

## **WIA Repeater and Beacon Policy Review – Comments to Draft Policy**

In August 2014 the WIA released a draft Repeater and Beacon Licence Recommendation Policy for comment. The draft policy attempted to strike a balance between the principals of good spectrum management, (the minimisation of cross-interference between repeaters), and the experimental nature of the amateur service and its inherent need for flexibility. The WIA encouraged all interested persons, and clubs, to review the draft policy, and forward any comments to the WIA by the 1st November, 2014.

This document summarises the responses received. A revised policy is attached and the WIA also intends to develop a Guidelines document to assist repeater and beacon owners who wish to apply for a licence.

### **ACMA Advice**

As part of the review process, the WIA consulted with the ACMA. After review by their legal team, the ACMA provided the following requirements:

1. An application for a licence is not considered an application until it is received by the ACMA. All applications must be submitted to the ACMA.
2. The WIA can provide a service to Amateurs if it wishes, where it advises on “prospective” applications and then forwards the application to the ACMA if the applicant agrees.
3. An applicant always has the right to submit a repeater and beacon application directly to the ACMA without WIA involvement.
4. The ACMA will generally seek advice/comments from both the applicant and the WIA before making a decision on a repeater application or variation.

#### **WIA Comment**

The requirements of the ACMA are not new, and have been the position for many years. However, the practice of WIA repeater and beacon coordinators has been to negotiate any recommended changes with licence applicants and then to modify the application on their behalf prior to lodgment with the ACMA. This practice avoided unnecessary delays in lodging an application which would better conform to WIA policy and custom in existence at the time.

Recently, a formal complaint to the ACMA questioned the legality of the WIA practice, and the fact that a coordinator would not agree to the full 120 Watts limit as specified in the amateur LCD.

The WIA and the ACMA subsequently re-examined the practices of the repeater and beacon coordination service, and after legal examination, the ACMA advised the WIA that a licence application cannot be modified on behalf of the applicant. Rather the applicant must lodge a revised and signed application themselves, either through the WIA service or directly to the ACMA.

As WIA coordinators still perform much of the work, a repeater and beacon licence application lodged through the WIA will still benefit from the reduced application fee.

However, an anomaly exists where an application may be submitted in the first instance through the WIA service in order to take advantage of the reduced fee, and then subsequently lodge an appeal with the ACMA. The applicant could then effectively ignore any WIA recommendation, including the frequency recommendation in accordance with the Amateur Bandplan, but would still benefit from the reduced fee structure by lodging through the WIA service in the first place. Clearly this would have implications for the Amateur service in not conforming to established amateur bandplans and potentially causing interference with other band users, and also for the ACMA because they would be expected to do a lot more work for the same concessional fee.

In light of the advice from the ACMA, the lack authority attached to any WIA recommendation, and the above deficiency, the value of continuing with the WIA repeater and beacon coordination service is questionable. The WIA has received advice from one volunteer coordinator that he is unable to continue in the role under these arrangements.

### **Comments received from WIA Affiliated Clubs/Groups**

A submission was received from the West Australian Repeater Group (WARG). WARG has given permission for their submission to be published in its entirety. The WARG submission is attached.

### **Comments Received from Individuals**

Comments were also received from the following individuals: Paul Hadlow VK2PNH; Will McGhie VK6UU; Grant Willis VK5GR; Rob Milliken VK1KRM; Peter Kohlmayer VK4LC; Anthony Benbow VK6AXB.

The salient points below have been extracted from the submissions received, and WIA comments to the various discussion points are included.

The WIA thanks all those who have contributed.

#### **Submission extracts:**

.....I'm currently going through the process of getting a repeater licence myself I can say I've had no real complaints about the process in general. At the start I did find the process to be very slow and I felt it wasn't going anywhere and at times I wondered if it would ever happen even got to the stage of forgetting about it all together.....,had the process explained to me I now understand why things take time.

I don't see any problems with the draft ... for my level of understanding. I think we do need to make sure that frequency pairs are issued correctly and not wasted. For me out in rural NSW I don't have the

issues facing those in the cities where there is almost a repeater on every corner. I think it is very important to be able to re-use frequencies and a sensible approach to power levels. I don't see the need to use 100 watts in the cities but out in the country or rural areas could be justifiable..... the extra power might have been good for coverage to the north of the town.

