

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

In the Matter of
Hiber Inc.
Petition for Declaratory Ruling to Access
U.S. Market Using the Hiberband Low-Earth
Orbit System
IBFS File No. SAT-PDR-20180910-00069
Call Sign S3038

ORDER AND DECLARATORY RULING

Adopted: May 6, 2020

Released: May 6, 2020

By the Chief, International Bureau:

I. INTRODUCTION

1. In this Order and Declaratory Ruling, we grant the petition of Hiber Inc. to access the U.S. market access to provide non-voice, non-geostationary (NVNG) mobile-satellite services (MSS) using a constellation of up to 24 small, low-Earth orbit (LEO) satellites authorized by the Netherlands. We grant Hiber market access in the 399.9-400.05 MHz (Earth-to-space) and 400.15-401 MHz (space-to-Earth) bands, subject to the conditions and other requirements specified herein. Hiber states that its proposed constellation will operate as part of a new low-power global area network, known as Hiberband, that will provide connectivity for sensors and Internet of Things (IoT) devices used by consumers in the United States and worldwide. Grant of this petition furthers the Commission’s mandate to “make available, so far as possible, to all the people of the United States ... rapid, efficient, Nation-wide, and world-wide communication services.”

II. BACKGROUND

2. Application. On September 10, 2018, Hiber filed a Petition for Declaratory Ruling seeking access to the U.S. market for its NVNG MSS system using the 399.9-400.05 MHz (Earth-to-

1 The Commission established a rebuttable presumption in favor of entry by satellites licensed by other World Trade Organization (WTO) member countries to provide services covered by the U.S. commitments under the WTO Agreement. Amendment of the Commission’s Regulatory Policies To Allow Non-U.S.-Licensed Space Stations To Provide Domestic and International Satellite Service in the United States, Report and Order, 12 FCC Rcd 24094 (1997). The Netherlands has been a WTO member since 1994.

2 Hiber Inc., IBFS File No. SAT-PDR-20180910-00069, Narrative at 2. (Hiber Petition). Hiber’s petition was filed under SAT-LOI-20180910-00069, however, section 25.137 of the Commission’s rules specifies that a petition for declaratory ruling is the means to request U.S. market access through any type of non-U.S. licensed space station in any frequency band. Accordingly, we have changed Hiber’s IBFS file number from a Letter of Intent (LOI) to a Petition for Declaratory Ruling (PDR).

3 47 U.S.C. § 151.

space) and 400.15-401 MHz (space-to-Earth) frequency bands.⁴ Hiber's constellation will operate in a polar sun-synchronous orbit at an altitude of approximately 600 kilometers, with a maximum of eight orbital planes, each containing three satellites.⁵ In its petition, Hiber requests a waiver "to the extent necessary" of certain Commission rules, including rules governing the Commission's processing round procedures and Hiber's proposed use of feeder links on a non-conforming basis.⁶ Hiber's application was placed on public notice and no comments were filed in response.⁷

3. *Processing Round.* For licensing and grants of U.S. market access for NGSO-like systems, the Commission employs a processing round procedure which includes a public notice announcing a cut-off date for applications to be considered concurrently. After review of each of the applications in the processing round and any pleadings filed in response to the applications, the Commission will grant the application if it finds the applicant is legally, technically, and otherwise qualified, and that grant of the application will serve the public interest.⁸ Also, except for NGSO FSS systems as provided by section 25.157(b)(2), if there is not enough spectrum to accommodate all qualified applicants, the Commission will divide the spectrum equally among the applicants, with a pre-set band splitting mechanism to assign spectrum among operators.⁹ Each licensee or grantee of U.S. market access will be allowed to choose its specific band assignment before it launches its first satellite.¹⁰ Licensees and grantees may also negotiate alternative agreements to redistribute bandwidth after authorizations have been issued.¹¹ 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.¹²

4. On August 15, 2019, the International Bureau released a public notice accepting for filing Myriota Pty. Ltd.'s petition seeking U.S. market access for its NVNG MSS system using the 399.9-400.05 MHz and 400.15-401 MHz bands.¹³ In the notice, the Bureau also initiated a processing round for NVNG MSS systems in these bands.¹⁴ The notice stated that previously filed and pending applications

⁴ Hiber proposes telemetry, tracking, and command operations in the 148-149.9 MHz (Earth-to-space) and 401-402 MHz bands outside of the United States and therefore is not seeking FCC authority to operate in these bands.

