

# Addendum to FYSO 2019–23

SEPTEMBER 2019

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# Response to submissions

Thank you to all stakeholders that responded to the public consultation IFC 10/2019 Draft five-year spectrum outlook 2019–23 (draft FYSO 2019–23).

We received 41 submissions and 2 online comments to the draft FYSO 2019–23 from 41 submitters. Six of these were commercial-in-confidence. Stakeholders included members of industry, industry representatives and peak bodies, government agencies and members of the public.

This document provides a summary of submissions received to the draft FYSO 2019–23 and the ACMA's response to them. While the final FYSO 2019–23 includes some responses to specific stakeholder comments, other responses are summarised here.

Please note that in response to submissions we are changing the way we refer to quarters in the FYSO, and in this document the following abbreviations are used throughout:

- > quarter 1 (Q1): 1 January–31 March
- > quarter 2 (Q2): 1 April–30 June
- > quarter 3 (Q3): 1 July–30 September
- > quarter 4 (Q4): 1 October–31 December.

## General feedback

We received many positive responses on specific questions and themes presented. Stakeholders indicated that they:

- > found the level of knowledge of technology and sources of spectrum demand to be very high
- > valued the transparency of the FYSO
- > were quite pleased with the current format of the FYSO
- > found the FYSO a useful planning tool
- > found the continuing improvements in the FYSO encouraging
- > believed that the approach of the FYSO, in line with the financial year, greatly assisted industry planning
- > welcomed the six-monthly progress report.

## Structure and approach of the FYSO

**Consultation question 1: What further improvements to the FYSO would make it easier for stakeholders to engage with the ACMA on its spectrum management work program?**

### Approach of the FYSO

#### *What submitters said*

Submitters commented positively about the FYSO as a tool for planning and feedback, and valued its transparency. Comments and suggested improvements included that:

- > the FYSO does not reference industry priorities and only refers to government priorities, when industry priorities would be important to the FYSO
- > more detail in terms of planning timeframes would be helpful to industry, especially in relation to consultations and dates for decision-making.

#### *Response to submitters*

We are pleased that the FYSO is so valued by those who use it.

We recognise the importance of industry and government priorities. The FYSO describes how we see the coming demands for spectrum across all sectors, to inform the ACMA's obligations regarding the overall public benefit derived from using the radiofrequency spectrum (paragraph 3(a) of the *Radiocommunications Act 1992* (the Act)). Feedback to the draft FYSO provides a transparent opportunity for industry and other stakeholders to outline their priorities.

We understand the desirability of greater detail regarding timeframes for consultation and dates for decision-making. We believe that making projections on a quarterly basis strikes the right balance between the reliability of our forecasts and their specificity.

### Structure and format of the FYSO

#### *What submitters said*

We received useful suggestions for improvement to the general format of the FYSO which included:

- > the design of the FYSO could be improved such that users can focus on their own workstream of interest in separate sections
- > a timeline could be provided summarising relevant recent progress
- > in general, more visual aids could be used to enhance the accessibility of the FYSO
- > the referencing of year 'quarters' should be standardised across all ACMA documents (currently the FYSO references financial year quarters whereas some other ACMA documents reference calendar year quarters).

#### *Response to submitters*

We aim to continue to improve and evolve the FYSO to better serve the needs of its stakeholders. For this year's final FYSO we will take up the following specific suggestions:

- > changing references in the FYSO to calendar year quarters, to align with other ACMA documents

- > addition of visual aids, including icons that may identify areas of interest in the FYSO to industry. We are also considering timelines and further visual aids.

Given the overlap of information in different interest areas and how user interests are not easily categorised using one system, a structure which has each 'separate workstream of interest' in separate sections may involve too much repetition. However, the addition of icons that identify areas of interest, will, we expect, assist FYSO readers to identify their topics of interest swiftly.

## **Stakeholder engagement**

### ***What submitters said***

Submitters noted the importance of ACMA stakeholder engagement opportunities other than the FYSO as ways to inform the ACMA about spectrum activities, and to keep the FYSO up to date, including:

- > continuation of other forums (both formal and informal) for the ACMA to provide further updates on planned activities
- > spectrum tune-ups on key topics and developments as they arise
- > regular feedback that may measure stakeholder satisfaction with the ACMA's engagement and communications.

### ***Response to submitters***

The interest in further opportunities to engage stakeholders is welcome. We will continue to look for opportunities to engage with stakeholders to ensure the ACMA spectrum management priorities appropriately reflect the needs of spectrum users. We will offer spectrum tune-ups periodically on topics of interest to stakeholders, and provide ongoing opportunities to engage with the work program through topic-specific consultations. In addition, the ACMA continues to seek feedback on its performance through regular stakeholder engagement and customer service surveys.

## **Technology developments/sources of spectrum demand over the next five years**

**Consultation question 2: Are there other technology developments or sources of spectrum demand that the ACMA should be aware of in considering spectrum management over the next five years?**

### **Approach to, and emphasis on, 5G and the importance of satellite**

#### ***What submitters said***

5G is clearly important to many submitters, with some submitters noting it was their main interest. While some comments emphasised the economic benefits of 5G, other submitters were more wary of the 5G rollout in Australia. Most of these other submitters raised health and electromagnetic energy (EME) concerns. These submissions are discussed in further detail under the heading 'Electromagnetic Energy (EME)' below.

One submitter raised that at an estimate, each mobile operator will need 100 MHz of mid-band and 1 GHz of mmWave spectrum for 5G to reach its full potential.

We received many submissions from satellite operators, users or their representative bodies in relation to the focus in the FYSO on 5G. Comments include:

- > the satellite industry should have more prominence in the FYSO, and attention should be given to innovative high capacity satellite systems and terminal mobility

- > there was too much emphasis on 5G and mobile broadband, at the expense of satellite
- > the ACMA neglects to note the value that satellite brings to 5G
- > high throughput satellite services are understated
- > more attention should be given to new and mainstream innovative high capacity satellite systems and terminal mobility.

