

Business operating procedure

Submission and processing of applications for space and space receive apparatus licences

DECEMBER 2023

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Amendment history

Version	Date of effect	Comments
1.0	19 December 2017	Initial release.
1.1	26 July 2019	Updated to include Appendix E: Earth stations in motion (ESIM) communicating with space stations in the fixed-satellite service (both GSO and NGSO) in the frequency ranges 11.7–12.75 GHz (space-to-Earth) and 14–14.5 GHz (Earth-to-space). Refer IFC 6/2019 .
2.0	December 2019	Draft for Industry consultation with proposed updates to include changes to licensing procedures, which were previously considered for the specific case of Ku band ESIM, for more general application. Refer IFC 38/2019 - Review of space licensing procedures.
2.1	August 2020	Finalisation of IFC 38/2019 and updates to reflect outcome of IFC 40/2019 by extending Ku ESIM to 10.7 to 11.7 GHz, and include advice that the operation of earth station receivers is authorised on the no protection from interference caused by a point to point station in the frequency bands 10.7–11.7 GHz, 18.2–11.8 GHz and 19.3–19.7 GHz.
2.2	September 2021	Draft for industry consultation: Proposed update considering WRC-19 Resolution 169 ESIM outcomes, additional information/explanatory material and letter of the assurance updated with text for when “Recorded in MIFR under 11.41”. Refer Updating regulatory requirements for earth stations in motion - consultation IFC 33/2021 .
3	August 2022	Finalisation of IFC 33/2021 and updates to reflect outcome of consultation on Proposed licensing arrangements for 2 GHz narrowband mobile-satellite services and 28 GHz fixed-satellite services - consultation 46/2021 . Additions: <ul style="list-style-type: none"> > consequential changes to section 1 (Purpose) > sections for 2 & 28 GHz, 3.5 (Earth station transmitters in 27.5 to 29.5 GHz band), section 3.5.9 (2 GHz Narrowband MSS), and supporting appendices G and H > Clarified that Appendix C provides examples of Information required for regulatory assessment and is not a mandatory list > Additional background information in Appendix E (Earth stations in motion communicating with space stations in the fixed-satellite service (both GSO and NGSO) in the frequency ranges 10.7–12.75 GHz (space-to-Earth) and 14-14.5 GHz (Earth-to-space)) on how Australian regulatory arrangements support ESIM with reference to Australian Radiofrequency Spectrum Plan section 10(9)
4	December 2023	Updates to implement outcomes of the 1.5 GHz band review: Extended MSS L-band options paper in new section 3.5.10. Updates to section 3.5.6 on protection for the Australian Radio Quiet Zone Western Australia to refer to remake Radiocommunications (Australian Radio Quiet Zone Western Australia) Frequency Band Plan 2023 (see ACMA consultation Proposal to remake the Australian Radio Quiet Zone Western Australia Band Plan).

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Applicants or accredited persons must read the [Disclaimer](#) in conjunction with the procedures set out below.

1 Purpose

This business operating procedure (BOP) outlines the procedures to be followed when seeking the issue of *space* or *space receive* apparatus licences authorising operation of frequency ranges listed in the [Radiocommunications \(Communication with Space Object\) Class Licence 2015 \(the CSO Class Licence\)](#).

The procedures outlined in this BOP cover the assessment of the space-related¹ aspect of the licence application process only. The accredited person (AP) or applicant must provide the response from this process with the subsequent apparatus licence application. The ACMA will only issue an apparatus licence where the space-related assessment supports the application.

The CSO Class Licence is regularly updated following a public consultation process. Any changes to the CSO Class Licence including additional frequency ranges or amended conditions will be considered in future updates to this BOP.

Other space/space receive BOPS

Note that this BOP does not cover the issuing of a *space* or *space receive* licence in all cases. Different procedures apply for the scenarios listed below and the relevant BOPs on the [procedures](#) for space and space receive licensing section of the ACMA website should be referred to for:

- > **Ka NGSO ESIM:** Interim arrangements for the submission and processing of applications for space and space receive apparatus licences authorising the use of earth stations in motion in the fixed-satellite service communicating with non-geostationary space stations in the frequency ranges 17.7–18.6 GHz, 18.8–19.3 GHz, 19.7–20.2 GHz, 28.5–29.1 GHz and 29.5–30 GHz
- > **Ka ESIM GSO (19.7-20.2 GHz, 29.5-30 GHz):** Procedures to be followed when seeking the issue of space or space receive licences authorising the use of earth stations in motion (ESIMs) communicating with geostationary space stations in the fixed-satellite service in the frequency bands 19.7–20.2 GHz and 29.5–30.0 GHz.

Additional requirements

In addition to the general procedures of this BOP, there are specific requirements for:

- > **Ku ESIM GSO/NGSO (10.7–12.75 GHz, 14–14.5 GHz):** Additional information on requirements for ESIM communicating with space stations in the fixed-satellite service (both geostationary orbit (GSO) and non-geostationary orbit (NGSO)) in the frequency ranges 10.7–12.75 GHz (space-to-Earth) and 14–14.5 GHz (Earth-to-space) is provided in Appendix E. That appendix should be read in conjunction with the requirements of this BOP.
- > **Ka ESIM GSO (17.7-19.7 GHz, 27.5--29.5 GHz):** Additional information on requirements for ESIM communicating with geostationary space stations in the fixed satellite service in the frequency ranges 17.7-19.7 GHz (space-to-Earth) and 27.5-29.5 GHz (Earth-to-space) is provided in Appendix F. That appendix should be read in conjunction with the requirements of this BOP.
- > **S band narrowband MSS (2005-2009 MHz, 2195-2200 MHz):** Additional information on requirements for narrowband mobile-satellite service (MSS) in the

¹ The term *space-related* used here is intended to mean space-based network or space system, and not to mean *space* or *space receive* apparatus licence type.

bands 2005-2009 MHz (Earth-to-space) and 2195-2200 MHz (space-to-Earth) is provided in Appendix H.

Applications outside of current policy

The procedures in this BOP are reflective of the status of satellite networks associated with typical licence applications and cover the majority of licensing scenarios only. Cases outside those outlined will be treated on a case-by-case basis.

2 Background

In considering licence applications under the [Radiocommunications Act 1992](#) the ACMA is required to consider a range of matters. Under section 100 (4) of the Act:

In deciding whether to issue an apparatus licence, the ACMA must have regard to:

- (a) all matters that it considers relevant; and*
- (b) without limiting paragraph (a), the effect on radiocommunications of the proposed operation of the radiocommunications devices that would be authorised under the licence.*

The procedures outlined in this document record the typical satellite regulatory matters considered by the ACMA when deciding whether to issue a *space* or *space receive* apparatus licence. Depending on the specific of an application the ACMA might be required to consider additional matters and request additional information or seek the views of Australian satellite operators (satellite operators on whose behalf the ACMA has submitted a satellite filing to the ITU).

We encourage cooperation and coordination between satellite operators to achieve mutual benefit, without the burden and delays of additional prescriptive regulation. In line with this approach, it is our view that coordination matters between foreign-filed satellite networks are the responsibility of the filing administrations and satellite operators. Accordingly, Australia's, and the ACMA's role is limited to the domestic licensing of these systems.

Typically, the assessment process may require:

- > consideration of consistency with current regulatory arrangements, including:
 - > Australian space regulations related to *space* and *space receive* licences
 - > the international (ITU) regulatory status of the subject satellite network
 - > the international (ITU) registration details of the subject satellite network
- > relevant government organisations to be consulted in relation to the application
- > the licence type(s), necessary to authorise operation of the space station, to be determined
- > appropriate special condition(s) and/or advisory note(s) to be applied to the licence.

This BOP provides an overview of the processes associated with each of these steps.

Additional information on the arrangements for *space* and *space receive* licences can be found from the [Apparatus licences](#) area on the ACMA website.

Where consideration of additional matters or consultation with Australian satellite operators is required the ACMA will first consult with accredited person (AP) or applicant.

3 Regulatory considerations

As with all radiocommunications services, frequency assigning and licensing needs to be consistent with current regulatory arrangements. At a high level, this means consistency with requirements as specified in the [Radiocommunications Act 1992](#), the [Australian Radiofrequency Spectrum Plan](#) (the Spectrum Plan), frequency [band plans](#) (both legislative and administrative) and [spectrum embargoes](#).

For the licensing of space-based communication systems (in this case, *space* and *space receive* apparatus licences), there is an additional requirement to check for consistency with Australian space regulations related to *space* and *space receive* licences, and the international (ITU) regulatory status and the international (ITU) registration details of the subject satellite network. This assessment is undertaken by the ACMA's satellite coordination area using information provided by the applicant or AP.

Further information on the assessment of the matters is below. This information should be checked before undertaking the procedures in other sections, as licences might be unable to be issued if these requirements are not met.

3.1 Australian space regulations

In order to issue a *space* or a *space receive* licence, the following requirements shall be met:

- > the related space object (that is the space station) must be:
 - > an Australian space object listed in the [Radiocommunications \(Australian Space Objects\) Determination 2014](#)
 - > a space object that is owned, controlled or operated by a company/entity listed in the [Radiocommunications \(Foreign Space Objects\) Determination 2014](#)
- > the frequency range of operation must be listed in the CSO Class Licence which authorises the operation of the associated earth stations
- > the service provided by the space station in the subject frequency range must be consistent with the Spectrum Plan.²

These requirements need be met before undertaking the other procedures that follow, otherwise licences are unlikely to be issued.

3.2 Determining the ITU regulatory status

It is necessary to ascertain the ITU regulatory status of the satellite network that the proposed space station is part of.

