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Proposed licensing arrangements for 2 GHz narrowband mobile-satellite services and 28 GHz fixed-satellite services

Dear colleagues at ACMA,

Viasat commends the ACMA for inviting industry inputs on the proposed licensing regime. Viasat's comments below address the options presented on the 28 GHz band for satellite services.

Introduction

Viasat is proud of the work we do in Australia from offices in Canberra, Melbourne and Sydney. Our Australian business works with NBN to connect regional Australia to the internet via their Sky Muster satellites, and with Telstra to provide reliable USO voice satellite telephone services to the most remote residents in the outback. And we have partnered with indigenous Australians, via the Centre for Appropriate Technology, for a state-of-the-art satellite station in Alice Springs for Earth observation. We deliver gate-to-gate in-flight broadband satellite Wi-Fi on Qantas, as well as space networks and ground stations for the Australian Defence Force. Moreover, **Viasat and Telstra** have recently commenced a massive 16.5-year infrastructure partnership worth billions in investments that will augment Australia's capabilities in the new frontier of telecommunications being built in space¹.

We soon will launch our next generation of satellites, ViaSat-3 – designed and built in our own payload facility. Each of three global satellites will provide over one Terabit per second, about ten times what was possible when Sky Muster was procured. That means much higher speeds, and

¹ Telstra News, *Our role connecting millions of Australians from space* (2 February 2022), <https://exchange.telstra.com.au/our-role-connecting-millions-of-australians-from-space/>.

more bandwidth, at lower costs for consumers and defence forces in Australia and globally, on land, gate-to-gate for services in the air, and pier-to-pier for broadband connectivity at sea.

Viasat's comments on the 28 GHz licensing arrangements

The 17.7-19.7 GHz (18 GHz) and 27.5-29.5 GHz (28 GHz) bands are critical for providing satellite broadband services in Australia. We note that both WRC-15 and WRC-19 determined that geostationary (GSO) earth stations in motion (ESIM) fulfils critical global mobile broadband goals. In particular, WRC-15 opened the 19.7-20.2 GHz and 29.5-30 GHz parts of the Ka band for GSO ESIM and decided that further expansion of GSO ESIM in the 18 GHz and 28 GHz bands would be considered at WRC-19 to extend mobile connectivity.

The adoption of Footnote 5.517A at WRC-19 made more Ka-band FSS spectrum available to GSO ESIM and enabled ubiquitous GSO ESIM connectivity throughout the Ka band for aero, maritime, and land-based operations. Importantly, WRC-15 and WRC-19 both determined that GSO ESIM in these parts of the Ka band are an application of the FSS². WRC-19 extended the decision of WRC-15 and opened the entire 27.5-30 GHz and 17.7-20.2 GHz bands to GSO ESIM, consistent with applicable provisions of the Radio Regulations.

As GSO ESIM are a part of the FSS allocation throughout the Ka band, they are entitled to primary status with respect to secondary services and co-primary status with respect to other co-primary services. For the benefit of implementation of GSO ESIM in Australia, Viasat highlights the following provisions of Res. 169 (WRC-19), which explain why that Resolution does not limit ESIM operations in the 27.5-29.5 GHz band segment within an Administration's borders, but rather provides guidance for the rare cross-border case where, in a neighbouring country, terrestrial services may be allocated and operating in the very same frequencies as a GSO ESIM:

² See Resolution 156 (WRC-15, Geneva) "Use of the frequency bands 19.7-20.2 GHz and 29.5-30 GHz by earth stations in motion communicating with geostationary space stations in the fixed-satellite service" considering e), resolves 1.1; Resolution 169 (WRC-19, Sharm el-Sheikh) "Use of the frequency bands 17.7-19.7 GHz and 27.5-29.5 GHz by earth stations in motion communicating with geostationary space stations in the fixed-satellite service" resolves 6; and footnote 5.517A of the Radio Regulations as adopted by WRC-19.

