Department of Digital, Culture, Media, and Sport's
Wireless Infrastructure Review:
Call for Evidence

Response from Mobile UK

December 2021

About Mobile UK

1. Mobile UK is the trade association for the UK's Mobile Network Operators (MNO) – EE, Virgin Media O_2, Three and Vodafone. Our goal is to realise the power of mobile to improve the lives of our customers and the prosperity of the UK.

2. As mobile increasingly becomes the device of choice for running daily life both at home and at work, customers want improved coverage and greater capacity. Mobile UK's role is to identify the barriers to progress and work with all relevant parties to bring about change, be they Government, regulators, industry, consumers, or citizens more generally.

Introduction

3. Mobile UK welcomes the opportunity to respond to the Department of Digital, Culture, Media, and Sport's Call for Evidence for its Wireless Infrastructure Review. This is the first step in an extremely important piece of policymaking that should set the UK on track for the investment needed to build world-leading mobile/wireless digital infrastructure.

4. The Review is both timely and urgent to deliver the policy changes which will support the investment in connectivity needed for the UK to support the emergence of the 5G ecosystem. Without the policy changes, there is a significant risk that the UK will not realise the full potential of 5G.

5. Mobile UK fully endorses the Government's commitment to making the United Kingdom a global leader in digital connectivity. We stand ready to assist in working in partnership to achieve this goal.

Mobile UK - Summary of Response

- Mobile networks are critical national infrastructure, which underpins economic prosperity, national resilience, inclusivity, and the path to Net-Zero.

- The public mobile networks, which currently support over 94 million connections, will remain the mainstay of the mobile ecosystem, with over £2 billion invested annually by mobile network operators in new coverage, capacity, and capability.

- The focus of this Review must be to **support investment in mobile connectivity, remove barriers to deployment, and ensure fair and proportionate regulation across the value chain.**

- Expanding mobile connectivity through encouraging investment is the key to delivering a successful 5G ecosystem.

- Infrastructure costs remain high as mobile networks are investing heavily in their 5G networks

while also extending 4G mobile broadband coverage to 95% of the UK's landmass. Removing barriers to deployment through planning laws and the Electronic Communications Code are key areas for reform.

- Consumer prices in the UK are extremely competitive, and that interventions to drive down prices further can exacerbate an already challenging investment climate.

- New business models and value chains are emerging (such as private networks and new models of deployment). The regulatory framework must be coherent, proportionate, and fair across the value chain, both horizontally and vertically (for example – in relation to telecom security, net neutrality, and smart data). It is bad for investment if the public networks are disproportionately targeted by regulation.

- Any public sector interventions must complement and/or work alongside private capital; it should not be a substitute for or crowd it out. The industry welcomes the example of the Shared Rural Network, which represents a collaborative approach to achieving the shared goal of extended rural coverage.

- The public sector, led by the national Government (for example, in health, transport, and education), should exploit its position as a significant customer and procurer and adopt digital technologies to take advantage of the connectivity provided by the private sector public mobile networks. This stimulates demand, encourages innovations, and allows public services to be delivered more efficiently.

- Fiscal or other incentives could encourage SMEs to adopt more digital/mobile connectivity to improve productivity, particularly if this assists with achieving net-zero objectives.

Mobile Communications – Context

6. The Government rightly recognises that mobile communication is part of the nation's critical infrastructure and is integral to people's personal and working lives. This was accelerated by the pandemic and has not diminished since. In summary:

- 98% of adults in the UK have a mobile phone, and there are currently 94 million active connections.

- Digital infrastructure, of which mobile is a key component, is estimated to contribute each year around £33 billion to national Gross Value Add (c.1.8%)[1].

- The Covid-pandemic starkly demonstrated how essential it has become. Mobile connectivity alone is estimated to have safeguarded about 20% of UK business during the first lockdown period, equivalent to £205bn of economic output that would otherwise have been lost.[2]

- Usage of mobile data across a broad range of applications is growing rapidly. (each customer consumes an average of 4.5Gb per month – up from 500Mb in 2013[3].

