

## Apparatus Licensing

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### Introduction

This information paper provides details of the licensing arrangements applicable to the land mobile licence type.

### What is a Land Mobile Licence?

A land mobile licence type is defined in the [Radiocommunications \(Interpretation\) Determination 2000](#) as a licence issued for a radiocommunications service that:

- a. comprises one or more land stations or land mobile stations; and
- b. is used for communications between:
  - i. land stations and land mobile stations;
  - ii. land mobile stations;
  - iii. land mobile stations through another land station; or

- iv. land stations through another land station; and
- c. may communicate with:
  - i. an aircraft station, but not on an aeronautical frequency; or
  - ii. a maritime ship station, but not on a maritime frequency.

## Licensing Options

The land mobile licence type permits licensing options including:

- [Land Mobile System](#);
- [Land Mobile System \(Cellular\)](#);
- [Paging System](#);
- [Ambulatory Station](#);
- [Ambulatory System](#);
- [PABX Cordless Telephone Service](#); and
- [CBRS Repeater](#).

## Land Mobile System

A land mobile licence authorising a land mobile system includes the base station, standby base stations, supplementary base station(s), mobile stations, overlay paging receivers, remote control stations up to one watt and bi-directional amplifier systems operating within the operating range of the main base station area. A notional service area radius of 40 kilometres is assumed for a land mobile system.

A land mobile system station is defined in the [Radiocommunications \(Interpretation\) Determination 2000](#) as a system comprising of 1 or more land stations, and 1 or more land mobile stations, that:

- a. are operated under a land mobile licence; and
- b. are established for the principal purpose of two way communications.

The frequency assignment model assumes that a quiet-base facility is employed to minimise nuisance interference. The quiet-base facility may comprise any form of coded receiver gating or squelch system.

### Supplementary Base Stations

Land mobile supplementary base stations are only used to improve the reliability of the service within the service area of the base station. Supplementary base stations cannot be authorised where they are located at distances greater than 40 kilometres (km) from the base station, nor can they be authorised to extend the service area beyond 40 km. Operation beyond 40 km must be authorised by a separate land mobile licence authorising a land mobile system. The concept of supplementary base stations does not apply in the HF bands.

### Standby Base Stations

Standby base stations may only be operated when the base stations cannot be operated. Standby base stations cannot be authorised in the VHF or UHF bands where they are located at distances greater than 40 km from the base station.

Standby base stations cannot be authorised in the HF band when they are located at a distance that results in a service area significantly different from than of the main base station.

### Remote Control Stations

Remote control stations with a transmitter power of one watt pY or less, operating within the service area of the related base station are authorised under the base station's land mobile licence authorising a land mobile system.

The Equivalent Isotropically Radiated Power (EIRP) of such remote control stations must not exceed that sufficient to achieve, under normal conditions, a received signal level of 15 dB above 12 dB SINAD at the base station receiver.

### Bi-directional Amplifier (BDA) Systems

Bi-directional Amplifier (BDA) systems may be operated under a land mobile licence authorising a land mobile system.

The following special condition will be included on all land mobile licences authorising a land mobile system employing BDAs:

'Whilst every effort will be made by ACMA to investigate reports of interference to any BDA system authorised for operation under this licence, no guarantees can be made that such interference will be reduced or eliminated. Additionally, should interference to another licensed radiocommunications service be reported and ACMA considers that such interference arises from a BDA system operating under this licence, the licensee may be required to modify, or cease, operation of the BDA system.'

### Licensing Equipment used by Civil Defence Organisations

Land mobile licences authorising land mobile systems operated by an organisation for the purpose of participating in disaster and/or civil defence activities will have the following special condition included:

'The station(s) covered by this licence are authorised to communicate with stations operated by other licensees for the purpose of providing a radiocommunications service in relation to natural disasters and civil defence activities.'

