

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

In the Matter of)
)
Terrestrial Use of the 2473-2495 MHz Band for) IB Docket No. 13-213
Low-Power Mobile Broadband Networks;) RM-11685
Amendments to Rules for the Ancillary Terrestrial)
Component of Mobile Satellite Service Systems)

REPORT AND ORDER

Adopted: December 22, 2016

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By the Commission: Commissioners Pai and O’Rielly issuing separate statements.

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I. INTRODUCTION

1. By this Report and Order (Order), the Commission modifies rules for operation of the Ancillary Terrestrial Component (ATC) of the sole Mobile-Satellite Service (MSS) system¹ operating in the Big LEO S-band.² The rule changes adopted herein modify the existing ATC “gating” criteria and enable Globalstar, Inc. (Globalstar), to seek authorization from the Commission to deploy a terrestrial low-power broadband network using Globalstar’s licensed spectrum at 2483.5-2495 MHz.

2. As stated in the *Notice of Proposed Rulemaking (NPRM)* in this proceeding,³ Globalstar’s additional rulemaking request concerning the deployment of a high power terrestrial service (LTE) technology in both the S-band (2483.5-2495 MHz) and L-band (1610-1617.775 MHz) will be addressed separately from this proceeding.⁴

3. In addition, we note that Globalstar had originally sought authority to also operate its low-power broadband network in the 2473-2483.5 MHz band, adjacent to its licensed MSS spectrum at 2483.5-2495 MHz.⁵ On November 9, 2016, Globalstar filed an *ex parte* letter in this proceeding revising its proposal to specify operations of its low-power terrestrial system in just its licensed MSS spectrum at 2483.5-2495 MHz, not including the adjacent 2473-2483.5 MHz band.⁶ Consistent with Globalstar’s revised proposal, in this Order we do not address a number of issues discussed in the *NPRM* that are specific to low-power terrestrial operations in the 2473-2483.5 MHz frequency band.⁷

II. BACKGROUND

A. The Big LEO Bands and Ancillary Terrestrial Component Rules

4. The Big LEO MSS spectrum is comprised of L-band and S-band spectrum. Within the S-band, the 2483.5-2500 MHz frequency band is assigned to code division multiple access (CDMA)⁸ MSS

¹ ATCs are terrestrial facilities licensed to the operator of an MSS system in the L-band and the 1.6/2.4 GHz band for provision of terrestrial radio communication, re-using frequencies assigned for the licensee’s MSS operations.

² “LEO” is an acronym for Low-Earth orbit, and generally refers to orbits at altitudes of less than 2,000 kilometers. The term “Big LEO” was coined to distinguish systems using the 1610-1626.5 MHz and 2483.5-2500 MHz bands, which operate with voice and higher data-rate capabilities, from “Little LEO” systems, that do not provide voice service and generally operate with lower data rate capabilities. The term “S-band” generally refers to radio frequencies from 2-4 GHz. The term “L-band” generally refers to radio frequencies from 1-2 GHz.

³ *Terrestrial Use of the 2473-2495 MHz Band for Low-Power Mobile Broadband Networks; Amendments to Rules for the Ancillary Terrestrial Component of Mobile Satellite Service Systems*, Notice of Proposed Rulemaking, IB Docket No. 13-213, RM-11685, 28 FCC Rcd 15351 (2013) (*NPRM*).

⁴ Additionally, Iridium Constellation LLC’s (Iridium’s) Petition for Rulemaking and Motion for Consolidation filed on February 11, 2013, requesting that the Commission revisit the Big LEO band plan, will be addressed separately. *See generally* Petition for Rulemaking of Iridium Constellation LLC, RM-11697 (filed Feb. 11, 2013); Motion to Consolidate of Iridium Constellation LLC, RM-11685 (filed Feb. 11, 2013).

⁵ *NPRM*, 28 FCC Rcd at 15352, para. 3.

⁶ Letter from L. Barbee Ponder, Globalstar, Inc., to Marlene H. Dortch, Secretary, FCC, IB Docket No. 12-213, at 1 (filed Nov. 9, 2016) (Globalstar Nov. 9, 2016 *Ex Parte* Letter).

⁷ Therefore, in revising Section 25.149 of the Commission’s rules, discussed *infra*, we specify the applicability of the rules, where necessary, to terrestrial low-power system equipment that will operate in the 2483.5-2495 MHz frequency band. *See* Letter from Edgar Figueroa, President and CEO, Wi-Fi Alliance, to Marlene H. Dortch, Secretary, FCC, IB Docket No. 13-213, at 2 (filed Nov. 22, 2016) (Wi-Fi Alliance Nov. 22, 2016 *Ex Parte*).

⁸ CDMA is a transmission technique in which the signal occupies a bandwidth larger than needed to contain the information being transmitted. The signal is spread over a wide bandwidth, the power is dispersed, and a code is used to send and retrieve the information. The spreading, the variation in the code, and other technical parameters permit a number of users to operate on the same frequency simultaneously without causing mutual harmful interference.

downlink systems.⁹ In 2003, the Commission adopted rules for licensing and operation of “ancillary terrestrial components” or ATCs, including in the 2483.5-2495 MHz band.¹⁰ In adopting the ATC rules, the Commission sought to achieve spectrum efficiency benefits through “dynamic allocation” of frequency use, and determined that these benefits can only be realized by having one licensee control both the MSS and terrestrial operations in bands allocated for MSS.¹¹ The Commission concluded that authorizing ATC operations would serve the public interest by facilitating increased network capacity, more efficient use of spectrum, extension of coverage for handset operation to places where MSS operators have previously been unable to offer reliable service, improved emergency communications, enhanced competition, and economies of scale in handset manufacturing that would be passed on to consumers.¹² Accordingly, the Commission adopted rules enabling an MSS operator with an FCC-issued space station license to request to modify its existing MSS license to obtain blanket authority for operation of ATC stations in the United States.¹³ The rules also established certain prerequisites, or “gating criteria” that MSS operators are required to meet in order to be permitted to offer ATC.¹⁴ The goal of these “gating criteria” was to ensure that the provision of ATC would be ancillary to the provision of MSS.¹⁵

B. Globalstar’s Petition for Rulemaking

5. Globalstar’s petition for rulemaking in this proceeding sought rule changes designed to expand and facilitate use of the 2483.5-2495 MHz band in which its MSS system is licensed, for a Globalstar terrestrial low-power system, including revising the ATC “gating criteria” for greater flexibility.¹⁶ It also had sought to modify the Commission’s rules to enable its proposed terrestrial low-

⁹ The 1610-1626.5 MHz L-band spectrum is split between Iridium’s time division multiple access (TDMA) MSS system and Globalstar’s CDMA MSS systems, and the 2483.5-2500 MHz S-band spectrum is assigned to Globalstar for downlink operations. The current band plan evolved in several stages, beginning in 1994, when the Commission first adopted licensing and service rules for satellite operators providing MSS with spectrum used for Big LEO systems. *See Amendment of the Commission’s Rules to Establish Rules and Policies Pertaining to a Mobile Satellite Service in the 1610-1626.5/2483.5-2500 MHz Frequency Bands*, Report and Order, 9 FCC Rcd 5936 (1994), *modified on recon. by* Mem. Opinion and Order, 11 FCC Rcd 12861 (1996). The most recent revision of the Big LEO band plan occurred in 2007, resulting in the current configuration that includes a Big LEO L-band with CDMA uplink systems having an exclusive assignment of 7.775 megahertz at 1610-1617.775 MHz plus 0.95 megahertz shared with TDMA systems. *Spectrum and Service Rules for Ancillary Terrestrial Components in the 1.6/2.4 GHz Big LEO Bands*, IB Docket No. 07-253; *Review of the Spectrum Sharing Plan Among Non-Geostationary Satellite Orbit Mobile Satellite Service Systems in the 1.6/2.4 GHz Bands*, Second Order on Reconsideration, Second Report and Order, and Notice of Proposed Rulemaking, 22 FCC Rcd 19733, 19734-37, 19739-42, paras. 1-6, 13-20 (2007).

¹⁰ *Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Bands; Review of the Spectrum Sharing Plan Among Non-Geostationary Satellite Orbit Mobile Satellite Service Systems in the 1.6/2.4 GHz Bands*, Report and Order and Notice of Proposed Rulemaking, 18 FCC Rcd 1962 (2003) (*ATC R&O*), *modified by* Order on Reconsideration, 18 FCC Rcd 13590 (2003), *reconsidered in part in* Mem. Opinion and Order and Second Order on Reconsideration, 20 FCC Rcd 4616 (2005) (*ATC Second Order on Recon.*), further reconsideration pending.

¹¹ *ATC R&O*, 18 FCC Rcd at 1993, para. 52.

¹² *ATC R&O*, 18 FCC Rcd at 1965, 1973-89, and 2064-65, paras. 2, 20-45, and 210-11.

¹³ *ATC R&O*, 18 FCC Rcd at 2077, para. 240.

¹⁴ *See ATC R&O*, 18 FCC Rcd at 1999-2009, paras. 66-88; *ATC Second Order on Recon.*, 20 FCC Rcd at 4623-29, paras. 19-36.

¹⁵ *ATC R&O*, 18 FCC Rcd at 1964, para. 1.

¹⁶ *See* Petition for Rulemaking of Globalstar, Inc., RM-11685, IB Docket 13-213 (filed Nov. 13, 2012), at 5 (Globalstar Petition). *See also* *Petition for Rulemaking Filed*, RM-11685, Public Notice, DA 12-2026 (IB Nov. 30, 2012).

power system to operate with the same equipment in the adjacent 2473-2483.5 MHz band, in which certain Part 15 unlicensed equipment operates, although as noted, it later withdrew its request to use that adjacent band.¹⁷ In support of its initial proposal, Globalstar had argued that if its proposed rules were adopted, it could provide a managed low-power network that consumers could use to access terrestrial broadband.¹⁸ In its revised proposal of November 9, 2016, Globalstar states that the 11.5 megahertz of spectrum it now proposes for terrestrial operations “will be rapidly utilized for the benefit of consumers.”¹⁹ Globalstar had also argued that its low-power network would enhance the commercial viability of its global MSS network through use of revenues from future terrestrial operations and spectrum leases to cover capital costs along with the ongoing operational costs of providing MSS.²⁰

C. Notice of Proposed Rulemaking

6. The *NPRM* in this proceeding proposed rule changes that would modify ATC “gating criteria,” as well as revisions to other rules that would allow Globalstar to apply for a license modification to deploy a low-power broadband network. In response to the *NPRM*, 16 parties filed comments, 13 parties filed reply comments, and there were numerous *ex parte* submissions.²¹

III. DISCUSSION

A. Part 25 Revisions

7. In the *NPRM*, the Commission discussed a number of proposals that would allow Globalstar to implement its plan of deploying a low-power terrestrial broadband network in its licensed spectrum at 2483.5-2495 MHz.²² The Commission proposed that the Part 25 Rules would apply to the 2483.5-2495 MHz portion licensed to Globalstar and that a blanket license would cover operations using those frequencies.²³ Among these, the Commission proposed changing Part 25 of the Commission’s rules as necessary to enable proposed low-power terrestrial operations under the provisions for ATC in that rule part.²⁴

1. Allowing greater terrestrial use of the 2483.5-2495 MHz frequency band

8. Footnote US380 of the United States Table of Frequency Allocations permits ATC operations in the Big LEO band, in conjunction with operations of a non-Federal MSS licensee.²⁵ The regulatory provisions related to ATC are contained in Part 25 of the Commission’s rules.²⁶ The *NPRM*

¹⁷ See *id.* at 4; Globalstar Nov. 9, 2016 *Ex Parte* Letter at 1.

¹⁸ Globalstar Petition at 15-17.

¹⁹ Globalstar Nov. 9, 2016 *Ex Parte* Letter at 2.

²⁰ Globalstar Petition at 23. Our existing ATC rules permit spectrum leasing by MSS licensees pursuant to the rules for spectrum manager leases. 47 CFR § 25.149(g) (this paragraph will be redesignated as § 25.149(h) but otherwise remains unchanged, see Appendix A, Rule Revisions).

²¹ Parties filing pleadings are listed in Appendix B. Comments were due on May 5, 2014; reply comments were due on June 4, 2014.

²² *NPRM*, 28 FCC Rcd at 15359, para. 19.

²³ *NPRM*, 28 FCC Rcd at 15359, para. 19.

²⁴ *Id.* at 15357-59, paras. 16-18.

²⁵ See 47 CFR. § 2.106. Footnote US380 to the U.S. Table of Frequency Allocations states that in the band 2483.5-2500 MHz, a non-Federal licensee in the MSS “may also operate an ancillary terrestrial component in conjunction with its MSS network, subject to the Commission’s rules for ancillary terrestrial component and subject to all applicable conditions and provisions of its MSS authorization.” *Id.*

²⁶ See, e.g., 47 CFR §§ 25.149, 25.255.

sought comment on a proposal to add or modify technical and operational provisions in Part 25 to allow greater terrestrial use of the 2483.5-2495 MHz band.²⁷

9. The *NPRM* tentatively concluded that the low-power operations proposed by Globalstar are ancillary to Globalstar's licensed MSS operations and appropriately considered for licensing as ATC.²⁸ Consistent with licensing as ATC, the Commission proposed making the necessary rule changes in Part 25 rather than in Parts 2 and 27, as Globalstar had suggested, because it believed the rule changes to Part 25 would be more suitable for Globalstar's proposed deployment and would better serve the public interest.²⁹ Globalstar supports the proposal to apply Part 25 MSS ATC rules to its proposed terrestrial low-power operations at 2483.5-2495 MHz.³⁰ As NTCH, Inc. (NTCH) notes, the Commission's ATC rules already contemplate expanding the use of MSS frequencies for terrestrial purposes.³¹

10. Several commenters agreed with our initial assessment that low-power operations be considered for licensing as ATC.³² This proposal was based upon Globalstar's initial plan to utilize the 2473-2483.5 MHz band in addition to the 2483.5-2495 MHz frequency band. Wi-Fi Alliance argued that the use of any part of the 2473-2483.5 MHz band for terrestrial use is contrary to the Commission's requirement that Globalstar only make ancillary use of its allocated spectrum for terrestrial operations.³³ Globalstar's current proposal is to use only the band already allocated for MSS and authorized for MSS use by Globalstar. We find that this is consistent with well-established Commission policy regarding the ability of MSS operators to seek authority to obtain ATC authorization without using any additional spectrum resources beyond spectrum already allocated and authorized by the Commission for MSS.³⁴ Therefore, Wi-Fi Alliance's concern with use of the 2473-2483.5 MHz band is moot.

11. Globalstar proposed and continues to support single-licensee control of both MSS and low-power terrestrial operations in the 2483.5-2495 MHz band and argues that single control is essential to ensure the protection of its Big LEO MSS operations.³⁵ Globalstar states that through use of a Network Operating System (NOS),³⁶ it will have a rapid means of identifying, controlling, and eliminating interference to MSS if necessary in a particular location.³⁷ Some parties have raised concerns about the

²⁷ *NPRM*, 28 FCC Rcd at 15357-58, para. 16.

²⁸ *NPRM*, 28 FCC Rcd at 15358-59, para. 18.

²⁹ *NPRM*, 28 FCC Rcd at 15358, para. 17.

³⁰ Globalstar Comments at 18-19.

³¹ NTCH Comments at 1.

³² See, e.g., Wireless Communications Association International (WCAI) Comments at 5; The Samuelson-Glushko Technology Law & Policy Clinic Reply at 8-10 (referring to the 2 GHz band, and citing the AWS-4 proceeding in which the Commission "allowed the incumbent MSS provider to use the AWS-4 terrestrial spectrum in a non-ancillary capacity, but also eliminated the gating criteria for the 2 MHz [*sic*] MSS band.") See *Service Rules for Advanced Wireless Services in the 2000-2020 MHz and 2180-2200 MHz Bands*, Report and Order and Order of Proposed Modification, 27 FCC Rcd 16102, 16013, para. 1 (2012).

³³ Wi-Fi Alliance Comments at 12.

³⁴ *ATC R&O*, 18 FCC Rcd at 1964, para. 1; 47 CFR. § 2.106, footnote US380.

³⁵ Globalstar Comments at 20-21; see Globalstar Nov. 9, 2016 *Ex Parte* Letter at 1, 3.

³⁶ The NOS can be characterized as a network management system. Globalstar has stated that its operations would be conducted so that its access points would be "carefully controlled by a Network Operating System (NOS), [which] will be analogous to that currently deployed by CMRS operators to manage pico- and femto-cellular infrastructure." *NPRM Reply Comments of Globalstar at 8-9* (filed Jan. 29, 2013) (Globalstar *NPRM Reply*).

