Extended mobile-satellite service L-band

Outcomes paper

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Executive summary

On 5 May 2022, we released the [*Review of the 1.5 GHz band*](https://www.acma.gov.au/consultations/2022-05/review-15-ghz-band-consultation-162022) discussion paper. The purpose of that paper was to start the discussion on possible changes to planning arrangements in the 1427–1518 MHz, 1518–1525 MHz and 1668–1675 MHz frequency ranges (collectively referred to as the 1.5 GHz band).

The 1.5 GHz band is currently used by a mixture of services and applications, including fixed services, aeronautical mobile services and various science services. Noting views raised in submissions to the discussion paper and the different pace of international developments for different uses cases in the band, we decided to review arrangements for the mobile-satellite service (MSS) in the 1518–1525 MHz and 1668–1675 MHz frequency ranges (the extended MSS L-band), with arrangements for other services in the band to be progressed separately.

The ACMA released the [*Review of the 1.5 GHz extended MSS L-band options paper*](https://www.acma.gov.au/consultations/2023-08/review-15-ghz-band-extended-mss-l-band-options-paper) on 16 August 2023. Consultation closed on 20 September 2023, and we received 8 submissions.

The options paper identified the following desirable planning outcomes for the band:

1. Support the introduction of MSS in all or part of the extended MSS L-band in a reasonable timeframe.
2. Support on-going use of the extended MSS L-band by incumbent licences and services including:
3. Licences used for stratospheric balloon communications and licences held by Defence across the 1427–1535 MHz frequency range.
4. Fixed licences and services including enabling the ongoing use of those licences used for the delivery of universal service obligation (USO) services in the 1427–1535 MHz frequency range until such time as a proven alternate technology solution is identified and deployed.
5. Radio astronomy and meteorological services in and adjacent to the
1668–1675 MHz frequency range.
6. Devices authorised to operate in accordance with the [Radiocommunications (Low Interference Potential Devices) Class Licence 2015](https://www.legislation.gov.au/Series/F2015L01438).
7. Consider necessary regulatory measures for new MSS use in the extended MSS L‑band to enable coexistence with incumbent and possible future in-band and adjacent band services such as wireless broadband (WBB).

The options paper set out 3 possible options for future use of the extended MSS L-band to give effect to the desirable planning outcomes:

* **Option 1:** No change.
* **Option 2:** Implement arrangements to allow MSS operation in the 1518–1525 MHz and 1668–1675 MHz frequency ranges on a no-interference, no-protection basis to incumbent in-band and adjacent band licences and services.
* **Option 3:** Implement arrangements for MSS in the extended MSS L-band (on the same basis as Option 2) and consider relocating some incumbent licences and services.

Option 2 was identified as our preliminary preferred option.

In the options paper, we also proposed to expedite the implementation of Option 2 by seeking comment on the required variations to the [Radiocommunications (Communication with Space Object) Class Licence](https://www.legislation.gov.au/Series/F2015L01486) 2015 (CSO class licence) as part
of this consultation process.

## Industry feedback and ACMA considerations

Strong support was provided for the ACMA’s preliminary preferred Option 2, with 7 of the 8 responses supporting our preferred Option 2, and one responder not having a preference. A ‘reply to comment’ period opened on 28 September 2023 and closed on 25 October 2023, to allow replies to the responses received for the options paper. We received one reply from the satellite industry.

One responder from the maritime industry noted that regardless of which option the ACMA decided to implement, there are potential impacts to the Inmarsat Global Maritime Distress and Safety Systems (GMDSS) service from IMT that should be noted ahead of further consultation on the 1.5 GHz band.

## Planning decision

The ACMA has considered the responses and replies to the options paper. We have concluded that arrangements consistent with Option 2 will progress to the implementation stage of the ACMA’s spectrum planning process (see Figure 1). We consider that the overall utility of the extended MSS L-band and the long-term public interest derived from use of the spectrum is increased under this option, compared with Option 1. Option 2 also enables arrangements for MSS to be implemented in a shorter timeframe than Option 3 to support more efficient use of the spectrum.

1. ACMA spectrum planning process



We are implementing the planning decisions to give effect to Option 2 by:

* **Amending the CSO class licence:** to include the frequency ranges
1518–1525 MHz and 1668–1675 MHz within conditions as proposed in
the consultation

**Updating the space business operating procedure (space BOP):** to include advice about arrangements in extended MSS L-band as proposed in the consultation.

We will now accept licence applications for space and space receive apparatus licences in the extended MSS L-band. Applications will be processed as outlined in the [space business operating procedure](https://www.acma.gov.au/publications/2020-08/guide/submission-and-processing-applications-space-and-space-receive-apparatus-licences). Beyond ensuring the proposed operation is in accordance with ITU requirements[[1]](#footnote-2)Note, no further assessment of compatibility between satellite systems is intended. Our view is that in this band, the ITU satellite coordination process is sufficient to resolve any compatibility matters.

## Next steps

The next stage of the review of the 1.5 GHz band will involve a review of terrestrial (non-satellite) services in the broader 1427–1535 MHz frequency range. This is proposed for consideration in the 2024–25 financial year.

Planning outcomes identified at this stage include both ACMA planning decisions as well as preliminary views on these future activities, some of which may be subject to further legislative or consultative processes.

A high-level implementation plan has been developed and is outlined in Table 1 in the [Next steps section](#_Planning_outcomes).

# Introduction

The extended MSS L-band (1518–1525 MHz and 1668–1675 MHz) is allocated in the [Australian Radiofrequency Spectrum Plan 2021](https://www.legislation.gov.au/Details/F2021L00617) (Spectrum Plan) to the following services on a primary basis:

* fixed, mobile and mobile-satellite (space-to-Earth) in the 1518–1525 MHz
frequency range
* mobile-satellite (Earth-to-space), radio astronomy and space research in the
1668–1668.4 MHz frequency range
* meteorological aids (MetAids), fixed, mobile, mobile-satellite (Earth-to-space) and radio astronomy in the 1668.4–1670 MHz frequency range

MetAids, fixed, meteorological-satellite (Metsat) (space-to-Earth), mobile and mobile-satellite (Earth-to-space) in the 1670–1675 MHz frequency range.

In May 2022, we released the [*Review of the 1.5 GHz band discussion paper*](https://www.acma.gov.au/consultations/2022-05/review-15-ghz-band-consultation-162022) (May 2022 paper). The consultation closed on 10 June 2022. We received 13 responses. The paper identified growing interest in the 1.5 GHz band to provide support for new services and expand operation of existing services. Noting the different pace of international developments for different uses in the band, the ACMA proposed to progress the review of arrangements for MSS in the extended MSS L‑band first. A review of terrestrial (non-satellite) services in the broader 1427–1535 MHz
frequency range will be progressed separately and is proposed for consideration in
the 2024–25 financial year.

