



Joint GSMA / ETNO response to BEREC Consultation on the BEREC Preliminary Report in View of a Common Position on Monitoring Mobile Coverage

8 November 2017

INTRODUCTORY REMARKS

ETNO and the GSMA, who represent the telecoms sector in Europe, welcome the opportunity to comment on BEREC's Preliminary Report on Monitoring Mobile Coverage. We hope the following detailed comments can serve as a constructive contribution to BEREC's deliberations on this preliminary report.

Various considerations that are relevant in the scope of this exercise, are equally relevant in the scope of the discussions around net neutrality and quality monitoring inter alia referring to Art. 4 of the Telecom Single Market Regulation. BEREC's considerations in both exercises need to be fully aligned. ETNO and GSMA had jointly submitted to BEREC detailed positions on the latter previously.

GENERAL COMMENTS

The BEREC consultation focuses on one particular regulatory objective: gathering and presenting information on mobile coverage for the purposes of increasing transparency in the market. Transparency is meant to promote competition by helping customers make informed decisions when choosing among MNOs; it should also help verticals and developers that make investment decisions on products whose value relies on the availability of mobile coverage. We believe that this transparency, if properly managed, enhances as well the value of mobile networks, and therefore welcome any initiative aimed at improving the way information on mobile coverage is organized, gathered and communicated.

Regulators should concentrate their harmonization efforts on ensuring that the information gathered and presented is valuable for the intended users and uses, and is not counterproductive. This can be achieved only by following certain principles:

- The information should be accurate. Realistically, no measurement technique is 100% accurate. They are all based on samples and/or estimations. This does not mean that Regulators should refrain from their objective of increasing transparency, but a minimum high threshold should be required for any measurement technique sanctioned by a Public institution.

- The information should be unbiased. Focusing on certain aspects of coverage above others, or simplifying the information to make it more accessible, can sometimes give a distorted picture that should be avoided.
- Only information that is relevant should be gathered and published. Expanding the scope of transparency has costs and can compromise accuracy. We therefore encourage NRAs and BEREC to narrow the scope to the characteristics of mobile coverage that induce a customer to choose one provider over another, or a vertical to invest in services that are complementary to mobile coverage.
- The frequency of publication and the detail of the information presented should enhance competition, not degrade it. Competition Policy and Economic Theory conclude that transparency can limit competition when it allows competitors to react immediately to the deployment decisions of a particular MNO. Providing real-time information with extremely granular maps, for example, could do more harm than good.

We note that there are other justifications, beyond increasing transparency in the retail market, for NRAs and BEREC to monitor coverage and do it in a harmonized manner. Most importantly, spectrum agencies are tasked with designing and monitoring coverage obligations linked to spectrum rights of use. In this respect, we encourage BEREC to pursue further harmonization on the way coverage commitments in spectrum licenses are defined, for the following purposes:

- Increase certainty for licensees by avoiding open obligations that are difficult to value at the time of award and can result in conflicting interpretations when evaluating compliance.
- Facilitate spectrum trading through increased transparency of the rights and obligations attached to licenses

Mobile coverage can also be monitored simply for statistical purposes, to facilitate comparisons among regions and countries. These exercises are not as critical commercially and the potential impact on the market is therefore limited, but they can be politically more sensible. They should adhere to the same principles of accuracy, unbiasedness and relevancy, and whenever they are used to establish a hierarchy of regions, due account should be taken of differences in costs and benefits of providing mobile coverage.

