



## THE WIRELESS INSTITUTE OF AUSTRALIA

### Spectrum Options: 403 –520 MHz

### Submission in Response to Discussion Paper

#### Introduction

The Wireless Institute of Australia (WIA) welcomes the opportunity to respond to issues raised in the Australian Communications and Media Authority (ACMA) initial discussion paper Spectrum Options 403 – 520 MHz.

The Amateur Service has secondary status in the band 420 – 450 MHz, to the primary service Radiolocation, which is the Department of Defence - see Australian footnote AUS11 in the Australian Radiofrequency Spectrum Plan.

Of importance in this part of the spectrum is International Footnote 282, which provides, in part, “In the bands 435-438 MHz, 1 260-1 270 MHz, 2 400-2 450 MHz, 3 400-3 410 MHz (in Regions 2 and 3 only) and 5 650-5 670 MHz, the amateur-satellite service may operate subject to not causing harmful interference to other services operating in accordance with the Table ...”

The Amateur Service exists to meet the needs of the community for public access to the radio frequency spectrum for self-training, experimentation and self-development. These purposes clearly fall within the objects Radiocommunications Act (1992) particularly the object to:

*(b) make adequate provision of the spectrum ... 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 and licensing arrangements, see the *Radiocommunications Licence Conditions (Amateur Licence) Determination No. 1 of 1997* (the Amateur LCD).

To a large extent spectrum usage within Australia is aligned with the International Telecommunications Union Table of Frequency Allocations for Region 3. In the case of the Amateur Satellite Service or other "weak signal" activities, interlocking arrangements with

other countries and regions are required to protect these activities and satellites. The existing sharing arrangements in the band 420-450MHz, with Defence on a secondary basis is an example of a mutual sharing arrangement that has worked well over a great many years.

In the context of examining these spectrum arrangements, the WIA welcomes the additional tools for evaluating competing needs of other spectrums users and uses – the “Total Welfare Standard”.

The WIA is of the view that the use of the highest value is not necessarily the use by the person who is willing and able to pay the most. Accordingly, the WIA sees the “Total Welfare Standard” as a specific tool for evaluating social and community needs as an appropriate test. Of course, its value will depend on how the weighting factors will be derived and applied in each situation, and so complete transparency in the decision making process will be essential.

The discussion paper is seeking specific responses to questions raised in the paper. The WIA mainly limits its responses to those questions that are of primary interest to the Australian amateur radio community, but with some observations on some wider issues.

## **Background**

### *The Wireless Institute of Australia*

The Wireless Institute of Australia (WIA) is the national organisation of Australian radio amateurs; it is the peak amateur radio body representing their interests nationally and internationally. Founded in 1910, the WIA is acknowledged as being one of the first radio societies in the world, and is the oldest national radio society.

The WIA represents the interests of the Australian amateur radio community through formal liaison with the ACMA and, as necessary, other organisations and government bodies.

WIA appointees participate in the work of spectrum management, consultative and technical standards bodies such as:

- the IRAC Preparatory Group for WRC-07,
- the Australian delegation to WRC-07
- Australian Radio Study Group 5
- Standards Australia’s standards committees, and
- Radiocommunications Consultative Committee.

The WIA was one of the first 14 national societies to become a member of the International Amateur Radio Union (IARU), the amateur services representative body comprised of the national societies of each separate country or territory, representing the amateur and amateur satellite services and recognised by the International Telecommunications Union (ITU).

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

There is an IARU association in each of the three ITU regions across the world, and the WIA is a founding member of the IARU Region 3 Association.

### **Current Usage 420 – 450 MHz**

The band under review has a portion set aside in the Australian Radio Frequency Spectrum Plan, for use by the Amateur Service. The Amateur Service is a Secondary Service with Radiolocation (Department of Defence (Defence)) as the Primary Service. A portion of spectrum in the 420 – 430 MHz has been made available for Land Mobile use by Police and Emergency Services in certain defined geographic areas.

The spectrum 420 – 450 MHz is available (except for certain geographic exclusion areas) to approximately 15,300 licensed amateurs, depending on the class of licence held, as follows:

Advanced Station Licence:	420 to 450 MHz
Standard Station Licence:	430 to 450 MHz
Foundation Station Licence:	430 to 450 MHz
Repeater Station Licence:	430 to 450 MHz
Beacon Station Licence:	430 to 450 MHz

One aspect of the self regulation of the amateur service is that operation is ordinarily in accordance with Band Plans. Each of the three IARU Regional organizations adopt a Regional Band Plan. The WIA participates in the development of the Region 3 Plans and develops and publishes the Australian Band Plans, which are generally aligned with the Region 3 Band Plans. These plans are voluntary and provide guidance to operators in the selection of frequencies and modes of operation to avoid to the extent possible interference and to provide protection for low signal operation, including satellite operation. The WIA constantly updates these plans to meet changes in technology and contemporary usage.