Following on from the May 2022 paper, we released the [*Review of the 1.5 GHz extended MSS L-band options paper*](https://www.acma.gov.au/consultations/2023-08/review-15-ghz-band-extended-mss-l-band-options-paper) (the options paper) in August 2023. The consultation closed on 20 September 2023, with 8 responses received from industry and interested parties.

A ‘reply to comment’ period opened on 28 September 2023 and closed on 25 October 2023, to allow replies to submissions we received for the options paper. We received one reply.

The purpose of this paper was to present the ACMA’s replanning outcomes for the extended MSS L-band and inform stakeholders about the future use of the band.

## Legislative and policy environment

Managing spectrum efficiently and effectively for the benefit of all Australians is a key priority for the ACMA.[[2]](#footnote-3)

The ACMA’s decisions are guided by the object of the [*Radiocommunications Act 1992*](https://www.legislation.gov.au/Details/C2019C00262) (the Act) to promote the long‑term public interest derived from the use of the spectrum by managing the spectrum in a manner that:

1. facilitates the efficient planning, allocation and use of the spectrum
2. facilitates the use of the spectrum for:
	1. commercial purposes
	2. defence, national security and other non‑commercial purposes (including public safety and community purposes)
3. supports the communications policy objectives of the Australian Government.

Communications policy initiatives relevant to the replanning considerations in this band have been identified.

Our work plan aims to support government communications and media objectives,
and the following priorities outlined in the December 2022 [Ministerial Statement of Expectations](https://www.infrastructure.gov.au/department/media/publications/australian-communications-and-media-authority-statement-expectations):

* promoting the long-term public interest derived from spectrum, including the benefits of technological developments that improve spectrum utilisation and efficiency
* supporting government policies related to regional, rural and remote Australia including by having regard to relevant ministerial policy statements in the planning and allocation of spectrum to support innovation and competition in these areas

promoting investment, innovation and the adoption of new and emerging technologies, while continuing to safeguard the interests of consumers and small businesses.

We are committed to meeting our objectives in the context of the government’s broader media and communications policy framework. In our [*Statement of Intent*](https://www.acma.gov.au/publications/2023-03/plan/acma-statement-intent), we responded to the government’s Statement of Expectations for the ACMA.

#### Universal service obligation

Part 2 of the [*Telecommunications (Consumer Protection and Service Standards) Act 1999*](https://www.legislation.gov.au/Details/C2021C00551) establishes the universal service obligation (USO) to provide people in Australia with access to standard telephone services on reasonable request, as well as reasonable access to payphone services. The USO is delivered by Telstra. The statutory obligation is reinforced with a contract between the Commonwealth and Telstra that runs to 30 June 2032. The USO is a well-established and long-standing part of Australian telecommunications.

Within the NBN fixed-line footprint, Telstra generally uses the NBN to provide voice services. Outside this footprint (generally in rural and remote Australia), Telstra continues to use its own existing infrastructure to meet its statutory and contractual USO obligations. Telstra provides most voice services in these areas over its copper network. However, it also delivers just over 10,000 USO services,[[3]](#footnote-4) including some payphones, through fixed wireless over its High-Capacity Radio Concentrator (HCRC) system, including use of spectrum in the 1.5 GHz band.

### Regional connectivity and satellite communications

The government has established the Low Earth Orbit Satellite Working Group to examine the future role of satellite technology in delivering telecommunications services. We are a participant of the Working Group alongside the Department of Infrastructure, Transport, Regional Development, Communications and the Arts (the Department) and other communications industry participants. The group met for the first time in February 2023 and identified 4 key issues for future consideration:

* how satellites can help close the digital inclusion gap, particularly in relation to First Nations peoples (consistent with Closing the Gap Target 17)
* how satellites can support greater resilience and redundancy in emergency circumstances
* using satellites to deliver universal telecommunications services

the economic benefit that could come from greater low earth orbit (LEO) satellite use, including by facilitating the Internet of Things (IoT).[[4]](#footnote-5)

The group has since discussed these issues and will continue to meet to provide advice and feedback to the government on possible regulatory reforms to support the industry.

## Licensing arrangements

There are 3 licensing approaches available to us for authorising access to spectrum – spectrum, apparatus and class licences. These approaches influence how spectrum replanning options can be developed and implemented.

A spectrum licence authorises the operation of devices within a defined frequency range and geographic area, with a high degree of exclusivity. The geographic area can vary in size and can comprise the entire country. Spectrum licences are usually allocated by an auction and have typically been utilised in bands used to deploy commercial mobile broadband networks. Spectrum licences may be allocated for up to 20 years.

An inherent feature of spectrum licensing is technological flexibility – that is, the licence conditions and associated technical framework, while usually optimised for an expected technology, specify generic technical conditions[[5]](#footnote-6) and generally do not expressly mandate or limit specific technologies or services. This allows a licensee to deploy any technology that complies with the conditions of the licence. It is up to the licensee to manage interference between their devices (note that the adoption of international standards within the technical framework mitigates the potential for interference between devices). Spectrum licences are more conducive to secondary trading than apparatus licences, due to design features such as their ability to be sub-divided.

An apparatus licence generally authorises the use of a radiocommunications device (or group of devices) operating under a specific radiocommunications service type, in a specific frequency range, and traditionally at one or more specific geographic locations for a period of up to 20 years. Apparatus licences are typically issued by the ACMA ‘over the counter’, consistent with our published administrative policy (e.g., Radiocommunications Assignment and Licensing Instructions – RALIs). [Taxes and cost recovery charges](https://www.acma.gov.au/fees-apparatus-licences) apply in relation to apparatus licences, which cover our costs and incentivise licensees to use spectrum efficiently.

We also created the [area-wide licence](https://www.acma.gov.au/publications/2020-02/guide/area-wide-licensing-acma-approach-introducing-area-wide-licences)[[6]](#footnote-7). This authorises the operation of one or more radiocommunications transmitters within a defined geographic area within frequencies specified in the licence. This is subject to the conditions included in the issued licence and in any applicable licence condition determination. The licence type is scalable, enabling its use for authorising different sized geographic areas and bandwidths. Unlike other transmitter licence types – which typically align with specific uses and purposes – the area-wide licence can authorise a variety of services, uses, applications and technologies.

Class licences are a standing authorisation to access spectrum without the need to apply to us for an individual licence (hence no taxes or charges are paid), subject to the conditions of the class licence. These conditions may include technical and geographic matters and may pertain to the type of use or class of user.

### Licensing of space-based communication systems

A space-based radiocommunications system may not be operated in Australia without a licence. In general, there are 2 broad options for licensing space systems in Australia.

