



**Inquiry into  
domestic intercarrier roaming  
declaration**



# **Public inquiry into declaration of domestic intercarrier roaming under Part XIC of the Trade Practices Act 1974**

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**Report prepared pursuant to Section 505 of the  
Telecommunications Act 1997**

**March 1998**

Report by the Australian Competition and Consumer Commission



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# Abbreviations

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AMPS	Advanced mobile phone system — a technical standard for cellular mobile telephone systems. Telstra operates an analogue AMPS system in Australia, which is being phased out. Telstra resells AMPS airtime to Optus.
CDMA	<b>Code division multiple access</b> — a digital voice transmission which is ‘spread’ over a much wider bandwidth by coding each bit with a sequence of many more bits in a pseudo random pattern. Adopted by at least two major cellular operators in the USA. Adopted as interim standard IS-95 by TIA in mid-1993. Likely to be used by any new operators in the 800 MHz band.
CSP	Carriage service provider.
CTIN	Centre for Telecommunications Information Networking.
D-AMPS	Digital AMPS (known as TDMA in the USA) — Uses time division multiple access technology which allows several conversations to share a single radio channel by each transmitting digitised voice within its allocated timeslot.
DCS 1800	Digital cellular system at 1800 MHz (GSM extension), also known as half rate GSM for local loops.
DECT	Digital european cordless telephony standard based on the Ericsson DCT900 aimed at providing a cordless telephone service. Uses TDMA and can hand over calls between cells. Is similar to digital cellular but optimised for an office environment compared to cellular’s optimisation for mobile and wide coverage.
EC	European Commission
ECPR	Efficient components pricing rule.
GEO	Geo-stationary orbit (in reference to a satellite).
GSM	Global system for mobile communications (or groupe special mobile) — a technical standard for digital cellular mobile telephone systems, currently used for 900 MHz band transmissions in Australia by Telstra, Optus and Vodafone. GSM uses a smart card, or subscriber identity module (SIM) for subscriber identity and billing purposes. Utilises TDMA system.
ISDN	Integrated services digital network — a form of telecommunications network capable of carrying both voice (telephone) and data traffic.
LEO	Low earth orbit (in reference to a satellite).
LMDS	Local multipoint distribution services.
LTIE	Long-term interests of end-users.

MMDS	Multichannel multipoint distribution services.
OECD	Organisation for Economic Cooperation and Development.
PACTS	Public access cordless telecommunications services.
PCS	Personal communication services. Radio communications that encompass mobile and ancillary fixed communications that provide services to individuals and businesses and can be integrated with a variety of competing networks.
PHS	Personal handy phone system.
PMR	Private mobile radio services.
PMTS	Public cellular mobile telecommunication services.
PCN	Personal communication network. Associates a telephone number with a person, not a device.
PSTN	Public switched telephone network — the switched telephone network to which public customers are connected.
SIM	<p>(Subscriber identity module) or plastic roaming — a removable module that identifies the subscriber separately from the handset to allow for other forms of GSM roaming. There may be a SIM type plastic card for CDMA in the future. Plastic roaming where the home operator provides a SIM from the visiting network provides all the features of manual roaming (such as a new number) when the two companies have not established an automatic roaming agreement but have taken an intermediate step by providing a service to obtain the SIM card and manage the billing from the home network.</p> <p>Another form of SIM roaming sees a customer moving the subscription identifier from one handset to another. An example is to allow roaming between two networks on different frequency bands without the use of a dual mode/band handset. Examples include GSM900 to DCS1800, GSM900 to PCS1900, DCS1800 to PCS1900, IS95 to CDMA@1900.</p>
TAF	Telecommunications Access Forum.
TDMA	Time division multiple access — allows several conversations to share a single radio channel by each transmitting digitised voice within its allocated timeslot. Used by GSM and DAMPS, JDC, DECT and DCS 1800 based PCN. Generally referred to as D-AMPS in Australia.
TPA	Trade Practices Act.
TPMR	Trunked private mobile radio.
TSLRIC	Total service long run incremental cost.



# Glossary

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Analogue	the term used to describe the continuously variable wave-form nature of voices and other signals.
Automatic roaming	allows people to make and receive calls by simply turning on their mobile handsets when inside the new network coverage area. To achieve this the two operators must have an agreement which covers a number of commercial and technical issues. For GSM, the operator's association Memorandum of Understanding plays a major role in creating a standard agreement which includes but is not limited to revenue sharing, delivery, timing, accuracy, intercarrier charging records, fraud management and control and service availability.
Bandwidth	the range of frequencies which an analogue transmission medium is capable of carrying, expressed in Hertz (cycles per second).
Base station	Radio transmitter and receiver used for transmitting and receiving calls to or from mobile telephones in a particular cell.
Cellular mobile telephone systems	Mobile telephone system in which the coverage area is divided up into a large number of small areas, each of which had its own base station.
Digital	the representation of a signal in the form of a stream of binary numbers rather than as an analogue electrical signal.
Hand-off/hand over	the process of transferring a telephone conversation from a particular frequency in one cell to a new frequency in an adjacent cell as the user moves between cells.
Hertz	measurement in cycles per second, of the pitch or frequency of wave-form.
Manual roaming	sees the customer establish a commercial relationship with each and every network onto which they wish to roam. This relationship can be established by the use of a credit card so as to transfer the credit risk from the host telecommunications company onto the credit card company. Normally the implication of these discrete relationships sees the customer obtaining a new phone number for each and every network onto which they roam
Mobile telephones	telephones which are not fixed and which communicate with the network by transmitting radio signals.

Network conditioning	the process of modifying the functional operation of telephone exchanges by means of re-programming or re-wiring. Such modifications can change the way in which the exchange handles a call or signalling information and may involve changes in routing, number recognition, call charge recording etc.
Radio transmissions	transmission of information in the form of radio waves, without the need for a physical cable.
Resale	the use of carrier capacity or services by another company to provide services to third parties.
Signalling system	the means by which telephones inform telephone exchanges, and telephone exchanges inform each other, of the important features of each telephone call.
Switching system	a system which allows the temporary connection of the telephone of the calling party with the telephone of any other party selected by the calling party.
Telecommunications network	a system for the transmission of information between one party and another. It comprises transmission, switching and signalling functions.
Transmission interface equipment	equipment used to convert one form of transmission to another.
Transmission medium	the medium of which information is conveyed, such as copper wire, co-axial cable, fibre optic cable and radio.
Transmission system	the means by which information passes from one point to another, comprising transmission mediums and transmission interface equipment.

# Summary

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The Australian Competition and Consumer Commission conducted a public inquiry under Part XIC of the *Trade Practices Act 1974* (the TPA) and Part 25 of the *Telecommunications Act 1997*, into whether services enabling domestic intercarrier roaming should be declared under s. 152AL of the TPA. In accordance with s. 505 of the Telecommunications Act this report sets out the Commission's findings.

## Background

The Government announced on 9 July 1997 its intention to auction spectrum in the 800 MHz and 1800 MHz (1.8 GHz) bands. To provide potential bidders 'with as much certainty as possible', the Minister for Communications and the Arts requested in September 1997 that the Commission consider whether to hold a public inquiry about declaring services to enable intercarrier roaming between digital networks.

The Commission commenced a public inquiry under Part XIC of the TPA in November 1997 to consider whether to declare services to enable domestic intercarrier roaming:

- between the existing GSM digital mobile services in the 900 MHz band and new services which may be offered in the 1800 MHz band; and
- between digital mobile services which may be offered in the 800 MHz band.

This is the Commission's first public inquiry into whether to declare a service under Part XIC, although some services were deemed to be declared services under transitional provisions.

Intercarrier roaming provides for a customer of one mobile network to use their handset to access service from another mobile network. For example, if a new mobile carrier initially rolls out its network in urban areas only, its customers may be able to use their handsets in other areas of Australia by roaming onto an existing GSM network in the 900 MHz band (of Telstra, Optus or Vodafone). Potential entrants have argued that roaming is necessary to compete against the incumbent mobile carriers with their existing national networks.

## Commission's view of roaming possibilities

The services the inquiry looked at can be considered in terms of the overall roaming possibilities that will exist after the spectrum auction. Mobile services are currently provided on Telstra's analogue AMPS network (which is being phased out) in the 800 MHz band and the GSM networks of Optus, Telstra and Vodafone in the 900 MHz band. Spectrum is planned to be auctioned in the 800 and 1800 MHz bands. The deployment of new technology after the spectrum auctions will create a number of roaming possibilities, only some of which will be supported by existing handsets.

In the 800 MHz band there may be entry based on CDMA and/or D-AMPS technologies. Entrants in this band will have the following roaming options.

- Roaming onto Telstra's analogue AMPS network in the 800 MHz band — such roaming is provided for by a carrier licence condition on Telstra and may be an important strategy for new entrants.
- Roaming onto other new digital networks in the 800 MHz band — carriers are likely to have an incentive to reach commercial agreements, particularly if new networks have complementary coverage. Handsets would provide for roaming between networks of the same technology, although roaming across digital technologies (i.e. between a CDMA network and a D-AMPS network) is not currently possible.
- Handsets for roaming from the 800 MHz band onto the GSM 900 MHz networks or DCS networks in the 1800 MHz band will be limited by the incompatibility of the signalling and control systems. While some of these limitations are being addressed through the development of intersystem protocol converters, the global market for this capability is likely to be small such that the commercial viability of appropriate handsets is unclear.

Currently in the 900 MHz band, there are the three GSM networks of Optus, Telstra and Vodafone. No new spectrum will be available in this band. Roaming is possible between the three GSM networks, although the incumbent operators may not have an incentive to roam onto each other's networks if they continue to compete on the basis of coverage. It is relevant that none of the incumbents requested the Commission to declare a service to enable them to roam onto another's network.<sup>1</sup> In these circumstances declaration may have little effect as it facilitates provision of access but can not mandate that an access seeker must request access.

In the 1800 MHz band, spectrum is being auctioned and networks using DCS technology (a derivative of GSM) are likely to be set up, either by the existing GSM carriers or by new entrants. Handsets currently provide for roaming between 900 MHz band GSM technology and 1800 MHz band DCS technology, and roaming between 1800 MHz band networks of the same technology would also be possible. The Commission considers that before making a decision to declare 900/1800 MHz band roaming it would need to determine if there are bottleneck issues or strategic reasons why roaming onto the 900 MHz band GSM networks would not be provided by the three incumbent operators. The inquiry focused primarily on whether 900/1800 MHz band roaming should be declared.

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<sup>1</sup> The Government, as part of its AMPS phase-out decision, may require existing GSM carriers to provide roaming to each other in selected regional or remote areas. However, this aspect was not of central concern to this inquiry.

## **Consequences of declaration**

Declaration is an important regulatory instrument that carries potentially significant benefits, but it can also be associated with some regulatory risks. A decision by the Commission to declare a service:

- would mean that a carrier or carriage service provider supplying the service (an access provider) must supply the service to any requesting service provider in accordance with the standard access obligations under s. 152AR of the TPA; and
- may lead to the Commission effectively determining the terms and conditions by which services enabling roaming are supplied to competitors, either through approving an access undertaking or in an arbitration determination.

Determining terms and conditions, particularly price, may risk deterring future investment and innovation. Accordingly, declaration is likely to be desirable in circumstances of clear market failure and where the potential benefits are sufficient to outweigh any regulatory risks to end-users.

