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TELSTRA CORPORATION LIMITED

Response to the ACCC's Discussion Paper on the declaration of a wholesale domestic mobile roaming service

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EXECUTIVE SUMMARY

Declaration of a wholesale mobile roaming service is not in the long-term interests of end-users (**LTIE**) because it undermines infrastructure-based competition, particularly in regional and rural Australia. The leading UK economist, Professor George Yarrow, identifies the issues which are at stake in this inquiry:

“[I]t is remarkable by international standards that the balancing act has been accomplished in Australian mobile telecommunications in a way that appears to combine relatively light handed regulation (tower-sharing arrangements, regulation of backhaul services), limited coercive taxation (i.e. fairly modest financial support from the public revenues) and vigorous competition, witnessed by the number and the commercial conduct of MNOs and MVNOs. Notwithstanding vigorous competition, there is geographically uniform (i.e. national) pricing and close to universal coverage of high quality services.”

Declaring mobile roaming would put all of this at risk. It would disrupt the highly competitive mobile market by eliminating the race for coverage between mobile network operators (**MNOs**) which incentivises and funds investment in expanding and upgrading mobile networks across Australia.

The effects of declaration will be most acutely felt by customers in regional and rural Australia because many areas would no longer be economically viable. The quality of coverage will reduce and access to the latest technologies will be limited, affecting business and agricultural productivity, and the effectiveness of health, education and government services delivered over mobile technology.

Competition is currently delivering world-leading outcomes to Australian consumers and businesses

Section 1 discusses the world-leading outcomes experienced by Australian customers, including:

- MNOs extending coverage to the vast majority of Australians – Telstra's network covers 99.3 per cent of the population and unique coverage areas from Optus and Vodafone extend coverage further. Between 2006 and 2016, Telstra expanded its Australian geographic coverage from 1.6 to over 2.4 million square kilometres, an increase greater than the size of France.
- Significant price reductions – prices have fallen over 50 per cent since 1997.
- Increasing value for money – many plans come with unlimited national calls and SMS, significantly increased data allowances (some have increased over 300 per cent in the last two years) and access to a range of media and entertainment services.

While competition has produced great outcomes, Telstra acknowledges that more needs to be done to meet the demands of mobile customers, particularly those in regional and rural areas who value coverage above all else. However, declaring roaming is not the answer and in fact it may end up reducing overall coverage. Maintaining the strongest incentives to invest in mobile networks is the best way to continue to produce world-leading customer outcomes.

Customer willingness to pay for network quality and coverage is driving MNO investment

Section 2 discusses the following competitive dynamics that are driving these world-leading outcomes:

- The coverage race between MNOs – despite Australia's vast landmass and dispersed population, coverage of the second and third MNOs in Australia is broader than in countries with higher population densities, e.g. the UK, the US, Canada, New Zealand, France and Germany.



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- Network expansion into regional and rural areas that would be uneconomic on a standalone basis –
[REDACTED]
 - National average pricing – which ensures the benefits of competition in metropolitan areas are shared with regional and rural areas through national pricing.

In the mobile industry, competition is achieving the important social goals of universal service and parity in urban and regional pricing which in other sectors have required complex industry and regulatory solutions such as a monopoly provider (nbn co) and compulsory levies on all users (USO).

This section also discusses how existing regulatory and policy settings support this race for coverage: for example, the facilities access regime encourages new entrants by reducing their costs of expansion.

Declaration will undermine outcomes enjoyed by customers

Section 3 discusses the negative effects of declaring roaming:

- The business case for regional and rural investment would be undermined. MNOs could no longer sustain a competitive strategy of building in uneconomic areas on the basis that they will attract customers willing to pay for higher-quality coverage, so the incentive to invest will be removed.
- Regional and rural customers (including businesses) would miss out on coverage being extended into new areas and coverage in existing areas being upgraded and, over time, some would lose mobile coverage.
- Customers would face higher prices. The roaming charge would need to be seven times the current retail revenue to recover site costs. Service providers could abandon national pricing to limit the impact of higher prices to only those customers that roamed. Regional and rural customers would pay more for their services than customers in metropolitan areas.
- Congestion in regional and rural networks would increase, resulting in degradation to the user experience, including reduced data speeds, to the detriment of all users of those networks.
- Roaming would provide a poor end user experience, with call drop-outs, periods where devices cannot be used as they 'ping-pong' between networks, reduced battery life and risk of network failure.

The ACCC cannot set a roaming price which accounts for an MNO's loss of retail revenue or which substitutes for the lost competitive dynamic of the coverage race and its beneficial outcomes for consumers. The access price will not preserve Telstra's incentive to continue building nor ensure that access seekers use roaming only as a step to building their own network.

Limiting declaration to specific technologies or geographic areas cannot resolve the adverse outcomes:

- As Telstra's coverage advantage relies on its 3G network, a 3G-only declaration would still neutralise Telstra's coverage advantage and undermine its incentive to continue to invest in uneconomic areas.
- There is also not a sufficient difference in customer experience and perceptions of 4G vs 3G to support a race for 4G in areas already covered by 3G roaming.
- Declaring 3G-only roaming also would have a chilling effect on investments in 4G and future technologies (5G and beyond) because investors would fear that the regulatory intervention would be repeated once those investments are irreversible.



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- Confining declaration to particular geographic areas would not resolve the dampening effects of declaration on competition and investment incentives. Further, the technical issues associated with roaming will remain and, as they are amplified where coverage overlaps, act as a disincentive for MNOs to expand coverage.

Common questions about the future of Australia's mobile industry

Section 4 discusses a range of issues raised by stakeholders.

Telstra acknowledges the concerns of stakeholders in regional and rural areas about better coverage – which they consistently value more than having a choice of retail provider. However, the coverage race is not over – the three MNOs have announced plans to extend coverage in regional and rural areas and the recently announced Round 2 of the Mobile Black Spot Programme will add another 266 mobile sites. Telstra has established its own planned co-investment funding program with a \$100-200 million commitment.

While coverage may be their first priority, Telstra also acknowledges that regional and rural customers are entitled to choice as much as metropolitan customers. Optus is 'hot on Telstra's heels' with an aggressive program to improve its rural coverage. While MNOs continue to expand their competing coverage, the best way to ensure customers in Telstra-only areas get the benefits of competition is nationally averaged pricing, which declared roaming could unwind.

Section 4 also addresses misconceptions used to justify declaration of roaming:

- Facilities sharing arrangements are effective in regional and rural areas: in fact, there is more facilities sharing on Telstra towers in these areas than in metropolitan areas. Telstra would support an industry review of facilities access arrangements, including the non-carrier tower owners.
- Telstra does not have a legacy inheritance in regional and rural areas. Most of Telstra's mobile towers and backhaul was built and substantially upgraded since competition commenced and Telstra's privatisation. Telstra has four times as many towers today as in 1998.
- USO funding for the fixed network does not cross subsidise Telstra's mobile network because the Government's independent cost study excluded assets to the extent they are used in the mobile network.
- International precedents do not support mandated roaming. Some countries, including the UK and France, are moving away from mandated roaming out of concerns for the impact on investment. Countries which have mandated roaming are seeking to address country-specific problems which inhibited commercial roaming arrangements, such as the difficulties of small regional carriers negotiating with nationwide carriers.

Declaration is not in the long-term interests of end users

Section 5 concludes that because of the adverse effects of declaring roaming as outlined in Telstra's submission, declaration would not satisfy the high threshold of promoting the LTIE.

The areas where Telstra is currently the only MNO are not 'enduring bottlenecks' warranting regulated access because the other MNOs are continuing to deploy network and, with nationally averaged pricing, Telstra is not in a position to leverage any advantage.

The strength of the 'future without declaration' has already been demonstrated twice before following the ACCC's decisions not to declare roaming in 1998 and 2004. The race for coverage has been repeated across 2G, 3G and 4G, delivering improved coverage and more innovation with each technology generation.



The 'future with declaration' neutralises coverage as a fundamental driver of competition. It will see investment, competition and innovation focusing on metropolitan and other areas which are economically viable on a standalone basis, with a 'hinterland' of thinner, more limited coverage, less innovative technology and at higher de-averaged prices in regional and rural areas.



01 COMPETITION IS DELIVERING WORLD-LEADING OUTCOMES FOR CUSTOMERS

This section describes the outcomes that are being delivered to customers under the current market conditions and benchmarks those outcomes against overseas markets.

Strong infrastructure-based competition has delivered to customers:

- Extensive and expanding coverage of high-speed mobile networks across Australia – Telstra's mobile network now covers 99.3 per cent of the Australian population and over 2.4 million square kilometres of our land mass (section 1.1).
- Increasing network speeds – Telstra in collaboration with Ericsson achieved a world first in testing 1Gbps peak network speed capability on a commercial network, promising even faster speeds and enhanced customer experience into the future (section 1.1).
- Greater choice and improved services (section 1.2), including:
 - Choice between over 60 mobile providers (three MNOs and around 60 mobile virtual network operators (**MVNOs**)), with Telstra's wholesale footprint covering 98.8 per cent of Australians (section 1.2.1). Competition between MVNOs has exploded, supported by a competitive wholesale market, and MVNOs are winning more market share in regional and rural areas.
 - Increasing value for money with the price per MB falling 97 per cent between 2009-10 and 2014-15, zero-rated or uncapped inclusions added to plans and access to the latest mobile technology, handsets and innovations (section 1.2.2).
- Significant long-term productivity and economic benefits, including time savings for businesses as a result of widespread take-up of mobile technology (section 1.3).
- National parity in pricing, which means that customers in regional and rural areas pay the same prices as customers in metropolitan areas and benefit from national competition between mobile providers (section 1.4).

Despite Australia's challenging geography and low population densities outside of major cities, Australia is ranked first in the world by the global mobile carriers association, the **GSMA**, in its connectivity index measuring network infrastructure and performance, affordability and connectivity, among other factors (section 1.5).¹

Most of these achievements in the Australian mobile industry have happened since the ACCC's decision in 2004 not to declare domestic roaming:

- The three MNOs have heavily invested in upgrading and rolling out mobile networks across Australia, for example:
 - Telstra invested over \$8 billion in its mobile network over the last six financial years, on a fully allocated basis including spectrum purchases and renewals;
 - Optus invested a total of \$1.3 billion in its mobile network in FY15-FY16;² and
 - Vodafone invested approximately \$3 billion in its mobile network between 2012 and December 2015.³



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- Coverage in regional and rural areas has been pushed beyond the outer limits reached by 2G, with Telstra's current coverage at 99.3 per cent of the population compared to 96 per cent of the population reached by Telstra's 2G network.
 - With this expansion in coverage and the entry of MVNOs, many more customers in regional and rural areas today have a choice of multiple mobile providers than was the case in 2004.

However, infrastructure-based competition has more to achieve (section 1.1.3). There are still challenges for customers in regional and rural areas who have no or patchy coverage. MNOs are continuing to invest to roll out the next generation of ultra-fast, low-latency mobile networks needed to support innovative applications, such as augmented and virtual reality, robotics, remote diagnostics and, particularly for regional customers, Internet of Things (IoT) for agriculture, transport and telemedicine.

On average, Telstra has directed approximately 15 per cent of its mobile capital expenditure to building mobile infrastructure to provide services to approximately the last two per cent of the population. Telstra has announced to the market that its investment plans will continue to be disproportionately weighted towards regional and remote Australia. This includes the following planned investments:

- \$350 million to expand coverage and capacity in regional and rural Australia;
- Up to \$240 million contribution to Rounds 1 and 2 of Mobile Black Spot Programme; and
- \$100-200 million contribution to a co-investment fund for the next five years for jointly funded projects to support infrastructure investment that is uneconomic on a standalone basis.

Telstra's planned \$350 million investment and contributions to the co-investment fund are contingent on the current regulatory settings remaining in place.

1.1. Competition continues to improve extensive mobile coverage

Telstra's consistent strategy has been to lead the race for coverage by continuing to push its mobile network further into regional and rural Australia to differentiate itself from other MNOs. As this coverage is highly valued by customers (section 2.1) and delivers a competitive advantage not just in regional and rural areas but also with metropolitan customers, Optus and Vodafone have consistently sought to reduce Telstra's coverage superiority through investments of their own.

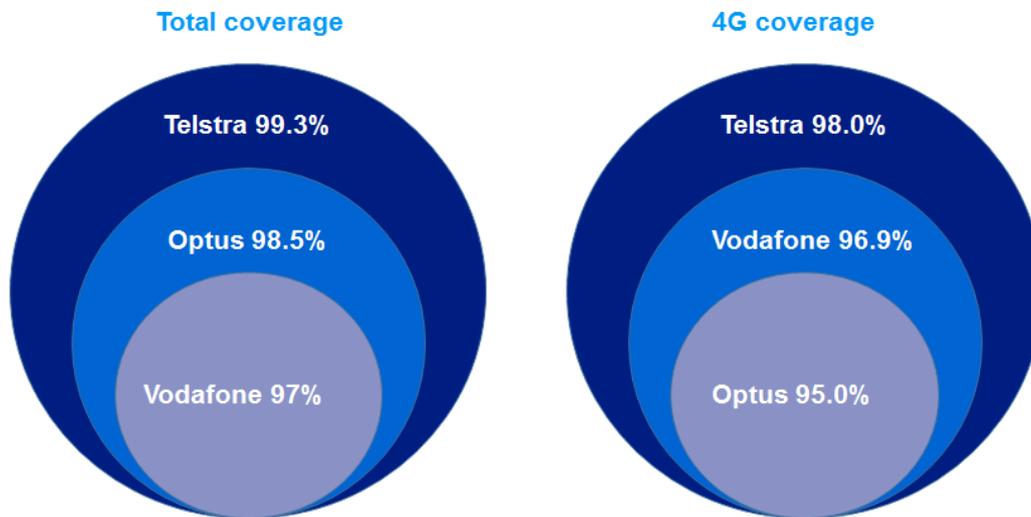
1.1.1. Improving coverage for Australians

The positive competitive outcome of the coverage race has led to world-leading coverage outcomes for customers. This is clear from:

- The current coverage footprint of each MNO (Figure 1);
- How the race for overall coverage has progressed over time, with the coverage gap between Telstra and Optus reducing to a difference in population coverage of just 0.8 per cent (Figure 2); and
- The number of sites associated with Telstra's mobile network which has increased significantly as MNOs actively compete to extend the geographic reach of their networks and to roll out new technology (Figure 3).

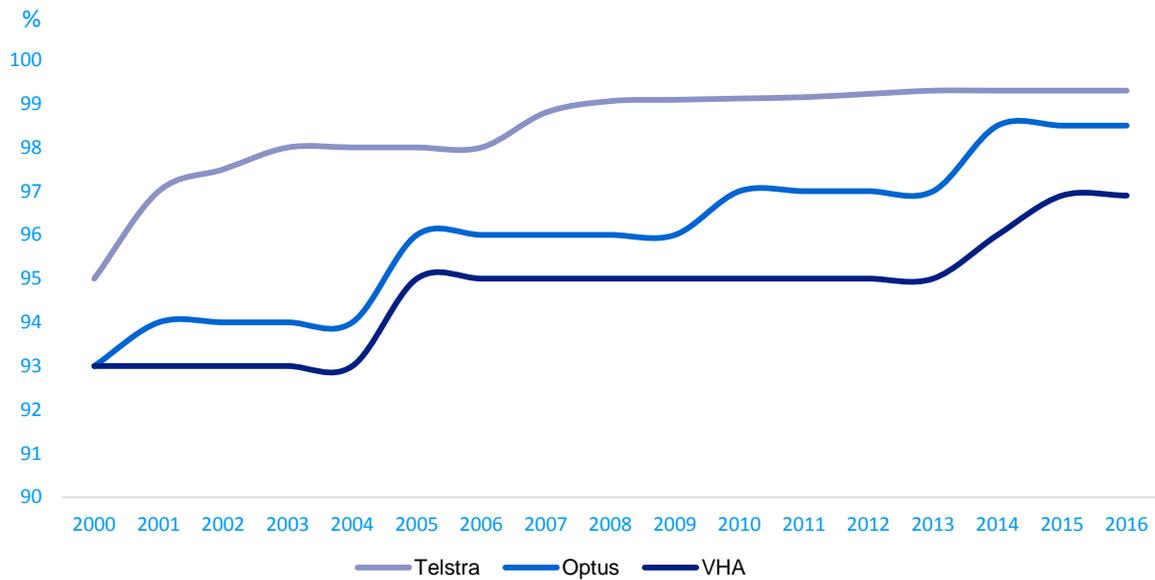


Figure 1: MNO coverage footprints



Source: Optus and Vodafone's coverage is from the ACCC Discussion Paper, *Domestic mobile roaming declaration inquiry*, October 2016, p 13. Total coverage may include domestic roaming. We have not verified the accuracy of other carriers' 4G coverage.

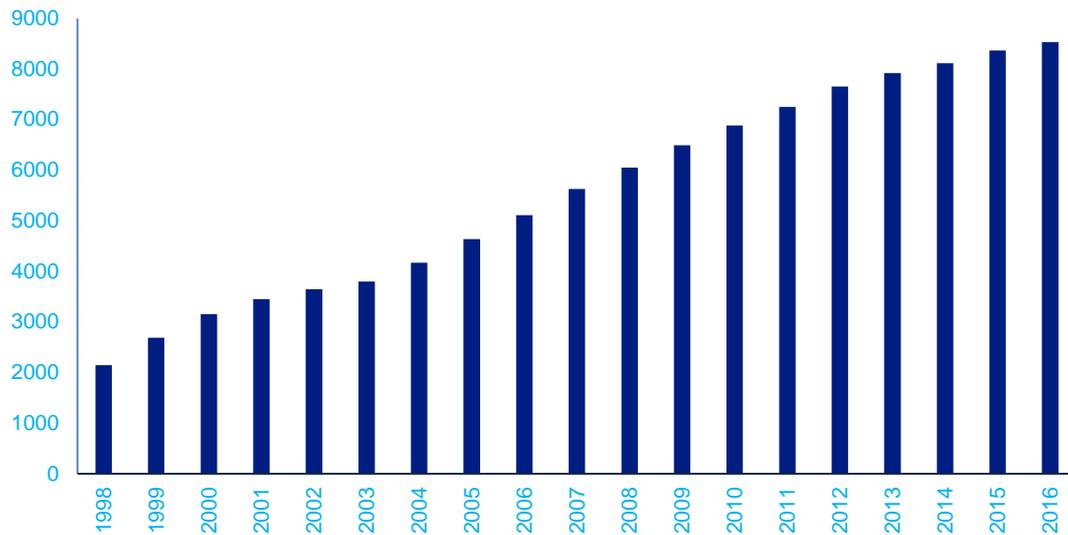
Figure 2: Historic coverage race



Source: MNO annual reports, website information and statements, ACMA Communications Reports and ACCC reports.



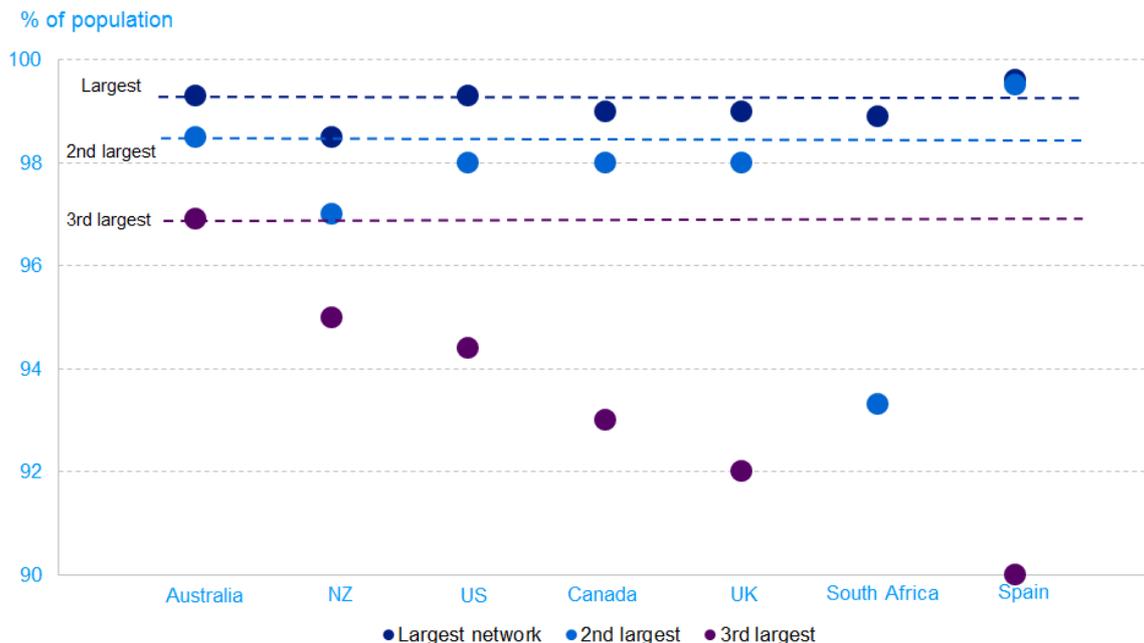
Figure 3: Number of Telstra mobile sites over time



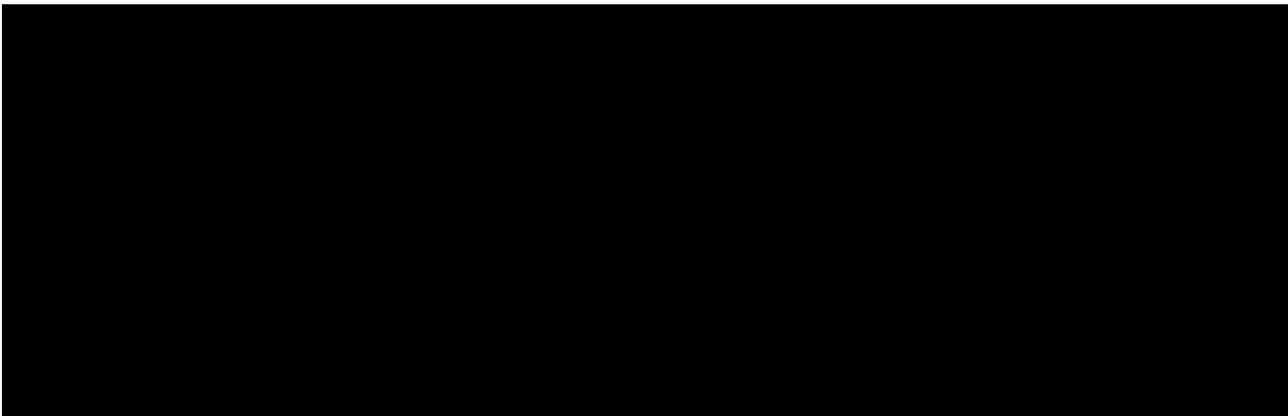
Note: figure for 2005 is an estimate. Sites includes towers and other structures such as monopoles, guyed towers, building rooftops, power poles and light poles.

Optus and Vodafone's investment under current regulatory and policy settings has resulted in broader population coverage than other number two and three MNOs in the countries that Vodafone has claimed to have regulated roaming (Figure 4).

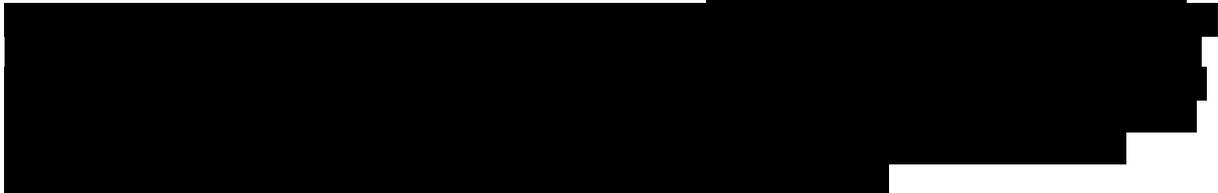
Figure 4: International comparison of population coverage of three largest mobile networks (maximum 3G/4G coverage)



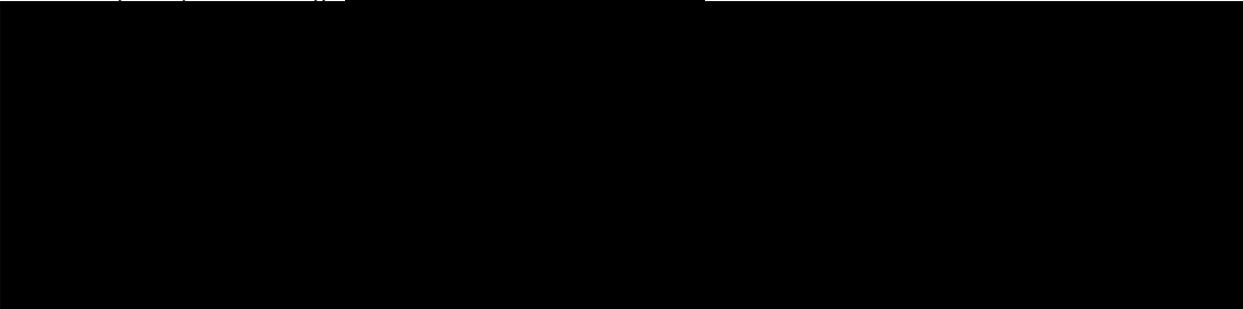
Geographic coverage also has substantially expanded. In the 10 years between 2006 and 2016, Telstra's mobile network coverage has increased from 1.6 million square kilometres to over 2.4 million square kilometres. The increased geographic coverage of the Telstra network involved building a mobile network across an area larger than the size of France.



The three national mobile networks in Australia do not perfectly overlap, and each network has areas of unique coverage – which is an expected result of market driven competition and strategic decision-making by each MNO in pursuit of a coverage advantage over the others. [REDACTED]



Similarly, Vodafone has focussed on extending its 4G network to cover a number of highways where Telstra has no or patchy 3G coverage [REDACTED]



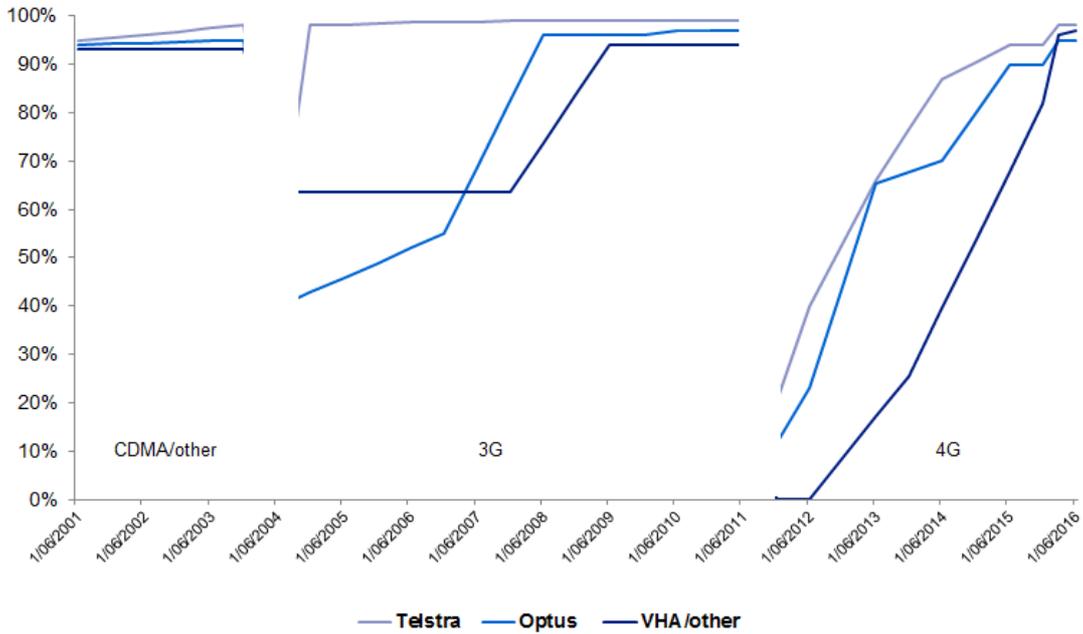
1.1.2. Fast and wide deployment of new network technologies

The coverage race has been repeated with each new generation of mobile technology (Figure 5):

- 2G has been replaced by 3G and will be switched off progressively from 2020 (Telstra switched off 2G on December 2016);
- The 4G rollout commenced in 2012 and now provides coverage to 98 per cent of Australians; and
- The industry globally is now looking to 5G as the next standard with 2020 the target for commercial launch of 5G in Australia.



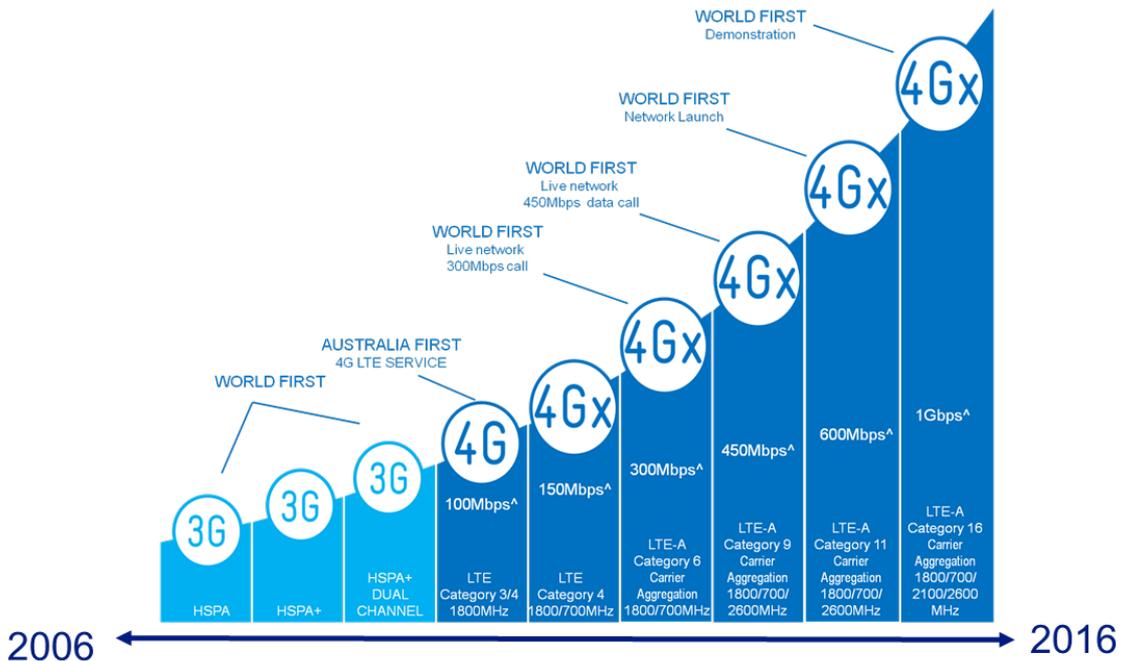
Figure 5: Historic coverage race for different network technologies



Source: MNO annual reports, website information and statements, and ACMA and ACCC reports.

Mobile network upgrades between each discrete generational change also deliver innovation, coverage depth and enhanced network quality. Telstra has led the global testing and deployment of new technologies within each of the third and fourth network generations (Figure 6).

Figure 6: Telstra's deployment of new technologies within 3G and 4G, 2006-2016



[^]Peak technology speeds. Actual speeds will be lower and are dependent on device capability. Speeds may vary due to factors such as location, distance from the base station, local conditions, concurrent users, hardware and software configuration and download source/upload configuration.



As recognised by the ACCC, MNOs are continuing to invest in their 4G networks to satisfy customer demand for high speed data services and are upgrading their 4G networks to provide an advanced version of LTE that improves network performance and significantly boosts data downloading speeds.⁵

Telstra's latest 4GX service has peak download speeds of up to 600Mbps, which is around eight times faster than the peak download speed on Australia's first 4G LTE service. Customers can expect typical download speeds of 5-200Mbps and typical upload speeds of 1-10Mbps on Telstra's 4GX network (using the latest 4GX devices such as the Google Pixel in 4GX areas). This compares to typical download speeds of only 30-40kbps and typical upload speeds of 10kbps on Telstra's old 2GSM GPRS network.⁶ In addition, latency (the time it takes a data packet to get from one point in the data network to another) has reduced from approximately 500 milliseconds on 2GSM GPRS to approximately 30 milliseconds on 4GX.

1.1.3. The coverage race will continue into the future

The race for quality coverage is far from over. MNOs will continue, under current regulatory and policy settings, to compete through innovation, technology leadership and investment.

The dynamic of the MNOs competing with each other to obtain, retain or reduce a coverage advantage very much remains. Announced investments include:

- Optus' plans to expand 4G to 98.5 per cent of the population by the end of 2016 to better both Telstra and Vodafone's current 4G coverage;⁷ and
- Telstra's plans to expand 4G coverage to 99 per cent of the population by the end of June 2017 (assuming retention of current regulatory and policy settings), including a substantial upgrade of each cell site, as well as more capacity for backhaul and reconfiguration of the 3G cell to work as a complement to 4G (section 3.6.1).

Telstra has also recently announced to the ASX several critical capital expenditures to build its competitive advantage in the market:

- Telstra plans to continue its disproportionate investment in regional and rural Australia. For more than a decade, approximately 15 per cent of Telstra's mobile capital expenditure has gone to building mobile infrastructure to provide services to approximately the last two per cent of the population.
- Telstra plans to spend \$350 million over the next three to five years to improve coverage and capacity in regional and rural Australia.
- Telstra has committed up to \$240 million contribution to Rounds 1 and 2 of Mobile Black Spot Programme.
- In addition to the Mobile Black Spot Programme, Telstra plans to contribute \$100-200 million to a co-investment fund over the next five years, that will help pay for projects jointly funded by community and other parties where coverage would otherwise be uneconomic (for example, recent projects where co-investment has worked well to deliver outcomes for regional and rural customers include the delivery of new fibre to Birdsville, Burketown and Aurukun and mobile services to remote Northern Territory communities).



This represents a planned further investment by Telstra of \$700-800 million in regional and rural coverage. Including co-investments, Telstra expects to generate investment of more than \$1 billion over the next five years which will be directed towards improving 3G and 4G coverage in regional and rural Australia.

Optus and Vodafone are also continuing to invest heavily in their own mobile networks. Based on publicly available information from the Radio Frequency National Site Archive (**RFNSA**), it is clear that all MNOs have plans to continue upgrading and rolling out new mobile facilities (Table 2).

Table 2: Number of proposed new sites and upgrades

MNO	Number of proposed new sites	Number of proposed upgrades
Telstra	376	2064
Optus	821	2591
Vodafone	194	2251

Source: RFNSA. Note that for future plans RFNSA is only relevant for an individual carrier view. There is no timeline for future plans, for example, for one carrier there could be future plans for three years but another carrier one year.

Looking even further forward, the following market developments mean that significant network investments by the three MNOs are required to retain customers in both the retail and wholesale markets.

First, global mobile data traffic is expected to grow tenfold in the next five to six years, with video forecast to account for 70% of mobile data traffic in 2021.⁹ Catering for such growth is not possible without significant investments in underlying network capacity. Ovum's view is that for a developed market like Australia, mobile network traffic is expected to increase approximately 4.5 to 5 times between 2016 and 2020, implying that nearly 80 per cent of mobile network capacity still remains to be built by 2020.¹⁰

Second, a number of emerging service categories will require ultra-fast, low-latency networks such as 5G and beyond. For example, Augmented Reality (**AR**) and Virtual Reality (**VR**) are a significant trend in both consumer and enterprise services. To enable mobile AR/VR use cases, extremely low network latencies are required to maintain near-immediate eye and body coordination. Another example is remote telemedicine; beyond video conference consultations there are potential developments in robotics, remote diagnostics and even surgery advances that would require ultra-fast, low-latency networks.

Another major global trend is the deployment of the IoT, where vast numbers of sensors (and other devices) are connected into mobile networks. Constant investment in mobile networks will be required in order to extract full potential from IoT, machine-to-machine and wearables. Different aspects of IoT – such as autonomous cars, V2X technologies and high-bandwidth, low-latency requirements of some solutions – rely on continued improvements in ever-better mobile networks. The increasing use of IoT will also put additional pressure on mobile networks which will require constant capacity upgrades.

Most of these future technologies are particularly important for regional and rural Australia. These include, but are not limited to, IoT solutions for agriculture, telemedicine and education solutions. Telemedicine and education solutions in the form of remote learning (the latter especially is increasingly delivered over mobile networks) also assist in reducing the service accessibility gaps that exist between metropolitan and regional and rural Australia.

All three MNOs are already trialling 5G and anticipating commercial launch of that technology in 2020.¹¹ Telstra is already actively involved in trialling with its technology partner, Ericsson and is working to ensure that any standard developed and any commercial application for 5G also extends to regional and rural areas, so that those areas continue to benefit from the flow-on economic and productivity gains associated with mobile technology.



Beyond current visible trends and foreseeable products lies another category of services and products that cannot yet be predicted. The 3G and 4G networks deployed globally over the past decade have been used in more varied ways than imagined when they were being planned. History therefore indicates there is little reason to believe we know what future mobile networks will be used for. In this context it is likely that high levels of mobile infrastructure investment will continue well into the future.

1.2. Competition is delivering greater choice and improved services to customers

In addition to access to extensive mobile coverage, customers are benefiting from greater choice of mobile service provider, vigorous price and non-price competition and product innovation. The benefits of competition are delivered to all customers regardless of where they live and work as mobile providers offer national pricing, packaging and products. This means that consumers and businesses in regional and rural Australia are benefiting from productivity improvements which flow from access to competitive mobile services, even those who live and work in areas currently served by a single mobile provider.

1.2.1. Customers have greater choice of mobile service provider

The vast majority of the Australian population (over 23.3 million people) in metropolitan, regional and remote Australia can choose to acquire mobile services from multiple providers – Telstra, Optus, Vodafone – and multiple MVNOs that have wholesale arrangements with the three MNOs (Table 3).

Table 3: Approximate proportion of Australian population with a choice of mobile providers

Proportion of population	Likely location of customers ¹²	Choice between mobile providers
98.8%	Metropolitan, regional and remote Australia	Customers can choose to purchase services from Telstra and 11 of Telstra's MVNOs.
98.5%	Metropolitan, regional and remote Australia	Customers can choose to purchase services from Optus and at least 27 Optus MVNOs or their resellers. Optus has some unique coverage areas, but most of these customers are also able to choose Telstra or Telstra MVNOs as their provider.
96.9%	Metropolitan and regional Australia	Customers can choose to purchase services from Vodafone and at least 16 Vodafone MVNOs or their resellers. Vodafone has some unique coverage areas, but most of these customers are also able to choose Telstra, Optus or their MVNOs as their provider.
0.5%	Remote and very remote Australia	Customers live in areas uniquely covered by Telstra's retail mobile service, noting that other MNOs may also have coverage in some of these areas.
0.7%	Very remote Australia	Customers live where there is no Telstra coverage. Other MNOs might have some unique coverage areas serving this part of the population.

The entry of a large number of MVNOs is an important feature of the competitive landscape in Australia and has been instrumental in driving price and non-price competition to the benefit of customers.¹³ There are now



around 60 MVNOs competing in the retail market and Table 4 identifies approximately 50 of them and their wholesale provider.

Table 4: Example MVNOs, resellers and their wholesale provider

Optus network	Telstra network	Vodafone network
amaysim ¹⁴	ALDI mobile ⁴¹	ACN ⁵³
Barefoot Telecom ¹⁵	Better Life ⁴²	CMobile ⁵⁴
Bendigo Bank telco ¹⁶	Lycamobile ⁴³	E.Tel ⁵⁵
ClubTelco ¹⁷	Macquarie Telecom ⁴⁴	gotalk ⁵⁶
Coles ¹⁸	Pivotel ⁴⁵	Hello Mobile ⁵⁷
Commander ¹⁹	Planet Mobile ⁴⁶	KISA ⁵⁸
Community Telco ²⁰	Southern Phone ⁴⁷	Kiss Mobile ⁵⁹
Dodo ²¹	Symbio ⁴⁸	Kogan ⁶⁰
engin ²²	telcoinabox ⁴⁹	Lebara ⁶¹
E.Tel ²³	TeleChoice ⁵⁰	Living Networks ⁶²
Exetel ²⁴	Think Mobile ⁵¹	OwnFone ⁶³
IF Telecom ²⁵	Woolworths ⁵²	Pivotel ⁶⁴
iiNet ²⁶		Reward Mobile ⁶⁵
Internode ²⁷		Revolution Telecom ⁶⁶
iPrimus ²⁸		Think Mobile ⁶⁷
Jeenee Mobile ²⁹		TPG ⁶⁸
Live Connected ³⁰		
More Telecom ³¹		
OVO Mobile ³²		
Southern Phone ³³		
SpinTel ³⁴		
Trinity Telecom ³⁵		
Truphone ³⁶		
Vaya ³⁷		
Virgin Mobile ³⁸		
Westnet ³⁹		
Yomojo ⁴⁰		

A competitive wholesale market is facilitating the entry of new MVNOs such as Kogan, Woolworths and Coles. Competition for MVNOs can also be seen through changes that MNOs have made to their wholesale offerings, including access to 4G networks and expanded coverage. Optus, which has the largest wholesale customer base, gave MVNOs access to its 4G network when it was launched in September 2012. Vodafone and Telstra have more recently provided access to their 4G networks. Vodafone provided TPG, an MVNO that switched from Optus to Vodafone, access to its 4G network in September 2015, followed by new entrant Kogan in October 2015 and then five additional MVNOs in June 2016.⁶⁹

Telstra Wholesale announced that it would extend 4G mobile coverage to its MVNO customers in March 2015 with an anticipated launch date of 30 June 2016. This was launched ahead of schedule in April 2016, and



currently 8 MVNOs have access to Telstra's 4G wholesale coverage.⁷⁰ Telstra has also recently expanded its wholesale coverage footprint with:

- The total combined coverage increasing from 1.3 to 1.59 million square kilometres;
- 4G coverage available to MVNOs increasing from 92 per cent to 95 per cent of the Australian population in September 2016; and
- 3G coverage available to MVNOs increasing from 98.5 per cent to 98.8 per cent of the Australian population in August 2016.⁷¹

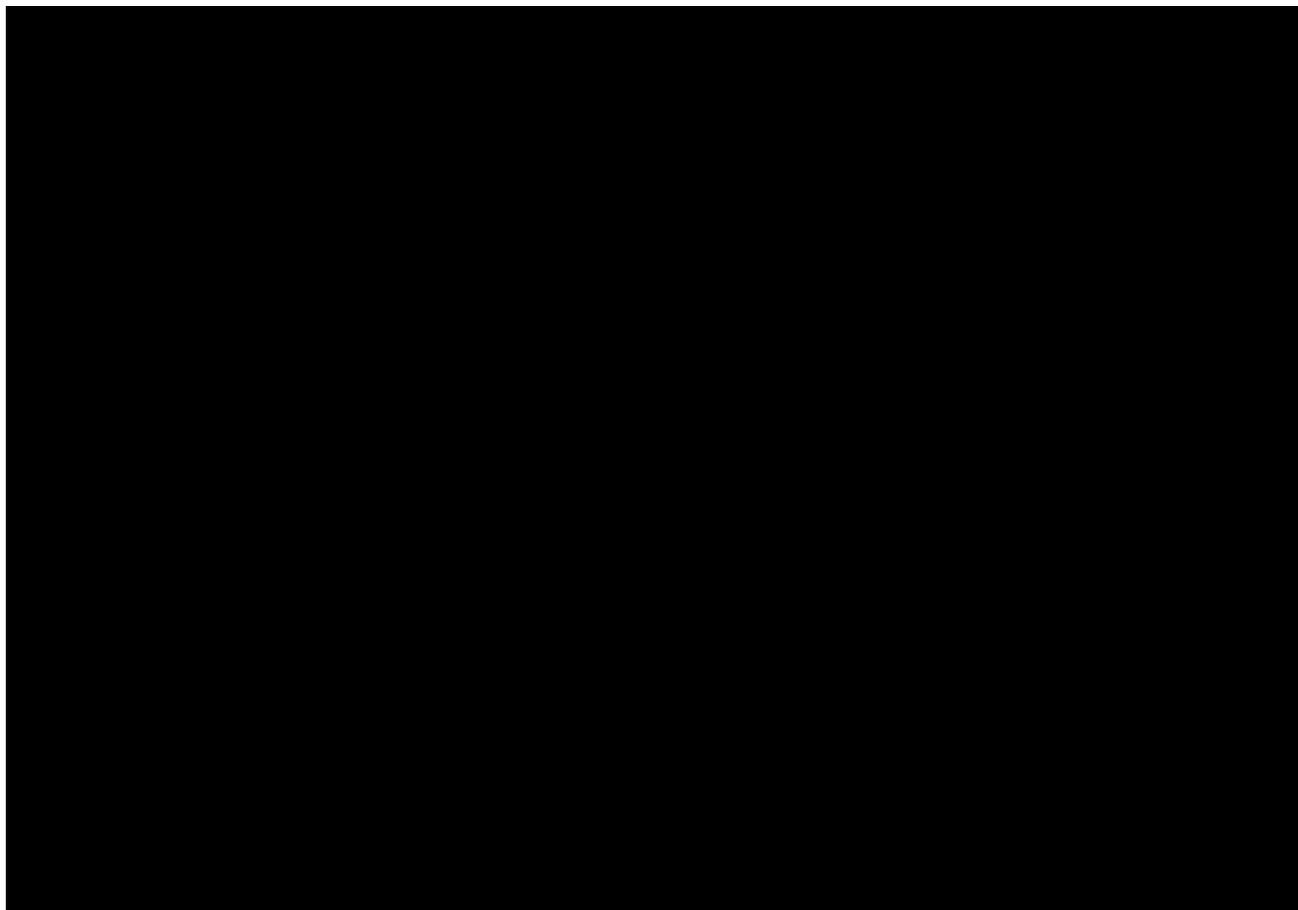
The different business models of MVNOs have been successful in attracting customers away from the MNOs. For example, amaysim now has over 1 million customers.⁷² Julian Ogrin, CEO of amaysim, commented on amaysim's success in pioneering the BYO subscription model (i.e. where customers can bring their own device):

"The creation of the BYO category shook up the mobile market and Aussie consumers have been the real winners. There is now true choice, with simpler plans available and telcos having to work harder than ever to keep customers as the trend of no lock-in contracts continues to rise."

