Viasat response to the ACMA consultation

Future use of the upper 6 GHz band: Options paper

16 July 2024

1 Introduction

Viasat appreciates the opportunity to comment on the options paper for the upper 6 GHz band (6425 – 7125 MHz). Viasat, through its wholly owned subsidiary Inmarsat, has been making use of the upper 6 GHz band for more than 40 years, and continues to rely on the upper 6 GHz band for the feeder uplinks for our L-band mobile-satellite service (**MSS**) network.

Our ability to continue to use that band relies on careful and methodical decision making by spectrum regulators such as the ACMA. We look to the ACMA to ensure that any planning decisions for this band allow the ongoing use of this band without harmful interference. A failure to do so would disrupt our L-band MSS services, causing significant harm to individuals, industry and government users, and potentially placing lives at risk.

Viasat uses the frequency band 6425 – 6575 MHz to provide feeder uplinks from gateway stations in Australia and elsewhere for our existing L-band I4 and I6 satellites. These feeder uplinks, which are an application of the fixed-satellite service (**FSS**), are used to support the L-band MSS services which are used for safety and critical communications on land, on ships and on aircraft. Viasat plans to launch a new I8 satellite in 2026, to provide crucial safety services and support advances in navigation, including throughout Australia. The I8 satellites will provide an extra layer of resilience to complement the existing constellation and I6 satellites in the Asia Pacific region, including Australia.

2 Discussion on the proposals

Viasat's main concern is regarding potential interference to our satellites from the introduction of new terrestrial systems in the frequency band 6425 – 6575 MHz. Viasat is of the view that shared use of the FSS with radio local area networks (**RLAN**) is feasible under realistic conditions. However, Viasat is of the view that shared use with wide-area wireless broadband (**WBB**) is not feasible under any realistic conditions. The Viasat geostationary orbit (**GSO**) satellites use global beam antennas that receive interference from terrestrial systems across around one third of the Earth surface. For example, from the location of 64°E, the satellite receives interference from all of Europe, Africa, and most of Asia, including most of Australia. The aggregate interference from WBB and similar mobile systems in other countries has significant potential to cause harmful interference. Interference to the feeder uplinks in frequency band 6425 – 6575 MHz may disrupt or prevent the important L-band MSS and navigation services.

Since Viasat operates the uplinks from Australia, it will be necessary to also consider potential interference from our earth stations to any new terrestrial systems. Any new systems should be required to accept any interference from incumbent earth stations. RLAN systems typically operate on a non-protected basis with respect to other services and hence this issue also supports FSS sharing with RLAN as a viable solution.

Regarding actions for the coming months, as an initial point, Viasat recommends that the ACMA takes no action on the upper 6 GHz band at this time. This is consistent with planning option 1: "*Maintain existing arrangements, with potential reconsideration at a later date*". This recommendation is based on two main arguments:

a) we don't believe there is a compelling need for more WBB midband spectrum and there is unlikely to be a need for several years to come. There has been evidence recently of a stalling in the grown of mobile data[1], while the ACMA continues steps to make more spectrum available for WBB in the 3.8 GHz band, which has similar characteristics to the upper 6 GHz band.

b) WRC-27 agenda item 1.7 will consider making further spectrum identifications for IMT, including all or parts of the frequency band 7125 – 8400 MHz, which is immediately adjacent to the upper 6 GHz band. This might make available additional IMT spectrum in all ITU Regions and could provide a neat solution to provide additional spectrum for RLAN in the upper 6 GHz band, while accommodating IMT in parts of the frequency band 7125 – 8400 MHz.

A more holistic view could therefore be taken after WRC-27, without harming WBB services in Australia.

Potential for sharing with RLAN

To the extent that the ACMA wishes to consider action to accommodate new applications before WRC-27, we would be content with an approach that sees RLAN use in the frequency band 6425 – 6575 MHz under the same power/deployment limitations as for the lower 6 GHz band. This would be consistent with planning option 2: "*Introduce arrangements to enable RLAN access to some or all of the upper 6 GHz band, via a variation to the LIPD Class Licence. There would be no introduction of arrangements introduced for WA WBB*."

