

The Coverage Challenge

The challenges of defining, measuring, and communicating coverage

Prepared for

The Commerce Commission

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Contact



Graham Friend, M.A., M.Phil., (Cantab), ACA

Managing Director
Coleago Consulting Ltd

Tel: [REDACTED]



Peter Schulze

Managing Consultant
Coleago Consulting Ltd

Tel: [REDACTED]

1. Executive summary

1.1 Introduction and the scope of this report

This report focuses on the challenges of defining and identifying a “material coverage issue” and the reasonableness of proposed remedies

On the 14th of December 2023, the Commerce Commission of New Zealand published a document entitled “Draft Product Disclosure – Coverage Map Guidelines” which focused on a range of issues associated with mobile coverage. The purpose of the draft guidelines is, amongst other objectives, to:

- increase customers’ awareness of coverage;
- enable a better comparison of coverage between service providers;
- allow customers to make informed decisions; and
- to improve consumers’ rights in the case of material coverage issues.

Coleago Consulting has been asked by the mobile operators in New Zealand to comment on the challenges of defining, measuring, and communicating coverage to consumers as well as the difficulties associated with defining and identifying what constitutes a “material coverage issue” at both a theoretical and practical level.

1.2 Introducing Coleago Consulting Ltd

Coleago only delivers projects with consultants with a minimum of 20 years’ experience in the industry

Coleago Consulting Ltd is an independent, specialist, telecoms strategy consulting firm which was founded in the United Kingdom in March 2001. Coleago specialises in advising both service providers and regulators on issues related to spectrum, networks and regulation. Coleago comprises a small team of highly skilled and experienced consultants. Unlike traditional consulting firms, Coleago only hires mature and highly experienced telecoms industry professionals with a minimum of 20 years’ experience within the industry. Service providers and regulators can therefore be confident that our advice and recommendations are based on extensive real-world experience. Coleago has delivered projects in more than 70 countries and has worked with a wide range of operators and regulators, including some of the most sophisticated and advanced players in the industry.

1.3 The challenges of defining, delivering, and measuring coverage

1.3.1 Factors that impact mobile coverage and quality of service

Mobile network coverage depends on a wide range of factors

In a real-world mobile network environment, coverage and quality of service (QoS) depend on a wide range of factors. In this report, we refer to coverage as a location where a customer may reasonably expect to receive some level of mobile service and QoS as a measure of the quality of that service which is likely to be received in that location. Coverage and QoS are closely linked. The key factors impacting coverage and QoS are:

- the quantity and type of spectrum acquired by an operator;
- the density and location of mobile towers and sites;
- the technology / configuration deployed at each site;
- the strength or power of the signal that towers can emit;
- the local topography including the geography of the area as well as the “clutter” which relates to the volume, scale and construction materials of buildings, the presence of vegetation, etc.;
- the number of customers within a particular coverage area;
- the number of active customers accessing network services in a particular area;

- whether those customers are indoors or outdoors;
- the usage patterns and traffic demand of those customers; and
- the type of device the customer is using.

Many of the factors that impact coverage and the quality of service within mobile coverage areas are beyond the control of the mobile network operator

These factors can vary from location to location and by time of day and season and many are beyond the control of mobile operators such as seasonal growth in vegetation, new building construction and the behaviour of customers and their device choices. As a result, the QoS provided to customers within a predicted mobile coverage area is necessarily delivered on a best effort basis. There can be no commitment to a defined level of coverage or service, and it is challenging to represent this best effort service in coverage maps, which require a probabilistic approach (i.e. the percentage likelihood of receiving service, given certain conditions e.g. outdoors). This approach is common across all mobile operators and is not unique to the New Zealand market.

1.3.2 The challenges of defining and describing coverage

The Coverage Map Guidelines provide the following definition for a material coverage issue

The draft Coverage Map Guidelines provide the following definition for a material coverage issue:

“A material coverage issue means a situation where a consumer’s experience of coverage materially fails to meet the representations the retail service provider (RSP) has made in its marketing communications, including in a mobile coverage map, such that the consumer is unlikely to have purchased the service had they been aware of the issue. A material coverage issue may occur at any point in the life of a service.”

Whilst this definition may seem conceptually straightforward, at both a theoretical and practical level it presents significant challenges that must be considered and addressed before it could be considered for implementation in a reasonable manner. Indeed, the draft guidelines themselves in part recognise the challenge and in section 14.4 the TCF and RSPs are charged with the task of developing an agreed threshold for a material coverage issue. In this report, we seek to highlight the challenges of simply defining coverage, let alone what might constitute a “material coverage issue”.

Defining, measuring and describing coverage to customers is extremely challenging

Due to the wide range of uncertain and uncontrollable factors that impact coverage, defining, measuring, and describing coverage to customers is extremely challenging. Mobile operators globally can only describe coverage in probabilistic terms, in other words, the likelihood of being able to receive a certain quality of service in a specific location¹. The probabilities attached to coverage definitions account for variations not only in space, but also in time. This implies that coverage will inherently vary over time at a specific location regardless of any actions that an MNO takes – a specific location could be covered one minute and not covered the next.

One of the most common ways of describing coverage adopted by mobile operators is to provide coverage maps which offer a guide to the likelihood of receiving a certain signal level at a specific location. Coverage maps, just like the mobile networks they seek to depict, are probabilistic in nature. For example, if a mobile operator states that their network covers 98% of the New Zealand population, this means that predictive modelling would predict that (subject to a defined level of confidence in that prediction) coverage reaches areas where 98% of the population normally resides but does not guarantee coverage for any individual user within those areas. Coverage maps provide a guide to likely levels of coverage but not a guarantee. There are a range of factors that explain why coverage maps can sometimes be a poor guide to the coverage that customers actually receive. These factors include:

- coverage maps only relate to expected outdoor coverage and therefore are a poor guide to indoor coverage;

¹ We discuss later in the main body of this report the predictive coverage methodology commonly used and why it is not possible to provide actual coverage at each specific location

- the scale of the map that a customer uses impacts heavily on the accuracy of the coverage prediction and customer expectations;
- changes in vegetation either permanently or seasonally;
- the operator's attitude towards risk when defining coverage levels and producing coverage predictions;
- the number of people within the cell and the amount of traffic they generate;
- the accuracy of the clutter mapping that is used in the model;
- new building developments that are not captured in current maps;
- the accuracy to which the operator is able to tune its propagation model to the local environment;
- the type of device a customer uses to access the network; and
- customer device condition and capability.

Finally, like all maps, mobile coverage maps quickly become out of date. It is not feasible or practical to update coverage prediction maps in real time and so they will always, to some extent, provide a relatively poor guide when helping customers set expectations of coverage.

Defining a "material coverage issue" is even more difficult

The difficulties associated with defining and describing coverage, make it extremely challenging and difficult to define what is a "material coverage issue". To be able to define a "material coverage issue" there must be a defined reference against which the customer's experience of coverage in a particular location must be compared. The challenge in a mobile network is that it is not possible to provide a definitive reference due to the inherently probabilistic nature of mobile coverage. Even if it were possible to define what constituted a "material coverage issue", it would be potentially even more challenging to prove that an issue existed for all the reasons we have highlighted relating to the actual coverage delivered.

It is important to note that in this report we are not focusing on so called coverage "black spots" or "not spots" where there is no coverage at all in which, therefore, no material coverage issue can arise as mobile operators do not claim to offer coverage in these areas.

1.3.3 Practical challenges in identifying a material coverage issue

What constitutes a "material coverage issue" will vary from customer to customer

It is also worthy to note that what constitutes a "material coverage issue" will vary from customer to customer. If we consider a coverage issue that has arisen on a commuter route that is used by two separate customers. One might commute on a motorcycle and therefore is unable to use their mobile device during the journey and is not even aware of the absence of coverage. In contrast, another customer may use public transport and uses their device throughout the journey and regards the absence of coverage as "material". How should the draft guidelines be developed to take account of the fact that different customers will have different views of what constitutes a "material coverage issue?" One solution could be to define an "average" user, but this would be extremely challenging and would require constant revision as the industry continues to evolve.

Whilst the vast majority of customers are reasonable, there will always be a minority who might seek to "game" a set of regulatory guidelines

Whilst the vast majority of customers are reasonable, there will always be a minority who might seek to "game" a set of regulatory guidelines related to coverage and the practical challenges of verifying them to obtain financial benefit at the expense of the mobile industry. It is for this reason that "material coverage issues" would need to be defined with great care and that any potential remedies would need to be proportionate and reasonable and reflect that mobile operators do not purport to provide guaranteed coverage and material coverage issues may arise that are beyond the control of the mobile operator.

