

31 January 2024

Mr. Mark Arkell
Manager
Space Systems Section
Australian Communications and Media Authority
PO Box 78
Belconnen ACT 2616

RE: Satellite direct-to-mobile services: regulatory issues

Dear Mr. Arkell,

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, "Satellite direct-to-mobile services: regulatory issues" ("the Consultation"). As the regulatory considerations for the introduction of satellite direct-to-mobile (D2M) services will be important to the success of Omnispace's mobile-satellite service ("MSS") business in Australia, Omnispace applauds the ACMA's efforts to seek advice from the satellite industry on these important issues.

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 Non-Terrestrial Networks (NTN).

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 NTN system, which will be a significant expansion of the Omnispace NGSO system.

The Omnispace next generation constellation 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.

Omnispace continues to invest in Australia and obtain authorisations to provide mobile-satellite service in Australia, therefore Omnispace has a specific interest in this proceeding. Omnispace Australia was granted an Apparatus Licence for Space Service in Low and Remote Density Areas on July 4, 2023 for connectivity with the F2 satellite mentioned above. In addition, Omnispace Australia has an operational satellite Earth station at Ningi QLD with MSS feeder links for its F2 satellite network in the 5 GHz and 7 GHz frequency bands. Ningi also provides Fixed Satellite System (FSS) feeder links for the ASIABSS satellite network in the 7 GHz segment. 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 regulatory considerations for the introduction of satellite D2M services.

Please contact me at [REDACTED] should there be a need for clarification or additional information.

Sincerely,

A black rectangular box redacting the signature of Les Davey.

Les Davey
Managing Director
Omnispace Australia Pty Ltd

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

ATTACHMENT 1

Introduction

Omnispace Australia Pty Ltd ("Omnispace") is pleased to have the opportunity to provide comments on the Australian Communications and Media Authority's (ACMA) consultation on regulatory considerations for the introduction of satellite direct-to-mobile (D2M) services.

There are clear public-benefits for allowing satellite D2M in existing mobile satellite service (MSS) bands for providing services to under-served areas. Deployment of D2M services enables many of the benefits and use cases associated with terrestrial mobile services to be extended to rural, remote, mountainous, desert and maritime regions, including those services related to public protection and disaster relief.

Issues for Comment

Omnispace is pleased that the ACMA is seeking comment on the suitability of the current regulatory environment for future satellite D2M services. Our comments on questions posed by the ACMA follow.

Current spectrum management framework suitability for satellite D2M

- 1. Is the current spectrum management framework fit-for-purpose to manage these new satellite services? This includes spectrum-licensed bands and other bands covered by the LIPD class licence.*

In the ACMA 31 October 2023 Spectrum tune-up for satellite D2M, the ACMA identified two possible approaches for authorising D2M connectivity.

The first approach applies to bands allocated to the mobile-satellite service (MSS) and utilises the existing satellite licensing framework without modification. In this approach, transmissions originating from a satellite with coverage of Australian territories (or parts thereof) are authorised by inclusion of the operator in the Radiocommunications (Foreign Space Objects) Determination and an appropriate apparatus licence, and transmissions originating from terrestrial user terminals are authorised using a class licence.

Omnispace agrees with the ACMA that satellite connectivity including D2M using bands already allocated to satellite services (including those for MSS) in Australia should be authorised under the existing licensing framework without the need for modifying that framework. We also note that there is a concurrent ACMA consultation on technical parameters associated with MSS access to the 2 GHz spectrum for which Omnispace will provide a submission.

It should be noted that additional MSS allocations in the S-band are the topic of WRC-27 Agenda Item 1.14 for which no new regulatory issues are contemplated. Recognizing that additional MSS allocations, such as those envisaged under Agenda Item 1.14, would increase the opportunities for economic and social benefits accruing from greater available MSS bandwidth, Australia should consider active support of this agenda item.

The ACMA also advised that satellite IoT operations in bands covered by the LIPD class licence would be authorised using that class licence. A class licence may be suitable to authorise Earth-to-space transmissions, as is current practice vis-à-vis the ACMA space object class licence, however, it is unclear how such a licensing mechanism would be used to authorise and enforce transmissions originating from space. Additional allocations for low data rate MSS are the topic of WRC-27 Agenda Item 1.12.

