

Before the
 Federal Communications Commission
 Washington, D.C. 20554

In the Matter of)	
)	
Viasat, Inc.)	ICFS File No. SES-LIC-20210323-00559
)	
Application for Earth Station License)	Call Sign: E210058
Douglasville, Georgia)	

ORDER AND AUTHORIZATION

Adopted: September 5, 2023

Released: September 5, 2023

By the Chief, Space Bureau:

I. INTRODUCTION

1. By this Order, we grant the Fixed-Satellite Service (FSS) earth station license application of Viasat, Inc. (Viasat) to operate an earth station in Douglasville, Georgia to communicate with its Viasat-3 system. We also grant Viasat’s request to operate this earth station in the 27.5-28.35 GHz frequency band on a co-primary basis with terrestrial Upper Microwave Flexible Service (UMFUS) operations, and deny Verizon, Inc’s Petition in opposition.¹ Verizon objects to Viasat’s use of the irregular terrain model (ITM) in modelling its power flux density (PFD) propagation contour. We find that Viasat’s use of the ITM PFD propagation model complies with the Commission’s rules, and we deny Verizon’s petition. Finally, we grant Viasat’s request for a waiver of section 2.106 of the U.S. Table of Frequency Allocations, 47 CFR § 2.106, to permit operations in the 17.7-17.8 GHz band on an unprotected, non-harmful interference basis.

II. BACKGROUND

A. Review of Section 25.136 and Public Notices

2. The Commission adopted section 25.136 in the *Spectrum Frontiers First Report and Order*² to specify conditions under which FSS earth stations can coexist with UMFUS operations in the 27.5-28.35 GHz and 37.5-40.0 GHz frequency bands. Section 25.136 requires FSS earth station applicants to provide several demonstrations, including an analysis showing the PFD contour at 10 meters

¹ Petition of Verizon, IBFS File No. SES-LIC-20210323-00559 (filed Sept. 3, 2021).

² *Use of the Spectrum Bands Above 24 GHz for Mobile Radio Services*, Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd 8014 (2016) (*Spectrum Frontiers First Report and Order*). The Commission subsequently released additional orders in the Spectrum Frontiers proceeding making changes to section 25.136, including adding additional frequency bands. See *Use of Spectrum Bands Above 24 GHz for Mobile Radio Services*, Second Report and Order, Second Further Notice of Proposed Rulemaking, Order on Reconsideration, and Memorandum Opinion and Order, 32 FCC Rcd 10988 (2017) (*Spectrum Frontiers Second Report and Order*); *Use of Spectrum Bands Above 24 GHz for Mobile Radio Services et. al.*, Third Report and Order, Third Further Notice of Proposed Rulemaking, and Memorandum Opinion and Order, 33 FCC Rcd 5576 (2018); *Use of Spectrum Bands Above 24 GHz for Mobile Radio Services*, Fifth Report and Order, 34 FCC Rcd 2556 (2019).

above ground level around their station does not exceed -77.6 dBm/m²/MHz.³ In addition, there are limits on the number of earth stations that may operate in a given county,⁴ and the aggregate population within all earth station contours within a market may not exceed a certain level based on the size of the market where the earth station(s) are located.⁵ Further, contours must avoid crossing major roadways, venues, passenger railroad lines, etc., to minimize the potential impact on UMFUS.⁶

3. The International Bureau (Bureau)⁷ sought “comment on the methodology for determining interference or protection zones” when it released a Public Notice on June 21, 2017.⁸ On June 16, 2020, the Bureau released the Guidance Public Notice (2020 Guidance PN), which sought to provide applicants with a better understanding of the Bureau’s expectations regarding earth station applications subject to section 25.136 while allowing applicants flexibility in how they demonstrate compliance with this rule.⁹ Regarding applicants’ use of modelled PFD contours to demonstrate compliance with section 25.136, the 2020 Guidance PN encouraged the use of “widely accepted” and “publicly available” models such as ITU Recommendations¹⁰ that are appropriate for the distance over which the PFD contours are being measured, the environment in which the earth station is located, and

³ 47 CFR § 25.136 (e)(1).

⁴ 47 CFR § 25.136(a)(4)(i).

⁵ 47 CFR § 25.136 (a)(4)(ii).

⁶ 47 CFR § 25.136 (a)(4)(iii).