This innovation has been picked up by the rest of the market and is available through a number of MNOs and MVNOs Australia-wide.

MVNOs are increasingly winning share from MNOs both nationally and in regional areas:

- The ACCC reported that between 2011 and 2015, the MVNO share of the national retail market has grown from six to 10 per cent;⁷³ and





1.2.2. Competition has resulted in customers paying less for more

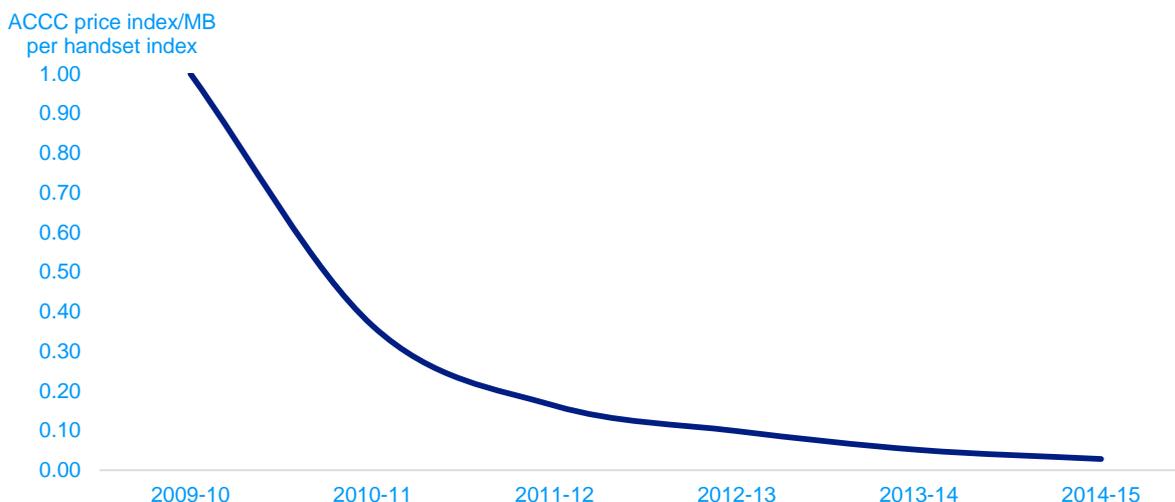
Australian customers are benefiting from vigorous competition in mobile markets in the form of lower retail prices, higher service inclusions, and other innovative offerings. Metropolitan, regional and rural customers are all benefiting from this competition as mobile service providers have national plans and pricing.

According to the ACCC's mobile services index, average retail mobile prices have exhibited a strong decreasing trend, falling 52.6 per cent since 1997.⁷⁵ At the same time, there has been a significant increase in the volume of mobile data downloaded by individual mobile subscribers, with the total volume of data downloaded over mobile handsets increasing 22-fold over the past five years.⁷⁶ The rate and pace of growth in mobile data use is profound, and in the next five to six years, global mobile data traffic is expected to grow tenfold, with video forecast to account for 70 per cent of mobile data traffic in 2021.⁷⁷

One of the reasons for the significant increase in data downloaded on mobile handsets is customers' desire to access content on their mobile phone, whether that be music, subscription video on demand (**SVOD**) services, sports or other media. For example, Ericsson's global Consumer Lab Media Report found that since 2012, the average consumer globally has increased their viewing hours on mobile devices by four hours a week.⁷⁸

This combination of lower prices and higher data usage has meant customers right across Australia are now getting much greater value for money. Figure 8 shows that the industry average cost per MB data downloaded fell 97 per cent from 2009-10 to 2014-15 (by dividing an index of average industry retail prices by an index of total mobile data consumed by customers).

Figure 8: ACCC mobile price index per MB downloaded

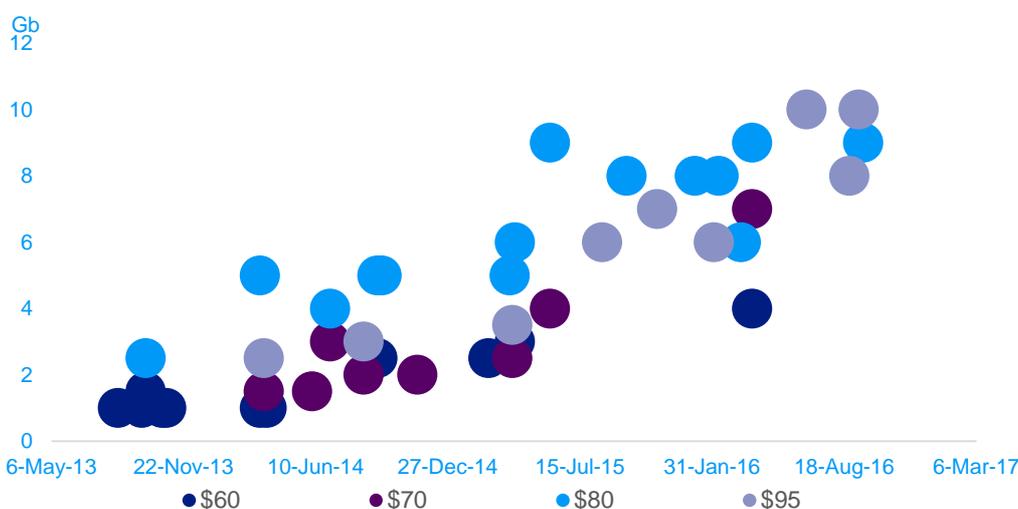


Source: ACCC Telecommunications Report 2014-15 and ABS 8153 – Internet Activity Survey, Australia.

The greater value for money is also evident from the significant increase in data inclusions for mobile phone plans (Figure 9). For example, in 2013, an \$80 plan would have included a little over 2GB of data. This quadrupled to over 8GB by 2016.



Figure 9: Telstra, Optus and Vodafone 24 month phone plans (GB per month)



Source: Telstra, based on publicly available historic marketing information.

The average and top monthly data inclusions of prepaid and postpaid mobile handset plans have also increased since July 2014 (Table 5).

Table 5: Increasing monthly data allowance for prepaid and postpaid mobile handset plans

Monthly data inclusions		July 2014	June 2015	October 2016
Average monthly data inclusions	Prepaid	1.4GB	2GB	5.8GB
	Postpaid	2.1GB	3GB	11.5GB
Top monthly data inclusions	Prepaid	5GB	7GB	9.5GB
	Postpaid	6GB	20GB	30GB

Source: ACCC, Telecommunications Reports 2014-15 (February 2016); Telstra, Optus and Vodafone websites for October 2016 figures. Note: average monthly inclusions for October 2016 only consider plans offered by MNOs.

Further increasing value for money, unlimited calls and SMS are rapidly becoming the norm. MNOs offer postpaid mobile plans that include unlimited voice calls and SMS to national numbers, with a significant number also including unlimited calls and SMS to international numbers. This is largely also the case for MNO prepaid services, with all MNOs offering either unlimited voice and SMS, or an ‘allowance’ which a customer has discretion to allocate between calls or SMS to national and international numbers. This is a significant change from just a few years ago when voice calls and SMS were typically charged on a per minute or per SMS sent basis.

Mobile service providers also offer other value-added features, at no additional charge for customers, such as data sharing between devices, data rollover and free or unmetered subscriptions to media and entertainment services (Table 6).⁷⁹ For example, MNOs are competing for content in order to make their mobile handset plans more attractive:

- Optus has offered promotional deals with Netflix, and has invested in sports rights deals with Cricket Australia and the English Premier League. Optus also has the rights to the 2018 FIFA World Cup with SBS.



- Vodafone has bundled free Spotify subscriptions with mobile plans since November 2014. Currently, Vodafone offers a choice of Stan, Spotify or Fairfax news.
- Telstra offers exclusive sports content (AFL and NRL), SVOD services (Netflix, Presto and Stan) and free and unmetered Apple Music subscriptions.

Table 6: Examples of mobile handset plan added features

Provider	Data sharing	Data rollover	Media/entertainment services	Other
Telstra	✓	✓	3 month Netflix, Presto & Stan subscriptions 3 new release rentals from BigPond Movies AFL & NRL 2016 Season Pass 6 month Apple Music subscription Unmetered use of Apple Music	International roaming: 1.5GB per month data allowance Free and unlimited Telstra Air® data Free 200GB Cloud Storage Subscription
Optus	✓	✓	Unmetered use of Netflix, Presto, ABC iView, Google Play Music, iHeartRadio, Pandora and Spotify English Premier League subscription	International roaming: 10 by \$10 Travel Packs (50MB per day data allowance)
Vodafone	✓	✓	6 month Spotify Premium, Stan, or The Sydney Morning Herald online subscription	International roaming: \$5 per day, data allowance equivalent to plan inclusion First month unmetered data Qantas Frequent Flyer Points

Mobile providers are also competing to offer attractive mobile plans with the latest handsets. For example, Telstra, Optus and Vodafone have all introduced plans that allow their customers to upgrade to a new phone 12 months into a 24 month contract for a one-off fee.⁸⁰ Another strategy is to provide exclusive offers in relation to specific handsets:

- Telstra launched Pixel, the Google phone, in November 2016 as the exclusive telecommunications partner in Australia.⁸¹
- Telstra is also the only mobile provider offering the new Sony Xperia XZ which was launched in Australia in October 2016.⁸² The previous Sony Xperia X range (which included 3 models) was launched in Australia across three different mobile providers: the Xperia X was exclusive to Vodafone, the mid-range Xperia XA was available from both Vodafone and Virgin and the high-end Xperia Performance was exclusive to Telstra.⁸³

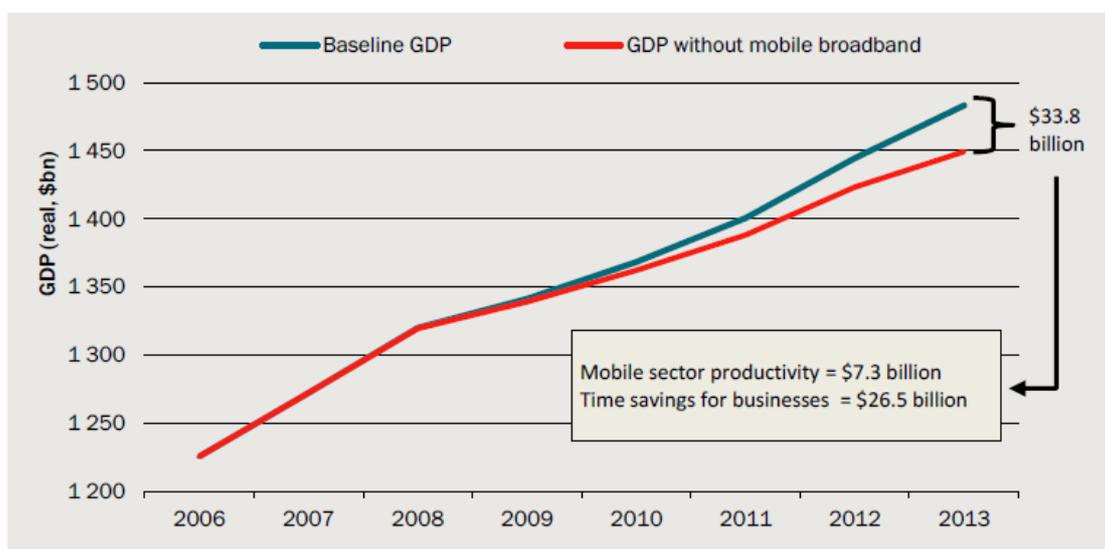


- Optus was the exclusive Microsoft partner for the launch of the Lumia 950 and 950 XL in late 2015.⁸⁴
- Vodafone partnered with Motorola on the Australian launch of the Moto X Style handset in September 2015.⁸⁵

1.3. Mobile competition is delivering long term benefits to the economy

Competition in mobile services is delivering significant economic benefits across the Australian economy. Research conducted for the ACMA in 2013 estimated that mobile broadband services increased the growth rate of the Australian economy by 2.9 per cent over the period from 2007 to 2013 which equates to an increase in Australia's economic activity of \$33.8 billion in 2013 – that's a 2.28 per cent contribution to Australia's total GDP (Figure 10).⁸⁶ Of this \$33.8 billion, only \$7.3 billion reflects the impact of productivity growth within the mobile communications sector. The bulk of the efficiency gains – \$26.5 billion – are from time savings for businesses as a result of using mobile broadband services.

Figure 10: Economic impacts of mobile broadband

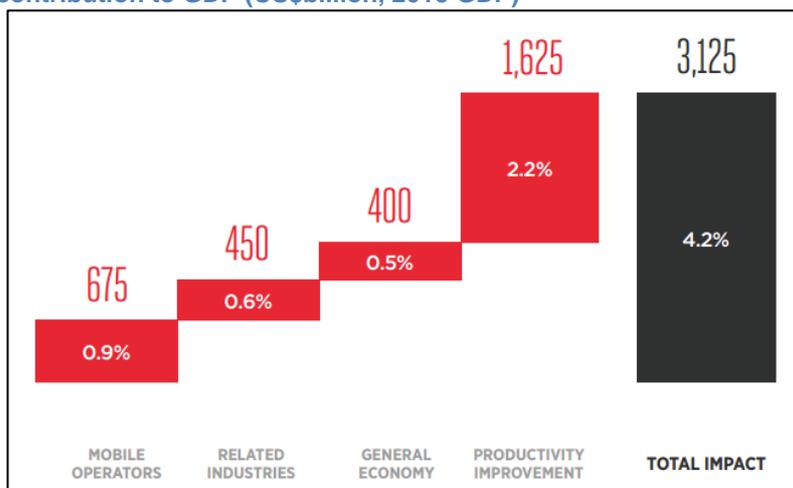


Source: The Centre for International Economics, *The economic impacts of mobile broadband on the Australian economy*, from 2006 to 2013.

According to research conducted by Deloitte Access Economics, the Australian economy was around \$34 billion larger in 2015 than it would otherwise have been as a result of long-term productivity benefits generated by mobile technology take-up.⁸⁷

This trend is not Australia-specific – the mobile ecosystem and increasing uptake of mobile technology is making an important and material contribution to economic outcomes globally and in the Asia-Pacific region:

- The GSMA's *Mobile Economy Report 2016* found that in 2015, the mobile ecosystem generated 4.2 per cent of global GDP, or around US\$3.1 trillion of economic value added.⁸⁸ This contribution is expected to grow to US\$3.7 trillion by 2020.⁸⁹ Making a significant contribution to this outcome are productivity improvements generated by widespread use of mobile technology (Figure 11).
- Within the Asia-Pacific region, the GSMA similarly estimates that in 2014 the mobile industry generated 4.7 per cent of GDP, or around US\$1.1 trillion with productivity improvements making the greatest contribution to the overall impact of mobile technology on economic outcomes.⁹⁰

Figure 11: Total contribution to GDP (US\$billions, 2015 GDP)


Source: GSMA 2016, *The mobile economy 2016*.

1.4. The impact on regional and rural Australia

1.4.1. Regional areas benefit greatly from infrastructure-based mobile competition

Competition has led to much greater mobile network coverage for regional and rural customers who may otherwise not have access to world-leading mobile services due to the cost of serving those areas. As stated by the ACCC in its most recent annual telecommunications report:

Competition in the retail mobile market has benefited many consumers living in regional Australia. As MNOs compete on the basis of network coverage, competition in the retail mobile market has helped to extend mobile coverage in Australia.⁹¹

Nationally averaged pricing also means that customers in regional and rural Australia enjoy the same benefits of competition as customers in metropolitan areas – including lower prices, increased data inclusions and mobile handset offers (section 1.2.2). This is despite the costs of network builds being substantially higher than in metropolitan areas (section 2.3.2).

Innovative, greater value for money, high quality mobile services matter even more in regional and rural areas because customers are more mobile-dependent than customers in metropolitan areas:

- ACMA research conducted in 2015 revealed that the proportion of exclusively mobile users in regional areas is 50 per cent higher than in capital cities (15 per cent versus 10 per cent). The proportion of mobile-only internet users is also higher in regional areas (26 per cent) compared to capital cities (19 per cent).⁹²
- The Regional Telecommunications Review 2015 found that people living in regional Australia have particular demands for telecommunications in the areas of business, education and health.⁹³
- Many regional businesses have very specific telecommunications requirements. For example, the Standing Committee on Agriculture and Industry's inquiry into agricultural innovation identified several areas of agricultural technology that are critically dependent on reliable access to telecommunications services including remote control and automation of farm equipment, monitoring and remote sensing.⁹⁴ One example of machine-to-machine technology that relies on network coverage to deliver benefits to regional businesses is Farmnet – a web portal system developed by NICTA that uses wireless sensors to measure soil moisture, soil quality and microclimates. Deloitte Access Economics found that Farmnet could reduce water and fertiliser costs in the dairy industry by between \$1.6 million and \$34 million a year.⁹⁵



1.4.2. While much has been achieved for regional and rural customers more remains to be done

The challenge of providing services in regional and rural areas is not yet fully met. Telstra's discussions with stakeholders have demonstrated the importance of continued investment in improving the quality and coverage of mobile networks in regional and rural areas.

In common with their metropolitan counterparts, increasing demand for more data means that depth of coverage in regional and rural networks constantly needs to be improved through capacity enhancements.

However, breadth of coverage is by far the most important issue for many regional and rural stakeholders. Limited access to telecommunications services was frequently cited in submissions to the Standing Committee on Agriculture and Industry's inquiry as being a fundamental barrier to agricultural innovation and the adoption of emerging technology.⁹⁶ In light of this, the Standing Committee reached a view that *"there is scope for further expansion of mobile networks in rural and remote Australia."*⁹⁷

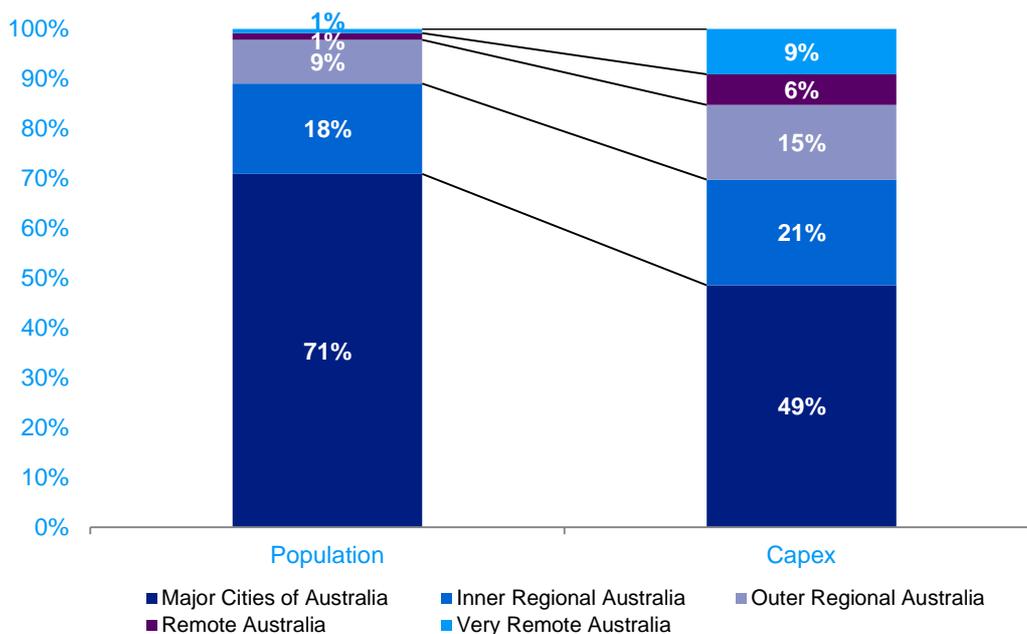
1.4.3. Telstra's commitment to regional and rural customers

Telstra's business strategy to stay ahead of its competitors in the coverage race means that Telstra has been at the forefront of adopting and extending mobile technology to regional and rural areas. For example, Telstra was the first MNO to extend 4G services into regional areas and Telstra's 4G network now reaches over 600 regional towns. Telstra's investment in, and commitment to regional and rural Australia, is detailed below.

1.4.3.1. Telstra has invested heavily in regional and rural areas

Figure 12 shows a geographic breakdown of Telstra's investment in its mobile network over the period FY05-FY16. On average, approximately 15 per cent of Telstra's mobile network capital expenditure was made in remote and very remote parts of Australia (as defined by the ABS) where approximately two per cent of the Australian population lives, and 51 per cent of mobile network capital expenditure was made outside of major cities, where only 29 per cent of the Australian population lives.

Figure 12: Geographic distribution of the Australian population and Telstra's mobile network capital expenditure on average, FY05-FY16



Source: ABS 3218.0 – Regional Population Growth, Australia. Note: capital expenditure based on direct mobile network capital expenditure, excluding spectrum and other allocated capital expenditure.



The race for coverage has also led Optus and Vodafone to make significant investments in regional and rural Australia. Optus has stated: *“We have always placed significant value on network investment, particularly for regional areas seeking choice and competition. In the last financial year we invested close to \$1.6 billion in strengthening networks.”*⁹⁸ Optus' investments in regional and rural Australia include:

- Extending 4G coverage to over 700 towns across Australia.⁹⁹
- \$1.7 million investment in the 12 months to August 2016 to upgrade 16 mobile sites to 4G at regional locations, including Mt Canobolas, Blayney, Orange CBD, Burnt Yards, Orange West, Manildra, Molong, Cargo, Cumnock, Mt Panorama and Hill End.¹⁰⁰
- \$4 million commitment made in August 2016 to further improve mobile phone coverage across the Central West NSW region including Orange, Bathurst and along the Mitchell Highway over the next 12 months.¹⁰¹
- \$3.5 million commitment made in September 2016 to improve its coverage across the Ballarat region over the next two years, with new towers planned for Ballarat Base Hospital, Newington, Alfredton, Delacombe, Lake Wendouree North, Ballarat Airport, Smythes Creek, and Bonshaw. This will also improve coverage along the Western Highway at Ballan, Rockbank and Brookfield; the Midland Highway at Castlemaine and Creswick South; and the Glenelg Highway at Smythes Creek.¹⁰²
- \$36.4 million contribution to Round 2 of the Mobile Black Spot Programme (in addition to the \$26.4 million in Federal and State Government funding secured) which will fund 65 mobile base stations and 49 satellite small cells across regional and rural Australia.¹⁰³

Vodafone is also investing in regional and rural Australia and has plans to construct 102 new mobile towers in regional Australia by the end of 2017. Vodafone committed to invest \$20 million to build 70 of these new mobile towers in regional areas of NSW, Tasmania, Queensland, WA and Victoria as part of the Mobile Black Spot Programme. Vodafone has also committed an additional \$9 million for a further 32 base stations.¹⁰⁴

1.4.3.2. Telstra has also promoted industry standards and innovation that better support regional and rural customers

Telstra has heavily invested in research and development activities, advocated within global standards bodies and pushed network equipment and handset vendors to ensure that latest mobile technologies are well adapted to deployment in regional and rural areas (Table 7)

Further details are set out in section 1 of Mike Wright's statement. For example, Telstra attended the GSMA Mobile World Congress in 2006 and fostered the start of a world user group to promote the global uptake of handsets with the 850 MHz spectrum band (a coverage-friendly frequency) in-built. This was key to ensuring that equipment manufacturers would produce a critical mass of 850 MHz capable handsets that would allow Telstra (and other carriers) to expand coverage to regional and rural Australia. Telstra was able to use 850 MHz spectrum to extend Telstra's 3G network from around 10,000 square kilometres to over 1.6 million square kilometres with the launch of NextG.

Telstra also took a leading role in the planning and design of the 700 MHz spectrum band channel configuration in Asia-Pacific during its global development in 2010-2011. The 700 MHz band is now used in Australia to deliver the best possible 4G coverage to regional, rural and remote Australia.

Table 7: Highlights of Telstra's historic and future commitment to regional areas

Date	Event
Early 1990s	Introduction of competition in mobile markets with Optus and Vodafone receiving licences.



Date	Event
1997	The Government required Telstra to close down AMPS.
2000s	<p>Telstra deployed the CDMA network to provide substituted coverage for the AMPS network in regional and rural Australia.</p> <p>During spectrum auctions for 1800 MHz in 1998 and 2000 and for 2100 MHz in 2001, while Vodafone and Optus did acquire some spectrum in regional Australia, they focused spectrum purchases on the capital cities. Telstra bought additional spectrum to cover Cairns, regional South Australia and other regional areas.</p> <p>In 2006, Telstra made a strategic decision to develop the NextG 3G network which would have wider and deeper coverage than the existing 3G networks operating at that time. Engineering expertise was used to optimise rural coverage and performance of NextG:</p> <ul style="list-style-type: none"> • Telstra's 3G cell coverage range increased from 50 kilometres to 200 kilometres. • High powered 'boomer' towers were developed to extend the range of higher frequency spectrum to provide rural coverage. • Low band, coverage friendly 850 MHz spectrum was re-farmed following the closure of the CDMA network and used to extend the reach of Telstra's network from around 10,000 square kilometres to over 1.6 million square kilometres in 10 months. • The prestigious Blue Tick standard was developed to identify coverage friendly devices that helped customers maximise coverage from the network.
2010s to date	<p>Telstra was instrumental to the early development of 4G network technology. Telstra was the first carrier to extend 4G services into regional areas.</p> <p>The Telstra Mobile Smart Antenna was introduced, allowing regional and rural users who had poor coverage indoors to capture the better quality signal from outside to extend it into their home. Initially this was for 3G only but a 4G version has since been introduced.</p> <p>In May 2013, Telstra purchased the largest block of coverage friendly 4G spectrum at 700 MHz to enable continuing delivery of the best 4G quality. In February 2016, Telstra acquired additional 1800 MHz spectrum for mobile use in 12 regional areas across the country, including major regional cities like Albury, Cairns, Grafton, Mackay and Darwin and their surrounding areas.</p> <p>Telstra is committed to invest \$165 million in the Mobile Black Spot Programme Round 1 site builds and is making innovative use of small cells to create coverage around towns that would otherwise not be viable for coverage improvements.</p> <p>Telstra is committed to invest \$63.7 million in the Mobile Black Spot Program Round 2.</p>
Future	<p>With voice over wifi anyone with an internet connection and wifi will be able to use their enabled smartphone to make and receive calls around the house on wifi as if in mobile coverage.</p> <p>Mobile signal boosters that could be used to create a local coverage improvement 'bubble' inside a car, truck or tractor.</p> <p>Narrowband IoT will provide deeper coverage into buildings and extend existing remote and</p>



Date	Event
	rural penetration beyond our current geographical coverage. Telstra has partnered with Ericsson and its device partners to bring this technology to Australia for network trials and demonstrations to the industry.

1.5. The Australian mobile market is delivering world-leading outcomes

Infrastructure-based competition driven by the coverage race has delivered world-leading mobile services to Australian customers when benchmarked against other developed economies:

- According to the GSMA Mobile Connectivity Index, Australia ranks first in the world for mobile connectivity overall, sixth in the world for mobile infrastructure coverage (despite Australia's dispersed population) and eighth in the world for mobile network performance.¹⁰⁵
- According to the OECD, Australia had the sixth highest penetration of wireless broadband in the OECD in 2015 at 113.7 per cent penetration behind only Japan, Finland, Sweden, the US and Denmark.¹⁰⁶
- The ITU's *Measuring the Information Society Report 2015* ranks Australia nine out of 182 countries for the cost of mobile services as a percentage of Gross National Income, behind only Macao, HK, Singapore, Denmark, Qatar, Norway, UAE and Luxembourg.¹⁰⁷

Australian customers' level of choice between infrastructure competitors is in line with choice in other international jurisdictions, a majority of which only have three national mobile providers and a much larger population to support (Table 8).

Table 8: Number of national mobile providers in developed countries

Country	No.	Country	No.
Australia	3	Japan	3
Austria	3	Netherlands	3
Belgium	3	New Zealand	3
Canada	3 (4)*	Norway	3
Denmark	4	Portugal	3
Finland	3	Spain	4
France	4	Sweden	4
Germany	3	Switzerland	3
Greece	3	United Kingdom	4
Ireland	3	United States	4*



Country	No.	Country	No.
Italy	4		

Source: MEI Research Paper, *The state of competition in Canada's Telecommunications Industry 2016*, May 2016. Note: this has been updated to account for recent developments in Italy and the UK. In the UK there remains four operators as the O2-Three merger was blocked by the European Commission. In relation to Italy the European Commission recently approved the Hutchison/VimpelCom joint venture. However the approval was subject to a divestiture condition intended to facilitate the entry of French telecommunications operator Iliad as a fourth player.

* Both Canada and the US have a number of regional networks, with Canada having a fourth provider in each region of the country.

Australia also has a comparatively large number of MVNOs competing in the retail mobile market (Table 9). In Australia, there are around 2.38 MVNOs per million people, compared to a global average of 0.13 and a European average of 0.78.

Table 9: Comparison of density of MVNOs, 2014

	Number of MVNOs	Population (millions)	MVNOs (per million people)	Subscribers (millions)	MVNOs (per million subscribers)
Global	943	7,238	0.13	~7,000	0.13
Europe	579	741	0.78	~780	0.74
Australia	~56 ¹⁰⁸	23.5	2.38	~21	2.67

Source: ACCAN Report, *The state of competition in the Australian mobile resale market*, January 2016.

Further, infrastructure-based competition between MNOs in Australia has resulted in a level of mobile coverage that is high by international standards both in terms of countries with similar population density and more generally (Table 10). Of the countries examined, currently only Sweden, Finland and the Netherlands have a more extensive competitive 4G coverage footprint than Australia. The extent of competitive 4G rollout in Australia also exceeds numerous countries which have higher population densities. Australia has broader 4G coverage than a number of those countries where roaming is regulated (including Canada, Norway, the US and New Zealand).

Table 10 also shows that second and third market entrants can and do compete with the first entrant to meet or exceed their mobile coverage. For example:

- In the UK, the third entrant EE has 98 per cent 4G coverage compared to the first entrant O2 which has 92 per cent coverage;
- In Norway, the second entrant Telia has 98 per cent 4G coverage compared to first entrant Telenor's 93 per cent coverage;
- In the Netherlands, the third entrant T-Mobile has the same 4G coverage as first entrant KPN at 99 per cent, while Vodafone, the second entrant has 95 per cent coverage;
- In New Zealand, the second entrant Vodafone has 92 per cent 4G coverage compared to first entrant Spark's 90 per cent coverage; and
- In Australia, the third entrant Vodafone claims to have 96.9 per cent 4G coverage compared to second entrant Optus' 95 per cent.

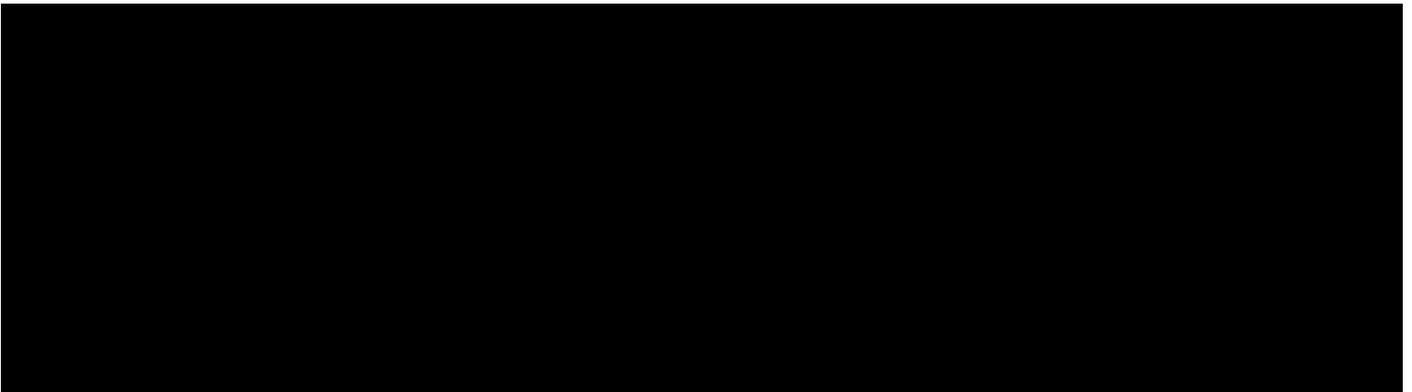
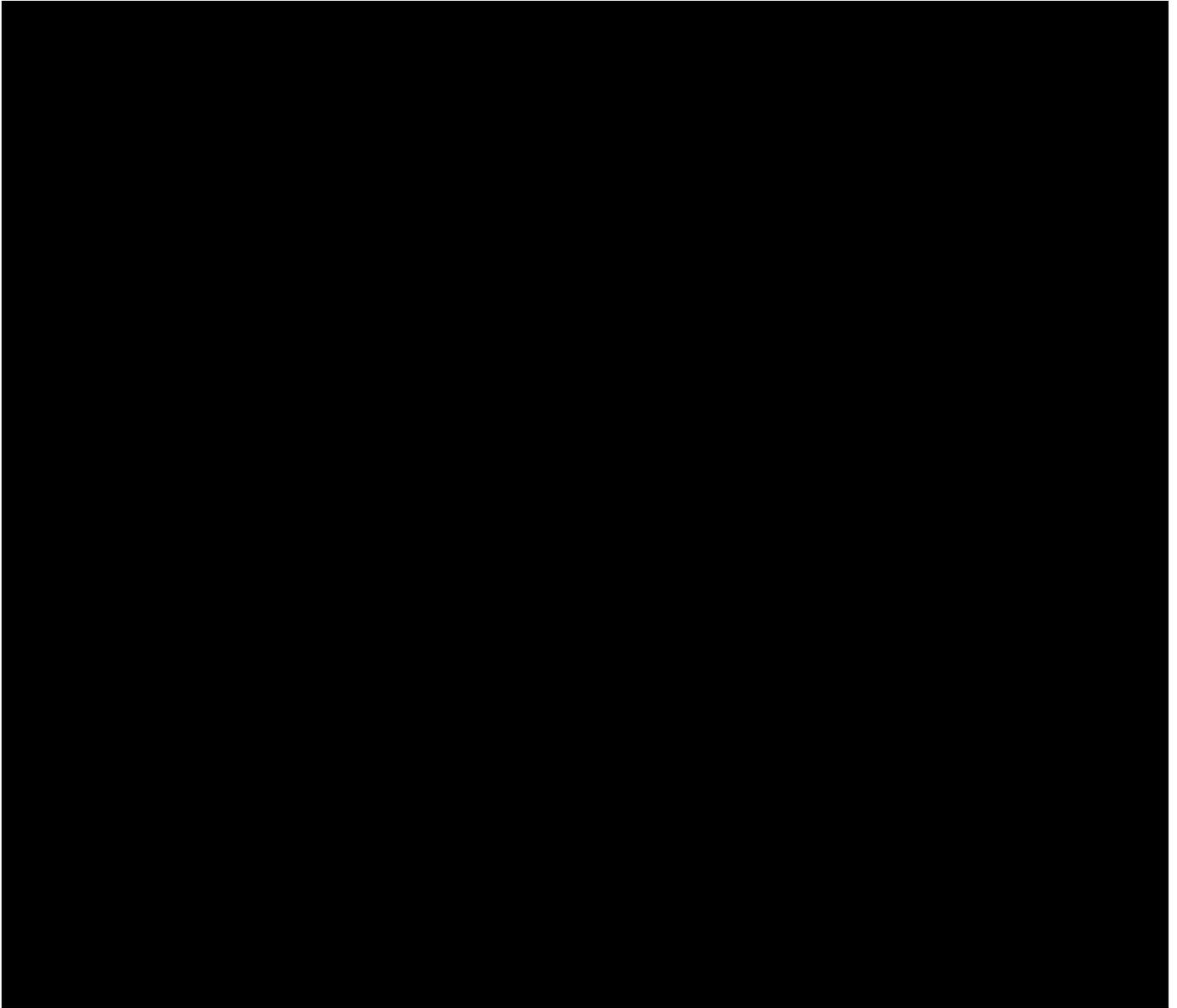
Table 10: International comparison of 4G coverage footprints¹⁰⁹

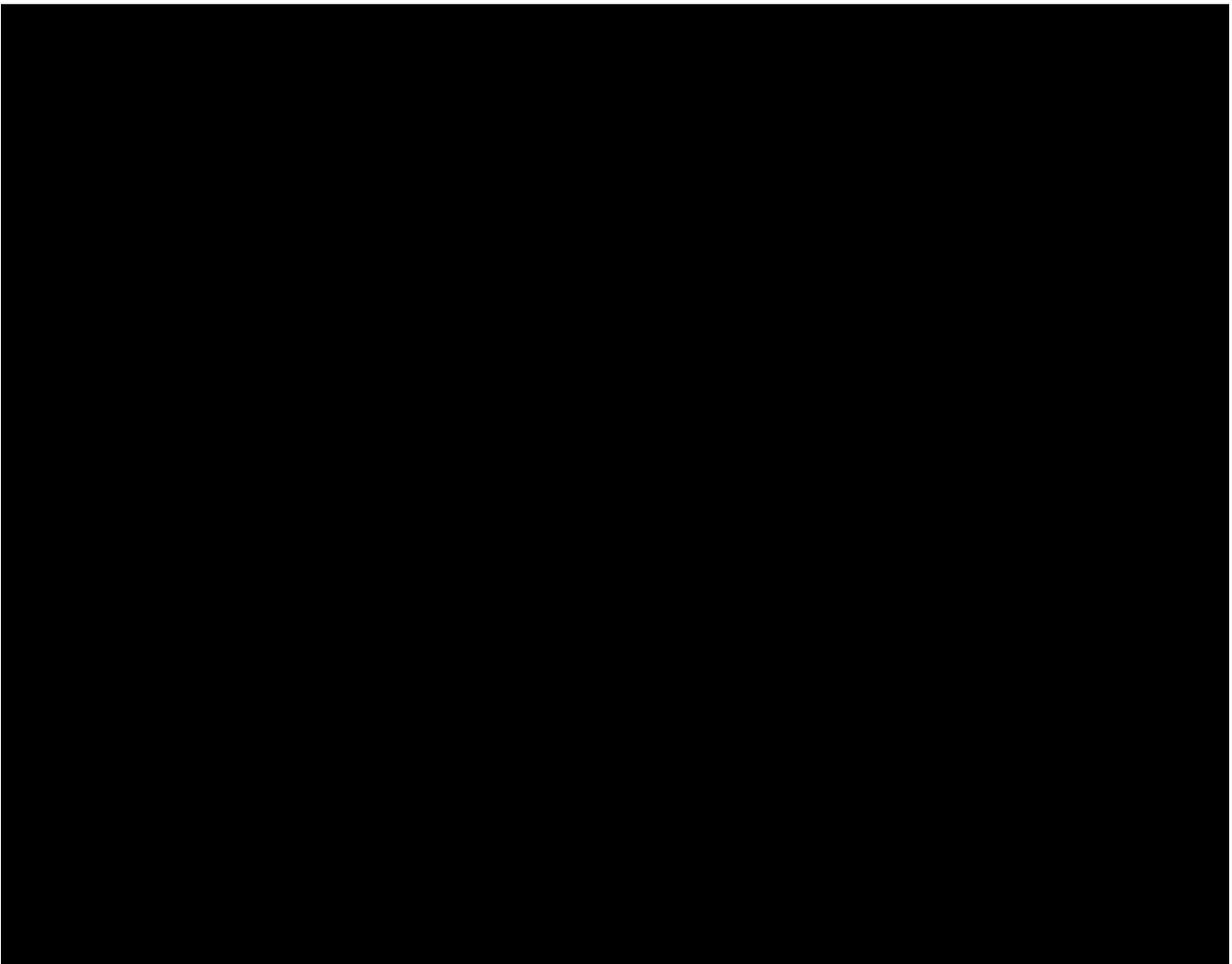
Country	People per km ² ¹¹⁰	First entrant	Second entrant	Third entrant
Sweden	24	99% ¹¹¹ (Telia Sonera)	99% ¹¹² (Tele2)	99% ¹¹³ (Telenor)
Netherlands ¹¹⁴	503	99% (KPN)	95% (Vodafone)	99% (T-Mobile)
Finland	18	98% ¹¹⁵ (TeliaSonera)	97% ¹¹⁶ (Elisa)	93% ¹¹⁷ (DNA Oy)
Australia	3	98% (Telstra)	95% (Optus)	96.9% (Vodafone)
Canada	4	96% ¹¹⁸ (Bell)	96% ¹¹⁹ (Telus)	93% ¹²⁰ (Rogers)
UK ¹²¹	269	92% (O2)	92% (Vodafone)	98% (EE)
Norway	14	93% ¹²² (Telenor)	98% ¹²³ (Telia Sonera)	75% ¹²⁴ (ICE)
US	35	97.4% ¹²⁵ (Verizon)	97.2% ¹²⁶ (AT&T)	85.6% ¹²⁷ (Sprint)
Austria	104	74% ¹²⁸ (A1 Telekom)	>90% ¹²⁹ (T-Mobile)	98% ¹³⁰ (3)
New Zealand	17	>90% ¹³¹ (Spark)	>92% ¹³² (Vodafone)	>70% ¹³³ (2degrees)
Greece	84	95% ¹³⁴ (Vodafone)	60% ¹³⁵ (Wind)	85% ¹³⁶ (Cosmote/OTE)
Spain	93	90% ¹³⁷ (Movistar/Telefonica)	91% ¹³⁸ (Vodafone)	87% ¹³⁹ (Orange)
Germany	234	90% ¹⁴⁰ (Deutsch Telekom)	87% ¹⁴¹ (Vodafone)	75% ¹⁴² (Telefonica)
France	122	76% ¹⁴³ (Orange)	39% ¹⁴⁴ (SFR)	73% ¹⁴⁵ (Bouygues Telecom)
South Africa	45	N/A (Telkom)	58.2% ¹⁴⁶ (Vodacom)	42.5% ¹⁴⁷ (MTN)



[REDACTED]

All customers value coverage around where they live and work, but a significant number also value coverage in other geographic areas (Figure 14):





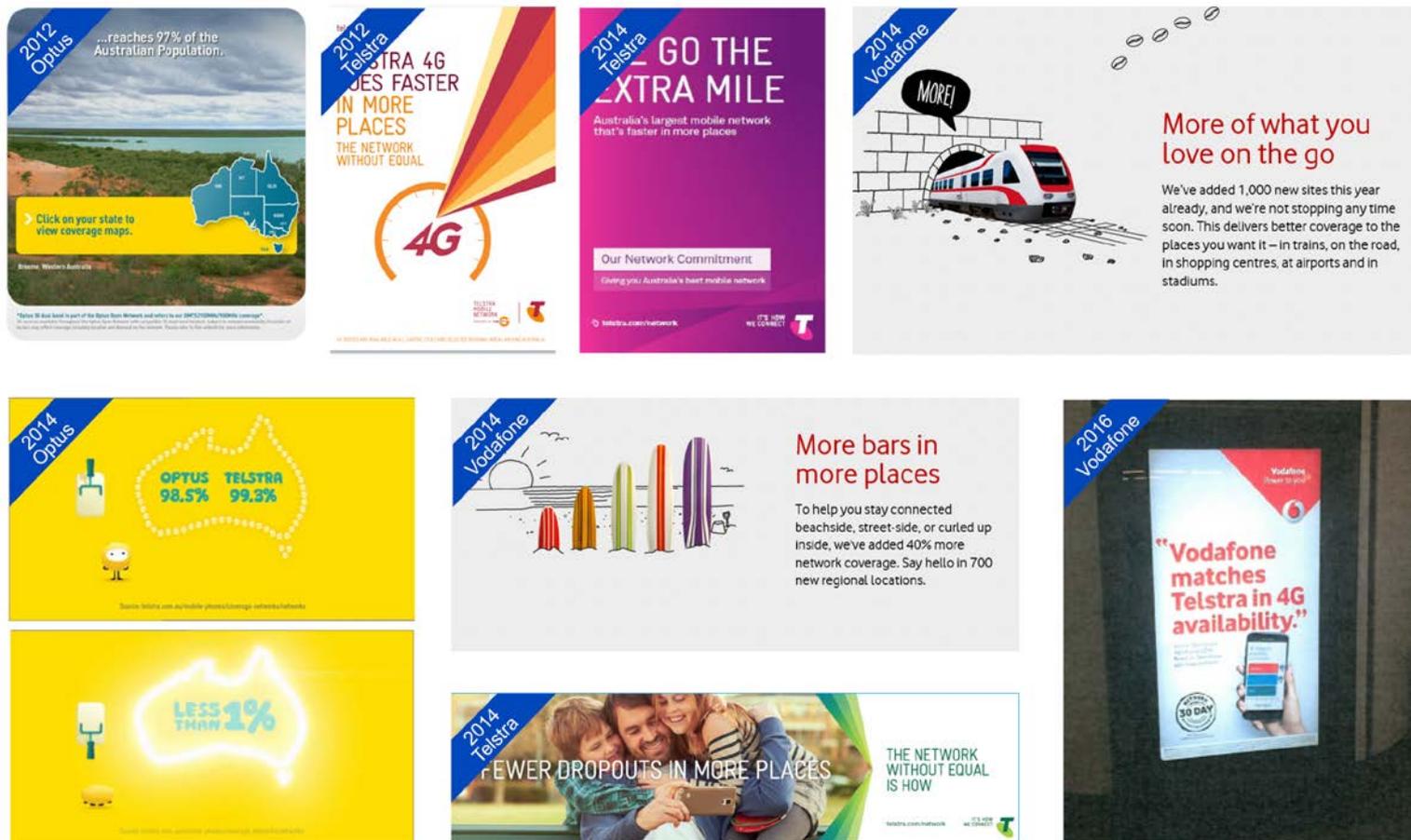
That customer preferences differ between MNOs is expected in a competitive market because each MNO makes strategic decisions about how to differentiate themselves along price and various network quality dimensions, including coverage:

- Given the number of customers that value coverage, Telstra has purposively pursued a long-term strategy of differentiating itself by providing superior network coverage and performance to its customers, particularly those in regional and rural Australia;¹⁴⁸
- Optus has clearly sought to implement an investment strategy that balances customer demand for extensive coverage against other factors such as price; and
- Vodafone has, at least historically, adopted a clear strategy of targeting customers who value cheaper rates.

