Mobile Ecosystems SMS ITC response
mobilesms@cma.gov.uk
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The CMA must include an assessment of how market power may be leveraged into mobile connectivity services as part of the investigation.

The mobile sector is of high importance to the UK economy. Ofcom confirms this position and sets out in its letter[1] to the Prime Minister, Chancellor, and Secretary of State for DSIT that Ofcom has supported the CMA in the Vodafone/Three merger review, and that it is continuing to work on mobile investment. Mobile investment is one of two projects highlighted to be of particular importance to boosting UK productivity and growth.

Funding of new services and their supporting network components requires investors to have confidence that they will see a return on their investment. In its Digital Work Plan,[2] Ofcom has identified that the development of 5G network connectivity services in association with the mobile ecosystem requires regulatory attention, and that the DMCCA regime may be the way for issues to be addressed.

The DMU and Ofcom must work collaboratively to ensure that mobile connectivity markets are able to function competitively and effectively within the end-to-end mobile ecosystem. This will support the required investment in new mobile connectivity services by ensuring that there are no barriers, created by market power within the mobile ecosystem, which hinder investment or innovation in mobile connectivity.

Post 2025 mobile connectivity, with satellite and 5G functionality, will support the ecosystem to achieve faster advances in services innovation creating new market growth opportunities.

Mobile connectivity is a critical element of the smartphone experience for consumers. Seamless connectivity is what allows consumers to engage and interact wherever they are. The incorporation of satellite coverage into connectivity services completes the ambition for consumers to be able to interact anywhere, meeting the expectation of today's consumer in respect of the functionality and useability of their devices and services. The form and quality of mobile connectivity is evolving, becoming more sophisticated and able to shape its level of responsiveness and functionality through technologies like 5G stand-alone, flexing to suit the needs of particular applications, customers and circumstances. 5G connectivity will be a key enabler for innovation for Apps in terms of quality and functionality.

Mobile operating systems, by their nature act as the interface between the device and the available connectivity. This has implications for the services mobile operators are able to offer to users (end consumers and App developers). A requirement to tailor connectivity to meet operating system requirements, and restrictions on network data transmission from the operating system have a knock-on impact for all users of the network. Mobile operators operate all services across a single mobile network infrastructure. A high-quality network slicing regime

[1] Open letter How Ofcom contributes to UK growth
[2] Digital markets, communications and media: update to Ofcom's areas of focus

requires a mobile operator to have visibility of traffic and control to manage that traffic regardless of origin or destination. Deviation from industry agreed 5G standards will have an impact on the capabilities that are available to consumers and prospective service plan propositions, which underpin the deployment investment case. For these reasons the scope of the investigation into mobile ecosystems must include connectivity.

5G stand-alone differs to prior generations. It requires greater openness and interoperability across the ecosystem in order that the full potential of the new 5G capabilities are available to all.

Close interworking between mobile operators, device manufacturers and operating systems is necessary to ensure that devices evolve to communicate effectively (and efficiently) with evolutions in connectivity generations and the deployment of spectrum bands by MNOs. For prior connectivity generations this has involved devices incorporating the relevant antenna and the operating systems noting the connectivity supplier and their individual spectrum frequency bands. Devices also support the insertion of SIMs, the development of the SIM over time and presently towards eSIM. These engagements between the mobile operator, OEM and operating system had been one-off events that were repeated periodically.

5G connectivity services introduce a step change in connectivity, functionality and a new requirement for open networking communications across the ecosystem. The planning and investment by mobile network operators to develop and install the connectivity required for our digital society and economy has been in progress since 2019 when the vision for the first 5G services was laid out by the 3GPP standards body. Now open choice access is needed to enable users to access the new mobile connectivity services, to manage individual user / application permissions in line with their purchases / subscription plans.

