

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

In the Matter of )
Audacy Corporation ) IBFS File No. SAT-LOA-20161115-00117
Application for Authority to Launch and Operate a ) Call Sign S2982
Non-Geostationary Medium Earth Orbit Satellite )
System in the Fixed- and Inter-Satellite Services )

ORDER AND AUTHORIZATION

Adopted: June 4, 2018

Released: June 6, 2018

By the Commission:

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I. INTRODUCTION

1. In this Order, we authorize Audacy Corporation (Audacy) to construct, deploy, and operate a non-geostationary satellite orbit (NGSO) satellite system to provide continuous, high-speed communications between other NGSO satellites and gateway earth stations, using frequencies in the inter-satellite service (ISS) and fixed-satellite service (FSS).<sup>1</sup> In authorizing Audacy’s system, we address concerns expressed by commenters seeking various conditions on the grant and partially deny two

<sup>1</sup> Audacy Corporation, Application for Authority to Launch and Operate a Non-Geostationary Medium Earth Orbit Satellite System in the Fixed- and Inter-Satellite Services, IBFS File No. SAT-LOA-20161115-00117 (filed Nov. 15, 2016) (Audacy Application). Audacy subsequently filed an erratum correcting values for an error concerning orbital plane information in Audacy’s Schedule S submission. Letter from James Spicer, Chief Engineer, Audacy, to Marlene H. Dortch, Secretary, FCC, IBFS File No. SAT-LOA-20161115-00117 (filed May 16, 2017).

remaining Petitions to Deny.<sup>2</sup> We also defer action on Audacy's request to use the 50.4-51.4 GHz band for service and gateway uplinks. Grant of this application will enable Audacy to provide global line-of-sight visibility to low Earth orbit (LEO) satellites enabling operators of LEO satellites to have continuous access to their satellites through the Audacy system, rather than having to use individual uplink and downlink frequencies at multiple, worldwide earth station locations. Grant of Audacy's application will further the Commission's goals of encouraging spectrum efficiency, technological innovation, and the more rapid development of new satellite services to the public.

## II. BACKGROUND

### A. Audacy's Applications

2. On November 15, 2016, Audacy filed an application to construct, deploy, and operate three satellites, at an approximate altitude of 13,890 kilometers.<sup>3</sup> Audacy proposes to operate FSS in the following Ka-band frequencies: 19.7-20.2 GHz and 29.5-30.0 GHz,<sup>4</sup> as well as FSS in the following portions of the V-band: 37.5-42.0 GHz, 47.2-50.2 GHz, and 50.4-51.4 GHz.<sup>5</sup> Audacy also proposes to use the 22.55-23.18 GHz, 23.38-23.55 GHz,<sup>6</sup> 24.45-24.75 GHz, 32.3-33.0 GHz, 54.25-56.9 GHz, 57.0-58.2 GHz, and 65.0-71.0 GHz frequency bands for ISS operations.<sup>7</sup>

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<sup>2</sup> In addition to the Petition to Deny that was conditionally withdrawn by Iridium, Petitions to Deny the Audacy Application were filed by Telesat Canada (Telesat) and ViaSat, Inc. (ViaSat). See Petition to Deny by Telesat (filed June 26, 2017) (*Telesat Petition to Deny*); Petition to Deny or Impose Conditions of ViaSat (filed June 26, 2017) (*ViaSat Petition to Deny*).

<sup>3</sup> Audacy filed its application as part of a processing round for additional NGSO-like applications and petitions in the Ku- and Ka-band frequencies requested by WorldVu Satellites Limited (OneWeb). *OneWeb Petition Accepted for Filing, IBFS File No. SAT-LOI-20160428-00041; Cut-Off Established for Additional NGSO-Like Satellite Applications or Petitions for Operations in the 10.7-12.7 GHz, 14.0-14.5 GHz, 17.8-18.6 GHz, 18.8-19.3 GHz, 27.5-28.35 GHz, 28.35-29.1 GHz, and 29.5-30.0 GHz Bands*, Public Notice, 31 FCC Rcd 7666 (IB Sat. Div. Jul. 15, 2016). Eleven additional applications and petitions were filed for NGSO-like satellite systems, including Audacy's application. Under the Commission's rules, the term "Ku-band" includes both the "conventional Ku-band" (11.7-12.2 GHz and 14.0-14.5 GHz) and the "extended Ku-band" (10.95-11.2 GHz, 11.45-11.7 GHz, and 13.75-14.0 GHz). 47 CFR § 25.103. The term "Ka-band" refers to the 18.3-18.8 GHz, 19.7-20.2 GHz, 28.35-28.6 GHz, and 29.25-30.0 GHz frequency bands, also known as the "conventional Ka-band," which the Commission has designated as primary for GSO FSS operation. See 47 CFR § 25.103. Audacy does not seek access to any Ku-band frequencies.

<sup>4</sup> Audacy clarified typographical errors in its application to make clear that its request to operate in the 27.5-30.0 GHz band (Earth-to-space) is limited to the frequencies of 29.5-30.0 GHz. Letter from James Spicer, Chief Engineer, Audacy, to Marlene H. Dortch, Secretary, FCC, at 1-2, IBFS File No. SAT-LOA-2016115-00117 (filed Aug. 11, 2017) (*August 2017 Letter*).

<sup>5</sup> Audacy's request to use the 37.5-42.0 GHz, 47.2-50.2 and 50.4-51.4 GHz bands, as addressed in this order, are considered as part of the "V-band processing round" that was initiated with the filing of an application from The Boeing Company. *Satellite Policy Branch, Boeing Application Accepted for Filing in Part, Cut-Off Established for Additional NGSO-Like Satellite Applications or Petitions for Operations in the 37.5-40.0 GHz, 40.0-42.0 GHz, 47.2-50.2 GHz and 50.4-5.14 GHz Bands*, Public Notice, 31 FCC Rcd 11957 (2016). Audacy's request to use these bands was placed on Public Notice, along with eight additional applications or petitions, on June 16, 2017. See Satellite Policy Branch Information: Space Station Applications Accepted for Filing, Public Notice, Report No. SAT-01245 (IB Sat. Div. June 16, 2017).

<sup>6</sup> Audacy originally requested to operate in the 22.55-23.55 GHz frequency band, but subsequently deleted its request to operate ISS in the 23.18-23.38 GHz frequency band. See *August 2017 Letter* at 1-2. Iridium Constellation LLC (Iridium) had filed a Petition to Deny the Audacy Application based on concerns of potential interference to inter-satellite links operated by Iridium in the 23.18-23.38 GHz frequency band. Petition to Deny of Iridium Constellation LLC (filed June 26, 2017). Iridium conditionally withdrew its Petition to Deny following Audacy's deletion of its request for use of the 23.18-23.38 GHz frequency band. See Letter from Scott Blake Harris, Counsel, Iridium, to Marlene H. Dortch, Secretary, FCC, IBFS File No. SAT-PDR-2016115-00117 (filed Nov. 17, 2017) (Iridium Conditional Withdrawal of Petition to Deny). Consequently, we dismiss Iridium's petition as moot.

3. As part of its application, Audacy seeks waivers of certain Commission rules.<sup>8</sup> Audacy states that its proposed system will provide continuous, high-speed, low-latency communications to NGSO spacecraft, which will allow customers to transfer data to users from NGSO spacecraft without having to use individual uplink and downlink frequencies at multiple, worldwide earth station locations, and asserts this proposal will increase spectrum efficiency and ease regulatory burdens on operators.<sup>9</sup>

#### **B. Comments on Audacy's Application**

4. Several parties filed pleadings in response to the public notice of Audacy's application to operate in the Ka-band frequencies in the Ku- and Ka-band Processing Round.<sup>10</sup> Telesat and ViaSat, Inc. (ViaSat) filed petitions to deny the Audacy Application.<sup>11</sup> Audacy opposed the petitions to deny and responded to the comments.<sup>12</sup> Several satellite operators also filed comments in response to Audacy's application in the V-band Processing Round.<sup>13</sup> Audacy responded to the comments.<sup>14</sup>

(Continued from previous page)

<sup>7</sup> In the public notice accepting Audacy's request to provide inter-satellite communications with customer satellites, the International Bureau made no determination as to whether a separate processing round would be initiated for the requested ISS frequency bands and did not invite additional applications in these frequency bands. *Applications Accepted for Filing; Cut-Off Established for Additional NGSO-Like Satellite Applications or Petitions for Operations in the 12.75-13.25 GHz, 13.85-14.0 GHz, 18.6-18.8 GHz, 19.3-20.2 GHz, and 29.1-29.5 GHz Bands*, Public Notice, 32 FCC Rcd 4180 (May 26, 2017). In the decision below, we find that the public interest would not be served by delaying action on Audacy's request and opening a separate processing round for these frequency bands. *See infra* para. 26-27. Rather, we condition Audacy's authority to operate on the obligation to cooperate with future co-frequency users.

<sup>8</sup> Audacy requests waivers of Sections 25.145(c), 25.156(d)(4), 25.156(d)(5), 25.157(c), 25.157(e), 25.114(c)(8), 25.208(r) and 25.202(a) of the Commission's rules. Audacy also seeks a waiver of the Commission's Ka-Band Plan and of footnote 5.556A to Section 2.106 of the Commission's rules (Table of Frequency Allocations).

<sup>9</sup> Audacy Application, Narrative at 38-42. Audacy states that, currently, individual satellite operators apply to the appropriate regulatory body for a transmission license to communicate between planned satellites and ground stations, and these applications are adjudicated on a case-by-case basis. Operators must then invest in earth station infrastructure, or rent third party facilities. By providing communication services to numerous spacecraft simultaneously, Audacy states that it will ease the burden on not only regulatory authorities, but also on operators themselves, who would no longer need to build out extensive ground infrastructure to access to their spacecraft. Audacy Application, Narrative at 4.

<sup>10</sup> *See* Comments of Elefante (filed June 26, 2017); Facebook (filed June 26, 2017); Hughes (filed June 26, 2017); SES S.A. and O3b Limited Comments (filed June 26, 2017); Space Norway Comments (filed June 26, 2017); SpaceX Comments; Elefante Reply Comments (filed July 14, 2107); Hughes Reply (filed July 7, 2017); Reply of SES S.A. and O3b Limited (filed July 14, 2017); Consolidated Reply of Space Exploration Holdings, LLC (filed July 14, 2017); Telesat Canada's Consolidated Reply to Oppositions to Petitions to Deny (filed July 14, 2017); Reply of Viasat, Inc. (filed July 14, 2017).

