



VMO2 response to Ofcom Discussion Paper: Connectivity You Can Count On

Non-Confidential Version

Executive Summary

Overview

Virgin Media O2 (“VMO2”) welcomes the opportunity to respond to Ofcom’s discussion paper: Connectivity you can count on¹¹. The paper is useful as it not only highlights the need for better mobile connectivity in the UK, along with the benefits it would bring, it also shines a light on the key barriers to making that happen, whilst emphasising that achieving a step-change in performance will require the support and actions of a number of stakeholders.

We welcome Ofcom shifting the focus of attention from coverage to improving quality and reliability, but we highlight that for many areas, the principal challenge is not a lack of operators’ appetite to invest, it is the existence of barriers to deployment. The focus here should be on breaking down these barriers so that investment translates into enhanced quality and customer experience more quickly, and for the remaining areas which are not economically viable for operators to invest in, public funding should be made available to deliver improvements and close the gap.

Mobile Quality Metrics and Map Your Mobile

VMO2 supports Ofcom’s aim to provide consumers and stakeholders with information about mobile network quality, and we broadly endorse Map Your Mobile as a useful tool. Metrics should reflect real-world customer experience rather than headline speeds, remain evidence-based, account for different consumer needs and connectivity solutions, and enable customers to easily understand what types of services they can use.

Proposed 90% Performance Benchmark

To date the public policy objective has been to drive the maximum economically possible coverage of mobile networks, using obligations in spectrum licences. That approach has run out of road. The value of spectrum brought into the primary market by Ofcom has fallen, whilst the cost of marginal improvements in coverage has risen. Given the likely much larger and enduring cost implications of improving performance, it follows that obligations attached to new licences undoubtedly risks spectrum going unsold, leading to worse networks than the counterfactual.

The proposed 90% benchmark serves as a useful reference point, can help inform policy discussions, and set a broad objective for the mobile market in general. However, performance varies by geography, often due to the strength of the underlying economic case for operators to invest, and the extent of barriers to deployment in each area. Universal application of the benchmark (and therefore the metrics), risks distorting investment incentives and disadvantaging innovative solutions such as Direct-to-Device (“D2D”) satellite services. It may be that different benchmarks are more appropriate to urban, suburban and rural areas.

UK operators face a number of enduring challenges and barriers when seeking to roll out and upgrade their networks. Given the significant impact of these, if Ofcom is to establish whether there are key underlying factors that are specific to the UK, or significantly different in their level and extent when compared to countries in the top third of the OECD performance table, we recommend that Ofcom and/or Government, should undertake a benchmarking analysis of the issues that operators and Ofcom have identified, and examine how these issues are avoided or successfully dealt with in the countries that are performing well. This could remove some outliers where solutions don’t fit with the UK legal framework or market, and uncover solutions that the UK has either not thought of, or implemented, but which demonstrably work.

¹¹ [Connectivity you can count on](#)

Ambition is helpful where it is realistic and signals long-term direction, but it should be underpinned by support and commitment to actions that can drive real change. If the ambition to move the UK from the bottom third to the top third of OECD countries on mobile performance is to be realised and long-lasting, intervention and reform will be required.

Consumer Information and Crowdsourced Data

Greater transparency is positive for consumers, and we therefore support Ofcom's aim to provide access to information that helps to inform their decision making and choose the best network for their needs. VMO2 supports the appropriate use of crowdsourced data to measure mobile network quality. This means ensuring that it is recent, robust, and relevant. Ofcom should act to ensure the crowdsourced data that it uses to inform consumers decision making is sufficiently recent and/or appropriately weighted to provide an accurate representation of operators' current network performance, given the substantial ongoing investments which are being made to deliver rapid and significant improvements to mobile network quality and the resulting customer experience. We are conscious that third parties now rely on Ofcom's data for commercial purposes and therefore the risk of misrepresentation and its (negative) impact on competition needs to be addressed.

Connectivity in Busy Areas

Urban capacity constraints are primarily driven by deployment barriers rather than insufficient investment appetite. Key issues include Notices to Quit ("NTQ") resulting from redevelopment, planning delays and refusals, wayleave and site access challenges, building safety regulations and limited access to additional capacity spectrum. These all represent significant challenges to delivering improved network quality in busy areas. Planning reform and better treatment of telecoms infrastructure in redevelopment projects will be especially important to improve the current situation. The continued development of the built environment can also lead to overshadowing of existing base stations, something which the current planning regime does not consider.

Connectivity in Indoor, Shared Public Places

Indoor performance challenges are primarily commercial rather than technical. Venue owners, landlords and developers need to play a more active role in enabling and funding connectivity. Neutral Host models also have an important role, particularly in stadia, transport hubs and other high-footfall locations, but it is important that the market continues to support multiple providers and avoids situations where individual players acquire significant bargaining power in particular environments, as this can increase costs and reduce incentives to innovate and invest in delivering improvements.

Connectivity on Trains

The delivery of mobile connectivity on trains is a significant technical, operational, and commercial challenge. Unreliable service is an area of significant frustration for passengers and has been highlighted as a particular pain-point. Improving mobile connectivity on trains is perhaps the area in which operators will require most support. Doing so will require closer collaboration between Government, Ofcom, Network Rail and industry, streamlined approvals, infrastructure sharing (sharing between operators' and Network Rail as FRMCS is deployed is a key opportunity), and public funding for areas where market-led investment is not viable.

Connectivity in Rural Areas

Economic viability remains the principal barrier to improving rural mobile connectivity. Continued public funding, but also planning reform, easier access to land, solutions for power and backhaul constraints, timely access to additional low-band spectrum, and a supportive framework for D2D satellite services, will all be required to improve connectivity and quality in rural areas.

Key Priorities for Ofcom

1. Support wider work on planning reform to reduce deployment frictions.
2. Examine the benefits case for a reduction in annual spectrum licence fees (which would give operators more cash to fund investments) to inform Government's decisions on this matter.
3. Support with work to identify the areas where the market alone will not deliver and build an evidence base to identify the benefits that public funding could unlock.
4. Support in building an evidence base on deployment barriers and their impact on connectivity outcomes, and a benchmarking analysis against top performing countries.
5. Maintain a clear roadmap for timely access to spectrum and ensure flexible licensing.
6. Review the Map Your Mobile methodology and improve the timeliness of crowdsourced network performance data to reflect substantial operator investments which are delivering improved network quality and customer experience at a rapid pace.
7. Bring key stakeholders together with the aim of finding solutions to problems which can enable and speed up the delivery of improvements.

Response to Questions

The quality of mobile connectivity we want to see

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

Mobile connectivity has never mattered more than it does today. It has evolved from being a convenience to an essential part of modern life, providing access to critical apps and services, enabling increased productivity and growth, and connecting people in the moments that matter.

In this context, disruptions in service, or a degradation of quality, can have a considerable detrimental impact. The increased significance of widespread access to good, reliable mobile connectivity, combined with the continued growth in demand for mobile data, validates Ofcom's approach to move its focus of attention from coverage to quality. This direction of travel also aligns with the broader industry shift from coverage led competition, to reliable connectivity and improved customer experience.

VMO2 welcomes efforts by Ofcom to provide consumers with relevant and richer information about mobile network quality to help them make more informed decisions and choose the best network for their needs, and in doing so, seek to further promote competition based on service quality.

Map Your Mobile Metrics

Ofcom's quality metrics, methodology, and use of crowdsourced data, are likely to become an increasingly important measure of network quality for consumers and policymakers. It is therefore crucial that they are appropriate and relevant, and the information published by Ofcom is up to date and robust, so that it provides an accurate representation of an operator's network performance and genuinely helps to better inform consumers decision making.

The launch of Map Your Mobile was a significant development in the measurement of mobile network quality and the provision of performance information. By providing an indicator of quality using metrics that broadly align with general everyday needs and enable reliable use of current mainstream applications and services, it serves as a useful and relevant tool. We therefore broadly support Ofcom's aim to provide a common reference point against which current and future mobile network performance can be judged and we believe it is also helpful to inform ongoing policy discussions.

The metrics that Ofcom uses for Map Your Mobile closely align with the customer-centric performance measures that VMO2 use to assess the quality of our own mobile network. These measures also move beyond a simplistic focus on coverage and headline speed. Independent analysis² and our own experience³, point to a consistent delivery of 3-5 Mbit/s downlink as a meaningful benchmark for a reliable everyday mobile experience for most consumer services. Furthermore, the importance that customers place on having a good mobile experience, especially in the moments that matter,

² Measurement providers such as Opensignal assess quality based on the ability to support everyday applications, rather than focussing on headline speed. In that context, industry analysis and operator experience suggests that a consistent low-single-digit Mbit/s connection is sufficient for many everyday consumer use cases.

