

Satellite direct-to-mobile services: regulatory issues

Response to submissions

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Canberra

Level 3
40 Cameron Avenue
Belconnen ACT

PO Box 78
Belconnen ACT 2616

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

Melbourne

Level 32
Melbourne Central Tower
360 Elizabeth Street
Melbourne VIC

PO Box 13112
Law Courts
Melbourne VIC 8010

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

Sydney

Level 5
The Bay Centre
65 Pirrama Road
Pymont NSW

PO Box Q500
Queen Victoria Building
NSW 1230

T +61 2 9334 7700
F +61 2 9334 7799

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Executive summary

We are aware of increasing interest in satellite-based radiocommunications services in frequency bands without the associated service allocation in the International Telecommunication Union (ITU) [Radio Regulations](#)¹ and the [Australian Radiofrequency Spectrum Plan](#). The most high profile of these services are ‘satellite direct-to-mobile’,² though there are others, such as satellite-based internet of things (IoT) services in bands authorised by the [Radiocommunications \(Low Interference Potential Devices\) Class Licence 2015](#) (the LIPD Class Licence).³ While differing in details, both of these scenarios raise a number of similar questions.

Satellite direct-to-mobile services

A satellite direct-to-mobile service is a recent advancement in communications technology that provides direct connectivity between a mobile phone⁴ and a satellite network.

Two different delivery models have emerged:

1. MSS satellite direct-to-mobile service – this requires a mobile phone with satellite communications capability⁵ and uses frequency bands already allocated to mobile-satellite services (MSS)
2. IMT satellite direct-to-mobile service – this uses frequency bands allocated to terrestrial mobile services used domestically by wireless broadband systems, including those identified for International Mobile Telecommunications (IMT) in the Radio Regulations, on standard mobile phones that have no additional satellite communications capability.

Since there are no novel regulatory issues arising from MSS satellite direct-to-mobile services and none raised in consultation submissions, we only consider IMT satellite direct-to-mobile services in this paper.

Spectrum regulatory considerations

Regulatory issues concerning IMT satellite direct-to-mobile services were outlined in our [Five-year spectrum outlook 2023–28](#) (FYSO 2023–28). We conveyed our view that mobile phones used in an IMT satellite direct-to-mobile service may be operated under the current spectrum licensing framework, without the need for explicit approval from the ACMA. This applies to both transmissions from the mobile phone and reception by the mobile phone. We also advised that operation of an IMT satellite direct-to-mobile service would likely only be practical under an Australia-wide spectrum licence. In these bands, a satellite operator providing a IMT satellite direct-to-mobile service would for all practice purposes only need to undertake coordination of space station transmissions (interference management) with a single licensee that is responsible for interference coordination within the licensed band

¹ The ITU Radio Regulations is an international treaty governing global use of the radiofrequency spectrum and satellite orbits.

² Other common names for this type of satellite service include direct to device (D2D), direct to handset, direct to cell, or direct to satellite.

³ See the ACMA’s most recent [consultation for low interference potential devices](#).

⁴ We use the generic term ‘mobile phone’ in this paper, also commonly called a smartphone, cellphone or mobile handset.

⁵ Typically, the satellite communication capability is included in the mobile phone by the addition of satellite operator proprietary technology.

across Australia.⁶ Meaning that there are no geographic boundary issues to coordinate across or multiple licensees for the satellite operator to consider.⁷

While mobile phones used in an IMT satellite direct-to-mobile service can be supported under Australia-wide spectrum licences, the interference management framework for these licences (and in the ITU Radio Regulations) in these bands does not envisage the possibility of space-based emissions (from ‘base stations’ in space). We have therefore been considering the applicable regulatory requirements and engaging with stakeholders to identify whether the current regulatory framework is fit for purpose.

Consultation

On 9 November 2023, we began a [public consultation](#) on regulatory and spectrum management issues for satellite direct-to-mobile services and other satellite use of bands without a satellite service allocation. We sought input on whether the current regulatory environment is suitable for future satellite direct-to-mobile services.

Consultation respondents generally considered IMT satellite direct-to-mobile services to be a positive development, but views differed on how this should be supported under the existing regulatory framework.

Some respondents supported the ACMA’s view expressed in the FYSO 2023–28 that mobile phones used in an IMT satellite direct-to-mobile service may be operated under the current spectrum licensing framework, without the need for explicit approval from the ACMA (provided all the conditions of a spectrum licence are met). Those supporting this position had different views on whether the ACMA should act to provide more certainty in the short term.

