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# LEGAL ISSUES SURROUNDING SPECTRUM AUCTIONS

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## INTRODUCTION

On 1 July 1993 the *Radiocommunications Act 1992* (Cth) ('the Act') came into force, providing the legislative basis for major reform of spectrum management in Australia. As part of that reform the Act expressly recognised, and facilitated, the use of economic principles in spectrum management. Thus, the first of the objects of the Act is 'to maximise, by ensuring the efficient allocation and use of the spectrum, the overall public benefit derived from using the radiofrequency spectrum'. The word 'efficient' in that provision has been interpreted as incorporating both economic and administrative efficiency.

The clearest example of the application of those economic principles was in sections 60 and 106 of the Act, which provide for the 'price-based allocation' of spectrum and apparatus licences respectively. Neither the Act, nor the explanatory material surrounding its passage through the Parliament, give any guidance as to the meaning of the phrase 'price-based allocation'. But the use of the phrase by the Parliamentary drafter acknowledges that the provision is concerned with the allocation of a public resource through a licensing mechanism, and that there is no 'sale' of licences. Rather, the issue of a licence is the conferral of a limited right via the exercise of a statutory power and, once issued, apparatus licences are subject to express powers of the Australian Communications Authority ('ACA') to vary their conditions, or to suspend or cancel them altogether. In the case of spectrum licences, however, the position is a little less clear. Whilst still not expressly recognising the concept of property in spectrum licences, the Act has regard to the High Court of Australia's wide interpretation of the concept of property in relation to placitum 51(xxxi) of the Constitution, so as to require the Commonwealth of Australia to pay just terms for its acquisition of a wide range of choate and inchoate rights. Accordingly, the Act contains a scheme for resumption of spectrum licences by the ACA 'on just terms'.

The phrase 'price-based allocation' is not defined in the Act, although section 60 does provide some indication of the procedures it contemplates in referring to price-based allocation of spectrum licences by means of auctions, tenders, pre-determined and negotiated price. The underlying economic rationale of such provisions is, of course, that resources should be allocated to the highest value user, and price-based allocation is the mechanism by which the ACA identifies the highest value user of spectrum, and so achieves that economically rational result.

## OPTIONS FOR ALLOCATION METHOD

The Act clearly contemplates that the ACA could allocate licences by means of auction, tender, pre-determined or negotiated price, yet the ACA has thus far used auctions as the primary means of price-based allocating to the exclusion of the other potential mechanisms. Since the Act was passed tenders have been rejected as an approach to price-based allocation because it has become clear that the nature of what is being allocated makes tenders impractical. This can be illustrated by examining the allocation of the MDS bands in Australia, which were widely regarded as being particularly suited to the delivery of pay-TV services. Broadly speaking, there were 19 channels to be allocated in the major population centres of Australia and, because of the nature of the services, the radiocommunications licences for each channel had to be subject to the identical technical conditions. Thus, transmitters had to be co-located within a 500 meter radius of each other, had to be operated at the same power, and with antennae having the same polarisation etc.

To this extent, therefore, the licences were homogeneous, and so at first sight would appear suitable for allocation by tender. However, in practice the value of the licences to any potential licensee depended very much on the number of licences that the licensee ultimately won in any particular area. This is because in a pay-TV context each channel would be used for a different type of service. To attract customers it is necessary to be able to offer a range of services – say a sport channel, a news channel, a a childrens' channel and a movie channel. So for a potential pay-TV operator the value of any particular channel increases or decreases with the number of other channels held in any particular area. Similarly, potential audience reach has a

major impact on financial viability. A pay-TV operator with licences in both Sydney and Melbourne has a potentially larger audience, and so a potentially larger revenue base. As a result, it can acquire more attactive programming, and so increase its revenues and profits; the value of each licence increasing in proportion to its revenue-raising capacity.

To allow for such an outcome in a tender, where bidding is static, it is necessary to allow for what is known as combinatorial bidding. That is, bidders must be able to bundle licences together and submit bids for them as a unit. For example, a bidder might wish to acquire 9 licences in Sydney, and 15 licences in Melbourne and bid, say, AUS$50 million for that combination. The difficulty here lies in resolving conflicting combined bids, and the complexity increases with the number of channels and locations. In some cases, it is simply impossible to reconcile the conflicting combined bids. A tender also normally requires that a potential licensee generally speaking has to commit in advance to a single bidding strategy. It must identify its optimum 'bundle' of licences, and bid for those licences, and those alone. In the normal form of tender it is not possible for a bidder to change its strategy after submitting its bids and, if outbid on its preferred combination of bids, transfer its bids to another combination. As a result, it is possible that the tender will not deliver the optimum economically efficient result, as a bidder may be denied the opportunity to bid for a particular combination of licences, and so those licences may not be allocated to the highest value user. To attempt to deal with alternative bidding combinations on the basis of sealed written bids would be an impossible exercise.