⁷ On January 4, 2023, the Commission adopted an Order that established the Space Bureau to handle the policy and licensing matters related to satellite communications and other in-space activities formerly handled by the International Bureau, which the Order eliminated. *See Establishment of the Space Bureau and the Office of International Affairs and Reorganization of the Consumer and Governmental Affairs Bureau and the Office of the Managing Director*, MD Docket No. 23-12, Order, FCC 23-1, paras. 1-2 (adopted Jan. 4, 2023). The Space Bureau officially launched on April 11, 2023. *See* Press Release, FCC, FCC Space Bureau & Office of International Affairs to Launch Next Week (April 7, 2023), <https://docs.fcc.gov/public/attachments/DOC-392418A1.pdf>. All references in this document to the International Bureau refer to filings made with, or actions taken by, the International Bureau prior to the establishment of the Space Bureau.

⁸ *International Bureau Seeks Comment on Implementing Earth Station Siting Methodologies*, Public Notice, DA 17-606 (June 21, 2017) (2017 Public Notice); and comments filed by EchoStar Satellite Operating Corp. and Hughes Network Systems, LLC (filed July 21, 2017); AT&T Services, Inc. (filed July 21, 2017); Viasat, Inc. (filed July 21, 2017); WorldVu Satellites Limited (filed July 21, 2017); The Boeing Company (filed July 21, 2017); Joint Comments of SES Americom, Inc., O3b Limited, Inmarsat, Inc., and Telesat Canada (filed July 17, 2017); CTIA (filed Aug. 7, 2017); Joint Reply Comments of SES Americom, Inc., O3b Limited, Inmarsat, Inc., Telesat Canada and WorldVu Satellite Ltd. (filed Aug. 7, 2017); AT&T Services, Inc. (filed Aug. 7, 2017); Viasat, Inc. (filed Aug. 7, 2017); Notice of Ex Parte of Hughes Network Systems, LLC and Inmarsat, Inc. (filed Aug. 25, 2017); Notice of Ex Parte of Hughes Network Systems, LLC, Inmarsat, Inc., SES Americom, Inc., O3b Limited, WorldVu Satellites Ltd, and Telesat Canada (filed Sept. 14, 2017); Space Exploration Technologies Corp. (filed Feb. 20, 2020), Hughes Network Systems, LLC (Apr. 9, 2020), CTIA (filed May 21, 2020), Verizon (filed June 5, 2020) and Hughes Network Systems (filed June 9, 2020).

⁹ *International Bureau Issues Guidance On Siting Methodologies For Earth Station Seeking To Operate In The 24.75-25.25 GHz, 27.5-28.35 GHz, 37.5-40 GHz, 47.2-48.2 GHz, and 50.4-51.4 GHz Frequency Bands To Demonstrate Compliance With Section 25.136*, Public Notice Guidance, DA-20-631, at 2 (June 16, 2020) (2020 Guidance Public Notice). SIA subsequently filed a Petition for Reconsideration of this Public Notice Guidance, to which IB requested comment. The Petition for Reconsideration is pending. *See* Satellite Industry Association, Petition for Reconsideration of International Public Notice on Siting Methodologies for Earth Stations Seeking to Operate in the 24.75-25.25 GHz, 27.5-28.35 GHz, 37.5-40 GHz, 47.2-48.2 GHz, and 50.4-51.4 GHz Frequency Bands to Demonstrate Compliance with Section 25.136 (filed July 16, 2020) and *Public Notice*, International Bureau Seeks Comments on Satellite Industry Association Petition for Reconsideration of Public Notice Issuing Guidance on Siting Methodologies for Earth Stations Subject to Section 25.136, DA 20-779 (July 22, 2020).

¹⁰ ITU Recommendation R-REC-P.452, available at <https://extranet.itu.int/brdocsearch/R-REC/Forms>.

the frequency band.¹¹ The 2020 Guidance PN also stressed the importance of applicants “explain[ing] which models they rely on for their analysis and why the chosen models are appropriate.”¹² Finally, the 2020 Guidance PN specified that the Commission will assess all section 25.136 applications “on a case-by-case basis.”¹³

B. Viasat Application and Responsive Petition

4. Between March and August 2021, Viasat filed more than 300 satellite earth station license applications—including the instant application—for new Ka-band gateways to support Viasat 3, its newest high throughput satellite, which launched in May 2023.¹⁴ In each of these applications, Viasat seeks co-primary status with UMFUS in the 27.5-28.35 GHz band under earth station siting criteria in section 25.136.¹⁵

5. On March 17, 2021, Viasat filed the instant application for a license to operate a 2.4 m transmit/receive earth station in the 27.5-28.35 GHz and the 17.7-18.3 GHz bands (the use of the latter band is unopposed).¹⁶ The application was accepted for filing on August 4, 2021.¹⁷ On September 3, 2022, Verizon filed a Petition asserting that Viasat’s use of the ITM model to generate its contours is not appropriate, and the Bureau should defer Viasat’s Application until more accurate data is used to measure the contour around Viasat’s earth stations.¹⁸