³⁷ *Id.* at 21. Globalstar stated that a remote technician will be able to use the NOS to shut down a particular access point, alter access points' power or radiation pattern, or perform other needed diagnostic and remedial functions. *Id.* For further discussion of the proposed NOS, see section III.C, *infra*.

effectiveness of Globalstar's NOS,³⁸ or have argued that there is no need to limit use of the 2483.5-2495 MHz band to use by Globalstar alone as the relevant MSS licensee.³⁹ Those specific concerns are addressed later in this Order,⁴⁰ and we ultimately conclude that single-licensee control of both the MSS and ATC operations in the 2483.5-2495 MHz band remains necessary at this time to enable coordination of terrestrial use with existing satellite operations in the MSS spectrum.⁴¹

2. ATC gating requirements

12. In the 2003 *ATC R&O*, the Commission adopted "gating criteria," or prerequisites, for MSS operators to meet in order to be allowed to offer ATC.⁴² These gating criteria are set forth in Section 25.149 of the Commission's rules with the purpose of ensuring that ATC would be ancillary to the provision of MSS.⁴³ The Commission adopted, among other rules, a requirement that MSS operators provide substantial satellite service to be eligible for ATC authorization.⁴⁴ Substantial satellite service is defined as the capability of providing continuous satellite service over the entire geographic area of satellite coverage required in the Commission's rules,⁴⁵ maintenance of spare satellites to expeditiously replace satellites no longer in service,⁴⁶ and commercial availability, meaning offering satellite service to the general public for a fee, throughout the mandatory coverage area.⁴⁷ The Commission also required that MSS and ATC be offered on an integrated basis.⁴⁸ The integrated services rule requires the offering of integrated MSS and ATC, through use of dual-mode handsets that can communicate with both the MSS network and the ATC, for example.⁴⁹

13. The *NPRM* tentatively concluded that relieving Globalstar from certain ATC gating criteria would facilitate spectrum use in the 2483.5-2495 MHz band, and thus could serve the public interest.⁵⁰ The Commission proposed creating a limited exception from some provisions of the ATC gating criteria in order to streamline the authorization process and facilitate deployment of Globalstar's low-power network.⁵¹ The proposal would require a demonstration that the licensee is offering commercial MSS, in other words, offering services to the general public for a fee, but eliminate the

³⁸ See, e.g., WCAI Comments at 8.

³⁹ See, e.g., Bluetooth SIG Comments at 6; Letter from Austin C. Schlick, Director, Communications Law, Google Inc., to Marlene H. Dortch, Secretary, FCC, IB Docket No. 13-213, at 1-2 (filed Oct. 13, 2015) (Google Oct. 13, 2015 *Ex Parte*).

⁴⁰ See section III.C (addressing the NOS-based approach), *infra*.

⁴¹ See section III.B; see also *NPRM*, 28 FCC Rcd 15358-59, para. 18 (stating that "[i]n adopting ATC rules, we found that there were spectrum efficiency benefits to 'dynamic allocation' of frequency use and that those benefits can only be realized by having one licensee control both the MSS and terrestrial rights in bands allocated for MSS.").

⁴² See *ATC R&O*, 18 FCC Rcd at 1999-2000, para. 66.

⁴³ See *id.* at 2000-01, paras. 67-71.

⁴⁴ See 47 CFR § 25.149(b)(1).

⁴⁵ 47 CFR § 25.149(b)(1).

⁴⁶ 47 CFR § 25.149(b)(2).

⁴⁷ 47 CFR § 25.149(b)(3); *ATC Second Order on Recon.*, 20 FCC Rcd at 4623, para. 19.

⁴⁸ 47 CFR § 25.149(b)(4).

⁴⁹ *NPRM*, 28 FCC Rcd at 15362, para. 27.

⁵⁰ *Id.* at 15361-62, para 26.

⁵¹ *Id.*

satellite system coverage and replacement satellite demonstrations from these criteria.⁵² These exemptions would apply only to an MSS licensee seeking authorization to operate a terrestrial low-power network. The *NPRM* also proposed an exception from the integrated services rule, specifically for the proposed low-power deployment.⁵³

14. In response to the *NPRM*, the Mobile Satellite Users Association (MSUA) and Iridium filed comments heralding the benefits of MSS, warning of the negative effects that the proposals could have on this service, and asking the Commission to ensure the continued usability of MSS.⁵⁴ Iridium claims that the proposed exceptions to the gating criteria eliminate the requirement for a Big LEO MSS/ATC licensee to offer robust MSS.⁵⁵ Iridium argues that if Globalstar were licensed to provide low-power ATC operations under the proposed rules, Globalstar “would be permitted to abandon 2.4 GHz satellite operations altogether, provided it maintains some minimal commercial satellite service offering somewhere in the world.”⁵⁶ Iridium is concerned that the MSS offerings remaining would not need to be provided to American customers or conducted using satellites operated by Globalstar.⁵⁷ While Iridium acknowledges that Globalstar has launched a second-generation MSS constellation, it argues that there would be no requirement for Globalstar to make use of those satellites.⁵⁸ In addition, Iridium posits that because of Globalstar’s anticipated nationwide deployment of the low-power terrestrial system, its ability to offer two-way (“duplex”) MSS using the 2.4 GHz band will be limited or nonexistent, because its duplex MSS operations cannot occur within the low-power ATC footprint.⁵⁹ MSUA similarly expresses concern that there is a lack of information in the record about how Globalstar’s low-power ATC would coexist with MSS, noting that the Commission’s proposal would remove any specific requirements concerning the location or scope of the MSS offered.⁶⁰ MSUA suggests that any modification to the ATC gating criteria should also incorporate a requirement for Globalstar to continue to support its current commercial services or comparable offerings within the United States as a condition of offering terrestrial low-power ATC.⁶¹ The Bluetooth Special Interest Group (Bluetooth SIG) also expressed concern that creating an exception from the integrated service rule would enable Globalstar to deploy on a much larger scale than a true MSS ancillary component, increasing the potential for interference.⁶² Wi-Fi Alliance states that the need for exemptions from some of the ATC gating requirements supports the view that Globalstar’s terrestrial operations will not be the type of “ancillary” operations envisioned when the ATC rules were adopted.⁶³ Wi-Fi Alliance stated in their June 2014 Reply Comments that Globalstar’s

⁵² *Id.* at 15362, para. 26.

⁵³ *Id.* 15362, para. 27.

⁵⁴ See MSUA Comments at 2; Iridium Comments at 3. Iridium initially states that it “takes no position on the merits of Globalstar’s Terrestrial Low Power Service [] proposal or the associated rule changes for the Big LEO 2.4 GHz band.” Iridium Comments at 1. We note, however, that Iridium makes substantive comments on the proposed changes to the ATC rules. See *id.* at 6-9.

⁵⁵ Iridium Comments at 2, 6-8.

⁵⁶ *Id.* at 4.

⁵⁷ *Id.* at 7-8.

⁵⁸ Iridium Reply Comments at 5-6.

⁵⁹ Iridium Comments at 8-9. Iridium notes that Globalstar provides its duplex services by pairing 2.4 GHz spectrum with 1.6 GHz spectrum. *Id.* at 8.

⁶⁰ MSUA Comments at 2.

⁶¹ *Id.* at 3. MSUA also asks that specific information and guidance on the impact of low-power ATC deployments be provided to any affected MSS end users. *Id.* at 2-3. As noted throughout this Order, we expect that Globalstar will coordinate its new proposed ATC operations with its existing MSS system.

⁶² Bluetooth SIG Comments at 4-5.

⁶³ *Id.*

proposal suggests that the low-power terrestrial network will support MSS and not the other way around.⁶⁴ More recently, the Wi-Fi Alliance stated that it was encouraged by the new Globalstar proposal, but it expressed concern about the possibility of Globalstar providing “bonded or aggregated service” using Part 15 spectrum.⁶⁵ These concerns are fully addressed in paragraph 32 below.

15. NTCH argues in favor of relaxing the gating criteria because it would make “broader and more economically feasible ATC operations possible.”⁶⁶ DISH Network Corporation (DISH) similarly supports the proposed rule changes.⁶⁷ Globalstar supports the proposed modifications to the gating requirements and argues that the rule change could allow consumers to obtain terrestrial-only connectivity and also allow Globalstar to use its Big LEO spectrum more efficiently.⁶⁸ Globalstar argues that the low-power operations will remain ancillary to MSS even without the integrated services requirement because Globalstar is committed to the continued development of its MSS operations.⁶⁹ In Globalstar’s view, the revised evidentiary standard, *i.e.*, requiring it to demonstrate that MSS is commercially available, is sufficient to ensure that the terrestrial operations are ancillary to MSS.⁷⁰ Under its modified proposal to utilize only 11.5 megahertz of spectrum, Globalstar continues to request relaxation of the gating criteria and reiterates that it remains strongly committed to the successful development of MSS.⁷¹ Also filing in support of Globalstar’s modified proposal, Hughes Network Systems, LLC supports changes to Part 25 of the Commission’s rules to enable Globalstar to provide terrestrial operations in the 2483.5-2495 MHz band, stating that the rule changes would serve the public interest by increasing spectrum utility and deployment.⁷²

16. The Globalstar MSS constellation has been operational since 1999. We find that Globalstar is continuing to develop and pursue its MSS operations in the portion of the Big LEO spectrum designated for its use. Contrary to comments by Iridium and Wi-Fi Alliance,⁷³ the proposed rules would not permit Globalstar to effectively abandon its satellite operations. As the Commission stated in the *NPRM*⁷⁴ and as Globalstar reiterated in its comments,⁷⁵ Globalstar launched 24 new second-generation satellites to replenish its MSS constellation between 2010 and 2013. It has invested more than \$1 billion over the last few years in this new satellite constellation and second-generation ground infrastructure.⁷⁶

⁶⁴ Wi-Fi Alliance Reply at 18.

⁶⁵ Letter from Edgar Figueroa, President and CEO, Wi-Fi Alliance, to Marlene H. Dortch, Secretary, FCC, IB Docket No. 13-213 (filed Nov. 22, 2016) and Letter from Edgar Figueroa, President and CEO, Wi-Fi Alliance, to Marlene H. Dortch, Secretary, FCC, IB Docket No. 13-213 (filed Dec. 5, 2016).

⁶⁶ NTCH Comments at 1.

⁶⁷ DISH Comments at 1-4; Oceus Networks Comments at 5 (supporting revision of the integrated service rule, discussed below).

⁶⁸ Globalstar Comments at 22-23.

⁶⁹ *Id.* at 23; Letter from James Monroe III, Globalstar, Inc. to Marlene H. Dortch, Secretary, FCC, IB Docket No. 13-213, at 1 (filed July 21, 2015) (Globalstar July 21, 2015 *Ex Parte* Letter).

⁷⁰ Globalstar Comments at 23.

⁷¹ Globalstar Nov. 9, 2016 *Ex Parte* Letter at 4.

⁷² Letter from Jennifer A. Manner, Senior Vice President, Regulatory Affairs and Jodi Goldberg, Associate Corporate Counsel, Regulatory Affairs, Hughes Network Systems, LLC, to Marlene H. Dortch, Secretary, FCC, IB Docket 13-213, at 1-2 (filed Nov. 18, 2016).

⁷³ See Iridium Comments at 7-8; Wi-Fi Alliance Reply at 18.

⁷⁴ *NPRM*, 28 FCC Rcd at 15362, para. 27 & n.75.

⁷⁵ See Globalstar Comments at 7.

⁷⁶ Globalstar July 21, 2015 *Ex Parte* Letter at 1.

We agree with Globalstar that the record here shows sufficient investment in the provision of MSS, and we need not separately require detailed showings regarding coverage and replacement satellites to verify the integrity of the MSS component. For such a mature system, we believe that partially exempting the operations proposed by Globalstar from some of the ATC gating criteria will facilitate deployment of its low-power network and is in the public interest. This exception is appropriate for the type of low-power ATC proposed by Globalstar, because it does not consist of a deployment on the same scale as a high-power terrestrial service. As a result, a fundamental goal of the ATC rules – that the deployment of terrestrial facilities be ancillary to satellite operations – will still be addressed. Therefore, our decision in this Order to provide a limited exception does not set a precedent for Globalstar’s high power LTE deployment proposal.⁷⁷ Moreover, we note that the “commercial availability” requirement in the ATC gating criteria will apply,⁷⁸ which requires the offering of MSS to the general public for a fee.⁷⁹ We therefore adopt a limited exception from some provisions of the ATC gating criteria in order to streamline the authorization process and facilitate deployment of Globalstar’s low-power broadband network. Specifically, we provide an exception for low-power ATC from the rules requiring detailed showings concerning satellite system coverage and replacement satellites, while still requiring a demonstration that the licensee is offering commercial MSS.

17. The ATC rules, and the integrated services rule in particular, focus on ensuring that ATC remains ancillary to satellite services and does not become a stand-alone terrestrial service. For the reasons described above, however, we conclude that a limited exception from the integrated services rule for a low-power ATC deployment in this band will not undermine this focus, and that the requirement to provide an integrated service is not critical for ensuring that the licensee maintains the ancillary character of its ATC operations in this band. Moreover, we believe that Globalstar’s management and oversight of deployment of low-power terrestrial facilities, while continuing to offer and support its MSS offering, are key safeguards that support our determination that in this case ATC will continue to be ancillary, consistent with the Commission’s approach in the *ATC R&O*. Furthermore, we will continue to monitor Globalstar’s investment in MSS to further ensure that it maintains the primary character of its MSS operations.⁸⁰

3. Mode of operations

18. In the *NPRM*, the Commission stated that allowing Globalstar to provide low-power ATC operations would require modification of the Commission’s rules to allow operations by end-user

⁷⁷ See Globalstar Petition at 3-4 (proposing two separate plans, one of which is an LTE-based mobile broadband network).

⁷⁸ See Appendix A, Rule Revisions, § 25.149(b)(3).

⁷⁹ *Id.*; *ATC Second Order on Recon.*, 20 FCC Rcd at 4623, para. 19. The proposed low-power ATC operations would be licensed in the United States. Accordingly, we interpret the “commercially available” requirement in Section 25.149(b)(3) of the Commission’s rules to mean commercially available in the United States, despite providing an exemption to specific coverage requirements in our new rules. We therefore address the concerns of Iridium and MSUA, discussed *supra*, that under our new proposed rules, Globalstar would no longer be required to offer any MSS in the United States.

⁸⁰ We note that, as a general matter, for licensees meeting the gating criteria – whether the full panoply or the more limited ones we are adopting for low-power ATC deployment in this band – any ATC deployment will still be subject to the Commission’s licensing process, where grant of the licensee’s application for ATC operations is contingent on the agency’s determination that such grant will serve the public interest. See *infra* para. 20-21. Accordingly, the Commission will have the opportunity not only to review compliance with the gating factors, but also to ensure otherwise that the licensee possesses and maintains its ability and commitment to conduct its ATC operations as an ancillary component to its MSS. In Globalstar’s case, we have made this assessment based on our findings and conclusions above in paragraphs 16-17 regarding Globalstar’s current operations and commitments, and our stated intent to continue monitoring Globalstar’s investment in its MSS operations provides an additional measure of surety that it will maintain the ancillary character of its ATC operations.

equipment in the 2483.5-2495 MHz band, as such operations are not in the “forward-band” mode of operations required by Section 25.149(a)(1) of the rules.⁸¹ More specifically, Globalstar’s low-power ATC operations involve end-user equipment, i.e., “the mobile terminals” transmitting in the MSS downlink band.⁸² Therefore, the end-user equipment would operate in “non-forward-band” mode. As a result, the Commission proposed and sought comment on modifying the rule to permit low-power ATC operations in the non-forward-band mode.⁸³ Globalstar maintains this request as part of its proposal to use only 11.5 megahertz of spectrum for its low-power terrestrial system.⁸⁴

19. Oceus Networks supports this proposal in its comments.⁸⁵ We received no other specific comments on this proposal to modify Section 25.149(a)(1) of the rules. Consistent with our finding that it is in the public interest to expand terrestrial use of the 2483.5-2495 MHz band, we conclude that it is in the public interest to amend 25.149(a)(1) of the Commission’s rules to permit ATC authorization in a non-forward-band mode of operations where the equipment deployed will meet the requirements for low-power ATC systems in the 2483.5-2495 MHz band as established in this Order.⁸⁶

4. Licensing

20. Consistent with our conclusion that Globalstar’s proposed operations in the 2483.5-2495 MHz frequency band may be licensed as ATC, Globalstar will be required to file an application to modify its Part 25 license pursuant to the existing ATC application procedures.⁸⁷ Globalstar agrees that this is the proper procedure.⁸⁸ In addition, as discussed later in this Order, any equipment that will operate in the Globalstar low-power terrestrial network will be subject to equipment certification by the Commission.⁸⁹

21. Under existing rules, MSS licensees seeking to deploy ATC must modify their licenses using FCC Form 312, accompanied by the appropriate fee.⁹⁰ Such licensees may apply for a blanket authorization to construct and operate ATC facilities.⁹¹ The application must include specific information and certifications describing the ATC operations, including that the terrestrial facilities will comply with the technical restrictions applicable to ATC licensees. These rules remain unchanged. Therefore, before beginning any ATC low-power operations, a licensee will be required to provide the Commission with specific, concrete details of its deployment, consistent with our rules.

