Australian Government

Department of Infrastructure, Transport, Regional Development, Communications and the Arts

House of Representatives Standing Committee on Communications and the Arts

Inquiry into co-investment in multi-carrier mobile coverage

Submission by the Department of Infrastructure, Transport, Regional Development, Communications and the Arts – Communications and Media Group

November 2022

Table of Contents

1. Introduction

The Department of Infrastructure, Transport, Regional Development, Communications and the Arts (the Department) welcomes the opportunity to make this submission to the Committee's inquiry.

Expanding mobile coverage and competition in regional, rural and remote Australia is an ongoing objective of Australian Government policy and programs administered by the Department. The Government in the October 2022 Budget committed $400 million to further expand mobile coverage and improve resilience in regional Australia.

Our submission provides background information and initial views in response to the inquiry's terms of reference.

We note there are also a number of other processes being conducted by the Australian Competition and Consumer Commission (ACCC), the Productivity Commission (PC) and NSW Government that are relevant to the Committee's work and may be of interest to it.

The submission draws on our past work in funding the expansion of mobile coverage in rural and remote Australia.

The submission focuses on service provision in rural and remote markets where commercial incentives to roll out mobile coverage are limited, rather than metropolitan and urban areas. It also focuses on the provision of mobile services using terrestrial mobile infrastructure and only looks at the use of satellite services as an adjunct or counterpoint to this where needed.

While the Department has given some thought to the issues raised by the inquiry, this is still an area of ongoing research and consideration. As is our usual practice, we plan to consult on the design and guidelines for new programs to expand mobile coverage.

The Department expects the Committee's inquiry and final report will provide useful guidance in maximising the value for money for the community from this further expenditure.

The Department's submission is informed by its experience pursuing two key policy objectives and their associated challenges. First, there is strong demand for mobile services within the Australian community, however, there can be poor commercial incentives to roll-out coverage in rural and remote areas where costs can be high and revenues low, creating a need for subsidies. Second, consumers are increasingly looking for a choice of providers, although this requires providers being prepared to offer services in these thin markets. These two objectives arise in an environment of rapid technological and other commercial changes.

The Department would welcome the opportunity to meet with the Committee to expand on its views, and would be happy to help the Committee with such further information as it is able to provide.

2. Definitions

We use a number of terms in our submissions which we explain here.

'Carrier' is generally used to describe licensed telecommunications carriers who construct infrastructure and operate it to provide voice and internet services to the general public (or contract others to do it for them). Such carriers are sometimes also referred to as 'mobile network operators' or 'MNOs' where they provide mobile networks. In Australia, Optus, Telstra and TPG are the main mobile carriers. To provide services, they need to have radiocommunications spectrum; this is discussed in detail below.

In simple terms, a carrier acquires radiocommunications spectrum, establishes or rents sites and towers, and installs radiocommunications transceivers to provide mobile coverage in a cell around the tower. Customers connect to the transceivers using their mobile phones or other devices like laptops or tablets. Calls or data transmissions are carried (or 'backhauled') to and from the transceivers on the towers by cables, wireless or satellite to the carriers' core networks to be connected to the person or data server required. This general model applies to the different, and increasingly capable, generations of mobile technologies, whether 3G, 4G or 5G.

'Service providers' provide mobile services to the general public. The three mobile carriers are service providers, but so too are the numerous retail providers who resell services using the mobile carriers' networks. These resellers are often called 'mobile virtual network operators' or 'MVNOs'. They may operate some fixed line facilities and customer management systems of their own but they typically do not own radiocommunications spectrum or operate radiocommunications networks of their own, making them 'virtual operators'. In Australia, MVNOs include ALDImobile, Boost Mobile, Coles Mobile, Exetel, Hello Mobile, Kogan Mobile, Lycamobile and Woolworths Mobile. Some of these resellers are wholly owned by the mobile carriers, such as Belong Mobile (owned by Telstra), amaysim and Gomo (owned by Optus) and Felix Mobile and Lebara (owned by TPG).

'Tower companies' or 'towercos' refer to firms that specialise in providing sites and towers to MNOs. Recently all MNOs have spun off their tower businesses into separate towercos, although they retain varying interests. Telstra established AmpliTel, Optus established Australian Tower Network (now Indara) and TPG sold its infrastructure assets to OMERS. Other examples include BAI, which has operated a tower business in Australia since the 1990s.

In this submission, we use 'neutral host' to refer to an entity that hosts a mobile carrier on its own infrastructure from the narrowest to the fullest extent possible. That is, the neutral host may provide sites or towers for a carrier's equipment or it may provide the full range of equipment a carrier needs to be able to supply a service to a customer. In principle an entity can be a 'neutral host' providing it treats all comers on the same equal basis.

The focus of this submission is mobile coverage in rural and more remote areas where the provision of such coverage is uncommercial, as well as transport corridors such as highways and major roads, where the costs of providing mobile coverage can exceed the revenue generated from such coverage.

The value of mobile coverage is discussed in section 3 below, even though it may be largely self-evident to the Committee. However, it is worth observing that mobile coverage is of interest not only to people that live or work in an area without coverage but also to people who travel to it. Thus, greater regional coverage is not only beneficial to people in regional areas that directly benefit from it, but also to people in metropolitan and urban areas, who may otherwise have excellent mobile coverage from the provider of their choice in their home location, but also want coverage from that provider when they travel. Carriers in Australia have historically competed on coverage and it remains a key issue. While the importance to urban consumers of coverage in the more remote areas where it needs to be subsidised may vary and be debatable, increasing coverage by multiple carriers also has relevance to competition in urban areas.

