

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

In the Matter of)
)
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) RM-11685
Component of Mobile Satellite Service Systems)

NOTICE OF PROPOSED RULEMAKING

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I. INTRODUCTION

1. By this *Notice of Proposed Rulemaking (Notice)*, the Commission proposes modified rules for the operation of the Ancillary Terrestrial Component (ATC)¹ of the single Mobile-Satellite Service (MSS) system operating in the Big LEO S band.² The proposed changes would allow Globalstar, Inc. (Globalstar) to deploy a low power broadband network. Under the proposals in this *Notice*, Globalstar would be able to provide low-power ATC using its licensed spectrum at 2483.5-2495 MHz under certain limited technical criteria, and with the same equipment would be able to utilize spectrum in the adjacent 2473-2483.5 MHz band pursuant to the applicable technical rules for unlicensed operations in that band. For all the reasons stated herein, we believe that Globalstar's proposal to deploy broadband access equipment should be further examined and a record developed to determine whether this proposal has the potential to enable more efficient use of Globalstar's S-band spectrum and spectrum in the adjacent band. This action could potentially increase the amount of spectrum available for broadband access in the United States. At the same time, significant concerns have been raised about potential detrimental impacts on unlicensed devices. We seek comment on the costs and benefits of the proposed approach, and on changes to our rules which may facilitate such deployment and minimize any negative impacts.

2. Globalstar also requested that the Commission initiate a rulemaking to permit it to deploy a higher power terrestrial service (LTE technology) in both the S band (2483.5-2495 MHz) and L band (1610-1617.775 MHz) over the longer term.³ We find that it is appropriate to address the L band proposal separately from this proceeding. Iridium Constellation LLC filed a Petition for Rulemaking and Motion for Consolidation on February 11, 2013, requesting that the Commission revisit the Big LEO band plan that was established in 2007, and consider its request together with Globalstar's petition.⁴ Iridium's petition will be addressed separately from this proceeding, as it involves only the 1610-1626.5 MHz frequency band, which is not within the scope of this proceeding.⁵

II. BACKGROUND

A. Globalstar's Petition

3. Globalstar's petition for rulemaking seeks to expand its use of the 2483.5-2495 MHz band to include terrestrial broadband access using low-power equipment. Globalstar proposed deploying equipment in both the 2483.5-2495 MHz portion of the S band, in which its MSS system is licensed, and in the adjacent 2473-2483.5 MHz band, in which certain Part 15 unlicensed equipment operates. In its Petition, Globalstar states that it is capable of rapidly deploying its proposed network. Globalstar argues that if its proposed rules are adopted, it can leverage the public's investment in devices utilizing existing IEEE 802.11 technology, its licensed S-band spectrum at 2483.5-2495 MHz, and adjacent spectrum at

¹ Ancillary Terrestrial Components (ATC) are terrestrial base stations and mobile terminals licensed to the operator of an Mobile-Satellite Service (MSS) system for provision of radio communication services offered together with MSS, re-using frequencies assigned for the licensees' MSS operations.

² "LEO" is an acronym for Low-Earth Orbit, and generally refers to orbits at altitudes of less than 2000 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 radiofrequencies from 2-4 GHz. Globalstar is currently authorized to operate its MSS (space-to-Earth) in the 2483.5-2500 MHz portion of the S band.

³ See RM-11685, at 13-15 (filed Nov. 13, 2012) (Globalstar Petition).

⁴ Iridium Constellation LLC, Petition for Rulemaking, PRM13IB (filed Feb. 11, 2013); Iridium Constellation LLC, Motion to Consolidate, PRM 13IB, RM-11685 (filed Feb. 11, 2013).

⁵ Should we find it to be appropriate, the Commission reserves the right to consolidate this proceeding with any proceeding addressing Globalstar's L-band proposal and Iridium's petition for rulemaking.

2473-2483.5 MHz, to provide a managed low-power network which consumers can use to access terrestrial broadband.⁶ Globalstar envisions both low-power access points and end-user devices operating within the 22 megahertz band designated as Channel 14 (*i.e.*, 2473-2495 MHz) in the IEEE 802.11 standard.⁷ Channel 14 is unused by IEEE 802.11 devices today in the United States because such devices are not authorized to operate in frequencies above 2483.5 MHz.⁸ Globalstar argues that consumers could use their existing Wi-Fi enabled devices with wireless access points Globalstar plans to deploy if restrictions in radiofrequency (RF) software in the current devices are lifted by modifying the devices' software.⁹ Globalstar states that it would utilize available network management and security technologies based on IEEE 802.11 technology to prevent unauthorized use of the 2473-2495 MHz band.¹⁰ Globalstar also indicates that its proposed deployment would involve new equipment.¹¹

4. Globalstar states that allowing it to provide low-power broadband will encourage wireless broadband investment and pave the way for creating additional broadband spectrum. Globalstar argues that its low-power broadband network will enhance the commercial viability of its global MSS network by entering into joint ventures with other companies and using the revenues from future terrestrial services and spectrum leases to cover the capital costs along with the ongoing operational costs of providing MSS.¹² In addition, Globalstar claims it will offer additional public interest benefits, including deploying 20,000 free access points to public and non-profit schools, community colleges and hospitals in the United States,¹³ and provide MSS free of charge to customers in federally declared disaster areas following natural or man-made disasters for the duration of the disaster.¹⁴

5. The Globalstar Petition was placed on Public Notice on November 30, 2012.¹⁵ The comment period closed on January 29, 2013. In response to the Petition, the Commission received 9

⁶ Globalstar Petition at 15-17. IEEE 802.11 devices are based on the Institute of Electrical and Electronics Engineers (IEEE) 802.11 standard and provide the basis for unlicensed wireless network products known as Wi-Fi devices. The IEEE 802.11 standard specifies fourteen 22 megahertz-wide channels between 2401-2495 MHz. See IEEE Std. 802.11-2012 at 1527, available at <http://standards.ieee.org/findstds/standard/802.11-2012.html>. As proposed, Globalstar's deployment would differ in some respects from the IEEE 802.11 standard. Globalstar would employ Orthogonal Frequency Division Multiplexing (OFDM) with a 22 megahertz channel bandwidth. Globalstar Petition, Technical Appendix at 7-9. While the IEEE 802.11(g) and (n) amendments to the standard specify use of OFDM, the channel bandwidth for such operations is 20 megahertz. See IEEE Std. 802.11-2012 at 1608. See also Wi-Fi/WLAN Channels, Frequencies, Bands & Bandwidths, available at <http://www.radio-electronics.com/info/wireless/wi-fi/80211-channels-number-frequencies-bandwidth.php>.

⁷ Globalstar Petition at 16-17.

⁸ In the United States, unlicensed IEEE 802.11 devices that operate in the 2400-2483.5 MHz band do so under the provisions of Sections 15.205, 15.209, and 15.247 of the Commission's rules. See 47 C.F.R. §§ 15.205, 15.209, 15.247; IEEE Std. 802.11-2012 at 2287, available at <http://standards.ieee.org/findstds/standard/802.11-2012.html>. Globalstar also notes that transmissions from unlicensed 802.11 devices at 2473-2495 MHz (IEEE 802.11 Channel 14) are effectively prohibited in the United States by Section 15.205(a) of the Commission's rules, which designates Globalstar's licensed S-band spectrum at 2483.5-2500 MHz as a "restricted band" for unlicensed purposes. Globalstar Petition at 17, n.26.

⁹ *Id.*

¹⁰ *Id.* at 42.

¹¹ *Id.* at 42, n.105.

¹² *Id.* at 23.

¹³ *Id.* at 43-44.

¹⁴ *Id.* at 44.

¹⁵ *Petition for Rulemaking Filed*, Public Notice, Report No. 2971 (Nov. 30, 2012). On December 14, 2012, the Commission granted an extension of the comment deadline to January 14, 2013. *International Bureau, Office of*

comments, 5 reply comments, and 29 *ex parte* comments.¹⁶ The Bluetooth Special Interest Group (Bluetooth SIG), Consumer Electronics Association, Wi-Fi Alliance, and Wireless Internet Service Providers Association raised concerns regarding Globalstar's petition with respect to low-power operations in the 2473-2495 MHz band.¹⁷ Other commenters raised questions about low-power operations in the 2473-2495 MHz band, particularly whether those operations would interfere with existing Broadcast Auxiliary Service (BAS)/Broadband Radio Service (BRS) licensees as well as unlicensed Wi-Fi and Bluetooth users. Commenters further raised questions about how equipment upgrades would be implemented.

