

Review of the 2.5 GHz band and long-term arrangements for ENG— Response to submissions

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Executive summary

This *Response to Submissions* paper marks the end of the Australian Communication and Media Authority's (the ACMA) consultation phase on the review of the 2.5 GHz band (2500–2690 MHz), and allows work on the review to move into the implementation phase. It sets out a number of decisions on future arrangements in the band, and in a range of other bands which are also directly affected by the changing arrangements in the 2.5 GHz band. It outlines implementation approaches and broad timeframes to achieve the review's key objectives:

- > planning and allocation of the 2.5 GHz band which will maximise the overall benefit derived from that spectrum
- > provision of long-term certainty for the current incumbents of the 2.5 GHz band—the free-to-air commercial broadcasters and the Australian Broadcasting Corporation (ABC).

The ACMA emphasises that the implementation phase will continue to be characterised by ongoing consultation with affected stakeholders.

In January 2010, the ACMA released a discussion paper *Review of the 2.5 GHz band and long-term arrangements for ENG* (electronic news gathering) which outlined a range of options to achieve the review's objectives.¹ The discussion paper explained that the ACMA had formed a preliminary view on its preferred approach for the 2.5 GHz band. This involved a combination of re-allocation of 2 x 70 MHz in the band, with wireless access services (WAS) the most likely use, and conversion of the current apparatus licences to spectrum licences in the remaining 50 MHz of the band for ENG operations by the free-to-air commercial broadcasters and the ABC.² The ACMA also considered that ENG operations should be licensed in a number of alternative bands, under sharing and coordination arrangements.

The ACMA received 42 submissions in response to the discussion paper. The majority of these broadly accepted the 2.5 GHz band review, but a number raised concerns with elements of the ACMA's preferred approach. Those issues that relate to the 2.5 GHz band are summarised in Chapter 3 of this paper, together with the ACMA's response. Issues that relate to the alternative bands are summarised in Chapter 4 of this paper, also with the ACMA's response.

After consideration of issues raised in submissions, the ACMA remains of the view that its preferred approach is the most appropriate way to ensure that the objectives of the 2.5 GHz band review are achieved. The ACMA acknowledges that a number of important issues were raised in submissions, and emphasises that implementation of new arrangements in the 2.5 GHz band and the alternative bands will be subject to ongoing consultation with affected stakeholders. This paper provides an outline of the processes that the ACMA will undertake to implement the new arrangements and an indicative timeframe for implementation. The ACMA is committed to working with

¹ For the purposes of this paper, ENG (Electronic News Gathering) is taken as the generic term for all services captured under Television Outside Broadcast Licences (TOBN) which are held by the free-to-air commercial television broadcasters and the ABC in the 2.5 GHz band.

² For the purposes of this paper, WAS (Wireless Access Services) should be taken to include IMT, wireless broadband services, next generation—3G and 4G—mobile telecommunications services and emerging technologies such as WiMAX.

potentially affected licensees in the 2.5 GHz band and the alternative bands to minimise disruption. Detailed implementation arrangements will therefore be subject to ongoing consultation.

Chapter 1. Introduction

The 2.5 GHz band was designated internationally in 2000 for use by nations wishing to implement IMT (International Mobile Telecommunications)—a WAS service. Since that time there has been increasing demand from telecommunications operators and equipment manufacturers for access to the band for the provision of WAS services around the world, including in Australia. A large number of countries have allocated, or intend to allocate, all or a portion of the 2.5 GHz band to WAS—see Table 1.

Table 1 Countries allocating 2.5 GHz spectrum for WAS

Countries currently using the band for WAS
Brazil, Canada, Denmark, Finland, Germany, Hong Kong, India, Japan, Malaysia, Netherlands, New Zealand, Norway, Poland, Russian Federation, Singapore, Spain, Sweden, Taiwan, Turkey, USA
Countries in the process of making or intending to make the band available for WAS
Austria, Belgium, Croatia, Estonia, France, Guernsey, Italy, Latvia, Portugal, Slovak Republic, South Africa, Switzerland, Thailand, United Kingdom
Countries that are considering using the band for WAS or have identified the band for WAS in their National Frequency Allocations Table
China, Czech Republic, Malta, Vietnam

In Australia, the 2.5 GHz band is currently almost exclusively licensed to the commercial free-to-air television broadcasters and the ABC for ENG. As the band becomes increasingly harmonised internationally for WAS, the incumbent licensees have faced continuing uncertainty about which parts of the radiofrequency spectrum will be available to them in the long term to meet their outside broadcasting requirements.

The global identification of the 2.5 GHz band for IMT is expected to result in large-scale development of equipment that can operate in that band and complies with international standards for IMT and WAS. Allowing use of the 2.5 GHz band for WAS would enable Australia to take advantage of the economies of scale, as well as the benefits of international roaming that global harmonisation makes possible.

Against that international background, the ACMA formed the view that reviewing arrangements in the 2.5 GHz band was a challenging but necessary task, and needed to be accompanied by identification of other radiofrequency bands which would allow provision of ENG service delivery which is equivalent to that currently provided using the 2.5 GHz band. This would provide certainty to both current ENG licensees in the 2.5 GHz band and potential WAS providers. It would also ensure that the planning and licensing arrangements in the band would enable the maximum benefits to be derived from the use of the spectrum.

Background

In February 2006, in response to national and international trends in wireless communications, the ACMA released a discussion paper—*Strategies for Wireless Access Services – Spectrum Access Options – Spectrum Planning Discussion paper SPP 10/06*—to test demand for future WAS spectrum. In October 2008, the ACMA

announced that the 2.5 GHz band was one of the candidate WAS bands which was identified as a result of that consultation. The ACMA also said that it had formed the preliminary view that the current planning, licensing and pricing arrangements in the band were unlikely to support its future efficient allocation and use. As a result, the ACMA undertook to review the arrangements in the band, and on 12 January 2010 released the public discussion paper *Review of the 2.5 GHz band and long-term arrangements for ENG*.³

The discussion paper explained that the review of the 2.5 GHz band had two important objectives:

- > to identify how the 2.5 GHz band should be planned and allocated to ensure that it accords with its highest value use
- > to identify suitable long-term spectrum arrangements for the incumbent users of the band—the free-to-air commercial broadcasters and the ABC.

The consultation period closed on 12 March 2010 and the ACMA received 42 submissions in response to the discussion paper—see [Attachment A](#).

Purpose

The ACMA's announcement of the outcomes and proposed way forward for the review—including the publication of this *Response to submissions* paper—marks the conclusion of consultation phase. Work on this review will now move into the implementation phase, which includes a proposed range of work to enable:

- > conversion of current ENG apparatus licences to spectrum licences in the 2.5 GHz mid-band gap
- > re-allocation of other segments of the 2.5 GHz band
- > development of sharing and coordination arrangements in the identified alternative bands to enable ENG operation in those bands.

The purpose of this paper is to provide stakeholders with a broad insight into the submissions received and an understanding of decisions on future arrangements in the 2.5 GHz band, and in a range of other bands, that the ACMA has reached following its consideration of submissions. The paper provides:

- > a summary of the issues raised in submissions to the discussion paper
- > the ACMA's preliminary responses to these issues
- > an outline of the processes the ACMA will undertake during the implementation phase.

Legislative and policy framework

The issues discussed and the approaches outlined in this paper are consistent with the object of the *Radiocommunications Act 1992* (the Radiocommunications Act). They are also informed by analysis against the *Principles for Spectrum Management* and the total welfare standard (TWS).

The *Australian Communications and Media Authority Act 2005* (the ACMA Act) sets out the spectrum management functions of the ACMA including:

- > managing the radiofrequency spectrum in accordance with the Radiocommunications Act

³ The discussion paper and submissions can be accessed at http://www.acma.gov.au/WEB/STANDARD/pc=PC_312013

- > advising and assisting the radiocommunications community.