A major obstacle to offering licences at pre-determined prices is that the ACA may well have only a limited understanding of the value of the licences. That knowledge is peculiarly within the purview of the various competitors for the licences, hinging on their business plans and the outcomes of the price-based allocations. Certainly, the predecessor of the ACA, the Spectrum Management Agency ('SMA') had no independent idea of the likely prices that would be paid for the MDS licences that were the subject of its first price-based allocation. The danger for the SMA in that case was that if it set the reserve prices too high the licences might not be allocated. In light of the trauma that followed the previous aborted attempt of the then Department of Transport and Communications to allocate those licences, such a result was simply unacceptable.

Another, and rather less obvious, danger in setting pre-determined prices is that they may cause purchasers to pay the incorrect price, because even they do not have the necessary information to properly value the licences. That is because the value of the licences may in practice not be known until such time as the licences are put into operation, and consumer sentiment established. Arguably this has already been demonstrated, again in relation to allocation of MDS licences. Following the allocation of the MDS licences in the major population centres, the SMA established a correlation between the value of the licences and the populations covered by the pay-TV services authorised by those licences. On the basis of those calculations, reserve prices were set for the smaller population centres and remote areas. Even though competition for these licences was thin, they were allocated in most cases at their reserve prices. However, in some cases the provision of services has apparently proved uneconomic, and some licence holders have surrendered their licences. This, of course, is a highly undesirable result. A major objective of the allocation of licences is to facilitate the early use of spectrum for the introduction of services. It could be argued that in these cases the allocations were economically inefficient, resulting in unnecessary transaction costs, and delays in the introduction of desirable services.

Negotiated price allocations would also potentially be at risk from either the ACA or the potential licensees, or both, having imperfect price information. More importantly, however, a negotiated price allocation would tend to be administratively inefficient as a means of dealing with a large number of buyers with competing requirements. If the negotiation is to achieve allocation to the highest value user, all negotiations would have to be conducted at the same time, so that the ACA could use the information as to price that it gains in one negotiation to inform itself in relation to the others, and to generate competition. With anything more than a small number of licences and a similarly small number of applicants, such

an approach could be an administrative, and commercial, nightmare.

A further major obstacle to using negotiated price systems is that it would be very hard in such a process to penalise the withdrawal of an offer to purchase by a potential licensee. Consequently, such a system would be open to abuse were one player in a market to seek to delay the introduction of new services by an existing or potential new competitor by prolonging the negotiations which, as mentioned above, would all have to be held contemporaneously. The number of lots or licences on offer at any one time would also rule out the use of negotiated price in many cases, as negotiation is far from the ideal method for dealing with large number of items at one time

## CHOICE OF ALLOCATION METHOD

There are a number of types of auction available to the ACA, the most familiar of which is probably the so-called 'English auction'. In such an auction lots are offered for sale sequentially, and bids are made by those wishing to purchase in ascending order. Bids accepted by the auctioneer cannot be withdrawn, and when bidding comes to an end the item is sold to the person for the price equal to the highest bid. English auctions have a couple of advantages. Firstly, both the seller and the buyers can observe each other's bids and bidding strategies, and that observation informs both buyers and seller. The buyers learn how far others value the property, and are able to adjust their own assessments of value as the auction proceeds. The seller learns what the true value of the asset is likely to be. Secondly, the result of an English auction is that the asset in question is demonstrably allocated to the person who values it the most. In economic terms a rational, and so desirable result.

One disadvantage of English auctions, however, is that they are amenable to collusion, and particularly so when auctions are conducted for similar items over a period of time. Distrust between potential rivals is a major obstacle to collusive bidding, and the use of sealed bid tenders is one way to discourage collusion. Once a sealed bid is lodged it cannot be altered, and a colluding bidder has to trust its rival/colleague not to renege on the collusion deal. But in an open outcry auction, colluding bidders can keep an eye on each other, and take steps to counteract a bid made in defiance of a collusion agreement. For that reason, it is 'safer' to enter into a collusive bidding agreement in an English auction.
The obverse of an English auction is a 'Dutch' auction, in which the auctioneer first announces a high price, and then announces a decreasing price until one bidder accepts one of those prices. The disadvantage here is that there is no information generated as between the bidders. No-one knows what others are likely to pay for the asset, and so each bidder relies solely on its own assessment of the value.