Yet even with these differences in strategy, all MNOs recognise that customers value network coverage and quality and so have consistently marketed their products on the basis of coverage to attract those customers (Figure 16). Most of these marketing campaigns focus on breadth of coverage – both for its own value and as a signal to potential customers about the quality of each MNO's network.



Figure 16: Examples of Optus, Telstra and Vodafone marketing on the basis of coverage¹⁴⁹



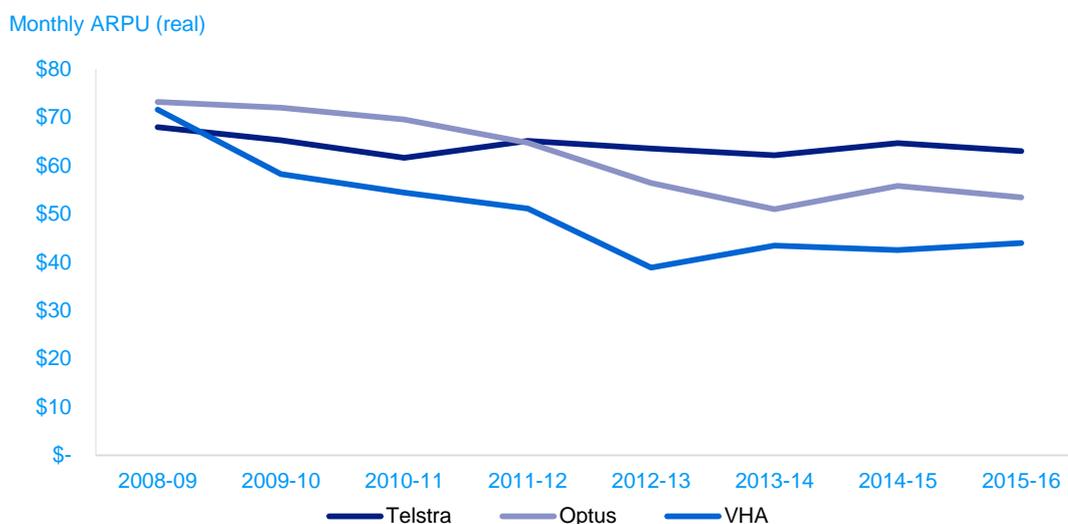
2.2. Customers have a high willingness to pay for quality network coverage

Not only do customers value coverage, but a substantial proportion of mobile customers are willing to pay more for coverage to enable them to consume content and use applications on their mobile devices as they move around and travel. As Mike Wright states: “...customers are prepared to pay for coverage and mobility in their services, not just in rural Australia, but across Telstra’s entire customer base.”¹⁵⁰

The high willingness of customers to pay for coverage is reflected in the sustained variation in average revenues per user (ARPU) between the MNOs, largely reflecting different network quality and coverage perceptions (Figure 17).



Figure 17: Monthly MNO ARPU (real)¹⁵¹



Source: MNO annual and half-yearly reports; ABS 6401.0 – Consumer Price Index, Australia. Note: there are differences in how each MNO calculates its ARPU, which cannot be resolved based on publicly available information. For example, Telstra and Optus' ARPUs are for postpaid only and Vodafone's is a mix of prepaid and postpaid.

Telstra has estimated customers' willingness to pay, by asking customers how much more they would pay for an \$80 plan on Telstra's network relative to identical plans on other MNOs' networks.¹⁵²

- Customers in metropolitan areas would on average pay an additional [REDACTED] on a \$80 plan to be with Telstra rather than Optus. When comparing Telstra to Vodafone, metropolitan customers would on average pay an additional [REDACTED] a \$80 plan to be with Telstra rather than Vodafone.
- Regional customers would on average pay an additional [REDACTED] on a \$80 plan to be with Telstra rather than Optus (the regional analysis for Vodafone was statistically insignificant).

Another MNO does not have to equal or exceed Telstra's coverage before it can compete for customers who value coverage and derive a revenue benefit from the additional investment in coverage. As the customer survey data in section 2.1 shows, the importance customers give coverage is relative to other factors including price, and weighting of those factors will differ between customers. Amongst the customers who give importance to coverage in their purchasing decisions, there will be customers who are prepared to pay a higher price than they currently pay, but not quite as high as they would pay for Telstra's offerings, for coverage which is better than is currently offered but not quite as extensive as Telstra. This creates the incentive and the reward for the other MNOs to incrementally close the coverage gap with Telstra – and for Telstra to continue pushing coverage into regional and rural areas to maintain its coverage superiority.

2.3. The willingness to pay for quality network coverage drives better outcomes for customers

Customers' willingness to pay for quality network coverage is a key competitive driver that has delivered many of the benefits of competition, particularly to regional and rural customers. This manifests in the Australian mobile market in three distinct ways:

- The race for better quality coverage which Telstra, Optus and Vodafone are all actively participating in (section 2.3.1);
- Investment in regional and rural mobile sites that are uneconomic on a standalone basis (section 2.3.2); and



-
- Nationally uniform pricing which means that customers in regional and rural areas pay the same prices as customers in metropolitan areas and benefit from national competition between mobile providers (section 2.3.3).

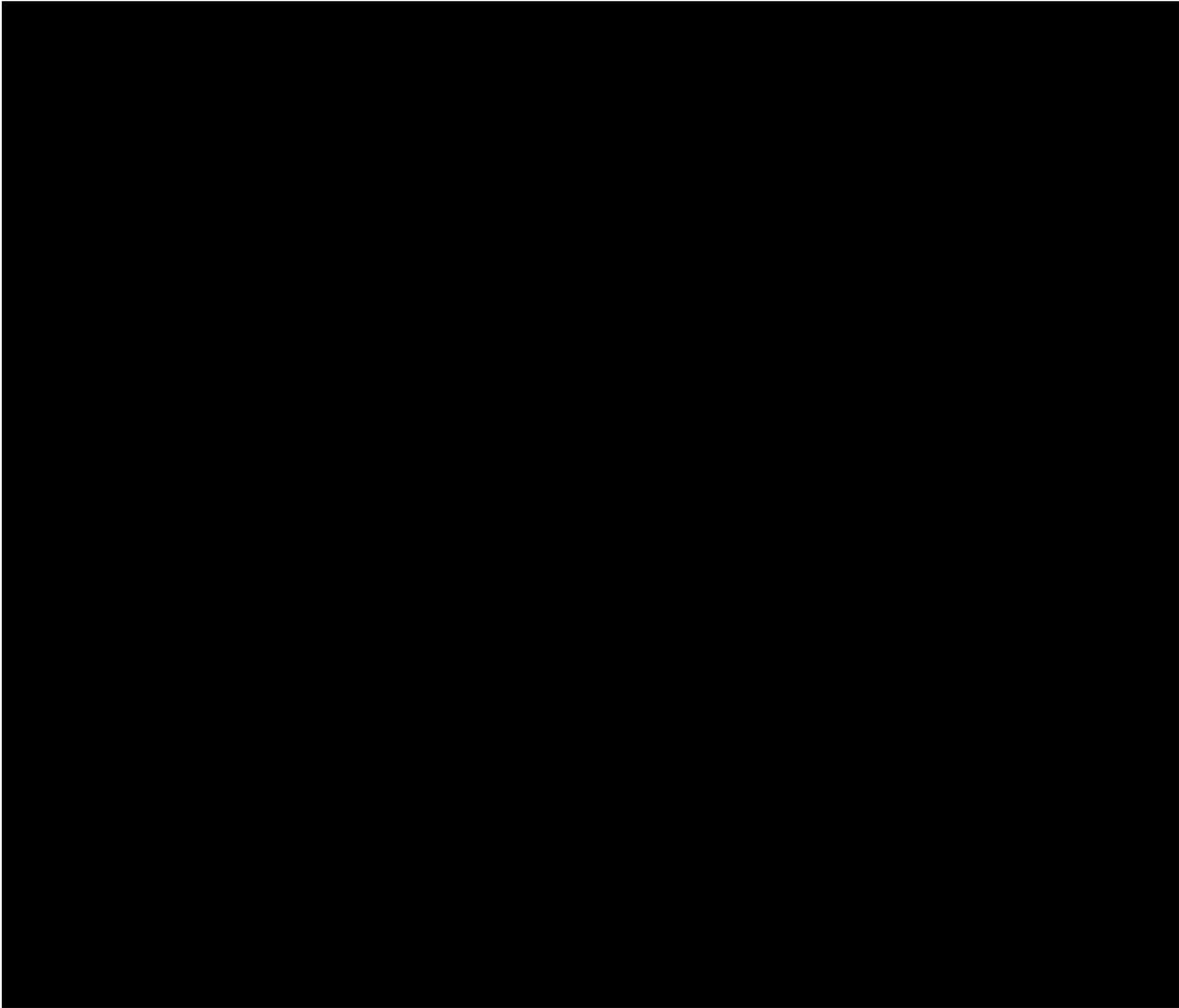
2.3.1. The race for better mobile network coverage

While Telstra has chosen coverage as its primary competitive differentiator, it is clear that, given the importance of coverage across all customers, Optus and Vodafone are also actively participating in the race for coverage. This is evident from:

- The narrowing of the coverage 'gap' between Telstra's coverage and Optus' coverage (Figure 2).
- The continuing high level of mobile network capital expenditure by Telstra, Optus and Vodafone (Figure 18). Telstra has had, and continues to have, higher overall investment than Optus and Vodafone in absolute terms. [REDACTED]

- Optus and Vodafone's estimated capital expenditure to sales ratios (capital intensity) being higher than historic levels [REDACTED]

[REDACTED]



To improve customer perceptions of its rural coverage, Optus has also engaged in strategic localised investment in selected rural areas. Through these highly publicised localised rural investments, Optus has sought to shift the broader customer perception about Telstra's network superiority in regional and rural areas. For example, in 2011, Optus installed a mobile base station directly into the small South Australian town of Corny Point, a town in which Telstra only supplied limited coverage from nearby base stations.¹⁵³ Optus then released videos on social media publicising this investment, stating: "*Network coverage around Australia is an issue for some areas and communities but it is continually improving. We talked to a few people from the South Australian community of Corny Point about how Optus has made a difference to their day to day lives and how they are now more connected in the world.*"¹⁵⁴

Vodafone also has recognised the importance of coverage and uses coverage claims to market its mobile services. Reflecting its announcements of more investment in coverage, Vodafone's coverage website claims that "*choosing your mobile provider is no longer a one horse race. That's because we never settle for things as they are. Our 4G network... now covers over 22 million Australians.*"¹⁵⁵ As outlined in section 1.4.3.1, Vodafone plans to construct 102 new mobile towers in regional Australia by the end of 2017. Seventy of these base stations are funded under Round 1 of the Australian Government's Mobile Black Spot Programme and through Vodafone's own co-contribution of \$20 million.¹⁵⁶ The other 32 of these base stations are funded through an additional \$9 million investment by Vodafone.¹⁵⁷



The importance customers place on network coverage and quality means that MNOs are continually focused on building and maintaining customer perceptions around coverage and quality. MNOs are conscious that customer perceptions of inferior network performance can have significant consequences. For example, the network issues that were experienced by Vodafone in 2010 were attributed to Vodafone's failure to maintain adequate investment in its network to keep up with surging data usage from smartphones.¹⁵⁸ Vodafone reported that it lost over 500,000 customers during the 2011 financial year as a result of this event. Vodafone has since worked to recover customer perceptions of its network performance.

2.3.2. Investment in uneconomic regional and rural mobile sites

Customers' high willingness to pay for broader coverage justifies investment in regional and rural sites that would otherwise be uneconomic.

There is a significant gap between the costs of deploying mobile infrastructure in regional and rural areas and the direct revenues earned from customers living, working and visiting the area:

- The upfront capital expenditure costs of expanding into low population density regional and rural areas tend to be greater than for metropolitan sites. [REDACTED]
- The average cost of sites increases sharply the more remote and less densely populated the coverage area becomes and the number of sites required to provide incremental population coverage increases:

- The average operating expenditure for a rural site is approximately [REDACTED] per annum. For regional sites, operating expenditure is [REDACTED] per annum while metropolitan sites are [REDACTED] per annum.
- At the same time, the direct revenues from investing in coverage in low population density regional and rural areas are far lower than the direct revenues available in higher population density areas, as there will be significantly lower mobile traffic in those areas. [REDACTED]

In his statement, Mike Wright explains:¹⁶⁰

"...for many of Telstra's investment decisions in sites across rural and regional Australia, the expected NPV of the sites based on expected direct revenue makes the investment simply uneconomic. This is because the cost of building and maintaining individual sites in rural areas is much greater than in metro areas, however these areas are much less densely populated resulting in



far less direct revenue potential. The more rural and remote the network extends, the less populous and challenging the terrain becomes and the less economic these investments become on a direct revenue basis.”

Ovum analysed the current business case for Telstra's investment for a sample of approximately 450 mobile sites where Telstra is the only MNO. Ovum modelled site acquisition costs using a range of costs for greenfield sites (new tower build) and brownfield sites (co-locating on an existing structure), [REDACTED]

Ovum concluded that of these Telstra-only sites, using [REDACTED]

[REDACTED]

2.3.3. Nationally uniform pricing

A substantial group of customers in low-cost metropolitan areas who value broader coverage, including in regional areas, are willing to pay a higher price which effectively recovers from them the costs of extending



geographic coverage. Conversely, customers in regional and rural areas are likely to be unwilling to pay for the full costs of deploying and upgrading the mobile networks in the areas they live (section 2.3.2).

These dynamics create strong incentives for MNOs to price on a nationally uniform basis. The result is that customers in regional and rural areas pay the same prices and also share the same benefits of competition that is taking place in the major cities.

Even if one MNO focuses more on the major cities (where the direct return on investments is much higher), the high willingness of customers to pay for broader coverage means other MNOs that have invested in that broader coverage are able to maintain nationally uniform pricing. Competition in mobile markets does not, therefore, undermine national average pricing by cherry picking.

2.3.4. The contrast with the fixed network

The importance of the willingness to pay for coverage in driving customer outcomes in the mobile industry can be illustrated by comparing how coverage and national uniform pricing are addressed in the fixed network.

Fixed customers place little value on coverage beyond their place of residence or work, so there is no incentive for fixed network operators to expand their networks beyond what is economic. There is also less incentive to price on a nationally averaged basis to meet social policy objectives, particularly when there is competition in low-cost areas that undermines such pricing.

As a result, in the fixed network, complex regulatory frameworks, compulsory cross-subsidy schemes and other forms of government interventions are needed in order to achieve the objectives of universal service and nationally averaged pricing.

The nbn regulatory framework provides a good example of this. Under the statement of expectations, nbn co is to deliver super-fast broadband services to all Australians at nationally uniform wholesale prices.¹⁶⁴ While the Vertigan Committee recommended to the Government that nbn co be allowed to lower prices in low-cost areas if needed to compete, the Government is also considering establishing an explicit cross subsidy scheme, including taxing competitors in low-cost areas, to support the funding of broadband infrastructure in high-cost areas.¹⁶⁵

In contrast, in the Australian mobile sector, the challenge of achieving a universal service with national uniform pricing is being met by market forces, facilitated by the current regulatory settings. As Professor Yarrow says in his report:¹⁶⁶

“The conflict between competition on the one hand, and uniform prices plus geographically wide service provision of acceptably high quality on the other, gives rise to a severe regulatory challenge. It is difficult to get the balance anything like right in the first place and, in the presence of technological changes that are continuously changing the economic context, the most appropriate balance is constantly shifting. The result has historically tended to be heavy handed, recurrent regulatory interventions, not assisted by frequent interactions with politicians. Better and worse solutions are possible, but even the better ones, such as levies on all service providers to fund ‘universal service provision’, as has sometimes been provided for in the context of fixed network telecommunications, have unattractive features. Levies, for example, are a form of compulsory taxation and the resulting patterns of transfers almost inevitably distort competition.”

These observations serve to highlight a feature of the Australian mobile telecommunications context that I found striking at a very early stage of my reading of relevant background information for the purposes of this report: it is remarkable by international standards that the balancing act has been accomplished in Australian mobile telecommunications in a way that appears to combine relatively light handed regulation (tower-sharing arrangements, regulation of backhaul services), limited coercive taxation (i.e. fairly modest financial support from the public revenues) and vigorous competition, witnessed by the number and the commercial conduct of MNOs and MVNOs.



Notwithstanding vigorous competition, there is geographically uniform (i.e. national) pricing and close to universal coverage of high quality services.”

2.4. Existing regulatory and policy settings also support the race for better quality coverage

Regulated access to site facilities (section 2.4.1) and backhaul (section 2.4.3) encourages the expansion of competitive mobile networks across Australia, without unnecessarily duplicating infrastructure. The regulatory and policy settings also ensure competitive access to spectrum needed by multiple MNOs to serve an area (section 2.4.2). Governments also make contributions to the investments made by MNOs through competitive tendering, to expand the breadth of coverage (section 2.4.4).

Most of Telstra's mobile infrastructure in regional and rural areas was deployed or substantially upgraded in competitive market conditions, but these policy and regulatory settings ensure that Telstra cannot leverage any residual legacy advantage it might have.

2.4.1. Regulated access to facilities encourages competitive coverage expansion

Regulated access to mobile towers encourages competitive coverage expansion by second and third entrants who can, by co-locating on existing facilities, reduce the upfront cost of establishing a new mobile base station. For example, as set out in the statement of Robert Joice,¹⁶⁷ co-locating on a 40 metre tower or monopole in a regional area can reduce upfront capital expenditure costs by approximately [REDACTED] or 29 per cent. Co-locating in rural areas allows even greater savings of approximately [REDACTED] or 36 per cent of the cost of building a new facility.

Ovum modelled the viability of a second-in MNO, for example Optus, building network in the sample of approximately 450 current Telstra-only sites in their study.¹⁶⁸ Ovum assumed that the second-in MNO would win 30 percent market share in the area from Telstra and that, using facilities sharing and regulated transmission services, its upfront costs to establish the new site would be [REDACTED]



[REDACTED]

All three MNOs engage in facilities sharing, as does nbn co. In addition, there are other owners of radio towers on which co-location occurs, although the terms of that co-location are not covered by the facilities access regime, but by separate agreements. These other radio tower owners include Axicom and Broadcast Australia.

In Robert Joice's experience:¹⁷²

"... the co-location facilities access regime... is robust and works effectively to promote tower sharing opportunities between carriers. Co-location has a number of advantages for carriers including lower initial capital cost, a shorter timeframe to deliver new services and avoiding community opposition to new telecommunications infrastructure (particularly in metro and regional areas)."

The ongoing effectiveness of the co-location process is demonstrated by the increasing use of facilities sharing by various carriers since the facilities access requirements were introduced.

In the past two financial years, Telstra has received approximately 2,130 'Level 1' co-location requests from wholesale customers. Level 1 applications involve a request from an access seeker for preliminary information about a mobile facility to which the owner of that structure is required to respond. In his statement, Robert Joice states that in his experience, at the same time as making a Level 1 application, access seekers will be exploring other infrastructure options, such as building their own tower or co-locating on a different structure. Given the exploratory nature of Level 1 requests, many of these requests do not proceed to application.¹⁷³

However, of those applications that do proceed to the 'Level 3' stage, which requires the access seeker to submit a design and construction proposal, a high proportion of these do proceed to build stage. Over the previous 10 years, there have been 3,711 Level 3 applications made to Telstra from wholesale customers who wish to co-locate on a Telstra mobile facility, and of these, 3,615, or 97 per cent, have been approved. Further, across this 10 year period, the number of Level 3 applications has generally been increasing (Table 11).

Table 11: Number of Level 3 tower sharing applications received by Telstra with respect to its own facilities

2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
134	177	520	193	216	392	502	307	378	496

Telstra has approximately 8,500 mobile facilities and owns approximately [REDACTED] of those sites. Figure 22 shows a breakdown of Telstra's mobile facilities in terms of those sites that it owns and those sites where it has deployed mobile equipment on a structure that it does not own. Of the mobile facilities that Telstra owns, Telstra estimates that approximately [REDACTED] of these facilities are currently shared with [REDACTED] which will further increase with the number of Level 3 approved applications that are awaiting build by the access seeker. Figure 21 illustrates the location of those Telstra-owned sites on which another carrier is co-located alongside the location of other Telstra mobile facilities.



Figure 21: Carriers co-located on Telstra mobile facilities

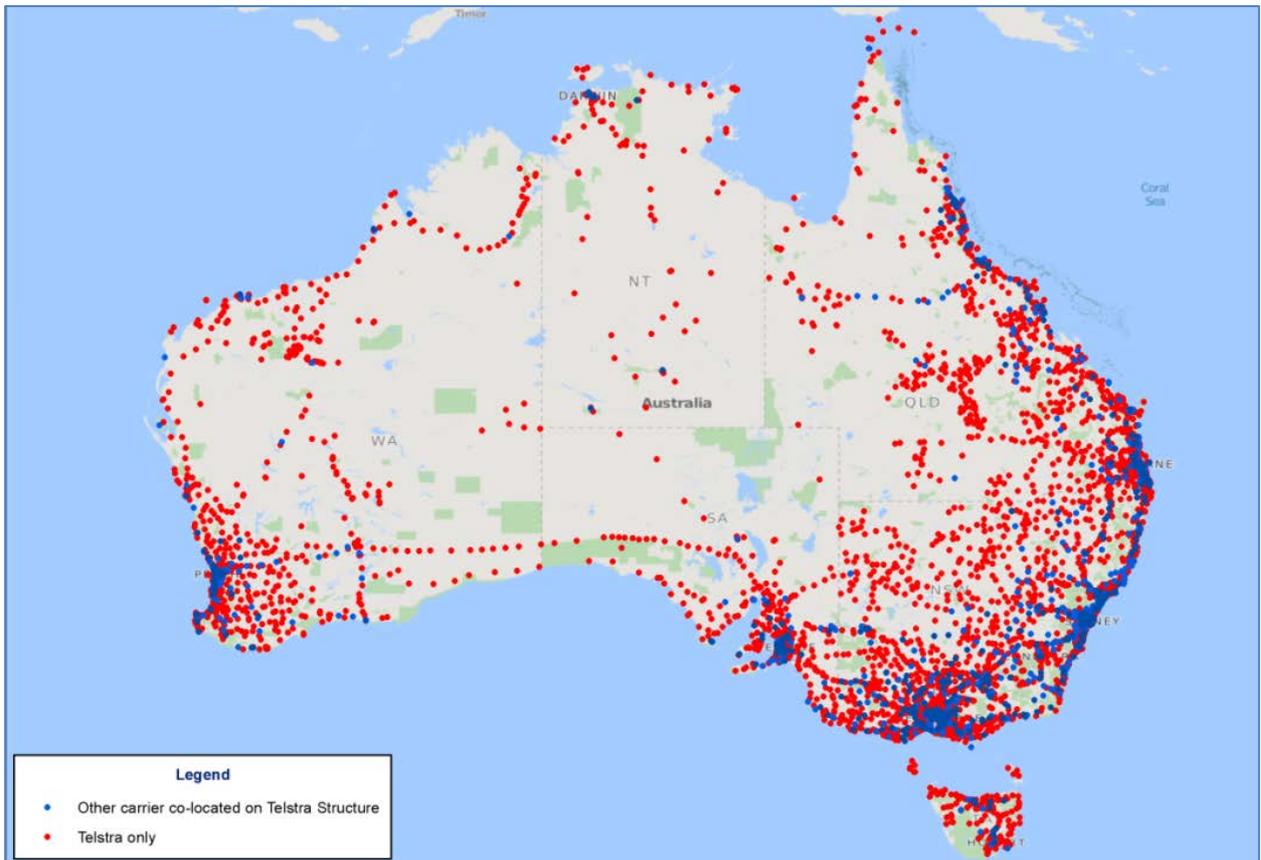
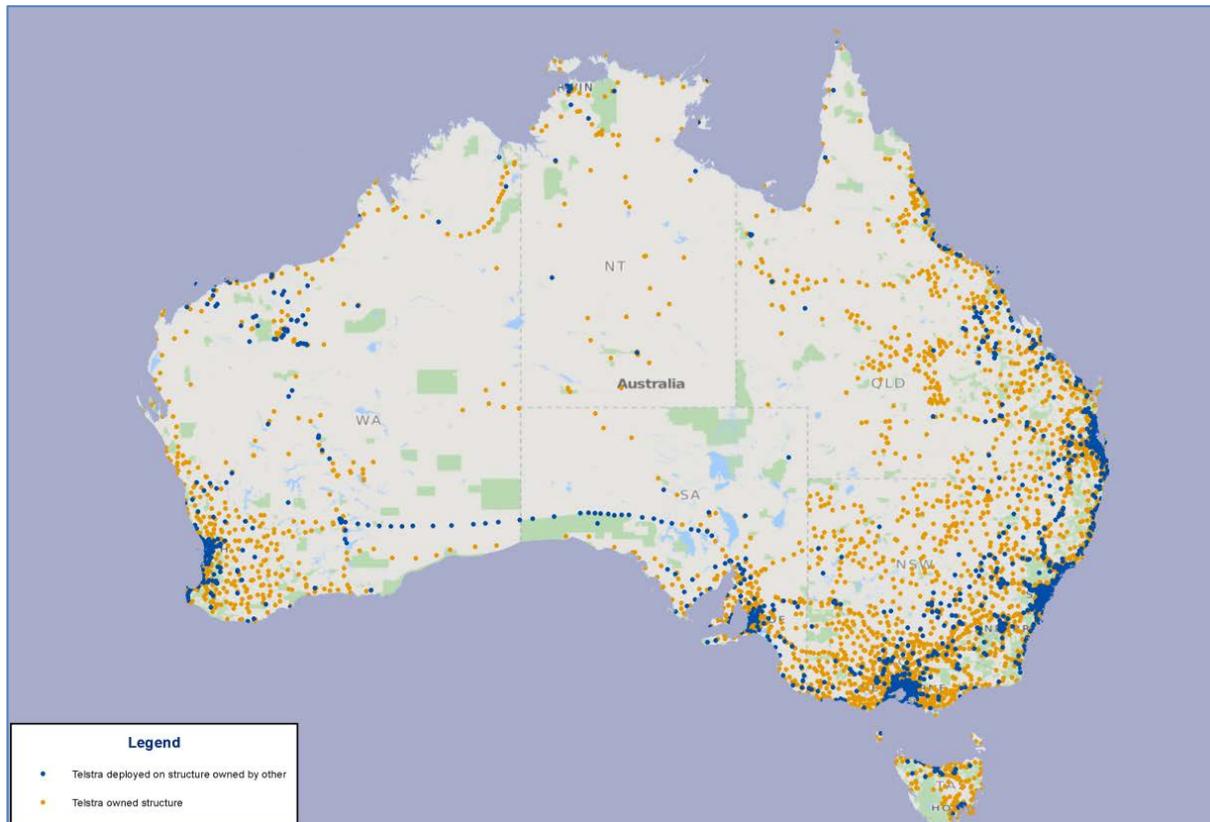


Figure 22: Telstra's mobile facilities showing those sites owned by Telstra and those sites that Telstra does not own but has equipment on



The efficiencies and benefits of co-location of mobile infrastructure are also clear in the assessment criteria employed in allocating funding under the Mobile Black Spot Programme. In both Round 1 and Round 2 of the Programme, applicants were encouraged to propose base stations for funding that would be capable of supporting two or more MNOs.¹⁷⁴ All of the new base stations that Telstra received funding for under Rounds 1 and 2 of the Mobile Black Spot Programme will be constructed to support an additional MNO (where technically feasible).

Telstra has no legacy advantage in tower and other physical support infrastructure in regional and rural areas because most of Telstra's current tower investment occurred after the entry of Vodafone and Optus (section 4.3):

- Most of the towers and physical or other support infrastructure currently in the Telstra network post-date the entry of Optus and Vodafone into the market (early 1990s) and the full privatisation of Telstra (2006) (Figure 3 in section 1.1).
- Even if the ground site existed in the days of AMPS and 2G, the investment required in the tower and other infrastructure at those sites since the 1990s points to Telstra having no significant legacy advantage. As the tower or other support structures on these sites now would be over 20 years old, it is likely that those towers would have been strengthened, extended or replaced over the intervening years.

Any residual legacy advantage which Telstra could possibly have on towers and other physical support infrastructure in regional and rural areas has been addressed by increased opportunities for alternative facilities sharing opportunities with the regulated facilities access on Telstra's facilities and the expansion of alternative co-location opportunities on other MNO facilities (as each MNO rolls out more network



infrastructure this creates more alternative co-location sites to Telstra's sites) and third party provider facilities (including the commercial tower space providers).

The Government is funding nbn co's rollout of fixed wireless, including new towers and sites that could also house MNO's equipment. The RFNSA shows that nbn co uses 2,343 facilities, and we estimate that approximately 70 per cent of these are new sites. Telstra understands that these sites are also covered by the facilities access regime.

2.4.2. Spectrum is allocated to MNOs through competitive processes

All three MNOs have made substantial investments in spectrum, including spectrum that will support the expansion of their networks to regional and rural areas. Table 12 outlines Telstra, Optus and Vodafone's current spectrum holdings in regional and rural areas. All of Telstra's current mobile spectrum holdings, including legacy 800 MHz spectrum, have been acquired through the ACMA competitive auction processes from 1998 onwards, apart from the 900 MHz spectrum which was allocated in an equal three way split between Telstra, Optus and Vodafone when the mobile market was originally deregulated.¹⁷⁵

Table 12: MNOs regional spectrum ownership

MHz	Telstra	Optus	Vodafone
700 MHz	40	20	(see discussion below)
850 MHz	30	-	10
900 MHz	16.8	16.6	16.6
1800 MHz	73.3	45.8	11.7
2100 MHz	22.1	17.5	12.5
2300 MHz	-	5.8	-
2600 MHz	80	40	-
3400 MHz	10.5	5.4	-

Note: This table depicts the average MHz over 12 regional areas and four remote areas (where applicable).

The 1800 MHz frequency spectrum auction held in December 2015 – January 2016 was structured to improve the availability and performance of 4G telecommunications services across regional Australia. The ACMA auctioned 144 licences for 1800 MHz spectrum in 12 regional areas and three residual licences. Competition allocation limits for bidders were imposed in this auction which set a maximum of five lots in any regional area. Table 13 shows the spectrum lots purchased and the amounts spent by the three MNOs (and TPG Internet who was the fourth successful bidder) in the 1800 MHz regional auction. Table 14 shows the geographic spread of the spectrum purchased in the 1800 MHz regional auction by the three MNOs.

Table 13: Spectrum lots purchased and amount spent in the 1800 MHz regional auction

1800 MHz regional auction	Telstra	Optus	Vodafone	TPG
Spectrum lots purchased	57	55	11	18
Amount spent (million)	\$191	\$196	\$68	\$88

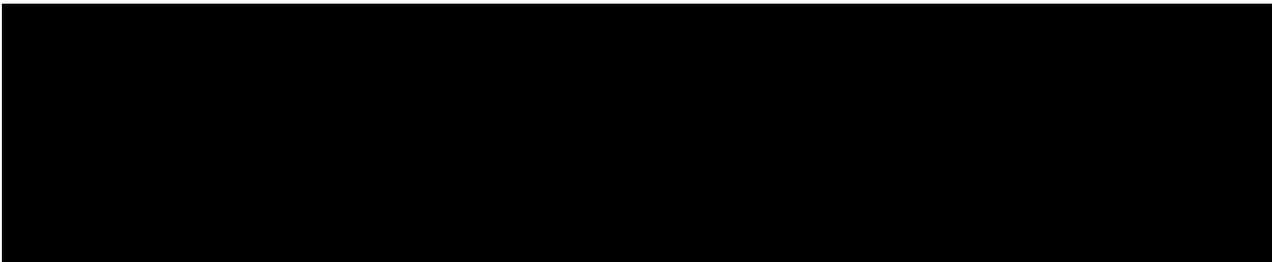
Source: ACMA.



Table 14: Geographic spread of spectrum purchased at 1800 MHz regional auction

FREQUENCIES (MHz)	REGIONAL 1800 MHz Lots											
	CANB	DARW	TASM	VICT	SAUS	WNSW	SNSW	NQLD	CQLD	SQLD	NNSW	WAUS
5MHz paired	Red	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
5MHz paired	Red	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
5MHz paired	Red	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
5MHz paired	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
5MHz paired	Blue	Blue	Blue	Green	Blue	Blue	Blue	Blue	Blue	Unsold	Blue	Blue
5MHz paired	Green	Yellow	Unsold	Green	Yellow							
5MHz paired	Green	Yellow	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
5MHz paired	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
5MHz paired	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
5MHz paired	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Red	Yellow	Red
5MHz paired	Yellow	Green	Yellow	Red	Green	Unsold	Green	Red	Unsold	Green	Green	Red
5MHz paired	Red	Green	Yellow	Red	Green	Green	Yellow	Red	Unsold	Green	Green	Unsold
FREQUENCIES (MHz)	RESIDUAL 1800 MHz Lots											
	NQLD	SAUS										
2.5MHz paired	Blue	Blue										
	ADEL		KEY									
5MHz paired	Green		Telstra	TELSTRA								
			Optus	OPTUS								
			Vodafone	VODAFONE								
			TPG	TPG								

Source: ACMA



The basis for Telstra's investment in 1800 MHz regional spectrum is further discussed in section 9.2 of Mike Wright's statement.

The digital dividend auction was held in 2013 to reallocate spectrum in the 700 MHz and 2.5 GHz bands. The 700 MHz band spectrum is also referred to as 'coverage spectrum' as it is low band spectrum that provides a wider area of coverage and high in-building penetration. Spectrum in the 2.5 GHz band is high bandwidth spectrum, or 'capacity spectrum', that is more suitable to providing high-data capacity with less effective distance and building propagation. A combination of these frequency bands can therefore be used to extend coverage into regional areas (700 MHz spectrum), and then satisfy capacity demands in regional towns (2.5 GHz spectrum).

Telstra, Optus and TPG purchased spectrum in the digital dividend auction (Table 15).


Table 15: Spectrum lots purchased and amount spent in the digital dividend auction

Digital dividend auction	Telstra	Optus	TPG
700 MHz	40	20	0
2.5 GHz	80	40	20
Amount spent	\$1.3 billion	\$650 million	\$13 million

Source: ACMA.

Vodafone did not participate in the digital dividend auction, but has since shown a willingness to further invest in spectrum that can be used to extend its mobile network to regional areas. In May 2016, Vodafone made a bid of \$594 million for 10 MHz of the 700 MHz that was passed on in the 2013 auction (consistent with the reserve price that both Telstra and Optus paid in 2013). This offer was declined by the Government following a consultation that indicated that there was strong interest from other industry players.¹⁷⁶

The unallocated 700 MHz spectrum will go to competitive auction most likely early next year. The ACCC has recently consulted on potential competition limits to apply to this auction and the ACMA has consulted on the draft allocation instruments.

As a result of spectrum policy, Telstra has no legacy advantage in spectrum. As referred to above, all spectrum has been acquired through the ACMA competitive auction processes except for the 900 MHz spectrum, which was allocated in an equal three-way split between Telstra, Optus and Vodafone.

More onerous competition limits have been imposed on Telstra in several auctions (including the auction of the 800 MHz non-metropolitan spectrum) to benefit competitors. In particular, in the 3400 MHz auction in 2000, Telstra was not permitted to bid for any spectrum in the defined major cities and towns, and to bid to a limit of no more than 22 MHz in each of the 32.5 MHz blocks being offered in the five regional areas. All other bidders were subject to a general limit of 67.5 MHz for the bandwidth on offer (100 MHz) in major towns and cities. This meant that competitors not only had larger spectrum parcels available, but they also did not face as much competition from Telstra in the auction bidding process meaning they likely faced lower prices for that spectrum.

2.4.3. Access to backhaul is competitive or regulated

The mobile backhaul market is increasingly competitive. In 2013, there were approximately 1827 Exchange Service Areas (**ESAs**) with 2 or more fibre providers and the market has only become more competitive since then.¹⁷⁷

Wholesale providers compete to provide backhaul to MNOs. For example, TPG successfully bid to replace Optus as the supplier of mobile backhaul to Vodafone sites in 2018 when the Optus backhaul deal finishes. TPG will provide dark fibre and network services to more than 3,000 Vodafone sites over a 15 year term, with minimum contracted revenue over the term exceeding \$900 million.¹⁷⁸ TPG will extend its current fibre infrastructure by constructing about 4,000 kilometres of new fibre to Vodafone cell sites across the country.

There is also the possibility that nbn co will enter the market as a backhaul service provider. nbn co commenced trials of its Cell Site Access Service for mobile base stations in 2013.¹⁷⁹ A second trial of this service is currently underway, scheduled to run until 1 July 2017.¹⁸⁰ This service allows mobile carriers to access nbn co's fibre network to connect their mobile towers. Under the trial, different prices apply to metropolitan, outer metropolitan and regional services.



Increased competition in the backhaul market will have flow-on effects to other markets. That is, retailers who are able to improve their backhaul arrangements will be in an improved position to compete in the retail market.

Where competing providers are not available, regulated prices apply. In its most recent decision for the Domestic Transmission Capacity Service (the **DTCS**), the ACCC's determination resulted in average regulated prices for the DTCS in regional areas falling 72 per cent.¹⁸¹

Telstra does not have a legacy advantage in backhaul in regional and rural areas. As explained in Mike Wright's statement, one of the most substantial, challenging and costly parts of the NextG rollout was to rebuild and replace Telstra's existing mobile network backhaul.¹⁸²

As the AMPS network mainly carried voice services, its bandwidth requirements for backhaul were limited. The initial 2G network also was mainly voice focused with limited data capabilities, and only required limited backhaul. Therefore, most backhaul services associated with AMPS and 2G services consisted of single copper or small microwave backhaul links, delivering 2Mbps bandwidth. For busier sites, mainly in metropolitan areas, the backhaul service would have delivered, at most, 4Mbps bandwidth.

By contrast, given the higher speeds and data capabilities of NextG and 4G the typical bandwidth provisioned in backhaul for 3G is 100Mbps and for 4G is up to 1Gbps. This is an increase of 50 times or more over the AMPS and CDMA backhaul bandwidth and usually involved replacing the existing copper or microwave link with a new fibre link.

This massive investment in new backhaul occurred long after Vodafone and Optus entered the market and after the full privatisation of Telstra.

The entry of competing backhaul providers and the regulation of backhaul on other routes has addressed any residual legacy advantage which Telstra could possibly have over backhaul in regional and rural areas.

2.4.4. Government funding has facilitated network coverage expansion for all MNOs

Competitively allocated Government funding programs have facilitated the expansion of coverage by the three MNOs at the margins of their coverage footprints.

These Government funds generally have been allocated on a competitive tender basis. They also occur in tandem with MNOs' own private investments, and require significant additional contributions by the MNO. As Optus has stated in response to the announcement of Round 2 of the Mobile Black Spot Programme:¹⁸³

"Real investment in regional and remote telecommunications services is the only sustainable way to improve competition, and strength and breadth of coverage in regional Australia. Optus has embarked on an extensive regional network investment program and today's Mobile Black Spots announcement will supplement additional investment in regional telecommunications."

The Government funding that Telstra has received for mobile networks accounted for less than one per cent of its mobile investment spend for the period FY06-FY15 on a fully allocated basis (excluding spectrum purchases and renewals).

Telstra has in the past participated in co-funding programs with the Federal, State and Territory Governments, most of which were subject to a competitive tender process.

Currently, the main co-funding programme, in which the States, Territories and local government participate with funding contributions, is the Federal Government's Mobile Black Spot Programme which is intended to improve mobile coverage and competition in regional and rural Australia through subsidising the cost of building new base stations in areas without coverage. The Government committed \$100 million in Round 1 (which is being supplemented by over \$200 million in co-contributions) which will deliver 499 new and upgraded mobile base stations across Australia.¹⁸⁴ Vodafone and Telstra were awarded funding in Round 1.