- Mobile operators are investing £532 million into rural coverage as part of its joint £1 billion Shared Rural Network initiative with the UK Government to extend 4G mobile broadband coverage to 95% of the UK's landmass.

- Mobile operators are investing over £2 billion per annum in new capacity, coverage, and capability.

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[1] DCMS, Connected Growth: A manual for places
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/808980/Connected_Growth_Manual.pdf
[2] O2, https://news.o2.co.uk/press-release/20-of-uk-business-safeguarded-by-the-power-of-mobile-connectivity-during-lockdown/
[3] Ofcom, Communications Market Report 2021

- 5G coverage is now available in more than 385 towns and cities across the UK. It is expected that operators will meet the Government's ambition of reaching the majority of the population by 2027.

- Mobile Network Operators, as companies themselves, represent an important sector within the economy, directly employing over 30,000 people. They are also investing in and maintaining a strong position in the high street with over 1,800 retail stores across the UK.

Mobile UK Response to the Call for Evidence

7. **Question One:** **What wireless connectivity will the UK require by 2030 in order to support the needs of consumers, businesses, and public services? Please consider the type of wireless connectivity as well as the geographic or sector-related coverage, quality and capacity that will be required.**

8. The major goal for the Wireless Infrastructure Strategy should be to spread coverage and capacity as far as is useful so that there is widespread access to connectivity (being a combination of coverage and capacity).

9. The UK's public mobile network operators, with currently 94 million connections, working in competition and attracting private capital to deploy 4G and 5G networks on a very wide scale, will continue to be the mainstay of the UK's mobile ecosystem.

10. Widespread connectivity will support the UK Government wider policy agenda of 'levelling up, improving public services, speeding up the UK's path to net-zero by 2050 and building a prosperous and inclusive society.

11. The public networks will be complemented with privately funded private networks, such as emerging examples at ports. Users of such facilities, if relevant or required, will enter commercial arrangements to connect to the public networks when out of range of the private networks.

12. Where there is a social or public benefit need that cannot be fully met through a commercial model, Governments (national, devolved, or local) should look to provide public funding in a targeted way to supplement private capital. Such initiatives should be developed in conjunction with and in collaboration with the industry to achieve shared outcomes more effectively. The industry strongly supports the example of the Shared Rural Network, which brought together £1billion of public and private investment to extend mobile coverage to remote and rural areas of the country. Public funding should not be used to displace or crowd out private capital; that would be very counter-productive.

13. **Question Two:** **What are the applications and future requirements that will drive this demand? For example, to what extent will sectors like transport, education and healthcare rely on the availability of wireless connectivity in 2030?**

14. The mobile sector is principally a market-based model, so the extent to which future applications can or should be predicted is limited. Indeed, there is a risk that an overly deterministic approach by the Government could hamper the emergence of new applications and business models. Over the last 40 years, the mobile market has been very innovative (often unpredictably so) while delivering positive consumer outcomes, economic gains and widespread social benefits (including universal access to telephony).

15. The public sector (such as transport, education, and health/social care) should adopt digital technologies that take advantage of the connectivity offered by 4G and 5G technologies.

16. As part of this review, the Government should consider how it can better utilise the public sectors as a key customer and procurer of digital connectivity.

17. The public sector, as a customer of the private sector public networks, would have a very positive impact on building the 5G ecosystem, creating a positive feedback loop (more demand for 5G drives more coverage, which in turn brings more applications into play; scale drives down costs).

18. The Government has also positioned climate change mitigation as an urgent policy priority. Mobile technology, both 5G and existing technologies, will play a key role in facilitating sectors and industries to meet the UK's carbon reduction targets. Government policy should incentivise businesses to adopt mobile/wireless technologies to aid carbon reduction.

