Non-Confidential version

Ofcom's Mobile Market review

Vodafone's response to Ofcom's discussion paper on the Mobile Market

April 2022

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1. Executive summary

1.1 Vodafone welcomes Ofcom's review of its regulatory approach to mobile markets and strongly agrees with Ofcom that now is a very good time to take stock and consider the structure, competitive landscape, financial health and regulatory policies and frameworks that underpin how our sector operates. 5G represents a huge opportunity to enhance the productivity of the UK and transform the societal benefits that mobile technology can bring to the UK population.

1.2 We are very pleased that Ofcom has identified in its discussion document the main issues that are influencing and will influence how we can serve our customers - consumers and businesses. In this response we seek to provide evidence and sector insight as a UK mobile operator.

1.3 We commend Ofcom as being the first regulator across Europe to take a more holistic view of the mobile network access market and consider the wider mobile eco-system issues. That said, we believe some of Ofcom's observations and conclusions fail to recognise the extent of the issues in this market and the transformational role that policy and regulation could play.

1.4 Viewing the wider mobile eco-system as a whole, it is clear that other players extract huge value from the mobile sector. It is also clear that the value chain includes very powerful players that dominate bottlenecks. Yet for mobile operators, returns are below what investors expect. This has been driven by an increasing regulatory cost burden - regulation that restricts how we monetise network investment. Investors believe the regulatory framework systematically squeezes network access operators. There is strong evidence the issues facing the sector are becoming increasingly challenging for the operators that invest in UK infrastructure today. This is reflected in the financial indicators in the market; average ROCE is reducing and only above WACC for two operators, share prices have more than halved in the last five years, and industry analysts continuously identify investor issues.

1.5 However Vodafone believes things can be improved, the sector can return to health and in this regard there are four main areas where Ofcom can really play a role in creating a more sustainable industry able to deliver good outcomes for customers and the economy and society at large:

1.6 **Develop a pro-investment regulatory framework:** Investment should be at the heart of policy regulation. Every intervention or Ofcom workstream, from spectrum policy to consumer initiatives, should consider the impact it will have on enabling sector investment. Before regulation is implemented, Ofcom should carry out cost benefit analysis that consider the benefits of the intervention compared to the overall objectives for the sector, which should be strong innovative infrastructure investment. Any future market structure changes should be viewed through the lens of sector investment and network quality. Having high quality mobile networks is fundamental to consumer welfare and the value the sector can deliver for the UK.

1.7 **Reform spectrum policy:** Ofcom's approach to spectrum should ensure it is utilised by the sector in the most efficient way at the least cost to enable high quality mobile networks to be rolled out. Future spectrum auctions should be designed in a way that does not lead to unnecessarily high prices and avoids rules which deter efficient allocation as a result of misplaced and unjustified fears about collusion. Annual licence fees should be reduced; it is not necessary that they are based on historic spectrum values that are no longer relevant and do not drive the behaviour intended – spectrum efficiency. If Ofcom is concerned that reducing licence fees will simply increase sector profits and not be re-invested back into mobile networks, then fees could be replaced by a requirement to invest a given amount in network rollout (above an agreed baseline), so we're still incentivised to use our spectrum efficiently, but the funds don't leave the mobile industry.

1.8 **Tackling barriers to investment and network roll-out:** Alongside action from the Government on planning reform, ECC implementation, and business rates to support network investment, we need to learn the lessons of TSRs and ensure that as mobile becomes the network of last resort with copper retirement, there is a funding mechanism that enables investment in resilience. If we are to enhance mobile network resilience beyond the point where it makes commercial sense to do so in service of the public good, this burden cannot be expected to rest solely with mobile providers.

1.9 **Maximising the 5G opportunity**: Net neutrality rules should enable operators to monetise network investment and quality. Network investors need to be confident that they can have commercial charging structures that enable them to capture fair additional revenue from new products and services. Ofcom needs to ensure a level playing field with others offering Mobile Private Networks who can access cheaper spectrum, with a lower regulatory burden. Wide deployment of Mobile Private Networks by non mobile operators has the effect of undermining scale commercial roll-out of 5G; the higher profitability of these network access areas is required to offset the lower profitability of network access roll-out in other less economic geographies and to consumers. Minimum viable scale (MVS) is also an important issue in a full stand-alone 5G network. Ofcom must consider that the MVS increases with this technology evolution - regulatory and competition approaches must consider this in their assessments of market activity.

2. Market analysis:

2.1 As part of engaging with Ofcom and responding to this review, we have commissioned external studies to focus on key parts of the market. We commissioned Frontier[1] to study the mobile market in the UK evaluating whether quality 5G investment is likely given the current framework. We also commissioned Deloitte[2], together with the other UK mobile operators, to study the wider mobile eco-system.

2.2 We draw on these reports and our knowledge of the UK mobile industry as the longest serving mobile operator to make the following observations:

- Profitability in the sector is low at a time when the demand for services and investment is high
- Regulation, the mobile access sector structure, and the wider mobile eco-system are all placing a strain on sector health
- Future returns from 5G investments are more uncertain than previous generations

2.3 We go on to provide more detail on these three observations below. They are significant because without resolution via regulatory reform the UK will not meet the government's 2027 5G ambitions, meaning that customers and the economy will suffer.

Returns in this market are low

2.4 The mobile industry in the UK is highly competitive. Operators' revenues have reduced in absolute terms and unit prices have reduced over the last five years by 80%. At least half of the operators in the market make a return that is less than their cost of capital.

2.5 ✂ There are several reasons for this: intense competition in the market; the constant need for network investment; regulatory costs; and revenue accruing to other parts of the value chain - as the tech giants and OTT operators both monetise our traditional revenue flows (messaging and communications) and capture new revenue streams. As a result, we have borrowed more, our share price has decreased, and we are capital constrained.

2.6 Ofcom conclude that the current return on capital employed (ROCE) for the sector ranges from 5.5% to 10%. However, these are average figures and include two operators with higher ROCE and two operators with lower ROCE. These values are based on what Ofcom term an 'economic' ROCE methodology and an 'accounting' ROCE methodology. We explain and expand on Ofcom's analysis in annex A, we show that Ofcom's 'economic' ROCE calculation is systematically biased towards producing

[1] Frontier Report 1 - Supporting investment in the UK mobile market

[2] https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/financial-advisory/deloitte-uk-future-of-the-uk-mobile-value-chain-feb-2022.pdf

higher results. We demonstrate that a true average 'economic' ROCE would be below the sector weighted average cost of capital.

2.7 We also show in annex A that the share price of the two listed telecoms companies in the UK has more than halved in the last five years and that there is consensus in the analyst community that returns in this sector are below investor expectations and that the financial health of the sector is poor.

Increasing demand for services

2.8 As discussed in Ofcom's document[3] on average the amount of data consumers use has increased over three and a half times in five years and the average prices paid have reduced by about 22%. This means that the unit costs for data, messages and calls has drastically fallen. The demand for data is likely to continue to increase with most estimates agreeing that doubling every two years is a likely scenario.

2.9 The pandemic has brought into sharp focus just how dependent we all are on our communication infrastructure. Large parts of the economy, households and public services are increasingly dependent on continuous connectivity, making the impact of network failure ever more significant. The disaster recovery and business continuity plan of most organisations (public and private) will all assume some reliance on communication infrastructure to function.