The outcomes of Round 2 of the Mobile Black Spot Programme were announced on 1 December 2016 and will see a total of \$213 million being invested in new mobile base station infrastructure.¹⁸⁵

- Optus has secured \$26.4 million in Federal and State Government funding and will co-contribute a further \$36.4 million which will fund 65 mobile base stations and 49 satellite small cells.¹⁸⁶
- Telstra has secured approximately \$83 million in Federal and State Government funding and will co-contribute a further \$63.7 million to build 148 mobile base stations.¹⁸⁷
- Vodafone has contributed \$1.6 million in addition to the estimated \$1.9 million it received in Federal and State Government funding for four base stations.¹⁸⁸

The Federal Government has committed a further \$60 million to Round 3 of the Mobile Black Spot Programme which is expected to commence in 2017.¹⁸⁹



03 DECLARATION OF ROAMING WILL UNDERMINE THE OUTCOMES ACHIEVED THROUGH INFRASTRUCTURE-BASED COMPETITION

“[N]ational roaming would also harm the business case for further investment in rural coverage: why should any operator invest in providing better coverage for the benefit of a competitor?”¹⁹⁰

- Vodafone UK

This section explains how the outcomes achieved under the existing competitive market dynamics, facilitated by the current regulatory and policy settings (outlined in section 2) will be undermined if mobile roaming is declared.

Declared roaming will neutralise the coverage advantage that has justified significant investment in regional and rural mobile infrastructure that is uneconomic on a standalone basis. As stated by Mike Wright, Group Managing Director, Networks:¹⁹¹

“...there are many rural and regional sites that are not stand-alone economically viable due to low usage or low population density. Many of these sites were invested in either as strategic investments to provide competitive differentiation or as part of a partially Government funded program.

Without the competitive advantage obtained through Telstra's ability to make coverage claims from these investments, the business case for these investments simply falls away. Not only could this mean that the continued expansion of the 4G network to 99% may need to be reviewed, but it will also mean that entire rural communities will simply miss out on services or experience a degradation in coverage which is essential to the broader economic prosperity of those communities and regions.”

Customers will be worse off if roaming is declared because:

- There will be less investment in regional and rural areas, resulting in less coverage, and lower quality network infrastructure and services: even using conservative assumptions, [REDACTED] (section 3.1);
- Customers will face higher prices, including because customers in regional and rural areas may lose the benefit of nationally averaged prices (section 3.2);
- There will be less dynamic competition and as a result there will be less of the service differentiation and innovation that customers currently enjoy, particularly in regional and rural areas as investment in future technologies focuses on more densely populated areas (section 3.3);
- There will be higher network congestion and slower speeds for all customers in regional and rural areas with up to 37 per cent of 3G Telstra-only sites suffering the effect of congestion under roaming (section 3.4); and
- There will be a lower service quality for customers using roaming, including call drop-outs, reduced battery life, 'ping-ponging' between networks and certain network features being unavailable (section 3.4.2).

The effectiveness of co-investment programs such as the Mobile Black Spot Programme, will also be undermined because they depend on MNOs competing against each other for the partial funding available as part of their efforts to secure a coverage advantage over each other.

There are no easy ways to resolve the adverse impacts on customers – either by limiting the scope of the declaration to 3G, confining declared roaming to areas where there is only one or two MNOs (section 3.6) or through the setting of the regulated price (section 3.7) – because declaring roaming in any form neutralises



coverage differentiation, which underpins the incentive to invest in expanding, enhancing and upgrading mobile networks in regional and rural Australia.

3.1. Declaration of roaming will reduce investment in regional and rural areas

Declaring wholesale roaming will neutralise the competitive advantage of coverage (section 3.1.1) and undermine the business case for investing in uneconomic sites in regional and rural Australia (section 3.1.2). This will result in lower quality network coverage in regional and rural areas, to the detriment of all customers (section 3.1.4).

3.1.1. Declaration of roaming will neutralise competition based on coverage

Declaration of roaming:

- Will neutralise any competitive coverage advantage which an MNO has over its competitors by equalising coverage;
- Will enable an access seeker to resell the deeper and broader coverage of other MNOs' networks, without having invested the time, money and effort in building its own competitive network; and
- Could even result in MNOs with less extensive infrastructure having the 'best' coverage of all because the smaller MNO (freed of the capital demands of breadth of coverage) would be able to combine the coverage of its own network (deepened with its redirected capital) and the 'best' parts of larger MNOs' networks beyond its own network footprint.

In his statement, Mike Wright explains: "... where roaming provides our competitors with the same coverage footprint as Telstra, Telstra will be unable to market itself on the superior coverage basis which has to date incentivised so much of its investment decision making".¹⁹²

Figure 23 shows examples of marketing claims that Telstra may need to reconsider if roaming is declared and coverage is equalised.

Figure 23: Examples of Telstra's marketing claims that rely on its coverage advantage





3.1.2. Declaration will undermine Telstra's business case for infrastructure investment in regional and rural Australia

As outlined in section 2.3.2, investment in mobile network infrastructure in regional and rural Australia is often uneconomic on a standalone basis and is only commercially justified by the ability to derive a competitive advantage from that investment: for example, Ovum found that, even using conservative assumptions, [REDACTED]

Declaration will neutralise any competitive coverage advantage and MNOs will no longer be able to earn indirect 'coverage advantage' revenues through investment in regional and rural areas. If MNOs are not able to compete on coverage because mobile roaming is declared, decisions about investing in extending and deepening coverage and upgrading to future technologies would need to be based on whether direct retail and wholesale (including roaming) revenues would recover the cost on a standalone basis. As Professor Yarrow comments:¹⁹⁴

"The effect on competition in the coverage dimension is straightforwardly restrictive. If coverage has value to a sub-set of [high density] end users, increasing coverage relative to rivals, whether by increasing an advantage or decreasing a disadvantage, has financial payoffs to an MNO in the form of increased revenues from high-density customers, either by allowing a higher price to be sustained or by increasing sales volumes or both. If coverage differentials among MNOs are eliminated, this incentive structure is undermined: all MNOs will likely have similar levels of coverage, none of them can get ahead of the rest and, if it does, the payoffs from so doing will be reduced. Just as a regulatory requirement that prices be the same for all firms would eliminate price competition, so legislating in a way that can be expected to tend toward equalisation of coverage would chill competition in coverage.

The same is true in [low density] areas. If coverage is equalised across the footprint [of] the first business to serve a particular area, there is little incentive for other MNOs to compete with one another to close the gap with the first-mover by means of their own new investment."

In his statement, Mike Wright also states:¹⁹⁵

"Under roaming, Telstra will have no incentive to expand 4G beyond its competitors' footprints, and similarly, Optus and Vodafone, assuming they act in an economically rational way, would be unlikely to invest in building new sites where they can service their customers via roaming.

I firmly believe that the inability to differentiate itself on this basis would impact Telstra's ability to commercially justify a range of future planned and potential investments in regional and rural Australia, and would also provide disincentives to Optus and Vodafone to continue to invest substantially in infrastructure in these areas. In my view, it would effectively "freeze" any further investments in coverage."

Telstra expects that the removal of its coverage advantage will likely result in a loss of revenue due to lost market share, not only in the areas where roaming is made available, but much more significantly, across metropolitan and regional areas given the importance many of its customers place on Telstra's coverage superiority outside the areas in which they live and work. [REDACTED]

In Telstra's own business cases for investment in regional and rural Australia (i.e. pre-dating this inquiry), it has estimated that the potential revenue loss at stake if perceptions about Telstra's coverage superiority



change could amount to [REDACTED]

This loss of revenue has important implications for Telstra's business case for investing in regional and rural Australia. In section 11.1 of his statement, Mike Wright sets out the details of Telstra's current capital expenditure investment program of a further \$350 million over the next five years for regional and rural Australia, which covers those areas that are the most uneconomic to invest in.

The consequences for regional and rural areas of declaration of roaming ending the coverage race are significant. Telstra's coverage advantage not only funds coverage breadth but also continuing investment in coverage depth to address capacity requirements to meet rapidly growing consumer demand for data services. As mobile roaming removes the coverage advantage, capacity upgrades at certain sites may no longer be economic. It is also possible that as previously uneconomic sites steadily depreciate and their operating costs outweigh any generated revenue, de-commissioning of towers may result in an actual reduction of the coverage footprint across Australia.¹⁹⁷

There is no plausible scenario in which Telstra, as a rational operator, would continue building in uneconomic areas if Telstra is unable to compete on its superior coverage because roaming is declared. As discussed in section 3.7, the access price for roaming will not sustain a business case for Telstra to continue building:

- It is not credible that the access price would be set at a level which can compensate Telstra for the following two reasons:
 - Given high costs of deploying infrastructure in regional and rural areas and low traffic volumes, the access price based on direct costs alone would have to be very high – Telstra estimates at least seven times retail revenues for regional sites.
 - This high price would still not substitute for the lost revenue from out of area customers (e.g. in metropolitan areas) who are currently prepared to pay Telstra for better coverage. Recognising this lost revenue would require the ACCC to adopt an Efficient Component Pricing Rule (**ECPR**), which the ACCC has rejected as inconsistent with the legislative criteria.
- Even if it was possible to find a price, the dynamic of the coverage race in driving coverage and innovation would be lost.

It is also not credible to believe that Telstra, in order to avoid brand damage, would continue to pour hundreds of millions of dollars of investment into mobile infrastructure in regional and rural areas for which it does not earn a reasonable return for shareholders. Brand is important, but it is not important enough to substitute for a competitive dynamic where, in return for the investment, Telstra is able to earn more revenue. Further, by continuing to invest in maintaining or expanding coverage in uneconomic areas to protect the Telstra brand, Telstra also would benefit access seekers, which further reinforces why a 'keep building regardless of roaming' is an improbable scenario. The coverage race will have come to an untimely, and unfortunate, end.

Vodafone UK, when it was facing the prospect of being an access provider for roaming in its network, thought the same way, and it is worth repeating their comment:

"[N]ational roaming would also harm the business case for further investment in rural coverage: why should any operator invest in providing better coverage for the benefit of a competitor?"¹⁹⁸

3.1.3. Declaration will mean access seekers will stop investing in competitive infrastructure in regional and rural Australia

Competitive coverage will, under current regulatory settings, continue to expand in regional and rural areas as both Optus and Vodafone continue to attempt to erode customer perceptions of Telstra's superior network coverage. Optus has announced that it will be extending its 4G network to 98.5 per cent of the population,



and Telstra has announced an expansion of its 4G network to 99 per cent (assuming retention of current regulatory settings).

The ability to attract out of area customers who are willing to pay for better coverage is as important to the business case of subsequent MNOs entering an area as it is for the first-in MNO. Another MNO does not have to equal or exceed Telstra's coverage before it can compete for customers who value coverage and derive a revenue benefit from the additional investment in coverage. As the customer survey data in section 2.1 shows, the importance customers give coverage is relative to other factors including price, and weighting of those factors will differ between customers. Amongst the customers who give importance to coverage in their purchasing decisions, there will be customers who are prepared to a higher price than they currently pay, but not quite as high as they would pay for Telstra's offerings, for coverage which is better than in currently offered but not quite as extensive as Telstra's. This creates the incentive and the reward for the other MNOs to incrementally close the coverage gap with Telstra – and for Telstra to continue pushing coverage into regional and rural areas to maintain its coverage superiority.

Ovum's analysis demonstrates the relevance of indirect revenues to the business case for a subsequent MNO to enter Telstra-only areas. Ovum concluded that it would be economically viable for Optus on a standalone basis, for example, to deploy network in [REDACTED]

However, if roaming is declared, access seekers will invest less in regional and rural areas. Currently, MNOs invest in the race for coverage because their next best alternative is to be left behind. With declared roaming their next best alternative will be buying access. Potential access seekers will prefer roaming to investing, because while they will need to pay wholesale prices for regulated access, roaming has substantially lower costs and risk for access seekers due to the lower upfront capital required.

Use of declared roaming will not be a step on the way to an access seeker deploying its own network in an area to replace reliance on roaming. MNOs currently derive investment returns from both broader coverage and deeper coverage which provides higher quality services to their customers. If roaming is declared, MNOs' returns from investing are no longer derived from incremental coverage, which they obtain from roaming, but solely from incremental improvements in service quality. This alone is insufficient to encourage them to invest in infrastructure in regional and rural areas where they can otherwise obtain roaming: the quality of service available on roaming, while potentially less than the MNO could provide if it built its own network, is likely to be 'good enough' for most of their customers who will occasionally visit these areas.

3.1.4. Customers will be worse off as a result of declared roaming

Customers will be worse off if mobile roaming is declared because there will be less competing mobile infrastructure and less coverage overall in regional and rural areas than would be achieved if the coverage race is allowed to continue. Those impacted will include: (a) the small number of customers in rural areas with no or limited coverage, (b) the small number of customers in regional and rural areas with only one choice of provider, (c) the larger number of customers in existing mobile coverage areas across regional and rural Australia which will need ongoing capacity expansions and upgrading to future technologies, and (d) the substantial number of customers in metropolitan areas that value higher quality coverage in regional and rural areas.

The significant investment that still needs to be made in regional and rural Australia which will be lost if roaming is declared includes:

- Expanded coverage of competing networks.



- Ongoing investments in backhaul and spectrum to service increasing usage by customers in regional areas to maintain a positive user experience.
- Further investment to enable customers in regional and rural areas to experience the full benefits of 4G technology, such as Voice over LTE (**VoLTE**), LTE-B and IoT.
- The rollout of future generations of mobile technology (e.g. 5G and beyond) to regional and rural Australia.
- Continued participation by MNOs in co-funding programs, such as the Mobile Black Spot Programme, that can achieve coverage in very high cost areas that would not otherwise occur.
- Potential future expansions in coverage beyond the MNOs' announced investment plans. For example, Telstra does not consider its current network footprint to be the outer limit of coverage that is possible under the current regulatory settings. If mobile roaming is not declared, Telstra will continue to review potential strategic investment to improve black spot coverage and expand its coverage footprint.

Customers in regional and rural Australia will be hardest hit by the disruption which declared roaming causes to the incentives for infrastructure investment because they are typically more dependent on mobile services than metropolitan customers (section 1.4). As the Regional Telecommunications Independent Review Committee (**RTIRC**) report identified, the benefits of improved mobile coverage “...might include economic returns associated with state priorities for regional development, or the deployment of mobiles in Indigenous communities to make Commonwealth and state outlays on existing programs, such as health, more immediate and relevant, or coverage of major roads and highways carrying significant traffic volumes.”¹⁹⁹

Examples of the wider benefits which customers in regional and rural areas could lose as a result of the detrimental impact of declared roaming on investment include:

- Productivity improvements that can be derived from new and emerging agricultural technology such as remote control and automation of farming equipment, monitoring and remote sensing, and other data sources. The Standing Committee for Agriculture acknowledged that “...the adoption and integration of these and other technologies has the potential to increase productivity (through better management of inputs and yields), improve environmental outcomes, and enable farmers and consultants to manage risk and make better management decisions.”²⁰⁰
- Social benefits from enhanced mobile connectivity supporting applications to improve health, education and other social programmes (such as those targeting Indigenous communities).

3.2. Customers will face higher prices if roaming is declared

While there is great uncertainty as to how the ACCC could determine a regulated roaming price (section 3.7), there is less uncertainty over the fact that declared roaming is likely to alter the quality-adjusted prices offered to customers, through increased prices and / or decreased quality.

There are a range of likely scenarios for access seekers that could alter the quality-adjusted prices they offer their customers if roaming is declared. For example:

- Access seekers that have a lower cost base, because of strategic choices to target customers that don't value network coverage or quality, may have to increase their prices to recover the costs of roaming (Figure 15 illustrates that twice as many Vodafone customers give price as the reason for choosing Vodafone over coverage).
- Access seekers could seek to 'de-average' their prices, for example by charging additional fees for 'roaming packs' or higher prices for data and calls made when roaming on another MNO's network.



- Access seekers may cease to compete as aggressively on price as they will be able to rely on the same coverage claim as Telstra through roaming.
- Access seekers could have reduced incentives to offer data inclusions and value-added services to customers in regional areas, given the higher cost of operating there.

Access providers would have to respond to any of the above changes in the market place, which could mean a move away from nationally averaged prices on their networks.

The risk of adverse consequences is particularly high for regional and rural customers. As Professor Yarrow comments.²⁰¹

“Equalisation of coverage among MNOs reduces the ‘out-of-area’ competitive pressures, by eliminating the payoffs in [high-density] areas from increased coverage in [low-density] areas. The expectation is that prices in [low-density] areas will rise, to the detriment of the LTIE of customers located in those areas.

...

In my view, therefore, it is to be expected that declaration would induce some tendency toward ‘economic separation’ between [high-density] areas and [low-density] areas, which will be adverse to the LTIE of [lower-density] end users.”

Professor Yarrow explains that price effects will become entangled with quality effects. The dulled incentives for coverage investments may not necessarily be reflected in higher prices for service contracts, but rather in the reduced quality of service that will be offered up at a given price, were roaming to be declared. This would impact all customers who value quality coverage.

3.3. There will be less dynamic competition if roaming is declared

If roaming is declared, the actual and potential infrastructure-based competition that exists under the current regulatory and policy settings will be replaced with a form of resale-based competition. The roaming MNO gets to share a combination of the providing MNO's core network management, spectrum, backhaul, radio network and facilities. The roaming MNO adds no value or differentiation other than its brand and other retail functions.

Declared roaming may mean customers in roaming areas have a choice of brand and retailer, but they are getting the same network quality, coverage and speed that they get now (and often worse quality service given the impact which roaming could have on network quality (section 3.4)) and the poorer customer experience inherent to roaming (section 3.4.2).

The replacement of infrastructure-based competition with resale-based competition would have a number of additional potential consequences for competition:

- In relation to retail and wholesale services – there will be fewer retail and wholesale customers who benefit from infrastructure-based competition than would have been the case if the coverage race was left to run its course.
- In spectrum markets – there will be less incentive for MNOs to compete in their acquisitions of spectrum to improve network quality in regional areas to the significant detriment to Federal Government finances. Instead, competitors will become more reliant on the spectrum choices made by the MNO that has invested. This leads to less differentiation for customers and less innovation in the use of spectrum.
- In relation to backhaul – access seekers will not make their own backhaul investment and provisioning decisions as that function is part of the roaming service. There would be less



differentiation for regional towns in terms of how much backhaul is provisioned. The MNO that does have network coverage would likely face less incentives to add backhaul capacity as demand grows, as all roaming MNOs would access and gain the benefits from those investments.

- In terms of facilities – currently MNOs strategically install new mobile facilities away from Telstra sites to gain a localised quality and coverage advantage. Roaming will reduce infrastructure-based competition, and therefore there will be fewer instances of this type of differentiation.
- Radio network and technology – if roaming is declared, competitors will no longer invest in infrastructure-based competition, and will instead rely on Telstra's choice of radio network and technology. Further, Telstra will have less incentive to upgrade these sites with newer technology meaning that customers in these areas will only be able to use less modern mobile services.

With reduced investment in competitive mobile infrastructure in regional and rural Australia, especially in respect of the as yet unknown benefits of future technologies, regional and rural Australia risks 'missing out' on the surplus and productivity benefits generated by better coverage, new technology and increased capacity of mobile services networks (section 1).

3.4. There will be customer experience and network management issues with roaming

Telstra commissioned Aetha to provide a report on the technical, operational and customer experience issues associated with domestic roaming. Aetha advised UK MNOs on domestic roaming issues in the recent UK inquiry which decided not to mandate roaming. Aetha concluded that:²⁰²

“Domestic roaming has significant limitations and adverse consequences that could potentially impact a large number of end users – not only the users of domestic roaming services, but also the existing users of Telstra’s network in regional Australia and more generally. Domestic roaming users will not experience a seamless service – their calls will continue to drop when they lose coverage from their home network, and they will not be able to access mobile data services whilst their mobile device is searching for another network (which may be frequently in some situations). They may also experience a reduction in the battery life of their device. A number of cells in Telstra’s network are likely to become congested, worsening the experience for all users, whether roaming users or existing Telstra users – increasing the chances that they will be unable to make an outgoing call, be unable to receive an incoming call, or suffer a dropped call. Mobile data speeds are also likely to fall, potentially limiting the applications that users will be able to use in future. There is also the risk that a technical problem with either Optus’s or VHA’s network will cause Telstra’s network to become significantly overloaded and consequently also fail. None of these problems are easy to solve technically, and many may be impossible.”

This section discusses the congestion issues which all customers can face in an area in which roaming is declared (section 3.4.1) and the poor customer experience inherent in roaming (section 3.4.2).

3.4.1. Roaming will result in congestion for all customers

The ACCC suggests in the Discussion Paper that, given the low population densities and therefore low traffic volumes in areas where roaming could be declared, the access provider's network is likely to have enough existing capacity to be able to absorb roaming traffic without significantly impacting service quality for the access provider's customers. For the reasons discussed in this section, this is not likely to be the case for Telstra's mobile network in regional and rural Australia.

As Telstra needs to prudently manage its capital and network resources, it does not dimension cell sites upfront with a significant amount of spare capacity (or 'headroom'). Future capacity planning is based on forecast traffic growth, with the investment required to address any expected network congestion set to occur on a just-in-time basis (that is, before the point at which it will impact on network performance and the customer experience).

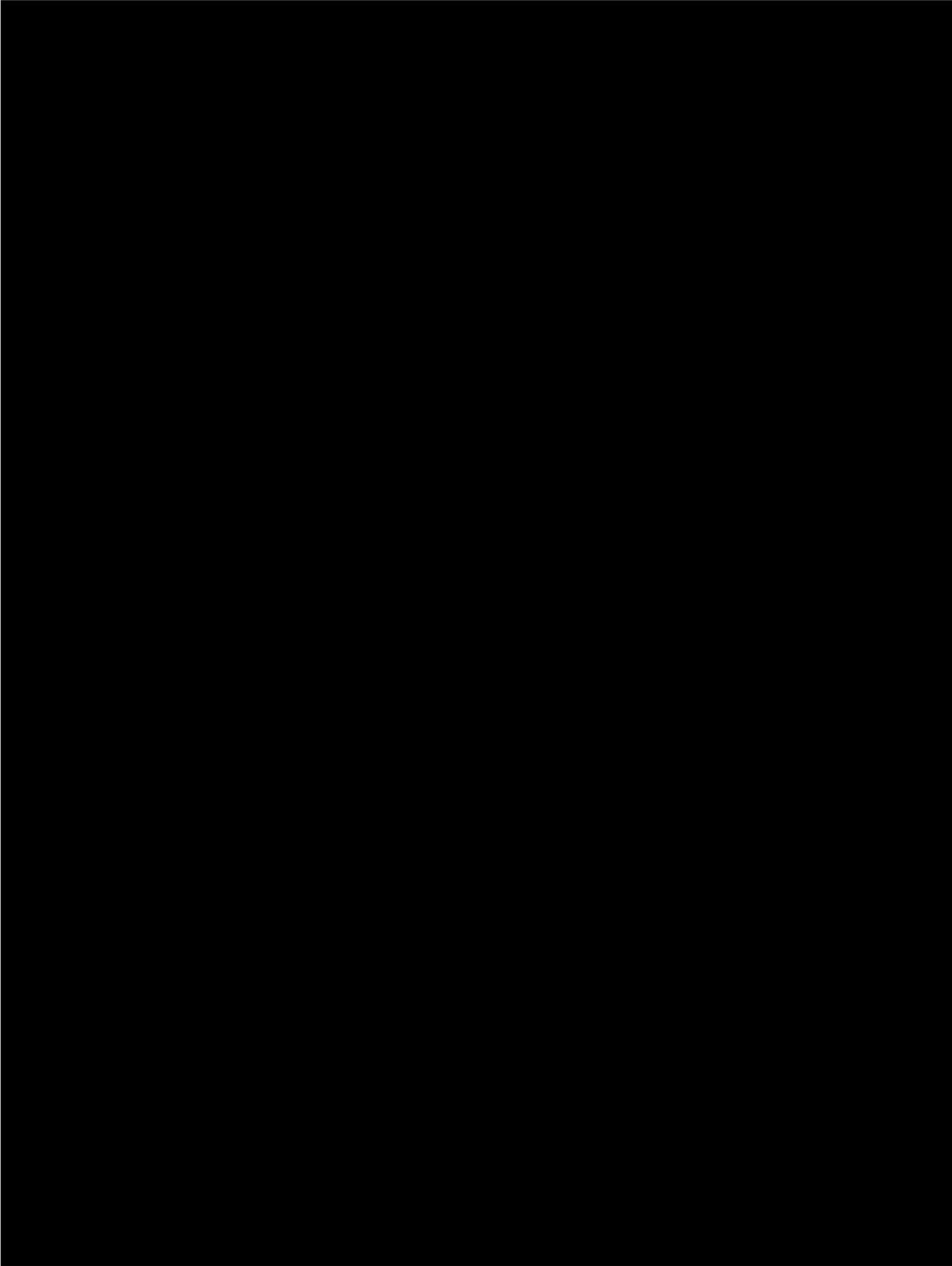


The direct impact of mobile roaming on the capacity of Telstra's mobile network comes from two sources – the increase in traffic from in-bound roaming customers²⁰³ and the increase in signalling required to handle location updates for those customers.²⁰⁴ The amount of traffic generated by customers which the access seeker wins from Telstra in a roaming area will be driven by the access seeker's own retail strategies. For example, if the access seeker is more 'liberal' on data inclusions than Telstra or decides to offer certain services such as music or video streaming on a zero-rated basis (i.e. as part of the mobile subscription) for which Telstra charges its retail customers, those customers' data usage may be substantially above the levels of usage if they had remained Telstra customers.

However, even if declared roaming does not result in additional traffic, Telstra still will not have the incentive to make the investment required to upgrade cell sites which are uneconomic on a standalone basis at their currently scheduled capacity upgrade dates.

Aetha undertook an analysis of the impact of roaming on cell sites where Telstra is currently the only MNO. Aetha has essentially considered two things:

- Whether the cells would become congested. Aetha considers a cell to be congested when a cell's 'headroom' is zero per cent (or negative). Headroom is a measure of the amount of capacity that remains in a cell before one of Telstra's Key Performance Indicators is breached.
- Whether there would be any impact on the download speeds experienced by end users (known as 'throughput').





[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

The ACCC notes in the Discussion Paper that the access provider would be entitled under the Standard Access Obligations to prioritise the requirements of its own retail customers. However, Telstra does not currently have the technical capability to prioritise traffic in this way, and implementing that solution would be costly (see the discussion in section 8.3 of Mike Wright's Statement).

3.4.2. Customers using roaming will have lower mobile service quality

Roaming is likely to result in a degradation of the customer user experience and complicate the management and operation of the Telstra network for the following reasons:²⁰⁹

- In-call handover challenges: if the customer is on a call while moving across the boundary between the access seeker's network and the roaming area, the customer will have to redial once their device has found and connected to an available network (which may take anywhere between a few seconds and a few minutes).²¹⁰
- No managed handover of customer devices between networks: if a user's device loses coverage from the network that it was connected to (either the access seeker's network or the access provider's network), there will be a delay (i.e. service outage) of between a few seconds and a few minutes as the device looks for the other network.²¹¹
- Reduced battery life of user devices: the battery use required to search for a new network and send a location update is relatively high. It is common for access seeker's to require roaming devices to make frequent attempts to reconnect to their home network.²¹²
- Extended 'camping on': there is a tendency for a roaming handset to remain on the access provider's network even when it is back in the coverage area of the access seeker. This not only raises customer service and billing issues, but would further add to congestion in overlapping areas which are not designated for the purposes of roaming.²¹³



- 'Ping-ponging' of devices between networks: in areas of overlapping coverage, customer devices are likely to frequently lose coverage from their home network, roam onto another network, but then reconnect with their home network a few minutes later. This will further reduce the battery life of the device and lead to frequent periods when the customer is unable to make use of their device. It will also create a lot of signalling traffic on the visited network.²¹⁴
- Unavailability of network features: customers will be unable to access all network features that may be available due to the sheer complexity and technological challenges of providing them whilst roaming. For example, Telstra currently does not provide products such as VoLTE, ViLTE and QoS to international roaming partners or as part of its wholesale MVNO service.²¹⁵
- Customer care: ancillary to the issue of customer service is the management of network usage and self-care notifications. Telstra supplies billing information to its customers based on their customer profile and usage. However, customers roaming onto its network would not have the benefit of this support or customer profiling.²¹⁶
- Risk of cascading network failure: if an MNO suffers an outage in an area, its customers' devices will almost immediately try to roam onto any available network. If declared roaming on another network is available, they will try to roam onto that network and it may also fail due to the increase in traffic, either in the same area or more widely.²¹⁷

The technical difficulties in drawing roaming area boundaries in a way that avoids overlapping coverage are discussed in section 3.6.2.

In relation to the costs of trying to resolve these issues, Mike Wright considers that *"the scale of analysis that would be required to look at these costs would be an extremely significant and laborious task"*.²¹⁸ Telstra is not aware of any solutions to these problems overseas. As the areas in which a declared roaming service will be used are already uneconomic on a standalone basis, Telstra would have little economic incentive to make further investment in those areas to address these concerns.

These technical and customer experience problems will arise with roaming whether commercially negotiated or declared. Where roaming is a commercial option, it will be for the access seeker and access provider to negotiate whether customer experience trade-offs are worth the extra coverage on offer from the access provider. However, in weighing the benefits and detriments of declaring roaming, it is important that the ACCC assess any perceived 'value' of declared roaming against the poor customer experience which will be provided by a roaming service and the inevitable increase in customer complaints.

3.5. Declaration will undermine Government policy objectives

The benefits of infrastructure-based competition and the desire to promote such competition is a key objective of Government policy, for example spectrum auctions and co-investment initiatives like the Mobile Black Spot Programme.

Because declared roaming would adversely impact infrastructure-based competition, there would be less future investment by MNOs and therefore less competition for auctioned spectrum. If MNOs are not building and expanding their networks, they do not need to expand their spectrum holdings. This reduced demand for spectrum would have implications for the Federal Government's policy objective of maximising the value from spectrum auctions for the benefit of taxpayers.

The objective of the Mobile Black Spot Programme is to improve and extend coverage of high quality mobile voice and wireless broadband services in regional and rural Australia and maximise the choice of mobile service providers for customers.²¹⁹ In particular, the Mobile Black Spot Programme aims to *"stimulate competition in mobile services in regional and remote Australia."*²²⁰

Co-investment schemes like the Mobile Black Spot Programme can extend the coverage race further into higher cost regional and rural areas. As the Government stated in its response to the Regional Telecommunications Review 2015, *“the full impacts of [the funding of the Mobile Black Spot Programme] in regional areas is only just beginning to be realised, and the process of transformation will continue to gather momentum over the next few years.”*²²¹ However, investments in future rounds of the Programme or other similar co-investment options would be threatened under declared roaming, as the incentives for MNO participation would be so much lower without the coverage race.

3.6. A limited declaration will not solve these issues

The ACCC recognises that declaring a wholesale roaming service has the potential to dampen the incentives of MNOs to invest in efficient mobile infrastructure and seeks input on whether the following limitations could address this issue:

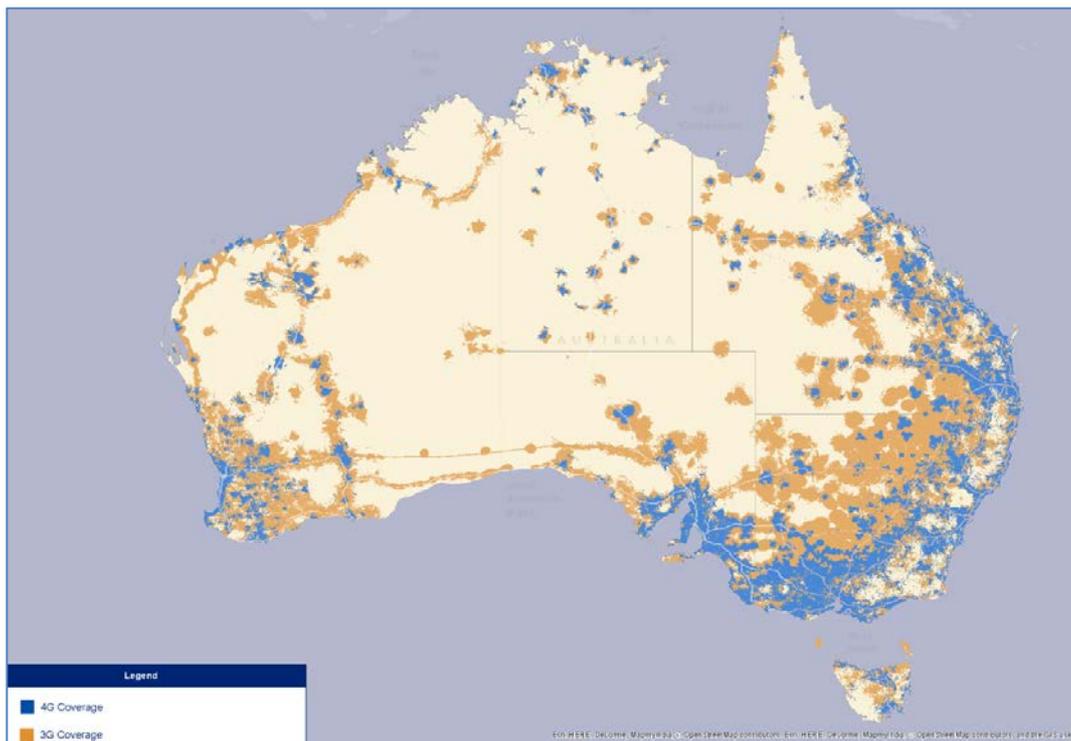
- Restricting the declaration to certain technologies such as 3G services; and
- Limiting the geographic scope of the declared service, for example, to areas where there is only one or two MNOs providing coverage or to areas with low population density.

A limited declaration in any form will not solve the issues outlined in this section in terms of reducing incentives to invest and reducing competitive dynamics in the retail and wholesale markets as a limited declaration would still eliminate competition on the basis of coverage.

3.6.1. Declaring a 3G roaming service will remove any coverage advantage

While Telstra is making substantial investments in rolling out its 4G network to regional and rural Australia, Telstra's coverage differentiation currently relies on the expansive geographic areas where Telstra only has 3G coverage. As depicted in Figure 27, Telstra's 3G network covers more than 2.4 million square kilometres. By contrast, Telstra's 4G network covers an area of more than 900,000 square kilometres.

Figure 27: Telstra's coverage map





The fact that Telstra's coverage advantage relies on its 3G network is reflected in the fact that Telstra markets its overall network. Telstra uses messaging along the lines that "the Telstra Mobile Network is Australia's fastest and largest mobile network".²²²

Therefore, limiting the scope of declared roaming to 3G-only roaming would not solve the dampening effects of declaration on investment incentives and competitive dynamics.

Limiting declaration to 3G-only roaming also will not preserve or promote investment incentives in 4G because there is little scope for deriving a competitive advantage through differentiation on the basis of different generations of technology for the following reasons:

- The value which customers place on coverage is very much from the perspective of having functional and working mobile voice and data services. Customers do not distinguish between network technologies used to deliver the service – that is, they don't choose a mobile provider on the basis of the availability of 3G or 4G specifically.



- While there are speed and user experience differences between 3G and 4G, most services and applications on 4G are useable on 3G. Further, the performance gap between 3G and 4G is variable depending on local conditions, number of simultaneous users in the cell and network design and performance. This means that even if there is a sustained performance of 4G over 3G, many customers, particularly those metropolitan customers who are willing to pay for coverage in regional and rural Australia that they will not necessarily use on a day-to-day basis, are likely to consider 3G 'good enough'.

The fact that network technology is not a key differentiating factor in customers' minds reflects how 3G and 4G technologies are used at the network level. The high level of interoperability of 3G and 4G technologies means that MNOs currently use 3G and 4G networks as complements within a cell site to provide a mobile service to customers. A customer on Telstra's network will often experience automatic and seamless switching between the 3G and 4G networks. Telstra customers making voice calls in areas with 4G also are switched to the 3G network. Voice calls have only been enabled on 4G since September 2015 with the introduction of VoLTE and are only available to enabled customers on selected 'new' handset types.

Limiting declaration to 3G-only roaming on the assumption that 3G is a 'sunk investment' oversimplifies the way in which mobile technology is deployed and will undermine future investment for the following two reasons.

First, as mobile networks involve ongoing investments, investment in a single technology is never complete (until that technology is decommissioned). Ongoing backhaul, spectrum and facilities investments are required to maintain good experiences for customers using the 3G network wherever they might be. Sometimes these investments are undertaken under the 'banner' of a 4G upgrade, but they nonetheless improve the performance of the 3G network. Telstra will typically undertake upgrade work at the cell site which has benefits both for the new 4G service and the existing 3G service, particularly upgrading backhaul which supports higher speeds on both 3G and 4G. As 'all boats rise with the tide' in a site upgrade, access seekers' customers who roam on the Telstra 3G network under declared roaming would experience the benefit of the improved 3G service, making it that much harder to convince customers that they should pay more for the higher quality of the Telstra 4G service.

Second, investments in the next mobile technology do not occur in a mutually exclusive way. In other words, it is not the case in the mobile industry that customers are shifted from one generation of technology once a new generation has been rolled out. Rather, Telstra, as with the other MNOs, typically pursues investments in



multiple generations of network technology at the same time with each generation reaching its natural end-of-life several years after the next generation of technology has been launched. For example, in 2006, Telstra launched its NextG 3G network and upgraded its 2G network to 2G Edge. Similarly, even once Telstra first launched 4G in September 2011, it continued upgrading its 3G network.

Applying regulation to one generation of technology not only affects ongoing investment, it sends a signal to investors about how the regulator may act in relation to future 'waves' of technology. If the advantage of heavily investing in 3G coverage was lost as a result of declaration, MNOs will be concerned that following the same business strategy with the next 'wave' of mobile technology will result in the same regulatory intervention. In this sense, it is difficult to see how proponents of regulated roaming would 'give up on' roaming regulation as 3G networks are progressively closed down. What is more likely is that they would lobby for 4G roaming. If the ACCC is willing to declare 3G roaming today, MNOs investing in 4G or 5G technology will expect that the ACCC will declare roaming for those technologies in the future, thereby reducing incentives to invest in and upgrade their networks.

3.6.2. Limiting the declared service geographically

The ACCC is also considering whether declaration of a mobile roaming service would be necessary in areas where there are multiple existing network operators or if it should only apply to areas where:

- There is limited choice of mobile service providers, and
- Where infrastructure-based competition has not emerged, and is unlikely to emerge.

The ACCC suggests there are a number of ways to define the geographic scope of a declared service – including, for example, limiting roaming to regions where only one or two MNOs provide coverage, or to areas with low population density.

The congestion and lower mobile service quality issues described above (sections 3.4.1 and 3.4.2 respectively) would not be substantially avoided by confining the geographic area of declaration. Aetha observed that:

*"Whilst limiting the geographic availability of domestic roaming has the potential to mitigate some of these problem, it is by no means a panacea. Moreover in practice it is unlikely to be possible to limit domestic roaming solely to those areas where each access seeker does not have coverage. In practice therefore we expect geographically-limited domestic roaming to suffer all of the same limitations and adverse consequences."*²²³

This is so for two reasons.

First, some of the problems are inherent to roaming whether it is required on a national or sub-national basis. Those problems include congestion and throughput issues, in call handover issues, managed device handover issues, and battery reduction.

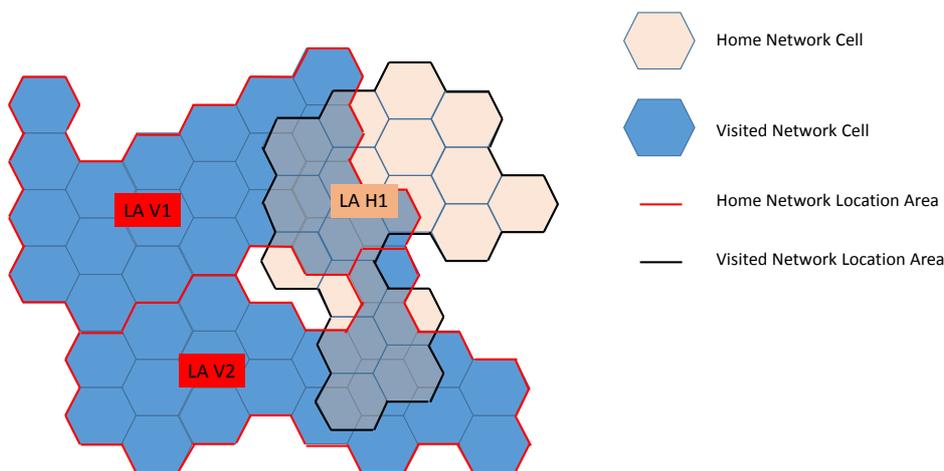
Second, the customer experience and technical problems which are attributable to overlapping coverage cannot be avoided because of the practical difficulties in defining any geographic area in which roaming is available. It will be necessary to minimise overlapping coverage between the access provider's network and the access seeker's network because many of the technical problems of roaming arise or are worsened by overlapping coverage (section 3.3). However, the boundaries of individual mobile networks are not perfectly aligned with each other, and inevitably there will be significant overlap between the access seeker and access provider networks with overlapping cell areas ringing the roaming area.

The problems of drawing the roaming boundary are compounded by how Telstra would need to manage the availability of roaming on a geographic basis within its network. For network management purposes, cell sites are grouped together: in the case of 3G to form LAs (**Location Areas**), which contain around 100 cell sites;

and in the case of 4G, to form TAs (**Tracking Areas**), which contain around 10 cell sites. For continuous, or sub-national, roaming to be 'switched on', it would need to be done at the LA / TA level.

This would mean that Telstra could not make granular adjustments to the roaming boundary to match the individual cell sites of the access seeker in the areas neighbouring the roaming area. For further information on this issue, please see section 6 of the Aetha Report.

Figure 28: Issue of overlapping coverage



Source: Aetha. This figure shows one Location Area in the Home Public Land Mobile Network (HPLMN – the mobile network operator that the customer has a contractual relationship with) and two Location Areas in the Visited Public Land Mobile Network (VPLMN, the network provider when the customer is roaming). Deciding which of Telstra's Location Areas a customer of another mobile provider can roam into is not straight forward and overlap is likely.

The challenges in avoiding overlapping coverage between the access provider and the access seeker networks have consequences for the forms of geographic roaming which the ACCC raises in the Discussion Paper.

First, the ACCC distinguishes between continuous roaming – where the access seeker uses roaming to fill gaps in its network coverage (e.g. along a highway) – and contiguous roaming – where the access seeker uses roaming in a large area in which it has no network of its own. The need to activate roaming at the LA or TA level means that declaring continuous roaming is not likely to be technically feasible.

Second, there is a suggestion in the Discussion Paper that roaming might provide an incentive for an access seeker to continue to build in regional and rural Australia because it could build an 'island of coverage' in a rural town and rely on roaming to provide out of town coverage without which the in-town coverage would be of limited value to customers.

However, islands of access seeker coverage increase the level of overlapping coverage and it is unlikely that the access provider would be able to 'turn off' roaming in the town without switching it off in much of the rural surrounds. As Mike Wright explains this in statement:²²⁴

"... under mandated roaming, I consider that the technical issues likely to arise would be most pronounced in areas where there is a substantial overlap in operator coverage, particularly where other carriers have "islands of coverage" over town centres but require roaming in the areas between these "islands" resulting in numerous, fragmented and moveable roaming boundary areas. In my view, the precise type and extent of these technical complications will also largely depend on the type of roaming service declared."



As such, there is actually likely to be a disincentive to an access seeker continuing to build 'islands of coverage' in areas where it accesses declared roaming, which, as well as the economic disincentives discussed above, may result in the access seeker's rollout stopping where it currently is.

As discussed in section 3.1.3, Ovum's analysis shows that there would be a business case for another carrier (e.g. Optus) to enter Telstra-only areas to gain an increase in overall market share. However, the technical and customer service issues arising from overlapping coverage may be a disincentive, on top of the economic disincentives discussed in section 3.1.3, for an access seeker continuing its build out in roaming areas and the current access seeker footprints may freeze where they currently are.

