

AUSTRALIAN COMMUNICATIONS AUTHORITY

**Spectrum Licence Allocation
800 MHz and 1.8 GHz Bands**

APPLICANT INFORMATION PACKAGE

6 February 1998

Foreword

Thank you for your interest in the spectrum licence allocation for spectrum in the 800 MHz and 1.8 GHz bands.

This Applicant Information Package (the Package) contains important information about the allocation which you must read and understand before taking part in the allocation process.

The Package contains:

- an overview of what is being allocated;
- a guide to the allocation process, including instructions for participating;
- all of the legal instruments under which the allocation will take place; and
- application documents which must be completed and forwarded by the closing date.

The closing date for applications is Friday 13 March 1998. No late applications will be accepted after this date [Note - The ACA has decided *NOT* to accept late applications as indicated in the draft marketing plan.] The date for the commencement of the auction will not be set by the ACA until after the closing date for applications.

To register for the auction the ACA must receive:

- your correctly completed applications documents; and
- a **bank cheque** covering both the entry fee plus the eligibility payment. **Bank cheques** for this amount should be made payable to “The Collector of Public Monies, Australian Communications Authority” and be crossed “Not Negotiable”. Payment must be in Australian dollars. Personal or company cheques will not be accepted.

BY: 5.00 pm (Canberra Time) on Friday 13 March 1998

**AT: ACA Auction Centre
Locked Bag 3321
BMDC ACT 2617
Australia.**

Questions about the the allocation process may be directed to Mr Ian Hayne, Manager, Spectrum Marketing Team on Tel. (02) 6256 5262 (international +612 6256 5262), by fax to (02) 6256 5122 (international +612 6256 5122), or by email to ihayne@aca.gov.au

Important Notice

The allocation of spectrum by issuing spectrum licences is provided for by the *Radiocommunications Act 1992* ('the Act'). Amendments under the *Radiocommunications Amendment Act 1997* provide for the sale of spectrum while encumbered; that is, while apparatus licensees are operating in the band. Clearance of these existing licensees will take place after sale, during a re-allocation period. Persons wishing to apply are urged to familiarise themselves with all the provisions of the Act, not just those pertaining to spectrum licensing and should be aware that any activities associated with radiocommunications may also be regulated by the *Trade Practices Act 1974*, the *Broadcasting Services Act 1992*, and the *Telecommunications Act 1997*. Depending on the activity undertaken using the spectrum under a licence, other Commonwealth, State and Territory laws may apply.

The Australian Communications Authority ('the ACA') is a statutory authority established under the *Australian Communications Authority Act 1997* ('the ACA Act') to, amongst other things, administer the *Radiocommunications Act 1992*. The ACA is required by section 10 of the ACA Act to perform its functions in a manner consistent with any general policies of the Commonwealth notified, and with any directions given, to the ACA by the Minister administering that Act (sections 11 and 12 of the ACA Act respectively). The policies of the Commonwealth, a sovereign entity, may change from time to time. Furthermore, in exercising its powers and functions, including those conferred on the ACA by the *Radiocommunications Act 1992*, the ACA may be expected to apply its own policies which may also change from time to time.

This paper provides advice on how the ACA proposes to allocate spectrum licences. Nothing in this paper should be taken to bind the ACA to any particular course of action in relation to the allocation of licences in the spectrum under discussion. Interested persons should not rely on statements made in this document about the policies that may be followed by other authorities, nor about the effect of any legislation, but should take what steps they consider necessary to inform themselves on those matters independently of the ACA. The comments made in this paper about the *Radiocommunications Act 1992* and the *Telecommunications Act 1997* reflect the present policies of the ACA.

Australia is a signatory to the International Telecommunication Constitution and Convention and to other international treaties relating to communications. The administration of radiocommunications by the ACA is undertaken with respect to these conventions and treaties.

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Prospective applicants should, on their own responsibility, take whatever steps they consider necessary to ensure they have access to appropriate technical or other specialist advice independently of the ACA concerning their application, operation of radiocommunications equipment and services, or other matters relevant to the proposed licence allocation system and operation of transmitters and services under the licences. Applicants are also advised to seek advice independently of the ACA on the treatment of spectrum licences and other investments under Australian taxation laws, and on the operation of foreign investment laws and policy on proposed investment in communications in Australia.

ACA Reservations

ACA May Change Process

The ACA may, under the Act, vary or deviate from these processes, or terminate the auction process.

The ACA reserves to itself the right to add to, vary or amend the information, terms and procedures set out in this Invitation document, in its sole discretion.

Other ACA Rights

The ACA reserves the right, in its absolute discretion at any stage of the auction process to do all or any of the following:

- (a) require additional information from any registered applicant; and
- (b) change the structure and timing of the auction process.

Registered Applicants to Meet Own Costs

Registered Applicant's participation in any stage of the auction process shall be at the registered applicant's sole risk, cost and expense.

Applications Become Property of the ACA

All application documents submitted in response to the Invitation document shall become the property of the ACA.

Collusive Bidding

Registered applicants and their officers, employees, agents and advisers must not engage in any collusive bidding, anti-competitive conduct or any other similar conduct with any other registered applicants, or any other person in relation to the preparation or lodgement of applications or bids for a spectrum licence under the auction process.

Confidential Information

Registered applicants and their respective officers, employees, agents and advisers must not take steps to obtain, or use, confidential information of the ACA relating to its businesses or the auction process other than information which is publicly available or made available by the ACA to registered applicants during the auction process.

Return of Information to the ACA

The ACA reserves the right, in its absolute discretion, to require that all written information provided to registered applicants (and copies of the information) be returned to the ACA at any stage.

Conflict of Interest

Registered applicants and their respective officers, employees, agents and advisers must not place themselves in a position which may, or does, give rise to a conflict of interest (or a potential conflict of interest) between the interests of the ACA or the Commonwealth (on the one hand) or any interests (on the other hand) during the Auction Process.

Application of Laws

The laws of the Australian Capital Territory apply to the auction process.

Protection of GSM Base Receivers

The ACA makes no representation as to the utility or otherwise of the spectrum. Applicants are advised, however, that a spectrum allocation lot that includes the frequency band 885-890 MHz will have reduced utility owing to a requirement to protect Telstra's GSM base receivers operating above 890 MHz. The adjacent base transmit / base receive arrangement at 890 MHz is a result of operating AMPS adjacent to GSM and is not usual spectrum management practice. To allow for optimum use of the spectrum in both these frequency segments, special technical and regulatory frameworks were put in place. A feature of the framework is that filters were fitted at sites where AMPS base transmitters and GSM base receivers were co-located. It is expected that spectrum licensees in the band 885-890 MHz will find it difficult to deploy equipment within several kilometres and within a few MHz of a GSM base without interference, unless additional high performance filtering is employed. The filters already in place on GSM receivers can assist in this regard. Negotiation between affected parties is seen as essential to optimising spectrum utility and access near the 890 MHz boundary.

Glossary

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|---------------------------------|---|
| ACA | Australian Communications Authority, established on 1 July 1997. The ACA administers the <i>Radiocommunications Act 1992</i> , under which this allocation will be made. |
| <i>accredited person</i> | a person accredited by the ACA to issue Interference Impact Certificates and Frequency Assignment Certificates. |
| <i>active bid(s)</i> | a valid bid in a round or a high bid from the previous round of an auction. |
| <i>the Act</i> | the <i>Radiocommunications Act 1992</i> . |
| <i>allocation area</i> | the area covered by a lot. |
| AMPS | Advanced Mobile Phone System. |
| <i>applicant</i> | a person who has submitted the application documents and all required payments, and whose application is accepted. |
| <i>auction</i> | an auction held by the ACA to allocate lots which become the subject of spectrum licences. |
| <i>bank cheque</i> | a bank cheque issued by a bank licensed to operate in Australia. |
| <i>BIN</i> | bidder identification number. |
| <i>carrier</i> | the holder of a carrier licence granted by the ACA under the <i>Telecommunications Act 1997</i> . |
| CDMA | code division multiple access. |
| <i>closing date</i> | the date identified in the notice published by the ACA inviting people to apply to take part in an auction. This is the last date that Application Forms will be accepted by the ACA. |

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| <i>DECT</i> | digital enhanced cordless telecommunications. |
| <i>effective occupied bandwidth</i> | the minimum width of a frequency band having fixed upper and lower limits that is necessary to contain 99% of the true mean power of the transmitter's emission at any time. |
| <i>EIRP</i> | equivalent isotropically radiated power. |
| <i>eligibility</i> | an applicant's initial eligibility to bid on lots, as varied during the auction. |
| <i>eligibility payment</i> | the amount payable by an applicant based on how much spectrum and its population coverage he or she hopes to win at the auction. |
| <i>eligibility percentage</i> | the percentage of their eligibility that applicants will be required to meet when bidding during a stage of the auction. |
| <i>emission centre frequency</i> | the frequency midway between the lower and upper frequency limits of a transmitter's effective occupied bandwidth. |
| <i>entry fee</i> | an amount payable by an applicant to register for an auction. The ACA has set this amount at \$10,000. The entry fee will not be refundable. |
| <i>FAC</i> | frequency assignment certificate. |
| <i>GSM</i> | Global System for Mobiles. |
| <i>horizontally radiated power</i> | the radiated maximum true mean power, within the frequency band of the licence authorising the operation of the device, summed over all polarisations and measured in units of dBm EIRP in a direction referenced from, and in the horizontal plane containing, the phase centre of the antenna used with the device. |

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| <i>IIC</i> | interference impact certificate, issued by an accredited person certifying that a device will not cause an unacceptable level of interference. |
| <i>initial eligibility</i> | the initial eligibility worked out by an applicant and entered on the applicant's application form. |
| <i>ITU</i> | International Telecommunication Union. |
| <i>lot</i> | spectrum allocation lot; a part of the spectrum covering a specified area and identified in a Marketing Plan as available for allocation. |
| <i>lot rating</i> | a measure of the value of a lot based on its population and the amount of bandwidth. Lot rating is calculated as the notional population multiplied by the bandwidth in MHz divided by 100. The lot rating is fixed by the ACA for a lot and is shown in the Marketing Plan as the lot rating for that lot. |
| <i>Marketing Plan</i> | a Marketing Plan prepared by the ACA under s.39 or 39A of the Act. |
| <i>maximum true mean power</i> | the true mean power measured in a 30 kHz rectangular bandwidth that is located within a specified frequency band, such that the true mean power is the maximum of true mean powers produced. |
| <i>mean power</i> | the average power measured during an interval of time that is at least ten times the period of the lowest modulation frequency. |
| <i>PCS</i> | personal communications services. |
| <i>peak power</i> | the average power during one radio frequency cycle at the crest of the signal envelope measured in a 30 kHz rectangular bandwidth that is located within a specified frequency band. |
| <i>PHS</i> | personal handiphone system. |

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| <i>RADCOM</i> | the ACA's computerised radiocommunications licensing management system. |
| <i>RF</i> | radiofrequency. |
| <i>SMA</i> | Spectrum Management Agency. A predecessor of the ACA. |
| <i>software</i> | means software to be licensed to registered applicants to use in the auction. |
| <i>stage</i> | a group of successive rounds of an auction to which the same eligibility percentage applies. |
| <i>STU</i> | standard trading unit; the smallest unit of spectrum space that the ACA will register for the purposes of licensing. |
| <i>successful applicant</i> | an applicant who makes the highest final bid on a lot. |
| <i>TDMA</i> | time division multiple access. |
| <i>true mean power</i> | (a) if an unmodulated carrier is present - the mean power measured while the unmodulated carrier is present; and (b) if an unmodulated carrier is not present - the mean power measured while transmitted information is present. |
| <i>working day</i> | a day that is not a Saturday, a Sunday or a public holiday in the Australian Capital Territory. |
| <i>waiver</i> | the option not to bid but to nevertheless retain current eligibility, even though the activity from current round bids is less than that necessary to maintain eligibility within the current activity rules. |

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1. What is Being Offered?

In this Chapter...

- a description of the areas in which spectrum is being offered
- a description of the bandwidth parcels that are being offered in each area
- a description of spectrum allocation lots being offered
- other important information about the spectrum being offered.

This part describes the spectrum being offered for allocation in the PCS spectrum auction. It describes the spectrum parcels that are available, and the areas in which they will be available. Each combination of band and area will be regarded as a spectrum allocation lot; that is, a lot that will be open to bidding in the auction. There are 230 lots on offer in this auction, and applicants are able to bid on any lot or any combination of lots up to their own pre-declared limit (their eligibility), which must be within the limits determined by the Minister.

Available Spectrum

The Minister for Communications, the Information Economy and the Arts, Senator the Hon Richard Alston, has given the ACA copies of Re-allocation Declarations that he has made under s. 153B of the Act, as a result of which the ACA must re-allocate the following parts of the spectrum by issuing spectrum licences:

- 2 × 20 MHz from 825-845/870-890 MHz in metropolitan areas;
- 2 × 5 MHz from 825-830/870-875 MHz in regional and outback areas;
- 2 × 10 MHz from 835-845/880-890 MHz in regional and outback areas;
- 2 × 45 MHz from 1710-1755/1805-1850 MHz in metropolitan areas; and
- 2 × 15 MHz from 1710-1725/1805-1820 MHz in regional areas.

A copy of the Minister's declarations is at **Attachment 1**.

Allocation Areas

For the purposes of the auction, the ACA has divided Australia into 21 areas determined by considering population distribution, communities of common interest, geography and ability to shield radio signals, and existing radio site usage. These areas are classified as one of three types of areas, either:

- metropolitan (Brisbane, Sydney, Melbourne, Adelaide and Perth);

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- regional (Canberra, Darwin and Hobart, and populated rural areas of Australia); or
- outback (these include all remote areas).

Table 1 shows, for each area in which spectrum will be allocated:

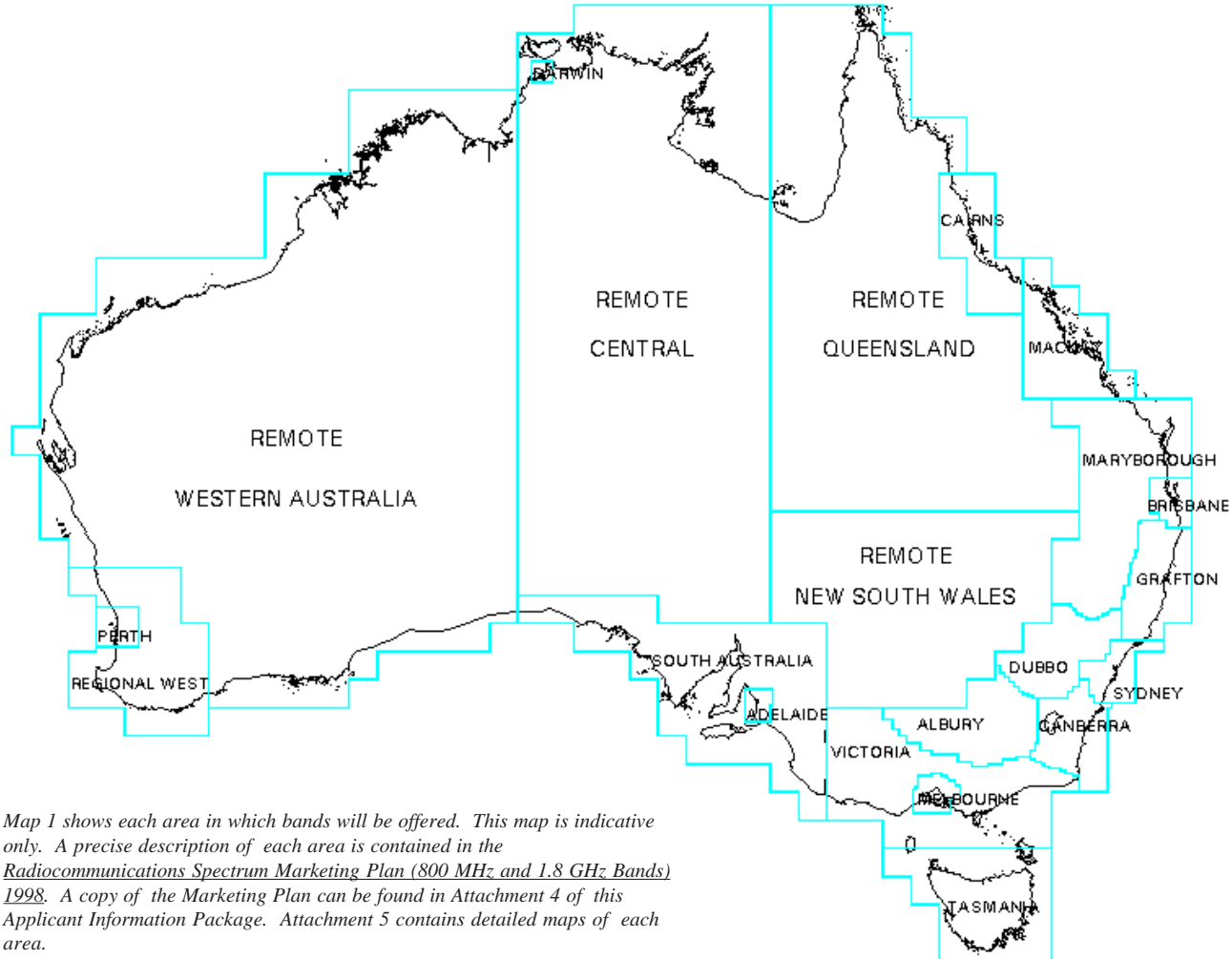
- the *type* of area;
- the *name* and *number* of the area for the purposes of the allocation; and
- the *population* of the area.

Table 1
Areas for Spectrum Licence Allocation

| Area Number | Name | Type | Population |
|-------------|-------------------|--------------|------------|
| 1 | Brisbane | Metropolitan | 1735500 |
| 2 | Sydney | Metropolitan | 4265500 |
| 3 | Melbourne | Metropolitan | 3246700 |
| 4 | Adelaide | Metropolitan | 1094900 |
| 5 | Perth | Metropolitan | 1189100 |
| 6 | Cairns | Regional | 368200 |
| 7 | Mackay | Regional | 305100 |
| 8 | Maryborough | Regional | 769100 |
| 9 | Grafton | Regional | 395000 |
| 10 | Dubbo | Regional | 273900 |
| 11 | Canberra | Regional | 505200 |
| 12 | Albury | Regional | 477800 |
| 13 | Victoria | Regional | 719900 |
| 14 | Tasmania | Regional | 482500 |
| 15 | South Australia | Regional | 308600 |
| 16 | Regional West | Regional | 201800 |
| 17 | Darwin | Regional | 107600 |
| 18 | Remote Queensland | Outback | 124400 |
| 19 | Remote NSW | Outback | 152700 |
| 20 | Remote Central | Outback | 127600 |
| 21 | Remote West | Outback | 289000 |

Note that the Sydney market includes Newcastle and Wollongong

Map 1 Areas for Spectrum Licence Allocation



Map 1 shows each area in which bands will be offered. This map is indicative only. A precise description of each area is contained in the Radiocommunications Spectrum Marketing Plan (800 MHz and 1.8 GHz Bands) 1998. A copy of the Marketing Plan can be found in Attachment 4 of this Applicant Information Package. Attachment 5 contains detailed maps of each area.

