-off is needed.

- Close collaboration with local authorities is vital (as they own the assets and grant wayleave/permission).
- Standardised processes and frameworks are needed to ensure compliance with health & safety, planning, and highways regulations.
- The process is deliberately cautious, and expensive, which is one reason why densifying networks in busy urban areas is slow and costly. Failure to properly manage these risks can result in rejected applications, legal disputes, or — in the worst case — safety incidents that damage the MNO's reputation and finances.
- This combination of upfront engineering, ongoing maintenance burdens, and shared responsibility with public bodies is a major practical barrier to faster rollout of small cells and improved capacity in town and city centres.

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

Town and city centres are economically vital but suffer from congestion-driven poor performance. Without targeted action to cut deployment costs and risks, progress is likely to remain slow. **However we believe that Ofcom is well-placed to act as a convenor and enabler across MNOs, local government, and industry.**

Given the challenges around structural calculations, weight limits, and maintenance on public assets and roll out, Ofcom could:

- Fund or coordinate research into lighter, lower-impact equipment designs and smart monitoring solutions.
- Develop, or share more widely a gold standard template, for best-practice guidelines and open access agreements between MNOs and local authorities that fairly allocate risk and maintenance responsibilities. (SFT and SG have developed the Infralink portal that is available as a resource to LAs<sup>2</sup>).
- Explore ways to de-risk deployments (e.g., insurance pools or certification schemes for common installations).
- Have a coordination role with UK and Devolved Governments to explore how greater rollouts and investment can be achieved, but with simpler processes and requirements.

**In summary**, a focus by Ofcom on these areas could address the deep-seated barriers (planning, sharing reluctance, structural risk, and economics) more effectively than broad coverage targets alone. A balanced approach — combining deregulation where safe, targeted incentives, and better evidence — would deliver the biggest impact for urban connectivity. At the same time, Ofcom should consider where regulatory levers could be appropriate to incentivise MNOs to improve urban connectivity, particularly where the commercial drivers should be present — e.g. busy areas at peak commuter periods, but where MNOs are continually failing to deliver.

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

<sup>2</sup> <https://infralink.scottishfuturetrust.org.uk/>

**Ofcom, as a trusted national entity, could play a valuable role by providing clear, practical information and guidance on safety, liability, street clutter, long-term maintenance costs, and public perceptions.** This could help demystify any current ambiguities or misconceptions and give local planning authorities additional confidence evidence to back up the approval of well-designed deployments more readily, particularly as there is an ever growing move for services (both public and private) going online.

**Most useful information Ofcom could provide:**

- 1. Standardised structural and safety data:** Clear, independent guidance on structural load calculations, weight limits, wind/ice loading, and safety factors for common public assets (lamp posts, traffic signals, buildings). This should include templated assessment methodologies, example calculations, and certification schemes for approved equipment. **Why?** Many councils lack in-house expertise on these topics and may be apprehensive about approving something that could later fail or create liability. Demystifying the engineering realities with authoritative, easy-to-reference data could reduce perceived risk.
- 2. Real-world maintenance and liability benchmarks:** Practical templates for maintenance agreements, insurance requirements, decommissioning obligations, and risk allocation between MNOs and asset owners. Include data on actual failure rates, maintenance costs, and how risks have been successfully managed in other areas. **Why?** Local authorities may have concerns about becoming responsible for ongoing upkeep or future problems. Concrete examples and model contracts could provide reassurance that risks can be properly transferred and managed.
- 3. Visual impact and design guidance:** Approved design catalogues for low-impact small cells and antennas, along with before/after visual simulations and evidence from other towns showing minimal public backlash when well-designed solutions are used. **Why?** Street clutter and aesthetics are frequent rejection reasons. Providing credible, pre-vetted options could help give planners more confidence to approve deployments that meet local character standards.
- 4. Evidence of economic and public benefit:** Localised data on how improved mobile coverage supports economic growth, footfall in high streets, emergency services reliability, and reduced reliance on less efficient alternatives. Include case studies of successful urban deployments with measurable outcomes. **Why?** This shifts the conversation from risk to opportunity, giving planning authorities a positive counterbalance when weighing up decisions.
- 5. Performance gap and capacity insights:** Better real-world data (beyond the current coverage maps) showing where genuine capacity shortfalls exist in town centres and how targeted infrastructure would address this issue without over-provisioning. **Why?** This type of evidence would help councils fully understand specific local problems and provide additional justification for proposed developments.

