Mostly Mobile

Ofcom's mobile sector assessment
Second consultation

Consultation

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Contents

One-page summary

Mobile has become central to UK citizens and consumers. In the future, our telecommunications will be mostly mobile.

Driving this success has been competition between mobile operators. As a result, the great majority of people in the UK use mobile services. Innovation is ongoing: we are using more text and data services; mobile internet access is taking off; and devices can do more and cost less.

However, not everyone benefits from these developments equally. Some consumers find the variety of mobile prices and services confusing, while others suffer from harm or inconvenience. Elderly and disabled people still have lower take-up. And coverage not-spots persist.

Our focus will be on resolving these issues. We propose to achieve this by **using markets where we can.** We also **recognise the limits of markets** and will respond to risks of market failure and to consumer protection needs with focused intervention. We are **widening our focus** to reflect the importance and complexity of mobile services:

- **Competition**. We will ensure that consumers continue to enjoy the benefits of competition. We have initiated a review of the market for mobile call termination. This will consider how the regime needs to evolve, whether the rates should be reduced, and if so how quickly, following the expiry of the current charge controls. We also intend to take an active approach to reducing the barriers facing new entrants but do not propose to undertake a wider formal market review of the mobile sector (unless there is a material change in the market).

- **Consumers**. Competition alone is not always sufficient to ensure consumers are properly protected, and enabled to make well-informed choices. We have already taken action to protect consumers from mis-selling and unfair additional charges. The mobile sector is becoming more diverse and further consumer issues are likely to arise. We propose to provide regulatory certainty for consumers and providers by adopting a framework that sets out: our consumer protection objectives, how we will assess their achievement and how we will develop our regulatory response to any emerging consumer issues.

- **Coverage**. We will look more closely into the persistent 'not-spot' problem and work where we can to facilitate better coverage. We welcome the Government's work in Digital Britain to extend mobile broadband coverage, and we are also working with mobile operators and emergency services to allow roaming for 999 calls.

- **Spectrum.** It is vital that spectrum is available in a timely manner to optimise the prospects for competition, innovation and better mobile coverage across the UK. In addition to our own work to ensure spectrum is used efficiently, we will assist the Government in its efforts to make spectrum available for mobile broadband services through the Digital Britain process.

Overall, we consider it appropriate to build on the consumer and economic benefits that have been driven by the mobile sector rather than to adopt a new regulatory approach. Continuing regulatory activity is required, however, to help promote competition and innovation, safeguard consumer interests, and to address, where possible, those areas where the market fails to deliver (such as not spots).

Section 1

Executive summary

Mobile has become central to our lives – driven by investment and innovation in a competitive market

1.1 Mobile has become central to UK citizens and consumers (including businesses). In the future, our telecommunications will be mostly mobile.[1]

1.2 The driving force behind this success has been competition, in the UK and in international markets. In the chase to win customers, mobile operators have deployed networks, offered ever-broader services and created new ways to buy and pay for services (such as pre-pay). As a result, the great majority of people in the UK use mobile services and most people report that the market meets their expectations.[2]

1.3 A further wave of innovation is now taking place: we are using more text and data services; mobile broadband is taking off; devices can do more and cost less.

1.4 As a result of these developments, mobile services play an increasingly important role in our lives, as individuals and as a society. The need of policy-makers to respond to this changing role is at the heart of our assessment of the mobile sector.

Our aim is that consumers and citizens continue to derive maximum benefit from innovative, widely available mobile services

1.5 Ofcom's central purpose is to regulate in ways that further the interests of UK citizens and consumers.[3]

1.6 Our goal is to ensure that the mobile sector contributes fully to the UK economy and society at large. In our first consultation for the mobile sector assessment[4] we set out our vision for the mobile sector more specifically, and set out seven objectives:

- choice of provider and value for money;

- ease of switching (and porting);

- choice of services;

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[1] By revenue, the mobile sector comprises 51 per cent of the UK telecoms sector. We estimate that, by mid-2010, more than half of all telephony in the UK will be mobile. Take-up of the mobile internet and mobile delivery of video and audio content is far less widespread, but is rapidly growing, albeit from a small base (Source: Ofcom, GfK).
[2] In 2008, 86 per cent of people aged fifteen and over personally used mobile services at least monthly while 94 per cent of mobile users said they were satisfied with their mobile service (Source: Ofcom).
[3] Communications Act 2003, Section 3(1)
[4] Mobile citizens, mobile consumers, Ofcom, August 2008
http://www.ofcom.org.uk/consult/condocs/msa08/

- a diverse range of high quality content;

- protection from harmful content;

- coverage (as far as commercially feasible, and further, if socially desirable); and

- protection from unfair practices and scams.

1.7   Currently, most of these objectives are being achieved most of the time, but there are some important gaps. For example, some consumers find themselves exposed to mis-selling and scams, others find the market confusing to navigate, and others (both individuals and businesses) report issues with absent or poor network coverage. Our assessment also seeks to identify where regulation may help address problems in a cost-effective and proportionate way.

The context of Ofcom's work in the mobile sector is changing

1.8   Since the late 1990s, regulation of the mobile sector has focused on two specific objectives: awarding spectrum and setting a ceiling on payments to deliver calls passing between networks ('mobile call termination call charges'). This approach has served consumers well in a market that was rapidly growing and adopting new technologies.

1.9   As the sector has grown in scale and significance and mobile has become an 'essential' service to many users, a small minority of customers are dissatisfied with their experience of mobile services. Industry stakeholders responding to our first consultation argued that we had shifted our focus over the years, imposing more regulation on retail activities (consumer protection), and that the regulatory burden had increased. We have been more active in consumer protection, reflecting the growth in mobile services and the fact that not all emerging issues were addressed by competition. We have taken a number of measures over recent years (such as action on mobile mis-selling) to provide a reasonable safety net for consumers.

1.10   The nature of the mobile sector is changing. Rather than mobile operators controlling all aspects of service, some of the fastest-growing services combine features supported by handset manufacturers with features enabled by third-party applications and content providers (for example, mobile email and social networking). Therefore, in the future the UK mobile market will be more diverse, with a growing number of content and application providers, and a new range of consumer and competition issues.

1.11   At the same time, industry is adapting its approach to deploying networks; the current trend is to share sites and, in some cases, access networks – while keeping the door open to providers who do not own a network, i.e. mobile virtual network operators. If this trend continues, regulation will need to keep pace with a changing market structure.

1.12   Greater attention to availability, inclusion and consumer issues, by us, our advisory bodies in the Nations, and the Government, also reflects the growing significance of the sector to the social and economic fabric of the UK. This is underlined by the Government's *Digital Britain* report,[5] which cites the widespread growth in mobile and

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[5] The Government's *Digital Britain* interim and final reports can be found at
http://www.culture.gov.uk/what_we_do/broadcasting/5631.aspx

raises the option of mobile networks playing a role in achieving universal access to broadband in the UK.

1.13 Content issues in mobile have the potential to be every bit as significant as in the fixed world. Just as mobility can make useful services even more useful, it can make particular types of risks more pronounced. We do not regulate internet content, but we take concerns about harmful content or contact very seriously, particularly with regard to protecting children when accessing the internet (whether via fixed or mobile). In 2008 we assessed the existing self-regulatory regime for mobile content services, and found that it has, on the whole, been effective.[6] We believe that access to the internet on mobile phones and other devices will pose new challenges which are similar to the problems posed by growing use of internet content in general.

Three strategic principles to inform our approach

1.14 Responding to these developments will require a flexible approach. In the mobile sector we will continue to observe our regulatory principle to *"operate with a bias against intervention, but with a willingness to intervene firmly, promptly and effectively where required."*[7]

1.15 We propose to adopt three strategic principles that will inform our approach to the mobile sector in future. These principles are:

- **Using markets where we can.** We will rely on market forces to deliver our vision for the mobile sector wherever possible.

- **Recognising the limits of markets.** We will respond to risks of market failure and consumer protection needs with focused intervention.

- **Widening the focus of our attention to reflect a changing world.** We will act with a view of the bigger picture, keeping regulation relevant by ensuring that it evolves to reflect the growing importance and complexity of mobile services.

1.16 These principles do not represent a radical departure from today's approach. Instead, they signal our intention to consolidate the existing success of the mobile market, respond to its shortcomings and lay the groundwork for further regulatory simplification in future as convergence continues.

1.17 Applying these principles, we see the core of our work developing in six important areas:

- **Competition**. We will ensure that consumers continue to enjoy the benefits of competition as the mobile sector changes. However, we do not currently intend to undertake any formal market review, apart from a review of the market for mobile call termination.

- **Consumers**. Competition alone is not always sufficient to ensure consumers are protected, and enabled to make well-informed choices. We have recently taken

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[6] http://www.ofcom.org.uk/advice/media_literacy/medlitpub/ukcode/
[7] See Ofcom's regulatory principles at http://www.ofcom.org.uk/about/sdrp/

action to protect consumers from mis-selling and unfair additional charges, and will continue to identify other areas of concern and take appropriate action.

- **Access**. We are investigating ways to tackle barriers to the use of mobile services by people with disabilities, such as difficulties using mobile handsets.

- **Coverage**. We believe that now is the right time to look more closely at the nature of, and reasons for, the persistent 2G 'not-spot' problem as well as the state of mobile broadband coverage and work where appropriate to facilitate better coverage.

- **Spectrum**. We consider it of utmost importance that spectrum is available in a timely manner to optimise the prospects for competition, innovation and better mobile coverage across the UK. We will assist the Government in its Digital Britain work over the next months.

- **Termination**. We have initiated a review of the call termination market, to consider how the regime needs to evolve as the sector changes.

1.18   We are also working with mobile operators and emergency services to allow roaming for emergency calls as soon as possible.

We will ensure that consumers continue to enjoy the benefits of competition

1.19   Competition in the mobile sector has, on the whole, been a success for UK consumers. This success derives in part from the existing market structure (underpinned by spectrum allocation).

1.20   However, we see trends that may put pressure on today's market structure and may lead to new competition issues:

- Competitive pressure on mobile operators, exacerbated by a challenging business climate, may drive further moves by operators to share networks or even to merge. Recent press speculation about changes to the UK market structure illustrates how rapid and unpredictable such changes can be.

- New service providers and applications could intensify competitive pressure.

- Limits on spectrum to support next-generation mobile networks may affect the number of '4G'[8] networks that are able to emerge in the UK.

- The appetite to invest in these new networks in the short term will inevitably be influenced by the current business climate and by access to credit.

1.21   Our priority is to ensure that customers (whether individuals or businesses) continue to benefit from fair and effective competition as the market develops:

- We will closely monitor competition between mobile access networks, and be ready to use our powers to ensure that consumers do not suffer from a significant reduction

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[8] We use this term broadly to mean LTE, WiMAX or other next-generation mobile technologies.

in competition. In doing so, we will consider the benefits of any network sharing or consolidation for coverage alongside the potential risks for competition.

- We see service and content competition becoming more important, and are keen to encourage an environment in which third parties can access networks to offer innovative propositions to consumers. The evidence today is that markets broadly achieve this objective - but if necessary, we will use our competition and regulatory powers to help ensure the market works effectively.[9]

- We propose to take a more active stance on ensuring that new spectrum licensees have access to key industry processes such as interconnection and number porting, to maximise consumer benefit from new services, technologies and innovative business models.

1.22   A few stakeholders asked us to launch a more wide-ranging review of competition issues. Some have been explicit in their desire that such a review be a platform for extending access regulation from the fixed sector (where regulated access is the norm) into the mobile sector (where it is not).

1.23   Our analysis shows that at the retail level the mobile sector is serving citizens and consumers reasonably well. The way competition works in fixed telecoms, with all competitors reliant to some extent on BT and a legacy of monopoly supply, is profoundly different to the development of the UK mobile sector. We do not see evidence of market failure of the sort that prompted major intervention in the fixed sector in our *Strategic Review of Telecommunications* in 2005.[10]

1.24   Therefore, we do not intend to undertake a wider market review, apart from the review of the market for wholesale mobile voice call termination.

1.25   We have not found an indication that so far the levels of investment and innovation in the UK have lagged significantly behind other comparable markets internationally. However, we will examine more closely the geographic reach and quality of coverage

We will act to protect consumers in an increasingly diverse mobile market

1.26   The second major finding of the mobile sector assessment is that competition alone is not always sufficient to protect consumers and to create conditions for them to act with confidence in the market.

1.27   Given the importance of the sector to UK consumers, it is right that there be effective protection against unacceptable practices. Recently we have taken action to prevent mobile mis-selling and to protect consumers from unfair additional charges. We intend to

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[9] Ofcom is a concurrent competition authority, sharing powers and duties with the OFT in enforcing competition law. Regulatory powers that may be relevant in future in this context could include, for example, requiring providers of mobile internet to be clear about how they prioritise traffic among different users and services.

[10] For example: there are multiple competing mobile network operators with national reach; market shares have shifted in recent years; new mobile virtual network operators (MVNOs) have entered the market; and we have seen evidence of innovation in pricing and services; and margins are below the levels seen in most of the EU.

continue to set rules where needed, and to act promptly to enforce those rules and general consumer law.

1.28   Our consumer policy objective, which applies across all communications markets, is to ensure that consumers benefit from well-functioning markets, are effectively protected from financial and physical harm and from unreasonable annoyance and anxiety, and are enabled to make informed choices.

1.29   The mobile sector is becoming more complex and diverse, and further consumer issues are bound to appear. As the sector changes, rules to empower and protect consumers may also need to adapt.

1.30   We want to provide as much regulatory certainty as we can, and to seek to prevent, rather than merely respond to, new issues. We therefore propose to adopt a framework that sets out: our objectives; how we will assess their achievement; and how we will identify and implement the most appropriate regulatory response.

1.31   We will monitor and report on progress in our annual *Consumer Experience* report, while continuing to engage with industry and consumer groups to identify issues in the sector and to respond proportionately.

We will continue to promote and facilitate access and inclusion for people with disabilities

1.32   Not everyone has been able to benefit from mobile services to the same degree – for example, people with disabilities and groups with specific needs, such as elderly people, have been less likely to take up mobile services than the rest of society. These consumers have reported difficulties such as handsets that interfere with hearing aids, complex pricing and availability of special customer services that meet their needs.

1.33   In the future, mobile devices will increasingly be used to receive content and applications, including access to public services,[11] democratic opportunities (such as engaging with political candidates), health opportunities (such as receiving text reminders about appointments), and opportunities to engage with social networks. This will make access for all who want it even more important.

1.34   We are taking a co-ordinated approach to these issues across the sectors we regulate through our work on access and inclusion.[12] We are engaging with disabled groups, mobile operators and other sector organisations to investigate further ways to tackle barriers to access and to enable use of mobile services by people with disabilities.

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[11] The trend towards increasing public services delivered online is highlighted in the Digital Britain final report. As described in Section 3 of this consultation, mobile will become increasingly like the internet, and inevitably, as public services move online they will also become mobile.

[12] One of Ofcom's priorities in 2009/10 is to understand what more we could do to address barriers to digital inclusion. The Access and Inclusion Review we published in March is considering these issues across the communications sector. It can be accessed at: http://www.ofcom.org.uk/consult/condocs/access/.

We will investigate the underlying causes of not-spots and work where we can to facilitate better coverage

1.35   Coverage of mobile networks in the UK is generally good. Indeed, it is better than in other comparable countries, but some issues persist:

- For 3G network coverage there is still a noticeable difference between rural and urban areas, and also between different parts of the UK, with coverage problems a particular issue in the devolved nations.

- 2G coverage is unlikely to be extended much further than it stands today, leaving a number of 'not-spots' across the UK, including but not limited to remote locations.

1.36   Mobile services have become central for UK citizens and consumers and for businesses. We have therefore decided that now is the right time to look into coverage issues in more detail.

1.37   Coverage issues come in different forms: complete not-spots, where no coverage exists at all; gaps in 3G coverage (areas where only 2G is available); not-spots in a specific network (where other networks are available); and issues with network quality such as areas with poor or unreliable coverage where networks are ostensibly available.

1.38   Often, these issues are highly local – in other words, there is no single underlying cause linking all coverage problems (nor, therefore, one standard solution). Local topography may play a part, as well as planning obstacles. Some affected areas are remote and sparsely populated, making mobile coverage costly. Furthermore, the intrinsic nature of cellular technology makes it extremely difficult to provide seamless, 100 per cent coverage across the country. Put simply, coverage issues are complex and aiming to solve all of them may be unrealistic.

1.39   However, we do believe that commercially-driven 3G roll-out in particular can still go further than it does today, despite these challenges. We believe that the sub-1GHz spectrum that will become available by liberalising the use of 2G spectrum and through the digital dividend[13] could play an important role in extending 3G coverage, especially in rural areas and indoors (as well as supporting the growth of mobile broadband networks). We also believe that network sharing agreements could contribute to increased coverage.

1.40   Ultimately, commercially-driven coverage will reach its limit. When that occurs, the question will arise: does that coverage meet the UK's needs – or is there a case for going further? Preparing for that point, in addition to assisting the Government in working towards the liberalisation and release of the relevant spectrum, we will be undertaking research looking at the causes of mobile not-spots as well as issues with network quality. Our aim is to increase the understanding of all stakeholders of the issues and their underlying causes.

1.41   If the social benefits of coverage are strong, then the question of further roll-out falls, to a large degree, into the domain of wider universal service discussions.

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[13] The spectrum available as a result of switchover to digital terrestrial television (DTT).

1.42   We will therefore continue our active dialogue with the Government on the detailing of its Digital Britain proposals to establish the role of mobile in delivering universal access, in particular of broadband services.

1.43   To address persistent 2G not-spots (or 'complete not-spots') we intend to explore how we might encourage creative solutions. For example, we intend to work with mobile operators and with public bodies in the Nations, regions and localities to bring together relevant expertise as they consider initiatives to resolve not-spots in their areas (as we have done previously with local broadband initiatives).[14]

1.44   Finally, we are committed to reaching a solution with mobile operators and emergency services on 999 roaming. The benefits to consumers of this facility are obvious – including, in some cases, saving lives – and prompt implementation is the fastest way to achieve this. We welcome the mobile industry's support for this initiative and, subject to successful testing; we expect this to be introduced by the end of the year.

We have initiated a review of mobile call termination charges

1.45   The regulation of payments to deliver calls between networks (mobile call termination charges) and our spectrum policy have long been the regulatory foundations of the mobile market. In parallel with the mobile sector assessment, we are conducting work to ensure that our policies in these areas keep pace with the changing sector.

1.46   On 20 May we published a consultation document that discusses the future of mobile call termination charges. It contains our preliminary work in preparation for the review of mobile call termination charges that will determine the regime after 2011.

1.47   We affirm our view that the forthcoming market review should consider all the options for mobile call termination. It may be the case that our existing approach will not be the best solution for the future, given the prospects for fixed-mobile substitution and, in time, convergence. We also want to reduce, where possible, the regulatory burden on industry. We also want to ensure we take utmost account of the recent Recommedation by the European Commission on these issues.[15]

1.48   Our preliminary consultation is therefore going back to first principles, reviewing the purpose and ends of this form of regulation and exploring a range of alternative approaches. We have asked explicitly: should we adopt a strategy of reducing mobile termination rates as far and as fast as we reasonably can, within the boundaries of sound economic policy and the legal framework, and while recognising underlying cost differences?

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[14] See, for example, the Government and Ofcom's guidance to public bodies considering public investment in broadband schemes: 'Public Broadband Schemes: a best practice guide', DTI/Ofcom, February 2007, available at http://www.berr.gov.uk/files/file37744.pdf

[15] Commission recommendation of 7 May 2009 on the Regulatory Treatment of Fixed and Mobile Termination rates in the UK (2009/396/EC) http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:124:0067:0074:EN:PDF

We will assist Government in its efforts to make spectrum available for mobile broadband services

1.49   The release of new spectrum suitable for next generation mobile technologies and the liberalisation of the existing 2G spectrum will play an important role in supporting the growth of mobile broadband and improving the coverage of mobile broadband networks. We are keenly aware of the importance of making suitable spectrum available and have been working on the release and liberalisation three main frequency bands suitable for mobile services: the current 2G licences; the 2.6 GHz band; and part of the digital dividend (the 800 MHz band).[16]

1.50   Within the Government's Digital Britain programme, the Government has sought to identify a solution to rebalance current spectrum holdings in a manner which is acceptable to stakeholders. At the time of publication of this consultation document, this process has advanced to the point where the Government's appointed 'Independent Spectrum Broker' has made recommendations, and the Government's final Digital Britain report has endorsed the broad approach proposed by the Independent Spectrum Broker and initiated a process of guiding technical arbitration.

1.51   We will assist the Government in its efforts to resolve some of the related issues, and, where appropriate, in the practical implementation of the Independent Spectrum Brokers' policy proposals.

1.52   It is too early to tell whether the process initiated by the Government will lead to a solution which is acceptable to all parties, and what action Government may decide to take. We expect to be able to respond in more detail to the outcome of that process in the MSA Statement later this year, which will also deal with the wider issues raised in this consultation document.

1.53   If for any reason the Government were not to direct Ofcom on these matters, we as the independent regulator would have to reconsider all of the issues being considered by the Independent Spectrum Broker and the Government in the context of Digital Britain. On the basis of the evidence available to us at the relevant time, we would need to decide what actions to take to secure optimal use of the radio spectrum and promote competition in the provision of mobile and other services, for the benefit of UK citizens and consumers, following due consultation, and in the light of our statutory duties and powers.

1.54   We believe that when debating the approach to these frequencies and the timing of their availability, it is important to consider the impact of the proposed solution on consumer benefit from availability and quality (particularly indoors and in rural areas), and that arguments for co-ordination need to be weighed against arguments for early release.

Content issues are real, but industry self-regulation has helped reduce risks

1.55   An ever-growing range of content is accessible via mobile. Users can now download applications that allow them to navigate, choose a restaurant, identify music, and much

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[16] Our most recent consultations on 2G liberalisation and on the digital dividend can be found at: http://www.ofcom.org.uk/consult/condocs/spectrumlib/ and http://www.ofcom.org.uk/consult/condocs/800mhz/

more. Many of these services are similar to those on the fixed internet, e.g. social networking sites, instant messaging, VoIP and content downloads.

1.56   These developments are likely to bring many of the challenges we have seen on the fixed internet into the mobile world, including protection from harmful and inappropriate content, privacy, illegal file-sharing, scams and fraud.

1.57   These challenges will be exacerbated by the specific characteristics of mobile, such as its personal nature, the ability to locate and track the location of users with mobile handsets, and the anonymity of pre-pay mobile services.

1.58   Mobile operators have acknowledged the challenges that mobile content may pose, in particular to children, and operate a self-regulatory regime to address these. We reviewed this regime in 2008 and found it to be largely effective.[17] It has our continued support.

1.59   We will work with mobile operators, consumer organisations, the Government and other relevant bodies to discuss the additional challenges that broadband on mobile devices may bring, and to determine which role each organisation can play to ensure that consumers can access the ever-greater variety of services on their mobile devices with confidence.

Adapting regulation for a mobile-centric world

1.60   Our proposed regulatory focus is not a radical departure from our existing approach, but it represents a significant evolution, reflecting the growing maturity of the mobile market over recent years. We are convinced that the current challenging economic conditions may delay, but will not stop, the development of services and technologies in the market.

1.61   While we cannot determine today what rules will be appropriate to deal with tomorrow's challenges, we can increase regulatory certainty by providing all stakeholders – consumers, operators and investors – with a clear picture of the principles and approach we intend to follow when deciding whether to impose or remove regulation.

1.62   Ultimately, there remain many unknown factors that will influence the UK mobile sector. How will mobile broadband develop? Will we see further fixed/mobile substitution or convergence? How far will the trend to share networks continue? With so much unclear, principles, together with a commitment to evidence-based regulation and clarity of purpose, are more important than hard-and-fast rules. As we adapt regulation, and seek constantly to improve and refine the rules we already have, our approach will remain focused on one single and straightforward objective: to do all we can to help deliver the benefits that mobile services can bring to the UK citizen and consumer.

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[17] http://www.ofcom.org.uk/advice/media_literacy/medlitpub/ukcode/

Section 2

Introduction

This second consultation in the mobile sector assessment sets out how mobile regulation may need to evolve in a changing market

2.1   We embarked on the mobile sector assessment in early 2008, asking: "Should Ofcom revise its approach to regulation of the mobile sector, in order to respond to the changing market environment?"

2.2   We felt that it was the right time to ask this question, when the UK had 'gone mobile' to a significant extent, and the 'second mobile revolution'; mobile internet and data services, was about to fully emerge.

2.3   In August 2008, we published our first consultation for the mobile sector assessment ('MSA 1'). This first consultation focused on taking stock: it mapped the status quo of the sector and its regulation and it identified the market trends and characteristics that we believed would shape the sector, and its regulation, in the future. We did not put forward any policy proposals at the time.

2.4   Since then we have received feedback from stakeholders, conducted further research and revisited the findings from our stakeholders. This consultation presents our conclusions from this additional work as well as setting out questions for further consultation.

2.5   We reiterate our vision for the mobile market and discuss how well it is functioning for citizens and consumers. Based on our research evidence, the state of the market today and the trends we outline, we set out our proposed response to our overarching question: whether we should revise its approach to regulating the mobile sector.

2.6   Mobile services have been a tremendous success story for consumers and citizens. Our focus is to ensure that they benefit citizens and consumers in the best possible way.

2.7   We anticipate that mobile services will continue to play a central role in citizens' and consumers' use of communication services. Indeed, mobile services are likely to become even more important than they are today as changes in services accelerate. The boundaries between the fixed and mobile sector will erode further; new network technologies, handsets and applications will make the market more fluid and complex than today, and at the same time, commercial pressures may lead to greater network sharing and potentially, access network consolidation. But, as we showed in our MSA 1 consultation, not everyone benefits from mobile services to the same degree, and this too is relevant to our duty to further the interests of citizens and consumers.

2.8   Consultation responses, and our analysis, pointed us towards a number of areas to examine further: competition in the mobile market, protecting consumers from scams and mis-selling, access and inclusion for elderly and disabled people, network quality and coverage, and mobile call termination. Each of these areas is discussed in detail.

2.9 In the past, regulation in the mobile sector focused primarily on the regulation of spectrum and the regulation of payments for the interconnection of networks between operators (known as mobile call termination). These remain critical for supporting competition and innovation in the sector. We are continuing to work in these areas through dedicated projects. We provide a discussion of spectrum issues and of our preliminary consultation on mobile termination rates in Annexes 5 and 6.

2.10 This second consultation sets out our conclusions about how well the UK mobile sector is performing for citizens and consumers, outlines how we think the market might evolve and describes the policy approach and specific actions that we intend to take to bring about this vision.

2.11 It describes our view of how the balance of regulation will have to evolve in the future, and aims to define our strategy for the future direction of mobile regulation, rather than resolving specific current policy issues.

Mobile has become the most prevalent telecoms technology

2.12 The first mobile call in the UK was made on 1 January 1985.[18] As seen in Figure 1, mobile is now the most popular telecoms technology in the UK.

### Figure 1 : Household penetration of telecoms technologies
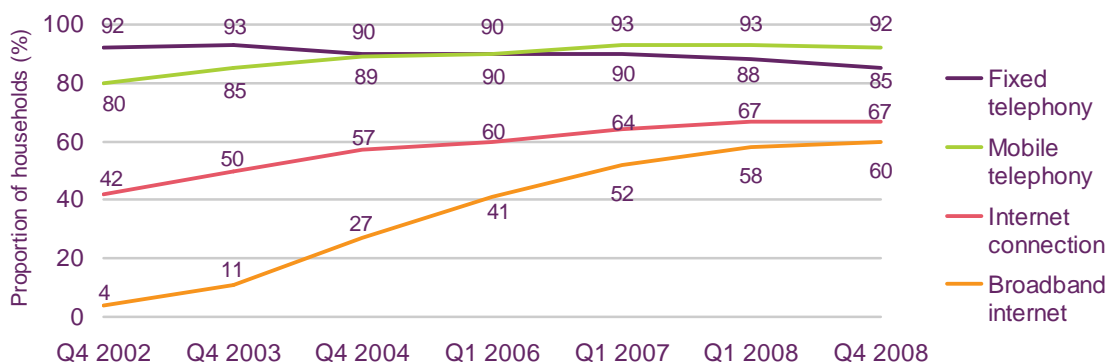
Source: Ofcom research

2.13 The penetration of mobile telephony in UK households is now showing signs of maturity, stabilising at around 92 per cent (see Figure 2). Total mobile connections, however, continue to grow, driven by new users in the business sector and the growing number of users with more than one connection, as seen in

2.14 By revenue, the mobile sector comprises 51 per cent of the UK telecoms sector. We estimate that, by mid-2010, more than half of all voice traffic in the UK will be mobile.[19]

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[18] Britain's first mobile phone call was made across the Racal Vodafone network on 1 January 1985 by comedian Ernie Wise.
[19] In 2007 mobile accounted for 40 per cent of total voice minutes and its share is growing by around 10 per cent per year. Source: http://www.ofcom.org.uk/consult/condocs/retail_markets/fnrsm.pdf

Figure 2: Mobile connections and penetration: 2002-08

Mobile connections and users

Mobile penetration
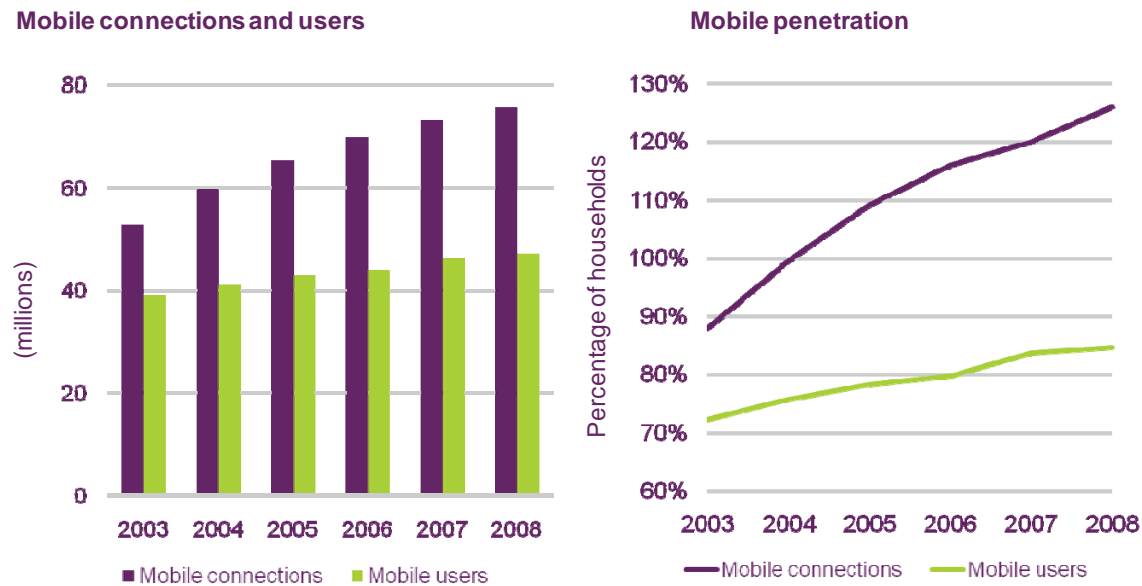
Penetration based on population aged 8+

Source: Ofcom research

Today, not all citizens and consumers benefit from the sector to the same degree and some problems remain

2.15   In the MSA 1 consultation we recognised that overall the mobile sector has delivered great benefits to citizens and consumers. Nevertheless there remained some problems:

- A significant minority of consumers remained dissatisfied. Given the scale of the industry, relatively small percentages can under-emphasise the real difficulties experienced by millions with mobile services. In individual cases detriment can be very high.

- Coverage of mobile networks is generally good, although there are still areas of the UK which are not served by some or all of the operators. People living in those areas, and businesses seeking to serve them, may be disadvantaged by lack of access to mobile voice and data services.

- There are also groups of people who are excluded from mobile services for other reasons. For example, we reported that elderly and disabled people have disproportionately low levels of mobile ownership.

2.16   As mobile becomes a more important way to communicate, these issues become more significant.

This picture was confirmed by consultation responses and shaped our thinking on priorities for this second phase of work

2.17   We received approximately 140 responses in total to our first consultation (109 from individuals, 34 from organisations). Annex 9 summarises the consultation responses received, and individual sections of this document discuss the responses in more detail, but in broad terms the responses can be summarised as follows:

- Members of the public painted a mixed picture in terms of the services provided and questioned the competitiveness of a market in which some users perceived all operators' offers to be the same and prices to be high.

- Consumer organisations highlighted the increasing complexity of offers and the need for us to provide a 'safety net' for disadvantaged users.

- Mobile operators reiterated that the market is highly competitive and that 'general consumer concern' about mobile does not warrant any further intervention.

- Representatives of service providers, and new entrants, stressed the need for a level playing field for smaller players and those new to the market.

2.18   These contributions have helped shaped our thinking in this phase of our work:

- We have looked carefully at the structure and competitiveness of the market and how it may change in the future. We believe that competition in the mobile sector has delivered substantial benefits to consumers and citizens to date, and will continue to do so in the future. We also recognise the commercial pressures on mobile operators, particularly in economically difficult times, and operators' need to generate a return on existing and future investment.

- We are alert to the need to protect consumers in an increasingly complex environment, and the importance for citizens to be able to access mobile services. As mobile services grow in importance in consumers' lives, the importance of ensuring that consumers get a fair deal also grows.

- We are also keen that citizens can benefit from mobile services independent of age, disability, income or which part of the UK they live in. In particular, we believe that we need to take a closer look at the problems citizens and consumers experience with mobile coverage, and why mobile 'not-spots' persist. We also need to consider the problems faced by particular groups of users, specifically elderly people and people with disabilities, in making the most of mobile services.

- We also discuss the challenges that may be posed by the increasing availability and take-up of mobile content. This issue is explored in Section 9.

Our focus is to ensure that the market serves citizens and consumers in the best possible way

2.19   In the MSA 1 consultation we outlined our vision for the UK mobile sector. Our vision is for a UK mobile and wireless sector that serves the needs of those who live and work in the UK by offering them:

- a wide choice of competing providers of mobile and wireless networks, that consumers can use reliably while commuting, travelling, at home or in the office;

- easy and reliable mechanisms to allow consumers to switch between competing network and service providers;

- a wide choice of good value and affordable mobile and wireless services (voice and data) - including mobile internet access that is, as far as technically feasible, as open and flexible as today's fixed internet;

- a diverse range of high-quality content and, where appropriate, protection from harmful content;

- coverage across as much of the UK as is economically feasible (and potentially going further, where that is socially desirable); and

- protection from unfair practices and scams, including those that infringe citizens' interests in protecting their personal information, identity or location.

2.20   This vision was endorsed by the majority of respondents to our consultation.

We continue to believe that the best route to achieving our vision is through well-functioning markets

2.21   We believe that our vision for the mobile sector can best be achieved by a market that exhibits a high degree of network and service competition, and that provides citizens and consumers with a regulatory safety net where necessary.

2.22   Our starting point with regards to regulation of the mobile sector is our regulatory principle that we will: *"operate with a bias against intervention, but with a willingness to intervene firmly, promptly and effectively where required."*[20]

2.23   We propose to adopt three strategic principles that will inform our approach to the mobile sector and address the objectives outlined above:

- **Using markets where we can**. We will rely on market forces to deliver our vision for the mobile sector wherever possible.

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[20] See Ofcom's regulatory principles at http://www.ofcom.org.uk/about/sdrp/

- **Recognising the limits of markets**. We will respond to market failures and consumer protection needs with focused intervention.

- **Widening the focus of regulation to reflect a changing mobile sector**. We will act with a view of the bigger picture, keeping regulation relevant by ensuring that it evolves to reflect the growing importance and complexity of mobile services.

2.24   These principles do not represent a radical departure from today's approach. Instead, they signal our intention to consolidate the existing success of the mobile market, respond to its shortcomings and lay the groundwork for further regulatory simplification as convergence continues.

2.25   In the rest of this section we describe what we consider to be the main challenges involved in achieving our vision for the mobile sector, and set out how the responses to the MSA 1 consultation and our further analysis have determined our priorities for this document.

Remainder of this document

2.26   The remainder of this document falls into seven sections, reflecting the issues that are our particular priorities, following the MSA 1 consultation:

- In **Section 3: The changing market environment** we describe our view of the future evolution of the mobile sector, driven by demand, service innovation, technology change and a growing demand for spectrum. It also highlights the resulting regulatory challenges.

- In **Section 4: Competition and new entry** we describe how we propose to address challenges that may arise from potential changes to the market structure, triggered by economic pressures, the advent of next generation networks (NGNs), the growing role of applications and services and spectrum availability.

- In **Section 5: Investment** we assess evidence on levels of commercially driven investment in the mobile sector, looking at network investment and the introduction of new technologies and services to the UK relative to other major European countries.

- In **Section 6: Consumer protection and empowerment** we explain our approach to consumer protection and empowerment in an increasingly complex mobile market. We describe our principles for prioritising and addressing consumer issues and for establishing the most appropriate regulatory response.

- In **Section 7: Access and inclusion for disabled and vulnerable citizens** we highlight the challenges that disabled and elderly users face when using mobile services and handsets. We published a consultation on Access and Inclusion in March 2009, which also described our regulatory priorities and proposed actions across the communications sectors. In this document we summarise the conclusions and actions relevant to mobile.

- In **Section 8: Coverage** we describe the challenges that consumers and citizens face with regard to the reach and quality of mobile networks. As mobile services

become more important, expectations of network reach and quality rise. We outline what we see as the contributions from us, and from other stakeholders, to ensure that mobile networks deliver optimal service availability and quality to citizens and consumers.

- In **Section 9: Mobile content** we outline the challenges for consumer protection and privacy that arise from growing access to internet content over mobile phones. It describes how we propose to engage with stakeholders to find appropriate ways of ensuring that the consumers can access, with confidence, the new wealth of content and applications available via mobile devices.

2.27 In order to provide the relevant context to our views we also include a number of annexes, which give more detail about some of the issues discussed in the main body of the document, or which summarise our positions in some important areas which affect the mobile sector although they are outside the direct scope of the MSA:

- In **Annex 5: Spectrum for mobile broadband** we are providing an overview of the frequency bands relevant for the future growth of mobile broadband.

- In **Annex 6: Mobile Voice Call Termination** we introduce the main lines of thought of our consultation on mobile termination rates, also launched today. It outlines why we think the time is now right to launch a market review of the mobile voice call termination market, and highlights the potential changes that we are considering.

- In **Annex 7: The growing capabilities of mobile handsets** we provide profiles of a number of recently-launched mobile handsets in comparison to older models, to highlight the growing capabilities of mobile devices.

- In **Annex 8: Summary of consultation responses** we summarise the consultation responses received to the MSA 1 consultation.

- In **Annex 9: Glossary** we define the most important technical terms used in this consultation document.

Next steps

2.28 We welcome responses to the consultation questions set out in this document; the consultation period runs until 16 September 2009.This consultation is the second in a series of three documents. We expect to close this project with a statement in autumn 2009. By that stage, we will have consulted extensively on matters relating to the state of the mobile sector, and therefore we intend to make the main focus of that statement a short consolidation of the strategic principles we will apply in the mobile sector in future.

2.29 Some areas of work will go on beyond the time horizon of this project, specifically our work on assessing mobile coverage and on mobile termination rates. We outline our plans for taking this work forward in the relevant sections of this document.

Consultation question

2.1 Do you agree with our principles for mobile regulation?

Section 3

The changing market environment

Summary

3.1   The mobile sector has grown in importance for citizens and consumers, and it will continue to change. This section introduces the trends that we believe are likely to shape the sector in the next five years and beyond. We first summarize stakeholders' reactions to the four scenarios presented in the MSA 1 consultation and then present our further thoughts on the evolving dynamics of the mobile environment.

3.2   In general, stakeholders recommended that we take a cautious approach when considering future market developments. Some feared that we might embark on premature regulatory interventions that could alter sector dynamics.

3.3   We believe that it is necessary to make evidence-based well-informed views about how the market may change, in order to map out a strategic approach to the mobile sector. In the fast-evolving wireless industry, all players – manufacturers, operators, researchers, investors, regulators and more – are required to take a forward-looking approach to efficiently plan their future activities. However, we are also conscious of the limits and pitfalls of doing so, and we are not trying to predict the future in a prescriptive way.

3.4   Mobile internet services (both on mobile handsets and on computers through 'dongles') show signs of entering a virtuous circle of demand, new services and technical capabilities. Flat-fee offers have accelerated mobile broadband take-up, acting as a catalyst for consumer demand. In principle, as users take advantage of new applications and services, operators are driven to invest further in infrastructure and so improve access speeds and backhaul network capabilities. In practice, dramatic increases in data traffic may make this challenging.

3.5   We believe the following trends are critical:

- Fixed and mobile networks are starting to converge. The planned adoption of next-generation networks and IP multimedia technologies, by both fixed and mobile operators, will make fixed and mobile networks (and services) more homogenous.

- The advent of new technologies such as 3.5G and 4G is bound to steadily increase network capacity and data-rates over the next five to ten years, reduce the costs of delivering existing services, and enable new services and applications.

- The scope for service innovation and competition is likely to increase. Adding new services over next-generation mobile networks is likely to become easier and cheaper and new players may be able to enter the value chain without incurring high upfront network costs. As a result, the pool of applications providers is already becoming larger and more diverse (including players based outside the UK).

- Mobile operators may come under increasing pressure as device manufacturers and applications providers seek direct customer relationships. Over the next few years at least, they will also be operating in a challenging economic environment. Mobile

operators are likely to retain a strong position in voice and SMS markets, but their position in the applications and service space could become more contested.

- We may see stronger trends towards market consolidation. Factors such as the increased ability and willingness of mobile operators to share 3G radio access networks (RANs), the increased network sharing capabilities of 4G technologies, and the limited availability of spectrum could all create pressure to reduce the number of stand-alone mobile networks operating in the UK.

3.6   All these sector trends are likely to put pressure on the way we regulate the mobile market.

In the MSA 1 consultation we presented four scenarios

3.7   In the MSA 1 consultation we presented four complementary scenarios that considered the possible directions of development of mobile and wireless markets over the next five years and beyond. We also sought to examine what these trends might mean for services, products and competition. These scenarios were not predictions; nor were they designed to be mutually exclusive or totally exhaustive. They should be taken together as a single piece of work, providing a range of possible market outcomes. Their purpose was to illustrate the degree of uncertainty that exists about how the UK mobile market might develop and the possible regulatory issues that could arise as a result:

- In scenario 1 we postulated that mobile voice services continue to be the major source of revenue for mobile operators, and that the size of **voice and SMS** bundles continues to increase. Demand for mobile data services continues to increase, but slows from current 'early adopter' rates, as mobile data access remains limited by retail terms (such as usage limits) and continues to be above prices for data access over a fixed network.

- In scenario 2 we considered the possibility for an increase in **mobile use in the home**, facilitated through technological developments that enable mobile operators to differentiate between use in-home and out-of-home. In this scenario, mobile services increasingly displace fixed services as the main form of telephony provision inside and outside the home or business premises.

- In scenario 3 we envisaged a future in which more consumers **access the internet over a mobile device** more often, leading to increasing data volumes. Although content providers and handset manufacturers see benefits, mobile operators face the risk of becoming 'data pipes' – and, in a way analogous to fixed broadband providers, find it difficult to extract profit from the growth in data. This is due to two factors: the network investment required to handle increased data volumes, and the fact that consumers value the content they are browsing and applications they are using, rather than the pipe or portal which is carrying the content. Furthermore, instant messaging and VoIP applications may cannibalise mobile operators' existing core revenue sources.

- Scenario 4 considered a future where mobile technology becomes more widely used for applications that move beyond the direct provision of **personal communications**. Mobile operators extend their current business model beyond the

voice, SMS and data products provided today, such as 'machine-to-machine' applications, e.g. remote metering or mobile payment mechanisms.

Responses from stakeholders

3.8   In responding to the consultation, some stakeholders reminded us to be cautious in attempting to predict the future, specifically with respect to emerging services such as mobile broadband:

"Virgin Media suggests that it is therefore extremely difficult at this stage to predict the future for wireless markets beyond a 3 year or 5 year period and would urge Ofcom to adopt a cautious approach in making any decisions that require a longer term perspective to be taken." Virgin Media

"The fact that the analysis largely overlooks a number of key developments that are already identifiable [in relation to VoIP, convergent products, NGNs] highlights just how unreliable it is for a regulator to seek to develop regulatory policy today on the basis of expectations of how markets might look several years from today." T-Mobile

"Future gazing is always fraught with uncertainty, and the past is not necessarily an accurate guide." Vodafone

"Regulatory intervention at this point, with the market in its infancy and changing rapidly, could have disastrous long-term unintended effects, distorting investment and stifling the ongoing innovation and experimentation that is critical in this early stage of mobile broadband deployment" AT&T

3.9   Some stakeholders highlighted the importance of specific trends, such as the further growth of mobile broadband and fixed-mobile converged products.

"The most significant trend in mobile markets in the near future will be continued growth in mobile broadband take up, including the use of multimedia based services." Ericsson

"Convergence of fixed and mobile networks, the ability to port between fixed and mobile, and mobile data will have significant influence on mobile and wireless markets in future." Mapesbury

"There will be a convergence between fixed and mobile services in that mobile network operators (MNOs) are likely to become able to offer a "home comms" service." SSE

The most significant trends are "Convergence of fixed, mobile, broadcast platforms. Growth in mobile broadband." Federation of Communication Services.

3.10   Others indicated that they did not foresee a significant change from today's market structure, or that any change will depend on the strategies of the players themselves.

"It is unlikely that VoIP services on mobiles will fundamentally disrupt the market in the way envisaged by Ofcom." Virgin Media

"Whether or not mobile operators will become 'data pipes' in the future mobile broadband market is unknown and will depend on their commercial strategies." Orange

3.11   We have taken all these comments into account in the description of our view of market trends and their potential future impact below.

Understanding mobile market developments is critical to making informed regulatory choices for the future

3.12   We recognise the high level of uncertainty when looking at the potential evolution of the mobile market. However, we consider it essential to develop informed views of market developments to ensure that regulation does not fall behind market developments.

3.13   Since the MSA 1 consultation, our view on the changing market environment has evolved. Consultation responses and the latest market developments have highlighted some of the trends that many stakeholders believe will shape the sector.

3.14   We initially focus our analysis on a small number of trends which we think will affect the future of the mobile sector. These trends draw primarily on the evolution of the mobile internet described in scenario 3 and the future of fixed-mobile substitution described in scenario 2. The trends are:

- Trend 1: Mobile voice is likely to remain the majority source of revenue for mobile operators in the short to medium term.

- Trend 2: Mobile data services will continue to grow rapidly.

- Trend 3: Mobile content and applications will become internet-based.

- Trend 4: Mobile networks will become Next Generation Networks (NGNs).

- Trend 5: Prospects for fixed-mobile convergence are growing.

3.15   These trends also reflect the developments highlighted to us by stakeholders.

3.16   After analysing the impact of these trends we will discuss the regulatory implications for Ofcom at the end of the section.

Trend 1: mobile voice likely to remain the majority source of revenue for mobile operators in the short to medium term

3.17   Voice continues to be the most important mobile service, ahead of SMS and data services. It remains the main source of revenues for mobile operators. Voice and SMS revenues grew between 2003 and 2008, from £10.4bn to £14.3bn (see Figure 3).

3.18   This is consistent with the growth of mobile call minutes. Between 2002 and 2007, mobile call minutes increased by 47bn, whereas fixed minutes declined by 17bn and mobile calls are now 40 per cent of total call volumes. [21]

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[21] Fixed Narrowband Retail Services Markets, Ofcom, March 2009., http://www.ofcom.org.uk/consult/condocs/retail_markets/fnrsm.pdf

Figure 3: Estimated mobile retail revenues by service 2002-08
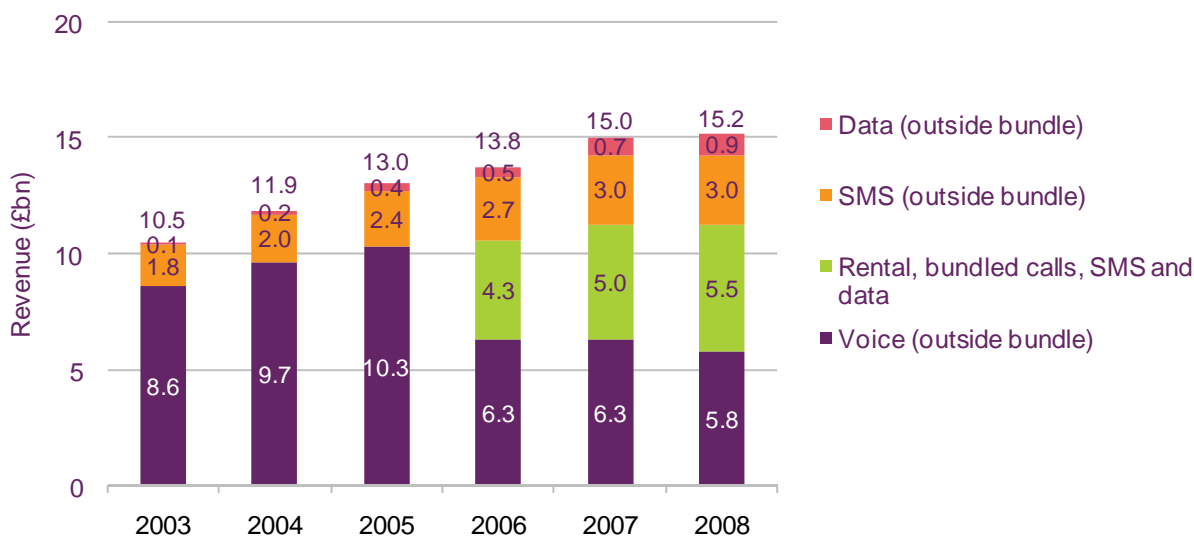
Source: Ofcom

Trend 2: mobile data services will continue to grow rapidly

3.19 Since the launch of 3G technology in 2003, take-up of mobile data services has been slow. This has changed over the past 18 months.

3.20 The two main areas of growth in mobile data services are:

- Mobile broadband (where mobile networks are used to access the internet from computers via dongles or embedded 3G interfaces). Since the launch of mobile broadband in 2007, sales have taken off, with more than two million new connections in the year from February 2008 to February 2009, as shown in Figure 4.

- Mobile data services on handsets. A growing proportion of mobile users within the UK use smartphones[22], which enable access to more advanced data features.[23] Research suggests smartphone owners are more likely to use mobile data services than owners of other handsets.[24] For example, 77 per cent of smartphone owners use email, 40 per cent use the GPS functionality, and 38 per cent use instant

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[22]A category of advanced mobile handsets; they run complete operating systems and have relatively large screens and powerful 'PC like' processors.
[23] 23 per cent of all UK handset sales in 2008 were smartphones, compared to only 13 per cent in 2007.
[24] Comscore, March 2009, http://www.comscore.com/press/release.asp?press=2759

messaging regularly on their smartphone. This compares with just 3 per cent of other handset owners using these features.[25]

Figure 4: Numbers of new mobile broadband connections
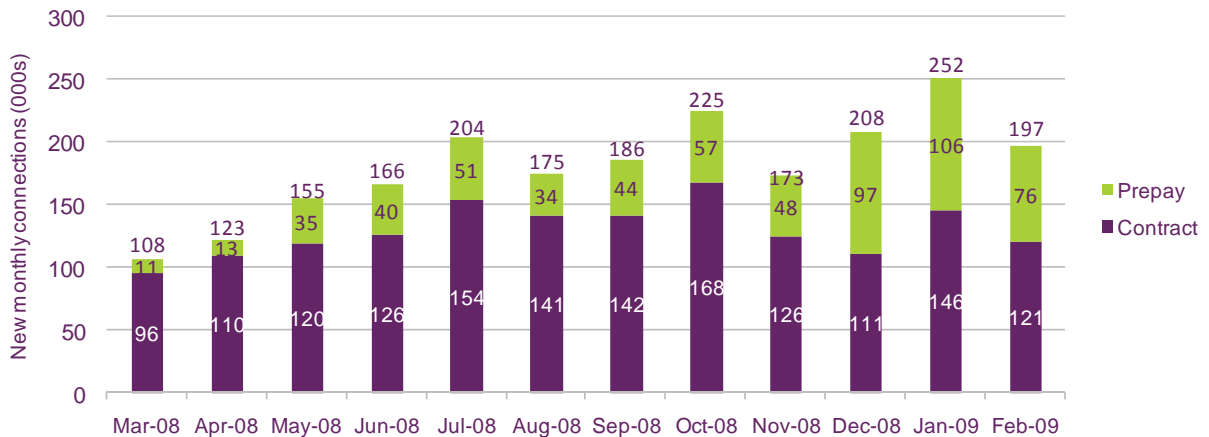
Source: GfK retail data

Note: covers consumer and business channels. Adjusted to cover 100 per cent of channels. Excludes Northern Ireland.