The second approach applies to terrestrial mobile service bands identified for International Mobile Telecommunications (IMT). This second option requires deeper consideration to ascertain if the existing regulatory framework is as the ACMA asks “fit-for-purpose”. WRC-23 considered the issue and agreed on the new WRC-27 Agenda Item 1.13. One of the main considerations for Agenda Item 1.13 is whether additional MSS allocations should be made in bands identified for IMT between 694/698 and 2700 MHz, as well as regulatory mechanisms that would be associated with Agenda Item 1.13.

Regardless of the appropriate licensing framework, satellite connectivity (including that for D2M) requires specification of technical characteristics and restrictions depending on the band and bandwidth of operation, general satellite network design and operation, user device characteristics and protection of incumbent usage. In most cases this will require separate consultations for each frequency band to decide these details as has been common practice in the past and exemplified by the ACMA consultation on 2 GHz narrowband MSS and the currently open ACMA consultation on 2 GHz MSS allocations.

The framework that is decided for satellite D2M using terrestrial MS bands in Australia must take into account and be aligned with the ITU Radio Regulations in force and potential revisions related to WRC-27 Agenda Item 1.13. Omnispace anticipates that following the conclusion of this consultation on “Satellite direct-to-mobile services: regulatory issues” additional consultation processes would also be required to determine appropriate regulatory and technical characteristics associated with satellite use of terrestrial mobile service bands. It would be prudent to wait until the ITU-R studies related to Agenda Item 1.13 reach suitable maturity before adopting regulatory provisions for D2M in bands without a corresponding primary MSS allocation. Similarly, it is prudent to wait until the ITU-R studies related to Agenda Item 1.14 reach suitable maturity before enabling regulatory provisions for D2M within bands under consideration for new MSS allocations in the 2 GHz range.

Proponents for satellite D2M using bands without a corresponding primary MSS allocation have suggested that such systems be authorised in Australia using ITU Radio Regulation No. 4.4. Omnispace strongly recommends that the ACMA does not embark on this authorisation route.

The use of Article 4.4 for satellite networks should be approached with caution, as noted by the Radio Regulations Board (RRB)²:

“in recent years, the Board noted that an increasing number of satellite operators planning to use a frequency band under No. 4.4, deployed their system or network and began offering commercial services without seeking any decision from a WRC. For these satellite systems, in particular non-GSO systems, the interference situation was uncertain due to the large number of orbital planes and satellites. Demonstrating conformity with the Rule of Procedure on

² WRC-23/Document 50-E “Report by the Radio Regulations Board to WRC-23 on Resolution 80 (Rev.WRC-07)”

No. 4.4 becomes very challenging when thousands of satellites could be involved. It was not clear that administrations and operators fully understood their obligations under No. 4.4 and its impact on the quality of service and capacity of their satellite system. In this context, as the risk of interference was likely increasing, more stringent regulatory provisions would be required to effectively address cases of harmful interference that originated from operations under No. 4.4 and to enforce No. 4.4 with appropriate consequences for non-compliance.”

WRC-23 discussed the use of ITU RR No. 4.4 in section 4.14 of the Report of the Director of the Radiocommunication Bureau, “Recording of frequency assignments to satellite networks and systems under No. 4.4” and confirmed “that frequency assignments recorded under RR No. 4.4 are not entitled to protection from harmful interference from other frequency assignments recorded under RR No. 4.4.”³ In other words, there is no first-in-time priority afforded to networks and systems authorised under ITU RR No. 4.4.

One challenge with operations from space using bands without a corresponding primary MSS allocation is the very real chance of creating satellite-to-satellite interference in bands that are not used consistently with ITU MSS allocations (e.g., operating under RR No. 4.4), particularly if the uplink/downlink directionality is different from the ITU satellite allocation. The opportunity for satellite-to-satellite interference is increased with satellite systems that have hundreds or thousands of satellites operating on a non-interference basis. Because free space propagation occurs with the minimum amount of signal attenuation, sensitive space-borne receivers would be more susceptible to interference from satellite operations operating under ITU RR No. 4.4, which emphasises the importance of reviewing the results of sharing studies under WRC-27 AI 1.13.

