5G 6G INNOVATION CENTRE

UNIVERSITY OF SURREY

Mobile–AI Compute Convergence: The UK's Opportunity to Lead Globally in Trusted AI Delivery

Submission to the DSIT Mobile Market Review Consultation University of Surrey — 6G Innovation Centre

April 2026

Executive summary

This evidence-based submission focuses on the future policy environment required for UK-based technology development in Mobile and wider ACT industries as they merge with expanding AI functionality to accelerate economic growth. Our objective is to outline a practical focused scenario supporting the UK's ambition to become a world leader in mobile connectivity with the associated economic and social benefits.

The UK does not need the world's fastest consumer networks. It needs the world's most trusted AI service delivery infrastructure from Cloud to Smartphone — and it has the assets, the institutional base, and a time-limited spectrum opportunity to build it.

Mobile networks will increasingly be employed as the essential infrastructure delivering AI applications — via end user devices (smart phones), within the mobile network (regional facilities), and in large data centres. This presents new and evolving cybersecurity challenges.

> **Mobile networks will increasingly be employed as the essential infrastructure delivering AI applications**

Mobile Network Operators are evolving towards autonomous controlled networks using agentic AI. **The need for resilience, reliability, and risk mitigation with national critical infrastructure presents key technology challenges.**

All these requirements are having to be addressed within a hugely challenging investment climate. This requires choices to be made by the Government as to where the UK's mobile infrastructure needs to be world class and that is also within our means to deliver it. The leading candidate by far is for the UK to be a world leader in trusted, secure AI service delivery infrastructure.

Key elements of such vision include:

1. **Integrated focus on the cybersecurity, resilience, and reliability of mobile[1] incorporating satellite and photonics[2].**
2. **Coordination of objectives with the AI opportunities action plan, Quantum Technologies plan, and spectrum policy. The objective is to raise the priority of ACT to help deliver future mobile networks as critical national infrastructure.**
3. **Implement a new funding model to deliver the fundamental and translational research required that connects research output directly to exploitation at scale. Allow mobile operator to repurpose £5m of their Annual License Fees to fund UK university research tied to DSIT's chosen goals**
4. **Introduce a new DSIT/UKRI Task Force on ACT strategies for 2030 to make the best use of Research and Innovation funding for market impact, investment, resilience and growth.**

The policies recommended in our proposal are practical, fiscally neutral, aligned with industry incentives and focused on the world-class mobile connectivity outcome the Minister says is essential.

[1] GTOC Security and Resilience Principles for 6G. https://www.gov.uk/government/publications/global-coalition-on-telecoms-security-and-resilience-principles-for-6g/gcot-security-and-resilience-principles-for-6g

[2] This is a mobile market review but in a security context the security envelope will need to be more widely defined around the relevant communications infrastructure including neutral host and shared components.

1

A Consequential Choice — the Lessons of History

Policy choices by governments can have consequences that outlast the governments that make them. In the 1980s, the UK chose to prioritise world-class mobile services over world-class mobile manufacturing. The consequence was the emergence of globally competitive mobile network operators and total demise of the UK's indigenous telecommunications systems industry. The services path delivered the largest economic benefit, but it has left a legacy of the UK being a taker but not maker of mobile systems technologies.

Today, on the threshold of the AI era, the same structural choice recurs. The question is not whether the UK should be ambitious in AI — it should be. The question is: ambitious in what? The height of the bar for "world-class" competitive status is now set by the two global superpowers. The UK has a medium-sized economy and cannot be world class in everything. Success pivots on the choices made. The UK can be world class through precision targeting that addresses a market opportunity in an area that builds on UK strengths, ensuring the business case is viable (the numbers add up), and providing strong leadership able to align government, regulator and private sector interests[3].

This submission makes the case that the UK's policy legacy, its institutional strengths, and its economic constraints point unambiguously toward one strategic direction: **global leadership in trusted, secure AI service delivery** — rather than global leadership in frontier AI compute manufacture or in raw network speed. This is the path most likely to drive economic growth, because AI functionality will be pervasive across the entire economy and public services, and the countries that deploy it most reliably will capture the most value.

