

# **AUSTRALIAN AMATEUR RADIO REGULATIONS HANDBOOK**

*Version 3*

*September 2021*

*(spurious emissions clarified p4)*

## **Introduction**

This handbook is a guide to the regulations governing the hobby of amateur radio in Australia. It is a joint publication of the Radio Amateur Society of Australia and the Radio and Electronics School (RES).

The Foundation exam uses a subset of the full regulations detailed in this handbook. You should be guided by the Foundation syllabus and any course of instruction you may be undertaking to determine the appropriate regulatory elements to learn.

Like all RASA resources, this is provided at no charge to the amateur radio community.

## **Who administers Amateur radio in Australia?**

In Australia, amateur radio is administered by the Australian Communications and Media Authority (ACMA).

Exams and the issue of callsigns are managed by the Australian Maritime College under contract from ACMA. Links:

<https://www.acma.gov.au/amateur-radio-licences>

<https://www.amc.edu.au/industry/amateur-radio>

## **What can I use my amateur radio station for?**

You can use your station for:

- self-training or technical experimentation in radiocommunications; or
- general communications with other amateurs.

Stations are also used for transmitting news and information services related to amateur radio.

You must not use your station for financial gain, and you can not transmit advertising or any form of entertainment. You are also restricted from using offensive/aggressive language or language that constitutes harassment.

You should avoid controversial topics including;

- religion;
- politics;
- business (you can talk about your profession/trade, but you cannot advertise your services or those of anyone else);
- derogatory remarks/observations/jokes directed at any group (gender, ethnic, religious, political, sexual orientation, etc.); and
- off-colour humour.

Above all, apply common sense and good taste.

### **Minimum age for an amateur licence**

There is no minimum age for an amateur licence in Australia.

### **Distress and safety messages**

A distress signal indicates that the station sending the message is threatened by grave and imminent danger and requires immediate assistance.

The distress signal consists of the word MAYDAY.

#### **Distress call and message**

The distress call consists of:

- the distress signal MAYDAY sent 3 times
- the words 'THIS IS'
- the callsign or other identification of the station in distress, sent 3 times

The distress message consists of:

- the distress signal MAYDAY (radiotelephony)
- the callsign, the ship name or other identification of the station in distress
- the position of the station in distress
- the nature of the distress and the kind of assistance required
- any other information which might be of assistance

#### **Obligation to accept distress traffic**

A distress call or message has absolute priority over all other transmissions and may be heard on any frequency.

When a distress call is heard, you must:

- immediately cease all transmissions
- continue to listen on the frequency
- record full details of the distress message

If a distress message is received, wait for a short while to see if the message is received by a station better placed to help.

If the distress message is not acknowledged within a reasonable time, the amateur operator is obliged to respond.

### Replying to distress messages outside of amateur bands

An amateur station may respond to a distress message received on a non- amateur frequency, but only if no other station licenced for that frequency has responded and the amateur station is in a position to directly assist.

### Notifying the appropriate authority

After acknowledging or attempting to acknowledge receipt of the distress message, you must immediately forward details of the distress situation to:

- for land-based distress situations - the police via the triple zero emergency phone service
- for air or sea-based distress situations - the Rescue Co-ordination Centre, Canberra, ACT:
  - **Aviation Rescue services telephone 1800 815 257**
  - **Maritime Rescue services telephone 1800 641 792**

You should resume listening and keep the respective authority informed of any developments.

Any assistance practicable should be given until cessation of distress traffic is announced (by means of the phrase 'SEELONCE FEENEE'), or until you are advised that assistance is no longer required.

### Urgency signals

In cases where the use of the distress signal is not fully justified, the 'URGENCY' signal may be used.

In radiotelephony, the urgency signal consists of the group of words 'PAN PAN', each word of the group pronounced as the French word 'panne'.

The urgency signal is repeated three times before the call.

The urgency signal has priority over all other transmissions except distress. All stations hearing an urgency signal must:

- ensure that they do not cause interference to the transmission of the message that follows
- be prepared to assist if required

Authority contact details as for distress messages.

### **Can I pass messages on behalf of a non-amateur (third party traffic)?**

You must not seek to transmit a message on behalf of a non-amateur (third party traffic) unless the message relates to a disaster.

