RSM response to key submission themes on the allocation of 24-30 GHz: spectrum for mobile and satellite services

This document provides an overview of the key feedback received during the 2025 consultation period on the use of 24-30 GHz for mobile and satellite services, along with a Radio Spectrum Management (RSM) response. This does not capture all of the detailed feedback - for this please see the individual submissions. For an overview of decisions made following this consultation process, see the summary of decisions on the RSM website at https://www.rsm.govt.nz/projects-and-auctions/current-projects/future-use-of-the-24-30-ghz-spectrum.

23.6 -24.0 GHz

Protections for Earth Exploration Satellite Services (passive) (EESS) in 23.6 -24.0 GHz band

There were comments that RSM should outline the reason for the International Telecommunications Union (ITU) Radio Regulations, Resolution 750 Limits in its documentation and that RSM should prohibit, detect and measure any out-of-band emissions in frequency ranges 23.6 – 24.0 GHz and in the guard band frequency range 24.0 – 24.25 GHz.

Mobile industry submitters have indicated that they can meet the second stage ITU Radio Regulations, Resolution 750 Limits.

RSM Response

The second stage (post 1 September 2027) limits (as proposed in the consultation) will be implemented in the national assignment process. Associated documentation can include information on the need for limits to protect EESS (Passive).

Measurements to determine if base stations meet the limits need to be undertaken in a lab which is highly specialised. RSM, like many regulators, do not operate labs and would not undertake these kinds of measurements. For product supply there are requirements in the existing framework where suppliers may need to produce evidence (e.g. test report) to show compliance with the limits.

The 24.0 – 24.25 GHz frequency band is not a guard band and ITU Radio Regulations Footnote No 5.340 (‘All Emissions Prohibited’) does not apply to this frequency band. The band has global use for Short Range Devices and is also designated for Industrial, Scientific and Medical (ISM) applications through Footnote RR No 5.150. RSM do not

intend to make changes (e.g. not removing provisions and not increasing EIRP power levels) without evidence of protection of adjacent passive services.

Protection for Radio Astronomy Service (RAS) sites in the 23.6 – 24.0 GHz band

One submitter outlined the importance of RAS and supported the approach in the consultation for the 23.6 -24.0 GHz band and the sites listed in table 3 of the consultation. The submitter also requested that no fees be applied for RAS stations.

RSM Response

RSM will look to identify the potential indicative RAS sites in table 3 of the consultation with a note that the precise location of the Waiau valley site is yet to be confirmed (e.g. provide some flexibility in the identification for that site).

Detailed technical assessment is required in using section 1.2.3 of the consultation as a starting point. This will need to determine the protection required and design a RAS exclusion and / or coordination areas in the vicinity of these sites, restricting the placement of outdoor mobile Base Stations and User Equipment to be outside of these exclusion areas. It will also need to assess the suitability of the proposed sites for RAS. RSM will look to the RAS community to undertake this detailed technical work to inform implementation into a framework (e.g. based on receive protection licensing). Fees will apply as per the Radiocommunications Regulations 2001.

24.25 – 27.5 GHz (26 GHz)

Mobile / Fixed Wireless Access in the 25.5 -27.0 GHz band

While there was general support for a delay in assignment process to 2028 -2030 some submitters advocated for certainty and the preliminary 26 GHz band allocation to be undertaken as soon as resources permit so they can plan investments. Some submitters highlighted mmWave spectrum has already been made available to operators in other countries such as Australia, USA, UK, Germany and Japan.

Some of those submitters also advocated for immediate licensing of Fixed Wireless Access (FWA) to be permitted in 27.5 -28.35 GHz. Another submitter advocated for flexible test licensing for commercial deployment so that they evaluate them in a proper customer environment with the network fully loaded.

Some submitters, in particular the Mobile Network Operators (MNOs), considered that national-scale use cases will emerge over time, and that the 26 GHz band should ultimately be allocated for mobile use on a national basis. Those submitters indicated that national management rights support more efficient network design, and non-national regimes could lead to inefficiencies and fragmented use. Other submitters considered that the band should not be made available on a national basis and

considered that there is no indication that a nationwide service is likely to be offered in the 26 GHz band. It was further highlighted that MNO coverage map tools indicate that 5G (mid-band) coverage is extremely low compared to low-band 4G and that mmWave coverage will be significantly less and thus lends itself to non-contiguous specific use cases.