The object of the Radiocommunications Act

Consistent with the spectrum management functions set out in the ACMA Act, the purpose of the Radiocommunications Act is provide for management of the radiofrequency spectrum in order to achieve a number of goals including:

- > 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
- > support the communications policy objectives of the Commonwealth Government.⁴

In light of the objects identified above, this paper details measures to reform arrangements in the 2.5 GHz band and identifies strategies for transition to these new arrangements that minimise the impost on users as far as possible.

Principles for Spectrum Management

The ACMA has developed a series of *Principles for Spectrum Management* to guide its decision-making on spectrum management within its existing legislative responsibilities and government policy settings.

The principles aim to:

- > promote consistency, predictability and transparency in the ACMA's decision-making regarding spectrum
- > increase the ACMA's ability to respond to challenges, including the impact of new technologies and increasing demand for spectrum for advanced services.

The principles recognise that a band's highest-value use is not determined solely by an economic assessment, but also by consideration of the broader public good or social benefit achieved by that use. Therefore, a key theme of the principles is that maximising the overall public benefit from use of the radiofrequency spectrum requires balanced application of both regulatory and market mechanisms.

The *Principles for Spectrum Management* are:

Principle 1—Allocate spectrum to the highest value use or uses.

Principle 2—Enable and encourage spectrum to move to its highest value use or uses.

Principle 3—Use the least cost and least restrictive approach to achieving policy objectives.

Principle 4—To the extent possible, promote both certainty and flexibility.

Principle 5—Balance the cost of interference and the benefits of greater spectrum utilisation.

⁴ The object of the Radiocommunications Act is to provide for the management the radiofrequency spectrum. The purposes of the objects are set out in paragraphs 3 (a) through (h).

In addition to the principles, the ACMA has also considered a range of other factors identified in its spectrum management decision framework. Technology developments and government policy are key factors in the decisions detailed in this paper.

A discussion of the ACMA's decision for the way forward for the 2.5 GHz band review in the context of the *Principles for Spectrum Management* is in Chapter 5 of this paper.

The total welfare standard

As part of determining what actions maximise the public benefit, the ACMA considers the impact on total surplus, or total welfare. This enables the ACMA to adhere to a consistent conceptual framework when assessing the public interest impact of the regulatory proposals it considers. The approach that results in the greatest net benefits is regarded as the approach that best promotes the public interest, and maximises total welfare.

Consistent with this approach, the ACMA evaluates the impact of a decision on affected groups but notes that issues associated with the distribution of benefits and costs between different parties should be addressed as a separate and distinct policy question.

The ACMA has undertaken a high-level consideration of the overall public benefit associated with the changes to the 2.5 GHz band and the proposed introduction of ENG operations to the identified alternative bands. It has also considered what costs may result from the proposed arrangements. The ACMA acknowledges that any change from current arrangements imposes some additional costs on incumbent licensees in the 2.5 GHz and alternative bands. The ACMA considers that making the 2.5 GHz band available for wireless access services will maximise the return to the community. However, in implementing the proposed arrangements the ACMA will give careful consideration to the costs that may be imposed, and seek to adopt an approach that generates the greatest net benefits.

Chapter 2. Overview of new arrangements

The discussion paper sought comment from industry and interested parties on a series of options the ACMA had identified for the future planning of the 2.5 GHz band, which ranged from continuing with the current approach through to re-allocating the entire band and issuing technology-flexible spectrum licences. The ACMA also identified several alternative bands in which spectrum could be made available for ENG operations, if the review led to less spectrum being available for ENG operators in the 2.5 GHz band. The discussion paper noted that the ACMA had formed a preliminary view on its preferred approach for the review of the 2.5 GHz band, which involved a combination of re-allocation of some of the 2.5 GHz band, conversion of current apparatus licences to spectrum licences in the balance of the band, and ENG access to several alternative bands.

New arrangements

Following consideration of submissions to the discussion paper, the ACMA remains of the view that this preferred approach is the most appropriate way forward in the review of the 2.5 GHz band:

- > re-allocation of 2500–2570 MHz and 2620–2690 MHz for spectrum licences, at least in major metropolitan areas, with technical frameworks that are technology flexible but optimised for WAS
- > conversion of ENG apparatus licences to 15-year spectrum licences on an Australia-wide basis in 2570–2620 MHz (the mid-band gap)
- > ENG access via apparatus licences to additional parts of the 2.5 GHz band in regional areas of known high use, as well as access on a shared basis with WAS in other areas dependent on demand for WAS
- > ENG access to all the identified alternative bands:
 - > shared use of the bands 2025–2110 MHz and 2200–2300 MHz
 - > exclusive use of the band 2010–2025 MHz, at least in capital city areas
- > ENG access to 1980–2010 MHz and 2170–2200 MHz, with the caveat that mobile-satellite services may be introduced into these bands in the future, with ACMA investigating the viability of long-term sharing between ENG and mobile-satellite services.

This approach offers the opportunity to realise the benefits to be gained from harmonisation of the 2.5 GHz band for WAS, while still ensuring the ongoing availability of suitable spectrum for ENG operations, which are of significant importance to the Australian people. In addition, it recognises the social and economic value of the range of services provided by licensees in the alternative bands. The development of sharing and coordination arrangements, and the minimisation of any clearance arrangements, are intended to ensure that those services can continue to operate in the alternative bands wherever possible. The ACMA therefore considers that the approach to the future of the 2.5 GHz band represents a balance between the needs and concerns of all involved stakeholders.

The ACMA regards ongoing consultation as a fundamental element of all its work, and stresses its commitment to active engagement with stakeholders as part of the refinement of implementation arrangements for the 2.5 GHz and alternative bands.

Implementation process

An overview of the stages of the 2.5 GHz project is provided in [Table 2](#) below. The project has been broken into separate stages that reflect the different bodies of work that have been, and will continue to be, undertaken by the ACMA to facilitate the 2.5 GHz band moving to its highest value use and the provision of long-term certainty for ENG.

The ACMA's announcement of the way forward for the review—including the publication of this *Response to Submissions* paper—marks the conclusion of Stage 4 of the review. Work on this review will now move into the implementation phase. The precise timing of various implementation processes will be subject to further consultation, but a broad indicative timeframe is given in Table 2.

Table 2 Stages of the 2.5 GHz review

Stage	Details	Status	Indicative timeframe
Consultation			
1	WAS consultation process Two papers released, one seminar Review of submissions Review of international developments/trends Investigation of options Decision on way forward	Completed	2006–2008
2	Announcement on consultation outcomes and further work Targeted stakeholder consultation Consideration of potential band for long-term ENG Consideration of appropriate regulatory arrangements, including licensing and allocation options	Completed	2009
3	Public consultation process Release of public discussion paper Industry tune-up on content of discussion paper Analysis of Submissions	Completed	January–September 2010
4	Way forward announcement Release of <i>Response to Submissions</i> paper Announcement of decision on way forward	Current	October 2010
Implementation			
5	Re-allocation processes—2.5 GHz band Consultation on precise areas to be re-allocated Consultation on draft re-allocation recommendation Development of technical frameworks in consultation with industry Development of draft licences Consultation on price-based allocation instruments Price-based allocation	Proposed	Commence now

6	Conversion processes—2.5 GHz band Consultation with licensees on draft conversion instrument Development of technical frameworks in consultation with licensees Development of draft licences Consultation on conversion plan Conversion	Proposed	Commence now Conclude late 2012/early 2013
7	Alternative band arrangements Development of sharing and coordination arrangements in consultation with industry Consultation on draft band plan(s) for clearance of fixed links Band plan Development of licensing arrangements Completion and publication of sharing and coordination arrangements	Proposed	Commence now Conclude late 2011/early 2012 By mid-2012
8	Relocation of ENG to identified alternative bands Any necessary relocation of fixed links Gradual relocation of ENG services to identified alternative bands	Proposed	By late 2013 By mid-2014

Note: Indicative timeframe does not apply to Perth where ENG operations are expected to continue in the 2.5 GHz band until after the anticipated earth station relocation at the end of 2015.