2.10 The migration away from copper to fibre in fixed networks brings the UK into the 21st century and enables a gigabit society. However, it makes communications services more vulnerable to power outages and will increase reliance upon mobile networks to fulfil the role of 'Network of Last Resort'. While the legacy copper network maybe more vulnerable to weather events and offer lower bandwidths compared to fibre, it has the advantage of being able to function independently of grid power for an extended period. Copper switch off removes this power independence as fibre relies on mains powered equipment in every property. This means that mobile networks, by default, will pick up the role of network of last resort.

The burden and restrictions of regulation

2.11 The ongoing burden of very significant spectrum costs through auctions and annual licence fees (Vodafone £), represents a huge drag on the industry. Consumer regulatory interventions have cost considerable sums to implement and foreclosed valuable revenue opportunities without proper consideration of the adverse impact on future industry investment. And net neutrality rules constrain the freedom of network providers who compete in an aggressive retail market, while leaving large Internet platforms unregulated and able both to monetise and predetermine the scope of end user experiences on the web, without providing any incentive to use network resources efficiently. We discuss these further below.

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[3] Ofcom's discussion document (Discussion paper: Ofcom's future approach to mobile markets), paragraph 1.9

The cost of short-term consumer regulation

2.12 Vodafone calculates that well-intended, but insufficiently targeted consumer regulatory interventions have resulted in a ✂ economic hit to Vodafone. This regulation has cost considerable sums to implement and foreclosed valuable revenue opportunities without proper consideration of the adverse impact on future industry investment or delivering demonstrable consumer value. [4]

2.13 The last 5 years have seen an unprecedented level of consumer intervention by Ofcom; a substantial list encompassing all aspects of customer onboarding, lifecycle management, switching and additional services such as roaming. These include the early implementation of specific requirements under the European Electronic Communications Code (EECC), which appears at odds with Ofcom's obligations to act proportionately and only in cases in which action is needed.

2.14 Ofcom at times fails to recognise that what it regards as minor changes in the interests of consumers often result in costly developments that in reality serve only a very small number of customers, whilst diverting resource away from more beneficial investment for the majority of customers (e.g., network coverage), or results in one set of consumers inappropriately subsidising another (e.g., Roam Like at Home where wealthy roaming customers were effectively subsidised by consumers unable to afford to travel).

2.15 For example, in implementing the requirements of the EECC, Ofcom relied on the principle of maximum harmonisation to avoid its usual meticulous approach to detailed cost benefit analysis. This has resulted in additional interventions and amendments whose implementation has not been considered in depth in their own right but as an aggregate of wider policy. The 'right to port' is a case in point. Vodafone has spent ✂ to implement changes necessary to enable mobile customers to port their number up to 30 days after cancellation. This went live to Vodafone customers in November 2020, is publicised alongside other porting information, and by mid-February 2022 had been used on only 0.02% of Vodafone ports.

2.16 In a similar vein the introduction of a mobile switching code for customers wishing to use the switching process but not move their number (STAC) is redeemed in less than 10% of the occasions it is actually generated, which is itself a small number (see below). Another example is where regulation has specified the type of colour background invoices should be sent on. Notwithstanding the initial system set up costs, these incur ongoing costs of ✂ per letter for transactional mail and ✂ per letter for loan collection letters.

2.17 The EECC measures are also indicative of the disproportionate burden operators face when regulation becomes overly interventionist and complex. A very small percentage of consumers may benefit in a very small way from some of the measures, but implementation has disrupted the entire end to end processes for companies without any form of cost benefit analysis and this has indirectly had a negative

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effect on all customers. Such holistic cost benefit analysis that considers the full impact of intervention should be fundamental to regulatory intervention. As illustrative examples:

- Sales and on-boarding: Pre-contract summaries.
  A simple form requiring a major overhaul of every customer journey; requiring digital redesign; retail store processes to be revisited and telephone scripts, processes and supporting systems to be radically altered. The information required then must be sourced from multiple back-end databases to feed into a single document. All of which is a substantial drain on IT resource and cost, even before the cost of increases to average call handling times and subsequent additional agent costs are understood.

  It remains to be seen whether consumers will ever use pre-contract summaries as the comparative tool that Ofcom envisaged.

- Cancellation and a customer leaving: Auto Switch
  Despite only being introduced in 2018, Ofcom now requires changes to the information provided to switching mobile customers, including the losing provider giving information about "which communication services will be unaffected by the switch". The rationale being that "customers who have other communications services with their losing provider may need to contact them for further information about the status of their other services following their switch, which could potentially lead to hassle and delay."
  This is symptomatic of a tendency to introduce rules overly based in the "now" and without thought as to longevity or wider context. Policy decisions relating to fixed switching and a desire for common approach drove the change above, rather than customer need. This lack of co-ordinated approach is costing Vodafone ✂ to deliver auto-switch information changes where customers may not even want the information. And demonstrates why impact assessments are so vital.

2.18 Vodafone has finite and limited resources and development capacity. A major regulatory undertaking takes up significant space in our monthly IT and development delivery drops, which cannot then by used for other investment, whether in customer service, improved products or to bring network improvement initiatives. Consumer benefit starts with the provision of coverage and service, and the last five years have seen a fundamental shift in consumer experience as 4G has comprehensively replaced 3G and we are now introducing 5G. As data usage has been unlocked for consumers, Vodafone invested in new and innovative products. These products deliver consumer benefits in response to competition as much as regulation, such as Vodafone's Unlimited speed-tiered tariffs, our Evo product which splits handset costs from airtime in a flexible manner allowing customers to manage their costs and removing any end of contract 'loyalty penalty', and the Vodafone Broadband Pro with 4G back-up for customers reliant on their broadband service.

2.19 Ofcom places great importance on improved engagement levels within the industry as an indicator of success. It highlights recent successes such as: the impact of End of Contract Notifications; the Fairness Commitments; the reduction of industry revenues by £99m as a result of changes to out of contract

payments (notwithstanding that not all operators have agreed to provide discounts to their out of contract customers); and improved switching rates following the introduction of auto-switch.

2.20 Vodafone would point out, however, that these success stories are not necessarily proven. Many of the core initiatives of the last 5 years are yet to deliver and Covid is likely to impact Ofcom's success criteria in the interim. With respect to switching, for example, Vodafone's porting rates across the last five years suggest a gradual increase in switching rates rather than a marked increase reflective of auto switch or any single initiative.

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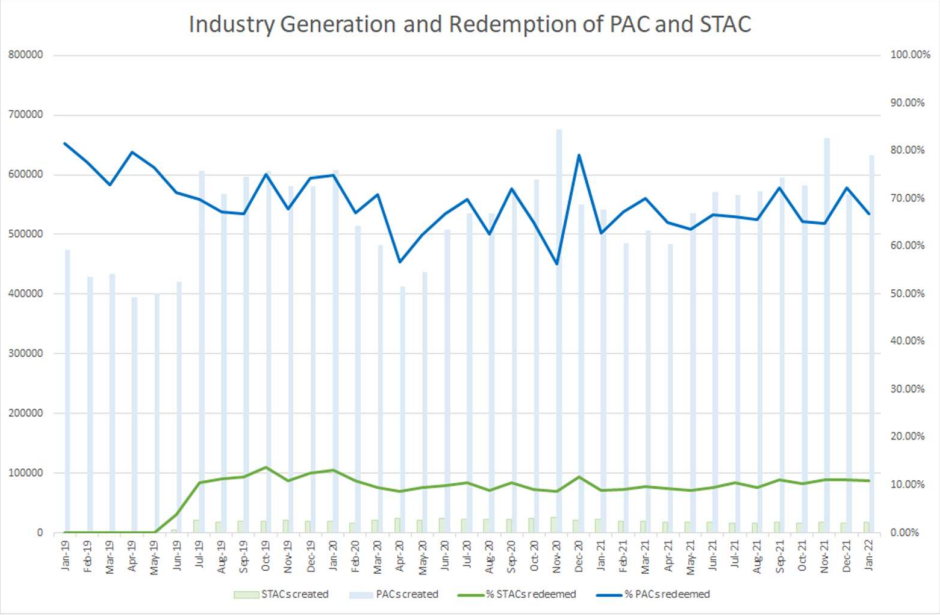
2.21 Industry data is similarly inconclusive. PAC and STAC generation volumes (the codes requested to enable switching) do not obviously reflect the impact of Ofcom initiatives and, following an early increase, are essentially flat. Similarly the percentage of PACs redeemed decline and then, like STACs, are flat. Most noticeably, the volume of STACs raised is negligible and redemption volumes are typically below 10%. It is clear that this intervention has little to no consumer resonance and cannot justify Ofcom's intervention.

