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Response to the proposed update to the *Australian Radiofrequency Spectrum Plan*

The Wireless Institute of Australia (WIA) is the peak body representing the Australian Amateur Service and has represented the interests of Australia's licensed radio amateurs since our foundation in 1910.

The WIA thanks the ACMA for the opportunity to comment on the proposed changes to the Australian Radiofrequency Spectrum Plan (ARSP). The Institute recognises the complexity of the document, the large amount of work necessary to update it and the need to consult widely on proposed changes.

This submission addresses several matters arising in the draft Spectrum Plan, some specific issues that arose out of WRC-15, and advocates additional changes to the ARSP requested previously by the WIA in submissions earlier in 2016 to the ACMA's Communications Infrastructure Division and the Spectrum Planning and Engineering Branch.

The WIA notes that there are few proposed changes that impact the 25 Amateur Service bands spread throughout the Frequency Allocations Table, which is welcome. However, the Institute is aware that the secondary Amateur allocations, particularly in the microwave spectrum, face pressures of spectrum demand from telecommunications services and the Internet of Things.

While the position and expectations of primary users is understood, it is the WIA's view that the Amateur Service in Australia should retain some access in bands – anywhere in the spectrum – where amateurs currently have secondary status, to uphold the fundamental principles embodied in the ITU's definition of the 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.*

Clause 10: Use of frequency bands – other circumstances

The WIA supports the addition of Clause 10 (10) as it enables a more dynamic use of spectrum, particularly in response to changing circumstances and new developments, which in the past has been difficult to accommodate in a timely manner, if at all.

Identified drafting error

The WIA has identified a drafting error in the Table of Allocations at 7000 to 7300 kHz (page 38), reproduced below.

7 000 – 7 100	AMATEUR AMATEUR–SATELLITE 140 141 141A	7 000 – 7 100	AMATEUR AMATEUR–SATELLITE
7 100 – 7 200	AMATEUR 141A 141B 141C 142	7 100 – 7 200	BROADCASTING AUS54 FIXED MOBILE except aeronautical mobile (R) Amateur AUS12 141B 141C 142
7 200 – 7 300 BROADCASTING	7 200 – 7 300 AMATEUR 142	7 200 – 7 300 BROADCASTING	7 200 – 7 300 BROADCASTING AUS54 Amateur AUS12

The WIA understands that, from 29 March 2009, the Primary Broadcast status of 7100-7200 kHz was suppressed, and thus the Australian allocation is not in accordance with the Radio Regulations. The Institute requests that the Table be amended accordingly. Further, the AUS54 Footnote (page 116) includes “7100-7300 kHz”, which is likewise incorrect. The WIA requests that it be amended to read 7200-7300 kHz.

Proposed secondary amateur allocation at 5 351.5 – 5 366.5 MHz re WRC-15

The main WRC-15 agenda item of interest to the community of Australian amateur operators was the proposal for a new secondary allocation to the amateur service around 5300 kHz, and the WIA was very pleased that the ACMA supported this agenda item.

The possibility of a new amateur allocation in the 5351.5 kHz - 5366.5 kHz frequency band has generated a great deal of interest amongst Australian amateurs for some years, who are very keen to have access to this part of the radiofrequency spectrum because its propagation characteristics are somewhat different to the adjacent amateur bands at 3.5 and 7 MHz and offers unique opportunities. In particular, it is anticipated that extensive use will be made of Near Vertical Incidence Skywave (NVIS) propagation to support relatively short distance communications when the HF bands above and below are not available because of issues with propagation, ionospheric absorption or noise.

The updated entry in the ARSP (page 36) is reproduced below, for reference:

5 351.5 – 5 366.5	FIXED MOBILE except aeronautical mobile Amateur 133B	5 351.5 – 5 366.5	FIXED MOBILE except aeronautical mobile (R) AUS7 Amateur 133B AUS57
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While supporting a new amateur service allocation, the WIA has a number of concerns about the proposed entry in the ARSP:

1. The WIA notes that Radio Regulations footnote 133B restricts radiated power to 15 W equivalent isotropic radiated power (eirp). The WIA views this limit as overly conservative in an Australian

context where distances between stations using the band can be generally much larger than in Europe, where the power limit originated. However, the WIA notes the sensitivity of incumbent services to proposed amateur activity in the band and accepts that a 15 W eirp limit is necessary at the present time. The WIA hopes that, given a positive experience of band sharing, this power limitation will be reviewed when the ARSP is next updated.