Information about the ITU regulatory status of a satellite network can be found by checking the ITU's Master International Frequency Register (MIFR). Knowledge of a network's progress with the ITU coordination process will be used to inform the ACMA's decision-making. The results of these checks are used in part to determine appropriate special condition(s) and/or advisory note(s) to be applied to the licence.

² Refer *Radiocommunications Act 1992*, section 104 Compliance with plans.

3.2.1 Recorded in the MIFR with favourable finding

If a satellite network is recorded in the ITU's MIFR with a favourable finding,³ then it is more likely that the risk of interference in Australia from the proposed service to existing licensed services is lower than for networks yet to be recorded in the ITU's MIFR. Special conditions and advisory notes that are specific to the situation must be applied to the apparatus licence (refer to Section 6).

3.2.2 Recorded in the MIFR and 11.41

If a satellite system is recorded under ITU RR No. **11.41** in the MIFR with an unfavourable finding against a licensed satellite network operating in Australia, the ACMA will require additional information that explains why the risk of interference should be considered low, as well as a letter of assurance (LOA).

In the case where an unfavourable finding is against an Australian-filed satellite that is not licensed in Australia, only a LOA is required.

3.2.3 Not recorded in the MIFR

In the case where a satellite network is not yet recorded in the MIFR but is progressing through the ITU coordination process, the ACMA may seek information using a LOA about its ITU coordination status from the satellite operator (via the applicant or AP) to ascertain whether or not the proposed satellite network is likely to be recorded in the MIFR.

The LOA is where the satellite operator advises the ACMA of any ITU published references, including coordination requests and/or notification notices, and particulars of any unresolved coordination issues. The LOA will also include a statement to the effect that measures will be taken to ensure that the operation of the satellite network in Australia will not cause interference to other satellite networks/systems operating in accordance with the ITU Radio Regulations. Details on the measures to be undertaken to not cause interference should be included in the LOA. The format of the LOA is at Appendix D.

Where the ACMA is assured of a likely successful outcome, the ACMA will progress the space station licence application. However, special conditions and advisory notes that are specific to the situation will be applied to the apparatus licence (refer to Section 6).

If information on a satellite system is yet to be published or processed by the ITU, the ACMA is unlikely to issue a licence, given the unknown scope of, or additional risk of interference.

3.3 Checking consistency with ITU registration details of the satellite network and proposed use

Upon determination of the ITU regulatory status of the satellite network, the ACMA needs to further check whether the ITU registration details of the satellite network are consistent with the characteristics of the proposed satellite-based radiocommunications service, as specified in the licence application, and that the service is consistent with the Spectrum Plan.

³ The term 'favourable finding' or 'unfavourable finding' refers to ITU BR assessment of the notification information with respect to No. 11.32 and 11.32A of the ITU Radio Regulations, resulting in the favourable or unfavourable finding.

Checking consistency of ITU registration details with the proposed service and the Spectrum Plan may include (but is not limited to) the following factors:

- > the frequency ranges:
 - > the frequency ranges of the associated space station must be covered by the frequency ranges of the satellite network
- > the class of station⁴:
 - > the service purpose/function of the space station must be consistent with the station class(es) of the satellite network
- > the service area:
 - > the proposed geographic area covered by the associated space station must be within the service area of the satellite network
- > the technical characteristics of the space station:
 - > the technical characteristics of the space station must be within the envelope of the associated space station of the satellite network.
- > power flux-density (pfd) and equivalent power flux-density (epfd) requirements as applicable. For example, the ITU's epfd examination results for NGSO satellite networks⁵.

3.4 Information required for regulatory assessment

To assess the proposed satellite-based radiocommunications service against the above requirements for the ITU regulatory status and ITU registration details of the host satellite network, the licence applicant or AP may submit completed *space* and/or *space receive* licence application form(s) (depending on the type of licence being sought – see Section 5)⁶, or alternatively, provide the information as listed at Appendix C in a summary table format to satellite.coordination@acma.gov.au.

Depending on the specifics of certain licence applications, the ACMA may seek further information from the applicant or AP to assist with the assessment. For example, further information may include maximum equivalent isotropically radiated power (e.i.r.p.) or equivalent power flux-density (epfd) of the space station.

3.5 Interference management requirements

Information on how that applicant has assessed the risk and likelihood of interference to and from existing services licensed in Australia, both space-based and terrestrial, and what process the applicant will use to manage interference should it occur will be used to inform the ACMA's decision-making. The results of these checks are used in part to determine appropriate special condition(s) and/or advisory note(s) to be applied to the licence. Information required in this regard is outlined below.

3.5.1 Interference management and due diligence

The applicant is required to demonstrate their own due diligence and undertake an engineering assessment that considers the risk and likelihood of interference to and from existing services in Australia. A summary of how such an assessment has been

⁴ See lists of space station class of station and earth station class of station in [Preface to the BR IFIC \(Space services\)](#)

⁵ The ITU's EPFD data and EPFD examination results, available on <https://www.itu.int/en/ITU-R/space/Pages/epfdData.aspx>.

⁶ The application forms are available from the list of radiofrequency [spectrum forms](#).

made is to be provided to the ACMA as part of the licence application. An indicative list of information that could be provided is as follows:⁷

- > a statement of various coordination agreements reached
- > compliance with relevant FCC or ECC requirements
- > engineering assessments undertaken.

3.5.2 Interference point of contact

The applicant is required to provide a point of contact that can assist in addressing any suspected cases of interference and cease transmission if directed by the ACMA. The details of the point of contact must be kept up to date.

3.5.3 Earth station interference management

The applicant is required to demonstrate that appropriate interference management measures are in place for all ubiquitous earth stations to be authorised (both fixed and mobile).

3.5.4 ITU requirements for NGSO/GSO/BSS

The applicant is required to demonstrate that ITU requirements for NGSO/GSO/BSS coordination have been (or are able to be) met as detailed in the table of frequency allocation footnotes as applicable to the frequency in the licence application.

3.5.5 Very large earth stations

For licensing applications for NGSO satellite networks, the applicant is required to demonstrate compatibility with very large earth stations notified under No. **9.7B** and No. **9.7A**⁸. ACMA would normally consult with the organisation that notified these earth stations as part of the assessment requirements.

3.5.6 Protection for the Australian Radio Quiet Zone Western Australia

The [Radiocommunications \(Australian Radio Quiet Zone Western Australia\) Frequency Band Plan 2023](#) (the band plan) establishes a radio quiet zone (RQZ) in the mid-west region of Western Australia. It facilitates the development and use of new radioastronomy technologies at that site by maintaining its 'radio-quietness'. The band plan specifies the geographic zone affected.

The band plan permits use of the frequency range 70 MHz to 25.25 GHz in the RQZ for radioastronomy purposes. It also provides that additional services which operate in the inner zone of the RQZ are to be taken to be secondary services to radioastronomy services. Secondary services are required to not cause harmful interference to radioastronomy services and cannot claim protection from harmful interference from radioastronomy services.

RALI MS32 [Coordination of apparatus licensed services within the Australian Radio Quiet Zone Western Australia](#) provides a framework for the interference protection of

⁷ Note that this list of suggested information is provided for guidance only. The list is not exhaustive and no specific item (or combination of items) from this list is mandatory. The information provided by the applicant is expected to vary on a case-by-case basis.

⁸ Note that in addition to the requirement to demonstrate compatibility with notified earth stations, there are GSO to GSO coordination requirements under No. **9.7** for the affected satellite networks associated with the very large earth stations. While these requirements should be considered (for example, as part of demonstrating that due diligence has been undertaken), they are considered separately to the requirement to demonstrate compatibility with notified earth stations.

radioastronomy activities sited within 50 km of the centre of the RQZ. A potential frequency assignment falls within the scope of this RALI if the assignment is for an apparatus-licensed transmitter of a coordinated terrestrial service station or earth station, and its frequency and geographical location is within the RQZ.

While space and space receive licensees are not subject to RALI MS32, space and space receive licensees are subject to the requirements of the relevant band plan, and as such are responsible for ensuring that their end-user earth station terminals do not cause harmful interference to radioastronomy services in the RQZ. To increase the visibility of this obligation and make it explicit to licensees, Special Condition RQZ1 will be applied to space receive licences. Contact details for the entity responsible for operating the Murchison Radioastronomy Observatory are contained in RALI MS32.

3.5.7 Earth station receivers and 11/18 GHz point to point fixed link transmitters

Under the Communications with Space Objects Class Licence, the operation of earth station receivers is authorised on the basis of no protection is afforded from interference caused by a point-to-point station in the frequency bands 10.7-11.7 GHz, 18.2-18.8 GHz and 19.3-19.7 GHz.

Written confirmation from the applicant for space apparatus licences in those bands is required stating that they accept that operation of earth station receivers would be on the basis that no protection is afforded from interference — from either current or future fixed links, and that operation is not to constrain the future growth of fixed services in this band nor would they be considered in future replanning processes for fixed services.

3.5.8 Earth station transmitters in 27.5 to 29.5 GHz band

Under the [CSO Class Licence](#) there are restrictions on the operation of earth station transmitters in the frequency range 27.5-29.5 GHz to achieve existence with terrestrial services. Written confirmation is required from the applicant stating that operation of earth station transmitters in the frequency range 27.5-29.5 GHz bands will comply with [CSO Class Licence](#) requirements.

Appendix G lists the relevant conditions of the CSO Class Licence and additional conditions to be applied to space receive licence in the frequency 27.5-29.5 GHz.