In both English and Dutch auctions the lots are offered sequentially, and this can give rise to economic inefficiencies where the lots are interdependent, either technically or commercially. In the example given above of the major centre MDS licence allocation in Australia, when bidding for the first licences offered in Sydney bidders knew neither whether they would obtain licences in Melbourne, nor the price of such licences as they might win. As a result the prices obtained by the SMA in total for both the Sydney and Melbourne licences were arguably lower than they would have been had the bidders been in a position to know whether or not they would obtain all the licences.

This problem is exacerbated in the case of spectrum licence auctions because of the nature of spectrum licences and the approach adopted to allocation. Spectrum licences authorise not the use of particular apparatus for a particular type of service at a point, or within a defined area, as do apparatus licences. Rather, they authorise the use of what is termed spectrum space, a three-dimensional entity bounded by geographic area, bandwidth and time. This spectrum space is allocated in the form of lots, which in fact comprise the smallest units of spectrum space that the ACA will permit to be traded, known as spectrum trading units, or STU's. Time is traded in spectrum licensing by means what is known under the Act as third party authorisation, and consequently the only units of spectrum that may be traded are defined by reference to geographic area and bandwidth. The bandwidth for STU's in any particular band are, generally speaking, uniform, and are set with a view to facilitating access to spectrum in bandwidths that will

readily allow for the type of service that the ACA considers is most likely to be introduced to the spectrum. The geographic area of STU's varies from area to area. In outback Australia the resolution is 3 degrees of arc, in rural Australia the resolution being 1 degree of arc, and in the metropolitan and regional parts of Australia where the population is most concentrated resolution is 5 minutes of arc.

Bidders for spectrum licences therefore bid for lots, which are the 'building blocks' for their licences, and the successful bidder on lots receives a spectrum licence which authorises that bidder to use the total spectrum space represented by those building blocks. As a result of this approach to the marketing of spectrum space, the lots at auction are interdependent in a technical sense, as a potential licensee needs to obtain all the building blocks to establish its system. So a potential licensee must acquire sufficient bandwidth, or a sufficient geographical 'buffer zone' to be able to operate the particular technology it has in mind with a sufficient protection from interference under the general interference regime established by the core conditions. The lots may also be interdependent in a commercial sense in that, as illustrated in the example given above in relation to the MDS licences, acquisition of a licence in any one area may increase the potential value to the licensee of the spectrum in another area.

The English open outcry auction is, however, eminently suitable for homogeneous licences that are not interdependent either geographically or technically, and the Australian Broadcasting Authority has regularly used such a system for the allocation of what are essentially local radio broadcasting licences.

Another form of auction, and one which has actually been used in spectrum auctions in New Zealand, is what is known as a second-price sealed bid, or a Vickrey auction. Under this system each bidder submits a sealed bid for the item to be sold, and the item is sold to the person who makes the highest bid at a price either equal to, or marginally above, the second bid that is submitted. The theory here is that each bidder will bid its true subjective valuation of the item, because the bidder does not know what the next highest bid will be. It could be just below the bidder's own bid, and so there is no point in submitting a very high bid in the hope that the next lowest bid will be much lower. The approach to bidding in a Vickrey auction should, therefore, be the same as in an English auction, where a bidder will tend to bid up to that bidder's valuation of the item. So in economic terms a Vickrey auction is essentially the same as an English auction, in that the asset will be awarded to the person who values it most highly, at a price marginally above the next highest bid. Procedurally the obvious difference is that the Vickrey auction is conducted in writing.

The use of Vickrey auctions for the allocation of spectrum and spectrum management rights in New Zealand attracted some criticism, which arose out of the fact that broadly similar bands were allocated for wildly different prices. For example, the first auction yielded the result that the management rights for the TACS-A Band sold for NZ$25.2 million, and the TACS-B Band for no less than NZ$300 million. In fact, the second band was re-allocated using the more usual style of tender where the highest bid wins, and ultimately sold for NZ$13 million. Similarly, one UHF TV channel was sold at the second highest price of $6.00, when the highest bid was $100,000.00.

