

ONLINE SUBMISSION

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The Manager
Spectrum Licensing Policy Section
Australian Communications and Media Authority
PO Box 78
Belconnen ACT 2616

Re: Draft Five Year Spectrum Outlook 2025-30

Intelsat, the leading provider of fixed-satellite services (“FSS”) worldwide¹, is pleased to submit comments to the discussion paper on *Draft Five Year Spectrum Outlook 2025-30*, published by the ACMA in March 2025.

Part 2: 2025 – 26 annual work program

Monitoring stage

40 GHz (37–43.5 GHz) and 47 GHz (47.2–48.2 GHz)

Intelsat supports the ACMA’s initiative in the *Response to submissions: Draft FYSO 2023-28* in the development of an interim licensing process for licence applications for gateway satellite earth stations in the following Q/V-bands allocated to FSS:

- 40 GHz (37 – 43.5 GHz) s-E
- 47 GHz (47.2 – 48.2 GHz) E-s

Satellite operators in Australia have plans to deploy feeder links in the Q-band (37.5– 40.5 GHz) and V-band (47.2 – 50.2 GHz and 50.4 – 51.4 GHz) to cover the Asia Pacific region with full coverage of Australia using geostationary (GSO) satellites and non-geostationary satellite orbits (non-GSO) satellites. This may include uncoordinated class licence and coordinated earth station use.

These Q/V bands are seen as growth bands for the satellite industry, supporting increasing demand for backhaul, earth stations in motion communicating (ESIMs), and potentially future user terminal services. Their relevance is further underlined by studies under WRC-27 Agenda Item 1.1 which are examining regulatory frameworks for aeronautical and maritime ESIMs in these bands.

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.

The bands 37 – 43.5 GHz and 47.2 - 48.2 GHz are included in the ACMA Embargo 49 to support the development of earth stations and protect from interference earth stations within the Mingenew Earth Station Protection Zone (ESPZ). Considering the long-term investments and operational requirements for gateway satellite earth stations, we urge the ACMA to consider providing the same protection to other Earth stations planned to operate in these frequency bands.

While satellite operators in Australia have substantial plans to use these Q/V bands in Australia for satellite feeder links, the MNOs in Australia have minimal customer take up of their 26 GHz mmWave 5G mobile services despite having coverage in the major cities since 2021. The leading mobile phone manufacturers have shown little interest in releasing mmWave 5G devices in Australia. The manufacturers have cited the limited coverage and potential cost increases for their lack of enthusiasm.² The point is that if the 26 GHz mmWave 5G mobile phone services lack support in Australia, it seems unlikely that the even higher frequency Q/V bands will be in demand for mobile phone services in the foreseeable future.

Advances in satellite manufacturing and earth station technology have made ESIM more widespread and more practical. Consequently, the utilization of Ku- and Ka-band frequency spectrum for providing ESIM connectivity (adopted at WRC-19 and WRC-23) is growing exponentially to meet user demands, which may lead to scarcity in spectral resources in these bands. Also, the rapidly increasing use of non-GSO, such as medium Earth orbits (MEO) and low Earth orbits (LEO), represents an important innovation in satellite technology enabled by enhanced satellite design, manufacturing and launch service capabilities. Airline passengers' ever-increasing hunger for bandwidth, combined with immense potential to obtain utmost operational proficiency with inflight connectivity (IFC) use will lead to steep increases in the required capacity.

With the aim of providing high capacity means of communication, even to the most isolated regions, these Q/V bands are vital for the future development of satellite services. A large numbers of satellite network filings has been submitted to the ITU containing these Q/V bands. At present, tens of Q/V-band satellites have been manufactured, and plans are underway for future satellites intending to use these bands for gateway links and possibly for user terminals.

Intelsat requests that the ACMA preserve these Q/V bands for space services and other services that successfully share these bands. The high gain, narrow beamwidth directional nature of Q/V band antenna beams, together with high elevation angles for transmitting to satellites, results in small coordination zones that facilitate sharing with FS.