3.21　This subsection discusses the three main enablers of mobile data take-up:
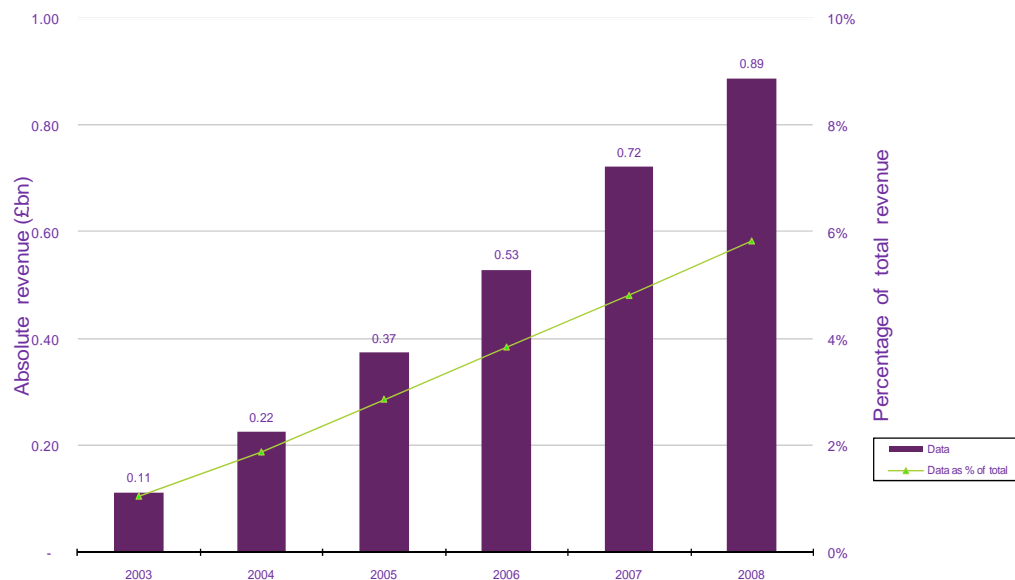
- increasing consumer demand;

- development and launch of new applications and services; and

- increased technical capabilities of devices and networks.

3.22　These factors are tied together by strong interdependencies forming a virtuous circle. We describe each factor in more detail below.

Demand side – increasing consumer demand

3.23　Consumers are spending more on data services, both in absolute terms and as a proportion of total mobile revenues. Revenues for data services (SMS excluded) rose from £0.11bn to £0.89bn, and from 1 per cent to almost 6 per cent of the total mobile retail revenues (see Figure 5).

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[25] TNS Global Telecoms Insight,
http://www.computerweekly.com/Articles/2009/04/09/235600/smartphones-keep-mobile-handset-market-afloat.htm

Figure 5: Growth of total data revenue

Source: Ofcom

3.24 Consumers' interest in mobile data services appears to have been stimulated by operators adopting innovative pricing structures. Operators have gradually replaced or supplemented the traditional 'per megabyte' pricing with flat-fee structures and bundled packages with unlimited data-browsing add-ons.[26] We believe that these new tariff structures have reduced uncertainty about the costs of using mobile data services and encouraged consumer take-up and use.

3.25 The uptake of data services in 2008 has caused an exponential growth of traffic volume: the amount of data volumes across UK mobile networks increased by a factor of six between the first and last quarters of 2008. However, as shown in Figure 6, the traffic growth in the last quarters was not matched by growth in data revenues. As data traffic continues to grow at exponential rates, it is likely that the capacity of mobile data networks is likely to become increasingly constrained. As discussed later, the resulting pressure to deliver higher capacity at lower cost may be a driver for NGN deployment.

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[26] In Q4 2007, for instance, Orange priced data connections on a very granular megabyte usage. It then moved to a flat fee of £15 for a much higher allowance of 3GB, as detailed in Pure Pricing reports from 2004 to 2009.

Figure 6: Data volumes and data revenues across selected UK mobile networks
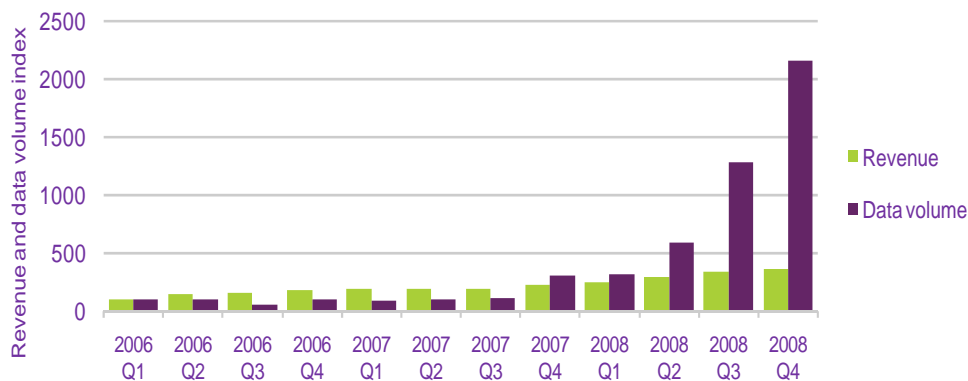
Source: Ofcom Basis: 100 in Q1 2006

Supply side – development and launch of new applications and services

3.26   The growth of consumer demand is matched by the growth, on the supply side, of mobile services and applications, significantly boosted in the past year by the phenomenon of application stores.

3.27   The application store is an online facility that enables users to download applications made available by a wide variety of software developers. Apple's iPhone is one of the first devices that started the trend towards application stores. Although it was not the first phone to allow users to install software on to handsets, it was the first to offer such a large and varied number of applications. In July 2008, Apple launched its own 'App Store' and since then more than 1bn applications have been downloaded.[27] Video games have been the most popular.[28]

3.28   Other companies are taking similar initiatives, e.g. Android by the Open Handset Alliance (OHA), Ovi by Nokia and Microsoft Windows Marketplace. Mobile operators are also competing for mobile phone applications, by launching their own application stores in a bid to catch up on handset and online players.

Supply side – increased technical capabilities of devices and networks

3.29   The data speeds now achievable over mobile networks, together with the increased capabilities of mobile devices, have created the right conditions for mobile data services to take off.

- Devices have more computing power and larger screens. As with PCs, some offer a web browser and run Java platforms allowing the use of a wide variety of

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[27] See http://www.apple.com/itunes/billion-app-countdown/
[28] See http://www.telegraph.co.uk/scienceandtechnology/technology/mobile-phones/5012383/Applications-let-mobile-phones-do-so-much-more.html

applications (In Annex 8 we compare five recent mobile devices with two relatively old phones launched in 2001).

- Mobile access networks have been improved to offer higher data rates, both in the downlink and uplink connections. 3G networks, for example, are being upgraded with High Speed Packet Access (HSPA) technologies, thereby allowing mobile operators to extend their mobile broadband coverage and offer improved data and streaming services.

3.30 As a result of these two factors, mobile consumers have a better user experience. The impact of these improvements can be seen in the way consumers use the devices. Figure 7 shows the percentage of mobile phone use, other than voice calls, in the UK in Q4 2008. The camera and photo management are by far the most popular functions, followed by game playing and mp3 listening. Internet access is still low with 13 per cent of respondents to our survey stating that they use the internet over their mobile phone.

Figure 7: Mobile phone use
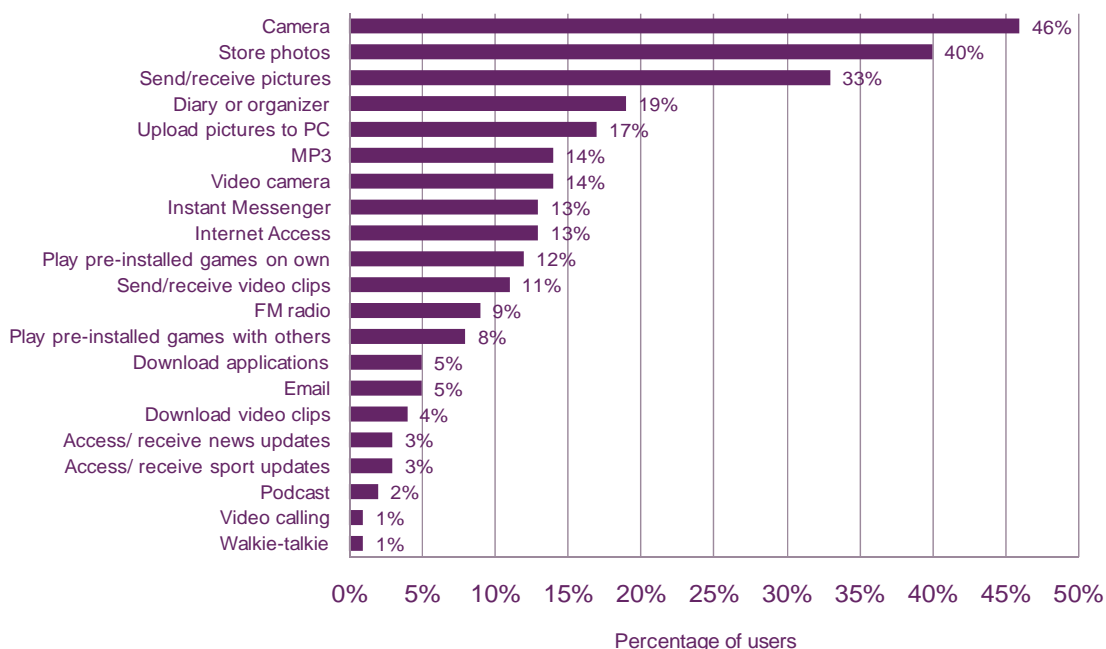
Source: Ofcom Communications Tracking Survey, Q4 2008
Question: Which if any of the following activities other than making and receiving calls do you use your mobile for?

Usage of mobile data services is stimulated by a virtuous circle of demand and supply

3.31 Currently only a minority of users access mobile data services. However, we believe that take-up of mobile internet and data services is being driven by a virtuous circle formed by the three enablers described above. Figure 8 shows the dynamics of this virtuous circle. Each enabler behaves as both cause and effect.

Figure 8: The virtuous circle of mobile phone data services
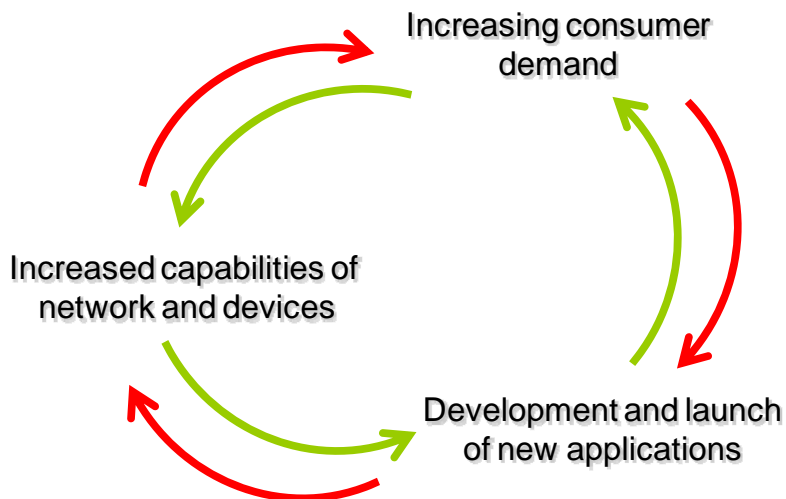
Source: Ofcom

3.32 As consumer demand grows, software developers are increasingly attracted by the mobile market. New data services are likely to affect the performance of existing networks as they demand more and more resources. Consequently, operators have an incentive to upgrade their mobile networks or invest in new technologies.

3.33 The virtuous circle also operates in reverse: as networks and devices allow higher bandwidth, better computer processing and more memory storage, there is more scope for innovative applications to run over mobile. This leads to the development of new services and consequently attracts more mobile consumers.

Trend 3: Mobile content and applications will become internet-based

3.34 We expect that the mobile platform will become an increasingly important platform for accessing the internet. Today's fixed internet access platform is open and interactive: users can access any internet content or application anywhere in the world, largely without restriction, and interact with that content and with other users.[29]

3.35 This in turn has triggered significant innovation in communications services from the early services such as e-mail and web browsing, to more recent ones such as instant messaging, VoIP, music and video downloads, social networks, and multi-player games.

3.36 Internet users can also readily create content (such as text, photos or videos) and actively participate in decisions about how that content will be offered to other users. Users easily write blogs and wiki pages, share videos on websites such as YouTube, personal information on social networking websites and photos on websites such as Picasa or Flickr. Interactions over the internet have therefore dramatically changed: the original model, where users passively consumed information produced by others, is now only one of many forms of interaction.

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[29] The Generative Internet, J Zittrain, Harvard Law Review 1974 (2006) http://www.harvardlawreview.org/issues/119/may06/zittrain.shtml

3.37   Until recently, there was nothing similar to this openness and flexibility in the mobile sector. Mobile internet platforms were mostly walled gardens (closed environments in which subscribers were offered an exclusive set of proprietary applications and content). Moreover, the technology was not ready to provide a satisfactory user experience for non-customised applications, partly because of limited mobile connection speed and partly because of the limited capabilities of devices.

3.38   Over time consumers have demanded, and got, open access to the internet. The same dynamic operated in the fixed internet, where some service providers initially sought to tie customers into their own content portals and applications. As more content and services became available and users became more internet-savvy, these early portals and walled gardens began to lose their significance.

3.39   Today, mobile operators are gradually transforming the proprietary mobile platforms into more open and flexible systems. In a first phase, they have sought partnerships with popular Internet application providers, e.g. facebook (see case study on facebook) and skype.

3.40   More recently, mobile operators are broadening their service portfolio by facilitating open internet access from mobile devices, and software and application installation on some handsets.

3.41   Figure 9 shows just a handful of the many data applications running on mobile platforms today. We have distinguished between brands on the fixed internet that are now available in the mobile world (left), such as Google, facebook and Wikipedia, and brands that originated directly in the mobile space (right), such as truphone, and mBlox.

Figure 9: Variety of online brands (illustrative)

Internet brands operating in mobile   Mobile data brands

Source: Ofcom

3.42   However, there are still a few applications which encounter resistance from operators, such as mobile VoIP and instant messaging (IM). Some new handsets branded by operators are disabled from making VoIP calls and in other cases, mobile VoIP is forbidden by contract clauses. Ofcom's general policy in relation to blocking of applications is that we are particularly concerned to ensure that consumer information

transparency exists, i.e. that consumers know which applications are blocked or degraded by the operator.[30] Our approach to such practices is further set out in Section 4.

3.43 It remains to be seen whether such strategies are commercially viable. Pressure from consumers may force mobile operators to become more open. We note that not all operators have adopted the same strategy. Hutchison 3G (H3G), for example, allows Skype calls and IM on its phones. Similarly, truphone VoIP calls are available on some mobile phones without restriction. Users who do not wish to use browsers and services pre-installed by their operator have the option to install alternative browsers such as Opera Mini or Skyfire.

3.44 Some analysts believe that the trends described above could create a risk that operators may become pure mobile ISPs or 'pipe' providers.[31] At the same time, some mobile operators have sought to develop and offer their own applications or are trying to attract popular developers to their open software platforms.

Case study: facebook

Five years after its launch, the facebook internet application has become the largest social network on the web, with around 185m users.

In 2006 facebook launched its mobile application that allows users to upload photos and notes, receive and reply to facebook messages, pokes and wall posts using text messages or browse on its mobile applications via the mobile internet connection.

After an initial period using normal web browsing facilities on mobile devices, facebook established partnerships with mobile operators in 2007 to offer a more effective integration between the application and the user. facebook has set up web sites with instructions allowing mobile operators to programme their subscribers' phones to ensure a more seamless interaction with the application such as reducing login problems. Since then mobile device manufacturers have started to integrate the most popular applications into their phones, eliminating the need for the mobile operators to facilitate easier access to the applications.

facebook, like other websites, has been redesigned to take advantage of smartphones. The web site interface has been stripped down to the most basic functions to focus attention and offer the relevant information on a smaller screen without distractions.

In May 2007 facebook launched its 'facebook Platform' that allows third-party software developers to create programs for facebook and to make money advertising alongside the program. Applications on facebook can be web-based, desktop-based or mobile-device based. Over 400,000 developers have worked out tools for the site and the applications have catalysed the activity on facebook. facebook is trying to stimulate the creation of more sophisticated applications by promoting chosen applications through its 'Great Apps' initiative.

Source: insidefacebook.com, developers.facebook.com, pcadvisor.com

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[30] http://www.ofcom.org.uk/media/speeches/2007/02/net_neutrality
[31] *The future of the Global Wireless Industry 2007-2012,* Analysys Research Limited, 2007.

Trend 4: Mobile networks will become Next Generation Networks (NGNs)

3.45 The ability of the internet to create a favourable environment for service innovation is mainly due to its specific technical structure. The internet has a layered architecture, which allows application developers to access it with great flexibility and to experiment with new solutions that users can then explore.

3.46 A NGN is a packet-switched network, i.e. a network where all user information, e.g. voice, video and data is split and conveyed by means of data packets.[32] By contrast, traditional telecoms networks are based on circuit switching, i.e. user information is transmitted through a dedicated circuit. NGNs have much greater flexibility because they separate the content and applications from the network which carries them.

3.47 Due to their similar layered structure, mobile NGNs[33] also have this openness and flexibility. To describe Mobile NGNs, we have used the four-layer model shown in Figure 10.[34] It includes the main elements required for the provision of a mobile service: applications/services, 'network intelligence', the core and access network, and the end-user device. The central elements enclosed by the dotted line show the layers that generally belong to the mobile operator.

Figure 10: Layered model of a mobile network

Applications Services — Software applications located on user's devices and network based servers, e.g. VoIP, social networks, live messaging, games, etc.

Network Intelligence — Set of control functions needed to coordinate the conveyance of services over the physical network, e.g. location information, routing plans, authentication, QoS support, billing.

Core / Access — Physical network divided into 'Core', i.e. the central nodes aggregating traffic and interconnecting to other networks, and 'Access', i.e. the radio last mile.

End-user device — Mobile device communicating to the Access network. It owns many intelligent functions, from receiving/transmitting capabilities, to software applications.

Source: Ofcom

3.48 At the core of this layered architecture is the Internet Protocol (IP). IP describes how data is carried across a communication network. The key to the success of IP is its flexibility: the developers of IP made very few assumptions about what information it would carry, and what network the information would be transported over. Instead, they

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[32] A packet is one unit of binary data, i.e. bits, capable of being routed through a computer network
[33] ITU-T definition of NGNs: *"A Next Generation Network (NGN) is a packet-based network able to provide Telecommunication Services to users and able to make use of multiple broadband, QoS-enabled transport technologies and in which service-related functions are independent of the underlying transport-related technologies. It enables unfettered access for users to networks and to competing service providers and services of their choice. It supports generalised mobility which will allow consistent and ubiquitous provision of services to users."*
[34] This model is similar to the one Ofcom has used to describe fixed NGNs, for example see http://www.ofcom.org.uk/consult/condocs/ngn/ngn.pdf

merely provided a scheme for packaging and moving data, whatever its purpose and whatever the physical medium. Therefore, IP allows the proliferation of applications from different sources and the use of any physical communication infrastructure, from radio waves to wires.

3.49   Next-generation telecoms networks, based on IP, are increasingly being adopted both by fixed and mobile operators. In recent years, fixed operators have shown strong interest in the development of NGNs based on IP technologies. For instance, BT is implementing its NGN plan, under the working title 21st Century Network. This has been driven to a significant extent by cost advantages brought by NGNs: IP carries information very efficiently, and IP equipment, due to its large-scale deployment, has become very cost-effective compared to other hardware used for traffic switching.

3.50   The concept of NGN is not limited to the fixed world; it is also being embraced by mobile operators. The next generation of cellular networks (4G) can be characterised as mobile NGN. Both Long-Term Evolution (LTE) and WiMAX, which belong to the family of 4G technologies, were conceived as all-IP networks. Their architecture follows the layers described above.

3.51   Some mobile operators have already started adopting IP for their core network. Many mobile operators are also planning to move towards IP solutions in the backhaul network (the link between the access network and the core), as it allows them to transport growing data traffic more cost-effectively.

3.52   With the advent of 4G technologies, IP will be used end-to-end, including the access network. This means that all services carried over 4G networks will be carried over IP, with even voice being routed over these networks in IP format (today this can only happen through mobile VoIP).

Trend 5: Prospects for fixed-mobile convergence are growing

3.53   The adoption of NGNs for both fixed and mobile networks drives the two industries towards convergence.[35] Increasingly, fixed and mobile networks will carry similar applications and will share the same transmission protocol – enabling a common layer of network intelligence to manage services across both types of network.[36] The access network will constitute the main fundamental difference between fixed and mobile networks and will determine the speed and reliability with which services will be consumed.

3.54   But convergence will not only manifest itself through network upgrades. It is also likely to be complemented by integrated services and applications. One example of this is the development of femtocells that allow mobile phones to be used in the home in conjunction fixed broadband technology (see Section 8 for more details). Another example is a convergent voice technology that allows a user to start a voice call or a

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[35] One player which is already investing in this kind of convergence is US operator Verizon. It has invested in IP multimedia subsystem (IMS) technology to provide a single service platform for both its fixed and mobile services.

[36] The concept of network intelligence is discussed further below. Some applications, however, may remain more successful and well received by consumers on only one of the two networks, e.g. HD movies on fibre networks.

data connection through the fixed network and then seamlessly switch to the mobile network while on the move.

The deployment of NGNs will have an impact on how mobile networks develop

3.55   The deployment of NGNs will have a big impact on how mobile networks continue to develop in future, specifically:

- mobile applications will become more independent from mobile networks;

- the importance of network intelligence will diminish;

- mobile internet speeds will become faster; and

- mobile handsets will become more sophisticated.

Applications gain independence from networks

3.56   One of the characteristic of NGNs is that they allow content and applications to be separated logically from the underlying physical network. An analogy is sending a physical letter which is put into a sealed envelope. Once the letter has been posted the author need not be concerned with precisely how the envelope is delivered. In the same way NGNs allow applications providers (authors) to offer services independently of the network.

3.57   Earlier generations of network technology generally required a close link between the service to be offered and the network characteristics (for example, voice networks were built specifically to enable two-way calls). In NGNs this link is not required. This makes it easier to offer new, innovative services without requiring direct access to the mobile network. This trend is already becoming apparent through mobile application stores. New providers can offer services directly to consumers without having to enter into a contractual relationship with a mobile operator or developing customised applications for a specific network. The degree of independence can vary between applications; in some cases, such as billing mechanisms, it may be more difficult to gain complete independence from the network operator.

3.58   The ability to develop applications for a mobile platform is likely to stimulate competition and diversity in a similar way to the fixed internet. For example, mobile VoIP services may become more popular. However, similar to fixed networks, it is not clear the extent to which the conversion to VoIP will occur or how quickly. In the short to medium term we expect mobile operators to retain a strong position in the supply of voice services.

The importance of network intelligence diminishes

3.59   Network intelligence describes the control functions to run a mobile network and to convey applications and services over the physical infrastructure. Figure 11 zooms into our layered model to identify some of the network intelligence functions. Some of these are essential to run business and network operations, including those which identify, authenticate and bill customers or those handling network operations and maintenance. Others are responsible for the conveyance of services and applications over the physical

core and access network, e.g. they are responsible for routing planning, quality of service (QoS) and location information.

3.60   The functions carried out by the network intelligence layer, and the information controlled by it, are needed for most mobile applications. For example, location information is needed to send a mobile call to the right handset.

Figure 11: Network intelligence functionalities (illustrative)
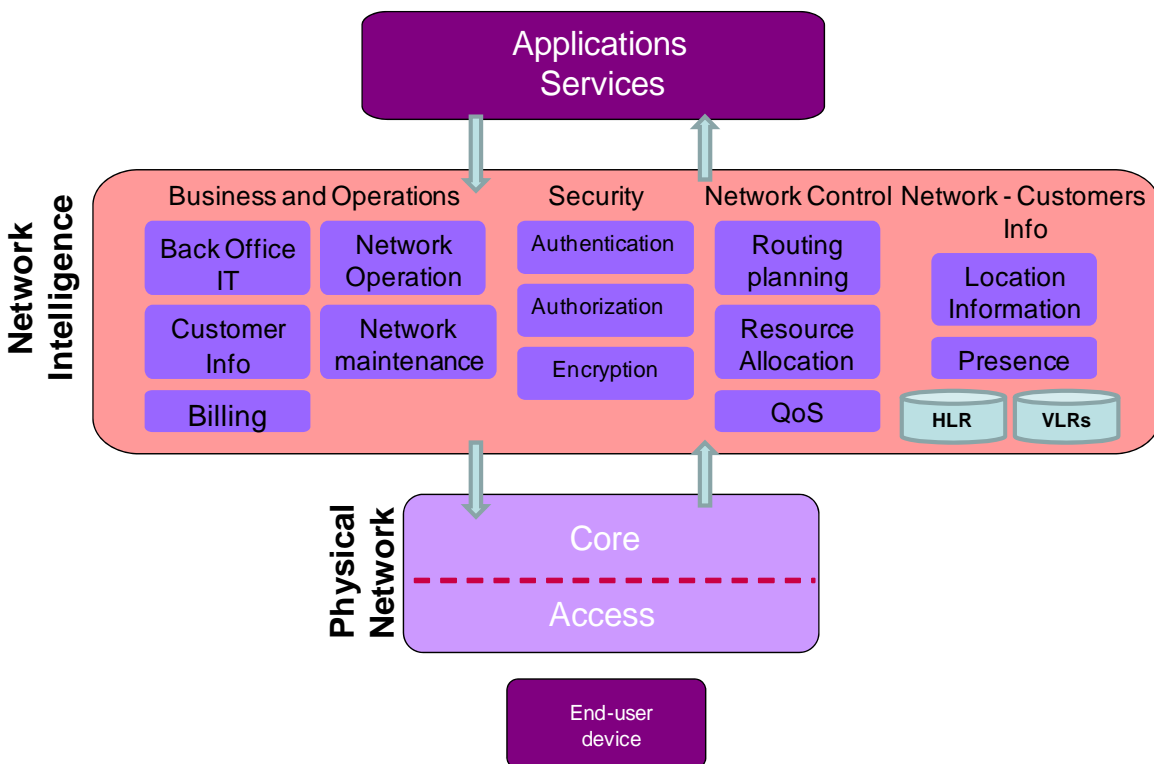
Source: Ofcom

3.61   However, many software applications are now so 'intelligent' that they can bypass most of these functions – that is, they offer capabilities to the user that mimic or replace functions previously exclusively undertaken by the network (and hence controlled by the network operator).

3.62   The ability of software developers to embed intelligence in their applications draws heavily on previous experimentation on the internet. On the internet, there is no built-in security, no ability to set the desired QoS, no billing functionality and no location information. Nevertheless, the web is increasingly used to purchase goods, pay bills, transfer money, make phone calls, watch television and locate the nearest restaurant. This has been made possible because the application has been enhanced with additional features that are not built in to the internet.

3.63   Applications in the mobile sector are also slowly acquiring this capability. The case study on Google and location information shows how information, traditionally provided through network intelligence, is being substituted by the ability of applications to retrieve

location information elsewhere. The importance of network intelligence is therefore diminishing.

Case study: Google and location information

Since the launch of Google Maps, Google has sought to strengthen its position in the context of location-aware applications. In November 2007 Google launched Google Maps for its Mobile 2.0 platform, based on its "My location" technology. Since then, Google has collected data from Google Maps users equipped with GPS handsets. Phones enabled to send information have been reporting to Google where they were (GPS coordinates), what cell towers they could connect to (cell ID) and what WiFi access point signals they could receive in that position. All this information has formed Google's "My location" database[37].

This database is intended to bypass location information usually retained by mobile operators in their information databases (HLR and VLR). Google's ability to recover a mobile user's location without accessing mobile operators' information clearly shows how applications are becoming more independent from the network. Unlike mobile operators' location information, however, the accuracy of "My location" depends on how much data has been gathered in a given area (rural areas may be initially disadvantaged). Nevertheless, the service is likely to improve due to the increasing number of users contributing to gather more location data.

There are many potential applications for the 'My location' database. One of the most successful has been Google Latitude, launched at the beginning of February 2009 as part of the updated Google Maps for Mobile 3.0 software (which was downloaded around 1m times in the first week). It allows users to share their location with a chosen circle of friends and track the location of their friends. There are three levels of information sharing available: 1) share the exact spot; 2) share the town you are in; or 3) share nothing at all. So far, users tend to share information symmetrically. Google Latitude allows users to insert their actual (or fictional) location manually. The application judges a user's location by triangulating 'My location' information using up to 24 reference points[38].

NGNs allow higher speeds thereby stimulating consumers' adoption of the mobile internet

3.64   A crucial aspect of mobile NGNs is their ability to offer increased data speed on the access link. Mobile data speeds have improved steadily over the years. Whereas 2G technologies allow peak data transmission rates of around 50 Kbit/s to 150 Kbit/s, 3G networks in their first implementation (Release '99) offered data rates of up to 384 Kbit/s (although only a few users per cell were able to transmit data at that rate).

3.65   In the last three years, mobile operators have invested in upgrading existing 3G data technologies, by deploying 3.5G standards (HSPA technology), that extend and enhance the performance of existing networks. Network upgrades to HSPA do not require large up-front investments, as they mainly involve software and a few hardware updates of existing 3G networks. In the UK, all five mobile operators have invested in these upgrades.

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[37] Google maps for mobile press release
(http://www.google.com/intl/en/press/annc/20071128_maps_mobile_my_location.html)
[38] Google latitude press release (http://www.google.com/intl/en/press/annc/20090204_latitude.html)

3.66   HSPA currently offers rates of up to 14.4 Mbit/s on the downlink and 5.72 Mbit/s on the uplink. The evolution of 3G networks is likely to culminate with HSPA+, which could offer transmission rates of 42 Mbit/s on the downlink and 11 Mbit/s on the uplink.[39]

3.67   New 4G technologies, based around NGN, improve the access speed further. At full capacity, LTE promises eventual peak download speeds of 170 Mbit/s.[40] The higher speeds offered by new mobile technologies are likely to further encourage consumer take-up of mobile internet services, and may mean, for instance, that mobile internet services become more of a substitute to fixed internet services.

Mobile devices are increasingly varied and sophisticated

3.68   The increasing sophistication of mobile devices is an important enabler of many mobile market developments. Not only have they boosted technical innovation and service take-up, but they are also contributing to the shift of intelligence out of the network. Mobile phones make convergence possible. Not only are they capable of interfacing with fixed and mobile networks (through their embedded radio interfaces), but they also support various applications, which were once exclusive to fixed networks.

3.69   Unlike other network equipment, the user terminal requires the integration of all network intelligence functions and radio technology. Therefore, if the access network is upgraded, the user's handset must be too, in order to exploit the new network feature; and if a new application hits the market, users have to install it on their phones. The development and take-up of new mobile handsets is crucial in determining the success of new mobile technology and the adoption of new services.

3.70   How quickly these trends emerge remains to be seen. It should be remembered, however, that the virtuous circle outlined above may mean that communications markets can become transformed very quickly.

3.71   Much will depend on how quickly consumers take up new technologies and services, which in turn will determine operators' plans for network upgrades. In many European countries, including the UK, the roll-out of 4G technologies is unlikely to happen before 2011. Some operators are reported to believe that HSPA enhancements will be sufficient to tackle user demand for mobile broadband for the next two to three years. According to these operators, there is still room for 3G data capabilities to be improved, and investments in LTE are not yet justifiable.[41]

3.72   Nevertheless, the trends described above are likely to become increasingly apparent over the next five to ten years and are therefore relevant to this assessment. The rest of this section sets out the implications of these trends.

The mobile sector will become more complex and diverse

3.73   The mobile sector will increasingly become more complex, and this will affect regulation in a number of different ways:

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[39] Qualcomm Release 8

[40] This rate is shared among users registered in the same LTE cell

[41] Andrew Parker, "Delays to 4G hurt handset makers", Financial Times, 16 February 2009*.*

- Fixed-mobile substitution will continue and the underlying fixed and mobile networks will increasingly converge. Currently, we conduct our analysis and devise regulatory measures separately for the two sectors. As substitution between the two sectors increases, this may become less appropriate.

- Devices and applications bypass the network intelligence layer. Consumers will be able to obtain functions and services that were once the exclusive preserve of the network operator directly through the device or from the application provider.

- A much larger pool of application providers is likely to emerge (including players based outside the UK) and we will see a more fluid, faster-changing market.

- Mobile network operators could increasingly be operating in a challenging environment. While they are likely to retain a strong position in voice and SMS markets,[42] their position in the applications and service space could come under increasing pressure.

Infrastructure sharing opportunities and spectrum availability may change the market structure

3.74 Today's market structure, with five independent access platforms, may change for a number of reasons (short of market consolidation). For example:

- network sharing between operators may evolve further; and

- spectrum to support bandwidth-hungry services may be scarce, despite forthcoming spectrum releases.

Network sharing is adopted today in different forms by some UK mobile operators and this will be further facilitated by 4G technologies

3.75 Network sharing can occur at many levels in mobile networks. The UK's mobile networks already have a significant degree of passive network sharing (e.g. where they simply share transmission masts) and, increasingly, active network sharing (where they share much more equipment).
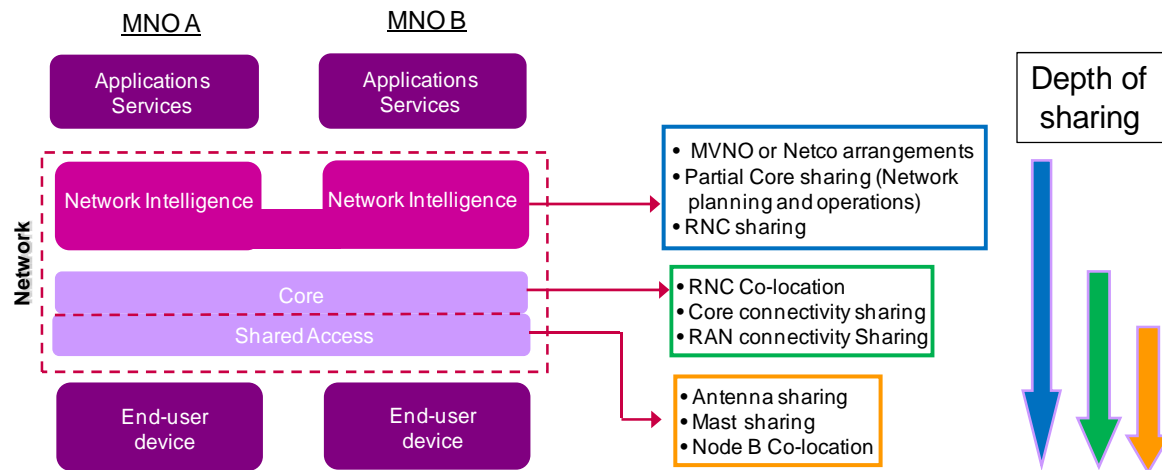
3.76 Infrastructure sharing is most frequently deployed to save capital costs. However, it may also lead to operational cost savings, coverage and environmental benefits thanks to a reduced number of masts.

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[42] As discussed in section 2, mobile is likely to account for the majority of voice call minutes within the next few years.

Figure 12: Depth of network sharing

Source: Ofcom

3.77 Figure 12 illustrates the different network sharing options between two mobile operators. As emphasized by the arrows on the right, the depth of infrastructure sharing may vary according to what operators agree to share. It may only involve the physical infrastructure supporting the access network, i.e. masts, antennas and buildings for radio equipment. Or it can involve deeper infrastructure, such as radio network controller (RNC) equipment and connectivity in the backhaul and core. Finally, it can include network intelligence, planning and operational functionalities.

3.78 Depending on the degree of share, network sharing can result in substantial infrastructure cost savings for mobile operators. For instance, in December 2007 T-Mobile and H3G announced that their active infrastructure sharing is expected to deliver €2 bn savings in the UK over 10 years, split equally between operating expenditure (opex) and capital expenditure (capex), with much of the savings coming from the radio-access network.[43]

3.79 The current trend is towards large-scale network sharing rather than ad hoc arrangements. Recently, three bilateral network sharing deals have been announced, between:

- T-Mobile and H3G;

- Vodafone and Orange; and

- Vodafone and O2.

3.80 Due to the high interest in network sharing shown by mobile operators, future mobile standards, such as LTE, have network sharing features built in. This will allow operators to design and plan a shared LTE network from the beginning, potentially minimizing the delay in adopting LTE technology. Mobile operators are then encouraged to invest by

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[43] See http://www.analysysmason.com/About-Us/News/Newsletter/Previous-news-articles/Everyones-a-winner-RAN-sharing/

the prospect of reducing capital expenditure, and consequently share the investment risk with their competitors.

3.81   In addition, the UK government, in the *Digital Britain* interim report, has signalled that it may encourage network sharing, as a means to enable greater network coverage.[44]

3.82   All these factors may drive the sector towards a reduced number of end-to-end networks, although it is difficult to make any firm predictions.

The importance of spectrum availability will increase with growing mobile internet take-up

3.83   By definition, mobile services need access to spectrum. Spectrum release is an important enabling factor in increasing competition and the roll-out of new innovative services, as well as improving coverage and the availability and speeds of mobile broadband.

3.84   Spectrum liberalisation and release will significantly increase the supply of spectrum available for mobile services in the near future. We have been pursuing three initiatives to release new spectrum to the market and to liberalise the use of spectrum which is already licensed:

- liberalising (and making tradable) the current 2G licences;

- the auction of the 2.6 GHz band; and

- the award of the digital dividend – the spectrum available as a result of switchover to DTT – and specifically the 800 MHz band within this.[45]

3.85   All of this spectrum is suitable for the upgrade of existing 3G networks or roll-out of 4G services.[46]

3.86   Whether spectrum availability will put pressure on the number of networks that can be supported is not yet clear:

- There are physical limits on the amount of spectrum that is particularly suitable for mobile services. Therefore, it is possible that demand for spectrum (especially at

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[44] Digital Britain, Interim Report, Action 6 – point d: "*the Government and Ofcom will consider further network sharing, spectrum or carrier-sharing proposals from the operators, particularly when these leads to greater coverage and are part of the mobile operator's contribution to a broadband universal service commitment.*"

[45] We provide an overview of the spectrum we are planning to release and of the factors which drive the timetable for this release in Annex 6.

[46] As part of its Digital Britain project, the Government has also been working on resolving the "roadblock in the release of spectrum that was hindering the progress towards a broadband mobile future" (*Digital Britain, Final Report*, June 2009 (http://www.culture.gov.uk/what_we_do/broadcasting/6216.aspx). It appointed an Independent Spectrum Broker, whose report was published on 13 May 2009 (http://www.culture.gov.uk/reference_library/publications/6147.aspx). We will assist the Government's and Independent Spectrum Broker's efforts to ensure the availability of this spectrum for mobile broadband services in a co-ordinated and timely way, and inform the necessary further refinement and detailing of its proposals and an implementation plan.

particular frequencies such as sub-1GHz) could outstrip supply, such that spectrum becomes a significant barrier to entry in the provision of some future mobile services.

- Specifically, limits on the type and amount of spectrum available to support next-generation mobile networks may affect the number of 4G networks or network operators that are able to emerge in the UK.

- But, on the other hand, it is also possible that technological drivers could result in a significant reduction in demand (by allowing spectrum to be used more efficiently). This would result in spectrum being relatively abundant.

3.87   Depending upon which of these outcomes arise, the number of players able to build out future mobile networks could be constrained.

3.88   We recognise that there is considerable complexity in the process of spectrum release, and in accordance with our statutory duties, we will assist Government in its efforts to arrive at a path that results in the optimal use of spectrum, and which furthers the interests of consumers and citizens.

3.89   We will discuss in the following sections how we will respond, should the market structure change due to RAN-sharing, consolidation, or spectrum scarcity.

These potential changes in the sector will put pressure on existing regulation

3.90   In this section we have outlined a number of trends which are likely to influence regulation in the future:

- demand and supply for mobile data services reach a virtuous circle of growth;

- applications become more varied and more independent of networks;

- fixed and mobile networks converge; and

- spectrum scarcity may put pressure on the number of competing networks.

3.91   The developments raise a number of challenges for us:

- with the growth of online services in the mobile environment, the role of mobile in delivering services to citizens and consumers will grow further, making consumer protection, as well as questions of access and inclusion, and coverage, even more important than they are today;

- mobile services will become more complex for consumers – and while many will benefit, others will find the complexity challenging;

- as mobile becomes more like the wider on-line economy, consumer protection measures may become less effective and the need for generic, tech-aware enforcement of consumer law may grow. Current measures (e.g. protection from mis-selling and scams, security of purchases made using either the mobile bill or a credit card, control of access to adult content etc) rely on mobile operators at the centre of the value chain and may need to be adapted to the new market context;

- new competition challenges may arise, if operators opt for increased RAN-sharing or if market consolidation occurs.

- Fixed-mobile convergence also raises the question of the future of mobile call termination rates, in a world where the delivery paths of fixed and mobile services may easily cross over.

3.92 We need to be ready to adapt our approach to ensure that competition remains – to the maximum extent that it is feasible and sustainable – at the core of the mobile sector's activities. We also need to make sure that consumers remain protected in an increasingly complex market. Citizens need to have the opportunity to access new services confidently, within the limits of their personal circumstances and their physical location.

3.93 We outline our specific proposals for action in the changing mobile market environment in the following sections.

Open questions

Q 3.1: Are there any additional sector trends that we should consider in our analysis?

Q 3.2: Have we identified the right regulatory challenges?

Section 4

Competition and new entry

Summary

4.1   In this section we examine how well competition is functioning in the mobile sector and describe how we propose to handle the challenges to competition posed by the evolving market.

4.2   We consider that competition is the most important stimulus for ensuring that consumers benefit from advances in the mobile sector through service and technology innovation, fair prices and investment. We believe that this remains true in a challenging economic environment.

4.3   When responding to our question in the MSA 1 consultation about the characteristics of a well-functioning market, many stakeholders mentioned competition as a key feature. However, views varied on the health of competition in the sector today.

4.4   To test the concerns expressed by some stakeholders, we have looked at the mobile sector more closely, specifically the retail and wholesale supply of mobile services and closely related products and services.[47] We assessed these with respect to market share, margins and price. We have also considered evidence of innovation and assessed some significant future developments, including spectrum release and network sharing, based on our findings in Section 3.

4.5   Our core finding is that competition within the mobile sector is generally working well: we see shifts in retail and wholesale market shares between existing players, switching levels are robust, new suppliers (such as MVNOs) are able to enter the market and providers are innovating with new product and price options.

4.6   However, we also observe some features of the market which could potentially limit competition or change the nature of competition in future:

- competing price offers are sometimes difficult to compare due to product complexity;

- mobile operators may adopt a strategy of restricting the use of non-approved applications or services;

- network sharing is currently being explored in a variety of forms. The long-term impact of network sharing – particularly network sharing that requires the coordination of activities that could impact on retail competition, such as network upgrades - could have implications for competition in future;

- the intensity of competition in today's market seems to be linked to the market structure at the wholesale level (that is, the number of competing networks). If this structure changed materially, a much closer examination of the impact on competition of any change could be required; and

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[47] We consider closely related products and services to include VoIP applications, handsets,

- some new spectrum licensees continue to find the market difficult to enter and have sometimes struggled to reach agreements in a timely manner with network operators on vital industry processes such as interconnection and mobile number portability.

4.7 We believe that competition between services will intensify over time, as applications and content proliferate and the mobile internet adopts more characteristics of the fixed internet.[48] We believe that the increasing proliferation of content, applications and service providers has great potential to deliver significant benefits to consumers in the form of innovation and choice.

4.8 However, spectrum scarcity and economic constraints may put increasing pressure on competition at the access network level, and the consolidation of network infrastructure through further network sharing (or even merger/acquisition activity) could also take place. Consolidation may have a detrimental effect on competition, and therefore have ramifications for price competition and network access, both for MVNOs seeking wholesale service supply and for consumers wishing to access third party applications and services.

4.9 Our proposed response, based on our findings, is:

- **No regulation of third-party access**. We do not see the need to consider regulating access by third parties (such as MVNOs or application providers) to mobile networks in a competitive market. It would be appropriate to revisit this decision if, for example, we see anti-competitive behaviour, including limitations in the supply of wholesale services to access seekers, that cannot adequately be addressed using *ex post* intervention.

- **Greater focus on enforcement.** We will take a more active stance on removing barriers to entry, in particular for new spectrum licensees, to maximise consumer benefit from new services, technologies and innovative business models.

- **We do not plan to do a formal market review or market investigation.** We do not plan to conduct a more detailed assessment of any part of the mobile sector at this stage, apart from our forthcoming mobile voice call termination market review. This position may change if the market structure changes (which, as illustrated by recent press speculation, is a real possibility). If there is market consolidation, then we would provide our strategic perspective as the sectoral regulator and a concurrent competition authority to the OFT and, potentially, to the Competition Commission.

- **Competition law principles will be used to assess future market change.** We will be vigilant in monitoring changes to the market structure and will weigh up potential benefits, such as increased investment and/or coverage against potential detriments to competition, in accordance with our duties under competition law.

- **Continue our spectrum release and liberalisation programme.** Our policies in relation to spectrum liberalisation and release will significantly increase the supply of spectrum which is potentially available for mobile services (see Annex 5 for further details).

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[48] See our observations in section 3 on the evolution of mobile data and the impact of NGN.

- **Assist Government in its efforts to make spectrum available for mobile broadband services.** We consider it of utmost importance that spectrum is available in a timely manner to optimise the prospects for competition, innovation and better mobile coverage across the UK (see Annex 5 for further details).

Respondents to the MSA 1 consultation agreed on the importance of competition and focused on market dynamics, price and innovation as key indicators

4.10   Almost all the consumers who commented on competition in their responses to the MSA 1 consultation agreed that it was important.[49] They commented on competition through a number of factors, including the number of retail mobile service providers, the number of network operators, product innovation, price, and customer service. Consumers generally agreed that there are a large number of providers of mobile services and were also positive regarding the level of innovation in the market. Price and customer service issues raised more mixed views, with some stating that competition is not lowering prices sufficiently and that some charges seemed excessive. **[50]**

*"I have a pay as you go which suits me as a low user. The rates are reasonable. **I think there is competition, especially with supermarkets getting in on the mobile act."***

*"Competition is currently good, with at least four major operators working in the UK, with a number of virtual operators existing alongside them. **That MVNOs can even exist at all shows a healthy level of competition"***

*"Some developments are good for the consumer, for example **increased competition, more innovative services**, and so on. However, some do not benefit the customer, such as confusing tariffs"*

*"We are certainly facing large competition within the area however **competition does not necessarily mean greater value**. - I had to call the police once, and was horrified about the £10 added to my bill I got for a couple of minutes talking on 0800 number, there is little excuse for this behaviour."*

*"At the moment there is fierce competition for new consumers. This leads to **apparently very attractive offers which may not be all they seem**."*

*"[It is desirable to have] a range of service providers offering mobile services that are inexpensive and suitable for consumer needs. With a number of operators already in the UK market this seems to be at least partly true. Features that militate against this are **confusing price tariffs, exclusivity in certain areas**."*

*"There are two areas in my experience as a mobile phone user which should be examined. The first is the current **charging policy relating to freephone numbers**. Most large companies provide these numbers for access to their customer service departments. Whilst these are free from a fixed telephone I am now having to pay to call*

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[49] 109 individuals responded to the consultation and of these 77 commented directly on competition. All 77 respondents that commented on competition either stated directly that competition is important, or indirectly signalled its importance by, for example, stating that lack of competition may be responsible for perceived high prices.
[50] Emphasis added here and throughout quotes used in this section.

*companies as I have opted to only have a mobile telephone service. The second area relates to **sms pricing**. Compared to the price of sending sms from continental Europe to the UK by EU citizens I believe that UK consumers are being vastly overcharged when sending sms to European mobile telephones."*

*"The existence of so many payment plans, minimum term contracts and the exorbitant costs involved in roaming abroad or paying as you go should be a good indicator that **something is very wrong**."*

4.11   The mobile operators all stressed that the market is competitive, and discussed competition with reference to the number of network operators and retail providers, innovation, price and market dynamics, spectrum developments, and customer service. Against most of these factors, operators believed that the market is performing well: they reported the presence of MVNOs, the roll-out of innovative services, price competition and increasing consumer 'value'. Some expressed concern relating to market dynamics around switching. Mobile operators also agreed that customer service is very important and that competitive forces were moving the market towards better customer services. H3G, although generally positive about the state of competition, and its role in promoting competition as a recent market entrant, expressed concern that donor-led switching could adversely affect competition.

*"Orange believes that the key features of a well-functioning mobile market are related to price and choice, combined with innovation...[and].. These features are extremely evident in the UK market indicating **a high level of effective competition**."* Orange

*"The UK mobile market is **ferociously competitive** with market penetration of almost 70 million active customers, and differs significantly from other European markets as there is no single dominant company"* T-Mobile

"One key factor is that the mobile market has been driven by competition from the very outset ... unlike fixed telephony." Vodafone

"With the fierce competition from MVNOs, particularly in the prepay market, there is a huge amount of choice for customers." T-Mobile

"In addition to the five network operators, Ofcom will be aware that there is a very active and increasingly competitive market for MVNOs (as well as DECT guardband/VOIP/Wifi) operators. Companies such as BT, Virgin and Tesco are very well known and established brands outside of the mobile market and they are now able to leverage their considerable brand strength in that market" Orange

"New entrants, not incumbents, have increased competition, brought innovation to market and delivered consumer benefit." H3G

*"…control of customer's telephone numbers by the incumbent mobile operator has maintained a significant barrier to customer switching" "**It is difficult for competition to function effectively, for the benefit of consumers, in a market where switching is difficult.** The current donor led porting system in the UK allows incumbent operators to engage in price discrimination in favour of some consumers and against others."* H3G

4.12   Other respondents to the MSA 1 consultation included MVNOs, consumer groups, government bodies and firms from other parts of the value chain and the communications industry more generally. Many had similar views to mobile operators with respect to the importance of competition and the criteria that indicate a healthy level of competition (market dynamics, price, etc). However, a wider spectrum of views was presented regarding whether the market was delivering against these criteria. Examples of this divergence are given here:

 *"**the way in which [MNOs] compete has therefore become ossified** – competition is centred on the high street (where the large chains of shops may themselves be seen as barriers to entry) and has led to an excessive and expensive focus on handsets and churn instead of lower prices and better and more innovative services" BT*

*"we believe that **there could be a greater number of service providers and service offerings** than exist today" Scottish and Southern Energy*

"At the UK level the mobile sector is currently far less regulated than the fixed sector reflecting the fact that there is far greater competition within the mobile sector both at the network level (with five network operators) and at the retail level with numerous MVNOs offering service." Virgin Media

 *"**The UK mobile sector is highly competitive** and this has resulted in considerable beneficial innovation, including the introduction of mobile broadband access" Ericsson*

*"The availability of **spectrum will have an effect on competition** in the mobile market place if Ofcom can ensure that the release of spectrum will lead to increased service availability in under-served areas, such as rural Wales" Welsh Assembly Government*

*"New entrant mobile operators have been encouraged to enter the mobile market by Ofcom and radio spectrum auctions have been designed to release blocks of spectrum to entice new names into the marketplace. But … **new entrants have had a difficult time in the UK"** Federation of Communication Services*

The competitive dynamics of the mobile sector are complex

4.13   In Section 3 of the MSA 1 consultation we outlined a simplified value chain for the mobile sector. This value chain included:

- Suppliers of equipment, software and services to network operators: these firms include network equipment vendors and software companies supplying operating or support systems.[51] Examples include Huawei, Nortel and Ericsson.