⁵ Since filing its petition, Hiber launched a satellite in November 2018, and a second satellite in December 2018.

⁶ 47 CFR §§ 25.156 and 25.157. Hiber also proposes to operate feeder downlinks in the 2200-2290 MHz band outside of the United States but seeks a waiver of section 25.112(a)(3). Hiber Petition, Narrative at 9.

⁷ Public Notice, Report No. SAT-01379 (March 22, 2019).

⁸ 47 CFR §§ 25.156 and 25.157.

⁹ *Amendment of the Commission's Space Station Licensing Rules and Policies*, First Report and Order and Further Notice of Proposed Rulemaking, 18 FCC Rcd 10760, 10783, para. 48 (2003) (*Space Station Reform Order*). "NGSO-like" is a term used in the Commission's rules to describe systems which are either (1) NGSO satellite systems or (2) GSO mobile satellite service (MSS) satellite systems that communicate with earth stations using non-directional antennas. See 47 CFR § 25.157(a).

¹⁰ 47 CFR § 25.157(f).

¹¹ *Space Station Reform Order*, 18 FCC Rcd at 10781, para. 45.

¹² See *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, 7829, para. 61 (2017) ("The purpose of the recent processing rounds was to establish a sharing environment among NGSO systems, to provide a measure of certainty in lieu of adopting an open-ended requirement to accommodate all future applicants).

for operations in these bands would be included in the processing round, including Hiber's Petition.¹⁵ In response to the notice, Hiber submitted a letter acknowledging that a processing round had been initiated and that its request for a waiver was no longer applicable, and requested that its application be treated the same as other timely filed participants.¹⁶ One additional application was filed for consideration in the processing round.¹⁷

III. DISCUSSION

5. After review of the record, we conclude that granting Hiber access to the U.S. market for its proposed NVNG MSS satellite system to provide connectivity for sensors and IoT devices, would increase options for consumers, and thereby serve the public interest, subject to the requirements and conditions specified herein. Below we address the various considerations and conditions for market access in specific frequency bands as well as coordination with Federal operations and other NVNG operations. We also address Hiber's waiver request.

A. Spectrum Requested

1. Operations in the 399.9-400.05 MHz band

6. For its service uplinks, Hiber proposes to operate in the 150 kHz channel bandwidth in the 399.9-400.05 MHz band using Code Division Multiple Access (CDMA) spread spectrum.¹⁸ Hiber's proposed use is consistent with the U.S. Table of Frequency Allocations, which allocates the band to MSS and Radionavigation-Satellite Service on a primary basis for both Federal and non-Federal use. MSS use of the band is limited to the NVNG MSS.¹⁹ Hiber, therefore, is granted market access for operations in this band subject to the conditions herein.

7. We also note that International Telecommunication Union (ITU) Radio Regulations were recently revised to include a maximum equivalent isotropically radiated power (e.i.r.p.) of any emission

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¹³ Satellite Policy Branch Information, Myriota Pty. Ltd. Petition Accepted for Filing, IBFS File No. SAT-PDR-20190328-00020, Cut-Off Established for Additional NVNG MSS Applications or Petitions for Operations in the 399.9-400.05 MHz and 400.15-401 MHz Bands, DA 19-779 (Aug. 15, 2019) (Processing Round Public Notice). For convenience, we refer to this processing round as the "400 MHz Processing Round."

