



**GSMA response to the BEREC public consultation on:  
Common Position on monitoring mobile coverage**

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**About the GSMA**

The GSMA represents the interests of mobile operators worldwide, uniting nearly 800 operators with more than 300 companies in the broader mobile ecosystem, including handset and device makers, software companies, equipment providers and Internet companies, as well as organisations in adjacent industry sectors. The GSMA also produces industry-leading events such as Mobile World Congress, Mobile World Congress Shanghai, Mobile World Congress Americas and the Mobile 360 Series conferences.

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## Introduction

The GSMA is pleased to have the opportunity to respond to BEREC's common position on monitoring mobile coverage. The GSMA agrees with BEREC on the importance of mobile coverage and clarity for consumers and regulators on the coverage achieved by mobile operators in their respective markets.

## General Comments

### **Informing consumer choice, ensuring competition and efficient investment**

The GSMA believes that approaches to coverage monitoring need to be placed in context. Firstly, information about coverage and service quality informs customer choice. Secondly, it should provide a positive incentive to ensure innovation and competition between players. Finally, it should guide and inform public policy initiatives aimed at expanding and upgrading mobile network infrastructure. The metrics chosen and the degree of transparency should be tailored to the particular objective pursued.

While GSMA supports in principle harmonised provisions for the EU digital market, there is no immanent need to harmonise information on mobile coverage across Member States for the sake of enabling end-users informed choice as stated by BEREC. Tariffs are usually provided nationally and end-users do not compare networks quality in different member states.

It is useful to distinguish between two main uses of data, that in our view have different requirements in terms of information requirements and harmonization at EU level:

- Monitoring coverage and publishing inter-operator comparisons to facilitate informed end user choices and promote competition is to a large extent a national issue, as mobile markets are national and consumers care about coverage in their country. If at all, coverage abroad is only a secondary input to their decision.
- Inter-country comparisons, for Public Policy purposes or as information for verticals and third parties, present higher EU level harmonisation requirements. However, the information requirements are not necessarily the same as for the previous objective, and there is no significant added value in gathering and publishing this information at operator level, or with a very high level of granularity.

GSMA thinks EU harmonization efforts can only reasonably focus on the second objective. We see benefit in regulators sharing best practices on inter-operator comparisons, but do not see a need of having to agree at EU level on the details of how the comparisons are generated and published.

### **Perceived coverage is jointly determined by handset and network quality**

The BEREC common opinion emphasizes the role of mobile operators in ensuring appropriate levels of coverage. GSMA members accept their responsibility, but we also believe it is important that increased transparency requirements on just one element of the equation do not blur the full picture. Although out of control of network providers, the handset quality plays a very relevant role in the level of coverage perceived by end users, and Public Initiatives aimed at fostering good levels of coverage should take it into account to some degree. In particular, Regulators should take care that increased pressure on mobile operators to provide ubiquitous strong signals does not hinder the incentives of device manufacturers to invest in enhancing the radio performance of the end user devices, still noting these devices must comply with 3GPP/ETSI technical specifications and, on the EU market, with the Radio Equipment Directive (RED), which includes requirements related to radio receivers' performances.

## **Consistency of the BEREC's common position with the existing requirements and mechanisms**

Any recommendation concerning the definition and publication of mobile coverage information should be consistent and provide sufficient flexibility with regards to the national requirements and mechanisms set by the NRA and on EU-level, as well as with regard to telecom operators voluntary measures. Accordingly, BEREC's common position should only address the countries where no reliable monitoring system for coverage and quality of service has been implemented. Information provided in the scope of this exercise should also not be confused with information requirements such as based on Art. 4 of the Open Internet Regulation. Care should be taken that consumers are not confused with inconsistent and not reliable information on network quality coming from different sources.

## **Joined-up thinking between coverage monitoring and subsidy models**

The economics of mobile networks are such that there is a natural limit to which operators can roll-out profitably, and additional investment requires a subsidy of one form or another – either from customers or from external subsidies. Regulators often include coverage obligations in licences in order to ensure this investment happens, without much consideration of how this will be funded, and what sources of subsidy are required in practice. Coverage monitoring is then carried out as a stand-alone compliance activity. A fresh look at coverage monitoring - and tools to better understand the economics of coverage - could play a role in identifying more effective and appropriate subsidy arrangements.