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Table 2

Table of Bands on Offer

"M" = metropolitan, "R" = regional, "O" = outback.

| Band Number | Lower (MHz) | Upper (MHz) | Lower (MHz) | Upper (MHz) | Bandwidth (MHz) | Areas Available | Band |
|-------------|-------------|-------------|-------------|-------------|-----------------|-----------------|---------|
| 1 | 825 | 830 | 870 | 875 | 2 × 5 | MRO | 800 MHz |
| 2 | 830 | 835 | 875 | 880 | 2 × 5 | M | 800 MHz |
| 3 | 835 | 840 | 880 | 885 | 2 × 5 | MRO | 800 MHz |
| 4 | 840 | 845 | 885 | 890 | 2 × 5 | MRO | 800 MHz |
| 5 | 1710 | 1712.5 | 1805 | 1807.5 | 2 × 2.5 | MR | 1.8 GHz |
| 6 | 1712.5 | 1715 | 1807.5 | 1810 | 2 × 2.5 | MR | 1.8 GHz |
| 7 | 1715 | 1717.5 | 1810 | 1812.5 | 2 × 2.5 | MR | 1.8 GHz |
| 8 | 1717.5 | 1720 | 1812.5 | 1815 | 2 × 2.5 | MR | 1.8 GHz |
| 9 | 1720 | 1722.5 | 1815 | 1817.5 | 2 × 2.5 | MR | 1.8 GHz |
| 10 | 1722.5 | 1725 | 1817.5 | 1820 | 2 × 2.5 | MR | 1.8 GHz |
| 11 | 1725 | 1727.5 | 1820 | 1822.5 | 2 × 2.5 | M | 1.8 GHz |
| 12 | 1727.5 | 1730 | 1822.5 | 1825 | 2 × 2.5 | M | 1.8 GHz |
| 13 | 1730 | 1732.5 | 1825 | 1827.5 | 2 × 2.5 | M | 1.8 GHz |
| 14 | 1732.5 | 1735 | 1827.5 | 1830 | 2 × 2.5 | M | 1.8 GHz |
| 15 | 1735 | 1737.5 | 1830 | 1832.5 | 2 × 2.5 | M | 1.8 GHz |
| 16 | 1737.5 | 1740 | 1832.5 | 1835 | 2 × 2.5 | M | 1.8 GHz |
| 17 | 1740 | 1742.5 | 1835 | 1837.5 | 2 × 2.5 | M | 1.8 GHz |
| 18 | 1742.5 | 1745 | 1837.5 | 1840 | 2 × 2.5 | M | 1.8 GHz |
| 19 | 1745 | 1747.5 | 1840 | 1842.5 | 2 × 2.5 | M | 1.8 GHz |
| 20 | 1747.5 | 1750 | 1842.5 | 1845 | 2 × 2.5 | M | 1.8 GHz |
| 21 | 1750 | 1752.5 | 1845 | 1847.5 | 2 × 2.5 | M | 1.8 GHz |
| 22 | 1752.5 | 1755 | 1847.5 | 1850 | 2 × 2.5 | M | 1.8 GHz |

The population of each area has been set by the ACA based on an estimate derived from census collection data from 1992. These population figures are provided for the purposes of the auction only.

Bandwidth Parcels for the Allocation

The radiofrequency bands on offer are being allocated as spectrum lots which may be aggregated through the allocation process to form spectrum licences.

The band segments for this allocation are set out in Table 2.

In the 800 MHz band, the ACA will allocate 4 parcels, each of 2×5 MHz in metropolitan areas (a total of 2×20 MHz), and 3 parcels, each of 2×5 MHz in regional and outback areas (a total of 2×15 MHz).

In the 1.8 GHz bands, the ACA will allocate the spectrum in 18 parcels of 2×2.5 MHz in metropolitan areas (a total of 2×45 MHz) and 6 parcels of 2×2.5 MHz in regional areas (a total of 2×15 MHz). The Minister has not made a declaration for the re-allocation of spectrum in the 1.8 GHz bands in outback areas.

Spectrum Allocation Lots

The ACA is going to use a simultaneous ascending bid auction system to allocate the spectrum. The system employs spectrum allocation lots (or "lots"). Lots are like "building blocks" of spectrum. The auction process allocates lots to the applicants who, in economic terms, value them most highly. The lots are then aggregated after the auction to form licences.

Each combination of *allocation area* and *spectrum parcel* will be regarded as a *spectrum allocation lot*. Each lot will be numbered sequentially and will have a "name" which combines the area name and the band number (e.g. "Sydney-21").

Table 3 shows the availability of spectrum allocation lots by area and band. It shows the number of each spectrum allocation lot from 1 to 230.

Each lot has a *lot rating* which is a measure of its population coverage and bandwidth. Lot ratings are calculated by multiplying the population of the area of the lot by the bandwidth of one half of the frequency pair constituting the lot (in MHz) and dividing by 100. Lot ratings are rounded down to the nearest whole number. Lot ratings are important to the auction system because they provide a basis for applying activity rules which prevent the auction from stalling (See **Chapter 2 - How is it being allocated?**).

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Table 3
Table of Lot Availability and Lot Numbers
Bands 1 to 10

| | | Band | | | | | | | | | |
|-------------|-----------|-------------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| Area | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| M | 1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| M | 2 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| M | 3 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 |
| M | 4 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 |
| M | 5 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 |
| R | 6 | 111 | * | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 |
| R | 7 | 120 | * | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 |
| R | 8 | 129 | * | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 |
| R | 9 | 138 | * | 139 | 140 | 141 | 142 | 143 | 144 | 145 | 146 |
| R | 10 | 147 | * | 148 | 149 | 150 | 151 | 152 | 153 | 154 | 155 |
| R | 11 | 156 | * | 157 | 158 | 159 | 160 | 161 | 162 | 163 | 164 |
| R | 12 | 165 | * | 166 | 167 | 168 | 169 | 170 | 171 | 172 | 173 |
| R | 13 | 174 | * | 175 | 176 | 177 | 178 | 179 | 180 | 181 | 182 |
| R | 14 | 183 | * | 184 | 185 | 186 | 187 | 188 | 189 | 190 | 191 |
| R | 15 | 192 | * | 193 | 194 | 195 | 196 | 197 | 198 | 199 | 200 |
| R | 16 | 210 | * | 202 | 203 | 204 | 205 | 206 | 207 | 208 | 209 |
| R | 17 | 210 | * | 211 | 212 | 213 | 214 | 215 | 216 | 217 | 218 |
| O | 18 | 219 | * | 220 | 221 | * | * | * | * | * | * |
| O | 19 | 222 | * | 223 | 224 | * | * | * | * | * | * |
| O | 20 | 225 | * | 226 | 227 | * | * | * | * | * | * |
| O | 21 | 228 | * | 229 | 230 | * | * | * | * | * | * |

Applicant Information Package

Table 3
Table of Lot Availability and Lot Numbers
Bands 11 to 22

| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 |
| 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 |
| 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 |
| 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 |
| * | * | * | * | * | * | * | * | * | * | * | * |
| * | * | * | * | * | * | * | * | * | * | * | * |
| * | * | * | * | * | * | * | * | * | * | * | * |
| * | * | * | * | * | * | * | * | * | * | * | * |
| * | * | * | * | * | * | * | * | * | * | * | * |
| * | * | * | * | * | * | * | * | * | * | * | * |
| * | * | * | * | * | * | * | * | * | * | * | * |
| * | * | * | * | * | * | * | * | * | * | * | * |
| * | * | * | * | * | * | * | * | * | * | * | * |
| * | * | * | * | * | * | * | * | * | * | * | * |
| * | * | * | * | * | * | * | * | * | * | * | * |
| * | * | * | * | * | * | * | * | * | * | * | * |
| * | * | * | * | * | * | * | * | * | * | * | * |
| * | * | * | * | * | * | * | * | * | * | * | * |
| * | * | * | * | * | * | * | * | * | * | * | * |
| * | * | * | * | * | * | * | * | * | * | * | * |
| * | * | * | * | * | * | * | * | * | * | * | * |
| * | * | * | * | * | * | * | * | * | * | * | * |
| * | * | * | * | * | * | * | * | * | * | * | * |
| * | * | * | * | * | * | * | * | * | * | * | * |
| * | * | * | * | * | * | * | * | * | * | * | * |
| * | * | * | * | * | * | * | * | * | * | * | * |

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Paired bands

All lots in this allocation consist of paired bands. Since this spectrum is being re-allocated primarily to promote competition in the newly liberalised telecommunications market, it is being configured in a way that facilitates telecommunications use. However, pairs could be broken or ‘subdivided’ if a licensee were able to find a buyer in a secondary market in spectrum were to develop. (For information on trading see the *Radiocommunications (Trading Rules for Spectrum Licences) Determination 1996*). All trading is subject to the requirement that it be undertaken in terms of standard trading units (STUs) of spectrum space (see **Chapter 4 - Spectrum Licensing**).

Any person wishing to bid for spectrum in configurations that do not require the regular pairing imposed by the operating arrangements for mobile telephony (for example, fixed links) would be able to bid for spectrum pairs and then seek to offer for sale any unused parts of the spectrum if any secondary market were to develop.

No “combinatorial” bidding

The ACA has decided not to provide for “combinatorial bidding”. This means that registered applicants will not be able to bundle lots together and offer a single bid representing the amount of money they would be prepared to pay for the bundle. Applicants interested in establishing an operation that covers more than one allocation area or more than one band should consider bidding on as many lots as they believe necessary to support their proposed operation.

Other Information about the Spectrum Being Offered

Spectrum subject to spectrum licensing

Spectrum licences will be issued to applicants who are the highest bidder on lots in this auction and who pay the bid price. Spectrum licences authorise the use of spectrum space in a particular band and over a particular area, rather than the use of specified devices.

People interested in the auction are urged to read and understand all of the provisions related to spectrum licensing set out in the *Radiocommunications Act 1992*.

An overview of spectrum licensing and how it works is provided in **Chapter 4 - Spectrum Licensing**. An overview of the technical framework applying to spectrum licences in the 1.8 GHz and 800 MHz bands and applied through the s.145 determinations and s.262 advisory guidelines is contained in **Chapter 5 - Technical Framework**.

Applicants should, on their own responsibility, take whatever steps they consider necessary to ensure that they have access to appropriate technical or other specialist advice independent of the ACA concerning their applications, operation of radiocommunications equipment and services, or other matters relevant to the proposed licence allocation system and operation of transmitters and services under the licences. These enquiries should include, but not be limited to, engineering assessment, availability of transmission sites, environmental and health considerations and Commonwealth, State and Local Government planning requirements.

Applicants should be aware that they will need to co-ordinate services to be operated under the spectrum licences with both existing and future apparatus licensed services within and outside the spectrum to be allocated. Furthermore, in some cases spectrum licensees will have to co-ordinate their services with other spectrum licensees, and the ACA **will not play a role in that co-ordination**. The co-ordination requirements will be set out in s.145 determinations and s.262 advisory guidelines as issued and varied from time to time by the ACA. Copies of the s.145 determinations and s.262 advisory guidelines that will be applied from the time of the spectrum allocation are included in the attachments to this package of documents.

Spectrum to be allocated while encumbered

Prospective applicants should be aware that the spectrum allocation lots will be allocated and become the subject of spectrum licences while the spectrum in these bands is encumbered; that is, certain apparatus licensed services will be able to continue to operate in the spectrum that is to be allocated in this auction during the re-allocation period. The procedure for encumbered allocation is set out in Part 3.6 of the *Radiocommunications Act 1992* (the Act). Applicants should familiarise themselves with the provisions of this Part.

The Act guarantees continuity for these incumbent services until the end of the period set out in the Minister's re-allocation declarations, known as the re-allocation period. For incumbent services in the 1.8 GHz bands, the re-allocation period in metropolitan areas ends on 31 December 1999, and in other areas, on 31 December 2000. For incumbent services in the 800 MHz bands, the re-allocation period will be two years from 21 July 1997 (to 21 July 1999) for the first 2×15 MHz, and ends on 31 December 1999 for the remaining 2×5 MHz, in accordance with the AMPS phase-out timetable.

IMPORTANT NOTE

The effect of the re-allocation provisions of the Act is that whilst a spectrum licence may be issued for spectrum in a particular area, the spectrum licensee may not be able to use spectrum that may still be used by an incumbent apparatus licensee until the end of the relevant re-allocation period. Prospective applicants should note that this may mean that they will obtain

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unrestricted access to spectrum under a spectrum licence at different times, and should carefully examine the potential effect of the re-allocation declarations on their proposed acquisitions of spectrum.

AMPS phase-out timetable

The Minister for Communications, the Information Economy and the Arts, Senator the Hon Richard Alston announced on 21 October 1996 arrangements for the analogue advanced mobile phone system (AMPS) phaseout. These arrangements were determined following extensive consultation between the former Spectrum Management Agency and AUSTEL, the mobile telephone carriers, and representatives of mobile telephone users.

There will be a phased withdrawal of spectrum to reflect the expected progressive reduction in capacity needed for the AMPS mobile phone service. Until the closing date of 1 January 2000, AMPS service will continue to be available in all parts of Australia where it is currently available.

The phaseout is a requirement of Part 19 of the *Telecommunications Act 1997*, which closely reflects licence conditions imposed in 1992 under the previous regulatory regime on the then public mobile licence holders (Telstra, Optus Mobile and Vodafone).

The Minister's announcement noted that the AMPS phaseout has particular implications for certain rural mobile phone users. In some locations, AMPS coverage extends further from transmitters (base stations) than GSM coverage. Accordingly, there are a small number of rural phone users who currently receive an AMPS service but would not necessarily be within the radius of GSM coverage.

Previously the Government had foreshadowed a review of rural planned service areas to be conducted in 1999. The Government has now brought forward this review to the first half of 1998, to be completed by 30 June 1998. The review, to be conducted by the ACA, will determine the actual coverage differences between the existing AMPS network and alternative mobile telephone services, including each of the GSM networks. The Government has given a commitment that equivalent rural coverage will be provided by 1 January 2000 through transitional arrangements involving a combination of:

- retaining a 'residual' AMPS service after 1 January 2000 in those regional areas where the GSM network operators agree to the continued operation of such a network; and
- ensuring alternative service coverage is available in areas where the GSM network operators do not agree to a 'residual' AMPS service (such as through GSM rollout obligations).

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Changes have also been made to the competition rules for the auction (see below), which have some implications for the proposed timetable for the withdrawal of AMPS spectrum. The Government has decided that the timetable for the withdrawal of AMPS spectrum will now be as follows:

| Stage | Withdrawal Date | Amount (MHz) | Frequency bands (MHz) |
|-------|------------------|--------------|-----------------------|
| 1 | 1 January 1997 | 2 x 3 | 887-890/842-845 |
| 2 | 1 July 1997 | 2 x 2 | 885-887/840-842 |
| 3 | 1 October 1998 | 2 x 5 | 870-875/825-830 |
| 4 | 1 April 1999 | 2 x 5 | 880-885/835-840 |
| 5 | 31 December 1999 | 2 x 5 | 875-880/830-835 |

IMPORTANT NOTE:

This timetable reverses the order of withdrawal of the third and fourth blocks of spectrum from that previously proposed.

In rural areas which receive mobile telephone coverage from an alternative technology (such as GSM, or another technology if available by then) which is reasonably equivalent to (or better than) the quality of service and breadth of coverage provided in that area by AMPS, the AMPS phaseout will go ahead. But in areas which the review shows do not have such coverage from an alternative technology, broadly equivalent mobile service coverage will be maintained by the retention of the AMPS service or, if such retention is not agreed by the existing GSM carriers, the imposition of carrier licence conditions on those carriers to provide alternative service (such as through GSM rollout).

Details of existing licensees

Details of current apparatus licensees are contained in the ACA's public Register of Apparatus Licences. A CD-ROM extract from this Register is available from the ACA for AUD\$109.00. More current information can be obtained by search of the ACA's live database from ACA area offices. A set of order forms and end-user agreements, together with instructions for purchasing a copy of the CD-ROM, is at **Attachment 17**.

Applicants need to be aware that, while the ACA has taken reasonable steps to confirm device details recorded in the Register by writing to licensees, the ACA cannot give any guarantee as to the accuracy of the data. Applicants should make their own enquiries about existing spectrum users.

The ACA plans to offer internet access to its live database Register by mid 1998.

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Nothing in the auction procedures prevents a successful bidder in the auction from approaching incumbent licensees and entering into negotiations for the incumbent to vacate the spectrum before the end of the re-allocation period.

Advisory Guidelines for Protecting Incumbents

The ACA has made advisory guidelines under s.262 of the Act for the protection of services of incumbent apparatus licensees from interference while their licence continues under a re-allocation declaration (see **Chapter 5 - Technical Framework**).

Competition/Bidding Limits

The ACA has powers to determine the procedures to be applied in allocating spectrum licences, and as part of these procedures can determine limits on aggregate parts of the spectrum that may be used by any one person, or a specified person, as a result of an allocation. The Minister has given written directions to the ACA about the exercise of this procedure making power in relation to this auction, and a copy of those directions is at **Attachment 2**.

IMPORTANT NOTE:

These directions have changed from the directions which were included in the draft Marketing Plans released in July 1997.

The ACA has implemented the Minister's directions by effectively placing limits on bidding, referred to in this information package as 'bidding limits'. In summary, in the major capital cities, no one person (new or incumbent licensee) may be allocated more than 2×15 MHz in the 1.8 GHz band.

In addition to this general limit, the spectrum segment 825-830/870-875 MHz will be reserved Australia wide for new entrants only (that is, not Telstra, Optus or Vodafone), with the restriction being enforced through carrier licence conditions. In addition, in major capital cities the spectrum segment 830-835/875-880 MHz will similarly be reserved for new entrants only. Applicants should note that the limits and "reservations" have changed since information released with the draft Marketing Plan in July 1997. In particular the Government no longer proposes there be any limit on the amount of spectrum that a new entrant can acquire in the 800 MHz band. Although the existing mobile carriers will still be precluded from bidding in "reserved" spectrum, the actual reserved lots are different to those proposed in July. These "reservations" are given effect through telecommunications carrier licence conditions (Attachment 3).

The Minister's directions apply limits to applicants and their associates. The ACA has put in place procedures to deal with this aspect of the Minister's directions, and information on those procedures is set out in **Chapter 3 - How to get a Licence**.

Licences will be allocated to successful bidders, subject to compliance with the limits. Post auction trading of licences leading to use of spectrum that would have exceeded the limits if it resulted from the auction will be monitored by the Australian Competition and Consumer Commission (ACCC).

Prohibition on Deployment of Analogue AMPS

Government policy requires the phase out of the AMPS network by the year 2000.

Under ss.360-361 of the *Telecommunications Act 1997*, no one other than Telstra may install or operate an analogue AMPS network. Section 362 of the Act enables a limited exemption from this prohibition to be made by the Minister in certain circumstances, including where the three current GSM mobile carriers have agreed to such a retention. A limited exemption may be given, following the announced review of AMPS service coverage to be completed this year, in specified existing AMPS rural service planned areas not adequately supplied with alternative mobile telephone services. 2 x 5 MHz of 800 MHz spectrum has been withheld from the spectrum auction in regional Australia to enable the operation of such a 'residual' AMPS network.

Roaming/Resale Rights and Access Rights

The Minister has also announced that to support competition, rights will be established to enable new digital service operators in the 800 MHz band to acquire capacity from the analogue AMPS service for limited resale before their digital service operation begins and to establish roaming between the analogue and digital 800 MHz band services.

Following requests by potential new entrants, the Minister has also asked the ACCC to consider whether it should establish appropriate access rights to facilitate inter-carrier roaming between digital mobile communications services. He has also asked the Commission to examine whether a code of practice is necessary to facilitate access by new and existing mobile communications operators to existing telecommunications towers and sites in order to facilitate network roll-out.

The ACCC is expected to issue final reports on inter-carrier roaming and access rights by mid-February. Further information is available from:

Mr Chris Pattas
Director, Telecommunications Access
Australian Competition and Consumer Commission
GPO Box 520 J
MELBOURNE VIC 3001

Telephone: (03) 9290 1858 (international + 613 9290 1858)

Fax: (03) 9663 3699 (international + 613 9663 3699)

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Application of the *Trade Practices Act 1974*

In this auction, an applicant can nominate to bid on any lot, or any combination of lots on offer, in any area or any band. Applicants should be aware that under the *Radiocommunications Act 1992* certain provisions of the *Trade Practices Act 1974* (TPA) apply to aspects of radiocommunications licensing. In particular, s.71A of the Act deems the issue of a spectrum licence to a person to be an acquisition by the person of an asset of another person for the purposes of s.50 of the TPA. Similarly, s.68A of the Act deems the authorisation, in accordance with s.68(1) of the Act, of a person to operate radiocommunications devices under a spectrum licence to be an acquisition by the person of an asset of another person for the purposes of s.50 of the TPA.