SPECIFIC COMMENTS

1. Introduction

1.2 Recommendations

- The establishment of coverage maps is only one element in the context of providing transparency on mobile network performance and cannot be assessed in an isolated way. Accordingly, non-individual measurement of network performance, the most accurate way to provide general and objective transparency is based on drive test. Complimentary to drive tests, many operators offer coverage maps in the internet, which provide calculated information about deployed networks in different regions. If coverage maps are alternatively sourced based on individual customer's measurement (e.g. via apps), it has to be fully taken into account that such sources are usually not reliable and provide no robust indication of an IAS provider's network performance. In any case, no monitoring tool that does not provide robust measurement results should have any legal implication. However, such tools may provide some useful information on customers individually experience (see detailed elaborations below). BEREC's draft reports partly considers these complementary tools, which all have specific limitations.
- NRA's have to set clear objectives for the initiatives on monitoring mobile coverage, ensuring these initiatives a real added value. When launching new initiatives, or extending existing ones, NRA's have to ensure the efforts are proportional and do not result in undue burdens for the operators (e.g. resources, IT developments), where for instance quick wins or workarounds could lead in a short time to relevant results instead. This also refers to maps and indication of quality with regard to voice services. Providers of voice services should have an incentive to provide quality and should not be burdened in case they decide to offer quality.
- In particular, mobile coverage information definition and delivery should be coherent with National requirements and mechanisms already defined between NRA and domestic mobile operators.
- Mobile coverage topic is to be considered as a separate and distinct matter with regards to mobile services' *Quality of Service* and *Qualiy of Experiece* (QoS/QoE) issues; indeed QoS/QoE matter depends on different measurements context, devices, usage, procedures and objectives.
- BEREC should provide guidance to NRAs on how to define certification criteria for robust monitoring systems. These criteria should be equally valid, irrespective of whether a NRA builds an own monitoring system or certifies a third party's monitoring system.
- The certification procedure for third party measurement systems should be lean, non-bureaucratic and non-discriminatory. Also ISPs should have the option to provide certified measurement systems, given that they are often the first point of contact for access-related matters
- Due to the technological characteristics of mobile networks, monitoring systems and processes applied to mobile IAS may need to differ from systems applied to fixed IAS. They should, at least, take into account the different kinds of specific interfering factors.
- With regards to QoS, only a robust monitoring system can deliver measurements that provide transparency of an ISP's actual performance. To be robust, the system needs to exclude external factors that interfere with the IAS's performance, such as infrastructure beyond the ISP's backbone and the end-user's infrastructure. Comparison of KPIs using a VPN may also be influenced by factors outside the carrier's network as well as general differences in the carrier's network without any influence from traffic management.

Network differences such as peering relationships and other factors outside the carrier's network (such as embedded adverts) may also impact the web page load time. Success rates may also be more of a factor related to the external content. Accordingly, a robust monitoring system needs to measure only the performance between a server within an ISP's backbone and the Internet access point.

- NRAs should also take into account that different types of data traffic may need to be assessed differently. For example, for live streaming of video, encoding delay is introduced by the content provider and not affected by the carrier. Similarly, measurement of stream bitrate is controlled by the client and server and will behave differently to the IAS speed measurement. Measurement will give variable results if the user is moving, as mobile networks do not necessarily give a steady throughput across locations. It will also vary according to usage, for example if a request on the test system occurs at the same time as another request on another client. Again we would emphasize the need to assess quality as a whole rather than just speed in assessing different types of traffic.
- Given the high volatility of mobile network performance (e.g. shared medium, high dependency of the performance on the current location), "drive test measurements" can complement single measurements: a drive-test provides a benchmark at the same place at the same moment of the different operators of a country, which is a more objective way of comparing operators than crowd-sourced measurements. Drive tests performed by independent third parties or by an NRA, provide a more robust indication of a network performance at different times and different locations. The use of this complementary transparency measure should be supported by Member States. On the other hand, crowdsourced information should not be over-relied upon as they cannot guarantee the same level of accuracy and reliability.
- The recommended speed tests will saturate the connection with a high load. However, since this is on a shared packet network, in doing so they will degrade the performance of other packet flows aggregated on the same part of the network (including backhaul and GPON/DOCSIS/mobile access). Ideally, the tests should not themselves cause quality issues and less intrusive methods should be used such as ΔQ .
- Recommendation on comparability: GSMA/ETNO welcomes the attempt to harmonize measurement tools across the EU, provided that these tools deliver reliable results. If such tools are supposed to cover different technologies, the distinct characteristics of network technologies have to be taken into account (i.e. copper, cable, fiber and mobile) and also the state of play of the broadband market in each EU jurisdiction. In this regard, GSMA/ETNO believes that more detailed work should be carried out at national level by the different NRAs.
- GSMA/ETNO would like to highlight that aggregated data should be published with sufficient context information, e.g. linked to information on technical details of network coverage. Indeed, based on averaged results, operators with a nationwide coverage might be handicapped compared to operators who have an opportunistic approach, only investing in densely populated areas with high economic potential for very high speed broadband connections. In addition, such metrics does not give an objective end-to-end view, taking into account that the "opportunistic" operators do not provide services in e.g. less densely populated areas. Consequently metrics should not be averaged over the service areas of operators, but over the entire country. Same logic applies to countries with technology competition. Publication of results should not lead to promotion of certain technologies or operators based on differences measured on arbitrary chosen parameters, certainly if those differences don't translate into objective differences in quality perceived by the customer.

