

12 May 2023

The Norwegian Communications Authority (Nkom)
Submitted to: firmapost@nkom.no
Copy to: avi@nkom.no

Re: Viasat's inputs to Nkom's consultation on allocation of 1500 MHz and 26 GHz bands.

Viasat is pleased to have the opportunity to provide input to the Norwegian Communication Authority (Nkom) on the consultation on allocation of the 1500 MHz and 26 GHz frequency bands ("Consultation")¹.

Viasat provides general comments on use of the 24.25-27.5 GHz (26 GHz) band and notes that the adjacent 27.5-29.5 GHz (28 GHz) band is essential for the provision of satellite broadband services in Europe, including Norway, and around the world.

Viasat's comments below: (1) provide information on the broadband services that Viasat and other satellite operators provide in Europe and around the world in the critical 28 GHz band, in addition to the rest of the Ka band; (2) support the identification of the 26 GHz band for terrestrial IMT/5G based on market demand and the preservation of the 28 GHz band for satellite broadband services; (3) propose aligning the amount of offered spectrum in the 26 GHz band with the actual and demonstrated market demand for terrestrial IMT/5G; (4) propose that Nkom consider the frequency band segment 26.5-27.5 GHz for terrestrial IMT/5G to accommodate future terrestrial IMT/5G and Fixed Service in the 26 GHz band; (5) urge Nkom to ensure that the aggregate level of terrestrial IMT/5G out-of-band emissions from the 26 GHz band into the adjacent 28 GHz band do not cause harmful interference to satellite receivers in space in the 28 GHz band; (6) recommend conditions that need to be placed on terrestrial IMT/5G services in the 26 GHz band to protect satellite services in the adjacent 28 GHz band; and (7) urge Nkom to implement latest version of ECC/DEC/(13)01² to allow license exempt aeronautical and maritime Earth Stations in Motion (ESIM) operation in the entirety of 27.5-30 GHz band, as well as define

¹ See *Consultation on allocation of 1500 MHz and 26 GHz bands* (published 31 March 2023), <https://nkom.no/frekvenser-og-elektronisk-utstyr/frekvenser-til-mobilkommunikasjon-og-5g/tildeling-av-1500-mhz-og-26-ghz-bandene>.

² See *ECC Decision (13)01 of 8 March 2013 on the use, free circulation, and exemption from individual licensing of Earth stations on mobile platforms (ESOMPs) in the frequency bands available for use by uncoordinated FSS Earth stations within the ranges 17.3-20.2 GHz and 27.5-30.0 GHz* (amended 26 October 2018; expected publication of post-WRC-19 amendment, June 2021), <https://docdb.cept.org/document/439>.



rules for license exempt use of fixed satellite earth stations according to ECC/DEC/(05)01³ and ECC Decision (06)03⁴.

Viasat is a global leading provider of communications solutions across a wide variety of technologies, both satellite and terrestrial. Viasat designs and builds every component of our networks—user terminals, satellite payloads and ground stations—to meet the market demand for reliable, effective and affordable, high-speed broadband connectivity.

Viasat's use of the Ka band, specifically the paired frequency bands 27.5-30 GHz (Earth-to-space)/ 17.7-20.2 GHz (space-to-Earth), is robust as Viasat uses this spectrum today to provide millions of high-speed broadband connections to households and businesses in North America, Central America, Latin America⁵, Australia⁶, and across Europe⁷.

³ See ECC Decision (05)01, *ECC Decision of 18 March 2005 on the use of the band 27.5-29.5 GHz by the Fixed Service and uncoordinated Earth stations of the Fixed-Satellite Service (Earth-to-space)* at <https://docdb.cept.org/document/384>.

⁴ See ECC Decision (06)03, *ECC Decision of 24 March 2006 on Exemption from Individual Licensing of high e.i.r.p. satellite terminals (HEST) operating with geostationary satellites and in the frequency bands 10.70-12.75 GHz or 19.70-20.20 GHz space-to-Earth and 14.00-14.25 GHz or 29.50-30.00 GHz Earth-to-space* at <https://docdb.cept.org/document/396>.