**In summary**, by proactively demystifying the technical, safety, and commercial risks through clear guidance, templates, and evidence, Ofcom has the potential to provide local planning authorities with the confidence to safely approve planning applications.

This would not remove all caution — nor should it — but it would give planning teams the tools and confidence to make balanced, evidence-based decisions faster. In turn, this would accelerate responsible deployment of telecoms infrastructure in towns and city centres while maintaining public safety and amenity standards.

We feel that Ofcom is ideally positioned to act as this neutral, trusted source of insight and standardisation.

## Section 5: Connectivity in indoor, shared public places

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

**The biggest barriers to better mobile performance indoors are primarily economic and perceptual, rather than purely technical.**

While mobile networks have made huge strides in outdoor coverage and raw speeds, indoor performance remains a persistent weak spot for many users. The core issues aren't a lack of solutions (e.g. small cells and DAS systems) but the incentives and realities that prevent their widespread deployment.

### High costs and the Wi-Fi fallback

In today's challenging economic climate, the business case – for both MNOs and building owners – to justify the (often significant) cost of properly enhancing indoor mobile coverage, can be difficult to prove.

Deploying distributed antenna systems (DAS), small cells, or other in-building solutions requires substantial upfront investment in hardware, installation, backhaul, and ongoing maintenance. For many building owners and MNOs, these costs are difficult to justify against the perceived benefit delivered.

As a result, **Wi-Fi is almost always seen as the default solution**, with “Wi-Fi calling” and strong home/office Wi-Fi often considered to be an acceptable workaround. When that isn't sufficient, the common advice is simply “stand by a window” or in many instances, a visit may be of limited time, so it has become normal just to “live with” the inconvenience. This, in turn, reduces urgency and demand for dedicated mobile infrastructure investments.

### Regulatory limitations

We acknowledge that it's not straightforward to determine how governments or regulators could meaningfully resolve this issue. The problems are deep-seated — rooted in economics, commercial incentives, and building practices — rather than straightforward regulatory gaps. Mandates or subsidies might help at the margins, but they don't address the fundamental unwillingness or inability of businesses to invest. There is also the question of

whether it is needed against, say, outdoor coverage, when connectivity is needed on the move. Conversely, there are certain circumstances, e.g. hospitals, where Wi-Fi may not be able to provide the experience a user is looking to achieve and hence cellular indoor coverage would be of huge benefit to workers, patients and their families.

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

In the first instance, **clarity would be welcomed from both Ofcom and the UK Government on where they believe the responsibility to resolve this issue lies** – i.e. MNOs, building owners, or both – and who should bear the associated costs. As things stand, identification of practical measures Ofcom could highlight in the indoor coverage space, is possibly challenging. One measure could be for Ofcom to provide clearer guidance (and potentially incentives) for developers to incorporate in-building wireless at the design stage (new builds and major refurbishments).

**We foresee Ofcom's greatest impact could come from acting as an enabler:** making the technical and regulatory environment as frictionless as possible so that when economic conditions improve, indoor connectivity improvements can happen rapidly. Continued focus on this in its 2026+ work plan would be a strong step forward, and could ally with influencing UK Government as to the best way forward/possible approaches.

**We would also encourage Ofcom to consider relevant international approaches that are addressing poor in-building coverage, and we highlight the current position in Saudi Arabia.**

Saudi Arabia has gone further than most countries by embedding indoor mobile coverage requirements into its telecoms and building regulatory framework, rather than relying solely on market incentives.

In 2025, the competent Saudi authority issued regulations under which certain building owners are required to provide in-building mobile coverage infrastructure as part of the development process. The regulations require developers to build internal telecoms infrastructure within buildings and indoor building solutions where buildings meet specified size or occupancy thresholds. The solution requirement is for an indoor mobile coverage system comprising in-building radio equipment, cabling and base station connectivity. The responsibility sits with the building owner/developer, who must fund and deploy the infrastructure.