¹⁴ *Id.*

¹⁵ *Id.* In addition to Hiber and Myriota, the public notice stated that Spire Global was included in the processing round. Spire requests use of the 399.9-400.05 MHz band for telemetry, tracking and control uplinks only. Spire's application was granted in part and deferred in part. *See* Spire Global, Inc., IBFS File No. SAT-PDR-20190321-00018, n. 2 (grant stamped Oct. 7, 2019). Kinéis filed an application in response to the public notice. *See* Kinéis IBFS File No. SAT-PDR-20191011-00113. The 400 MHz Band Processing Round also includes Astro Digital, which was subject to a separate accepted for filing public notice that did not initiate a processing round. Astro Digital's application was granted in part and deferred in part. Astro Digital, IBFS File No. SAT-LOA-20170508-00071 (grant stamped Aug. 1, 2018). Within the frequency ranges included in the processing round, Astro Digital was authorized to use a telemetry carrier (space-to-Earth) centered at 400.5 MHz (center frequency). Its request to use other portions of the 399.9-400.05 MHz and 400.15-401 MHz bands remains pending and is included in the 400 MHz Processing Round for the pending portion of its application and any modification to its authorization resulting from consideration of the lead and competing applications in this processing round. *See* Satellite Policy Branch Information, Public Notice, DA 20-184 (Feb. 21, 2020).

¹⁶ Letter to Marlene H. Dortch, Secretary, FCC from Bruce Hensch, General Counsel, Hiber Inc. (filed Sept. 16, 2019).

¹⁷ Kinéis, IBFS File No. SAT-PDR-20191011-00113. We also note that Swarm Technologies, Inc. filed a petition to serve the U.S. market using the 399.9-400.05 MHz and 400.5-401 MHz bands, and requested a waiver of 47 CFR § 25.155 to be included in this processing round. No determination has yet been made regarding Swarm's petition or waiver request. *See* Swarm Technologies, Inc., IBFS File No. SAT-PDR-20200228-00021.

of MSS earth stations for this band. Hiber must comply with this requirement that came into force on November 23, 2019.²⁰

2. Operations in the 400.15-401 MHz band

8. For its service downlinks, Hiber proposes to use the 400.15-401 MHz band. This band is allocated for NVNG MSS and for the Space Operation Service, for both Federal and non-Federal use.²¹ Hiber's proposed use is consistent with the U.S. Table of Frequency Allocation which allocates the band to MSS and limits it to NVNG systems.²² Hiber states it will use Gaussian Minimum Shift Keying (GFSK) modulation for its downlink operations and is capable of limiting its usage to 100 kilohertz.²³ In addition, it expects to be able to share with Orbcomm Licensee Corp (Orbcomm), which is authorized and already operating in the band, and any other users in this band. Hiber asserts that interference with other systems in this band is unlikely as the Hiber satellites will transmit to earth stations only in short bursts when the satellite is directly overhead.²⁴ Further, Hiber states it is capable of complying with requirements to time share with Department of Defense (DoD) satellite operations.²⁵

9. In addition, as required by section 25.142(a)(2) of our rules, Hiber identified the power flux density (pfd) produced at the Earth's surface by each space station in its system in the 400.15-401 MHz band.²⁶ This information is necessary to determine whether coordination with terrestrial services is required.²⁷ Hiber represents that its pfd on the ground will be no more than -125.9 dBW/(m²/kHz), which is below the coordination threshold.²⁸ Because Hiber's satellites do not exceed the pfd threshold for coordination with terrestrial services under the Commission's Rules, such coordination will not be required.²⁹ Hiber also, as required by our rules, identified measures taken to protect the radio astronomy service in the 150.05-153 MHz and 406.1-410 MHz bands from harmful interference from unwanted

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¹⁸ Hiber Petition, Attachment A at 3.

¹⁹ 47 CFR § 2.106, footnote US320. Federal use of NVNG MSS is pursuant to frequency assignment policies of the National Telecommunications and Information Administration (NTIA).

²⁰ ITU-R Radio Regulations, footnote 5.260A (WRC-19).

²¹ Space Operation Service refers to the transmission of the satellite telemetry data from the satellite to receiving earth station(s) for the mobile satellite service and earth exploration satellite service operating in this band.

²² 47 CFR § 2.106, footnote US320. The band 400.15-401 MHz is also allocated to the space research service in the space-to-space direction for communications with manned space vehicles. 47 CFR § 2.106, footnote 5.263.

²³ Hiber Petition, Attachment A at 3.

