PRODUCTIVITY COMMISSION
REVIEW OF THE RADIOCOMMUNICATIONS ACTS
AND
THE ROLE OF THE AUSTRALIAN COMMUNICATIONS AUTHORITY

SUBMISSION FROM
THE AUSTRALIAN COMMUNICATIONS AUTHORITY
(ACA)

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EXECUTIVE SUMMARY

Coming after a sustained period of innovation in Australian spectrum management, the Commission's review of the Radiocommunications Acts and the market based reforms and activities undertaken by the ACA is very timely. It is an opportunity to take stock of achievements and assess what further improvements can be made.

Based on its experience of implementing market based reforms in this dynamic industry, the ACA believes that the current legislation has provided the basis for one of the best systems of radiocommunications regulation in the world and for innovation in spectrum use. Nevertheless we recognise there is scope for further improvement.

The ACA believes that the objectives set out in the *Radiocommunications Act 1992* (the Act) provide a sound basis for decision making in spectrum management. Trade-offs between objectives are necessary — but the process of working through these trade-offs has been manageable through open and transparent consultative processes.

Spectrum use is regulated in order to manage interference and thus maximise spectrum utility. However, regulation has been significantly reduced in Australia, with considerable flexibility provided to spectrum users to manage their systems.

Our system of spectrum management relies on several key elements:

- spectrum planning, to provide predictability and certainty and to establish a framework for minimising interference;
- licensing, to define the rights and obligations of spectrum users, especially as part of this interference management framework;
- standards, where these are the most efficient way of managing interference;
- licence fees, to encourage efficient use of the spectrum; and
- auctions, to allocate spectrum where demand exceeds supply.

Spectrum planning is a hierarchical process, starting from the international level and moving to more specific domestic planning. Current planning approaches, and market based reforms such as spectrum licensing, provide increased flexibility and efficiency in spectrum use.

Licensing arrangements have been effective. The ACA has no difficulty in principle with delegating licensing functions if this was cost effective, but notes there would still be a need to provide for interference management, a public register of licences and to protect classified frequency assignments. The ACA already 'delegates' a considerable part of the frequency assignment process to external accredited persons.

The three different types of radiocommunications licences (class, apparatus and spectrum) are applied to different situations, where different approaches to regulation are justified. In particular, spectrum licensing provides considerable scope for improvements in efficiency and flexibility. However, the ACA believes that the sharp distinctions between licence types probably are no longer very useful. Additional flexibility could be gained by allowing licence terms and conditions to be varied to suit the particular case rather than being determined by the licence type.

Australia is regarded as a world leader in radiocommunications standards, and adopts a light touch, consultative and cooperative approach. Standards can be a useful part of the interference management armoury, although we use them only when efficient to do so. Community concerns about electro-magnetic radiation pose particular challenges for the ACA, but the current process for establishing standards is operating effectively. While setting mandatory human exposure limits may potentially restrict technology innovation, protection of public health overrides this concern.

Charging for the use of spectrum through licence fees is aimed at improving efficiency as well as providing a fair return to the community for the use of a scarce resource. The charging system, developed following extensive consultation, is based on a formula that reflects the amount and location of spectrum used. Because the formula approach necessarily involves some efficiency compromises in the interests of simplicity and ease of administration, the ACA's longer term aim is to move to a more directly market based approach to fee setting.

Auctions are a useful way of allocating spectrum where demand exceeds supply. Our long and successful experience shows that our auction processes have been open, consultative, flexible and have facilitated innovation and competition.

Security of tenure has been of concern to some apparatus licensees. Commercial licensees need reasonable certainty of tenure to plan their businesses appropriately. Notwithstanding this, the ACA believes that clearance processes have worked quite well in practice. Vital to their success is appropriate notice of band clearance and assistance from the ACA in establishing alternative arrangements. The ACA supports the Report of the Radiocommunications Review view that the Act should be amended to provide greater security of tenure for apparatus licences in certain circumstances.

Conversion of apparatus to spectrum licences has not worked as well. Processes have proved to be cumbersome, and not always consistent with spectrum efficiency. Amending the Act to improve simplicity and efficiency would be desirable.

The ACA does not believe that licensees required to vacate spectrum should have any right to compensation. However, under limited circumstances, compensation can play a useful role in overcoming entrenched opposition to change in spectrum use.

Spectrum trading has advanced slowly in Australia, but is still in advance of most other countries. The regulatory framework generally supports the secondary market in spectrum, but the ACA is aware of claims that the taxation system may be impeding trading opportunities.

Whether adequate provision of spectrum is made for non-commercial uses of the spectrum has sometimes been controversial. In practice, however, few public or community users have been required to clear spectrum. The ACA supports greater transparency in concessions to community groups, but is sensitive to government policies on this issue. There would be merit in restricting future concessions to the taxation component of fees rather than licensing charges. Arrangements to ensure that there is an incentive for defence spectrum to be used efficiently are adequate, although there is potential for periodic review of defence spectrum needs.

There is no technical reason why broadcasting spectrum cannot be used for other purposes, and the ACA supports this where appropriate. The ACA considers, however, that differences in the way that the ACA and the ABA plan spectrum primarily relate to differences in legislation governing the processes.

For satellite communications we have developed equitable, transparent and efficient licensing arrangements. Both foreign and Australian satellites are brought within the system, and are potentially liable for fees and the need for coordination with other services. We do have some concerns with the international coordination procedures established through the International Telecommunication Union (ITU), and are working for reform at this international level.

Provisions in the Act to facilitate competition in relation to auctions have generally been effective. There are no explicit pro-competitive provisions for administrative allocations, however, and the Commission may wish to seek views on whether such provisions are needed.

The effectiveness of the ACA as a spectrum manager has been recognised by our overseas counterparts who often seek our advice. We also have various mechanisms in place to measure our effectiveness.

Finally, 'future proofing' the system of spectrum management so that it remains effective even in the face of rapid technological and market change is a priority for the ACA. While we see the potential for technological change to see the end of spectrum scarcity and to result in further convergence of communications, it is not yet clear what impact these developments will have on spectrum management. The ACA is confident that spectrum management can keep pace with these challenges.

Introduction

The ACA welcomes this opportunity to provide a submission to the Productivity Commission inquiry into radiocommunications legislation and the role of the ACA. The inquiry is very timely, coming as it does after a sustained period of innovation in Australian spectrum management. It is appropriate now to take stock of what has been achieved in this area and to assess the extent to which these developments have led to an improvement in the operation of Australian communications. It is also timely to consider what further spectrum management improvements may be desirable in an industry and market place that are undergoing continuing change.

This submission follows the topics set out in the Commission's issues paper. Our comments are made from the vantage point of many years experience of operation under the *Radiocommunications Act 1992* (the Act) by both the former Spectrum Management Agency and now the Australian Communications Authority.

The ACA believes that the Act has provided the basis for one of the best, if not the best, systems of radiocommunications regulation in the world. Its emphasis on market based approaches, the underlying principles of efficiency, equity and transparency, and the flexibility it provides to both spectrum users and regulators in managing spectrum have facilitated the dynamic growth of radiocommunications in Australia in recent years. The Act provides a flexible, responsive framework that enables the ACA to accommodate the developing needs of the great majority of spectrum users. Many overseas administrations have sought Australian assistance on spectrum management issues, providing evidence of the success of our approach.

Nevertheless, the ACA believes that there is some scope for changes to legislation and practices to produce further improvements and to facilitate the achievement of the best possible arrangements for future spectrum management in Australia.

What problems does the legislation seek to address?

The rationale for regulating the use of the radiofrequency spectrum derives from the fact that spectrum is a finite (though non-depletable) resource whose utility depends upon effective allocation processes and the management of interference between uses. We allocate spectrum to particular *uses* (including those defined by licensees themselves), license particular *users*, and develop technical rules to control interference and to facilitate sharing of the spectrum resource in order to maximise the utility of the spectrum. Regulation is designed to enable and encourage businesses, government, community bodies and the public to use the spectrum efficiently and to derive benefits from its use.

Given this rationale, the ACA believes that the objectives of the Act adequately describe at least the social and economic concerns that the legislation needs to address. While decisions about spectrum use inevitably involve trade-offs between competing objectives, the Act establishes an appropriate structure for these decisions by having as the first objective the maximisation of the overall public benefit derived from use of the spectrum. The other objects of the Act provide a fair enumeration of the social and economic factors impinging on spectrum use including:

- the need for adequate provision for public and community services;
- efficiency, equity and transparency in pricing;
- other communications and industry policy objectives of the Government; and
- the need to promote Australia's interests internationally.

The one area covered in the Commission's terms of reference not explicitly mentioned in the objects of the Act is the environment. However, it can be argued that the first object (maximising overall public benefit) *implicitly* requires consideration of environmental issues. Certainly the ACA is very conscious of the need to give recognition to environmental concerns, and is very active in meeting its responsibilities in the field of electromagnetic radiation (EMR), for example. The ACA does not see any need for additional powers in the environmental field — environmental concerns are already well covered by other legislation. Nevertheless the Commission may wish to consider whether there is a case for amending the Act to give *explicit* recognition of environmental issues.

We do not believe that the Act's objectives are too broad or are insufficiently clear. They enable the ACA to make decisions about spectrum use by bringing in all relevant factors. It is hard to see how they could be made much more explicit without tending to undermine the very flexibility they are designed to promote.

In our view the priorities that have been attached to different objectives of the Act have not changed significantly since the legislation came into effect. While from time to time greater attention may be focused in public debate on some elements (such as public and community use, EMR or promotion of Australia's interests internationally), the way the ACA responds to these various objectives has remained remarkably constant over the years. The objectives of the Act have served us well in meeting these changes in emphasis over time.

As already mentioned, decisions on spectrum use involve trade-offs between competing objectives. It could thus be argued that the objectives are not consistent with each other. For example, it is possible to foresee situations where making adequate provision for spectrum use by public or community services may not be consistent with the most economically efficient allocation of frequencies. Similarly the most efficient system of charging for the use of the spectrum may not necessarily be the most equitable.