6. On September 16, 2022, Viasat filed an Opposition to Verizon’s Petition,¹⁹ to which Verizon filed a reply.²⁰ Viasat argued that its applications included the technical information required under section 25.136, and that “Viasat’s proposed earth station operations have been fully coordinated with all potentially affected UMFUS licensees.”²¹ Verizon asserts that Viasat’s use of the ITM to calculate the contours of its earth stations does not satisfy the Bureau’s guidance, and the Commission should defer Viasat’s application until Viasat uses a more “widely accepted” and “publicly available” model to measure contours.²² Further, Verizon asks the Commission to require Viasat to operate non-compliant earth stations on “a secondary, non-interference basis.”²³

7. On May 13, 2022, the Commission requested that Viasat respond to specific questions regarding its use of ITM in connection with the applications at issue and on June 27, 2022, Viasat filed an

¹¹ 2020 Guidance PN at 3.

¹² *Id.* at 4.

¹³ *Id.* at 2.

¹⁴ See Letter from Jarrett S. Taubman, VP & Deputy Chief Government Affairs and Regulatory Officer, Viasat, Inc., to Marlene H. Dortch, Secretary, FCC, IBFS File No. SES-LIC-20210323-00559 (filed June 27, 2022) (Viasat June 27, 2022 Letter).

¹⁵ 47 CFR § 25.136.

¹⁶ Viasat, Inc., Application for Earth Station Authorization, IBFS File No. SES-LIC-20210323-00559 (filed March 17, 2021).

¹⁷ Public Notice, Satellite Radio Applications Accepted for Filing, Report No. SES-02387 (Aug. 4, 2021).

¹⁸ Verizon Petition.

¹⁹ Opposition of Viasat, Inc., IBFS File No. SES-LIC-20210323-00559 (filed Sept. 16, 2022) (Viasat Opposition).

²⁰ Verizon’s Reply in Support of its Petition, IBFS File No. SES-LIC-20210323-00559 (filed Apr. 26, 2022) (Verizon Reply).

²¹ Viasat Opposition at 1.

²² Verizon Reply at 1.

²³ *Id.*

ex parte response.²⁴ On July 21, 2022, Verizon filed an *ex parte* presentation explaining why it believes that the ITM is an inappropriate model for analyzing interference effects in the 27.5-28.35 GHz band.²⁵

III. DISCUSSION

8. We accept Viasat, Inc.'s use of the ITM as an acceptable propagation model in compliance with the section 25.136 requirement that FSS earth station applicants operating within the 27.5-28.35 GHz band provide an analysis showing the contour around their earth stations. We address each of Verizon's objections below, and find that Viasat has adequately explained how its implementation of the ITM predicts a contour that demonstrates compliance with the siting criteria in section 25.136 of the Commission's rules.

9. First, Verizon argues that, according to the 2020 Guidance PN, any model used to demonstrate section 25.136 compliance should be a "widely accepted and publicly available" propagation model. Verizon further argues that the 2020 Guidance PN recommends "[a]pplicants should not use statistical models to estimate clutter loss" such as the ITM "when there are more accurate means of estimating clutter loss" such as ITU-R Rec. P. 452.²⁶ In response Viasat argues that the ITM is "widely accepted and publicly available" and "is an accepted [FCC] model" that Viasat has validated the accuracy of in other contexts.²⁷ Viasat also argues that ITM has been used to "produce conservative results (low path loss) for propagation paths for the site-specific geometries analyzed."²⁸

10. We agree with Viasat that the ITM is a widely accepted and publicly available model and is appropriate for purposes of predicting a contour to demonstrate compliance with the siting criteria in section 25.136. Indeed, the ITM is an accepted model used by the Commission in other contexts.²⁹ In addition, the model's source code base is publicly available on the National Telecommunications and Information Administration's (NTIA) website.³⁰ We disagree with Verizon's characterization that the ITM model as implemented by Viasat uses only statistical approximations (such as average terrain variation).³¹ The ITM model does have an "area mode" which estimates a number of parameters using empirical formulas in which average terrain variation plays an important role.³² However, it also has a "point-to-point" mode which derives inputs for these same parameters from a terrain profile of actual

²⁴ Viasat June 27, 2022 Letter.

²⁵ Letter from Daudeline Meme, Vice President & Associate General Counsel, Verizon, to Marlene H. Dortch, Secretary, FCC, IBFS File No. SES-LIC-20210719-01091 (filed July 25, 2022) (Verizon *Ex Parte* Presentation).

²⁶ Verizon Petition at 2-3; 2020 Guidance PN at 3.