2. The WIA is concerned that a power limitation based on eirp for a high frequency amateur band has potential compliance issues, both for the amateur operator and for the ACMA. Given the typical location of amateur stations in urban areas and the (usually) home-made nature of the antennas used, it may be difficult for some amateur operators to determine antenna gain and consequently whether or not their stations station complies with the power limitation. This will also be a difficulty for the ACMA in the event that compliance has to be checked. It is the WIA's view that it is better to avoid such issues by not using eirp as a power specification for any HF band.
3. A suggested solution is to offer two options for compliance:
 - (a) A 'safe harbour' option in which the maximum transmitter power is limited to 50 W peak envelope power (pX) and the type of antenna that can be used is restricted to short vertical whips, horizontal dipoles at low elevation, or other simple low-gain antennas; or
 - (b) An alternative combination of power and antenna may be used, but the licensee must be able to demonstrate through field strength measurements, calculations or other suitable reference material, that the radiated power does not exceed 15 W eirp.
4. Calculations indicate that, when using a 50 W transmitter with a 5 m high vertical antenna, the radiated power is unlikely to exceed 15 W eirp. Modelling of low horizontal dipoles, including inverted-V type configurations, is challenging due to the effects of ground loss, which is difficult to accurately include in calculated results (See *QST*, January 2015 p.67 for an example and comment). However, ground losses significantly reduce radiated power from low horizontal antennas. Also, the directivity of such antennas is such that most of the radiated power will be directed vertically with the consequence that transmission range will be relatively limited, which is a desirable feature of NVIS propagation. These factors will thus limit the potential for interference to other users of the frequency band.
5. Consequently, and based on the above factors, the WIA proposes the following footnote to replace footnote 133B (page 131) in the Australian column. The WIA believes the proposed footnote is a reasonable compromise between promoting the utility of the band for the Amateur Service and the need to protect incumbent services:

AUS133B Stations in the amateur service using the 5351.5 – 5366.5 kHz frequency band shall either:

- a) not exceed a transmitter peak envelope power of 50 W and only use vertical antennas of no more than 5 m length or dipole antennas (horizontal or inverted V style configurations) that have no part more than 10 m above ground; or
- b) use an alternative combination of power and antenna, but the licensee must be able to demonstrate through field strength measurements, calculations or other suitable reference material, that the radiated power does not exceed 15 W eirp

Operation of amateur stations in the 5351.5 – 5366.5 kHz frequency band is on a secondary basis in Australia and amateur stations operate under the condition that harmful interference is not caused to stations of other services in Australia or other countries operating in accordance with the Radio Regulations.

Compliance with option *a*) is easy to check, as all amateur operators have the necessary skills to measure transmitter output power and suitable measurement instruments are readily available.

Option *b*) is likely to be useful for Advanced licensees who have the knowledge and tools to ensure that their station complies with the 15 W eirp limit.

The WIA would also embark on an education campaign via its website and *Amateur Radio* magazine, highlighting the obligations of the Amateur Service when operating as a secondary service in an amateur band.

Proposed secondary amateur allocation at 70 MHz

Members of Australia’s radio amateur community have long sought a secondary amateur allocation around 70 MHz for experimentation and propagation studies. The WIA included a proposal for such an allocation in a submission to the ACMA’s Industry Partnerships Section in 2014, in response to an invitation to provide Amateur Service requirements for an updated Licence Conditions Determination replacing that which was to sunset in 2015. The proposal for an allocation at 70 MHz was reiterated in submissions earlier in 2016 to the ACMA’s Communications Infrastructure Division and the Spectrum Planning and Engineering Branch (re RALI LM 2 and MS 42). Analysis of the *Register of Radiocommunications Licences* database shows that a number of segments are very lightly used.

The WIA seeks implementation of this additional secondary amateur allocation and is hopeful of ‘early release’ for such an allocation. To that end, the WIA proposes the following additional amendment to the ARSP Frequency Allocation Table, along with an additional related footnote:

68 – 74.8 FIXED MOBILE except aeronautical mobile 149 175 177 179	68 – 72 BROADCASTING Fixed Mobile 173	68 – 74.8 FIXED MOBILE 149 176 179	70 – 70.5 Amateur AUSy
	72 – 73 FIXED MOBILE		70 – 74.8 FIXED MOBILE 176 149
	73 – 74.6 RADIO ASTRONOMY 178		
	74.6 – 74.8 FIXED MOBILE		

AUSy Operation of the amateur service in the 70.0–70.5 MHz frequency band is subject to the conditions of Radio Regulation No. 4.4. Operation of Australian amateur stations is on a secondary basis in the 70.0–70.5 MHz frequency band and is on the condition that harmful interference shall not be caused to stations of other services in Australia operating in accordance with the Radio Regulations. Amateur stations using the 70.0–70.5 MHz band shall not exceed a mean transmitter power of 25 W.