Re-allocation processes

The ACMA will undertake a range of consultation processes to develop arrangements for re-allocation of parts of the 2.5 GHz band. As the ACMA noted in the discussion paper, it may be appropriate or necessary to re-allocate different amounts of spectrum in different geographic areas. The ACMA will undertake further consultation with interested stakeholders on how much spectrum should be re-allocated in different areas. The views of interested stakeholders will also be sought on how that spectrum should be made available in any price-based allocation, for example, whether it should be in a single nationwide lot (possibly with some areas excluded from that lot), or in a number of smaller lots. Several responses to the discussion paper provided commentary on this issue, and these comments will be considered as the process moves forward. The ACMA expects to commence further formal consultation on these issues by the first half of 2011. However, informal consultation will commence immediately.

This work will culminate in the release of a draft recommendation to the Minister for Broadband, Communications and the Digital Economy to make a spectrum re-allocation declaration for the 2.5 GHz band, in accordance with section 153G of the Radiocommunications Act. The precise timing of the release of the draft recommendation will depend on the outcome of the consultation with interested stakeholders.

Subsequently, should a spectrum re-allocation declaration be made by the minister, the ACMA notes that, under the spectrum licensing provisions of the

Radiocommunications Act, the re-allocation period must be at least two years. During the re-allocation period, the incumbent apparatus licensees may continue to operate their service. At the end of the re-allocation period, the apparatus licensee must vacate the spectrum, or come to a commercial agreement with the spectrum licensee to continue operation.

As discussed below under *Relocation of ENG operations to the alternative bands*, the ACMA considers that arrangements in the alternative bands may not be completed and published until late 2013. Commercial free-to-air broadcasters and the ABC may therefore not be able to finalise any significant relocation into the alternative bands until early 2014. To provide sufficient time for ENG relocation to occur, the ACMA therefore considers that the re-allocation period in the 2.5 GHz band should not end before mid-2014. However, this would not prevent an auction of the re-allocated spectrum from being undertaken in late 2012 if practicable. This re-allocation period is also consistent with keeping open the option of holding a simultaneous auction of re-allocated 2.5 GHz and digital dividend spectrum.

An early price-based allocation with post mid-2014 licence start dates would give new licensees certainty to be able to undertake business planning (and network planning should WAS be the highest value use). It also gives certainty of tenure to the existing licensees until such a time they can be moved with minimum disruption to ENG services.

The ACMA will also establish a technical liaison group in which stakeholders can assist in the development of the technical frameworks to support spectrum licences in those parts of the 2.5 GHz band which will be subject to re-allocation. The group will be similar to those that have been established in the past to assist in the development of spectrum licences in other bands. These groups are normally made up of technical experts from potential spectrum licensees in the band in question, and the ACMA envisages that this arrangement would also apply with the 2.5 GHz band. The ACMA will shortly invite interested stakeholders to join the technical liaison group and potential spectrum licensees are encouraged to consider participation to ensure that the licences which are developed will be able to meet their needs.

The precise timing of any price-based allocation in the 2.5 GHz band depends on a range of factors, including ongoing consultation. However, the ACMA considers that an allocation might occur in late 2012 or early 2013.

Conversion processes

The ACMA will undertake extensive consultation with commercial free-to-air broadcasters and the ABC to develop appropriate arrangements to convert their apparatus licences to technology-flexible spectrum licences. This will include working with their technical experts to develop the technical frameworks to support the spectrum licences.

The ACMA considers that there are interdependencies between the technical frameworks for the re-allocated and converted spectrum licences because they share a spectral boundary and hence guard bands will be planned—see [Figure 1](#) in Chapter 3 and discussion under *Guard bands* (p.18). The precise timing of technical framework development for the converted licences will be resolved in consultation with stakeholders. However, the interdependencies mean that the ACMA will ensure that, where necessary, elements of the converted and re-allocated spectrum licence frameworks are developed in parallel.

The precise timing of any conversion is also a matter for ongoing consultation with the commercial free-to-air broadcasters and the ABC. To provide certainty for the

incumbent licensees. the ACMA intends to commence consultation on possible arrangements in late 2010.

The ACMA considers that it is highly desirable to have a common expiry date for all spectrum licences in the 2.5 GHz band. This means that, if all licences are to have fifteen year terms—the maximum term allowable under the Radiocommunications Act—then converted licences would have the same start date as licences which are issued as a result of any price-based allocation in the band.

Alternative band arrangements

As outlined in the discussion paper and in Chapter 4, there are a number of sharing and coordination arrangements which will need to be developed with a range of industry sectors to enable the introduction of ENG in the alternative bands. This will include:

- > development of appropriate protection arrangements for earth stations
- > development of arrangements for enabling operation of ENG and Defence aeronautical mobile telemetry
- > consideration of the extent of any necessary clearance of fixed links
- > consideration of adjacent band coordination requirements.

The ACMA would then develop appropriate licence conditions. In the case of any fixed link clearance, the ACMA would also develop, consult on, and publish a band plan to give effect to the clearance processes.

The ACMA intends to commence consultation with affected stakeholders on coordination arrangements and fixed-link clearance requirements as soon as possible. Any fixed-link clearance requirements are envisaged to be specified under a formal band plan made under section 32 of the Radiocommunications Act. The ACMA would develop band plan requirements in consultation with industry before releasing a draft band plan for formal consultation as required under section 33 of the Radiocommunications Act.

As noted in the discussion of fixed links under *ACMA response to submissions* (p.22), the arrangements for ENG in regional and remote areas in the alternative bands are related to the amount of 2.5 GHz band spectrum which is re-allocated in regional and remote areas. Consequently, the precise timing of the release of a draft band plan for formal consultation is related to the timing of re-allocation processes (see *Reallocation process* p.9). However, under the assumption that a band plan is finalised in late 2011, it is anticipated that coordination requirements could be finalised and published by mid 2012.

As discussed in *Spectrum for pay television, production companies and equipment suppliers* (see p.15), the ACMA considers that licensing arrangements can be developed in the alternative bands which will enable operation of ENG for both planned and unplanned events. Consultation on licensing arrangements in alternative bands is anticipated to occur in 2011 with arrangements finalised in late 2011 or early 2012 after finalisation of the band plan.

The ACMA will undertake consultation with affected stakeholders to develop these arrangements. The ACMA intends to commence this consultation by the end of 2010, but the timing of the finalisation of the development of new arrangements will depend on the outcome of that consultation. However, the ACMA considers that it may be possible to have identified agreed arrangements by late 2011 or early 2012.

Relocation of ENG operations to the alternative bands

The ACMA intends to develop new arrangements in the alternative bands which will enable a staged relocation of ENG operations from the 2.5 GHz band to the alternative bands. However, the ACMA's initial view is that some fixed-link relocation may be necessary before any ENG relocation can occur, though the ACMA emphasises its intention to minimise the extent of any fixed-link clearance. The ACMA considers that fixed links may require two years to relocate; therefore if arrangements have been identified by late 2011, then any necessary fixed-link relocation could be expected to have occurred by late 2013.

Once any necessary fixed-link relocation had been completed, then ENG relocation from the 2.5 GHz band could be finalised. The ACMA does not intend to establish arrangements which would preclude earlier ENG relocation, but the ACMA's preliminary view is that, to avoid disruption to ENG operation, it may not be possible to finalise ENG relocation until mid-2014. However, this will be subject to consultation with affected stakeholders.

Chapter 3. The 2.5 GHz band

This chapter outlines the new arrangements that will apply in the 2.5 GHz band, provides a summary of issues raised in submissions to the discussion paper about those new arrangements and presents the ACMA's response to those issues.