Graph to show the PAC and STAC code generation levels over the last few years



2.22 Vodafone therefore welcomes Ofcom's recognition that following such a heavy focus on introducing new consumer regulation, there is now a need for stability, as Ofcom focus shifts to promoting effective compliance with the existing measures and understanding the impacts of those recent interventions.

Spectrum is a tax on our industry

2.23 The mobile industry is perhaps unique in being charged heavily by the Government for one of its principal input resources, i.e., spectrum – the water industry is not charged for rain, the solar generation industry is not charged for the sun, and closer to home (other than business rates which every enterprise pays), the fixed communications industry is not charged by the State for the ground through which its conduits run.

2.24 The approach of charging for spectrum was introduced at the turn of the century as a mechanism to ensure that all spectrum was put to the most efficient usage. We applaud this aim, but the application of spectrum charging, copied around the world, has led to the draining of significant resources from the industry – leading to a crisis in investor confidence – and, as we present here with evidence, the current application of spectrum charges drives spectrum inefficiency rather than efficiency.

Spectrum auctions are not maximising the benefits operators can bring to consumers

2.25 The principle of auctioning spectrum was that it would be left in the hands of those who would provide services yielding the highest economic value for the nation. However, by setting rules that pit the mobile operators against one another, policymakers have successively created an environment where a significant proportion of industry investment has not gone into improving mobile communications

networks - these substantial sums instead have left the sector entirely, being spent instead on spectrum fees. Future spectrum auctions should be designed in a way that does not lead to unnecessarily high prices and avoids rules which deter efficient allocation as a result of misplaced and unjustified fears about collusion. We support the need to ensure that market entry is not foreclosed, and that individual operators are not ganged-up upon, but as well as taking away industry funds, the auction approach to date has precluded sensible debate/negotiation to optimise spectrum usage.

2.26 The phenomenon is most laid bare by examining the latest spectrum auction. ✂ This auction yielded only £295M more than a managed allocation approach would have done, but at the expense of delaying spectrum being available for usage by a year, with consequent damage to the economy. Given 5G was rolled out during this period, in some cases the delay greatly complicates defragmenting the 3.4GHz band, and in other cases means it may never be defragmented.

.ALFs are not currently set at an appropriate level

2.27 We do not believe ALFs are set at an appropriate level. The logic of Administered Incentive Pricing (on which ALFs are based) is that the incumbent should pay the fee that the highest value excluded user would have been prepared to pay. Auction values have been a reasonable proxy for this, however:

- Whilst Ofcom has sought to derive the most relevant benchmarks in carrying out this analysis, there will always be debate about anomalies – for the avoidance of doubt we still consider the inclusion of Germany and Slovenia as appropriate comparators to be incorrect – and Ofcom will always be left in the position of making decisions that cannot be properly tested. For example, do the German benchmarks point to 2100MHz being worth more than 700MHz, or were the auction sums yielded a function of timing of when the relevant auctions happened?
- The auction data on which Ofcom relies is already in some cases old and will only become more outdated.
- Given that no mobile network has an overall paucity of spectrum in the UK, is it valid to base the worth of spectrum to the excluded user on the amount that a mobile operator bid in a particular auction? Isn't the excluded spectrum user a new entrant who would like to launch a mobile network but was unable to secure spectrum to do so?

2.28 In annex B we show examples of where the current approach to ALFs has been a hinderance to trade. However, regardless of whether ALFs are set at the correct level or meet their regulatory goal of incentivising efficient use of spectrum, it cannot be avoided that they result in more than £300M/yr being taken out of the industry, at a time when significant investment is needed. Ofcom analysis is that paying ALFs has little impact on investment levels, because each case stands on its own merits. However, ALFs are mandatory (absent divesting the spectrum), meaning that funding must be found for them first, before discretionary investment can be considered – indeed within that investment, regulatory imperatives such as meeting coverage obligations (see below) must take priority. This pushes items such as enhancing the coverage and quality of 5G down the priority stack. Whilst that doesn't

necessarily mean that investments are cancelled, it does mean that they must have a rate-of-return commensurate with the higher cost of securing external capital, given the higher priority items have the first call on internal funding. In its analysis[5] Ofcom dismisses this as a marginal consideration as it only affects investment to the degree that projects which are justified at an internal cost of capital but not at a market cost of capital, might not go ahead. However, these under-estimate current market sentiment, where there is considerable disquiet at the level of debt already borne by network operators and level of future investment needed. ✂ [6]This increases our debt across the board and therefore also increases our cost of capital.

2.29 The mobile industry and its consumers are also not treated equitably relative to other spectrum users, with other applications not being subject to pricing based on the value of the excluded user. For example:

- It is quite clear that the excluded user of spectrum currently being used by digital terrestrial television is mobile. However, the administered incentive fees paid by television in no way bear any relation to the value that spectrum would have at auction for mobile services. Television provides significant social benefit, particularly in the context of public service broadcasting, but in an era where public services are migrating to be provided primarily by digital means, and low-income households are increasingly dependent on internet access via mobile, the same societal benefit argument could be made of mobile services. A proper analysis might assess the full spectrum fee that should be levied on television and either discount this down for the societal benefit, or part-fund the fee from the public sector to reflect the benefits. However, instead the fees are levied on a quite different basis to that faced by the mobile sector, with mobile paying many times as much.
- Similarly, for the shared access spectrum bands licensed by Ofcom, mobile is the excluded user. For example, the equipment used in the 3.8GHz band is typically adapted from that developed for the adjacent mobile bands, and at least some of the 3.8GHz band is licensed for public mobile use in other markets. However, rather than paying on an administered incentive pricing basis according to mobile being excluded, Ofcom instead charges an admin fee based on its costs. If ultra-conservatively assessed based on extrapolating auction prices[7], and spreading the costs across 2000 shared users[8], then using Ofcom's ALF approach would yield a fee of around £5500/yr for an 80MHz channel (increasing with inflation), compared to £640/yr (fixed) that is currently charged. It could be argued that such preferential treatment is justified to stimulate innovation, but the mobile

[5] Ref 2100MHz ALF statement

[6] ✂

[7] ✂

[8] We understand that Ofcom has awarded approximately 400 licences over three years.

sector has been possibly the most innovative industry over the past decade yet has been given no such incentives to invest.

2.30 We do not make these points with a motivation of driving up the costs for other spectrum users. Instead, we do so to highlight that the mobile industry is not treated equitably with other spectrum users, and this matter is apparent to the investment community when we seek to secure funds to build the networks that policymakers desire.