The acquisition of assets within Australia is subject to provisions contained in Part IV of the TPA. The TPA prohibits (s.50) acquisitions of shares or assets where the acquisition is likely to have the effect of substantially lessening competition in a substantial market. Such acquisitions can nevertheless be authorised under the TPA if the Australian Competition and Consumer Commission (ACCC) is satisfied that they would result in such benefit to the public that they should be allowed to take place. Alternatively, undertakings can be given to the ACCC under the TPA, where appropriate, to resolve matters where the proposed acquisition is, in the ACCC's view, likely to contravene the TPA.

The ACCC's approach to the administration and enforcement of the acquisition provisions of the TPA is outlined in its revised Merger Guidelines published in July 1996. A copy of the merger guidelines may be obtained from the ACCC or downloaded from the ACCC's website.

There is no formal requirement for proposed acquisitions to be notified to the ACCC. However, the ACCC would encourage parties interested in acquiring spectrum licences to consider whether the acquisition is likely to raise issues under the TPA. If this is the case, then the ACCC would encourage the parties to approach the ACCC on an informal and confidential basis prior to participating in the sale process.

The ACA will be providing details of all applicants to the ACCC.

Applicants should therefore seek such legal or other advice as they consider necessary as to their ability to use spectrum for the purposes intended. Information on the ACCC can be found on their home page at:

<http://www.accc.gov.au>

Taxation Treatment of Spectrum Licences

The ACA is not able to provide any advice on the treatment which may be accorded spectrum licences under Australian taxation laws. Applicants should seek such specialist advice as they consider necessary on how spectrum licences may be treated under tax laws.

Foreign Investment Approval

Foreign applicants intending to establish a business in Australia may need prior approval under the Government's foreign investment policy and the Foreign Acquisitions and Takeovers Act 1975.

The Government's foreign investment policy is framed and administered with a view to encouraging foreign investment and ensuring that such investment is consistent with the needs of Australia. The Government recognises the substantial contribution foreign investment makes to the development of Australia's industries and resources.

The types of proposals by foreign interests to invest in Australia that require prior approval and should be notified to the Australian Government include (but are not limited to) the following:

- acquisitions of substantial interests in existing Australian businesses with total assets of \$5 million or more;
- plans to establish new businesses involving a total investment of \$10 million or more;
- direct investments by foreign governments or their agencies irrespective of size;
- certain acquisitions of real estate.

With regard to the telecommunications sector specifically, prior approval is required for foreign involvement in the establishment of new entrants to, or investment in existing businesses in, the telecommunications sector. Proposals above the notification thresholds will be dealt with on a case by case basis and will be normally approved unless judged contrary to the national interest. (In a press release by the Treasurer of 14 August 1997, the Government noted that it "considers it important from a competition viewpoint that participants in the telecommunications sector not be unnecessarily constrained by foreign investment regulation").

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Foreign applicants are encouraged to make their own inquiries about foreign investment approval. Detailed information is available from the Treasury website at:

<http://www.treasury.gov.au/organisations/FIRB/Policy>

Further information can also be obtained from, or submissions made to:

The Executive Member
Foreign Investment Review Board
C/o The Treasury
CANBERRA ACT AUSTRALIA 2600

Telephone: (02) 6263 3795 (international + 612 6263 3795)

Fax: (02) 6263 2940 (international + 612 6263 2940)

Licensing under the *Telecommunications Act 1997*

The *Telecommunications Act 1997* introduces a regulatory regime designed to achieve full and open competition in the Australian telecommunications market. A key element of the new arrangements introduced in the Act is that there is no limit on the number of carriers permitted to enter the market.

Under this regime, any person may install and operate telecommunications facilities and networks. A carrier licence, however, must generally be held by any person owning specific infrastructure (referred to as 'network units') where those facilities are used to supply carriage services to the public.

A carrier licence need not be held where the network units are used solely or principally for exempt purposes (such as defence, and certain transport, electricity supply or broadcasting activities) or where the ACA has determined (through the 'nominated carrier declaration' provisions) that another person who holds a carrier licence accepts the carrier related responsibilities for the facilities.

There are four categories of network unit set out in the Act, one of which deals with radiocommunications facilities.

A designated radiocommunications facility is a network unit if it is used, or is for use, to supply a carriage service between a point in Australia and one or more other points in Australia (notwithstanding whether the supply involves the use of a satellite or a line or other facility outside Australia). The following kinds of facility are designated radiocommunications facilities for the purposes of the *Telecommunications Act 1997*:

- a base station for the supply of public mobile telecommunications services;
- a base station that is part of a terrestrial radiocommunications customer

access network;

- a fixed radiocommunications link;
- a satellite based facility;
- a radiocommunications transmitter or receiver of a kind specified in a Ministerial determination.

Carriers are individually licensed, subject to initial application and annual licence charges intended to recover the costs of regulating the industry.

Persons wishing to apply for carrier licences including applicants for spectrum licences which could be used to provide carriage services under that Act, are urged to familiarise themselves with the provisions of the Act, not just those pertaining to the granting of licences. Applicants should make their own enquiries as to the legislative and other obligations (including industry development obligations) that are imposed on carriers and those declared to be nominated carriers.

Further advice on the requirements relating to the carrier licensing and nominated carrier declaration schemes can be obtained from the:

Licences and Infrastructure Team

Australian Communications Authority

PO Box 13112

Levels 11-14

Law Courts PO

200 Queen Street

MELBOURNE VIC 8010

MELBOURNE VIC 3000

Telephone: (03) 9963 6813 (international + 613 9963 6813)

Fax: (03) 9963 6979 (international + 613 9963 6979)

A guide and applicant information on carrier licences can also be found on the ACA's website at the following address:

<http://www.aca.gov.au/support/pubs/industry/GuiCarLc.html>

Telecommunications Standards

Under s.376 of the *Telecommunications Act 1997* the ACA may make standards relating to specified customer equipment. Customer equipment is equipment that operates in connection with a carriage service beyond the network boundary of a carrier or carriage service provider. If the licensee is a carrier and is offering an air interface to customers, the customer's equipment will be subject to technical standards under s.376. All customer equipment is subject to TS001 (safety) and AS/NZS2772.1 (Radiofrequency radiation). Except for certain technology specific standards for Customer Equipment, (GSM, AMPS, CT2 CAI, DECT, PHS,

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& Mobilesat) there are no applicable mandatory standards for the air interface.

Further information on technical standards can be obtained from:

Mr Grant Symons
Executive Manager
Telecommunications Standards
Australian Communications Authority
PO Box 7443
St Kilda Rd
MELBOURNE VIC 3004

Telephone: (03) 9828 7461 (international + 613 9828 7461)

Fax: (03) 9828 7438 (international + 613 9828 7438)

Defence use of the Spectrum

The Australian Defence Force is a large user of the radiofrequency spectrum.

Under the Act and the Radiocommunications Regulations, a wide range of defence and national security uses of the spectrum is exempt from the application of the Act.

All spectrum users need to be aware that they may, from time to time, have to share use of the spectrum with agencies engaged in activities associated with defence and national security and whose services are exempt from the Act in this way ('exempt services'). The ACA can give no guarantee that the use of spectrum by such exempt services will not cause interference, and prospective applicants should note that civil proceedings under s. 50 of the Act will not lie if interference is caused by exempt services to spectrum licensees.

Co-ordination with existing radiocommunications services

Nothing in the ACA's spectrum licensing approach absolves licensees from the obligation to avoid interfering with services provided by other legitimate users of the radiofrequency spectrum. This may require a spectrum licensee to co-ordinate proposed new devices with existing apparatus licences, and with the devices operated by other spectrum licensees (see **Chapter 5 - Technical Framework**).

Protection for Adjacent Services

The ACA has made advisory guidelines under s.262 of the Act for protecting from interference, devices that are operated under apparatus licences in spectrum that is adjacent to spectrum that is the subject of spectrum licences issued as a result of the auction (see **Chapter 5 - Technical Framework**).

Protection for the MOST

The Molonglo Observatory Synthesis Telescope (MOST) is a scientific research facility located at Bungendore about 40 km from Canberra. This facility is engaged in research into weak cosmic sources in the 800 MHz band. All spectrum licensees are required to provide protection to the MOST facility until 31 December 2008 (see **Chapter 5 - Technical Framework**).

Imposition of Licence Conditions

The ACA reserves the right at all times to impose on spectrum licensees such licence conditions as it considers necessary to allow the ACA to fulfil its statutory obligations regarding the management of radiofrequency spectrum. In particular, Australia is a signatory to the International Telecommunication Constitution and Convention and will impose any licence conditions necessary to enable Australia to fulfil its international treaty obligations.

Duration of licences

Licences will be auctioned for a fixed term not exceeding fifteen (15) years. This is the maximum allowable under the Act. There is no automatic right of renewal.

No further re-allocation declaration before 2000

The Minister has announced in a press release of 9 July 1997 that it is the Government's intention not to make the 2×30 MHz from 1755-1785/1850-1880 MHz in the 1.8 GHz band subject to a re-allocation declaration before the year 2000. This 2×30 MHz is part of the DCS 1800 spectrum that is not being re-allocated.

2. How is it being allocated?

In this Chapter ...

- **general information about the simultaneous ascending auction system**
- **information about how the auction process works**

In this auction, applicants will compete for *spectrum licences*. This form of licence was implemented for the first time in 1997. Broadly speaking, instead of authorising the operation of a specific device or type of device, a spectrum licence authorises the use of spectrum within a geographic area, provided that the device complies with the engineering framework for spectrum licensing in the band.

This part explains how the ACA will use the *simultaneous ascending auction* system to allocate spectrum allocation lots (or *lots*). Lots are like “building blocks” of spectrum space. The auction process allocates lots to the applicants who value them most highly. These lots are aggregated after the auction by the ACA to form licences.

The spectrum allocation lots on offer in the auction are defined in the *Radiocommunications Spectrum Marketing Plan (800 MHz and 1.8 GHz Bands) 1998 (Attachment 4)*, and are described in the previous chapter.

Overview

IMPORTANT WARNING

*The following information is only intended to provide a general overview of the allocation scheme which is contained in the Radiocommunications (Spectrum Licence Allocation) Determination 1998 ('the Determination'). Potential applicants should **not** rely on this information, but should instead rely on the content of the Determination itself. Potential applicants are also urged to seek appropriate independent legal other advice in relation to the Determination. A copy of the Determination is at Attachment 6.*

In a simultaneous ascending auction, all bidders are able to bid on all elements of their preferred aggregations at the *same time*. All the lots on offer are auctioned simultaneously, rather than in sequence. Bidders can bid on any lot, or any combination of lots, up to their own pre-declared limit. This limit is expressed as eligibility; a representation of the amount of bandwidth and population coverage the bidder ultimately hopes to win.

Bidding is conducted over multiple rounds and the auction closes when there are no new bids on any of the lots in a round in the final stage of the auction (see

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Auction Stages). A key feature of the auction is the application of *activity rules* that encourage active participation and ensure that the process does not stall. If a bidder fails to meet his or her activity requirements, the amount of spectrum that he or she is eligible to bid on reduces. Bidders may not bid on lots in such a way that their bidding activity would exceed their eligibility.

Applicants must pay an entry fee to participate in the auction which is intended to cover the ACA's costs in bringing the spectrum to market. The ACA has set this fee at \$10,000 (Attachment 8). This fee is not refundable.

Applicants must also pay an *eligibility payment* to register for the allocation process. The rate of eligibility payment has been set by the ACA as \$2.00 per lot rating (Attachment 8). The eligibility payment will be calculated proportionally to the amount of eligibility nominated by the applicant. The eligibility payment will be held against bid withdrawal penalties in the auction. Any eligibility payment remaining after deduction of bid withdrawal penalties will be credited against the bid price of successful applicants. This eligibility payment is refundable at the end of the auction if there is any surplus after the deduction of bid withdrawal penalties, and after credit to the balance of the bid price (ie. winning bids plus bid withdrawal penalties minus the eligibility payment).

Each round of the auction will consist of:

- a bidding period when bidders make their bids and any automatic rebids, or withdraw some or all of their current high bids so that they may redeploy their eligibility to pursue different bidding strategies;
- a short period of time for the ACA to calculate the results and make them available for download, and for bidders to consider the results before the next round commences.

Due to the very large number of permutations of bidder preferences in an auction which offers 230 lots, this auction will be run on a computer, and people will bid electronically. Bidders will submit their bids using a computer and modem, transmitting bids over the public telephone network or the internet. Bids will be encrypted for security and data integrity.

The ACA's auction bidding software provides for bidding and withdrawing bids in the auction, and for viewing the results of the auction. The software allows a bidder to view the whole database of lots on offer, or to select lots by area, or by frequency band, or by both. Information is also provided regarding the current eligibility, current activity, the current value of high bids, and any bid withdrawal penalties for all bidders.

The ACA will use "public key" encryption to seek to secure the privacy and integrity of each bidder's bid file as it is transmitted to the ACA. Public key encryption also offers scope to provide sophisticated digital authentication procedures for files that are mathematically improbable to compromise. For the auc-

tion, the ACA will provide all pairs of encryption keys. Each bidder will be given a copy of the ACA's public key and a copy of their own secret key. The ACA will retain a copy of all public and secret keys distributed in the auction, stored under appropriate security arrangements. In all cases, the bidder must provide a bidder identification number and certain authentication information for a bid to be accepted (see the determination for details of the authentication required).

The ACA accepts that emergency situations may occur during the auction, and under these circumstances will accept telephone bids. Telephone bidding will only be permitted in circumstances which the ACA considers amount to an emergency. Telephone bidders may issue instructions by telephone to an operator who will be using the bidding software to prepare bids. The submitted bid will then be returned by fax to the bidder as confirmation.

Application Period

Applications will close at 5:00pm (Canberra time) on Friday 13 March 1998.

Applications must be accompanied by the entry fee of \$10,000 and the eligibility payment calculated by the applicant.

NOTE: The ACA cannot accept late applications after the closing date. Applicants should note this represents a change from the proposals in the draft Marketing Plan.

Restrictions on use of software overseas

The ACA is going to provide two versions of its auction software. One is for bidders in Australia. That software contains high-level encryption systems that may be illegal in other countries and which cannot be exported from Australia without a permit.

The second type of software that the ACA will provide is for applicants who wish to bid from outside Australia. For these applicants, the ACA will provide an 'Export Only' version of the software which will not contain the restricted encryption components.

Applicants intending to bid from overseas will need to obtain their own copy of the encryption software from a supplier. They should then insert the encryption software into the working directory of the ACA software.

The auction computer system works with the PGP 2.6.x encryption software. Details about some potential sources for PGP 2.6.x can be found on the internet at:

<http://www.pgpi.com/download>

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Deed of Guarantee

The ACA has introduced a new approach to the provision of guarantees. Under the new approach, guarantees must be provided by *all* applicants (including individuals) other than those referred to in paragraphs 2.8(1)(a)-(c) of the determination. The guarantees must be in the ACA approved form which is provided to potential applicants as part of this Applicant Information Package.

The guarantors will be required to guarantee the obligation of a successful registered applicant under the determination to pay the bid price or pre-determined prices owed to the ACA under the determination. However, the amount of the guarantee will be limited to an amount calculated as five times the amount of any applicant's initial eligibility, expressed in dollars. For example, if an applicant nominates its initial eligibility as 576,585, the guarantee that the applicant must provide will be for a maximum of five times that eligibility, namely \$2,882,925.

Guarantees must be provided by banks licensed to operate in Australia, by a person authorised to carry on a business in Australia as an insurer under the Insurance Act 1973 or, if Part VII of that Act has not ceased to have effect, a Lloyds underwriter.

Simultaneous ascending auctions

Under the determination, the auction will take place in a number of stages, each of which will comprise a number of rounds. The number of rounds in each stage is not fixed, and bidding is possible on all lots in all rounds. The auction manager will decide when the auction should move from one stage to the next.

Each stage of the auction will require applicants to make active bids in each round on a higher percentage of their eligibility than the previous stage. Applicants will be told the number of stages for the auction and the activity percentage applying to each stage before the auction commences.

The auction continues from round to round until such time as a round passes in the final stage, no new bid is made on any lot in that round and no bidder exercises a waiver. The auction can also be brought to an end by the auction manager at a specified round (cl 4.25 of the determination.)

Each round has two discrete components, and these follow a schedule, which is published in advance for every round. There is:

- a bidding period, when bidders may lodge their bids and automatic rebids for the round, or withdraw their high bids from previous rounds so that they may change bidding strategies within their eligibility; and
- a calculation period, when the ACA calculates the highest bid on every lot on offer and makes those results available. Bidders can review the results and consider their strategy for the next round.

After considering the results for one round, bidders bid again on their preferred lots, or make a different set of bids in the next round.

Once all bidding has stopped the auction manager will declare the auction closed and will advise all registered applicants of the closure. The applicant who has the highest bid on each lot at the end of the auction wins the lot at the price the applicant bid.

The auction manager has discretion to stop the auction at a specified round, but must advise all registered applicants of this before the proposed closure.

Bidding in the Auction

Starting Bids

At the start of the auction, every lot will be subject to a specified starting bid. Starting bids act like a reserve price, but they are disclosed at the start of the auction. The starting bid on all lots will be set by the auction manager after the closing date for applications.

Minimum Bids

After the starting bid is made on a lot, new bids on that lot will be subject to a minimum bid. This is the amount that a person wishing to bid on that lot must bid in order to make a valid bid in that round. This amount is calculated by adding an increment to the current high bid, and is updated for every lot and every round, based on a formula. Note that in the case where a bid is withdrawn, the high bid will be taken as the next highest bid made on that lot. The minimum bid for the lot will be set equal to the high bid amount reported in the results, or, if there has been no other bid on the lot, to the minimum starting bid.

The formula for calculating the minimum bid for the next round takes the current high bid and adds the *higher of*:

- a percentage of the current high bid; or
- a price per lot rating.

The Auction manager will set these amounts after the closing date for the auction.

During the auction, the auction manager can vary these amounts after consulting with bidders. In the early stages of the auction, larger increments are likely to be set, but as the auction matures, smaller and more conservative increments might be chosen to allow for more marginal adjustments to pricing. Adjusting the level of the minimum bid increment may also be used to influence the speed at which the auction closes.

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Automatic Re-bidding

In this auction, the ACA is providing a facility for automatic re-bidding. This facility is being provided to speed the auction process.

In simple terms, a person may nominate to automatically re-bid on a lot. They may do this so that in the event that another bidder also bids on that lot, or makes a higher bid on that lot, they can be sure to win the lot, up to a limit which they nominate. There is no obligation on any applicant to use the automatic re-bid facility. Applicants using the facility, however, may speed the auction along because it effectively allows a number of bidding actions on a lot to be compressed into a single round.

Automatic re-bids are calculated to raise the high bid value on a lot by one increment at a time, up to a limit set by each bidder nominating to automatically re-bid (the *automatic rebid limit*).

To use the automatic rebid facility, applicants will nominate an automatic rebid limit for each of the lots they want to win. The automatic rebid limit must be greater than the minimum bid set by the ACA for the lot. It can be as far over the minimum bid as the applicant is prepared to risk.

When processing bid instructions, the auction system will identify the high bidder on each lot. If any of the other applicants have nominated an automatic rebid limit higher than this amount, the system will identify the person with the highest re-bid limit as the high bidder on the lot. The amount recorded as their bid will be one bid increment higher than the next highest automatic rebid limit, or the high bid. If their automatic rebid limit is not enough to cover a full increment, then the high bid shown will be set to the amount of their automatic rebid limit.

While the ACA believes this will be a useful facility, we advise that it be used with some caution. With automatic re-bidding, it would be possible for bidding on one lot to escalate very quickly, while adjacent identical or nearly substitutable lots remain comparatively low priced. Re-assessing the best bid on a range of options after each round is a less risky strategy.

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Eligibility Limit

An applicant may bid on any lot or any combination of lots, provided that the total of the lot ratings of the lots on which they are *active* never exceeds their eligibility. Bidders are not restricted to bidding on the particular lots that they considered when nominating their eligibility.

The ACA's auction software provides information to bidders during the auction to assist them to manage their bidding within this limit. Correctly utilised, the system will not permit a bid file to be prepared if it contains bids which would exceed this limit.

Minister's Bidding Limits

As set out in Chapter 1 under **Competition/Bidding Limits**, the Minister has directed the ACA to apply limits on the spectrum allocation which any bidder can acquire at the auction. The auction software will prevent any one bidder from making a bid which would breach these limits. The Minister has also imposed particular limits on Telstra, Optus and Vodafone (in the 800 MHz band). The ACA will not police these limits in its software.