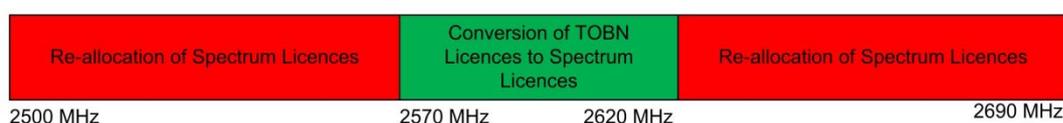
The new arrangements

The international designation of the 2.5 GHz band for WAS has been reflected in Australia through the consequent interest that WAS providers have expressed in gaining access to the 2.5 GHz band. To maximise the potential for the realisation of the benefits of international harmonisation, the ACMA intends to replan the 2.5 GHz band based on the European Conference of Postal and Telecommunications Administrations (CEPT) model.⁵

Licensing and allocation arrangements, however, will reflect the need to provide capacity in the 2.5 GHz band for ENG operation as illustrated in [Figure 1](#):

- > re-allocation of 2500–2570 MHz and 2620–2690 MHz for spectrum licences, at least in major metropolitan areas, with technical frameworks that are optimised for WAS, but that are technology flexible
- > conversion of ENG apparatus licences to 15-year spectrum licences on an Australia-wide basis in 2570–2620 MHz (the mid-band gap).

Figure 1 ACMA approach to the 2.5 GHz band



Feedback from stakeholders in response to the ACMA's public discussion paper was broadly accepting of the 2.5 GHz band review, although submitters did raise a number of concerns with the ACMA's preferred approach. The ACMA acknowledges the importance of this contribution. This chapter, and the following chapter, directly discuss and address the particular concerns raised in submissions.

General issues raised in submissions

Timing of implementation

Stakeholder commentary

The timing of any processes to change arrangements in the 2.5 GHz band was an issue of significant stakeholder interest. In particular, both ENG and WAS operators were keen for certainty as soon as possible on decisions surrounding spectrum access and tenure. In general, however, these stakeholders had different views on appropriate timing:

1. Existing ENG licensees in the 2.5 GHz band were of the view that no decisions on 2.5 GHz should be made until after issues with the identified alternative bands have been resolved.

⁵ The CEPT is the multinational body responsible for radiocommunications, telecommunications and postal matters in Europe. The acronym is taken from the French *Conférence européenne des administrations des postes et des télécommunications*.

2. Those submitters who expressed interest in gaining access to the 2.5 GHz band for WAS operation generally, though not always, expressed a preference for a price-based allocation and deployment of WAS services to occur as soon as possible.

Some submissions from potential 2.5 GHz WAS operators sought a price-based allocation of the band as early as 2011, with deployment enabled by 2012, and the date of the current ENG licence expiry in February 2013 as the latest reasonable date for service deployment. These submissions also expressed a preference for an alignment of timing of any 2.5 GHz and 700 MHz allocations.

ACMA response to submissions

The ACMA acknowledges that there are a range of issues to be considered and resolved in the alternative bands in order to establish sharing, coordination and licensing arrangements which will enable ENG operation in those bands. The ACMA also accepts that potential WAS operators are keen for an allocation of the 2.5 GHz band relatively soon so that they can begin to plan their networks.

The ACMA considers that, to ensure continuity of ENG operations, it would be desirable to preserve the option of a staged migration of ENG operations from the 2.5 GHz band to the alternative bands. This would enable ENG operators to commence using some alternative bands, in at least some geographic locations, before final arrangements have necessarily been implemented in all bands and all geographic areas. This should mitigate the risks of disruption which might occur if ENG licensees attempt a single move into all alternative bands.

However, the development of all arrangements in the alternative bands may take several years, so to defer commencement of any processes to enable re-allocation of parts of the 2.5 GHz band until those arrangements are in place would potentially delay any price-based allocation by a number of years. In particular, the ACMA considers that any necessary relocation of fixed links is unlikely to be complete before the end of 2013.

The ACMA therefore considers that it is necessary to commence the development of new arrangements in the alternative bands and the 2.5 GHz band in parallel. The precise timing of an allocation in the 2.5 GHz band will depend on the resolution of a variety of issues, ranging from development of technical frameworks to establishment of appropriate auction capability, but the ACMA considers it highly unlikely that any allocation would take place before late 2012. In addition, to enable a staged migration of ENG services, the ACMA considers that it will be necessary for at least some ENG services to remain in the 2.5 GHz band for a period beyond late 2013, if that is the end date for fixed-link relocation.

The ACMA notes that, under the spectrum licensing provisions of the Radiocommunications Act, the re-allocation period must be at least two years. During the re-allocation period, the incumbent apparatus licensee may continue to operate their service. At the end of this period, the apparatus licensee must vacate the spectrum, or come to a commercial agreement with the spectrum licensee to continue operation.

The ACMA will undertake further consultation on appropriate re-allocation arrangements. However, given that ENG migration to the alternative bands cannot be completed until the relocation of fixed links has taken place, the ACMA considers that the end of the re-allocation period must be after late 2013; mid-2014 would provide time for a staged migration to occur after fixed-links relocation is complete. The ACMA will undertake further consultation on whether this means that the start dates for the re-allocated spectrum licences should also be after late 2013.

There was some suggestion in submissions to the January discussion paper that potential bidders believe the 2.5 GHz and 700 MHz (digital dividend) bands have complementary propagation characteristics and that it may therefore be desirable for the two bands to be auctioned in a single, simultaneous process.

It is important to note that if a simultaneous process is to occur, then timing of any 2.5 GHz band allocation may also be affected by any delays to the 700 MHz band processes. The re-allocation of spectrum involves several legislative steps and takes considerable time. In its ongoing consultation on the 2.5 GHz band re-allocation, the ACMA will give further consideration to whether a single, simultaneous process is desirable.

Spectrum for pay television, production companies and equipment suppliers

Stakeholder commentary

While the commercial free-to-air broadcasters and the ABC hold the licences to operate ENG services in the 2.5 GHz band, the band is also used by pay television operators, third party production companies and equipment suppliers. The ACMA understands that this use is usually authorised via third party agreements with the current ENG licensees. In submissions to the discussion paper, some pay television operators, third party production companies and equipment suppliers sought formal ENG access arrangements equivalent to those being offered to the current incumbent ENG licensees in the 2.5 GHz band and the identified alternative bands. Their submissions proposed that these arrangements should be enabled via apparatus licences allocated on an open and competitively neutral basis.

ACMA response to submissions

The ACMA considers that the objective of maximising the overall benefit derived from use of the 2.5 GHz band and allowing it to move to any higher-value use in the future will be more effectively achieved by spectrum licensing the mid-band gap, rather than by retaining apparatus licensing. Technology-flexible spectrum licences would allow licences in the mid-band gap to be traded in the future not only to another ENG operator, but also to a WAS operator who wished to utilise Time Division Duplex (TDD) equipment in the mid-band gap, if that is a higher-value use of the spectrum. The apparatus licence category which currently applies to ENG operators restricts the use of the licence to the transmission of television and associated signals on certain frequencies on an Australia-wide basis. This means that if this licence type is retained in the mid-band gap in the future, it would not be possible to trade it to an operator wishing to deploy any other technology. A spectrum licence, on the other hand, provides greater flexibility as well as longer-term certainty to the licensee.

The ACMA understands the business need of some pay television operators, third party production companies and equipment suppliers to have the certainty of spectrum access if they held their own licences. The ACMA notes that support for such licensing is provided for planned events in the 7.2, 8.3 and 13 GHz bands, though in general operators have not taken extensive advantage of these arrangements. Instead of holding their own licences in other bands, for a range of technical and economic reasons they have tended to prefer to invest in 2.5 GHz equipment and operate under third-party authorisations from the commercial free-to-air broadcasters and the ABC.

The ACMA believes that access to the mid-band gap is a key platform of the solution which will enable provision of long-term certainty to the current incumbents of the 2.5 GHz band. The ACMA believes that the alternative bands are suitable for a range of ENG applications but, of the spectrum options proposed in this review, the mid-band gap is well suited, without technical restrictions, to the support of airborne operations, where ENG transmitters are fitted to helicopters. The ACMA considers that the preservation of capacity for operations of this nature is important.