3. Radiocommunications spectrum

Spectrum is an essential component to any wireless communications system, including mobile networks. Ideally, an MNO needs access to a mix of low (sub 1 GHz), mid (1-6 GHz) and high (above 6 GHz) band spectrum to deploy a network. Low-band spectrum can travel further and penetrate obstacles (such as buildings) more easily, making it ideal for widespread coverage. However, lower frequency bands have relatively less bandwidth, meaning that they carry less data. Mid band spectrum provides a good mix of coverage and data capacity, while high band spectrum can provide lots of capacity, making it important for 5G.

The Australian Communications and Media Authority (ACMA) is Australia's spectrum regulator, responsible for licensing spectrum. There are three main licence types in Australia:

1. Spectrum licences allow users to operate a range of radio devices in a specific geographic area and frequency band. Technical conditions are typically optimised for a specific use. Spectrum licences can be issued for up to 20 years.

2. Apparatus licences allow users to operate certain types of transmitters and receivers and can cover many different service types. These can also be issued for up to 20 years.

3. Class licences allow users to operate common radio equipment on shared frequencies. Generally, devices are not registered and users pay no fees. Class licensing is used for applications such as Wi-Fi, cordless phones and medical equipment.

There is not clear evidence that spectrum access is a barrier to expanding coverage in regional or remote areas for the major mobile carriers. All the major mobile carriers own national spectrum licences for low band and have holdings of medium and high band spectrum.

Low-band spectrum

A large part of low-band spectrum in Australia is currently spectrum licensed by MNOs, as set out in the table below.

Low-band spectrum holdings

Band	Current licensee
700 MHz	Telstra, Optus, TPG
850 MHz	Telstra, TPG
850 MHz expansion band	Telstra (from 2024)
900 MHz	Optus (from 2024)

In addition to this, the 600 MHz band is currently allocated for television broadcasting in Australia and 2x5 MHz of spectrum at 809 MHz-814 MHz / 854 MHz-859 MHz has been set aside to support the development of a Public Safety Mobile Broadband (PSMB) capability.

Access to low-band spectrum (sub-1 GHz) has been identified as a possible barrier to entry by some smaller market players seeking to implement multi-carrier or neutral host models to provide services in regional and remote areas. In order to access low-band spectrum in the short to medium-term, new entrants to the market or smaller regionally focused carriers may need to enter into some form of spectrum sharing arrangement with one of the three major mobile carriers, who hold spectrum licences in areas where they are not providing a service.

Regulatory frameworks enable spectrum sharing

The spectrum regulatory framework is designed to facilitate spectrum sharing and is not a barrier to spectrum licensees developing arrangements to share their spectrum with third parties. For example, the *Radiocommunications Act 1992* allows for third party use of spectrum licences. Such authorisation is subject to the requirements of section 50 of the *Competition and Consumer Act 2010.*

Interference concerns may present a challenge for the sharing of low-band spectrum, but this would depend on the geographic areas where spectrum sharing is proposed and to what extent coverage overlaps or is adjacent to existing carrier deployments. Where sharing extends only to operating in the same spectrum without deeper levels of network integration, it is more likely that interference management issues at the boundaries of the shared spectrum may result in dead zones where spectrum cannot be used efficiently.

Spectrum sharing can enable more efficient use of spectrum and is one way to facilitate access to spectrum.

Depending on the specific multi-carrier model, infrastructure sharing may not involve sharing of spectrum. As the three major mobile carriers each own a mix of spectrum, including low-band spectrum, it may not be necessary for them to share spectrum to expand coverage.

Mid-band spectrum

Mid-band spectrum is available across Australia through a mix of apparatus and spectrum licensing. Apparatus licensing in parts of the 1800 MHz, 2 GHz, 3.4 GHz and 3.6 GHz bands may be an option for new market entrants in some regional and remote areas in addition to third party agreements with the three major mobile carriers. Similarly, ACMA is preparing to allocate additional spectrum in the 3.4-4.0 GHz band to cater for a range of uses with a mix of spectrum and area-wide apparatus licences.

Depending on the scope of a planned deployment, mid-band spectrum is suitable for a range of use cases, as it has relatively good propagation characteristics and can provide good data capacity as well. Some operators have raised concerns about the increased cost associated with using mid-band spectrum, due to the need to deploy more physical infrastructure in order to provide equivalent coverage to that achievable with lower band spectrum.

4. General approach to service provision and problem

Despite the benefits of mobile coverage there are challenges to its provision in less populated areas and on less travelled roads. While there may be different technical challenges, these are generally surmountable. The fundamental issues are commercial and economic.

The default approach in Australia is that telecommunications services are provided on a commercial and competitive basis, in response to market demand. Commercial decisions have underpinned investment in a range of areas, including in Australia's mobile networks, backhaul infrastructure, data centres, and some rollouts of fixed access technologies like fixed-line and fixed wireless.

Competition between the three major mobile carriers, Telstra, Optus and TPG Telecom, has to date delivered high-quality mobile services across Australia. All three carriers have broad network coverage in the major cities and larger regional centres, claiming significant levels of population coverage (~96 % for TPG, 98.8% for Optus and 99.5% for Telstra[1]) and close to 100% coverage in metropolitan markets.