Submitters gave a wide range of spectrum estimates ranging between 200 MHz and 1200 MHz. Some elements in submissions pointed to the need to obtain up to 1000 MHz per operator but other elements outlined that the spectrum need could be between 400MHz to 800MHz per operator. Submitters also provided other input on technical matters including synchronisation, frame structure and pointing of the base station antennas.

One submitter asked for the 24.75 GHz to 25.25 GHz should be made available for Fixed Satellite Service (FSS) (Earth to space) gateways Earth stations in addition the other proposed uses.

RSM Response

RSM has received mixed messages on when terrestrial mobile / FWA users need access to the 26 GHz and lower 28 GHz frequency band. On one hand a delay is supported as use cases are developing, on the other immediate licensing is being requested for FWA or commercial trials. RSM consider that the assignment process for 26 GHz and 28 GHz frequency bands need to be considered together for mobile / FWA use. RSM will only allow testing under current strict rules and not for commercial deployment to preserve 26 GHz and lower 28 GHz frequency band for an assignment process.

RSM consider that making spectrum available on a national basis in management rights will not lead to the most efficient use of spectrum. It is likely there will be many areas in the country where the spectrum goes unused given the nature of this frequency range and likely deployments. This non-national approach is in-line with international practice (e.g. Australia and the UK). RSM will proceed with a non-national approach with exclusive rights for urban areas and an individual station licensing model (e.g. first in time) for outside of those areas, allowing wide area deployment should use cases develop. The exact details of this will be considered in the assignment design.

The consultation spectrum estimates (800 MHz per operator maximum) will inform assignment process. Further detailed technical views and information on mobile systems will be taken into account in the next steps in an assignment process.

The 24.65 GHz to 25.25 GHz and the 27.0 -27.5 GHz frequency bands were not proposed for FSS (Earth to space) Earth station use and RSM has heard of limited interest this band for this purpose to date. RSM will not be permitting this band for FSS (Earth to space) Earth stations.

EESS and SRS (space to Earth) in the 25.5 -27.0 GHz band

One submitter supported the 25.5 -27 GHz frequency band for both EESS and SRS Earth stations at the sites listed in table 6 of the consultation at Awarua, and Orepuki, the submitter also highlighted that they wish add Warkworth to the list. Other submitters raised concerns that if many exclusion areas are defined for EESS and SRS may reduce the feasibility to deploy a viable rural FWA systems. Another submitter considered that the band should be allocated primarily for mobile use, with EESS, SRS and RAS operating on a secondary basis. Other submitters considered that further allocation to EEES and SRS should be done after the decision on mobile allocation is made.

RSM Response

RSM will look to make the spectrum available the 25.5 -27 GHz frequency band for both EESS and SRS Earth stations only for the sites listed in table 6 of the consultation and Warkworth at this stage. RSM do not agree with suggestions to make EESS and SRS Earth stations secondary to mobile or suggestions to delay making assignments for these stations.

While there may be some coordination zones around these sites that could preclude FWA use in areas, this is a small number of sites and there will be other frequency bands and connectivity options within these areas.

Regarding timing, RSM will look to the EESS and SRS Earth stations proponents to the detailed technical work to inform implementation into a licensing regime. RSM does not currently have an applicable licensing regime for EESS and SRS Earth stations.

27.5 -28.35 GHz (lower 28 GHz)

Mobile Fixed Wireless Access and Fixed Satellite services in 27.5 -28.35 GHz (lower 28 GHz- shared)

Some mobile stakeholders considered that the band should be preserved and made available to support mobile, FWA and private network use, rather than being effectively pre-empted for satellite and non-MNO or private network deployments. It was also suggested that RSM do not allocate lower 28 GHz on long-term or preferential terms until the band is available for mobile and suggested that licences for Earth stations be on a short-term basis. Other mobile stakeholders seem to accept shared use but preferred geographic – non-priority approaches under Option 1.

Most satellite stakeholders considered that the 27.5 -28.35 GHz band should be allocated to FSS (all types of stations including Gateways, User terminals and Earth station in motion (ESIMs)) as the primary service, with mobile as secondary or that the band should be for FSS only. It was outlined that allowing Mobile would adversely affect

the development of the New Zealand FSS / ESIM ecosystem if FSS is not allocated on a primary status. Some satellite stakeholders indicated that where the band is shared, they would prefer geographic priority approaches under Option 2 and were supportive of the priority arrangement across geographies described in the Discussion Document under Parts A. Some satellite operators expressed a desire to deploy gateways in urban areas noting that these areas have optimal fiber infrastructure. Some satellite operators proposed that the technical limits used Australia be adopted by RSM for protection of Mobile / FWA regarding the options. Submitters also raised other technical points, including proposing -91 dBW/m^2/MHz (based on Australian limits) to limits to protect mobile from FSS Earth stations.