The Minister has also directed the ACA to apply these limits to associated persons (in order to prevent the intention of the limits being undermined).

Associated Persons

To ensure compliance with the limits on associates, it is necessary for the ACA to implement procedures enabling associated bidders to be identified, and to ensure that bids from these associated persons do not jointly exceed the Minister's limits. The procedures for identifying associated persons are described in **Chapter 3 - How to Get a Licence**. Briefly, the provisions involve the ACA checking before the auction whether any bidders are associated. The provisions require persons identified as associates to either submit a single application or, if they choose to maintain separate applications, to be treated as if they were a single bidder in the auction.

At the end of the auction, the ACA will circulate to each successful applicant, details of all other successful applicants, and ask each successful applicant to sign a statutory declaration about whether or not they are an associate of any other successful applicant, or of Telstra, Vodafone or Optus. If any bidders declare themselves to be, or are found to be associates, and if the total of all of the lots of all of the parties to an association exceeds the Minister's bidding limits, then the lots to be allocated to them will be reduced to the limit of the bidding limits. Any lots which remain unsold because of the operation of these provisions will be offered for allocation in a separate, later allocation.

IMPORTANT NOTE

Prospective applicants should note that there can be serious consequences if they are found to be associated after the commencement of the auction, and if the total of the lots of the parties to the association exceeds the Minister's bidding limits. In particular, prospective applicants should note that they may be liable to pay the bid price for lots which they may not be entitled to have incorporated within a spectrum licence. Prospective applicants should also note that failure to notify the ACA of an association may give rise to both civil and criminal liability.

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For further information on the procedures relating to associated persons, see Associated Persons Procedures in Chapter 3 - How to get a licence below.

Activity

Activity Targets

To prevent the auction stalling, bidders will have to be **active** on lots with a lot rating that exceeds the relevant activity target, such as the examples above, set by the auction manager for the stage in which they are bidding. **Active** means they must either:

- be recorded as the highest bidder on a lot in the previous round's results **and** not withdraw that bid in the current round;
- **or** make a new valid bid on a lot (which need not be the highest bid made during the round) in the current round.

For new bids made in a round, any valid bid will count, not just those bids that are the highest for the round. When the number of new bids at one level of activity declines, the auction manager may decide to move to the next stage of the auction with a higher activity level (see below). The auction manager will ask all applicants to comment on this and take their comments into account before taking a decision to make the stage transition. When the new bid activity level declines at this higher activity target, the ACA may again raise the target to the next level, following the same process. Once the activity target is set at the final level, it will remain at that level until no new bids are made on any lot in a round, and the auction then closes, or until the auction manager otherwise closes the auction.

Auction Stages

Simultaneous multiple round auctions are conducted over several stages (previously, this has been three), with each stage having an unspecified number of rounds. Each successive stage requires a higher level of bidder activity, and the auction manager will move the auction from one stage to the next (and so a higher level of activity) when a decline in bidding activity indicates that an equilibrium is near.

The level of bidder activity required in each stage is expressed as a percentage of their eligibility. For example, the auction manager could set activity targets as follows:

- 60 per cent of their eligibility in the first stage;
- 85 per cent of their eligibility in the second stage; and
- 95 per cent of their eligibility in the third stage.

These amounts will not be set until after applications close, when the likely competitive environment can be considered.

Eligibility Reductions

Bidders not complying with these activity requirements will have their eligibility for licences reduced unless they use a waiver (see below). Bidders who lose eligibility for under-activity will, in future rounds, only be able to bid in accordance with their reduced eligibility level. Once lost, eligibility cannot be recovered.

The ACA's auction bidding software incorporates a facility to give bidders a running total of their activity during the auction. The system provides notification if a bid file does not contain enough activity to meet the current activity target.

High Bids

Applicants do not have to raise their own high bids but they may do so if they wish. If they raise, the act of raising the bid will not add to their activity (they will already be regarded as active on the lot by having been the high bidder from the previous round).

If two or more identical bids are received, the applicant whose bid is the first recorded on the auction computer system will be regarded as the high bidder for that round. Telephone bids will be timed when they are entered onto the computer system by the ACA. If there are any disputes in this area, the auction manager will make the final decision.

Waivers

The ACA recognises that there will be times when bidders need to take "time out" from the auction, perhaps to consider an alternative bidding strategy. All bidders, therefore, will have a number of waivers which exempt them from the reduction of eligibility described above. The number of waivers is set by the auction manager.

Applicants can:

- nominate to exercise a waiver in a round (a "pro-active waiver"), **or**
- if they do not exercise one, the Auction Manager will automatically apply one of their waivers (an "automatic waiver") rather than reduce eligibility; **unless**
- the applicant asks the auction manager **not** to do this (an "automatic waiver over-ride").

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A difference between a pro-active waiver and an automatic waiver is that a bidder can use a pro-active waiver to keep the auction open for one more round if there are no new bids made.

The auction manager will set the number of waivers after applications close, and registered applicants will be informed as to how many waivers they will have.

Bid Withdrawal

This form of auction allows bidders to change their bidding strategies and the lots they hope to win. To do this they may need to withdraw their high bids on some lots to move to other lots without exceeding their eligibility.

When a high bid is withdrawn, and if no other bidder bids on the lot, the lot will be shown in the next results file at the second highest price that has been bid during the auction, but without that price being attributed to the second highest bidder. This is because the second highest bidder, acting on the knowledge that it is not the highest bidder, may have already decided to deploy its eligibility elsewhere, in which case attributing the lot to that bidder may cause them to exceed their eligibility.

The second highest bid price, therefore, will be attributed in the results to the default bidder [BIN 9999], which is the ACA. In this situation, the ACA will not apply a minimum bid increment to the amount in the next round. Instead, the minimum bid on the lot will be set equal to the second highest bid. In this way, if the bidder who made the second highest bid is still interested in the lot, it may bid on the lot and confirm its interest without further financial commitment.

If a bidder withdraws a high bid, the lot rating of that lot will be deducted from the bidder's activity in the round. The bidder will need to consider whether, by withdrawing a bid on a lot, it fails to meet the activity target for that round.

Bid Withdrawal Penalties

To discourage bidders making frivolous bids and then withdrawing them, each bid withdrawal may be subject to a bid withdrawal penalty.

The penalty works like this: a "bid" is like a promise of a certain amount of money for the lot. If the bid is withdrawn, and the lot is ultimately sold for less, the promise is broken.

The person withdrawing the bid is liable to the ACA to make up any shortfall between the promise that it made (the withdrawn bid), and the final bid price at the close of the auction. If, at the end of the auction, there is no shortfall, then there will be no bid withdrawal penalty.

Close of Auction

The auction will be closed when a round passes in the final stage with no new bids being made, and no “pro-active waivers” being exercised. It is also possible for the auction manager to bring the auction to a close on two rounds notice.

The auction manager must advise all registered bidders of the close of auction. Applicants who made the highest bids on lots at the close will be issued with a notice of payment due.

Payment Process

When the auction closes, each successful applicant will be issued with a notice confirming the results of the auction and setting out the amount owing on each lot on which it was successful, plus any bid withdrawal penalties, less the initial eligibility payment (this is called the "balance of bid price" in the auction rules).

This notice will be sent by receipted mail to the address of the applicant.

Successful bidders will have 5 working days from the date of the notice in which to pay 10 per cent of the "balance of the bid price". Successful bidders will then have a further 10 working days to pay the remainder, making a total of 15 working days from the date of the notice for the balance of the bid price to be paid.

Prospective applicants should note that they will be required to pay the balance of the bid price on all lots on which they are successful, even if one or more of those lots cannot be incorporated within a spectrum licence by virtue of the Minister's bidding limits (see Associated Persons Procedures in **Chapter 3 - How to Get a Licence.**)

Default

If either payment is missed, the applicant will be in default.

In the case of default, all bids made by the defaulting applicant will be treated as withdrawn bids and the bid withdrawal penalty calculated accordingly. The eligibility payment will be credited against this penalty, but if there is still an outstanding penalty, this will become a debt due to the ACA.

Any other monies paid by the applicant (for example, the first 10 per cent payment) will be forfeited. The ACA may also initiate damages action for the cost of having to re-auction the affected spectrum lots and for the difference in the price obtained.

Any successful bidder defaulting on payment of a lot will not be entitled to a spectrum licence for that lot or any other lot on offer in the auction.

Unallocated Lots

Any unsold or defaulted lots may be allocated by the ACA by another auction, by tender, or by a pre-determined or negotiated price.

Licence start dates

Licence start dates will be the date of issue of the licence.

3. How to Get a Licence.

In this chapter ...

- a step-by-step guide to the allocation process
- details about how to fill in the application form
- what will happen after you apply and the auction progresses.

Introduction

To get a licence, follow these steps carefully:

1. Inform yourself - read and understand all of the information in this applicant information package!
2. Work out how much spectrum you want, and where;
3. Register for the auction;
4. Bid in the auction; and (if successful)
5. Pay the money you bid to the ACA.

Step 1 - Inform yourself

Spectrum licensing is different from the more traditional apparatus licensing approach which is familiar to most spectrum users. It offers more flexibility and new opportunities to spectrum users.

Before participating in this auction make sure that you read and understand all of the material in this Package. Understand the opportunities and responsibilities that spectrum licensing entails. You are strongly urged to seek your own legal and engineering advice to help you do this.

Once you have your licence, the ACA expects you to manage the potential for interference. The ACA requires that before you operate any devices as part of your system you conduct, or contract someone else to conduct for you, an engineering analysis of your system to make sure that it fits within the spectrum space authorised by your licence and will not cause unacceptable interference to other users of the spectrum. There are a series of determinations under s.145 and advisory guidelines under s.262 of the Act that must be followed to avoid unacceptable interference.

The ACA also requires that before you operate any devices in your spectrum space, you register them. You cannot use the devices unless they are registered, or are exempt from the requirement to be registered. Mobile telephone handsets are exempt from registration.

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More information about spectrum licensing is in **Chapter 4 - Spectrum Licensing**, and on the technical framework for spectrum licensing, in **Chapter 5 - Technical Framework**.

IMPORTANT NOTE

Spectrum licences are issued for fixed terms of up to 15 years. Under the Radiocommunications Act 1992, spectrum licences must be re-allocated by a price-based allocation (eg. another auction) and can only be re-issued to the persons to whom they were previously issued without another price-based allocation process, when that would be in the public interest.

The ACA will be using the “simultaneous ascending auction” system to allocate spectrum licences. It is different from the traditional "English" open outcry auction often used to sell art or antiques, for example, and with which most people are familiar. You should carefully read the auction rules contained in the *Radiocommunications (Spectrum Licence Allocation) Determination 1998* (**Attachment 6**) and understand what they mean before you apply to take part.

IMPORTANT NOTE

Take care in completing the application forms. These are important for establishing your right to participate and bid during the auction.

The ACA will arrange for people who register to participate in the auction by the closing date to be given an opportunity for training and to participate in a trial auction. Training will not be provided to bidders overseas. Applicants should not, however, rely solely on the training given by the ACA. That training will be concerned only with the “mechanics” of the auction system. The ACA will not provide training or advice on bidding strategies, or on all the possible effects of the actions of bidders during the auction process. Applicants should seek such legal and other advice as they consider necessary in relation to the auction system.

IMPORTANT NOTE

Once involved in an auction, you must be prepared to take part in every round, otherwise, you may become ineligible to be issued a licence.

Step 2 - Work out How Much Spectrum You Want

How much spectrum you want will depend on what you want to do.

In allocating spectrum licences, the ACA is not just offering the opportunity to acquire spectrum and use it for communication systems. There is also scope for licensees to authorise other people to use the spectrum space authorised by their licence. If an applicant wishes to do this, they may be interested in acquiring a large amount of bandwidth in a number of areas.

Whatever your circumstances, you need to think carefully about how much spectrum you need and what you propose to do with it. Under spectrum licensing, the onus is on you to acquire enough spectrum to accommodate your systems, and, if appropriate, the systems of all of those people whom you wish to authorise to operate under your spectrum licence. You should seek expert engineering advice.

Example

Joe, from Joe's Telephone Systems, wants to operate a mobile telephone service in metropolitan areas. Joe's aspirations are modest and after seeking engineering advice, he concludes that he only needs a 5 MHz pair in metropolitan areas, and that he prefers the 800 MHz bands.

Joe looks at the lots available in this allocation. He sees, from the tables in the Marketing Plan, that there are 4 lots each of 2×5 MHz available in each metropolitan areas in the 800 MHz bands.

Joe therefore aims to obtain a single lot of 2×5 MHz in each of the 5 metropolitan markets. If all 4 of the lots were identical (in this allocation, they are not, because they become available for use at different times), Joe would be able to bid in such a way that he targeted the cheapest lot in each area from round to round.

How much spectrum you want is up to you, but whether or not you get it depends on who else wants it, and how much you and they are prepared to pay.

When planning your spectrum requirements, the ACA recommends that you seek expert engineering advice regarding the spectrum needs of the systems you want to operate. The ACA makes no representations about the suitability of the spectrum to be offered for any particular use, including the uses set out in the examples above.

Step 3 - Register for the auction

If, after you have considered your spectrum needs, you decide that you want to participate in this spectrum auction, you **MUST** register with the ACA by the closing date for registration, Friday 13 March 1998.

You should register as early as possible. This will enable the ACA to contact any applicants who have not completed or submitted all the necessary forms, and to accept corrections which were received in accordance with subclause 2.5(3) of the *Radiocommunications (Spectrum Licence Allocation) Determination 1998* by the closing date.

To register in this auction, you **MUST**:

- Fill out the application form (see **Attachment 19**).

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- Work out your eligibility based on your business plan, and calculate your eligibility payment - you **MUST** nominate how much eligibility you require (this is a measure of how much spectrum you want to win) and you **MUST** pay the eligibility payment based on this. *You cannot bid on more spectrum than authorised by your eligibility.*
- There is an entry fee of \$10,000 for this allocation, which must be lodged at the time of application. The instrument setting the entry fee and rate of eligibility payment is at **Attachment 8**.
- Complete the Deed of Guarantee *if you are required* to do so under the auction rules.
- Complete the Deed of Acknowledgment in every case, which commits you to your actions in the auction.
- Get your application form, **and** a bank cheque for the total of the entry fee, and the eligibility payment, **and** the completed Deeds, to the ACA by 5:00 pm (Canberra time) on Friday 13 March 1998.

IMPORTANT NOTE

Late applications cannot be accepted.

This represents a change to the proposals contained in the ACA's draft plans released in July 1997.

The application form

Any individual or body that wishes to bid for a spectrum licence in this auction MUST complete the application form. Follow the instructions on the form carefully.

One copy of the Application form is included in this Applicants Information Package. Further copies are available from the ACA and the ACA's world wide web site:

<http://www.aca.gov.au>

An application form jointly submitted by more than one person must be signed by each of those persons. Each party to an application is jointly and severally liable in respect of the application.

Where the applicant is a company, the application form must be executed under seal with a certification that the seal was duly affixed.

The application form must have an original signature or other means of execution. A facsimile or a copy of a completed application form cannot be accepted. The

ACA can only accept application forms that are complete and legible. To assist legibility all forms should be completed in block letters, or be typed.

Nominate spectrum preferences

To participate in this auction, you must tell us how many spectrum lots you want, in which areas, as your first preference. We ask that you do this because if the ACA is able to satisfy every applicant's first preference, we will not proceed to auction - instead, we will offer you a licence covering the bandwidths and areas that you nominate, at the starting bid for the lots (see below - **Allocation of licences without an auction**).

Items **F** to **O** of the application form are provided specifically to help you nominate your preference, and calculate your *eligibility* in the auction. Eligibility is important because it will be used to determine how much spectrum you can acquire in this auction, how much you have to pay in your *eligibility payment*, and how active you have to be during the auction.

IMPORTANT NOTE

Applicants can nominate any eligibility amount (up to that imposed by the Minister's Bidding Limits) and applicants are NOT restricted to nominating the amount calculated on the spectrum preferences part of the application form.

Calculate eligibility

To nominate your allocation preferences, and calculate your eligibility in this auction:

1. ENTER in column **I** the number of lots you hope to win in the **800 MHz band** in each area. For example, you wish to obtain 2×10 MHz in the 800 MHz band. Each lot in the 800 MHz band is a 5 MHz pair, so enter "2" in column **I**. Note that column **H** sets out the maximum number of lots that a single person and their associates may acquire in each area (see **Bidding Limits**). In the 800 MHz bands, a person and their associates may acquire all of the lots on offer.
2. For each area, multiply the number you entered in column **I** by 5 and ENTER the result in column **J**.
3. ENTER in column **L** the number of lots you hope to win in the **1.8 GHz band** in each area. For example, you wish to obtain 2×10 MHz in the 1.8 GHz band. Each lot in the 1.8 GHz band is 2.5 MHz pair, so enter "4" in column **L**. Note that column **K** sets out the maximum number of lots that a single person and their associates may acquire in each area following the Minister's Bidding Limits.
4. For each area, multiply the number in column **L** by 2.5 and ENTER the result in column **M**.

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5. For each row, add the amounts in column **J** and column **M** and ENTER the result in column **N**.
6. For each row, multiply the population in column **G** with the bandwidth in column **N**, divide by 100 and ENTER the result in column **O**.
7. Total all the entries in Column **N** and ENTER the result in box **P**.

The result in box **P** is the eligibility needed to bid on this nominated set of preferences. You may nominate any value of eligibility, provided that it does not exceed the amount set by the Minister's bidding limits (5,614,530).

Example

Joe wants 1 lot of 2×5 MHz in the 800MHz band in each metropolitan market.

Joe enters the number "1" in column **I** in each of the first 5 rows of the eligibility calculation form.

He then multiplies this by five and enters "5" in column **J** for each of the first five rows of the eligibility calculation form.

He is not proposing to bid in the 1.8 GHz bands, so he enters the total of Columns **J** (5) and **M** (0) directly into column **N**.

He then calculates the lot rating, as the population in column **G** multiplied by the bandwidth in column **N** divided by 100 and enters this result in column **O**.

| | G | N | O |
|-----------|----------|----------|----------|
| Brisbane | 1735500 | 5 MHz | 86,775 |
| Sydney | 4265500 | 5 MHz | 213,275 |
| Melbourne | 3246700 | 5 MHz | 162,335 |
| Adelaide | 1094900 | 5 MHz | 54,745 |
| Perth | 1189100 | 5 MHz | 59,455 |
| | TOTAL | 576,585 | |

Joe totals all of the entries in column **O** and enters the result (576,585) in box **P**. Box **P** is Joe's eligibility based on these preferences (see cl. 2.5 of the Determination). Joe may, if he wishes, nominate a different eligibility amount in box **P**.

IMPORTANT NOTE

You can, if you wish, nominate all of the spectrum in all of the markets, up to the limit of the Minister's bidding limits. However, you will be required to have active bids on lots that, in total, meet an increasing percentage of your nominated eligibility. If you don't, your eligibility will be reduced, which will mean that the amount of spectrum you can acquire at the auction will also be reduced!

Activity

Each lot on offer has a *lot rating* (see cl. 9 of the *Radiocommunications Spectrum Marketing Plan (800 MHz and 1.8 GHz Bands) 1998 (Attachment 4)*). Lot ratings are calculated by multiplying the population of the area of the lot, by the bandwidth of the lot and dividing the result by 100.

Each applicant's *activity* in each round of the auction will be calculated by adding the lot ratings of all the lots on which they are *active*.

Active means they must either be recorded as the highest bidder on a lot in the previous round's results, and not withdraw the bid in the current round (see **Bid Withdrawal** below), or they must have made a valid bid on the lot in the current round. *Activity* relates to **valid** bids, not **highest** bids. A bid does not have to be the highest bid on a lot in a round to count towards activity.

IMPORTANT NOTE

During the auction, applicants do not have to bid on the lots that cover the bands and areas nominated on the application form. Applicants can use their eligibility to bid on any lot on offer in the auction, once the auction is under way.