- Tower and backhaul providers: these firms or individuals provide the sites for network equipment (including landlords of sites). 'Backhaul' is the connection between different sites in the core network (such as base stations and switching sites). BT is the dominant supplier of backhaul to mobile network operators.[52]

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[51] Such as OSS/BSS software (Operations Support Systems and Business Support Systems).
[52] Ofcom, *Business Connectivity Market Review*, 8th Dec 2008
http://www.ofcom.org.uk/consult/condocs/bcmr/)

- Mobile operators: these are the licensees of mobile spectrum and operators of networks (H3G, O2, Orange, T-Mobile and Vodafone). New network operators with smaller (local or site-specific) networks are emerging; for example, operating on spectrum frequencies in the 'DECT guard band'.[53]

- Mobile providers: these are the firms which enter into contracts with customers for the provision of mobile services. This category includes the mobile operators themselves and firms that purchase services from a mobile operator for re-supply (mobile virtual network operators or MVNOs) such as Virgin Mobile and Tesco Mobile.[54]

- Device vendors: these firms provide mobile devices, including mobile phone handsets. Examples include Nokia, Motorola and Apple.

- Content providers: this includes firms or individuals who create or aggregate content. 'Content' can include ring-tones, premium rate voice and SMS services, applications for use in smartphones and internet, or audio or video content passed over mobile networks.

- Distributors: these firms help customers obtain mobile services but are not themselves providing the service – they are 'middlemen' (and include direct and online sales channels). Examples include Phones4U and Carphone Warehouse.

Figure 13: Simplified mobile value chain

Source: Ofcom

4.14 In the UK, and elsewhere in the world, 'end-to-end competition' exists in the mobile market. By this we mean that there are competing providers at all points along the identified value chain. This is different to, for example, fixed telephony, where a former monopoly supplier, BT, still has a position of significant market power with respect to the provision of an access network (the last mile).

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[53] DECT guard bands were originally set up to protect cordless phones (Digital Enhanced Cordless Telecommunications) from interference by mobile telecommunication transmission.
[54] A mobile virtual network operator or MVNO offers mobile telecoms services to end-customers by leasing certain network elements from an existing infrastructure owner (a Mobile Network Operator, MNO). Becoming an MVNO is an alternative route into the retail mobile telecoms market, without buying spectrum or building a network.

In our further assessment of the mobile sector we focus on mobile operators and service providers

4.15 Mobile operators occupy a central role in the mobile value chain. The operators choose suppliers for network equipment, towers and transmission, as well as establishing distribution channels for mobile services. They are also prominent retail suppliers and are active in the wider UK telecommunications market. In assessing the functioning of the mobile market, we therefore focused primarily on the supply of wholesale and retail mobile services; mobile operators, MVNOs and directly related suppliers of products and services.

4.16 Respondents to the MSA 1 consultation agreed that the provision of these retail and wholesale services are the most important factor in assessing the competitive functioning of the mobile sector. No single set of competitive concerns raised consistently by stakeholders related to any other parts of the value chain.

"Orange believes that the price of products and services paid by consumers (and by extension wholesale purchasers) is the single most important factor in assessing how well the mobile market is functioning." Orange

"Network competition exists at wholesale as well as retail level without regulatory underpinning – as evidenced by commercial MVNO and national roaming agreements." Vodafone

We assess how well these parts of the mobile sector are performing, based on the criteria developed in the MSA 1 consultation and the issues highlighted by stakeholders

4.17 In the MSA 1 consultation, we looked at performance criteria in the mobile market that we considered provided an indication of the state of competition. As illustrated in the comments above, respondents to the MSA 1 consultation broadly agreed that the health of competition can be assessed by observing:

- the number of players in the market and their market shares;

- the rate of switching between suppliers;

- evidence of service and price innovation;

- price trends; and

- market entry by new spectrum licensees.

Five national mobile access networks form a competitive foundation for the UK mobile sector

4.18 The UK mobile industry comprises five mobile network operators, four of which are 2G- and 3G-capable and one pure 3G network. The spectrum licences that these networks use for their access layer were released in three stages. In 1985 two 2G spectrum licences were awarded to the companies now known as Vodafone and O2. The second

round, in 1991, included the release of 2G spectrum bands now owned by Orange and T-Mobile, as well as a small additional spectrum parcels for Vodafone and O2. In 2000 all four of the incumbent 2G operators were awarded a licence for 3G spectrum along with H3G, which was then a new entrant to the mobile sector.

4.19   The existence of five national mobile access networks is a marked difference between the mobile telecommunications sector and the fixed-line sector, in which, for the majority of UK residents, there is only one physical fixed telecommunications access network. The existence of numerous national access networks leads to choice for the consumer, and, also provides the ability for MVNOs to negotiate wholesale contracts rather than being obliged to rely on regulation for the supply of wholesale services.

4.20   There is, of course, no guarantee that this market structure will remain in place over the long term. If the market structure changes are the result of a merger (which could happen very quickly, and without warning), then any risks to competition would need to be assessed by the Office of Fair Trading (OFT) and, if necessary, by the Competition Commission (CC) in accordance with the UK merger regime or by the European Commission, in accordance with the EU merger regime. The UK merger process is further discussed below at paragraph 4.83.

Market shares between retail and wholesale suppliers have changed over the past few years

4.21   The relative positions of competing firms change as their fortunes wax and wane. Changes in market shares over time can therefore give a good indication of the dynamics of the market and may be useful in assessing the nature and extent of competition. In particular, volatile market shares may indicate effective competition, for example, through successful entry, rivalry or innovation.

4.22   The most visible form of competition to consumers is between competing retail suppliers. At the retail level, there have been some significant shifts in market share between the main suppliers – which include mobile operators and MVNOs - over recent years (as shown in Figure 14). The MVNOs, such as Tesco Mobile, have gained retail market share over the period. O2 has also experienced some growth over recent years (in part, due to the launch of the iPhone, to which it has exclusive UK distribution rights).

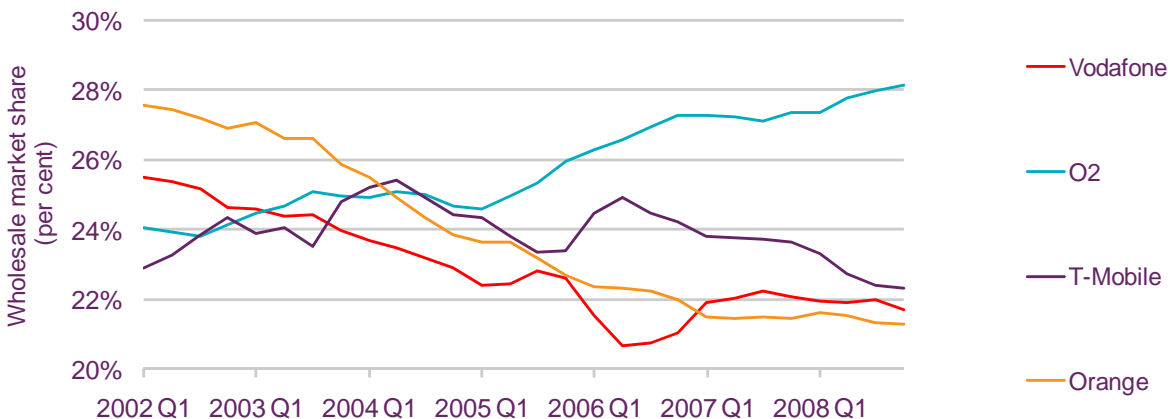**Figure 14: Mobile providers' retail market shares 2004-2008**
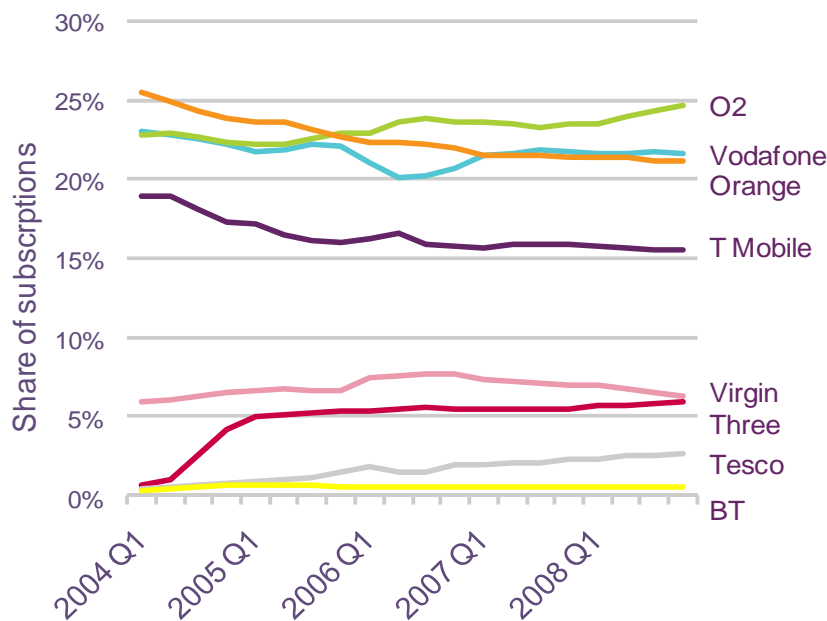
Note: Includes estimates where Ofcom does not receive data from operators

4.23   All MVNOs rely on a wholesale network to support the services sold to their customers. Figure 15 shows the relative breakdown of UK customer accounts according to the underlying network, and it can be seen that there have been significant shifts in market share among the big four operators. O2 has emerged as a market leader in recent times; its increasing wholesale market share reflects in part the retail success of its MVNO client, Tesco, whose share of the retail market has grown ever since its launch in 2003. H3G (not shown) has also captured 6.5 per cent market share, although most of this was due to early growth following its entry in 2003. Note that we do not currently have information for all MVNOs, some of whom are believed to have grown quickly over the past year. We will be publishing updated wholesale and retail market share data (incorporating the MVNOs for whom we have relevant information) in our Communications Market Report in the summer.

Figure 15: Largest four MNO wholesale market shares

Note: Includes estimates where Ofcom does not receive data from operators. Wholedale data include MVNOs and resellers. In the case of Vodafone and Orange, only reseller figures are included.

4.24 Operators adopt varying strategies in the wholesale market. For example, despite having lower retail market share than Vodafone, O2 and Orange, T-Mobile has the most MVNO clients on its network, and has the largest number of subscribers who are not T-Mobile retail customers, mainly due to the wholesale agreement with Virgin Mobile. Figure 16 illustrates the share of MVNOs subscribers for each of the four largest mobile network operators, showing T-Mobile's strong leading position in the wholesale space. This would suggest that T-Mobile's strategy has been to focus more on its wholesale business rather than compete directly for retail sales

Figure 16: MVNO subscriptions by mobile operator Q4 2007
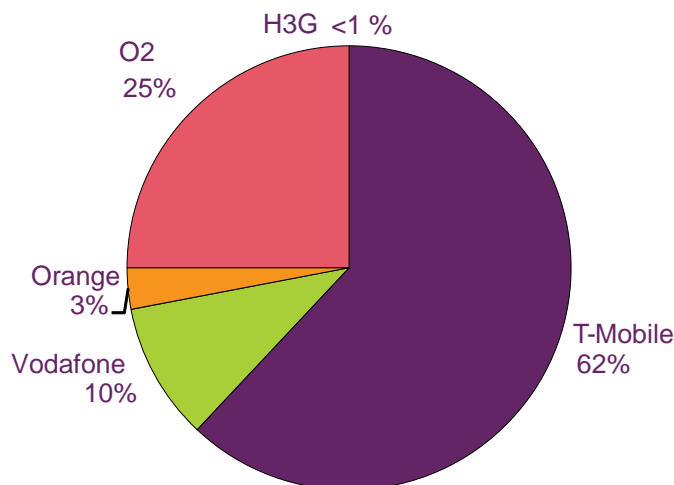
Source: Ofcom, Q4 2007
Note: Wholedale data include customers owned by the operator (so called 'self supply').

## MVNOs are playing a significant role in mobile retail services

4.25   Launched in 1999, as a joint venture by One2One (now T-Mobile) and Virgin, Virgin Mobile was the first and remains the largest MVNO, with about 4.5m customers. Tesco Mobile was launched in 2003 as a joint venture between Tesco and O2 and has approximately 2m customers. [55]

4.26   The existence of MVNOs in a sector without wholesale regulation is another good indicator of the competitive health of the industry. Mobile operators have no regulatory obligation to provide access to their network – that MVNOs are mostly able to gain access to the network and operate successful retail businesses indicates the presence of countervailing buying power on behalf of the MVNOs.

4.27   Today there are roughly 25 MVNOs in the UK.[56] All UK MVNOs buy wholesale access and minutes from a mobile network operator, but some also lease elements such as capacity, telecoms systems and billing and customer care systems in order to enable them to customize their services. The most common business model is to buy wholesale minutes from one network, which often involves a close relationship between the network operator and the virtual operator.

4.28   UK subscribers are more likely to be supplied by a 'virtual' operator than subscribers in most other European countries, or indeed in any of the countries we considered (see Figure 17). The exception is in Germany, where MVNO and resellers supply a quarter of the market – although in Germany mobile spectrum licences contain an obligation for

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[55] Tesco Mobile is a 50:50 joint venture between Tesco and O2. The company sells exclusively Tesco Mobile branded services in Tesco stores across the UK using O2's technology and network.
[56] Source: Ofcom.

mobile operators to offer their services to service providers (resellers), which certainly influences this outcome.[57]

Figure 17: MVNO and reseller share of total mobile connections: 2007
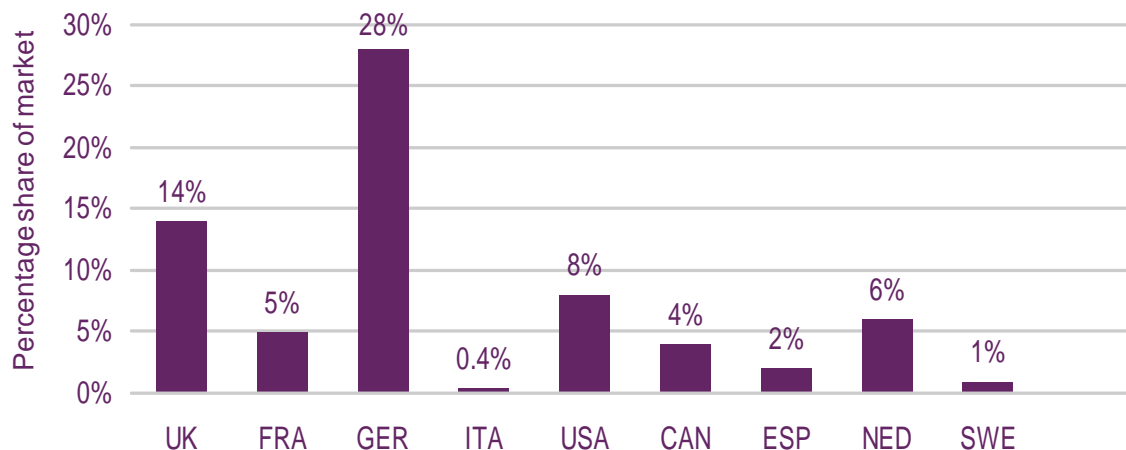
Source: IDATE / Ofcom
Note: UK and Germany figures includes reseller subscriptions in addition to full MVNOs

4.29   As well as competing on price and customer service with their host network and with other networks (and their clients), MVNOs can stimulate innovation in the market by trying different approaches to marketing and by putting together elements of mobile service to attract new customer groups. Figure 18 provides examples of three MVNOs that have entered the market in the last couple of years with new business models.

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[57] Germany has no MVNO access regulation, but licences for mobile network frequencies (GSM/ UMTS) contain an obligation for mobile operators to offer their services for service providers (resellers of complete packages from the mobile operator including SIM card). This obligation was introduced in 1991 and will last until 2016. Service Providers in Germany provide resale of mobile operators' services and own no infrastructure, and contribute as resellers in the total figure for Germany in Figure 5. Currently two MVNOs (called Vistream and Ring Mobilfunk) are active in the German mobile market. They both concluded their MVNO agreements with the mobile operator E-Plus on a voluntary basis.

Figure 18: MVNO innovation in the UK

Blyk Mobile	Blyk provides a service exclusively for 16-24 year olds, providing them with £15 worth of free credit per month, to use on voice minutes, data minutes, SMS or MMS. In return its customers must consent to receive targeted advertisements on their phones. It currently has over 200,000 customers.[58]
bglobal plc	bglobal plc uses Orange's network to facilitate its smart electricity metering system, which is installed in at least 60,000 meters across the UK.[59]
Lebara Mobile	Lebara Mobile launched in October 2007 and now has approximately 600,000 subscribers. Lebara is targeted mainly at UK-based migrant residents and ethnic communities who want to make low cost international calls. This MVNO uses Vodafone's network in the UK. Lebara sells its SIM cards through local shops in the communities it targets.[60]

Source: Ofcom

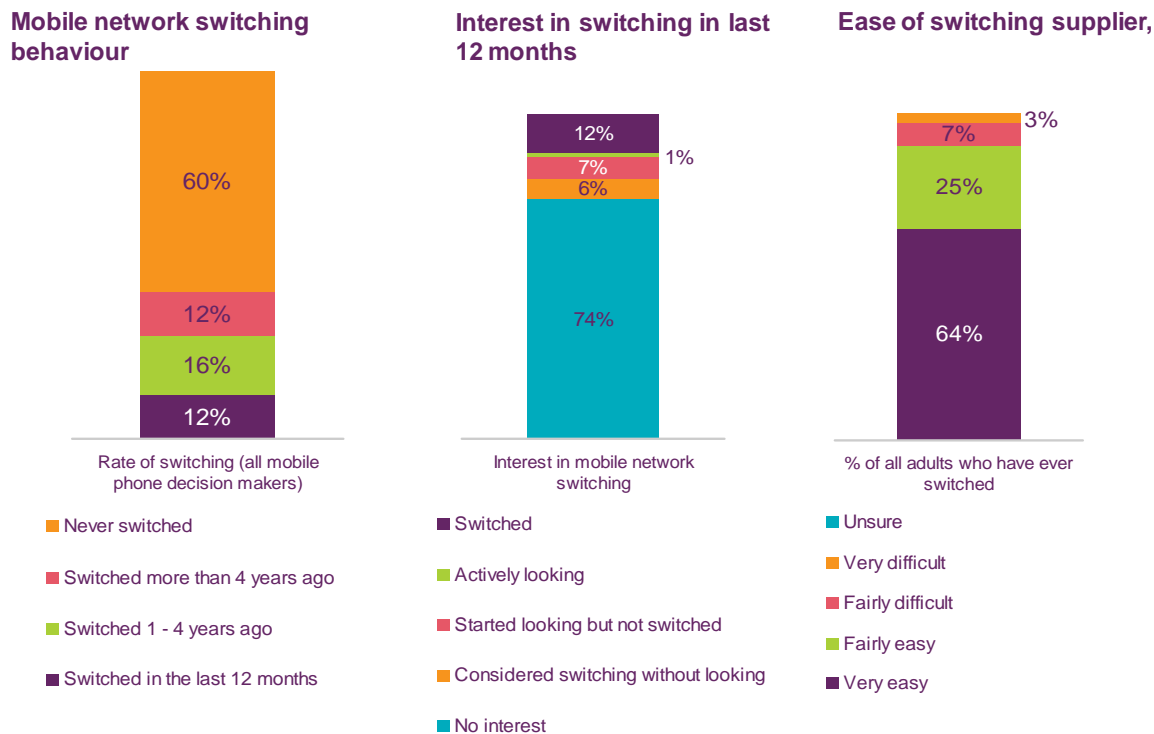## Switching data indicates that consumers do not see themselves as captive

4.30   Switching between providers makes competition effective and drives consumer benefits. It is a sign of healthy competition, particularly as markets mature, because companies must compete against each other to increase or maintain market share.

4.31   In some ways, switching mobile provider is easier than switching fixed telecommunications or pay-TV, where the physical line to a customer's home or workplace may need to be altered in some way. But some aspects of mobile service make it harder to switch:

- long contract terms for post-pay subscriptions and penalties for early cancellation;

- widespread sale of SIM-locked handsets/devices;

- ease and availability of number portability;

- operator retention strategies (e.g. fidelity rebates); and

- complexity of tariff offerings – transaction and search costs.

4.32   In 2007/08 12 per cent of consumers had switched mobile service provider, and a further 14 per cent were considering switching. Of the users who have ever switched, a significant majority (79 per cent) found it either 'very easy' or 'fairly easy' to do so (2008 Q2) (see Figure 19)

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[58] Blyk website (www.blyk.co.uk)
[59] bglobal website (www.bglobalplc.co.uk)
[60] Lebara Mobile website (www.lebara-mobile.co.uk)

Figure 19: Mobile network switching behaviour

Mobile network switching behaviour

Interest in switching in last 12 months

Ease of switching supplier,

Rate of switching (all mobile phone decision makers)

- Never switched
- Switched more than 4 years ago
- Switched 1 - 4 years ago
- Switched in the last 12 months

Interest in mobile network switching

- Switched
- Actively looking
- Started looking but not switched
- Considered switching without looking
- No interest

% of all adults who have ever switched

- Unsure
- Very difficult
- Fairly difficult
- Fairly easy
- Very easy

Source: Ofcom decision making survey July 2008

4.33   These figures seem to present a positive story – it appears that those who want to switch find it easy to do so, and those who don't switch are simply not wishing to do so; it may be that they are happy with their current providers or are simply not inclined to search for a better deal.

4.34   Although not directly comparable, it is can also be useful to look at switching rates in other markets to inform a discussion of acceptable switching rates within the UK mobile sector. As an example, switching rates are given for various telecommunications markets in showing that switching within the mobile sector is roughly similar to that in the broadband and fixed markets.

4.35   Taken together, this data indicates that switching rates are high and that attitudes to switching are positive – although there appears to be a relatively large proportion of consumers who report never switching (60 per cent) and having no interest in switching (74 per cent).

Figure 20: Switching in UK communications markets 2007-08
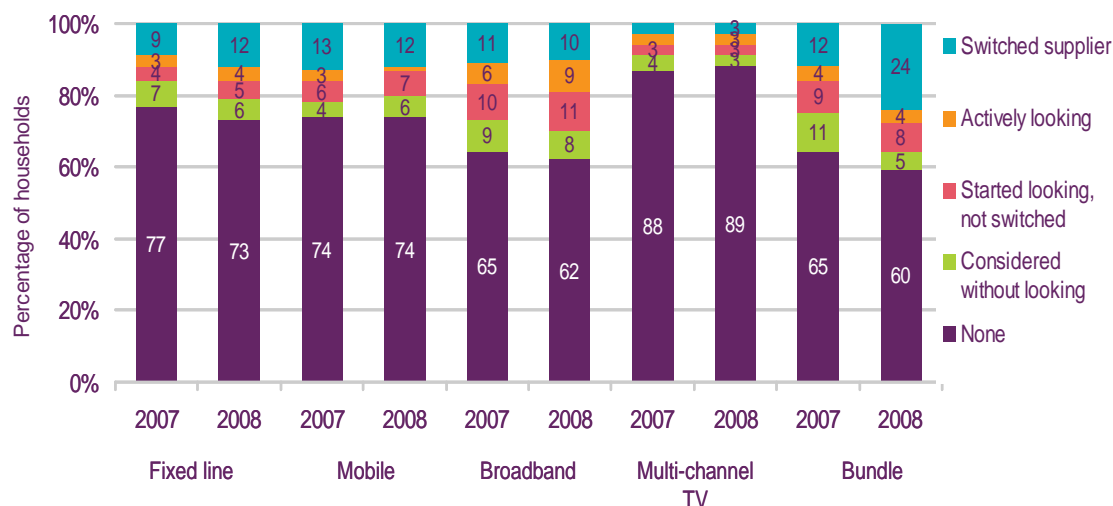
Source: Ofcom decision making survey, Q3 2008Base: Fixed-line decision makers (941) mobile decision makers (1270) broadband decision makers (460) multichannel TV decision makers (896)

4.36   Comparison with international mobile sectors can also be useful. Unfortunately, data on switching is collected in a variety of ways, which can make direct comparison between countries difficult. However, surveys conducted in the UK and in the Republic of Ireland used a similar framework to produce comparable results, and showed that switching rates are higher over the last two years in the UK than in Ireland, with 28 per cent of surveyed individuals indicating that they had switched in the last two years, compared with 20 per cent in Ireland.[61]

We are observing recent innovations in retail services

4.37   New devices, services and bundles (product innovation) and better ways of producing existing devices and services (process innovation) benefit customers. Innovation provides the key to unlock wider choice, and better quality and value. For suppliers, innovation provides a way to differentiate their services, particularly as some characteristics of competing basic telecoms services (e.g. voice calls, text messages and access to the internet) are often quite similar, from the consumer's perspective.

4.38   Mobile technology has evolved rapidly over the past decade, creating the potential for innovation. Competition also plays a critical role in creating the need for businesses to innovate (in order to preserve or build market share) and ensuring that, over time, the benefits of new innovations are passed back to customers.

4.39   Service innovations in the mobile sector in recent years include:

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[61] TNS UK, *Face to Face omnibus* Nov/Dec 2008, TNS Rep, *Ireland telephone omnibus*, Feb 2009.

- commercial innovations like pay-as-you-go pricing and, more recently, SIM-only services;

- video calling;

- mobile TV (e.g. broadcast multichannel TV and also services like football highlights);

- mobile VoIP and instant messaging;

- web and gaming portals e.g. Vodafone Live, Planet 3, O2 Blueroom, Orange World, T-Mobile web' n' walk;

- converged bundles (e.g. X-Series from 3UK which includes instant messaging, Orb, Slingbox, and ebay, as well as Nokia's music services bundled with handset); and

- user generated content and social networking e.g. Facebook phone (INQ1); Youtube uploads direct from phone.

4.40   Not all these services have been successful but, taken together, they demonstrate that the market appears to be generating strong incentives to develop and offer new services.

4.41   An example of pricing innovation is the rise of 'SIM-only' deals. These deals allow a customer to purchase services without a subsidised handset, and have been a highly successful pricing strategy; by the end of 2008, these offers had grown to represent 40 per cent of new post-pay subscribers. 'SIM-only' contracts are discussed further in the case study below.

4.42   Mobile broadband is another service innovation that has emerged as a success story since the second half of 2007 (discussed in Section 3).

SIM-only contracts – a new, popular pricing model

A 'SIM-only' contract allows a customer to buy a mobile service without receiving a subsidised handset. These contracts might appeal to customers who already have a hand-set – drawing on the large number of consumers who already own a working handset. Most SIM-only contracts allow the customer to leave after one month's notice, contrasting with the growing number of post-pay contracts with a long lock-in period, with 18 months becoming increasingly common for post-pay. All of the mobile network operators and many of the MVNOs are currently offering SIM-only deals.

Although contracts similar to 'SIM-only' have been available since the 1990s, the popularity and marketing prominence of SIM-only contracts occurred in mid-2007. To encourage take-up, some operators have offered incentives such as double allowances and discounted line rentals instead of handsets for upgrading customers.

O2 launched its *Simplicity* brand in August 2007, with many other retail providers following with similar offers, such as Virgin's *Liberty SIM* launch in March 2008.[62] The price point has also decreased significantly since 2007, with most of the operators now offering service for £10 per month. In February 2009, customers could buy, say, 150 minutes and 350 texts for £10 per month in a 30 day contract. The same minutes and text, with a handset included and over a longer contract period, cost around £25 per month.

The SIM-only contracts combine a bundle of voice and text (like a post-pay contract), with the transparency and flexibility of pre-pay services. It has been popular with both pre- and post-pay customers; the lack of a bundled handset makes it easier to compare SIM-only deals and the relatively short contracts avoid 'lock-in', which can be attractive to those who wish to be able to shop for better deals.

'SIM-only' contracts are growing in popularity at a time when the proportion of pre-pay subscribers is shrinking, falling from 64 per cent of total subscribers at the end of 2007 to 61 per cent by the end of 2008'.[63] At least some of these subscribers are likely to be moving to SIM-only contracts (currently counted within the post-pay segment). However, Vodafone is also reporting that the growth in subscribers on SIM-only contracts is also coming from post-pay subscribers, stating that 30 per cent of its customers are choosing SIM-only deals when renewing their contracts.[64]

Today, SIM-only contracts are one of the fastest growing mobile deals available to consumers. There were 1.2m SIM-only contract sales in the UK in 2008, equivalent to 20 per cent of contract sales during the period.[65]

T-Mobile estimates that by the end of 2009 25 per cent of its customers will be on SIM-only deals, up from 1 per cent at the end of 2007.[66]

Pricing complexity remains an issue for consumers although the market continues to evolve

4.43   In the MSA I consultation, we presented evidence that prices in aggregate are falling, and that people have choice about the structure of their charges. Between 2002 and 2007 the real price of mobile services declined by an estimated 45 per cent.[67] We also presented evidence that post-pay customers seem to have fared well:

- prices for bundles of a particular size are decreasing; and

- the size of bundle available for a given monthly price commitment is getting larger, although the length of contract commitments necessary to secure these offers has also increased.

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[62] See http://about.virginmobile.com/aboutus/media/news/2008/2008-03-18/
[63] The Communications Market 2008, Ofcom, http://www.ofcom.org.uk/research/cm/cmr08/
[64] 'Informa Telecoms & Media'.
[65] GfK retail data. Covers consumer channels only. Adjusted to cover 100 per cent of consumer channels. Excludes Northern Ireland.
[66] 'Informa Telecoms & Media'.
[67] Fixed Narrowband Retail Services Markets, Ofcom, March 2009, http://www.ofcom.org.uk/consult/condocs/retail_markets/fnrsm.pdf

4.44   The most intensive competitive pressure continues to be focused on the headline features of mobile packages – including, for example, handset offerings, line rentals and inclusive allowances. It may be the case that competitive pressure in other areas – less visible to consumers – is much less intense.

4.45   Although it is difficult to make definitive comparisons due to the wide range of prices and services on offer, it is possible to draw out some patterns and pricing features that illuminate the degree of competition in the market. In a competitive market we would generally expect:

- frequent discounting and/or regular introduction of new pricing strategies;

- rapid response by competitors (e.g. rapid adoption of successful pricing strategies);

- prices to be responsive to changes in demand and supply conditions.

4.46   This type of competitive behaviour is not uncommon in markets for complex bundled services and services with some switching costs. In particular, we would expect service providers to reduce prices – perhaps even below cost – for those aspects of mobile packages to which consumers are most responsive (e.g. handset prices/ranges, line rentals and inclusive allowances), and raise prices for those aspects to which consumers are least responsive (say, voicemail or roaming or calls to 08xx numbers). Given the complexity of mobile tariffs, 'least responsive' might sometimes coincide with 'least visible'. Potential new consumers are also more responsive to price than captive customers, due to the presence of switching costs. This may help to explain the prevalence of strategies such as handset subsidies and discounted line rentals.

4.47   However, the complexity of comparing different bundles makes it difficult to make accurate general statements about price. Mobile packages typically consist of combinations of different service offerings, making direct comparison between packages difficult. For example, BillMonitor.com,a mobile tariff comparison website, compares over 100,000 tariffs in the UK market for a given user's data, in order to make recommendations.

4.48   Concerns have also been raised by individual consumers, in the MSA 1 consultation responses and elsewhere, that despite the apparently wide range of choices, complex pricing itself might work against consumers' interests.

"I find myself bewildered by the complexity of different pricing plans on offer from mobile vendors, to the extent that I cannot compare them to decide which is best value"

"Complexities in mobile technology and service offerings can sometimes degrade consumer experience and confidence."

"[The] general layer of confusion is very beneficial to the operators and detrimental to the consumer"

"The existence of so many payment plans, minimum term contracts and the exorbitant costs involved in roaming abroad or paying as you go should be a good indicator that something is very wrong"

4.49   On balance, therefore, although there is indication that prices are decreasing, there is a plausible case that pricing complexity may be a source of consumer concern (see Section 6 for a further discussion of how complexity in the mobile market may affect consumers).

4.50   There is, however, some evidence that the market is continuing to evolve changing and that market-based mechanisms are emerging to address the problem of complexity:

- offers that enable customers to make a more direct comparison (for example, SIM-only deals have proved popular, allowing customers the choice to remove handsets from their pre-paid bundle); and

- price comparison services continue to grow in number and sophistication (for example, we have awarded price accreditation to BillMonitor.com and are talking to a number of other providers).

4.51   We will continue to monitor the issue of complexity of pricing in the mobile sector and the level of consumer concern through our regular consumer research and by analysing complaints data. If market-based mechanisms do not prove effective in the medium term, it may be appropriate to introduce further obligations on mobile operators which require them to offer more transparent pricing. These could include, for example, a user-friendly set of common criteria which would be designed to make it easier for consumers to compare different mobile products and services.

Profitability is below comparable international markets

4.52   Given the complexity of pricing analysis, we have also looked at measures of profitability to gauge the degree of price competition in the market. We can observe that in a competitive market, competition should result in firms earning normal returns in the medium to long run, i.e. returns consistent with the cost of capital.

4.53   High profits by individual companies can be consistent with competitive markets, if they are the rewards of innovation, or act as a signal to market entry. More generally, a competitive market is likely to generate significant variations in profit levels between firms as supply and demand conditions change, but with an overall tendency towards levels commensurate with the cost of capital of the firms involved.

4.54   In Section 5 we look at how the UK mobile operators' EBITDA[68] margins compare with their international peers. Although we have not conducted a detailed profitability analysis, we are able to show that profit margins have been consistently lower than in comparable international markets., .

4.55   On the reasonable assumption of a similar cost of capital between the countries shown, the significantly lower profit margin exhibited by the largest two UK operators makes it

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[68] Earnings Before Interest, Taxes, Depreciation and Amortization (EBITDA) is an approximate measure of a company's operating cash flow based on data from the company's income statement. EBITDA is used to compare the profitability of a company with other companies of the same size in the same industry but which may have different levels of debt or different tax situations.

less likely that excess profits are being earned by mobile operators in the UK compared to other major EU countries, such as France and Germany (see Figure 22, Section 5).

4.56   Furthermore, Figure 21 shows that the profitability of the mobile operators is decreasing over time, particularly since the entry of H3G.

Figure 21: Average EBITDA margin of UK mobile operators
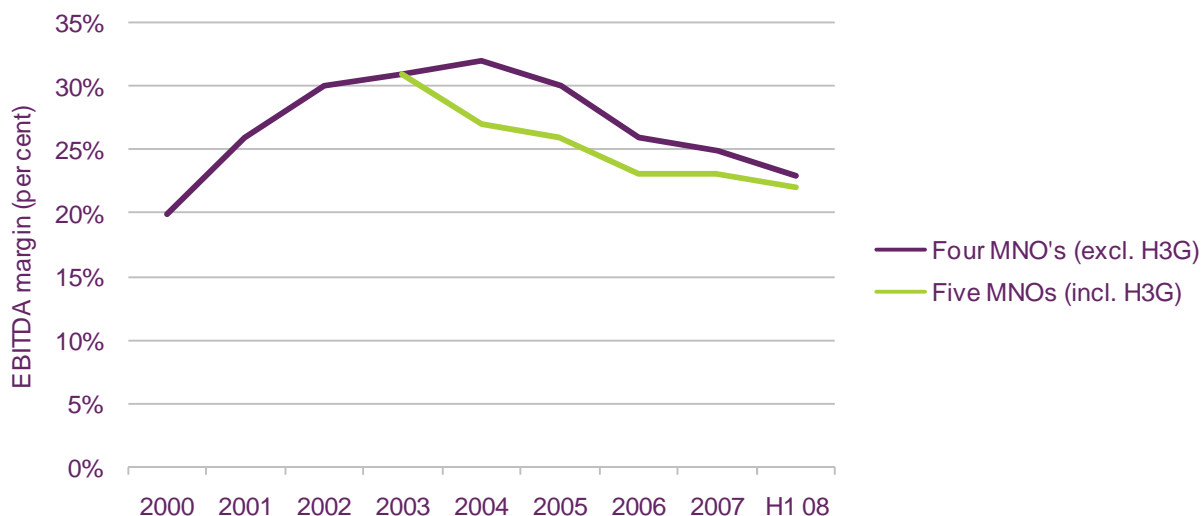
Recently new spectrum has been auctioned that could be used for innovative sub-national and niche networks

4.57   In March 2006 Ofcom conducted an auction to determine the assignment of wireless telegraphy licences to use the 'DECT guard-band'.[69]

4.58   These spectrum packages are not suited to the creation of 2G national networks like those currently operated by today's 2G operators. They are better suited to deliver mobile services using technologies such as WiMax and picocell-based services – and this could include some form of fixed-mobile converged service. Therefore, the impact of the release of these spectrum rights lies in their ability to form a fertile ground for a generation of new, innovative sub-national and niche mobile markets.

4.59   Following the 2006 auction there were twelve recipients of spectrum awards; one was an existing UK mobile operator (O2), four were existing UK fixed telecom providers (BT, Cable & Wireless, Colt and Opal) while the remaining seven were a mix of small

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[69] Frequency bands 1781.7-1785 MHz paired with 1876.7-1880 MHz (concurrent spectrum access licences). The spectrum bands called 'DECT guard bands' were originally set up to protect cordless phones (Digital Enhanced Cordless Telecommunications) from interference by mobile telecommunication transmission.

specialist companies, WiFi hot-spot providers, and international telecommunications network operators.[70]

4.60   We anticipate that this process of releasing spectrum may provide numerous benefits for the UK mobile industry, including opportunities for innovative mobile services, and may act as a stimulus for competition in the supply of retail and wholesale mobile services.

New licensees are finding the market difficult to enter

4.61   In order to gain full interconnection, new licensees must reach interconnection and mobile number portability (MNP) agreements with each existing mobile network operator and also with each new player which precedes them in entering the MNP system. A number of new licensees, including MCom and C&W, as well as some of the existing MVNOs are pursuing MNP agreements.[71] Although all have made progress towards completing the agreements, at this stage only MCom has completed agreements with the existing five UK mobile operators, while C&W have signed but not completed testing with all five mobile operators. Considering that the licences were awarded in May 2006, this amounts to considerable delay.

4.62   Delays in establishing MNP agreements have arisen for a number of different reasons, with responsibility lying both with network operators and sometimes with the entrants themselves. In some cases, disputes on interconnection rates have further delayed the process

4.63   We are encouraged that there has been progress recently. Additionally, entrants that have only recently started negotiating portability appear to be making good progress towards securing agreements.

4.64   We consider it important that the negotiation of interconnection and MNP agreements does not unduly delay or prevent market entry, and will take an active stance in ensuring that is the case (as discussed in more detail later in this chapter). We have already resolved disputes in this area and will continue to take action if appropriate.[72]

New entrants may also emerge by entering at the application layer

4.65   As discussed in the previous chapter, the mobile market continues to develop rapidly and there is a possibility that new entrants may be able to begin providing mobile services to consumers without having to acquire spectrum or build a new mobile network. For example, some mobile handsets allow users to operate a VoIP or IM service.

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[70] The full list of winning bidders can be found at
http://www.ofcom.org.uk/radiocomms/spectrumawards/completedawards/award_1781/notices/030506.pdf
[71] In principle, it is possible to launch a commercial service without number portability (since new customers can be issued with a new number) but in practice and as a matter of commercial reality, the two processes run together. Put another way, it is even more difficult to sell a new telephony service if all your customers are unable to bring their number with them should they wish to do so.
[72] For example, we have recently resolved a dispute between T-mobile and M-Com concerning the termination rate (payable by T-Mobile (UK) Ltd (T-Mobile) to Mapesbury Communications Ltd (MCom) for calls originated on T-Mobile's network and terminated on MCom's network) detailed as part of the interconnection agreement. The determination was published on 20th March 2009.

4.66   The extent to which such services will affect competition for traditional mobile services such as voice and SMS in the short to medium term is currently unclear. It is likely that, in the longer term at least, such applications could provide significant competitive stimulus in the mobile sector. However, importantly, the extent to which this is the case is likely to depend on the degree to which mobile operators allow consumers to access such services (see discussion later in this section of possible anti-competitive behaviour).

Mobile operators have made some moves towards increased co-operation

4.67   In a maturing market, there are possible efficiency gains for mobile network operators who choose to co-operate in their service delivery. One specific form of co-operation is sharing some parts of mobile networks, including RAN sharing. Sharing of sites, support facilities or full RAN sharing can allow operators to achieve lower operational costs and/or greater coverage than as fully separate networks.

4.68   UK mobile operators have already made some moves towards RAN sharing. Details of RAN sharing, interaction with technological change and policy approaches are discussed in the previous section. Three bilateral network sharing deals have been announced, between T-Mobile and H3G, Vodafone and Orange and Vodafone and O2.

4.69   As discussed earlier, technology developments will facilitate further RAN sharing in the future and the Government may encourage network sharing as a means to enable greater network coverage. This trend could potentially put pressure on competition. It is possible that increased network sharing in future may have implications for competition in the market. Our proposed response is set out below.

We do not plan to conduct a market review at this stage (other than our Mobile Call Termination Market Review)

4.70   In response to the MSA 1 consultation, some respondents called for a more detailed review of the mobile market, explicitly including the question of whether to extend access regulation to cover third-party access to mobile networks:

*"BT believes it is time for an urgent in-depth review of the structure of the UK mobile industry to assess whether it is delivering real choice for customers. This should include a thorough examination of the case for **mandated wholesale access** to the mobile networks and their facilities" BT*

*"…access to mobile services by [CPs] is restricted and the strong question remains - why cannot **functional separation** be extended to large mobile incumbents?" BT*

4.71   We believe that the mobile sector is currently serving citizens and consumers reasonably well and are not planning to conduct further assessment, such as a market review for mobile call origination, at this stage. We will therefore not be considering the imposition of remedies, such as wholesale access conditions, at this stage. In reaching this view, upon which we are consulting, we have considered the following factors:

- entry in the mobile market continues to take place both through new spectrum licensees and by application-based providers;

- market shares of both mobile network operators and MVNOs continue to change over time;

- consumers are switching between suppliers, and the rate of switching has not fallen significantly in recent years;

- service and price innovation continues to take place, and;

- price trends indicate that prices are falling, and, from the evidence we have available, mobile operators' profitability in the UK overall does not appear to exceed that in other similar markets.

4.72   Consequently, the mobile market continues to show signs of healthy competition and we do not currently see strong evidence of the type of market failure that drove our major intervention in the fixed sector.[73]

4.73   As part of the implementation of the EU Framework for electronic communications networks and services, the EC publishes a *Recommendation on Relevant Markets* for assessment via a market review. In February 2003 the EC published its first such recommendation, including *Mobile access and call origination on public telephone networks* (then called *Market 15*).[74] In August 2003 we published a market review of the mobile access and call origination services market and found that the defined markets contained no providers with significant market power (SMP).[75] In its most recent (December 2007) publication of its recommendations[76], the EC has removed the mobile access and call origination market from the set of recommended markets. This agrees with our experience and the finding that the UK mobile sector does not currently require a market review (other than the market for call termination).

4.74   Nor do we consider that it is appropriate at the current time to consider the question of whether there exist features of the UK mobile market that would warrant a reference to the Competition Commission under the Enterprise Act 2002.[77]

4.75   Although we do not intend to embark on a market review at this stage, or consider imposing access obligation on mobile operators, we will continue to be vigilant in using our competition authority powers to assess changes to the market structure and prevent anti-competitive behaviour. We will also take competition into account in our decisions on spectrum. These actions are discussed in more detail below.

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[73] Ofcom, Strategic Review of Telecoms, September 2005,
http://www.ofcom.org.uk/consult/condocs/statement_tsr/statement.pdf
[74] Commission Recommendation of 11th Feb 2003 on relevant product and service markets within the electronic communications sector susceptible to *ex ante* regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communication networks and services
[75] Mobile access and call origination services market -
http://www2.ofcom.org.uk/static/archive/oftel/publications/eu_directives/2003/mobileaco0803.pdf
[76] Commission Recommendation of 17 December 2007 on relevant product and service markets within the electronic communications sector susceptible to *ex ante* regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications networks and services
[77] Details of the scope of the Act are contained here:
http://www.opsi.gov.uk/Acts/acts2002/en/ukpgaen_20020040_en_1

We will assist Government in its efforts to make spectrum available for mobile broadband

4.76 Access to spectrum is central to innovation and competition in the mobile sector. Releasing new spectrum into the market and liberalising the use of existing spectrum will encourage competition and innovation in the mobile market for two main reasons:

- The availability of new spectrum will increase competition and contestability in the market.

- It will also allow spectrum for new services, such as WiMAX.

4.77 Within the Government's Digital Britain programme, Government has sought to identify a solution to rebalance current spectrum holdings in a manner which is acceptable to stakeholders. At the time of publication of this consultation document, this process has advanced to the point where the Government's appointed 'Independent Spectrum Broker' has made recommendations, and the Government's final Digital Britain report has endorsed the broad approach proposed by the Independent Spectrum Broker and initiated a process of guiding technical arbitration.

4.78 In line with our duty to secure the optimal use of spectrum we will assist the Government to secure the release and enable the liberalisation of a number of spectrum bands which could be used for mobile services such as mobile broadband.

4.79 It is too early to tell whether the process initiated by the Government will lead to a solution which is acceptable to all parties, and what action Government may decide to take. We expect to be able to respond in more detail to the outcome of that process in the MSA Statement later this year, which will also deal with the wider issues raised in this consultation document.

4.80 If for any reason the Government were not to direct Ofcom on these matters, we as the independent regulator would have to reconsider all of the issues being considered by the Independent Spectrum Broker and the Government in the context of Digital Britain. On the basis of the evidence available to us at the relevant time, we would need to decide what actions to take to secure optimal use of the radio spectrum and promote competition in the provision of mobile and other services, for the benefit of UK citizens and consumers, following due consultation, and in the light of our statutory duties and powers.

We will be vigilant in monitoring changes in the market structure, and weigh up potential benefits against potential detriment - as appropriate

4.81 We recognise that the current market structure has, for the most part, served citizens and consumers well. The success of the UK mobile sector has, in part, reflected decisions taken (for example in relation to spectrum allocation) that have driven today's market structure. Based on current and future trends, we foresee that changes in market structural, and/or changes in the nature of competition within that structure, are possible within the UK mobile sector. Some of this change could be minor and require little or no action by the regulator. Some may be profound, and require a fundamental reappraisal of the conclusions of this assessment.

4.82   There are two important factors which may affect mobile sector market structure:

- *Spectrum availability*: as demand for broadband grows, and mobile operators roll out new networks requiring larger spectrum allotments, the availability of spectrum allocated to mobile use could constrain the ways in which competition may develop and may alter the competitive dynamics in the sector.

- *Changes to the value-chain*. The relative relationships between the different activities in the mobile value chain, and the degree of competition in each segment, may change. A specific example is mobile network operation - agreements to share RANs may lead to a reduction in the number of unique mobile access networks within the UK, as well as raise the potential for co-operative behaviour between mobile (core) operators. It is of course possible that consolidation (that is, mergers or acquisitions between operators) may also occur in future

4.83   Regarding RAN sharing and/or merger and acquisition activity, such developments fall under the jurisdiction of competition law. Ofcom has the power to examine any network-sharing agreements under the rules relating to the prohibition of anti-competitive agreements (Article 81 of the EC Treaty / Chapter I of the Competition Act 1998).[78] In the event of a merger in an area where Ofcom has regulatory expertise, such as mobile services, we may offer advice and guidance to the Office of Fair Trading (OFT) and potentially the Competition Commission (CC) during the course of its investigation, both in terms of our strategic perspective as sectoral regulator and as a concurrent competition authority, supporting their work.[79]

4.84   Undoubtedly the mobile sector will evolve through these changes, some changes instigated by us, such as spectrum release, and others by industry. Our main role will be to preserve, defend and promote competition throughout the mobile value chain as changes in the market take place.

We will act if we suspect anti-competitive behaviour

4.85   We consider effective competition within the application layer of the mobile network to be of increasing importance for continuing price and service innovation in the mobile sector.

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[78] In brief, arrangements between competitors risk infringing competition law if they have as their object or effect the prevention, restriction or distortion of competition. If an agreement is anti-competitive, then it is void and the parties to it may be liable to a fine. However, an anti-competitive agreement can survive competition law scrutiny if it is possible to demonstrate that it meets the criteria for an exemption. These criteria are: the agreement must contribute to improving the production or distribution of goods or to promoting technical or economic progress; and the agreement allows consumers a fair share of the resulting benefit; and it does not impose restrictions which are not indispensable to the attainment of these objectives; and it does not afford such undertakings the possibility of eliminating competition in respect of a substantial part of the products in question.

[79] Under the Enterprise Act 2002, the OFT has the function of reviewing UK mergers. Where the OFT deems there to be a relevant merger which meets certain thresholds, the OFT will open a merger investigation. The test is whether the merger has resulted or may be expected to result in a substantial lessening of competition in the relevant market. If the OFT concludes it has not, then it "clears" the merger. If, on the other hand, the OFT thinks this test is met, then the OFT must either refer the merger to the Competition Commission (the CC) or accept remedies from the parties to the merger in lieu of a reference. If the merger is referred to the CC, it conducts an in-depth review and either allows the merger (with or without any remedies) or prohibits it.

Competitors in this layer include providers of mobile content, applications, VoIP services and instant messaging. They also include MVNOs.

4.86   As discussed in Section 3, mobile operators are central to the value chain and are potentially in a position to control aspects of network access. In particular, mobile operators could, in theory, restrict access in the following ways:

- Firstly, mobile operators could limit or deny certain applications from transmitting data via mobile broadband connections. Particular industry concern rests on the limitation of activities that provide voice or communications services.

- Secondly, mobile operators may restrict third party access to network information that may be used as inputs to mobile applications, such as the information required to provide location-based services.

- Thirdly, mobile operators may restrict access to their networks for the provision of voice, SMS or data services, such as those currently provided through MVNOs.

4.87   The first two issues relate broadly to mobile operators' potential to inhibit application providers. As described, this could either be through restricting end-user access to the application, (which would amount to a 'net neutrality' issue), or by restricting the application from accessing information held by the mobile operator (such as the information required for the implementation of location-based services).

4.88   As stated in the MSA 1 consultation, in a competitive market we expect that the degree of 'net neutrality' (if any) will be determined by consumer choice and therefore does not require regulation. An important corollary is that consumers should be aware of any restrictions that are placed on their service, both at the point of sale and during the term of the contract. Therefore, to the extent that any intervention is called for, it would be focused on making the restrictions transparent to consumers, rather than regulating access.

4.89   Regarding the sharing of commercial/network information held by mobile operators, we similarly observe that an effectively functioning market should resolve any access issues. Companies wishing to access subscriber information in a manner which would allow them to create applications attractive to consumers are able to negotiate commercially with mobile operators. There is no obligation for mobile operators to provide information of this nature; they choose to provide this access on a commercial basis. We would become concerned only if refusal to supply information was occurring in a persistent and/or strategic manner. Furthermore, as mentioned in Section 3, we see signs that technological evolution may reduce the competitive impact of such information asymmetries, as applications are increasingly able to operate independently, without mobile operators co-operation.

4.90   The third issue relates to the provision of wholesale service to MVNOs. Although there is no obligation for mobile operators to provide access to wholesale services, we may become concerned if mobile operators were to deny or restrict such access in a persistent manner to the determent of the MVNO market.

4.91   Despite these potential access restrictions, mobile operators appear to be providing access adequately; we see that entry barriers for services such as VoIP over mobile are

decreasing, new applications are launching over mobile platforms, and MVNOs continue to enter the market and secure unregulated access to wholesale services from mobile operators.

4.92   The market has shown signs that it can overcome asymmetries between mobile operators and access seekers, and will continue to do so in the future. However, we will continue to monitor the progress of the sector regarding the launch of new services and MVNO access, with an eye to ensuring that the competitive health of the industry is not hampered by anti-competitive behaviour.