⁵ See *Viasat Brings Fastest Home Satellite Internet Service to Mexico*, <https://www.viasat.com/news/viasat-brings-fastest-home-satellite-internet-service-mexico>; *Viasat Completes Brazilian Residential Internet Service Roll-Out--Now Covers 100% of the Country; Offers New Premium Satellite Internet Service Plan with Highest Speed and Data*, <https://www.prnewswire.com/news-releases/viasat-completes-brazilian-residential-internet-service-roll-outnow-covers-100-of-the-country-offers-new-premium-satellite-internet-service-plan-with-highest-speed-and-data-301161443.html>.

⁶ See *Viasat Wins \$286M Satellite Broadband Deal with Australia*, <https://spacenews.com/viasat-wins-286m-satellite-broadband-deal-australia/>.

⁷ See *Viasat's Expansion in Europe Helps Bridge the Gap to Faster Broadband* (video), <https://corpblog.viasat.com/viasats-expansion-in-europe-helps-bridge-the-gap-to-faster-broadband/>; *Viasat Affirms Commitments to Bring its Powerful ViaSat-3 Satellite to Europe*, <https://www.viasat.com/news/viasat-affirms-commitments-bring-its-powerful-viasat-3-satellite-europe>; *Viasat Completes Acquisition of Remaining Stake in its European Broadband Joint Venture, inclusive of the Ka-Sat Satellite and Ground Assets* (April 30, 2021), <https://www.viasat.com/about/newsroom/press-releases/viasat-completes-acquisition-remaining-stake-its-european/>; *Viasat Ramps Satellite in the Middle East and Western Europe Ahead of ViaSat-3 Launch; Signs Ka-Band capacity Lease Deal with Avanti Communications* (June 3, 2021), <https://investors.viasat.com/news-releases/news-release-details/viasat-ramps-satellite-services-middle-east-and-western-europe>.



Adding even more speed and capacity for users at home, at work or on the move, Viasat recently launched the first of three advanced Ultra High Throughput satellites that will provide global coverage for broadband services⁸. The second ViaSat-3 satellite, to be launch soon, will provide coverage for Europe, including Norway⁹. These satellite network also use the entire 28 GHz band to provide broadband connectivity.

The 28 GHz portion of the Ka band, that is adjacent to the 26 GHz band, is a critical element of the satellite broadband connected world. The satellites using the 28 GHz band bridge the digital divide today and will continue to do so in the future. These satellites provide ubiquitous connectivity that no other technology can offer.

In addition to fixed broadband services, Viasat has pioneered mobile broadband services using innovative antenna designs for ESIM, or Earth Stations on Moving Platforms (ESOMPs), as they are known in Europe, for broadband service to aircraft, ships and other land-based users. For example, passengers and crew on aircraft use the 28 GHz band, in addition to the rest of the Ka band identified above, to meet demand for gate-to-gate, high-speed broadband for communications and entertainment, cabin support, and fleet digitization and maintenance. Global shipping and passenger vessels rely on the 28 GHz band for navigation and broadband communications benefiting passengers and crew and facilitating the transportation of cargo. Trains, buses and other land-based vehicles also rely on satellite broadband services operating in the 28 GHz band for passenger connectivity, operations and maintenance support, and fleet tracking.

Viasat supports identifying the 26 GHz band for terrestrial IMT/5G to provide broadband wireless electronic communications services pursuant to European Commission Decisions (EU) 2019/784 of 14.5.2019 and (EU) 2020/590 of 24.4.2020. Notably, the European Conference of Postal and Telecommunications Administrations (CEPT) 5G Roadmap expressly provides that the 28 GHz band is to be preserved across CEPT Administrations for satellite broadband services. The CEPT 5G Roadmap (Version 10, Revised 6 March 2020) explains that “Europe has harmonized the 27.5-29.5 GHz band for broadband satellite and is supportive of the worldwide use of this band for ESIM. This band is therefore not available for 5G”¹⁰.

⁸ See *ViaSat-3 Americas Successfully Launched* (May 1, 2023), <https://news.viasat.com/newsroom/press-releases/viasat-3-americas-successfully-launched>.