²⁷ Viasat *Ex Parte* Response at 6, Attachment 3 (*citing* Letter from Viasat to FCC, GN Docket No. 14-177 et al. (filed Apr. 20, 2017)). Viasat states that it previously validated the accuracy of the ITM as part of the Commission's *Spectrum Frontiers* proceeding in which on-site measurements of radio frequency levels around its Carlsbad, California facility were performed from a 1.8 m roof-mounted antenna operating in the Ka band. *Id.* at 6.

²⁸ Viasat Opposition at 6, Explanatory Addendum.

²⁹ See NTIA Report 82-100 at 1 (Apr. 1, 1982), available at https://www.ntia.doc.gov/files/ntia/publications/ntia_82-100_20121129145031_555510.PFD. See also The Commission Begins the Process for Authorizing 6 GHz Band Automated Frequency Coordination systems, 36 FCC Rcd 14098, 14100, para 5 (2021) ("The ITM has been widely available and accepted since the early 1980s [and] has been used by the Commission for interference prediction in other proceedings . . .").

³⁰ See Viasat *Ex Parte* Response at 4; *Irregular Terrain Model (ITM) (Longley-Rice) (20 MHz – 20 GHz)*, <https://its.ntia.gov/research-topics/radio-propagation-software/itm/itm.aspx>. (last visited Mar. 3, 2023).

³¹ Verizon Petition at 4.

³² https://its.ntia.gov/media/50676/itm_alg.pdf at 5, noting that the documentation states that the parameters h_{ej} , d_{Lj} , Θ_{ej} , $j = 1; 2$, which are part of the input in the point-to-point mode are, in the area prediction mode, estimated using empirical formulas in which Δh (eg average terrain variation) plays an important role.

terrain data between two known points.³³ Viasat used the ITM model in point-to-point mode and used terrain and clutter height data from NEXTmap Data.³⁴ The ITM model, when used in point-to-point mode, removes the location variability.³⁵ Accordingly, Viasat did not use a “statistical model[] to estimate clutter loss,” despite Verizon’s claim to the contrary.³⁶ The 2020 Guidance PN emphasizes the importance of flexibility for applicants to demonstrate compliance with section 25.136, and efficiency for the Bureau to determine compliance with section 25.136.³⁷ Earth station operators are therefore given latitude to use a non-ITU model like the ITM, provided they explain why the model is appropriate, which Viasat has done in this case.³⁸

11. Second, Verizon argues that Viasat uses “proprietary formulas and add-ons”³⁹ and that Viasat fails to “provide a list of input parameters and formulas used to calculate the PFD contours or protection zones to allow for independent verification of . . . the PFD contours.”⁴⁰ Verizon further claims Viasat failed to provide statistical parameter inputs needed to verify the ITM.⁴¹ Because of Viasat’s alleged failures, Verizon argues, it cannot independently verify Viasat’s PFD contours.⁴² Verizon also notes that when it attempted to recreate Viasat’s earth stations’ contours on NTIA’s website, the model failed to run for frequencies over 20 GHz and produced an error message.⁴³

12. Viasat asserts that its application, along with an exhibit that describes Viasat’s methodology, includes all information necessary to independently verify necessary input parameters, calculations, and PFD contour analysis.⁴⁴ Viasat further argues that Verizon’s failure to independently verify the ITM’s PFD contour analysis is merely the result of Verizon’s failure to use “an executable version of the [ITM]” on NTIA’s website.⁴⁵ In addition, Viasat notes that Verizon is not guaranteed access to specific software tools nor is access to NTIA’s tools guaranteed by the Commission’s rules or the 2020 Guidance PN and asserts that Verizon has the available tools to successfully replicate Viasat’s PFD contour analysis.⁴⁶

13. We find that Viasat has provided sufficient data and background in its filings in order to verify its modelling. We agree with Viasat that its application and exhibits provide sufficient explanation and data for others, such as Verizon, to independently verify the results of the ITM. The ITM was selected by Viasat and its engineering firm, RKF, because the ITM is an accepted model used by the

³³ *Id.*

³⁴ Viasat Ex Parte Response at 2.

³⁵ https://its.ntia.gov/media/50676/itm_alg.pdf at 4.

³⁶ Verizon Petition at 3; Verizon Reply at 2-3; 2020 Guidance PN at 3.

³⁷ 2020 Guidance PN at 2.

³⁸ *See* para. 17 below.

³⁹ Verizon Petition at 5.

⁴⁰ Verizon Reply at 2.

⁴¹ *Id.*

⁴² *Id.*

⁴³ Verizon Petition at 4.

⁴⁴ Viasat Opposition at 4.

