BEREC
Body of European Regulators for Electronic Communications

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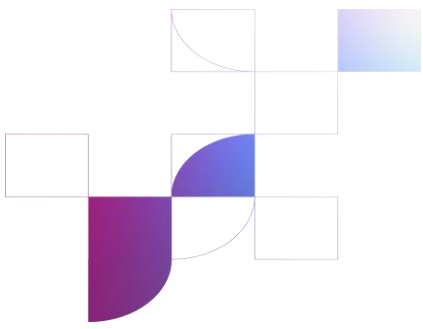
BEREC Opinion

on the methodology for the mapping of QoS coverage of Connectivity Indicators for the DDPP



5 December 2024

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Executive summary

BEREC was asked in early 2024 by the European Commission (EC) for an opinion on the first draft of a methodology for geographical mapping of 5G mobile connectivity and fixed wireless access (FWA) with quality of service (QoS) parameters.[1] The proposal of the methodology is from the University of Aachen contracted by the EC and aims at developing further the current KPI (in particular on 5G).[2] It will consider the BEREC Guidelines on Geographical Surveys of network deployments in accordance with Art. 22 of the EECC and the mapping Annex (Annex I) of the EU Guidelines on State Aid for Broadband.

The first draft of the methodology has been shared with BEREC on the 15th of July 2024.

While preparing this opinion, the contractor and the EC replied to a series of questions asked by BEREC experts to allow for a better understanding of the chosen concept and all the elements proposed.

This fruitful cooperation is a base for the BEREC present opinion and, according to the intended updated timeline by the Commission, for the **further work necessary on the methodology before it might be proposed for adoption.**

The proposed methodology is part of an ambitious plan by the Commission which, through the proposed methodology, foresees the adoption of a new KPI within the Digital Decade Policy Programme (DDPP) to improve DDPP reporting and also for the purpose of State Aid assessment[3] (“multi-purpose approach”).

At the time, BEREC prefers to focus its first opinion on the goal of the proposal and on the likely outcomes of its full application. Details on technical aspects will follow as long as the draft methodology will be commented by stakeholder and preliminarily tested.

In principle, BEREC welcomes the ultimate goal of the draft methodology which is to increase harmonisation in terms of evaluating and reporting 5G coverage – also in terms of network expected performance - throughout the EU and increase the comparability of the reported data.

- It is also BEREC’s view that adopting such a methodology for various purposes such as monitoring DDPP and State Aid raises critical challenges and could lead to the undermining of other regulatory processes and purposes due to contradictory information from other measurement methodologies. It is worthwhile for comparability purposes at European level, and BEREC will gladly provide its expertise, to carry out a robust model. However, it cannot be intended to supersede more precise information, such as detailed maps provided in some

[1] First Draft of the „5G Mobile and Fixed QoS Coverage Mapping Methodology“ presented by the EC/Consultant to BEREC on 16th July 2024.
[2] EC Implementing Decision (EU) 2023/1353 of 30 June 2023, https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=pi_com:C(2023)4288.
[3] Guidelines on State Aid for Broadband networks, Annex I.

Member States at local level for the information of end users. This could lead to inefficiencies, hindering progress in delivering reliable information to the end-user. If monitoring 5G roll out at European level - to see if DDPP targets are met and to lead State Aid procedures - may deserve more harmonisation through a European preferred methodology (like the one prepared by the EC), by approaching information given to end user and local authorities, it is recommended to take into account also the current practices to meet specific needs in different Member States and to benefit from best practices like BEREC's Art. 22 Broadband mapping Guidelines.

Generally, it is imperative to ensure that the tools and methodologies deployed for various objectives are tailored to their specific purposes. Some inherent trade-offs of the proposal, in terms of objectives, instruments, flexibility, costs and timing need in fact to be addressed carefully.

BEREC is also aware that the proposed methodology may require substantial investments by the operators and – most of all – NRAs/OCAs (in terms of costs for the simulator and mapping and resource training). Moreover, for this methodology it is necessary to have a full-scale 3D terrain model including 3D models of buildings and terrain for the entire area in question. Regular updates will also be necessary.