Ironically, the introduction of guidelines to improve the information available to customers could result in customers receiving less useful information

1.3.4 Unintended consequences

A potential consequence of introducing the draft guidelines is that mobile operators will have an incentive to take a very conservative view of their network's coverage in order to reduce the risk of triggering a claim for a "material coverage issue". Ironically, the introduction of guidelines designed to improve the information available to customers regarding coverage could result in customers receiving more conservative and potentially less useful information.

Coverage issues arise which are beyond the control of a mobile operator

1.3.5 The inability of operators to control mobile coverage

Even if it were possible to agree on a reasonable and measurable definition of a "material coverage issue", there are many reasons why the issue may have arisen which were beyond the control of the mobile operator and therefore it would be unreasonable to hold the operator liable for the issue. Examples of such developments include:

- seasonal vegetation growth;
- unusually unfavourable weather;
- road repairs that result in traffic being diverted to alternative routes which increases the amount of vehicular traffic in a particular area;
- new construction in the signal path between the user and the point of service;
- duration of the coverage issue, this may be a transient network issue that is resolved in hours or days; and
- changes in customer devices might exclude the customer from any claim for material coverage issue.

A mobile operator should only be liable for a coverage issue which is within its control

A range of factors could give rise to a "material coverage issue" however defined but these factors may be beyond the control of the mobile operator. It is only reasonable that mobile operators are only subject to remedies for which they are responsible. For example, if the expiry of a site lease results in a tower having to be decommissioned causing a loss of coverage, then it may be reasonable to expect the mobile operator to offer some form of compensation. However, if the construction of a new building results in a loss of coverage, then it is less reasonable to expect the mobile operator to provide compensation for actions or omissions of a third party that are entirely beyond their control.

The mobile industry already offers customers guarantees regarding service

1.4 Existing consumer protection

Even if it were possible to reach a consensus on what constituted a material coverage issue, consumers are already afforded extensive protection in relation to such issues from the mobile industry itself. Mobile coverage is what an economist would describe as an "experience good". An "experience good" is one which can only be accurately valued once it has been experienced. Mobile coverage is an "experience good" as customers can only value the quality of an operator's mobile coverage once they have acquired the service and begin using it. The mobile industry in New Zealand voluntarily recognises the "experience good" nature of the service they offer, and this is why they provide customers with a range of guarantees. For example:

- One NZ offers customers who subscribe to a pay monthly plan the right to receive their full money back within 30 days if they are not satisfied with the service they receive (subject to terms and conditions²); and
- 2degrees offers customers who subscribe to a pay monthly plan the right to receive their money back and return their interest free phone (if purchased with the plan) if they are not satisfied with the service, they receive within 30 days (subject to terms and conditions).

² <https://one.nz/legal/terms-conditions/network-guarantee/>

The Consumer Guarantees Act already affords the customer protection

A period of 30 days should be more than sufficient to identify any material coverage issues that a customer might experience going about their everyday lives.

In addition to the guarantees offered by the mobile industry itself, customers are also offered protection by the Consumer Guarantees Act 1993³.

The Act encompasses both products but also services and specifically highlights telecommunications as a service included within the Act. The following four components of the service are guaranteed:

- carried out with reasonable care and skill;
- fit for a particular purpose you told the seller about;
- carried out within a reasonable time if not timeframe agreed; and
- charged for at a reasonable price when the price is not set.

Of the four components, the guarantee of being “fit for purpose” would capture a material coverage issue. Under the Act, customers are entitled to a refund, replacement, or repair.

The Fair Trading Act 1986⁴ also provides customers with protection and makes the following types of trader behaviour illegal:

- deceptive or misleading conduct and false representations;
- unsubstantiated claims;
- unfair sales practices; and
- unfair contract terms.

Consumer protection legislation is sufficient to protect customers and is the approach adopted in other markets

Existing consumer protection in New Zealand is more than adequate to address consumer concerns regarding coverage and this is the approach that is adopted widely in other markets.

1.5 Approaches in other markets

The proposed New Zealand approach would be very unusual

Coleago Consulting has been supporting the telecoms industry since 2001 and in this time has never encountered a market where provisions similar to those contained in the ‘Draft Product Disclosure – Coverage Map Guidelines’ have been implemented. This is not to say that similar provisions do not exist elsewhere, only that we have not encountered similar provisions in the more than 70 markets in which we have delivered projects.

In preparing this report, Coleago researched the approach adopted in a sample of regulators across a range of different markets including highly respected regulators such as the United Kingdom’s Ofcom. We studied the regulatory approaches in the following countries:

- United Kingdom;
- Ireland;
- France;
- Netherlands;
- Singapore,
- Australia, and
- Canada.

In every case, the regulator retained the power to impose remedies on operators who failed to meet coverage obligations stipulated in their licences. There is a range of

³ <https://www.legislation.govt.nz/act/public/1993/0091/24.0/DLM311053.html>

⁴ <https://www.legislation.govt.nz/act/public/1986/0121/latest/DLM96439.html>

approaches adopted across different markets for addressing issues raised by customers. However, what is consistent is that in the markets we studied, any remedies, especially those relating to the termination of contracts and refunds, are assessed on a case-by-case basis. In addition, in our research, we did not identify any instances whereby a regulator sought to define formally what might constitute a “material coverage issue” and propose specific remedies. In the limited instances where automatic compensation was due, as in the case of the Netherlands, compensation arose in the case of a complete network outage which is easily defined and observed. It is likely that the challenges of defining a “material coverage issue” which we highlight in this paper, and availability of other consumer remedies explain why we were unable to find examples of its use in other markets. Whilst we have not performed an exhaustive search and there may be markets which have adopted the proposed approach in New Zealand, we feel it is reasonable to say that the approach is not commonly if at all adopted elsewhere.

1.6 Summary and recommendations

Mobile coverage varies from location to location, by time of day, and over time and is probabilistic in nature. A wide range of factors determine mobile coverage and quality of service. It is difficult to provide a robust definition of mobile coverage and therefore challenging to define both theoretically and practically what would constitute a “material coverage issue” and how to verify it in a cost-effective manner. Furthermore, many of the factors that could give rise to a coverage issue, however defined, may be beyond the control of the mobile operator and it would therefore be unreasonable to require an operator to provide compensation for an issue they cannot control.

The industry does however recognise the limitations of coverage maps, for example, as a means of explaining the nature of the service they offer, which is why the industry itself offers customers a 30-day, money back guarantee. Furthermore, existing consumer legislation, in the form of the Consumer Guarantees Act and the Fair Trading Act, offer customers protection in the event that the service they receive is not fit for purpose.

The proposed guidelines would be very challenging to implement in a clear, predictable, and consistent manner due to the challenges of predicting, measuring, and controlling coverage, as we have previously highlighted. Implementing the guidelines will increase costs within the industry, which will ultimately be borne by the customer, whilst the benefits will be limited, especially as existing legislation already provides suitable protection. Furthermore, the challenges of defining and verifying a material coverage issue could give rise to some customers seeking to “game” the provisions for unfair gains.

The challenges highlighted in this report in relation to defining coverage and what might constitute a coverage issue largely explains why leading regulators rely on existing consumer legislation to protect customers rather than imposing disproportionate remedies themselves on operators.

Coleago recommends that the Commerce Commission does not impose additional consumer remedies for coverage related issues but relies instead on existing consumer legislation.

1.7 Structure of the report

This report begins by providing a simple explanation of the fundamental design principles that a mobile network adopts to provide coverage. In chapter 3, we highlight the challenges of predicting coverage and the inherent limitations of coverage maps. Chapter 4 explores the theoretical and practical challenges of defining a material coverage issue before highlighting the approaches adopted in other markets in chapter 5. The report concludes with a summary and recommendations for the New Zealand market.

2. Coverage and quality of service in a mobile network

An understanding of the principles of network design is important for understanding the challenges of predicting coverage

2.1 Introduction

In this chapter we provide a simplified and high-level overview of how mobile operators design the elements of mobile networks that they own and control to deliver coverage and quality of service. An understanding of the basic principles of mobile network design is important for understanding the challenges associated with predicting and communicating coverage, especially through the use of predictive coverage maps which we discuss in detail in the following chapter. If the reader is already familiar with radio planning concepts and ideas this chapter can be skipped, and the reader should move directly to chapter 3.