²⁴ Hiber Petition, Attachment A at 8. Accordingly, as noted in the condition in paragraph 23, Hiber must protect the discrete set of Orbcomm's primary frequency assignments in the 400.15-400.505 MHz and 400.645-401 MHz (space-to-Earth) frequency bands. *See Orbcomm Licensee Corp.*, Order and Authorization, 23 FCC Rcd 4804, 4813, para. 23 (Int'l Bur. and OET, March 2008).

²⁵ Hiber Petition, Attachment A at 8.

²⁶ 47 CFR § 25.142(a)(2).

²⁷ *Id.* These pfd limits are set forth in the ITU Radio Regulations at Appendix 5, Annex 1 (ITU-RR App. 5, Annex 1).

emissions.³⁰

B. Coordination with Federal Systems

10. As noted above, both the 399.9-400.05 MHz and 400.15-401 MHz bands are allocated for Federal and non-Federal use. Several Federal agencies operate in the 400.15-401 MHz band for meteorological operations. For example, the Department of Commerce/National Oceanic and Atmospheric Administration (NOAA) operates systems in this band to collect meteorological data for weather forecasting systems, including radiosondes, rocketsondes and dropsondes.³¹ In addition, the National Aeronautics and Space Administration (NASA) uses the band for services involving the International Space Station, and the Department of Defense (DoD) uses the band for a variety of research, testing and training purposes. As Federal use is coordinated through the National Telecommunication and Information Administration (NTIA), Hiber may not commence operations in the U.S. market until it has completed coordination with NTIA.³²

C. Coordination with NVNG MSS systems

11. Section 25.142(b)(3), which addresses NVNG MSS systems, requires Hiber to demonstrate that its satellite system will not cause unacceptable interference to authorized NVNG MSS systems in the frequency bands where Hiber proposes to operate. Under this rule, applicants for authority to operate NVNG MSS systems are “encouraged to coordinate their proposed frequency usage... and [a]ll 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....”³³ Orbcomm is currently authorized to operate in the 400.15-400.505 MHz and 400.645-401 MHz frequency bands, and Hiber’s operations in these frequency bands must protect Orbcomm’s operations. In this context, Hiber states that its downlink operations in the 400.15-401 MHz frequency band can be accommodated by using 100 kilohertz.³⁴

12. The applicants in this processing round represent that they are capable of sharing with current and future licensees in these bands.³⁵ Consequently, we encourage the parties to reach an

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²⁸ Hiber Petition, Attachment A at 9.

²⁹ 47 CFR § 25.142(a)(2) referencing 2.106. *See* Footnote 5.264, which in turn references ITU Annex 1 of Appendix 5, requiring coordination of MSS space stations with terrestrial services if the pfd exceeds -125 dB(W/m²/4 kHz). 47 CFR § 2.106, Footnote 5.264.

³⁰ 47 CFR § 25.142(b)(2). *See* Letter to Alyssa Roberts, FCC, from Bruce A. Henoch, General Counsel Hiber Inc. (Feb. 10, 2020).

³¹ 47 CFR § 2.106. Radiosondes are battery operated sensor packages lifted through the atmosphere by a balloon and used to transmit data to a ground station receiver. Dropsondes, in turn, are sensor packages dropped from aircraft and data is transmitted to an aircraft receiver for processing. Rocketsondes are small rocket systems used to obtain high altitude temperature, density, and wind measurements.

³² 47 CFR § 25.142(b)(2)(iii).

³³ 47 CFR § 25.142(b)(3).

³⁴ Hiber Petition, Attachment A at 3.

³⁵ Hiber Petition at 8. Myriota Pty Ltd., IBFS File No. SAT-PDR-20190328-00020, Narrative at 10 (Myriota’s system “has the flexibility and spectral efficiency to operate harmoniously with other NVNG systems in this band”); Kinéis, IBFS File No. SAT-PDR-20191011-00113, Narrative at 12 (“The Kinéis system also has the flexibility and spectral efficiency to operate harmoniously with other NVNG MSS systems in this band, both those previously licensed and those with applications pending.”). Spire, however, requests use of the 399.9-400.05 MHz band for TT&C uplinks only, along with 402-403 MHz. Spire states it listed multiple uplinks “to increase the flexibility it has to coordinate spectrum use with existing users and to operate in accordance with both the ITU and

agreement regarding shared use of the bands for their NVNG MSS systems. Hiber may commence operations in the 399.9-400.05 MHz and 400.15-401 MHz frequency bands under the conditions set forth in this grant.³⁶ Hiber also must coordinate with other entities in the processing round licensed or granted U.S. market access for this spectrum. Absent a coordination agreement, spectrum will be divided among licensees and grantees of U.S. market access pursuant to section 25.157 of the Commission's rules.³⁷