<sup>11</sup> *See* Telesat Petition to Deny; ViaSat Petition to Deny.

<sup>12</sup> Audacy Opposition and Response.

<sup>13</sup> *See* Comments of SES S.A. and O3b Limited (filed July 17, 2017) (SES and O3b Comments); Space Exploration Holdings, LLC (Space X Comments) (filed July 17, 2017); Consolidated Comments of Telesat Canada (Telesat Comments) (filed July 17, 2017); Consolidated Comments of ViaSat, Inc. (filed July 17, 2017) (ViaSat Comments). Hughes also submitted a filing made after the close of the comment period. *See* Letter from Jennifer Manner and Brennan Price, Hughes Network Systems, LLC, to Marlene H. Dortch, Secretary, FCC (filed July 17, 2017) (*Hughes Ex Parte*). In addition, Hughes Network LLC filed an ex parte concerning, in part, Audacy's request to use the 50.4-51.4 GHz frequency band. *See* Letter to Marlene H. Dortch, Secretary, FCC, from Jennifer A. Manner, Senior Vice President, Regulatory Affairs, Hughes Network Systems LLC (June 1, 2018). We address this portion of Audacy's request in paragraph 19, below.

<sup>14</sup> Response of Audacy Corporation (filed July 27, 2017) (Audacy Response).

### C. Developments After Audacy's Application

5. In September 2017, following the close of the comment cycles in this proceeding, the Commission adopted the *NGSO FSS Report and Order* updating several rules and policies governing NGSO FSS systems.<sup>15</sup> Among other changes, the Commission adopted equivalent power-flux density (EPFD) limits on NGSO FSS systems operating in portions of the 17.8-20.2 GHz and 27.5-30.0 GHz frequency bands in order to protect GSO FSS networks. The *NGSO FSS Report and Order* also adopted changes to the Ka-band Plan and to spectrum sharing rules, among other things.<sup>16</sup> The Commission also adopted a more flexible milestone schedule for NGSO constellations and eliminated the international geographic coverage requirement. The rule changes adopted in the *NGSO FSS Report and Order* are now in effect,<sup>17</sup> and we therefore consider below their impact on the actions we take on Audacy's Application.

6. In November 2017, the Commission adopted the *Spectrum Frontiers Second Report and Order, Order on Reconsideration and MO&O*,<sup>18</sup> which, among other things, made or affirmed determinations that the 40.0-42.0 GHz and 48.2-50.2 GHz frequency bands will be reserved for FSS use,<sup>19</sup> while limiting satellite operations to communications with individually licensed earth stations in the 37.5-40.0 GHz and 47.2-48.2 GHz frequency bands.<sup>20</sup> The Commission also affirmed that the existing PFD limit is applicable to satellite operations in the 37.5-40.0 GHz frequency band. To the extent that Audacy requests waiver of rules already addressed in the *Spectrum Frontiers* proceeding, we consider those requests taking into account the decisions taken in that proceeding. Where rules are modified as a result of future actions in the *Spectrum Frontiers* proceeding, or in other proceedings such as the rulemaking addressing NGSO FSS operations,<sup>21</sup> Audacy's FSS operations will be subject to those modified rules. We discuss these matters with greater specificity below.

7. Since the filing of Audacy's application, the Commission has also taken action on several requests for U.S. market access using NGSO FSS systems in the Ku- and Ka-bands that were part of Ku- and Ka-band Processing Round.<sup>22</sup>

### III. DISCUSSION

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<sup>15</sup> *Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters*, Report and Order and Further Notice of Proposed Rulemaking, 32 FCC Rcd 7809 (2017) (*NGSO FSS Report and Order*).

<sup>16</sup> *Id.* at 7820-21, paras. 35-36.

<sup>17</sup> See 82 FR 59972 (Dec. 18, 2017); 83 FR 22391 (May 15, 2018).

<sup>18</sup> *Use of Spectrum Bands Above 24 GHz for Mobile Radio Services et. al.*, 32 FCC Rcd 10988, 11878, Second Report and Order, Second Further Notice of Proposed Rulemaking, Order on Reconsideration, and Memorandum Opinion and Order, FCC No. 17-152, (2017). When citing to the *Second Report and Order* portion of the document, we will refer to the *Second Report and Order*, when citing to the *Second Further Notice of Proposed Rulemaking* portion of the document, we will refer to the *Second FNPRM*, when citing to the *Order on Reconsideration*, we will refer to *Reconsideration Order*, and when citing to the *Memorandum Opinion and Order* portion of the document, we will refer to the *MO&O*.

<sup>19</sup> *Spectrum Frontiers MO&O*, 32 FCC Rcd at 11050, 11051, paras. 189, 192.

<sup>20</sup> *Spectrum Frontiers Second Report and Order and M&O*, 32 FCC Rcd at 11005, 11062, paras. 55, 220.

<sup>21</sup> *NGSO FSS Report and Order*. See also *Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters*, Notice of Proposed Rulemaking, 31 FCC Rcd 13651 (2016) (*NGSO FSS NPRM*).

<sup>22</sup> See *WorldVu Satellites Limited, Petition for Declaratory Ruling Granting Access to the U.S. Market for the OneWeb NGSO FSS System*, Order and Declaratory Ruling, 32 FCC Rcd 5366 (2017) (*OneWeb Order*); *Space Norway AS*, Order and Declaratory Ruling, FCC 17-146 (November 3, 2017); *Telesat Canada*, Order and Declaratory Ruling, FCC 17-147 (Nov. 3, 2017); *Space Exploration Holdings, LLC*, Memorandum Opinion, Order and Authorization, FCC 18-38 (March 28, 2018) (*SpaceX Order*).

8. After review of the record, we conclude that grant of the Audacy Application, as amended,<sup>23</sup> will serve the public interest, subject to the requirements and conditions specified herein. Below, we address the various outstanding issues raised by commenters on the Audacy Application. We also address Audacy's waiver requests. Where appropriate, we defer matters of general applicability to ongoing or potential future rulemakings.

9. As part of its application, Audacy seeks waivers of certain Commission rules.<sup>24</sup> Generally, the Commission may waive any rule for good cause shown.<sup>25</sup> Waiver is appropriate where the particular facts make strict compliance inconsistent with the public interest.<sup>26</sup> In making this determination, we may take into account considerations of hardship, equity, or more effective implementation of overall policy on an individual basis.<sup>27</sup> Waiver is appropriate if special circumstances warrant a deviation from the general rule and such deviation will serve the public interest.<sup>28</sup> We address the specific requests for waivers below, as well as conditions that the Commission imposes on Audacy's authorization.

#### A. Ka-Band FSS Issues

10. *Waivers for 19.7-20.2 GHz (Ka-band Plan Waiver).* Audacy seeks a waiver of the Commission's Ka-band Plan for use of the 19.7-20.2 GHz frequency band.<sup>29</sup> At the time Audacy filed its application, the Commission's Ka-band Plan limited use of the 19.7-20.0 GHz band to GSO FSS systems only.<sup>30</sup> Grant of a waiver of the Ka-band Plan is no longer necessary since we recently adopted changes to the Commission's rules that allow NGSO FSS operations in the 19.7-20.2 GHz frequency band on an unprotected, non-interference basis relative to GSO FSS operations, subject to EPFD limits.<sup>31</sup> These changes became effective on January 17, 2018, so we dismiss the request for waiver of the Ka-band Plan as moot. Moreover, Audacy has demonstrated that its proposed operations will comply with the conditions the Commission established in opening up the 19.7-20.2 GHz band to NGSO FSS operations. More specifically, in its petition, Audacy provided technical demonstrations to show that it will comply with international EPFD limits designed to protect GSO networks in the 19.7-20.2 GHz frequency band set forth in Article 22 of the ITU Radio Regulations (ITU-RR).<sup>32</sup> In addition, Audacy states that it will not cause harmful interference to and is willing to accept interference from GSO FSS operators in this frequency band.<sup>33</sup>

11. *Operations in the 29.5-30.0 GHz band.* Audacy's system will use the 29.5-30.0 GHz band for uplink operations between its three earth stations and satellites on a secondary, non-interference basis. The U.S. Table of Frequency Allocations designates the 29.5-30.0 GHz band as co-primary for

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<sup>23</sup> *August 2017 Letter* (requesting the removal of the 23.18-23.38 GHz frequency band from its application).

<sup>24</sup> *See supra* note 8.

<sup>25</sup> 47 CFR § 1.3.

<sup>26</sup> *Northeast Cellular Tel. Co. v. FCC*, 897 F.2d 1164, 1166 (D.C. Cir. 1990).

<sup>27</sup> *WAIT Radio v. FCC*, 418 F.2d 1153, 1159 (D.C. Cir. 1969), *cert. denied*, 409 U.S. 1027 (1972); *Northeast Cellular*, 897 F.2d at 1166.

<sup>28</sup> *Northeast Cellular*, 897 F.2d at 1166.

<sup>29</sup> Audacy Application, Narrative at 50. *See 2000 18 GHz Band Order*, 15 FCC Rcd 13443-44, para. 28 (removing secondary NGSO FSS allocation in the 19.7-20.2 GHz frequency band).

<sup>30</sup> *See 2000 18 GHz Band Order*, 15 FCC Rcd 13443-44, para. 28 (removing secondary NGSO FSS allocation in the 19.7-20.2 GHz frequency band).

<sup>31</sup> *NGSO FSS Report and Order*, 32 FCC Rcd at 7813, paras. 9-10 (providing unprotected, non-interference basis status to the 19.7-20.2 GHz band).

<sup>32</sup> Audacy Letter of April 3, 2017 in response to Commission Letter of March 10, 2017, at 2-3.

<sup>33</sup> Audacy Application, Narrative at 52.

non-Federal Fixed, Fixed Satellite, and Mobile Services.<sup>34</sup> In the *NGSO FSS Report and Order*, the Commission reiterated that the 29.5-30.0 GHz band is designated for non-Federal GSO FSS operations on a primary basis and for NGSO FSS operations on a secondary basis.<sup>35</sup> Audacy states that it will coordinate its operations with GSO systems and will operate its uplink operations on a secondary, non-interference basis with respect to GSO operations in the 29.5-30.0 GHz band and will not claim interference protection from GSO FSS stations in this band, as required by the Commission's rules.<sup>36</sup> Audacy further states that its uplink operations in the 29.5-30.0 GHz band will comply with the EPFD limits Table 22-2 of the ITU Radio Regulations.<sup>37</sup> Audacy also provided technical demonstrations to show that it will comply with international EPFD limits designed to protect GSO networks in the 29.5-30 GHz frequency band set forth in Article 22 of the ITU Radio Regulations.<sup>38</sup> Finally, Audacy specifies that it will only uplink in these frequency bands during emergency recovery situations, and, due to the narrow beam width of the uplink antennas, Audacy anticipates in-line interference events with other operators to be rare. Consistent with the decisions in the *NGSO FSS Report and Order*, and Audacy's technical demonstrations, we grant Audacy's request to operate in the 29.5-30.0 GHz band.