## **Legislative requirements for declaration**

Under s. 152AL of the TPA the Commission may only declare a service if it is satisfied that declaration will promote the long-term interests of end-users of carriage services or of services provided by means of carriage services (the LTIE). In regard to the decision whether to declare services to enable roaming, the LTIE are likely to be promoted only if the following factors are present:

- The existing level of competition in the mobile market is inadequate — declaration would not create benefits for consumers if mobile services were already competitively provided.
- New carriers will not be able to compete unless they can roam onto an existing network because national coverage is considered to be of critical importance to consumers — if roaming is of lesser significance then declaration is less likely to promote the LTIE.
- The incumbent mobile carriers will not provide roaming to entrants on reasonable terms and conditions in the absence of regulatory intervention. Even if roaming is important, if it is commercially provided there may be no need for declaration. Further, the threat of intervention by the regulator for anti-competitive conduct may be sufficient to encourage the incumbent carriers to provide roaming services.
- It is technically feasible to provide such a service.
- The benefits to consumers in terms of promoting competition from declaration are not outweighed by any longer term costs such as that of discouraging investment, particularly relating to innovative services.

Following are the main findings from the inquiry regarding whether declaring roaming in the 1800 MHz band or the 800 MHz band would be in the LTIE.

- The Commission considers that the relevant market is a market for mobile communication services.
- The market for mobile services is reasonably competitive when compared to most countries with the market characterised by strong growth and high penetration rates, particularly when account is taken of low handset prices which reflect cross-subsidies from usage charges.<sup>2</sup> It is expected, however, that additional competition would lead to lower usage prices in particular.
- The value of national coverage to customers is unclear, as at least some proportion of customers are likely to trade off the capability of roaming for price/quality/feature combinations, resulting in some scope for niche regional entry. However, the Commission considers that national coverage, and therefore roaming, is still important for entry as it is valued by a significant proportion of mobile customers.
- The outcome of the spectrum auction is uncertain. There is the prospect of entry by new players in the 800 MHz band; however all spectrum in the 1800 MHz band may go to the incumbents.
- If there is entry, roaming is likely to be commercially provided without the need for regulatory intervention. This is particularly likely in the 800 MHz band where there would be stronger incentives to enter roaming arrangements, but is also likely in the 900/1800 MHz bands where there are three existing GSM operators who each have commercial incentives to provide roaming. The Commission also took account of commitments by existing carriers that they would be willing and would prefer to enter into roaming negotiations on a commercial basis.
- Not declaring roaming would avoid any adverse impact on investment incentives, particularly in circumstances where the benefits of declaration are uncertain at this stage.
- Even if roaming were declared, the Commission considers that strict cost-based pricing tests should not be applied towards the provision of roaming services (within an undertaking or arbitration). This means that declaration would primarily be for the purpose of mandating access, which is likely to be provided in any case.
- Given the desirability for new entry in the 1800 MHz band, the Commission will monitor the market and will be likely to intervene if the incumbents refuse to provide roaming services on a commercial basis if requested to do so.

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2 However, in certain areas mobile communications services are not competitive, such as in remote areas which are serviced only by Telstra's AMPS network.

## **Conclusion**

The Commission considers that national coverage, and therefore roaming, is important for entry and competition for a significant portion of the mobile market, although there is some scope for niche market entry, that is, providing mobile services on a regional basis only.

Assuming there is entry in the 800 MHz or 1800 MHz bands after the spectrum auction, the Commission considers that roaming is likely to be commercially provided without the need for regulatory intervention.

The Commission considers that declaring roaming may have an adverse impact on investment incentives, particularly when the benefits of declaration are still uncertain.

On that basis the Commission has decided that it is not in the LTIE to declare roaming in the 800 MHz or 1800 MHz bands at this stage.

Given the importance of roaming for new entry in the 1800 MHz band, the Commission will monitor the market and will probably intervene if the incumbents refuse to provide roaming services.

If the incumbent mobile carriers act competitively they are likely to provide roaming to entrants. Alternatively, if the incumbent carriers fail to provide roaming on reasonable terms and conditions and in a timely manner the Commission may view this as anti-competitive conduct and take early action under Part XIB of the TPA and/or review the declaration decision.

The Commission intends this approach to send a strong signal to potential entrants that they can expect roaming to be available through commercial processes and, if commercial processes fail, through declaration. This approach ensures that declaration occurs only if a roaming market does not develop without regulatory intervention.





# 1. Introduction

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Part XIC of the *Trade Practices Act 1974* (the TPA) establishes a regime for regulated access to carriage services and services which facilitate the supply of carriage services.

Access obligations in relation to a particular service are established by the declaration of that service by the Australian Competition and Consumer Commission. Once a service is declared, carriage and content service providers must be provided with that service and specified ancillary services, on request, by any carrier or carriage service provider supplying the services. The access regime will thus enable industry operators to provide carriage or content services to their customers without upstream carriers or carriage service providers restricting supply of essential input services (with a potentially anti-competitive effect).

Declaration may take place on the recommendation of the Telecommunications Access Forum (TAF) or after a public inquiry conducted by the Commission. Declaration of a specified eligible service after a public inquiry requires that:<sup>3</sup>

- the Commission has held a public inquiry under Part 25 of the *Telecommunications Act 1997* into a proposal to make the declaration;
- the Commission has prepared a report about the inquiry under s. 505 of the *Telecommunications Act*;
- the report was published during the 180 day period ending when the declaration was made; and
- the Commission is satisfied that making the declaration will promote the long-term interests of end-users of carriage services or of services provided by means of carriage services (the LTIE).

In November 1997, the Commission began a public inquiry pursuant to Part 25 of the *Telecommunications Act* to consider whether to declare services, under s. 152AL of the TPA, to enable domestic intercarrier roaming:

- between the existing GSM digital mobile services in the 900 MHz band and new services which may be offered in the 1800 MHz band (1.8 GHz); and
- between digital mobile services which may be offered in the 800 MHz band.

Submissions were required by 22 December 1997 and a public hearing was held on 20 January 1998 to provide a further opportunity for interested members of the public to air their views.

During the course of the inquiry the Commission considered the various views put by all interested parties in relation to issues that had been identified in preliminary work.

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<sup>3</sup> Section 152AL(3) of the Act.

These issues became the subject of a discussion paper, subsequent submissions, both written and oral, and separate discussions with particular groups.

In accordance with s. 505 of the Telecommunications Act this report sets out the Commission's findings into whether declaration is in the long term interests of end-users.

Copies of this report will be provided to the Minister and the Australian Communications Authority. A copy will also be available to the public via the Commission's Public Register.

The report is structured as follows. **Section 2** contains a brief overview of the spectrum auction and the Government's recent AMPS phase-out decision which provides some context to the Commission's consideration. **Section 2** also provides an outline of the inquiry process to date. **Section 3** provides examples from other jurisdictions where national or intercarrier roaming has been introduced. **Section 4** considers the long-term interests of end-user criteria that the Commission is required to consider in determining whether a service should be declared under Part XIC. Finally, in **Section 5** the Commission's decisions and findings are reported.

## **2. Background**

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### **2.1 Spectrum auction**

On 9 July 1997 the Government announced its intention to reallocate spectrum in the 800 MHz and 1800 Mhz (1.8 GHz) bands with an auction for spectrum licences. The bids for spectrum closed on 13 March 1998.

In the 800 MHz band some spectrum has been reserved for new entrants. In the 1800 MHz band there is no reservation for entrants although limits have been set on the amount of spectrum that any one bidder can acquire. These limits would allow the three incumbents to acquire all available spectrum in the 1800 MHz band if successful in bidding to their maximum allowable allocation at the auction.

The spectrum being auctioned can support a variety of new technologies including, but not limited to:

- in the 800 MHz band, CDMA and TDMA (digital AMPS) — these are digital technologies compatible with AMPS; dual-mode handsets provide for roaming between these technologies and analogue AMPS; and
- in the 1800 MHz band, DCS 1800 — this is a GSM technology; dual-band handsets provide for roaming between DCS 1800 services and the existing GSM networks in the 900 MHz band.

To provide potential bidders ‘with as much certainty as possible’ for the spectrum auction, the Minister for Communications and the Arts requested in September 1997 that the Commission consider whether to hold a public inquiry into whether to declare services to enable intercarrier roaming between digital networks.

### **2.2 AMPS resale/roaming**

The inquiry did not consider whether to declare services to enable domestic intercarrier roaming onto Telstra’s analogue AMPS network. In January 1998 the Government announced that a licence condition will be imposed on Telstra to provide entrants in the 800 MHz band with:

- rights to resell the analogue AMPS service; and
- reciprocal roaming rights between Telstra’s analogue AMPs network and new digital 800 MHz networks.

In February 1998 the Government announced that it will phase out the AMPS network in regional areas by the year 2000. The extent of actual AMPS coverage is currently the subject of an Australian Communications Authority investigation due to be completed in mid-1998.

## 2.3 Inquiry process to date

Following the Minister's request to consider whether to conduct a public inquiry the Commission:

- requested that the Telecommunications Access Forum consider what services would be necessary to support intercarrier roaming services;
- conducted preliminary discussions with interested parties; and
- engaged the Centre for Telecommunications Information Networking (CTIN) to assist in identifying the services and related technical issues to enable intercarrier roaming.

On 24 November 1997 the Commission released a discussion paper. Eleven written submissions were received from Telstra, Optus Communications, Vodafone, AAP Telecommunications, Hutchison Telecoms, Nortel, Ericsson, Iridium South Pacific, Neil Wyatt, Australian Telecommunications Users Group and one confidential submitter.

A public hearing was conducted in Melbourne on 20 January 1998.

## 2.4 Discussion paper

The discussion paper announced the inquiry and requested public submissions. The paper provided a general functional definition of domestic intercarrier roaming:

the ability for a customer of one domestic network (the home network) to access service from another domestic network (the host network) using the same handset (p. 8).

The decision to define the service in functional terms was on advice from the Commission's technical consultant that a number of different forms of roaming are possible and they may have differing impacts on the LTIE test. The Commission considered it appropriate to canvass the range at the outset of the inquiry and to seek industry views as to whether the Commission should:

- not declare any service;
- declare one particular form of roaming; or
- declare a generic service and allow industry to determine the technical aspects of the service and vary the technical specifications as technology develops.

The Commission considered that choosing a particular form of roaming at the outset of the inquiry would have prejudged that such a form was most likely to be in the LTIE. The note to s. 152AL(3) of the TPA states that ‘Eligible services may be specified by name, by inclusion in a specified class or in any other way.’<sup>4</sup>

However, one participant argued that eligible services must be sufficiently specified at the start of the inquiry to provide interested parties with adequate detail about the particular service that is proposed to be declared, otherwise parties may be hampered in their ability to comment on the proposal.

The Commission considered that the public inquiry process provided parties with the opportunity to comment on the methods by which the service (as described in functional terms) may be supplied and to address technical issues associated with each method. If it had been appropriate the Commission would have provided a further period for interested parties to comment on particular proposals.

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4 The explanatory memorandum adds:

In making a declaration of an eligible service, the ACCC will have a high level of flexibility to describe the service, whether it be functional or any other terms. This will enable, where appropriate, the ACCC to target the access obligations (which are triggered by declaration) to specific areas of bottleneck market power by describing the service in some detail, or to more broadly describe a service which is generally important (such as services necessary for any-to-any connectivity).

### 3. Australian and overseas experience

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All three Australian incumbent mobile operators provide roaming services to customers of international carriers when they visit Australia. International carriers have an incentive to enter into roaming agreements because, generally, there is a comparable benefit to each in entering such arrangements arising from:

- the complementary nature of their relationship (that is the coverage area of each network is unique, with little or no overlap); and
- the fact that carriers are not competitors in each other's domestic markets.

Where an international carrier has established roaming agreements with more than one Australian mobile network operator, the customers of the international carrier can readily switch between the networks in Australia.

There is also a limited form of domestic roaming in Australia. While a customer of an Australian mobile network is generally prevented from using the services of another network, an exception is made for calls to emergency services. For example, Optus mobile customers who are out of range of the Optus network may still be able to make an emergency call on their handset using the Telstra or Vodafone network.