Therefore, BEREC expects that **establishing such new model would be very costly. For this BEREC very much welcomes the planned detailed consultation with mobile operators to verify the assumption of the author that mobile network operators (MNOs) already have such models and widely use it for network planning.** Such consultation should be initiated as soon as possible, and BEREC should be informed on the implementation and results of the exercise.

The consultation with MNOs and **small scale testing** which is planned for early 2025 will be of high importance for further steps. **Therefore, BEREC is of the opinion that the consultation with MNOs should be initiated as soon as possible** to verify fundamental assumptions of the project, i.e. that the required calculation models are already available and used by the industry. This is important to understand the implementation cost and to reply to BEREC´s serious concerns regarding the administrative burden for NRAs/OCAs and the cost-benefit ratio of implementation of the proposed methodology for all the stakeholders.

BEREC is also convinced that the small scale tests will bring very important practical findings which will lead to a better informed discussion on the methodology (that would be fully applied only in 2027). Through the test, intact, it will be possible to compare the results of the new methodology with other, existing systems, and possibly also with real measurements in the chosen locations.

BEREC therefore considers that the currently proposed draft methodology should not be adopted without small scale testing because the cost and administrative burden of a full implementation (methodological and policy-wise, in terms of measured KPI) might outweigh any benefit reached in the form of unification of approaches. Furthermore, it risks contradicting results of existing tools.

Thus, the present Opinion is to be considered as a preliminary advice by BEREC on major topics of the proposal, in order to contribute in a constructive procedure for setting up such an important methodology. More accurate and specific comments will be shared after the results of the trial.

BEREC has also a number of very technical comments to certain elements proposed, but considers more productive to discuss them later after the first testing phase. At this stage, BEREC is inclined to support a simplified approach, using only easily available parameters such as lower resolution (grid raster as recommended in the BEREC Art. 22 Broadband mapping GL) for the objective of comparison and monitoring at European level.

It must also be noted that national regulatory authorities (NRAs) currently apply different systems for 5G coverage mapping. Various calculation models are currently in use, whereas measurements are also widely applied for mapping and/or verification of the data.[4] In some countries, calculations are not done by operators, but are performed by NRAs who own (and paid for) the calculation models and are guaranteeing reliability of the data.

BEREC will start an update of its Guidelines on Article 22 broadband mapping in late 2025 which is also seen as an opportunity for further alignment of the NRA approaches thus increasing comparability, representing an opportunity to work in parallel with the Commission and explore synergies (see below section 4).

1. Introduction

1.1. Background and procedure incl. BEREC's role

Decision (EU) 2022/2481 of the European Parliament and of the Council establishes the Digital Decade Policy Programme 2030 (DDPP) that is intended to guide Europe's digital transformation.[5] It establishes digital targets and objectives in the realms of digital skills, digital infrastructure, digitalisation of business and of public services. Article 5(1) of the DDPP requires the European Commission to monitor Member States' progress towards the general objectives and the digital targets set out in the DDPP and, to that end, the European Commission set out in the Implementing Decision (EU) 2023/1353 of 30 June 2023 the KPIs for each digital target.

[4] Cf. also BEREC Implementation Report on Connectivity Indicators for the DDPP (BoR (24) 187).
[5] OJ L 323, 19.12.2022.

BEREC's focus is on the two KPIs related to connectivity, KPI 3 (Gigabit connectivity for fixed networks)[6] and KPI 4 (5G networks)[7]. The Commission set up a subgroup on the 5G indicator as it intends to update the 5G indicator in the future. For this purpose, the Commission announced at the beginning of 2024 a draft "Roadmap for a two-stage approach for the development of a methodology for the mapping of QoS coverage for mobile and fixed broadband services and establishing harmonised pre-conditions for future data processing".

Within the expected update of the Digital Decade KPIs on connectivity and 5G in particular, the EC intends to develop a methodology enabling the mapping of QoS coverage for fixed wireless and mobile broadband (and in particular 5G).

In February 2024 the EC presented the Roadmap to the expert group with an adjusted time table. BEREC is expected to release formal opinions on the proposed methodology. The first draft of the "5G Mobile and Fixed QoS Coverage Mapping Methodology" was presented by the EC/Consultant to BEREC on 16th July 2024.