The first option requires operators to obtain apparatus licences for each of their earth stations individually: an *earth licence* for the uplink and an *earth-receive licence* for the downlink. Under this approach, a licence is not required for the space stations or space-receive stations onboard a satellite.

The second option involves a combination of apparatus and class licences. In certain bands specified in the CSO class licence, operators are required to obtain an apparatus licence for the space stations onboard a satellite with a *space licence* for the downlink and a *space-receive licence* for the uplink. Earth stations (for either uplink or downlink) in the system are then automatically authorised collectively under the CSO class licence. This approach is typically used for satellite systems with numerous or ubiquitous fixed-satellite service earth stations. It provides an efficient means of licensing a large number of earth stations and avoids the need to obtain a licence for every earth station in a satellite system.

A key requirement, irrespective of which approach to licensing is used, is that the satellite system must be filed with the International Telecommunication Union (ITU) by the ACMA or the equivalent national administration of another ITU member state.

If an operator wishes to licence a satellite system under the second option, the controlling business entity must first be included in either the [Radiocommunications (Australian Space Objects) Determination 2014](https://www.legislation.gov.au/Details/F2021C00361) or the [Radiocommunications (Foreign Space Objects) Determination 2014](https://www.legislation.gov.au/Details/F2022C00589).

Information on how licence applications for space-based radiocommunications systems are assessed for compliance with ITU and other satellite regulatory matters is outlined in our [business operating procedures](https://www.acma.gov.au/business-operating-procedures-spectrum).[[7]](#footnote-8)

#### CSO class licence

The [Radiocommunications (Communication with Space Object) Class Licence 2015](https://www.legislation.gov.au/Details/F2022C00699) is a legislative instrument made by the ACMA under section 132 of the Act. It provides a standing authorisation for the operation of earth stations in specified frequency ranges. This is for either transmission or reception – if the operator of an associated satellite system has obtained space and space-receive licences authorising operation of the space-based segment of their system.

The CSO class licence also sets out equipment rules that earth stations authorised by this licence must comply with, as well as technical conditions that must be met for transmissions in certain frequency ranges to minimise interference with other radiocommunications services.

#### International obligations

Our current practice is that a satellite filing with the ITU for the associated space object will be required, in accordance with Australia’s obligations as a member of the ITU.

It should be noted that while the ACMA can develop a framework to support the licensing of a satellite service, the viability of a satellite service is largely dependent on the status of the satellite system in the ITU satellite coordination process. This is the responsibility of prospective licensees to assess, and we can make no assurances in this regard.

## Spectrum planning outcomes development

We are guided in our spectrum management functions by the [object of the Act](https://www.acma.gov.au/object-and-scope-radiocommunications-act-1992), set out in section 3. A balanced application of regulatory and market mechanisms is often necessary to achieve key elements of the object of the Act, in particular promoting the long-term public interest derived from the use of the radiofrequency spectrum and meeting the government’s policy objectives.

In determining the planning outcomes presented in this paper, we have considered responses to the May 2022 paper and the options paper. The desired planning outcomes were:

1. Support the introduction of MSS in all or part of the extended MSS L-band in a reasonable timeframe.
2. Support on-going use of the extended MSS L-band (and where relevant, adjacent bands) by incumbent licences and services as summarised at [Appendix B](#_Appendix_B:_Summary). This includes:
3. Licences used for stratospheric balloon communications and licences held by Defence across the 1427–1535 MHz frequency range.
4. Fixed licences and services (point-to-point and point-to-multipoint). This includes enabling the ongoing use of those licences used for the delivery of USO services in the 1427–1535 MHz frequency range until such time as a proven alternate technology solution is identified and deployed.
5. Radio astronomy and meteorological services in and adjacent to the
1668–1675 MHz frequency range.
6. Devices authorised to operate in accordance with the [Radiocommunications (Low Interference Potential Devices) Class Licence 2015](https://www.legislation.gov.au/Series/F2015L01438) (the LIPD class licence), such as ground/wall penetrating radars.
7. Consider necessary regulatory measures for new MSS use in the extended MSS L‑band to enable coexistence with incumbent and possible future in-band and adjacent band services (such as WBB). This is so the introduction of MSS before options for other services are considered does not unduly limit or constrain future replanning of the broader 1.5 GHz band.

We have also considered other relevant developments, both domestic and international, that may impact the potential future use of the band.

Following release of this paper, we will consult further on proposed licensing and technical planning arrangements as outlined in the [Next steps section](#_Planning_outcomes).

## Issues not within the scope of this paper

The following issues are not within the scope of this paper.

### Apparatus licence tax arrangements

A review of the apparatus licence tax arrangements that apply to different services is not within the scope of this paper. In general there are opportunities for interested parties to provide their views about pricing matters as part of the consultation on the annual work program, the [Five-year spectrum outlook](https://www.acma.gov.au/publications/2023-10/five-year-spectrum-outlook-2023-28) (the FYSO). It is also noted in the FYSO 2023–28 that we are considering a review of apparatus licence taxes in the frequency ranges 520 MHz to 2690 MHz in the 2025–26 financial year, where there would be further opportunities to comment. In addition, should the proposed planning arrangements outlined in this paper extend to consultation on proposed licensing arrangements there would be opportunities to comment on the relevant pricing matters at that time.

### Engagement in international activities

The scope of this paper does not extend to Australian strategies or positions on matters under consideration in international spectrum management forums, such as the ITU or Asia-Pacific Telecommunity (APT). These matters are dealt with separately through relevant preparatory processes led by the ACMA and/or the Department. Stakeholders interested in these processes can find more information on the [ACMA website](https://www.acma.gov.au/international-radiocommunications-activities) or by contacting either the ACMA’s International Radiocommunications Section (irs@acma.gov.au) or the Department’s International Radiocommunications Section (wrc@communications.gov.au).

# The process to date

This chapter recaps the scenarios outlined in the May 2022 paper and options proposed in the options paper.

## Overall approach to replanning the band

### The May 2022 paper

This examined the current use of the band, domestic demand for new services and international arrangements and technology trends.

The May 2022 paper identified the following WBB planning scenarios:

* **Scenario 1:** all or part of the 1427–1517 MHz frequency range would be allocated for WBB using supplemental downlink[[8]](#footnote-9) (SDL) technologies. Different-sized guard bands at the 1427 MHz and/or 1518 MHz frequency boundaries could be considered to enable coexistence with earth exploration-satellite service (EESS) (passive) and MSS stations. Adopting SDL arrangements may help to simplify and improve coordination and coexistence arrangements with other in-band and adjacent
band services.
* **Scenario 2:** all or part of the 1427–1517 MHz frequency range would be allocated for WBB using time division duplex (TDD) technologies. Different-sized guard bands at the 1427 MHz and/or 1518 MHz frequency boundaries could be considered to enable coexistence with EESS (passive) and MSS stations. TDD WBB arrangements could support either local area (LA) WBB or wide area (WA) WBB operations. However, more complicated coordination arrangements would be required with other in-band and adjacent band services and coexistence may be more difficult than under SDL WBB arrangements.