There were comments that expressed agreement with the importance of satellite systems to broadcasting, as set out in the draft FYSO.

Other comments on 5G included:

- > support in principle for the need to find additional spectrum for 5G with the caveat that it should only occur if the use by incumbent users is balanced against future use
- > spectrum allocations should reflect that other applications are coming into play, and this should mean a review of how much emphasis is put on the needs of mobile network operators.

### ***Response to submitters***

Several comments were made regarding sources of spectrum demand and the relative importance given to each. We have updated Part 1 of the FYSO in response to these comments and other developments.

The FYSO describes how the ACMA sees spectrum demand as a whole, to inform its obligations regarding the overall public benefit derived from using the radiofrequency spectrum (paragraph 3(a) of the Act).

Demand for spectrum to support wireless broadband, including both mobile and fixed applications, continues to be a major driver for changes in highest-value spectrum use across bands. While some stakeholders feel that demand for mobile broadband and 5G has taken a disproportionate amount of our time and attention at the expense of the satellite industry, we do not think this is the case.

The Australian satellite industry provides a great diversity of services—e.g. broadcast television, telephony, broadband, earth observation, radionavigation and space research. Together, these services have access to a large quantity of spectrum Australia-wide with a significant quantity of dedicated spectrum (over 4 GHz) for exclusive use by ubiquitous user terminals and around 4.5 GHz available on a shared coordinated basis.

5G represents important progress in technology and we recognise the potential of the satellite industry to be part of the delivery of 5G. We are also fully aware of the needs of other technologies and uses and take those into consideration when planning spectrum.

The final FYSO 2019–23 reflects both a broad consideration of the satellite industry's needs, and several specific actions to ensure continued support for this critical industry.

In addition to the planning and allocation activities for the 26 GHz band currently underway and the recently made changes to the Low Interference Potential Device (LIPD) class licence to support wireless data communications systems (including those supporting 5G) at 60 GHz, we continue to monitor several other bands for possible replanning for 5G wireless broadband services. The bands are identified in



the Planning section of Part 2 of the FYSO. These bands are generally less mature in terms of harmonisation, standardisation and international implementation of 5G. However, we acknowledge that spectrum between 37–43.5 GHz is of significant interest for both terrestrial 5G and satellite broadband services—the US, for example, has established arrangements supporting both services. We will continue to consider global trends and local circumstances to determine if replanning for possible 5G services in the 37–43.5 GHz band is appropriate—noting that the case for replanning of part of the band for satellite services may be appropriate regardless.

## **Spectrum sharing and Dynamic Spectrum Access (DSA)**

### ***What submitters said***

Stakeholder support for greater sharing and innovative sharing technologies is cautious and qualified. Some comments include:

- > DSA systems should be considered as an important spectrum-sharing driver
- > spectrum-sharing is fundamental, but it should be done in a more ‘holistic sense’
- > qualified support to spectrum sharing, so long as it does not compromise existing services
- > concern that comments implying greater sharing of spectrum in the future are not being clearly explained and are sending a confusing message to spectrum users especially licence holders who may be concerned this may undermine their rights
- > sharing through leasing arrangements is supported but other models being trialled are struggling to be successful
- > concern about potential discussions about spectrum sharing of the 4.9 GHz Public Protection and Disaster Relief (PPDR) spectrum with mobile network operators
- > the case for DSA presents limited opportunities for domestic application in Australia and technical limitations, spectrum availability and user expectations are unlikely to make it viable in the medium term
- > one submitter suggested that the ACMA should implement a dynamic spectrum sharing framework and consultation that would be applicable to Australia, while learning from the Citizens Broadband Radio Service (CBRS) model in the United States.

### ***Response to submitters***

Spectrum sharing is fundamental to effective spectrum management and is achieved through the use of a range of spectrum-sharing approaches. We will continue to monitor international developments for new sharing opportunities. Traditionally, spectrum sharing has largely focused on static approaches. We agree that DSA is important to spectrum sharing in the right band under the right conditions. However, it is not clear to us that such conditions exist in Australia to date.

We consider it is timely to examine the potential for contemporary models for shared access being adopted internationally to be looked at in a domestic context. This includes models where secondary access is facilitated through licensing and/or technology-based systems that may incorporate various combinations of sensing or knowledge bases (e.g. through deployed databases or central notification portals) that enable self-coordination at a system (access controller) or device level. CBRS is one such model, although there are others that may be better suited to the Australian environment. Specific frequency bands/licensees and potential secondary access services/technologies have not yet been considered in detail.

To assist the ACMA and industry in better understanding the opportunities and issues associated with possible dynamic sharing approaches, we released a discussion

paper on spectrum sharing approaches and our staff hosted a tune-up event in Q3 2019. Topics covered include new and emerging approaches to spectrum sharing; their applicability to the Australian environment; international developments in spectrum sharing and how and why such arrangements might be adopted in Australia; how sharing affects users and how sharing access can be managed by industry and third parties.

The 4.9 GHz band is class licensed for public safety agencies (PSAs) and will remain so in the future. No changes are currently contemplated in this band.

## **National interest access**

### ***What submitters said***

Submissions were generally supportive of a dedicated allocation for Public Safety Mobile Broadband (PSMB) in the 850 MHz expansion band. Some expressed concern that mobile broadband may be allocated spectrum at the expense of national interest access. Other comments on PSMB and defence needs for spectrum included:

- > NSW is working with states and territories to develop PSMB capability they described as 'mission critical' to public safety during emergencies and needs dedicated spectrum.
- > There is support for the replanning of the 850 MHz expansion band and the provision of 2 x 5 MHz in this band for PSMB services (one submission suggested this should be 2 x 10 MHz).
- > There were concerns that the legislation and resourcing required for the investigation and prosecution of misuse of distress beacons was not robust enough.
- > Defence systems are highly spectrum dependent, and there is some concern that the emphasis on 5G may lead to unnecessary reallocation of spectrum away from the needs of defence.
- > Concerns were expressed over the 'piecemeal approach' taken by the ACMA to expanding the use of exemption applications to class licensing arrangements. It was suggested that the increasing number of accepted applications would decrease transparency of devices being operated and expand the scope for which the exemption would apply.