While commercial rollouts have delivered strong population coverage outcomes, the carriers' total land mass coverage varies from 10% to 33%. A map showing maximum mobile phone coverage is at Attachment A.

The provision of mobile coverage has become increasingly challenging as coverage has pushed into less populous and less travelled areas. The costs to expand a carrier's coverage rapidly increase as the network approaches 100% population coverage. In these areas the cost of provision increases (e.g. to provide power at the sites and backhaul (transmission) to and from the core network). Compounding these higher costs are lower potential revenues given lower resident and visiting populations. These factors impact the provision of a single network; they are amplified when it comes to providing access to multiple mobile services, which involves dividing already small markets between multiple operators.

In this context, to expand on commercial mobile coverage, Australian Governments have partnered with the major mobile carriers and state and territory governments through co-investment schemes which subsidise the capital costs (and some operational and maintenance costs) of mobile network deployment in less commercial areas. These most notably include the Mobile Black Spot Program (MBSP), which is funding the

----

[1] www.accc.gov.au/media-release/accc-seeks-further-views-on-telstra-tpg-mobile-network-deal

deployment of over 1,270 new mobile base stations in regional, rural and remote areas, and the Regional Connectivity Program (RCP), which is funding targeted, 'place-based' upgrades to mobile (and broadband) connectivity in regional communities. These programs have been successful in improving the availability of mobile coverage in regional areas.

The MBSP has also improved coverage with multi-carrier solutions in a number of regional areas by incentivising the mobile carriers to share (generally passive) infrastructure on favourable commercial terms where appropriate and feasible to do so. The MBSP has introduced competitive tension in some underserved markets by encouraging other carriers to deploy infrastructure in less marginal areas following the rollout of funded base stations under the program.

However, an issue raised by the community and other stakeholders where mobile coverage is subsidised is whether consumers can be provided with access to the major mobile carriers and service providers more uniformly.[2] This is seen as extending the benefit of competition, at least at the retail level (and on a subsidised basis) to resident consumers, providing them with greater choice, including of products and pricing (noting that pricing of mobile services is done on a national basis). It also provides consumers in commercial areas with wider geographic coverage overall and greater utility if and when they travel to more remote areas. It may be that the characteristics of the locality where additional coverage is being considered may affect the merits or importance of multi-carrier outcomes. For instance, additional coverage along transport corridors does not necessarily provide an operator with much by way of new customers living in those areas. However, it can provide a benefit to their wider customer base that all operators may want to offer.

5. Benefits, feasibility and costs of single and multi-carrier mobile coverage models

This section looks at the benefits, feasibility and costs of expanding mobile coverage into non-commercial areas generally and then in terms of single and multi-carrier models. It looks at these from the perspective of both consumers and industry. As the Committee will appreciate there is interaction between the benefits, feasibility and costs of different approaches.

Benefits

Mobile services are the preferred means of communications by many Australians, with over 30 million services in operation. While most data is downloaded over the fixed network, mobile services have long been used for the vast majority of voice calls, as well as providing text services and, increasingly, data services.

Mobile services provide additional functionality and utility not offered by fixed services simply by virtue of providing communications while on the move, away from the usual place of residence or business. In premises, mobile devices are widely used to access fixed line connections, for example, via Wi-Fi, because of their convenience and familiarity to consumers.

Research published recently by ACMA confirms an increasing number of people in Australia are mobile-only. In 2020 60% of adult Australians were mobile-only for voice calls at home and 16% were mobile-only for Internet at home.[3]

----

[2] 2021 Regional Telecommunication Independent Review Committee (RTIRC21); *A step change in demand*, www.infrastructure.gov.au/sites/default/files/documens/2021-rtirc-report-a-step-change-in-demand.pdf, references to multi-carrier access can be found at pages 46-48

[3] www.acma.gov.au/publications/2020-12/report/mobile-only-australia-living-without-fixed-line-home

Available data suggests that for people with low income and for Indigenous Australians, their preferred solution is a mobile service because of the attractive price and the inherent mobility it provides. In the case of the homeless, mobile may be their only practical option.

Industry research suggests mobile services contribute heavily to productivity gains. For example, Deloitte estimate that the productivity impact of Australia accelerating 5G adoption will bring a huge economic dividend, worth $27 billion to GDP by 2030.[4]

Such data confirms what most people intuitively think. Their access to a mobile device significantly enhances their everyday lives, whether it be keeping up with emails, making calls when needed, finding directions, getting and providing quotes, booking a ticket, finding service providers, accessing government services online, or simply keeping in touch with family and friends. The list of uses is likely endless.

The practical importance of mobile services is reflected in their widespread use to provide EFTPOS services in businesses and for two-factor banking authentication across Australia.

Mobile services can significantly enhance safety, both in terms of getting information, such as disaster warnings, out to people when they are out and about, or enabling people to seek help when they need it, whether it be a simple car breakdown, or a more serious emergency. They can also support emergency services agencies in responding to critical incidents. No or poor mobile coverage in the event of a bad accident is frequently cited in the media. The role of mobile services in these circumstances is underlined by the recent deployment of advanced mobile location technology for the Triple Zero service, forthcoming investment in a Cell Broadcasting National Messaging System capability, widespread interest in public safety mobile broadband (PSMB), and the hardening of mobile infrastructure for added resilience.

Expanding mobile coverage will help people in regional Australia further benefit from mobile communications and the economic and social benefits it has delivered.

