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ASC Response to NEW ZEALAND DRAFT FIVE YEAR SPECTRUM OUTLOOK 2022–2026

Discussion document December 2021

(Submission by email: Radio.Spectrum@mbie.govt.nz)

This submission is being made on behalf of the Asian Satellite Coalition (ASC) and its parent organisation, the Asia Video Industry Association (AVIA). ASC is a pan-regional coalition of international satellite operators, whose purpose is to conduct active liaison and information exchange with Asian regulatory bodies, and regional international organizations. ASC's activities are focused principally on ensuring adequate spectrum is available for satellites to help power the continued growth and development of the Asian economies. A key part of ASC's effort is to help regulators manage spectrum and mitigate interference among various technologies which are users of adjacent spectrum.

ASC takes this opportunity to highlight the key role satellites play in connecting people, expanding ICT services and supporting the socio-economic development of many countries. Satellites present a cost-effective solution for tackling the digital divide by enabling the rapid expansion of terrestrial networks or providing broadband directly to remote and hard to reach areas. In many countries, satellites are being used to help expand the coverage of 4G networks to places that would not otherwise be covered. Furthermore, the integration of satellites in the 5G ecosystem will bring high-throughput 5G and cloud computing services to all users, everywhere. However, to play their role in the communications ecosystem, satellites need continued access to adequate spectrum. For this reason, ASC would encourage RSM to adopt a balanced approach to spectrum allocation that takes into account the spectrum needs of all relevant services (IMT, FSS, and others).

On this basis, ASC makes this submission to highlight our views in response to the NEW ZEALAND DRAFT FIVE YEAR SPECTRUM OUTLOOK 2022–2026 (referred to herein as 'Discussion Document'), particularly regarding the frequency bands 1700-2300 MHz, 3.3-4.2 GHz, 6/7 GHz, 24-30 GHz and 40/50 GHz.

Implementation of decisions on 1700-2300 MHz

ASC welcomes the implementation of decisions on the re-planning of the 1700-2300 MHz band, particularly the flexibility in sharing between satellite/space operations and terrestrial services in the paired 2200 MHz Band (2025-2110 MHz and 2200-2290 MHz). ASC would also encourage RSM to continue reserving the paired 2100 MHz band expansion (the 2x30 MHz pair of 1980-2010 MHz and 2170-2200 MHz) for mobile-satellite service, considering the recent development of 5G/NR supporting

non-terrestrial network within 3GPP¹ that would enable compatible deployment between terrestrial and non-terrestrial networks over the entire 2100 MHz band (1920-2010 MHz and 2110-2200 MHz).

ASC looks forward to the future RSM consultation on the allocation design of the paired 2100 MHz band expansion (the 2x30 MHz pair of 1980-2010 MHz and 2170-2200 MHz).

Review and re-plan 3.3-3.4 GHz, 3.4-3.8 GHz, 3.8-4.2 GHz

ASC understands that RSM is in the process of deciding on the possible assignment mechanism of spectrum rights in the band 3.4-3.8 GHz for nationwide mobile broadband networks supporting 5G and associated technologies, in anticipation of the expiry of the bulk of management rights within 3.41-3.8 GHz by the end of October 2022. ASC looks forward to having the opportunity to comment on a technical consultation relating to the configuration of these new management rights in the band 3.4-3.8 GHz, including clarity on the implementation of unwanted emission limits with respect to the compatibility between 5G and C-band satellite downlinks (space-to-Earth direction) in the upper adjacent frequency range above 3800 MHz. Some mitigation measures such as guard band/frequency separation need to be applied to ensure compatibility between 5G and C-band satellite downlinks operating in bands adjacent to each other.

In Section 2.4 of the Discussion Document, ASC notes that RSM is also considering a mix of frequency bands to address possible demand of private wireless networks supporting industry verticals. An association was made in Table 2 of Section 4.3 that several frequency bands, particularly 3.3-3.4 GHz and 3.8-4.2 GHz, would be considered for private wireless networks.

ASC would like to draw RSM's attention to continued use of the band 3.8-4.2 GHz by several satellite assets to provide services in New Zealand, as listed in Table-1 below:

No.	Satellite Name	Orbital Slot
1	NSS-9	177W
2	Intelsat-18	180E
3	Intelsat-19	166E
4	Horizons-3e	169E
5	AsiaSat-5	100.5E
6	Eutelsat 172B	172E
7	AsiaSat-7	105.5E
8	AsiaSat-9	122E

Table-1 Satellite Assets in New Zealand

¹ 3GPP TR38.821

On this note, ASC expresses its concern about the potential of sharing 3.8-4.2 GHz with private wireless networks that may impose constraints on current and future satellite operations over New Zealand. ASC notes that RSM also commissioned a technical consultation on regional and non-national use of 3.3-3.4 GHz in New Zealand in August 2021. Although ASC did not submit a response to this consultation, ASC would like to express our support for RSM to pursue replanning the band 3.3-3.4 GHz for private wireless networks. It is noted that using the band 3.3-3.4 GHz for private wireless networks on a localised or sub-regional basis could allow substantial frequency reuse given the geographical spread of New Zealand. Moreover, the band 3.3-3.4 GHz would also capitalise on the same 5G ecosystem of 3GPP n78 band class.

