

○ MINDING THE GAP(S) IN AUSTRALIAN SPECTRUM LAW

*Benoit Pierre Freyens, Department of Economics, University of Wollongong
Correspondence to Benoit Pierre Freyens: ben.freyens@anu.edu.au*

Achieving efficient spectrum management in the pursuit of the public interest was a key aspect of the legislative reforms enacted through the *Radiocommunications Act 1992*. However, the Act is unclear about the precise nature of the efficiencies to achieve and choices between different efficiency objectives are often dictated by the nature of the services, bands and market considered. This article argues that efficient spectrum policy can be furthered by crafting additional licensing regimes or expanding the possibilities of existing regimes. Despite successes in moving towards this goal, some legal rules still feed a pool of 'licensing gaps' that detract from the public interest they are meant to serve. The article discusses remedies to these gaps.

INTRODUCTION

Achieving efficient spectrum management was a central tenet of the legal reforms introduced in Australia, about a decade and a half ago, through the *Radiocommunications Act*. However, we do not achieve efficiency merely by auctioning off spectrum, in fact we regularly achieve the opposite when auctions lead to non-competitive market structures or withheld bandwidth due to revenue-maximising schemes (Hazlett and Muñoz 2009). So we need to know what we are talking about and how we can achieve it.

Spectrum law is unclear about the precise nature of the efficiencies to achieve. Should new licensing regimes be allocative efficient, productive efficient or dynamically efficient? An efficient licensing regime would ideally combine these three objectives but in practice they are often of mutually exclusive nature. Furthermore, choices between different efficiency objectives are often dictated by the nature of the services, bands and market considered. Thus, there is no straightforward solution to the efficiency conundrum.

This article argues that what the public interest needs most is achieving the flexibility to design optimal licences for selected efficiency objectives. Australia has experimented with flexible governance arrangements since the 1992 and later reforms. Hybrid licences have flourished within the administrative and open access approaches, albeit less so within the property rights approach where the regulatory discretion to craft dynamically efficient sub-regimes is transferred to the licensee.

Hence, some of the legal rules embedded in the trichotomic licensing structure¹ of the 1992 reforms have helped deploy a wider array of governance instruments to fine-tune the needs of users and better respond to the opportunities of new technologies. But at the same time, other legal rules stemming from the same set of legal reforms feed a pool of 'licensing gaps' that detract from the public interest they are meant to serve. Other gaps in spectrum management regime also originate in the failure of licensees to make a productive and dynamic use of their licensing rights. Thus, although the 1992 reforms have undoubtedly led to better spectrum governance, there are still untapped sources of efficiency improvements, which are weighing heavily on current issues such as spectrum licence renewal, digital dividend allocation, and rolling out the wireless

segment of the National Broadband Network. This article reviews these policy gaps and suggests a combination of legislative amendments and strategic licensing decisions as remedy.

MAPPING LICENCES TO GOVERNANCE REGIMES

Australia’s current set of three radiocommunication licences dates back largely to the 1992 reforms. A few subsequent amendments in 1995 and 1997 modernised apparatus licences, authorising licence transfer and third party operations, along with spectrum reallocation processes and other policy novelties. The three licensing regimes enabled by the Act have seen little change ever since. The last significant alteration was a multi-year consolidation process among class licences started in 2000 and completed in 2008. Table 1 compares the key characteristics of Australia’s three licensing regimes.

Licence type	Technology Flexibility	Service Neutrality	Rights Exclusivity	Rights Assignment
1. Apparatus licence	No	None	Medium to High	Variable
2. Spectrum licence	Yes	High	Very high	Auctions
3. Class licence	Yes	High/Low	None	None

Table 1 Licence types by key attributes

Hence, apparatus licences are very prescriptive and highly controlled by the regulator; spectrum licences are technically designed by the regulator but legally managed by the licensee with much discretion, whereas class licences are also highly flexible within the boundaries established by industry standards. As suggested in Table 2 there is, conceptually, a much wider array of spectrum management approaches available to policy makers (Freyens 2007, ITU 2007, Pogorel 2007, CEPT 2009, Freyens 2009), depending on the degree of exclusivity of the licences, the pricing procedures for licence assignment, and the discretion granted users for a variety of decisions ranging from services selection, technology deployment to the design of rules to coordinate transmissions and control interference. Only the regulator would have the expertise and legal capacity to decide on the right balance between these regimes, although crucial economic data on the costs and benefits of each regime is often lacking.