Improving access to mobile services is a consistent theme in the triennial Regional Telecommunications Review, including most recently in 2021[5]. Similar observations have been made by Regional Development Australia, Infrastructure Australia[6], the Productivity Commission[7] and many other stakeholders and commentators.

These more qualitative observations are supported by a more numerical assessment of premises without mobile coverage. Around 0.5% of the population is estimated to have no external mobile coverage at their premises. This would equate to about 60,000 premises, assuming there are 12 million premises in Australia. By definition, however, mobile services are used when people are out and about. As noted above, landmass coverage is estimated at 10% to 33% depending on the provider, noting much of Australia is very sparsely inhabited or uninhabited.

In our experience, people in rural and remote areas expressing interest in accessing multiple carriers do so on the basis they want to access a better range of products and/or prices. The competition benefit to consumers may also be reduced, if the shared network is isolated from some of the MNOs' networks, as consumers tend to prefer the providers with the best contiguous coverage.

----

[4] www2.deloitte.com/au/en/pages/economics/articles/mobile-nation.html.
[5] RTIRC21 (see above)
[6] www.infrastructureaustralia.gov.au/sites/default/files/2022-03/1_RSIG_Introduction_0.pdf, p 9-10, 17
[7] Productivity Commission, 5-year Productivity Inquiry: *Australia's data and digital dividend*, interim report, www.pc.gov.au/inquiries/current/productivity/interim2-data-digital/productivity-interim2-data-digital.pdf, p 32-39

If mobile services in an area are provided by multiple carriers, operating separately, there may be greater total capacity and fewer congestion issues; however, this may depend on the relative numbers of customers on each network in the area. Similarly, if there are multiple networks, there may be greater resilience in disasters, in that all networks can carry emergency calls to Triple Zero (or 112) and consumers could potentially move between networks, for example, by having dual SIM phones, or even multiple phones, albeit it at higher cost. However, these benefits will only accrue where it is viable to operate multiple networks, and this is often difficult in less populated rural and remote areas, as discussed in section 4 above.

From a carrier or service provider's perspective, as noted on page 5 above, greater mobile coverage not only adds to the potential customer base in the newly serviced areas (noting the increase may be modest) but enhances their offering in urban areas where the majority of customers are. This can help drive take-up, particularly amongst customers who travel widely and frequently and value coverage. Moreover, depending on the model employed, the costs to a carrier may be reduced through infrastructure sharing, as discussed below. The costs may be less than each carrier providing its own stand-alone tower, including the site, tower, electronics, power and backhaul.

However, these benefits of multi-carrier access also need to be considered in terms of feasibility and costs, which are discussed below.
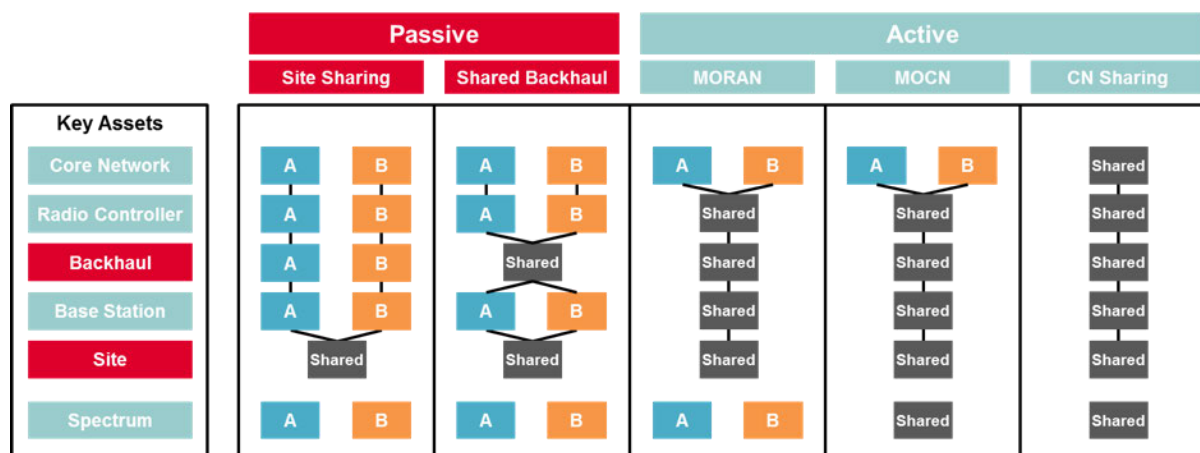
Feasibility and cost

The feasibility of a single mobile carrier operating its own network in rural and remote areas is well established as is demonstrated by such operations. The main issue in provisioning such a network in rural and remote areas is largely cost and likely revenues, raising issues of their commerciality. While building its own network gives a carrier greater coverage, greater operational control and strategic freedom, it comes with the cost of the network. These costs include acquiring the site, building or procuring the tower, providing the network electronics, and backhaul (transmission to the core network) and power. In a densely populated urban market these costs may be lower and recoverable. In a rural and remote area, the costs can be considerable. In a remote location, we estimate the cost can be $2 million or more per carrier per site. However, the number of customers using the facility will be far lower than in an urban area.

Multi-carrier models are of varying familiarity and these are discussed in more detail below. Again, while there are a number of technical and commercial models, they have advantages and disadvantages, including different cost implications.

Multi-carrier mobile networks can adopt a range of technological approaches with different degrees of sharing between providers and different implications. The main variables in the models are the degree to which infrastructure is shared and how sharing is undertaken. The sharing can relate to passive infrastructure like sites, towers and shelters, or active infrastructure, including the radio access network (RAN), associated radiocommunications spectrum, and network electronics.

