



**Australian
Communications
and Media Authority**

Five-year spectrum outlook 2015–19

The ACMA's spectrum
demand analysis and strategic
direction for the next five years

SEPTEMBER 2015

communicating | facilitating | regulating

A large, abstract graphic at the bottom of the page consists of multiple overlapping, wavy lines in shades of teal and grey, creating a sense of movement and depth.

Canberra

Red Building
Benjamin Offices
Chan Street
Belconnen ACT

PO Box 78
Belconnen ACT 2616

T +61 2 6219 5555
F +61 2 6219 5353

Melbourne

Level 32
Melbourne Central Tower
360 Elizabeth Street
Melbourne VIC

PO Box 13112
Law Courts
Melbourne VIC 8010

T +61 3 9963 6800
F +61 3 9963 6899

Sydney

Level 5
The Bay Centre
65 Pirrama Road
Pyrmont NSW

PO Box Q500
Queen Victoria Building
NSW 1230

T +61 2 9334 7700 or 1800 226 667
F +61 2 9334 7799

Copyright notice

<http://creativecommons.org/licenses/by/3.0/au/>

With the exception of coats of arms, logos, emblems, images, other third-party material or devices protected by a trademark, this content is licensed under the Creative Commons Australia Attribution 3.0 Licence.

We request attribution as: © Commonwealth of Australia (Australian Communications and Media Authority) 2015.

All other rights are reserved.

The Australian Communications and Media Authority has undertaken reasonable enquiries to identify material owned by third parties and secure permission for its reproduction. Permission may need to be obtained from third parties to re-use their material.

Written enquiries may be sent to:

Manager, Editorial and Design
PO Box 13112
Law Courts
Melbourne VIC 8010
Tel: 03 9963 6968
Email: candinfo@acma.gov.au

Contents

Acknowledgements	5
Part 1— The ACMA’s evidence-informed spectrum management strategy	6
1. Introduction	7
1.1. Purpose	7
1.2. How evidence informs the development of the FYSO	7
1.3. Total welfare standard	9
1.4. Principles for spectrum management	10
1.5. Spectrum management decision-making framework	11
1.6. Legislation for Australian spectrum management	15
1.7. Planning instruments made by the ACMA	16
2. The year ahead—Significant issues affecting spectrum management in Australia	17
2.1. What is the external environment?	17
2.2. International developments/trends—2015 World Radiocommunication Conference positioning	18
2.3. Regulatory reform and the Spectrum Review	19
2.4. The ACMA’s red tape reduction program	20
2.5. Review of the ACMA	21
3. The ACMA’s response to the year ahead	21
3.1. Addressing current and future demand	21
3.2. Spectrum research program	22
3.3. Economics of spectrum management	23
3.4. Mobile broadband strategy	25
3.5. Economic impact of mobile broadband	26
3.6. 2014–15 achievements	27
Part 2— Significant spectrum projects in 2015–16 and beyond	29
1. Strategic approach	30
2. Theme—Maximising the overall public benefit arising from use of spectrum	32
2.1. Progress on the mobile broadband strategy	32
2.2. 1800 MHz band in regional Australia	34

Contents (Continued)

2.3.	Review of the 800 and 900 MHz bands	34
2.4.	Priority compliance areas	35
2.5.	Broadcasting regulatory issues	36
2.6.	Spectrum pricing initiatives	37
2.7.	Unsold 700 MHz lots	38
3.	Theme—Reducing the cost to business arising from regulation	39
3.1.	Customer Service Centre	39
3.2.	Contemporary licensing and assignment tools	39
4.	Theme—Current reform priorities	40
4.1.	Spectrum Review	40
4.2.	Implementing outcomes from the 400 MHz band review	40
5.	Theme—Ensuring the national interest	41
5.1.	Preparation for the International Telecommunication Union World Radiocommunication Conference in November 2015	41
6.	Watching brief beyond the next twelve months	42
6.1.	5G	42
6.2.	M2M and IoT	42
Part 3— Indicative work plans 2015–19		44
1.	Purpose	45
1.1.	Development of the indicative work programs	45
1.2.	The indicative work programs	45
1.3.	Consultation for spectrum management changes	46
Schedule 1: Band-by-band work program		48
2015–16		49
2016–17		52
Longer-term		54

Contents (Continued)

Schedule 2: Regulatory and service-planning work programs	55
2015–16	56
2016–17	59
Invitation to comment	60
Appendix A—Table of frequency bands	62
Appendix B—Acronyms and abbreviations	63
Appendix C—WRC-15 Agenda items	66

Chairman's message



Welcome to the 2015 edition of the Australian Communications and Media Authority's Five-year spectrum outlook (FYSO).

The first FYSO was released in 2009 as part of a three-pronged approach by the ACMA to improve our engagement with industry and Australian citizens on spectrum management issues. The purpose of the FYSO was to provide industry with an annually updated overview of spectrum priorities and issues over the near to medium term, at least so far as the ACMA views it. To this initiative was added the ACMA's Principles of

spectrum management, which appear in this document in Part 1, and a program of public forums including the ACMA's flagship *RadComms* conferences and subject-specific 'Tune-up' events.

This approach has led to widespread recognition of the ACMA as a world-leading spectrum regulator and has in itself been an essential contribution to the ACMA delivering best-practice converged communications regulation.

Over the period since 2009, the ACMA has delivered a number of important outcomes, including the reallocation of the digital dividend (700 MHz), the associated completion of the digital television switchover and the progressive harmonisation of government spectrum use in the 400 MHz band.

I believe the current regulatory framework has served us (the ACMA and all the industry, government and citizen spectrum stakeholders) well. However, the development of new technologies, together with increased and varied demands from users who are seeking greater flexibility in spectrum access and licensing, has set the scene for the review of spectrum management and regulation in Australia. In parallel with the ACMA's 'business as usual' work, manifest in the FYSO, the Authority will continue to work with the government as it implements the recommendations of the Spectrum Review. You are likely to see further changes to the way the ACMA goes about its spectrum regulation work in the future. It potentially offers exciting, value adding opportunities.

This year's FYSO brings together in one place information, analysis and work plans, with the aim of giving you easy access to information, as well as encouraging collaboration between all users of spectrum.

The 2015-19 FYSO concentrates primarily on near to medium term issues and the ACMA's plans to address them. Our portfolio of activities is packed with important projects, including:

- > the refreshing and re-articulation of the ACMA's mobile broadband strategy
- > 1800 MHz—regional and remote band planning and allocation
- > a review of the 800 and 900 MHz bands

- > the continued operation and success of the new ACMA Customer Service Centre
- > an upgrade of contemporary licensing and assignment tools
- > our contribution to assist the government implement the recommendations of the Spectrum Review.

This year's FYSO reflects the ACMA's commitment to ongoing consultation and partnership with industry, the Australian public, government and our international colleagues. This consultation and partnership is exemplified in the focus of this edition on the work of the ACMA and industry on Australia's preliminary views in the lead-up to the highly influential international radiocommunications regulatory forum in Geneva later this year (WRC-15).

While the FYSO focuses on the near- to medium-term issues, we remain acutely aware of the importance of various longer-term issues. Two key matters come to mind:

- > Planning for the implementation, by the ACMA and government, of the outcomes from the review of spectrum management in Australia especially the inevitable long-dated transitional issues, and how that can position us to deliver an updated regulatory toolkit to address the spectrum management issues of the next decade and beyond.
- > How the outcomes of WRC-15 will affect Australia and how implementation might affect the ACMA's future work plans.

The ACMA continues to critically evaluate demand and the need for spectrum across all sectors to better understand the complex and dynamic interaction of social, economic and technical factors that will continue to drive spectrum requirements.

As always, we actively seek your feedback (via spectrumlicensingpolicy@acma.gov.au) to assist us in delivering spectrum management activities consistent with our strategic goal—to make communications and media work in Australia's public interest', which in turn, will help us meet our self-imposed performance standard 'To be, and to be recognised as, a world-leading, best-practice converged communications regulator'.

I would like to take this opportunity to thank you for taking the time to read and engage with this edition of the FYSO.



Chris Chapman
Chairman

Executive summary

Radiofrequency spectrum is a finite, naturally occurring resource and a major asset to Australian industry and consumers. It allows for services such as wireless broadband and communication to be delivered to multiple devices, safety-of-life, broadcasting (both television and radio) and multiple small business applications, such as two-way radios.

The Australian Communications and Media Authority (the ACMA) manages Australia's radiofrequency spectrum within a rapidly changing and evolving environment. The increasing sophistication of wireless technologies, and the rapidly growing and competing demand for spectrum from different users and services, means that spectrum management is becoming increasingly challenging. Part of the ACMA's task is to balance the needs of existing spectrum users with facilitating access for new technologies.

The object of the ACMA's Five-year spectrum outlook (FYSO) is to outline the fundamental issues that affect spectrum requirements and management over the next five years. It outlines the ACMA's proposed actions to address these issues, while also highlighting the spectrum issues that could arise for radiocommunications services beyond the issue year of the FYSO.

The FYSO is an annual update that assists the ACMA to improve its performance of its spectrum management functions. Stakeholders can use the FYSO to identify when the ACMA expects a particular work program to commence, and to understand the priority applied to particular activities by the ACMA.

Within this context, this FYSO is provided in three parts.

Part 1 articulates, at a high level, the ACMA's decision-making framework, and how evidence informs the FYSO and the ACMA in developing its work programs. Also, within the context of the external environment, the FYSO provides an overview of the year ahead by addressing some of the significant issues that may affect spectrum management in Australia. Some of these include Australia's preparation for the World Radiocommunication Conference in Geneva and an overview of broader radiocommunications policy initiatives, including the government's decision to implement the three main recommendations of the Spectrum Review. A key issue will be how the outcome of the review will affect the ACMA's spectrum management activities into the future.

This part also addresses the ACMA's response to the year ahead are by outlining some of the key tools the ACMA uses to address the demand on spectrum, such as:

- > the spectrum research program, which is a vital element of the ACMA's analysis of the broader spectrum management environment
- > the importance of spectrum as an input for driving economic growth and discussion on the economics of spectrum management
- > highlighting the ACMA's work on the mobile broadband strategy
- > how the current legislative basis impacts upon how the ACMA manages access to the radiofrequency spectrum

- > outlining the planning instruments that allow the ACMA to plan and allocate radiofrequency.

Finally, this part provide a list of the projects and outcomes achieved by the ACMA since the release of the 2014–18 edition.

Part 2 describes the overarching framework within which the ACMA determines its key priority areas and work program for the near term. This part is aimed at providing a level of transparency to stakeholders about the pressures on spectrum, and the priorities assigned to particular spectrum management activities in response to those pressures.

Key priority areas arise through four broad themes, which are informed by the ACMA's research program and the ACMA's work to further the government's deregulatory agenda.

The first theme—maximising the overall public benefit arising from use of spectrum—reflects the ACMA's Principles for spectrum management. This theme explains why, for example, the ACMA's mobile broadband strategy, the review of the 1800 MHz band in regional and remote area of Australia, and review of the 800 and 900 MHz bands are current priority areas. This theme also provides up-to-date information on the ACMA's priority compliance areas, broadcasting regulatory issues and spectrum pricing initiatives.

The second theme—reducing the cost to business arising from regulation—reflects the government's deregulatory agenda. This theme explains why, for example, the ACMA's new system, the SPECTRA Enterprise Suite from LS telcom, is a current priority area. It will improve functionality associated with assigning frequencies and allocating licences. The introduction of the new suite of tools also provides the ACMA with the opportunity to improve its business processes.

The third theme—implementing current reform priorities—recognises that the ACMA is responsible for implementing major reform priorities: for example, the review of spectrum management in Australia and implementing the outcomes of the 400 MHz band review.

The final theme—ensuring the national interest—acknowledges that sometimes ongoing work programs become a key priority area because this work culminates in decisions that have far-reaching consequences for future spectrum management. This theme explains why, for example, preparations for the World Radiocommunications Conference (WRC) to be held by the International Telecommunications Union (ITU) in Geneva in November 2015 is a key priority area for the ACMA.

Part 3 sets out the ACMA's five-year spectrum management work plan. This section includes details on proposed commencement or completion timeframes. The intention is to provide greater clarity on what action the ACMA is taking in response to identified pressures and the timing of those actions so that stakeholders have an early opportunity to provide feedback to the ACMA on that work plan.

Acknowledgements

In developing the 2015–19 FYSO, the ACMA gratefully acknowledges the input provided, in response to the *Five-year spectrum outlook 2014–18*, by the following individuals and organisations:

- > [Australian Radio Communications Industry Association](#)
- > [Australian Subscription Television Association](#)
- > [Communications Alliance Ltd](#)
- > [Motorola Solutions](#)
- > [Northwest rapid transit](#)
- > [O3b Limited](#)
- > [Qualcomm](#)
- > [Telstra](#)
- > [Transport for NSW.](#)

Part 1—
The ACMA's evidence-informed
spectrum management strategy



1. Introduction

The ACMA is an independent statutory authority within the Australian Government's communications portfolio. The ACMA manages the radiofrequency spectrum in accordance with its obligations under the *Australian Communications and Media Authority Act 2005* (the ACMA Act) and the *Radiocommunications Act 1992* (the Act).

The ACMA supports the efficient, effective and appropriate operation of the Australian spectrum management regulatory regime. The annual FYSO is an important tool that assists in realising this goal. Initially launched in 2009, the FYSO continues to provide insight and transparency for industry and government spectrum users about pressures on spectrum; and the direction of the ACMA's spectrum management work in the short, medium and longer term to respond to those pressures.

The FYSO is a vital component in the ACMA's consultation and planning framework for spectrum management. It provides information on spectrum use and management, and in turn facilitates engagement on specific spectrum issues, discussion papers, as well as facilitating feedback through spectrum tune-ups and the ACMA's *RadComms* conference.

Through these targeted mechanisms, the ACMA is working to actively engage all stakeholders in an open discussion on the demands on spectrum, prioritising spectrum projects and possible changes to spectrum access arrangements. This partnership approach is critical in managing the scarce natural resource that is the key communications-enabler in a converged communications environment, and assists the ACMA to improve the ACMA's regulatory toolkit and frameworks.

1.1. Purpose

The FYSO provides an overview of the radiocommunications environment and work plans to illustrate the direction of the ACMA's spectrum management work in the short, medium and long term. The ACMA consider that some level of certainty about the ACMA's activities can be provided within the timeframe of this FYSO, such as the work plans for the 2015 to 2017 periods outlined in Part 3. However, as identified in previous FYSO's, the level of certainty decreases for the fourth year (2018), due to the speed within which technology evolves and impacts on the associated capability and efficiencies derived from the use of the spectrum.

The FYSO is intended to provide an avenue for meaningful engagement with stakeholders about emerging pressures on spectrum. It is not intended to be a substitute for separate and targeted industry consultation on specific spectrum management issues. For this reason, any observations on proposed approaches outlined in parts 2 and 3 of this FYSO may only represent the ACMA's preliminary thinking.

1.2. How evidence informs the development of the FYSO

The ACMA undertakes its own scan of the domestic and international spectrum environment to identify trends in spectrum use and likely future pressure points on spectrum. While there is an inherent degree of uncertainty in predicting spectrum requirements over the next five years, consideration in advance of the likely pressure points on spectrum is valuable for two reasons. Firstly, it should ensure that the ACMA's work priorities are closely linked to actual emerging demand pressures. Secondly, it should provide a greater degree of industry certainty about the ACMA's priorities and promote dialogue with spectrum users about these priorities.

The ACMA uses the following key types of information to support its decision-making and regulatory policy development activities:

- > public interest tests
- > industry data
- > technical information and technology research
- > social and market research
- > economic modelling and analysis
- > consumer complaints data
- > expert knowledge and practice know-how
- > broader government policy objectives
- > international developments.