[3] *The three foundational golden rules for government technology initiatives aiming at global leadership — see 'The Graveyard of Good Intentions', Temple & Webb, 2026.*

2

Reframing "World-Class" Connectivity

The Consultation Document opens with a clear ministerial priority:

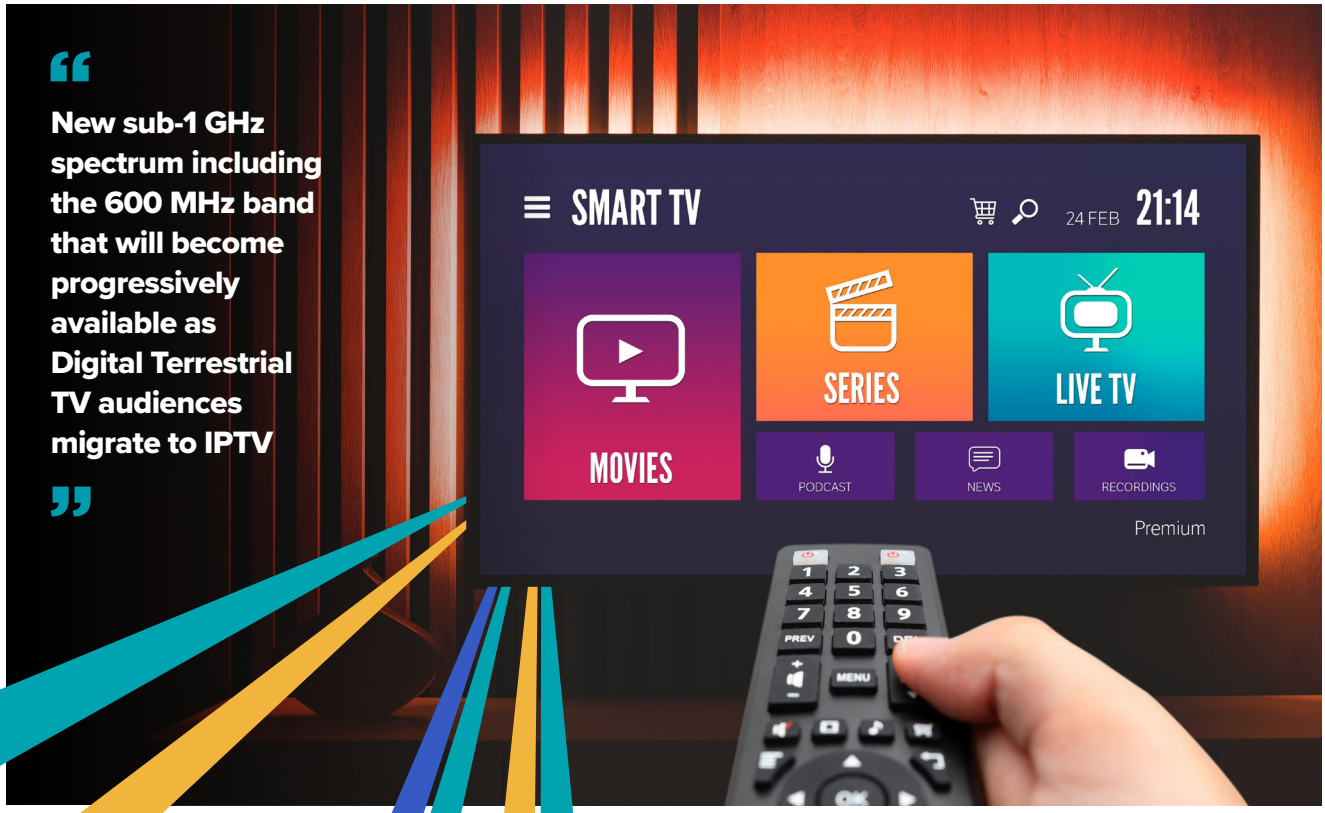
"This government has made growth a priority. As Minister for Digital Economy, I am clear: if we want a more prosperous, innovative and inclusive UK, world class connectivity is not optional, it is essential."

This submission endorses that ambition but argues that what will be the difference between success and failure is facing up to the same question: World-class connectivity **in what regard?** The answer to that question determines everything: which spectrum to prioritise, which network architectures to fund, which research to commission, and how close the outcome can meet the goal set.

The Consultation Document itself provides the evidence that the UK's mobile sector cannot afford to optimise for everything simultaneously. Operator margins are under sustained pressure. Their capital is constrained. Public expenditure is too stretched for the Government to fund significant "market failures" in delivering its "world-class" ambition.