The main options are summarised in the following diagram, published by the GSMA[8], a global organisation of carriers and equipment vendors.

----

[8] www.gsma.com/futurenetworks/wiki/infrastructure-sharing-an-overview/

By sharing infrastructure, carriers seek to reduce their costs and increase the reach of their footprints. However, the savings from sharing need to take account of additional costs it causes, such as system interoperation and partitioning, particularly as sharing become more sophisticated.

The less complex approaches to sharing involve the sharing of passive infrastructure. This is often referred to as co-location.

Co-location has been used extensively in Australia and has been important in extending coverage. There is a high level of passive tower sharing on which radiocommunications equipment is co-located. This has been supported by the facilities access regime in the *Telecommunications Act 1997*. Co-location can reduce rollout and operating costs, avoid unnecessary duplication of infrastructure and avoid some planning issues. Co-location is common in major cities and inner and outer regional areas with tower sharing rates between 35% to 85% depending on the carrier[9]. However, co-location rates drop in outer regional and very remote Australia.

Active sharing involves increasing sharing of RAN equipment, including base stations, radio controllers and potentially spectrum, as well as core network infrastructure, by multiple carriers.

The three key technological models in this regard are:

- Multi-Operator Radio Access Network (MORAN) sharing, where equipment is shared but spectrum and core networks are not.
- Multi Operator Core Network (MOCN) sharing, where all elements of the radio access network, including spectrum, are shared, but providers operate their own core networks.
- Core Network (CN) sharing, where the core network is shared, along with all elements of the radio access network, including spectrum.

While CN sharing may be seen as analogous with 'roaming', where a carrier acquires rights to use another carrier's network to provide services, there are differences in approach, for example, in terms of how the carrier accessing the network does this.

All sharing solutions depend on a high degree of cooperation between carriers, with active solutions involving even greater cooperation. The commercial model supporting a sharing solution also needs to be considered.

The Committee may like to refer to the GSMA paper for further details.[10]

----

[9] www.accc.gov.au/system/files/Mobile%20Infrastructure%20Report%202022.pdf
[10] GSMA, as above

Technical limitations of multi-carrier approaches

International experience suggests that RAN sharing approaches may not be suitable in all situations.

RAN sharing typically has more limited capacity compared to situations where each carrier deploys its own base station equipment. For example, Vodafone and O2 announced in 2018 that they were scaling back of their United Kingdom RAN sharing arrangement. They noted in areas of very high data traffic, a shared network may buckle under the strain and have a negative impact on quality of service.[11] This is less of a concern where RAN systems are deployed in thinner markets.

Notwithstanding potential cost savings, sharing solutions may not be economically attractive for carriers in some locations. For example, if the coverage provided by the sharing arrangement is significantly isolated from the rest of a carrier's network, it may not be commercially attractive for the carrier to offer services using the system. Carriers strongly favour contiguous coverage over deploying isolated islands of coverage.

Additionally, for very small markets it may be uneconomic for the carriers to split the market share. This may discourage carriers that expect to only receive a small share of market from offering services at a given location. The revenue from expected market share may be substantially smaller than cost of offering services at the location. These locations may require high levels of funding to make it commercially attractive for multiple carriers to offer services, compared to locations in thicker markets.

Australian experience with mobile sharing

Under the MBSP, grantees are required to offer co-location on funded infrastructure to other carriers where technically feasible. The MBSP also requires the grantee to provide backhaul to a co-locating carrier at more favourable prices than those regulated by the ACCC Domestic Transmission Capacity Service.

Under Round 5A of the MBSP, mobile network infrastructure provider and operator Field Solutions Group (FSG) was awarded funding to undertake two trials of new mobile deployment models in partnership with Optus.

The first trial involves the use of an Active Neutral Host RAN to deliver coverage from FSG's Regional Australia Network and the Optus mobile network on seven new mobile towers along Queensland's Adventure Way between Thargomindah and Cunnamulla. The neutral host model will use a single set of electronics and radio equipment on each tower to deliver coverage from both providers, with the potential to accommodate additional carriers.

The trial aims to demonstrate the technical feasibility of the neutral host model, as well as its benefits in reducing costs for mobile network operators and driving competitive coverage outcomes in less economically viable areas of rural Australia.

The second trial will utilise a domestic roaming arrangement to allow other carriers' customers to 'roam' onto FSG's Regional Australia Network in regional, rural and remote areas. Under this arrangement, other carriers' subscribers will be able to continue to use Optus voice and data services on their mobile device when visiting an area with coverage on the FSG Regional Australia Network.

The trial aims to demonstrate the ability for 'place-based' networks in areas unlikely to be served by traditional mobile network operators to realise cost-effective connectivity for customers of these providers through a domestic roaming agreement.

----

[11] Vodafone and O2 pull back on RAN sharing as urban data usage soars, rethinkresearch.biz/articles/vodafone-and-o2-pull-back-on-ran-sharing-as-urban-data-usage-soars/

6. Successful multi-carrier outcomes and their applicability to Australia

In addition to our experience under MBSP 5A noted above, two examples of network sharing to deliver multi-carrier mobile access commonly cited are those of New Zealand and the UK. These are discussed below. Other historical examples are provided at Attachment B.

