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Ms Victoria Robertson
Manager
Spectrum Outlook and Review Section
Australian Communications and Media Authority
PO Box 78
BELCONNEN ACT 2616

Dear Ms Robertson

Submission on
draft version of the spectrum re-allocation recommendation: 2300-2302 MHz frequency band

The Wireless Institute of Australia (WIA) welcomes the opportunity to comment on the terms of this draft recommendation, which proposes that the 2300-2302 MHz band be declared for allocation via spectrum licensing nationally.

As indicated in the Australian Radiofrequency Spectrum Plan (ARSP) and in the Consultation paper, the amateur service in Australia has access to the 2300-2302 MHz band on a secondary basis, with Advanced amateur licensees being authorised to operate in the band.

The WIA thanks the ACMA for writing individually to every Advanced amateur licensee, and inviting them to comment on the proposed spectrum re-allocation.

Summary of the WIA Response

The WIA proposes that an allocation of 2300-2300.15 MHz be retained for use by Advanced amateur licensees on a co-primary basis on the condition that harmful interference is not caused to systems deployed by the spectrum licensee.

The proposed 150 kHz-wide allocation is less than the unoccupied bandwidth at the lower frequency edge of the lowest frequency LTE channel, irrespective of what LTE channel bandwidth may be deployed during the spectrum licence tenure for the 2300-2400 MHz band. Similarly, if WiMAX is deployed, the proposed allocation lies at the WiMAX channel guard band for the lowest frequency WiMAX channel.

Total loss of the 2300-2302 MHz band would, at best severely hamper, or at worst eradicate, weak-signal narrowband terrestrial contacts between amateur stations within Australia and around the Australasian region, as well as earth-moon-earth (EME) contacts globally.

Although the WIA's Australian amateur band plans indicate 2403-2406 MHz and 2424-2425 MHz for narrowband modes, including EME, the relentlessly advancing deployment of WiFi and other ISM systems is already creating a substantive rise in the noise floor between 2400 MHz and 2450 MHz, which will only increase over time.

The Amateur Service

The Amateur Service exists to meet the needs of the community for public access to the radio frequency spectrum for self-training, technical experimentation and self-development, as defined in the International Telecommunications Union (ITU) Radio Regulations Article 1:

> 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 authorised persons interested in radio technique solely with a personal aim and without pecuniary interest.

which is echoed in the objects of the *Radiocommunications Act 1992* (September 2012):

> (b) make adequate provision of the spectrum . . . (ii) for use by other public or community services;

but not diminishing the other equal objects.

Access to the Amateur Service spectrum is through a process of qualification leading to a Certificate of Proficiency, and a licensing arrangement under the *Radiocommunications Licence Conditions (Amateur Licence) Determination No. 1 of 1997* (the Amateur LCD).

The Amateur Service provides a benefit to the community in that it encourages individuals, and groups of like-minded individuals, to undertake self-training and self-development in technological and related skills. This results in technology-aware, skilled individuals that continue such learning throughout their lives. Amateur radio benefits to the community are further detailed in Appendix 1.

About the WIA

The WIA is the national organisation of Australian radio amateurs (www.wia.org.au). It is 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.

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 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,
- Standards Australia's standards committees, and
- the Radiocommunications Consultative Council.

The WIA 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).

Context

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. However, only the VHF bands at 50 MHz and 144 MHz were allocated on a primary basis and in all the higher amateur bands, amateurs were the secondary service. The 288-296 MHz band was withdrawn in 1963, the 420-450 MHz (70 cm) allocation was added in 1964, on a secondary basis, and the 50-52 MHz sector of the 50-54 MHz band was re-allocated to the Channel 0 television service. Later, the 576-585 MHz (50 cm) band was withdrawn in 1989.

Over the past two decades, the WIA notes that there has been significant loss of segments from the Australian amateur allocations in the 70 cm, 23 cm, 13 cm and 9 cm bands, with 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 9 cm band has lost 98 MHz (2302-2400 MHz), and the 9 cm band has operating prohibitions over some 70 MHz in segments across 3300-3600 MHz.

