Inmarsat response to

RSM Draft Five Year Spectrum Outlook 2022 – 2026

28 February 2022

Inmarsat is pleased to provide comments to the New Zealand Radio Spectrum Management (**RSM**)'s discussion document on its Draft Five Year Spectrum Outlook 2022 – 2026 (the "**FYSO**"), particularly for the "priority RSM work programme items" in the L-band, C-band, the 6 GHz band, the 24 – 30 GHz band and Q/V bands.

1. General comments

Inmarsat is the leader in global mobile satellite communications, operating a system of 14 satellites that provide communications solutions to customers on land, in the air, and at sea. The company has a long track record of operating reliable global mobile satellite telecommunications networks, sustaining business applications and mission-critical safety and operational applications in New Zealand and globally for more than 40 years. Inmarsat recently announced the rollout of Orchestra — an unique, global, multi-dimensional, dynamic mesh network that will support the growing demand for mobility worldwide and at hot spots and high average speeds and low average latency. In the largest-ever transformation of Inmarsat's market-leading services, Orchestra will provide a seamless configuration of Inmarsat's ELERA (L-band) and Global Xpress (Ka-band) networks with terrestrial 5G, targeted low earth orbit (**LEO**) capacity, and dynamic mesh technologies, to create a single advanced solution for global mobility.

Inmarsat's aviation services using ELERA and Global Xpress networks are used today by various airlines, including Air New Zealand, by business jets operating in New Zealand, and by New Zealand military. Inmarsat's maritime services are used on private leisure vessels, super yachts, fishing vessels, sea transport ships (tourism and passenger transport) and cruise liners operating in and around New Zealand. Land-based services (Internet of Things (**IoT**) and broadband) using ELERA and Global Xpress (**GX**) networks are used in New Zealand by commercial companies, emergency services and military users for reliable connectivity, in particular in remote areas.

Inmarsat New Zealand Ltd operates gateways in New Zealand, located at Warkworth and Albany, operating in both C-band and Ka-band (17.7 – 20.2 GHz and 27.5 – 30.0 GHz). Continued access to spectrum for gateway stations is important for providing high availability service to our customers in the Asia Pacific region, including customers in New Zealand.

2. Review and re-plan the 24 – 30 GHz band

In line with Inmarsat's previous response to the "RSM 24 – 30 GHz use in New Zealand Discussion Document" on 10 June 2021, Inmarsat highlights the importance of the frequency band 27.5 – 30 GHz for the Fixed Satellite Service (**FSS**) and Inmarsat supports the plan to allocate 24.25 – 27.5 GHz primarily for terrestrial mobile services use. As mentioned above,

Inmarsat New Zealand Ltd operates GX gateways in New Zealand at Warkworth and Albany in the frequency band 27.5 – 30.0 GHz.

There is increasing spectrum demand to fulfil the need to provide high-speed data communications to aircraft, vessels, machines, and backhauling to small cell networks and IoT networks. The frequency ranges 17.7 – 20.2 GHz and 27.5 – 30.0 GHz are needed not only to accommodate feeder links to gateway stations, but also to address the current and future demand of Earth Station in Motion (**ESIM**) and Very Small Aperture Terminal (**VSAT**) operation. Satellites are now in orbit and equipment is available for consumers to enable use of the full ranges 17.7 – 20.2 GHz and 27.5 – 30.0 GHz for ESIM terminals.

Long term licences in the frequency bands 17.7 – 20.2 GHz and 27.5 – 30.0 GHz have not yet been made available throughout the bands as final decisions are yet to be taken following the 24 – 30 GHz consultation. Noting that the responses to the consultation were broadly in line with the Ministry's preferred position, and also noting that international decisions on long term allocation in that band have concluded, there is no reason to delay decisions to make long term licences available for satellite operation. This work should be of a high priority with the allocation of spectrum within the next year.

3. Review and re-plan 600 MHz, 3.3. – 3.4 GHz, 3.4 – 3.8 GHz and 3.8 – 4.2 GHz

In 2019, RSM granted Inmarsat the authorisation to continue operation at Warkworth in the band 3582.7 – 3657.7 MHz until 2032. Inmarsat's Earth station is also used for reception of telemetry, tracking and control (**TT&C**) links, which are received in the band 3700 – 4200 MHz. Inmarsat underlines that in any review and replanning of the band 3400 – 4200 MHz for mobile services, it is necessary to ensure that satellite operators are able to continue use of this band, at least for feeder links and for TT&C.

The FYSO notes the importance to New Zealand of the development of infrastructure relating to space, including the provision of TT&C installations. Inmarsat would like to engage with RSM, with a view to ensuring continued operation of feeder and TT&C links on a long-term basis.