### B. V-band FSS Issues

12. *Sharing with GSO FSS systems.* The Commission does not currently have service rules relevant to sharing between NGSO and GSO FSS systems in the 37.5-42.0 GHz and 47.2-50.2 GHz bands that are part of Audacy's application. There are currently no FCC-licensed GSO FSS systems operating in these bands, although one GSO satellite application to operate in these bands has been recently granted.<sup>39</sup> The Commission recently adopted a new rule in Section 25.289 requiring that, unless otherwise provided in the rules, an NGSO system licensee must not cause unacceptable interference to, or claim protection from, a GSO FSS or BSS network.<sup>40</sup> Accordingly, a condition to this effect will be included in the Audacy grant. Article 22 of the ITU Radio Regulations contains provisions to ensure compatibility of NGSO FSS operations with GSO networks.<sup>41</sup> However, within the 37.5-50.2 GHz range there are currently no ITU EPFD limits. We note that Audacy's grant will be subject to modification to bring it into conformance with any rules or policies adopted by the Commission in the future. Therefore, if relevant EPFD limits or other procedures are adopted by the Commission, or to the extent applicable, by the ITU in the future, Audacy's operations subject to this grant must comply with those limits or procedures. These conditions address ViaSat's petition and will facilitate the development of NGSO and GSO systems in these frequencies.<sup>42</sup>

13. *Operations in the 37.5-40.0 GHz Band and Associated Waivers.* In the *Spectrum*

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<sup>34</sup> U.S. Table of Frequency Allocations, 47 CFR § 2.106.

<sup>35</sup> *NGSO FSS Report and Order*, 32 FCC Rcd at 7813, para. 9.

<sup>36</sup> Audacy Application, Narrative at 58.

<sup>37</sup> *Id.* at 59.

<sup>38</sup> Audacy Letter of April 3, 2017 in response to Commission Letter of March 10, 2017, at 4-5.

<sup>39</sup> Hughes Network Systems, LLC was granted authority to deploy and operate a GSO space station providing fixed-satellite service using Ka- and V-band frequencies including 40-42 GHz and 47.2-50.2 GHz bands. Hughes request to use the 50.4-51.4 GHz (Earth-to-space) bands was deferred. Hughes Network Systems Application, IBFS File No. SAT-LOA-20170621-00092 and IBFS File No. SAT-AMD-20170908-00128, grant stamped in part and deferred in part (March 20, 2018).

<sup>40</sup> 47 CFR § 25.289.

<sup>41</sup> See generally ITU R.R. Article 22, Section II.

<sup>42</sup> See ViaSat Petition to Deny at 5, 8-9 (filed June 26, 2017) (questioning the sufficiency of the EPFD limits proposed by the Commission to protect GSO systems from harmful interference and requesting that each NGSO operator be held jointly and severally liable for harmful interference caused to GSO systems until the Commission adopts adequate aggregate EPFD limits and enforcement mechanisms).

*Frontiers MO&O*, the Commission determined that it would authorize non-Federal satellite earth stations in the 37.5-40.0 GHz band on a first-come, first-served basis subject to the rules adopted in the *Spectrum Frontiers* proceeding.<sup>43</sup> Section 25.114(c)(8) of the Commission's rules requires space station applicants to provide the maximum PFD limits within each coverage area and energy dispersal bandwidth, if any, needed for compliance with Section 25.208.<sup>44</sup> Section 25.208(r) includes PFD limits in the 37.5-40.0 GHz band for both operations under assumed free space conditions<sup>45</sup> and operations during periods when the FSS system raises power to compensate for rain-fade conditions at the earth station.<sup>46</sup> In its application, Audacy sought waivers of Sections 25.114(c)(8) and 25.208(r).<sup>47</sup> Audacy states that its use of the 37.5-40.0 GHz band will slightly exceed the Commission's PFD limits described above for the angles of arrival between 5-7.5°, and Audacy therefore requests waivers of these rules. Audacy argues that its PFD levels fall well below the less stringent ITU PFD limits for this band.<sup>48</sup> Audacy further states that this deviation is necessary to compensate for the effects of rain fade and would not result in harmful interference to any incumbent fixed or terrestrial mobile services in this band, given that Audacy will employ narrow antenna beams to use the 37.5-40.0 GHz band for downlink transmissions from its three NGSO satellites to a single gateway Earth station in the United States.<sup>49</sup>

14. In the recently adopted *Spectrum Frontiers MO&O*, the Commission declined to permit satellite operations in the 37.5-40.0 GHz band at higher PFD levels than the existing limits applicable to clear sky conditions.<sup>50</sup> In the *Spectrum Frontiers MO&O*, we fully considered the same arguments presented by Audacy's Application in support of these waiver requests,<sup>51</sup> and therefore consistent with our determinations in the *Spectrum Frontiers MO&O* and the rationale underlying those determinations, we deny Audacy's waiver request of Section 25.208(r).

15. In connection with its request for a waiver of Section 25.208(r), Audacy also asks for a waiver of Section 25.114(c)(8), which specifies that applicants must provide the calculated maximum PFD levels within each coverage area needed for compliance with Section 25.208, for the angles of arrival specified in the applicable paragraphs of Section 25.208.<sup>52</sup> Consistent with our denial of Audacy's waiver request of Section 25.208(r), Audacy's request for a waiver of the Section 25.114(c)(8) related informational requirement is similarly denied.

16. *Operations in the 40-42 GHz Band.* This band is allocated to the FSS (space-to-Earth) on

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<sup>43</sup> We note that only earth stations individually licensed in this band pursuant to Section 25.136 have interference protection rights. *Spectrum Frontiers Reconsideration Order*, 32 FCC Rcd at 11034, para. 139, fn355.

<sup>44</sup> 47 CFR. § 2.114(c)(8).

<sup>45</sup> 47 CFR § 25.208(r)(1).

<sup>46</sup> 47 CFR § 25.208(r)(2). See *V-band Second Report and Order*, 18 FCC Rcd at 25440-41, paras. 28-29.

<sup>47</sup> Audacy Application, Narrative at 56. The note to paragraph (r) states that the conditions under which satellites may exceed the power flux density limits for free space conditions to compensate for the effects of rain fading have not yet been defined, and the conditions and extent to which the free space limits can be exceeded will be the subject of a further rulemaking by the Commission. 47 CFR § 25.208(r), NOTE TO PARAGRAPH (r). There appears to be a typographical error in the note to paragraph (r). The note refers to paragraph (q)(1), but should refer to paragraph (r)(1) for the PFD limits applicable to NGSO systems under assumed free space conditions.

<sup>48</sup> Audacy Application, Narrative at 56.

<sup>49</sup> *Id.* at 57.

<sup>50</sup> *Spectrum Frontiers MO&O*, 32 FCC Rcd at 11056-57, paras. 207-209.

<sup>51</sup> *Id.* at 11056, 11057, paras. 205, 208-209.

<sup>52</sup> Audacy Application, Narrative at 8; 47 CFR § 25.114(c)(8).

a primary basis.<sup>53</sup> We observe that in the *Spectrum Frontiers* proceeding, the Commission does not propose terrestrial mobile use of the 40-42 GHz band at this time.<sup>54</sup> Furthermore, Audacy's proposed use of this band is consistent with the existing allocation.<sup>55</sup> We therefore grant Audacy's request to operate in the 40-42 GHz band.

17. *Operations in the 47.2-50.2 GHz Band.* The 47.2-48.2 GHz portion of this band is currently allocated in the U.S. Table of Frequency Allocations for FSS, fixed service and mobile service, limited to non-Federal stations, and the 48.2-50.2 GHz portion is allocated for these same services for both Federal and non-Federal stations.<sup>56</sup> In the *Spectrum Frontiers Second Report and Order*, the Commission decided to limit FSS operations to individually licensed earth stations in the 47.2-48.2 GHz portion of the band, which will also be authorized for terrestrial Upper Microwave Flexible Use Service (UMFUS) operations. In addition, earth station operations in the FSS in the 47.2-48.2 GHz band must not cause interference to stations in the fixed and mobile services, except where the individually licensed earth stations are authorized under Section 25.136 of the Commission's rules.<sup>57</sup> In the *Spectrum Frontiers MO&O*, the Commission indicated that the 48.2-50.2 GHz portion of the band will be reserved for FSS use, including for deployment of satellite user terminals.<sup>58</sup> Accordingly, we grant Audacy's request to operate in the 47.2-50.2 GHz band, subject to the rules adopted in the *Spectrum Frontiers* proceeding.

18. *Operations in the 50.4-51.4 GHz Band and Associated Waivers.* Audacy seeks authorization for uplinks in the 50.4-51.4 GHz band.<sup>59</sup> This band is allocated in the U.S. Table of Frequency Allocations to the FSS, but at the time Audacy filed its application, the 50.4-51.4 GHz frequency bands was not among the available frequencies for FSS that were listed in Section 25.202(a)(1) of the rules. Audacy, therefore, requested waiver of Section 25.202(a)(1).<sup>60</sup> The Commission recently decided to remove the list of FSS frequencies from Section 25.202(a)(1) as unnecessary.<sup>61</sup> Accordingly, Audacy's request for waiver of Section 25.202(a)(1) is dismissed as moot.

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<sup>53</sup> U.S. Table of Frequency Allocations, 47 CFR § 2.106.

<sup>54</sup> *Spectrum Frontiers MO&O*, 32 FCC Rcd at 11048, para.185.

<sup>55</sup> U.S. Table of Frequency Allocations, 47 CFR § 2.106.

<sup>56</sup> Historically, the 47.2-50.2 GHz band has been subject to a band plan for sharing between wireless services and FSS. In 1998, as part of the V-band plan, the Commission designated the lower segment of the band, 47.2-48.2 GHz for wireless services use, and the upper 48.2-50.2 GHz segment for FSS use. *Allocation and Designation of Spectrum for Fixed-Satellite Services in the 37.5-38.5 GHz, 40.5-41.5 GHz and 48.2-50.2 GHz Frequency Bands*, First Report and Order, 13 FCC Rcd 24649, 24651, para. 2 (1998). In 2003, the Commission noted that it was preserving the 47.2-48.2 GHz FSS uplink allocation for gateway operations, pairing with downlink operations in the 37.5-40.0 GHz band. *V-band Second Report and Order*, 18 FCC Rcd at 25457, para. 67. The upper portion of the band, 48.2-50.2 GHz (Earth-to-space) band is identified in international footnote 5.516B for use by high-density applications in the FSS in ITU Region 2. International Table of Frequency Allocations, 47 CFR § 2.106, footnote 5.516B. Earth station operations in the 47.2-50.2 GHz band, including limitations on such operations, will be addressed as part of the earth station licensing process.