New Zealand's Regional Connectivity Group (RCG)

The RCG is an independent entity established in 2017 by the New Zealand Government to build infrastructure for the country's three mobile operators – Vodafone, Spark and 2degrees – as part of New Zealand's Rural Broadband Initiative 2 and Mobile Black Spots Fund.

The RCG uses MOCN sharing, where all three operators share spectrum, base station equipment, transmission and passive infrastructure (sites, equipment shelters, towers and mains power) to provide 4G wireless broadband and mobile services. The operators pay a monthly fee to RCG on a wholesale basis based on the amount of capacity they need at each site.

The RCG is funded by the Telecommunications Development Levy and contributions from the three operators, totalling NZ$225 million. This will fund almost 600 cell sites by December 2023 which will increase national geographic coverage by 25%.

By April 2022, the RCG had completed more than 325 sites.[12] This has brought connectivity to over 27,650 households and businesses across New Zealand, 68 tourist spots and 742 km of highways.[13]

The RCG manages and monitors capacity, common radio parameter settings and manages common radio backhaul for 4G solutions. In contrast with the implementation of 4G mobile coverage, which uses a MOCN type of neutral host solution, 3G overlay solutions are implemented as MORAN solutions where each MNO uses its own spectrum.

UK Shared Rural Network (SRN)

The SRN was established in 2019 by the UK Government, in conjunction with mobile operators Three UK, Vodafone, O2 and EE, to extend 4G mobile coverage to 95% of the UK by 2025. In March 2020, the UK Government and four MNOs signed the formal agreement setting out how the program would be governed. The agreement requires each operator to reach 90% geographic coverage by 2025, with mobile coverage obligations on spectrum licensing coming into effect in 2026.

The SRN will be funded jointly by the MNOs and the Government. Collectively, the MNOs will contribute £532 million to the SRN, in order to address partial not-spots, a geographic area with 4G coverage from least one, but not all four mobile network operators. The Government will invest an additional £500 million to provide new mobile masts in areas with no 4G coverage. [14]

The arrangement will not use active RAN sharing. Instead, the operators will share passive infrastructure at both newly funded sites and existing sites where there is coverage from at least one but not all operators. The SRN aims to increase the UK's coverage as follows:[15]

----

[12] The RCG Website: www.thercg.co.nz/liven-their-300th-site/

[13] www.thercg.co.nz/rcg-marches-on-into-2022/; TelSoc conference, 13 April 2022

[14] www.gov.uk/government/news/government-breakthrough-on-500-million-support-package-to-boost-rural-mobile-coverage--2

[15] Shared Rural Network, https://srn.org.uk/forecast-coverage-improvements/ https://srn.org.uk/forecast-coverage-improvements/

	4G Coverage from all MNOs		4G Coverage from at least one MNO	
	Pre-SRN	Forecast post-SRN	Pre-SRN	Forecast post-SRN
Overall	69%	84%	91%	95%
England	84%	90%	97%	98%
Scotland	44%	74%	81%	91%
Wales	60%	80%	90%	95%
Northern Ireland	79%	85%	97%	98%

Coverage data as of Jan 2021.

The SRN aims to provide coverage to 280,000 premises and 16,000 km of roads, with the biggest improvements expected in Scotland and Wales. The SRN implementation and rollout strategy can be divided into two phases. By January 2021, the first phase of the SRN had funded 222 neutral host solutions in UK.[16]

Applicability of New Zealand and UK experience to Australia

There are differences between the Australian, New Zealand and UK mobile markets that lead to different market dynamics.

Primarily, the smaller landmass and higher population density in the UK and New Zealand mean on a cost-revenue basis any of the individual MNOs could increase its own mobile coverage, even in non-commercial areas where such investments may require subsidies to proceed. Programs like the New Zealand initiative can deliver substantial coverage improvements for relatively modest funding amounts. In both the UK and New Zealand, the MNOs have comparable market share and coverage (both by population and geography). In these countries, competition in the mobile market is mainly through differentiation in the features and services offered by each carrier. There is a strong commercial incentive to work cooperatively to reduce costs to cover uneconomic areas.

7. Other relevant processes

A number of other processes are in train that are relevant to the Committee's work and from which it may gain insights. Four in particular are mentioned here.

Telstra-TPG

On 21 February 2022 Telstra and TPG Telecom announced a ten-year regional MOCN commercial agreement.[17] The ACCC is considering an application for merger authorisation lodged by Telstra and TPG in

----

[16] www.telecomtv.com/content/access-evolution/the-uk-s-shared-rural-network-srn-is-revived-let-the-collaboration-begin-40719/
[17] www.tpgtelecom.com.au/sites/default/files/media-release/Joint%20media%20release%20-%20Telstra%20and%20TPG%20Telecom%20sign%20landmark%20network%20sharing%20agreement%20for%20regional%20Australia.pdf

relation to spectrum sharing and active mobile network infrastructure sharing in certain regional areas of Australia. The ACCC is likely to make a determination in early December 2022.

Under the deal TPG Telecom will gain access to around 3,700 of Telstra's mobile network assets, increasing TPG Telecom's current 4G coverage from around 96% to 98.8% of the population. Telstra will gain access to TPG Telecom's spectrum across 4G and 5G, which will allow it to grow its network, increase capacity and continue to provide the country's largest network.

Under the MOCN arrangement Telstra will share its RAN for 4G and subsequently 5G services in the defined coverage zone, with Telstra retaining a 'first mover' advantage for the first six months after any 5G rollout. However, both carriers will continue to operate their own core networks where key differentiating functionality resides.