Additional regulatory measures proposed by respondents included a public register of active IMT satellite direct-to-mobile services, a mandatory inter-operator agreement as a pre-requisite to the supply of an IMT satellite direct-to-mobile service, and a requirement to obtain written permission from the ACMA to ‘interfere substantially’ with radiocommunications (under s195 [Radiocommunications Act 1992](#)).

Some other respondents considered that the ACMA should delay authorisation of IMT satellite direct-to-mobile services until dedicated regulatory arrangements are developed domestically and internationally.

One respondent raised wide-ranging concerns about the potential impacts of IMT satellite direct-to-mobile services on radio astronomy services in Australia.

⁶ As the Australia-wide spectrum licence area does not include areas such as external territories and their territorial seas, while theoretically there could be additional though minimal coordination requirements for those areas, they are not the initial focus of the proposed services and will be considered later if required. Refer to the discussion on ‘Operation under Australia-wide spectrum licences’ in our [regulatory guidance](#) paper. For information on the definition of Australia when used in a geographical sense, see the definition at [How to use spectrum boundary data](#).

⁷ See [FYSO 2023–28](#), p. 22.

Next steps

After considering the issues raised in the consultation, we consider that:

- While the existing spectrum management framework for spectrum licences can support IMT satellite direct-to-mobile services, it is beneficial to provide industry with clarity on the regulatory framework – to address this, we have published [regulatory guidance](#) on the operation of an IMT satellite direct-to-mobile service.
- Radio astronomy concerns need to be further investigated; we also encourage relevant parties to resolve interference issues without regulatory intervention by the ACMA.
- Supporting satellite-based services IoT (space station transmitters/earth station receivers) in bands authorised by the LIPD Class Licence requires further consideration.

Introduction

Satellite direct-to-mobile services

A satellite direct-to-mobile service⁸ is a recent advancement in communications technology that provides direct connectivity between a mobile phone⁹ and a satellite network. This enables a mobile phone to communicate with stations on satellites when it is outside the coverage area of both terrestrial cellular and wi-fi networks. Previously, a dedicated device such as a satellite phone was required for mobile communication with satellites.

From a spectrum management perspective, there are 2 types of satellite direct-to-mobile services:

1. MSS satellite direct-to-mobile services. These operate in frequency bands already planned for mobile-satellite services (MSS) with allocations in the International Telecommunication Union (ITU) [Radio Regulations](#)¹⁰ and the [Australian Radiofrequency Spectrum Plan](#) (the Spectrum Plan). They can be authorised under our normal licensing process.¹¹
2. IMT satellite direct-to-mobile services, which are the focus of this paper. These services are intended to operate in frequency bands allocated to terrestrial mobile broadband services, known internationally as International Mobile Telecommunications (IMT) services.¹² These frequency bands are predominantly authorised for use in Australia by mobile network operators (MNOs) under spectrum licences and the bands are not planned for MSS – there no MSS allocations¹³ supporting space station transmitters and receivers.

Spectrum regulatory considerations

In our [Five-year spectrum outlook 2023–28](#) (FYSO 2023–28), we provided information on regulatory arrangements and potential issues with satellite direct-to-mobile services and other satellite use of bands without a satellite service allocation.

The FYSO 2023–28 stated our view that mobile phones used in an IMT satellite direct-to-mobile service may be operated under the current spectrum licensing framework, without the need for explicit approval from the ACMA.¹⁴

This means that the emissions (in the form of radiocommunications) from a mobile phone that can reach a space station on-board a satellite (when out of range of a terrestrial base station) are authorised under the existing spectrum licensing framework, provided the mobile phone emissions remain within the parameters of the licence conditions. Similarly, when a space station transmits to a radiocommunications receiver in a mobile phone, operation of the phone continues to be authorised by the spectrum licence.

While mobile phones used in an IMT satellite direct-to-mobile service can be supported under spectrum licensing frameworks, the interference management framework for spectrum

⁸ Other common names for this type of satellite service include direct to device (D2D), direct to handset, direct to cell, or direct to satellite.

⁹ We use the generic term 'mobile phone' in this paper, also commonly called a smartphone, cellphone or mobile handset.

¹⁰ The ITU Radio Regulations is an international treaty governing global use of the radiofrequency spectrum and satellite orbits.