There are two possible reasons why these results came about. In the first case, bidders were allowed to withdraw bids without penalty and, as a result, the market 'thinned' to the point where the prices bid fell dramatically below the first and highest maintained bid. In the second case, the market was always very thin, and all the use of a Vickrey auction in that case in fact achieved was to make public information that would otherwise have been concealed, namely the maximum price that the highest bidder would have been prepared to pay for the licence if pushed to compete.

Whilst these New Zealand allocations were arguably economically efficient, the political fallout from the results means that Vickrey auctions are likely to be approached with considerable caution in the future.

These difficulties confronted the US Federal Communications Commission ('FCC'), even without the benefit of the advance in spectrum management of the invention of the spectrum licence, and in an attempt to overcome the

perceived deficiencies in the more common methods of auctioning, the FCC set about creating a new system, custom designed for the allocation of spectrum. The FCC gathered together a team of lawyers, economists, game theorists and others to consider how the concept of an auction could best be modified to cope with the complexities of efficiently allocating very large numbers of lots of spectrum amongst a potentially very large number of applicants. Although another variable was also present in the the US equation which is not, so far, relevant in the Australian context. That arises from the fact that in the US, the pure economics of allocating spectrum to the highest value user is tempered by the policy objective of ensuring that some sectors of the radiocommunications community should receive a degree of preferential treatment in allocation. The result of the FCC 's labours has been the 'invention' of an entirely new form of auction, the simultaneous ascending bid multiple round auction.

Under a simultaneous ascending bid multiple round auction all the lots are offered for sale at the same time, rather than sequentially. Bidders can bid on any lot, or any combination of lots, up to a pre-declared limit that they set themselves. That limit is called 'eligibility', and represents the amount of bandwidth and population coverage that a bidder ultimately hopes to 'win' at auction. Bidders are not allowed to bid on lots so as to exceed their eligibility.

Bidding continues over a number of rounds and the auction closes when there are no new bids on any of the lots in a round. Activity rules are used to ensure that the auction maintains momentum by compelling bidders to take part before the final stages of the auction, and also to ensure that price information becomes available during the auction. If bidders fail to meet the activity rules that apply to them at any time, the amount of spectrum on which they are eligible to bid is reduced. Bidders make their bids on lots, and the bidding continues over a number of bidding 'rounds' until bidding ceases. Once of the distinguishing features of such an auction is that, by contrast with an English, Dutch or Vickrey auction, it is possible for bidders to withdraw their bids in respect of one or more of the lots. Although this is not without penalty.

By adopting this approach it is possible for bidders to change their overall strategy in terms of the lots on which they are bidding, and it is this ability to alter bidding strategy in the course of an auction that makes the simultaneous ascending bid auction such a powerful tool in allocating to the highest value user. Thus, a bidder may set out with a number of potential business plans, and depending on how the bidding develops during the auction, the bidder may activate one of its 'fallback' positions. To illustrate, take the example mentioned above of the pay-TV operator wishing to establish pay-TV services in Australia. Its optimum business plan calls for nationwide coverage, with a minimum of 12 channels in each capital city, and 6 in each other area. On this basis, the operator believes that it could achieve major market penetration, the revenue allowing it to purchase sufficient programming to support all the channels, thus making its overall 'package' more attractive to subscribers. But the plan hinges on gaining control of the Sydney and Melbourne markets, with at least two of the other major capital cities. Its second option is to move into the sports and news business only, with at least 5 channels in each of the capital cities, and little else. It has a range of other options culminating in a service to remote and country areas only, combined here and there with a satellite-based service.

After bidding for several rounds in the capital city markets, it becomes obvious to the pay-TV operator that it is in competition with a competitor with more funds to commit to the purchase of spectrum. It simply cannot afford its first option. Under an English auction, or a sealed bid tender, the 'game' would be over. But in a simultaneous multiple round auction, the bidder can see from monitoring the bidding that it may be able to acquire spectrum in other areas at a cost that will allow it to follow one of its fallback options. The bidder is then able to withdraw its bids from its first preference, and start bidding on the other spectrum.