6. In March 2013, Jarvinian Wireless Innovation Fund (Jarvinian), Globalstar's business partner, applied for experimental special temporary authority (STA) to conduct tests of a low-power wireless system operating with technical parameters consistent with Globalstar's proposal.¹⁸ On June 10, 2013, Globalstar filed the results of the testing with the Commission and announced that they exceeded expectations.¹⁹ Globalstar added that the system surpassed public Wi-Fi by 5 times the effective distance and 4 times the effective capacity, and no impact on public Wi-Fi operations in adjacent channels was recorded.²⁰ On July 1, 2013, Jarvinian also filed a report on the results of its testing with the Commission.²¹

B. Allocations and Licensed and Unlicensed Operations in the Relevant Bands

7. In the United States Allocation Table, the 2450-2483.5 MHz band is allocated on a co-primary basis to the Fixed Service (FS) and Mobile Service (MS) for non-Federal use by Broadcast Auxiliary Service (BAS) and fixed point-to-point and point-to-multipoint networks, and to the Radiolocation Service on a secondary basis for non-Federal use. The 2483.5-2500 MHz band is allocated on a co-primary basis to the MSS (space-to-Earth) and the Radiodetermination Satellite Service (RDSS) (space-to-Earth) for Federal and non-Federal use. In addition, the 2495-2500 MHz band is allocated on a co-primary basis to the FS and MS except Aeronautical Mobile Service (AMS) for non-Federal use.²²

8. Part 74 BAS and Parts 90 and 101 FS and MS stations are licensed to operate in the 2450-2483.5 MHz band; MSS stations are licensed to operate in the 2483.5-2500 MHz band for satellite-to-user links (downlinks);²³ Part 27 BRS stations are licensed to operate in the 2496-2500 MHz band;²⁴

(Continued from previous page)

Engineering and Technology, and Wireless Telecommunications Bureau Grant Extension of Comment Deadline on Globalstar, Inc. Petition for Rulemaking, Public Notice, RM-11685, DA 12-2026 (Dec. 14, 2012).

¹⁶ A List of the Comments, Opposition, Reply Comments and *Ex Parte* Comments is attached at Appendix B.

¹⁷ See Bluetooth SIG Comments at 2-4; Consumer Electronics Association Reply Comments at 1-5; Wi-Fi Alliance Comments at 4-5; and Wireless Internet Service Providers Association Comments at 3. See also Letter from Mark Powell, Executive Director, Bluetooth Special Interest Group, Inc., to Mignon Clyburn, Chairwoman, Federal Communications Commission (filed Aug. 1, 2013) (Bluetooth SIG August 1, 2013 *Ex Parte*).

¹⁸ Jarvinian Wireless Innovation Fund, Experimental License No. 0096-EX-PL-2013 (granted Mar. 25, 2013); Jarvinian Wireless Innovation Fund, Exp. License No. 0162-EX-PL-2013 (granted Apr. 1, 2013).

¹⁹ Letter from L. Barbee Ponder IV, General Counsel & Vice President Regulatory Affairs, Globalstar, Inc., to Mignon Clyburn, Chairwoman, Federal Communications Commission, RM-11685 (filed Jun. 10, 2013) (June 10, 2013 Globalstar *Ex Parte*).

²⁰ *Id.*

²¹ See Letter from John Dooley, Managing Director, Jarvinian Wireless Innovation Fund, to Marlene H. Dortch, Secretary, Federal Communications Commission (filed July 1, 2013).

²² See 47 C.F.R. § 2.106.

²³ See 47 C.F.R. § 25.202(a)(4)(i). MSS stations are also licensed to operate in the 1610-1626.5 MHz band for user-to-satellite links (uplinks). *Id.*

²⁴ See 47 C.F.R. § 27.5(i)(2)(i).

and grandfathered Part 74 BAS and Parts 90 and 101 FS and MS stations are authorized to operate in the 2483.5-2500 MHz band on a primary basis with the MSS and RDSS, and in the sub-band 2495-2500 MHz band with stations in the FS and MS (except AMS) that are licensed under Part 27.²⁵

9. Part 18 of the Commission's rules authorizes unlicensed industrial, scientific, and medical (ISM) devices to operate in the 2400-2500 MHz band.²⁶ ISM devices include equipment or appliances designed to generate and use RF energy locally for industrial, scientific, medical, domestic, or similar purposes, excluding applications in the field of telecommunications.²⁷ ISM equipment generally must avoid causing interference to any authorized radio service, unless the interference occurs in an ISM band.²⁸

10. Part 15 of the Commission's rules governs the operation of low power radiofrequency devices in the 2400-2483.5 MHz band, including allowing operations without an individual license from the Commission.²⁹ A party seeking to market a Part 15 unlicensed device to the public must first comply with the Commission's equipment authorization procedures, which, *inter alia*, require a demonstration that the device complies with the Commission's rules.³⁰ As a general condition of operation, Part 15 devices may not cause harmful interference³¹ to any authorized services and must accept any interference that may be received from them or other Part 15 devices.³²

11. The Federal Government has a limited number of frequency assignments in the 2450-2495 MHz band. The Air Force has frequency assignments for research, development, and testing. The use of these frequencies is coordinated prior to use on a non-interference basis. The Navy also has frequency assignments in this band that are used for shipboard calibration of new or upgraded systems. Transmissions in such cases are made between the ship and the shore, with short transmissions, which are made only after the radio frequency environment is first monitored. NASA has frequency assignments in this band to support distribution of television programming throughout the Johnson Space Center and to certain outlying NASA locations. The television programming is distributed using point-to-point microwave communication systems.

²⁵ See 47 C.F.R. §§ 2.106, NG147, 74.602(a)(2), 90.20(d)(73), 90.35(c)(74), 101.147(f)(2). In 1985, the 2483.5-2500 MHz portion of the 2450-2500 MHz band was reallocated from the FS and MS to the RDSS. See Allocating Spectrum for, and Establishing Other Rules and Policies Pertaining to, a Radiodetermination Satellite Service, General Docket No. 84-689, *Report and Order*, 50 Fed. Reg. 39101, 39103, ¶ 15 (1985) (*RDSS R&O*). Existing BAS (Part 74), MS (Part 90), and FS (Part 101) stations in the 2483.5-2500 MHz licensed as of July 25, 1985, or on a subsequent date following as a result of submitting an application for license on or before July 25, 1985, were grandfathered on a primary basis. *Id.* at 39104, ¶ 19.

²⁶ 47 C.F.R. § 18.301(a).

²⁷ 47 C.F.R. § 18.107(c). Typical ISM applications are the production of physical, biological, or chemical effects such as heating, ionization of gases, mechanical vibrations, hair removal, and acceleration of charged particles. Examples of consumer ISM equipment are domestic microwave ovens, jewelry cleaners for home use, and ultrasonic humidifiers. 47 C.F.R. § 18.107(c), (g).

²⁸ 47 C.F.R. § 18.111.

²⁹ 47 C.F.R. § 15.1(a).

³⁰ 47 C.F.R. §§ 2.803, 2.901, 15.201(b).

³¹ Under the Commission's rules, harmful interference is defined as interference which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs, or repeatedly interrupts a radiocommunication service operating in accordance with the International Telecommunication Union Radio Regulations. 47 C.F.R. § 2.1(c).

³² 47 C.F.R. § 15.5.