<sup>57</sup> Section 25.136 specifies processes for earth station applicants in the 47.2-48.2 GHz band and includes procedures to enable sharing with UMFUS. 47 CFR § 25.136(d).

<sup>58</sup> *Spectrum Frontiers MO&O*, 32 FCC Rcd at 11050, para. 189.

<sup>59</sup> Audacy Application, Narrative at 53-54.

<sup>60</sup> *Id.* at 53-54.

<sup>61</sup> *NGSO FSS Report and Order*, 32 FCC Rcd at 7817-18, para. 27.



19. In the *V-band First Report and Order*, the Commission designated the 50.4-51.4 GHz band segment for use by fixed and mobile.<sup>62</sup> The Commission recently proposed authorizing fixed and mobile use under the UMFUS rules in the 50.4-51.4 GHz band in the *Spectrum Frontiers Order and Further Notice*,<sup>63</sup> but has not yet acted on this issue.<sup>64</sup> Rather than act on access to this band prematurely, we defer action until sharing between terrestrial and satellite operations in the band, as well as other uses of the band, are addressed in the context of the *Spectrum Frontiers Proceeding*.

20. *Limits on Emissions into the 50.2-50.4 GHz Band.* The National Telecommunications and Information Administration (NTIA), on behalf of the National Aeronautics and Space Administration, the Department of Commerce, and the National Science Foundation, has expressed concerns about any proposed authorized out-of-band emission limits in the 50.2-50.4 GHz band that is designated for the Earth exploration-satellite service (EESS) (passive) use.<sup>65</sup> The NTIA indicated that these Federal agencies strongly opposed the future grant of NGSO FSS earth station licenses in the 49.7-50.2 GHz or 50.4-50.9 GHz bands operating in accordance with footnote US156 to Section 2.106 of the Commission's rules,<sup>66</sup> stating that out-of-band emissions from such earth stations would result in harmful interference to the operations of U.S. government assets in the adjacent 50.2-50.4 GHz band.<sup>67</sup> The NTIA requested that more stringent out-of-band limits be placed on such earth station operations to ensure that the Federal government's EESS operations at 50.2-50.4 GHz—particularly those aspects that are critical to its prediction of meteorological phenomena—are not compromised. The Commission acknowledges the significant concerns expressed by the NTIA and notes that this unwanted emissions issue could be considered in a future Commission action. Therefore, although we require Audacy to comply with the out-of-band emission limits currently in footnote US156 to Section 2.106 of the Commission's rules for its operations in the 49.7-50.2 GHz band,<sup>68</sup> we also explicitly condition Audacy's authorization upon compliance with any future limits applicable to unwanted emissions into the 50.2-50.4 GHz band that may be adopted, either because of modifications approved by the 2019 World Radiocommunication Conference (WRC-19), or as a result of any future Commission rulemaking, independent of any ITU deliberation.<sup>69</sup>

### C. Inter-Satellite Service Issues

21. *Licensing and Coordination Issues.* Audacy proposes to operate “forward and return” ISS links between its satellites and satellites operated by third parties in the 22.55-23.18 GHz, 23.38-23.55 GHz, 24.45-24.75 GHz, and 32.30-33.00 GHz frequency bands. Audacy also proposes to operate ISS links between its own satellites in the 54.25-56.90 GHz, 57.0-58.2 GHz and 65.0-71.0 GHz frequency bands. We find that authorizing these proposed ISS links serves the public interest because the Audacy

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<sup>62</sup> *V-band First Report and Order*, 13 FCC Rcd at 24651, para. 3 (referring to fixed and mobile services jointly as wireless services).

<sup>63</sup> *Spectrum Frontiers Order and Further Notice*, 31 FCC Rcd at 8158.

<sup>64</sup> *Spectrum Frontiers Second Report and Order*, 32 FCC Rcd at 109994, n.35.

<sup>65</sup> NTIA raised these concerns during the coordination of proposed commercial operations in portions of the V-band. See “Memorandum of Understanding between the Federal Communications Commission and the National Telecommunications and Information Administration,” January 31, 2003 (MOU), available at [http://apps.fcc.gov/edocs\\_public/attachmatch/DOC-230835A2.pdf](http://apps.fcc.gov/edocs_public/attachmatch/DOC-230835A2.pdf).

<sup>66</sup> 47 CFR § 2.106, footnote US156. The same limits are also included in Section 25.202(j) of the Commission's rules, 47 CFR § 25.202(j).

<sup>67</sup> Specifically, the NTIA asserts that out-of-band emissions would degrade data collection capability, and would impact both domestic and international weather forecasting such as hurricane trajectories and the probability of tornado development.

<sup>68</sup> 47 CFR § 2.106, footnote US156.

<sup>69</sup> A possible revision to the limits applicable to unwanted emissions in the 50.2-50.4 GHz band was included in ITU Resolution 750 (REV. WRC-15) and is being considered under WRC-19 Agenda Item 1.6.

service will enable operators of LEO satellites to have continuous access to their satellites using Audacy's global line-of-sight visibility to those satellites, rather than using their own individual uplink and downlink frequencies at multiple, worldwide earth station locations. As set forth in Section 25.279 of the Commission's rules, we have coordinated Audacy's proposed ISS with the NTIA, since Audacy's proposed ISS links are in frequency bands that are also authorized for use by agencies of the federal government.<sup>70</sup> In addition, Audacy must coordinate its proposed frequency usage for ISS links with any existing permittees and licensees in the ISS whose facilities could be affected by Audacy's new proposal, in terms of frequency interference or restricted capacity.<sup>71</sup> Furthermore, Audacy must cooperate fully with other future co-frequency systems in coordinating ISS usage.<sup>72</sup> We note that our authorization of Audacy to operate ISS in these bands does not remove the requirement for third party satellite operators communicating with Audacy to also obtain prior Commission authority to operate ISS links with Audacy. If the third-party satellites are non-U.S. licensed satellites, and the proposed communications involve earth stations located in the United States, then a petition for U.S. market access under Section 25.137 of the Commission's rules must be granted by the FCC prior to such communications taking place.<sup>73</sup>

22. *Operations in the 22.55-23.18 GHz, 23.38-23.55 GHz, 24.45-24.75 GHz, and 32.3-33.0 GHz Bands.* Audacy states that its system will use the 22.55-23.18 GHz, 23.38-23.55 GHz, 24.45-24.75 GHz, and 32.3-33.0 GHz bands to relay "Advanced User forward/return data to/from the Advanced Users to Audacy's Relays."<sup>74</sup> The U.S. Table of Frequency Allocations designates the 22.55-23.55 GHz band on a co-primary basis for Federal and non-Federal Inter-Satellite, Fixed and Mobile services, and the 24.45-24.75 GHz, and 32.3-33.0 GHz bands on a co-primary basis for Federal and non-Federal Inter-Satellite and Radionavigation services.<sup>75</sup> Footnote US278 provides that, in the 22.55-23.55 GHz, and 32.3-33.0 GHz bands, NGSO inter-satellite links operate on a secondary basis to GSO inter-satellite links.<sup>76</sup> Audacy states that it commits to coordinating with Federal users in the bands, including the National Science Foundation, to avoid instances of harmful interference that cannot be remedied.<sup>77</sup> Audacy also states that it will coordinate its operations with GSO systems and will operate its operations on a secondary, non-interference basis with respect to GSO operations and will not claim interference protection from GSO FSS stations, as required by the Commission's rules.<sup>78</sup> In addition, in the 24.45-24.75 GHz band, footnote 5.533 states that the inter-satellite service shall not claim protection from harmful interference from airport surface detection equipment stations of the radionavigation service.<sup>79</sup> Accordingly, Audacy's proposed use of the 22.55-23.18 GHz, 23.38-23.55 GHz, 24.45-24.75 GHz, and 32.3-33.0 GHz band is consistent with our rules, and we grant Audacy's request, as conditioned below.

23. *Operations in the 54.25-56.9 GHz and 57.0-58.2 GHz Bands.* Use of the 54.25-58.2 GHz frequency band is shared between U.S. Government and non-Federal operations for Earth exploration-

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<sup>70</sup> 47 CFR § 25.279(b)(1).

<sup>71</sup> 47 CFR § 25.279(b)(2).

<sup>72</sup> *Id.* (stating that "All affected applicants, permittees, and licensees, shall at the direction of the Commission, cooperate fully and make every reasonable effort to resolve technical problems and conflicts that may inhibit effective and efficient use of the radio spectrum").

<sup>73</sup> 47 CFR § 25.137.

<sup>74</sup> Audacy Application, Narrative at 58.

<sup>75</sup> 47 CFR §§ 2.106. We note that the Commission's proposal to add primary non-Federal fixed and mobile service allocations to the 32 GHz band is still pending. *Spectrum Frontiers*, Order and Further Notice and Proposed Rulemaking, 31 FCC Rcd 8014, 8149-50, paras. 389-90 (2016).

<sup>76</sup> 47 CFR §§ 2.106, footnote US278.

<sup>77</sup> Audacy Application, Narrative at 59.

<sup>78</sup> *Id.* See also 47 CFR §§ 2.105(c)(2)(i), (ii).