In terms of international experience many countries have recently, or are now in the process of, liberalising their mobile markets and some of these countries have mandated domestic roaming with mixed results. These countries include Canada and some Latin American countries (AMPS); and Italy, Denmark, Norway and South Africa (all GSM roaming).

**Canada** required the two incumbent analogue carriers to enter roaming arrangements with one of the new entrants before they could use purchased spectrum to use PCS technology. Commercial agreements have been reached.

In **Italy** roaming was offered to the rival GSM operator at a regulated price to allow quick entry into the market but also to encourage the entrant to build its own infrastructure. Roaming is now used for less than 2 per cent of the rival's traffic. Telstra claims roaming created major problems with network congestion and handset implementation in Italy. Other commentators have claimed that there were no significant technical problems and that most of the issues related to price.

In **Denmark** and **Norway** requirements have recently been imposed on the incumbent operators to offer national roaming using GSM Phase 1 technology to new DCS 1800 operators. Danish legislation requires roaming to be commercially negotiated if requested. This has meant customers will be able to roam on any other available network, including in overlapping areas. While it is intended that carriers will charge cost-based prices, in Denmark the regulator has no access pricing or arbitration role.

Following Commission inquiries the Danish regulator advised that two roaming agreements have been reached between GSM 900 operators (two incumbents) and 1800 DCS operators (two new entrants), using dual band GSM Phase 2 handsets. Roaming has been implemented in one network, with technical problems associated with

overlapping coverage being overcome by using ‘non-seamless roaming.’ That is, the customer needs to explicitly select another network on their handset to roam onto that network.

In **South Africa** roaming was introduced as a transitional measure while the new entrant was rolling out its network. However, after a period the new entrant decided to voluntarily stop allowing its customers to roam onto the incumbent’s networks because of: (i) concern that the customers were developing a closer customer relationship with the incumbent than itself; and (ii) its network roll-out was sufficiently progressed to satisfy customers.

In the **United States** carriers have a commercial incentive to provide roaming, although this is between non-overlapping networks which involves similar incentives to international roaming.

The **European Commission** (EC) considered the issue of roaming following a ruling that European mobile operators still did not have significant market power. The EC has emphasised infrastructure sharing, rather than national roaming, as a way of increasing competition from the DCS 1800 market entrants.

## 4. LTIE test

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The Commission may only declare a service if it is satisfied that declaration will promote the long-term interests of end-users of carriage services or of services provided by means of carriage services.

Section 152AB of the TPA provides that in determining whether a particular thing promotes the LTIE, regard must be had to the extent to which the thing is likely to result in the achievement of the following objectives (the secondary objectives):

- promoting competition in markets for listed services (carriage services or services supplied by means of carriage services);
- achieving any-to-any connectivity in relation to carriage services that involve communication between end-users; and
- encouraging the economically efficient use of, and the economically efficient investment in, the infrastructure by which listed services are supplied.

The Commission is of the view that the term LTIE refers to end-users' economic interests which include lower prices, increased quality and greater diversity of products. The Commission regards end-users as consumers (both residential and business) of communications carriage services and other services supplied using communications carriage services.

This section examines the likely impact of declaring roaming on the three secondary objectives in both the 800 MHz and 1800 MHz bands. Once the likely result on the secondary objectives has been assessed the overall question of whether roaming is in the LTIE (the primary objective) will be considered in both bands.

### 4.1 Will declaration promote competition?

The Commission applies a two stage analysis to determine whether declaration will promote competition.

- First, it identifies the market (or markets) likely to be affected by declaration of the eligible service (market definition).
- Second, it determines whether declaration of the eligible service is likely to promote competition in those markets and, if so, the extent to which competition is likely to be promoted.

The second stage involves establishing:

- the existing state of competition in the market(s); and then
- comparing the level of competition in the market(s) that would be likely to occur without declaration with the likely level of competition that would occur with declaration (the future 'with and without test').



Section 152AB(4) requires that, in determining the extent to which a particular thing is likely to promote competition, regard must be had to the extent to which it will remove obstacles to end-users gaining access to carriage services.<sup>5</sup> In this regard roaming can be said to promote competition if it will be likely to facilitate effective entry and provide end-users with a greater diversity of services, such as niche and innovative services.

#### 4.1.1 Market definition

The Commission considers that the relevant market for both 900/1800 MHz band roaming and 800 MHz band roaming is the national market for the supply of public cellular mobile telecommunication services (PMTS) by means of either digital or analogue technology to service providers and end-users. The functional dimensions of the market are wholesale and retail.

PMTS is defined in AUSTEL's July 1993 report on *Market Dominance: mobiles* as:

A fully mobile voice service offering interactive two way communications with the user having the ability to make and receive calls while stationary or moving, including at high speed.

For convenience the relevant market definition is referred to in this report as simply 'mobile services.' The Commission's analysis of market definition and competition are discussed below.

#### *Substitutability*

Section 4E of the TPA defines a market for particular goods or services to include a market for those goods or services and other goods or services that are substitutable for, or otherwise competitive with, the first mentioned goods or services. Market definition is thus the process of identifying the sellers and buyers which effectively constrain the price and output decisions of the firms in the market.

All services which are substitutable for mobile services must be identified. Substitution is considered at two levels:

- demand substitution; and
- supply substitution.

#### *Demand substitution*

On the demand side a number of services have been examined which may be considered as possible substitutes for (cellular) mobile services. However, none of these services are considered to be a good demand substitute for mobile services. Services considered were:

- the fixed network or public switched telephone services;
- public access cordless telecommunications services;

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5 The explanatory memorandum adds '... it is intended that particular regard be had to the extent to which the particular thing would enable end-users to gain access to an increased range or choice of services.'

- radio paging;
- private mobile radio services;
- trunked private mobile radio; and
- mobile radio and satellite services, such as LEOs and GEOs.<sup>6</sup>

**Fixed networks.** Fixed networks, such as the PSTN, provide all the functionality of mobile services except for mobility. The Commission considers that the main factor behind a customer's purchase of a mobile service is to obtain mobility of service on which a price premium is charged, particularly for calls to customers in the local area. As fixed networks do not provide mobility, fixed services are not considered close substitutes for mobile services by most consumers.

**Public access cordless telecommunications services (PACTS).** PACTS has some functional similarities with mobile services in terms of two-way communication and interconnection with the PSTN (it has been described as a digital cordless technology). However, there are also significant differences in functionality between PACTS and mobile services. PACTS generally have no call handover ability between cells and users are constrained to stay within a very short distance from the base station (typically a maximum of 100 metres). Because of its limited mobility the majority of mobile services users would not consider PACTS a close substitute. It should be noted that PACTS services are not currently provided in Australia, although PACTS type technology is popular in highly urbanised communities such as in Japan (PHS) and South East Asia. In Europe the technological standard is known as DECTS (Digital European Cordless Telephony).

**Paging services.** Paging services have comparable mobility to mobile services but are not considered to form part of the current mobile services market because of the lack of interactive two-way voice communication. Radio paging and mobile services tend to be complementary services rather than substitutes. Their complementary nature is demonstrated by customers who use both. If the services were substitutes, customers would choose one or the other but not both. If the price of mobile services increased there may be some customers at the margin who would move to a paging service, but this possibility is insufficient to include radio paging in the mobiles market. It should also be noted that mobile phones increasingly feature many of the services provided by pagers, although at a noticeable premium.

**Private mobile radio services (PMR).** PMR is a mobile communications system which is set up and maintained by the user. PMR utilises user-owned infrastructure and transmission facilities, and does not have any common or shared facilities between users. The service can provide coverage to large areas depending upon geographical siting of base stations.

Two services are considered substitutable if a significant migration of customers from one service to another occurs in response to an increase in price of the first. If the price of mobile services increased, the Commission considers it unlikely that there would be a significant migration of customers from mobile services to PMR. The main limiting

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<sup>6</sup> Such satellite services include the proposed services that will be offered by Iridium and Globalstar.

factor would be the initial investment in the sunk costs necessary to set up the PMR infrastructure and the fact that it is suited to customers with a large number of users who only require communication between themselves and a base station.

**Trunked private mobile radio (TPMR).** TPMR is a private mobile radio service with the ability to link to the PSTN, often at premium rate. TPMR services are differentiated from mobile services in terms of improved capacity, signalling capability, group calling and data transmission features. TPMR also allows all parties to a communication to speak simultaneously. TPMR is also capable of managing several interactive calls at once.

There are no indications of the number of customers who could move from mobile services to TPMR, nor any indication of the number of TPMR services available should prices for mobile services increase and customers decide to move back to TPMR. The lack of functionality of TPMR in terms of the difficulty and costs of interconnection to the PSTN, together with limited geographic coverage, indicate that TPMR is not a good substitute for mobile services. The differential in mobile services prices and significantly higher functionality also suggest that TPMR is not likely to be a good substitute in the foreseeable future.

**Mobile satellite services.** Mobile satellite services are a mobile service based upon a satellite rather than (terrestrial) cellular radio. Mobile satellite services are likely to become an important niche in the future. However, it is likely that the cost of satellite mobile services would, at least initially, be significantly higher than terrestrial mobile services — meaning that satellite services may not be substitutable for mobile services for some time.

**Microwave services.** Broadband radio services such as multichannel multipoint distribution services (MMDS) and local multipoint distribution services (LMDS), which are known as ‘wireless cable’ reflecting their ability to support high bandwidth services, are not considered substitutes for mobile services as they currently support only one way communication and do not offer mobility of communications.

**Wireless local loop.** Wireless local loop technologies offer the possibility of providing local access services at a lower cost than traditional fixed line technologies and can use a number of different radio technologies such as microwave, digital and analogue cellular, and cordless technologies (such as DECTs). The Commission does not consider wireless local loop to be a close substitute for mobile services because of the limited mobility of communications offered.

*(ii) Supply substitution*

On the supply side, potential sources of substitution can be identified when an existing supplier in the mobile services or other markets using existing infrastructure can change its output mix in order to supply mobile services.

The relevant output of the market is a public mobile telecommunications service, which can be supplied using either digital technology or analogue AMPS technology, although only Telstra can supply AMPS network services.<sup>7</sup>

Other services will be considered substitutable for mobile services if suppliers change their output mix to supply more mobile services as a result of a change in demand, or change their supply conditions leading to a price increase for mobile services. The Commission has not identified any existing combination of telecommunications services which could be closely substitutable with mobile services, thus no existing supplier substitutes are included in the mobile services market.

No substitutable services have been identified because the conditions of supply of mobile services are unique in terms of factors such as the radio spectrum required or the use of cellular radio base stations. A number of other telecommunications services are complementary services, not substitutes, to mobile services on the supply side. For example, the PSTN is used to terminate calls from mobile services to the fixed network (however, the PSTN infrastructure is not a substitute to supply mobile services because additional investment, and spectrum, is needed to supply mobile services).

### ***Geographic dimension to market***

The Commission considers that the geographic areas to which mobile services are supplied is the market for the supply of mobile services within Australia.

### ***Functional levels of the market***

The Commission considers that the mobile services market has two functional levels in relation to mobile roaming. The supply of mobile services by vertically integrated suppliers (Telstra, Optus and Vodafone in relation to digital mobile services) constrains the price and output decisions of non-integrated suppliers (resellers at the retail level). These functional levels are detailed below.

- Wholesale
  - Wholesale of analogue AMPS airtime and related services by Telstra to its retail arm Mobilenet, to Optus and to other resellers.
  - Wholesale of digital airtime by Telstra, Optus and Vodafone to resellers.
  - Services required to support the basic functions of domestic intercarrier roaming:
    - authentication — registration and authentication of the roaming customer;
    - mobility management — the system capability to automatically track the location of the customer;

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<sup>7</sup> Previous and current regulatory requirements dating to 1991 restricts ownership and operation of an analogue AMPS network to Telstra. Other licensed mobile carriers wishing to provide an analogue AMPS service may do so on the basis of resale of airtime purchased from Telstra.