There have been earlier attempts by ACMA to suggest legal reforms towards a single licensing regime under the Act, which would allow the regulatory agency to tailor its licences to the needs of users as new services and technologies emerge. As Table 2 suggests, there are at least about 20 different ways to manage spectrum allocation and interferences (and potentially many more). A wider array of approaches contributes to the efficiency and public interest objectives of the Act. In particular, such a discretionary approach would allow ACMA to fine tune flexibility-certainty dilemmas amongst spectrum and apparatus licensing regimes.²

The bespoke approach was never seriously considered beyond ACMA’s policy branches, but Australia’s practical approaches on the ground reveal that some of these conceptual approaches have been used in Australia for some time. However Australia’s trichotomic licensing structure does not reflect these developments on the ground. Australia’s practical experiments with hybrid

spectrum management regimes are only authorised under the Act through legal provisions allowing ACMA a significant degree of discretion in designing apparatus licences.³

Regime	Technology Flexibility	Service Neutrality	Rights Exclusivity	Rights Assignment	Club Membership	Rules Control
1. Standard C&C	No	None	Low	Adm. price	-	GM
2. Pure property rights	Yes	High	High	Auctions	-	NG
3. Privately run commons	Yes	High/Low	High/Low	Auctions	Yes	SC
4. Private parks (co-ops)	Yes	High	High	Auctions	Yes	SC
5. Monitored easement	Yes	High	Moderate	Auctions	-	GM
6. Common pool (Benkler)	Yes	High	Collective	No assign.	Yes	SC
7. Public parks-open access	No/Yes	Moderate	Collective	No assign.	No	SC
8. Device-specific parks	No	None	Collective	No assign.	No	GM
9. Quasi property rights	Yes	None	High	Auctions	-	SC
10. Market-run easement	Yes	High	Moderate	Auctions	-	NG
11. Managed commons	Yes	High	Collective	No assign.	Yes	GM
12. Libertarian Open access	Yes	High	Collective	No assign.	No	SC
13. Collective C&C	No	None	Collective	Adm. price	No	GM
14. Open access C&C	No	None	Collective	No assign.	No	GM
15. Controlled easement	No	None	Moderate	Auctions	-	GM
16. Eased C&C	No	None	Low	Market pricing	-	GM
17. Flexible C&C	Yes	Moderate	High	Market pricing	-	GM
18. Flexi-eased C&C	Yes	Moderate	Moderate	Market pricing	-	GM

Table 2 Spectrum management regimes by key attributes

GM refers to Government managed; NG to Negotiated under the legal system; SC to Self- or community-controlled.

Source: updated adaptation from the arguments presented in Freyens (2007; 2009) and Pogorel (2007).

Decentralised C&C approaches have seen a fair bit of activity in Australia. Not all apparatus licences fit the stereotype of an arch-rigid management regime ruled by government-fiat. There

is no shortage of demand for regimes providing both rights certainty and some degree of service or technological flexibility in Australia and although spectrum licences are one way to meet this need, some versions of the apparatus licensing regime have provided alternatives in some areas.

Mapping licences to practical management regimes on the ground also reveals gaps between theory and practice. Some of these gaps arise from prescriptive provisions in the Act, whilst other gaps stem from an economic incentive problem. The article discusses each of these gaps and suggests some legislative amendments. The limits of conducting multi-regime policy equipped only with a trichotomic licensing structure constrain ACMA in its quest to allocate spectrum to its highest value while serving the public interest. Spectrum licences are too exclusive and unaffordable for many users, class licences are too restricted to low power services, and apparatus licences are generally too prescriptive and provide little certainty to licensees. These limitations warrant legislative reforms in some areas of licensing policy: the degree of exclusivity in property rights need to be adjusted to increase the dynamic efficiency of spectrum-licensed bands, and the degree of certainty in apparatus licences needs to be adjusted in some areas to create conditions favourable to long-term investment decisions