Telstra and TPG have offered the ACCC the right to review their planned network sharing arrangement, which would give the ACCC the ability to veto the agreement after the first eight years of operation if competition issues arise. TPG is also offering to hold onto existing leases and licenses for up to 300 cellular sites, for up to eight years in addition to the 169 sites it will provide Telstra.[18]

NSW Government

On 28 April 2002, the NSW Government announced[19] it would work with Optus, Telstra, TPG Telecom, BAI Communications, FSG, Infrastructure Logic, NEC and Pivotel Mobile to overcome what Deputy Premier Paul Toole called a "patchwork" of coverage created by the "one tower, one carrier model".

On 28 September 2022, NSW Government opened its $30 million Active Sharing Grants Program[20] for the construction and operation of active sharing mobile solutions that will provide new and improved mobile coverage to regional NSW. Applications closed on 14 November 2022.

The objectives of the Active Sharing Partnership opportunity are to:

- demonstrate the suitability of different types of active sharing solutions in delivering coverage and connectivity outcomes for regional NSW;

- encourage competition in the regional telecommunications market to provide consumers with greater quality, affordability, and choice in their telecommunication provider;

- identify fit-for purpose commercial and delivery models for active sharing mobile solutions that can be implemented at scale in future government funding programs;

- deliver new and improved mobile coverage to regional NSW locations where people live, work and play using active sharing mobile solutions.

ACCC Mobile Infrastructure Inquiry

The ACCC's inquiry into mobile infrastructure commenced on 1 July 2022 following a direction by the previous Minister for Communications. The direction requires the ACCC to conduct a public inquiry into:

- access fees for towers and associated infrastructure in regional, rural, remote and peri-urban Australia, and the underlying costs; as well as

- the feasibility of temporary mobile roaming during natural disasters and emergencies.

----

[18] www.itnews.com.au/news/telstra-tpg-offer-accc-power-to-end-network-deal-after-eight-years-587447
[19] www.itnews.com.au/news/nsw-gov-lays-out-50m-plan-for-mobile-tower-sharing-579355?utm_source=feed&utm_medium=rss&utm_campaign=editors_picks
[20] www.nsw.gov.au/grants-and-funding/mobile-coverage-project

The inquiry responds in part to Recommendation 9 of the 2021 Regional Telecommunications Review, which recommended a feasibility study to consider the capacity of mobile roaming during emergency situations. The 2021 Review found that during instances of natural disasters and emergencies mobile connectivity is critically important to the emergency response, however is significantly impacted by power and network outage. This not only impacts on access to real time information and emergency coordination, but also on recovery and support following disasters.[21]

The ACCC must consult widely, including industry and consumers. The inquiry is expected to cover a range of matters which will be of interest to this inquiry, including:

- the costs of providing access to towers and associated passive and active infrastructure, including land, the infrastructure itself, and processes for providing access;

- the fees that arise, and the factors that determine them;

- the effectiveness of current access arrangements;

- the matters providers consider in deciding to provide towers and access;

- how these matters may affect the provision of greater mobile coverage;

- the implications (if any) of mobile carriers divesting their tower businesses; and

- the feasibility of providing temporary roaming services during natural disasters and other such emergencies (including technical feasibility, the support systems and business processes required and the associated time and costs expected).

The inquiry is due to be completed by July 2023 and includes extensive consultation.

Productivity Commission's 5 Year Productivity Inquiry: Australia's data and digital dividend

As part of its 5 Year Productivity Inquiry the PC has released an interim report on Australia's data and digital dividend. Amongst other things the interim report notes the importance ascribed to mobile services and concerns about the lack of mobile coverage in rural and remote areas, citing the 2021 Regional Telecommunications Review and Infrastructure Australia in support of its view. The PC canvasses the possibility of improving telecommunications outcomes by tendering for solutions on an area-by-area basis.[22] The PC is expected to finalise its report in early 2023.

8. Concluding comments

The value and benefits of mobile services to people in Australia are demonstrated by their strong uptake and usage.