We begin by highlighting the critical role of electromagnetic spectrum in a mobile network to deliver communication services and how different spectrum frequency bands exhibit different characteristics which impact on coverage. Similarly, different technology levels exhibit different coverage characteristics. We then describe at a high level the design principles which support the Radio Access Network (RAN) of a Mobile Network before detailing the wide range of factors which impact coverage and quality of service. We conclude this chapter with a summary of the key points.

2.2 Radio spectrum and coverage

Spectrum is a form of energy which radiates from its source, and which gets progressively weaker the further it travels from the source

Mobile networks use the radio portion of electromagnetic spectrum to provide communication services. Spectrum can simply be thought of as a form of energy which radiates from its source and travels in waves which get progressively smaller and weaker as they travel further from the source. A simple analogy are the ripples that are created when a stone is dropped into a still pond – the stone, the source of energy, creates ripples which radiate out, but the ripples get smaller and weaker the further they travel. This explains why the signal received by a mobile phone gets weaker the further the customer is from the nearest mobile network mast.

Spectrum is a finite natural resource. It is defined by the frequency range in which it is located, with the frequency being measured in Hertz (Hz). Mobile networks use the radio portion of spectrum and, within this, the most commonly used radio frequencies today lie in the range of circa 300 MHz to 6 GHz, referred to as the UHF (Ultra High Frequency) band. Mobile networks are likely to deploy higher frequency spectrum in the future including what is sometimes referred to as mmWave spectrum.

The ability of spectrum to radiate or propagate plays a key role in the coverage that a mobile network can provide

The ability of spectrum to radiate or propagate plays a key role in the coverage that a mobile network can provide. The ability of spectrum to propagate depends on the frequency of the spectrum. Low frequency spectrum, such as 700, 800 and 900 MHz spectrum, can propagate or travel further than higher frequency spectrum such as 2100, 2600, 3500 MHz and mmWave spectrum. This is similar to low frequency sound waves, such as the sound of a bass drum, which travels further than high frequency sound waves. When approaching a music concert, for example, the first sound you hear is the bass drum rather than the higher frequency sound waves of the singer. One of the key factors that determines coverage is the type of spectrum a mobile operator has access to. All things being equal, an operator with access to low frequency spectrum will have better coverage than an operator who only has access to high frequency spectrum.

Low frequency spectrum propagates further than high frequency spectrum, as we have already highlighted. In addition, low frequency spectrum is better at penetrating buildings, glass, and other forms of clutter which can prevent a radio signal from continuing to travel. High frequency spectrum such as 3500 MHz, for example, does not travel as far and is not as good as penetrating buildings and other forms of clutter.

The quantity of spectrum an operator has access to is a significant determinant of QoS

In fact, there are a wide range of factors that can impact the ability of radio spectrum to propagate, and these include vegetation and structures of different types which have different impacts. We discuss these factors in more detail later in this chapter.

We have highlighted that the specific frequencies a mobile operator has access to is a significant input to how they deliver coverage. The type of spectrum an operator has is important from a coverage perspective but the quantity of spectrum which an operator can deploy is a key determinant of the quality of service a network can deliver. In simple terms, the more spectrum an operator has access to, all things being equal, the better the quality of service it can offer.

Whilst lower frequency spectrum offers better propagation and coverage, there is less available bandwidth in a lower frequency band by its very nature. For example, channel size at 700 MHz might be 5 or 10 MHz whilst those at 3500 MHz might be 100 MHz. The speed a network can deliver is directly proportional to channel size. Hence it is easier to provide fast connections at 3500 MHz, but these connections do not travel as far as lower speed connections at 700 MHz.

Spectral efficiency measures how much information can be carried by a Hertz of radio spectrum and is usually defined in terms of bits / Hertz. As seen by the definition bits / Hertz, higher frequency spectrum, although less efficient in terms of propagation, has more capacity to carry information due to the higher frequency. The more information that can be carried the better. Spectral efficiencies are highest when operators are able to deploy their chosen technology in a large, contiguous block of spectrum. Typically, there are larger amounts of contiguous spectrum available in higher bands such as 3500 MHz compared to lower frequency bands such as 700 MHz.

In summary, all things being equal, a critical input to the coverage and quality of service a mobile operator can provide is the type and quantity of spectrum to which it has access.

2.3 Mobile radio access network design

Customers are able to communicate and access data via a mobile operators Radio Access Network or RAN

Customers are able to communicate and access data via a mobile operators Radio Access Network or RAN. The RAN comprises a network of sites upon which the network operator deploys radio equipment which comprises technology which can transmit and receive radio waves at certain levels of power. The sites mainly comprise large free-standing towers or masts and smaller sites built on top of buildings and similar structures. In very simple terms, it is the combination of sites and spectrum, and the impact of the environment in which it is deployed, that determines coverage and quality of service. However, in practice, Radio Access Network coverage and capacity planning is extremely complex and it is these complexities which we explore in the remainder of this chapter.

2.4 The approach to radio access network planning

Radio planning software is used to design the radio access network

Computers and complex radio planning software, combined with digital maps, are used to produce models that create coverage predictions based on the following elements:

- digital representations of the elevation of the terrain (Digital Terrain Maps DTM, Digital Elevation Maps DEM or Digital Terrain Elevation Maps DTEM);
- digital representations of the type of cover on the terrain such as buildings, vegetation, etc. referred to as clutter data;
- data regarding the location of existing base stations; and
- data regarding the frequencies used, the antenna type deployed, the position (height), the direction (azimuth), and the angle (tilt) of the antenna relative to vertical.

The accuracy of all the data is key to the generation of meaningful network coverage predictions. Mobile networks then use “drive testing” across the network to measure

the actual versus the predicted coverage area. Signal strength is used by operators to verify the output of the computer model and to then refine the assumptions and predicted coverage and quality of service levels accordingly.

2.5 Factors that impact coverage

There are a wide range of factors that impact mobile coverage

When performing a radio planning exercise to determine the network design required to deliver a certain level of coverage and quality of service, there are a wide range of factors that must be considered. A high-level overview of the most critical factors is described below:

- **Spectrum availability:** As we highlighted earlier in this section, the spectrum a mobile operator has access to plays a major role in its ability to provide both coverage and quality of service. As discussed, low band spectrum has better propagation characteristics and is therefore more suitable for providing coverage – however it delivers lower speeds and network capacities. There is typically more spectrum available in high bands and so access to larger quantities of spectrum has a significant impact on capacity.
- **Coverage and QoS requirements:** The mobile network operator must first determine what level of coverage the radio network should provide. The RAN design will also be predicated on an assumed level of quality of service which will be delivered within the coverage area (typically, in terms of a signal strength that facilitates delivery of a given connection bandwidth). Coverage requirements will typically be defined in terms of outdoor coverage. The coverage and quality of service requirements will be based on commercial considerations or requirements imposed by the regulator.
- **Topography:** The environment in which the network is deployed has a significant impact on coverage. Radio engineers typically discuss different clutter types which range through rural, suburban, urban, and dense urban. Radio propagation is significantly impacted by the environment in which the network is deployed. Due to its time- and location-changing nature (radio connection paths change, in real time, even with a stationary user), radio propagation is typically described using the probability of not exceeding a certain attenuation. This is one of the main mechanisms underlying the probabilistic nature of coverage.
- **Environmental considerations:** Propagation of radio signals can be impacted by a wide range of additional environmental considerations that must be considered. For example, vegetation and buildings will impact on the ability of radio signals to propagate, especially when higher spectrum frequency bands are deployed.
- **Signal power:** The strength of the signal that can be emitted from a base station will impact coverage. There are typically limits on the maximum power or Electrical Magnetic Radiation which can be emitted by active radio equipment. These limits are set by the regulator. The greater the power, the further the radio signal will propagate.
- **Population density and demand:** Radio access networks are shared by customers within the cell of coverage. A cell provides a given level of capacity, so the more customers there are within the cell, the lower the share of capacity available to customers using the network concurrently. Population density and expected customer data usage must be considered when planning coverage at a given level of quality of service. These customer densities vary over time, by time of day, and seasonally.
- **Technology:** Coverage and capacity are both influenced by the choice of technology which is deployed within the network. Later generations of technology such as 4G and 5G provide better spectral efficiency than earlier technologies such as 2G and 3G. Coverage can be impacted by technology choice in that later technologies provide wider coverage than earlier technologies due to improved sensitivity. Capacity enhancements such as high order Multiple In, Multiple Out

(MIMO) and increased sectorisation, and the addition of additional cells to a base station, can improve QoS within a cell. MIMO refers to antenna models that are able to produce multiple paths between the customer and the base station. Beam forming antennae can be utilised to reduce interference and thus improve customer experience. The effectiveness of an operator deploying the latest generation of technology depends on the devices that customers are using.

