



11 May 2023

The Manager Economics Advisory
Australian Communications and Media Authority
PO Box 13112 Law Courts
Melbourne VIC 8010

Re: Amazon Web Services, Inc. (AWS) Submission to the Australian Communications and Media Authority's (ACMA) Response to Five-year spectrum outlook 2023-28 and 2023-24 work program Draft for consultation

Summary

AWS welcomes ACMA's initiative to draft a five-year spectrum outlook and work program. Through AWS Ground Station (**AWS GS**), AWS is committed to opening up and growing the Australian space industry. AWS supports ACMA's objective to enhance regional connectivity and promote investment, innovation, and adoption of new and emerging technologies. To support this goal, AWS is proposing:

1. simplifying procedures for earth station observation licensing;
2. expanding spectrum band usage to encompass earth exploration satellite services (**EESS**) operations; and
3. establishing a pricing structure that considers EESS models as part of ACMA'S proposed changes to reduce taxes for services above 5 GHz.

Background

AWS GS is a cloud product that enables satellite operators to access their space workloads around the world. New and novel space-based applications, especially in the burgeoning EESS and Internet of Things (**IoT**) segments, spur economic growth and job creation. However, the high costs to build or operate international earth stations are a major barrier to entry into the space industry. For example, non-geostationary satellite orbit (**NGSO**) constellations engaged in EESS require a geographically diverse global terrestrial infrastructure to support their operations. The goal of AWS GS is to reduce costs for our customers, including NGSO engaged in EESS, in terms of time, money, and coordination. AWS GS supports customers' satellite commands and downlink data requirements across multiple regions quickly, easily, and cost effectively, with multiple antennas at each geographically diverse AWS earth station. AWS GS's customers can downlink satellite data directly into an AWS region for immediate processing and distribution and leverage AWS GS for telemetry, tracking and control (**TT&C**). With capabilities like AWS GS, satellite operators can scale up their ground segment use commensurate with the deployment of their on-orbit assets, reducing delay both in their infrastructure buildout and service delivery to end-users.

Comments

In response to ACMA's invitation to comment on how spectrum-sharing arrangements could be best facilitated to meet the needs of different spectrum users¹, AWS believes that spectrum sharing by NGSO

¹ ACMA Five-year spectrum outlook 2023-28 and 2023-24 work program, Page 16 (March 2023).



EESS operators should be a target for ACMA given that NGSO EESS technology is specifically engineered for the purpose of sharing spectrum. AWS agrees with ACMA that spectrum sharing is a core component of managing access to spectrum², and that spectrum sharing by NGSO EESS operators can be successfully achieved through uncoordinated access. AWS supports a model of spectrum sharing in Australia and believes the space industry would benefit from it. As such, AWS respectfully requests ACMA to consider adopting a spectrum sharing model through 1) simplifying procedures for earth station observation licensing; 2) expanding spectrum band usage to encompass EESS operations; and 3) establishing a pricing structure that considers EESS operations.

1. Un-coordinated access to spectrum sharing and earth observation innovation can be accomplished by simplifying procedures for earth station licensing.

Most of AWS GS customers' use case is within the 2 GHz band. In Australia, this band is mostly shared with television outside broadcasting (TOB) service providers. As such, in order for AWS GS customers to operate in Australia, AWS and TOB service providers must first coordinate and sign individual agreements each time for each frequency. Even though AWS GS has had a positive experience with TOB service providers, the current process is time-consuming, and introduces uncertainty in planning. As such, AWS respectfully requests ACMA to consider a simplified mechanism for spectrum sharing between NGSO EESS operators and TOB service providers. AWS suggests ACMA to consider a) shortening the licensing process timelines and b) providing an exemption for no interference use cases.

- a. Short licensing processing timelines. AWS believes that licensing processing times should be short and the process transparent. Certainty for processing licensing requests is critical for satellite operators that use AWS GS, which often include start-ups that raise capital from private investors based on milestones linked to regulatory licensing. Improving licensing processes would promote investment and innovation in Australia without requiring any significant cost investment or burdensome regulatory change. This can be achieved through the development of a one-stop-shop digital platform through which operators would interact with ACMA without the need for executing individual agreements between space operators and TOB service providers.
- b. Exempt no-interference use cases. AWS believes that licensing certain categories of satellite services is an unnecessary regulatory burden. AWS urges ACMA to exempt earth station operators that do not cause harmful interference, like receive-only earth stations, and transmissions intended to perform TT&C functions that can operate on a no-interference basis. The purpose of licensing is public safety and preventing harmful interference. If licensing is not accomplishing those twin aims, then ACMA should not require a license.

2) ACMA would foster earth observation innovation by expanding spectrum band usage to encompass EESS operations.

As mentioned above, AWS GS's customer use cases are primarily NGSO EESS. These operators require nearly constant communications with their spacecraft globally, so, their selected communications are

² *Id.*



driven by ITU allocations to enable use of the same communications platform globally. AWS GS currently supports customers in S-band receive (2200 to 2300 MHz), S-band transmit (2025 to 2120 MHz), and X-band receive (7750-8400 Mhz).

