

# Spectrum Review

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Engineers Australia is a professional association representing professional engineers and technologists, Australia wide. Engineers Australia has the unique ability to connect with members from a wide variety of engineering disciplines, including from our Information, Telecommunications and Electronics Engineers (ITEE) College, which embodies the learned society role for engineers skilled in the engineering, science and art of radio frequency spectrum engineering, the subject of the Review.

Engineers Australia provides the following input to the review process, and welcomes the possibility of providing further input to future review processes.

Engineers Australia is the trusted voice of the profession. We are the global home for engineering professionals renowned as leaders in shaping a sustainable world. Our Royal Charter and By-laws place obligations on us to advance the science and practice of engineering for the benefit of the community

Radio frequency spectrum is a finite resource. Engineers have a core role related to maximising value from the limited spectrum resource, through systems design and innovation. Engineers need to apply the rules and protocols associated with radio frequency spectrum planning to ensure compliance within the basic spectrum utilisation frameworks adopted both nationally and internationally. In much the same way engineers are in the best position to exploit emerging techniques for increasing the value of spectrum, for the benefit of the nation, communities, and for individual users. Ideally the spectrum frameworks should be technology agnostic in order to maximise opportunities for innovation.

Market-based mechanisms are likely to produce the most efficient outcomes. However, these do require checks and balances to avoid dominant players exercising market power and potentially not being challenged to innovate and deliver best (national) value in spectrum use. Market power may lead to anti-competitive conduct and dominance in spectrum holdings which may be good for a specific player in a specific sector but is unlikely to satisfy a broader interpretation of best value engineering in utilisation of spectrum.

Professional resources available to ACMA will need to include sufficient personnel skilled in the engineering of spectrum use and its planning. Engineers Australia considers that the government is under a misapprehension if it believes that the reforms proposed will result in a reduction in the skilled resources required to manage the integrity and risks associated with the reforms envisaged. Engineers Australia is generally comfortable with the strategy behind the reforms and the reforms themselves. However, Engineers Australia is aware that the management of the processes underlying the reforms is key to successful delivery of the reforms.

Engineers Australia is supportive of the thrust for the spectrum reforms: transparency, efficiency, flexibility, certainty, and simplicity, in an appropriate balance. For instance simplicity may not enable the greatest efficiency. There must also be recognition that both demand and technology change with time, and flexibility to accommodate demand and technology change, needs to be balanced by the level of certainty. Whilst certainty in a commercial sense is absolutely critical to investment risk, in a technical sense it is arguably more important: Engineers Australia would for instance have significant concern without certainty in the use of spectrum for motor vehicle to vehicle communication particularly in driverless vehicle scenarios and for certain biomedical applications. These are safety critical systems which need certainty.

Engineers Australia supports private sector investment in spectrum resources, where it is appropriate. However, while the private sector can provide a significant amount of infrastructure investment, the spectrum planning agenda cannot be driven purely by the availability of finance and markets: professional Engineers have a critical role, especially in the evolutionally ICT sector, to ensure the balance of risks and rewards are established on evidence-based, mathematically sound, value engineering principles.

It is also important to recognise that private sector financing is not suitable for all spectrum use, regardless of the source of finance. It is thus incumbent on the government to ensure the maximum possible attention to aspects of quality and public good for all spectrum users.

Private investment in public infrastructure is not just a partnership between government and business. It is a partnership between government, business and the community. Spectrum management ensures interference between competing users is managed through an equitable, value engineering, evidence-based process that ensures end-user quality needs are met without unduly constraining other spectrum users.

While simplification may be a goal, the Act may need to ensure that planning for spectrum allocation and allotment plan specifications are as detailed as possible, with outcomes and quality standards clearly defined: a role likely to require the skills of professional Engineers.

Engineers Australia makes the following comments in respect of the proposals outlined in the discussion paper:

### **Proposal 1: Implement a clear and simplified framework of policy accountability**

Engineers Australia agrees in principle with the proposal. Ministerial decisions should be fully informed with regard to technical impacts and risks, and must consequently be informed through reference to appropriately qualified advisors. Decisions should have a sound engineering basis, with publically available documentation of the reasons for any policy or decision.

### **Proposal 2: Establish a single licensing framework**

The proposal here needs to be balanced with the requirement for greater certainty in respect of certain users and also the substantial investment in equipment in most cases built to the needs of an international market (e.g. embedded class-licensed devices in portable and many fixed computing equipment instances).

### **Proposal 3: More flexible allocation and reallocation processes**

Engineers Australia supports this proposal. However, the implementation of this proposal imposes skilled resource requirements on ACMA to enable the impacts and risks of decisions to be fully evaluated and investigated. Engineers Australia is not convinced that current resources in ACMA would be sufficient to support implementation of this proposal without substantial risk. For transparency, any decisions must include justification and engineering value analysis to demonstrate improved outcomes.

### **Proposal 4: Establish a more transparent and flexible approach for spectrum pricing to promote efficient use and re-use of spectrum**

Engineers Australia supports this proposal in principle. Experience in opportunity cost pricing in 400MHz band in high demand areas for instance needs to be applied. Appropriate resourcing must be available to support planning and administration of such an initiative. Spectrum is a vital resource for our ICT infrastructure, requiring sound and competency-based management.