Omnispace notes that the existing mobile service spectrum licences in IMT bands refer to only terrestrial, and not to space services. So, if ITU RR No. 4.4. were to be utilised, at the very least, the authorisations would need to be updated to reflect non-terrestrial operation authorisations, to include satellite operation (currently authorisation extends only to terrestrial and HAPS transmissions) with additional licence conditions concerning ITU RR No. 4.4. And, following this, the associated ACMA Business Operating Procedure(s) will need to be revised accordingly.

Omnispace notes that, as an outcome of the CPM27-1 meeting held in December 2023 in Dubai, ITU-R WP 4C will lead studies on the two agenda items mentioned above, with support provided by WP 5D, in the next study period. It would be prudent for the ACMA to closely follow the activities of WP 4C and WP 5D.

Domestically, Omnispace considers that an industry Technical Liaison Group (TLG) should be established to investigate the satellite and terrestrial services coexistence issues, to determine the necessary regulatory conditions for sharing spectrum in bands for which new allocations to the mobile-satellite service are contemplated under WRC-27 AI 1.13 and 1.14.

In the interim, Omnispace supports the use of technology trials, to provide empirical validation for theoretical domestic and ITU-R sharing studies.

Omnispace is of the view that bands covered by the LIPD class licence should not be used for satellite D2M. The licensing mechanisms in these bands are unsuitable for providing the quality-of-service objectives required for the range of use cases expected for D2M services.

³ WRC-23/Document 494-E, Section 4.14 at p. 8.

Omnispace notes that the ACMA has already made provision for satellite IoT using the bands covered by the LIPD class licence, and in the 2 x 5 MHz of the S-band in the satellite class licence. The 2 x 5 MHz of the S-band licensed in Australia for narrowband MSS represents a loss of 1/6th of the spectrum available for D2M services in the 2 GHz range.

Omnispace regulatory concerns

2. *If not considered fit-for-purpose: What are your concerns? What is your proposed solution? What next steps should be taken?*

Omnispace considers that for satellite D2M in bands without a corresponding primary MSS allocation, studies are needed to investigate the satellite/terrestrial coexistence issues. This is especially important if ITU RR No. 4.4 is utilised by the ACMA to authorise D2M in bands without a corresponding primary MSS allocation prior to an allocation to the MSS being agreed at WRC-27.

For medium- and long-term satellite D2M licensing of the operation in bands without a corresponding primary MSS allocation, studies and technology trials are first required to validate the practicality of including an MSS (or other satellite) allocation in the target bands. These studies, trials and allocations are necessary pre-requisites for obtaining agreement on a suitable regulatory framework, and licensing conditions.

Omnispace considers that a TLG or similar group should be established as a first step to undertake theoretical coexistence studies, with the next step being the evaluation of the results of technology trials. These studies and trial results may be provided to the ITU-R in its process to develop the Conference Preparatory Meeting report for WRC-27 Agenda Item 1.13.

Other Omnispace concerns

3. *Are there any other commercial, regulatory or public-benefit implications we should take into account?*

Omnispace considers that there are commercial, regulatory, and public-benefit implications that need to be considered before satellite D2M licensing is implemented in bands without a corresponding primary MSS allocation.

The commercial concern is that a successful business plan for a true global D2M network should not rely on operating on a non-interference basis as would be required under ITU RR No. 4.4. Global satellite networks cost billions of Australian dollars and that kind of investment necessitates a more certain commercial and regulatory framework than one that would require modification or ceasing operations if it interferes with other systems – satellite or terrestrial. Innovation and first-to-market advantage should not be at a cost to those operating in accordance with international norms.

The Omnispace position on the regulatory framework for satellite D2M licensing has been discussed for issues 1 and 2 above.

In conclusion, Omnispace considers that ACMA's proposal to allow the use of satellite D2M in existing MSS allocations will enable the implementation of innovative services that can benefit the huge expanse of Australia that currently lacks access to telecommunications while maintaining compliance with the international regulatory framework of the ITU. Adopting a regulatory framework regarding satellite D2M in bands without a corresponding primary MSS allocation should only be done once the ITU-R studies related to WRC-27 Agenda Item 1.13 reach suitable maturity.