### Frequency Assignment and Land Mobile Networks

Most land mobile radio networks in Australia operate using radio channels in the:

- VHF Mid Band (70 to 87.5 MHz);
- VHF High Band (148 to 174 MHz); and
- 400 MHz Band (403 to 420 MHz & 450 to 520 MHz).

When the geographic coverage and network capacity of a network is expanded it is beneficial to reuse existing network radio channels to the maximum extent possible in order to minimise the infrastructure cost of the expansion and minimise future maintenance costs.

When assigning new services, it is good frequency assignment practice to use an assignment strategy that avoids using radio channels of an existing network, unless no other radio channels are available. When no other channels are available, new radio channels should be chosen after considering the characteristics of the existing service (eg, number of channels used, geographic locations, channel loading and how long the service has been in operation). Such a practice improves the likelihood that a network can reuse an existing radio channel when expanding, thereby assisting to minimise the infrastructure cost of the network expansion. Also, minimising the variety of equipment in a network reduces network maintenance costs (eg, number of spare parts reduced, reduction of training requirements for maintenance staff). Frequency assigners are encouraged to keep this assignment strategy in mind for new assignments in the VHF Mid Band, VHF High Band, and the 400 MHz Band.

Licensees of existing services should note that the above assignment strategy does not guarantee that existing channels will necessarily be available to support future network expansion. Licensees wishing to ensure channels are available for expansion should license the required channels in the locations likely to be used by the expanded network. The required channel will then be available, subject to any future replanning activities which ACMA publicly consults on, for use when the network expands.

The radio spectrum usage profile of land mobile networks can be determined by analysing ACMA's online [Register of Radiocommunications Licences](#), which is also available on a CD-ROM as the Radiocommunications Record of Licences Database. Examples of networks that should be given special consideration are the various police and emergency services networks operating in the frequency range 458 to 470 MHz. Examples of other networks operating in Australia are listed below.

### EXAMPLES OF LAND MOBILE NETWORKS IN AUSTRALIA

1. VHF MID BAND (70 to 87.5 MHz)	
Land Mobile Network Licensee	Area of Operation
Councils/Shires	Australia Wide
Emergency Services	Australia Wide
Resource Companies	Australia Wide
Utility Companies	NSW Wide

2. VHF HIGH BAND (148 to 174 MHz)
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Land Mobile Network Licensee	Area of Operation
Emergency Services	Australia Wide
Government Radio Networks	SA/Victoria
Resource Companies	Australia Wide
State Government Department	Australian Wide
Utility Companies	NSW Wide

3. 400 MHz BAND (403 to 420 MHz and 450 to 520 MHz)	
Land Mobile Network Licensee	Area of Operation
Government Radio Networks	NSW/SA
Police and Emergency Services	Australia Wide
Railways	Australia Wide
Utility Companies	Australia Wide
Volunteer Organisations	Australia Wide

### Land Mobile System (Cellular)

The land mobile system (cellular) licensing option is intended to accommodate any number of base stations, and associated mobile stations and remote control stations, at any location within 40 kilometres of the station location specified on the licence.

'Land mobile system (cellular)' has been described generally in Schedule 2, Items 31, 32 and 33 of the [Radiocommunications \(Transmitter Licence Tax\) Determination 2003](#). The items provide for the operation of land mobile system (cellular) in high, medium or low density areas and notes that:

*'A spectrum access exists for each authorisation of the operation of a group of land stations and land mobile stations that involves a combination of: (a) a particular transmit frequency and (b) a particular bandwidth and (c) a geographical area (a circle with a radius of 40 kilometres from a specified site).'*<sup>1</sup>

This licensing option may be used to authorise the operation of stations only if ACMA is satisfied that, for spectrum management purposes, it is not necessary to individually frequency coordinate base stations in the geographical area described by the licence. An example is the Motorola Integrated Dispatch Enhanced Network (iDEN) used in the United States of America.

