

Written Evidence Submitted by Telecom Infra Project (TIP) (UKT0018)

The Telecom Infra Project (TIP) is a global community of companies and organisations working together to accelerate the development and deployment of open, disaggregated, and standards-based solutions that deliver the high-quality connectivity. Founded in 2016, TIP has grown into a diverse membership that includes hundreds of member companies - from service providers and technology partners, to system integrators and other connectivity stakeholders, academia and government.

Our diverse membership allows us to offer this inquiry a perspective drawn from the broadest possible industry base, on the potential for reforming the market for telecom network equipment to improve security.

We wish to direct our submission to the role that disaggregating telecommunications networks can play in increasing the competition in the market that the committee has rightly recognised as vital for British infrastructure. UK companies are playing a leading role in developing technologies that allow disaggregation, such as OpenRAN, and the Government's approach can provide an opportunity to entrench this role as a global leader. We are confident the companies involved will come to be a new generation of vendors.

About Telecom Infra Project

With UK mobile network operators such as Vodafone, BT and Telefónica (O2) at its heart, TIP is taking an innovative approach to building and deploying the technology that improves global connectivity. A community of manufacturers, software makers, network operators, integrators, and others work to make the telecom supply chain more diverse, innovative, and open, so that future digital infrastructure is brought more quickly to market for everyone.

We are an engineering-led organisation focused on technological solutions and providing alternative and complementary options for connectivity. One of the central components of

our organisation is our TIP Community Labs - physical spaces that enable collaboration between member companies to develop new solutions. We host one of our community labs in Ipswich, sponsored by BT and another, sponsored by Facebook, in London.

TIP's ecosystem sees three broad areas where disaggregation and deeper interoperability will enable better end to end network solutions:

- **Access** – Our Access Project Groups focus on finding new and refining old ways that providers can use to connect users. Major projects include: OpenRAN, a new open architecture for radio access networks (on which more below); Open Cellular, solutions for sustainable community cellular infrastructure in rural areas; vRAN Fronthaul, which focuses on improving connections between cell sites and centralised baseband units in virtualised networks; and Wi-Fi, which focuses on improving the capabilities of managed Wi-Fi deployment and interoperability for offloading of mobile traffic.
- **Transport** – Our Transport Project Groups work to improve the technologies that let operators route and deliver traffic across their network to satisfy ever increasing demand. Major projects include: Open Optical and Packet Transport (OOPT), which works to accelerate innovation in IP and Optical networks; and Wireless Backhaul (WBH), which builds new wireless solutions to transmit network traffic from the edge of a network to the core more efficiently.
- **Core and Services** – Our Core and Services Project Groups develop solutions to help operators manage their networks more efficiently and develop new services. Major projects include: Edge Application Developer, which aims to improve the capabilities of providers to support and host new end-user services; Open Core Network, which focuses on decentralizing virtualised components of how providers manage core functions of their network; and End-to-End Network Slicing, which identifies, develops, and demonstrates applications of discrete, bespoke, fully virtualised specialised services within a single telecom network.

One of the most mature technologies used by TIP members to develop solutions is OpenRAN, an innovative, disaggregated way of designing a significant section of telecom networks.

OpenRAN

OpenRAN is the term used to describe a new way of structuring the radio access network (RAN) equipment in mobile networks. RAN equipment comprises the masts, antennas and associated parts that mobile network operators use to connect wirelessly with mobile devices like smartphones. The core, by contrast, coordinates how these signals are sent and received, as well as tracking usage for billing and authentication. Today, there is a high level of vendor concentration in the RAN market, with figures¹ from industry analysts Analysys Mason suggesting the top three vendors held around 75% of the market in 2018.

¹ https://www.analysismason.com/Research/Content/Reports/RAN_market_share_RMA18

OpenRAN separates the hardware and software components of this equipment and standardises the interfaces between them. This makes it easier for different companies to make and sell RAN equipment, which gives mobile network operators more choice in how they build this network, providing better value for money for operators and end-users alike. OpenRAN is non-proprietary, providing a route to market for smaller companies who can specialise in certain components where previously the barriers to entry were extremely high.

Benefits of disaggregation

TIP believes open, disaggregated networks address the challenges of a consolidated ecosystem by providing network operators more choice and flexibility to improve networks at a pace that keeps up with rising demand.