**We encourage Ofcom to explore with DCMS the replicability of the Saudi Arabian approach, or elements of it, as a potentially useful model to improve in-building coverage in the UK.**

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

While Ofcom's tools like Map Your Mobile represent progress, many users and industry stakeholders find the predictions inconsistent with real-world experience. Predicted "good" or "variable" indoor signals often fail to match actual performance due to factors such as building materials, internal layout, network congestion, device variability, and local obstructions. This reduces trust and limits the maps' usefulness for decision-making.

Better data would increase accountability for MNOs, empower building owners and developers to incorporate connectivity early in designs, and help consumers make informed choices. It would also give Ofcom stronger evidence to recommend policy changes or spectrum decisions that genuinely accelerate indoor improvements.

Indoor coverage maps focus heavily on signal availability, but performance often collapses under load. Data on peak-time indoor congestion, particularly in high-density environments like apartment blocks, offices, stations and event venues, would be extremely useful. This would expose where raw coverage exists but user experience does not.

Ultimately, shifting from broad predictive maps of questionable accuracy toward detailed, validated, real-world insights would make Ofcom a far more effective catalyst for progress in this stubbornly difficult area. This kind of transparency could help bridge the gap between perceived coverage and actual user experience.

**In summary**, better indoor mobile performance requires aligned incentives: businesses willing to invest, lower deployment costs, and perhaps a shift in expectations away from Wi-Fi as the universal crutch. Until economic conditions improve and the cost-benefit equation changes, meaningful progress is likely to remain slow. We encourage Ofcom to consider further enhancements to indoor coverage prediction tools and to explore the potential replicability in the UK of the Saudi Arabian approach to addressing poor in-building coverage.

## Section 6: Connectivity on trains

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

The current ownership of the responsibility of providing coverage acts to stifle coverage capabilities. Network Rail owns the trackside infrastructure, whereas the train operating companies (TOCs) normally have the responsibility of providing coverage to passengers. The TOCs are reliant on the MNOs to provide coverage to the trackside ergo the trains through Wi-Fi aggregation nodes to provide on-board capabilities or through passengers using their own mobile service provision.

Given the nature of railways, there are often challenges to getting mobile signal to the trains, either culverts, tunnels and other clutter such as trees inhibit mobile coverage. Historically, the MNOs have struggled to deploy infrastructure on or near to the railways.

The commercial landscape is challenging as Network Rail has recently entered into an agreement with NEOS networks for the deployment and use of trackside fibre. There have been a number of trials on the rail network including the TransPennine corridor which did not proceed past putting in the fibre down as the economics of deploying 5G were cost prohibitive; and, Project Swift in Scotland where Cisco tried to deploy Wi-Fi to trains from the trackside; again this did not go beyond the trial project stage<sup>3</sup>.

*Which are most significant and why?*

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<sup>3</sup> [Project SWIFT](#)

**The UK rail system's fragmented structure creates major governance and coordination barriers to better mobile performance on trains, beyond purely technical or commercial hurdles.** Technical challenges coupled with complex interfaces in the current UK setup and seemingly uncoordinated previous measures, have so far inhibited comprehensive rail mobile coverage improvements.

### **Fragmented governance and institutional challenges**

The UK rail industry remains highly fragmented despite ongoing reforms toward Great British Railways (GBR). Network Rail owns and maintains the infrastructure (tracks, tunnels, bridges, etc.), while multiple TOCs run services, often under franchises or concessions. Rolling stock comes from separate ROSCOs (leasing companies), and MNOs handle the networks.

The requirement for coordination with so many relevant authorities creates challenges in deploying trackside infrastructure (e.g., masts, fibre, small cells, or DAS). Furthermore, these bodies have differing priorities, budgets, and risk appetites:

- **Network Rail** focuses on safety, operational reliability, and its own control-period funding cycles.
- **TOCs** are often focused on prioritising short-term passenger experience and franchise commitments but lack direct control over trackside assets.
- **MNOs** face commercial pressures: rail corridors often run through low-density rural areas with poor ROI for coverage investments designed for populated areas.

And even when a coordinated desire to achieve improved coverage exists, deployment can be slowed down by statutory, but necessary functions:

- **Planning:** In particular in sensitive locations which require consultation and assessment which can extend deployment timelines.
- **Land access and wayleaves:** While recent reform of the Electronic Communications Code has sought to streamline these arrangements, negotiations over terms can still take time.
- **Railway safety requirements:** Installing equipment in the rail environment requires compliance with strict safety standards, coordination with railway operations, and access to operational corridors. These necessary safeguards can add complexity to project delivery.
- **Industry coordination and investment:** The rail sector involves multiple organisations with different responsibilities, budgets and planning cycles. This can make it more challenging to coordinate and prioritise end-to-end connectivity investment across the network.

