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Spectrum Planning Section  
Australian Communications and Media Authority  
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### **WIA Submission on “Future approach to the 3.6 GHz band” IFC: 9/2017**

The Wireless Institute of Australia (WIA) welcomes the opportunity to respond to the ACMA’s consultation on the *Future approach to the 3.6 GHz band*.

#### **About the WIA**

The WIA is the national organisation of licensed amateur radio operators ([www.wia.org.au](http://www.wia.org.au)), the peak body representing the interests of the Australian radio amateur community nationally and internationally.

Founded in 1910, before passage of the *Wireless Telegraphy Act 1912*, the WIA is acknowledged as being one of the first radio societies in the world, and is the world’s oldest national amateur radio society. As such, the WIA has established a substantial heritage in advocacy for community involvement in radiocommunications and the use of spectrum.

The WIA represents the interests of the Australian radio amateur community through formal liaison with the ACMA, other government institutions and other organisations. A key role of the WIA is providing training and licence assessment services for people interested in obtaining their amateur licence, particularly young Australians.

WIA volunteer appointees participate in the work of spectrum management, consultative and standards bodies, including:

- Australian Radio Study Groups in preparatory work for World Radio Conferences (WRCs)
- Australian delegations to WRCs,
- Standards Australia’s standards committees, and
- the Radiocommunications Consultative Committee.

The WIA is a member of the International Amateur Radio Union (IARU, [www.iaru.org](http://www.iaru.org)), which represents the interests of the amateur and amateur satellite services internationally and is recognised by the International Telecommunications Union (ITU). Membership of the IARU is comprised of the national societies of each separate country or territory. The WIA was one of the first 14 national societies to become a member of the IARU when it was formed in 1925.

There is an IARU association in each of the three ITU regions across the world. The WIA is a founding member of the Region 3 association ([www.iaru-r3.org](http://www.iaru-r3.org)), which serves the Asia-Pacific nations. A WIA volunteer currently serves as one of the six directors of the IARU Region 3 organisation.

The WIA is committed to maintaining Amateur service allocations across the radiofrequency spectrum, both primary and secondary. Over decades, the Institute has defended assiduously the retention of amateur access to frequency bands throughout the spectrum.

The ACMA’s Options paper, “Future use of the 3.6 GHz band”, identifies a range of possible replanning options to facilitate the 3.575-3.7 GHz band moving to its highest value use. The WIA acknowledges that the ACMA’s preferred option:

*“... is to establish arrangements optimised for wide-area broadband deployments (be they mobile or fixed) over the entire 125 MHz of the 3.6 GHz band available in metro and regional areas. The expected licensing regime under this approach would be spectrum licences allocated via auction.”*

The WIA confines its response to issues most relevant to the amateur radio community.

### Background on the 3300-3600 MHz Amateur band

The Australian Radiofrequency Spectrum Plan (ARSP) provides an allocation at 3300-3600 MHz for the Amateur Service on a secondary basis, which Advanced amateur licensees are permitted to use, with substantial geographic restrictions set out in the *Radiocommunications Licence Conditions (Amateur Licence) Determination 2015*. As the ARSP extract here shows, in the 3400-3600 MHz segment, the current primary services are Fixed, Mobile and Radiolocation (with accompanying footnotes).

3 300 – 3 400 RADIOLOCATION	3 300 – 3 400 RADIOLOCATION Amateur Fixed Mobile	3 300 – 3 400 RADIOLOCATION Amateur	3 300 – 3 400 RADIOLOCATION AUS100A Amateur Fixed Mobile 149
149 429 429A 429B 430	149 429C 429D	149 429 429E 429F	
3 400 – 3 600 FIXED FIXED–SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 430A Radiolocation	3 400 – 3 500 FIXED FIXED–SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 431A 431B Amateur Radiolocation 433 282	3 400 – 3 500 FIXED FIXED–SATELLITE (space-to-Earth) Amateur Mobile 432 432B Radiolocation 433 282 432A	3 400 – 3 600 FIXED MOBILE 432B 433A RADIOLOCATION 433 AUS101A Amateur Fixed–satellite (space-to-Earth)
431	3 500 – 3 600 FIXED FIXED–SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 431B Radiolocation 433	3 500 – 3 600 FIXED FIXED–SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 433A Radiolocation 433	282

Over the past 25 years, the WIA notes that there has been withdrawal of segments from amateur allocations originally at 420-450 MHz (70 cm), 1215-1300 MHz (23 cm), 2300-2450 MHz (13 cm), and 3300-3600 MHz (9 cm), resulting from re-allocation to new services. The 70 cm band has lost 10 MHz (420-430 MHz), the 23 cm band has lost 25 MHz (1215-1240 MHz), the 13 cm band lost 98 MHz (2302-2400 MHz) – with 2300-2302 MHz still ‘on notice’ to be withdrawn and re-allocated for future spectrum licensing.

