

**Feasibility study on development of coverage  
information for 5G deployments  
Main findings and recommendations**

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## 1. Context of the study

Previous generations of networks were designed as general-purpose communication networks with limited differentiation capabilities across use cases. 5G generation networks are expected to create an ecosystem for technical and business innovation involving vertical markets such as energy, agriculture, city management, government, healthcare, manufacturing, public transportation, to say the least. 5G is also expected to serve a larger portfolio of applications with requirements ranging from high reliability to ultra-low latency to high bandwidth and mobility.

The 5G ecosystem is likely to become the cornerstone for digital connectivity which is a major driver of economic growth and serving societal needs. Many of the proposed 5G services and use cases and their respective providers are part of a particular vertical market (i.e. services which are specific to an industry or a group of customers), some of which have been broadly classified by the 5G Infrastructure Public Private Partnership (5G PPP) as 'verticals'<sup>1</sup>, but which BEREC also considers to be simply businesses with connectivity requirements. Businesses with connectivity requirements / vertical industries are expected to be the main driver of the 5G ecosystem.

Within this context, BEREC set out to consider the feasibility of provisioning coverage information and Quality-of-Service (QoS) aspects of future 5G networks that cater for the needs of verticals. The objective was to provide insights on two key areas:

1. Describe the expected benefits from NRAs' presentation of coverage information and QoS aspects for use by verticals implementing use cases such as automotive, industrial, environmental monitoring, etc.;
2. Attempt to describe the metrics that are of relevance to the verticals.

The following sets out key observations / insights under the two areas of work outlined above. In addition, BEREC sets out its conclusion and recommendation in light of the practical difficulties of determining the merits of the project.

## 2. Expected benefits – main findings

BEREC observes that stakeholders provided limited feedback on the potential benefits of NRAs presenting 5G coverage information for verticals presently.<sup>2</sup>

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<sup>1</sup> <https://5g-ppp.eu/verticals>.

<sup>2</sup> Five submissions were received to BEREC's draft feasibility study BoR(19) 191, October 2019; Cisco, European Broadcasting Union (EBU), GSMA/ETNO, TDF and Telefonica. A summary report is published alongside this document BoR (20) 32. Interested readers may also recall BEREC's early engagement on this project which resulted in four responses: Facebook, Huawei, M3Connect, and UIPT.

Some stakeholders claim that the market will provide relevant information directly to verticals, without a need for regulatory intervention on coverage mapping (see also BoR (20) 32 which is the report on the consultation on the draft feasibility study). Essentially, these respondents claim that demand will drive the market to provide information in the correct form and modality for vertical industries / businesses with connectivity requirements.

Nevertheless, based on the findings from the study to date<sup>3</sup>, BEREC considers that:

- One benefit of the development of coverage information of 5G deployments would be to assist verticals and/or system integrators for end solutions in verticals to optimise their connectivity decisions (a point supported by the submission from the European Broadcasting Union);
- Another benefit would be that the availability of such information from an independent 3<sup>rd</sup> party (i.e. the NRAs) would play an important role in the negotiation process between the vertical and the provider of the connectivity solution (in the case of using third party networks); and
- Relevant information may assist NRAs in ensuring service providers meet their obligations (though this area would be beyond the scope of the work and it is too early to consider this aspect in any detail).

At this stage, the ability of BEREC to quantify these benefits was limited given the early stage of development of 5G deployments. Advancing work to quantify benefits would also seem premature at present.

Other insights on benefits that were uncovered during this study stem from responses to the NRA survey<sup>3</sup>. In particular, 8 NRAs set out that there is information on vertical ecosystems in their markets, which they would consider demonstrate various benefits;

- For example, one insight is that 5G pilots/projects and service trials are often openly marketed demonstrating high levels of collaboration between stakeholders. BEREC received some information on 5G trials at Helsinki airport, 5G Groningen in the Netherlands, corridor Lisbon-Madrid in Portugal, Residential study on 5G and IoT in Romania, and Rural First in the United Kingdom. In several other cases, it was noted that the NRA had gauged interest from verticals through consultation processes and in one case, the NRA approached local authorities around potential business connectivity requirements;
- In addition, in one example, an NRA set out that it has a dedicated strategy to support 5G services. For example, it hosts a website promoting innovative 5G

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<sup>3</sup> BEREC also conducted an extensive NRA survey, February 2019 which resulted in 26 responses (Austria, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Malta, Montenegro, Netherland, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain and United Kingdom).

service trials<sup>4</sup> and intends to co-organise an event on 5G '*rethinking transport*' in April 2020.