Under RALI FX 3 as of 23 September 2019 no new assignments made be made point-to-point fixed link in the [28 GHz band \(25.7-29.5 GHz\)](#). Existing assignments in the bands 28.1 - 28.5 and 29.1-29.5 have been grandfathered and are afforded protection until 23 September 2026. Written confirmation is required from the applicant stating that operation of earth station transmitters will meet these requirements.

Appendix G provides guidance on how to assess the interference potential from ubiquitous FSS earth stations transmitters into grandfathered point-to-point fixed links.

Appendix F should also be referred to for requirements for ESIM communicating with geostationary space stations in the fixed satellite service in the frequency ranges 17.7-19.7 GHz (space-to-Earth) and 27.5-29.5 GHz (Earth-to-space).

3.5.9 2 GHz Narrowband MSS

MSS services in the 2005-2009/2195-2200 MHz bands are supported on the basis that coexistence between satellite systems is a matter for industry to self-manage within Australia.

Irrespective of arrangements within Australia, licensees are required to ensure that the impact of their operations on services outside of Australia in accordance with the ITU satellite coordination framework. This includes operating in accordance with any agreement between operators/administrations reached as part of the ITU process.

Prospective licensees in the bands 2005-2009/2195-2200 MHz should be aware that if they are obligated under ITU satellite coordination framework to protect services outside of Australia (for example due to ITU filing priority) this may impact the viability (ability to operate) a MSS service in Australia in the 2005-2009/2195-2200 MHz. For example, it may be necessary to restrict the areas within Australia in which they may operate or operate at reduced power.

Services provided by prospective licensees may also be susceptible to interference from services operating outside of Australia that are operated in accordance with the ITU framework.

Prospective applicants should be aware that in the case of interference between non-Australian satellite systems (systems not filed by Australia to the ITU), it is considered a matter for the relevant administrations to resolve.

In addition to the general requirements of this BOP, Appendix H specifies assessment procedure and information the ACMA expects to be provided when considering regulatory aspects of application for *space receive licences* and *space licences* in the 2005-2010 MHz and 2195-2200 MHz bands. In summary, the main requirements are to:

- > provide evidence that any operations will be in accordance with the conditions of the CSO Class Licence
- > ensure protection of TOB services during the transition of TOB services out of the 2 GHz band in accordance with the Radiocommunications ([Mobile-Satellite-Service](#)) (1980–2010 MHz and 2170–2200 MHz) Frequency Band Plan 2022
- > provide ongoing protection of adjacent band TOB services in the 2010-2110 MHz band. A key restriction (refer Spectrum Embargo 23) being the ACMA not issuing space receive licences in 2009-2010 MHz)

In the period prior to the completion of the transition of TOB services from the narrowband MSS segment (see table in Appendix H), the ACMA will consider requests to operate outside of metropolitan and designated areas on a case-by-case basis. This is to ensure protection of TOB services during the transition period.

3.5.10 Extended L-band MSS

Applications for space and space receive apparatus licences in the extended L-band (1518–1525 MHz and 1668–1675 MHz) should be considered in accordance with the requirements of this BOP, with consideration of the following additional matters:⁹

- > That beyond ensuring the proposed operation is in accordance with ITU requirements,¹⁰ no further assessment of compatibility between satellite systems is undertaken. Our view is that in this band, the ITU satellite coordination process is sufficient to resolve any compatibility matters.
- > As part of the next stage of the 1.5 GHz band review, we will take into account the potential effect of MSS earth station receivers in the 1518–1525 MHz and adjacent bands when considering any change in arrangements.

⁹ Refer outcomes of the 1.5 GHz band review: [Extended MSS L-band options paper](#).

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.

- > That to better enable coexistence of MSS 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. As part of the review the ACMA intends to consult on MSS receiver performance requirements including a date for the implementation of (or assumption for interference management purposes) better performing MSS earth station receivers, including more stringent blocking levels.
- > To provide visibility of the next stage of the 1.5 GHz band review the following advisory note (user defined) is to be included on all space receive licences.

As part of the next stage of the 1.5 GHz band review the ACMA intends to consult on MSS receiver performance requirements including a date for the implementation of (or assumption for interference management purposes) better performing MSS earth station receivers, including more stringent blocking levels.

4 Consultation with relevant government organisations

Due to possible security issues associated with foreign ownership of aspects of space communications, some applications may be subject to wider government consultation. In general, the ACMA will consult with relevant organisations in the following situations:

- > new missions by existing ground stations that support (or suggest support) of foreign space systems, including the launch or early orbit phases
- > new foreign-owned, or partly foreign-owned, earth stations and space support equipment¹¹
- > new Australian-owned earth stations that will provide support to foreign space systems, including launch or early orbit phases, except where the foreign space system is used solely for commercial communications (for example, television broadcasting).

The applicants or AP should note that additional time may be required to process applications that are subject to wider government consultation.

5 Licensing arrangements for space stations

As for all other types of radiocommunications, a space-based radiocommunications system may not be operated in Australia without a licence. In general, there are two broad options for licensing of 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 aboard a satellite.

The second option involves a combination of apparatus and class licences. In certain bands specified in the Communication with Space Object Class Licence, it requires

¹¹ Space support equipment includes equipment that assists in the calibration of early orbit and on-orbit systems.

operators to obtain a licence for the space stations aboard a satellite with a *space licence* for the downlink and a *space receive licence* for the uplink. Earth stations in the network are then automatically authorised collectively under the Communication with Space Object Class Licence. This approach is typically used for satellite systems with numerous or ubiquitous earth stations. It provides an efficient means of licensing a large number of earth stations, avoiding 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 normally be filed with the International Telecommunication Union (ITU) by the ACMA or equivalent national administration of an 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](#) (Australian Space Objects Determination) or the [Radiocommunications \(Foreign Space Objects\) Determination 2014](#) (Foreign Space Objects Determination). In the context of space station operation, the *space* and *space receive* licence types may be used to authorise the transmission (downlink, that is, space-to-earth direction) and the reception (uplink, that is, earth-to-space direction) of space stations.

5.1 Space Objects Determinations

The Foreign Space Objects Determination and the Australian Space Objects Determination are legislative instruments made by the ACMA that extends application of the Radiocommunications Act to:

- > In the case of the Foreign Space Objects Determination, space objects owned, controlled or operated by foreign business entities listed in the determination; and,
- > In the case of the Australian Space Objects Determination, Australian space objects listed in the Determination. The ACMA considers Australian space objects to be those associated with satellite operators who have successfully applied to the ACMA seeking to achieve access to frequencies through the International Telecommunication Union (ITU) process

This has the effect of requiring radiocommunication between these space objects and earth stations inside Australia to be authorised by a licence issued by the ACMA.

A satellite operator must first be included in either Section 4 of the Australian Space Objects Determination or Schedule 1 of the Foreign Space Objects Determination before a satellite network can be licensed to operate in specific shared satellite radiofrequency bands listed in the Communications with Space Object Class Licence.

Inclusion of an entity in either the Australian Space Objects Determination or the Foreign Space Objects Determination does not confer a right on that entity to obtain a licence nor operate in frequency bands identified in CSO Class Licence. Rather, it is a necessary prerequisite that must be in place before a space or space receive apparatus licence can be issued.

Before varying either Determination, the ACMA must undertake consultation in accordance with the requirements of the *Legislation Act 2003*.

By being included in the Foreign Space Objects Determination, the relevant company is agreeing to be bound by Australian spectrum management regulations, however these generally only come into effect if a licence is issued.

The following information is required as part of any application for inclusion in the Foreign Space Objects Determination and the Australian Space Objects Determination as indicated below.

- 1) Timeframe information regarding deployment of the satellite and terrestrial components and timeframe for lodgement of licensing applications to the ACMA.
- 2) General information on the service to be delivered, potential customers, etc.
- 3) In the case of the Foreign Space Objects Determination, information explaining why inclusion of the relevant entity in the Determination is in the Australian interest.
- 4) The correct name of the company to be included in the Determination (in the same format as others listed in the Determinations)
- 5) Evidence that there is an authorisation/agreement/request from this company to request the modification of the Determination or contractual agreement between both companies indicating that such request is necessary.
- 6) Information that demonstrates the proposed inclusion would meet the classifications in the determination. For example, in the case of the Foreign Space Objects Determination, information confirming eligibility to be listed in Schedule 1, being *owners, controllers or operators of foreign space objects operating in frequency range mentioned in class licence*. This could include a record of incorporation in the relevant foreign jurisdiction.
- 7) Evidence that the person making the request is authorised to do so.
- 8) In the case of the Foreign Space Objects Determination, information on the ITU satellite filing, which administration it was filed by, and evidence that company listed controls the company that has the filings and has the ability to cease providing transmissions to Australia if requested to by the ACMA.

The decision to update the Determination is a matter for the [Authority](#) of the ACMA. Accordingly, the information supplied needs to be of standard that would satisfy a legal due diligence check. The ACMA typically updates the Determinations approximately once per year, preferably combining a number of requests in a single update.

6 Special licence conditions and advisory notes

The [Radiocommunications Licence Conditions \(Apparatus Licence\) Determination 2015](#) (LCD) specifies general conditions of operation that are common to most apparatus licence types. Additional conditions not in the LCD may be included on individual apparatus licences to address issues specific to an assigned service. These conditions are printed on the licence under the heading 'Special Conditions'.

In addition, 'Advisory Notes' may also be included on licences to inform licensees of matters relevant to a particular service. Unlike licence conditions, advisory notes do not impose a legal obligation on the licensee.