- call delivery management — the system capability to originate and terminate the calls (and messages for short message service) between customers; and
  - service transparency — services to support intercarrier roaming should be transparent to end-users.
- Retail
    - Analogue AMPS retail service provision by Mobilenet and Optus and other wholesale resellers to individual users.
    - Digital retail service provided by Telstra, Optus, Vodafone and resellers to individual users.

***Time dimension of market***

The Commission considers that the period over which substitution possibilities should be considered is the longer term — but still the foreseeable future — that will effectively constrain the pricing and output decisions of suppliers of mobile services.

**4.1.2 Determining the likely level of competition without declaration against the likely level with declaration**

To consider whether declaration of roaming is likely to promote competition in the relevant market of mobile services, the Commission initially considered the effectiveness of the existing state of competition. Consistent with the explanatory memorandum in relation to s. 152AB, the Commission considers that it should not declare services enabling roaming where existing market conditions already provide for the competitive supply of mobile services.

This subsection initially examines the existing level of competition in the market. It then compares the level that would be likely to occur without declaration against the likely level that would occur with declaration (the future ‘with and without test’).

How declaration of roaming will promote competition depends on the structure of the relevant market and the conduct of participants in the market. Accordingly, factors influencing competition such as market share, coverage and barriers to entry are discussed as part of the existing state of competition. Further, if the provision of roaming is essential for effective new entry, then roaming is likely to have a significant effect on promoting competition. Accordingly, the importance of national coverage, and roaming, is considered within this analysis. If national coverage is important then the question of whether roaming will be commercially provided needs to be considered because declaration will likely not promote competition if roaming services are likely to be commercially provided anyway in the absence of declaration (these matters are separately discussed in subsections (c),(d) and (e)).

***(a) Existing state of competition***

There are a number of indicators showing that Australia has a reasonably competitive market by world standards. One such indicator is Australia’s relatively high degree of

penetration and growth in mobile services compared to most OECD countries. A further indication is that prices have been reasonably competitive and that combined fixed and usage prices have fallen. However, there are also other indications which suggest that price competition has not been as intensive as it could be, suggesting that the state of price competition may still be relatively immature.

The following evidence indicates that the mobiles market is reasonably competitive.

- OECD figures in 1994 indicate that Australia had the fourth lowest price (out of 25 countries) for a basket of mobile telecommunications tariffs.<sup>8</sup> Attachment A compares 1997 mobile tariff charges in a selection of OECD countries. These figures indicate that the Australian market is still reasonably competitive by comparison with many overseas countries in terms of connection and usage charges, although Australia has gone down in the relative rankings since 1994.<sup>9</sup>
- Further, there has been a relatively high subsidisation of handset prices. Digital handsets currently wholesale at around \$500,<sup>10</sup> and there are many mobile phone promotions which offer handsets at less than \$60, sometimes much less.
- It was submitted that competition in Australia tends to be confined to handsets rather than usage charges. This may reflect the relatively high cost of handsets which may pose an entry barrier to customers and the consequent cross-subsidies that are being used for the market to grow rapidly. Such a practice is not unique to mobiles and similar strategies are being adopted in some other jurisdictions. In addition, this tendency to cross-subsidise entry has led to a very high demand for mobile services which had reduced the pressure on price competition. However, one aspect of subsidised handsets is the long contract periods which reduce the ability of customers to churn, thereby weakening competitive pressure.
- As market growth plateaus, it would be expected that the extent of price competition will increase significantly.
- Service and product differentiation and sales promotion exist to some degree, such as:
  - population coverage (discussed below);
  - value added services (such as call diversion, voicemail, e-mail and other data services);
  - superior service quality with technology such as enhanced voice quality GSM software;
  - removable cards that allow for prepaid digital calls; and
  - operator and other call assistance features.

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8 However, many OECD countries have only recently liberalised their mobile markets.

9 There are, however, significant problems in international comparisons as there is little comparative data between identical total charges (handset charges plus connection and usage charges) for identical mobile plans.

10 'Australia, Mobile Communications — Spectrum, Infrastructure, Mobile Phones', *Telecommunications & Superhighway News*, p. 8.

Other factors which indicate that the existing mobiles market is reasonably competitive, such as penetration and growth, market share and population coverage, are discussed further below.

### *Penetration and growth*

Amongst the OECD countries only Scandinavia experienced faster growth rates, and Australia ranks fifth in the world in terms of penetration rates.<sup>11</sup> There are expectations that penetration will continue to grow. In 1996 penetration in the Australian population had grown to 24 per cent, while at end-1997 it was around 28 per cent with about 5.5 million mobile customers. It has been estimated that coverage is likely to reach 40–45 per cent by the year 2000 ( that is, 7.5–8 million customers).<sup>12</sup>

Ovum expects that mobiles will grow by at least 500 000 customers in each year until 2002.<sup>13</sup>

Ovum reported that revenue per customer will stabilise at approximately \$800 per customer per year and that airtime prices will come under increasing pressure but price elasticities will lead to increased usage per customer.<sup>14</sup>

The three digital GSM networks are experiencing high growth rates and increases in revenue as analogue mobiles are being phased out. In mid 1997, 95 per cent of all new mobile phone sales were digital.<sup>15</sup> There appears to be strong growth in the number of digital mobile subscribers — in June 1997 there were approximately 2.243 million digital subscribers out of 4.632 million total mobile subscribers; and in December 1997 there were 2.956 million digital subscribers out of a total of 5.1 million mobile subscribers (excluding service provider subscribers).<sup>16</sup>

Telstra submitted a report providing econometric estimates suggesting that mobile penetration in Australia is high by world standards (nearly double those one would expect even for countries with three competitors contesting the market). Telstra submitted that therefore it seems implausible to suggest that such relatively high penetration levels could be achieved without the domestic market being vigorously competitive — with that intense competition being reflected in end-user prices.<sup>17</sup> The report concluded that the supply of mobile services in Australia has been characterised by strong competition (consistent with penetration rates), and that competition has

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11 *ibid*, p. 3.

12 Australia — Mobile Communications — Statistical Overview (Size and Revenues), *Telecommunications & Superhighway News*, Paul Budde Communication Pty Ltd, Sydney, 3 February 1998, p. 3.

13 Ovum Ltd, *Telecommunications Market and Technology Trends, A report to the ACCC*, 6 February 1998, p. 40.

14 *ibid*.

15 *ibid*, p. 3.

16 ABN Amro (formerly BZW Australia), *Communications News Update*, 26 February 1998.

17 Henry Ergas, Eric Ralph and John Small, *Declaration of GSM Roaming: An Economic Analysis*, 22 February 1998, p.8.

forced prices down, stimulating demand for the service. The report is one view, but it is an incomplete account of competition in the mobiles market. While competition had been strong in some aspects, it has been more limited in terms of usage prices.

*Market share*

In April 1997 the mobile services markets has three carriers together with service providers, with the following approximate market shares for wholesale and retail customers:<sup>18</sup>

Telstra	58 per cent
Optus	27 per cent
Vodafone	7 per cent
Service providers	8 per cent

A comparison of market shares for both total (analogue plus digital) mobile subscribers and digital only subscribers is set out in Table 1. These figures do not include service providers' subscribers.

**Table 1. Mobile subscribers and market share (source: ABN Amro Research<sup>19</sup>)**

		Analogue		Digital		Total	
		Subs*	Share** %	Subs	Share %	Subs	Share %
31 Dec 1996	Telstra	1802	69.80	818	47.60	2620	61.00
	Optus	779	30.20	634	36.90	1413	32.90
	Vodafone	0	0.00	265	15.40	265	6.20
30 Jun 1997	Telstra	1688	70.70	1089	48.60	2777	60.00
	Optus	701	29.30	829	37.00	1530	33.00
	Vodafone	0	0.00	325	14.50	325	7.00
31 Dec 1997	Telstra	1542	71.40	1413	47.80	2955	57.80
	Optus	617	28.00	1050	35.50	1667	32.60
	Vodafone	0	0.00	493	16.70	493	9.60

\* Mobile telephone subscribers ('000s)

\*\* Carrier market share

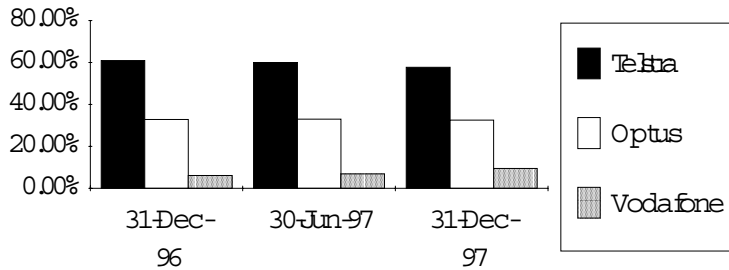
18 Paul Budde, *Telecommunications Strategies Report, 1997/1998*.

19 ABN Amro (formerly BZW Australia), *Communications News Update*, 26 February 1998.

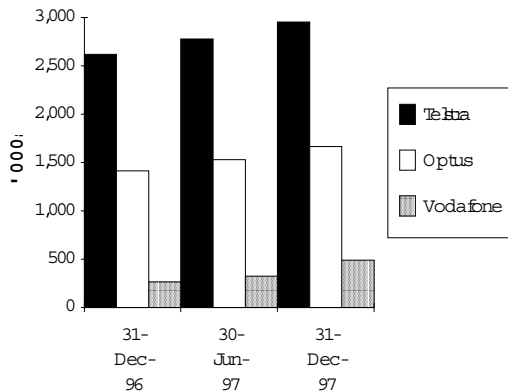


Some of these statistics are graphed below for comparison.

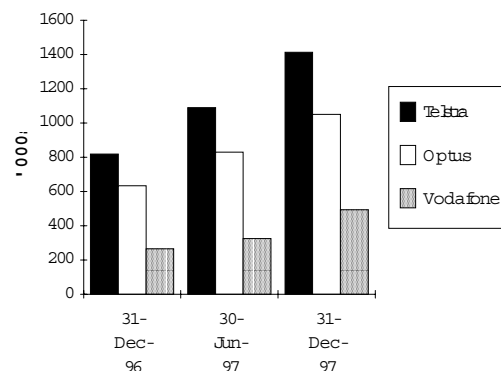
**Chart A: Total market share  
(analogue and digital)**



**Chart B: Total number of mobile subscribers**



**Chart C: Number of digital mobile subscribers**



A comparison of market shares between December 1997 and June 1997 indicates that Vodafone increased its market share by over 2.6 per cent mostly at the expense of Telstra (loss of 2.2 per cent market share in six months) for combined digital and analogue figures. Vodafone had increased its digital market share by approximately 2.2 per cent at the expense of both Telstra and Optus. During the six months to 31 December 1997 Vodafone overtook Optus in net subscriber additions and nearly caught up with Telstra.<sup>20</sup>

This asymmetry between market shares will likely be an incentive for one of the carriers to offer roaming to a new entrant, making it less likely that the three carriers could sustainably act in unison to refuse to supply roaming or deter new entry at the wholesale level. For example, the larger Telstra network would be more attractive to a new entrant seeking roaming and such roaming could damage the smaller networks. Conversely, the smaller networks would have strong incentives to try and offset this by swiftly offering roaming to a new entrant at a favourable price. This would represent

<sup>20</sup> *ibid*, p. 4.

an additional revenue stream and any loss in market share would be borne largely by the larger carriers. The issue of whether roaming would be commercially negotiated is discussed in subsection (e).

*Resale market*

Optus submitted that the mobile resale market has:

- 15 Vodafone service providers;
- 5 Optus service providers; and
- 4 Telstra service providers.