For example, you can pass a message on behalf of a member of the public if there is a bushfire, a flood, a cyclone or similar disaster. In this case, messages from survivors to their friends/relatives can be sent via another amateur station. These messages must not be charged for – they must be free.

These messages can be from overseas amateur stations. Australia has third party agreements with most other countries.

As an amateur radio operator, you are not normally allowed to transmit on non-amateur frequencies (fire, police, marine, etc.), even in a disaster.

### **Causing interference**

You must install and maintain your amateur radio station correctly, so that you do not cause interference. The ACMA has the right to restrict the operation of an amateur station if it is causing interference.

If interference is occurring to another licensed radiocommunication service, even it is not your fault, you must stop transmitting until the problem is resolved.

If interference is not to a licensed radiocommunication service, such as a television, then you should exercise diplomacy and common sense to resolve the problem.

### **Spurious limits**

Spurious emissions from an amateur station must be attenuated by the following amounts:

*For frequencies less than 30MHz:*

5W and above output power – 50 dB

Below 5 W use the following formula:  $43 + 10 \log (\text{PEP}) \text{ dB}$

*For frequencies 30MHz and above:*

Because the required level of spurious emission attenuation (below 500W) changes with Mean Power (P), the maximum permitted spurious emission is independent of Mean Power and is fixed at **0.05mW** (i.e. **-13dBm**) for all transmissions above 30MHz.

### **How long can I operate at a location other than my station address?**

You can operate portable for 4 months. After that time, you need to notify ACMA of your new address.

### **When and how do I identify my station?**

You transmit the call sign of any station being called, or communicated with, followed by your call sign:

- at the beginning and end of a transmission or series of transmissions; or
- if the transmission or series of transmissions lasts more than 10 minutes - once every 10 minutes.

You identify by voice (using the English language), by visual image or by an internationally recognised code (for example, Morse).

If you are participating in an emergency services exercise (WICEN, etc), these operations often use operational callsigns, like mobile 1, base 2, etc. In this case, the amateur callsigns of the stations in the exercise must be transmitted once every 30 minutes.

### **Encryption/scrambling**

Transmissions from an amateur station must not be encrypted or scrambled, except for signals used to control a satellite, signals used to control a remote amateur station or by stations participating in emergency services operations or exercises.

You also must not use a secret code when communicating on amateur radio.

### **Re-transmission**

If you re-transmit another station's transmission, you must have the other station's permission and you must indicate that it is a retransmission.

### **Who can use my station?**

Amateur stations must be operated by a qualified operator (that is, a person who holds an amateur radio licence).

Unqualified persons may use an amateur station under the direct supervision of a qualified operator.

If a station is operated unattended (computer-controlled modes, etc.), it must be:

- fitted with a system to shut down the transmitter if a malfunction causes an unintended transmission of longer than 10 minutes; and
- be capable of being shut down remotely if the station causes interference to another service.

An amateur station must not be able to be used by an unauthorised person. It could be kept in a locked room or electronically or physically disabled to prevent unauthorised use.