While the bands above 37.5 GHz were identified at WRC-19 for IMT, some recent developments should give the ACMA cause for re-evaluation on the use of these bands for IMT:

- Firstly the (then) acting FCC Chair questioned the viability of mmWave spectrum to support 5G services. Given the recent allocation of the 4 GHz and 26 GHz band in Australia, the ACMA should not embark on any further disruptive 5G allocations above 4 GHz.
- In any case, 5G (IMT) can be disruptive to existing services when it enters a spectrum environment. Vendors and operators often expect 'clear' spectrum.
- Higher frequency bands do not look as useful for mobile coverage, but do provide viable spectrum for space services, particularly FSS.
- The ACMA should not proceed to allocate any further space service bands to IMT, at least until current spectrum in low/mid bands are fully utilised.

² <https://www.whistleout.com.au/MobilePhones/News/Is-mmWave-5G-dud-Australia> (accessed 27 Mar 2025)

Recommendation:

Since a number of satellite operators already have imminent plans for these bands in Australia, Intelsat would encourage the ACMA to move consideration of these bands into the 'Initial investigation stage'.

We recommend that the protection provided to these bands at Mingenew be provided to earth stations at other planned earth station sites.

We also recommend to the ACMA to begin ensuring the necessary long-term arrangements and the technical conditions for sharing with other services, for example, with existing point-to-point fixed link services in the frequency band 37.5 – 39.5 GHz, and potential future International Mobile Telecommunication (IMT) identified in the Q/V bands.

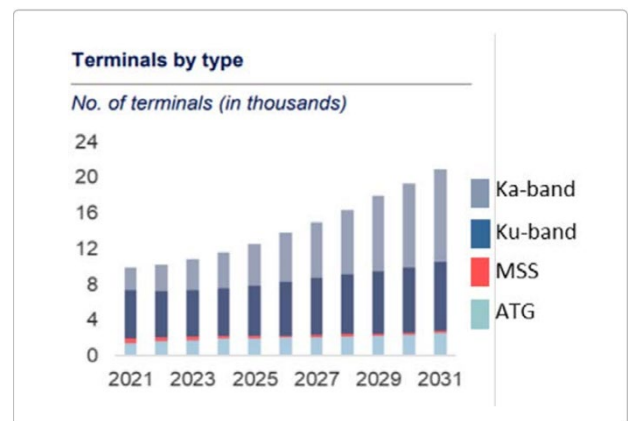
Initial investigation stage

13 GHz (12.75 – 13.25 GHz) – ESIM

Thanks to recent innovations in antenna technology, smaller and more efficient terminals are now capable of operating in the Ku band while not causing interference to incumbent services. These compact, electronically steered terminals enable greater deployment flexibility and support increased access to connectivity in remote and mobile environments.

Today, Earth Stations In Motion (ESIM) are being used around the world by airlines on commercial and private planes, by the maritime sector on cargo, tanker, ferry and passenger vessels, and land transportation on trains, buses, and other motor vehicles. The increasing demand from airline and cruise passengers, government and enterprise sectors is resulting in a rapid growth for broadband connectivity demand for in-flight and cruise ship.

GSOA reported³ that inflight connectivity (IFC) data consumption is on a steep rise and subscribers expect more value. In 2021 approximately 9,900 aircraft were actively providing IFC services through over 120 airlines. This number is expected to surpass 20,900 aircraft by 2031 representing 58% IFC penetration. The high demand for inflight and maritime connectivity can be partially satisfied by additional capacity obtained by allowing operation of ESIM communicating with GSO space stations in the FSS in the frequency band 12.75-13.25 GHz (Earth-to-space). This reflects that people are accustomed to being connected, even on the move, and their appetite for data is increasing.



As a result of WRC-23 (Agenda Item 1.15) international (ITU-R) regulation is now in place to allow ESIMs on aircraft (A-ESIMs) and vessels (M-ESIMs) to use the 12.75-13.25 GHz band to communicate with geostationary space stations in the fixed-satellite service under Appendix 30B. To operate these

³ [GSOA WRC-23 Positions Booklet - Agenda Item 15](#)

ESIMs, the notifying administrations need to file assignments (Appendix 30B ESIM) in accordance with Annex 1 of Resolution 121 (WRC-23). Resolution 121 (WRC-23) contains technical, regulatory and operational conditions for operation of A-ESIM and M-ESIM, while ensuring protection of allocated services among other things protection of terrestrial services with both a minimum distance from the low-water mark and maximum e.i.r.p. density towards the horizon for M-ESIM, and a pfd mask for A-ESIM.