Nevertheless, the ACA does not believe that this causes a problem in practice. Such conflicts are inevitable — the objectives of the Act provide a good framework for them to be resolved in the overall public interest. Nor are we convinced that there would be much benefit in more clearly articulating these trade-offs in the principles governing spectrum management. The trade-offs are usually best looked at in a case by case way: in some circumstances the arguments for social/non-commercial uses of spectrum may be particularly compelling; in others these needs may be able to be accommodated without prejudicing economic objectives. (Thus for example a decision by the regulator not to grant spectrum to a particular community use may not mean that this use does not proceed. The community service may be able to make arrangements with a commercial service provider instead.) The ACA considers that given the complexities likely to be encountered in practice, more clearly articulating the trade-offs would run the risk of undermining the responsive and flexible approach

that the Act is designed to promote. Moreover, the ACA does not operate "in a vacuum" in this area — it has regard and gives weight to the Government's policy objectives and current community attitudes in dealing with these trade-offs.

The approach to allocating spectrum under the Radiocommunications Act

To a considerable extent Australia has moved away from the traditional heavily regulated and tightly allocated model of spectrum management. The Act introduced a range of market mechanisms designed to complement or substitute for traditional administrative methods for allocating spectrum. The new form of licensing — spectrum licensing — is one of the most important of these mechanisms. As a technology neutral, largely self-regulating form of licensing, it moves many decisions about spectrum use away from planners/regulators towards licensees.

Spectrum planning, however, remains a key element of spectrum management. Spectrum planning takes place through a hierarchical process. At the highest level, international planning through the ITU establishes broad spectrum uses. This gives industry a predictable base from which to develop communications systems and products, and helps manage cross border interference that could otherwise result from unplanned spectrum use.

There are significant benefits in Australia aligning with international arrangements (to the extent possible given regional differences). As a 'technology taker' we gain access to radiocommunications equipment at less cost than is likely to be the case if we adopted markedly different spectrum arrangements to the rest of the world. Alignment also provides us with the ability to support international safety-of-life services and devices (eg. Emergency Position Indicating Radio Beacons (EPIRBs)).

At the national level and next stage in the planning hierarchy, the ACA produces the Australian Radiofrequency Spectrum Plan (the Spectrum Plan), which is the overarching domestic planning document. The Spectrum Plan generally aligns with the broad ITU spectrum allocations for the Asia-Pacific region. It allocates blocks of spectrum to broad types of services such as fixed, mobile, radionavigation and broadcasting, and provides predictability and transparency to users. It is updated regularly to reflect changes in international arrangements, particularly following ITU World Radiocommunications Conferences (WRCs), currently held every three years. Based on the Spectrum Plan, the ACA can adopt band plans for specific bands as and when necessary. Such band plans further sub-divide the allocations made in the Spectrum Plan to specific service types. They can also be used to administratively reclaim spectrum and re-allocate it from one service to another.

Both the Spectrum Plan and individual band plans are subject to mandatory public consultation processes. They are also (like many other spectrum management issues) discussed within the ACA's consultative bodies, the Radiocommunications Consultative Council and the International Radiocommunications Advisory Council.

Overall, the ACA considers that the current approach to spectrum planning is operating efficiently. Planning processes provide a degree of certainty and predictability and help to minimise interference between services. The Spectrum Plan

is updated relatively frequently in response to international developments. It also includes mechanisms that enable the ACA to deal with changing uses of the spectrum between formal updates. Accordingly, we do not believe that the Spectrum Plan has been a significant impediment to changes in spectrum use.

As noted, market based mechanisms, such as spectrum licensing, already allow licensees considerable flexibility in spectrum use. Moreover, the ACA has shown itself ready to adopt more flexible spectrum management arrangements where there is a need to do so, and where this will not result in excessive interference. The ACA is not aware of any widespread feeling that significant changes need to be made to current planning processes.

The Commission has sought views as to whether there are alternative approaches involving less government intervention that would achieve efficient and effective use of spectrum within Australia. Spectrum licensing is one approach already available that provides the opportunity for a system of user rather than regulator planning of the spectrum. The ACA is firmly committed to spectrum licensing. We believe that the expansion of spectrum licensing provides scope for further improvements in the efficiency of spectrum use in Australia.

However, the potential for these improvements should not be overstated. In most spectrum licensed bands, the spectrum overwhelmingly has been (or is likely to be) used for services that are consistent with international allocations in these bands. Thus for example, the 800 MHz and 1800 MHz bands spectrum licensed in 1998 are largely being used for mobile telephony, as they are overseas. Similarly, the 27 and 28 GHz bands are being used for Local Multipoint Distribution Services (delivering broadband data), just as they are in many other countries.

Licensees are not compelled to follow international allocations, but the ready availability of equipment — at a cheaper price than would be the case if it had to be specially made for the Australian market — has strongly tended to push them down this path. (There are some exceptions to this, for example in the variety of uses in the 500 MHz band, the use of the 27 GHz band in small part for satellite links and the planned use of a part of the 2 GHz (3G[1]) band for a portable wireless data service. Nevertheless, the point remains generally valid.)

Another mechanism that has been adopted elsewhere is the sale of 'management rights' over the spectrum. New Zealand has pioneered this approach, whereby larger parcels of spectrum are sold to enable private sector managers to plan and allocate the spectrum to service providers. Although the difference between spectrum licensing and management rights is principally one of scale, the ACA considers there is merit in considering this approach here, and is monitoring developments in New Zealand.

Before moving down such a path, however, a number of factors would need to be considered. One is the place of incumbent licensees. In commercially popular bands, there are few if any large unencumbered blocks of spectrum. Spectrum clearance is nearly always controversial, and those incumbent licensees who fear displacement may resist the selling of large blocks of spectrum for management rights. (Some

[1] '3G' stands for third generation mobile telephony.

consideration may need to be given to the needs of existing licensees.) Competition aspects may also be important — the few companies that we are aware of operating in Australia that have the necessary expertise to act as spectrum managers already have considerable market power.

The duration of the management rights could also be an issue. To operate effectively, management rights would probably require rather longer terms than the current maximum period for spectrum licences (15 years). Perhaps even perpetual rights could be considered. In the absence of a strong secondary market for spectrum, such long-term rights arguably could have a discouraging effect on innovation in spectrum use. (Consideration also might need to be given to whether measures might be necessary to prevent inefficient hoarding of spectrum.)

The Commission also sought views on whether there is sufficient consultation within Australia prior to ITU meetings. The ACA believes there is. We already consult widely with industry before these meetings. To facilitate this, we have established a system of preparatory committees mirroring the system of international committees under the umbrella of the International Radiocommunications Advisory Committee. The consultation process is sometimes complex — major commercial interests are often involved, and sometimes compete with each other for Australia's support in international forums — but it is difficult to see what more consultation could usefully be done. The ACA has recently reviewed its international consultative arrangements to streamline them, but of course we would be interested in views about how they could be further improved.

Turning to national issues, the ACA invests considerable effort in consultation with industry and clients on more general planning and spectrum management issues. The principal regular avenue for consultation is through the Radiocommunications Consultative Council. In addition, the ACA routinely seeks input to its processes through publishing and inviting comment on discussion papers, draft reports and, in some circumstances, draft recommendations to the Minister.

The task of consultation is not particularly straightforward. Approximately 90,000 separate persons, government bodies and businesses, spread through every sector of the economy, hold our apparatus and spectrum licences. The few ‘peak’ bodies, such as the Wireless Institute of Australia and the Microwave Users Forum, cover only a small part of our client base. Further, for the most part, the end-users and ultimate beneficiaries of our services (such as mobile phone users) do not hold licences and the general consumer is unaware of our licensing and spectrum management arrangements. Against this background, we are considering what improvements might be made to our consultative processes on spectrum management issues and we would welcome input from interested parties.

Licensing

Licensing the use of spectrum is the means of defining the rights and obligations of spectrum users. Licensing is also the principal means of coordinating different uses of spectrum to provide an environment in which interference can be minimised and managed. Unless one were to accept the risks and consequences of greater levels of

interference, it is doubtful that there is any practicable alternative to licensing as a means of authorising access to the spectrum (some form of licensing is used in all spectrum management systems used in other countries). We believe that the licensing system has been effective in meeting the objectives of the Act, providing a framework for decisions to be made about allocation, use by public or community services, and for an efficient, equitable and transparent system of charging. Significant efficiency gains have been realised, and new technologies smoothly accommodated.

The Act provides at section 238 that the ACA may delegate licensing powers, in relation to broadcasting services bands, to the Australian Broadcasting Authority (ABA). The Act makes no provision for delegation of primary licensing powers to parties other than the ABA. In addition, the *Australian Communications Authority Act*, at sections 49 and 41, allows the ACA to delegate its powers and functions to another authority of the Commonwealth. Therefore, a limited power of delegation is available, although a proposal to delegate the issuing of licences to a private sector body would require legislative change.

If a different entity was able to provide the licensing function at an administrative cost lower than that incurred by the ACA, prima facie, there would be a benefit to spectrum users in delegating the function to that entity. However, administrative cost is not the only consideration. Effective licensing also implies management to minimise interference, and the costs of interference management would need to be taken into account by the licensing body.

If the power to issue licences were to be delegated to another party, other issues that would need to be considered in any such arrangement would include:

(a) the need for a single, public-access register of licences issued and their technical parameters;
(b) the need for the licensing body to take into account security-classified frequency assignments, in addition to those on the public register, before issuing licences; and
(c) the implications of recommendations made in the June 2001 Report of the Radiocommunications Review that licensees be compensated for the costs of relocating to alternative spectrum where longer-term apparatus licences are prematurely terminated.

These issues should not preclude consideration of alternative licence administration arrangements but would need to be considered and resolved, prior to any delegation.

In addition to the above, the ACA notes that a facility for on-line, automated processing of Frequency Assignment Certificates, submitted by accredited persons, to be available over coming months will result in further savings to users. Further on-line developments would allow the automated processing of licence applications and automated issue of licences, thus largely eliminating any manual processing. The timing of these further developments has not yet been decided.

One area where there has already been considerable 'delegation' of former ACA responsibilities is the accredited assigner scheme. Accreditation recognises that many people outside the ACA possess the necessary expertise to enable them to undertake frequency assignment work and coordination activities. The Act provides that the

ACA can grant accreditation to issue frequency assignment certificates under apparatus licensing (certifying that operation of a device will not cause unacceptable interference) and/or interference impact certificates (which perform a similar function under spectrum licensing). Currently there are 41 accredited persons.