³ <https://news.virginmediao2.co.uk/leaving-the-vanity-metrics-behind-and-focusing-on-what-matters-customer-experience>

underscores that a focus on reliability of throughput and connection is a more useful measure of quality than coverage and headline speed, especially as differences in speed above a certain threshold may have no perceptible change to the customers experience.

Whilst the current Map Your Mobile metrics reflect a service level that enables reliable access to the everyday apps and services that most smartphone users engage with, Ofcom should be mindful that consumers have a diverse range of needs. There are still a large number of people in the UK, especially within older age groups, whose needs are primarily, or solely, for basic services such as calling and messaging, which may be carried out using a feature phone⁴, or that use services which require less throughput or latency than the thresholds currently set for the Map Your Mobile metrics. These consumers may not find the current metrics helpful, and there is a risk that their use could lead to some consumers making purchasing and switching decisions that do not best meet their needs, nor enable them to get better value for money. We therefore encourage Ofcom to take an inclusive approach to account for diverse consumer needs when setting thresholds for quality metrics and when presenting information intended to help consumers choose the network that will best meet their needs.

Evolution of Metrics

VMO2's aim is for our mobile network and its performance, to evolve in line with developments in use cases and the experience that our customers expect in the moments that matter. As the direction of use cases has, and still is, largely driven by the consumption of video, increasingly of higher quality and through streaming, a key consideration for us is to deliver a good service to customers that consume video. This includes minimising buffering, avoiding interruptions, and delivering a good overall visual experience. At present, we can deliver this by supporting a consistent throughput of 3-5 Mbit/s downlink and 1 Mbit/s uplink.

Changes in use cases, enabled by the evolution in screen technology and device form factor, such as a shift towards even higher quality video and in particular, streaming, may require us to support higher downlink and uplink speed over time. Whilst we expect downlink traffic to continue to be dominant, we expect uplink to generate proportionately more traffic going forwards, increasingly driven by AI-enabled services. If this proves to be the case, our mobile network will need to adapt accordingly to support these higher performance services and allow for more uplink traffic.

Changes on both the demand and supply side of the market will continue to drive strong growth in mobile data traffic over the coming years. This growth is primarily due to rising per-subscriber data consumption, rather than an increase in subscriber numbers, which are expected to remain broadly stable. Demand growth is therefore structural rather than cyclical and reflects sustained changes in consumer behaviour. These growth projections arise from several drivers, including:

- **Per-subscriber traffic growth**, fuelled by the continued scaling of data-intensive applications, particularly video streaming, cloud services, and social media;
- **Growth in 5G-capable, evolved devices**, which unlock higher intensity use cases and drive increased usage;

⁴ Age UK research found that among people in the UK aged 65+, around 23% (equivalent to around 3 million) use a standard (i.e. not smart) mobile phone, and among people aged 55-65, around 7% (equivalent to around 900,000) also use a standard mobile phone. [internet-use-statistics-july-2025-1.pdf](#)

- **Network evolution**, with the rollout of standalone 5G, small cells and new high-capacity sites, all enabling improved performance and, in turn, stimulating further demand or unlocking latent demand;
- **Rising uplink demand**, driven by AI-enabled services, cloud synchronisation, content sharing, and multimedia messaging.

In the light of these developments, and in a rapidly changing environment, VMO2 believes that a sensible approach for Ofcom to take would be to monitor the market for significant developments in applications, usage patterns and customer requirements that would support the case to review the current metrics. In this event, Ofcom should ensure that it takes an evidenced-based approach to its assessment of developments, and its review of the metrics. Ofcom should give careful consideration as to whether it is appropriate to evolve the metrics and seek to gain a deep understanding of how well they would meet the diverse needs of consumers, and what the benefits and risks could be of implementing changes. Further, it maybe that changes in factors do not affect urban and rural areas uniformly (for example), suggesting that more granularity might be needed in the approach to benchmarking.

2. 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.**

The proposed 90% benchmark could serve as a useful general measure and a reference point for a wide range of stakeholders, as well as being a target to work towards when seeking to deliver further improvements to mobile quality. The benchmark is useful in this respect and helps to inform policy discussions. However, as we have highlighted, different users value different aspects of performance, and these trade-offs are generally best resolved through competition, with wider support and public funding required where the market alone is not expected to deliver.

Ofcom acknowledges that mobile network quality will vary across place and time, such that perfect performance cannot be achieved in all locations, or at all times. Whilst the 90% benchmark may be achievable across many areas, enabled by intense market competition and substantial operator investments, wider delivery will require changes to the policy and regulatory environment to better support investment, reduce barriers, and reflect the present economic demands, and those in the coming years. The most powerful changes are likely to be as follows:

- A reduction in spectrum fees, to free up cash for investment;
- Planning reform;
- Timely access to additional capacity and coverage spectrum; and
- Public funding for areas that are not economically viable for operators to invest in.

90% Application Across Geographies

Mobile quality should generally be understood as an outcome of competitive investment and the extent of costs and barriers to network improvement, rather than simply a rigid prescriptive standard. We agree with Ofcom's assertion that the 90% benchmark should not be a minimum requirement, and that it cannot be expected to be achieved in all locations.

Variations in mobile network quality across locations are often a predictable outcome of network economics within a privately financed infrastructure market and they reflect differences in demand density, deployment costs, and usage patterns. These variations are not evidence of market failure, therefore the rigid imposition of a single universal quality benchmark and set of metrics across all areas of the UK, is not appropriate. Doing so risks distorting investment incentives and discriminating against emerging and innovative technologies that can uniquely deliver important basic connectivity in areas where the delivery of traditional terrestrial mobile network connectivity is unviable.

The development of D2D services such as O2 Satellite, is a clear example of where investment in emerging, innovative technologies and solutions can deliver significant benefits. D2D services complement the existing terrestrial mobile network and enable an operator to infill not-spots and extend outdoor coverage even further into rural and remote areas, including very hard to reach areas beyond the scope of the Shared Rural Network ("SRN"). However, current capability is limited when compared to the terrestrial mobile network. Whilst, at present, O2 Satellite may not meet the thresholds set for the Map Your Mobile metrics, and therefore nor the proposed corresponding 90% benchmark, it provides essential connectivity in areas where existing terrestrial mobile coverage may be patchy or not available, likely due it being economically and/or practically unviable to deliver or enhance. O2 Satellite is an example of VMO2 investing in an innovative service which delivers real benefits and supports a range of activities and scenarios by meeting the demand for essential basic connectivity which provides access to critical apps and messaging services which would otherwise not be available. Ofcom should therefore be especially mindful that a blanket application of the Map Your Mobile metrics and the proposed 90% benchmark, may not be appropriate, nor useful for consumers, and it could lead to unintended consequences, perverse incentives and distortion of competition.

Crowdsourced Data

VMO2 supports the appropriate use of crowdsourced data to measure mobile network quality. This includes ensuring that it is recent, robust, and relevant. Whilst crowdsourced data has its limitations, for example sample sizes may be low in rural areas, the dataset may exclude users of some commonly used devices, and some data used to provide performance scores will be based on a technology that the consumer either doesn't have access to as part of their existing service or the service they go on to choose (e.g. 5G SA), or is a technology that they don't frequently connect to (e.g. 4G), it is nevertheless representative of real world experience of mobile network performance and can should generally provide consumers with useful information about the service they can expect to receive.

However, VMO2's has some concerns over Ofcom's current methodology for Map Your Mobile (which we outline later in our response, including to question 4, by highlighting areas for further examination and improvement). VMO2's biggest and most pressing concern is in relation to Ofcom's current approach to using crowdsourced data, specifically the use of samples collected across a 12-month rolling period - this is simply too long. Publishing information aimed at providing users with the level of performance they should expect to receive from an operators' network, but which relies on data that is up to 12 months old, risks misleading consumers and policymakers. We explain our reasoning, below.

Substantial Investments Delivering Rapid Improvement to Quality and User Experience

In a highly competitive market, VMO2 continues to invest heavily to compete and provide the level of service that our customers expect. This investment includes the widespread deployment of recently acquired spectrum, refarming our existing spectrum to 4G and 5G following 3G switch-off, undertaking

major urban capacity uplifts, switching on high-capacity Giga sites across the UK, increasing network densification, and deploying additional small cells.

In 2025, VMO2 added 1 Terabit per second (“Tbit/s”) of capacity to its mobile network. In the first half of 2026 alone, we added the same amount, and we plan to add a further 1 Tbit/s in the second half of this year, delivering a total of 2 Tbit/s, as we build the UK’s most reliable mobile network.

We recently signed multi-year agreements with Ericsson and Nokia to evolve our mobile network and ensure that the majority of our Radio Access Network (“RAN”) equipment is upgraded to the latest 5G standalone (“5G SA”) technology. Our rollout of 5G SA has been rapid and widespread; this is a significant development, as one of the key features of 5G SA is that it enables more efficient use of spectrum, so for every MHz of spectrum deployed on a site, we can support more customers and more traffic, thereby further increasing the amount of available capacity, and directly improving network quality and customer experience.