**Scenario 3:** all or part of the 1427–1518 MHz frequency range would be allocated for WBB using frequency divisions duplex (FDD) technologies. Different-sized guard bands at the 1427 MHz and/or 1518 MHz frequency boundaries could be considered to enable coexistence with EESS (passive) and MSS stations. FDD WBB arrangements could support either LA WBB or WA WBB operations. However, more complicated coordination arrangements would be required with other in-band and adjacent band services, and coexistence may be more difficult than SDL WBB arrangements.

The May 2022 paper also identified the following MSS planning scenarios:

* **Scenario 4:** the 1518–1525 MHz and 1668–1675 MHz frequency ranges would be made available for MSS use. However, incumbent apparatus licensees would be able to continue operating in these frequency ranges. This means MSS stations in the 1518–1525 MHz frequency range would operate on a no-protection basis to new and existing incumbent services. This mirrors existing arrangements for MSS in the adjacent 1525–1535 MHz frequency range. There would also be some operational restrictions on MSS stations in the 1668–1675 MHz frequency range to protect radio astronomy and Metsat services.

**Scenario 5:** similar to scenario 4; however, some or all incumbent apparatus licensees would be required to re-locate from the 1518–1525 MHz frequency range. MSS stations in the 1518–1525 MHz frequency range would operate on a no-protection basis for any remaining incumbent services.

We presented 5 issues for comment in the May 2022 paper:

1. Are there any international arrangements or technology trends that the ACMA should be aware of?
2. What is the demand for access to the 1.5 GHz band for WBB, MSS and broadcasting services? Are there any other new services that should be considered?
3. What are the ongoing requirements for incumbent services in the 1.5 GHz band? Are there any viable alternative options?
4. What planning scenarios should be considered in the 1.5 GHz band?
5. Comment is sought on the coexistence scenarios identified, including the ACMA’s preliminary thinking on these scenarios. Are there any other coexistence scenarios the ACMA should consider?

### Options paper

We subsequently progressed the band to the preliminary replanning stage, which included release of the options paper in August 2023.

In conducting its planning activities, we are informed by the object of the Act. Consistent with that object and after reviewing submissions to the May 2022 paper, the options paper proposed the following 3 desirable planning outcomes for the review of the extended MSS L-band:

1. Support the introduction of MSS in all or part of the extended MSS L-band in a reasonable timeframe.
2. Support ongoing use of the extended MSS L-band (and where relevant, adjacent bands) by incumbent licences and services as summarised at [Appendix B](#_Appendix_B:_Summary). This includes:
3. Licences used for stratospheric balloon communications and licences held by Defence across the 1427–1535 MHz frequency range.
4. Fixed licences and services (point-to-point and point-to-multipoint). This includes enabling the ongoing use of those licences used for the delivery of USO services in the 1427–1535 MHz frequency range until such time as a proven alternate technology solution is identified and deployed.
5. Radio astronomy and meteorological services in and adjacent to the 1668–1675 MHz frequency range.
6. Devices authorised to operate in accordance with the [Radiocommunications (Low Interference Potential Devices) Class Licence 2015](https://www.legislation.gov.au/Series/F2015L01438) (the LIPD class licence), such as ground/wall penetrating radars.
7. Consider necessary regulatory measures for new MSS use in the extended MSS L‑band to enable coexistence with incumbent and possible future in-band and adjacent band services (such as WBB). This is so the introduction of MSS before options for other services are considered does not unduly limit or constrain future replanning of the broader 1.5 GHz band.

The paper identified and assessed 3 replanning options for the extended MSS L-band.

* Option 1: No change, maintain the existing arrangements.
* Option 2: Implement arrangements to enable MSS use of the extended MSS L‑band. All incumbent services and licences can continue operating in the band.

Option 3: Implement arrangements to enable MSS use of the extended MSS L‑band. Re-locate some or most incumbent services and licences to alternative bands or delivery techniques.

Option 2 was identified as our preferred option as it best aligns with our desirable planning outcomes. This option also allows arrangements for MSS to be implemented in a shorter timeframe than Option 3.

The ACMA presented 4 issues for comment in the options paper:

1. Comment is sought on the proposed desirable planning outcomes for the review of the extended MSS L-band.
2. Comment is sought on the options identified. Do you have any alternative options to propose?
3. Comment is sought on the ACMA’s assessment of options.

Comment is sought on the ACMA’s preliminary preferred approach, including the proposed draft amendments to the [Radiocommunications (Communication with Space Object) Class Licence](https://www.legislation.gov.au/Series/F2015L01486) 2015 and associated licence application and allocation process.

## Discussion of responses

Consultation on the options paper closed on 20 September 2023. We received
8 responses to the options paper. A ‘reply to comment’ period opened on 28 September 2023 and closed on 25 October 2023, with one reply received. All submissions are available [on the ACMA website](https://www.acma.gov.au/consultations/2023-08/review-15-ghz-band-extended-mss-l-band-options-paper).

# Summary and response to options paper issues

This section summarises responses made on the issues for comment in the options paper, as well as additional issues raised, and the reply to responses we received. A list of all respondents is in [Appendix A](#_Appendix_A:_Summary). Of the 8 responses received, 7 directly addressed the issues for comment and supported the ACMA’s preferred Option 2.

A maritime industry responder had no view on the 3 options proposed by the ACMA. They did not address the issues for comment. However, they raised several concerns with potential deployment of International Mobile Telecommunications (IMT) in adjacent bands, noting potential interference to maritime and aviation receivers with poor adjacent-channel blocking performance.

The responder suggested that the following would require consideration during further consultation regarding the 1427–1532 MHz frequency range:

* The Inmarsat constellation operating at 1530–1544 MHz and 1626.5–1645.5 MHz is an approved GMDSS service under Chapter IV of the International Convention on the Safety of Life at Sea (SOLAS Convention) and requires spectrum protection as per the ITU Radio Regulations. Inmarsat equipment operating GMDSS in the
1530–1544 MHz frequency range may experience interference.

As of 1 January 2024, new performance standards will apply to Inmarsat-C ship earth stations which address the adjacent band interference blocking requirement, but this will not apply to existing vessels. In some cases, application of new performance standards has been extended to 1 January 2038. It is estimated that not all vessels with Inmarsat equipment will meet the new performance standard until 1 January 2038.