⁹ See *Viasat Completes Major Milestone with Second ViaSat-3 Satellite Payload: Payload Delivered to Boeing to Prepare for Broadband Service to EMEA Region* (July 13, 2022), <https://news.viasat.com/newsroom/press-releases/viasat-completes-major-milestone-with-second-viasat-3-satellite-payload>.

¹⁰ See European Conference of Postal and Telecommunications Administrations (CEPT), *Spectrum for wireless broadband – 5G*, Section B.3 (Version 10, Revised 6 March 2020) at https://www.cept.org/Documents/ecc/57839/ecc-20-055-annex-15_cept_5g_roadmap.

In addition to the general comments above, Viasat would like to address the following topics:

#1 Market use cases for the 26 GHz band are still in early development thus future demand for terrestrial IMT/5G services can be fully accommodated in the 26 GHz band and other bands identified for terrestrial IMT/5G.

Viasat understands there is little usage of the 26 GHz band in Europe and internationally due to limited demand for mmWave at this point given business case uncertainty. Thus, Viasat supports adopting a flexible approach that accommodates any future demand for terrestrial IMT/5G services in the 26 GHz band and other bands identified for terrestrial IMT/5G, while also appropriately protecting existing services, like satellite broadband services, operating in the adjacent 28 GHz band.

WRC-19 designated over 17 gigahertz of spectrum for terrestrial IMT/5G in the mmWave bands, including the 26 GHz band¹¹. Viasat urges Nkom to take the vast amount of spectrum available for terrestrial IMT/5G in the mmWave bands identified by WRC-19 and the additional low-band and mid-band spectrum being made available in countries around the world for terrestrial IMT/5G into account as part of its overall review of spectrum for terrestrial IMT/5G services. Given the vast amount of spectrum available for terrestrial IMT/5G in the mmWave bands, including the 26 GHz and other bands, Viasat urges Nkom to protect satellite broadband services operating in the 28 GHz band.

#2 There is sufficient spectrum in the 26 GHz band to accommodate future IMT/5G services and Fixed Service .

Taking into account that the sub-frequency band 24.5-26.5 GHz can be used by Fixed Service (FS) links, according to ERC Recommendation T/R 13-02¹², and the 24.25-24.5 GHz and 26.5-27.5 GHz sub-frequency bands can be used for terrestrial IMT/5G, Viasat supports Nkom's decision to accommodate both services in the 26 GHz band. There is ample spectrum within the 3.25 gigahertz of spectrum comprising the 26 GHz frequency band for both existing FS systems and new terrestrial IMT/5G. As presented in ECO Report 03¹³, a number of European countries have started to designate spectrum for terrestrial

¹¹ See ITU Press Release, *WRC-19 identifies additional frequency bands for 5G*, (22 Nov. 2020) (those bands include the following: 24.25-27.5 GHz, 37-43.5 GHz, 45.5-47 GHz, 47.2-48.2 and 66-71 GHz) at <https://news.itu.int/wrc-19-agrees-to-identify-new-frequency-bands-for-5g/>.

¹² See Recommendation T/R 13-02 of 1993 on preferred channel arrangements for fixed service systems in the frequency range 22.0-29.5 GHz (revised 15 May 2010 and amended 29 May 2019), <https://docdb.cept.org/document/869>.

¹³ See ECO Report 03, *The Licensing of "Mobile Bands" in CEPT*, <https://docdb.cept.org/download/3553>.

IMT/5G in the 26.5-27.5 GHz frequency band, namely, Croatia, Greece, Slovenia, and Italy. France has also limited the initial 5G operators to the 26.5-27.5 GHz band¹⁴. The Czech Republic¹⁵ also started with the designation of the 26.5-27.5 GHz band for future mobile terrestrial IMT/5G networks.

