

12 May 2023

The Manager
Spectrum Licensing Policy
Australian Communications and Media Authority
PO Box 13112
Law Courts
Melbourne VIC 8010

RE: Draft Five-year spectrum outlook (FYSO) 2023-28 and 2023-24 work program

Dear Sir/Madam,

Omnispace Australia Pty Ltd ("Omnispace") sincerely appreciates the opportunity to submit a response (see attachment 1) to the Australian Communications and Media Authority's ("ACMA") Consultation Paper, "*Five-year spectrum outlook 2023–28 and 2023–24 work program*" Draft for consultation" ("FYSO"). As government spectrum planning is integral to the availability and success of Omnispace's mobile-satellite service ("MSS") business in Australia, Omnispace applauds ACMA's efforts to develop a transparent spectrum management work program with public participation.

Background on Omnispace

Omnispace has far ranging and specific interests in the 2 GHz S-band given that it operates a global non-geostationary orbit ("NGSO") satellite system in the 2 GHz S-band (1980-2025 MHz Earth-to-space / 2170-2200 MHz space-to-Earth) with feeder links in the 5-7 GHz band. Omnispace's NGSO system has been brought into use in accordance with applicable International Telecommunication Union ("ITU") regulations. Omnispace is leveraging over AUD\$1 billion of assets that the company acquired to deploy its NGSO system in order to provide MSS and hybrid connectivity via a complementary ground component ("CGC").

Omnispace currently offers MSS capacity in various markets through its existing operational on-orbit F2 satellite network. The F2 satellite network is the first element of the NGSO constellation that will be capable of providing 24 x 7 coverage and connectivity around the globe ("Omnispace System"). In 2022 Omnispace launched two S-band capable LEO satellites into space to test the company's next generation 5G Non-Terrestrial Network ("NTN"), which will be a significant expansion of the Omnispace NGSO system.

Omnispace is investing in new technology and infrastructure as part of its next generation global constellation designed to provide hybrid 5G connectivity. The Omnispace network will power critical global communications, including 3GPP Release 17 compliant 5G NTN and Internet of Things ("IoT") connectivity, directly from its satellites in space to mobile devices around the world.

Omnispace is building upon the investments it has already made to validate 3GPP standards-based 5G products and technologies and to demonstrate 5G connectivity from space.

In Australia, Omnispace has an operational satellite Earth station at Ningi QLD with MSS feeder links for its satellite network in the 5 GHz and 7 GHz frequency bands. In 2022, Omnispace was added as a satellite operator on the Radiocommunications (Foreign Space Objects) Determination Amendment 2022 (No.1) ¹.


Thank you again for the opportunity to provide comments on the “Draft Five-year spectrum outlook 2023-28 and 2023-24 work program.”

Please contact me should there be a need for clarification or additional information.

Sincerely,

A black rectangular box redacting the signature of Les Davey.

Les Davey

A black rectangular box redacting contact information.

Managing Director
Omnispace Australia Pty Ltd

¹ <https://www.legislation.gov.au/Details/F2022L00701>

ATTACHMENT 1

Introduction

Omnispace is pleased to have the opportunity to provide these comments on the Australian Communications and Media Authority's consultation on the *Five-year spectrum outlook 2023–28 and 2023–24 work program* Draft for consultation.

Omnispace has a global operational non-geostationary orbit ("NGSO") satellite system in the 2 GHz S-band (1980-2025 MHz Earth-to-space / 2170-2200 MHz space-to-Earth) with licenced MSS feeder links in the 5175-5250 MHz (uplink) and 7010-7075 MHz (downlink) bands in Australia. Omnispace has an operational Earth station at Ningi in Queensland and is interested in acquiring a nationwide licence to provide MSS / CGC service throughout Australia. In the USA and Canada, Omnispace has entered into an MoU with Ligado networks to utilise up to 40 MHz of L-band spectrum and 60 MHz of S-band spectrum for a space based, direct-to-device 5G NTN compliant network. Therefore, Omnispace's comments to the FYSO focus on the L-band, 2 GHz S-band, the 6 GHz band and the importance of international engagement at the ITU and the APT.