This investment ceiling creates a fork in the road ahead. One direction is an evolutionary improvement in security, reliability, and coverage of low-to-medium bandwidth services, potentially enhanced by new sub-1 GHz spectrum including the 600 MHz band that will become progressively available as Digital Terrestrial TV audiences migrate to IPTV. The other direction is a revolutionary leap to multi-gigabit services requiring new upper mid-band spectrum (7–15 GHz), dense new site infrastructure, and fundamentally different network architectures.

These are not complementary paths that a financially constrained industry can pursue simultaneously at scale. They are genuine alternatives with different cost structures, different energy profiles, different timescales, and different beneficiaries. The evolutionary path better serves the UK's primary AI deployment ambitions, and that mobile connectivity policy and priorities should be shaped to further strengthen those AI ambitions and therefore likelihood of UK global success.



> **New sub-1 GHz spectrum including the 600 MHz band that will become progressively available as Digital Terrestrial TV audiences migrate to IPTV**

3

The AI Compute Continuum: Why Mobile Connectivity Is Central

The Rational Topology of AI Compute

AI inference — the process of running a trained model to generate a useful output — will not remain permanently anchored in hyperscale cloud data centres. Economic, energy, latency, and privacy pressures are already driving a structural migration of AI workloads toward the device.

The rational topology of AI compute over the next decade will settle into three tiers. Tier 1 — on-device inference — handles most AI interactions by volume: personal assistants, real-time translation, image processing, agent task orchestration, and context-aware suggestions. This tier runs on the neural processing units now standard in flagship smartphones, consuming milliwatts of power per inference rather than the kilowatts required by cloud GPU clusters. A recent Qualcomm study found that shifting AI compute from cloud to smartphone reduces energy per query by approximately 90%.[4] Tier 2 — regional aggregation points — handles workloads that exceed device capability or require access to sensitive shared data: clinical decision support, financial risk analysis, public safety systems, enterprise AI agents. These run at 8–10 UK-based compute facilities, close enough to minimise latency and within UK legal jurisdiction. Tier 3 — cloud hyperscale — handles frontier model training, very large context inference, and specialised research compute.

In this topology, **the mobile radio access network is not merely a pipe for consumer entertainment traffic — it is the connective tissue of the entire AI service delivery system.** Its quality, security, and reliability determine whether AI services work for all for citizens and enterprises operating outside controlled environments.

What AI Traffic Actually Needs

Traditional mobile network policy has optimised for peak speed and consumer competition metrics. AI service delivery requires a different set of network characteristics: bounded latency, low jitter, high reliability, predictable performance under load, and end-to-end security. These are not automatically produced by policies optimised for best-efforts broadband. The value of AI connectivity is not in peak speed but in reliable delivery of time-sensitive data with a consistent high quality of coverage. To economically achieve universal coverage, these characteristics will need to be delivered over terrestrial and non-terrestrial (satellite) networks.

[4] *See: Shifting AI inference from the cloud to your phone can reduce AI costs | Qualcomm*

4

The Economic Case for Secure, Reliable, Resilient Connectivity

> **AI adoption could grow the UK economy by an additional £400 billion by 2030.**

The AI Opportunities Action Plan projects that AI adoption could grow the UK economy by an additional £400 billion by 2030. That figure is not a forecast — it is more a ceiling. The fraction of that ceiling the UK captures depends on many variables: management capability, skills, data access, regulation, and software integration all matter. Secure, reliable mobile connectivity is one of those critical enabling variables — and uniquely, it is one that DSIT policy can directly address. Three infrastructure failure modes currently discount the dividend, and all three are directly addressed by the mobile connectivity strategy this submission proposes.

Unreliable connectivity already costs UK SMEs £7.7 billion in lost economic output annually, on pre-AI traffic according to one study[5]. The AI services that come to be layered on top can only amplify this figure.

Cybersecurity failure currently costs the UK economy £14.7 billion per year in direct losses from significant cyber-attacks[6]. In an AI-enabled economy the attack surface expands dramatically: every AI inference interaction over a mobile network is a potential vector, and the data being processed — clinical, financial, legal, personal — is of far higher value to adversaries than conventional consumer traffic. Insecure infrastructure does not merely disrupt AI services; it destroys the trust that is the prerequisite for AI adoption in regulated sectors.