Mobile networks are built to support all connectivity scenarios and customer types across a single network infrastructure. The networks are managed to ensure maximum routing efficiency for optimal consumer experience and to achieve optimal economics to support optimal consumer pricing. The mobile nature of users results in fluctuations of available capacity / the need to share capacity for a short period across a larger pool of users. In compliance with net neutrality the mobile operator manages the demands from the different types of users on the network, eg business users and consumer users, treating them agnostically to their device manufacturer or operating system type. In the context of impending 5G stand-alone services that nature of mobile networks and movement of users will determine which of non-standard internet access services (standard internet access is always available) will be available to users, and the overall volume of capacity available to the new service types in a moment at a given location. To manage the network effectively, to manage consumers' connectivity packages (tariffing and service choices, eg security and service bars), to manage App connectivity choices directly with App developers for the consumer's benefit, networks require autonomy to manage the control of connectivity services. This means unrestricted visibility of the data packet types and data packet destinations and the two-way flow of network management messaging functions between the mobile network, through the operating system to App developers / internet destinations. Any restriction on a mobile operator's ability to access this data will

detrimentally affect the choice and quality of the services they are able to provide to their consumers.

The ecosystem needs to work collaboratively, ensuring there are open choices and interoperability. This will promote investment and innovation to the benefit of the whole ecosystem, service users and the economy.

Telecommunications networks have been built to be open and support interoperability. Openness and interoperability are continuously being extended to additional parts of the network as capabilities of the network /ecosystem develop. For example, OpenRAN facilitates new and innovative entrants to the mobile radio access network, improving supply choice by encouraging an open market to a wider range of vendors. This provides vendor diversification and vendor resilience into the supply chain. Mobile operators are building 5G network services to offer API interoperability and simplifying access to connectivity services by App Developers via the work of GSMA/Camera[3]. This enables App Developers to obtain uniform access to mobile connectivity services regardless of the country a service is accessed from or the network a particular user has its connectivity service contract with. App Developers can engage directly with mobile operators or indirectly via Communications Platform as a Service (CPaaS) marketplace providers.

Connectivity consumers (enterprise and end users) are best served by open choices enabled by open access to high quality, efficient and innovative services. Assured open access will deliver further development and innovation in connectivity services extending the reach and quality of 5G networks (and any possible future 6G networks) for UK consumers, as mobile operators will have the confidence that they are able to fully control and manage their networks and service propositions.

Each component of the ecosystem needs to respect the requirement of the other parts, to work in harmony to ensure end to end interoperability deploying the principle of fair dealing. This applies to facilitating related functionality to give effect to capabilities set by standards in other segments of the ecosystem. For example, at present it is of high importance that 3GPP connectivity standards are facilitated across operating systems to enable the new 5G stand-alone services to be commercially launched by mobile network operators, at scale, to end users and App developers.

Mobile operators are regulated companies, compliant with Privacy and Electronic Communications (EC Directive) Regulations 2003 and required to meet the Governments' most stringent security standards. In order for 5G stand-alone connectivity services to function, and for consumer adult service bars elected as part of the connectivity services subscription and security services to function, the connectivity provider must have full visibility of data packets. Encryption requests implemented by the mobile network operators enable all connectivity services to be made available to consumers and to deliver both a higher quality connectivity

[3] CAMARA telco global API alliance - Networks

experience at lower costs. Alternatively, the provision of an encryption key to the mobile network operators enables all connectivity services to be made available to consumers.

With the agreement of OEMs mobile operators are able to simplify and fully digitise for consumers the management of their connectivity service by preloading the device with the key connectivity management applications and other apps consumers value via the "out of box experience". For example, the MyVodafoneApp includes plan details, plan duration, upgrade information, billing and billing history, access to help and customer rewards.

Retail connectivity service provision in the UK is highly competitive with ~100 retailers and further recent market entry stimulated by eSIM for specialised targeted services eg travellers roaming connectivity. We expect to compete with any market entrant, including any with 'strategic market status', on a fair basis. Where 'strategic market status' companies enter the market, we expect equal non-discriminatory access to marketplaces and choice screens where these are used by those firms in their retailing processes.