3.7. Setting a regulated price offers no feasible solution

If roaming was regulated, access seekers would be required to pay for the wholesale roaming service. While that wholesale price would be an additional revenue source for the access provider, it would lose its coverage advantage and the following revenues if roaming is declared:

- Direct retail revenues – these losses occur if customers that generate traffic on sites where roaming is possible switch their mobile provider from the access provider to the access seeker; and
- Indirect 'coverage advantage' revenues – these losses occur because access seekers are able to make the same coverage claim as the access provider and compete away the retail revenues obtained by the access provider earned from customers in all areas willing to pay for broader coverage.

If the roaming price is set too low, the access seeker will be able to offer and market to customers the same coverage as the access provider, without incurring the same level of cost, effort and risk that the access provider has. If the roaming charge does not compensate the access provider for the loss of the direct retail revenues and indirect 'coverage advantage' revenues, then it will reduce the MNO's capacity and incentives to invest in regional and rural areas.

Setting price on the basis of unit cost is one approach that would typically be considered for regulated services. However, for the wholesale price to be anywhere near the unit cost of access, it would need to be extremely high for regional and rural sites due to the low traffic volumes and probably still insufficient to result in the overall recovery of cost – on Telstra's estimates the average wholesale price would be seven times average retail revenues for regional sites.²²⁵ This is because the higher wholesale price would need to substitute for the lost retail revenue from metropolitan customers and the loss of such customers that arise from the roaming MNO being able to eliminate the coverage advantage. However, that still does not compensate the access provider for all the loss of indirect 'coverage advantage' revenues, particularly from metropolitan customers who have a high willingness to pay for coverage and who could switch to a competitor who is able to offer broad coverage through declared roaming.

What makes this more complex is that the ACCC is required to have regard to direct costs when setting prices under the legislative criteria (the **Direct Cost Criteria**). This requirement has in the past been interpreted by the ACCC to mean that they cannot take into account the effects of the loss of retail revenues or market share – the indirect 'coverage advantage' revenues.

The ECPR has been proposed as a pricing methodology that in theory could compensate the access provider for the costs of investing in sites that are uneconomic on a standalone basis. In simple settings, ECPR is calculated by subtracting retailing costs from retail revenues to determine a wholesale price. However, the ECPR price in this case would need to be extremely complex. It would need to consider average revenues not just at the site but from customers who value the existence of that site even though they might not use it or do so rarely and are willing to, and do, pay a coverage premium. This implementation of ECPR would be very difficult to measure and, in a practical sense, would require the host MNO to impose a wholesale charge on each of the roaming MNO's customers whether or not they actually roam. A greater complication of this



pricing approach is that the ACCC has previously expressly ruled it as inconsistent with the Direct Cost Criteria that it must have regard to when determining price terms in Access Determinations.

Where regulators in other countries regulate roaming and determine prices they typically set a per call, minute or data charge. For example, in Europe the inter-EU-member roaming tariff is €0.0085 per MB.²²⁶ In Canada, the domestic roaming charge was legislated to be equal to the average retail revenue for calls, minutes and data. If the ACCC were to adopt a similar wholesale price payable only for traffic generated while a customer roams in a regional or rural area, this basis would not be nearly enough to retain MNOs' incentives to invest in regional and rural areas.

Even if it was possible to find a price, the competitive race for coverage would be over. A regulated rate of return model would not provide anything like the incentives to expand coverage and improve coverage that the race for coverage currently does.



04 COMMON QUESTIONS ABOUT THE FUTURE OF AUSTRALIA'S MOBILE INDUSTRY

Concerns have been raised by some market participants and stakeholders in the lead up to, and since the ACCC commenced, its mobile roaming declaration inquiry. While Telstra believes declaring roaming is not the answer to these concerns, it is important that consideration is given to the best way of addressing them. This section 4 sets out our views on those concerns and other comments that have been made during the course of the inquiry.

4.1. Will coverage be extended beyond the existing footprint?

Telstra recognises the frustration among some customers that there are still areas with no or patchy mobile coverage in regional and rural Australia.

As discussed in section 1.1.3, it is important to recognise that the depth and breadth of coverage in regional and rural Australia is likely to continue to improve as a result of currently announced investments by the three MNOs:

- Telstra recently announced its commitment, on the basis that the current regulatory settings remain in place, to continue to invest strongly in regional and rural Australia. Telstra will continue rolling out its 4G network to 99 per cent of the population by the end of June 2017. While this rollout will be an overlay of its existing 3G network coverage, Telstra typically undertakes a substantial upgrade of each cell site when deploying 4G, including more capacity for backhaul and reconfiguration of the 3G cell to work as a complement to 4G (section 3.6.1). The result typically is to improve both the depth of coverage and the availability and reliability of the signal across the geographic area served by the cell site.
- Optus is continuing to roll out its 4G mobile network, with a target of 98.5 per cent of the population. While some of the new Optus coverage may overlap with existing Telstra coverage, in order to gain a coverage advantage Optus may well build in areas where no other MNO has built.
- Vodafone is also building in regional and rural areas, including with Mobile Black Spot Programme Round 1 co-investment, narrowing the gap in the breadth of coverage by eliminating 'black spots' as well as investing \$9 million in a further 32 regional towers.²²⁷
- A further 266 new or upgraded base stations will be funded through Round 2 of the Mobile Black Spot Programme further narrowing the gap in breadth of coverage. These base stations, awarded between Telstra, Optus and Vodafone, will in aggregate add over 17,700 square kilometres of handheld device coverage in regional and rural Australia, over 52,300 square kilometres of new external antenna coverage and over 1,900 kilometres of new mobile coverage on major transport routes.²²⁸

Given that competition in the Australian mobile market has already produced world-leading outcomes in terms of coverage, despite our large land mass and low population densities, further extending coverage will be increasingly more difficult as coverage pushes further out into less densely populated areas. Geographic coverage of 100 per cent of Australia by mobile services is unrealistic with current technology given that large areas of Australia are unpopulated and rarely visited (and for which alternative solutions such as satellite-based mobile services would be more appropriate). But the question is whether more can be done to incentivise one or more MNOs to deploy in areas with no or patchy coverage?

In Telstra's view, concerns about the extent to which the coverage gap will be closed and coverage will be further extended are best addressed by measures which leverage the current market dynamics – such as encouraging technological development and adoption, increasing co-investment or, as discussed below,



resolving concerns with facilities sharing – rather than by declaring roaming which will undermine those market dynamics.

MNOs can also take their own initiatives to promote co-investing from other sources. On 17 November 2016, Telstra's CEO announced that, if the current regulatory settings remain unchanged, Telstra would set up a \$100-200 million co-contribution fund from which Telstra would commit capital for projects jointly funded by communities and other parties to support infrastructure investment that is not viable on a standalone basis.

Telstra has made a number of jointly funded investments recently, such as a \$30 million three-year program (2015-2018) with the Northern Territory Government to expand telecommunications infrastructure and serve more remote communities with mobile and fixed broadband services. Further examples of jointly funded investments is the work that Telstra is doing with the support of the Barcoo and Diamantina Shires, the Queensland Government and the Federal Government to deliver a fibre link and new mobile base stations to Birdsville, Jundah, Stonehenge, Windorah and Bedourie as well as new fibre and mobile services to Aurukun.

This new, additional funding could be complemented by local councils, business groups, community organisations or state and federal governments to deliver new base stations in no-coverage areas and backhaul improvements that support opening a wider area to mobile coverage or improving the quality of existing coverage.

In summary, expanding coverage remains a challenge but one that the existing regulatory and policy settings help MNOs address. Regulated roaming will not add any more coverage and, indeed, risks reducing it (section 3.1).

4.2. Will more regional and rural customers have a choice of provider?

One argument put forward by proponents of declared roaming is that it would increase the number of mobile service retailers in regional and rural Australia because, even if there are no competing networks, there would be competing retail service providers on the one network.²²⁹

The number of customers that live in areas covered by only one retailer is small (0.5 per cent of the population – see Table 3 in section 1.2.1) and has been steadily decreasing under the existing market, regulatory and policy settings. More choice is on the way for regional and rural customers:

- Continuing investment will further extend choice. Optus' plan to rollout 4G to 98.5 per cent of the population is likely to result in Optus coverage in many areas which currently are served only by Telstra.
- As the Optus 4G network expands into areas of existing Telstra-only coverage, [REDACTED]
- If the Optus network is extended into Telstra-only coverage areas, the Discussion Paper suggests that the Vodafone-Optus roaming agreement may extend Vodafone roaming to the new Optus coverage area, giving customers the added choice of Vodafone as a service provider. [REDACTED]

In contrast, declared roaming will not improve choice for regional and rural customers because:

- Some customers could end up with less coverage and less choice between MNOs because roaming will undermine incentives for the other MNOs to close the gap with Telstra's superior coverage (section 3.1).



-
- Customers will suffer from less differentiation between MNOs (section 3.3). MNOs would not have an incentive to expand into areas which they could access through declared roaming. Instead of having a choice between differentiated products and services and prices between two or more MNOs on their own networks, customers in single MNO areas end up with a shallow choice between relabelled versions of what is already on offer from the first-in MNO.
 - Customers who choose another provider via declared roaming will face service quality issues, such as call drop out and 'ping-ponging' between networks (section 3.4.2).
 - All customers in single MNO areas, including those who do not choose an alternative provider, will suffer a degradation in their services because of congestion and a slowing of data speeds (section 3.4).

4.3. Does Telstra benefit from a legacy advantage in deploying mobile networks in regional and rural Australia?

Expansion of mobile networks into regional and rural Australia requires more significant investment compared to metropolitan areas. Some stakeholders have suggested that these costs disadvantage new entrants because Telstra has residual legacy advantages from prior to when Optus and Vodafone were given licences. This is not the case.

Optus and Vodafone received licences and entered the mobile services market in the early 1990s. Both Optus and Vodafone were given the right to access Telstra's existing AMPS network at regulated prices as part of the Government initiative to give the new mobile competitors a leg up while they were rolling out their 2G networks. This required right of access was to address any perceived 'monopoly inheritance' held by Telstra. Optus took up the AMPS resale right and within two years gained 34 per cent market share, but Vodafone chose not to. Telstra was also required to close down the AMPS network, so that it would be competing against Optus and Vodafone on 2G.

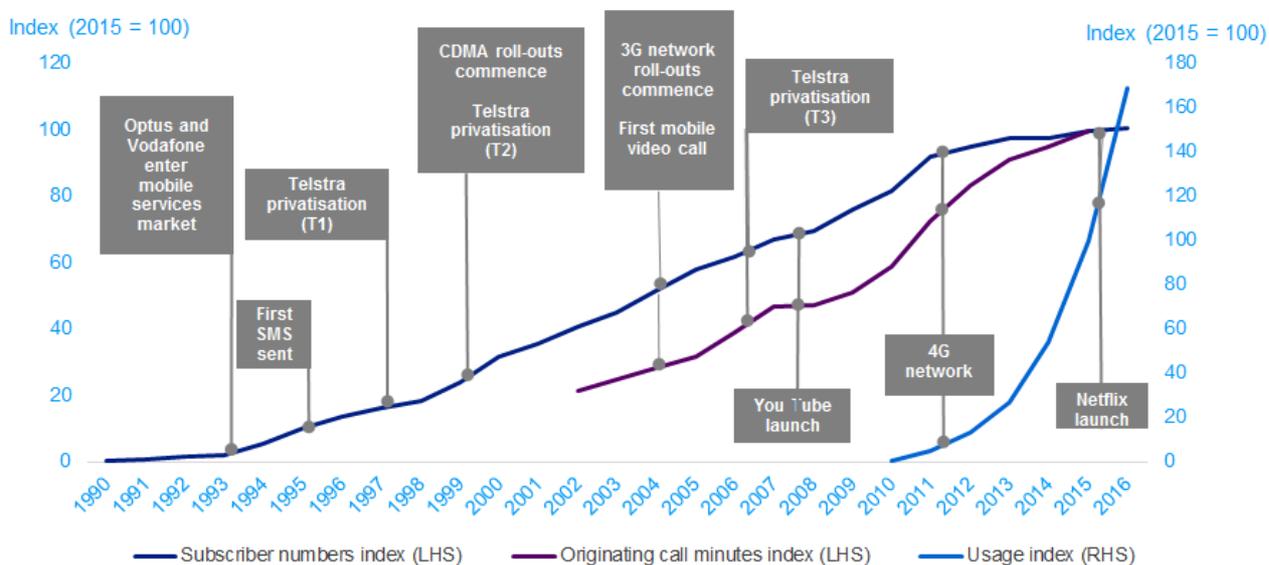
The 2G GSM network was a digital network that enabled the development of new services, including text messaging and services dependent on SIM cards. When Telstra launched its 2G GSM network on 27 April 1993 there were just 635,000 analogue mobiles in Australia, and less than four per cent of Australians had one. Due to coverage issues which made it uneconomic to extend into more remote areas, it was effectively a network covering only metropolitan and more populated regional areas. The Telstra 2G network provided coverage to 53 per cent of the population or approximately 600,000 square kilometres.

Although Telstra was the first to launch a 2G network in Australia, this was closely followed by Optus just one month later in May 1993 and Vodafone in October 1993. The network initially operated on the 900 MHz band. Mobile backhaul for 2G was provided over Telstra's 2-4Mbps copper backhaul links.

Since then, the market has grown significantly such that all MNOs have had the opportunity to invest in improving and expanding their mobile network and win customers (Figure 29). Each operator had an equal chance to grab a slice of this expanding market by investing and innovating to provide customers what they value. At times some operators have adopted the low-cost option, while others have focused on network quality and coverage.



Figure 29: Mobile market growth



As discussed in section 2.4, Telstra has no residual legacy advantage in relation to towers, spectrum or backhaul as it has had to build most of its towers, buy new spectrum and rebuild backhaul since Optus and Vodafone entered the market:

- Telstra has no legacy advantage in tower infrastructure in regional and rural areas because most of Telstra's current tower investment occurred after the entry of Vodafone and Optus. Telstra used approximately 2,000 mobile base stations in the late 1990s, after Vodafone and Optus had entered, and uses approximately 8,500 now (Figure 3). Any residual legacy advantage which Telstra could possibly have on towers in regional and rural areas has been addressed by increased opportunities for alternative tower sharing arrangements with the expansion of other MNOs' networks, the entry of competing tower providers and regulated access on Telstra's facilities.
- Telstra has no legacy advantage in spectrum and has acquired all of its current spectrum holdings through the ACMA competitive auction processes from 1998 onwards, apart from the 900 MHz spectrum which was allocated in an equal three way split between Telstra, Optus and Vodafone. In addition, Telstra has been subject to more onerous competition limits in several auctions (including the auction of the 800 MHz non-metropolitan spectrum) to benefit competitors.
- Telstra does not have a legacy advantage in backhaul in regional and rural areas as Telstra's NextG rollout in 2005 required the rebuild and replacement of Telstra's 2-4Mbps copper backhaul links used for AMPS and 2G with fibre links able to support 100Mbps to 1GBps (section 2.4.3).

4.4. Are customers disadvantaged by bundling mobile services?

It has also been suggested that Telstra's position as the only MNO in some areas of regional and rural Australia gives Telstra an advantage over its competitors for bundled services to the detriment of customers. Telstra's coverage advantage and superior network is an important point of differentiation for Telstra and is attractive to customers as evidenced by their willingness to pay for additional coverage (sections 2.1 and 2.2). However, this is to Telstra's customers' benefit not detriment. Telstra does not offer any form of bundling on its mobile services for residential customers or small businesses. That is, Telstra's residential and small business customers do not get a bundled discount for acquiring mobile services with Telstra's other services and so are not disadvantaged by using multiple providers for their telecommunications and technology needs.



For Telstra's enterprise and government customers, pricing and plans are highly customised and packages may include mobile and other services for which a customised price is given. However, Telstra does not hard bundle its mobile services so government and enterprise customers can choose to take mobile services from Telstra and acquire their other telecommunications and technology needs from other providers.

4.5. Is infrastructure sharing working?

As discussed in section 2.4.1, the facilities access regime is working effectively, as demonstrated by the level of sharing of Telstra's mobile facilities [REDACTED] with sharing currently on [REDACTED] of these facilities. Telstra has also approved another 393 applications in 2016 (up to 15 November 2016) which may result in some new co-location sites depending on when the access seeker decides to proceed with construction (as they have two years to install equipment following approval of the Level 3 application). More facilities sharing occurs on Telstra facilities in regional and rural areas than in metropolitan areas.

Over the last 15 years, the facilities access regime has been periodically reviewed and the process improved. As recently as 2013, the ACCC concluded that *"the [Facilities Access] Code remains relevant and continues to serve as a useful tool in facilitating access to eligible facilities"*²³⁰, making only minor amendments.

That said, Telstra believes there would be benefit in a whole of industry re-assessment of the current process for co-locating under the facilities access regime with a view to seeking agreement on potential improvements. Some of the potential areas of improvement include:

- Streamlining the process to reduce the overall time taken by the access provider to review and approve a tower sharing application from start to finish;
- Access seekers providing more accurate forecasts to allow access providers to better manage their resources and reduce delay in processing applications;
- Access providers and access seekers cooperating to ensure early community engagement to reduce delays in council planning approval for new shared greenfield sites;
- Promoting early information sharing in relation to intended greenfield sites to encourage co-location and avoid duplication of infrastructure and, where relevant, to allow access providers to share in construction costs in some circumstances; and
- Extending an industry-based arrangement for tower sharing to tower owners which are not mobile carriers, and therefore not subject to the Facilities Access Code, such as Axicom and Broadcasting Australia.

The Mobile Carriers Forum (MCF) may be the appropriate forum for this discussion and agreement to take place. However, major non-carrier tower owners are not members of the MCF and a wider industry forum would need to be established for these discussions.

4.6. Have public funds contributed to the development of Telstra's mobile network?

Vodafone has suggested that Telstra's network has received significant Government funding and hidden subsidies, and this provides a basis for declaring roaming. This is not the case.

4.6.1. Telstra's payments to Government

While small parts of Telstra's mobile network have received government funding (section 4.6.1), it should also be noted that Telstra makes significant payments to the Government each year. These payments include:

- Telstra's tax payments: over the last five years to FY16, Telstra has paid \$8.2 billion in income tax. Vodafone reports over calendar years – for the four years to 2015, Vodafone has paid \$18.6 million in

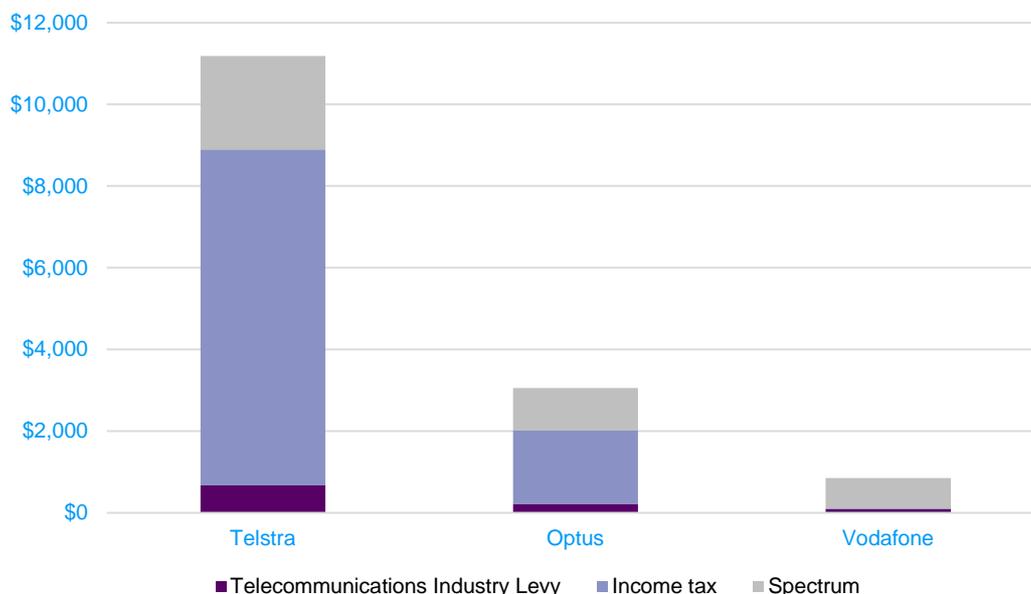


tax, but in three out of the four years Vodafone has not paid any tax as it has not made a profit in Australia (see Figure 30).

- Telstra's contributions social policy measures funded by industry: Telstra makes the largest contributions to the USO scheme and other social policy measures funded by industry (referred to as Telecommunications Industry Levy payments in Figure 29). Telstra has paid over \$670 million in the last five years compared to Vodafone's payments of \$89 million over the same five year period. Telstra receives back funding for the USO, payphone USO and emergency services platform of over \$280 million per year, but in effect contributes two thirds of those payments to itself.
- Telstra's spectrum purchases and licence renewals: Telstra has paid \$2.3 billion for spectrum over the last five years. This compares to Vodafone payments of \$745 million and Optus payments of \$1 billion.

Figure 30 compares Telstra's aggregate payments tax and USO payments to the payments made by Vodafone and Optus over the last five years.

Figure 30: Comparison of aggregate payments to Government over the last five years



Source: MNO Annual Reports; ACMA levy assessments and determinations; Telstra estimates.

4.6.2. Government funding and Telstra's mobile network

Government funding has played a role in facilitating entry and expansion of mobile networks. These government programs facilitate the coverage race between the three MNOs at the margins of their coverage footprints. In all cases, Government funding is provided for deployment of mobile infrastructure in areas where coverage might not otherwise extend to, and is awarded through, a competitive tender process.

Government funding initiatives, including the Mobile Black Spot Programme are usually open to competitive tender, with all MNOs having an equal opportunity to secure co-investing. Much of Vodafone's own planned rollout in regional and rural areas is underpinned by Mobile Black Spot Programme funding.

While these Government funds have assisted coverage expansion they are often just part of much larger co-investment programs, and occur alongside MNOs' own private investments. For example, the Government



funding that Telstra received over the period FY06-FY15 accounted for less than one per cent of Telstra's mobile investment spend on a fully allocated basis (excluding spectrum purchases and renewals).

4.6.3. Payments under the Universal Services Obligation

Vodafone also argues that Telstra has in some way leveraged its mobile infrastructure in regional and rural areas off fixed network infrastructure that is partially funded through the USO contributions which carriers (including Telstra) make.

The USO payments are for the supply of fixed telephony services, and do not fund Telstra's mobile network. An independent study of Telstra's USO costs was undertaken by Paul Paterson of Castalia Strategic Advisors (**Castalia report**) for the Department of Broadband, Communications and the Digital Economy in 2011. The Castalia report identified that the majority of USO costs are associated with Telstra's copper access network connecting individual premises. This copper infrastructure is not used for mobile services. Where USO services utilise parts of the core network, the Castalia report allocated only a proportion of the core costs to USO services and Telstra is only compensated for those costs.

There is therefore no basis to suggest that USO payments contribute to Telstra's mobile network.

It is also worth noting the significant difference in backhaul requirements for fixed telephone services and mobiles. As discussed in relation to whether Telstra had a backhaul legacy advantage (section 2.4.3), the requirements for mobile backhaul have increased significantly with the 3G and 4G networks having to support broadband services and significant increases in data traffic.

4.7. Does Telstra have monopoly power in areas where it is the only MNO?

Some stakeholders have raised concerns that Telstra has monopoly power and that Telstra's profit margins are high. Supporters of roaming make this argument based on their characterisation of the areas in which Telstra is the only MNO as being a 'natural monopoly'. Natural monopoly is a very technical concept and Telstra provided detailed economic analysis of the concept and its application to Telstra's mobile network in Attachment 1 to its confidential response to the ACCC's information request on 26 August 2016.

However, in general terms, characterising the Telstra-only areas as a natural monopoly is unsound for the following reasons:

- A characteristic of natural monopolies is that they are enduring. However, as the discussion in section 1.1 shows (particularly Figure 2), the coverage race is not over, and Optus and Vodafone are continuing to deploy infrastructure in regional and rural areas. The result is that the 'gap' between Telstra's coverage and the other MNOs continues to narrow. Therefore, just because an area is today served by Telstra only does not mean that Optus or Vodafone will not deploy their network in that area in the future.
- All areas of Telstra coverage, whether Telstra is the sole provider or there are competing MNOs, function as part of a single integrated network and services are marketed and priced on a nationally uniform basis. Therefore it would be a mistake to view the areas in which Telstra is the only MNO as isolated from the competitive dynamics that prevail in the wider market. As Professor Yarrow comments:²³¹

"It follows that an observation of a defined sub-set of customers, e.g. those located in a particular geographic area, being supplied by a single firm is not indicative of a competition problem per se... It may be a normal outcome of a competitive process and when the relevant set of customers is small or the relevant cumulative transactions are of relatively low value, my own experience indicates that it nearly always is.

...



The competitive pressures on a business are jointly or co-determined by a combination of factors, among which the number of actual competitors is just one and can therefore never be determinative when considered in isolation.”

Vodafone seeks to demonstrate that Telstra benefits from a monopoly position in mobile services by relying on a 2015 paper it commissioned from the Centre for International Economics (the **CIE**), *Australia's telecommunications market*. The paper purported to show that Telstra customers were paying on average a \$9 premium per month for mobile services, due to structural issues and market power.

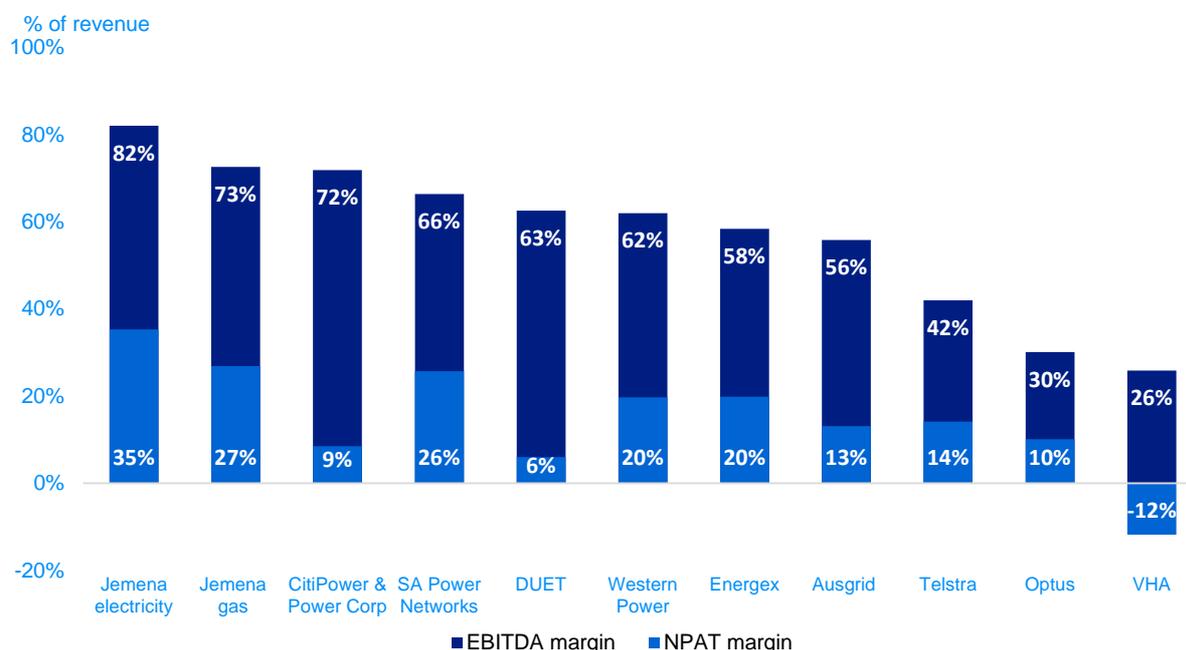
There are very significant shortcomings in the analysis carried out by the CIE that make its conclusions completely invalid.

- The model developed by the CIE is used to estimate the values customers place on mobile plan characteristics. However quality (e.g. coverage), a product feature that for many years MNOs have competed on, was ignored as a factor in the CIE modelling.
- The CIE model unnecessarily assumes that customers place the same value on a particular mobile plan characteristic, regardless of which company is providing the service. For example, the value placed on a Telstra data allowance is the same as all other service providers. This assumes away quality differences between operators and in doing so essentially ignores strategic decisions of companies to position themselves in the market in a particular way. It similarly ignores that customers place different valuations on each service provider.
- The CIE report attempts to estimate customers' valuations of mobile plan characteristics. It does this by analysing a database of mobile plans. Each plan is given equal weighting in the analysis, regardless of how many customers actually buy that plan. For example, a plan with 2,000 customers is given equal weighting as a plan with 50,000 customers. By placing equal weighting on each plan, the CIE analysis is representative of *plans* – it is not representative of *customers*. If properly constructed, the observations would be weighted by the market share of each plan.

As a result the CIE modelling cannot distinguish between the hypothesis that the Telstra 'premium' is due to coverage quality, or the claim that structural issues are limiting the ability for competition to reduce the 'premium'.

The evidence which Telstra presents in section 2 – and the behaviour of both Optus and Vodafone in advertising their efforts to close the coverage lead of Telstra – provides a more compelling explanation for why Telstra customers are prepared to pay more. That is, Telstra customers are willing to pay more because Telstra has invested in superior coverage.

That Telstra's higher prices are not the result of monopoly pricing behaviour is further illustrated by looking at comparative performance of the telecommunications sector as a whole and Telstra's comparative performance to the other MNOs. Australian MNOs' EBITDA and net profit margins are generally lower than the margins of regulated Australian utilities (Figure 31), indicating that supranormal profits are not being earned in the telecommunications sector. The lower margins in the telecommunications sector are despite the ACCC and AER having generally treated Telstra and the energy distribution network providers as facing the same level of systematic risk.²³²


Figure 31: Regulated utility EBITDA and net profit margins


Source: Provider Annual Reports 2014-15, except Telstra 2015-16, Jemena electricity and gas 2015, and Optus year to 31 March 2016. Note: Telstra EBITDA margin is for FY16 for its mobile business, whereas its net profit margin is for its whole business. Optus' EBITDA and net profit margins are for its whole business for FY to March 2016. Vodafone's EBITDA margin is for the half year ended June 2016, whereas its net profit margin is for the full year ended December 2015.

EBITDA margins of the Australian MNOs vary. For the half year to June 2016, Vodafone's mobile EBITDA was 26 per cent; whilst for FY 2016, Telstra's mobile EBITDA was 42 per cent and Optus' was 30 per cent (though this relates to Optus' entire business).

EBITDA margins are a function of both revenue and operating expenditure. Telstra's EBITDA margin is higher than Vodafone's as it earns more revenues from every subscriber (on average), reflecting Telstra's business strategy to win and retain customers who are prepared to pay more for better quality coverage, while Vodafone competes more on lower price. That is, Telstra's higher EBITDA margin in part reflects higher investment by Telstra given its more extensive network (with higher investment also feeding through to higher depreciation and amortisation charges, other things being equal). Telstra's higher EBITDA margin is also due to it having lower operating expenses per subscriber than Vodafone (on average), reflecting the economies of scale that come with having won a larger subscriber base in competition against Optus and Vodafone.²³³ Telstra's higher EBITDA margin is therefore a result of its success in competing and not as a result of any monopoly power.

Net profit margins of the MNOs are also generally lower than the majority of regulated utilities (Figure 31).

Differences in margins across MNOs at any given point in time are driven by many factors. In addition to EBITDA, the drivers of net profit margin include depreciation, financing costs (e.g. interest payments) and tax expenses. Vodafone appears to have relatively high financing costs compared to Telstra and Optus. For example, Vodafone's financing costs were 46 per cent of its EBITDA for the half year ended 30 June 2016, whereas Telstra's whole of business financing costs were just 16 per cent of the EBITDA of its mobile business (or only seven per cent of the EBITDA of its whole business).²³⁴ These differences show that financing costs can be substantially influenced by choice of financial structure; in the case of Vodafone, its financing costs may reflect arrangements in place with its global parents.



4.8. If domestic roaming already exists, why is there a problem in declaring it?

As discussed in section 7 of Mike Wright's statement, roaming is provided on a commercial basis, including in the past by Telstra. Because these roaming agreements have applied over a period which has seen significant investment in mobile coverage, some advocates of declared roaming argue that these commercial roaming agreements are evidence that roaming does not have a disincentive effect on investment.

However, as the ACCC Discussion Paper notes, the previous and existing roaming agreements are limited in geographic coverage to areas where the roaming provider (Optus or Telstra) is not the only MNO.

By limiting the geographic area where other parties have been able to roam, commercial agreements have maintained the access provider's investment incentives by maintaining its coverage advantage. In contrast, the declared roaming service being considered by the ACCC would do the exact opposite – it would, at a minimum, apply in areas where the access provider is the only MNO. Thus, while the commercial roaming arrangements are designed to preserve the coverage advantage – and therefore the dynamics of the race for coverage – declaring roaming negates the coverage advantage, and therefore will have the consequential adverse impacts on investment and customer benefits outlined above.

Other previous roaming arrangements have been associated with specific investment initiatives allowing the MNOs to factor in the economic effects of roaming in those investment decisions.²³⁵ While many of the technical issues with roaming (section 3.4.2) arise whether roaming is declared or commercially negotiated, commercial negotiations provide a more flexible forum in which to agree and develop solutions to mitigate those impacts, such as by agreeing 'buffer zones' to reduce coverage overlap.

4.9. International precedents do not support declaration of roaming

To the extent that the ACCC is looking to international precedents to establish whether declaring roaming will be in the LTIE, there is no international precedent which supports declaring wholesale domestic roaming in Australia. Although concerns about mobile network coverage have arisen around the world, there is no compelling case that regulating domestic roaming is the appropriate tool to solve the problem.²³⁶ Further, Australia has one of the highest levels of coverage in the world, with 99.3 per cent of Australians having mobile coverage where they live. Three key lessons can be drawn from international precedents:

- Regulating roaming can harm incentives to invest in infrastructure, and even more so when pricing is regulated (which will be the case if the ACCC declares mobile roaming in Australia);
- Domestic roaming has been required internationally to address unique circumstances of mobile markets in particular jurisdictions, which do not apply to Australia; and
- There is no clear evidence from international precedents that regulating wholesale roaming has achieved the competition or investment outcomes that regulators were seeking to deliver.

A number of jurisdictions which used to regulate roaming no longer do so because of concerns about the impact on investment, including the UK and France. The following provides an overview of the international approaches to roaming – further details about international precedents for regulating roaming are included in Appendix A.

4.9.1. International precedents recognise detrimental impacts of roaming regulation on investment

There is international recognition that regulated roaming can have a detrimental impact on investment incentives. In light of the importance of encouraging investment in mobile infrastructure and technology, regulators in various jurisdictions have:

- Removed roaming requirements introduced in earlier generations of mobile technology;



- Intervened to wind back roaming agreements due to concerns about market distortion as a result of ongoing roaming; or
- Where roaming is regulated, been cautious to ensure that ongoing investment is encouraged, for example, by declining to impose price regulation (which would not be an option if the ACCC declared roaming because Part XIC requires the ACCC to specify a price for declared services).

In the UK, 2G roaming was included as a condition of O2 and Vodafone's 3G spectrum licences from 1999. Ofcom removed this requirement in 2004 in preference for market rather than regulated solutions. National mobile roaming on 2G was considered again in 2014-15 as part of the partial 'not-spots' consultation and MNOs, including Vodafone UK, advocated against regulated roaming on the basis that it would undermine investment incentives. The UK Government decided not to regulate roaming because of the potential impact on investment incentives and considered that the most effective solution was including a coverage obligation in spectrum licences with some element of site sharing:²³⁷

"MNOs' and DCMS's technical consultants have advised that enabling roaming on a national scale is complex and would require work by MNOs to iron out the issues for roaming to work successfully. This means that whilst national roaming offered the potential to deliver large coverage gains for consumers relatively quickly, it could also increase costs to MNOs and potentially impact on the investments being made by MNOs in the UK to deliver faster and better services for their customers."

It has been suggested by an industry participant that the UK Government's decision not to regulate roaming in the UK is not informative in the Australian context because of the high population density in the UK. This argument does not recognise the reality of how effectively infrastructure-based competition is working in Australia. While it is correct that the UK has a higher population density than Australia, this was not one of the reasons given by the UK Government for not regulating roaming. Rather, the UK Government was concerned about the impact that regulating roaming would have on investment and innovation.

Despite having a high population density, mobile coverage in the UK is less extensive than in Australia, particularly when looking at different generations of technology on a standalone basis. Table 16 provides an overview of current coverage in the UK. Looking at 3G coverage alone, only 88 per cent of the population are able to receive services from all four of the MNOs.²³⁸ When looking at the combined coverage of 3G and 4G (Table 17), only 92 per cent of the UK population are able to receive services from more than two operators, as compared to 96.9 per cent of the population in Australia.²³⁹

Table 16: UK mobile coverage, percentage of premises covered by all MNOs, 2015

Network technology	2G	3G	4G
Premises covered (%)	93	88	46

Source: Ofcom Connected Nations Report 2015.

Table 17: Coverage of mobile providers in the UK, 2015

Category	O2	Vodafone	EE	Three
Combined 2G/3G (%)	98	98	99	98
Combined 3G/4G (%)	92	92	98	98

Source: Ofcom Connected Nations Report 2015.

Countries with low population densities which have regulated roaming also have less extensive coverage than in Australia. Canada and New Zealand have achieved 4G population coverage of only 96 per cent and 90 per



cent respectively compared to Australia where infrastructure-based competition has brought 4G mobile coverage to 98 per cent of the Australian population, with 99 per cent coverage in prospect by June 2017 (assuming retention of current regulatory settings).

It is therefore clear that in the competitive Australian mobile market low population density is not holding back mobile investment. Further, the adverse investment impacts of regulating roaming which the UK Government was concerned about would be more pronounced in Australia, where population density is low, should roaming be declared.

France has also stipulated 2G roaming through licence conditions but, in 2015, the communications regulator (**ARCEP**) was given new powers by the French legislature to engineer the early termination of national roaming agreements.²⁴⁰ ARCEP is gradually phasing out roaming agreements to ensure that investment incentives, and in particular the rollout of 4G networks, are not adversely affected.²⁴¹ ARCEP considers that regional investment and connectivity targets can be fully achieved through the competition model in place within the mobile industry.

Regulators that have regulated wholesale roaming have limited the extent of roaming regulation to minimise the risk that roaming will harm investment incentives:

- In the US, the Federal Communications Commission (**FCC**) declined to impose price regulation which it considered would diminish the investment incentives of both smaller carriers to expand the geographic reach of their networks and larger carriers to expand, maintain and upgrade their existing networks.²⁴²
- In New Zealand, no pricing regulation is imposed by the Commerce Commission and access seekers must commit to rolling out their own mobile network to 65 per cent of the population.²⁴³ This population threshold “*is designed to balance incentives for significant investment with a degree of challenge, and also to encourage the provision of service outside the main centres*”.²⁴⁴

4.9.2. Countries with regulated domestic roaming have unique market circumstances

In countries where domestic roaming has been regulated, this has been a decision made by the regulator to address circumstances unique to the mobile market in that jurisdiction which are not applicable to Australia:

- **Canada:** the Canadian Radio-television and Telecommunications Commission (**CRTC**) regulates roaming in order to allow smaller wireless carriers, including new entrants, to offer national network coverage and compete with the three major carriers in view of evidence that there was limited wholesale competition and competition in the retail market from MVNOs.²⁴⁵ This is clearly not the case in Australia where strong wholesale competition has facilitated the entry of a number of MVNOs and resellers into the retail market (section 1.2.1). Further, the CRTC only regulates the rates, terms and conditions on which the three major carriers (Bell Mobility, Rogers and TELUS) provide wholesale roaming to other small wireless carriers. Roaming between the three major carriers is not regulated by the CRTC and is only provided for as part of spectrum licence conditions which do not regulate price.
- **New Zealand:** one of the reasons national roaming was introduced was that the two incumbent operators (Spark and Vodafone) used incompatible technical standards – CDMA and GSM (respectively).²⁴⁶ Once the new entrant, 2degrees, chose which technology to use on its own network, it effectively only had one potential roaming partner. While Spark has shut down its CDMA network, this is still the case because, having chosen to use the 900 MHz band, 2degrees customers' handsets are not compatible with Spark's network. This means that 2degrees is committed to Vodafone as its roaming partner.²⁴⁷ This is not the case in Australia where all MNOs use the same technical standard and third entrant, Vodafone, has a choice of two potential roaming partners while any new entrant would have a choice of three.



- **US:** at the time roaming was first regulated in 2007, there were several regional wireless carriers in the US that were seeking roaming arrangements with national carriers in their licenced area. These small wireless carriers existed as a legacy of the FCC's early spectrum licensing practices. There are still many regional carriers in the US today (though there has been significant consolidation with the four major nationwide carriers acquiring regional carriers). In comparison, all three MNOs in Australia are national with their own substantial networks nationwide.

4.9.3. Evidence suggests that regulating domestic roaming does not promote competition or investment

The evidence from international precedents on whether regulating domestic roaming promotes competition or encourages investment is limited, but the evidence that is available suggests that regulating roaming does not promote competition in retail mobile markets. For example, in the US, there has been no major new entry or expansion at the network operator level brought about by the FCC's roaming policies. In more regional and rural areas of the US, market concentration levels have not reduced and are significantly higher than more densely populated areas. Indeed, the second and third largest MNOs in the US have lower population coverage than Optus and Vodafone respectively (Figure 32 in Appendix B).

In essence, the relationship between roaming and the promotion of competition is, at best, tenuous and there is no unequivocal evidence that demonstrates increased competition after the introduction of regulated roaming. If anything, the competition risks are likely to be greater, given that regulating roaming removes a point of potential differentiation between mobile operators in the market and may actually result in distortions to competitive dynamics within the market, with poor outcomes for consumers. As Vodafone submitted to the NZ Commerce Commission in 2013:²⁴⁸

“Network population coverage drives both competition and investment, and can be an important source of differentiation...Australia is a good example of a competitive market where the operators have quite different coverage...The ACCC does not regulate national roaming. The competitive market has been allowed to develop so that established network operators competitively differentiate their services, including on the basis of network coverage...”

Vodafone also spoke out against roaming in the UK, stating that *“national roaming would also harm the business case for further investment in rural coverage: why should any operator invest in providing better coverage for the benefit of a competitor?”*²⁴⁹



05 DECLARATION IS NOT IN THE LONG-TERM INTERESTS OF END USERS

This section applies the above analysis of how customers benefit from the current state of competition (section 1), how the competitive dynamics of the race for coverage drives these beneficial outcomes (section 2) and how declaring roaming will undermine those competitive dynamics (section 3) to the statutory test of the long-term interests of end users (LTIE) by which the ACCC is to decide whether to declare roaming.

The section first considers the general principles the ACCC should apply in its approach to the LTIE and then turns to discuss why declared roaming will not meet the three LTIE objects of promoting competition, any-to-any connectivity and the efficient use of, and efficient investment in, infrastructure.

5.1. General principles relevant to applying the statutory framework in this inquiry

First, it is important to recognise that the criteria the ACCC must satisfy before declaring a service sets a high threshold. This is because regulatory intervention in markets is not to be taken lightly and is only warranted where it can be shown to offer an overall net benefit.²⁵⁰ A theoretical or abstract incremental benefit conferred by declaration compared to the future without declaration will not meet this statutory standard – in order to support a declaration, there must be a likely benefit that is sustainable over the long-term, and thus consistent with the LTIE.

This high legal threshold has a sound economic basis. As Professor Yarrow comments:²⁵¹

“Since assessment [required by the LTIE criteria] in effect requires a comparison between two long-term forecasts or projections, there is inevitably a good deal of uncertainty surrounding the exercise. The regulatory exercise is therefore similar in many respects to long-term commercial investment decisions under uncertainty. Declaration will entail a commitment to incur irrecoverable (i.e. sunk) costs, including incremental administrative costs for the ACCC and compliance costs for businesses. The effect is to introduce ‘options values’ into the appraisals.

