Australian Government | acma Australian Communications and Media Authority

Proposal to make the Telecommunications (Mobile Network Coverage Maps) Standard 2026

Consultation paper

JANUARY 2026

Canberra
Level 3
40 Cameron Avenue
Belconnen ACT

PO Box 78
Belconnen ACT 2616

T +61 2 6219 5555
F +61 2 6219 5353

Melbourne
Level 32
Melbourne Central Tower
360 Elizabeth Street
Melbourne VIC

PO Box 13112
Law Courts
Melbourne VIC 8010

T +61 3 9963 6800
F +61 3 9963 6899

Sydney
Level 5
The Bay Centre
65 Pirrama Road
Pyrmont NSW

PO Box Q500
Queen Victoria Building
NSW 1230

T +61 2 9334 7700
F +61 2 9334 7799

Copyright notice

https://creativecommons.org/licenses/by/4.0/

Except for the Commonwealth Coat of Arms, logos, emblems, images, other third-party material or devices protected by a trademark, this content is made available under the terms of the Creative Commons Attribution 4.0 International (CC BY 4.0) licence.

All other rights are reserved.

The Australian Communications and Media Authority has undertaken reasonable enquiries to identify material owned by third parties and secure permission for its reproduction. Permission may need to be obtained from third parties to re-use their material.

We request attribution as © Commonwealth of Australia (Australian Communications and Media Authority) 2026.

Contents

Executive summary

We are consulting on a draft Telecommunications (Mobile Network Coverage Maps) Standard 2026. The Telecommunications (Mobile Network Coverage Maps) Direction 2025 requires us to determine an industry standard that ensures mobile coverage maps are prepared and published in a manner that is clear, comparable and useful for consumers. The draft standard addresses this by establishing a consistent framework for how mobile network operators (MNOs) model, classify and present mobile coverage information.

Mobile coverage maps are an important source of information for consumers and essential for understanding service availability across Australia. However, current industry practices vary significantly. Differences in modelling approaches, underlying assumptions and presentation conventions mean that coverage maps are not directly comparable between operators. This weakens the usefulness of coverage maps for consumers and undermines broader policy goals such as improving transparency and supporting informed choice.

The draft standard seeks to address these issues by requiring MNOs to adopt a consistent approach to modelling and presenting coverage. Predictive modelling is identified as the most appropriate basis for generating comparable coverage maps, noting its scalability and consistency advantages over in-field measurement. While predictive modelling has known accuracy limitations, these can be addressed through standardised technical parameters, clearly defined coverage categories and the use of plain English caveats to explain how coverage may vary in practice.

The draft standard proposes:

- **A consistent set of coverage categories** (good, moderate, useable and none) with accompanying consumer-facing descriptions that explain the level of service that can generally be expected.
- **Defined signal-strength thresholds** for 4G and 5G outdoor handheld coverage, based on RSRP and SS-RSRP[1] values, informed by international practice and findings from the National Audit of Mobile Coverage.
- **Standardised modelling assumptions**, including parameters relating to receiver characteristics, propagation environment and minimum mapping resolution, to improve comparability across operators.
- **Mandatory caveats** explaining key factors that influence mobile connectivity and the limitations inherent in predictive coverage modelling.
- **Requirements for publication**, including accessibility considerations aligned with Web Content Accessibility Guidelines (WCAG) 2.2.

The draft standard also specifies requirements for Mobile Virtual Network Operators (MVNOs). Given that MVNOs rely on host networks for coverage, the draft standard would require them to publish coverage maps that accurately represent the coverage available to their customers.

[1] RSRP (Reference Signal Received Power) for 4G/LTE and SS-RSRP (Synchronization Signal RSRP) for 5G/NR – discussed later.

Additional provisions address the needs of emergency services organisations (ESOs), with a requirement that maps are published in a manner that allows ESOs to extract the underlying data for analytical purposes.

Stakeholder input will inform the ACMA's finalisation of the standard, which is required to be determined by 31 March 2026 and commence by 30 June 2026.

Issues for comment

This consultation seeks feedback on the draft Telecommunications (Mobile Network Coverage Maps) Standard 2026 with reference to the questions below. We also seek stakeholder views about how the draft standard meets the objectives set in the Telecommunications (Mobile Network Coverage Maps) Direction 2025. The draft standard is available in the key documents section of the consultation page.

Consultation questions

1. What are your views about the proposed coverage levels and their meaning? Are 4 levels adequate for enhancing consumer understanding of coverage?
2. Are there additional assumptions or limitations, beyond what is proposed, that should be disclosed to consumers?
3. Should there be any flexibility around the publication of the relevant descriptions and caveats?
4. Is WCAG 2.2 the most appropriate accessibility guidelines for the presentation of such content?
5. Is there a case for permitting MNOs limited flexibility to adopt a coverage threshold other than -115 dBm, within strict bounds? If so:
    a. should such flexibility allow thresholds to be set either higher (resulting in a smaller coverage area) or lower (resulting in a larger coverage area)?
    b. What would constitute a reasonable range of variation, and what criteria should apply in determining whether a variation from the standard threshold is appropriate?
    c. How would this be best presented on a coverage map?
6. Should additional modelling parameters – such as clutter models – be specified in the standard? This includes the extent to which they would improve comparability between operators and the financial and time costs of implementing them.
7. Should certain parameters – such as receiver gain and body loss – be defined separately for different frequency bands?
8. The draft standard requires that maps be updated at a minimum on a quarterly basis. Should an alternative update interval be considered? If so, what interval would be suitable, and for what reasons?
9. Is it reasonable that MVNOs have a less onerous requirement for producing and publishing coverage maps, and is it reasonable that MNOs would be required to provide MVNOs with access to the relevant coverage maps?
10. The draft standard requires MNOs to publish coverage maps in a manner that allows the underlying data to be extracted by ESOs for analysis purposes. Are there any technical, operational, or data quality issues that may affect the utility of this provision?