- **Devices:** Mobile phones are similar to a car radio with radio station pre-sets. A radio must be capable of being tuned to the station a listener wants to hear. A mobile phone also has a fixed set of frequencies to which it is tuned. Modern and high-end devices are tuned to a large number of frequencies. Older and / or lower-end phones are typically tuned to fewer frequencies. If a mobile operator, for example, is assigned additional spectrum in the 3.5 GHz band but no customers have devices capable of operating at that frequency band, then the additional spectrum offers no utility in terms of coverage or quality of service. Furthermore, even where two different devices are tuned to the same frequency, differences in device design and capabilities could mean that one device is able to receive a signal and the other is not. Mobile operators must take account of the evolution of devices within their customer base; however, this is difficult to predict.
- **Site availability:** When developing a radio network plan, the radio planning software used by telecom engineers will indicate the optimal location in which to locate a site. However, landlord site availability, planning permission issues, environmental considerations, access to power and so on may mean that, often, the site cannot be located in the optimal location. Site availability, especially in suburban, urban and dense urban areas will play a significant role in providing coverage.
- **Site access:** A mobile operator needs reliable and efficient access to a site to conduct maintenance and perform network upgrades as required. The ability to gain access to a site, especially in rural areas where access to roads may be limited, will impact on the ability to locate a site in the optimal location.
- **Access to power:** A base station requires power to operate. The location of a site therefore needs to take into account access to power. The source of power may be the national grid, or a base station may rely on its own power generators supplemented by back-up batteries in the event of generator failure.
- **Interference considerations:** Radio signals can be subject to interference and so the radio plan must take into account the risk of interference from other mobile operators. Interference can also arise in a range of other circumstances which include interference from reflected signals, known as multipath fading and occurs when signals are reflected by surfaces such as buildings.
- **Backhaul capacity:** The traffic received at an individual base station must be transported from the radio access network back to the network core where it is then directed towards its final destination. Radio network access planning must therefore take account of the availability of backhaul capacity. Backhaul can be provided by microwave, satellite and, increasingly, fibre as the traffic levels in mobile networks continue to increase.
- **Network security and resilience:** Radio planning must also incorporate security measures to protect against cyber threats and ensure the resilience of the network infrastructure against natural disasters and infrastructure failures.

This high-level overview has highlighted the large number of factors that collectively determine mobile network coverage and quality of service. Many these factors are beyond a mobile network operator's control. Topography, environmental considerations, maximum power limits, population density, movement and customer usage patterns, customer device choice, and site availability issues are all factors over which operators have limited or no control. It is this lack of control that makes it challenging to predict and manage mobile coverage, as we explore in the next chapter.

2.6 Summary

Radio access network design is a highly complex process that must take into account a wide range of factors, many of which are beyond the control of a mobile operator. This lack of control explains why network planning is probabilistic in nature. Unlike a fixed network, where there is a clearly defined path and end point, no such concept exists in a mobile network. The probabilistic nature of mobile coverage and the lack of control of a significant number of factors that impact coverage make it extremely challenging to predict coverage and communicate it to customers. This is the subject of the next chapter.

3. The challenge of communicating coverage

Coverage maps are the most common method by which coverage is communicated to customers

3.1 Introduction

In the preceding chapter we described the complexities of radio access network planning and design and the difficulties of predicting mobile coverage which is probabilistic in nature. We highlighted the large number of factors that impact the coverage provided by a mobile network, many of which are beyond the control of the network operator, and which are subject to change over time. In this chapter we explore the challenges of predicting the coverage that customers will experience and how difficult it is to communicate to customers what they might reasonably expect in terms of coverage and quality of service from a network operator. We focus specifically on the use of coverage maps as these are the most common basis by which coverage is communicated to customers.

The majority of customers often fail to appreciate the probabilistic nature of coverage maps

3.2 Communicating coverage through coverage maps

All mobile network coverage predictions are probabilistic, and it is the probabilistic nature of coverage which makes communicating coverage to customers so challenging. Overlaying the coverage predictions from radio planning software and coverage prediction models onto a map, as a layer, is the easiest, simplest, and most commonly adopted approach to communicating coverage.

The map allows a customer to identify a known location, for example their home address, and to then develop an expectation that it is reasonable to expect coverage at that location if it is overlayed with an indicator (usually an opaque colour block or blocks) showing that the coverage prediction model indicates that it is reasonable for the customer to expect coverage at that location. The main challenge is that customers typically regard the indications of coverage as absolute, whilst in practice, they are probabilistic. Furthermore, customers often conflate coverage and QoS whereas in practice QoS will vary significantly across a mobile network. Relatively few customers appreciate the probabilistic nature of the service offered by mobile networks.

A map, such as the one shown in the exhibit below, shows coverage but is not a useful tool for an individual customer to create an expectation regarding coverage at their target address due to the limitations imposed simply by the scale of the map. This is the reason that printed maps are not practical or useful.

Exhibit 1: Small scale national coverage map

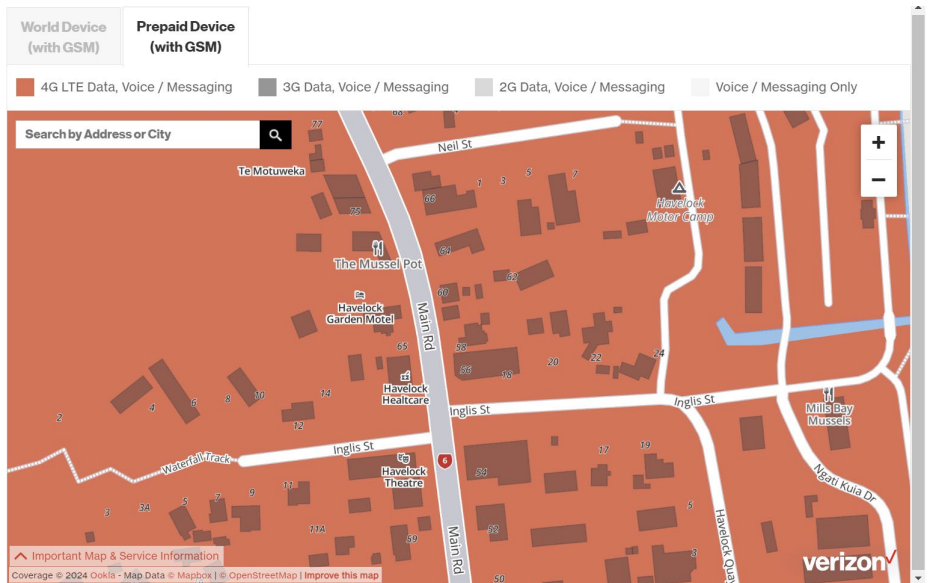


Source: Operator website

Coverage maps can only provide a guide to expected outdoor coverage

By comparison, the map below allows for individual buildings to be identified and the entire mapped area indicates that there is a good expectation that the customer will obtain coverage. The expectation may be created that the entire area, both indoors and outdoors, has excellent coverage or signal strength. It must be noted, however, that the underlying data, and therefore the resulting coverage prediction, represents only the ground (terrain) surface and the clutter data. This means that only outdoor coverage can be represented on the map and that coverage maps are a poor guide to in-building coverage. The ability to predict indoor coverage is even more challenging because the digital maps that are used for prediction purposes do not contain information on the nature of building construction, materials used, etc, all of which impact the ability of a radio signal to enter a building.