5. Technical limits for terrestrial low-power equipment

22. *Total Transmit Power for terrestrial low-power equipment.* The *NPRM* proposed that the total transmit power for low-power ATC equipment operating in the 2483.5-2495 MHz band be codified

⁸¹ 47 CFR § 24.149(a)(1). In the “forward-band” mode, ATC mobile terminals transmit in the MSS uplink frequency band and base stations transmit in the downlink band. *ATC R&O*, 18 FCC Rcd at 2019, para. 107.

⁸² See Globalstar Petition at 16-17; Globalstar Comments at 33.

⁸³ *NPRM*, 28 FCC Rcd at 15361, para. 24.

⁸⁴ Globalstar Nov. 9, 2016 *Ex Parte* Letter at 3.

⁸⁵ Oceus Network Comments at 5.

⁸⁶ See Appendix A, Rule Revisions, § 25.149(a)(1), Note to Paragraph (a)(1).

⁸⁷ See *ATC R&O*, 18 FCC Rcd at 2077, para. 240.

⁸⁸ Globalstar Nov. 9, 2016 *Ex Parte* Letter at 5.

⁸⁹ See *NPRM*, 28 FCC Rcd at 15395, para. 19; 47 CFR § 25.149(c).

⁹⁰ *ATC R&O*, 18 FCC Rcd at 2077, para. 240.

⁹¹ *Id.* The Commission will continue to require individual licensing of facilities that may pose an adverse effect to the environment, public health, scenic and historic locations, tribal lands, aviation, or related concerns. See *id.* at 2077, para. 239; 47 CFR § 25.149(a)(4)-(5).

under a new Section 25.149(c)(4) of the Commission's rules.⁹² The proposed total transmit power was not to exceed 1 watt with a peak equivalent isotropically radiated power (e.i.r.p.) of no more than 6 dBW (4 watts) with a minimum 6 dB bandwidth of 500 kilohertz and a maximum conducted power spectral density (PSD) limit of 8 dBm/3 kHz.⁹³ Globalstar continues to seek adoption of this revised limit as part of its proposal to operate in only the 2483.5-2495 MHz frequency band.⁹⁴ Several commenters agree with the technical limits in the *NPRM* proposal,⁹⁵ and no commenters disagreed. Sprint states that adoption of these power limits would provide a reasonable environment for which Sprint can develop BRS base station and device receivers that will not experience brute force overload interference due to adjacent low-power terrestrial operations.⁹⁶ We find that these limits are generally appropriate for devices operating in the Globalstar network in the 2483.5-2495 MHz band, and conclude that these limits on total transmit power should be adopted into a new provision of the Commission's rules, Section 25.149(c)(4), as proposed in the *NPRM*.⁹⁷

23. *Unwanted emissions limits above 2495 MHz.* In the *NPRM*, the Commission had proposed that unwanted emissions above 2495 MHz be attenuated below the transmitter power (P) measured in watts by a factor of no less than $40 + 10 \log (P)$ dB at the 2495 MHz channel edge, $43 + 10 \log (P)$ dB at 5 megahertz from this channel edge, and $55 + 10 \log (P)$ dB at X megahertz from the channel edge where X is the greater of 6 megahertz or the actual emission bandwidth.⁹⁸ This was a relaxation of the current ATC base station unwanted emissions attenuation rule by 3 dB within the first 5 megahertz above 2495 MHz (i.e., 2495-2500 MHz). The *NPRM* sought comment on this proposal and whether these limits would be sufficient to avoid interference to licensed services operating above 2495 MHz and if not, what the appropriate limit(s) should be.⁹⁹ On November, 16, 2016, Globalstar, the Wireless Communications Association International (WCAI), and Sprint jointly filed an *ex parte* letter.¹⁰⁰ This letter asked the Commission to adopt an unwanted emissions limit of $43 + 10 \log (P)$ dB at the 2495 MHz channel edge, and $55 + 10 \log (P)$ dB at X megahertz from the channel edge where X is the greater of 6 megahertz or the actual emission bandwidth.¹⁰¹ The *ex parte* filing further stated that in the event that

⁹² *NPRM*, 18 FCC Rcd at 15362, para. 28.

⁹³ *NPRM*, 28 FCC Rcd at 15362, para. 28.

⁹⁴ Globalstar Nov. 9, 2016 *Ex Parte* Letter at 3. While the Commission envisioned that the transmit power would apply to a composite signal using spectrum from both the 2473-2483.5 MHz and 2483.5-2495 MHz frequency bands, we note that the rule change applying the limit to the 2483.5-2495 MHz band was specifically contemplated as part of the original proposal. See *NPRM* 18 FCC Rcd at 15362, para. 28.

⁹⁵ See, e.g., Cisco Systems, Inc. (Cisco) Comments at 10; Wi-Fi Alliance Comments at 17; Sprint Comments at 8. Some of these comments support this limit in connection with operations in the 2473-2483.5 MHz band, but this issue is rendered moot by the decision in this proceeding.

⁹⁶ Sprint Comments at 8-9.

⁹⁷ *NPRM*, Appendix A, Proposed Rule Changes, § 25.149(c)(4); Appendix A, Rule Revisions, § 25.149(c)(4).

⁹⁸ *NPRM*, 28 FCC Rcd at 15363-64, para. 32.

⁹⁹ *NPRM*, 28 FCC Rcd at 15365, para. 34.

¹⁰⁰ Letter from Mary N. O'Connor, Counsel to the Wireless Communications Association International, L. Barbee Ponder IV, General Counsel, Vice President Regulatory Affairs, Globalstar, Inc., and Richard Engelman, Director, Government Affairs, Sprint Corporation, to Marlene H. Dortch, Secretary, FCC, IB Docket No. 13-213, at 2 (filed Nov. 16, 2016) (Globalstar, WCAI, and Sprint *Ex Parte* Letter). In connection with its revised 11.5 megahertz proposal, Globalstar had initially requested that the Commission apply same unwanted emissions limit above 2495 MHz that was proposed in the *NPRM*. Globalstar Nov. 9, 2016 *Ex Parte* Letter at 3-4. Globalstar subsequently changed its request on Nov. 16, 2016, as part of its joint *ex parte* letter with WCAI and Sprint. Globalstar, WCAI, and Sprint *Ex Parte* Letter at 2.

¹⁰¹ Globalstar, WCAI, and Sprint *Ex Parte* Letter at 2.

low-power terrestrial operations cause harmful interference to BRS or Educational Broadband Service (EBS)¹⁰² systems above 2496 MHz, Globalstar will meet its absolute obligation as an ATC licensee to mitigate and resolve such interference.¹⁰³ The three parties also stated that they would work cooperatively on any relevant technical issues arising in connection with Globalstar's planned application for modification of its MSS licenses to add the low-power ATC, including on issues concerning Globalstar's planned NOS and related interference mitigation practices.¹⁰⁴

24. In light of the agreement reached between Globalstar, WCAI, and Sprint, we do not need to address the comments filed by WCAI and Sprint regarding the *NPRM* proposal for a revised unwanted emissions limit above 2495 MHz.¹⁰⁵ We reiterate the obligations imposed upon ATC operations in the *Globalstar ATC Modification Order* and other related Commission proceedings, and continue to require ATC operators to protect the operations of BRS Channel 1 against harmful interference.¹⁰⁶ If a BRS station finds that it is receiving harmful interference from an ATC station, Section 25.255 of Commission's rules requires that ATC station to resolve that interference.¹⁰⁷ Taking into consideration these obligations, the agreement between Globalstar, WCAI, and Sprint on a more restrictive unwanted emissions limit at and above 2495 MHz than was proposed in the *NPRM*, and the lack of other comments on this issue in response to the *NPRM*, we believe that the unwanted emissions limit requested by Globalstar, WCAI, and Sprint is appropriate.¹⁰⁸ Therefore, Globalstar will be required to attenuate below the transmitter power (P) measured in watts the unwanted emissions above 2495 MHz by a factor of no less than $43 + 10 \log (P)$ dB at the 2495 MHz channel edge, and $55 + 10 \log (P)$ dB at X megahertz from this channel edge where X is the greater of 6 megahertz or the actual emissions bandwidth.¹⁰⁹

25. The Commission also noted in the *NPRM* that Section 25.254(d)(6) of the Commission's rules specifies a measurement bandwidth of 1 percent of the 26 dB emission bandwidth for determining ATC base stations' compliance with the Section 25.254(d) unwanted emissions limits in the 1 megahertz immediately above and adjacent to 2495 MHz, while Section 15.247(d) of the Commission's rules specifies a measurement bandwidth of 100 kilohertz for determining Section 15.247 devices' compliance with the Section 15.247(d) unwanted emissions limit outside the band of operation.¹¹⁰ In the *NPRM*, the Commission proposed to not apply the Section 15.247(d) measurement bandwidth requirement to unwanted emissions from Globalstar's operations above 2495 MHz and sought comment on whether to apply a 1 megahertz resolution bandwidth as required in Section 25.254(d).¹¹¹ We did not receive any

¹⁰² As with the BRS, EBS operates above 2495 MHz.

¹⁰³ Globalstar, WCAI, and Sprint *Ex Parte* Letter at 2.

¹⁰⁴ *Id.*

¹⁰⁵ *See id.* at 1.

¹⁰⁶ *See Globalstar ATC Modification Order*, 23 FCC Rcd at 7222-23, paras. 32-36; *Review of the Spectrum Sharing Plan Among Non-Geostationary Satellite Orbit Mobile Sharing Service Systems in the 1.6/2.4 GHz Bands*, 19 FCC Rcd 13356, 13389, para. 73 (2004) (discussing CDMA MSS operators sharing spectrum at 2495-2500 MHz with the BRS).

¹⁰⁷ Section 25.255 of the Commission's rules states in part that "[i]f harmful interference is caused to other services by ancillary MSS ATC operations, either from ATC base stations or mobile terminals, the MSS ATC operator must resolve any such interference." 47 CFR § 25.255. We also adopt § 25.254(e) to confirm the applicability of the technical limits and other requirements specified in § 25.149(c)(4) and (g)(2)-(3) to the continuing operations of the low-power network. *See* Appendix A, Rule Revisions, § 25.254(e).

¹⁰⁸ Globalstar, WCAI, and Sprint *Ex Parte* Letter at 2.

¹⁰⁹ *See* Appendix A, Rule Revisions, § 25.149(c)(4)(vi).

¹¹⁰ *NPRM*, 28 FCC Rcd at 15364, para. 32, n.86; 47 CFR §§ 15.247(d), 25.254(d)(6).

¹¹¹ *NPRM*, 28 FCC Rcd at 15364, para. 32, n.86.

specific comments on this proposal. Thus, for determining compliance with the unwanted emissions limit above 2495 MHz as specified in Section 25.149(c)(4) of the new rules, we deem the measurement bandwidth from Section 25.254(d) to be applicable, as proposed in the *NPRM*. This measurement bandwidth is included in Section 25.149(c)(4) of our revised rules, specific to terrestrial low-power system equipment.¹¹²

26. *Unwanted emission limit at the lower edge of Globalstar's planned frequency band.* In the *NPRM*, the Commission sought comment on whether the existing out-of-channel emission limit for ATC base stations operating in the 2483.5-2495 MHz band was applicable.¹¹³ The Commission noted that the limit was created assuming high-powered operations in the 2483.5-2495 MHz band, and that Globalstar's proposal was to operate its low-power network across the lower band edge at 2483.5 MHz.¹¹⁴ The Commission also sought comment on the appropriate unwanted emissions limit applicable to the lower band edge of Globalstar's then-proposed operations, at 2473 MHz.¹¹⁵ Consistent with Globalstar's revised proposal,¹¹⁶ including low-power operations, we consider whether the lower band edge unwanted emissions limit proposed in the *NPRM* for 2473 MHz should be applicable at 2483.5 MHz, now the lower band edge proposed by Globalstar.¹¹⁷

27. The Commission suggested in the *NPRM* that a possible limit on unwanted emissions at the lower band edge of Globalstar's proposed low-power terrestrial operations be the limit specified in Section 15.247(d) of the Commission's rules.¹¹⁸ This limit states that in any 100 kilohertz bandwidth outside the frequency band in which a device is operating, the unwanted emissions shall be at least 20 dB below the power in the 100 kilohertz bandwidth within the band that contains the highest level of the desired power.¹¹⁹ Commenters raised the issue that Globalstar's proposed unprotected use of IEEE 802.11 Channel 14 (2473-2495 MHz) is directly adjacent to Channel 11 (2451-2473 MHz), with no guard band between these two channels.¹²⁰ The Commission had sought comment on whether the emissions limit in Section 15.247(d) would be compatible with systems operating below 2473 MHz and if not, what limit would be appropriate.¹²¹ We note that the proposed operations of Globalstar will no longer be adjacent to IEEE 802.11 Channel 11.¹²² Subsequent to Globalstar's revised proposal, the Bluetooth SIG filed an *ex parte* letter stating that transmissions in the 2483.5-2495 MHz band at the proposed power levels could affect users of Part 15 devices below 2483.5 MHz and asking whether the out of band emissions limit at the lower edge of Globalstar's planned operations should be the same as that at the upper edge of Globalstar's planned operations.¹²³

¹¹² Appendix A, Rule Revisions, § 25.149(c)(4)(vii).

¹¹³ *NPRM*, 28 FCC Rcd at 15363, para. 31; *see* 47 CFR § 25.254.

¹¹⁴ *Id.*

¹¹⁵ *NPRM*, 28 FCC Rcd at 15362-63, paras. 29-30.

¹¹⁶ Globalstar Nov. 9, 2016 *Ex Parte* Letter at 1.

¹¹⁷ *Id.* at 3.

¹¹⁸ *NPRM*, 28 FCC Rcd at 15363, para. 30.

¹¹⁹ *NPRM*, 28 FCC Rcd at 15363, para. 30; *see* 47 CFR § 15.274(d).

¹²⁰ *See, e.g.*, Wi-Fi Alliance Comments at 18-19; Cisco Comments at 11; WISPA Comments at 5-6.

¹²¹ *NPRM*, 28 FCC Rcd at 15363, para. 30.

¹²² *See* Globalstar Nov. 9, 2016 *Ex Parte* Letter at 1.

¹²³ Letter from Mark Powell, Executive Director, Bluetooth SIG, Inc., to Marlene H. Dortch, Secretary, FCC, IB Docket 13-213, at 1-2 (filed Nov. 22, 2016) (Bluetooth SIG Nov. 22, 2016 *Ex Parte*).

