

Response to the
Australian Communications Authority

Discussion Paper

**The Management of Interference from
Broadband over Power Line Applications**

April 2005

From the
Wireless Institute of Australia



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Wireless Institute of Australia

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1.0 Executive Summary

WIA policy on broadband telecommunications (s2.3)

The WIA supports the development of broadband access and competitiveness in Australia.

However, the WIA is concerned that any systems deployed should not result in detrimental impacts on existing users of the radiofrequency spectrum, the operation of other telecommunication services and electrical or electronic equipment.

In particular, existing and future users of RF spectrum should not have to shoulder the burden of the detrimental effects arising from radiofrequency interference (RFI) generated by Access BPL systems where that interference substantively exceeds the local RF noise environment, or spectrum noise floor, generally encountered or expected by spectrum users.

The WIA supports the development of policies and regulations by the ACA that protect all existing spectrum users from the substantial RF interference that Access BPL systems demonstrably produce.

WIA position on BPL interference (s3.1.2)

The WIA believes that existing and future Amateur Service licensees should not have to bear the burden of detrimental effects arising from interference to their legitimate activities generated by Access BPL systems where that interference substantively exceeds the local ambient spectrum noise floor generally encountered or expected on any Amateur band allocated in the Australian Radiofrequency Spectrum Plan.

In addition, recognising that Access BPL systems are susceptible to RF interference, the WIA advocates that radiocommunications licensees (including radio amateurs) should be exempt from action by a BPL provider over RF interference to a BPL system, where the licensee is operating in accordance with their licensing conditions.

WIA position on interim guidelines for BPL trials (s3.2.5)

(a) Notice of trials

The WIA believes the information from BPL trial operators *must* be provided to the ACA at least *28 days* in advance of the date for a trial, and that the ACA should publish the information on their website *within 7 days of receipt*. In clause 3(a), the WIA believes the word 'should' needs to be replaced with *must* to maintain the intent of the guidelines.

(b) Identification of Radiocommunication Services

Licensed radiocommunications services within 2.5 km of power lines proposed to carry Access BPL signals must be reliably identified. To ensure thorough analysis, the WIA believes Access BPL operators should be required to request from the WIA a list of amateur radio stations within the trial area.

The WIA would like to draw attention to the fact that there are a large number of radio services operating under the LIPD Class Licence which would not be identified in a licence search, as well as an unknown number of shortwave broadcast listeners. The WIA believes the interests of all stakeholders would be served if BPL trial operators were also required, at the very least, to advertise prominently in print media serving the trial area.

(c) Consultation with Licensees

The WIA believes that Access BPL operators must be required to contact, in writing, identified radio services within 2.5 km of the trial area and give at least 60 days advance notice of a proposed trial.

(d) Obligations of BPL trial operators

When notified of an interference complaint, the BPL trial operator should be obliged to work with the complainant, and/or the complainant's representative/s, to investigate such complaints and take timely, effective action to mitigate the interference to a specified or satisfactory extent during the operation of the trial.

Recognising that Access BPL systems are susceptible to RF interference (ref 13), the WIA believes BPL operators must be obliged to accept this technical flaw. As a consequence, BPL operators should have no recourse to action against radiocommunications licensees (including radio amateurs) over RF interference to a BPL system, where licensees operate in accordance with their licensing conditions.

WIA position on the obligations of BPL operators to consumers (s4.2)

The WIA believes that alerting consumers should be an essential obligation for BPL operators. The means and methods would need to be appropriate and effective from the consumers' perspective. At the very least, advertising in local media should be required. Licensed spectrum users should be alerted by BPL operators individually, in writing (see Section 3.2.5). BPL operators should be obliged to investigate interference complaints and take timely, effective action to mitigate interference to a specified or satisfactory extent.

WIA position on the importance of regulatory certainty (s5.1.1)

The WIA believes regulatory certainty is important both for BPL operators and stakeholders. Affected stakeholders and BPL operators alike must be certain of:

- definitions and interpretations in regulatory instruments,
- processes and protocols in the application of regulations,
- the ability, probity and conscientiousness of the regulatory agency to act,
- the consequences of the application of regulations, and
- clarity as to the outcomes of regulatory action.

Regulatory certainty would be strengthened by including new provisions in the Radiocommunications Act to give holders of Apparatus licences, and perhaps Class licences, appropriate rights of civil action against people not only causing interference from a radiocommunications device, but any device (see comments at Section 3.2.4).

In addition, recognising that Access BPL systems are susceptible to RF interference (ref 13), the WIA believes regulatory certainty would be strengthened also by including provisions that:

- require BPL operators to accept this technical flaw, and
- exempt radiocommunications licensees against action from a BPL operator over RF interference to a BPL system, where licensees operate in accordance with their licensing conditions.

WIA position on industry management of BPL interference issues (s5.2.1)

It is clear that BPL industry management of interference (ie. industry self-regulation) would be problematic, being fraught with conflict of interest and dominated by commercial concerns.

The WIA opposes management of BPL interference issues solely by an industry body.