Issues for Comment

MONITORING STAGE

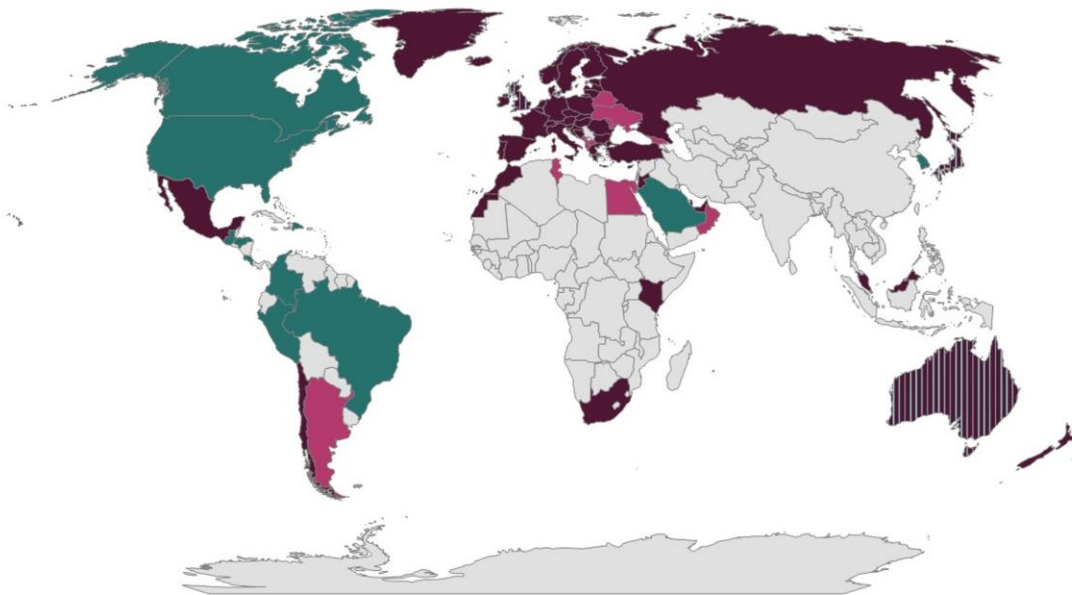
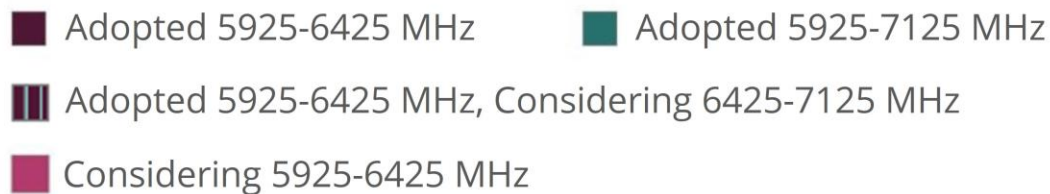
Bands being studied under WRC-23 Agenda Item 1.2

Omnispace's interest in WRC-23 Agenda Item 1.2 is confined to the frequency bands 6425 – 7025 MHz (Region 1 only) and 7025 – 7125 MHz (globally).

All or part of the 6425 to 7125 MHz 'upper 6 GHz' band has already been made available for terrestrial unlicensed or class licensed WAS/RLAN use in the United States, Canada, Saudi Arabia, the Republic of Korea, and number of other countries, and is actively being considered in many other countries around the world (see figure 1 below).

Omnispace is cognizant of studies prepared in response to the FCC's rulemaking on the band 5925 – 7125 MHz between WAS/RLANs and Fixed Satellite Service ("FSS") uplinks and MSS feeder downlinks, as well as those prepared and submitted to ITU-R WP5D considering IMT and the FSS to address WRC-23 Agenda Item 1.2. Review of the studies leads Omnispace to the view that use of the band 6425 – 7125 MHz for WAS/RLANs (with appropriate technical conditions) presents a workable mechanism for shared access with FSS (including MSS feeder downlinks). Whereas IMT use in any part of the 6425 to 7125 MHz band will likely exclude further FSS licensing in Australia and further curtail the ability for FSS growth in the band.

Figure 1: Countries Enabling Wi-Fi in 6 GHz (Wi-Fi 6E) (Source: Wi-Fi Alliance)



Furthermore, Omnispace notes that proposals for an IMT identification in 6425 – 7025 MHz in Region 3 are out of scope of the Agenda Item. Such proposals were not contemplated when AI 1.2 was drafted, and if they were, would likely have resulted in an agenda item with a different formulation and accompanying Resolution.