Introduction

The Telecommunications (Mobile Network Coverage Maps) Direction 2025 (the direction) requires the ACMA to determine an industry standard for preparing and displaying mobile coverage maps. A consistent approach to coverage mapping will enable consumers to access clear, comparable information about service availability in different geographic areas. Improved coverage maps will also support a better understanding of the impacts of network outages on Triple Zero.

Objectives

Under the direction, the draft standard is to give effect to the following objectives:

(a) that mobile coverage maps are prepared and published in a manner that is comparable, including standardisation of approaches to the extent necessary to ensure meaningful comparability;

(b) that mobile coverage maps are prepared and published in a manner that provides clear, up-to-date and useful information about the service that can reasonably be expected in a given geographical area, and which, to the extent technically and practicably appropriate, incorporates or reflects any or all of the following matters:

(i) appropriate modelling methodologies and assumptions so there is a reasonable likelihood they represent on-ground experience;

(ii) a standardised approach to service metrics (which may include for example, representing signal strength, reliability, and quality);

(iii) the visual representation of reasonably expected service levels accompanied by plain language descriptions of indicative end-user activities at each level in a given geographical location;

(iv) compliance with Web Content Accessibility Guidelines (WCAG) 2.2, any replacement guidelines or other best practice regarding accessibility;

(v) the provision of information that explains methodologies, assumptions and any limitations around the accuracy of the maps including coverage depiction (for example, regarding indoor coverage, expected coverage for users inside moving vehicles, geographical areas prone to congestion, or known blackspots that conflict with predicted coverage displayed);

(vi) capability for enabling data contained in published mobile coverage maps to be extracted by other organisations (such as emergency services organisations) for analytical purposes; and

(vii) any other matter that improves the comparability, clarity, and utility of mobile coverage maps;

(c) mobile coverage maps capture information required under subparagraph 7(1)(b)(iii) for different network technologies or technology platforms (for example, Low Earth Orbit (LEO) satellite Direct to Device) used by the carrier or carriage service provider to supply the Relevant Mobile Telecommunications Services.

The draft coverage mapping standard

The draft Telecommunications (Mobile Network Coverage Maps) Standard 2026 (the draft standard) requires mobile network operators (MNOs) to prepare and publish coverage maps that:

- are underpinned by a common set of predictive coverage modelling assumptions and parameters, specified in the draft standard

- show up-to-date information about the level of coverage that consumers can expect in a given geographic area of Australia
- use consistent labels and language to describe the coverage available
- differentiate the type of coverage expected from different technologies.

The draft standard does not require MNOs to provide coverage. Rather, it requires them to prepare and publish maps that offer accurate and comparable information about the mobile phone coverage for services that they do provide.

In developing the draft standard, the ACMA has, as required by the direction, considered the available findings of the National Audit of Mobile Coverage.[2]

The draft standard also takes into account early consultation with key stakeholders, MNOs, government agencies and international regulators that have experience with mobile coverage mapping.

Consultation and next steps

This consultation seeks feedback on the draft standard with reference to the targeted questions posed throughout this paper. We also seek stakeholder views on how the draft standard meets the objectives set out in the direction.

Following consultation, we will proceed to finalise the standard. Under the direction, we are required to determine the standard by 31 March 2026, with the standard to take effect by 30 June 2026.

The direction gives the ACMA the power to vary the standard as needed over time. The implementation of the standard is intended to be an iterative process, developed in consultation with industry and consumers.

This initial stage has focused on establishing baseline, comparable maps to support consistent approaches by MNOs and to provide a common foundation for stakeholders. Future stages may explore the inclusion of new and emerging mobile technologies and measurement techniques. Consistent with the ACMA's usual practice, any changes to the standard will be informed by stakeholder feedback and experience with the standard in practice. They may also respond to any compliance matters identified through our routine compliance monitoring and enforcement activities.

The ACMA will work with industry to implement the standard and will, as appropriate, review the standard to ensure objectives of the direction continue to be met.

[2] Section 7(2).

Approaches to coverage mapping

Modelling mobile network coverage

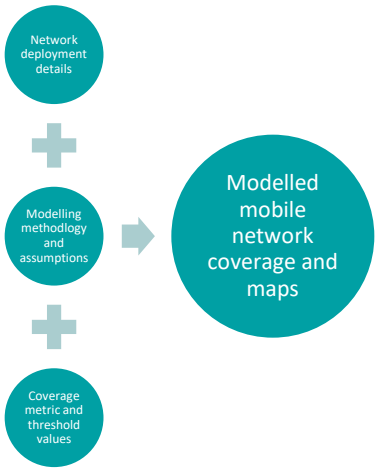
Modelling mobile network coverage is inherently complex because of the numerous variables – such as terrain, building density, signal propagation and user behaviour – that influence network performance at any given time or place.

Generally, there are 2 accepted approaches to network modelling: predictive modelling and in-field measurements. Predictive modelling provides consistency and comparability, making it useful for planning and benchmarking, but it relies on assumptions that may not fully reflect real-world conditions. On the other hand, in-field measurements can deliver a more accurate on-ground picture, however they are resource-intensive and can be affected by conditions of the day such as weather, and only provide a snapshot in time measurement.

Predictive modelling

Predictive coverage modelling allows for mobile network coverage maps to be efficiently generated and rapidly updated over time in a consistent manner. These models utilise the operational characteristics of MNO networks, combined with a defined methodology and assumptions, and coverage metrics and thresholds, to estimate the network coverage. Figure 1 below provides a simplified illustration of this general approach.

Figure 1: Simplified approach to mobile network coverage modelling and mapping



Limitations in modelling mobile network coverage

While predictive modelling offers a cost-effective and reproducible way to estimate mobile network coverage, with opportunities for comparability between operators, there are challenges in accurately modelling coverage and producing consumer-facing maps.

