

Telecommunications Infrastructure Report Card 2007

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An Assessment of Australia's Fixed and
Mobile Telecommunications Infrastructure

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**An Assessment of Australia's Fixed and Mobile
Telecommunications Infrastructure**

Market  Clarity



**ENGINEERS
AUSTRALIA**

Telecommunications Infrastructure Report Card 2007

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Glossary

ACMA	Australian Communications and Media Authority
CAN	Customer Access Network
DCITA	Department of Communications, Information Technology and the Arts
DSL	Digital Subscriber Line
DSLAMs	DSL Access Multiplexers
HFC	Hybrid Fibre-Coaxial Networks
ICT	Information and Communications Technology
LSS	Line Sharing Service
OECD	Organisation for Economic Cooperation and Development
POP	Point of Presence
PSTN	Public Switched Telephone Network
ULL	Unconditioned Local Loop

COMMUNIQUÉ

Engineers Australia believes that Australia's telecommunications infrastructure is a vital component of effective economic activity and growth, and has a fundamental impact on the Australian community's standard of living. Telecommunications infrastructure provides the means for business to communicate with suppliers, customers and employees and allows local business to access Australia's and the world's marketplace. Individuals are able to broaden their communications networks and their access to information.

Over the last decade, the Australian telecommunications industry has been influenced by several key factors that have changed the way in which telecommunications infrastructure is delivered. These include:

- The creation of a deregulated, competitive telecommunications industry.
- The rapid growth in mobile and wireless services and technology to support them.
- The privatisation of Telstra.
- The advent of "next generation" internet protocol broadband services for business, personal and entertainment purposes.

The Engineers Australia Telecommunications Infrastructure Report Card examines:

- The quantity of fixed infrastructure for telecommunications transmission.
- Whether there is an adequate level of access to that fixed infrastructure by customers.
- The availability of infrastructure for mobile communications.

The Report Card assigns rankings to each statistical division in all States and Territories. The ranking methodology was developed to apply across the whole of Australia. The Report Card assigns a rating which ranges from A (very good) to F (inadequate). The ratings are based on the number of fixed access points per household and mobile access points per user, and adjusted for population density.

The rankings presented in this document do not take into account comparisons between Australia and other countries due to the unavailability of suitable benchmarks. The Report Card does not comment on affordability or terms of access to that infrastructure.

Unsurprisingly, the Report Card has found Australia's telecommunications infrastructure is heavily concentrated in Eastern Australia, particularly in and between capital cities. This leads to a reasonable level of access in these areas, but this diminishes for rural and regional Australia.

Melbourne, Sydney and Brisbane are interconnected by high capacity links and these provide infrastructure benefits for centres such as Bendigo and the Gold Coast that are adjacent to those links. For other locations, including some State capital cities such as Hobart and Darwin, infrastructure provision is generally poor.

Fixed and mobile infrastructure is readily available in some areas, but in other areas is not provided due to lack of profitability for infrastructure providers. The areas that received a score of "F" for instance, have low population density where, if the infrastructure was provided, the charges may be unattractive for users. Governments have variously implemented subsidy programs, one off or ongoing, to improve access to infrastructure in areas such as these.

There are a number of government policies and programs relating to aspects of the telecommunications industry and to infrastructure in general, and the government has adopted a market-based strategy with selective intervention where considered appropriate. However, there is no comprehensive strategic plan or long term vision at a national level for telecommunications infrastructure. The development of such a plan or vision could encourage infrastructure providers to be more proactive in identifying and appraising future infrastructure projects. This is relevant for areas that are poorly served.

In general, the market for telecommunications services in rural and remote parts of Australia cannot commercially support duplication of (or in some cases, any) infrastructure. Providing the benefits of competition (or any service in some cases) requires a government funding contribution. In this instance, government funding can be justified on the basis of benefits to the economy and community that are derived from the availability of telecommunications.

A principal that can be adopted where full or partial government funding is provided to a carrier in the circumstances outlined above is that other carriers should be allowed access on reasonable terms to the infrastructure. This would encourage competition and provide a degree of neutrality between those carriers receiving and those not receiving government funds. The host carrier should be able to derive the benefits of hosting other carriers through additional revenue.