The goal in common between these examples seems to be that gaining more knowledge and promoting exemplar trials may develop a more enabling environment for 5G. This, in turn, may enable NRAs to anticipate the types of regulatory issues which may need to be addressed in the future.

### 3. Description of metrics relevant to verticals – main findings

Having undertaken an assessment of all inputs, it seems clear that BEREC would find it difficult to gather information on the metrics of relevance given all the diverse use cases mentioned by stakeholders during the course of the study.

For example, even in the latest round of information gathering from stakeholders in the consultation on BoR(19) 191, one respondent (the EBU) set out information on 5 distinct use cases which it would be most familiar with: three cases under the heading of content production and two further cases under the heading of content distribution. The metrics it set out include the following:

- network reliability factors of up to 99.99%;
- mobility figures of up to 500 km/h; and
- payloads of between 0.4 Mbit/s for high quality audio, 3-5 Mbit/s for high definition TV (HDTV) content and 15-25 Mbit/s for ultra-high definition TV (UHDTV).

This demonstrates how varied the potential metrics are for some familiar and well-defined use cases.

In another example, from an NRA response to the survey, some QoS requirements for public protection and disaster relief (PPDR)<sup>5</sup> were set out, though more work would be needed to derive applicable metrics from the set of requirements and applicable standards provided by it as an example.

In addition, and as set out in the NRA survey, smart city is an umbrella term covering trials from everything from air-quality monitoring to movement sensors to detect earthquakes.

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<sup>4</sup> <https://www.traficom.fi/en/communications/communications-networks/5g-momentum-ecosystem-enables-finnish-leadership-5g>

<sup>5</sup> In Slovenia, a number of high level requirements were set out by AKOS. These requirements were expressed by a PPDR mobile virtual network operator (MVNO) and may serve as an interesting starting point to consider relevant metrics in this use case. AKOS also provided early stage views on PMSE (program making and special events) and video surveillance and electricity smart networks requirements. Having considered the information received, BEREC considers that translating such requirements into metrics could benefit from more study after similar use cases are deployed using 5G.

On the basis of the above, it is not feasible to gather applicable/definitive metrics for use cases at this time.

However, the study showed the importance of backhaul in the success of 5G. 9 NRAs set out views on the supply of 5G compatible backhaul in their markets. For example, 5G compatible backhaul was considered to be a critical success factor with public funding available in more than one market, in another market backhaul was considered to be a bottleneck that could be addressed with additional fibre connections to base stations, and in yet another market 5G backhaul was not considered an issue as obligations were imposed that performance in backhaul had to be equivalent to the equipment in the base station. In one market radio links were specifically identified as a factor to support backhaul and in another market a synergy between the 5G roadmap and the strategic national-broadband plan in that market was established to potentially avoid a bottleneck in backhaul.

## 4. Conclusion and recommendation

In light of the above, BEREC considers that it would be too early for BEREC to set out a policy objective to provide harmonised information on 5G coverage and QoS aspects of networks.

In fact, the current thinking of BEREC is that it should adopt a wait and see approach. One idea which BEREC is considering is what criteria would need to be in place before revisiting this particular project in the future. In this regard it would seem reasonable to reconsider the project following the deployment of one or two use cases in practice (i.e. in two or three years' time).

BEREC does consider there is merit in keeping BEREC in the conversation about coverage information and QoS aspects of networks, potentially as part of a workshop with stakeholders or via an appropriate engagement between BEREC and stakeholders at BEREC's Stakeholders' Forum event due to take place on 1 April 2020.<sup>6</sup>

BEREC would then use the information to make proposals for future work in this area, which could include complimenting BEREC's previous work on Common Position on information to consumers on mobile coverage - BoR (18) 237 – albeit focusing on use cases other than enhanced Mobile Broadband for consumers.<sup>7</sup>

On the basis of these findings, BEREC considers that rather conducting a specific project it would be best to continue to facilitate exploratory discussions with industry, with the objective of keeping BEREC informed of relevant discussions around coverage information and QoS aspects of 5G.

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<sup>6</sup> In one example, seven Administrations including several NRAs (Czech Republic, Germany, Finland, France, Netherland, Portugal, and United Kingdom) presented at the CEPT workshop on new spectrum solutions for industry sectors, Copenhagen, May (2019), all of which helped inform the development of BEREC's feasibility study <https://cept.org/ecc/cept-workshop-on-new-spectrum-solutions-for-industry-sectors>

<sup>7</sup> See also "Study on Implications of 5G Deployment on Future Business Models", report by DotEcon Ltd and Axon Partners Group, No BEREC/2017/02/NP3, March 2018.