C. The Big LEO Bands and Ancillary Terrestrial Component Rules

12. The Big LEO MSS spectrum is comprised of L-band and S-band spectrum, with an exclusive Big LEO S-band assignment for CDMA downlink systems at 2483.5-2500 MHz.³³ In 2003, the Commission adopted rules for licensing and operation of “ancillary terrestrial components” or ATCs.³⁴ In adopting ATC rules, the Commission 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. The adopted rules include provisions for licensing ATC operations in the 2483.5-2495 MHz band. The Commission concluded that authorizing ATC operation 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 manufacture that would be passed on to consumers.³⁵ An MSS operator with an FCC-issued space station license may request blanket authority for operation of ATC stations in the United States in an application for license modification.³⁶

D. The Growing Spectrum Demands of Mobile Broadband Services

13. The rapid adoption of smartphones and tablet computers, combined with deployment of high-speed 3G and 4G technologies, is driving more intensive use of mobile networks. According to Cisco Systems, global mobile Internet traffic is expected to grow over 13-fold from 2012 to 2017.³⁷ This growth is fueled by widespread adoption of smartphones and tablets. As of the second quarter of 2012, 55 percent of U.S. mobile subscribers owned smartphones.³⁸ Further, Pew reports that as of June 2013,

³³ The 1610-1626.5 MHz L-band spectrum is split between Iridium’s time division multiple access (TDMA) MSS system and Globalstar’s code division multiple access (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*, CC Docket No. 92-166, Report and Order, 9 FCC Rcd 5936 (1994) (*Big LEO Service Rules Order*), modified on recon., Memorandum 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 an exclusive assignment of 7.775 megahertz at 1610-1617.775 MHz for CDMA uplink 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*, IB Docket No. 02-364, Second Order on Reconsideration, Second Report and Order, and Notice of Proposed Rulemaking, 22 FCC Rcd 19733, 19734-37, 19739-42 (2007).

³⁴ *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), further reconsideration pending.

³⁵ *ATC R&O*, 18 FCC Rcd at 1965, 1973-89, and 2064-65, ¶¶ 2, 20-45, and 210-11.

³⁶ *Id.* at 2077, ¶ 240.

³⁷ Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2012-2017 at 5 (Feb. 6, 2013), available at http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-520862.html (*Cisco Study*) (last visited Sept. 5, 2013); *see also National Broadband Plan* at 76.

³⁸ Nielsen Newswire, The Nielsen Company, Two Thirds of New Mobile Buyers Now Opting for Smartphones, July 12, 2012, available at <http://www.nielsen.com/us/en/newswire/2012/two-thirds-of-new-mobile-buyers-now-opting-for-smartphones.html> (last visited Sept. 5, 2013).

34 percent of American adults owned a tablet, an increase from only 18 percent in September 2010.³⁹ These devices increasingly rely on Wi-Fi technologies to access the Internet. In 2012, Cisco reports that 33 percent of mobile data was off-loaded to Wi-Fi, and by 2017, it predicts that up to 46 percent of mobile data traffic will be off-loaded to Wi-Fi.⁴⁰

14. Anticipating the growing demand for additional spectrum, the *National Broadband Plan* recommended the Commission undertake to make 500 megahertz of spectrum available for broadband use within 10 years.⁴¹ The *National Broadband Plan* also recommended that 300 megahertz of this spectrum between 225 MHz and 3.7 GHz be made available for mobile use within 5 years.⁴² In 2010, the President directed the National Telecommunications and Information Administration (NTIA) to collaborate with the Commission to “make available a total of 500 MHz of Federal and nonfederal spectrum over the next 10 years, suitable for both mobile and fixed wireless broadband use.”⁴³

15. The *National Broadband Plan* also recommended that the FCC “accelerate terrestrial deployment in 90 megahertz” of MSS spectrum.⁴⁴ The *National Broadband Plan* proposed different approaches to expanding terrestrial services in different MSS bands.⁴⁵ The *National Broadband Plan* encouraged the FCC to “take actions that will optimize license flexibility sufficient to increase terrestrial broadband use of MSS spectrum, while preserving market-wide capability to provide unique mission-critical MSS services.”⁴⁶ For the Big LEO band, the *National Broadband Plan* recommended that “[t]he FCC should grant licensees flexibility under the ATC regime in the 2.5 GHz Big LEO band, already being used for terrestrial broadband deployments, to make this spectrum permanently suitable for terrestrial broadband service, subject to appropriate safeguards to promote the public interest.”⁴⁷

III. DISCUSSION

A. Part 25 Rule Proposals

16. We believe that Globalstar’s proposal to deploy a low-power terrestrial system in the 2473-2495 MHz band should be examined to determine whether it is possible to increase the use of this spectrum terrestrially in the near term, without causing harmful interference to users of this band and adjacent bands, and without compromising Globalstar’s ability to provide substantial service to the public under its existing MSS authorization. If supported by the record, this action could potentially increase the usefulness for terrestrial mobile broadband purposes of 11.5 megahertz of licensed spectrum. As a result, these changes may induce increased investment and innovation throughout the industry and ultimately improve competition and consumer choice. Therefore, we propose to make the changes to Part 25 of the rules necessary to provide for the operation of low-power ATC in the licensed MSS spectrum in the 2483.5-2495 MHz band. We seek comment on this proposal to add technical and operational provisions

³⁹ See Kathryn Zickuhr, Pew Internet & American Life Project, “Tablet Ownership 2013” (June 10, 2013), available at <http://pewinternet.org/Reports/2013/Tablet-Ownership-2013.aspx> (last visited Sept. 5, 2013).

⁴⁰ *Cisco Study* at 11.

⁴¹ *Connecting America: The National Broadband Plan*, Recommendation 5.8 at 84-85 available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-296935A1.pdf (last visited Sept. 5, 2013) (*National Broadband Plan*).

⁴² *Id.*

⁴³ Memorandum of June 28, 2010 - Unleashing the Wireless Broadband Revolution, 75 Fed. Reg. 38387 (July 1, 2010).

⁴⁴ *National Broadband Plan*, Recommendation 5.8.4 at 87-88.

⁴⁵ *Id.* at 88.

⁴⁶ *Id.* at 87.

⁴⁷ *Id.* at 88.

to Part 25 to align with uses that are compatible with Part 15 uses. We note that significant concerns have been raised about potential detrimental impact on unlicensed devices, such as Bluetooth, that are currently used extensively for various wireless broadband services and applications. We specifically seek further information and supporting detailed technical analysis regarding concerns with any potential detrimental impact on existing unlicensed devices in the 2400-2483.5 MHz band.⁴⁸ We also seek comment on the results of testing of Globalstar's low-power mobile broadband network.

17. In its Petition, Globalstar requested that we modify the Table of Allocations in Part 2 of the Commission Rules to add non-federal Fixed Service (FS) and Mobile Service (MS) allocations in the 2483.5-2495 MHz band.⁴⁹ As noted above, use of the 2483.5-2495 MHz band for fixed and mobile services is limited to grandfathered Part 74 BAS and Parts 90 and 101 mobile and fixed stations.⁵⁰ Adding FS and MS allocations as Globalstar requests would change the status of Globalstar's terrestrial uses with respect to already authorized users of the spectrum. In lieu of proposing changes to the Allocation Table, we propose to modify certain provisions in Part 25 to allow greater terrestrial use of the 2483.5-2495 MHz band, consistent with current footnote US380 to the Table of Allocations which permits ATC operations. Globalstar also argues that the proposed regulatory framework be established in Part 27 of the Commission's rules.⁵¹ However, after considering the scope of Part 25 and Part 27 of the Commission's rules, we believe that proceeding with rule changes under Part 25 would better serve the public interest. Part 27 contains rules applicable to wireless communications service – those services that generally operate wide area networks using high-powered base stations. Licensees subject to Part 27 must comply with various license requirements that would not be applicable to low-power ATC under Part 25, including, for example, build out requirements. Furthermore, these requirements are generally not tailored to the broadband access equipment Globalstar proposes to deploy. We tentatively conclude that modifying Part 25 to permit low power broadband access deployment on MSS spectrum as envisioned by Globalstar would better serve the public interest than modifying Parts 2 and 27 of the rules, as Globalstar proposed, and we seek comment on this approach.

18. We also tentatively conclude that, due to the proposed managed deployment of this equipment in a unique radiofrequency environment involving both unlicensed and licensed operations, the proposed operations are ancillary to Globalstar's licensed MSS operations and are thus appropriately considered for licensing as ATC. Globalstar states that, "unlike public 802.11 applications, [its] access points will 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."⁵² According to Globalstar, the NOS will also create a rapid means of specifically identifying and controlling potential interference.⁵³ In 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

⁴⁸ See Bluetooth SIG Comments at 2-4; Consumer Electronics Association Reply Comments at 1-5; Wi-Fi Alliance Comments at 4-5; and Wireless Internet Service Providers Association Comments at 3.

⁴⁹ Globalstar Petition at 5.

⁵⁰ See *supra* n.25.

⁵¹ Globalstar Petition at 28-35.

