

28th February 2022

Radio Spectrum Management Policy and Planning
Ministry of Business, Innovation and Employment
PO Box 2847 WELLINGTON 6140

Re: Draft Five Years Spectrum Outlook 2022 - 2026

Intelsat, the leading provider of fixed-satellite services (“FSS”) worldwide,¹ is pleased to submit comments to the consultation paper on Draft Five Years Spectrum Outlook 2022 – 2026 (“Consultation”) , published by the RSM (Radio Spectrum Management) on December 2021.²

Intelsat would like to thank the RSM (Radio Spectrum Management) for the opportunity to provide comments on the Consultation and offers the following comments for RSM’s consideration.

In the Consultation Paper, the RSM has provided its views regarding the Draft 5 years Spectrum Outlook 2022 – 2026 into four Sections. We would like to address some of the issues of all Sections, as presented below.

1. Section 1 of the Consultation: Spectrum Management Framework

In terms of spectrum allocations, the RSM states in Section 1.2 of the Consultation that the 3.5 GHz spectrum are being unused and the RSM have reallocated the unused 3.5 GHz spectrum to enable the industry to initiate the 5G rollout,

Comments:

Intelsat disagrees to such claim with the consideration that some Intelsat’s satellites stated in Table-1 below have provided its services in New Zealand using portion of the 3.5 GHz band (3.4 – 3.8 GHz). Therefore, it is not correct regarding the claim on the unused 3.5 GHz band in New Zealand.

¹ For the past 50 years, Intelsat has been delivering information and entertainment for many of the world’s leading media and network companies, multinational corporations, Internet Service Providers and governmental agencies, among many users. Intelsat Asia Carrier Services, LLC, a subsidiary of Intelsat US LLC, holds an Australian carrier licence under subsection 56(1) of the Telecommunications Act 1997.

² See, Consultation Paper, Draft Five Years Spectrum Outlook 2022 - 2026 (hereafter “Consultation Paper”), available online at [Draft Five Year Spectrum Outlook 2022-2026 \(rsm.govt.nz\)](https://www.rsm.govt.nz/draft-five-year-spectrum-outlook-2022-2026)

No.	Satellite Name	Orbital Slot
2	Intelsat-18	180E
3	Intelsat-19	166E
4	Horizons-3e	169E

Table-1 Intelsat's Satellites in New Zealand

2. Section 2.2 of the Consultation: Satellites and space – evolving technologies and use cases

In the Consultation, the RSM acknowledged the significant investment by governments and the private sector in the space industry.

Comments:

Intelsat thanks and supports the RSM for its acknowledgement on the significant investment by governments and the private sector in the space industry which has stimulated the following affect:

- a. development of new satellite technologies
- b. driven down the price of satellites
- c. reduced the cost of satellite launching

Intelsat agrees and supports the RSM's assessments on New Zealand's role in the space economy industry such as :

- a. potential launch site locations;
- b. potential TT&C facilities in the southern hemisphere
- c. potential increase of ITU-R satellite filings through New Zealand Administration.

In addition, as indicated in the Consultation, in Section 2.1, the Investment Bank Morgan Stanley has predicted that the market for satellite communications is expected to grow from \$24 Billion USD in 2018 to \$ 128 Billion USD by 2028.

Considering the above RSM's acknowledgement on the space industry investments and Morgan Stanley's prediction on the satellite communications market by 2028, the RSM would require to assure the satellite spectrum availability for long term period. The lack of RSM's assurance and support on the satellite spectrum availability for long term period, would be contrary to the RSM's acknowledgement on the importance of the space industry investments.

3. Section 2.2 of the Consultation: Growth in wireless broadband traffic

The RSM is proactively monitoring the developments in the 6.425 – 7.125 GHz band for mobile and Wi-Fi.

Comments:

FSS systems operate across the full upper 6 GHz band (i.e. 6425 – 7075 MHz) and satellite operators have long term plans for the use of the band. Intelsat would not oppose consideration of the upper 6 GHz band for Wi-Fi/RLANs subject to the same technical constraints as the lower 6 GHz for the protection of FSS uplinks. However, Intelsat does not support ‘standard power’ (i.e. higher power devices) for outdoor use under a dynamic spectrum access system such as the automatic frequency coordination (AFC) system adopted in the U.S. Regional deployment of RLANs, especially outdoors and at high power, poses a long-term threat of aggregate interference to FSS uplinks in the 6 GHz band.