The ACMA therefore intends to convert the current apparatus licences in the mid-band gap held by the commercial free-to-air broadcasters and the ABC to 15-year spectrum licences.

The ACMA understands that where pay television operators, third-party production companies and equipment suppliers require access to ENG spectrum, it tends to be for planned events rather than for the rapid, unplanned deployment that characterises the electronic newsgathering undertaken by the free-to-air broadcasters. The ACMA also understands that a significant amount of equipment used is capable of operating in the alternative bands, though modifications may be required to ancillary equipment to support operation in the proposed alternative bands.

Based on current usage patterns—that is, if there is no growth in spectrum requirements—the ACMA considers that it would be feasible to provide dedicated spectrum to support planned events in the alternative bands. Providing dedicated spectrum for rapid, unplanned deployment for news coverage (that is, true ENG) and planned events would facilitate transition to the new arrangements by minimising ENG and planned event coordination issues. The dedicated planned event spectrum could be used by production companies irrespective of whether they were working for the pay television or free-to-air sectors. This would be in addition to dedicated spectrum to support the free-to-air sector’s requirement for rapid, unplanned deployment for news coverage. The current planned event usage of ENG spectrum under third-party agreements could also continue, but that would be a commercial arrangement and would not involve the ACMA.

However, a number of submissions predicted a significant growth in demand for spectrum access to meet high definition television and 3D television requirements. The ACMA consider that if there is growth in spectrum requirements then the alternative bands would be insufficient to satisfy demand, unless there are improvements in technology and industry practices. Relocation to the higher bands would eventually be required.

Consequently, the ACMA intends to:

1. Provide some spectrum in the alternative bands, subject to availability, for planned events so that those currently operating under third party arrangements may apply for their own licences should they wish.⁶
2. Monitor growth and demand in spectrum requirements for planned events and undertake a future review of spectrum arrangements in other bands when required.

The ACMA emphasises that the provision of planned event spectrum in the alternative bands might only be a transitional arrangement, if the growth in spectrum demand for ENG services that was predicted in some submissions eventuates. The ACMA notes that pay television operators, third-party production companies and equipment suppliers—and indeed the commercial free-to-air broadcasters and the ABC—could participate in any price-based allocation in the 2.5 GHz band should they wish to do so.

Frequency ranges 2500–2570 MHz and 2620–2690 MHz

Stakeholder commentary

The discussion paper proposed that the frequency ranges 2500–2570 MHz and 2620–2690 MHz would be re-allocated for spectrum licensing and subject to a price-based allocation process. The ACMA sought stakeholder views on how metropolitan, regional

⁶ There may not sufficient spectrum in Perth and Canberra to support this arrangement due to earth station coordination requirements -see p. 22.

and remote areas might be most appropriately defined for licensing in the 2.5 GHz band, and the amount of spectrum, if any, that should be re-allocated in those areas.

The majority of submissions broadly accepted the proposals for these frequency ranges. While the commercial free-to-air broadcasters and the ABC expressed a preference for the status quo to be retained, they also acknowledged international harmonisation and increasing demand for WAS provision in the 2.5 GHz band. Submissions from WAS providers expressed general support for the ACMA preferred approach, although differed in their views on specific arrangements. For example, some expressed a preference for national licences in the band, while others proposed that a lesser quantum of spectrum than 2 x 70 MHz might be appropriate in regional and remote areas. A number of submissions from entities which currently use the 2.5 GHz band for ENG operation indicated that they would seek compensation for costs arising from any change in current arrangements.

The National Coordinating Committee for Government Radiocommunications proposed that long-distance, fixed point-to-point links might be accommodated in any technical framework developed for areas outside major urban centres.

ACMA response to submissions

The ACMA remains of the view that, to maximise the overall benefit derived from use of the 2.5 GHz band, price-based allocation of spectrum licences in the frequency ranges 2500–2570 MHz and 2620–2690 MHz is appropriate, in order to allow the market to determine the highest-value use of the spectrum.

Further consultation will be undertaken on how different geographic areas will be defined and the quantum of spectrum that will be re-allocated in each of those areas. In particular, before giving the Minister for Broadband, Communications and the Digital Economy a recommendation that he make a spectrum re-allocation declaration for the 2.5 GHz band, the ACMA will consult on a draft version of the recommendation in accordance with section 153G of the Radiocommunications Act.

The ACMA will consult with interested stakeholders on processes leading to a price-based allocation of the 2.5 GHz band. This will include a spectrum tune-up and establishment of a technical liaison group in which stakeholders can assist in the development of the technical frameworks to support spectrum licences in the 2.5 GHz band.

If less than 2 x 70 MHz is spectrum licensed in regional and remote areas, the ACMA proposes to develop flexible licensing arrangements which would allow either an ENG or WAS service to be deployed. Development of arrangements would be in consultation with industry.

The ACMA does not consider it is desirable to introduce new, fixed point-to-point links into the 2.5 GHz band, since the band is emerging as a globally harmonised band for WAS. The ACMA considers that there are a range of other bands which would be suitable for the deployment of such links in regional and remote areas.⁷

2570–2620 MHz: The mid-band gap

Stakeholder commentary

The discussion paper proposed that in the frequency range 2570–2620 MHz (the mid-band gap), the current apparatus licences held by the commercial free-to-air broadcasters and the ABC should be converted to 15-year spectrum licences.

⁷ See RALI FX3 Microwave fixed services frequency coordination at www.acma.gov.au/WEB/STANDARD/pc=PC_2599.

The majority of submissions accepted this approach. However, some supported re-allocation of the entire 2.5 GHz band while others proposed that the mid-band gap should remain apparatus licensed and that those licences should be allocated on an open and competitively neutral basis.

ACMA response to submissions

As discussed in *Spectrum for pay television, production companies and equipment suppliers* (see p.15), the ACMA does not propose to re-allocate the mid-band gap because it considers that access to that spectrum is an important platform of the solution which will enable provision of long-term certainty to the current incumbents of the 2.5 GHz band. Moreover, to allow the use of the mid-band gap to change in the future, should a higher value use of the spectrum emerge, the ACMA supports the development of technology-flexible licences in this frequency range and proposes to achieve this through spectrum licensing.

The ACMA therefore intends to convert the current apparatus licences in the mid-band gap held by the commercial free-to-air broadcasters and the ABC to 15-year spectrum licences.

Guard bands

Stakeholder commentary

In the discussion paper, the ACMA explained that if both Frequency Division Duplex (FDD) and ENG or TDD services were accommodated in the 2.5 GHz band, there would be a requirement for a guard band between the FDD and ENG/TDD allocations. The ACMA invited comments on where the guard band should be located.

In their submissions, respondents generally expressed a preference for any guard band to be located in spectrum other than the spectrum they would be using. This reflected concern that the presence of guard bands may reduce spectrum availability and flexibility for operators whose spectrum the guard bands are placed in. Potential WAS operators therefore generally preferred that guard bands be planned in the mid-band gap, while ENG operators proposed that guard bands be planned in the FDD spectrum at the boundaries of the mid-band gap.

ACMA response to submissions

The ACMA is keen to ensure that outcomes of this review maximise the net benefits. While acknowledging the potential impact a guard band may have on an operator, a key consideration is the current standardisation of spectrum arrangements and, consequently, WAS technologies. This is expected to result in the large-scale development of equipment that complies with the standards, which will result in improved economies of scale in production and, consequently, lower equipment costs for operators and consumers. In order to gain the benefit of these developments, the preferred approach, as indicated by the ACMA in the discussion paper, is to follow the harmonised band plan where the guard bands between FDD and TDD blocks in the 2.5 GHz band are planned to sit within the TDD mid-band gap.

In developing technical frameworks for spectrum licences in the 2.5 GHz band, the ACMA will therefore plan the guard band to sit within the mid-band gap.