Additionally, the WIA advocates that conditions imposed on BPL operators include 'network shut down' requirements that provide for:

- shut down of part or the whole of a BPL network for a brief temporary period, for the purpose of interference identification; and
- shut down of part or the whole of a BPL network to eliminate interference causing substantial economic loss or danger to life.

WIA position on the adoption of a BPL standard and other approaches (s5.3.1)

Recognising the evident difficulties in determining a wholly standards-based approach, the WIA proposes a combination of:

- a formal, mandatory Australian standard relating to BPL emissions,
- an industry code for the operation of BPL systems, and
- specific regulatory requirements under appropriate Australian acts.

The WIA notes that existing models for this approach are found in telecommunications industry regulation.

WIA position on developing a code or guidelines (s5.4.1)

In the event that development of an industry code or guideline is proposed, the WIA advocates:

- that the regulator (ie. ACA/ACMA) would thus be the most appropriate body to oversee development;
- the adoption of established government practices for open, transparent and participative consultation;
- that compliance with a code or guidelines must be mandatory in relation to issues of identification, acknowledgment and resolution of interference problems.

The WIA believes the content of such a code or guidelines should cover, at the least:

- identification of interference to other services and equipment from BPL systems;
- acknowledgment by BPL operators of interference complaints, whether from individuals or stakeholder groups;
- a clear and transparent methodology for identifying , measuring and reporting the detrimental impacts of BPL interference;
- clear, transparent processes for resolving interference issues;
- appeal to the regulatory agency in the event resolution of interference issues fails.

WIA position on imposing licensing, conditions and fees (s5.5.1)

The WIA supports the application of appropriate provisions to regulate the operations of BPL systems and operators, without unreasonably impeding trials or the legitimate rollout of BPL systems.

In regard to licensing BPL systems or operators under the Radiocommunications Act, the WIA seeks clarification from the ACA in respect of under what definition a BPL system might fall. The WIA accepts that it would be necessary to amend the Radiocommunications Act if it was resolved to licence BPL systems or operators under that Act.

The WIA would support the regulation of BPL through carrier licensing under the Telecommunications Act.

Regardless of the licensing regime, the WIA believes licence conditions should include, but not be limited to:

- requirements to notify in advance consumers, licensees and other services of the intention to deploy a BPL system;
- technical prescriptions to limit conducted and radiated emissions causing interference to other devices and radiocommunications services and users;
- obligations to mitigate interference to others (see sections 3.2.5 and 4.2);
- a requirement that BPL operators accept susceptibility to RF ingress as a technical flaw inherent to BPL systems; and
- exemption for radiocommunications licensees against action from a BPL operator over RF interference to a BPL system, where licensees operate in accordance with their licensing conditions.

WIA position on regulating in-house BPL devices and systems (6.1)

The WIA believes that it would be in the interests of all stakeholders for the ACA to facilitate the development of an interim standard for in-house BPL devices and systems. This would act to reduce the risk of interference to radiocommunications equipment and services occurring.

It is our view that this interim standard set the maximum permitted electromagnetic emission levels to fall within current CISPR 22 requirements for IT equipment, at the least, or at levels that may be anticipated to be adopted under the amended CISPR 22.

The WIA does not support the ACA's Option 1 – Do nothing and monitor international developments, or Option 2 – Adopt the FCC's standard.

2.0 The Wireless Institute of Australia

The Wireless Institute of Australia (WIA) is the peak membership organisation representing the interests of licensed amateur radio operators in Australia. Founded in 1910, the WIA is acknowledged as being one of the first amateur radio societies in the world.

As radio amateurs are required to be licensed under the Radiocommunications Act, a major role of the WIA (www.wia.org.au) is representing the interests of the Australian amateur radio community through formal liaison with the Australian Communications Authority (ACA). Appointed representatives from the WIA also 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.

2.1 International affiliation and representation

The WIA is the Australian 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, the regular World Radiocommunications Conferences (WRCs), and their forerunners.

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

The ITU coordinates telecommunications internationally through its Constitution, Convention and Administrative Regulations, which include the Radio Regulations. ITU agreements with member countries have treaty status, including the Radio Regulations.

The WIA has also participated in the Australian Preparatory Groups for the WRCs and provided members for the Australian delegations to these conferences.

2.2 Involvement with community emergencies and events

State and territory based Wireless Institute Civil Emergency Network (WICEN) organisations (www.wicen.org.au) serve to coordinate radio amateurs for volunteer service to the community providing communications during emergencies where safety of life and property may be at stake.

Each of the eight WICEN organisations has formal links with the various emergency services and authorities in their regions, and operate as autonomous bodies under the relevant disaster or emergency response plan.

The radio amateurs involved volunteer their time and use their own equipment and individual expertise, without reward. They provide emergency service authorities with an invaluable communications resource that is not otherwise immediately available in a community emergency, or to provide additional resources where and when required.

WICEN groups have been involved in providing communications support for many major bushfire emergencies, floods and other natural disasters.