ASC further believes that private networks may not necessarily need dedicated spectrum for such use since private networks should be able to use any spectrum that have been either assigned for IMT exclusively or available under existing general use licence(s). We note that the consulting firm LS Telecom found in a comprehensive study² that there are already substantial harmonized spectrum for terrestrial IMT available in Region 3. A total spectrum in excess of 1000 MHz available for IMT to date in New Zealand could also be used for deployment of private networks in New Zealand. ASC believe that the C-band spectrum (i.e. 3.4 – 3.8 GHz) which have been demarcated for 5G services in New Zealand with a total amount of 400 MHz spectrum would also able to address the demand of private networks deployment. In addition, the availability of the 3.4 -3.8 GHz band for 5G in New Zealand would be a win-lose situation for the satellite industry considering that the satellite assets stated in the above Table-1 will no longer be able to use the band 3.4 – 3.8 GHz to provide services, since the existing ITU-R studies show that 5G will be not be able to co-exist with satellite services in the same band.

Based on the above descriptions, replanning of the band 3.8 – 4.2 GHz for private networks should not be considered as an RSM work programme priority for 2022 – 2026 and therefore Table 2 in section 4 of the Discussion Document which contained a summary of RSM’s work plan priorities may need to be reconsidered accordingly. In addition, here are the other reasons why replanning the band 3.8 – 4.2 GHz should not be an RSM work programme priority:

- 1) It would be contrary to the RSM’s views regarding re-farming and recycling spectrum as stated in section 3 of the Discussion Document
- 2) It would be contrary to the RSM’s assessments on the space economy industry since the band 3.8 – 4.2 GHz is heavily used for satellite services

ASC looks forward to the future RSM consultation on the review of suitable frequency bands for private wireless networks, with inclusion of potential candidate bands as mentioned above.

Investigate use of 6/7 GHz for Wi-Fi 6E

ASC would not oppose the RSM’s proposal on making 5925-6425 MHz available for Wi-Fi use, as suggested in the discussion document of this topic in June 2021. The risk of aggregate interference into

² See study posted at this internet address :

https://www.lstelcom.com/fileadmin/content/lst/marketing/media/2019_Study_LicensingUseofMobileSpectrum.pdf

FSS uplinks in 5925-6425 MHz may be acceptably low for Wi-Fi operations if the WLAN devices are limited to low power indoor operations and very low power outdoor operations.

ASC would also not oppose potential future use of 6425-7125 MHz for Wi-Fi, provided that primary services in the band such as the FSS are protected and can still be deployed in New Zealand in the future. However, ASC would oppose any consideration of the use of the 6 GHz band for IMT, as it implies exclusive, primary use of this band for mobile services that are not compatible with FSS. In addition, ASC would like to point out that for Region 3, Agenda Item 1.2 (WRC-23) is only considering the 7025-7125 MHz portion of this band for possible identification for IMT (5G). Furthermore, ASC would like to point out that the 6425-7025 MHz band is heavily used for FSS uplinks. Moreover, the 6725-7025 MHz portion of this band is a part of the Appendix 30B Allotment Plan where all ITU Member States have an obligation to protect satellite access by all countries.

From a technical perspective, the issues related to compatibility between 5G and FSS uplinks in the 6425-7075 MHz band are the same as for the 5925-6425 MHz band and as described in ITU-R Report S.2367.

ASC looks forward to the implementation of decisions in making 5925-6425 MHz available for low power indoor and very-low power outdoor Wi-Fi use in due course, and will monitor any further RSM consultation on the investigation of allocation design of 6425-7125 MHz in the near future.

Allocation design of 24-30 GHz

ASC notes that RSM commissioned a technical consultation on the review and re-plan of the 24-30 GHz band in April 2021. ASC endorses the response to this consultation submitted by the Global Satellite Coalition, of which ASC (through AVIA) is a member.

ASC would like to reiterate that the band 24.25-27.5 GHz was globally harmonized for IMT at WRC-19 (see No. 5.532AB of the ITU Radio Regulations). ASC strongly encourages RSM to consider allocating the band 24.25-27.5 GHz for mmWave 5G (including mobile broadband, private wireless network and fixed wireless access applications), while retaining the band 27.5-30 GHz for fixed satellite services (including ESIMs). By adopting this replanning approach, New Zealand can enjoy the full benefits of mmWave 5G in the band 24.25-27.5 GHz (if and when demand develops), while also enjoying the full benefits of satellite services in 27.5-30 GHz (for which there is already proven demand coupled with substantial investments from satellite operators).