This Opinion expresses BEREC's preliminary comments on the overall proposal of a first draft of the methodology taking into account explanations received from the EC during two virtual meetings[8] and answers to a questionnaire of BEREC[9].

1.2. Agreement with the ultimate goal, but cost of practical implementation need to be considered and evaluated after small scale testing

BEREC welcomes the ultimate goal of the proposed methodology which is to increase harmonisation in terms of evaluating and reporting 5G coverage and networks expected performance throughout the EU and increase the comparability of the reported data. The overall plan is quite ambitious both in terms of methodological effort and policy outcomes, and BEREC welcomes the updated and extended timeline of the overall process by the Commission.

Moreover, the choice of a methodology as a multipurpose instrument valid both for defining a new KPI according to the DDPP and assisting Member States for notifications of State Aid measures, may affect the main features of the methodology, implementation outcomes and expected results.

[6] Gigabit connectivity, measured as the percentage of households covered by fixed VHCN. The technologies co nsidered are those currently able to deliver gigabit connectivity, namely Fibrfe tot he Premises and Cable DOCSIS 3.1.

[7] 5G coverage, measured as the percentage of populated areas covered by at least one 5G network regardless of the spectrum band used.

[8] 1st October and 19th November 2024.

[9] EC response received on 30th October 2024.

BEREC hence considers that the currently proposed draft methodology should not be adopted without small scale testing, because the cost and administrative burden of implementation run the risk to outweigh any benefit reached in the form of unification of approaches. Furthermore, it risks contradicting results of existing tools.

1.3. Since it is a draft methodology the Opinion aims at advising the European Commission

BEREC considers it necessary to wait for the results of the small scale testing showing the costs and difficulties of a very sophisticated methodology in practice. BEREC also considers it necessary to involve the MNOs as they are expected to generate the data for the model based on the methodology.

BEREC welcomes the willingness of the EC to discuss further the best way to implement the methodology as well as to adjust it where needed to make it implementable. After the small scale testing (foreseen by mid-2025) BEREC expects the Commission to report in a further document the experiences and results, allowing BEREC to evaluate amendments which may include a simplification of the methodology if needed for practical implementation.

BEREC would also like to point out that while it understands the need for better comparability of coverage data across the EU, one of the main purposes of the mapping tools in use by NRAs/OCAs is to inform end users on the availability of fixed (VHCN) and mobile (5G) connectivity. In that sense BEREC would like to investigate which adjustments of the proposed methodology (actually based on a theoretical approach) are required for a better compatibility with the purpose of NRAs' mapping tools.

1.4. Engagement of other stakeholders

BEREC likes to emphasize the necessity of involving MNOs at an early stage to evaluate whether the models they use can be adapted to the methodology or, on the contrary, if the methodology needs to be adapted to what actually used models can deliver.

2. Summary of the proposed methodology

2.1. Purpose

The European Commission (EC) has identified a discrepancy between the current 5G KPI and the 5G connectivity targets outlined in the EU's Digital Decade Policy Programme. The 5G target aims to ensure 5G connectivity with high-quality service in all populated areas by 2030. However, the existing KPI primarily reflects basic coverage and does not account for Quality

of Service (QoS), particularly during peak times. According to the EC, this limitation renders the current trajectory insufficient to fully support Europe's digital transformation.

To address this gap, the EC wants to develop a harmonized 5G QoS indicator that supplements the existing 5G coverage metrics. This new indicator intends to enable more comprehensive monitoring of network performance, ensuring alignment with end-user needs and emerging technological developments. The Commission emphasizes that this methodology will be future-proof and capable of adapting to advancements beyond 5G technology.

The methodology is presented as designed to serve several objectives, making it "multi-purposed":

- Monitoring progress toward the EU Digital Decade targets.
- Supporting EU policy and regulatory decision-making by harmonizing the approach to 5G broadband mapping across Member States.
- Enable comparisons in theoretically available QoS across Member States.
- Streamline and simplify data collection regarding 5G for NRAs and OCAs – with data directly collected in a "ready to use" format from MNOs.
- Facilitating EU State Aid assessments by providing evidence for determining "market failure" in areas lacking adequate connectivity and defining thresholds for ensuring "step change" improvements in broadband and mobile network. Once adopted, the QoS indicator is expected to replace current mapping requirements under Annex 1 of the EU State Aid Guidelines.
- Inform users about the "expected peak-time end user speeds" availability as a possible future option.[10]

Comments

BEREC acknowledges the intention of the European Commission to produce a methodology that answers questions ranging from comparability between Member States (MS) to target monitoring and setting in the context of state aid and user information on peak times.

