

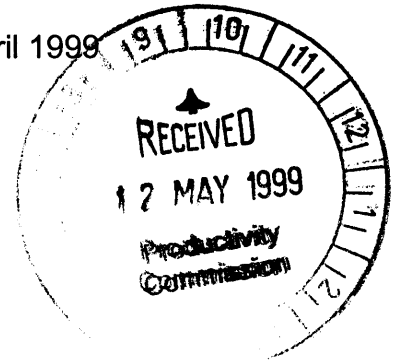


Australian
Communications
Authority

500 100 - 28

Dr Geraldine Gentle
Assistant Commissioner
Productivity Commission
LB 2 Collins St
MELBOURNE VIC 3000

29 April 1999



Dear Dr Gentle

Thank you for the opportunity to meet with you and your colleagues on 28 April to discuss the Commission's review of broadcasting regulatory arrangements. The issues to be canvassed in the review are complex, and the rapid development of technical delivery options is serving to further add to the complexity of existing regulatory structures.

As we discussed, the ACA's primary interest in broadcasting stems from the use by broadcasters of radiofrequency spectrum to deliver their services. While main responsibility for licensing and collection of fee revenue from broadcasters lies with the ABA, the ACA retains a role in ensuring efficient use of the spectrum overall. In this context it is worth noting the different allocation and fee charging processes which apply to services within the broadcasting services bands, and services using other parts of the radiofrequency spectrum.

As you requested, I have enclosed some summary material which describes the two main radiocommunications licence types, spectrum licensing and apparatus licensing. As Spectrum licences must be allocated using a price based process, I have also enclosed material on the auction system we have employed in recent allocations.

Yours sincerely

A handwritten signature in black ink, appearing to read "John Grant".

John Grant
Executive Manager
Spectrum marketing Group

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Contact: ihayne@aca.gov.au		Date: 11 June 1998	http://www.aca.gov.au/licence/spectrum/index.htm		

Introduction to Spectrum Licensing

Spectrum licensing is a form of licensing introduced in Australia by the *Radiocommunications Act 1992*. Spectrum licences were awarded for the first time in 1997, following the auction of the 500 MHz band. Spectrum licences are a tradeable, technology neutral (that is, the licence is not related to any particular technology, system or service) 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 the technical framework for the bands.

Spectrum licences offer a new way of managing the radiofrequency spectrum. Licensees will have the flexibility to plan and deploy devices within their spectrum space. Licences are for a fixed term of up to fifteen (15) years.

Within the bounds of spectrum space and the technical coordination framework, licensees will be free 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. The only requirement is that some types of device must be registered with the ACA before they can be operated.

Spectrum licences are tradeable. Licensees can negotiate with others to buy and sell spectrum space in the open market as the need arises, or authorise others to use their spectrum space. Spectrum licence 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 examples 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 maintaining exclusivity of access for each spectrum licensee, in a medium which is effectively a continuum in at least 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. A necessary condition of each STU is that its ownership cannot be shared, and this allows exclusivity of access to be preserved.

These finite indivisible units of spectrum space are called standard trading units, or STUs (Figure 1).

Figure 1: Standard Trading Units (STUs)



Standard Trading Units are like cubes of spectrum space.

STUs are like building blocks, or house bricks. By themselves, they are 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 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. Licensees can negotiate to buy and sell spectrum space in terms of STUs. By trading at the level of STUs, the requirement for exclusivity is preserved. Licensees who wish to trade part of a licence can disaggregate the licence into its component STUs and sell them 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 area grid will be constant for all bands.

For further information about spectrum licensing, contact Mr Ian Hayne, Manager Spectrum Marketing, at ihayne@aca.gov.au.

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Introduction

Under the apparatus licence system there are 16 transmitter licence types and four receiver licence types.

In order to facilitate the development and implementation of appropriate licensing procedures, including the application of licence conditions and fees, different kinds of radiocommunications applications are separately identified within the various licence types as individual licensing options; usually related to kinds of services or stations or uses.

