

Capricorn Space Submission to the Australian Communications and Media Authority (ACMA)

Draft Five-Year Spectrum Outlook (FYSO) 2024-29

29 April 2024

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Introduction

Capricorn Space appreciates the opportunity to respond to the ACMA's Draft Five-Year Spectrum Outlook (FYSO) 2024-29 and requests that the ACMA create opportunities to further earth station facilities operating in the Earth Exploration-Satellite Service (EESS), Space Research Service (SRS) and Space Operations Service (SOS), which we will refer to as the **"Space Science"** allocations.

The key ranges of interest are S-band (2025-2110 MHz and 2200-2300 MHz), X-band (7145-7235 MHz and 8025-8500 MHz) and Ka-band (22.55-23.15 GHz and 25.5-27 GHz).

The following sections will provide further detail on five main work items:

1. Establishment of Earth Station Protection Zones for the Space Science allocations (**"Science-ESPZs"**);
2. Review of Embargo 23;
3. Protection of Earth Receive licences from fixed point-to-point links;
4. Support for Earth Receive licences in the Ka-band SRS/EESS downlink (25.5-27 GHz); and
5. Impact of Licence Tax on Australia's Space Economy.

1. Science-ESPZs

The concept of Earth Station Protection Zones (ESPZ)—where coordination requirements are established to ensure protection and preservation of a general area *without* needing earth station licences in the RRL to coordinate with—is currently established in RALI MS 44. The ESPZs defined in RALI MS 44 are intended to preserve and support opportunities for any prospective earth station operators/licensees, but is currently limited to Fixed-Satellite Service (FSS) allocations. Consequently, RALI MS 44 really only defines **"FSS-ESPZs"**.

Similar requirements to protect certain Space Science facilities, *without* needing earth station licences in the RRL to coordinate with, exist in RALI MS 43 (and in certain provisions of RALI MS 46). Unlike RALI MS 44, these do cover Space Science allocations, but are limited to the CSIRO, NASA and ESA facilities at Tidbinbilla and New Norcia, which are not open to commercial service providers.

The only provision that achieves both support of Space Science allocations and is open to any prospective earth station operator/licensee is Embargo 49, which supports the Mingenew WA satellite park, also supported by:

- certain provisions of RALI MS 44 (but only in FSS allocations);
- certain provisions of RALI MS 46 (only in the Ka-band SRS/EESS downlink); and
- the exemption from Embargo 23 (for S-band only).

This sets up Mingenew WA as the only “**Science-ESPZ**” openly-available to commercial operators and/or service providers.

There is already a high demand for and interest in earth station licences within the Space Science allocations, particularly S- and X-band, plus growing interest in the Ka-band SRS/EESS downlink (25.5-27 GHz). Given this increasing demand, there is a need to expand beyond Mingenew WA as the sole viable Science ESPZ. Concentrating ground services in this one area greatly increases the likelihood of conflict or interference between satellite systems as well as terrestrial based interference between multiple earth station network operators.

Furthermore, having Mingenew WA as the only viable option for these services does not provide flexibility in selecting the most adequate location for serving LEO constellations with certain orbit inclination angles, or to cover gaps in the ground station service areas of global networks. For example, there is a large distance between Mingenew WA and New Zealand, and therefore some ‘in-between’ LEO passes will be left unserved.

As such, we believe that the ACMA should work to establish arrangements for **Science-ESPZs** to address the current and future demand for earth station connectivity in the Space Science allocations, with the goal of establishing northern and southern **Science-ESPZs** in eastern Australia (two sites are required to complement disparate orbital inclinations).

Such arrangements for Science-ESPZs could be incorporated into RALI MS 44, or in a separate RALI or Embargo (noting that consequential changes may need to then be made to other RALIs e.g. RALI MS 46). Furthermore, it should be clearly understood that the Science-ESPZs do not necessarily need to be in the same areas as the FSS-ESPZs. Some areas which may be suitable for Space Science allocations may not be suitable for FSS allocations, and vice versa. As demonstrated by the different approaches that the ACMA has taken for Mingenew WA and Eastern FSS-ESPZs, the ACMA can use its discretion to apply policy to different combinations of bands and areas, and a Science-ESPZ does not necessarily need to comply with all the conditions that the ACMA used to identify the FSS-ESPZs just to fit into the “mould” of RALI MS 44. The ACMA could just as well consider establishing separate arrangements for Space Science bands at other sites, without those sites being able to, or required to, support all the FSS allocations currently covered in MS 44.

