Rivada Networks is a US-based company which specialises in the development and application of innovative concepts and technology to enable the sharing of radio spectrum and networks capacity. It has focused on two particular groups of use cases:

Firstly, Rivada has developed technology for open access wireless marketplaces, in which capacity on a wholesale, neutral-host network is made available to all and any MNOs, MVNOs and non-MNOs on a non-discriminatory basis. Prices are set by electronic auctions. Rivada calls this technology the Open Access Wireless Market and believes it has the potential to transform the competitive landscape for 4G and 5G networks in every country.

Secondly, Rivada has invented technology to provide priority access to public safety or other privileged users on a network shared with commercial traffic. Rivada calls this technology Tiered Priority Access with Ruthless Preemption.

Rivada Networks is interested in bringing these concepts into the UK and applying them to the 5G buildout. The application of Rivada's approach is likely to be much more successful, providing more rapid 5G access to more people over a greater area, than the UK's traditional reliance on network competition. Rivada has many international patents covering all key aspects of these technologies.

Rivada's technologies relevant to the UK 5G market

Open Access Wireless Market

Network capacity, specifically wireless capacity, has a value that changes throughout the day and across the network as user demand changes. All of the capacity on a wholesale, neutral host network can best be made available to potential users by allowing an auction mechanism to clear all available capacity at whatever price the market will bear. This approach has been successfully implemented for decades in international energy markets, including in Germany, but not yet been tried in telecom networks. Rivada's approach is different from that of the existing MNOs in that Rivada would have no retail customers. As a wholesale-only operator, Rivada's Open Access Wireless Market treats all MNOs, MVNOs and non-MNOs that may need capacity as equal bidders. In order to allow buyers of capacity to manage their risks, there would be annual, monthly and hourly capacity products, so that an MNO could buy forward capacity for the year ahead, adjust that in the monthly auctions and fine-tune it in the hourly auctions. Excess capacity that had been acquired by any one customer in advance could also be recycled into the monthly and hourly auctions. Under the principle of open access, capacity

cannot be hoarded or withheld. All capacity is made available in the spot market, with the result that any attempt to “corner” the market would likely only serve to subsidise one’s competitors.

Conceptually this approach could be used whether Rivada builds a nationwide 5G network or concentrates on cells in congested or otherwise unserved areas. The availability of such a network would provide capacity that an MNO or MVNO might need on a planned or contingent basis, including for example to help deal with network failures or occasional congestion. Once established, the capacity market would be available for MNOs and MVNOs to sell any excess capacity that they have in their own networks, built independently of any network that Rivada might build. Rivada’s approach to its business enshrines the key characteristics of efficiency, transparency, simplicity and fairness and it has the potential to be transform the UK’s wireless market.

Tiered Priority Access with Ruthless Preemption

For public safety applications, Rivada has developed Tiered Priority Access, which allows the most efficient use of network resources by allocating network capacity based on hierarchical groups of priority. The approach allows users to be allocated into tiers with different priority claims on the network’s resources. Rivada’s Ruthless Preemption technology immediately makes all or a defined subset of the network resources exclusively available to one or more classes of privileged traffic by moving all other classes off the network. This is particularly useful during regional or national emergencies where it is imperative that public safety personnel have immediate and complete access to all of the network resources they require. This is a key requirement when sharing defence or other public sector spectrum with commercial users.

Dynamic Spectrum Arbitrage

Rivada’s Dynamic Spectrum Arbitrage is the technology that enables our Tiered Priority Access, allowing us to provide for shared use of spectrum or network capacity between public sector uses, E.G. defence or public safety, and commercial users. This more controlled approach to sharing will maximise the potential for the network owner to monetise spare capacity while balancing the Quality of Service that the commercial user may offer their subscribers with the ability to give absolute priority to the primary users when necessary.

These technologies are 3GPP standard compliant.

What does Rivada think the UK should do for 5G?

The technologies described above of course require access to radio spectrum that is supported by commercially available 4G or 5G network equipment. It is especially important that end customers using standard off-the-shelf smartphones are able to access the capacity that their network provider has acquired for them.

In the case of 5G, Rivada considers the 3.4-3.8 GHz band as especially important because it is the lowest frequency band allocated for 5G that will potentially bring the benefits of low latency and high mobile broadband capacity to all users in a country. But it is inconceivable that multiple competing networks will be built out across the entire extent of the country and for this reason Rivada supports the 5G Further, Faster initiative being established by the IET. Rivada thinks there is an opportunity for the UK Government to secure a leadership position in 5G, but this will require new sources of investment, new players operating alongside the traditional MNOs and MVNOs and pro-innovation polices adopted by the Government and the Regulator.

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