From 2015, the segment 3400-3575 MHz (designated by the ACMA as the “3.4 GHz band”), became restricted for amateur access across substantial geographical areas around state and territory capital cities (except for the Northern Territory), along with major regional cities in the four eastern states, arising from Apparatus licensing of fixed wireless access systems for the NBN, as primary users (co-primary with Radiolocation and Mobile). The amateur allocation throughout the most-populated areas of Australia contracted to 3300-3400 MHz and 3575-3600 MHz.

In consultation with the Australian radio amateur community, and with reference to the International Amateur Radio Union (IARU), the WIA develops band plans for each amateur frequency allocation

across the spectrum, as set out in the ARSP. The WIA's band plan for 3300-3600 MHz (the "9 cm band") is attached at **Appendix 1**. It sets out the suggested divisions of amateur uses across the band.

Amateurs using, or interested in using, the 9 cm band have to design, build, test and refine a complex communications system. The microwave bands attract highly motivated individuals skilled in a variety of disciplines, ranging over system design and development, computer-aided design, RF and electronics design and construction, mechanical and electromechanical equipment development and construction. In recent years the amateur community has developing wideband digital system, eg, digital amateur television. Such people engage in significant self-development and technical experimentation, in keeping with the ITU definition of the Amateur Service and the objects of the *Radiocommunications Act 1992*.

The WIA notes that high performance microwave system self-construction kits for the 9 cm band are currently available in Australia from Minikits ([www.minikits.com.au](http://www.minikits.com.au)), in addition to a variety of online suppliers located in Europe and the USA. The availability of kits for self-assembly serves to encourage the use of the 9 cm band, self-training and technical investigation by amateurs, in keeping with the ITU definition of the Amateur Service and the objects of the Radiocommunications Act. In addition, the repurposing of ex-commercial equipment is also serves to encourage use of the 9 cm band, as this example demonstrates: <http://vk3at1.org/3.4GHz%20surplus%20panel%20transverter%20V1.0.pdf>

The WIA notes that the 9 cm band is free of interference from the ubiquitous Class-licensed wideband services (predominantly WiFi network devices) operating in the 13 cm and 6 cm (5650-5850 MHz) amateur bands. This pervasive interference serves as an impediment to weak-signal beyond line-of-sight communications that many amateurs seek to explore in the microwave spectrum.

Over-the-horizon propagation modes that amateurs seek to explore on the microwave bands include tropospheric scatter, rain storm scatter, tropospheric refraction and ducting, scatter from high flying aircraft ('aircraft enhancement'), knife-edge diffraction and earth-moon-earth reflection (EME, or Moonbounce).

These pursuits are explored predominantly by using narrowband technologies (hand-keyed Morse, SSB voice and digital transmissions). However, amateurs also seek to explore wideband technologies, including image and video transmission. A number of amateurs and groups of amateurs have constructed, installed and maintain repeaters (which are listed in the RRL). Over recent years, this technology experimentation has moved on to the use of digital video broadcasting (DVB). The WIA's 9 cm band plan (Appendix 1) reflects these developments.

The WIA is aware that a small number of amateurs have established use of 3575-3600 MHz. However, because their use does not require frequency coordination as do repeaters and beacons, they do not appear in the RRL.

## **The issues**

Australian amateurs now face the prospect of further reduction of access that will reduce the 3300-3600 MHz band by a further 25 MHz, leaving 3300-3400 MHz. Where access was once 300 MHz, successive re-allocation is reducing that to 100 MHz.

The WIA is concerned that spectrum licensing will effectively embargo secondary users, in particular the Amateur Service, from access to 3575-3600 MHz across the most populous areas, where radio amateurs predominantly live and conduct their activities.

## **WIA response**

The WIA seeks to preserve the opportunities for amateurs to explore communications technologies and techniques on the allocated Amateur Service frequency bands throughout the spectrum, along with the ability to experiment with, or adapt, both existing and emerging technologies and application, including

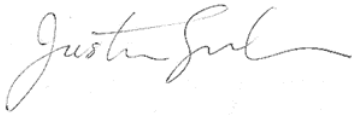
those not yet invented, all of which is in keeping with the ITU definition of the Amateur Service and the objects of the Radiocommunications Act.

In keeping with established policy, the WIA seeks retention of amateur access to 3575-3600 MHz outside the specific geographic areas 1, 2, and 3, where future licensed services are deployed.

The WIA is available to discuss any aspect of its submission and would be pleased to meet with staff from the Spectrum Planning Section to provide a wider briefing on contemporary developments of Amateur Radio in Australia and overseas pertinent to the Options paper's proposals.

The contact person for the WIA will be Mr Peter Young, WIA Regulatory Counsel, who can be contacted on 0438 212 368, or by email at [petervk3mv@tpg.com.au](mailto:petervk3mv@tpg.com.au).

Yours sincerely

A handwritten signature in cursive script, appearing to read "Justin Giles-Clark".