RSM Response

RSM disagree with suggestions to only make spectrum available for one of these services (i.e. Mobile or FSS) or to make one primary and one secondary. RSM disagree with suggestions to pause on any satellite licensing activities or make these short term and consider that there is an immediate need for licensing of FSS stations while Mobile / FWA stations is a future need. RSM consider that longer term certainty needs to be provided for FSS, particularly around investments made in gateway / feeder link Earth stations. Regarding the option for sharing, RSM consider that Option 1 (geographic – non priority approach) is the best approach and will best preserve urban areas for future mobile / FWA deployments and will have a lower burden to administer. RSM agree with the proposed -91 dBW/m^2/MHz (based on Australian limits) to limits to provide a reasonable protect mobile from FSS Earth stations (e.g. protecting the urban areas and coordination zones). It should be noted that as proposed in the consultation existing licensed Earth stations in the RRF that are within urban areas will be able to continue. RSM will allow a limited, time bound hybrid approach between Option 1 and Option 2 for a very limited number of new Gateway / Feeder Link Earth stations in urban areas. This will be through a limited application window where operators must already have advanced / preexisting plans.

RSM will look to allow licensing of FSS user terminals Earth stations (not moving) for specific point locations outside of the urban areas only (under Option 1). In the future RSM may consider discretely defined areas (e.g. based on Territorial Local Authorities) provided that there are appropriate measures (e.g. geofencing) to protect Mobile and FWA in urban areas.

FSS Earth stations In Motion (ESIMs) in 27.5 -28.35 GHz (lower 28 GHz)

Some satellite operators considered that User Terminals and L-ESIMs should be permitted outside of urban areas. Satellite operators also expressed concern that on the adoption of ITU Radio Regulations, Resolutions 123 and 169 conditions for the operation of Aeronautical and Maritime ESIMs noting this would not allow allow gate-to-

gate and pier-to-pier operation and it was noted that these limits are intended for cross border. There was a suggestion on alternative technical limits but no evidence was provided on how this would protect terrestrial services. No studies were provided on coexistence to suggest alternative limits. Some operators suggest allowing Aeronautical-ESIMs and Maritime-ESIM without restrictions noting that they will be transient and if there are interference issues then this can be dealt with after it occurs and the operator will address it.

Satellite operators consider that user terminals and ESIMs should be authorised / licensed under a general user licence for the 27.5 – 30 GHz frequency range.

RSM response

Regarding allowing use of Land-ESIM outside urban areas, RSM has concern that rules may not be met where these terminals may get used in urban areas (e.g. user takes one to an urban area or drives into an urban area) which could cause interference and in-turn compliance issues that RSM will need to resolve. RSM has not seen information or evidence on how this would be prevented. Therefore, RSM will not allow Land-ESIM in this part of the band.

RSM note that alternative limits for ESIMs could be applied within New Zealand instead of the limits in ITU Radio Regulations Resolutions 123 and 169. However, within this frequency range terrestrial mobile / FWA systems will be operating in urban areas where New Zealand also has most of its major airports and ports. RSM note that there was a large body of studies undertaken for World Radio Conference (WRC)-19 and WRC-23 which were the basis for the limits in Resolutions 123 and 169 which RSM consider are adequate to protect terrestrial services. RSM has not been provided with alternative coexistence studies and evidence to show how these will be protected and what alternative limits are appropriate (noting there has been opportunity through Technical Working Groups). The time has now passed to consider this. RSM disagree with suggestions to allow ESIMs without restrictions to wait and see if there is interference, RSM consider that it is highly likely that unrestricted use would cause interference even if periodic. This approach would lead to considerable difficulties for RSM through investigations and for satellite operators through mitigating or ceasing operation.

While General User Radio Licences (GURL) provide simple straight forward authorisation for spectrum use, RSM considers that GURLs alone are no longer fit for purpose for satellite user terminals and ESIM Earth stations. GURLs are normally used where there is a low risk of interference to other services such as short-range devices or in other areas where the user is required to have qualifications (e.g. operator certificate) such as maritime, aeronautical and amateur GURLs. In contrast: satellite terminals are high powered and there is risk of onsite issues (e.g. high-power terminals close in frequency to receivers) and potentially co-frequency cases in the future (with shared arrangements); and are being mass deployed for use by the general public who do not

have the skills to understand interference scenarios, where the satellite operator needs to be responsible and culpable. While many other countries do have equivalents to the GURLs (e.g., licence exemption) they have other requirements e.g., where the satellite operator must have an operator's licence or meet other regulatory requirements to be able to use the licence exemption. RSM will further consider licensing of user terminals and ESIM and announce any proposed changes in due course.