⁵² Reply Comments of Globalstar, Inc., RM-11685 at 8-9 (filed Jan. 29, 2013) (Globalstar Reply). The "NOS will manage security functions like the authorization/de-authorization of access points and terminal devices, and administer technical functions like (i) access point co-channel interference diagnostics, (ii) access point conducted power output, and (iii) access point RF radiation pattern/antenna gain." *Id.* at 9.

⁵³ *Id.* "For example, an interference complaint from an adjacent-band operator may be rapidly correlated with access points in a given area. A remote technician may use the [low-power ATC] NOS to diagnose access points, alter their power output, modify their radiation pattern, or perform other diagnostic and remedial functions similar to those currently possible in femto-cellular networks." *Id.*

one licensee control both the MSS and terrestrial rights in bands allocated for MSS.⁵⁴ Globalstar's NOS-based approach appears to offer benefits consistent with those identified in the *ATC R&O*, particularly given the potential benefits to spectrum efficiency in both the licensed MSS band and the adjacent unlicensed band. Although Globalstar's proposed operations differ in some respects from the types of operations contemplated in our original *ATC R&O*, we seek comment on whether analogous technical, policy, and legal bases for restricting ATC licensing to the incumbent MSS licensee adopted in the *ATC R&O* also apply to Globalstar's proposed operations.

B. Overview of Proposed Low-Power Rules

19. As previously mentioned, we propose modifying Part 25 rules in order to allow Globalstar to implement its plan of deploying a low-power broadband network in its licensed spectrum from 2483.5-2495 MHz and in a portion of the adjacent band, at 2473-2483.5 MHz, used for unlicensed devices. We propose that the Part 25 rules will apply to the 2483.5-2495 MHz portion licensed to Globalstar and that a blanket license will cover operations using these frequencies. We do not intend to grant Globalstar any additional or different interference protection rights than those that currently apply to existing unlicensed operations in the 2473-2483.5 MHz band under Part 15 or to ATC operations under the Part 25 rules, with the exception of the revisions to the ATC rules discussed below. Under this approach, Globalstar would be required to file an application to modify its Part 25 license or licenses pursuant to the existing ATC application procedures, and any deployed equipment in the 2473-2495 MHz band would need an equipment certification. We seek comment on this general approach.

20. Under this approach, Globalstar's managed operations in the 2473-2483.5 MHz band would not be entitled to interference protection from licensed services, other Part 15 devices, or Part 18 ISM devices.⁵⁵ Similarly Globalstar's low-power ATC operations in the 2483.5-2495 MHz band would not be entitled to interference protection from a number of other authorized operations. Globalstar's operations would also need to protect other licensed services from harmful interference to the extent required under current rules.⁵⁶ We believe this approach addresses one of the concerns raised by commenters. Generally, commenters were concerned that Globalstar would obtain through its proposal superior status over other authorized users.⁵⁷

21. The unlicensed uses of the 2400-2483.5 MHz band include Wi-Fi and Bluetooth hands-free communication devices, as well as Bluetooth Low Energy technology applications such as medical temperature measurement devices and blood glucose, blood pressure, and heart rate monitors.⁵⁸ The Wi-Fi Alliance notes that Wi-Fi effectively uses three IEEE 802.11 channels in the 2400-2473 MHz band, Channels 1, 6, and 11.⁵⁹ The Bluetooth Special Interest Group (Bluetooth SIG) states that the 2473-2483.5 MHz band is "extremely important" to Bluetooth technology and its operations.⁶⁰ Bluetooth SIG

⁵⁴ *ATC R&O*, 18 FCC Rcd at 2071-72, ¶¶ 227-229.

⁵⁵ Under Part 18, Globalstar's devices operating in the 2483.5-2495 MHz band would not be entitled to protection from ISM devices that operate in the 2400-2500 MHz band. 47 C.F.R. § 18.111 (b), (c).

⁵⁶ Under Section 25.254(a)(3) of the Commission's rules, ATC operations in the 2483.5-2495 MHz band must avoid causing interference to other services sharing the use of the 2450-2500 MHz band (*i.e.*, Part 27 Broadband Radio Service, Part 74 Broadcast Auxiliary Service, Part 90 Mobile Service, and Part 101 Fixed Service). *See* 47 C.F.R. § 25.254(a)(3). *See also* §§ 25.254(d), 25.255.

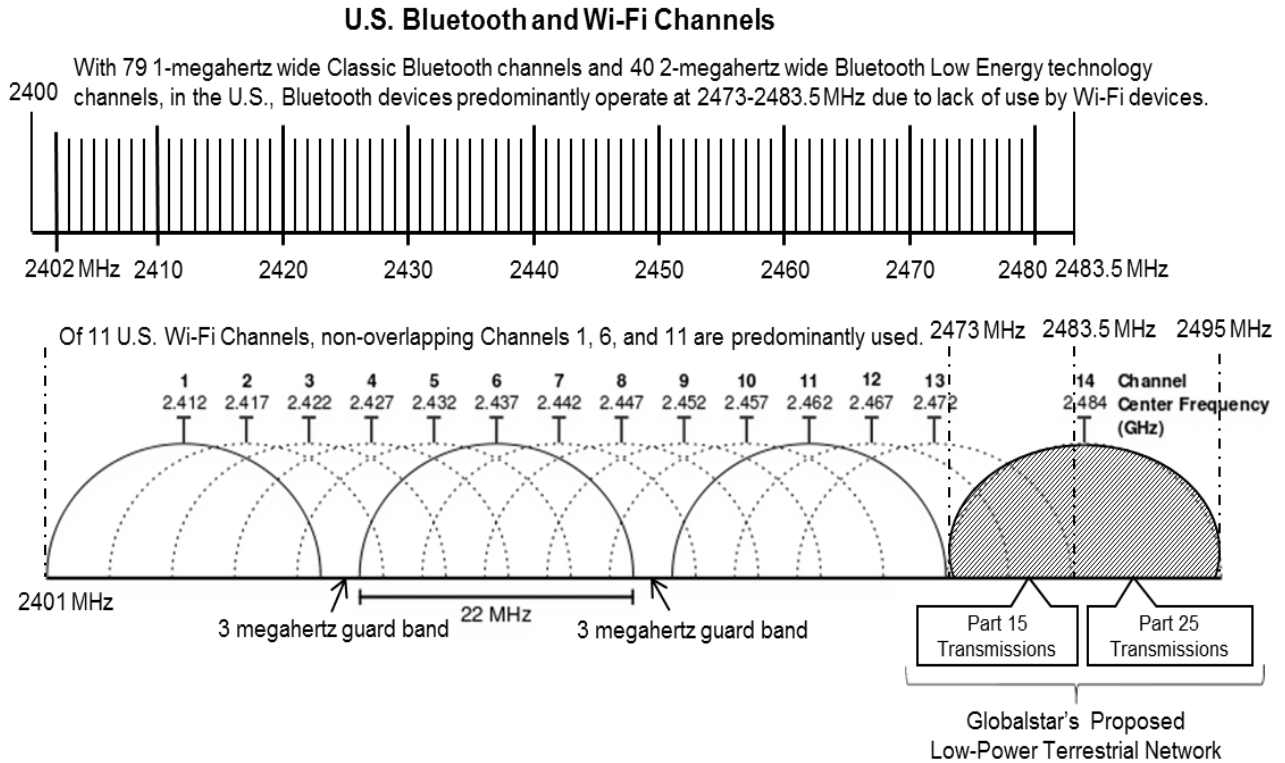
⁵⁷ *See, e.g.*, Wi-Fi Alliance Comments at 4. Globalstar does not expect its operations below 2483.5 MHz to receive protection from interference from other licensed and unlicensed operations. Globalstar Reply Comments at 14.

⁵⁸ *See* Bluetooth Medical & Health at www.bluetooth.com/Pages/Medical.aspx; New Bluetooth 4.0 Medical Devices to Hit the Shelves by December 2011 at www.eweek.com/c/a/Health-Care-IT/New-Bluetooth-40-Medical-Devices-to-Hit-the-Shelves-by-December-2011-563465/.

⁵⁹ *See* Wi-Fi Alliance Comments at 4.

⁶⁰ Bluetooth SIG Comments at 2.

notes that this band is relatively “quiet” from a radiofrequency perspective, and thus is particularly useful for its relatively low power systems. This is because the 2473-2483.5 MHz band is unused by the majority of Wi-Fi devices in the U.S. because of limitations on unwanted emissions in the 2483.5-2500 MHz band, and is thus somewhat of a “safe haven” for Bluetooth frequency hopping devices.⁶¹ The current Bluetooth and Wi-Fi channelization plans for the 2400-2495 MHz band and Globalstar’s proposed use are shown in the chart below.