In the case of mobile infrastructure, access on reasonable terms can be facilitated by commercial roaming arrangements. This requires customer handsets to have the ability to roam between networks. Although this is not universally possible, any government funding for mobile infrastructure should, to the extent practicable, be focused on investment that provides a common air interface supported by most carriers.

A number of highly important aspects of telecommunications policy are now converging, and their outcomes will have a profound impact on the future of Australia's telecommunications infrastructure.

Overall, Australia is reasonably well-served by its telecommunications infrastructure. Engineers Australia makes the following recommendations.

Recommendations

1. Australia needs an ongoing, regularly reviewed and updated strategic plan for telecommunications infrastructure development.
2. Government should ensure that regulations and subsidies (if appropriate) are regularly reviewed and adapted as needed.
3. Unnecessary duplication of infrastructure should be avoided, particularly where government subsidies are given. Where there are no government subsidies, policies should encourage carriers to avoid duplications through appropriate access regimes.
4. A requirement to support inter-carrier roaming on any mobile infrastructure funded by government.

Engineers Australia Fixed Infrastructure Ranking

New South Wales		Victoria		Queensland		Western Australia		South Australia		Tasmania		Northern Territory		Australian Capital Territory	
Statistical Division	Rank	Statistical Division	Rank	Statistical Division	Rank	Statistical Division	Rank	Statistical Division	Rank	Statistical Division	Rank	Statistical Division	Rank	Statistical Division	Rank
Sydney	B	Melbourne	B	Brisbane	B	Perth	C	Adelaide	D	Greater Hobart	D	Darwin	D	Canberra	C
Hunter	E	Barwon	D	Moreton	C	South West	F	Outer Adelaide	D	Southern	D	Northern Territory - Bal	F		
Illawarra	D	Western District	D	Wide Bay-Burnett	D	Lower Great Southern	F	Yorke and Lower North	F	Northern	F				
Richmond-Tweed	D	Central Highlands	E	Darling Downs	D	Upper Great Southern	F	Murray Lands	D	Mersey-Lyell	F				
Mid-North Coast	D	Wimmera	F	South West	E	Midlands	F	South East	E						
Northern	D	Mallee	F	Fitzroy	E	South Eastern	F	Eyre	F						
North Western	E	Loddon	E	Central West	E	Central	F	Northern	F						
Central West	D	Goulburn	D	Mackay	E	Pilbara	F								
South Eastern	D	Ovens-Murray	E	Northern	E	Kimberley	F								
Murrumbidgee	D	East Gippsland	D	Far North	E										
Murray	E	Gippsland	D	North West	E										
Far West	F														

Notes	
1	Within each state or territory, regions are sorted in order of ascending Statistical Division number (not shown)
2	The area covered by each of the Statistical Divisions (including those containing capitals) are shown in the maps included with the detailed infrastructure analysis of each state and territory

Engineers Australia Mobile Infrastructure Ranking

New South Wales		Victoria		Queensland		Western Australia		South Australia		Tasmania		Northern Territory		Australian Capital Territory	
Statistical Division	Rank	Statistical Division	Rank	Statistical Division	Rank	Statistical Division	Rank	Statistical Division	Rank	Statistical Division	Rank	Statistical Division	Rank	Statistical Division	Rank
Sydney	B	Melbourne	B	Brisbane	B	Perth	C	Adelaide	C	Greater Hobart	E	Darwin	E	Canberra	D
Hunter	D	Barwon	D	Moreton	C	South West	D	Outer Adelaide	D	Southern	E	Northern Territory - Bal	F		
Illawarra	D	Western District	E	Wide Bay-Burnett	E	Lower Great Southern	E	Yorke and Lower North	E	Northern	E				
Richmond-Tweed	E	Central Highlands	E	Darling Downs	E	Upper Great Southern	E	Murray Lands	E	Mersey-Lyell	E				
Mid-North Coast	E	Wimmera	E	South West	F	Midlands	E	South East	E						
Northern	D	Mallee	E	Fitzroy	E	South Eastern	E	Eyre	F						
North Western	E	Loddon	E	Central West	F	Central	E	Northern	E						
Central West	E	Goulburn	E	Mackay	E	Pilbara	E								
South Eastern	D	Ovens-Murray	E	Northern	E	Kimberley	F								
Murrumbidgee	E	East Gippsland	E	Far North	E										
Murray	E	Gippsland	E	North West	F										
Far West	F														