In the four years since the accredited persons scheme was introduced, the amount of frequency assignment work done outside the ACA has steadily increased. Over 60 per cent of apparatus licensing frequency assignment work, and all device registration work under spectrum licensing, is now undertaken by accredited persons.

In summary, the ACA has no difficulty in principle with delegation of the licensing function, if a different entity was able to provide the function and its associated responsibilities at an administrative cost lower than that incurred by the ACA.

Licence types

Class Licences

Class licensing is a means of authorising access to spectrum for services which:

- use common frequencies on a non-coordinated basis;
- use equipment that is operated under a common set of conditions; and
- present a low potential for interference.

A class licence: sets out the conditions under which any person is permitted to operate; is not issued to an individual user; and does not involve licence conditions applied to individuals. Class licences authorise users of designated segments of spectrum to operate on a shared basis. Examples of class licensed devices are 'garage door openers', radio controlled toys, cordless phones and mobile telephone handsets.

Class licences are simple for the spectrum user, do not involve any licence fee and generally involve minimum licence administration by the ACA.

On the other hand they are suitable only for particular equipment types and uses. Class licensed services may suffer interference and generally will not be afforded protection from interference caused by other radiocommunications services. Where a class licensed transmitter causes interference, the onus is generally on the operator to rectify that interference.

Class licensing operates successfully in a number of areas and the ACA has moved recently to also class license certain maritime and aviation licences. It will examine further opportunities for class licences where there are administrative efficiencies and the risks of interference are low or acceptable.

Apparatus Licences

An apparatus licence is a licence issued by the ACA that authorises the licensee to operate a radiocommunications transmitter or receiver of a specified kind. In effect, it is a licence to use a specific segment of the radiofrequency spectrum, limited in both frequency and location, for a specified purpose for any period up to a maximum of five years.

Apparatus licensing is the default form of licensing in most bands where services need to be licensed individually. Apparatus licences are administratively simple and can be allocated over the counter (ie. without a price-based process). They can also be auctioned, although the need and opportunity to auction apparatus licences arises only occasionally.

Apparatus licensing is the form of licensing most frequently used by the ACA and is very similar to licensing models used by other spectrum managers around the world. There are approximately 200,000 apparatus licences currently on issue in Australia, although this will reduce over the next year as a result of the replacement of some individual licences through the introduction of new class licences for a range of maritime and aviation applications. Examples of devices subject to apparatus licensing are two-way radio transmitters, fixed links carrying for example telecommunications backbone traffic and mobile phone base stations.

Spectrum Licences

A spectrum licence authorises the licensee to operate any radiocommunications device within the specified spectrum space, providing that operation is in accordance with the conditions of the licence. Spectrum licences were allocated for the first time in 1997, following the 500 MHz band auction, and have since been used to license the 800 MHz, 1.8 GHz, 2 GHz, 2.4 GHz, 3.4 GHz, 27 GHz and 28/31 GHz bands.

Spectrum licences are technology and service neutral, subject to the parameters of the technical framework established for the band. They provide tenure of up to 15 years and offer considerable flexibility to the licensees in terms of trading. Interference management costs for the services provided in the bands are effectively transferred by spectrum licence boundary conditions to the licensee. Costs of meeting these conditions include characterising the emission performance of the equipment involved, planning use of the band and the area, and registering devices.

The decision to allocate a band by issuing spectrum licences rests with the Minister, although the ACA may, at the Minister's request or on its own initiative, make recommendations to the Minister.

There are no rules or criteria in the Act that specify circumstances in which spectrum licensing should be used rather than apparatus licensing. The ACA's recommendation on the form of licensing to be used in a particular band is decided only after extensive consultation with industry. The ACA's observation is that, as a general rule, spectrum licensing has been preferred by industry for the higher value, higher risk and newer application bands as it offers longer guaranteed tenure and minimises risk to the licensee because of its technology neutrality and increased trading flexibility.

Overall, spectrum licensing has resulted in some considerable improvements in the efficiency of spectrum management. It has done this by forcing both regulators and licensees to think more broadly about the real purposes of spectrum management and challenging the "way things have always been done", by improving flexibility of spectrum use and by introducing more market disciplines into the system.

A spectrum licence must be issued using a price based allocation process (although apparatus licensees can be offered the opportunity to convert to spectrum licences at a fixed price). This has led to auctioning being equated with spectrum licensing in the minds of some observers. In fact auctions can be, and have been, held for apparatus licences.

One remaining question is whether there is still the need to keep the sharp distinction in the Act and in licensing practice between spectrum and apparatus licence types. In practice this distinction has weakened to a small degree. Some apparatus licences (eg. regional MDS services) were offered with some of the flexibility of spectrum licences — they were "area based" rather than site based as is normally the case for apparatus licences. (Thus licensees were free to choose their own transmission sites within an overall licence area, rather than being restricted to a specific site or sites.)

The ACA believes that this sharp distinction probably no longer serves a useful purpose. Arguments over whether a particular service should be apparatus or spectrum licensed are rarely clear-cut. What is important is that licensing arrangements allow policy objectives to be met efficiently. To do this, a range of licensing terms, interference management techniques, and allocation methods might be needed to meet a range of user needs. It may be worth considering whether a single licence type (ie. combining apparatus and spectrum licence types[2]) might further improve flexibility. Under such a model, the terms and conditions (including tenure and interference management techniques) could be varied to suit the particular case, rather than being to some extent pre-determined by the requirements of the current licence types.

If the distinction between the two licence types were retained, there may be a need to consider some incremental changes in the Act. Currently there is a prohibition in the Act (s.105) against issuing apparatus licences in a spectrum licensing area, except under 'special circumstances'. In practice the ACA has found that there can be some advantage in allowing existing apparatus licences to remain in place in a spectrum licence area. This is because of the difficulties of converting apparatus to spectrum licences (see the later section on *Licence re-allocation and conversion*). There would be merit in considering whether this prohibition needs to remain.

Standard setting

The ACA is considered a world leader in standards and compliance regulation. As one of the first to introduce ‘light touch’ self-regulation for radiofrequency standards and compliance, the ACA arrangements are a model of open, transparent and cost

[2] With such a licence type, use could also be made of elements of a class licence (eg. within a licensed communications system, a class licence could authorise use of ubiquitous terminals).

effective standards and compliance development. ACA standards set the minimum performance requirements necessary to minimise interference and optimise use of the radiofrequency spectrum. A key feature of the ACA regime is that standards are set in consultation with manufacturers, importers and suppliers, and this leads to objectives being met cost-effectively to benefit consumers as well as spectrum users.

With the exponential growth in the number and use of electronic and electrical products, the radiofrequency spectrum is increasingly at risk from pollution by unwanted emissions. At the same time, industries as well as the general public have come to expect radio and communications transmissions to operate without undue disruption or failure. The consequences of interference can range from nuisance effects caused by poor reception of television or radiocommunications, to more costly disruptions to communications, health, and safety or security services.

An effective approach is to minimise the risk of interference from its source, through compliance and labelling arrangements for all manufacturers, importers and suppliers of radiocommunications, electrical and electronic products at the point of supply. The arrangements have been streamlined to apply to all suppliers in a similar manner and are underpinned by a post-market surveillance regime.

Unlike certification and pre-market approval systems utilised in the past by regulators, the ACA's regulatory arrangements do not require certification or approval of products, thus eliminating lengthy delays to market caused by the certification or approval process. They utilise a Declaration of Conformity which transfers the responsibility for compliance onto suppliers, while mandatory arrangements provide the certainty that products sold meet ACA requirements.

The ACA ensures the integrity of the regulatory arrangements by conducting post-market audits of compliance records. The costs to manufacturers and importers subject to standards include testing, maintenance of compliance records and labelling. Compared to a product approval process, the costs are minimal. The documentation to demonstrate compliance is in accordance with the level of risk posed to other devices using the radiofrequency spectrum. For the vast majority of products, product testing represents a one-off cost to the supplier and testing may be conducted in-house or by an accredited laboratory.

Suppliers have a choice of four labelling formats that they may use to identify products. The label indicates that a product has complied with the ACA standards applicable to it. The compliance label has become widely recognised both domestically and internationally as a mark that demonstrates compliance with the ACA's regulatory requirements.

Extensive consultation with industry and stakeholders occurs whenever the ACA introduces or amends legal instruments for standards and labelling. Under Section 163 of the Act, the ACA must ensure that interested persons have the opportunity to make representations and that due consideration is given to any representation made. Information on impending amendments is advertised in newspapers or mailed to the suppliers on the ACA database. The ACA also consults the Office of Regulation Review in the development of Regulatory Impact Statements so as to ensure that expected benefits do not impose undue costs on businesses and the community.

Alignment with the recommendations from the Kean Report

In accordance with the findings of the Kean Report[3], the Commonwealth adopts a cooperative approach towards reviewing existing regulations, and regulators are encouraged to consider "essential requirements" when mandating standards. In some cases, voluntary standards can be too prescriptive for regulatory purposes, causing regulators in different jurisdictions to call up only parts of a standard[4].

With reference to the Kean Report, the ACA's standards and compliance regulatory arrangements are effectively:

- a low-cost, self regulatory scheme to both the regulator and supplier;
- based on international standards developments; and
- a structure that encourages the growth of a viable Australian testing and assessment infrastructure.

Radiocommunications Regulatory Arrangements

For radiocommunications equipment, the compliance and labelling arrangements complement the ACA's licensing conditions for users and operators of devices by addressing potential interference issues at the point of supply.

Radiocommunications standards are developed under the Act to support class and apparatus licensing by setting performance criteria to manage interference. The standards development process includes a public consultation phase. Standards and frequency assignment procedures underpin the interference management regime, which has the Spectrum Band Plan at its peak. Industry is thus provided with a stable radiocommunications environment and certainty for product innovation and investment. In accordance with light touch regulation the standards are only mandated by exception for services such as land mobile radio and cordless telecommunications, when this is established as the most efficient way of managing interference.

Standards Australia committees develop the standards through a cooperative process involving industry, government and user representatives. Where possible, the standards are based on existing international or regional equivalents but are only voluntary in nature unless the ACA empowers them through adoption. Because of the world's three largely non-aligned frequency regions, land-based equipment standards from around the world are often incompatible as they are developed for totally different radiocommunication environments. Radiocommunications standards set the minimum performance requirements to meet Australia's spectrum planning needs and the management of interference.