Land mobile licences authorising land mobile system (cellular) are subject to the following special conditions:

'The licensee is authorised to operate land mobile system (cellular) station(s) comprising land stations, land mobile stations and remote control stations, in the area within the boundary of a circle of radius 40 kilometres from the site specified in the licence to be the notional centre of the area.'

'The operation of land mobile system (cellular) stations comprising land stations, land mobile stations and remote control stations must not extend the service area beyond 40 kilometres radius from the notional centre of the area specified on the licence.'

### Paging System

The paging system licensing option facilitates the operation of base stations and portable receiving devices used to contact, or convey messages to, individuals. Paging systems can be used in either interior or exterior applications.<sup>2</sup>

A paging system is defined in the [Radiocommunications \(Interpretation\) Determination 2000](#) as one or more stations that:

- a. uses only paging technology; and
- b. comprising 1 or more stations that:
  - i. are operated under a land mobile licence or a fixed licence; and

- ii. in an exterior paging application, comprise:
  - A. a land station established for the purpose of one-way communication to 1 or more paging receivers; and
  - B. 1 or more land stations that are used solely to improve service reliability within a 40 kilometre radius of the station mentioned in sub-subparagraph (A); and
- iii. in an interior paging application:
  - A. are used for communications with 1 or more paging receivers;
  - B. if permitted by the licence, may communicate with a mobile station that uses an interior paging talkback channel (within the meaning of section 3 of the VHF High Band Frequency Band Plan (148 to 174 MHz) 1991 <sup>3</sup>) to acknowledge receipt of a paging transmission; and
  - C. are located within premises or restricted areas.

A paging system station means a station that is operated as part of a paging system.

### **Supplementary Main Station**

Exterior paging systems may employ supplementary main stations to improve the service reliability of the main station within the coverage area of the paging service.

Supplementary main stations cannot be authorised at distances greater than 40 km from the main station. They are considered to be main paging system stations and are to be separately licensed.

Interior paging services operate inside building complexes and their area of operation is restricted.

### **Weather Paging**

The licensee of a land mobile licence authorising an exterior paging system used for transmitting weather information or weather warnings, must also hold a maritime coast licence authorising the operation of a limited coast marine rescue station. The frequency of operation is 148.0875 MHz.

For further information about maritime coast licensing, refer to the Policy Information Paper entitled [Maritime Coast Licence Information Paper](#).

### **Ambulatory Station and Ambulatory System**

The ambulatory station and ambulatory system licensing options facilitate the operation of services that only consist of mobiles. The ambulatory system option is designed to cater for the operation of large fleets of mobiles.

#### **Ambulatory Station**

An ambulatory station is defined in the [Radiocommunications Regulations](#) as a land mobile station that:

- a. is operated principally for communications with other land mobile stations; and
- b. if permitted by the transmitter licence that relates to the land mobile station - may communicate with:
  - i. an aircraft station, but not on an aeronautical frequency; or
  - ii. a maritime ship station, but not on a maritime frequency.

#### **Ambulatory System**

An ambulatory system station is defined in the [Radiocommunications \(Interpretation\) Determination 2000](#) as one or more land mobile stations that:

- a. are operated under a land mobile licence;
- b. are operated principally for communications with other land mobile stations; and
- c. if permitted by the land mobile licence - may communicate with:

- i. an aircraft station, but not on an aeronautical frequency; or
- ii. a maritime ship station, but not on a maritime frequency.

### Licensing Equipment used by Civil Defence Organisations

Land Mobile licences authorising Ambulatory Systems operated by an organisation for the purpose of participating in disaster and/or civil defence activities will have the following special condition included:

'The station(s) covered by this licence are authorised to communicate with stations operated by other licensees for the purpose of providing a radiocommunications service in relation to natural disasters and civil defence activities.'

### Short Term Rental

Land mobile licences authorising ambulatory stations or ambulatory systems are often taken out by radiocommunications equipment suppliers for the purpose of renting out personal mobile radiocommunications equipment for specific events, such as golf tournaments.