Of course, if it were possible for bidders to make bids and withdraw them without any penalty at all, bidders might be tempted to 'bid up' the price of some lots with a view to inflating the price for its competitors. Indeed, it could be argued that the auctions of MDS licences in the major centres of Australia were an example of such behaviour. In those allocations the major

new entrant in the pay-TV market, who traded under the name of Galaxy, was forced to compete for almost all licences by a rival which bid up the licence values. Occasionally the rival was left with a licence and would be forced to pay the bid price. However, overall the effect of the competition at the auction was that the prices were pushed much higher than would have been the case otherwise, with Galaxy paying in total around 200 million for the licences. Galaxy proved to be unprofitable, and is now in the hands of the liquidators. In economic terms, of course, this means that the allocation was far from efficient, and this bidding strategy could have delayed the widespread introduction of pay-TV to Australia by a number of years.

Accordingly, it is necessary to balance the need for the withdrawal of bids to facilitate changes in bidding strategy, against the potential abuse of the system for competitive reasons. The mechanism used to achieve this is to allow bidders a number of 'free' withdrawals, normally five, but to impose financial 'penalties' for any withdrawals above that number. The financial penalties are deducted from the eligibility payment bidders are required to pay at the time that they register for the allocation process. The eligibility payment is calculated on the basis of the bidders' self-declared eligibility limit referred to above. Any eligibility payment remaining at the end of an auction after deduction of bid withdrawal penalties, is credited against the bid price of successful applicants, or refunded, as the case requires.

The rounds of the auctions comprise two parts. There is a bidding period when bidders make bids, or alternatively withdraw some or all of their earlier bids so that they can redeploy their eligibility in different bidding strategies. The second part of a round is the results and analysis period, when the ACA calculates and releases the results to bidders, who then analyse the results to determine their bidding strategy for the next round.

Due to the very large number of permutations of bidder preferences in an auction which offer large numbers of lots (eg 230 lots in the recent auctions for the 800 MHz and 1.8 GHz bands), the ACA auctions are run on computer. Bids are made by computer and modem and the bids, which are encrypted for security and data integrity, are transmitted over the public telephone network. The ACA provides the necessary software to bidders, loads it onto their computer systems, and provides training in its use. The ACA generally also runs a 'mock' auction prior to each price-based allocation to allow bidders to familiarise themselves with the auction process and the software, and also to provide bidders with an opportunity to observe the effect of various bidding strategies.

It can be seen, therefore, that there are a number of options for auction design, each with its own strengths and weaknesses. The ACA (and its predecessor the SMA) has now used both English and simultaneous ascending bid auctions for the allocation of licences, and the choice in any particular case depends on a number of factors. Thus, the ACA adopted a simultaneous ascending bid format for the initial allocation of PCS spectrum, but also allowed for allocation at a pre-determined price (equivalent to a reserve price) should competition have failed to eventuate and the requirements of all applicants could be satisfied without need to go to auction. At the end of the simultaneous ascending bid auction for the PCS spectrum a number of lots remained unsold. Those lots were subsequently sold by means of an English open outcry auction, which was adopted as the preferred means of allocation for a number of reasons:

- because market information as to the value of the licences had already been obtained under the original allocation
- the number of licences was small, and nature and extent of any interdependencies were clear
- the system is quicker, simpler and cheaper to run for small numbers of licences.

## LEGISLATIVE AUCTION DESIGN CONSTRAINTS

Whilst there are no direct legislative constraints on the form of auction adopted by the ACA, the overall procedures for allocation differ according to the type of licence being allocated, with the administrative procedures required by the Act for the allocation of spectrum licences being more detailed than those for apparatus licences. To allocate spectrum licences for the first time, for example, the Minister must first designate the band to be allocated by means of spectrum licences, then a marketing plan for the band must

be made by the ACA, and also a conversion plan if there are any incumbent services in the band. In addition, the ACA has to make procedures for the allocation process itself, and also establish the interference regime by means of further legislative instruments. By contrast, apparatus licences can be allocated by making only auction procedures and an interference regime.

The provisions of the Act that deal specifically with the procedures for price-based allocation are deceptively simple For example, in its original form section 106(1), which provides for the allocation of apparatus licences by price-based allocation, merely said that the Spectrum Management Agency may determine a price-based allocation system for the issue of apparatus licences. But this simplicity conceals two major major constraints on auction design. Firstly, both section 106 and its specrum licensing equivalent, require that the procedures be a 'system for the issue of licences'. This suggests that what is required is something more than merely setting out the general manner in which the price-based allocation process is to occur. Instead what is necessary are self-contained and complete procedures from the point of offer of the licences in some manner for allocation, to the point of the issue of the licences. Secondly, the general law on auctions and sales would suggest that once the procedures have been set in place, and the process has begun, it will not be possible for the ACA to deviate from those procedures – at least where to do so might be to the detriment of the persons who are likely to apply for licences.