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[3] *Linking Industry Globally*, Report of the Committee of Inquiry into Australia's Standards and Conformance Infrastructure, March 1995, Australian Government Publishing Service, Canberra. The inquiry examined the standards and conformance infrastructure across all government regulators and industry segments in Australia.

[4] Australia's Standards and Conformance Infrastructure, The Government's response to the Report of the Committee of Inquiry into Australia's Standards and Conformance Infrastructure – Linking Industry Globally, Commonwealth of Australia 1995.

Electromagnetic Compatibility Regulatory Arrangements

The ACA introduced Electromagnetic Compatibility (EMC) regulatory arrangements in 1997 to control electromagnetic interference from a wide range of electrical and electronic products. The Australian EMC regime was also in part a response to the adoption by the European Union (EU) of the Electromagnetic Compatibility Directive (89/336/EEC). Compliance with the ACA scheme was originally on a voluntary basis, but since 1999 compliance has been mandatory for all applicable products on the Australian market. Factors that strongly influenced the need to implement EMC regulatory arrangements included the need to:

- protect the radiofrequency spectrum from electromagnetic interference;
- preserve and extend export market opportunities for Australian electrical and electronic products;
- enhance the level of skills in Australia, particularly in the area of product design and testing.

The EMC standards state the minimum requirements to prevent interference from products used in the domestic, commercial and industrial environments. Only conducted and radiated emissions, the major contributors to interference, have been mandated under the standards.

Where possible, processes and standards are harmonised with those implemented internationally to prevent the need for retesting products before they can be sold in Australia or exported. One of the drivers for EMC arrangements is that voluntary compliance could not provide the confidence or certainty for the government to participate in bilateral and multilateral mutual recognition arrangements to align Australia with its major trading partners so as to improve trade. With this regulatory arrangement in place, products tested in Australia can be acceptable for sale in an importing country without delay or regulatory impediments to trade[5].

The ACA has been considered a pioneer in promulgating self-regulation in this area. Many countries, including New Zealand and the EU, have adopted the Australian model and implemented similar self-regulatory arrangements.

For suppliers, the main advantage of this self-regulatory approach is that products gain faster access to markets. Suppliers welcome this in increasingly competitive markets where products have short product life cycles. Consumers also benefit when suppliers pass on cost-savings and from faster access to new technologies.

Electromagnetic Radiation Regulatory Arrangements

The possibility of health effects associated with human exposure to radiofrequency electromagnetic radiation (EMR) has long been a topical issue in the community. Using its standards-making powers under the Act, the ACA has developed regulatory arrangements—including a mandatory human exposure standard—to address these concerns.

[5]From 1 November 2001, it is intended that the EMC arrangements in Australia and New Zealand will be harmonised by adopting the same suite of EMC standards and similar compliance labelling requirements. Australia also has MRAs with the EU, Switzerland and APEC economies on EMC.

The standard sets maximum limits for human exposure to radiofrequency fields in the frequency range 3 kHz to 300 GHz. It was developed by Standards Australia and Standards New Zealand following a review of the relevant scientific literature and is in accord with the recommendations of the World Health Organisation, the International Radiation Protection Association, and other major national reviews and guidelines[6].

Compliance with human exposure limits is administered in two different ways: devices with integral antennas designed to be used close to the human body are regulated at first point of supply to the market, while transmitters requiring installation are set to be regulated through the ACA's licensing system. Although the regime requires all transmitters that fall under its scope to comply with the ACA standard, evidence of compliance is only required for those devices that have a genuine potential to exceed the radiation exposure limits.

EMR regulation is a unique regulatory issue for the ACA for two reasons. Firstly, it is a more politically volatile issue than spectrum or interference management. Instances in recent history in which government and science are perceived to have failed in their protection of the public (eg. in relation to smoking or asbestos) have created some mistrust in the community, making it vital that public perceptions of risk be considered alongside the technical issues associated with the regulations. Secondly, the standards provision under the Act were originally drafted to regulate transmitters in terms of their ability to interfere with each other—device to device—rather than to regulate human exposure to a transmitter.

Despite these challenges, the ACA believes the current process for establishing standards is effective. Setting mandatory human exposure limits may potentially restrict incentives for product innovation, but we believe that protection of public health overrides the negative effects on innovation.

In recognition of Australia's obligation to harmonise its regulatory environments with other signatories to the World Trade Organisation's Technical Barriers to Trade Code, the ACA monitors the development of an internationally agreed method for measuring exposure from mobile phone handsets. As well as minimising barriers to trade, the adoption of such test method into the ACA's regulatory arrangements will ensure that consumer information about the tests which mobile phones have undergone remains cohesive on a global scale.

Charging for the use of spectrum

Charges to the users of spectrum serve two objectives. Firstly, charges for access to spectrum should act as a rationing device and should be set in a manner that encourages efficient use of spectrum. Charges to users of spectrum should also deliver a fair return to the community for the private use of a community resource. The ACA believes that its regime of licence fees meets these objectives.

[6] The ACA standard is based on an interim standard that failed to be adopted by Standards Australia. The Australian Radiation Protection and Nuclear Safety Agency is currently developing a new standard. The ACA will consider the implications of this when it is finalised.

The current regime of licence fees was established in 1995 after extensive consultation with industry. The design of the licence fee system drew on the report *Management of the Radio Frequency Spectrum* which was released in October 1991 by the House of Representatives Standing Committee on Transport, Communications and Infrastructure. In relation to charging, that Committee had recommended that:

> *The cost recovery component of annual charges for spectrum access be levied in such a way that the actual costs incurred by the spectrum manager on behalf of individual users are identified and recovered from individual users;*
>
> *To further assist in developing a transparent charging structure, the taxation component contained in the charges should be clearly identified; and*
>
> *A suitable means of recovering economic rent be formulated.*

The licence fee structure introduced in 1995 contained three elements, viz:

- a spectrum access tax, to reflect the amount and value of the spectrum used by a licensee;
- a spectrum maintenance component to reflect each licensee's share of the costs incurred on behalf of spectrum users generally and on activities which are not attributable to any specific licensees (this component is calculated as a percentage of the spectrum access tax); and
- an administrative charge, being the cost of processing a licensing transaction.

The spectrum access tax is based on a formula that takes into account:

- the spectrum location authorised by a licence (some spectrum bands are in higher demand and are therefore more congested than other bands);
- the amount of spectrum (bandwidth) used by a licensee;
- the geographic coverage authorised by the licence; and
- the power of the transmitter (transmitters operating a low power will attract a discount).

We acknowledge that, in the interests of simplicity and accessibility to spectrum users, the fee formula incorporates some compromises and a degree of crudeness in the manner in which different factors are measured and charged. That said, we are unaware of any more robust models around the world. Most spectrum administrations around the globe have fees based on cost recovery alone and very few appear to have fee models designed to encourage efficient use of spectrum.

The Commission has asked about the rationale for setting the spectrum maintenance component (SMC) as a proportion of the spectrum access tax (SAT). SMC covers a range of costs not easily attributable to individual licensees. Examples include international coordination, ITU membership, domestic planning and some interference investigation. Because it is not possible to directly attribute these costs, the ACA uses the value of the spectrum, as measured by the SAT, as a rough proxy to apportion these costs between users. The ACA does not believe that it is possible, without excessive administrative effort and cost, to apportion these costs more accurately.

The ACA has noted that the practice of disaggregating apparatus licence fees into a notional cost recovery component (SMC) and a notional economic rent on the use of spectrum (SAT), has caused some confusion amongst clients. Further, if SMC were to be adjusted to reflect each change in the overall tax base, there would be frequent and significant changes in licence fees. (Changes in the overall tax base have occurred through the spectrum licensing of some bands, the phasing out of analogue mobile phone services and recent increases in fees for GSM 900 services.) There is a risk that the SMC concept could lead to inefficient fee setting in that fees could be altered *across the board* simply as a consequence of licensing or revenue changes in a *particular band*. For these and other reasons, the ACA is considering whether the concept of the SMC continues to serve a useful purpose.

Another issue the Commission seeks advice on is whether the absence of fees gives users of class licences competitive advantages over users of other types of licences. This is a claim occasionally made by holders of apparatus and spectrum licences, but to date there has been very little evidence that this has emerged as a real problem. As noted above, class licensed services may suffer interference and generally will not be afforded protection from interference caused by other radiocommunications services.

Nevertheless, the ACA does recognise that there is a possibility that class licensing could offer a source of competitive advantage. It will continue to monitor the situation to see if this possibility is likely to develop in practice.

While there is some evidence that Australian fees for access to spectrum are high, relative to those charged overseas, there is no evidence available to the ACA that the levels of charges in Australia are such as to deter efficient uses of the spectrum. Since introducing the fee formula in 1995, we have continued to monitor and adjust the fees. We have a program to review fee levels, in particular in bands which are experiencing congestion and in which there is arguably a case for increasing fees.

Ideally, in spectrum bands and geographic locations where there is scarcity and congestion, fees should be set at "market" levels. That said, the task of establishing those market levels is very difficult. Methods by which values might be established that would match supply with demand include:

- shadow pricing against auction outcomes;
- shadow pricing against alternative (non-wireless) service delivery mechanisms;
- gathering evidence of market values from observing trading in the secondary market; and
- where there is evidence of congestion (excess demand) in a band or location, gradually increasing annual spectrum charges to the level which causes an easing of that congestion.

The ACA will continue to use these methods to assess, refine and develop its approach to the pricing of spectrum.

The Auction Process

In Australia, as in other countries, most spectrum is not allocated using price-based allocations but is allocated 'over the counter' on a first-come first-served basis. The ACA has a very large number of clients in spectrum where there is no exceptional demand or technology basis for changing the use of a band, or for using price-based allocations. Administrative allocation will thus continue to be used extensively, indeed in most cases. Administrative allocation is also useful as a means of ensuring access to spectrum for low commercial value but essential or useful services, such as the aeronautical or maritime bands or spectrum for emergency services.

Administrative allocation is poorly suited, however, to situations where demand for a spectrum band exceeds the available supply. Spectrum managers then face difficult decisions about which applicants should gain access to a particular band when more companies or individuals wish to acquire spectrum to operate services than can be accommodated within that band. In these circumstances, there is no administrative allocation method that can guarantee that spectrum will be allocated to its most efficient uses, and to those users who value it most highly.