There are a number of technical and commercial models that can be deployed, in different combinations, to promote multi-carrier mobile coverage. They have different advantages and disadvantages but the success of them all depends on the willingness of MNOs to participate.
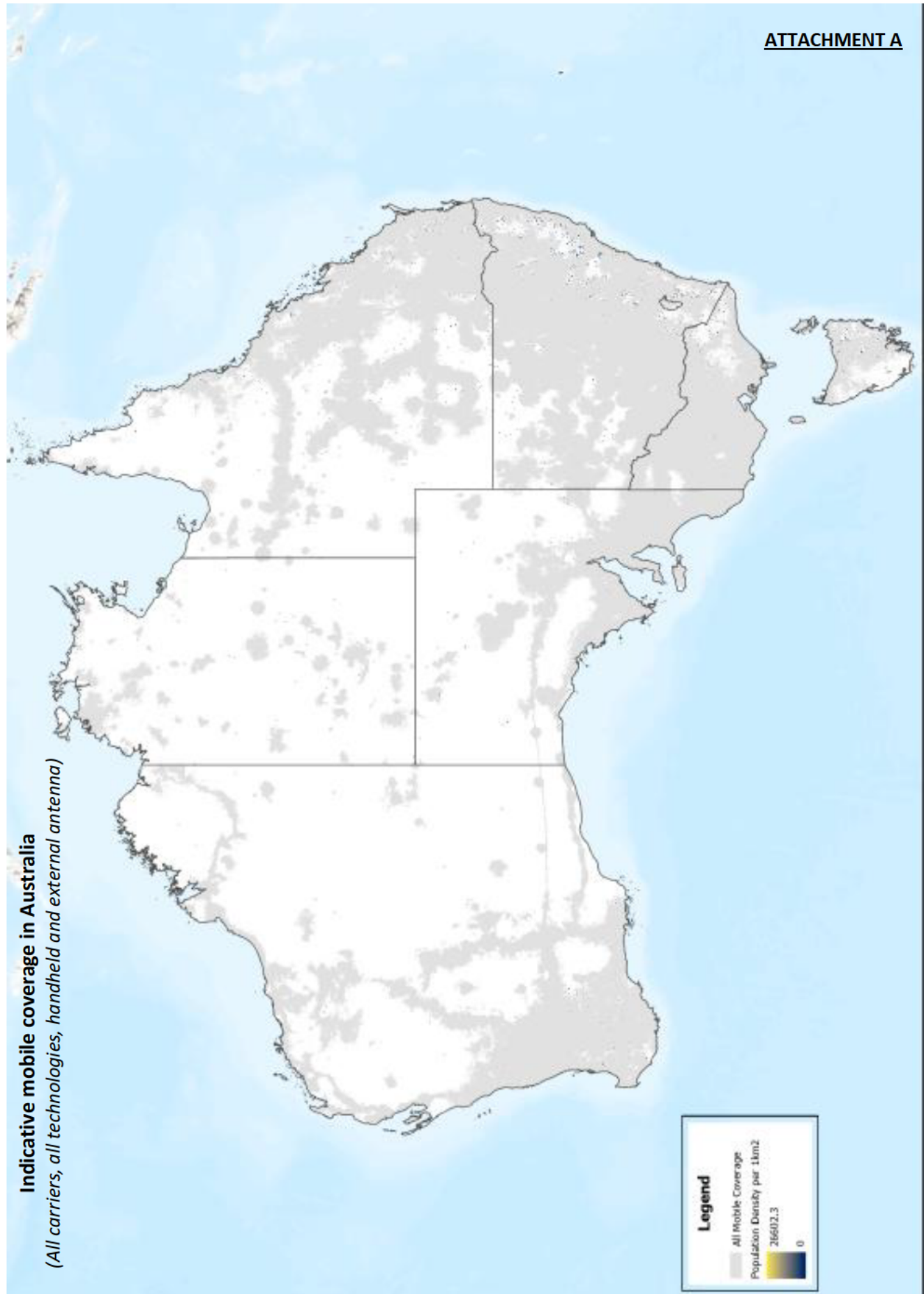
Multi-carrier outcomes can reduce the costs of providing services per carrier, compared to independent base stations. These lower costs need to be balanced against the thin markets being shared between multiple carriers. Where appropriate, Government subsidies can influence the commerciality of a site (or of an individual base station), regardless of whether the site or facility is being used by a single carrier or multiple carriers.

The Department would welcome the opportunity to expand on these matters further should the Committee see that as useful.

----

[21] RTIRC21, as above, p 39-43

[22] Productivity Commission, 5-year Productivity Inquiry: Australia's data and digital dividend, interim report, as above, p 36-42

ATTACHMENT A

Indicative mobile coverage in Australia
(All carriers, all technologies, handheld and external antenna)

Legend

All Mobile Coverage

Population Density per 1km2

26602.3

0

Examples of Active Mobile Sharing Arrangements (selected list)[23]

Country	Operator 1	Operator 2	Sharing Type	Year
Australia	Telstra	Hutchison	Active (MORAN) plus roaming	2004-12
	Vodafone Hutchison Australia	Optus	Active (MORAN) plus roaming	2004
Brazil	Oi	TIM Brasil	Active (MORAN)	Mar-13
Brazil	Telefónica (Vivo)	América Móvil (Claro)	Active (MORAN)	Mar-13
Canada	Bell Mobility	Telus	Active (MORAN/MOCN)	Oct-08
Canada	Rogers	Videotron	Active (MORAN)	Jul-09
Canada	Rogers	Manitoba Telecom	Active (MORAN)	Jul-09
Canada	Bell Mobility	SaskTel	Active (MORAN)	Oct-09
France	SFR	Bouygues	Active (MORAN)	Jan-14
Malaysia	Maxis	U Mobile	Active (MORAN)	Oct-11
Malaysia	Maxis	REDTone	Active (MOCN)	Jul-12
Malaysia	Celcom	Puncak Semangat (Altel)	Active (MOCN)	Jul-13
PNG	Telikom PNG	Bmobile	Active (MORAN)	Aug-14
Russia	Vimpelcom	MTS	Active (MORAN)	Dec-14
Russia	MegaFon	VEON (Beeline)	Active (MORAN)	Jan-16
Spain	Vodafone Spain	Orange Spain	Active (MORAN)	Nov-06
UK	T-Mobile UK [now EE]	Hutchison (3)	Active (MORAN)	Dec-07
UK	Vodafone UK	Telefónica (O2 UK)	Active (MORAN)	Jun-12
Vietnam	Viettel [formerly EVN Telecom]	Hanoi Telecom (Vietnamobile)	Active (MOCN)	Apr-09

----

[23] Coleago, Active Sharing Best Practice: The regulatory viewpoint (5 April 2017)

[INTENTIONALLY BLANK]