A responder from the mobile telecommunications industry noted there is already international momentum supporting allocation and development of WBB services in the 1427–1518 MHz frequency range and that co-existence considerations will maximise efficient use of the 1.5 GHz spectrum. They argued that guard bands below 1518 MHz should not be larger than 1 MHz and thus the ACMA should not accept applications for space licences in the 1518–1520 MHz frequency range, which may be implemented in the [space BOP](https://www.acma.gov.au/publications/2020-08/guide/submission-and-processing-applications-space-and-space-receive-apparatus-licences). The responder asked the ACMA to explain how ‘additional restrictions on service deployments around ports and airports’ would translate to long-term public interest, as these facilities are often located close to major cities with high WBB demands.

A satellite industry responder argued that MSS needs to be able to continue operating without harmful interference from future 1.5 GHz IMT/WBB services.

A second satellite industry responder stressed the importance of the L-band for MSS applications in Australia, including applications such as public safety, disaster response, telemedicine, remote education and unmanned aircraft system use in air traffic management.

A third satellite industry responder noted their specific interest in the 1.5 GHz band for 3GPP non-terrestrial networks (NTN) services for applications such as direct space-to-mobile communications. The responder considered that the extended MSS L-band has the potential to be used as an extension of 3GPP 5G NTN band n255. They also argued that there should be conditions to guard against spectrum hoarding such as licence applicants having an existing satellite filing to allow timely use of the band.

A telecommunications industry responder noted the importance of maximising the efficient use of the 1.5 GHz spectrum due to the level of competing demand for this spectrum and considered Option 2 will best support deployment of MSS in the band. They also noted that the nature and scope of co-existence measures between WBB and MSS should be informed by international studies.

Another telecommunications industry responder urged us to continue protection of HCRC systems with all 3 options, as they are still in operation in areas where there is no mobile or NBN coverage to facilitate fixed wireless access solutions.

#### ACMA response

We have noted a number of issues that have been raised in the submissions that are outside the scope of this phase of the consultation. Some of these issues will be considered in the next stage of the review of the broader 1427–1518 MHz frequency range (including consideration of the potential effects on GMDSS).

## Issues for comment

**Question 1**

Comment is sought on the proposed desirable planning outcomes for the review of the extended MSS L-band.

Seven responders supported the proposed desirable planning outcomes for the extended MSS L-band.

A responder from the mobile telecommunications industry strongly supported outcome number 3 and stated that it is necessary to maximise the public benefit derived from the use of the spectrum.

A responder from the satellite industry stated that the extended MSS L-band would ‘provide additional spectrum to improve regional connectivity and enable the growth of the Australian user community as well as Internet of Things (IoT) applications through satellite communications and other MSS operations’. However, they argued that incumbent services may provide a challenge to introducing MSS into the band and recommended the ACMA conduct a consultation to address potential coexistence issues. The responder also stated that they do not support regulatory constraints on the MSS in the extended MSS L-band as that would limit MSS services.

Another responder from the satellite industry stated that the extended MSS L-band will allow growth of Australian space services. However, they were concerned with compatibility between extended MSS L-band and incumbent services, noting that any power limits in the 1518–1525 MHz frequency range may prevent MSS operation. The responder also noted that regarding outcome number 3, incumbent coexistence measures will need to be addressed.

A responder from the telecommunications industry agreed with outcome 3, provided that the ACMA introduce coexistence measures between MSS and services in the 1427–1535 MHz frequency range.

Another responder from the telecommunications industry supported the extended MSS L-band on the basis that MSS operates on a no-interference-no-protection basis, as this would increase use of the band.

#### ACMA response

The ACMA notes the broad support for the proposed desirable planning outcomes.

**Question 2**

Comment is sought on the options identified. Do you have any alternative options to propose?

All responders to this question preferred Option 2. A mobile telecommunications responder noted that this option provided ‘the right balance between increasing the utility of the spectrum … while supporting continued operations in the band’.

A responder from the satellite industry stated that they oppose Option 1 and, although Option 3 would provide what they referred to as ‘a more complete solution’, they acknowledged that implementing Option 3 would take time and was also not their preferred option. The responder noted they agreed with the ACMA’s preferred option (Option 2) but argued that MSS needs to operate without harmful interference from other services and should be protected through regulatory measures.

The same satellite industry responder noted the ACMA stated in the options paper that the ITU satellite coordination process is sufficient to resolve compatibility matters but requested that MSS downlinks are not constrained in Australia by incumbent services by ensuring that downlink power flux density levels in the 1518–1525 MHz frequency range are allowed to operate at the same level as in the 1525–1559 MHz frequency range. The responder recommended that WBB is limited to below 1492 MHz (as has been implemented in some countries) to reduce compatibility issues between MSS and WBB. The responder supported the constraints on MSS proposed by the ACMA only for the short to medium term, arguing long-term constraints will impact MSS operations.

A second satellite industry responder mirrored the above comments.

A third satellite industry responder agreed that Option 2 would complement existing MSS L-band arrangements, support timely introduction of extended MSS L-band services, be a simple solution, and have no impact on incumbent services. They did; however, argue that Option 2 would constrain MSS to coordinate around incumbent services, and so licensing new terrestrial services should be prevented. The responder also supported Option 3 as it would reduce potential for interference to MSS, suggesting that relocation of incumbents should be in parallel to Option 2 so that new MSS networks may be brought into use earlier.

A telecommunications industry responder recognised our need to review arrangements for terrestrial services in the 1427–1535 MHz frequency range and noted increasing demand to support WBB services. The responder requested that the ACMA comment on the latest ITU coexistence studies so that operators are able to make long-term investment decisions.

The same telecommunications industry responder questioned how the next stage of the 1.5 GHz band review would promote the long-term public interest, stating that ‘design of co-existence frameworks should be clear and transparent, with a view to maximising the efficient use of the spectrum by providing sufficient predictability of spectrum access’ which would promote network investment, benefit users and the Australian digital economy. The responder requested that the ACMA consider imposing compatibility requirements on MSS operators early to avoid costs and delays to stakeholders.

#### ACMA response

The ACMA notes the support for our preferred Option 2. We have no plans to restrict licensing of terrestrial services in the extended MSS L-band noting that enabling coexistence with incumbent and possible future in-band and adjacent band services such as WBB aligns with the ACMA’s desirable planning outcomes.

**Question 3**

Comment is sought on the ACMA’s assessment of options.

A satellite industry responder argued that under Option 2, MSS services would operate as secondary services which may result in MSS operations not being feasible in future in the extended MSS L-band. They argued that future systems in the same band and adjacent bands should not be prioritised over MSS and that protection for terrestrial mobile systems should be reviewed as part of the 1427–1535 MHz review.

A second satellite industry responder mirrored the above comments.

A third satellite industry responder agreed with our views on Option 1 and Option 2. They noted that they plan to use the extended MSS L-band for 5G NTN services, therefore, proposed operational restrictions will need to align with the 3GPP standard. The responder suggested implementing Option 2 and Option 3 in parallel so that incumbent service relocation is not delayed.