A key factor in some of these investments, which was also one of the most significant developments in the UK mobile market for many years, is the Vodafone-Three merger. For VMO2, it enabled our purchase of 78.8 MHz of additional spectrum⁵, and facilitated significant updates to our long-standing network sharing agreement with Vodafone (“Beacon”)⁶ to support widespread and long-term upgrades to improve network quality, underpinned by committed investment. The spectrum purchase enables VMO2 to materially increase the capacity, coverage and quality of our mobile network, reducing congestion, and providing improved customer experience. The updated Beacon agreement provides a clear pathway for the intensive deployment of this additional spectrum, along with wider deployment of our existing spectrum, though we highlight that success is contingent on each party delivering on their commitments.

VMO2’s ongoing Mobile Transformation Plan⁷ will increase the coverage, reliability and performance of our network, across the UK. In 2025 we committed to investing £700m in network improvements, and we subsequently committed to invest the same amount in 2026⁸, this investment continues at pace to ensure that we deliver for our customers.

Part of our network transformation plan includes the delivery of new Giga sites, our most advanced mobile sites, which provide ten times more capacity than previous infrastructure by combining low, mid and high-band spectrum with the latest technologies and Massive MIMO (“M-MIMO”), to improve coverage, capacity, reliability, and speed, whilst customers demand for mobile data continues to grow. Following the deployment of our first Giga site in October 2025⁹ we have now deployed over 500 across the UK, the latest being in North Elgin¹⁰, and we aim to rollout a further 500 of these high-capacity sites. It should be noted that this Giga site is deployed in an area of relatively low population density, which underscores that the continued growth in demand for data extends beyond dense urban areas.

⁵ [Virgin Media O2 to boost its mobile network through spectrum acquisition deal - Virgin Media O2](#)

⁶ [Vodafone and Virgin Media O2 announce new, long-term network sharing agreement - Virgin Media O2](#)

⁷ [Virgin Media O2 to supercharge network reliability with £700m Mobile Transformation Plan - Virgin Media O2](#)

⁸ [O2 doubles down on mobile network improvements in 2026 with £700m investment - Virgin Media O2](#)

⁹ [Virgin Media O2 set to boost mobile connectivity across the UK with first-of-its-kind Giga Site switch on and newly acquired spectrum - Virgin Media O2](#)

¹⁰ [O2 reaches 500 ‘Giga Site’ milestone in major UK mobile network upgrade - Virgin Media O2](#)

Our substantial recent investments quickly translated into improved network quality, as evidenced in the Umlaut Connect Mobile Network Test 2026, an independent and comprehensive benchmarking report¹¹, which recognised VMO2 as being the most improved mobile network in Europe.¹²

The level, pace, and impact of our investment in network transformation, highlights the critical importance of ensuring that the crowdsourced data that Ofcom uses to provide information about network quality, is sufficiently recent to reflect recent and ongoing improvements to our mobile network to ensure it provides an accurate representation of the performance that a customer should expect to receive. Publishing misrepresentative data will not help consumers, on the contrary, it could mislead them. It also poses a reputational risk for Ofcom when published on its own website, and if replicated more widely, for example through comparison sites that use Ofcom's data feeds, or AI tools.

VMO2 hopes that the outline we have provided on the level and pace of our network investment and transformation is useful to Ofcom, and that it highlights the critical importance of using suitably recent crowdsourced data. We welcome Ofcom's intention to seek to make improvements in this area and we urge Ofcom to take appropriate steps to ensure that the crowdsourced data it uses is as up to date as possible, covers a shorter period of time, for example, either 3 months, or 6 months, maximum, and/or Ofcom implements a stronger weighting within Map Your Mobile for more recent data. Doing so will significantly reduce the risk of misrepresenting our network performance and misleading consumers and other stakeholders.

Is 90% Realistic and Sufficiently Ambitious?

Ambition is helpful where it is realistic and signals long-term direction, but it should not form a quality floor, or ceiling, that could distort investment incentives. In a competitive market, the most effective way to support the delivery of better quality, is to improve the commercial conditions under which investment decisions are made and provide support and public funding where the market alone will not deliver.

Ofcom's discussion paper is useful, in that as well as highlighting the need for better mobile connectivity, it shines a light on the key issues and barriers to making that happen. However, if the ambition for a step-change in improvement to mobile quality, moving the UK from the bottom third to the top third of OECD countries is to be realised and long-lasting, intervention and reform will be required. The support and actions of key stakeholders, including Ofcom, and Government, will be essential to make this happen.

In its discussion paper, Ofcom states that there is no clear evidence of UK-specific structural factors that would account for the UK's relative underperformance. It is not clear to VMO2 what analysis Ofcom has done to arrive at this finding, and we would welcome clarity on this point.

As we outline in this response, there are several enduring, systemic issues that UK operators face which act as barriers to rollout and make delivering improvements to network quality challenging. Given the impact of these challenges, for Ofcom to establish whether there are key underlying factors that are either specific to the UK, or significantly different in their level and extent when compared to countries in the top third of the OECD performance table, it would be advisable, and beneficial, for

¹¹ The report is based on network testing consisting of drive tests and walk tests conducted between October 27th and November 8th, 2025. The report was published in December 2025.

¹² <https://www.accenture.com/content/dam/accenture/final/accenture-com/document-4/Mobile-NetworkTest-UK-Connect-Umlaut-2026.pdf>

Ofcom and/or Government to undertake a comparison analysis. Key factors and challenges include the following:

- Operator revenues;
- Population distributions;
- Public funding initiatives;
- Planning laws and process;
- Spectrum fees; and
- Wider regulatory burdens and costs which demand a significant amount of operators' available funds, e.g. security and resilience obligations, and implementation of additional consumer protection measures.

Conducting analysis on these factors is likely to provide better insight and perhaps uncover how some barriers and challenges have been overcome or helpfully reduced in other countries, which could act as useful evidence to inform the decision-making process on next steps and priority actions that are most likely to drive improvements to UK mobile network quality and deliver the target benchmark and the Government's essential requirement of world-class connectivity.

While UK operators have invested many billions of pounds in mobile network infrastructure, the level of improvement in quality will depend upon a combination of more supportive regulatory frameworks, clearer investment incentives, and the removal, or significant reduction of existing barriers. As we have outlined, the most powerful enablers of improvement are likely to be planning reform, a reduction in spectrum fees, timely access to additional capacity and coverage spectrum, and support and public funding to deliver improvements in areas that are not economically viable for operators to invest in, or are particularly challenging, such as rural areas and connectivity on trains.

UK consumers benefit from strong price competition and some of the lowest mobile prices in Europe, yet international benchmarking consistently shows that the UK lags many countries on mobile quality. Independent evidence from companies such as RootMetrics/Ookla, and Opensignal, place the UK in the middle to lower tier of European markets. While price and performance are not always directly correlated, these outcomes are consistent with a wider pattern in which sustained downward pressure on prices can limit operators' ability to invest at scale in network capacity and performance over time.

The Government has stated that world-class connectivity is not optional, it is essential, and it has an ambition for high-quality 5G SA in all populated areas by 2030. This leads to the question of what is achievable by the market alone. Achieving consistently high quality everywhere is challenging, and depends on sustained access to capital, reduction in costs, additional spectrum, and reforms and support to reduce existing barriers. Coverage and quality should also not be conflated. On current trajectories, baseline 5G SA availability in populated areas is likely to be delivered. However, without improvements to the investment environment, many areas are likely to receive a limited quality of service.

Ofcom correctly highlights that the Vodafone-Three merger will further drive dynamic competition driven by sustained higher investment levels as the merger investment remedy and corresponding network programme is delivered¹³. VMO2's mobile network will benefit from this remedy too, as part

¹³ [Final undertakings](#)

of the update to our network sharing arrangements¹⁴. Taken together, these two developments will lead to a substantial improvement in the quality of mobile networks and customer experience.

However, the standard of “good” performance may not be reached in all areas, and the market alone will not deliver everywhere. This means there is uncertainty over the proposed 90% benchmark being realistic and achievable. As Ofcom highlights, if the ambition is to be met, it will require action from Government and Ofcom, along with support from other key stakeholders including local authorities, rail companies, infrastructure providers, developers, and landlords.

Setting a stretching target means that Ofcom and Government must also go further in pursuing good investment outcomes. The more investment that operators can secure for higher quality mobile connectivity, the more extensive deployment is likely to be, and the greater the resulting benefits for the UK.

Market-led improvements in mobile network quality

3. 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?

We welcome Ofcom commissioning consumer research to better understand the relevance and value that consumers place on information about mobile network quality. Greater transparency is positive for consumers, and we therefore support Ofcom’s aim to provide them with the ability to access information that helps them to make a better-informed decision on which is the best network for their needs. However, as we have highlighted, this information must be recent, robust, and relevant. On other policy matters¹⁵ Ofcom has highlighted that consumers may not be able to digest large amounts of and/or complex information in their purchasing decisions. Therefore, significant thought needs to be given to how this information can be presented and accessed by a range of consumers.