### ***Response to submitters***

We remain strongly committed to ensuring sufficient access to spectrum is available to meet important defence, national security, law enforcement, emergency service and other public and community service requirements. Public safety requirements are being considered when planning options for the 850 MHz expansion band and in our approach to spectrum sharing. At the 12 December 2018 meeting of the Council of Australian Governments (COAG), all jurisdictions agreed to a strategic roadmap that set out a plan to design, implement and operate PSMB, and to continue to work together to resolve the supporting spectrum arrangements in parallel with proof of concept trials.

We will review whether prohibition declarations are working as intended, and whether the range of devices to which they are apply is appropriate. We will consult via a discussion paper to be released in Q4 2019. Submissions will be welcomed in response to this paper.

## International engagement

### Consultation question 3: Do you have any comments about the ACMA's planned international engagement activities?

#### What submitters said

Submitters supported the ACMA's engagement in international forums, especially the World Radiocommunication Conference (WRC) and many encouraged more participation, or had some suggestions for further developments of international activities, including:

- > encouraging the ACMA to attend 3GPP TSG meetings to stay abreast of new developments
- > developing Australian positions for WRC-19 agenda item 1.13 supporting the harmonisation of 24.25–27.5 GHz, 37–43.5 GHz and 66–76 GHz for international mobile telecommunications (IMT)
- > doing more to encourage industry to be part of working groups involved in WRC planning
- > taking the lead in adding the need for licensed spectrum provision for fixed wireless access, smart cities and enterprise and industrial applications to the international agenda
- > concerns that WRC-19 may discuss sharing of the 4.9 GHz PPDR spectrum with mobile network operators. Public safety sector needs more time to develop use cases and applications ahead of competitors such as mobile network operators. There was support expressed for no change to 4.9 GHz allocations for PPDR at WRC-19.

Some suggestions on improving international engagement approaches were made. Suggestions included:

- > role responsibilities at international events such as WRC between the Department of Communications and the Arts and the ACMA could be better clarified
- > the ACMA should take more heed of the international satellite licensing and spectrum management developments, such as in Europe
- > the ACMA should be a little more cautious in its approach where technology is in the early stages of development in international forums.

#### Response to submitters

We appreciate the interest in our international engagement. We monitor international developments for further opportunities for development and ways to enhance our own planning. At this stage, however, we do not plan to send delegates to 3GPP TSG meetings.

Preliminary views on WRC-19 agenda items are being developed as part of Australia's domestic preparations for WRC-19. Stakeholders interested in participating in this group can get more information from the ACMA website or by contacting the ACMA's International Radiocommunications Section ([IRS@acma.gov.au](mailto:IRS@acma.gov.au)).

The Department of Communications and the Arts (DoCA) is the lead agency for WRC-19 and any related ITU or regional meetings. We regularly discuss with DoCA preparations for these meetings including providing technical and regulatory advice related to WRC agenda items. We are responsible for preparations and leading other meetings, such as those of the ITU's Study Groups and Asia-Pacific Telecommunity Wireless Group meetings.

## Planning framework

**Consultation question 4: Do you have any feedback on the ACMA's plans for monitoring, initial investigation, preliminary replanning or re-farming of bands?**

**Consultation question 5: Do you have any feedback on optimising established planning frameworks?**

### Planning and replanning

#### *What submitters said*

There were several general comments made about the ACMA's approach to planning, including that:

- > replanning outcomes should be regarded as a failure of regulatory foresight
- > some band planning may benefit from a more 'holistic' analysis instead of band-by-band planning, for instance 24.25–27.5 GHz and 37–43.5 GHz
- > the ACMA could consider reinstating to monitoring status previous mobile broadband work plans that have not had significant work on them recently, to give updates and ensure certainty of status. Examples would be 2300–2302 MHz, 1900–1920 MHz and 2100 MHz apparatus licences.

#### *Response to submitters*

The ACMA does not agree that identifying a need to replan a band is necessarily a failure of the expected standard of regulatory foresight. Spectrum harmonisation, technology standardisation, international technology adoption, and local specific circumstances in bands change over time. While efforts are made to establish regulatory arrangements that facilitate changes in use over time, it is effectively impossible to always foresee and pre-emptively implement supporting regulatory arrangements. Every regulatory regime (domestic and international) in the world is at times subject to replanning and other regulatory changes. As a result, replanning is an expected and necessary ongoing activity. The ACMA's transparent and consultative approach to spectrum planning, including through the FYSO, is designed to ensure that the need to replan a band is identified as early as possible.

We have included the 1900–1920 MHz band under 'Monitoring' and the 2300–2302 MHz band under 'Initial investigation' in Part 2 of the FYSO. As updates become relevant for them, we will reinstate other bands to this list to ensure that licensees are aware of their ongoing status.

We agree that taking as broad an approach as is practicable to band re-planning is desirable. Our consideration of the 26 and 28 GHz bands, and of the 3.8 GHz band (see the final FYSO for details) are examples. Nonetheless, band re-planning necessarily involves choosing some spectrum for consideration at a particular time. This is both due to resourcing considerations (for both the ACMA and industry) and to acknowledge that the drivers to replan bands can and often do occur at different times.