28. On December 7, 2016, Globalstar filed an *ex parte* letter suggesting that the Commission adopt a revised unwanted emissions limit.¹²⁴ Although Globalstar believes that the Section 15.247(d) unwanted emissions limit provides sufficient protection to adjacent-band operations and meets the need of interested parties in the record,¹²⁵ Globalstar indicates that it would accept the following unwanted emissions limit at 2483.5 MHz: “Emissions below 2483.5 MHz shall be attenuated by a factor of at least $40 + 10 \log (P)$ dB at the channel edge at 2483.5 MHz, $43 + 10 \log (P)$ dB at 5 MHz from the channel edge, and $55 + 10 \log (P)$ dB at X MHz from the channel edge where X is the greater of 6 MHz or the actual emission bandwidth.”¹²⁶ This alternative unwanted emissions limit in footnote 5 of Globalstar’s December 7, 2016, *ex parte* was subsequently supported by the Entertainment Software Association (ESA).¹²⁷ On December 14, 2016, the Hearing Industries Association filed an *ex parte* letter stating that Globalstar’s revised unwanted emissions limit is a better solution than the 20 dB out-of-band emissions limit of Section 15.247(d) to protect its very-low-power transmissions, but that it would need to complete its testing and analysis before drawing final conclusions on the effect on hearing aids.¹²⁸ In response, Globalstar filed an *ex parte* letter stating that out-of-band emissions from a Globalstar device will be below the local ISM band noise and interference floor, and that hearing aids using Bluetooth are further protected by a gap between the highest frequency used by those hearing aids and the lower end of Globalstar’s licensed spectrum.¹²⁹ In addition, Globalstar commented that the March, 2015, tests conducted in the FCC’s Technology Experience Center showed that Bluetooth hearing aids could operate even while Globalstar’s Wi-Fi-based low-power devices were operating on Channel 14 with no discernable impact to hearing aid operation.¹³⁰

29. We recognize the beneficial use of hearing assistance devices and the many other kinds of unlicensed devices operating in this and other spectrum. While we recognize the desirability of using very weak signals for these operations, particularly to preserve battery life, this design choice does not warrant constraints on users of the spectrum outside the licensed bands. Moreover, the Commission has on many occasions underscored that unlicensed devices operate under the fundamental condition that they are not protected against harmful interference. Therefore, additional tests to determine the interference susceptibility of such devices from operations in adjacent bands are unwarranted.

30. We find that the alternative lower band edge unwanted emissions limit agreed to by Globalstar in its December 7, 2016, *ex parte* letter is appropriate to apply to Globalstar’s lower band edge

¹²⁴ Letter from L. Barbee Ponder, Globalstar, Inc., to Marlene H. Dortch, Secretary, FCC, IB Docket No. 13-213, at 1-2, n.5 (filed Dec. 7, 2016) (Globalstar Dec. 7, 2016 *Ex Parte*).

¹²⁵ Globalstar Dec. 7, 2016 *Ex Parte* Letter at 1-2.

¹²⁶ Globalstar Dec. 7, 2016 *Ex Parte* Letter at 2, n.5. We assume that the (P) in the limit proposed in footnote 5 refers to the transmitter power measured in watts. *Id.*

¹²⁷ Letter from Michael Warnecke, Chief Counsel, Technology Policy, Entertainment Software Association, to Marlene H. Dortch, Secretary, FCC, IB Docket No. 13-213, at 1-2 (filed Dec. 12, 2016) (ESA Dec. 12, 2016 *Ex Parte*).

¹²⁸ Letter from Laura Stefani, Counsel to the Hearing Industries Association (HIA), to Marlene H. Dortch, Secretary, FCC, IB Docket No. 13-213, at 3 (filed Dec. 14, 2016). HIA also raises a question about what wireless technology Globalstar will use, and makes a suggestion specific to the use of LTE technology. These topics would be more appropriately addressed in the context of a future Globalstar application to modify its Part 25 license to permit ATC operations.

¹²⁹ Letter from L. Barbee Ponder, Globalstar, Inc., to Marlene H. Dortch, Secretary, FCC, IB Docket No. 13-213, at 1-2 (filed Dec. 15, 2016).

¹³⁰ *Id.* at 2.

at 2483.5 MHz. We adopt paragraph (v) in Section 25.149(c)(4) of our rules consistent with this limit.¹³¹ As noted in the *NPRM*, the proposed out-of-band emissions limit from Section 25.254 of the Commission's rules was created with high-powered operations in mind,¹³² and Globalstar's operations will be low-power. In addition, the concerns raised regarding interference to Channel 11 are not applicable to Globalstar's operations because it will not be operating in the 2473-2483.5 MHz band or using IEEE 802.11 Channel 14.¹³³ We note that the out-of-band emissions below 2483.5 MHz would fall on spectrum used by Part 15 devices, and any unwanted emissions from Globalstar's operations that are compliant with the newly adopted Section 25.149(c)(4)(v) limit will be lower than the unwanted emissions from Part 15 devices when operating in the 2400-2483.5 MHz band. Thus, interference to Part 15 devices operating in the 2400-2483.5 MHz band will be dominated by in-band emissions generated by other Part 15 devices, ISM equipment, and other devices operating in the band. It appears that adoption of the limit proposed by Globalstar for the lower band edge will resolve the concerns of other parties, including Bluetooth SIG, HIA, and ESA.¹³⁴ The unwanted emissions limit voluntarily agreed to by Globalstar shall not be construed as generally being applicable to licensed services when operating adjacent to unlicensed operations.

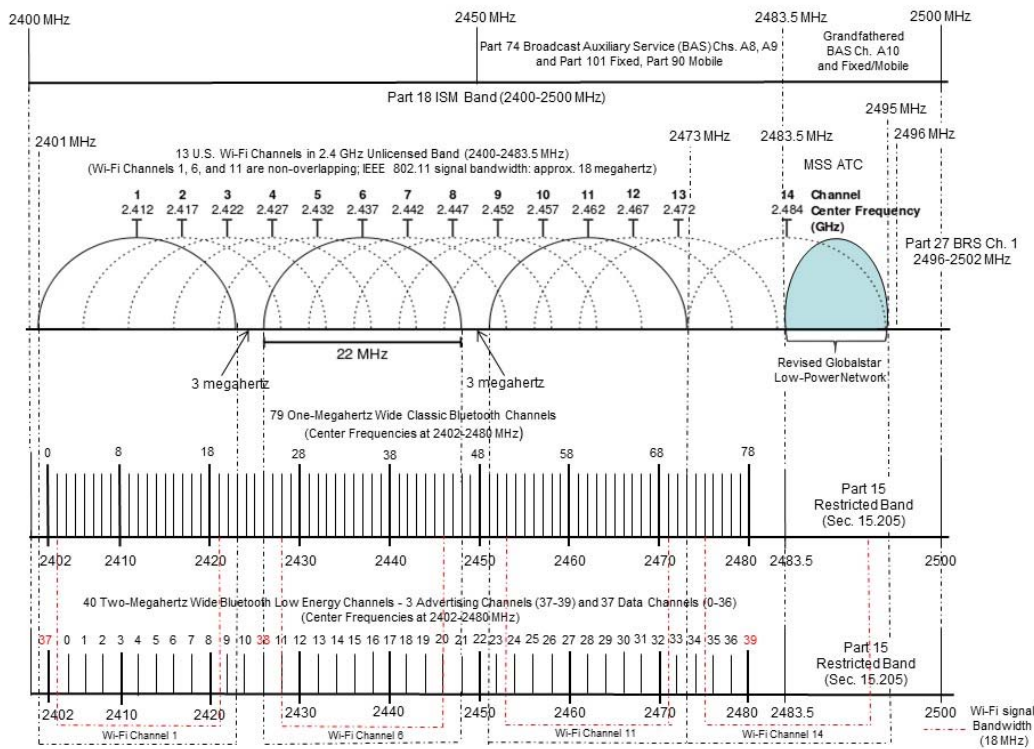
¹³¹ See Appendix A, Rule Revisions. Globalstar's proposed text has been slightly revised in our adopted rule for clarity and consistency. We also note that the measurement bandwidth adopted in new Section 25.149(c)(4)(vii) will also apply to unwanted emissions below 2483.5 MHz. See Appendix A, Rule Revisions, § 25.149(c)(4)(vii).

¹³² *NPRM*, 28 FCC Rcd at 15363, para. 31.

¹³³ We also find it unnecessary to address questions regarding existing Wi-Fi devices operating with the Globalstar network, since Globalstar operations will not include IEEE 802.11 Channel 14 under the revised proposal. See, e.g., Bluetooth SIG Comments at 5 (questioning Globalstar's proposal to use high selectivity passband filters to segregate Channel 14 operations from Channel 11).

¹³⁴ In its November 22, 2016 *ex parte*, Bluetooth SIG requested that the out-of-band emission limit at the lower edge of the band, at 2483.5 MHz, be the same as that for the upper edge of the band, at 2495 MHz, as proposed by Globalstar in its November 16, 2016 *ex parte*. Bluetooth SIG Nov. 22, 2016 *Ex Parte* Letter at 1-2. Although the unwanted emissions limit that Globalstar voluntarily agreed to in its December 7, 2016, *ex parte* to apply at and below 2483.5 MHz differs from the unwanted emissions limit above 2495 MHz that Globalstar agreed to in its November 16, 2016 *ex parte*, this limit is significantly more restrictive than the Section 25.247(d) unwanted emissions limit at the lower band edge of Globalstar's low-power network operations proposed in the *NPRM*, and is appropriate. See Globalstar Nov. 16, 2016 *Ex Parte* Letter at 2; *NPRM*, 28 FCC Rcd at 15363. Also as noted, the ESA agrees with this limit. ESA Dec. 12, 2016 *Ex Parte* Letter at 1-2.

Overview of U.S. Channels in 2.4 GHz Unlicensed Band (2400-2483.5 MHz)



B. Part 15 Considerations

31. As discussed above, Globalstar no longer seeks to operate in the 2473-2483.5 MHz band.¹³⁵ Therefore, it is no longer necessary to address the extensive comments and *ex parte* filings relating to the effects of Globalstar's proposed operations in the 2473-2483.5 MHz band to Part 15 devices, or of certain related technical issues.¹³⁶ In this section, we consider several other issues relating to the proposed operations.

32. *Continued applicability of Part 15 rules to unlicensed devices.* Following Globalstar's revised proposal, Wi-Fi Alliance filed *ex partes* asking the Commission to ensure that any service provided by Globalstar would conform to Part 15 of the Commission's rules as applicable to ensure that Globalstar not "bond" or "aggregate" ATC operations in its licensed MSS spectrum with operations in frequencies below 2483.5 MHz.¹³⁷ Wi-Fi Alliance proposes that the Commission adopt a rule specifically

¹³⁵ Globalstar Nov. 9, 2016 *Ex Parte* Letter at 1.

¹³⁶ For example, the Commission sought comment in the *NRPM* on how to address the restriction in Section 15.205 with respect to Globalstar's operations. *NRPM*, 28 FCC Rcd at 15367, para. 40. We find that it is not necessary to address whether to revise the limitations in Section 15.205 of the Commission's rules, since Globalstar does not seek to operate in the 2473-2483.5 MHz band.

¹³⁷ Wi-Fi Alliance Nov. 22, 2016 *Ex Parte* Letter at 2; Letter from Edgar Figueroa, President and CEO, Wi-Fi Alliance, to Marlene H. Dortch, Secretary, FCC, IB Docket No. 13-213, at 1 (filed Dec. 5, 2016) (Wi-Fi Alliance Dec. 5, 2016 *Ex Parte*).

addressing the continued applicability of Part 15.¹³⁸ Globalstar, NCTA, and ESA agree.¹³⁹ We recognize the concern raised by Wi-Fi Alliance and take the opportunity in this Order to confirm the continued applicability of Part 15 of the Commission's rules to operations of unlicensed devices in the 2400-2483.5 MHz band, including Sections 15.205, 15.209, 15.247, and 15.249.¹⁴⁰ We also confirm, as Globalstar's proposed rule text suggests, that a licensee or operator of a terrestrial low-power system in the 2483.5-2495 MHz band may not consent to receive transmissions above 2483.5 MHz from equipment in unlicensed spectrum at 2400-2483.5 MHz in excess of the emissions otherwise permitted under Sections 15.205, 15.209, and 15.249 of the Commission's rules.¹⁴¹ In the interest of not adopting repetitive rules, however, we decline to adopt the specific text proposed in the form of an additional rule in Part 25. Instead, we refer here to the existing Part 15 rules that will be applicable to any unlicensed equipment operating in the 2400-2483.5 MHz band, regardless of any agreements to the contrary.¹⁴² We believe the Part 15 provisions will ensure that Globalstar does not "bond" or "aggregate" its spectrum in frequencies below 2483.5 GHz in a way that could harm the operation of Wi-Fi or other unlicensed services in that spectrum.¹⁴³

33. *Restricted Band Requirements for Non-Globalstar Devices to Use Wi-Fi Channels 12 and 13.* The *NPRM* sought comment on whether the restricted band requirements should be relaxed to allow non-Globalstar Wi-Fi and unlicensed devices to more fully utilize Wi-Fi Channels 12 and 13.¹⁴⁴ The *NPRM* further asked whether such relaxation would degrade Globalstar's MSS operations in the 2483.5-2500 MHz band.¹⁴⁵

34. A number of commenters were in favor of this proposal.¹⁴⁶ For example, Wi-Fi Alliance argues that Channels 12 and 13 may be able to support Wi-Fi operations depending on filtering, power

¹³⁸ Wi-Fi Alliance Dec. 5, 2016 *Ex Parte* Letter at 1.

¹³⁹ Globalstar Dec. 7, 2016 *Ex Parte* Letter at 2-3; Letter from Danielle J. Piñeres, NCTA, to Marlene H. Dortch, Secretary, FCC, IB Docket No. 13-213, at 1 (filed Dec. 7, 2016); ESA Dec. 12, 2016 *Ex Parte* Letter at 1.

¹⁴⁰ See generally 47 CFR § 15.1; see also §§ 15.205, 15.209, 15.247, and 15.249.

¹⁴¹ Globalstar Dec. 7, 2016 *Ex Parte* Letter at 2.

¹⁴² See, e.g., 47 CFR §§ 15.1, 15.205, 15.209, and 15.249.

¹⁴³ On December 19, 2016, WCAI filed an *ex parte* requesting that language proposed for Section 25.149(g)(2) in the Globalstar Dec. 7, 2016 *Ex Parte* be clarified to state that the proposed rule would only apply to licensees and operators in the 2483.5-2495 MHz band. Letter from Mary N. O'Connor, Counsel to the Wireless Communications Association International, to Marlene H. Dortch, Secretary, FCC, IB Docket No. 13-213. For the reasons discussed here, we are not adopting Section 25.149(g)(2) as proposed by Globalstar in its Dec. 7, 2016 *ex parte*. Thus, WCAI's concern is moot.

¹⁴⁴ *NPRM*, 28 FCC Rcd at 15367-68, para. 41. As noted in the *NPRM*, the 2483.5-2500 MHz restricted band was added to Section 15.205(a) in the Commission's 1989 re-write of the Part 15 rules explicitly to protect the radio determination satellite service (RDSS) in the 2483.5-2500 MHz band. See *id.* at 15367, para. 39 & n.106. (citing *Revision of Part 15 of the Rules regarding the operation of radio frequency devices without an individual license*, First Report and Order, 4 FCC Rcd 3493 (1989) (*Part 15 Re-Write Order*)). The Section 15.209(a) unwanted emissions limit in the 2483.5-2500 MHz band was also added to Part 15 in the *Part 15 Re-Write Order*. *Id.* In 1994, the Commission added a primary MSS allocation to the 2483.5-2500 MHz band, and thus MSS in the 2483.5-2500 MHz band is protected by the restricted band provisions. *Id.* (citing *Amendment of Section 2.106 of the Commission's Rules to Allocate the 1610-1626.5 MHz and the 2483.5-2495 MHz Bands for Use by the Mobile-Satellite Service, Including Non-Geostationary Satellites*, Report and Order, 9 FCC Rcd 536, 539, paras. 3, 18 (1994) (*Big LEO Allocation Order*)).

¹⁴⁵ See *NPRM*, 28 FCC Rcd at 15367-68, para. 41.

¹⁴⁶ See, e.g., NCTA Comments at 5-9; Cisco Comments at 3 n.5, 9 n.17; Bluetooth SIG Comments at 4; Wi-Fi Alliance Comments at 14-15; Samuel-Glushko Technology Law & Policy Clinic Reply at 19-23. The proposal was also supported in some *ex parte* filings. See, e.g., Kerrisdale Oct. 10, 2014 *Ex Parte* Letter at 1, 8-11; Kerrisdale

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levels, and future technological developments, and that the Commission should modify its rules to remove the barriers to Channels 12 and 13 Wi-Fi operations regardless of how we proceed on Globalstar's proposal.¹⁴⁷ Wi-Fi Alliance further argues that Globalstar has not adequately supported its contention that public Wi-Fi on Channels 12 and 13 would seriously degrade MSS.¹⁴⁸ Specifically, Wi-Fi Alliance alleges that Wi-Fi can operate without causing interference to MSS operations because Wi-Fi is indoors while MSS is outdoors, and advanced interference avoidance techniques are being designed into Wi-Fi equipment.¹⁴⁹ Other comments in this context were based on the premise that Globalstar would be operating in the 2473-2483.5 MHz band,¹⁵⁰ and we do not need to consider them here as such operations are not going to occur.