The AI adoption failure penalty is the largest and least-discussed discount on the £400 billion. MIT's NANDA initiative found that only 5% of AI pilot programmes achieve rapid revenue acceleration, with the vast majority delivering no measurable P&L impact — attributing failure primarily to adoption, workflow, and integration barriers. [7]Unreliable and insecure infrastructure compounds each of these barriers: it degrades the consistency that workflow integration requires and erodes the trust without which adoption stalls. A country whose mobile infrastructure cannot support reliable AI service delivery will find those barriers harder, not easier, to overcome. Even a 10-percentage point improvement in the UK's AI project success rate, applied across the breadth of the economy, represents tens of billions of pounds in captured value annually.

There is such high volatility in the world today that forecasting has never been so problematic. For that reason, we turn to constructing an illustrative scenario: it is anchored to the £400 billion in the Government's AI Opportunities Action Plan as the ceiling working assumption. The UK's stated AI advantages — healthcare, field services, logistics, public administration, SMEs — sit overwhelmingly in sectors where workers are mobile and AI must be delivered across radio networks, not fixed broadband. On a conservative working assumption that around £250 billion of the ceiling is mobile-dependent and £150 billion is realisable through AI in controlled fixed-network environments, the mobile-dependent pool represents approximately £29 billion per year in annual GVA terms, using the government's own IMF reference of £47 billion average annual GVA. [8]This split is a modelling assumption, not a measured fact, and the true figure will depend on how AI adoption unfolds across sectors. But on any plausible variant of this scenario, poor mobile infrastructure puts between £18 billion and £29 billion of annual GVA at risk — an illustrative value-at-risk range, not a precise estimate, but one that is robust to reasonable changes in the underlying assumptions. Even the lower bound exceeds the UK's entire annual science budget. No other single policy decision in this consultation approaches that order of magnitude.

5 *See: https://www.mobileuk.org/news/three-research-poor-connectivity-is-costing-british-smes-ps18-77bn-a-year*

6 *See: https://www.gov.uk/government/publications/independent-research-on-the-economic-impact-of-cyber-attacks-on-the-uk*

7 *Fortune August 2025: https://fortune.com/2025/08/18/mit-report-95-percent-generative-ai-pilots-at-companies-failing-cfo/*

8 *Prime Minister's statement January 2025, citing IMF estimates: https://www.gov.uk/government/news/prime-minister-sets-out-blueprint-to-turbocharge-ai*

5

The Role of Government in Changing the Trajectory of UK Mobile Infrastructure

What needs to be different in DSIT's approach for the next ten years is driven by the Minister's statement that **"a world class connectivity is not optional, it is essential."** This requires a significant uplift of mobile infrastructure.

With sufficient focus, aligned with MNO's commercial interests, DSIT can successfully drive the UK's Mobile Infrastructure towards it becoming the world's most trusted AI service delivery infrastructure from Cloud to Smartphone.

Such focus does not mean neglecting other ACT research and development topics where the UK excels — it means focus DSIT's effort on where the UK can rapidly translate these efforts into live networks. This is addressed in the next section.

> **"A world class connectivity is not optional, it is essential."**

6.1 The 600 MHz Spectrum Opportunity

Digital Terrestrial TV broadcast audiences are in structural decline. The BBC Director General has publicly signalled that IP switchover in the 2030s is the right direction. The BBC MUX-B multiplex licence renewal decision in 2030 is the first formal inflection point at which the UK can signal its direction on the 470–694 MHz UHF band.[9]

The propagation physics of sub-700 MHz spectrum have distinctive properties that are directly relevant to the AI traffic challenge. Coverage radii are measured in kilometres rather than hundreds of metres, dramatically reducing handover frequency and the jitter spikes that handover events introduce. Building penetration losses are measured in single-digit decibels, providing more reliable indoor connectivity without small-cell densification. Channel conditions change slowly relative to wavelength, producing inherently more stable and predictable transmission characteristics.

This submission proposes that DSIT evaluate the 614–694 MHz portion of the Digital Terrestrial TV band specifically for a dedicated AI quality-of-service overlay layer — spectrum allocated with licence conditions specifying bounded latency, reliability, and security requirements rather than speed maximisation. This is not a conventional broadband capacity auction. It is the creation of a network layer architected from first principles for the traffic characteristics that AI service delivery requires. No other major nation is so well positioned to make this decision on this timeline.[10]

“Any AI infrastructure designed today must be secure through to at least 2045...”

6.2 Post-Quantum Security as the Foundation

Any AI infrastructure designed today must be secure through to at least 2045, when the first 6G networks will reach the end of their operational lives. This creates an urgent requirement that is not yet adequately reflected in mobile network policy: post-quantum cryptography (PQC) by design.