We will take a more active stance on facilitating new market entry, particularly for spectrum licensees

4.93   New market entry adds to the competitive landscape and can stimulate innovation, both of which are positive for the mobile sector. We consider it important that new entrants do not face undue barriers to entry, and will take an active stance in removing such barriers should we find them to exist.

4.94   To date, we have identified a particular barrier to new entrants which have purchased spectrum with the intention of launching new mobile services. These entrants must establish interconnection and mobile number portability agreements with the existing top five mobile operators. These agreements are essential if customers of the new entrant are to be able to call the customers of other networks.

4.95   Experience has shown that these agreements have taken a long time to establish. While many factors may influence the speed at which new entrants bring products to market, we believe the establishment of interconnection and MNP agreements should not be a limiting factor.

4.96   In relation to interconnection and MNP agreements, mobile operators currently have the following obligations:

- *Interconnection:* Condition 1.1 of the General Access and Interconnection Obligations requires that: *"Communications Providers shall, to the extent requested by another Communications Provider in any part of the European Community, negotiate with that Communications Provider with a view to concluding an agreement for Interconnection with a reasonable period".*

- *Mobile number portability*: Condition 18 of the General Access and Interconnection Obligations requires that: *"Communications Providers shall, pursuant to a request from another Communications Provider, provide portability as soon as is reasonable practicable".*

4.97   We intend to increase the priority with which we attend to instances where mobile operators may not be fulfilling their existing obligations.

4.98   In addition, as the UK's spectrum authority, and in keeping with our established approach to spectrum release, we will design spectrum auctions and the packaging of spectrum with continuing attention to the need to encourage outcomes consistent with a competitive mobile sector. In addition, we have continuing oversight on spectrum licences. In the first instance, licences can be written with conditions safeguarding

aspects of the spectrum use. In extreme instances of misuse, we have the power to revoke a spectrum licence.

Consultation questions

Q 4.1: We have outlined a number of factors which may affect the future market structure, including network sharing, spectrum and potential consolidation. Do you agree with this assessment, including risks and benefits that we have outlined?

Q 4.2: Do you see any risks to competition that we have not highlighted?

Q 4.3: Do you agree that a market review in the mobile sector (other than in the call termination market) is not currently required?

Q 4.4: We have concluded that competition in the mobile sector is currently addressing access concerns adequately. Do you agree?

Section 5

Investment

Summary

5.1   Given the current challenging economic conditions, we are keen to do all we can to ensure that UK citizens and consumers continue to benefit from efficient investment in networks. This is also consistent with our duties.[80]

5.2   The discussion in this section focuses on investments in network infrastructure, which include maintenance of existing networks, expansion of networks into new areas and the construction of completely new networks, for example based on 4G technology and using newly-released or liberalised spectrum. Our focus in this consultation is on commercially driven investments, rather than non-market-led investments (e.g. roll-out conditions or universal service commitments), such as those proposed in Digital Britain.[81]

5.3   Non-network investments, such as in handsets, applications or customer services also bring important benefits to UK citizens and consumers. In some cases these investments are co-ordinated across different firms and/or different parts of the supply chain. For example, the iPhone was developed by Apple, required a deal with O2 that included network upgrades and then triggered investments in new software by third-party developers via the Apple application store.

5.4   Investment in the UK mobile sector in recent years has been comparable to that in other European markets. Capital expenditure (capex) as a percentage of revenues has been consistent with capex in comparable countries, and new network technologies, handsets and services have generally been launched in the UK around the same time as in other countries.

5.5   Investment in the UK has fallen as a proportion of revenue in the period 2007/08, but this appears to be in line with recent changes in market conditions and the gradual maturation of the mobile sector in western economies.

5.6   Credit availability and recession will undoubtedly affect funding available for investment in the mobile sector in the short term. Although there is uncertainty regarding when this situation will ease, infrastructure in the mobile sector is a longer term investment and mobile network operators must plan for future needs. For this reason, it is likely that investment in the sector will not be acutely sensitive to short term market fluctuations and that investment levels will broadly be sustained through periods of downturn. This will be particularly true in the case that operators anticipate the sector to remain competitive.

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[80] Sections 3 and 4 of the Communications Act 2003. We also acknowledge *Digital Britain's* proposal to give us further duties in this area (*Digital Britain Final Report,* Chapter 3a "A Competitive Digital Communications Infrastructure", paragraphs 63 – 67*)*, p. 65f.
[81] See *Digital Britain Final Report,* Chapter 3a, p. 47ff.

5.7   We believe that the best contribution we can make to timely and efficient investment in the mobile market continues to be to promote competition and ensure that any regulation we impose does not hinder or delay investment. We also recognise the important role regulatory certainty has for investment decisions in a sector with long investment horizons.

Consultation respondents agreed on the importance of the link between regulation and investment, but expressed differing views on preferred levels of intervention

5.8   In their responses to the MSA 1 consultation, several corporate and government respondents highlighted the need to ensure that our interventions are conducted in a manner which is mindful of investment conditions. [82] But respondents disagreed as to whether this goal was best met through more or less regulatory intervention.

- Scottish and Southern Energy said that *"one of the purposes of regulation should be to ensure contestability of infrastructure investments."* It mentioned that in its view promoting contestability should go hand in hand *"with a form of market governance that oversees the maintenance of standards for interoperability."*

- The Welsh Assembly Government said that there might currently be *"obstacles to investment for new entrants in terms of spectrum, technical standards and backhaul costs. Removing these obstacles, or at least reducing them, should be a focus for Ofcom in order to stimulate investment and encourage competition.*"

- AT&T said that the *"mobile industry is still a comparatively young and dynamically changing industry… Regulatory intervention at this point, with the market in its infancy and changing rapidly, could have disastrous long-term unintended effects, distorting investment and stifling the ongoing innovation and experimentation…."*

5.9   Mobile operators were keen that we recognise the level of investment made to date, while also emphasising the current trend towards reduced margins and the impact that further or changed regulation may have on different revenue streams:

5.10   T-Mobile said that *"remaining an active player in the UK mobile market requires a large amount of continuing network investment. Ofcom needs to ensure that any regulatory intervention does not discourage any future investment."*

5.11   Orange agreed and said that *"when it (Ofcom) is imposing any form of regulation, Ofcom must take a wider view and consider the overall impact that the regulation will have on the market and specifically the climate for investment."*

5.12   O2 said we did not focus enough on our duty to encourage investment in the MSA 1 consultation and that *"Ofcom should have at the heart of its review the objective of creating an investment regime under which such investment may be made with confidence by mobile operators."*

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[82] Responses to our consultation can be found here:
http://www.ofcom.org.uk/consult/condocs/msa08/

5.13   In its recent Digital Britain report, the Government has also highlighted the need for regulation to strike an appropriate balance and take account of both investment considerations and competition outcomes when assessing consumer benefit.[83]

5.14   In the remainder of this section we provide an overview of investment in the mobile sector in recent years, and an analysis of current pressures on the industry. We also provide a brief summary of how we think we should proceed with regards to regulatory actions that might affect investment.

The UK mobile market has seen a healthy level of investment to date

5.15   EBITDA margins within the UK mobile sector tend to be lower than in comparable markets. Figure 22 compares the margins on earnings before interest, tax, depreciation and amortisation (EBITDA)[84] for the top two players in markets such as the US, Italy, Germany, France and Spain – and shows that the UK has the lowest margins of any of the countries considered.

Figure 22: EBITDA margins – Top 2 mobile operators, US and Europe
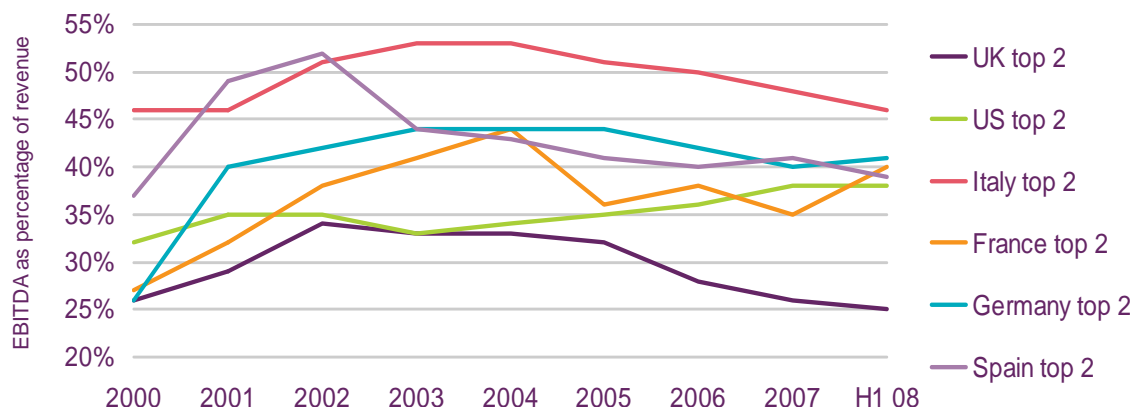
Source: Ofcom

5.16   However, lower returns in the UK do not seem to have held back investment compared to other European markets. Investment – as a percentage of operators' revenues, and on a per-subscriber basis – is broadly similar to that in comparable markets (see Figure 23 and Figure 24 below), although MNOs which are present in the UK tend to invest more – relative to market size – in at least some other markets.

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[83] *Digital Britain Final Report*, Chapter 1 "Executive Summary", Paragraph 37, p.15.

[84] EBITDA is an approximate measure of a company's operating cash flow based on data from the company's income statement, and is commonly used to compare the profitability of a company with other companies of the same size in the same industry which may have different levels of debt or different tax situations.

Figure 23: Capex as a percentage of revenues[85]
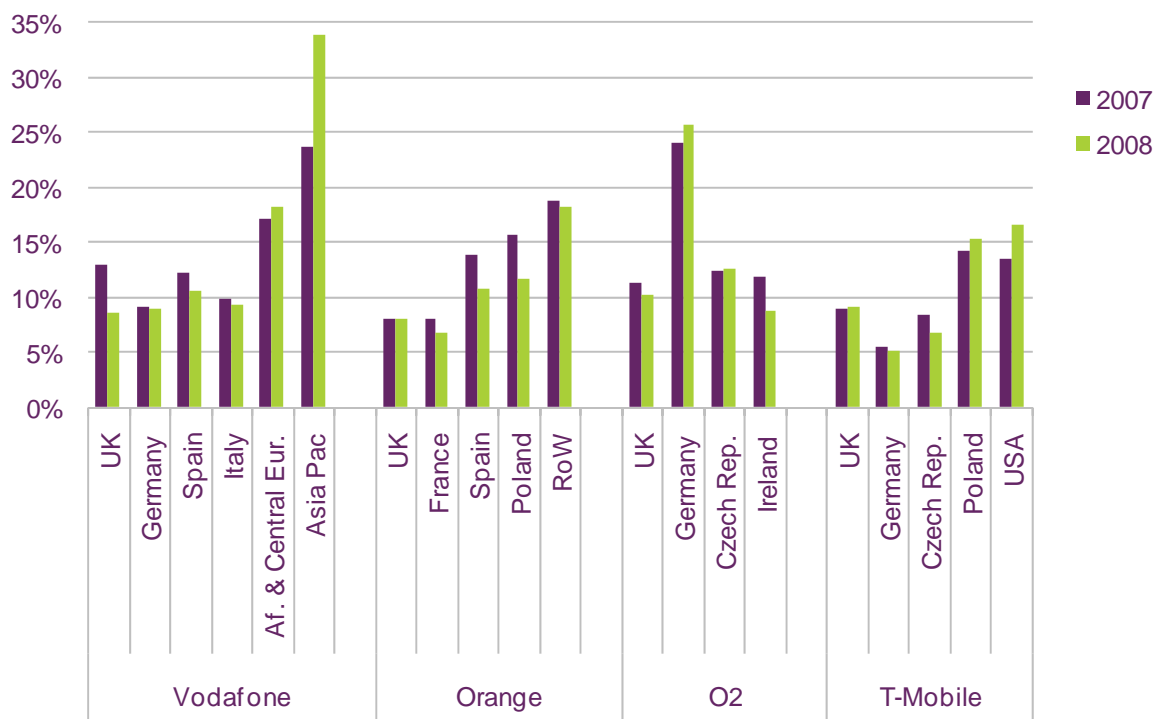
Note: RoW = Rest of World
Source: Ofcom, Operator published accounts

Figure 24: Capex per subscriber (2008)
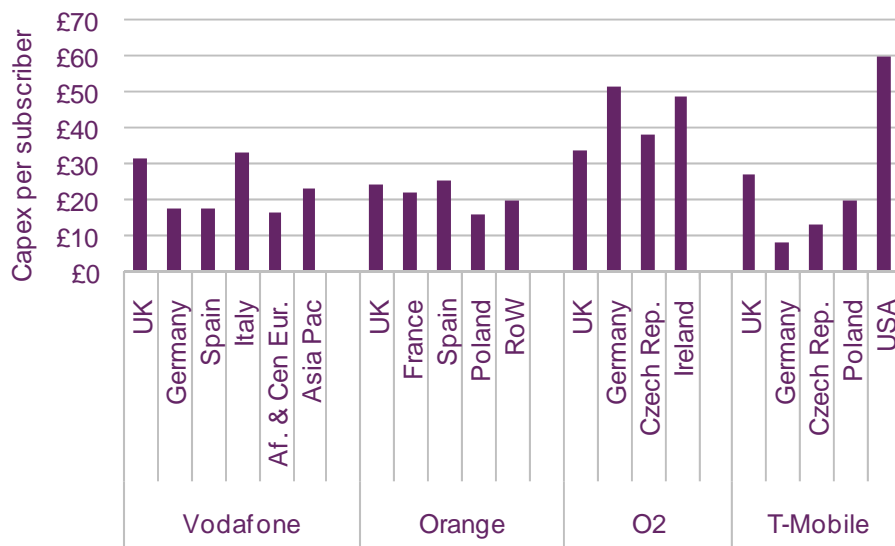
Source: Ofcom, Operator published accounts

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[85] We have used operators published accounts to estimate capex as a percentage of revenues. This means that results are not in all cases exactly comparable: exact accounting policies, e.g. with regards to the capitalisation of handset subsidies and service development costs, may vary.

73

Note: Exchange rates used are the average for 2008 from the European Central Bank

5.17   Nor have lower margins affected the extent to which new services are made available to UK consumers. For example, the UK's roll-out of 3G technology is in line with other markets (see Figure 25 below).

Figure 25: 3G and HSDPA launches in Europe

Source: IDATE/Ofcom

5.18   The UK mobile market has also witnessed continued investment in new devices and services, with the release of leading handsets like the iPhone, the G1 and Blackberry Storm, and the rapid growth of innovative services like mobile broadband. On 23 June 2009 Vodafone announced it would allow customers to boost in-home coverage using femtocells – an offer billed by the company as the first of its kind in Europe.[86]

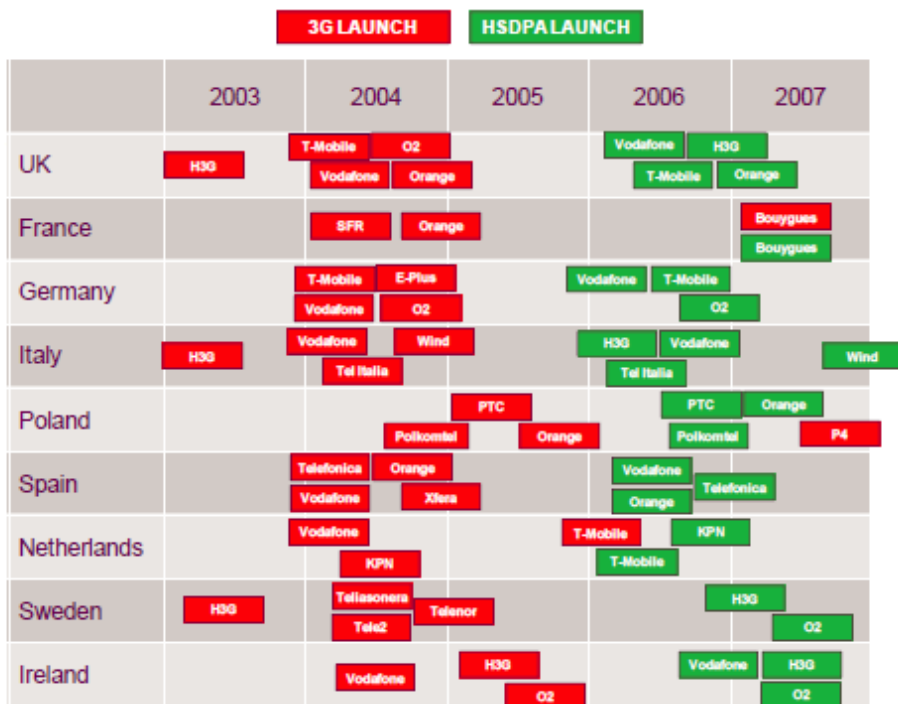5.19   However, the relationship between investment and competitive conditions within a country is a complex one and reflects many factors, including the size of the market both in terms of population and wealth, its growth potential, technological change and the decision horizons of the industry. A number of explanations for UK investment levels are plausible:

- Even though returns may be lower, the (risk-adjusted) benefits of investment outweigh the costs. In an efficient market players will make investments as long as there is a positive business case. The positive business case can be driven either to

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[86]   See **http://www.vodafone.com/start/media_relations/news/local_press_releases/uk_press_releases/2007/access_gateway.html**

gain potential revenue upsides (e.g. by attracting new customers or being able to offer new services), or to avoid potential downsides driven by competition (e.g. potential subscriber loss if an operator does not keep up with technology and service developments).

- Competition increases the pressure on operators to differentiate their services, look for new sources of revenue and therefore to invest in network roll-out and upgrades. In less competitive markets this pressure is likely to be lower and despite higher margins there may be lower incentives to invest. Monopolists, if their position cannot be contested, may be less likely than firms in competitive markets to undertake investment.

- Mobile operators may have continued to invest in the UK because it is a place where four major globally-active players of world telecommunications come together with a relatively level playing field. In some senses the UK may be seen as a test bed for global ideas, before rolling out to higher value markets.

5.20   Furthermore, evidence on investment is inevitably difficult to interpret, not least because of cyclical effects. For example, investment has fallen over the past few years, as a result of the completion of the initial network rollout of 3G. Other factors that impact investment are slowing subscriber and revenue growth in a maturing market. Therefore, operators have over time scaled back their investment programmes down to circa 8 per cent of revenues (see Figure 26). However, to our knowledge, UK operators continue to expand 3G coverage within the UK and to undertake regular further investment to improve network performance.

Figure 26: Capex (as a percentage of revenue) vs. EBITDA margin

Source: Ofcom, operator published accounts

5.21   A reduction in capex in the mobile sector in the UK also reflects a wider trend. As the figures for Vodafone show below, it has reduced its capital expenditure across European markets to around 10 per cent or less of revenues in each market. This contrasts with emerging markets, where higher investments reflect the ongoing deployment of new networks to serve a growing subscriber base.

Figure 27: Vodafone capital expenditure as percentage of revenues
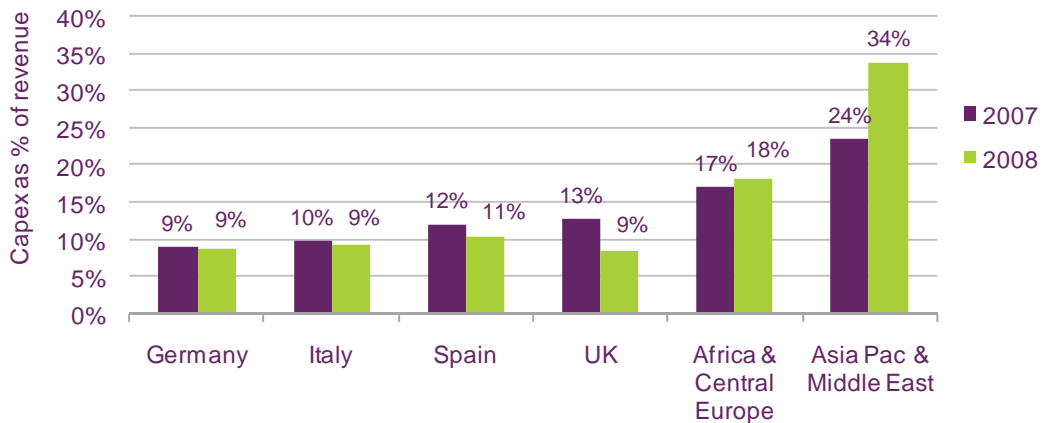
Source: Vodafone published accounts

5.22 Rolling out 4G networks will obviously require significant programmes of investment and may lead to investment levels increasing again. The reasons that this investment has not yet begun are not related to the current market conditions: the technical standards themselves have only just been finalised or are still progressing; demand for the services they offer is still in its infancy, and equipment is not yet available (and may become cheaper in future).

How will long-term investment strategies be affected by the current restricted credit and recession?

5.23 The recession and restricted credit conditions have undoubtedly made the case for investment by mobile operators in the UK and elsewhere more difficult for a number of reasons:

- Reduced access to credit may affect the ability of mobile operators to raise finance even for profitable investments.

- The recession and accompanying slowdown in consumer spending may reduce demand for high-end mobile services, making the business case for investment in such services less convincing in the short term.

5.24 There is significant uncertainty regarding the timeline for economic recovery and, more specifically, the easing of credit conditions. This is exacerbated by the debate regarding regulatory reform for financial markets. However, mobile network operators must plan over significant time horizons, including their estimates of future demand for services and new products in their investment decisions today. For this reason, it is likely that investment in this sector will not be acutely sensitive to short term market fluctuations and will broadly sustain investment levels through periods of downturn.

We will continue to encourage efficient investment by promoting competition

5.25 Investment will only provide economic benefits if the value of the additional output exceeds the cost of the investment, for example the dotcom boom led to billions of

pounds of lost economic output as a result of wasteful investment. This is why regulators normally focus on encouraging *efficient* investment (taking account of externalities where appropriate).

5.26   In industries with networked infrastructure, there is a need to recognise the need for individual firms to be large enough to generate a sufficient return on their investments, while also safeguarding the consumer benefits of competition and choice which require multiple independent firms in the market.

5.27   The most important thing that we believe we can do to encourage efficient investment continues to be to promote competition and where possible provide regulatory certainty to ensure that we support a vibrant industry in which competition drives efficient, unhindered investment.

5.28   In practice, we believe these objectives are best pursued through the following priority areas:

- **Spectrum:** We consider it of utmost importance that spectrum is available in a timely manner to optimise the prospects for competition, innovation and better mobile coverage across the UK. We will assist the Government and its Independent Spectrum Broker in their work over the coming months;

- **Regulatory certainty:** We will focus on providing regulatory certainty where we can – for example, on the likely future development of policy, in areas such as consumer policy and the setting of mobile termination rates; and

- **Competition:** We will apply our competition powers to ensure fair and effective competition as the market develops. We will closely monitor competition between mobile access networks, service and content competition and third party access to networks as well as access of new spectrum licensees to key industry processes such as interconnection and number porting, as outlined in section 4.

Questions

5.1 Do you agree with our assessment of investment in the UK mobile market and our priorities to secure future efficient investment?

Section 6

Consumer protection and empowerment

Summary

6.1   The mobile market generally works well for consumers. But it is a complex market, and some consumers find it difficult to make informed choices and remain protected from misleading or exploitative practices. Because mobile services matter a great deal to consumers, when things go wrong, consumers can suffer significant costs and/or inconvenience. The number of people affected is large in absolute terms but is small relative to the total number of consumers (which is very large).

6.2   Ofcom should therefore continue to play a role in ensuring that mobile consumers are empowered and equipped to get a good deal, and properly protected from things going wrong. As our experience over the past few years has demonstrated, competition alone is not sufficient to meet these goals. In order to protect and empower consumers, it has been necessary for us to take action in a number of areas over recent years, e.g. acting against mobile mis-selling and preventing unfair additional charges.

6.3   We have a consumer policy framework which applies across all communications markets and which sets out the goals which we want to achieve for consumers: competition; access to information needed to get a good deal; easy and reliable switching; effective complaints and dispute handling; protection from misleading and exploitative practices; and ensuring that vulnerable consumers are not disadvantaged. We will continue to monitor how well these goals are being achieved by conducting regular consumer research and publishing the results of that research, and the consequent policy implications, in our annual *Consumer Experience* report.

6.4   We consider that the approach we take to consumer protection and empowerment in the mobile sector should strike the right balance between taking timely action when necessary, and the need to apply regulation only when effective and proportionate. It is a flexible and adaptable framework which should allow us to identify and tackle consumer empowerment and protection issues in the rapidly changing mobile sector in a timely fashion, as and when they arise in future.

Performance of the market today: consumer protection and empowerment

6.5   In the MSA 1 consultation, we stated that while the mobile market was working well for most consumers, there remained a number of specific concerns. Research data and complaint statistics showed that consumers were affected by issues, including:

- **Confusion.** The sheer range of price packages on offer, and the complex nature of service offers, were confusing to some consumers. This is exacerbated where some charges are not fully transparent.

- **Customer service.** Some consumers considered the standard of customer service they had received to be inadequate.

- **Sales practices.** A proportion of mobile customers had been affected by mis-selling and cashback problems/scams.

6.6   Stakeholder responses to the MSA 1 consultation expressed a variety of views on particular issues, such as the need for us to act more decisively on consumer protection issues. [87]

6.7   Most individual consumers who responded reported concerns about the transparency of tariffs, bundles and offers, which they felt made it difficult to compare offers between suppliers. They also reported dissatisfaction with the customer service provided by suppliers after a sale was completed, and especially when there was a problem. Consumers felt they had little recourse at this point, particularly those who had purchased contracts and were therefore locked in to a provider for 18 or 24 months. A selection of quotes is shown below.

"Mobile phone companies seem a bit unscrupulous so I think they need heavier regulation to make them more transparent about their charges. Regulation promoting transparency is good for markets anyway and is also good for consumers".

"I see little evidence that the operators have any concept of customer value and priority".

"All regulators have a duty to ensure that fair prices are charged for services and that notification of those charges is freely available and clearly explained. As a regulator, Ofcom must be seen to be enforcing this duty".

"Allow users to cancel if the service is not up to spec. If you sign up to 18 months service, you don't expect caps to be introduced a couple of months in".

6.8   As well as written responses, we also held a round-table meeting with organisations representing consumers including the Communications Consumer Panel, Consumer Focus, Consumer Direct, Which?, and Citizens Advice. Participants suggested that mobile operators are not as responsive to customers' needs as would be expected in a fully competitive market, and also that the tariffs and contracts offered by mobile operators have become too complex.

6.9   Conversely, responses from industry stated that the strong competitive mobile market was driven by informed consumers who were exerting pressure on them to be responsive to their needs. Pricing innovation was one area where they felt this was most evident. A number of mobile operators also argued that we had become too interventionist in the area of consumer protection and should have a stronger evidence base for assessing consumer harm before imposing sector-specific regulation. Quotes from a number of mobile operators' responses to the consultation are given below.

"Regulation is now imposed or threatened in circumstances where consumer detriment appears to be low or where the operators and the market have not been given sufficient time to address the problems." Orange

"We observe how, over time, regulation that had its origins in fixed markets has progressively been transferred to mobile, how mobile is affected just as much by the

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[87] Non-confidential responses can be viewed at http://www.ofcom.org.uk/consult/condocs/msa08/responses/

cumulative rise in regulation across the board as by mobile-specific intervention. We therefore invite Ofcom to consider how its bias against intervention sits with the cumulative increase in regulation over which it has presided." Vodafone

"Ofcom should seek, wherever possible, to use its Enterprise Act or other general consumer protection powers, more frequently than it appears willing to do today. Ofcom needs to be mindful that any specific intervention it considers must be proportionate, targeted and be consistent with its other statutory duties. Ofcom must not yield to pressure to be seen to "be doing something" in circumstances where intervention is not in fact merited." O2

"Ofcom is becoming less and less light touch and an increasingly interventionist approach in relation to consumer matters and is scrutinising each aspect of the market despite there being fierce competition for customers which should deliver the right outcomes." T-Mobile

Performance of the mobile market in meeting consumers' interests

6.10 As seen in Figure 28, the mobile market has consistently received high reported levels of satisfaction in our consumer research, with improving performance over time and higher overall levels of satisfaction than in other communications markets.

Figure 28: Satisfaction with overall services from mobile supplier, over time
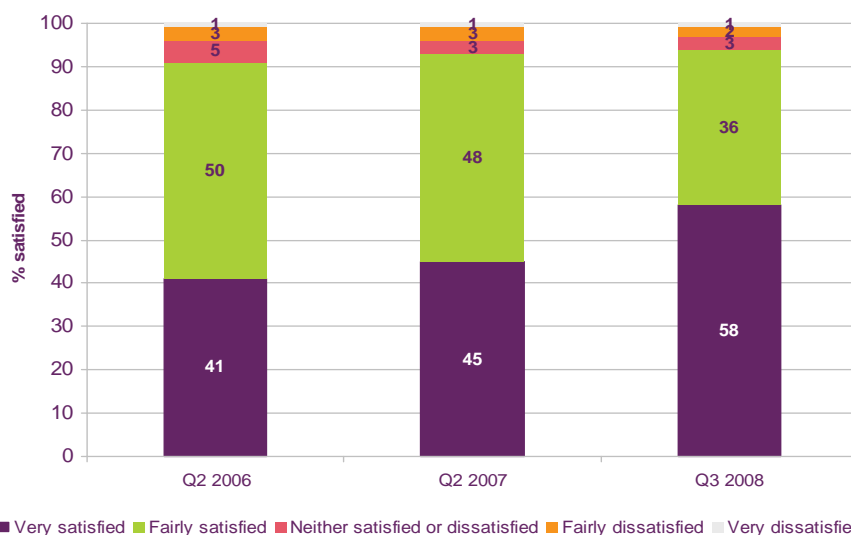
Source: Ofcom communications tracking survey (2006/07) / Ofcom decision-making survey (2008)

6.11 In 2008, 94 per cent of those surveyed said they were satisfied with the overall service they received, and the proportion of 'very satisfied' increased significantly from 45 per cent to 58 per cent. Three per cent (around 1.09m[88]) of mobile consumers were dissatisfied. Satisfaction with the mobile market also tends to be higher than in other communications markets: the figure of 94 per cent satisfaction in the mobile market compares with 87 per cent in the fixed telecoms market and 83 per cent in the

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[88] Based on 46 million UK adults, 86 per cent of whom personally own mobile

broadband market. Satisfaction with value for money among mobile consumers has also been consistently higher than for other communications services. In 2008, 89 per cent of mobile customers said that they were satisfied with the value for money of their mobile service, compared with 82 per cent in the fixed telecoms sector and 78 per cent in the broadband sector.

Figure 29: Satisfaction with overall services from communications supplier, over time
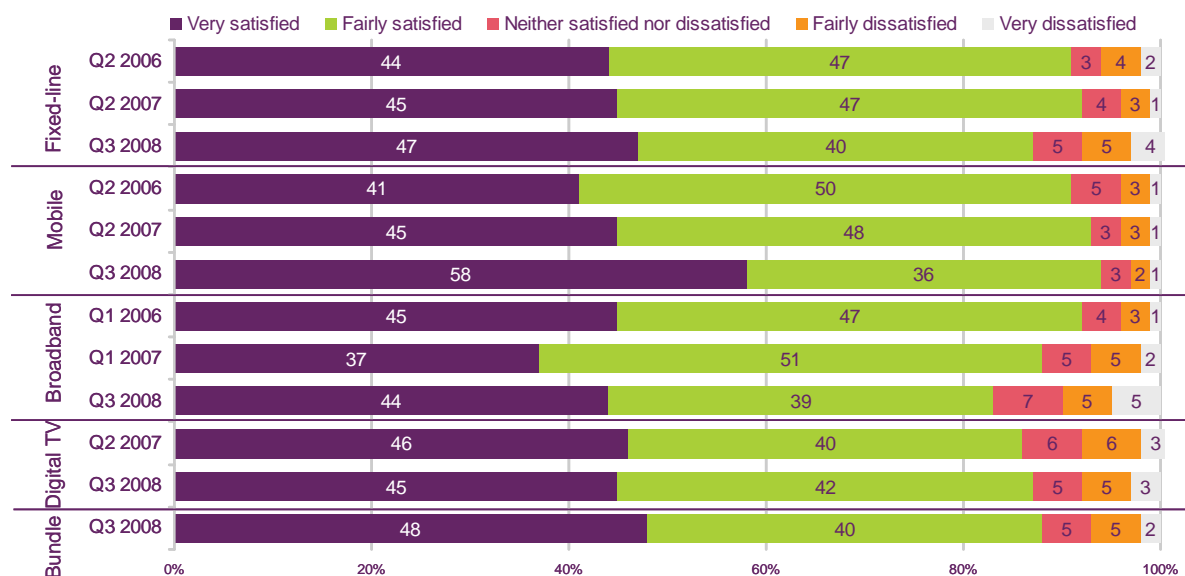
Base:all decision makers aged 15+ with a service who expressed an opinion. Fixed line (Q2 2006, 2198) (Q2 2007,1329) (July 2008, 928) mobile (Q2 2006, 1862) (Q2 2007, 1273) (July 2008, 1265) broadband (Q1 2006, 830) (Q1 2007, 727) (July 2008, 454) multi-channel TV (Q2 2007, 1211) (July 2008, 891) bundled services (July 2008, 534)

Source: Ofcom communications tracking survey (2006/7) / Ofcom decision-making survey (2008)

Figure 30: Satisfaction with value for money, over time

Legend: ■ Very satisfied ■ Fairly satisfied ■ Neither satisfied nor dissatisfied ■ Fairly dissatisfied ■ Very dissatisfied

		Very satisfied	Fairly satisfied	Neither satisfied nor dissatisfied	Fairly dissatisfied	Very dissatisfied
Fixed-line	Q2 2006	29	49	9	10	3
	Q2 2007	33	48	8	7	4
	Q3 2008	32	50	6	8	4
Mobile	Q2 2006	31	51	10	7	1
	Q2 2007	34	54	6	5	1
	Q3 2008	48	41	5	5	2
Broadband	Q1 2006	32	55	5	7	1
	Q1 2007	27	51	10	10	3
	Q3 2008	34	45	5	9	7
Digital TV	Q3 2008	48	34	6	9	4
Bundle	Q3 2008	42	44	4	8	2

Base:All decision makers aged 15+ with a service who expressed an opinion.

Source: Ofcom communications tracking (2006/7)/decision-making survey (2008) Fixed-line (Q2 2005, 1896) (Q2 2006, 2198) (Q2 2007, 1329) (July 2008, 928) mobile (Q2 2005, 1791) (Q2 2006, 1862) (Q2 2007, 1273) (July 2008, 1265) broadband (Q1 2006, 830) (Q1 2007, 727) (July 2008, 454) multi-channel TV (Q2 2006, 1778) (Q2 2007, 1211) (July 2008, 891) bundled services (July 2008, 534)

6.12   The evidence that consumers in the mobile market experience greater satisfaction than in other communications markets is also supported by our research, which asked consumers in different markets whether they had concerns about the market. As seen in Figure 31, levels of concern in the mobile market have not increased in recent years and are generally lower than in other communications markets.

Figure 31: Any spontaneous concerns mentioned by consumers
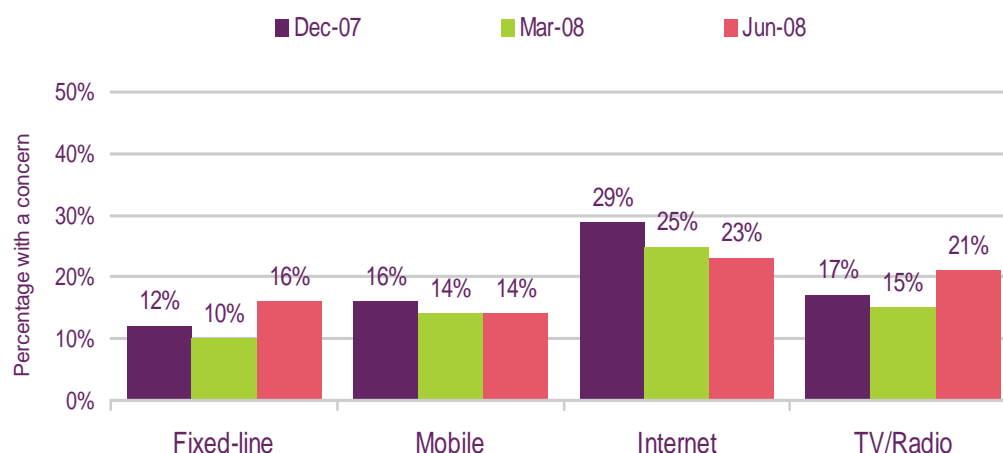
Base: All adults 15+ who have each service, June 08 - Fixed (988), mobile (957), Internet (679), TV/Radio (1112)
Source: Ofcom consumer concerns tracking survey

6.13   Nevertheless, despite the high overall level of satisfaction, some concerns remain, as evidenced by the consultation responses we received, our consumer research and the complaints data. When asked what their main concerns about the mobile sector were, consumers said these were charges for calls/rental, and coverage problems.

6.14   As well as identifying consumers' concerns through our research, we also receive complaints directly from consumers. The Ofcom Advisory Team (OAT) continues to receive a significant number of complaints every month in relation to a range of mobile issues, as can be seen in Figure 32. The total number of complaints has fallen, however, since 2008.

Figure 32: OAT complaints data for mobile from January 2007 till March 2009
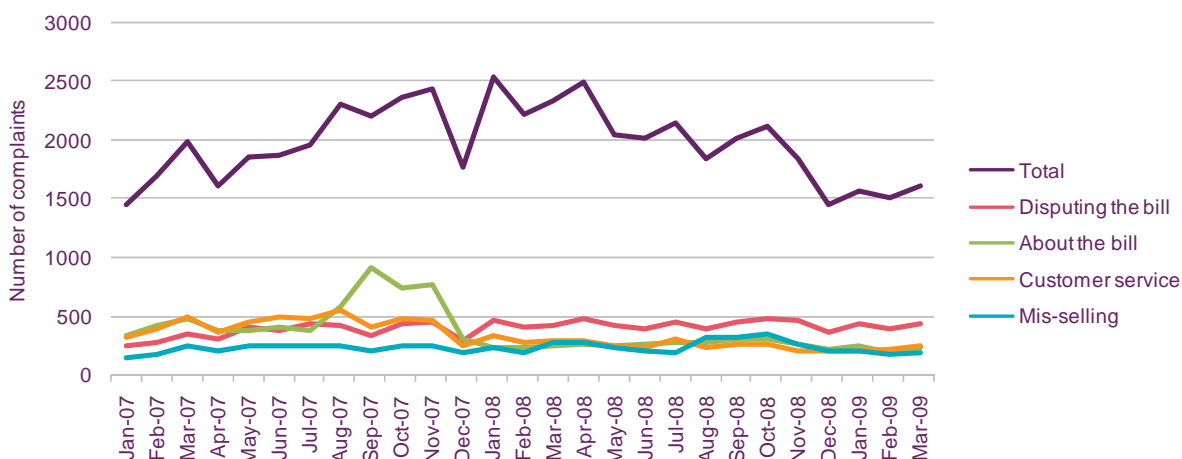
Source: Ofcom

6.15   Complaints about the mobile market are also received by other organisations – for example, Consumer Direct has released data on its complaint statistics for 2008.[89] 'Mobile phone service agreements' were the second most complained about area for the second successive year (behind 'second hand cars purchased from independent dealers'), although the market did see an overall 9 per cent decrease in complaints between 2007 and 2008.[90] In fourth place, however, was 'mobile phones hardware' where the number of complaints rose by over 13 per cent between 2007 and 2008.

6.16   Taken together, this evidence suggests that, despite the high overall level of satisfaction with the mobile market, a minority of consumers still have significant problems. Regulatory action to tackle these problems may therefore be appropriate, particularly where consumers suffer from significant detriment. This is discussed in more detail later.

6.17   While the mobile market performs well in relation to other communications markets, it does not seem to do so in comparison with other consumer products. A research report published by the Department for Business, Enterprise and Regulatory Reform (BERR)[91] in November 2008[92] compared 45 markets in the UK on consumer perceptions against six key performance indicators, which included ease of comparing quality and price, choice, living up to expectations, protecting consumer rights and the trustworthiness of advertising and marketing. The report combined these scores into an overall Consumer

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[89] Consumer Direct is the government-funded telephone and online service offering information and advice on consumer issues.

[90] http://www.consumerdirect.gov.uk/news/press_releases/national/2009/toptencomplaints2008

[91] On 5 June 2009 BERR was merged with the Department for Innovation, Universities and Skills (DIUS) to form the Department for Business, Innovation and Skills (BIS), www.bis.gov.uk.

[92] 'Report for BERR on the 2008 Consumer Conditions Survey', 17 November 2008 http://www.berr.gov.uk/files/file48855.pdf

Confidence Index, or CCI. Figure 33 shows how a selection of these markets performed in relative terms, both for the overall CCI score and for individual features.

6.18 'Mobile phone network services' appeared in the bottom third of markets measured in terms of overall CCI score, as did internet service providers and fixed-line telecoms services, with gas and electricity finishing in last place. The mobile market did perform better in terms of choice (moving up to the middle third), but it was also among the markets in which complaints from consumers were highest (scores from a selection of markets are shown in the table below). The mobile market also performed better than other telecoms markets.

Figure 33: Performance on consumer indicators of ten markets

Market	CCI score	Quality	Price	Choice	Expectations	Consumer Rights	Advertising	Complaints
Clothing	High	High	High	High	High	High	High	Low
Small domestic	High	High	High	High	High	High	High	Mid
Food	High	High	Mid	High	High	High	Mid	High
PCs, software	Mid	Mid	Mid	High	High	Mid	Mid	High
Used cars	Mid	Mid	High	High	Mid	Low	Low	Mid
Mobile network	Low	Low	Low	Mid	Low	Low	Low	High
ISPs	Low	Low	Mid	Mid	Low	Low	Low	High
Fixed line	Low	Low	Low	Low	Low	Low	Low	High
Vehicle repairs	Low	Low	Low	Low	Mid	Low	Low	High
Gas & Elec.	Low	Low	Low	Low	Low	Low	Low	High

Source: BERR (now part of BIS), Report for BERR on the 2008 Consumer Conditions Survey, November 2008

Note: the references to high, low etc in the table below are about the score on that indicator relative to other markets. Hence the mobile market had a high level of complaints compared to all other markets and had a lower score than most other markets in terms of quality, price, meeting expectations, consumer rights and advertising, while scoring slightly better in terms of choice.

6.19 While this research measured consumer *perceptions* of the mobile sector, the results are consistent with some of the concerns we expressed in our MSA 1 consultation, and are also consistent with points raised by individual consumers and other stakeholders in their responses to the consultation. They suggest that the mobile sector, like other telecoms sectors, could perform better in meeting the expectations of its customers.

6.20 To a large extent, though, the mobile sector's performance on consumer issues reflects the positive and negative features of a mass-market consumer business. So, although the majority of mobile customers are satisfied with their mobile service, some are not, suggesting that there is a tendency to miss, or fail to deal with, issues that affect smaller groups of consumers or individuals, e.g. complaints from consumers when things go wrong. The next section explores the underlying reasons why the mobile market may be prone to difficulties for some consumers.

Complexity of the mobile market

6.21   When consumers are asked about their overall level of satisfaction with the mobile sector, the vast majority say that that they are satisfied. But when asked to compare the mobile market with other markets, consumers say that mobile performs badly in comparison.

6.22   How can these two findings be reconciled? The BERR[93] report indicated that the markets which were relatively highly rated tended to be at the more 'fun' or pleasure end of the market spectrum. It also suggested that the markets which did worse are some of the 'pain' markets such as the types of markets where consumers give them attention only when things go wrong, or which are more complex, or which have experienced negative publicity. Nevertheless, the report did not discuss the extent to which the mobile market fell into the 'pain' category. It is notable that the mobile market performed better than other communications markets, largely as a result of greater perceived choice.

6.23   The comparison with non-telecoms markets in BERR's survey suggests that communications markets present consumers with a number of specific challenges. Specifically, these particular markets may score poorly as a result of the complexity involved.

6.24   What makes communications markets more complex than other markets? There are a number of specific features of communications markets which may mean that consumers find if more difficult to get the best deal:

- **Subscription services.** Customers in telecoms markets usually decide to buy before they use the service. Not only do they need to anticipate future needs, but if they commit to a minimum contract period they need to anticipate the future options they are giving up. Since consumers only make purchasing decisions infrequently, this may exacerbate the difficulties of choosing the best deal (since consumers will only look periodically at switching provider).

- **New products and technologies**. In a market with frequent service innovation, consumers cannot necessarily rely on past experience and may opt for simple rules of thumb instead, e.g. choice on the basis of brand.

- **Bundled products.** Consumers may find it more difficult to weigh up the relative merits of, and compare, bundled products (e.g. a mobile service that includes a 'free' handset) in the same way as for services sold on a stand-alone basis.

- **Relatively complex tariffs combined with non-transparent charges and multiple terms and conditions.** As with other communications services, mobile phone tariffs often involve a simple 'headline' price combined with less visible charges for other items (e.g. non-direct debit charges). In other cases, consumers may not know the prices they are being charged for certain calls - for example, consumers may pay significantly more for calling non-geographic and premium rate services from mobile phones than from fixed-line phones, but they may not be aware that they are doing so. Even when prices are fully transparent, their complexity means that consumers

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[93] Now part of BIS (www.bis.gov.uk), see footnote 91.

may not be able to understand easily or fully what they are being offered. As shown in Figure 34, many consumers, across all communications markets, find it difficult to make cost comparisons, although the issue does not appear materially worse in the mobile market than in other markets (e.g. fixed). Views on the ease of cost comparisons are also sharply polarised: half of all fixed-line consumers think it is easy to make cost comparisons, while half think it is difficult or don't know; among mobile, internet and multi-channel TV consumers, over half believe it is easy to make cost comparisons, but around one in three believe it is difficult, or don't know.

Figure 34: Consumers' opinions on the ease of making cost comparisons
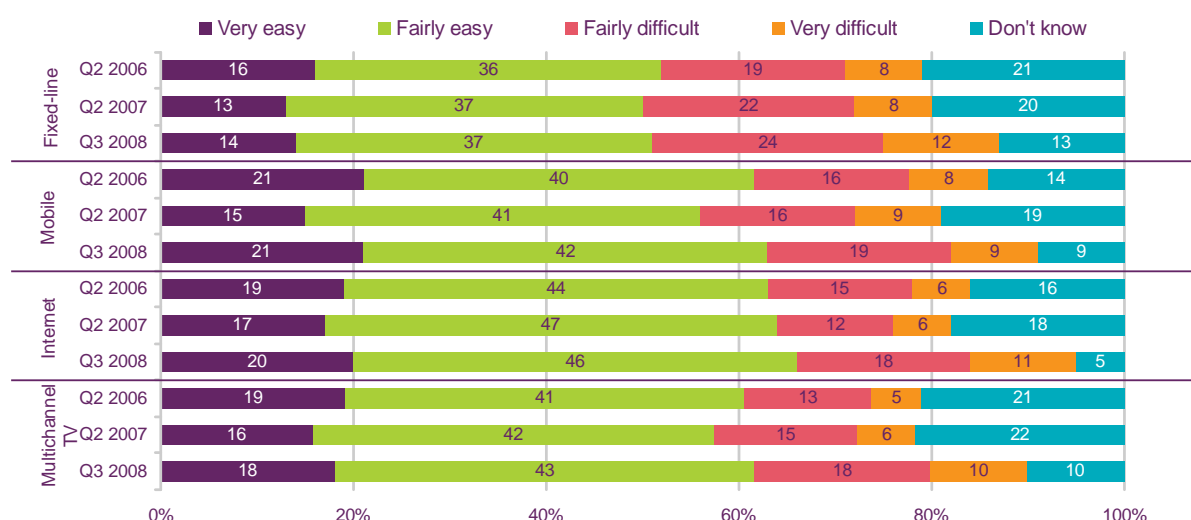
Base: All adults with fixed line (2006, 2234) (2007, 1350) (2008, 941) mobile (2006, 1883) (2007, 1273) (2008, 1270) internet (2006, 1479) (2007, 917) (2008, 460) multichannel TV (2006, 1784) (2007, 1226) (2008, 896)
Internet data for 2008 is based on broadband customers only

Source: Ofcom communications tracking/decision-making survey

6.25   The complexity of communications markets compounds the difficulties caused by other factors related more generally to consumer behaviour. One important insight from behavioural economics (see the case study below) is that, even in competitive markets, non-optimal outcomes arise as a result of the fact that consumers fail to act in their own best interests due to behavioural traits such as failure to process information objectively or mis-evaluation of the costs and benefits of prospective decisions. These traits may also mean that action by the regulator is needed to ensure that consumers are properly empowered and protected.

Behavioural economics

There has been increasing focus on recent years on behavioural economics. An OECD report, published in May 2008, indicated that regulators have increasingly focused on exploring demand-side issues that might affect consumers' ability to exert choice. One insight from behavioural economics is that "consumers often fail to act in their own best interests due to

behavioural traits such as failure to process information objectively or mis-evaluation about the costs and benefits of prospective decisions".[94]

The OECD noted that among the various biases identified by behavioural economics, the following may be particularly relevant to telecommunications markets, and may assist in explaining how, consumers may make seemingly irrational decisions in choosing an operator, service or package, even where there is adequate information:[95]

- *Choice or information overload*: consumers having too many products or features to compare (e.g. can lead to random choice, or failure to make any choice);
- *Endowment*: consumers may be reluctant to give up what they have, even though they would not buy such goods or services if they did not already have them (e.g. misplaced loyalty);
- *Defaults*: the order of options, particularly in markets where a choice must be made, influences choice (e.g. path of least resistance);
- *Hyperbolic discounting*: consumers tend to be short-sighted when making decisions where immediate costs or benefits are weighed against future adverse costs or benefits (e.g. they place more value on the immediate benefits of the offer);
- *Framing biases*: consumer choice is influenced by the 'frame' in which information is presented. Presentation of the same information in a different 'frame' can lead to a different decision (e.g. choices can vary according to the type of information given about other people's choices); and
- *Heuristics*: consumers often take short cuts when the decision environment is too complex relative to their capabilities (e.g. by following rules of thumb).

The mobile sector seems set to remain a vibrant, but complex, market

6.26   There are signs that there are counter-balancing pressures to ease some of the impact of these factors on consumers. For example, SIM-only contracts and pre-paid services are both mechanisms that allow consumers to focus on particular aspects of their service, such as the price of network access or the overall level of expenditure, and control them. There are also price comparison services, and we think it is likely that such services will continue to develop in their effectiveness, sophistication and ease of use (e.g. the price comparison site BillMonitor.com).

6.27   At the same time, some aspects of the mobile sector are becoming more complex, and this means that it could become more difficult for consumers to be sufficiently empowered to benefit from competition. Some of the most notable changes which have taken place in recent years are:

- the increasing use of mobile internet services, including mobile broadband;

- entry into the market by a range of service providers;

[94] Insights from behavioural economics, including many different types of consumer biases, are explored in detail in the proceedings of the October 2005 Roundtable on Economics for Consumer Policy (OECD, 2006).
[95] OECD, '*Enhancing competition in telecommunications: protecting and empowering consumers*', 24 May 2008, p. 9. http://www.olis.oecd.org/olis/2007doc.nsf/LinkTo/NT00005FB2/$FILE/JT03246386.PDF

- more offers of bundles of mobile services alongside other products such as fixed-line telephony and broadband;

- the launch of new tariff bundles, including wider promotion and take-up of SIM-only contracts; and

- the appearance of more sophisticated mobile services which some people may find more difficult to use, and from which they are therefore involuntarily excluded.

6.28 The changing mobile market has both positive and negative implications for consumers. And indeed, a single development can have both positive and negative implications. For example, greater network sharing between mobile network operators can extend mobile coverage further, but may reduce differentiation between operators. The launch of new services and price offers can lead to more choice of services and falling prices for consumers, but can also lead to more confusion, particularly if price transparency is lacking. Similarly, the entry of new service providers can lead to more choice for consumers, but can also create greater scope for mis-selling, as shown in Figure 35 below.