2.31 In summary, ALFs do not achieve the regulatory aim for which they were devised and represent a significant drag on investment – there needs to be change.

Extending coverage to uneconomic geographies increases our costs

2.32 The industry has been subject to a series of regulatory interventions to drive mobile coverage beyond that which would be economically or commercially justified, generally imposed via spectrum licence conditions. The first spectrum auction of 3G frequencies in 2000, which yielded some £24Bn to the exchequer, imposed obligations to provide a data service to 90% of the population. In 2013, Telefonica was awarded discounted 4G spectrum in exchange for committing to cover 98% of the population. In 2017, all mobile operators were instructed to provide voice coverage to 90% of UK geography. Finally, in 2020, operators accepted a licence obligation to reach 90% of geography with a 2Mbps data service (the Shared Rural Network, SRN), in exchange for the auction of 5G spectrum being unfettered by rules relating to coverage, and the Government providing financial assistance in reaching that goal.

2.33 We agree that some aspects of these policy interventions were worthwhile – indeed Vodafone played a significant role in devising the SRN – but they represent a significant financial and resource burden on the industry. For example, SRN is collectively costing the industry – so UK mobile consumers – some £500M. Whilst there are parallels with other industries, for example it is usual for housebuilders to be compelled to build a proportion of less profitable social housing in exchange for obtaining planning consent on more profitable house designs, it is highly unusual for such interventions to commit stakeholders to commit to overwhelmingly economically non-viable activities, and exceptionally unusual for this exercise to be repeated. Realistically we do not expect any incremental revenue to be yielded by the £500M investment in the SRN – it is a purely social cause.

The Telecoms Security Act demands network changes that all incur costs

2.34 The Act has resulted in the need to comply with Designated Vendor Directions and with the security Code (generally known as the Telecoms Security Requirements, TSRs). We do not question the need to ensure the utmost security of UK telecoms networks, nor the need for equipment vendors to be chosen within the recommendation of the UK's security experts. However, mobile networks face considerable cost to comply with the requirements of the Act, which in many cases are not faced by smaller competitors and those running competing over-the-top/cloud services. Once again, these will be a drain on our resources – both financial and people – which will constrain what is left available for discretionary investment projects. We will comment on this more fully in our response to Ofcom's forthcoming

consultation on the compliance regime, but suffice to say that Ofcom can materially impact the burden of compliance by how interventionist a regime it introduces.

Net Neutrality rules on MNOs should enable us to monetise our investments

2.35 An industry dynamic that has not necessarily increased our costs but has reduced our ability to recover our investment costs is the approach taken towards Net Neutrality, hampering the monetisation of network investments. Vodafone is a keen supporter of an open internet, one that is agnostic to content, leaving the end user free to navigate the net as they wish. However, today's Net Neutrality rules need significant reform to ensure they are proportionate and appropriate, and do not unnecessarily stifle innovation and competition.

2.36 Large internet platforms have used Net Neutrality and open access to guide consumers into their own gated, commercialised eco-systems✂

2.37 ✂ This level of control cannot be underestimated and highlights how Net Neutrality rules are aimed off target at communication providers who offer no credible threat to an open internet.

2.38 In mobile, the problems from Net Neutrality are even more acute, given the finite capacity of radio spectrum. The scale of the problem is being recognised in other countries, with South Korea and Italy both providing recent examples where funding models are being adapted to support network investment for the first time.

2.39 The rules are simply not flexible enough to cope with today's level of service innovation. They were never designed to accommodate new and evolving technologies, such as 5G and this severely limits what services can be developed. 5G slicing will be incredibly useful to many applications, allowing the economic potential of 5G to be realised, yet Net Neutrality has the potential to stifle what is possible in this area.

2.40 Current Net Neutrality rules promote economic unfairness. Light users are left to subsidise heavy bandwidth users, thus denying them access to more affordable tariffs that perhaps could be sold at a lower cost, with a lower QoS rating attached (except for emergency access), making them more affordable to price sensitive consumers. We've already seen some lower price tariffs pulled from the market due to the application of Net Neutrality rules. The move towards unlimited tariffs in mobile has, despite a warm reception by consumers, exacerbated the problem. Unlimited packages are increasingly coming under strain, as data SIMs are being used for purposes they were not intended for, resulting in a minority of users consuming massive amounts of bandwidth and compromising mobile networks given the finite nature of radio spectrum.

2.41 The principle of treating all devices equally may sound egalitarian and fair, but there is an ever-growing range of devices on offer (from smartphones to FWA routers and numerous types of IoT) with very different needs and capabilities. Net Neutrality seeks to treat every device in the same way (or else require the network to a secure special service exemption every time there is a need to achieve something different). This is limiting consumer choice, preventing innovation, and creating completely

irrational outcomes. Why would a regulatory regime seek to deliver 8k video to a mobile handset, when it is beyond the capability of the human eye to distinguish it? Why launch a niche device to target one problem or offer one solution, when open internet rules mean it can't be managed in a cost-effective way? The inability to distinguish different classes of device acts to deny consumers innovations before they have even been launched.

2.42 Network slicing is one of the fundamental capabilities of 5G, allowing the technology to showcase what it can achieve however, it is not clear whether net neutrality regulation would prohibit certain network slicing capabilities, and this in turn creates uncertainties around the business case for investment. Network slicing offers benefits, providing an opportunity to maximise the utility of spectrum by offering spare capacity to businesses interested in a guaranteed quality of service on demand, powered by dynamic pricing. Not only is this efficient, but it improves network economics and stimulates investment.

2.43 In our 5G report of October 2021 we note that

2.44 In seeking not to discriminate, Net Neutrality has become discriminatory. Non-discrimination is "equivalent conditions in equivalent circumstances". However, preventing users who wish to pay for enhanced service to get a better experience (e.g., for gaming) is a form of discrimination. It fails to recognise their circumstances are not equivalent to those for whom a lower quality of service and price are acceptable (e.g., email only users). Networks dimensioned above some users' requirements discriminates against those users who inevitably pay the price of the over-dimensioned network. This in turn deters or prevents innovation at network level to support different applications. We therefore welcome Ofcom's concurrent review of the rules, believing the outcome of that review is fundamental to the future health of the UK mobile market.

5G an expensive uncertain business case with disintermediation & encroachment risk

5G is expensive and an incremental investment over our normal network refresh

2.45 [redacted][9]

2.46 At the same time the Deloitte report that we commissioned with the other mobile operators considered the revenues in the wider eco-system and estimated that, whilst the mobile service revenue was £12.3bn in the UK, just two areas where tech giants from the wider eco-system operate – digital

[9] [redacted]

advertising and in-app purchases – accounted for £22.2bn. This is the issue; the revenue streams and profit areas in the mobile eco-system are outside of the core mobile network access areas.

2.47 Frontier described this in their report as 'the investment hold-up problem'.[10] This occurs in situations where the parties that may most benefit from an investment in the value chain are not necessarily the main parties responsible for making that investment. This drives the wrong market incentives; the investing party will not invest for the greater good of the wider eco-system because they will not be able to recover their investment, even though the wider eco-system would more than recover the investment and consumers of the eco-system products would benefit.

The 5G investment case is far riskier than the 4G case

2.48 Unlike 4G, which predominantly represented an evolution of services provided on previous generation technology, 5G has revolutionary aspects, in that many of the potential service applications are novel and untested in the market. For 5G, a greater number of stakeholders operate in the value chain and wider ecosystem, influencing demand, distribution and renumeration.