Monitoring investment to achieve DDPP 2030 objectives and informing users about available connectivity performance are two different things.

[10] Even though the proposed methodology lacks justification for the need of an indicator „expected peak time end user speeds" which goes beyond the DDPP targets.

One of the main concerns is that a mapping methodology based solely on simulations with no commitment in terms of reliability and no feasible way to verify actual quality of experience in the field is going to be deceptive for end users trying to be informed about connectivity in their area. Experience from various NRAs showed that coverage maps simulations, even when they only represent radio coverage, can be unreliable if not checked on the ground through drive tests. Furthermore, adding a notion of theoretical download and upload speeds may exceed what is feasible with a high reliability, given the inherent variability of mobile networks, and is going to add significant complexity to any possible verification through drive tests.

A methodology representing expected peak-time user speeds cannot meet all the intended objectives. In particular, the inherent lack of reliability of some indicators at a local scale could lead to misunderstandings by the end users and local authorities. Moreover, notions of peak-time conditions can be misunderstood and may not reflect MNOs' investments in 5G technology deployments.

BEREC points out that it is unclear how the proposed methodology will help in setting future targets as part of the DDPP or other future endeavors. It is essential that such objectives are stated in advance or at least outlined for NRAs to understand how the proposed methodology will help. There is, to this day, no definition of what constitutes a "good" level of 5G Quality of Service in terms of peak-time end-users speeds. And even if this will be a later political decision, as BEREC was informed, this "threshold" is a very important and relevant element of the monitoring.

In conclusion, it is BEREC's view that adopting a "multi-purposed" approach to the methodology raises challenges. In particular, the absence of a coordinated and synergistic allocation of resources to address the diverse goals could lead to inefficiencies. A multi-purposed methodology, without clear articulation of the interdependencies and prioritisation of objectives may dilute efforts and hinder progress in delivering reliable information to the end-user. I.e. the inherent trade-offs of the proposal, in terms of objectives, instruments, flexibility, costs and timing need in fact to be addressed carefully.

2.2. Suggested main characteristics

The proposed methodology for the geographical mapping of 5G mobile and FWA networks aims to be a prescriptive and detailed guide for quantifying 5G theoretical radio coverage, reflecting service availability, and 5G QoS coverage, in terms of estimated end-user DL/UL speeds in peak time conditions. The view of the Commission (EC) is that a methodology based on simulated QoS (QoS-1) parameters provides a stable, transparent, comparable and relatively accurate KPI as it takes into account the cell capacity and nominal cell load of 5G networks depending on the different areas, urban, suburban, rural.

Two frequency ranges are distinguished: 5G-NR FR1 (sub-6 GHz) and 5G-NR FR2 (mm-wave). Taking into account propagation characteristics of these frequency bands, the methodology proposes different calculation models for radio coverage results. These results

are then transformed into per-pixel 5G QoS-1 coverage in terms of peak-time per-user DL/UL data rate.

The propagation model parameters for 5G-NR FR1 are more relaxed and in the form of recommendation. It is **recommended to use** a deterministic site-specific model (e.g. based on ray-tracing), taking into account digital 3D data of buildings and environmental clutter or it may be a (semi-)empirical statistical model, with parameters calibrated for the target network area.

On the other hand, a deterministic site-specific model (e.g. based on ray-tracing) **must be used** for 5G-NR FR2, taking into account digital 3D data of buildings and environmental clutter.

Although only a 20mx20m grid is indicated in the methodology for both frequency ranges, the EC clarified in its response to the BEREC questionnaire and the meeting on 19 November 2024 that this should be mandatory only for the FR2, at least in the initial phase of the implementation. As stated in the EC answers, a transition period is likely to be required to reach the 20mx20m grid. In 2026, and possibly 2027, data gathering will probably rely on larger 100mx100m grids.