Figure 35: Consumer outcomes from a changing mobile market
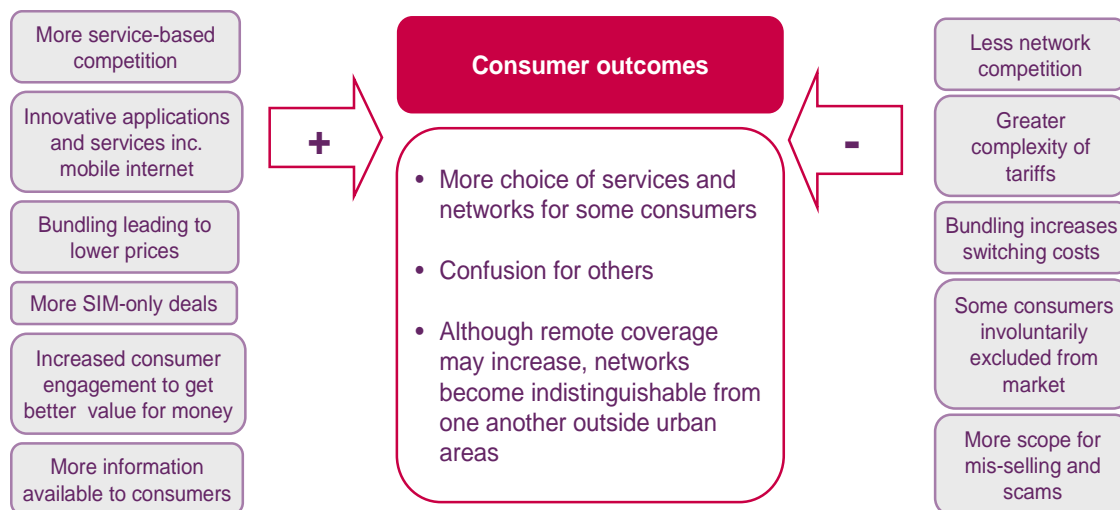
Source: Ofcom

6.29 This picture changes further when we consider the impact of a shift from voice and text packages to data services and mobile broadband being sold alongside them. For example, the fact that consumers are increasingly buying mobile applications over their phones using new platforms that are outside traditional regulation (such as some 'applications stores') may mean that they do not have the same level of consumer protection (notably from PhonePayPlus) that they have been used to.

6.30 Our starting point is not that regulation should extend to these new environments in an unthinking way; the first and most important step is to ensure that consumers know what level of protection they can expect when they make a purchase, and can make an

informed choice (see box below).

Changing mobile applications

As discussed in Section 3, there is increasing use of mobile applications. Mobile customers have always had access to redress if some of these applications, such as premium rate services, did not work in the way they expected. But increasingly, applications for mobile phones are being sold over the internet. This effectively means that the *same* service can be subject to *different* regulation according to the way in which it is delivered. For example, a mobile ringtone or application which is delivered by text message is subject to regulation by Ofcom and PhonePayPlus, as it is classified as a phone-pay service. But a ringtone or other application which is ordered and paid for over the mobile internet (e.g. through a mobile applications store) is regulated in the same way as any other purchase through general consumer law. Applications and services are likely to be sold increasingly over the mobile internet, and consumers may need to be informed about which type of regulation applies, otherwise there is the possibility that they will have incorrect expectations about their rights if they encounter a problem.

Role of regulation in ensuring consumers' interests are met

6.31   The evidence suggests that despite the high overall level of satisfaction with the mobile market, there remain some problems. Regulatory action to tackle these problems may therefore be appropriate, for a number of reasons.

6.32   Firstly, consumers may suffer from significant financial costs or inconvenience when things go wrong, even where only a small minority are affected. If you are the person who suffers as a result of these failures, the fact that many other consumers – even millions of others – have not suffered is little comfort. Irrespective of the level of competition in the market, setting safety-net regulation to provide minimum standards of conduct by providers is therefore an appropriate response (providing that there is evidence for intervention and the other principles of regulatory best practice are observed). To do so is both consistent with our primary duty (to further the interests of consumers) and squarely within our powers (to set general conditions relating to consumer protection).

6.33   The case of mobile mis-selling is a useful example of this. Research conducted by us identified 4 per cent of mobile customers who said they had experienced mis-selling in the mobile market.[96] Consumers who have been mis-sold mobile services often suffer a significant financial detriment as a result. Some customers suffer stress, inconvenience and financial harm when they are unable to obtain sales incentives promised to them and yet are still bound to pay the full monthly line rental to the mobile service provider for the duration of the minimum term of the contract (typically 12 or 18 months). In our statement on mobile mis-selling, we estimated that the current ongoing value of financial harm to consumers from general mis-selling stands at £21m a year, while that from cash-back mis-selling amounts to £8m a year and from the cost of time spent dealing

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[96] *The Consumer Experience 2008,* November 2008, http://www.ofcom.org.uk/research/tce/

with mis-selling and cash-back problems £3m per year.[97] As a result, we set a regulatory rule to increase the level of protection for all consumers from mobile mis-selling.[98]

6.34　Secondly, action by Ofcom may be needed in order to ensure that consumers are empowered to get the best deal. This is consistent – and flows from – our view that a well-functioning market furthers the interests of consumers. For example, if consumers do not have, and cannot easily obtain, information to enable them to exercise choice with confidence, then this demand-side market failure can undermine the objective of a well-functioning market in the same way as a supply-side market failure (that is, relating to providers). Given the complexity of the mobile sector (and indeed, other telecoms markets), and the fact that consumer research and complaints data demonstrate that many consumers continue to face difficulties when using mobile services, such action may be necessary – particularly if the market itself does not take steps to ensure that consumers are equipped to get a good deal.

6.35　Therefore, in certain circumstances, regulation may be needed in order to ensure that consumers' interests are protected; competition alone may not be sufficient to ensure that this happens.

Our framework for consumer protection and empowerment

6.36　Our overall approach to consumer protection and empowerment applies across all communications markets, not just mobile. Indeed, the fact that the mobile market performs better than other telecoms markets in terms of consumer perceptions (both in the BERR[99] survey and in our own research) suggests that there is no systemic consumer problem with the mobile market alone – although some issues are, by their nature, relevant only to the mobile sector.

6.37　But we also need to ensure that any action we take to protect and empower consumers is both effective and proportionate: mobile operators argued in their consultation responses that we were in danger of taking precipitate or excessive measures to protect and empower consumers, indicating that the costs of doing so often exceeded the benefits. This section outlines our proposed regulatory response to ensuring that we take action to protect consumers when we need to - but only when we need to.

6.38　In order to address concerns about over-regulation, and in order to create greater certainty about when we take measures to protect and empower consumers, it is important to clarify our existing consumer policy framework and describe in more detail how this applies to the mobile market. This framework, which applies across all communications markets, not just mobile, was first set out in our consumer policy statement of December 2006.[100]

6.39　This consumer policy framework comprises of three elements:

- our consumer policy objective;

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[97] *Protecting consumers from mis-selling of mobile telecommunications services*, March 2009, http://www.ofcom.org.uk/consult/condocs/mobmisselling/statement/
[98] *Protecting consumers from mis-selling of mobile telecommunications services*, March 2009, http://www.ofcom.org.uk/consult/condocs/mobmisselling/statement/
[99] Now part of BIS (www.bis.gov.uk), see footnote 91.
[100] *Ofcom's consumer policy,* December 2006. *http://www.ofcom.org.uk/consult/condocs/ocp/statement/*

- criteria to achieve this objective; and,

- metrics for assessing achievement or otherwise of these criteria.

6.40 The overall objective of our consumer policy (within the confines of our statutory duties, functions and requirements) is to take reasonable and proportionate steps to ensure that consumers benefit from well-functioning markets, are effectively protected from financial and physical harm, unreasonable annoyance and anxiety, and are enabled to make informed choices.

6.41 The criteria which we consider to underlie this overall consumer policy objective are as follows:

- ***Competition*** is the single most important means of ensuring that consumers' interests are furthered, since it drives innovation, lower prices and greater choice. But competition alone is not the only necessary factor – other factors are important, either to ensure that competition works effectively, or to ensure that consumers' interests are protected where competition alone may not further the interests of consumers.

- ***Access to the information needed to get a good deal***. If competition is to be effective, consumers must play an active and informed role in markets. For this to happen, they need clear and transparent information on the products they wish to purchase and the prices they will be charged. Where the market does not deliver the information consumers want or need, we will consider appropriate intervention where this can improve the situation for consumers.

- ***Easy and reliable switching***. If consumers cannot switch easily or buy new services because they do not have information needed to do so or because there are significant obstacles to doing so, then competition may not be able to deliver the intended benefits. Therefore we may need to put in place measures which facilitate easy and reliable switching.

- ***Effective complaints and dispute handling*** is necessary in order to ensure that consumers can pursue complaints in a fair manner, and that they are advised of their right to seek alternative dispute resolution without undue delay where the provider cannot provide satisfaction.

- ***Protection from misleading or exploitative practices*** is needed by consumers because it prevents them from suffering financial and other detriment from unscrupulous suppliers.

- ***Vulnerable consumers are not disadvantaged.*** Where vulnerable groups of consumers cannot engage in the market, they may fail to benefit from competition or new services that others take for granted. Vulnerable consumers are not one homogeneous group; the needs of elderly and disabled people for example can differ from those of low-income groups. Where there is evidence that particular consumers are more likely to be vulnerable to harm than others, we will take this into account

when formulating and implementing consumer policy and may give greater weight to the interests of those groups.[101]

6.42 The third element of our consumer policy framework is objective metrics to measure whether the criteria set out above are being achieved or not. As well as bespoke research into particular policy areas, we undertake regular tracking research to assess whether these criteria are met, and we will also make use of other evidence including complaints data received by us and by Consumer Direct, and consumer research and evidence obtained by others, including the Communications Consumer Panel. We undertake the following research programmes:

- A communications tracking survey which considers changes across all communications markets and assesses the degree and success of competition (e.g. overall levels of satisfaction in different markets).

- A consumer decision-making survey which monitors consumer switching and satisfaction across all communications markets, (e.g. the proportion of customers who have switched supplier).

- A consumer concerns survey which measures and tracks levels of concerns in communications markets on a quarterly basis (e.g. asking customers what concerns they have about the mobile market).

Business consumers

Although we undertake regular research into the views of residential consumers we have not previously done this for business consumers. In part this has been because in the earlier phases of market development, businesses were regarded as inherently more able to exercise bargaining power with suppliers and to benefit from competition, and in part because it is difficult to get a proper representative sample of business consumers. One of our priorities during 2009 is to evaluate the extent to which the needs of businesses are being met in all communications markets, including the mobile market. We will be conducting further research among a range of business users in order to achieve this, as well as examining our policy approach to issues affecting businesses.

Business consumers may rely on mobile phones to an even greater extent than residential consumers and may make greater use of more sophisticated mobile services (e.g. converged mobile and fixed services). But mobile operators also compete fiercely for their custom and offer even small businesses mobile packages designed for them. There has also been constant innovation in business mobile services, most notably with the rise in the use of smartphones and mobile email. Our new programme of work will examine the extent to which competition and innovation in all communications markets are meeting the needs of business consumers.

6.43 We will continue to report on how the mobile sector and other communications sectors achieve these criteria. Specifically, we will continue to publish an annual *Consumer Experience* report on how well all communications sectors, including the mobile sector,
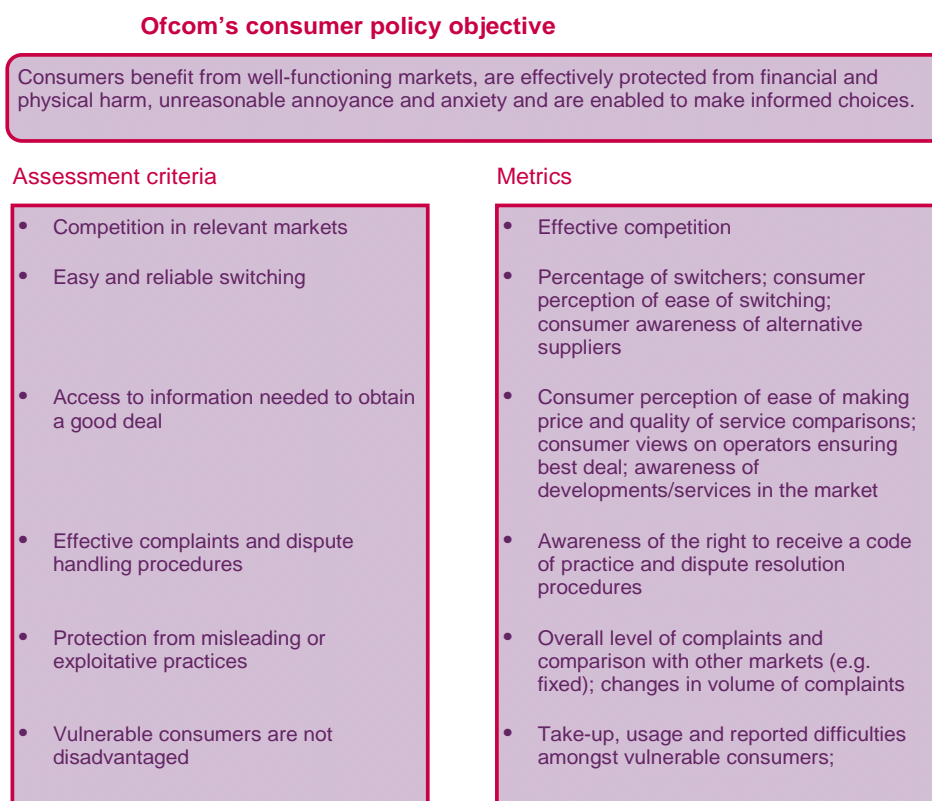
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[101] We discuss access and inclusion in the context of mobile services, particularly the needs of disabled citizens, in Section 7 of this document.

perform on objective measures of consumer protection and empowerment. We revise the content of this report year on year to ensure that it continues to be relevant to the changing market environment.

6.44   As well as publishing a detailed research report, we also publish an evaluation of our policy work across all communications markets. This policy evaluation report considers the key findings and trends emerging from the research and uses these to assess the impact of our policy work and activities. Evaluating our policy enables us to assess whether our work is effective and focused on the correct issues. It also helps us identify issues which we may have to consider in the future and what work we should prioritise. A summary of our approach to consumer policy measures across all communications markets is shown in the figure below.

Figure 36: Our consumer policy framework

Ofcom's consumer policy objective

Consumers benefit from well-functioning markets, are effectively protected from financial and physical harm, unreasonable annoyance and anxiety and are enabled to make informed choices.

Assessment criteria	Metrics
• Competition in relevant markets	• Effective competition
• Easy and reliable switching	• Percentage of switchers; consumer perception of ease of switching; consumer awareness of alternative suppliers
• Access to information needed to obtain a good deal	• Consumer perception of ease of making price and quality of service comparisons; consumer views on operators ensuring best deal; awareness of developments/services in the market
• Effective complaints and dispute handling procedures	• Awareness of the right to receive a code of practice and dispute resolution procedures
• Protection from misleading or exploitative practices	• Overall level of complaints and comparison with other markets (e.g. fixed); changes in volume of complaints
• Vulnerable consumers are not disadvantaged	• Take-up, usage and reported difficulties amongst vulnerable consumers;

Source: Ofcom

We will continue to act where evidence shows reason for concern

6.45   Using our research evidence and the *Consumer Experience* report, we report on our progress and, also considering other data, such as that on complaints, we identify the areas which we may need to address through our consumer policy work. There are a number of areas where we consider that we may need to take action to ensure that the consumer policy criteria are achieved. For this reason we are undertaking a number of different projects to ensure that consumer and citizen interests are furthered. These

projects, which demonstrate our priorities in the consumer protection area, are described below, alongside the consumer policy objectives they seek to achieve.

Easy and reliable switching

- *Mobile number portability*[102] which considers, among other things, whether the current process allowing customers to retain their phone numbers when switching provider could be made quicker or easier. The time for processing a porting request has been reduced from five days to two. We are currently considering whether further changes to the mobile porting process may be required to deliver consumer benefits.

Access to information needed to get a good deal

- *Review of additional charges.*[103] One of the issues mentioned by consultation respondents was the fact that many consumers felt that charges in the mobile market were not fully visible. This means that consumers would not have sufficient information to compare providers and secure a good deal, and vulnerable consumers may not be adequately protected. Since publishing the consultation, we have taken action to prevent unfair additional charges and this should help ensure that consumers have greater transparency over charges. By preventing unfair early termination charges, this work should also help facilitate easy switching.

- *Review of information about quality of service.*[104] In order to choose the best operator consumers may want to know which is best in terms of customer service. Our review is considering whether consumers have sufficient information in this area. One outcome from this review may be that mobile operators (and/or providers of fixed telephony and broadband services) will be required to provide consumers with information on their performance, in terms of customer service indicators.

- *Price accreditation.*[105] One of the issues discussed in the MSA 1 consultation was the difficulty mobile consumers have in comparing different tariff options. As shown above, our consumer research has found that around one in three consumers say that they find it difficult to make cost comparisons. One of the ways in which this could be addressed is a website, accredited by Ofcom, that would allow consumers to make proper cost comparisons. We have recently accredited BillMonitor.com, and are also talking to a number of other providers.

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[102] *Telephone number portability for consumers switching suppliers*, November 2007, http://www.ofcom.org.uk/consult/condocs/gc18review/statement/

[103] *Review of additional charges*, December 2008 http://www.ofcom.org.uk/consult/condocs/addcharges/

[104] *Review of quality of service information phase 1: Information on quality of customer service*, July 2008. http://www.ofcom.org.uk/consult/condocs/qos08/

[105] Further details of Ofcom's price accreditation scheme can be found at: http://www.ofcom.org.uk/consult/condocs/ocp/statement/pricescheme/consumerfaq

Effective complaints and dispute handling

- *Review of alternative dispute resolution (ADR) and complaints handling procedures.*[106] It is important that all consumers, including mobile consumers, are able to secure adequate redress when they feel that things have gone wrong. It is not yet clear whether they are able to do this. We are therefore looking at how we can ensure that consumers are able to resolve disputes and complaints, and, in particular, are aware of their right to escalate complaints and to use ADR when their disputes are unresolved.

Protection from misleading or exploitative practices

- *Review of mobile mis-selling.*[107] Following the rise in the number of complaints on mobile mis-selling, the industry adopted a self-regulatory code to address this issue. We reviewed the operation of the code and decided to impose new rules (which come into effect in September 2009) which, broadly, adopt and strengthen those arrangements and will require mobile operators to not engage in dishonest, misleading or deceptive conduct and to ensure that those selling their products and services similarly do not mis-sell.

Vulnerable consumers are not disadvantaged

- *Review of access and inclusion*[108] which is considering a range of access and inclusion issues, to ensure that vulnerable consumers are not disadvantaged. Two priorities are relevant to the mobile market: national roaming for emergency calls, and the use of communications technologies by people with disabilities. In addition, we are considering further the role that mobile broadband can play in extending broadband take-up and availability.

Role of mobile operators in improving consumer outcomes

6.46 In all these areas, we have taken, or are considering, regulatory action to ensure that mobile operators have clear rules about minimum standards of behaviour. In other areas, however, our powers are more limited. For example, because the mobile market has been found to be effectively competitive, it is not appropriate to regulate the level or structure of mobile operators' retail prices.

6.47 We also see some areas where it is currently not clear whether regulation is appropriate, but where we consider, based on consumer feedback, that the industry should examine whether outcomes for customers can be improved without regulation. We consider that mobile operators could do more to ensure that consumers' interests are being served, in particular by following the best practice of other operators in the following areas:

- Ensuring complaints handling procedures are able to deal with consumers' complaints properly.

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[106] ,*Review of Alternative Dispute Resolution and Complaints Handling Procedures*, July 2008, http://www.ofcom.org.uk/consult/condocs/alt_dis_res/

[107] *Protecting consumers from mis-selling of mobile telecommunications services*, March 2009, http://www.ofcom.org.uk/consult/condocs/mobmisselling/statement/

[108] *Access and Inclusion*, March 2009, http://www.ofcom.org.uk/consult/condocs/access/

- Providing clear and transparent tariffs which allow consumers to compare providers and tariff options easily, e.g. for additional charges, and for non-geographic and premium rate calls.

- Proactively checking and advising consumers on whether they are on the most appropriate tariff, even when their contracts are not on the verge of expiring or the customer is threatening to leave.

- Ensuring that customers are able to properly compare operators in all aspects that are important to consumers, e.g. coverage.

- Taking steps to minimise the potential for consumers to run up unexpectedly high bills (often known as 'bill-shock'), e.g. clear and transparent call charges and better traffic monitoring and notification.

6.48   Using our ongoing consumer research we will monitor the extent of consumer concern in these and other areas to ensure that consumers' interests are being met and will consider further regulatory action as appropriate.

How we undertake regulatory action

6.49   By using the consumer policy framework described above, we are able to assess whether action by us is necessary to protect the interests of consumers, or whether competition between, and action by, mobile operators, is sufficient to ensure that these interests are met. We consider that this framework helps us to identify and take action when it is necessary, while avoiding excessive regulation.

6.50   Even if the process set out above identifies that we may need to take regulatory action to protect the interests of consumers, we still have a clear set of regulatory principles that define when, and how, we take such action. These principles (set out in the box below) are designed to ensure that we fulfil our statutory duty to further the interests of citizens and consumers, while also meeting our duties to act reasonably and proportionately.

Ofcom's regulatory principles[109]

- We will regulate with a clearly articulated and publicly reviewed annual plan, with stated policy objectives.
- We will intervene where there is a specific statutory duty to work towards a public policy goal which markets alone cannot achieve.
- We will operate with a bias against intervention, but with a willingness to intervene firmly, promptly and effectively where required.
- We will strive to ensure its interventions will be evidence-based, proportionate, consistent, accountable and transparent in both deliberation and outcome.
- We will always seek the least intrusive regulatory mechanisms to achieve its policy objectives.
- We will research markets constantly and will aim to remain at the forefront of technological understanding.

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[109] For further details see: http://www.ofcom.org.uk/about/sdrp

> - We will consult widely with all relevant stakeholders and assess the impact of regulatory action before imposing regulation upon a market.

6.51 So, even if our research identifies an area for concern, we would take action only if it was proportionate to the problem identified and appropriate for us to do so. In reviewing our policy to assess the case for regulation, we consider the following questions:

- What is the nature of the issue and to what extent will market developments solve it?

- Can increased competition, or application of general competition law, solve the issue?

- Will the application of general consumer law address the issue?

- Is self/co-regulation appropriate?

- Using an impact assessment, what is the most effective and appropriate regulatory action?

6.52 A number of mobile operators, in their MSA 1 consultation responses, argued that we should place more emphasis on the use of general consumer law and self/co regulation as an alternative to formal statutory regulation. These two specific issues are discussed in greater detail below.

The role of consumer law

6.53 Ofcom is a designated enforcer under Part 8 of the Enterprise Act 2002. Using these powers, we can take action to enforce consumer protection legislation, such as the Unfair Terms in Consumer Contracts Regulations, the Consumer Protection (Distance Selling) Regulations and the Consumer Protection from Unfair Trading Regulations. We have used these various powers several times, and one notable example of their use in the mobile market is given in the box below.

Use of consumer law enforcement to protect consumers[110]

In November 2008, a mobile phone retailer signed legally binding undertakings committing them to stop breaches of consumer law following a joint investigation by Ofcom and by Staffordshire Trading Standards. The investigation identified a range of conduct that we found (under the Enterprise Act) to be a breach of general consumer law, including:

- not providing customers with a replacement when they returned faulty handsets within a reasonable period of time;
- including unfair terms in their handset return policy;
- using unfair terms in their 'cashback' schemes; and
- making misleading, false or deceptive representations or omissions to consumers about matters such as network coverage in particular areas, or about what was included in their mobile price plans.

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[110] For further details see:
http://www.ofcom.org.uk/bulletins/comp_bull_index/comp_bull_ccases/closed_all/cw_985/

6.54 In considering whether to impose new regulation, we always first examine whether enforcement action under general consumer law is sufficient to address the consumer harm which we have identified.

6.55 Using consumer law, we can act quickly against a firm which is breaching its legal obligations, and thereby set an example to other firms which are similarly harming consumers. But in some areas, using general consumer law alone as a remedy may have some disadvantages. For example, in the case of mobile mis-selling, our consultation document considered the use of general consumer law and set out the view that reliance on consumer law alone in that specific instance would have a number of disadvantages:

- Many companies engaged in mis-selling had become bankrupt, thereby limiting the value of any forward-looking Enterprise Act enforcement undertakings.

- The remedies available to us under the Enterprise Act do not allow us – once an infringement has been established – to require the contravening party to compensate consumers who have suffered financial loss. (We are able to take action to 'remedy the consequences' of a contravention of a regulatory rule under our sectoral powers).

- Given the very large number of individual independent retailers in the mobile market, effective targeting of enforcement is very difficult and would require a disproportionately high level of enforcement resources on our part.

- The consumer protection regime, under the Enterprise Act, does not extend to the protection of small business customers, some of whom were affected by mobile mis-selling.

6.56 Therefore, in that case, we decided that it was appropriate to impose a regulatory rule. In considering whether to impose any new consumer protection regulation in the mobile market in the future, we will again need to consider the incremental benefits to consumers of doing so, over and above relying on general consumer law on a case-by-case basis. If we can rely on consumer law to achieve our statutory objectives and fulfil our duties, we will. In each specific instance, we will continue to consider the costs and benefits of each approach.

6.57 Changes in the mobile market (set out in the earlier chapters) may require us to widen the use of general consumer law to protect consumers from harm caused by sellers of mobile services who are not otherwise covered by the regulatory regime. For example, retailers and application providers are unlikely to be classified as communications providers but may take action which harms consumers. In a more fragmented market, with a more diverse pool of suppliers, regulatory rules that affect some categories of suppliers but not others may be less effective across the wider market. We have already taken enforcement action under general consumer law to stop the harm caused by the actions of a mobile phone retailer (as outlined in the box above). As such retailers and application providers become a more important segment of the mobile value chain, we expect that it will be appropriate for Ofcom to make greater use of its consumer law powers, although we will continue to consider each individual case on its merits.

6.58   In some cases, it may be appropriate for us to tackle an issue both through general consumer law as well as by applying new regulatory obligations – as we have done in the case of mobile mis-selling.

The role of self- and co-regulation

6.59   Self- and co-regulation can, in certain circumstances, provide an effective means to further citizens' and consumers' interests, in line with our statutory duties and obligations.[111] An area where it has worked well, for instance, is in the area of mobile content; the mobile operators adopted a scheme which our review[112] found to be largely effective in restricting young people's access to inappropriate content (see Section 9).

6.60   Before imposing any new formal regulation or revising existing regulation, we will also continue to consider the role of self- or co-regulation as an alternative to formal intervention. We have set out principles[113] which will help us assess whether a self- or co-regulatory solution is appropriate in specific cases. Briefly, we think self-regulation is most likely to succeed if:

- suppliers, collectively, have an incentive to solve the issue;

- the likely industry solution matches the legitimate needs of citizens and consumers, and;

- industry is able to establish clear objectives for a potential scheme.

6.61   By contrast, self- and co-regulation are unlikely to be appropriate where there are incentives for individual companies not to participate, or where there are incentives for companies not to comply with agreed voluntary measures. If we determine that self-regulation is unlikely to succeed, co-regulation may be used to ensure that incentives are effectively aligned. Where neither self- or co-regulation are appropriate but regulation is necessary, a statutory regulatory solution will be required.

Conclusion and consultation questions

6.62   The approach we take to consumer protection and enforcement aims to strike the right balance between taking timely action when necessary, and the need to apply regulation only when effective and proportionate. It is a flexible and adaptable framework which allows us to identify consumer protection issues in a timely fashion as and when they arise. And it is a framework which is consistent across all communications markets – an important consideration as convergence increases. We reiterate our approach to consumer policy issues in order to provide more clarity for consumers, industry and other stakeholders.

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[111] Self-regulation occurs where industry administers a solution without formal oversight, while co-regulation is where industry collectively administers a solution to an identified issue with a form of statutory control,

[112] Our final report can be accessed at:

http://www.ofcom.org.uk/advice/media_literacy/medlitpub/ukcode/ukcode.pdf

[113] *Identifying appropriate regulatory solutions: principles for analysing self- and co-regulation*, December 2008, http://www.ofcom.org.uk/consult/condocs/coregulation/statement/

6.63 Stakeholders should note that we have previously consulted upon, and agreed, our consumer policy framework. We would welcome the views of stakeholders on the following questions:

Q 6.1: Ofcom considers that regulatory intervention to protect and empower consumers continues to be needed in the mobile sector and that competition alone is not necessarily sufficient to secure this. Do you agree?

Q 6.2: We believe that the approach we take to consumer protection and empowerment in the mobile sector strikes the right balance between taking timely action when necessary, and the need to apply regulation only when effective and proportionate. Do you agree?

Q 6.3: Are there any areas relating to mobile services that Ofcom is not currently addressing but which it needs to address in order to achieve its consumer policy objectives? Are there other areas where regulation could be scaled back?

Section 7

Access and inclusion for disabled and vulnerable citizens

Summary

7.1   In this chapter we consider issues of access and inclusion by examining how easy people find it to obtain mobile services, and whether people's differing abilities to obtain and use services risk excluding particular groups from advantages or facilities that the rest of us take for granted. These issues affect not only our rights as consumers, but also our individual interests as citizens in being able to participate fully in society. For Ofcom, 'access and inclusion' means enabling people to take part in, and benefit from, the economy, democracy and society as a whole.

7.2   As with consumer concerns, our main finding is that, for most people, most of the time, the sector is performing well. Mobile services are widely available in the UK – as reflected in the high levels of take-up. We also do not see evidence that there are barriers of affordability for the use of mobile services to a material extent in the UK.

7.3   Our approach to access and inclusion in mobile is part of a wider effort by us to take a systematic, evidence-based approach to identifying priorities for action. One of our main priorities for 2009/10 is to understand what more we could do to address barriers to digital inclusion.[114] In relation to the mobile sector specifically, we believe that:

- mobile ownership presents a number of citizen opportunities and benefits, such as the opportunity to receive updates from the health services – these opportunities are bound to grow in the future;

- fewer people are excluded from the mobile market (for reasons other than choice) than are excluded from other digital communications markets; but

- disabled people still have barriers to access, which require further action.

7.4   As part of our current review of access and inclusion, we will decide what action to take on these issues.[115] The review is considering a broad range of issues facing disabled people in using communications services, including the case for improved text relay services.

7.5   We are also continuing to facilitate the introduction of SMS access to the emergency services. A trial is expected to take place this summer.

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[114]See the Ofcom Annual Plan at http://www.ofcom.org.uk/about/accoun/reports_plans/annual_plan0809/
[115] See Access and Inclusion: Digital Communications for all at:
http://www.ofcom.org.uk/consult/condocs/access/

Mobile could offer citizen opportunities and benefits in a number of areas

7.6   Mobile is now the most prevalent telecoms technology among households in the UK. As noted in Section 2, more households use a mobile phone (93 per cent) than any other telecom service, including fixed line. One in eight UK households rely solely on mobile services for their voice communication needs.

7.7   In the MSA 1 consultation we stated that as well as providing benefit to consumers mobile phones also provide benefits for citizens. We identified that now, and in the future, the use of mobile services enables social, political, educational and cultural activities in ways that go beyond our activities as consumers.

7.8   We found that the use of mobile services presents citizen opportunities and benefits in the following areas:

- **Opportunities to use public services**: mobile may become more widely used to access public services e.g. information about public transport.[116]

- **Democratic opportunities**: there may be a role for mobile devices in democratic processes, for example as a tool in voter registration. Mobile will inevitably also be used even more as an element of the communications between political candidates and parties and the electorate.

- **Health opportunities**: GPs' surgeries are already adopting technologies which enable users to receive text message reminders about appointments. They can also send out important health messages such as invitations to receive flu jabs.

- **Social opportunities**: web-based social networks are increasingly looking towards mobile as a way to offer access to their users.

7.9   Given these citizen opportunities and benefits, those without access to mobile services may find themselves disadvantaged or marginalised. It is therefore sensible for us to track these issues, and to be concerned if it appears that access to mobile services is not open to all those who wish to obtain services.

Certain groups are more or less likely to use mobile services

7.10   We estimate that more than seven million people in the UK do not have access to a mobile phone.[117] Of those who don't have a mobile, only 8 per cent (slightly below 600,000 people) appear not to have a mobile for involuntary reasons. This is a small percentage, but the impact of exclusion on this group could be significant, particularly if the market is failing to address the needs of some of the most vulnerable citizens.

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[116] The trend towards increasing public services delivered online is highlighted in Digital Britain. As described in Chapter 3, the mobile will become increasingly like the internet, and inevitably as public services move online they will also become mobile.

[117] See MSA 1 consultation at http://www.ofcom.org.uk/consult/condocs/msa08/

7.11 Elderly and disabled people have lower levels of ownership than the general population. The figure below shows the levels of mobile non-ownership among older and disabled people.

Figure 37: Levels of non-ownership among older and disabled people, compared with other core groups and services
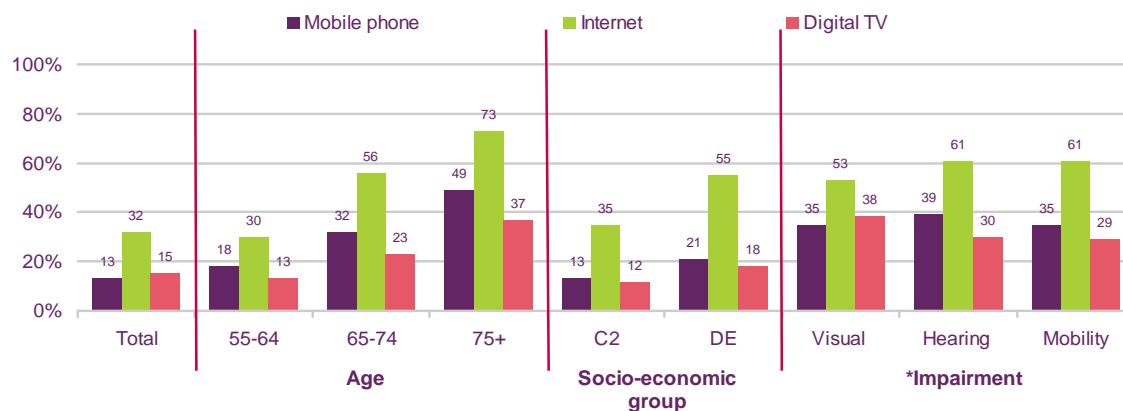
Source: Ofcom communication tracking survey
Base: All adults (Q4 2008 – age and SEG) (Q2 2008 – impairment)
* Caution should be applied when interpreting data among these groups. While sample sizes are above 100 we are unable to establish how representative these groups are of their universe. Further details can be found in the Consumer Experience Report Disability Annex. Data not directly comparable with other demographic data shown on this chart due to different of surveys

7.12 People in the 55-64 age group display a similar level of take-up to the general population.[118] People who are 65 and over are far less likely to purchase, or have access to, mobile services.[119] Only 7 per cent of users over 65 make a mobile call every day (compared with half of all adults), only 5 per cent send a text daily (compared to 58 per cent of all adults) and nearly nine in ten older users have pre-pay services rather than a contract. [120]

7.13 Disabled people are less likely than the wider population to use mobile services (although this is not the case for deaf people specifically). In the MSA 1 consultation we noted that this finding is striking, considering that one of the main benefits of mobile phones is convenience and mobile might therefore be expected to play a positive role in the lives of disabled citizens.

7.14 In the MSA 1 consultation we said that we would look further into why these groups don't have higher levels of mobile ownership, and we sought stakeholders' views on what

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[118] The total level of non-ownership of mobile found among the general population in the Media Literacy survey is 15 per cent (More recent analysis suggests that for the total of the population at the end of 2007 that number is actually 16 per cent.

[119] The distinction is relevant in that the consumer data cited distinguishes between those people are able to access services, which is a higher proportion than report themselves owning a mobile and buying services.

[120] Ofcom, *UK Communications Market Report 2008* - http://www.ofcom.org.uk/research/cm/cmr08

factors we should take into account in thinking about access and inclusion issues in mobile markets.

Relevant Ofcom duties

7.15 In carrying out our duties, we are obliged to have regard, among other things, to the needs of disabled people, the elderly and those on low incomes.[121]

7.16 The primary regulation to address the needs of these groups is the universal service obligation, imposed on BT and covering the provision of, in summary, affordable fixed telecommunications.

7.17 The universal service obligation must be provided using the fixed network[122] and relates only to voice calls and 'functional internet access' (which is normally regarded as narrowband access).[123] We have no statutory powers to require communications providers to provide broadband or mobile services (beyond enforcing the coverage requirements in, for example, spectrum licences).[124] Nor do we have powers to require private sector communications providers to take steps to increase take-up or the effective use of these services by particular groups. Of course, in some of these areas we can and do take actions that are not directly linked to specific statutory powers, such as working with groups representing disabled people and industry to facilitate better outcomes. For example, we have undertaken and published research on the usability of different communications technologies and discussed this with relevant parties.[125]

7.18 We do not have any specific powers to promote the availability of easily usable equipment or to promote media literacy, although in both areas we are active as advocates and in promoting activity that we believe will further the interests of citizens and consumers.[126]

Work conducted by Ofcom on access and inclusion identified services for disabled people as a priority area

7.19 On 18 March 2009 we published a consultation on access and inclusion issues across all of the sectors we regulate.[127] That consultation asked four questions:

- For which communications services would lack of widespread availability and take-up raise policy concerns?

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[121] Communications Act, Section 4 (21).

[122] The Universal Service Directive allows for flexibility, for example for using wireless technologies (including cellular wireless networks) to deliver universal service to a higher proportion of the population. See http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32002L0022:EN:NOT

[123] The Government's interim Digital Britain report did raise the option of mobile networks having a potential role in delivering universal access to broadband in the UK. This is discussed further in the next chapter.

[124] For example, see 3G roll out enforcement http://www.ofcom.org.uk/consult/condocs/3g_rollout/3GRolloutobligation/

[125] Assistive technologies in communications, March 2009, www.ofcom.org.uk/research/usability

[126] Further information on our media literacy programme can be found at: http://www.ofcom.org.uk/advice/media_literacy/

[127] The consultation can be accessed from http://www.ofcom.org.uk/consult/condocs/access/

- What are the significant gaps in the geographic availability of these services?

- Are there issues preventing widespread take-up of these services?

- Are there significant impediments to the effective use of these services?

7.20   We proposed to target five areas: broadband availability and take-up, 999 mobile roaming, services for disabled people, universal service and media literacy. The report did not identify take-up and use of mobile services overall as one of the five areas for targeted access and inclusion work. The analysis and evidence on take-up from the MSA supports our view that this should not be a priority, when compared with other issues. However, 999 mobile roaming and services for disabled people (including mobile services) were identified as priorities.

7.21   In this chapter we examine further what barriers to access exist for disabled people and investigate what steps we are already taking, or could take, to break down these barriers. Some of the issues facing disabled people are outside our remit. In these cases we may be able to provide research and insight and there may be other organisations that are better placed to play a role.

We have investigated the barriers to access and inclusion for disabled people

7.22   In the MSA 1 consultation, most of the responses relating to issues of access and inclusion focused on disability issues. In the next section we set out the key concerns raised by stakeholders during the consultation regarding disabled and vulnerable consumers.

Consultation responses

7.23   We received a number of responses to the MSA 1 consultation from groups representing disabled people. These organisations recognised the benefits offered by mobile communications but also expressed concern about the 'digital divide' between disabled and other users. For example, the RNID stated that:

"It is true that in many respects the mobile sector has delivered great benefits to consumers. However, it is also true that significant minority groups, including deaf and hard of hearing people, have often found themselves increasingly disenfranchised as citizens in the modern world because the mobile sector is failing to meet their needs in full. It is essential that Ofcom recognises the plight of consumers with different profiles of abilities and preferences and uses both its formal and informal powers to address the various barriers to full participation that still exist in this market."

7.24   Many individual respondents to the consultation also felt that it was important that everyone should have access to mobile, although a few argued that a mobile phone was not a necessity. Some respondents (and some industry respondents, such as O2) argued that there was little or no evidence to support the idea that people without mobile devices were excluded from participation in society. Some gave examples of ways in which technological developments could help service the demands of particular groups. For example, Vodafone cited the very limited take-up of textphone services, relative to the widespread use of SMS text among deaf and hard of hearing customers, to

demonstrate the contrast between regulator-led and customer-led approaches, although it accepted that it cannot necessarily be assumed that mainstream products will prove suitable for all customers in all cases.

7.25   Both individuals and organisations raised issues that they felt acted as barriers to access for disabled people, focusing particularly on barriers for people with hearing impairments. A number of responses from mobile operators and other industry players also tackled issues of access and inclusion.

7.26   The issues raised in the consultation responses regarding people with disabilities were:

- **Problems with mobile handsets**: several respondents (including Hearing Concern Link and RNID) argued that many mobiles interfere with hearing aids. They cited the FCC rules in the US that require manufactures to publish data on mobiles that can be used with hearing aids and suggested that we should encourage manufacturers, service providers and retailers to publish similar information.[128] A number of individuals who responded to the consultation argued that handsets need to be usable by the elderly and/or visually impaired and several felt that 'no frills' phones, which were simple to use and had larger buttons, could help improve access to mobile for some groups. BT recognised that handsets continued to be an issue for many and felt that an inclusive design approach would be helpful.

- **Pricing**: a number of respondents to the MSA 1 consultation thought that tariffs were complex and that, apart from the impact on the wider market, this could act as a barrier to access for some minority groups. Several respondents also argued that the hearing-impaired were disadvantaged because many firms offer cheap rates for voice usage that do not apply to SMS, and SMS-only bundles weren't sufficiently available.

- **SMS access to emergency services**: Hearing Concern Link noted that the 999/112 Liaison Committee was debating the issue of using text (SMS) access to emergency services. It urged us to move the work ahead as swiftly as possible. BT noted that with local schemes being set up for SMS access it was becoming more important that a national SMS emergency service is established.

- **Customer service**: a few respondents raised issues with customer services stating that they were not always accessible for disabled people. The RNID noted that many of their members and other deaf and hard of hearing people reported dissatisfaction with the customer support of mobile operators stating that they were not always 'deaf aware'.

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[128] The FCC requires telephone manufacturers to clearly label their telephones and the telephone packaging containing hearing aid compatible handsets. They must also make information available in the package or product manual, and require service providers to make the performance ratings of hearing aid compatible telephones available – see http://www.fcc.gov/

- **Text relay service**: TAG argued that although the text relay service was mandated by the General Conditions[129] some suppliers only played lip service to this requirement and that as a result it was not a functional equivalent to voice calling. It argued that sign language users require a video relay service and hard of hearing users need captioned telephony, neither of which is mandated in either the General Conditions or under Universal Service.

- **Service innovations and applications**: the RNID made a case for mobile network operators to open up the networks to allow others to provide services that could benefit disabled users who require functional internet access and the ability to interact. BT also felt that in terms of specialised services there was a need for an open architecture so that smaller, more specialised firms could fill the gaps left by major players.

7.27   Individuals who responded regarding access and inclusion tended to agree that competition did not fully solve issues of access and inclusion for some minority groups and felt that there was a role here for the regulator. Other respondents argued that greater encouragement of competition would drive suppliers to develop services for particular groups. T-Mobile argued that while Ofcom is right to consider issues of inclusion, the resolution of these is ultimately a question for the Government.

Consumer round-table discussion

7.28   As part of our engagement with various organisations during the consultation, in October 2008, Ofcom and the Communications Consumer Panel held a round-table session in order to give consumer representatives an opportunity to provide input to the Mobile Sector Assessment.

7.29   Participants agreed that mobile had become an essential part of life, both for people in the mainstream and those with special needs. Several of the points raised at the discussion reflected issues that consumer groups and individuals had raised in their consultation responses. Additional points relating to access and inclusion included:

- the UK could learn valuable lessons from international markets e.g. with respect to handset features for disabled users (including hearing aid compatibility) and handsets and services for users on low incomes;

- some customers, for example those with learning difficulties, could benefit from access to training in using devices and services; and

- open access to mobile platforms could allow third parties to offer services that could benefit specific groups of users, but are not commercially viable for mobile network operators, who cater for the mass market.

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[129] The General Conditions of Entitlement apply to anyone who provides an electronic communications service or electronic communications network. These are set out at www.ofcom.org.uk/telecoms/ioi/g_a_regime/gce.

We have conducted consumer research to explore the experiences of disabled consumers

7.30   Some of the issues raised during the MSA 1 consultation are reinforced by findings from our own consumer research. We publish an annual report that investigates consumers' experience of telecoms, the internet and digital broadcasting. As well as looking at the experience of consumers overall we also commission qualitative research designed to explore the experiences of disabled consumers.

7.31   The following case studies summarise findings from our consumer experience research which relate to people's perceptions of, and experience with, mobile services. The first case study investigates the experience of people with hearing impairments, the second of people who have learning difficulties.[130]

7.32   Hearing-impaired people valued SMS services. Our study indicated that there were still a number of barriers to take-up, but those who used mobile services found that they made a significant contribution to their independence.

Case study – People with hearing impairments and mobile [131]

Take-up

Overall, mobile telephony, with its focus on text-based communication, was felt to have changed the lives of many people with a hearing impairment, enabling them to communicate using a convenient, mainstream method.

As with the general population, take-up of mobile was lower among the older group – particularly those over 60 in the DE socio-economic group. Reasons given for low take-up in this group were:

- a perception that mobiles were expensive (especially given many of them had access to a fixed-line telephone);
- inertia and lack of interest, often due to there being no perceived need for a mobile as well as a fixed-line telephone;
- a lack of confidence with technology and specifically with SMS;
- perceived lack of compatibility with hearing aids; and
- perceptions or experience of poor sound quality.

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[130] The studies illustrate some of the issues that face people with disabilities however, due to the qualitative nature of the research and the objectives of the study, the samples are not representative of all consumers with either hearing impairments or learning disabilities.

[131] In November 2007 we conducted a qualitative study into people with hearing impairments and their experience of communications service. The study set out findings in a range of areas including: take-up of mobile, benefits offered by mobile and barriers to access. The full report, including a description of the methodology, can be found at http://www.ofcom.org.uk/research/tce/ce07/annex5.pdf.

Benefits

The most frequently mentioned benefits of mobile related to the freedom and independence that a mobile can provide. Mobility was seen as critical to those with hearing impairments who may in the past have felt unable to go out on their own. Some participants talked about the enormous relief they felt now they could carry a mobile and knew that it would always be possible to use SMS to contact someone. Other benefits cited by the participants in the study included an enhanced social life and better communication with work.

Equipment, services and aids

People with hearing impairments had relatively little awareness of, or engagement with, ways of adapting mainstream devices to their needs, or knowledge of how to use additional mainstream or specialist equipment and aids currently on the market. Many people said they would prefer to have mainstream devices and equipment with the features and functions they needed, rather than specialist equipment provided by specialist suppliers.

Barriers to access and problems with use

SMS was very positively received, although some participants did talk about downsides such as conversations taking a long time and being impersonal. Heavy users of SMS felt that there was a lack of availability of text-based tariffs.

Many participants avoided using voice functions, where some perceived the problems to be greater than with fixed-line telephony, citing inferior sound quality and incompatibility with hearing aids.

Telephone customer services were not felt to be tailored to hearing-impaired people's needs. There were numerous complaints about customer services staff, and their perceived lack of understanding of the caller's needs. There were also complaints about automated telephone services.

Suggestions for overcoming barriers to entry and access included:

- reduction in cost barriers;
- staff training;
- improved media literacy; and
- a greater effort by mobile companies to promote their services.

7.33   Mobile phones can offer independence and a sense of reassurance to people with learning difficulties. However, those with literacy problems find text challenging to use.

Case study – people with learning disabilities and mobile[132]

Take-up

Mobile phone use was far more common among younger than older participants. Those who did not own a mobile phone initially stated that they could not see the need for one. On probing, it turned out that for some the following access issues were also factors:

- living in a rural area where there is no signal;
- high costs;
- having a speech impediment; and
- problems with literacy/and or dexterity.

Benefits

Mobile phones provided owners with a personal sense of ownership - for many it had a more personal feel than the landline and for some participants mobile phones were a step towards independence as they could use their mobile phone in private and while out and about on their own. Mobile phones also provided reassurance to people with learning disabilities and to their relatives. However, people with learning difficulties also reported a number of barriers to use.

Barriers to access and problems with use

The main barriers to access related to the design of the phones and the literacy skills required to use them. Those with poor literacy found using a mobile phone challenging because of the amount of text on the screen. Few used the contact list and many did not use voicemail because they found the automated instructions confusing. However, many participants had developed solutions to these issues e.g. memorising numbers or asking friends or family for help.

Most participants struggled to understand their bills and had problems managing money. As a result the ease of managing bills and the suitability of the method of payment mattered more to then than getting value for money. Very few of the participants who had a mobile were on a contract package. The perception was that pre-pay mobiles were financially easier to manage.

Most participants were also unaware of how existing services or technology could facilitate their access or improve their experience (e.g. voice recognition). Overall, many participants were unable to explore the potential of phone technologies that could help them overcome some of the barriers that they faced. Instead, they relied on others to tell them about the range of services and technology that might be useful to them.

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[132] In June 2008 we commissioned Ipsos MORI to conduct research with people with learning disabilities, exploring their access to, and use of, communication services including mobile. The full report including a description of the methodology can be found at
http://www.ofcom.org.uk/research/tce/ce08/disabilities.pdf.

What steps could be taken to improve access to mobile for disabled people?

7.34   Our research and responses to MSA 1 consultation have already highlighted a number of barriers to access and use of mobile for disabled people. We are already taking steps to tackle some of these issues. In some other areas, our powers and role is more limited. This section details our ongoing work and proposed future steps in addressing barriers to access and inclusion for disabled and vulnerable people.

Problems with mobile handsets

7.35   Some disabled consumers report problems using mobile handsets. Interference with hearing aids was one of these issues. This was also flagged by some respondents to the consultation who also cited steps taken in the US as a positive example of how these problems could be mitigated.

7.36   In the US, the Federal Communications Commission (FCC) requires phone manufacturers, including those selling mobile handsets, to make their products accessible to disabled people if such access is "readily achievable".[133] The FCC has also set benchmarks that spell out what percentage of a handset maker's products must be hearing-aid-compatible. Currently, each manufacturer must offer at least two hearing-aid-compatible models. In Europe, manufactured goods are regulated at a European level. This means that Ofcom has does not have powers to enforce hearing-aid compatibility. However, we recognise that this is an issue for people with hearing impairments; we will discuss it in more detail with the mobile operators and will also raise it as an issue as part of the Radio and Telecommunications Terminal Equipment Directive Review.

SMS charging

7.37   Our qualitative research shows that some users with hearing impairments perceived there to be a lack of availability of text-based tariffs. Respondents to the consultation also argued that many firms offer cheap rates for voice usage that don't apply to SMS.

7.38   We investigated these concerns. Most of the mobile network operators do offer SMS-only tariffs or unlimited SMS tariffs and information about these tariffs can be found on their websites.[134]

SMS access to emergency services

7.39   Respondents to the MSA 1 consultation also raised the issue of accessing the emergency services via SMS. We do not have powers to impose a requirement to provide SMS access to emergency services. However, we are involved in discussions with the 999/112 Liaison Committee about this issue. We expect a trial of emergency SMS to begin in summer 2009.

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[133] For information see: http://www.fcc.gov/cgb/consumerfacts/section255.html

[134] For information see; http://www.t-mobile.co.uk/shop/pay-monthly/deals, http://shop.o2.co.uk/home, http://shop.orange.co.uk/shop/paymonthly?WT.svl=204#top-dolphin-plans, http://shop.vodafone.co.uk/shop/mobile-price-plans/all-plans.

Customer service

7.40   Respondents to the MSA 1 consultation raised concerns that the mobile operators' customer services showed a lack of understanding of the needs of hearing-impaired users. In conducting qualitative research into the experiences of people with hearing impairments we also encountered complaints from people about customer service operators and about automated telephone services.