Learnings From Previous Initiatives – The Topcomm Scheme

Well-intentioned schemes designed to provide consumers with information to enable them to make better informed decisions have not always been a success. The Topcomm scheme¹⁶ had an objective, set out by Ofcom, to provide quality information to consumers in a way that should be relevant, accessible, accurate, comparable, transparent, and provided in a timely manner. Whilst the Topcomm scheme may be long forgotten and unknown to many, VMO2 believes that the objective and aims set for it were sound, fundamental principles that stand the test of time, and should underpin the provision of any network quality information and so are of direct relevance to Map Your Mobile and Ofcom’s reporting that is based on the data it uses.

In the case of the Topcomm scheme, despite it being operational for several years, Ofcom took the decision to close it down, concluding that it failed to meet its objective. In its decision statement, Ofcom highlighted that Consumer Focus had expressed the view that information should be published much sooner than the “up to 7 months after the data had been collected”, ideally no more than one or two months after the end of the reporting period as otherwise the data will be out of date by the time it is published. Ofcom agreed that providing information to consumers as soon after it has been

¹⁴ [Vodafone and Virgin Media O2 announce new, long-term network sharing agreement - Virgin Media O2](#)

¹⁵ [Prohibiting inflation-linked price rises - Proposals for new rules and guidance](#)

¹⁶ [Topcomm Review Statement](#)

captured, was a “fairly reasonable objective”. Ofcom stated that whilst it did not have any evidence available to help it determine if quality of service information necessarily has a ‘shelf life’ and must be published within a specified time period, or what that time period is, it would consider the question in the context of the wider policy re-evaluation.

As we have highlighted, VMO2 has a serious concern that the information currently provided by Ofcom uses data that is not sufficiently recent. Given the experience of the Topcomm scheme, we encourage Ofcom to be mindful of its objectives when using crowdsourced data for Map Your Mobile, and when presenting information aimed at helping consumers to choose the best network for their needs, as well as inform key stakeholders about the levels of mobile network quality across the UK.

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

Customer and Stakeholder Needs

For Ofcom to accurately determine how well Map Your Mobile currently meets customer needs, we would suggest that this should be largely informed by the feedback Ofcom receives directly from consumers themselves, and from organisations that represent them.

In this respect, we welcome Ofcom’s commissioning of qualitative research to learn more about the levels of understanding and experience of mobile network quality amongst consumers, its role and importance in consumers’ decision-making processes, and how information about quality could be better communicated. Whilst research has consistently shown that price is the main consideration in consumers decision-making for mobile services, in the highly competitive UK mobile market, operators also compete strongly on quality. We therefore believe it is important that Ofcom continues to promote competition on quality and takes full account of the diverse needs of consumers when refining and further developing the information that it provides and seeks to ensure that consumers can easily understand what services they can use based on the quality measurement of each network provider.

Further insight could be gained by canvassing wider opinion. In addition to the responses that it receives to its discussion paper, Ofcom may wish to consider undertaking specific additional research to better understand the experience of consumers that are familiar with Map Your Mobile and have used it, beyond the feedback it has received from the Jigsaw research that included consumers who were not aware of it or had not used it previously.

From VMO2’s perspective, our network rollout is guided by putting customer needs and experience at the heart of our strategy. In 2025 we asked some of our customers about the ‘moments that matter’. These represent the key interactions that are important, and where connectivity failure and degraded quality is most impactful. It comprises a combination of location, time of day, need, and emotional impact. Examples include commuting, travelling, live events and busy city centres. Whilst there were a wide range of moments that matter expressed by customers, regardless of the mode of transport, commuting was identified as being the most important.

We used this customer feedback to combine insights with our network data and sentiment analysis, enabling us to prioritise targeted upgrades across specific locations, journeys and high impact environments to deliver an improved user experience, aligning with our approach to providing a consistent throughput of 3-5 Mbit/s for downlink and 1 Mbit/s for uplink. Examples of these targeted

improvements are across transport routes, urban centres, and major venues. We note that this shows a high degree of correlation with the focus areas Ofcom identifies in its discussion paper.

Specific Improvements

Ofcom has acknowledged that Map Your Mobile is not perfect and there is room for improvement. From VMO2's perspective, as we have highlighted, we believe that the main improvement Ofcom can make is to ensure that the crowdsourced data used is as up to date as possible and/or recent data is given a stronger weighting.

Another consideration, that we think Ofcom could explore to help make the information on performance provided by Map Your Mobile more meaningful for consumers, is to provide an outline of the types of apps and services they will be able to use, based upon the measured level of performance provided by an operator network at a given location. Consumers may find it more beneficial to understand what they can do, and where, rather than the specific level of performance that has been measured. For example, by establishing the required throughput and latency for common types of service, e.g. calling and messaging, browsing, social media and streaming, interactive video, or gaming etc, Ofcom could then connect this to the information that it provides, by indicating which of these services are likely to be useable for the consumer, based on the performance level measured through the crowdsourced data.

We set out below all the areas we have identified that we think should either be implemented, or examined by Ofcom, to develop and improve Map Your Mobile to ensure that it best meets consumers and stakeholders' needs.

- More sampling in a shorter period to better reflect current network performance;
- Higher weighting for the most recent crowdsourced data;
- Increased data collection, as the current worst-case is 100 samples up to 12 months ago;
- The addition of D2D Satellite services and appropriate metrics;
- Ensure Ofcom's terms of use for its data and API are robust, and that price comparison sites use the data appropriately to provide information that is recent, consistent, and comparable;
- Assessment of how 5G performance, especially 5G SA, can be presented, as performance information currently combines 4G and 5G measurements;
- Further examination of how performance scores may vary depending upon the technology (e.g. 4G, 5G NSA, 5G SA) that was used to deliver service at the point of crowdsourced measurement, to ensure that Ofcom provides consumers with a representation of what service is available to them, not just a reflection of which operator has more customers using that particular technology;
- Consideration of how MVNOs could be represented if they provide services that are different to that of their MNO provider e.g. 5G SA, speed tiering etc;
- Consideration of how the current inclusion of MVNO data within MNO performance scores may vary by MNO and the implications of this;
- Explore whether iOS data can be included, to boost the sampling and include commonly used devices – allowing different device performance to be factored in;
- Consideration of whether the current 'cliff-edge' pass or fail of the performance metrics is appropriate, i.e. achieving 4.9 Mbit/s downlink, or 51 milliseconds latency is a 'fail', but there will be no meaningful difference in customer experience. This also has direct

relevance to consumers whose needs do not reflect the current thresholds set for the metrics;

- Presentation of information (e.g. using simple icons and categorisation) that indicate the services that a user can expect to use, based on the crowdsourced measurements;
- Clarity on Ofcom's existing and planned drive testing work to validate operators' coverage predictions, and explore if it could usefully be extended to further measure, and validate, network quality;
- Application of sampling error. Limited sampling could potentially result in performance results being tied between operators. Ofcom should seek to increase sample size, where it is able to do so, or consider a different approach to low-sample locations which may only represent the much wider postal area and not be helpful for consumers. In addition, displaying tied operators listed in alphabetical order could be misinterpreted by consumers as one operator being superior in performance, which is not the case.

VMO2 would welcome Ofcom's views on these suggestions, and we would be happy to engage with Ofcom to discuss them further, along with hearing about any ideas and plans that Ofcom has to develop Map Your Mobile, and the information it publishes on mobile network performance.

Connectivity in busy areas

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

Ofcom is correct in identifying town and city centres as key examples of where mobile performance, rather than just coverage, is the primary challenge. These areas are home to large amounts of people and concentrated economic activity, such as work, retail, and transport hubs, meaning there is some of the highest consistent levels of network usage across the country. Whilst this creates pressure, it also offers a strong commercial incentive for operators to invest.

As we have highlighted, VMO2 is investing heavily to meet this growing demand. With £700m invested in 2025 and a further £700m in 2026, this includes the deployment of 5G SA, additional network capacity, rollout of new spectrum, small cells, and 1000 Giga sites across the UK. The challenge in town and city centres is not a lack of willingness to invest, or lack of demand, it is ensuring that the planning, regulatory and spectrum frameworks enable investment to translate into efficient deployment, at scale.

The priority should be creating an environment that allows investment to be translated into deployment more quickly and efficiently. There are a number of barriers that diminish or thwart investment, which can for the most part be categorised as either a deployment friction or a spectrum policy choice. Addressing redevelopment pressures, reducing planning frictions, ensuring Local Planning Authorities ("LPAs") are sufficiently resourced, improving access to sites, ensuring future regulatory frameworks account for telecommunications infrastructure, and maintaining access to spectrum, will all be essential to improving the performance and reliability of mobile networks in urban areas. We examine these areas below.