The suggested 25 W (*pX*) transmitter power is typically used by existing mobile stations and use of similar power levels by the amateur service presents little likelihood of interference to incumbent services in the adjacent frequency bands. In the event of interference to incumbent services, suitable geographic exclusion zones could be applied. The suggested power level also poses negligible electromagnetic emissions risk.

Proposed PRIMARY status for amateurs at 50-52 MHz

This issue has been raised previously in submissions to the ACMA’s Industry Partnerships Section in 2014 and more recently to the Communications Infrastructure Division.

The WIA notes that, in the years since the clearance of Channel 0 analogue television from the 45-52 MHz band, there is scant evidence of interest from other services in this area of the spectrum.

Raising the Amateur Service status to Primary would encourage greater interest and use of this band and facilitate more intercommunication as propagation experiments and published studies over the past decade have demonstrated that 50 MHz offers long-distance regional and world-wide propagation on more occasions than was previously believed, and is not altogether dependent on solar cycle conditions. An example of experiments is the use of Bi-static radar to identify propagation paths not normally expected using traditional methods.

The fact that unexpected long-distance propagation on 50 MHz occurs on many occasions mitigates against other uses of this sector of the spectrum, as was demonstrated when Channel 0 was operational.

Further proposed frequency band allocations

As foreshadowed in previous submissions and discussions with the Communications Infrastructure Division, the WIA is seeking further allocations as set out below. In view of the extensive considerations necessary to identify and address the issues involved, the WIA proposes that discussions surrounding the proposal continue over the coming year.

1. A secondary allocation within the 918-925 MHz ISM band.

This band is intermediate between the 70 cm and 23 cm amateur bands and offers different opportunities for experiments with technologies and propagation. In considering possible implementation, it would be advantageous for an allocation to overlap with those in NZ (921-928 MHz), and the USA and Canada (902-928 MHz). In seeking an allocation in this spectrum segment would be based on similar transmitter peak power levels that exist under the LIPD conditions.

2. Extension of the 1800-1875 kHz band up to 2000 kHz.

This spectrum segment is largely vacant of any identified licensed user and therefore access would benefit intercommunications by the amateur community in Australia with other regions that have access already. The WIA understands that, in this region, the former LORAN navigation systems have long since cleared the band, and that only a few ionospheric radar systems and some defence services have any interest.

3. Extension of the 3776-3800 kHz DX Window above 3800 kHz.

The purpose of this proposal, as with No.2 above, is to provide improved opportunities for intercommunications between fellow amateurs, particularly those in Australia's neighbouring countries in our region, as well as across the globe.

The WIA is aware that extending the DX window below 3776 kHz has difficulties owing to the high number of extant assignments between 3700 kHz and 3776 kHz, particularly to government and community services. Australian amateurs have demonstrated an awareness of this situation and have a good record of avoiding interference situations.

On 48 weeks of the year, there are contests – “radio sport” – that encourage and promote the use of the 1800 kHz band. Every month, there is a significant global contest, widely promoted and attracting popular support. On occasion, “crowding” on the 1800-1875 kHz band is evident. This is exacerbated when stations operate from rare locations (DXpeditions).

Likewise with 3776-3800 kHz DX window. However, the issues set out above regarding the 1800 kHz band are greater as there are many more contests and DXpeditions that involve the DX Window. Crowding is frequently reported. In addition, it is observed that many overseas amateurs expect to contact Australian stations outside the confines of 3776-3800 kHz.

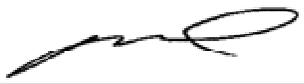
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Conclusion

Thank you again for the opportunity to respond to the proposed update to the ARSP. Should you have any points or questions in this submission that require clarification, please contact Mr Phil Wait, WIA President, via the National Office.

The WIA looks forward to the ACMA's response to all the stakeholder submissions, and the commencement of the new ARSP.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Phil Wait', enclosed in a thin black rectangular border.

Phil Wait
President