These challenges include:

- **Complexity and variability of the mobile environment**

  Mobile networks are inherently dynamic, leading to unavoidable variability in both coverage and user experience. Factors such as signal propagation characteristics, network load (number of active users), and resource allocation decisions drive this

variability. Consequently, predictive models, and therefore the coverage maps derived from them, have inherent accuracy limits.

In particular, signal strength at a given location is subject to prediction error. The actual signal at any moment can vary from the predicted value, creating a distribution of signal strengths over time.

- **Correlation between modelled metrics and on the ground user experience**

  There are varying degrees of correlation between metrics used in predictive modelling and actual end-user experience. This especially applies to signal strength metrics because, even when predicted and actual signal strengths align, the end-user experience, such as call success or data throughput can still vary significantly.

- **Device-dependent user experience**

  User experience (such as network features and achievable data rates) often depends on handset capabilities and potentially the type of service the user has subscribed to from their provider.

Careful consideration is required when presenting modelled coverage in maps. This includes clearly articulating limitations and assumptions, particularly when describing the level of user experience that can reasonably be expected.

In-field measurement

In-field measurement involves collecting real-world data to assess mobile network coverage and performance. Two common approaches are used: field surveys, which rely on professional drive-testing and signal measurements at specific locations, and crowd-sourced data, which aggregates user-generated performance information from consumer devices and apps.

The National Audit of Mobile Coverage uses field survey data and crowd-sourced data to prepare the publicly available Mobile Audit Visualisation Tool. The audit has obtained field survey data from both drive-testing and static location measurements from devices deployed in 77 locations across Australia. Crowd-sourced data is collected through applications installed on smartphones that track network performance and user experience information such as signal strength, connection speeds and time taken to access websites.

Field surveys

In-field measurement provides accurate, real-world data on mobile network coverage by capturing actual signal performance at specific locations through field surveys.

However, conducting field surveys presents a number of challenges:

- **High cost and resource intensity**

  Conducting field surveys at scale requires substantial financial and operational resources, making them impractical for nationwide or frequent coverage mapping.

- **Snapshot-in-time results**

  Measurements capture network performance only at the moment they are taken, meaning they do not reflect typical or long-term performance. Outcomes may quickly become outdated.

- **Sensitivity to temporary environmental conditions**

  Measurements can be heavily influenced by short-term factors such as weather, traffic conditions, and seasonal changes, affecting consistency and reproducibility.

- **Variability in measurement methodologies across operators**

  Differences in how mobile network operators conduct field testing – such as equipment used, drive routes, or data collection methods – reduce comparability and make standardisation difficult.

Crowd-sourced user experience data

Crowd-sourced performance data refers to user generated measurements collected through consumer devices and apps, providing practical insights into mobile network performance. Unlike predictive modelling or professional field testing, this data reflects the actual experience of users in their everyday environments.

Some of the issues associated with crowd-sourced data include:

- **Uneven geographic distribution of data**

  Data density varies depending on where users happen to use their devices, leading to gaps or clusters that may not reflect actual coverage uniformly across regions.

- **Dependence on user behaviour patterns**

  Measurements depend on how, when and where users interact with their devices, which can skew results toward high-traffic or high-usage areas rather than providing systematic coverage.

- **Variation in device types and capabilities**

  Different handsets have different radio performance characteristics, meaning user-generated measurements may not be comparable across devices.

- **Differences in user plans and service levels**

  Performance data may vary based on the mobile plan or service settings a user has, introducing inconsistency unrelated to underlying network capability.

International approaches

Several countries – including Ireland, New Zealand and the United Kingdom – have attempted to standardise, to varying degrees, the way coverage maps are produced.

Generally, predictive approaches are used in these countries to generate coverage maps, supplemented in some cases by in-field measurements (such as drive-testing of predicted signal strengths values and crowd-sourced user experience data). These predictive models typically rely on radio propagation algorithms that account for terrain, clutter and antenna characteristics to estimate signal levels across geographic areas.

Of the predictive approaches adopted in these countries, a commonly employed approach is to establish standardised coverage descriptors that apply to all MNOs. The underlying technical basis of the descriptors is commonly agreed Reference Signal Received Power (RSRP) thresholds that define minimum signal strength levels for different service categories (for example, voice and data).

Table 1 outlines the key components of the coverage-mapping approaches adopted in Ireland, New Zealand and the United Kingdom.

Table 1: Coverage mapping approaches in Ireland, United Kingdom and New Zealand

Requirement	Ireland (ComReg)	United Kingdom (Ofcom)	New Zealand (Commerce Commission)
Standardised coverage descriptors	• Very good • Good • Fair • Fringe • No coverage	• Good outdoor and in-home • Good outdoor, variable in-home • Good outdoor • Variable outdoor • Poor to none outdoor	• Good • Moderate • Limited
Standardised technical parameters	Signal strength thresholds for each coverage level	Signal strength thresholds for each coverage level	Signal strength thresholds for each coverage level
Publication	Visualisation on ComReg's Mobile Coverage Map website,[3] ioS and Android apps	Visualisation on Ofcom's 'Map Your Mobile' website[4]	Visualisation on MNO websites
Measurement or verification	Sample drive test measurements are used to complement or verify MNO data	Sample drive test and crowd sourced measurements are used to complement or verify MNO data	None

Australian industry practices

In preparing this draft standard the ACMA spoke with the Australian Mobile Telecommunications Association (AMTA) and each MNO to understand current industry practices for modelling and mapping mobile network coverage. This included a briefing from AMTA on the work of its Mobile Coverage Mapping Working Group, which has been exploring industry-led approaches to producing comparable coverage maps.

These discussions indicated that while MNOs use broadly similar approaches – such as relying on signal strength metrics and common radio planning software – their modelling practices differ in implementation. As a result, coverage outputs are not directly comparable, even when common coverage thresholds are applied.