Appendixes A and B detail the special conditions and advisory notes that are to be included on *space* and *space receive* apparatus licences. Where a special condition or advisory note is not pre-defined, the ACMA will develop and include appropriate conditions or advisory notes on the licence.

In addition to the requirements outlined in the main body and other appendices of this document, Appendixes E and F detail special conditions and advisory notes for Ku and Ka ESIM, respectively. Appendix H lists the relevant conditions of the CSO Class

Licence and additional conditions to be applied to space receive licence in the frequency 27.5-29.5 GHz.

Appendix G details requirements for 2 GHz narrowband MSS.

7 Further information

Please contact the ACMA's Customer Service Centre at info@acma.gov.au.

Appendix A: Recorded in the MIFR

Where the satellite network has been successfully coordinated and is recorded (notified) in the MIFR with a favourable finding or is recorded under ITU RR No. 11.41 in the MIFR with an unfavourable finding against a licensed satellite network operating in Australia:

A.1 Special Conditions

Pre-defined (SB)

1. Operation of this space station and associated earth stations must be in accordance with frequency assignments recorded in the Master International Frequency Register (MIFR) of the International Telecommunication Union.

[Note: Operation in accordance with frequency assignments recorded in the MIFR includes the operation in accordance with any Administration agreements reached as a result of an ITU frequency coordination process].

Pre-defined (EQ)

2. The licensee shall advise the ACMA of changes to the point of contact provided for the purpose of tracing any suspected cases of interference.

Pre-defined (RQZ1) applicable to Space Receive licence only

3. Earth station transmitters on land associated with this space station must not be operated within 70 kilometres distance from the Murchison Radioastronomy Observatory without the approval of the entity responsible for operating the Murchison Radioastronomy Observatory.

Pre-defined (EM) (in MIFR with 11.41)

4. Upon receipt of a report of harmful interference under International Telecommunication Union Radio Regulation No. 11.42 all necessary steps shall be taken to immediately eliminate the harmful interference or cease operation.

[Note: This special condition is only applicable when the filing has been recorded in the MIFR with unfavourable findings under No. 11.41 against one or more Administrations].

User-defined

5. This licence authorises communications with *[ITU satellite network name]*.

[Note: Operation of this space station and associated earth stations is only authorised if the frequency assignments of the satellite network recorded by the ITU with which communications are authorised by this licence are not cancelled or suppressed].

A.2 Advisory Notes

Pre-defined (EI)

1. The Master International Frequency Register (MIFR) is maintained by the International Telecommunication Union (ITU) in accordance with the Radio Regulations.

Pre-defined (EN)

2. This licence does not authorise operation of earth stations outside of Australia.

Appendix B: Not recorded in the MIFR

Where the satellite network is still under coordination and has not as yet been recorded (notified) in the MIFR:

B.1 Special Conditions

Pre-defined (EH)

1. Transmissions must not occur in circumstances that result in harmful interference to stations outside of Australia where these stations are operating in accordance with the Radio Regulations of the International Telecommunication Union except where the transmissions are in accordance with any agreements reached as a result of an ITU international frequency coordination process.

Pre-defined (SA)

2. Prior to the frequency assignments being recorded in the Master International Frequency Register (MIFR) of the International Telecommunication Union (ITU), this space station and associated earth stations may operate in accordance with the operating parameters published by the ITU in Special Sections of International Frequency Information Circulars and in accordance with any agreements reached as a result of an ITU frequency coordination process.

Pre-defined (EQ)

3. The licensee shall advise the ACMA of changes to the point of contact provided for the purpose of tracing any suspected cases of interference.

Pre-defined (RQZ1) applicable to space receive licence only

4. Earth station transmitters on land associated with this space station must not be operated within 70 kilometres distance from the Murchison Radioastronomy Observatory without the approval of the entity responsible for operating the Murchison Radioastronomy Observatory.

User-defined

5. This space station and associated earth stations are authorised to communicate with the *[satellite network name]* satellite network as published by the International Telecommunication Union (ITU) in Special Section *[ITU reference – take the most recent document number]* of International Frequency Information Circular *[IFIC number]*.

[Note: Operation of this space station and associated earth stations is only authorised if the frequency assignments of the satellite network recorded by the ITU with which communications are authorised by this licence are not cancelled or suppressed]

B.2 Advisory Notes

Pre-defined (EI)

1. The Master International Frequency Register (MIFR) is maintained by the International Telecommunication Union (ITU) in accordance with the Radio Regulations.

Pre-defined (ED)

2. Coordination agreements reached as a result of an ITU international frequency coordination process are intended to minimise the potential for harmful interference to radiocommunications stations. A radiocommunications station operated prior to a frequency assignment being recorded in the MIFR cannot necessarily claim protection from harmful interference from radiocommunications stations of other countries.

Pre-defined (EN)

3. This licence does not authorise operation of earth stations outside of Australia.

Appendix C: Examples - Information required for regulatory assessment

Table 1: Examples - Information required for *space* and *space receive* licences

Category	Example 1	Example 2
Licence type	Space receive	Space
Licence renewability (ongoing/non-ongoing) and licence period	Non-renewable (12 months)	Renewable (initial 1 year)
Direction	Uplink	Downlink
Frequency lower bound (MHz)	1611	11701
Frequency upper bound (MHz)	1612	12400
Service purpose (communications, TT&C, broadcasting reception)	Communications	Broadcasting reception
The related ITU satellite network name ¹²	SAT-A	SAT-B
The orbital longitude of the satellite network	NGSO	140E
The service area where associated earth stations operate ¹³	NSW	Australia-wide
The owner/controller/operator of the related satellite network	Organisation A	Organisation B

Note: depending on the specifics of certain licence applications, the ACMA may seek further information from the applicant or AP to assist with the assessment.

Note: the above are only examples indicating the type of information required when applying for a *space* or *space receive* licence.

¹² Failure to provide accurate ITU satellite network information will delay the process. The ITU SNL database (Part B) is a useful tool for checking the accuracy of the satellite network name. See <http://www.itu.int/net/ITU-R/space/snl/bsearchb/spublication.asp>.

¹³ A map illustration for the service area will be possibly needed.

Appendix D: Letter of assurance pro forma

This pro forma is to be used when a satellite filing has not been successfully recorded in the Master International Frequency Register (MIFR) or a satellite filing has been recorded in the MIFR but with unfavourable findings under 11.41.

The application for a licence to communicate with [*satellite commercial name*] in the frequency bands [*insert frequency bands*] will use the [*ITU satellite filing name*] satellite filing, for which the International Telecommunication Union (ITU) has published 'special sections' such as [*CR/C xxx in IFIC XXXX (only include one—preferably the CR/C publication)*]. This filing has been made by the Administration of [*country name*], and has orbital position/characteristics of [*XXX E/W (GSO) or contains a constellation of P satellites in Q planes at R inclination and S altitude (NGSO)*].

[*Satellite operator*] provides the following assurances¹⁴ to the ACMA to support applications for licences within Australia:

Not recorded in the MIFR

1. Coordination with other administrations for the [*ITU satellite filing name*] satellite filing has begun, but has not yet resulted in a 'favourable finding' (Part II-s) notification published by the ITU in a fortnightly international frequency information circular (IFIC).

Recorded in MIFR under 11.41

1. Coordination with other administrations for the [*ITU satellite filing name*] satellite filing has resulted in (Part II-s) notification published by the ITU in fortnightly international frequency information circular(s) (IFIC) IFIC-number.

2. To the best of our knowledge, operation in accordance with the [*ITU satellite filing name*] satellite filing will not cause harmful interference to other satellite networks operating as per the ITU Radio Regulations.

In the event of any actual case of harmful interference (to other satellite networks operating as per the ITU Radio Regulations), all efforts will be made to immediately address and resolve such interference.

¹⁴ If the above assurances do not cover all communications to/from the satellite, please indicate the limits of this assurance (for example, if it only applies to a particular frequency band or company).

Appendix E: Earth stations in motion communicating with space stations in the fixed-satellite service (both GSO and NGSO) in the frequency ranges 10.7–12.75 GHz (space-to-Earth) and 14-14.5 GHz (Earth-to-space)

This appendix outlines additional procedures to be applied when considering the issue of space or space receive licences authorising the use of ubiquitous earth stations in motion communicating with space stations in the fixed-satellite service (both GSO and NGSO) in the frequency ranges 10.7–12.75 GHz (space-to-Earth) and 14–14.5 GHz (Earth-to-space).

For background refer ACMA consultation Earth stations in motion in Ku band – [IFC 6/2019](#)

Modified treatment when checking consistency with ITU registration details of the satellite network and proposed use

When determining the ITU registration details of an FSS filing involving the operation of ESIM, the procedures of *Section 3.3 Checking consistency with ITU registration details of the satellite network and proposed use* should be followed, along with other considerations.

These other factors that are particularly relevant for ESIM operation when checking consistency of ITU registration details with the proposed service and the Spectrum Plan are the class of station and the service area of the filing, as detailed below:

- > service purpose/function of the space station must be consistent with the class(es) of station¹⁵ of the satellite network. In the ACMA's experience, ESIM do not always meet this requirement. There are currently no class of station codes specific to ESIM operation in Ku band. Further, an analysis of ITU satellite filings for networks currently known to be operating or planning to operate ESIM only include class of station code EC (Space station in the fixed-satellite service), but no codes indicating mobile operation in general (though there are codes for ship earth station, aircraft earth station, aeronautical earth station). How ACMA will assess station class is outlined below for both the downlink and uplink.
- > proposed geographic area of the licence must be included within the satellite network filing and that area must include Australia. This requirement is to ensure the operation within Australia has been considered in the ITU satellite coordination process and as a way of ensuring services to Australia are within the operating envelope of the network. This requirement is to be maintained for Ku band ESIM.

