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Submission to “Consultation on draft Direction to use 3.5 GHz band spectrum for the National Broadband Network spectrum gap”

The Wireless Institute of Australia (WIA) welcomes the opportunity to comment on the draft *Australian Communications and Media Authority (3.5 GHz frequency band) Direction 2014*.

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

Accordingly, on behalf of our members and the amateur radio community in Australia, the WIA has a direct interest in the proposed use of the 3.5 GHz frequency band set out in the draft Direction as it directly affects the Amateur Service allocation at 3300-3600 MHz.

The Amateur Service is defined in the International Telecommunications Union (ITU) Regulations as follows:

- 1.56** amateur service: A radiocommunication service for the purpose of self-training, intercommunication and technical investigations carried out by amateurs, that is, by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest.
- 1.57** amateur-satellite service: A radiocommunication service using space stations on earth satellites for the same purposes as those of the amateur service.

Australian amateur radio operators are licensed under the Apparatus licensing provisions of the *Radiocommunications Act 1992*, Part 3.3. The Institute represents the interests of the Australian radio amateur community through formal liaison with the ACMA, other government institutions and a diversity of 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 people.

WIA 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 planned and held by the ITU at regular intervals,
- Standards Australia's standards committees, and
- the Radiocommunications Consultative Council.

The Institute is a member of the International Amateur Radio Union (IARU, www.iaru.org), which represents the interests of the amateur and amateur satellite services internationally and is recognised by the ITU.

The Amateur Allocation at 3.3-3.6 GHz

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. Over the segment at 3400-3600 MHz, the current primary services are Fixed, Mobile and Radiolocation (footnoted, 282, 433 and AUS101A). Amateur use has some geographic prohibitions at 3425-3492.5 MHz and 3542.5-3575 MHz.

With the resumption of amateur licensing following World War 2, Australian amateur licensees gained access to a range of frequency bands above 30 MHz, right through the VHF, UHF and SHF spectrum through to 10 GHz. Over the decades since then, the WIA has worked with the amateur radio community to develop and advocate band plans that set out the suggested divisions of amateur uses within each allocation. The band plan for the 3300-3600 MHz (9 cm) band is shown in **Appendix A**.

The Issue

The WIA notes that Section 4 of the Direction refers to two blocks of spectrum:

- (a) 25 MHz from 3400 MHz up to and including 3425 MHz; and
- (b) 50 MHz from 3492.5 MHz up to and including 3542.5 MHz.

Both these spectrum blocks impact licensed radio amateurs' access to the 9 cm band. Your attention is drawn, in particular, to the segment at 3400-3410 MHz in the band plan at Appendix A. In this segment, custom and practice provides covers a variety of transmission modes and operations, including Earth-Moon-Earth reflection (EME, or moonbounce) and amateur satellites, both of which involve international coordination and operations with amateurs in other countries across the world.

There has been considerable effort over decades to have other countries' administrations harmonise amateur allocations in this region of the spectrum. **Table 1** lists amateur allocations in the 3300-3600 MHz band in a variety of countries across all three ITU regions. The Amateur Service is secondary in all these allocations. The WIA's 9 cm band plan harmonises the use of 3400-3410 MHz for weak-signal and amateur satellite operations with band plans in other countries having a 9 cm band allocation.

Table 1

Some Amateur Service allocations in ITU Region countries	
Region 3	Allocation
India, Sri Lanka	3300-3400 MHz
Bangladesh, New Zealand	3300-3410 MHz
China, Indonesia, Malaysia, Singapore, Vietnam	3300-3500 MHz
Pakistan, Philippines, South Korea	3400-3500 MHz
Japan, Chinese Taipei	none
Region 2	
Argentina	3300-3400 MHz
IARU-R2; Canada, USA, Venezuela	3300-3500 MHz
Region 1	
Albania, Denmark, Estonia, Poland, UK (future)	3400-3410 MHz
Germany, Israel, UK (present)	3400-3475 MHz
Bulgaria	3400-3500 MHz

The WIA notes that, since March 2009, the International Amateur Radio Union (IARU) has maintained a policy to seek upgrading of the allocation status of 3400-3410 MHz to primary. **The IARU's stated objective is to achieve harmonisation of 3400-3410 MHz as an amateur allocation across ITU Regions 1, 2 and 3, for both earth-to-space and space-to-earth operation.**

The Institute understands that the following footnote to CEPT radiofrequency allocations in Region 1 has been adopted:

EU17: In the sub-bands 3400-3410 MHz, 5660-5670 MHz, 10.36-10.37 GHz and 10.45-10.46 GHz, the amateur service operates on a secondary basis. In making assignments to other services, CEPT administrations are requested wherever possible to maintain these sub-bands in such a way as to facilitate the reception of amateur emissions with minimal power flux densities.