35. Globalstar states that allowing public Wi-Fi to operate on Channels 12 and 13 would seriously degrade Globalstar's MSS operations.¹⁵¹ As discussed, Globalstar argues that because its low-power terrestrial operations will be provided through a managed network, it will be able to prevent harmful interference to MSS and other services.¹⁵²

36. No satisfactory mechanism allowing general use of Channels 12 and 13 in the 2473-2483.5 MHz spectrum without significant risk of interference to Globalstar's licensed MSS operations has been proposed. Therefore, we decline to relax the restricted band requirements because unlicensed operators using channels 12 and 13 would not be able to coordinate with Globalstar to prevent interference with MSS operations above 2483.5 MHz.

37. *Proposed access for Part 15 devices to the 2483.5-2495 MHz band.* A number of parties argue that Part 15 unlicensed access should be permitted in the 2483.5-2495 MHz band, along with the 2473-2483.5 MHz band.¹⁵³ Bluetooth SIG asserts that the provisions of Section 15.5(b) of the Commission's rules stating that "[o]peration of an intentional, unintentional, or incidental radiator is subject to the conditions that no harmful interference is caused and that interference must be accepted that may be caused by the operation of an authorized radio station" would protect Globalstar's MSS operations from interference.¹⁵⁴ In addition, Bluetooth SIG states that the general public would benefit

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Nov. 10, 2014 *Ex Parte* Letter at 2, 10-13; *see generally* Letter from Sahm Adrangi, Chief Investment Officer, Kerrisdale Capital Management, LLC, to Marlene H. Dortch, Secretary, FCC, IB Docket No. 13-213 (filed Dec. 2, 2014).

¹⁴⁷ Wi-Fi Alliance Comments at 14-15; Wi-Fi Alliance Reply at 17; NCTA agrees that the Commission should revisit its unwanted emissions limits at the upper 2.4 GHz band edge and permit robust Wi-Fi operations in Channels 12 and 13, and states that as technology develops, the practice of utilizing only non-overlapping channels will yield to more sophisticated techniques to take advantage of additional spectrum. NCTA Comments at 6-7

¹⁴⁸ *See* Wi-Fi Alliance Comments at 15 (stating that there is no technical basis for Globalstar to claim that it requires greater interference protection in the 2483.5-2495 MHz bands for its MSS operations if the 2473-2483.5 MHz band is used for Wi-Fi); Wi-Fi Alliance Reply at 15-17 (citing Globalstar Comment at 22).

¹⁴⁹ Wi-Fi Alliance Reply at 16. NCTA similarly argues that Wi-Fi and low-power terrestrial operations would likely be somewhat separate geographically from Globalstar's MSS operations, because Wi-Fi and the low-power terrestrial network are likely to be used most heavily in urban and suburban areas, where MSS is used primarily in rural and unserved locations where traditional telephone service is not available. NCTA Comments at 8-9.

¹⁵⁰ *See, e.g.*, Wi-Fi Alliance Reply at 15-17; NCTA Comments at 7-9; WISPA Comments at 7-8.

¹⁵¹ Globalstar Reply at 17 n.52, 30.

¹⁵² Globalstar Comments at 19-20.

¹⁵³ *See, e.g.*, Bluetooth SIG Comments at 4, 6; Google Oct. 13, 2015 *Ex Parte* Letter at 1-2; Letter from Harold Feld, Senior Vice President, Public Knowledge and Michael Calabrese, Wireless Future Project, Open Technology Institute at New America, to Marlene H. Dortch, Secretary, FCC, IB Docket No. 13-213, at 2 (filed June 6, 2016) (Public Knowledge and Open Technology Institute June 6, 2016 *Ex Parte*).

¹⁵⁴ Bluetooth SIG Comments at 4 (citing 47 CFR § 15.5(b)).

from an additional 22 megahertz of spectrum.¹⁵⁵ In *ex parte* filings, Google Inc. (Google), Public Knowledge, and the Open Technology Institute at New America, among others, also agree that the entire 2.4 GHz band should be opened up to enable public use of Channel 14.¹⁵⁶ Consistent with the scope of the *NPRM*, we limit this rulemaking to Globalstar's specific proposal. We are not in a position to authorize in-band operation of Part 15 unlicensed devices in the 2483.5-2495 MHz spectrum.

C. Operational Requirements

38. As described *supra* in section III.A.4, following this proceeding Globalstar must apply for Commission authorization before it may deploy its low-power terrestrial network, consistent with existing procedures.¹⁵⁷ While we plan to fully evaluate any application filed by Globalstar once the rules adopted in this proceeding take effect, we take this opportunity to address here a few specific points. In the *NPRM*, we sought comment on the managed deployment, via an NOS, of equipment operating with Globalstar's network.¹⁵⁸

39. *Network Operating System and 24/7 point of contact.* In this Order, we adopt several requirements for a low-power ATC licensee's management of its operations. As noted in section III.A.1, Globalstar had proposed that its low-power ATC operations will be conducted so that its access points are "carefully controlled by a Network Operating System (NOS), [which] will be analogous to that currently deployed by CMRS operators to manage pico- and femto-cellular infrastructure."¹⁵⁹ In the *NPRM*, the Commission sought comment on this NOS-based approach.¹⁶⁰ Globalstar has also indicated that it intends to employ an NOS center that will be available for contact 24 hours a day, seven days a week.¹⁶¹

¹⁵⁵ Bluetooth SIG Comments at 4.

¹⁵⁶ See, e.g., Bluetooth SIG Comments at 6; Google Oct. 13, 2015 *Ex Parte* Letter at 1-2; Letter from Harold Feld, Senior Vice President, Public Knowledge, to Marlene H. Dortch, Secretary, FCC, IB Docket No. 13-213 at 3 (filed Nov. 20, 2015); Letter from Michael Calabrese, Director, Wireless Future Project, Open Technology Institute and Harold Feld, Senior Vice President, Public Knowledge to Marlene H. Dortch, Secretary, FCC, IB Docket No. 13-213, at 2 (filed March 24, 2016); Letter from Austin C. Schlick, Director, Communications Law, Google, to Marlene H. Dortch, Secretary, FCC, IB Docket No. 13-213, at 2 (filed April 5, 2016); Letter from Michael Calabrese, Director, Wireless Future Project, Open Technology Institute at New America, to Marlene H. Dortch, Secretary, FCC, IB Docket No. 13-213, at 1-2 (filed April 21, 2016); Public Knowledge and Open Technology Institute June 6, 2016 *Ex Parte* Letter at 2; Letter from Stephen E. Coran, Lerman Senter PLLC, Counsel for WISPA, to Marlene H. Dortch, Secretary, FCC, IB Docket No. 13-213 (filed June 9, 2016).

¹⁵⁷ See *ATC R&O*, 18 FCC Rcd at 2077, para. 240.

¹⁵⁸ See *NPRM*, 28 FCC Rcd at 15359, para. 18.

¹⁵⁹ *NPRM* Reply Comments of Globalstar at 8-9 (filed Jan. 29, 2013). Globalstar proposes to have ViaSat, Inc. operate its NOS. See Globalstar Sept. 10, 2015 *Ex Parte* Letter, Attach. TLPS NOS Management at 2.

¹⁶⁰ *NPRM*, 28 FCC Rcd at 15358-59, para. 18.

¹⁶¹ See Globalstar Sept. 10, 2015 *Ex Parte* Letter, Attach. TLPS NOS Management at 2, 5 (Globalstar indicates that it intends to employ the ViaSat Wi-Fi network management system as the platform for its NOS, and ViaSat states that it operates a U.S.-based 24/7 help desk). See also Statement of Dane E. Ericksen and Richard A. Rudman, Engineers for the Integrity of Broadcast Auxiliary Services Spectrum (EIBASS) Co-Chairs, IB Docket No. 13-213, at 3 (filed Jan. 9, 2015) (EIBASS Jan. 9, 2015 *Ex Parte* Letter) (requesting that the Commission mandate a 24/7/365 "hot line" telephone number to the Globalstar NOS to ensure that interference problems can be reported, and dealt with, in a timely manner); Letter from L. Barbee Ponder, General Counsel & Vice President Regulatory Affairs, Globalstar, to Marlene H. Dortch, Secretary, FCC, IB Docket No. 13-213, at 5 (filed Dec. 29, 2014) (Globalstar Dec. 29, 2014 *Ex Parte* Letter) (stating that Globalstar commits to "providing a coordination point of contact to all BAS licensees in those geographic areas where TLPS will be deployed.").

40. While some parties supported Globalstar's NOS proposal,¹⁶² others raised concerns in comments and *ex parte* filings about whether Globalstar would fulfill its commitment to the NOS.¹⁶³ WCAI expresses concern that some of Globalstar's statements in its petition suggest that Globalstar may not be in full control of the terrestrial use in the 2483.5-2495 MHz band, and that Globalstar has not provided enough detail to show how it will be able to avoid interference to BRS or its own MSS.¹⁶⁴ WCAI requests that the Commission make clear that Globalstar is solely responsible for compliance with the Commission rules and must maintain sufficient control over any terrestrial devices so that any interference can be promptly cured.¹⁶⁵ Even with that clarification, WCAI states, questions remain about how Globalstar will maintain sufficient control to be able to remotely reduce power, limit bandwidth, or cease operations in the event interference to BRS Channel 1 occurs.¹⁶⁶ In later filings, WCAI also notes its concerns that because the terrestrial low-power network-enabled devices causing interference may be highly mobile, the devices could be "long gone" before Globalstar can identify and cure the source of interference, and that Globalstar may not be able to identify individual client devices as the source of interference.¹⁶⁷ However, as discussed in paragraph 24 above, WCAI and Sprint have agreed with the out-of-band emission limit being established for frequencies above 2495 GHz and have not reiterated any of the other concerns raised in previous filings.

41. We conclude that the terrestrial low-power network licensee must utilize an NOS, consisting of a network management system located at an operations center or centers. We require that the NOS have a point of contact available 24 hours a day, seven days a week with the technical capability to address and resolve interference issues. This contact information must be made publicly-available on the licensee's website. The NOS must have the capability to control the operation of all low-power transmitters so that it can address any interference concerns by whatever means necessary, including but not limited to reducing power or terminating operations at a particular location or installation. These requirements are adopted in new Section 25.149(g)(2) of the Commission's rules.¹⁶⁸

42. Globalstar will be responsible for controlling operations of its low-power network access points through the NOS. A number of commenters expressed views about the ability of Globalstar to manage network security to prevent unauthenticated users or devices from using its low-power terrestrial network.¹⁶⁹ Sprint and WCAI, for example, ask whether devices initially activated for the low-power terrestrial network will be prohibited from operating after they are no longer subscribed, to prevent unauthorized use.¹⁷⁰ We conclude that Globalstar will also be responsible for implementing measures to

¹⁶² See, e.g., Letter from Gary Griffiths, President and CEO, iPass, Inc., to Marlene H. Dortch, Secretary, FCC, IB Docket No. 13-213, at 2 (filed Sept. 15, 2015).

¹⁶³ To the extent that the concerns raised by commenters relate to the ability of the NOS to resolve interference by Globalstar devices operating in the 2473-2483.5 MHz band, we decline to address them.

¹⁶⁴ WCAI Comments at 8-9; WCAI Reply at 5-6, 8. WCAI is particularly concerned with interference to BRS Channel 1, operating above 2495 MHz. See WCAI Comments at 2.

¹⁶⁵ WCAI Comments at 9; WCAI Reply at 6, 8-9.

¹⁶⁶ WCAI Comments at 9-10.

¹⁶⁷ WCAI Sept. 18, 2015 *Ex Parte* Letter at 3; see Letter from Paul J. Sinderbrand and Mary N. O'Connor, Counsel to the WCAI, to Marlene H. Dortch, Secretary, FCC, IB Docket No. 13-213, at 1 (filed Oct. 30, 2015) (reiterating arguments from prior filing).

¹⁶⁸ See Appendix A, Rule Revisions.

¹⁶⁹ See, e.g., Sprint Comments at 9; WCAI Comments at 9-10; Cisco Comments at 14-15.

¹⁷⁰ Sprint Comment at 9; WCAI Comments at 8-10. For example, WCAI is concerned that Globalstar's reference to "terrestrial partners" in its Petition suggests that it will not be in full control of its terrestrial use of the 2483.5-2495 MHz band. WCAI Comments at 8. WCAI relatedly asks how access to Globalstar software upgrades will be limited to only Globalstar subscribers; what measures Globalstar will take to ensure that only its subscribers can

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control the availability of its network to user devices, and will be responsible for any other measures necessary to prevent unauthorized use of the 2483.5-2495 MHz band. We view this as a crucial component of the network management functions of the NOS. All access points operating in the 2483.5-2495 MHz band must operate only if authorized by the NOS, and all client devices operating in the 2483.5-2495 MHz band must operate only if authorized by such access points. These requirements are adopted in new Section 25.149(g)(3) of the Commission's rules.¹⁷¹ This addresses the concerns raised by commenters regarding Globalstar's control over devices operating with its network, because client devices would only be able to operate when authorized by access points that would in turn be authorized by the NOS.¹⁷² In addition, we note that consistent with the ATC licensing process, Globalstar's application for a license modification to add a low-power ATC will be evaluated, including details regarding the NOS, prior to any authorization of the system, to ensure compliance with these requirements.¹⁷³

D. Broadcast Auxiliary Service (BAS) Channels A8-A10

43. The *NPRM* sought comment on the ability of Globalstar's proposed operations to coordinate with BAS Channels operating in the 2483.5-2500 MHz band.¹⁷⁴ As of July 25, 1985, the Commission ceased accepting applications for new or modified BAS, Part 90, and Part 101 microwave stations for the 2483.5-2500 MHz band. Existing licensees in the band have been permitted to continue operating on a grandfathered basis.¹⁷⁵ There are currently three BAS channels that are authorized for operation in the 2450-2500 MHz band – A8, A9, and A10.¹⁷⁶ Currently, MSS licensees operating in 2483.5-2500 MHz are required to coordinate their proposed operations to avoid causing harmful interference to those grandfathered operations in the 2483.5-2500 MHz band, and to BAS Channels A8 and A9 stations and Parts 90 and 101 mobile and fixed stations in the adjacent 2450-2483.5 MHz band.¹⁷⁷ The Commission posed questions about whether criteria could be used in deploying low-power network access points that would effectively avoid interference to primary BAS operations.¹⁷⁸ It also asked if access-point-by-access point coordination is feasible.¹⁷⁹ The *NPRM* requested input on specific procedures, rule changes, or policies that may be necessary to either continue to protect grandfathered BAS Channel A10 stations from harmful interference or to relocate those stations.¹⁸⁰ We address the

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obtain devices enabled to operate in the 2483.5-2495 MHz band; and what restrictions will be placed on master access points equipped to operate at 2483.5-2495 MHz to assure that only Globalstar can use them in the United States. *Id.* at 9-10. As discussed *infra*, we do not anticipate that device upgrades via software will be available under Globalstar's proposal for operations only in the 2483.5-2495 MHz frequency band. *See* Globalstar Nov. 9, 2016 *Ex Parte* Letter at 4.

¹⁷¹ *See* Appendix A, Rule Revisions, § 25.149(g)(3); *see also* Appendix A, Rule Revisions, § 25.149(c)(4)(viii).

¹⁷² *See, e.g.*, WCAI Comments at 8-10.

¹⁷³ *See* prior discussion of the license modification process in this section.

¹⁷⁴ *NPRM*, 28 FCC Rcd at 15365, para. 35.

¹⁷⁵ *See NPRM*, 28 FCC Rcd at 15365, para. 35, n.95; *Big LEO Allocation Order*, 9 FCC Rcd at 539, paras. 3, 18 (1994).

¹⁷⁶ *See* 47 CFR § 74.602(a). Channel A8 occupies 2450-2467 MHz; Channel A9 occupies 2467-2483.5 MHz; and Channel A10 occupies 2483.5-2500 MHz.

¹⁷⁷ *See ATC R&O*, 18 FCC Rcd at 2061-62, paras. 202-03.

¹⁷⁸ *NPRM*, 28 FCC Rcd at 15365, para. 38.