Features of the Apparatus Licensing Regime

Features of the apparatus licensing system include:

- broad apparatus licence categories;
- an equitable and transparent approach to apparatus licence fees;
- apparatus licence terms of up to five years, in conjunction with a licensing system which gives payment options for licence fees;
- the option, for apparatus licensees who seek terms for longer than one year, of paying the total amount of the licence fee at the time the licence is issued or by annual instalments;
- [transfer](#) of an apparatus licence between parties; and
- the application of licence tax [exemptions](#), [concessions](#) and [discounts](#) that are available to individuals and organisations providing emergency or safety of human life functions.

Apparatus Licence Structure

The licence types and their related licensing options are listed in Table 1. To bring a consistent approach to spectrum management, the 20 licence types have been based on definitions in the *Australian Radiofrequency Spectrum Plan*, that are drawn from definitions used by the International Telecommunication Union (ITU). Licence types are defined in the *Radiocommunications (Transmitter and Receiver Licences) Determination*. Terms used in this determination are defined in the *Radiocommunications (Definitions) Determination No. 2 of 1993* and the *Radiocommunications Regulations*.

Table 1 - Licence Types and Licensing Options

Licence Types	Licensing Options Under the Apparatus Licence Types
Transmitter licences	
1. <u>Aeronautical</u>	Aeronautical Assigned Aeronautical Non Assigned
2. <u>Aircraft</u>	Aircraft Assigned Aircraft Non Assigned
3. <u>Amateur</u>	Unrestricted Limited Novice Novice Limited Intermediate Amateur Beacon Amateur Repeater
4. <u>Broadcasting</u>	Broadcast Service Narrowband Area Service Narrowcasting Service
5. <u>Defence</u>	Defence Spectrum
6. <u>Earth</u>	Fixed Earth Mobile Earth Earth - Optus Only
7. <u>Fixed</u>	Point to Point Point to Multipoint Point to Multipoint System Private CTS (Fixed) Television Outside Broadcast Television Outside Broadcast Network Television Outside Broadcast System Sound Outside Broadcast
8. <u>Land Mobile</u>	Paging System Ambulatory Ambulatory System Land Mobile System PABX Cordless Telephone Service Private CTS (Land Mobile) CBRS Repeater
9. <u>Maritime Coast</u>	Major Coast Limited Coast Non Assigned Limited Coast Assigned Limited Coast Marine Rescue
10. <u>Maritime Ship</u>	Ship Station Class A Ship Station Class A Group Licences Ship Station Class B Assigned Ship Station Class B Non Assigned Ship Station Class C Assigned Ship Station Class C Non Assigned
11. <u>MDS [Multipoint Distribution Service]</u>	MDS Class A MDS Class B MDS Repeater Station MDS Alice Springs MDS Canberra MDS Regional MDS Remote Stations
12. <u>Outpost</u>	Outpost Assigned Outpost Non Assigned
13. <u>PTS [Public Telecommunications Service]</u>	PMTS [Public Mobile Telecommunications Service] Class A PMTS [Public Mobile Telecommunications Service] Class B
14. <u>Radiodetermination</u>	Radiodetermination
15. <u>Scientific</u>	Scientific Assigned Scientific Non Assigned
16. <u>Space</u>	Space

16. Space

	Space (CMDA) Space - Optus Only
Receiver licences	
17. Major Coast Receive	Major Coast Receive
18. Earth Receive	Earth Receive
19. Fixed Receive	Fixed Receive
20. Space Receive	Space Receive Space (CMDA)

Underlying Principles of Apparatus Licensing

A systems approach, in which a single licence authorises operation of as many devices within a system as appropriate, has been taken wherever possible. For example, under the Land Mobile System licensing option, individual licences are not issued for mobile stations, remote control stations of 1 watt or less, standby base stations or supplementary base stations, within the operational range of the main base station.

Where an individual frequency assignment is required, the 'assigned' licensing option is used. Relevant frequency assignments are printed on the licence. For licences where standard frequencies apply, the 'non assigned' licensing option is used. These frequencies and their usage are detailed in a *Licence Conditions Determination* referenced on the licence. Typical examples of licence types having both assigned and non assigned licensing options are Aircraft, Maritime Ship and Outpost.

While, under the *Radiocommunications Act 1992* (the Act), licences are not generally required for receivers, some receiver licences are necessary to accommodate the requirement of operators that the receivers are afforded interference protection provided by frequency coordination. If that is the case, the receivers are licensed and included in the ACA's computer data base.