The ACA considers that decisions about use of the spectrum are usually more appropriately made by operators of communication systems rather than by regulators. Under the Act, the ACA is required to maximise the overall public benefit derived from using the radiofrequency spectrum by ensuring its efficient allocation and use. The ACA considers that, in general, spectrum will be used most efficiently where it is allocated to those who value it most highly. Allocations made in the market place are likely to be better at ensuring that spectrum is allocated to its highest valued, and more efficient, use. Such allocations are also likely to be fairer than inevitably arbitrary decisions by regulators as to the best use for a band. Market allocations also help to ensure a fair return to the taxpayer for private access to a public resource.

Australia was one of the pioneers in spectrum auctions. We conducted our first spectrum auction in 1994 and, as shown in the table below, we have used auctions on a regular basis since that time.

Year	Band	Current or Likely Use
• 1994*	2.3 GHz Band	Pay television and wireless internet
• 1995*	2.3 GHz Band (regional)	Pay television and wireless internet
• 1997	500 MHz Band	Land mobile and point-to-point
• 1998	800 MHz and 1.8 GHz Bands	Mobile telecommunications
• 1998	800/1.8 GHz Bands (residual lots)	Mobile telecommunications
• 1999	28/31 GHz Bands	Broadband wireless
• 1999	800 MHz Band (residual lot)	Mobile telecommunications
• 1999*	800 MHz land mobile band	Trunked Land Mobile
• 2000	1.8 GHz Band (additional lots)	Mobile telecommunications
• 2000	3.4 GHz Band	Broadband wireless
• 2000	27 GHz Band	Broadband wireless
• 2001	800 MHz (additional lots)	Mobile telecommunications
• 2001	2 GHz Band	3G Mobile telecommunications

* Apparatus licence auctions.

In the auctions described above, the ACA has used traditional open-outcry auctions, as well as the simultaneous, multiple-round auction system, developed by the US Federal Communications Commission. Through observing Australian and overseas experience with allocation systems, the ACA considers that, as a general rule, the simultaneous, multiple-round auction system is the most appropriate allocation method where there are multiple lots on offer and when the lots are substitutable or complementary.

The attraction of this form of auction is that it enables bidders to form aggregations of spectrum to suit their specific business needs. It also allows bidders to change their bidding strategies, if necessary, during the course of an auction. A simultaneous multiple round auction will also enable the market's valuation of the spectrum to be revealed. A bidder is therefore not bidding blindly, as he would in a sealed bid tender, but will have knowledge of how other bidders value the spectrum. The ACA acknowledges that the simultaneous, multiple-round auction system is more complex and more time consuming to set up and conduct than other forms of allocation, but considers that these disadvantages are substantially outweighed by the benefits of the allocation method.

The ACA believes that its auction processes have been extremely transparent, and have not had a significant influence on the choice of technology adopted by bidders. Great care in auctioning has been taken to ensure that there is extensive public consultation and that potential bidders have the opportunity to influence the parameters of the auction such as lot size that may impact on technology choice. Where there is a conflict between bidders on lot size, the ACA seeks to adopt the 'lowest common denominator' that enables all potential systems to be accommodated.

The Commission has sought views on whether the charge for spectrum licences should consist of an upfront payment or an annual charge. The main reason that the ACA has used upfront charges is that there is a significant risk to the government and taxpayer from annual charges. An example is the so-called 'C block' PCS auction conducted in the USA. The FCC provided in the auction for payments to be made over ten years rather than upfront. In the event, several companies defaulted on payments at the end of the first year. The resulting situation has still not been resolved several years later. We believe that the risk of defaults needs to be factored in to any decision on the method of payment.

With payment upfront, the risk of default is ameliorated by the ACA not issuing the licence. The licence is thus immediately available for re-allocation.

Licence tenure and band clearance

Licensees, especially in the commercial area, need reasonable certainty of tenure if they are to make appropriate decisions about equipment purchases, network rollout, service provision etc. Recognising this, the ACA tries to give as much warning as possible about changes in spectrum use. Factors influencing the appropriate duration of licences within the statutory limits include the likelihood of the band being required for other uses, the nature of the service being offered (in particular the amount of investment required and its expected payback period), the life of equipment using the band, and the rate of technological change in related or competing services. Inconvenience and costs to the public could also be a consideration for some services (eg. mobile telephony, broadcasting).

Apparatus licences provide flexible tenure for any period from one day to five years and are obtainable on application. Apparatus licences provide access to spectrum that has been coordinated with other licences to minimise the risk of interference and will be afforded protection from interference caused by other services. They are tradeable (although they cannot be readily subdivided), and involve known and published licence fees.

A small number of apparatus licensees have expressed concern that their tenure on licences is subject to disruption, for example, by a change in a band plan or by a spectrum re-allocation declaration. In recent years, such disruption has generally occurred as a consequence of spectrum re-allocation declarations associated with auctions of spectrum licences in mobile telecommunications bands. An examination of the ACA's licensing database indicates that, for the 112,000 'assigned' licences[7] (ie. those involving a dedicated frequency assignment) on issue at June 2001, the licence periods sought and granted to licensees were:

[7] There are about 150,000 assigned frequencies associated with the 112,000 licences.

	Terms of Assigned Licences on Issue at June 2001 (Years)					
	<1	**1**	**2**	**3**	**4**	**5**
No of licences	2,393	102,316	2,477	769	1,197	3,043
% of licences	2%	91%	2%	1%	1%	3%

While licensees are at liberty to apply for licences of up to five year's duration, the statistical evidence suggests that most have been content with licences of one year's duration and to apply for renewal on those licences on their expiry. Notwithstanding the clear preference for licences of one year's duration approximately 60% of the 112,000 licences were first issued at least five years ago; the shorter-term licences having been renewed each year on expiry.

Where licences are displaced by a spectrum re-allocation declaration, the Act requires that the rights of incumbent licensees be protected for a minimum period of two years. In practice, the period of forewarning given to incumbents is substantially longer. Where it becomes known to the ACA that incumbents may be affected by change in use of a band, the ACA will typically apply an embargo on new assignments in that band and provide warning to incumbent licensees by way of advisory notes which are printed on licences. In particular circumstances, the ACA might also publish discussion papers to alert incumbents and other parties to the potential change.

Further, in addition to these processes, the Act sets out requirements on the ACA for more formal consultation with incumbent licensees, before any recommendation can be made to the Minister on the re-allocation of a band. Through the combination of these processes, incumbent licensees typically have many years forewarning of any potential disruption to their licences.

A second concern expressed by some apparatus licensees is that apparatus licences do not provide the tenure necessary for a licensee to secure finance for the business in which the licence would be used. This concern relates firstly, to the absence, in legislation, of any presumption that licences will be renewed on their expiry and secondly, to the maximum five year duration of apparatus licences. The ACA would have no difficulty if the Act were to be amended to provide a positive presumption of renewal, providing always that such a provision did not inhibit spectrum planning arrangements relating to band plans and spectrum re-allocation declarations.

The ACA also notes that in its June 2001 Report on the Radiocommunications Review, the Department of Communications, Information Technology and the Arts has recommended that:

> "*The Act be amended to increase the maximum duration of apparatus licences to at least 10 years, with industry to be consulted further on the detailed arrangements. Consultation is to include price-based allocation of longer term licences, possible administrative allocation with payment of a surcharge, incorporation of rolling mid-term reviews of licence periods and a scheme of*

compensation for relocation costs where longer-term apparatus licences are affected by re-allocation."

The ACA considers that extending the maximum duration of apparatus licences, in combination with a positive presumption of renewal, subject to protection of arrangements relating to band plans and spectrum re-allocation declarations, should ameliorate any concerns as to security of tenure over apparatus licences. It would also bring the apparatus and spectrum licence types closer together (see the earlier discussion on a possible single licence type).

Another issue often raised in discussions of spectrum tenure is whether there should be 'use it or lose it' provisions to prevent spectrum hoarding. Such provisions have been recently imposed as a result of a Ministerial direction on Low Power Open Narrowcasting licences, and by the ACA in relation to the forthcoming satellite licence auction. There are some practical difficulties associated with such conditions, for example in establishing what constitutes use of the spectrum. This is difficult in a technology neutral environment where licensees are free to use the spectrum for whatever service they wish. For this reason, the use of such provisions has been confined to relatively narrowly defined circumstances. Nevertheless the ACA would welcome feedback on whether such conditions can play a useful role.

Licence re-allocation and conversion

The Act provides for two separate paths to the issuing of spectrum licences. Under the 're-allocation' approach (Part 3.6 of the Act), incumbent apparatus licensees are given a period of notice (a minimum two year re-allocation period) to vacate the spectrum. Following the allocation of spectrum licences, the new spectrum licensees therefore have clear, unencumbered access to the spectrum from the end of that re-allocation period.

The ACA's view is that the re-allocation provisions have operated effectively and without complication. The principal risk in re-allocation is that incumbent users will be moved unnecessarily or prematurely from the spectrum — that is, well before a new licensee is ready to commence service, or, if the relevant lots are unsold at auction, before the licence has been allocated.

The alternative path to spectrum licensing is the 'conversion' process (Part 2.2 of the Act) in which incumbent apparatus licensees are provided a first right of refusal on the offer of a spectrum licence. Spectrum licences must, as far as is practicable, authorise the operation of radiocommunication devices to the same extent as, or a greater extent than, is authorised under the apparatus licences they replace. Spectrum licences would be auctioned only if the offers of spectrum licences were refused, or if there were no licensees in parts of the band or in parts of the designated geographic area.

The ACA's experience is that the conversion processes can be problematic and are useful only where a small number of apparatus licensees have discrete spectrum parcels, all of which covers large geographic areas.

Difficulties arise because in most bands, multiple apparatus licences have been issued to multiple parties to authorise transmissions at multiple locations around the country. Any one licensee is likely to be authorised to operate on different frequencies at different locations. The conversion process in the Act would require spectrum licences to be offered for those particular locations and, if possible, spectrum licences for the remaining locations would offered through a price-based allocation. Where many 'small' apparatus licences are on issue, most of those licensees are likely to be offered licences of minimal size. In practice, such licences would probably offer little utility or benefit beyond the apparatus licences they replace, and would have a disproportionate negative impact on the utility of surrounding spectrum licences.