The flexibility of pricing should allow smaller entrants equitable access to spectrum, even though spectrum auctions may result in higher prices.

### **Proposal 5: Structuring payment schedules for licences**

Engineers Australia supports the principle of flexibility in arrangements for payment of licence fees.

Flexibility should also include limits on the maximum proportion of a band that one, or a group of organisations can own, to enable innovation and competition.

### **Proposal 6: The ACMA to take an open data approach to substantially improve the range, availability and quality of information provided to support an efficient spectrum market**

Any data essential for overall spectrum management (such as usage/demand profiles) should be made as open as possible. Ensuring integrity of data needs to be appropriately resourced, and is an essential role for ACMA (where the work is not contestable with private sector capabilities). An increase in flexibility of the spectrum management process increases the burden on ensuring that data is current. Obligations on maintaining current information, which is required to be lodged in a flexible spectrum market, need to be clearly articulated and compliance may need to be enforced. Engineers Australia supports the proposed open data approach.

### **Proposal 7: Payment of compensation for resuming all or part of a licence**

Engineers Australia offers no comment on the assumption that fair compensation will be determined by an appropriate mechanism which can be subject to appeal and resolution in a timely manner.

There should be the greatest degree of certainty possible for any licence holder, and adequate compensation should be paid for any resumption of spectrum or change of technical operating parameters that may be imposed.

### **Proposal 8: Facilitate greater user involvement in spectrum management**

Delegations should be subject to the delegated authority demonstrating and maintaining relevant skills to undertake the delegated spectrum management function together with necessary reporting and documentation processes. ACMA resources (where work is not contestable with private sector capability) would be needed to verify compliance with delegated authorities.

Competency of "band managers" should potentially be determined by an independent Professional body such as Engineers Australia.

### **Proposal 9: Develop more principles-based device supply regulation**

Engineers Australia supports this proposal in principle. It is essential that adequate resources and mechanisms are available to monitor and enforce compliance. Interference compliance requirements should be made on the basis of sound engineering judgement.

Consistency should be encouraged through national (e.g. Communications Alliance, preparatory groups for WRC, etc) and international bodies (ITU, IEC/ISO, ETSI, IEEE, 3GPP, etc) constituted for matters which include spectrum management issues. There will always be inconsistencies due to cutting edge developments, requiring harmonisation to deal with ongoing transitions in use.

### **Proposal 10: Improve regulation by extending the suite of enforcement measures available to the ACMA**

Engineers Australia supports this proposal in principle. Compliance and enforcement should be consistent with that used generally in the ICT sector, especially Telecommunication standardisation/compliance practice. The implications for resourcing of ACMA for enforcement action need to be recognised.

Engineers Australia notes the role of regulatory authorities reporting to Minister(s) is to ensure the authorised use of spectrum by licensing and by fair use of unlicensed spectrum. Interference and excessive intrusion by other users should be detected and prosecuted. There is great scope for the monitoring to be automated through application of electronic warfare technologies.

### **Proposal 11: The ACMA to continually review options for allocating spectrum to alternative / higher value uses and to ensure that barriers to achieving this are reviewed and removed where appropriate**

Engineers Australia supports this proposal in principle. Higher value has a subjective aspect and value well beyond commercial value must be considered. In particular, spectrum use where a community service is involved (e.g. emergency services, transport services and broader issues such as research use, remote sensing, transport systems, sensor networks, etc) may require recognition of values which may not be apparent today. Where such value is apparent, an appropriate mechanism for measuring the value of the spectrum use needs to be established. International treaty obligations may additionally impose restraints on moving to high value use.

A competitive market that promotes competition, innovation and community needs, is supported by Engineers Australia provided it is based on sound evidence-based engineering analysis.

### **Comments**

Engineers Australia makes the following comments in respect to the specific proposals

#### **1. What changes should be made to the proposals outlined in this paper to make them work more effectively?**

Engineers Australia does not propose changes to the principles embodied in the proposals. However, we are concerned that the effective implementation and management of the changes be adequately resourced (where the work is not contestable with private sector capabilities).

The success or otherwise of the changes needs to be measured, and apart from financial outcomes, objective measures should be developed in relation to the quality of the user experience in the use of services supported by radio frequency spectrum.

Safety critical services such as road vehicle collision avoidance should be subjected to safety case assessment that considers the effects of loss of transmission or interference that degrades the communications service.

The subjective value of spectrum to be taken into account under the principles outlined needs to be determined with appropriate review and scrutiny.

### **2. What additional proposals should be considered?**

Engineers Australia recommends consideration of an independent certification role for proposed band managers.

The role of professional engineers in the implementation, and for compliance/audit of new legislation should be codified.

### **3. What timeframes (short-term and longer-term) should apply to implementation of the reform proposals?**

The public safety use of spectrum should be completed as a matter of priority. Immediate attention (12 to 18 months) should be given to safety of life services of all kinds, also noting the special needs of aviation, rail services and road vehicles in this respect. Simplification of the various licence types would encourage technical innovation and should also be given a high priority.

### **4. What transitional arrangements should be put in place?**

Engineers Australia recommends that mechanisms be established to mitigate opportunistic and speculative activities. This is also important for the application and use of spectrum in regional and remote areas.





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