Omnispace is pleased that the ACMA will continue to monitor developments on the upper 6 GHz frequency range at the upcoming regional and international preparatory meetings for WRC-23 and encourages it to take an active role in those discussions and looks forward to providing further input to the ACMA on the replanning of the 6425 to 7125 MHz frequency band.

INITIAL INVESTIGATION STAGE

6 GHz (5925 – 7125 MHz)

Omnispace responded to ACMA’s Q2 2021 discussion paper as part of the initial investigation stage, looking at the state of both the 5 GHz and 6 GHz bands and international developments in these bands. Omnispace operates licenced feeder links in the 5175-5250 MHz (uplink) and 7010-7075 MHz (downlink) bands in Australia with an operational satellite gateway Earth station at Ningi in Queensland.

In relation to unlicensed or class licenced WAS/RLAN use, Omnispace is satisfied that studies and considerations undertaken within the FCC and NPRM process, and South Korea’s regulatory study

for the 6 GHz band have resulted in the development of suitable technical conditions for the operation of LPI and VLP power classes of WAS/RLAN devices that will not constrain the further development of FSS, specifically MSS feeder links (space-to-Earth). Omnispace believes that further studies on sharing and compatibility will need to be undertaken at the international level (including experience and empirical data gained) on the feasibility and effectiveness of Automated Frequency Coordination (“AFC”) systems to protect incumbent services from high or Standard Power (SP) class licenced RLANs.

Omnispace does not support any consideration of the use of the 6 GHz band for IMT, as it implies exclusive, primary use of the band for mobile services. Compatibility between outdoor IMT deployments and MSS downlinks in the same band will be challenging at best and tremendously problematical due to aggregate interference as has been noted in GSOA inputs to the ITU-R WP5D in relation to WRC-23 AI 1.2. In any event, as noted by the ACMA in the Q2 2021 discussion paper, IMT now has a large amount of spectrum available with more frequency bands available soon. WRC-19 also identified over 17 GHz of high-band spectrum for IMT and there are already Agenda Item proposals to consider sub-bands in the range 7 – 24 GHz for IMT identification at WRC-27, therefore it is hard to understand how spectrum that is currently being used by licenced and operating satellite services in Australia that global satellite systems rely on should be repurposed for IMT.

PRELIMINARY REPLANNING STAGE

1.5 GHz (1427 - 1518 MHz) and Extended MSS L-band (1518 – 1525 MHz and 1668 – 1675 MHz)

Omnispace does not have a direct interest in the 1.5 GHz band, however, we do have interest in the Extended MSS L-band for future MSS deployments and so we have an indirect interest that future uses of the 1.5 GHz band do not constrain or restrict future uses of the Extended MSS L-band.

We note that the 1.5 GHz band has been planned for the implementation of supplementary based IMT services in Europe (3GPP bands n75 and n76), FDD IMT services (3GPP band n74), TDD IMT services, (3GPP bands n50 and n51), and three similar options published in Recommendation ITU-R M.1036 as frequency arrangements for the implementation of IMT. If Australia should choose one of these frequency arrangements for the 1.5 GHz band, then it must consider the results of ongoing sharing studies between IMT and MSS being undertaken in ITU-R WP4C in order to ensure maximum utility of the Extended MSS L-band.

The Extended MSS L-band, by virtue of being immediately adjacent to 3GPP 5G NTN band n255 (1525 – 1559 MHz/1626.5 – 1660.5 MHz) has the potential to be used as an extension of band n255. If 3GPP seeks to define the Extended MSS L-band for 5G NTN it will consider adjacent band compatibility with n255 and the defined bands below 1518 MHz.

Omnispace looks forward to contributing to the ACMA’s consultation exercises related to the 1.5 GHz band and Extended MSS L-band.

2 GHz Band (1980-2010 / 2170-2200 MHz)

Omnispace supports the ACMA decision to proceed with licensing the 1980 – 2005 / 2170 – 2195 MHz bands (S-band) so that MSS operators can provide important, new and innovative

consumer mass market mobile-satellite services (MSS) and Complementary Ground Component (CGC) based on 3GPP 5G technology to all Australians, but especially to those in areas underserved by terrestrial mobile networks.

This band is identified for the satellite component of IMT and the ITU-R has initiated the process for technologies to be evaluated as the satellite component of IMT-2020 scheduled to conclude in 2024, and 3GPP has defined the band n256 for 5G NTN. Therefore, Omnispace strongly encourages the ACMA to plan this band for MSS and CGC services to bring advanced hybrid mobile communications to unserved communities throughout Australia.