**WIA Comment**

The repeater licence application process often takes longer than anticipated. Hopefully a clearly announced policy with clearly defined regulatory requirements will minimize future delays. The draft policy allows for higher transmitted power when geographic factors permit.

**Submission Extracts:**

*Quote from Draft Policy:*

*"This policy primarily covers repeater and beacon licence applications. IRLP and APRS services in many cases do not require individual licensing. However, due to the varying ways in which these services are operated, individual licensing may be required, especially for unattended operation.*

*Due to the increasing limited amount of spectrum available for repeaters and in some cases beacons, the WIA will apply the same principals regarding frequency allocation and spectrum reuse to IRLP and APRS systems. The WIA will work with individuals, clubs and the ACMA to ensure that when licensing is required it is done so in the most practical and cost effective way".*

.... the WIA appears to infer that IRLP and APRS services, if operated in unattended mode, need a separate licence. While I may accept that IRLP and Echolink nodes may fall into that category (although I think it is a highly grey area of the LCD) I absolutely do not accept that the operation of unattended APRS Internet gateways requires any form of special licensing. Unattended operation of AX.25 packet radio services has been permitted by amateurs for well over 20 years. To me, trying to suggest that it is otherwise is grossly misleading. There is no extra provisions in the LCD that dictate unattended internet linked APRS services where the inputs and outputs of those services can only contain traffic from licensed amateurs needs any form of separate apparatus license or frequency coordination.

I suggest this paragraph be deleted or at least substantially reworded. It does not belong in a policy document dealing with repeater and beacon band plan coordination when the policy of unattended IRLP and APRS has not itself been clarified.

**WIA Comment**

Unattended operation of IRLP and APRS services could become an interference risk if the numbers of systems become significant. Unattended operation of amateur stations is likely to be reviewed as part of the remake of the amateur LCD.

This item could be included in a WIA Guideline document.

*Quote from Draft Policy: Para 8 reads:*

*"Applications for a repeater or beacon licence may also be made directly to the ACMA. It should, however, be noted that the ACMA may charge a different application fee for processing these applications."*

.....Direct recourse to ACMA is not in the amateur service interest as the ACMA has no standards against which to carry out the frequency coordination task within the amateur service. .... Indeed if they apply commercial standards for re-use the WIA objections may be overruled by ACMA as they may apply much looser standards (take for example the re-use distances on UHF CB where channels appear to be reused within 120-150km - far less than most amateurs would wish).

My suggestion for this paragraph is to delete it and replace it with something more along the lines of "the WIA is committed to providing a dispute resolution path via the board when an applicant is unable to agree terms with the WIA repeater frequency coordination committee." If you are serious about handling these disputes, and feel that ultimately the WIA sees a need to offer recourse direct to ACMA, then at least make sure that ACMA is prepared to accept this (in the past they weren't) and have an agreed separate set of technical standards lodged with them against which any future coordination could be carried out. As it stands, the current paragraph may in fact be inoperable.

#### **WIA Comment**

Refer to the advice received from the ACMA

#### **Optimise frequency re-use**

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The reference to power limits is unclear. Is the WIA referring to TX power into the cavities, Tx Power into the antenna or Effective Radiated Power taking account of antenna gain and all system losses? If the power here is referencing anything other than ERP then it is completely open to challenge and shows a complete lack of technical understanding of the frequency reuse problem. Capping power without capping antenna gain or allowing for operators who may have more lossy cavities than some all show a lack of technical merit to the polity statement. This section either needs to be tightened up to become a meaningful measurable limit with some engineering basis (as site elevation has an equally large impact on the problem as does local repeater operator's tolerance for intermittent tropospheric ducting on this issue).

Ultimately, this polity point really needs to deal with setting repeater re-use spacing, considering how to do that considering all factors such as ERP, Height above Sea Level (and mean ground level in an area) and the applying and existing co-channel service operator acceptance/tolerance of tropospheric ducting. Statements around a percentage of time that uplink and downlink interference from tropospheric ducting should have been included here. Zeroing in on only trying to restrict repeater TX output power shows a lack of thought has been put into the spectrum engineering aspects of band planning.