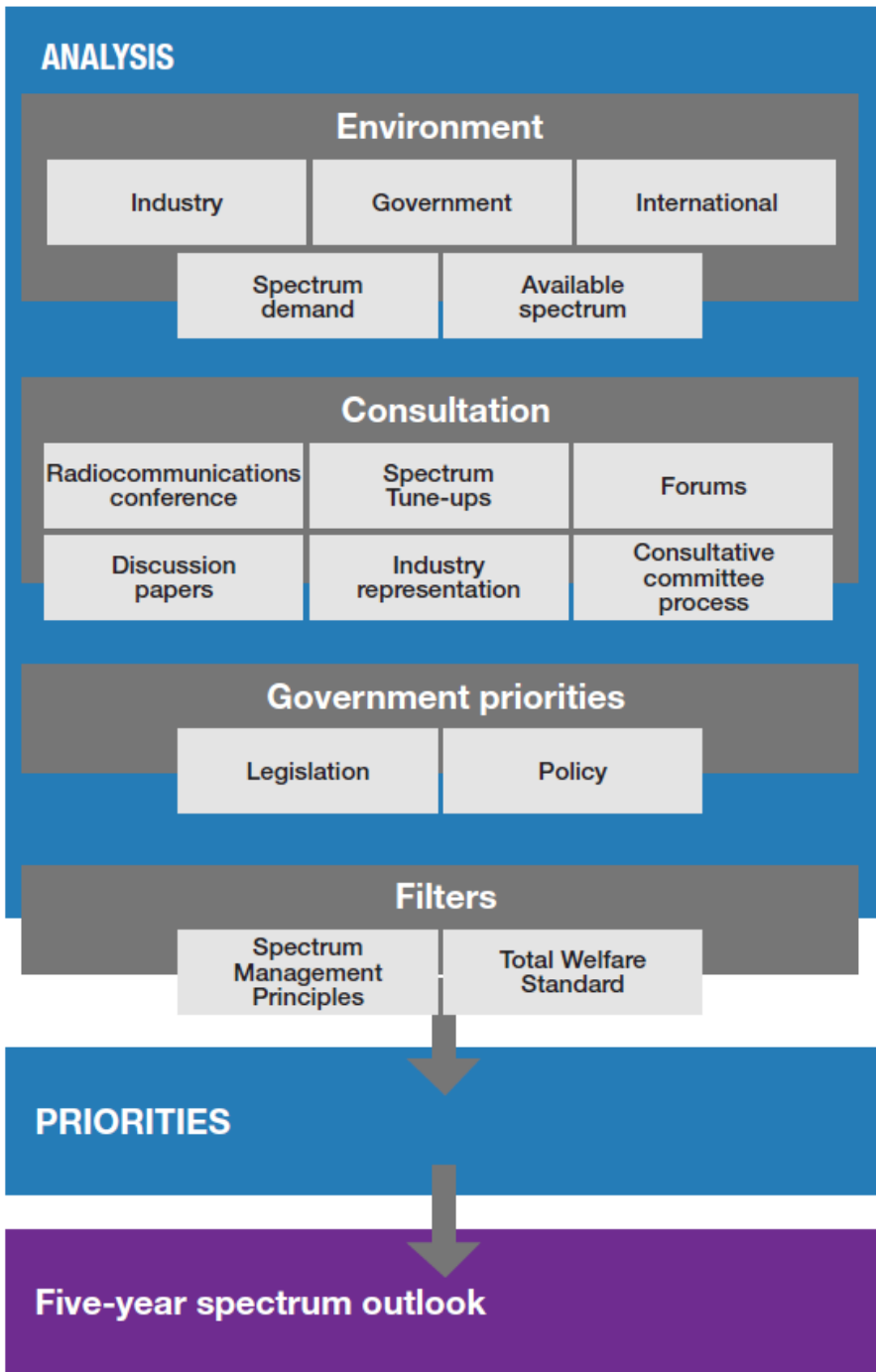
Consideration of the above points will ensure that the ACMA's work priorities are closely linked to actual emerging demand pressures. In turn, this should provide certainty to industry about the ACMA's priorities and promote dialogue with spectrum users about these priorities.

The ACMA has a broad research program, of which spectrum research is an important part. The spectrum research program is concerned with building better tools for spectrum demand forecasting, valuation and decision-making tools to support planning and allocation decisions and improve the ACMA's function as an effective and efficient regulator.

In addition to the ACMA research program, the ACMA relies on the evidence obtained from its scanning of the spectrum environment, including outcomes of consultation with industry and stakeholders, as a key means of informing the ACMA's view on spectrum demand, spectrum availability and, ultimately, its work plan.

When considering issues for inclusion in the FYSO, a comprehensive approach is undertaken, based on the best available evidence. Figure 1 illustrates how the ACMA uses this evidence to inform its work plans for spectrum management.

Figure 1: How evidence informs the FYSO



1.3. Total welfare standard

In fulfilling its statutory obligations, the ACMA aims to make regulatory decisions that are in the ‘public interest’. The ACMA uses the Total Welfare Standard to give effect to the public benefit object in Part 1.2 of the Act¹:

maximise, by ensuring the efficient allocation and use of the spectrum, the overall public benefit derived from using the radiofrequency spectrum.

Subject to the statutory framework provided by the Act, the ACMA uses a Total Welfare Standard as its overarching framework when assessing the optimal approach to individual spectrum management issues.

When a Total Welfare Standard is applied, the impact of a regulatory proposal on the public interest is measured as the sum of the effects on consumers, producers, government and the broader social impacts on others in the community.

A Total Welfare Standard requires that, to the extent possible, all significant benefits and costs arising from a regulatory proposal are given the same weight regardless of the identity of the recipient; and the approach expected to generate the greatest net benefits for the community is the preferred approach. This is consistent with best practice regulation as guided by the Office of Best Practice Regulation (OBPR).²

The ACMA recognises that the assessment of costs and benefits using a Total Welfare Standard approach will often need to take into account both quantitative and qualitative factors. Since 2007, the ACMA has adopted a [Total Welfare Standard](#)³ for use when:

- > the policy and legislative framework provides the ACMA with discretion about the tests it might apply
- > a regulatory intervention might have a significant economic impact on consumers, producers or other stakeholders.

The ACMA uses a Total Welfare Standard for assessing the costs and benefits of different regulatory and market mechanisms for specific spectrum management issues, where appropriate. It is important to note that the impact on total welfare is only one important factor that the ACMA will take into account. The ACMA will apply the Total Welfare Standard in conjunction with the Principles for spectrum management and the spectrum management decision-making framework.

1.4. Principles for spectrum management

The ACMA's [Principles for spectrum management](#)⁴ (the principles) are designed to provide further guidance about the ACMA's approach to management of the spectrum. The principles are intended to be used in conjunction with the ACMA's use of the Total Welfare Standard and together articulate ACMA's proposed standard approach to spectrum regulation.

The key theme of the principles is that maximising the overall public benefit from use of the spectrum requires a balanced application of both regulatory and market-based mechanisms.

The principles are:

- > Allocate spectrum to the highest value use or uses.
- > Enable and encourage spectrum to move to its highest value use or uses.
- > Use the least cost and least restrictive approach to achieving policy objectives.
- > To the extent possible, promote both certainty and flexibility.
- > Balance the cost of interference and the benefits of greater spectrum utilisation.

The ACMA is constantly monitoring the appropriateness of these principles and their interaction with the objectives of the Act and will consider the continuing applicability of

² The OBPR, [The Australian Government Guide to Regulation](#), p. 48, viewed 1 May 2015.

³ www.acma.gov.au/theACMA/About/The-ACMA-story/Facilitating/decisionmaking-process-fyso-25-1

⁴ www.acma.gov.au/theACMA/About/The-ACMA-story/Facilitating/decisionmaking-process-fyso-25-1

these principles as the government implements the key recommendations of the Spectrum Review.

1.5. Spectrum management decision-making framework

The elements listed above are some of the inputs that form part of the [Spectrum management decision-making framework](#) (the Framework).⁵ This Framework is consistent with the principles of good regulatory process and the use of all available relevant inputs produces good regulatory outcomes.

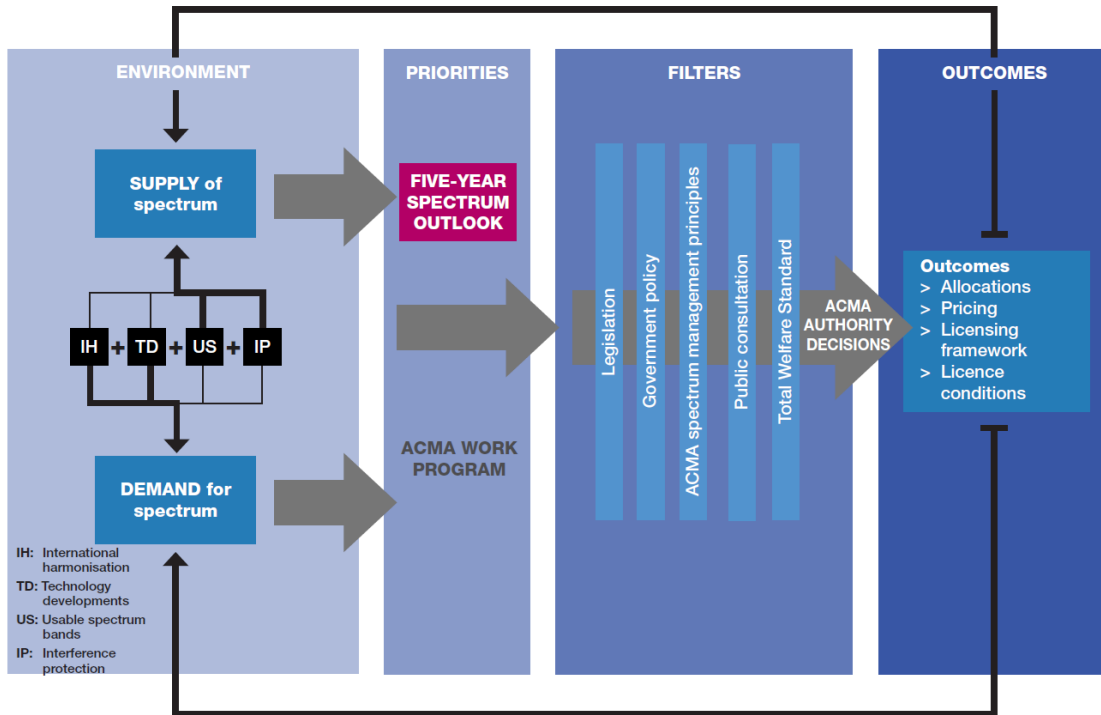
The Framework is informed by:

- > assessing the spectrum environment through:
 - > monitoring international developments
 - > listening to the needs of industry
 - > awareness of broader government requirements
 - > identification of spectrum demand/supply equation
 - > future needs of incumbents
- > consulting with industry and government via:
 - > the ACMA's annual Radiocommunications Conference (*RadComms*)
 - > the ACMA's Spectrum tune-ups
 - > other radiocommunication forums
 - > ACMA discussion papers
 - > industry representations
 - > submissions to relevant spectrum projects including the FYSO
- > identifying regulatory frameworks via:
 - > relevant legislation
 - > government policies on spectrum
- > applying overarching filters such as:
 - > the Principles for spectrum management
 - > the Total Welfare Standard.

Figure 2 illustrates ACMA's spectrum management decision-making framework. It shows the use of the principles and the place of this document in the overall process for making decisions about spectrum management.

⁵ www.acma.gov.au/theACMA/About/The-ACMA-story/Facilitating/decisionmaking-process-fyso-25-1

Figure 2: The ACMA’s spectrum management decision-making framework



The Framework process requires a significant amount of information from sources external to ACMA. The ACMA generally uses the information-gathering and work planning methodology outlined above to ensure that significant planning, licensing and pricing decisions are well-informed, robust and meaningful. This process ensures that the ACMA has a clear understanding of the technical, economic and social environments governing users and services, which then enables the ACMA to implement spectrum-management decisions that address these needs.

In addition to the Framework above, the ACMA uses the information acquired through its environmental scan outlined in Figure 1 to inform its analysis of the spectrum environment and to prioritise its work planning and decision-making process.

Environment

The following information is intended to provide stakeholders with an understanding of how the ACMA undertakes its environmental scanning process outlined in Figure 1 and uses the outcomes of this to inform its work planning and decision-making process.

Industry

Collaboration with various industry sectors and representative bodies, via both formal and informal consultation mechanisms, combined with the outcome of spectrum research and monitoring of international spectrum developments informs the ACMA’s view regarding conditions in the contemporary communications and media environments.

The outcome of this interaction between the ACMA and stakeholders is the development of spectrum management strategies with an emphasis on market developments, and the refinement of regulatory policy settings and interventions needed to support efficient use of the spectrum resource.

Government

The ACMA works closely with the Department of Communications and other central government agencies to ensure that its spectrum management strategies represent best practice regulation, reflect the government's policy agenda and further the national interest.

Best practice regulation

Developments in the spectrum environment provide an opportunity for streamlining the regulatory environment applying to radiocommunications, allowing productivity gains in the broader economy. The ACMA balances the drive for deregulation with an awareness that some level of regulation in the spectrum environment is necessary, and indeed desirable, for both industry and consumers.

At its most basic level, regulation aimed at interference management is designed to maintain the utility of the spectrum, thereby maximising the overall benefits that can be derived from a finite resource. By imposing rules that manage the risks of unacceptable levels of interference, regulation contributes to the efficient use of the spectrum. By aligning with internationally harmonised standards, regulation allows Australia to reap the benefits of economies of scale in the manufacture of equipment. International harmonisation also allows the introduction of innovative value-added services into the Australian economy.

Devices that rely on radiocommunications are integral to daily life and regulation assists individuals to have confidence that these devices will work, and work safely. Regulation also ensures the allocation and use of spectrum can accommodate the needs of community and other not-for-profit organisations, ranging from the Royal Flying Doctor Service to the Bureau of Meteorology.

The ACMA therefore considers that an appropriate level of regulation is necessary and provides an essential framework for the radiocommunications environment in Australia. This framework must be capable of responding to the rapidly changing spectrum environment.

The ACMA considers that if regulation is to achieve its purpose, it is important to actively engage with potentially affected individuals, businesses and community organisations in the development of that regulation. The ACMA is committed to the provision of transparent, collaborative and responsive regulatory regimes.

International

The ACMA and industry participate in international radiocommunications forums to promote Australia's views and expertise and to further Australian interests in spectrum management. Australian participation in these forums also facilitates the competitive provision of services and the efficient use of the radiofrequency spectrum.

The ACMA oversees extensive industry and stakeholder consultation in preparation for the International Telecommunication Union (ITU) World Radiocommunication Conference (WRC). The outcome of the 2015 WRC (WRC-15) will affect the ACMA's work plan from 2016 onwards, as Australia's radiofrequency allocations are updated to align with the ITU's requirements for the Asia-Pacific region. Further information on the ACMA and industry participation in ITU radiocommunication activities can be found at section 2.2 and Part 2, section 5.

Spectrum demand and availability

To meet stakeholder expectations and fulfil its spectrum management obligations in accordance with the objects of the Act and the [Principles for spectrum management](#), the ACMA needs to understand the critical drivers of future spectrum demand and the likely impact of these drivers on the economy. These drivers occur in both the

domestic and international context and include changing consumer demand and technology take up, the outcome of international planning decisions, and government regulatory objectives, such as the broader deregulation and regulatory reform agenda.

As the international trend to identify more spectrum for mobile services continues and economies of scale in equipment availability develop, demand for access to spectrum will also increase. The pace at which demand emerges will inevitably place increased pressure on existing spectrum management arrangements and incumbent services. The tension involved in balancing the needs of incumbent users and new users and uses of the spectrum requires the ACMA to make decisions that will affect the availability of spectrum.

The ACMA is continually exploring opportunities to increase the utility of spectrum including the potential to re-farm (reassign) or re-allocate spectrum to assist it in moving to its highest value use. An example of this commitment is the ACMA's ongoing review of bands such as 800/900 MHz, 1800 MHz, 3.5 GHz, and more recently, the outcomes of the review of the 27 GHz band. In addition, the Spectrum Review provides an opportunity to investigate and explore options to reform the regulatory toolkit to meet challenges in these areas.