19. By way of background, Mobile UK's report *Connectivity and Climate Change* suggested that mobile technologies could reduce emissions in four key sectors by as much as:

- Energy emissions could be reduced by as much as 1.7 billion tonnes of CO_2e between 2020-2030

- Transport emissions could be reduced by 6.6 - 9.3 million tonnes of CO_2e annually

- Manufacturing sector emissions across all G7 countries combined could be reduced by 182 million tonnes of CO_2e by 2035

- The agricultural industry could reduce emissions by 1 million tonnes of CO_2e by 2035.

20. **Question Three: What wireless connectivity is the market on track to deliver by 2030 in terms of geographic coverage, quality, capacity.**

    a - How far will 5G coverage extend by 2027?

    b - To what extent will network capacity keep up with increasing consumer demand for data and network capacity or will the quality of experience vary in certain environments?

21. Mobile operators expect to meet the Government's ambition to extend 5G coverage to the majority of the UK's population by 2027. At least one mobile operator has already stated this publicly. Each operator has or is in the process of setting out their own targets and strategies for network deployment.

22. Concerning capacity, the growth in mobile data traffic in the last ten years has been very marked and rapid. Network capacity is more of a constraint on usage than customer demand. According to an ITU forecast, there are many forecasts for the future, and considerable further growth is expected – perhaps another 100 times in the next ten years[4].

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[4] https://www.researchgate.net/figure/Global-mobile-data-traffic-forecast-by-ITU-Overall-mobile-data-traffic-is-estimated-to_fig1_331159423

Growth in mobile data traffic (Gb usage/user per month)
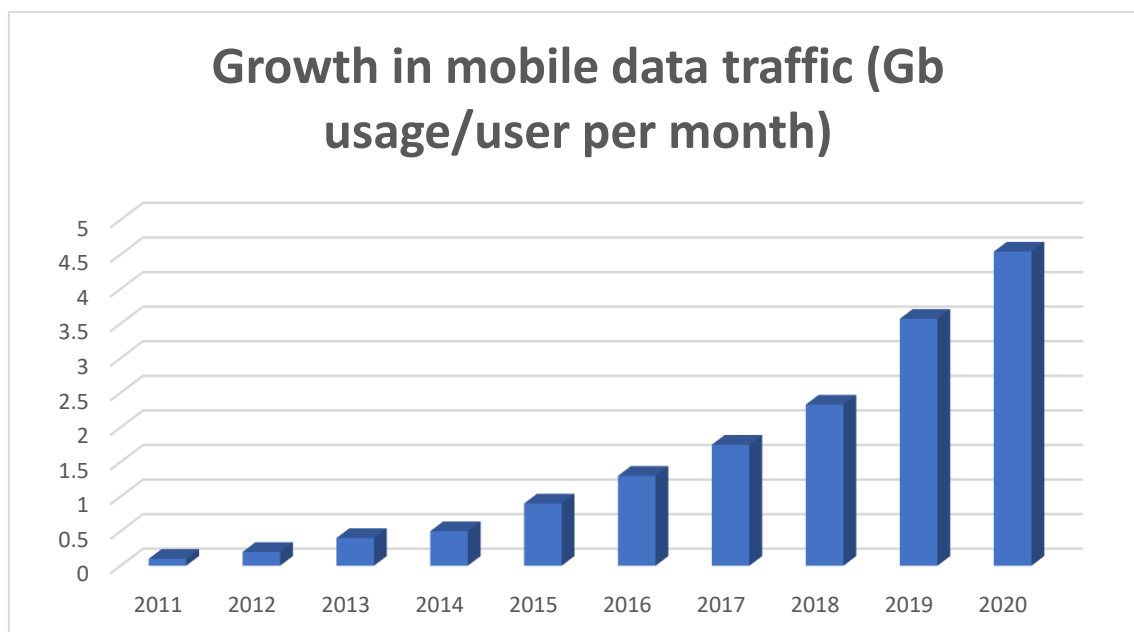
23. While operators are financially motivated to ensure this is done efficiently (re-farming spectrum, 5G being more spectrally efficient than earlier generations, for example), Ofcom's timely release of new bands are aligned internationally as far as possible, will be necessary to cope. Mobile operators will remain very closely engaged with Ofcom on this subject.

