

Radio Spectrum Management - New Zealand

Request for feedback on the technical issues for the 24–30 GHz band in New Zealand.

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Introduction

Sateliot welcomes the initiative of Radio Spectrum Management (RSM) in New Zealand to seek stakeholder feedback on the future allocation and management of the 24–30 GHz (Ka-band) spectrum. We appreciate RSM's continued commitment to transparent spectrum governance and its proactive engagement with the satellite and telecommunications sectors. As non-terrestrial networks (NTN) become increasingly important in enabling global connectivity and supporting emerging digital ecosystems, forward-looking regulatory frameworks are essential to ensure innovation, sustainable growth, and equitable access to high-value spectrum resources. RSM's leadership in consulting industry stakeholders is a crucial step toward shaping an efficient Ka-band environment that balances national interests, commercial opportunities, and technological evolution.

Sateliot is pleased to contribute to this consultation by sharing insights informed by our operational experience in satellite IoT services. Founded in 2018, Sateliot is the first LEO satellite operator to deliver global IoT connectivity using the 3GPP 5G NB-IoT NTN standard, seamlessly extending terrestrial mobile networks into space. This standardized approach allows Mobile Network Operators (MNOs) to expand their coverage into remote and underserved areas without requiring any hardware modifications to existing IoT devices.

Operating as a wholesale satellite network partner to MNOs, Sateliot integrates through GSMA-compliant roaming agreements, complementing terrestrial networks rather than competing with them. Our constellation of Low Earth Orbit (LEO) satellites operates as “cell towers in space,” providing cost-efficient, scalable, and standards-based IoT connectivity across global markets.

Our feedback to this consultation reflects our technical knowledge, operational experience, and regulatory understanding of Ka-band feeder-link usage for LEO satellite constellations. It also incorporates forward-looking considerations relevant to spectrum planning in New Zealand, particularly in relation to gateway deployment, coexistence, and long-term capacity needs.

Sateliot's responses in this document follow the structure and sequence of the questions posed in the consultation, referencing relevant sections where appropriate. As part of our future operational roadmap, Sateliot plans to establish a dedicated Ka-band ground station at the Awarua Satellite Ground Station site in 2027. This station—equipped with Sateliot's own Ka-band antenna systems and associated RF and ground-segment infrastructure—will serve as a high-capacity gateway integrated into our global ground segment. It will support mission control, high-throughput uplinks and downlinks, and provide scalable feeder-link capacity to enable the growth and evolution of our LEO constellation.

40. Do you agree with RSM's proposed new spectrum uses outlined in Section 3.1? If not, provide details on the modifications you wish to seek with appropriate reasoning.

Sateliot respectfully does not fully agree with the full range of new spectrum uses proposed in Section 3.1. While we support the overarching objective of ensuring long-term access to the 28.35–29.5 GHz band, Sateliot requests that this band be allocated solely to FSS Earth Station (Earth-to-space) gateways at specific fixed locations across New Zealand, without introducing additional user categories.

Our reasoning is as follows:

1. The upper 28 GHz band is globally recognised as the primary feeder-link band for NGSO and GSO satellite systems. High-throughput constellations—including SATELIOT's own future Ka-band infrastructure—depend on stable, uncontested, and predictable access to this spectrum for gateway uplinks, network control, and scalable constellation growth.
2. Introducing other transmitting terminal types (e.g., widespread VSATs or L-ESIMs) increases adjacent-band and aggregate interference complexity for feeder links, which operate with high-order modulation, tight link margins, and stringent availability requirements. Even if each terminal is individually compliant, large-scale deployment creates coordination challenges that can degrade gateway performance.
3. Gateway feeder links lack alternatives:
 - Mobility terminals (A-ESIM, M-ESIM, L-ESIM) can operate effectively in neighbouring Ka-band segments under global ITU frameworks.
 - By contrast, feeder-link gateways require high-power, narrow-beam, site-specific Earth stations whose performance is sensitive to uplink noise and adjacent-band emissions.
4. New Zealand's national interests are best served by securing long-term, high-capacity Ka-band gateway infrastructure.
Sites such as Awarua are uniquely well-suited to hosting Earth-to-space feeder links. Ensuring that the upper 28 GHz band remains dedicated to gateway operations will support New Zealand's role in the global space and NTN ecosystem, while attracting investment into resilient ground-segment infrastructure.

For these reasons, Sateliot recommends a gateway-only allocation model in 28.35–29.5 GHz, with:

- Individually licensed FSS Earth-station (Earth-to-space) gateways;
- Flexibility for multiple antennas and network growth at authorised gateway sites;
- No introduction of additional user categories that could complicate interference management.