## **A future-proof approach**

The GSMA recognises that consumers' use of mobile services and their expectations change over time, and it is important that any approach to coverage and monitoring is flexible in this regard and able to evolve in future years with changing expectations - particularly where the regulator supports this through a well-designed subsidy or rebate programme. Such an approach will help ensure strong and sustainable investment and competition. It requires that coverage metrics are periodically adapted to changes in technology and use, and additionally that periodic assessments are performed to evaluate whether the information gathered is useful and fit for purpose. We see a risk of devoting significant operator and regulator resources to develop and maintain maps without paying proper attention to whether they inform subsidy programs, or to whether customers actually use them to choose supplier or make other economic decisions.<sup>1</sup>

## **Ownership and confidentiality of coverage information**

In order to design an effective and workable approach to coverage monitoring, the question of information ownership first needs to be addressed. Operators typically have their own coverage records, based on network build plans, propagation models and validated using field testing. Regulators typically conduct some level of field test verification, at least on a sample basis - but more comprehensive information will generally come either from operators or third parties. Additionally, some third parties are beginning to specialise in compiling independent coverage information, based on crowd-sourced data. Finally, some coverage information provided by operators to regulators may be confidential and may have competitive value, and so would need to be treated correspondingly.

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<sup>1</sup> We would welcome for example figures on the usage of existing maps and benchmarks provided by NRAs

Clearly, any coverage monitoring solutions need to be consistent with the ownership and confidential status of the data being used.

When defining the criteria for the presentation of mobile coverage (through the display of maps), BEREC and NRAs should take into account the existing trade-off between the granularity and speed of the information to be provided to the end user and the necessary confidentiality of information about operators' network elements localization.

Under suitable conditions, GSMA members would expect to use their data to inform customers of the coverage they offer. There are many examples of coverage maps provided by individual operators on a voluntary basis.

Third parties can complement information provided by operators and NRAs, provided that their information on mobile coverage is robust. For example, this can encompass drive tests or outdoor measurements financed or performed by third parties. However, particularly with regards to third parties, confidentiality and ownership of data have to be respected.

## Four principles

GSMA would finally like to do a reminder of the four key principles highlighted in our response to the previous consultation. We believe they are still valid:

- The information should be **accurate** and based on proper measurements, particularly if it is used to assess contractual compliance. However, maps that are supposed to provide the full overview on national mobile coverage are all **based on samples and/or estimations** and, thus, cannot be 100% accurate. This does not mean that Regulators should refrain from their objective of increasing transparency, however end-users should be **informed about the lack of accuracy** related to specific means such as calculated coverage maps and NRAs should **refrain from publishing data that is not found to be accurate**. Additionally, **minimum requirements** should be defined for any measurement technique sanctioned by a Public institution to ensure reliable information.
- 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 end-users informed choice. 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.

## Common position (CP1)

### Technical Specifications for Monitoring Mobile Coverage in Europe

When choosing metrics on national levels, GSMA considers that a proper balance should be struck between two conflicting objectives:

- Properly reflecting the perception of coverage by end users
- Isolating coverage metrics from factors outside the control of the mobile operators

Depending on the context, one objective should prevail over the other. If the information is used to monitor compliance with obligations assumed by an operator<sup>2</sup>, it is key to use metrics which match with the way these obligations are expressed in the licenses terms, like for example measuring signal strength under conditions excluding interference from factors outside the network provider's control. This information is also crucial to make an informed choice between different network operators' performance. On the other hand, if the intended use of the information is to allow end users to make an informed choice including not only network performance but also e.g. handset quality and the service used online, measurement units should aim at better reflecting the quality of experience, with appropriate disclaimers to free operators from responsibility for factors they cannot control.

GSMA also believes that crowdsourcing information, while useful to complement other methods, should not be overestimated because by its nature it cannot guarantee the same level of statistical accuracy and reliability with respect to a *super-partes* measurement system, such as e.g. the one carried out by specific drive test campaigns in which the networks of all MNOs are measured simultaneously and with the same representative standards. Crowd-sourced information based on app-based individual measurements only provide random snapshots of quality experienced by customers at a specific location. Also, dilution of measurements through limited hardware performance cannot be excluded.

#### Answer to the five concrete questions posed by BEREC:

1. *Should BEREC define common metrics for mobile coverage? Please explain your answer, for example by setting out the reasons why BEREC should or should not define common metric, including views on the potential benefits and risks to consumers and other stakeholders.*

While GSMA supports in principle harmonised provisions for the EU digital market, there is no immanent need to harmonise information on mobile coverage across Member States for the sake of enabling end-users informed choice as stated by BEREC. Tariffs are usually provided nationally and end-users do not compare networks quality in different member states. Accordingly, providing common metrics across EU Member-States does not necessarily add value for consumers. More important are in this regard the above described objectives such as enabling consumers' informed choice (between national providers), ensuring competition and efficient investment.

