

Your response

Question	Your response
Section 2: The quality of mobile connectivity we want to see - What are your views on the use of the Map Your Mobile good performance metric and how should the measure evolve over time? What are your views on the usefulness of: - the 90% figure as a benchmark applicable across geographies and based on crowdsourced data?, and - Whether the 90% benchmark is realistic and sufficiently ambitious?	Confidential? - N I welcome Ofcom's move from predicted coverage and headline speeds towards measured user experience. Telecoms policy has relied for too long on easy metrics rather than good metrics. Users care whether a map loads, a ticket appears, a payment completes, an authentication message arrives or a call continues. However, "users" increasingly goes beyond smartphones to include connections for vehicles, wearables, industrial equipment, assistive equipment for disabilities, and potentially AR/VR and robotics in future. Also, there may need to be a distinction made between 4G, 5G and 5G standalone as that may impact specific applications The metric 5 Mbit/s down, 1.5 Mbit/s up and 50 ms latency is a useful minimum viable connectivity threshold, but it is not a complete definition of 'good'. I would retain it for continuity, while adding a higher everyday tier, perhaps around 15/5 Mbit/s for the early 2030s, plus packet loss, jitter, failed sessions, time to first byte, voice continuity and SMS/OTP reliability. Peak-time and mobility performance should be explicit. The thresholds should also be regularly reviewed in case new application and device behaviour and broad uptake makes them unsuitable. It should also be recognised that these thresholds mean that fixed broadband performance (with Wi-Fi or ethernet last-metre) will often be substantially better than cellular. The 90% benchmark 90% is a sensible screening benchmark, but not a universal target for every geography and use case. Crowdsourcing has survivor bias: true not-spots and failed connections can disappear from the denominator, while samples cluster where people already use phones. New buildings and construction projects are therefore excluded, and poor coverage is found retrospectively, when remediation is complex and expensive. Ofcom should publish sample counts, confidence indicators and failed/no-signal observations, and segment results for urban, rural, indoor, road and rail environments, plus peak and off-peak periods. The target is realistic nationally and would represent a material improvement. It may be insufficiently ambitious for important public places, yet difficult in some remote areas without intervention. The answer is segmentation, not one arbitrary number. A particular problem is that averages do not necessarily represent the experience of particular individuals – some may suffer poor connectivity 100% of the time, depending on where they live / work. There should be a metric that translates the national average to the perception of the median individual. Lastly, this is a very person-centric metric which does not apply to connectivity used for vehicles, IoT, business and industrial devices, agricultural connectivity etc. These also need to be addressed Related work: Ofcom Lowers Bar for 5G Connectivity Expectations; The Worst Metrics in Telecoms.
Section 3: Market-led improvements in mobile network quality	Confidential? – N Customers need place-and-time reliability, not just a postcode colour. They should be able to compare actual performance where they live, work and travel, indoors and outdoors, at peak times, on routes and in venues. Map Your Mobile should distinguish predicted coverage