NTQ - Notice to Quit

Chief amongst the deployment frictions is the increasing difficulty of retaining and replacing urban mobile sites. A substantial proportion of mobile infrastructure in cities is located on rooftops, as they are often the optimal locations for signal propagation. However, as development activity accelerates, operators are increasingly required to remove infrastructure from buildings that are being demolished

or redeveloped. This is typically done via a building owner issuing an NTQ. Whilst we fully recognise that building owners must retain the ability to redevelop or repurpose their assets, and telecoms infrastructure does not override legitimate development activity, a better balance must be struck between redevelopment and maintaining connectivity. Once an urban rooftop site is lost, replacement can take many years, for several reasons. Suitable rooftop space is scarce, access negotiations are often lengthy and complex (especially where we must pursue Code rights), and planning and heritage constraints can further narrow the pool of viable alternatives. The result is that redevelopment can lead to a prolonged deterioration in network performance for the businesses, residents and visitors who rely on those services.

VMO2's own experience in Paddington illustrates the scale of the challenge. Following the loss of a rooftop site, our teams have spent years assessing replacement options, encountering planning refusals, conservation constraints, and lengthy legal negotiations, simply to secure access for surveys, as well as significant difficulties in identifying technically suitable alternative locations. Meanwhile, the original building has been rebuilt without provision for telecommunications infrastructure. The below case study more fully illuminates this issue.

[REDACTED].

The NTQ issue is particularly acute in London, but it is not confined to the capital. [REDACTED]. In some areas, operators are putting significant work and investment in simply to maintain existing network performance, let alone improve and expand it. Put another way, we are running to stand still.

[REDACTED].

[REDACTED].

To address the issue of NTQs, planning policy and frameworks must start placing a greater emphasis on the impact that development can have on existing connectivity. There must be a mechanism that requires developers to engage with mobile operators at a much earlier stage in the design process where existing infrastructure (either on their site or in close proximity) may be affected, or where a development is likely to materially increase demand for connectivity and thus affect network performance. LPAs can play an important role in encouraging and facilitating this engagement point.

In addition, we believe there needs to be a clear expectation that developers assess reprovisioning options and work with operators to mitigate the impact on connectivity if their redevelopment requires the removal of existing telecoms infrastructure.

Development of buildings (especially in cities) is the primary driver for NTQ's being served. However, we understand that at least one site provider Agent has expressed the view that lower rents, brought about by changes to the Electronic Communications Code ("ECC"), are leading to a significant increase in NTQ's. We wish to highlight that the ECC does not cap rents, rather it provides a framework for the Tribunal to determine a price if no agreement can be reached between the parties. [REDACTED].

Planning

The broader planning regime also creates unnecessary friction for network upgrades and expansion in towns and cities. A good majority of applications we submit are ultimately approved. The challenge is therefore often not whether infrastructure can be deployed, but how long it takes, the specifics of where it can be placed, how much uncertainty is introduced into the process, and how much resource must be consumed to reach an outcome that was highly likely from the outset.

This situation can be improved by allowing a greater proportion of routine upgrade activity to proceed under more streamlined processes. This includes permitting additional antennas, supporting taller infrastructure where technically justified, and modernising Part 16 of the General Permitted

Development Order (“GPDO”) to better reflect how contemporary mobile networks are deployed. These changes are particularly important in town and city centres, where demand growth is strongest and where capacity upgrades are often required on existing sites rather than through entirely new deployments.

There is also a less obvious consequence of planning restrictions. The first site identified by an operator is typically the location that best balances technical performance, customer demand and environmental considerations. If there are planning refusals that force infrastructure to be moved elsewhere, operators will generally seek a nearby alternative solution. However, these alternatives are often technically inferior. The cumulative effect of thousands of small compromises across a network is reduced efficiency, lower performance, and the need for additional infrastructure to achieve the same outcome. This is an issue that is rarely visible in individual planning decisions but can have a significant impact on network quality at scale.

Access to sites remains another persistent challenge. Negotiating rooftop access and wayleaves in dense urban areas is inherently complex, given there are often multiple interests involved and a general reluctance from building owners to host digital infrastructure. Planning uncertainty often exacerbates this process for operators. Building owners do not want to enter lengthy negotiations if they believe planning permission is unlikely to be secured, whilst operators are reluctant to incur substantial design and legal costs before they have confidence that deployment is achievable. Greater planning certainty would help address this dynamic and speed up access negotiations.

Alongside planning reform, policymakers should be mindful of broader regulatory frameworks that can impact deployment. A good example of this is the Higher-Risk Building (“HRB”) regulations introduced under the Building Safety Act. The legislation was formed with very little thought given to telecoms and digital infrastructure and has subsequently caused huge delay and friction to mobile infrastructure deployment over the last two years. For VMO2, it has actively prevented [X] that would have otherwise been able to proceed. Some of these sites are in areas that experience high levels of network congestion and would therefore benefit greatly from upgrade works.

We welcome MHCLG’s recently announced dispensation for some of the procedural requirements for mobile telecoms works (namely, the need to go through Gateway 2 and seek approval from the Building Safety Regulator before work commences). We believe this is a proportionate step that will help to reduce unnecessary barriers to mobile deployment whilst maintaining the wider safety objectives of the regime (noting the continued oversight provided through Gateway 3 and the broader building safety framework). Whilst further work is required to provide clarity on the practical implementation of the dispensation, we are committed to working constructively with MHCLG and other stakeholders to ensure it can be effectively delivered. The experience, however, highlights the importance of considering the impact of new regulatory frameworks in a wide and holistic way, with thought to unintended consequences.

Spectrum

Alongside deployment barriers, timely access to suitable spectrum remains fundamental to improving performance in town and city centres. As Ofcom correctly identifies, many urban connectivity challenges are now capacity challenges rather than coverage challenges, and thus delivering better performance requires sufficient spectrum resources to meet rapidly growing data demand.

This will include access to additional mid-band spectrum, such as the Upper 6 GHz, and 7125-7250 MHz, which will be critical to support capacity growth in dense urban environments, as well as other areas. Access to this spectrum can deliver the large contiguous channel bandwidths needed to support future capacity requirements, maintain high-quality 5G SA, and enable the successful evolution to 6G that could enable the UK to perform on par with peer OECD countries. Spectrum

policy must seek to align with wider harmonisation, especially in Europe, to enable economies of scale in equipment and avoid unnecessary increases in cost for operators (e.g. bespoke vendor equipment that would be required in the scenario of a UK-only spectrum assignment), and afford operators flexibility to deploy capacity where it is needed, efficiently, utilising the latest technologies, and without the imposition of narrow geographical restrictions or cumbersome coordination requirements.

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

Planning and deployment

We welcome Ofcom's commitment to support Government as it considers next steps on its work on the Mobile Market Review. We have several specific policy recommendations relating to the planning regime that would help reduce deployment frictions and support investment in urban connectivity. At a high level, these can be grouped under two broad themes:

1. Expand the scope of Prior Notification by allowing a greater proportion of mobile infrastructure upgrades and deployments to proceed without requiring Prior Approval or Full Planning Permission. This should reflect the technical requirements of modern networks, including the infrastructure needed to support 5G SA, and evolution to 6G.
2. Improve engagement between developers and connectivity providers by introducing mechanisms that ensure the impact of new developments and redevelopment on existing mobile connectivity is properly considered and mitigated. This should include earlier engagement with operators and greater consideration of reprovisioning where existing infrastructure is affected.

We recognise that many of the underlying policy levers sit with Government rather than Ofcom. Nonetheless, Ofcom can play an important role in supporting these objectives through its evidence base, stakeholder engagement, and wider policy work.

Alongside supporting planning reform, we believe Ofcom's future work should focus on improving the evidence base around deployment barriers and fostering greater collaboration between the organisations that influence connectivity outcomes in town and city centres. Whilst operators have a clear commercial incentive to invest in urban connectivity, the pace at which that investment translates into improved customer outcomes is often shaped by factors outside operators' direct control. Ofcom is well placed to help identify these barriers, highlight their impact, and bring together the stakeholders needed to address them. We set out some ideas on this, below.

Create an evidence base to explore how the planning environment affects network performance

Ofcom already provides valuable data on mobile networks. We believe there is an opportunity to complement this with evidence on the factors that influence deployment, such as planning refusal rates, determination times, redevelopment activity, site losses, and sub-optimal site re-location and/or re-design. We encourage Ofcom to undertake further analysis to examine the scale of these issues, the cost they add on to industry, as well as the relationship between them and network performance and consumer outcomes. Greater visibility of these challenges, with an impartial assessment of how these frictions and costs add up, will help inform policy discussions and consideration of effective approaches, support, and interventions that can deliver better outcomes.