2. Review of Embargo 23

Embargo 23 means that any earth station assignments in the S-Band SOS allocation (2025-2110 MHz and 2200-2300 MHz) (except for Mingenew WA) need special dispensation from the ACMA. In practice, this requires the licence applicant to obtain an agreement from the co-channel Television Outside Broadcasting (TOB) operator, as per the frequency allocations defined in RALI FX 21. These agreements are resource-intensive and time-consuming to set up, creating an entirely excessive level of red tape, particularly for rural and remote areas for which the demand for TOB is evidently extremely low.

In February 2022, Capricorn Space responded to the ACMA's consultation on the TOB Frequency Band Plan with a recommendation to limit the applicability of Embargo 23 to earth station licences, to only the metro and regional areas of higher demand for TOB¹. In particular, it should be noted that new fixed links can be applied for *outside* these higher demand metro/regional areas without any problem, so it is not clear why the embargo applies to earth stations in regional/remote areas, but not to fixed links.

Alternatively, the exemption to Embargo 23 applicable to Mingenew WA could be extended to other, targeted "Science-ESPZ" areas (as introduced above).

3. Protection of Earth Receive licences from fixed point-to-point links

The coordination and licensing requirements for new fixed point-to-point (P-P) links are defined in RALI FX 3. Unfortunately, RALI FX 3 does not currently have a requirement in the 8 GHz Band for fixed transmitters to coordinate with and protect licensed earth station receivers in the X-band EESS and SRS downlink allocations (spanning 8025-8500 MHz). This potentially leaves commercial Space Science earth station facilities (outside of Mingenew WA) vulnerable to interference from new fixed P-P links. Even if the ACMA can guarantee that Earth Receive licences would be afforded protection, there is still the issue that a new fixed link could be licensed, procured, installed—due to a lack of sufficient guidance to accredited persons working in these bands—which would in turn result in (a) very costly modifications to the fixed link licensee and/or (b) disruption to the earth station receiver operation while the interference is identified and resolved. As such, we request that RALI FX 3 be amended to include a requirement for both 8 GHz fixed link transmitters and 8.2 GHz TOB transmitters to have to protect licensed earth station receivers in 8025-8500 MHz.

The same applies to the 6.7 and 7.2 GHz Bands (with respect to the 7145-7235 MHz X-band SRS uplink) and to the 22 GHz Band (with respect to the Ka-band SRS uplink), except that the interference potential is in the reverse direction; from an existing earth station transmitter to a new (potentially unsuspecting) fixed link licensee. As such, it would also be beneficial to add instructions for new fixed P-P assignments to be coordinated with existing Fixed Earth licences.

4. Support for Earth Receive licences in the Ka-band SRS/EESS downlink (25.5-27 GHz)

As mentioned above, there is growing interest from a number of service providers and operators in providing ground station capability to support Ka-band SRS/EESS downlink (25.5-27 GHz) payload reception in Australia. Except for the ESA and NASA facilities at New Norcia and Tidbinbilla, the only location in Australia at which a commercial earth station receiver in this band would be afforded protection is at Mingenew WA (via the coordination requirements in section 3.7 of RALI MS 46).

¹ Capricorn Space's Feb 2022 submission to the ACMA's IFC 45/2021 can be found here: <https://www.acma.gov.au/consultations/2021-12/replanning-2-ghz-band-review-2-ghz-television-outside-broadcast-frequency-band-plan-consultation-452021>

It is important to note that the Ka-band SRS/EESS downlink band is completely within the 26 GHz spectrum-licensed band of 25.1-27.5 GHz. This band is intended to support mm-wave Wireless Broadband (WBB) services that are authorised by (a) spectrum licences (SL) in spectrum-licensed areas and (b) Area Wide Licences (AWLs) everywhere else.

The spectrum-licensed areas—in which demand for mm-wave WBB is likely to be highest—are already blocked by the existing spectrum licensed arrangements. That means that any new Earth Receive licences in Australia would have to be outside of these, in (relatively-speaking) low-demand areas for mm-wave.

Furthermore, there is currently no legislative or policy barrier preventing applications for Earth Receive licences in the band: there is no Embargo, there is no Frequency Band Plan, and an Earth Receive licence would be entirely compatible with the ARSP. **As such, the first request here is that the ACMA accept over-the-counter applications for Earth Receive licences. The second and third requests are for the ACMA to review RALI MS 46 to support I. Earth Receive licences in regional/remote Australia and II. Earth Receive licences within Space-ESPZs.**

To facilitate this, it would be necessary to consider the balance of:

- a) the spectrum denial caused by unused AWLs in areas where demand for mm-wave WBB is low; and
- b) the spectrum denial that could be caused to a genuine WBB service by an Earth Receive licence.