With the ability to use a wide range of frequency bands extending from MF (1800 kHz) through the HF bands (3-30 MHz) and VHF/UHF bands, with portable equipment suited to deployment in the field, the flexibility and facility afforded is not usually available to other services.

The valuable work of WICEN volunteers has been recognised by the federal Parliament's Senate Standing Committee on Industry, Science, Technology, Transport, Communications and Infrastructure (ref. 1).

Each of the various WICEN organisations conduct regular activities to maintain the preparedness of members. Many of these exercises provide communications in support of community activities, such as canoe marathons, car rallies and other major sporting and community events. More than 100 such events each year are supported by the various WICEN organisations across Australia.

From time to time, individual radio amateurs have provided communications in response to natural disasters, most notably following Cyclone Tracy, the Boxing Day tsunami of December 2004, and maritime incidents during severe storms, for example.

2.3 WIA policy on broadband telecommunications

The WIA supports the development of broadband access and competitiveness in Australia.

However, the WIA is concerned that any systems deployed should not result in detrimental impacts on existing users of the radiofrequency spectrum, the operation of other telecommunication services and electrical or electronic equipment.

In particular, existing and future users of RF spectrum should not have to shoulder the burden of the detrimental effects arising from radiofrequency interference (RFI) generated by Access BPL systems where that interference substantively exceeds the

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local RF noise environment, or spectrum noise floor, generally encountered or expected by spectrum users.

The WIA supports the development of policies and regulations by the ACA that protect all existing spectrum users from the substantial RF interference that Access BPL systems demonstrably produce.

3.0 The issue of interference

3.1 Potential for BPL to cause interference

Ch.1, p.10

The ACA seeks comment on the potential for BPL operations to cause interference to radiocommunications services, telecommunication services and electrical or electronic equipment.

The Macquarie dictionary defines *potential* as “possible as opposed to actual”.

A BPL system only has ‘potential’ to cause interference when it is deployed but not turned on. Any ‘potential’ to cause interference becomes actual when the system is active and users of radiocommunications services or electronic equipment are affected in the normal course of their use, even if that use is not continuous or arises after deployment of a BPL system.

That Access BPL systems cause interference to radiocommunications services is a demonstrable fact.

- It has been demonstrated in European, UK, Japanese and USA trials and deployments that Access BPL systems generate significant RF interference to existing spectrum users by raising the local spectrum noise floor many tens of decibels (references 1 to 8).
- Australian trials of Access BPL systems have demonstrated the same capacity to generate significant RF interference (refs 9, 10, 11).
- Access BPL systems generate RF interference over large geographic areas (refs 2(c), 3, 8).
- WIA observations of Australian trials have shown that the capacity of these BPL systems to cause interference extends to 2 km or more from the activated power lines.
- Widely-deployed Access BPL systems have the capacity to cause RF interference over enormous geographic areas (refs 3, 4, 8). This would be exacerbated by over-the-horizon propagation via the ionosphere, particularly from Sporadic E layers which afford specular (ie. lossless) reflection and ray-focusing, resulting in RF field strengths above that arising from free-space path loss values (refs 3, 14).
- It has also been demonstrated that Access BPL systems generate RF interference extending more than a decade beyond the top system frequency (ie. >300 MHz). This effect has been ascribed to non-linearities in the power lines (refs 8(b), 12 (c)).

Access BPL systems are intended to be “always on”. Thus:

- the RF interference they generate will be ever-present;
- only the level and system bandwidth will vary with system parameters and varying user demand.

3.1.1 Impact on amateur radio stations

Radio amateurs often carry on communications using weak signals that are just above the local spectrum noise floor (RF noise background). Hence, signal-to-noise ratios are low – often considerably lower than those experienced or expected by other services.

Most amateur radio stations are located in suburban locations, where the spectrum noise floor encountered is generally tolerable most of the time for the majority of amateur radio activities.

A proportion of radio amateurs are located in rural regions, where the spectrum noise floor is comparatively low, which permits operating with lower signal levels and signal-to-noise ratios.

Amateur radio stations use antenna systems that are typically located within a suburban backyard and are not far from mains power lines. Even in rural areas, radio amateurs generally locate their antennas close to their homes, which means they, too, are not far from power lines.

The high frequency (HF) spectrum from 3 MHz to 30 MHz affords long-distance communications, across a geographic region or across the world, without the infrastructure necessary to the use of other radiocommunication technologies. It is comparatively inexpensive and provides users the ability to operate self-sufficiently. This characteristic has proved important in local, regional and global emergencies. The Boxing Day tsunami of December 2004 is a particular exemplar, where amateur operators played a leading role in initial responses across south and south east Asia.

Australian BPL trials to date demonstrate that the RF radiation of Access BPL systems can exceed the local spectrum noise floor by 40-70 dB or more in the vicinity of urban power lines (refs 9,10, 11).

Experience overseas and in Australia has demonstrated that the much-vaunted BPL interference mitigation facility of “notching” (spectral masking) selected frequency bands is generally ineffective. It does not succeed in reducing the interference to a level that would permit continued use of affected bands under previous conditions (refs 2, 4, 11). The WIA notes that the facility of notching is not provided on ‘back channel’ transmissions (return signals from consumers).