This would help identify whether areas experiencing poorer mobile performance are also facing greater barriers to infrastructure deployment. [3<]. The objective would instead be about creating an

evidence base that support more informed policymaking and improve understanding of frictions in given locations.

Convene developers, landlords, and LAs to improve deployment practices and connectivity planning

Ofcom has correctly identified that many of the barriers to improving connectivity sit outside the direct control of mobile operators. We therefore encourage Ofcom to utilise its convening skills to bring together developers, landlords, local authorities, and industry, to promote best practice and ensure connectivity is considered earlier in the development and redevelopment process.

Monitor and highlight deployment barriers arising from redevelopment, NTQs, and wider regulatory frameworks

A significant proportion of operator investment in some urban areas is directed towards maintaining existing connectivity, rather than delivering entirely new coverage or capacity. Redevelopment activity can result in the loss of established sites, whilst securing replacement locations can take many years. In line with our suggestion above in relation to planning, further analysis from Ofcom on the scale of these issues, including the relationship between site loss, replacement times and customer outcomes, would provide greater visibility of these challenges and help inform policy discussions and support more effective approaches to reprovisioning infrastructure.

Spectrum

In contrast to most deployment barriers, spectrum sits more squarely within Ofcom's remit. We therefore encourage Ofcom to focus on two priorities:

Maintain a clear pipeline of future capacity spectrum

We encourage Ofcom to provide greater certainty around the future availability of key capacity bands, particularly upper 6 GHz, and 7125-7250 MHz, which will play an important role in supporting future 5G SA quality, and 6G services.

Enable flexible licensing approaches

Spectrum can best improve customer outcomes if operators are able to deploy it efficiently and without unnecessary additional costs. As such, future award designs should maximise deployment flexibility and avoid geographic or technical restrictions that could constrain rollout or limit the benefits that spectrum can deliver. We especially encourage Ofcom to ensure that future licensing approaches for upper 6 GHz spectrum support deployment wherever commercially justified demand exists, rather than restricting unhindered rollout to narrow predefined geographic areas, as this is likely to disincentivise wider rollout.

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

We would welcome Ofcom providing more information that helps local authorities to better understand both the connectivity challenges in their area, and the factors that influence them. We believe the following would be useful:

- **Performance data** - this is not only useful for consumers, but it can also help give local authorities a better sense of the connectivity challenges in their area and thus an indication of where future infrastructure may be needed;
- **Data on planning and deployment barriers** - as referenced in response to question 6, Ofcom could focus on improving the evidence base linking connectivity outcomes and deployment

conditions. Information such as planning refusal rates, determination times, appeal rates and other deployment metrics could help authorities better understand how local planning environments impact connectivity outcomes;

- **Information on site loss and redevelopment impacts** - Local authorities would benefit from greater visibility of the impact that redevelopment activity can have on existing mobile infrastructure. Sector-wide information on site loss, replacement times, and the effect on network quality, would help inform decisions around regeneration and growth;
- **Best practice guidance** - Ofcom could collate practical examples of how mobile connectivity can be incorporated into developments from the outset, including rooftop provision, reprovisioning of existing sites, and engagement with operators. This can be a resource for local authorities and developers, coming from a neutral and trusted voice.

More generally, we believe Ofcom can play an important role in helping authorities move beyond viewing mobile infrastructure as individual planning applications, and towards understanding how individual decisions contribute to the performance of the wider network. As referenced previously, many of the barriers to improved connectivity arise not from a lack of investment by operators, but from the cumulative impact of deployment and redevelopment challenges. Better information on these issues would support more informed local decision-making and ultimately better connectivity outcomes for consumers and businesses.

Connectivity in indoor, shared public places

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

VMO2 agrees that indoor connectivity is an important factor in customers' overall experience of mobile connectivity. Our answer encompasses both fully, and partially covered spaces, with the core consideration being that they are high-footfall environments.

As set out in Ofcom's discussion paper, the challenge in these environments is two-fold. Firstly, the physical design of a building and construction materials used can reduce signal penetration, making it harder for outdoor networks to deliver a consistently good indoor experience. Secondly, the high volume of people puts strain on the network's capacity. Yet the barrier to improving connectivity is largely not a technical one. We can, and do, find ways to work around building infrastructure and add capacity to parts of the network that experience intense pressure.

The more fundamental barrier is how deployments are facilitated and funded. The benefits of improved connectivity are shared across multiple parties, but the responsibility is often assumed to sit primarily with mobile operators. Venue owners, landlords, retailers and transport operators, all benefit when visitors and customers can access reliable connectivity. It improves customer experience, supports digitalisation in these spaces, enables fast and reliable payments, and generally increases the attractiveness and utility of the venue. There must be greater recognition that delivering connectivity within these spaces is a shared responsibility, and thus building owners should play a more active role, not only by facilitating access and deployment, but by contributing appropriately towards the investment required where they are direct beneficiaries of the improved experience.

Neutral Host providers and commercial models can play an important role in addressing these challenges, and we expect them to become increasingly important in certain environments. Even when costs are shared with a building owner, the in-building infrastructure required will often exceed the commercial viability thresholds for any one operator. Neutral Hosts can therefore enable deployment that may otherwise not proceed, by making the initial capital investment, and providing

the shared infrastructure that multiple operators can use and thus serve customers from. This is particularly relevant for Distributed Antenna Systems (“DAS”) and other complex in-building solutions, where the economics become more compelling when infrastructure is shared across multiple operators, rather than duplicated. Positive developments on this front have been made via the Joint Operators Technical Specification Neutral Host In-Building Solutions (“JOTS NHIB”), which provide a common framework for the deployment of shared indoor infrastructure, helping to simplify the process and bring down costs.

Additionally, a Neutral Host model can also be beneficial because it brings special expertise in these types of buildings and can efficiently manage the building owner’s and complex venue requirements. A good example of this is the recent work in the new Everton F.C. stadium (Hill Dickinson) at Bramley-Moore Dock, where connectivity was incorporated into the venue at an early stage and delivered through a Neutral Host model. In engaging with the building owners early and ensuring connectivity is considered in the design process, there has been a much easier route to deployment in comparison to trying to retrofit after construction.

However, the Neutral Host model should not be treated as a panacea to improving indoor connectivity. Dedicated indoor and venue-based infrastructure is typically more expensive than traditional macro network deployment, even when Neutral Host providers make the upfront investment and secure commercial agreement with multiple operators. The high cost of delivering a DAS means it is only installed where more cost-effective methods will not provide a good solution. It therefore needs to be targeted where it can deliver clear customer benefits. Neutral Host models can improve the economics of deployment through shared infrastructure, but they do not eliminate the underlying costs associated with delivering high-quality connectivity in complex environments. The commercial case must still be robust for all parties involved.

[X]. In some cases, venue owners may expect operators to fund a greater proportion of investment than operators consider justified, given the expected customer benefits and traffic demand. [X].

[X].

Despite these concerns, VMO2 has been actively addressing connectivity challenges in these types of environments. For example, we partnered with a neutral host to deliver a managed 4G and 5G DAS upgrade at the Sunderland F.C Stadium of Light, addressing long-standing connectivity issues experienced by fans. We treated this project as a controlled trial, allowing us to assess the impact of improved connectivity through customer surveys, on-the-ground testing and crowdsourced data. The results demonstrated that investment in these environments can have a meaningful impact on customer experience, with higher satisfaction levels, improved ability to access digital services during events and almost half of O2 customers perceiving the network to be better than competing providers following the upgrade.

We have also been developing and deploying temporary mobile networks to boost coverage and capacity at special and major events, including concerts and sporting fixtures. This has included the use of Open RAN, and the successful deployment of a 5G Cell on Wheels (“CoW”) at the Allianz Stadium (formerly known as Twickenham).

We want to do more of this. There is clear appetite from mobile operators to continue investing in connectivity in these environments, and customer expectations will continue to increase. If we are to achieve this, there needs to be a sustainable commercial model, which includes ensuring building owners play an appropriate role in enabling and supporting deployment, [X].

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

There is perhaps a less obvious role for Ofcom here, but we do believe there would be merit in Ofcom highlighting the role that landlords, developers and venue operators can play in enabling connectivity. As above, mobile connectivity is increasingly part of the overall experience people expect from stadia, shopping centres, transport hubs, offices and other shared spaces. This could be achieved by showcasing examples of successful delivery models and good practice, as well as the provision of evidence on strong consumer outcomes and economic benefit.

Additionally, Ofcom could promote examples that demonstrate the value of incorporating connectivity early into venue design for new or redeveloped spaces.

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

As above, we believe there would be merit in Ofcom producing case studies and highlighting examples of where collaboration has worked well and any evidence on consumer and economic benefit.