The “harvest now, decrypt later” attack strategy — in which adversaries capture encrypted network traffic today for decryption once quantum computing capability is available — is already being executed by state-level actors against UK infrastructure. NCSC has significant PQC capability through its involvement in the NIST standardisation process that produced the CRYSTALS-Kyber and Dilithium algorithms. The requirement that all government AI services deployed over UK mobile networks must meet NCSC PQC standards from point of service launch — rather than retrospectively — creates both a national security foundation and a competitive differentiator for UK-hosted AI services in international markets where sovereign trust is a procurement criterion.

There is a need to ensure that PQC for wireless is prioritised; algorithms which efficiently work within the latency, computational and energy use limitations of future mobile networks.

[9] University of Surrey White Paper on the future of DTT Spectrum

[10] *There is no feasibility issue using 600 MHz band as it is already used for mobile in other parts of the world and staying on globally standardised technology road maps will ensure a low entry barrier.*

6.3 Controlling Life Critical Infrastructure

As mobile networks evolve toward agentic AI-driven autonomous management, a new research frontier opens that is directly relevant to the UK's trusted AI delivery mission. AI-managed networks introduce failure modes that differ fundamentally from those of deterministic rule-based systems — individual components may each behave correctly while their interactions under stress produce outcomes that were never designed or anticipated. Understanding, modelling and mitigating these emergent behaviours in mobile networks that carry AI services across healthcare, emergency services and public administration is precisely the kind of applied research that connects directly to national security and economic outcomes. For example, a key area of research and development is technology to ensure that the data used by AI systems to manage networks is trustworthy, a specialism beyond an 'LLM' to a 'LNM', a large network model. It is also research where the UK's combination of 6GIC technical capability, its MNO members and NCSC security expertise creates a genuinely distinctive national position.[11]

6.4 Net Neutrality

There is a public interest case for changes to net neutrality regulation to allow block exemption for bundled offerings of AI Compute and secure reliable mobile connectivity "as a service" so this can be given preference over consumer entertainment driven traffic loads.[12] There is also a compelling national security case. The NCSC's 2025 Annual Review records a 129% surge in nationally significant cyber incidents against UK infrastructure, with Russian state-aligned actors explicitly targeting the UK in retaliation for support of Ukraine — the NCSC's own term for this activity is 'hybrid warfare'. Current net neutrality rules make no distinction between AI inference traffic serving NHS clinical decisions and DDoS traffic generated by NoName057(16) — a Russian hacktivist group the NCSC named in January 2026 as actively attacking UK critical infrastructure. This is the burning platform case for a net neutrality block exemption for AI traffic of economic and public service importance: this proposal is not addressing a theoretical future risk but a documented present one, and one that no responsible government can continue to ignore by treating all traffic as equal.

> **"The NCSC's 2025 Annual Review records a 129% surge in nationally significant cyber incidents"**

6.5 From Strategy to Infrastructure Delivery

There is much to be added to translate the proposed vision into an infrastructure delivery plan: for example, eco-system alignment, business and operating models. That is something best addressed by those experts in government infrastructure industrial strategies.

[11] *Global Coalition on Telecommunications (GCOT) principles for 6G were announced at MWC 2026 and may provide a route through to global influence.*

[12] *It needs to be a block exemption as case-by-case regulatory approval would be far too slow and too costly to create a functioning market.*

7

Delivering the Mission: Technology, Research and Funding

7.1 The 6G That the UK Needs

6G will emerge as a family of standardised technologies, as 5G did, with market conditions determining which is deployed at scale. The relevant question for the UK is not which 6G architecture is technically most ambitious, but which architecture best serves the reliable, secure, scalable AI service delivery mission. This also defines the UK's global diplomatic mission — to find allies sharing the same goal.

6GIC research, informed by engagement with the UK's three mobile network operators, supports the evolutionary sub-6 GHz path as the right choice for the UK.[13]

This path anchors 6G capability on the existing site estate — substantially already built through 4G and 5G rollout — adding capability rather than replacing infrastructure. It avoids the energy cost escalation associated with upper mid-band densification, which would require doubling the UK site count to maintain equivalent coverage at higher frequencies. And it delivers the network quality characteristics that AI traffic requires.