In these circumstances, conversion arrangements raise complex engineering and legal issues and do little to enhance spectrum efficiency. Some simplification and improved spectrum efficiency might be delivered if the ACA were able to offer a licensee, as far as practicable, a spectrum licence for the same frequency range across different geographic locations. This, however, would require an amendment to the Act.

Further, where multiple apparatus licences have been issued to multiple parties to authorise transmissions at multiple locations, the conversion process causes a 'Swiss cheese' effect. There will be geographic and spectrum areas in which no apparatus licences have been issued. If the 'vacant' areas (in which no apparatus licences have been issued) are considered to be of low commercial value, they will be incorporated into the draft spectrum licences to be offered to the incumbent apparatus licensees. If those vacant areas are commercially attractive, the ACA will proceed to an auction for lots in those areas. Once again, these arrangements are complex and unsatisfactory and involve considerable judgement and discretion by the ACA.

Even where the number of apparatus licensees is small, and all have discrete spectrum parcels covering large geographic areas, conversion processes can still be problematic. In many bands, there is a small number of non-standard licences and, particularly in more remote areas, these may overlap the larger apparatus licences. Where a band is designated for spectrum licensing, all incumbents must be offered the right to convert from apparatus licensing and this raises legal complexities in respect of overlapping apparatus licences. To overcome these difficulties, the ACA suggests that the Act could be amended such that the Minister would designate a band for spectrum licensing while allowing certain licences in the band to continue under an apparatus licensing scheme.

The Commission has raised the issue of compensation to licensees for the cost of moving or if they choose not to convert their licences. There is little justification in law or on strict efficiency grounds for the payment of compensation. It would imply a 'right' to access the spectrum that licensees do not have in law. Nor have they paid for such a right when acquiring licences (thus it could be argued they would receive windfall gains if compensation was paid to them). The Act, and ACA practice, provides reasonable periods of notice for licensees to help them adjust to changes in spectrum use.

Nevertheless, compensation could in practice play a role in overcoming entrenched opposition to change that is in the overall public interest, leading to earlier realisation of the benefits of change. Consideration could be given to the possibility of compensation under strictly limited circumstances. Possible conditions could include:

- compensation would only be payable where timely clearance of a band is necessary;
- a decision to provide for compensation would only be made where the Government assessed there were clear net public benefits in doing so. (Benefits could include significantly earlier access to a band than might otherwise be possible; introduction of new services or new competition; and minimising disruption to existing services); and
- compensation would only be likely to be justified for high value bands.

Voluntary compensation from the new owner would still be possible, under a commercial arrangement.

Secondary trading of licences

Under the provisions of the Act, both apparatus and spectrum licences can be traded in the secondary market. Whereas the Act envisages that an apparatus licence will be traded as a single entity, spectrum licences can be traded in full or in part, by splitting the bandwidth of a licence and/or the geographic area of a licence.

The spectrum areas probably most amenable to secondary trading are those parts subject to spectrum licensing. Spectrum licences are tradeable in whole or in part and can be 'sub-divided' or aggregated to form licences different in scope to the original licences. Trading is subject to some conditions, such as a requirement to abide by technical conditions of the licence. (These are designed to minimise interference.) In order to preserve the integrity of the technical framework, there are some limits on how finely spectrum licences can be sub-divided. However, these limits have proved to be more a theoretical than a practical issue, and have had no impact on actual trades.

Since the issuing of the first spectrum licences in 1998, the trading of spectrum licences gathered pace only slowly, but is now being used relatively freely. Of the 608 spectrum licences which the ACA has issued since 1998, 91 have been traded in full or in part over the past 12 months. That said, many of the trades were effected for the purpose of intra-company asset re-structuring, rather than to transfer the licences to an unrelated entity. Nevertheless, the level of trading suggests that licensees are making increasing use of the trading provisions.

Some trading of apparatus licences has also occurred. An apparatus licence is traded with the existing conditions in place (eg. type of service, site, transmitter power) unless the ACA agrees to change the conditions of the licence. The ACA is aware of trades in particular for land mobile radio licences and quasi-broadcasting licences (such as frequencies for low power open narrowcasting (LPON) and high power open narrowcasting (HPON) services).

The Act also provides for both spectrum licensees and apparatus licensees to authorise third parties to operate transmitters under their licences. In apparatus licensing, third party authorisations would generally occur on a time-share basis and have been used infrequently. In spectrum licensing, third party authorisations would enable the licensee to ‘rent’ bandwidth to other parties and thus derive revenue from excess capacity. The ACA believes that there is scope for spectrum licensees to make greater use of third party authorisations, although it remains to be seen whether the market will develop in this direction.

The ACA is not aware of any particular constraints to the development of secondary markets. While the five year maximum tenure for an apparatus licence might be perceived as a constraint, it needs to be understood that the nature of apparatus licences (and the fact that alternative apparatus licences are often readily available from the ACA) makes them less amenable to being traded in the secondary market.

The regulatory framework generally supports licence trading. The ACA provides licence registers that enable details of licence holders to be searched, and imposes cost recovery only charges on registering trades. However, one feature of the overall regulatory framework that has been argued may inhibit secondary trading is the taxation system. The ACA is aware of claims, by spectrum licensees in particular, that capital gains tax and/or State stamp duties have deterred trading of licences.

The ACA notes that a private spectrum trading facility has been opened in the past year and supports such initiatives. In what we understand may be a "world first", a private on-line spectrum trading desk was established by an Australian merchant bank (Macquarie Bank).

The Commission has sought comment on the economic costs of constraints on secondary trading. While the ACA has no information available to it about their extent, it recognises that there are likely to be some costs in restricting the free flow of the scarce spectrum resource to other uses and users.

One general 'constraint' on spectrum trading is the need to manage interference. It is likely that licence conditions, out of band emission limits and similar interference management tools will need to be carried across in any trade, unless further detailed engineering work is done to ensure that the risk of interference is minimised. The ACA, however, is willing to explore ways of giving added flexibility to spectrum users wherever possible and would consider relaxing such constraints on a case by case basis.

Non-commercial uses of the spectrum

The issue of provision of adequate access to spectrum for public or community services has at times aroused controversy. From time to time, some non-commercial users of the spectrum have felt threatened by what they see as the 'commercialisation' (or market orientation) of the ACA's approach to spectrum management. Moreover, some corporate bodies (such as utilities) have tended to regard their use of spectrum as 'non-commercial'.

In practice, however, there have been very few instances where any users (let alone non-commercial ones) have lost access to spectrum bands altogether. In those cases where it is necessary to clear users out of a band, the ACA takes great pains to ensure that they have access to alternative spectrum so that services can be maintained. The ACA remains sensitive to concerns of non-commercial spectrum users, and recognises that they may face particular difficulties in adjusting to changes in spectrum allocation.

The Commission has sought views on how public or community services should be defined. There is a limited definition, for limited purposes, in the Act (see below). At a broader level, however, this question is important because the objects of the Act require adequate provision of spectrum to be made for such services. The ACA believes that at this general level, there is little advantage in defining these services very narrowly.

While it can be argued that an unduly wide definition could distort spectrum markets by giving some bodies privileged access to the spectrum, in practice it is not easy to come up with a generic definition. It is likely that there will be a range of bodies performing public or community functions who may find it difficult to compete in open spectrum markets with more commercial users. Whether or not a particular body would be appropriately included may depend upon the specific service in question. (Some services that a body may offer may be of a 'public or community' nature; other services might be more of a kind associated with private enjoyment of the spectrum.) The question of whether adequate spectrum has been provided needs to be looked at in this context.

At a narrower level, section 10 of the Act provides a definition of a *public or community service*. Under this section, such a service is one provided by a body or organisation of a kind specified in writing by the Minister. (The Minister has never made such a determination.) The Act goes on to say that such a body must either be an authority of the Commonwealth, a State or a Territory, or a not-for-profit organisation.

This definition under section 10 relates to the issuing of ACA marketing plans for spectrum to be allocated by issuing spectrum licences (section 39). Such a marketing plan may indicate how much of the spectrum under the plan is to be reserved for public or community services. As the Minister has never made a determination of the kind referred to in section 10, this part of the Act has never been applied. However, it is not unusual for respondents to spectrum licensing consultation processes to argue that some spectrum should be reserved for public or community services. The ACA believes that the current provisions of the Act give sufficient scope for such requests to be properly considered.

The ACA relies on consultation with representatives of public or community services to determine whether adequate spectrum is provided for these uses. If necessary, the ACA can work with such organisations to help them assess their spectrum needs and to ensure that spectrum is available to them. While for commercial uses of the spectrum the ACA believes that such analysis is best left to the market place, this may not always be appropriate for public or community services, particularly if they are to be given some privileged access to the spectrum.

The possibility of public or community users making windfall gains from their spectrum holdings if they were given privileged access (by on-selling or leasing this spectrum for commercial uses) would also need to be considered.

A current example of cooperation on meeting spectrum needs for such groups can be found in work being undertaken on a possible national public safety radiocommunications network. Ideally such a network would provide a common platform for police and emergency services throughout Australia, especially to enable inter-working during emergencies. Despite the considerable efforts of the ACA and its predecessors over a number of years, it has not been possible previously for the various jurisdictions to agree on a common approach. Now an Inter-Government Spectrum Harmonisation Committee has been set up with ACA involvement to explore the possibility of establishing a national network.

In answer to the Commission's query as to whether adequate attention is given to the opportunity cost of spectrum that is allocated to the Department of Defence (Defence) or emergency services, the ACA notes that Defence now pays licence fees according to the same formula as other spectrum users. (Many other countries do not charge for Defence use of the spectrum, or make only token charges.) It may be difficult to make judgements about opportunity costs in the defence environment, for example security reasons may prevent full disclosure of the purpose for which spectrum is used. It may also be difficult to fully 'price' services provided by Defence. In our view, however, the introduction of price signals through licence fees has been a very helpful step in managing conflicts between defence and civilian uses of spectrum.