Connectivity on trains

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

As part of VMO2's Mobile Transformation Programme, we are focused on delivering connectivity in locations and in the moments that matter most to our customers, which includes along key rail infrastructure. In 2025, we completed in-tunnel coverage at the Gasworks and Copenhagen tunnels at King's Cross, completed two large railway upgrades along the East Coast Mainline, and deployed coverage across a 45-mile stretch in Northumberland that was previously a not spot. We have also delivered the UK's first mobile cell site on existing Network Rail infrastructure along a stretch of railway in East Sussex. This collaboration with Network Rail has delivered a technical blueprint that can be replicated nationally, which improves mobile coverage whilst also protecting signalling and GSM-R communications.

As of 2026, we have announced a partnership with a neutral host¹⁷, which will deliver strong and continuous coverage across three major stations, key tunnels, and selected macro sites along the route. In parallel, industry efforts under Project Reach will improve connectivity across major rail corridors, covering 12 stations and 89 tunnels on the East Coast (London-Edinburgh), West Coast (London-Glasgow), and Western Rail lines (London-Bristol). This initiative is major step forward to ensuring seamless mobile coverage for rail passengers across the UK.

Despite all this work, we agree with Ofcom's assessment of the challenges associated with rail connectivity. Out of the environments examined in the discussion paper, rail is particularly demanding from both a technical and commercial perspective. Whilst there are well understood coverage challenges in rural areas and capacity challenges in urban areas, rail combines both simultaneously, together with a unique set of operational, infrastructure, and delivery constraints.

The technical barriers in delivering mobile connectivity to trains should not be underestimated. Modern trains create a challenging radio environment due to carriage construction materials, signal attenuation through windows and the constant movement of passengers through different coverage areas. At the same time, trains generate exceptionally high levels of demand. A single train can

¹⁷ [O2 and Cellnex sign agreement to end Brighton Main Line 'not-spots' for 300,000 daily passengers - Virgin Media O2](#)

contain several hundred passengers relying directly on mobile connectivity for work (from joining video calls to accessing cloud applications), entertainment (which is often in the form of streaming content) and communication throughout their journey. This creates an unusually concentrated demand for capacity that is not abated in the same way as the activities or socialisation that would typically occur in other large indoor venues.

Additionally, the topography of the land makes providing continuous trackside coverage inherently difficult. Railway corridors often pass through tunnels, deep cuttings, heavily wooded areas and remote rural environments, all of which makes deployment challenging and costly.

Whilst the technical challenges are substantial, the most significant barriers are commercial and organisational. In a similar vein to large indoor venues, rail connectivity delivers benefits far beyond those captured by any individual network operator; improved connectivity benefits passengers, train operating companies, Network Rail, businesses and the wider economy. The benefits are distributed, but the costs are often concentrated on mobile operators, and those costs are more substantial than usual due to the deployment complexities outlined above. However, [REDACTED].

Given these investment challenges for operators, we view rail as a key area where public funding is most justified, especially if there is an ambition for widespread coverage along rail corridors. In the absence of public funding, policymakers should consider the broader levers they have to support the financial sustainability of the telecoms sector and heed the recommendations of operators in response to the Government's Mobile Market Review.

A further challenge is the complexity of delivery. Meaningful improvements to rail connectivity typically requires coordination between multiple organisations, including operators, Network Rail, train operating companies, neutral host providers, and local authorities. [REDACTED]. Consistency of approach supports us in more efficient engagement and planning for rail-side infrastructure.

[REDACTED].

[REDACTED].

[REDACTED].

[REDACTED].

[REDACTED].

[REDACTED]. Likewise, clearer planning and policy recognition of the public benefits associated with rail connectivity would help support deployment and ensure connectivity is given appropriate weight alongside other planning considerations.

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

As we have outlined, we view rail as a clear example of a challenge that cannot be resolved through market forces alone, and where coordinated action by government, regulators and industry is likely to have the greatest positive impact and deliver improvements. As such, we agree with Ofcom's proposal to work with government in this area.

Other areas that Ofcom can support on are helping industry in reducing the deployment frictions associated with working on and around railway infrastructure. [REDACTED]. Continued collaboration between Ofcom, Government, Network Rail, and industry, could help streamline these processes and ensure planning policy properly promotes railway connectivity.

We also believe there is a significant long-term opportunity associated with the transition from GSM-R to the Future Railway Mobile Communication System (“FRMCS”). Whilst delivery of FRMCS remains several years away, it provides a significant opportunity to plan rail communications infrastructure in a way that supports both operational railway requirements and improved passenger connectivity. There is a strong case for ensuring that infrastructure deployed as part of this transition is designed with sharing and future commercial mobile use in mind, and we believe that Ofcom’s involvement in these discussions would be beneficial.

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

Ofcom should examine international approaches to improving rail connectivity. This could include performance, characteristics of routes, and different funding, infrastructure-sharing and delivery models. Given the substantial public benefits associated with improved rail connectivity, understanding how other countries have approached these challenges could help to identify promising solutions and inform policy discussions and next steps for the UK.

Connectivity in rural areas

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

Economic Viability

In its discussion paper, Ofcom identifies that there are areas where the market alone will not deliver improvements in mobile network quality. Ofcom correctly highlights that mobile connectivity is often weaker in rural areas as the business case is challenging due to lower population density and high cost to deploy. These factors combine to reduce operators’ expected returns, dampening investment incentives in an already challenging macro-economic environment. This is the main underlying barrier to achieving better mobile performance in rural areas.

We welcome Ofcom’s acknowledgement that much effort has been focussed on expanding mobile coverage. Initiatives such as the SRN have seen substantial investments by operators’, in addition to public funding to deliver further improvements in areas that are not economically viable for operators to invest in. This has delivered significant benefits by extending coverage across the UK, and work remains ongoing to deliver even further expansion, enabled by the public funding and additional Government support.

Investments already committed by operators will improve rural mobile connectivity to an extent, but after that, additional investment in terrestrial mobile network infrastructure is likely to be limited in rural areas. In a challenging environment, and with a range of competing demands, operators will be incentivised to direct their investments in areas where it is likely to deliver the most return. Part of Ofcom’s work on mobile connectivity, and in supporting Government on next steps for its Mobile Market Review, should involve identifying and highlighting areas where it is not economically viable for operators to invest, and examination of how public funding could be used to improve mobile connectivity, and what the resulting benefits could be.

Practical and Technical challenges

In addition to the fundamental commercial challenge of delivering mobile connectivity in rural areas, there are also significant practical and technical constraints. We note that Ofcom plans to undertake a series of case studies aimed at developing a deeper understanding of the practical challenges of improving rural mobile connectivity and seeks to identify the challenges that might be addressed by the market alone, and those which may lie beyond what the market is likely to deliver.

VMO2 has extensive experience of the barriers and challenges involved in delivering mobile connectivity in rural areas, both through our own initiatives, as well as through collaborative efforts as part of our Beacon network sharing agreement with Vodafone, and wider collaboration on the SRN programme. We provide an outline of these barriers and challenges, below.

Planning and Access

The provision of mobile connectivity in rural areas, including as part of the SRN, is dependent on the ability to acquire the necessary rights from the landowner to access and deploy at a site, and secure the required permissions from the LPA.

We have encountered various barriers, resource-intensive processes, increased costs, and resistance, to building and improving mobile network infrastructure in rural areas. [3]. We provide, below, an outline of some of these challenges:

- Variable levels of resource within LPAs;
- Rejection of planning applications by LPAs;
- Increasing litigation of planning applications by LPAs through to appeal;
- Refusal of permission and to the grant of rights, in areas where there is a need, and demand, to provide or improve connectivity;
- [3].
- Operators having to yield to objections to obtain approval, by altering the site design and/or location, which can result in a reduction in the level of coverage and/or quality that could otherwise have been delivered;
- The requirement for additional approval of Section 37 via the Energy Consent Unit under the devolved Government for Scotland, where Ministers decide on applications to build, operate or modify onshore electricity generating stations over 50 megawatts;
- Refusal by landowners and landlords to enter into consensual agreements which forces us to take steps to exercise our statutory Code Rights. Consequently, taking steps towards making applications to the Lands Tribunal is becoming the only option to acquire Code Rights on an increasing number of sites;
- Excessive timeline to exercise Code Powers, which in any case can often impact working relationships and create ill feeling;
- [3].
- Lack of response to requests to engage on providing access;
- Protracted negotiations and delays;
- Unreasonable commercial terms - ransom rents and prohibitive access terms.
- [3].

[3] the TNS programme was re-shaped considerably to focus deployment of sites in areas where there was an evidenced need, and would deliver greater benefits, for example, where people live, work, travel and undertake leisure activities. This highlights the importance of ensuring there is a clear and unambiguous benefits case established for any additional build.

Power

A common problem with delivering sites across rural areas is getting a power supply to them. Remoteness of a site can make it a substantial challenge to connect to the grid and power the site, this can also drive long lead times and lead to delays in delivering connectivity.

In our work on delivering the SRN, we have been, and remain in, extensive discussions with power Distribution Network Operators (“DNOs”) regarding the feasibility of getting power to sites, [REDACTED].