⁴⁵ Viasat Opposition at 4. The C++ implementation from NTIA’s website is “functionally identical to the version of the ITM currently available on Github, but does not generate the same warning or error messages as the Github version in certain cases.” Viasat Ex Parte Response at 4. However, when Viasat downloaded the C++ code from NTIA’s website and implemented the code for its demonstrations the code “compiles and runs without error for the distances and frequency ranges analyzed by Viasat.” *Id.*

⁴⁶ *Id.* at 4-5.

Commission in other contexts.⁴⁷ Viasat has adequately explained in its initial applications (including an exhibit explaining the ITM’s methodology),⁴⁸ and in an *ex parte* response to the Bureau’s questions why the ITM is an acceptable model to demonstrate its earth stations compliance with section 25.136.

14. Third, Verizon argues that the ITM does not apply or is inaccurate when applied in frequency bands beyond the 20 GHz band because the article Viasat references to verify use of the ITM for 27.5-28.35 GHz is invalid.⁴⁹ It also states Viasat has not named an analogous circumstance when the ITM had been used at 27.5-28.35 GHz.⁵⁰

15. In response, Viasat asserts that while the article it references to support its use of the ITM at 27.5-28.35 GHz modified the ITM’s upper limit to 20 GHz in later documentation, use of the model in 27.5-28.35 GHz nonetheless conforms within these topologies.⁵¹ Finally, Viasat argues that error messages generated by the Github version of the ITM at frequencies above 20 GHz in no way impacts the validity of Viasat’s use of the ITM because the original source for the ITM makes clear that it is valid up to 40 GHz.⁵²

16. We disagree with Verizon that the use of the ITM as a propagation model is necessarily limited to frequencies between 20 MHz and 20 GHz.⁵³ The model was developed before use in the frequency bands above 20 GHz was viable, but its methodology is still applicable. We find persuasive Viasat’s argument that the ITM model is suitable for use with 27.5-28.35 GHz frequencies because the ITM model methodology (using double knife edge and irregular terrain diffraction⁵⁴) can be applied in frequency bands ranging from 20 MHz to 40 GHz.⁵⁵ In addition, NTIA documentation validates this conclusion.⁵⁶

17. Viasat has also performed testing of similar ITM modeling with measurements of radio frequency levels operating in the Ka-band.⁵⁷ The tests were conducted at 27.5-28.35 GHz and

⁴⁷ See NTIA Report 82-100 at 1 (Apr. 1, 1982), available at https://www.ntia.doc.gov/files/ntia/publications/ntia_82-100_20121129145031_555510.PFD. See also The Commission Begins the Process for Authorizing 6 GHz Band Automated Frequency Coordination systems, 36 FCC Rcd 14098, 14100, para 5 (2021) (“The ITM has been widely available and accepted since the early 1980s [and] has been used by the Commission for interference prediction in other proceedings . . .”).

⁴⁸ See Viasat Application, Exhibit A.

⁴⁹ See “What are the underlying calculations, parameters, and assumptions for the Longley-Rice (ITM) propagation model?” September 24, 2013, RF Engineering Articles, <https://www.softwright.com/support/faq/underlying-calculations-parameters-assumptions-longley-rice-itm-propagation-model/>.

⁵⁰ See Verizon Petition at 3.

⁵¹ See Viasat Opposition, Explanatory Addendum.

⁵² See Viasat *Ex Parte* Response at 4; see also A.G. Longley & P. Rice, Prediction of Tropospheric Radio Transmission Loss Over Irregular Terrain. A Computer Method, ESSA Tech. Rep. ERL 79-ITS 67, U.S. Government Printing Office, at 2 (1968) (NTIA ITM) (noting that the model is intended for use in frequencies from “20 to 40,000 MHz,” *i.e.*, 20 MHz to 40 GHz).

⁵³ See Verizon Petition at 3; see also Verizon Reply at 5.

⁵⁴ Double Knife Edge and irregular terrain diffraction are specific techniques used for predicting RF propagation. They are used in the ITM model as well as other propagation models such as the NSMA OHLOSS path calculation, (see <https://nsma.org/wp-content/uploads/2016/05/WG2-99-052.pdf>) and are discussed in the ITU recommendation ITU-R P.526-15 (see https://www.itu.int/dms_pubrec/itu-r/rec/p/R-REC-P.526-15-201910-I!!PDF-E.pdf). Notably, the ITU Recommendation states - regarding knife edge diffraction - that the technique applies when the wavelength is fairly small in relation to the size of the obstacles, *i.e.*, mainly to VHF and shorter waves ($f > 30$ MHz).

⁵⁵ Viasat *Ex Parte* Response at 5.

⁵⁶ See NTIA ITM.