Notes	
1	Within each state or territory, regions are sorted in order of ascending Statistical Division number (not shown)
2	The area covered by each of the Statistical Divisions (including those containing capitals) are shown in the maps included with the detailed infrastructure analysis of each state and territory

1. Introduction

1.1 Background

Over the period 2000 to 2005, Engineers Australia produced a series of Infrastructure Report Cards at a national, State and Territory level. These Report Cards assessed the planning, management, funding and provision of Australia's transport, water and energy infrastructure. This 2007 Telecommunications Infrastructure Report Card adds to the suite of existing Infrastructure Report Cards.

The 2007 Telecommunications Infrastructure Report Card intends to raise awareness of the importance of telecommunications infrastructure to the community's social and economic well being and to generate debate on the appropriate level of telecommunications infrastructure required to meet Australia's needs.

1.2 Process

Engineers Australia commissioned Market Clarity, a telecommunications consultant, to provide a report on fixed and mobile telecommunications infrastructure. The full report is provided in the appendix. From that report, Engineers Australia determined a series of rankings for Australian statistical divisions¹ according to the availability of telecommunications infrastructure based on data that was current at October 2006. The Report Card is limited to fixed infrastructure related to telecommunications transmission and access networks, and to mobile networks. Table 1 summarises the telecommunications infrastructure assessed in the Report Card.

Table 1: Infrastructure Assessed in the Report Card

Type	Purpose	Technologies	Ranking Category
Customer Access Network (CAN)	Connects customer to an aggregation point	<ul style="list-style-type: none"> • Copper twisted pairs • DSL Access Multiplexers (using twisted pairs, possibly in the form of ULL or LSS) • Fixed wireless broadband such as 802.11, 802.16 or proprietary wireless systems (including point to point microwave) • Coaxial access part of hybrid fibre-coaxial (cable TV) systems • Access fibre networks (fibre to the premises/home) 	Fixed Access
		<ul style="list-style-type: none"> • Cellular 2G, 2.5G and 3G mobile networks 	Mobile Access
Backhaul	Connects aggregation points to major nodes in capital cities or regional centres	<ul style="list-style-type: none"> • Transmission fibre including Fibre to the Node (FTTN) 	Long haul
Long haul	High-capacity links between capital cities, or from regional centres to capital cities	<ul style="list-style-type: none"> • Fibre trunks • Microwave links 	

¹ The Australian Bureau of Statistics uses the following standard geographical classifications: Statistical Local Area (SLA), Local Government Area (LGA), Statistical Subdivision (SSD), Statistical Division (SD), State/Territory and Australia.

The rankings provide a relative indication of telecommunications infrastructure based on:

- Infrastructure Density — how much telecommunications infrastructure is deployed within a statistical division.
- Competition — how many telecommunications carriers own particular types of infrastructure within a statistical division.
- Technology Diversity — for fixed and mobile access rankings, the availability of multiple access technologies within a statistical division.
- Population and Geography — how infrastructure competitiveness and density compare to the geographical size and population density of a statistical division.

The rankings have been assigned for fixed and mobile infrastructure on a National basis.

The rankings are:

- **A - Very Good** The availability of telecommunications infrastructure satisfies the current and future needs of the most demanding users.
- **B - Good** The availability of telecommunications infrastructure is adequate and can generally satisfy the needs of most users.
- **C - Adequate** The telecommunications infrastructure available could be improved.
- **D - Poor** Expenditure on telecommunications infrastructure is needed.
- **E - Very Poor** There are major telecommunications infrastructure deficiencies that require substantial investment.
- **F - Inadequate** There is minimal telecommunications infrastructure and the minimal expectations of the majority of users cannot be met.