Attachment A to this Submission is the Band Plan for that part of the spectrum relevant to this discussion.

Amateur repeater and beacon station very often share communications site facilities with other services and so technical data is recorded against each licence for coordination purposes (interference management). Associated two and single frequency fixed links are also recorded for coordination purposes. The current number of coordinated fixed links are:

- 420 - 423 MHz – 150 assignments;
- 430 - 432 MHz – 99 assignments; and
- 440 - 443 MHz – 290 assignments.

The statement in the ACMA discussion paper in respect to the band 440 – 450 MHz that use appeared to be light does not reflect amateur use in this band. In addition to fixed single and

two-way links the Band Plan provides an allocation for television experimentation at 443 - 450 MHz, now also allowing digital television.

Transferring this activity to a higher amateur band will may be a serious barrier to further development and at least will impose a considerable cost due to lack of suitable equipment.

### **Emergencies and Disaster Relief**

The WIA and radio clubs have established and maintain an extensive network of repeater based stations, associated links and interface arrangements throughout Australia. These repeaters and links extend through the Very High Frequency (VHF), Ultra High Frequency (UHF) and Super High Frequency (SHF) amateur spectrum bands. The prime band for linking purposes is the UHF spectrum where there is a ready availability of commercial link equipment that can be easily modified for amateur service use. Equipment in the higher bands for linking purposes is not easily obtained and is largely cost prohibitive. There are other factors including range, antenna design and tower loading that affect the overall costs.

These repeaters and fixed links extend the coverage of amateur operations, and are used in times of emergency or disaster relief operations.

The WIA draws attention to the statement by the International Telecommunications Union (ITU) Secretary-General, Dr Hamadoun I. Touré, in respect to the Amateur Service Recommendation ITU-R 1042 Disaster Communications in the Amateur Services. It recommends:

*“1 that administrations encourage the development of amateur service and amateur-satellite service networks capable of providing communications in the event of natural disasters;*

*2 that such networks be robust, flexible and independent of other telecommunications services and capable of operating of operating from emergency power;*

*3 that amateur organizations be encouraged to promote the design of robust systems capable of providing communications during disasters and relief operations;*

*4 that amateur organizations be allowed to exercise their networks periodically during non-disaster periods.”*

The WIA and its associated organisations, the Wireless Institute Communications Emergency Network (WICEN) and the Wireless Institute National Emergency Communications (WINEC) are in the process of building and enhancing this capability, with particular emphasis on independence from telecommunications services and the availability of alternative power sources.

## Recent Relocation Issues

In recent years, fixed links and repeaters in the 420 - 450 MHz band have suffered the aggregated effects of having to relocate equipment from the band 420 – 430 MHz and 433.05 – 434.79 MHz (LIPD) resulting from previous ACMA decisions. These exclusions have resulted in the relocation of some, but not all, fixed links into the band between 430 – 432 MHz paired with 440 – 443 MHz.

The amateur service by its very nature has limited capacity, the result of limited financial resources and reliance on technical capability from volunteers, to re-locate at short notice.

## Technology Advancements in the Amateur Service

The amateur service has participated in the transition from analogue to digital technologies. One example is the development of an open digital voice and data protocol called Digital Smart Technologies for Amateur Radio or “D-Star”. This digital voice with imbedded data capability uses 6.25 kHz occupied bandwidth on VHF and UHF (420 – 450 MHz) and 150 kHz data in high spectrum bands. A commercial amateur radio supplier has developed a self-contained repeater and linking system with readily available amateur land mobile equipment. There is also use of APCO P25 digital voice technology by amateur operators that is governed by equipment availability.

This technology is now in Australia, encouraged by the WIA and with repeaters being installed in the state capital cities with an Australia wide transportable demonstration/emergency repeater system available to meet various needs.

The amateur service in Australia is innovative and forward thinking with developments in Software Defined Radio, Digital TV, burst communications off meteor tails, the significant growth digital software for communications purposes that has spun off into commercial developments are yet a further examples of investigation and self- training in new radiocommunications technology developments.

The WIA, in response to applications for repeaters, has implemented “interleaving” arrangements in high demand spectrum locations, e.g. Sydney and to a lesser extent Melbourne, having regard for the fact that 12.5 kHz equipment is not readily available. The take up of digital narrower band equipment will occur over time.

## Discussion

The release of the discussion paper has triggered a considerable amount of interest within the amateur community. The paper poses a number questions that will take some time to work through, depending on a number of factors.

The amateur service in the band 420 - 430 MHz under the Australian Radiofrequency Spectrum Plan is a secondary service” and radiolocation (Defence) is the primary service. Any changes have a “knock on” or inter-locking affect on the amateur service within this band. The WIA acknowledges that the band 430 – 440 MHz is “out of scope” for the purposes of the review. The WIA notes however, that the band 420 – 430 MHz appears to be “in-scope” and therefore comments made in relation to 440 to 450 apply, with exceptions noted.