⁵⁷ Viasat *Ex Parte* Response, Annex 1.

measurements were taken at both two and ten meter heights above ground level at locations around the earth station location.⁵⁸ Those test results demonstrated the measured signal levels were significantly less than those predicted by free space path loss values.⁵⁹ Thus, the actual path loss was larger than free space path loss, demonstrating that the potential for interference in real world conditions is less. Using the natural terrain feature Digital Surface Model and a bare earth Digital Terrain Model, the NEXTMap provides terrain elevation data representing reasonable adjustments to propagation modeling criteria and reflecting actual terminal terrain conditions with the selected clutter data. The ITM is not disqualified to the extent that the ITM's predictions are conservative as Verizon has argued.⁶⁰ The rules establish the limits necessary to minimize the impact on UMFUS and applications are evaluated on whether or not they meet that criteria. If an applicant chooses to demonstrate compliance with the siting criteria using a more conservative model and/or assumptions, and can successfully demonstrate compliance, that demonstration simply provides more confidence that the siting criteria would also be met by the actual deployment. The rules do not require that the licensee use less conservative modeling to minimize the size of the contour in addition to meeting and complying with the siting criteria.

18. Fourth, Verizon argues that the ITM is a statistical model that fails to account for shorter ranges within the first kilometer because the ITM was originally designed to account for long-range terrain effects over one kilometer and frequencies below 1000 MHz.⁶¹ Further, Verizon argues that the ITM does not “use localized terrain and clutter data based on 2D or 3D mapping” and that Viasat should have used a “widely acceptable and publicly available”⁶² model like the ITU-R Rec. P. 452 that accounts for localized terrain and clutter without the use of NEXTMap data.⁶³ In response, Viasat argues that it accounts for loss within the first kilometer by using the ITM model's formulas in association with the NEXTMap terrain and clutter data starting at 100 meters from the earth station sites.⁶⁴ Viasat also defends the use of the ITM at distance as low as 200 meters by citing a doctoral thesis to support this point.⁶⁵

19. We disagree with Verizon's assertion that Viasat's ITM does not account for shorter ranges within the first kilometer.⁶⁶ We find persuasive Viasat's use of NEXTMap data, which provides elevation information, in conjunction with the ITM to account for shorter ranges.⁶⁷ Viasat has provided data to support knife edge modeling which takes the effect of the actual environment into account by using 3D vector building data plus terrain profile diffraction loss to the ITM predicted loss (ITM path loss minus free space loss) for paths equal to or less than one kilometer.⁶⁸ In all but one case shown, the ITM model significantly underestimates the loss compared to the knife edge prediction.⁶⁹ Nothing in the Commission's rule requires that applicants use models without the aid of other resources like NEXTMap

⁵⁸ *Id.*

⁵⁹ *Id.*

⁶⁰ Verizon *Ex Parte* Presentation at 2.

⁶¹ Verizon Petition at 4.

⁶² 2020 Guidance Public Notice at 3.

⁶³ Verizon Petition at 4-5.

⁶⁴ Viasat Opposition at Explanatory Addendum.

⁶⁵ Viasat Opposition at Explanatory Addendum; *see also* “Modelling and Coverage Improvement of DVB-T Networks,” a thesis submitted for the degree of Doctor of Philosophy by Kasampalis Stylianos, March 2018.

⁶⁶ Verizon Petition at 4.

⁶⁷ *See* Viasat Application, Exhibit A.

⁶⁸ *See* Viasat Opposition at Explanatory Addendum.

⁶⁹ Viasat *Ex Parte* Response, Attachment 2.

to account for loss within the first kilometer.

20. Based on our review of Viasat's showing, we conclude that its proposed earth station complies with the criteria in section 25.136(a)(4) of the rules. First, there are no other earth stations licensed in the 28 GHz band in Douglas County, Georgia, where Viasat's proposed earth station will be located. Second, Viasat's proposed -77.6 dBm/m²/MHz contour covers a population of only one person, which is well below the limit of 450 people.⁷⁰ Third, the area within Viasat's proposed -77.6 dBm/m²/MHz contour does not contain a major event venue, urban mass transit route, passenger railroad, or cruise ship port, nor does it cross any of the types of roads listed in the rule.⁷¹ Finally, Viasat has coordinated with the relevant UMFUS licensees.⁷² Accordingly, Viasat will be authorized to operate without providing interference protection to UMFUS stations within Viasat's -77.6 dBm/m²/MHz contour.