On the 13 cm band, 2400-2450 MHz is shared with industrial, scientific and medical (ISM) services that are proliferating throughout urban, regional and rural areas relentlessly. Although low-powered (<5 W) Class licensed equipment is deployed, predominantly WiFi network devices, the WIA has been informed by amateurs operating on 13 cm that this has nonetheless raised the ambient noise floor by some 10 dB to 15 dB. As more such systems are deployed, the noise floor will continue to rise. This rise in the noise floor impacts weak-signal narrowband operation in 2400-2450 MHz, including amateur satellites. It is noted that WiFi devices nearby to an amateur station can cause much higher level interference.

Outline of the 13 cm Amateur Band Use

The WIA band plan (www.wia.org.au/members/bandplans/data/) for the 13 cm band, as at January 2013, is shown in Figure 1, here. In general, it reflects historical and planned usage of the allocation. All Australian amateur band plans offer guidance to operators in the selection of frequencies and modes of operation. While adherence is voluntary, the band plans help avoid interference between operators, to the extent possible, and to provide protection for weak-signal operation, including satellite operation.

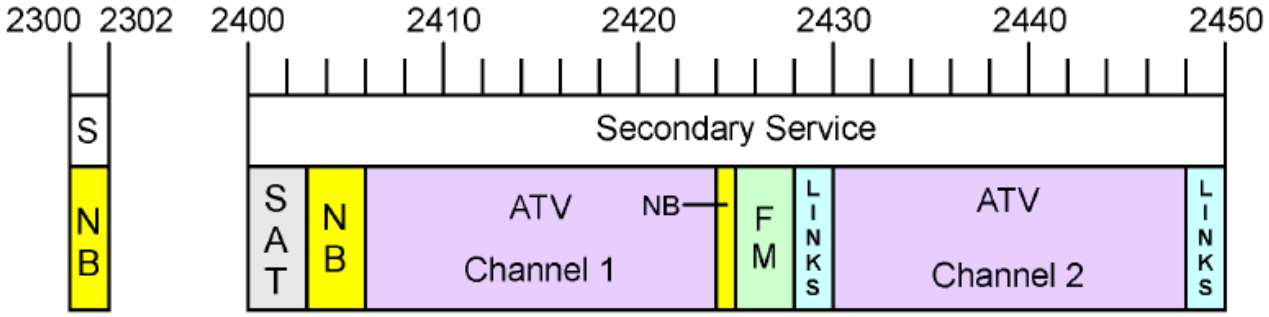

Figure 1. WIA band plan for the 13 cm band. The vertical marks along the top line are at 2 MHz intervals. NB = narrowband (weak-signal) operation. SAT = satellite operation. ATV = amateur television operation. FM = frequency modulated operation (simplex and repeaters). Links = link channels for linking repeaters.

Note the three narrowband segments. The 2300-2302 MHz and 2403-2406 MHz segments are generally used for both terrestrial weak-signal communications and EME.

The 2403-2406 MHz segment is congruent with the 13 cm band plans in North America (Canada and the USA) and some other countries.

The 2424-2424.5 MHz segment is congruent with 13 cm band plans in Japan and New Zealand, which have allocations at 2400-2450 MHz and 2396-2450 MHz, respectively.

Some international crossband EME contacts have occurred recently between the 2300-2302 MHz and 2403-2406 MHz segments.

Terrestrial long-distance point-to-point working occurs in both the 2300-2302 MHz and 2403-2406 MHz segments. This is often pursued by amateurs deploying microwave band stations on "field days" when they operate at remote and/or well-located sites and attempt to accumulate contacts with other similar stations along with home stations.

Since the 13 cm band was allocated following World War 2, there has accumulated a significant history of Australian amateurs assembling high performance systems for leading-edge narrowband weak-signal communications and amateur television (www.wia.org.au/members/records/data/). Many state, territory and national distance records have been established and re-established over the decades. They compare favourably with similar records established in other regions around the world and are recognized globally.