Together these service providers accounted for revenues of \$500 million in 1997.<sup>21</sup> Optus recorded mobile service revenues of \$651.9 million, and Telstra recorded mobile services revenue of \$1.058 billion in the half year ending 31 December 1997.

*Population and area coverage*

Telstra submitted that population and area coverage of the three mobile carriers were:

	<b>Population coverage</b>	<b>Area coverage</b>
	%	%
Telstra	94	5
Optus Communications	~91	<5
Vodafone	~91	<5

Optus recently stated its coverage was over 91 per cent.<sup>22</sup>

***Barriers to entry***

The Commission notes that the current legislative regime contains no barriers which prevent potential new entrants from supplying mobile services, nor is there any infrastructure build requirements or other conditions attaching to licences to supply mobile services.

The Commission has identified a number of barriers to entry, though many of them are declining and the Commission does not regard any of them to be significant enough to sustainably prevent effective entry, particularly having regard to the market structure and concentration, and the expected growth in the market. These barriers to entry are:

- allocation of spectrum, to be auctioned progressively over the next few years;
- capital investment for new network;
- national coverage (but not required for entry), given that it may take around five years to complete a rollout of a mobile network with national coverage;

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21 *ibid.*

22 Optus presentation by Mr Chris Anderson to AMTA Mobile Communications Forum, Sydney, 25 February 1998, p. 4.

- the reduced scope of legislative powers and immunities for carriers — this may be addressed to some extent by the operation of the facilities access provisions of the Telecommunications Act including the Commission’s *Code of Access to Telecommunications Transmission Towers, Tower Sites and Underground Facilities*;
- majority of resellers and dealers at the retail level may be tied to the three incumbents;
- costs for a customer to change from AMPS to digital (however, recent statistics on the decline of AMPS customers and the growth in digital customers suggests that this barrier is not significant);
- only Telstra may operate the AMPS network (though the network is to be phased out);
- corporate relationships:
  - Telstra and Optus have scope to lever off their supply of other telecommunications services;
  - customers migrating from the AMPS network may favour their existing AMPS service provider, however Telstra’s decline in digital growth compared to Optus and Vodafone suggests that this may be falling in importance;
- service and product differentiation may exist to a degree:
  - coverage (Telstra, in particular, has differentiated itself by claiming greater coverage);
  - carriers have value added services (such as call diversion, voicemail, e-mail and other data services);
  - superior service quality with technology such as enhanced voice quality GSM software;
  - removable cards that allow for prepaid digital calls;
  - operator and other call assistance features; and
  - brand name.

*Conclusion on existing state of competition*

The Commission is of the view that the existing state of competition in the mobiles market is reasonably competitive. However, it does not consider that the level of competition in services satisfies the intention of Part XIC to the extent that roaming should not be declared.

The Commission therefore considered the ‘with and without test’ to determine the level of competition in the market for mobile services that would be likely to occur without declaration and compared it to the likely level that would occur with declaration.

**(b) Likely future competition with and without declaration**

The Commission is of the view that determining the likely level of future competition with and without declaration, in the context of roaming, is interrelated and, therefore, the importance of national coverage for effective competition should be considered. Further, if roaming is important for new entry then the following must be considered — whether it is commercially viable to rollout a new mobile network to provide national coverage; or if it is likely that roaming will be commercially provided by the incumbent network operators without the need for declaration. These matters are discussed separately.

*Scope for new entry*

The Commission considers there is scope for effective new entry which will probably increase competition in the mobiles market and, in particular, provide more competition in usage price. The Commission also considers there is the likelihood of continued growth in demand for mobile services.

There are indications that market liberalisation has a significant effect on increasing mobile competition. A US study found that in American markets with three mobile competitors, prices tended to be 18 per cent lower than in markets with two players. In the UK the entry of personal communication networks (PCN) of Mercury one-2-one and Orange (in addition to the duopoly) in 1993 and 1994 ‘led to a major shake-up in industry prices.’<sup>23</sup> (Roaming was not used however). The Bureau of Industry Economics has reported that competitive market structures experienced larger price reductions than countries with non-competitive market structures.<sup>24</sup>

Competition in the form of price reductions may have a significant impact on the LTIE. A Link Telecommunications survey found 59 per cent of 500 Australian small businesses regarded the total operation cost as the influencing factor when choosing a mobile phone.<sup>25</sup> *The Economist* reported that probably the biggest deterrent to mobile use is price.<sup>26</sup>

Assuming that additional competition from new entry will lead to lower prices, the next matter addressed is whether roaming is likely to increase the competitive impact of entry or whether it is of relatively low order importance to the ability to compete.

The importance of national coverage for new entry is relevant to determine the effect roaming would have on likely competition.

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23 Martin Cave and Peter Williamson, ‘Entry, Competition and Regulation in UK Telecommunications’, *Oxford Review of Economic Policy*, 1996 Vol 12, No 4, p. 118.

24 *International Performance Indicators, Telecommunications 1995*, Bureau of Industry Economics, March 1995, p.147.

25 ‘Australia — Mobile communications — Statistical Overview (Size and Revenues)’, *Telecommunications & Superhighway News*, Paul Budde Communication Pty Ltd, Sydney, 3 February 1998, p. 2.

26 ‘A Survey of Telecommunications — A connected world’, *The Economist*, 13 September 1997.

**(c) Importance of national coverage to effective competition**

Potential new entrants argued that national coverage is essential to be able to compete effectively. The carriers submitted that national coverage is not essential, that differentiation in price, quality or service is sufficient for new entry, and that niche regional markets are viable. If national coverage is not necessary, then roaming (which enables a new entrant to provide national coverage) will have less of an effect in facilitating future competition.

The Commission considers that the significance of national coverage needs to be answered empirically. It considers that many personal users will probably value a roaming capability, but will be prepared to trade-off to varying degrees this capability for other price/quality/feature combinations. This means that the significance of roaming will vary. In addition, if new entrants without roaming could only attract customers at prices below a profitable level, there would not be new entry.

*Niche market entry possible*

There are some customers, such as businesses with local interests determined by their distribution (e.g. tradespeople, regional distributors etc.) who have very localised coverage requirements. Optus submitted that many businesses only require local coverage.

Many residential users require mobiles for the lifestyle and convenience features. A survey undertaken by Morgan Research on behalf of Nokia indicated that the major reason for buying a mobile phone is for lifestyle considerations such as keeping in touch with friends and juggling a busy social life.<sup>27</sup> A survey from Link Telecommunications found that 58 per cent of mobile phones users consider it an important safety measure for children and spouses.<sup>28</sup>

However, information contained in the Optus submission indicates that only around a third of mobile users are residential users, although 80 per cent of all new connections are from the residential market.<sup>29</sup> This provides an indication of the proportion of customers who use the service as a truly national service and suggests that a discount service in limited areas may be viable. However, it is unclear what difference in price would be needed to attract customers to a network with limited coverage. Therefore, the Commission considers that there is some scope for niche market entry, without national coverage, or the need for roaming.

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27 Optus Communications, *Optus Submission on Digital Roaming Public Inquiry*, 1998, p. 7 citing Budde, *Telecommunications Strategies Report 1997/98* at 6.1.1.1.

28 id.

29 id.

*National coverage important for promoting competition*

While entry with limited coverage may be viable, such entry may have only limited impact on price/quality/feature combinations offered to consumers in the market. Alternatively, if national coverage is important to consumers there may be more intense competition in terms of price, quality and features if new entrants are able to offer national coverage similar to the incumbents.

There are strong indications that national coverage is important to a significant portion of the mobile market. A US study found that 58 per cent of cellular users considered national coverage to be important.<sup>30</sup> Ovum reported that national roaming arrangements are a way of increasing the level of effective competition between cellular mobile operators.<sup>31</sup> It claimed that entrants must be able to offer more than 90 per cent national coverage before they are attractive to many segments of the market. Given that a network rollout may take about five years to achieve national coverage the Commission considers that roaming may produce competitive benefits during the intervening period.

However, if the final competitive outcome is the same (that is, rejecting the argument that entrants need assistance to help fund their rollout), these short-term benefits may be insufficient to outweigh the risk of declaration to investment incentives. That is, the Commission considers that roaming should not be declared if new entrants would rollout their networks nationally in any event. Optus and Vodafone have been able to enter and compete without roaming.<sup>32</sup> The question of whether new entrants would be able to rollout their own networks is addressed in subsection (d).

A final consideration, which is discussed in subsection (e), is that while there currently may be three mobile carriers, they may act as a cartel and refuse to supply roaming services on reasonable terms and conditions.

**(d) *The viability of rolling out another network to achieve national coverage***

The case for declaring services to enable roaming would be stronger if supplying mobile services in some areas (particularly rural and remote areas) is essential for effective competition and rolling out another network is not commercially viable. Further, it should be noted that if rolling out another network is commercially viable, then the threat of such rollout may encourage the incumbents to provide roaming on a commercial basis.

The existence of three digital GSM networks would suggest that mobile networks are commercially viable to rollout. In addition, satellite and other radio based services are likely to be offered in the future, providing national coverage, although at considerably higher costs than terrestrial based services, at least initially. In addition, the *Code of*

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30 <http://www.yankeegroup.com/surveys>.

31 Interconnect — a global guide to effective telecommunications 1997. Ovum, London, 1997, p. 158.

32 This fact should be seen in the context that both Optus and Vodafone commenced their GSM rollout about the same time as Telstra's GSM rollout, and both had the option of reselling Telstra's AMPS services, which Optus chose to do. Vodafone chose to supply only digital services.

*Access to Telecommunications Transmission Towers, Tower Sites and Underground Facilities* (currently being developed by the Commission) may address this by providing new entrants with infrastructure sharing rights on a pre-determined and timely basis.

This conclusion needs to be qualified to an extent in that the rollout plans of the incumbent mobile networks have been affected by licence conditions requiring certain coverage commitments to be met — that is, the underlying economics may still mean that the provision of mobile services in low density areas may be not economically viable. Further, spectrum will be available on a geographic basis and the cost of acquiring spectrum in a number of different areas to enable the roll-out of a more national network may be costly.

Another factor is that it is more costly to provide coverage for mobile services in the 1800 MHz band than for services in the 900 MHz band, such that 1800 MHz band services are mainly suited to high density areas. This suggests that 1800 MHz band entrants would be unlikely to seek to match the incumbents' geographic coverage.

**(e) Ability to achieve national coverage through commercial roaming arrangements 900/1800 MHz band**

The Commission's economic consultant, Stephen King, has provided advice (Attachment B) on whether the three mobile carriers would be likely to provide roaming to entrants on a commercial basis, without the need for declaration. He concludes that roaming is likely to be commercially provided if: (i) there is entry in the 1800 MHz band (where entry may be less likely as the incumbents may successfully bid for all the spectrum; if there is no entry then these issues do not apply); and (ii) if the entrant considers roaming to be sufficiently valuable.

- Roaming is likely to be commercially negotiated if the new entrant's profits are greater than the loss to any one carrier, so that the entrant can agree to pay to that carrier an amount for roaming services such that each of them will gain.
- The likelihood that one carrier will offer roaming will force all carriers to compete to offer roaming — if they are going to lose profits anyway they might as well try to get back some money by being the one that sells roaming services to the entrant.
- Such a situation is more likely where there are asymmetric effects between carriers. The Optus submission notes that the larger Telstra network would be more attractive to a new entrant seeking roaming and that such roaming could damage the smaller networks. The corollary is that the smaller networks may try and offset this by swiftly offering roaming to a new entrant at a favourable price.
- Generally, the more important roaming is to an entrant's profits, the more likely it is that the entrant would be able to come to agreement with one of the existing carriers.
- A Commission watching brief over roaming, with a threat of intervention if progress is not achieved, will encourage carriers to offer roaming before intervention. Roaming will have to be provided at some time so they will compete to be the first to secure the entrant's business at an agreed price rather than a regulated price.