21. Finally, Viasat has requested a waiver of section 2.106 of the U.S. Table of Frequency Allocations (U.S. Table), 47 CFR § 2.106, to permit space-to-earth operations in the 17.7-17.8 GHz band. Viasat notes that the Commission granted a similar waiver in authorizing Viasat-3 after Viasat demonstrated that the ViaSat-3 downlinks at 17.7-17.8 GHz would not cause harmful interference into primary fixed service operations or neighboring Broadcast Satellite Service spacecraft. Viasat asserts that there is good cause for a corresponding waiver to allow the earth station at issue here to receive those same downlinks, as such waiver would have no impact on the authorized radiofrequency environment and otherwise would be consistent with the Commission's prior decision.⁷³

22. The Commission recently adopted a Report and Order that, among other things, made changes to the U.S. Table to add a co-primary allocation for FSS in the space-to-Earth direction to allow limited GSO FSS downlink use.⁷⁴ These rule changes are not yet in effect, so we address below Viasat's request for waiver of the U.S. Table. A waiver is appropriate if both (1) special circumstances warrant a deviation from the general rule, and (2) such deviation better serves the public interest.⁷⁵ Generally, the Commission may waive any rule if there is good cause to do so⁷⁶ and, in making this determination, may take into account considerations such as hardship, equity, or more effective implementation of overall policy on an individual basis.⁷⁷ We find that there are special circumstances that warrant grant of Viasat's

⁷⁰ Viasat Application, Exhibit A at 2-3.

⁷¹ 47 CFR § 25.136(a)(4)(iii).

⁷² 47 CFR § 25.136(a)(4)(iv), Viasat Application, Exhibit C.

⁷³ Viasat Application Narrative at 3 (*citing* 47 CFR § 1.3; Fugro-Chance, Inc., 10 FCC Rcd 2860, at ¶ 2 (1995) (waiver of U.S. Table appropriate "when there is little potential for interference" into conforming services and "the non-conforming operator accepts any interference from [such] services").

⁷⁴ *Amendment of Parts 2 and 25 of the Commission's Rules to Enable GSO Fixed-Satellite Service (Space-to-Earth) Operations in the 17.3-17.8 GHz Band, to Modernize Certain Rules Applicable to 17/24 GHz BSS Space Stations, and to Establish Off-Axis Uplink Power Limits for Extended Ka-Band FSS Operations*, Report and Order, IB Docket No. 20-330, FCC 22-63, at paras. 18-19, (Aug.3, 2023) (*17 GHz Proceeding*).

⁷⁵ *NetworkIP, LLC v. FCC*, 548 F.3d 116, 125-128 (D.C. Cir. 2008) (*citing* *Northeast Cellular Telephone Co.*, 897 F.2d 1164, 1166 (1990)).

⁷⁶ *See* 47 CFR § 1.3.

⁷⁷ *See* *Northeast Cellular*, 897 F.2d at 1166 ("[A] waiver is appropriate only if special circumstances warrant a deviation from the general rule and such deviation will serve the public interest. The agency must explain why deviation better serves the public interest and articulate the nature of the special circumstances to prevent discriminatory application and to put future parties on notice as to its operation."); *WAIT Radio v. FCC*, 418 F.2d 1153, 1159 (D.C. Cir. 1969) ("The agency's discretion to proceed in difficult areas through general rules is intimately linked to the existence of a safety valve procedure for consideration of an application for exemption based on special circumstances.").

waiver request to receive signals in the 17.7-17.8 GHz band, and that deviation from the Table of Allocations better serves the public interest in this case. Consistent with our finding that Viasat has demonstrated that Viasat-3 would not cause harmful interference into the band, we permit this earth station to receive those same downlinks, and consistent with the Commission's recent decision in the *17 GHz Proceeding*. Operations in this band are on an unprotected, non-harmful interference basis, that is, they must not cause harmful interference to any authorized users, nor can they claim protection from harmful interference caused by any authorized users.

IV. CONCLUSION

23. We conclude that Viasat's use of the ITM to model its PFD contour complies with section 25.136. Accordingly, we grant the FSS earth station license application of Viasat to operate an earth station in Douglasville, Georgia to communicate with its Viasat 3 system. We also grant Viasat's request to operate this earth station in the 27.5-28.35 GHz frequency band on a co-primary basis with terrestrial UMFUS operations, and deny Verizon's Petition in opposition. Finally, we grant Viasat's request for a waiver of section 2.106 of the U.S. Table of Frequency Allocations, 47 CFR § 2.106, to permit operations in the 17.7-17.8 GHz band unprotected, non-harmful interference basis.

V. ORDERING CLAUSES

24. Accordingly, IT IS ORDERED that, pursuant to the authority contained in sections 0.51 and 0.261 of the Commission's rules, 47 CFR §§ 0.51 and 0.261, and sections 4(i), 301, 303(r), 308, and 310 of the Communications Act, as amended, 47 U.S.C. §§ 154(i), 301, 303(r), 308, 309, and 310, subject to the requirements and conditions set forth below, the Application filed by Viasat, Inc. is GRANTED.