28.35 -29.5 GHz and 29.5 -30 GHz (upper 28 GHz)

Most mobile stakeholders accepted that the 28.35 -29.5 GHz portion of the band would be for satellite. Only one stakeholder wished to preserve the option for future mobile use under technical conditions.

All satellite stakeholders agreed that the 28.35 -29.5 GHz portion should be exclusively for satellite. Satellite stakeholders also noted that 29.5 -30 GHz is already used for satellite and there is no primary allocation for mobile and this needs to be decoupled from the other portions of the band with no changes from the current situation.

Some satellite operators considered that there should be no restrictions on Earth station antenna elevation and some considered that EIRP density limits towards the horizon are sufficient. Some operators suggested alternative limits.

Regarding ESIMs, the views satellite operators have on 27.5 -28.35 GHz apply to this portion (see above) and that ESIMs would be inappropriately limited. Additionally, some satellite operators highlighted that the limits in the ITU Radio Regulations Resolutions are specifically designed to protect co-frequency terrestrial service operations and in this case there are no co-frequency terrestrial services. It was considered that adjacent band co-existence is achieved and recommend adopting only technical requirements consistent with U.S. 47 C.F.R. § 25.202(f) emission limits, ITU-R SM.1541 out-of-band emission limits, and ETSI 303 699 off-axis spurious emission limits.

Regarding the GURL, the views satellite operators have on 27.5 -28.35 GHz apply to this portion (see above). Additionally, satellite operators consider that there should be no change to the 29.5 -30 GHz frequency range.

RSM Response

RSM will look to move ahead with making the 28.35 -29.5 GHz portion available for satellite use only.

Regarding technical conditions, RSM will adopt the conditions in the consultation regarding the minimum elevation. This is an important parameter for coexistence with terrestrial service but some flexibly may be provided for the different sub bands, including 29.5 -30 GHz which is not immediately adjacent to terrestrial services

operating below 28.35 GHz. It is noted that Gateway Earth stations usually operate in frequency ranges beyond this sub band (e.g. over the a large part of the entire band).

Regarding the issues raised on ESIMs, the response is largely the same as above (i.e. lower 28 GHz). The differences between ESIMs that are co-frequency vs adjacent frequency are acknowledged and RSM may consider technical studies on relaxations to these limits or for alternative limits provided they protect mobile / FWA in the adjacent band.

Regarding the GURLS, the response is the same for 27.5 -28.35 GHz (see above).

17.7 -20.2 GHz

Submitters that commented on this frequency band generally supported the approach but did not provide much detail. One submitter suggested that allow receive protection for individually licensed FSS gateway earth stations, fixed user terminals, and ESIM in certain locations, and otherwise permitting use on an opportunistic basis.

A submitter asked that RSM expand its approach to include the adjacent 17.3-17.7 GHz band for FSS (space-to-Earth) use on a co-primary basis, consistent with international allocations in ITU Regions 1 and 2. It was also noted that this is being considered as part of WRC-27 Agenda Item 1.4 for Region 3.

RSM Response

RSM plan to implement the proposal to open the 17.7–20.2 GHz frequency band for receive protection licences for stations at specific locations under an individual receive protection licence under the existing FSS Earth station licensing regime. All other use (e.g. wide area user terminals / ESIM use) will be on an opportunistic basis. No changes are proposed for existing fixed links.

Regarding the 17.3-17.7 GHz band, RSM note that this is not currently allocated to FSS (space-to-Earth) and is FSS (Earth-to-space) in Region 3, which New Zealand is in. Therefore, RSM does not recognise FSS (space-to-Earth) in the 17.3 -17.3 GHz band and will await outcomes from WRC-27 then consider appropriate national actions.

Body scanners in 20 -40 GHz

Some submitters highlighted that there are current and future generation mmWave body scanners devices which operate in the 24.25 – 30 GHz and 20 - 40 GHz frequency bands overlapping the 24 - 30 GHz frequency range which is under consultation.

Submitters suggest that regulatory certainty for these body scanner devices is desirable and highlighted that the units are permitted in Australia, United States and Canada.