The upper ranking (A) has not been assigned because some of the requirements of the most demanding users cannot be satisfied with the existing infrastructure in any statistical division.

Due to the rate at which new technologies are developing, a high ranking should not be regarded as implying that no further expenditure on telecommunications infrastructure in that statistical division is required.

The Report Card rankings do not reflect the services available (which depend on other factors in addition to infrastructure) and do not take into account the affordability or terms of access to that infrastructure. The rankings presented in this document do not take into account comparisons between Australia and other countries due to the unavailability of suitable benchmarks.

The rankings given to each of the statistical divisions on a State and Territory basis are provided in sections 2 to 9.

1.3 Infrastructure Overview

Telecommunications infrastructure is generally best in the larger capital city markets. However, some non-capital city markets, by virtue of location between capital cities, do benefit from that circumstance and can be well served by infrastructure. This is not unlike the situation for railways and roads that pass through regional areas. In the same way, telecommunications benefits are only realised where access points (the equivalent of railway stations and highway on/off ramps) exist. The Report Card shows a better ranking for those statistical divisions with more access points, long haul and back haul transmission infrastructure and multiple access carriers (infrastructure competition).

1.3.1 Long Haul Transmission Infrastructure

In terms of long haul transmission infrastructure, the report Card found the following:

- **Infrastructure providers** - In terms of infrastructure providers, thirty-three companies have been identified as providing long haul transmission infrastructure in Australia, with fibre and long haul microwave technologies in use. While fibre-based infrastructure provides the highest bandwidth, construction is capital-intensive. As a result, only eleven companies operate long haul fibre infrastructure, while twenty-eight companies operate long haul microwave transmission infrastructure.
- **Inter-Capital Transmission Infrastructure** - In all cases, except for Hobart and Darwin, adequate long haul (including duplication to cover for failures) and Point-of-Presence (POPs) exist for capital cities.
- **Capital City to Regional Centres Transmission Infrastructure** - Long haul rankings reflect the existence of POPs and inter-capital city fibre passing through statistical divisions and this generally reflects the extent of capital city to regional centre transmission infrastructure.
- **Microwave** - All statistical divisions are served by long haul microwave links, which provide access to one or more capital cities.
- **The Telstra Network** - Telstra has publicly stated that all of its exchanges are served by fibre. However, it was not possible in this study to verify the details of such links in public documentation. If this was taken into account, the ranking in those statistical divisions that appear to lack long haul fibre routes would improve, but the relative rankings are unlikely to change. In more contested statistical divisions, the impact would be minimal, as there are multiple suppliers to those locations.
- **Capital City Transmission Infrastructure** - Melbourne, Brisbane, Sydney and Adelaide have a reasonable diversity of transmission infrastructure ownership. There is less diversity of ownership in Perth and Canberra. Darwin and Hobart have the lowest diversity in capital city transmission infrastructure.
- **Regional Transmission Infrastructure** - Intra-regional links are strongly associated with whether or not a particular regional city is located on a major inter-capital route. Queensland is an exception to this, with cities such as Townsville and Rockhampton (on the route between Brisbane and Cairns) acting as regional hubs for a small number of long haul microwave networks serving the inland of the State, such as Mount Isa. The long haul microwave systems appear to retain a major role in providing region-to-region transmission infrastructure, particularly in the eastern States.

1.3.2 Fixed Access Infrastructure

In terms of fixed access infrastructure, the Report Card found the following:

- **Twisted Access Networks** – access networks remain dominated by the copper twisted pair network owned by Telstra. This infrastructure can be used by other providers to supply broadband services, especially where copper distances are up to a few kilometres. Carriers other than Telstra have gained access to Telstra's copper pairs in exchanges, although with the implementation of fibre to the node, access to copper pairs may be required at remote multiplexer locations.
- **Broadband Cable** – is available in locations including Sydney, Brisbane, Melbourne but it is unlikely that further broadband cable roll out will occur.
- **Fixed Wireless** – is available in capital cities and many regional centres mainly because rollout and delivery of service can occur relatively quickly and easily. Network technologies for this purpose include WiMax (pre WiMax systems have been implemented, eg unwired).
- **Mobile Networks for Fixed Services**- directional antennas added to a remote terminal can greatly improve the performance of a distant mobile link and support broadband data access.
- **Fibre to the Home/Premises** – very little fibre to the home exists in relation to other solutions.