Amateur stations located in urban or rural areas served by an Access BPL system would not be able to safely transmit on affected Amateur bands because of the high risk of interference to other stations possibly active that would not be heard through the BPL interference. Stations transmitting under such circumstances run the risk of breaching their Amateur licence conditions and the Radiocommunications Act 1992. Any amateur so affected would have to curtail or abandon all activity on the Amateur bands affected by BPL interference.

The technical design and implementation of BPL systems renders them susceptible to interference from external radiofrequency transmissions at quite low power levels (ref. 13). This carries a risk to amateur operators should they inadvertently cause interference to a BPL system, even though operating within their licence conditions, as a BPL operator may seek to take action against the amateur licensee.

3.1.2 WIA position on BPL interference

The WIA believes that existing and future Amateur Service licensees should not have to bear the burden of detrimental effects arising from interference to their legitimate activities generated by Access BPL systems where that interference substantively exceeds the local ambient spectrum noise floor generally encountered or expected on any Amateur band allocated in the Australian Radiofrequency Spectrum Plan.

In addition, recognising that Access BPL systems are susceptible to RF interference, the WIA advocates that radiocommunications licensees (including radio amateurs) should be exempt from action by a BPL provider over RF interference to a BPL system, where the licensee is operating in accordance with their licensing conditions.

3.2 Interim guidelines for BPL trials

Ch.1, p.13

The ACA seeks comments on the adequacy and appropriateness of the interim guidelines. Stakeholders should be aware that these guidelines may be used as a model for future arrangements.

The WIA considers the interim guidelines are insufficient to protect radio amateurs, let alone many other stakeholders, for the reasons set out below.

3.2.1 Trial Information on the ACA Website 3(a)

Before initiating an Access BPL trial, operators are presently required to give the ACA at least 14 days notice, providing information on the operator, location of the trial, dates, frequencies used, and trial operator contact details. The ACA intend to place this information on the ACA website to *“assist in information sharing with all stakeholders and to advise on the latest BPL activities and developments in Australia”*.

The WIA believes that fourteen days notice of a trial is inadequate for affected stakeholders to evaluate the risk to their service, especially given the demonstrated potential of Access BPL to severely disrupt HF radio communications.

The WIA expects that unavoidable delays in publishing information on the ACA website would result in a much shorter notification period to stakeholders.

Clause 3(a) uses the term “should” when it refers to Access BPL operators notifying the ACA of trials, and therefore the clause is not mandatory. The WIA believes all requirements contained in the guidelines for BPL trials must be mandatory conditions.

3.2.2. Identification of Radiocommunications Services 3(e)

The WIA believes that the present process of identifying radiocommunications services potentially affected by Access BPL may not ascertain all licensed radio services and licensees, and could be improved.

In particular, the location of an amateur radio station is not always identical to the service address recorded in the ACA Radiocommunications Licence database. An analysis of that database will not show all the licensed amateur radio stations operating in a particular geographic area.

Access BPL operators are required to identify licensed radiocommunications services within one kilometre of an Access BPL trial by undertaking an analysis of the ACA's Register of Radiocommunications Licences.

Observations of the Queanbeyan NSW and Moruya NSW Access BPL trials have identified BPL interference at levels above background radio noise more than 2km from the trial location.

3.2.3 Consultation with Licensees 3(f)

Access BPL operators are presently required to contact, by writing, those licensees identified within 1 km of the BPL network. As stated previously, and based on observations of recent BPL trials, the WIA believes 1 km is not sufficient distance to protect licensed radio communications services from interference.

Additionally, there is no time requirement placed on notification.

3.2.4 Unresolved Harmful Interference 3(g)

The WIA agrees with this requirement, considering that it does not diminish the right of a licensee to lodge an interference complaint directly with the ACA/ACMA (or the appropriate regulatory agency) seeking enforcement of regulatory provisions.

For example, it is not unusual for legislation such as the Trade Practices Act, and indeed the Radiocommunications Act (eg. at Section 50), to give a right of civil action in respect of matters subject to criminal action.

The WIA believes that holders of Apparatus licences, and perhaps Class licences, should be given appropriate rights of civil action against people not only causing interference from a radiocommunications device, but any device.

The WIA is concerned that, as presently drafted, the Radiocommunications Act, and in particular section 197, may not provide the appropriate protection for particular services in particular circumstances. We are also apprehensive that the enforcement agency may not take action when a complaint is lodged, perhaps on the basis that there is uncertainty as to the effect of the provision, and a concern on the agency's part to avoid what could be long and costly litigation.

3.2.5 WIA position on interim guidelines for BPL trials

(a) Notice of trials

The WIA believes the information from BPL trial operators *must* be provided to the ACA at least *42 days* in advance of the date for a trial, and that the ACA should publish the information on their website *within 7 days of receipt*. In clause 3(a), the WIA believes the word 'should' needs to be replaced with *must* to maintain the intent of the guidelines.