The following channels are available for this purpose:

415.450 (MHz)	471.475 (MHz)	495.050 (MHz)
415.475 (MHz)	471.625 (MHz)	495.175 (MHz)
415.500 (MHz)	471.900 (MHz)	
415.525 (MHz)	471.975 (MHz)	
415.550 (MHz)		

Licences issued for this purpose are subject to the following special condition:

'No interference shall be caused to any radiocommunication station or service and no protection from interference by such stations or services shall be afforded.'

Licences issued for this purpose carry the following advisory note:

'Operation under this licence is on the basis that the frequency assigned may be shared by other users.'

Third party authorisations must be issued by the licensees. Further information is provided in the Policy Information Paper entitled [Third Party Authorisations](#).

### PABX Cordless Telephone Service

Wireless PABX services using CT3 technology in the 857-861 MHz band are licensed under the PABX (Public Automatic Branch Exchange) cordless telephone service option.

The PABX cordless telephone service is defined in the [Radiocommunications \(Interpretation\) Determination 2000](#) as a service that:

- a. consists of 1 or more land stations used in conjunction with a PABX;
- b. if the service has more than 1 land station - has land stations sited so that the distance between any 2 land stations does not exceed 2 kilometres; and
- c. operates in the frequency band from 857 megahertz to 861 megahertz.

There are no equipment specifications or standards specified for radio equipment used in PABX cordless telephone service. PABX cordless telephone services that cause harmful interference to other services may be asked to switch off until the problem is resolved.

Handsets used in conjunction with a PABX cordless telephone service are authorised under [Radiocommunications \(Cordless Telecommunications Devices\) Class Licence 2001](#).

### CBRS Repeater

The CBRS repeater licensing option is used to authorise citizen band repeaters operating in the UHF band.

A CBRS repeater station is defined in the [Radiocommunications \(Interpretation\) Determination 2000](#) as a station that:

- a. is operated under a land mobile licence; and
- b. is established at a fixed location for the reception and automatic retransmission of radio signals from CB stations.

### Operating Arrangements and Conditions

ACMA will consider proposals for land mobile licences authorising CBRS repeater stations from persons who, or organisations which, demonstrate the ability to fund, erect, operate and maintain a UHF CBRS repeater station, on a long term basis.

The licensee of a CBRS repeater station must commission the CBRS repeater station within twelve months of the initial licence being issued, otherwise the status of the licence may be reviewed. Licensees, for the purpose of dealing with heavy traffic, may limit the duration of transmissions through the CBRS repeater station, at their discretion.

The following are not permitted under the CBRS repeater licensing option:

- linking of CBRS repeater stations
- use of delayed re-transmission devices and
- single frequency operation.

### Frequencies

The frequencies that may be assigned to CBRS repeater stations are listed in Table 1 below:

**Table 1 - Frequencies for CBRS Repeater Stations**

Transmit Frequency (MHz)	Receive Frequency (MHz)
476.425 - Channel 1	477.175 - Channel 31
476.450 - Channel 2	477.200 - Channel 32
476.475 - Channel 3	477.225 - Channel 33
476.500 - Channel 4	477.250 - Channel 34
476.525 - Channel 5 *	477.275 - Channel 35 *
476.550 - Channel 6	477.300 - Channel 36
476.575 - Channel 7	477.325 - Channel 37
476.600 - Channel 8	477.350 - Channel 38

*\* Emergency Channel Pair - these channels are for emergency communications use only. For further information refer to the [Citizen Band Radio Stations Class Licence](#).*

### CBRS Repeater Station Establishment Criteria

CBRS Repeater stations may be established at distances separated by:

- a. except for co-channelled or emergency repeater stations as detailed in b), c) or d), not less than 20 km;
- b. in the case of co-channelled general purpose CBRS repeater stations (ie, operating on the same channel/frequency pair), not less than 100 km;
- c. in the case of stations operating on the emergency channel pair (5/35), not less than 75 km. In circumstances where co-channel operation is at distances less than 100 km, an omni-directional antenna with 5° beam down-tilt must be used; or

- d. an emergency repeater station may be co-sited with, or adjacent to, a pre-existing general purpose CBRS repeater station.