MINDING THE GAPS: UNAUTHORISED AND DORMANT REGIMES

Are there really gaps between these practical approaches and the conceptual regimes of the bespoke model, and do these gaps matter? Finding significant gaps in one of the most advanced reform countries with a decade and a half of ongoing flexible experimentations to its credit might not be a trivial exercise. Yet several important conceptual licensing regimes are not emerging in Australia under the current set of legal rules. These ‘gap regimes’ can be separated into two types; those prevented by legal rules, which are concentrated on the spectrum licensing / property rights quadrant, and those enabled by legal rules but inhibited by other factors, which apply both to spectrum licensing and apparatus licensing regimes.

Gaps in the policy continuum arise quite expectedly from the high degree of exclusivity and legal protection granted spectrum spaces. Spectrum licensing is essentially a ‘package’ of rights and obligations over which ACMA has little power to make variations under the Act. RALIs (Radiocommunications Assignment and Licensing Instructions), Administrative band plans and legislative band plans would not normally apply to spectrum licences and various sections of the Act make sure spectrum licences will not become a future laboratory for testing as yet unknown governance regimes. This high degree of protection enables a higher level of certainty in rights and usage. Yet, the matter of experimenting with new types of property rights models has been frequently discussed by academics and policy analysts in the last few years. There are high hopes for some of these regimes, which are briefly discussed below.

(I) MONITORED EASEMENT

In 2003, economists Gerald Faulhaber and David Farber suggested a ‘fee simple ownership with non-interference easement’ to solve the property right / shared access dilemma that was gripping the policy debate in the US (Faulhaber and Farber 2003). In the easement regime, primary licensees (‘owners’) have clear broadcast rights but secondary users (unlicensed or differently licensed users) may use the band so long as they never purposely interfere with the owner’s transmission and reception rights. Compliance is enforced through identification signals and compensation

schemes for owners' monitoring costs. Wayne Leighton suggested the model could fit high-power band-hopping services referred to as 'elephants' and low-power spread spectrum services, referred to as 'fruit flies' (Leighton 2004, Freyens 2009). Faulhaber and Farber, who are strong advocates of the property rights approach, saw much promise in this approach and summarise it in these terms:

'...economists have favoured a market-based regime, while engineers have favoured a commons-based regime to promote new technologies. We show that there is a property rights market-based regime that can unleash the power of the market and unleash the power of the new technologies to efficiently allocate spectrum that is likely to meet our needs for the near future.' (Faulhaber and Farber 2003, 220)

The idea of allowing non-interfering easements or at the very least some form of co-existence formula for apparatus licences within spectrum-licensed spaces seems to have been explicitly considered by ACA in its 2001 submission to the 2002 Review of Radiocommunications:

'If the distinction between the two licence types [apparatus and spectrum] were retained, there may be a need to consider some incremental changes to the Act. Currently there is a prohibition in the Act (s. 105) against issuing apparatus licences in a spectrum-licensed 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...There would be merit in considering whether this prohibition needs to remain.' (ACA 2001, 13)

For reasons discussed earlier in this paper, this suggestion would have met with some degree of resistance among spectrum licence stakeholders. Yet, the conversion of apparatus licences into spectrum licences under s.38 of the Act has raised a number of intricate legal and technical issues such as 'Swiss cheese' effects and dealing with the conversion of multiple apparatus licences over multiple geographic areas (discussed at full length in ACA 2001, 25, and Productivity Commission 2002, 133-136). These issues have only been partially remedied by the 1997 amendments to the Act, which introduced spectrum re-allocation mechanisms.

Furthermore, the easement question also directly relates to the matter of allowing non-interfering class licensed services into spectrum spaces. Given that class licences operate rather successfully on non-interfering conditions in apparatus licences bands, why would that option not be available to them in spectrum-licensed spaces as well? The mere issue of whether the Act actually does prevent such secondary usage for class licences is in fact quite open to interpretation. The Productivity Commission notes that:

'...there is uncertainty about the ACA's ability to issue class licences over the same frequency as spectrum licences. Although technically possible, legal considerations may arise if spectrum licences had been marketed as exclusive rights to particular bands.' (Productivity Commission 2002, 98)