We believe that charges for Defence spectrum should continue to be made on the same basis as for other users. This provides the best assurance that there will be an incentive for Defence to make efficient use of spectrum, including surrendering spectrum that it no longer requires. (It should be noted that there have been several examples where Defence has been willing to give up or share spectrum.) If there is still a concern about the adequacy of pricing signals, the ACA notes that the July 2001 Report of the Radiocommunications Review, recommended that "arrangements for the Defence use of spectrum...should be reviewed periodically by the ACA and the Department of Defence."[8] Such a periodic review could help to ensure that the need for Defence use of spectrum is subject to continuing scrutiny.

For other emergency services, it is possible that fee exemptions and concessions that the ACA has in place could lead to some inefficiency in spectrum use. Increased transparency about the amount of revenue forgone would be desirable. It might also be argued that spectrum efficiency would be better served if all users of the spectrum were charged the appropriate fee, with compensating assistance in the form of a publicly visible grant in lieu of the current hidden subsidies to ensure that emergency services were no worse off.

While acknowledging these arguments, the ACA remains sensitive to government policies that encourage emergency services, and believes that it would not be appropriate to charge for the use of spectrum unless adequate arrangements were in place to protect their operations.

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[8] Report of the Radiocommunications Review, June 2001, p.50.

Currently, the ACA provides fee exemptions to safety of life services principally staffed by volunteers. The fee exemptions recognise the particular difficulties such bodies may have in raising funds to cover such purposes as licence fees. The ACA supports limiting fee exemptions to this type of body.

The ACA does note that exemptions from licensing *charges* (as distinct from licence fees) can have undesirable effects. Licensing charges are levied for services such as frequency assignment work undertaken by the ACA on behalf of licensees. Exempt bodies do not pay these charges. Experience would indicate that exemption from such charges can have the effect of encouraging eligible bodies to obtain licences even where the benefit given by the licence is less than the cost of undertaking frequency coordination. Undertaking frequency assignment and other licence issue work for exempt bodies represents a considerable burden on the ACA, and the absence of charges means that there is no price incentive for such bodies to carefully consider the need for new licences. For this reason, the ACA supports the recommendation in the Report of the Radiocommunications Review that "if concessions are considered in future they should be limited to the taxation component of fees."[9]

Finally, the Commission has asked whether there are any particular issues relevant to the provision of services to remote communities. The ACA is responsive to the needs of remote communities in making spectrum management decisions. As an example, it excluded certain spectrum from the 500 MHz spectrum licensing allocation that was used by Telstra to deliver the Universal Service Obligation (using its Digital Radio Concentrator System). Also, new licensing arrangements have been introduced for some remote area HF (high frequency) services, to remove the need for individual licensing (for example remote area residents no longer require individual apparatus licences for radiocommunications for school of the air and telephone interconnect purposes).

One of the features of the ACA's spectrum pricing approach is that fees are related to the density of spectrum use. As a result, ACA licence fees are markedly lower outside of the major metropolitan areas. Also, spectrum management issues tend to be much less complex in remote areas than elsewhere — spectrum congestion is rarely a problem. Accordingly, the ACA does not believe that spectrum management practices are likely to pose significant problems for the provision of communications services in remote areas. Difficulties are much more likely to arise from commercial issues surrounding the provision of services in sparsely populated areas.

Broadcasting

There is no *technical* reason why spectrum that is currently designated for broadcasting services cannot be used for other purposes. However, the Act prevents the ACA issuing licences in the broadcasting services bands except in accordance with a decision of the ABA, or agreement between the ABA and the ACA.

It is worth noting that in the USA, the Federal Communications Commission has foreshadowed that spectrum currently used for television broadcasting will be

[9] Report of the Radiocommunications Review, p.33. For this purpose, we take "the taxation component of fees" to mean both the spectrum access tax (SAT) and the spectrum maintenance component (SMC) elements of our current fee structure.

auctioned for other purposes. (The spectrum would be auctioned in advance of the clearance of television services from the bands, but its use for other purposes would be dependent on its clearance in due course.) This precedent may lead to calls for "excess" broadcasting spectrum to be allocated for other purposes in other countries.

While there are differences in the way that the ACA and ABA plan and allocate spectrum, these primarily relate to the nature of the services being planned and differences in the head legislation for the bodies (ie. the *Radiocommunications Act 1992* and the *Broadcasting Services Act 1992*). Given this, it is not clear that transferring all spectrum planning and licensing responsibilities to the ACA as recommended by the Commission in its Broadcasting Report would in itself result in a significant change in planning practices. The division of responsibility between government agencies is of course for the Government and Parliament to determine.

Whether or not responsibility for broadcasting spectrum was transferred, the ACA notes that there is some potential for "freeing up" broadcasting spectrum consequent upon the conversion to digital television broadcasting. Once the conversion process is complete, spectrum currently used for analogue television would be available for other purposes.

Some important but difficult decisions will need to be made about the future of this spectrum. As noted above, there is no technical reason why this spectrum cannot be used for non-broadcasting purposes. Consideration needs to be given as to what this spectrum can be used for, how it should be allocated, and whether the television broadcasting bands should be replanned to optimise its use.

The latter question raises difficult issues. The USA plans to auction large contiguous blocks of spectrum formerly used for television (eg. channels 60-69). From the standpoint of maximising spectrum utility this approach would clearly also be desirable in Australia rather than selling a 'Swiss cheese'[10] of non-contiguous channels. But such an approach would require extensive replanning and clearance of the bands to free up large blocks, and is likely to involve considerable cost and inconvenience to both broadcasters and the viewing public. The ACA does not yet have a view as to whether the benefits of such a replanning are likely to exceed the costs, but notes that it would be desirable to examine this issue as the digital conversion process proceeds.

Satellites

Consistent with the objectives of the Act, the ACA has introduced radiocommunications licensing arrangements for satellite services that:

- provide equitable and transparent licensing arrangements for a wide range of satellite systems and services, including both Australian and foreign satellites;
- provide a return to the Commonwealth for private use of the public spectrum resource;

[10] Under current Australian channel planning, rather than a large contiguous block of spectrum such as would be formed by channels 60-69, it is likely that channels recovered from analogue television use would be isolated and scattered throughout the band and across geographic areas.

- minimise the burden of regulation on the community; and
- are administratively efficient.

The licensing arrangements established by the ACA 'charge' both Australian satellite and foreign satellite operators for their use of the spectrum to provide services to places in Australia. It is not the case that only satellites (or 'space objects') declared to be 'Australian' are charged licence fees.

The ACA has the power to determine:
- which space objects are Australian space objects for the purpose of the Act; and
- the circumstances in which foreign space objects are subject to the Act.

The ACA has exercised both of these powers and made the following determinations:
- *Radiocommunications (Australian space objects) Determination 2000*; and
- *Radiocommunications (Foreign space objects) Determination 2000*.

The four Optus satellites are examples of Australian space objects. They are located at 152° East longitude, 156° East longitude, 160° East longitude and 164° East longitude in the geostationary orbit and operate in the Mobile Satellite Service and the Fixed Satellite Service to provide radiocommunications services to places in Australia. Operation of these satellites is authorised by apparatus licences — Space and Space Receive licences — issued by the ACA to Optus Networks. The operation of Earth stations in Australia that communicate with the Optus satellites is authorised by the *Radiocommunications (Communication with space object) Class Licence 1998* (the Class Licence).

The Globalstar satellites are examples of foreign space objects that have been determined by the ACA to be subject to the Act. The Globalstar system is made up of 48 satellites in low Earth orbit, and provides Mobile Satellite Services on a global basis. The United Kingdom is responsible to the international community for the Globalstar system (that is, it is a UK satellite system). Operation of the Globalstar satellites to provide services to places in Australia is authorised by Space and Space Receive licences issued by the ACA to Vodafone Australia. The operation of user terminals (Earth stations) in Australia that communicate with Globalstar satellites is authorised by the Class Licence.

Licence fees are set out in the Apparatus Licence Fee Schedule. Licence fees for satellite services do not discriminate between satellites on the basis of country of origin. For satellites with identical technical and operational characteristics, the same licence fees apply whether the satellite is Australian or foreign.

While there are many different types of satellite services and many different satellite systems, often with unique technical and operational characteristics, they are all subject to the same licence fee arrangements. Accordingly, the ACA does not believe that the current charging arrangements influence competition between users (other than to encourage the use of more spectrum efficient systems that attract lower licence fees).

However, before a satellite system can be licensed to provide a service, it is necessary for the technical and operational characteristics of proposed services to be

coordinated with potentially affected services. Because emissions from satellites have the potential to cause interference to services across a large portion of the surface of the Earth, international coordination of satellite systems is required.

The need for international coordination has been addressed by member States of the ITU with regulatory arrangements set out in the Radio Regulations. Those arrangements include both 'planned' bands and 'unplanned' bands. For a variety of reasons, many more satellites have been established in the unplanned bands than in the planned bands.

Use of the planned bands is subject to the arrangements set out in Appendix S30, Appendix S30A and Appendix S30B of the Radio Regulations. Collectively, these appendices make up the Broadcasting Satellite Service Plan (the BSS Plan) and the Fixed Satellite Service Plan (the FSS Plan). The plans are an attempt to ensure access to the geostationary orbit by each member State of the ITU. The plans allocate both orbital positions and specific frequencies to member States for use under particular technical and operational conditions. The plans are intended to support the provision of national services by member States.

Use of the unplanned bands is subject to the arrangements set out in Article 9 and Article 11 of the Radio Regulations. The unplanned bands are all those frequency bands allocated to satellite services that are not governed by the BSS Plan or the FSS Plan. Access to the unplanned bands is on a 'first come, first served' basis with an obligation on all parties to cooperate to reach mutually acceptable technical solutions.

The ITU is responsible for administering the regulatory arrangements established by its member States set out in the Radio Regulations. As the number of satellite systems, both proposed and operational, has increased dramatically over the past decade, a significant publications backlog has developed at the ITU. At this time, publication of detailed technical information ('Coordination Requests') about proposed satellite systems may be delayed by up to two years.

The length of a typical satellite procurement program is about 5 years. ITU publication delays have the potential to significantly complicate the procurement process as delays in the publication of technical information can result in the need for changes to the design of a satellite late in the construction cycle.

The member States of the ITU have agreed to a number of changes that are intended to ameliorate the publications backlog. While delays in the ITU processes are a matter for concern, the ability of Australian satellite operators to bring new satellites into service has not been significantly diminished (though it is likely that Australian satellite operators have incurred additional costs as a result of the publication backlog).