A government responder raised their concerns that potential planning options might impede incumbents at the next stage of the 1.5 GHz review but acknowledged that these concerns will be addressed in future.

A telecommunications industry responder supported the ACMA’s assessment of options on the understanding that MSS stations in the 1518–1525 MHz frequency range will not be afforded protection from incumbent services, and that ‘the ACMA will implement measures to help ensure that the upcoming review of the arrangements for terrestrial (non-satellite related) services in the broader 1427–1535 MHz frequency range is not unduly constrained’.

#### ACMA response

The ACMA notes the comments made by responders to our assessment of options.

**Question 4**

Comment is sought on the ACMA’s preliminary preferred approach, including the proposed draft amendments to the [Radiocommunications (Communication with Space Object) Class Licence](https://www.legislation.gov.au/Series/F2015L01486) 2015 and associated licence application and allocation process.

A mobile telecommunications industry responder agreed that a class licensing and apparatus licensing approach would be suitable for the extended MSS L-band as it is currently implemented in the 1525–1559 MHz and 1610–1660.5 MHz portion of the
L-band. They requested that the ACMA supplies (at minimum) performance requirements for MSS earth station receivers, including adjacent-channel selectivity (ACS) and blocking requirements to enable coexistence with WBB services below
1518 MHz. The responder also supported advisory notes be added to future space receive licences in the 1518–1525 MHz band, arguing that above 1518 MHz the ACMA should not allow the continued operation of ‘poorly-performing’ receiver equipment in incumbent MSS licences.

A satellite industry responder stated that MSS licensees will require access to complementary space and space receive apparatus licences in the extended MSS
L-band, and that it ‘seems premature’ for the ACMA to include a note regarding
possible date of implementation of better performing MSS receivers while plans for the 1427–1518 MHz frequency range have not been explored. The responder proposed to expand Embargo 70 to include new terrestrial licences in the 1427–1535 MHz frequency range Australia-wide.

A second satellite industry responder mirrored the above comments.

A third satellite industry responder urged us to further consider the provision to restrict operation of a station in the 1673.38–1675 MHz frequency range to protect incumbent licences, as proposed in the draft CSO class licence variation.

A government responder suggested that the ACMA add references to relevant ITU Recommendations and/or internationally recognised standards to support our proposal for better performing MSS receivers and more stringent blocking levels.

A telecommunications industry responder agreed with the ACMA’s proposal to introduce requirements on MSS stations to implement better performing receivers so that early introduction of MSS will not limit replanning in the 1.5 GHz band. They therefore
support the addition of an advisory note to space receive licences and an update to
the [space BOP](https://www.acma.gov.au/publications/2020-08/guide/submission-and-processing-applications-space-and-space-receive-apparatus-licences) noting review of the 1427–1535 MHz frequency range and date for implementation for better performing MSS receivers, and also support enforcement
of Embargo 70. The responder insisted that technical arrangements should support
3GPP-compliant equipment and interference limits to 1427–1518 MHz to support WBB.

Another telecommunications industry responder noted that they support the advisory note to space receive licences, a note in the space BOP and continued enforcement of Embargo 70.

#### ACMA response

The ACMA acknowledges that responses were in support of our preliminary preferred licensing approach. Following consultation on the options paper, we will include a note in the space BOP flagging future review and possible application of regulatory measures on MSS operating in the L-band, including a statement of our intention to define a date for the implementation of better performing MSS receivers, including more stringent blocking levels. Any space receive licences issued will include an advisory note to reflect the above. Receiver performance requirements and blocking levels will be considered during the next stage of the L-band planning process. The ACMA
will continue to enforce Embargo 70 to preserve future planning options in the
1427–1518 MHz frequency range.

## Reply to comment

One reply to submissions was received from the satellite industry. The responder noted that all responses to the options paper did not oppose the introduction of MSS into the extended L-band and broad support for Option 2. The responder listed 3 concerns with submissions:

1. Regulatory conditions on MSS operators in respect to incumbent and new terrestrial services: the responder agreed that MSS operations in the 1518–1525 MHz frequency range should not claim protection from incumbent licences but disagreed that MSS should operate as a secondary service to new licences. They noted that there will be some negative impact on MSS services from fixed services, therefore any new terrestrial stations should not have priority over MSS operations, arguing this would imply that new terrestrial stations would have the right to cause interference to MSS. The responder noted that they had proposed extending Embargo 70 to include 1518–1535 MHz in their original submission to the options paper, and that this would avoid risk of interference from new fixed links.
2. Mobile earth station receiver blocking requirements: the responder did not agree with comments from 2 responders regarding implementation of receiver blocking requirements being implemented to extended MSS L-band receivers and urged the ACMA to consider the issue of better performing receivers during the next stage of 1.5 GHz replanning.
3. Use of the 1518–1520 MHz frequency range: the responder argued that
an additional 2 MHz guard band above 1518 MHz as suggested by a telecommunications industry responder is unnecessary as MSS would need to accept interference from incumbent services and coexistence measures for new services would be subject to future review.

#### ACMA response

MSS will operate under the CSO class licence in the extended MSS L-band under the same conditions as current MSS services, so as a result, the ACMA will not extend Embargo 70 to include the 1518–1535 MHz frequency range. Other issues raised will be considered in the next stage of the review of the 1.5 GHz band.

# Planning outcomes

## Planning decisions

Following consultation, we have decided to proceed with implementation of Option 2 for the extended MSS L-band. The implementation of Option 2 will see an update to the CSO class licence, as detailed in the options paper.

The main elements of Option 2 are:

* The introduction of arrangements for MSS use of the 1518–1525 MHz (space-to-Earth) and 1668–1675 MHz (Earth-to-space) frequency ranges (in line with desirable planning outcome 1). MSS stations operating in the 1518–1525 MHz frequency range will not be afforded protection from incumbent in-band and adjacent band services.

No change in arrangements for incumbent licences and services. Therefore, in line with desirable planning outcome 2, this supports ongoing use of the extend
MSS L-band by incumbent licences and services.

The next stage of the 1.5 GHz band review will consider options for new terrestrial (non-satellite) services as well as options for expanding arrangements for incumbent services across the broader 1427–1535 MHz frequency range. The future review will not consider changes to arrangements for radio astronomy or meteorological services operating in, and adjacent to, the 1.5 GHz band. We intend to maintain existing arrangements for these services and continue providing them protection.