Licence Conditions

The operation of radiocommunications equipment authorised by an apparatus licence is subject to:

- conditions specified in the Act, including an obligation to comply with the Act;
- a condition that any radiocommunication device operated under the licence must comply with all the standards applicable to it;
- conditions specified in the *Radiocommunications Licence Condition (Apparatus Licence) Determination No. 1 of 1997* and any other determinations made by the ACA under paragraph 107(1)(f) of the Act;
- conditions specified in the licence; and
- any further conditions imposed by the ACA under section 111 of the Act.

Licence Conditions Determinations

Under paragraph 107(1)(f) of the Act, the ACA may determine, by written instrument, conditions relating to a particular type of apparatus licence. These conditions are known as Licence Conditions Determinations (LCDs). LCDs contain the generic conditions particular to various radiocommunications licence types and licensing options, including details of assigned frequencies, or frequency bands, and permitted power levels.

Special Conditions

Any other conditions of operation which apply to an individual licence but are not included in the LCD, will be printed on the licence under the heading 'Special Conditions'.

An accredited frequency assigner may ask the ACA to impose one or more special conditions on the licence according to the circumstances in which the frequency assignments for the licence are made.

Advisory Notes

Advisory notes, providing information that may be of interest to a licensee, will be printed on the licence under the heading 'Advisory Notes'.

Apparatus Licence Transfer

Transfer of an apparatus licence from one person or body to another is permissible, with some exceptions.

Licences attracting fee exemptions may not be transferred to a person who, or an organisation which, has not been granted exempt status by the ACA. Similarly, licences attracting a fee concession may not be transferred to a person who, or an organisation which, has not been granted concessional status or exempt status by the ACA. Licences which are subject to bulk discount may be transferred.

Third Party Use

Subject to conditions specified in the Act, licensees may authorise, by written instrument, other persons to operate radiocommunications devices under the apparatus licence. This is known as third party authorisation.

Fees and Charges

Apparatus licence fees are designed to recover the ACA's costs in managing the radiofrequency spectrum and to provide a return to government for use of the spectrum resource. As well as including ACA costs, licence fees are set having regard to spectrum location, geographical location, amount of spectrum occupied and coverage area authorised by the licence.

The apparatus licence fee framework, which is intended to be equitable, efficient and transparent, generally provides for a licence fee to comprise three components:

- a spectrum access tax (SAT)
- a spectrum maintenance component (SMC); and
- an administrative component.

Further details about these components are provided in the Apparatus Licence Fee Schedule.

Apparatus Licence Periods

Clients have the option of taking out an apparatus licence for any period up to five years.

Licences may be issued for periods of less than one year for any purpose. For example, shorter term licences may be issued for special occasions such as the Olympic Games, a scout jamboree, or for an Amateur radio operator visiting the country for a brief period.

In respect of licences issued for periods of one year or less, the licence fee is due and payable on the issue of the licence.

Licensees applying for licences for a term longer than one year (up to a maximum of five years) will have options for paying:

- the full licence fee, up-front, at the time of licence issue; or
- by annual instalment.

The formulas and minimum charges applicable for licences issued or renewed for more than twelve months can be found in the Radiocommunications (Transmitter Licence Tax) Determination No. 1 of 1996 and the Radiocommunications (Charges) Determination No. 1 of 1997.

Annual instalment payments will include any Consumer Price Index increases.

While there is no monetary benefit in paying by instalments, the benefit comes from the licensee being granted access to spectrum for up to five years.

There is a penalty for late instalment payments.

Renewals

Licensees receive an advice that a licence renewal fee is due several weeks before a licence elapses.

An apparatus licence cannot be renewed following the death of a licensee. Even if someone were to continue to 'renew' a deceased Amateur's licence, as the request for renewal was not made by the licensee, the licence would not be valid. Under these circumstances, the licence would be cancelled and the renewal fees refunded, from the date that that licence was first renewed after the death of the licensee.

Refunds

Where a licensee has advised the ACA, in writing, that he or she wishes to surrender a particular licence, the licensee is entitled to a pro rata refund of the spectrum access tax and the spectrum maintenance component of the total fee paid for the licence. However, if this pro rata refund is below the established minimum fee of \$30, no refund will be available.