The implication is that a decision to trigger the cost causality cannot, or at least should not, be made on the basis of simple comparison of expected long-term benefits to end users in each of the two, relevant scenarios: there is a threshold minimum advantage of the [future position with declaration] over the [current and future position without regulation] required to substantiate a declaration decision. I note that this is an entirely economic point, distinct from any additional legal burden of proof that may be relevant (a matter on which I am not qualified to comment). I am not able to give any safe quantitative estimate of the level of the threshold, but can say that the threshold will tend to be higher (a) the greater the surrounding uncertainties and (b) the faster the rate of change of data-relevant information (roughly, the more that is likely to be learned over the next few years if a ‘wait and see’ approach is adopted).”

The threshold to a decision to declare roaming should be high precisely because the Australian mobile industry already is, on the current regulatory settings, delivering world-leading outcomes for customers in coverage, network quality, speed, value for money and innovation.

Second, while the nature of the ‘future with’ and ‘future without’ declaration comparison to be applied in assessing the LTIE requires predicting future outcomes, there is more predictability about what will happen without declaration. As emphasised by the Tribunal in *Application by Chime Communications Pty Ltd (No. 2)*, the task of forecasting future commercial likelihoods is not a matter of guesswork.²⁵² The first step is to undertake an empirical analysis of the existing state of affairs and then to assess a link to a particular forecast outcome.²⁵³

As discussed in section 1, we can see that a similar pattern of investment by each MNO, increasing levels of coverage, commercially negotiated roaming arrangements, falling prices and increasing service quality has



been repeated across the successive generations of mobile technology. This successful 'future without' pattern was repeated after each of the ACCC's two previous decisions not to declare roaming.

Third, it is important to accurately understand and dimension the problem which is being solved for. The 'size of the prize' sought by regulating access is relevant to assessing whether the risks of regulation are worth taking. The size of the problem which roaming would address is relatively small and shrinking:

- Only 0.5 per cent of the population currently are located in Telstra-only areas, and the announced investments by Optus and Vodafone are likely to see this number shrink further in the short-term.
- While the geographic area covered only by Telstra is over a million square kilometres, Telstra covers this area with only 600 sites out of approximately 8,500 Telstra sites nationwide. Each of Optus and Vodafone have been or currently are involved in rollout programmes to deploy a similar number of towers or more. For example, the RFNSA database lists 821 proposed new Optus sites (Table 2).

5.2. Declaring roaming will have detrimental effects on competition and infrastructure investment and is not in the LTIE

5.2.1. Promoting competition

In considering the extent to which declaration is likely to result in achieving the objective of promoting competition, it is necessary to form a view on current competitive conditions in the particular market in order to determine whether the opportunities and environment for competition would be better with or without the declaration.²⁵⁴ The Tribunal in *Application by Chime Communications Pty Ltd (No. 2)* considered that a market would be sufficiently competitive if *"the market experiences at least a reasonable degree of rivalry between firms each of which suffers some constraint in their use of market power from competitors (actual and potential) and from customers"*.²⁵⁵

There currently is a strong degree of rivalry in retail and wholesale mobile markets, as evidenced by the following:

- Infrastructure-based competition between two or more MNOs in areas covering 98.5 per cent of the population and between three MNOs in areas covering 97 per cent of the population. Each MNO has announced further investment in extending and deepening coverage, including in regional and rural areas (section 1.1.1).
- Increased choice of providers for customers in rural and regional Australia, including some 60 MVNOs whose entry has been facilitated by infrastructure-based competition between the MNOs. MVNOs are increasingly making strong gains in regional Australia, with the MVNO share of regional SIOs [REDACTED]. In the face of this fierce retail competition, Telstra has been losing market share, including in regional areas (section 1.2.1).
- Increased value for money with retail prices falling 52.6 per cent since 1997 whilst data and other value-adding inclusions have increased significantly. For example, the industry average cost per MB of data downloaded on a mobile device fell 97 per cent from 2009-10 to 2014-15 (section 1.2.2).
- Increasing service quality with typical download speeds of 5-200Mbps on Telstra's 4GX network (section 1.1.2).

The proponents of declared roaming argue that it will promote more competition because it gives customers in areas where there currently is only one mobile network a greater choice of retail provider. However, nationally averaged pricing means that customers in single MNO areas already realise the benefits of competition. As Professor Yarrow comments:²⁵⁶

"End users located in low population density areas, i.e. in regional and rural Australia, appear to get a very good deal in terms of pricing. Indeed, taking a traditional measure of the balance of benefits



from transactions, the differential between prices and costs, whether calculated as an absolute dollar amount or as a price-cost margin (the Lerner index), these are the people who get the best pricing deal.

...

This runs counter to a commonly held perception that consumers in [low density] areas are people who do not share adequately in the benefits of competition – a belief that may be based on an observation that, for these end users, choice among services provided by MNOs is more limited than for customers in high density areas... That is, the number of suppliers in a geographic area is examined under the lens of a proposition that fewer suppliers means higher price-cost differentials. If that is correct, things are being viewed through a distorting lens."

Declaring roaming to give customers in single MNO areas a choice of retail provider will actually leave them worse off because:

- The short-term benefit of providing increased choice through declared roaming will involve a trade-off with the long-term benefits of infrastructure-based competition in areas where, if roaming had not been declared, the coverage race would have resulted in the entry of either or both of the other MNOs.
- Customers may have a choice of retail provider but the prices on offer will be higher than the price currently offered by their single retail provider because nationally averaged pricing may unwind as a result of declared roaming. As Professor Yarrow comments:²⁵⁷

"It can be inferred from the price-cost differentials in [low density] areas that, under current arrangements, downward pressure on prices are intense (why else would prices be set so low in relation to costs?) The pressures do not emanate from direct rivalry for the custom of the relevant end users in their home areas – no such rivalry exists – rather they emanate from direct retail competition in [high density] areas and/or from threats of entry into direct competition in [low density] areas from other MNOs (they could extend their own infrastructure into those areas) and/or from inter-area arbitrage.

Equalisation of coverage among MNOs reduces the 'out-of-area' competitive pressures, by eliminating the payoffs in [high density] areas from increased coverage in [low density] areas. The expectation is that prices in [low density] areas will rise, to the detriment of the LTIE of customers located in those areas."

While not all end users need benefit from a declaration, the ACCC needs to be satisfied that, taking account of both 'winners' and 'losers', there is a net benefit across all end users.²⁵⁸ Relevantly, where roaming is geographically limited, declaration of roaming will adversely impact customers outside the areas in which declared roaming would be available:

- Customers who are willing to pay more for coverage may get current coverage at a lower price but they will miss out on greater depth and breadth of coverage in regional and rural areas which they value more than price.
- Customers living and working in regional and rural areas, including those in areas where there is more than one MNO, also face the prospect of higher prices because the current approach of nationally averaged prices loses its economic and strategic rationale for MNOs with coverage being equalised. As Professor Yarrow comments:²⁵⁹

"In my view, therefore, it is to be expected that declaration would induce some tendency toward 'economic separation' between [high density] areas and [low density] areas, which will be adverse to the LTIE of [low density] end users. Put another way, insofar as their



effects on the LTIE in remote areas are concerned, there appears to be a degree of fragility attached to the current arrangements.”

- Customers living and working in regional and rural areas which currently do not have coverage may face reduced prospects of getting coverage in the future. If coverage is equalised, each MNO will not have the incentive to extend their network but will focus on investing in areas where there is a standalone business case to build.
- Customers living in areas with current coverage which are uneconomic on a standalone basis will face reduced service levels and congestion because MNOs will no longer have an incentive to continue to invest. [REDACTED]
- Customers who give greater importance to low prices over coverage will also pay higher prices where declaring roaming results in higher prices. Equalising coverage may therefore narrow the competitive options available to those customers.

5.2.2. Any-to-any connectivity

Interconnection (through regulated MTAS) already achieves any-to-any connectivity between mobile devices connected to different mobile networks when those devices are within their respective networks' coverage areas. The purpose of this objective is to ensure connectivity between customers connected to different networks and not deal with the lack of connectivity or coverage within an individual network for its own customers.

5.2.3. Economically efficient use of, and economically efficient investment in, infrastructure

The objective of encouraging economically efficient use of, and investment in, infrastructure is about ensuring that optimal buy / build decisions are being made such that the best outcomes in terms of price, quality and diversity will be delivered to end users.²⁶⁰

Professor Yarrow comments that this LTIE objective should be read as favouring, where possible, investment over use because of the greater dynamic benefits for customers of infrastructure-based competition over resale competition:²⁶¹

“The LTIE criterion is specified in terms of encouraging economically efficient use of, and investment in, network infrastructure. It therefore has a ‘static’ aspect, “use of”, and a dynamic aspect, “investment in”. Where public policy objectives are of a long-term nature, as the LTIE criterion indicates they are in this case, it is the dynamic aspects that are typically the most important quantitatively...

The relative significance of dynamics is rather greater in telecommunications than in the generation of electricity because of the higher rate of technological change. Also, unlike in electricity generation, the technological change involved in telecommunications is much more tilted toward a product-enhancing, rather than a cost-reducing, form. As such it is transmitted much more directly to consumers: introduction of new technology leads almost immediately to enhancement in service quality, without further ado.....new investment plays a critical role in this process of development because technological progress arrives embodied in new investments.”

For the reasons set out in sections 1 and 2, the existing regulatory and market conditions have resulted in strong infrastructure-based competition which have been delivering positive outcomes for Australian customers in metropolitan, regional and rural areas.

The differences between the MNOs' network coverage is an outcome of market-driven competition – not a failure warranting regulatory intervention. It is one of the main ways that MNOs pursue product differentiation



and each of Telstra, Vodafone and Optus have made different decisions about how to achieve differentiation in respect of coverage and technologies.

One reason that the ACCC has previously identified for declaring a service is that the underlying infrastructure constitutes an 'enduring bottleneck'. The proponents of regulated roaming argue that competing MNOs face significant barriers to expansion, including that low population densities make only one mobile network viable in many areas.

However, mobile infrastructure in areas currently served by a single MNO is not an 'enduring bottleneck' for the following reasons:

- The coverage race is a dynamic process in which one MNO seeks to gain an advantage by being the first to deploy network in an area while the other MNOs seek to pullback that advantage by overbuilding. Areas which were served by a single MNO one or two years ago may now be served by two or three MNOs, and areas which are served today by a single MNO may be within the future deployment plans of one or more MNOs.
- Current regulatory settings already address the barriers to expansion for a subsequent MNO into a single MNO area. Facility sharing and regulated transmission allow the subsequent MNO to substantially lower its upfront costs compared to the first-in MNO. As a result, it would be economically feasible, on a standalone basis, for another MNO to deploy network in [REDACTED]
- Even where the direct revenues do not justify the costs of deployment in an area, an MNO could expect to win more customers outside those areas who place more value on coverage. As coverage is an important factor to which customers give relative weight in their buying decisions, an MNO does not necessarily have to equal the Telstra coverage before it is able to win customers who value coverage – there are likely to be customers who are prepared to pay somewhat less than they pay Telstra for somewhat better coverage than the competing MNO currently offers. Ovum estimates that if an MNO won an extra 1.5 per cent market share nationally, the resulting indirect revenues would make it worthwhile for the MNO to deploy network in nearly [REDACTED]
- The second-in MNO has the opportunity to improve the economics of deploying further network through aggregating the traffic of the third MNO under commercial roaming arrangements. As the Discussion Paper notes, current and past roaming agreements have provided for roaming in areas where the roaming provider overlaps with another network.
- Even if a current or future single MNO area is never overbuilt by another MNO, the MNO in that area is not able to exercise any 'bottleneck' leverage or power inside or outside that area. As discussed in section 4.7, single MNO areas function as an indivisible part of a single national network, and the dynamics of competition between the MNOs apply network wide.

In the absence of declaration of roaming, infrastructure-based competition will continue into the future and drive ongoing efficient investment in infrastructure for the following reasons:

- The three MNOs have announced plans to extend their coverage in regional and rural areas.
- The Mobile Black Spot Programme and other similar coverage programs are likely to continue and participation is driven by the coverage race between the three MNOs.
- Continuing investment will be made in expanding and upgrading capacity to cope with the rapid growth in data consumption.



- Investment will be made in technology upgrades within 3G and 4G to support new services and applications, such as IoT.
- Future investment will be undertaken to deploy 5G and other generations of mobile technology.

If roaming is declared, investment decision-making of the MNOs are likely to focus on upgrading and extending coverage only in those areas which are economically viable on a standalone basis. As the MNOs have already deployed network in regional and rural areas which are not economically viable on a standalone basis, the investment required to maintain service levels as traffic grows will not be made. The access provider may also have no incentive to upgrade capacity to handle the volume of increased traffic from roaming users. As modelling undertaken by Aetha shows, the result could be increased congestion and falling throughput speeds in regional and rural areas.

The proponents of regulated roaming argue that further deployment of competing mobile network infrastructure in regional and rural areas represents an uneconomic duplication of infrastructure. The ACCC's Declaration Guidelines state that, if competition is not effective, it could conclude that making the declaration would result in a more efficient allocation of resources and prevention of duplication of infrastructure.²⁶⁴ However, in this case expanding coverage of the MNOs is being incentivised and funded by vigorous competition between the MNOs for those customers who have a willingness to pay for better quality coverage. As Professor Yarrow comments, this is highly efficient.²⁶⁵

“Vertical product differentiation is, in practice, very frequently accompanied by second-degree price discrimination... This is because quality of product or service functions as a workable self-sorting mechanism, which distinguishes between sub-sets of consumers who are more willing to pay for incremental quality and consumers who are willing to pay rather less.

The salience of this self-sorting mechanism is that it can provide a highly efficient means of recovering fixed costs and, in doing so, can counteract a tendency for high fixed-cost activities to be under-supplied... Typically, the supplier's price-cost differential is significantly higher for the 'higher quality' product: it attracts less price-sensitive customers who are willing to pay for the incremental quality. In making the choice I voluntary contribute more, possibly substantially more, than a customer who chooses the lower quality product.”

Professor Yarrow goes on to state:²⁶⁶

“Putting things at their simplest, [low density] area expansion automatically creates an extra revenue source ([high density] area customers who particularly value coverage and are sorted via second-degree price discrimination) that substitutes for the coercive, implicit taxes or explicit levies upon which traditional approaches rely. Since the outcomes are the result of voluntary trade in competitive conditions, all end users tend to benefit, although the [low density] end users can be expected to benefit most.”

Limiting the declaration of roaming to 3G will not overcome the disincentive effects on the continued deployment of 4G and the future deployment of 5G and following generations of technology, as discussed in section 3. As the ACCC acknowledges:²⁶⁷

“Where investors perceive there to be a risk that the access price will inappropriately reduce their revenues, or revenues will be lower than costs, declaration may distort investment incentives with investment being discouraged.”

Professor Yarrow comments in his paper that how regulators treat sunk costs can send a particularly strong signal to investors:²⁶⁸

“Whereas for a commercial business operating in a competitive market bygones are bygones and sunk costs play little or no role in the decision calculus surrounding new investments, that can never be the case for a regulator. Every decision made sends an information signal that may be liable to cause revisions to a regulator's reputation in the perceptions of those who take an interest in its conduct. These



decisions are closely watched because of the underlying market power that lies behind them: regulatory decisions can have significant effects right across a whole market or sector. More specifically, observers of regulatory conduct will tend to pay particular attention to the way in which the regulator approaches sunk cost issues. Even more specifically they will, implicitly or explicitly, be interested in the question of whether the fact that a cost is sunk will have any influence on decisions, i.e. on the question: would the decision have been any different if the cost had not been sunk? If the answer is yes, investors tend, metaphorically, to put their hands over their wallets.”

5.3. Who gains out of declared roaming?

In summary, there are no ‘winners’ amongst customers as a result of declared roaming:

- For customers in Telstra-only coverage areas, providing a choice of mobile providers through declared roaming will deliver a service with a sub-optimal customer experience and, whether they take the option up or stay with Telstra, may cause congestion and degradation in their service and may result in higher prices than in metropolitan areas.
- For customers in other regional and rural coverage areas, who already have a choice of a range of providers because two or more MNOs have deployed networks, prices will be higher than in metropolitan areas and they may no longer benefit from further investment in capacity expansion or in new technologies in their coverage areas.
- For customers in no coverage areas, the prospects of further network rollout reaching their area becomes even less likely.
- For customers in metropolitan areas, those who value price over coverage may end up paying more to cover the costs of roaming coverage which they do not value. Customers who value coverage more highly will not benefit from further extension and deepening of coverage in regional and rural areas for which they have a high willingness to pay.

The beneficiary of declared roaming is an MNO seeking to close the competitive advantage of those MNOs who have invested more in coverage, without having to make a matching investment of its own. As Professor Yarrow concludes:²⁶⁹

“If the diagnostic question cui bono? (i.e. who benefits?) is asked, the most obvious answer is an access seeker currently not covering the relevant areas, although this clearly depends on the terms of access. If access terms are reasonably favourable, the access seeking MNO is given an alternative route to increasing its coverage. Interestingly, the benefits come from the increased marketability, relative to competitors, in higher population density areas: demand for its services in the [high density] areas is stimulated by its ability to offer coverage that is closer to that of its rivals. In effect, competitive conditions and incentives are perturbed in the [high density] areas to its advantage.”

5.4. The industry requires regulatory certainty

If the ACCC decides not to declare roaming, it is important that the ACCC provide some regulatory certainty going forward.

The ACCC will have considered domestic roaming three times – first at the beginning of the competitive market (1998), then as the 3G coverage race was getting under way (2004) and now with the coverage race well into delivering coverage of 3G and 4G to coverage levels that are amongst the highest in the world. Similar issues will have been considered in each of the three declaration inquiries. On the previous two occasions following the ACCC's decision not to intervene, market forces went on to deliver yet again higher levels of coverage. This raises the question of how many more times does the ‘future with / future without’ comparison have to prove the validity of the ‘future without’ case?



Therefore, the ACCC should, in addition to deciding not to intervene this third time, be definitive that it will not be revisiting domestic roaming again unless there is a clear, sustained failure in the competitive dynamics which have driven the mobile industry so far over 2G, 3G, 4G and now into the beginning of 5G.



APPENDIX A: International experience does not support the case for declaration

The international experience does not support declaring wholesale domestic mobile roaming in Australia. Some jurisdictions have regulated roaming for a specific generation of mobile network (e.g. 2G) as a condition of spectrum auctions, which allows carriers to price it into their business case/investment decision. However, a number of these countries, such as France and the UK, have moved away from such roaming conditions. Few countries have used roaming regulation, including pricing regulation, as a way to address perceived competition issues and/or concerns regarding areas with limited or no mobile coverage.

Countries claimed to have roaming but do not

Vodafone has claimed that there is regulated roaming in South Africa and Spain. However, there is no evidence that roaming is regulated in these countries.²⁷⁰

Countries moving away from and declining to regulate national roaming

A number of countries that previously regulated roaming as part of the rollout of earlier generations of mobile technology are moving towards no regulation. For example:

- In **France**, the communications regulator (**ARCEP**) is gradually phasing out national roaming agreements because it believes this will increase investment in network rollouts and help achieve connectivity targets, and is also concerned about the competition risks posed by such agreements.
- In the **UK**, while 2G roaming was included as a condition of O2 and Vodafone's 3G spectrum licences from 1999, this requirement was removed by Ofcom in 2004 in preference for market rather than regulated solutions. More recently, in 2014-15 the Government conducted a consultation in which it decided not to regulate 2G roaming because it found "*whilst national roaming offered the potential to deliver large coverage gains for consumers relatively quickly, it could also increase costs to MNOs and potentially impact on the investments being made by MNOs in the UK to deliver faster and better services for their customers.*"²⁷¹

Countries with regulated domestic roaming with commercial pricing

Countries that do have some form of regulated roaming generally allow participants to determine prices commercially. For example, **France, Italy** and **Denmark** regulate roaming by making it a condition of their spectrum auctions while **Norway, New Zealand** and the **US** have regulated roaming but allow participants to determine prices commercially.

The reasons these countries have regulated roaming are unique to each jurisdiction and not applicable to the Australian context. For example:

- In the **US**, there are a number of regional wireless carriers who have difficulty obtaining roaming arrangements with national carriers in their licensed area due to an asymmetry of bargaining power. This is not the case in Australia where all three MNOs are national and there is no asymmetry of bargaining power between them;
- In **New Zealand**, regulated roaming only occurred because the two incumbent operators (Spark and Vodafone) used incompatible technical standards, so the new entrant effectively only had a monopoly supplier once it decided which technical standard to use for its own network; and
- In **Norway**, only the two largest network operators – Telenor and Telia – have close to nationwide coverage. The third player, ICE, has coverage of approximately 75 per cent. While the two network operators are required to provide wholesale national roaming to ICE as it further builds out its own network, they are not required to provide roaming to each other.



Countries with domestic roaming regulation with regulated pricing

Canada is the only developed economy that Telstra is aware of that has imposed domestic roaming regulation with regulated pricing.²⁷² Roaming regulation imposed by the Canadian Radio-television and Telecommunications Commission (**CRTC**) only regulates the rates, terms and conditions on which the three major carriers provide wholesale roaming to other small wireless carriers. Roaming between the three major carriers is not regulated by the CRTC and is only provided for as part of spectrum licence conditions which do not regulate price. Regulation was imposed to enable smaller carriers to offer broad or national network coverage in competition with the three major carriers at the retail level in view of evidence that there was limited wholesale competition and competition from MVNOs.

This is clearly not the case in Australia where strong wholesale competition has facilitated the entry of a number of MVNOs and resellers into the retail market.



Table 18: Comparison of Australia to other jurisdictions where domestic roaming is regulated

	Australia	Canada	New Zealand	US	Norway
Current population coverage of largest carrier	Telstra 99.3%	Bell Mobility 99%	Vodafone 98.5%	AT&T 99.3%	Telenor 99.8% (2G)
Current population coverage of next largest carriers	Optus 98.5% Vodafone 97.0%	TELUS 99% Rogers 97%	Spark 97%	Verizon 97.4% T-Mobile 94.6% Sprint 92.4%	Telia ~100% (2G)
Current population coverage of new entrants / smaller regional carriers (excluding MVNOs)	N/A	New entrants: 76.2% ²⁷³ Other small carriers: coverage unknown	2degrees unknown (committed to rollout at least 65%)	There are many small, regional wireless carriers: coverage will differ for each	ICE 75%
Current MVNO share of retail market	~10% ²⁷⁴	<1%	< 1%	Unknown ²⁷⁵	10%
Competitiveness of market at the time roaming was considered (as assessed by the regulator)	Competitive ²⁷⁶	Less competitive wholesale market due to "lack of rivalrous behaviour"	Less competitive due to incompatibility between major MNO networks	The FCC considered there was effective competition in the CMRS market ²⁷⁷ but there was evidence that smaller carriers found it difficult to obtain access to national carrier networks at reasonable prices. The FCC, however, does not have to make	Less competitive (but this may be disputed given there are three MNOs, many MVNOs and service providers)



	Australia	Canada	New Zealand	US	Norway
				any finding relating to competition to regulate roaming. ²⁷⁸	
Is wholesale roaming regulated?	No	New entrants on MNO network – Yes by access regulation Between existing MNOs – Yes by spectrum license conditions	Yes	Yes	Telenor – Yes, to ICE (the third MNO), MVNOs and service providers by access regulation Telia – Yes, to ICE and also to MVNOs by merger undertaking
Are roaming rates between incumbents regulated?	No – commercial pricing	No – commercial pricing	No – commercial pricing	No – commercial pricing	No – commercial pricing (Telenor not required to provide roaming to Telia and vice versa)
Are roaming rates for smaller networks / new entrants regulated?	No – commercial pricing	Yes	No – commercial pricing	No – commercial pricing but has to be reasonable	No – commercial pricing, subject to non-discrimination and no margin squeeze
Reason for regulating roaming (where applicable)	N/A	Presence of regional carriers	Incompatible technical standards so new entrants have to deal with a 'monopoly' wholesale supplier	Asymmetry of bargaining power between regional carriers and national carriers	Facilitating third entrant's network deployment when they are only at 75% population coverage
Are the reasons for regulating roaming	N/A	No – there are no regional-based mobile	No – there is one technical standard in	No – all three MNOs in Australia are national	No – Vodafone, the third entrant into Australia,



	Australia	Canada	New Zealand	US	Norway
applicable to Australia?		providers and there is evidence of competition in wholesale MVNO arrangements, which enhances retail competition	Australia	and there is no asymmetry of bargaining power between them	has 96.9% population coverage



A.1 Countries moving away from and declining to regulate national roaming

France

France has at various times regulated roaming through spectrum auctions and licence conditions. In relation to 2G, the licences of existing mobile operators stipulated that 2G roaming had to be provided to new entrants with only a 3G licence (namely Free Mobile, as it entered when 2G licences had been allocated).²⁷⁹ Free Mobile's rights to 2G roaming expired in January 2016. In relation to 4G, as a result of the 800 MHz frequency spectrum auction in 2011, Free Mobile has a right to roam on SFR's network in priority rollout areas (the most sparsely populated parts of France).²⁸⁰

There are currently two major national roaming arrangements in France:

1. the Orange/Free Mobile 2G/3G roaming agreement, which was signed in 2011. Orange provided 2G roaming under this agreement in accordance with stipulations in its licence to provide 2G roaming to new entrants with only a 3G licence, while Orange commercially agreed to provide 3G roaming to Free Mobile; and²⁸¹
2. the commercial agreement between SFR and Bouygues Telecom that was signed in 2014, consisting of a network sharing agreement for the building of new parts of their 2G/3G/4G networks and a roaming agreement for the customers of SFR to roam on parts of the 4G network of Bouygues Telecom.

Although ARCEP initially welcomed these roaming agreements, more recently concerns have developed regarding the impact that roaming agreements have on investments in network infrastructure. This year, ARCEP has used new powers given to it by the French legislature in 2015²⁸² to engineer early termination of the Orange/Free Mobile roaming agreement, as well as the SFR/Bouygues Telecom 4G roaming agreement.

ARCEP's process began with an announcement in January 2016 of a consultation on roaming and network sharing in which ARCEP called for the early termination of both roaming agreements.²⁸³ In May 2016, following the consultation period, ARCEP issued guidelines that recognise that roaming can be beneficial, however *"...roaming can only be transitory or limited in scale, particularly given the disincentive to invest it could otherwise induce."*²⁸⁴ The guidelines accept that network sharing (e.g. sharing of masts and sometimes also active equipment, which is distinct from national roaming) *"can be a relevant solution in the more sparsely populated parts of the country, and acceptable provided that its negative impact, notably in the area of competition, can be offset by positive effects, and particularly in improving the coverage and quality of mobile services,"*²⁸⁵ which by implication suggests that ARCEP would prefer network sharing agreements be limited to those areas.

At the same time as the guidelines were issued, ARCEP began an 'adversarial' phase with the four MNOs in France to engineer changes to the existing national roaming agreements between these players. The result of 'high-level dialogue' during this adversarial phase was that, in June 2016, Orange and Free submitted amendments to their 2G/3G roaming agreements to progressively limit roaming by Free from January 2017 and to end their roaming agreement by 2020, and SFR and Bouygues Telecom undertook that SFR would cease roaming on Bouygues Telecom's 4G network by the end of 2018.²⁸⁶

ARCEP expects that the 'gradual phasing out of roaming services' will support continued network rollouts, particularly 4G networks.²⁸⁷ In essence, ARCEP's intervention has been with a view to not allowing roaming agreements to dampen incentives to invest in mobile infrastructure. The recognition that voluntary, commercially agreed rather than regulated network sharing may be a relevant long-term solution *"in more sparsely populated parts of the country"* is also significant.

The French competition authority has also taken an interest in these roaming agreements and in 2013 issued an opinion on the roaming arrangement enjoyed by Free. The authority concluded that while roaming can help encourage competition by lowering barriers to entry for a new operator, it warned:²⁸⁸



“roaming must be temporary as it also constitutes a risk to competition. Roaming helps to bring together the services offered by the guest operator and those of the host operator, based on important competition parameters such as quality of service, rates and coverage. In doing so, it reduces differentiation between operators.

It can lead to risks to the market structure. In fact, the parties to the roaming agreement are strengthened and the competitiveness of other network operators is, in relative terms, impaired. This can eventually unbalance the market, even more so when the host operator is a major player in the market and when the agreement is entered into over a long period of time and covers a large part of the territory.”

The authority recommended that Free's national roaming should not be extended beyond a reasonable deadline – 2016 for 2G and 2018 for 3G.

United Kingdom

1. Previous roaming regulation through spectrum licences

In 1999, the UK Government intended to impose a national roaming condition on all 2G operators. T-Mobile successfully challenged that condition. O2 and Vodafone 'voluntarily' agreed to have their licences varied to provide national roaming access to their 2G networks to new market entrants that obtained a 3G licence in the subsequent auction (possibly with the aim to avoid delays to the auction caused by a legal dispute regarding the roaming condition). The condition required each licensee to enter into commercial negotiations with new market entrants with respect to national roaming on their 2G network. The agreement would only take effect when the requesting MNO had rolled out its 3G network to cover 20 per cent of the UK population. The condition was also subsequently included in O2's and Vodafone's 3G spectrum licences. The condition was introduced prior to the auction so that, going into the auction bidding, *“new entrants would have a high degree of certainty as to the availability of roaming and the conditions upon which they would be able to conclude an agreement.”*²⁸⁹

The transposition of the 2002 EU Regulatory Framework for telecommunications²⁹⁰ into the UK Telecommunications Act 2003 abolished the notion of 'spectrum licenses' replacing it with 'authorisations', and required National Regulatory Authorities, including Ofcom, to apply a competition-based assessment to a defined set of markets, including wholesale markets for access to mobile networks.

Ofcom did not consider it possible to carry over O2's and Vodafone's roaming conditions since these conditions had been agreed voluntarily and were not formally a precondition for the 3G auction.²⁹¹

After a consultation process, Ofcom (successor to Oftel) decided that the imposition of a general access condition *“would not be proportionate or objectively justified.”*²⁹² Ofcom said the preferred policy should be for new market entrants to secure national roaming through market means rather than regulation. It also determined that a discontinuation notice be issued with respect to the national roaming licence condition.²⁹³

2. Industry investment trumps regulated roaming

Consultation on national roaming

In November 2014, the Department for Culture Media & Sport (**DCMS**) consulted on various proposals to help eliminate poor mobile coverage in the UK in response to growing concern around partial 'not-spots' in the UK.²⁹⁴ Options included:

- infrastructure sharing;
- Multi-Operator MVNO (where mobile services are retailed by an entity distinct from a MNO);
- national roaming on 2G (voice and SMS only, non-seamless and partial not-spots only); or



- do nothing.

Vodafone spoke out against national roaming saying:

“National roaming would also be extremely challenging from a legal and regulatory perspective as UK mobile operators have paid the Government hundreds of millions of pounds for spectrum licences on the basis of existing regulation founded on the principle of competing networks. Furthermore, national roaming would also harm the business case for further investment in rural coverage: why should any operator invest in providing better coverage for the benefit of a competitor?”²⁹⁵

Impact assessment

The DCMS conducted an impact assessment which found that national roaming would have a negative £187 million NPV over 10 years.

- This assessment accounted for potential losses due to both the disincentive for MNOs to invest in the 4G network, as well as potential slowing of the 4G rollout due to diverting resources to national roaming.²⁹⁶
- It also noted the risk called out by Ofcom that *“MNOs may decide to decommission certain sites where they overlap and concentrate on cost-reduction. Therefore, although partial not-spots would be reduced there may be some marginal increases in total not-spots.”²⁹⁷*

The DCMS found that the biggest indirect costs associated with national roaming relate to incentives for mobile operators to continually make investments on their network, saying:

“MNOs compete on coverage and therefore removing their ability to compete on this measure reduces their incentives to expand coverage”

“To carry out additional investment of the scale required to implement roaming will likely lead to an equivalent reduction in the available investment capital for 4G rollout.”

“[S]ome MNOs have built their culture and strategy around differentiating their product offering at the retail level. They are therefore likely to resist the change in strategy and culture that a wholesale mast-by-mast pricing regime would demand.”²⁹⁸

The DCMS found the key economic risks associated with this policy relate to impact on incentives for mobile operators to continually make investments on their network, saying:

- Regulated national roaming could *“result in MNOs reducing their expenditure on maintaining existing 2G networks as they ‘free-ride’ on the networks of others.”*
- *“MNOs are currently rolling out 4G and any additional investment in 2G networks could result in capital being diverted from this rollout. Similarly, while national roaming is proposed to be limited to 2G, any directive to mandate this on voice may be seen as setting a precedent for mandating sharing on data networks. This may further increase the investment risk.”²⁹⁹*

Government's decision not to regulate national roaming

After receiving over 1000 interested party responses, the Government concluded in March 2015 that:

“MNOs’ and DCMS’s technical consultants have advised that enabling roaming on a national scale is complex and would require work by MNOs to iron out the issues for roaming to work successfully. This means that whilst national roaming offered the potential to deliver large coverage gains for consumers relatively quickly, it could also increase costs to MNOs and potentially impact on the investments being made by MNOs in the UK to deliver faster and better services for their customers.”³⁰⁰

In its decision not to regulate national roaming, the Government noted its preference for a voluntary solution to be put forward by the industry, and to keep Government intervention to a minimum.³⁰¹ It also noted that:

“a number of respondents cautioned the Government to avoid any measures which will disincentivise investment in the mobile phone industry or inhibit genuine competition. The telecoms industry were joined



*by business and consumer groups in expressing concern that Government action should not act as a deterrent to the general expansion of mobile coverage to the long-term detriment of UK consumers. The industry called on the Government to act only if the benefits outweigh the costs, and to make it easier for operators to extend coverage by underwriting the costs of this.*³⁰²

This decision is consistent with internal Ofcom documents presented to its Policy executive in July 2013 which found:

“Our overall conclusion is that although national roaming has the potential to ensure that all customers can use their phones in any residual partial not spots, the risks and impact of unintended consequences are high. There is a very real risk that roaming would lead to erosion of coverage at the edges of networks, and (unless very well targeted) a loss of network resilience in some areas where there are currently two networks.”³⁰³

The document also called out potential consumer detriment and the importance coverage advantages play in justifying coverage in areas that would otherwise not be profitable:

“...we also believe that mandating a roaming obligation carries some important risks. For example, the additional cost of introducing roaming may be passed on to consumers; there may be a loss of network competition; and it may create incentives and opportunities for operators to coordinate behaviour. All would have negative implications for consumers.”³⁰⁴

“...if one network currently has the largest national coverage (as is the case with EE at present) and can benefit more widely from that coverage advantage, the profit loss associated with removing that advantage (through roaming) could be substantial. One way to see this is if the largest operator is able to charge a price premium nationwide because of its higher coverage, but there may be other advantages (such as lower marketing costs) which also translating[sic] into higher profits pre-roaming.

These wider coverage advantages may justify maintaining coverage in partial not-spots that otherwise based on local traffic would not be profitable. This network operator would lose the profits associated with this advantage when a roaming obligation is introduced. This means that post-roaming obligation some partial not-spots (where the largest coverage network was present) may no longer be profitable unless the roaming charge compensates the network for the loss of the coverage advantage to ensure that it makes a profit post-roaming obligation.”³⁰⁵

Voluntary industry solution agreed

Rather than regulate roaming, an industry solution was agreed with the Government in which all four carriers agreed³⁰⁶ to:

- a guaranteed £5bn investment programme to improve mobile infrastructure by 2017;
- guaranteed voice and text coverage from each operator across 90 per cent of the UK geography by 2017, halving the areas currently affected by patchy coverage as a result of partial not-spots;
- full coverage from all four mobile operators increasing from 69 per cent to 85 per cent of geography by 2017;
- provide reliable signal strength for voice for each type of mobile service (whether 2G/3G/4G); and
- make the deal legally binding by accepting amended licence conditions to reflect the agreement – enforceable by Ofcom.

As part of the agreement, the Government agreed to bring the agreement to the attention of Ofcom in the context of their work to revise Annual Licence Fees and reform the out-dated and ineffective Electronic Communications Code to make it easier for the whole communications sector to rollout out new mobile and broadband services, and increase choice for consumers.

There are similarities and important differences between the 1999 ‘voluntary’ agreement to offer national roaming by O2 and Vodafone and the 2015 ‘voluntary’ agreement with mobile operators not to impose national roaming. In both cases, a possibly lengthy ex-post dispute of a refusal to supply (1999) and a possible failure of coverage conditions (2015) respectively were avoided through what is in substance a type



of regulatory settlement. However, the outcomes are fundamentally different. In 1999, the outcome of regulatory negotiations was an acceptance by O2 and Vodafone of a national roaming condition, while in 2015 the result was not to impose national roaming.

The difference in these outcomes is due to the differences in market structure and regulatory objectives at the different times. In 1999, the market structure was such that existing networks had national coverage, while a new entrant had no infrastructure at all. The regulatory objective was to make entry of a fifth operator feasible. In 2015, the market had four competing operators organised in two joint ventures of access infrastructures, and the regulatory concern was one of a lack of rural coverage.

In 1999, the imposition of national roaming was seen as helpful in achieving the regulatory objective of establishing a fifth entrant, and arguably assisted in the success of 3 as an important competitive force in the UK mobile market. In contrast, in 2015, national roaming was not seen as instrumental towards achieving better coverage and was regarded as potentially endangering investment and effective competition.

A.2 Regulated roaming with commercially negotiated pricing

United States

In the US, automatic voice roaming is a common carrier obligation pursuant to sections 201 and 202 of the Communications Act, which requires commercial mobile radio service (**CMRS**) providers to provide domestic roaming for voice services on a just, reasonable and non-discriminatory basis to other technologically-compatible providers. In 2011, the FCC regulated data roaming on commercially reasonable terms where technologically feasible.³⁰⁷

While roaming is regulated, the US has chosen not to regulate roaming rates because of the potential impact on investment incentives, so mobile operators are free to commercially determine rates provided they do so on a reasonable basis.

Roaming appears to be necessary in the US because of the large number of small, regionally or locally based wireless carriers who have sought roaming arrangements with national carriers in their licensed areas.

1. The US market structure is different from Australia

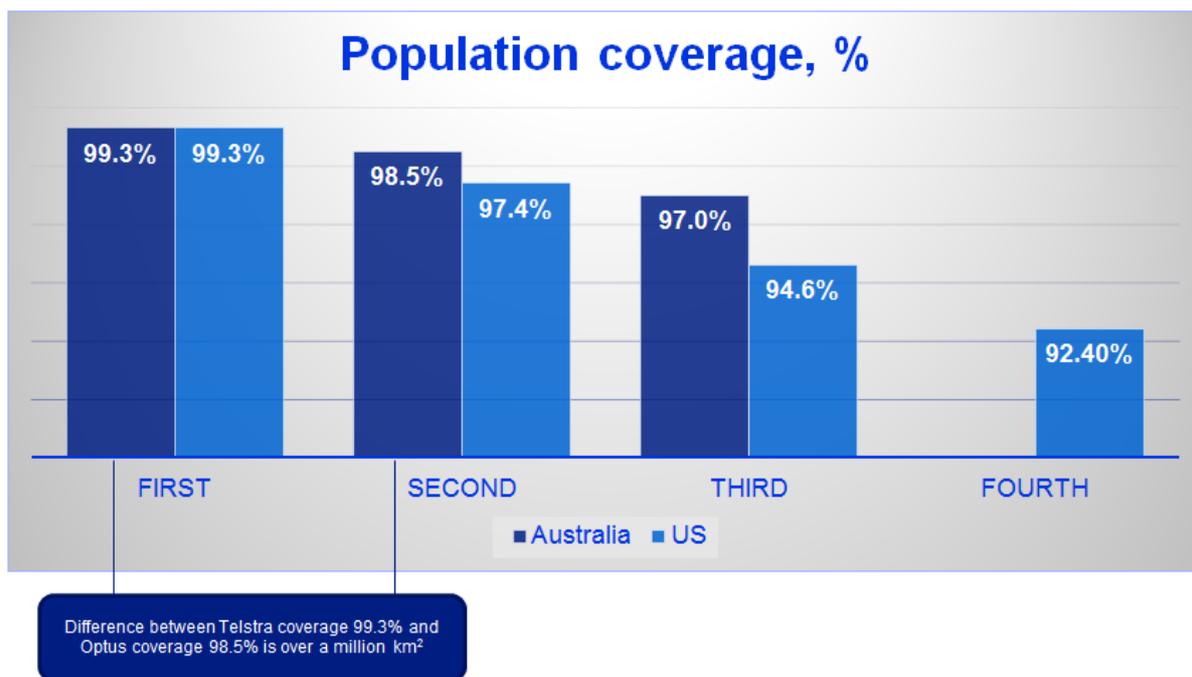
There are three main differences in market structure between Australia and the US.

1. *The coverage difference between the national carriers is lower in Australia than in the US*

The coverage difference between the national carriers is lower in Australia with Telstra covering 99.3 per cent of the population, Optus covering 98.5 per cent of the population and Vodafone covering 96.9 per cent of the population. In contrast, AT&T has the same population coverage as Telstra at 99.3 per cent while Verizon covers only 97.4 per cent, T-Mobile 94.6 per cent and Sprint 92.4 per cent. There is a material difference in population coverage between the national carriers in the US and Australia, particularly considering that a difference of 2-4 percentage points in population coverage amounts to a substantial increase in area coverage.



Figure 32: Population coverage of national carriers – Australia and the US



- The US has a number of small regional carriers who have sought roaming arrangements with national carriers in their licensed area

This market structure was caused by the FCC’s early licensing practices in the 1980s³⁰⁸ in which the FCC made two blocks of spectrum available in each designated cellular market area – one for a local wireline carrier that provided landline telephone service in the market area and the other to a non-wireline carrier. Originally, the FCC awarded non-wireline carrier licences through comparative hearings where parties with competing applications would argue why they were more deserving of the cellular licence than another. The FCC later adopted rules in 1984 and 1986 to issue the remaining licences by lottery. Hundreds of thousands of US citizens took part in the lottery through syndicates and were awarded licences to provide cell service to small regions in the US.

While this initial form of spectrum licence allocation ended in 1991, a number of small US wireless carriers still remain. In its 2007 decision to impose automatic roaming, the FCC found evidence that small wireless carriers were having difficulty negotiating roaming agreements with national carrier networks at reasonable prices, saying:

“We are mindful of the ongoing complaints by small, regional and rural carriers against the nationwide carriers that, under current market conditions, it is getting more difficult for small and rural carriers to obtain access to nationwide carriers’ networks through automatic roaming agreements.”

“RTG reports that ‘small rural carriers have experienced a spike in the cost for their customers to roam on the nationwide carriers’ network and an increased unwillingness by the nationwide carriers to enter into roaming agreements or renew existing ones.’”³⁰⁹

In contrast, Australia has no regional or local mobile carriers. Telstra, Optus and Vodafone all have national networks and there is no asymmetry in bargaining power between them.



3. *The four national carriers in the US operate on incompatible networks reducing the number of suppliers for national roaming on each of the GSM and CDMA networks*

Similar to New Zealand, not all carriers in the US use the same technology. AT&T uses the GSM (Global System for Mobile communication) technology which is the most common technology type globally and Verizon uses the less common CDMA (Code Division Multiple Access) network. Both carriers have 98-99 per cent population coverage. The other two national carriers – T-Mobile and Sprint – while serving similar percentages of the US population (94.6 per cent and 92.4 per cent respectively), cover considerably less of the US on a square mile basis than Verizon and AT&T. According to FCC estimates, T-Mobile, which uses the GSM network, and Sprint which uses the CDMA network, cover 42 per cent and 24 per cent of the US, respectively.³¹⁰ So while there might be 4 MNOs in the US, once an MNO has committed to a technology (GSM or CDMA) its choice of roaming partner is limited.