Downlink (space-to-Earth) 10.7–12.75 GHz:

Applicants should demonstrate that if the licence application was assessed assuming the use of traditional fixed Earth stations, the risk of interference would be low.

Applicants must then demonstrate that use of receiving ESIM is within the operating envelope of the ITU registration details. Receiving ESIM will be supported provided the technical characteristics are within the envelope of the ITU registration details. In this

¹⁵ See lists of space station class of station and earth station class of station in [Preface to the BR IFIC \(Space services\)](#).

case, receiving ESIM operation is supported in Australia under [Australian Radiofrequency Spectrum Plan](#) section 10(9) (A frequency band may be used by an earth receive station in a frequency band allocated for the fixed-satellite service (space-to-Earth) where that station is in motion, or in a stationary position at an unspecified point on land, on water or in the air). Internationally operation is under ITU RR No. **4.4**.

Uplink (Earth-to-space) 14–14.5 GHz

ITU registration details should be checked to determine whether they include MSS, earth stations on board vessels or aircraft earth stations. If so, ESIM can be operated under existing ARSP allocation and footnotes. The ACMA's expectation is that more recent satellite filings should be able to meet these requirements.

Alternatively, applicants should demonstrate that if the licence application was assessed assuming the use of traditional fixed Earth stations, the risk of interference would be low. Applicants must then demonstrate that use of transmitting ESIM is within the operating envelope of the ITU registration details. Transmitting ESIM will be supported provided the technical characteristics are within the envelope of the ITU registration details. In this case, transmitting ESIM operation is supported under ITU RR No. **4.4**.

Note that under ITU Rules of Procedure an administration intending to use a frequency assignment to a transmitting station under No. **4.4** has to notify this frequency assignment to the Bureau, pursuant to Article **11**, if possible prior to bringing it into use. For this requirement the ACMA considers the responsible administration to be that administration that filed the satellite network.

Interference management and due diligence

When demonstrating due diligence and evidence of an engineering assessment that considers the risk and likelihood of interference to and from existing services in Australia, the procedures of *Section 3.5.1 Interference management and due diligence* should be followed. This may include information regarding compliance with relevant FCC or ECC requirements including:

- > equivalent isotropically radiated power limits for ESIM
- > ESIM controlled by a network control facility
- > power flux density restrictions
- > ESIM that use closed-loop tracking of the satellite signal shall employ an algorithm that is resistant to capturing and tracking signals from nearby satellites; earth stations shall immediately cease transmissions when they detect that unintended satellite tracking has occurred or is imminent

E.1 Summary of additional special conditions and advisory notes applicable to Ku band ESIM

Space apparatus licence authorising ESIM in 10.7–12.75 GHz

The following additional special conditions and advisory notes are to be applied to *space licences* authorising the use of earth stations in motion communicating with GSO space stations or NGSO space systems in the fixed-satellite service in the frequency band 10.7–12.75 GHz, in line with the procedures outlined above.

Category	Type	Item	Text
Special condition	Pre-defined	ESIM8	Earth stations in motion may be operated in association with this licence provided that these earth stations would, if stationary, otherwise be in accordance with the operating parameters published by the ITU in Special Sections of International Frequency Information Circulars and in accordance with any agreements reached as a result of an ITU frequency coordination process.
Special condition	Pre-defined	ESIM5	Radiocommunications between space stations and earth stations in motion authorised under this licence shall not be used or relied upon for safety-of-life applications.

Space receive apparatus licence authorising ESIM in 14–14.5 GHz

The following additional special conditions and advisory notes are to be applied to *space receive licences* authorising the use of earth stations in motion communicating with GSO space stations or NGSO space stations in the fixed-satellite service in the frequency band 14–14.5 GHz, in line with the procedures outlined above.

Category	Type	Item	Text
Special condition	Pre-defined	ESIM8	Earth stations in motion may be operated provided that these earth stations would, if stationary, otherwise be in accordance with the operating parameters published by the ITU in Special Sections of International Frequency Information Circulars and in accordance with any agreements reached as a result of an ITU frequency coordination process.
Special condition	Pre-defined	ESIM4	Radiocommunications between space stations and earth stations in motion authorised under this licence shall be subject to permanent monitoring and control by a Network Control and Monitoring Centre (NCMC) or equivalent facility and be capable of receiving and acting upon at least 'enable transmission' and 'disable transmission' commands from the NCMC.
Special condition	Pre-defined	ESIM5	Radiocommunications between space stations and earth stations in motion authorised under this licence shall not be used or relied upon for safety-of-life applications.

Appendix F: Earth stations in motion communicating with geostationary space stations in the fixed-satellite service in the frequency ranges 17.7–19.7 GHz (space-to-Earth) and 27.5-29.5 GHz (Earth-to-space)

This appendix outlines additional procedures to be applied when considering the issue of *space* or *space receive* licences authorising the use of ubiquitous earth stations in motion (ESIMs) communicating with geostationary space stations in the fixed-satellite service in the frequency ranges 17.7–19.7 GHz (space-to-Earth) and 27.5–29.5 GHz (Earth-to-space) in accordance with ITU Resolution 169 (WRC-19) “Use of the frequency bands 17.7-19.7 GHz and 27.5-29.5 GHz by earth stations in motion communicating with geostationary space stations in the fixed-satellite service” ([Resolution 169 \(WRC-19\)](#))

Note that earth station transmitters in the band 27.5-28.3 GHz also need to meet the requirements of the CSO Class Licence as outlined in Appendix H.

F.1 Compliance with ITU Resolution 169 (WRC-19)

Applicants should be aware that while Australia has specified (in the CSO Class Licence) different technical requirement to those of Resolution 169, applicants will be required to confirm when operating ESIM within Australia, with respect to the impact on other countries, that the operation will be in accordance with the requirements of Resolution 169 (WRC-19)¹⁶.

Operation of ESIMs associated with the space station needs to be in accordance with provisions of Resolution 169 (WRC-19) and the applicant needs to provide the ACMA with evidence of:

- > a commitment that the ESIM operation would be in conformity with the Radio Regulations and Resolution 169 (WRC-19). [Note for operation of ESIM in Australia the technical requirements of the CSO Class Licence apply and not those of the resolution].
- > a commitment that, upon receiving a report of unacceptable interference, the notifying administration for the GSO FSS network with which the ESIM communicate shall follow the procedures in resolves 5 of Resolution 169 (WRC-19)

Resolution 169 (WRC-19) requires the notifying administration of the satellite network with which the ESIMs communicate to notify the ESIMs to the ITU. The ITU Circular Letter [CR/461](#) provides information on the notification of the ESIMs indicating that the commitments listed above need to be made during the notification of the ESIMs.

¹⁶ In this regard applicants should note requirement of Resolution 169 (WRC-19) “resolves further” that, should an administration authorizing ESIMs agree to pfd levels higher than the limits contained in Part II of Annex 3 within the territory under its jurisdiction, such agreement shall not affect other countries that are not party to that agreement

Further to requirements listed in 3.3 *Checking consistency with ITU registration details of the satellite network and proposed use* the ESIMs must be notified to the ITU for the network with which the ESIMs communicate and recorded in the MIFR.

The ACMA will generally not issue a space or space receive licences authorising ESIMs unless ESIMs were notified with the ITU and recorded in the MIFR.

F.2 Interference management requirements

- > When demonstrating due diligence and evidence of an engineering assessment that considers the risk and likelihood of interference to and from existing services in Australia, the procedures of *Section 3.5 Interference management requirements* should be followed. This includes requirement for further information regarding compliance with the following requirements [Note in the main having ESIMs notified with the ITU and recorded in the MIFR would meet these requirements] :
- > the ESIM characteristics shall remain within the envelope characteristics of typical earth stations associated with the satellite network with which the ESIM communicate (Resolution 169, resolves 1.1.1).
- > the use of ESIM shall not cause more interference and shall not claim more protection than for typical earth stations in this GSO FSS network (Resolution 169, resolves 1.1.2).
- > the operation of ESIM complies with the coordination agreements for the frequency assignments of the typical earth station of this GSO FSS network obtained under the relevant provisions of the Radio Regulations (Resolution 169, resolves 1.1.3)
- > for the operation of ESIM, techniques to maintain pointing accuracy with the associated GSO FSS satellite, without inadvertently tracking adjacent GSO satellites, are employed (Resolution 169, resolves 5.1)
- > ESIM are subject to permanent monitoring and control by a network control and monitoring centre (NCMC) or equivalent facility in order to comply with the provisions in Resolution 169 (WRC-19), and are capable of receiving and acting upon at least “enable transmission” and “disable transmission” commands from the NCMC or equivalent facility (Resolution 169, resolves 5.2)
- > ESIM shall not be used or relied upon for safety-of-life applications (Resolution 169, resolves 2)
- >

F.3 Summary of additional special conditions and advisory notes applicable to Ka band ESIMs

The operation of ESIMs is subject to the conditions and notes of the [CSO Class Licence](#). These include:

- > that operation of stations under the class licence is authorised only when its operation does not interfere with the operation of a radiocommunications receiver
- > earth station receivers authorised by the class licence will not be afforded protection from the interference caused by other radiocommunications services.
- > The following additional special conditions and advisory notes are to be applied to space/ space receive licences authorising the use of ESIMs communicating with geostationary space stations in the fixed-satellite service in the frequency ranges 17.7–19.7 GHz (space-to-Earth) and 27.5–29.5 GHz (Earth-to-space) in line with the procedures outlined above.