### **5.3 MHz band (5351.5–5366.5 kHz)**

#### *What submitters said*

Particular interest in this band is shown by the amateur community, noting that already much of it is allocated to land mobile access. Several suggestions were made in relation to planning in the band, including:

- > the upper end be restricted to 5366 kHz as there is a large Queensland-wide allocation at the top of the band which would preclude sharing with amateur services
- > amateur operation should be restricted to spot frequencies on existing commercial allocations of 5351, 5355 and 5360 kHz using Upper Side Band mode only with a max 2.8 kHz bandwidth
- > a trial digital mode allocation in the vacant 5363–5365 kHz segment should be progressed
- > a trial sharing arrangement should be undertaken for a defined period e.g. six months, noting projected reticence to allow amateurs immediate unrestricted access to a commercial band
- > the new commercial allocations in segment 5350–5365 kHz should be embargoed
- > the possibility of interference by amateur operations to the Jindalee Operational Radar Network facility and other incumbents can be successfully mitigated through permitting limited, contiguous sets of channel frequencies within the WRC-15 allocation, use of time-of-day limitations, the use of near-vertical-incidence antennas all aided by low effective isotropic radiated power.

#### ***Response to submitters***

The ACMA intends to publish a discussion paper in Q1 2020 seeking industry views on implementation issues associated with including a secondary allocation for the amateur service in the 5351.5–5366.5 kHz band, including appropriate technical conditions and in which part of the band the amateur service could be supported.

### **70–70.5 MHz**

#### ***What submitters said***

A secondary allocation to radio amateurs was proposed in this band.

#### ***Response to submitters***

We note the continued interest in this band from the amateur community. The ACMA will not be further investigating this matter at this time. The ACMA considers that operating amateur services in this frequency range is not feasible as it would be inconsistent with ITU Radio Regulations and existing services are already operating in the frequency range. This frequency range is used by a variety of fixed and land mobile services as supported under the VHF mid band (70–87.5 MHz). Class-licensed devices authorised under the LIPD Class Licence operate in the frequency range 70–70.24375 MHz.

### **600 MHz band (617–698 MHz)**

#### ***What submitters said***

Various comments on this band were made. They included:

- > the ACMA should monitor 520–698 MHz as it is too early to assume any specific arrangements
- > this band should be retained for broadcasting purposes to support ongoing testing and transition of new technologies
- > 600 MHz could, like some other spectrum, be made available for other higher value uses, due to the evolving TV technology and increase in streaming which is reducing demand for spectrum by broadcasters
- > international developments should be considered, such as that 600 MHz was identified for IMT in a number of Asia-Pacific nations including New Zealand, as

well as in Canada, Mexico and USA, and that because of a new WRC-23 agenda item, additional countries may identify this band for IMT as well.

### ***Response to submitters***

We will continue to monitor this band, and actively monitor international and domestic developments in the 600 MHz band to determine if and when arrangements should be reviewed.

### **1.5 GHz band (1427–1518 MHz) and Extended MSS L-band (1518–1525 MHz and 1668–1675 MHz)**

#### ***What submitters said***

Several submitters considered this band should be deprioritised in planning, or at least not progressed in planning in the short-term future. Other comments on the planning of the 1.5 GHz band and extended MSS L-band included:

- > The ACMA should consider making the L-band available in a staggered fashion, initially 1452–1492 MHz followed by 1492–1518 MHz (subject to demand). European administrations are making limited parts of the L-band available for mobile broadband.
- > The ACMA's initial investigation only considers the effect of mobile broadband on mobile satellite services in the extended L-band without addressing compatibility with existing and planned mobile satellite services in the conventional L-band (1525–1559 MHz).
- > The importance of mobile satellite services above 1518 MHz in dealing with global threats ought to be recognised as well as in maritime services. If mobile satellite is considered in 1.5 GHz, necessary compatibility requirements should be part of the mobile operator's licence.
- > The band has challenging incumbency issues in regional and remote areas, but planning could progress in metropolitan areas.

#### ***Response to submitters***

Regarding the 1.5 GHz band, the studies in international forums are still ongoing and it may be prudent to await the outcomes of these before progressing domestic consideration. It should be noted that no decisions have been made on if and how much of the band might be made available for IMT. We recognise that a simultaneous review of both the extended MSS L-band and the 1.5 GHz band would likely be appropriate. This will include consideration of the effect on both incumbent in-band and adjacent band services. Any planning options proposed will be subject to public consultation.

The 1.5 GHz band is discussed further under consultation question 6 (forward allocation work plan), below.

### **1800 MHz band (1710–1785 MHz and 1805–1880 MHz)**

#### ***What submitters said***

Support was expressed for preliminary replanning of 1800 MHz band and a review of existing arrangements as spectrum may be under-utilised in remote areas. It was suggested that the proposed changes should be synced and incorporated where appropriate with the spectrum licence technical frameworks reviews discussed in 'Optimising established planning frameworks' in Part 2 of the draft FYSO 2019–23.

#### ***Response to submitters***

The issues and suggestion are noted and will be taken into account when we review our planning schedule.

## **2 GHz band (1980–2010 MHz and 2170–2200 MHz)**

### ***What submitters said***

- > Australia should align its policies in this band with international developments
- > the 2 GHz MSS band review is timely and the ACMA needs to have a considered position on this
- > the embargoing of the 2 GHz band has held back development in Australia
- > it is important that 1980–2010 MHz and 2170–2200 MHz be available for mobile satellite services in Australia potentially with a complementary ground component, to potentially provide Australia with the benefits of broadband and Internet of Things connectivity
- > 1980–2010 MHz and 2170–2200 MHz be available for early mobile satellite service use on a shared, non-exclusive basis
- > there is considerable scope for opening up the band to alternative applications outside of major state capital cities
- > if the ACMA cannot make changes to spectrum licensing conditions in parallel for all bands sub-3 GHz, the priority is 1800 MHz and 2 GHz followed by 2.3 GHz
- > consideration should be given to having 2 GHz and below being held on a basis similar to individual apparatus licensing format rather than auctioned off
- > consideration should be given to allocation of non-broadcast services in blocks immediately adjacent to existing television outside broadcasting allocations. Ongoing consultations with broadcasters on the future use of this band are recommended, including adjacent allocations, prior to decision-making.