<sup>79</sup> 47 CFR §§ 2.106, footnote 5.533.

satellite service (EESS) (passive), fixed, mobile, space research (passive) and inter-satellite services.<sup>80</sup> The 56.9-57.0 GHz band is not allocated for non-Federal inter-satellite service operations. Footnote 5.556A of the Table of Frequency allocations restricts use of the 54.25-56.9 GHz and 57-58.2 GHz frequency bands to GSO systems.<sup>81</sup> Audacy requests a waiver of the GSO-only limitation in these bands and requests to use the 54.25-56.9 GHz and 57-58.2 GHz frequency bands on a non-conforming, non-interference basis to provide inter-satellite services between any two of its three satellites.<sup>82</sup> Audacy states that its satellites' inclined orbits result in a maximum of two geostationary conjunctions per orbit, the network will employ only three narrow ( $<1^\circ$ ) beams in these bands, and these beams are directed away from the Earth.<sup>83</sup> Moreover, Audacy's asserts that its network will comply with the PFD limits set forth in footnote 5.556A. Audacy further notes that these characteristics make Audacy's satellites much more akin to a GSO system with respect to EESS operations as opposed to a large-scale LEO network intended to provide broadband service to terrestrial-based end users. Audacy acknowledges that the U.S. Government has existing and planned ISS systems in the 56.9-57 GHz band segment, but is unaware of any existing systems in the 54.25-56.9 GHz or 57-58.2 GHz frequency bands and therefore does not anticipate creating a risk for harmful interference for any incumbent user or existing EESS system.<sup>84</sup> Similarly, Audacy states that it is also not aware of any current non-government EESS or other GSO operations in these bands, but will coordinate with any individual operators on a case-by-case basis to ensure no harmful interference occurs into existing and planned GSO systems.<sup>85</sup> Because the characteristics of Audacy's system design, including its orbital configurations, narrow beams, and small number of space and Earth stations, alleviate the Commission's concerns regarding possible interference, we find that Audacy provides an adequate justification to waive footnote 5.556A to allow ISS operations with NGSO satellites in these bands.

24. *Operations in the 65.0-71.0 GHz Band.* Audacy similarly seeks to use the 65.0-71.0 GHz band to provide inter-satellite services between any two of its three satellites. The U.S. Table of Frequency Allocations contains a primary allocation for non-Federal Inter-Satellite service in the 65.0-71.0 GHz frequency range. Accordingly, we find that Audacy's use of this band for inter-satellite links is consistent with use of the band permitted under our rules and grant Audacy's request for ISS operations in the 65.0-71.0 GHz band.

#### **D. Other Matters**

25. *Waiver of Processing Round.* We deny Audacy's request for a waiver of Section 25.157 of the Commission's rules to consider its application wholly outside of the Commission's processing round procedures for NGSO-like applications. Audacy states that its system's ability to share frequencies with existing and future NGSO networks operating co-channel in the same radiofrequency bands will not preclude additional entry by future NGSO systems and therefore obviates the need for a processing round.<sup>86</sup> Given the large number of NGSO FSS applications that seek to operate in the same frequency bands as Audacy's proposed system, we believe that the public interest is best served by relying on a processing round to determine the sharing rules among the different NGSO systems, rather than a difficult technical evaluation of whether Audacy's system is able to share spectrum with all existing and future NGSO networks. Our inclusion of Audacy's application in the Ku- and Ka-band and V-band Processing Round has not prejudiced Audacy, since under the avoidance of interference mechanism that we adopted

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<sup>80</sup> 47 CFR § 2.106.

<sup>81</sup> *Id.* at footnote 5.556A.

<sup>82</sup> Audacy Application, Narrative at 53.

<sup>83</sup> *Id.* at 55.

<sup>84</sup> *Id.*

<sup>85</sup> *Id.*

<sup>86</sup> Audacy Application, Narrative, at 46.

in the *NGSO FSS Report and Order*, Audacy will be able to use all the spectrum it requested for its system if it is indeed able to operate in the same frequency bands as other NGSO systems without causing interference to or requiring protection from them.

26. We do agree, however, that a processing round is not needed for the frequencies that Audacy requested for ISS use and grant Audacy's request for a waiver of Section 25.156(d)(4). The purpose of the processing round procedure is to prevent one applicant from unreasonably precluding additional entry by other operators in the requested frequency band.<sup>87</sup> Section 25.156(d)(4) states, in pertinent part, that "applications...for inter-satellite link<sup>88</sup> authority will be treated like an application separate from its associated service band" and each request for inter-satellite link request "will be considered pursuant to the procedure for applications for GSO-like operations or NGSO-like operation, as applicable."<sup>89</sup> Accordingly, Audacy's application for ISS would be treated like a separate application for NGSO-like operations and addressed through a modified processing round. As stated previously in this Order, the Bureau accepted for filing Audacy's request to provide inter-satellite communications with customer satellites in the 22.55-23.55 GHz, 24.45-24.75 GHz, 32.3-33.0 GHz, 54.25-56.9 GHz, 57.00-58.2 GHz, and 65.0-71.0 GHz frequency bands, but made no decision as to whether a separate processing round would be initiated for these frequencies and did not invite additional applications in these frequency bands.<sup>90</sup> Audacy requests a waiver of Section 25.156(d)(4) arguing that the rule was adopted to address cases where applicants sought to use inter-satellite links in frequency bands that had not been allocated for ISS and that Audacy's system does not contemplate providing traditional service links to terrestrial end users, which supports treating Audacy's application as a single application.<sup>91</sup>

27. We find that the public interest would not be served by delaying action on Audacy's request and by opening a separate, further processing round for these frequency bands and that a waiver of Section 25.156(d)(4) is justified. We believe that the more efficient approach in this instance is to impose conditions on Audacy's operation, requiring coordination with existing operators that have ISS in the bands requested by Audacy to ensure protection of such systems, as well as an obligation to cooperate

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<sup>87</sup> *Space Station Licensing Reform Order*, 18 FCC Rcd 10760, 10774-76 paras. 25-29 (2003).

<sup>88</sup> ISLs are communication links between in-orbit satellites that operate in spectrum allocated to the ISS. *WB Holdings 1 LLC, Application for Authority to Construct, Launch, and Operate a Ka-band Satellite System in the Fixed-Satellite Service*, Order and Authorization, 16 FCC Rcd 2513 n.3 (IB Jan. 30, 2001) (WB Holdings Order).

<sup>89</sup> 47 CFR § 25.156(d)(4). See also *Amendment of the Commission's Space Station Licensing Rules and Policies; Mitigation of Orbital Debris*, First Report and Order and Further Notice of Proposed Rulemaking, 18 FCC Rcd 10760, 10810-12, paras. 127-131 (2003) (*First Space Station Reform Order*) (stating "We will consider requests for service link authority separately from feeder link and intersatellite [sic] link requests" and "our procedures for applications for feeder link or intersatellite [sic] link authority will be consistent with our procedures for the associated service link application.").

<sup>90</sup> *Supra* para. 2, n.7.

<sup>91</sup> Audacy Application, Narrative at 44-45. As part of its waiver request Audacy cites to the *First Space Station Reform Order* for the proposition that applicants seeking to operate inter-satellite links prior to an allocation were considered under a first-come, first-served procedure, while processing rounds were initiated for frequencies that had been allocated for a proposed service with already established rules. *Id.* at 45. We do not agree with Audacy's characterization of the *First Space Station Reform Order*. Contrary to Audacy's suggested interpretation of the Commission's policy, the determination of the procedure used to consider inter-satellite links does not depend on whether an allocation is made or not, but rather on the nature of the service link proposed. See *First Space Station Reform Order*, 18 FCC Rcd at 10810 ("[O]ur procedures for applications for ... intersatellite [sic] link authority will be consistent with our procedures for the associated service link application. In cases where the proposed service link is a GSO-like service, the first-come first-served procedure ... will apply. Examples of these applications are requests for an intersatellite [sic] link between two GSO satellites, and requests for a feeder link between a fixed earth station and a GSO satellite. In all other cases, where the associated service link application proposes an NGSO-like satellite system, the modified processing round procedure will apply.").

fully with future co-frequency systems. We have so conditioned Audacy's use of ISS frequencies.<sup>92</sup> In the case of Audacy's proposed system, there are no service links in the usual sense – that is, communications with customer earth stations – and therefore it would not be clear which portion of Audacy's requested ISS bands should be separated out as “service links” for the purposes of a processing round. We also find that a waiver is supported by the small number of satellites involved in Audacy's request for ISS between its own satellites in the 54.25-56.9 GHz, 57.00-58.2 GHz, and 65.0-71.0 GHz frequency bands, and the limited duration and spatial separation of the communications involved with ISS between Audacy satellites and third-party customer satellites, which we find should facilitate coordination with any existing operators of ISS in this band and make it possible for use of these ISS frequencies for future operators. This approach is also consistent with the requirement for coordination among inter-satellite service systems set forth in Section 25.279 of the Commission's rules.<sup>93</sup> We observe, however, that if findings prove incorrect and coordination is not feasible with existing or future ISS operators in these bands, we may consider opening a processing round at that time which would more clearly define the coordination obligations.

28. *Waiver of Band-Splitting Procedure.* Audacy's application seeks a waiver of Section 25.157(e) of the Commission's rule. At the time of filing of Audacy's application, Section 25.157(e) provided for “available spectrum” to be “divided equally” among the applications granted as the result of a processing round.<sup>94</sup> This rule presumed that NGSO operators could not use the same frequencies without causing harmful interference to each other, and therefore must be assigned discrete segments of the requested band. Audacy requested a waiver of Section 25.157(e) to permit it to share all frequency bands requested in its application with other NGSO FSS operators through avoidance of interference events, rather than by assignment of only a portion of these bands. After the filing of Audacy's application, we adopted changes that will apply a spectrum sharing mechanism to all NGSO FSS systems that have sharing capabilities (e.g., directional earth station antennas), regardless of the frequency bands used.<sup>95</sup> Accordingly, Audacy's request for waiver of Section 25.157(e) is no longer needed and is dismissed as moot.

29. *Matters Broadly Applicable to NGSO FSS Applications.* Hughes urges the Commission to adopt mechanisms for ensuring that aggregate EIRP limits are met by all NGSO systems authorized in the United States.<sup>96</sup> ViaSat questions the sufficiency of the EIRP limits proposed by the Commission to protect GSO systems from harmful interference and requests that each NGSO operator be held jointly and severally liable for harmful interference caused to GSO systems until the Commission adopts adequate

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<sup>92</sup> *Supra* para. 21 (stating that Audacy must coordinate its proposed frequency usage for ISS links with any existing permittees and licensees in the ISS whose facilities could be affected by Audacy's new proposal, in terms of frequency interference or restricted capacity and must cooperate fully with other future co-frequency systems in coordinating ISS usage); *see also infra* para. 40(q). The Commission has previously waived the processing round requirement where it found that authorization under a first-come, first-served licensing procedure did not preclude other operations in the subject band, and would not cause harmful interference to incumbents. *See, e.g., DigitalGlobe, Inc.*, Order and Authorization, 20 FCC Rcd 15696, para. 5 (Sat. Div., IB 2005); *Space Imaging, LLC*, Declaratory Order and Order and Authorization, 20 FCC Rcd 11964, 11969, para. 13 (IB 2005) (“In particular, we would expect NGSO-like applicants requesting waivers of Sections 25.156 and 25.157 to show...that modified processing rounds are not necessary to preclude an applicant from unreasonably restricting further entry in that frequency band.”).