Category	Type	Item	Text
Special condition	Pre-defined	ESIM4	Radiocommunications between space stations and earth stations in motion authorised under this licence shall be subject to permanent monitoring and control by a Network Control and Monitoring Centre (NCMC) or equivalent facility and be capable of receiving and acting upon at least 'enable transmission' and 'disable transmission' commands from the NCMC.
Special condition	Pre-defined	ESIM5	Radiocommunications between space stations and earth stations in motion authorised under this licence shall not be used or relied upon for safety-of-life applications.
Special condition	Pre-defined	ESIM7	The licensee shall advise the ACMA of changes to the point of contact provided for the purpose of tracing any suspected cases of interference from earth stations in motion.
Advisory note	User defined		Under the provisions of ITU Resolution 169 (WRC-19) the operation of earth stations in motion in Australia with respect to the impact on other countries is to be in accordance with the requirements of ITU Resolution 169 (WRC-19).

Appendix G: Additional conditions for space receive licences in frequency bands 27.5-29.5 GHz (Earth-to-space)

This appendix provides guidance on how to assess the interference potential from ubiquitous FSS earth station transmitters into 28 GHz grandfathered point-to-point fixed links.

It outlines additional conditions to be applied to space receive licences in the frequency ranges 27.5-29.5 GHz. Note that ESIM use in this band (for stations communicating with GSO networks) would also need to meet the requirements of Appendix F.

ACMA planning arrangements in the 28 GHz (27.5-29.5 GHz) (illustrated in Figure 1 below) support the operation of ubiquitous uncoordinated fixed-satellite service (FSS) earth station deployments (referred to as 'ubiquitous FSS', with certain restriction to achieve co-existence with terrestrial services).

The restrictions are contained in the [CSO Class Licence](#). As noted in section 3.5.8 (Earth station transmitters in 27.5 to 29.5 GHz band), written confirmation is required from the applicant stating that operation of earth station transmitters in the frequency range 27.5-28.3 GHz bands will comply with [CSO Class Licence](#) requirements.

Planned arrangements for the 28 GHz band

27.5–28.1 (600 MHz) INSIDE POP. CENTRES Primary: FWA/FSS gateway Secondary: A-ESIM and M_ESIM only on certain conditions	28.1–29.5 GHz (1900 MHz) AUSTRALIA-WIDE Primary: All FSS Secondary: FWA
27.5–28.1 (600 MHz) OUTSIDE POP. CENTRES Primary: All FSS Secondary: FWA	

G.1 Protection of 28 GHz grandfathered point-to-point fixed links (until 1 September 2026)

Under RALI FX 3, since 23 September no new assignments may be made for point-to-point fixed link in the [28 GHz band \(27.5-29.5 GHz\)](#). Existing assignments in the bands 28.1 - 28.5 and 29.1-29.5 have been grandfathered and are afforded protection until at least 23 September 2026.

There is potential for interference to grandfathered point-to-point fixed link assignments from ubiquitous FSS earth station transmitters. Under the CSO class licence, a station operates on the condition that it does not interfere with other radiocommunications services. This means it is the responsibility of on FSS operators to ensure they do not cause interference to grandfathered point-to-point fixed links.

The following guidance is provided for prospective licensees to assess the interference potential from ubiquitous FSS earth station transmitters into grandfathered point-to-point fixed links (PTP).

Ubiquitous FSS licensees should use the requirements of RALI FX3 to assess the potential for interference to PTP services. Prospective licensees will be expected to undertake such an assessment before operating. If interference occurs, licensees will be required to provide evidence of the assessment undertaken. This analysis should be undertaken for the following scenarios:

1. VSAT operators should consider potential interference to a PTP assignment within 50 km.
2. A-ESIM operators should consider potential interference to a PTP assignment while operating in Australian airspace.
3. M-ESIM operators should consider potential interference to a PTP assignment when operating within 50 km of the shore. It should be noted, there are 2 coastal areas, around Ballina (NSW) and Hobart (Tas.), where there is high potential for interference to PTP assignments.
4. L-ESIM operators should consider potential interference to a PTP assignment within 60 km.

To assess the interference potential an interference criterion of -145 dBW/MHz can be used as a simplified (but conservative) alternative to calculating to unwanted ratios as set out in RALI FX 3. In all cases the individual station characteristics as recorded on the Register of Radiocommunication Licences should be used.

G.2 CSO Class Licence conditions

Relevant CSO Class licence (refer to section 8 of the class licence,) conditions are:

8 Interference with other stations

(1) This class licence authorises operation of a station only when its operation does not interfere with the operation of a radiocommunications receiver.

(1A) For the purposes of subsection (1), the operation of a station authorised by this class licence is taken to not interfere with the operation of an area-wide receive station that is:

- (a) operating under an area-wide receive licence in the frequency range of 27.5 to 28.1 GHz that is located outside a 26 GHz band spectrum licence area; or
- (b) operating under an area-wide receive licence in the frequency range of 28.1 to 29.5 GHz.

...

(6) This class licence authorises the operation of a station in the frequency range of 27.5 to 28.3 GHz on land only if the radiocommunications transmitter of the station:

- (a) is not operated in the frequency range of 27.5 to 28.1 GHz in a 26 GHz band spectrum licence area; and
- (b) when operated in the frequency range of 28.1 to 28.3 GHz in a 26 GHz band spectrum licence area, is not operated within the greater of:
 - (i) 50 MHz above 28.1 GHz; or

- (ii) twice the occupied bandwidth of the radiocommunications transmitter above 28.1 GHz; and
 - (c) when operated in the frequency range of 27.5 to 28.1 GHz outside a 26 GHz band spectrum licence area, the emissions of the radiocommunications transmitter do not exceed a maximum EIRP to the horizon of -17.8 dBW in a 1 MHz bandwidth within 30 kilometres of a 26 GHz band spectrum licence area; and
 - (d) when operated in the frequency range of 27.5 to 27.7 GHz outside a 26 GHz band spectrum licence area, is not operated within the greater of:
 - (i) 50 MHz above 27.5 GHz; or
 - (ii) twice the occupied bandwidth of the radiocommunications transmitter above 27.5 GHz.
- (7) This class licence authorises the operation of a station in the frequency range of 27.5 to 28.3 GHz on board an aircraft that is in the air only if the radiocommunications transmitter of the station does not exceed the maximum power flux density limits specified in clause 3.1 of Part II: Aeronautical ESIMs of Annex 3 to ITU-R Resolution 169 (WRC-19) for any emissions that fall in the frequency range of 27.5 to 28.1 GHz in a 26 GHz band spectrum licence area.
- (8) This class licence authorises the operation of a station in the frequency range of 27.5 to 28.3 GHz on board a ship only if the radiocommunications transmitter of the station does not exceed a power flux density on the shore of -112.2 dBW per square metre for each MHz at a height of 30 metres above ground level for any emissions that fall in the frequency range of 27.5 to 28.1 GHz in a 26 GHz band spectrum licence area.

G.3 Special conditions and advisory notes (space receive)

User defined conditions

In addition to the special conditions of Appendix A and B (as appropriate – dependent on status in the MIFR) the following user defined special conditions are by the applied to space receive licences.

- > This space station is authorised to communicate with earth station transmitters provided operation of a station in the frequency range of 27.5 to 28.3 GHz on land:
 - > is not operated in the frequency range of 27.5 to 28.1 GHz in a 26 GHz band spectrum licence area
 - > when operated in the frequency range of 28.1 to 28.3 GHz in a 26 GHz band spectrum licence area, is not operated within the greater of 50 MHz above 28.1 GHz or twice the occupied bandwidth of the radiocommunications transmitter above 28.1 GHz
 - > when operated in the frequency range of 27.5 to 28.1 GHz outside a 26 GHz band spectrum licence area, the emissions of the radiocommunications

transmitter do not exceed a maximum EIRP to the horizon of -17.8 dBW in a 1 MHz bandwidth within 30 kilometres of a 26 GHz band spectrum licence area

- > when operated in the frequency range of 27.5 to 27.7 GHz outside a 26 GHz band spectrum licence area, is not operated within the greater of 50 MHz above 27.5 GHz or twice the occupied bandwidth of the radiocommunications transmitter above 27.5 GHz
- > This space station is authorised to communicate with earth station transmitters in the frequency range of 27.5 to 28.3 GHz on board an aircraft that is in the air provided that earth station transmission does not exceed the maximum power flux density limits specified in clause 3.1 of Part II: Aeronautical ESIMs of Annex 3 to ITU-R Resolution 169 (WRC-19) for any emissions that fall in the frequency range of 27.5 to 28.1 GHz in a 26 GHz band spectrum licence area
- > This space station is authorised to communicate with earth station transmitters in the frequency range of 27.5 to 28.3 GHz on board a ship only if the earth station transmission does not exceed a power flux density on the shore of -112.2 dBW per square metre for each MHz at a height of 30 metres above ground level for any emissions that fall in the frequency range of 27.5 to 28.1 GHz in a 26 GHz band spectrum licence area.

Appendix H: Additional requirements for space receive and space licences in frequency bands 2005-2010 MHz (Earth-to-space) and 2195-2200 MHz (space-to-Earth)

This appendix outlines additional procedures to be applied when considering the issue of *space* or *space receive* licences in the frequency ranges 2005-2009 MHz (Earth-to-space) and 2195-2200 MHz (space-to-Earth).