1.3.3 Mobile Infrastructure

In terms of mobile infrastructure, the Report Card found the following:

- **Mobile Sites** - Australia's mobile telecommunications networks have evolved into four networks that often overlap, especially in urban markets. Whilst the networks have been encouraged to share sites, and therefore share common infrastructure, many independent backhaul networks exist.
- **Handset to Network Interfaces** - the dominant handset to network interfaces are GSM and WCDMA (3G) with (narrowband) CDMA being phased out. GSM and WCDMA share common network systems. Whilst carriers occupy adjacent frequency bands for GSM, Telstra is deploying WCDMA at 850MHz. Therefore, inter-carrier roaming is not feasible without handsets operating in the relevant bands.

1.4 Government Policy

Over the last decade, the Australian telecommunications industry has been influenced by several key factors:

- The creation of a deregulated, competitive telecommunications industry.
- The rapid growth in mobile and wireless services and technology to support them.
- The privatisation of Telstra.
- The advent of "next generation" internet protocol broadband services for business, personal and entertainment purposes.

As adoption of broadband has accelerated, so has the expectation of reasonably equitable access to those services. Equity in the context of telecommunications is usually associated with two aspects of services, namely performance and price. Performance relates to whether the non-urban user is able to access services of comparable performance to urban users, and price is looked at in terms of whether the price is equivalent, or at least comparable, for urban and non-urban users.

Historically, Australia has had a monopoly telecommunications carrier, and Australia's broad policy was to use direct government subsidy where large infrastructure projects were required, and internal cross-subsidy to maintain comparable service prices. The advent of the competitive market has resulted in a change to these approaches.

The telecommunications sector differs from other national infrastructure sectors such as roads, railways, electricity, gas and water in that the infrastructure is almost entirely owned by the private sector. This means that telecommunications infrastructure investment has a tendency to be focused on investments that maximise direct financial return rather than the national interest. Marginal investments for telecommunications infrastructure providers usually require legislated or government financial support that can be justified for national benefit reasons.

Direct government subsidy must take into account the need to foster the competitive environment. At the same time, new entrants erode the market share of the former monopoly, and as that company is made subject to corporate disciplines, internal cross-subsidy becomes less attractive.

These considerations impact on the development of telecommunications policy.

1.4.1 Policy and Programs

While the Commonwealth Government remains the focal point for telecommunications policy development, in recent years there has been an acceleration of telecommunications related policy at State and local government levels.

Commonwealth Government policies and regulatory regimes aimed at the telecommunications industry include:

- The *Telecommunications Act 1997*, the main objective of which is to provide a regulatory framework that promotes the long-term interests of end-users of carriage services or of services provided by means of carriage services and the efficiency and international competitiveness of the Australian telecommunications industry.
- The Broadband Blueprint, which provides a national framework for the future of broadband in Australia. The Blueprint articulates the essential elements of the broadband market and a forward strategy to encourage their development.
- The regulatory framework that governs the rights and obligations of telecommunications carriers in relation to the installation and maintenance of telecommunications facilities.
- Policies and regulatory frameworks that relates to mobile phone towers and antennae.
- The monitoring and reporting regime of the Australian Communications and Media Authority (ACMA).

At a State and Territory level, mobile phone towers exceeding five metres in height are subject to the provisions of the relevant State or Territory legislation, usually through the local government-planning framework.