## Co-Existence with commercial services

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This would appear to be outside of the WIA's realm of responsibility. The WIA is there to ONLY coordinate the amateur band plan. The WIA repeater frequency coordinators are not official ACMA frequency assigners and therefore have not been accredited to determine site compatibility requirements.

When licensing an amateur radio repeater service that intra-site coordination is still being left to ACMA as I understand it as the accredited body, and they only check that the new amateur transmitter will not interfere with the commercials. ...

Having said that, I believe it is worthy however to seek to consider a proposed repeater's operating frequency against the likely intermodulation and harmonic relationships it might encounter against other commercial transmitters and receivers at a combined site. The view here would be that in undertaking these calculations, the WIA is seeking to maximise the chance of a successful license being granted by the ACMA with minimal disruption possible to the amateur service repeater. A more appropriate wording of Point 2 would be:

" Many amateur repeaters are located on shared sites close to commercial services. The WIA will seek to undertake as far as practical intermodulation and harmonic interference desktop studies of such sites when an application is made, with a view to not only selecting a band plan frequency that maximises frequency re-use within the amateur service, but also maximises the probability of the amateur service successfully co-habiting with neighbouring co-sited commercial and government services"

To implement this will require the WIA repeater coordinator committee to have suitable training and software systems that allow them to undertake said calculations.

### **WIA Comment**

The practice of the WIA repeater and beacon coordinators has been to ignore all path characteristics, filter and transmission line losses, and antenna characteristics. Most amateur repeater stations use low-gain antennas.

The information required to be submitted in order to complete a more detailed analysis may be difficult to obtain for amateur repeater operators.

The WIA (as an organization) does not possess the tools to perform a more detailed analysis, (although our repeater and beacon coordinators may possess the skills, their access to the software tools may be dependent on their employer). It is also, frankly, beyond what the WIA is prepared to ask of its volunteers. The WIA does not currently provide any funding to the service, other than reimbursement of out-of-pocket expenses.

A detailed analysis of intermodulation and harmonic interference is also outside the current scope of the WIA repeater and beacon coordinator service.

In the WIA's view, if a more detailed and professional analysis is required, it would best be performed by a specialist organization.

The WIA intends to develop a Guidelines document to assist repeater and beacon owners wishing to apply for a licence.

### **EMR Compliance**

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While EMR compliance is a very important aspect of operating fixed services especially at community sites, it has never been the responsibility of the frequency assigners in the commercial world that I am aware of. It is very much the responsibility of the site owner/operator however. The WIA in requiring any evidence of EMR compliance is potentially opening itself up to more legal exposure than it needs to, as it is the licensee not the frequency assigner who bears the responsibility. If the WIA requires this documentation it could be construed by the operator that the WIA is endorsing this EMR documentation as provided. As the WIA is not a qualified EMR assessor this entire point should be dropped in its present form. Tying it to transmitter power exceeding 100W is simplistic in the extreme and could in fact be considered dangerous. Powers as low as 10W could exceed the standards if the antennas are mounted too close to ladders or if the cumulative site EMR considering all transmitters on a site is exceeded at any point on the tower or on the ground at any power level. The point as it stands in the draft policy seems again to take a very narrow view in that it only targets high power repeaters, to the exclusion of all of the other potential EMR risks on a site.

If however the board feels that it is worthy to mention EMR, then a statement more along the lines of the following is suggested:

"The WIA strongly recommends to all repeater constructors/operators that they carefully assess their EMR compliance requirements and remind site owners that they are responsible for their own transmitter's compliance with the EMR regulations in force at the time."

### **WIA Comment**

Agreed. A similar statement has been included in the draft policy.

### **Band plans**

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.....Point 4 in the policy itself needs to be slightly softened to allow for band plans to be used as a guide only when unusual experimental applications are presented for frequency allocation.

### **WIA Comment**

Agreed. The draft policy now includes the word "generally"

### **Power of Repeaters**

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...Regulating the power of repeaters or limiting them to "commercial practice" immediately takes away any experimental aspects of a repeater system design. The purpose shown in the WIA paper of trying to regulate power was because of fears of EMR, or of frequency re-use or site compatibility.