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2.51 When making investments it is usual for firms to be concerned about the riskiness of the investment. This 'risk' drives the return investors expect; the riskier the investment, the greater the return required by investors. In its fixed wholesale access market review[11] in the market analysis section, Ofcom identified the ideal investment scenario. This was where the investor not only believes they will benefit from the investments they are making but that they also have an 'anchor tenant' or retail customer base that will procure the new services that will result from the investment. This was the case in Openreach's Fibre investment - Openreach being part of the BT Group means it has a huge base of UK telecom consumers which they currently sell to in the UK. ✂

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2.52 A fundamental part of the investment in standalone 5G networks is the different characteristics and quality of service offerings that will be possible. Standalone 5G can offer low latency, very high speeds, and the high-end network capabilities that many of the new evolving network products and services require. In the future customers will require network services aligned to the service and products they use. We as the investor in these high-end network characteristics want to be able to monetise and charge appropriately for differing network offerings. Indeed, its fundamental to the 5G investment business case, just like it is fundamental to Openreach to be able to charge higher prices for higher speeds on the FTTH services they are investing in, which is why Ofcom does not impose regulation on

[10] Frontier Report 1 - Supporting investment in the UK mobile market, section 4

[11] Statement: Promoting investment and competition in fibre networks – Wholesale Fixed Telecoms Market Review 2021-26 - Ofcom

Openreach for higher speeds of FTTH. Openreach require a 'fair bet' for the investment they make, and curtailing potential revenue streams post investment is not in-line with a 'fair investment bet'.

2.53 ✂[12]

2.54 ✂

2.55 ✂[13]

2.56 ✂

2.57 ✂[14]

2.58 ✂

2.59 ✂

2.60 ✂

2.61 ✂

2.62 ✂

2.63 ✂

2.64 ✂

2.65 ✂

2.66 ✂

2.67 ✂

2.68 ✂

Scale is necessary – as is a balanced competitive landscape and wider eco-system

The minimum viable scale of a full 5G mobile operator is greater than the market shares of some operators

2.69 Ofcom have explained in their discussion document[15] that scale is an important factor in determining the network economics of a mobile operator. What determines the financial health of operators in this sector is not the absolute costs of their network but more the costs of their network divided by the number of customers that are served by the network (the unit cost per customer). Because the mobile telecoms market is competitive in the UK the unit cost to supply services to end customers is vitally important.

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[12] ✂

[13] ✂

[14] ✂

[15] Box 6.4, Ofcom's discussion document (Discussion paper: Ofcom's future approach to mobile markets),

2.70 However, as Ofcom has identified, this is now becoming more important because the scale required to viably operate and hit the prevailing price level is now higher than it has ever been and is set to increase still further.

2.71 ✂[16]

2.72 ✂

✂

2.73 ✂[17]

2.74 ✂

2.75 ✂[18][19]

2.76 ✂

2.77 ✂

2.78 ✂

✂

2.79 ✂

2.80 ✂

2.81 ✂

2.82 ✂

[16] ✂

[17] ✂

[18] BT agrees definitive terms to acquire EE for £12.5bn to create the UK's leading communications provider

[19] LIBERTY GLOBAL AND TELEFONICA TO MERGE THEIR U.K. OPERATIONS CREATING THE LEADING FIXED-MOBILE PROVIDER IN THE COUNTRY - O2 The Blue

3. The consequences of the current conditions

3.1 The market issues described above have consequences for the mobile access market in the UK. In this section we will highlight:

- The potential benefits from 5G for UK consumers and the wider economy are huge
- The sector in its current state will not deliver the government ambitions ✂
- Left unchanged the sector will not deliver the full benefits 5G technology can deliver

5G offers huge potential

3.2 There have been several studies which have discussed the benefits 5G can bring to the UK. Benefits include business and industrial benefits, consumer benefits and wider societal benefits. All of these have been discussed in a range of reports.

3.3 The incremental value of 4G was calculated as delivering £20 billion of consumer surplus over ten years[20] and as adding 0.7%, £14 billion, to GDP per annum. The value of 5G is likely to be greater; it not only delivers higher broadband speeds, but also has dynamic benefits based on the other pillars. The annual benefit of just the business applications of 5G to the UK economy has been estimated at £15 billion[21] but the additional economic value of consumer applications has not yet been calculated.

3.4 We commissioned SPC to consider the benefits 5G could bring to consumers in the UK and they found the societal benefits could be extensive in scope and scale.[22] SPC also developed a framework for assessing the value of consumer benefits and designed a table that categorised the different types of benefits. This could be used by Ofcom to value use cases and new products as they are developed.

3.5 We also commissioned WPI to look at the industrial and business benefits that could flow from 5G and they concluded that 5G could boost the UK economy by £150bn over the next 10 years.[23]

✂

3.6 ✂[24]

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[20] Deloitte (2018) The impacts of mobile broadband and 5G: A literature review for DCMS.

[21] WPI Economics (2020) Levelling Up: How 5G can boost productivity across the UK. 5G could provide £150bn boost to UK economy over next ten years (vodafone.co.uk)

[22] SPC - 5G Consumer Benefits Report

[23] WPI Economics (2020) Levelling Up: How 5G can boost productivity across the UK. 5G could provide £150bn boost to UK economy over next ten years (vodafone.co.uk)

[24] ✂

3.7 The Broadband stakeholders Group (BSG) is also commissioning a report that is due to be published before the summer. This report commissioned jointly by telecom operators will identify the industry wide 5G investment gap.

The current 5G investment plans will not deliver the government's 2027 targets

3.8 In November last year DCMS issued a call for inputs asking, amongst other things, if mobile operators will achieve the government's ambition for **the majority of the population** to have access to a 5G network by 2027.[25]

3.9 Alongside this, in February this year Ofcom consulted on meeting the future demand for mobile data. Ofcom estimated that mobile data would continue **to increase by 40% year on year** and that operators would require more spectrum and to densify their network.[26]

3.10 These are two characteristics of 5G networks, the percentage of the population that the network covers and the capacity of traffic the network can carry. Another important characteristic of 5G networks is the **latency the network can achieve**, i.e., the delay the traffic running over the network experiences and the ability of the network to **compute and process data at the edge of the network**.

3.11 The government and Ofcom need to be more precise and develop a more sophisticated 5G ambition. At present the government's target for the majority of the population being covered by 5G holds the risk that 5G networks will be rolled out only to the degree that handsets will show 5G symbols, without realising any of the social or economic benefits. Today's 5G networks will not be able to deliver any of the new products and services enabled by 5G, due to their lack of sophistication.

3.12 To unlock the true potential of 5G products and services, 5G networks need to be able to:

- Cover the majority of the UK land mass – **95% geographic coverage**
- Have the required capacity in the parts of the network it is required – **more mid-band spectrum, more sites and increased backhaul fibre capacity**
- Transport data quickly without delay – **low latency**
- Compute and process data at the edge of the network **– edge computing**

3.13 These characteristics are the type that will enable massive machine type communications (mMTC) and ultra reliable low latency communications (URLLC), the areas where new services and network products will really emerge.

- **mMTC** – 5G will enable faster and more reliable communication for the Internet of Things ('IoT') devices, paving the way for smart agriculture, cities and logistics, energy network monitoring and remote healthcare (remote patient monitoring, remote medical proctoring).

[25] Wireless Infrastructure Strategy: call for evidence - GOV.UK (www.gov.uk)
[26] We response to this consultation separately

- URLLC – 5G will permit faster and larger data transfers, enabling enhanced autonomous vehicles, smart energy grids, industrial automation, and more remote medical procedures (e.g., remote assisted surgery).