These are major constraints, and effectively require the ACA to set in place comprehensive procedures that anticipate every eventuality that might arise in a price-based allocation. If the procedures do not, there may be a lacuna that will lead to the process being aborted in circumstances where for the ACA to take action to address a problem would disadvantage one or more of the players in the auction. Indeed, this need for the procedures to be self-contained was a major factor in the SMA abandoning a tendering approach to the allocation of the MDS licences, because the complexity of dealing in a rule-making form with combinatorial bidding increased to such an extent that it was not possible to be certain that all potential combinations of circumstances would be addressed.

## PRO-COMPETITIVE RULES

There are a number of aspects of auction design that can be used to achieve pro-competitive results.

As a government agency the ACA is generally speaking expected to recover its costs, but at the same time the ACA is aware that to set application fees at full cost recovery could militate against applications being made; particularly when the market is thin. Low entry fees will naturally tend to ensure that potential players are not discouraged from applying or taking part in the allocation. However, if entry fees are set too low, it is possible that frivolous or vexatious applicants may enter the market with the intention of disrupting the market. In addition, low entry fees may lead to speculative bidding in the hope of raising capital at a later date, and if it proves impossible to raise the necessary capital, and defaults in payment occur, the allocation will not be efficient.

Entry fees can, of course, be both direct and indirect, and whilst in the early auctions that the SMA conducted the direct entry fees were low, indirect entry fees were imposed. For example in the first MDS auctions, applicants had to either have a minimum capitalisation, or had to have their payment of the balance of any bid price guaranteed by a corporation with such capitalisation. More recently, that limitation has been removed, and the ACA has protected its exposure to defaulting applicants by requiring all applicants to provide a deed of financial security securing payment of an amount equivalent to the deposit that might be payable.

A further method of encouraging a stronger market is to provide for payment of bid prices by installment, thus facilitating entry by new entrants. However, that process has not yet been adopted in Australia.

The most direct means of seeking to achieve a pro-competitive result is to either prohibit the acquisition of certain spectrum altogether, or to limit the amount of spectrum that may be acquired through the auction by any particular player and its associates. This, however, raises

some formidable practical and potential legal obstacles.

At its simplest, a bidding limit prohibits any acquisition of the spectrum to be auctioned by a potential bidder. The result of an auction would then generally be that new entrants to the market would be able to acquire access to the spectrum, and would not have to compete with the incumbents for that spectrum. (In fact such bidding limits were placed on certain telecommunications carriers in the auction for what is known as PCS spectrum by means of carrier licence conditions under the telecommunications legislation.)

A lesser degree of market regulation can be achieved by imposing a bidding limit that prohibits a bidder acquiring more than a specified number of lots. Such a limit is relatively easily administered by the auction computer system. However, to make the prohibition effective, it is also necessary to put in place a mechanism that would prevent the use of other vehicles to obtain access to the spectrum, such as acquisition by joint-venture partners, subsidiary corporations etc. Naturally, the ACA is not privy to all agreements between the various applicants for licences, and it is therefore not possible for the ACA to determine which applicants are relevantly associated with each other.

Similarly, it is possible that bidders could be unknowingly associated with each other by virtue of relevant agreements that they each hold separately with a third party. In such cases neither the ACA nor the bidders themselves are capable of ascertaining a prohibited degree of relationship by means of 'searching' publicly available material.

To overcome this problem the ACA devised a mechanism that required each bidder to reveal to all other bidders the identities of all other parties with whom they had relevant agreements in relation to the use or acquisition of spectrum to be auctioned. Each bidder is then required to disclose whether it has a prohibited 'relationship' with any other bidder, and the ACA relies on criminal sanctions relating to the making of false statements to ensure the veracity of the information provided. If bidders are found to be associated, their bids are aggregated, and the computer bidding system simply rejects bids made by such associated bidders that would have the effect of exceeding the pro-competitive limits.

Because of the need referred to above for a price-based allocation system to be complete and self-contained, however, it is not sufficient for this process to be conducted only at the outset of an allocation. The procedures also have to accommodate the discovery of a prohibited degree of association before, during and after completion of the bidding, and establish what is to happen with the standing high bids in each case. The result has been provisions that are administratively somewhat onerous, and also rather complex in their operation.