### **Technical and Commercial Barriers (in context)**

- **Technical:** Signal penetration through modern carriages (metalized windows), handover issues at high speeds, tunnels/cuttings (Victorian-era alignments exacerbate this), and backhaul limitations. Solutions like trackside fibre (e.g. Project Reach), on-train repeaters, or neutral-host networks exist but need physical deployment.

- **Commercial:** High costs for rural coverage with uncertain passenger revenue upside. MNO's prioritize urban/suburban 5G or 5GSA. Onboard Wi-Fi often relies on mobile backhaul and suffers from outdated tech or throttling.

**In summary**, recent initiatives (e.g. Project Reach and SG & SFT's current LEO trial in partnership with ScotRail) indicate momentum, especially as GBR aims to reduce fragmentation.

We believe that there is a role for Ofcom in improving collaboration between government, industry, rail authorities and MNOs which could help accelerate deployment of connectivity improvements across the rail network.

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

We agree with Ofcom's proposal to work with government to support improvements in train connectivity but suggest that this engagement should extend to all relevant bodies in the rail ecosystem and that collaboration across the whole ecosystem will be key to drive a step change in the mobile experience on railways.

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

In terms of data provision, it would be helpful if Ofcom's online mobile coverage tools included metrics on coverage and performance by rail route and by MNO.

More widely, we are aware of a number of initiatives and studies that have been conducted to improve mobile coverage on railways in Europe<sup>456</sup>. We would welcome insights from Ofcom on what lessons can be learned from European approaches, in particular in France where rail mobile coverage blackspots have largely been eliminated (albeit not performance issues), flowing from strong regulatory coverage obligations.

## **Section 7: Connectivity in rural areas**

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

**The biggest barriers to better mobile performance in rural locations** stem from a combination of technical, economic, regulatory, environmental, and social factors. These make deploying and maintaining infrastructure disproportionately expensive and complex compared to urban or suburban areas, where economies of scale and easier accesses apply. SG and SFT believe the key challenges to deployment are listed below:

<sup>4</sup> <https://www.ookla.com/articles/france-rail>

<sup>5</sup> [https://www.weplananalytics.com/en/research/mobile\\_coverage\\_on\\_spainsh\\_high\\_speed\\_train\\_ave-december-2025](https://www.weplananalytics.com/en/research/mobile_coverage_on_spainsh_high_speed_train_ave-december-2025)

<sup>6</sup> <https://insights.opensignal.com/2025/05/22/connectivity-in-the-fast-lane-the-motorway-and-railway-mobile-experience-in-france-italy-and/dt>

## 1. Power supply challenges

One of the most fundamental issues is securing **cost-effective, reliable power connections**. Rural sites often lack a normal DNO connection, forcing reliance on an expensive, long-distance connection being ordered or, more frequently, the deployment of diesel generators. These are noisy, require regular refuelling, and are less environmentally friendly. Without viable alternatives (such as solar with sufficient battery storage in often cloudy or windswept areas), ongoing operational costs or new connection costs when some distance from the grid will remain high and uneconomic to install.

## 2. Backhaul connectivity limitations

Even if power to a site can be achieved, backhaul to transport data back to the core network is frequently a blocker for the MNOs looking to deploy in rural areas. Many rural areas lack nearby fibre connections and the distances and terrain to run new fibre digs can be complicated and expensive. Microwave links to adjacent sites often face line-of-sight (LOS) obstacles. For example:

- Forestry restrictions.
- Difficulty identifying or negotiating with landowners for mid-hop relay points.
- Extreme solutions such as very large dishes for long distances or dual dishes over water, which then fail structural or wind-loading calculations.

Whilst satellite (LEO) can be considered a solution, throughput and data limits still mean it is a far less preferred option and likely to be favoured as a solution for sparsely populated places and points of interest.

## 3. High costs and deployment difficulties

Building and maintaining a site in remote areas is inherently expensive due to:

- **Complex planning procedures**, permissions and land ownership models.
- Harsh weather conditions that delay work and require over engineered solutions to ensure compliance and safety in significant weather events.
- Limited availability of equipment hire and skilled labour locally.
- Difficult site access, often requiring helicopters, ATVs, or other specialized logistics.