¹¹ Provided the mobile phone meets all other regulatory requirements, which is the expectation.

¹² For more information, see <https://www.itu.int/en/ITU-R/Documents/ITU-R-FAQ-IMT.pdf>

¹³ Having an allocation is normally the first step in developing a spectrum planning framework to support a service. For more information see our [Spectrum planning framework Information paper](#).

¹⁴ See [FYSO 2023–28](#), p. 22.

licences (and the ITU Radio Regulations) in these bands does not envisage the possibility of space-based emissions (from 'base stations' in space). We have therefore been considering the applicable regulatory requirements (principally interference management considerations and geographic authorisation questions) to identify whether the current regulatory framework is fit for purpose.

Consultation

On 31 October 2023, we held an [online stakeholder forum](#) where we discussed whether the regulatory environment for satellite direct-to-mobile services is fit for purpose, heard from interested parties and provided an opportunity to discuss potential issues and solutions.

Following this, on 9 November 2023, we opened a [public consultation](#) on regulatory and spectrum management issues for satellite direct-to-mobile services and other satellite use of bands without a satellite service allocation. We sought input on whether the current regulatory environment is suitable for future satellite direct-to-mobile services and invited feedback on the following questions:

1. Is the current spectrum management framework fit for purpose to manage these new satellite services? This includes spectrum-licensed bands and other bands covered by the [Radiocommunications \(Low Interference Potential Devices\) Class Licence 2015](#) (the LIPD Class Licence).
2. If not considered fit for purpose: what are your concerns? What is your proposed solution? What next steps should be taken?
3. Are there any other commercial, regulatory or public-benefit implications we should take into account?

Since there are no novel regulatory issues arising from MSS satellite direct-to-mobile services and none raised in consultation submissions, we only consider IMT satellite direct-to-mobile services in the remainder of this paper.

Submissions

The consultation closed on 7 February 2024. We received submissions from the following 21 respondents, which were [published](#) on 26 March 2024:

- Access Partnership
- Australasian Railway Association
- Australian Maritime Safety Authority
- Australian Mobile Telecommunications Association
- Communications Alliance SSWG
- Connected Farms
- CSIRO
- EchoStar Global Australia
- Fleet Space Technologies
- Free TV
- Lacuna Space
- LoRa Alliance
- Lynk Global
- Myriota
- NBN Co Limited
- Omnispace Australia
- Optus
- Pivotel
- Satelio IoT Services
- Space Exploration Technologies Corp
- Telstra.

Consultation overview

Respondents generally considered IMT satellite direct-to-mobile services to be a positive development, but views differed on how this should be supported under the existing spectrum licensing framework.

Some supported the ACMA's view, as expressed in the FYSO 2023–28, that mobile phones used in an IMT satellite direct-to-mobile service can be operated under the current spectrum licensing framework, without the need for explicit approval from the ACMA. Those supporting this position had different views on whether the ACMA should take additional regulatory action to provide more certainty in the short term.

Possible additional regulatory measures proposed by respondents included a public register of active IMT satellite direct-to-mobile services, as well as the following mandatory pre-requisites for the supply of an IMT satellite direct-to-mobile service:

- a written agreement between a satellite operator and a spectrum licensee
- a satellite operator must get the ACMA's written permission to 'interfere substantially' with radiocommunications, under the provisions of section 195 of the [Radiocommunications Act 1992](#).

Other respondents submitted that the ACMA should deny authorisation to IMT satellite direct-to-mobile services for one or more of the following reasons:

- under the provisions of Article 4.4 of the ITU Radio Regulations¹⁵
- until the relevant bands for IMT satellite direct-to-mobile services are included (allocated) in the Spectrum Plan
- until it is considered and resolved at an international level at the World Radiocommunication Conference 2027 (under agenda item 1.13).

We address each of these issues in the next section.

¹⁵ Article 4.4 is a provision of the ITU Radio Regulations. It provides that if a country wants to operate a satellite service on a frequency that has no international allocation for that purpose, it can do so under two conditions: (i) the satellite service must not cause harmful interference to other satellites that are operating on their designated frequencies, and (ii) if the satellite service experiences interference from other satellites that are operating within their designated frequencies, the operator cannot claim protection or complain about it.