Intelsat notes in the Consultation that the 6 425-7 125 MHz band is considered for possible mobile/5G services in New Zealand. In this regard, Intelsat would like to point out that for Region 3, WRC-23 is only considering the 7 025-7 125 MHz portion of this band for possible identification for IMT (5G). Furthermore, Intelsat would like to point out that the 6 425-7 025 MHz band is heavily used for FSS uplinks. Moreover, the 6 725-7 025 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.

In addition, technically, the issues related to compatibility between 5G and FSS uplinks in the 6 425-7 075 MHz band are the same as for the 5 925-6 425 MHz band and as described in ITU-R Report S.2367.

The current heavy use by the 6 425-7 025 MHz band by FSS uplinks, the Appendix 30B allotment Plan and the demonstrated significant potential for interference between 5G and FSS and the required tight limitations of 5G to co-exist with incumbent services would make co-existence most challenging and difficult. As a result, 5G would need to be limited to indoor use only with tight power limitations to ensure compliance with ITU-R studies. Furthermore, 5G would need to accept interference from transmitting FSS earth stations as their deployment change over time, according to demand, and would need to apply interference reduction measures, e.g. use of cognitive radio techniques, to mitigate interference from transmitting FSS earth stations. Intelsat would advise strongly against considering use of the 6425 – 7125 MHz band for 5G/mobile services.

In addition, the RSM should also note that the viability of 5G use cases remains uncertain. In China, for example, many 5G use cases previously touted by the mobile industry – including remote surgery and 5G VR – are being abandoned as too niche or expensive.³ Indeed, one executive has admitted that the “showroom” applications “were ultimately just a promotion for 5G.”⁴

³ <https://www.lightreading.com/asia/china-culls-unprofitable-5g-use-cases-as-it-narrows-focus/d/d-id/772855>.

⁴ *Id.*

4. Section 2.4 of the Consultation: Private networks and Industry verticals

The RSM have made priorities of replanning the band 3.8 – 4.2 GHz to provide spectrum for wireless private networks.

Comments:

Intelsat believe that wireless private networks may not need a dedicated spectrum for such use since wireless private networks should be able to reuse any spectrum that have been assigned for IMT exclusively. The harmonized spectrum for terrestrial IMT in Region 3 could be found in a comprehensive study done by the consulting firm LS Telecom¹, A total spectrum more than 1000 MHz available for IMT exclusively to date in New Zealand could also be used for deployment of wireless private networks in New Zealand including C-band spectrum (i.e. 3.4 – 3.8 GHz) which have been assigned for 5G services in New Zealand with a total amount of 400 MHz of spectrum. Therefore, the RSM should not focus nor prioritize the replanning of the band 3.8 – 4.2 GHz to provide spectrum for wireless private networks. In addition, to the above availability, the following reasons explain why the RSM should not prioritize the replanning of the band 3.8 – 4.2 GHz should:

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

Intelsat 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.

Intelsat believe that the total amount of 400 MHz of C-band spectrum made available for 5G services provided by 4 MNOs are more than enough. These could be supported by the recent Ofcom, the communications regulator in the United Kingdom⁵, researched the ability of mobile operators to launch 5G services with 40 MHz of spectrum. Such research found that “(...) there was no evidence that 5G could not be delivered with smaller [e.g. 40 MHz blocks] or non-contiguous carriers in other frequency bands [i.e. spectrum other than C-band].” To support its finding that 40 MHz of C-band spectrum was sufficient to provide 5G services, Ofcom developed a theoretical cell site throughput model to estimate network performance based on various assumptions on the type of antenna used, bandwidth of C-band carrier, and signal strength received by the user. The results clearly demonstrate that terrestrial mobile operators will be able to deliver all the main services anticipated under 5G – including, but not limited to, connected cars, virtual reality cloud broadband, and live 4K streaming – with 40 MHz of spectrum.