AWS commends ACMA for its previous and ongoing efforts to resolve competing demands in the 2GHz range in order to allow better deployment of a range of satellite services. However, AWS respectfully suggests that ACMA also considers other satellite models, such as those engaged in earth observation, within the 2 GHz band to align with ITU allocation.

Also, AWS welcomes ACMA's work to review and update arrangements to support satellite services in Ku- and Ka-bands.³ Expanding capabilities to new bands will promote earth station provider innovation, which will remain a key component supporting an increasing number of space stations. AWS commends ACMA for monitoring the 40 GHz bands.⁴ However, in order for AWS GS to expand Ka capabilities into Australia and foster earth observation innovation, it will need access to the 20 GHz bands. AWS kindly requests ACMA to consider monitoring the 20 GHz bands to further promote the long-term public interest derived from spectrum.

3. ACMA would foster earth observation and space innovation by establishing a pricing structure that considers EESS operations.

AWS welcomes ACMA's proposed changes to reduce taxes based on the tax formula for services above 5 GHz, from 50% to 90% depending on the frequency range and the service and to introduce a 'systems price' for earth stations with multiple antennas. These changes are crucial for space innovation. AWS would like to reiterate its prior recommendation to ACMA suggesting that taxes on non-exclusive use of spectrum should be further reduced, requiring licensees to pay a nominal spectrum access fee within their desired band and eliminating redundant spectrum fees for earth station licensees repeatedly accessing the same spectrum bandwidths. If these recommendations are implemented, Australia's spectrum costs will better align with other jurisdictions and will foster space innovation.

- a. ACMA should make a distinction in spectrum fees between non-exclusive and exclusive use of spectrum by reducing taxes on non-exclusive use of spectrum by an adjustment factor of 95%. AWS GS supports innovative EESS satellites that use large spectrum bandwidths on a receive-only, non-exclusive basis. However, as of today, there is no difference in spectrum fees between an earth license requesting exclusive use of a frequency (e.g., for continuous transmit, as opposed to TT&C) and an earth license requesting non-exclusive use of a frequency (e.g. receive license), which permits spectrum sharing. Spectrum fees collected for receive-only, nonexclusive operations calculated at exclusive cost pricing is a barrier to Australia being globally competitive. Australia is one of the few jurisdictions that charges per bandwidth for receive-only communications. We propose that taxes on non-exclusive use of spectrum should be further reduced by an adjustment factor of 95%, essentially requiring licensees to pay a nominal spectrum access fee within their desired band, or in the alternative, only the recovery costs of spectrum management for non-protected licenses. This reflects the efficiency of nonexclusive use and the lowered costs that should come with it, and would better support the ACMA's principle of efficient

³ *Id.* Page 40

⁴ *Id.*



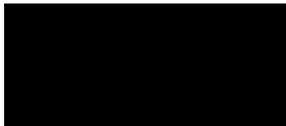
allocation and use of the radiofrequency spectrum because it would accurately reflect the opportunity costs where no spectrum denial is created and encourage shared spectrum use.

b. Eliminating redundant spectrum fees for earth station licensees repeatedly accessing the same spectrum bandwidths. Earth station licensees like AWS GS pay multiple times to access the same spectrum. AWS understands the business operating procedures for fixed earth and earth receive apparatus licenses require licenses to be granted on a per ITU constellation basis. In accordance with those procedures, AWS recommends ACMA continue to grant licenses on a per ITU satellite network basis but collect taxes for new licenses based on the spectrum management costs as assessed by the administrative processing fee and a marginal spectrum fee. The marginal spectrum fee would be the additional charge to add to the authorized frequency range for a license holder. For example, if AWS GS has a license for 8025-8300 MHz to support one satellite, and then requests to support another satellite in 8025-8400 MHz, AWS GS proposes to only pay the marginal spectrum fee for the additional 100MHz of bandwidth plus the administrative processing fee. If the licensee simply requests to add a point of communication to spectrum it has already paid to use, the licensee has a marginal cost of zero and will pay the administrative costs to process the license.

c. Nominal fees for Ground Station operators. AWS believes that licensing fees should not create a barrier to entry. In order to encourage the entry of start-ups in the space sector, AWS recommends that ACMA establish authorization fees in various applications forms to a reasonable amount, preferably a nominal, competitive, low fee. Best practice regulatory frameworks currently recognize TT&C systems as an accessory to service generally applying low fees as the spectrum is not used for in-country service. A low fee (sometimes issued as a flat annual fee) that covers the cost of processing and coordinating requests is the norm in most jurisdictions. Spectrum costs likewise should not prevent the development of innovative services in Australia. AWS believes the spectrum cost formula for TT&C systems should be a low flat annual fee, like other jurisdictions such as Sweden and South Africa. This allows for accurate financial forecasting and avoids unintended large-scale cost effects as spectrum usage grows.

Thank you for considering our submission. If you would like to discuss the matters raised, or any further information, please let me know.

Yours sincerely,



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