A further consequence of the introduction of bidding limits has been the introduction of administrative discretions into the auction procedures, which carries with it an increased level of legal risk arising from the potential for challenge to decisions. Over roughly a ten year period from the early 1970s, the Australian Parliament passed a number of Acts aimed at improving Government decision-making. Those Acts created a range of procedures by virtue of which some administrative decisions could be challenged. In this context, the most significant reform was the codification of the common law grounds of challenge, and simplification of the procedures.

The ACA, and one of its predecessor the SMA, have always been concerned to reduce the number of administrative discretions in auction processes for the specific purpose of limiting the opportunities for challenges to be mounted to the conduct of price-based allocations. This approach has been followed to ensure that various players in the relevant markets do not seek to delay the auction of spectrum on 'technical' legal grounds for the purpose of seeking commercial advantage in delaying the introduction of competing services. A by-product of this approach has been the very detailed specification of the auction procedures, which at the same time assists in achieving the objective of creating a wholly self-contained auction system.

## COLLUSION

Collusive bidding activity has been observed in spectrum auctions conducted by the FCC. For example it was alleged some applicants adopted the somewhat creative method of signalling their bidding intentions to other participants by means of the 'trailing numbers' in their bids.

The FCC has sought to prohibit collusive bidding at auctions, and has reasonably extensive rules to deal with this issue which, broadly speaking, are as follows. Firstly, in an exercise that is similar to the ACA's pro-competitive rules, applicants for licences are required to:

- disclose the identity of those with whom they have agreements or other understandings in relation to bidding in an auction
- reveal the detail of any such agreements
- indicate that they have not entered into any other similar agreements

Secondly, after applying for licences, applicants are generally prohibited from discussing their bidding strategies with any other bidder. It has been argued that these rules operate to the detriment of legitimate business activities such as mergers and acquisitions, and have interfered in the conduct of 'normal' business by applicants. It has also been suggested that the rules might militate against capital raising. The FCC has, however, refused to declare a 'safe harbour' for such non-spectrum related activities, presumably because the potential for abuse of such an exception would be too great, and rules too difficult to administer.

By contrast, none of the bodies that has conducted price-based allocation of spectrum has put in place rules aimed at the prevention of collusion although, where in place, the rules to give effect to pro-competitive bidding limits might indirectly have that effect.

## DEFINING THE 'PROPERTY' TO BE ALLOCATED

Undoubtedly the greatest legal challenge in any spectrum auction is the definition of just what is to be allocated – the 'property rights' to be sold.

Generally speaking, the radiofrequency spectrum cannot be touched, felt, heard or seen, although it does stray into the realms of visible light at one end. What is to be allocated, therefore, in any spectrum auction is something that has no physical quality, and so is the sum of a number of rights and liabilities. This is not anything particularly unusual in general terms, as there are many species of 'property' that are simply the sum of a number of rights and liabilities – mortgages would be an obvious example.

However, spectrum has the unusual dimension of its utility to any particular person being potentially wholly dependent on the activities of others, who may be geographically situated thousands of miles away, and in a different country. As a result, part of the utility of spectrum falls to be decided under international treaty, which establishes a broad framework for the control of international interference. Similarly, a spectrum user can be affected by the intended or unintended use of spectrum in a wholly different band.

Licensing of spectrum use is achieved in much the same manner as any other activity is regulated. First, the activity is made illegal, and then that prohibition is relaxed by licensing it subject to conditions. In the case of licensing use of the spectrum, the result is somewhat contrary, in that what is licensed is the use and manner of use of transmitters; yet the focus of the radiocommunications industry and community is not so much the transmission of signals, but the protection of the reception of wanted signals. In practice, reception is indirectly protected by the conditions imposed on the means of transmission, such as power and location of transmitters. In other words, the 'rights' associated with a radiocommunications licence, and hence the 'property' it incorporates, is comprised in the extent to which transmitters can be operated to achieve a service area for the purpose required by the licensee, without causing unacceptable interference to other legitimate users of the spectrum, whether that use is adjacent in terms of spectrum, or geography, or otherwise.

A further dimension of spectrum use to be accounted for in defining the 'property' associated with a licence, is that spectrum is managed on the basis of probabilities, rather than certainties. Thus, in deciding whether or not a proposed service should be apparatus licensed in a particular manner, or whether a particular device should be registered for operation under a

spectrum licence, the probable impact of the operation of a transmitter on the reception of signals is established. In a very limited number of cases, however, that approach does not work and it is possible that despite all calculations being correct, the result is interference to another service.

