



Spectrum for Vertical Industries

GSMA Europe Policy Position Paper

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Connectivity for Vertical Industries

Mobile operators are beginning the pre-commercial activity of their 5G networks, and will soon start the commercial ones. For verticals, the importance as 5G connectivity will be vital to ensure they have the best connectivity to transform their business.

As the mobile industry will be able to provide an array of connectivity options with 5G that will include but not be limited to: network slicing, small cells and wider geographical coverage among many. Having at its disposal very diverse spectrum assets, and deployment experience, mobile operators may be able to provide many, if not all, of the use cases that verticals may put forward.

The GSMA believes that the shape of 5G connectivity for verticals is a dynamic challenge that can be efficiently determined through voluntary negotiations in the market, avoiding spectrum rights fragmentation and breaking the principle of service neutrality. The award rules in the primary market determine an initial distribution of usage rights.

It is important there is fair access to awards, ensuring that spectrum is used effectively. However, awards are only the starting point for subsequent negotiations by private parties. Overtime, we believe the key to success will come from competitive markets for connectivity and well-functioning secondary markets for spectrum.

Even when valuations expressed in the primary award are too high for a vertical or business to be granted usage rights, innovation can still develop through commercial spectrum sub-leasing agreements between primary spectrum licensees, holding the spectrum usage rights, and industrialists who may have specific needs, such as private local 5G networks. In the following paragraphs we develop this vision in more detail.

Vertical Set-asides

Spectrum that is set-aside nationally for vertical industries in pioneer 5G bands such as the 700 MHz, 3.5 GHz or 26 GHz, poses a severe threat to the wider success of 5G.

Set-asides can limit the assignment of sufficiently large contiguous blocks to allow mobile operators. This, in turn, prevents them from delivering the fastest 5G services by fragmenting the foundation on which those services will be built.

Regulators should avoid set-asides where it is not possible to meet the aim of making available 80-100 MHz per operator contiguously in priority mid-bands (e.g. 3.5 GHz) and around 1 GHz in millimetre waves (e.g. 26 or 28 GHz). Any reservations sub-1GHz bands will cause even greater negative impact, in particular because those bands are used for wide-area coverage.

More widely, set-asides for restricted use cases can lead to inefficient spectrum usage. Spectrum assigned outside a conventional market-based national award procedure open to all players risks being underused. The global footprint of 5G services and applications need a specific harmonised standard based on IMT technologies and deployed in licensed IMT frequency bands.

An alternative to fragmenting these bands would be for vertical industries to use unlicensed spectrum for their 5G needs.

There are already several vertical companies that have made use of the 5.9 GHz band and LTE technology to completely automate several warehouses¹.

The model is proving so successful that is currently being exported across the world as a best-in-class connectivity solution for local needs. Such innovative approaches are tremendously powerful as they make use of the technology and economies of scale provided by the mobile ecosystem coupled with widely available

frequencies. This is one example among many where vertical innovation is driving connectivity and growth and a natural place for verticals to start innovating.

Generally speaking verticals needs should be nevertheless first carefully assessed in order to evaluate if they really cannot be met by alternative, unlicensed bands prior to considering other alternatives.

1. Ocado Automated Warehouse

Coexistence and Synchronisation

Policy makers need to consider the difficulty of coexistence between different services in the same band.

Synchronisation between mobile operators will already prove to be a very big challenge, to say nothing of the monumental task of international coordination that would be required at the border between countries and their respective operators.

The issue will be further compounded by mixing industrial and commercial networks, presenting further technical deployment challenges, which will result in harmful interference or limit the 5G services that can be supported. For example, all 5G networks in a band will need to be synchronised, which means very high-speed public broadband networks could not co-exist with very low latency industrial networks in the same area.

In a scenario where verticals are awarded a portion of mobile frequencies, at the very least, they will need to coordinate with 5G commercial networks to mitigate interference by synchronising or wasting spectrum for guard bands and establishing large separation distances between base stations thus further reducing coverage across the geography of a market.

It should be noted that previous ECC work around has proven that such synchronisation and coordination issues are a real problem. In the work they did on Public Protection and Disaster Relief (PPDR) and Railways services using adjacent spectrum to ECS networks they concluded that technical specifications of MFCN Base Station (BS) and User Equipment (UE) do not guarantee interference free operation of concurrent networks in adjacent blocks throughout the coverage area. In the case of FDD systems, an increased UE

adjacent selectivity would be required. This could also affect the base stations of vertical networks deployed with a different density to ECS in TDD bands.

For TDD bands like the C-Band, it is recognised that synchronisation or semi-synchronisation of the networks is the only alternative to fully coordinating all the base stations. Where an agreement between all operators is not possible, Member States may need to facilitate coordination between base stations (similarly to PMR planning) and should therefore be prepared to provide the relevant tools or services.

Moreover, policy makers should consider whether CEPT should be invited to investigate how coexistence of these different types of deployment of 5G and previous ECS technologies could effectively happen in order to avoid situations like the GSM-R coexistence planning. This would ensure that studies were done to demonstrate that in the event of a vertical allocation within a mobile band, it would not at best limit 5G rollout or at worst bring it to a complete halt.

The GSMA would like to stress that the complexity that will be added to an already very complex situation for 5G in mobile bands would be further exacerbated if vertical industries were to have their own dedicated frequencies within mobile bands – to say nothing of the aforementioned issues of fragmentation, cost and inefficiency.

Commercial Sub-market and Secondary Market

A potential solution to vertical connectivity needs is support for a secondary market through licence incentives.

One way would be the inclusion of licence obligations within specific bands that would oblige the winners to provide service to dedicated local needs on a commercial basis and provided there is a reasonable offer. Such an option would maintain the certainty, consistency and predictability the industry needs while also incentivising the secondary market to find a solution.

This option could be complemented by the addition of a leasing obligation in defined local or regional areas should commercial discussion fail to or decide not to use mobile to provide the connectivity. Such an addition would allow vertical to have access to the frequencies, in a given location and lease them for the purposes of creating its own network, while allowing market forces to determine the best use of the spectrum.

This bottom-up approach would be creating a more dynamic secondary market for spectrum in Europe without jeopardising the future of 5G. Finland and Italy both chose this model for the 3.4-3.8 GHz and 26 GHz band, where MNOs who obtain the spectrum in the band will have to provide access to verticals on a commercial basis or will be otherwise mandated to lease the spectrum to them.









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