The total cost to design, acquire land/permissions, deploy, and maintain these sites can be prohibitive for the relatively low number of users served. MNOs naturally prioritise higher-density areas with better returns.

## 4. Visual and community impact

New masts and equipment are often seen as a visual intrusion in scenic rural or protected landscapes. This can lead to strong **community reluctance** or opposition from some during planning. Perceived health concerns can add another layer of resistance, highlighting a need for better public education. MNOs may be reluctant to revisit "not-spots" later if their priorities have shifted elsewhere so those sites that have already been left behind are even less likely to have a solution deployed.

## 5. Operator strategies and incentive problems

MNOs tend to favour large-scale **macro site deployments** using their own robust (and costly) equipment. They are often hesitant to collaborate with third parties for infrastructure sharing, cost-splitting, or lighter/smaller cell solutions that could be more suitable for rural gaps.

Compounding this is a disconnect in performance reporting: MNOs frequently claim coverage targets are met based on **theoretical/predicted metrics**, while real-world user experience and crowd-sourced data often reveals far more "not-spots." With official targets appearing satisfied (e.g., via Ofcom metrics), there is reduced industry urgency or regulatory pressure to tackle the practical gaps.

### Why these barriers persist

Rural areas combine low population density (poor ROI) with high per-site costs. This creates a vicious cycle: limited investment leads to no or poor service, which reinforces low demand connectivity, which justifies further under-investment. Solutions could include greater regulatory incentives for sharing, innovative low-cost technologies (e.g., better satellite backhaul or community-scale deployments), and improved transparency around actual vs. theoretical coverage. Pro-active engagement by MNOs and infrastructure providers giving visibility of their planning activity would also be useful. Case studies and/or best practice can aid the chances of success, and so there could be a role to play for Ofcom to highlight such approaches and/or successes.

Overall, closing the rural digital divide isn't just about technology — it's about aligning economic incentives, simplifying processes, addressing local concerns, and shifting from a one-size-fits-all macro approach to more flexible, collaborative models. Without targeted intervention, these structural barriers continue to limit progress.

*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.*

### 1. Deliver an honest, evidence-based assessment of coverage gaps

Ofcom's first priority should be providing a transparent and accurate picture of the true scale of gaps in mobile service provision.

- Ofcom should move beyond theoretical modelling and predicted coverage claims to a robust assessment grounded in **real-world performance**.
- Significantly enhance the **mapping portal** and **"Map Your Mobile" tool** to incorporate more crowd-sourced data, user-submitted measurements and their lived experience. This would reveal the actual extent of not-spots far more reliably than current methods.
- Publish large-scale, regular public reporting on rural not-spots, backed by a comprehensive measured mobile signal dataset.

**Why this matters:** Without honest baseline data, it is impossible to set meaningful targets or hold stakeholders accountable. Better data creates urgency and directs resources where they are most needed. Having such data may also aid those developing interventions. Understanding such gaps allows the development of areas and the consideration of aspects

such as subsidy control rules. It would also help potentially accelerate activity rather than others having to build an evidence base.

## **2. Connect as many people as possible using every available tool**

Ofcom should adopt an ambitious, technology-neutral approach with the clear objective that **no one in the UK should be left behind digitally** in today's world.

- Prioritise practical solutions that deliver usable mobile broadband and voice coverage to the maximum number of premises and road kilometres.
- Encourage a mix of macro sites, small cells, shared infrastructure, satellite, fixed wireless access, and other innovative technologies.
- Set stretching, outcome-focused targets that reflect genuine user experience rather than theoretical coverage.

The outcome to aim for is a significant, measurable reduction in rural not-spots within defined timeframes, with clear progress tracking via the improved mapping tools.

## **3. Strengthen resilience in rural networks**

Ofcom's proposed performance framework is primarily focused on whether users receive adequate speeds, latency and capacity during normal operations. That is important, but distinct from the resilience of the underlying network. A service which normally performs well but is susceptible to extended outages due to power failures, fibre cable breaks or severe weather events cannot be described as connectivity that users can count on.