Omnispace is interested in acquiring a licence in Australia to provide MSS / CGC service in this band and looks forward to contributing to relevant technical studies and consultations related to the band.

In its responses to the January 2022 consultations on the band, Omnispace proposed that ACMA maintain the 2 x 30 MHz allocation for MSS/CGC and not fragment the band by allocating 2 x 5 MHz for narrowband MSS. While the ACMA has allocated the 2 x 5 MHz for narrow band MSS use, Omnispace still maintains that:

- Traditional MSS is also capable of transmitting narrowband signals;
- Allocating 2 x 5 MHz in the upper part of the 1980-2010 MHz / 2170-2200 MHz band unnecessarily fragments the normal 2 x 15 MHz channel bandwidth for MSS licences in this band;
- Having the entire 2 x 30 MHz S-band MSS allocation would better accommodate future 5G NTNs;
- Allowing the widest variety of services to be offered to the Australian continent as those that MSS systems can offer globally results in more viable and credible business plans and more efficient use of the global spectrum and orbital resources; and
- A single country use-case specific for satellite applications has an inherent economy of scale disadvantage compared to global satellite systems.

Considering the points above, Omnispace is of the view that, to maximise spectrum efficiency by defragmentation, the ACMA consider aligning the technical requirements of the 2 x 5 MHz NB MSS spectrum to those that are decided for the remaining 2 x 25 MHz with a view to recombining the two band segments in future.

Given that the ACMA is ready to start authorising operations in the entire 1980-2010 MHz/2170-2200 MHz band by the end of 2024, the ITU-R process for evaluating candidate technologies for the satellite component of IMT-2020 will conclude in 2024 and MSS operators require regulatory certainty in advance to plan and execute satellite coordination, hardware and software development and to determine launch schedules, Omnispace supports expediting the timelines of 2024 in rural areas and 2026 in capital cities for transitioning TOB out of the band and implementing MSS / NB-MSS and CGC as far as is possible. Industry groups and operators interested in providing MSS / CGC services in the 2 GHz S-band should work with the ACMA and TOB operations to develop mechanisms that would achieve shorter timeframes. In non-metropolitan areas, service could be allowed as soon as the class licences are issued and then once the MSS licencing is finalised, licenced operators could work with the ACMA and TOB operations to implement an earlier transition period.

Omnispace has previously noted the preliminary view of the ACMA that the allocation of S-band MSS spectrum will occur via auction given that demand would likely exceed supply. To date, there has not been an auction in the 2 GHz band for mobile-satellite services on a stand-alone basis.

However, when the complementary ground component was included as an additional option then, in the case of Mexico and Saudi Arabia, a competitive market-based award process was used.

Omnispace's experience with these auctions, as a bidder in one and a winner in the other, leads it to the conclusion that a market-based allocation mechanism does not increase the allocative efficiency and hence does not make economic sense. Omnispace is more than willing to work with the ACMA and provide additional information regarding allocation mechanisms for MSS spectrum in the 2 GHz band globally.

Regardless of the allocation mechanism, there should be a condition(s) that guards against spectrum hoarding and market speculation, including that license seekers have an existing ITU-R satellite network filing for this band so that the network can be brought into service quickly thereby ensuring that Australians, particularly those in rural and remote areas, enjoy the economic and social benefits of early access to new services.

Noting that the Australian Government's priority is for digital inclusivity, especially for first nation Australians, priority for potential licensees should be afforded to those operators seeking to ensure cost-effective mass-market technologies that may be integrated with and complement terrestrial mobile network coverage.

It is a widely held opinion that the existing global MSS allocations are not sufficient to support the capacity required to meet the demand for 5G NTN or future 6G NR and NTN integrated networks. As radio frequency signals at higher frequencies suffer from increasing atmospheric and hydro meteoric attenuation, and the antennas required for efficient reception of lower frequency radio signals are not easily accommodated in the form factor for modern mobile (and mobile satellite devices) it will soon be necessary to find additional spectrum between 1 and 5 GHz to support growth of 5G NTN services. In this regard, Omnispace would like to collaborate with the ACMA on strategies and mechanisms to meet the increasing capacity demands for global MSS operations, such as but not limited to, the development of agenda items for a future World Radiocommunication Conference.