The main interference issue with respect to FSS operations in the upper 6 GHz band is from the aggregate interference from RLAN devices to the satellite receiver. The satellite antenna beams typically cover a very wide area and typically covering the whole of the visible Earth surface through use of a global beam. While Viasat can accept the low power and very low power limits on RLAN devices that apply in the lower 6 GHz band, Viasat would be concerned with the suggestion of higher power RLAN use, discussed on page 30 of the consultation document.

Noting that AFC is intended to assign channels for high-power RLAN devices to operate following coordination with other terrestrial devices (other RLAN devices and other services such a fixed links) in the local area, it is not apparent that it would control the aggregate interference from RLAN devices in the satellite beam. Therefore, we do not see the possibility for AFC based RLAN devices operating with standard power to protect the satellite receivers. It may be possible to permit standard power operations under particular technical conditions (e.g. in a restricted number of buildings with higher than average building loss) while providing similar protection to FSS uplinks, but this would require new and more complex technical studies, so is uncertain at this time. We have also noticed that much of the RLAN community appears to be content with the low power and very low power regulations for RLAN, so there seems to be very limited demand from the industry themselves for "standard power" devices under an AFC scheme.

Potential for sharing with WBB

The suggested introduction of WBB in all or part of the upper 6 GHz band causes the greatest concern for Viasat. There has been evidence of harmful interference to satellite systems from

[1] See first slide in presentation from industry observer William Webb to the 6G Global Summit: https://drive.google.com/file/d/14-Hj7ceErHF-0raHXUgd_oyROVXmNtA4/view

IMT base stations in other satellite uplink bands[2], and if interference was to occur, it would be difficult or impossible to resolve.

We note that only the frequency band 7025 – 7125 MHz is identified for International Mobile Telecommunications (**IMT**) in Australia in the Radio Regulation (**RR**) (through RR footnote 5.457E). The remainder of the upper 6 GHz band, 6425 – 7025 MHz, is allocated to the mobile service but not identified for IMT in most Region 3 countries, including Australia. The use of the Viasat uplink band, 6425 – 6575 MHz, by IMT in Australia and other countries has been studied by Viasat[3] and a significant risk of interference to our MSS satellites has been identified. That risk of interference was partly mitigated by the fact that WRC-27 did not identify the frequency band 6425 – 6575 MHz for IMT in Australia and retained the previous RR Article 21.5 power limits for mobile systems, reducing the risk of aggregate interference to our satellites. The use of the frequency band 6425 – 7025 MHz by IMT in Australia, would not only increase the risk of interference but would clearly be contrary to the spirit of the RR.

While the consultation document states that the ACMA's preliminary view would be that WBB systems would also be required to implement the expected EIRP mask as adopted by WRC-23, Viasat does not accept that this will provide adequate interference protection if IMT or similar WBB systems are widely deployed. Not only are the expected EIRP limits too high to protect our satellites, in our view, but they are also impractical to ensure compliance with. The compliance with expected EIRP limits can only be demonstrated by complex testing in a purpose designed laboratory. Furthermore, compliance with the expected EIRP limits are subject to operational constraints such as beam pointing limitations, that are impractical for regulators to check compliance with.

Considering the risk of interference to satellite uplinks, and the available alternative bands for WBB, we urge the ACMA not to consider the frequency band 6425 – 6575 MHz, at least, for future WBB systems.

Based on the above, Viasat would oppose planning option 3: "*Introduce arrangements to enable WA WBB access to some or all of the upper 6 GHz band, using apparatus and/or spectrum licensing. There would be no arrangements introduced for RLANs*". The only circumstance under which this option would be suitable is if WBB is limited to the spectrum above 6575 MHz and is not deployed in the frequency band 6425 – 6575 MHz.