¹⁷⁹ *Id.*

¹⁸⁰ *Id.* EIBASS reiterated an interest at the *NPRM* stage in "refarming" Channels A8-A10 to resolve long-standing issues with Globalstar and other users in the 2483.5-2500 MHz band, such as the BRS/EBS. *See* EIBASS *NPRM* Comments at 5-7. As noted in the *NPRM*, EIBASS and SBE have previously voiced concerns about the potential

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comments regarding compatibility with BAS, but note that concerns based on Globalstar's proposed operations in the 2473-2483.5 MHz band are now moot.¹⁸¹

44. The Society of Broadcast Engineers, Incorporated (SBE) argues that there is an incompatibility between MSS ATC and BAS operations that has never been resolved with respect to BAS Channel A10, and also Channels A8 and A9 due to adjacent channel interference.¹⁸² SBE states that Globalstar's proposed low-power operations are incompatible with and would interfere with BAS Channel A10 and would compound an already existing incompatibility.¹⁸³ According to SBE, there is already pressure on the few Electronic News Gathering (ENG) channels, despite frequency re-use techniques, because of the multiple-use allocation of the spectrum.¹⁸⁴ SBE explains that the Commission has erred in conclusions drawn in prior proceedings regarding BAS Channel A10,¹⁸⁵ and reiterates a previous proposal that the Commission migrate BAS Channel A8-A10 facilities downward with the new 12-megahertz wide BAS channels beginning at 2450 MHz.¹⁸⁶ It asks that we enact its refarming proposal now, rather than adopting Globalstar's proposal in this proceeding.¹⁸⁷ EIBASS concurs with SBE's comments and states that Globalstar's proposed low-power terrestrial operations would increase interference to BAS Channel A9 and cause massive new interference to grandfathered BAS Channel A10.¹⁸⁸ It reiterates that MSS is obligated to protect the earlier-in-time operations of grandfathered BAS Channel A10, and notes that grandfathered TV BAS Channel A10 operations exist in virtually all of the major TV markets.¹⁸⁹ EIBASS acknowledges that the Commission has found that ATC and BAS Channel A10 can share spectrum through frequency coordination, but also points to other proceedings in which it

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for Globalstar's ATC operations at 2483.5-2495 MHz to cause harmful interference to grandfathered BAS Channel A10 operations at 2483.5-2500 MHz. See EIBASS *Ex Parte* comments in IB Docket No. 02-364 (filed Dec. 1, 2009); comments in ET Docket No. 10-142 (filed Sept. 15, 2010); EIBASS Petition for Reconsideration, ET Docket No. 10-142 (filed May 27, 2011); and comments in WC Docket No. 11-183 (filed Nov. 17, 2011). See also SBE's filings in Docket Nos. ET 95-1; IB 99-81; ET 00-258, WT 02-55; and WT 03-66. See also SBE Petition for Reconsideration, IB Docket No. 01-185 (filed Apr. 4, 2003), and SBE Petition for Reconsideration, IB Docket No. 02-364 (filed Sept. 8, 2004).

¹⁸¹ See Globalstar Nov. 9, 2016 *Ex Parte* Letter at 1.

¹⁸² SBE Comments at 7.

¹⁸³ SBE Comments at 5-6. SBE points to its 2004 Petition for Reconsideration in which it proposed a two-step refarming plan for migrating BAS Channel A8-A10 facilities downward by narrowing the bandwidth of the stations in place and then narrowing the channel bandwidth to 12 megahertz, with the new channels beginning at 2450 MHz. This would result in an upper limit of 2486 MHz rather than the current limit of 2500 MHz. *Id.* at 6.

¹⁸⁴ SBE Comments at 2-4. In an *ex parte* filing, ABC Television Network (ABC) and CBS Television Stations (CBS) state that spectrum available for interference-free licensed Part 74 BAS communications is becoming increasingly congested. Letter from Gary Nadler, General Manager, Digital and Wireless, ABC Television Network and Jeff Birch, Vice President, Engineering, CBS Television Stations, to Marlene H. Dortch, Secretary, FCC, IB Docket No. 13-213, at 2 (filed Nov. 18, 2014) (ABC and CBS *Ex Parte* Letter). They state that they have been able to minimize some of the potential interference by using the BAS channels, but only after "engaging in exhaustive and resource-consuming frequency coordination efforts to secure use of all three of the BAS Channels." *Id.*

¹⁸⁵ SBE Comments at 4-5. In this Order, we decline to revisit conclusions from prior proceedings, but instead address the issues specific to Globalstar's proposal, as described in the NPRM. Our reasoning from the prior proceedings regarding compatibility issues remains equally forceful in responding to the arguments raised here.

¹⁸⁶ SBE Comments at 6.

¹⁸⁷ SBE Comments at 8.

¹⁸⁸ EIBASS Reply at 1-2. Both EIBASS and SBE state that adopting SBE's refarming proposal would also accommodate BRS/EBS operations. See EIBASS Reply at 3; SBE Comments at 7.

¹⁸⁹ EIBASS Reply at 1.

states the Wireless Telecommunications Bureau and the Office of Engineering & Technology reached a different conclusion.¹⁹⁰

45. Globalstar argues that the rules proposed in the *NPRM* would protect licensed radio services, including BAS channel A10, from interference and that no rule changes are needed to ensure this protection.¹⁹¹ Globalstar also states that its proposed terrestrial low-power ATC transmissions would have less of an impact on BAS operations than more conventional, high-power commercial mobile applications.¹⁹² Globalstar expects that a majority of its equipment will be deployed indoors, thus decreasing the risk of interference from low-power ATC into BAS receivers.¹⁹³ Globalstar also asserts that its outdoor access points will be professionally installed and coordinated with BAS prior to installation.¹⁹⁴ Globalstar further states that because its network will operate as a managed system, it will have the ability to identify and control potential interference.¹⁹⁵

46. In response, EIBASS requests that we ensure that interference can be mitigated in real-time, not after-the-fact.¹⁹⁶ EIBASS further requests that in markets that contain grandfathered BAS Channel A10 TV Pickup stations, we require Globalstar to provide a disclaimer to its customers that its low-power ATC network is subject to temporary interruption in the event of interference to earlier-in-time, co-primary, TV BAS operations.¹⁹⁷ EIBASS encourages the Commission to utilize the same model adopted for allowing Part 101 Fixed Service stations entry to the 7 and 13 GHz TV BAS bands by prohibiting deployment of Globalstar access points within the operational area of a grandfathered TV BAS Channel A10 TV Pickup station.¹⁹⁸ EIBASS states that if Globalstar were to be permitted to operate in the same area as a grandfathered TV BAS Channel A10 Pickup station, the Commission could adopt a provision similar to Section 27.60 of the Miscellaneous Wireless Services rules applying to Lower 700 MHz Band A-block stations.¹⁹⁹ In this scenario, Globalstar would obtain a "consent" letter from the grandfathered TV BAS Channel A10 TV Pickup licensee(s) in order to deploy in the desired market.²⁰⁰ EIBASS requests that the burden be placed on Globalstar to argue that it can manage frequency

¹⁹⁰ EIBASS Reply at 3 (citing WT Docket No. 02-55 and ET Docket No. 95-18). We note that the proceedings in WT Docket No. 02-55 and ET Docket No. 95-185 involved different frequency bands and presented different sets of circumstances with respect to BAS operations than those addressed in this proceeding. Again, we have previously addressed the underlying issues presented by EIBASS's arguments, and note that our reasoning from prior proceedings involving BAS Channels A8-A10 remains applicable.

¹⁹¹ Globalstar Comments at 25, 28; Globalstar Reply at 21-22.

¹⁹² Globalstar Comments at 29.

¹⁹³ Globalstar Dec. 29, 2014 *Ex Parte* Letter at 5.

¹⁹⁴ *Id.*

¹⁹⁵ See Globalstar Dec. 29, 2014 *Ex Parte* Letter at 5.

¹⁹⁶ EIBASS Jan. 9, 2015 *Ex Parte* Letter, at 3 (asking the Commission to mandate a 24/7/365 "hotline" telephone number to the NOS to ensure that interference problems can be reported, and dealt with, in a timely manner). In a later filing, EIBASS raised concerns about the ability of Globalstar to construct an NOS that could adequately protect electronic news gathering (ENG) operations, since the NOS would "be unlikely to have sensitivity matching the network of fixed ENG receive-only sites that broadcasters have created[.]" and that even if Globalstar was able to construct such an NOS, "it is not likely that paying subscribers would tolerate such a secondary status." EIBASS July 10, 2015 *Ex Parte* Letter, at 2.

¹⁹⁷ EIBASS Jan. 9, 2015 *Ex Parte* Letter, at 3.

¹⁹⁸ EIBASS Feb. 13, 2015 *Ex Parte* Letter at 4.

¹⁹⁹ *Id.*

²⁰⁰ *Id.*

coordination.²⁰¹ EIBASS further states that if the Commission chooses not to adopt an operational area preclusion prohibiting Globalstar's low-power ATC from operating in grandfathered TV BAS Channel A10 markets, the Commission issue a Further Notice of Proposed Rulemaking before allowing such deployment.²⁰² EIBASS remains concerned that Globalstar will be unable to protect grandfathered ENG operations, due to the mobile nature of such operations, which transmit from varying locations and at odd hours.²⁰³ KPHO Broadcasting Corporation, the licensee of KTVK (TV) states that it will often use Channel A10 to transmit live news coverage when interference precludes the use of the other 2 GHz BAS channels and expresses its concern about the impact of potential interference that low-power ATC could cause to Channel A10 TV Pickup licensees.²⁰⁴

47. Globalstar states that the Commission need not adopt any new rules to protect BAS systems.²⁰⁵ We agree. In the *ATC R&O*, the Commission required ATC operators, prior to construction and operation of ATC base stations, to consult local coordination committees for information on the frequencies used and the geographic locations of the BAS systems that could potentially receive brute force overload interference from the ATC base stations.²⁰⁶ If a mutual agreement between ATC operators and BAS licensees cannot be arrived at, the parties must notify the Commission, and the Commission will take necessary action to ensure that BAS systems are protected.²⁰⁷ The Commission stated that, in any event, ATC operations will be required to protect against adjacent-channel and brute-force overload interference to previously licensed services.²⁰⁸ We understand that coordination can be difficult when equipment utilizing the BAS channels in question is mobile and often in different locations, however, consistent with existing policy, Globalstar must coordinate its operations with BAS operations to avoid causing harmful interference to those grandfathered operations.²⁰⁹ In these circumstances, we do not believe it is necessary to require Globalstar to notify its customers located in markets where grandfathered TV BAS Channel A10 TV Pickup stations are located that the low-power ATC network may be subject to temporary interruption in the event of TV BAS operations.

48. Furthermore, we agree with Globalstar that relocation of BAS stations is not necessary to protect such stations from the operations of Globalstar's low-power terrestrial network.²¹⁰ We conclude that the measures discussed above will allow BAS and Globalstar's low-power operations to successfully co-exist in the band.

²⁰¹ *Id.*

²⁰² *Id.*

²⁰³ Letter from Dane E. Ericksen and Richard A. Rudman, EIBASS, to Marlene H. Dortch, Secretary, FCC, IB Docket No. 13-213, at 1-2 (filed July 10, 2015) (EIBASS July 10, 2015 *Ex Parte* Letter).

²⁰⁴ Letter from Joseph L. Snelson, Jr. CPBE, Vice President of Engineering, KPHO Broadcasting Corporation, to Marlene Dortch, Secretary, FCC, IB Docket No. 13-213, at 1 (filed Nov. 10, 2014); *see also, e.g.,* ABC and CBS *Ex Parte* Letter; Letter from David Harpe, Vice President, Technology, WGN Continental Broadcasting Company, LLC, to Marlene H. Dortch, Secretary, FCC, IB Docket No. 13-213 (filed Nov. 19, 2014).

²⁰⁵ Globalstar Reply at 22.

²⁰⁶ *ATC R&O*, 18 FCC Rcd at 2061-62, para. 203.

²⁰⁷ *ATC R&O*, 18 FCC Rcd at 2061-62, para. 203; *see, e.g.,* 47 CFR § 74.604.

²⁰⁸ *ATC R&O*, 18 FCC Rcd at 2061-62, para. 203. *See* Appendix A, Rule Revisions, § 25.149(c)(4). Systems meeting the technical parameters set forth in Section 25.149(c)(4) will be deemed to have satisfied the requirements of Section 25.254(a)-(d). *Id.*

²⁰⁹ *See NPRM*, 28 FCC Rcd at 15366, para. 38; *ATC Second Order on Recon.*, 20 FCC Rcd at 4651, para. 94 ("Big LEO band MSS operators seeking to add ATC to their systems will be required to coordinate their use of the 2483.5-2500 MHz band with BAS licensees, or may negotiate with those licensees for relocation or some other solution to potential interference problems."); *see* Appendix A, Rule Revisions, § 25.149(c)(4).

²¹⁰ Globalstar Reply at 22.

E. Equipment Certification

49. The Commission's rules require that all radiofrequency (RF) devices subject to equipment authorization must comply with the Commission's technical requirements prior to importation or marketing for use in the United States, except in certain limited circumstances.²¹¹ A party seeking to market certain RF devices to the public must comply with the Commission's equipment authorization rules, which, *inter alia*, require a demonstration that the device complies with the Commission's rules.²¹² The *NPRM* proposed to require equipment manufacturers to certify all terrestrial low-power equipment under modified provisions in Section 25.149 of the Commission's rules.²¹³ The Commission stated that the rules proposed in the *NPRM* would not distinguish between low-power network access points and end user terminals or client devices, and would require certification for all low-power network equipment.²¹⁴ WCAI agrees with the proposal that all equipment employed as part of Globalstar's terrestrial network should be subject to the Commission certification regime for equipment authorization, whether the equipment is classified as an access point or client end user device.²¹⁵ It states that all of the equipment operating in the 2483.5-2495 MHz band should be subject to a stringent compliance evaluation.²¹⁶ WCAI further states that the Commission should clearly require any device operating as a master device, whether new or repurposed, to obtain a new equipment certification and a new FCC ID before it can operate in the 2483.5-2495 MHz band as part of Globalstar's proposed low-power terrestrial network.²¹⁷ Cisco agrees.²¹⁸ Considering the revised technical requirements incorporated into Section 25.149(c)(4), we will adopt the proposed rule requiring that applications for equipment authorization of terrestrial low-power system equipment demonstrate compliance with the 25.149(c)(4) requirements.²¹⁹

50. The *NPRM* further concluded that the certification procedures contained in Subpart J of Part 2 of the rules would permit approval of low-power equipment as a composite system.²²⁰ Globalstar no longer proposes to operate devices that would utilize spectrum allocated for use by Part 15 devices,²²¹ so we find that a composite system approach is no longer necessary. In addition, Globalstar has stated that it expects new low-power terrestrial devices at 2483.5-2495 MHz to be newly certified equipment assigned a new FCC ID under well-established Part 2 procedures.²²² Accordingly, we decline to address all other proposals in the *NPRM* regarding equipment certification, including modifications to existing equipment certifications.²²³

²¹¹ Under Section 2.803(c) of the Commission's rules, 47 C.F.R. § 2.803(c), certain limited marketing activities are permitted prior to equipment authorization.

²¹² 47 CFR §§ 2.803, 2.901.

²¹³ *NPRM*, Appendix A, Proposed Rule Changes.

²¹⁴ *NPRM*, 28 FCC Rcd at 15368, para. 42.

²¹⁵ WCAI Comments at 10.

²¹⁶ WCAI Comments at 11.

²¹⁷ *Id.*

²¹⁸ Cisco Comments at 12 n.25.

²¹⁹ See Appendix A, Rule Revisions.

²²⁰ *NPRM*, 28 FCC Rcd at 15368, para. 42.

²²¹ Globalstar Nov. 9, 2016 *Ex Parte* Letter at 1.

²²² *Id.* at 4.

²²³ See *NPRM*, 28 FCC Rcd at 15368-70, paras. 42-47.

F. Free Access Points and Public Safety Considerations

51. The *NPRM* sought comment on the commitment Globalstar made in its Petition to deploy up to 20,000 low-power ATC access points “free of charge in the nation’s public and non-profit schools, community colleges and hospitals.”²²⁴ Globalstar also committed to providing its MSS “free of charge to Globalstar subscribers within any federally declared “disaster area” following a natural or man-made disaster.”²²⁵ The Commission asked commenters for input on whether one or both of Globalstar’s commitments should be incorporated as requirements in the Commission’s rules. The Commission further asked whether, in the alternative, one or both of Globalstar’s commitments should be established as license conditions. Given the few comments we received on Globalstar’s commitment to these offerings, the concerns raised by some commenters,²²⁶ and the proposal of Globalstar to now operate only in the 2483.5-2495 MHz frequency band, we decline to incorporate either of Globalstar’s commitments as requirements in the Commission’s rules, and do not anticipate that they will be included in the license conditions.