(b) Identification of Radiocommunication Services

Licensed radiocommunications services within 2.5 km of power lines proposed to carry Access BPL signals must be reliably identified. To ensure thorough analysis, the WIA believes Access BPL operators should be required to request from the WIA a list of amateur radio stations within the trial area.

The WIA would like to draw attention to the fact that there are a large number of radio services operating under the LIPD Class Licence which would not be identified in a licence search, as well as an unknown number of shortwave broadcast listeners. The WIA believes the interests of all stakeholders would be served if BPL trial operators were also required, at the very least, to advertise prominently in print media serving the trial area.

(c) Consultation with Licensees

The WIA believes that Access BPL operators must be required to contact, in writing, identified radio services within 2.5 km of the trial area and give at least *42 days* advance notice of a proposed trial.

(d) Obligations of BPL trial operators

When notified of an interference complaint, the BPL trial operator should be obliged to work with the complainant, and/or the complainant's representative/s, to investigate such complaints and take timely, effective action to mitigate the interference to a specified or satisfactory extent during the operation of the trial.

Recognising that Access BPL systems are susceptible to RF interference (ref 13), the WIA believes BPL operators must be obliged to accept this technical flaw. As a consequence, BPL operators should have no recourse to action against radiocommunications licensees (including radio amateurs) over RF interference to a BPL system, where licensees operate in accordance with their licensing conditions.

4.0 The interests of stakeholders

4.1 Obligations of BPL operators to consumers

Ch.2, p.17

The ACA seeks comments on whether there should be obligations placed on BPL operators to alert consumers to possible disturbance to consumer devices prior to deployment of BPL systems and what form these obligations might take.

Consumer devices affected by the detrimental impacts of interference from BPL systems may include, but are not limited to:

- medical alarms and monitors;
- cordless telephones;
- shortwave radio receivers;
- HF transceivers – such as amateur radio, land mobile, 27 MHz Citizens Band and marine radio equipment;
- wireless remote control devices (eg. audio systems, R/C models and toys);
- garage door openers;
- radio security devices; and
- access control systems.

Many such devices do not require a license (eg. shortwave receivers), or operate under the LIPD Class Licence (eg. medical and security alarms, and remote control devices). Consumers using these devices may not be aware of the intended operation of an Access BPL trial system in their area, or if they are aware, will not realise the consequences until they experience interference. Even then, they would be unlikely to be aware of the cause, particularly if the disruption was partial or intermittent. It is also likely that consumers experiencing BPL interference may blame anyone nearby who has a visible communications antenna, provoking unnecessary conflict with an innocent party, such as an amateur operator.

Broadcast licensees implementing a new service or a change to transmissions are required to publish notices advising of the commencement of transmissions because of the known potential for interference to existing reception. Since BPL systems have been demonstrated to cause interference to existing services, then it is appropriate for a similar obligation to be imposed on Access BPL operators.

4.2 WIA position on the obligations of BPL operators to consumers

The WIA believes that alerting consumers should be an essential obligation for BPL operators. The means and methods would need to be appropriate and effective from the consumers' perspective. At the very least, advertising in local media should be

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required. Licensed spectrum users should be alerted by BPL operators individually, in writing (see Section 3.2.5 above). BPL operators should be obliged to investigate interference complaints and take timely, effective action to mitigate interference to a specified or satisfactory extent.

5.0 Options to manage interference from Access BPL Systems

5.1 Role and effect of regulation

Ch.3, p.18

The ACA seeks comment on the importance of regulatory certainty to both BPL providers and stakeholders who could be subject to interference.

Stakeholders in use of the radiofrequency spectrum have a natural expectation that such use will continue to operate as expected, and that the introduction of new technologies and services will not have a detrimental impact. This particularly applies where users operate with a licence under the Radiocommunications Act. Their expectations are informed by the licence conditions imposed by regulation.

Regulatory certainty is essential for an affected service or individual to take action against a persistent interferer. Any affected stakeholder must be certain of:

- definitions and interpretations in regulatory instruments,
- processes and protocols in the application of regulations,
- the role of the regulatory agency,
- the consequences of the application of regulations, and
- clarity as to the outcomes of regulatory action.

In the event of interference to an amateur radio station's operations, the affected licensee must be able to obtain effective remedies through the ACA's interference complaints process and, ultimately, civil action.

Amateur radio frequency bands are co-ordinated worldwide to enable international communications, and to provide standardised frequencies for amateur satellite communications. This co-ordination recognises and allows for the fact that radio amateurs frequently operate at low signal levels and low signal-to-noise ratios, whether they are engaging in either terrestrial or space communications.

Regulatory certainty that serves to preserve the ability to co-ordinate amateur frequency bands internationally to allow for these constraints is essential to the amateur service.

Although radio amateurs are hobbyists, pursuing their interests motivated by self-education and without pecuniary reward, in assembling a station they accumulate a considerable investment in time and effort and a generally modest investment from expenditure of surplus income. They have a justifiable concern that the detrimental impacts of BPL interference will substantially constrain their interests and activities.