22. Several parties raise concerns about the effect of Globalstar’s proposed low-power terrestrial network on unlicensed operations in and below the 2473-2483.5 MHz band.⁶² Bluetooth SIG notes that recent innovations in Bluetooth technology used in connection with health and wellness products may be impacted, and that Globalstar’s operations may affect a channel used to facilitate “discovery” and interconnection of Bluetooth devices with each other.⁶³ The Wi-Fi alliance is also concerned that Bluetooth devices would face constraints in spectrum above 2473 MHz, which would generally contribute to congestion in the 2400-2483.5 MHz band.⁶⁴ Globalstar argues that since Bluetooth devices are frequency-hopping systems that operate on constantly varying 1 megahertz channels throughout the 2400-2483.5 MHz band, the 2473-2483.5 MHz band segment represents just one small portion of the unlicensed spectrum that is utilized by Bluetooth technology and its low-power network is no more likely to cause harmful interference to a Bluetooth device than already-existing IEEE 802.11-based Wi-Fi operations elsewhere in the 2400-2483.5 MHz band.⁶⁵ Globalstar contends that

⁶¹ Bluetooth SIG August 1, 2013 *Ex Parte* at 1.

⁶² See generally Bluetooth SIG Comments, Consumer Electronics Association (CEA) Reply Comments, Wi-Fi Alliance Comments, and Wireless Service Providers Association (WISPA) Comments.

⁶³ *Id.*

⁶⁴ See Wi-Fi Alliance Comments at 4.

⁶⁵ Globalstar Reply Comments at 13, n.29.

Bluetooth devices and other unlicensed equipment will be able to coexist with its low-power network and continue to operate in the 2473-2483.5 MHz band, without any loss of spectrum for Bluetooth and other existing and future unlicensed technologies.⁶⁶

23. We seek comment on any costs, in terms of impacts on unlicensed operations both in the 2473-2483.5 MHz band and below 2473 MHz (*i.e.*, in the 2400-2473 MHz band) that might flow from Globalstar's proposed low-power terrestrial network. To the extent that any party asserts that Globalstar's low-power network may cause interference or substantially constrain other operations, we encourage the party to submit technical analyses detailing their concerns, as well as a detailed assessment of any associated costs.

C. Revisions to Section 25.149 of the Commission's Rules

1. Mode of Operations

24. Globalstar's proposed low-power ATC operations would require a rule modification to allow operations by end-user 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.⁶⁷ Because Globalstar's proposed deployment involves end-user equipment, *i.e.*, "the mobile terminals" transmitting in the MSS downlink band, the end-user equipment would operate in "non-forward-band" mode.⁶⁸ We propose to modify this rule to permit low-power ATC operations in the non-forward-band mode, and seek comment on this proposal.

2. ATC Gating Requirements

25. In the *ATC R&O*, the Commission adopted rules establishing several prerequisites, or "gating criteria" that MSS operators must meet in order to be allowed to offer ATC. These gating criteria are set forth in Section 25.149 of the Commission's rules. To ensure that ATC would be ancillary to the provision of MSS, the Commission adopted, among other rules, a requirement that MSS operators must provide substantial satellite service to be eligible for ATC authorization.⁶⁹ The Commission defined substantial satellite service as the capability of providing continuous satellite service over the entire geographic area of satellite coverage required in its rules,⁷⁰ maintenance of spare satellites to expeditiously replace destroyed or degraded satellites,⁷¹ and commercial availability of service throughout the mandatory coverage area.⁷² The Commission also required that MSS and ATC services be offered on an integrated basis.⁷³

26. We believe that relieving Globalstar from certain ATC gating criteria for its low-power network may facilitate spectrum use in both the 2483.5-2495 MHz band as well as unlicensed operations in the adjacent band, and thus could serve the public interest. We propose, therefore, to create a limited exception from some provisions of the ATC gating criteria in order to streamline the authorization process and to facilitate deployment of Globalstar's proposed low-power broadband network. Specifically, we propose to modify the gating criteria to require a demonstration, as noted in the attached

⁶⁶ Globalstar Reply Comments at 13.

⁶⁷ 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, ¶ 107.

⁶⁸ 47 C.F.R. § 25.149(a)(1).

⁶⁹ *ATC R&O*, 18 FCC Rcd at 2001-02, ¶ 72.

⁷⁰ 47 C.F.R. § 25.149(b)(1).

⁷¹ 47 C.F.R. § 25.149(b)(2).

⁷² 47 C.F.R. § 25.149(b)(3).

⁷³ 47 C.F.R. § 25.149(b)(4).

rules, that the proposed licensee is offering commercial MSS.⁷⁴ Under this proposal, we would provide an exception for low-power ATC from rules requiring detailed showings concerning satellite system coverage and replacement satellites. Globalstar is continuing to develop and pursue MSS operations in the portion of the Big LEO spectrum designated for its use, and has recently announced that it has substantially replenished its satellite constellation by completing a launch campaign, at a cost of more than \$1 billion, for 24 new satellites that are now in full commercial service.⁷⁵ This substantial capital investment has facilitated re-initiation of voice and other two-way services. We believe that Globalstar continues to be invested in the provision of MSS. Thus, we believe a simplified evidentiary showing may be sufficient to address a fundamental goal of the ATC rules—that the deployment of terrestrial facilities is in fact ancillary to satellite operations. We seek comment on this approach.

27. We also propose an exception from the integrated services rule for the proposed low-power deployment. The integrated services rule requires the offering of integrated MSS and ATC, for example, through use of dual-mode handsets that can communicate with both the MSS network and the ATC. It does not appear feasible for Globalstar to meet this requirement with respect to the entire 2473-2495 MHz band because there is no MSS allocation in the 2473-2483.5 MHz band. The ATC rules, and the integrated service rule, in particular, focus on ensuring that ATC remains ancillary to satellite services and does not become a stand-alone terrestrial service.⁷⁶ Given the potential enhanced use of the 2473-2495 MHz bands, we invite comment on whether relaxation of this requirement would serve the public interest, while still maintaining the terrestrial service as ancillary to MSS. Under this approach, Globalstar's management and oversight of deployment of low-power terrestrial facilities, while continuing to offer and support its MSS offering, would be the critical factors in determining whether the ATC continues to be ancillary. We seek comment on this approach.

3. Technical Rules

28. *Limits for equipment operating in the 2483.5-2495 MHz band.* We propose that the total transmit power for low-power ATC equipment operating in the 2483.5-2495 MHz band under new proposed Section 25.149(c)(4) of the Commission's rules not exceed 1 Watt with a peak equivalent isotropically radiated power (EIRP) of no more than 6 dBW (4 Watts) with a minimum 6 dB bandwidth of 500 kilohertz and a maximum conducted PSD limit of 8 dBm/3 kHz.⁷⁷ This limit is identical to the limit in Section 15.247 of the Commission's rules.⁷⁸ Section 15.247 specifies limits for unlicensed operations by digitally modulated communications equipment operating in the 2400-2483.5 MHz band. We believe it is appropriate to apply the same limits with respect to the 2483.5-2495 MHz band, given the nature of the proposed operations, including the use of digital modulation, and the widespread use of this limit in designing Part 15 devices. We seek comment on this proposal.

29. *Unwanted emissions below 2473 MHz.* CEA asserts that Globalstar's proposed operations on IEEE 802.11 Channel 14 (2473-2495 MHz), immediately adjacent to IEEE 802.11 Channel 11 (2451-2473 MHz), could, without any guard band, result in the loss of use of Channel 11 by Wi-Fi

⁷⁴ See Appendix A, proposed rule 25.149(g).

⁷⁵ Press Release, Globalstar, Inc., *World's Most Modern Satellite Communications Network Complete* (Aug. 28, 2013), available at: <http://www.globalstar.com/en/index.php?cid=7010&pressId=792>.

⁷⁶ *ATC R&O*, 18 FCC Rcd at 2009, ¶ 88. The Integrated Services rule is located at 47 C.F.R. § 25.149(b)(4).