Chapter 4. The identified alternative bands for ENG operation

This chapter outlines the new arrangements that will apply in a range of alternative bands, provides a summary of issues raised in submissions to the discussion paper about those new arrangements, and sets out the ACMA's response to those issues.

The new arrangements

As well as access to the mid-band gap in the 2.5 GHz band, the following range of alternative bands will be made available for ENG operation:

- > shared use of the bands 2025–2110 MHz and 2200–2300 MHz
- > exclusive use of the band 2010–2025 MHz, at least in capital city areas
- > ENG access to 1980–2010 MHz and 2170–2200 MHz, with the caveat that mobile-satellite services may be introduced into these bands in the future, with ACMA investigating the viability of long-term sharing between ENG and mobile-satellite services.

These bands were originally identified as potentially appropriate for ENG after considering international arrangements for ENG, the operating frequency range of ENG equipment, radio propagation characteristics, and existing services in these and adjacent bands in Australia.

A number of concerns about the alternative bands were raised in submissions. Most of these concerns are associated with the potential for sharing and interference issues within the bands, following the introduction of ENG. The ACMA recognises that these are important issues, but is confident that appropriate sharing, coordination and licensing arrangements can be developed through ongoing consultation with industry.

General issues raised in submissions

Equivalent access for ENG licensees in the identified alternative bands

Stakeholder commentary

In their submissions responding to the public discussion paper, the commercial free-to-air broadcasters and the ABC expressed doubt about whether arrangements could be developed in the alternative bands which would provide them with sufficient capacity to enable provision of ENG service delivery which is equivalent to that currently provided using the 2.5 GHz band. They were concerned that the sharing and coordination arrangements that will be required—particularly with the space industry around Canberra and Perth—would effectively represent a significant reduction in the amount of spectrum available for ENG operation. This concern was also reflected in a number of submissions from parties who currently operate under third-party authorisation arrangements in the 2.5 GHz band.

ACMA response to submissions

The ACMA recognises the benefits that accrue to the Australian community from ENG and related services, including the provision of live news coverage and coverage of planned cultural and sporting events. The ACMA continues to consider that arrangements can be developed in the alternative bands which will ensure provision of ENG service delivery which is equivalent to that currently provided. The ACMA remains committed to continuing to work with ENG licensees to develop these arrangements.

The ACMA also recognises, however, the value of the existing services in the alternative bands, and therefore considers it appropriate to develop arrangements which accommodate, wherever possible, the needs of all stakeholders. This will involve continuing consultation with stakeholders.

The ACMA considers that there are significant interdependencies between the development of arrangements in the 2.5 GHz and alternative bands. For example, the extent of clearance of incumbent services in the alternative bands will be directly affected by the geographic size of the areas that are re-allocated to spectrum licensing in the 2.5 GHz band. The areas to be re-allocated cannot be finalised until after the ACMA undertakes further public consultation. These interdependencies mean that it is appropriate to develop new arrangements in the 2.5 GHz and alternative bands in parallel, rather than sequentially.

The ACMA emphasises, however, that it does **not** consider any rushed relocation of ENG services to be an appropriate course of action. Indeed, the ACMA considers that it may be several years before relocation is finalised.

Compensation

Stakeholder commentary

The ACMA notes comments from current TOBN licensees who indicated that they would seek compensation for the costs associated with any relocation to the alternative bands. In addition, a number of freelance operators who operate in the 2.5 GHz band also indicated in submissions that they would be unable to remain in business unless they received compensation for costs associated with operating in the alternative bands.

ACMA response to submissions

The ACMA stresses that questions of compensation are not matters for the ACMA. However, the ACMA emphasises that the implementation phase of the review will be characterised by ongoing consultation with all affected parties.

Frequency bands 2025–2110 MHz and 2200–2300 MHz

ACMA original proposal

To support use of the bands 2025–2110 MHz and 2200–2300 MHz by ENG, the ACMA proposed the following in the discussion paper:

Earth stations

1. Operation of ENG in these bands will be restricted by coordination requirements (exclusion and coordination zones) with earth stations. The most significant impact will be on ENG operations in Perth (where the bands will not be available until at least 2015) and Canberra.
2. To protect earth station receivers, the operation of ENG transmitters on helicopters and other airborne platforms would not be supported in the band 2200–2300 MHz.

Defence aeronautical mobile telemetry systems

1. A combination of:
 - i. Limiting Department of Defence aeronautical mobile telemetry systems to a specific part of the 2200–2300 MHz band as a long-term goal.
 - ii. Coordination of aeronautical mobile telemetry systems and ENG requiring Defence to provide advance notice (for example, one month) to ENG operators of any usage including day, time duration, area of operation and spectrum occupied.

Fixed links

1. Clearance of fixed links from capital cities and the surrounding areas up to 300 kilometres from capital cities.
2. Australia-wide clearance of fixed, point-to-point links from the bands 2053.5–2081.5 MHz and 2228.5–2255.5 MHz to provide dedicated spectrum for infrequent regional/remote area operations.⁸
3. In bands and areas not cleared of fixed links, temporary ENG operation on a coordinated basis with fixed links.

Adjacent band spectrum licensing services (2 GHz and 2.3 GHz)

1. Development and implementation of coordination rules and technical restrictions for management of ENG/spectrum licensing band edge interference, with consequential amendments to spectrum licensing technical frameworks.

Stakeholder commentary

Space science industry

The space science industry expressed particular objection to the potential for sharing with ENG services due to the risk of ENG induced interference to, and lack of coordination with, earth stations operating in the alternative bands. In their submissions, the space science industry identified the following locations where appropriate earth station coordination and/or protection arrangements will need to be developed for operations in and around:

- > Perth, Western Australia:
 - > Landsdale—approximately 17 km north of Perth central business district
 - > New Norcia—approximately 100 km north of Perth
 - > Mingenew—approximately 320 km north of Perth;
- > Canberra, Australian Capital Territory:
 - > Tidbinbilla—approximately 17 km south-west of Canberra
- > Alice Springs, Northern Territory
- > Hobart, Tasmania.

Department of Defence

In their submission in response to the discussion paper, the Department of Defence emphasised its requirements for the following:

- > spectrum to remain available to meeting current and future aeronautical mobile telemetry needs
- > continued access to the 2200–2300 MHz band for current and future defence capability.

Defence also expressed a desire for a geographic protection zone to be established in the areas around Alice Springs, Northern Territory.

Fixed links

Fixed-link licensees were opposed to the scope of proposed clearance requirements, particularly the proposed Australia-wide clearance. A number of submissions emphasised the social and economic contribution that is facilitated via their links.

⁸ Channels 3, 4, 3', 4' of the 2.2 GHz fixed-link channel plan.

Adjacent band incumbents

Spectrum licensees adjacent to the alternative bands (that is, 2 GHz and 2.3 GHz spectrum licensees) expressed concern about possible changes to current technical frameworks and the 'first-in-time' principle used for adjacent band coordination.

ACMA response to submissions

Space science industry

The ACMA notes that the particular concerns raised in these submissions reflect a broad range of matters that are subject to ongoing work and consultation by the ACMA and relevant industry representatives. The ACMA is committed to pursuing a range of options in conjunction with the space science industry to manage these concerns.

Earth stations operated in Canberra (Tidbinbilla) and Perth (Lansdale and New Norcia) are covered by international treaties with the United States of America and the European Space Agency respectively. Discussions between the ACMA, earth station operators and 2.5 GHz TOBN licensees on shared use of the bands are ongoing. Sharing techniques under consideration include time, spectrum segmentation, and geographical sharing. Until this matter is resolved, the quantity of spectrum available for ENG in the alternative bands in Perth and Canberra is unknown.

Other earth stations are either in remote locations (Alice Springs and Mingenew/Dongara) that are considered not to have an impact on capital city ENG operations; or usage is considered limited (Hobart and Melbourne), with minimal impact on ENG operations.