## Coexistence considerations

Option 2 will have no impact on incumbent licences and services and is relatively simple to implement. The CSO class licence will be updated to include the changes proposed in the options paper consultation, adopting the same allocation and licensing processes for those portions of the MSS L-band spectrum that are already available for use. The changes that have been implemented are the:

* update of subsection 8(2) authorising (if certain conditions are met) the operation of a station within 20 km of a radio astronomy observatory listed in footnote AUS87 of the Spectrum Plan to include the frequency range 1670–1675 MHz.
* update of subsection 8(3), which prohibits operation of a land station within 500 km of a radio astronomy observatory listed in footnote AUS87 of the Spectrum Plan as well as prohibiting stations onboard airborne aircraft, to include the frequency range 1668–1670 MHz.

inclusion of a new subsection 8(3A) that requires a station to not exceed an emission level of ‑128.1 dBm/4 MHz for more than 20% of the time at the output of the antenna of any radiocommunications receiver authorised under an earth receive apparatus licence operating in the 1673.38–1675 MHz frequency range.

### 1518–1525 MHz and adjacent bands

The 1518–1525 MHz frequency range will be used for space-to-Earth communications by the MSS. MSS user terminals will only receive signals in this band and will not pose an interference risk to incumbent licences and services; however, incumbent services and licences may potentially cause interference to MSS user terminals. MSS user terminals would not be afforded protection from such interference.

There is also potential for a future change of arrangements in the 1427–1535 MHz band to affect MSS user terminals. As the MSS terminals in the extended MSS L-band will operate under a class licence, they will not be afforded protection from interference. As part of the next stage of the 1.5 GHz band review, we will take into account the potential effect on MSS receivers in the 1518–1525 MHz and adjacent bands when considering any change in arrangements. This could include the application of planning arrangements to reduce the risk of interference (such as the use of guard bands and additional restrictions on service deployments around ports and airports).

To better enable coexistence with other adjacent-band services, including possible WBB services, it is likely additional regulatory measures will also need to be applied to any MSS use in the L-band. The actual regulatory measures required to enable coexistence will depend on the outcomes of the next stage of the 1.5 GHz band review and the subsequent changes to planning arrangements.

### 1668–1675 MHz and adjacent bands

The 1668–1675 MHz frequency range will be used for Earth-to-space communications by the MSS. MSS user terminals will only transmit in this frequency range and there is no interference risk to them; however, MSS user terminals pose an interference risk to incumbent services and licences. To manage this risk, restrictions on the frequencies and areas where MSS user terminals can operate are required to ensure the following licences and services are protected:

* the ARQZWA established by the [Radiocommunications (Australian Radio Quiet Zone Western Australia) Frequency Band Plan 2023](https://www.legislation.gov.au/Series/F2023L00286) and encompassing the 70 MHz to 25.25 GHz frequency range.
* apparatus-licensed radio astronomy services in the 1668–1670 MHz frequency range operated by the CSIRO, located at Parkes and Narrabri in New South Wales.
* radioastronomy facilities operating in the 1.2–1.8 GHz frequency range under footnote AUS87 of the Spectrum Plan.

Metsat earth station receivers in the 1673.38–1678.62 MHz frequency range operated by Universal Space Network Inc, located at Yarragadee in Western Australia (this is consistent with international footnote 380A of the Spectrum Plan, which requires MSS to protect earth stations of the Metsat service).

It is noted the CSO class licence already provides guidance on measures to manage interference for the ARQZWA. This is detailed in Note 3 at the end of section 8 and subsection 8(3) of the CSO class licence.

## Licensing arrangements for MSS

Licence applications will be considered within the existing [Procedures for space and space receive licensing](https://www.acma.gov.au/node/1507).[[9]](#footnote-10) Beyond ensuring the proposed operation is in accordance with ITU requirements,[[10]](#footnote-11) no further assessment of compatibility between satellite systems is intended. Our view is that in the extended MSS L-band, the ITU satellite coordination process is sufficient to resolve any compatibility matters.

Option 2 also allows the ongoing use of the extended MSS L-band by incumbent services and licences. To ensure prospective MSS licensees are aware of the next stage of the 1.5 GHz band review and any implications it will have, we intend to:

* attach an advisory note to any space receive licences issued flagging the future review, including our intention to define a date for the implementation of (or assumption for interference management purposes) better performing MSS receivers, including more stringent blocking levels.

include a note in the business operating procedures for the submission and processing of applications for [space and space receive](https://www.acma.gov.au/publications/2020-08/guide/submission-and-processing-applications-space-and-space-receive-apparatus-licences) apparatus licences, flagging the future review of arrangements and possible application of regulatory measures on MSS operating in the L-band. This will include a statement of our intention to define a date for the implementation of (or assumption for interference management purposes) better performing MSS receivers, including more stringent blocking levels.

# Next steps

To give effect to the planning decisions and preliminary views outlined in this paper, the ACMA has developed the indicative high level implementation plan set out in Table 1 below. The table shows the activities and estimated timing that will follow the release of this paper.

Completion of these activities is contingent on a variety of factors, including feedback received from stakeholders and consideration by the ACMA. Timeframes are indicative and intended to provide a guide to the sequencing and commencement of particular streams of work. A more detailed implementation program will be developed and consulted on through the ACMA’s annual [FYSO](https://www.acma.gov.au/five-year-spectrum-outlook) process.

1. Indicative timeline for implementation of planning arrangements in the extended MSS L-band

| Action | Timeframe |
| --- | --- |
| Update to the [Radiocommunications (Communication with Space Object) Class Licence](https://www.legislation.gov.au/Series/F2015L01486) 2015 to include the extended MSS L-band. | Done |
| Update to the [space business operating procedure](https://www.acma.gov.au/publications/2020-08/guide/submission-and-processing-applications-space-and-space-receive-apparatus-licences). | Done |
| Consultation on the 1.5 GHz (1427–1518 MHz) band options paper. | Q3/4 2024 |