⁷⁷ Recognizing that the neither the current rules nor the rules proposed in this Notice provide for low power network operations solely above 2483.5 MHz, we envision that the 1 Watt transmit power and 6 dBW EIRP limits would apply to a composite signal that simultaneously uses spectrum from both the 2473-2483.5 MHz and 2483.5-2495 MHz bands. See Federal Communications Commission Office of Engineering and Technology Laboratory Division Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under § 15.247 (April 9, 2013) at 5, available at 558074 D01 DTS Meas Guidance v03r01.

⁷⁸ 47 C.F.R. § 15.247.

users.⁷⁹ WISPA also raises this concern.⁸⁰ In response, Globalstar asserts that although the two channels are immediately adjacent to one another, a functional IEEE 802.11-based communications link occupies only approximately 18 megahertz of the 22 megahertz of available bandwidth in each of these channels. Globalstar argues that the resulting *de facto* guard band will minimize harmful interference between Wi-Fi systems and its low-power network. Globalstar further argues that its access points and higher powered terminal devices will be equipped with high selectivity passband filters, which will further segregate Channel 14 operations from those on Channel 11.⁸¹ We seek comment on these concerns and claims.

30. We seek comment on the appropriate limit for unwanted emissions below 2473 MHz resulting from Globalstar's proposed low-power operations at 2473-2495 MHz. One possible limit is specified in Section 15.247(d) of the Commission's rules. That rule, applicable to spread spectrum or digital modulation systems operating in the 2400-2483.5 MHz band, specifies 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 fundamental power in the 100 kilohertz bandwidth within the band that contains the highest level of desired power. We recognize that unlicensed use of IEEE 802.11 Channel 11 (2451-2473 MHz) is directly adjacent to Channel 14 (2473-2495 MHz) with no guard band between these two channels, and as pointed out by Globalstar, the overwhelming majority of IEEE 802.11 access points operate on non-overlapping Channels 1, 6, and 11.⁸² In light of this, we seek comment on whether the current unwanted emissions limit provided in Section 15.247(d) is compatible with systems operating below 2473 MHz from Globalstar's proposed operations at 2473-2495 MHz. If this limit is not appropriate, we seek comment on an appropriate limit.⁸³ Parties proposing such an emission limit should provide technical analyses and/or studies adequate to demonstrate that their proposed limit is appropriate.

31. *Applicability of the unwanted emission limit of Section 25.254 at the lower edge of the 2483.5-2495 MHz band.* Section 25.254 of the Commission's rules specifies an out-of-channel emission limit for ATC base stations operating in the 2483.5-2495 MHz band. This limit was created assuming high-powered operations in the 2483.5-2495 MHz band. In this *Notice*, however, we propose to authorize low-power operations across the lower band edge at 2483.5 MHz. Therefore, we seek comment on whether the Commission should interpret Section 25.254 of the rules as not applying, at the lower edge of the 2483.5-2495 MHz band, to low-power network under consideration in this proceeding. Alternatively, we seek comment on whether we should provide an explicit exception to Section 25.254 of the rules with respect to the lower edge of the 2483.5-2495 GHz band for operations involving a signal emitted from such equipment.

32. *Unwanted emissions limits with respect to licensed services operating above 2495 MHz.* Section 25.254(d) of the Commission's rules sets out the unwanted emission limits for ATC base stations in the 2483.5-2495 MHz band in order to avoid interference to BRS/Educational Broadband Service

⁷⁹ See CEA Reply Comments at 4.

⁸⁰ See WISPA Comments at 3.

⁸¹ Globalstar Reply Comments at 14.

⁸² See Globalstar Petition Appendix B, Technical Analysis at 3. IEEE 802.11 Channel 1 occupies 2401-2423 MHz; Channel 6 occupies 2426-2448 MHz. See IEEE Std. 802.11-2012 at 1527 and 1572, available at <http://standards.ieee.org/findstds/standard/802.11-2012.html>. See also Wi-Fi/WLAN Channels, Frequencies, Bands & Bandwidths, available at <http://www.radio-electronics.com/info/wireless/wi-fi/80211-channels-number-frequencies-bandwidth.php>.

⁸³ We intend that any new emissions limits below 2473 MHz would apply only to Globalstar's proposed low-power operations in the 2473-2495 MHz band and would not apply to Part 15 devices that operate entirely within the 2400-2483.5 MHz band. To the extent equipment using the Globalstar low-power network also operates in the 2400-2473 MHz band, it would be subject to Part 15 rules for such operations.

(EBS) adjacent channel licensees operating above 2495 MHz.⁸⁴ This rule requires that ATC base stations attenuate unwanted emissions above 2495 MHz by a factor of no less than $43 + 10 \log (P)$ dB, where P is the total transmitter power in Watts.⁸⁵ This rule was developed based on high power base station operations. For its low-power ATC equipment, Globalstar proposes to attenuate the unwanted emission above 2495 MHz by a factor no less than $40 + 10 \log (P)$ dB at the channel edge at 2495 MHz, $43 + 10 \log (P)$ dB at 5 megahertz from the channel edges, and $55 + 10 \log (P)$ dB at X megahertz from the channel edges where X is the greater of 6 megahertz or the actual emission bandwidth. This is 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).⁸⁶ Clearwire argues that Globalstar's proposed power levels, out-of-band emissions,⁸⁷ and potential outdoor installations create a high probability for interference to Clearwire's operations above 2496 MHz.⁸⁸ We observe, however, that the unwanted emissions limits proposed by Globalstar are similar to those proposed in another proceeding by the Wireless Communications Association International, Inc. (WCAI) and supported by Clearwire Corporation (Clearwire) for unwanted emissions for its wide bandwidth, low-power mobile devices operating above 2511 MHz.⁸⁹ Those wide-bandwidth, low-power mobile devices' operations are similar to the low-power operations proposed by Globalstar.⁹⁰

33. Clearwire also argues that Globalstar's proposal lacks mutuality of obligation that fosters an environment of cooperation at the licensees' respective band edges.⁹¹ Under the current rules, BRS/EBS mobile digital stations that operate in the 2496-2690 MHz band are required to limit their unwanted emissions below 2496 MHz by a factor no less than $43 + 10 \log (P)$ dB.⁹² This limit is 3 dB stricter than the limit proposed by Globalstar for its low-power network in the 2496-2500 MHz band. It should be noted however that this stricter limit imposed on BRS/EBS unwanted emissions below 2496 MHz is intended to avoid interference to MSS operations below 2495 MHz, which will continue

⁸⁴ 47 C.F.R. § 25.254(d).

⁸⁵ 47 C.F.R. § 25.254(d)(1).

⁸⁶ Furthermore, we note 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. 47 C.F.R. §§ 15.247(d), 25.254(d)(6). Although the emissions from Globalstar's proposed operations would include a portion that is subject to the measurement bandwidth requirement in Section 15.247(d), we propose not to apply this measurement bandwidth requirement to unwanted emissions from Globalstar's operations above 2495 MHz and seek comment on whether to apply a 1 megahertz resolution bandwidth as required in Section 25.254(d).

⁸⁷ We note that the term "out-of-band emissions" is sometimes used when referring to emissions outside of the frequency bands in which a device transmits. In the context of this proceeding, however, the correct term to describe the emissions outside of the necessary bandwidth of the transmitting system is "unwanted" emissions, and so we use the term "unwanted" emissions where appropriate throughout this *Notice*.

⁸⁸ Comments of Clearwire Corporation, RM-11685, at 3 (filed Jan. 14, 2013) (Clearwire Comments).

⁸⁹ See Petition for Rulemaking, Wireless Communications Association, International, WT Docket No. 03-66, RM-11614, at 3 (filed Oct. 22, 2010), and Letter from Cathleen A. Massey, Clearwire to Marlene H. Dortch, Federal Communications Commission, WT Docket No. 03-66, RM-11614, at 1 (dated Oct. 19, 2012).

⁹⁰ Under Section 27.50(h)(2) of the rules, BRS and EBS mobile stations are required to limit their EIRP to 2 Watts. 47 C.F.R. § 27.50(h)(2). Globalstar proposes to limit the EIRP to 4 Watts for both access points and end-user terminals. Globalstar Petition Appendix B, Technical Analysis at 3.

⁹¹ Clearwire Comments at 20-21.

⁹² 47 C.F.R. § 27.53(m)(4).

regardless of whether the rules proposed in this proceeding are adopted. The signal power received from the satellite by an MSS terminal is significantly lower than that received by a BRS terminal. As a result, the potential interference impact of BRS transmissions to an MSS terminal is much higher than that of a low-power ATC transmission into a BRS terminal.