### ***Response to submitters***

Preliminary views on WRC-19 agenda items are being developed as part of Australia's domestic preparations for WRC-19. Stakeholders interested in participating in this group can get more information from the ACMA website or by contacting either the ACMA's International Radiocommunications Section ([IRS@acma.gov.au](mailto:IRS@acma.gov.au)) or the International Radiocommunications Section of the Department of Communications and the Arts ([WRC@communications.gov.au](mailto:WRC@communications.gov.au)).

A discussion paper on 2 GHz was released for publication in Q3 2019 which will help us assess whether there is a case for further consideration of arrangements in the band, including whether to move it to the 'initial investigation' stage.

## **3.3 GHz (3300–3400 MHz), 4.5 GHz (4400–4500 MHz) and 4.8 GHz (4800–4990 MHz) bands**

### ***What submitters said***

The ACMA should move more purposefully in these bands which have received interest from mobile network operators and fixed wireless access operators. Allocation of 3.3 GHz needs to occur within the next 12 months.

### ***Response to submitters***

Currently the 3.3, 4.5 and 4.8 GHz bands remain at the 'monitoring' stage of consideration and there are no immediate plans to accelerate these. An allocation within the next 12 months is not possible.

## **3.4–3.575 GHz band**

### ***What submitters said***

It was submitted that optimisation of this band's licensing framework is a priority.

### ***Response to submitters***

We have identified work on optimising the 3.4–3.575 GHz band as a priority. The ACMA will continue to work with stakeholders to develop the most appropriate solution for the band. This band is discussed further under consultation question 6 (forward allocation work plan), below.

### **3.8 GHz band (3700–4200 MHz)**

#### ***What submitters said***

There were concerns that the progression of C-band spectrum in this band to the initial investigation stage for possible 5G use might be premature and should be postponed until the outcomes of the WRC-19 process regarding this spectrum are known. This deferment was supported especially by the satellite industry who noted that a review of the band caused them concern. Some broadcasters (e.g. Foxtel) rely on C-band feeds for content. Another submitter pointed out the importance of unconstrained access to part of the 37.5–42.5 GHz band as soon as possible.

Other submitters supported progress of a 3.8 GHz planning activity focused on clearance and allocation of the lower (approx.) 100 MHz of the band for wireless broadband from 3.7–3.8 GHz. There were comments that the ACMA should move with 'more purpose' regarding the 3.8 GHz band, as well as other related bands.

There was a suggestion this band should be moved to initial investigation stage.

#### ***Response to submitters***

We take into account a range of issues when reviewing arrangements in a band. Considering the band as a whole will maximise the opportunity for taking balanced approaches that take appropriate account of all interests, including those of incumbent services as well as considering opportunities for making available existing and/or alternative spectrum for incumbent and prospective services.

We note that an IMT identification in the 3.8 GHz band is not on the agenda for WRC-19. Our proposal is to investigate options for use the band based on domestic interests as well as international developments in Europe, Japan and the USA. We are alert to the needs of existing fixed satellite and point-to-point services in the band, as well as the potential for both wide area and site based (for example, fixed wireless access) wireless broadband use. Recent developments in the band including its identification as a profile band for 5G and increased domestic interests warrant a discussion with industry on any implications for long-term arrangements in the band. We acknowledge the concerns of the satellite industry regarding this band.

Stakeholder views on future arrangements for the 3.8 GHz band are being canvassed as part of a discussion paper which was released in Q3 2019.

### **Bands studied under WRC-19 agenda item 1.16 (5150–5350 MHz, 5350–5470 MHz, 5725–5850 MHz and 5850–5925 MHz)**

#### ***What submitters said***

There were several comments supporting an approach that preserves Radio Local Area Network access to the 5 GHz band and suggesting enabling outdoor usage (through revisions to Resolution 229) in these bands, especially 5150–5350 MHz which is currently part of a class licence and limited to indoor usage only. Revisions to Resolution 229 were supported.



### ***Response to submitters***

The Australian Preparatory Group for WRC-19, scheduled to meet in the week beginning 16 September 2019, will determine the Australia's position on this issue. At this stage, Australia will not be supporting changes to Resolution **229 (Rev. WRC-12)**.

### **5.6 GHz band (5600–5650 MHz)**

#### ***What submitters said***

Comments from submitters included:

- > the suggestion to make licensed spectrum in the 5.6 GHz band available more broadly under an apparatus licence model ultimately controlled by dynamic spectrum access
- > the 5.6 GHz band is central to effectiveness of 5 GHz band. The ACMA should review the need for apparatus licensing in the 5.6 GHz band and instead consider alignment with ongoing regulatory changes in EU and USA for this band.

### ***Response to submitters***

We aim to finalise arrangements to make the remaining regional areas of the 5.6 GHz band available in Q3/4 2019. A key decision is whether there is interest from incumbent 3.6 GHz point-to-multipoint licensees to transition to the band. This will affect how and when the band is made available.

As stated in the [Future use of the 3.6 GHz band: Decisions and preliminary views](#) paper, the ACMA has adopted a policy position that arrangements in the 5.6 GHz band would not be varied to the detriment of apparatus-licensed point-to-multipoint licensees prior to the end of 2028.

### **28 GHz band (27.5–29.5 GHz)**

#### ***What submitters said***

There were comments from submitters that the 28 GHz band should be given the highest priority and that work should commence to put the entire band into the Radiocommunications (Communications with Space Object) Class Licence 2015. The satellite industry, generally, showed support for exclusive use of this band by fixed satellite services.