<sup>93</sup> 47 CFR § 25.279(b)(2).

<sup>94</sup> 47 CFR § 25.157(e).

<sup>95</sup> *NGSO FSS Order*, 32 FCC Rcd at 7826, para. 52 (applying the newly adopted Section 25.161 to NGSO FSS systems in any frequency band).

<sup>96</sup> Hughes Comments at 3.

aggregate EPFD limits and enforcement mechanisms.<sup>97</sup> Space Norway requests that grant of Audacy's application be conditioned on Audacy's implementation of mechanisms to avoid in-line interference with highly elliptical orbit NGSO systems, such as that proposed by Space Norway.<sup>98</sup> SpaceX asks that we consider conditions that would promote efficient use of spectrum.<sup>99</sup>

30. All of these issues are of general applicability and were addressed in the *NGSO FSS Report and Order* adopted September 26, 2017.<sup>100</sup> ViaSat has sought reconsideration of the Commission's decision to adopt EPFD limits in the 27.5-28.6 GHz and 29.5-30 GHz uplink bands.<sup>101</sup> Those arguments will be addressed in the context of that petition for reconsideration. To the extent commenters raise any other issues of general applicability that are pending in any ongoing Commission rulemaking proceedings, we defer consideration of such issues to those proceedings, and condition grant of the Audacy application on their outcome, based on the record in those proceedings.<sup>102</sup>

31. *ITU Coordination.* In its Petition to Deny, Telesat observes that international coordination will be required between the Audacy system and its own NGSO FSS system.<sup>103</sup> Telesat argues that, at minimum, any grant to Audacy should be conditioned upon compliance with this international obligation. SES and O3b also requested that any grant of the Audacy Application be subject to the same conditions that were placed on the grant of U.S. market access for the O3b NGSO FSS system and OneWeb.<sup>104</sup> In response Audacy states that commenters fail to acknowledge distinctions between the use of FSS spectrum for Audacy's proposed feeder links and service links proposed in other processing

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<sup>97</sup> ViaSat Petition to Deny at 5, 8-9 (filed June 26, 2017).

<sup>98</sup> Space Norway Comments at 4.

<sup>99</sup> SpaceX Comments at 15.

<sup>100</sup> See generally *NGSO FSS Report and Order*, 32 FCC Rcd at 7820, para. 35 (addressing concerns of compliance with aggregate EPFD limits by affirming that the Commission will require NGSO FSS licensees to comply with aggregate EPFD limits, and may intervene if operators cannot agree among themselves how to ensure the aggregate limits are met), 7820, para. 35 (acknowledging ViaSat concern that EPFD limits in the 17.8-30 GHz range were not developed with the most advanced modern GSO networks in mind, but concluding that it would not be advisable to remain without such EPFD limits in our rules pending the proposal and development of new EPFD limits), 7824-25, paras. 47-48 & n.111 (noting Space Norway concern for protection of highly elliptical systems and concluding that the required good faith coordination among NGSO FSS systems "also offers the best means to mitigate potentially unequal burdens for . . . those in highly elliptical orbits"), *id.* (noting SpaceX proposal to encourage efficient spectrum use among NGSO FSS systems, but finding the record insufficient to adopt a requirement at the time).

<sup>101</sup> *Petition for Reconsideration of ViaSat, Inc.*, IB Docket No. 16-408 (filed Jan. 17, 2018).

<sup>102</sup> To the extent that commenters believe that their concerns are not already addressed by ongoing rulemakings, we remind commenters that they have the option to file petitions for rulemaking with the Commission.

<sup>103</sup> Telesat Petition to Deny at 3-4 (stating that Audacy's NGSO system would interfere with Telesat's NGSO operations because the two systems would operate in overlapping geographical areas on overlapping Ka-band frequencies, and that Telesat has demonstrated that in-line interference mechanisms are unworkable). Furthermore, Telesat states that Audacy offers no recognition that the Canadian ITU filings that are associated with Telesat's NGSO system have date priority over later ITU filings that may be associated with Audacy's system band frequencies. Telesat also indicated that grant of Audacy's application must be conditioned on the outcome of the NGSO rulemaking, as the Commission did in granting OneWeb's NGSO application; Telesat Reply (filed July 7, 2017); see also International Telecommunication Union (ITU) Radio Regulations, No. 9.12 (requiring coordination of certain NGSO systems), No. 9.53 (requiring both parties in coordination to "make every possible mutual effort to overcome [coordination] difficulties, in a manner acceptable to the parties concerned"), No. 11.42 (requiring the immediate cessation of harmful interference actually caused to a recorded assignment with which coordination is required but has not been effected).

<sup>104</sup> *Id.* at 8-10. Since the O3b grant, however, the Commission has adopted significant revisions to its rules and policies governing NGSO FSS. The conditions herein are consistent with these rule changes.

round filings.<sup>105</sup> We recently declined to adopt Telesat's proposal to tie coordination obligations and licensing conditions directly to ITU filing dates by awarding priority according to those dates,<sup>106</sup> and accordingly deny Telesat's petition in so far as it reiterates Telesat's ITU filing date priority proposal. Instead, we include a condition requiring Audacy, like all other NGSO FSS operators, to comply with the spectrum sharing requirements specified in Section 25.261<sup>107</sup> of the Commission's rules with respect to any other NGSO system licensed or granted U.S. market access pursuant to the processing rounds in which Audacy participated.<sup>108</sup> We note however, that outside the United States (i.e. when communications to or from the U.S. territory are not involved) the coexistence between Audacy's operations and operations of a system that received a grant for access to the U.S. market are governed only by the ITU Radio Regulations and are not subject to Section 25.261. Accordingly, we include a condition, which was also included in the *OneWeb Order*, requiring compliance with the ITU Radio Regulations.<sup>109</sup>

32. *EPFD Analysis.* Several commenters suggested that the EPFD analysis provided by Audacy is insufficient and that the Commission should request a supplemental EPFD analysis.<sup>110</sup> Specifically, SES and O3b stated that Audacy has not included files with equivalent isotropically radiated power (EIRP) and power flux density (PFD) masks necessary to independently assess the proposed systems' compliance with applicable EPFD limits and that the Commission should defer action on these proposals pending submission of the relevant PFD and EIRP mask data.<sup>111</sup> We disagree. At the time Audacy filed its application, Section 25.146 of the Commission's rules required specific EPFD showings from NGSO FSS applicants, including the use of ITU software, in certain portions of the Ku-band,<sup>112</sup> but no comparable requirement existed in Part 25 for the Ka-band frequencies requested by Audacy.<sup>113</sup> Nonetheless, Audacy provided an updated Ka-band EPFD analysis using ITU approved software and included the associate input files necessary to permit independent verification.<sup>114</sup> Consistent with the new

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<sup>105</sup> Audacy Opposition and Response at 3-4; Audacy Response at 6.

<sup>106</sup> *NGSO FSS Report and Order*, 32 FCC Rcd at 7825-26, para. 50. See also WorldVu Satellites Limited, Petition for Reconsideration at 3-6 (filed Jan. 17, 2018).

<sup>107</sup> We recently adopted changes to Section 25.261. In the absence of coordination, spectrum splitting is triggered when the change in system noise temperature caused by interference, or  $\Delta T/T$ , exceeds a threshold of 6 percent. *NGSO FSS Report and Order* at 7825, para. 49.

<sup>108</sup> See *OneWeb Order*, 32 FCC Rcd at 5377; see also *infra* para. 42.

<sup>109</sup> *OneWeb Order*, 32 FCC Rcd at 5376, para. 23(a). Compliance with ITU coordination procedures is a requirement of the ITU Radio Regulations, which hold the force of treaty to which the United States is a party. Compliance with the ITU Radio Regulations is a typical condition of both U.S. space station licenses and grants of U.S. market access. See 47 CFR § 25.111(b); see also, e.g., *Inmarsat Mobile Networks, Inc., Application to Operate a Fixed-Satellite Service Gateway Earth Station Facility in Lino Lakes, Minnesota with the Inmarsat-5 F2 Space Station*, Order and Authorization and Declaratory Ruling, 30 FCC Rcd. 2770, 2784, para. 41c (IB 2015).

<sup>110</sup> See SES and O3b Comments at 3-5; SES and O3b Reply at 2-5 (filed July 14, 2017); Hughes Comments at 2-3.

<sup>111</sup> SES S.A. and O3b Limited Comments at 4-5 (filed June 26, 2017).

<sup>112</sup> 47 CFR § 25.146.

<sup>113</sup> The NGSO FSS Report and Order adopted the ITU EPFD limits for the 17.8-30 GHz band, and incorporated them by reference into Section 25.108(c)(3). It also extended the EPFD demonstration requirements contained in Section 25.146 to include the 17.8-30.0 GHz band, while simultaneously relaxing them, requiring instead that applicants certify that they will meet these international limits. See *NGSO FSS Report and Order*, 32 FCC Rcd at 7820-21 and 7822, paras. 35 and 41-42 (adopting the ITU-RR EPFD limits, and expanding and relaxing the EPFD demonstration requirements in Section 25.146(a)).

<sup>114</sup> See Letter from James Spicer, Chief Engineer, Audacy, to Marlene H. Dortch, Secretary, FCC, at 1-6, IBFS File No. SAT-LOA-20161115-00117 (filed April 3, 2017). These input files included the network's orbital elements and transmission characteristics as well as the PFD and/or EPFD masks required by the ITU's software.