To support the transition of TOB services from the 2005-2010/2195-2010 MHz the issue of space and space receive licences is restricted as follows:

1. Assignments for space licences in the band 2195-2200 MHz are only allowed areas outside of metropolitan and designated areas as defined in the MSS Band Plan.
2. Assignments for space receive licences in the band 2005-2009 MHz are only allowed in areas outside of metropolitan and designated areas as defined in the MSS Band Plan subject to meeting the requirements outlined below and case-by-case consideration by the Manager Spectrum Planning Section. Note: The ACMA has a policy of not issuing space receive licences in the frequency range 2009-2010 MHz.

For background on the restriction described above, refer to spectrum embargo 23 and ACMA decisions on licensing arrangements for [2 GHz narrowband mobile-satellite services](#) (IFC 46/2021). The requirements in this BOP will be revised in accordance with the transition timeline for TOB services as recorded in the IFC 46/2001 response to submission paper. A summary of the timeline is provided in the table below.

Table 1: MSS and TOB transitional arrangements in the 2 GHz band

Area	Service	Requirement
Metropolitan areas and designated areas ¹⁷	TOB	Operations cease by 28 February 2026, protected from narrowband MSS until then.
	Narrowband MSS (2005-2009/2195-2200 MHz)	Operations not to commence until 1 March 2026.
	MSS (2 x 25 MHz)	Licence allocation arrangements to be determined. Operations not to commence until 1 March 2026.
Outside metropolitan areas and outside	TOB	Operations cease by 29 February 2024, protected from narrowband MSS until then.
	Narrowband MSS	Until 29 February 2024, operation is on the basis of no protection afforded from TOB and no interference to TOB.

¹⁷ Metropolitan and designated areas and TOB transition timeframes are set out in the Radiocommunications (Mobile-Satellite Service) (1980–2010 MHz and 2170–2200 MHz) Frequency Band Plan 2022.

Area	Service	Requirement
designated areas	(2005-2009/2195-2200 MHz)	From 1 March 2024 until 28 February 2026, only TOB services in metropolitan areas and designated areas require protection.
	MSS (2 x 25 MHz)	<p>Licence allocation arrangements to be determined.</p> <p>Until 29 February 2024, operation is on the basis of no protection afforded from TOB and no interference to TOB.</p> <p>From 1 March 2024 until 28 February 2026, only TOB services in metropolitan areas and designated areas require protection.</p>

H.1 Assessment procedures

H.1.1 Compliance with conditions of CSO class licence

All applications for *space receive licences/space licences* in the 2005-2010/2195-2200 MHz band will need to provide supporting information demonstrating how they meet the requirements of the CSO Class licence (refer to section 8 of the class licence, extract below):

8 Interference with other stations

- (1) This class licence authorises operation of a station only when its operation does not interfere with the operation of a radiocommunications receiver.
- ...
- (4) Subject to subsection (5), this class licence authorises the operation of a station in the frequency range of 2005 to 2010 MHz only if:
 - (a) the radiocommunications transmitter of the station is not on board an aircraft that is in the air; and
 - (b) the emissions of the radiocommunications transmitter above the frequency 2010 MHz do not exceed an EIRP of -66 dBW for each MHz.
- (5) This class licence does not authorise the operation of a station in the frequency range of 2005 to 2010 MHz in a metropolitan area unless:
 - (a) the emissions of the radiocommunications transmitter of the station do not exceed a maximum EIRP of 0.5 dBW for each MHz; and
 - (b) the maximum duty cycle of the radiocommunications transmitter does not exceed 1% averaged over a 15-minute period; and
 - (c) each transmission of the radiocommunications transmitter does not exceed 4 seconds in duration.

H.1.2 Requirements in metropolitan areas

(Note: No licences will be issued authorising operations in metropolitan areas until 1 March 2026)

In addition to compliance with the conditions of the CSO class licence, the restrictions below will apply in metropolitan areas (Note: they do not apply in designated areas). Applicants are to provide evidence describing how they will meet the following requirements:

- > The EIRP of transmitting earth stations must not exceed -7 dBW.
- > Transmitting earth stations must employ bandwidths of at least 3.75 kHz (Note with a CSO class licence pfd limit of 0.5 dBW/MHz, power will need to be reduced for bandwidths less than 180 kHz)
- > Earth stations may not transmit within 10 km of listed television outside broadcast (TOB) receive stations listed in H.4 (TOB receive sites)

H.1.3 Requirements outside metropolitan areas

(Note: operations in designated areas (which are outside metropolitan areas) are not to commence until 1 March 2026)

In addition to compliance with the conditions of the CSO class licence, the restrictions below will apply outside of metropolitan areas (including designated areas). Applicants are to provide evidence describing how they will meet the following requirements:

- > The EIRP of transmitting earth stations must not exceed -7 dBW.
- > Transmitting earth stations must employ bandwidths of at least 3.75 kHz
- > Note: The combination of EIRP and minimum bandwidth result in a maximum EIRP power spectral density of 17.3 dBW/MHz.
- > Earth stations may not transmit within 10 km of listed television outside broadcast (TOB) receive stations listed in H.4 (TOB receive sites)
- > For EIRP spectral density of 0.5 dBW/MHz, the duty cycle limit is 10%.
- > For EIRP power spectral densities greater than 0.5 dBW/MHz:
 - > for areas within 120 km of a high gain TOB or within 20 km of a medium-gain TOB site, the duty cycle may not exceed 1% average over a 15-minute period
 - > for other areas, the duty cycle is limited to 10% average over a 15 minute period

H.1.4 Self-coordination between licensees

MSS services in the 2005-2009/2195-2200 MHz band are supported on the basis that coexistence between satellite systems is a matter for industry to self-manage within Australia.

Applicants are required to acknowledge this in their application and provide an explanation of the intended sharing methodology and approach proposed.

To support multiple operators within the band, operators are encouraged to licence only what they need (for example by limiting usage to no more than 1 MHz per operator). Where that is not possible applicants should explain why and what are the characteristics of their systems that facilitates sharing.

To support multiple operators the ACMA suggest assignment be made from the lower band edge with a horizontal loading strategy.

H.1.5 ITU satellite coordination framework

Licensees are required to ensure that the operation of their services within Australian with respect to services outside of Australia is in accordance with the ITU satellite coordination framework. This includes operating in accordance with any agreement between operators/administrations reached as part of the ITU process.

Prospective licensees should be aware that the obligation to operate in accordance with ITU satellite coordination framework may impact the to (ability to operate) MSS services in Australia. Prospective operations of a licensee may also be susceptible to interference from services operating outside of Australia, in accordance with the ITU framework.

Prospective applicants should also be aware that in the case of interference between non-Australian satellite systems (systems not filed by Australia to the ITU), it is considered a matter for the relevant administrations to resolve.

Applicants are required to acknowledge the above in their applications.

H.2 Special conditions and advisory notes (space receive)

User defined conditions

In addition to the special conditions of Appendix A and B (as appropriate- – dependent on status in the MIFR) the following user defined special conditions are by the applied to space receive licences:

- > This space station is authorised to communicate with earth station transmitters provided:
 - > the earth stations are not operated within 10 kilometres of the television outside broadcast receiver sites
 - > the equivalent isotropic radiated power of transmitting earth stations does not exceed -7 dBW and the earth station emission bandwidth is at least 3.75 kHz.
 - > the earth stations are not in metropolitan and designated areas as defined in the Radiocommunications (Mobile-Satellite-Service) (1980–2010 MHz and 2170–2200 MHz) Frequency Band Plan 2022
- > the transmitting earth stations that transmit with an equivalent isotropic radiated power density greater than 0.5 dBW/MHz
 - > for areas within 120 km of a high gain television outside broadcast receiver or within 20 km of a medium-gain television outside broadcast receiver site, the duty cycle must not exceed 1% average over a 15-minute period
 - > for other areas, the duty cycle must not exceed 10% average over a 15 minute period
- > the earth stations operate in accordance with the conditions of the Radiocommunications (Communication with Space Object) Class Licence 2015

Advisory notes

In addition to the advisory notes of Appendix A and B (as appropriate – dependent on status in the MIFR) the following user defined advisory note is to be applied to space receive licences:

- > In the band 2005-2009 MHz coexistence between satellite systems licensed in Australia is a matter for licensees to self-manage. No protection from interference is afforded by the ACMA from systems authorised under space receive licences and operating in accordance with the conditions of the licence.
- > television outside broadcast receiver sites are listed in the Business operating procedure - Submission and processing of applications for space and space receive apparatus licences as published on the ACMA website

H.3 Special conditions and advisory notes (space)

User defined conditions

In addition to the special conditions of Appendix A and B (as appropriate- – dependent on status in the MIFR) the following user defined special conditions are by the applied to space licences:

- > This space station is authorised to communicate with earth station receivers provided:
 - > the earth stations are not in metropolitan and designated areas as defined in the Radiocommunications (Mobile-Satellite-Service) (1980–2010 MHz and 2170–2200 MHz) Frequency Band Plan 2022
 - > the earth stations operate in accordance with the conditions of the Radiocommunications (Communication with Space Object) Class Licence 2015

Advisory notes

In addition to the advisory notes of Appendix A and B (as appropriate – dependent on status in the MIFR) the following user defined advisory note is to be applied to space licences:

- > In the band 2195-2200 MHz coexistence between satellite systems licensed in Australia is a matter for licensees to self-manage. No protection from interference is afforded by the ACMA from systems authorised under space licences and operating in accordance with the conditions of the licence.