24. Within the scope of future spectrum policy, the future of spectrum pricing will have to be considered. While there needs to be some way ensuring a fair allocation of spectrum and of promoting the efficient use of spectrum, setting what amounts to an additional tax for the use of the airwaves reduces the funds available for investment in infrastructure – approximately £10bn since the £22bn 3G auctions in 2000. This policy work will be an important element of the Wireless Infrastructure Review.

25. For the shared rural network programme, the Government has essentially recycled 2½ years of spectrum fees and leveraged £532m of private sector investment. This multiplier effect means that UK plc would benefit far more if spectrum fees were used to achieve policy objectives such as SRN in our sector than for general public expenditure.

c - How will the market for wireless connectivity for businesses and the Internet of Things and machine-to-machine communications develop?

As discussed earlier in this document, the development of wireless connectivity and the Internet of Things should be led by the market; however, there is a role for the Government and the public sector to assist both as a significant customer and procurer but also through the testbeds and trials programme.

26. **d - What roles are non-mobile technologies likely to play in the provision of advanced wireless connectivity? These could include such as satellite, fixed wireless access and Wi-Fi (public and indoor) networks.**

Mobile operator responses only

27. **Question Four: What data sources should be used to report 4G and 5G coverage in the next reporting periods?**

a - How should 'good' wireless connectivity, and specifically 5G, coverage be defined?

28. This is a question that will have to be looked at in some detail, so it is not practical to provide a

definitive answer. 'Good' means fit for purpose, and comparing the rich feature set of 5G (low latency, high reliability, network slicing, high throughput speeds) will not be straightforward.

29. Going forward, it will be a matter for the regulator to derive a relevant and economically sustainable set of measurements to the market. It is perhaps not a matter of strategic importance to the WIR.

30. **Question Five: How might the market structure for wireless connectivity services change over the next decade and what impact would these changes have on investment in wireless networks?**

31. **a - What effect are existing and projected revenue streams and predicted returns likely to have on operator investment plans?**

32. Revenues in the UK mobile market are currently flat, as they are in many other markets worldwide. The UK also has some of the most competitively priced services in the EEA. Lack of revenue growth is a major contributor to the high cost of capital for building connectivity. Unless resolved, this will be to the detriment of the wider 5G ecosystem.

33. While there are many opportunities to develop new revenue streams, Mobile UK emphasises throughout our response that a much more supportive investment and regulatory environment for building connectivity will be the key to building a successful 5G ecosystem for the benefit of the whole economy.

34. **b- Is there an opportunity for new market entrants?**

35. Yes – at all points in the value chain, with many new business models emerging. The mobile operators/Mobile UK are engaged in several ways, principally through the actions set out the Diversifications Strategy, in bringing these about.

36. The mobile operators have also been working on Joint Operator Technical Specifications (JOTS) for new deployment models such as neutral host. The JOTS for neutral host in-building has been published on the Mobile UK website[5]. Drafting work is underway for 5G, and outdoor neutral host JOTS variants.

37. **Question Six: How can the regulatory and policy framework best continue to support the development and deployment of wireless infrastructure? Please provide specific, evidence-based suggestions.**

38. The UK currently enjoys an early mover advantage with 5G (although other nations are launching 5G and catching up), with the technology already deployed in over 385 towns and cities across the country. Major upgrades are still required across all mobile networks, both for 5G and existing 4G networks, in an investment environment for MNOs (Mobile Network Operators), which is incredibly challenging.

39. While 5G offers many opportunities for developing new revenue streams (such as connecting more devices and adding value beyond mobile connectivity), new industrial and consumer uses are as yet undetermined.