Main consultation issues and our responses

Mandatory written agreement between a satellite operator and spectrum licensee

Several respondents suggested that the ACMA require satellite operators and spectrum licensees to have a written agreement as a pre-requisite to the supply of an IMT satellite direct-to-mobile service in the spectrum licensee's spectrum bands. Proponents considered this a best-practice approach that would minimise the risk of interference.

ACMA response

While it may be prudent for an agreement to be in place with a spectrum licensee before a satellite operator transmits into spectrum-licensed space and we would recommend this as best practice, we do not consider it necessary to impose it as a requirement.¹⁶ However, if there is no agreement in place and interference is reported by a spectrum licensee, the ACMA may take appropriate action in accordance with our [compliance and enforcement policy](#).

Type of agreement between a satellite operator and spectrum licensee

One respondent advised that a third-party authorisation agreement under section 68 of the Radiocommunications Act would be the appropriate mechanism for a spectrum licensee to authorise operation of an IMT satellite direct-to-mobile service.

ACMA response

We consider that a third-party authorisation of the kind contemplated under section 68 is not applicable as the basis for an agreement between a spectrum licensee and a satellite operator to operate an IMT satellite direct-to-mobile service. This is because the satellite operator (operating a station on-board a satellite in outer space) would be operating that station outside the geographic area of the spectrum licence, hence it cannot be subject to a third-party agreement under the Radiocommunications Act. The specific type of agreement and its provisions would be a matter for the parties involved.

Public register of IMT satellite direct-to-mobile services

Some respondents requested that the ACMA publish basic details of IMT satellite direct-to-mobile services that are subject to an inter-operator agreement, such as the spectrum licensee, satellite operator partner, frequency ranges and geographical extent. This would promote transparency about the presence of such systems.

ACMA response

The ACMA has no existing legal power to compel spectrum licensees to provide information about such agreements made with other entities, nor to publish information about such agreements. We do not typically publish such information and are not aware of any valid public-interest arguments for doing so. For example, we do not publish or have visibility of

¹⁶ The ACMA has no existing legal power to require or seek evidence of an inter-operator agreement between commercial entities, so any such requirement would involve new regulation.

third-party agreements made by spectrum licensees under section 68 of the Radiocommunications Act.

We encourage industry stakeholders interested in publishing such information to pursue their own publication arrangements.

Written permission under section 195

One respondent suggested that operation of an IMT satellite direct-to-mobile service in a spectrum-licensed band would invoke section 195 of the Radiocommunications Act. It was argued that the provisions of this section would require a satellite operator to obtain the ACMA's written permission to 'interfere substantially' with radiocommunications before operating this type of service.

The relevant parts of section 195 provide that a person must not, without the ACMA's written permission, use a transmitter on board a foreign space object in a manner that the person knows is likely to interfere substantially with radiocommunications within Australia.

The respondent argued that a satellite operator that transmits over the Australian landmass using frequency ranges allocated for terrestrial spectrum-licensing in Australia must be presumed to know that this would likely substantially interfere with an existing terrestrial mobile network.

ACMA response

We consider that if a spectrum licensee pursues an arrangement with a satellite operator to provide an IMT satellite direct-to-mobile service in its spectrum-licensed space, there would be no grounds on which the satellite transmissions could be considered to substantially interfere with radiocommunications. This is because the spectrum licensee intends for such transmissions to occur. The provision of an IMT satellite direct-to-mobile service appears to be a way for the spectrum licensee (as a mobile network operator) to provide an additional or enhanced service in particular cases, which requires working in partnership with the satellite operator.

If a spectrum licensee were to believe that a satellite operator is interfering substantially with radiocommunications in its spectrum-licensed space, the ACMA may investigate and take appropriate compliance and enforcement action, as per normal practice.

Operation in non-Australia-wide spectrum licence areas

In the FYSO 2023–28, we stated our view that given the broad coverage provided by satellite services, operation of an IMT satellite direct-to-mobile service would likely only be practical under an Australia-wide spectrum licence.¹⁷ Two respondents requested that the ACMA consider allowing the operation of IMT satellite direct-to-mobile services in non-Australia-wide spectrum licence areas and bands. It was argued that:

- co-channel interference issues at licence area boundaries are not inherently insurmountable
- restricting direct-to-mobile services solely to operation under Australia-wide spectrum licensees may be anti-competitive and negatively impact rural carriers.¹⁸

¹⁷ See [FYSO 2023–28](#), p. 22.

