February 28, 2022

Radio Spectrum Management Policy and Planning
Ministry of Business, Innovation and Employment
PO Box 2847
Wellington 6140
New Zealand
By email: Radio.Spectrum@mbie.govt.nz

Re: Draft Five Year Spectrum Outlook 2022-2026 (December 2021)

Kuiper Systems LLC (**Kuiper**), a wholly owned subsidiary of Amazon.com Services LLC (together, **Amazon**), welcomes the opportunity to make this submission to Radio Spectrum Management (**RSM**) on the Draft Five Year Spectrum Outlook (**Draft Outlook**).

I. Background

Amazon plans to launch and operate a constellation of non-geostationary satellite orbit (**NGSO**) satellites in low Earth orbit (**LEO**) that will provide ubiquitous, high-capacity, high-speed, low latency broadband services to unserved and underserved communities around the world, including in New Zealand. The Kuiper System will increase the availability and choice of internet connectivity, in line with the Government's plan to improve digital inclusion through the development of a Digital Strategy for Aotearoa. Through its NGSO constellation, Amazon plans to serve a variety of customers – from residential consumers, schools, rural and remote communities and small businesses, to telecommunications operators, enterprise systems (including logistics and remote energy infrastructure), as well as the public sector, emergency communications, and disaster relief efforts. To provide these services, we require ongoing access to the Ka-band radio spectrum, broadly the 27.5-30 GHz (Earth-to-space) and 17.7-20.2 GHz (space-to-Earth) frequency bands.

Kuiper will build on Amazon's existing investments in New Zealand. As you may know, Amazon has been operating in the country for more than eight years through our cloud services arm, Amazon Web Services (AWS). Operating through its local affiliate, AWS has offices in Auckland and Wellington, and employs more than 150 staff in roles such as solutions architects, professional services consultants, and cloud experts and engineers. AWS also has thousands of New Zealand customers of all sizes, across all industries - including start-ups, small and medium businesses, multi-national enterprises, and public sector organisations. In September 2021, Amazon announced the deployment of an AWS Cloud Region in Auckland in 2024. That infrastructure investment is estimated at $7.5 billion New Zealand dollars over the next 15 years, and will create an estimated 1,000 new jobs. Just this month, Amazon also announced the launch of a low latency Local Zone in New Zealand to run workloads closer to customers in country. These investments are driven by our belief in New Zealand's high technology future.

II. Comments on Specific Sections of the Draft Outlook

Amazon applauds RSM's approach of taking a strategic view to enable wireless digital connectivity to contribute to the economic growth, innovation and global connectiveness for users in New Zealand. We agree with RSM that satellite technologies are driving change to support digital transformation, bringing broadband services worldwide and in New Zealand.

Project Kuiper will help meet the growing demand on internet infrastructure that is driven by the growth of digital products and services. In its discussion on "Technologies Driving Change" (Draft Outlook, Section 2, at pp. 12-18), RSM examines the changes taking place in the satellite and space industries. The growing range of applications and services that are driving growth in other industries are equally relevant to the satellite industry. We recognise the increasing demand for access to broadband data services worldwide, and are eager to meet that demand. Private networks, IoT applications, and middle mile/backhaul solutions to support 5G networks are already being delivered by satellite systems around the world. These are among several areas where Amazon will be offering services and which will benefit users in New Zealand. We encourage RSM to enable the contributions of satellite in its policy and regulatory actions.

On-going and timely access to Ka-band spectrum is essential for satellite systems in New Zealand. Last year, RSM undertook a consultation in relation to the use of the 24-30 GHz band.[1] The submissions to this proceeding confirm that there is every reason to maintain the primary fixed-satellite service spectrum allocation in the 27.5-30 GHz band, which is paired with the 17.7-20.2 GHz band. Ka-band frequencies are essential for the operation of modern broadband satellite systems, which support a wide variety of applications, including aeronautical and maritime broadband, mobile backhaul connectivity, fixed broadband services, and government universal service programs, among others. We recommend RSM undertake a rapid completion of the work on the 24–30 GHz Discussion Document to give the satellite industry confidence of its investments in New Zealand and to ensure that satellite operators are able to provide broadband services in the country using Ka-band frequencies.