Exhibit 2: Large scale, local coverage map

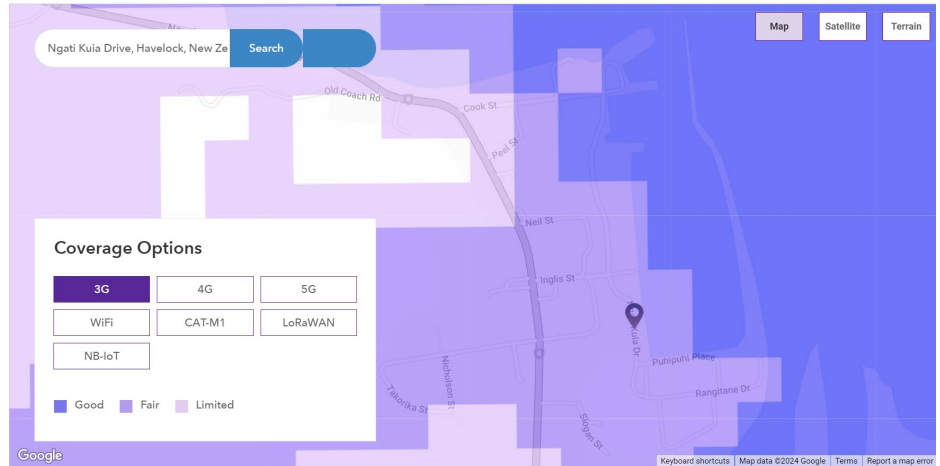


Source: Operator website

The scale of coverage maps mean that they can be difficult to interpret

The map below is detailed; however, it is clear from the size of the aggregated blocks of data that it will be difficult to clearly identify the presence or absence of a suitable signal at a specific point based on this map. The coloured blocks are useful indicators of the expectation of coverage, or not, as indicated by the white blocks. In this coverage map, the size of the blocks means that the user may find it difficult to interpret whether or not to expect coverage at a particular point. The size of the blocks also means that there could be wide variances in signal level within each block rather than the indicated “good”, “fair”, or “limited” categories shown on the map. This is typical of coverage maps internationally and highlights that a higher resolution does not necessarily mean greater accuracy.

Exhibit 3: Very large-scale coverage map



Source: Operator website

3.3 Limitations of coverage maps

Sufficiently low enough scale is a key limitation of coverage maps

We highlighted in Chapter 2 that computers and radio planning software are used to produce the models that create coverage predictions. We also listed the key data inputs that are used within these software tools. The accuracy of all the input data is key to the generation of meaningful coverage predictions and therefore the resulting coverage maps for mobile networks. One of the key limitations of coverage maps is the scale of the maps used and that the scale cannot be sufficiently low enough to allow customers to be fully informed of the likelihood of coverage.

There are significant variations in available digital terrain data. Digital terrain data varies from 0.5m² to 50m² per data point. This means that a single data point in the terrain data could represent, for example, the average height of a geographical feature with an area of anywhere from 0.5m² to 50m². This is a very large amount of variance and results in a single point or coloured block on the map representing an area of anything between 0.5m² and 50m² which can be difficult for customers to interpret accurately and very difficult to indicate on a map.

To achieve reasonable degrees of probability in the coverage models produced, so that networks can be optimised, the mobile industry standard mapping for coverage prediction uses between 1m² and 100m² data for dense coverage areas. These are areas with many mobile towers and high densities of users and high network traffic. 80% of operators utilise data between 2m² and 5m² for these areas. In extremely high-density areas, 0.5m² data is required and in densely built areas with multiple high-rise buildings 3-dimensional planning is undertaken. Lower density areas with base stations further apart and less densely populated areas with lower expected traffic levels require lower levels of detail in the terrain data. Industry standards in these areas is between 5m² and 20m² per data point. In areas where only rural and road coverage is contemplated 50m² is acceptable. This is due to the density of the network base

stations, customer density, and traffic load on the network. The clutter data is more consistent in areas with fewer buildings.

Terrain and clutter change over time and so maps quickly become outdated

The terrain and clutter of a modelled location changes over time and the speed of change is different in different environments. In high density metro and urban areas with ongoing development the terrain can change rapidly. A new high-rise steel-reinforced building constructed between a mobile user location and the serving base station can impact the signal from that base station to that customer. However, the impact in densely populated areas with high traffic levels is usually very limited as the number of sites in such an area is high. The high number of sites is required to provide sufficient capacity for all users to have access to the network. In these high-density areas, distances between sites are typically in the 100's of metres. The greater impact of these changes is usually in the distribution of traffic across the network. Traffic distribution affects the customers' experience of the network in terms of signal strength and quality of service.

In a low traffic area such a change can have a very large impact on a single user if the construction is between the user and the only base station in the area. The customer may be left entirely without service at the location where previously service was available and the coverage map, if not updated, would vary from the on-the-ground signal experience.

It is not possible to maintain coverage maps in real time and so they will always be out of date

Due to the importance of the terrain data used, it is in the interests of the operators to use terrain data that is as current as possible. Mobile industry standards are that terrain data should be updated every three to five years in high-density dynamic environments to re-establish coverage predictions. Map information is not updated in real time, nor are mobile operator coverage maps, so a coverage map will become out of date the moment it is published. It is not feasible or practical to update coverage prediction maps more regularly so they will always, to some extent, provide a relatively poor guide when helping customers set expectations of coverage.

Similarly, the accuracy of the site location and the antenna data has a very high impact on the accuracy of the coverage prediction produced. Should the computer model use an incorrect antenna model with different propagation characteristics from the antenna deployed in the real world, the coverage predicted versus the real-world coverage will be different. This is the reason testing and verification of the coverage prediction versus the real-world coverage is important.

Coverage maps do not attempt to predict indoor coverage

The single biggest limitation in the production of coverage prediction maps is that the terrain and other data is limited to the surface of the terrain. This data is gathered using satellite imaging, laser measurements, or other image sources that are limited to the capture of data from above. Due to this limitation, the model and prediction are limited to the surface of the terrain as seen from the perspective of the device used to capture the images. This means that any coverage prediction map is a prediction of the coverage based on all the of the above elements but limited to the surface of the terrain i.e. outdoors as seen from above. It is for this reason that mobile operators choose to deploy base stations inside of high density, high traffic areas which are usually public buildings like malls and other commercial properties as this improves coverage and capacity inside these buildings.

Coverage prediction maps cannot be considered as legally binding contracts by the operator to provide a service at a particular point on the map due to a probabilistic simulation model indicating that there is a high probability that a signal will be received at that point. In several cases it has been noted that customers are able to access network resource outside of designated coverage areas. In one case, in an emerging market, a landowner charged users a fee to climb a tree on his property because at that height and at that point, although outside of designated coverage, the network was accessible. This is a demonstration of the uncertainty of the coverage models produced. Coverage prediction maps cannot be considered to be 100% accurate.

3.4 Summary

The global mobile industry has invested significant time and resources in developing and refining its approach to predicting coverage. Coverage maps are highly complex to produce and are probabilistic in nature. The process is heavily dependent on the accuracy of the multiplicity of inputs utilised in producing the model. As a result, there are limited opportunities available to the industry to improve the process of predicting coverage. Furthermore, many of the elements of the data are dynamic and these change over time, meaning that coverage predictions require regular updates and improvement as the environment changes. These changes include seasonality in vegetation, weather, patterns of movement of people and therefore network traffic as well as new building developments and changes in personal environmental conditions. The overlaying of these predicted signal levels on a map is the most effective way to communicate and create an expectation of coverage. However, the scale of the map and the aggregation of the data make these maps very useful but inherently prone to errors.

To be able to define a “material coverage issue”, it is critical that a suitable reference point can be established first. The preceding chapter highlighted that coverage is probabilistic in nature. This chapter has highlighted that the probabilistic nature of coverage and the limitations of mapping make it very difficult to communicate coverage to customers through maps. This further complicates the challenge of defining a suitable reference point from which a “material coverage issue” can be defined.

In the next chapter we explore the challenges of defining a material coverage issue in more detail and highlight that many of the causes of potential issues are beyond the control of the mobile operator, meaning it would be unreasonable to hold an operator accountable for issues that it cannot control.

4. Difficulties in defining and verifying material coverage issues

There are major challenges in defining and verifying material coverage issues

4.1 Introduction

The proposed draft regulatory changes make reference to “material coverage issues” and in this chapter we highlight the significant challenges of defining what may constitute a material coverage issue. If a “material coverage issue” is challenging to define then it will be exceptionally difficult to identify and measure in a fair and reasonable manner when assessing whether a customer has reasonable grounds for complaint. Furthermore, as this chapter highlights, many of the factors that could give rise to a change in coverage, and hence a complaint, are beyond the control of the mobile operator and therefore it would be unreasonable to hold them accountable for a change in coverage.

4.2 Customer expectations and defining material coverage issues

The draft Coverage Map Guidelines provide the following definition for a material coverage issue:

“A material coverage issue means a situation where a consumer’s experience of coverage materially fails to meet the representations the retail service provider (RSP) has made in its marketing communications, including in a mobile coverage map, such that the consumer is unlikely to have purchased the service had they been aware of the issue. A material coverage issue may occur at any point in the life of a service.”