The methodology assumes that mobile and FWA 5G deployments are separate, such that a 5G MNO does not use common spectrum resources to jointly serve mobile and FWA users. In case an MNO is using a common operating frequency band for mobile and FWA services, the MNO must declare the spectrum resource partitioning between the two services.

In the per user data rate estimation, the following should be taken into account:

- For mobile networks nominal values of cell load under peak-time conditions are assumed, taking into account cell classification as urban/suburban/rural. Cell classification is based on population density statistics for the corresponding network area. Additionally, in EC answers it is stated that the “worst-case” nominal cell load should be used. Specific load issues like tourist season may be taken into account by modifying the classification of the cell (e.g. from rural to urban).
- For FWA peak time conditions take into account percentage of premises in the target area served (“premises connected”) by the 5G FWA network and assume nominal value of the oversubscription ratio factor (ORF).

3. BEREC's doubts about the current proposal of the EC's contractor / good elements and costs of implementation

3.1. Doubts

BEREC welcomes the aim of the methodology to harmonise the approaches used for mapping more and thus increase comparability, but the current proposal leaves a lot of room for improvement in terms of clarity, and simplification. More importantly, a QoS indicator based on theoretical modelling may give end users inaccurate information, undoing progress in countries where reliable data is being provided.

The objectives of the methodology must be narrowed down

BEREC is of the opinion that, without a clearly circumscribed objective, efforts can become fragmented, resources may be misallocated and stakeholders might pursue divergent priorities.

By narrowing the focus to specific and achievable outcomes, such as the monitoring of the progress towards the EU Digital Decade targets, the approach can provide clearer benchmarks for assessing advancements and measure progress. By employing a harmonised and theoretical approach, different from local measures, the methodology allows for consistent benchmarking and cross-regional analysis, which are indispensable for tracking progress and informing policy decisions.

Consideration of existing tools and frameworks

The proposed methodology does not sufficiently consider the existing tools and frameworks already implemented at the national level. Failing to leverage these established tools risks duplicating efforts and contradicting existing tool.

Theoretical models alone are insufficient to accurately inform end users:

BEREC highlights that the proposed methodology, which relies on theoretical modelling, can indeed calculate or simulate network performance and provide some level of information on QoS. However, BEREC considers that theoretical models alone are insufficient to accurately reflect user experience and provide reliable information to end-users on the local availability of 5G services.

To fill the gap between the theoretical maps and user experience, the proposed methodology lacks a user-oriented approach involving MNOs and complementary crowdsourcing apps that allow users to conduct their own mobile network performance tests, including uplink and downlink speeds, as well as web browsing.

The methodology must effectively address the triple challenge of readability, reliability and technical feasibility to meet the needs of user.

In this context, it is imperative to ensure that the tools and methodologies deployed for these objectives are tailored to their specific purposes.

The proposed methodology requires significant efforts from Member States to implement, while potentially failing to provide meaningful and reliable information to end users if not complemented by crowdsourcing measures.

Unification/comparability/level of detail

As already noted, BEREC welcomes the goal and consequent efforts to improve comparability of the proposed indicator and, in perspective, of QoS mapping (also to unify practices in gathering background data for mapping).

Nevertheless, it should be carefully evaluated, which level of accuracy is desired and needed. It is a fundamental question as there will be a **trade-off** between the level of accuracy (and comparability) on one side and the level of burden posed on the entities obliged to gather data and calculate the QoS indicator.

Up to that, also the **level of detail of the methodology itself** will play a decisive role in terms of accuracy and comparability of the results gained. The proposed methodology does not contain precise-enough definitions of the propagation model and its parameters. **It stems from the experiences of the BEREC member NRAs who currently perform the calculations themselves that any small change in the input parameters causes significant change in the result (especially in areas with worse coverage).**

Any change in any propagation parameter, calculation step or model resolution would have crucial influence on the computed result and the differences can be even in tens percentage points, especially in areas with worse coverage. This may be considered by the EC in further improvements and fine tuning of the methodology.

The need to be clear between obligation vs. recommendation.