### **Amateur frequency allocations and bandwidth requirements, per licence class**

<b>Licence class</b>			<b>Band</b>	<b>Frequency</b>	<b>Necessary bandwidth (note 1)</b>
A			2200m	135.7-137.8 kHz	No greater than 2.1 kHz
A			630m	472-479 kHz	No greater than 2.1 kHz
A			160m	1800-1875 kHz	Where the necessary bandwidth exceeds 8 kHz, the maximum power spectral density from the transmitter must not exceed 1 watt per 100 kHz.
A	S	F	80m	3500-3700 kHz	As per above
A			80m	3776-3800 kHz	No greater than 2.8 kHz (note 2)
A	S	F	40m	7000-7100 kHz	Where the necessary bandwidth exceeds 8 kHz, the maximum power spectral density from the transmitter must not exceed 1 watt per 100 kHz.
A	S	F	40m	7100-7300 kHz	No greater than 8 kHz
A			30m	10100-10150 kHz	No greater than 8 kHz
A	S		20m	14000-14350 kHz	Where the necessary bandwidth exceeds 8 kHz, the maximum power spectral density from the transmitter must not exceed 1 watt per 100 kHz.
A			17m	18068-18168 kHz	As above
A	S	F	15m	21000-21450 kHz	As above
A			12m	24890-24990 kHz	As above
A	S	F	10m	28000-29700 kHz	Where the necessary bandwidth exceeds 16 kHz, the maximum power spectral density from the transmitter must not exceed 1 watt per 100 kHz.
A			6m	50-52 MHz	No greater than 100 kHz
A	S		6m	52-54 MHz	No restriction
A	S	F	2m	144-148 MHz	No restriction
A	S	F	70cm	430-450 MHz	No restriction (note 3)
A	S		23cm	1240-1300 MHz	No restriction
A			13cm	2300-2302 MHz	No restriction
A	S		13cm	2400-2450 MHz	No restriction
A			9cm	3.3-3.6 GHz	No restriction (note 4)
A	S		6cm	5.650-5.850 GHz	No restriction
A			3cm	10-10.5 GHz	No restriction
A			12mm	24-24.250 GHz	No restriction
A			6mm	47-47.2 GHz	No restriction
A			4mm	76-81 GHz	No restriction
A				122.250-123 GHz	No restriction
A				134-141 GHz	No restriction
A				241-250 GHz	No restriction

Notes:

1. Any emission mode allowed within bandwidth constraints
2. Technically 8 kHz is allowed, however this would exceed band limits.
3. Wideband emissions above 430 MHz must not interfere with other (non-amateur) services
4. The 3.4-3.6 GHz band is used for 5G mobile telephony. Amateur stations are restricted from operation in most of this band in capital cities and many regional areas. Refer to the ACMA LCD, Schedule 5 (p26).

### **Maximum output power – Advanced Station**

135.7-137.8 kHz – 1 watt effective radiated power

472-479 kHz – 5 watts effective radiated power

All other bands:

400 watts Peak Envelope Power (PEP – also known as  $P_x$ ) for the following modes:

- (a) analogue television; or
- (b) Single Side Band (SSB) suppressed carrier; or
- (c) SSB reduced carrier.

For all other modes – maximum output power 120 watts mean power (also known as  $P_y$ ).

### **Maximum output power – Standard Station**

Maximum output power 100 watts PEP for the following modes:

- (a) SSB suppressed carrier; or
- (b) SSB reduced carrier.

For all other modes – maximum output power 30 watts mean power.

### **Maximum output power – Foundation Station**

Maximum output power 10 watts PEP for all modes.

### **Primary and secondary band users**

The radio spectrum is a finite resource. It needs careful management, otherwise chaos would result. Accordingly, frequency allocations are divided between primary and secondary users.

Primary users, as the name suggests, are the principal users of the spectrum segment.

Secondary users must not cause harmful interference to Primary users and cannot claim protection from harmful interference caused by Primary users.

Harmful interference is defined as *interference that*:

- *endangers the functioning of a radionavigation service or other safety services that are operating in accordance with the Radio Regulations; or*
- *obstructs, repeatedly interrupts or seriously degrades a communications service operating in accordance with the Radio Regulations.”*



Amateurs have primary status in the following bands:

160M, 80M, 40M (7-7.1 MHz), 20M, 17M, 15M, 12M, 10M, 6M (52-54MHz), 2M, 12mm, 6mm, 134-136 GHz and 248-250GHz.

### **Beacon stations**

A beacon station must transmit its call sign every 10 minutes.

Beacon stations may only be operated portable for 7 days.

### **Tone systems used in amateur radio**

There are two tone systems used in amateur radio: Continuous Tone Coded Squelch System (CTCSS) and Dual Tone Multi Frequency (DTMF).

CTCSS tones are sub audible (cannot be heard) and are primarily used on repeater systems to prevent non-amateur radio emissions from operating the repeater's receiver. If a device causes interference to the repeater's receiver then the repeater will ignore the interference since it does not have the CTCSS tone present.

DTMF uses audible tones. These tones are the ones you hear when dialling a number on your telephone. The tones are used to connect and disconnect (link) repeaters in an ad-hoc manner to extend the range of communications; for example, with the IRLP system.