In addition, spectrum management interference regimes are generally predicated on a number of assumptions relating to equipment quality, engineering practices and siting. For example, to be able to predict the potential impact of one proposed service on another, it may necessary to assume that a certain protocol will be followed in the siting of transmitters and receivers – with eg transmitters at high sites and receivers at low sites. If a licensee sites its receivers at high sites, the potential for interference under such a regime will therefore increase. Similarly, it is assumed that receivers will meet current standards, and be of a certain standard susceptibility. A user cannot expect to receive protection from interference if, contrary to normal usage, its receiver has the same sensitivity to interference as deep-space listening stations, as to do so would deny proper access to spectrum to other users.

Spectrum management policy objectives also impact on the definition of property in relation to spectrum. Spectrum licences are intended to be both service and technologically neutral. In theory, therefore, any interference management regime should not favour any particular service. However, to design a spectrum efficient interference regime that would accommodate any and every potential service would be an almost impossible task – the only options being either to leave large areas of spectrum vacant as 'guard bands' to protect the spectrum licensee from interference, or to allocate lots of such bandwidth as to have the equivalent effect. Either outcome would naturally detract from efficient spectrum use. Furthermore, potential licensees have to have some indication of the likely range of use and service that they will be able to obtain, otherwise they will have no information on which they can assess the value of the licences. Accordingly, the ACA is placed in the position of designing at least one potential interference regime for each spectrum licensed band.

Technological neutrality is also difficult to achieve, given that in reality world equipment manufacturers naturally tend to produce equipment to operate in the bands to which the service that equipment supports is most suited. In addition, the likely use of many bands is actually decided in international forums, in practice leaving Australian spectrum users with little or no room for manoeuvre.

The combination of all the above factors effectively requires the ACA to prepare a proposed interference regime for each band to be price-base allocated, which regime is predicated on all the 'normal' assumptions about interference mechanisms, equipment, and type of service as apply in any area of radiocommunications licensing. However, even that is not necessarily an exhaustive statement of the extent of the property rights associated with any licence, as the inherently unpredictable nature of spectrum use may mean that, notwithstanding everyone's best efforts, two services operating within the terms of their licences, may cause or suffer interference as a result of each others' operations.

If so, the ACA seeks to resolve the issue through a co-operative process with the affected licensees. However, if no agreement ultimately proves possible, it is for the ACA to determine how the conflicting uses are to be resolved, and to give effect to that decision by the imposition of licence conditions. Accordingly, the boundaries of the 'property' in any licence arguably fall to be decided by the ACA after the time of sale, and there is no compensation for a licensee should the boundary be narrowed from that which either the licensee, or possibly even the ACA, originally considered to be the case.

In effect, therefore, the ACA only defines the 'property' in spectrum licences to a limited degree, and there is some degree of uncertainty as to the extent to which any service might ultimately be capable of being operated. Whilst uncertainty is generally regarded as being anathema in the context of commercial decision making, and particularly so where large sums of money will be expended, such a degree of uncertainty has not deterred applicants from spending large sums on spectrum. For example, the ACA received a total of AUS$347.4 million in bids in the initial allocation of spectrum in the

800 MHz and 1.8 GHz bands, and a further AUS$2.7 million in bid withdrawal penalties. A further AUS$30.6 million was paid through the recently completed open outcry auction of the lots that remained unallocated at the end of the initial simultaneous ascending bid auction. The legal risk associated with the definition of the property in this case requires that all the uncertainties and assumptions inherent in an interference management regime are carefully considered and drawn to the attention of potential bidders.

## CONCLUSION

This paper has outlined the major legal issues surrounding the allocation of spectrum licences in Australia that arise from:

- the unusual nature of the mechanism used for allocation:
- the various policy objectives in allocating licences; and
- the very nature of what is being 'sold'

Many other legal risks arise from the fact that what is essentially occurring in the price-based allocation of licences, is the sale of an asset for, in many cases, an extremely large sum of money. However, these risks are no different to the type of legal risk associated with the sale of any other asset of similar value.

The largest legal issue lies in the definition of what is to be allocated, which in the case of spectrum appears to equate to some, in part unspecified, rights together with an entire legislative interference management regime, characterised by a degree of uncertainty.

Note: The views expressed in this paper are not necessarily those of either the author, or the Australian Communications Authority.