34. We seek comment on Globalstar's proposed unwanted emissions limits above 2495 MHz and whether these limits would be adequate to avoid interference to licensed services operating above 2495 MHz. If not, we seek comment on what the appropriate limit(s) should be to avoid interference to licensed services operating above 2495 MHz.

D. Broadcast Auxiliary Service Channels A8-A10

35. Comments filed by Engineers for the Integrity of Broadcast Auxiliary Services Spectrum (EIBASS) raise a number of long-standing concerns related to BAS operations in the 2450-2500 MHz band.⁹³ By way of background, there are three BAS channels that are authorized for operation in the 2450-2500 MHz band – A8, A9, and A10.⁹⁴ 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.⁹⁵ Existing licensees in the band have been permitted to continue operating on a 'grandfathered' basis.⁹⁶ Our records indicate that there are approximately 599 active BAS licensees operating on Channels A8 and A9, categorized as follows: 58 TV Relay⁹⁷ (54 Intercity Relay (ICR) and 4 TV Translator Relay (TTR)), 492 TV Pickup (TV PU),⁹⁸ 17 TV Studio Transmitter Link (TV STL),⁹⁹ and 32 Local Television Transmission Service (LTTS).¹⁰⁰ Our records also indicate there are approximately 186 active grandfathered BAS licensees operating on Channel A10, as follows: 5 TV Relay (4 ICR and 1 TTR) and 181 TV PU.¹⁰¹

⁹³ See generally Comments of Engineers for the Integrity of Broadcast Auxiliary Services Spectrum, RM-11685 (filed Jan. 14, 2013) (EIBASS Comments); Reply Comments of Engineers for the Integrity of Broadcast Auxiliary Services Spectrum, RM-11685 (filed Jan. 29, 2013).

⁹⁴ See 47 C.F.R. § 74.602(a). Channel A8 occupies 2450-2467 MHz; Channel A9 occupies 2467-2483.5 MHz; and Channel A10 occupies 2483.5-2500 MHz.

⁹⁵ See n.25, *supra*. Subsequent allocation changes adding an MSS allocation effectively placed MSS in the same position as RDSS vis-à-vis FS and MS. 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, ¶¶ 3, 18 (1994) (*Big LEO Allocation Order*).

⁹⁶ See n.25, *supra*. In the 2450-2483.5 MHz band, Part 74 BAS, Part 90 MS, and Part 101 FS operations are authorized on a co-primary basis. 47 C.F.R. §§ 2.106, 74.602(a)(1), 90.20(c)(3), (d)(73), 90.35(b)(3), (c)(74), 101.147(f)(1), (f)(3).

⁹⁷ TV Relay stations (ICR and TTR) use fixed point-to-point facilities primarily to transmit or relay TV program material and related communications for use by TV broadcast stations. 47 C.F.R. § 74.601.

⁹⁸ TV PU (TV Pickup) stations are land mobile (temporary fixed) stations used for the transmission of TV program material and related communications from scenes of events back to the TV station or studio. 47 C.F.R. § 74.601.

⁹⁹ TV STL (TV Studio Transmitter Link) stations are fixed stations that are used for the transmission of TV program material and related communications from the studio to the transmitter of a TV broadcast, Class A TV, or low power TV station or other purposes as authorized in § 74.631. 47 C.F.R. §§ 74.601, 74.631.

¹⁰⁰ LTTS (Local Television Transmission Service) stations typically are used to provide temporary service to broadcasters and the cable television relay service (CARS), and are coordinated on a case-by-case basis, such that the LTTS licensee is responsible for determining the presence of other systems in order to protect its own receivers from interference. 47 C.F.R. § 101.803(b).

¹⁰¹ The majority of the 181 grandfathered TV PU stations on Channel A10 are licensed with a circular geographic area designated by a radius (in kilometers) around a set of coordinates (latitude/longitude). The rest are licensed for city-wide coverage and 1 for county-wide coverage.

36. The 2483.5-2500 MHz band has a long history of joint uses and, on many occasions, the Commission has determined that additional services could operate in this band, concluding that coordination could be used to prevent the newly integrated services from causing harmful interference to existing services in the band. In the 1994 *Big LEO Service Rules Order*, which established the licensing and service rules for MSS operations, the Commission affirmed that MSS licensees could coordinate their operations to avoid causing harmful interference to existing operations in the 2483.5-2500 MHz bands and declined to relocate grandfathered operations in this band.¹⁰² In 2003, to enhance MSS licensees' ability to offer mobile services, the Commission adopted the *ATC R&O*, which, *inter alia*, allowed CDMA MSS licensees in the 2483.5-2500 MHz band to add ATC operations. In that decision, the Commission determined that MSS licensees operating ATC facilities could coordinate their operations prior to construction and operation to avoid causing harmful interference to existing BAS, Part 90, and Part 101 microwave operations in the 2483.5-2500 MHz band.¹⁰³ Consequently, these MSS licensees were not required to relocate incumbent BAS operations in the 2483.5-2500 MHz band. Instead, they were required to coordinate their proposed operations to avoid causing harmful interference to those grandfathered operations in the 2483.5-2500 MHz band, and BAS Channels A8 and A9 stations and Parts 90 and 101 mobile and fixed stations in the 2450-2483.5 MHz band.¹⁰⁴

37. Although the Commission has previously concluded that the other services authorized to use the 2483.5-2500 MHz band could coordinate their operations to avoid causing harmful interference to BAS operations in this band, EIBASS has voiced concerns about the potential for harmful interference to BAS Channel A10 operations from Globalstar's terrestrial low-power network operating in the 2483.5-2495 MHz band, and has reiterated an interest in "refarming" Channels A8-A10 to resolve long-standing issues with Globalstar and other users in the 2483.5-2500 MHz band, such as BRS/EBS.¹⁰⁵

38. We seek comment on Globalstar's ability to effectively coordinate the deployment of its terrestrial low-power network with primary BAS Channel A10 operations in the 2483.5-2500 MHz band. Are there criteria that can be used in deploying low power network access points that will be effective in avoiding interference to primary BAS operations, and, if so, what are they? Alternatively, is access-point-by-access point coordination feasible? We seek input on what specific procedures, rule changes or policies may be necessary to either continue to protect grandfathered BAS Channel A10 stations from harmful interference or to relocate such stations.

E. Part 15 Rules

39. Section 15.205 of the Commission's rules specifies certain bands in which unlicensed devices are restricted from operation, including the 2483.5-2500 MHz band. The restriction protects MSS

¹⁰² See *Big LEO Service Rules Order*, 9 FCC Rcd at 5992-94, ¶¶ 147-51.

¹⁰³ See *ATC R&O*, 18 FCC Rcd at 2061-62, ¶¶ 202-03.

¹⁰⁴ See *ATC R&O*, 18 FCC Rcd at 2061-63, ¶¶ 203-06. ATC operators, prior to construction and operation of ATC base stations, must consult local coordination committees for information on the frequencies used and the geographic locations of the BAS systems that may receive harmful interference, and must take the steps necessary to avoid causing harmful interference to these previously licensed facilities. *Id.* at 2061-62, ¶ 203. See also 47 C.F.R. § 25.254(a)(3).

¹⁰⁵ See EIBASS Comments at 5-7. Previously, EIBASS and the Society of Broadcast Engineers (SBE) have voiced concerns about the potential 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 95-18; 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).

operations in that band,¹⁰⁶ and prohibits any emissions in the band by unlicensed operations, other than spurious emissions.¹⁰⁷

40. Given the unusual circumstances involved here, with Globalstar proposing to transmit a signal that is in part operating under rules for unlicensed operations and in part under rules for licensed operations, we seek comment on whether the Commission should interpret Section 15.205 of the rules to apply to Globalstar's proposed deployment in the 2483.5-2495 MHz band.¹⁰⁸ The rule was not developed with this type of operation in mind and Globalstar's managed deployment of equipment may provide an alternative means of ensuring self-interference protection of MSS operations.¹⁰⁹ We seek comment on this question. Alternatively, we seek comment on providing an explicit exception in Section 15.205(d) of the rules for unlicensed operations involving a signal emitted from low-power ATC equipment.

