

# **Submission to the Spectrum Management Review, June 2014**

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## **Preamble**

Effective Spectrum Management is undeniably a complex undertaking. Australia is fortunate to have been well served in the past by a small army of passionate, directed individuals, collectively providing solid guidance for many involved considerations. The ACMA has a central role to play, both presently and for the foreseeable future, complementing the activities of the Department of Communications in this crucial area.

The crucial role of radio spectrum management is more evident to society today than it has ever been in the past. As a global population we have become accustomed to an increasing collective appetite for spectrum to meet our rapidly evolving mobile communications demands. We are able to readily appreciate that the sustained demand for spectrum in as little as a decade or two may vastly exceed current usage.

The task of spectrum management must continue to account for all the historical issues related to spectrum, such as physical characteristics of various bands, WRC determinations, device harmonisation in a global market, meteorology uses, defence requirements, broadcast and other legacy application demands, and communications market economics. In addition to this, emergent demands for larger contiguous or near contiguous allocations, coupled with technology evolution trends in as-yet-unclear directions, ensure that spectrum management remains a complex field of policy endeavour.

## **1. Review Terms of Reference**

It is understood that the review process will provide many opportunities for input throughout 2014, and that initial input is now sought to aid in ensuring that the review Terms of Reference are appropriately refined to support this process.

The terms of reference as they are formulated at present, and articulated within the May 2014 Issues Paper, appear to provide a sensible coverage of this important area. However, there are high-level concerns that appear quickly with reference to individual items of the Terms of Reference, and in relation to the interpreted overall 'flavour' of the review as revealed by the Terms of Reference as a whole.

Principally, these concerns are that a complex process can not be overly simplified or drastically de-engineered, at a time when the inherent complexity of spectrum management is perhaps only increasing. This comment does not imply that efforts to simplify processes are not worthwhile. There are likely to be significant gains achievable through careful attention to spectrum management legislation and policy. However, this simplification must not push too far into the

realm of removing process structure that serves an important technical role. This presents as a real risk, as the true inherent complexities of the spectrum management task is perhaps poorly understood by all but the most technically literate of individuals. There are many 'traps' waiting for those even with years of experience working on particular spectrum management issues.

Another concern is that an overemphasis on financial return to the government from spectrum licensing activities must not occur. While there is no suggestion that heavily contested spectrum should be provided to commercial entities cheaply, public good valuation must be included in decision making frameworks. This can be difficult to measure and weight in comparison to direct financial licensing revenues, but must be included. As spectrum becomes more heavily contested this objective is likely to apply to a greater extent than in the past.

Brief comments are provided below specific to individual terms of reference items. Section 2 additionally provides comments related to the stakeholder questions presented in the issues paper.

## **1.1 Simplify the framework to reduce its complexity and impact on spectrum users and administrators, and eliminate unnecessary and excessive regulatory provisions**

While there is full support for the aim of simplifying regulation and streamlining processes, it must be noted that spectrum management is inherently a highly complex endeavour. The prospect of rapid future technology change and demand evolution, suggests that spectrum management is today more complex than it has ever been in the past.

Dot points contained in the issues paper that cause a particular concern with regard to the prospect of 'oversimplification' are:

- simplifying and streamlining the planning, allocation, licensing and re-issue processes within the Radiocommunications Act
- simplifying/reducing the regulatory burden of technical regulation and interference management requirements

Where there is a genuinely unnecessary regulatory burden, there is a strong case for simplification and streamlining. However, we must ensure that we are able to distinguish between legislation crafted poorly in the past, and that which has been well crafted where we might need to be reminded of the technical reasons underlying the processes introduced.

## **1.2 Improve the flexibility of the framework and its ability to facilitate new and emerging services including advancements that offer greater potential for efficient spectrum use, while continuing to manage interference**

This is a crucial aspect for consideration once realistic estimates for technology and demand evolution are appreciated. We face the prospect of unprecedented change over the coming decades. The spectrum management framework is likely to require significant reform to maximally provide for the needs of the future. Such future needs may appear surprisingly rapidly.

There are a great number of technology developments that are currently being actively researched and developed that will have significant impact on future spectrum usage. It is not difficult to envisage an entirely different model for how prime spectrum bands are managed and licensed emerging on a global scale over the next 10 years plus. Indeed, it is possible to conceive of a number of potentially viable alternatives in this regard today. However, this speculative thinking

must be driven towards a reliable prediction of the future that can be used to direct reform of the spectrum management framework. It appears that the only way to achieve such a goal is to ensure an appropriate mix of experts is assembled to participate in a dedicated study activity in this area.