Regarding Option 4: "*Introduce arrangements to enable both RLAN and WA WBB access to different frequency segments within the upper 6 GHz band, using the respective authorisation arrangements in options 2 and 3*"; this could only be acceptable with respect to Viasat's operations with a band segmentation that placed RLAN in the frequency band 6425 – 6575 MHz, avoiding WBB in this band. In any band segmentation scheme for the upper 6 GHz band, it clearly makes most efficient use to place RLAN at the lower side of the band, to be immediately adjacent to the existing RLAN band 5925 – 6425 MHz. A feasible scenario would see RLAN authorised up to 6585 MHz, making available additional RLAN channels of 1x320 MHz, 1x160 MHz, 2x80 MHz, 4x40 MHz and 8x20 MHz (as illustrated in Figure 3 of the consultation document). There are other options that would make even more RLAN channels available, such as a band segmentation at 6905 MHz, while maintaining only RLAN in the critical band for Viasat's operations.

It is stressed that any variants to Option 4 that would place WBB in any part of frequency band 6425 – 6575 MHz are opposed. Furthermore, should there be a need of guard band between WBB and the FSS (e.g. from transmitting earth stations to WBB receivers), the guard band should be taken from the WBB band.

[2] See information provided by India regarding interference from IMT base stations to a satellite operating in the band 2 655-2 690 MHz in ITU-R document 4C/253 (https://www.itu.int/md/R19-WP4C-C-0253/en)

[3] See ITU-R WP 5D contribution 5D/1489 (https://www.itu.int/md/R19-WP5D-C-1489/en)

3 Specific answers to questions

In line with the above discussion, we provide specific answers to the questions.

Q1. What are your views on the 4 broad planning options identified for the upper 6 GHz band?

Viasat is of the view that Option 1 makes most sense at this time, given the potential availability of alternative mid-band spectrum for WBB at WRC-27. The other three options all contain variants that would be acceptable to Viasat, but only if WBB is not authorised in the frequency band 6425 – 6575 MHz.

Q2. If we decide to divide the band into different RLAN and WA WBB segments, should the WA WBB segment:

> *a. be a multiple of 100 MHz? This would align with the largest 3GPP channel size (noting that the ability for WA WBB operators to deploy one or more 100 MHz channels will depend on the outcome of the assignment process)*
>
> *b. align with the 160/320 MHz wi-fi channel raster? This would maximise the number of the larger wi-fi channels available (by avoiding options that would split these channels).*

For Viasat, the most important factor is that WBB is avoided in the frequency band 6425 – 6575 MHz and hence a segmentation at 6575 MHz or higher would be acceptable (with RLAN on the lower side of the divide, WBB on the upper side).

Q3. Of the segmentation options based on wi-fi channels (options 1–3 in this paper), what is the preferred option and why?

For Viasat, the most important factor is that WBB is avoided in the frequency band 6425 – 6575 MHz. Segmenting the band at 6585 MHz, 6745 MHz or 6905 MHz would all be acceptable options and would align with the wi-fi channels.

Q4. Is it appropriate to limit our consideration of hybrid options for accommodating multiple services to frequency segmentation only? For example, should geographic segmentation or less traditional sharing models be considered when determining models for enabling access to the upper 6 GHz band by both WA WBB and RLAN services?

We are aware of studies, in particular in CEPT, that are considering a range of hybrid options including geographic segmentation (e.g. WBB outdoor, RLAN indoor) and frequency band segmentation. The use of geographic segmentation in the frequency band 6425 – 6575 MHz would probably exacerbate the situation, since our satellites would receive aggregate interference from RLAN and WBB combined. This variant would be opposed.

4 Concluding comments

Viasat thanks the ACMA for the opportunity to comment. While we recommend Option 1, it is apparent that Options 2 and 4 include realistic variants that could be acceptable for Viasat's operations. Whatever option is taken forward for more detailed consideration, it is vital that the ACMA carefully and fully considers the potential impact on our operations. Viasat strongly opposes all options and variants that would open the frequency band 6425 – 6575 MHz for WBB.