The energy dimension deserves specific emphasis. The UK's mobile network operators currently spend approximately £400 million per year on electricity. Analysis of the energy implications of different 6G architectures suggests that upper mid-band densification combined with softwarised, disaggregated network infrastructure could drive that bill to £1.5–2.0 billion by 2035. This is before accounting for the energy requirements of GPU compute co-located at cell sites, which the more architecturally ambitious 6G visions require. The evolutionary path, by contrast, maintains a broadly stable energy cost trajectory.[14]

7.2 Mobile Connectivity Research has become Sub-Critical and Disconnected

To be a global leader in AI delivery, the UK must sustain a critical mass of mobile connectivity research to:

- **Shape global technology standards.**
- **Make informed, high-stakes infrastructure buying decisions.**
- **Secure innovation in how technologies are integrated into secure, optimized architectures.**
- **Sustain the UK's technical expertise talent pool**

The research base for the mobile connectivity segment is currently under structural pressure from both sides: MNOs are spending less on research in this area under funding pressures. But this is not just the usual ask for more money.

For high payback from investment in research, there must be an institutional scale-up bridge in place between applied research and market application. That does not exist.[15]

[13] *See: Advanced connectivity technologies: a reset Vision to support industry and policy priorities, University of Surrey, 2025*

[14] *There must be a long-term settlement between the Government, Ofcom and the mobile network operators to resolve the trade-offs between keeping consumer prices low, the government goals (low congestion and improved coverage) that drive up energy consumption and the government net zero goals. The numbers must add-up at the end of the day if there is not to be a repeat of running down the MNOs capacity to invest.*

[15] *Opportunistic bridges exist through spin-offs; they generate successes but there is an historic systematic UK scale-up failure.*

7.3 New Research Funding Approach that Matches the Speed of the Global Superpowers

To be world class in the architecture and security of trusted AI Delivery Platforms requires such innovation to be viewed as a "race". Winning that race requires a radical new approach to funding university applied research that features precision industry-led targeting, low processing overheads, fast speed to engage and means to rapidly flex as technologies and threats move on.

- **Base Funding:** Allow Mobile Network Operators (MNOs) to repurpose **£5 million** of their Annual Licence Fees to fund UK university research specifically tied to DSIT's chosen goal (the goal emerging from our analysis is **Trusted Secure AI Delivery platforms**).
- **Matching Incentive:** For every further £1 of private MNO money spent, the Treasury should allow an additional **£3** offset of licence fees[16] (subject to an annual cap).

This creates an affordable, low overheads, high-performing and high payback research funding model:

- It delivers the missing institutional connection between applied research and commercial deployment, through the procurement and commercial arms of the MNOs who co-fund it.
- It is self-managing (low DSIT headcount impact).
- Creates a "collaborative incubator" between Government, MNOs, and Ofcom, that facilitates informed innovation supporting regulation to emerge organically.

This should sit alongside the continuing need to fund long term "pure" research across the spectrum of mobile connectivity to be fully informed of all directional trends. Such other research funding needs close DSIT/UKRI cooperation to ensure Research and Innovation funding (inc. Horizon Europe) maximises market impact.

The proposal must explicitly include funding to strengthen the UK's representation in European and global standards bodies. Standards influence is the form of supply-chain leverage that generates the broadest and most durable economic returns.

The funding levels proposed have been set low enough for DSIT to absorb within its overall AI research budget capacity and justified on the basis that directly supports the aims of the AI Opportunities Action Plan.[17] It plugs a critical weakness in the current action plan, as the business case in Section 4 demonstrates. It can be up and running quickly as MNOs already have contract relationships with several UK universities.

[16] *At least a £1 to £3 ratio incentive is likely to be needed as research has become such a low priority for MNOs that are all under extreme cost cutting pressures.*

[17] *AI Opportunities Action Plan*

8 Conclusion

The recent history of UK technology policy is a history of being present at the creation and absent from the scale-up. The timely opportunity this consultation represents is to make the creation-to-scale-up connection explicit and to align mobile infrastructure policy with the UK's AI deployment ambition. The prize is establishing the UK as the world's most trusted environment for AI deployment — the place where AI works reliably, securely, and efficiently across public services, regulated industries, and everyday life. Countries that achieve that will lead the next phase of AI. The UK has the research base it needs. That just needs to be coupled into a market-led governance of aligned interests along the lines we propose.

5G INNOVATION CENTRE

UNIVERSITY OF SURREY

University of Surrey — 6G Innovation Centre
April 2026
Submitted in response to
DSIT Mobile Market Review Consultation

UNIVERSITY OF SURREY