IV. CONCLUSION

52. The adoption of the rules in this Order will help expand terrestrial use of the 2483.5-2495 MHz frequency band. The regulatory framework will be in place to enable Globalstar to utilize its 11.5 megahertz licensed MSS spectrum to deploy a low-power terrestrial network.

V. PROCEDURAL MATTERS**A. Final Regulatory Flexibility Analysis**

53. As required by the Regulatory Flexibility Act of 1980 (RFA),²²⁷ the Commission has prepared a Final Regulatory Flexibility Analysis (FRFA) relating to this Order. The FRFA is set forth in Appendix C.

B. Paperwork Reduction Act of 1995

54. This Order contains new information collection requirements in Sections 25.149(c)(4), and (g)(2)-(3) of the revised rules²²⁸ subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104-13. It will be submitted to the Office of Management and Budget (OMB) for review under Section 3507(d) of the PRA. OMB, the general public, and other Federal agencies are invited to comment on the new or modified information collection requirements contained in this proceeding.

55. Pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198,²²⁹ we previously sought specific comment on how the Commission might further reduce the information collection burden for small business concerns with fewer than 25 employees. We received no comments on this issue. We have assessed the effects of the revisions adopted that might impose information collection burdens on small business concerns, and find that there will be no change in information collection for businesses with fewer than 25 employees. The information collection will include no policy changes that might impose information collection burdens on small businesses with fewer than 25 employees.

²²⁴ *NPRM*, 28 FCC Rcd at 15370, para. 18.

²²⁵ Globalstar Petition at 44.

²²⁶ *See, e.g.*, WISPA Reply at 8; Iridium Reply at 9.

²²⁷ *See* 5 U.S.C. § 604. The RFA, *see* 5 U.S.C. §§ 601-612, has been amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), Pub. L. No. 104-121, Title II, Stat. 857 (1996). The SBREFA was enacted as Title II of the Contract with America Advancement Act of 1996.

²²⁸ *See* Appendix A, Rule Revisions.

²²⁹ *See* 44 U.S.C. § 3506(c)(4).

C. Congressional Review Act

56. The Commission will send copies of this Report and Order to Congress and the General Accountability Office pursuant to the Congressional Review Act, 5 U.S.C. § 801(a)(1)(A), and will send a copy including the final regulatory flexibility analysis to the Chief Counsel for Advocacy of the Small Business Administration, in accordance with Section 603(a) of the Regulatory Flexibility Act, 5 U.S.C. § 601, et seq. (1981).

VI. ORDERING CLAUSES

57. Accordingly, IT IS ORDERED that, pursuant to the authority contained in Sections 4(i), 7(a), 302(a), 303(c), 303(e), 303(f), 303(g), 303(j), and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 157(a), 302(a), 303(c), 303(e), 303(f), 303(g), 303(j), and 303(r), that this Order in IB Docket No. 13-213 IS ADOPTED.

58. IT IS FURTHER ORDERED that the amendments of Part 25 of the Commission's rules set forth in Appendix A shall become effective 30 days after the date of the publication of the text or summary thereof in the Federal Register, except that those rules and requirements which contain new or modified information collection requirements that require approval by the Office of Management and Budget under the Paperwork Reduction Act shall become effective after the Commission publishes a notice in the Federal Register announcing such approval and the relevant effective date.

59. IT IS FURTHER ORDERED that the International Bureau will issue a Public Notice announcing the effective date for all of the changes adopted in this Report and Order.

60. IT IS FURTHER ORDERED that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, will send a copy of this Order, including the Final Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration.

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary

APPENDIX A
RULE REVISIONS

For the reasons discussed above, the Federal Communications Commission amends title 47 of the Code of Federal Regulations, part 25:

PART 25 – SATELLITE COMMUNICATIONS

1. The authority citation for Part 25 continues to read as follows:

Authority: Interprets or applies sections 4, 301, 302, 303, 307, 309, 319, 332, 705, and 721 of the Communications Act, as amended, 47 U.S.C. §§ 154, 301, 302, 303, 307, 309, 319, 332, 605, and 721, unless otherwise noted.

2. Amend § 25.149 by revising paragraph (a)(1) and the note to paragraph (a)(1), revising paragraph (c)(3), adding paragraph (c)(4), revising paragraph (e), redesignating paragraph (g) as (h), and adding new paragraph (g), to read as follows:

§ 25.149 Application requirements for ancillary terrestrial components in the Mobile-Satellite Service networks operating in the 1.5/1.6 GHz and 1.6/2.4 GHz Mobile-Satellite Service.

(a) * * *

(1) ATC shall be deployed in the forward-band mode of operation whereby the ATC mobile terminals transmit in the MSS uplink bands and the ATC base stations transmit in the MSS downlink bands in portions of the 1626.5-1660.5 MHz/1525-1559 MHz bands (L-band) and the 1610-1626.5 MHz/2483.5-2500 MHz bands.

NOTE TO PARAGRAPH (a)(1): An L-band MSS licensee is permitted to apply for ATC authorization based on a non-forward-band mode of operation provided it is able to demonstrate that the use of a non-forward-band mode of operation would produce no greater potential interference than that produced as a result of implementing the rules of this section. A 1.6/2.4 GHz band licensee is permitted to apply for ATC authorization on a non-forward-band mode of operation where the equipment deployed will meet the requirements of subsection (c)(4) of this section.

* * * * *

(c) * * *

(3) Licensees and manufacturers are subject to the radiofrequency radiation exposure requirements specified in §§ 1.1307(b), 2.1091, and 2.1093 of this chapter, as appropriate. ATC base stations must comply with the requirements specified in § 1.1307(b) of this chapter for PCS base stations. ATC mobile stations must comply with the requirements specified for mobile and portable PCS transmitting devices in § 1.1307(b) of this chapter. ATC mobile terminals must also comply with the requirements in §§ 2.1091 and 2.1093 of this chapter for Satellite Communications Services devices. Applications for equipment authorization of ATC mobile or portable devices operating under this section must contain a statement confirming compliance with these requirements for both fundamental emissions and unwanted emissions. Technical information showing the basis for this statement must be submitted to the Commission upon request.

(4) Applications for equipment authorization of terrestrial low-power system equipment that will operate in the 2483.5-2495 MHz band shall demonstrate the following:

- (i) The transmitted signal is digitally modulated;
- (ii) The 6 dB bandwidth is at least 500 kHz;
- (iii) The maximum transmit power is no more than 1 W with a peak EIRP of no more than 6 dBW;

(iv) The maximum power spectral density conducted to the antenna is not greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission;

(v) Emissions below 2483.5 MHz are attenuated below the transmitter power (P) measured in watts by a factor of at least $40 + 10 \log(P)$ dB at the channel edge at 2483.5 MHz, $43 + 10 \log(P)$ dB at 5 MHz from the channel edge, and $55 + 10 \log(P)$ dB at X MHz from the channel edge where X is the greater of 6 MHz or the actual emission bandwidth.

(vi) Emissions above 2495 MHz are attenuated below the transmitter power (P) measured in watts by a factor of at least $43 + 10 \log(P)$ dB on all frequencies between the channel edge at 2495 MHz and X MHz from this channel edge and $55 + 10 \log(P)$ dB on all frequencies more than X MHz from this channel edge, where X is the greater of 6 MHz or the actual emission bandwidth;

(vii) Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately above and adjacent to the 2495 MHz a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. If 1 percent of the emission bandwidth of the fundamental emission is less than 1 MHz, the power measured must be integrated over the required measurement bandwidth of 1 MHz. A resolution bandwidth narrower than 1 MHz is permitted to improve measurement accuracy, provided the measured power is integrated over the full required measurement bandwidth (*i.e.*, 1 MHz). The emission bandwidth of the fundamental emission of a transmitter is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section; and

NOTE TO SECTION (c)(4): Systems meeting the requirements set forth in this section are deemed to have also met the requirements of § 25.254(a)-(d). No further demonstration is needed for these systems with respect to § 25.254(a)-(d).

* * * * *

(e) Except as provided for in paragraphs (f) and (g) of this section, no application for an ancillary terrestrial component shall be granted until the applicant has demonstrated actual compliance with the provisions of paragraph (b) of this section. Upon receipt of ATC authority, all ATC licensees shall ensure continued compliance with this section and §§ 25.253 or 25.254, as appropriate.

* * * * *

(g) Special provisions for terrestrial low-power systems in the 2483.5-2495 MHz band.

(1) An operational MSS system that applies for authority to deploy ATC in the 2483.5-2495 MHz band for terrestrial low-power operations satisfying the equipment certification requirements of paragraph (c)(4) of this section is not required to demonstrate compliance with paragraph (b) of this section, except to demonstrate the commercial availability of MSS, without regard to coverage requirements.

(2) An ATC licensee seeking to modify its license to add authority to operate a terrestrial low-power network shall certify in its modification application that its operations will utilize a Network Operating System (NOS), consisting of a network management system located at an operations center or centers. The NOS shall have the technical capability to address and resolve interference issues related to the licensee's network operations by (a) reducing operational power; (b) adjusting operational frequencies; (c) shutting off operations; or (d) any other appropriate means. The NOS shall also have the ability to resolve interference from the terrestrial low-power network to the licensee's MSS operations and to authorize access points to the network, which in turn may authorize access to the network by end-user devices. The NOS operations center shall have a point of contact in the United States available 24

hours a day, seven days a week, with a phone number and address made publicly-available by the licensee.

(3) All access points operating in the 2483.5-2495 MHz band shall only operate when authorized by the ATC licensee's NOS, and all client devices operating in the 2483.5-2495 MHz band shall only operate when under the control of such access points.

4. In § 25.254, add paragraph (e), to read as follows:

§ 25.254 Special requirements for ancillary terrestrial components operating in the 1610-1626.5 MHz/2483.5-2500 MHz bands.

* * * * *

(e) Licensees of terrestrial low-power systems operating in the 2483.5-2495 MHz band shall operate consistent with the technical limits and other requirements specified in § 25.149(c)(4) and (g)(2)-(3).

APPENDIX B
Parties Filing Pleadings

Comments

Alarm Industry Communications Committee
ARRL, The National Association for Amateur Radio
Association of Home Appliance Manufacturers
Bluetooth SIG
Cisco Systems, Inc.
DISH Network Corporation
Globalstar, Inc.
Iridium Constellation LLC
National Cable & Telecommunications Association
NTCH, Inc.
Oceus Networks
Society of Broadcast Engineers, Incorporated
Sprint Corporation
Supplemental Comments of Iridium Constellation LLC
Wi-Fi Alliance
Wireless Communications Association International
Wireless Internet Service Providers Association

Reply Comments

Bluetooth SIG
EIBASS
Globalstar, Inc.
GySgt Steven James Robeson, USMC (retired)
Iridium Constellation LLC
Mobile Satellite Users Association
Oceus Networks
Samsung Electronics America, Inc. and Samsung Telecommunications America, LLC
Samuelson-Glushko Technology Law & Policy Clinic
State of Maryland Office of the Governor
Wi-Fi Alliance
Wireless Communications Association International
Wireless Internet Service Providers Association

Ex Parte Filings

ABC Television Network and CBS Television Stations (11/18/2014)
Blair Levin (6/10/2016)
Blue Sky Information Services (7/26/2016)
Bluetooth Regulatory Committee, Jimmy Salame (2/27/2015)
Bluetooth SIG (3/12/2015, 3/20/2015, 10/23/2015, 6/3/2016, 11/23/2016)
BNP Paribas, Jean-Philippe Poirier (11/21/2014)
Cable Labs (2/26/2015, 4/14/2015)
Charles Campbell (3/27/2015, 4/28/2015, 4/29/2015, 8/5/2015, 9/10/2015, 6/22/2016, 8/30/2016, 9/15/2016, 10/21/2016)
Congressional Hearing Caucus (4/8/2016)
Consumer Electronics Association (4/16/2015)
Consumer Technology Association (6/22/2016)
David Ebert (2/22/2016)
Dustin C. Gagnon (10/6/2016)

The Honorable David Vitter, United States Senate (3/23/2016)
EIBASS (6/30/2014, 7/18/2014, 10/30/2014, 11/3/2014, 11/10/2014, 1/9/2015, 2/13/2015, 4/7/2015, 4/20/2015, 7/10/2015, 4/7/2016)
Entertainment Software Association (4/20/2015, 7/23/2015, 5/31/2016, 6/6/2016, 12/13/2016)
Entertainment Software Association, Microsoft Corp., Nintendo of America, and Sony (9/16/2016)
Etymonic Research Inc., Jonathan K. Stewart (7/24/2015, 10/30/2015)
Gerst Capital, LLC (2/24/2015, 3/11/2015, 3/17/2015, 3/24/2015, 4/1/2015, 4/6/2015, 4/14/2015, 5/14/2015, 5/19/2015, 7/16/2015, 7/28/2015, 9/22/2015, 9/25/2015, 12/16/2015, 12/21/2015, 1/6/2016, 3/3/2016, 3/31/2016)
Globalstar, Inc. (7/2/2014, 7/17/2014, 7/28/2014, 10/6/2014, 10/9/2014, 10/9/2014, 10/16/2014, 10/30/2014, 12/4/2014, 12/5/2014, 12/10/2014, 12/11/2014, 12/17/2014, 12/29/2014, 1/21/2015, 2/26/2015, 2/26/2015, 3/10/2015, 3/12/2015, 3/13/2015, 3/18/2015, 3/20/2015, 3/27/2015, 3/27/2015, 3/30/2015, 4/6/2015, 4/23/2015, 5/4/2015, 5/20/2015, 6/23/2015, 6/30/2015, 7/6/2015, 7/7/2015, 7/10/2015, 7/13/2015, 7/21/2015, 7/23/2015, 9/10/2015, 9/18/2015, 9/21/2015, 10/1/2015, 10/13/2015, 10/16/2015, 10/19/2015, 10/28/2015, 11/18/2015, 11/24/2015, 12/7/2015, 12/15/2015, 12/17/2015, 12/23/2015, 1/15/2016, 2/9/2016, 2/22/2016, 3/22/2016, 3/28/2016, 5/25/2016, 6/6/2016, 6/8/2016, 6/14/2016, 6/15/2016, 6/17/2016, 6/23/2016, 6/27/2016, 7/6/2016, 7/21/2016, 8/23/2016, 9/29/2016, 10/3/2016, 10/14/2016, 11/4/2016, 11/7/2016, 11/8/2016, 11/10/2016, 11/15/2016, 11/16/2016, 12/7/2016, 12/12/2016, 12/13/2016, 12/15/2016)
Google Inc. (4/2/2015, 10/13/2015, 12/11/2015, 3/24/2016, 4/5/2016, 4/21/2016, 5/26/2016, 6/3/2016, 6/10/2016, 8/1/2016, 8/4/2016, 8/8/2016, 8/9/2016, 8/12/2016, 8/17/2016, 9/1/2016, 9/8/2016, 9/16/2016, 11/18/2016)
Hearing Loss Association of America (10/2/2015)
Hearing Industries Association (7/13/2015, 12/14/2015, 3/1/2016, 4/21/2016, 6/7/2016, 6/21/2016, 12/14/2016)
Hearing Industries Association and Entertainment Software Association (9/1/2016)
Hughes Network Systems, LLC (11/18/2016)
Ignition Partners (5/19/2015)
Information Technology Industry Council (12/21/2015, 6/21/2016)
iPass Inc. (5/13/2015, 9/15/2015)
Iridium Constellation LLC (7/9/2014, 9/18/2014, 9/22/2014, 10/6/2014, 10/6/2014, 10/6/2014, 10/16/2014, 10/20/2014, 10/20/2014, 11/5/2014, 11/17/2014, 11/20/2014, 12/4/2014, 12/17/2014, 2/5/2015, 2/20/2015, 4/17/2015, 6/01/2015, 6/23/2015, 6/8/2016)
Jeremy L. Berry (3/27/2015, 5/1/2015, 4/7/2016)
Kerrisdale Capital Management, LLC (10/10/2014, 10/22/2014, 11/10/2014, 12/2/2014)
Kevin G. Rooney (7/5/2016, 8/19/2016, 8/24/2016, 9/19/2016, 11/25/2016)
KPHO Broadcasting Corporation (11/10/2014)
Louisiana Economic Development (10/31/2014)
Mark Walton (3/25/2015, 4/28/2015, 7/16/2015, 9/29/2015)
Mary F Kuhn (10/20/2015)
Microsoft Corporation (5/29/2015, 6/18/2015, 10/29/2015, 6/7/2016, 6/27/2016, 7/11/2016, 9/13/2016, 9/22/2016)
Microsoft, Wi-Fi Alliance, ESA, and NCTA (12/10/2015)
Microsoft, Wi-Fi Alliance, ESA, NCTA, and Sony (1/13/2016, 1/19/2016)
Microsoft, Nintendo of America, and Sony (6/7/2016)
National Cable & Telecommunications Association (10/23/2014, 12/18/2014, 3/12/2015, 4/16/2015, 4/27/2015, 5/20/2015, 3/25/2016, 5/31/2016, 6/6/2016, 7/12/2016, 12/8/2016)
Nintendo of America, Inc. (7/6/2016, 9/21/2016, 9/22/2016)
Open Technology Institute at New America (2/13/2015, 4/1/2016, 4/21/2016, 5/21/2016, 8/16/2016, 8/23/2016)