Radio amateurs, whether assembling their own communications systems from commercial off-the-shelf equipment and/or constructing critical components of them, also need regulatory certainty regarding spectrum noise floor constraints in order to accommodate their system design needs. Radio amateurs assemble their stations with the expectation that the regulations under which they operate their equipment will remain stable and be actively enforced.

Equipment manufacturers and suppliers of amateur radio equipment rely on stable and effective regulation in order to develop and market generally quite complex equipment for the amateur radio market.

It is clear that BPL operators will be large organisations having considerable economic power and resources. Thus the balance of power, resources and influence in any complaint by or dispute with stakeholders over interference, particularly individuals affected, lies with BPL operators. A primary purpose of regulation is to redress this imbalance of power.

The WIA understands that regulatory certainty would also be essential for BPL operators and providers in order to protect their capital investment against intervention by a regulator, or court action from an individual or organisation.

5.1.1 WIA position on the importance of regulatory certainty

The WIA believes regulatory certainty is important both for BPL operators and stakeholders. Affected stakeholders and BPL operators alike must be certain of:

- definitions and interpretations in regulatory instruments,
- processes and protocols in the application of regulations,
- the ability, probity and conscientiousness of the regulatory agency to act,
- the consequences of the application of regulations, and
- clarity as to the outcomes of regulatory action.

Regulatory certainty would be strengthened by including new provisions in the Radiocommunications Act to give holders of Apparatus licences, and perhaps Class licences, appropriate rights of civil action against people not only causing interference from a radiocommunications device, but any device (see comments at Section 3.2.4).

In addition, recognising that Access BPL systems are susceptible to RF interference (ref 13), the WIA believes regulatory certainty would be strengthened also by including provisions that:

- require BPL operators to accept this technical flaw, and
 - exempt radiocommunications licensees against action from a BPL operator over RF interference to a BPL system, where licensees operate in accordance with their licensing conditions.
-

5.2 Industry management

Ch.3, p.20

The ACA seeks views on the merits of allowing the BPL industry to develop its own arrangements. In addition, the ACA would like an indication of whether the BPL industry is interested in developing its own arrangements for managing interference issues.

The WIA considers that industry self-regulation is problematic, both in concept and in implementation. There are many examples of such self-regulatory regimes failing negatively affected stakeholders.

The WIA believes that an industry group comprising only BPL providers, charged with developing its own arrangements for managing interference issues, would be highly likely to focus on the commercial needs of the industry, rather than the interests of adversely affected stakeholders, let alone considering the wider issues of socio-economic impacts, such as the true balance between benefits and costs, and so forth.

Interference complaints lodged by United States radio amateurs to BPL providers and the FCC have largely been ignored (ref 4). There have been similar instances in Austria, too (ref 7). Many media releases and submission to regulatory inquiries by BPL proponents have refuted potential or demonstrated interference, or trivialised the issue. These experiences serve to strengthen a belief that, rather than being interested in resolving BPL interference issues, the BPL industry everywhere has sought to deny interference.

5.2.1 WIA position on industry management of BPL interference issues

It is clear that BPL industry management of interference (ie. industry self-regulation) would be problematic, being fraught with conflict of interest and dominated by commercial concerns.

The WIA opposes management of BPL interference issues solely by an industry body.

Additionally, the WIA advocates that conditions imposed on BPL operators include 'network shut down' requirements that provide for:

- shut down of part or the whole of a BPL network for a brief temporary period, for the purpose of interference identification; and
- shut down of part or the whole of a BPL network to eliminate interference causing substantial economic loss or danger to life.

5.3 Role of standards

Ch.3, p.21

The ACA seeks comments on whether the adoption of a standard is considered appropriate and which international standard, or an Australian developed standard, is preferred. The ACA also seeks comments on whether a wholly standards based approach is sufficient to manage potential interference or whether an approach similar to the FCC's might be more appropriate.

Administrations in European countries, the European Community, the United States, Japan and elsewhere have yet to develop agreed standards for their own jurisdictions for regulating the operation of BPL systems.

It is clear that, in general, the conditions applying to the radiofrequency, industrial, socio-economic and political environments are largely specific to individual jurisdictions. These conditions are reflected in EMC, RFI and other regulatory requirements applicable to a wide range of technologies and services.

The same applies in Australia. While there are some commonalities and parallels with international standards, there are considerable differences. The WIA recognises that many Australian standards on EMC and RFI are based on European standards, and some incorporate conditions that parallel other standards. Concessions to circumstances specific to Australia are also evident.

There is presently no global standard for regulating the operation of BPL systems and managing RF emissions from BPL deployments. It is apparent that none will be developed soon.

The WIA notes that the European approach has been to attempt to develop a standard to control the (unintentional) emissions from BPL systems. We also note that, to date, the European process has been unsuccessful.

The WIA understands the approach adopted by the FCC is to control the use of BPL systems within the US's existing regulatory framework (ie. Part 15). This approach, in effect, establishes a performance standard in terms of permissible emission levels, which is given effect through a combination of measures, including:

- electromagnetic emission limits for particular frequency bands;
- equipment certification;
- measurement methodology for BPL electromagnetic emissions;
- recording of details of BPL deployments in a public-access data base, including the details of contact officers;
- a process for interference resolution.