This panel of experts must systematically consider all imagined future technical possibilities as they relate to spectrum management. This includes the adoption of truly intelligent radio systems, with new and flexible power control capabilities, and the use of mobile point-to-point communications in what are otherwise licensed spectrum bands. It involves consideration of entirely different ways to monetise in-demand spectrum, and a large group of other considerations that today appear somewhat fanciful. Australia needs to follow international directions, such as those delivered through the WRC, but the likely rapidity of future change ensures that the nation will be poorly served if we wait until the international signals are clear. The nation may require some innovative thinking from a collective group of leading minds.

It is likely that many services using individual frequency bands today will be better served in the future by use of shared bands in a highly structured fashion. This includes emergency services. As broadband demands continue to make their way through the entire ecosystem, emergency service demand for spectrum is set to see increases. The nature of this spectrum use exhibits far higher variation than many other applications, and it is ultimately counter productive to allocate increasing amounts of dedicated spectrum to all such users. Requirements of priority use of spectrum and reliability issues are crucial. Use of shared transmission infrastructure must allow for emergency service communications to operate long after back-up battery supplies for commercial services have been depleted (at least in the current paradigm where battery supply is tightly constrained).

The point to the above paragraphs is not to highlight specific issues, but to illustrate the point that there are many complex issues that require proper consideration in relation to where future technology and demand considerations will lead. This aspect must be afforded the utmost respect in the overall spectrum management review deliberations.

### **1.3 Ensure efficient allocation, ongoing use and management of spectrum, and incentivise its efficient use by all commercial, public and community spectrum users**

This is a core requirement of spectrum management. It can only be achieved over the next 10-30 years with proper attention to the evolution issues raised in section 1.2 above. There is little doubt that significant changes to the spectrum management framework will be required in the longer-term outlook.

### **1.4 Consider institutional arrangements and ensure an appropriate level of Ministerial oversight of spectrum policy and management, by identifying appropriate roles for the Minister, the Australian Communications and Media Authority, the Department of Communications and others involved in spectrum management**

The ACMA, in close association with the Department of Communications, is the right body to perform all the 'heavy lifting' when it comes to spectrum management. The ACMA is well-placed to integrate with a wide group of radio communication experts, providing much-needed technology input from broad perspectives.

It is worth considering if the ACMA/Department of Communications team needs to be enhanced on the in-house technical expert side. Most of the broader experts assembled through ACMA bring an element of their own vested interests into the mix. The need for dispassionate, yet expert, input at

the highest level is present. It is important that such a role is filled by a technical expert (or experts) as opposed to a technical managers.

In relation to the issues identified in the discussion paper, it is sufficient to state at this point that these all appear to be necessary and worthwhile items for further deliberation in regard to this terms of reference item.

### **1.5 Promote consistency across legislation and sectors, including in relation to compliance mechanisms, technical regulation and the planning and licensing of spectrum**

Consistency and clarity of processes is very important. There is a strong argument that these goals require a core group of technology experts (again as distinct from managers), dedicated to the task, most obviously as part of the ACMA.

To the extent that the items identified in the issues paper relate to spectrum use by police and emergency services, public transport authorities, etc., there are strong cases for migration of at least a portion of such uses to shared frequency bands. This prospect alone has significant detailed technical ramifications, and may ultimately lead to a re-analysis and potential major reform of spectrum licensing structures. A significant focussed national discussion with expert stakeholders is required to optimally address such issues. To the extent possible, such discussions need to be transparent, to ensure they cover all the issues and do not miss major considerations due to the limitation of experience bases of those seated around the table at the time.

### **1.6 Develop an appropriate framework to consider public interest spectrum issues**

All spectrum issues are matters of public interest. A key concern is that public interest concerns are weighted appropriately, especially in relation to other financial concerns. The issues paper appears to have an overly narrow definition of public interest, and this may require reconsideration.

### **1.7 Develop a whole-of-government approach to spectrum policy**

It is unclear that areas of the government outside of the Department of Communications should have any special interest in spectrum policy. Even notable stakeholders such as the Department of Defence and the Bureau of Meteorology, should rightly be viewed as part of the broader stakeholder group. These stakeholders are best managed through the ACMA processes.