Resolves 1.2.4 provides: “the provisions in this Resolution, including Annex 3, set the conditions for the purpose of protecting terrestrial services from unacceptable interference from aeronautical and maritime ESIMs in neighbouring countries in the frequency band 27.5-29.5 GHz”

- Paragraph 1 of Annex 3 provides: “The parts below contain provisions to ensure that maritime and aeronautical ESIMs do not cause unacceptable interference in neighbouring countries to terrestrial service operations when ESIMs operate in frequencies overlapping with those used by terrestrial services at any time to which the frequency band 27.5-29.5 GHz is allocated and operating in accordance with the Radio Regulations (see also resolves 3 of this Resolution)”
- Part II of Annex 3 provides power flux density (PFD) limits for the 27.5-29.5 GHz band segment when an aeronautical ESIM is operating “within line-of-sight of the territory of an administration”
- The further resolves provides that an administration may authorize ESIMs within its own territory without reference to the to the power flux density levels contained Res. 169 where doing so does not affect other administrations.

Resolution 169 was never intended for internal coordination *except in Administrations with borders between them and Administrations not authorising ESIM*. Given Australia is an island continent without such borders, Resolution 169 does not and should not apply.

Considerations on Maritime ESIM (M-ESIM) for Pier-to-Pier Connectivity

The proposed pfd of -112.2 dBW/MHz is 21.2 dB lower than the -91 dBW required coordination level between area-wide apparatus licenses (AWLs). We note that the -112.2 dBW must be met at **30m instead** of the **5m** for 95% of time applied to AWL-to-AWL coordination. This would mean that M-ESIM will not be able to operate in most Australian ports.

Viasat's views:

- M-ESIM are a high value service for maritime operations connecting passengers and crew
- This value exceeds the incremental value derived from terrestrial fixed wireless access (FWA) in these areas
- If the -91 dBW pfd at 5m is used instead, FWA would not be constrained from providing services
- Ports have clutter -- this will help separate the two services
- Ship mounted FSS terminals in-port are stationary and nearly identical to terrestrial FSS terminals

Considerations on Aeronautical ESIM (A-ESIM) for Gate-to Gate Connectivity

A-ESIM are subjected to a different pfd via the upper altitude requirements of Resolution 169 (WRC-19). Resolution 169 should not be used for domestic coordination. The further resolves in Res.169 provides that an administration may authorize ESIMs within its own territory without reference to the to the power flux density levels contained Res. 169 where doing so does not affect other administrations.

Considerations on guard bands

Ubiquitous FSS stations on land (*i.e.*, land ESIM and VSAT) are permitted to operate up to the boundary of an AWL (*i.e.*, the boundary of a defined populated area in the 27.5 – 28.1 GHz band). This is not the case *within* defined populated areas. In Viasat's view, this is not consistent across the board and should be revised, given the already *feasible co-existence between VSAT and FWA within populated areas*.

For the operation of land ESIM and VSAT either in the 28.1-28.3 GHz band within a defined populated area, or in the 27.55 – 27.7 GHz band outside this defined populated area, ubiquitous FSS is being required to apply a 50 MHz guard band, or twice the occupied bandwidth of FSS, if greater than 50 MHz, to mitigate potential adjacent channel interference to primary FWA.

Guard bands are an inefficient use of the critical spectrum resource in this case where other effective interference mitigation arrangements are being applied. ACMA has correctly deduced

that ubiquitous FSS can safely operate right up to the boundary of an AWL, based on in-band powers. In adjacent bands, where the combination of transmitter and receiver performance and filtering will mean received powers will be approximately 45 dB lower, ACMA is of the view that a guard band is required. Viasat encourages ACMA to revisit the proposed guardband approach to further assess its merits, considering available analyses, for example, those from ECC.

For instance, ECC Decision (15)04 defines the pfd from an aircraft (A-ESIM) on the ground. Viasat notes that, recognizing the environment for the uplink is identical, ECC Decision (13)01 uses exactly the same envelope for GSO ESIM and that this is replicated for altitudes above 3 km in Resolution 169. Also noting that the 'below' 3 km pfd's were "a last day's compromise" at WRC-19 and, at the time, the Australian position was to support the ECC (13)01 levels, we submit that these levels are sufficient domestically to protect terrestrial services from overflying ESIM at any altitude.

Given these levels have been proven through thorough CEPT studies to protect terrestrial services, Viasat submits that A-ESIM would be able to overfly in the entire band 27.5 – 29.5 GHz without causing unacceptable interference. Given that in band systems are protected by these levels, it is puzzling why the ACMA has chosen to apply an additional guard band.

We look forward to further discussions on these important issues.

Sincerely,

A handwritten signature in black ink, appearing to read "Cristian Gomez", with a stylized flourish at the end.

Cristian Gomez
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