THE WIRELESS INSTITUTE OF AUSTRALIA
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National Society of Radio Amateurs
(A Company Limited by Guarantee)

Founded 1910

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Director Planning
Planning Branch
Australian Broadcasting Authority
PO Box 34
BELCONNEN
ACT 2616

By email: planning@aba.gov.au

27 June 2005

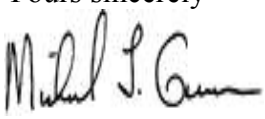
Dear Sir

Spectrum for Digital Radio

I enclose the Response of The Wireless Institute of Australia to the above Discussion Paper.

If the Authority seeks any additional information, please don't hesitate to contact me.

Yours sincerely



Michael Owen
President
The Wireless Institute of Australia

Response to the
Australian Broadcasting Authority

Discussion Paper

Spectrum for Digital Radio

May 2005

From the

Wireless Institute of Australia

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1 Summary

The ITU allocates the band 50-54 MHz to the amateur service in regions 2 and 3, and the band 47-68 MHz to broadcasting in Region 1.

Notwithstanding the ITU allocation, most significant administrations in Region 1 have allocated at least the band 50-52 MHz to the amateur service, and so the band, particularly the lower half has become a global and important allocation to the amateur service.

The band 50-54 MHz is of particular interest to the amateur service, because of the unique propagation characteristics of that part of the spectrum.

It is those characteristics that make the band unsuitable for broadcasting.

In Australia the 50-54 MHz band, allocated to the amateur service in Region 3, should be retained for and allocated exclusively to the amateur service once the existing Channel 0 transmitters are replaced.

2. Introduction

The Australian Broadcasting Authority (ABA) has issued a Discussion Paper dated May 2005, seeking submissions by 27 June 2005 on the issues identified in the paper, which basically addresses the possible bands for the introduction of digital radio, and in particular whether restrictions should be placed on the planning and allocation of broadcasting services in certain bands identified as candidate bands for digital radio.

The candidate bands identified in the Paper are the MF Band, VHF Band I and VHF Band III.

As is pointed out in the Introduction to the Discussion paper, the ABA will merge on 1 July 2005 with the Australian Communications Authority (ACA) to form the Australian Communications and Media Authority, (ACMA), and so, as is acknowledged in the Discussion Paper it will be the ACMA that will consider these submissions and make recommendations to Government.

While the present inquiry will be conducted in the terms of the Australian Communications and Media Authority (Consequential and Transitional Provisions) Act 2005, it is hoped that notwithstanding the separate functions of the ACMA in respect of telecommunications, spectrum management, broadcasting and datacasting set out in Division 2 of Part 2 of the Australian Communications and Media Authority Act 2005, the ACMA will be able to take a broader view of the totality of its functions and responsibilities than was possible when the BSB planning functions was a separate responsibility of the ABA.

3. The Wireless Institute of Australia

The Wireless Institute of Australia (WIA) is the national organisation of Australian radio amateurs, 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 ACA. WIA appointees participate in the work of spectrum management consultative and technical standards bodies such as:

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

For more than a decade, the WIA has conducted the radio amateur licence examination system on behalf of the ACA. Certificates of proficiency and licences are issued by the ACA.

The WIA was one of the first 14 national societies to become a member of the International Amateur Radio Union (IARU), the representative body recognised by the International Telecommunications Union (ITU). The IARU is a Sector Member in the ITU Radiocommunications Sector and actively participates in many meetings, in particular 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.

4. The band 50 – 54 MHz Internationally

The ITU Table of Frequency Allocations allocates the band 47-68 MHz to Broadcasting in Region 1, and in Regions 2 and 3, part of that band, 50 –54 MHZ is allocated to Amateur.

The allocation is subject to various footnotes affecting Regions 1 and 3, including Australia's footnote with China and the Democratic Peoples Republic of Korea of an additional allocation to broadcasting on a primary basis.

