CSIRO Submission on "Five-year spectrum outlook 2023–28 and 2023–24 work program" Draft for consultation

8 May 2023

Introduction

CSIRO welcomes this opportunity to provide a submission in relation to the Draft for Consultation: "Five-year spectrum outlook 2023–28 and 2023–24 work program."

CSIRO Space & Astronomy builds and operates national facilities for radio astronomy and for the space research service, which are recognised, for the purposes of spectrum management, as radiocommunication services by the ITU and the Radiocommunications Act 1992. CSIRO also supports the development of new technologies including IoT.

New and emerging technologies

CSIRO, as Australia's National Science Agency, supports the development of new technology to benefit Australians and enhance the Australian economy. At the same time, CSIRO has a responsibility to protect the current and ongoing investment in science infrastructure including radio telescopes operated under international collaboration and space tracking facilities operated under international treaty agreements.

As a general point, CSIRO encourages the ACMA to consider interference to these very sensitive and very expensive instruments when considering new technologies or changes to the current spectrum regulatory system. Specific comments on points raised in the FYSO are given below.

Specific comments

Satellite

Under "Market and technology drivers of change in spectrum demand" in the discussion of satellite communications and particularly large NGSO constellations, on page 20 there is a statement (emphasis added): "As part of this process, we encourage **cooperation and coordination between satellite networks to achieve mutual benefit**, without the burden and delays of additional prescriptive regulation." CSIRO notes that large NGSO constellations pose a risk of interference to other services including RAS and SRS. We suggest that the ACMA should encourage NGSO operators to seek coordination agreements with Australian RAS and SRS

operators, in line with SpaceX's exemplary approach to this matter, and not just coordination between NGSO operators.

On page 29 in relation to preliminary replanning of the 1.5 GHz band, the ACMA notes that the band 1427 – 1518 MHz is under consideration for extended MSS L-band. CSIRO notes that the adjacent band 1400 – 1427 MHz is very important for RAS/EESS/SRS (passive) and is protected under RR 5.340 (all emissions prohibited). If this band were used by MSS over RAS sites, the out-of-band emissions will inevitably encroach on this protected band. The same comment applies to the discussion of the 1.5 GHz band on page 40.

In relation to monitoring the band 37–43.5 GHz (page 34), the FYSO references footnote AUS87, which identifies several radio astronomy facilities that use the 40 GHz band to conduct passive observations. The FYSO then refers to interest from the satellite industry for this band, including uncoordinated class licence and coordinated earth station use. CSIRO notes that the RAS has many important spectral lines in the band 38-50 GHz. Interference is not a major concern for ground-based transmissions in this range if there is a reasonable separation distance, but that satellite-based transmissions could not only cause high interference but could potentially physically damage the RAS receivers. The same applies to the 46 and 47 GHz bands described on page 35.

In relation to satellite planning under "Optimising established planning frameworks", CSIRO has significant concerns with the trend towards new MSS applications such as D2C (direct to cell). Such applications will be extremely difficult to monitor or enforce in a radio quiet zone or under the coordination arrangements currently in place. Care should be taken in ensuring RAS protections can be enforced with operators by creating exclusion zones where no MSS service should be provided. This is particularly concerning for the 2 GHz band due to the technological difficulties for satellite operators to form sufficiently small beams to avoid RAS sites, but it is equally applicable to other proposed MSS frequency bands. Given the extremely high sensitivity of RAS receivers, far sidelobe levels of the satellite beam may still cause significant interference at an observatory.

PTS in 1800 MHz and 2 GHz

On page 29 in relation to implementation of band planning of the 1800 MHz and 2 GHz bands, ACMA advises an intention to seek review of RALIs MS33 and MS34 in Q3 2023. CSIRO notes that RALI MS 33 has measures to protect the SRS in the bands 2025-2110 MHz and 2110-2120 MHz, as well as measures for the ARQZWA for radio astronomy, and that RALI MS 34 considers protection of RAS under RALIs MS 31 and 32. While wishing to maintain these conditions (with appropriate updates if required) CSIRO also points out that RAS has a secondary allocation in 1710 - 1930 MHz which might require broader consideration.

WBB in 4 GHz

CSIRO notes that on page 32, in monitoring the potential of the 4 GHz (4400–4990 MHz) band for WBB, ACMA recognizes the (Australian) primary allocation to RAS in 4950–4990 MHz under the ARSP. CSIRO also notes that the band 4800 – 4900 MHz has a (global) secondary allocation to RAS, and that the adjacent band 4990 – 5000 MHz has a primary allocation to RAS and a secondary allocation to SRS (passive). Consideration of this band for WBB should give regard to protection from out-of-band emissions as well as the protection of primary allocations.

Drone regulation

CSIRO welcomes efforts to provide clearer guidance on spectrum usage by drones, as this has been a subject of uncertainty for some time. CSIRO notes that, as with the other topics above, consideration needs to be given to RAS and SRS facilities that may experience interference from RPAs. Airspace restrictions may need to be considered as a protection measure, noting that this would be a responsibility of CASA rather than ACMA but may require collaboration between the two Authorities.

Conclusion

CSIRO values the opportunity to provide input to this consultation process. We are available for further discussion if necessary.

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