EPFD requirements adopted in the *NGSO FSS Report and Order*,<sup>115</sup> and to ensure that Audacy will satisfy its EPFD obligations going forward, we condition this grant on Audacy receiving a favorable or “qualified favorable” rating of its EPFD demonstration by the ITU prior to initiation of service, in accordance with our rules. Review by the ITU of Audacy’s compliance with ITU EPFD limits, using methods now approved by the ITU,<sup>116</sup> will provide sufficient assurances that Audacy will comply with the EPFD limits specified in Article 22 of the Radio Regulations beyond the other technical demonstrations that it has already provided. As per the *NGSO FSS Report and Order* and required by our rules, Audacy will also need to provide the Commission with any update to the input data files previously submitted.<sup>117</sup>

33. We decline ViaSat’s requests in its petition to limit operations to the parameters specified in the application rather than the limits of what the rules permit, and to impose conditions related to aggregate interference.<sup>118</sup> As in previous NGSO FSS orders, we will allow Audacy to operate up to the PFD and EPFD levels specified in applicable regulations, rather than the levels associated with specific demonstrations in its application. We find this flexibility is warranted given the preliminary nature of the system design, the fact that this grant is conditioned on Audacy’s satisfaction of the ITU’s EPFD assessment and the condition that Audacy cooperate with other NGSO operators to meet limits for aggregate EPFD. We therefore reject ViaSat’s arguments that Audacy should be limited to the levels used in the EPFD demonstration in its application and deny this portion of ViaSat’s Petition to Deny.<sup>119</sup>

34. *Geographic Coverage Requirements.* Audacy requests a waiver, to the extent necessary, of Section 25.145(c) of the Commission’s rules.<sup>120</sup> At the time Audacy filed its application, Section 25.145(c) required NGSO FSS systems using certain Ka-band frequencies to provide service coverage to (i) all locations as far north as 70 degrees North Latitude and as far south as 55 degrees South Latitude for at least 75% of every 24-hour period and (ii) on a continuous basis throughout the fifty states, Puerto Rico and the U.S. Virgin Islands. In the *NGSO FSS Report and Order*, the Commission eliminated the international geographic coverage requirement in former Section 25.145 and moved the remaining domestic coverage requirement to Section 25.146(b).<sup>121</sup> At the same time, the Commission reduced the scope of frequency bands to which the domestic coverage requirements of Section 25.146(b) apply.<sup>122</sup> Because the scope of the rule no longer covers the frequency bands that Audacy requests for FSS use, Audacy’s request for waiver of the domestic coverage requirement is unnecessary. Accordingly, we dismiss as moot Audacy’s request for waiver of both the domestic and international geographic coverage requirements.

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<sup>115</sup> The Commission adopted the ITU EPFD limits in the 17.8-30 GHz frequency range and amended its rules to require that NGSO FSS applicants simply certify that they will meet the international EPFD limits. *NGSO FSS Report and Order* at 7820-7822, paras. 35 and 41; *see also* 47 CFR § 25.146.

<sup>116</sup> Letter from Francois Rancy, Director, ITU Radiocommunication Bureau, to Administrations of ITU Member States, “Examinations under Resolution 85 (WRC-03)” (Dec. 6, 2016), <https://www.itu.int/md/R00-CR-CIR-0414/en>.

<sup>117</sup> *NGSO FSS Report and Order*, 32 FCC Rcd at 7822, para. 41.

<sup>118</sup> ViaSat Petition to Deny at 7.

<sup>119</sup> *Id.* at 3-8.

<sup>120</sup> Audacy Application, Narrative at 44.

<sup>121</sup> *NGSO FSS Report and Order*, 32 FCC Rcd at 7822 and 7831-7832, paras. 40 and 69. We also note that the Commission initiated a further rulemaking to consider elimination of the domestic geographic coverage requirement as part of the recent *NGSO FSS Order*. *See also NGSO FSS NPRM*, 31 FCC Rcd at, at 7833-7834, paras. 73-76.

<sup>122</sup> *See* 47 CFR § 25.146(b) (“In addition, an NGSO FSS applicant proposing to operate in the 10.7-12.7 GHz, 12.75-13.25 GHz, 13.75-14.5 GHz, 18.8-19.3 GHz, or 28.6-29.1 GHz bands must provide a demonstration that the proposed system is capable of providing FSS on a continuous basis throughout the fifty states, Puerto Rico, and the U.S. Virgin Islands”).



35. *Waiver of Section 25.156(d)(5)*. Audacy requests a waiver of Section 25.156(d)(5).<sup>123</sup> We find that no waiver is necessary of this Section. Former Section 25.156(d)(5) of the Commission's rules stated that "[i]n cases where the Commission has not adopted frequency-band specific service rules, the Commission will not consider applications for NGSO-like operation after it has granted an application for GSO-like operation in the same frequency band, unless and until the Commission establishes NGSO/GSO sharing criteria for that frequency band." After the filing of Audacy's application, the Commission deleted this rule, noting that it was unnecessarily restrictive.<sup>124</sup> Accordingly, waiver of the rule is no longer required and we dismiss Audacy's request as moot.

36. *Interference Concerns with regards to platform-enabled telecommunication systems*. Facebook and Elefante expressed concern about the potential interference between Audacy's system and possible future deployment of platform-enabled telecommunication systems in the 22.55-23.55 GHz.<sup>125</sup> In response, Audacy asserts that Elefante's concerns are premature because no allocation or service rules exist for such systems in the 22.55-23.55 GHz frequency band, nor are actively under consideration at this time, and therefore are outside the scope of this proceeding.<sup>126</sup> Audacy further notes, in response to Elefante's and Facebook's concerns, that its proposed use of this 300 megahertz band represents less than 6% of the total spectrum being considered for United States platform-enabled telecommunication systems use.<sup>127</sup> We do not agree with these commenters that we should delay grant of Audacy's application in favor of further study of spectrum sharing.<sup>128</sup> As the Commission recently stated in the *NGSO FSS Report and Order*, the issue of aerial platforms is being studied internationally and may be the subject of a future Commission rulemaking proceeding; however, retaining a "placeholder" allocation for such services is not the appropriate approach, at least until such a rulemaking is initiated.<sup>129</sup> Accordingly, we decline to place conditions on Audacy's authorization in response to these concerns, while noting that Audacy will be bound by the outcome of any future Commission rulemaking regarding to operations in these bands.

37. *Radio Astronomy*. Out-of-band signals into allocated radio astronomy bands can cause

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<sup>123</sup> Audacy Application, Narrative at 45-46.

<sup>124</sup> *NGSO FSS Report and Order*, 32 FCC Rcd at 7821-22, para. 39. See also *NGSO FSS NPRM*, 31 FCC Rcd at 13659-60, para. 21.

<sup>125</sup> Facebook Comments at 4-5; Elefante Comments at 1-20. Although Facebook states that its comments apply to all of Audacy's application, its comments are limited to Audacy's proposed operations in the 24-27 GHz and 47.2-47.5 GHz and 47.9-48.2 GHz frequency bands. Further, even though commenters mention the 47.2-47.5 GHz and 47.9-48.2 GHz frequency bands, they do not provide any substantial basis for their concerns regarding proposed Audacy operations in those bands.

<sup>126</sup> Audacy Opposition and Response at 16-19.

<sup>127</sup> Audacy Opposition and Response at 15.

<sup>128</sup> Elefante Comments at 15-17.

<sup>129</sup> *NGSO FSS Report and Order*, 32 FCC Rcd at 7819, para. 31 n.72. We also note that Elefante's concern about Audacy's use of 22.55-23.55 GHz band is largely mooted by Audacy's withdrawal of its request for use of the 23.18-23.38 GHz frequency band. On May 31, 2018, Elefante filed a petition for rulemaking to establish the Stratospheric-Based Communications Services (SBSC). This petition is pending, and the Commission has not initiated the requested rulemaking proceeding at this time. Petition of Elefante for Rulemaking to Modify Parts 2 and 101 of the Commission's Rules to Enable Timely Deployment of Fixed Stratospheric-Based Communications Services in the 21.5-23.6, 25.2527.5, 71-76, and 81-86 GHz Bands (filed May 31, 2018). We also specifically decline Elefante's request that we confirm that Audacy's third-party customer User Satellites must operate without protection from fixed services. See Letter from Edward A. Yorkgitis, Jr., Counsel to Elefante Group, Inc., to Marlene H. Dortch, Secretary, FCC, File No. SAT-LOA-20161115-00117 (filed May 16, 2018) and Letter from Edward A. Yorkgitis, Jr., Counsel to Elefante Group, Inc., to Marlene H. Dortch, Secretary, FCC, File No. SAT-LOA-20161115-00117 (filed May 31, 2018). As noted previously, non-federal ISS and fixed services are co-primary under the U.S. Table of Frequency Allocations, and requiring ISS operations to operate without protection would be inconsistent with that co-primary allocation. See *supra* para. 22.

interference to radio astronomy observations. We also note that radio astronomy as a service frequently makes use of observations (passive) in bands not allocated to the radio astronomy service. This practice is a result of scientifically valuable signals being subject to the Doppler Effect and shifted in frequency outside radio astronomy-allocated bands. Although not a condition to this authorization, Audacy should be aware of these facts and contact the National Science Foundation Spectrum Management Unit ([esm@nsf.gov](mailto:esm@nsf.gov)) to assist with coordination and information on radio astronomy sites. In the bands in question, the relevant sites are the Green Bank Telescope, the Very Long Baseline Array, and the Very Large Array<sup>130</sup>.

#### IV. CONCLUSION

38. We conclude that grant of the Audacy Application, as conditioned and set forth herein, will serve the public interest by enabling Audacy to pursue its goal of enabling operators of LEO satellites to have continuous access to their satellites through the Audacy system, rather than using individual uplink and downlink frequencies at multiple, worldwide earth station locations.

#### V. ORDERING CLAUSES

39. Accordingly, IT IS ORDERED, that the application filed by Audacy Corporation IS GRANTED IN PART, DENIED IN PART, DEFERRED IN PART, and DISMISSED as MOOT IN PART, as set forth in this Order and Authorization, pursuant to Section 309 of the Communications Act of 1934, as amended, 47 U.S.C. § 309.