AMTA conveyed that work within its working group further demonstrated that harmonising a subset of modelling parameters and adopting a common signal threshold still produced materially different coverage maps.

[3] https://coveragemap.comreg.ie/map.
[4] https://www.ofcom.org.uk/mobile-coverage-checker.

Despite the efforts of all parties, the AMTA working group was unable to reach a consistent, industry-wide approach to key modelling parameters or thresholds.

The ACMA's proposed approach

In determining the modelling approach for the draft standard, we sought to balance the need for a standardised methodology that ensures comparability with the flexibility required for MNOs to present consumers with a more accurate indication of coverage.

While we acknowledge the limitations of predictive modelling, on balance, predictive modelling will help us better achieve the objective of producing comparable, standardised coverage maps.[5]

In-field measurement is not feasible given the size of Australia's land mass and population distribution. However, the maps produced under the National Audit of Mobile Coverage (which uses in-field measurement) will offer a complementary picture of coverage for consumers. This is noting that the coverage depicted in those maps will reflect the conditions on the day the measurement was taken and be limited to audit roads and towns.

[5] Section 7(1)(a).

Coverage mapping requirements

Coverage levels and descriptions

Central to the direction is the objective to produce coverage maps that are comparable and which provide clear and useful information about the service levels that can be reasonably expected in each area.

Our approach focuses on what we consider users will find most useful – clear and consistent coverage levels and descriptions. This approach ensures coverage maps are designed around user needs, not just engineering considerations. The technical details underpinning each coverage description level are discussed in the following section.

We propose 4 coverage categories: 3 tiers of predicted coverage and one indicating no coverage. This framework defines coverage levels while aiming to provide users with clearer, more meaningful information. This approach takes into account international practices and the need for a more nuanced approach than a simple ‘coverage/no coverage’ distinction.

We propose that the maps developed under this standard will identify the coverage levels set out in Table 2 below for each mobile technology offered by the MNO, currently 4G and 5G. We note the direction identifies low-earth orbit satellite (LEOsat) direct to device (D2D) technology as an example of one of the technologies that may be displayed on the coverage maps developed under the standard. Given the relative infancy of LEOsat D2D technology, the ACMA does not propose to require MNOs to incorporate this technology in their coverage maps at this stage.

Table 2: Proposed coverage levels and descriptions

Predicted coverage level	Description
Good	You can expect a strong experience in these areas. Voice calls, SMS and data connections are likely to be reliable and of high quality.*
Moderate	You can expect a fair to good experience in these areas. Voice calls, SMS and data connections are likely to have average reliability and moderate performance.*
Useable	You can expect a useable experience in these areas, but with more variability compared to the Moderate coverage level. Voice calls, SMS and data connections may have reduced reliability and variable performance.*
None	There is no planned coverage in these areas, so you should not expect or rely on service. Any connection you happen to receive would be fortuitous, highly variable and intermittent, with low performance.

**Your ability to connect to a network can be affected by factors other than coverage levels.*

Question 1

What are your views about the proposed coverage levels and their meaning? Are 4 levels adequate for enhancing consumer understanding of coverage?

Applicable caveats

As noted above, predictive coverage has its limitations. It is important therefore that consumers understand how these limitations may affect the accuracy of the maps produced under the standard.

Users' ability to connect to the network will vary depending on their exact location (including if the user is indoors or outdoors), the phone or device they are using, and whether they are moving. In addition, network conditions (for example, how many people are using a mobile tower at the same time), and environmental factors (such as vegetation, buildings and weather) also influence connectivity. This means user experience may differ from what the coverage prediction indicates.

For these reasons, the ACMA proposes that the maps show the predicted coverage levels based on **outdoor** coverage only. It is challenging to reliably model indoor and in-vehicle coverage using predictive modelling. However, indoor and in-vehicle coverage become more likely as the predicted outdoor coverage level increases.

To help users understand the coverage maps, the draft standard proposes that they be published alongside the following information about the assumptions and limitations of the coverage level information.

General mobile coverage map information

- The mobile coverage map shows where you are likely to be able to connect to a mobile network **when outdoors and at ground level**. It is based on technical modelling that predicts where coverage should be available, and where possible, how strong that coverage may be.
- The map provides general guidance only. It does not guarantee that you will always be able to connect or that you will experience the quality of connection shown.
- The coverage map does **not apply if you are indoors or in a vehicle**. Indoor coverage depends on building construction and where you are located inside the building. For example, you may have difficulty connecting, or experience poorer performance if you are inside a building with thick walls or few windows, or if you are in a basement.
- The mobile coverage map does not apply to phones or devices that are not properly configured or that are incompatible with the mobile networks.
- Not all network features and data speeds are possible on all phones or devices.

Question 2

Are there additional assumptions or limitations, beyond what is proposed, that should be disclosed to consumers?

Publication requirements

The draft standard requires that MNOs publish prepared coverage maps on their website and prescribes requirements related to publication. MNOs would be required to publish coverage maps prominently on their websites in an easy to find location.

Recognising that MNOs current approaches to coverage maps are likely underpinned by different software applications, the ACMA does not intend to be prescriptive in terms of the visual presentation of maps developed in compliance with the standard (for example, there are no rules about file format, colour schemes or fonts).

However, to promote comparability, the standard does require that MNOs publish consistent labels and caveats in a way that they can be easily identified by the user. In line with paragraph 7(2)(b)(iv) of the direction, maps produced and published under the standard are also expected to comply with the Web Content Accessibility Guidelines (WCAG) 2.2 to ensure accessibility for people with disability.

Data labels and applicable technologies

The draft standard requires that the maps include or be published with a legend showing the following data labels:

- Good coverage
- Moderate
- Useable
- No coverage.