¹⁸ It is unclear which carriers this may refer to, as there are no dedicated rural carriers in Australia holding spectrum licences.

ACMA response

Given that mobile phones used in an IMT satellite direct-to-mobile service may be operated under existing spectrum licensing arrangements, it is open to a spectrum licensee to provide such a service in any spectrum-licensed area without explicit approval from the ACMA. However, we maintain the view expressed in the FYSO 2023–28 that it would only be practical under an Australia-wide spectrum licence. This is because the nature of the relevant satellite system is to transmit over a broad coverage area, with limited ability to restrict emissions within specific geographic boundaries such as those defined by metropolitan or regional spectrum licence areas.

If a spectrum licensee nevertheless proceeds to operate an IMT satellite direct-to-mobile service in a non-Australia-wide licence area, then the potential for interference to services operating outside of the spectrum licence area needs to be considered. This may necessitate interference mitigations not required for Australia-wide licences, such as not being able to service significant parts of their licensed area in order to manage interference outside that area.

Delay or prevent operation of IMT satellite direct-to-mobile services

Some respondents expressed a view that explicit authorisation from the ACMA would be required before an IMT satellite direct-to-mobile service could be operated in Australia, which is not the case. Those respondents were generally opposed to – or expressed a high degree of concern about – the operation of such services in Australia. These views were expressed by stating that the ACMA should not allow IMT satellite direct-to-mobile services to operate:

- under the provisions of Article 4.4 of the ITU Radio Regulations¹⁹
- until the ACMA has formally allocated the relevant frequency bands to satellite services in the Spectrum Plan following a full public consultation process for each band in question
- before Agenda Item 1.13 is considered at the World Radiocommunication Conference 2027 (WRC-27)
- before a formal review is completed and the technical framework for spectrum licences in the 700 MHz band is amended, to take into account the potential impact of IMT satellite direct-to-mobile services on TV reception.

ACMA responses

Regarding Article 4.4

Operating a satellite service under the provisions of Article 4.4 of the ITU Radio Regulations is commonly referred to as operating on a ‘no-interference, no-protection’ basis. This provides the satellite operator with a justification (framework) for operating stations on-board a satellite to provide an IMT satellite direct-to-mobile service in bands allocated to terrestrial mobile services under international law (in practice, this is generally only intended to apply in the short- to medium-term).

The ACMA has no role in authorising the operation of a foreign satellite system operating under Article 4.4, except if it requires licensing for operation in Australia. Conformity with the Radio Regulations is a matter for the satellite operator and filing administration – of which the

¹⁹ Article 4.4 is a provision of the ITU Radio Regulations, the international treaty governing global use of the radiofrequency spectrum and satellite orbits. It provides that if a country wants to operate a satellite service on a frequency that has no international allocation for that purpose, it can do so under 2 conditions: (i) the satellite service must not cause harmful interference to other satellites that are operating on their designated frequencies, and (ii) if the satellite service experiences interference from other satellites that are operating within their designated frequencies, the operator cannot claim protection or complain about it.

ACMA is neither, given that (at this point) only foreign satellite systems would be providing IMT satellite direct-to-mobile services in Australia. For these satellite systems, the foreign administration that submitted the satellite filing to the ITU is the responsible filing administration.

Regarding the Australian Radiofrequency Spectrum Plan

The Spectrum Plan provides that in general, each frequency band may only be used for the service(s) for which it is allocated. However, the technology-flexible nature of the spectrum-licensing framework generally allows the relevant frequency bands to be used for an unspecified service,²⁰ provided the use meets the conditions of the spectrum licence. Section 7 of the Spectrum Plan states that a service operating under a spectrum licence is taken to be a primary service unless the spectrum licence specifies that it is a secondary service. This means that both transmission and reception of radiocommunications in a mobile phone used in an IMT satellite direct-to-mobile service operating under a spectrum licence would be a primary service and would be afforded the associated interference protection measures.

For these reasons, a mobile phone used in an IMT satellite direct-to-mobile service operating under a spectrum licence would meet the existing provisions of the Spectrum Plan.

Regarding WRC-27

WRC-27 will consider studies on possible new allocations, spectrum requirements and technical, operational and regulatory matters related to satellite direct-to-mobile services operating in terrestrial IMT bands (under agenda item 1.13) (see also ITU-R [Resolution 253](#) (WRC-23)). While in Australia there is no need for a new allocation to support IMT satellite direct-to-mobile services operating under spectrum licensing, any ITU regulatory requirements will need consideration in the Australian context.