A licence remains in force after the death of a licensee, as a result of section 103(2) of the Act, for the currency of the licence. This means that no refund is available.

Definitions of 'Bandwidth' and 'Australia Wide'

Bandwidth

Detailed information about the word 'bandwidth', as used in the transmitter or receiver licence tax determinations in relation to the operation of a transmitter or receiver, may be found in the [Apparatus Licence Fee Schedule](#).

Australia Wide

Normally an apparatus (assigned) licence is issued by the ACA to authorise the operation of a station, system or service within a particular low, medium or high density geographic area within Australia. In special cases, an apparatus licence may be issued to authorise 'Australia wide' operation, that is, operation on a transitory basis at any place in Australia. In the case of a system or hand-held equipment authorised by a Land Mobile (Ambulatory System) licence, operation between groups of units at multiple locations throughout Australia is permitted.

Further information about the definition of 'Australia Wide' may be found in the [Apparatus Licence Fee Schedule](#).

Charges for Other ACA Licensing Activities

One of the Federal Government's policy intentions for the ACA is to assist the identification and recovery of the costs of managing the spectrum from the users of the radiofrequency spectrum. The ACA charges for a number of services in order to recover the cost of providing these services, for example, a charge is made for a change of frequency requested by a licensee. Further information about the ACA's licensing activity charges may be found in the [Apparatus Licence Fee Schedule](#).

Review of Decisions

Persons dissatisfied with an ACA decision relating to apparatus licensing can ask the ACA to reconsider that decision. If a person is dissatisfied with the reconsidered decision, he or she may apply to the Administrative Appeals Tribunal (AAT) for a review. The AAT is an independent body whose function is to review specified administrative decisions.

The kinds of decisions that may be reconsidered in relation to apparatus licensing are identified in [section 285](#) of the Act.

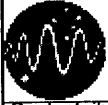
Further information about how to apply for a review of a decision may be found in [Part 5.6](#) of the Act and in the ACA's information paper entitled [Review of Decisions](#).

Further Information

If you have any additional queries relating to this document, please contact any [ACA Office](#).

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 Australian Communications Authority	Spectrum Auctions
Contact: ihayne@aca.gov.au	Date: 1 September 1998 http://203.37.2.230/pcs/simul.htm

Simultaneous Ascending Auctions

When allocating spectrum licences, the ACA uses the most appropriate auction design for the licences being allocated. We have considerable experience in using English open oral outcry auctions, which are familiar to most people, and we also have experience and a sophisticated capability to run simultaneous ascending auctions to allocate spectrum licences. This is a new form of auction. It is open and arguably the most efficient and effective market allocation system ever devised. Its efficiency was first demonstrated by the Federal Communications Commission (FCC) in the auction of PCS licences in the USA, and more recently the success of the 500 MHz and 800 MHz/1.8 GHz auctions conducted in Australia by the ACA and its predecessor, the Spectrum Management Agency (SMA).

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. 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 they are eligible to bid on reduces. A bidder may not bid on lots so that their bidding would exceed their eligibility.

Applicants are required to pay an entry fee to participate in the auction which is intended to cover the ACA's costs in bringing the spectrum to market. This fee is not refundable.

Applicants must also pay an eligibility payment to register for the allocation process. The eligibility will be calculated proportionally to the amount of spectrum space applicants hope to have awarded to them. The eligibility payment will be held in trust and used as surety against bid withdrawal penalties in the auction. It 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, or withdraw some or all of their current high bids so that they may redeploy their eligibility to pursue different bidding strategies; and
- a results and analysis period when the ACA calculates the results releases them, and bidders consider the results before the next round commences.

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

To participate in the ACA's electronic auction, applicants need to have an IBM compatible computer with at least a x486 processor, Windows 95 or NT 4.0 and a modem. The ACA no longer provides product support for 16 bit operating systems. The ACA will provide the bidding software, manuals and necessary training.

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. Bidders can also gather information regarding current eligibility, current activity, and any bid withdrawal penalties.

If you would like to find out more about the auction process contact Ian Hayne on (02) 6256 5262 or email ihayne@aca.gov.au

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