Moreover, ASC would like to bring to the attention of RSM that 5G business cases in the mmWave spectrum have been slow to develop and remain highly uncertain. In South Korea, which championed the use of the 26/28 GHz band for 5G, only 2400 MHz of mmWave spectrum was licensed at auction to three MNOs in 2018 (*i.e.*, 800 MHz per licensee). However, since that auction, the South Korean MNOs have installed only 161 base stations in this band as of the end of August 2021, as against a build-out

requirement of over 45,000 by the end of 2021.³ Lack of demand and lack of 5G applications that would take advantage of this mmWave band were cited as the reasons for the lack of investment.⁴ Similarly, in China, the MNOs and vendors are abandoning many 5G use cases, including high-profile use cases such as remote surgery and 5G VR as “too niche or too expensive.”⁵

ASC hopes RSM would take into consideration the emerging satellite development in the mmWave band as recognised in Section 2.1 of the Discussion Document in its review of the band 24-30 GHz. ASC looks forward to the opportunity to comment on a subsequent RSM consultation on this matter in due course.

Monitor development in the use of new satellite bands in 40/50 GHz

ASC notes that RSM is monitoring developments in satellite technology and use of new satellite bands (as indicated in Section 2.1 of the Discussion Document), while also monitoring international developments on 40 GHz mmWave, particularly 40.5 -43.5 GHz (as indicated in Section 3.2 of the Discussion Document).

Across the satellite industry, a number of GSO and NGSO satellite systems are already being planned that will use the Q/V bands, including 37.5-42.5 GHz, 42.5-43.5 GHz, 47.2-50.2 GHz, 50.4-52.4 GHz. The current use of the Q/V bands would largely be gateway links in conjunction with Ka band for the user terminals (e.g. VSAT, ESIMs). However over time the user terminals are also expected to support the Q/V bands in the near future, and this evolution should duly be taken into account in the consideration of the 40/50GHz band.

ASC would encourage RSM to continue to monitor developments in satellite technology in the Q/V bands and review the Table of Radio Spectrum Usage in New Zealand (PIB 21, Issue 11 – June 2021⁶) in a timely manner by recognising new satellite Q/V bands across the frequency ranges 37.5-42.5 GHz, 42.5-43.5 GHz, 47.2-50.2 GHz and 50.4-52.4 GHz that are largely unallocated to date in New Zealand.

General User Radio License (GURL) Update

As indicated in Section 3.3 of the Discussion Document, the RSM is considering updating the General User Radio License (GURL), particularly for short range devices and to consider a General User Radio License regime for higher frequency bands.

ASC are of the view that the GURL Regime is cost-effective and beneficial from an administrative perspective for shared frequency use on a non-interference basis. However, in relation to the higher frequency bands, ASC would like to remind the RSM that the frequencies of the Q/V-band spectrum are

³ See *Telcos lag in mmWave 5G equipment installation: lawmaker*, The Korea Herald, 10 Sep. 2021, at <http://www.koreaherald.com/view.php?ud=20210910000417>.

⁴ *Id.* (“Carriers, however, have been reluctant to invest in mmWave 5G, considering disappointing user migration to 5G networks amid a lack of services that can take advantage of the speeds that even current 5G networks offer.”).

⁵ See Robert Clark, *China culls unprofitable 5G use cases as it narrows focus* (19 Oct. 2021), at <https://www.lightreading.com/asia/china-culls-unprofitable-5g-use-cases-as-it-narrows-focus/d/d-id/772855>.

⁶ <https://www.rsm.govt.nz/about/publications/pibs/pib-21/>

becoming critical to satellite systems. Satellite operators are already working at the ITU level to develop a regulatory framework to allow satellites to operate efficiently in the Q/V-band (37.5-42.5 GHz, 42.5-43.5 GHz, 47.2-50.2 GHz, and 50.4-52.4 GHz). This spectrum is to be used, not only for receivers of HTS satellites' signals and gateway feeder-links of next generation satellites, but portions of the band could also be used for HD-FSS terminals in the future. Moreover, this year, satellite systems using 40/50 GHz frequencies will be in service. These bands are currently under a lot of discussions and many operators are developing projects around this available spectrum.

ASC would like the RSM to consider the above information when introducing possible applications of the higher frequency bands in the GURL regime, to ensure that such applications deployed under the GURL will be compatible with innovative satellite technologies to be deployed in these bands.