¹ See

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

⁵ See, Ofcom, §A7.39, *Award of the 700 MHz and 3.6-3.8 GHz spectrum bands: Annexes* (13 March 2020), available online at https://www.ofcom.org.uk/data/assets/pdf_file/0017/192410/annexes-award-700mhz-3.6-3.8ghz-spectrum.pdf.

Therefore, New Zealand’s current 5G spectrum which have allocated 3400 – 3800 MHz for IMT should be more than enough to support New Zealand’s 5G deployment while preserving the band 3800 – 4200 MHz for satellite services.

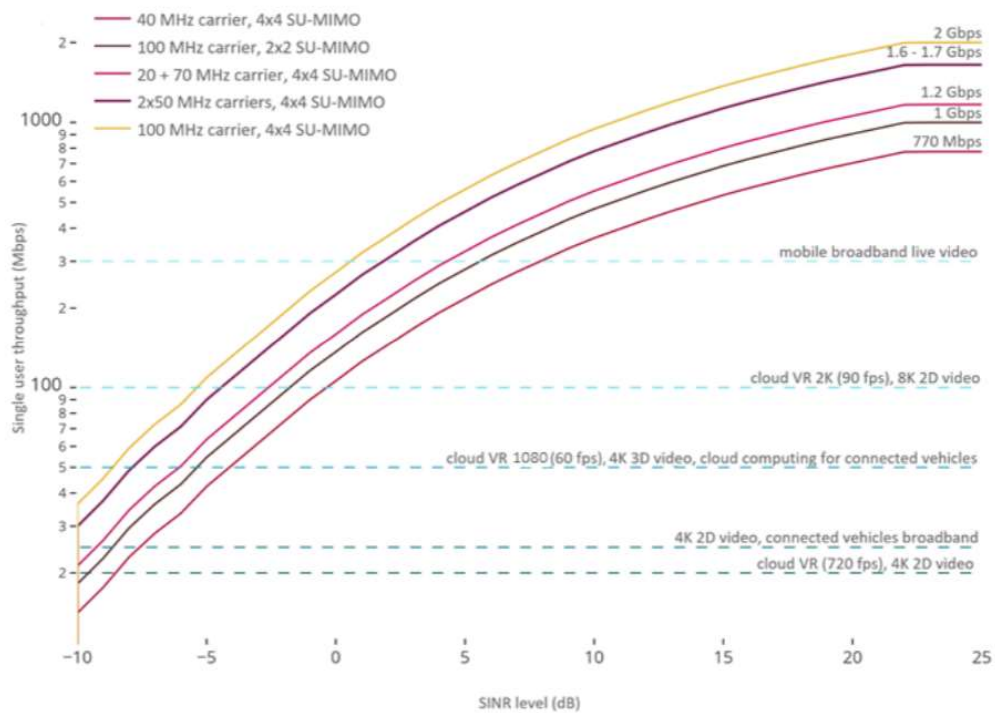


Figure 1. Downlink throughput for a single user (SUT) across different signal levels in a cell compared to the minimum rate required for some 5G services⁶

Additionally, the availability of 3.4 GHz until 3.8 GHz band for 5G in New Zealand would be a win lose situation for satellite industry considering that satellite industry will no longer be able to use the band 3.4 – 3.8 GHz to provide its 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.

Intelsat also looks forward to having the opportunity to provide detail comments on a technical consultation relating to terrestrial 5G deployment in New Zealand 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 adjacent compatibility between 5G and C-band satellite downlinks operating in bands adjacent to each other.

⁶ See, Ofcom, §A7.39, Award of the 700 MHz and 3.6-3.8 GHz spectrum bands: Annexes (13 March 2020), available online at https://www.ofcom.org.uk/data/assets/pdf_file/0017/192410/annexes-award-700mhz-3.6-3.8ghz-spectrum.pdf.

5. Section 3.1 of the Consultation: Spectrum re-farming, recycling and sharing

Refer to the Consultation Section 3.1., the RSM is of the view that Re-farming and recycling Spectrum re-farming is a tool that could increase the efficient use of spectrum. Spectrum re-farming and recycling allows the use of existing spectrum to support newer generation technologies. It has happened in New Zealand through the transition from analogue television to digital television and the transition from 1st, 2nd, 3rd, and 4th generation of cellular technologies.