- a) As stated above, the EMR case is something that the WIA should not be attempting to take any responsibility for in terms of providing "approval".
- b) The frequency re-use argument is totally moot when you don't also consider antenna gain and system losses. If you limit the TX power to 50W but don't cap antenna gain, it is feasible especially on 70cm or above to build antennas with say 6-9dBi gain, making your 50W signal look like 200-400W ERP. Any policy should discuss this in terms of frequency re-use and ERP limits giving due consideration to repeater location, location ground height vs. surrounding mean ground height and tower height, coupled with some targets for percentage of time that tropospheric interference will be accepted. Anything else ultimately is ineffective and lacking in any sound engineering basis.
- c) High power and site compatibility can be an issue, but is one for the ACMA to assess as the WIA role is purely one of intra-amateur spectrum coordination not intra-site cross service coordination. The WIA is outside of its brief to be trying to "regulate" this aspect of repeaters. This is not to say the issue is not important either, which is why I suggested some wording in the policy considerations section above. The WIA should "guide" but not dictate. It should provide technical assistance and be a source of information for repeater constructors, not appear as a regulator. Unless it does that, I fear it will lose the respect of the amateur service in this country.
- d) Applying land mobile standards is again an unclear point. Seriously if you want to do this then quote the actual standards you are going to apply, and then show due cause why the standards should be followed, and accept that in the spirit of experimentation that at times following those standards is not appropriate. As it stands, it is not something I can support in a WIA policy with the wording as presented.
- e) One aspect of repeater transmit power that should have been dealt with is that of building repeaters that do not have equal transmit and receive coverage characteristics. The WIA should provide as a guiding technical policy the goal of all repeater operators to design their systems such that they have balanced path loss link budgets in both the mobile -> repeater and repeater -> mobile directions. In the case of FM voice systems this should assume that a 25W mobile station can equally access and hear the repeater at an equivalent signal level in both directions. Heavily uplink (mobile -> repeater) limited duplex system designs are to be discouraged as they only result in excessive downlink signal being radiated which degrades frequency re-use. If you want to limit repeater output power, this is by far the more fair and reasonable measure to place on these systems. A 25W mobile can only access a 100W repeater if the repeater's receiver has a 6dB better noise figure than the mobile receiver - no small engineering feat. Of course, there is a contrary approach to this if independent voted linked receive sites are used which is the classic case of a power limit on the transmitter not making sense.

**WIA Comment**

The WIA may recommend a particular power level, but is required to forward a repeater application to the ACMA without modification.

The principles discussed by the responder could be included in a Guidelines document.

For repeater and beacon stations wishing to use high-gain antennas, the Guideline document could include some simple easy to use tables or a calculator for antenna gain, height, transmission line loss and recommended power, etc.

### **Spectrum Availability**

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The determination of the "point at which spectrum is not available" should be explained and a method for calculating the same should be supplied or this point is open for dispute. Within the amateur service, a statement like "under median propagation conditions, two repeaters should not be allocated to the same channel such that on any part of their respective coverage areas a user transmitting into one repeater will more than 10% of the time cause both repeater transmitters to activate". If no channels can be found for the proposed repeater location that satisfy this requirement then it shall be agreed by all parties that there isn't any spectrum available in that location.

### **WIA Comment**

This principal could be included in a Guideline document. Finding a method for determining "median propagation conditions" and "10% of the time" could be problematic.

### **Portable Repeaters**

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Again the WIA is trying to limit output power without any real substantial justification. When issuing licenses for these, if there is a fixed repeater somewhere in the state where the portable repeater is allowed to operate, then a geographic exclusion zone should simply be included on the portable repeaters license stating it is not to operate within (perhaps) 150km of repeater X? This would be a far more effective solution rather than trying to cap the portable repeater output power.

### **WIA Comment**

Partly agreed. Portable repeaters are often used for WICEN activities, especially during emergency and community support events. Deployment may be at very short notice and it is not practical to geographically limit their use.

The draft policy has been modified to treat portable repeaters on a case-by-case basis.

### **Amateur Beacons**

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This could have gone further to state that the WIA will seek to provide a national clean frequency for all beacons above 50MHz as far as practicable.