In the 26 GHz band, Viasat recommends that Nkom start by approving one gigahertz of spectrum for terrestrial IMT/5G use and only if there is additional market demand of more than one gigahertz should Nkom consider more spectrum, at that time. If there is proven terrestrial IMT/5G market demand in the 26 GHz band that is more than the one gigahertz of spectrum initially approved, all possible measures should be taken by Nkom to ensure that new terrestrial IMT/5G systems can use the 26 GHz spectrum on a coordinated basis with existing FS systems, taking into account the use of the 26 GHz band and other bands identified for terrestrial IMT/5G. Based on current demand for terrestrial IMT/5G, the 26 GHz band should be more than adequate to accommodate deployment of existing FS systems and new terrestrial IMT/5G.

#3 Any spectrum award procedure for terrestrial IMT/5G in the 26 GHz band should only be considered based on demonstrated demand.

Viasat supports the initiation of the assignment process for the right to use spectrum for terrestrial IMT/5G, including in the 26 GHz band. As stated above, more than one gigahertz of spectrum for terrestrial IMT/5G in the 26 GHz band should only be considered if there is demonstrated market demand by terrestrial IMT/5G providers. Block grants or local licensing ahead of demonstrated demand should be avoided. When considering the amount of spectrum to assign for terrestrial IMT/5G, Viasat urges Nkom to take into account that mobile operators can accommodate 400-megahertz channel block sizes in the 26 GHz band. Block sizes of 800-megahertz are based on the implementation of multiple 400-megahertz carriers per licensee, exceeding the minimum specifications set by international standards¹⁶. Viasat urges Nkom to carefully consider the required terrestrial IMT/5G block sizes for grants and local licensing in the 26 GHz band and only assign the amount of spectrum necessary to meet demonstrated market demand.

¹⁴ See Dashboard of 5G/IMT experiment licenses in France, <https://www.arcep.fr/cartes-et-donnees/nos-publications-chiffrees/experimentations-5g-en-france/tableau-de-bord-des-experimentations-5g-en-france.html>.

¹⁵ See Czech Frequency Band Plan for 26.5-27.5 GHz, <https://spektrum.ctu.cz/en/band/26.5-27-ghz>.

¹⁶ 5G specifications in ITU-R M.2150 require a minimum average spectral efficiency of 7.8 bps/Hz in dense urban areas for a cell capacity of 3 Gbps per cell in a 400 MHz channel.

#4 Power limits should be set to prevent out-of-band emissions.

As stated above, Viasat, as with many satellite operators, provides broadband services in the adjacent 28 GHz frequency band throughout Europe and the rest of the world. As such, Viasat is concerned about potential out-of-band emissions from the 26 GHz band by terrestrial IMT/5G systems into the 28 GHz band. Increases in power by terrestrial IMT/5G systems in the 26 GHz band could increase terrestrial IMT/5G out-of-band emissions into the 28 GHz band. Increased out-of-band emissions in the 26 GHz band could adversely affect the interference environment in the 28 GHz band by interfering with the ability of satellite receivers in space to receive signals from earth stations. Therefore, Viasat respectfully requests that Nkom limit out-of-band emissions from terrestrial IMT/5G operations in the 26 GHz band to protect satellite broadband service in the adjacent 28 GHz band. Viasat also requests that Nkom ensure that the *aggregate level* of terrestrial IMT/5G out-of-band emissions from the 26 GHz band into the adjacent 28 GHz band does not cause harmful interference to satellite receivers in the 28 GHz band.

Viasat has supported the study and development of reasonable operating parameters for terrestrial IMT/5G in the 26 GHz band throughout the ITU WRC-19 process. To this end, Viasat urges Nkom to conform domestic implementation of terrestrial IMT/5G to the operating parameters decided in Resolution 242 (WRC-19)¹⁷. Among several items, Viasat emphasizes the importance of the portion of Resolution 242 (WRC-19) that requires that terrestrial IMT/5G base stations within the 26 GHz frequency band with high power operations (e.i.r.p. per beam exceeding 30 dB (W/200 MHz)) not point their antenna beams upward and maintain a minimum separation angle of ≥ 7.5 degrees from the geostationary orbit. Viasat urges Nkom to include these technical limitations on terrestrial IMT/5G base stations, as outlined in Resolution 242 (WRC-19). These power and separation angle limitations provide specific limits on the terrestrial IMT/5G services operating in the 26 GHz band to protect existing satellite services in the adjacent 28 GHz band. Therefore, Viasat respectfully requests that Nkom adopt these terrestrial IMT/5G limitations to protect critical satellite broadband services operating above 27.5 GHz.