To make informed policy choices, the ACMA needs research and analysis that pulls these many inputs together. During the 2014–15 period, the ACMA has completed a number of key research projects that will impact on the ACMA's future decisions on meeting increasing spectrum demand:

- > [*The economic impacts of mobile broadband on the Australian economy, from 2006 to 2013*](#)
- > [*The ACMA mobile network capacity forecasting model*](#)
- > [*Evidence-informed regulatory practice: an adaptive response, 2005–15.*](#)

The ACMA recognises that future mobile broadband services are not the only current or future spectrum uses that it should focus on. In seeking to respond to the demand for mobile broadband spectrum, it is important to take into account the needs of incumbent services, together with national safety and security obligations, and passive and sensing uses of spectrum. The recent release of the [*Beyond 2020—A spectrum management strategy to address the growth in mobile broadband capacity*](#) is one-step towards identifying the future mobile broadband requirements for industry and citizens.

Consultation

The ACMA actively encourages stakeholder engagement by identifying and sharing information about emerging technologies and regulatory thinking with its stakeholders. As outlined in the sub-categories in Layer 2 of Figure 1, The ACMA uses formal and informal stakeholder engagement strategies, and techniques that range from regular direct discussions with interested organisations and individuals, to formally constituted advisory committees. As well as the FYSO, some of the direct strategies include:

- > RadComms conferences
- > Spectrum tune-ups
- > the release of formal and occasional papers
- > ongoing collaboration with industry and other stakeholders via meetings, e-newsletters and portal approaches (for example, e-newsletters and portals available to accredited persons, and the implementation process for the outcomes of the 400 MHz review)
- > mature processes for obtaining stakeholder input into its involvement in the ITU processes, most notably in preparation for World Radiocommunication Conferences.

These initiatives are in addition to the ACMA's well-established discussion paper process.

The ACMA's multi-faceted approach to consultation recognises that spectrum management is a topic that has significant strategic and operational aspects, and a particularly diverse range of stakeholders. When undertaking consultation processes, some overarching issues that the ACMA considers include:

- > providing clarity in the key messages presented
- > meeting the obligatory consultation requirements
- > providing appropriate timing for consideration and response to issues
- > taking opportunities to work in partnership with industry, government and the community to further common regulatory objectives
- > understanding the capacity and resources of the ACMA and stakeholders in engaging on various issues
- > using the best methods of communicating with affected stakeholders
- > committing to accountability and transparency in all matters.

The ACMA generally uses the information provided by stakeholders to ensure that significant planning, licensing and pricing decisions are well informed, robust and meaningful. This process ensures that the ACMA has a clear understanding of the technical, economic and social environments governing users and services, which enables the ACMA to implement spectrum management decisions that address these needs.

Priorities

The outcomes of the environmental scanning and consultation processes provide the ACMA with the necessary information to generate the detailed spectrum management work plans contained in this document.

This approach also informs a prioritisation process, which allows the identification of key areas of ACMA focus in the following year.

Given this broad analysis and decision-making framework, the ACMA welcomes stakeholder commentary on whether there are other factors that it should be aware of in developing future spectrum management priorities and work programs.

See the ACMA website for more information on the role of research in [evidence-informed decision-making and regulation](#).

1.6. Legislation for Australian spectrum management

The ACMA is responsible for managing the radiofrequency spectrum in accordance with section 9 of the *Australian Communications and Media Authority Act 2005* (the ACMA Act) and the Radiocommunications Act.

The Radiocommunications Act sets out the objectives the ACMA must consider in undertaking this task, as well as the regulatory tools that are available to it, including frequency planning, licensing, making standards and overseeing compliance with licence conditions to avoid interference with other spectrum users.

The objects of the Act are to provide for management of the radiofrequency spectrum in order to:

- > maximise, by ensuring the efficient allocation and use of the spectrum, the overall public benefit derived from using the radiofrequency spectrum
- > make adequate provision of the spectrum:
 - > for use by agencies involved in the defence or national security of Australia, law enforcement or the provision of emergency services
 - > for use by other public or community services
- > provide a responsive and flexible approach to meeting the needs of users of the spectrum
- > encourage the use of efficient radiocommunication technologies, so that a wide range of services of an adequate quality can be provided
- > provide an efficient, equitable and transparent system of charging for the use of spectrum, taking account of the value of both commercial and non-commercial use of spectrum
- > support the communications policy objectives of the Australian Government
- > provide a regulatory environment that maximises opportunities for the Australian communications industry in domestic and international markets
- > promote Australia's interests concerning international agreements, treaties and conventions relating to radiocommunications or the radiofrequency spectrum.

1.7. Planning instruments made by the ACMA

The Radiocommunications Act sets out the powers of the ACMA in relation to frequency planning and provides for the preparation of plans that will govern the allocations of the spectrum.

The [Australian Radiofrequency Spectrum Plan 2013](#) (the Spectrum Plan) is a legislative instrument administered by the ACMA and is the highest-level spectrum-planning document. It divides the Australian radiofrequency spectrum into a number of frequency bands and specifies the general purpose for which each band may be used in Australia. The Spectrum Plan is drawn from, and kept current with updates to Article 5 of the ITU [Radio Regulations](#). The Radio Regulations are revised every few years at the WRC. The Radio Regulations edition of 2012 is the latest version. The last revision of the Spectrum Plan was in January 2013.

The Spectrum Plan is designed to:

- > make provision for specified types of services to operate in each frequency band, and specify high-level conditions attached to their operation
- > be consistent with Australia's obligations as a member of the ITU
- > provide details of international frequency allocations agreed by the ITU for regions 1, 2 and 3
- > identify Australian arrangements that differ from the ITU
- > ensure that ACMA planning and licensing decisions that are consistent with the spectrum plan requirements, promoting harmonisation in spectrum usage.

The Spectrum Plan, while it is the first radiofrequency planning document that should be consulted, it is just the starting point and is not usually sufficient for managing the more detailed aspects of spectrum management required for frequency coordination and interference management. Such information is contained in a variety of legislative instruments and administrative policy documents. These provide spectrum management frameworks for radiocommunication services operating under the

apparatus, class or spectrum licensing systems provided for under the Act. Broadly speaking these are:

- > [Spectrum licensing technical frameworks](#)—a collection of predominately legislative instruments with some technical spectrum policy documents that support management of the spectrum licensing system.
- > [Radiocommunications class licence](#)—legislative instruments that provide detailed description of requirements on the use of specific parts of the spectrum.
- > [Apparatus licence conditions](#)—coordination and spectrum planning requirements contained in a collection of legislative instruments and technical spectrum policy documents that provide detailed guidance on specific spectrum access arrangements, such as permitted frequency channelisation and antenna performance characteristics in support of the apparatus licensing system.
- > [Frequency band plans](#)—legislative instruments that provide detailed description of requirements on the use of specific parts of the spectrum.
- > [Radiocommunications Assignment and Licensing Instructions \(RALIs\)](#)—RALIs are technical spectrum policy documents that provide detailed guidance on specific spectrum access arrangements, such as permitted frequency channelisation and antenna performance characteristics. RALIs are subject to periodic review and are amended as the ACMA considers necessary.
- > [Administrative band plans](#)—technical spectrum policy documents (RALIs) that serve a similar purpose to legislative frequency band plans, but without the latter’s statutory obligations. They provide a spectrum policy basis for use of specific parts of the spectrum.
- > [Spectrum embargoes](#)—technical spectrum policy document (RALI) used in support of spectrum re-planning process to perverse spectrum options during the replanning process. They alert industry of the ACMA approach to licence issue and renewal in frequency bands subject re-planning. They are used in conjunction with other policy and planning tools. A spectrum embargo includes details of the frequency band, date of effect, coverage area, time frame, instructions and reasons for the spectrum embargo.
- > [Radiocommunications standards](#)—the ACMA develops radiocommunications standards under section 162 of the Act to ensure compatibility with, or to limit emissions from, transmitters. To do this, the ACMA requires manufacturers and importers of radiocommunications products and their authorised agents to comply with its supplier-based labelling scheme. The scheme aims to ensure that radiocommunications products meet relevant ACMA mandatory standards before these products are placed on the Australian market.

2. The year ahead—Significant issues affecting spectrum management in Australia

2.1. What is the external environment?

There are significant challenges in spectrum management over the next decade and how these challenges unfold remains unclear.

Both the regulator and stakeholders need to build capabilities that remain flexible and agile to respond to any number of challenging future scenarios. However, at present some of the developments in the expansion of spectrum use have either commenced or are imminent.

For example, the drive for greater mobility and continual growth of ‘spectrum hungry’ content (especially in 4G devices and then eventually 5G technologies) will exacerbate any possible capacity crunch. At the same time, continued growth in internet-enabled wireless devices, machine-to-machine (M2M) and machine-to-people (M2P)

applications place further emphasis on the development of the ‘internet of things’ (IoT) and in the future the ‘internet of everything’ (IoE). On the supply side, as new technologies are developed, improved licensing methods will be required to facilitate the increased role of spectrum sharing as a response to the forecast shortage of spectrum. Spectrum will also be more dynamically used, as smart antennae and smaller cells will optimise the use of wireless infrastructure.

These competing demands for spectrum bands (especially in the lower frequencies) will require the regulator (in consultation with stakeholders) to carefully weigh decisions about the allocation of spectrum. This will include consideration of the needs of incumbent services (and their sunk capital investment), together with national safety and security obligations and vital passive and sensing uses of spectrum.

2.2. International developments/trends—2015 World Radiocommunication Conference positioning

A key component of spectrum planning in Australia is participation in the spectrum planning activities of the International Telecommunication Union (ITU). The ITU is the United Nations specialised agency responsible for information and communications technology issues; providing a forum for governments and industry to coordinate global development and regulation of radiocommunication services and satellite services, amongst other things.

The ITU Radiocommunication Sector (ITU-R) plays a key role in the global management of the radiofrequency spectrum. The ITU-R assists in ensuring the rational, equitable, efficient and economical use of the radiofrequency spectrum by all radiocommunications services through carrying out studies and approving recommendations on radiocommunications matters. Where appropriate, decisions made by the ITU-R may flow through into updated Australian spectrum arrangements.

At a regional level, other organisations seek to achieve harmonised views on spectrum planning and radiocommunications issues. From an Australian perspective, the most important of these is the Asia-Pacific Telecommunity (APT), the Asia-Pacific region representative body in the ITU. Others include the Inter-American Telecommunication Commission (CITEL), the European Conference of Postal and Telecommunications Administrations (CEPT), the Arab Spectrum Management Group (ASMG) and the African Telecommunications Union (ATU).

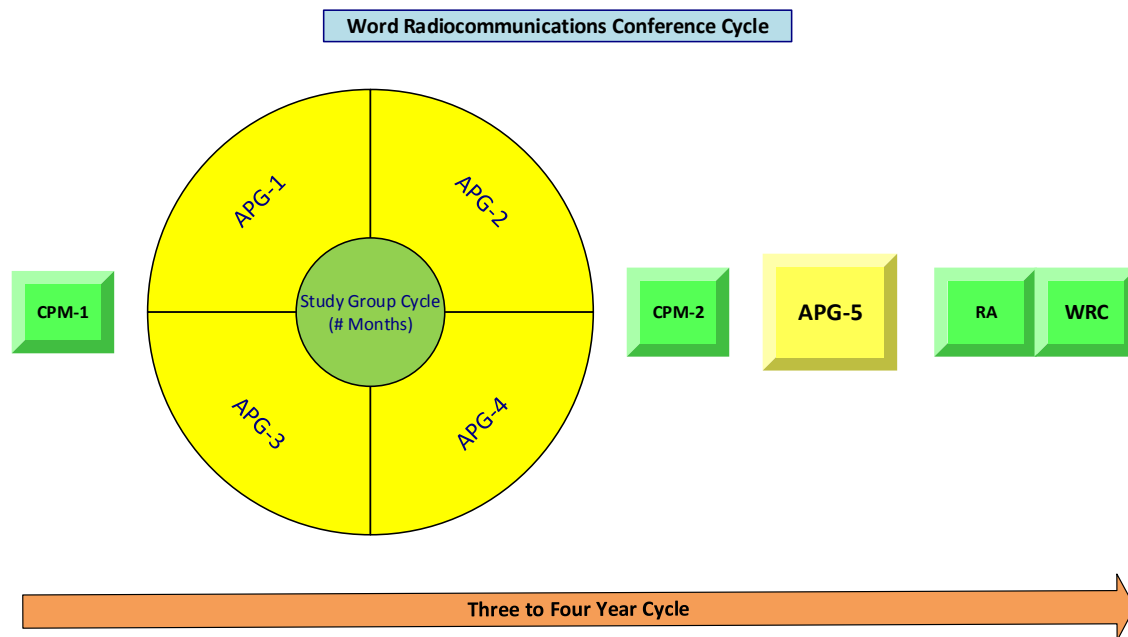
The ACMA and Australian industry participate in international radiocommunications forums to promote Australia’s views and expertise—and to protect Australian interests—in spectrum management, facilitating the competitive provision of services and the efficient use of the radiofrequency spectrum.

Central to these issues is the ITU World Radiocommunication Conference (WRC), held every three or four years. The WRC reviews and revises the [Radio Regulations](#) that governs the international use of the radiofrequency spectrum and the geostationary-satellite and non-geostationary satellite orbits. The next WRC is scheduled for 2–27 November 2015 in Geneva Switzerland (WRC-15). The ACMA oversees extensive industry and stakeholder consultation in preparation for this and other important international meetings. Australian industry and stakeholder involvement is essential in ensuring that the decisions and future development of international radiocommunications regulations serve Australia’s interest. This is led by the ACMA’s Preparatory Group for WRC-15 (PG WRC-15) and the Australian Radiocommunications Study Groups (ARSGs), which mirror the work of the ITU-R Study Groups established for WRC-15. The ACMA chairs the PG WRC-15 and membership includes representatives of both government and industry. The six ARSGs are chaired by a mix of government and industry representatives, coordinated by the ACMA.

An important part in the WRC preparatory process involves the ACMA working closely with APT to achieve a coordinated approach to radiocommunications issues in the Asia–Pacific region. Cooperation within the APT results in Australia’s positions and proposals to a WRC being harmonised with those of other countries in the region, increasing the likelihood of these being considered favourably at the WRC.

Figure 3 below provides an illustration of the WRC cycle. Note the cycle is at the APG-5 stage of planning for WRC-15.

Figure 3: WRC cycle



2.3. Regulatory reform and the Spectrum Review

In May 2014, the Minister for Communications announced that a comprehensive review of the spectrum management framework would be undertaken. The current spectrum arrangements were established in 1992, with the last substantive review undertaken in 2002.

When the current spectrum arrangements were introduced, the framework was progressive by international standards in its use of market mechanisms, administrative, regulatory adaptation and commons approaches. However, changes in technology, markets and consumer preferences in the communications sector suggest there is a case to modernise the regulatory framework to better deal with the increasing demand for spectrum from all sectors.

In 2013, the ACMA released an updated version of *Broken concepts—The Australian communications legislative landscape*, which highlighted the ever-increasing strain on old legislative and regulatory concepts struggling with new technology. This paper was released along with a companion piece titled [Enduring concepts—Communications and media in Australia](#)⁶, which seeks to identify those concepts that are of ongoing importance to media and communications in Australia, notwithstanding the pressures

⁶ www.acma.gov.au/theACMA/enduring-concepts-building-blocks-for-a-converged-media-and-communications-future

of convergence. The two concept papers neatly framed the challenges for a regulator focused on a 'converged structure'.

The Spectrum Review, conducted by the Department of Communications in conjunction with the ACMA, examined the operation of the Act and other radiocommunications primary and subordinate legislation (including regulations and delegated instruments). The review also considered the interaction of the Act with other portfolio legislation including the *Broadcasting Services Act 1992*, the *Telecommunications Act 1997* and the ACMA Act.

The Spectrum Review examined the effectiveness of the current framework and identified opportunities to make arrangements more efficient, effective and flexible, while ensuring interference issues are appropriately managed and providing certainty for incumbents. It also considered opportunities for reducing regulation and exploring non-legislative reform approaches where possible.

The Spectrum Review, allied to the government's deregulation agenda, provided an opportunity to reflect on the regulatory framework for spectrum management by systematically and diligently removing outmoded and unnecessarily burdensome elements, as well as assessing the fit of regulatory tools for the contemporary environment. The government has considered the recommendations of the Spectrum Review and has agreed to implement the three main recommendations.