40. IT IS FURTHER ORDERED that this authorization is subject to the following requirements and conditions:

- a. Audacy must timely provide the Commission with the information required for Advance Publication, Coordination, and Notification of the frequency assignment(s) for this constellation, including due diligence information, pursuant to Articles 9 and 11 of the ITU Radio Regulations. This authorization may be modified, without prior notice, consistent with the coordination of the frequency assignment(s) with other Administrations. *See* 47 CFR § 25.111(b). Audacy is responsible for all cost-recovery fees associated with the ITU filings. 47 CFR § 25.111(d).
- b. Audacy's operations shall not cause harmful interference to, and shall not claim protection from, GSO networks operating in the FSS and BSS, in accordance with Section 25.289, 47 CFR § 25.289. In the event that relevant EPFD limits or procedures related to sharing between GSO and NGSO networks are adopted by the Commission or the ITU in any of the frequency bands to be used by Audacy, operations must be in conformance with such limits and procedures.
- c. Prior to initiation of service, Audacy must receive a favorable or "qualified favorable" finding in accordance with Resolution 85 with respect to its compliance with applicable EPFD limits in Article 22 of the ITU Radio Regulations.
- d. Audacy must cooperate with other NGSO FSS operators in order to ensure that all authorized operations jointly comport with the applicable limits for aggregate EPFD in the space-to-Earth direction (EPFD<sub>down</sub>) contained in Article 22 of the ITU Radio Regulations as well as Resolution 76 of the ITU Radio Regulations.
- e. Fixed-satellite service operations in the 19.7-20.2 GHz band (space-to-Earth) and the 29.5-30 GHz band (Earth-to-space) are authorized up to the applicable power flux-density and equivalent power flux-density limits contained in Article 22, as well as Resolution 76 of the ITU Radio Regulations.
- f. Fixed-satellite service operations in the 37.5-40 GHz band (space-to-Earth) are

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<sup>130</sup> See 47 CFR § 2.106, footnote US131, for locations of these radio astronomy observatories.

authorized up to the power flux-density limits in 47 CFR § 25.208(r). Prior to starting operation, Audacy has to present the showing described in Section 25.114(c)(8) to confirm compliance with these power flux-density limits.

g. Fixed-satellite service operations in the 40-42 GHz band (space-to-Earth) are authorized up to the power flux-density limits in 47 CFR § 25.208(s) and (t).

h. Inter-satellite service operations in the 22.55-23.18 GHz, 23.38-23.55 GHz and 24.45-24.75 GHz bands are authorized up to the power flux-density limits applied to those bands by Section 25.208(c), 47 CFR § 25.208.

i. Operations in the 19.7-20.2 GHz band (space-to-Earth) and 29.5-30 GHz band (Earth-to-space) are on a secondary basis with respect to GSO FSS operations.

j. In accordance with footnote US278 to 47 CFR § 2.106, Audacy's inter-satellite service operations in the 22.55-23.18 GHz, 23.38-23.55 GHz and 32.3-33 GHz frequency bands, are on a secondary basis with respect to geostationary inter-satellite service operations.

k. Space-to-Earth operations in the 19.7-20.2 GHz band must complete coordination with U.S. Federal systems in accordance with footnote US334 to the United States Table of Frequency Allocations, 47 CFR § 2.106, prior to being used. The use of space-to-Earth operations in the 19.7-20.2 GHz band must be in accordance with any signed coordination agreement between Audacy and U.S. Federal operators. Two weeks prior to the start of any operations in the 19.7-20.2 GHz band, Audacy must provide contact information for a 24/7 point of contact for the resolution of any harmful interference to Jimmy Nguyen, Email: Jimmy.Nguyen@us.af.mil.

l. In the 37.5-38 GHz and 40.0-40.5 GHz bands, operations must be successfully coordinated with Federal Space Research Service (SRS) facilities, pursuant to Recommendation ITU-R SA.1396, "Protection Criteria for the Space Research Service in the 37-38 GHz and 40-40.5 GHz Bands."

m. In accordance with footnote US211 to 47 CFR § 2.106, Audacy is urged to take all practicable steps to protect radio astronomy observations in the adjacent bands from harmful interference from its operations in the 40-42 GHz band.

n. In accordance with footnote US342 to 47 CFR § 2.106, Audacy is urged to take all practicable steps to protect the radio astronomy service from harmful interference from its operations in the 22.55-23.18 GHz and 47.2-50.2 GHz bands. In addition, Audacy must take all necessary measures to prevent harmful interference between its inter-satellite operations in the 32.3-33 GHz band and operations in the radionavigation service and the space research service (deep space) in accordance with Recommendation 707 of the ITU Radio Regulations.

o. Audacy's transmissions in the 22.55-23.18 GHz and 23.38-23.55 GHz bands must comply with the unwanted emissions power limits for non-geostationary satellites applicable in any 200 megahertz of the passive band 23.6-24 GHz, consistent with the requirements contained in footnote US145 to Section 2.106 of the Commission's rules, 47 CFR § 2.106, footnote US145.

p. Audacy's inter-satellite service operations in the 24.45-24.75 GHz bands shall not claim protection from harmful interference from airport surface detection equipment stations of the radionavigation service pursuant to footnote 5.533 to Section 2.106 of the Commission's rules, 47 CFR § 2.106.

q. Audacy must coordinate its proposed frequency usage for inter-satellite service operations in the 22.55-23.55 GHz, 24.45-24.75 GHz, 32.3-33.0 GHz, 54.25-56.9 GHz, 57.00-58.2 GHz, and 65.0-71.0 GHz frequency bands with any existing permittees and licensees in the inter-satellite service whose facilities could be affected by Audacy's new

proposal, in terms of frequency interference or restricted capacity, and must cooperate fully with other future co-frequency systems in coordinating inter-satellite service usage.

41. IT IS FURTHER ORDERED that Audacy must comply with the sharing of ephemeris data procedures described in Section 25.146 of the Commission's rules, 47 CFR § 25.146(e).

42. IT IS FURTHER ORDERED that operations in the 19.7-20.2 GHz, 29.5-30 GHz, 37.5-42 GHz, and 47.2-50.2 GHz bands must comply with spectrum sharing method specified in 47 CFR § 25.261, as revised by FCC 17-122, with respect to any NGSO system licensed or granted U.S. market access pursuant to the processing rounds initiated in Public Notice, DA 16-804, Public Notice, DA 17-524 and Public Notice DA 16-1244. Spectrum sharing between Audacy's operations and the operations of NGSO systems granted market access, where such operations do not include communications to or from the U.S. territory, are governed only by the ITU Radio Regulations and are not subject to Section 25.261.

43. IT IS FURTHER ORDERED that the request for waiver of Geographic Service Requirements as to international and domestic coverage IS DISMISSED AS MOOT for the reasons set forth herein.

44. IT IS FURTHER ORDERED that the Petitions to Deny of Telesat Canada and ViaSat, Inc. ARE GRANTED to the extent that some of the conditions requested by Telesat Canada and ViaSat are imposed, as indicated herein, and are otherwise DENIED.

45. IT IS FURTHER ORDERED that the Petition to Deny of Iridium IS DISMISSED AS MOOT.

46. Any future grant of earth station licenses for operations with the Audacy system will be subject to the following conditions:

- a. Operations in the 37.5-40.0 GHz bands are unprotected with respect to the fixed and mobile services, except as authorized pursuant to 47 CFR § 25.136.
- b. Operations in the 47.2-48.2 GHz band must provide interference protection to the fixed and mobile services, except as authorized pursuant to 47 CFR § 25.136.
- c. Audacy's earth station emissions in the 50.2-50.4 GHz band must comport with the limits contained in ITU-R Resolution 750 (REV. WRC-15) and/or footnote US156 to Section 2.106 of the Commission's rules, 47 CFR §2.106, footnote US156, including any future revisions of footnote US156 to Section 2.106. Such revisions may be introduced either because of modifications that may be approved by WRC-19 to Resolution 750, or as a result of a Commission rulemaking proceeding, independent of any ITU deliberation.
- d. Any future grant of earth station licenses for operations with the Audacy system will be subject to the following condition, unless the condition is satisfied prior to such license grant: in the 48.94-49.04 GHz band, operations must be coordinated with radio astronomy stations operating on a co-primary basis in this band.

47. IT IS FURTHER ORDERED that this grant and any earth station licenses granted in the future are subject to modification to bring them into conformance with any rules or policies adopted by the Commission in the future.

48. IT IS FURTHER ORDERED that Audacy must coordinate physical operations of spacecraft with any operator using similar orbits, for the purpose of eliminating collision risk and minimizing operational impacts. The orbital parameters specified in this grant are subject to change based on such coordination.

49. IT IS FURTHER ORDERED that this authorization is also subject to the following requirements:

- a. Audacy must post a surety bond in satisfaction of 47 CFR §§ 25.165(a)(1) & (b) no later

than July 7, 2018, and thereafter maintain on file a surety bond requiring payment in the event of a default in an amount, at minimum, determined according to the formula set forth in 47 CFR § 25.165(a)(1); and

- b. Audacy must launch 50 percent of the maximum number of proposed space stations, place them in the assigned orbits, and operate them in accordance with the station authorization no later than June 7, 2024, and Audacy must launch the remaining space stations necessary to complete its authorized service constellation, place them in their assigned orbits, and operate each of them in accordance with the authorization no later than June 7, 2027. 47 CFR § 25.164(b).<sup>131</sup>
- c. Failure to post and maintain a surety bond will render this grant null and void automatically, without further Commission action. Failure to meet the milestone requirements of 47 CFR § 25.164(b) may result in Audacy's authorization being reduced to the number of satellites in use on the milestone date. Failure to comply with the milestone requirement of 47 CFR § 25.164(b) will also result in forfeiture of Audacy's surety bond. By June 22, 2024, Audacy must either demonstrate compliance with its milestone requirement or notify the Commission in writing that the requirement was not met. 47 CFR § 25.164(f).

50. IT IS FURTHER ORDERED that the request for partial waiver of footnote 5.556A to allow NGSO operations on an unprotected, non-interference basis in the 54.25-56.9 GHz and 57.0-58.2 GHz frequency bands IS GRANTED.

51. IT IS FURTHER ORDERED that the request for waiver of 47 CFR § 25.156(d)(4) IS GRANTED.

52. IT IS FURTHER ORDERED that the request for waiver of 47 CFR § 25.157(c) concerning availability of spectrum in a processing round IS DENIED.

53. IT IS FURTHER ORDERED that based on the spectrum sharing opportunities addressed in Paragraph 24 above, which presumes grants on a co-frequency basis with other satellite systems, the request for waiver of the band segmentation provision in 47 CFR § 25.157(e) IS DISMISSED AS MOOT.

54. IT IS FURTHER ORDERED that the request for waiver of 47 CFR § 25.202(a)(1), concerning the availability of the 50.4-51.4 GHz band for FSS, IS DISMISSED AS MOOT.

55. IT IS FURTHER ORDERED, that Audacy's request for authorization using the 50.4-51.4 GHz band for service and gateway uplinks is deferred pending Commission action in the *Spectrum Frontiers Proceeding*.

56. IT IS FURTHER ORDERED that Audacy's request for waiver of Sections 25.114(c)(8) and 25.208(r) of the Commission's rules, 47 CFR §§ 25.114(c)(8), 25.208(r), concerning power flux density limits in the 37.5-40.0 GHz band is DENIED.

57. IT IS FURTHER ORDERED that the request for waiver of 47 CFR § 25.156(d)(5), concerning processing of NGSO applications, IS DISMISSED as MOOT.

58. IT IS FURTHER ORDERED that the request for waiver of the Ka-Band Plan IS DISMISSED as MOOT.

FEDERAL COMMUNICATIONS COMMISSION

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<sup>131</sup> We note that the *NGSO FSS Order* modified Section 25.164(b) to offer additional flexibility and requires launch and operation of 50 percent of an authorized system within six years of grant and the remaining satellites within nine years of grant.

Marlene H. Dortch  
Secretary