D. Orbital Debris Matters

13. Hiber submitted a detailed description of its orbital debris mitigation plan covering all of its proposed satellites.³⁸ We find that Hiber has undertaken sufficient measures concerning mitigation of orbital debris, including the planned addition of propulsion for purposes of collision avoidance to its satellites beginning with the third satellite deployed.³⁹ We also note that the Commission recently updated its orbital debris rules and initiated a Further Notice of Proposed Rulemaking.⁴⁰ The Hiber system will be subject to any applicable rules and policies adopted in this proceeding.

E. Waiver Request

14. Hiber states it will operate feeder downlinks in the 2200-2900 MHz band in areas outside of the United States and therefore it is not requesting FCC authority. The international allocation for this band includes the Earth-Exploration Satellite Service (EESS). Hiber states that its use, which includes gathering information on the environment and weather, qualifies as EESS and therefore is consistent with the international allocation. Hiber, however, requests a waiver of section 25.112(a)(3) "to the extent necessary."⁴¹ Because Hiber will not offer this service in the United States, a waiver of the Commission's rule is not required, and we dismiss the request as moot.

F. Other Matters

15. In addition to complying with the applicable general provisions of part 25, the Commission adopted specific rules governing NVNG MSS systems. Hiber's grant of U.S. market access is subject to compliance with these rules, set forth in section 25.142, and conditioned herein. These rules include the pfd requirement noted above, and compliance with the emission limitations set forth in section 25.202(f).⁴²

IV. ORDERING CLAUSES

16. Accordingly, IT IS ORDERED that Hiber's Petition for Declaratory Ruling to access the U.S. market using the 399.9-400.05 MHz and 400.15-401 MHz bands is GRANTED pursuant to section 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. § 303(r), and sections 25.137(c) and

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domestic ... tables of frequency allocations." Spire Global, Inc., IBFS File No. SAT-PDR-20190321-00018, Narrative at 15-16, granted in part, and deferring Spire's request to use the 399.9-400.05 MHz band (Oct. 7, 2019).

³⁶ See in particular conditions in paras. 23 and 24 below.

³⁷ 47 CFR § 25.157(e).

³⁸ Hiber Petition, Attachment – Orbital Debris Assessment Report.

³⁹ Hiber Petition, Attachment A at 11; and Letters from Hiber dated February 22, 2019 and March 1, 2019, in IBFS File No. SAT-PDR-20180910-00069.

⁴⁰ See *Mitigation of Orbital Debris in the New Space Age*, Report and Order and Further Notice of Proposed Rulemaking, FCC 20-54 (rel. April 24, 2020).

⁴¹ Hiber Petition at 9. Section 25.112(a)(3) requires dismissal of applications seeking authority to operate in a frequency band not allocated under the International Telecommunication Union Radio Regulations.

⁴² 47 CFR §§ 25.142(a)(2), (a)(3).

0.261 of the Commission's Rules, 47 CFR §§ 25.137(c), 0.261.

17. IT IS FURTHER ORDERED that Hiber must comply with all existing and future space station coordination agreements reached between the Netherlands and other administrations. In the absence of a coordination agreement, such communications must comply with applicable provisions of the International Telecommunication Union (ITU) Radio Regulations as the Commission cannot guarantee the success of the required conditions.

18. IT IS FURTHER ORDERED that Hiber may not provide voice services, 47 CFR § 25.142(b)(1).

19. For operations in the 400.15-401 MHz (space-to-Earth) band, Hiber must comply with the applicable pfd limits established in Appendix 5, Annex 1 of the ITU Radio Regulations.