Over the longer term, the ACMA will continue to contribute its evidence base and experience to assist in the development of reform proposals. The Spectrum Review also provided the opportunity to address what the ACMA sees as five key pressures manifesting in different ways across communications and media:

1. extraordinary technology developments
2. market and industry structural change
3. heightened consumer and citizen engagement
4. the incessant globalisation of markets
5. the need for regulation and national digital communications strategies.

2.4. The ACMA's red tape reduction program

Following the government's announcement to reduce the burden of 'red/green tape' on the Australian economy, and the Minister for Communications' de-regulatory framing paper, the ACMA is continuing its commitment to reduce red-tape. Where implementation of deregulatory measures involves the ACMA considering the removal, simplification or other changes to existing regulation, the ACMA's decision-making process will continue to be undertaken in the context of its statutory obligations, and on the basis of a comprehensive risk assessment with careful examination of the impact of any proposed change.

The ACMA is actively identifying areas where it can directly reduce overly burdensome regulation in the short to medium term.

The ACMA has identified early opportunities for reform including:

- > process improvements to reduce the costs to industry in dealing with the ACMA on licence and other resource allocation issues (for example, the new Customer Service Centre and Project HELM, which will provide enhanced support for ACMA IT applications in spectrum management)
- > undertaking a comprehensive stocktake of existing regulation
- > removing redundant and spent regulatory provisions.

2.5. Review of the ACMA

On 12 June 2015, the Minister for Communications announcement a review of the ACMA. The review will examine the ACMA's objectives and functions, structure and governance, performance and resourcing to ensure that it remains fit-for-purpose post for the contemporary and future communications regulatory environment. The review will be undertaken by the Department of Communications and will be supported by a reference group of Australian and international communications and regulatory experts.

As outlined in the Minister's media release, *'the review will consider the current communications sector and the evolving shape of the digital media and communications environment and how the role of the communications regulator should adapt to these over time. The review will take into account broader regulatory reform programmes being implemented by the Government.'* This includes the deregulatory agenda discussed in section 2.4 above.

Read [further information about the review](#).⁷

3. The ACMA's response to the year ahead

3.1. Addressing current and future demand

There is widespread recognition that mobile broadband services are an economic enabler and that the provision of these services, technologies and applications in the wider community is in the public interest. The expectation of end users for access to services exhibiting increased speed and data allowance puts pressure on network operators in meeting demand and leads to requests from operators for access to greater amounts of spectrum.

Part of the ACMA's role is to gain an understanding of the critical drivers of future spectrum demand, and the likely impact of these drivers may have on the economy. As these drivers are both varied and connected, and can materialise from within Australia and from beyond our shores, the ACMA uses research and analysis to pull these many inputs together to help make informed policy choices.

Over the next few years, further pressure will be placed on the ACMA's existing capability to respond flexibly to new spectrum management challenges. The ACMA will continue to investigate and explore options to reform its regulatory toolkit to meet these rising challenges. It is likely that technological evolution will continue to require a shift from fixed to mobile arrangements in some bands. Traditional allocation methods will come under ever-increasing pressure to manage demand for access to bands to meet the future spectrum requirements of both government and commercially-driven businesses. Streamlined spectrum regulation and efficient processes will be essential to ensure the Australian communications environment continues to cultivate technological innovation.

In Australia there are already more wireless than fixed-internet subscribers. This shift is expected to continue as outlined in the ACMA [Communications report 2013–14](#).⁸ Data traffic has surpassed voice on mobile networks, though at this stage, the total volume of wireless data traffic is less than fixed data traffic. A priority for the ACMA in the next decade will be making more spectrum available to meet this unprecedented growth in demand for mobile broadband and next generation services, while ensuring the protection of vital passive and sensing uses of spectrum.

⁷ www.communications.gov.au/what-we-do/television/media/acma-review

⁸ www.acma.gov.au/theACMA/Library/Corporate-library/Corporate-publications/communications-report

3.2. Spectrum research program

As discussed in Part 1, the ACMA's research program is a vital element of its analysis of the broader spectrum management environment. It is therefore a key area of focus for us.

The ACMA has published its 2015 update to the rolling three-year ACMA research program, which is informed by strategic priorities and developments in the external environment. The research program is divided into five broad research focus areas:

1. **Market developments**—focuses on key market developments and the regulatory policy settings and interventions needs to support efficient use of public resources such as spectrum.
2. **Media content and culture**—considers the ACMA's legislative obligations to reflect community standards in the delivery of media and communications services.
3. **Social and economic participation**—focuses on regulatory settings and interventions to assist businesses and citizens in participating in the online and offline environment.
4. **Consumer and citizen safeguards**—focuses on consumer, industry and government safeguards, such as Australian's experience in managing unsolicited communications and effectiveness of content and telecommunications safeguards.
5. **Regulatory best practice and regulatory development**—considers the effectiveness, costs and benefits of current regulatory settings, as well as their impact on overall spectrum management efficiency and how such settings will respond to emerging challenges.

Following consultation with both internal and external stakeholders, the spectrum-related research reflected in the ACMA's three-year research program is outlined in Table 2 and focuses on two of these areas: market developments and regulatory best practice and regulatory development.

Table 1: Spectrum research topics identified in the ACMA’s research program

Research focus area	2015–16	2016–17	2017–19
Market developments	Continued development of the mobile broadband strategy AM radio in regional Australia Developments in mobile networks		
Regulatory best practice and regulatory development	Stakeholder surveys Regulatory implications of the IoT Research to support a review of spectrum pricing, including exemptions, concessions, administrative charges and taxes (Stage 1) Reform of spectrum apparatus licence taxes in light of revised spectrum pricing principles (Stage 2)	Reform of spectrum apparatus licence taxes in light of revised spectrum pricing principles. (Stage 3) International perspectives on emerging regulatory pressure points	Renewal rights of licensees

3.3. Economics of spectrum management

The ACMA continues to observe the importance of spectrum as an input for driving economic growth. For example, the ACMA engaged the Centre for International Economics (CIE) to examine the economic benefits of mobile broadband in 2013. It estimated that mobile broadband increased Australia’s economic activity (its GDP) by \$33.8 billion in 2013.⁹

With the continuing emergence of technologies that rely on the use of spectrum for purposes such as machine-to-machine communications, the Internet of Things (IoT) and digital communications, demand for spectrum continues to grow. Pressures on spectrum access will continue to be particularly intense in the 300 MHz to 3 GHz range, which is attractive to many current spectrum uses because of its propagation characteristics. While the quantity of spectrum that is available is likely to remain

⁹ CIE, [The economic impacts of mobile broadband on the Australian economy, from 2006 to 2013](#), viewed on 4 May 2015, p. 2.

relatively unchanged, demand for spectrum in the near to medium term is expected to grow.

There are a number of considerations when examining the demand and supply characteristics of the radiofrequency spectrum for each band and/or region where spectrum is used. These include:

- > the commercial value of the spectrum—considering the costs of delivering a similar quality of service using other frequencies or technologies and examining what similar businesses or individuals have paid to access the spectrum for similar purposes domestically or internationally
- > future uses of the spectrum—new transmission technologies (for example, Long Term Evolution (LTE) and emerging fifth generation (5G) standards in mobile broadband that could enable improvements in spectrum efficiency and business radio applications) and new content compression standards (for example, High Efficiency Video Coding (HEVC) in TV broadcasting)
- > the capacity to share spectrum—improvements in technology will mean that what was previously used exclusively by one user could now be used by multiple users (for example, frequency re-use through using low power, small cells; cognitive radio; and using white spaces)
- > the ability for smaller users to co-ordinate themselves—it is possible that the highest value use of the spectrum is not being achieved when a large number of disparate users cannot get together to demonstrate that, as a whole, they value a particular frequency the most (for example, owners of cars that use keyless entry)
- > international harmonisation—economies of scale enabled by harmonisation leads to materially cheaper devices; it may also facilitate international roaming (for example, the adoption of the ‘APT 700 MHz band’, which was an initiative led by the ACMA)
- > public interest considerations—the ACMA is required under the Act to make adequate provision of spectrum for defence, national security, law enforcement and emergency services and other public or community services.

In this environment, the ACMA applies economic concepts and tools to the management of spectrum, in particular to maximise the overall public benefit derived from using the radiofrequency spectrum by ensuring the efficient allocation and use of the spectrum. These tools include, but are not limited to:

- > The use of market mechanisms—the ACMA has, and continues to conduct auctions for spectrum licences (for example, in the 700 MHz and 2.5 GHz bands in 2013, and is now preparing for an auction of spectrum in the 1800 MHz band in regional areas by the end of November 2015) and facilitates spectrum trading.
- > Using spectrum and class licensing where possible—technically flexible approaches increase the likelihood that spectrum continues to be used in an efficient manner over time; class licensing facilitates outcomes where the potential for interfering with other users are small while the benefits are potentially very large.
- > Spectrum pricing—where it may not be appropriate to use auctions as allocation mechanism (for example, point-to-point links), the ACMA seeks to charge on the basis of opportunity cost (that is, the price a user is willing to pay to compensate another user or users who would be denied from using the spectrum), where:
 - > demand outstrips the available spectrum—the opportunity cost is likely to represent a commercial valuation; estimates of cost savings over the life of the licence; or benchmarks based on prices paid for spectrum historically, in adjacent frequency bands or internationally

- > there is sufficient spectrum to meet demand—the opportunity cost will reflect how much it costs the ACMA to sell the spectrum unless there are higher value uses for the spectrum in the near future (for example, early access to spectrum which has been allocated at auction).
- > Cost benefit analysis—the ACMA may conduct or rely on modelling that demonstrates the costs and benefits of re-allocating or allocating spectrum (for example, any regulatory decision that is considered to have a greater than minor impact or is not machinery in nature requires a Regulatory Impact Statement. This requires a cost-benefit analysis to be conducted at either a qualitative level or quantitative level depending on the size of the impact).
- > Demand forecasting and future uses for the spectrum—the ACMA conducts its own forecasting and engages consultants to forecast future demand for spectrum (for example, demand for spectrum for mobile broadband services). The ACMA also engages with industry to ensure it is taking into account future uses, which serves as an input into demand forecasts.
- > Private parks—the ACMA allocates spectrum to a manager (for example, an industry body) to undertake the management of the spectrum where a group of users share spectrum access amongst each other. This allows multiple users to share spectrum and increase the efficient use of the spectrum.

New applications of economics continue to be applied to spectrum management (for example, incentive auctions). The ACMA continues to monitor these developments and will adopt approaches which are appropriate for the Australian market.

3.4. Mobile broadband strategy

Mobile broadband spectrum management is one area where the ACMA has, for a number of years, provided more detailed public guidance on its associated strategy and work plan. Maintaining appropriate spectrum arrangements for mobile broadband services remains a major element of the ACMA's spectrum management work program.

Mobile broadband services deliver substantial economic benefits to the Australian community and demand for mobile broadband capacity continues to grow. In understanding and addressing mobile broadband growth, it is important to note that increases in mobile broadband capacity are enabled by three main factors:

1. access to additional spectrum or improved use of existing spectrum
2. use of increasingly spectrally efficient technologies
3. deployment of appropriate network infrastructure and topologies.

The ACMA, in its role as the national spectrum manager, therefore has an important role to play in facilitating the continued growth in mobile broadband capacity and the provision of the associated benefits by establishing and maintaining appropriate spectrum management settings.

The evidence suggests Australia currently has sufficient spectrum available for mobile broadband services in the short to medium term. However, long lead-times for making additional spectrum available, and the importance of international harmonisation, mean that the ACMA will press ahead with work in this area. To that end, the ACMA released *Beyond 2020—A spectrum management strategy to address the growth in mobile broadband capacity*¹⁰, which described a draft set of strategies, including a transparent spectrum management planning process for identifying potential future

¹⁰ Refer to the [ACMA website](#).

spectrum options for mobile broadband to guide the ACMA in its actions. The draft strategies are:

1. Encouraging a holistic approach to addressing the outcomes of mobile broadband capacity growth that balances the available inputs of spectrum, technology and network infrastructure/topology.
2. Articulation of a transparent spectrum management process for identifying potential future spectrum options for mobile broadband. This includes the identification of a pool of potential spectrum options at varying stages of consideration. This will provide the ACMA with capacity to react to demand requirements on a contingency basis if, and when, needed and when the evidence suggests that mobile broadband is, or is becoming, the highest value use of a particular band.
3. Where possible, utilisation of long lead-times to assist in reducing the effect on incumbents arising from re-farming of spectrum to mobile broadband.
4. Exploration, and where appropriate, adoption of opportunities for greater sharing between mobile broadband services and other services.
5. Engagement in international deliberations to influence the development of domestically suitable internationally-harmonised spectrum options.

The ACMA currently has a number of mobile broadband planning projects at various stages of the process for consideration of additional spectrum for mobile broadband. It is intended that the FYSO continues to be used as a tool to keep stakeholders informed about the suite of mobile broadband spectrum planning projects. More information on specific mobile broadband spectrum planning projects is available in Part 2. The ACMA expects to release its updated mobile broadband strategy and work program in early 2016.

3.5. Economic impact of mobile broadband

The *Economic impacts of mobile broadband on the Australian economy, from 2006 to 2013* was released by the ACMA in April 2014 and articulated the various ways in which mobile broadband take-up and usage has changed Australia for the better.

This report, published in conjunction with the CIE and based on a survey of 1,000 Australian businesses, sought to model the economic impact of mobile broadband spectrum use and availability on the Australian economy. The project was intended to assist in informing the ACMA's understanding of the economic implications of mobile broadband planning and allocation decision-making.

Not only were there the expected results, such as the substantial growth in the number of 4G-enabled smartphones, or the increase in average mobile data traffic; but the estimated economic benefits of mobile broadband showed continued growth of the sector and that mobile broadband increased Australia's economic activity (its GDP) by \$33.8 billion in 2013.

The mobile communications sector has achieved a substantial productivity growth of 11.3 per cent every year from 2006 to 2013 and also generated productivity growth in other industries. The combined growth of the two effects led to the CIE's findings that mobile broadband has increased Australia's GDP growth from 2.6 per cent per annum to 2.9 per annum between 2006 and 2013.

Provision of spectrum demand forecasting for wireless access services

Another ACMA research project, working with Analysys Mason, has been the development of a mobile network capacity forecasting model that looks at likely traffic scenarios and what this might mean for additional spectrum or infrastructure needs.

Overall, this model provides an understanding of the spectrum-infrastructure trade-off for the mobile broadband industry in Australia. This model is just one of a number of tools used by the ACMA to inform its mobile broadband strategy.

3.6. 2014–15 achievements

One of the key purposes of the FYSO is to provide an indication to stakeholders about where the ACMA is directing its resources and which spectrum projects are considered a high priority, therefore receiving primary consideration over other spectrum management issues. This does not assume that the work plans are set in stone; rather, it provides a starting point for the ACMA about the consideration and status of other spectrum-related work as it arises.

The ACMA has undertaken a considerable amount of work associated with spectrum management processes since the last edition of the FYSO was released. Table 2 provides a brief précis of the projects and the outcomes achieved by the ACMA that were identified in the 2014 FYSO. A description of each activity type can be found in Part 3—Indicative work plans 2015–19.