DTMF tones can also be used to control and interrogate a repeater's operating parameters. Repeater equipment can be remotely polled to report on its power, temperature, etc.

### **Repeater stations**

Repeaters and repeater radio links must only transmit when either receiving a signal on the input frequency or transmitting their identification.

Repeaters and repeater radio links must transmit their call sign every ten minutes of operation.

A Foundation or Standard station must not use a repeater which transmits on frequencies they are not authorised to use – for example, a Foundation station can not use a repeater that transmits on 52 MHz, even if it receives on a band the Foundation station can use, like 146 MHz.

If repeaters are operating cross band, they must incorporate an access control system to prevent Standard and Foundation licencees being retransmitted on bands they are not authorised to use.

The access control system normally uses CTCSS.

Internet linking of repeaters is permitted provided the operators of the service take measures to prevent non-authorized (non-amateur) users e.g. DMR, Echolink.

Repeater stations may only be operated portable for 7 days.

### **Club stations**

Club stations are established by an amateur radio club or group. They are normally licenced as an Advanced Class station. A club station may be operated unsupervised by a Standard or Foundation class amateur, provided they operate in accordance with their respective licence conditions – i.e. frequency and power.

Club stations must keep a logbook.

### **Emission designators**

The International Telecommunications Union (ITU) has developed a system of letters and numbers which are used to identify different radio transmission types.

For example - SSB suppressed carrier is represented by:

#### **2K80J3E**

The first four letters/number represent the necessary bandwidth of the signal – 2K80 means two thousand, eight hundred kHz, or 2800 kHz

The final three letters/numbers represent the modulation used – J means the carrier is amplitude modulated, 3 means single channel analogue and E means telephony (speech).

FM is represented by:

#### **16K0F3E**

16K0 = 16 kHz bandwidth

F = Frequency modulation

3 = Single channel analogue

E = telephony

A full description of the ITU system may be found at:

<https://www.acma.gov.au/publications/2005-01/guide/emission-characteristics-radio-transmissions>

## **Callsigns**

Every amateur station is issued with a callsign. Callsigns are constructed as follows:

(Prefix) (number) (suffix)

For example:

VK2ABC

### **Prefix**

Callsign prefixes are allocated internationally by the ITU – Australia is allocated the following prefix blocks:

AXA-AXZ

VHA-VNZ

VZA-VZZ

Most Australian amateur stations use the VK prefix. There are special prefixes for competition stations (VJ, VK, VL), the AX prefix is used for national days, and the VI prefix may be used for special event stations.

### **When can I use the AX callsign prefix?**

The AX callsign prefix is used to commemorate days of national significance.

It may be substituted for the VK prefix on:

- 26 January (Australia Day);
- 25 April (ANZAC Day); and
- 17 May (World Telecommunications Day)

For example, VK2ABC becomes AX2ABC.

Note that this does not apply to repeaters, beacons or 2 x 1 contest callsigns.

## Numeric prefix

The numeric prefix indicates the State/Territory of the station when first licenced, as follows:

Number	State/Territory
0	Antarctica and Antarctic territories
1	ACT
2	New South Wales
3	Victoria
4	Queensland
5	South Australia
6	Western Australia
7	Tasmania
8	Northern Territory
9	External islands (Norfolk, etc)

## Suffixes

The callsign suffix indicates the station's licence class, as follows:

Suffix	Licence class
A-Z	Contest stations
AA-ZZ	Advanced
AAA-ZZZ	Advanced, Standard, Foundation
FAAA-FZZZ	Foundation (no new callsigns are issued from this block)
RAA-RZZ	Repeaters and beacons

## Special event stations

Special event stations commemorate an event of special significance to amateurs or the Australian population generally. Special event callsigns may use a combination of letters and numbers outside the normal callsign structure, such as :

VI100ANZAC      VK100MARCONI, etc.

## Reciprocal licencing

Amateurs who are licenced in another country may be granted authorisation to operate in Australia, provided their licence is recognised by ACMA as equivalent to an Australian licence.

More information may be found on the ACMA website at <https://www.acma.gov.au/overseas-amateurs-visiting-australia>

Or, if the link has changed, search on "overseas amateurs"

## **ANNEX A – BASIC OPERATING PROCEDURES**

### Listen first

Always listen before transmitting to ensure that the frequency is not already in use.