Internationally, until an allocation is made, a satellite system operating in bands for which there is no allocation in the ITU Radio Regulations may do so under the 'no-interference, no-protection' provisions of Article 4.4. As discussed above, conformity with Article 4.4 and other provisions of the ITU Radio Regulations is a matter for the foreign satellite operator and the foreign administration that filed the satellite system with the ITU.

We have noted respondents' views regarding WRC-27 agenda items and will engage in the study cycle as necessary. The Department of Infrastructure, Transport, Regional Development, Communications and the Arts (the Department) leads the development of Australia's positions relating to WRC-27 agenda items. Stakeholders can engage further on this issue via the usual international preparatory processes to develop Australian positions on WRC-27 agenda item 1.13.

As is a standard practice after any WRC, we intend to review domestic planning arrangements after a decision is made on this matter at WRC-27.

Regarding 700 MHz spectrum licences and TV reception

As we have previously established, mobile phones used in an IMT satellite direct-to-mobile service in Australia can be operated under the current spectrum licensing framework without explicit authorisation from the ACMA. We do not anticipate a need to separately address potential impacts on TV reception that may arise from direct-to-mobile services operated in the 700 MHz band, including transmissions from stations on a satellite to a mobile phone.

²⁰ Australian Radiofrequency Spectrum Plan, subsection 9(1).

Mobile phones accessing an IMT satellite direct-to-mobile service remain required to operate in accordance with the conditions of the spectrum licence and relevant provisions of the Radiocommunications Act, as is the case now on terrestrial networks. Any emissions from mobile phones that occur outside the limits of these requirements will be managed under relevant compliance and enforcement provisions, as per normal practice.

Existing conditions in spectrum licences include emission limits to manage interference from mobile phones (which operate in 703–748 MHz) to adjacent-band television services (which operate below 694 MHz). In addition to the requirement for the spectrum licensee to ensure compliance with these limits, from a technical perspective there is no reason that the characteristics of a mobile phone will change when communicating with a different receiver (that is, a terrestrial base station compared to a receiver on a satellite). Therefore out-of-band emission levels should be the same, irrespective of whether a mobile phone is transmitting to a terrestrial base station or a receiver on a satellite.

Radio astronomy concerns

One respondent raised wide-ranging concerns about the potential impact of IMT satellite direct-to-mobile services on radio astronomy services in Australia, including within the Australian Radio Quiet Zone Western Australia (ARQZWA).

Prospective IMT satellite direct-to-mobile service operators advised in their submissions that they are already working with the radio astronomy community on arrangements to limit the potential for harmful interference to radioastronomy services from forthcoming services.

ACMA response

We acknowledge the importance of radio astronomy, particularly the ARQZWA, and the need to balance a spectrum environment that supports radio astronomy activities with the benefits to Australians from IMT satellite direct-to-mobile services.

Radio astronomers are concerned about the impact of IMT satellite direct-to-mobile services on frequency bands with allocations to the radio astronomy service as well as other bands for which observations are conducted on a fortuitous basis. While there are specific ITU requirements for frequency bands with radio astronomy allocations, in bands where radio astronomy observations are made on a fortuitous process, it is largely a best-endeavours process.

Beyond the requirements of the ITU framework, in Australia, we have established various frameworks to provide a managed interference environment for radio astronomy at specific locations. For example:

- recognition in the Spectrum Plan
- the [Radiocommunications \(Australian Radio Quiet Zone Western Australia\) Frequency Band Plan 2023](#)
- RALI MS31: [Notification zones for apparatus licensed services around radio astronomy facilities](#)
- RALI MS32: [Coordination of apparatus licensed services within the ARQZWA](#)
- inclusion of coordination requirements for terrestrial transmitters with the ARQZWA in spectrum licensing technical frameworks.

However, these requirements are related to terrestrial transmitters and do not apply to transmitters in space (since space is outside the geographic limits of Australia). As such, it is a complex and challenging matter to determine requirements that support radio astronomy while at the same time allowing Australia to benefit from IMT satellite direct-to-mobile services.

Rather than develop specific regulatory requirements, our preference is for industry to continue working with radio astronomers to resolve these matters and develop appropriate coexistence arrangements.