Australia will be able to derive economic benefits from the deployment of ESIM operations in Australia, in the 13 GHz band if A-ESIMs and M-ESIMs are authorised to operate within Australia. Aeronautical ESIM installed in the Australian domestic airlines such as Virgin Australia, Qantas, Jetstar and Rex and commercial international airlines flying into and out of Australia will be able to provide value added services using this additional bandwidth to meet the expectations of airline end users including passengers and flight crew by providing broadband in flight connectivity services. Australia's international and even domestic route lengths are such that pleasure and business passengers will benefit. Such internet broadband connectivity is also expected by passengers and ship crew in Australian and international commercial maritime vessels include cruise ships, since it has become an expectation for passengers to be well connected whenever and everywhere they are. Installation of maritime ESIM in vessels would be able to fulfill the broadband connectivity needs of ship passengers and crew.

Recommendation:

Now that WRC-23 has allocated in the 12.75-13.25 GHz band a new application under the FSS identification of ESIMs to communicate with geostationary space stations under Appendix 30B, the ACMA is encouraged to implement domestic licensing policies to allow this use in Australia. As indicated in the previous section, Australia will benefit economically by allowing aircraft and maritime vessels of Australian and international origin to use this band.

This band was proposed for consideration in the 'Monitoring stage' of the draft 2024-25 annual work program. Intelsat would encourage the ACMA to consider placing this band into the 'Initial investigation stage'.

Implementation stage

3.4–4 GHz

Intelsat emphasizes that the protection of the C-band spectrum—particularly above 4 GHz—is essential to provide regulatory certainty to long-standing media and broadcast customers. These services rely on interference-free access to spectrum to deliver content nationally and regionally. Eroding access to these frequencies risks undermining the stability of broadcasting services and may lead to increased costs and service disruptions.

Intelsat notes the comments made in this Consultation Paper in the 'Recent developments' and 'Next steps' sections about allocations of Area Wide Licences (AWLs) for local Wireless Broadband (WBB) services in the 3950-4000 MHz band particularly in the metro and regional areas.

A number of satellite operators and satellite service providers⁴ provided a response to the “*Arrangements for highly localised WBB in the frequency bands 3400-3475 MHz and 3950 – 4000 MHz, Technical Liaison Group paper*”, with concerns about the arrangement for the WBB over the currently allocation to FSS in the frequency band 3950 – 4000 MHz.

Intelsat continues to be concerned that new and varied allocations for satellite earth station receivers in this band and geographical areas through the AWL rx licensing method is not an economically viable option and will lead to this incumbent service being systematically disadvantaged vis-à-vis WBB services in the same geographical area and band, therefore potentially driving FSS out. Continuing to license FSS ES receivers using location specific apparatus licence methodology will produce a more spectrum efficient arrangement and allow more FSS ES receivers to continue to operate without adversely affecting the highly localised (HL) WBB deployment.

At the recent Technical Liaison Group (TLG) on the 3950-4000 MHz band in metro and regional areas a number of satellite operators including Intelsat communicated to the ACMA that out-of-band (OOB) emissions into the FSS low-noise block downconverter (LNB) operating band is the major mechanism for causing interference to Earth Station (ES) receivers, rather than the overloading of the receiver, since filters cannot be applied to the receive carrier frequencies of the LNB. The final TLG document from the ACMA recognised the potential for interference from HL WBB OOB emissions into FSS ES receivers and proposed that HL WBB licensees be required to protect earth receive licences on a first-in-time coordinated basis to a level of –128.6 dBm/MHz as required for incumbent earth stations under earth receive licences.

Intelsat supports incorporating this requirement into RALI MS47 and MS50 (Frequency Coordination and Licensing Procedures for HL WBB PMPS Licences in the 3950–4000 MHz band). This approach aligns with international best practices for safeguarding FSS operations in adjacent bands and ensures continuity of critical satellite services. Given the importance of this issue, Intelsat recommends that any updates to RALI MS47 and MS50 be subject to further consultation with affected stakeholders to ensure robust and practical interference management.

The Radiocommunications Advisory Guidelines (Managing Interference from Spectrum Licensed Transmitters – 3.4 GHz Band) 2015 (as of 29 October 2023) (referred to as RAG Tx) indicates that FSS Earth receive stations operating in the 3600-4200 MHz band under earth receive licences on or after 16 July 2027 will require additional minimum RF filtering (rejection) levels above and below the upper and lower frequency limits of their licence. This would require custom RF filters to be fitted for frequencies of operation. Even then, the minimum RF rejection levels can only be met by licensing additional bandwidth above and below the required bandwidth to protect the earth station receivers from interference.