This approach ensures strong alignment with international practice, protects critical feeder-link performance, and provides the certainty required for Sateliot and other operators to invest in long-term Ka-band gateway deployments in New Zealand.

43. To not constrain future use of A-ESIMs and L-ESIMs, do you propose any changes to the technical conditions for operating A-ESIMs and L-ESIMs within 28.35 – 29.5 GHz? If so, what would these be and what assumptions as well as processes did you use to derive these changes? RADIO SPECTRUM MANAGEMENT 55 Allocation of 24 - 30 GHz Spectrum

Sateliot fully supports the continued accommodation of A-ESIM and M-ESIM under existing WRC-approved ITU-R frameworks (Res. 169 and Res. 123). These operating models are mature, globally harmonised, and already engineered to protect existing services.

Sateliot propose RSM for consideration following protection criteria in order to ensure protections of FSS gateways operating in 28.35 - 29.5 GHz (Earth-to-space):

- In accordance with the ITU-R Rec. S.1323-2 “Maximum permissible levels of interference in a satellite network (GSO/FSS, non-GSO/FSS; non-GSO/MSS feeder links) in the fixed-satellite service caused by other codirectional FSS networks below 30 GHz” **I/N ratio should not exceed 6% (-12,21 dB) for more than 10% of time.**
- In accordance with provisions of the RR, Resolution 169 (Rev. WRC-23) Sateliot recommends **implementing an exclusion zone to restrict ESIMs operation within 500 km** of a non-GSO MSS feeder-link earth station in any portion of the frequency band 29.1-29.5 GHz.

However, we do not support expanding L-ESIM use in 28.35–29.5 GHz because:

- Unlike aircraft and maritime terminals, L-ESIMs operate close to terrestrial receivers, and
- their aggregate effect is substantially more difficult to model or manage.

Rather than relaxing constraints, Sateliot recommends that RSM:

1. Continue supporting A-ESIM and M-ESIM under ITU conditions with no additional restrictions;
2. Limit L-ESIM use in the band, ideally removing them from 28.35–29.5 GHz entirely; and
3. Apply any L-ESIM rules (if adopted) only on an exceptional, controlled basis, not as a general national policy.

This ensures both protection of terrestrial services and the long-term operational certainty needed for high-throughput gateway feeder links.

44. Do you agree with RSM’s proposed licencing arrangement to licence FSS (Earth-to-space) GSO or NGSO gateways operating in 28.35 – 29.5 GHz? If not, what changes would you recommend?

We agree in principle with RSM’s proposal to licence FSS (Earth-to-space) GSO and NGSO gateways in 28.35–29.5 GHz on an individual, site-specific basis, with gateways permitted at any location in New Zealand, and with long-term certainty beyond May 2026.

From Sateliot’s vantage point – planning a dedicated Ka-band gateway at Awarua – this approach is appropriate and we recommend:

1. Site-based gateway licences with flexibility for multiple antennas and satellites
 - A single gateway licence should be able to cover multiple antennas, beams, and satellite networks at the same site, subject to aggregate EIRP and coordination limits, rather than requiring separate licences per satellite or per antenna.

- This reduces administrative overhead and supports incremental constellation growth.
2. Long, predictable licence terms
 - High-throughput Ka-band gateways require substantial capital investment (antennas, RF chains, buildings, fibre backhaul). Licence terms of at least 10–15 years with a clear renewal expectation are critical to justify such investments.
 3. Clear coordination rules but no arbitrary siting restrictions
 - Coordination with other Ka-band gateways and with any protected services in 17.7–20.2 GHz should be governed by transparent technical criteria (pfd/epfd limits, antenna diagrams, etc.), not by coarse geographic exclusion zones that could undermine Awarua and similar high-quality sites.

Overall, we are supportive, provided the gateway licensing framework explicitly facilitates NGSO gateway deployment at Awarua with protected, interference-managed access to Ka-band.

Closing remarks

Sateliot appreciates the opportunity to contribute to this RSM Consultation and values the constructive dialogue fostered with spectrum regulators and industry stakeholders in New Zealand. We remain committed to continued collaboration, technical engagement, and open communication as RSM advances its work on the future allocation and management of the 24–30 GHz Ka-band.

Sateliot's planned operation of a dedicated Ka-band ground station at Awarua beginning in 2027 reflects our strategic commitment to ensuring the bandwidth, operational resilience, and service quality required for a rapidly expanding NB-IoT LEO constellation. Securing predictable and interference-free access to Ka-band feeder-link spectrum at Awarua is essential to support high-capacity gateway operations, maintain robust mission control, and enable the long-term commercial scalability of our services. We look forward to ongoing engagement as RSM develops policies that will shape New Zealand's leadership in the satellite and NTN ecosystem.

Sincerely,



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