Eligibility Payment

To participate in this auction, in addition to the entry fee (see below), applicants **MUST** lodge with the ACA an Eligibility Payment calculated as two dollars (AUD\$2.00) for each unit of eligibility (Attachment 8). Calculate the eligibility payment and enter the result in box **Q** on the application form.

Example

Joe has calculated the firm's eligibility to be 576,585 (see above). He has entered this in box **P** on the application form. Joe calculates the Eligibility Payment as $576,585 \times \$2.00 = \$1,153,170$. He enters \$1,153,170 in box **Q** on the application form.

PCS Spectrum Auction

Under the auction system it is possible to withdraw bids, but this may be subject to withdrawal penalties. The Eligibility Payment will be held against such a liability (see below - **Bid Withdrawals** and **Bid Withdrawal Penalties**).

The Eligibility Payment will be credited to the final bid price payable if you are the highest bidder on lots during the auction.

If you are unsuccessful, and you do not incur bid withdrawal penalties, your Eligibility Payment will be returned to you in full.

Entry Fee

To Register in this auction, applicants MUST pay an Entry Fee of \$10,000 (Item R on the application form). The Entry Fee will not be waived. The Entry Fee is not refundable.

Total Amount Payable

To work out the total amount payable to the ACA in order to participate in this auction, add the amounts in boxes **Q** and **R** and enter the amount in box **S**.

IMPORTANT NOTE

When you lodge your application form with the ACA, the Form MUST be accompanied by a bank cheque made payable to the ACA for the amount in box S on the application form.

Deed of Guarantee

Applicants must provide a Deed of Guarantee before they can be registered unless they are exempted from providing a Deed of Guarantee under the determination. This Deed guarantees the payment of any moneys owing to the ACA by applicants under the determination.

All applicants **must** provide Guarantees unless they satisfy the ACA that they:

- are an authority of the Commonwealth, or of a State or Territory; or
- are a subsidiary of an authority of the Commonwealth or of a State or Territory (within the meaning of the Corporations Law); or
- are an Australian company which does not carry on a business for a profit.

IMPORTANT NOTE

An applicant is not automatically exempt from the requirement to provide a guarantee if it thinks it falls into one of these categories. The ACA must be satisfied that the applicant falls into one of these categories. An applicant must take action to satisfy the ACA that it meets the criteria. If the ACA is not satisfied, the applicant will have to provide a Deed of Guarantee.

To be satisfied that the applicant falls into one of the exempt categories, the ACA requires that evidence produced be in the form of a properly made statutory declaration. The statutory declaration should:

- be made by a director, or member of the governing body of the applicant; and
- state the capacity in which the person is making the declaration; and
- state the matters relied upon in order to establish that the company or body is exempt.

Applicants should also provide full details of all other matters of which they are aware that may be relevant to the ACA's consideration of the issue.

Guarantor must be qualified to give guarantee

An Applicant who must provide a guarantee must also satisfy the ACA that the guarantor is **qualified** to give the guarantee (as set out in clauses 2.8(5) and (6) of the determination - **Attachment 6**.)

To be satisfied that the guarantor is qualified the ACA requires that evidence be produced in the form of a properly made statutory declaration that:

- states the capacity in which the person is making the declaration; and
- states the specific status of the guarantor which satisfies the requirements in clause 2.8(6) of the determination.

Submitting a Deed of Guarantee

Guarantees may only be provided by completing and submitting the Deed of Guarantee in the form approved by the ACA. A copy of the Deed form is included in application documents included in this Applicant Information Package. You can obtain more Deeds from the ACA website.

Instructions for completing the Deed of Guarantee are provided on the form. These instructions should be followed carefully. The Guarantee, must have an original signature or other means of execution. **Photocopies and facsimile transmissions are not acceptable.** A Deed of Guarantee must be complete and legible to be accepted by the ACA.

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The originals of the statutory declaration attesting to the status of the guarantor must accompany Deeds of Guarantee that are submitted.

Deeds of Guarantee must be received by the ACA at the same time as the application form (before closing time on the closing date).

If a Deed of Guarantee has not been received from an applicant by the closing date, then the applicant will be excluded from participating in the auction unless it satisfies the ACA that it falls within one of the categories referred to in subclause 2.8(1) of the *Radiocommunications (Spectrum Licence Allocation) Determination 1998 (Attachment 6)*.

Deed of Acknowledgment

All applicants MUST complete a Deed of Acknowledgment. This Deed acknowledges, amongst other things, that an applicant will honour all bids that are made by them during the auction. A copy of the Deed of Acknowledgment is included in the application documents included in this applicant information package. You may request more copies from the ACA at the address below.

Getting Forms and Money to the ACA

To register for the auction the ACA must receive:

- your completed application form; and
- your Deed of Guarantee properly completed and executed, if this is required;
- your Deed of Acknowledgment properly completed and executed; and
- a bank cheque covering both the entry fee plus the eligibility payment. Bank cheques for this amount should be made payable to “The Collector of Public Monies, Australian Communications Authority” and be crossed “Not Negotiable”. Payment must be in Australian dollars. Personal or company cheques will not be accepted;

BY: 5.00 pm (Canberra Time) on Friday 13 March 1998.

AT: **ACA Auction Centre**
Locked Bag 3321
BMDC ACT 2617
Australia.

OR **Purple Building**
Benjamin Offices
Chan St, Belconnen ACT 2617
Australia.

The ACA will process your registration and issue a receipt that will also confirm the details that have been registered about your application.

Applicant registration will be complete only when the applicant has completed registration requirements and the ACA enters the names of the applicants in the register of applicants. The ACA must refuse registration if all required forms, entry fee, and eligibility payment are not provided in accordance with the *Radiocommunications (Spectrum Licence Allocation) Determination 1998 (Attachment 6)*.

Associated Persons Procedures

As noted in **Chapter 2 - How is it being Allocated?** under the heading **Associated Persons**, the ACA has implemented procedures designed to assist associated persons in complying with the Minister's bidding limits.

Before the Auction

Following the closing date for applications, the ACA will send all applicants a letter with details of all the other applicants. You will have 10 working days from the date of this letter to forward to the ACA a statutory declaration, either:

- stating that you are not an associate of any other applicant; OR
- identifying the other applicant(s) with whom you are associated.

"Associate" for this purpose has the meaning given in the *Radiocommunications (Spectrum Licence Limits—800 MHz and 1.8 GHz Bands) Direction 1998* (see **Attachment 2**). Applicants not fulfilling this requirement will be excluded from the auction and their eligibility payment will be refunded.

The ACA will also send details of the applicants to the Australian Competition and Consumer Commission (ACCC). The ACA will review the information provided by the applicants and any report from the ACCC, and will then decide whether any of the applicants are associated.

If the ACA decides that you are an associate of one or more other applicants, the Auction Manager will write to you and each person with whom you are associated to advise you of the person or persons with whom you have been found to be associated. The application documents will be returned at this time.

Applicants who are found to be associated with each other may:

- withdraw all but one of their applications; or
- withdraw all of their applications and join together in another single application made by a new applicant; or
- remain registered as individual applicants, but be treated as a *designated applicant group*.

PCS Spectrum Auction

If applicants who are associated with each other do not either withdraw all but one of their applications, or do not substitute a single new application for their applications, they will be designated as associated applicants. This means that they will all receive the same bidder identification number (BIN) and encryption code keys.

During the auction, the ACA will accept only the first set of bid instructions received using that BIN, and will reject any other bid instructions purporting to come from any other member of the designated applicant group using the same BIN. All members of the group will be regarded as having bid in this way, and so they will all be affected equally by bidding, bid withdrawal, exercise of waivers and reductions in eligibility.

Effectively, all members of a designated applicant group will be treated a single bidder. Before the auction starts, the eligibility of the members of the group will be summed, but the total may be altered by the ACA. This is because the ACA will not accept a total eligibility for associated applicants which would exceed the total of the lot ratings of all of the lots that could be bid without exceeding the Minister's bidding limits. If applicants apply for eligibility in excess of that amount, the ACA will reduce the total eligibility of the associated applicants to the limit set by the Minister. Any excess in eligibility payments will be refunded in proportion to the amounts originally paid by the applicants.

Members of a designated applicant group will all carry the same amount of eligibility as each other. They will all have the same number of waivers. If the bidding of a member of a designated applicant group would result in a loss of eligibility or the use of a waiver, then the reduction in eligibility or the use of the waiver will be applied to all members of the group.

During the Auction

If the ACA becomes aware during the course of the auction that an applicant may have become an associate of another applicant, the ACA will suspend the auction, and write to these applicants asking them to submit within 5 working days a statutory declaration about whether they are or are not associated.

If the ACA decides that the applicants are associated, the ACA will:

- advise the affected applicants and associates that the ACA has found them to be associates;
- advise all other applicants of the association;
- issue a new BIN and encryption keys for use by all the associated bidders from the time the auction resumes (and revoke the previous individual BIN and encryption keys). From that point on they will be treated as members of a designated applicant group.

IMPORTANT NOTE

This will have the effect of invalidating all previous bids by the associates; to preserve eligibility in the auction they will need to rebid (or take waivers) from the first resumed round.

Where a designated applicant group is formed while the auction is suspended, the eligibility for the associated bidders will be set as the sum of the current eligibility of each member of the association at the round immediately before the suspension came into effect, provided that this would not exceed the total of the lot ratings of all of the lots that could be bid for without exceeding the Minister's bidding limits. (If the ACA reduces eligibility to this limit, refunds of eligibility payments will not be made until after the conclusion of the auction.) The number of waivers that may be exercised by the new BIN will be set at the highest number of waivers held by any member of the association at the end of the round immediately before the suspension.

After the Auction

After the auction, if you are a successful bidder, the ACA will send you details of all other successful applicants. You will then be required to complete another statutory declaration that, either:

- you are not an associate of any other successful applicant; OR
- naming the other successful applicant(s) with whom you are associated.

Where successful applicants are then found to be associated, the ACA will combine the lots where they are successful with the lots where each of their associates are successful. If the total of the lots of all of the parties to an association exceeds the Minister's bidding limits, then:

- the associated parties will be required to nominate how the lots should be allocated among them, up to the limit of the bidding limits, and spectrum licences will be allocated for these lots; however
- the applicants will still be liable to pay the balance of the bid price on all the lots they have successfully bid for at the auction, not just those within the Minister's limits. No spectrum licence will be issued to an applicant who has not paid the balance of the bid price in respect of all of the lots on which that applicant was the highest bidder at the end of the auction. The parties will be required to pay the deposit and balance in respect of the total lots. If they fail to do so, they will be regarded as defaulting on these requirements and will be treated in the same way as any other party who defaults on payment (see **Default** below).

Any lots which remain unsold because of the operation of these provisions will be offered for allocation in a separate, later allocation.

PCS Spectrum Auction

IMPORTANT NOTE

Applicants are warned that the operation of these requirements could result in their becoming liable to pay for lots even though those lots are in excess of the Minister's bidding limits if the association only becomes known during the course of, or after, the auction. It is therefore in the interests of applicants to notify any association with other applicants before the auction commences.

Allocation of licences without an auction

On the application form, there is provision for applicants to nominate how many lots they want to acquire in the 800 MHz and 1.8 GHz bands in each area. If the ACA can satisfy every applicant's preference without needing to go to an auction, it will offer all of the applicants a licence based on their nominated preference at the price of the starting bid for the lots that would comprise the licence. If all applicants accept the offer, the ACA will not proceed with the auction (see Part 3 of the *Radiocommunications (Spectrum Licence Allocation) Determination 1998* (see **Attachment 6**).

If the ACA is unable to satisfy every applicant's preference, the Authority will proceed to auction. In this event, the Authority will set an auction date and move into the process of confirming auction details with applicants.

Confirmation of Registration

If the ACA decides to proceed to an auction, the ACA will send a package of information by receipted mail to registered applicants in accordance with the *Radiocommunications (Spectrum Licence Allocation) Determination 1998* (see **Attachment 6**). This package, which will be sent at least 10 working days before the starting date of the auction set by the ACA, will contain:

- advice of the starting date and time of the auction;
- advice that the applicant is registered;
- confirmation of the applicant's initial eligibility in the auction (see cl 2.5 of the determination, **Attachment 6**);
- advice of the number of waivers issued to applicants for the auction;
- the schedule for the first round of the auction;
- telephone and fax numbers to be used in communication with the ACA during the auction;
- the applicant's bidder identification number, passwords, encryption keys and transaction code keys for use in the auction;

- information about how to obtain important data to be used in preparing bids in the first round of the auction;
- advice of the number of stages set for the auction and the activity percentage required for each stage;
- advice on starting bids and the minimum bid increments (see below - **Minimum Bid Increments**).

Publication of applicants' names and bidder identification numbers

The ACA will publish in the national press the name of all the applicants who have been registered to take part in the auction, together with their eligibility and their bidder identification numbers. The ACA will only publish the names of natural persons if those persons have consented to the release of this information. During the auction, applicants are identified in the auction results by their bidder identification number.

Getting Ready for the Auction

Training

Before the start of the auction, the ACA will contact all registered applicants to advise them of the time, date and place of training on how to participate in the auction, and how to use the bidding software.

You are strongly advised to attend the training!

Nothing requires the ACA to provide training to clients outside Australia.

The ACA will also provide all applicants with an auction manual to assist them in participating in the auction.

Computer Bidding

The ACA has developed computer software to enable applicants prepare their bids and transmit them to the ACA during the auction. This software is designed with point-and-click functionality to make bidding on lots easier. The ACA will provide the software, manuals and some training. The ACA will grant a licence for the software to registered applicants. A copy of the licence is included in the application documents (**Attachment 19**). Applicants agree to the licence conditions by signing the Deed of Acknowledgement.

Applicants will need to install the program on their computer and test it thoroughly to become familiar with it. Installation will take around 10 minutes.

PCS Spectrum Auction

Applicants will need to ensure that they have appropriate archiving facilities for auction results files. One results file is produced for each round of the auction, and each file is likely to be of the order of 350 kB (uncompressed) in size.

Prior to the auction the ACA will conduct a trial auction so that applicants can become familiar with the auction procedure before the allocation process begins. Details of the trial auction will be sent to all applicants.

Important Information for Overseas Applicants

The ACA is going to provide two versions of the bidding software. One is for bidders in Australia. This version contains high-level encryption systems that may be illegal in other countries and which cannot be exported from Australia without a permit.

The second type of software that the ACA will provide is for applicants who wish to bid from outside Australia. For these applicants, the ACA will provide an "Export Only" version of the software which will not contain the restricted encryption components.

IMPORTANT NOTE

Applicants intending to bid from overseas will need to obtain their own copy of the encryption software from a supplier. They should then insert the encryption software into the working directory of the ACA software.

The auction computer system works with the PGP 2.6.x encryption software. Details about some potential sources for PGP 2.6.x can be found on the internet at:

<http://www.pgpi.com/download>

Minimum System Requirements for ACA Auction Software

To run ACA's auction software, applicants will need:

- a personal computer with a Pentium or higher microprocessor;
- Microsoft Windows 95 or NT 4.0 operating system;
- Screen resolution of 800 x 600 pixels;
- Minimum 16 MB of random access memory (RAM) (32 MB for NT 4.0);
- 10 MB of hard disk space for programs and local files plus capacity to store results files;
- 1 x 1.44 megabyte floppy disk drive;

- a modem, and
- Microsoft Office 97, or at the very least, a complete installation of the Microsoft Access 97 ODBC 3.0 driver set.

Step 4 — Bid in the Auction

The ACA is using the simultaneous ascending auction system to allocate licences.

An introduction to the auction system is in **Chapter 2 - How is it Being Allocated?**

Auction Rules

This form of auction has a number of rules which govern its progress, and serve to keep it fair. These rules are set out in the accompanying *Radiocommunications (Spectrum Licence Allocation) Determination 1998* (**Attachment 6**).

IMPORTANT WARNING

The following information is only intended to provide a general overview of the allocation scheme which is contained in the Radiocommunications (Spectrum Licence Allocation) Determination 1998 ('the Determination'). Potential applicants should not rely on this information, but should instead rely on the content of the Determination itself. Potential applicants are also urged to seek appropriate independent legal and other advice in relation to the Determination. A copy of the Determination is at Attachment 6.

Auction Rounds

Bidding takes place over a number of rounds. In a round, applicants will be able to submit bids on the lots they want to win, or withdraw bids on lots they no longer wish to pursue; that is, it is possible in this form of auction to change bidding strategies. The ACA will then prepare results for this bidding.

There will be a number of rounds each day. Initially, 2 rounds per day are planned, but in order to keep the auction moving, up to 6 rounds per day may be desirable. Rounds will continue until no more bids are received on all lots. The ACA will consult with all bidders before changing the number of rounds per day.

Once all bidding has stopped the auction manager will declare the auction closed and will advise all applicants of the closure.

The auction manager has the discretion to stop the auction at a specified round, but must advise all registered applicants of this at least two rounds before the proposed closure. The ACA does not plan to use this mechanism except under exceptional circumstances.

PCS Spectrum Auction

Electronic Bidding

Each applicant will be issued with access to a dial-in facility to the ACA similar to those offered by commercial internet service providers. Alternatively, the ACA software can transmit bids over the internet. The dial-in facility will allow applicants to connect to the auction computer by modem using a telephone number supplied by the auction manager. The ACA will assign a Bidder Identification Number (BIN), a password, transaction codes keys, and encryption keys to each applicant.

The auction software is designed so that applicants need only connect to either upload bid files or download result files. All of the processing and preparation of bids can be done without being connected to the ACA.

To establish a connection, the auction software will transmit the applicant's *userid* (BIN) and *password* issued by the ACA.

Once connection is established, the applicant will be able to:

- download from the auction computer system a file containing the latest auction results; or
- upload to the auction computer system the applicant's bid file during a round.

An applicant may need to connect to the Auction Centre a number of times during a round:

- to bid; and
- to obtain the final results of the round after the bid withdrawal period.

The schedule for a round, made available to applicants one round in advance, will provide information to applicants about when to make these connections. This information will be contained in the results file at the end of each round.

IMPORTANT NOTE

Once the auction is underway, applicants are strongly encouraged to download EVERY results file produced by the ACA. Each applicant's status can vary quite markedly from round to round, and you will need to view the results of every round to ensure that your eligibility is maintained.

Further, the results file for each round contains the schedule for the next round, and so contain important information about the times for bidding and for connecting to download auction results.

The ACA accepts no liability for the failure of an applicant to make or withdraw a bid as a result of that applicant being unaware of changes to the auction schedule.

The results file will be published in Microsoft Access 97 format. A complete specification of the files and their contents is at **Attachment 18**.

Emergency Telephone Bidding

In the event of what the ACA considers to be a technical emergency that precludes a bidder bidding on-line, the ACA may accept placement of bids by telephone. When an applicant contacts the ACA with their bids, the ACA needs to be able to establish that the person speaking is who they purport to be. The ACA needs to *authenticate* the instructions.

For each applicant in the auction, the ACA will prepare a list of 'one-time' transaction code keys for use in authenticating bids. Each list will contain a minimum of 100 transaction key codes. No two lists will be the same. No two codes will be the same, except as generated by chance. Each key will consist of 8 randomly generated letters. Each key will be used once, in the order in which the keys are listed. The ACA will retain a copy of each list issued to the applicant.

Applicants bidding by telephone must identify each communication of bidding instructions to the ACA using the next available transaction code key by quoting the key to the ACA operator when asked.

Once a transaction code key is used, the applicant must strike through that key on their copy of the list and note the round and the date and time that it was used. The ACA will do the same.

Transaction code keys will be distributed by receipted mail or by safe-hand. Applicants should note that they will be bound by any bid made using their own transaction code keys, and will be required to pay the balance of bid price on any lot on which they are the highest bidder at the close of the auction as a result of such as bid. Consequently, if the applicant has any suspicion that the integrity of the keys has been compromised in transit or otherwise, he or she **MUST** advise the ACA immediately so that new keys can be prepared.

Making Bids

The ACA auction software is designed to help applicants see the implications of their strategy in terms of their commitment to pay, and their activity levels, which are important to preserving eligibility in the auction.

Applicants may bid on any lot or any a combination of lots **provided that the total of the lots ratings of the lots on which they are active never exceeds their eligibility or the Minister's bidding limits**. Bids that exceed an applicant's eligibility or the Minister's bidding limits will be rejected by the auction system.