I. Proposed licensing rules & coordination requirements for Earth Receive licences in regional/remote Australia:

To strike a balance, the following provisions could be implemented:

1. **Coordination requirements for new Earth Receive licences (with respect to existing AWLs and SLs):** The ACMA has already developed coordination requirements for new Earth Receive licences in Remote areas in C-band, under RALI MS 47 (Appendix F). Something similar could be adopted in the 26 GHz Band to facilitate new Earth Receive licence applications outside of spectrum-licensed areas. For added flexibility—where a proposed Earth Receive licence fails coordination against an existing AWL’s spectrum space—the Earth Receive licence applicant should be able to seek out-of-policy exemption and apply for the licence anyway, which would carry a User Defined Special Condition stating that the Earth Receive licence is issued on a “no protection” basis with respect to the existing AWL’s licence number (such that deployments under the existing AWL are not unduly restricted).
2. **“No overlap” prohibition:** RALI MS 47 also has a prohibition on new Earth Receive licences inside spectrum space covered by an existing AWL (see Section 3.4 of MS 47). Note: this ‘no overlap’ prohibition should be able to be waived by agreement (via out-of-policy exemption if necessary).

3. **Earth Receive licensee can challenge a 'blocking' AWL:** The above prohibition is reasonable for a period of time (as opposed to indefinitely). Noting that the ACMA has given itself the option to take into account the use (or lack thereof) of existing AWLs when it comes time to considering whether or not to offer renewal of the AWL, there could be a challenge process by which an Earth Receive licence applicant, that is blocked by an AWL, flags this with the ACMA. When considering whether to offer the AWL for renewal, such a challenge can be taken into account.
4. **Coordination requirements for AWL transmitters (with respect to existing Earth Receive licences):** The above would need to be accompanied by a requirement for AWL transmitters (those that are required to be registered) to have to coordinate with and protect existing Earth Receive licences, unless that Earth Receive licence carries a Special Condition of no protection from the relevant AWL licence.

II. Proposed licensing rules & coordination requirements for Earth Receive licences within Space-ESPZs:

Beyond the above proposal (which is for Earth Receive licences more generally), we believe the ACMA should go a step further and make special provisions for Earth Receive licences **within Space-ESPZs**. As opposed to the proposed provisions 1 through 4 above, these would:

- a) Allow Earth Receive licences within Space-ESPZs to overlap the spectrum space of existing AWLs; and
- b) AWL transmitters would be required to coordinate with Earth Receive licences (and/or pre-defined points) within Space-ESPZs regardless of first-in-time status (and regardless of "no protection" Special Conditions, since Earth Receive licences within Space-ESPZs would not be expected to carry these).

5. Impact of Licence Tax on Australia's Space Economy

Based on stern and repeat feedback from our clients, Capricorn Space requests that the ACMA consider a reduction in licence tax as it represents a major barrier to growing the space economy within Australia. As a case in point, many clients comment on the high cost of obtaining licences within Australia and particularly cite the fact they are not charged a licence tax to receive satellite services when operating via New Zealand. In the interests of growing the Australian space business, it is requested the ACMA re-assesses licence taxes associated with satellite services.

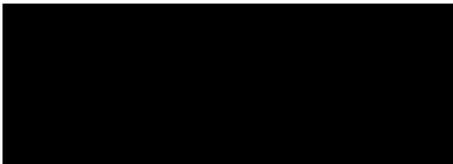
There are different ways in which the ACMA could seek to relieve the very high licence tax, for example:

- a) Across-the-board licence tax reductions, particularly for higher-frequency bands in which very wide bandwidths are needed to provide services (e.g. X-band EESS downlink and other bands > 10 GHz); and/or
- b) Significant tax reduction for Fixed Earth and Earth Receive licences within Earth Station Protection Zones (ESPZ). The basis for this is that, once the ESPZ is established, the Fixed Earth and Earth Receive licences themselves do not cause any spectrum denial beyond what is already created by the ESPZ itself (and the associated coordination rules in e.g. RALI MS 44); and/or

- c) In the specific case of Mingenew WA, we request that the area around Mingenew and Geraldton to be re-classified from “Low Density” to “Remote”. Existing spectrum licence areas could help to guide this, e.g. from Arrowsmith-Three Springs northwards (as per the 3.4 GHz spectrum licence regional area) or from Leeman-Coorow northwards (as per the 1800 MHz spectrum licence regional area).

Thank you for the opportunity to provide industry input to the FYSO review.

Yours sincerely



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