3.14 We believe that the spirt of the government's ambitions for 2027 is that UK mobile networks should be able to carry, process and encourage new products and services to be rolled out, and that UK mobile networks should not be a barrier to innovation and increased productivity for the UK. In their 2017 paper 'Next Generation Mobile Technologies: A 5G Strategy for the UK' the DCMS set out it's ambition to make the UK a global 5G leader and to ensure the UK is at the forefront of 5G development.

3.15 With the current market conditions, UK mobile operators will fall short of this ambition and mobile networks will be a technological barrier for the UK by 2027.

✂

3.16 ✂[27]

Mobile operator investment generally in the market will not meet these targets

3.17 The majority of current 5G investment is in non-standalone (NSA) as Ofcom note.[28] This is faster and cheaper to deploy as it uses the existing 4G RAN and 4G core.

3.18 Ofcom expects mobile operators to upgrade to standalone (SA) 5G in the future but although there are network benefits in doing so, the cost is much higher and will take longer to rollout as the core has to be upgraded to 5G.

Gap

3.19 With the current UK 5G coverage lagging behind 20+ countries at around 30% of the population[29] we perceive a gap between the required level of investment and the reality.

3.20 ✂[30]

3.21 The case to invest in full stand-alone 5G is further complicated given that, the cost of replacing Huawei equipment in the network could amount to billions. The Government estimated it could run to £2bn cost; BT estimated £500m for their network.

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[27] ✂

[28] Ofcom's discussion document (Discussion paper: Ofcom's future approach to mobile markets

[29] GSMA Intelligence-5G Network coverage

[30] ✂

- The cost must be borne by MNOs, in addition to the 5G deployment cost, but the additional manpower, project resources etc will also add months/years to the 5G timelines.
- Add to that the opportunity cost of the delayed benefits from 5G and some commentators estimate the UK could be £7bn worse off. (Assembly research for telecoms industry)
- Add to this the backdrop of COVID driving data usage upwards much faster than would most likely have occurred otherwise (Ofcom indicates 32% year on year increase in their Communications Market Report update Q2 2021), investment needed to maintain the data hungry apps and it's not unreasonable to see why SA 5G deployment might be delayed.

✂

3.22 ✂

3.23 ✂

3.24 ✂[31]

3.25 ✂

3.26 ✂

[31] ✂

4. The future policies required to unlock investment

4.1 We are ambitious for the UK market, but that ambition cannot be realised without a significant change in the regulatory approach. Ofcom needs to be cognisant of the multiple headwinds the industry is experiencing, and put in place a regulatory environment that allows us to compete fairly, with cost burdens and obligations spread equally. We think Ofcom should be bold, and establish a set of principles that guide future decision making, with the aim of restoring the health of the UK mobile sector, and which speed up recovery and allow the UK industry to do what it has done so effectively over the past 37 years – deliver for UK consumers.

4.2 In this section we expand on the detailed regulatory and policy changes that will enable this sector to transform and develop into a sector that attracts increased investment, meets the government's 2027 5G targets and increases the economic and societal benefits communication services can bring through the development of innovative 5G network services.

4.3 To support the policy asks we detail below, we also provide further details, descriptions, and examples of the policies we are suggesting in Annex C. In summary we want a regulatory framework and approach that:

- Focuses on long term investment and enabling operators to roll out quality 5G infrastructure that can drive the UK forward.
- Reforms spectrum policy to focus on maximising the benefits spectrum can deliver to the wider UK economy, not simply the cash that spectrum auctions and licence fees can attract
- Tackles the barriers to investment, reducing charges placed on this sector and simplifying planning and associated regulation.
- Enables us to monetise valuable network investment, whilst recognising the external threat from the wider eco-system and the increased MVS that full stand-alone 5G networks require

Develop a pro-investment regulatory framework:

4.4 Investment should be at the heart of policy regulation. Every intervention or Ofcom workstream, from spectrum policy to consumer initiatives, should consider the impact it will have on enabling sector investment. Any future market structure changes should be viewed through the lens of sector investment and network quality as a key driver for consumer welfare.

4.5 Ofcom have, over the last 5 to 10 years, dramatically increased their focus on consumers and regulation that directly affects consumers. We support the focus on our customers. However, we also believe in the

power of competition to deliver good outcomes for consumers, and we feel Ofcom should focus its attention on ensuring the most vulnerable customers are protected.

4.6 There is a cost to short term regulation that narrowly focuses primarily on pricing effects in the sector. The cost is the longer-term health of sector investment. Not only does such regulation generally reduce our revenues, but it also incurs implementation costs and, more importantly, sends a signal to potential sector investors that returns will reduce in this market due to continued regulatory headwinds.

4.7 Ofcom should be very clear how they will assess interventions and the importance of investment going forward. As discussed earlier, we have asked Frontier to research this topic and design a suggested detailed cost impact approach.[32] Ofcom should adopt this measured investment focused impact approach when considering all market dynamics, for example sector consolidation.

4.8 This will send clear signals to the investor community that returns will not necessarily reduce due to regulation and that the sector regulator will take a more balanced approach, treating this sector as an innovative dynamic one that requires constant investment, innovation and development – rather than a utility that is simply required to be subject to return-based regulation.

4.9 Lastly, whilst we welcome Ofcom's approach that potential mergers in telecoms markets need to be assessed on a case-by-case basis, rather than on a presumptive view of the appropriate number of competitors, we believe that this is not the main competition consideration in the sector. To ensure a focused pro-investment approach, Ofcom and other regulatory bodies must consider the negative influence the rapidly changing wider mobile eco-system could have on the sector, the fragmentation of network roll-out economics, and the currently distorted UK market structure[33]. These are the issues the CMA and Ofcom should consider when assessing competition concerns or any potential merger activity in the UK.

Reform spectrum policy:

4.10 One of the most important regulatory issues in this sector has been the allocation of and charging for spectrum. Mobile operators continue to pay over £300m as an industry in annual license fees and have the risk of incurring additional costs when future spectrum is auctioned, including mmWave bands and potentially 6G and 600Mhz. We believe spectrum has taken funds out of the sector that would have otherwise been used to fund further network roll-out and network technology upgrade.

4.11 Ofcom has traditionally argued their approach to spectrum as it ensures efficient use of that spectrum and, although they acknowledge the approach does extract funds from the industry their response is that it is not certain that those funds would be investment in networks and could instead be used to increase operators' profits.

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[32] Frontier Report 2 - Ofcom's Approach to impact Assessments

[33] In terms of distorted market structure we refer to the fact that the UK telecoms sector is increasingly becoming dominated by two very large vertically integrated converged operators

4.12 It's time for Ofcom to review its approach to spectrum considering the current market dynamics and conditions. While mobile spectrum is still highly valuable, it is worth considerably less than it was 20 years ago, the sector is worth less than it was 20 years ago and the wider mobile eco-system and reliance on mobile access networks is far more intense and complex. It's time for Ofcom to adopt an approach that focuses on ensuring spectrum is utilised by the sector in the most efficient way at the least cost to ensure high quality mobile networks are rolled out. Spectrum policy should be targeted at ensuring maximum investment is attracted into 5G network roll-out.

4.13 Future spectrum auctions should be designed in a way that does not lead to unnecessarily high prices and avoids rules which deter efficient allocation as a result of misplaced and unjustified fears about collusion. Annual license fees should be reduced, and should not be based on historic spectrum values that are no longer relevant. If Ofcom is concerned that reducing ALF charges will merely increase sector profits and not be re-invested back into mobile networks, then they should construct a network roll-out commitment system. In this scenario, operators would be able to retain part of their ALFs in exchange for an agreement from the operator that they make commitments to roll-out 5G further and wider than was originally planned.