### Calling another station

Use the callsign of the station being called first repeated a maximum of 3 times, then the words, THIS IS, followed by your callsign repeated a maximum of 3 times, ending with OVER, e.g.:

**VK6ZZ VK6ZZ VK6ZZ THIS IS VK2KO VK2KO VK2KO OVER**

This call may be modified as conditions permit – i.e. if you are using an FM repeater, it is not necessary to repeat the callsigns 3 times, and THIS IS and OVER can be dispensed with – e.g.

**VK6ZZ (brief pause) VK2KO**

### Reply

Again, use the other station's callsign, followed by THIS IS (if required) and then your callsign followed by GO AHEAD and OVER, e.g.:

**VK2KO, THIS IS VK6ZZ, GO AHEAD OVER**

### General "CQ" call

A general call to any other amateur station (i.e. you are looking for a contact with any other station) may be made by substituting the signal 'CQ' in place of the called station's callsign, e.g.:

**CQ CQ CQ THIS IS VK9YZ VK9YZ VK9YZ OVER**

### Using repeaters

As discussed previously, when using a repeater, you can dispense with THIS IS and OVER.

CQ calls are not normally made on repeaters – you simply announce that you are listening e.g.:

**VK7AB listening.**

### Breaking into an existing QSO (contact)

If you wish to break into an existing contact between two stations, wait for a pause and announce your callsign only. Do not talk over the top of the stations.

## ANNEX B - PHONETIC ALPHABET

The phonetic alphabet is used to spell words when radio conditions are poor and signals are weak.

	Word	*Spoken as		Word	*Spoken as
<b>A</b>	ALFA	<b>AL FAH</b>	<b>O</b>	OSCAR	<b>OSS CAH</b>
<b>B</b>	BRAVO	<b>BRAH VOH</b>	<b>P</b>	PAPA	<b>PAH PAH</b>
<b>C</b>	CHARLIE	<b>CHAR LEE</b>	<b>Q</b>	QUEBEC	<b>KEH BECK</b>
<b>D</b>	DELTA	<b>DELL TAH</b>	<b>R</b>	ROMEO	<b>ROW ME OH</b>
<b>E</b>	ECHO	<b>ECH OH</b>	<b>S</b>	SIERRA	<b>SEE AIR RAH</b>
<b>F</b>	FOXTROT	<b>FOKS TROT</b>	<b>T</b>	TANGO	<b>TANG GO</b>
<b>G</b>	GOLF	GOLF	<b>U</b>	UNIFORM	<b>YOU NEE FORM</b>
<b>H</b>	HOTEL	<b>HOH TELL</b>	<b>V</b>	VICTOR	<b>VICK TAH</b>
<b>I</b>	INDIA	<b>IN DEE AH</b>	<b>W</b>	WHISKY	<b>WISS KEY</b>
<b>J</b>	JULIET	<b>JEW LEE ETT</b>	<b>X</b>	X-RAY	<b>ECKS RAY</b>
<b>K</b>	KILO	<b>KEY LOH</b>	<b>Y</b>	YANKEE	<b>YANG KEY</b>
<b>L</b>	LIMA	<b>LEE MAH</b>	<b>Z</b>	ZULU	<b>ZOO LOO</b>
<b>M</b>	MIKE	MIKE			
<b>N</b>	NOVEMBER	<b>NO VEM BER</b>			
* The syllables to be emphasised are in bold type					

## ANNEX C – Q CODES

Q codes are three letter codes sent using Morse Code to abbreviate standard questions and answers. They may be sent as a question, with a question mark, or as an answer to a question; e.g.:

**QTH?** – *What is your location?*

**QTH Sydney** – my location is Sydney

Some radio amateurs use these codes during telephony contacts as well.