Customers may not have reasonable expectations of coverage

The preceding two chapters have demonstrated the challenges associated with representing coverage to customers through the use of coverage maps such that the customer forms reasonable expectations as to the experience of coverage they will receive in practice. Despite the mobile industry’s best efforts, customers’ expectations of coverage may not be reasonable in the first place due to the challenges of interpreting coverage maps. This represents the first problem in defining a material coverage issue; the customer may not have a reasonable reference as to what coverage they should expect. Indeed, the draft guidelines themselves recognise the challenge and in section 14.4 the TCF and RSPs are charged with the task of developing an agreed threshold for a material coverage issue. Reaching agreement over the definition and threshold for what constitutes a material coverage issue is going to be extremely challenging.

Customers have the option of a 30-day money back guarantee

Mobile coverage is what an economist would describe as an “experience good”. An “experience good” is one which can only be accurately valued once it has been experienced. This is the reason why the mobile industry, including the mobile industry in New Zealand, offers customers the opportunity to receive their money back and terminate their contract within 30 days after taking out a contract. 30 days should be sufficient time to determine whether the coverage they actually receive under normal, regular day-to-day usage, is consistent with the map upon which they may have made their purchase decision.

Customers are already protected in a manner similar to that envisaged by the draft guidelines in the situation where their expectations of coverage are not met by the coverage they actually receive. However, the guidelines indicate that a material coverage issue may arise at any time during the life of the service. Coverage can change for a wide range of factors that we have previously described and many of them are beyond the control of the mobile operator. Not only is a material coverage issue difficult to define but even when an issue, however defined, does arise it may not be reasonable to hold a mobile operator accountable for an issue that is beyond its control.

4.3 Accountability for material coverage issues

Some causes of a loss of coverage are the responsibility of a mobile operator

It is inevitable, from time to time, that mobile network elements will be affected by outages. This will impact the experience of customers during the period of the network outage when the customer receives no coverage at all. Mobile operators can reasonably be held accountable for coverage issues arising from such failures. However, such network outages are generally short in duration and quickly rectified and therefore it would not seem reasonable to define such a loss of coverage as a “material coverage issue.”

Longer term, coverage issues can arise, for example, as the result of a landlord lease expiring and not being renewed for a site. The loss of the site can create a material coverage issue if no other sites in the vicinity can carry the traffic, and the process of locating a new site, negotiating a lease, obtaining planning permission and then constructing and commissioning the new site can take a long time, typically 12 months to two years, longer in some cases. In such a case, it may be reasonable to hold the mobile operator accountable and, in most markets, as we discuss later, there are already processes in place for addressing such issues and ensuring the customer is suitably and appropriately compensated.

There are many potential causes of coverage issues which are beyond the control of the mobile operator

It is possible to conceive of a range of “material coverage issues” for which a mobile operator should be held accountable. However, it is also possible to construct a wide range of scenarios where a “material coverage issue” arises that is beyond the control of the network operator and where it would be unreasonable to hold the operator accountable and liable for compensation.

It is outside the capability of coverage predictions tools and available digital maps to identify future construction and predict its impact on radio signals. The terrain data used for these coverage predictions is based on satellite or other imagery and therefore only reflects the terrain at the date and time that the data is collected. This data lacks any predictive elements for further or future construction as the data is only a reflection of the reality when it is captured. Mobile coverage can be significantly impacted by new building construction and mobile operators have limited visibility of and no control over new building development. It may not be reasonable to hold a mobile operator accountable for a change in coverage which arises due to new building construction.

Another example is where the customer or a neighbour has planted extensive vegetation which has now grown and resulted in a degradation in the mobile signal in the customer’s home. It may not be reasonable to hold a mobile operator accountable for a change in coverage which arises due to the actions of a customer or a neighbour.

A further example is where a customer constructs a new metal-clad garden shed in the radio path between the serving base station and the customer’s home office. This office was previously well served by the operator but now has insufficient signal for the network to be useful to the customer. This customer is at the edge of the network and does not have neighbouring cells that provide service. In such a case, the impact on network traffic and the data received by the operator will not provide any indication that there is an issue due to the scale. The impact for the customer however is material but, again, it may not be reasonable to hold the mobile operator accountable for the issue.

The customer’s choice of device can create a coverage issue. For example, after the iPhone 4 was launched, some users reported that the signal strength of the phone was reduced when touching the lower left edge of the phone, bridging one of the two locations which separates the two antennas, resulting in what was perceived to be a reduction in service or coverage. It may not be reasonable to hold a mobile operator accountable for a change in coverage which arises due to device choices by customers.

Whilst customers are generally reasonable and honest, a minority may seek to exploit the challenges of defining what constitutes a “material coverage issue”. For example, suppose a customer has acquired a property as a secondary holiday home and the property is located in an area where coverage is generally poor. The customer seeks to

terminate their contract and obtain a full refund as if the coverage issue has always existed. This could be seen as a customer seeking to “game” the proposed guidelines and gain unfair and unreasonable financial gain from the mobile operator. It is not difficult to imagine other scenarios where unscrupulous customers seek to exploit the proposed guidelines for financial gain.

Verifying coverage issues will present financial and practical problems

4.4 Verifying the existence of a material coverage issue

Even if it were possible to arrive at a practical definition of a “material coverage issue” it would be important to be able to verify the existence and materiality of the issue, especially if the operator would be liable to offer the customer considerable compensation. However, verifying a material coverage issue is likely to be impractical and prohibitively costly if on-site signal testing by a suitably qualified, independent radio engineer is required to verify that an issue has arisen. The industry and regulator would need to identify suitably qualified independent third parties and agree how their activities would be funded. Such an exercise would be complex and time consuming and add to the cost burden of the industry, which may be detrimental to future investment and lead to the need to increase consumer prices.

4.5 Summary

We have highlighted that customers may not have appropriate expectations regarding coverage as a result of the inherent limitations of coverage maps. We have also demonstrated the challenges of defining what constitutes a “material coverage issue”. Even if both these issues can be overcome, there is then the question as for what causes of a “material coverage issue” can a mobile operator be reasonably held accountable. We also highlighted that it is likely that unscrupulous customers may attempt to “game” the definition of “material coverage issues” for financial gain. This leads to the need for an independent verification process which presents its own practical and financial challenges. These challenges largely explain why well-respected regulators across a range of other developed mobile markets have not implemented proposals similar to those envisaged in the draft guidelines.

5. Approaches adopted in other markets

Coleago has not been able to identify other markets which have adopted similar proposals to those suggested for New Zealand

5.1 Introduction

Coleago Consulting has been supporting the telecoms industry since 2001 and in more than 20 years we have never encountered a market where customer compensation provisions similar to those contained in the Draft Product Disclosure – Coverage Map Guidelines, have been implemented. This is not to say that similar provisions do not exist elsewhere, only that we have not encountered similar provisions in the more than 70 markets in which we have delivered projects. In this chapter we provide a brief overview of the approaches adopted in a range of developed markets to highlight how other regulators address similar issues.

5.2 General observations

Customers in other markets are typically protected by codes of practice, dispute resolution services and, ultimately, by consumer protection law

In general, customers of mobile operators are protected by existing consumer rights legislation. Whilst legislation varies from country to country, relevant consumers' statutory rights typically include:

- goods and services should be of satisfactory quality and fit for purpose; and
- should be as described.

Consumer legislation usually provides for the following remedies:

- customers have the right to reject and return;
- repair or replacement;
- right to a refund; and
- right to a price reduction.

There are typically time constraints imposed on the ability of consumers to bring a claim. Customers typically have rights to a return and refund if there is a fault or if it is not fit for purpose within a specific amount of time, often 30 days. Customers have additional time-bound rights for repair and replacement up to six months. Usually after a certain period, the onus of proof switches to the customer to demonstrate that the fault existed at the time of purchase.

In the case of countries within the European Union, under the European Communities Electronic Communications Networks and Services and Universal Service and Users' Rights Regulations 2011, telecoms service providers are required to have a code of practice for handling consumer complaints in place. The obligation for Electronic Communications Service Providers to develop codes of practice for handling end-user complaints was maintained under the Electronic Communications Networks and Services and Universal Service and Users' Rights Regulations 2003 and this was further developed to include provisions in respect of reimbursement of payments / refunds in Decision Notice D16/03 "Users' Rights to Communications Services".

The response of European national regulatory bodies to the EU's regulations was to compel operators to establish a code of practice and to also establish independent, telecommunication specific ombudsman and arbitration services in order to address and resolve customer complaints such as coverage-related issues. The ombudsman is responsible for investigating issues and seeking to establish mutually acceptable and proportionate remedies. In some countries, the decision of the ombudsman is binding on the operator and customers and in others, it is not. In the event that the customer rejects the decision of the ombudsman, where this is allowed, they retain the right to pursue the issue under general consumer protection legislation.