Tackling barriers to investment and network roll-out.

4.14 There is a range of practical policy reforms and government action that could both make the roll-out of 5G networks easier and cheaper, and encourage the adoption and use of new 5G products and services.

4.15 In terms of practical help, the government should provide rate relief on 5G network equipment. They should zero rate charges on the development and operational costs of small cells and network in-fill sites. They should zero rate ultra-rural radio access network sites in places where the economics of network roll-out do not work at all for mobile operators, but where communities really benefit from improved access to mobile sites.

4.16 Alongside action from the Government on planning reform, ECC implementation and business rates to support network investment, we need a pragmatic and balanced approach to the implementation and timing of the TSRs. Of course, network security is of paramount importance but the implementation of the TSRs needs to work alongside the network operator's capital expenditure plans and not hinder wider network technological innovation.

4.17 Open RAN is a position initiative and has the potential to be hugely benefital for the industry, however more can be done to support Open RAN. We welcome Government support for Open RAN and would like the Government to go further and faster. As a priority it needs to increase the funding available to support what is a new technology with high development and roll-out costs, particularly for deployment.

4.18 The public sector is also an important consumer of connectivity services. The switch to full fibre fixed broadband services in the UK has benefitted from the public sector using its demand to support deployment into new areas. While the anchor tenant model used in fixed is not directly applicable in mobile, the public sector can nevertheless use its demand for mobile services to support 5G and IoT

deployment by explicitly favouring such services in tenders. This may mean not selecting the lowest cost option as the wider externalities of supporting 5G result in better longer-term value for the UK.

Maximising the 5G opportunity:

4.19 Government, Ofcom, and the wider UK advocates want mobile operators to roll-out 5G networks that are as geographically extensive and technologically sophisticated as possible. This means that mobile operators need to be able to attract the maximum possible investment into 5G networks. There are several ways in which Ofcom and the government can help improve commercial investment in this sector which will mean that the UK gets better 5G networks that are rolled out further – the alternatives are that in three to five years' time, the government must consider a higher degree of sector subsidies to ensure universal 5G coverage in the UK.

4.20 ✂ Consumers, businesses, and the industrial sector have little interest in the technological upgrades of networks in and of themselves – what they are really interested in and will pay incremental revenue for is the services and products that are delivered and enabled by these networks.

4.21 Net Neutrality rules need to be updated to enable this. Network investors need to be confident that they can have commercial charging structures that enable them to capture additional revenue from new products and services. If certain services require enhanced network quality or characteristics, operators should be able to charge for this. If service providers require specific network characteristics or cause a considerable drain on network capacity, then they should fund increased capacity. This can be achieved only to a limited extent today. What's needed is a clear Net Neutrality position that enables network investment.

4.22 The evolution to full stand-alone 5G networks as mentioned previously increases the minimum viable scale that a mobile operator requires to achieve the prevailing pricing in the retail market. Ofcom and the CMA need to consider this when making future assessments of market activity and appreciate that the future prospects for smaller sub-scale mobile network operators are worse and more challenging in this technological environment.

4.23 Another way that government and Ofcom can ensure the maximum commercial roll-out of 5G network is to ensure the scope and scale of mobile operator network roll-out is not hindered ✂

4.24 Currently Ofcom encourage this entry into mobile network roll-out from outside the traditional mobile access providers by providing cheaper (compared to what the core mobile operators pay) spectrum. It may, in the short term seem like a great way of encouraging 5G network roll-out by operators outside of the traditional mobile sector but it will come at a cost of reducing the economics of universal 5G roll-out. Operators that are only interested in high value 5G network access roll-out will reduce the economic scale and scope of operators that are attempting to provide national 5G coverage – which will result in a requirement for more funding from government later to achieve universal 5G roll-out.

4.25 Lastly, Ofcom have a role to play in encouraging government to target spend in some areas that will have the effect of encouraging and promoting the use of 5G products and services more generally in the

UK. The government could direct its own spend towards new and technologically advanced 5G services, and this would have the effect of stimulating demand and promoting the use of services. Funding could also be provided to 5G application and product development, including network trials, product testbeds and innovative research initiatives. This would all help drive the use and awareness of 5G and the benefits that it can deliver.

Annex A -

Annex B -

Annex C –

Annex D - Ofcom's Consultation Questions

1.1 In this annex we respond to Ofcom's questions directly, although our response considers Ofcom's questions throughout this annex should serve as a guide to show where in our response we have responded to the specific questions, and in some cases provide additional material for Ofcom to consider.

1) Do you agree that the key potential market developments over the next five to ten years are those set out in Section 5? Are there any other key developments we should consider?

1.2 As discussed in the main body of this response the next five years will be a transformational time for this sector. Unfortunately what most of the developments have in common is that they, (a) increase the link/size/complexity between network access investment and the monitisation of that investment and (b) reduce the scope and scale of network economics that means national network roll-out is more challenging or that national network operators need to serve a larger customer base.

1.3 The report[34] we commissioned with the other national mobile access providers best describes the challenges in section 2 where it discussed the sector investment challenges. Section 2 of this report, market analysis also discusses these challenging market developments and what they mean for our industry.

2) Do you agree that competition among MNOs is likely to continue to play a key role in the delivery of good outcomes, as outlined in Section 6?

1.4 The mobile network access market in the UK is highly competitive, this competition has had a very positive impact on consumer pricing, developing an innovative dynamic market and to a degree driving technological development. However, competition can tend to drive a short-term approach and a focus on consumer pricing today at the expense of longer-term investment which, in markets that investment in critical national infrustruture can be an issue.

1.5 Therefore, we don't agree that competition alone in this market can be relied on to drive good outcomes for consumers. In a retail-only type industry, like for example retail gas and electric supply where the competing companies do not have longer term considerations like infrustruture investment generally competition can be relied on to deliver good outcomes for consumers, notwithstanding the need to potentially protect vulnerable or at-risk low value consumer groups.

1.6 However even in retail only markets like energy competition alone have driven prices to such a level that no contingence for wholesale price rises were considered, which led to the collapse of a number of companies and considerable consumer difficulties. This is because as mentioned above competition

[34] The Deloitte Report

tends to drive a shorter-term focus, which in industries that require longer term substantial infrustruture investment can be a real issue and requires monitoring. We highlight in section 2, our market analysis section how the competitive issues in this industry and associated with the sector are not balanced, instead they are focused on two very large vertically integrated operators for mobile access and that competition from the wider eco-system is now much more of a competitive risk and danger to longer term investment in the sector – the wider eco-system being dominated in many areas by a small number of very large operators.

1.7 The report we commissioned with Frontier also mentioned the changing incentives to investment with 5G technology evolution. This places even more weight on the investment challenge argument and explains further why competitive alone without regulatory reform in this sector will not drive the optimum outcomes.

3) **Do you consider that there are likely to be significant wider external benefits (externalities) from a quicker or more widespread rollout of high-quality networks than that which the market is likely to deliver, as discussed in Section 6? If so, please provide clear examples to help explain your answer.**

1.8 The Centre for Policy Studies has estimated that delays and geographic constraints on 5G deployment could mean that up to 11 million households and businesses do not get access to high-speed mobile connectivity by 2027[35]. Such delays will create a substantial drag on the predicted benefits to the economy.