A list of common Q codes:

Q codes	Question/response
QRK1-5	The intelligibility of your signals is: 1 Bad, 2 Poor, 3 Fair, 4 Good, 5 Excellent
QRM1-5	I am being interfered with: 1 Nil, 2 Slightly, 3 Moderately, 4 Severely, 5 Extremely
QRN1-5	I am troubled by static: 1 Nil, 2 Slightly, 3 Moderately, 4 Severely, 5 Extremely
QRO	Increase power
QRP	Decrease power
QRQ?	Shall I send faster?
QRS	Send more slowly (...words per minute)
QRT	Stop sending
QRX?	When will you call me again?
QRX	I will call you again at ... hours (on ... kHz or MHz)
QRZ	Who is calling me?
QSA1-5	The strength of your signals (or those of ...) is: 1 Scarcely perceptible, 2 Weak, 3 Fairly good, 4 Good, 5 Very Good
QSB	Your signals are fading
QSL?	Can you acknowledge receipt?
QSL	I am acknowledging receipt
QSO	I can communicate with ... direct (or by relay through ...)
QSP?	Will you relay to ...?
QSP	I will relay to ...
QSY	Change to transmission on another frequency (or on ... kHz or MHz)
QTH?	What is your location?
QTH	My location is ...
QUM?	May I resume normal working?
QUM	Normal working may be resumed

The full list of Q codes may be found at:

[https://en.wikipedia.org/wiki/Q\\_code](https://en.wikipedia.org/wiki/Q_code)

## ANNEX D – ELECTROMAGNETIC COMPLIANCE

### Electromagnetic radiation

Electromagnetic radiation (EMR) is the mechanism by which radio waves are emitted and propagated.

Exposure to high levels of EMR can be dangerous for humans. ACMA regulates levels of human exposure to EMR through their Radiocommunications Licence Conditions (Apparatus Licence) Determination 2015, which calls up the following Australian standard:

*Radiation Protection Standard for Maximum Exposure Levels to Radiofrequency Fields—3 kHz to 300 GHz*

The standard is published by the Australian Radiation Protection and Nuclear Safety Agency.

### Compliance levels for Amateur stations

The standard sets out two compliance levels for the operation of radio transmitters:

#### **Compliance level 1**

Compliance level 1 applies to stations where:

- the **average** total power supplied by the transmitter is not more than 100 W; and
- each antenna fed by the transmitter is installed so that it is inaccessible to a member of the general public.

or

- the bottom of the lowest antenna fed by the transmitter is at least 10 m above ground level; and
- the **average** total equivalent isotropically radiated power (EIRP) of all antennas fed by the transmitter is not more than 3200 W in any direction.

Compliance level 1 also applies to a mobile station for which the average total power is not more than 100 W.

Standard and Foundation stations comply with level 1 automatically, as long as their antennas are behind a fence.

For Advanced stations, given that the *average* power produced by a 400W SSB transmitter is less than 100W, if you operate at no more than 100W on FM or any other mode with a carrier or high duty cycle (FT8, for example) and your antenna is behind a fence, you will comply with level 1.

If your station complies with level 1, there is no requirement to keep records.

However, for Advanced stations, if you are using high gain antennas (stacked yagis on VHF, for example), with an EIRP of 3.2 kW or more, and the antennas are less than 10m above the ground, your station does not meet the level 1 requirements.



## **Compliance level 2**

If your station does not meet level 1 requirements, it is classified as level 2. You are required to prove that your station complies with the Australian standard and maintain records to this effect.

### ACMA calculator

ACMA have produced a simple RF exclusion zone calculator. The exclusion zone is an area where EMR levels may exceed the Australian standard.

The calculator may be found at the bottom of this page on the ACMA website:

<https://www.acma.gov.au/our-rules-eme>

## **ANNEX E – BIBLIOGRAPHY**

Australian Radio Frequency Spectrum Plan, ACMA 2017.

Commonwealth of Australia, Radiocommunications Act, 1992

No.174, 1992

Compilation No. 71

Compilation date: 1 July 2018

Includes amendments up to: Act No. 25, 2018

Registered:14 August 2018

ITU Radio Regulations, Edition of 2020.

Radiocommunications Licence Conditions (Amateur Licence) Determination 2015

Made under paragraph 107(1)(f) of the Radiocommunications Act 1992.

Compilation No. 3

Compilation date: 29 April 2020

Radiocommunications Licence Conditions (Apparatus Licence) Determination 2015

Made under paragraph 107(f) of the Radiocommunications Act 1992

Compilation No. 1

Compilation date: 19 November 2019

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