As stressed by the Productivity Commission (2002), the Act does not provide clear-cut advice on this matter and consequently opportunities for dynamic and productive band usage are being squandered. In the meantime, and wherever possible, ACMA has shifted the load of allowing high-demand class licensed services to apparatus bands (e.g. numerous UWB services such as imaging or ground-breaking radar under scientific licences). Yet, ACMA will not be able to do this indefinitely. If the portion of the total spectrum occupied by spectrum licences is called to grow, as is frequently commented in Australia, the squeeze on new high tech services will become unbearable. In its 2002 Inquiry, the Productivity Commission encouraged the ‘early’ resolution of this issue, in a manner that will facilitate the efficient use of spectrum, and respects the rights and flexibility of spectrum licensees. Little has happened in the meantime.

Although they are not specifically authorised under the Act, there are several other efficiency-enhancing licensing options, which would require relatively minor amendments to the Act to be operational. In fact, some of them, such as the first two below would probably work with the sole use of new subordinate legislative instruments.

(II) PRIVATELY RUN COMMONS

A private commons is a property right regime in which the spectrum owner or owners authorises collective usage of the band by third parties. Users become members of the private commons upon acquitting an owner-set fee and committing to follow general management rules set by the owner, and specific rules set by the collective of users. Once users are authorised into the band they can use the entire spectrum band, and transmission interferences would be governed by sharing and etiquette rules defined among users based on the types of compatibilities in equipments and technologies deployed. Power limits could be regionally specified to allow higher power in low-density regions. Owners manage overcrowding and congestion through club entry and exits. In this way, spectrum remains in private hands but coordination and management follow rules more similar to those of a quasi-commons.

Both spectrum licences and apparatus licences allow the creation of private commons through third party authorisation rules, although exclusive rights under the apparatus regime are not equivalent to private property rights. For this and other reasons, spectrum licensing offers considerably more scope to develop private spectrum commons than apparatus licences.

First, spectrum-licensed spaces typically consist of much larger spectrum bands than most apparatus licences do. Second, spectrum licences offer more fluid conditions and independence to redefine use and technology both spectrally and geographically, and they also permit spectrum subdivision. In addition, spectrum licences are not bound by the constraints imposed by the Spectrum Plan and frequency band plans.⁴ Arguably then, spectrum licences provide the only obvious environment in which to develop private spectrum parks. Despite an overt regulatory preference for flexible, technology-neutral approaches, the privately run commons has not been exploited in Australia so far and there is as yet little to suggest it will arise freely from the unfettered operations of property rights approaches.

(III) PRIVATE PARKS

In February 2006, ACMA submitted a specific version of the privately run commons licensing model for consultation with wireless access services (WAS) stakeholders (ACMA 2006a). The suggestion was to issue ‘private park’ licences specifically designed to accommodate WAS. Dy-

dynamic access, technical band efficiency, black spots and competitive delivery had become major issues for these services, and there were clear indications the spectrum licensing regime may not be suitable to address them. Future WAS needs required a service-neutral regime authorizing any number and type of interoperable base stations in a licensed space with band coordination undertaken by users – in short a regime combining aspects of spectrum and class licensing.

The private park licence is a membership-based, fee-based approach, which keeps most aspects of the privately run commons described above, relying on device registration and self-coordination rules by users. However the private park is somewhat closer to class licensing than the privately run commons regime is. On the one hand, ACMA (not a band owner) directly issues the shared-use licences to users. Furthermore, devices would be expected to use dynamic frequency selection techniques in the manner of class-licensed devices. Finally, there would be no seniority privileges, and no ‘hard’ licence boundaries – although base stations would have to be sited within the geographical area of the licence.

The private park approach also differs from the privately run commons through user discrimination; prime licences would be issued in short numbers and would cover nation or state-wide services, inclusive of high-density areas. Prime licences would govern high-value (urban) spectrum and would be auctioned. Secondary licences would be sold for a moderate fee, restricted to low density regional and remote areas, and would be issued in much higher numbers (potentially unlimited). Further tiers could be defined as fitting the circumstances addressed by the licence.⁵

The private park regime resolves the current crowding out of small, regional operators by large carriers operating in spectrum-licensed spaces through a different mechanism than the easement. Here the regime forces users of similar size and background to coordinate and self-manage their services on different geographical spectrum-licensed spaces within the band. Stakeholder feedback was mixed, with many WAS providers generally wary of new licensing techniques (ACMA 2006b, 2006c).