- In these circumstances the only reason roaming will not be provided is if the new entrant does not seek it because of an unwillingness to pay an economic price.

On the basis of the above the Commission considers that there are commercial incentives for the incumbents to offer roaming to new entrants, and that any collusive behaviour or anti-competitive action to refuse to provide roaming to deter or prevent new entry would not be sustainable. Accordingly, the Commission considers that roaming is likely to be commercially agreed. However, if there are indications, or if market circumstances exist, that collusion between carriers to refuse roaming would be likely to be sustainable, then the Commission would consider that a structural solution such as declaration may be appropriate.

A further aspect of whether roaming will be provided on commercially agreed terms is the carriers' public stance on their willingness to provide it.

#### *Carriers' response*

The Commission invited the carriers to indicate how they would respond if approached by a new entrant in the 1800 MHz band with a substantive proposal for roaming on a commercial basis. All three mobile carriers confirmed that they would enter negotiations with the aim of coming to an agreement with mutual commercial benefit to both parties. All three mentioned that the technical difficulties associated with roaming must be resolved before arrangements could be reached.

Telstra stated that it is prepared to discuss the possibility of domestic intercarrier roaming with any existing player or potential market entrant, subject to addressing the associated technical difficulties. Telstra stated that there are significant technical difficulties which must be overcome before any relevant commercial negotiations could be successfully concluded.

Optus stated that it has an incentive to maximise connections to its GSM networks, whether retail (resellers) or wholesale, saying roaming is analogous to resale, which it already provides. Optus has publicly stated that it is committed to offering commercial roaming based on commercial terms.<sup>33</sup>

Vodafone has publicly stated that if the Government and industry are truly committed to deregulation, then issues such as intercarrier roaming should be left to commercial market forces and industry self-regulation.<sup>34</sup>

#### *Digital 800 MHz band*

The Commission considers that there are strong incentives for successful bidders for spectrum in the 800 MHz band to provide digital roaming between themselves.

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33 Chris Anderson, Optus Chief Executive, Optus presentation to AMTA Communications Forum, Sydney, 25 February 1998, p.15

34 Dr Brian Clark, Chief Executive Office, Vodafone Australasia Pty Ltd, *Vodafone and its Role in Regional Mobile Communications Networks*, AMTA Mobile Communications Forum, Sydney, 25 February 1998, p. 7.



Roaming would provide benefits to both carriers as it allows them to supplement the coverage of its own network by providing for its customers to roam onto other networks — that is, roaming will be considered desirable where the two networks have non-overlapping coverage. Thus if one carrier initially establishes a CDMA network in Sydney and another carrier a CDMA network in Melbourne, roaming would allow those carriers' customers to use their handsets in both cities.

Depending on the outcome of the spectrum auction, the Commission considers that roaming arrangements which mutually benefit both carriers are likely to be established, without the need for declaration. The possibility of an incumbent acquiring spectrum in the 800 MHz band may raise concerns about the ability of new entrants to compete. However, in such a situation there is a good prospect that the incumbent would have the incentive to roam with new entrants as the incumbent would also have limited digital network coverage in the 800 MHz band until it is able to rollout nationally.

***(f) Conclusion on future competition with and without declaration***

On the basis of the matters discussed above the Commission considers it likely that the future level of competition will be promoted to a degree without roaming, as there are indications that opportunities exist for effective entry for niche mobile services without national coverage.

The Commission also considers that effective new entry and the future level of competition would be further promoted with roaming, because there is a significant proportion of customers in the mobiles market who value the option or feature of national coverage. Further, the Commission considers that it is likely that roaming will be provided by the incumbent network operators on commercial terms without the need for declaration.

As mobile carriers have indicated a willingness and preference for commercial processes, as well as having commercial incentives to provide roaming to new entrants, the Commission considers that commercial processes should be given a chance to work first. Commercial processes are likely to yield outcomes superior to a regulated approach, especially in a dynamic and changing industry such as mobile telecommunications.

## **4.2 Any-to-any connectivity**

The Commission does not consider that declaration is relevant to achieving any-to-any connectivity as this has been provided for in the mobile context by the deeming of GSM and AMPS access services.

The objective of any-to-any connectivity is to ensure that end-users of the same or similar service are able to communicate with each other, even if they are connected to different networks.<sup>35</sup>

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<sup>35</sup> See s. 152AB(8) of TPA.

The Commission considers that domestic intercarrier roaming is unrelated to any-to-any connectivity as it involves the connection of a customer to a network, not communication between two customers who are already connected. Roaming should be regarded as promoting the related concept of ubiquity.

### **4.3 Efficient investment in, and efficient use of, infrastructure**

There are two components to this objective, namely, whether declaration would encourage:

- economically efficient use of infrastructure; and
- economically efficient investment in infrastructure.

Section 152AB(6) requires that in determining the extent to which this objective is achieved, regard must be had to the following matters:

- whether it is technically feasible for the services to be supplied and charged for, having regard to:
  - whether access is feasible having regard to the technology that is in use or available);
  - the costs of providing access and whether the costs are reasonable;
  - the effect of access on the operation or performance of telecommunications networks;
- the legitimate commercial interests of the supplier(s) of the service, including its ability to exploit economies of scale and scope;
- the incentives for investment in the infrastructure by which the services are supplied.

Roaming may encourage the economically efficient use of infrastructure as roaming onto existing networks, particularly where there is unused capacity, would involve lower costs than developing alternative networks. The price of roaming will be important to encourage the efficient use of existing networks and result in the right build/buy incentives for access seekers.

The remaining criteria are now considered.

#### **(a) Technical feasibility (900/1800 MHz band)**

The Commission understands that there are two technical standards which could support roaming between these bands:

- GSM Phase 1 (or a modified version applicable to the Australian market); or

- GSM Phase 2.

Each phase involves a particular level of network technology and handset technology. Currently, the Australian GSM networks use Phase 1 technology, while both Phase 1 and, more recently, Phase 2 handsets are sold in Australia.

**(i) GSM Phase 1**

GSM Phase 1 technology is currently used by the three Australian incumbent operators to provide roaming to the customers of international carriers. Phase 1 technology does not allow automatic roaming to be provided in only selected areas of a network, that is, if roaming onto a network is provided at all it will be available everywhere that network has coverage. This is not an issue for international roaming where the networks do not overlap. However, in a domestic context it will imply that if a new network is set up in say, Sydney, with rights to roam onto an existing network, the customers of the new network operator will be able to roam onto an existing GSM network in Sydney even though their own network has coverage there.

Telstra has argued Phase 1 will create technical problems, particularly arising from the ability of customers to roam onto a network in an overlapping coverage area. The alleged technical problems, and the Commission's views, are set out below.

- Customer service difficulties — customers may automatically roam when there is a temporary loss of coverage on their home network and remain indefinitely (and possibly without their awareness) on the host network until roaming back is manually activated. This may generate problems such as billing disputes, particularly if customers are charged a premium for roaming.
  - The Commission considers that these problems may be overstated. Roaming would require customers to acquire dual band handsets (which will typically be of Phase 2 standard) which display the network the customer is currently on and will automatically seek to return to the home network at regular intervals. Moreover, customers may prefer to automatically roam rather than have their calls drop out.
- Network avalanche effect — when a home network fails due to a technical problem then all of that network's customers will roam onto the host network possibly causing failure on that network too. Further, it was submitted that roaming would cause difficulties in network dimensioning for an unknown number of roamers.
  - The Commission considers that these problems also seem overstated. First, a sudden increase in usage of a network if another network failed would affect call quality but would not necessarily cause that second network to also fail. While parts of networks may be made inactive for maintenance work this is normally scheduled for low usage times when any additional customers are likely to be able to be accommodated on other networks.

- Second, the Commission does not consider that a ‘flood’<sup>36</sup> of known roaming customers is an insurmountable problem because the exchange of information between carriers should allow an access provider to plan for the needs of another network’s customers travelling to an area, in the same way as it plans for its own customers travelling to that area. In addition, both the network avalanche effects and network dimensioning problems can be minimised through appropriate network planning and inter-working arrangements which already exist in the fixed network.

The arguments about technical feasibility regarding GSM Phase 1 may be resolved if roaming is based on the Danish model which features:

- GSM Phase 1 network technology — roaming between the 900 MHz and 1800 MHz bands;
- GSM phase 2 dual band handsets; and
- non-seamless roaming, that is the customer must explicitly select roaming on the handset before roaming is activated.

The Danish model appears to resolve the alleged technical problems of customer service difficulties and network avalanche effect. However, the costs of implementing these features, or a GSM Phase 1 solution, in the Australian mobiles market, is uncertain.

Even without declaration the Commission considers that GSM Phase 1 roaming is technically feasible and the carriers and new entrants should examine the Danish implementation using current GSM Phase 1 network technology in determining commercial roaming arrangements. Other possibilities include examining international roaming arrangements, as well as domestic roaming implementation in other countries.

**(ii) GSM Phase 2**

New GSM technology, GSM Phase 2, allows for automatic roaming to be restricted to selected areas (that is, roaming in areas only where the home network does not have coverage) and is thus able to overcome problems arising from network overlap. International standards for GSM Phase 2 are currently being determined (and are expected during 1998) and network equipment will not be generally upgraded until after standards have been agreed upon, although handsets are already available. There is a risk that attempts to impose a Phase 2 roaming solution may lead Australia to implement the technology in a different way from that which is eventually agreed upon by the international GSM body. This would create costs for mobile services suppliers in Australia in requiring customised handsets and equipment.

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36 It should be noted that s. 152AR (4) of the TPA does not impose an access obligation to the extent the access provider is prevented from meeting its own reasonably anticipated requirements. Further, s. 152CQ of the TPA restricts the Commission from making an access determination which would require a party (other than the access seeker) to bear some or all of the costs of extending or enhancing the capability of a facility.

While GSM Phase 2 appears the more appropriate technical standard to enable domestic intercarrier roaming, the Commission considers that declaration of GSM Phase 2 technology may not be an appropriate or effective solution because GSM Phase 2 is not currently an ‘active’ service. That is, it is not currently being supplied by any carriage service provider (CSP) in Australia. Since declaration creates access obligations on a CSP only to the extent that the CSP is supplying a declared service, then declaring GSM Phase 2 would be ineffective to create an obligation on anyone to supply the service, at least immediately. Nonetheless, both carriers and equipment suppliers should continue their efforts in both national and international forums to ensure GSM Phase 2 standards are agreed and implemented.

**(b) Technical feasibility (800 MHz band)**

The Commission understands that handsets do not currently provide for roaming between different digital technologies in the 800 MHz band, for example between CDMA and D-AMPS. Same technology roaming is possible, as is roaming onto Telstra’s analogue AMPS network. Thus the Commission will consider whether declaring roaming would promote the LTIE within the digital 800 MHz band in relation to roaming between potential new CDMA networks, or roaming between other potential new digital networks such as D-AMPS.

**(c) The legitimate commercial interests of the supplier(s) of the service, including its ability to exploit economies of scale and scope**

In the context of declaration the Commission considers that the legitimate commercial interests of the supplier(s) of the service are its interest in maintaining its contractual commitments and being able to use the network for its own ends, including its ability to exploit economies of scale and scope.

Declaration of roaming may limit the supplier’s ability to use the spare capacity in its network where it is likely to use such spare capacity for its own use. (However, it should be noted that s. 152AR(4) does not impose access obligations on an access provider to the extent it is prevented from meeting its own reasonable anticipated requirements). This situation may arise if there are a number of customers roaming onto the host network, particularly if alleged technical problems of network avalanche effect were to occur. The Commission considers that declaration may have a negative impact on the legitimate commercial interests of the supplier(s) of the service, depending on the demand of other networks for roaming. However, roaming will be largely limited to times when the home network is out of service or out of range, and if it is provided at a price premium, the Commission does not consider that roaming would have a significant negative impact on the legitimate commercial interests of the supplier(s) of the service.