There are a variety of government programs relating to telecommunications infrastructure, some of which include:

- Subsidy — Government subsidies encourage either the deployment of telecommunications infrastructure, or support price equalisation of telecommunications services using that infrastructure.
- Infrastructure Ownership — Direct or indirect government investment in telecommunications infrastructure, which is then made available as a carriage service to other users.
- Demand Aggregation — Government agencies with similar requirements can encourage delivery of infrastructure to a region by aggregating several contracts into a single, larger contract.
- Planning Requirements — Governments encourage telecommunications investment as part of new residential or business investments with development controls.

At present, there is no comprehensive national or State plan for telecommunications infrastructure.

1.4.2 Current Policy Initiatives

A number of important aspects of public telecommunications policy are now converging, and their outcomes will have a profound impact on Australia's telecommunications infrastructure.

Since data was gathered for this Report Card, the future of Australia's telecommunications infrastructure has been affected by:

- The rapid expansion of Australia's 3G network infrastructure to support the increased demand on services provided through wireless (broadband) networks (both fixed and mobile) is anticipated. To a large extent, the 3G rollout uses existing 2G and 2.5G network infrastructure, such as monopole and lattice towers.
- The Commonwealth Government announced the awarding of \$938 million of contested grant funding to a consortium of Optus and Elders (known as OPEL) for infrastructure deployment in regional areas. The OPEL funding focuses primarily on access services, supporting the deployment of ADSL2+, WiMAX, and some fibre infrastructure in rural and regional Australia.
- The results of the Commonwealth Government's consideration of arrangements for rollout of new infrastructure (in particular Fibre to the Node (FTTN)) for delivering broadband services in capital cities and major regional centres.

The Commonwealth is being advised by an expert group on how to evaluate proposals for such infrastructure. It is expected that the outcome will avoid unnecessary infrastructure duplication and incorporate a commercially acceptable access regime in the investment decisions.

The *Australia Connected* announcements made in June 2007 should, if the program is successful, greatly expand non-metropolitan access to broadband services and support more equitable access to services.

2 New South Wales

NSW has twelve statistical divisions, with a populations spread of more than 6.68 million people. However, the population is thinly dispersed, with a State-wide average of 8.65 people per square kilometre. This falls to 3.3 people per square kilometre if Sydney is excluded.

NSW has a large number of fibre-based and microwave-based long haul systems, and access technologies are generally well-represented. All access network technologies are used in NSW, including access fibre (predominantly deployed in the major coastal cities of Sydney, Wollongong and Newcastle), fixed wireless broadband in both metropolitan and regional locations, HFC, DSL broadband systems, and 2.5 and 3G mobile. However, regional NSW is relatively poorly served.

Table 2 summarises the infrastructure rankings. Figures 1 and 2 represent the rankings in map form for each NSW statistical division for fixed and mobile infrastructure.

Table 2: NSW Statistical Division Summary

Statistical Division	Fixed Infrastructure Rankings	Mobile Infrastructure Rankings
Sydney	B	B
Hunter	E	D
Illawarra	D	D
Richmond-Tweed	D	E
Mid-North Coast	D	E
Northern	D	D
North Western	E	E
Central West	D	E
South Eastern	D	D
Murrumbidgee	D	E
Murray	E	E
Far West	F	F

Figure 1: Fixed Infrastructure Rankings, NSW



Figure 2: Mobile Infrastructure Rankings, NSW



3 Victoria

Victoria has eleven statistical divisions and a population of more than 4.9 million. Its population density is around 21 people per square kilometre State-wide.

Victoria has the largest number of individual infrastructure owners, with all infrastructure types represented.

Table 3 summarises the infrastructure rankings. Figures 3 and 4 represent the rankings in map form for each Victorian statistical division for fixed and mobile infrastructure.

Table 3: Victoria Statistical Division Summary

Statistical Division Name	Fixed Infrastructure Rankings	Mobile Infrastructure Rankings
Melbourne	B	B
Barwon	D	D
Western District	D	E
Central Highlands	E	E
Wimmera	F	E
Mallee	F	E
Loddon	E	E
Goulburn	D	E
Ovens-Murray	E	E
East Gippsland	D	E
Gippsland	D	E

Figure 3: Fixed Infrastructure Rankings, Victoria



Figure 4: Mobile Infrastructure Rankings, Victoria



4 Queensland

Rapid population growth in South-East Queensland (in both the Gold Coast and the Sunshine Coast) has produced what amounts to two “urban” regions in that State.