The definition by BEREC of common parameters for mobile coverage should be consistent with the national requirements and mechanisms set by the NRA. BEREC's position should consider common parameters only for those NRAs who have not yet implemented any reliable monitoring system for coverage and quality of service and where network operators have not voluntarily established such systems.

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<sup>2</sup> For example, as part of a spectrum licence assignment or as part of a tender for public funds

That being said, inter-operator and inter-country comparisons would not be possible without a common metric consistently applied within a Member State or within the EU. The GSMA supports this - although thought needs to be given to the journey involved in creating that alignment. Regulators must ensure that the process of alignment doesn't result in any existing licensee facing a more onerous obligation that set out in their original licence, and any changes in licence obligations is by mutual agreement (as envisaged in the European Electronic Communications Code).

2. *What service availability definition and minimum requirements would you consider appropriate? What multi-level requirements would be appropriate to represent different level of coverage? Please explain your answer, for example by detailing how your figures for minimum service availability were established and by providing evidence.*

(see also comments above on CP1).

Only a robust monitoring system can deliver measurements that provide transparency of an MNO's actual performance. To be robust, the system needs to exclude external factors that interfere with the MNO's performance, such as infrastructure beyond the MNO's backbone and the end-user's infrastructure.

As such, each MNO must monitor its own technical parameters (notably the "pre-specified minimum") to elaborate its coverage's maps, keeping the responsibility of the definition of the different levels of signal strength. If the NRA chose the level of received signal, the mapping from MNOs would be under strong constraints that would jeopardize the reliability of the results and disengage MNOs from their responsibility.

Metrics based on signal power have some advantages: they are comparatively easy to measure, easy to compare, and a good base for signal prediction modelling. However, a predicted mean signal level at a location will in reality – if measurement are not performed under conditions that exclude diluting factors – correspond to actual signal levels that are higher or lower and so users will therefore experience with certain probabilities a range of experiences, making a single binary threshold somewhat open to interpretation. Related to this, if Regulators set relatively high minimum signal levels, they can give rise to situations in which consumer experience is satisfactory but the minimum level is not reached. Finally, where different technologies are used and carriers aggregated across different frequency bands, with different levels of congestion, the user experience may further vary and so this approach needs to be used carefully. Finally, we note that beyond a certain level higher signal strength is not necessarily correlated with better consumer experience (see response to Question 3), an issue that should be duly taken into account when choosing multiple thresholds or setting policy objectives.

Metrics based on Quality of experience, like a "reliability rate" defined as the expected rate of success of being able to access a particular service with a minimum level of quality, provide more understandable and adequate information to the end user on the coverage. The probability of connecting to the service, results from the combination of different technical parameters including network planning and optimizations, signal strength, network load, geographic topology, distance from the base station, etc. However, it is important that users are properly informed about the meaning of the figures coming from this approach, such as the influence of the handset that is used or the impact of external circumstances like extraordinary events that can lead to cell congestion.

It should also 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. Indoor coverage is highly dependent on the type of construction, which in turn is very heterogeneous.

3. *What signal power thresholds would you consider appropriate for different mobile technologies? What multi-level thresholds would be appropriate to represent different level of coverage? Please explain your answer, for example by providing rationale for such thresholds and by detailing how they were derived, including assumptions made and how they are linked to minimum service availability.*

In general, overly ambitious thresholds are not conducive as higher signal power does not necessarily lead to better quality or better consumer experience. Increasing field strength, which is a measure of the downlink signal (from base station to terminal), does not necessarily translate to a better user experience because the performance may be constrained by the uplink (from terminal to base station) which is power constrained.

As outlined in the BEREC consultation document, most NRA's have set LTE RSRP thresholds in the range between -115 and -110 dBm. Thresholds exceeding -110 dBm seem overly ambitious in a multi technology/frequency band environment and would correspond either to very high data rates or very high service probability, potentially indicating no coverage in areas where users can get satisfactory service, or leading to over engineered and costlier coverage than required. A high binary coverage threshold applied to a single layer as though it is the sole resource available will overestimate the resource that is required to provide consumers with highly reliable service coverage since it fails to account for the available contributions to probability from other coverage layers.

In case thresholds keep differing across Europe, it must be made transparent and clear that measurements are not comparable as they would relate to different user experiences or probabilities within the areas deemed covered according to the different thresholds.

4. *What might be the practical implications associated with selecting thresholds such as the impact of factors outside of the control of the mobile network operators (for example please see the discussion on key elements for monitoring mobile coverage from the consumer perspective as set out in the consultation)*

The selection of threshold very much depends of the pursued objective. E.g. to indicate an overview on customers' experience, crowd-sourced coverage maps may be adequate. However, such maps do not provide a representative indication of the performance provided by a network operator. However, GSMA's understanding is that BEREC's common position aims at establishing thresholds that ensure reliability and completeness of information on mobile coverage.