The lots on which you may bid are not restricted to the lots nominated when working out your eligibility. The auction software will revise and display the activity status after every new bidding instruction or bid withdrawal instruction is added.

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These bidding instructions can be changed by an applicant at any time *until they are transmitted to the ACA*. Bidding instructions cannot be changed after transmission, but bids can be withdrawn in certain circumstances (see clauses 4.21 - 4.22 of the *Radiocommunications (Spectrum Licence Allocation) Determination 1998 (Attachment 6)*).

Applicants can lodge their bid instructions only once in a round. Their instructions may contain bids on any lot or any combination of lots, subject to compliance with the Minister's bidding limits. Associated applicants (see **Associated Persons Procedures** section in this Chapter) will be required to either withdraw all but one of their applications, bid through a substituted applicant, or (if they decide to bid as separate entities) be restricted to only one set of bid instructions per round between them.

Applicants will use the ACA software to prepare a bid file which contains bid instructions referring to the lots and the amount bid on each lot. Each bid file will be transmitted to the ACA auction centre using a modem and will be automatically received. Bid files will be check-summed and encrypted prior to transmission to help preserve their integrity.

Telephone bidders will be asked to quote their BIN and transaction code key to the operator. The operator will then accept bid instructions identifying the lots being bid on and the amount of each bid. Telephone bidders will receive a fax-back confirmation of receipt of their bids.

Auction Results

The ACA will publish the results file for every round in the auction. The results will contain:

- all bids and bid withdrawals made by all applicants during the round;
- information about the highest bid on every lot, and the bidder identification number of the registered applicant who made it;
- information about the status of all applicants in the auction (eg, their activity levels, their eligibility, number of waivers remaining); and
- information about the starting date and times for bidding and for results preparation for the next round.

The results will be available for download by registered applicants using the auction software, because the software uses the information in the results to help construct the next bids. The ACA will also release all results for all rounds on its world wide web server at:

<http://www.aca.gov.au>

Close of Auction

The auction will be closed when a round passes with no new bids being made, and no "pro-active waivers" being exercised in the final stage of the auction.

The auction manager must advise all registered applicants of the close of auction. Applicants who made the highest bids on lots at the close will be issued with a notice of payment due.

Step 5 - Paying for Your Licence

When the auction closes, the ACA will send to each successful applicant a notice setting out:

- each lot on which they were successful;
- their high bid for that lot;
- the total of bid withdrawal penalties, and the lots on which they incurred bid withdrawal penalties; and
- the balance of the bid price after deduction of the Eligibility Payment.

This notice will be sent by receipted mail to the address provided in the application form.

Applicants will have 5 working days from the date of the notice in which to pay 10 per cent of the balance of the bid price.

Applicants will then have a further 10 working days to pay the remainder. If either payment is missed, all bids will be regarded as withdrawn bids and bid withdrawal penalties will be applied. These will be deducted from the eligibility payment, and where the eligibility payment is not sufficient to cover the penalty, the remainder will become a debt to the ACA. The ACA may also initiate an action for damages.

PAYMENT MUST BE MADE BY BANK CHEQUE

Defaulted lots may be allocated at another price based allocation process.

Examples of How the Auction Procedures May Operate

To illustrate how the auction procedures might operate in practice, a number of examples are given below. Prospective applicants should, however, note that these examples are not exhaustive, contain only brief descriptions of the relevant procedures in each case, and are based on the ACA's understanding of the procedures.

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Prospective applicants should not rely on these examples, nor on the more detailed descriptions of the ACA's interpretations of the auction procedures given above, but should satisfy themselves of the meaning of the procedures, and take such legal and other advice as they consider necessary.

Starting Bids

Under clause 2.13(2) of the *Radiocommunications (Spectrum Licence Allocation) Determination 1998 (Attachment 6)*, the starting bid on each lot is the amount calculated by multiplying the *starting price per lot rating* [set by the auction manager under clause 2.13(1)(a)] by the lot rating of the lot.

Example

Assume that the starting price per lot rating is \$5.00.

At the start of the auction, Joe wishes to place a starting bid on all 5 of the lots he hopes to win.

The aggregate of lot ratings for all of these lots, from the Marketing Plan, is 576,585. The starting bid is the product of 576,585 and \$5.00. This produces a figure of \$2,882,925.

The starting bid on each lot will be calculated by the ACA and included in the round 0 (the opening round) file available to on-line bidders.

Minimum Bid Increments

For the purposes of the following example, assume that the Auction Manager has set the minimum bid increments as follows:

- 2.13(1)(b) price per lot rating increment = \$2.00; and
- 2.13(1)(c) percentage of high bid increment = five per cent (5%).

Until advised further by the Auction Manager, the minimum new bid that would be accepted by the ACA on any lot after a starting bid has been made would be the current highest bid on that lot, plus the highest of:

- \$2.00 per lot rating unit for the lot; or
- 5 per cent of the high bid currently recorded in the results.

Example

Joe was not successful in the first round. He sees that his competitor, Erica, from Strategic Spectrum Management, is recorded as the highest bidder on the 5 lots that he wants, with a high bid of \$5.4 million.

Joe calculates the minimum bid that he must make in order to continue bidding on these lots:

- \$2.00 per lot rating = \$1,153,170
- 5% of \$5.4m = \$270,000

Therefore, the minimum acceptable bid in the next round on the 5 lots Joe wants to win would be $\$5,400,000 + \$1,153,170 = \$6,553,170$.

Joe bids.

The minimum bid calculated by the auction system for every lot will be included in every results file produced by the ACA.

Activity requirements

To prevent the auction stalling, applicants will have to be active on lots with a lot rating that exceeds a percentage of their eligibility in every round. Activity requirements are explained in **Chapter 2 - How is it Being Allocated?**

Active means they must either be recorded as the highest bidder on a lot in the previous round's results, and not withdraw the bid in the current round (see **Bid Withdrawal** below), or they must have made a valid bid on the lot in the current round. Activity relates to **valid** bids, not **highest** bids. A bid does not have to be the highest bid on a lot to count towards activity.

IMPORTANT NOTE

Any applicant that does not meet this activity target will have their eligibility reduced!

Example

In round 1, the ACA has set an activity target of 60 per cent.

Joe has eligibility of 576,585. To reach an activity percentage of 60 percent, Joe must either make new bids, or be recorded as the highest bidder in the previous round, on lots that have combined lot rating of $60\% \text{ of } 576,585 = 345,351$.

If Joe bids on a single 800 MHz lot in Sydney (lot rating 213,275) he will not meet his activity target, and his eligibility will be reduced. If he also bids on a 800 MHz band lot in Melbourne (lot rating 162,335), his activity will be $213,275 + 162,335 = 375,610$, which is above his activity target, and his eligibility will not be reduced.

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Applicants not complying with the activity requirements will have their eligibility reduced. Applicants who lose eligibility for under-activity will only be able to bid in accordance with their reduced eligibility level. Eligibility is re-calculated every round, based on activity in the round. Bidders who do not meet their activity requirements will have a new reduced eligibility in the next round. That new eligibility will be calculated as their *current activity* divided by the *activity target* for the round (see cl. 4.19(2) of the *Radiocommunications (Spectrum Licence Allocation) Determination 1998 (Attachment 6)*).

To avoid reductions in eligibility, applicants will need to meet the activity target for the round of the auction.

Example

Continuing the example above, Joe decides to only bid on the Sydney lot, and not the lot in Melbourne.

His activity, therefore, is 213,275.

At a 60 per cent activity target, Joe's new eligibility is:

$$= 213,275 \div 0.60$$

$$= 355,458$$

which is only 61 per cent of his initial eligibility.

This is still enough eligibility to cover future bidding on this one lot, and some other 800 MHz lots. If he then only bids on this lot in the next round, he will meet the activity target of 60 per cent.

Bid Withdrawal Penalties

As explained in Chapter 2, applicants can withdraw their bids from a previous round. To prevent people making and then withdrawing bids frivolously, and perhaps delaying the auction process, all bid withdrawal is subject to a bid withdrawal penalty.

When a bid is withdrawn, the person making the withdrawal is liable to the ACA to make up any shortfall between the promise that it made, and the amount that the lot finally sells for. Applicants who have incurred a withdrawal penalty will be informed of their obligations at the end of the auction. Of course, there is no penalty if the lot eventually sells for a sum equal to or more than the withdrawn bid.

Example

Joe is the high bidder at \$3m on one of the lots that he originally commenced bidding on. The history of bidding on this lot is:

| | |
|-------|--------|
| Erica | \$1.5m |
| Joe | \$2.0m |

Applicant Information Package

Erica \$2.5m

Joe \$3.0m

Joe notices that a different lot from the one he has been bidding on requires a minimum bid of only \$1.0m.

Joe decides to switch his bidding to the cheaper lot, and withdraw his current standing \$3.0m bid.

In the results after the bid withdrawal period, the lot will show the default bidder (bidder 9999) as the highest bidder. The highest bid shown in the results will be \$2.5m (the next highest bid made). The minimum bid for the next round will not include an increment, and will also show \$2.5m.

In this situation, if Erica still wants the lot, she will have to re-make her previous \$2.5m bid.

If at the end of the auction, no other bid is lodged on the lot, Joe will be liable for a bid withdrawal penalty equal to his withdrawn bid (\$3.0m) minus the final sale price (\$2.5m) (assuming Erica does bid) = \$0.5m.

When Joe adds this to the price of the other lot (assume he gets it for \$1.5m), he is in front.

If an applicant withdraws a bid in the round in which the bid is made, the bidding on that lot will not count towards the applicant's activity in the round.

If at the end of the auction, a lot that has been subject to a withdrawn bid is not sold, the bid withdrawal penalty will be equal to the difference between the withdrawn bid and the next highest bid made by any other bidder in the auction. If there are no other bids on the lots, the withdrawal penalty will be for the full amount of the withdrawn bid.

4. Spectrum Licensing

In this Chapter ...

- **information about spectrum licensing**
- **an introduction to the concept of "spectrum space" standard trading units (STUs) of spectrum space**
- **information for people wanting to use spectrum space themselves**
- **information about authorising others to use spectrum space**
- **information about trading spectrum space**
- **other important information about licence conditions, spectrum licence tax, and regulatory compliance.**

Spectrum licensing is a form of licensing introduced in Australia by the *Radiocommunications Act 1992*. Spectrum licences were issued for the first time in 1997, following the auction of the 500 MHz band. Spectrum licences are a tradeable, technology neutral spectrum access right for a fixed non-renewable term. Instead of authorising the use of a specific device, spectrum licences authorise the use of spectrum space and give licensees the freedom to deploy any device from any site within their spectrum space, provided that the device is compatible with the core conditions of the licence, and other conditions imposed by the ACA on the licence, and the technical framework of determinations and advisory guidelines established for the bands (see **Chapter 5 - Technical Framework**). Compliance with the core conditions is undertaken in accordance with a set engineering framework for interference management.

Spectrum licences offer a new way of managing the radiofrequency spectrum. Licensees will have much greater flexibility than under apparatus licensing to manage the deployment of devices within the spectrum space authorised by the licence for a fixed term of up to fifteen (15) years.

Within the bounds of spectrum space and the technical co-ordination framework, licensees may be able to operate whatever type of communications service they choose, and be able to change that service in response to technical improvements or changes in consumer demand.

Spectrum licences are tradeable. Licensees are free to seek to buy and sell spectrum space in the open market as the need arises, or to authorise other people to operate devices in their spectrum space, including under commercial arrangements. Spectrum licences can be aggregated or sub-divided to form new licences.

Spectrum Space

The concept of "spectrum space" is fundamental to the ACA's approach to spectrum licensing. Spectrum space is conceptually like other types of three dimensional space. It covers an area and it has a height. Spectrum space, if thought of as a cube, covers a geographic area authorised by a licence. The *area* is like the floor of the cube. The radiofrequency *bandwidth* is represented by the height of the cube.

Standard Trading Units

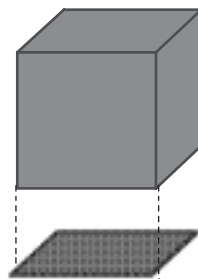
The challenge in developing spectrum licensing was the need to have a licensing and management system that was capable of dealing with a medium which is effectively a continuum in four dimensions (latitude, longitude, frequency and time - note that, for convenience, the ACA effectively holds "time" constant for all licences, so allowing spectrum space to be thought of in three dimensions).

The solution to this problem was to commoditise the spectrum subject to spectrum licensing; that is, to create finite indivisible three-dimensional units of spectrum space that can be aggregated into useful configurations. These finite indivisible units of spectrum space are called standard trading units, or STUs (Figure 1).

STUs are like building blocks, or house bricks. By themselves, they may be too small to have much utility, but because of their regular shape, and their referential relationship with their immediate neighbours, they can be stacked vertically, or horizontally with neighbouring STUs to form larger bodies of spectrum space that do have utility (Figure 2).

Figure 1

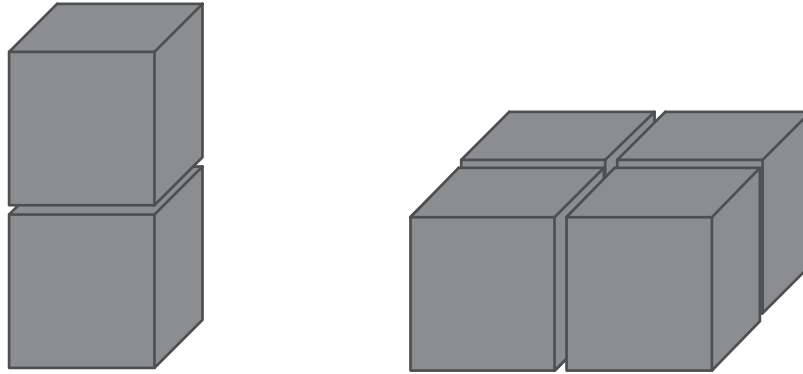
Standard Trading Units (STUs)



Standard Trading Units are like cubes of spectrum space. They cover an area in the horizontal plane, and they have height, representing bandwidth

Figure 2

STUs can be aggregated



STUs can be stacked vertically (left) to provide increased bandwidth, or horizontally (right) to cover a larger area

The main use of the STU concept is in trading spectrum space. The ACA permits spectrum space to be bought and sold in terms of STUs. Licensees who wish to trade part of a licence can disaggregate the licence into its component STUs and offer them for sale individually or in multiples. A single STU is the smallest unit of spectrum space for which the ACA will issue a licence or register trading.

The frequency bandwidth of STUs may vary in size depending on the spectrum band in which licences are being issued, but the minimum areas which may be traded will be constant for all bands. For the purposes of spectrum licensing in the 1.8 GHz and 800 MHz bands, the following definitions apply.

Frequency Band

The frequency bandwidth of each STU will be 1 MHz in the 800 MHz band, even though this spectrum is proposed to be sold in parcels of 5 MHz, and 2.5 MHz in the 1.8 GHz bands. The technical framework (see **Chapter 5 - Technical Framework**) for spectrum licensing in these bands has been predicated on these STU sizes.

Geographic area

In the geographic dimension, STUs follow the spectrum map grid (SMG) published by the ACA. The SMG has three resolutions related to population density. In outback Australia the resolution is 3 degrees of arc. In rural Australia, it is one degree of arc and in the metropolitan and regional parts of Australia where the bulk of the people live, and where the need for efficient spectrum use is highest, the resolution is 5 minutes of arc. It should be noted that the size and shape of

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STUs varies with latitude, but the sides of an area covered by an STU will be approximately 330 km, 110 km, and 9 km respectively.

The ACA reserves the right to vary the areas where each resolution applies. It may need to do this, for example, in response to shifts in population density identified from an Australian census, or because there is a demonstrated need to do this to facilitate trading. In general terms the ACA expects that any change in resolution will tend to facilitate trading at a finer resolution. (It should be noted that areas for the purposes of STU's are not the same as the areas described in the marketing plan.)

Using Spectrum for Communications Systems

Under spectrum licensing, licensees are responsible for planning the use of equipment within their own spectrum subject to the core conditions of the licence and the technical framework described in the various determinations and guidelines (see **Chapter 5 - Technical Framework**). The core conditions specify for each licence:

- the part or parts of the spectrum in which the operation of devices is authorised under the licence;
- the area within which the operation of devices is authorised;
- the maximum emission levels outside the bandwidth of the licence; and
- the maximum emission levels outside the area of the licence.

In addition to the core conditions, and the conditions required by the Act to be included, there may be licence conditions included by the ACA under s.71 of the Act (see also **Chapter 5 - Technical Framework**). Examples of the licence conditions that the ACA will impose are set out in the sample licence included in the Marketing Plan at **Attachment 4**. Most of these are related to interference management. These conditions are very important, as they relate to the management of actual interference that may be experienced or caused by devices operated under the licence. They are also important because some conditions impose **responsibilities** on spectrum licensees, especially responsibility for the management of interference, and responsibilities to negotiate with other licensees (or site managers) in relation to co-sited devices.

Before a device will be registered for use under a licence, the ACA may need to be satisfied that use of the device has been properly planned and that it will not cause unacceptable interference to other spectrum users. The ACA will accept an Interference Impact Certificate (IIC), issued by an accredited person (see below - **The Role of Accredited Persons**) as evidence that a device will not cause unacceptable interference. Licensees may engage an accredited person to conduct an engineering assessment of the proposed transmitter, and if satisfied that the device will not cause unacceptable interference, the accredited person may issue such a certificate.

The procedure for checking whether or not there is a probability that a device will cause unacceptable interference is set out by the ACA (see **Chapter 5 - Technical Framework**).

An accredited person cannot properly issue an IIC unless he or she follows this process.

If a licensee seeks registration of a device directly from the ACA and does not have an IIC, the ACA will charge for the work necessary to be satisfied that the device will not have an unacceptably high probability of causing interference. The ACA will charge for work done on a time and materials basis. The ACA's current standard charging rate for consultancy work is \$191.00 per hour.

Registered devices must be identified with a label carrying their registration number (see below).

The Radiocommunications (Unacceptable Levels of Interference) Determinations

Two Determinations relating to unacceptable levels of interference have been made under s.145 of the *Radiocommunications Act 1992* for this auction. One applies to devices in the 800 MHz bands (**Attachment 9**), the other to the 1.8 GHz bands (**Attachment 10**).

These determinations apply to all devices to be registered under a spectrum licence in the bands being allocated, irrespective of the type of service that a licensee proposes to operate.

The determinations (see **Chapter 5 - Technical Framework**) set out procedures that licensees should follow to ensure that their systems satisfy the core conditions of the licence relating to emission limits both outside the geographic area and outside the frequency band of the licence. The emission limit outside the band establishes an emission buffer zone along the frequency boundaries of the licence. The emission limit outside the area supports the management of intermodulation interference. The determinations also require the calculation of a 'device boundary' for the device. The device boundary check establishes an emission buffer zone along the area boundaries of the licence.

Compulsory Registration of Certain Devices

It will be a condition of all spectrum licences issued in these bands that licensees must not operate transmitters under those licences unless the transmitters are registered with the ACA, or have been exempted from the registration requirements.

Registration Exemptions

Certain kinds of transmitters are exempt from the registration requirements. These are mobile transmitters that operate outside the limits of towns that are on

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the towns mobile list; or on roads that are not on the roads mobile list; and mobile transmitters that only transmit at sea and only communicate with mobile receivers at sea. Cellular mobile telephone handsets will be exempt from device registration.

The Role of Accredited Persons

An accredited person is someone who has been accredited by the ACA to perform engineering work traditionally undertaken by the ACA and its predecessors. Under the Act, only an accredited person can issue the Interference Impact Certificate (IIC) that may be required before a transmitter can be registered for operation under a spectrum licence. Anyone with the appropriate qualifications and experience can apply to the ACA for accreditation.

It is expected that accredited persons will become an increasingly important alternative source of advice to licensees on the management and planning of spectrum use.

The ACA proposes to facilitate access to RADCOM for accredited persons to perform a whole range of on-line transactions, including searches of the register, notification of trading, requests for new antenna IDs and so on. All of these facilities are expected to be released over the next two years.