# Glossary

|  |  |  |
| --- | --- | --- |
| 1.5 GHz band |  | the 1427–1518 MHz, 1518–1525 MHz and 1668–1675 MHz frequency ranges |
| 1.5 GHz band plan |  | [Radiocommunications 1.5 GHz Frequency Band Plan 2015](https://www.legislation.gov.au/Details/F2015L01271) |
| 3GPP |  | 3rd Generation Partnership Project |
| ACMA |  | Australian Communications and Media Authority |
| ACS |  | adjacent channel selectivity |
| ARQZWA |  | Australian Radio Quiet Zone Western Australia |
| CSIRO |  | Commonwealth Scientific and Industrial Research Organisation |
| CSO class licence |  | [Radiocommunications (Communication with Space Object) Class Licence](https://www.legislation.gov.au/Series/F2015L01486) 2015 |
| EESS |  | earth exploration-satellite service |
| extended MSS L-band |  | the 1518–1525 MHz and 1668–1675 MHz frequency ranges |
| FDD |  | frequency division duplex |
| FYSO |  | Five-year spectrum outlook |
| GMDSS |  | Global Maritime Distress and Safety Systems |
| HCRC |  | High-Capacity Radio Concentrator |
| IMT |  | International Mobile Telecommunications |
| ITU |  | International Telecommunication Union |
| LA WBB |  | local-area wireless broadband |
| LEO |  | low earth orbit |
| LIPD class licence |  | [Radiocommunications (Low Interference Potential Devices) Class Licence 2015](https://www.legislation.gov.au/Details/F2023C00524) |
| May 2022 paper |  | [Review of the 1.5 GHz band](https://www.acma.gov.au/consultations/2022-05/review-15-ghz-band-consultation-162022) discussion paper |
| MetAids |  | meteorological aid service |
| Metsat |  | meteorological satellite  |
| MSS |  | mobile-satellite service |
| NTN |  | non-terrestrial networks |
| PTP |  | point-to-point |
| SDL |  | supplemental downlink |
| Space BOP |  | [Space business operating procedure](https://www.acma.gov.au/publications/2020-08/guide/submission-and-processing-applications-space-and-space-receive-apparatus-licences) |
| Spectrum Plan |  | [Australian Radiofrequency Spectrum Plan 2021](https://www.legislation.gov.au/Series/F2021L00617) |
| TDD |  | time division duplex |
| USO |  | universal service obligation |
| WA WBB |  | wide-area wireless broadband |
| WBB |  | wireless broadband |
| WRC |  | World Radiocommunication Conference |

# Appendix A: List of respondents

We opened the consultation for our options paper, [*Review of the 1.5 GHz extended MSS L-band options paper*](https://www.acma.gov.au/consultations/2023-08/review-15-ghz-band-extended-mss-l-band-options-paper) on 16 August 2023. The consultation period formally closed on 20 September 2023. We received 8 responses from the following stakeholders.

1. Australian Maritime Safety Authority (AMSA)
2. Australian Mobile Telecommunications Association (AMTA)
3. Communications Alliance Satellite Service Working Group (CA SSWG)
4. Defence Spectrum Office, Department of Defence
5. Omnispace Australia
6. Optus
7. Telstra Group Limited (Telstra)
8. Viasat + Inmarsat (Viasat)

We opened a ‘reply to comment’ period on the responses received to the options paper on 28 September 2023. The reply period closed on 25 October 2023. We received
one reply.

# Appendix B: Summary of 1.5 GHz band arrangements

A summary of existing arrangements in the 1.5 GHz band is provided in Figure 2 below. A more detailed description is provided in the [May 2022 paper](https://www.acma.gov.au/consultations/2022-05/review-15-ghz-band-consultation-162022). Tables 2 to 4 also provide a breakdown of licences and licensees in the 1.5 GHz band.

1.5 GHz and adjacent band arrangements





Top 10 PTP licensees in 1427–1535 MHz, at 1 July 2023

| **Licensee** | **Number of licences**  |
| --- | --- |
| Telstra Corporation Limited | 866 |
| University of New South Wales | 26 |
| Department of Police & Emergency Management (Tas) | 26 |
| Powercor Australia Ltd | 25 |
| Essential Energy | 19 |
| Queensland Rail Limited | 12 |
| Electricity Networks Corporation | 12 |
| Power and Water Corporation | 11 |
| Western Australia Police | 10 |
| Airservices Australia | 5 |

Licensees and licence types (other than PTP) in 1427–1535 MHz, at 1 July 2023

| **Licensee and licence types** | **Number of licences** |
| --- | --- |
| **Telstra Corporation Limited** | **721** |
| Fixed point-to-multipoint | 721 |
| **Inmarsat** | **27** |
| Earth receive | 5 |
| Space | 22 |
| **Department of Defence** | **20** |
| Aeronautical assigned system | 2 |
| Aircraft assigned | 5 |
| Fixed receive | 12 |
| Radiodetermination | 1 |
| **University of New South Wales** | **10** |
| Earth receive | 1 |
| Fixed point-to-multipoint | 9 |
| **Thuraya** | **3** |
| Space | 3 |
| **Astrocast SA** | **2** |
| Space | 2 |
| **EOS Defence Systems Pty Ltd** | **2** |
| Scientific assigned | 2 |
| **Mungalalu Truscott Airbase** | **1** |
| Earth receive | 1 |

Licensees and licence types in 1668–1675 MHz, at 1 July 2023

| **Licensee and licence types** | **Number of licences** |
| --- | --- |
| **Commonwealth Scientific and Industrial Research Organisation (CSIRO)** | **2** |
| Earth receive | 2 |
| **Universal Space Network Inc** | **2** |
| Earth receive | 2 |

1. In this regard, ITU Radio Regulations APPENDIX 5 (REV.WRC-19), Identification of administrations with which coordination is to be affected or agreement sought under the provisions of Article 9 specifies coordination requirements that are relevant to Australia. [↑](#footnote-ref-2)
2. ACMA [*Corporate plan 2023–24*](https://www.acma.gov.au/publications/2023-07/plan/corporate-plan-2023-24). [↑](#footnote-ref-3)
3. Telstra, [Submission to the 2021 Regional Telecommunications Review](https://www.infrastructure.gov.au/sites/default/files/documents/rtr2021-submission-no-613-telstra-public.pdf), 2021, accessed 26 April 2022, p. 23. [↑](#footnote-ref-4)
4. Department of Infrastructure, Transport, Regional Development, Communications and the Arts, [*New satellite working group charts way forward for telco industry*](https://minister.infrastructure.gov.au/rowland/media-release/new-satellite-working-group-charts-way-forward-telco-industry) [media release], Australian Government, Wednesday 15 February 2023, accessed 23 March 2023. [↑](#footnote-ref-5)
5. Technical conditions include maximum power, frequency range, out-of-band emissions limits, and geographical licence area. [↑](#footnote-ref-6)
6. The ACMA has also created the area-wide receive licence, which authorises the operation of radiocommunications receivers. [↑](#footnote-ref-7)
7. Specifically, procedures for submission and processing of applications for [space and space receive apparatus licences](https://www.acma.gov.au/procedures-space-and-space-receive-licensing) and [earth, earth receive apparatus licences and device registrations under area-wide apparatus licences for fixed earth stations](https://www.acma.gov.au/procedure-earth-and-earth-receive-licensing-and-registering-earth-stations). [↑](#footnote-ref-8)
8. SDL refers to use of the 1.5 GHz band for downlink-only operations (base stations transmitting to user terminal receiver) to supplement existing FDD or TDD WBB operation in 1 or more other bands. [↑](#footnote-ref-9)
9. This paper notes the intention to make a small change to the existing business operating procedure if changes to the CSO class licence are made. [↑](#footnote-ref-10)
10. In this regard, ITU Radio Regulations APPENDIX 5 (REV.WRC-19), Identification of administrations with which coordination is to be effected or agreement sought under the provisions of Article 9 specifies coordination requirements that are relevant to Australia. [↑](#footnote-ref-11)