**(d) The incentives for investment in the infrastructure by which the services are supplied (900/1800 MHz band)**

In deciding whether to declare services enabling intercarrier roaming, the Commission assessed the effect declaration would have on investment incentives in new mobile

infrastructure and maintenance, improvement and expansion decisions relating to existing infrastructure.

The Commission considered whether a declaration would provide greater certainty to new entrants and help facilitate efficient investment in new mobile networks. If roaming were not likely to be provided or if potential entrants held that perception, then there would be a risk that efficient entry would be deterred. That is, not to declare roaming when it should be declared may mean that new entry and facilities-based competition would not occur.

On the other hand, if mobile networks do not have natural monopoly characteristics (meaning that networks are economic to duplicate), there is a risk that declaration will encourage free riding and discourage some investment by new entrants in rolling out their own networks. In such a case declaration may not be in the LTIE, as it would not be likely to promote innovation, diversity in services and products, nor enhanced quality as facilities-based competition would be expected to do.

In addition, access regulation may discourage investment in new facilities or the enhancement of existing facilities. Regulation may deter future investment as the owner would not have full control over its facility and, if there are a number of firms considering entry, potential investors may decide that it is better to wait for others to invest first. For instance, with innovative services, where the return on investment is highly uncertain, if the investment does not succeed the investor will incur all of the cost, but if the investment does succeed the gains may have to be spread amongst the investor and the access seekers.

Mobile services were relatively new when the existing carriers chose to invest in them and the level of demand for mobile services was highly uncertain. It has been argued that the existing profits of the incumbents can be considered a reward for their risk-taking. The Commission is aware that declaration may create risks that will deter future investment in innovative services.

Declaration creates both a right of access to the declared service and the potential for the Commission to determine the terms and conditions by which the service should be provided, such as in the context of an access arbitration. In regard to roaming services, the Commission expects the incumbents to provide them on the basis of commercial agreement, in the absence of declaration. Accordingly, the effect of declaration in establishing a right of access would not be expected, in itself, to have a significant effect on investment incentives (i.e. access would be provided whether or not the service is declared). However, declaration may still have a significant effect on investment arising from the Commission's ability to determine terms and conditions. For example, declaration may lead to:

- uncertainty over the price at which the Commission would mandate that roaming must be provided;
- under-investment if the price for roaming is perceived to be set too low;
- distortions from the way in which the declared service is specified; and
- direct costs of regulation, such as compliance costs.

It should be noted that the risk of these costs will be avoided by the Commission's decision not to declare the services to enable roaming. However, if the incumbents fail to provide services to enable roaming on reasonable terms and conditions, the Commission will need consider whether declaration would produce benefits which outweigh these risks in terms of their effect on the LTIE.

*Uncertainty over pricing and access determinations*

Adverse risks to investment incentives may arise if roaming is declared (meaning that the Commission may effectively determine the terms and conditions by which a service is supplied to competitors, either through approving an access undertaking or in an arbitration decision). Determining terms and conditions, particularly price, may deter future investment and innovation if there is perceived uncertainty about how the Commission will determine them.

The adverse effect could be softened if the Commission indicated the price or method of determining a price that would be appropriate for roaming. The Commission considers that roaming should not be priced using cost-based principles such as TSLRIC. Rather, roaming should be priced at a reasonable commercial or market price, which may mean that roaming would be charged ultimately at a premium to customers, above normal usage rates (though not at unrealistic commercial prices).

As the Commission considers that roaming should be priced at a commercial rate, declaration would mainly have the effect of mandating that roaming must be provided. In such a situation a Commission arbitration under Part XIC may have largely the same effect as a standard commercial arbitration.

While the Commission believes that this would ameliorate some of the uncertainty over pricing of roaming under Part XIC, it acknowledges that there may still be difficulties in practice to determine precisely a market price and that some uncertainty would still remain. Further, investors in other innovative services may still be discouraged by the threat of regulation and uncertainty over what price would be applied to their services.

*Under-investment if the price for roaming is set too low*

It was submitted that any roaming price that leads to lower prices through more competition will undermine incumbent profits and may provide a poor signal to future investors. However, the incumbents were aware that the market would be fully liberalised post 1 July 1997.

In any case, if the incumbents provide roaming services to entrants on a commercial basis, then the possibility of under-investment will be relevant only if the price for roaming is less than that which would be determined in a commercial agreement. To prevent this possibility the Commission considers that the parties could base negotiations on benchmarks for a range of reasonable prices at which the Australian carriers currently provide roaming to overseas carriers. The final price would need to be modified to take account of any technical improvements to cater for domestic roaming and appropriate volume discounts. A further indicator for domestic roaming pricing may be the price of GSM resale services, which provide a similar functionality for the customer to that of roaming.

*Distortions from the way in which declaration is made*

Distortions to future investment may arise if the Commission were to declare a particular form of roaming that is not consistent with developing industry standards. Telstra considers that any form of national roaming would involve significant technical problems (discussed above). Nonetheless, while GSM Phase 1 appears able to be used to support domestic roaming, it is clear that GSM Phase 2 is intended to become the international standard. Declaration of Phase 1 may lead to wasteful investment in network infrastructure that is being phased out and, unless the declaration is varied down the track, the declaration may impede the introduction of Phase 2 technology.

Another effect on future investment is that roaming may discourage future network rollout and new mobile value-added services by the incumbents as roaming would allow customers of other networks to have access to the extended coverage or new services. However, it should be noted that some rollout is mandated as a carrier licence condition. Further, investment in coverage and new services may be encouraged if the carriers compete to win the roaming business of an entrant.

Another possibility is that a new entrant could set up a minimal amount of its own infrastructure (at worst no infrastructure) and then rely on roaming onto other networks to provide extended coverage to its own customers, or to ‘arbitrage’ or ‘free-ride’ off the investments of others. The Commission does not consider that any of these situations are likely to be successful or sustainable if roaming is charged on commercial terms. That is, access on commercial terms, which may include a premium to normal usage rates, would preclude a new entrant competing on price in relation to roaming services. Accordingly, whether roaming is provided through commercial negotiation or through declaration, the price charged for roaming services is likely to prevent arbitrage opportunities arising.

*Direct costs of regulation, such as compliance costs*

The Commission considers that declaration would introduce possible compliance and administrative costs which would not be imposed if there were no declaration and commercially negotiated roaming arrangements were reached. For example, carriers incur costs in configuring their networks and adding software to accommodate roaming; but they may not be substantial.

**(e) The incentives for investment in the infrastructure by which the services are supplied (digital 800 MHz band)**

The Commission considers that there are adverse incentives for investment by declaring roaming in the 800 MHz band, similar to those mentioned for the 900/1800 MHz bands. As the Commission earlier considered that there are stronger incentives for commercial roaming in the 800 MHz band than the 900/1800 MHz bands, then the adverse incentives for investment may be greater. (Further, there may be less of a need to roam in the 800 MHz band as the technology and frequency is generally more conducive for call quality and minimising call drop-outs in non-metropolitan areas where a new entrant will more often need roaming).



## **5. Commission decision**

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### **5.1 900/1800 MHz bands**

The Commission has decided that at this stage it is not in the LTIE to declare roaming in the 1800/900 MHz bands. While the Commission considers that national coverage, and therefore roaming, is important to promote competition in mobile services, it considers that roaming arrangements are likely to be commercially negotiated with the three incumbent mobile carriers. Further, the Commission considers that declaration may have adverse effects on investment incentives, particularly in relation to innovative services, which are uncertain at this time.

Since roaming is important nonetheless for new entry, the Commission considers that indications of anti-competitive conduct by the incumbents such as refusal to provide roaming in a timely manner will result in action by the Commission which could include early action under Part XIB and/or a review of the declaration decision at that stage.

The Commission has taken the following considerations into account.

- Regulation, with its attendant costs, should occur only where it is shown to be necessary, such as where market processes have clearly failed to achieve desired outcomes.
- The threat of declaration may be just as effective as actual declaration, without the Commission potentially being required to arbitrate on the terms and conditions of access.
- Providing a reasonable degree of certainty for entrants — the Commission sees roaming as desirable and is willing to ensure access through regulation if necessary.
- While resort to commercial processes may lead to a delay in the provision of roaming, declaration still may not result in a quick implementation, as certain unresolved technical standards, together with network and handset implementation issues still need to be resolved.

### **5.2 Digital 800 MHz band**

For the same reasons the Commission has decided that declaring roaming in the 800 MHz band would not be in the LTIE at this stage. The Commission considers that roaming will be provided in the 800 MHz band. There are likely to be strong incentives to enter into commercial roaming arrangements as negotiating parties should be able to offer complementary coverage to each other.

Similarly to the 900/1800 MHz bands, the Commission considers that not declaring is avoiding unnecessary regulation and its costs and adverse effects on investment incentives.

The Commission considers it appropriate to monitor for any indications of anti-competitive conduct, particularly if an incumbent acquires spectrum. Any refusal to provide roaming in a timely manner will result in action by the Commission which could include early action under Part XIB and/or a review of the declaration decision.

# Attachment A

**Table 1. Tariffs for cellular mobile radio<sup>a</sup>**

Country	Connection charge (DEMCP) <sup>b</sup>	Monthly subscription rate (DEMCP)	Standard rate for a one minute call (DEMCP)	Reduced rate for a one minute call (DEMCP)	Total monthly cost <sup>c</sup> (DEMCP)	Ranking
Australia	81.120	43.680	0.499	0.250	110.807	6
Denmark	140.770	16.088	0.473	0.237	81.474	2
Finland	68.904	8.613	0.657	0.253	90.043	4
France	102.655	51.328	0.587	0.293	130.409	8
Germany	49.000	44.000	1.640	0.390	225.008	13
Italy	218.000	65.400	0.540	0.322	145.575	10
Japan	21.681	0.000	0.402	0.241	55.923	1
Netherlands	85.824	28.608	1.211	0.286	163.490	11
New Zealand	105.600	28.512	1.003	0.285	144.947	9
Norway	26.970	26.790	0.356	–	87.697	3
Sweden	75.495	20.492	0.626	0.410	111.458	7
UK	83.650	43.02	0.287	–	93.790	5
USA	0.000	40.25	0.966	–	203.504	12

a All tariff and consumer parity information is from *1997 National Telephone Tariffs*, Siemens AG, Munich, 1997. Mobile tariff comparisons between operators are difficult with many operators offering various tariff packages tailored to particular target groups. Therefore the Siemens' study presented a selection of each operators' 'standard package' for residential users. Where multiple countries were reported for a country the cheapest operator was included.

b DEMCP are 1997 consumer parties expressed in Deutschemarks.

c The total monthly cost is calculated using the following assumptions:

1. The connection charge is distributed over three years
2. Following the OECD methodology for a residential moderate user 13 calls per week are included, seven of which are made at the standard rate and six at the reduced rate.
3. Calls are on average three minutes in duration.

## Attachment B. Comments on roaming for new mobile phone entrants

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Stephen P. King  
13 February 1998

In my comments I will ignore technical issues influencing the possibility of roaming and will ignore the existing AMPS network, focussing only on the GSM networks.

As stated in the background the primary issue is whether roaming services would be provided on a commercial basis in the absence of regulatory intervention. The key to this issue is the fact that there already exist three GSM networks and that roaming onto any of these networks would, by itself, provide nationwide access to any new mobile carrier's customers.