From these records, an increasing pattern of achievement can be discerned with the passing of time, as the number of amateurs active on 13 cm increases and as access to increasingly sophisticated technology has become available, which Australian amateurs continue to exploit.

Impact of Losing 2300-2302 MHz

Total loss of the 2300-2302 MHz band would, at best severely hamper, or at worst eradicate, weak-signal narrowband terrestrial contacts between amateur stations within Australia and around the Australasian region, as well as earth-moon-earth (EME) contacts globally.

As the deployment of ISM systems in 2400-2450 MHz advances, the usability of the 2403-2406 MHz and 2424-2425 MHz segments for weak-signal operations will decline further. Some current operators report that it is becoming increasingly more difficult to avoid, "work around" or escape the ISM interference in these narrowband weak-signal segments. Loss of 2300-2303 MHz is not compensated by the availability of segments within 2400-2450 MHz.

Amateurs using, or interested in using, the 13 cm band have to design, build, test and refine a complex communications system. It is a band that attracts 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*.

The WIA notes that there are currently at least two Australian suppliers of high performance transverter kits for the 13 cm band: Mini-Kits (www.minikits.com.au) and VK3XDK (www.vk3xdk.net46.net/). (A transverter operates with a transceiver at lower frequencies to convert received signals in a desired higher frequency band down to the transceiver, and translate signals transmitted from the transceiver up to the desired frequency band).

The availability of kits for self-assembly serves to encourage the use of the 13 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*.

The WIA wishes to preserve a future for leading edge weak-signal amateur radio development and operations in this region of the microwave spectrum, which sits at a "waypoint" between the UHF and SHF region of the radiofrequency spectrum, where technological approaches to engineering challenges begin to transition from those pertaining to the lower UHF spectrum to those necessary in the SHF region.

Total re-allocation of 2300-2302 MHz is contrary to the objects of the *Radiocommunications Act 1992*, highlighted above.

Adjacent Spectrum at 2290-2300 MHz

In the 2013 Australian Radiofrequency Spectrum Plan, the allocation immediately below 2300 MHz – 2290-2300 MHz – is designated for FIXED, MOBILE (except aeronautical mobile) and SPACE RESEARCH (deep space) (space-to-Earth). Footnote AUS93 is appended, which says:

> "The band may be used by stations of the aeronautical mobile (OR) service for the purposes of defence on condition that harmful interference will not be caused to stations of the space research (deep space)(space-to-Earth) service in this band."

It is envisaged that spectrum licensees using the 2300-2400 MHz band will be required to reduce unwanted out-of-band emissions at the lower frequency boundary to meet a specified standard, so as to avoid interference to licensed users of the 2290-2300 MHz band.

PROPOSAL

The WIA proposes that an allocation of 2300-2300.15 MHz be retained for use by Advanced amateur licensees on a co-primary basis on the condition that harmful interference is not caused to systems deployed by the spectrum licensee.

The ACMA's Consultation paper states that the intention of the proposed re-allocation is:

> *". . . to enable the extension of the already spectrum-licensed 2302–2400 MHz band (the 2.3 GHz band) from 98 MHz to 100 MHz of bandwidth.*

and:

> *". . . to expand the 2.3 GHz band to provide 5 MHz channels. Changing the arrangements to allow for 5 MHz channels would provide industry with greater efficiencies as technology evolves and would assist licensees to use TD-LTE technologies in the band."*

The Consultation paper explains that:

> *"This increase would better enable the deployment of next generation technologies, such as WiMAX and Time-Division Long-Term Evolution (TD-LTE), which typically operate using multiples of 5 MHz channels. Enabling the operation of these technologies would also harmonise the band with other international regulatory arrangements and global equipment standards."*

The proposed 150 kHz-wide allocation is less than the unoccupied bandwidth at the lower frequency edge of the lowest frequency LTE channel, irrespective of what LTE channel bandwidth may be deployed during the 15-year spectrum licence tenure for the 2300-2400 MHz band. The WIA notes that, while the Consultation paper expressly mentions 5 MHz channels, LTE systems may be configured for channel bandwidths of 1.4, 3, 5, 10, 15 or 20 MHz. It is understood that configuration is at the discretion of the spectrum licensee.