5.3 Approaches of leading regulators

In this section we describe the approaches adopted in:

- United Kingdom;
- Ireland;
- France;
- Netherlands;
- Singapore,
- Australia, and
- Canada.

5.3.1 United Kingdom

In the United Kingdom, customers are protected under the Consumer Rights Act 2015. Customers have the right to have product faults put right free of charge or to be provided with a refund or replacement within 30 days. After this period, the burden of responsibility shifts to the consumer to prove there was a fault at the time of purchase. The Act also protects customers in relation to the provision of services.

The legislative framework governing the UK's telecommunications industry is primarily contained in the Communications Act 2003 (as amended). The Act gives Ofcom, the UK telecommunications regulator, powers to implement specified consumer protection measures if it believes that doing so would be consistent with its statutory duties.

In general, customers who have complaints about their broadband, landline or mobile services, or problems paying their bills, should contact their provider first for advice and assistance. If this does not resolve the problems, the customer can make a formal complaint to the provider.

Customers who remain dissatisfied with the response from their provider, having made a formal complaint, may have their complaints dealt with through an Alternative Dispute Resolution (ADR) scheme. The schemes act as an independent middleman between the service provider and the customer. Communications providers offering services to individuals and small businesses must be members of an Ofcom-accredited ADR scheme. There are two schemes: Communication and Internet Services Adjudication Scheme (CISAS) and Ombudsman Services: Communications. Customers cannot appeal the decision made by the independent adjudicator.

Ofcom also requires mobile operators to publish a Complaints Code of Practice. The Code of Practice for EE⁵ describes the role of the dispute services as follows:

"Ombudsman Services is an independent dispute resolution scheme, approved by Ofcom. Please ensure that you read Ombudsman Services guidelines to ensure that your complaint satisfies the conditions for referral. If your complaint satisfies these conditions, then you must contact Ombudsman Services within six years of first complaining to us. In a case of deadlock where we are unable to reach an agreed resolution to your complaint, then you must contact Ombudsman Services within 12 months of deadlock being issued. When your complaint goes through Ombudsman Services, an independent assessor will review your complaint and decide about how to settle it."

5.3.2 Ireland

In June 2017, the Irish telecommunications regulator, the Commission for Communications Regulation (ComReg), published the "Electronic Communications Complaints Handling Code of Practice - Response to Consultation and Decision". ComReg's decision set out the minimum requirements for service providers' codes of practice for complaint handling. Specifically, the decision required operators to specify in their code of practice the mechanism whereby end-users can avail of refunds.

5 <https://ee.co.uk/content/dam/ee-help/Help-PDFs/ee-complaints-code-of-practice-january-2022.pdf>

Vodafone Ireland's Complaints Code of Practice⁶ was updated in November 2022. It states that:

"Refunds will be granted on a case-by-case basis, depending on the details of the complaint. Our Customer Escalations team will let you know if you are eligible. Our Code of Practice does not affect your Statutory Rights as a consumer. If you are not satisfied with our response to your query, you can still seek independent advice from a number of independent bodies listed below."

In the case of Ireland, customers can complain directly to ComReg if they are unable to resolve the issue directly with their service provider.

5.3.3 France

France is also a member of the EU and is therefore bound by the same EU wide legislation as Ireland. In France, the Organe de Conciliation des Télécommunications is the body that acts as a mediator, under the mandate of the Federal Office for Communication (OFCOM), for civil law disputes based on telecommunications services.

A conciliation procedure can be opened if a customer can prove that they have tried to find a solution with the relevant telecommunications provider without success. The last contact with the provider must not be more than 12 months old. The dispute may not have been dealt with beforehand by another court or an arbitral tribunal and the request for conciliation must not be manifestly abusive.

After receiving and reviewing the complaint the Ombudsman prepares a conciliation proposal. The parties have the option of accepting or refusing the conciliation proposal, or submitting a counterproposal, which will be forwarded to the other party for a position.

Once both parties have signed the conciliation proposal, it has the same effect as a contract. The conciliation proposal has no influence on the rights of the parties. In proceedings before an ordinary court, the agreement will have legal force. In principle, the customer or the provider of telecommunications may, after the conclusion of the conciliation procedure, pursue the issue through the courts if the operator does not act on the agreement.

5.3.4 Netherlands

The Netherlands is part of the EU and therefore follows the same legislative requirements as other EU countries. Consumers protection is provided under the remit of the Netherlands Authority for Consumers and Markets. In addition to general consumer protection, the Authority has developed specific protections for the telecommunications sector.

As of July 1, 2017, the Telecommunications Act was amended in the Netherlands to give consumers and business users the right to compensation for (temporary) unavailability of network and communication services. As a result of the change, network providers are required to provide compensation for outages lasting longer than 12 hours. Both consumers and business users can claim this compensation unless the outage is caused by force majeure. Compensation is to be paid in cash. This principle may be deviated from if the subscriber expressly agrees to another arrangement, such as extra call minutes or data. For a fixed monthly telecom subscription, the compensation amount is one thirtieth of that subscription fee (Minimum of 1 euro). When it comes to a subscription for multiple services (such as internet, television, and telephone), the calculation is based on the full monthly amount. If the outage lasts longer than 24 hours, an additional amount is due for each subsequent 24 hours. Only

⁶ <https://n.vodafone.ie/content/dam/gowingmyself/pdfs/Vodafone-Ireland-Complaints-Code-of-Practice-November-22.pdf>

the subscription costs count when calculating the compensation and monthly payment costs for devices are not included.

5.3.5 Singapore

In Singapore, consumers have a range of dispute resolution options to address their contractual disputes with service providers. These include the Consumer Association of Singapore and the Small Claims Tribunal. Singapore has also introduced the Alternative Dispute Resolution Scheme.

The ADR Scheme is designed to ensure level playing field between the disputing parties. Once a consumer has elected to proceed with the ADR process, service provider participation is mandated by law. The ADR Scheme covers disputes or issues related to all telecoms and media services, with a maximum dispute value of S\$10,000. The dispute must also have occurred within the past one year and should be resolvable through service recovery efforts or compensated for in kind or in monetary terms.

There are two stages to the process: mediation and determination. Mediation is the process whereby an appointed mediator will help to facilitate parties to the dispute to reach a mutual agreement/settlement based on the supporting information provided (by both parties). Determination is a process whereby an appointed determinant will render a decision to a dispute based on the supporting information provided (by both parties). The decision rendered is final and binding on both consumers and service providers.

5.3.6 Australia

In Australia, customers must first attempt to resolve any issues with their service provider. If they are unable to do so, then they can contact the Telecommunications Industry Ombudsman in order to resolve the issue. The ombudsman follows a three-stage dispute resolution procedure. The first step sees the ombudsman engage with the operator to seek to resolve the issue. If it cannot be resolved at this stage, then it moves to conciliation or investigation. In conciliation, either by conference call or by talking to each party separately, an attempt is made to resolve the issue. Investigation involves obtaining additional information to support the process. Following these processes, a recommendation will be made. If the recommendation does not resolve the issue, then the process moves to “decision.” If the customer accepts the decision, the operator must follow the Telecommunications Industry Ombudsman’s directions. The customer can then not to take the complaint to any other forum if the operator follows the directions. If the operator does not follow the direction, the ombudsman refers them to the regulator, the Australian Communications and Media Authority, for enforcement.

5.3.7 Canada

The Commission for Complaints for Telecom Television Services (CCTS) is the organisation for addressing customer complaints including issues related to coverage not being as described.

If a customer and an operator agree to a mutually acceptable resolution during conciliation or investigation, that resolution is binding on the operator and the operator must implement it. Failure by an operator to implement a binding resolution is a serious instance of non-compliance with the Code and the CCTS may impose a range of remedies in response, up to and including terminating the operator’s participation in the CCTS and referring the issue to the industry regulator.

Examples of factors that may be considered in determining the remedy include:

- the severity of the issue and any related cost incurred by the customer in dealing with the issue;

- the responsiveness of the operator in addressing the complaint;
- the reasonableness of the complaint and the requested resolution;
- the reasonableness of any offers the operator made to resolve the complaint; and
- the reasonableness of the time the customer spent working on a resolution to their complaint.

Determining whether compensation is appropriate, and the amount, is done on a case-by-case basis.