The ACA proposes to allow 'on-line' device registration. The first stage will be to enable people to apply 'on-line' to register transmitters by providing all the necessary details. The ACA's spectrum management information system, RADCOM, will perform certain checks on the information upon receiving an application for registration, and, if it passes those checks, the ACA will be able to register the device, and RADCOM will confirm that the transmitter has been registered.

Hard copy applications for device registration will also be accepted, but they may take a little longer to process than automated transactions.

The ACA will be able to provide licensees with contact details for existing accredited persons where those persons have consented to the release of those details.

Labelling Requirements for Transmitters

It is a requirement of the ACA that licensees label all transmitters with the Registration Number provided when the transmitter is registered.

There are some exemptions to the requirement for labelling. The exemptions apply to devices that have low interference potential, for example, low power mobile transmitters. For further details contact the ACA for a copy of the *Radiocommunications (Labelling) Determination 1996*.

Authorising Third Parties

There is nothing to prevent a spectrum licensee from authorising other people to operate devices in its spectrum space under a commercial arrangement.

The ACA points out to potential applicants and potential third party authorisees that the authorisation of a third party under the Act by a spectrum licensee would appear to be the exercise of a statutory power, and that it is not clear that the power of a spectrum licensee to revoke a third party authorisation can be fettered by any contractual or other arrangement. The ACA notes, however, that some licensees have, in the past, entered into agreements that, if valid, would have the effect of preventing the licensee from revoking a third party authorisation unless, for example, there had been a breach of contract as between the licensee and the third party authorisee.

The ACA further points out to potential applicants and potential third party authorisees that such arrangements can lead to difficulties when there is a dispute as to whether or not a third party authorisation has been validly revoked. In this situation, the ACA may be placed in the position of having to decide whether a third party authorisee is lawfully operating a transmitter, which could involve the ACA having to make an assessment of, for example, the contractual rights of the parties. The ACA may find this difficult or impossible to do.

The ACA, therefore, suggests that spectrum licensees should carefully consider the arrangements under which they make third party authorisations, and seek their own legal advice on how the requirements of the Act might be met in relation to the authorisation of the use of devices under spectrum licences.

All devices operated within the spectrum space, including those operated by third parties, have to be registered with the ACA, unless exempt, and the spectrum licensee would be responsible for ensuring that devices are registered.

Spectrum licences will include a condition that operation of devices by a person other than the licensee must comply with any rules made by the ACA about third party use (s.68(2)(a) of the Act).

Spectrum licences will include a condition that the licensee must notify any authorised third parties under the licence of their obligations under the Act, in particular, registration requirements for devices and any rules made (s.68(2)(b)).

IMPORTANT NOTE

A device cannot be operated unless authorised directly by a licence, or by the licensee issuing an authorisation to another person to operate the device. Licensees operating a mobile telephone service, in order to comply with this requirement, will need to individually authorise every handset that operates in their spectrum space. This is a separate issue from the exemption from device registration extended to mobile telephone handsets.

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Applicants should also note that for the purposes of certain sections of the *Trade Practices Act 1974*, authorisation to operate devices under a spectrum licence is taken to be acquisition of an asset by the authorised third party.

Trading in Spectrum Space

Spectrum licensees will be able to seek to negotiate the purchase of additional spectrum space if a market place were to develop, to cover larger areas, or more bandwidth, or both. Licensees will also be able to subdivide their licences and offer to sell spectrum space as, for example, a number of narrower bandwidth channels, or a number of smaller areas subject to the requirements as to STUs (see below). It will be up to licensees to find their own buyers and sellers of spectrum space, and the ACA will not have a role in facilitating such trading, other than to make available through the Register of Spectrum Licences (see below) the contact details of all spectrum licensees.

An important rule regarding trading is that the transfer of spectrum space made under a trade does not have effect until registered with the ACA, and new licences, or variations to existing licences, to reflect the changed ownership arrangements are issued (see below). This means that as soon as practicable after any transaction involving spectrum space is concluded, the seller and the buyer should jointly register the trade with the ACA. There is a form for this available from the ACA.

Spectrum licences may not be traded for the purpose of securing loans. This restriction is necessary to ensure that the ACA is not involved in registering transactions that are concerned only with such a transfer, and where there is no change in the relevant spectrum space.

Trading of spectrum space can only take place in terms of whole STUs of spectrum space defined by the ACA. The area and the bandwidth of each spectrum licence can be subdivided and sold, or the licences can also be sold in their entirety.

Registration of Trading

Both parties to a trade, or an assignment, should notify the ACA as soon as practicable after a trade has been agreed so that the Register of Spectrum Licences can be updated. The parties to a trade must complete a 'Notice of Trading' Form setting out the new ownership details and send it to the ACA for registration.

The ACA will register assignments as soon as practicable after receiving a Notice of Trading Form. A trade does not take effect until the Register has been changed by the ACA. The ACA will then vary, issue or cancel licences as appropriate to give effect to the change. There will be a fee charged to recover the ACA's costs in registering any trade, and for issuing the new licence(s).

The Register of Spectrum Licences

The Register of Radiocommunications Licences is a public reference source containing information about the use of spectrum by radiocommunications licensees (ss.143-144 of the Act). The ACA will establish a Register of Spectrum Licences to be kept in an electronic form. It will include the following information in respect of each spectrum licence:

- the name and postal address of the licensee;
- the date of issue and expiry of the licence; and
- details about the conditions of spectrum licences.

These details are similar to the registration requirements for apparatus licences.

The ACA is also required to keep in the Register a record of transmitters, above a certain power, operated under spectrum licences so that users can co-ordinate spectrum use with other licensees. Each licence will include a condition that transmitters are not to be operated under the licence unless the registration requirements of the ACA have been met (s.69 of the Act). The condition may exempt transmitters of particular kinds (for example, small transceivers) from meeting the requirements for registration. The details that the ACA will record are:

- date of registration;
- location;
- radiated power as a function of frequency; and
- antenna details (height).

The registration requirements may include a requirement that the licensee present a certificate (an *interference impact certificate*) issued by an accredited person stating that operation of the device under the licence will not cause unacceptable interference (see **Chapter 5 - Technical Framework**). In certain circumstances the ACA may accept an application to register a device without a certificate being furnished, for example, to allow the operation on an experimental basis of a new type of transmitter. If an interference certificate is required, but none is furnished, the onus will be on the licensee to notify the ACA of transmitter details. Once details of a device have been registered, the licensee or person authorised by the licensee will need to comply with those details in operating the device until such time as the registration is varied. Operation of a device will not be authorised under a licence if it is operated in a manner that is not in accordance with the details in the Register.

The ACA will update the Register as soon as practicable if a spectrum licence is varied, suspended, cancelled or surrendered, or if the licence or part of the licence is assigned to another person, or resumed by the ACA (s.146 of the Act).

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Transmitters that are part of a group of transmitters may be registered individually or as a group.

The ACA does not propose to register mobile transmitters that operate:

- outside the limits of a town on the towns mobile list; or
- on a road that is not on the roads mobile list; or
- at sea and only communicate with a mobile receiver at sea.

Low powered handsets used under spectrum licences are not required to be registered with the ACA. However, spectrum licensees intending to use spectrum for mobile telecommunications will be required to authorise the use of third party operated handsets under the licence in accordance with s.68 of the Act (see **Authorising Third Parties** above).

Spectrum Licence Conditions

A spectrum licence authorises the licensee, or a person authorised by the licensee, to operate radiocommunications devices in accordance with the conditions contained in the licence. Each spectrum licence will include core conditions (s.66 of the Act) that specify:

- the part or parts of the spectrum in which the operation of radiocommunications devices is authorised under the licence;
- the area of Australia within which the operation of radiocommunication devices is authorised; and
- the maximum permitted level of radio emissions outside these spectrum and area boundaries.

Effectively the core conditions define the spectrum space within which the licensee is authorised to operate radiocommunications devices under the licence.

The licence will also include conditions about:

- payment of charges (s.67);
- use by third parties, especially in relation to handsets (s.68);
- registration of transmitters (s.69); and
- any other matters that the ACA may need to include in the licence to provide for efficient administration of the Act, for example, to require proper co-ordination with other devices or to manage devices in a way that does not compromise Australia's international treaty obligations.

Spectrum Licence Tax

The ACA will recover from all licensees a share of the overhead costs of maintaining the spectrum through an annual fee or ‘spectrum licence tax’. Apparatus licensees contribute towards these costs through the spectrum maintenance component in their annual licence fees. The other two components paid annually by apparatus licensees are the spectrum access tax and a cost recovery charge for licence issue or renewal. Spectrum licensees will not pay a spectrum access tax.

The spectrum licence tax will be calculated for each spectrum licensee as its share, on a MHz per person basis, of the spectrum maintenance component that would apply if the spectrum subject to the Minister's declaration had been allocated by issuing apparatus licences. This means that instead of each spectrum licensee contributing the same amount to overhead costs as apparatus licences, they each contribute to the amount that would apply to one apparatus licence.

The total revenue collection may vary from year to year, but will be linked to the apparatus licence fee table. The proportion paid by each licensee from year to year may vary depending on the number of licences on issue and their total coverage. The factors affecting each licensee’s contribution for the band will be reviewed annually.

The total amount of spectrum licence tax that the ACA would collect from all licensees in these two bands under the ACA's current licence fee table is expected to be of the order of \$100,000. All licensees in the band will make a proportional contribution to this, based on their coverage in terms of MHz and population.

Licence Term

The licences issued will be for terms of fifteen (15) years. The ACA will publish information regarding licences that are due to expire.

Spectrum licences, like apparatus licences, are issued with no automatic right of renewal. At the end of the licence period, replacement licences will generally be re-allocated following a price based procedure (s.81 of the Act). This provision does not prevent a spectrum licence being reissued to a person to whom it was previously issued.

A spectrum licence may be reissued to the same licensee without participating in a price based allocation process where this is in accord with a determination by the Minister (s.82(3) of the Act), or the ACA is satisfied that special circumstances exist as a result of which it is in the public interest for that person to continue to hold the licence (s.82(1)(b) of the Act).

The Act does not exempt the licensee from paying a spectrum access charge in these circumstances.

Licence Sanctions

Suspending and Cancelling Spectrum Licences

If the ACA is satisfied that a licensee, or an authorised third party has:

- breached a licence condition or the Act, or
- has operated a device in breach of any other Commonwealth, State or Territory statutory or common law, or
- operated the device in the course of contravening such a law,

the ACA may, by written notice giving reasons, suspend a spectrum licence (s.75 of the Act). The suspension will cease within 28 days unless proceedings for an offence against the Act are instituted. The ACA may revoke the suspension at any time.

The ACA may also take action to cancel a spectrum licence (s.77 of the Act).

Application may be made to the ACA for reconsideration of a decision to suspend or cancel a spectrum licence (s.285 of the Act).

It should also be noted that in the event that licence conditions are breached by a licensee or an authorised third party, other licensees may also be able to pursue a remedy through the courts by undertaking civil proceedings.

Licence Resumption

The ACA is empowered to resume spectrum licences by agreement, or by compulsory process subject to payment of just compensation (ss.89-95 of the Act). The ACA may only exercise its powers to resume spectrum licences where the Minister has given written approval (s.91(2)(a) of the Act).

Charging for ACA Services

Under its enabling legislation, the ACA may recover its costs. Any services provided by the ACA to spectrum licensees will be charged at the ACA's normal charging schedule.

In many instances, the ACA has set a standard charge for services offered, including registration of devices and registration of trading of spectrum space.

Each spectrum licence will include a condition that the licensee meet its obligations to pay any cost recovery charges levied by the ACA (s.67 of the Act).

Licences that are about to expire

The ACA will periodically publish notices in the Commonwealth Gazette stating where information can be obtained about spectrum licences that are due to expire within the next two years (s.78 of the Act). These publications will also invite expressions of interest from members of the public who would like a spectrum licence to be issued to them. This information can also be obtained from any of the ACA's area offices.

The ACA also proposes to send regular expiry reminders to licensees during the last two years of their licence. The first batch of these notices is not likely to be issued until 2010/2011 (that is, about thirteen years after the auction takes place).

5. Technical Framework

In This Chapter...

- **an explanation of the technical framework underpinning spectrum licensing in the 1.8 GHz and 800 MHz bands**
- **an explanation of the purpose and operation of the s.145 Determinations of unacceptable interference**
- **an explanation of the various Advisory Guidelines that protect apparatus licensed devices in adjacent spectrum and in the spectrum licensed spectrum during the re-allocation period**
- **an explanation of other interference management mechanisms**
- **other important information about the technical framework.**

Introduction

The technical framework has been established by the ACA to support the use of many different types of service, including the following:

- all types of digital or analogue modulation (although, under Government policy, analogue AMPS is not permitted in re-allocated spectrum);
- narrowband and broadband services;
- frequency or time domain duplexing (in certain deployment configurations);
- large mobile or point to multipoint service areas of around 40 km radius in urban areas at 800MHz;
- point to point services when both ends of the link have transmitters operating in the upper band at 800 MHz or either the upper or lower band when a link operating at 1800 MHz is located in regional areas; and
- mobile transmitters with high radiated power (up to 40 W) at 800 MHz.

Broadly speaking, the technical framework for spectrum licensing in the 1.8 GHz and 800 MHz bands is constructed from three interlocking tools. Two of these tools are used to deal with the management of emission levels, namely the core conditions of the licences themselves, and the registration of devices under the Act. The third tool, advisory guidelines to be made by the ACA under the Act, will provide a framework for the co-ordination of spectrum licensed services with apparatus licensed services operating within the spectrum to be re-allocated, and

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with apparatus licensed services that operate in spectrum surrounding the spectrum to be spectrum licensed. One of the advisory guidelines will also provide a co-ordination framework for spectrum licensed services.

The entire technical framework is predicated on the assumptions that:

- spectrum and apparatus licensees will employ good engineering practice in establishing and maintaining their services;
- receivers employed by spectrum licensees will, as a minimum, meet the notional receiver performance levels set out in Schedule 1 of each of the *Radiocommunications Advisory Guidelines (Managing Interference from Apparatus-licensed Transmitters - 1800 MHz Band) 1998*, and the *Radiocommunications Advisory Guidelines (Managing Interference from Apparatus-licensed Transmitters - 800 MHz Band) 1998* (see **Receiver Performance** below); and
- receivers employed by apparatus licensees will, as a minimum, meet the relevant standard made under the *Radiocommunications Act 1992* or, if there is no such standard, the level of performance referred to in the advisory guideline that applies to the apparatus licensed service in question; and
- spectrum licensees will be responsible for managing interference that they, or their third party authorisees, cause to their own services through their operation of devices under any spectrum licence or apparatus licence.

The following general principles have also been followed in developing the technical framework:

- the ACA has attempted to provide the maximum flexibility to spectrum licensees to establish services;
- absolute power levels have been specified as emission limits rather than power levels that are relative to the transmitter power;
 - this allows licensees to strike a balance between the maximum radiated power of a device and its out-of-band performance;
- the core conditions indirectly specify frequency stability by requiring the emission limits outside the band to be maintained under all conditions;
 - this allows a licensee to balance emission bandwidths along with frequency stability, as well as transmitter rise and fall times providing 'internal guard bands' as necessary.

The interference mechanisms that the technical framework seeks to manage are those caused by:

- unwanted in-band emissions;
- the modulation process;

- the frequency generation process;
- transient unwanted emissions such as those caused by switching a transmitter on and off; and
- intermodulation effects.

All five of these mechanisms are dealt with by a combination of the core conditions relating to out-of-area and out-of-band emissions, and those parts of the registration process which give effect to those conditions at the point of registration of devices prior to their operation.

The technical framework also provides additional controls in relation to out-of-band interference, such as that caused by intermodulation effects. Firstly, a series of constraints are imposed on the deployment of transmitters and receivers by means of the registration process. Secondly, a licence condition imposes on spectrum licensees the responsibility to manage out-of-band interference that arises from devices being located within 200 metres of each other.

It should be noted that in all cases, the technical framework established by the ACA for the 1.8 GHz and 800 MHz bands is a basis upon which further flexibility may be achieved. The ACA is prepared to consider alternative management arrangements for emission levels agreed between spectrum licensees and, where relevant, apparatus licensees. Spectrum licensees should, however, note that the ACA will not give effect to alternative arrangements unless all affected and potentially affected licensees have agreed to the arrangements.

For example, spectrum licensees might agree alternative arrangements with other licensees under which higher powers for smaller bandwidths inside the frequency band of the licence would be allowed. The variation to the level of power would depend on the width of the guard bands being proposed, and the notional RF selectivity expected for receivers operating under adjacent licences.

Furthermore, it should be noted that agreements between licensees can only continue to apply while the size and the shape of the spectrum space owned by the licensees remains the same. Where trading of licences takes place and new boundaries are formed, these agreements will need to be re-negotiated. This re-negotiation can occur at any time, that is, before or after the trade, so that there is no loss of flexibility to licensees.

When trading occurs by means of the division of spectrum space, a check will be required to ensure that the "device boundaries" of devices that are to continue operating remain within the geographic area of the relevant licence. The ACA intends to issue provisional licence numbers before a trade to facilitate the redistribution of devices between the portions of spectrum space that occur after the trade.

Core Conditions

This part of the Chapter explains what the core conditions relating to emissions are intended to achieve, and how the emissions subject to those conditions are further managed under the technical framework.

Out-of-area emissions

Emissions from a fixed transmitter operated under a spectrum licence located anywhere in the geographic area of the licence are limited by core conditions to a horizontally radiated power (measured within a 30 kHz bandwidth) of 59 dBm EIRP at 800 MHz and 54.5 dBm EIRP at 1800 MHz. The conditions, therefore, effectively place an overall cap on power at the boundary and also throughout the entire geographic area of a licence.

Under the s.145 determinations, emissions from a mobile transmitter are limited to a horizontally radiated power (measured within a 30 kHz bandwidth) of 46 dBm EIRP at 800 MHz and 24.5 dBm at 1800 MHz.

An additional layer of management is imposed at the point of registration of devices. Before registering a device a licensee or accredited person must calculate the device boundary of the transmitter in accordance with the relevant determination made by the ACA under s.145 of the Act. Attachment 9 is the *Radiocommunications (Unacceptable Levels of Interference - 800MHz Band) Determination 1998* and Attachment 10 is the *Radiocommunications (Unacceptable Levels of Interference - 1800MHz Band) Determination 1998*. This involves establishing the distance, along radials from the transmitter, that is required for the emission level to drop below what the ACA considers to be the typical sensitivity that will be achieved by receivers in adjacent geographic areas. The distance along each radial is based on a mathematical propagation model. The model takes account of the terrain loss of emissions by adjusting the antenna height of a device according to its height above average terrain, called its effective antenna height. Effective antenna heights are calculated every 5 minutes in distance along each radial.

If the device boundary so calculated falls outside the geographic area of the relevant spectrum licence the ACA will, generally speaking, refuse to register the device because the levels of emission outside the licence that it would cause will be 'unacceptable interference' within the meaning of s.145 of the Act. The ACA will consider registration in these circumstances where all affected licensees reach alternative arrangements for the management of emission levels.

The effect of these two layers of management is to create 'emission buffer zones' along the geographic boundaries of the licences.

The corollary of this aspect of interference management is that spectrum licensees must expect that certain levels of emission will legitimately cross their geographic

boundaries from points within other spectrum licensed areas. Accordingly, when considering what services they might establish within their own geographic areas, spectrum licensees will have to take into account the fact that transmitters may be located at certain points within other spectrum licensed areas, and that those transmitters may radiate power into the spectrum licensee's area at any level up to that allowed under the relevant s.145 determination of unacceptable interference.

Out-of-band emissions

Out of band emission limits are imposed by a core condition. To establish whether the operation of a device will cause 'unacceptable interference' by breaching the out-of-band emission limits, a licensee or accredited person must work out the radiated power of the device within bandwidths outside the frequency band of the licence using good engineering practice. If the power so calculated is greater than a figure specified in the relevant licence condition, two things follow:

- if the device is not yet registered - the ACA will generally speaking refuse to register it, because the interference that it would cause will be 'unacceptable interference' within the meaning of s.145 of the Act, (unless, for example, all relevant licensees agree alternative arrangements);
- if the device is already registered - there will be a breach of the core licence condition, unless, once again, all relevant licensees have agreed the alternative arrangements, and the ACA varies the relevant licence or licences to reflect those varied arrangements (see s.72 of the Act).