The global infrastructure that underpins connectivity is complex, and made of many different interconnected technology components. Disaggregation — separating complex technologies into small pieces that can be combined in different ways — will allow for more flexible networks that let operators develop and upgrade individual components, selecting the best technology available at any point in time for each piece of a telecom network. They can choose from a wide range of software and hardware options that interoperate seamlessly, instead of having to source integrated infrastructure solutions from a very limited set of suppliers.

Separating out complex technologies and ensuring interoperability also means more companies, including SMEs, can compete in different parts of the technology stack, incentivising innovation and giving network operators more choice among both incumbent and emerging solutions. This can make the process of upgrading networks — either partially or totally — easier, faster, and more cost-efficient.

This method of development also has benefits for security by changing the development culture. Network security is best achieved from open scrutiny of development practices. Security is also enhanced by a more diverse market, as it provides greater incentives to compete on security and trust, as well as greater flexibility to mobile network operators.

OpenRAN's deployment and next steps

To date, Vodafone has launched trials of OpenRAN in the UK, Ireland, Mozambique and the Democratic Republic of the Congo. Telefónica will launch OpenRAN trials for 4G and 5G in the UK, Germany, Spain and Brazil this year. Internationally, Etisalat has completed its first deployment in the UAE and will now start trials of OpenRAN solutions in other regions. In Indonesia, Indosat Ooredoo and Smartfren will soon conduct the first OpenRAN field trials.

OpenRAN is emerging from a mature ecosystem and full deployments are due in the near term. Support from policymakers can assist this process by creating the enabling environment for a more innovative ecosystem.

TIP's UK members are leading efforts to accelerate OpenRAN. The TIP community lab at Adastral Park Ipswich is sponsored by BT and operated by Tech Mahindra.

The community lab has been used by a TIP project group to integrate and test OpenRAN use cases. Over the last 18 months, this novel, world-leading work led to the specifications which enable OpenRAN to be deployed in more contexts, including where it is traditionally challenging to link the core with the RAN. One of the challenges of any RAN is backhaul – sending data from masts and antennas to the core and the Internet – because it is often costly to build the links. Older generations of RAN technology were inflexible working with limited types of backhaul, making it more complicated and expensive to upgrade or roll out new equipment. Work at the TIP Community Lab enables the RAN to work with wired or wireless backhaul (such as microwave or cable).

This is particularly useful in urban contexts and where fibre is not always available to interconnect network functions. The project group included key players in the emerging OpenRAN eco-system: Cable Labs, Mavenir, Accelleran, Aceaxis, and Benetel.

Further work is currently being planned to investigate the use of machine learning to optimise and improve the radio efficiency, exploiting OpenRAN interfaces.

Policy recommendations

Barriers to entry in the UK's telecommunications market can be lowered significantly by encouraging a disaggregated supply chain. Work is ongoing within industry, with UK companies playing a leading role, to do this. This allows greater choice for mobile network operators, who can build networks more cost-effectively, and ultimately benefits consumers. Disaggregation also provides the means for more companies in the market and this trend is already allowing our smaller UK members to grow.

These benefits can be accelerated in a UK context. We would have two recommendations for the committee's consideration:

1. The UK should provide support for innovative British companies in radio access networks. The Budget indicated an ambitious agenda around infrastructure modernisation, which could well support this aim. In this regard, the proposal to create a "UK ARPA", modelled after the US Advanced Research Projects Agency, could be relevant.
2. The Government should consider ways to make it easier for mobile network operators to procure from outside the established vendors. Having the right environment for this market to flourish is indispensable to gaining the security advantages inherent in that diverse marketplace. Other countries have been able to successfully design nimble regimes which enabling earlier deployment of OpenRAN.

Conclusion

The UK has an opportunity to improve long-term communications infrastructure, not just for 5G but previous and subsequent generations of telecom networks. We believe the

structure of the network equipment ecosystem is an important factor in achieving this goal, and the approach offered by disaggregated solutions can provide a more secure, diverse and innovative sector that will realise the UK's technological ambitions. Moreover, with targeted support from policymakers, the UK can play a leading role in this and subsequent generations of network technologies.

TIP looks forward to supporting the work of policymakers in this regard. We thank you for your consideration of this submission and are available for further consultation.

(5 June 2020)