7.41   Ensuring that services are accessible to disabled people (including, for example, reasonable adjustments to ensure that all users can effectively make complaints) go beyond simple courtesy, and are a matter of legal obligation.[135]

7.42   We have not found any direct evidence to suggest that there is a systemic failure in this regard, but we will continue to monitor this issue and will be prepared to act if there is evidence that access is being denied unfairly or unreasonably.

Text relay service

7.43   Some respondents to MSA 1 complained that the text relay service was not a functional equivalent for voice calls.[136] We will decide what actions to take in relation to the current situation with text relay services in the UK, as part of the access and inclusion review; these services might have been affected by technological developments, helping to build the case for introducing improved relay services.

Service innovations and applications

7.44   Some respondents to the MSA 1 consultation made a case for opening up networks to allow third parties to provide applications that might be of use to particular minorities, particularly where it is unlikely that such services would be commercially attractive to very large providers or network operators, but where the services could be developed and deployed by other organisations. This is an intriguing suggestion and one that deserves serious consideration as a way of addressing some of these issues.

7.45   As discussed in Section 3, one of the characteristics of next generation networks is that they allow a clear separation between the application layer and the underlying physical network. As adding new services over the existing network becomes simpler, the scope for service innovation is likely to increase.

7.46   We can already see service innovations taking place in the mobile industry, and applications are currently being developed that may be of particular value to disabled people. For example, Google has developed a version of its search engine for mobile phones, using speech recognition. Speech recognition facilities could help mitigate the problems with mobiles that some users with literacy problems currently report. Other applications include *SpinVox* that translates voice messages into text and *Vlingo*, an

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[135] Under the Disability Discrimination Act, providers are required to make reasonable adjustments to the way in which they provide their services to make them accessible to disabled people. Separately, under General Condition 15 Ofcom also requires them to provide a range of services for disabled customers including priority fault repair for people who depend on the phone and free directory enquiries with onward connection for people who cannot use the telephone directory.
[136] A text relay service allows text phone users to call phone users (and vice versa) via a third party operator who translates text to speech.

enhanced voice recognition package that enables users to dial a number by simply speaking a contact's name, and to send and reply to e-mails and text messages without touching the keyboard.

7.47   For the reasons set out in Section 3, we do not think that regulation is necessary as networks move towards a more open architecture.

Next steps

7.48   As part of our wider work on access and inclusion, we intend to review the issues that face disabled people and decide how to address them. The work in the MSA provides a starting point for the mobile aspects of this review. As part of this we will examine further the barriers to access and use of mobile and what additional steps can be taken to tackle them.

7.49   Separately, wherever possible, we will also engage with other institutions and bodies to improve outcomes for disabled and vulnerable consumers.

7.50   We will encourage and facilitate a dialogue between mobile network operators, other sectoral organisations and groups representing the disabled to further investigate ways to tackle barriers to access and use of mobile by disabled people.

Section 8

Coverage

Summary

8.1   One of our overarching aims for the converging communication sectors is the widespread availability of mobile services. This reflects our belief that Ofcom's duty to promote "the availability throughout the UK of a wide range of electronic communications services" has grown in importance as these services, which include mobile, are playing an ever greater role in citizens' and consumers' lives.

8.2   The *Digital Britain* interim and final reports underline the importance of mobile service coverage; it raises the option of mobile networks having a potential role in delivering universal access to broadband in the UK. Mobile broadband is also experiencing rapid take-up, generating greater interest in the roll-out and upgrading of 3G networks.

8.3   Competition has helped drive investment in networks to reach the majority of the population, and we should continue to foster competitive outcomes to further this process. But we recognise that this approach may need to be supplemented to address those areas where commercial provision will not take place, in order to achieve more extensive availability of mobile services.

8.4   In the rest of this section, we discuss the drivers and limitations on achieving widespread availability. Our overall view and approach can be summarised as follows:

- Different types of coverage issues exist and these are evolving, for example, with the advent of mobile broadband.

- The reasons for coverage issues are complex and highly localised – there is no underlying cause linking all coverage problems (and therefore no single standard solution). Given the nature of cellular technology, it is also difficult, if not impossible, to provide 100 per cent, seamless geographic coverage across the country.

- Nevertheless, we believe that commercially driven 3G roll-out will continue, potentially through network sharing, and driven by technological developments and spectrum release and liberalisation.

- We are committed to reaching a solution with mobile operators and emergency services on 999 roaming.

- Ultimately, commercially driven coverage and access will reach its limit (and 2G roll-out may have already reached a plateau) We will therefore undertake further research to investigate the causes of not-spots as well as issues with network quality.

- We will also assist the Government's *Digital Britain* initiative regarding its approach to spectrum and the role of mobile in delivering its proposed universal service commitment.

- Finally, we will liaise with public sector bodies on any initiatives they may pursue to address persistent mobile not-spots in specific areas.

Respondents to the MSA 1 consultation painted a mixed picture of coverage

8.5 Coverage was briefly discussed in the MSA 1 consultation. We pointed out that the market had pushed mobile coverage to a high percentage of the population. While coverage has generally been good in the UK, we noted that there were still areas of the UK not served by some or all of the operators.

8.6 We considered 3G coverage in more detail, because it is critical for the growth of new services such as mobile broadband, and noted that 3G networks are currently less extensive than 2G. We also highlighted that some people do not have access to any mobile networks due to persistent mobile 'not-spots', and we also flagged the issue of emergency access.

8.7 In the MSA 1 consultation, we asked respondents two questions about coverage:

- Have you been affected by issues with coverage or 'not-spots'? How have they affected you?

- Can markets and commercial agreements address issues such as 'not-spots' and emergency access? If not, what role might be played by the regulator to address these issues?

8.8 Almost 60 respondents to the MSA 1 consultation commented on coverage. Overall, the messages were mixed and reflected the various facets of coverage issues.

Mobile operators highlighted that coverage was dynamic and that 100 per cent coverage was not commercially viable

8.9 The mobile operators had a fairly consistent view. Most outlined that, while continued roll-out of networks was taking place, 100 per cent UK coverage was not plausible, as some areas would never be profitable and therefore did not justify commercial investment. They also mentioned that operators could not roll out in particular areas, due to lack of suitable cell site locations or problems with planning permission. (We discuss the factors that may limit coverage later in this chapter).

"A wider debate is needed about the future of universal service and associated funding, but in the meantime the right approach to coverage issues is to ease planning constraints, allow infrastructure sharing in appropriate circumstances and seek market-based solutions wherever possible". Vodafone.

Stakeholders highlighted a variety of coverage problems, most of which were highly specific and local

8.10 Respondents highlighted a variety of not-spot issues reflecting the fact that 'not-spots' means different things to different people. To some, it meant the lack of a network being available where they live or work – either outdoors or indoors. To others, it meant an

intermittent lack of coverage when they are commuting, so that they experience dropped calls in transit. And for some, it meant poor or patchy quality of coverage (and mobile voice or broadband experience) even where networks are 'available'. A selection of responses is set out below:

"My house is a not spot."

"I can't get 3G coverage in [my] flat in the middle of Southampton."

"I actually get poor reception in my back garden, and fantastic reception in the front garden! This is a highly populated area - there really should be no excuse for this kind of poor coverage."

8.11   Respondents also commented on how poor mobile coverage affects businesses as well as consumers.

"*Our business depends on mobile communications, and when the service is not available it affects our ability to do business and reduces our competitiveness.*"

"[We are] not able to send or receive business-critical emails with a financial loss implication because the 3G network didn't perform as it was supposed to do."

Recent market research has confirmed that quality of coverage is an important concern for consumers

8.12   In addition, the perceived degree of the coverage problem has been reflected in our most recent consumer survey[137] which showed that issues with signal and reception are a primary factor of consumer concern – as significant in importance as the cost of services, in unprompted feedback.

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[137] http://www.ofcom.org.uk/research/tce/ce08/

Figure 38: Specific concerns about mobile phone services (unprompted)
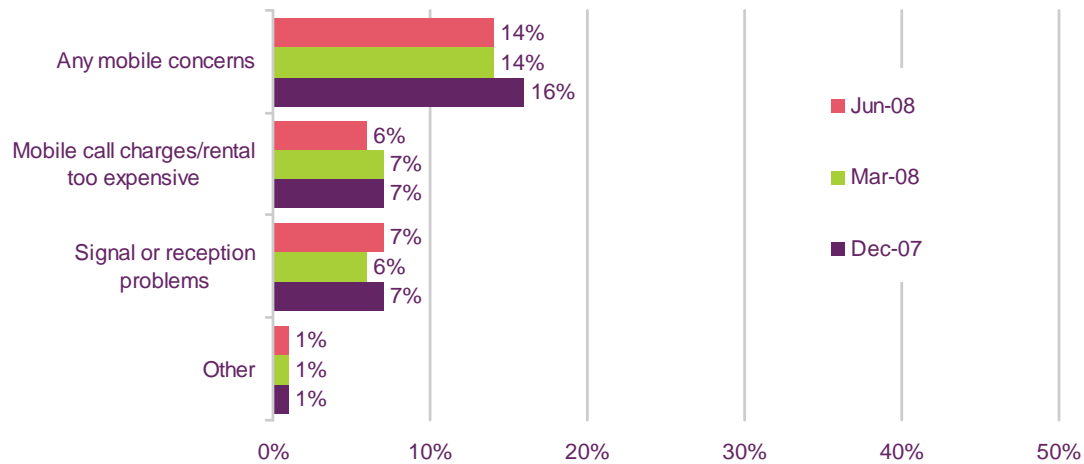

Base: All adults 15+ with mobile phone (Dec 08,907) (Mar 08,925) (Jun 08, 957)
Source: Ofcom consumer concerns tracking survey

8.13   In summary, coverage continues to be an important concern and one that takes different forms. The critical question is: can markets and commercial agreements help to address the various types of coverage issues highlighted above? If not, what role, if any, might regulation play?

Mobile coverage in the UK compares well with other countries

8.14   The UK compares relatively well internationally in terms of the percentage of the population with mobile coverage, especially for 3G, although it should be noted that such high-level figures may hide localised gaps in coverage.[138]

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[138] Figures have been rounded up to nearest percentage point. There may also be some differences in measuring coverage between nations.

Figure 39: Mobile network availability (2007)
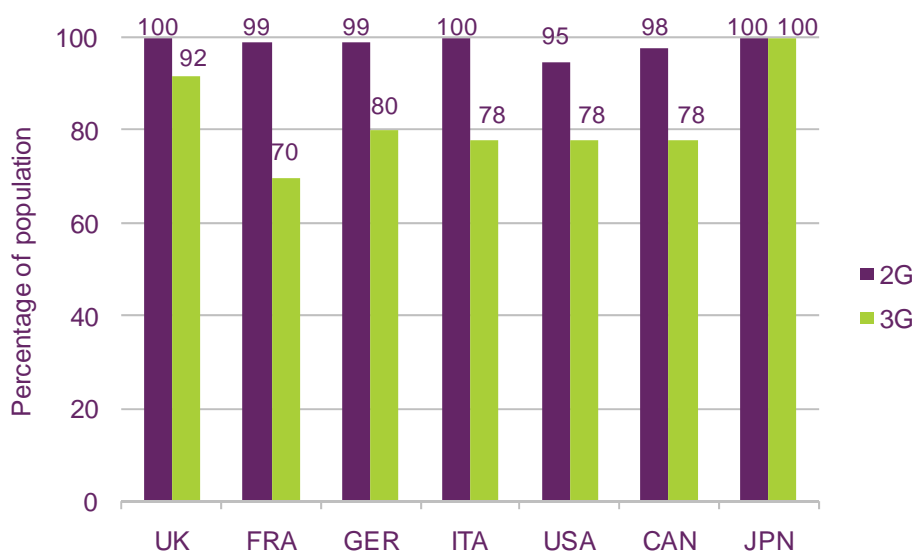
Some coverage issues are particularly relevant for the nations and regions

8.15   Coverage issues such as lack of 3G coverage tend to affect Scotland, Wales and
Northern Ireland and the south-west of England, more so than other parts of the UK. We
illustrated in the MSA 1 consultation how both 3G population and geographic coverage
in these areas was much lower than in other English regions.[139]

8.16   Furthermore, it is difficult to judge the exact scale of coverage issues, as available
coverage figures are subject to limitations. The statistics that we currently collect and
publish are supplied by the GSM Association and collated for us by Europa
Technologies. These statistics are published in our *Communication Market* reports. For
example, in 2008, these showed that the UK has:

- 99 per cent 2G population coverage across the UK, with England and Northern
Ireland shown at 100 per cent, Scotland at 99 per cent and Wales at 98 per cent.[140]

- The figure for UK 2G geographic coverage is 98 per cent and lowest for Scotland at
92 per cent.

8.17   However, the following issues need to be borne in mind in interpreting these figures:

- The estimates probably over-estimate geographic coverage. The figures measure
the percentage of total postcode districts within which service is at least partially
available[141] – not a true reflection of the percentage of actual land mass;[142]

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[139] Figures 69 and 70 in the MSA 1 consultation.
[140] Data show the percentage of people living in a postcode district with at least 75 per cent area
coverage from one or more mobile networks.

- They also assume that a postcode district is 'covered' by mobile, if it has at least 75 per cent area coverage from one or more mobile networks. In other words, the not-spots in most postcode districts (those where up to 25 per cent of the ground area, and the population living there, are not covered by mobile) are 'masked' and not reflected in these statistics.

- They are also subject to large error margins. This is due to differences in the ways operators collect data, and also because data are rounded up from postcode to postcode district, to allow some standardisation and comparison between operators.[143]

Coverage issues are very local and specific

8.18   Coverage issues fall broadly into four categories:

- **complete 'not-spots'** – areas where no coverage exists at all, very often in remote locations;

- **gaps in 3G coverage** – areas where only 2G is available;

- **'not-spots' that affect a specific network** - areas where one network's customers do not have coverage but customers of another network do; and

- **issues with network quality** – such as areas with "poor or unreliable coverage" where networks are ostensibly available.

8.19   Partial or complete not-spots also occur where coverage is poor outdoors in areas where no-one lives, for example, along some parts of arterial routes or minor roads. Some people may expect mobile in remote areas where no power supplies or other facilities are easily available but where, for example, tourists visit. In effect, mobile not-spots are talked about in terms of achieving **geographic access**, rather than just delivering to where people live and work (which raises different issues to, for example, the broadband not-spots discussion).

8.20   The following case study highlights the issue of achieving geographic access. The one-off survey was undertaken last year and mentioned in the 2008 Wales Nations and Regions report.[144]

Case Study - A470 Mobile coverage survey

In early 2008, following discussions with the Ofcom Wales Advisory Committee, we commissioned a drive-by survey of the A470, as a case study of mobile coverage. This provided an insight into the level of service availability on one of Wales's main trunk routes, which runs the full length of the nation, from Llandudno in the north to Cardiff in the south.

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[141] Available in at least 75 per cent of the postcode district area

[142] Postcode districts vary in the size of land mass; 'uncovered' rural postcodes can be relatively large.

[143] This is why the threshold for assuming a postcode district is covered by an operator is set to at least 75 per cent area coverage

[144] http://www.ofcom.org.uk/research/cm/cmrnr08/wales/wales.pdf

Using an automated test rig, calls were made from mobile handsets mounted in a car which was driven the entire length of the route. Call attempts were made every two minutes and successful calls lasted 90 seconds; where there was no coverage calls were re-attempted every 10 seconds. Handsets using each of the four mobile network operators were used for the 2G test and all five operators for 3G.

Of the calls made with 2G handsets, 32 per cent of call attempts failed because there was insufficient signal quality. Where there was a good signal, 89 per cent of calls made were completed successfully, with the majority of failures for the remaining 11 per cent due to calls dropping after being established successfully. Sections of the road north and south of Dolgellau, including the Coed Y Benin forest park, and over the Brecon Beacons, proved particularly problematic for some operators.

With calls made with dual- mode 3G/2G handsets, 39 per cent of call attempts failed because there was insufficient 2G or 3G signal quality. Where calls could be made, only 17 per cent were made using the 3G network, with the majority of phones falling back to the more widely available 2Gnetworks. Once a call was established, 81 per cent of calls completed successfully.

While the methodology used was not suitable for drawing a direct comparison between different mobile operators, the results provide a good overview of service availability on this route and highlight that coverage on these less-populated routes is significantly lower than in population centres.

We believe that commercially-driven coverage can still grow

8.21   In the MSA 1 consultation, we asked stakeholders whether markets could help address not-spot issues. The response was mixed, with operators more positive than other stakeholders.

Operators say 3G coverage can still increase

8.22   Some mobile operators stressed that mobile coverage is dynamic and that 3G will continue to be extended to a higher percentage of the population. For example, T-Mobile stated in its response to the MSA 1 consultation that its:

"…ground-breaking network sharing agreement with H3G will lead to 3G coverage levels being almost equivalent to those of our 2G network by the end of 2009." T-Mobile

8.23   Mobile operators, therefore, did not see any need for regulatory intervention on mobile coverage.

Other stakeholders appeared less optimistic about the market

8.24   There were conflicting messages from other stakeholders on this subject. Some respondents felt that there should be regulatory intervention to expand coverage beyond current or planned levels - and suggested what form the intervention should take.

8.25   Encouraging network sharing (sharing masts and/or RAN) and national roaming (so that consumers are able to roam onto an available network in areas where their network was

not available) were highlighted as possible options. Stakeholders saw these as potential ways to address not-spots and, generally, to improve coverage in rural areas.

8.26   A few respondents noted the inherent tension between expanding coverage and the impact on where people live, and on landscapes. In other words, while they recognised that rolling out infrastructure was necessary to improve coverage, they did not want to see base stations situated near their homes or within the countryside and areas of scenic interest.

We believe there is potential for the market to expand coverage further for 3G

8.27   Our view is that there are several market developments which can potentially help to extend coverage further for 3G. These were mentioned in the MSA 1 consultation. We discuss and provide updates on each of them below. They are:

- Network sharing (which may help remove some 3G not-spots and individual operators' not-spots)

- Spectrum releases and spectrum liberalisation (which can help remove some 3G not-spots, improve coverage indoors as well as improve network quality)

- Femtocells (which may possibly remove indoor 'not-spots' and improve network quality)

Network sharing can reduce operators' costs to provide greater coverage

8.28   Network or RAN sharing involves operators using their own spectrum but sharing base stations and potentially other parts of the radio access network. The shared elements vary, depending on the deals negotiated between mobile operators.

8.29   Sharing passive network infrastructure, such as sites and masts, on an *ad hoc* basis, has a long history in the UK. In practice, many places that would be not-spots are being served today via mast or site-sharing arrangements that will have been struck commercially between mobile operators on a bilateral basis.

8.30   The recent network sharing arrangements announced by the mobile operators were outlined in Section 3. Mobile operators claim that improvements to coverage will result from these deals. We have mentioned T-Mobile's claim about how its network-sharing arrangement with H3G will increase 3G coverage. In addition, Vodafone and O2's recent deal claims that it will "help improve service quality and deliver services such as mobile broadband to a wider population".[145]

8.31   Network sharing can increase coverage by allowing existing base station infrastructure to be used by a partner operator (which does not have a network in a particular area) or

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[145] Vodafone and O2 announced that they would focus on joint build of new sites and consolidation of existing 2G and 3G sites. Masts, antennae, sites, cabinets and power supply will be shared but network electronics and radio network controllers, linked to the core network, will remain independent. See the relevant press release at the link below:
http://www.vodafone.com/start/media_relations/news/group_press_releases/2009/telefonica_and_vodafone.html

even by making coverage in a completely uncovered area viable (by reducing new-build costs and allowing greater asset utilisation). As an illustration, it is reported that T-Mobile and H3G have around 7,500 mobile base stations each and that by combining their networks, H3G will have potential access to 13,000 sites.[146] On a national level, this could extend 3G coverage for H3G's and T-Mobile's customers.

8.32   While the net effect is likely to be positive, network sharing does have some potential to reduce coverage on a more granular level. This is because overlapping cell sites may be decommissioned in some local areas, possibly leading to degradation in the quality of coverage, and perhaps, new not-spots. For example, the T-Mobile and H3G's network-sharing deal may lead to a reduction of about 30 per cent in the number of sites in their network.[147] There also may be a decrease in capacity, as radio access network resources can potentially be shared by the operators, and this might lead to a reduction in network quality and coverage.

2G liberalisation and the release of further spectrum can help rural 3G and indoor coverage

8.33   We have been working on several spectrum developments which may also support increased and improved mobile coverage in the UK. These are currently being taken further forward by the Government and the Independent Spectrum Broker as part of the Digital Britain process. The competition and coverage issues associated with the new spectrum release were discussed in Section 4 and Annex 5. To recap, the three main spectrum developments are:

- Liberalising (and making tradable) the current 2G licences: Licence changes allowing the deployment of 3G and other technologies at 900 MHz could help facilitate roll-out at a reduced cost for operators, compared to current 3G deployments at 2.1 GHz . This is because lower frequencies have better propagation characteristics than higher frequencies, so that signals travel further. Allowing the use of 3G technologies at 900 MHz can extend coverage in rural areas and provide better coverage indoors in urban and rural areas. Operators in countries such as Australia, New Zealand and Finland have rolled out 3G in the 900 MHz band with that purpose.

- The auction of the 2.6 GHz band: the likely use of this spectrum is to provide mobile broadband services using new mobile technologies such as WiMAX or LTE.

- The auction of the Digital Dividend, in particular the 800 MHz band (790- 862 MHz). We have recently consulted on proposals to clear the whole of this band to align with the spectrum that we expect to be released by a critical mass of other European countries. We concluded, in short, that we can expect very substantial net benefits to UK citizens and consumers if we make this change. The costs of the proposals involve moving both existing and planned DTT and wireless-microphone users from the band. We will publish a statement with our decisions on these issues

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[146]see http://www.mobileeurope.co.uk/news_analysis/113467/3_UK_and_T-Mobile_to_share_3G_network_-_and_more%3F.html
[147] See http://www.nokiasiemensnetworks.com/global/Press/Press+releases/news-archive/UKs+largest+3G+mobile+network+integration+appoints+technology+partner.htm

in the summer. The Government has also set out proposals how to bring this spectrum to market in co-ordination with the two other frequency ranges above. We will assist the Government in details developing their policy proposals.

Femtocells can help indoor coverage too

8.34   Finally, femtocells may have a role in extending mobile coverage indoors in those premises with a fixed-line broadband service. The MSA 1 consultation gave a description of how femtocells work.[148] Briefly, they are low-power access points using standard cellular technology over existing licensed spectrum. They interface to the operator's core network via standard broadband lines and support existing phones. Femtocells are being produced for 2G and 3G services, but most of the market interest appears to be in 3G, and all existing 3G phones can be used with 3G femtocells.

8.35   Femtocells can be used to improve indoor coverage. They can also be used to offload capacity from outdoor networks, increase data rates, provide special voice and data tariffs, and possibly additional services such as home entertainment and home automation.

8.36   Femtocells were originally designed for home use and this continues to be the main target market for them. However, in the past year there has also been a significant increase in interest in the use of femtocells in offices, with some operators suggesting they see a role for femtocells in serving enterprises.[149]

8.37   Significant technical challenges to femtocell deployment were apparent too at the time of publication of our MSA1 consultation.[150] However, many of these issues have now been addressed, leading to the first femtocell standard being agreed in April 2009.[151] Further femtocell standards, including for LTE, are planned to be included in Release 9 of the 3GPP[152] standard by early 2010. In addition, other standards bodies, including 3GPP2 and WiMAX Forum, are also working on femtocell standards.

8.38   Finally, there have also been significant commercial developments of femtocells internationally. US operators have led the way - Sprint was the first to launch femtocells

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[148] See paragraph 3.122-3.126 of the MSA 1 consultation.

[149] "Femtos Mean Business for Orange", Unstrung, February 2009 see
http://www.unstrung.com/document.asp?doc_id=172660

[150] These included the need for a common architecture for integrating femtocells to the operator's core network, confirmation that interference between femtocells and 'macrocells' which form a large part of operators' outdoor network, can be managed, scaleable approaches to managing large numbers of femtocells and so on.

[151] Solutions for femtocells using WCDMA technology (3G) can now be developed on a standardised basis following the publication of the Release 8 3GPP standard. The release of Release 8 (http://www.3gpp.org/World-s-first-femtocell-standard) includes a new architecture and interface for supporting femtocells, new mobility procedures and new radio performance specifications and testing requirements. The release 8 specification also includes details of security procedures and management processes for femtocells.

[152] Third Generation Partnership Project

with national US availability in 2008.[153] Verizon launched a similar service in January 2009[154]. .

8.39   Meanwhile, in Europe, Vodafone UK has just announced the first commercial femto-cell offering from 1 July targeted at residential consumers. Vodafone's product offering, called the Vodafone Access Gateway, is a small 'box' (similar in size to a broadband router). The product is being offered free to some customers (on premium price plans) and it is also being offered as part of an inclusive price plan from £15 a month or for a one-off charge. This new market development has some potential to improved and more reliable indoor coverage for Vodafone's customers (depending on the uptake of the femtocell offering)[155].

8.40   To support a wide range of business cases, femtocells will need to be produced in sufficiently large volumes to enable low prices, and may need to be bundled with other services and technology. Mobile operators might also need to consider offering subsidies to make the end-user cost acceptable.

8.41   It is also important to note that households using femtocells also need a broadband connection and that femtocells can be operator-specific; hence installing a femtocell in a household or business may only benefit customers of that operator.

8.42   There are also questions as to how femtocells will compare with other indoor coverage techniques, including the use of liberalised lower frequency spectrum and the use of Wi-Fi based dual-mode handsets and repeaters. These issues have also been considered by us in our work on spectrum liberalisation.[156]

8.43   It is clear that much progress has been made on femtocell technology since we last reported, and that femtocells might be used to complement existing network coverage, capacity and services by operators within the next one to two years.

Despite the potential improvements, there will still be gaps in coverage

8.44   While we believe that coverage can increase, we saw no consensus among MSA 1 consultation respondents on exactly how far commercial coverage can extend. Nevertheless, none of the respondents stated that it would reach universal coverage through market forces alone. For instance, Orange stated:

"… it will never be possible to provide 100% coverage and therefore to eliminate 'not-spots' and so the issue becomes how to improve and extend coverage as far as possible, particularly in rural and sparsely populated areas. The principal limitations are environmental and financial." Orange

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[153] "Sprint Customers Nationwide Can Soon Get Enhanced Coverage, Unlimited Calling in Homes, Offices with the Award-Winning Sprint AIRAVE by Samsung", Sprint Press Release, July 2008. http://newsreleases.sprint.com/phoenix.zhtml?c=127149&p=irol-newsArticle_newsroom&ID=1181288&highlight=

[154] Verizon Wireless "Network Extender" Enhances In-Home Call Capabilities , Verizon press release January 2009, http://news.vzw.com/news/2009/01/pr2009-01-26c.html

[155] http://www.vodafone.com/start/media_relations/news/local_press_releases/uk_press_releases/2007/access_gateway.html

[156] Application of spectrum liberalisation and trading to the mobile sector, Annex 13, http://www.ofcom.org.uk/consult/condocs/spectrumlib/

8.45   Given there is some agreement that the market will not provide a 100 per cent footprint, we expect gaps in 2G and 3G coverage to continue.

8.46   It is therefore useful to consider other solutions for gaps in coverage. These are:

- the suggestion that national roaming is a potential solution, and we will look at the related issue of emergency roaming; and

- the factors which determine the feasibility of a solution for not-spots and the possible role of the public sector in not-spot solutions.

National and regional roaming

8.47   Roaming is defined as the ability for cellular customers to automatically make and receive voice calls, send and receive data, or to access other services, outside the geographical coverage area of their home network, by using a network in the area they are visiting.[157] Roaming arrangements can be developed commercially or through regulation.

8.48   There are two main types of roaming related to national coverage issues:

- national roaming, and;

- regional or local roaming.

8.49   If the visited network is in the same country as the home network, this is known as **national roaming**. (If the visited network is outside the home country, this is known as international roaming). National roaming arrangements normally cover an entire country. They have been used around the world to help new entrants to develop mobile coverage while building their own networks.

8.50   **Regional roaming** allows customers of operators without coverage in a particular geographic region (within a specific country) to roam onto a network operating in that area. Regional roaming is mainly used in countries with large geographic areas, such as the US and India, where some mobile networks have been established in specific regions.

8.51   Regional roaming arrangements currently do not exist in the UK. The UK has four mobile operators, each with their own nationwide 2G networks (and slightly less extensive 3G networks) although there are varying levels of coverage on a granular level.

8.52   There is one major commercial national roaming arrangement in place between UK mobile operators: H3G's deal (currently with Orange) provides 2G roaming for its customers in those areas where it has no 3G coverage. H3G's roaming arrangement was, however, a commercial necessity for the company, as it has allowed it to offer 'national coverage' to consumers while it continued building up the footprint of its 3G

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[157] GSMA, http://gsmworld.com/technology/roaming/index.htm#nav-6

network. National roaming is also being used by smaller operators to supplement their own networks (for example, by Cable & Wireless).[158]

8.53   Apart from these, no roaming service is being offered to UK consumers. This is despite some anecdotal evidence that a small number of consumers – who are affected by coverage issues - are purchasing international SIM cards, e.g. from Sim4travel, Jersey Telecom etc, so that they can roam across networks (where these operators have agreements with UK networks). In these circumstances, consumers pay international roaming rates of £0.25 per minute, or more, to make a call. This illustrates how important improved coverage is for some individuals particularly in rural areas.

8.54   Any UK mobile provider (MNO or MVNO) is able to discuss and enable national or regional roaming with other mobile operators on a commercial basis. The option is there for mobile operators if they wish to take it, for 2G or 3G services, depending on their assessment of the market demand and opportunity.

The feasibility of enabling roaming and its role in extending coverage

8.55   In principle, roaming could play a helpful role in extending coverage in areas where networks already exist. In other words, it could help customers in an area where their network does not have coverage, but another network does. Roaming could deliver particular improvements in coverage where a number of operators have networks but where their coverage is often adjacent to the others. In such areas, a roaming solution could provide a greater degree of continuous coverage.[159]

8.56   However, it is important to note that roaming does not resolve complete not-spots (i.e. areas where no networks exist). However, it may make coverage in some not-spots viable if operators agree to use infrastructure jointly from the outset. But roaming might also have the opposite effect, by removing incentives for investment. It can remove mobile operators' ability to differentiate on the basis of their coverage levels, i.e. if an operator considered its investment in a new mast could be used by another operator not investing in the same area, it might decide not to proceed with deployment. An operator may therefore balance this consideration against the potential for gaining extra revenue through charging another operator for using its assets.

8.57   There are also technical issues associated with implementing national roaming in the UK, which may make it a difficult option for operators. Enabling national roaming between nationwide mobile operators may cause unwanted roaming in areas of overlapping coverage. This may be particularly the case in urban areas, where multiple UK mobile operators provide coverage in overlapping cells, or when in transit through areas with non-contiguous coverage. A high number of users travelling in and out of an area and moving in and out of coverage may cause a phone to search for another available network. We understand this may cause issues such as:

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[158] Cable & Wireless has a fixed-mobile convergence solution for customers. It is using a technology called picocells (connected to its fixed network) to improve mobile coverage indoors - in its customers' properties - and furthermore, through a national roaming arrangement with Orange, its mobile service also provides coverage outdoors.
[159] Clearly any roaming agreements would need to meet other licence obligations including ones relating to coverage.

- putting extra demand on network capacity - for example, on call handover and signalling between base stations - which may not be designed to cope with the high volume of roaming devices that national roaming arrangements imply;[160]

- keeping customers on a visiting network for some time even though their own network may be available – this is because handsets are usually programmed to re-scan network coverage only after a certain amount of time (we understand that this is typically 6-30 minutes). Therefore, a consumer may trip onto (and stay for some time on) another network, even though his or her own provider also has coverage in the area;[161][162] and;

- issues with handsets. Existing handsets have a 'forbidden network' list which would have to be amended or erased (and this process may not be straightforward). In addition, some older 2G handsets may not be able to scan for alternative networks in 'priority' order.

8.58   All of this suggests that national roaming across the UK may be complex to manage.[163]

Inadvertent roaming

8.59   In the context of roaming, we also note some concerns by stakeholders in Northern Ireland and south-west Scotland about the issue of 'inadvertent roaming'. This is when a non-UK mobile network can be picked up by a customer of a UK mobile operator in the UK. It effectively mirrors international roaming, but without the customer leaving the UK.

8.60   Inadvertent roaming happens where the distance between territories is relatively short and where the UK networks have inadequate coverage. In these circumstances, a non-UK network can become available and, if it is used, the customer will incur international roaming charges. For instance, in Northern Ireland, there have been long-standing issues with cross-border roaming with the Republic of Ireland. This continues to be a concern for mobile users who live and work close to the border, and who face higher mobile bills because of roaming.

8.61   We understand a few operators in Northern Ireland, such as O2 and H3G, have responded by introducing new roaming tariffs which may help people avoid excessive

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[160] While international roaming also requires an increase in capacity, international visitor levels are quite predictable and relatively low compared to the UK mobile subscriber population. In a full national roaming scenario, any UK subscriber of any mobile network could roam on any other network, requiring a significant increase in peak capacity.

[161] This issue may be solved by reducing the time between two scans, so the handset can switch to its own network more promptly. However, this would potentially trigger more handovers, constrain network capacity (see the point above) and limit battery life;

[162] This issue mostly affects national roaming (rather than international roaming) since operators prefer to keep their customers on their own domestic network instead of roaming on other networks (in order to minimise their costs or customer charges). With international roaming - as the 'domestic' network has no coverage abroad - the customer is always roaming on foreign networks and thus roaming charges must apply.

[163] Restricting roaming to parts of the nation – regional roaming – might be an alternative. In a regional roaming scenario, it is possible to bar access to particular areas of networks instead of the whole network. This can be done by identifying location areas and using location area codes to prevent access to these areas.

charging roaming charges. In addition, practical advice has also been given to customers. For instance, they have been advised to check the network shown on their mobile before making a call. And customers have been advised to consider disabling the roaming function on their mobile, until they want to use it when travelling abroad.

8.62   Finally, if UK mobile operators improved coverage in the affected areas, then this could help to address the issue, as it can prevent inadvertent roaming occurring in the first place.

We want to resolve emergency roaming as soon as possible

8.63   In the MSA 1 consultation, we highlighted the specific issue of emergency roaming where - unlike the situation in most other EU countries[164] - UK mobile customers cannot call the emergency services using other available networks when beyond the range of their home network. In contrast, handsets/SIMs bought from overseas (i.e. those using international roaming) can roam onto any network and make an emergency (or other) call wherever there is mobile coverage. Therefore a UK consumer needing emergency access may have worse access to the UK's 999 services than an international visitor. Mobile telephony is now the main means to contact the emergency services, with more 999 calls made via mobile phones than fixed lines.

8.64   We believe there is value in extending the availability of emergency services to enable '999 mobile roaming', to enhance public safety and bring benefits to UK citizens. Several respondents to the MSA 1 consultation agreed that this was a priority area, with mobile operators generally indicating that, as long as certain technical points could be resolved, a solution was possible.[165] In addition, we have recently received the firm support of the 999/112 Liaison Committee in delivering emergency roaming.

8.65   We are keen to build on this momentum. We have initiated constructive discussions with the mobile operators and the emergency service authorities, urging their continued co-operation and support for developing a technical solution. This has culminated in the announcement, within our *Access and Inclusion* consultation, of their plan to test an appropriate emergency roaming solution in 2009.[166] The current proposal is for us to work with the mobile operators and emergency authorities to develop a solution based on Limited Service State (LSS). LSS is different to a full national roaming solution, but is technically easier, and cheaper and quicker to implement.[167]

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[164] Communications Committee Implementation *of European emergency number 112 - results of the second data-gathering round*, January 2009.

[165] There are a number of policy and technical issues that Ofcom, mobile operators, the emergency authorities and call handling agents must consider when assessing the optimal way of introducing it into the UK.

[166] http://www.ofcom.org.uk/consult/condocs/access/

[167] LSS is a specification embedded in mobile networks and handsets. It is intended to enable access to all available networks for the purpose of making emergency calls. LSS is the state a handset enters when it is not allowed to register on a network, that is when it is out of coverage of its home network but there is coverage by another network that is 'forbidden' because roaming on that network is not allowed. In order to be able to make an emergency call while in this state, the mobile network operator controlling the network that provides coverage in that area must allow a limited form of access which will enable the handset to 'camp' on any acceptable cell and make emergency calls through that network.

8.66   It would enable consumers to make emergency calls through an alternative network, when their home network is not available. Mobile operators have agreed to work to the plan, test solutions and agree a means of implementation. Subject to this process, our aim is to enable the introduction of a 999 mobile roaming service across all mobile networks later this year.

8.67   This action has the potential to significantly improve access to emergency services. However, we are conscious that stakeholders are keen for the general footprint of mobile to be extended. We therefore now discuss what we consider to be the factors that determine the viability of solutions to not-spots – where no networks exist.

There are three key factors determining the feasibility of not-spot solutions

8.68   We believe there are at least three factors relevant to the provision of true near-universal mobile coverage: the business case, planning approval and a viable technical solution.

A business case is required

8.69   In general, revenues must exceed costs for investment to take place.[168] However, in rural areas, mobile traffic and revenues are lower and costs can be higher. The low population densities in rural areas mean that revenues will be less than in urban areas and, for 3G at least, we understand that rural sites (cabinet size, backhaul and power supplies) may cost more than in urban areas. Operating expenditure may also be higher due to accessibility issues: it can cost more and take longer for an engineer to go to a site in a rural area compared to a site in an urban area.

8.70   It is possible that a business case could be improved, in some areas, with public sector subsidy. Direct subsidy may be the only way to bring mobile provision to those areas where all mobile operators have made it clear their commercial coverage will not reach. This is particularly true for 2G 'not-spots', as mobile operators are apparently undertaking further 3G roll-out in some areas.

8.71   Any decision to provide a public subsidy is a decision for the Government rather than Ofcom. Any public sector intervention would also have to comply with state aid rules.

8.72   Government may decide to pursue such a route to achieve public policy objectives, e.g. for economic development or equity. In economic terms, the subsidy would reflect the externality benefits of extending coverage. We are aware of one such case of public intervention in the UK on mobile telephony. This is the Highlands and Islands Enterprise project, in the late 1990s, which used approximately £4m of public sector funding to encourage operators to extend mobile coverage to 90 per cent of A and B roads in their region[169]. The total project cost was over £40m with the remainder of the investment from the private sector partners, Vodafone and Cellnet (now O2), which rolled out infrastructure to non-commercial arterial routes by sharing masts.

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[168] Operators may, however, build cell sites in some unprofitable rural areas, because they "justify their existence through delivering ubiquity of coverage" - page 22 of T-Mobile's response to the interim Digital Britain report at: http://www.culture.gov.uk/images/publications/T-MobileUK_DBIRResponse.pdf

[169] Under the UK road numbering scheme, A and B routes are main roads and local routes respectively.

8.73 More recently, one mobile operator implied that public funding might help. Vodafone was reported as stating this in response to a discussion on Welsh not-spots:

"Due to the topography and geography of Wales it is not always possible, let alone cost effective, to deploy network infrastructure. Therefore a question for the [Westminster Welsh Affairs Select] committee is what public money or incentives might be available to support the provision of technology to support these hard-to-reach areas".[170] Vodafone

8.74 However, in some areas of low population density/footfall, where only a limited number of calls might be made per month, it may be very hard to justify public funding, let alone private sector investment. Extending coverage for all consumers in not-spots would also require infrastructure to be built by all operators – unless sites were shared or roaming arrangements were developed.

Planning approval is necessary

8.75 Planning approval is devolved to Planning Authorities in local government, which make decisions on applications from mobile operators or their agents on the location of masts. Neither planning decisions (nor legislation) are matters that we can directly influence. Many planning applications are turned down and the reasons vary considerably, e.g. perceived adverse impact on the community or on the environment. In many cases, mobile operators look for an alternative site and re-submit their applications.

8.76 Mobile operator respondents to the MSA 1 consultation such as Orange, Vodafone and H3G emphasised that we should consider the planning process in the coverage discussion. The mobile operators believe that it often stands in the way of rolling out base stations in particular areas. We do recognise that, in some cases, strong local opposition to planning applications by mobile operators or their agents can actually change operators' plans. If the process is protracted, they either stop or shift their investment elsewhere.

8.77 Opposition can come from local people, landowners, those safeguarding areas of scenic interest and other stakeholders. The opposition to mobile infrastructure can often be highly contentious and is often politicised at a local level. The planning process is of course designed to weigh up, on a case-by-case basis, local stakeholders' concerns about infrastructure alongside the benefits of coverage. We do not have the local knowledge necessary, or the remit, to be involved in the debate on individual planning applications; nor is it appropriate for us to do so.

A viable technological solution is not always possible in all cases

8.78 Providing seamless coverage with cellular mobile is a very difficult task. Mobile networks are subject to a wide range of variables and factors which can impair user experience – much more so than fixed networks. Transmission on the radio medium is affected by highly variable propagation conditions, interference, fixed obstacles such as buildings, trees etc, mobile obstacles, e.g. cars, buses, etc This causes fast and unpredictable

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[170] http://www.walesonline.co.uk/news/wales-news/2009/03/18/phone-mast-nimbys-blamed-for-preventing-all-wales-network-91466-23169213/

variations of the signal strength, known as the 'fading' effect, that may strongly affect the quality of service or even lead to a connection dropping.

8.79   Moreover, mobility allows users to move across different cells during a call and the network must respond reactively by enabling sufficiently fast handovers between them. Although the latest mobile technologies have significantly improved network capability by adopting very advanced transmission techniques, many challenges remain intrinsic to the radio medium and continue to pose constraints to actual performance.

8.80   Some large not-spot areas, such as parts of the Highlands and Islands, areas of mid-Wales and the west of Northern Ireland, are also a result of extremely challenging topographies – mountains, trees - that limit the option to deploy (or the range of) cellular masts.

8.81   It can be difficult for cellular networks to serve users inside (and throughout) certain buildings. Recent technological developments such as femtocells and boosters may help indoor problems. In some very remote areas, access to power supplies can be an issue. There may be potential solutions for powering mobile masts using wind power in certain rural locations. However, the point is that technological developments are crucial, but often very costly, for solving some of the limitations on the reach of mobile networks.

As not-spots are localised issues with no single underlying cause, there is no single standard solution to coverage concerns

8.82   In summary, it is clear that addressing not-spots is a complex matter and achieving universal coverage would be a difficult task. Moreover, the reasons for gaps in coverage are highly localised – many are due to the lack of a business case, some are technically problematic, some are due to planning obstacles and others a mix of these issues.

8.83   Given this complexity, there does not appear to be a 'one size fits all' solution to not-spots.

8.84   While we believe that commercially driven roll-out can still extend 3G coverage despite some of these challenges, we also recognise that commercially-driven 2G may have reached its limit.

8.85   If the social benefits of extending coverage (beyond commercial deployment) are strong, then the question of such roll-out falls, to a large degree, into the domain of wider universal service discussions – a debate currently forming part of the Government's *Digital Britain* initiative (discussed further below) – and perhaps also into the arena of potential public sector interventions.

8.86   At this stage, it is also not clear whether there might be an appetite for public sector intervention on mobile to resolve not-spots. However, if some form of intervention were to be considered, it would be important to determine whether it was intended to address regional or local issues or whether it would try to improve coverage in areas which are populated, on arterial routes/transport corridors, or elsewhere.

We will investigate the underlying causes of not-spots and work where we can to facilitate better coverage

8.87   We intend to play an active role to help industry and other stakeholders extend coverage, where feasible. We will explore how we might facilitate creative solutions to address coverage issues in particular areas. For example, we intend to work where we can with public bodies (such as devolved governments or local development authorities) and make our expertise available to them if they are considering initiatives to resolve not-spots in their areas (as we have done previously with local broadband initiatives).

8.88   To support our potential facilitation role, we will conduct further research to identify the nature of coverage issues in more detail. Our aim will be to investigate (and provide more evidence) on:

- why coverage issues persist;

- the factors involved in, as well as the scope for, solutions; and

- how the issues and solutions may vary in different cases or contexts.

8.89   We have also noted the concerns about mobile network quality raised by respondents to the MSA 1 consultation, and we are aware of the increasing issues with 3G data services. For instance, a number of respondents flagged the 'patchy' and unreliable nature of networks in areas with ostensible mobile coverage and the poor quality sometimes experienced when using the mobile internet.

8.90   We hold some data on mobile coverage; this is used to publish high-level, aggregate coverage figures for the UK and the devolved nations in our *Communications Market* reports (CMR). However, as we mentioned earlier, this data are subject to limitations. Furthermore, we are conscious that the data we publish in the CMR (and the data we use to determine whether 3G licence obligations have been fulfilled) are focused on outdoor voice coverage.[171] They do not measure:

- the quality of mobile voice and SMS services; or

- the quality of mobile broadband provision.

8.91   Given the wider concerns with network quality and the lack of data on the issue, we think it is also now important to investigate mobile network quality. Stakeholder concerns on the issue can only be expected to increase with the uptake and use of new mobile services, particularly mobile broadband, and as these services grow in importance and sophistication.

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[171] At the same time as this consultation document we also publish for the first time a series of maps showing coverage across the UK by mobile networks. These are based on the data used to measure the fulfillment of the 3G licence obligations, and show coverage against a threshold set by Ofcom for December 2008. The coverage maps can be found here: http://www.ofcom.org.uk/radiocomms/ifi/licensing/classes/broadband/cellular/3g/maps/3gmaps/.

8.92   Despite its recent popularity, there are concerns about mobile broadband quality. One consumer survey showed satisfaction with mobile broadband was dropping, while fixed ISP ratings remained constant (or higher) for the same measures of quality.[172] Another report indicated that mobile broadband download speeds may, on average, be just under 1Mbps – and stated that this was less than a quarter of the maximum speed levels being advertised. It is therefore important that we try and understand the experience of mobile broadband users, as we have recently done with fixed line broadband services[173].

8.93   The need to do this research has also been strengthened by the *Digital Britain* report. It suggests that mobile may be a potential technology which could help deliver a broadband universal service commitment. Understanding the current broadband experience delivered by mobile networks may thus help to inform what role evolving mobile infrastructure and services can play, in future, in terms of solutions for those not served (or underserved) by broadband.

8.94   We will therefore also initiate a programme of research on mobile network quality. Our aim is to establish if, and how, we can get an up-to-date understanding of the network quality of UK mobile services and in different environments, for example, outdoors, indoors and in transit.

8.95   We hope the research will provide information to show consumers, industry and government how the performance of mobile networks is evolving. It will help inform our engagement on issues relating to the network quality of mobile services and feed into our future policy development. It may also be useful if we get an obligation to report on mobile network quality.[174]

Digital Britain may also have an impact on the mobile coverage issue

8.96   As mentioned earlier, central government can also, directly or indirectly, influence the mobile coverage issue through its policy approach to universal service (and spectrum, e.g. through release of the Digital Dividend spectrum and the liberalisation of the existing 2G licences, potentially linked to new coverage obligations).

Mobile may help deliver a possible broadband universal service commitment

8.97   At the European level, a recent report by the European Commission looked at the question of a universal service obligation for mobile voice services. It found this to be unnecessary given the wide availability and high affordability of mobile services.[175] Similarly, the UK Government set out its position on universal service in its '*Digital Britain'* interim and final reports in January and June 2009. While it did not suggest a universal service for mobile, it did propose a universal service commitment for broadband by 2012, with mobile as a potential means for delivering it.

8.98   In determining their approach to delivery, the Government's priorities were:

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[172] YouGov, '*Dongle Tracker Wave 3'*, January 2009. Such issues have meant that of those surveyed who purchased mobile broadband instead of a fixed ISP, a quarter stated they would cancel their mobile broadband service and get a home ISP.

[173] http://www.epitiro.com/news/epitiro-publishes-uk-mobile-broadband-research.html

[174] The Government's *Digital Britain* report contains a proposal for Ofcom to undertake network audits. (*Digital Britain*, Chapter 3)

[175] Please see http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/08/583&format=HTML

- "2Mbps to virtually every household in the UK (in addition, mobile will have a role to play in providing broadband coverage at different speeds)"

8.99   If there is a role for mobile in the delivery of a universal service for broadband, it is possible that mobile coverage could ultimately be extended to some areas which are underserved by broadband. This potential has been echoed by H3G in its response to the MSA 1 consultation:

"Mobile networks would appear to have a significant cost advantage in rolling out broadband to areas which do not as yet have fixed-line access. For instance, H3G is currently providing HSDPA services to areas which do not currently have access to ADSL. As H3G extends its network coverage to 99% of the population by 2012, it will provide broadband for the first time to many such areas" H3G

8.100   However, such mobile coverage would, of course, have to be capable of delivering the specified threshold bandwidth. If this is set at 2Mb/s, it may have to involve evolutionary mobile networks such as HSPA+ or LTE.

8.101   The Government has acknowledged these points within the final Digital Britain report. In the following extract, the Government elaborates its view on how the proposed broadband USC relates to mobile.

Figure 40: Extract from Digital Britain regarding Broadband Universal Service Commitment

1 Where BT's DSL cannot deliver 2Mbps to a location, mobile networks may be able to serve this location in time (whether this applies in all cases cannot easily be quantified at this stage);

2 Between now and 2012 the number of such locations is likely to increase as the mobile operators continue to roll out 3G coverage;

3 Whilst the Government objective of 2Mbps is a stretch for the 3G technology the near universal roll out of some 3G networks will guarantee 1-1.5Mbps availability across a range of current broadband "not-spots;

4 Broadband mobile networks could deliver considerably higher data rates in the future (beyond 2012) if they were able to operate in much wider radio channels – with 2x20 MHz wide radio channels at least quadrupling the mobile radio cell edge data rate – but this improvement requires mobile Next Generation Network technology; and

5 The mobile networks (3G and Next Generation Networks) could significantly extend their reach, at lower cost, if they used radio spectrum located below 1 GHz.

This last point indicates how precious spectrum below 1 GHz is in being able to provide broadband coverage at much lower cost to the last 10% of the UK population. But this last 10% of the population is well dispersed and it is not a viable market on its own.

Source: Digital Britain Final Report

8.102 Mobile is being used elsewhere to help deliver universal broadband availability. In January 2009, the Irish government announced that H3G Ireland had won the contract for its national broadband scheme to provide access to the remaining 10 per cent of the Irish population, or around 33 per cent of the area of the country. H3G will roll out and use its HSPA mobile broadband network and provide an initial solution at a minimum speed of 1.2 mbps through mobile. Eight per cent of the national broadband intervention areas will be covered by satellite services. Under the scheme, broadband will be available to 100 per cent of the population by September 2010.

8.103 Moreover, the final Digital Britain report mentions the following objectives with regards to mobile coverage : [176]

"In our wireless infrastructure, Digital Britain sets out three objectives: firstly, a rapid transition to next generation high-speed mobile broadband; secondly, progress towards universal coverage in 3G and Next Generation Mobile, reliable coverage throughout the rail network and mobile coverage on the London Underground; thirdly, maintaining a highly competitive mobile market."

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[176] Digital Britain, Department for Culture, Media and Sport and Department for Business, Innovation and Skills, p.14.

8.104 We are also keen to see the availability of mobile networks extended – one of our objectives is, as stated in the MSA 1 consultation, is "… *coverage across as much of the UK as is economically feasible (and potentially going further where that is socially desirable)*". In addition, we welcome the continued growth of mobile broadband services.

8.105 As part of its *Digital Britain* project, the Government has been considering various issues relating to spectrum. In this regard it appointed an Independent Spectrum Broker, whose report was published on 13 May 2009.[177] The Government has largely welcomed these proposals in its recent final *Digital Britain* report.

8.106 We believe that the when debating a holistic approach to these frequencies and the timing of their availability, it is important to consider the impact of the proposed solution on consumer benefit from availability and quality (particularly indoors and in rural areas) and that arguments for co-ordination need to be weighed against arguments for early release.

Our proposed approach to the issue of coverage

8.107 In this chapter, we have outlined the different types of coverage issues and noted which developments may help alleviate some current problems. We have also discussed the factors that determine the scope for solutions in not-spots and conveyed that these are likely to vary by individual case.

8.108 We conclude by outlining our proposed approach to coverage and network quality issues. The figure below shows our specific new actions as well as those actions we will continue to take forward.