Submitters suggest options for authorising body scanners and providing certainty through a new general user radio licence, individual licensing of each unit or amendment to an existing GURL.

RSM Response

RSM consider that these body scanners are radio transmitters under the Radiocommunications Act (1989).

RSM note that globally the regulatory provisions and associated frequency ranges are more mature than others. For example the 24.25 GHz to 30 GHz and 67 GHz to 80 GHz frequency bands have been permitted in Australia under a body scanner class licence. However, Australia are yet to consider updates to its authorisation on body scanners (see Draft five-year spectrum outlook 2026-31). The 69.8 -79.9 GHz and 76.5 -80.5 GHz frequency bands have been harmonised in Europe (see ERC Recommendation 70-03) noting also the Harmonised Standard EN 303 940 (in development). The broader 20 – 40 GHz frequency band has been permitted in some places (e.g. under waivers or scientific licences) but is under study in other places such as Europe (see https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=77505 which will likely be provided for ECC for consideration). This work item also highlights that will exclude the passive bands under ITU RR No.5.340 'all emissions prohibited' (23.6 -24.0 GHz and 31.3 -31.5 GHz frequency bands).

RSM generally consider that body scanners / security scanners when operated indoors, in specific screening areas at low power, in a minimum number of locations present a low risk of interference (localised) to Mobile / FWA, EESS, SRS Earth stations and FSS (Earth to space) space station receivers in portions of the 24 -30 GHz frequency range.

RSM consider that needs for body scanners should be for government use only and must be driven by the government agencies who wish to use this technology and not commercial vendors.

RSM will develop an appropriate licensing framework for body scanners in the 24.25 -30 GHz and 69.8 - -80.5 frequency ranges strictly limited to indoor use government use only. The exact licensing framework is still to be determined. At an appropriate time, RSM may consider body scanners in other frequency ranges including the 12 -40 GHz and 20 – 40 GHz frequency ranges (or portions thereof) currently under study / consideration in Europe. RSM consider that products should not have wanted emissions (transmit in) RR No.5.340 'all emissions prohibited' frequency bands but in this case may consider studies along with technical conditions that prevent risks to passive receivers in these bands.

RSM will also look to list appropriate radio standards for product supply under its product supply regime https://www.rsm.govt.nz/business-individuals/supplier-compliance which may be EN 303 940 (in development) or a variant.

Satellite coordination issues and Non-Geostationary and Geostationary sharing

Some submitters made comments on the technical limits for Non-Geostationary Satellite Orbit (NGSO) and Geostationary Satellite Orbit (GSO) sharing relating to the EPFD limits in Article 22 of the ITU Radio Regulations which is currently being studied in the ITU-R.

One submitter recommended that RSM implement measures in its licensing regime for NGSO systems to ensure that these systems comply with the ITU Radio Regulations EPFD limits of Article 22. This submission specifically sought measures for GSO/ Multi-Orbit protection from NGSO and for NGSO constellations to share FSS frequencies and orbital resources effectively.

One satellite operator considered that the 28 GHz band should be reserved exclusively for satellite gateways as other terminal types (e.g., widespread very small aperture terminals or L-ESIMs) increases adjacent-band and aggregate interference complexity for feeder links. This satellite operator provided views application of the protection criteria and coordination trigger between satellite systems.

RSM Response

RSM consider this matter out of scope of this consultation and do not agree with these proposals. RSM maintains its view that intra-system interference management (satellite to satellite system interference) is managed though a separate process internationally by the ITU satellite coordination process and the ITU filing administrations (ITU member states). New Zealand is not a filing administration for these satellite networks. For Earth station licensing, RSMs requirement is that there is a filing with the ITU (e.g. ITU SNS notice ID) and we do not verify the stage in the coordination process or assess interference between the networks.

RSM further note that this is currently being studied in the ITU-R following discussions at WRC-23 on the matter. RSM will monitor and review the outcome of these studies as appropriate.

Fees and charging

Some submitters raised concerns regarding fees and equitable access to spectrum between satellite and mobile operators. Some mobile network operators argued that in

the context of increasing competition and convergence between the services offered by mobile and satellite operators, the current spectrum pricing approach risks unintentionally favouring satellite services.

RSM response

RSM is not currently considering changes to how Earth stations are charged for licences, or changes to the radio licensing regime more generally. RSM maintain its position on this matter as outlined in the consultation document. If RSM were to consider changes to our radio licensing charging approach in future, we would consult on any proposed changes prior to their introduction.