Notwithstanding the international band plan conditions, and recognising conformity with international allocations with the phasing out of Band I broadcasting in Europe, many European countries have made a 50 MHz amateur allocation. For example, in the UK the band 50-51 MHz is allocated to amateur primary, but on the basis of non-interference to other services outside the United Kingdom, with the maximum power of 400 watts, while the band 51-52 MHz is allocated amateur secondary, on the basis of non-interference to other services inside or outside the United kingdom and with a maximum power of 100 watts.

Other Region 1 countries allocating a band at 50 MHz to the amateur service along the lines of the United Kingdom include:

Andorra 50-52 MHz, Algeria 50-52 MHz, Austria 50-52 MHz secondary, Belgium 50-52 MHz secondary, Bosnia and Herzegovina 50-52 secondary, Bulgaria 50.05-50.20 MHz secondary, Croatia 50.0-51.9 MHz secondary, Cyprus 50-51 Mhz secondary, Czech Republic 50-52 MHz secondary, Denmark 50-52 MHz secondary, Estonia 50-52 MHz secondary, Finland 50-52 MHz secondary, France 50.2-51.2 MHz secondary, Iceland 50-52 MHz secondary, Ireland 50-50.5 MHz secondary, Liechtenstein 50-52 MHz secondary, Lithuania 50-52 MHz secondary, Luxembourg 50-52 MHz secondary, Malta 50-52 MHz secondary, Netherlands, 50-52 secondary, Norway 50-52 MHZ secondary, Poland 50-52 MHz secondary, Romania 50-52 secondary, Serbia and Montenegro 50-51.9 MHz secondary, Slovak Republic 50-52 MHz secondary, Slovenia 50-52

primary, Somali 50-54 MHz, South Africa 50-54 MHz, Spain 50-51 MHz and Switzerland 50-52 MHz secondary,

There is thus a general international recognition of the importance of the band 50-54 MHz to the amateur service, and in particular the lower part of that band.

5. The Importance of the 50 – 54 MHz Band to the Amateur Service

The 50 – 54 MHz amateur band is of considerable value to the Amateur Service because of its unique propagation characteristics. Propagation varies seasonally and with the 11- year sunspot cycle. Ionospheric propagation is very common, and this permits communication over extremely long distances using propagation modes such as E layer reflection, F layer reflection, and transequatorial propagation.

Many thousands of amateur stations worldwide are involved in propagation studies and experiments, and Australian amateur stations are also active in this area. From Australia it is common for amateur stations to conduct experiments with their counterparts throughout Asia and the Pacific. Communications with amateur stations in the Americas, Europe and the Middle East are also quite frequent during periods of high solar activity.

Interest in propagation studies in the 50 – 54 MHz is also illustrated by the existence of at least 200 propagation beacon stations that are operated as licensed amateur stations in many countries and territories.

The listing of the current beacons transmitters by separate country or territory is probably the best way of illustrating the extent of the use throughout the world by the amateur service of that part of the spectrum, between 50 MHz and 50.03 MHz.

The 69 countries and separate territories in that list are as follows:

Argentina, Ascension Islands, Australia, Austria, Belgium, Bermuda, Bosnia-Herzegovina, Brazil, Bulgaria, Canada, China, Costa Rica, Croatia, Cuba, Cyprus, Denmark, Ecuador, El Salvador, Estonia, Faroe Islands, Finland, France, French Guiana, Gabon, Greece, Greenland, Guadeloupe Islands, Hong Kong, Iceland, Indonesia, Israel, Italy, Japan, Kazakhstan, Lebanon, Lithuania, Luxembourg, Malawi, Malaysia, Mauritania, Mexico, Morocco, Nauru, New Caledonia, New Zealand, Norway, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Romania, Serbia & Montenegro, Slovenia, South Africa, Spain, St Kitts and Nevis Islands, Sweden, Switzerland, Tahiti, Trinidad, Ukraine, United Kingdom, United States of America, Venezuela and Yugoslavia.

For these experiments to be conducted successfully, it is essential that Australian amateur stations continue to have access to their present bands which are the

same frequency bands as their counterparts in other countries. In particular, the WIA wishes to stress again that the core frequency range for the experiments mentioned above is the low end of the band; that is the frequencies immediately above 50 MHz.