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- What information do customers need about network quality to choose the best network for their needs, and where are the main gaps in current provision of that information? - How well does Map Your Mobile currently meet customer and stakeholder needs, and what specific improvements would make it more useful?	from measured performance, network capability from device or tariff limitations, and poor service from sparse data. MVNO host networks should also be explicit. Map Your Mobile is a useful first version. Postal district level reporting is useless for urban areas, though. My own post district has over 30000 properties, 60000 inhabitants, likely 100000s of transient visitors daily and varying topography. My priorities are sample counts and confidence indicators; failed tests and no-signal observations; peak/off-peak and historical views; public-venue and route/corridor views; clearer treatment of MVNOs; and downloadable data or an API that is actively promoted to relevant app providers (eg Zoopla, Rightmove, Amazon etc). It should also tell users when every network is poor, because switching is not a solution to an all-network not-spot. There should also be consideration given to a “map your mobile day” app, which shows an aggregate for a given user’s daily experience at home, on a commute, at work etc. Lastly, it may be interesting to see how Map Your Mobile could integrate with the MNOs’ own APIs for instance through the CAMARA Project and GSMA Open Gateway. Related work: Broadband policy and metrics: reassessing satellites' role.
Section 4: Connectivity in busy areas - What do you think are the biggest barriers to achieving better mobile performance in town and city centres and why? - What do you think should be Ofcom’s main priorities for our future work in this area? - What information would stakeholders, especially local authorities / planning authorities find useful for Ofcom to provide further insights on and why?	Confidential? - N The biggest barriers are localised and often institutional, not a national shortage of spectrum. Busy-area failures occur at particular streets, stations, venues and times. Constraints include site access, planning uncertainty, landlord economics, power and fibre, street furniture, multi-operator coordination and peak congestion. Some of the problems may relate to issues beyond the radio, such as operators’ IP-layer connectivity, DNS, peering capacity and proximity etc. Ofcom should publish capacity-hotspot data and distinguish congestion from simple lack of coverage. It should also produce a practical local-authority toolkit: comparative planning outcomes, case studies, model asset-access and small-cell agreements, public-asset inventories, neutral-host guidance and a recommendation for named digital-infrastructure leads. There also needs to be a pathway towards a national policy for wireless (and wired) coverage and capacity in major property developments, both indoors and outdoors. Look at what is done in Saudi Arabia, Singapore, HK etc such as mandatory inbuilding systems for new builds with 7+ stories. Planning can be a real barrier, but Ofcom should not simply recycle operator lobbying. The useful evidence would link applications, refusals, appeals and deployment times to whether infrastructure was actually built and whether user performance improved. Related work: Understanding Neutral Host Networks; audio companion.
Section 5: Connectivity in indoor, shared public places - What do you think are the biggest barriers to achieving better mobile performance indoors and why? - What do you think should be Ofcom’s main priorities for our future work in this area?	Confidential? - N Indoor wireless is the obvious missing piece in UK mobile policy. The report and Ofcom should not just focus on public venues and similar accessible spaces – these are just the tip of the iceberg. Many offices and homes may have Wi-Fi but it often does not cover entire buildings including shared spaces (eg in MDUs or office lobbies and internal staircases) and may have constraints in terms of access and usage policy (eg blocking Wi-Fi calling) The hardest barrier is fragmented ownership and incentives, not just radio physics.

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What information would you find useful for Ofcom to provide further insights on in relation to connectivity indoors and why?	Operators do not own the building; landlords have limited direct revenue; tenants want all networks; neutral hosts cannot always secure MNO participation; and Wi-Fi is usually planned separately and often has no automatic authentication. Nobody owns the end-to-end outcome. Some applications such as mobile emergency calling in all areas of a building and access to newer assistive technologies is often overlooked. A critical issue is the difference between building types and sizes, from entertainment venues to shared office towers to hospitals to MDUs, airports, factories, “big box” retail stores, stone-walled country pubs, farm buildings, stations etc. Moreover each of these have complex internal layouts, including basements, fire-escapes, internal rooms etc. which may not have Wi-Fi or cellular coverage Ofcom should make indoor connectivity a first-class workstream. Priorities should include UK guidance for developers, landlords and tenants; a multi-operator or neutral-host default for shared public buildings; model procurement clauses; better integration with Wi-Fi, Passpoint/OpenRoaming and 6 GHz; public-sector leadership in hospitals, stations and civic buildings; and explicit treatment of emergency calling, basements, stairwells and the 2G/3G switch-off. Wi-Fi calling is useful, but it is not a policy answer and does not always work on enterprise Wi-Fi unless set up correctly. Users with security needs and VPNs may be especially poorly treated by public Wi-Fi. Ofcom should collect measured data by building type, occupancy and event load, including dead zones, system type, participating MNOs, cost and lifecycle. It should not infer real indoor experience from outdoor measurements through walls. Related work: Will Indoor Wireless AI fit with MNOs' AI?; BEREC work-shop review; Indoor wireless video interview; DBTT podcast, from 23:50. There is also a separate PDF provided from a recent Disruptive Analysis workshop on Indoor Wireless, which is not for open publication.
Section 6: Connectivity on trains - What do you think are the biggest barriers, technical and commercial, to achieving better mobile performance on trains? Which are most significant and why? - Do you agree with our proposal to work with government to support improvements in train connectivity? - What information would you find useful for Ofcom to provide further insights on in relation to connectivity on trains and why?	Confidential? - N On-train connectivity and user behaviour varies between short/commuter use and long-distance travel. Longer journeys are more similar to usage of connectivity and home or work, including watching long-form content, participating in meetings, using cloud resources etc. A useful metric is that sessions of either social-media use or video meeting participation can require up to 1GB/hour download and considerable upload. Aggregated over a busy train, this can mean possible multi-gigabit needs, served by a mix of through-the-window cellular and onboard Wi-Fi. Some of the most demanding users are Wi-Fi only: business users with laptops, and children with tablets. While using hotspot functions on smartphones helps and is getting easier, this also adds to interference. Technical barriers include weak trackside signal, train penetration loss, handover, tunnels and cuttings, congested macro cells, limited backhaul and ageing onboard Wi-Fi. The larger barrier is fragmented responsibility and incentives. MNOs see long, thin corridors with poor standalone economics; train operators often procure the presence of Wi-Fi rather than an outcome; rolling-stock owners control windows and antennas; and Network Rail, DfT and future Great British Railways structures control corridor assets. Nobody is accountable end-to-end. Service intervals are often years- or decades-long, and thus unsuitable for ongoing upgrades or enhancements of onboard equipment, especially given certification hurdles and a lack of easy modularity. Yes, Ofcom should work with government, but this needs a delivery architecture, not another stakeholder forum. The shift towards public