Levels of protection not provided

It should be noted that under the interference management regime established for spectrum licensing in the 500 MHz regime, receivers in adjacent areas are further protected from in-band interference by 'levels of protection', which were enforced by means of a licence condition. This protection was afforded by requiring that the power at a receiver must not exceed a specified level measured in a certain manner. That gave protection to receivers on a sliding scale, which varied with the antenna height and distance to the boundary of the geographic area. This is not necessary under the current allocation, because the STU bandwidth is sufficiently large for licensees to avoid interference from adjacent areas by relocating their service within their own spectrum space as necessary, including within their own frequency band.

Deployment constraints

Whilst the two core conditions aimed at emission levels provide some measure of protection from intermodulation effects, the ACA considers it will be necessary to provide further means of protecting against this interference mechanism. To this

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end, the ACA proposes to impose some constraints on the deployment of transmitters in both bands. The ACA does not intend to impose deployment constraints on receivers, and the onus will lie on spectrum licensees to determine the best siting for their receivers, having regard to the overall technical framework.

It is, however, important to note that (as mentioned above) the technical framework does not provide any protection from intermodulation effects where transmitters are sited within 200 metres of each other. Consequently, the ACA proposes to impose a special condition on the spectrum licences that will have the effect of requiring spectrum licensees to come to an arrangement amongst themselves in relation to interference in such cases.

The deployment constraints vary from band to band, and from area to area. The constraints are expressed in terms of effective antenna height which is calculated using the average ground height within approximately 10 kilometres of each device. For a more detailed explanation of effective antenna height, please see the relevant s.145 determinations.

Lower 800 MHz Band (825 - 845 MHz)

In this band transmitters must be deployed at less than an effective antenna height of 10 metres. In this case the effect of the framework is to effectively protect high sited receivers, and the ACA anticipates that spectrum licensees will site their receivers in this way to obtain a reasonable service area. Potential licensees should have regard to this when considering potential sites and the utility of the spectrum.

Upper 800 MHz Band (870 - 890 MHz)

In this part of the 800 MHz Band transmitters may be deployed at any effective antenna height. The ACA has adopted this course to provide maximum flexibility for spectrum licensees in country areas where the likelihood of nearby services (receivers) at low sites is low, and consequently the siting of transmitters at low sites may be expected, generally speaking, not to cause any problems. The potential for interference in the 800 MHz Band is further limited by the fact that transmitters will be confined below the 10 metre level across the whole of the lower 800 MHz Band across the entire country. Consequently, because transmitters in the lower band must be at low sites, and because it is assumed that the spectrum will be used in paired bands (but not necessarily - see below), it can be anticipated that transmitters in the upper band will generally be at high sites. Although the ACA has not required that transmitters in the upper band be placed at high sites, and the receivers at low sites, the ACA considers that this will be the natural result of the combination of the deployment constraint in the lower band plus paired band usage.

If spectrum licensees follow this anticipated siting of transmitters in the upper 800

MHz Band, interference from intermodulation effects will normally be a co-siting issue, and fall for resolution between spectrum licensees and others under the special condition requiring negotiation where transmitters are sited within 200 metres of each other.

If, however, spectrum licensees take advantage of the flexibility open to them to site transmitters operating in the upper 800 MHz Band at less than 10 metres above effective ground level, and intermodulation interference arises as a result of the siting of such a transmitter within 200 metres of a receiver, the spectrum licensee who places the transmitter at the low site will bear the responsibility for managing the interference. Managing interference includes investigating possible causes of interference, taking steps to resolve disputes concerning interference, and taking steps to reduce the likelihood of interference occurring.

1.8 GHz Band in areas of high mobile use

The areas of high mobile use are set out in the relevant s.145 determination. In these areas in the 1.8 GHz Band, the same arguments apply as for the whole of the 800 MHz Band. Consequently, in the 1.8 GHz Band in areas of high mobile use the ACA proposes to impose deployment constraints in the lower part of the band (1710 - 1755 MHz) but not in the upper part (1805 - 1850 MHz).

1.8 GHz Band outside areas of high mobile use

The ACA does not propose to impose any deployment constraints in either the upper or lower parts of the 1.8 GHz Band in areas that are outside the areas of high mobile use. This is to support continued use by fixed services, which operate on a high site, point to point basis, and will allow them to acquire spectrum licences. However, the operation of services at high sites in both upper and lower parts of the 1.8 GHz Band causes a number of problems. In particular, to manage out-of-band interference, spectrum licensees will have to provide themselves with additional out-of-band 'emission buffers' along any 'frequency boundary' within the 15 MHz of spectrum that is available outside areas of high mobile use. Accordingly, spectrum licensees who may want to operate a receiver at a high site where transmitters in adjacent bands are likely to be operating, when considering the services that they might be able to operate within this spectrum, should note that they may have to:

- provide guard bands and/or high performance filters at the edges of their spectrum; or
- negotiate with the adjacent licensee either to employ transmit filtering, or to avoid placing transmitters near the frequency boundary at that location.

In-band issues arising under the technical framework where there are no deployment constraints imposed

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Because of the assumptions on operation at high and low sites that underlie the technical framework in areas of high mobile use, potential spectrum licensees and incumbent apparatus licensees should also have regard to the following further issues.

Firstly, spectrum licensees who want to operate a receiver at a high site outside areas of high mobile use will have to:

- place their receivers at a large distance from the geographic boundary; or
- negotiate with the adjacent licensees not to place their transmitters near their own geographic boundaries.

Secondly, spectrum licensees who propose to operate a service in the lower 1.8 GHz Band at a high site in a country area should note that a transmitter at such a site may have direct line of sight to a receiver operated by another spectrum licensee in an area of high mobile use in that Band. In keeping with the *Radiocommunications Advisory Guidelines (Protection of Mobile Base Receivers - 1800 MHz Lower Band) 1998 (Attachment 16)* the ACA will expect both spectrum and apparatus licensees to locate their transmitters well away from such areas of high mobile use. The guidelines indicate acceptable geographic separation. Incumbent apparatus licensees should note that the effect of this regime will be that after the two year re-allocation period, an incumbent apparatus licensee will need to take account of the advisory guideline, and either relocate to upper band, acquire the high mobile use spectrum, or come to an arrangement in relation to interference with the relevant spectrum licensee.

Practical examples of the operation of the technical framework, and potential loss of utility of spectrum

In regional areas, mobile base stations are usually located at the best vantage point for serving a country town. Sites are difficult to procure. Therefore, it is likely that both mobile and fixed services in regional areas will be in close proximity to each other, as they often are in urban areas now. Therefore, it is likely that a high level of negotiation could occur at sites that do not fall within the defined areas of high mobile use. There could be a proportionate loss of utility of that spectrum.

For example, under the framework it is possible for two adjacent spectrum licensees to operate mobile services with dissimilar configurations, for example frequency domain duplex (FDD) frequency adjacent to a time domain duplex (TDD) service. This is a similar problem to that experienced at the old AMPS-GSM boundary where there was a loss of spectrum utility. TDD equipment is already available for these bands and more equipment is expected to become available over the term of the licences (15 years). A licensee who wants to operate DCS 1800 outside an area of high mobile use needs to be aware that someone in an adjacent spectrum licence may wish to operate transmitters at high sites near the licensee's DCS 1800 base receivers.

These examples of how the interference management regime might affect proposed services and spectrum utility are not intended to be exhaustive. Potential spectrum licensees should take such expert technical and other advice as they consider necessary to inform themselves of the technical framework, and the possible effects on their proposed services of the operation of services by other spectrum and apparatus licensees under that framework. Potential spectrum licensees should similarly inform themselves of the possible losses of utility of spectrum to which the operations of other licensees might give rise.

Managing interference between apparatus licensed and spectrum licensed devices

The ACA proposes that interference between devices operated under spectrum licences and devices operated under apparatus licences (and in one case operated under more than one spectrum licence) will be managed by advisory guidelines made under s.262 of the Act. The guidelines have been developed so as to, generally speaking, provide apparatus licensees with the same levels of protection from other services as they currently enjoy under the apparatus licensing system. The guidelines achieve this by specifying compatibility requirements between spectrum licensed services and apparatus licensed services. The compatibility requirements are essentially a model on the basis of which spectrum and apparatus licensees are expected to develop co-ordination procedures for the management of interference to each others services, using good engineering practice. Licensees who cannot resolve interference problems between themselves may expect the ACA to have regard to the guidelines in dealing with such disputes.

However, the guidelines are not binding either on licensees or the ACA, and the ACA has adopted this approach in order to provide the maximum flexibility for both spectrum and apparatus licensees in how they arrange their affairs so as to avoid interference with each others services. Once again, the ACA is prepared to consider alternative interference management arrangements agreed between spectrum licensees and, where relevant, apparatus licensees. Spectrum licensees should, however, note that the ACA will not give effect to alternative arrangements unless all affected and potentially affected licensees have agreed to the arrangements, and that subsequent trading will impact on any agreements reached.

The ACA recommends that radiocommunications devices be registered at the system design stage (especially services that are near the frequency boundary of Telstra's GSM service at 890 MHz) to enable apparatus licensees, if they wish, to re-check the coordination and if an obvious error is detected, negotiate directly with the spectrum licensee before further costs are incurred when transmitters are not able to be operated due to interference. Registration at the system design stage, however, should not to be used for the purpose of inhibiting the operation of devices by adjacent licensees through the requirements of coordination for devices that are never intended to be operated.

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The compatibility requirements that the ACA would normally expect to be maintained in relation to apparatus licensed receivers (including incumbent services during the time of the re-allocation period), are described in the guidelines as follows.

Radiocommunications Advisory Guidelines (Protection of Apparatus-licensed Receivers - 800 MHz Band) 1998 (Attachment 11)

These guidelines apply to receivers of trunked land mobile services, narrowband point to point services, wideband point-to-point services, studio transmitter links, GSM base receivers and AMPS receivers. A special situation exists at the AMPS-GSM boundary where a spectrum licensee will probably have to provide high performance filters to GSM base receivers in order to extract maximum utility from the 5 MHz of spectrum that is adjacent to the GSM services. An overview of propagation models is given in the guideline to assist licensees in the development of suitable co-ordination procedures.

The ACA recognises that the potential for interference to GSM operations from the spectrum licensee of the band immediately adjacent to Telstra's GSM system is higher than any other interference scenario. The ACA has undertaken to Telstra that it will act quickly to ensure that no interference is caused. The ACA will rely on these s.262 advisory guidelines to establish a benchmark against which complaints of interference will be investigated and resolved.

Radiocommunications Advisory Guidelines (Protection of Molonglo Observatory Synthesis Telescope) 1998 (Attachment 12)

The Molonglo Observatory Synthesis Telescope (MOST) is a radio telescope located approximately 30 km to the east of Canberra that monitors radio signals from weak celestial radio sources in a frequency band centred on 843 MHz. These advisory guidelines set out the compatibility requirement to provide the MOST with a reasonable level of interference protection from transmitters operating in this band. A suggested approach to assessing the compatibility is also provided. The compatibility requirement will cease at the end of 2008.

Radiocommunications Advisory Guidelines (Protection of Apparatus-licensed Receivers - 1800 MHz Band) 1998 (Attachment 13)

These guidelines apply to receivers of microwave fixed point-to-point services operating in or adjacent to the 1800 MHz band as well as services operating under the meteorological satellite service below 1710MHz. Incumbent point-to-point receivers (a receiver that has part of the frequency band of its spectrum access, and its location, within designated spectrum space), will require protection for the re-allocation period detailed in the designation of the 1800 MHz Band. Receivers operating in conjunction with services for which licences were issued before the date of issue of the Marketing Plan, and which are:

- outside the bands to be spectrum licensed; and/or
- outside the areas to be spectrum licensed

will require continuing co-channel and adjacent channel protection for the full period of the spectrum licences. A survey, seeking confirmation of licence details for existing services at both 800 MHz and 1800 MHz has been completed and the updated details from the survey have been incorporated into the ACA's Register and CD-ROM.

Receivers whose apparatus licences are issued after the date of issue of the Marketing Plan will be required to accept any in-band emission from a device operated under a spectrum licence, if the spectrum licensed device is operated in accordance with the core conditions of the licence and the relevant s.145 determination. Transmitters that operate in the 1800 MHz lower band and are related to those receivers are required to comply with *Radiocommunications Advisory Guidelines (Protection of Mobile Base Receivers - 1800 MHz Lower Band) 1998* (see below).

In the case of receivers operating under spectrum licences, compatibility requirements are specified in the following advisory guidelines.

Radiocommunications Advisory Guidelines (Managing Interference from Apparatus-licensed Transmitters - 800 MHz Band) 1998 (Attachment 14)

Broadly speaking, these guidelines specify the compatibility requirements that apparatus licensed transmitters should meet in relation to receivers that have been registered for operation in the 800 MHz Band under spectrum licences. (For a more detailed description of the services to which these guidelines apply, prospective spectrum licensees and apparatus licensees should see the guidelines themselves.) A notional receiver performance level is also specified to enable licensees to develop appropriate co-ordination procedures. The ACA intends to assume that all receivers operating under spectrum licences have a performance at least equal to the notional performance when settling interference disputes.

Radiocommunications Advisory Guidelines (Managing Interference from Apparatus-licensed Transmitters - 1800 MHz Band) 1998 (Attachment 15)

These guidelines operate in a manner similar to those above except that they specify a compatibility requirement for receivers operated under spectrum licences at 1800 MHz.

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Radiocommunications Advisory Guidelines (Protection of Mobile Base Receivers - 1800 MHz Lower Band) 1998 (Attachment 16)

These guidelines affect the use of transmitters at 1800 MHz whose apparatus licences are issued after the date of issue of the Marketing Plan as well as transmitters operating under spectrum licences in the lower band and located outside areas of high mobile use.

Receiver Performance

As mentioned above, licensees will need to take account of the emission limits permitted under the technical framework when deciding the level of performance they require for their receivers. Receivers will cope with emission levels with differing degrees of success depending on their interference susceptibility performance. For example, a receiver with poor performance would normally deny large amounts of spectrum space for transmitters to use in order to protect it from interference. The ACA does not intend to enforce receiver standards. It is for each licensee to balance the cost of receiver performance against the cost of spectrum space denied to their transmitters.

Poor receiver performance is only a problem when a licensee uses spectrum space belonging to an adjacent licensee. The framework provides for the operation of receivers that have an interference susceptibility equal to or better than that achieved by current technology and intends for this level of performance to guide the interference settlement process. Receivers with poor interference susceptibility performance can be used, but in those cases, a licensee may have to use part of their own spectrum space as a guard band. For example, interference that results from a receiver having an RF bandwidth that is larger than the frequency band of the licence, will be the licensee's responsibility. It is the licensee's responsibility to use receivers in a manner that is both consistent with good engineering practice and effectively copes with the levels permitted under the technical framework.

Interference that the technical framework does not prevent

No matter how rigorous the engineering analysis of a device, there is always a possibility of actual interference when devices are deployed in the field. This is because the technical framework is designed on a probabilistic basis. Under the framework described in this Chapter, it is anticipated that interference between spectrum licensed devices will occur at about the same rate as between apparatus licensed devices, that is, interference will arise in less than one percent of cases. Such interference may be caused by emissions at frequencies either inside or outside licensees' spectrum space.

Licensees are strongly advised before making an interference complaint to attempt to locate the source of any interference by checking the Register of Radiocommunications Licences. This investigation may reveal the cause of the interference and it may be possible to settle the problem without the ACA's intervention. If the ACA becomes involved, licensees may be charged for any work undertaken.

Registering groups of transmitters

Transmitters must always be registered as either an individual transmitter or as part of a group of transmitters. If two or more transmitters are operated for the purpose of communicating with the same receiver or same group of receivers and they have identical emission characteristics, then those transmitters may be treated as a group for registration purposes. A transmitter may belong to more than one group. Groups are defined to help minimise the work associated with the registration process of similar transmitters, for example, mobile transmitters and cellular base stations. Low power mobile transmitters, and low power fixed transmitters operated in enclosed spaces (for example, those usually associated with PCS systems) are exempted from device registration requirements.

Both fixed and mobile transmitters must be registered (unless exempted). Mobile devices may be registered as a group (or one logical device), and in some cases that one logical device may operate in a number of locations called effective mobile locations. Lists of effective mobile locations are available from the ACA. An effective mobile location has an associated effective radius which is used to further expand the device boundary to take account of the roaming nature of a mobile transmitter.

International co-ordination

The ITU Radio Regulations have international treaty status and are binding on Australia. Transmitters operated under a spectrum licence, other than in accordance with ITU Radio Regulations, must not cause interference to any services of any other country (for example, Papua New Guinea or Indonesia) which are operating in accordance with ITU Radio Regulations. If operation of a transmitter does cause harmful interference to overseas services operating in accordance with ITU Radio Regulations, the transmission must cease. Spectrum licensees must also accept interference from any overseas service operating in accordance with ITU regulations. Potential spectrum licensees should note that the ACA will impose such additional licence conditions on spectrum licences as may be necessary to meet its international obligations.

Health and safety

Every spectrum licensee will need to take into account occupational health and safety requirements for radiofrequency devices. Occupational health and safety requirements that concern use of radiofrequency devices are currently the responsibility of the relevant State or Territory Governments.

In addition, licensees will be required to comply with any health exposure standards that may be made by the ACA for the health and safety of persons who operate, work on or use radiocommunications transmitters and receivers.

Environmental and other considerations

Antenna siting, height and construction may be regulated by State, Territory or local government legislation. Before planning for a device to operate in a certain location, licensees should investigate the local rules pertaining to the erection of towers and antennas.

Obtaining a permit to operate non-standard devices

A licensee who wishes to operate standard devices under a spectrum licence (that is, equipment that conforms to mandatory ACA standards) will not have to apply to the ACA for permission to do so. However, a permit will be required to operate non-standard devices. These permits may be issued by the ACA under s.167 of the *Radiocommunications Act 1992*, and will only be issued for the term of the licence.

Permits to supply non-standard devices for operation under a spectrum licence may also be issued by the ACA under s.174 of the Act.

Attachment 1

**Minister's Declarations under s.153B of the
Radiocommunications Act 1992**

Attachment 2

Minister's Bidding Limits

Attachment 3

Minister's Carrier Licence Conditions

***Carrier Licence Conditions (Spectrum Re-allocation) Declaration
1998***

Carrier Licence Conditions (Access and Roaming) Declaration 1998

Attachment 4

*Radiocommunications Spectrum Marketing
Plan (800 MHz and 1.8 GHz Bands) 1998*

Attachment 5

Area Maps and Boundary Coordinates

Attachment 6

*Radiocommunications (Spectrum Licence
Allocation) Determination 1998*

Attachment 7

Appointment of an Auction Manager

Attachment 8

Setting of Entry Fee and Eligibility Payment

Attachment 9

***Radiocommunications (Unacceptable Levels
of Interference - 800 MHz Band) Determination
1998***

Attachment 10

***Radiocommunications (Unacceptable Levels
of Interference -1800 MHz Band)
Determination 1998***

Attachment 11

***Radiocommunications Advisory Guidelines
(Protection of Apparatus-licensed Receivers -
800 MHz Band) 1998***

Attachment 12

***Radiocommunications Advisory Guidelines
(Protection of Molonglo Observatory
Synthesis Telescope) 1998***

Attachment 13

***Radiocommunications Advisory Guidelines
(Protection of Apparatus-licensed Receivers -
1800 MHz Band) 1998***

Attachment 14

***Radiocommunications Advisory Guidelines
(Managing Interference from Apparatus-
licensed Transmitters - 800 MHz Band) 1998***

Attachment 15

***Radiocommunications Advisory Guidelines
(Managing Interference from Apparatus-
licensed Transmitters - 1800 MHz Band) 1998***

Attachment 16

***Radiocommunications Advisory Guidelines
(Protection of Mobile Base Receivers - 1800
MHz Lower Band) 1998***

Attachment 17

Order Form and Information for the ACA CD-ROM Extract from the Register of Radiocommunications Licences

Attachment 18

Auction System File Formats

Attachment 19

Application Documents