40. Policy and regulatory changes, such as the UK Government's decision to remove certain vendors from the market, have added additional financial pressure on the industry.

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[5] https://www.mobileuk.org/jots

41. Consumer interventions (such as the ongoing implementation of the EECC and the smart data project being discussed) in a market already acknowledged as one of the most competitive in Europe with some of the lowest prices continues to impact margins and profitability.

42. Competition for capital is intense and should not be viewed from a purely UK perspective. The UK competes on a global scale to attract investment, and indeed companies within the UK have global reach and must decide where to invest. Investors must have a reasonable prospect of a positive return on capital to provide the necessary finance to match the UK's ambitions.

43. Mobile operators, therefore, face a difficult investment environment where sufficient returns are hard to achieve and which, if not addressed, puts the UK's 'advanced guard' position in jeopardy.

44. Access to finance

45. Access to capital is the key challenge. The competition for capital is intense – allocation to country, sector and asset class (connectivity provider, tower provider, etc.) are all contested vigorously. Investors must have a reasonable prospect of a positive return on capital to provide the necessary finance.

46. Other challenges, such as regulation, access to land, and spectrum, are discussed more fully below.

47. A coherent plan for addressing these issues will be a key success factor for building a thriving mobile ecosystem in the UK.

48. **a - How can government encourage continued investment and innovation in wireless networks?**

49. As set out in the responses above, the investment environment is challenging. To a very large extent, it will be the responsibility of the mobile operators to develop strategies and business models that will justify investment in wireless/mobile networks.

50. That said, the operators face several challenges where the Government/regulators can encourage continued investment and innovation by removing barriers (or exercising forbearance in imposing them.) The regulatory requirements must be fair across and up and down the value chain. There should be no situation where public network operators are subject to regulation and compliance costs that unfairly put them at a disadvantage to other market actors (for example, telecoms security, net neutrality, spectrum pricing and/or open data requirements). This is bad for investment.

51. The challenges to which we refer (and expand on in answer to later questions) include:

- Build-ups of monopolistic power in the value chain
- Regulation (a consistent, proportionate, and predictable framework)
- Overcoming the practical challenges of network deployment (fiscal, planning, access to land, availability of power, micro 'not-spots)
- Network capacity (spectrum availability)
- Getting to carbon neutral (mobile networks)
- Security
- Skills
- Technology evolution (R&D, standards-setting process)
- Public sector interventions (timing, purpose, process etc.)

b - How can government encourage continued take up of wireless networks by businesses

and consumers?

52. For the most part, take-up will be driven by market forces and providers identifying and meeting unmet needs. The Government is nonetheless correct to consider this question as part of the WIR.

53. For example, SMEs do not always adopt digital/mobile technologies that would improve productivity in their respective businesses – or even help them adopt green technology. Lack of confidence and know-how can be a barrier.

c - Is the current regulatory framework, including on spectrum, suitable to support new competitive models?

54. No. We respond to this question in our responses to Q7

d - How can government support the deployment of energy-efficient wireless networks?

55. The Government can support the transition to energy-efficient networks by working with the mobile sector to retire 2G and 3G networks. This will require good coordination with consumers, businesses, and Government departments to ensure that all customers work to a common upgrade path and well-understood deadlines.

56. Each generation is more energy-efficient than the last, and 5G is the most energy-efficient network yet.

57. The industry is working to mitigate this increased energy use by increasing energy production from renewable sources within their operations. Mobile operators have also made significant commitments to reaching net-zero.

58. **Question Seven:** **What should government consider when designing a policy and regulatory framework to support the development of new wireless technologies?**

59. **a - Is the current policy and regulatory framework suitable? If not, what changes are required?**

Network equipment

60. The Government has already recognised that the ban on installing Huawei equipment in the 5G network has led to an effective duopoly in network equipment supply. This issue is being addressed through the **Diversification Strategy**.