However, infrastructure reach is limited. Once beyond the regions nearby to Brisbane, most of Queensland ranked an E for fixed infrastructure. Queensland also ranked relatively poorly for mobile technologies at the snapshot date.

Table 4 summarises the infrastructure rankings. Figures 5 and 6 represent the rankings in map form for each Queensland statistical division for fixed and mobile infrastructure.

Table 4: Queensland Statistical Division Summary

Statistical Division Name	Fixed Infrastructure Rankings	Mobile Infrastructure Rankings
Brisbane	B	B
Moreton	C	C
Wide-Bay Burnett	D	E
Darling Downs	D	E
South West	E	F
Fitzroy	E	E
Central West	E	F
Mackay	E	E
Northern	E	E
Far north	E	E
North West	E	F

Figure 5: Fixed Infrastructure Rankings, Queensland



Figure 6: Mobile Infrastructure Rankings, Queensland



5 Western Australia

At October 2006, Western Australia had relatively limited infrastructure outside of Perth and its immediate surrounds. The Central and Pilbara statistical divisions rank poorly, even though they are host to long haul infrastructure used to connect submarine cables and satellite stations to the national network.

Table 5 summarises the infrastructure rankings. Figures 7 and 8 represent the rankings in map form for each Western Australian statistical division for fixed and mobile infrastructure.

Table 5: Western Australia Statistical Division Summary

Statistical Division Name	Fixed Infrastructure Summary Rankings Access and Long haul	Mobile Infrastructure Summary Rankings
Perth	C	C
South West	F	D
Lower Great Southern	F	E
Upper Great Southern	F	E
Midlands	F	E
South Eastern	F	E
Central	F	E
Pilbara	F	E
Kimberley	F	F

Figure 7: Fixed Infrastructure Rankings, Western Australia



Figure 8: Mobile Infrastructure Rankings, Western Australia



6 South Australia

South Australia has a widely dispersed population. For instance, the Northern statistical division has a population of only 78,000 people. Even the statistical divisions of Adelaide and Outer Adelaide rank relatively poorly, achieving a D in fixed infrastructure, and Adelaide achieved only a C for mobile infrastructure.

Table 6 summarises the infrastructure rankings. Figures 9 and 10 represent the rankings in map form for each South Australian statistical division for fixed and mobile infrastructure.

Table 6: South Australia Statistical Division Summary

Statistical Division Name	Fixed Infrastructure Rankings	Mobile Infrastructure Rankings
Adelaide	D	C
Outer Adelaide	D	D
Yorke and Lower North	F	E
Murray Lands	D	E
South East	E	E
Eyre	F	F
Northern	F	E

Figure 9: Fixed Infrastructure Rankings, South Australia



Figure 10: Mobile Infrastructure Rankings, South Australia



7 Tasmania

Tasmania has a relatively small population and there is a lack of competition to provide long haul services across Bass Strait. Tasmania has very little telecommunications infrastructure.

Table 7 summarises the infrastructure rankings. Figures 11 and 12 represent the rankings in map form for each Tasmanian statistical division for fixed and mobile infrastructure.

Table 7: Tasmania Statistical Division Summary

Statistical Division Name	Fixed Infrastructure Rankings	Mobile Infrastructure Rankings
Greater Hobart	D	E
Southern	D	E
Northern	F	E
Mersey-Lyell	F	E

Figure 11: Fixed Infrastructure Rankings, Tasmania



Figure 12: Mobile Infrastructure Rankings, TAS



8 Northern Territory

The Northern Territory has extremely low population concentrations outside Darwin.

Darwin is the most remote capital city from the rest of Australia's telecommunications infrastructure.

Table 8 summarises the infrastructure rankings. Figures 13 and 14 represent the rankings in map form for each Northern Territory statistical division for fixed and mobile infrastructure.