Given the importance of supporting both radio astronomy and IMT satellite direct-to-mobile services, we intend to closely monitor developments. If required, we may consider introducing regulatory arrangements to provide both sectors with certainty on spectrum access and interference management requirements. We encourage parties involved to keep us informed about developments, to aid predictability and certainty for all spectrum users.

Emergency and safety communications

One respondent raised general concerns about the availability and reliability of emergency communications capabilities in satellite direct-to-mobile services in general. The respondent suggested that in their current form, these services may not have the not have the same level of reliability as dedicated distress communications devices such as EPIRBs or the Triple Zero emergency calling service.²¹ The respondent suggested that further consideration was required on matters such as user perceptions of what is achievable by new satellite direct-to-mobile services in terms of distress and safety communications, and the potential resourcing required for government agencies to support them.

ACMA response

While we acknowledge the concerns raised, these issues are outside the scope of this consultation and raise broader issues about emergency communications policy. We have conveyed these issues to the Department for their consideration.

Competition issues: spectrum holdings and market access

Two respondents raised broader competition issues about spectrum holdings and market access arising from proposed IMT satellite direct-to-mobile services. Concerns included barriers to new market entrants, market monopolisation, spectrum hoarding, and first-mover advantages that could stifle competition.

ACMA response

Competition and spectrum market access issues are outside the scope of this consultation. Refer to our separate previous [consultation on expiring spectrum licences](#) as this specifically sought comment on these broader issues.

²¹ Our understanding is that this concern is because satellite direct-to-mobile services were not originally designed for emergency purposes. For example, their level of reliability is related to the number of satellites in operation, which currently varies between operators.

Other satellite uses of bands without a satellite allocation

Five respondents advocated for the ACMA to consider operation of satellite-based IoT systems in bands covered by the LIPD Class Licence (that is, supporting space station transmitters and earth station receivers). One has a particular interest in the frequency range 915–928 MHz, advising that this band is particularly suited to IoT satellite applications because extension of the existing IoT ecosystem with a satellite component requires minimal (if any) hardware modifications.

One respondent suggested that the consideration of a common power flux density limit on the Earth's surface from space station transmitters, such as that proposed in Europe,²² could reduce the potential impacts of such transmissions on other uses in Australia, such as radio astronomy.

Another respondent suggested that the ACMA should be open to permitting Earth-to-space communications using any terrestrial-allocated spectrum (not only in spectrum-licensed bands), if an applicant is able to provide sufficient justification supporting its request (such as a public interest benefit).

ACMA response

We acknowledge that technology developments increasingly allow the use of terrestrial bands (bands with no allocations for space services) for both Earth-to-space and space-to-Earth communications for satellite IoT applications. While a large number of systems envisaged operate in bands covered by the LIPD Class Licence, not all are.

For earth station transmitters in frequency bands with no allocation to space services, such operations would be on an uncoordinated and unprotected basis. In principle, we do not have any concerns about such activities and, in bands covered by the LIPD Class Licence, the operation of earth station transmitters is already supported.²³ For other frequency bands not covered by the LIPD Class Licence (where apparatus licensing is applicable), the regulatory framework is not so clear. Accordingly, we are open to ensuring that there are no regulatory barriers to these operations, although we will need to further consider their regulatory implications. This work could be considered in our broader work program on satellite direct-to-mobile regulation.

For space station transmitters/earth station receivers, we are yet to determine an approach for supporting space services under the LIPD Class Licence or under an alternative apparatus licensing approach. A key consideration is understanding how potential impacts of space station transmitters on radio astronomy services can be managed.

²² For example, see [ECC Report 357](#), Regulatory analyses of satellite use in the band 862-870 MHz to communicate with terrestrial SRD.

²³ See discussion in our 2022 [consultation](#) on proposed updates for low interference potential devices.

Consultation outcome

After considering the issues raised in the consultation, we have published [regulatory guidance](#) for operators of IMT satellite direct-to-mobile services.

We will engage in the WRC-27 study cycle for agenda item 1.13 as necessary, noting that the Department leads the development of Australian positions on WRC agenda items. Stakeholders can engage further on this issue via the usual international preparatory processes to help develop these Australian positions.

We will continue to investigate radio astronomy concerns and encourage ongoing discussion between relevant parties.

The provision of satellite-based IoT services (space station transmitters) in bands authorised by the LIPD Class Licence requires further consideration. We will be discussing these issues with relevant parties to determine a way forward.