61. The MNOs agree that it is strategically important to have diversity and choice in the supply of network equipment and will continue to engage constructively in achieving the strategy's objectives.

Customer applications

62. On the customer side, it is estimated that a small number of platforms account for more than 70% of traffic carried over a typical mobile network. The organisations that net neutrality rules were originally designed to protect now wield considerable power and have both the ability and incentive to influence internet outcomes.

63. In our response to Ofcom's Call for Evidence, Mobile UK has highlighted this very large change in the Internet ecosystem in recent years. The large platform providers are much more likely to cause foreclosure in the market(s) for internet-based services than the internet access providers, and competition authorities should be alert to this risk and respond accordingly.

64. Given the change in market structure, Mobile UK has said that the outcome of the net neutrality review should be an inherently permissive regime, backed up by some basic safeguards to protect

free speech and ensure that all legal content is available for all.

Regulation (a consistent, proportionate, and predictable framework)

65. The success of 5G in the UK will depend on a healthy ecosystem of connectivity and applications. The more applications emerge, the greater the incentive to roll out further connectivity, thus creating a virtuous circle of growth and innovation.

66. To this end, it is essential to have a regulatory framework that stimulates investment in connectivity in a context where industry revenues have been flat in recent years. For the sustainability of the wider ecosystem, the prospective risk/reward from investing in connectivity must be as compelling as for the new applications. A return to revenue growth would go some way to achieving this.

67. While it is not productive to revisit previously settled issues, it must be recognised that regulation has been used extensively in recent years, with high compliance costs being incurred. It is now imperative that the regulatory framework is more proportionate and balanced across the value chain with a careful eye on the cumulative effect of regulation.

68. To support investment in mobile infrastructure, particularly 5G, we would like to see a prospective regulatory framework that:

- Has a greater bias against intervention

- Is more balanced in its incidence

- Recognises the opportunity cost of intervention

69. Mobile operators will want to pursue the revenue opportunities presented by 5G, differentiate themselves from each other and other competitors, experiment, pursue different strategies, and have the chance to do so on more equal terms to others in the value chain. Meeting compliance requirements has a significant opportunity cost that diverts scarce human resources and financial resources away from more value-added development activity and puts operators at a disadvantage, such as the 'hyperscale' platforms. In considering any further consumer interventions, regulators should exercise considerable forbearance and not put the regulated communications providers at any further disadvantage to those in other parts of the value chain.

Overcoming the practical challenges of network deployment (planning, access to land, fiscal)

70. Building out mobile networks is time-consuming and very resource-intensive.

71. There are currently around 37,000k sites (wholesale provider or operator-controlled). As the networks evolve, with 4G enhancements and newer 5G deployment, many more sites will be rolled out as the need to increase network capacity evolves—[Mobile operators will provide confidential estimates to DCMS on forecast numbers]. Even though estimates of very high numbers of small cells are exaggerated, the operators and wholesale providers face significant challenges in finding, negotiating, and building sites.

72. Mobile UK welcomes the proposed reforms to planning in England. We also await the Government's conclusions from its recent consultation on Electronic Communications Code reform. This is a vital piece of legislation determining code operators' rights to access, share and upgrade sites.

73. Mobile UK and the operators are also engaged with DLUHC on the future approach to business rates. We seek a predictable, fair system that does not act as a brake on investment. There is a strong case for business rates holidays on the new 5G infrastructure, as has been available for new

fibre rollout.

Security

74. All mobile operators and Mobile UK are fully engaged in implementing the Telecoms Security Bill, working closely with the government, Ofcom, and NCSC.

75. The UK's mobile operators have always treated security as a top priority and have an exceptionally good record in this regard. We urge that the requirements are proportionate to the identified risks, are consistent with Government's other policy ambitions (to be a leader in 5G, to diversify the supply chain) and that operators are given sufficient time to implement the requirements efficiently and that the tiering of requirements falls equitably and does not compromise the overall integrity of the interconnected telecoms ecosystem.