Table 8: Northern Territory Statistical Division Summary

Statistical Division Name	Fixed Infrastructure Rankings	Mobile Infrastructure Rankings
Darwin	D	E
Northern Territory - Balance	F	F

Figure 13: Fixed Infrastructure Rankings, Northern Territory

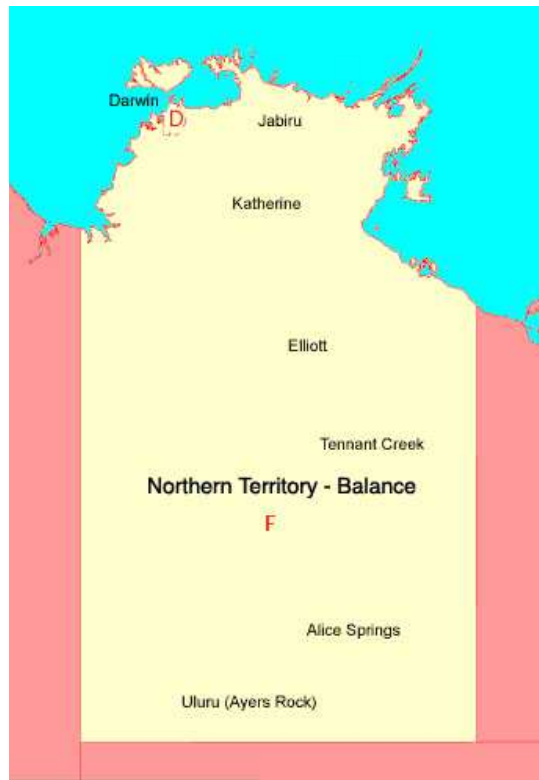
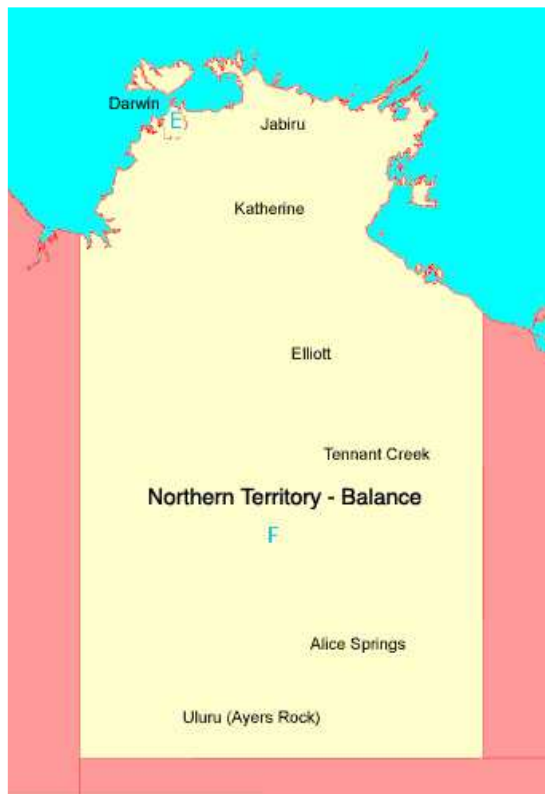


Figure 14: Mobile Infrastructure Rankings, Northern Territory



9 Australian Capital Territory

While metropolitan Canberra performs moderately well, the remainder of the ACT has limited access to the telecommunications infrastructure.

It appears that apart from PSTN services, the balance of the ACT (statistical division 810) only receives those services that can be delivered from within statistical division 805. Therefore, no accurate assessment can be made of the balance of the ACT.

At the snapshot date, the ACT appeared relatively poorly-served in mobile infrastructure.

Table 9 contains the infrastructure ranking. Figures 15 and 16 represent the rankings in map form for fixed and mobile infrastructure.

Table 9: ACT Statistical Division Summary

Statistical Division Name	Fixed Infrastructure Rankings	Mobile Infrastructure Rankings
CANBERRA	C	D

Figure 15: Fixed Infrastructure Rankings, ACT



Figure 16: Mobile Infrastructure Rankings, ACT



Appendix