**Justin Giles-Clark**  
President, Wireless Institute of Australia

# Appendix 1

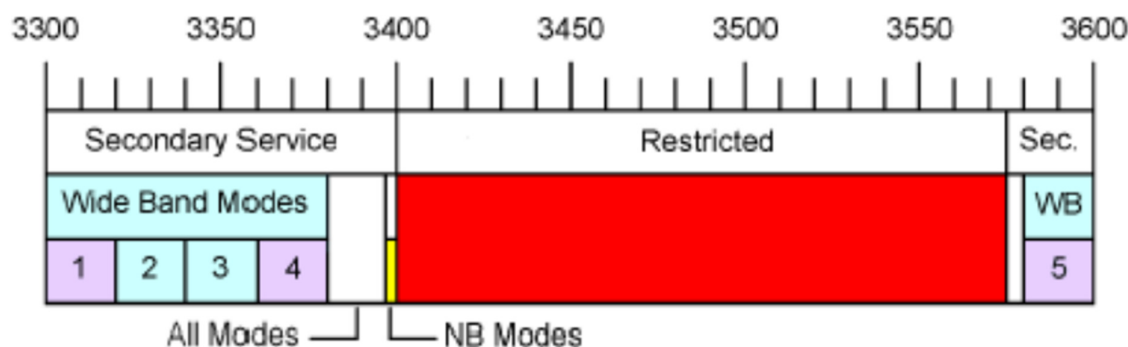
## 9 cm band – Advanced licensees only

**NOTE:** From July 2015, operation on frequencies between 3400 and 3575 MHz is prohibited in many parts of Australia (basically all major population centres). However operation is still permitted in country and remote areas. For full details, please refer to the latest ACMA Amateur Licence Conditions Determination.

The main impact is on weak signal work. To ensure that there is a common national weak signal segment that can be accessed by stations in any part of Australia, the Narrow Band Modes segment has been moved to 3398 MHz.

### Band Allocation

3300 - 3600 MHz	RADIOLOCATION	Primary Service
3300 - 3600 MHz	AMATEUR	Secondary Service
3400 - 3410 MHz	AMATEUR SATELLITE	Permitted on non-interference basis
3400 - 3600 MHz	FIXED SATELLITE (Space to Earth)	Secondary Service
3400 - 3600 MHz	FIXED, MOBILE	Secondary Service



3300.000 - 3380.000	WIDEBAND MODES	(Note 5)
3300.000 - 3320.000	Channel 1: ATV	
3320.000 - 3340.000	Channel 2: Voice or data	
3340.000 - 3360.000	Channel 3: Simplex, any mode	
3360.000 - 3380.000	Channel 4: ATV	
3380.000 - 3398.000	ALL MODES	
3398.000 - 3400.000	NARROW BAND MODES	(Note 1)
For operation in any part of Australia		
3398.000 - 3398.100	EME only	
3398.100 - 3398.400	CW / SSB	
3398.100	Calling frequency: national primary	
3398.200	Calling frequency: national secondary	
3398.220 - 3398.240	Digital DX modes	
3398.400 - 3398.600	Beacons	(Note 2)
3398.600 - 3400.000	Experimental	
3400.000 - 3575.000	NO OPERATION IN ACMA RESTRICTED AREAS	
3575.000 - 3580.000	ALL MODES	
3580.000 - 3600.000	WIDEBAND MODES	(Note 5)
3580.000 - 3600.000	Channel 5 (ATV)	

**Note 1: Narrow Band Modes**

This segment is reserved for modes such as CW, digital modes and SSB with bandwidths up to 4 kHz. Weak signal operation has absolute priority. Calling frequencies should be used only to make initial contact and then vacated as soon as possible. Please avoid any terrestrial operation within the EME segment. The "Digital DX modes" segment includes recommended spot frequencies for SSB-based digital modes, on the same pattern as in Note 1 of the 2 metre band plan. The Experimental segment is reserved for specialised experimental use, including possible future linear translators.

**Note 2: Beacons**

Beacon frequencies are allocated on a call area basis, e.g. VK1: 3400.410 - 3400.419, VK2: 3400.420 - 3400.429 etc. Beacon frequency spacing is 2 kHz. The beacon segment should be kept clear of other transmissions.

**Note 3: Amateur Satellites**

There are no amateur satellites currently operating or planned for this band.

**Note 4: FM Simplex**

Recommended channel spacing is 100 kHz. Channels reserved for special purposes should be kept clear of other operation.

**Note 5: Wideband Modes**

These segments are for wideband simplex operation or duplex links. Suggested uses are:

ATV (channels 1, 4 or 5):

FM or DVB Maximum bandwidth 20 MHz, centred on the channel midpoint

DVB Maximum bandwidth 10 MHz, centred 5 MHz above or below the channel midpoint

Recommended use for duplex links is channel 1 input and channel 4 output.

Data or Voice:

Recommended channel spacing is 100 kHz, or 1 MHz for high speed data, excluding upper and lower segment edges, with voice links at the lower end of the segment and data links at the upper end.