2. Characteristics of mobile coverage

2.1 User location

- As mentioned above, mobile coverage highly depends on various local factors, such as the location of the antenna, whether the location is in-house or outside.
- It should be sufficient to perform metrics outside buildings and not set higher requirements for outdoor conditions to make sure that mobile signal is available indoor as well. As BEREC recognizes, indoor coverage depends on the type of construction and it would be misleading to assume they are all the same.
- The BEREC finding that the level of mobile indoor coverage is highly dependent on the structure of the buildings and thus cannot be assessed by just adding an attenuation factor is highly welcomed. Such an approach would imply an unproportioned burden to operators. It is not sensible to impose any indoor coverage requirements since the heterogeneity of the buildings would operators not allow to calculate the needed effort to fulfill such a requirement.

2.2 User equipment

- End-user equipment is highly relevant for coverage maps that are sourced with customers' individual measurement. Such measurement tools (e.g. apps) usually do not reflect the actual performance of the IAS since the device distorts the measurement (e.g. restricted technical performance, use of wifi, parallel run apps, measurement server outside of the IAS' backbone).
- In case of testing user equipment (e.g smartphones) inside vehicles it is placement is also an important factor. It should be ensured average equal radio conditions for all operators when performing drive tests (e.g. using handsets/USIM rotation).
- The large number of different devices used for accessing mobile services make metrics and comparisons difficult between devices.
- BEREC should aim at simplifying and harmonising the number of devices to be considered for the quality of service analysis, and take into account the different factors that may affect handset sensitivity.

2.3 Performance indicators

- The performance of the IAS is highly dependent on factors beyond the ISPs' influence (e.g. the kind of downstream in higher network topologies). For example, packet loss metrics are of little or no practical use to consumers or edge providers for evaluating service quality, or for comparing the performance of alternative networks, even for delay intolerant applications. On the contrary, low packet loss could be an indication of slow network performance, and thus worse for delay-intolerant applications. The focus on packet loss metrics could have adverse unintended consequences that ultimately harm end-users and CAPs. New transparency requirements on packet loss could prompt end-users to choose IAS with low packet loss. Consequently, ISPs have an incentive to reduce packet loss through increased router buffers, which could result in slower and less optimized Internet routing systems.
- The post-processing of measurement results should be accurate enough in order to detect and discard or adjust all measures from the evaluation that could be negatively affected by the measuring system or by the customer's environment.

- Measured performance must not be confused with general network performance; e.g. customers may choose a lower bandwidth although tariffs with higher bandwidths are available.

2.3.2 Quality of Service (QoS)

- GSMA and ETNO believes that monitoring QoS can be a positive and fruitful exercise both for European citizens and for European market players operating along the broadband value chain. Beyond legal obligations stemming from sector-specific EU regulation and further best practice at national level, GSMA and ETNO support cost-effective and appropriate steps to increase transparency to enable consumer choice and, by this, support network competition. As to the concepts and parameters inherent to measurement tools, GSMA and ETNO also would like to highlight that close attention must be given, for the sake of accuracy, to the characteristics of the technology platform whose quality is measured and to the specificity of national broadband markets. The possible definition of a single Europe-wide system designed to monitor and measure the quality of broadband on all national levels must be sufficiently flexible to allow an adjustment to the individual national characteristics and should always be available on an opt-in basis, allowing regulators who have already implemented their measurement systems to maintain them.
- The performance of a mobile IAS is determined by a wide range of factors and, thus, performance is much more variable than in the case of fixed line Internet access. The mobile IAS's performance is determined by a number of variables, such as the end-user's current location and distance to the nearest antenna, the type of (isolated) building where the end-user is, the capacity and usage of the cell in the specific moment (depending on the number of current users within the cell) and the weather. Accordingly, an agreed speed range has to be broad, with minimum speeds close to or at zero and maximum speeds that are available under optimal conditions. Any measurement at a specific point in time is only a selective snapshot. The same applies to average performance indication, which can provide an indication of what end users may expect, however this may vary greatly between individual use cases. Particularly, this refers to mobile broadband where there is, for technological reasons, a broad range of possible connectivity (depending on a user's individual location and the usage of a mobile cell at a certain point in time).
- As regards IAS in terms of physical access to the Internet, GSMA and ETNO suggests that the exercise of measurement of quality by regulators be carried out by sticking to the legal provisions of the sector-specific regulation, which is by taking into account very well defined parameters defined in the regulation.
- A proper standardisation process within ETSI and already established standards should be used. In particular as to the IAS speed measurements, it is necessary to start from the ETSI standard to define the parameter, its statistical significance and the measurement methodologies to be applied

2.3.3 Quality of Experience

- Discussions on quality of mobile broadband lines need to be broader, considering not only speeds and coverage, but the overall customers' experience. For example, web-browsing can be more influenced by round-trip-time than by the real download speeds because of the effective way of downloading a browsed web-page.
- It is therefore important to have a broader view on customer experience and not just single out those parameters. In any case, a proper assessment of speed performance needs to ensure specific criteria in order to ensure reliable results, and taking into account that technology-neutral measurement is challenging.