The IARU notes that EU17 encourages CEPT administrations to afford some consideration to amateur weak-signal operations in the band (meaning EME, satellite operations and terrestrial weak-signal operations on over-the-horizon paths).

In addition, the WIA is informed that 3400-3410 MHz is a guard band for some airborne military systems of US and European origin. That is, this 10 MHz block is unused by such systems, to provide a frequency “buffer” for their operation, and hence enables sharing with the Amateur Service.

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. 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*.

WIA Response

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.

Over the past two decades, the WIA notes that there has been significant loss of segments from the amateur allocations in the amateur band allocations at 420-450 MHz, 1215-1300 MHz, 2300-2450 MHz, and 3300-3600 MHz, with re-allocation to new services. Australian amateurs are facing the prospect of further loss of access in the 9 cm band arising from the draft Direction 2014.

Loss of amateur access to 3400–3410 MHz and 3492.5–3542.5 MHz would directly impact the following amateur activities within Australia:

- a) weak-signal narrowband terrestrial communications within Australia and around the region;
- b) Earth-Moon-Earth (EME, or moonbounce) communications, within Australia, around the region and globally;
- c) future Amateur Satellite use in the 3400-3410 MHz segment; and
- d) exploration, experimentation and use of wideband transmission modes.

The WIA seeks to preserve the ability of amateurs to explore the technologies and techniques involved in all the above activities, as well as the ability to experiment with, or adapt, emerging technologies and applications in the future, 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 1992*.

Noting that:

- (a) the NBN Co Fixed Wireless and Satellite Review (Final Report) of May 2014 identified that at least 80,000 premises in the metro fringe and hard to service areas of the mainland major cities will require an NBN fixed wireless service, and
- (b) the ACMA has identified that area-wide apparatus licences within the 3.5 GHz frequency band (3400 – 3600 MHz) may be suitable for the purposes of NBN Co,

the WIA seeks preservation of Amateur Service use of 3400-3410 MHz Australia-wide, consistent with international allocations and CEPT footnote EU17 in Region 1, and suggests that a 25 MHz block for the NBN could be found elsewhere in the 3400–3600 MHz band.

In addition, the WIA seeks preservation of Amateur Service use of 3492.5–3542.5 MHz (and the repositioned 25 MHz NBN block) outside those geographic areas where NBN fixed wireless services are deployed, such that any likely interference to the NBN service is obviated and subject to the existing provisions of secondary services.

This is consistent with the principles of existing geographic prohibitions, as identified in Appendix A and the Radiocommunications Licence Conditions (Amateur Service) Determination No. 1 of 1997 – 2013 update.

Context of Amateur Radio Activities and Interests

Radio amateurs seek to explore and experiment with new technologies, yet retain an interest in, and continued use of, technologies of the past, albeit in a modern context.

Innovation in the use of radio/wireless technologies in increasingly diverse applications continues relentlessly, both within and beyond the sphere of amateur radio activities, and the WIA sees that it is important to facilitate radio amateurs' ability to adopt or adapt innovations without unnecessary impediments.

While commercial and defence operations focus on reliable, high signal-to-noise ratio communications, radio amateurs deliberately seek to explore testing and establishing communications under difficult circumstances where weak-signal reception is the norm, rather than the exception. The amateur radio community, globally and in Australia, has built up a commendable record of investigation and achievement in advancing the state of the art with weak-signal communications technologies and techniques.

The WIA notes that the 9 cm band, 3300–3600 MHz, is free of interference from the ubiquitous Class-licensed wideband services (predominantly WiFi network devices, deployed *ad hoc* across urban and regional areas) operating in the 2400–2450 MHz and 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).

The above pursuits are explored predominantly by using narrowband technologies (hand-keyed Morse, SSB voice and digital). However, amateurs also seek to explore wideband technologies, including image transmission – Amateur Television (ATV), voice and data. To support the latter activities, a number of amateurs and groups of amateurs have designed, constructed, installed and maintain repeaters on various Amateur Service allocations. In recent years, some amateurs have begun to experiment with digital video broadcasting (DVB).