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	ownership creates an opportunity to treat connectivity as shared infrastructure across fleets, stations and corridors. It should not require multiple Wi-Fi logons (and especially clunky captive portals) across a single journey. The programme should be technology-neutral: more public-cellular or neutral-host trackside sites, repeaters or treated windows, modern and easily upgradeable onboard Wi-Fi, and multi-link gateways combining cellular, LEO and dedicated track-to-train. LEO is useful backhaul, not a capacity panacea, but is becoming more useful rapidly. FRMCS is primarily for operational rail communications, not passenger broadband. Passpoint/OpenRoaming should replace repeated captive portals as an urgent priority. All railway Wi-Fi should be VPN-friendly. Ofcom should publish route- and segment-level results by operator, Wi-Fi, time, train type and crowding, including failed/no-signal tests and backhaul type, with repeat testing and raw data. Also compare with connectivity on equivalent coaches on the same routes, and possibly future self-driving cars or eVTOL aircraft Related work: My recent analysis of UK train connectivity. I also have available a model for on-train connectivity needs, which I can share privately with Ofcom if it is useful
Section 7: Connectivity in rural areas • What do you think are the biggest barriers to achieving better mobile performance in rural locations and why? • What do you think should be Ofcom's main priorities for our future work in rural locations and what outcomes should we aim to achieve? • What solutions (technical, commercial, policy or delivery) could improve rural mobile performance? • What information would you find useful for Ofcom to provide further insights on in relation to rural connectivity and why?	Confidential? - N Rural connectivity is not one problem. Barriers include weak site economics, topography, power and backhaul, planning, limited low-band capacity, seasonal demand, one-network areas and crowdsourcing bias. The main requirement is often reliable area coverage, not headline speeds. Ofcom should classify residual gaps after the SRN and merger commitments: zero coverage, weak or low-capacity service, single-network availability, seasonal congestion, road/rail corridors, resilience gaps and local enterprise or IoT needs. Outcomes should cover population, land area and corridor performance, with an explicit minimum for basic safety and everyday use. This should not just include people with smartphones, but also agricultural sensors and vehicles, or even connected livestock. Do not underestimate rural indoor wireless issues, especially in stone buildings, smaller modern MDUs with good insulation, or metal-walled farm and industrial buildings. Some of those structures are also in places with poor fixed / FTTx connectivity, so Wi-Fi is of limited use as a substitute. Solutions need a mixed toolkit: macro infill and sharing; MOCN, roaming or neutral-host mechanisms where proportionate; public-asset access; local/shared spectrum and private or community networks; FWA and Wi-Fi; satellite backhaul; and direct-to-device satellite for basic messaging and emergency coverage. D2D is a complement, not a substitute for terrestrial capacity, but is expected to improve. Useful data would show each residual gap, its likely cause and plausible remedy; no-signal observations and sample confidence; seasonal demand; road and tourism routes; power/backhaul resilience; and one-network versus multi-network availability. I disagree with treating roads as generic outdoor coverage. They are safety and economic corridors and should be measured separately, including tracks used for agricultural and forestry purposes. Related work: Broadband policy and metrics: reassessing satellites' role; Understanding Neutral Host Networks; TelecomTV panel on indoor and rural ubiquity, from 24:40.

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