Discussion and points raised within the issues paper on this topic suggest that “whole-of-government” has no relevance to this item. The focus should perhaps not be government at all, but “national futures based”. Development of a long-term, sustainable road-map for spectrum policy, is more where this item seems to fit according to the issues paper comments. Please see comments made in section 1.2 in this regard.

### **1.8 Develop a whole-of-economy approach to valuation of spectrum that includes consideration of the broader economic and social benefits**

Appropriately weighting broader economic and social benefits is a very difficult task, especially when long term evolution considerations are involved. Wide 'expert' input is likely to be needed, and a process must be developed that ensures that dissenting voices are heard. Ultimately debate must be encouraged where issues are potentially contentious. We can not hope to lead as a nation

without robust discussion on issues where perspectives differ.

A very real risk is that short-term financial benefits will outweigh longer-term considerations of less directly measurable benefits.

The comments included in the discussion paper have a flavour of determination of broader economic and social benefit not for the purpose of ensuring maximum spectrum management efficiency, but from the perspective of being able to price spectrum appropriately and thus maximise financial return to the government. The former is a laudable goal, the latter would appear to be somewhat short-sighted.

## **2. Questions for Stakeholders**

Brief responses to the questions posed in the issues paper are provided below.

### **2.1 What additional issues should be considered by the review?**

The primary concerns are:

1. That a sufficient number of engineering 'experts' are involved in key technical decisions, so the risk of poor decision outcomes from a technology perspective can be avoided. Attempts to oversimplify or 'de-engineer' an inherently complex area of endeavour must not be allowed to occur. What appears capable of simplification may only appear so due to a lack of detailed understanding of the inherent complexity of the field. We must simplify only to the extent possible.
2. Financial return to government should not be allowed to dominate over considerations of public good. An appropriate balance is required. This in turn is likely to require input from a broad group of experts.
3. Long-term technology evolution in communications, coupled with spectrum usage demand growth, are likely to require fundamental reform of spectrum management within the next 20 years. It is conceivable that the need for fundamental reform will emerge in the early part of the next two decades. The nation must take the threat posed to spectrum management seriously, and commence planning now. We must not be fooled by the relative stability of the past, into thinking that future evolution will be sufficiently slow and controlled to enable adaptation at a point when the path becomes clear.

### **2.2 Are there any issues you think should be taken off the table?**

It would seem important to ensure that an open mind to all and any reform agendas is present at this crucial juncture in spectrum management history.

### **2.3 Which issues should be given priority and why?**

Other stakeholders are likely to have specific views on this question in relation to more immediate concerns.

As a professional engineer there is a concern that longer-term technology evolution issues may translate to the need for a significant reform in spectrum management. The momentum of the spectrum ecosystem is such that the capability to implement a major reform process related to

spectrum usage, needs to be introduced well in advance of the anticipated required date of completion. Obtaining clarity of likely long-term reform requirements is hence an issue of high priority.

## **2.4 Which issues can be addressed in the short term (the next 12-18 months) and which should be considered over a longer period?**

Spectrum management is by necessity a forward-looking endeavour. Prediction of future needs in an environment of rapidly evolving technology is certainly not a precise science. It is worthwhile attempting to develop a solid appreciation for how technology evolution over the next 20 years might be expected to impact on spectrum management policy. This work should be completed within the next 12-18 months, and regularly reviewed, perhaps as often as every two to three years for the next decade. Any required changes to legislation that might stem from the technology-informed long term perspective, might be expected to occur beyond the 12-18 month window.

Quite apart from the longer-term technology evolution perspective, there are likely to be other issues that can be productively addressed within a period as short as 12-18 months.

## **2.5 What should be the extent of reform – can the framework be improved by adjusting what is currently in place or are more fundamental changes required?**

Other stakeholders are likely to have more directed input on this question. The long-term perspective (driven by the technology evolution perspective) may indeed suggest some element of fundamental change. It is important to allow a proper engineering analysis to be completed prior to implementation of any short-term fundamental changes (should such be recommended). Any need to fundamentally reform the system needs to be implemented in a one-shot process.

It is important to note that many of the items listed in the issues paper with regard to particular numbered items of the terms of reference, suggest a relatively short-term focus and a belief that to some extent the current spectrum management framework does not require major reform. This perspective is fully understandable and acceptable until the reality of the extent of technology change and demand increase over the next 10-30 years is more fully appreciated.