This distinction is particularly acute in Scotland's rural and island communities, where a single mobile site, power supply or backhaul route may serve an entire community and where repair work can be more challenging and time consuming.

In light of this, we would encourage Ofcom to take on a more prominent role on resilience matters – seeking greater assurance about operators' (both mobile and fixed) contingency and restoration planning; developing a clearer evidence base on geographic vulnerabilities and shared points of failure and setting transparent expectations for backup power, temporary service provision, incident notification and restoration planning.

We believe that these measures are also fundamental to the 90% performance benchmark examined earlier in this document. We do not consider that a network that achieves the benchmark but loses service for an extended period following an outage constitutes connectivity that rural and island communities can count on.

Ofcom should prioritise resilience as a core part of its rural work: This might include:

- Developing a clearer national and regional picture of network vulnerability, assessing the number of communities dependent on a single core infrastructure or where multiple operators have the same potential physical points of failure;
- Undertaking analysis of significant mobile outages and working with industry to agree improvement actions based on the learning generated by these incidents;
- Assessing options for providing greater transparency on operators' resilience readiness, particularly for sites that are higher risk and dependent on a single power or backhaul connection

- Considering whether there is a case for putting in place minimum resilience expectations for critical rural and island sites.

Explore how **Advanced Wireless** technologies (including 5G Standalone, private networks, LEO and future 6G elements) can augment and provide backup to the fibre estate.

- Promote redundant connectivity options so that rural homes, farms, and businesses maintain critical connectivity during disruptions.

**Desired outcome:** More resilient rural digital infrastructure that supports emergency services, remote working, precision agriculture, and everyday reliability.

#### 4. Enable greater market participation and infrastructure sharing

Ofcom should actively lower barriers for new entrants and collaborators:

- Facilitate better access for **tower companies, neutral hosts, and disruptors** to MNOs' spectrum and core networks.
- Encourage commercial models that support infrastructure sharing and cost-splitting, making rural deployments more viable.

This would bring more players and investment into rural areas, reducing the burden on traditional MNOs and accelerate deployment through competition and innovation.

#### Overall outcomes Ofcom should aim for

- **Accurate public understanding** of remaining coverage gaps, with transparent dashboards showing real progress.
- **Substantially improved rural connectivity** — both in terms of population coverage and service quality — so that rural residents, businesses, and visitors enjoy reliable mobile performance comparable to urban standards where feasible.
- **Enhanced network resilience** that protects against outages.
- A more **dynamic and collaborative ecosystem** where neutral hosts and innovative providers can meaningfully contribute.

By leading with better data, setting ambitious “connect everyone” goals, and removing unnecessary regulatory friction, Ofcom can drive genuine progress. This approach balances ambition with practicality, leverages all available technologies, and ensures rural UK benefits fully from the digital economy.

**In summary**, SG and SFT believe that Ofcom's main priorities for future work in rural locations should focus on transparency, ambitious coverage delivery, resilience, and enabling broader market participation. The goal is to close the digital divide effectively and ensure rural communities are not left behind in an increasingly connected world. We feel that further focus on Scotland is needed by Ofcom as there are still areas underserved despite the conclusion of the S4GI and SRN programmes. The Vodafone and Three merger appears unlikely to result in extensive infrastructure deployment in these locations. We would, therefore, ask that Ofcom provides more detailed, granular analysis of Scotland's coverage, gaps and underperforming areas.

**We also encourage Ofcom to play a stronger role in telecoms resilience by strengthening oversight of operator preparedness, identifying network vulnerabilities, and setting clear expectations for service continuity and recovery during outages.**

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

**Improving rural mobile performance requires a mix of technical upgrades, commercial innovations like shared infrastructure and roaming, policy interventions by Ofcom, and pragmatic delivery approaches.** SRN is predicted to boost 4G geographic coverage from at least one MNO to over 91% of Scotland's landmass, with all-MNO coverage reaching 70%, and obligations targeting 91% by early 2027<sup>7</sup>. However, challenges remain in "not-spots," indoor performance, data speeds, and reliability, especially in truly remote areas. Scotland still remains behind the curve compared to the rest of the UK and for 5GSA to have the same or increased footprint.