The data labels must be accompanied by the definitions set out in Table 2 above (and set out in Schedule 1 to the draft standard). The maps must also show these coverage levels for the different technologies provided, i.e., 4G and 5G.

Maps to be accompanied by standard information about assumptions and limitations

The draft standard also requires that maps be published with appropriate caveats and disclaimers explaining factors that may cause the actual on-ground coverage experience to differ from the predictive coverage model shown on the maps.

The draft standard prescribes the text for the assumptions and limitations as set out above.

It is expected that the assumptions and limitations, and labels, will be prominently displayed such that they are easily identified by consumers.

Question 3

Should there be any flexibility around the publication of the relevant descriptions and caveats?

Question 4

Is WCAG 2.2 the most appropriate accessibility guidelines for the presentation of such content?

Technical requirements

The ACMA is of the view that predictive modelling, based on a RF link budget methodology, with defined assumptions and objective signal strength metrics and coverage thresholds, is the most suitable approach to address the requirements of the direction.

In reaching this view, we considered whether including general, subjective guidance in the standard could appropriately meet the intent of the direction. Such guidance could simply standardise the number of coverage levels and corresponding descriptions of expected service with MNOs to determine their own technical parameters underpinning each description.

While we acknowledge that this approach may be suitable in some circumstances, we are of the view that a coverage mapping standard should include objective requirements to improve comparability between maps. Without such requirements, the modelling and mapping process would be subject to undue uncertainty, resulting in comparability that does not meet the objectives in the direction.

Service metrics

Predictive models typically rely on either signal strength metrics or user experience metrics to predict coverage levels:

- **Signal strength metrics** – commonly RSRP (Reference Signal Received Power) for 4G/LTE and SS-RSRP (Synchronization Signal RSRP) for 5G/NR.
- **User experience metrics** – such as expected user data rates.

The ACMA has considered the relative merits of each approach, including research into domestic and international practices, review of technical references, and engagement with the Australian mobile industry.

We note that some signal metrics can be selected that are relatively simple to model consistently and largely independent of factors such as network loading. However, these signal metrics are only a general, indirect indicator of end user experience —the predicted signal strength does not always directly correlate with actual user experience.

In contrast, user experience metrics provide a direct indication of performance but require more complex modelling assumptions and process, as they rely on knowledge of network conditions that vary over time, such as loading. These metrics are also more difficult to verify using field measurements because of this dependence on network conditions and may be dependent on the user's device.

We have formed the view that modelling based on signal strength metrics is the most suitable approach to meet the objectives of the Direction. Signal strength metrics defined in 3GPP specifications that were considered include:

- Reference Signal Received Power (RSRP) for 4G/LTE networks.
- Synchronization Signal RSRP (SS-RSRP) for 5G/NR networks.
- Reference Signal Received Quality (RSRQ), which is derived from RSRP and Received Signal Strength Indicator (RSSI) values.

While RSRQ is more closely correlated with user experience, its dependence on RSSI – which is highly influenced by dynamic network loading – introduces significant challenges for predictive modelling. Addressing these challenges would require assumptions about network loading and other factors, adding complexity to the modelling methodology.

In contrast, RSRP and SS-RSRP are not affected by network conditions such as loading, making them more suitable for consistent and reliable predictive modelling. The suitability of these metrics for field-based validation further strengthens their use from a compliance perspective.

The use of RSRP and SS-RSRP aligns with international practices in countries such as New Zealand, the United Kingdom, and Ireland. The ACMA also understands RSRP and SS-RSRP is the metric that most closely aligns with current MNO practices for modelling network coverage.

RSRP (4G/LTE) and SS-RSRP (5G/NR) are considered the most appropriate metrics for modelling mobile network coverage under the direction. Issues in correlating these metrics with end-user experience will be managed through careful selection of coverage threshold values, and clear description and explanatory notes on maps and coverage levels.

Threshold signal levels

Selecting appropriate RSRP and SS-RSRP thresholds is essential because these values define both where coverage is present and the level of user experience likely to be achieved. As there are no universally established standards for these thresholds, we have exercised judgment in determining suitable values.

Our approach was to first identify a threshold value that delineates the boundary between coverage and no-coverage. From this starting point, incremental increases were applied to establish successive coverage levels. In determining these values, we drew on relevant industry standards, technical specifications and practices, findings from the National Audit of Mobile Coverage, and approaches adopted by international regulators.

Industry material, including 3GPP specifications, indicates that RSRP and SS-RSRP are key parameters used to determine whether a device can camp on a mobile network cell in idle mode. These thresholds effectively define the edge of coverage – even if a device can detect a signal, it will not camp on the cell unless the measured RSRP or SS-RSRP meets the required minimum level.

The ACMA recognises that there is no single, universally applied threshold value. Instead, MNOs select their own values, which can vary. International experience suggests that these thresholds are often adjusted according to factors such as whether the cell serves an urban or rural area and the type of service intended at the coverage edge – for example, voice, SMS or specific data rates.

