

15 July 2023

The Manager
Spectrum Planning Section
Australian Communications and Media Authority
PO Box 78
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Dear Sir/Madam

Capricorn Space Submission on Spectrum planning framework: Draft frequency coordination requirements review work program 2023–24

Capricorn Space appreciates the opportunity to respond to the ACMA's *Draft frequency coordination requirements review work program*, and in particular wishes to address protection of earth station receivers in the Earth Exploration-Satellite Service (EESS) and Space Research Service (SRS), primarily within the frequency range 8025-8500 MHz, but also in the EESS & SRS allocations in 25.5-27 GHz.

The preceding sections will include requests/recommendations for modifications to the following Radiocommunications Assignments and Licensing Instructions (RALIs):

- RALI MS 44
- RALI MS 45
- RALI MS 46
- RALI FX 3

Overview of RALI MS 44

RALI MS 44 currently intends to preserve spectrum around Earth Station Protection Zones (ESPZs) for future earth station transmitters and receivers, by requiring terrestrial services to coordinate with nominal coordination points distributed within the ESPZs. These ESPZs are located at Quirindi NSW, Moree NSW and Roma QLD, as well as at Mingenew WA and Uralla NSW. While Mingenew and Uralla are limited to C-band downlinks (as well as C- and Ka-band uplinks at Mingenew), the first three ESPZs mentioned cover a much wider range of bands.

This wider range of bands mentioned above consists of all the Fixed-Satellite Service (FSS) allocations between 3.4 GHz and 51.4 GHz, with the exception of those Defence satellite bands in X-, Ku- and Ka-bands with Footnote AUS100, AUS100A, AUS101 or AUS101A in the Australian Radiofrequency Spectrum Plan (ARSP).

In these Defence satellite bands excluded by the ACMA, there are other satellite service allocations: Mobile-Satellite Service (MSS) allocations which are also designated for defence purposes; and Meteorological-Satellite Service (MetSat) allocations in 7450-7550 MHz (space-to-Earth) and 8175-8215 MHz (Earth-to-space), in the same direction as the Defence FSS allocations.

The remaining satellite service allocations which involve communications with earth stations are in the table below:

Downlink allocation	# of Earth Receive licences	Uplink allocation	# of Fixed Earth licences
EESS 8025-8400 MHz and SRS 8400-8500 MHz	39 (16 site records over 14 distinct facilities / 8 licensees) (New Norcia & Tidbinbilla in 8400-8500 MHz – RALI MS43)	EESS/SRS 7145-7190 MHz (deep space) and 7190-7235 MHz	3 (New Norcia & Tidbinbilla – RALI MS43)
MetSat 7750-7900 MHz	18 (8 site records over 7 distinct facilities – BoM & GA)		
EESS/SRS 25.5-27 GHz	2 (New Norcia & Tidbinbilla – RALI MS46)	SRS 22.55-23.15 GHz	2 (New Norcia & Tidbinbilla – RALI MS43)
SRS 31.8-32.3 GHz	3 (New Norcia & Tidbinbilla – RALI MS43 – and Narrabri)	SRS 34.2-34.7 GHz	2 (New Norcia & Tidbinbilla – RALI MS43)
SRS 37-38 GHz	0	EESS/SRS 40-40.5 GHz	0

Note: omitted are MSS and Radionavigation-Satellite Service (RNSS) 43.5-47 GHz and Amateur-Satellite Service (ASS) 24-24.05 GHz and 47-47.2 GHz.

Preservation of X-band EESS downlink 8025-8500 MHz

As can be seen, there is significant usage and growth in the X-band EESS & SRS downlink band (8025-8500 MHz), and extends well beyond the Treaty-supported European Space Agency (ESA) and NASA facilities at New Norcia WA and Tidbinbilla ACT, respectively. As such, the hard-coded site-specific provisions of RALI MS 43 are not adequate nor fit-for-purpose for ensuring protection of earth station receivers in the band 8025-8500 MHz.

It is precisely this 8025 – 8500 MHz band that forms the backbone of Legacy and NewSpace Earth Observation activities in Australia and failure to protect this core resource will diminish Australia's international standing in these markets. It will also serve to undermine the Australian Space Agency's proclaimed goals of expanding the size of the domestic space sector and creating new Australian jobs.