4. Monitor developments in 6425 – 7125 MHz mobile/Wi-Fi

In the work programme for 2022-26, RSM includes in the "Monitoring priority" group the development in the band 6425 – 7125 GHz for mobile/Wi-Fi. Inmarsat proposes that the RSM adds "Satellites and space" as a relevant application on this issue. While monitoring the development of this frequency band for mobile/Wi-Fi, it is important for RSM to take into consideration the existing FSS operations in this band. In particular, it will be necessary to establish technical and operational measures on new services to avoid harmful interferences to satellites using the band 5925 – 7075 MHz.

In line with Inmarsat's previous response to the "RSM WLAN use in the 6 GHz band" on 30 June 2021, Inmarsat does not recommend the RSM to consider this frequency band for terrestrial mobile service such as 5G. Studies already conducted by Inmarsat and others in the context of WRC-23 agenda item 1.2 show that IMT deployment is not feasible while meeting

satellite uplink protection requirements. However, Inmarsat supports the consideration of the band 6425 – 7125 MHz for wireless local area network (**WLAN**) subject to appropriate measures to ensure that they would not cause excessive interference to the FSS. Many administrations have already made this band available for WLAN devices, so it is likely that WLAN equipment for this band will soon be available.

It is noted that one of the aspects raised within Section 3 of the draft FYSO is the consideration of sharing between services. The shared use of this band by the FSS and terrestrial Wi-Fi could be a clear example of sharing between certain services/systems.

5. Monitor developments in satellite technology and use of new satellite bands (e.g. Q/V bands)

Inmarsat is currently operating in a part of Q/V band and Inmarsat expects to make greater use of Q/V band satellite allocations in the future. It is likely that action will be needed during the 2022-26 period to allow authorisation of satellite and other services in these bands in New Zealand.

6. Monitor international developments on telemetry, short messaging, and low-data-rate IoT satellites

Inmarsat currently provides IoT services with a range of terminal types using the L-band mobile satellite service (**MSS**) spectrum (1518 – 1559 MHz, 1626.5 – 1660.5 MHz, 1668 – 1675 MHz).

Demand for the IoT is increasing with the expanding ecosystem of connected devices. A fully realised IoT ecosystem will require more than one type of connectivity, to cater for different IoT applications. With satellite technology, users can extend the availability and reliability of IoT to devices operating in remote regions, including aeronautical, maritime, farming and logistics. Hence, it is important not to impose additional regulatory and/or licensing conditions on satellite IoT systems operating under the existing framework for MSS services in New Zealand.

7. Proposal for additional Priority Work Programme Item - Investigate use of the band 1518 – 1525 MHz and 1668 – 1675 MHz

Inmarsat's existing L-band MSS network operates in the frequency bands 1518 – 1559 MHz, 1626.6 – 1660.5 MHz and 1668 – 1675 MHz for global communications. Inmarsat's ELERA programme reflects Inmarsat's long-term commitment to future of services in the L-band, for vital safety related services and services for diverse industries such as transportation, agriculture sectors, etc. Inmarsat will soon be able to provide MSS service using the extended L-band frequencies (1518 – 1525 MHz and 1668 – 1675 MHz) in New Zealand with the recent launch of the first Inmarsat-6 satellite (**I6**) in December 2021. Inmarsat understands that there are incumbent users at least in the band 1518 – 1525 MHz and hence a technical analysis of the feasibility of shared use should be the first step in review of this band, and Inmarsat would be pleased to provide assistance to RSM on that. Inmarsat urges RSM to review the ongoing

use of the bands 1518 – 1525 MHz and 1668 – 1675 MHz with a view to making the extended L-band available for MSS as soon as practicable. Inmarsat suggests that this should be a priority work item.

8. Monitor developments in 1427 – 1518 MHz

Because of the importance of MSS operations in New Zealand, protecting MSS should be an important consideration for the RSM in its spectrum planning. There is a significant risk to Inmarsat's current MSS operations in and around New Zealand if the band 1427 – 1518 MHz is made available for IMT services. To Inmarsat's understanding, there is currently very little 4G/5G equipment available for this band, and what equipment is available operates only in a limited range (1452 – 1492 MHz). Inmarsat agrees that RSM should monitor developments on this band.

In the event that RSM does pursue the use of this band for 4G/5G mobile services, Inmarsat suggests that the RSM does not include the 1492 – 1518 MHz frequencies of the 1.5 GHz band in initial plans for possible terrestrial mobile services. This approach would avoid significant risk of interference to MSS operations above 1518 MHz and would allow the upper part of the 1.5 GHz band to be used for other applications for which compatibility with L-band MSS operations can be more easily achieved. Several European regulators have chosen to limit mobile licences in the 1.5 GHz band only to the band 1452 – 1492 MHz.