As with spectrum licensing, policy-makers currently have very poor visibility with respect to stakeholders interests and incentives and further behavioural research would be warranted. Anyway, ACMA’s commitment to the private park as a dynamically-efficient response to future WAS needs is firm, and has been re-iterated in the 5 year Spectrum Outlook 2009-2013 document (p. 115). It is thus likely that some form of privately run WAS commons will take place in some not too distant future in Australia, but for this alternative to succeed ACMA may first need to develop a better capacity to understand the motivations and expectations of spectrum users.

(IV) MANAGEMENT RIGHTS

Another variant on the private licensing model is the management rights⁶ approach. Here, instead of authorising third parties on a technology-compatible park under shared access rules, the owner (the ‘band manager’) uses sections s.68 and s.85 of the Act to carve the spectrum-licensed space into different geographic or frequency rights subdivisions. The band manager then sub-leases or sells these portions of spectrum-licensed space for sub-licensees to use as they please subject to the general conditions governing the spectrum-licensed space. In a way, this regime could be referred to as ‘sub-spectrum licensing’, and it is the mainstream property rights approach adopted in New Zealand.

Although some owners of the 3G spectrum licences in the 2 GHz band (e.g. Telstra) have allowed different services and technologies to be deployed under these conditions within their

space, the number of authorised third party usages remains low.⁷ Paradoxically, despite the lesser suitability of apparatus licences for this type of spectrum management model, the band management regime may have historically seen more take-up by Government users such as the Department of Defence under section s.114 of the Act, particularly in the land mobile bands (Productivity Commission 2002). As with the privately run commons option, the provisions for its use are present in the Act but it is not widely exploited, which suggests a lack of market incentives.⁸

(V) MARKET-RUN EASEMENTS

For most advocates of a property rights approach to spectrum management, having the government enforce easement rights to secondary users (regime 5 discussed above) and govern interference management through regulation simply violates what property rights and markets are really about. Instead, these arrangements should come out naturally from the freedoms and flexibilities granted spectrum owners. If some segments of private spectrum continuously lie fallow for any reason and there is demand for these segments, owners will realise the value of this idle spectrum by exploiting their rights to subdivide their band and sell the resulting lots to the highest bidder (making an ‘assignment’ under s.85 of the Act).

Alternatively they might allow secondary users to access their active bands for a fee whenever they do not use them (Third party authorisation under section s.68 of the Act). After all, this is what spectrum licensing is all about; letting market forces determine the best usage by setting the private value of spectrum (a revealed preference approach in economics jargon).

However, this immense potential for efficient spectrum allocation through market exchange is not being fulfilled in Australia. In most spectrum-licensed spaces, usage of huge, high-value bands remains confined to a single user and very few services. The reason for this disappointing take-up is not well known at this stage and the issue begs further research. One possible explanation is that owners of spectrum-licensed spaces are more concerned with their core business than with the further exploitation of their spectrum inputs. Perhaps, this has to do with the complexities of the technical frameworks designed to manage interferences, or restricted visibility about the benefits of spectrum trading.

(VI) FLEXI-EASED C&C

In the section ‘flexibility of apparatus licences’ of its 2002 Inquiry Report (p. 94-95), the Productivity Commission notes that legislative amendments enacted upon proposals from the SMA and later ACA had permitted various market mechanisms to be used in the management of apparatus licences, including licence trading, third party use and allocation by price mechanisms.⁹

Yet, because apparatus licences are site-based, and cannot be subdivided nor merged in terms of geographic areas or in terms of bandwidth, the 2002 Inquiry concluded that apparatus licences ‘generally remain highly prescriptive and inflexible with respect to changes in spectrum use and new technologies’ (p. 95). Licensees seeking a change of location, bandwidth, technology or service for their licence can only do so through ACMA, which is a further restriction to free flowing allocation mechanisms.