Department of Defence

The ACMA acknowledges the Department of Defence's operational requirements and is keen to ensure that any approach undertaken represents a fair balance between the concerns of differing sectors. The ACMA emphasises that the review will be characterised by ongoing engagement with affected parties and notes that the Department of Defence has played a key role in establishing successful spectrum sharing and coordination arrangements with co-users in the past.

The Department of Defence has existing coordination agreements whereby it advises the operators of earth stations in Canberra, Perth and New Norcia of planned aeronautical mobile telemetry activities in the 2200–2300 MHz band. As per proposals in the discussion paper, the ACMA has discussed with the Department of Defence options surrounding the development of similar arrangements for ENG activities. Discussions with the Department of Defence are ongoing.

Fixed links

The ACMA is keen to ensure that any approach undertaken represents a fair balance between the concerns of differing sectors and emphasises that the review will be characterised by ongoing engagement with affected parties. The ACMA believes that fixed links need to be cleared in capital cities and surrounding areas to support ENG operations and future growth in ENG usage. However, based on submissions received, the ACMA is reconsidering the proposed Australia-wide clearance of some fixed-link channels to support regional and remote ENG. The ACMA is considering the use of other regulatory approaches, such as not allowing any new fixed-link assignments, to provide support for ENG in regional areas. This approach reduces the number of fixed links to be cleared and allows ENG operators to pre-plan available channels in regional areas. The ACMA acknowledges that the approach increases the complexity of regional ENG operations, but this is seen as an acceptable compromise given the lower use of ENG in regional areas.

The ACMA notes that arrangements for ENG in regional and remote areas in the alternative bands are related to the amount of 2.5 GHz band spectrum re-allocated in

these areas. Arrangements will therefore be reviewed when the quantum of spectrum to be re-allocated in the 2.5 GHz band is finalised. The ACMA expects that requirements for ENG operation in regional and remote areas in 2025–2110 MHz and 2200–2300 MHz may be different. This will depend on whether the 2.5 GHz band is only re-allocated in capital cities areas—allowing ENG to operate in regional areas in the 2.5 GHz band—or whether it is re-allocated Australia-wide.

The ACMA will undertake further consultation with interested parties on the development of ENG and fixed-link arrangements.

Adjacent band incumbents

The ACMA recognises the concerns of adjacent band spectrum licensees on possible changes to the current technical framework, but considers that they may be most appropriately addressed through ongoing consultation. It should be noted that a first-in-time approach to adjacent band coordination is a feature of all spectrum licensing frameworks. The updating of technical frameworks to reflect the introduction of new services is a standard spectrum management activity.

Frequency band 2010–2025 MHz

ACMA original proposal

To support use of the band 2010–2025 MHz by ENG, the ACMA proposed in the discussion paper:

1. Introduction of arrangements to occur in parallel with arrangements for the 2025–2110 MHz band.
2. After the introduction of ENG, consideration would be given to removing any impediments to the spectrum moving to its highest-value use as the band is internationally identified as a band suitable for TDD IMT systems. For example, developing a technology-flexible framework that supports both ENG and IMT services in the band.

The ACMA notes that supporting the operation of ENG in the 2010–2025 MHz band would have minimal effect on existing services as services operating in this band typically overlap the 2025–2110 MHz band.

Stakeholder commentary

Fixed links

Fixed-link licensees expressed concern at the scope of proposed clearance requirements, particularly the proposed Australia-wide clearance.

ACMA response to submissions

Fixed links

The ACMA emphasises that links in this band typically overlap the 2025–2110 MHz band. Consequently, any coordination or clearance issues would be resolved when developing arrangements for the 2025–2110 MHz band. A more detailed discussion on fixed links and ACMA intentions is in the discussion above on 2025–2110 MHz and 2200–2300 MHz.

Frequency bands 1980–2010 MHz and 2170–2200 MHz

ACMA original proposal

To support use of the bands 1980–2010 MHz and 2170–2200 MHz by ENG, the ACMA proposed in the discussion paper:

1. ENG access to the 1980–2010 MHz and 2170–2200 MHz bands, with the caveat that mobile-satellite services may be introduced in these bands in the future. Consequently, ENG use of these bands is considered an interim option.
2. That the ACMA also investigate the viability of long-term use of ENG in capital cities, with mobile-satellite operation restricted to regional and remote areas.
3. Development and implementation of coordination rules and technical restrictions for management of ENG/spectrum licensing band edge interference, with consequential amendments to spectrum licensing technical frameworks.
4. That development and implementation of coordination and technical restrictions for management of interference between ENG and fixed links be predominantly undertaken in parallel with work for the bands 2025–2110 MHz and 2200–2300 MHz.

Stakeholder commentary

Mobile Satellite Services

A number of satellite operators objected to the ACMA's proposal that ENG operations be relocated in part to the 1980–2010 MHz and 2170–2200 MHz bands—even on a short- to medium-term basis. They also opposed proposals to limit Mobile Satellite Services (MSS) to regional and remote areas in these bands should MSS be introduced to Australia.

Fixed links

Fixed-link licensees expressed concern about the scope of proposed clearance requirements, particularly the proposed Australia-wide clearance.

ACMA response to submissions

Mobile Satellite Services

The ACMA recognises that the 1980–2010 MHz and 2170–2200 MHz bands have been designated by the International Telecommunication Union for mobile-satellite services and that mobile-satellite operators may in the future be interested in introducing services in these bands in Australia. However, the designation was made over 15 years ago, is not exclusive and is on an equal status with terrestrial fixed and mobile services. In the USA⁹, some of the MSS bands are used for mobile broadband services and such an outcome is also possible in Australia. The ACMA remains of the view that these bands would be appropriate for ENG on an interim basis, with further investigation to be undertaken on their long-term use by ENG. If proposals to use these bands for other services arise in the future, the ACMA would commence normal consultation processes on options for future use.

Fixed links

Based on submissions received, the ACMA is reconsidering the proposed Australia-wide clearance of some fixed-link channels. The majority of fixed links in this band are in regional and remote areas, so the ACMA does not expect significant clearance or coordination issues. The ACMA emphasises that it intends that any coordination or clearance issues would be resolved when developing arrangements for the 2025–2110 MHz band. A more detailed discussion on fixed links and ACMA intentions is in the discussion on the 2025-2110 MHz and 2200-2300 MHz bands in *ACMA response to submission* (p. 22).

⁹ Known as Advance Wireless Services (AWS) in the USA.

Chapter 5. Assessment against principles for spectrum management

This chapter summarises the ACMA's assessment of the new arrangements against the *Principles for Spectrum Management*.

The ACMA considers that the future arrangements in the 2.5 GHz and alternative bands balance the needs and concerns of a range of sectors in the Australian economy. This reflects the ACMA's commitment, when considering the highest-value use of a band, to recognise both broad social benefits as well as economic contributions that might be expected to arise from the band's use.

The new arrangements provide certainty about future spectrum availability for ENG and WAS operations. They will maximise the public benefit derived from use of the spectrum, both by re-allocation in the 2.5 GHz band, which will enable the band to be allocated to its highest-value use, and by an increase in the use and flexibility of the alternative bands.

The ACMA recognises that there is still a great deal of work to be undertaken in developing detailed implementation approaches for the new arrangements. The ACMA emphasises that those approaches will be developed in close consultation with affected stakeholders to ensure that, wherever possible, arrangements cause as little disruption as possible.

Assessment of proposals against the spectrum management principles

Principle 1—Allocate spectrum to the highest value use or uses

Spectrum in the 2.5 GHz band that is subject to re-allocation will be allocated via a price-based allocation of spectrum licences with a flexible technical framework. This will allow the entities who value the spectrum most highly to acquire the licences, thus meeting Principle 1.

In those sections of the 2.5 GHz band which will be subject to conversion, the use to which the band is allocated is not directly altered. The ACMA considers that provision of 50 MHz of spectrum in the 2.5 GHz band to the commercial free-to-air broadcasters and the ABC for ENG operation is an important element of the overall proposal to provide ongoing certainty to these incumbent licensees. However, the ACMA acknowledges that this is not necessarily consistent with Principle 1.