Considering the proposition and explanations given by the EC in the meeting on 19th November 2024, the methodology is written more as recommendation for the Frequency Band 1 (FR1) and more as obligation or decision for the Frequency Band 2 (FR2). It should be clear which data each MS must provide to the EC and when the data gathering should start. Current usage of FR2 by MNOs is limited to areas which are not expected to be market failure areas (e.g. densely populated areas) so it may be wise to postpone FR2 mapping for a later stage or keep it voluntary in the first phase in order to avoid complex and possibly costly implementation of the methodology.

Accuracy vs. flexibility in technical issues

The methodology should ensure an adequate level of harmonisation and comparability between MSs with realistic coverage. To produce realistic coverage data, the methodology

should have more flexibility in the definition of cell load bringing them closer to operational values. The EC's proposed changes of cell classification to overcome certain specific cell load issues should be clearly stated in the methodology.

There are also other technical issues regarding 20mx20m raster which is not ideal for object identification, line-of-sight propagation and 3D modelling. While more precise raster than 100mx100m may be needed for nation-wide coverage, it is questionable if the proposed 20mx20m will fit FR2 applications or characteristics.

NRAs must have all relevant information about DDPP new KPIs and proposed methodology to evaluate KPIs correctly, such as number of households/inhabitants at individual address. The DDPP uses the term "populated areas" when setting the coverage goal. It is therefore important to clarify the proxy. Assessing additional population data and/or software may affect timing of the implementation. In some MSs certain types of data (such as number of households) are not available to the NRA or is not available on an early basis. This will cause inaccuracies in reporting.

The case of FWA

The methodology assumes that mobile and FWA 5G deployments are separate, in a way that a 5G MNO does not use common spectrum resources to jointly serve mobile and FWA users. In addition to that, when FWA and 5G are not separate, operators must declare the spectrum resource partitioning between the two services, and map mobile and FWA separately. In most cases where an MNO offers FWA as an add-on service to its mobile network it will use common spectrum resources for the FWA and mobile service. Such application of FWA may not be in all cases considered as a substitute to fixed access so only separate deployments or 5G SA on the basis of network slicing with a guaranteed minimum data rate for FWA should be taken into account in gathering data for FWA.

3.2. Costs and timings of the implementation of the proposed methodology should be consistent with the regulatory relevance of the outcomes

Topic: Complexity of propagation models (and costs to establish these models)

Ray-tracing propagation methodology is proposed as recommended for lower frequency bands (FR1) and as obligatory for higher frequency bands (FR2). BEREC experts point out that due to the computational complexity of such methodology, it is not well suited for calculations of larger areas, such as a whole city. Moreover, for this methodology it is necessary to have a full-scale 3D terrain model including 3D models of buildings and terrain (including e.g. trees which change shape over time) for the entire area in question. Regular updates will be necessary to ensure the model remains relevant.

Therefore, BEREC expects that **establishing such a new model would be very costly. For this BEREC very much welcomes the planned detailed consultation with MNOs to verify the assumption of the author that MNOs already have such models and widely use it for network planning.** Such consultation should be initiated as soon as possible.

3.3. Costs of the implementation of the proposed methodology

Topic: Grid raster format and volume of data from operators

- According to the EC explanation, the calculations for the QoS of each MNO and their results in raster format will have to be performed by MNOs themselves. MS authorities (NRAs or OCAs) are expected to carry out the verification of the logical consistency of the data and the aggregation of the data from the different operators. In case MS authorities calculate QoS parameters themselves, they are expected to follow the same methodology. This implies that the entity responsible for calculation of QoS should set up the model as prescribed which can result in additional costs. As stated above, it should be well investigated how many MNOs and institutions do already have suitable simulation and calculation systems.

BEREC noted that various grids/rasters are used throughout the EU. The NRAs are supporting harmonisation in this regard. The planned review of BEREC's Art 22 Broadband mapping Guidelines, which requires a focus also on 5G, is an opportunity to work in parallel and explore synergies (see section 4 below).

BEREC also wishes to stress that complex calculation in combination with higher resolution requirement will lead to higher data volumes - not only data volumes of the points definitions, but especially of the resulting files, which will amount to tens of GB. These will further be multiplied by the number of frequency bands and by the fact that separate calculations are performed for mobile and for FWA. One such data set from one operator might therefore amount to TBs in size.