Service prescription is a central feature of most apparatus licences, but there are exceptions. As discussed in one of the case studies, ACMA has since 1992 issued technologically-neutral PTS apparatus licences for GSM services in the 900 MHz band. This regime offers similar practical

degrees of flexibility as spectrum licences within the constraints of an apparatus licence. It is classified as Flexi C&C rather than Flexi-eased C&C because ACMA will not in practice authorise an easement for class licences on GSM bands.¹⁰ Yet, since the GSM bands are licensed under an apparatus regime, nothing in the legal rules would prevent non-interfering easements for secondary users if ACMA had to revise its position as circumstances change and favour such an arrangement, which illustrates the type of governance efficiency gained amongst some apparatus licences.

RECOMMENDATIONS: A NEW SET OF REFORMS?

Amending the Act raises a number of strategic questions. What are the limitations in the Act if the regulatory agency wishes to proceed with a new set of spectrum management regimes and what sort of legislation would be needed? Would it be enough to amend current licensing models, and how? Or should the current regulatory framework be expanded to introduce other licensing categories?

These questions first beg determining which types of Australian licences are currently better conducive to efficient spectrum governance. Taking stock from Australia's past experience this may surprisingly prove to be apparatus licences. Under the Act, ACMA has used apparatus licensing much more extensively than any other approach to tailor its approaches beyond the apparent set of options presented by the trichotomic licensing structure. As discussed in earlier sections of this paper, this facility has enabled very different practical regimes to unfold.

Counter-intuitively, the most promising avenue for apparatus licensing is not necessarily a large scale move away from highly prescriptive regimes towards e.g. a Flexi-C&C model. Completely redesigning apparatus licensing would be a huge task, would be very disruptive for many services (e.g. narrowcasting) and would be entirely inappropriate for others (e.g. fixed links). However, wherever possible, ACMA may want to exercise further its discretionary power to allow a wider variety of more flexible apparatus licensing options to unfold. The licensing arrangements in the 400 MHz band (mainly land mobile) and in the 900 MHz band (mainly GSM) provide an illustration. For instance, the Act could be amended to encourage more allocative efficiency in narrowband applications. Or the Act could be amended to allow the apparatus licensing regime to grant more legal certainty to GSM licensees, which in turn might encourage investment in new technology networks. Such amendments could expand the potential of apparatus licensing well beyond the flexible regimes currently experimented.

Although apparatus licences are already conducive to a tailored licensing approach, spectrum licences by contrast are not. Spectrum licences currently constitute a very monolithic regime under the Act. They occupy large portions of spectrum in very exclusive ways. Although spectrum licences were designed as a tool to remove market barriers, the large spectrum-licensed spaces they control are too often dictated by the 'spectrum-guzzling' technologies deployed on them. How could licensees be expected to subdivide and trade quantities of spectrum that they need in large amount to guarantee the workability of their technical frameworks? Under these conditions, the main alternative available to increase the yield of spectrum-licensed spaces is to allow non-interfering secondary usage such as by low-power, spread-spectrum or UWB devices.

Reforms should allow secondary usage rights for class licences with low interference potential within spectrum-licensed spaces – in order to improve the productive efficiency of spectrum licences. This will restrict the property rights of spectrum licences and would accordingly be ex-

pected to lower the proceeds from spectrum licence auctions.¹¹ However, these losses should be more than offset by the economic value of enabled technological development and increased band usage in high-value spectrum-licensed spaces. To the extent that proceeds from auction are a transfer from band users to the government whereas improved non-interfering band usage corresponds to a productivity increase, the gains to the public interest are straightforward.

These concessions in the extent of the property rights assigned to spectrum licensees could also be compensated by allowing a presumption of renewal in the public interest – in order to increase the certainty of spectrum licences - thus increasing the potential value of licences and mitigating the lower licence value incurred through enforced easements to property rights. Longer licence tenure such as 8 or 10 years should also be considered for some apparatus licences. Finally, new licensing regimes should be considered under the Act to reflect the growing disparities among apparatus licences, even if the above recommendations were to be acted upon.

Together, the reforms suggested in this paper will allow both spectrum and flexible apparatus licensing regimes to better contribute to economically efficient spectrum usage in technical terms (increased band usage), in dynamic terms (easier band access) and in allocative terms (migration of services towards market demand) through improved spectrum governance.