The existence of three potential providers of roaming services implies that the provision of roaming will not be decided on the basis of a simple 'gain' and 'loss' statement as presented in the background note. Rather, the provision of roaming will depend on the strategic interaction between the three existing GSM network owners. An existing carrier will **not** simply weigh up the benefits of extra roaming revenue and greater use of their system compared with the increased competition in overlapping areas, due to a new mobile carrier rolling out a limited network which becomes more attractive to customers with roaming.

In addition, when deciding whether or not to provide roaming to a new entrant, each existing carrier will weigh up the potential gain or loss in profit if they offer roaming to an entrant given that the other existing network owners are carrying out exactly the same calculation. This does not mean that roaming has to lead to greater profits for all existing carriers for it to be offered. Instead, an existing carrier will offer roaming services if they believe that it is their strategic interest to do so. This in turn may depend upon the carrier's beliefs about the likelihood of their competitors offering roaming.

This is, of course, the standard 'prisoners' dilemma' of competition. Firms do not compete because it will raise their total profit. Rather they compete because, if their rivals compete and they do not, then they will lose even more profit.

To put it simply, consider the following numerical example. Imagine that each carrier believes that a new entrant without roaming will make little impact on their profits. Say each firm expects to make \$40m per year. However, the new entrant's profits will rise if it has roaming capability. Let us also assume that the marginal cost of roaming is zero, and that if one carrier offers roaming to the new entrant (at the marginal price of zero) then the entrant's profits will rise by \$5m and EACH existing carrier will lose \$4m. So each and every existing carrier will lose profits by offering roaming. Is it likely to be offered? Yes! So long as the gain in profits to the new entrant from roaming exceeds the losses made by any ONE of the existing carriers, roaming will be offered. In the example here, the new entrant can bribe one existing carrier by paying it \$4.5m to get roaming. Now both the entrant and the new carrier gain by having a roaming agreement but the other existing carriers lose.

Does this suggest that in the absence of intervention the new carrier will have to pay an exorbitant amount for roaming? No. In fact the new carrier would not need to pay more than a nominal amount to gain roaming in the above example. Each existing carrier would know that each other existing carrier would want to offer roaming, so there would be a race to supply roaming to the new entrant. The existing carriers would be willing to sell roaming at any positive price because it is better to lose \$5m less some positive price than just to lose \$5m!

The above example is obviously highly simplified. However, it captures the key point that roaming will be offered if it is jointly profitable for a combination of some existing carrier and an entrant. The example could be made more complex and weaken this condition further. To see this, say there are asymmetric losses. An existing company that provides roaming at a zero price only loses \$3m because it also gets to roam onto the new entrant's network where the other existing carriers lose \$4m. This would increase the intensity of bidding to provide roaming and an existing carrier would be willing to PAY up to \$1m to be the exclusive roaming network for a new entrant.

Alternatively, say that the new entrant's gain from roaming was only \$2.5m and the loss in profits are given by the asymmetric figures above. Now there are two equilibrium outcomes. The entrant cannot bribe any existing network to provide roaming as the total gain in profits would be -\$0.5m. So long as each existing carrier believes that **no other** carrier is going to offer roaming, then it will not offer roaming. However, as soon as any carrier believes that another existing carrier is likely to offer roaming, then it will also want to offer roaming — it is better to offer than not offer if **someone** is going to offer roaming. (Formally, the game has multiple equilibria.) If a carrier thought that the ACCC would eventually intervene and require one existing carrier to provide roaming, then that carrier would want to provide roaming and would probably do so before any ACCC intervention.

Note that to get this result we did not assume that a new entrant could bribe an existing carrier. Rather, we simply assumed that the existing carrier supplying roaming suffered a relatively smaller loss in profits than other carriers. This would appear to be a very weak assumption.

The simple examples presented above highlight a number of points. First, given that there are three networks there will be strong pressures for at least one network to offer roaming once a new entrant has purchased spectrum. So long as one incumbent and an entrant find it jointly profitable to offer roaming, then it is likely that roaming will be offered at a reasonable price. Given the differences in geographic coverage and customer base of the existing networks, it seems quite likely that this condition will hold.

Secondly, asymmetric effects between carriers will increase the likelihood that roaming will be offered. For example, the Optus submission notes that the larger Telstra network would be attractive to a new entrant seeking roaming and that such roaming could damage the smaller networks. The corollary is that the smaller networks may try and offset this by swiftly offering roaming to a new entrant at a favourable price.

Thirdly, if roaming is as important to a new entrant as suggested in the ACCC discussion paper, then this makes it significantly more likely that roaming will be offered. The more important roaming is to an entrant's profits, the more likely it is that

the gain to the entrant from being able to offer roaming will outweigh the loss to at least one of the carriers. While I personally believe that the discussion paper overstates the importance of roaming, the market will test this issue automatically. If roaming is very important, then the pressures to offer roaming will be significantly greater.

Fourthly, if the ACCC simply has a watching brief over roaming, with the threat to intervene if satisfactory progress is not achieved (as recommended by the Optus submission) then this will provide a strong impetus for an existing carrier to offer roaming before ACCC intervention. The only thing worse than offering roaming is to not offer roaming when another network does offer it. An ACCC watching brief may be a powerful tool in these circumstances.

Finally, even with only three existing networks there are strong competitive forces that push each network to offer roaming. This suggests that roaming will only not be offered if (i) it is relatively unimportant to an entrant so that the entrant simply does not seek roaming or is unwilling to pay an economic price for roaming or (ii) the existing networks explicitly agree not to offer roaming. In addition to violating s. 45 of the TPA, a collusive agreement would be useless if the ACCC had a watching brief on roaming. Knowing that the ACCC will force someone to offer roaming sometime in the future if it is not offered voluntarily, the existing carriers have an incentive to 'race' to be the first to offer roaming and gain the extra business of the new entrant.

In brief, I do not believe that the declaration of services to enable domestic intercarrier roaming would promote competition in the mobile phones market. However, I believe that if the ACCC states that it is watching the market and will review its decision, say, twelve months after the spectrum auctions then this could promote competition and would make any review unlikely unless roaming was of little value to a new entrant.

I would like to address three additional points raised by the discussion paper, the Optus submission and the declaration made by Professor Hausman.

First, the discussion paper and the debate about roaming in general has an undesirable 'flavour' of market design. It is very likely that even if all the new spectrum was gained by new players in the wireless communications market, that little or none of this valuable spectrum would be used to duplicate the services provided by the three existing GSM networks. There are already three GSM networks and spectrum is scarce and highly valuable in other uses. Why waste this valuable resource by rolling out another mobile phone network which would simply lead to greater competition and lower profits? Rather, a new entrant is likely to do something innovative, highly profitable and socially beneficial with the new spectrum.

Personally, I would not like to predict exactly what a new spectrum owner would do with this resource. It may be useful to enter the local telephone market in urban areas by providing wireless local loop. It may be used as part of a low level satellite system. I do not know where the new spectrum will be used, and the potential purchasers would not want to tell us or anybody else before the auction. However, it is quite possible that roaming onto existing GSM networks will only be a third-order issue when the spectrum is in its new use. If it is not, and roaming is important, then the competitive pressures suggested above are likely to lead to the provision of roaming.

Secondly, if the most valuable use of the 1.8 GHz spectrum is to compete with the existing mobile phone providers, then it is quite likely that all the new spectrum will be bought by these existing suppliers. The reason for this is quite simple. The total profits to be made by three mobile carriers competing are likely to be higher than the total profits if there are four competitors. Entry tends to bid down total firm profits. This is the nature of competition. However, it also means that the existing carriers have a greater incentive to ensure that there is no entry by a fourth carrier than a new potential fourth carrier has to buy the spectrum and enter.

Again this can be illustrated by a simple numerical example. With three carriers, each makes profits of \$40m. Assume that entry by a new carrier is profitable and that the new carrier is able to make the same profits as incumbents, say \$29m each after entry. The new carrier would be willing to pay up to \$29m to buy spectrum and enter the market. However, the existing carriers are willing to pay \$11m each or up to \$33m in total to buy the spectrum and keep the entrant out. So long as the incumbents can coordinate their bidding, purchase of the new spectrum to enter the existing GSM market will be impossible.

As Professor Hausman notes, one way to avoid this outcome is to limit spectrum purchase by existing carriers. This is not planned for the 1.8 GHz spectrum. Alternatively, there could be a failure to coordinate between the incumbent carriers. Unfortunately, the auction restrictions may be designed to aid incumbent coordination as much as possible! According to the ACCC discussion paper, no carrier can purchase more than 2 x 15 MHz of spectrum on the 1.8 GHz band out of the 2 x 45 MHz available.

If my interpretation of these numbers is correct, this means that each incumbent needs to buy exactly its allowed maximum spectrum to prevent an entrant buying spectrum. No incumbent can be tempted to free ride on another incumbent buying spectrum and blocking entry as this cannot occur. Each incumbent knows exactly how much spectrum they need to buy to prevent entry and know that entry will be able to occur if they do not buy their 'allocation' of spectrum. Coordination to prevent entry is greatly simplified in these circumstances.

Thirdly, the Optus submission and the Hausman paper place significant emphasis on the possibility that regulated roaming will undermine the profits of current infrastructure owners and will send a strong negative signal to future infrastructure investors. This, of course, assumes that roaming will be provided at a price that undermines the current profitability of investment. This is a reasonable assumption. Assuming that any new entrant would compete head-to-head with incumbent GSM operators, would provide essentially the same service as incumbents and are no more efficient than incumbents, regulated roaming would either have no effect on the GSM market or would reduce incumbent profits. It would have no effect on the market if roaming prices were set to perfectly protect current carriers' profits. For example, if ECPR was used. Alternatively, if access prices were set at any lower price, this would benefit consumers but would necessarily lower incumbent profits.

The Optus and Hausman papers place considerable emphasis on cost-based roaming prices. In fact, this emphasis is misguided. ANY roaming price that leads to lower prices through more competition will undermine incumbent profits. In other words, a

regulated roaming price would only protect incumbent's return on their investments if that price made roaming irrelevant from the consumers' perspective.

This strong conclusion is weakened if a new entrant is more efficient than an incumbent. However, in such circumstances the incumbent would want to contract out its operations to the more efficient entry voluntarily. Alternatively the conclusion is weakened if the new entrant provides a differentiated product. But again, in this case the incumbents would also desire to voluntarily offer this new product if it were profitable.

Alternatively, do we care about the incumbent's profits? The answer should be that we do not care about the incumbent's current *ex post* profits but rather about the *ex ante* expected profits. This is the point of the Optus and Hausman discussion. While roaming may reduce excessive carrier profits that currently exist, these profits could not have been perfectly foreseen. To reduce these profits is equivalent to the government taxing a person who wins at the race track but not helping them when they lose. The result of such a tax would be less gambling. In the telecommunications context, a tax on current profits would equivalently lead to less risky investment in the future. As such investment may be socially beneficial it is undesirable to place disincentives in the path of this investment. Compulsory roaming *ex post* provides a poor signal to future investors.

Overall, if entry occurs through spectrum purchase and the entrant wishes to provide GSM (or compatible) mobile phone services, then there will be strong competitive pressures on incumbent carriers to provide roaming. A watching brief by the ACCC with review after, say, 12 months, should be adequate to overcome any reluctance by incumbents to provide roaming **if** roaming is sufficiently valuable to the new entrant to be worth the cost of its provision. This said, the design of the spectrum auction makes it difficult for an entrant to buy spectrum to provide competing GSM services. A more likely outcome is that, if the spectrum is bought by an entrant, then this entrant will not be aiming to compete head-to-head with the existing carriers. Rather the entrant will be aiming to provide niche services in mobile telephony, or to provide alternative products that require spectrum. In these circumstances, roaming may not eventuate but the likely cause will not be a lack of competitive provision but a lack of value of this service to the new entrant.