1.9 We discuss this further in section 3 where we discuss that we commissioned WPI to look at the industrial and business benefits that could flow from 5G and they concluded that 5G could boost the UK economy by £150bn over the next 10 years.[36] And we also commissioned SPC Networks to consider the consumer benefits of 5G. The key findings are:

1.10 While the annual benefit of just the business applications of 5G to the UK economy has been estimated at £15 billion pa, the additional economic value of consumer applications has not been calculated. The additional economic value of consumer benefits will be substantial: offering consumers private benefits, ranging from time saved to an improved quality of life, to societal benefits, such as greater social inclusion and reduced carbon emissions.

1.11 The table below illustrates private and social benefits expected from the new consumer services.

[35] The Deloitte Report

[36] WPI Economics (2020) Levelling Up: How 5G can boost productivity across the UK. 5G could provide £150bn boost to UK economy over next ten years (vodafone.co.uk)

Table 2: Consumer Benefits per Use Case

		Private benefits					Social benefits	
		Time saving	Enhanced Experience	Improved quality of life	Remove duplicate product	Physical safety	Social inclusion	Net Zero
Consumer Use Cases	Faster download or films etc.	✓	✓					✓
	5G FWA		✓		✓		✓	
	5G Multicast		✓		✓		✓	
	Best Seat Experience		✓	✓			✓	
	VR Social Media		✓				✓	
	In car entertainment/ workspace	✓	✓					✓
	Metaverse		✓					
	Haptic Internet	✓	✓	✓			✓	
	See through car					✓		
	5G Hearing aids			✓			✓	

Source: SPC report Jan 2022

4) **Do you agree with our views on how competition across the value chain may evolve over the next ten years, and the potential implications for the delivery of good outcomes, as outlined in Section 6?**

1.12 We are very pleased that Ofcom have identified the major issues that could emerge across the value chain over the next ten years - that we are aware of now. However what Ofcom have not done is assessed the impact these issues might have on the sector or considered scenarios that may play out across the sector and the implications this could have for consumers. This is what Ofcom needs to do if it is to make this review highly valuable for consumers and create the narrative for the meaningful policy change required.

1.13 In section 3, where we explain the consequences of our market analysis on the sector we attempt to do this, but Ofcom also need to do this from their own analysis, for example Ofcom need to ask themselves:

- What does non-national mobile operators rolling out high value private MPN's in specific high value geographies or to specific high value customers do for the minimum viable scale for a national mobile operator?
- What does ROCE analysis that shows two operators producing a ROCE above their WACC and two below mean for the future of competition in the market?
- What does ROCE analysis that shows a reducing average ROCE that is very close to an industry WACC together with a spectrum paper that discusses how an additional 50,000 mobile small cells will be needed by 2030 mean for long term sector investment.

- What does having a wider eco-system that is very concentrated in places, for example operating system supplier mean for consumers if those operating system providers (Apple and Google) move into the retail mobile access sector?

5) As set out in Section 6, do you agree that quality of experience will become more important in the future? Do you agree that developing better information on quality of experience for customers will help further the delivery of good outcomes?

1.14 We believe that even now, customers care more than merely whether mobile service is available. In order to seamlessly use their mobile applications, customers want more than the presence of a 4G symbol in the corner of their handset, they want the services they use, whether streaming content or sharing social media to just work without any thought being given to the presence or capability of the underlying network. The advent of the 5G services will increase that; customers will choose mobile network providers not just on the reach of their network, but also the performance of it.

1.15 We share Ofcom's aspirations to allow consumers to make informed decisions, but there needs to be a fine balance struck of providing information in a format that does not resort to technical gobbledygook, while not dumbing down to the point of being meaningless. Messaging must also be clear that we are in a world of statistical predictions, and that although everything is being done to make forecasts of service quality as accurate as possible, we are not able to guarantee that accuracy. In this context, we believe that when gathering information on quality of experience, properly calibrated crowd-sourced data probably provides better material than network data. We will continue to work with Ofcom and industry partners to agree aligned approaches to representing service quality.

6) Do you think there is more that could be done to reduce barriers to customers receiving good indoor coverage (see Section 6)? If so, please outline what steps could be taken and what impact those steps would be likely to have.

1.16 Providing good indoor mobile coverage is becoming more complex:

- As users consume more data, deployment of more spectrum is required, but the higher frequencies that can support greater bandwidths are less able to transmit through buildings. This makes the provision of indoor coverage from outdoor macro networks more difficult, but conversely there are gains that can be made in re-using spectrum.
- As the UK improves the eco-efficiency of its building stock, this increases the building attenuation loss.

1.17 This said, whilst acknowledging the issue, we do not believe that there are significant actions required on Ofcom's part. Overall, the system of using in-building Wi-Fi systems works well, and mobile networks now widely support VoWiFi for example.

1.18 We believe that in-building neutral host solutions have a place to provide mobile services in public areas such as shopping centres. Whilst we do not see any fundamental regulatory barriers to the deployment of such solutions, there may be a need for clarity. For example, so long as the equipment is

under the control of the existing mobile networks, then the current provisions of the Wireless Telegraphy Act suffice; however, we would welcome Ofcom confirmation that where operation and ownership of the radio access network is outsourced to a neutral host, this would be permissible under existing licensing arrangements.

7) **Do you agree that clarifying our future regulatory approach will help encourage investment, as outlined in Section 7?**

1.19 In many places in this submission, we have highlighted the need for Ofcom to deliver what could be referred to as a 'fair bet' in mobile. This requires delivering as much certainty as is realistically possible into the market, enabling informed investment decisions to be made. When capital is at risk, investors have a keen appetite to know the full risk profile of the industry. The prospect of a conveyer belt of interventionist regulation that impacts profitability does little to foster a pro-investment climate.

1.20 Taking this risk away, the risk that returns from investments could be curtailed in the future by regulation is a positive step BUT it falls short of what this sector needs to stimulate the investment required. Using the fixed market as an example Ofcom clearly sign posted a pro-investment regulatory stance, in fact their CEO made a speech[37] that indicated wholesale regulation on new fibre build would not be introduced for 10+ years. But Ofcom also did far more than this, they handed money back to Openreach, they enabled Openreach to increase prices today to generate funds to invest. Ofcom estimated that Openreach would make excessive returns amounting to approximately £2.5bn over five years from price rises enabled by relaxed regulation, but this was necessary to stimulate the investment required.

1.21 Ofcom need to do the same in the mobile sector to stimulate investment but instead of relaxing wholesale prices that they have no control over they need to address the sector costs they do control and in the mobile sector this is spectrum charges. If Ofcom were to very clearly signpost a pro-investment future regulatory approach together with an approach to ALF's similar to what we have suggested in section 4 of this response then investors would have certainty and regulatory action that supported and re-enforced that certainty.

8) **Are there any other potential barriers to the delivery of good outcomes over the next five to ten years that we have not considered? If so, please outline what these are likely to be, with supporting examples/evidence where possible, and any suggestions for how they might be reduced.**

1.22 We have discussed in section 2, 3 and Annex C many different market developments and changes over the next five years that pose a threat to this mobile network access industry. Left unchanged with the current regulatory frameworks this industry will not tend towards the most positive outcome for the UK or the consumers of our services. The market is unbalanced and the power of the wider mobile eco-

[37] https://www.ofcom.org.uk/about-ofcom/latest/media/speeches/2020/full-fibre-must-be-a-fair-bettext

system is in the hands of operators that do not invest in UK infrustruture. Our policy asks should address these and limit the potential risk they pose to this sector.