In those geographic areas of the 2.5 GHz band, if any, which are subject to neither re-allocation nor conversion, the allocation of the band would not be directly altered. The ACMA considers that this would only occur in those areas where there was little evidence of demand for a change in use of the band, suggesting that the current allocation may be its highest-value use, and is therefore consistent with Principle 1.

The ACMA considers that shared use—where this can be done without causing harmful interference to individual users—will often allow greater value to be derived from the spectrum than could be obtained from a single use. The proposed arrangements in the alternative bands provide the opportunity for the realisation of gains to the Australian economy and community. These gains arise from spectrum use by a range of users including the space science industry, the Department of Defence, and a range of organisations who require fixed links, as well as the free-to-air and subscription television broadcasting sectors. The ACMA recognises that successful

implementation of arrangements will require goodwill and cooperation among these sectors, but considers that shared use of the alternative bands will ensure that significant value can be derived from use of these bands, thus meeting Principle 1.

The ACMA therefore considers that the arrangements are largely consistent with the first of the principles.

Principle 2—Enable and encourage spectrum to move to its highest-value use or uses

The highest-value use of a band may change over time, for example, due to evolving technologies. In order to maximise the overall public benefit that is derived from use of the spectrum, it is desirable to allow the use of spectrum to change quickly and easily, ideally without the need for delay that can be imposed by regulatory intervention.

Spectrum in the 2.5 GHz band, which is subject to re-allocation or conversion, would be subject to a flexible technical framework that would allow spectrum use to change over time, if a higher-value use emerges. For example, the converted ENG licences in the mid-band gap could in the future be traded to a WAS TDD operator if TDD operation emerged as a higher-value use. The ACMA therefore considers that the re-allocation and conversion arrangements meet this principle.

In any geographic areas where the 2.5 GHz band is subject to neither re-allocation nor conversion, the use of the band could only change with the ACMA's intervention. The ACMA again notes that this would only occur in those areas where there was little evidence of demand for a change in band use, but acknowledges that it is not consistent with Principle 2.

The shared-use arrangements that will be developed in the alternative bands will allow a greater range of users to operate in those bands. Over time this will facilitate changing use of the bands, for example, an increase or decrease in the extent to which any one user requires access to the bands. However, additional new uses could only be accommodated with the ACMA's intervention. The ACMA considers this is necessary to provide certainty and protection for current licensees in the bands, but it means that the arrangements are only partially consistent with Principle 2.

The ACMA considers that the arrangements are necessary to provide long-term certainty for the current 2.5 GHz band licensees, while still providing certainty and protection for current licensees in the alternative bands, but acknowledges they are only partially consistent with the second principle.

Principle 3—Use the least cost and least restrictive approach to achieving policy objectives

The major policy objectives underpinning the review of the 2.5 GHz band are to determine how to plan and allocate the band to ensure that the overall benefit derived from use of the spectrum is maximised and to provide long-term certainty for the current incumbents of the 2.5 GHz band.

The ACMA considers that re-allocation and conversion in the 2.5 GHz band will allow the objectives of the review to be achieved, and will minimise restrictions on both licensees and future band use. The ACMA acknowledges that any change from current arrangements imposes some additional costs on incumbent licensees in the band, but considers that these are outweighed by the benefits accruing from the provision of certainty about long-term arrangements. Moreover, the retention of part of the 2.5 GHz band for use by the current licensees via conversion of their apparatus licences in the mid-band gap to spectrum licences also assists in minimising possible costs. The ACMA therefore considers that the arrangements are consistent with Principle 3.

The provision of long-term certainty for the free-to-air commercial broadcasters and the ABC will require altering arrangements in the alternative bands. This will impose some additional costs on some incumbents in the alternative bands and in some cases will also impose additional restrictions in the form of new coordination arrangements. However, the ACMA believes that, through ongoing consultation with stakeholders, arrangements can be developed which will minimise the extent of those additional costs and restrictions. The ACMA therefore considers that arrangements in the alternative bands are consistent with Principle 3.

The ACMA therefore considers that the proposed arrangements are consistent with Principle 3.

Principle 4—To the extent possible, promote both certainty and flexibility

The ACMA considers that the introduction of 15-year technology-flexible spectrum licences via re-allocation and conversion in the 2.5 GHz will provide both certainty and flexibility for licensees. The long re-allocation period also provides certainty of ENG tenure and minimises any disruption to licensees, while providing certainty for new licensees in terms of network planning. Those arrangements are therefore consistent with Principle 4.

In those geographic areas of the 2.5 GHz band, if any, which are subject to neither re-allocation nor conversion, the use of the band could only change with the ACMA's intervention. Given that the ACMA normally only changes band use following extensive consultation processes, this would provide reasonable certainty for licensees, but little flexibility in use. The ACMA again notes that this would tend to apply only in areas where there was little evidence of demand for a change in band use, but acknowledges that it is not entirely consistent with Principle 4.

The sharing and coordination arrangements that will be introduced in the alternative bands will enable an increase in the range of uses in those bands, and hence an increase in flexibility. The ACMA considers that once arrangements are in place, licensees will have reasonable certainty. The arrangements in the alternative bands therefore promote certainty and flexibility.

Consequently, the ACMA considers that the proposed arrangements are largely consistent with Principle 4.

Principle 5—Balance the cost of interference and the benefits of greater spectrum utilisation

The ACMA emphasises that balancing interference and spectrum utilisation does not necessarily mean giving equal weight to both. It may also involve weighting the balance one way or the other depending on the requirements of different uses. The ACMA considers that the introduction of 15-year, technology-flexible spectrum licences via re-allocation and conversion in the 2.5 GHz will provide licensees with considerable discretion in terms of how they use the band. However, the technical framework for the licences will impose some restrictions to avoid levels of interference that could impose significant costs on adjacent licences and this places some limits on the extent of spectrum utilisation. For example, the requirement for a guard band between the FDD and ENG/TDD band segments may have some impact on licensees in the mid-band gap.

Similarly, in those geographic areas of the 2.5 GHz band, if any, which are subject to neither re-allocation nor conversion, there will still be a requirement to avoid unreasonable interference to adjacent services, and this may limit spectrum utilisation to some small extent.

The new arrangements will allow a greater range of uses in the alternative bands and potentially increase spectrum utilisation. However, that would potentially lead to an

unacceptably high risk of interference. The ACMA will work with stakeholders to develop sharing and coordination arrangements to reduce that risk. In those cases where interference protection requirements are extremely stringent, for example earth stations, spectrum utilisation may be reduced due to the need to provide additional protection to the sensitive sector or site.

The ACMA considers that in all cases the proposed arrangements balance interference and spectrum utilisation issues, and that they are therefore consistent with Principle 5.

Attachment A: Respondents to the discussion paper

During the nominated comment period to the ACMA's IFC01/2010 discussion paper, a total of 42 submissions were received from:

ABC	Inmarsat
AMTA	Intel Corp.
AUSTAR	IP Wireless
BnC Television services	Macquarie Telecom
Bureau of Meteorology	Motorola
California Institute of Technology	National Coordinating Committee for Government Radiocommunications
Cisco	Optus
Crown Castle International	Premier Media Group
CSIRO	Qualcomm
Department of Defence	Research in Motion Australia
Department of Innovation, Industry, Science and Research	SES World Skies
ETSA Utilities	Stratos—Aerospace Agency Services
Ericsson	Telstra
European Space Agency	Top Notch Video
Free TV Australia	Universal Space Network
FOXTEL	Vision TV
Geoscience Australia	Vodafone-Hutchinson Australia
Global Television	Wireless Broadband Australia
Global VSAT Forum	Woodside Energy Ltd
GSMA	4RF Communications
Hindsight Video	

The ACMA also received one commercial-in-confidence submission.

Submissions are available on the ACMA website at
www.acma.gov.au/WEB/STANDARD/pc=PC_312013