Space systems have a clear demand for access to Ka-band frequencies and are very efficient users of the radio spectrum. Satellite systems continue to demonstrate a requirement to have access to the Ka-band, with the steady launch of satellites in this band over the last two decades and the introduction of new NGSO and GSO broadband systems. We recommend RSM maintain access to frequencies in Ka-band for satellite systems, both for gateway feeder links and customer terminals (including Earth Stations in Motion).

RSM notes the importance of spectrum sharing as a way forward (Draft Outlook, Section 3, pp. 19-26). Amazon notes that satellite systems have specific sharing mechanisms that are defined by the ITU Radio Regulations. The ITU-R has developed approaches that allow many different NGSO and GSO satellite systems to co-exist with each other without harmful interference. In addition, satellite systems can share with other spectrum uses -- such as fixed service stations and low powered broadband technologies. This was considered by RSM in the 24-30 GHz Discussion Document. Spectrum sharing with ubiquitous terrestrial systems, however, is challenging. We recommend that RSM align the frequency bands

[1] 24-30 GHz use in New Zealand, Discussion Document (April 2021), available at https://www.rsm.govt.nz/assets/Uploads/documents/consultations/2021-24-30-ghz-use-in-new-zealand/2021-discussion-document-consultation-24-30-ghz-use-in-new-zealand.pdf (**24-30 GHz Discussion Document**).

identified for 5G/IMT systems with the internationally harmonized 3GPP n258 band (24.25-27.5 GHz).[2] Any requirement for satellite and IMT (mobile 5G) systems to share any portion of the 28 GHz band will constrain and, at the same time, prevent both services from reaching their full potential due to the geographical separation distances required to ensure compatibility.

The licensing of most satellite user terminals in New Zealand should be in accordance with a General User Radio Licence (GURL). In relation to the discussion on licensing approaches in Section 3 of the Draft Outlook, Amazon recommends that the licensing of most satellite user terminals should be in accordance with a GURL. This mechanism will facilitate the licensing process, simplify the deployment of satellite terminals, and enable rapid customer adoption of new and innovative satellite technologies for the benefit of users in New Zealand.

Finally, Amazon notes that in Section 3.2 and Section 4 of the Draft Outlook, RSM indicates among its priorities an intention to "*Review and re-plan the 24-30 GHz band including technical consultation*". We recommend that the RSM include an acknowledgement of Ka-band satellite systems in the check boxes in Table 2 of Section 4 (p. 28) for Massive IoT, Private Networks and Industry Verticals, Spectrum sharing + efficient user of spectrum, and General user licensing, as these are areas to which satellite contribute.

III. Summary

Amazon is eager to provide satellite technology that will assist RSM with its digital connectivity goals. To achieve wireless digital connectivity that contributes to economic growth, innovation and global connectiveness for users in New Zealand, Amazon encourages RSM to enable the contributions of all technologies that provide connectivity, including satellite. To that end, we urge RSM to promptly complete its work on the 24-30 Discussion Document and ensure continued satellite access to the Ka-band radio spectrum in the 27.5-30 GHz (Earth-to-space) and 17.7-20.2 GHz (space-to-Earth) frequency bands on a primary basis to facilitate broadband service offerings that will benefit customers in New Zealand.

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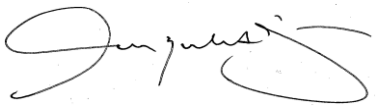
Amazon thanks the RSM for the opportunity to comment on the Draft Outlook. We look forward to working to expand broadband access and increase customer choice for more households and businesses in New Zealand, and welcome the opportunity to meet with RSM to provide further context and discuss these comments or any other issues of interest in this submission.

Respectfully submitted,



Gonzalo de Dios
Head of Global Licensing, Project Kuiper

[2] Millimetre wave bands contain plenty of spectrum to accommodate 5G uses, without disturbing the extensive satellite use of the 28 GHz band. For example, the 24.25-27.5 GHz band (26 GHz band) has been identified by the International Telecommunication Union (ITU) for 5G/IMT use on a global basis. The 26 GHz band provides 3.25 GHz of total spectrum for 5G/IMT services, which is more than enough to satisfy 5G requirements in millimetre wave bands.