25. IT IS FURTHER ORDERED that the Petition filed by Verizon is DENIED.

26. IT IS FURTHER ORDERED that Viasat's authorization is subject to the following requirements and conditions:

- a. Licensee must ensure that a current listing of the name, title, mailing address, email address, and telephone number of the responsible point of contact are on file at the FCC. Any changes must be filed electronically in the International Communications Filing System using the "Pleadings and Comments" link on the MyICFS homepage within 10 days of the change.
- b. Licensee must comply with the license modification and notification requirements of 47 CFR § 25.118 to change the coordinates of its authorized earth station.
- c. Licensee must notify the Commission when all earth stations operating under this authorization are no longer operational or when they have not been used to provide any service during any 6-month operation.
- d. The 17.8-20.2 GHz band is shared with U.S. Government space stations and associated earth stations in the Fixed-Satellite Services. Services within the United States over the satellite network of which this is a cooperating earth station are subject to coordination under US334 and operation of the earth station(s) authorized herein will be subject to any technical constraints resulting from this coordination. *See* 47 CFR § 2.106, Footnote US334.
- e. Changes to previously authorized transmitting facilities, operations and devices regulated by the Commission that may have significant environmental impact, and are not excluded by § 1.1306, require the preparation of an Environmental Assessment (EA) by the licensee. (*See* 47 CFR §§ 1.1307, 1.1308, and 1.1311).
- f. The licensee shall, at all times, take all necessary measures to ensure that operation of this authorized earth station does not create potential exposure of humans to radiofrequency radiation in excess of the FCC exposure limits defined in 47 CFR §§ 1.1307(b) and 1.1310. Physical measures must be taken to ensure compliance with

limits for both occupational/controlled exposure and for general population/uncontrolled exposure, as defined in these rule sections. Compliance can be accomplished in most cases by appropriate restrictions, such as fencing. Requirements for restrictions can be determined by predictions based on calculations, modeling, or by field measurements. The FCC's OET Bulletin 65 (available on-line at www.fcc.gov/oet/rfsafety) provides information on predicting exposure levels and on methods for ensuring compliance, including the use of warning and alerting signs and protective equipment for workers.

- g. Operations in the 27.5-28.35 GHz (Earth-to-space) frequency band are authorized based on a demonstration of compliance with 47 CFR § 25.136(a)(4). Consequently, this earth station may operate without providing any additional interference protection to stations in the Upper Microwave Flexible Use Service in the 27.5-28.35 GHz frequency band.
- h. The earth station licensee is required to take corrective action to mitigate interference in the 27.5-28.35 GHz frequency band if the actual PFD, at ten meters above ground level, exceeds $-77.6 \text{ dBm/m}^2/\text{MHz}$ anywhere outside the contour specified in the application.
- i. To the extent that the actual gain pattern of the antenna ultimately deployed by the licensee exceeds the antenna mask used in the calculation of the PFD contour, the contour resulting from the actual antenna pattern must continue to meet all of the criteria specified in 47 CFR § 25.136(a)(4)(i-iv).
- j. Viasat's request for a waiver of section 2.106 of the U.S. Table of Frequency Allocations, 47 CFR 2.106, to permit operations in the 17.7-17.8 GHz band is GRANTED. Operations in this band are on an unprotected, non-harmful interference basis, that is, they must not cause harmful interference to any authorized users, nor can they claim protection from harmful interference caused by any authorized users.
- k. Operations in the 17.8-18.3 GHz frequency band are on a secondary basis to the Fixed Service (FS). Licensee must accept any interference from existing and future FS transmissions in the 17.8-18.3 GHz frequency band.
- l. Grant of this application is subject to operations consistent with the associated space station authorization(s) or grant(s) of U.S. market access, including all conditions, waivers, and findings therein.
- m. Grant of operations in the 27.5-28.35 GHz frequency band is based on the applicant's calculation of the aggregate population affected by all earth stations in the county, under 47 CFR § 25.136(a)(4)(ii), using the "actual area method." For Douglas County, in the State of Georgia, the estimated population affected by this earth station was determined to be 1 person, out of a maximum of 450 people allowed to be affected in this County, based on the decennial 2020 U.S. Census Population information.

27. This action is taken by the Chief of the Space Bureau under delegated authority pursuant to sections 0.51 and 0.261 of the Commission's rules, 47 CFR §§ 0.51 and 0.261.

FEDERAL COMMUNICATIONS COMMISSION

Julie M. Kearney
Chief
Space Bureau