CONCLUSIONS

Through its apparatus licences, Australia has already started using a varied array of approaches in its practical management of radiocommunications. However, these experiments took place within the legal constraints of the trichotomic licensing model, under the Act. This expansion of the traditional control and command approach to encompass models that are more flexible has been successful but is still limited in scope. Although legal reforms have enabled several hybrid regimes to unfold, the current licensing framework still does not reflect the full extent of governance needs in practice, and the mismatch is likely to grow over time. Apparatus licences are generally too prescriptive and uncertain, spectrum licences are too exclusive and too general, and class licences are too restricted to short-range low-power applications. Australia needs an expanded regime toolkit not only to deal with its complex and diverse set of radiocommunications operations, but also to better address future and complex issues such as the allocation of the digital dividend, the governance of the National Broadband Network, and dealing with emergent technologies.

I suggested here that the potential for regime widening in Australia is largely concentrated in the spectrum licensing quadrant. Although spectrum licensing is the most service neutral regime in Australia, it is also currently the most protected regime under the Act, and therefore the most difficult to tailor to meet the competitive needs of different types of users. This high degree of protection implies that several variants of the spectrum licensing regime are either forbidden by legal rules, or enabled but overlooked, lacking the right incentives for their exploitation by private operators. Legal reform could remedy this situation by allowing greater activity rates and secondary usage in spectrum-licensed spaces. The consequent reduction in the property rights enjoyed by spectrum licensees could be compensated by a certainty of licence renewal. After all, if a productive use of spectrum-licensed bands can be guaranteed, there remains little reason for ‘use-it-or-lose-it’ clauses at licence renewal. A simultaneous increase in the level of certainty and flexibility for apparatus licences would move in a similar direction. This two-pronged approach

(less exclusivity, more certainty) offers a promising way to maximise both economic and governance efficiency in spectrum policy.

ACKNOWLEDGMENTS

Parts of this paper proceed from a research report on radiocommunications policy recently prepared for the Australian Communications and Media Authority. The views and interpretations presented here are my own and do not necessarily represent those of ACMA. All errors of fact are also mine. I am grateful to Mark Loney, Michael Poole, Tony George, Alan Jordan, and several legal experts at ACMA for a thorough revision of the facts surveyed by the paper and a large number of comments and corrections, which greatly benefited the paper. Again, these corrections were provided independently of the views expressed in this paper, and these persons should not be assumed to support or endorse its recommendations. I also acknowledge the feedback of two anonymous referees, which led to substantial revisions.

ENDNOTES

- 1 Trichotomy’ refers to the division into three parts. There are three types of radiocommunications licences in Australia: spectrum, class and apparatus licences.
- 2 For a fuller discussion of earlier attempts to develop a bespoke licensing approach see (Freyens 2010).
- 3 In practice, ACMA also has some degree of discretion in designing class and spectrum licences, but for various reasons, it has been much less used to define and authorise new spectrum management regimes.
- 4 However, if the services produce inter-country interferences they must be stopped. The potential for this situation is low given the country’s geographical isolation.
- 5 In its proposal, ACMA suggests a three tiered approach; business class (auctioned), economy class (over the counter for a fee) and discount economy (open access) – see Appendix D, p.51 (ACMA 2006a).
- 6 The term ‘management right’ refers to New Zealand’s approach to property rights licensing in which a manager acquires rights to a large spectrum space, which can be subdivided and traded without government intervention. In Australia, this regime is enabled through third party authorisations (s.68) and spectrum trading rules (s.85). Terminology can be confusing between Australia and New Zealand; e.g. ‘management rights’ corresponds to spectrum licensing in Australia, and ‘spectrum licensing’ in New Zealand correspond to ‘device registration’ in Australia.
- 7 ACMA does not collect information on third party authorisations. Existing evidence relies on community consultations, inquiry submissions, case studies and word of mouth. ACMA has recently issued a discussion paper with an extensive list of possible barriers to trade and third party authorisations (ACMA 2008).
- 8 I note here that this incentive problem is not well understood nor seems to have been much investigated, and further research on the failure of spectrum owners to exploit this potential source of income would be warranted.
- 9 Those amendments came through various amendments to the Act such as the *Communications and the Arts Legislation Amendment Act 1995*, *Radiocommunications Amendment Act 1997* and the *Radiocommunications Legislative Amendment Acts 1997 and 2000*.