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The difficulties experienced by other administrations in attempting to develop standards suggests that a specifically Australian standard would need to be developed, but any such standard would need to recognise any international standards as may exist.

The WIA has not been able to identify any existing international standard that would be adequate to guarantee protection of amateur operations from the detrimental effects of RF emissions from BPL systems in Australia.

We note that current interests in BPL systems are based on the availability of equipment sourced from overseas. This limits the capacity for the Australian regulatory agency (ACA/ACMA) to manage the deployment of BPL systems here as system performance capabilities will be determined by the dominant overseas requirements.

However, the WIA notes that HF radiocommunications services, usages and needs in Australia (and Australian waters) differ significantly from those that exist in countries that have established, or are moving to establish, BPL regulatory requirements.

The WIA position is that any standard or other regulatory device must meet Australian conditions and requirements and must not be merely a device to permit the use of systems developed for other radiocommunications environments.

A purely standards-based approach is unambiguous and clearly supported by explicit provisions of the Radiocommunications Act. The major difficulty with this is simply that of determining an appropriate standard. In this context, the needs of prospective BPL proponents and existing radiocommunication users are contrary and potentially irreconcilable. Evidence of this difficulty is available in the apparent inability of the European approach in attempting to identify appropriate emission limits for BPL systems.

In addition, we note that even though the FCC has a strong regulatory background, there is growing dispute, including within the Commission, that the FCC's approach is appropriate or enforceable.

It is the view of the WIA that a combined approach involving a formal, registered EMC standard for BPL systems, supported by an effective regulatory regime, offers the better chance of being able to properly protect existing radiocommunications services while permitting introduction of BPL systems.

However, the WIA is concerned that the Radiocommunications Act may not provide the level of regulatory support that is needed to effectively implement such a combined approach.

5.3.1 WIA position on the adoption of a BPL standard and other approaches

Recognising the evident difficulties in determining a wholly standards-based approach, the WIA proposes a combination of:

- a formal, mandatory Australian standard relating to BPL emissions,
- an industry code for the operation of BPL systems, and
- specific regulatory requirements under appropriate Australian acts.

The WIA notes that existing models for this approach are found in telecommunications industry regulation.

5.4 Developing a guideline or industry code

Ch.3, p.22

Stakeholder comment is sought on the appropriate body to develop a code or guideline under options 1, 2 or 3. The body could be a BPL industry body, a stakeholder body or the ACA in consultation with interested parties. In addition, comments are invited on the possible content of a code. Interested parties can use the interim access BPL trial guidelines as a reference point.

A code or guideline developed solely by a BPL industry body would likely result in an outcome dominated by the commercial needs of the proponents, with limited regard for the interests other stakeholders.

It is the WIA's view that this approach is akin to "putting the fox in charge of the hen-house".

The current regulatory framework relating to radiocommunications and telecommunications in Australia is based on the concept of open, transparent and inclusive participation by interested parties. This means that only the regulatory agency (ie. ACA/ACMA) is the appropriate body to manage the process for development of any code or guideline. The resultant process should be open and transparent and provide for all interested stakeholders to identify their interest (and participation) and to have their concerns acknowledged and considered. Only by such an open process is it possible for full consideration of the total community costs and benefits arising from the introduction of BPL systems to be properly assessed.

Consequent to that, the concept of an "industry code" raises the question of whether compliance with such a code should be mandatory or voluntary. While a voluntary code might be appropriate to cover matters between a BPL service provider and its customers where a formal, legal relationship exists, it is the view of the WIA that a voluntary code would be of little value in situations between a BPL provider and a third party affected by the detrimental impacts of a BPL system, but otherwise having no formal

relationship with the BPL provider. A voluntary code in such situations would appear to add nothing to the existing legal rights of the affected third party and could have the effect of diverting attention away from existing rights.

Any code or guidelines would be ineffective if compliance were voluntary, rather than mandatory, at least to the extent that the code deals with resolution of issues such as identification, acknowledgment and resolution of interference problems.

5.4.1 WIA position on developing a code or guidelines

In the event that development of an industry code or guideline is proposed, the WIA advocates:

- that the regulator (ie. ACA/ACMA) would thus be the most appropriate body to oversee development;
- the adoption of established government practices for open, transparent and participative consultation;
- that compliance with a code or guidelines must be mandatory in relation to issues of identification, acknowledgment and resolution of interference problems.

The WIA believes the content of such a code or guidelines should cover, at the least:

- identification of interference to other services and equipment from BPL systems;
- acknowledgment by BPL operators of interference complaints, whether from individuals or stakeholder groups;
- a clear and transparent methodology for identifying , measuring and reporting the detrimental impacts of BPL interference;
- clear, transparent processes for resolving interference issues;
- appeal to the regulatory agency in the event resolution of interference issues fails.

5.5 Licensing, conditions and fees

Ch.3, p.23

The ACA invites comment on licensing and imposing a fee on BPL providers for their spectrum use. Comments would also be welcomed on the possible licence conditions.