8.109 Assuming that the market remains at least as competitive as it is today, we believe the most important policy actions to help 3G mobile coverage and not-spots will continue to relate to spectrum liberalisation and release.

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[177] The Independent Spectrum Broker's report can be found here:
http://www.culture.gov.uk/reference_library/publications/6147.aspx

Figure 41: Ofcom's proposed approach to mobile coverage

Category	Action	Purpose
New – Facilitation role and evidence base	Work where we can with local stakeholders and public sector on any action they may wish to take on mobile coverage.	Establish public sector/local activity to resolve not-spots – whether subsidy is involved and areas where intervention is sought
	Examine the actual causes of persisting not-spots	Provide evidence on the factors that are key to resolving not-spots and set out the scope for viable approaches and solutions
	Investigate network quality in mobile services including mobile broadband	Improves understanding of network quality and performance
Things we are already doing… **… on spectrum and Digital Britain engagement**	Assisting the Government in its efforts to make spectrum available which is suitable for mobile services.	May, for example, resolve 3G not-spots in rural areas and improve indoor coverage.
	Engaging on more strategic policy shifts such as changes to the scope or delivery of universal service.	Establish scope and impact of changes to universal service and/or approach to spectrum
… on competition	Continuing to foster a healthy level of competition and contestability in the mobile market	Drives incentives for innovation and investment where commercially viable
	(Through monitoring market developments) respond to any situations where behaviour is hindering innovation on coverage	Improves investment in new solutions which can improve coverage more generally

Source: Ofcom

Consultation questions

Q 8.1: Do you agree that our proposed facilitation role around mobile not-spot issues is a realistic and sensible thing to do?

Q 8.2: Do you agree with our general approach set out in the table above? Are there are any other actions we should take and why?

Section 9

Mobile content

Summary

9.1   In the MSA 1 consultation we set out a vision for a UK mobile and wireless sector that serves the needs of those who live and work in the UK. We identified the characteristics that such a sector would have. These included:

- a diverse range of high-quality content and, where appropriate, protection from harmful content; and

- protection from unfair practices and scams, including those infringing on citizens' interests in protecting their personal information and location.

9.2   In the MSA 1 consultation we asked the following questions:

- Can we expect the self-regulatory approach to mobile content to continue to be successful?

- Will privacy and security issues become more important as services become more personal and complex?

9.3   We also outlined the possible need for a wider debate about mobile content issues.

9.4   In this chapter we look at the current and future development of content accessed via mobile, ask whether it raises different issues to content delivered via the fixed internet, and consider what implications this may have for regulation in the future.

9.5   The main points discussed are:

- the development and use of mobile content;

- issues unique to mobile content;

- the current regulatory regime;

- issues that mobile content may raise in the future;

- implications for regulation; and

- next steps.

More people are accessing an increasing range of mobile content

9.6   Mobile content is a broad term that incorporates material accessed and shared via the internet and mobile networks such as still pictures, video, audio and audio-visual material, games and applications.

9.7   In the past this content was regarded as a special service on mobile operators' networks and was delivered through mobile-specific arrangements (e.g. ringtones, premium rate numbers, and premium SMS and MMS). Today it increasingly comes from the internet - sometimes 'made for mobile', and in other cases directly from the same sources as fixed internet content. Mobile phones equipped with cameras also facilitate the creation and distribution of user-generated content.

9.8   In Section 3 we stated that mobile content and data services have entered a 'virtuous circle' of demand, typified by new services and technical capabilities driven by consumer demand, new application developments and the increased technical capabilities of devices and networks.

9.9   An ever-growing range of content is accessible via mobile. There are mobile applications offering a wide range of services. Users can now download applications that allow them to plan their journeys, choose a restaurant, identify music, and much more. A recent Deloitte report[178] estimates that in 2009 mobile phone users will download more than 10 bnapplications. Following the launch of the iPhone App store, other players have already launched, or are planning to launch, their own application stores, including Research in Motion, Microsoft, Nokia, and Google.[179]

Mobile content raises the same issues as fixed internet content, but certain concerns may be exacerbated by the portable and personal nature of mobile

9.10   If mobile content is increasingly based on using the same delivery mechanisms, delivering the same material as fixed internet content, then when considering mobile content, we need to look at the same issues that occur with the fixed internet.

9.11   Digital content, delivered on a variety of platforms, can raise issues in three overarching areas[180]:

i)   protecting people from exposure to potentially harmful or offensive content (for example, preventing children from viewing age-inappropriate material);

ii)   ensuring people's privacy is respected; and

iii)   consumer protection questions which include issues of anonymity – in other words, the manner in which some users may be able to avoid identification.

9.12   However, specific characteristics unique to mobile may exacerbate particular issues and concerns. These characteristics are the **portable** and **personal** nature of mobile and the greater potential mobile offers for **anonymity**.

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[178] Telecommunications Predictions TMT Trends 2009
http://www.deloitte.com/dtt/cda/doc/content/dtt_2009predictions_telecomms.pdf
[179] For further information see: http://press.rim.com/release.jsp?id=2223,
http://www.microsoft.com/presspass/press/2009/feb09/02-16MWCPR.mspx,
http://www.nokia.com/A4136001?newsid=1290745, and http://android-developers.blogspot.com/2008/08/android-market-user-driven-content.html
[180] Chapter 7 of the Government's *Digital Britain* final report also emphasises the importance of online safety and security.

9.13   Later in this section we examine how these characteristics may raise issues in the future.

Mobile content is largely self-regulated

9.14   The regulatory environment for mobile content is complex and fragmented. There are multiple sources of legislation, regulation and guidance that impact to some extent on different aspects of mobile content. There is also a range of regulatory, self-regulatory and trade bodies that deal with aspects of mobile content. These include:

- the Audiovisual Media Services Directive (AVMS): legislative advertising standards, sponsorship rules, product placement;

- the Advertising Standards Authority (ASA): adverts in paid-for space (e.g. banner ads and pop-ups), advertising content in commercial e-mails, commercial text messages;

- the Information Commissioner's office: privacy and electronic communications directive[181];

- Ofcom/Phonepay Plus: TV-like services and premium rate services; and

- Ofcom/OFT: consumer protection.

9.15   Mobile operators have also adopted self-regulation. The most prominent examples of content self-regulation within the mobile sector are the Independent Mobile Classification Board (IMCB) and the Code of Practice (the Code) for the sales and marketing of subscriptions to mobile networks.[182]

9.16   The UK code of practice for self-regulation of new forms of content on mobiles provides a series of undertakings regarding young people's access to, and the classification of, mobile commercial content. The IMCB has set a 'Classification Framework' for commercial mobile picture-based content. All major UK mobile phone operators subscribe to and support the Code and the Classification Framework.

9.17   Last year we conducted a review of the Code with the support of the Home Office and the Children's Charities' Coalition of Internet Safety (CHIS).[183] Overall, we found the Code effective in restricting young people's access to inappropriate content and a good example of industry self-regulation. We found that the Code was understood and readily adopted by all concerned. In implementing the Code the mobile operators have established a process whereby an initial breach of the Code by a commercial content provider results in a warning (yellow card) and any subsequent breach of the Code can result in a sanction (red card). The yellow/red card scheme is viewed by both the mobile operators and the content suppliers as a highly effective compliance mechanism.

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[181] http://www.ico.gov.uk/what_we_cover/privacy_and_electronic_communications.aspx
[182] The Code and Classification Framework can be found at:
http://www.imcb.org.uk/assets/documents/10000109Codeofpractice.pdf and
http://www.imcb.org.uk/classificationframe
[183] Our review can be found at: http://www.ofcom.org.uk/advice/media_literacy/medlitpub/ukcode/

9.18   The review made a number of recommendations to maintain confidence in the application of the Code and the Classification Framework:

- The ICMB should undertake to publish annual reports and minutes of board meetings on the IMCB website to ensure transparency and confidence of operation.

- The industry should consider periodic, independent evaluation of mobile commercial content rating and of mobile internet content filtering.

- Mobile operators should consider a regular review of the Code to ensure that it is effective in addressing new challenges.

- Mobile operators should make more effort to ensure information supplied by retailers, customer services and websites is accessible and easy to understand.

- The mobile industry should consider forwarding enforcement data to the IMCB for publication on their website.

- A voluntary opt-in system should be established allowing only 'child-friendly' content to be accessed by phones used by younger children.

As mobile content becomes ubiquitous, concerns may be exacerbated

Protecting people from exposure to potentially harmful or offensive content

9.19   Fixed internet content is accessed in the home, public places such as libraries and internet cafes or the workplace. Mobile is by its nature a portable service, often used outside the home. Although this obviously offers benefits to users, it is plausible that this could raise concerns regarding children's access to the internet. As more young people have smartphones or other internet-enabled mobile devices, parents and carers may increasingly have concerns about being unable to supervise children's access to content.

9.20   Audio-visual content available on mobiles derives from two sources. Some content is provided directly by the mobile operator and its third party commercial partners and is therefore under the operator's control due to contractual arrangements with the content creator/supplier. The other source of content is from the broader internet and is, therefore, outside the editorial control of the operator.

9.21   Mobile operators have already established a number of content controls:

- **Age verification**: one example of the age verification process used by mobile operators is a nominal credit card transaction which is subsequently credited to the holder's mobile bill. (Credit cards are ordinarily available only to people aged 18 and over.) Other age verification methods include credit reference searches, and face-to-face in-store checks of documentation.

  If a person attempts to access 18-rated material and has not demonstrated to the mobile operator that they are 18 or over, access will be blocked and they will be prompted to verify their age.

- **Default content controls**: some of the mobile operators have controls for content accessed via their service set to default 'on' at the time of purchase for pay-as-you-go customers, and some have the same policy for contract customers.

  For content from the 'wider' internet, most operators have this default 'on' at the time of purchase for pay-as-you-go, and some operators have content controls set as 'off' for contract customers. However, users can find ways to access this content either by accessing the internet via mobile or by using an alternative browser. Additionally, offensive content can also come from other users rather than commercial operators.

9.22   As mobile follows the same pattern as the fixed internet by moving away from 'walled gardens' to more unrestricted access, it is easy to see how it could become harder for mobile operators to control access to content. Network filters for web content can be effective in blocking young people's access to age-inappropriate material; however, these filters can be bypassed by accessing the internet via other means such as wi-fi.

9.23   There are already a number of alternative browsers (e.g. Opera and Skyfire) available for use on some mobile devices. Use of these browsers can serve to bypass via their service providers' browser. If more users choose to bypass the mobile operator it may become harder to filter the content that they have access to.

Preventing invasion of privacy

9.24   Location-based services offer a number of functions. For example, when combined with social networking, a service can be offered to let friends know when they are near each other. It also offers the potential for location-based marketing.

9.25   However, location-based services also raise privacy concerns. For example, after the launch of Google Latitude there were a number of articles in the British press asking whether such services would entail a surrender of privacy. Even for routine use amongst consenting users, the likelihood is that social expectations and norms about the use of location-based services will take time to evolve – and that in the meantime, there will be a period of experimentation and 'trial and error' amongst users.

9.26   Even more seriously, the development of a number of applications that identify the location of the device could also raise safety and security issues – for all citizens, but particularly for children and vulnerable people. Research for our 2008 media literacy audit identified a number of concerns among mobile users including risk to privacy relating to responses such as intrusion into other people's space. Parents in particular might be concerned that their children's location could be shared with those they communicate with online. The Byron Review identified that one of the greatest risks for children relating to contact on the internet was so-called 'stranger danger' and noted that "*it would be naïve to deny that…these risks may have increased with the advent of mobile platforms".[184]*

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[184] 'Safer Children in a Digital World: the report of the Byron Review', http://www.dcsf.gov.uk/byronreview (Paragraph 3.50)

Anonymity

9.27   There is potentially greater scope for people to access and distribute content anonymously via mobile than there is with the fixed internet (which requires a fixed access service with an identified subscriber – although the user may remain anonymous). In the UK consumers are not generally required to provide identification when purchasing pay-as-you-go SIM cards or mobile dongles. This could make it harder to police the distribution or consumption of illegal content. While remaining anonymous using the fixed internet is relatively easy (in internet cafes, for example), it may become even simpler in a mobile world where devices can easily be obtained and passed between people.

The nature of mobile content poses questions for the future

9.28   The amount of legislation and regulation that impacts on various elements of mobile content is complex and potentially confusing. The existing self-regulatory regime is valuable but may not be sufficient as the sector continues to evolve and grow in significance as a way of accessing the internet. Concerns may emerge over the protection of privacy and, conversely, over security issues caused by people's ability to remain anonymous while accessing or creating mobile content. Questions of protection from unsuitable content may also become more pressing, particularly as mobile content is likely to continue to move out of 'walled gardens' and to be more aligned to the fixed internet.

9.29   The review that we conducted of the code of practice for the self-regulation of new forms of content on mobiles noted that the current arrangements block access to 18-rated material to non-age-verified customers. With increasing numbers of younger children having access to mobiles capable of accessing audio-visual content, mobile operators may need to consider if a binary system at 18 provides sufficient protection from inappropriate content for younger users, or whether a more granular system should be considered.

9.30   The Byron Review[185] also noted that it is a possible that a system based on 18+ and under 18-suitable content may not prove sufficiently granular as mobile internet access becomes more prevelant. It recommended that the UK Council for Child Internet Safety should monitor the changing risks for children from mobile internet access and work with the mobile industry to address these risks, including exploration of the need for more granular levels of filtering. The Byron Review also recommended that the mobile phone industry should consider offering specific products for younger children, such as phones without internet access, but this was not seen as one of the highest priorities.[186]

9.31   Follow the recommendations of the Byron Review, a UK Council for Child Internet Safety (UKCCIS) was launched on 29 September 2008. Since its inception UKCCIS has established four working groups to take forward implementation of the Byron recommendations. These working groups are in the following areas: Industry Standards,

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[185] 'Safer Children in a Digital World: the report of the Byron Review', http://www.dcsf.gov.uk/byronreview
[186] This also needs to be seen in the context of the long-standing industry practice of not marketing mobile services in ways that specifically target children or teenagers, a precautionary approach recommended in the earlier Stewart Report dealing with concerns about possible health effects of the use of mobile services.

Better Education, Public Information and Awareness and Video Games. The overarching aim of these groups is to contribute to the development of the UK's first Child Safety Strategy.[187]

Next steps

9.32 Given the practical obstacles to imposing regulation on the internet, and the complex nature of the market, there are few if any 'silver bullet' interventions that regulators can adopt to respond to these concerns. It is possible that innovative new technologies could offer solutions to potential concerns with mobile content. However, as technology develops and as more people access content via mobile it will be important to have a good understanding of any new or growing areas of concern. We intend to closely monitor developments and to continue to take action where we can to improve the level and quality of information available to policy-makers and consumers.

9.33 A particular focus will be work to improve media literacy, since regardless of the wider regulatory questions, it remains in the interests of citizens and consumers that as many people as possible are in a position to understand and weigh up the risks and benefits of new technology for themselves.

9.34 We are currently conducting quantitative research with parents and children.. The purpose of this study is to give an overview of children and young peoples' reported access to content with a particular focus on experiences of "inappropriate content" via mobile phones, games consoles and portable media players. This research is likely to be published this summer.

9.35 This research will indicate whether there are existing issues with children accessing mobile content.

9.36 We will also continue dialogue with stakeholders, mobile operators and other stakeholders in order to ensure that any future self-, co- or formal regulation is appropriate, proportionate and future proof.

Consultation questions

Q 9.1: Are there any additional issues about mobile content and accessing content via mobile that should be considered?

Q 9.2: We have set out some differences between accessing content via the fixed internet and via mobile. Are there any further differences?

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[187] For further information on UKCCIS see: http://www.dcsf.gov.uk/ukccis

Annex 1

Responding to this consultation

How to respond

A1.1   Ofcom invites written views and comments on the issues raised in this document, to be made by 5pm on 16 September 2009.

A1.2   Ofcom strongly prefers to receive responses using the online web form at http://www.ofcom.org.uk/consult/condocs/msa/howtorespond/form, as this helps us to process the responses quickly and efficiently. We would also be grateful if you could assist us by completing a response cover sheet (see Annex 3), to indicate whether or not there are confidentiality issues. This response coversheet is incorporated into the online web form questionnaire.

A1.3   For larger consultation responses - particularly those with supporting charts, tables or other data - please email mobile@ofcom.org.uk attaching your response in Microsoft Word format, together with a consultation response coversheet.

A1.4   Responses may alternatively be posted or faxed to the address below, marked with the title of the consultation.

Emma Taylor
Floor 4 (Competition Group)

Ofcom

Riverside House
2A Southwark Bridge Road
London SE1 9HA

Fax: 020 7981 3706

A1.5   Note that we do not need a hard copy in addition to an electronic version. Ofcom will acknowledge receipt of responses if they are submitted using the online web form but not otherwise.

A1.6   It would be helpful if your response could include direct answers to the questions asked in this document, which are listed together at Annex 4. It would also help if you can explain why you hold your views and how Ofcom's proposals would impact on you.

Further information

A1.7   If you want to discuss the issues and questions raised in this consultation, or need advice on the appropriate form of response, please feel free to contact:

David Stewart (Project Director) via email at david.stewart@ofcom.org.uk or by phone on 020 7783 4173 or

Katja Benyon (Project Manager) via email at katja.benyon@ofcom.org.uk or by phone on 020 7981 3286.

Confidentiality

A1.8   We believe it is important for everyone interested in an issue to see the views expressed by consultation respondents. We will therefore usually publish all responses on our website, www.ofcom.org.uk, ideally on receipt. If you think your response should be kept confidential, can you please specify what part or whether all of your response should be kept confidential, and specify why. Please also place such parts in a separate annex.

A1.9   If someone asks us to keep part or all of a response confidential, we will treat this request seriously and will try to respect this. But sometimes we will need to publish all responses, including those that are marked as confidential, in order to meet legal obligations.

A1.10   Please also note that copyright and all other intellectual property in responses will be assumed to be licensed to Ofcom to use. Ofcom's approach on intellectual property rights is explained further on its website at http://www.ofcom.org.uk/about/accoun/disclaimer/

Next steps

A1.11   Following the end of the consultation period, Ofcom intends to a further consultation in the first half of 2009.

A1.12   Please note that you can register to receive free mail Updates alerting you to the publications of relevant Ofcom documents. For more details please see: http://www.ofcom.org.uk/static/subscribe/select_list.htm

Ofcom's consultation processes

A1.13   Ofcom seeks to ensure that responding to a consultation is easy as possible. For more information please see our consultation principles in Annex 2.

A1.14   If you have any comments or suggestions on how Ofcom conducts its consultations, please call our consultation helpdesk on 020 7981 3003 or email us at consult@ofcom.org.uk . We would particularly welcome thoughts on how Ofcom could more effectively seek the views of those groups or individuals, such as small businesses or particular types of residential consumers, who are less likely to give their opinions through a formal consultation.

A1.15   If you would like to discuss these issues or Ofcom's consultation processes more generally you can alternatively contact Vicki Nash, Director Scotland, who is Ofcom's consultation champion:

Vicki Nash
Ofcom
Sutherland House
149 St. Vincent Street

Glasgow G2 5NW

Tel: 0141 229 7401
Fax: 0141 229 7433

Email vicki.nash@ofcom.org.uk

Annex 2

Ofcom's consultation principles

A2.1   Ofcom has published the following seven principles that it will follow for each public written consultation:

Before the consultation

A2.2   Where possible, we will hold informal talks with people and organisations before announcing a big consultation to find out whether we are thinking in the right direction. If we do not have enough time to do this, we will hold an open meeting to explain our proposals shortly after announcing the consultation.

During the consultation

A2.3   We will be clear about who we are consulting, why, on what questions and for how long.

A2.4   We will make the consultation document as short and simple as possible with a summary of no more than two pages. We will try to make it as easy as possible to give us a written response. If the consultation is complicated, we may provide a shortened Plain English Guide for smaller organisations or individuals who would otherwise not be able to spare the time to share their views.

A2.5   We will consult for up to ten weeks depending on the potential impact of our proposals.

A2.6   A person within Ofcom will be in charge of making sure we follow our own guidelines and reach out to the largest number of people and organisations interested in the outcome of our decisions. Ofcom's 'Consultation Champion' will also be the main person to contact with views on the way we run our consultations.

A2.7   If we are not able to follow one of these principles, we will explain why.

After the consultation

A2.8   We think it is important for everyone interested in an issue to see the views of others during a consultation. We would usually publish all the responses we have received on our website. In our statement, we will give reasons for our decisions and will give an account of how the views of those concerned helped shape those decisions.

Annex 3

Consultation response cover sheet

A3.1   In the interests of transparency and good regulatory practice, we will publish all consultation responses in full on our website, www.ofcom.org.uk.

A3.2   We have produced a coversheet for responses (see below) and would be very grateful if you could send one with your response (this is incorporated into the online web form if you respond in this way). This will speed up our processing of responses, and help to maintain confidentiality where appropriate.

A3.3   The quality of consultation can be enhanced by publishing responses before the consultation period closes. In particular, this can help those individuals and organisations with limited resources or familiarity with the issues to respond in a more informed way. Therefore Ofcom would encourage respondents to complete their coversheet in a way that allows Ofcom to publish their responses upon receipt, rather than waiting until the consultation period has ended.

A3.4   We strongly prefer to receive responses via the online web form which incorporates the coversheet. If you are responding via email, post or fax you can download an electronic copy of this coversheet in Word or RTF format from the 'Consultations' section of our website at www.ofcom.org.uk/consult/.

A3.5   Please put any parts of your response you consider should be kept confidential in a separate annex to your response and include your reasons why this part of your response should not be published. This can include information such as your personal background and experience. If you want your name, address, other contact details, or job title to remain confidential, please provide them in your cover sheet only, so that we don't have to edit your response.

Cover sheet for response to an Ofcom consultation

BASIC DETAILS

Consultation title:

To (Ofcom contact):

Name of respondent:

Representing (self or organisation/s):

Address (if not received by email):

CONFIDENTIALITY

What do you want Ofcom to keep confidential?

Nothing	☐	Name/contact details/job title	☐
Whole response	☐	Organisation	☐
Part of the response	☐	If there is no separate annex, which parts?	

DECLARATION

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Name   Signed (if hard copy)

Annex 4

Consultation questions

Section 1 - Executive summary

Section 2 – Introduction

2.1 Do you agree with our principles for mobile regulation?

Section 3 – The changing market environment

Q 3.1: Are there any additional sector trends that we should consider in our analysis?

Q 3.2: Have we identified the right regulatory challenges?

Section 4 – Competition and new entry

Q 4.1: We have outlined a number of factors which may affect the future market structure, including network sharing, spectrum and potential consolidation. Do you agree with this assessment, including risks and benefits that we have outlined?

Q 4.2: Do you see any risks to competition that we have not highlighted?

Q 4.3: Do you agree that a market review in the mobile sector (other than in the call termination market) is not currently required?

Q 4.4: We have concluded that competition in the mobile sector is currently addressing access concerns adequately. Do you agree?

Section 5 – Investment

Q 5.1: Do you agree with our assessment of investment in the UK mobile market and our priorities to secure future efficient investment?

Section 6 – Consumer protection and empowerment

Q 6.1: Ofcom considers that regulatory intervention to protect and empower consumers continues to be needed in the mobile sector and that competition alone is not necessarily sufficient to secure this. Do you agree?

Q 6.2: We believe that the approach we take to consumer protection and empowerment in the mobile sector strikes the right balance between taking timely action when necessary, and the need to apply regulation only when effective and proportionate. Do you agree?

Q 6.3: Are there any areas relating to mobile services that Ofcom is not currently addressing but which it needs to address in order to achieve its consumer policy objectives? Are there other areas where regulation could be scaled back?

Section 7 – Access and inclusion for disabled and vulnerable citizens

Section 8 – Coverage

> *Q 8.1: Do you agree that our proposed facilitation role around mobile not-spot issues is a realistic and sensible thing to do?*

> *Q 8.2: Do you agree with our general approach set out in the table above? Are there are any other actions we should take and why?*

Section 9 – Mobile content

> *Q 9.1: Are there any additional issues about mobile content and accessing content via mobile that should be considered?*

> *Q 9.2: We have set out some differences between accessing content via the fixed internet and via mobile. Are there any further differences?*

Annex 5

Spectrum for mobile broadband

Summary

A5.1   As we highlighted in our MSA 1 consultation, the detailed discussion of spectrum policy is outside the scope of this Assessment. However, given the central importance of spectrum for the mobile sector, and the current work being carried out by the Government, we provide a brief introduction of the role of spectrum in the development of the mobile sector and the relevant spectrum bands.

Spectrum is a critical and scarce resource for mobile operators

A5.2   Spectrum is one of the key input resources for mobile network operators - without spectrum a mobile network operator cannot send and receive signals to and from its customers, and therefore cannot operate a network. Spectrum policy can influence some of the crucial determinants of the structure of the market for a number of reasons:

- lack of access to spectrum can constitute an absolute barrier to entry into the market as a network operator: without access to spectrum it is not possible for a mobile operator to operate a mobile network;

- not all spectrum is interchangeable and operators' specific spectrum holdings can directly impact network economics and therefore influence the evolution of competition at the network operator level;[188]

- the bands of spectrum which are available for mobile services may strongly influence the services which can be made available to consumers at a reasonable cost; and

- the availability of spectrum at sufficiently low frequencies is likely to influence the extent of mobile coverage, particularly in rural areas.

A5.3   Limits on the type and amount of spectrum available to support mobile networks affect both upgrades to current 2G and 3G networks and the number of 4G (LTE or WiMAX) networks or network operators that are able to emerge in the UK.

A5.4   Spectrum for mobile services remains scarce for a number of reasons:

- there are physical limits on the amount of spectrum which is particularly suitable for mobile services;

- within these limits only a proportion of the spectrum is available for mobile services because the same spectrum is also used to support a range of other services, terrestrial television broadcasting for example;

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[188] For a description of the mobile value chain please refer to section 4 in the main body of this consultation.

- increased demand for mobile services, in particular increased data volumes generated by mobile broadband, increases the demand for spectrum by mobile operators; and

- in some cases, the use of spectrum is restricted at an international level, e.g. part of the spectrum currently used for 2G is set aside exclusively for these services across Europe. However, the international co-ordination of spectrum use (also called 'spectrum harmonisation') can also have a positive effect on spectrum supply, e.g. by helping to create consistency in spectrum availability across Europe and therefore facilitating the development of equipment and devices at sufficient scale - particularly when this facilitates some uses while not actively excluding others. The economics of mobile service provision rely on international economies of scale in the production of network and user equipment; spectrum is therefore only of real value for mobile services if the same frequencies are available in a number of large markets internationally.

A5.5   Throughout our existence, we have recognised the importance of spectrum policy for achieving our duties to further the interests of citizens and consumers.

A5.6   As part of its Digital Britain project, the Government is currently considering various issues relating to the spectrum suitable for mobile services. It has appointed an Independent Spectrum Broker, whose report was published on 13 May 2009. The Government's response is contained in the Digital Britain Final Report which was published on 16 June 2009.[189]

A5.7   In addition to our own work to ensure spectrum is used efficiently for the benefit of UK consumers and citizens, we will assist the Government in its efforts to make spectrum available for mobile broadband services through the Digital Britain process.

Frequency bands suitable for mobile services

A5.8   The release of spectrum suitable for next generation mobile technologies and the liberalisation of the existing 2G spectrum will play an important role in supporting the growth of mobile broadband and improving the coverage of mobile broadband networks. The main frequency bands currently suitable for mobile services are:

- the spectrum at 900 and 1800MHz which is currently used for 2G services;

- the spectrum at 2.1GHz currently used for 3G services;

- the 2.6 GHz band which is harmonised across Europe for the provision of mobile services and is cleared and available for new use in the UK today; and

- the 800MHz band, which forms part of the Digital Dividend, the spectrum which will become available as a result of the switchover from analogue to digital television (DSO).

[189] Digital Britain, Final Report, June 2009 (http://www.culture.gov.uk/what_we_do/broadcasting/6216.aspx), Report from the Independent Spectrum Broker: findings and policy proposals, 12 May 20009 (http://www.culture.gov.uk/reference_library/publications/6147.aspx).

A5.9   As shown in Figure 42 the planned release of spectrum will significantly augment the amount of spectrum available for mobile services.[190]

Figure 42: Spectrum particularly suitable for future mobile services
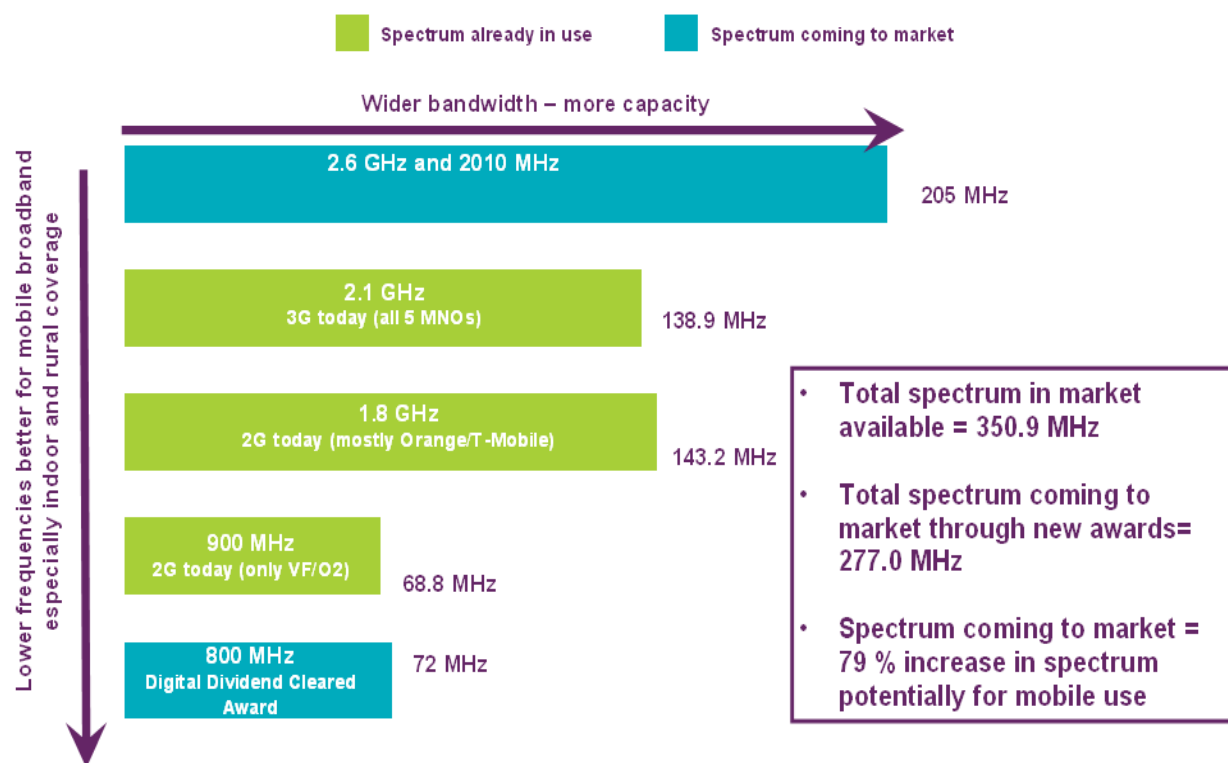
Source: Ofcom

A5.10   Over time a number of factors may influence the appetite of existing mobile operators and new entrants to acquire spectrum and invest in networks:

- the take-up of mobile broadband services, and users' sensitivity to service quality and availability;

- the degree of competition; and

- the availability of funding for spectrum acquisition and network investment.

Benefits for mobile coverage of liberalising and releasing spectrum

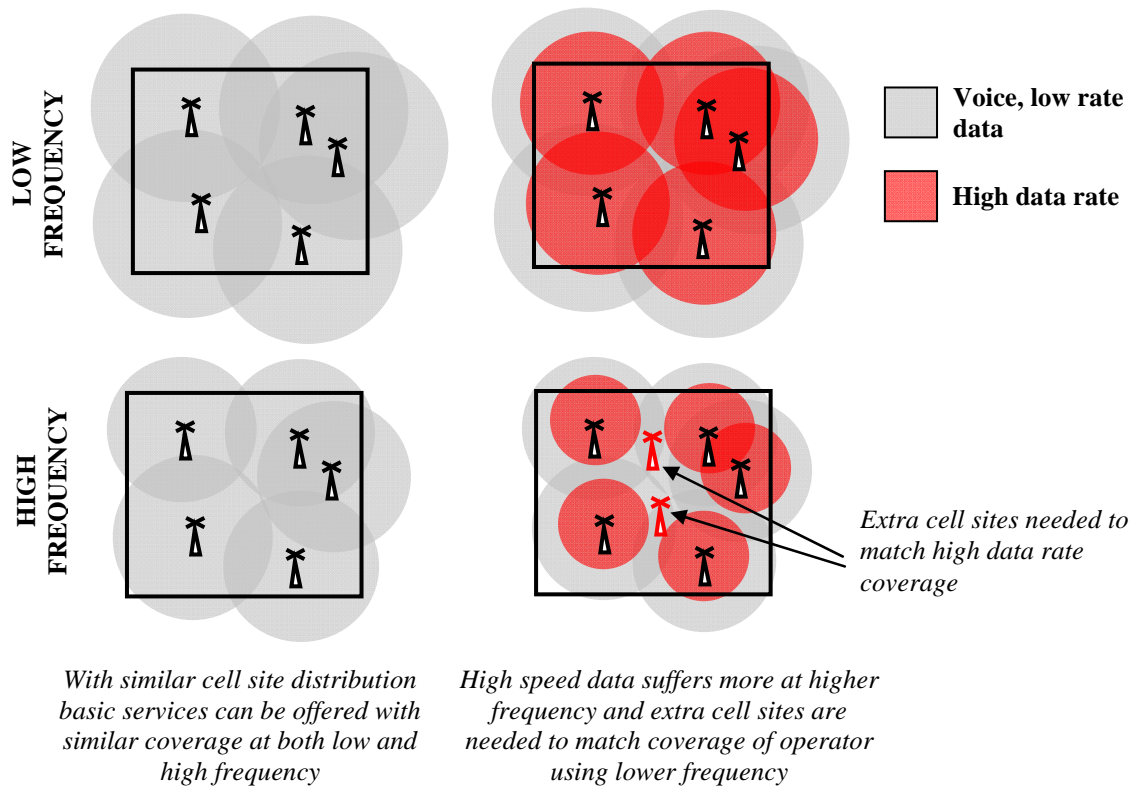A5.11   Spectrum is not perfectly interchangeable for all purposes: different frequency bands have different characteristics with regards to the cost at which widespread availability and good indoor coverage can be provided. In broad terms, spectrum in lower frequencies allows broader coverage and better indoor coverage for a given cost.

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[190] This assumes we implement our proposals to clear the 800 MHz band (see below).

A5.12　This relationship is illustrated in the diagram below. It means that lower frequencies, such as spectrum below 1 GHz, are particularly attractive for further mobile broadband roll-out, compared to higher frequencies such as either the 2.1 GHz band in which today's 3G networks operate or the 2.6 GHz band which we are planning to release.

Figure 43: Relationship between spectrum capacity and coverage

With similar cell site distribution basic services can be offered with similar coverage at both low and high frequency

High speed data suffers more at higher frequency and extra cell sites are needed to match coverage of operator using lower frequency

Source: Ofcom

A5.13　Hence releasing further spectrum at low frequencies (such as the 800 MHz band) and liberalising the use of existing spectrum (such as the 900 MHz band) will allow mobile operators to expand the coverage of mobile broadband services, e.g. in rural areas, at lower cost. It could also help to improve the quality of existing services, in particular within buildings, while allowing operators to deliver the base layer of coverage for the next generation of higher speed mobile broadband services more cheaply.

A5.14　Below we summarise the characteristics of the frequency bands that are currently part of our spectrum release and mobile liberalisation programmes.

Characteristics of the frequencies in question

Liberalising the current 2G licences

A5.15　Spectrum in the 900 MHz and 1800 MHz spectrum bands is currently harmonised across the European Union for 2G mobile services.

A5.16   'Liberalising' the current 2G licences (900 MHz and 1800 MHz spectrum) means allowing technologies other than 2G technologies to be rolled out in these bands.[191]

A5.17   These licence changes could help facilitate rollout of 3G or other technologies, at a reduced cost for operators compared to current deployments of 3G at 2.1 GHz. As discussed above this is because lower frequencies have superior propagation characteristics over higher frequencies, meaning signals travel further. As a result, allowing the use of mobile broadband technologies at 900 MHz may improve rural 3G coverage and may provide better indoor coverage in both rural and urban areas.

A5.18   For historical reasons spectrum in the 900 MHz frequency band is currently held by two operators only: O2 and Vodafone. All four 2G operators (O2, Orange, T-Mobile and Vodafone) hold spectrum in the 1800 MHz bands.

A5.19   The exact timing of the liberalisation of these bands will depend on the results of the current work on spectrum issues by the Government, and also developments in Europe which are expected to result in a requirement for Member States to liberalise these licences in due course.

A5.20   Equipment to allow 3G at 900 MHz is already available, including a range of handsets and a number of mobile broadband dongles. Equipment to allow 3G at 1800MHz has had less momentum though vendors have indicated that equipment would be available if an operator was interested.

A5.21   Operators in countries such as Australia and Finland have already rolled out 3G in the 900 MHz band in order to extend 3G coverage into rural areas.

Auction of 2.6 GHz band

A5.22   The 2.6 GHz band can also be used to provide mobile broadband services using new mobile technologies such as WiMAX or LTE. The spectrum is already cleared and available for new uses in the UK.

A5.23   In April 2008 Ofcom published a decision to award the 190 MHz of spectrum available in the 2.6 GHz band as soon as possible. That award has been delayed due to a legal challenge brought by two of the mobile operators. On 23 June 2009, following the publication of the Digital Britain report which set out the possibility that the Government may direct Ofcom as to how the 2.6GHz band should be released, Ofcom announced that it had decided to withdraw its decision of April 2008.

A5.24   Other European countries are also awarding this band. Sweden and Norway have held auctions for this band, with a number of other European countries expected to follow during this year.

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[191] See our consultation *Application of spectrum liberalisation and trading to the mobile sector – A further consultation*. See in particular Annex 6, Annex 11 and Annex 12. http://www.ofcom.org.uk/consult/condocs/spectrumlib/.

Digital Dividend

A5.25   Spectrum in the 800 MHz band (790-862 MHz) is particularly suitable for the next
         generation of mobile broadband services (e.g. delivered through 4G technologies –
         LTE or WiMAX). Finland, Sweden, France, Switzerland, Germany, Spain and Denmark
         have all decided to release the 800 MHz band as their digital dividend following digital
         switchover, and other European countries are likely to follow suit. This band will
         become available as part of the UK's dividend following our decision to clear this band,
         published in a statement on 30 June 2009.

Annex 6

Wholesale mobile voice call termination

A6.1   In order for customers of different networks to be able to call each other, telecommunications networks, including mobile networks, need to be connected to one another. One long-standing role of telecommunications regulators across the world has been to help ensure adequate interconnection of telecommunications networks. Without regulation, larger networks might seek to refuse interconnection to smaller networks and thereby undermine competition since smaller networks could not offer an attractive service to new customers. This reflects the feature of communications networks that the more people you can reach and be reached by on a network, the more valuable its service is likely to be to you.

A6.2   In practice, network operators conclude interconnection agreements, setting out the terms and conditions on which they will interconnect – with us resolving disputes concerning those agreements if either party asks it to do so.

A6.3   One of the services that is provided between network operators is call termination – that is, the completion of a voice call to a customer of another network. Mobile voice call termination is the service necessary for a network operator to connect a caller with the intended mobile recipient of a call on a different network. Under current interconnection practices, the network of the customer making the call pays an amount (known as the wholesale mobile call termination charge) to the network of the customer being called (Figure 44).[192]

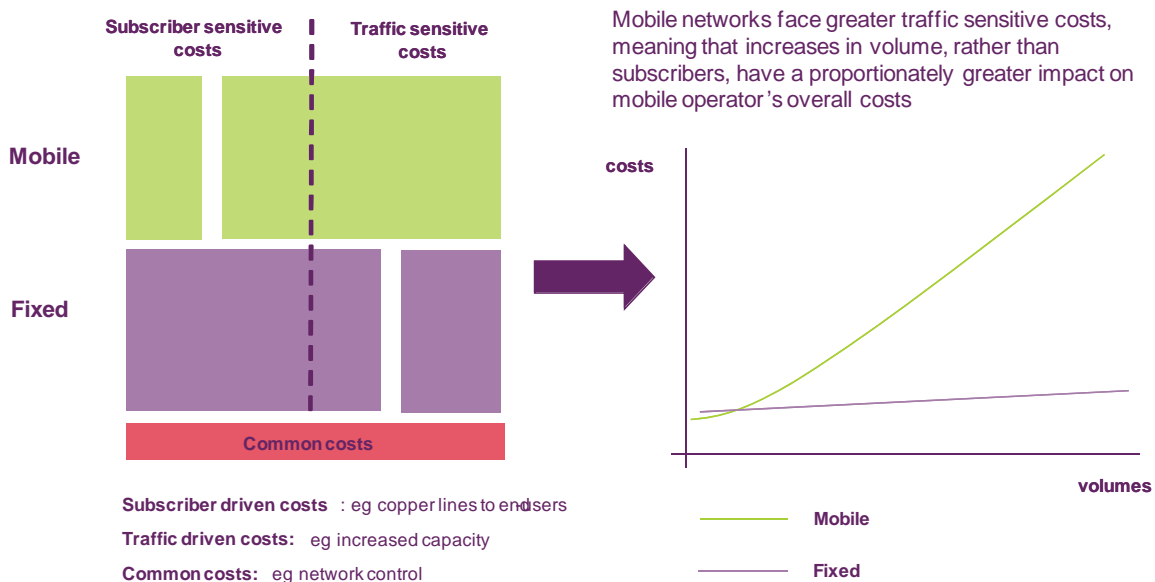**Figure 44: Mobile termination and calling party pays**
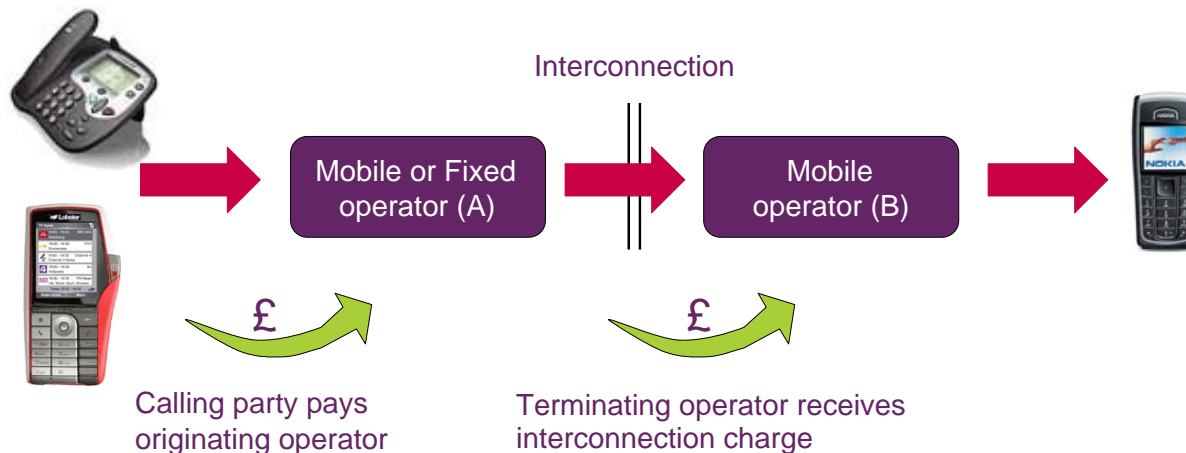
Source: Ofcom

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[192] This charge is referred to as a wholesale charge because it is charged and paid between network operators, rather than by retail customers.

A6.4   When considering the competitive characteristics of call termination, most regulators across the world have concluded that, without regulation, each operator is able to set a charge for connecting calls to its own customers without any competitive constraint. That is, in terms of the European Union (EU) Framework, the operator in question has significant market power (SMP) with respect to termination.

A6.5   Given this, operators will rationally set the charge as high as possible. Therefore, many regulators including us have regulated termination charges (or 'termination rates'), typically basing them on cost-oriented rates. The regulatory process for setting these rates is called a market review.

A6.6   Although termination rates are regulated, they are a very significant part of a mobile network operator's revenue. We estimate that 14 per cent of total revenue is generated from mobile to mobile, or fixed to mobile call termination. Another way to think of this is that 14 pence in every pound spent on phone calls, goes to other networks to pay for terminating the call.

Differences between fixed and mobile

A6.7   Regulated termination rates are set independent of *who* is buying termination (that is, on which network the incoming call originates). Both wholesale fixed voice call termination (FCT) and mobile voice call termination (MCT) have been regulated for some time.

A6.8   However, mobile and fixed sectors have very different market structures, reflecting different market developments over time. There are significant differences in cost drivers, for example traffic sensitive costs are significantly higher on mobile networks, while subscriber driven costs are more important on fixed networks. This is illustrated in the figure below:

Figure 45: Illustration of traffic sensitive and subscriber sensitive costs on fixed and mobile networks

Subscriber sensitive costs | Traffic sensitive costs

Mobile

Fixed

Common costs

Mobile networks face greater traffic sensitive costs, meaning that increases in volume, rather than subscribers, have a proportionately greater impact on mobile operator's overall costs

costs

volumes

Mobile

Fixed

Subscriber driven costs : eg copper lines to end users
Traffic driven costs: eg increased capacity
Common costs: eg network control

Source: Ofcom

A6.9   In the fixed sector, the legacy of monopoly means that a single fixed incumbent network operator, BT, competes with many smaller fixed operators. In the mobile sector, spectrum policy has determined the number of competitors, with allocations of first two, then four and finally nine spectrum licences suitable to operate a national mobile network, currently held by five different licensees. This picture may continue to change further with the release of more spectrum over the next few years.

Figure 46: Overview of the differences between core and access network ownership between fixed and mobile networks
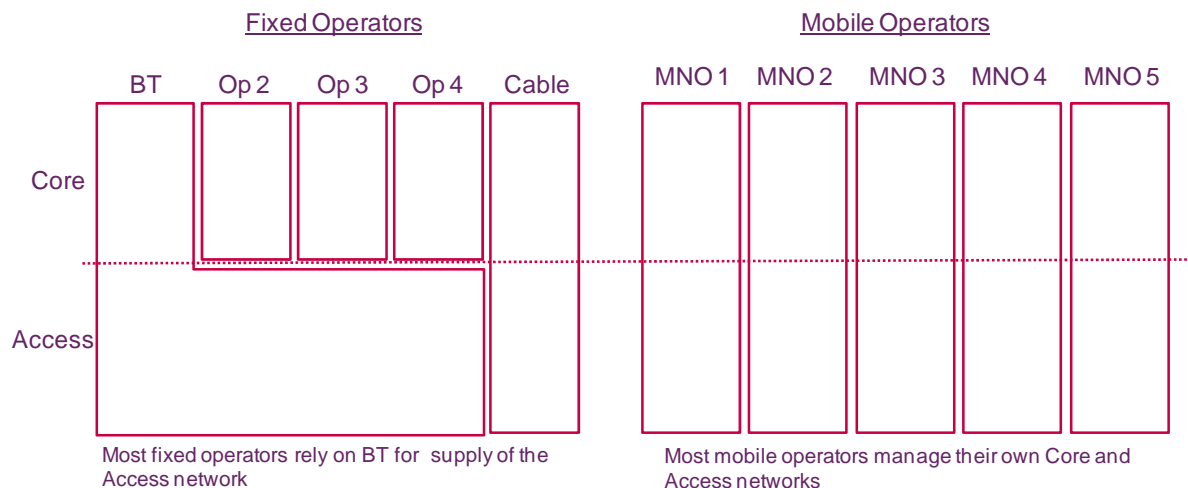
Source: Ofcom

Fixed call termination

A6.10   BT's fixed termination charges are regulated directly as part of the Network Charge Control (NCC), which sets charges on BT for wholesale conveyance and interconnection services, including termination. Broadly speaking, BT's wholesale FCT charges are set on the basis of its underlying costs, using LRIC+ (Long-Run Incremental Cost plus) methodology, which is a widely accepted economic cost methodology.[193]

A6.11   Other operators' fixed termination charges are subject to the condition that they are required to provide network access and do so on fair and reasonable terms. Although in principle operators can agree FCT charges through commercial negotiation, in practice, charges are subject to industry wide reciprocity agreements. If we were required to determine a dispute regarding FCT charges, while treating each case on its

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[193] Long Run Incremental Cost LRIC is a method of understanding the incremental cost to an operator for providing a service, compared with not providing that service. LRIC+ includes an allocation for the fixed costs and common costs for the service, so that the cost of a minute of traffic on a particular network segment is the same for all services carried across that segment. Pre-2005 fixed and mobile termination rate mark-ups were equi-proportionate (EPMU). Equi-proportionate means that all mark-ups move up or down in an equal fashion. For example, it is equi-proportional if when the average income of all workers goes up 10 per cent, so does the income of the 'poor'. Since 2005, mark-ups have typically been more on the basis of fully allocated cost (FAC) because of data limitations though we would not expect resulting rates to differ significantly.

own facts, it is likely that we would have regard to BT's regulated charges in determining what constituted "fair and reasonable terms".[194]

A6.12   Wholesale FCT charges are currently no more than 0.25 pence per minute.[195] This rate is regulated until September 2009. A new network charge control is expected to be set later this year as part of the fixed narrowband market review.[196]

Mobile call termination

A6.13   Our most recent market review, culminating in a Mobile Call Termination market review statement (the 2007 MCT Statement),[197] published on the 27 March 2007, found all five UK mobile network operators to possess SMP and capped call termination charges for each operator.

A6.14   Mobile call termination has been calculated using the same well established LRIC+ economic cost standard, but has reflected the significant differences in how costs arise in a mobile network compared to a fixed network (see Figure 45 above).[198]

A6.15   In addition, the charges reflect differences in the underlying costs for different types of network operators as a result of differences in their spectrum licences. As a result, the same charge level was set for the four 2G/3G network operators, based on the costs of a hypothetical average efficient operator, with a higher rate for H3G, recognising the higher costs it faces as a newer, 3G-only entrant.

A6.16   Over the past decade, regulators and companies with an interest in mobile termination rates (i.e. fixed and mobile operators) have argued with sector regulators and in court over the setting of mobile termination rates, largely responding to the significant net commercial impact of these wholesale payments.

A6.17   These differences in structure and relative significance of termination rates have led to retail prices for mobile calls being mostly charged on a per minute basis, while fixed calls are currently commonly set on a per month basis, or 'flat rate'. Most time-plans mobile operators retail do not distinguish between off-net and on-net calls, and but instead contain bundles of minutes that can be used to terminate calls on any network, fixed or mobile.

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[194] This position was made public in the November 2003 fixed narrowband market review statement http://www.ofcom.org.uk/consult/condocs/narrowband_mkt_rvw/fixednarrowbandrsm.pdf.

[195] BT's actual FCT charges vary by time of day. The average charges are currently between 0.17 pence per minute and 0.25 pence per minute depending on the point of interconnection and the extent of conveyance (e.g. single/double tandem).

[196] See the *Review of the Fixed Narrowband Services Wholesale Markets* at http://www.ofcom.org.uk/consult/condocs/review_wholesale/ and the Review of BT Network Charge Control at http://www.ofcom.org.uk/consult/condocs/review_bt_ncc.

[197] See *Mobile Call Termination*, http://www.ofcom.org.uk/consult/condocs/mobile_call_term/statement/

[198] In particular, a much greater proportion of costs in a mobile network (e.g. the radio access network) are sensitive to the volume of traffic rather than the number of subscribers. Under the current LRIC+ costing methodology, this leads to a greater proportion of cost being recovered from traffic services including voice termination. In a fixed network, by contrast, the local loop access costs, which are significant, vary with the number of subscribers rather than traffic.

A6.18   However, driven by competition, technology and familiarity with mobile, we are starting to see a blurring of the boundaries between fixed and mobile, with mobile phones being used in the home and fixed lines providing mobile connectivity, for example with BT's Fusion service.