[REDACTED].

[REDACTED].

Off-grid power solutions that use solar, battery, hydro, and wind generators, have experienced the same issues as with permanent power, but attempts are still being made to install them where the off-grid solution is more economical than permanent power.

Backhaul

As with power, [REDACTED], the remoteness of these sites has meant extensive cable runs and digs to lay cable over multiple site providers land, requiring a number of complex wayleave negotiations which are fraught with the same challenges as we have outlined for power, despite the early ordering of fibre for backhaul.

[REDACTED].

Challenging Terrain and Conditions

Rural areas, especially remote rural areas, frequently have challenging terrain requiring complex and costly delivery e.g. use of helicopters, or all-terrain vehicles.

Deployment can also be challenging in remote areas due to inclement weather. This is not just the case in winter months, as we have had challenges with snow in June in Scotland when trying to complete build for the Partial Not-Spots (“PNS”) element of the SRN.

15. 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?

As we have outlined, whilst operators are attempting to build and improve connectivity where there is a business case to do so, there will be gaps in the extent of connectivity and quality that can be delivered in areas where the business case for operator investment does not stand up. Public funding is required to close these gaps, targeted at areas where there is evidenced demand and appetite for improvement from local authorities and communities.

As a result, we believe one of Ofcom’s priority work items on mobile connectivity and in supporting Government on its Mobile Market Review, should be to support on identifying the areas where it is not economically viable for operators to invest, and to examine how public funding could be used to improve connectivity and quality in these areas, and what the resulting benefits are likely to be.

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

Ofcom acknowledges that the proposed benchmark of good mobile performance may not be realistic to achieve in all areas and that commercial investment alone will not solve all rural connectivity

challenges. Whilst shared infrastructure, ongoing investments, and satellite technologies will continue to play a role, public funding is needed to close the remaining gap.

Rural areas may be impacted by a lack of coverage or its variability, and/or available capacity. Establishing the primary cause is important when seeking to identify the most suitable solution. Whilst the delivery of the SRN continues, and several areas in Scotland that currently have no terrestrial mobile coverage will receive it when the programme is expected to complete in early 2027, further delivery of terrestrial coverage to serve areas that will not be covered following completion of the SRN, or the Scottish 4G infill programme ("S4Gi"), will require public funding and support due to the weak operator business case and high cost and barriers to deployment.

In areas where capacity is the primary issue, this is likely to be due to a lower level of network densification, finite low-band spectrum, and barriers to upgrading sites or deploying new densification sites, such as planning issues and opposition by LPAs, and/or the local community, especially in conservation areas, [3].

VMO2's experience with building out mobile connectivity in rural areas has led us to identify the following areas that could help to improve the situation:

- **Stronger recognition of mobile infrastructure within planning policy**, ensuring telecommunications is treated as Critical National Infrastructure and a key enabler of digital connectivity and economic growth;
- **Early engagement from local communities and planning authorities**, to agree the best site locations for all parties;
- **Fewer planning hurdles for routine upgrades and replacements**, reducing the number of applications requiring full planning permission or prior approval and easing pressure on local authorities;
- **Greater flexibility to deploy infrastructure in the right locations**, including increased use of rooftops and more flexibility around upgrades in conservation areas to support faster 4G and 5G deployment;
- **Commercial Terms**, when working with other operators, establishing and agreeing terms is essential to provide the certainty required to invest and deliver, however operators' incentives do not always align.

D2D Satellite Services

Several areas of the UK where there was no, or limited, coverage, where deployment of terrestrial mobile network connectivity is unviable or failed due to barriers and local resistance, have recently received coverage and connectivity to essential services through the launch of the O2 Satellite D2D service, with other operators expected to follow with their own D2D service offerings.

VMO2 welcomes Ofcom's work on introducing an authorisation framework to enable these services in the UK. Ofcom and VMO2 both recognise these services can deliver significant benefits to consumers in the form of extended basic mobile connectivity which supplements existing terrestrial coverage, reaching into currently unserved areas.

[3]. Less conservative PFD limits would help to enable greater coverage and deliver wider benefits for consumers and other types of users.

Ofcom has committed to reviewing its D2D authorisation framework, including technical conditions, following the outcome of WRC-27, where discussions on D2D access and conditions will be held under

Agenda Item 1.13. VMO2 encourages Ofcom to review its existing technical conditions including the PFD limits at the earliest feasible opportunity. Ofcom should ensure that it takes an evidence-led approach to its review, [3<].

Timely access to additional low band spectrum

In its discussion paper, Ofcom states that it has limited powers, and its role will be to highlight issues, provide better data, and where appropriate, support others to deliver better outcomes for consumers, including working with Government as it considers next steps for its Mobile Market Review.

VMO2 strongly believes that spectrum policy is one of the most powerful levers available to Ofcom. It can enable the release of spectrum which can be used to deliver substantial improvements to the quality of mobile connectivity, including in rural areas, resulting in better outcomes for consumers.

As VMO2 has consistently highlighted to Ofcom over recent years, additional low band spectrum can play a key role in improving the mobile experience in rural areas and help narrow an increasing quality divide. As well as being ideal for providing wide area coverage, including deep inside buildings, it can enable an efficient upgrade path when deployed on to existing macro sites to increase capacity and, to a lesser extent, boost coverage, especially in rural areas where the cost and/or other barriers make further site densification, or deployment of mid-band spectrum, unviable for operators.

Coverage and service quality in these areas primarily depends on sub-1 GHz spectrum. However, these areas face an increasing capacity problem and without action, will fall further behind in terms of quality and capability. The continued growth in mobile data traffic, along with the limited availability of low band spectrum, means that it becomes quickly absorbed by demand, even when accounting for operators refarming its use to 4G/5G when 2G and 3G is switched off. The need for additional low band spectrum will therefore become more pressing over time as traffic and user demand increases.

If spectrum in the 470-694 MHz band was freed up in a timely manner and made available for mobile use, it could provide a significant capacity uplift in rural areas. The band is currently used to deliver Digital Terrestrial Television, yet the value of this mode of providing television is decreasing. In a rapidly changing environment in which current users of this spectrum (the public service broadcasters and multiplex licensees) may themselves see a need to adapt and change TV distribution models, planning and flexibility is of key importance. Ofcom and Government need to be agile and plan sufficiently far in advance to facilitate a smooth transition for all involved and ensure optimal use of the spectrum. VMO2 therefore welcomes the recent publication of the Government's Media Green Paper, which includes consideration of these distribution, consumption and technology developments, along with the benefits that could be enabled through alternative use of the spectrum.

In general, the timing of spectrum availability carries different costs and benefits. From a mobile network planning perspective, the earlier there is certainty of access and clarity on what will happen, and when, the better. This will enable operators to plan both investment and network evolution decisions in the knowledge of when the spectrum will become available. [3<]. Assuming there is a timely and sensible award process, spectrum in the 470-694 MHz band can be used to improve mobile network performance with efficient investment onto existing masts, and spectrum that has a lower deployment cost to enhance network quality, can be a strong driver for investment.

Further Network Sharing, and Potential Spectrum Sharing

We note Ofcom's intention to work with industry to explore potential long-term solutions to improve mobile connectivity in rural areas, including examining the possibility of further network sharing, and spectrum sharing. VMO2 is keen to understand Ofcom's thinking and ideas on this, given the primary

barrier is economic, and existing network sharing is extensive and widespread, as is the deployment of low-band spectrum which is most suited to sites in rural areas.

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

Public Funding Scope and Benefits

As we have highlighted, part of Ofcom's work on mobile connectivity and in supporting Government on its Mobile Market Review, should involve work on highlighting the areas where it is not economically viable for operators to invest, and examination of how public funding could deliver benefits.

Planning Constraints

In relation to planning, we welcome Ofcom's review and analysis of the planning permission and prior approval decisions of various LPAs over the last five years, and of additional data provided by two operators on refusal rates for mobile planning applications. In its discussion paper, Ofcom presents this analysis within the section on connectivity in busy areas, however, we wish to highlight that refusals for planning permission and approvals are also an enduring challenge to improving connectivity rural areas. This includes areas where there is a commercial case for operators to invest and they are actively seeking to do so, as well as areas that are not commercially viable for operators to invest in alone, but public funding has been allocated to deliver connectivity, e.g. the TNS element of the SRN.

We encourage Ofcom to support on further work to gain additional greater insight on planning barriers in rural areas. As we have outlined, we have significant experience of planning related challenges and how they impact the delivery of mobile connectivity in rural areas. Increased transparency of planning application refusals and concessions that operators had to make to gain approval for new mobile infrastructure, and upgrades, identified by their location within rural areas, could help to provide more detailed insight into the challenges that operators face when seeking to deliver improvements, and give consumers and policymakers a better understanding and explain why the coverage or quality of mobile connectivity in a particular area is not at the level they expect, despite operators' best efforts.