BPL systems transmit RF across an uncontrolled environment of open, unshielded, unbalanced conductors. The physics says radiation of the RF will occur. Experience demonstrates that it does. RF emission is thus an innate characteristic of BPL systems.

There is no practical way to modify or re-engineer the power line transmission medium on which BPL systems depend to deliver telecommunications services to customers' premises. This is widely acknowledged in the literature.

As Access BPL systems radiate RF emissions over an area related to its deployment on power lines, it clearly "uses up" radiofrequency spectrum within that area. Thus, existing and prospective users of the affected spectrum are denied its use as they would otherwise expect.

An underlying foundation of the Radiocommunications Act is the principle of "spectrum denial". The use of given radio frequencies over a given geographic domain denies its use by others.

This principle informs the basis of licence fees under the Apparatus licence regime and the market-based allocation of Spectrum licences. It also informs the principle of sharing embodied in the allocation of secondary services in given frequency bands and in Class licensing.

Spectrum denial from the detrimental impacts of RF interference also underpins the management of interference through EMC, EMI and RFI regulations.

There may be an argument to support licensing BPL systems and the imposition of licence fees because:

- BPL systems are "always on";
- they "use up" spectrum over a considerable bandwidth and geographic area;
- the current interference management regime/s never really envisaged continuous interferers;
- it would go some way to expressing the cost of the negative externality of BPL spectrum use.

It is clear that licensing under the Radiocommunications Act depends on defining what is to be licensed. The Act provides a number of definitions. The WIA asks that the ACA clarify the issue in respect of under what definition a BPL system might fall.

In any event, the WIA believes that the Radiocommunications Act would most likely need to be amended to enable the licensing of BPL providers or systems.

The WIA acknowledges there are difficulties in identifying appropriate licence conditions and the risk that imposition of inappropriate (or any practical) conditions could unreasonably impede the legitimate rollout of BPL systems.

Licence conditions would need to protect the interests of existing consumers and spectrum users, regardless of the final shape or technology of BPL systems. Interference arising from conducted and radiated emission levels would be a primary aspect of licence conditions. The WIA acknowledges the current difficulty in identification of acceptable BPL emission levels that simultaneously protect existing consumer and spectrum usages while not precluding BPL rollout.

As an alternative to radiocommunications licensing, the WIA believes it may be appropriate to explore the application of carrier licensing under the Telecommunications Act and the imposition of appropriate conditions on BPL providers under that regulatory regime.

5.5.1 WIA position on imposing licensing, conditions and fees

The WIA supports the application of appropriate provisions to regulate the operations of BPL systems and operators, without unreasonably impeding trials or the legitimate rollout of BPL systems.

In regard to licensing BPL systems or operators under the Radiocommunications Act, the WIA seeks clarification from the ACA in respect of under what definition a BPL system might fall. The WIA accepts that it would be necessary to amend the Radiocommunications Act if it was resolved to licence BPL systems or operators under that Act.

The WIA would support the regulation of BPL through carrier licensing under the Telecommunications Act.

Regardless of the licensing regime, the WIA believes licence conditions should include, but not be limited to:

- requirements to notify in advance consumers, licensees and other services of the intention to deploy a BPL system;
- technical prescriptions to limit conducted and radiated emissions causing interference to other devices and radiocommunications services and users;

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- obligations to mitigate interference to others (see sections 3.2.5 and 4.2 above);
- a requirement that BPL operators accept susceptibility to RF ingress as a technical flaw inherent to BPL systems; and
- exemption for radiocommunications licensees against action from a BPL operator over RF interference to a BPL system, where licensees operate in accordance with their licensing conditions.

6.0 In-house BPL

Ch.4, p.25.

The ACA is interested in comments on these options, as well as any other options that are considered relevant. Are there any other issues relating to in-house BPL systems that the ACA should be aware of?

The WIA notes that the sales of in-house BPL systems have been low, to date. However, we also note that the advertising and promotion of in-house BPL products has been increasing since late-2004. This trend is likely to continue.

Another trend emerging is the incorporation of in-house BPL facilities, as an embedded system, into consumer white goods and other appliances, with the purpose of linking separate products to provide features and facilities not presently available. In addition, property developers are experimenting with incorporating in-house BPL systems into apartment buildings and townhouse developments.

The conclusion to be drawn is that in-house BPL products and systems will proliferate over the near-to-medium term.

6.1 WIA position on regulating in-house BPL devices and systems

The WIA believes that it would be in the interests of all stakeholders for the ACA to facilitate the development of an interim standard for in-house BPL devices and systems. This would act to reduce the risk of interference to radiocommunications equipment and services occurring.

It is our view that this interim standard set the maximum permitted electromagnetic emission levels to fall within current CISPR 22 requirements for IT equipment, at the least, or at levels that may be anticipated to be adopted under the amended CISPR 22.

The WIA does not support the ACA's Option 1 – Do nothing and monitor international developments, or Option 2 – Adopt the FCC's standard.

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