In further discussions it should be clarified whether and how the data sets will be handed over and who will be able to process, aggregate and store such data. BEREC is convinced that this data management will also create significant costs. As NRAs do not have the same resources and budget – a common goal should be to find a way to reduce administrative and monetary costs and take into account of these differences. In that regard it must be born in mind that additional NRA costs are not the same for NRAs which are performing calculations and those which are collecting and aggregating data from operators.

Topic: NRAs have calculation software / existing tools

Currently, some NRAs perform the calculation of coverage on their own, using a licenced software (for which considerable financial resources have been invested), and using data gained from operators on the parameters of particular BTSs. These NRAs then guarantee that the required parameters are uniformly submitted by all operators and that the calculation is at

a certain level accurate and comparable among operators and over time. **These past investments should be taken into account when deciding about any new approach and when assessing the cost-benefit ratio of altering the status quo.**

Against the backdrop of existing tools and past investments, it is likely that most NRAs will continue performing their own calculations and measurements for the purposes of regulatory controls and consumer empowerment with the help of maps, i.e. to provide information about "real" availability of a service in a certain quality to end users.

BEREC would therefore prefer a simplified methodology for the purpose of monitoring the fulfilment of the Digital Decade target and for this purpose is prepared to further work on it with the EC, the contractor and the MNOs. **BEREC also suggests to include in the planned small scale tests a comparison of different approaches** e.g. to compare result for one area when using the draft methodology vs. when using simplified parameters such as lower resolution (e.g. the grid raster currently recommended by the Art. 22 BEREC Guidelines), simplified model of terrain, no 3D modelling etc., vs. results when using field measurement (see section 4).

3.4. Other issues

Topic: Lack of clarification of proxy/definition of populated areas

BEREC considers it also important to discuss in relation to the QoS mapping: the proxy for the resulting percentage value.

It is not a technical parameter of the methodology itself, but it will have an impact on the interpretation of the results. It was raised as an issue by several Member States (MSs) during previous debates on the possible improvements of the KPIs on coverage.

Many MSs are not in favour of keeping "households" as the proxy, above all in relation to mobile networks. Most NRAs map mobile coverage with inhabitants and/or area as a proxy which is regarded as suitable by BEREC.

Furthermore, Article 2 Point (4) of the Implementing Decision (EU) 2023/1353 setting out key performance indicators to measure the progress towards the digital targets set that 5G coverage is "measured as the percentage of populated areas covered…", but the term "populated areas" is has not yet been defined even if it is highly needed.

4. The link with Art. 22 EECC and BEREC Guidelines on Art. 22 on geographical surveys of network deployments

4.1. BEREC Art. 22 GL Update will start in 2025 2nd half

Article 22 of the EECC established that NRAs and/or Other Competent Authorities (OCAs) should conduct a geographical survey of the reach of electronic communications networks capable of delivering broadband by December 2023. Paragraph 7 tasked BEREC with the delivery of guidelines to assist these public authorities on the consistent implementation of their obligations under the Article. In March 2020, after consultation with stakeholders and OCAs, BEREC published BoR (20) 42, the "Core Guidelines"[11]. This methodological document aimed at enabling the relevant European authorities to develop national broadband maps which would provide useful information for decisions makers to deliver on important regulatory and policy functions. At the same time, the information needed to be as harmonized and comparable as possible across countries and operators, whilst safeguarding the proportionality of data collections and ensuring that new demands would not risk the integrity of existing national processes and systems, as several NRAs/OCAs already had broadband maps in place.

In its recent Implementation Report on the BEREC Guidelines on Geographical surveys of network deployments[12], BEREC has established that the BEREC Guidelines have improved the comparability of national key performance indicators, especially for wired networks, and have provided a solid foundation for a harmonised delivery of geographical surveys across Europe[13]. However, the same document concludes that the delivery of harmonized 5G indicators, especially those describing quality of service[14], is very challenging and deserves further work. In BEREC's view there is room for improvement regarding the national approaches in implementing the Guidelines with respect to wireless networks, to achieve further harmonisation and with this increase the comparability of indicators across MS. Thus,

[11] BEREC Guidelines on geographical surveys of network deployments, BoR (20) 42. After the publication of this document, in March 2021, BEREC published its Guidelines on Geographical surveys of network deployments Article 22 (2), 22 (3) and 22 (4), BoR (21) 32, and in June 2021 its Guidelines on geographical surveys of network deployments - Verification of information, BoR (21) 82. The three Guidelines are available here: Handbook of BEREC Guidelines on Geographical surveys of network deployments

[12] BoR (24) 146, published in October 2024

[13] There have been substantive improvements in the use of common definitions, on the number of countries collecting geographical information, on the granularity of this information and the use of GIS.