As such, we request that the ACMA including the band 8025-8500 MHz under the Earth Receive bands in Appendix A of RALI MS 44, for the ESPZs of Quirindi, Moree and Roma.

Note: The bands 7190-7235 MHz, 8025-8400 MHz, 40-40.5 GHz are already protected in the area of Mingenew WA, by Embargo 49.

Note: The band 8400-8500 MHz is already protected at the New Norcia and Tidbinbilla facilities by RALI MS 43.

Protection of X-band EESS downlink 8025-8500 MHz

Noting that RALI MS 44 is focused on the *preservation* of spectrum options for *future* earth stations, we now focus on protection requirements for existing, licensed earth station receivers in the band.

RALI MS 45

We believe that the most appropriate RALI for the inclusion of such protection requirements is RALI MS 45—*Frequency coordination requirements between microwave fixed point-to-point links and FSS earth stations*, since this is the only document which specifies a general approach—i.e. covering multiple frequency bands and prescribing a coordination methodology between fixed point to point (P-P) stations and earth stations—since the long-retired former RALI MS 26 (which is still referenced in RALI FX 3).

Note: Other exceptions include RALI MS 38 (now also retired) and RALI MS 46 (both RALIs specific to the 28 GHz fixed link band, which is no longer available for new fixed P-P links).

RALI MS 45 notes that *“The intention is to increase the scope in the future to include the coordination of fixed P-P transmitters with FSS earth station receivers if required”*.

We request and recommend that RALI MS 45 be extended to both (a) address the protection of earth station receivers—as flagged by the ACMA in the statement italicised above—and (b) remove the limitation of “FSS”, so that protection of earth station receivers in the bands 8025-8400 MHz and 8450-8500 MHz can be included.

Note: 8400-8450 MHz is omitted since, according to ITU Radio Regulations No. 5.465 “8400-8450 MHz is limited to deep space”, which has different protection requirements. Currently the deep space facilities in Australia are protected via RALI MS 43.

RALI FX 3

Noting that the protection of earth station receivers is currently not covered in RALI MS 45—and that in its consultation, the ACMA does not currently intend to review RALI MS 45 in this financial year 2023-24—we believe that a relatively simple modification can be made to RALI FX 3 to ensure protection of earth station receivers in the band 8025-8500 MHz, and for this protection to be introduced promptly.

Currently, RALI FX 3 includes the instruction that ***“proposed fixed links need to be coordinated with licensed earth stations operating in this band”*** in multiple fixed link bands. However, these only feature in the bands 2.1/2.2 GHz, 3.8 GHz, 6 GHz, 6.7 GHz, 7.2 GHz and 11 GHz bands.

We request and recommend that RALI FX 3 be amended to include the simple statement ***“proposed fixed links need to be coordinated with licensed earth stations operating in this band” in the 8 GHz & 8.3 GHz bands***, to address the fact that earth station receivers in the 8025-8500 MHz are not adequately protected by ACMA rules, unless they are located at certain specific facilities e.g. New Norcia, Tidbinbilla and Mingenew.

This problem is more widespread than just the X-band EESS band downlink, as registered earth station receivers are currently not explicitly protected in other bands, e.g. 18 GHz.

EESS/SRS downlink 25.5-27 GHz

We also consider that interest may increase in the EESS/SRS downlink in 25.5-27 GHz. Currently, reception in these bands is protected by coordination requirements in RALI MS 46, specific to New Norcia WA, Tidbinbilla ACT and Mingenew WA. We submit that the ACMA consider modifications to RALI MS 46 necessary to facilitate additional earth station receiver facilities around Australia, including the introduction of requirements for second-in-time Area Wide Licence (AWL) transmitter registrations to ensure protection of any Earth Receive licences in the band 25.5-27 GHz. New Earth Receive licences should be permitted to overlap existing AWL – Standard licences, provided that they pass detailed coordination with any first-in-time registered AWL transmitters. The annual licence tax payable on 26 GHz AWLs is relatively low and the presence of an unused AWL without registrations should not be permitted to preclude or deny the introduction of such EESS/SRS earth station receiver facilities.

Yours sincerely

Mark
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