Comments:

Intelsat supports the Re-farming and recycling spectrum to be applied to 5G services in New Zealand, especially when 5G services are looking for additional spectrum to deploy their services without the need to disrupt any other services such as FSS.

6. Section 3.3 of the Consultation: Licensing approaches enabling new technologies

The RSM is also considering in Section 3.3 of the Consultation to update the General User Radio Licences (GURL), particularly for short-range devices and to consider a General User Radio Licences regime for higher frequency bands.

Comments:

Intelsat supports 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, Intelsat would like to remind the RSM that the frequencies of the Q/V-band spectrum are becoming critical to satellite systems. Satellite operators are already working at ITU level to develop a regulatory framework to allow satellites to operate efficiently in the V-band (37.5–42.5 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 also 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 discussion and many operators are developing projects around this available spectrum.

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

7. Section 3.4.2 of the Consultation: Radio Spectrum Fees Review

RSM intends to review the radio spectrum licensing fees regime in 2023. Intelsat 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 licences, that for the vast majority of users is set at \$150 (including GST) per license. Intelsat 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.

8. Section 4 of the Consultation: Priorities 2022 – 2026

Taking the work plan priorities from Section 3, Table 2 outlines our major activities and projects over the upcoming outlook period. A brief description of each activity and how it relates to each of the trends identified in this Spectrum Outlook. We note that flexibility is required in responding to emerging issues in radio spectrum as new technologies and issues emerge. Hence, this indicative work programme is designed to be flexible and responsive to issues over time. Table 2: Summary of RSM's Work Plan Priorities

Comments:

Based on our previous comments as stated above, Intelsat would like to provide further comments to Table 2 of the consultation paper in page 28 as follows:

- 1) Replanning the band 3.8 – 4.2 GHz should not be considered as an RSM work program priority for 2022 – 2026.
- 2) The possibilities of using 6425 – 7125 MHz for mobile need to be reconsidered and should not be an RSM work program priority.


Concluding Comments

Based on the above explanations, below are the summary of our feedback on the draft five years spectrum outlook 2022 – 2026 Consultation:

- 1) Intelsat's satellites are still using portions of the band 3.5 GHz (i.e. 3.4 – 3.8 GHz) to provide its services in New Zealand and therefore it is not correct regarding the unused 3.5 GHz band claim.
- 2) Intelsat do not oppose if the RSM intends to also make 6425-7125 MHz available for Wi-Fi use, as long as such use is for low-power indoor or very low power outdoor. Intelsat Opposes to the use of 6425 – 7125 MHz for IMT/5G as it implies exclusive use for IMT/5G.
- 3) Intelsat supports the RSM for its acknowledgement on the space industry economy.
- 4) Intelsat supports the Re-farming and recycling spectrum to be applied to 5G services in New Zealand.
- 5) There are more than 1000 MHz available for IMT exclusively to date in New Zealand which could also be used for deployment of wireless private networks in New Zealand including C-band spectrum (i.e. 3.4 – 3.8 GHz) which have been assigned for 5G services in New Zealand with a total amount of 400 MHz of spectrum.
- 6) The availability of 3.4 – 3.8 GHz band are more than enough to support for the deployment for 5G in New Zealand and the availability of these band for 5G services in New Zealand would be a win lose situation for satellite industry.
- 7) Intelsat welcomes the opportunity to provide its detail comments on technical consultation regarding the clarity on the implementation of some mitigation measures to ensure compatibility between 5G and C-band satellite downlinks operating in bands adjacent to each other.
- 8) The RSM to ensure that the services deployed under the GURL (General User Radio Licenses) will be able to support innovative satellite technologies in the Q/V band.
- 9) Intelsat Supports the current licensing fees and highlights that any change to the fee frameworks would require prior consultation of the public and the industry.
- 10) Replanning the band 3.4 – 3.8 GHz and the possibilities of using 6425 – 7125 MHz for mobile should not be considered as an RSM work program priority for 2022 – 2026.

Intelsat stands ready to provide additional information on any of the topics discussed in this contribution.

Respectfully submitted,



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