Massive internet of things

In Section 2.3 of the Discussion Document, RSM addresses IoT and M2M systems, recognizing these are applications and not a service from a regulatory perspective. RSM need not create specific allocations for "IoT/M2M services".

Satellite has a key role to play in the development of this ecosystem. Satellite systems can offer ubiquitous coverage for IoT/M2M applications and partner with existing terrestrial IoT/M2M providers to extend the range of their offerings. Broad geographic coverage also enables efficient, low-cost satellite support for IoT/M2M applications regardless of device location, as compared to the extensive infrastructure that would otherwise be required for a terrestrial IoT/M2M network.

ASC supports making adequate spectrum available in appropriate frequency bands for satellite to support IoT/M2M applications in both licensed and unlicensed manners in New Zealand and globally to facilitate operational flexibility and efficient spectrum use through global harmonization. RSM should also foster operational synergies between terrestrial and satellite layers for IoT/M2M applications by ensuring frequency bands available for use by both layers are harmonized (e.g., adjacent or overlapping) to facilitate satellite/terrestrial compatibility, simplify IoT/M2M device design, and reduce costs for IoT/M2M devices. These factors should also be considered in assessing appropriate frequency bands for satellite IoT/M2M development and adapting regulations accordingly to facilitate these applications.

ASC looks forward to contributing to forthcoming considerations by RSM that will review appropriate frequency bands and adapt regulations accordingly (e.g. update relevant PIBs and/or applicable conditions in General User Licences) to encompass these growing IoT/M2M applications.

Radio Spectrum Fees Review

The RSM intends to review the radio spectrum licensing fees regime in 2023 as indicated in Section 3.4.2 of the Discussion Document. ASC would like to highlight that any change of the fee framework should be transparent and require prior consultation of the public and the industry.

Additionally, the RSM should note that the cost of the authorization should be limited to the recovery of the regulator's administrative costs to process the application and maintain the license. Licensing fees should not be used as a source of revenue or be excessive, as licensing fees are generally passed on to the customer. Currently, the holders of radio and spectrum licenses in New Zealand must pay an annual fee to cover the administrative costs of registering their licenses, that for the vast majority of users is set at \$150 (including GST) per license. ASC believes that such fee is appropriate for administrative licensing and supports RSM's approach in applying a reasonable flat-rate fee per license to cover the costs of technical planning and license registration.

Summary and Conclusion

ASC supports RSM in its goal of ensuring New Zealand can fully benefit from all existing and emerging communications technologies. To that end, in this submission ASC:

- Welcomes the replanning of the 1700-2300 MHz band, with the intention of reserving the paired 2100 MHz band expansion for mobile-satellite service. This would enable compatible deployment between terrestrial and non-terrestrial networks over the entire 2100 MHz band (1920-2010 MHz and 2110-2200 MHz).
- Draws attention to the continued heavy use of the band 3.8-4.2 GHz for satellite services, and expresses concern that these services could be negatively affected by potential sharing with private networks. Ample harmonized spectrum is already available to be used for wireless private networks, and ASC believes RSM should focus on those alternative frequency bands, and abandon plans to reprogram 3.8-4.2 GHz.
- Supports the proposed replanning of the 3300-3400 MHz band.
- Welcomes the opportunity to comment on technical consultations that will bring clarity on the implementation of mitigation measures to ensure compatibility between 5G and C-band satellite downlinks operating in bands adjacent to each other.
- Agrees to RSM's proposal to make 5925-6425 MHz available for Wi-Fi use based on conditions as flagged in the relevant consultation in June 2021, and do not oppose if RSM intends to also make 6425-7125 MHz available for Wi-Fi, as long as such use is for low-power indoor or very low power outdoor uses.

- Opposes the use of 6425 – 7125 MHz for IMT/5G as it implies exclusive use for IMT/5G.

- Strongly encourages RSM to focus its replanning of the mmWave spectrum on the internationally agreed band 24.25-27.5 GHz for mmWave 5G (including mobile broadband, private wireless network and fixed wireless access applications), while retaining the band 27.5-30 GHz for fixed satellite services (including ESIMs).

- Urges that RSM make adequate spectrum available in appropriate frequency bands for satellite IoT/M2M in both licensed and unlicensed manners, in such a way as to facilitate operational flexibility, efficient spectrum use and operational synergies between terrestrial and satellite layers for IoT/M2M applications, by ensuring frequency bands available for use by both layers are harmonized.

- Reminds the RSM to ensure that the services deployed under the GURL will be able to support innovative satellite technologies in the Q/V band.

- Supports the current licensing fees and highlights that any change to the fee frameworks would require prior consultation of the public and the industry.

Again, we thank RSM for this opportunity to comment on its thinking. Of course, if any further information is needed about any of the points discussed in this paper, please feel free to contact us.