Some terrain considerations, however, may permit closer spacing.

In all cases, an antenna system configured to restrict coverage to the required coverage area will be stipulated by ACMA, but will, in any case, be such that the EIRP does not exceed 21 watts.

The following special condition will be attached to land mobile licences authorising CBRS repeater stations:

'When the transmitter is coupled to an antenna the level of all discrete spurious components caused by the transmitter and measured at the connection to the antenna must not exceed -30 dBm. Broadband noise floor of the transmitter measured at the same point must not exceed -47 dBm in a 16 kHz bandwidth for frequency offsets greater than 300 kHz from the transmit frequency.'

### **Interference**

The use of gain antennas of any configuration is permitted for CBRS repeater stations provided that the EIRP does not exceed 21 watts. Interference must not be caused to the reception of sound broadcasting or television broadcasting, or to the operation of other radiocommunications stations or services, including the CBRS.

No external radiofrequency power amplifier shall be used by, or attached to, a CBRS repeater station.

### **Licence Conditions**

The operation of radiocommunications equipment authorised by a land mobile licence is subject to:

- conditions specified in the [Radiocommunications Act 1992](#) (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 and determinations made by ACMA under paragraph 107(1)(f) of the Act
- conditions specified in the licence; and
- any further conditions imposed by ACMA under section 111 of the Act.

Generally, conditions are applied to licences to enable users to communicate effectively with a minimum of interference. All conditions relating to a licence must be complied with.

### **Licence Conditions Determinations**

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

The [Radiocommunications Licence Condition \(Apparatus Licence\) Determination 2003](#) contains conditions of licence that are common to all apparatus licences.

The LCD for the land mobile licence type is entitled [Radiocommunications Licence Conditions \(Land Mobile Licence\) Determination No. 1 of 1997](#).

### **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 person](#) may ask ACMA 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'.

An [accredited person](#) may ask ACMA to impose one or more advisory notes on the licence according to the circumstances in which the frequency assignments for the licence are made.

## Callsigns

Callsigns are a unique series of letters and/or numbers allocated to a radiocommunications user to identify a station. Callsigns should be used for all on-air communications, including testing. Callsigns allocated to land mobile stations conform with International Telecommunication Union Radio Regulations (see Table 2 for callsign template).

The licensee of a land mobile station (ambulatory or land mobile system) must use either a form of identification that clearly identifies the station, or a callsign allocated by ACMA, at the start of each transmission or series of transmissions.

The licensee of a land mobile station (CBRS repeater station) must use the call sign allocated to them by ACMA:

- a. at least once in each 5 minute period of operation of the station; and
- b. by morse code signal or by a synthesised voice.

If the licensee transmits the call sign by a morse code signal, the signal must be transmitted:

- a. using a modulating tone in the frequency range 700 to 3000 Hz (inclusive); and
- b. at a rate not less than 10 words per minute and not greater than 20 words per minute.

**Table 2 - Land Mobile Callsign Template**

<b>aaamnn</b>	Land Mobile callsign template (example of typical callsign VKA714)
aaa	first two alpha characters are VJ, VK, VL, VM, VN, VZ, or AX, with the third character being any alpha
m	numeric character 2 - 9
nn	numeric character 0 - 9

**Table 3 - CBRS Repeater Callsign Template**

<b>aaamm</b>	CBRS Repeater callsign template (example of typical callsign VKA14)
aaa	first two alpha characters are VH, VJ, VK, VL, VM, VN, VZ, or AX, with the third character being any alpha
m	numeric character 2 - 9

## Duration

Apparatus licences may be issued for periods varying from one day to up to five years. However, the most common period is one year.