The ACA continues to support reform of ITU processes and arrangements but recognises that the publications backlog will not be solved by a single 'magic bullet'. The ACA also continues to support Australian satellite operators such as Optus and the Department of Defence in their efforts to work more efficiently and more productively within the existing regulatory framework. The ACA does not believe that for the foreseeable future there is an alternative approach to the coordination of

satellite systems than the arrangements set out in and established by the ITU Radio Regulations.

Impact of the legislation on competition

The Act contains provisions that enable the Government to influence the outcome of spectrum auctions (and other price-based allocations) in a pro-competitive way. Sections 60 and 106 give the Minister the power to give written directions to the ACA in relation to limits to be imposed on the amount of spectrum that can be acquired by a person or persons.

This power has been used on several occasions. For example:

- in the 800 MHz/1800 MHz auction conducted in 1998, the Minister directed the ACA to impose limits that prevented bidders acquiring more than 2 x 15 MHz of spectrum in the 1800 MHz band. As well, 2 x 5 MHz in the 800 MHz band was 'reserved' for new entrants into the mobile telephony market (this 'reservation' was actually given effect through carrier licence conditions under the *Telecommunications Act 1997* rather than through a determination under section 60 of the Act);
- in the 3.4 GHz auction conducted in 2000, the Minister's bidding limits restricted bidders to a maximum of 67.5 MHz of spectrum in any area. Additional limits restricted Telstra to a maximum of 2 x 22 MHz in regional areas, and prevented that company from acquiring any spectrum in metropolitan areas; and
- in the 2 GHz ('3G') auction conducted in 2001, the Minister directed the ACA to impose limits that prevented a bidder from acquiring more than 2 x 15 + 5 MHz in State and Territory capitals and 2 x 10 MHz in regional areas.

These provisions have worked well. As intended, they resulted in increased competition and new entrants in Australian communications markets. They offer sufficiently flexibility to enable the Government to tailor and pursue policies to suit particular circumstances. (The provisions can be supplemented by imposing 'use it or lose it' licence conditions to reduce the risk of anti-competitive hoarding of spectrum. Such a condition is being imposed for the forthcoming satellite licence auction.)

There are, however, no comparable provisions in the Act dealing with 'over the counter' or administrative allocations. It would be possible for a single licensee to acquire the entire spectrum in a particular band for its own use, simply by being first in line and applying for all the available spectrum. (Note that in the case of Low Power Open Narrowcasting services, however, the Minister has directed the ACA to impose a 'use it or lose it' condition on licences to prevent hoarding.)

The ACA has sometimes imposed its own restrictions on the amount of spectrum that a licensee may acquire under these circumstances. In trunked land mobile spectrum, the ACA developed 'loading' rules designed to prevent licensees acquiring additional licences until their existing systems reached a certain traffic level. The rules were introduced to prevent hoarding of spectrum given the relative shortage of spectrum in these bands and the difficulty we had in finding new channels for licensees. Another example is in the 3.4 GHz band. In issuing apparatus licences before that band was

auctioned for spectrum licensing, the ACA restricted licensees to a maximum of half of the band in any one location.

The ACA has no evidence that the absence of any power for the Minister to impose competitive limits on administrative allocations has caused any harmful effects on market competition. However, this is a matter that the Commission may wish to seek other views on.

The Commission has asked whether the Act is effective in controlling market dominance and increasing competition. Apart from the Minister's powers, it is not clear that the Act is (or should be) well suited to pursuing this objective — it can be argued that the promotion of competition is better handled at the level of general trade practices legislation rather than specifically through the Act. (Note that the *Trade Practices Act 1974* applies to the issue of radiocommunications licences except those in the broadcasting services bands, but we are not aware that the ACCC has ever used its powers to stop acquisition of a licence.)

The ACA is not aware of any evidence that the operation of the Act is having a significant deleterious effect on competition in the Australian communications market.

The Commission has sought views on whether the Act affects competition between wired and wireless communication technologies. Beyond the obvious (and we would suggest inevitable) restriction that the limited supply of spectrum imposes on the freedom to implement wireless technologies, the system of radiocommunications legislation is unlikely to be a major factor influencing such competition. In general, costs imposed by spectrum regulation are usually small compared to the cost of acquiring equipment and building networks. Competition between wireless and wired technologies is more likely to be influenced by intrinsic factors related to the technology costs and capabilities.

The ACA does not believe that the Radiocommunications Act discourages innovation. Evidence of this can be found in the fact that Australian industry and consumers have access to a wide range of new wireless-based services, in a time frame consistent with better practice around the world. In a recent example, a US company providing a wireless based broadband technology, praised Australia's "very clever regulatory policy", noting that there are some innovative things that can be done with a small amount of spectrum as Australia allowed it to acquire[11]. The ACA has acted relatively quickly to make spectrum available to support new systems and services (witness for example the auctions in recent years of spectrum for third generation mobiles (3G), LMDS, and 3.4 GHz for broadband fixed wireless access) — the ACA's record in this regard stands up very well internationally.

In fact, the Australian system of spectrum management is one of the more innovative in the world. It is predicated on principles of technology neutrality and openness to change. Spectrum licensing aims to provide the maximum scope for licensees to be innovative in using spectrum. As well, spectrum pricing is designed to provide incentives to spectrum users to adopt more efficient technologies and systems.

[11] ArrayComm quoted in the New York Times, 2 April 2001.

A possible factor tending to discourage innovation is the length of time it takes for new applications to have spectrum allocated to them through international processes. The ITU WRC cycle currently lasts three years, and it may take several cycles for agreement to be reached on significant changes to allocations. This is not something, however, that is directly under Australian spectrum management control, nor is it something that affects only (or mainly) Australia. However, Australia does need to continue to push for reform of the ITU to ensure institutional support for innovation as far as is practicable.

As explained earlier in this submission, spectrum clearance is difficult and contentious, and this could discourage innovation. In the lower frequency (and more readily useable) bands there is very little spectrum remaining unallocated. If spectrum managers are to find additional spectrum to accommodate new services, they will therefore usually either have to find ways that spectrum can be shared or seek to move existing services out of a band. Often sharing is not possible.

Notwithstanding any impacts on innovation, the ACA believes that the current clearance arrangements represent a reasonable balance between the rights of incumbents and the need to encourage new uses of the spectrum.

The effectiveness of the ACA

The ACA uses a range of indicators to assess its performance. The performance indicators include:

- subjective, qualitative indicators (eg. new radiocommunications services not unnecessarily impeded by regulation);
- objective quantitative measures (eg. the extent of spectrum managed through spectrum licensing);
- assessment by clients (including by several surveys, which have consistently shown high approval of ACA work); and
- some limited international benchmarking (eg. comparing timing of allocation of spectrum in Australia and overseas).

The ACA also has a Customer Service Charter[12] that sets out the level of service its clients can expect from the ACA.

The ACA would welcome any suggestions as to how our performance measures might be improved.

The ACA believes that its own performance has met the standards expected of it by government and by users of the spectrum. We also believe that we are a leader, internationally, in management of the spectrum and that we enjoy that reputation amongst overseas spectrum management administrations.

An example of this is the new licensing arrangements for satellite-based communications introduced by the ACA in 1997. These arrangements were intended to support the more open telecommunications market place established by the

[12] The Customer Service Charter can be found at *http://www.aca.gov.au/authority/charter/csc.pdf*

Telecommunications Act 1997 as well as to facilitate the provision of ubiquitous services by a wide range of providers, many of which were new entrants to the Australian marketplace. While these new arrangements were originally regarded as novel by some commentators, they are now well accepted by satellite operators and service providers. Some overseas administrations have also expressed their interest in and sought advice about the ACA's space-based licensing arrangements for their own use.

We acknowledge that our position internationally in spectrum management has been facilitated by the flexibilities and market-based reforms provided in the Act. That said, we take some pride in our achievement in giving practical effect to economic principles in managing the spectrum, and changing traditional approaches from close control to facilitation.

Looking to the future

'Future proofing' the system of spectrum management so that it remains relevant and effective even in the face of rapid technological and market change is a major priority for the ACA. Flexibility, reliance on market signals, technology neutrality and extensive industry consultation are key elements in this, as is the need for us to keep abreast of technological developments.

Some commentators have argued that future technological change could see the end of 'spectrum scarcity'. Techniques such as ultra wide band radio or software defined radio could, it is argued, drastically reduce the need to have dedicated bands set aside for particular purposes. They could allow much greater sharing of the spectrum resource and reduce or even eliminate the need for individual licensing (though this would come at the expense of sophisticated processing power).

These developments, however, remain largely untested, both technically and commercially. Full commercial application is likely to be many years off. Nor is it yet obvious to what extent they could replace rather than complement 'traditional' radio systems. For the moment there is no evidence of any decline in the demand for spectrum as a result (indeed demand continues to increase). In the meantime, the existing spectrum management tools remain relevant and necessary.

Even if there is a technological revolution along these lines, it is not clear that new management tools will be needed. All that may be needed to handle ultra wide band radio systems, for example, may be an extension of class licensing. (This is not to argue that spectrum management and the ACA would not be affected. A possible outcome could be that there would be much less emphasis on ACA licensing work, but that additional resources may be required to monitor and resolve interference.)

Technological convergence might be a 'special case'. It is obvious that there has been a significant convergence between formerly distinct sectors such as computing, telecommunications and broadcasting. This trend is almost certain to continue.

Such convergence poses some interesting questions for governments and regulators. From the ACA's point of view, 'convergence' has been manageable. While it may

sometimes be difficult to say whether a particular service best fits into the broadcasting or telecommunications sector (datacasting is a case in point), these issues have been able to be handled through cooperation between relevant agencies. Similarly there has been good cooperation on issues surrounding 'quasi-broadcasting' services such as LPONs and HPONs, which could otherwise present jurisdictional problems.

As a general principle, there is advantage in standardising regulation across competing technologies and services. Yet governments do have different objectives for different communications systems, and these need to be carefully considered before regulatory arrangements are changed. As noted earlier in this submission, the appropriate regulatory structures (including the division of responsibilities between agencies) are a matter for the Government.

Australian Communications Authority
12 October 2001