Viasat highlights that satellite-powered broadband is rapidly transforming technology to provide high-speed, affordable and robust broadband connectivity supporting the applications and services today's users want, whether at home, work or on the move. To meet this demand, Electronic Communications Committee (ECC) of the Conference of European Post and Telecommunications (CEPT) has endorsed amended ECC/DEC/(13)01 to further enhance aeronautical and maritime ESIM operations in the 27.5-29.5 GHz portion of the Ka band. Viasat encourages Nkom to implement

¹⁷ ITU Radio Regulation, Resolution 242 (Rev. WRC-19), *Terrestrial component of International Mobile Telecommunications in the frequency band 24.25-27.5 GHz*.

ECC/DEC/(13)01 as amended in the relevant national regulations¹⁸ and allow the license exempt use of ESIM in the frequency ranges 17.3-20.2 GHz and 27.5-30 GHz. Viasat also invites Nkom to define in the relevant national regulations¹⁹ rules for license exempt use of fixed earth stations operating in a geostationary satellite network in the frequency bands 27.5000–27.8285 GHz, 28.4445–28.8365 GHz, 28.8365–28.9485 GHz, 29.4525–29.5000 GHz, and 29,5-30 GHz according to ECC Decision (05)01 and ECC Decision (06)03.

In conclusion, Viasat urges Norway to follow global trends and identify the 26 GHz band, as well as the numerous other bands that are available, for terrestrial IMT/5G and, consistent with the CEPT 5G Roadmap, preserve the 28 GHz band for satellite broadband services. The ITU's WRC-19 terrestrial IMT/5G decision paves the way for terrestrial IMT/5G across the 26 GHz band.

Viasat summarizes the following points and urges Nkom to:

1. Recognize the robust use of the 28 GHz band for satellite broadband services.
2. Implement terrestrial IMT/5G in the 26 GHz band based on market demand and maintain the 28 GHz band for satellite services.
3. Align the amount of the offered spectrum in the 26 GHz band with the actual and demonstrated market demand for terrestrial IMT/5G. Market use cases for the 26 GHz are still in early development thus future demand for terrestrial IMT/5G services can be fully accommodated in the 26 GHz band and other bands identified for terrestrial IMT/5G.
4. In the case of demonstrated market demand, initiate the process for licensing the frequency band 26.5-27.5 GHz for terrestrial IMT/5G while also maintaining Fixed Service systems in the 26 GHz band.
5. Ensure that the aggregate level of terrestrial IMT/5G out-of-band emissions from the 26 GHz band into the adjacent 28 GHz band does not cause harmful interference to satellite receivers in the 28 GHz band.
6. Condition terrestrial IMT/5G base station authorizations on Resolution 242 (WRC-19) out-of-band limits and pointing requirements in order to protect 28 GHz satellite receivers in space.

¹⁸ See Regulations on general authorization for the use of frequencies (license exempt regulations) here <https://lovdata.no/dokument/SF/forskrift/2012-01-19-77?q=Forskrift%20om%20generelle%20tillatelser%20til>.



7. Ensure that the use of terrestrial IMT/5G in the 26 GHz band does not constrain the use of the entire 28 GHz band for satellite broadband services, including ESIM.
8. Implement ECC/DEC/(13)01 as amended to allow license exempt aeronautical and maritime ESIM operation in the entirety of 27.5-30 GHz band, as well as define rules for license exempt use of fixed satellite earth stations according to ECC/DEC/(05)01 and ECC Decision (06)03.

Viasat appreciates Nkom's consideration of the information above and commitment to the development of satellite broadband services throughout the 27.5-30 GHz and 17.7-20.2 GHz portions of the Ka band, including the 28 GHz portion of the band. We remain at your disposal to answer any further questions or provide further details as requested.