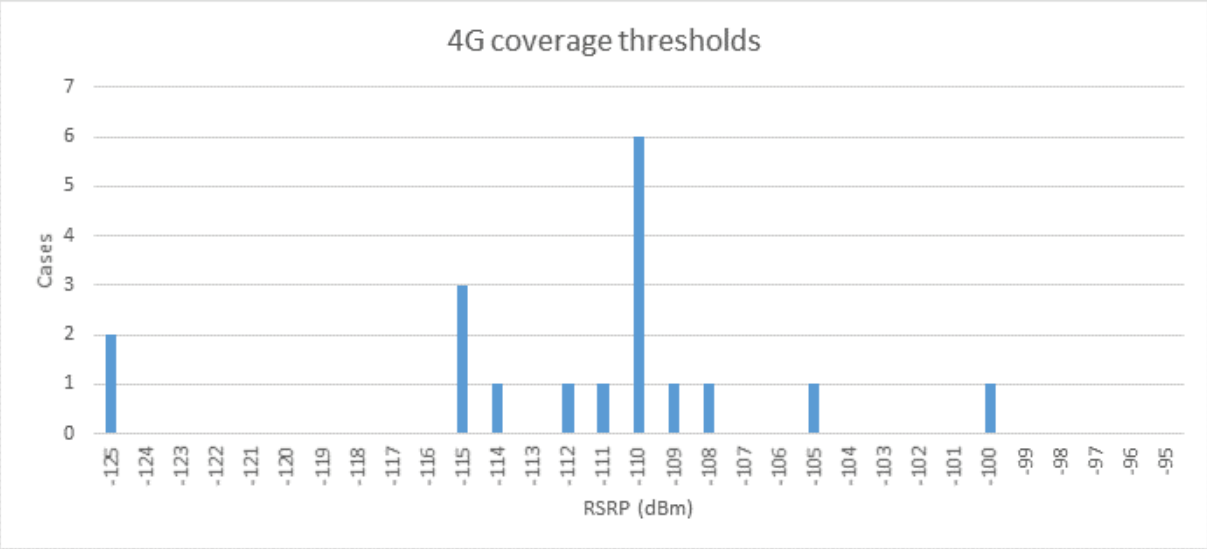
The National Audit of Mobile Coverage considered the question of what RSRP and SS-RSRP values define an ‘acceptable’ coverage that provides a useable service in the Australian context. The audit concluded that a RSRP and SS-RSRP value of -115 dBm for both 4G and 5G was appropriate based the relationship between RSRP and SS-RSRP and factors such as data session successes, the confidence level of successful service initiation, and voice performance (setup duration and quality).

The audit demonstrates that, to a certain extent, service is possible below the -115 dBm value. However, it is of a lower quality and reliability. Similarly, it is possible for call failures to occur above the -115 dBm figure, albeit far less likely than below. This is an empirical reflection of the fact that a mobile network is dynamic meaning that user experience outcomes can vary regardless of the level of coverage.

Internationally, many countries have determined RSRP threshold values that define LTE coverage (there is less information available for 5G). While these thresholds vary across jurisdictions due to factors such as geography, population distribution and network design, surveying these values provides a useful reference point and confidence check when considering an appropriate threshold for Australia.

A useful source of information of 4G/LTE coverage thresholds is the figure below extracted from the Plum report undertaken for ComReg on Coverage thresholds for 5G services which is based on Common Position on information to consumers on mobile coverage from the Body of European Regulators for Electronic Communications (BEREC).[6] As noted in the Plum report, these thresholds are based on various assumptions and are not necessarily directly comparable (and date from around 2018). It also notes that the majority of RSRP values are in the -105 to -115 dBm range with outliers at -100 and -125 dBm.

Figure 2: European LTE coverage thresholds[7]



The ACMA also examined the mobile coverage mapping approaches adopted in the United Kingdom, Ireland and New Zealand. These countries use RSRP/SS-RSRP metrics, with the publicly available values for the coverage/no coverage threshold in the table below.

[6] While the Plum report focusses on 5G coverage, it also contains data on RSRP values used for 4G coverage modelling.
[7] Plum study for ComReg p 2.

Table 3: Coverage/No-coverage thresholds used in the United Kingdom and Ireland[8]

Country	4G/LTE (SS-RSRP dBm)	5G/NR (SS-RSRP dBm)
United Kingdom	-105 dBm	-105 dBm
Ireland	-115 dBm	Various based on frequency band (-112.8 to -131.0 dBm)

The ACMA notes that the National Audit value of -115 dBm appears reasonable when compared to the other data sources. This value:

- is informed by recent empirical data from Australia
- is at the lower end of the main range of the European data points. This is unsurprising given that the urbanisation of Europe would likely generally lead to higher values i.e., expansive rural fringe coverage considerations being less of an issue than in Australia
- is 10 dB lower than the United Kingdom (which uses -105 dBm for both 4G and 5G), noting similar arguments for a lower figure in Australia discussed for Europe above
- aligns with Ireland for 4G.

We have formed the view that a RSRP and SS-RSRP value of -115 dBm for both 4G/LTE and 5G/NR is a reasonable threshold for mobile network coverage for mapping purposes.

Because the outer boundary of a mobile network's coverage is typically determined by a low-frequency band 4G/LTE cell, this threshold plays a central role in defining overall coverage. At the same time, as outlined earlier, the standard also aims to distinguish between different levels of user experience at stronger signal levels.

There is limited global guidance on threshold values for higher coverage levels. However, based on approaches adopted in the United Kingdom and Ireland – acknowledging that New Zealand's values are not publicly available – a separation of approximately 20 dB between the coverage threshold and the 'good' outdoor coverage level appears to be commonly used, generally spanning two intermediate coverage tiers.

The ACMA therefore proposes to increment the threshold values by 10 dB for each of the coverage levels i.e., -105 dBm for 'moderate' coverage and -95 dBm for 'good' coverage.

Tables 4 below consolidates the proposed metrics and threshold values for 4G and 5G network coverage modelling. The coverage level descriptors are discussed earlier in this paper, along with the important caveats and explanations for coverage mapping in general.

[8] Note New Zealand value is not publicly available.