### ***Response to submitters***

We have identified the review of arrangements in the 28 GHz band as a priority. The outcomes of the review are planned for release in Q3 2019. Depending the outcome of this review, we would then move the band to the re-planning stage (i.e. implementation). Further comments have been submitted in relation to this band in consultation question 6 (forward allocation work plan), below, and we have given our response accordingly there.

### **V-band (spectrum bands above 40 GHz)**

#### ***What submitters said***

There were several comments on the V-band (spectrum above 40 GHz) which is being considered in agenda item 1.13 of WRC-19. This spectrum includes frequency ranges 40.5–42.5 GHz, 42.5–43.5 GHz, 45.5–47 GHz, 47–47.2 GHz, 47.2–50.2 GHz, 50.4–52.6 GHz, 66–76 GHz and 81–86 GHz. Comments included:

- > the ACMA should commence consultation on making 2x2 GHz in V-band available for satellite services (48.2–50.2 GHz, 40–42 GHz) as it is vital that fixed satellite services do not lose the ability to use these bands due to WRC decisions

- > there is support for further investigation and potential allocation of 40.5–43.5 GHz spectrum
- > pointing out the importance of NBN gaining unconstrained access to all of the 47.2–50.2 GHz and 50.4–51.4 GHz band as soon as possible.

### ***Response to submitters***

The Australian preliminary view on bands being considered under agenda item 1.13 is being developed as part of Australia’s domestic preparations for WRC-19.

Stakeholders interested in participating in this group can get more information from the ACMA website or by contacting either the ACMA’s International Radiocommunications Section ([IRS@acma.gov.au](mailto:IRS@acma.gov.au)) or the International Radiocommunications Section of the Department of Communication and the Arts ([WRC@communications.gov.au](mailto:WRC@communications.gov.au)).

## **Broadcasting**

### ***What submitters said***

Several comments were made about broadcasting, mainly in the context of the highest value use for the 600 MHz (617–698 MHz) spectrum. They included:

- > the combination of improving compression standards and increasing use of ‘streaming’ for delivery of traditional television content points to the potential for existing television broadcast spectrum to be released for higher value uses in the future
- > highest value use of the 600 MHz band should be reviewed to see if it can be released for other uses, including IMT.

There were also several comments made about the ACMA’s current broadcasting activities, including:

- > the request that the Act be amended so that the national services are not constrained by the digital radio framework, which is based on commercial licence areas
- > interest shown in the ACMA’s consideration of the future delivery of radio
- > support for the ACMA’s proposed variations to the Brisbane digital radio channel plan. There was a recommendation that re-consultation be initiated at the earliest opportunity to address a long-outstanding coverage shortfall.

### ***Response to submitters***

We are actively monitoring international and domestic developments in the 600 MHz band to determine if and when arrangements should be reviewed. We have noted suggestions on and interest in digital radio, future of radio and changes to legislation.

## **Satellite planning**

### ***What submitters said***

- > There is support for the ACMA’s work on updating subordinate legislation relating to space objects.
- > There is support for the initiative of including 10.7–11.7 GHz in the class licence relating to space objects, with the suggestion that the ACMA consider increase the uplink capability in 12.75–13.25 GHz for expansion in the future. However, others submitted that the proposal for class licensing to be extended to 10.7–11.7 GHz needs careful study due to the significant and increasing usage of terrestrial fixed links in that band.
- > There is support for regulation and licensing enabling the service of Earth stations in motion by non-geostationary-satellite orbit networks in the Ku-band. A space-

based apparatus licence and associated class licence should continue to support the operation of earth stations in motion.

- > There is support for additional planning for smallsats and smallsat services. The ACMA should provide guidance on this topic. There is risk currently with systems operating under inappropriate service and licence types.
- > In relation to 5G, there is growing recognition of the coexistence of terrestrial and satellite technology, of which the ACMA should remain aware.
- > Reconsideration of the embargo of some smallsat systems in built-up areas may be needed.
- > Coordination and licensing of satellite systems should be prioritised.

### ***Response to submitters***

The interest and support in satellite planning projects such as regulation, Earth stations in motion, legislation relating to space objects, planning for small satellite services and coordination and licensing of satellite systems, is acknowledged. We will be reviewing our overall approach to licensing of space-based communications systems in the general review of space licensing procedures project.

## **Class licensing and low interference potential device (LIPD) class licence**

### ***What submitters said***

Several issues were raised by submitters in relation to class licensing, the 66–71 GHz band and the LIPD class licence in particular. They included:

- > suggestions from several submitters that a decision on class licensing arrangements for the 66–71 GHz band should not be made until the outcome of the WRC-19 is known.
- > comments about the important role class licensing arrangements will play in Ku, Ka and other bands where ubiquitous service developments are emerging.
- > a suggestion that apparatus licensing would allow a more controlled rollout with a more rigorous assessment of impact on other services in the 66–71 GHz band. Existing arrangements in the 58 GHz band should be extended in the wider band.

### ***Response to submitters***

Submitter feedback on our approach to class licensing is noted and acknowledged.

The ACMA has considered issues raised by industry as part of the consultation on updates to class licensing arrangements in the 66–71 GHz band. After considering issues raised in submissions, the ACMA made the variation to the LIPD Class Licence on 16 August 2019 ([IFC 45/2018](#)). As outlined in the LIPD response to submissions paper, with arrangements equivalent to class licences already supporting usage in the US and UK in this band and with a recent European Conference of Postal and Telecommunications Administrations (CEPT) update regarding the 57–71 GHz band, the ACMA considers that international harmonisation has been largely achieved and saw no reason to delay a decision until after WRC-19.

## **Maritime (VHF channel plan)**

### ***What submitters said***

It was submitted that while not supporting extensive conversion of duplex channels to simplex, continued review of the maritime band within a broader context of long-term reform should be undertaken.

### **Response to submitters**

Following the outcome of [public consultation](#), we have made the Radiocommunications – Maritime Omnibus Variation 2019 (No. 1), bringing in a raft of changes to the VHF maritime mobile band. We will continue to work with industry, noting the outcomes of relevant international deliberations arising from WRC-19.