The WIA notes that there are currently at least two Australian suppliers of self-assembly microwave system kits for the 9 cm band: Mini-Kits (www.minikits.com.au) and VK3XDK (www.vk3xdk.net46.net/). The availability of such products 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 1992*.

About the WIA

As noted at the outset of this submission, the WIA is the national organisation of licensed amateur radio operators (www.wia.org.au), the peak body representing the interests of the Australian radio amateur community nationally and internationally.

Founded in 1910, 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 also noted previously, the Institute is a member of the International Amateur Radio Union (IARU, www.iaru.org), which represents the interests of the amateur and amateur satellite services internationally and is recognised by the International Telecommunications Union. 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.

The IARU is a Sector Member of the ITU Radiocommunications Sector and actively participates in many ITU meetings, including the WRCs. 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).

Conclusion

The WIA appreciates the opportunity to provide this submission on the draft *Australian Communications and Media Authority (3.5 GHz frequency band) Direction 2014*.

A response to the ACMA's related consultation on "Making the most of the 3.5 GHz band in future" has also been provided by the WIA (30 July 2014).

The Australian amateur radio community and the WIA looks forward to the release of the ACMA's response to the Minister for Communications' Direction 2014 concerning apparatus licensing of NBN fixed wireless services in the 3.5 GHz band.

Yours sincerely

A handwritten signature in blue ink, appearing to be 'Phil Wait', with a stylized flourish at the end.

Phil Wait VK2ASD
President

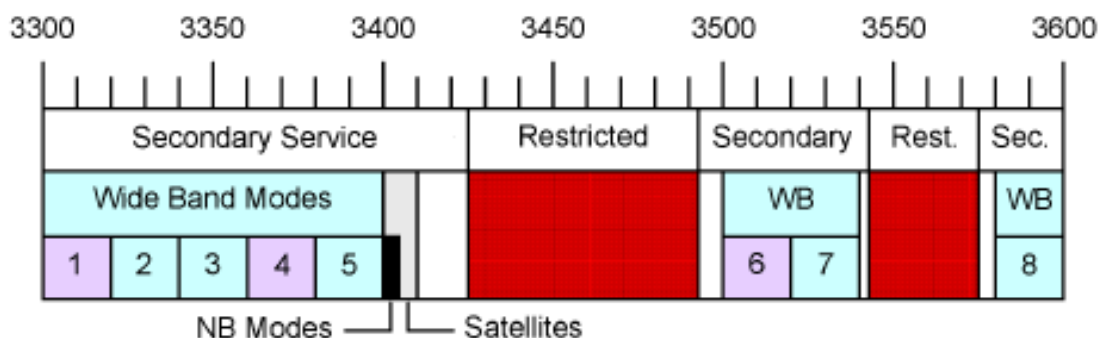
APPENDIX A

9 cm band – Advanced licensees only

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

NOTE: In the band segments 3425.0 - 3442.5 MHz and 3475.0 - 3492.5 MHz, operation is prohibited in and around most major population centres. In the segments 3442.5 - 3475.0 MHz and 3542.5 - 3575.0 MHz, operation is prohibited in most parts of Australia. For full details, please refer to the current ACMA Amateur Licence Conditions Determination.



3300.000 - 3400.000	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 - 3400.000	Channel 5: Simplex, any mode	
3400.000 - 3410.000	AMATEUR SATELLITES	(Note 3)
3400.000 - 3402.000	NARROW BAND MODES	(Note 1)
3400.000 - 3400.100	EME only	
3400.100 - 3400.400	CW / SSB	
3400.100	Calling frequency: national primary	
3400.200	Calling frequency: national secondary	
3400.220 - 3400.240	Digital DX modes	
3400.400 - 3400.600	Beacons	(Note 2)
3400.600 - 3402.000	Experimental	
3402.000 - 3404.000	FM SIMPLEX	(Note 4)
3410.000 - 3425.500	ALL MODES	
3425.000 - 3492.500	NO OPERATION	
3500.000 - 3600.000	WIDEBAND MODES	(Note 5)
3500.000 - 3520.000	Channel 6: ATV	
3520.000 - 3540.000	Channel 7: Voice or data	
3542.500 - 3575.000	NO OPERATION	
3580.000 - 3600.000	Channel 8: Any mode	