A6.19   Although the boundaries between fixed and mobile are blurring and we are seeing new propositions emerge which take advantage of these opportunities, growth in the number of providers of mobile and fixed services alone is unlikely to increase competition in termination of mobile voice calls. This is because each terminating operator has total control over calls terminating to its customers on its network.

A6.20   As such, in the past we have defined call termination markets separately for each operator, with each operator having a 100 per cent market share of calls terminating on its network. Each operator therefore has the potential to hold SMP, within each call termination market, subject to any purchasers having countervailing buyer power (CBP) in that market.

A6.21   If this situation were to change, it may have an impact on future findings of SMP for mobile operators.

Competition regulation: dealing with market power and market failure

A6.22   Under the Communications Act, we have the power to impose conditions on communications providers with SMP in particular markets.[199] This power is executed using a process called a market review. National regulatory authorities ('NRAs'), such as Ofcom, are required to carry out reviews of competition in communications markets to ensure that regulation remains appropriate and proportionate in the light of changing market conditions.[200]

A6.23   Each market review has three stages as laid out in sections 79 to 91 of the Act:

- definition of the relevant market or markets;[201]

- assessment of competition in each market, in particular whether any undertakings have SMP in a given market;[202] and

- assessment of appropriate regulatory obligations where there has been a finding of SMP.

Characteristics of wholesale mobile voice call termination markets today

A6.24   In the past we have held that termination of voice calls on each mobile network constitutes a separate market in which the terminating mobile network operator has a 100 per cent market share. Furthermore we held that wholesale purchasers of

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[199] Section 45 of the Communications Act sets out Ofcom's powers to impose general conditions and significant market power conditions.
[200] Sec 80 et seq of the Communications Act (2003)
[201] Section 79 of the Communication Act (2003)
[202] Section 80 of the Communications Act (2003)

termination have little or no countervailing buyer power. Consequently, terminating operators appear to have little or no incentives to keep charges low.

A6.25   Barriers to entry are currently very high (and perhaps absolute) as no alternative provider may currently terminate calls on a particular number without the agreement of the mobile operator which provides service to the called party. A growth in the number of providers of mobile services, perhaps arising from liberalisation of spectrum usage continues to look unlikely to have any impact on competition to terminate voice calls, as each provider is likely to have a 100 per cent share of call termination to its customers.

Previous market reviews and appeals

A6.26   Mobile call termination charges have been subject to some form of regulation for nearly two decades. The figure below highlights some key points in the regulatory timeline of MCT services. Regulation of MCT has also been subject to several appeals and disputes. The most recent appeals process before the Competition Appeals Tribunal (CAT), regarding our 2007 MCT market review, recently concluded.[203] Figure 48 shows the reduction of MCT charges paid by BT for each of the five mobile network operators (MNOs) over a similar period.
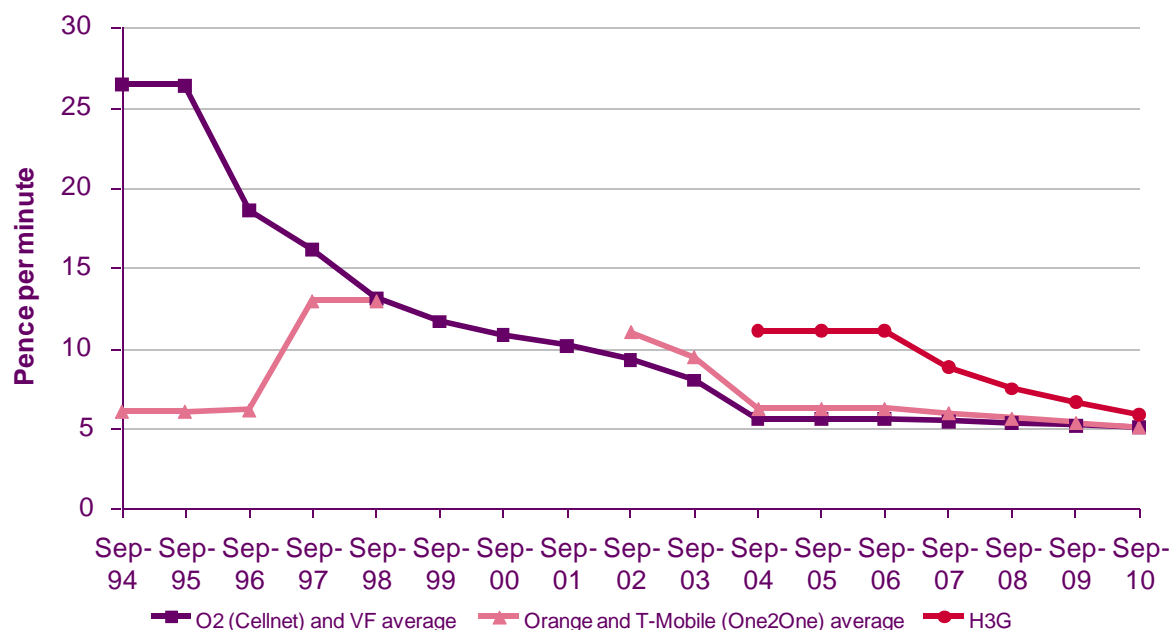
Figure 47: Time line of regulation 1985 - 2005
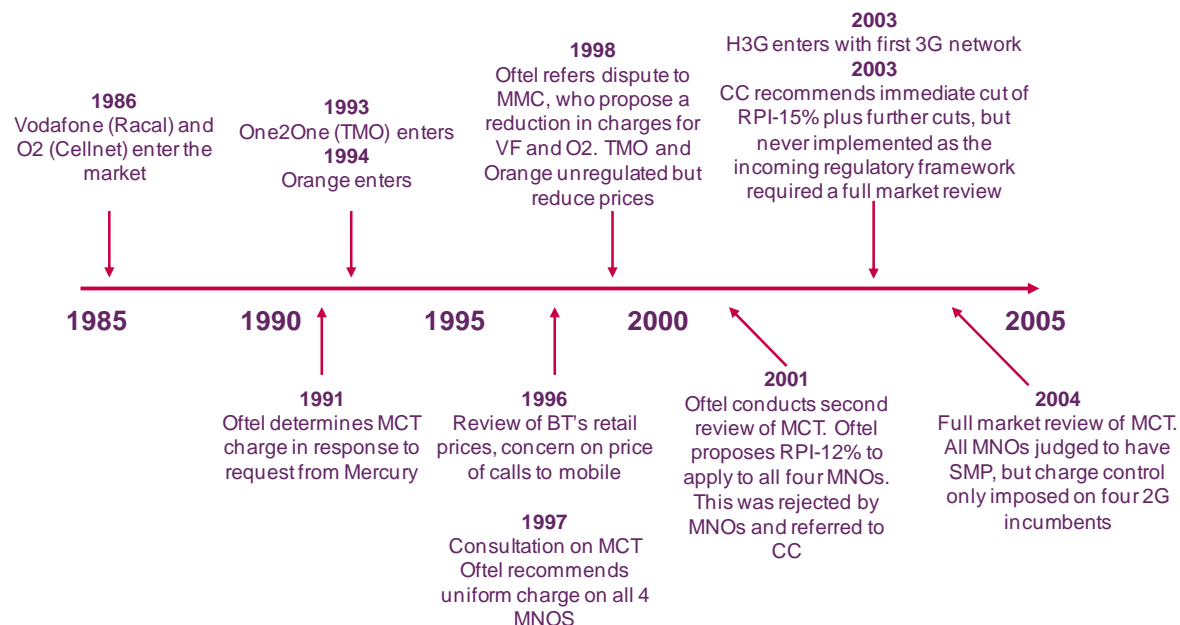
Source: Ofcom

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[203] H3G's appeal against Ofcom's SMP finding and Ofcom's decision to apply a price control is pending before the Court of Appeal.

Figure 48: Changes in the termination charges payable by BT

Source: Ofcom

Our stakeholders perspectives on termination rates

A6.27 In the MSA 1 consultation we asked stakeholders their views on whether the current market review process and the structure of mobile termination regulation could be improved in any way.

A6.28 In addition, the European Commission conducted a public consultation on its draft Recommendation and accompanying Explanatory Note on the regulatory treatment of fixed and mobile termination charges in the EU between 26 June and 10 September 2008.[204]

A6.29 The responses of the 2G/3G mobile network operators (i.e. not H3G) to these consultations, although varying in many aspects have the following in common, in particular they:

- argue for symmetric mobile call termination charges in the same national market, although they do not believe this should lead to a 'one size fits all' approach across the EU;

- argue that MTC charges and fixed call termination charges should be separate, as there are *legitimate* cost differences between the two sectors. However this argument relies on the assumption that it is appropriate to recover the costs of the access network from termination in the case of mobile. In particular the mobile operators argued that unlike a fixed network, where the cost of the access network is subscriber driven (i.e. each subscriber needs a line and a line card regardless of

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http://ec.europa.eu/information_society/policy/ecomm/library/public_consult/termination_rates/index_en.htm

167

usage levels), a mobile network's costs are driven by usage, as both spectrum and equipment is shared between subscribers and the amount required is driven by usage; and

- argue that MTC charges should include some provision for the recovery of fixed and common costs. Not doing so would lead to fixed or common costs being recovered in other less efficient ways, potentially to the detriment of consumers. It also ignores the fact that the recipient of the call benefits from being called; a termination regime which fails to recover costs from caller to the network (as well as a network's own subscribers) would lead to a situation where costs would have to be wholly recovered from the mobile network's own subscribers. This, they argue, would be economically inefficient.

A6.30 BT and H3G (the only 3G only operator) responded with very different perspectives on termination regulation:

- H3G proposed that symmetric zero termination rates ('Bill and Keep') is the best option for the future termination regime. Until this is introduced they argued that small or late entrants should be allowed a higher termination rate. This is because H3G believes that incumbent networks have a incentive to engineer an on-net/off-net retail price differential in order to deter calls to competing networks. Smaller networks need to respond by setting their off-net prices at the same level as the larger networks on-net price. However this can be unprofitable if the on-net prices are below the level of the regulated MCT charges. They claim this is therefore, in effect, a margin squeeze by incumbents on late entrants.

- furthermore, H3G argued that because smaller operators are 'forced' to offer low off-net call prices this leads to a large amount of off-net traffic and thus to a net outflow of traffic from the smaller network. If MCT charges are symmetric, this disadvantages the smaller operator. Therefore, a move to Bill and Keep would prevent this transfer. In the meantime smaller operators should receive higher MCT charges to counter the impact of the outflows.

- BT argued that current MCT charges have been set at a level that far exceeds the incremental costs of terminating calls, and that fixed customers are, in effect, subsidising mobile customers. Furthermore BT argues that recent technological improvements in so-called 'home zone' products allow mobile operators to terminate calls at cheaper fixed rates, within the customer's home zone, which leads to arbitrage opportunities.

The MSA 1 consultation and wholesale voice call termination

A6.31 In the MSA 1 consultation, we stressed the importance of thinking widely about the regulatory options, including not regulating termination charges or adopting a simpler approach.

A6.32 Our current view is that there is no single regulatory option for termination regulation that is unambiguously better than the alternatives. Different approaches will impact different consumer types to differing degrees, particularly if there were to be a sudden shift in approach and considerable uncertainty about how future services might develop remains.

Possible regulatory remedies

A6.33   Determining what approach should be adopted for the period after March 2011 will involve weighing the relative merits of various different approaches.

A6.34   With the possible exception of deregulation, all of the options identified would lead to a reduction in mobile termination rates. This raises a further question about whether we should adopt a policy of reducing termination rates as far and as fast as we reasonably can, within the boundaries of sound economic policy, and the legal framework, whilst recognising underlying cost differences. One objective of such a policy would be to allow greater flexibility at the retail level, facilitating innovation, though doing so may have other consequences that would need careful consideration.

A6.35   We have not yet reached any view about whether we should adopt such a strategy, but have identified six possible options for the future regulation of MCT.

Possible regulatory approaches for MCT

- *Deregulation* – removal of all termination regulation from mobile operators;

- *Long Run Incremental Cost + (LRIC+)* – charge control set broadly on the basis of the same cost standard as it is today;

- *Long Run Marginal Cost (LRMC)* – revised charge control methodology with no allowance for recovery of common costs;

- *Capacity Based Charges (CBC)* – a different approach to setting the structure of termination charges based on the capacity required for termination;

- *Mandated Reciprocity* – set mobile changes to match the rates set for fixed operators; and

- *Mandated 'Bill and Keep' (B&K)* – termination charges effectively set at zero.

The most important issue is how each approach affects consumers

A6.36   We consider that all each of the options identified above, with the possible exception of the deregulatory option (the outcome of which is uncertain) is likely to reduce the current pence per minute charge for MCT.[205] Such a reduction will have different effects on consumers, competition and commercial practice on the industry.

A6.37   In summary we consider that:

- lower mobile termination charges are likely to benefit consumers overall (both fixed and mobile) because operators will have greater retail pricing flexibility. We would expect operators to be able to offer consumers a wider variety of retail packages and tariff structures;

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[205] Relative to current rates calculated using a LRIC+ methodology.

- while some low-usage customers may be worse off (if termination charges are reduced) there may be more appropriate policy mechanisms to ensure that these or other vulnerable consumer groups are adequately protected;

- lower termination charges might ameliorate possible competition concerns over on/off-net price differentials;

- lower mobile termination charges are likely to lessen possible concerns over discrepancies between fixed and mobile termination charges; and

- the commercial impact of lower termination on UK operators, particularly regarding the potential for discrepancy of effect between fixed and mobile operators, needs careful consideration.

Annex 7

Mobile device evolution

A7.1   In this annex, we compare the technical capabilities of a small number of mobile handsets.

A7.2   In Figure 8 we list the characteristics of five recent mobile devices selected as a sample of the most innovative handsets marketed in March 2009. They are the Nokia N95, Apple iPhone, BlackBerry Bold 9000, LG KC910 Renoir, T-Mobile G1 (the 'Google phone') and INQ 1 (H3G's 'Skype phone').

A7.3   Figure 9 summarizes the features of two older handsets, i.e. the Nokia 6510 and Blackberry 5820, which have been sold since 2001.

A7.4   We looked at the characteristics that have evolved over time:

- the features which have improved device usability, e.g. touch screen, display size;

- the features which have transformed a basic wireless telephone into a general-purpose pocket PC, e.g. computer power, memory size, operating system, java and USB capabilities; and

- the features that turn the mobile phone into a converged and integrated device, e.g. multimedia capabilities and different radio interfaces.

A7.5   The newer phones are more capable in almost every respect: memory, display quality, data and multimedia capability, connectivity, and the ability to use a variety of radio networks (e.g. Bluetooth, Wi-Fi, GPS as well as 2G and 3G).

A7.6   Compared to old models, current handsets have almost four times the total number of pixels in a handset's display size. The Apple iPhone, LG Renoir and T-Mobile G1 all feature touch screen functionality. Processor speed is around 600 MHz (note that a similar speed in desktop PCs was only reached in 1999 with the Intel Pentium III), and the memory size can be increased by external memory cards of up to 8 GigaBytes.

A7.7   The current phones enable several multimedia capabilities, e.g. MP3, radio, camera, video streaming and Photo editing, but only one of them - the INQ1 (sold by H3G) allows Skype-to-Skype VoIP calls. All are Java enabled, i.e. they can potentially run every kind of Java application and they provide a USB port, i.e. they interconnect with many other electronic devices. Finally, they fully integrate a large number of radio transceivers, thus enabling Wi-Fi, 2G and 3G voice and data connections.

Figure 49: Devices available since March 2009

	Nokia N95 8GB	Apple iPhone 3G 16GB	BlackBerry Bold 9000	LG KC910 Renoir	T-Mobile G1	INQ 1
Display size in pixels[206][207]	240 x 320	480 x 320	480 x 360	240 x 400	320 x 480	240 x 320
Touch screen	✗	✓	✗	✓	✓	✗
Computing power	332MHz	620MHz	624MHz	n.a.	528MHz	n.a.
Operating system	Nokia Series 60, 3rd edition, feature pack 3.1	Mac OS X v10.4.10	BlackBerry software (for device, internet and desktop)	n.a.	Android OS	n.a.

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[206] A pixel is the basic unit of a video image on a display.
[207] We measure the screen size as the total number of pixels and we do not report the screen resolution (measured in ppi, i.e. pixels per inch).

	Nokia N95 8GB	Apple iPhone 3G 16GB	BlackBerry Bold 9000	LG KC910 Renoir	T-Mobile G1	INQ 1
Memory size	Up to 8GB internal flash memory and up to 100 MB internal dynamic memory	Internal phone memory 16GB	1GB multimedia card, 128-MB flash memory	100 MB internal memory, MicroSD (TransFlash) up to 8GB	Internal phone memory 192MB Micro SD up to 16 GB	Internal phone memory 50 MB Micro SD 1GB
Java enabled	Java MIDP[208] 2.0	JavaScript	JavaScript	Java MIDP 2.0	Java MIDP 2.0	✓
USB interface	✓ v2.0 miniUSB	✓ v2.0	✓ v2.0	✓ v2.0	✓ miniUSB	✓ v2.0
Enabled multimedia capabilities	- MP3 player - Video recorder - 5 megapixels camera - FM radio - Photo/video editing	- MP3 player - Video recorder - 2 megapixels camera - Photo/video editing	- MP3 player - Video recorder - 2 megapixels camera - memory card slot	- MP3 player - Video recorder - 8 megapixels camera - memory card slot - FM radio Photo/video editing	- MP3 player - 3.15 megapixels camera - memory card slot - Photo/video editing	- MP3 player - 3.2 megapixels camera - video recorder - Skype to Skype calls - Phone can be used as a laptop dongle
Radio interfaces (2G, 3G, WiFi, Bluetooth, GPS)	- GPRS: Class 32, 107 / 64.2 kbps - HSCSD - EDGE: Class 32, 296 kbps; - DTM Class 11, 177 kbps - 3G - HSDPA - WLAN Wi-Fi 802.11 b/g, - UPnP - Bluetooth v2.0 with A2DP - Infrared port	- GPRS - EDGE - 3G - HSDPA - WLAN Wi-Fi 802.11b/g - Bluetooth v2.0, headset support only	- GPRS: Class 10 (4+1/3+2 slots), 32 - 48 kbps - EDGE: Class 10, 236.8 kbps - 3G - HSDPA, 3.6 Mbps - WLAN Wi-Fi 802.11 a/b/g - Bluetooth v2.0 with A2DP	- GPRS: Class 10 (4+1/3+2 slots), 32 - 48 kbps - EDGE - 3G - HSDPA, 7.2 Mbps - WLAN Wi-Fi 802.11b/g - Bluetooth v2.1 with A2DP	- GPRS: Class 10 (4+1/3+2 slots), 32 - 48 kbps - EDGE: Class 10, 236.8 kbps - 3G - HSDPA 7.2 Mbps; HSUPA, 2 Mbps - WLAN Wi-Fi 802.11 b/g - Bluetooth v2.0, headset support only	- GPRS - EDGE - 3G - HSDPA 1.8 Mbit/s/HSDPA 3.6 Mbit/s - Bluetooth

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[208] MIDP: Mobile Information Device Profile (MIDP) lets you write downloadable applications and services for network-connectable mobile device.

Figure 50: Two mobile devices available in 2001

	Nokia 6510 (2001)	BlackBerry 5820 (2001)
Display size in pixels	96 x 60	160 x 160
Touch screen	✘	✘
Computing power	n.a.	n.a.
Operating system	Nokia PC Suite 4.51a	BlackBerry
Memory size	500 names in phone book memory	8 MB Flash memory 1 MB SRAM
Java enabled	✘	Java development platform
USB interface	IR connection	Data port connects with USB
Enabled multimedia capabilities	Radio	Radio
Radio interfaces (2G, 3G, WiFi, Bluetooth, GPS)	GPRS, HSCSD, WAP 1.2.1, Infrared port	GSM/GPRS

Annex 8

Summary of consultation responses

Summary

A8.1   This annex provides an overview of the consultation responses to MSA 1. It contains:

- Section A: Consultation response statistics;

- Section B: Summary of responses from individuals; and

- Section C: Summary of responses from organisations

SECTION A - Consultation responses statistics

A8.2   In total, the MSA 1 consultation received just over 140 responses - 109 from individuals and 34 responses from organisations. We also held a roundtable discussion during the consultation period which was attended by representatives from the following organisations:

Citizens Advice
Consumer Direct
Consumer Focus
Ofcom Consumer Panel
PhoneAbility
PhonepayPlus
PUAF (Public Utilities Access Forum)
RNIB (Royal National Institute for the Blind)
RNID (Royal National Institute for the Deaf)
Which?

A8.3   We received non-confidential responses from the following organisations:

Advisory Committee for Northern Ireland (ACNI)
Advisory Committee for Scotland (ACS)
AT&T
BBC
BT
Campaign for National Parks
Carphone Warehouse
Consumer Focus
David Hall Systems
Ericsson Limited
Federation of Communications Services
H3G
Hearing Concern LINK
Mapesbury Communications

Orange
O2
PhoneAbility
Royal National Institute for the Deaf
Scottish & Southern Energy
Scottish Government
Scottish National Heritage
South Shropshire Council
TAG (Telecommunications Action Group)
The Number (118 118)
T-Mobile
Virgin Media
Vodafone
Welsh Assembly Government
Zimo Communications

A8.4   Non-confidential responses by both individuals and organisations can be found on our website under: http://www.ofcom.org.uk/consult/condocs/msa08/responses/.

SECTION B – Responses from individuals

A8.5   Overall, consumers recognise the pace of technological change in the mobile market. They regard mobile phones as essential to participating in modern society. While some respondents reported positive experiences or did not have any pressing issues a majority of respondents outlined specific issues with their service or provider, or expressed concern regarding the price of calls, texts and/or data charges.

A8.6   Recurring themes drawn from consumer responses are:

- concern regarding transparency of tariffs / bundles / contracts;

- dissatisfaction with 'after-sales care' by service providers;

- varying levels of concern regarding the effect of coverage issues, but a feeling that national roaming would solve the problem and, in any case, should be in place for emergency services; and

- the view that we should 'regulate more', with consumer protection being our focus (some respondents would not mind if we regulated prices); and an agreement that competition and innovation are critical to providing consumers with genuine choice.

A8.7   Below is a summary of the consumer responses under the main workstreams of the second phase of our mobile sector assessment:

- the mobile market / competition;

- consumer issues and access and inclusion; and

- coverage.

The Mobile Market / Competition

A8.8   While some respondents believe the market is functioning well, many raised concerns that:

- mobile operators are employing restrictive practices (such as SIM locking, exclusive contracts for devices, long contract periods, and difficulties with the switching process);

- competition is not delivering lower prices (e.g. price of data access, pay-as-you-go calls and texts are considered too high and roaming charges are too high). Consumers also raised the issue of exclusion of freephone and other non-geographic call ranges from call bundles;

- operators are 'controlling' the services consumers can access from their devices (e.g. access to VoIP services was highlighted as a primary concern); and

- the balance of power in the market overall is perceived to be with mobile operators.

A8.9   Some respondents considered that we do not need to do anything, or are doing enough to promote competition in the mobile market. Others felt there were specific areas where we could be more active, such as to ensure choice (ability to choose both device and network), to make it easier to switch (including regulating the contract length) and to review termination rates.

A8.10   There was a mix of views regarding the role of competition in addressing price and service transparency and the potential role of us in addressing these issues. One respondent felt that increased competition could make selling practices worse, while another felt it was an area of concern but not yet unacceptable. Another respondent stated that excessive standardisation could reduce competition, but still felt the current approach was not working. The majority of respondents believed that we could contribute in this area (e.g. that we should introduce a consistent and standard way to compare prices, and that contract terms and conditions should be easier to understand).

"There is insufficient competition in the mobile industry in the UK and as a consequence consumers are paying the cost."

"A mobile telecoms network is intrinsically a much lower cost operation than that of a fixed network and as such calls on mobile networks should cost less. That such calls actually cost far more is prima facie evidence of price fixing."

"Stop carriers from blocking VoIP traffic over data connections. At a packet level, VoIP data is no different from 'Internet' browsing. If VoIP calls are more cost effective than voice calls, then carriers should not be allowed to discriminate and block VoIP."

"Since this is an oligopoly in the UK, more power should be given to the people over price (cheaper for roaming use), availability and functionality (unrestricted access for VoIP)."

"It smacks of price-fixing and relying on consumer ignorance to make money. There is insufficient competition in the mobile operator industry in the UK and as a consequence, consumers are paying the cost."

"It would be bad for the market to be flooded by cheap unreliable service providers. Maybe the balance is about right."

Consumer issues and access and inclusion

A8.11   Respondents described a mixed experience in the market and concerns broadly mirrored those raised by us in MSA 1. The key consumer issues raised include:

- a lack of transparency of prices, bundles, key contract terms and conditions and difficulties in comparing offers between suppliers;

- handset subsidiaries allowing service providers to artificially inflate call charges;

- a general distrust of service providers – consumers are concerned about sales practices and view the introduction of new services/technology merely as a way to extract more revenue, while issues with basic standards, such as good customer service, are not addressed; and

- a general feeling that customer service standards are poor and consumers have to use ADR to resolve issues.

    "Mobile phone companies seem a bit unscrupulous so I think they need heavier regulation to make them more transparent about their charges. Regulation promoting transparency is good for markets anyway and is also good for consumers."

    "I see little evidence that the operators have any concept of customer value and priority."

    "All regulators have a duty to ensure that fair prices are charged for services and that notification of those charges is freely available and clearly explained. As a regulator, Ofcom must be seen to be enforcing this duty."

    "Citizens and consumers are currently ripped off by mobile operators charging far more for data than voice services. Texting charges are also far too high."

    "Allow users to cancel if the service is not up to spec. If you sign up to 18 months service, you don't expect caps to be introduced a couple of months in."

A8.12   In terms of features of a well functioning mobile market, responses were aligned with those features outlined in the consultation document which expressed our vision for the sector – good coverage, value for money, ability to switch, access to a variety of services, transparent prices and services.

A8.13   Overall, respondents felt that on the occasions where there is evidence of rising consumer concern, we should act (e.g. name service providers who attract the highest levels of complaints, cap tariffs, develop codes of practice for operator behaviour or fine service providers for breaches).

A8.14 Individual respondents highlighted that consumer protection should be our main focus, including protection from mis-selling and questionable sales/advertising practices, premium rate service scams, data protection, ensuring consumers can switch and that prices are competitive.

A8.15 A small number of respondents commented on access and inclusion issues with most highlighting that it was important to ensure a that 'no frills' option (both device and tariff) is always available in the market for elderly consumers or those on a low income.

A8.16 Several respondents commented that competition would not deliver services to niche markets (including for consumers with particular impairments) and it would be up to regulation to deal with potential concerns in these areas.

A8.17 Unsurprisingly, there were strong views on how regulators should respond if competition does not reduce international roaming charges. Many felt that prices should better reflect costs, should be capped or that operators should receive fines. Others felt that rates should be standardised across the EU or removed altogether. Several suggested it should be easier to choose another operator for these calls or to choose a local operator (in the country they were visiting) while retaining their UK number.

A8.18 Responses received early in the consultation period from members of the public reflected a misunderstanding of the concept of 'mobile termination rates' as meaning the introduction of 'receiving party pays' (RPP). RPP was not popular with respondents. Of those who responded more broadly to the termination rate question, the consensus was that rates should be lower or zero.

Coverage

A8.19 Some respondents had not experienced coverage issues or felt that the impact had been minimal. Others reported serious disruption to their service and the way they use their mobile phone:

- coverage issues in the home and/or in the area where consumers work which, while undermining the service generally, also restrict their choice of operator;

- some respondents reported potentially serious impacts from lack of coverage such as an inability to receive messages in an emergency, loss of work due to missing important calls and interrupted customer service when businesses that rely on mobile communications were unable to contact staff;

- in several cases coverage issues were discovered by consumers after they had signed a contract – some consumers were able to cancel their contracts while others were not;

- a number of respondents reported that 3G coverage was poor outside of main urban areas, but some reported dropped calls and data connections while in populated areas such as London; and

- a number of respondents stated that they considered national roaming the best way to address coverage issues and 'not spots' and that they believed that this would likely need to be enforced through regulation.

"I feel there needs to be better sharing of networks in the UK to fill the gaps in service."

"Not able to send or receive business critical emails with financial loss implication because the 3G network didn't perform as it was supposed to."

"I have found coverage generally to be less than advertised, however, I work and travel in the densely populated South East, so have no major problems."

"Frankly, we should be ashamed as a country about the quality and/or lack of coverage in significant geographical areas of our country, even along main roads."

SECTION C – Responses from Organisations

A8.20   Responses from organisations varied greatly, not only depending on their position in the market. Key issues raised are reported below by grouping together similar organisations.

Mobile operators

Market / competition

A8.21   Vodafone described the market as highly competitive, driven by savvy consumers – in its view commercial pressures mean operators have to serve consumers well.

A8.22   Orange agreed that the features of a well-functioning market are related to price, choice and innovation and that these were highly evident in the UK market.

A8.23   T-Mobile also described the market as *"ferociously competitive"* with market penetration of almost 70m. It highlighted that, different from other EU markets, there is no single dominant company.

A8.24   O2 highlighted the high level of investment by mobile operators to date, and cautioned that we should be careful not to jeopardise this investment by putting excessive pressures on operators. It stressed the need for a stable, predictable regulatory regime.

A8.25   O2 believed that our concerns that the mobile market is difficult for new entrants are misplaced, evidenced by the fact that there are new entrants in several different parts of the value chain.

Consumer issues

A8.26   T-Mobile and O2 stated that we have misunderstood competition in the pre-pay market, which is increasingly based on incentive-based pricing (i.e. 'free' minutes and texts in return for regular top-ups).

A8.27   Vodafone highlighted that concerns about pricing transparency need to be considered *"in the context of a vibrant competitive market where on the whole customers are getting a good deal."* Pricing innovation is a proof of market pressures – it is important to note that choice and variety can result in complexity.

A8.28   Orange stated that the increased range and complexity of tariffs over the recent years has directly mirrored the increased competitiveness of the market – operators have no incentive to intentionally confuse customers and regulation should only be imposed where there is clear evidence of market failure.

A8.29   O2 acknowledged that there is consumer dissatisfaction in the market, but believed it is important to analyse the reasons for dissatisfaction in closer detail, and the opportunities the market provides for customers to get a better deal.

A8.30   Mobile operators in general felt that there was a danger for us to over-regulate in the consumer area. We should clearly test evidence and ensure we understand problems before acting on consumer issues (e.g. whether there are enduring problems and who is causing them).

A8.31   T-Mobile stated that consumer protection issues should be left to the OFT, which is better able to maintain a level of consistency in enforcement across different sectors.

Coverage and Universal service

A8.32   Vodafone highlighted that coverage issues can take different forms that may need different remedies.

A8.33   T-Mobile said that it is committed to extending 3G coverage and entered into a network sharing agreement with H3G in December 2007.

A8.34   O2 stated that we must quantify the extent of any social benefit associated with a greater roll-out and the costs of an intervention must be outweighed by the benefits.

A8.35   T-Mobile stated that femtocells weren't a solution for bridging coverage gaps.

A8.36   Views diverged on the role operators should play with regards to universal service, but most operators highlighted the need to resolve the question of financing any contribution of mobile operators to providing universal service:

- H3G believed that operators might have a role to play with regards to universal service in relation to the delivery of broadband;

- Vodafone felt that mobile was already contributing significantly to the universal availability of voice services;

- Orange was unconvinced that mobile could play a significant role as it *"is not and cannot be a 'universal service' and should not be viewed as such."* It stated that 2G covers virtually the entire of the UK population and 3G coverage is increasing;

- T-Mobile stated that operators should be able to bid to provide universal services if they wish but do not think it should be automatically included – it pointed to the EC communication in September 2008 not to extend USO to mobile;[209] and

- O2 also pointed to the September 2008 decision and mentioned that it was the Government and not Ofcom that determines USO policy.

A8.37　O2 stated that greater coverage where it is not commercially viable should be funded from the public purse, rather than by shareholders.

A8.38　Vodafone highlighted that it is not opposed to 112/999 roaming in principle. O2 mentioned that the current issues with 999 roaming are partly due to debates with the emergency services around misuse and signalled its readiness to discuss the matter. Orange indicated that it was willing to continue to work with us and with other mobile operators to *"investigate what type of solution might be best."*

2G liberalisation

A8.39　H3G expressed concern that 2G liberalisation may result in 900MHz spectrum becoming concentrated in the hands of a few operators (i.e. its current holders.)

A8.40　T-Mobile referred to its comments on the relevant consultation in this context and in relation to further views on coverage.

A8.41　Vodafone stressed that it is supportive of our spectrum policy, but felt we should not starve operators of spectrum by putting excessive emphasis on other uses.

International roaming rates

A8.42　Vodafone felt that this should be left to the market and O2 stressed that pressure on roaming rates could undermine investment.

A8.43　Orange argued that the market is competitive and that, therefore, regulation is not warranted. It also stated that regulation of international roaming charges will not be within our control for the foreseeable future and therefore the question is *"disingenuous"*. T-Mobile agreed, stating that international roaming is one area where regulation should be rolled back, particularly as it has not had the impact expected and has led to lower volumes of traffic and lower revenues.

Mobile call termination rates

A8.44　Operator positions on mobile call termination rates are varied:

- Vodafone supported a move towards symmetry;

- H3G favoured bill and keep;

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[209] *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions*, 25 September 2008, http://ec.europa.eu/information_society/policy/ecomm/doc/library/communications_reports/universal_service/1_en_act_part1_v1.pdf

- Orange and O2 highlighted that LRIC+ has worked to date and should not be changed without good reason; and

- T-Mobile agreed that a price-cap needs to be set on cost orientation, but this does not need to be the result of a detailed LRIC model.

A8.45   Vodafone and T-Mobile stressed that the path to a new regime should be evolutionary rather than abrupt.

A8.46   T-Mobile also felt that termination rates for new entrants should be cost based.

A8.47   Orange believes that the debate on termination rates should begin only after the CAT / Competition Commission findings are published in early 2009.

A8.48   An introduction to mobile call termination including a more detailed summary of stakeholder responses can be found in Annex 7 to this consultation.

Net neutrality

A8.49   Orange said that in a competitive market, net neutrality and open access can be left to the market to determine. Any regulated requirements of net neutrality that impact voice and data revenues would mean operators reconsidering their business model.

A8.50   T-Mobile indicated that competition is already offering mobile consumers a true internet experience, and that it was the pioneer of open mobile internet access with its *"Web'n'walk"* service towards the end of 2005 .

Focus of regulation

A8.51   Overall Vodafone felt that the mobile market is subject to a rising tide of regulation with its origins in the fixed world, and that – apart from spectrum policy – few deregulatory initiatives were visible. T-Mobile also stressed that it felt we were acting in an increasingly interventionist manner. This view was also presented by Orange, specifically in relation to consumer protection policy.

A8.52   Orange felt there is a role for us as a facilitator in dealing with consumer protection issues, with all relevant parties and not just those that we regulate. The focus should be on what actually needs to be done to help consumers and not on what form of regulation we are empowered to impose.

A8.53   Orange believed that it is hard to envisage a situation in which access regulation will be required to assist new entrants. It mentioned that several MVNOs are live on the Orange network, with more in the pipeline. T-Mobile also stated that we should avoid providing regulatory advantages to new entrants that bring little benefit and can carry significant costs to efficiency.

Fixed operators / Independent retailers / MVNOs / niche operators

Market / competition

A8.54　The Carphone Warehouse described the sector as *"dynamic, innovative and competitive"* and stressed that due to an increase in the complexity of services and devices the role of an independent retailer is becoming more important. Ericsson also stated that the mobile market already exhibited signs of a well functioning market and that high take-up of services proves this.

A8.55　AT&T stated that we have the tools to address market failure and that competition should be driven by choice, openness and innovation.

A8.56　BT voiced very strong concerns about the state of competition in the mobile market and urged us to *"re-invigorate the sector and stimulate further market entry and innovation"*. It suggested that in order to achieve this, mandated wholesale access to mobile networks may be required. This view was also supported by The Number, who felt that the mobile operators can impede access or impose unfair access which impacts The Number's retail prices and its ability to control pricing.

A8.57　 BT and Scottish and Southern Energy agreed that mobile number portability was an important issue to resolve in facilitating competition.

A8.58　David Hall Systems felt that we should develop a neutral regulatory framework so that competition develops as a result of market forces.

A8.59　Zimo Communications stated that mobile operators needed to do more to explore alternative models which do not impede technical innovation, *"rather than block unwelcome traffic (such as VoIP calls) […]"*.

Consumer issues

A8.60　David Hall Systems was not convinced that additional regulation was the answer to consumer issues. It considered it vital that consumer mobile literacy is increased and commented that the industry currently does not provide sufficient information for consumers to make informed decisions.

A8.61　The Federation of Communication Services felt that consumer concerns should be raised with industry in the first instance to assist with identifying the root cause.

Universal service

A8.62　BT believes that universal access demands a fundamental reassessment. Virgin stated that universal access should not be viewed in terms of a particular infrastructure, but should be about ensuring universal access to *service*.

A8.63　David Hall Systems felt that if there is a real trend to mobile from fixed, then universal access will need to be based on wireless access rather than fixed. Ericsson thought mobile could play a part in universal access, but that funding issues would need to be addressed.

International roaming rates

A8.64   Ericsson felt that roaming prices should be decided by the market and until the market fails, there should be no intervention.

A8.65   David Hall Systems felt that high cost of roaming rates was evidence that competition was not working effectively.

Net neutrality

A8.66   AT&T felt that net neutrality would inhibit operators' ability to manage against spam, viruses, etc and it would inhibit the users' experience.

A8.67   However, Zimo Communications stated that it is vital to ensure a level playing field for all entrants and for freedom of choice for the consumer.

Regulation

A8.68   Scottish and Southern Energy stated that regulation should focus on easing constraints for new entrants. Mapesbury agreed and said Ofcom should focus on where market distortions still exist.

A8.69   David Hall Systems felt it was vital to ensure that regulation did not stifle innovation.

A8.70   The Carphone Warehouse indicated that as mobile is one of the least regulated industries it would be hard to see scope for deregulation.

A8.71   The Federation of Communication Services felt that deregulation would not be possible until there is *"undistorted competition"*.

Network Access

A8.72   BT felt that cost based network access to the mobile operators' networks should be introduced. Federation of Communication Services said that regulation should be refocused on wholesale access. Scottish and Southern Energy stated that the time was right for Ofcom to promote further competition in service provision, which includes access regulation.

A8.73   However, other respondents felt access regulation should not be introduced as it may take away a key driver of infrastructure competition or reduce infrastructure investment.

Government / Advisory Committees / Charities / Consumer groups

Market / competition

A8.74   The Welsh Assembly Government stated that we should focus on removing/reducing barriers to investment (i.e. spectrum, technical standards, backhaul costs) and that spectrum release will go some way to addressing this.

A8.75   Consumer Focus gave issues such as contract length and renewal, contract transparency and 'bill shock' as examples where the market is not functioning effectively.

Consumer issues and Access and Inclusion

A8.76   TAG said that deaf users do not have access to the same range of tariffs as other consumers. Video is expensive for users who require sign language. There is room for improvement in call bundles offering text in place of minutes.

A8.77   TAG was encouraged that we are considering in more detail the issues of exclusion for deaf people.

A8.78   The Advisory Committee for Northern Ireland accepted that numbering policy will need to progress as the industry/technology does, but felt it is important that the numbering plan ensures tariff transparency.

A8.79   Consumer Focus urged us to look at the position of low income users by analysing different packages and prices and believe this sits beside a discussion regarding a universal service obligation.

A8.80   Consumer Focus was not convinced that the mobile market is one where consumers either do have all the information they need or can understand it when they are given it. We should further analyse the purchasing decisions of consumers and see how they differ based on the route to market used. Consumer Focus would also like us to explore the relationship between contract length and technology innovation.

Coverage and Universal service

A8.81   Campaign for National Parks and the Scottish Natural Heritage would like mobile operators to address coverage issues in an environmentally sensitive way and support national and emergency roaming as the most appropriate way to do this, rather than building further infrastructure. Our Advisory Committee for Scotland also mentioned that we should do all we can to encourage network sharing and national roaming to improve services.

A8.82   The Scottish Government was supportive of our work in relation to emergency roaming, however, it would like to see the scope widened to include improved coverage in Scotland per se (particularly in rural areas). The Welsh Assembly also stated that we need to focus on underserved areas and that policy development should ensure wider roll out of 3G service coverage. Limited coverage by a number of operators also impacts consumers' choice.

A8.83   Our Advisory Committee for Scotland highlighted that there remain significant areas of Scotland with no 2G coverage and 3G coverage remains poor, with the impacts of this likely to increase as data traffic expands for all types of users.

A8.84   Our Advisory Committee for Northern Ireland felt we should carry out research to better understand reasons behind network roll-out (i.e. correlation between population density and network roll-out, factors that affect roll-out, policy consequences). It also expressed

concern that operators may use network sharing to reduce costs in already well-served areas, rather than try to improve services in those that are under-served.

A8.85   TAG believed the universal service obligation should be extended to include mobile. Welsh Assembly Government also said that we should consider the role of mobile operators in any revised telephony (and broadband) universal service obligation.

Termination rates

A8.86   TAG was opposed to regulation that would move charges from caller to the receiving party as deaf people are less able to determine the nature of incoming calls.

A8.87   Consumer Focus was concerned that any deregulation of termination rates would not be in the best interests of consumers.

Regulation

A8.88   TAG felt that regulation is needed to address choice, competition and access on equal terms with hearing users.

A8.89   Our Advisory Committee for Northern Ireland stated that if most mobile traffic is data, the justification (subsidisation of handsets to drive penetration) for high termination rates is not relevant. It notes that a *"sender-keeps-all"* policy may increase operators' incentives to interconnect.

Annex 9

Glossary

2G Second generation of mobile telephony systems. Uses digital transmission to support voice, low-speed data communications, and short messaging services.

3G Third generation of mobile systems. Provides high-speed data transmission and supports multimedia applications such as full-motion video, video-conferencing and internet access, alongside conventional voice services.

3.5G 3.5G refers to evolutionary upgrades to 3G services starting in 2005-2006 that provide significantly enhanced performance. High Speed Downlink Packet Access is expected to become the most popular 3.5G technology (see HSDPA).

4G See LTE

3GPP Third Generation Partnership Project. The 3GPP was formed in December 1998 as a collaboration agreement bringing together a number of telecommunication standards bodies, referred to as Organizational Partners. The original aim of the 3GPP was to produce globally applicable technical specifications for third-generation mobile systems based on evolved GSM core networks and the radio access technology UTRA (Universal Terrestrial Radio Access).

Access network Electronic Communications Network which connects end-users to a service provider; running from the end-user's premise to a Local Access Node and supporting the provision of access based services. It is sometimes referred to as the local loop or last mile.

Additional charges Consumers are sometimes required to pay additional amounts of money ('additional charges'), over and above the headline prices they expect. For example, they may pay more in order to pay bills by cash or cheque, rather than by direct debit (through a 'non-direct debit' charge). Other examples include: paying an early termination charge to terminate a contract early, or paying extra to receive a fully itemised bill.

ADR Alternative Dispute Resolution.

ADSL Asymmetric Digital Subscriber Line. A digital technology that allows the use of a standard telephone line to provide high-speed data communications. Allows higher speeds in one direction (towards the customer) than the other.

App store An extension of a service provider's online store that offers free and paid applications for mobile phones.

Blog Short for weblog. A weblog is a journal (or newsletter) that is frequently updated and intended for general public consumption. Blogs generally represent the personality of the author or the website.

Bluetooth Wireless standard for short-range radio communications between a variety of devices such as PCs, headsets, printers, mobile phones and PDAs.

Broadband A service or connection generally defined as being 'always on' and providing a bandwidth greater than narrowband.

Cashback A type of sales incentive where a retailer promises the payment of a certain amount of money to the customer when the customer takes out a mobile contract.

Consumer Direct A telephone and online consumer advice service, supported by the Department for Business and Regulatory Reform. www.consumerdirect.gov.uk/.

Communications Act Communications Act 2003, which came into force in July 2003.

Competition Act Competition Act 1998, which came into force in 1998.

CPs Communications Providers. Companies which provide services to a customer's home, such as telephone and internet services, and which usually own some infrastructure.

Data packet In networking, the smallest unit of information transmitted as a discrete entity from one node on the network to another.

DECT guard band Frequency bands 1781.7 – 1785 MHz paired with 1876.7 – 1880 MHz. Band allows service providers to use low-power applications, such as picocells to enhance mobile coverage and capacity.

Dongle A physical device, attached to a PC's USB port, which adds hardware capabilities.

DSL Digital Subscriber Line. A family of technologies generally referred to as DSL, or xDSL, capable of transforming ordinary phone lines (also known as 'twisted copper pairs') into highspeed digital lines, capable of supporting advanced services such as fast Internet access and video-on-demand. ADSL, HDSL (high data rate digital subscriber line) and VDSL (very high data rate digital subscriber line) are all variants of xDSL).

DTT Digital Terrestrial Television. The digital television transmission network based on terrestrial transmitter towers.

Dual Mode A mobile phone that is compatible with more than one form of data transmission network.

EDGE Enhanced Data rates for GSM Evolution. A digital mobile phone technology that allows improved data transmission rates as an extension on top of standard GSM.

Enterprise Act Enterprise Act 2002, which, among other things contains consumer protection legislation. Ofcom is one of the designated enforcers of the Enterprise Act. More information on the Enterprise Act can be found on OFT's website www.oft.gov.uk.

Ethernet A common technology that allows computers on a network to talk to each other.

EC European Commission

General Condition Set of conditions applying to communication providers, imposing legal obligations on providers.

GPRS General Packet Radio Service, a packet data service provided over so-called 2.5G mobile networks.

GPS Global Positioning System. A 'constellation' of 24 well-spaced satellites that orbit the Earth and make it possible for people with ground receivers to pinpoint their geographic location.

GSM Global Standard for Mobile Telephony, the standard used for 2G mobile systems.

HLR Home Location Register. The main database of permanent subscribers for a mobile network.

HSDPA High Speed Datalink Packet Access, an evolution of 3G mobile technology, often known as 3.5G, which offers higher data speeds.

HSPA High Speed Packet Access. 3G digital data services that jointly refer to downlink and uplink mobile broadband technologies.

HSPA+ further enhancement of HSPA. Compared to HSPA, it provides increased downlink and uplink data transfer speeds.

HTTP Hypertext Transfer Protocol is an application-level protocol for hypermedia information systems. It is used in the World Wide Web to retrieve inter-linked resources.

Interconnection The linking of one Public Electronic Communications Network to another for the purpose of enabling the persons using one of them to be able (a) to communicate with users of the other one; (b) to make use of services provided by means of the other one (whether by the provider of that network or by another person).

International roaming A service offered by mobile operators that allows customers to use their phone abroad. The home operator has agreements with foreign operators that allow customers to make and receive calls, send and pick up text messages, and use some of the other mobile services (such as access to voicemail or topping-up credit on pre-pay phones). The exact services available and the charges for their use vary between operators.

Internet A global network of networks, using a common set of standards (e.g. the Internet Protocol), accessed by users with a computer via a service provider.

IM (Instant Messaging) is a form of electronic communication that involves real-time correspondence between two or more users who are all online simultaneously. An instant messaging programme sends messages from one computer to another by means of small pop-up windows.

IP (Internet Protocol) The packet data protocol used for routing and carriage of messages across the Internet and similar networks.

ISP Internet Service Provider. A company that provides access to the internet.

LTE (Long Term Evolution). Part of the development of 4G mobile systems that started with 2G and 3G networks. Aims to achieve an upgraded version of 3G services having up to 100 Mbps downlink speeds and 50 Mbps uplink speeds.

Mis-selling Covers a range of sales and marketing activities including the omission of relevant and/or provision of false or misleading information to consumers, applying unacceptable pressure on consumers to change supplier and in extreme cases slamming. Mis-selling can work against the interests of both consumers and competition and can undermine the confidence in the industry as a whole.

MMS Multimedia Messaging Service. The next generation of mobile messaging services, adding photos, pictures and audio to text messages.

Mobile Broadband Various types of wireless high-speed internet access through a portable modem, telephone or other device.

Mobile service providers Mobile network operators (MNOs) and MVNOs

MNOs Mobile Network Operator / Mobile Operator (Vodafone, O2, Orange, T-Mobile, H3G)

MNP Mobile Number Portability.

Mobile termination rate The 'per minute' fees that mobile phone companies charge other carriers to deliver incoming calls to users on their networks.

MP3 (MPEG-1 Audio Layer-3) A standard technology and format for compressing a sound sequence into a very small file (about one-twelfth the size of the original file) while preserving the original level of sound quality when it is played.

MP3 Player A device that is able to store and play back MP3 files.

MVNO Mobile Virtual Network Operator - an organisation which provides mobile telephony services to its customers, but does not have allocation of spectrum or its own wireless network (e.g. Virgin Mobile, Tesco Mobile, BT Mobile, Fresh, and Blyk).

MSP Mobile Service Provider

NGN Next Generation Network. Internet Protocol based core networks which can support a variety of existing and new services, typically replacing multiple, single service legacy networks.

OAT Ofcom Advisory Team - the team within Ofcom responsible for advising and dealing with complaints and enquiries from members of the public.

Ofcom Office of Communications - the regulator for the communications industries, created by the Communications Act.

OFT Office of Fair Trading - the consumer and competition authority of the UK. www.oft.gov.uk

Narrowband A service or connection providing data speeds up to 128kbit/s, such as via an analogue telephone line, or via ISD.

PhonepayPlus (previously known as ICSTIS) regulates phone-paid services in the UK. Under the Communications Act 2003, Ofcom has responsibility for the regulation of premium rate services. In December 2007 it was confirmed that PhonepayPlus will act as the agency which carries out the day-to-day regulation of the PRS market on Ofcom's behalf. www.phonepayplus.org.uk

PMSE Programme Making and Special Events. A class of radio application that supports a wide range of activities, entertainment, broadcasting, news gathering and community events.

Service provider A provider of electronic communications services to third parties whether over its own network or otherwise.

SIM Subscriber Identity Module – a small smart card type device that has details of the mobile subscriber including public telephone number and the numbers required by the network to recognise and authenticate the subscriber.

SMS Short Messaging Service – facility to send text messages of up to 160 alphanumeric characters between compatible devices.

SIM-only a monthly mobile contract which is sold without a handset.

SMP Significant Market Power – is a position held on a relevant market, by an operator for example, either individually or jointly with others, equivalent to dominance. That is a position of economic strength affording the entity in question the power to behave to an appreciable extent independently of competitors, customers and ultimately consumers.

Telecommunications, or 'Telecoms' Conveyance over distance of speech, music and other sounds, visual images or signals by electric, magnetic or electro-magnetic means.

Trading Standards The Trading Standards Service enforce the laws that govern goods and services bought, hired and sold, including Trade Descriptions Act 1968, The Consumer Protection Act 1986, The Consumer Credit Act 1974,Enforcement provisions under Part 8 of the Enterprise Act 2002.

UMTS Universal Mobile Telecommunications System. The 3G mobile technologies most commonly used in the UK and Europe.

USO Universal Service Obligation. This is a series of requirements, currently upon BT and Kingston Communications, to provide every household in the UK with access to a landline telephone.

VoIP Voice over Internet Protocol. A technology that allows users to send calls using Internet Protocol, using either the public Internet or private IP networks.

VLR Home Location Register. The database of all subscribers who are currently visiting within a service providers' area.

WAP Wireless Application Protocol.

WiFi hotspot A public location which provides access to the internet using WiFi technology.

WiMAX A wireless MAN (metropolitan area network) technology, based on the 802.16 standard. Available for both fixed and mobile data applications.

Wireless LAN or WiFi (Wireless Fidelity) Short range wireless technologies using any type of 802.11 standard such as 802.11b or 802.11a. These technologies allow an over-the-air connection between a wireless client and a base station, or between two wireless clients.

XHTML A mark-up language for Web pages from the W3C. XHTML combines HTML and XML into a single format (HTML 4.0 and XML 1.0).