- Regarding Internet Access Services, GSMA and ETNO very much support BEREC's finding that up- and download speed are only some parameters crucial for customers' experience. Additional parameters which are in but also outside of the ISP's providers control strongly determine customers' experience. It should be ensured that operators have equal access to test servers outside of the ISP's providers' control.
- As regards mobile connectivity, the following features are already important today and will be even more important in 2025: download speed, latency, network congestion, resilience, reliability, fall back or seamless integration with other wireless technologies (i.e WiFi, HetNets, 2G/3G/4G/5G), security and uninterrupted access. There is no "one size fits all" commercial connectivity offer to satisfy each and every customer's needs.
- Comparisons sanctioned by Public Institutions should avoid as much as possible measurement techniques for QoE that introduce a large subjective component, such as consumer surveys, especially when the aim is comparing MNOs at national level.

3. Presentation of mobile coverage

3.1 Macro information on mobile coverage represented through metrics

- If measurement results are used to increase transparency for customers (e.g. interactive maps), to improve end-users' informed choice, it is of utmost importance that these data are robust, up to date and mirroring reality.
- Regarding the accessibility for a wider audience, GSMA and ETNO have the following comment: Making public performances that cannot unequivocally be assigned to ISPs could provide misleading messages to the public about specific ISPs performance should be carefully considered by NRAs as negative consequences might be permanent.
- It is obvious that proper guidance on the correct interpretation of the measurement results is needed when end-to-end quality metrics are provided: an ISP can't be blamed for the fact e.g. that the server of an internet content provider would be congested.
- Although macro information on mobile coverage collected in periodic questionnaires might not be comparable, it should be considered to compare which are the metrics collected in each Member State that are aligned with EU objectives (e.g Coverage for 30Mbps mobile broadband EU Digital Agenda and more recently Connectivity for a European Gigabit Society).

3.2 Mobile coverage on specific location represented through maps

- Interactive maps that are based on crowd-sourcing can only provide an overview, possibly incomplete, of measurements reflecting subscribed tariffs and not of deployed networks. If publication is considered, this should only encompass clusters of location and measurements, reflecting a reasonably high number of measurements. Even for a high number of measurements they usually do not constitute statistically representative samples (e.g. proportion indoor/outdoor) necessary for drawing conclusions on neither subscribed tariffs nor the general network performance. The necessary number of measurements should be based on statistical theory, therefore determining the size of the considered area per test. E.g. per considered area there should be a minimal number of tests per considered time period. Even then it can be that these tests always happen at the same location, e.g. indoor x times per time period versus spread over the area. Note that the geographical aspect of mobile coverage is very important. When networks in evolution (e.g. roll-out of upgrades) the time aspect is also important.

- Publicly accessible maps should not provide an overview on individual measurements and must not be linked to individual locations; any offered map on measurement results should only indicate anonymised and geographically clustered measurement results. Customers' privacy should be ensured.
- It would also be recommended to reflect the evolution and investment effort of operators over time. The percentages of coverage should not be shown only in a static moment or year, it must also be shown graphically showing the evolution of coverage over the years.
- Where prediction methods are used for maps there should be a consistent approach to coverage prediction probability of service. There should also be clear distinction between probability of coverage being present and other network/service availability KPIs & metrics.

3.2.1 Accuracy

- When defining criteria for the presentation of mobile coverage (i.e. through maps), BEREC and NRAs must take into account the existing trade-off between the granularity of information provided to the end user and the confidentiality of information about operators' network elements localization.
- If coverage maps are supposed to provide a reliable overview on mobile coverage, accuracy of measurement is of utmost importance. Accordingly, immanent weaknesses, particularly with regard to customers' individual measurements have to be considered.
- Accordingly, in addition to BEREC's meaningful components of accuracy, the overall importance of reliability of measurement tools should explicitly be highlighted. Only measurements used for coverage maps that stem from reliable measurement tools provide meaningful transparency on network performance to end users.
- Any limitation of the quality of measurement results, particularly regarding accuracy, should be made transparent. In regard to IAS, end-user dependent factors have a crucial importance with regard to accuracy. ISPs only control their networks but there are many things out of their control, such as premises, equipment etc. For instance, no Speed Measurement with any customer terminal can be considered as reliable. Not only the environment can disturb measurement but also performance of the terminal.

3.2.2 Transparency

Please view this comments in addition to Accuracy arguments, as provided in paragraph 3.2.1:

- Any limitation of reliability of data should be transparency displayed; e.g. mapping of individual mobile measurements which are not representative for general network performance.