Table 2: Completed projects

Activity type	Final outcomes
Expiring spectrum licences	<ul style="list-style-type: none"> <li data-bbox="470 952 1339 1055">> 2.3 GHz: Finalised revision of the technical framework and relevant licences have been re-issued. The new licence term commenced on 25 July 2015. <li data-bbox="470 1066 1339 1169">> 3.4 GHz: Finalised revision of the technical framework. Multiple offers for re-issue have been made. The new licence term will commence on 14 December 2015.
Implementation	<ul style="list-style-type: none"> <li data-bbox="470 1189 1339 1317">> Restack/retune of digital TV: The restack of digital television services was completed in December 2014. The restack process moved digital television services out of the digital dividend band. As part of this work: <ul style="list-style-type: none"> <li data-bbox="518 1328 1339 1391">> licences for council operated services as well as broadcaster services were re-issued or varied <li data-bbox="518 1402 1339 1496">> minor changes to the technical specifications to some sites were required with television licence area plans varied and licences adjusted accordingly <li data-bbox="518 1507 1339 1570">> progress of the restack was closely monitored for any potential slippage <li data-bbox="518 1581 1339 1675">> licensing processes were implemented to allow early access to the digital dividend spectrum by Telstra and Optus in areas where television services had cleared the band <li data-bbox="518 1686 1339 1848">> the Restack Coverage Assessment Project (ReCAP) was successfully completed in December 2014. ReCAP provided investigations, evidence-based advice and support to the Department of Communications in dealing with television coverage and reception issues following the restack. <li data-bbox="470 1859 1339 2018">> Wireless microphone transition: From 1 January 2015, wireless microphones were no longer authorised to operate in the frequency range 694–820 MHz under the low interference potential devices class licence. The ACMA supported the transition through updating arrangements for supply and use, providing new spectrum options

Activity type	Final outcomes
	<p>and providing information and tools to assist wireless microphone users transition to the new arrangements.</p> <ul style="list-style-type: none"> > Mid-West Radio Quiet Zone: As part of the work supporting the Australian Radio Quiet Zone Western Australia (ARQZWA), a framework has been put in place to protect radioastronomy activities sited within 50 km of the ARQZWA, identified in RALI MS32. > Developed new RALI MS39: This RALI was developed to meet the requirements of the 20 October 2014 direction from the Minister for Communications. It defines frequency assignment requirements for Public Telecommunications Service apparatus licences in the 3400–3425 MHz and 3492–5-3542.5 MHz frequency ranges. > Sunsetting requirements (see Section 4.2 for full list of revoked and remade). > 400 MHz band arrangements: As part of work supporting implementation of changes to the 400 MHz band, following a public consultation process, land mobile frequency coordination requirements have been updated.
Regulatory assessment	<ul style="list-style-type: none"> > Microwave-fixed service bands: New channel arrangements included in channelling arrangements for microwave fixed point-to-point links. > Made the Radiocommunications (Transmitter Licence Tax) Determination 2015 and amended the Radiocommunications (Charges) Determination 2007 to enable a group of wireless audio devices to operate as a system. > The LPON review is now complete and the following recommendations were implemented: <ul style="list-style-type: none"> > the ACMA has extended the determination made under section 34 of the BSA allowing LPONS licensees to operate between 87.5–88.0 MHz until 31 December 2020 > the channel 3 TV exclusion zones were removed post-digital TV restack. Subsequently, the ACMA conducted LPON auctions in most areas where LPON licenses were previously unavailable due to the exclusion zones, via a staged release under the standard price-based allocation process during 2014–15 > where possible, the ACMA has consolidated LPON licensees operating between 88.1 MHz and 108.0 MHz (the in-band) into the standard 87.5–88.0 MHz band (the sub-band), where alternative frequencies became available after the removal of channel 3 TV exclusion zones post-digital TV restack.
Monitoring	<ul style="list-style-type: none"> > The LIPD Class licence: The low interference potential devices class licence was updated as part of the sunsetting instruments process and to include updates to support new devices including Ultra-wide band (UWB) devices. The next update is anticipated in 12–18 months' time. > Intelligent Transport Systems (ITS): The ACMA has continued to monitor developments in ITS both domestically and internationally.

Part 2—
Significant spectrum projects in
2015–16 and beyond



1. Strategic approach

Spectrum management involves working in a rapidly changing, converged communications environment. In such an environment, the ACMA's key priority areas can only ever be a snapshot in time. The ACMA emphasises that priorities will change as it respond to shifts in the external environment. The ACMA's ongoing research program is an important element in ensuring the understanding of the external environment remains current and allows priorities to change as the ACMA responds dynamically to changing pressures.

The ACMA's priority areas arise from four broad themes:

1. Maximising the overall public benefit arising from use of spectrum.
2. Reducing the cost to business arising from regulation.
3. Implementing current reform priorities.
4. Ensuring the national interest.

These themes summarise the broad range of matters that the ACMA may be considering at any one time. They reinforce the importance of the guidance provided by the principles and reaffirm the ACMA's commitment to furthering the government's intention to reduce, wherever possible, the regulatory burden placed on business. Finally, the ACMA considers that ensuring the national interest, for example through the prosecution of Australia's agenda at international forums, is a very important part of the ACMA's role. This is reflected in the objectives of the Act and is included in the broad themes that follow.

Eleven key priority areas have been identified, as shown in Table 3 below. These are the areas where the ACMA expects peaks in both workload and focus in the short to medium term. This table also maps each area to the broad themes, to show why the ACMA considers that work to be a priority this year. Importantly, these areas demonstrate that the ACMA's priorities extend well beyond 'high profile' projects.

The intention is to set the scene for the forthcoming delivery of a series of key projects, strategic research agenda and policy initiatives that are currently underway in the ACMA and show consideration of the strategies outlined under Outcome 2.1 of the ACMA corporate plan.

Table 3: The ACMA's key priority areas

Theme	Key priority area
2. Maximising the overall public benefit arising from use of spectrum	2.1 Mobile broadband strategy
	2.2 1800 MHz band in regional Australia
	2.3 Review of the 800 and 900 MHz bands
	2.4 Priority compliance areas
	2.5 Broadcasting regulatory issues
	2.6 Spectrum pricing initiatives
3. Reducing the cost to business arising from regulation	3.1 Customer Service Centre
	3.2 Contemporary licensing and assignment tools

Theme	Key priority area
4. Implementing current reform priorities	4.1 Spectrum Review
	4.2 Implementing outcomes from the 400 MHz band review
5. Ensuring the national interest	5.1 WRC-15 preparation/Agenda items

Some projects might arguably sit across more than one theme. However, for reasons of simplicity and clarity, each key priority area has been attributed to the principle theme from which it derives.

For example, all of the ACMA’s work is informed by the government’s deregulatory agenda and it is committed to assisting the government to further reduce the burden that regulation and red tape places on individuals, businesses and community organisations. The way that this frames the ACMA’s priorities—and indeed its work—is discussed below.

In addition, the ACMA is subject to the government’s requirements to cost all policy options, as administered by the OBPR. This means that the ACMA’s key priority areas are informed by the importance of maximising the overall public benefit arising from use of the spectrum. As the ACMA has consistently said, this does not mean that spectrum should always be allocated to the commercial user who is prepared to pay the most for it. Spectrum use is a key enabler of broad social objectives as well as commercial ones and the ACMA has always intended for ‘overall public benefit’ to capture both. However, the regulatory best practice objectives of the government mean that the ACMA must attempt to cost the benefits and burdens of possible regulatory decisions. That is, to the greatest extent possible, the ACMA needs to be able to quantify the overall public benefit accruing from options to allow an assessment of the preferred way forward. For some time, the ACMA has been urging stakeholders to work with it in trying to cost social or non-commercial uses of spectrum—particularly the benefits and burdens of possible changes to existing arrangements for those uses—and it continues to do so.

Clear identification of the broad themes that assist the ACMA in setting the key priority areas for its work each year may provide greater visibility and understanding for stakeholders of the ACMA’s internal working processes.

Much of the work of the ACMA falls outside these areas, but it remains very important. In some cases, it is ongoing work, for example the ACMA’s planning and licensing functions. In other cases, it is work that has been on the ACMA’s forward work program for some time, but has not yet matured to the point where it becomes a key priority. An example of this is the work on the 900 MHz band. Alternatively, it is work that was a key priority at one point, but has now become a routine part of the ACMA’s functions.

2. Theme—Maximising the overall public benefit arising from use of spectrum

2.1. Progress on the mobile broadband strategy

Addressing the growth in demand for mobile broadband capacity has been a headline issue in the ACMA's spectrum management work program since its inception. While traditionally the search for additional spectrum for mobile broadband services has been focused on frequency bands below around 4 GHz, recent international interest has extended into higher frequency bands well above 6 GHz.

Background

The history of work on issues related to mobile broadband spans over the ACMA's lifetime. Work began in February 2006, with the commencement of the wireless access services (WAS) consultation process^{11, 12} that ultimately identified a need for more spectrum for WAS. As a result, the 2.5 GHz and 3.6 GHz bands (in regional areas) were identified as bands that could be made available for WAS in the short to medium term.

The WAS consultation process also considered the dividend that would become available as a result of the transition to digital television. However, at the time of the release of the paper, the government had not decided if or when a 'digital dividend' would be released. The government subsequently announced that 126 MHz of the 520–820 MHz UHF broadcasting band would be made available for delivering wireless communications services, including mobile broadband.¹³

The ACMA's dialogue with stakeholders on mobile broadband services continued in May 2011 with the release of *Towards 2020—Future spectrum requirements for mobile broadband* (Towards 2020).¹⁴ The paper detailed the existing mobile broadband environment in Australia, provided an analysis of the quantum of spectrum that would be required to meet that demand, and identified frequency bands that could potentially be made available for mobile broadband services.

While the *Towards 2020* work has provided a solid basis for the ACMA's mobile broadband spectrum management work over the last few years, a number of factors have arisen since it was developed, making it timely for a review and update of the ACMA's overall strategy.

The ACMA is of the view that supporting the continued growth of mobile broadband services would promote the object (section 3) of the Act, including the maximisation of the overall public benefit derived from using the radiofrequency spectrum, and would be consistent with the principles. However, as required under the Act and the principles, the ACMA's spectrum management decisions in support of mobile broadband need to be balanced with the impacts on other spectrum users.

¹¹ Available on the [ACMA website](#).

¹² Available on the [ACMA website](#).

¹³ Senator the Hon. Stephen Conroy, [Size and Location of the Digital Dividend](#), media release, 24 June 2010.

¹⁴ Available on the [ACMA website](#).

In reviewing its mobile broadband strategy, the ACMA identified the following assumptions that guided its considerations:

1. The highest value use of spectrum will vary between bands and geographic areas over time. As such, mobile broadband will only sometimes be the highest value use of a particular spectrum band.
2. Mobile broadband services will continue to deliver societal and economic benefits to Australia and these benefits will increase with greater use of mobile broadband services made possible through increased network capacity.
3. Demand for mobile broadband services (and therefore capacity) will continue to increase for the foreseeable future, though the rate of this increase is difficult to determine.
4. Australia currently has adequate spectrum available for mobile broadband purposes in the short to medium term, but it is likely that in the medium to long term, additional spectrum will be necessary.
5. Long lead-times will remain for making additional spectrum available domestically for mobile broadband due to the timeframes for mobile broadband technology development and standardisation, international spectrum harmonisation and domestic re-farming of spectrum.
6. Spectrum will continue to be a key enabler for many other non-mobile broadband services that provide important economic and societal benefits to Australia. The associated requirement for spectrum to enable these services will continue, however these requirements may vary over time.
7. The use of technology flexible technical frameworks and provision of sufficient tenure will remain core principles when designing spectrum arrangements including for mobile broadband services.
8. International spectrum harmonisation and technology standardisation will continue to play an important part in delivering equipment economies of scale, consumer choice and international roaming opportunities. International spectrum harmonisation and technology standardisation will continue to be considered when developing domestic arrangements.
9. The review of established frameworks for spectrum already in use for mobile broadband services will continue to be necessary so that the efficient use of the spectrum is able to be maximised.
10. Increases in mobile broadband capacity will continue to be met through a combination of additional spectrum, improved technologies, increased network infrastructure and new network topologies.

These assumptions were utilised in the development of proposed mobile broadband strategies and an associated work program.

Timing

Taking into account both the assumptions and the overarching spectrum management framework, and the context of mobile broadband capacity growth and demand, the ACMA has developed a set of proposed strategies, including a transparent spectrum management process for identifying potential future spectrum options to address the growth in demand for mobile broadband capacity. These strategies are outlined in [*Beyond 2020—A spectrum management strategy to address the growth in mobile broadband capacity*](#), released in September 2015.

The ACMA currently has a number of mobile broadband planning projects examining the need for additional spectrum for mobile broadband. It is intended that the FYSO be used as a tool to keep stakeholders informed on the suite of mobile broadband spectrum planning projects.

2.2. 1800 MHz band in regional Australia

There is high demand for access to the frequency ranges 1725–1785 MHz and 1820–1880 MHz in regional Australia (the regional 1800 MHz band). This is principally due to the increasing availability of Long Term Evolution (LTE) technology, including 4G, to deliver mobile services. Given this demand, the ACMA commenced [a review of arrangements](#) in the band in 2012 with a view to identifying options to facilitate the deployment of mobile services in both the short and long term.

Background

Both the international and domestic environment have highlighted that there is increasing demand for access to the 1800 MHz band to deploy mobile services using LTE technology. The 1800 MHz band is the most widely used band for LTE deployments globally, with LTE networks deployed in the band in over 40 countries. However, current arrangements in the 1800 MHz band in regional Australia do not allow for the benefits associated with mobile services to be realised. Instead, the 1800 MHz band has generally been used in regional Australia for the deployment of fixed point-to-point links authorised under apparatus licences.

The ACMA has been working closely with industry and stakeholders to develop an appropriate and effective strategy to enable access to the 1800 MHz band in regional areas. The ACMA has consistently stated that spectrum licensing is the preferred long-term arrangement for the regional 1800 MHz band. Spectrum licensing would best accommodate emerging high-value uses of the band such as mobile services. Moreover, spectrum licences provide licensees with certainty of tenure and the flexibility to deploy different technologies under the same licence.

Therefore, the ACMA commenced the reallocation process of the regional 1800 MHz spectrum from apparatus to spectrum licensing.

On 26 May 2015, the Minister for Communications made a declaration that the regional 1800 MHz band is to be reallocated by the issue of spectrum licences. Accordingly, the ACMA has commenced preparation to allocate the spectrum by auction. In addition, the ACMA is including the residual spectrum from the recently completed re-issue process for existing spectrum licences in the band (the residual lots).

Timing

The ACMA intends to auction the regional 1800 MHz band and residual lots in the 2015–16 year. This will be done via a simultaneous multi-round ascending (SMRA) auction. An SMRA auction will provide the most effective and efficient allocation of the spectrum within the proposed time frame. The ACMA will release an Applicant Information Pack (AIP) in September 2015. The AIP will provide all the relevant information surrounding all aspects of the auction.

2.3. Review of the 800 and 900 MHz bands

The 800 MHz and 900 MHz bands—803–890 MHz and 890–960 MHz respectively—are highly complex and accommodate a wide range of services and technologies. In physical terms, they are in the so-called coverage ‘sweet spot’ for cellular mobile services, owing to the relationship between the propagation characteristics of these frequencies and the ideal trade-offs between cell sizes (which impacts the level of capital expenditure on networks) and the amount of capacity that can be delivered to consumers within a given geographic area.

As a result, these bands include several sub-1 GHz bands that are harmonised (through the ITU) for International Mobile Telecommunications (IMT – ITU parlance for mobile broadband communications) and standardised (through the 3rd Generation

Partnership Project, or 3GPP) for 2nd, 3rd and 4th generation mobile technologies. There is growing demand for access to this spectrum for cellular mobile services by both commercial and government (specifically public safety) interests.

These bands are currently heavily encumbered by a range of non-cellular services that are allocated in the extant 900 MHz Band Plan (covering 820–960 MHz), which was made in 1992. The radiocommunications landscape has changed dramatically since this time and the allocations in that band plan no longer satisfy the Act's key objectives of optimising both efficiency and public benefit to be derived from its use.

Background

In May 2011, the ACMA commenced a review of the 803–960 MHz band with the release of its *Exploring new opportunities* paper, which coincided with the release of ACMA's *Towards 2020* paper. The papers were complementary and both considered medium- and long-term options to fulfil the need for additional spectrum for mobile broadband services.

Subsequently, in December 2012, the ACMA released [The 803–906 MHz band—exploring options for future change](#)¹⁵, which as a second round of consultation, sought input on a range of broad themes. These included including extension of the band plan to incorporate the 803–820 MHz segment vacated through the 'digital dividend' process; technical and licensing arrangements in existing cellular mobile frequency segments; potential to introduce new services/technologies in the band and consideration of the overall structure of the band.

On 25 March 2015, the government issued Terms of Reference for the Productivity Commission to conduct a study into the best way to secure a public safety mobile broadband (PSMB) capability to meet the long-term needs of Australia's public safety agencies (PSAs). The final report is expected in December 2015.

Timing

Prior to the engagement of the Productivity Commission, finalisation of planning arrangements in the 800 MHz band has been delayed as deliberation on the spectrum requirements for PSMB communications continued. In 2014, the ACMA decided to split the preparation of a decision paper (the third round of consultation) to address those aspects of the review of 800 and 900 MHz bands that can proceed irrespective of the eventual outcome of the government's consideration of PSMB.