2. **The US has chosen not to regulate roaming rates because of potential impact on investment**

Despite deciding to regulate automatic roaming in 2007, the FCC “*decline[d] to regulate the automatic roaming rates, instead allowing the rates to be freely determined through negotiations between the carriers based on competitive market forces.*”³¹¹

In its 2007 decision, the FCC said:

*“...we are not persuaded that consumers would be harmed in the absence of a price cap or some other form of rate regulation.”*³¹²

*“Based on the foregoing considerations, we conclude that regulation of roaming rates is not warranted on economic grounds. In addition, however, we agree with concerns raised in the record that rate regulation has the potential to distort carriers’ incentives and behavior with regard to pricing and investment in network buildout.”*³¹³

*“Similarly, regulation to reduce roaming rates has the potential to deter investment in network deployment by impairing buildout incentives facing both small and large carriers. By enabling smaller regional carriers to offer their customers national roaming coverage at more favorable rates without having to build a nationwide network, rate regulation would tend to diminish smaller carriers’ incentives to expand the geographic coverage of their networks. In addition, by reducing or eliminating any competitive advantage gained as a result of building out nationwide or large regional networks, rate regulation would impair larger carriers’ incentives to expand, maintain, and upgrade their existing networks.”*³¹⁴

In 2011, the FCC addressed data roaming, requiring carriers to offer data roaming on commercially reasonable terms where technologically feasible.³¹⁵ Similar to its 2007 decision in relation to voice roaming, the FCC established a framework for individual negotiations of reasonable rates and terms based on market forces rather than prescribing data roaming rates.

In 2014, the FCC provided guidance for determining whether the terms of a data roaming agreement meet this ‘commercially reasonable’ standard.³¹⁶ According to the FCC, it will consider the totality of the facts, which permits a complaining party to adduce evidence in any individual case as to whether proffered roaming rates are substantially in excess of retail rates, international rates, and resale rates, as well as a comparison of proffered roaming rates to domestic roaming rates as charged by other service providers.

Further, industry commentary suggests that companies such as Sprint may be relying on roaming to provide service instead of investing in its own wireless network:

“A recent survey of FCC files indicates that T-Mobile has spectrum throughout the continental U.S. Yet, as shown by the coverage viewer on T-Mobile’s website, T-Mobile has failed to build out its network in extensive areas throughout the Midwest, Mountain, and certain Eastern portions of the U.S.,” said



AT&T's VP of Federal Regulatory Affairs Joan Marsh. "In these broad swaths of the country, T-Mobile holds PCS and AWS spectrum that it could use to provide broadband services. It instead has chosen to rely on roaming. In contrast, AT&T has built out its network in many of those same areas, and, notably, it did so with the same higher frequency spectrum T-Mobile holds. There is no reason T-Mobile could not do the same."³¹⁷

Likewise, "Verizon [has] said the FCC 'should reject Sprint's self-serving proposals and maintain its long-standing roaming policies that appropriately encourage carriers to expand and improve their wireless networks. . . . Sprint wants to rely on roaming instead of deploying its considerable spectrum assets and extending its network into more rural, less populated areas.' Verizon contends that Sprint wants to focus on improving its network in high-density areas and reaping profits as a result while ignoring investment in the rest of the country."³¹⁸

3. There is limited evidence that regulating domestic roaming in the US has promoted competition or investment

Evidence from the FCC's latest report analysing mobile market conditions shows that there has been increased consolidation in the market since 2012 and, as at 2015, the four nationwide service providers – Verizon, AT&T, Sprint and T-Mobile – accounted for approximately 98 per cent of the nation's mobile wireless service revenue, up from approximately 91.5 per cent in 2012 (Table 19).³¹⁹ The table also shows that the third and fourth largest national mobile providers – Sprint and T-Mobile – have not been able to 'catch up' with Verizon and AT&T through roaming.

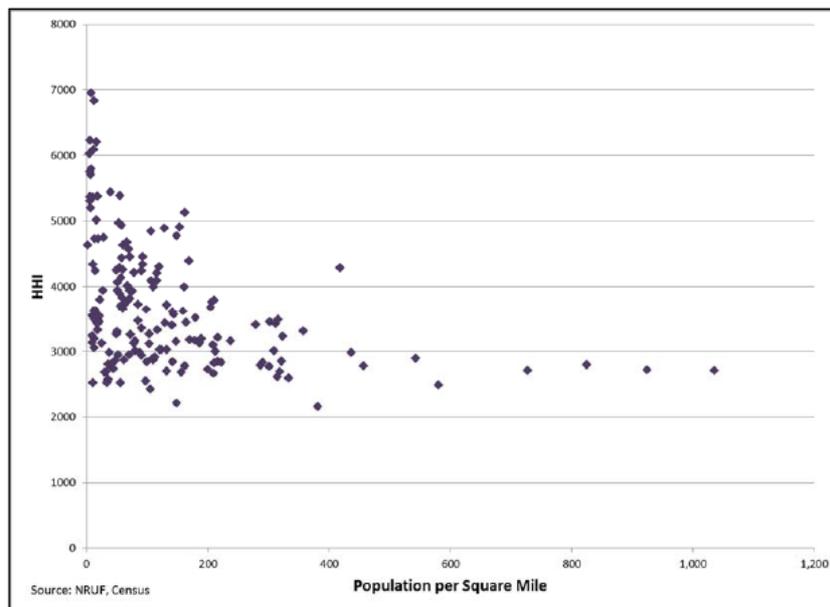
Table 19: Market shares for mobile wireless service providers based on service revenues

Nationwide service providers	2012	2013	2014	2015
Verizon Wireless	34.4%	36.5%	38.7%	38.1%
AT&T	32.0%	32.5%	32.5%	32.4%
Sprint	15.7%	15.5%	14.9%	14.0%
T-Mobile	9.3%	10.9%	11.9%	13.5%
Total nationwide service provider market share	91.5%	95.3%	97.9%	98.0%
Regional service providers	2012	2013	2014	2015
U.S. Cellular	2.2%	1.9%	1.8%	1.8%
Metro PCS	2.5%			
Leap Wireless	1.6%	1.4%		
NTELOS	0.2%	0.2%	0.2%	0.2%
Cincinnati Bell	0.1%	0.1%	0.1%	
Other	1.9%	1.0%		
Total regional service provider market share	8.5%	4.7%	2.1%	2.0%

Source: FCC Nineteenth Report.

In terms of the number of mobile wireless connections, the top four nationwide providers have 99 per cent of wireless connections.³²⁰ Also, as Figure 33 shows, to the extent that roaming was intended to increase the options for consumers in more rural / regional areas of the US, roaming has done little to reduce market concentration levels in areas which are less densely populated.³²¹

Figure 33: 2015 HHIs plotted against 2010 EA population density



Source: FCC Nineteenth Report.

While some of the above evidence can be explained by the rate of industry consolidation that has occurred in the US over the last 10 years, with Verizon, AT&T, Sprint and T-Mobile acquiring smaller, regional carriers,³²² it is still compelling evidence that regulating roaming has little impact on competition in mobile markets, with no major new entry or expansion brought about by the FCC's roaming policies. Other market forces (such as industry consolidation and broader economic conditions) are more likely to influence competitive dynamics.

New Zealand

In New Zealand, national roaming is a specified service meaning it is subject to mandatory supply obligations. There are, however, no pricing principles and the Commerce Commission can only determine non-price terms if there is a dispute. Roaming was regulated by the Commerce Commission because the two incumbent operators used incompatible technical standards, so the new entrant effectively only had one potential supplier once it decided which technical standard to use for its own network.³²³

4. Context

Historically, Vodafone operated a 2G and 3G GSM network and Spark operated a 3G only CDMA network. This meant that once 2degrees, the new entrant, decided which technological standard to use for its own network it effectively had only one potential supplier of mobile roaming services. Given Vodafone or Spark would essentially be a monopoly supplier to 2degrees, the Commerce Commission found there was a heightened risk that 2degrees would not be able to secure roaming commercially and therefore recommended an access requirement as an important backstop to commercial negotiations. Despite this, the Commerce Commission chose not to impose pricing regulation given the costs, uncertainty and delay of a more intrusive regulatory approach.³²⁴



While Spark closed down its CDMA network in 2012, because 2degrees has chosen Vodafone as its roaming partner, the two incumbents are still not practical substitutes as 2degrees' customers handsets are only able to roam on Vodafone's network. This is because Telecom's network uses the 850 MHz and 2100 MHz frequencies, whereas both Vodafone and 2degrees use the 900 MHz and 2100 MHz bands. On this basis, the Commerce Commission found in its last review of national roaming in 2013 that roaming is not competitive for 2degrees and should therefore remain a specified service.³²⁵

5. Vodafone's view

In its 2013 submission to the Commerce Commission in its review of national roaming, Vodafone said:

"While a minimum level of population coverage may be necessary to offer a viable and competitive service as a new entrant, it is not necessary that established network operators provide a new entrant identical network coverage to effectively compete. Australia is a good example of a competitive market where the operators have quite different coverage."

"The ACCC does not regulate national roaming. The competitive market has been allowed to develop so that established network operators competitively differentiate their services, including on the basis of network coverage... Any further review must ensure that the obligations are current and reflect the developments of the market. Vodafone recommends that such changes include naming 2Degrees as an incumbent operator similar to the status of Vodafone and Telecom, and the unwinding of the obligation for 2G roaming."³²⁶

6. The New Zealand experience is not applicable to the Australian context

New Zealand's experience is not relevant in the Australian context. Unlike in New Zealand, all carriers in Australia have always used compatible technical standards for their mobile networks. Therefore, if one carrier wanted to roam on another carrier's network it would have the ability to negotiate roaming arrangements with two other networks. If a new carrier enters the Australian market, then they would be able to negotiate a roaming agreement with three other networks. Further, all three carriers in Australia are well established with mobile networks covering more than 96.9 per cent of the population.

This is not the case in New Zealand where, having chosen the 900 MHz band, 2degrees is committed to Vodafone as its roaming partner. Thus while 2degrees is now well established in the retail market, with over 20 per cent market share, has commercial roaming agreements with Vodafone and is rolling out its own network, roaming is still regulated. This is likely due to the Commerce Commission's focus on the fact that, as a matter of technology choice, Vodafone is a monopoly supplier to 2degrees. For that reason, the Commerce Commission would likely require long-term contracts or all 2degrees' customer handsets to be compatible with the Vodafone and Spark networks before it would consider deregulating roaming.

Norway

The Norwegian Communications Authority's (**NKOM**) decision in 2016 to maintain a requirement on Telenor to offer national roaming was intended to ensure that ICE, the third MNO (with only 75 per cent population coverage), is able to offer national coverage while further developing its own network to ensure Norway has a viable third mobile network.

1. Context

Until 2008, there were two GSM networks in Norway (operated by Telenor and Telia) and one CDMA network (operated by ICE) that was only capable of carrying data traffic. In 2008, the third GSM network began to be rolled out in a joint venture between Tele2 and Network Norway called Mobile Norway. Tele2 and Network Norway merged in 2011.



By 2015, the Mobile Norway network had achieved a population coverage of around 75 per cent. However, having failed to capture spectrum in the 800 MHz, 900 MHz and 1800 MHz bands (ICE acquired these frequencies) Tele2's residential customer base was acquired by the second largest carrier, Telia, and the Mobile Norway network together with Tele2's business customer base were divested to ICE. A condition for clearance of the acquisition of Tele2 was that Telia provide national roaming to ICE and also offer wholesale access to MVNOs.

2. Regulation of wholesale access (including national roaming) by NKOM

In large part due to perceptions of having superior network coverage, Telenor has for some time been regarded by NKOM as having substantial market power (**SMP**) in the market for Mobile Access Call Origination (**MACO**), and as a result of this has been under a regulatory obligation to provide wholesale access to MNOs that require national roaming, MVNOs and, more recently, also service providers. Telenor's obligation to provide wholesale access does not extend to providing national roaming to the second largest MNO (Telia), which has similar population coverage, but perhaps less geographic coverage than Telenor.

Telenor's wholesale prices are not determined by NKOM, but Telenor is under obligations including not to discriminate in its wholesale pricing, not to margin squeeze, to prepare separate accounts, and to publish reference offers.

In 2016, NKOM decided to continue to impose an SMP obligation on Telenor requiring Telenor to supply wholesale MACO (including national roaming).³²⁷ The primary reason for its decision in relation to the requirement to provide national roaming was that *"the principal objective of the regulation in the market for access and call origination on mobile networks has been to achieve sustainable, infrastructure-based competition, and the electronic communications authorities are of the view that a third operator is necessary for achieving this objective."*³²⁸

NKOM stated that *"...national roaming has been considered to be an important form of access because it enables new network owners to offer national coverage and therefore able to offer competitive services while the network is being developed."*³²⁹

While ICE currently has an access agreement with Telia, NKOM found that in the next 2-3 years ICE may wish to renegotiate the terms of its access with Telia or negotiate a new agreement with Telenor and found that *"there is no reason to assume that ICE has adequate negotiating power to discipline Telenor's offer of access to national roaming... it is necessary to have a regulatory safety net that enables ICE to effectively negotiate such access."*³³⁰

NKOM's decision appears to be temporary; designed to aid ICE to become a viable competitor with NKOM stating, *"Nkom is of the opinion that access to national roaming will, from a limited forward looking perspective, be necessary for ensuring that an operator that constructs its own mobile network is able to offer competitive services and thereby assist in achieving the objective of sustainable competition."*³³¹

3. The experience in Norway is not applicable to the Australian context

Norway's situation is very different from Australia's. NKOM's decision is designed to aid a later entrant with a smaller network coverage to offer national coverage to its customers while it further builds out its own mobile network in a market with only two major network operators with close to nationwide coverage. This is very different to Australia which has three major mobile network operators already with very similar nationwide mobile coverage.

Far from being a new entrant, Vodafone entered the market in the early 1990's, has had access to spectrum to deploy successive 2G, 3G and 4G technologies and now has a mobile network spanning 97 per cent of the Australian population. While NKOM's access decision is designed to allow ICE to offer its customers national coverage while it invests in its network to match the coverage of Telenor and Telia, Vodafone already has national coverage through its own network and a commercial roaming agreement with Optus.³³² Access to



Telstra's network would be unlikely to encourage Vodafone to further invest in its network, the way NKOM's decision is designed to incentivise ICE. Rather, it would likely halt any further investment in Vodafone's network. It is notable that Telenor does not have any obligation to provide national roaming to the second largest player, Telia, which has a population coverage that is similar to Telenor's, but perhaps slightly less depth of coverage and less geographic coverage in some areas.

A.3 Access regulation with regulated pricing

Canada

The CRTC regulates the rates, terms and conditions on which the three major carriers (Bell Mobility, Rogers and TELUS) provide GSM-based wholesale roaming to other smaller wireless carriers, including regional carriers and new entrants. That is, the CRTC does not regulate roaming amongst the three major carriers. The CRTC considered that regulated roaming was necessary to facilitate the offer of broad or national network coverage by smaller wireless carriers, including new entrants to allow those carriers to compete with Bell Mobility, Rogers and TELUS in the downstream retail market.

While at a high level Canada's market bears some structural similarities to Australia (three major MNOs, small population spread over a large land mass), Canada also has a number of small and regional MNOs and relatively few MVNOs as there is little or no competition between the large MNOs to provide wholesale services to smaller carriers and MVNOs. In contrast, Telstra, Optus and Vodafone all provide wholesale services to MVNOs and/or resellers, which has facilitated the entry of these players into the retail market and thus enhanced competition in the thriving retail market.

1. The roaming regulatory regimes in Canada

There are two different roaming regulatory regimes in Canada: (1) roaming through spectrum licence conditions; and (2) GSM-based wholesale national roaming.

Industry Canada initially regulated roaming at commercial rates as a condition of the 2008 spectrum auction primarily to assist new entrants. New entrants could get roaming within their licensed territories for 5 years. Any carrier, including new entrants, could get roaming outside their licensed territory for 10 years. The parties would negotiate the conditions of roaming and these would also be settled by an independent arbitrator if the parties could not agree. Industry Canada also created some rules regarding what was and was not considered to be roaming under the licence condition (e.g. roaming should function without the need for any special facilitating action by the customer).

In March 2013, the conditions of licence for mandatory roaming were changed to remove the distinction between new entrants and other carriers as well as the distinction between in-territory roaming and out-of-territory roaming.³³³ This meant that all carriers could obtain roaming from all other carriers indefinitely. Roaming was still at commercial rates and still enforced by arbitration.

In June 2014, section 27.1 was added to the Telecommunications Act which capped domestic wholesale roaming rates at average retail revenue per minute for voice, average retail revenue per MB for data and average retail revenue per SMS for text. However, the CRTC had already begun to review domestic roaming and the legislation stated that rates set by the CRTC would prevail over these caps.

In Telecom Decision CRTC 2014-398, 31 July 2014, *Wholesale mobile wireless roaming in Canada – Unjust discrimination/undue preference*, the CRTC found that domestic wholesale roaming rates were higher than wholesale international roaming rates with US carriers. The CRTC found that this was an undue discrimination. The CRTC rendered any exclusivity clauses in domestic roaming agreements inoperative but took no other action because of section 27.1 of the Telecommunications Act.

In Telecom Regulatory Policy CRTC 2015-177, 5 May 2015, *Regulatory framework for wholesale mobile wireless services (CRTC 2015 Decision)*, the CRTC found that Bell Mobility, Rogers and TELUS collectively



held market power for domestic wholesale roaming services and that these were essential services.³³⁴ As a result, the CRTC stated that it would regulate rates for domestic wholesale roaming using a long-run incremental costing methodology and recommended the repeal of section 27.1 of the Telecommunications Act.

The CRTC 2015 Decision directed the three major carriers, Bell Mobility, Rogers, and TELUS to provide GSM-based wholesale roaming subject to the rates, terms, and conditions established by the CRTC to Canadian wireless carriers **other than** Bell Mobility, Rogers, and TELUS. In other words, the decision does not apply to roaming amongst the three major carriers.

Section 27.1 of the Telecommunications Act was subsequently repealed effective 1 July 2015.³³⁵

2. Lack of rivalrous behaviour between major carriers

The CRTC 2015 Decision found that it was necessary to regulate the rates, terms and conditions on which Bell Mobility, Rogers and TELUS supply **other** Canadian wireless carriers because *“there is a lack of rivalrous behaviour in the national market for GSM-based wholesale roaming between the national wireless carriers.”*³³⁶ It found, *“there is little, if any evidence...that the national wireless carriers compete with each other for the business of smaller wireless carriers”*³³⁷ and that the carriers *“collectively have the ability and incentive to...maintain rates and impose terms and conditions that would not prevail in a competitive market.”*³³⁸

The CRTC 2015 Decision also noted the lack of competition from MVNOs in the retail market, stating that *“there are few wholesale MVNO access arrangements in Canada, despite significant demand”*.³³⁹ The CRTC considered that the *“denial of access to the national wireless carriers’ GSM-based networks has resulted in the prevention of competition from MVNOs in the downstream retail market and, consequently, fewer choices for consumers.”*³⁴⁰

This suggests a behavioural concern that the three major carriers did not constrain each other's competitive behaviour at the wholesale level of the mobile market, with implications for downstream retail competition.

3. The Australian wholesale and retail markets are competitive

In Australia, the market is vastly different. Telstra, Optus and Vodafone compete vigorously for the business of MVNOs and resellers. In Australia, many MVNOs are large companies with countervailing power such as Woolworths and Aldi. Further, Telstra, Optus and Vodafone regularly lose MVNO business to each other as a result of competitive tender processes. This contrasts to Canada where there are almost no MVNOs and small wireless carriers are reportedly subject to high wholesale prices, and have difficulty negotiating commercial terms and exclusivity clauses due to the lack of wholesale competition between the three nationwide carriers.

The competitive wholesale mobile market in Australia is further evidenced by a competitive retail market with end users benefiting from low prices, additional inclusions and high data plans as a result of competition between MNOs, between MNOs and MVNOs, and between MNOs, MVNOs and resellers.

In contrast, based on 2014 figures cited in the CRTC's *Communications Monitoring Report 2015*, Bell, Rogers and TELUS have approximately 90 per cent retail market share (in terms of number of subscribers). The remaining 10 per cent is made up of new entrants, local carriers (such as MTS Allstream and SaskTel), other smaller carriers and MVNOs (with less than one per cent market share).³⁴¹ Another point of difference between Australia and Canada is that Australia has no regional-based carriers that require roaming services from the nationwide providers to compete nationally. All of Australia's mobile carriers operate nationwide and the mobile market is national.



4. The Canadian experience is not applicable to the Australian context

The clear differences between the Canadian and Australian markets mean that the Canadian experience is not applicable to the Australian context. The wholesale market is competitive and Vodafone is not akin to a small wireless carrier requiring access to a national network because Vodafone itself owns and operates a national network which rivals the population coverage of Telstra and Optus. Even though it regulated roaming for the benefit of the smaller wireless carriers, the CRTC did not take the extra step of regulating the price and terms on which Bell Mobility, Rogers and TELUS provide mobile roaming to each other, which is required as a condition of their spectrum licences rather than a CRTC access regime.



APPENDIX B: ACCC Q&A

This Appendix responds to the questions in the ACCC's Discussion Paper and cross-references to where further information can be found in this submission or other appendices.

1. *How relevant have government funding programs been in assisting the MNOs in establishing their competitive positions in the mobile services market in regional areas? Please provide reasons for your view.*

Government funding programs are aimed at supporting MNOs to build out coverage in areas that may otherwise be uneconomic on a direct revenue basis. While this has been important to provide mobile coverage to regional and rural areas that may otherwise not have received coverage, Government funding makes up only a small proportion of MNOs' investments. For example, the Government funding that Telstra received in FY06-FY15 accounted for less than one per cent of Telstra's mobile investment spend on a fully-allocated basis excluding spectrum purchases and renewals during that period. Further, the majority of Government funding provided to MNOs requires significant MNO co-investment and is allocated through competitive tender processes. For further discussion, see sections 2.4.4 and 4.6.1.

Funding that Telstra has received as part to deliver the Universal Service Obligation (**USO**) has been used to ensure standard telephone services and payphones are reasonably accessible to all people in Australia. That is, it has been used in the supply of Telstra's fixed telephony network. This funding has not been used in the deployment of its mobile network. An independent study of Telstra's USO costs (the Castalia Report) found the majority of USO costs are associated with Telstra's copper access network which is not used to provide mobile services. Where USO services utilise part of Telstra's core network, Telstra is only compensated for a proportion of those core costs. The study excluded costs (including an allocation of common costs or shared infrastructure) attributable to infrastructure used for non USO services in regional and rural Australia. For further discussion, see section 4.6.3

2. *What is the extent of mobile network co-location of infrastructure (or infrastructure sharing) in:*
 - (a) *regional Australia?*
 - (b) *metropolitan Australia?*

There is extensive tower sharing on Telstra's mobile infrastructure. Telstra also co-locates on many sites that it does not own and many of those sites also host other MNOs.

Telstra has provided information about the extent of mobile network co-location of infrastructure in sections 2.4.1 and 4.5 and in sections 2.2 and 4 of Robert Joice's statement.

3. *How effective is the facilities access regime in promoting access to mobile network infrastructure, in both regional and metropolitan areas? Are there any limitations of the facilities access regime in facilitating the expansion of mobile networks in regional Australia?*

There is a high level of infrastructure sharing supported by bilateral agreements between the MNOs.

The effectiveness of the facilities access regime in supporting deployment of competing mobile networks in regional and rural Australia is illustrated by the fact that on Telstra towers there is a higher proportion of tower sharing in regional and rural areas than in metropolitan areas.



Industry participants periodically review the facilities access regime in a bid to improve the process for co-location. Telstra acknowledges the value in further industry consultation (including with non-carrier tower owners) with a view to seeking agreement on further potential improvements.

For further discussion, see sections 2.4.1 and 4.5 and Robert Joice's statement.

4. *Would more extensive co-location requirements be an effective substitute for mobile roaming services?*

As infrastructure-based competition delivers better customer outcomes than resale competition through domestic roaming, effective facilities access arrangements are the preferred approach. They support deployment of competing infrastructure by a subsequent MNO in an area at substantially reduced upfront costs compared to the first-in MNO. Telstra believes the current facilities access arrangements are effective, as demonstrated by the level of access requests, of accepted requests and of co-location achieved on Telstra sites. However, the facilities access arrangements (including the Facilities Access Code) have been periodically reviewed to identify improvements, and Telstra believes it would be useful to undertake a further review now involving MNOs and third party tower owners, including the non-carrier commercial tower space providers which are not covered by the Code.

For further discussion about co-location under the facilities access regime, see sections 2.4.1 and 4.5 and Robert Joice's statement.

5. *To what extent does regulation of the DTCS, including through regulated pricing, assist MNOs in extending their mobile networks in regional Australia? Please explain your views.*

The mobile transmission market in regional and rural areas is increasingly competitive as a result of wholesale competition to provide backhaul to MNOs, which will potentially intensify if nbn co enters the market as a backhaul service provider. In regional and rural areas which are considered non-competitive, prices for backhaul have fallen dramatically, with the average regulated DTCS price in regional areas recently being reduced by 72 per cent (section 2.4.3).³⁴² The option to buy commercial or regulated backhaul substantially reduces the upfront capital costs faced by a subsequent MNO entrant (with facilities access allowing those upfront capital costs to be further reduced).

6. *Are international arrangements for the regulation of mobile roaming relevant to the Australian market? Please provide reasons for your view.*

International arrangements for the regulation of mobile roaming are not relevant to the Australian market:

- Where roaming has been regulated in other jurisdictions, this has been to address circumstances unique to the mobile market in that jurisdiction, which are not applicable to Australia. For example, in Canada, roaming regulation was imposed by the CRTC to enable smaller, regional carriers to offer broad or national network coverage in competition with the three major carriers. In Australia, all three MNOs are national. Further, the CRTC only regulates the rates, terms and conditions on which the three major carriers (Bell Mobility, Rogers and TELUS) provide wholesale roaming to other small wireless carriers. Roaming between the three major carriers is not regulated by the CRTC and is only provided for as part of spectrum licence conditions which do not regulate price.
- Where roaming has been regulated, the extent of coverage is lower than achieved in Australia through the operation of market forces, e.g. in Canada and New Zealand which have low population densities like Australia.



- Where roaming is regulated, regulators have been cautious to ensure that ongoing investment is encouraged and have, for example, declined to impose price regulation. This measure is not open to the ACCC, which will need to set regulated pricing if domestic mobile roaming is declared.

For further discussion, see section 4.9 and Appendix A.

7. *Where have international regulators made decisions not to regulate domestic mobile roaming services? Are such decisions relevant to the regulation of mobile roaming in Australia? Please provide reasons for your views.*

In the UK, national mobile roaming on 2G was considered in 2014-15 as part of the partial 'not-spots' consultation. The UK Government decided not to regulate roaming because of the potential impact on investment incentives and considered that the most effective solution was including a coverage obligation in spectrum licences with some element of site sharing.

For further discussion, see section 4.9 and Appendix A.

8. *What has been the impact of regulation of mobile roaming on competition and investment internationally? If possible, please outline whether it has impacted investment in regional and metropolitan areas to different extents.*

A number of jurisdictions which have experience with regulated roaming have removed roaming requirements because of concerns that regulated roaming adversely impacts investment incentives in their markets.

For example, in France there are currently two major roaming arrangements (one which provides for 2G roaming by Free on Orange's network in accordance with stipulations in its licence and another which is a commercial 4G roaming agreement between SFR and Bouygues Telecom). Although the communications regulator (ARCEP) originally welcomed these roaming agreements, more recently concerns have arisen about the impact of roaming agreements on investment in mobile network infrastructure. ARCEP was given new powers by the French legislature in 2015 to engineer the early termination of national roaming agreements and ARCEP is now using those powers to gradually phase out roaming agreements to ensure that investment incentives and in particular the rollout of 4G networks are not adversely affected. ARCEP considers that regional investment and connectivity targets can be fully achieved through the competition model in place within the mobile industry.

The UK is another jurisdiction where roaming was previously regulated through spectrum licence conditions, but has since been removed in preference for market rather than regulated solutions. Further, as discussed in question 7 above, the UK Government considered that regulating national roaming would disincentivise investment and inhibit genuine competition.

Vodafone and Optus investment under current regulatory and policy settings has resulted in broader population coverage than other number two and three carriers in most countries (Figure 4 in section 1.1.1).

For further discussion, see section 4.9 and Appendix A.



9. *What are the relevant markets for the declaration inquiry?*

Telstra agrees with the two relevant markets outlined in the ACCC's discussion paper:

- The relevant market in which the service in question is supplied would be the market for wholesale mobile roaming services which MNOs supply to each other.
- The relevant market in which declaration may affect competition is the national retail market for mobile services.

However, as Professor Yarrow comments, the ACCC's assessment of whether to declare should not turn on market definition, and might be distorted by an overly narrow definition of market:

“The binary, comparative assessment of the [‘without declaration’ position] and the [‘with declaration’ position] does not require that a view be formed as to the scope of any relevant markets and Part XIC of the CCA does not require the ACCC to undertake or to pay particular regard to market definition. Legal requirements and good practice economic assessment are well aligned in this respect, because it is appropriate to take a broad look at the economic context so as to capture all material factors that are relevant to the decision and also all material effects of the decision that might be taken. In doing this it may be found that some aspects of the economic context merit greater attention than others, but market definition as such does nothing to assist in this exercise: indeed it is frequently a source of potential error.”

The more important point, as Professor Yarrow concludes, is to look to the “*demand complementarities associated with the existence of geographically mobile customers*” and then to consider how this plays out in terms of pricing, coverage and investment.

10. *Is the relevant retail market a national market or are there separate regional markets for mobile services? If there are separate regional markets for mobile services, how would the boundaries of these markets be determined?*

Telstra considers that the relevant retail market is a national market. Again, even if there were sub national or regional markets, the more important factor is, as Professor Yarrow notes, the “*demand complementarities associated with the existence of geographically mobile customers*” which should not be obscured by market definition.

11. *Please describe any mobile roaming arrangements currently in place and whether such arrangements have changed since the previous inquiry? Are current arrangements or agreements limited in terms of geographic scope or technology, and if so how?*

Telstra does not currently have any mobile roaming arrangements in place.

The Optus-Vodafone roaming agreement was struck after the ACCC's decision not to declare roaming in 2004. This demonstrates that, in the absence of regulation, there are commercial incentives to negotiate roaming. Telstra has no more knowledge of the geographic limitations of the Optus-Vodafone roaming agreement than, as stated in the ACCC's Discussion Paper, Vodafone roaming is limited to areas of overlap between Optus and Telstra and does not extend to areas where Optus is the only MNO.

There are regulatory obligations which require the MNOs to have arrangements in place with each other to allow customers to make emergency calls on another network when out of range of their home network.³⁴³



12. *Are there any current negotiations for new roaming agreements? Has there been any request for mobile roaming service which has been refused in the past three years? If so, what were the reasons for any such refusal?*

Telstra is trying to win Vodafone's roaming business after its current contract with Optus expires in 2018. [REDACTED]

13. *Are roaming agreements for areas where there is limited infrastructure based competition likely to be reached in the future? Please provide reasons for your views.*

Vodafone and Telstra are currently negotiating a commercial roaming arrangement to replace the Optus-Vodafone roaming agreement when it expires. [REDACTED]

14. *Is competition effective in the mobile services market and how does it differ in metropolitan and regional areas of Australia? Please provide evidence and reasons for your views.*

As set out in section 1, Australian customers benefit from one of the most competitive mobile markets in the world. The overwhelming majority of customers in regional and rural areas have a choice of three MNOs and up to 60 MVNOs – the same level of choice as in metropolitan areas. Even customers in an area served by only one MNO still benefit from nationally averaged prices and plans driven by intense competition in other areas.

15. *How does Telstra's coverage advantage in areas where it is the only MNO affect its ability to compete for customers in the national retail mobile services market? How does this compare to its ability to compete for consumers in regional areas? Please provide evidence and reasons for your views.*

As explained in section 2.1, all customers value coverage around where they live and work, but a significant number of people also value coverage in other geographic areas. This includes metropolitan customers who, although they place greater relative importance on metropolitan coverage, also value coverage in regional and rural areas. By investing in superior coverage, Telstra is able to satisfy demand of a substantial number of customers who highly value extensive quality coverage by their MNO. This enables Telstra to compete for customers in both regional and metropolitan areas who value quality coverage in regional and rural areas. However, there are also other customers for whom coverage, while important, is relatively less influential than other factors, e.g. price, and the other MNOs compete more keenly for these customers. These outcomes are to be expected in a competitive market.

16. *What are the key drivers of competition for mobile services in metropolitan and regional areas of Australia?*

As discussed in section 2.1, there are a range of factors that influence buying decisions of customers, and customers give different weighting to those factors. Coverage, network quality and price are the most influential factors, however different customers place different relative importance on these factors. As such MNOs make independent strategic business and investment decisions about how to differentiate themselves along price and various network quality dimensions which is driving dynamic competition in mobile markets in Australia.



17. *Is there any regional variation (e.g. price, inclusions, terms and conditions) in retail mobile services offered in Australia? If yes, please provide evidence to support your views.*

There is no regional variation in retail mobile services offered in Australia as mobile service providers offer plans on a nationwide basis.

18. *How does the price and range of Telstra's retail offers compare to those of other mobile service providers? Do you consider that the higher prices charged by Telstra in comparison to other mobile services on the market constitute a premium? What factors do you think contribute to Telstra's ability to charge a higher price? Please provide information about the level of any premium and evidence to support your views.*

Telstra's prices unadjusted for quality tend to be higher than the other MNOs. This is an outcome of Telstra's strategy to invest heavily in coverage and network quality, including in regional and rural Australia, in order to attract those customers who are willing to pay for superior mobile network coverage. Describing Telstra's higher charges as a premium potentially obscures the fact that the higher prices allow Telstra to make significant investments in mobile infrastructure, including investment in areas of regional and rural Australia which would be uneconomical on a standalone basis. Telstra's higher prices provide greater value for which a substantial group of customers are prepared to pay for and is the result of Telstra's investment strategy.

For further discussion, see sections 2.1 – 2.3.

19. *Is the extent of competition for mobile services in regional areas likely to change in the future in the absence of declaration? Please provide reasons for your views.*

As described in section 1.1.3, the coverage race is not over. All three MNOs have announced plans for further investment in coverage, including in regional and rural areas. Further Government funding programs such as Round 2 of the Mobile Black Spot Programme which was announced on 1 December 2016, also facilitate the expansion of mobile network coverage to areas where there is currently no coverage.

It can be expected that competition in the absence of declaration will continue to deliver world-leading benefits to Australian customers, including improved depth and breadth of coverage that will increase choice of providers for customers in the most remote parts of Australia.

20. *How would declaration affect competition in markets for wholesale mobile services?*

As discussed in section 1.1, intense competition from MVNOs is a particular feature of the retail mobile market and this is facilitated by a competitive wholesale market. Strong competition between MNOs to provide wholesale services to MVNOs is evident from the recent entry of MVNOs including Kogan, Woolworths and Coles and MVNOs switching between networks. Because competition for wholesale mobile services is driven by infrastructure-based wholesale providers, the reduction in infrastructure-based competition if roaming is declared will also reduce competition for wholesale mobile services by reducing the competing coverage areas in which MNOs offer wholesale services.

Regulated roaming is likely to have similar effects at the wholesale level as at the retail level, whether or not the access seeker uses roaming to extend its coverage for wholesale MVNO services (section 3.3). Any unwinding of nationally averaged retail pricing is likely to also be reflected in an unwinding of nationally averaged wholesale prices. In addition, if an access seeker uses roaming to provide wholesale MVNO services, the access seeker MNOs will seek to recover roaming charges from the MVNOs, and in turn the MVNOs will likely also seek to recover these increased costs by passing them on to their customers.



21. *How would declaration affect competition for retail mobile services in regional areas and nationally? Please provide reasons and any available evidence for your views.*

Competition for retail mobile services will be less dynamic if roaming is declared as it will remove infrastructure-based competition which has been such a defining feature of mobile markets in Australia. As discussed in section 3, because declaration will neutralise efforts by the MNOs to obtain, maintain or reduce a coverage advantage, there will be no incentive to invest in regional and rural areas which are uneconomic on a standalone basis. Resale competition on a single network would replace infrastructure-based competition between two or more network providers. The result will be higher prices, less innovation, reduced service levels for all customers as a result of congestion and slower speeds, and a poorer customer experience for customers using roaming.

22. *To what extent do consumers in regional Australia see Telstra as the most viable choice of service provider? If so, please provide an estimate of the proportion of such consumers and evidence to support your views.*

As the Australian Government Regional Telecommunications Review concluded, regional customers depend on mobile coverage more than metropolitan customers, which is consistent with Telstra's market research which shows regional customers value regional coverage more highly than metropolitan customers. A substantial group of customers in regional areas will, therefore, value highly the superior regional and rural coverage in which Telstra has invested. Telstra's higher market share in regional and rural areas reflects the competitive success of Telstra's business and investment strategy. However, as discussed in section 1.2.1, many customers in regional and rural areas have a choice of multiple providers and [REDACTED]

23. *To what extent do consumers in regional areas benefit from competition in the national retail mobile services market? Please explain your response.*

As prices are nationally averaged, customers in regional and rural areas where there is only one or two MNOs benefit from intense retail competition in areas (which represent most of the market) where there are three MNOs and up to 60 MVNOs (section 1.2).

24. *What are the key factors that influence consumer choice of service provider in:*

- (a) *metropolitan areas?*
 (b) *regional areas?*

As discussed in section 2.1, customers choose their mobile service provider based on a range of factors, but coverage and price are the two most important. Network reliability is also an important factor for customers. There are some differences in the relative importance of these factors between metropolitan and regional customers, with regional customers valuing better network coverage relatively more than metropolitan customers and metropolitan customers placing more importance than regional customers on price. There are also differences in the relative significance which Telstra, Optus and Vodafone customers give to the factors influencing their buying decisions, which reflect the different business strategies of the three MNOs.



25. *How important is geographic coverage, as distinct from population coverage, to consumers living in metropolitan areas?*

In Telstra's view, customers do not segment coverage into geographic and population coverage. Customers who value coverage highly simply want to be able to use their devices in as many places as possible. While those places are likely to be in areas where people live, coverage in regional and rural areas where farming, mining and other activities are undertaken outside population centres is also important to some customers.

MNOs can respond with different strategies in relation to population and geographic coverage: for example, while Telstra seeks to cover both population centres and surrounding land in regional and rural areas, Optus appears to focus on an 'island of coverage' approach in some areas in an apparent effort to dilute Telstra's coverage advantage. Vodafone has focussed on improving highway coverage in order to attract those customers who value being able to use their devices while they travel. For further discussion of MNOs strategies for differentiated coverage see section 2.3.1.

26. *How important is geographic coverage to a mobile service provider's ability to compete in the national market for mobile services?*

For a substantial proportion of customers, coverage is clearly one of the most important factors when making purchasing decisions about their mobile service provider. Customers value both the depth and breadth of coverage. Regional customers value regional coverage highly, but so too do a significant proportion of metropolitan customers (section 2.1). Although coverage is important, it is not necessary that MNOs have equivalent coverage in order to compete effectively. In fact, differentiated coverage is to be expected in a competitive market. Differentiated coverage has been one of the key dynamics of the mobile market in Australia and has facilitated more effective price and non-price competition between the MNOs.

27. *Does the level of geographic coverage on a network impact a provider's ability to compete for business customers to a greater extent than other customers? Please provide reasons for your views.*

The depth and extent of coverage in regional and rural areas will be of value to a range of customers who are highly mobile across the geographic area in which they live or work, including tradespeople who rely on their mobile phone to conduct business while at or moving between jobs in their service area. However, the requirements of coverage of small and medium sized enterprises (**SMEs**) are not so different to other people who live and work in regional and rural areas that Telstra varies its marketing between the two. Telstra markets its mobile business products on a similar basis to its residential mobile services, by using a range of factors including its geographic coverage, speed, reliability and flexibility, e.g. "*Share and collaborate on Australia's best mobile network*", "*What's more, they include data sharing to help improve your productivity – in the office and on the road*" and "*Australia's largest and most reliable network*".

SMEs (including in regional and rural areas) do have other service requirements over and above coverage which are the focus of Telstra SME marketing and customer support activities, including:

- The ability to acquire total Telstra solutions, e.g. mobile, fixed line, cloud and business phone systems;
- Quality advice from approximately 82 dedicated Business Accredited stores around the country;
- 24/7 support from business specialists; and



- Ability to share data across eligible services on the same account.

28. *How is declaration of a mobile roaming service likely to benefit consumers in regional areas and more generally? Is it likely to disadvantage consumers or any groups of consumers in any way?*

For the reasons discussed in section 3.1.4, customers in metropolitan, regional and rural areas will be worse off if mobile roaming is declared because there will be less incentive to build and maintain competing mobile infrastructure and less coverage overall in regional and rural areas.

Declaration of roaming will deny customers the benefits of infrastructure-based competition. These benefits will continue if roaming is not declared, including expanding and improving quality of coverage in regional and rural Australia by infrastructure-based providers (and MVNOs hosted on different networks) and the rollout of future generations of mobile technology. Because customers in regional and rural Australia are more dependent on mobile services than customers in metropolitan areas, they will be hardest hit by the disruption which declared roaming causes to the incentives for infrastructure investment.

Further, declaration of roaming will likely alter the quality-adjusted prices customers currently enjoy, either through increased prices or decreased quality (section 3.2).

29. *Is there potential for a new MNO to enter the mobile market in Australia? If so, to what extent would declaration facilitate their ability to enter and compete in the mobile market?*

If another mobile operator entered the mobile market in Australia it would have three MNOs with which to negotiate a commercial roaming agreement including Telstra. However, Telstra has not been approached by any other entrant seeking to negotiate a roaming agreement.

Telstra notes that where roaming has been regulated overseas to assist new entry it has been coupled with build requirements that encourage the new entrant to roll out its network (e.g. in New Zealand).

30. *How may the scope of the declared service (such as geographic scope and technologies to be included) affect the extent to which declaration of a mobile roaming service may promote competition in the relevant markets?*

Limiting the scope of a declared mobile roaming service will not mitigate the adverse impacts of declaration on investment incentives in regional and rural Australia. The reduction in infrastructure-based competition will result in a loss of the benefits of dynamic competition that are enjoyed by customers under current market conditions.

For further discussion, see section 3 and in particular section 3.6.

31. *To what extent would declaration of a mobile roaming service promote the achievement of any-to-any connectivity in relation to carriage services that involve communications between end-users?*

In Telstra's view, the objective of any-to-any connectivity is directed at achieving interconnection between end user services connected to different network: i.e. in the case of mobile, each end user service is within its home network's coverage area. Any-to-any connectivity is not about creating connectivity within an individual network where the MNO does not have its own coverage. Therefore, roaming will not relevantly promote any-to-any connectivity.

However, if any-to-any connectivity is thought to have some role in relation to whether roaming should be declared, it does not unambiguously support declaring roaming over not declaring roaming. A



roaming customer in a service area without coverage from his or her home network may be able to use roaming to make or receive calls. But conversely, as Professor Yarrow observes “*suppression of competition in coverage in the [future without declaration] could be expected to lead to a gap opening up between coverage achieved in the [future without declaration] and in the [future with declaration]. This could be because extension of coverage was less rapid in consequence of a declaration decision or because the aggregated area of coverage shrinks.*”

32. *Do mobile networks in regional Australia exhibit natural monopoly characteristics? Please provide reasons to support your view. If so, what are the implications of this for the assessment of the effect of declaration on the efficient use of, and investment in, infrastructure?*

Mobile networks in regional Australia do not exhibit natural monopoly characteristics as they operate as part of a single integrated national network and are constrained by competitive market forces operating nationwide. For further discussion, see sections 2.2 and 4.7.

33. *Are there barriers and challenges to extending a mobile network in metropolitan and regional areas of Australia and how significant are they?*

The first-in MNO faces higher upfront costs than subsequent MNO entrants. Subsequent entrants face substantially lower upfront costs and risk if they use tower sharing (which is regulated under the facilities access regime) and competitively provided or regulated backhaul services (section 2.4).

34. *What is the extent of the first mover advantage when extending into regional Australia? Has Telstra's position as the incumbent provider (for both fixed and mobile services) provided it with advantages in building a mobile network in regional areas? Please provide reasons and evidence to support your views.*

There is no first mover advantage. All MNOs are on an equal footing when it comes to expansion in to new areas. Any first entrant is at risk of being overbuilt, a risk which is heightened because of the facilities access and backhaul regulatory regimes. Once overbuilt, the first entrant faces no particular advantage as the retail and wholesale markets are very competitive.

While Telstra had Australia's first AMPS network, the government forced Telstra to shut down that network after Optus and Vodafone were given licences. Telstra does not have any legacy advantage for the reasons set out in section 4.3.