Further information on this topic is contained in the Communications Alliance (CA) Satellite Services Working Group’s (SSWG’s) submission to the ACMA ‘*Area-wide apparatus licences in the 3.8 GHz band in metropolitan and regional Australia - Licensing, allocation process, technical framework and pricing arrangements Consultation Paper*’ (1 August 2023)⁵.

Recommendation:

⁴ Intelsat, SES and Speedcast

⁵ https://www.commsalliance.com.au/data/assets/pdf_file/0008/94931/CA-SSWG-response-to-ACMA-allocation-of-AWL-in-3.8-GHz-band.pdf

Intelsat would encourage the ACMA to continue to license FSS ES receivers in C-band using the location specific apparatus licence methodology.

Intelsat would also recommend the ACMA continue to use the first-in-time coordination level of -128.6 dBm/MHz to protect C-band FSS ES receivers from interference from HL WBB OOB emissions.

Upper 6 GHz (6425 – 7125 MHz)

Intelsat along with a number of satellite operators and satellite service providers, have been using the upper 6 GHz band (6425-7075 MHz) for many years, and continue to rely on the band for FSS uplinks, MSS feeder uplinks and downlinks.

Intelsat supports the ACMA's decision to introduce arrangements for low powered RLAN in 6425-6585 MHz via the Low Interference Protection Device (LIPD) class licence. Since Intelsat and others operate uplinks from Australia, it will be necessary for RLAN providers to consider potential interference from these earth stations. With RLAN systems under the LIPD class licence operating on a non-protected basis with respect to other services this is seen as a viable solution.

We note the ACMA's plan to investigate the use of higher-power RLAN and Automated Frequency Coordination (AFC) in the broader 6 GHz band (5925-6585 MHz) through a consultation paper in Q3 2025. It is important for the ACMA to carefully consider the sharing aspect with respect to FSS uplinks in particular if the standard power Wi-Fi is to be considered. High-power RLAN use of the frequency band 6425 – 6585 MHz may result in interference into FSS uplinks, even with use of an AFC system. The ACMA will need to take into account that a GSO satellite receiver may receive interference from terrestrial systems deployed not only in Australia but across about one third of the Earth's surface.

Recommendation:

Intelsat would encourage the ACMA to carefully consider the sharing aspect with respect to FSS uplinks in particular if the standard power Wi-Fi is to be considered in the frequency band 6425 – 6585 MHz.

Part 1: Five-year spectrum outlook 2025–30

Satellite direct-to-mobile services

As noted in CA SSWG's submission to the ACMA on *Satellite direct-to-mobile (DTM) services regulatory issues* (7 Feb 2024), DTM services are developing rapidly, already offering messaging services, with the future holding the promise of higher speed networks, with speeds in the tens of megabit per second to a 3rd Generation Partnership Project (3GPP) non-terrestrial networks (NTN) Release 17 handset for satellite operations in the S and L bands. Releases 18 and 19 promise even higher speeds with the possible introduction of additional frequency bands (e.g. Ka and Ku-bands).

Australia, due to its geographical environment and the absence of land borders, is in a better position than small land-locked countries to continue supporting the development of MSS DTM and IMT Sat DTM technology standards and regulation including operation of a system within the requirements of RR Article No. 4.4. This would support a competitive market which benefits from the economies of scale being created through the inclusion of NTN in the 3GPP standards. It is important to remember that DTM services are already in operation and soon will be available in many parts of the globe. Australia can benefit from them quickly if so allowed.

The satellite industry is increasingly playing a vital role in enabling DTM communications. This is especially relevant in bands already standardized by 3GPP, such as the S, L, but this could also be included in other bands, which facilitate economies of scale by leveraging mass-market mobile devices. Leveraging existing 3GPP bands ensures that satellite D2D services can develop efficiently, cost-effectively, and with interoperability benefits across networks

Intelsat notes the ACMA's report In the FYSO 2024–29 on the outcome of their consultation on the suitability of Australian regulatory arrangements and spectrum access for satellite direct-to-mobile services. Intelsat is heartened with the ACMA view that IMT-based satellite direct-to-mobile services can be operated under Australia-wide spectrum licences without the need for further approval from the ACMA.