Table 4: Proposed 4G and 5G coverage thresholds – outdoor coverage, handheld device

Coverage level	Description	RSRP (4G) SS-RSRP (5G) Greater than or equal to (dBm)	RSRP (4G) SS-RSRP (5G) Less than (dBm)
Good	You can generally expect a strong experience in these areas. Voice calls, SMS and data connections are likely to be reliable and of high quality.*	-95	
Moderate	You can usually expect a fair to good experience in these areas. Voice calls, SMS and data connections are likely to have average reliability and moderate performance.*	-105	-95
Useable	You can expect a useable experience in these areas, but with more variability compared to the Moderate coverage level. Voice calls, SMS and data connections may have reduced reliability and variable performance.*	-115	-105
No coverage	There is no planned coverage in these areas, so you should not expect or rely on service. Any connection you happen to receive would be fortuitous, highly variable and intermittent, with low performance.		-115

** Your ability to connect to a network can be affected by factors other than coverage levels.*

As noted above, the choice of the coverage/no-coverage threshold is critical, and some discretion is unavoidable. The ACMA is open to allowing MNOs limited flexibility to vary this threshold within a narrow RSRP range (for example, ±3 dB), provided specified criteria are

met. This would enable an MNO to reflect differences in network configuration or service offerings where these diverge from the assumed –115 dBm RSRP/SS-RSRP threshold. Under this scenario the thresholds for other coverage levels would not change.

To preserve comparability between coverage maps, any such deviation would need to be based on clear criteria, narrow in scope and presented transparently. For example, if an MNO elects to extend coverage beyond the standard threshold, an additional coverage layer descriptor may be required to clearly differentiate this from the ordinary coverage boundary.

Question 5

Is there a case for permitting MNOs limited flexibility to adopt a coverage threshold other than -115 dBm, within strict bounds? If so:
a. Should such flexibility allow thresholds to be set either higher (resulting in a smaller coverage area) or lower (resulting in a larger coverage area)?
b. What would constitute a reasonable range of variation, and what criteria should apply in determining whether a variation from the standard threshold is appropriate?
c. How would this be best presented on a coverage map?

Methodology and assumptions

Modelling methodologies and associated assumptions are used by MNOs as a set of procedures to calculate the signal metric value at geographic points (at a specified resolution) which is then used to produce predicted coverage maps. This is essentially an RF link budget analysis where the signal expected to be received by an end user device is calculated by considering transmitter characteristics, propagation factors, and assumed receiver characteristics.

The coverage mapped for each cell can be a composite of the modelled signal levels for each frequency band in operation. In this way the best signal level for all bands considered can be used to determine the coverage level at a given location.

Depending on the specificity required, a methodology can include some or all the following aspects:

- **Propagation factors:** propagation model(s) to be used, model assumptions and parameters (such as terrain, clutter, user mobility, outdoor/indoor/in-vehicle assumptions). These aspects may vary between geo-type (urban, suburban, rural).
- **Prediction modelling resolution:** the size of each geographic cell where predictions are required to be made (which influences map resolution).
- **Prediction model confidence:** RF propagation paths in mobile networks are inherently dynamic and variable meaning that the predicted value will not always align with the actual value at a given location and point in time.
- **Integration of field measurements and other network optimisation activities:** data obtained by MNO field measurements can be used to improve modelling of their networks as can knowledge of their network specific optimisation activities.
- **Receiver characteristics:** receiver height and antenna gain, body loss and other device assumptions.
- **Modelling software:** software used to model coverage.

Generally, the greater specificity in modelling methodology and assumptions, the greater the consistency and comparability that can be expected between coverage modelling undertaken by MNOs. Conversely, being overly prescriptive may:

- be unnecessary (i.e., provide little or no material benefit in comparability)
- impact accuracy of individual MNO maps by removing the flexibility of MNOs to optimise their modelling/mapping based on deep knowledge of their networks (for example tuning of propagation models through field measurements) or using more accurate terrain and clutter data
- impose unwarranted costs on MNOs to implement.

While not necessarily entirely in contention, there is therefore likely to be some tension between accuracy in the modelling of individual mobile networks and comparability between MNOs. In proposing the parameters for inclusion in the standard, the ACMA is consciously seeking a pragmatic balance between accuracy (enabled by flexibility for MNOs to model their networks as they see fit) and comparability (which necessitates some commonality in approaches between MNOs).

The methodology aspects proposed for inclusion in the Standard are provided in Table 5. These proposed parameters and values are based on research and discussions with industry.

Table 5: Underpinning methodology parameters for the mobile network coverage mapping standard

Methodology parameters	Value
Resolution of coverage map	100 m by 100 m
Cell edge coverage probability	85%
Receiver height	1.5 m (above ground level) [9]
Receiver gain	-3 dBi[10]
Body loss	4 dB[10]
Propagation model type	Outdoor[10]
Mobility	Pedestrian
Lognormal fading standard deviation	8 dB

While MNOs would be required to apply the assumptions set out above, they would otherwise retain discretion in how they model their networks. In doing so, MNOs are expected to exercise sound judgement in selecting propagation models, terrain and clutter data, and any other modelling inputs needed to produce outputs consistent with the standard's requirements.

The ACMA recognises that while specifying parameters above will reduce variability between MNO modelling approaches (and hence increase comparability of maps), there will remain

[9] See ITU-R document Annex 4.4 to document 5D/716-E (WRC-23 cycle).
[10] Chosen to reduce variability in modelling i.e. so that the challenges of indoor/in-vehicle coverage (such as building entry losses) do not have to be managed.

opportunities for divergence in approaches. We note that the direction requires the standard to commence no later than 30 June 2026, leaving the MNOs a relatively short time to implement any change. At this stage, we consider that implementing the specified parameters should be relatively straightforward for MNOs and is unlikely to impose significant time or cost. On this basis, the cost–benefit assessment appears clearly positive.

However, specifying additional parameters – particularly those that materially affect modelling outcomes, such as the specific propagation model used or the clutter data adopted – would introduce additional implementation cost and complexity and may negatively impact the use of propriety and/or private data to improve accuracy, with benefits that remain unquantified. The ACMA is therefore seeking further evidence to inform whether mandating additional parameters would be justified.

We also note that the proposed methodology parameters have been developed with low frequency band operation in mind, as these frequencies typically determine the outer boundary of overall network coverage. Parameters such as receiver gain and body loss may differ for higher frequency bands, and while these are less relevant to edge-of-coverage modelling, they remain important for higher-level coverage assessments. For this reason, we are open to specifying band-specific parameters where appropriate and seek industry feedback on where this may be necessary.