35. *What are the incentives to build or extend a mobile network in areas of regional Australia where population density is low?*

Infrastructure-based competition in regional and rural Australia where population density is low is driven by the race for coverage as MNOs make strategic investments in order to obtain, maintain or reduce a coverage advantage.

For further details about how the race for coverage has incentivised investment in regional and rural Australia, see section 2.

36. *To what extent would declaration of a mobile roaming service promote the efficient use of the infrastructure used to provide mobile services?*

Key elements of the infrastructure required for mobile cell sites are already regulated. For example, regulated access already provides for sharing of towers and backhaul used in the supply of mobile services, and can avoid uneconomic duplication of this infrastructure in regional and rural areas.



With this regulation already in place, it is not necessary to solve a second time for the efficient use of towers and backhaul by declaring roaming.

The sharing of spectrum, radiocommunications equipment and core network which roaming involves is not efficient because:

- The three MNOs have their own spectrum for use in regional and rural areas (section 2.4.2);
- The sharing of radiocommunications equipment and core network through roaming can result in congestion for all customers (section 3.4); and
- This infrastructure is the means by which the MNOs engage in product differentiation and innovation.

37. *How may the geographic scope of the service description affect the extent to which declaration could promote the efficient use of such infrastructure?*

Limiting the geographic scope of roaming does not change the assessment of roaming against the efficient use criteria. Regulated access to towers and backhaul will still be available in the roaming area and provide for the sharing of the mobile network infrastructure elements which are most efficient to share. As roaming involves substitution of resale competition for infrastructure competition, the sharing of the other elements of the access provider's network is not efficient.

38. *How would declaration affect the incentives of an access provider to make investments in mobile infrastructure? Please provide evidence to support your views.*

As discussed in sections 3 and 4, equalisation of coverage through roaming will result in investment decisions in uneconomic areas being made on a standalone basis. That is, declaration of roaming will undermine incentives to invest in mobile network infrastructure in regional and rural Australia.

39. *What factors should we consider when examining the economic efficiency of extending mobile networks into areas without network coverage? Is it likely to be efficient for Telstra to extend the reach of its mobile network beyond the current geographic coverage? Please provide reasons for your views.*

If market forces are not interrupted by declaration of mobile roaming, they will determine the extent to which coverage is further extended by MNOs in an attempt to stay ahead of, or catch-up with, their competitors. To the extent market forces alone cannot achieve coverage, co-investment will assist to extend coverage further. The extension of coverage by one or more MNOs through market forces will extend the benefits of mobile service availability and competitive outcomes (through averaged prices) to more customers. As Professor Yarrow remarks:

“...it is remarkable by international standards that the balancing act has been accomplished in Australian mobile telecommunications in a way that appears to combine relatively light handed regulation (tower-sharing arrangements, regulation of backhaul services), limited coercive taxation (i.e. fairly modest financial support from the public revenues) and vigorous competition, witnessed by the number and the commercial conduct of MNOs and MVNOs. Notwithstanding vigorous competition, there is geographically uniform (i.e. national) pricing and close to universal coverage of high quality services.”

For further discussion about how competition is driving the race for coverage, see sections 1.1 and 3.



40. *To what extent is the declaration of a mobile roaming service likely to impact efficient investments by access providers in extending their network coverage and in upgrading their existing networks?*

As discussed in sections 3 and 4, equalisation of coverage through roaming will result in investment decisions in uneconomic areas being made on a standalone basis. That is, declaration of roaming will undermine incentives to invest in mobile network infrastructure in regional and rural Australia.

41. *How would declaration affect the incentives of an access seeker to make investments in mobile infrastructure in order to:*

- (a) *extend their network coverage?*
 (b) *upgrade their existing network?*

Please provide evidence to support your views.

Declaration of roaming will undermine the incentives of an access seeker to make investments in mobile infrastructure to extend or upgrade their existing network. The key driver of investment in regional and rural areas is the ability to derive or reduce a competitive coverage advantage. The ability, through better coverage, to attract customers who highly value coverage will be as important to the business case of a subsequent MNO entering an areas as it is for the first-in MNO. Ovum's modelling shows that if a subsequent MNO could attract an additional market share of [REDACTED]

[REDACTED] Because declaration of roaming will neutralise any coverage advantage, the business case for investment in regional and rural Australia (for both access seekers and access providers) falls away.

For further discussion about the effects of declaring roaming on access seekers incentives to invest, see section 3.1.3. See also Ovum's report at section 5.5 and Statement of Mike Wright at section 11.

42. *What factors should we consider when examining the economic efficiency of an access seeker to extending its network into areas where there is an existing mobile network? Would it be efficient for either Optus or VHA to extend their mobile networks into areas where only Telstra has mobile coverage? Please provide reasons for your views.*

In the absence of declaration of mobile roaming, the coverage race will continue and Optus and Vodafone will have incentives to reduce Telstra's coverage advantage. The further that Optus and Vodafone build, the further the benefits of this infrastructure-based competition will be delivered to customers.

The upfront costs of the second-in and third-in MNO are substantially lower than the first-in MNO's upfront costs due to the availability of regulated tower sharing and regulated backhaul. It is also important to take into account that by narrowing the gap with Telstra another MNO can expect to attract customers who are willing to pay for better coverage, even if that coverage is still less than Telstra's. This is illustrated by Ovum's analysis referred to in the answer to question 41.

For further discussion about the economic efficiency of extending mobile coverage, see sections 2.3.2 and 3.1 and section 5 of the Ovum Report.



43. *Would restricting the scope of any declared roaming service to services on 3G networks address any dampening effect of the declaration may have on the incentives of MNOs to make efficient investments in mobile infrastructure?*

As discussed in section 3.6.1, limiting the scope of declaration to 3G would not mitigate the investment disincentive effects of declaration because Telstra's key coverage advantage currently relies on the expansive geographic areas where Telstra only has 3G coverage. Telstra would have no incentive to continue to deploy 4G to regain its competitive coverage advantage because there is not a sufficient differential in performance between 3G and 4G in customers' minds, reflecting how the MNOs also use 3G and 4G as complements. Declaring 3G only also sends a signal to investors considering future investments such as 5G that the regulator could intervene in the future to require regulated access after it is too late for the investor to reverse course and re-evaluate its investment. As Professor Yarrow comments "[t]he risk of such opportunistic behaviour by a regulator in turn tends to chill new investment, because of the lower expected returns that it implies."

44. *If the ACCC were to declare a mobile roaming service:*

- (a) *How should the service be described?*
- (b) *What would the appropriate geographic scope for the service be?*
- (c) *Should the service description be technology neutral or limited to certain technologies (e.g. 3G networks)? Please provide reasons for your views.*

As Aetha's report illustrates and as outlined in section 3.4 and 3.6.2, there are significant technical and operational issues with roaming which would need to be addressed in a service description of a declared roaming service. These issues arise with a commercial roaming service but commercial negotiation provides a more flexible environment in which to address these issues without also the disincentive effects of coverage equalisation.

45. *Should a declared mobile roaming service include mobile voice, SMS and data services?*

The disincentive effects of declaring roaming are likely to be the same whatever products and services are included in the roaming service declaration.

46. *Are there services that should be included or explicitly excluded? Please provide reasons to support your view.*

The disincentive effects of declaring roaming are likely to be the same whatever products and services are included or excluded from the roaming service declaration.

47. *Are there other matters which should be explicitly set out in the service description?*

Telstra considers that the key issue at this stage is to address the threshold question of whether wholesale domestic roaming should be declared.

48. *How is the setting of a regulated price for a declared mobile roaming service likely to impact competition in the mobile services market? Would the costs of accessing a declared roaming service likely to be passed onto consumers by access seekers and if so, in what form (e.g. higher retail prices)? Please provide reasons to support your view.*

Telstra considers that any regulated wholesale roaming price wouldn't compensate MNOs for the cost of investment in regional and rural areas or the loss of indirect revenues it receives from marketing its coverage advantage on a national level. Even if it were possible to set an appropriate price for a



declared roaming service, the competitive race for coverage would be over. A declared pricing model would not provide anything like the incentives to expand coverage and improve coverage that the race for coverage currently does.

Telstra believes the costs of accessing a declared roaming service would require other MNOs to increase their prices either generally or by charging only regional and rural customers more.

For further discussion of the difficulties of setting a regulated price for roaming, see section 3.7.



¹ GSMA, Mobile Connectivity Index, available at: <http://www.mobileconnectivityindex.com/#> (accessed 14 November 2016).

² Singtel Group Sustainability Report 2016, available at: http://info.singtel.com/sustainabilityreport2016/pdf/FullReport_SR2016.pdf (accessed 3 November 2016).

³ Vodafone, Media Release, Vodafone offers gold service to Queensland businesses, 4 December 2015, available at: <http://www.vodafone.com.au/media/gold-service-queensland-businesses/> (accessed 3 November 2016).

⁵ ACCC Telecommunications Reports 2014-15, *Competition in the Australian telecommunications sector*, February 2016, pp 26-27.

⁶ Speeds may vary due to factors such as location, distance from the base station, local conditions, concurrent users, hardware and software configuration and download source/upload configuration.

⁷ Sydney Morning Herald, *Singtel-Optus chief pledges to break Telstra's stronghold*, 27 January 2015, available at: <http://www.smh.com.au/business/singteloptus-chief-pledges-to-break-telstras-stronghold-20150126-12yq3e.html> (accessed 17 November 2016).

⁹ Ericsson, *Ericsson Mobility Report on the pulse of the networked society*, June 2015, pp 14-16.

¹⁰ Report of Ovum Ltd, *Mobile Network Investment and Domestic Roaming*, 2 December 2016, [3.8] (**Ovum Report**).

¹¹ Mike Wright, Telstra Exchange, *Preparing for the arrival of 5G*, 3 August 2016, available at: <https://exchange.telstra.com.au/2016/08/03/preparing-for-the-arrival-of-5g/> (accessed, 28 October 2016); Aanchal Bharadwaj, Vodafone Red Wire, *5G by 2020: The next generation*, available at: <http://www.vodafone.com.au/red-wire/5g-by-2020> (accessed 28 October 2016); Optus, Media Release, *Optus and Huawei trial 4.5G technology*, 19 February 2016, available at: <https://media.optus.com.au/media-releases/2016/optus-and-huawei-trial-4-5g-technology/> (accessed 28 October 2016).

¹² Based on ABS classifications relating to the geographic distribution of Australia's population: ABS 3218.0 – Regional Population Growth, Australia.

¹³ ACCC, *Telecommunications Reports 2014-15: Competition in the Australian telecommunications sector*, February 2016, p 29.

¹⁴ <https://www.amaysim.com.au/>.

¹⁵ <https://www.barefoottelecom.com.au/plan-type/mobile-plans>.

¹⁶ <https://bendigobanktelco.com.au/about-us>.

¹⁷ http://www.clubtelco.com.au/mobile_compare_plans.html.

¹⁸ <https://www.coles.com.au/our-range/our-products/coles-mobile>.

¹⁹ <https://www.commander.com.au/mobiles/mobile-plans>.

²⁰ <http://www.communitytelco.com.au/cis/current-plans>.

²¹ <https://connectto.dodo.com/mobile/NewPlansselection.aspx>.

²² <http://www.engin.com.au/mobiles/mobile-plans>.

²³ <https://www.etel.com.au/en/about/main>.

²⁴ <https://www.exetel.com.au/mobilephone/plans>.

²⁵ <http://www.iftelecom.com.au/simonly.php>.

²⁶ <https://www.iinet.net.au/mobile/>.

²⁷ http://www.internode.on.net/residential/phone_and_voip/nodemobile/.

²⁸ <http://www.iprimus.com.au/product-info/mobile/mobile-coverage-map/>.

²⁹ <https://www.jeenee.org.au/about-us/coverage/>.

³⁰ <http://www.liveconnected.com.au/coverage-maps>.

³¹ <http://www.moretelecom.com.au/>.

³² <https://www.ovo.com.au/>.

³³ <http://www.southernphone.com.au/mobile/>.

³⁴ <https://www.spintel.net.au/mobile>.

³⁵ <http://www.trinitytelecom.com.au/sim-only.php>.

³⁶ <https://www.truphone.com.au/legal/truphone-single-subscriber-plans-cis/>.

³⁷ <https://www.vava.net.au/>.

³⁸ <http://www.virginmobile.com.au/coverage/>.

³⁹ <https://www.westnet.com.au/mobile/>.

⁴⁰ <https://www.yomojo.com.au/home/coverage>.

⁴¹ <https://www.aldimobile.com.au/faq/#collapse-three>.

⁴² <https://www.betterlifemobile.com.au/faq-page#n180>.

⁴³ <http://www.lycamobile.com.au/en/faq>.

⁴⁴ <https://macquarietelecom.com/blog/4g-announcement/>.

⁴⁵ http://www.pivotel.com.au/pivotel_terms_conditions.php.

⁴⁶ <http://www.planetisp.com.au/mobile-broadband/>.

⁴⁷ <http://www.southernphone.com.au/mobile/>.

⁴⁸ <http://www.symbionetworks.com/>.

⁴⁹ <http://www.telcoinbox.com.au/telco/products/mvno-wholesale-mobile>.

⁵⁰ <https://www.telechoice.com.au/our-mobile-network>.

⁵¹ <https://www.thinkmobile.com.au/blog/support/coverage/>.

⁵² <https://mobile.woolworths.com.au/coverage.html>.

⁵³ <https://www.acnpacific.com/mobile/>.

⁵⁴ <https://www.cmobile.com.au/support-faq/how-do-i-know-what-coverage-i-need/>.



- ⁹⁸ Optus, Media Release, *Optus to build 114 sites in government mobile black spot program second round funding*, 1 December 2016, available at: <https://media.optus.com.au/media-releases/2016/optus-to-build-114-sites-in-government-mobile-black-spot-program-second-round-funding/> (accessed 1 December 2016).
- ⁹⁹ Optus, Media Release, *Optus phones given the "pick" of approval in regional areas*, 6 July 2016, available at: <https://media.optus.com.au/media-releases/2016/optus-phones-given-the-pick-of-approval-in-regional-areas/> (accessed 28 November 2016).
- ¹⁰⁰ Optus, Media Release, *Optus furthers commitment to the central west*, 17 August 2016, available at: <https://media.optus.com.au/media-releases/2016/optus-furthers-commitment-to-the-central-west/> (accessed 28 November 2016).
- ¹⁰¹ Optus, Media Release, *Optus furthers commitment to the central west*, 17 August 2016, available at: <https://media.optus.com.au/media-releases/2016/optus-furthers-commitment-to-the-central-west/> (accessed 28 November 2016).
- ¹⁰² Optus, Media Release, *Optus furthers commitment to Ballarat*, 29 September 2016, available at: <https://media.optus.com.au/media-releases/2016/optus-furthers-commitment-to-ballarat/> (accessed 28 November 2016).
- ¹⁰³ Optus, Media Release, *Optus to build 114 sites in government mobile black spot program second round funding*, 1 December 2016, available at: <https://media.optus.com.au/media-releases/2016/optus-to-build-114-sites-in-government-mobile-black-spot-program-second-round-funding/> (accessed 1 December 2016).
- ¹⁰⁴ Vodafone, *Regional Connect*, available at: <http://www.vodafone.com.au/red-wire/category/regional/> (accessed 28 November 2016).
- ¹⁰⁵ GSMA, Mobile Connectivity Index, available at: <http://www.mobileconnectivityindex.com/#> (accessed 27 October 2016).
- ¹⁰⁶ OECD, *OECD broadband statistics update*, 2 August 2016, available at: <http://www.oecd.org/sti/broadband/broadband-statistics-update.htm> (accessed 27 October 2016).
- ¹⁰⁷ ITU, *Measuring the Information Society Report 2015*, 30 November 2015, available at: <http://www.itu.int/en/ITU-D/Statistics/Documents/publications/misr2015/MISR2015-w5.pdf> (accessed 27 October 2016).
- ¹⁰⁸ Currently there are over 60 MVNOs.
- ¹⁰⁹ Note: Australian coverage figures are for 2016. Other countries are most up to date publicly available information.
- ¹¹⁰ The World Bank, *Population density (people per sq. km of land area)*, available at: <http://data.worldbank.org/indicator/EN.POP.DNST> (accessed 28 November 2016).
- ¹¹¹ Telecomlead, *TeliaSonera plans \$2 billion telecom Capex in 2015*, 29 January 2015, available at: <http://www.telecomlead.com/telecom-services/teliasonera-plans-2-billion-telecom-capex-2015-55748> (accessed 28 October 2016).
- ¹¹² Tele2 and Telenor developed a network sharing arrangement for their investments in 4G coverage – Net4Mobility (see <http://www.net4mobility.com/index.php/en/>). The combines 4G & 2G network under this network sharing arrangement covers 99% of the Swedish population. This network sharing arrangement involved passive infrastructure sharing, but the parties also jointly bid for 4G spectrum and brought existing licences into the venture: see, OECD Working Party on Communication Infrastructure and Services Policy, *Wireless Market Structures and Network Sharing*, 8 January 2015, pp 45-48.
- ¹¹³ See footnote 112 above.
- ¹¹⁴ P3 Connect Mobile Benchmark, *The Netherlands 2016*, available at: <http://www.connect-testmagazine.com/mobile-network-tests/the-netherlands-2016/> (accessed 26 October 2016).
- ¹¹⁵ Telia Company, *Telia is rolling out 4G for mobile calls in Norway*, 19 October 2016, available at: http://www.teliacompany.com/en/newsroom/news/news-articles/2016/telia-is-rolling-out-4g-for-mobile-calls-in-norway/?t_id=1B2M2Y8AsgTpgAmY7PhCfq%3d%3d&t_q=telia+DNA+4G+sharing&t_tags=language%3aen%2csiteid%3a482201c3-6dc1-4ea9-9a0a-65e570f40258&t_ip=203.20.79.244&t_hit.id=TeliaSonera_Entities_ContentTypes_PageTypes_NewsArticlePage/a42211eb-1824-49a1-8120-a5165ba36496_en&t_hit.pos=1 (accessed 26 October 2016). Telia Sonera and DNA have a network sharing agreement in Eastern and Northern Finland for 2G, 3G and 4G technologies (see Telia Company, Press Release, *TeliaSonera and DNA join forces in network sharing in Eastern and Northern Finland*, 20 August 2014, available at: http://www.teliacompany.com/en/newsroom/news/news-press-releases/2014/8/teliasonera-and-dna-join-forces-in-network-sharing-in-eastern-and-northern-finland/?t_id=1B2M2Y8AsgTpgAmY7PhCfq%3d%3d&t_q=telia+DNA+4G+sharing&t_tags=language%3aen%2csiteid%3a482201c3-6dc1-4ea9-9a0a-65e570f40258&t_ip=203.20.79.244&t_hit.id=TeliaSonera_Entities_ContentTypes_PressReleasePage/036a7d99-4813-435f-bb80-94e40decd5d9_en&t_hit.pos=2 (accessed 26 October 2016)).
- ¹¹⁶ Elisa Annual Report 2015, *CEO's review*, available at: <http://vuosikertomus.elisa.fi/en/annual-report-2015/business/ceos-review.html> (accessed 26 October 2016).
- ¹¹⁷ DNA Annual Report 2015, *DNA continued to make significant investments in networks in 2015*, available at: <http://annualreporting.dna.fi/2015/en/business/network-infrastructure> (accessed 26 October 2016). By the end of 2016, DNA's 4G network is expected to reach 99% of the population through the joint venture with TeliaSonera: DNA Annual Report 2015, *DNA provides solutions for changing service needs*, available at: <http://annualreporting.dna.fi/2015/en/corporate-responsibility/society/solutions-for-changing-service-needs> (accessed 26 October 2016).
- ¹¹⁸ Bell Canada Annual Report 2015, p 11, available at: <http://www.bce.ca/investors/AR-2015/2015-bce-annual-report.pdf>. Bell's 4G coverage is expected to reach 98% by the end of 2016.
- ¹¹⁹ Telus Annual Report 2015, p 48, available at: http://about.telus.com/community/english/investor_relations/financial_documents/reports_archive.
- ¹²⁰ Rogers Communications 2015 Annual Report, p 36, available at: <http://netstorage-ion.rogers.com/downloads/IR/pdf/annual-reports/Rogers-2015-Annual-Report.pdf> (accessed 26 October 2016).
- ¹²¹ Ofcom (2015), *Connected Nations Report 2015* – this is combined 3G and 4G. 4G coverage is considerably lower at only 46% across all four MNOs.



- ¹²² Telenor Group, *Annual Report 2015*, p 13, available at: <https://www.telenor.com/wp-content/uploads/2016/04/iPDF-Annual-Report-2015.pdf> (accessed 28 October 2016).
- ¹²³ Required to reach 98% by 2016: TeliaSonera, *Annual and Sustainability report 2015*, p 6, available at: http://www.teliacompany.com/globalassets/telia-company/documents/reports/2015/annual-report/teliasonera_annual-and-sustainability-report-2015-eng.pdf (accessed 28 October 2016).
- ¹²⁴ 450 alliance.org, *AINMT Expands in Norway*, 7 February 2015, available at: <http://450alliance.org/newsroom-events/articles/ainmt-expands-norway/> (accessed 28 October 2016).
- ¹²⁵ FCC, Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services, WT Docket No. 16-137, Nineteenth Report, DA 16-1061 (rel 23 September 2016), p 116.
- ¹²⁶ FCC, Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services, WT Docket No. 16-137, Nineteenth Report, DA 16-1061 (rel 23 September 2016), p 116.
- ¹²⁷ FCC, Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services, WT Docket No. 16-137, Nineteenth Report, DA 16-1061 (rel 23 September 2016), p 116.
- ¹²⁸ Telekom Austria Group, *Annual Report 2015*, p 63, available at: http://cdn1.telekomaustralia.com/final/en/media/pdf/TAG_Annual_Report%202015.pdf (accessed 28 October 2016).
- ¹²⁹ T-Mobile, *Deutsche Telekom in Australia*, available at: <https://www.telekom.com/company/worldwide/60704> (accessed 28 October 2016).
- ¹³⁰ Hutchison Drei Austria GmbH, *Facts and Figures*, available at: https://www.drei.at/portal/media/bottomnavi/ueber_3/unternehmen_1/facts-and-figures-drei.pdf (accessed 28 October 2016).
- ¹³¹ Spark, *Annual Report 2016*, p 40, available at: http://investors.sparknz.co.nz/FormBuilder/Resource/module/gXbeer80tkeL4nEaF-kwFA/doc/FY16_H2/2016_Annual_Report.pdf (accessed 28 October 2016).
- ¹³² Vodafone, *Reliable Coverage*, available at: <http://www.vodafone.co.nz/network/coverage/> (accessed 28 October 2016).
- ¹³³ 2degrees, Media Release, *2degrees switches on 4G in Taupo, Ohakune, Taranaki, Picton and Timaru*, 4 August 2016, available at: <https://www.2degreesmobile.co.nz/company/news-and-media-releases/2degrees-switches-on-4g-in-taupo-ohakune-taranaki-picton-and-timaru/> (accessed 28 October 2016).
- ¹³⁴ Vodafone Group Plc, *Annual Report 2016*, p 34, available at: https://www.vodafone.com/content/annualreport/annual_report16/downloads/vodafone-full-annual-report-2016.pdf (accessed 28 October 2016).
- ¹³⁵ WIND, *4G*, available at: <https://www.wind.gr/en/wind/support/coverage/mobile-telephony-network/4g/> (accessed 28 October 2016).
- ¹³⁶ Prepaid data SIM card Wiki, *Greece*, available at: <http://prepaid-data-sim-card.wikia.com/wiki/Greece> (accessed 28 October 2016).
- ¹³⁷ Telefonica, *Results January - September 2016*, available at <https://www.telefonica.com/documents/162467/51547305/rdos16t3-eng/dafa1dd7-0bcb-445a-b51d-e87734b22080> (accessed 28 November 2016).
- ¹³⁸ Vodafone PLC, *Annual Report 2016*, p 33 available at https://www.vodafone.com/content/annualreport/annual_report16/downloads/vodafone-full-annual-report-2016.pdf (accessed 28 October 2016).
- ¹³⁹ Orange, *Coverage*, available at <http://4g.orange.es/cobertura/> (accessed 28 November 2016).
- ¹⁴⁰ T-Mobile, *Annual Report 2015*, available at: <http://www.annualreport.telekom.com/site0216/?id=155> (accessed 28 October 2016).
- ¹⁴¹ Vodafone Group Plc, *Annual Report 2016*, p. 32, available at: https://www.vodafone.com/content/annualreport/annual_report16/downloads/vodafone-full-annual-report-2016.pdf (accessed 28 October 2016).
- ¹⁴² Telefonica Deutschland, *Annual Report 2015*, p. 17, available at: <https://www.telefonica.de/investor-relations-en/financial-publications/q4-2015-fy-2015.html> (accessed 28 October 2016).
- ¹⁴³ ARCEP, Press Release, *ARCEP publishes its first report on mobile operators' investment efforts*, 3 December 2015, available at: http://www.arcep.fr/index.php?id=8571&tx_gsactualite_pi1%5Buid%5D=1811&tx_gsactualite_pi1%5BbackID%5D=26&cHash=2152cdc0e4df6d69e3335d8b58f4d6ee&L=1 (accessed 28 October 2016).
- ¹⁴⁴ ARCEP, Press Release of 3 December 2015 at footnote 143.
- ¹⁴⁵ ARCEP, Press Release of 3 December 2015 at footnote 143.
- ¹⁴⁶ Vodacom, *Integrated report for the year ended 31 March 2016*, available at <http://www.vodacom-reports.co.za/integrated-reports/ir-2016/pdf/full-integrated.pdf> (accessed 28 November 2016).
- ¹⁴⁷ MTN Group, *MTN Group Limited Integrated report for the year ended 31 December 2015*, available at http://www.mtn-investor.com/mtn_ar2015/pdf/iar.pdf (accessed 28 November 2016).
- ¹⁴⁸ See Statement of Mike Wright, [237].
- ¹⁴⁹ Telstra sometimes has disputed comparative coverage claims made by Optus and Vodafone, either by letters requesting the claim to be withdrawn or by bringing litigation. This has resulted in the withdrawal or modification of some advertisements by Optus and Vodafone, including some of the advertisements in this montage. That comparative coverage advertising is so hotly disputed demonstrates the importance of coverage in marketing by MNOs, and illustrates the impact on competitive dynamics if it was neutralised by mandated roaming.
- ¹⁵⁰ See Statement of Mike Wright, [83].
- ¹⁵¹ While Figure 17 clearly indicates a willingness to pay, some caution needs to be exercised when interpreting it. The data may not capture business willingness to pay. It also may not align to differences in ARPUs, because MNOs offer different plans with



²²⁸ Australian Government Department of Communications and the Arts, *Mobile Black Spot Program*, available at: <https://www.communications.gov.au/what-we-do/phone/mobile-services-and-coverage/mobile-black-spot-program> (accessed 1 December 2016).

²²⁹ See for example Vodafone (<https://www.vodafone.com.au/red-wire/network-sharing/>).

²³⁰ ACCC, *Facilities Access Code Final Decision*, September 2013, p 5, available at <https://www.accc.gov.au/regulated-infrastructure/communications/transmission-services-facilities-access/access-codes-telecommunications-facilities/final-decision> (accessed 28 November 2016).

²³¹ See Report of Professor George Yarrow, [10.2]-[10.3].

²³² The equity betas allowed by the ACCC and AER in their most recent determinations have been 0.7 for both Telstra and electricity and gas network service providers. In its most recent fixed line services determination, the ACCC notes that, “the equity beta for fixed line services would be lower than that of business lines such as mobile communications.” (ACCC (2015), *Public inquiry into final access determinations for fixed line services: Final Decision*, p 82.) This suggests that – were it possible to ascertain a standalone net profit margin for Telstra's mobile business – it would be reasonable for it to be higher than its overall business net profit margin of 14%.

²³³ For example, Vodafone's revenues and operating expenses per retail subscriber for the half year ended June 2016 were \$321.52 and \$237.94 respectively; whereas for Telstra they were \$326.98 and \$199.46 (for the half year ended December 2015). Calculated based on providers' half yearly reports: Hutchison Telecommunications (Australia) Limited, *ASX Half Year Information*, 30 June 2016, available at: <http://clients3.weblink.com.au/pdf/HTA/01762372.pdf> (accessed 2 December 2016); Telstra, *Financial results for the half-year ended 31 December 2015*, available at: <https://www.telstra.com.au/content/dam/tcom/about-us/investors/pdf%20D/Financial-results-for-the-half-year-ended-31-December-2015.pdf> (accessed 2 December 2016).

²³⁴ Calculated from: Hutchison Telecommunications (Australia) Limited, *ASX Half Year Information*, 30 June 2016, available at: <http://clients3.weblink.com.au/pdf/HTA/01762372.pdf> (accessed 2 December 2016); Telstra, Annual Report 2016, available at: <https://www.telstra.com.au/content/dam/tcom/about-us/investors/pdf-e/2016-Annual-Report.pdf> (accessed 2 December 2016).

²³⁵ See Statement of Mike Wright, section 7.

²³⁶ These precedents represent a range of developed economies and oft-cited examples of countries that have grappled with the policy and market implications of regulating domestic roaming and, in some cases, decided to mandate wholesale roaming.

²³⁷ Department for Culture, Media & Sport, *Tackling Partial Not-Spots in Mobile Phone Coverage, Government Response to Consultation Document*, 12 March 2015, p 25.

²³⁸ Ofcom (2015), *Connected Nations Report 2015*, p 32.

²³⁹ Ofcom (2015), *Connected Nations Report 2015*, p 33.

²⁴⁰ These powers, introduced as part of an economic reform law called “Loi Macron”, allow ARCEP to request that MNOs amend national roaming and/or network sharing agreements when required to meet regulatory objectives.

²⁴¹ See ARCEP, Press Release, *Mobile network sharing: Arcep examines the contractual amendments submitted by operators*, 16 June 2016, available at:

http://www.arcep.fr/index.php?id=8571&no_cache=1&L=1&tx_gsactualite_pi1%5Buid%5D=1876&tx_gsactualite_pi1%5Bannee%5D=&tx_gsactualite_pi1%5Btheme%5D=&tx_gsactualite_pi1%5Bmotscle%5D=&tx_gsactualite_pi1%5BbackID%5D=26&cHash=3d42088ddea40bbe050ab1c425be38d7 (accessed 2 December 2016).

²⁴² Reexamination of Roaming Obligations of Commercial Mobile Radio Service Providers Report and Order and Further Notice of Proposed Rulemaking, 22 FCC Rcd 15817 (2007), p 17; Reexamination of Roaming Obligations of Commercial Mobile Radio Service Providers and Other Providers of Mobile Data Services, Second Report and Order, 26 FCC Rcd 5411 (2011) p 12-13.

²⁴³ Commerce Commission New Zealand, *Final Report – investigation into amending the roaming service*, 10 March 2008, [137].

²⁴⁴ Commerce Commission New Zealand, *Final Report – investigation into amending the roaming service*, 10 March 2008, [138].

²⁴⁵ CRTC, Telecom Regulatory Policy CRTC 2015-177, *Regulatory Framework for wholesale mobile wireless services*, 5 May 2015, [127].

²⁴⁶ Commerce Commission New Zealand, *Final Report – investigation into amending the roaming service*, 10 March 2008, [44].

²⁴⁷ Commerce Commission New Zealand, *Final Decision on whether to investigate omitting National Roaming from part 3 of Schedule 1*, Decision No. [2013] NZCC 15, 20 September 2013, pp 5 and 17-19.

²⁴⁸ Vodafone New Zealand, *Submission on Draft Review of National Roaming as a Specified Service*, 26 August 2013, p 1-2.

²⁴⁹ Telecoms.com, *UK government outlines plans for compulsory national roaming*, 5 November 2014, available at: <http://telecoms.com/301271/uk-government-outlines-plans-for-compulsory-national-roaming/> (accessed 28 November 2016).

²⁵⁰ *Australian Government Guide to Regulation*, Department of Prime Minister and Cabinet, p 2.

²⁵¹ See Report of Professor George Yarrow, [3.5]-[3.6].

²⁵² *Application by Chime Communications Pty Ltd (No. 2)* [2009] ACompT 2, [13].

²⁵³ *Application by Chime Communications Pty Ltd (No. 2)* [2009] ACompT 2, [14].

²⁵⁴ *Re Seven Network (No 4)* [2004] ACompT 11 at [126]; *Application by Chime Communications Pty Ltd (No. 2)* [2009] ACompT 2, [128].

²⁵⁵ *Application by Chime Communications Pty Ltd (No. 2)* [2009] ACompT 2, [48].

²⁵⁶ See Report of Professor George Yarrow, [7.11(a)].

²⁵⁷ See Report of Professor George Yarrow, [11.18]-[11.19].

²⁵⁸ ACCC Declaration Guide, p 31.

²⁵⁹ See Report of Professor George Yarrow, [11.22].

²⁶⁰ *Re Seven Network (No 4)* [2004] ACompT 11, [130].

²⁶¹ See Report of Professor George Yarrow, [13.3].



²⁶⁴ ACCC Declaration Guide, pp 42-3.



²⁶⁵ See Report of Professor George Yarrow, [6.1]-[6.2].

²⁶⁶ See Report of Professor George Yarrow, [7.11(b)].

²⁶⁷ ACCC Declaration Guide, p 47.

²⁶⁸ See Report of Professor George Yarrow, [8.5].

²⁶⁹ See Report of Professor George Yarrow, [15.12].

²⁷⁰ Ovum, South Africa (Country Regulation Overview), 22 February 2016; Ovum, Spain (Country Regulation Overview), 4 January 2016.

²⁷¹ Department for Culture, Media & Sport, *Tackling Partial Not-Spots in Mobile Phone Coverage*, Government Response to Consultation Document (12 March 2015), [80].

²⁷² These precedents represent a range of developed economies and oft-cited examples of countries that have grappled with the policy and market implications of regulating domestic roaming and, in some cases, decided to mandate wholesale roaming.

²⁷³ CRTC, *Communications Monitoring Report 2015*, Figure 5, 5.25.

²⁷⁴ ACCC Telecommunications Reports 2014-15, *Competition in the Australian telecommunications sector*, February 2016, pp 29. Note: this MVNO share includes resellers.

²⁷⁵ The FCC typically attributes subscribers of MVNOs to their host facilities-based service providers – see FCC, Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services, WT Docket No. 16-137, Nineteenth Report, DA 16-1061 (rel 23 September 2016), footnote 48.

²⁷⁶ ACCC, *Telecommunications Reports 2014-15: Competition in the Australian telecommunications sector*, February 2016, p 26.

²⁷⁷ FCC, Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services, WT Docket No. 07-17, Twelfth Report, FCC 08-28 (rel 4 February 2008), [1].

²⁷⁸ Richard Feasey, *The regulation of mobile wholesale markets in the rest of the world (and its relevant to the CRTC's enquiry into wholesale wireless markets in Canada)*, Attachment 1 to Rogers Communications Intervention, 12 May 2014, p 20.

²⁷⁹ OECD (2004), *Development of Third Generation Mobile Services in the OECD*, p 19, available at:

<https://www.oecd.org/sti/33721114.pdf> (accessed 28 November 2016).

²⁸⁰ See ARCEP, Press Release, *ARCEP publishes the results of the allocation procedure for 4G mobile licences in the 800 MHz band (the digital dividend)*, 22 December 2011, available at

http://www.arcep.fr/index.php?id=8571&tx_gsactualite_pi1%5Buid%5D=1470&tx_gsactualite_pi1%5BbackID%5D=1&L=1

(accessed 28 November 2016).

²⁸¹ See ARCEP, Press Release, *ARCEP welcomes the national roaming agreements signed by Free Mobile and France*, 3 March 2011, available at:

http://www.arcep.fr/index.php?id=8571&L=1&tx_gsactualite_pi1%5Buid%5D=1363&tx_gsactualite_pi1%5BbackID%5D=1&cHash=78a8f6c060 (accessed 28 November 2016).

²⁸² These powers (as part of an economic reform law called "Loi Macron") allow ARCEP to request that MNOs amend national roaming and/or network sharing agreements when required to meet regulatory objectives.

²⁸³ See ARCEP, Press Release, *ARCEP publishes guidelines on roaming and mobile network sharing for consultation*, 12 January 2016, available at:

[http://www.arcep.fr/index.php?id=8571&no_cache=0&no_cache=0&tx_gsactualite_pi1\[uid\]=1825&tx_gsactualite_pi1\[annee\]=&tx_gsactualite_pi1\[theme\]=&tx_gsactualite_pi1\[motscle\]=&tx_gsactualite_pi1\[backID\]=26&cHash=3ec025a73cbc672646e582732508ac9e&L=1](http://www.arcep.fr/index.php?id=8571&no_cache=0&no_cache=0&tx_gsactualite_pi1[uid]=1825&tx_gsactualite_pi1[annee]=&tx_gsactualite_pi1[theme]=&tx_gsactualite_pi1[motscle]=&tx_gsactualite_pi1[backID]=26&cHash=3ec025a73cbc672646e582732508ac9e&L=1) (accessed 28 November 2016).

²⁸⁴ See ARCEP, Press Release, *ARCEP exercises its newfound authority over mobile network sharing: publishes guidelines and finalises its analysis of existing agreements*, 25 May 2016, available at:

[http://www.arcep.fr/index.php?id=8571&no_cache=0&no_cache=0&tx_gsactualite_pi1\[uid\]=1861&tx_gsactualite_pi1\[annee\]=&tx_gsactualite_pi1\[theme\]=&tx_gsactualite_pi1\[motscle\]=&tx_gsactualite_pi1\[backID\]=26&cHash=5adae9e95469d2991951b0681b55dc0e1&L=1](http://www.arcep.fr/index.php?id=8571&no_cache=0&no_cache=0&tx_gsactualite_pi1[uid]=1861&tx_gsactualite_pi1[annee]=&tx_gsactualite_pi1[theme]=&tx_gsactualite_pi1[motscle]=&tx_gsactualite_pi1[backID]=26&cHash=5adae9e95469d2991951b0681b55dc0e1&L=1) (accessed 28 November 2016).

²⁸⁵ ARCEP Press Release of 25 May 2016, above note 284.

²⁸⁶ See ARCEP, Press Release, *Mobile network sharing: ARCEP examines the contractual amendments submitted by operators*, 16 June 2016, available at:

http://www.arcep.fr/index.php?id=8571&no_cache=1&no_cache=0&tx_gsactualite_pi1%5Buid%5D=1876&tx_gsactualite_pi1%5Bannee%5D=&tx_gsactualite_pi1%5Btheme%5D=&tx_gsactualite_pi1%5Bmotscle%5D=&tx_gsactualite_pi1%5BbackID%5D=26&cHash=3d42088ddea40bbe050ab1c425be38d7&L=1 (accessed 28 November 2016) and see also Anne Morris, "French mobile operators signal end to national roaming agreements," *FierceWireless*, 17 June 2016, available at:

<http://www.fiercewireless.com/europe/french-mobile-operators-signal-end-to-national-roaming-agreements> (accessed 28 November 2016).

²⁸⁷ ARCEP Press Release of 16 June 2016, above note 286.

²⁸⁸ Autorite de la concurrence, Press Release, *Mobile telephone: network sharing and roaming*, 11 March 2013, available at: http://www.autoritedelaconcurrence.fr/user/standard.php?id_rub=483&id_article=2062 (accessed 28 November 2016).

²⁸⁹ Information Memorandum for the 3G Spectrum Auction, 1 November 1999, [3.5.1], cited in Ofcom, *National roaming: A further consultation*, 22 July 2004, p 4.

²⁹⁰ The EU Regulatory Framework of 2002 consisted of a set of Directives (EU legislation that EU member states were required to transpose into national law): the Framework Directive 2002/21/EC, the Access Directive 2002/19/EC, the Authorisation Directive 2002/20/EC and the Universal Service Directive 2002/22/EC.

²⁹¹ Ofcom consultation of 15 May 2003, [3.33].

²⁹² Ofcom, *National roaming: A further consultation*, 22 July 2004, p 3.

²⁹³ Ofcom decided to delay this process until 3 had concluded its national roaming auction process in 2006. There is no record of Ofcom issuing the discontinuance notice after 3 entered into a commercial roaming agreement with Orange. Therefore, it appears to remain technically in place at the request of 3, but not used.



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- ²⁹⁵ Telecoms.com, *UK government outlines plans for compulsory national roaming*, 5 November 2014, available at: <http://telecoms.com/301271/uk-government-outlines-plans-for-compulsory-national-roaming/> (accessed 28 November 2016).
- ²⁹⁶ Department for Culture, Media & Sport, *Impact Assessment – Tackling Partial Not-Spots in Mobile Phone Coverage*, 5 November 2014 (**DCMS Impact Assessment**), p 3.
- ²⁹⁷ DCMS Impact Assessment, p 8.
- ²⁹⁸ DCMS Impact Assessment, p 25.
- ²⁹⁹ DCMS Impact Assessment, p 29.
- ³⁰⁰ Department for Culture Media & Sport, *Tackling Partial Not-Spots in Mobile Phone Coverage, Government Response to Consultation*, 12 March 2015 (**UK Government Response**), p 25.
- ³⁰¹ UK Government Response, p 14.
- ³⁰² UK Government Response, p 14.
- ³⁰³ Ofcom, *Extract from a paper presented to Ofcom's Policy Executive*, July 2013 (**Ofcom Policy Executive FOI response**), p 6.
- ³⁰⁴ Ofcom Policy Executive FOI response, p 3.
- ³⁰⁵ Ofcom Policy Executive FOI response, p 5.
- ³⁰⁶ Gov.UK, Press Release, *Government secures landmark deal for UK mobile phone users*, 18 December 2014, available at: <https://www.gov.uk/government/news/government-secures-landmark-deal-for-uk-mobile-phone-users> (accessed 28 November 2016).
- ³⁰⁷ Reexamination of Roaming Obligations of Commercial Mobile Radio Service Providers and Other Providers of Mobile Data Services, Second Report and Order, 26 FCC Rcd 5411 (2011).
- ³⁰⁸ Priceonomics, *The spectrum auction: how economists saved the day*, 19 August 2016, available at: <https://priceonomics.com/the-spectrum-auction-how-economists-saved-the-day/> (accessed 28 November 2016); Federal Communications Commission, *Cellular Service*, available at: <https://www.fcc.gov/general/cellular-service> (accessed 28 November 2016).
- ³⁰⁹ Reexamination of Roaming Obligations of Commercial Mobile Radio Service Providers Report and Order and Further Notice of Proposed Rulemaking, 22 FCC Rcd 15817 (**FCC 2007**), p 11.
- ³¹⁰ Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services, WT Docket No. 16-137, DA 16-1061, Appendix VI (rel. Sept. 23, 2016).
- ³¹¹ FCC 2007, p 8.
- ³¹² FCC 2007, p 16.
- ³¹³ FCC 2007, p 16.
- ³¹⁴ FCC 2007, p 17.
- ³¹⁵ Reexamination of Roaming Obligations of Commercial Mobile Radio Service Providers and Other Providers of Mobile Data Services, Second Report and Order, 26 FCC Rcd 5411 (2011).
- ³¹⁶ Reexamination of Roaming Obligations of Commercial Mobile Radio Service Providers and Other Providers of Mobile Data Services, Declaratory Ruling, 29 FCC Rcd 15483 (WTB 2014). AT&T and Verizon Wireless filed applications for review of this decision, which remain pending.
- ³¹⁷ Fierce Wireless, *AT&T accuses T-Mobile of relying on roaming instead of building its own network*, 28 October 2014, available at: <http://www.fiercewireless.com/wireless/at-t-accuses-t-mobile-relying-roaming-instead-building-its-own-network> (accessed 28 November 2016).
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- ³¹⁹ FCC, Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services, WT Docket No. 16-137, Nineteenth Report, DA 16-1061 (rel 23 September 2016), Table II.C.2.
- ³²⁰ FCC, Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services, WT Docket No. 16-137, Nineteenth Report, DA 16-1061 (rel 23 September 2016)), Chart II.C.1.
- ³²¹ FCC, Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services, WT Docket No. 16-137, Nineteenth Report, DA 16-1061 (rel 23 September 2016), Chart II.C.3.
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