### **WIA Comment**

Beacons are provided a national frequency as part of the bandplan arrangements. The WIA makes recommendations consistent with the Amateur bandplan.

## Conclusion

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Overall there are a number of good points in the policy, but there are also a number of mis-guided statements that all appear to be targeting solving a complex problem through one mechanism alone. This makes the policy appear "amateurish". There are other issues as well that the policy is completely silent on. It should have included a statement to try and manage the issue of spectrum squatting, i.e. where a licensee holds a license to a service that is off the air for an extended period. All licensees should be encouraged to either maintain continuity of service or if after 12 months of no service, be prepared to consider relinquishing the license on request if a new applicant in the area wishes to build a replacement service. If the original applicant is un-contactable, then if after 2 years of no service being active, the WIA should be prepared to license a new system (if requested) on the original channels in the same area, forcing the original applicant to reapply for an allocation. Spectrum squatting is particularly a problem with the very scarce ATV channel allocations on 70cm and 23cm.

The policy should also provide a statement on how the WIA would manage existing active allocations in the event that the band plan needs to be revised. The amateur service is going to continue to face pressures relating to what spectrum it can access and this will be an ongoing problem for the WIA and the repeater network operators over the next 5-10 years.

In conclusion I feel that the policy is very short sighted, lacks technical depth, fails to address many areas where appropriate guidance could have been given and is written in a style that attempts to be very "regulatory" when that is not the role of the WIA. As it stands, I could not support the policy.

### **WIA Comment**

In regards to spectrum squatting. As long as a licensee continues to pay licence fees they have a legal right to use the assigned frequency. Squatting is a matter for the Department of Communications to consider as part of the current Spectrum Review. The WIA has raised the issue in its submission to that review.

In regards to the policy lacking depth and appearing "amateurish": as stated previously, the WIA (as an organization) does not possess the tools to perform such a detailed analysis, (although our repeater and beacon coordinators may possess the skills, their access to the software tools may be dependent on their employer). It is also, frankly, beyond what the WIA is prepared to ask of its volunteers and the WIA does not currently provide any funding to the service, other than reimbursement of out-of-pocket expenses.

The WIA is not aware of significant incidences of cross repeater interference, and to our knowledge any past incidences have been quickly resolved.

Although there is always scope for improvement, and this review is an attempt in that direction, the process appears to have served amateur radio well in the past.

### **Submission extracts:**

..... I fully concur with .... Comments (about) repeater Tx Rx reciprocity, the blurring of the boundary between site engineer/manager, spectrum co-coordinator and frequency assigner.

All too often as a site manager I was forced to make decisions involving organisations with multiple assignments and no services on site vs. an organisation requiring a single assignment for an immediate requirement. Clearly a classic example of frequency assigning having no regard for the practical constraints of site engineering (antenna, Rx and Tx multicoupling and max Pwr).

Yes we need to be cognisant of commercial practices and standards and employ best practices when it comes to site engineering but no organisation can successfully run with the hares and hunt with the hounds.

..... the WIA repeater policy should (in my view) provide a framework to guide aspirants for a repeater service to best manage the frequency of choice to fit with :- the ARS band plan (including reuse radius); ARS spectrum efficiency (assignment vs. active service); individual site engineering practices and standards (e.g. antenna, feeder, multi-coupling, service area coverage, reciprocity etc); collocation with other site services; and (if required) technical guidance for best performance on busy sites. One such issue is selectivity vs. sensitivity on commercial sites with a potentially high Rx noise floor.

#### **WIA Comment**

As stated previously, the WIA (as an organization) does not possess the resources to perform detailed analysis, (although our repeater and beacon coordinators may possess the skills, their access to the software tools may be dependent on their employer), and the WIA does not currently provide any funding to the service, other than reimbursement of out-of-pocket expenses.

Naturally, the WIA could make a decision to provide an expanded level of service, but the cost would need to be recovered from repeater operators.

### Submission extracts:

This draft is what (the WIA) already practice, but never told anyone before. It is not a draft. It is their existing policy.... Where is the quality control on this document?.... The bacteria in the bottom of a septic tank could run the show better than these idiots.

#### **WIA Comment:**

The draft was intended capture the existing policy.