Optimising established planning frameworks

14 GHz (14.0 – 14.5 GHz)

Regarding Ku band (14.0 – 14.5 GHz) GSO land based ESIM, some Asia Pacific countries including Australia have allowed the operations of Ku-band GSO ESIM including land based ESIMs also known as VMES (Vehicle Mounted Earth Stations) in their territory as indicated in [APT Report# 110](#). As per APT Report# 110, the ACMA have indicated that operation of ESIM is able to be authorised in 10.7 – 12.75 GHz and 14 – 14.5 GHz via space and space receive licenses in concert with the Space Object Class License subject to meeting licensing assessment procedures. In addition to APT Report# 110, the table below shows the developments of VMES in other regional organisations.

	GSO Ku Band			
Terminal Type	USA (FCC)	CEPT (ECC)	Europe (ETSI)	International (ITU)
VMES	CFR 47 §25.226	ECC/DEC 18(04) published in 2019	EN 302 977	Recommendation ITU-R S.1857

Land based ESIM considered in the ECC Decision 18(04) are to be deployed with GSO satellite networks already in operation or may be deployed in the future. The ECC Decision 18(04) addresses the harmonised use, exemption from individual licensing, and free circulation and use of land based ESIM operating on Ku-band GSO satellite networks. This ECC Decision provides a regulatory framework for authorising land based ESIM on the condition that such deployment will not cause harmful interference to other authorised services.

The regulatory framework specifies that land-based ESIM should be exempt from individual licensing and offered free circulation and use. The other authorised services within the CEPT are limited to the fixed service (FS) in the 14.25 – 14.5 GHz band, deployed in limited number of administrations, and radio astronomy service (RAS) in the 14.47 – 14.5 GHz band, where astronomy observations are carried out at a limited number of observatories within the CEPT. The technical conditions established for land based ESIM to maintain compatibility with FS and RAS are also described in this ECC Decision.

Technical studies carried out by the CEPT have identified the technical solutions to protect the FS in the 14.25 – 14.5 GHz band and RAS in the 14.47 – 14.5 GHz band. Such protection is achieved by ceasing transmissions from land based ESIM in the frequency bands that overlap the frequency

assignments of FS and/or RAS stations when the land based ESIMs enter or are located within the zones identified for the protection of FS and/or RAS stations ('protection zones').

During consultation on the ACMA's business operating procedure (BOP) for Ka band ESIM in 2021, the SSWG also submitted commentary on arrangements for Ku ESIM arrangements introduced in August 2020⁶. The ACMA responded in its outcome paper that the issue will be considered in a possible revision of the BOP at a later time. As indicated by the input from the SSWG to the draft FYSO for 2022-27⁷, Ku-band (14.0 - 14.5 GHz) non-GSO ESIM have already been authorised in Europe via an ECC decision for CEPT countries and it is anticipated that work will commence in the ITU-R to develop international regulations for their use in due course. Similarly, the U.S. FCC has adopted rules that permit non-GSO ESIM operations in the Ku-band. The table below summarizes those various regional decisions.

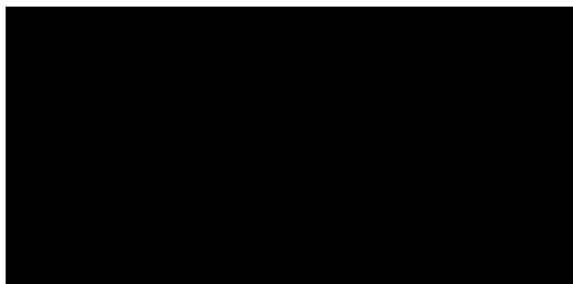
	Non-GSO Ku Band		
Terminal Type	USA (FCC)	CEPT (ECC)	Europe (ETSI)
ESIM	CFR 47 §25.228	ECC Report 279 ECC/DEC 18(05) ECC/DEC 19(04)	EN 302 980 EN 302 981

Recommendation:

Intelsat recommends adding revision of the BOP on Ku-band (14.0 – 14.5 GHz) ESIM for both GSO and non-GSO to the 2025-26 annual work program.

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

Respectfully submitted,



Mohaned Juwad
Director, Spectrum Policy

⁶ [November 2021 CA SSWG Submission - ACMA Updating regulatory requirements for earth stations in motion](#)

⁷ [May 2022 CA SSWG Submission – ACMA Five-year spectrum outlook 2022–27 and 2022–23 work program](#)