[14] Where expected peak time speed plays out as a specially challenging indicator.

BEREC is supportive of the goal pursued by the methodology proposed by the EC: to increase harmonisation and the derived comparability of nationally reported 5G coverage data and welcomes this possibility to explore ways by which to achieve these outcomes.

Because of all of this, and with the objective to increase the comparability of wireless coverage and QoS indicators and information, BEREC will work on an update of the BEREC Article 22 Guidelines in the second half of 2025. By then, BEREC, NRAs and the EC will have learnt about the experiences of the NRAs who are carrying out pilot tests to apply the proposed methodology and will have had the opportunity to gauge the operator's views on the approach. Overall, there will be better knowledge on the benefits and costs of its use so that it is possible to better judge whether it is a good way to fulfil the desired objectives, also when compared with any possible alternatives to build upon existing approaches with the objective to achieve more comparable outcomes.

4.2. Discussion related to level of harmonization in the updated GL (whether this meets expectations from the new methodology)

BEREC is committed to improving the comparability of 5G coverage information across European countries and will continue to collaborate with the EC and with OCAs in this pursuit. The updating of the BEREC Guidelines will provide the opportunity to reflect on the lessons learnt throughout the processes and move forwards to deliver more comparable and relevant 5G coverage and QoS indicators.

BEREC will work on the update once the outcome of the EC "Methodology on 5G Mobile and Fixed QoS Coverage Mapping" is known, most likely in the second half of 2025. If it turns out that the objective of increased comparability can be achieved with the updated Art. 22 GS Guidelines (by integrating some of the principles), BEREC would consider that this is a more cost effective way and would enter into a dialogue with the Commission to go down this route rather than developing a stand-alone methodology.

5. Conclusions – the Opinion incl. improvements/better ways to reach the objective

5.1. BEREC considers that the current proposal should not be adopted without prior small scale testing.

BEREC appreciates the idea of harmonisation and comparability of 5G KPIs on EU level and improvement of geographical mapping of 5G mobile connectivity and fixed wireless access (FWA) with quality of service (QoS) parameters. However, defining a straight-forward and easy to implement methodology for mobile technologies that can at the same time satisfy

comparability goals and be used for determining market failure areas is not easy – if possible at all. The current proposed methodology, even at a draft stage, is set in the right direction but BEREC believes that further work is necessary on the methodology before it might be proposed for adoption, including **consultation with MNOs and small scale testing which are expected to give elements for a cost/benefit assessment**. The process of verification and aggregation of the mapping results also needs more details.

BEREC is of the opinion that the consultation with MNOs should be initiated as soon as possible to cross check the proposed methodology and to reply to BEREC's concerns regarding the administrative burden and the cost-benefit ratio of altering the status quo.

BEREC is also convinced that the small scale tests will bring very important practical findings which will enable comparison of the results of the new methodology with other, existing systems, and possibly also with the complement of real measurements in the chosen locations.

5.2. BEREC is convinced that further work is needed and stands ready to work with the Commission to improve the methodology and make it implementable.

BEREC welcomes the fruitful cooperation with the Commission. This is a base for further work which is needed in particular for the technical aspects. It is crucial to work in tandem in order to make the methodology implementable. BEREC also welcomes the Commission's flexibility in adjusting the timeline for further work and testing. BEREC considers **further work necessary on the methodology before it might be proposed for adoption.** BEREC also likes to highlight that it is important not to mix the various goals within one methodology but to fine tune the approach in such a way that the objective of increased comparability **is reached without compromising on the objective of providing meaningful information to end users.**

Annex

Comments on specific technical aspect of the proposed draft methodology (will be provided after the small scale testing).