The ACMA now expects to release the decision paper in the last quarter of 2015. The decision paper is expected to provide certainty for users by implementing the proposed reforms with minimum possible disruption and provide incumbent users with sufficient notice and long lead times/transition windows, where possible. This will include the identification of new spectrum provisions for mobile broadband, however the implementation plan set out in the paper will not pre-empt any decisions on how/to whom this spectrum is allocated. The ACMA expects to revisit this issue when the policy direction on PSMB is clear. The decision paper will also postpone any final decision on the reconfiguration (optimisation) of use of the current 900 MHz mobile allocation (890–915/935–960 MHz), pending further industry consultation on options.

2.4. Priority compliance areas

The purpose of the annual priority compliance area (PCA) program is to direct the ACMA's compliance resources towards identified compliance problems and areas of

¹⁵ www.acma.gov.au/theACMA/Consultations/Consultations/Current/ifc-472012-the-803960-mhz-bandexploring-options-for-future-change

highest risk. PCAs address cases of harmful interference that are of high risk to spectrum utility, or of high risk to public safety or public interest.

Establishing PCAs means that the ACMA has forward-looking and fit-for-purpose compliance strategies that address the highest priority issues.

Background

The ACMA will continue its priority compliance area program in 2015–16, with a focus on:

- > LED lighting product compliance with mandated EMC standards
- > compliance of mobile devices including mobile handsets
- > transmitter licensing compliance for services operating in the 400MHz bands to facilitate the ongoing transition to the new 400MHz band plan.

PCAs are set based on evidence from intelligence-gathering mechanisms, analysis and risk assessment.

Within the constraints of the existing legislative framework, the ACMA adopts a holistic approach to its PCA program. The ACMA seeks to educate individuals about the law before non-compliance has occurred and use traditional enforcement methods when necessary, if the law has been broken. This end-to-end view enables the ACMA to extend its regulatory reach in an effective and targeted way.

The ACMA also continues to investigate and respond to high-risk issues (for example, prohibited devices such as mobile phone jammers and unlicensed mobile phone repeaters) that fall outside these priority areas on a case-by-case basis.

Timing

[PCAs for 2014–15](#) were published on the ACMA website in August 2014.

2.5. Broadcasting regulatory issues

The object of this key priority area is to reduce the cost and time taken for industry to comply with the ACMA's broadcast planning process.

The government has accepted the recommendation of the Spectrum Review that the management of broadcasting spectrum, including planning licensing and pricing, should be integrated into the general spectrum management framework. The government expects a new framework to be progressively rolled out from mid-2017.

In addition to assisting the government in the implementation of the review recommendations, the ACMA intends to consider ways in which the more immediate changes can be made to the existing subordinate regulatory framework in order to reduce the administration and delay costs incurred by licensees who seek approval to make changes to their services.

Background

The ACMA prepares legislative instruments called licence area plans (LAPs) for analog radio under section 26 of the *Broadcasting Services Act 1992*. LAPs determine the number, category and characteristics of broadcasting services to be available in particular areas of Australia that use the broadcasting services bands. Once a broadcasting service for a particular area is planned in a LAP, an apparatus licence may be issued under the Act to authorise the operation of the transmitter. This licence may be subject to further operating conditions prescribed in technical planning guidelines (TPGs) made pursuant to section 33 of the [Broadcasting Services Act](#)

[1992](#).¹⁶ Licensees are able to request variations to LAPs to improve services in their licence areas, for example, to add a transmitter for in-fill coverage, or request a power increase

Most requests for LAP variations are of minor impact. Yet the existing framework requires the ACMA to undertake a process of varying a legislative instrument, resulting in requests for such changes to technical transmission parameters taking lengthy periods to finalise.

Timing

The ACMA is planning to consult with the industry in the second half of 2015 on proposed amendments to the TPGs that will remove redundant analog television provisions and relax the start-up provisions for new transmitters and for changed technical specifications.

2.6. Spectrum pricing initiatives

All apparatus and spectrum licensees are affected by the pricing or taxation of spectrum. Taxation is also one of the suite of management tools used by the ACMA to promote the efficient use of spectrum.

Background

In response to the recommendations of the Spectrum Review, the government has announced a spectrum pricing review to be conducted by the Department of Communications. As noted in the final report of the Spectrum Review, prices charged for spectrum will need to be reviewed to ensure that they are appropriate for the new legislative and licensing arrangements.

The Department of Communications is expected to report to government on the outcomes of its review in mid-2016. It is expected that new pricing arrangements will be implemented to coincide with the commencement of the new licensing system in mid-2017.

The ACMA's existing program of spectrum pricing development work will be informed by the government's adoption of the recommendations of the Spectrum Review.

The ACMA's existing program has identified a number of areas for priority spectrum pricing work over the period leading up to and including the implementation of the new pricing arrangements forecast in the Spectrum Review.

Timing

Taxation for satellite services

In 2015–16, the ACMA plans to finalise its existing review relating to the apparatus licence tax arrangements associated with providing satellite services in Australia.

Opportunity cost-based pricing

The ACMA implemented the first of five intended increments towards a new opportunity cost (OC)-based licence tax rate of \$199/kHz (plus annual CPI escalation) for these high-density areas on 15 August 2012. In June 2014, the ACMA proposed implementing the second of the remaining increments towards the full OC-based tax rate, after conducting a monitoring exercise of the levels of congestion within the high-density areas. The feedback the ACMA received from industry is assisting the ACMA in considering whether to introduce the second increment and the monitoring exercise to be used for considering future increments.

¹⁶ www.comlaw.gov.au/Details/C2015C00216

In June 2014, the ACMA also announced that it proposed to introduce OC-based pricing in the remote density areas of Australia in the 400 MHz band. Given the relatively low levels of demand for services, the ACMA proposed a reduction in the nominal tax rate from approximately \$4 to \$0 per kHz, but with the retention of the minimum tax rule. Under the minimum tax rule, a user is charged \$37.48, even if the nominal tax calculation is less than \$37.48. The ACMA expects to make announcements about the taxation arrangements for high density and remote density areas of this band in 2015–16.

Television outside broadcast

The ACMA has previously committed to reviewing the apparatus licence taxation arrangements associated with television outside broadcast services. This review is expected to commence at the end of the current transition of these services from the mid-band gap of the 2.5 GHz band to new apparatus licence arrangements in alternative bands. This review is expected to commence in 2016 and will be informed by the government's response to the spectrum pricing review.

New calculator

The ACMA is considering developing a new calculator that it anticipates being released in 2015–16. The previous calculator has been offline due to a number of technical issues. Feedback from industry participants indicates that the Apparatus Licence Fee Calculator is a valuable tool in the performance of their work.

Stakeholder interest

The ACMA welcomes comments from stakeholders about spectrum taxation and charging arrangements. While spectrum-pricing work focuses on major initiatives, the ACMA is also interested in hearing from stakeholders about other bands and services where changes to the spectrum pricing arrangements could improve the efficiency of spectrum use.

The specialist nature of pricing work means that it can sometimes be difficult ensuring that the right people in an organisation are aware of the ACMA's proposals and provided with an opportunity to contribute to the discussion. The ACMA continues to welcome feedback from stakeholders about how best to target its pricing discussions and what forums might work to keep stakeholders informed and to provide feedback on future pricing arrangements.

2.7. Unsold 700 MHz lots

The former minister directed¹⁷ the ACMA to report on the appropriate procedures for the allocation of the unsold 700 MHz lots having regard to:

- A. the prices achieved for spectrum licences allocated as a result of the auction
- B. prevailing market circumstances that may have an impact on the value of the relevant spectrum.

The ACMA reported to government in September 2014. As is the case for unallocated spectrum generally, interested parties can make expressions of interest in the unsold spectrum to either the ACMA or the government.

¹⁷ [Australian Communications and Media Authority \(Spectrum Allocation – Post-Auction Review\) Direction No. 1 of 2013](#)

3. Theme—Reducing the cost to business arising from regulation

3.1. Customer Service Centre

The Customer Service Centre was established to provide a single point of contact for customers seeking information, advice or services from the Communications Infrastructure Division of the ACMA.

Background

The Customer Service Centre commenced operations on 3 March 2014. Before this, there were approximately one hundred points of entry that a client had to choose from in attempting to find the right area of the ACMA to respond to their issue or concern. Establishing the service centre has greatly streamlined this process.

The service centre assists customers wanting to apply for a licence, report interference to radiocommunications services or to their television or radio reception, buy a Smartnumber, ask about cabling, or any of the other myriad responsibilities of the Communications Infrastructure Division.

The ACMA is currently undertaking work to expand the service centre to handle customer enquiries on behalf of all ACMA business areas. This will provide a significantly improved customer service experience across all activities and responsibilities of the ACMA.

Timing

The Customer Service Centre will be fully functioning by late 2015, and aims to respond to customer enquiries either immediately or within three working days at least 95 per cent of the time. Customer satisfaction levels with the enquiries centre are measured via an annual survey.

3.2. Contemporary licensing and assignment tools

The ACMA is undertaking a project to replace its aging radiocommunications licensing and frequency assigning toolsets (collectively referred to as RADCOM). The objective of the project is to implement a new system, while also significantly improving processes to modernise and improve the way the ACMA does business with applicants and licensees.

Background

The ACMA's new system, the SPECTRA Enterprise Suite from LS telcom, will improve functionality associated with assigning frequencies and allocating licences. The introduction of the new suite of tools also provides the ACMA with the opportunity to improve its business processes.

The use of SPECTRA is being introduced on a staged basis, commencing with spectrum licensing, followed by the apparatus licensing process and finishing with the broadcast licence management function.

The ACMA will also make changes to the look of standard documents such as licences and invoices to make them simpler. It will also improve the customer experience by establishing online mechanisms for radiocommunications licence management and access to the public register of radiocommunications licences digital channels for licensing.

Timing

Spectrum licensing-related activities were transferred to the SPECTRA system in 2013 and the ACMA Lodgement Facility was released to support spectrum licence device

registration. The ACMA is working to implement apparatus licensing functions within the SPECTRA system. The final stage of the project will be to provide functionality for broadcast licence management. This will occur late in 2015.

4. Theme—Current reform priorities

4.1. Spectrum Review

In May 2014, the Minister for Communications, the Hon Malcolm Turnbull MP, announced a review of Australia's spectrum policy and management framework.¹⁸ The Spectrum Review looked at the changes needed to cope with the increase in demand for spectrum and changes in technology, markets and consumer preferences. The review reported to the minister in March 2015. The Spectrum Review Report¹⁹ outlines recommended changes to improve Australia's spectrum policy and management framework. On 25 August 2015, the government released its response, agreeing to implement the recommendations of the Spectrum Review.²⁰

The government will implement the three main recommendations of the review:

1. Replace the current legislative arrangements with new legislation that removes prescriptive process and streamlines licensing, for a simpler and more flexible framework.
2. Better integrate the management of public sector and broadcasting spectrum to improve the consistency and integrity of the framework.
3. Review spectrum pricing to ensure consistent and transparent arrangements to support the efficient use of spectrum and secondary markets.

The ACMA will assist the Department of Communications with the implementation of the review.

4.2. Implementing outcomes from the 400 MHz band review

A review of the 400 MHz band was triggered by feedback from users of the band that the current arrangements governing the band's use were increasingly inefficient and inflexible, including that:

- > the band was congested in some capital cities
- > the band configuration did not support some existing and emerging technologies
- > planning rules for assigning frequencies in the band were inflexible in some circumstances, constraining new and innovative uses of the band.

Key outcomes for the 400 MHz review were to deliver harmonised government spectrum in support of the *National Framework to Improve Government Radiocommunications Interoperability* that was endorsed by the Council of Australian Governments (COAG) in 2009, an increased number of available channels in the band, and spectrum configurations that support new and emerging technologies.

Background

The 400 MHz band carries radiocommunications for a diverse range of industry and government organisations that deliver essential public and private services to the

¹⁸ The Hon Malcolm Turnbull MP, Minister for Communications, [Spectrum reform to drive future innovation and productivity](#), media release, 23 May 2014.

¹⁹ Available on the [Department of Communications website](#).

²⁰ The Hon Malcolm Turnbull MP, Minister for Communications, [Next stage of spectrum reform to commence](#), media release, 25 August 2015.

Australian community. The band has been one of most heavily used parts of the spectrum in Australia.

The efficient and effective use of the 400 MHz band is important to the Australian community because of the diverse range of essential and emergency services that rely on the band for operations. An efficiently structured 400 MHz band facilitates effective and efficient use by all of these services.

The new 400 MHz band arrangements facilitate the implementation of a nationally-harmonised and interoperable system of government radio networks. Advances in government radio interoperability are leading to considerable efficiency gains in resource use and availability, particularly during events of national significance such as bushfires and floods.

In recognition of the benefits of government radio interoperability, COAG endorsed a *National Framework to Improve Government Radiocommunications Interoperability* in 2009. This framework was developed by the National Coordinating Committee for Government Radiocommunications in consultation with the ACMA and complements the 400 MHz review objectives.

Timing

The 400 MHz band review commenced in 2008 and extensive consultation was undertaken with stakeholders to develop reform proposals. A staged plan to restructure the band was released by the ACMA in 2010 with milestone commencement dates from 31 December 2012 through to 31 December 2018. Licensees have 12 months from the milestone date to make the required changes, for example, for the December 2018 milestone, it is anticipated that all licensees will have made the required changes by the end of 2019. So far, progress towards milestone requirements has been excellent and milestone timing has not changed from that announced by the ACMA in 2010.

Additionally, the ACMA will implement new licensing and associated arrangements for harmonised government spectrum in the 400 MHz band early in 2016. The ACMA has been consulting with the states and territories about more effective licensing arrangements for harmonised government spectrum since 2013.

5. Theme—Ensuring the national interest

5.1. Preparation for the International Telecommunication Union World Radiocommunication Conference in November 2015

A key focus for the ACMA this year is the International Telecommunication Union World Radiocommunication Conference (WRC-15). It is the job of WRC to review, and, if necessary, revise the [Radio Regulations](#) that govern the use of the radiofrequency spectrum and the geostationary-satellite and non-geostationary-satellite orbits.

Background

The ITU-R works to ensure rational, equitable, efficient and economical use of the radiofrequency spectrum by all radiocommunications services (including those using satellite orbits) and to carry out studies and approve recommendations on radiocommunications matters. The ITU-R also maintains the international [Radio Regulations](#), which set out the allocations of bands to various types of services.

Australia is a signatory to the ITU Convention, a treaty-level legal instrument that obliges Australia to comply with the Radio Regulations. In essence, Australian radiocommunications services must not cause interference to the services of other countries where those services operate in accordance with the Radio Regulations.

Conversely, Australian services are entitled to protection against interference from other countries.

The outcomes of WRC-15 will affect the ACMA's future work plan, as Australia's spectrum allocations are updated to align with revision of the ITU Radio Regulations and their impact on global and regional spectrum allocations and regulatory requirements. This will be reflected in editions of the FYSO from 2016 onwards. A number of WRC-15 agenda items are likely to result in change, including potential new spectrum allocations that could shape the ACMA's work plan in years to come.

Further information on the Australia's preparation for WRC-15 and WRC-15 Agenda items can be found on the [ACMA website](#). Further information on ITU Agenda items for WRC-15 is available on the Conference Preparatory Meeting page on the [ITU website](#).

Timing

Key events and dates leading to WRC-15 are:

- > ITU-R Radiocommunication Assembly—26–30 October 2015
- > ITU World Radiocommunication Conference—2–27 November 2015.

6. Watching brief beyond the next twelve months

6.1. 5G

With the successful establishment and relatively high take-up of 4G technologies, industry stakeholders are now looking towards the development of 5G services in the next progression of wireless technologies. However, the precise trajectory of technology change is difficult to assess at this time.

Some industry participants see the next wireless technology developments as 'evolutionary' improvements to the existing wireless parameters (improved coverage, reliability and network density), which will rapidly improve current mobile technologies.

Other industry participants see the next wireless technology development as improved data rates and lower latency, which will mean a 'revolutionary' leap forward in technologies beyond the current wireless technology generations. This step forward will allow greater possibilities for IoT technologies, including broader scope of use of technologies such as M2M, cloud computing and connected cars that they consider unachievable under current wireless generation technologies.