5.4 Summary

There are a range of approaches adopted across different markets for addressing issues raised by customers. However, what is consistent is that in the markets we studied, any remedies, especially those relating to the termination of contracts and refunds, are assessed on a case-by-case basis. In addition, in our research, we did not identify any instances whereby a regulator sought to define formally what might constitute a “material coverage issue” and propose specific remedies. Where automatic compensation was due, as in the case of the Netherlands, compensation arose in the case of a complete network outage which is easily defined and observed. It is likely that the challenges of defining a “material coverage issue” which we have highlighted in this paper help explain why we were unable to find examples of its use in other markets. Whilst we have not performed an exhaustive search and there may be markets which have adopted the proposed approach in New Zealand, we feel it is reasonable to say that the approach is not commonly, if at all, adopted elsewhere.

6. Recommendations for New Zealand

We believe that the draft proposals will be challenging to implement fairly and that the proposed remedies are disproportionate

6.1 Introduction

In this paper we have explained that there are a wide range of factors that impact a mobile operator's ability to provide mobile coverage. The fundamental laws of physics imply that mobile coverage is probabilistic in nature and so it is difficult to define well a reference level of coverage from which a "material coverage issue" can be identified and measured.

The probabilistic nature of coverage and the limitations of coverage maps mean that it is also challenging to communicate coverage to customers in such a way that they can establish reasonable expectations of the coverage they will receive in a specific location. Coverage is an "experience good" and this is why customers in New Zealand are offered a 30-day money back guarantee to take account of the challenges of effectively communicating coverage and potential differences in actual coverage experienced.

Coverage issues can arise over time; however, many of the causes of coverage issues are beyond the control of the operator. Even if it were possible to develop a practical definition of a "material coverage issue", and there was a process for independently verifying the existence of the issue, it would be unreasonable to hold an operator responsible for a coverage issue over which it had no control.

We believe that the challenges of defining and verifying what constitutes a "material coverage issue" explains why leading telecommunication regulators have not adopted this approach. Furthermore, the challenges related to coverage highlighted in this paper explain why regulators only consider compensation and potential refunds on a case-by-case basis.

In this chapter we briefly summarise the Commerce Commission's proposals before highlighting the existing customer protections that exist in New Zealand. However, we recognise that there will be circumstances where a coverage issue arises and that some form of compensation is appropriate – we therefore conclude this chapter with a set of recommendations for New Zealand.

6.2 Commerce Commission proposals

The draft guidelines may be considered disproportionate

The draft Product Disclosure – Coverage Map Guidelines, issued to the telecommunications industry under section 234 of the Telecommunications Act 2001 on the 14th December 2023 includes the following provision.

"Retail Service Providers (RSP) should allow consumers to exit their service, or move to a different service, without penalty if they experience a material coverage issue and the RSP cannot remedy this issue within 15 working days of a customer raising the issue."

The draft guidelines include a wide range of what could be regarded as onerous and disproportionate provisions given the challenges highlighted in this paper. The provisions include refunds of service fees and proposals for dealing with devices which are acquired by the customer on payment plans bundled with the customer's service, as well as customers continuing to receive discounts on bundled services even if they wish to exit the mobile contract.

6.3 Existing customer protections

Customers can get their money back within 30 days

6.3.1 Money back guarantee

The mobile industry in New Zealand voluntarily recognises the "experience good" nature of the service they offer, and this is why they provide customers with a range of guarantees. For example:

- One NZ offers customers who subscribe to a pay monthly plan the right to receive their full money back within 30 days if they are not satisfied with the service they receive (subject to terms and conditions⁷); and
- 2degrees offers customers who subscribe to a pay monthly plan the right to receive their money back and return their interest free phone (if purchased with the plan) if they are not satisfied with the service they receive within 30 days (subject to terms and conditions).

A period of 30 days should be more than sufficient to identify any material coverage issues that a customer might experience going about their everyday lives.

6.3.2 The Telecommunications Dispute Resolution service

Customers can use the TDR service to resolve complaints

If an issue does arise during the contract period and after the initial 30 days, the customer can contact the Telecommunication Dispute Resolution (TDR) service if it has been unable to resolve the issue directly with the service provider. The TDR will act as a mediator and facilitator and will adjudicate on the customer's complaint. If the customer accepts the decision of the TDR, then the service provider must follow the directions within the decision.

The primary purposes of the scheme are to:

- ensure that customers have access to an effective independent dispute resolution mechanism to address issues where the customer is not satisfied with the outcome of, or the parties have been unable to resolve, a complaint;
- facilitate the resolution of disputes through practices that are fair and equitable and are consistent with the purposes and provisions of the Telecommunications Act;
- provide prompt, independent resolution of disputes, having regard to the Customer Care Code (if applicable) and relevant legal requirements; and
- increase consumer confidence in the telecommunications industry by maintaining appropriate standards of practice that apply consistently across the telecommunications industry.

In order to support the primary purposes of the TDR, the TDR is operated in accordance with the following principles:

- recognition and protection of customers' legal rights;
- independent, efficient, fair and accessible handling of disputes;
- transparency of the disputes handling procedures for complainants;
- prompt and timely resolution of disputes; and
- neutral and non-discriminatory dispute resolution practices that provide consistent treatment for complainants.

Whilst the TDR's Terms of Reference specifically exclude complaints relating to the absence of network coverage, the ToR do however state that "a Consumer shall not be prevented from basing a Complaint on the Scheme Member engaging in misleading conduct regarding its coverage" which speaks directly to the issues discussed in this paper regarding customer perceptions of coverage arising from coverage maps. The potential remedies include the ability to waive, rescind or amend a charge in relation to a Telecommunications Service. It is also important to note that the ToR do not override other consumer legislation in relation to disputes.

7 <https://one.nz/legal/terms-conditions/network-guarantee/>

The Consumer Guarantees Act already affords the customer protection

6.3.3 The Consumer Guarantees Act

In addition to the guarantees offered by the mobile industry itself and the provisions of the TDR, customers are also offered protection by the Consumer Guarantees Act 1993⁸. A description of the Act is best provided by the Government of New Zealand's own website which states:

The Consumer Guarantees Act (CGA) protects consumers by:

- allowing you to seek repairs, replacements, or refunds when goods are faulty; and
- setting minimum guarantees for all products and services.

All New Zealand businesses and people in trade must meet their responsibilities under the CGA. This means if you have a problem with a product or service, you can do something about it.

The Act encompasses both products and services and specifically highlights telecommunications as a service included within the Act. The following four components of the service are guaranteed:

- carried out with reasonable care and skill;
- fit for a particular purpose you told the seller about;
- carried out within a reasonable time if not timeframe agreed; and
- charged for at a reasonable price when the price is not set.

Of the four components, the guarantee of being "fit for purpose" would capture a material coverage issue. Under the Act, customers are entitled to a refund, replacement or repair.

6.3.4 The Fair Trading Act

The Fair Trading Act 1986 also provides customers with protection and makes the following types of trader behaviour illegal:

- deceptive or misleading conduct and false representations;
- unsubstantiated claims;
- unfair sales practices; and
- unfair contract terms.

6.3.5 Summary of existing consumer protection measures

New Zealand is already aligned with best practice for consumer protection

Customers are already offered a wide range of protective measures. These measures are provided for by the industry itself by the Telecommunication Dispute Resolution service as well as the Consumer Guarantees Act and Fair Trading Act. The regulatory and consumer protection measures in place in New Zealand are already aligned with the approaches adopted by some of the most respected telecom regulators in the industry and can be regarded as best practice.

6.4 Recommendations

Mobile coverage varies from location to location, by time of day and over time, and is probabilistic in nature. A wide range of factors determine mobile coverage and quality of service. It is difficult to provide a robust definition of mobile coverage and therefore challenging to define both theoretically and practically what would constitute a "material coverage issue" and how to verify it in a cost-effective manner. Furthermore, many of the factors that could give rise to a coverage issue, however defined, may be beyond

the control of the mobile operator and it would therefore be unreasonable to require an operator to provide compensation for an issue they cannot control.

The industry does however recognise the limitations of coverage maps, for example, as a means of explaining the nature of the service they offer which is why the industry itself offers customers a 30-day, money back guarantee. Furthermore, existing consumer legislation, in the form of the Consumer Guarantees Act, offers customers protection in the event that the service they receive is not fit for purpose.

The challenges highlighted in this report, in relation to defining coverage and what might constitute a coverage issue, largely explain why leading regulators rely on existing consumer legislation to protect customers rather than imposing disproportionate remedies themselves on operators.

Coleago recommends that the Commerce Commission does not impose additional consumer remedies for coverage related issues but relies instead on existing consumer legislation.