## 1. Technical Solutions

- **Infrastructure sharing and densification:** SRN exemplifies this by building shared masts for partial and total not spots, reducing duplication and costs.
- **Industry Standardised Acquisition process:** This process would help landowners and planning department when dealing with installation of mobile infrastructure. Often suppliers are left to go through the acquisition process and this will differ in approach by each organisation; we have also seen evidence of a disconnect between the MNO and their supply chain on what happens going through acquisition process. Furthermore, we have heard anecdotal evidence that planning applications received have often been highly variable in terms of quality/thoroughness.
- **Advanced wireless technologies:** 5G offers better spectral efficiency, lower latency, and resilience through features like network slicing for prioritised services. In rural areas, these enhance resilience against outages as they complement rather than replace 4G in the low-density areas.

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<sup>7</sup> [Forecast coverage improvements – Shared Rural Network](#)

- **Direct-to-Device (D2D) satellite connectivity:** This is valuable for total not-spots, providing basic coverage (SMS, limited voice/data) where no terrestrial service exists. However, it falls short of cellular performance: service availability limitation defined by the satellite constellation's footprint; weaker signals (especially indoors, requiring line-of-sight); capacity constraints due to large satellite beams and limited spectrum; and, speeds often below 4G LTE expectations (e.g., initial services focusing on low-bandwidth uses). Consumers should not face higher charges for "additionality" that doesn't match their existing terrestrial expectations—this risks unfairness when they're already paying for unmet service levels. D2D is a strong supplement for emergencies and remote extension, not a full replacement.

Hybrid terrestrial-satellite approaches (e.g., seamless fallback) and advanced wireless can improve overall resilience in rural areas by providing redundancy during outages from weather, power issues, or congestion.

## 2. Commercial Solutions

A key concept could be the enablement of **national roaming or wholesale access models** to mimic international roaming. A startup could build targeted rural infrastructure and allow seamless access for existing customers of EE, Vodafone, Virgin Media O2, and Three. This would let users "roam" onto the new network automatically in weak areas, delivering a consistent experience without switching SIMs or providers. However, at present, this is too difficult for new market entrants to deploy as commercial incentives, spectrum access and regulatory hurdles hinder deployments. We acknowledge that national roaming has been considered in the past but we believe the time is right to revisit this. **Can Ofcom consider the case for mandating or incentivising national roaming in rural areas, or spectrum leasing?**

Should this become possible, startups could potentially focus on high-need corridors (roads, farms, underserved communities) using shared infrastructure or advanced wireless for cost efficiency. This would improve competition, drive collaboration with communities and LAs, facilitate utilization of existing assets/street furniture, and accelerate consumer outcomes without requiring full duplication of MNOs' networks.

## 3. Policy and Regulatory Role for Ofcom

Ofcom has used **coverage obligations** in spectrum licences (e.g. 800 MHz auctions) to drive rural improvements, with legally binding targets enforceable via license conditions. Ofcom could expand this by:

- Working with Treasury to change the traditional auction system: forgoing receipts: instead requiring MNOs to achieve strict coverage levels tied to license obligations.
- Determination of and incentivisation of the delivery, by MNOs, of minimum service levels (e.g., reliable voice/data in more premises, not just geographic outdoor coverage). A clear understanding of any deficiencies would also assist government policymakers in assessment of where public sector support may be appropriate.
- Consideration of facilitating rural roaming agreements or wholesale access obligations for better seamless coverage.
- Promoting spectrum innovations for D2D while ensuring it complements (not substitutes for) terrestrial quality.

- Supporting planning/land access reforms and monitoring performance more granularly (e.g., indoor/rural-specific metrics).

Ofcom's focus on consumer interests positions it well to address fairness issues around services such as D2D.

#### 4. Delivery Considerations

Prioritise high-impact areas (e.g., roads, emergency services, farms) via data-driven site selection. Combine SRN progress with consumer tools (Ofcom's coverage checker) and quick wins like boosters. In the longer term: a layered approach—terrestrial densification + advanced wireless + satellite supplementation—maximises resilience and performance.

**In summary**, while D2D helps close absolute gaps, sustainable rural improvement hinges on better terrestrial coverage via sharing, roaming innovations, advanced technologies for resilience, and Ofcom-driven obligations that enforce meaningful service levels. This balances technical realities with commercial viability and consumer fairness. Progress made in government funded projects such as S4GI and SRN shows that collaboration works; extending it with seamless access models could deliver the biggest step forward.