The ACMA will continue to monitor international developments through participation at international forums and information sharing with international colleagues.

6.2. M2M and IoT

Technologies requiring access to radiofrequency spectrum are evolving at a high rate, with ever-smarter technologies continuing to emerge. One of these is a proposed development of the internet in which everyday objects have network connectivity, allowing them to communicate via the sending and receiving of data. These developments are generally classified under the IoT and have the potential to aggregate many M2M connections. A number of these connected technologies are already available, however when they will be ubiquitous is currently unknown.

Figure 4: Internet of Things



The ACMA has licensing arrangements in place that adequately encourage innovation in this area via the class licensing regime. However, there is potential demand for additional spectrum management arrangements as M2M applications have the potential to be disruptive as the number of connected devices increase as more objects are connected. A recent conference held by the Organisation for Economic Co-operation and Development ([OECD](#)) noted that the pace of developments in the IoT may be much faster than that of the mobile phone services over the past two decades: *'The number of connected devices in a house in OECD countries is expected to be 14 billion by 2022—up from around 1.4 billion in 2012'*. The IoT has the capability to bring many benefits to economies and societies through the connection of machines, devices, systems and citizens to the internet.

The ACMA will continue to monitor international developments through participation at international forums and information sharing with international colleagues.

Part 3—
Indicative work plans 2015–19



1. Purpose

The ACMA's indicative work programs are considered by industry to be a particularly valuable part of the FYSO.

The ACMA has outlined its activities being undertaken over a two-year period, 2015 to 2017.

Part 3 continues the practice of outlining the priority assigned to spectrum projects by the ACMA. In response to stakeholder feedback, the emphasis in this FYSO is to provide greater detail on when a particular project is to commence and the expected time frame to complete each project. The work programs provide a basis for meaningful engagement with stakeholders about the ACMA's current work priorities, and the known future projects provide a starting point for the ACMA and industry with regard to the consideration and status of other spectrum-related work as it arises.

1.1. Development of the indicative work programs

Stakeholders should consider the projects identified in the work program as the ACMA's response to increasing pressures on spectrum demand and availability. However as identified in Part 1 of the FYSO, the ACMA's priorities may change as the government implements the recommendations of the Spectrum Review.

The projects outlined in the work program are not detailed and should be considered to represent the ACMA's preliminary thinking. The work programs do not reflect all the work the ACMA undertakes in radiocommunications issues. For example, the work programs do not include the ACMA's 'business as usual' work, such as responding to requests from stakeholders resulting in minor changes to services within existing regulatory arrangements.

The ACMA received nine submissions in response to its 2014–18 FYSO, with submissions closing on 19 December 2014. Submissions covered a range of matters, including the spectrum needs or requirements of individual submitters, and suggestions for matters the ACMA might wish to consider in positioning future editions of the FYSO. The ACMA consider these submissions to be a key element in informing the development of its work programs.

1.2. The indicative work programs

On a yearly basis, the ACMA organises the indicative spectrum management work programs it expects to commence, or continue to progress, over the next five years. The information is divided into two schedules:

- > Schedule 1 is a list of projects or activities on a band-by-band basis, listed in ascending frequency order.
- > Schedule 2 lists the regulatory or service-based projects that, given the activity's broad ranging impact (such as spectrum pricing activities) may span a number of bands or services.

These work programs should be considered in the context of the key priority areas discussed in Part 2. In some cases, key priority areas appear in the detailed work programs, such as the 400 MHz, 800/900 MHz and 1800 MHz projects. In other cases, however, key priority areas do not appear as projects in their own right but should rather be seen as providing a framework in which the ACMA will pursue a range of projects in the work program. For example, the development of flexible arrangements for spectrum access and consideration of appropriate pricing mechanisms are matters that the ACMA would consider in many of the projects in the work program.

The work programs outlined in the schedules provide a mix of information relevant to the identification and status of a project:

- > For band-related projects in Schedule 1, each row includes an activity type that is intended to provide a quick reference for stakeholders in determining what outcome a project is directed towards. Further information on the activity types is provided below.
- > For regulatory projects in Schedule 2, no activity type is provided as the project item may be linked to band planning or other projects undertaken by the ACMA.
- > The tables in the schedules also provide an indicative time frame for the completion of the project. This is intended to assist stakeholders in informing their business cases and engaging in early dialogue with the ACMA about current and future spectrum needs.

The following table provides a quick reference guide to identifying the purpose or status of each project.

Table 4: Spectrum management activity type and meaning

Activity type	Meaning
Expiring spectrum licences	Consider the re-issue of spectrum licences prior to expiry. This process is required under Part 3.2, Division 4 of the Act.
Allocation	Process to allocate licences via price-based or over-the-counter mechanisms. Process may include consultation on appropriate allocation instrument and supporting information.
Implementation	Process has moved to the implementation phase as set out in individual consultation documents. For example, process may include issue of licences, clearance of bands post consultation process or transition of services from one band to another.
Regulatory assessment	To undertake research and analysis to develop spectrum management strategies to provide access to spectrum new technologies or in response to demand for additional spectrum.
Monitoring	Watching brief on regulatory or planning activities. Future action may be contingent on the external environment, for example, outcomes of WRC, emerging technology, international policies or demand.
Band review	Developing arrangements for the future use of a band. Process may include in-depth consultation with public, industry and government to identify improvements to the way a band is used.

1.3. Consultation for spectrum management changes

The ACMA publishes the work programs in the FYSO to give information to industry, government and community groups about planned spectrum management activities that can assist them in providing the ACMA with views about likely future pressures on spectrum management over the 2015–19 period.

The ACMA stresses that consultation with interested parties about planned spectrum management work and related changes will be an ongoing feature of its regulatory functions.

The work programs are living documents that the ACMA reviews annually to ensure their relevance to current trends in radiocommunications. This will include regular updates of the time frames, and priorities for each task and project to ensure they reflect current demand.

Schedule 1:
Band-by-band work program



2015–16

Frequency range	Work task	Outline	Status	Priority	Expected completion time frame
45–52 MHz 56–70 MHz 85–108 MHz 137–144 MHz	Band review: VHF broadcasting service bands (BSB)	<p>Spectrum in these bands has been vacated following the switch-off of analog television</p> <p>The VHF BSB review will examine potential future uses for these bands. Subsequent projects will be needed to implement arrangements for any new uses of the bands.</p> <p>The ACMA will commence this review of VHF BSB now that the two government reviews into digital radio have been completed. The DRM+ digital radio technology can operate in some of these bands, however the report of the digital radio reviews makes no finding on this potential.</p>	Inactive	Medium	2016
174–230 MHz	Implementation: Establish and chair a Digital Radio Planning Committee for Regional Australia	Planning for digital radio services outside mainland state capitals will be informed by the considerations of the Digital Radio Planning Committee for Regional Australia, as recommended by the Department of Communications Digital Radio Report.	Active	High	Consult with industry on the establishment of the committee by the end of calendar 2015
403–520 MHz	Implementation: 400 MHz band arrangements	Outcomes of the 400 MHz band review announced in April 2010 and implementation began in early 2011. Project is due for completion by end 2019.	Active	High	2019

Frequency range	Work task	Outline	Status	Priority	Expected completion time frame
803–960 MHz	Band review: Review of the band 803–960 MHz to explore future opportunities	Review current mobile broadband spectrum planning arrangements, as well as potential future extension of arrangements below the current spectrum licenced 850 MHz band. The review will be considered in accordance with the ACMA's mobile broadband strategy. The review will also examine potential new arrangements for fixed and land mobile services in the band, as well as potential frequency arrangements for public safety mobile broadband and M2M as necessary.	Active	High	Q4 2015
1710–1712.5 MHz and 1805–1807.5 MHz (Paired) 1770–1775 MHz and 1865–1870 MHz	Allocation: Residual spectrum in the 1800 MHz band— spectrum licences	Undertaking allocation of the residual spectrum from the expiring spectrum licence process in the 1800 MHz band. These areas are Adelaide, regional South Australia, Cairns/Townsville.	Active	High	Q4 2015
1710–1785 MHz 1805–1880 MHz	Allocation: Price-based allocation of the regional 1800 MHz band	Minister has made a reallocation declaration for the frequency range 1725–1785 MHz and 1820–1880 MHz. Accordingly, the ACMA is undertaking a priced-based allocation anticipated to commence in November 2015.	Active	High	Q4 2015
1900–1920 MHz 1920–1980 MHz 2110–2170 MHz (Paired)	Expiring spectrum licence process: 2 GHz band	Reissue and/or reallocation of expiring spectrum licences.	Active	High	Q4 2017

Frequency range	Work task	Outline	Status	Priority	Expected completion time frame
5850–5925 MHz (5.9 GHz band)	Band review: Intelligent Transport Systems (ITS)	Development of spectrum access and licensing arrangements to facilitate the introduction of intelligent transport systems (ITS). The ACMA released a public consultation paper in November 2009 outlining possible arrangements for ITS in the band. The ACMA has received input from industry and is monitoring international developments before developing arrangements for ITS.	Active	Medium	Q4 2015
26.5–27.5 GHz	Band review: 27 GHz band	The ACMA has recommended to the minister to revoke the notice designating the 27 GHz band as a spectrum licenced band. Should the minister revoke the notice, the ACMA will undertake a process to implement arrangements to allow the issue of apparatus licences in the band.	Active	High priority	Q3 2015

2016–17

Frequency range	Work task	Outline	Status	Priority	Expected completion timeframe
174–230 MHz	Implementation: Complete digital radio planning and licensing for Canberra and Darwin	Planning for digital radio services outside mainland state capitals will be informed by the considerations of the Digital Radio Planning Committee for Regional Australia, as recommended by the Department of Communications Digital Radio Report. The government expects the committee to give priority to the licensing of permanent licencing of digital radio services in Canberra and Darwin.	Inactive	Medium	The time frame for completion will be informed by the deliberation of the Digital Radio Planning Committee for Regional Australia and the passage of any necessary minor legislative amendments
380–400 MHz	Implementation: Defence band	Defence currently has exclusive use under footnote AUS101. In principle agreement between Defence and some federal government agencies has been reached to provide access to parts of this segment and is being progressed bilaterally	Active	Medium	Subject to other agency considerations
1.5 GHz	Band review: Potential future use by mobile broadband	This band was identified as a candidate band for mobile broadband in <i>Towards 2020</i> and is likely to be considered under the ACMA's mobile broadband strategy. The 1.5 GHz band is under consideration for potential IMT identification under agenda item 1.1 of WRC-15. The ACMA will consider the outcomes of this issue at WRC-15 before further consideration of this band domestically.	Inactive	Medium	Subject to WRC-15 outcomes/ mobile broadband strategy

Frequency range	Work task	Outline	Status	Priority	Expected completion timeframe
1980–2010 MHz and 2170–2200 MHz	Band review: Potential future use by mobile broadband	These bands are currently available on an interim basis for television outside broadcasting (TOB) and were identified as candidate bands for mobile broadband in <i>Towards 2020</i> . The ACMA will further consider this band under the ACMA's mobile broadband strategy (noting potential interest in access to the band (in some geographic areas) for mobile satellite service applications is possible).	Active	Low to medium	Subject to mobile broadband strategy

Longer-term

Frequency range	Work task	Outline	Priority
803-960 MHz	Implementation	Multi-staged implementation of the outcomes of the review of the 803–960 MHz band.	High
2700–3100 MHz	Regulatory assessment: Assignment coordination difficulties between radar operators	The ACMA is working with Defence, Airservices Australia and the Bureau of Meteorology to consider improved arrangements for radiolocation and radionavigation services in these bands. This has included establishment of a domestic radar technical working group.	Low
3575-3700 MHz	Band review: Potential future use by mobile broadband	This band was identified as a candidate band for mobile broadband in <i>Towards 2020</i> and is likely to be considered under the ACMA’s mobile broadband strategy. The band is embargoed in major cities pending a review of arrangements. The 3600–3700 MHz band is under consideration for a potential IMT identification under agenda item 1.1 of WRC-15. The ACMA will consider the outcomes of this issue at WRC-15 before progressing work domestically.	Medium

Schedule 2: Regulatory and service-planning work programs



2015–16

Work task	Outline	Status	Priority	Expected completion time frame
Regulatory assessment: Mobile broadband strategy	Development of a spectrum management strategy on mobile broadband services. Further information on the mobile broadband strategy can be found in parts 1 and 2 of this FYSO.	Active	High	Ongoing work program
Implementation: Licence area planning (LAP) process review	The ACMA is considering options to reduce the cost and complexity in licence planning, including a review of the ACMA's technical planning guidelines (TPGs)	Active	Medium	Ongoing work program
Implementation: Broadcast service planning, licence area plans (LAPs), television licence area plans (TLAPs) and digital radio channel plans (DRCPs)	The ACMA responds to requests to vary LAPs, TLAPs and DRCPs to enable changes to existing transmissions, provide new transmissions extending or improving coverage, or to include new services.	Ongoing work program	Medium	Ongoing work program
Implementation: Sunsetting instruments	The <i>Legislative Instruments Act 2003</i> (LIA) provides a regime (known as sunsetting) for the automatic repeal of regulations and other legislative instruments after 10 years unless action is taken to exempt them. Over the months and years ahead, the ACMA, like all other Commonwealth departments and agencies, will need to respond to the 'sunsetting' requirements of the LIA.	Ongoing work program	High	Ongoing work program
Implementation: HF DF	The establishment of a new high-frequency direction-finding (HF DF) and monitoring system to provide the ACMA with a long-term capability to resolve harmful interference to licensed users of the HF band (3–30 MHz).	Active	Medium	Q4 2016

Work task	Outline	Status	Priority	Expected completion time frame
<p>Regulatory assessment:</p> <p>Review of taxation arrangements for Ka-band spectrum for satellite use</p>	<p>The ACMA has previously flagged a review of apparatus licence taxation arrangements for satellite services.</p> <p>The ACMA's review will focus on the Ka-band and will include a review of the basis of the taxes, and the application of the generalised tax formula to satellite services.</p> <p>Lessons learned in this review may be carried over to other satellite bands in future.</p>	Active	Medium	Review to be completed in 2015–16
<p>Regulatory assessment:</p> <p>Methodology for implementing opportunity cost pricing in appropriate bands</p>	<p>In January 2010, the ACMA decided to consider the use of opportunity cost pricing for annual fees for administratively allocated spectrum. Reviews of taxation arrangements will normally be aligned with major licensing, planning and allocation processes conducted by the ACMA. This will allow the ACMA to focus its resources to projects that have a high priority across the agency. The first will be the 400 MHz band review.</p>	Active	Medium	<p>The ACMA expects to make announcements about the taxation arrangements for high-density and remote-density areas of this band in 2015–16</p> <p>Further consultation about high-density areas will be undertaken over the next four years</p>
<p>Review:</p> <p>Review of spectrum planning, assignment and coordination frameworks</p>	<p>The ACMA's ongoing review of spectrum planning, assignment and coordination frameworks (as specified in spectrum licensing technical frameworks and apparatus licensing RALIs) to ensure their currency and that the frameworks are reflective of current technologies and operational practices.</p>	Active	Medium	Ongoing

Work task	Outline	Status	Priority	Expected completion time frame
Monitoring: LIPD class licence	<p>The LIPD class licence was remade in July 2015 as part of the sunseting instruments process and to include updates to support new devices. The ACMA is monitoring emerging technology developments for consideration of possible future reviews and updates to the class licence and conditions for operation, frequency bands and radiated power limits.</p> <p>Items identified for consideration in next update include reviewing existing arrangements for 60 GHz data communications devices (59–63 GHz for outdoor transmitters; 57–66 GHz for indoor transmitters).</p>	Active	Medium	Ongoing, next update anticipated end 2016
Implementation: Arrangements for long-term licensing in the harmonised government segments of the 400 MHz band	More flexible licensing arrangements to be developed for area-based licensing in the harmonised government segments of the 400 MHz band.	Active	High	Q1 2016
Regulatory assessment: Earth receive station licensing	The ACMA commenced consultation on its regulatory response to address non-compliance. This work program is ongoing.	Active	Medium	Ongoing work program

2016–17

Work task	Outline	Priority
<p>Regulatory assessment: Infrastructure park</p>	<p>The ACMA is undertaking research and analysis into the development of a type of 'private park' to be made available for smart infrastructure.</p>	<p>Medium</p>
<p>Regulatory assessment: Taxation arrangements for television outside broadcast services</p>	<p>The ACMA has previously committed to reviewing the apparatus licence taxation arrangements associated with television outside broadcast services. This review is expected to commence in 2016, at the end of the current transition from the mid-band gap of the 2.5 GHz band, to new apparatus licence arrangements in alternative bands.</p>	<p>Medium</p>
<p>Monitoring: Whitespace</p>	<p>Whitespace is a colloquial term used to describe 'unused' television channels and has traditionally been used by wireless microphones. There is now interest in whitespace for use by Wi-Fi-like systems. The ACMA is monitoring developments in this area and the government's implementation of the recommendations of the Spectrum Review might assist in the development of new regulatory approaches that would assist in the introduction of such technologies.</p>	<p>Medium</p>

Invitation to comment

Making a submission

The ACMA invites comments on the issues set out in the *Five-year spectrum outlook 2015–19* or any other issues relevant to spectrum demand analysis and strategic direction. Submissions should be made:

By email: spectrumlicensingpolicy@acma.gov.au

By mail: The Manager
Spectrum Licensing Policy Section
Spectrum Management Policy Branch
Australian Communications and Media Authority
PO Box 78
Belconnen ACT 2616

The closing date for submissions is COB, Friday 18 December 2015.