20. IT IS FURTHER ORDERED that Hiber's grant of U.S. market access is subject to the following requirements and conditions:

a. Hiber must comply with time sharing requirements with Department of Defense satellites for its operations in the 400.15-401 MHz band, 47 CFR § 25.260.

b. Hiber must establish a 24-hour per day contact person and telephone number so that claims of harmful interference into Department of Defense earth stations and other operational issues can be reported and resolved expeditiously. This contact information must be filed with the Commission within 14 days of the release of this Order.

21. IT IS FURTHER ORDERED that Hiber may not commence operations in the U.S. market until it has completed coordination with the National Telecommunications and Information Administration.

22. IT IS FURTHER ORDERED that prior to commencing operations in the U.S. market in the 400.15-401 MHz (space-to-Earth) band, Hiber must certify that it has completed a coordination agreement with the Department of Commerce/National Oceanic and Atmospheric Administration for operations in this frequency band.

23. IT IS FURTHER ORDERED that prior to commencing operations in the U.S. market in the 400.15-400.505 MHz and 400.645-401 MHz frequency bands, Hiber must certify that it has completed a coordination agreement with Orbcomm for operations in these frequency bands. Absent a coordination agreement, Hiber must file a modification application demonstrating that such operations will not interfere with Orbcomm, and it may not commence operations in these bands until grant of any modification application.

24. IT IS FURTHER ORDERED that, in the absence of a coordination agreement among the operators of systems in the 400 MHz Processing Round that have been licensed or granted access to the United States market, the available spectrum will be divided equally among these systems.

25. IT IS FURTHER ORDERED that, if a division of spectrum occurs, Hiber must comply with the requirements of section 25.157 for band selection and notification, 47 CFR § 25.157.

26. IT IS FURTHER ORDERED that Hiber must comply with ITU Radio Regulation 5.260A, as modified by ITU-WRC 19, regarding the maximum e.i.r.p. of any emission of MSS earth stations in the 399.9-400.05 MHz band.

27. IT IS FURTHER ORDERED that this market access grant and any earth station licenses granted in the future are subject to modification to bring them into conformance with any applicable rules and policies adopted by the Commission in the future, including *Mitigation of Orbital Debris in the New Space Age*, Report and Order and Further Notice of Proposed Rulemaking, FCC 20-54 (rel. April 24, 2020).

28. IT IS FURTHER ORDERED that Hiber's request for a waiver of section 25.112(a)(3) is dismissed as moot. 47 CFR § 25.112(a)(3).

29. IT IS FURTHER ORDERED that this market access grant IS SUBJECT to the following requirements:

- a. Hiber must post a surety bond in satisfaction of 47 CFR §§ 25.165(a)(1) & (b) no later than June 5, 2020, 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. Hiber must launch 50 percent of the maximum number of proposed space stations, place them in the assigned orbits, and operate them in accordance with this grant no later than May 6, 2026, and must launch the remaining space stations necessary to complete its authorized service constellation, place them in their assigned orbits, and operate them in accordance with the grant no later than May 6, 2029. 47 CFR § 25.164(b).
- c. Failure to post and maintain a surety bond will render this authorization null and void automatically, without further Commission action. Failure to meet the milestone requirements of 47 CFR § 25.164(b) may result in Hiber's authorization being reduced to the number of satellites in use at the milestone date. Failure to comply with the milestone requirements of 47 CFR § 25.164(b) will also result in forfeiture of Hiber's surety bond. By May 21, 2026, Hiber must either demonstrate compliance with this milestone requirement or notify the Commission in writing that the requirement was not met. 47 CFR § 25.164(f).

30. IT IS FURTHER ORDERED that Hiber is afforded 30 days from the date of release of this Order to decline this grant as conditioned. Failure to respond within that period will constitute formal acceptance of the authorization as conditioned.

31. IT IS FURTHER ORDERED that petitions for reconsideration under section 1.106 or applications for review under section 1.115 of the Commission's Rules, 47 CFR §§ 1.106 and 1.115, may be filed within 30 days of the date of the public notice of this Order.

FEDERAL COMMUNICATIONS COMMISSION

Thomas P. Sullivan
Chief, International Bureau