H.4 TOB receive sites

Table 1 List of High Gain (>24 dBi) TOB Sites

State	Latitude	Longitude	Site Name	Site ID
NSW	-33.820079	151.185	ABC Tower 221 Pacific Highway GORE HILL	48711
NSW	-33.861548	150.854947	Axicom 102.7m Lattice Tower 77-89 Border Rd HORSLEY PARK	201854
NSW	-33.805516	151.18076	TXA Artarmon Site Tower 192-196 Hampden Road ARTARMON	4045
NSW	-33.811691	151.195969	TXA Willoughby Site Tower 15 Richmond Avenue WILLOUGHBY	4129
QLD	-27.466378	152.943371	TXA B-Site Tower 560 Sir Samuel Griffith Drive MOUNT COOT-THA	12757

SA	-34.908683	138.576069	Channel 7 Adelaide 40 Port Road HINDMARSH	9004134
SA	-34.982397	138.708346	TXA NWS Site Tower 109 Summit Road CRAFTERS	23132
SA	-34.98104	138.708078	TXA Crafters Site Tower 115 Mount Lofty Summit Road CRAFTERS	23181
SA	-34.978867	138.708543	Broadcast Australia Site Summit Road CRAFTERS	23139
VIC	-37.810323	144.967818	150 Lonsdale Street MELBOURNE	38812
VIC	-37.835419	145.347735	TXA Eyre Road Site Tower 8 Eyre Road MT DANDENONG	12015
VIC	-37.81852	144.957141	Rialto Towers 525 Collins Street MELBOURNE	11599
VIC	-37.813822	144.969482	120 Collins Street MELBOURNE	11596
VIC	-37.834892	145.348713	BAI Comms Site 116-118 Ridge Rd MOUNT DANDENONG	12014
VIC	-37.881244	144.999296	ABC-TV Studios 8 Gordon Street ELSTERNWICK	34582
VIC	-37.837476	145.34661	TXA Ornata Road Site Tower 12 Ornata Road MOUNT DANDENONG	12013
VIC	-37.828469	145.353401	TXA Observatory Road Site Tower 20-24 Observatory Road MT DANDENONG	12010
VIC	-37.886475	144.269148	Police & Ambulance Site MT ANAKIE	11694
WA	-31.88197	115.857527	Channel Seven Perth Off Dianella Dr Dianella	142069
WA	-31.884531	115.859305	Channel 9 TV Studios Hayes Avenue DIANELLA	26523
WA	-31.954606	115.857086	Bank West Tower 108 St Georges Terrace PERTH	25931
WA	-32.012667	116.061768	TXA Carmel Site 255 Welshpool Road East CARMEL	26624
WA	-32.008347	116.084151	Tower TXA Bickley Site Television Road BICKLEY	26647
WA	-31.878311	115.859826	New10 Cottonwood Cres DIANELLA	34599

List last updated June 2022

Table 2 List of Moderate Gain (between 14 and 24 dBi) TOB Sites

State	Latitude	Longitude	Site Name	Site ID
ACT	-35.270042	149.158275	Ainslie Lookout MT AINSLIE	9602
ACT	-35.275515	149.097771	Telecom Tower BLACK MOUNTAIN	9580
NSW	-33.805516	151.18076	TXA Artarmon Site Tower 192-196 Hampden Road ARTARMON	4045
NSW	-33.868697	151.209364	MLC Centre 19-29 Martin Place SYDNEY	3351

NSW	-33.870388	151.20912	Centre Point Tower 112 Market St SYDNEY	9002613
NSW	-33.811691	151.195969	TXA Willoughby Site Tower 15 Richmond Avenue WILLOUGHBY	4129
NSW	-33.867456	151.21085	Colonial Centre 52 Martin Place SYDNEY	3253
NSW	-33.896668	151.19389	Seven Network Studios 8 Central Avenue EVELEIGH	138664
NSW	-33.870174	151.190145	Building C 19-33 Saunders St PYRMONT	203119
NSW	-34.147242	150.67077	Wollondilly Council RFS site Lot 3 Mount Hercules Rd RAZORBACK RANGE	34904
NSW	-33.891238	151.250068	Optus site Tower 2 Westfield Plaza 500 Oxford Street BONDI JUNCTION	34680
NSW	-33.934298	151.157471	Airport Hilton Marsh Street ARNCLIFFE	5290
NSW	-33.931287	151.185445	Cnr Oriordan & Robey Sts MASCOT	3650
NSW	-33.849872	151.057816	RFS Site 15 Carter St HOMEBUSH	404460
NSW	-32.890196	151.538894	NBN TV Site Mt Sugarloaf 3A Mount Sugarloaf Rd WEST WALLSEND	5838
NSW	-33.546826	150.616561	Miles Comms Site 2 246 Burralow Road KURRAJONG HEIGHTS	10143
NT	-12.46358	130.840345	Mitchell Centre 55 Mitchell Street DARWIN	480820
NT	-12.464178	130.844383	ABC Studios 16-18 Bennett Street DARWIN	34588
NT	-12.448771	130.837229	Lot 3119 Blake Street DARWIN	1228
NT	-12.414473	130.969253	Broadcast Australia Site 100 Deloraine Rd SHOAL BAY	139711
NT	-12.458896	130.836978	Marrakai Building Lot 5440 (93) Smith Street DARWIN	1055
QLD	-27.464574	152.94742	BAI Comms Site 620 Sir Samuel Griffith Drive MOUNT COOT-THA	12752
QLD	-27.46313	152.94813	TXA T-Site Tower 445 Sir Samuel Griffith Drive MOUNT COOT-THA	12749
QLD	-27.471614	152.942255	TXA Q-Site Tower 632 Sir Samuel Griffith Drive MOUNT COOT-THA	12761
QLD	-27.472527	153.025353	111 George St BRISBANE	52966

QLD	-27.483962	153.036288	Telstra Exchange 820 Main St WOOLLOONGABBA	12930
QLD	-26.657085	153.091886	140-142 Horton Pde MAROOCHYDORE	16209
QLD	-27.969604	153.213366	GCT Mt Tamborine Site 103m Tower Golf Course Road MOUNT TAMBORINE	403573
QLD	-26.789909	152.918196	Regional broadcaster tower Cnr Bald Knob Road and Landsborough-Maleny Road BALD KNOB	15894
QLD	-28.1384	153.481	GCT Currumbin Site Monopole 66 Crest Drive CURRUMBIN	40379
QLD	-28.234736	153.28894	40m tower NRN Broadcast Site Bilbrough Lookout SPRINGBROOK	153528
QLD	-27.991715	153.428753	Golden Gate Bldg Rooftop 3422 Gold Coast Hwy SURFERS PARADISE	13795
QLD	-26.683062	153.136393	Breakwater Apartment Bldg 8 Pacific Bvd Pt Cartwright BUDDINA	400580
QLD	-27.7883	153.213012	Crown Castle Site off Cliff Barons Road DARLINGTON RANGE	13476
QLD	-28.002222	153.426385	QTQ 9 Offices 50 Cavill Avenue SURFERS PARADISE	9022281
SA	-34.888076	138.613894	ABC Building 85 North East Road COLLINSWOOD	22777
SA	-34.924828	138.598754	91 King William Street Currie Street Frontage Santos House ADELAIDE	22170
SA	-34.908683	138.576069	Channel 7 Adelaide 40 Port Road HINDMARSH	9004134
SA	-34.98104	138.708078	TXA Crafers Site Tower 115 Mount Lofty Summit Road CRAFERS	23181
TAS	-42.878083	147.332304	ABC Studios Brooker Avenue HOBART	32730
TAS	-42.897566	147.236358	Broadcast Australia Site Pinnacle Rd MT WELLINGTON	32830
VIC	-37.810323	144.967818	150 Lonsdale Street MELBOURNE	38812
VIC	-37.815342	144.945415	HSV-7 Bldg Colonial Stadium cnr La Trobe St Extn & Harbour Espl DOCKLANDS	102197

VIC	-37.837476	145.34661	TXA Ornata Road Site Tower 12 Ornata Road MOUNT DANDENONG	12013
VIC	-37.835419	145.347735	TXA Eyre Road Site Tower 8 Eyre Road MT DANDENONG	12015
VIC	-37.828469	145.353401	TXA Observatory Road Site Tower 20-24 Observatory Road MT DANDENONG	12010
VIC	-37.81852	144.957141	Rialto Towers 525 Collins Street MELBOURNE	11599
VIC	-37.814922	144.970588	Broadcast/Comms Tower Roof 101 Collins Street MELBOURNE	11597
VIC	-37.813822	144.969482	120 Collins Street MELBOURNE	11596
VIC	-37.886475	144.269148	Police & Ambulance Site MT ANAKIE	11694
VIC	-38.173546	144.300291	Broadcast Site Brownhill Heights Reserve CERES	8000005
VIC	-38.354268	144.952035	Air Services Australia Site Steane Ave ARTHURS SEAT	9000919
VIC	-37.813625	144.936307	476 Docklands Dr DOCKLANDS	139648
WA	-31.953914	115.855585	Central Park Tower 170 Georges Terrace Perth	142068
WA	-32.012667	116.061768	TXA Carmel Site 255 Welshpool Road East CARMEL	26624
WA	-31.88197	115.857527	Channel Seven Perth Off Dianella Dr Dianella	142069
WA	-32.057926	115.751211	Fremantle Hospital Lot 1970 Alma Street FREMANTLE	27170
WA	-31.952081	115.846971	State Parliament House Harvest Terrace Perth	142074

List last updated July 2022, as recorded in ACMA decisions on licensing arrangements for [2 GHz narrowband mobile-satellite services](#) (IFC 46/2021)