Similarly, if WiMAX is deployed, the proposed 150 kHz allocation lies at the WiMAX channel guard band for the lowest frequency WiMAX channel. The WIA understands that WiMAX also has variable channel bandwidths of 1.25, 2.5, 5, 10 and 20 MHz; however, the Consultation paper specifically mentions 5 MHz channels. Again, it is understood that channel configuration is at the discretion of the spectrum licensee.

Amateur stations using the proposed 2300-2300.15 MHz allocation would be geographically scattered and operating intermittently. As such, they would offer little or no interference risk to users of spectrum-licensed systems in 2300-2302 MHz. The qualification on the proposed allocation of avoiding harmful interference offers an appropriate management regime for the resolution of any interference, as applies with other amateur allocations.

Conclusion

The WIA appreciates the opportunity to provide this submission on the draft spectrum re-allocation recommendation concerning the 2300-2302 MHz frequency band.

The proposed retention of 2300-2300.15 MHz is not antithetical to the use of the allocations at 2290-2300 MHz or 2300-2400 MHz, and offers a solution deserving of serious consideration.

The WIA wishes to meet with you to discuss this submission. I will contact you in the next two week to arrange a meeting.

Yours sincerely

Phil Wait
President

APPENDIX 1

AMATEUR RADIO BENEFITS TO THE COMMUNITY

Developing career paths and businesses

Many radio amateurs have extended or leveraged their interest in amateur radio into careers in engineering, IT, radio communications, science and telecommunications.

Radio amateurs are employed in highly skilled jobs across many industries, including manufacturing, mining, transport, government services, retailing and education. Gaining their amateur radio licence taught them the skill of “learning to learn”.

The Chief Technology Officer at NSW Police, Syd Griffith (Public Service Medal, 2009), built a distinguished career in technology and communications, beginning with an interest in amateur radio. He still holds a licence, callsign VK2AHF.

A boyhood interest in amateur radio led entrepreneur Dick Smith, callsign VK2DIK, to open a car radio business, from which he subsequently built his iconic electronics retailing empire.

Radio amateur Neil Weste, callsign VK2NW, joined forces with a colleague, David Skellern, to found the Sydney-based technology innovator Radiata, which developed a wireless local area network technology that brought $600 million to the Australian economy when it was bought out by Cisco Systems.

Training young people in electronics and radio technology

The Wireless Institute of Australia facilitates training in the basics of electronics and radio communications for anyone interested in gaining their licence, and particularly encourages young people.

Amateur radio in emergencies

When natural disasters and community emergencies arise, amateur radio is often used as a means of emergency communication when landline phone, mobile phones and other conventional means of communications fail. Amateur radio is not dependent on centralised infrastructure that can deteriorate, fail or be overloaded.

Radio Amateurs can provide a valuable resource to emergency services and aid organisations in times of need, either by providing skilled extra manpower required to cope with extended operations at emergency communications centres, or by deploying their own facilities in the field.

Radio Amateurs can quickly use existing amateur radio networks or establish temporary networks tying disparate agencies together to enhance interoperability.

NSW radio amateurs have a long history, over many decades, of providing communications during disasters, ranging from the devastating 1956 floods, through many bushfire events and offshore yachting emergencies. WICEN Emergency Communications (www.nsw.wicen.org.au/), comprising radio amateur volunteers, operates as a specialist support squad under the NSW State Disaster Plan (DISPLAN). WICEN members receive training in field and radio room operations. Members of WICEN are trained and nationally accredited through VRA Training.

In addition, radio amateurs work as volunteers in RECOM – the Red Cross Emergency Communications unit (www.wia.org.au/members/emcom/recom/). Members of RECOM are trained and nationally accredited through Trainsafe Australia.