Skills

76. A further challenge the mobile industry faces is staff development in a context where it is constantly necessary to update skills and expertise. Mobile network architecture is going through profound change (cloud-based, edge computing, OpenRAN, AI-supported network management, etc.)

77. Mobile UK and other trade bodies are strongly advocating a formal review of the Apprenticeship Levy so that levy funds can be better used to train apprentices and so that staff can gain new skills. (For example, the Levy does not support career transitions - you can only use the Levy for people in roles which already involve the required capability/apprenticeship area).

78. Expiry of funds; 'use it or lose it' rule presents a loss of opportunity of not being able to divert funds to **upskill** outside of the levy regulations. A review of the levy rules is long overdue.

Public sector interventions (timing, purpose, process etc.)

79. The Government has set out an ambition to be a world leader in 5G, recognising that additional economic and social benefits can flow from being an earlier adopter of 5G across the economy and the general benefits of improving mobile connectivity.

80. As such, it has initiated the 5G trials and testbed programme. The Government has also initiated the Supply Chain Diversification strategy following the banning of Huawei equipment from the UK's 5G networks. The Shared Rural Network programme is a further example of significant public intervention.

81. The WIR must consider whether or what further public interventions will be required to provide connectivity and develop the 5G ecosystem where it is needed but where market forces are not likely to deliver.

82. Mobile UK's observation is that the main learning of the last ten years is that these interventions are most successful when Government/public sector work closely with mobile operators to design programmes that work for both parties (the Mobile Infrastructure Project v SRN being the main examples of how not to and how to execute successful public/private sector projects). Public sector investment should not crowd out private sector investment. For instance, we would be concerned if public funds were used to build 5G private networks, where the private sector could do this. Public funds should be weighted towards developing/procuring public sector applications (social care, telehealth, traffic management) that make use of the connectivity provided by the private sector.

The Public sector as a customer

83. While market forces should be the prime driver that determines the take-up of wireless networks,

there is ample opportunity for the government to support uptake.

84. In the first instance, the Government sits in a unique position as a significant customer to take a leadership position via its procurement. The public sector is in the midst of its digital transformation, where services and processes are digitised and/or moving to wireless solutions. The public sector can create significant demand that can encourage innovation and the availability of new services. Equally, as has been identified by several digital strategies, the uptake of digital and wireless infrastructure is expected to create significant productivity and efficiency gains. Further, wireless technologies and, in particular, the Internet of Things powered by 4G and 5G could also act as a key enabler to the Government's ambitions to reduce emissions.

85. Secondly, the Government can set a strong signal to the market through its national strategies to set ambitious goals for 5G uptake across several sectors by outlining the opportunities wireless infrastructure could provide. For instance, it has been suggested by the Government's own Future Communications Challenge Group that the UK GDP impact of mobile would be £112bn in 2020, growing to £198bn per annum by 2030.

   b - What spectrum is required for future wireless networks? Is the current spectrum management framework suitable for delivering this?

86. Please see our response to question 3b

87. **Question Eight - What can the UK learn about the development and deployment of wireless networks in other countries?**

88. *One of the features of the mobile industry – and, in this respect, it differs from other forms of critical national infrastructure- is that the underpinning equipment/architecture is in constant development.*

89. *Mobile UK welcomes the Government's expressed intent to support the standards-setting process more closely – where political engagement and convening power can complement the technical inputs strongly from mobile operators and other interested stakeholders. The WIR should set out more fully how this support will be put into effect.*

90. The Future Communications Challenge Group in 2017 suggested that if the UK seized the real chance to be a world leader in the development of 5G and played a key role in defining industry standards, 5G could help to support an estimated 5 to 6% of UK GDP per annum.6

91. International engagement is an important element in maintaining the UK as a leader in the mobile ecosystem.

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6 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/582640/FCCG_Interim_Report.pdf