Electronic submissions in Microsoft Word or Rich Text Format are preferred.

Media enquiries should be directed to Emma Rossi on 02 9334 7719 or by email to media@acma.gov.au.

Effective consultation

The ACMA is working to enhance the effectiveness of its stakeholder consultation processes, which are an important source of evidence for its regulatory development activities. To assist stakeholders in formulating submissions to its formal, written consultation processes, it has developed [Effective consultation—a guide to making a submission](#). This guide provides information about the ACMA's formal written public consultation processes and practical guidance on how to make a submission.

Publication of submissions

In general, the ACMA publishes all submissions it receives. The ACMA prefers to receive submissions that are not claimed to be confidential. However, the ACMA accepts that a submitter may sometimes wish to provide information in confidence. In these circumstances, submitters are asked to identify the material over which confidentiality is claimed and provide a written explanation for the claim.

The ACMA will consider each confidentiality claim on a case-by-case basis. If the ACMA accepts a claim, it will not publish the confidential information unless authorised or required by law to do so.

Release of submissions where authorised or required by law

Any submissions provided to the ACMA may be released under the *Freedom of Information Act 1982* (unless an exemption applies) or shared with other Commonwealth Government agencies under Part 7A of the *Australian Communications and Media Authority Act 2005*. The ACMA may also be required to release submissions for other reasons including for the purpose of parliamentary processes or where otherwise required by law (for example, under a court subpoena). While the ACMA seeks to consult submitters of confidential information before that information is provided to another party, the ACMA cannot guarantee that confidential information will not be released through these or other legal means.

Privacy

The [Privacy Act 1988](#) imposes obligations on the ACMA in relation to the collection, security, quality, access, use and disclosure of personal information. These obligations are detailed in the [Australian Privacy Principles](#) that apply to organisations and Australian Government agencies from 12 March 2014.

The ACMA may only collect personal information if it is reasonably necessary for, or directly related to, one or more of its functions or activities.

The purposes for which personal information is being collected (such as the names and contact details of submitters) are to:

- > contribute to the transparency of the consultation process by clarifying, where appropriate, whose views are represented by a submission
- > enable the ACMA to contact submitters where follow-up is required or to notify them of related matters (except where submitters indicate they do not wish to be notified of such matters).

The ACMA will not use the personal information collected for any other purpose, unless the submitter has provided their consent or the ACMA is otherwise permitted to do so under the Privacy Act.

Submissions in response to this paper are voluntary. As mentioned above, the ACMA generally publishes all submissions it receives, including any personal information in the submissions. If a submitter has made a confidentiality claim over personal information which the ACMA has accepted, the submission will be published without that information. The ACMA will not release the personal information unless authorised or required by law to do so.

If a submitter wishes to make a submission anonymously or use a pseudonym, they are asked to contact the ACMA to see whether it is practicable to do so in light of the subject matter of the consultation. If it is practicable, the ACMA will notify the submitter of any procedures that need to be followed and whether there are any other consequences of making a submission in that way.

Further information on the Privacy Act and the ACMA's privacy policy is available at www.acma.gov.au/privacypolicy. The privacy policy contains details about how an individual may access personal information about them that is held by the ACMA, and seek the correction of such information. It also explains how an individual may complain about a breach of the Privacy Act and how the ACMA will deal with such a complaint.

Appendix A—Table of frequency bands

Frequency band		Frequency range	
VLF		3–30 kHz	
LF		30–300 kHz	
MF		300–3000 kHz	
HF		3–30 MHz	
VHF		30–300 MHz	
UHF		300–3000 MHz	
	L-band		1000–2000 MHz
	S-band		2000–4000 MHz
SHF	C-band	3–30 GHz	4–8 GHz
	X-band		8–12 GHz
	Ku-band		12–18 GHz
	K-band		18–26 GHz
	Ka-band		26–40 GHz
EHF		30–300 GHz	

Note: there are variations in the frequency ranges corresponding to the band names for the microwave frequency bands (L-band, S-band, etc.). In particular, several exceptions to the above frequency bands exist for allocations to the satellite services.

Appendix B—Acronyms and abbreviations

Acronym	Definition
3GPP	3 rd Generation Partnership Project
AM(R)S	Aeronautical mobile services
APT	Asia-Pacific Telecommunity
ARSG	Australian Radiocommunications Study Groups
ASDE	Airport Surface Detection Equipment
ATU	African Telecommunications Union
BoM	Bureau of Meteorology
BSA	Broadcast Service Act
CEPT	European Conference of Postal and Telecommunications Administrations
CDL	Common data link
CIE	Centre for International Economics
CITEL	Inter-American Telecommunication Commission
COAG	Council of Australian Governments
CMTS	Cellular Mobile Telecommunication Service
CPM	Conference Preparatory Meeting
DAB	Digital Audio Broadcasting
DoC	Department of Communications
DRCP	Digital Radio Channel Plan
EMC	Electromagnetic compatibility
EME	Electromagnetic energy
ESL	Expiring spectrum licence
FSS	Fixed Satellite Service
GNSS	Global Navigation Satellite System
GSM	Global System for Mobile Communications

Acronym	Definition
HEVC	High Efficiency Video Coding
HF	High Frequency
HF DF	High Frequency Direction Finding
ITU	International Telecommunication Union
ITU-R	ITU Radiocommunication Sector
IMT	International Mobile Telecommunications
IoE	Internet of Everything
IoT	Internet of Things
ITS	Intelligent Transport Systems
LAP	Licence Area Plan
LED	Light-emitting Diode
LIA	<i>Legislative Instruments Act 2003</i>
LIPD	Low Interference Potential Devices
LPON	Low Power Open Narrowcasting
M2M	Machine-to-machine
M2P	Machine-to-people
OBPR	Office of Best Practice Regulation
PCA	Priority compliance area
PC	Productivity Commission
PSMB	Public Safety Mobile Broadband
RA	Radiocommunication Assembly
RALI	Radiocommunications Assignment and Licensing Instructions
RLAN	Radio Local Area Networks
RNSS	Radionavigation-satellite service
TLAP	Television Licence Area Plan
TPG	Technical Planning Guidelines
UWB	Ultra-wide Band

Acronym	Definition
VHF	Very High Frequency
WRC	World Radiocommunication Conference

Appendix C—WRC-15 Agenda items

WRC-15 Agenda item	Description	Responsible ARSG
Agenda Item 1.1, IMT candidate bands.	To consider additional spectrum allocations to the mobile service on a primary basis and identification of additional frequency bands for International Mobile Telecommunications (IMT) and related regulatory provisions, to facilitate the development of terrestrial mobile broadband applications, in accordance with Resolution 233 (WRC-12).	PG JTG 4-5-6-7
Agenda item 1.2, Region 1 694–790 MHz mobile	To examine the results of ITU-R studies, in accordance with Resolution 232 (WRC-12), on the use of the frequency band 694–790 MHz by the mobile, except aeronautical mobile, service in Region 1 and take the appropriate measures.	PG JTG 4-5-6-7
Agenda item 1.3, Broadband PPDR	To review and revise Resolution 646 (Rev.WRC-12) for broadband PPDR, in accordance with Resolution 648 (WRC-12).	ARSG 5
Agenda item 1.4, Amateur service secondary allocation 5 250–5 450 kHz	To consider possible new allocation to the amateur service on a secondary basis within the band 5 250–5 450 kHz in accordance with Resolution 649 (WRC-12).	ARSG 5
Agenda item 1.5, Unmanned aircraft systems	To consider the use of frequency bands allocated to the fixed-satellite service not subject to Appendices 30, 30A and 30B for the control and non-payload communications of unmanned aircraft systems (UAS) in non-segregated airspaces, in accordance with Resolution 153 (WRC-12).	ARSG 5
Agenda item 1.6.1, possible primary allocation to FSS between 10 GHz and 17 GHz, Region 1	To the fixed-satellite service (Earth-to-space and space-to-Earth) of 250 MHz in the range between 10 GHz and 17 GHz in Region 1.	ARSG 4
Agenda item 1.6.2, possible primary allocation to FSS in Region 2 and Region 3	Possible primary allocations to the fixed-satellite service (Earth-to-space) of 250 MHz in Region 2 and 300 MHz in Region 3 within the range 13–17 GHz; and review the regulatory provisions on the current allocations to the fixed-satellite service within each range, taking into account the results of ITU-R studies, in accordance with Resolutions 151 (WRC-12) and 152 (WRC-12), respectively.	ARSG 4
Agenda item 1.7, Review of the band 5 091–5 150 MHz by the FSS	To review the use of the band 5 091–5 150 MHz by the fixed-satellite service (Earth-to-space) (limited to feeder links of the non-geostationary mobile-	ARSG 4

WRC-15 Agenda item	Description	Responsible ARSG
	satellite systems in the mobile-satellite service) in accordance with Resolution 114 (Rev.WRC-12).	
Agenda item 1.8, Earth stations located on board vessels	To review the provisions relating to earth stations located on board vessels (ESVs), based on studies conducted in accordance with Resolution 909 (WRC-12).	ARSG 4
Agenda item 1.9.1, possible new allocations to FSS in 7 150–7 250 MHz and 8 400–8 500 MHz	To consider, in accordance with Resolution 758 (WRC-12) possible new allocations to the fixed-satellite service in the frequency bands 7 150–7 250 MHz (space-to-Earth) and 8 400–8 500 MHz (Earth-to-space), subject to appropriate sharing conditions.	ARSG 4
Agenda item 1.9.2, possible allocation to MMSS in 7 375–7 750 MHz and 8 025–8 400 MHz	To consider, in accordance with Resolution 758 (WRC-12) the possibility of allocating the bands 7 375–7 750 MHz and 8 025–8 400 MHz to the maritime-mobile satellite service and additional regulatory measures, depending on the results of appropriate studies.	ARSG 4
Agenda item 1.10, MSS 22–26 GHz	To consider spectrum requirements and possible additional spectrum allocations for the mobile-satellite service in the Earth-to-space and space-to-Earth directions, including the satellite component for broadband applications, including International Mobile Telecommunications (IMT), within the frequency range from 22 GHz to 26 GHz, in accordance with Resolution 234 (WRC-12).	ARSG 4
Agenda item 1.11, EESS primary allocation 7–8 GHz	To consider a primary allocation for the Earth exploration-satellite service (Earth-to-space) in the 7–8 GHz range, in accordance with Resolution 650 (WRC-12).	ARSG 7
Agenda item 1.12, Extension of worldwide allocation to the EESS	To consider an extension of the current worldwide allocation to the Earth exploration-satellite (active) service in the frequency band 9 300–9 900 MHz by up to 600 MHz within the frequency bands 8 700–9 300 MHz and/or 9 900–10 500 MHz, in accordance with Resolution 651 (WRC-12).	ARSG 7
Agenda item 1.13, Review of RR No. 5.268 space research service	To review No. 5.268 of the Radio Regulations with a view to examining the possibility for increasing the 5 km distance limitation and allowing space research service (space-to-space) use for proximity operations by space vehicles communicating with an orbiting manned space vehicle, in accordance with Resolution 652 (WRC-12).	ARSG 7
Agenda item 1.14, Review of coordinated universal time UTC	To consider the feasibility of achieving a continuous reference timescale, whether by the modification of coordinated universal time (UTC) or	ARSG 7

WRC-15 Agenda item	Description	Responsible ARSG
	some other method, and take appropriate action, in accordance with Resolution 653 (WRC-12).	
Agenda item 1.15, Spectrum demands for on-board communication stations in the maritime mobile service	To consider spectrum demands for on-board communication stations in the maritime mobile service in accordance with Resolution 358 (WRC-12).	ARSG 5
Agenda item 1.16, Regulatory provisions and possible spectrum allocations for new Automatic Identification System	To consider regulatory provisions and spectrum allocations to enable possible new Automatic Identification System (AIS) technology applications and possible new applications to improve maritime radiocommunication in accordance with Resolution 360 (WRC-12).	ARSG 5
Agenda item 1.17, Spectrum and regulatory requirements to support wireless avionics intra-communications (WAIC)	To consider possible spectrum requirements and regulatory actions, including appropriate aeronautical allocations, to support wireless avionics intra-communications (WAIC), in accordance with Resolution 423 (WRC-12).	ARSG 5
Agenda item 1.18, Radiolocation for automotive applications in the 77.5–78.0 GHz	To consider a primary allocation to the radiolocation service for automotive applications in the 77.5–78.0 GHz frequency band in accordance with Resolution 654 (WRC-12).	ARSG 5
Agenda item 7, Satellite issues	To consider possible changes, and other options, in response to Resolution 86 (Rev. Marrakesh, 2002) of the ITU Plenipotentiary Conference, an advance publication, coordination, notification and recording procedures for frequency assignments pertaining to satellite networks, in accordance with Resolution 86 (Rev.WRC-07) to facilitate rational, efficient, and economical use of radio frequencies and any associated orbits, including geostationary-satellite orbit.	ARSG 4
Agenda item 9.1.1, Protection of the MSS in 406–406.1 MHz	Protection of the systems operating in the mobile-satellite service in the band 406–406.1 MHz.	ARSG 4
Agenda item 9.1.3, Regulatory measures to support international public telecommunication services in developing countries	Use of satellite orbital positions and associated frequency spectrum to deliver international public telecommunication services in developing countries.	ARSG 4
Agenda item 9.1.5, Consider actions to support existing and future operation of FSS	Consideration of technical and regulatory actions in order to support existing and future operation of fixed-satellite service earth stations within the band 3 400–4 200 MHz, as an aid to the safe operation	ARSG 4

WRC-15 Agenda item	Description	Responsible ARSG
earth stations to aid safe of aircraft	of aircraft and reliable distribution of meteorological information in some countries in Region 1.	
Agenda item 9.1.6, Definitions	Studies towards review of the definitions of fixed service, fixed station and mobile station.	ARSG 1
Agenda item 9.1.7, Guidelines for emergency and disaster relief	Spectrum management guidelines for emergency and disaster relief radiocommunication.	ARSG 1
Agenda item 9.1.8, Nano- and pico-satellites	Regulatory aspects for nano- and pico-satellites.	ARSG 7

Canberra

Red Building
Benjamin Offices
Chan Street
Belconnen ACT

PO Box 78
Belconnen ACT 2616

T +61 2 6219 5555
F +61 2 6219 5353

Melbourne

Level 32
Melbourne Central Tower
360 Elizabeth Street
Melbourne VIC

PO Box 13112
Law Courts
Melbourne VIC 8010

T +61 3 9963 6800
F +61 3 9963 6899

Sydney

Level 5
The Bay Centre
65 Pirrama Road
Pyrmont NSW

PO Box Q500
Queen Victoria Building
NSW 1230

T +61 2 9334 7700
1800 226 667
F +61 2 9334 7799