- ¹⁰ The only known exceptions consist of easements for some point-to-point apparatus licences on off-shore islands.
- ¹¹ However, there is recent econometric evidence that this needs not always be the case (Hazlett 2008).

REFERENCES

- Australian Communications Authority, 2001. 'Submission from the Australian Communications Authority to the Productivity Commission review of the Radiocommunications Act and the role of the Australian Communications Authority.' Australian Communications Authority, October 2001, Canberra/Melbourne.
- Australian Communications and Media Authority. 2006. 'Strategies for wireless access services: Spectrum planning'. Discussion Paper SPP 1/06, Australian Communications and Media Authority, Canberra / Melbourne.
- Australian Communications and Media Authority. 2006. 'Strategies for wireless access services: Spectrum access options – consultation outcomes'. Spectrum Planning Discussion Paper SPP 08/08, Australian Communications and Media Authority, Canberra / Melbourne.
- Australian Communications and Media Authority. 2006. 'Strategies for wireless access services: Spectrum access options'. Discussion paper SPP 10/06, December 2006, Australian Communications and Media Authority, Melbourne / Canberra.
- Australian Communications and Media Authority. 2008. Spectrum trading: Consultations on trading and third party authorisations of spectrum and apparatus licenses. Australian Communications and Media Authority, 18 November 2008, Commonwealth of Australia.
- Electronics Communications Committee (ECC) of the European Conference of Postal and Telecommunications Administrations. 2009. 'Light licensing, licence-exempt and commons'. ECC Report Nr 132, June 2009, Electronics Communications Committee (ECC) of the European Conference of Postal and Telecommunications Administrations, Moscow.
- Faulhaber, Gerald R.; Farber, David. 2003. 'Spectrum management: Property rights, markets, and the commons'. in L.F. Cranor and S.S Wildman (Ed.), *Rethinking rights and regulations: Institutional responses to new communication technologies*, MIT Press, Cambridge, MA.
- Freyens, Benoit Pierre. 2007. The economics of spectrum management: A review. Accessed 28 April 2009 at: http://www.acma.gov.au/WEB/STANDARD/pc=PC_311025.
- Freyens, Benoit Pierre. 2009. 'A policy spectrum for spectrum economics'. *Information Economics and Policy* 21: 128–44.
- Freyens, Benoit Pierre. (forthcoming 2010). 'Licensing options for digital dividend spectrum'. in G. Faulhaber, G. Madden and J. Petchey (Ed.), *Regulation and the economic performance of communication and information networks*, Edward Elgar, Cheltenham.
- Hazlett, Thomas W. 2008. 'Property rights and wireless license values'. *Journal of Law & Economics* 51: 563–98.
- Hazlett, Thomas W; Muñoz, Roberto E. 2009. 'A welfare analysis of spectrum allocation policies'. *RAND Journal of Economics* 40 (4): 24–54.
- International Telecommunication Union. 2007. 'Beyond licensed vs. Unlicensed: Spectrum access rights continua'. Document SMIS/07, 10 January 2007, Workshop on Market Mechanisms for Spectrum Management, International Telecommunication Union, Geneva.
- Leighton, Wayne A. 2004. 'Models for spectrum allocation: Which is most efficient, and how do we achieve it?' Proceedings of the 15th Biennial Conference of the International Telecommunications Society, Berlin, 5–7 September.

Pogorel, Gerard. 2007. 'Regulation and competition: Nine regimes of radio spectrum management: A 4-step decision guide'. *Communications et Strategie* 65: 167–183.

Productivity Commission. 2002. 'Radiocommunications: Inquiry report'. Report Nr 12/2002, AusInfo, 1 July 2002, Productivity Commission, Canberra.

Cite this article as: Freyens, Benoit Pierre. 2010. 'Minding the gap(s) in Australian spectrum law'. *Telecommunications Journal of Australia*. 60 (1): pp. 6.1 to 6.13. DOI: 10.2104/tja10006.