Cisco comments on BEREC's public consultation on a feasibility study on the development of coverage information for 5G deployments.

Cisco welcomes the opportunity to input into BEREC's consultation on a feasibility study on the development of coverage information for 5G deployments.

We appreciate this consultation and potential study as part of the wider work stream within BEREC on enabling 5G in Europe and that coverage information would be only one of many potential regulatory actions in support of 5G investments. In the below we set out some key considerations to take into account when seeking to understand verticals' connectivity needs (as opposed to consumer connectivity needs) and also touch upon what we see as one of the key enabling regulatory actions for ensuring verticals' 5G connectivity needs are met, i.e. ensuring availability of locally licensed spectrum.

First, there are aspects that need to be considered differently for networks serving verticals:

- Separating indoor versus outdoor use cases is relevant when considering coverage: indoor often requires that base stations or small cells are physically positioned indoors, i.e., on the business' premise, in order to provide adequate coverage and/or capacity, especially for commercial buildings with high penetration losses. When on premise and especially when indoors, there are higher likelihood of services being isolated from adjacent businesses, through building penetration as well as propagation losses. This category is more likely addressable by local licenses (on which the comments below provide more detail).
- Outdoor, including off premise, is a very different category with regard to appropriate license area, better served by larger licenses, which are more typically handled by telecom operators. Generally speaking, this case is probably better handled by traditional licensing via contracted or managed telecom operator services.

For networks located on the business premise and primarily for indoor use:

- Local spectrum licenses, with appropriately low power flux density rules at the site boundary rules ensuring good RF isolation, can vastly simplify the need for NRAs having to involve themselves in detailed issues regarding QoS, etc. Such isolation is easiest at higher frequencies, perhaps ≥15GHz, where penetration losses are higher.
- The license rules should be technology agnostic, both explicitly or implicitly (implicit constraints include channelization, narrow bandwidth, requirements about frame structure, etc.). Again, with a low PFD at license boundary (e.g., comparable to thermal noise levels), such coordination issues are no longer relevant. Technologies agnosticism should be inclusive of 3GPP (4G, 5G, 6G, etc.), IEEE (802.xx), proprietary access technologies, etc. It also needs to keep in mind that a vertical may have

multiple technologies (or different frame structures, etc.) in operation on premise, for different use cases.

- The license rules provide the business with access to sufficient bandwidth for multiple frequency carriers and/or technologies.
- The license provides the business with freedom regarding operational model(s), so they may choose them based upon their own business requirements. Owing the license gives them investment protection for their equipment, they don't need to change modems if they switch providers at a later time. Operationally, the vertical should have the freedom to make the choice(s) best suited to their business needs, e.g., self-operated, telecom operated, third party operated, and/or any hybrid or combination of the above.

With these basic underlying constraints, then the issues of QoS are now up to and under the control of the business itself which provides the business with the greatest possible freedom. Businesses only have to worry about their own RF equipment, not their neighbors'.

Through the creation of locally licensed spectrum with the characteristics described here, businesses (and their respective nations) would be become more productive and efficient in addressing use cases such as:

- Industrial use cases such as: flexible manufacturing, utility monitoring, warehouse automation, industrial monitoring & process control, etc
- Enterprise use cases such as: healthcare, R&D facilities & laboratories, smart retail, building maintenance & control, smart hospitality, transportation hubs, etc.

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