As mentioned, the amateur service with fixed links and repeaters in the 420 - 450 MHz band has suffered the aggregated effects of having to relocate equipment from the band 420 – 430 MHz and 433.05 – 434.79 MHz (LIPD) resulting from previous ACA/ACMA decisions. These decisions did not and still do not today acknowledge the costs for affected licensees.

The WIA stresses that the amateur service is self-funding and relies heavily upon volunteers and, to an extent, donations.

### Observations/Comments

The WIA accepts that for many licensees; the use of spectrum is a tool for their business and not a business in itself. The cost of restructuring of the UHF spectrum is high, and ultimately, a cost borne by the consumer. Restructuring the UHF spectrum could particularly affect the transport, building, retail, security and resource industry sectors. If restructuring of the UHF spectrum is not conducted in a fully informed and considered manner, and is inappropriate or unnecessary there will be an unnecessary cost to be borne by the community.

That is why the issues cannot be approached lightly or ignoring these pressures.

The WIA questions the real scarcity verses the paper exercise of counting the number of apparatus licences on issue. At the *Radcomms08* conference a presentation was provided by the ACMA that displayed a limited spectrum occupancy study of the 420 to 520 MHz band in Sydney that shows that there was very little use (white space) or occupancy that would indicate less than optimal spectrum use. Coupled with the potential to impose a “use it or lose it” condition of licences is the possibility of opening up more spectrum to meet the immediate and potentially long term demands. The WIA would suggest that, as occurred in the VHF band re-arrangements that took place 15 years ago, more occupancy studies are necessary in order to gain a more informed picture of spectrum usage. To determine the real use of the UHF spectrum, perhaps a pilot study/survey in spectrum congested areas to gauge licensees reaction to a “use it or lose it” licence condition would provide more information on licensee intentions.

The WIA view is that, as already said, Defence use and future arrangements need to be resolved first and secondly, that law enforcement agencies and other emergency services as major users need to be accommodated in a timely manner and question why the potential use of 380 – 400 MHz is excluded from scope of this exercise?

The WIA accepts that there is increasing demand for spectrum in this area and, indeed, the amateur community is also increasing its use of this part of the spectrum for a variety of purposes, some of which have already been described.

### **Amateur Service Options**

The WIA preferred option(s) would be to retain the spectrum 440 – 443 MHz (primarily fixed links), under an expanded sharing arrangement with similar services with options for geographic separation (use of exclusion zones) or compatibility of use, e.g. fixed links.

If shared use is not an option, that would need to be fully explained. But an obvious question would emerge, why not move to another band?

That is easier said than done! For example, to relocate the affected fixed links in the 440 – 450 MHz band to the next highest amateur band segment, the 1240 – 1300 MHz band, where again the amateur service is a secondary service, is not simple. The WIA has conducted some research on the availability of commercial fixed single and multi channel link equipment. There is no suitable readily available link equipment. This means extensive modification and developmental work requiring suitable resources and finance. Indicative costs based on commercial rates would translate to costs in the order of \$20,000 per link. Antenna and coaxial changes and rigging costs are estimated at an additional \$5,000 per site.

The other option would be to re-locate affected and future fixed links into the existing spectrum 430 – 440 MHz. This option potentially saves on equipment costs but would involve a complete re-plan of this spectrum. This re-planning (a major undertaking not dissimilar to what is being contemplated by the current discussions) and implementation would take a number of years to complete. Confining all future links within the 430 – 440 MHz band would pose extreme technical difficulties and expense. The existing voluntary band plan provides two link segments beginning at 430 and 440 MHz. Loss of access to a portion of spectrum above 440 MHz would leave no obvious way of accommodating a second link segment to allow for dual frequency links or room for expansion of the emergency networks. Again, neither the WIA, nor its associated radio clubs have the financial and other resources to undertake this activity on a short time scale.

The WIA points out that the amateur service, like most radiocommunications users, requires a degree of certainty in order to plan, organise, implement and use effectively its spectrum allocations. Spectrum security has been raised at recent international amateur forums.

The WIA now considers it now appropriate to flag its intention to seek “Co Primary” status in the 430-440 MHz and 1240-1300 MHz bands (or at least portions thereof). To the extent possible any Australian proposals will harmonise with other international organisation in negotiations with their respective administrations.

## Next Steps

The WIA notes that the ACMA, through the Radiocommunications Consultative Committee, is to form a Working Group to study the 403 – 520 MHz Options.

The WIA formally requests representation on this committee to represent the amateur and recreational user community as an affected party.

## Individual Responses to Questions

The WIA has provided responses to relevant questions in Attachment B.

The WIA is available to discuss the matters raise in our response. At this stage, the WIA seeks confidentiality for its responses.

This position will be reviewed once further consultation with the amateur community has been completed.

18 July 2000

For The Wireless Institute of Australia

A handwritten signature in cursive script that reads "Michael J. Owen".

Michael Owen  
President