### **Spectrum licensing technical frameworks**

#### **What submitters said**

Comments on spectrum licensing included:

- > The ACMA should review the device boundary criteria for spectrum licensing and use a less prescriptive model that can be implemented in readily available software.
- > A review of spectrum licensing conditions for unwanted emission limits in 1800 MHz, 2 GHz and 2.3 GHz bands to support Active Antenna System technology and align with international standards is needed.
- > Priority should be given to review of the spectrum licensing technical framework, starting with progression of 2.3 GHz harmonisation before expanding to include remaining bands in 2.1–2.6 GHz range.
- > The ACMA's existing spectrum planning frameworks could be optimised by increasing transparency around the process for dealing with expired spectrum licences for major bands. Reissuing of expired spectrum licences or administrative reassignment of apparatus licences is a key opportunity for such acquisition.
- > The current framework risks being locked in which impedes downstream competition and consumer outcomes as well as risking the realisation of the highest value use of spectrum resources.
- > Market testing should be conducted periodically for new demand, such as through a consultation paper prior to expiry of a major spectrum licence.
- > A priority should be simplifying the spectrum planning framework without waiting for legislative reforms.
- > A review of the spectrum licensing technical framework including the design of spectrum licence core conditions and advisory guidelines should be a priority.

#### **Response to submitters**

We will consider reviewing the device boundary criteria as part of the development of or review of spectrum licence technical frameworks. In the meantime, it is noted that the current framework provides the flexibility for accredited persons to use alternative methods and registering devices with the use of 'guard space'.

We support transparency regarding major spectrum allocations and expiry of spectrum licences. The ACMA will look for opportunities for how this can be achieved, and we will continue to engage with the ACCC on promoting competition in spectrum markets (and spectrum-dependent markets). In April 2019 the government announced ACMA and ACCC cross-appointments which will assist with ensuring the two agencies work closely together.

## Forward allocation work program

**Consultation question 6: Do you have any comments about the ACMA's approach to the forward allocations, or the prioritisation and timing of allocations?**

### *What submitters said*

Twelve of the 41 submitters commented on the forward allocation work plan.

The submitting mobile network operators and their representative body strongly supported the defragmentation of the 3.4–3.575 GHz band as a very high priority, and also the deferral of the allocation of the 1.5 GHz band. These submitters all opposed a concurrent allocation of the 26 GHz band with the 850/900 MHz band for reasons including that concurrent allocations may put some parties at a disadvantage and fewer bidders may be able to participate at all auctions.

There were various views about the timing and priority to be given to the 26 GHz, 850/900 MHz and 28 GHz bands.

A number of other submitters commented on the forward allocation work plan:

- > Some other submitters generally concurred with the mobile network operators, including about prioritising the defragmentation of the 3.4 GHz band.
- > Support was expressed for the separation of the 26 GHz and 850/900 MHz allocations due to regulatory and financial burden on potential bidders and the subsequent negative impact this could have on competition in downstream markets.
- > The satellite industry was particularly interested in the allocation of the 28 GHz band, supporting work on the band and stating it was a high priority. Support was expressed for defragmentation of the band and it was also suggested that the entire 28 GHz band be class licensed.
- > One submitter suggested that 28 GHz spectrum planning certainty is required by 2020.
- > Several other submitters also supported continuing to progress the 28 GHz band.
- > Some submitters noted the importance of any 1.5 GHz planning work taking into account the satellite L-band issues, and that they are comfortable with the proposed timelines for this band.
- > Others expressed interest or support for the proposed planning work in the 1.5 GHz band, but did not identify progressing this work as a high priority.

### *Response to submitters*

The ACMA's response to submissions is included in the Forward Allocation Work Plan section of the FYSO.

## Spectrum management practice improvements

**Consultation question 7: Do you have any feedback on the ACMA's approach to improving how we manage spectrum?**

### *What submitters said*

There were a variety of responses to the ACMA's spectrum management approach, with a number of stakeholders expressing a willingness to become further involved in

discussions on spectrum management reforms. Some submitters generally supported the ACMA's nominated spectrum management practice improvements. One submitter commented that it was pleasing to see that the ACMA had moved away from simply clearing spectrum and combining it into blocks for auction. However, others highlighted some concerns, including that:

- > the delay in the Spectrum Pricing Review was a source of frustration
- > there is implied greater sharing of spectrum in the future, and the message this could have for the spectrum review and the sixth channel are not explained clearly enough to stakeholders
- > the ACMA needs to recognise lighter touch regulation is becoming more relevant as technologies and types of services become available.
- > without an explicit objective in relation to the impact of competition in the framework, downstream competition may be overlooked or given insufficient weight and the economic value of spectrum will not be maximised.

Submitters suggested various improvements to the ACMA's spectrum management approach, including that the ACMA:

- > could do with a more modern approach in some ways, such as reflecting innovation and efficient use of spectrum by the satellite industry
- > should proceed quickly, sooner rather than later, with the Spectrum Pricing Review, and review its fundamental basis for charging
- > should use a more structured approach to consultation.

### ***Response to submitters***

We recognise the importance of the Spectrum Pricing Review to stakeholders, and its progress in conjunction with the Communications portfolio review of charging. We will be consulting on potential new cost recovery proposals in Q4 2019 and we intend to consult on a draft approach to a new spectrum pricing formula in Q2 2020.

Submitters' concerns in relation to spectrum reform and the sixth channel are noted, however these are an issue for the Department of Communications and the Arts in the first instance.

The concerns in relation to competition issues are also noted. We agree that an efficient allocation of spectrum should take into account all elements of efficiency; that is productive, allocative and dynamic efficiency.

We also continue to explore new options for allocating and licensing spectrum having recently concluded consultation on the proposed area-wide licence type (formerly the spectrum space apparatus licence).