Open Technology Institute and Public Knowledge (2/13/2015, 2/18/2015, 3/24/2016, 6/6/2016, 6/13/2016)
Open Technology Institute and WISPA (1/8/2015)
Public Knowledge (11/20/2015, 11/20/2015, 1/11/2016, 3/14/2016, 5/31/2016, 7/21/2016)
Phil Sawatsky (8/5/2015)
Richard Foley (10/17/2016)
Ret. Lt. Gen. Russel L. Honore (10/15/2015)
Ruckus Wireless (11/7/2014)
Sean Olbrych (4/21/2015)
Schools, Health & Libraries Broadband Coalition (12/8/2015, 8/22/2016, 11/4/2016)
Stephen B Ronan (4/21/2015)
Steve R. (6/19/2014)
Theatro Labs, Inc. (5/1/2015)
Vanessa Lovia (5/1/2015)
W Nelowet (9/7/2016)
WEPOWER Eco Corp. (4/30/2015)
WGN Continental Broadcasting Company, LLC (11/19/2014)
Wi-Fi Alliance (11/3/2014, 2/9/2015, 3/12/2015, 4/30/2015, 4/30/2015, 5/26/2015, 10/14/2015, 12/4/2015, 4/21/2016, 6/6/2016, 8/12/2016, 9/21/2016, 11/22/2016, 12/5/2016, 12/13/2016)
Wireless Communications Association International (5/8/2015, 5/8/2015, 9/18/2015, 10/30/2015, 12/11/2015, 2/26/2016, 5/19/2016, 5/31/2016, 6/6/2016, 6/13/2016, 6/20/2016, 6/22/2016, 6/23/2016, 9/1/2016, 12/19/2016)
Wireless Communications Association International, Globalstar, Inc. and Sprint Corporation (11/17/2016)
Wireless Internet Service Providers Association (5/29/2015, 12/10/2015, 6/9/2016, 6/10/2016, 6/13/2016, 6/16/2016, 11/21/2016)
Zayo Group Holdings, Inc. (5/19/2015, 5/21/2015)

APPENDIX C

Final Regulatory Flexibility Analysis

1. As required by the Regulatory Flexibility Act of 1980, as amended (RFA),¹ an Initial Regulatory Flexibility Analysis (IRFA) was incorporated in the *Terrestrial Use of the 2473-2495 MHz Band for Low-Power Mobile Broadband Networks; Amendments to Rules for the Ancillary Terrestrial Component of Mobile Satellite Service Systems*, Notice of Proposed Rulemaking.² The Commission sought written public comment on the proposals in the *NPRM*, including comment on the IRFA. No comments were received on the IRFA. This present Final Regulatory Flexibility Analysis (FRFA) conforms to the RFA.³

A. Need for, and Objectives of, the Proposed Rules

2. This Order adopts modified rules for the operation of the Ancillary Terrestrial Component (ATC) of the single Mobile-Satellite Service (MSS) system operating in the 2483.5-2500 MHz frequency band. The changes will allow Globalstar, Inc. (Globalstar) to apply for a modification of an existing Commission license to add authority to operate a low-power network. Under the rules adopted in this Order, Globalstar would be able to provide low-power ATC under certain technical restrictions. This Order makes necessary changes to and relieves Globalstar from certain requirements in Part 25 of the Commission's rules to provide for the operation of a low-power network in the 2483.5-2495 MHz band. The rules adopted include technical rules to limit unwanted emissions that could cause interference to other services operating above or below the 2483.5-2495 MHz band. In addition, the Order also specifies rules that will apply to the certification of equipment to operate with Globalstar's proposed low power network.

B. Summary of Significant Issues Raised by Public Comments in Response to the IRFA

3. No party filing comments in this proceeding responded to the IRFA, and no party filing comments in this proceeding otherwise argued that the policies and rules proposed in this proceeding would have a significant economic impact on a substantial number of small entities. The Commission has, nonetheless, considered the potential impact of the rules proposed in the IRFA on small entities. On balance, the Commission believes that the economic impact on small entities will be positive rather than negative.

C. Response to Comments by the Chief Counsel for Advocacy of the Small Business Administration.

4. Pursuant to the Small Business Jobs Act of 2010, which amended the RFA, the Commission is required to respond to any comments filed by the Chief Counsel for Advocacy of the Small Business Administration (SBA), and to provide a detailed statement of any change made to the proposed rules as a result of those comments.⁴ The Chief Counsel did not file any comments in response to the proposed rules in this proceeding.

¹ See 5 U.S.C. § 603. The RFA, see 5 U.S.C. § 601 – 612, has been amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), Pub. L. No. 104-121, Title II, 110 Stat. 857 (1996).

² *Terrestrial Use of the 2473-2495 MHz Band for Low-Power Mobile Broadband Networks; Amendments to Rules for the Ancillary Terrestrial Component of Mobile Satellite Service Systems*, Notice of Proposed Rulemaking, IB Docket No. 13-213, RM-11685, 28 FCC Rcd 15351, 15377-80 (2013) (*NPRM*).

³ See 5 U.S.C. § 604.

⁴ 5 U.S.C. § 604(a)(3)

D. Description and Estimate of the Number of Small Entities to Which the Rules May Apply

5. The RFA directs agencies to provide a description of, and, where feasible, an estimate of, the number of small entities that may be affected by the rules adopted herein.⁵ The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction."⁶ In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act.⁷ A small business concern is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the Small Business Administration (SBA).⁸ Below, we describe and estimate the number of small entity licensees that may be affected by the adopted rules.

6. *Satellite Telecommunications and All Other Telecommunications.* The rules adopted in this Order will affect some providers of satellite telecommunications services, if adopted. Satellite telecommunications service providers include satellite and earth station operators. Since 2007, the SBA has recognized two census categories for satellite telecommunications firms: "Satellite Telecommunications" and "Other Telecommunications." Under the "Satellite Telecommunications" category, a business is considered small if it had \$15 million or less in average annual receipts.⁹ Under the "Other Telecommunications" category, a business is considered small if it had \$25 million or less in average annual receipts.¹⁰

7. The first category of Satellite Telecommunications "comprises establishments primarily engaged in providing point-to-point telecommunications services to other establishments in the telecommunications and broadcasting industries by forwarding and receiving communications signals via a system of satellites or reselling satellite telecommunications."¹¹ For this category, Census Bureau data for 2007 show that there were a total of 512 satellite communications firms that operated for the entire year.¹² Of this total, 464 firms had annual receipts of under \$10 million, and 18 firms had receipts of \$10 million to \$24,999,999.¹³

8. The second category of Other Telecommunications is comprised of entities "primarily engaged in providing specialized telecommunications services, such as satellite tracking, communications telemetry, and radar station operation. This industry also includes establishments primarily engaged in providing satellite terminal stations and associated facilities connected with one or more terrestrial systems and capable of transmitting telecommunications to, and receiving telecommunications from, satellite systems. Establishments providing Internet services or voice over Internet protocol (VoIP)

⁵ 5 U.S.C. § 604(a)(3).

⁶ 5 U.S.C. § 601(6).

⁷ 5 U.S.C. § 601(3) (incorporating by reference the definition of "small business concern" in 15 U.S.C. § 632). Pursuant to the 5 U.S.C. § 601(3), the statutory definition of a small business applies "unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register."

⁸ Small Business Act, 15 U.S.C. § 632 (1996).

⁹ See 13 CFR § 121.201, NAICS code 517410.

¹⁰ See 13 CFR § 121.201, NAICS code 517919.

¹¹ U.S. Census Bureau, 2007 NAICS Definitions, "517410 Satellite Telecommunications."

¹² See http://factfinder.census.gov/servlet/IBQTable?_bm=y&-geo_id=&-_skip=900&-ds_name=EC0751SSSZ4&-_lang=en.

¹³ *Id.*

services via client-supplied telecommunications connections are also included in this industry.”¹⁴ For this category, Census Bureau data for 2007 show that there were a total of 2,383 firms that operated for the entire year.¹⁵ Of this total, 2,346 firms had annual receipts of under \$25 million.¹⁶

9. Our rule changes will only impact one Satellite Telecommunications Service Provider, Globalstar, Inc. (Globalstar). Globalstar reported \$76.3 million in revenue in 2012. Regarding the use of the frequency bands that are the subject of this rulemaking, the applicable definition of small entity is the definition under the Small Business Administration (SBA) rules applicable to Satellite Telecommunications. Because the rule amendments affect only Globalstar, which cannot be described as a small entity, and no other satellite telecommunications service providers, we find that no substantial number of small entities is potentially affected by our actions.

10. ***Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing.*** The rules will pertain to manufacturers of communications devices. The appropriate small business size standard is that which the SBA has established for radio and television broadcasting and wireless communications equipment manufacturing. The Census Bureau defines this category as follows: “This industry comprises establishments primarily engaged in manufacturing radio and television broadcast and wireless communications equipment. Examples of products made by these establishments are: transmitting and receiving antennas, cable television equipment, GPS equipment, pagers, cellular phones, mobile communications equipment, and radio and television studio and broadcasting equipment.”¹⁷ The SBA has developed a small business size standard for firms in this category, which is: all such firms having 750 or fewer employees.¹⁸ According to Census Bureau data for 2007, there were a total of 939 establishments in this category that operated for part or all of the entire year. Of this total, 784 had fewer than 500 employees and 155 had more than 100 employees.¹⁹ Thus, under this size standard, the majority of firms can be considered small.

11. We anticipate that the rules will apply to new equipment that will be manufactured.

E. Description of Projected Reporting, Recordkeeping, and Other Compliance Requirements for Small Entities

12. The rule changes adopted in this Order will affect the reporting, recordkeeping, and other compliance requirements for small business equipment manufacturers who would provide the equipment to be used as part of the contemplated new system. All devices that will operate in the low-power terrestrial network will be subject to the certification procedures contained in Subpart J of Part 2 of the Commission’s rules, including certifying compliance with the relevant rule parts. Parties responsible for equipment compliance will be required to demonstrate that an authorized access point device can only operate in the 2483.5-2495 MHz band when it is operating under the control of a Globalstar Network Operating Center and that a client device can only operate in the 2483.5-2495 MHz band when it is operating under the control of an authorized access point.

¹⁴ U.S. Census Bureau, 2007 NAICS Definitions, “517919 Other Telecommunications,” <http://www.census.gov/naics/2007/def/ND517919.HTM>.

¹⁵ See 13 CFR § 121.201, NAICS code 517919.

¹⁶ U.S. Census Bureau, 2007 Economic Census, Subject Series: Information, Table 5, “Establishment and Firm Size: Employment Size of Firms for the United States: 2007 NAICS Code 517919” (issued Nov. 2010).

¹⁷ U.S. Census Bureau, 2007 NAICS Definitions, “334220 Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing,” <http://www.census.gov/naics/2007/def/ND334220.HTM#N334220>.

¹⁸ 13 CFR § 121.201, NAICS code 334220.

¹⁹ http://factfinder.census.gov/servlet/IBQTable?_bm=y&-fds_name=EC0700A1&-geo_id=&-+skip=300&ds_name=EC0731SG2&-_lang=en.

F. Steps Taken to Minimize Significant Economic Impact on Small Entities, and Significant Alternatives Considered

13. The RFA requires an agency to describe any significant alternatives that it has considered in developing its approach, which may include the following four alternatives (among others): “(1) the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance and reporting requirements under the rules for such small entities; (3) the use of performance rather than design standards; and (4) an exemption from coverage of the rule, or any part thereof, for such small entities.”²⁰

14. The Commission is aware that some of the revisions may impact small entities. The *NPRM* sought comment from all interested parties, and small entities were encouraged to bring to the Commission’s attention any specific concerns they may have with the proposals outlined in the *NPRM*. No commenters raised any specific concerns about the impact of the revisions on small entities.

15. This Order specifies the equipment certification approach for equipment that will be able to operate with the proposed low-power terrestrial network. We conclude that parties responsible for equipment compliance must demonstrate that an authorized access point device can only operate in the 2483.5-2495 MHz band when it is operating under the control of a Globalstar Network Operating System and that a client device can only operate in the 2483.5-2495 MHz band when it is operating under the control of an authorized access point. While this may have an impact on small entities seeking to certify equipment to operate with the Globalstar low-power terrestrial network, we believe this demonstration will have less of an impact on small entities than an alternative proposal in the *NPRM* that the responsible parties provide evidence of Globalstar’s consent at the time of application.

G. Reports to Congress

16. **Report to Congress:** The Commission will send a copy of this Order, including this FRFA, in a report to be sent to Congress pursuant to the Congressional Review Act.²¹ In addition, the Commission will send a copy of this Order, including this FRFA, to the Chief Counsel for Advocacy of the SBA. A copy of this Report and Order and FRFA (or summaries thereof) will also be published in the Federal Register.²²

H. Legal Basis

17. The action is authorized under Sections 4(i), 7(a), 302(a), 303(c), 303(e), 303(f), 303(g), 303(j), and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 157(a), 302(a), 303(c), 303(e), 303(f), 303(g), 303(j), and 303(r).

²⁰ 5 U.S.C. § 603(c)(1)-(c)(4).

²¹ See 5 U.S.C. § 801(a)(1)(A).

²² See 5 U.S.C. § 604(b).

**STATEMENT OF
COMMISSIONER AJIT PAI**

Re: *Terrestrial Use of the 2473-2495 MHz Band for Low-Power Mobile Broadband Networks*, IB Docket No. 13-213; *Amendments to Rules for the Ancillary Terrestrial Component of Mobile Satellite Service Systems*, RM-11685.

Six months ago, I voted against a proposal that would have given Globalstar special rights to unlicensed spectrum in the 2.4 GHz band. I did not support that approach because it would have marked a significant departure from our successful and long-standing policy of promoting innovative, shared access to these spectrum commons.

I am glad that Globalstar revised its proposal and has advanced a plan that does not give it preferential access to unlicensed spectrum. In light of this widely-supported change, and record evidence that the public interest will be served by giving Globalstar increased flexibility within its licensed spectrum, I am now voting to approve.

**STATEMENT OF
COMMISSIONER MICHAEL O'RIELLY**

Re: *Terrestrial Use of the 2473-2495 MHz Band for Low-Power Mobile Broadband Networks*, IB Docket No. 13-213; *Amendments to Rules for the Ancillary Terrestrial Component of Mobile Satellite Service Systems*, RM-11685.

For quite some time, the Commission has had before it a rulemaking to consider modifications to the 2.4 GHz rules that would allow Globalstar to offer a terrestrial wireless network while maintaining its satellite offering. After much debate on its original proposal, Globalstar decided, last month, to replace it with a narrower request, thereby addressing concerns previously raised. Today, the entire process comes to a positive conclusion with Globalstar's revised proposal receiving unanimous approval from the Commission.

In all fairness, I was somewhat surprised by the path this proceeding took and the public spectacle that occurred earlier this summer. I did not expect to be the deciding vote on the item, as originally circulated, but once there I went about my normal review to understand the proposal's details and the concerns raised in the record. This included extensive conversations on exactly how Globalstar's terrestrial network would work, the potential ramifications to and/or harmful interference concerns of unlicensed entities using the 2.4 GHz band, and the opportunity for greater overall spectrum efficiency. It was never my intent, nor do I believe that I was the cause of delay in reaching a decision regarding Globalstar's original proposal. Moreover, it should be noted that I found a lot of merit in that request and did not foreclose the possibility of voting in favor of it under certain circumstances, until the new proposal was put forth.

In the end, the Commission is permitting Globalstar to deploy a terrestrial network using spectrum licensed to it for satellite services. Whether that network ever comes to fruition is for Globalstar and the marketplace to decide. The Commission is merely providing additional and appropriate spectrum flexibility, which should be considered and welcomed more often, to allow for it to occur.