It is critical that reporting must only refer to metrics that are within the control of the licensed operator, to avoid misleading information and unnecessary conflicts. Examples outside of the licensee's control include the following:

- subjective measures such as "Quality of Experience"
- "end to end" measures that rely on elements outside of the licensees' network and domain of control
- coverage that is reliant on other parties, such as coverage inside railway carriages (dependent on repeaters and/or propagation properties of the carriages themselves)

A particularly critical factor outside the control of the licensee is receiver sensitivity in terminals. Customers using devices with poor sensitivity experience a poorer service in a given area than customers with better quality receivers. Sensitivity varies widely between devices and manufacturers, and has generally deteriorated in past years, as vendors have prioritised processor, display, audio and battery performance - as well as cosmetic styling - over radio performance.

Any regulatory strategy to improve coverage and quality of service will ultimately be ineffective unless a means is found to incentivise terminal vendors to prioritise sensitivity. This would likely involve raising consumer awareness of the issue and allowing consumers to make it a criterion for terminal selection and potentially when they interpret predicted coverage.

To be reliable, a QoS measurement system needs to exclude, in addition to the end user's device, other external factors that interfere with the IAS performance, such as the infrastructure beyond the ISP's backbone. Accordingly, a reliable monitoring system needs to measure only the performance between a server within an ISP's backbone and the Internet access point.

5. *Given the rapid evolution of mobile data consumption, how often do you consider that common metrics should be reviewed to remain fit for purpose or useful for consumers in the future?*

The frequency of the reviews cannot be set in advance. BEREC should periodically assess whether technology or use have changed to a point that makes the review necessary. That said, GSMA understands that given the purpose of this initiative snapshots are more relevant than historical comparisons. Overall, the benefits of frequent reviews seem to outweigh the drawbacks, although care should be taken to minimize the costs of the exercise to the operators.

## Common position 2 (CP2)

### The use of signal predictions for mobile coverage estimation

GSMA acknowledges that making detailed coverage estimations without input from operators is technically and economically impractical, and entails a higher risk of inaccuracies. We favour a system in which the estimations are based on operator input and the reliability of the results is certified by NRAs (see response to CP3). In addition, we prefer the option where operators perform the calculations themselves, based on agreed methodologies (propagation models, etc.), as opposed to the option where operators provide detailed network information (location of base station, antenna parameters, frequencies, ...) that allows NRAs to do the calculation themselves. We believe our preferred method is simpler, less intrusive and takes into account that many operators already provide mobile coverage information to the public.

Theoretical models are estimations, and it is important that operators are not liable for mistakes that are within an acceptable margin of error. This is particularly crucial since according to BEREC's Guidelines on the TSM any monitoring system provided by a NRA is per se considered as certified (i.e. reliable). Calculated quality does not replace the need of individual measurements to assess contractual compliance, based on measurement systems that provides accurate results.

Finally, GSMA agrees with BEREC that there would be benefit in having a harmonised approach in the future regarding the requirements and parameters that impact the results of the theoretical model, as listed in page 8 of the consultation. However, different operators and Regulators might have



different views on the metrics and levels to be harmonised, due to their strategic choice, know-how, expertise, etc. It is important therefore that the harmonisation is subject to the greatest consensus possible, and done in an open and transparent way, even if the related figures will be different from one operator to another due to their strategic choice, know-how, expertise, etc.

### Common position 3 (CP3)

#### Ensuring accuracy of coverage information provided to the public

We agree with the common position, and would like to stress the requirement of ensuring statistical robustness of the measurement methodology. In this regard, crowdsourcing is in our view not a reliable methodology to control the accuracy of coverage maps, and should be avoided. Publicly provided information must not be confused with individual measurements of on network quality to assess contractual compliance.

### Common position 4 (CP4)

#### Availability and presentation of mobile coverage information

Since the objective is to facilitate customer choice, the information made available should be simple and easy to understand, whilst still relevant. The GSMA agrees it is important to strike a balance between complexity and accessibility in coverage metrics.

NRAs should refrain from publishing any available data, but should focus not only on relevant but also on reliable data. Otherwise end-users will not be enabled but confused to make an informed choice, comparing networks.

Maps developed by NRAs must not reveal business secrets. If NRAs publish confidential data they hold about mobile networks, there is quite a risk to make public sensitive data on how competing companies deploy their networks.