## **Licensing and licence systems, pricing and compliance and enforcement**

<b>Consultation question 8: Do you have any comments about the ACMA's planned activities for licensing and licensing systems, pricing, and compliance and enforcement?</b>
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### **Pricing**

#### ***What submitters said***

There is strong interest in the ACMA's current review of spectrum prices. Satellite operators are particularly concerned that satellite licensing prices be reviewed, and

there is concern that the current apparatus licence fee schedule is not fit for new large bandwidth services. In summary:

- > A strong interest was noted in the pricing of 3.5 GHz band, and in the implementation of the Spectrum Pricing Review.
- > Satellite operators and their representatives believe the ACMA should review the fee structures associated with satellite services. Some submitters particularly reference high-throughput services in the Ku- and Ka-bands. Some identify this as a matter of urgency. There were concerns that the spectrum space apparatus licence proposal may involve significant spectrum access costs for the satellite industry.
- > There were concerns expressed that the ACMA's current Apparatus Licence Fee Schedule has not been designed with new larger bandwidth services in mind.
- > Further review of the scientific licence structure and pricing is supported to ensure that it is fit for purpose to support the testing of 5G use cases.
- > There were concerns expressed about the emphasis on market-based allocation and that this only conforms to the preferences of major carriers. There needs to be an alternative methodology to cater for the individual market segments.

#### ***Response to submitters***

We are aware of the issues associated with the pricing of satellite services when large amounts of bandwidth are required and multiple devices can be deployed. All the issues raised by submitters will be considered as part of our implementation of the Spectrum Pricing Review.

## **Licensing**

#### ***What submitters said***

A variety of licensing comments and issues were raised by submitters. These included:

- > would like some more detail on the spectrum space apparatus licence proposal and drone licensing and regulation
- > do not support introducing underlay class licensing in spectrum licensed bands in either the 26 GHz band or the 3.8 GHz band
- > interest in the 5030–5091 MHz range from users in Remote Piloted Aerial Systems (RPAS) who would like to know more about appropriate licensing options
- > support for revision of the current Radiocommunications Licence Conditions (Amateur (Licence) Determination 2015 and opposition to class licensing for amateurs. Not all submitters supported the ACMA's proposal to include amateur qualifications within the Australian Qualifications Framework, though there was some interest in working with the ACMA for further consideration of this proposal.

Suggestions were made for how to streamline the licensing process, including:

- > exploring the convergence of apparatus and spectrum licensing to improve certainty and flexibility
- > reviewing the elements of the apparatus licensing framework.

#### ***Response to submitters***

We recently released a consultation paper on the proposed new apparatus licence type (the 'area-wide licence') and are considering submissions. This proposal seeks to establish the foundations of the licence type and where the ACMA proposes to issue area-wide licences on a regular basis within a particular band, we expect to further

consult on regulatory changes and administrative documents to support that particular implementation.

We are considering a range of planning, licensing and pricing models to provide access to spectrum. Recent examples include the initiatives in 26 and 28 GHz bands.

Class licensing arrangements in the 26 GHz band will be considered through the consultations specific to that band. We have not decided on licensing arrangements for the 3.8 GHz band. We released a discussion paper in Q3 2019 consulting publicly with current and potential users of this band.

A Syllabus Review Panel, convened by the ACMA in relation to the new Deed of Agreement with the Australian Maritime College, will ensure that amateur radio syllabuses and associated qualifications continue to equip amateur licensees with the knowledge and skills necessary to operate an amateur station in Australia. The ACMA is intending establish the Syllabus Review Panel in Q4 2020.

We will be consulting on future licensing mechanisms and conditions for non-assigned amateur and outpost licences. We will also consider submissions in response to the consultation paper on the proposed changes to amateur licence conditions proposed in the draft Radiocommunications Licence Conditions (Amateur Licence) Omnibus Amendment Instrument 2019 (No.1). However, after further consideration, and noting that the Australian Qualifications Framework (AQF) is focused on vocational qualifications which are associated with a skills shortage and/or industry demand, the ACMA does not propose to progress the inclusion of amateur qualifications within the AQF.

We are monitoring international RPAS regulatory arrangements and we are considering the creation of new RPAS-specific planning and apparatus licensing arrangements in the range of 5030–5091 MHz.

We thank submitters for their constructive suggestions on streamlining the licensing process. These will be considered as we review the licensing process and framework.

## **Compliance and enforcement**

### ***What submitters said***

It has also been noted in relation to CBRS that the technology and products may bring risks, being part of a global marketplace, and they may make problems for compliance and enforcement.

### ***Response to submitters***

We note concerns regarding the potential for non-compliant radiocommunications equipment to be imported into Australia through global supply chains. We are considering, in conjunction with government, supply side protections which could improve the regulation of equipment that will or may cause interference to radiocommunications.

## **Electromagnetic Energy (EME)**

### ***What submitters said***

Several submissions expressed concern about the rollout of 5G without more evidence of EME safety. Some suggested further testing or slowing down the pace of 5G development and expressed concern about the ARPANSA standard.

Other submissions acknowledged and supported EME compliance as an ACMA priority compliance area.



There were some suggestions for change such that:

- > the ACMA and ARPANSA update their policies relating to the resolution of EME issues
- > more research be conducted into the safety of 5G before progressing 5G rollout.

***Response to submitters***

Public safety EME exposure limits are set by ARPANSA as Australia’s primary authority on radiation protection and nuclear safety. The limits are based on ARPANSA’s evaluation of scientific information. We are advised that there are no established health effects from the low-level exposure to the RF EME from 5G mobile phone base station antennas.

We acknowledge the importance of EME regulation to the Australian public and have made EME compliance for small cell deployments in mobile networks a compliance priority for 2019–20.

More information is available at [acma.gov.au](https://www.acma.gov.au).