Question 6
Should additional modelling parameters – such as clutter models – be specified in the standard? This includes the extent to which they would improve comparability between operators and the financial and time costs of implementing them.

Question 7
Should certain parameters – such as receiver gain and body loss – be defined separately for different frequency bands?

Other considerations

Frequency of map updates

We propose that maps are updated no less than every quarter to reflect changes in coverage due to network deployment or optimisation activity, changes to terrain or clutter models.

Question 8

The draft standard requires that maps be updated at a minimum on a quarterly basis. Should an alternative update interval be considered? If so, what interval would be suitable, and for what reasons?

Sharing of data and maps between MNOs

The draft standard requires MNOs to provide other MNOs access to their coverage maps in certain circumstances. This includes situations where there is an agreement between MNOs to share Radio Access Network infrastructure that is used to provide a relevant mobile telecommunications service.

For example, in 2024, TPG and Optus entered into a Multi-Operator Core Network (MOCN) agreement under which they would share network infrastructure and spectrum to expand their regional mobile coverage. Under the draft standard, TPG and Optus would be required to share their respective coverage maps to support the provision of coverage information to consumers. This is intended to ensure that customers can find information about the extent of expected service coverage, regardless of the underlying network arrangements or commercial agreements between MNOs.

Requirements for Mobile Virtual Network Operators (MVNOs)

End users increasingly rely on services delivered by a wide range of MVNOs, which largely operate as wholesale customers of the 3 MNOs – Optus, Telstra and TPG.[11] While MVNOs generally do not possess the information or technical capability to produce their own coverage maps, we consider it appropriate that they be required to publish coverage maps for their customers. As with MNOs, MVNOs would be required to publish coverage maps prominently on their websites in an easy to find location.

To support this obligation, MNOs would be required to provide their MVNO partners with timely access to coverage maps that accurately represent the coverage available to end users on those MVNO services.

MVNOs are required to clearly label which MNO network, or variation thereof, their service operates on.

[11] As at March 2025, MVNOs had a market share of 19% of mobile phone services in operation. *Source: Roy Morgan Single Source. October 2020 – March 2021 through to October 2024 – March 2025. https://www.roymorgan.com/findings/9907-growth-mobile-virtual-network-operators-june-2025.*

Question 9

Is it reasonable that MVNOs have a less onerous requirement for producing and publishing coverage maps, and is it reasonable that MNOs would be required to provide MVNOs with access to the relevant coverage maps?

Data access by emergency services organisations

Subparagraph 7(1)(b)(vi) of the direction allows ACMA to include, in the standard, a requirement that data from published mobile coverage maps can be extracted by other organisations, such as emergency services organisations (ESOs), for analysis.

Accordingly, the draft standard requires MNOs to publish mobile coverage maps in a manner that allows the underlying data to be extracted by ESOs, for analysis purposes.

We have deliberately avoided prescribing specific formats or methods for data access, recognising that multiple factors can influence how such requirements function in practice. These include the purpose for which ESOs seek access, the software used by MNOs to generate and present the data, the systems ESOs use to consume it, and the age of the data – all of which can affect its practical utility.

We are interested in hearing from both MNOs and ESOs about the utility of the provision in the draft standard.

Question 10

The draft standard requires MNOs to publish coverage maps in a manner that allows the underlying data to be extracted by ESOs for analysis purposes. Are there any technical, operational, or data quality issues that may affect the utility of this provision?

National Audit of Mobile Coverage

Subparagraph 7(2) of the direction requires ACMA to consider the available findings of the National Audit of Mobile Coverage when developing the standard.

The National Audit of Mobile Coverage is an Australian Government initiative designed to independently validate mobile network performance by identifying black spots and coverage gaps across regional and rural Australia. The audit provides empirical data to benchmark real-world service quality against predictive coverage models supplied by mobile network operators (MNOs).

The National Audit of Mobile Coverage commenced in May 2024 and will run until June 2027. Our consideration of the audit outcomes is set out below.

In preparing the draft standard, we reviewed and considered a range of material that has been developed and published about the audit, including the audit methodology and the Mobile Audit Visualisation Tool.

As detailed above in the discussion of the technical requirements of the standard, the standard proposes a baseline RSRP threshold of -115 dBm, reflecting the signal strength coverage threshold used in the audit.

While the audit maps and the maps produced under the draft standard use the same base RSRP threshold, we acknowledge their differences. The National Audit maps are based on in-field measurements, providing a “snapshot in time” of actual network performance under prevailing conditions such as traffic load, weather and interference. Whereas the maps produced under the draft standard will use predictive modelling to estimate coverage under typical conditions. Because of this, the maps produced under the standard and those produced for the audit will not be directly comparable but together, they can provide consumers with a more complete picture of mobile service availability.

Invitation to comment

Making a submission

We invite comments on the issues set out in this consultation paper.

Online submissions can be made by uploading a document. Submissions in PDF, Microsoft Word or Rich Text Format are preferred.

Submissions by post can be sent to:

The Manager
Mobile network coverage mapping project
Australian Communications and Media Authority
PO Box 78
Belconnen ACT 2616

The closing date for submissions is **5 pm (AEDT) on Sunday 1 March 2026**.

Consultation enquiries can be emailed to MobileCoverageMaps@acma.gov.au.

Publication of submissions

We publish submissions on our website, including personal information (such as names and contact details), except for information that you have claimed (and we have accepted) is confidential.

Confidential information will not be published or otherwise released unless required or authorised by law.

Privacy

View information about our policy on the publication of submissions, including collection of personal information during consultation and how we handle that information.

Information on the *Privacy Act 1988*, how to access or correct personal information, how to make a privacy complaint and how we will deal with any complaints, is available in our privacy policy.