## Applying for an Apparatus Licence

Applications for an apparatus licence may be made to the [National Licensing and Enquiries Centre](#) (NLEC), ACMA, Canberra. Applicants should complete the ACMA form entitled [Application for Apparatus Licence\(s\)](#) (RF 57). If frequency assignments are required with this licence, the frequency coordination work may be performed either by ACMA or an accredited person.

If the work is to be done by ACMA a form entitled [Application for Additional Station Information](#) (RF 77) should also be submitted with the licence application.

Alternatively if you wish to use the services of an accredited person you should refer to the [List of Accredited Persons](#) for contact details. An accredited person will issue you with a frequency assignment certificate and this should be submitted with the licence application to [NLEC](#). Accredited persons are not employed by ACMA, nor is ACMA responsible for the work of accredited persons.

More information about [Accreditation](#) can be found on the ACMA website.

## Fees

Spectrum is a valuable resource. Fees are intended to ensure a fair return to the Commonwealth for the private use of this valuable public resource. Licence fees are set having regard to spectrum location, geographical location, amount of spectrum occupied and coverage area authorised by the licence.

Detailed information about fees is provided in the [Radiocommunications Apparatus Licence Fees and Charges](#) booklet.

### Licence Fee Exemptions and Concessions

Individuals and organisations may be eligible for an exemption or concession from the payment of licence fees. For further information see [Licence Fee Exemptions and Discounts](#).

### Transfers of Apparatus Licences

Apparatus licences may be [transferred](#). Applicants wishing to transfer an apparatus licence should complete and submit to [NLEC](#), the form entitled [Application for Transfer of Apparatus Licences\(s\)](#) (RF60). Both the transferer and the transferee must sign the transfer form. Applicants are required to pay a transfer charge to cover ACMA's administrative expenses.

There are a number of limitations on the transfer of apparatus licences. The [Radiocommunications \(Transfer of Apparatus Licences\) Determination 2000](#) specifies these limitations.

A device authorised by the transferred licence is still required to operate under the same technical conditions (included transmission site) as specified on the original licence.

### Third Party Operation

Licensees may authorise, by written instrument, other persons to operate radiocommunications devices under the apparatus licences. These are known as [third party authorisations](#).

There are a number of limitations on third party authorisations. The [Radiocommunications \(Limitation of Authorisation of Third Party Users\) Determination 2000](#) specifies these limitations.

A person authorised to use a radiocommunications device under a [third party authorisation](#) is subject to all of the conditions applicable to that device under the licence.

### Further Information

If you have any additional queries relating to this, or any, licence type, please contact [NLEC](#).

Other information about land mobile is detailed in the following RALIs:

- [Trunked Land Mobile Services](#) (LM 3);
- [Frequency Assignment Procedures for Land Mobile Services Adjacent to TV Channels 2, 3 and 6](#) (LM 5);
- [Management of Bi-directional Amplifiers in the Land Mobile Service in the Frequency Range 29.7 MHz to 520 MHz](#) (LM 6);  
and
- [Frequency Assignment Requirements for the Land Mobile Service](#) (LM 8).

### Footnotes

1. Items 31, 32 and 33 contain licence descriptions and the annual amount of tax for one spectrum access, for the (specified) licensing options under the Land Mobile licence type. These items can be found at Schedule 2 of the [Radiocommunications \(Transmitter Licence Tax\) Determination 2003](#).

2. The definitions of *exterior paging* and *interior paging* in the [Radiocommunications \(Interpretations\) Determination 2000](#) refer to communication. *Communication* is defined in that determination as including communication in any form, including speech, music or other sounds, data, text, visual images and signals.

3. The conditions for operating talkback, in an interior paging system, are set out in section 9 of the [Radiocommunications Licence Conditions \(Land Mobile Licence\) Determination No. 1 of 1997](#).

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