For many years after the introduction of television Channel 0, Australian amateur activity was confined to the band 52 – 54 MHz. This effectively isolated Australian amateur stations from those in other countries, for two reasons:

(1) The propagation characteristics of the 50 MHz band vary with frequency. It is quite common for communication to be possible on 50 MHz but not on 52 MHz.

(2) In virtually all other countries with a 50 MHz amateur allocation, the amateur band begins at 50.000 MHz; therefore almost all amateur activity worldwide is on this frequency. The majority of the propagation experiments mentioned above take place on frequencies between 50.000 and 50.500 MHz.

The importance of this portion of the 50 – 54 MHz band was recognised by the ABA and ACA some years ago when the Amateur Service was permitted to regain access to a segment beginning at 50.000 MHz, subject to geographical restrictions.

It should be noted that in Europe, where most countries have now authorised amateur activity on 50 MHz, that the allocated band in all cases begins at 50 MHz, not at 52 MHz.

6. Spectrum Requirements for Digital Audio Broadcasting

The Discussion Paper identifies Eureka 147 as the most available standard, but DRM as having significant advantages, and postulates the possibility of a dual standard DRM/Eureka 147 receiver.

The Discussion Paper even suggests that placing of restrictions on VHF Band I would send a signal of support to the DRM consortium to pursue extension of the DRM operating frequency!

What is clear is that at present there is no certainty as to which digital audio broadcasting system will be adopted in Australia. However it does seem clear that no matter which system is used, spectrum requirements would not be excessive. With digital television, a single 7 MHz channel can provide an HD video signal, four SD video channels, plus their sound channels and additional audio-only channels. Even with 200 kHz channel spacing as used in the FM broadcast band, a single 7 MHz TV channel would provide enough spectrum for 35 audio-only channels.

When the existing Band I television channels are cleared, this will free up a total of 21 MHz of spectrum. Of these 21 MHz, 2 MHz from 50 – 52 MHz fall within the internationally standard 50 – 54 MHz amateur allocation. This would still leave 19 MHz for reallocation to other services.

Of these 19 MHz, 14 MHz is available in one continuous band 56 – 70 MHz. As well as the obvious propagation advantages of these frequencies compared with 45 – 52 MHz, it would also seem logical that any Band I spectrum used for digital radio broadcasting should be continuous, rather than an allocation with a gap in the middle for the amateur band and other services operating between 54 and 56 MHz.

The use of existing TV channels 1 and 2 would potentially provide,

> If using Eu 147 DAB – at least 9 multiplexes which would provide 45 program streams, and
>
> If using DRM, possibly 70 to 700 program streams at quality equivalent to analogue FM.

7. The suitability of Frequencies below 56 MHz for Broadcasting

The WIA contends that the use of VHF Band I, especially below 56 MHz, for broadcasting purposes is not appropriate and has been demonstrated to be not successful.

One reason is the very propagation characteristics that make frequencies around 50 MHz attractive to radio amateurs for experimental purposes make that same spectrum unsuitable for effective interference management for broadcast use.

Interference problems between Channel 0 television stations have been well documented. These problems can occur over distances of 2000 km or more, and there have been occasions when viewers have observed serious interference from interstate Channel 0 stations. There have also been examples of interference between Channel 0 stations (45 – 52 MHz) and their counterparts in New Zealand (44 – 51 MHz).

8. Conclusions

International harmonisation is desirable, both technically and economically, particularly below 56 MHz, because frequencies in the 50 MHz region are capable of propagation over extremely long distances. It is undesirable for Australia to maintain non-standard frequency allocations that can result in interference between different services in different countries.

The WIA recommends that Australia should align its frequency allocations to the maximum extent possible with those of other countries. The WIA recognises the arguments that could lead to the use of Band 1 frequencies for digital sound broadcasting. Because of the long-distance propagation effects that regularly occur on frequencies below 54 MHz, the WIA proposes that any Band 1 allocation to sound broadcasting be restricted to the frequencies presently occupied by TV channels 1 and 2 (that is, 56 to 70 MHz).

In this event, the WIA seeks allocation of the band 50-54 MHz to the Amateur service on a primary basis once the existing Channel 0 transmissions are discontinued.

27 June 2005