41. The Wi-Fi Alliance requests that the Commission consider revising the band-edge restriction and unwanted emissions limits specified in Sections 15.205 and 15.209, respectively, to enable the use of Channels 12 and 13 by Wi-Fi and other unlicensed devices, provided that use does not interfere with Globalstar's licensed low-power ATC operations in the upper portion of Channel 14, *i.e.*, in the 2483.5-2495 MHz band.¹¹⁰ Globalstar indicated that it does not object to seeking comment on this issue, but notes that the limits are necessary in order to protect MSS in the 2483.5-2495 MHz band, and that it is fully committed to maintaining that service.¹¹¹ Accordingly, we seek comment on this issue. Would

¹⁰⁶ 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 radiodetermination satellite service (RDSS) in the 2483.5-2500 MHz band. *See* Revision of Part 15 of the Rules regarding the operation of radio frequency devices without an individual license, GEN. Docket No. 87-389, RM-5193, RM-5250, RM-5575, *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*. In the 1994 *Big LEO Allocation Order*, 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. *Big LEO Allocation Order*, 9 FCC Rcd at 536, 539, ¶¶ 3, 18.

¹⁰⁷ A companion rule in Section 15.209 of the Commission's rules limits unwanted emissions from unlicensed devices in the 2483.5-2500 MHz band. Under Section 15.205(a) of the Commission's rules, for Part 15 unlicensed devices, only spurious emissions are permitted in the 2483.5-2500 MHz band. Under Section 15.205(b), these spurious emissions must not exceed the unwanted emissions limit in Section 15.209. *See* 47 C.F.R. §§ 15.205(a), (b). Under Section 15.247(d), unwanted emissions which fall in the restricted bands in Section 15.205(a) (*e.g.*, 2483.5-2500 MHz) must comply with the emissions limits in Section 15.209(a). *See* 47 C.F.R. §§ 15.209(a); 15.247(d). The unwanted emissions limits for the 2483.5-2500 MHz band in Section 15.209(a) also preclude IEEE 802.11 devices from operating in the United States on IEEE 802.11 Channel 12 (2456-2478 MHz) and Channel 13 (2471-2483 MHz) at the full power level specified in the IEEE 802.11 standard and Section 15.247. As a result, unlicensed low power Bluetooth and Zigbee devices tend to operate in the 2473-2483.5 MHz portion of the 2400-2483.5 MHz unlicensed band. *See supra* ¶ 27.

¹⁰⁸ Globalstar asserts that its low-power operations in the 2473-2483.5 MHz unlicensed spectrum would be consistent with Part 15 regulations. It also contends that its low-power operations at 2483.5-2495 MHz will be "functional, licensed, in-band" transmissions in Globalstar's own Big LEO spectrum, not spurious or out-of-band emissions. Thus, it asserts that the Commission's unwanted emissions limits above 2483.5 MHz should be inapplicable to its low-power operations above 2483.5 MHz. *See* Globalstar Petition at 16, n.24.

¹⁰⁹ While the situation here is unusual, there is some limited precedent where we have permitted simultaneous and contiguous operation under different rule parts. For example, we permit wideband IEEE 802.11ac devices to operate under two different sections of Part 15 rules. This is described in our Knowledge Database (KDB) publication 644545, available at www.fcc.gov/labhelp. In this case, we do not require the devices to meet the unwanted emissions requirements where the emissions are "intentional."

¹¹⁰ Letter from Edgar Figueroa, President and CEO, Wi-Fi Alliance, to Marlene H. Dortch, Secretary, Federal Communications Commission (filed May 8, 2013).

¹¹¹ Letter from L. Barbee Ponder IV, General Counsel & Vice President Regulatory Affairs, Globalstar, Inc., to Mignon Clyburn, Chairwoman, Federal Communications Commission (filed May 17, 2013).

relaxation of the limits in order to enable use of Channels 12 and 13 degrade MSS capabilities, particularly if those capabilities are not deployed on the same managed basis as Globalstar contemplates for its operations in Channel 14?

F. Equipment Certification

42. A party seeking to market RF devices to the public must first comply with the Commission's equipment authorization procedures, which, *inter alia*, require a demonstration that the device complies with the Commission's rules.¹¹² We propose to require equipment manufacturers to certify all terrestrial low-power equipment under modified provisions specified in section 25.149 of the rules.¹¹³ The proposed rules 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. Since the equipment will be operating simultaneously under the provisions of section 15.247 and modified provisions specified in section 25.149, we also tentatively conclude that the equipment must be certified under both the rule parts.¹¹⁴ In such cases the device could be treated like a composite device subject to multiple rule parts. Composite devices are required to ensure compliance with the relevant rule parts.¹¹⁵ We seek comment on this approach and how compliance should be demonstrated for such devices. We also conclude that the current certification procedures in Subpart J of Part 2 of the rules permit such approval.¹¹⁶ We seek comment on this conclusion.

43. A grant of equipment certification specifies the frequency range over which the equipment is approved to operate. A grantee of equipment certification may obtain authorization to add additional frequency bands to a previously approved device by filing a new application for certification and labeling the equipment with a new FCC ID. In some cases, the Commission permits grantees to add new frequency bands to a previously certified device by filing a request for a "permissive change."¹¹⁷ If the changes are made through software, the Commission has permitted the grantees to add certain additional frequency bands; however, the Commission does not permit a grantee of certification to add or change the rule part under which a device is certified (*e.g.*, from Part 15 to Part 25) by filing a request for a permissive change, unless the equipment was originally certified as a software defined radio (SDR).¹¹⁸

¹¹² 47 C.F.R. §§ 2.803, 2.901.

¹¹³ Under current Part 25 rules, ATC base stations are not required to obtain equipment certification. 47 C.F.R. § 25.149(c).

¹¹⁴ Compliance with the 1 Watt transmit power limit would be determined using the measurement procedures specified in the proposed Section 25.149(c) and Section 15.247(b)(3) of the Commission's rules for systems using digital modulation in the 2400-2483.5 MHz band. 47 C.F.R. § 15.247(b)(3).

¹¹⁵ See 47 C.F.R. § 15.31(k). A device can be subject to different technical standards and has to demonstrate compliance with individual standards and in no event may the measured emissions of the composite system exceed the highest level permitted for an individual component. *Id.*

¹¹⁶ See 47 C.F.R. § 25.149(c). Certification is an equipment authorization issued by the Commission or by a designated Telecommunication Certification Body (TCB) based on an application and test data submitted by the manufacturer or importer. The certification procedure is typically applied to RF equipment that has a greater risk of non-compliance, such as equipment employing new technology for which the testing methodology is not well defined, or that poses a higher risk of interference.

¹¹⁷ See 47 C.F.R. § 2.1043. Changes to the basic frequency determining and stabilizing circuitry (including clock or data rates), frequency multiplication stages, basic modulator circuit or maximum power or field strength ratings require new authorization. If such changes are made using software under the control of the grantee, the Commission has provided guidance on the permissive change rules in KDB publication 178919, available at www.fcc.gov/labhelp.

¹¹⁸ See KDB publication 178919 at 4.

For such a change, we would require the grantee to file a new application for certification and label the equipment with a new FCC ID.¹¹⁹

44. Globalstar maintains that Wi-Fi enabled devices can be upgraded through software based modification.¹²⁰ We seek comment on requiring applicants for certification of certain equipment that operates in the 2483.5-2495 MHz band to provide evidence of Globalstar's consent to the applicant's request for equipment certification. Specifically, we propose limiting this requirement to equipment that operates in the 2483.5-2495 MHz band that is used as a network access point and that will operate as a master device as defined in Section 15.202 of the rules, since the master device in a system controls the frequencies on which other devices in the system (client or end user terminal devices) can operate.¹²¹ We therefore do not believe a requirement to obtain Globalstar's consent is necessary for the certification of devices that operate exclusively as a client to a master device. We seek comment on this approach. Globalstar expects that network access points operating in the 2483.5-2495 MHz band would be new devices. We believe that requiring this additional step would not place a significant burden on the device manufacturers. We seek comment on this proposal.

45. In the case of client or end user terminal devices that would operate with the master or network access points, Globalstar states that to expand the operating frequency range of existing devices to include the 2483.5-2495 MHz band, the original grantees of certification for those devices will have to submit permissive change filings describing the proposed modifications.¹²² It also states that it has the ability to control the availability of software updates for end-user devices and will provide the update only to devices certified by the Commission and to end-users authenticated to receive service over Globalstar's facilities.¹²³ Globalstar states that most 802.11-enabled end-user devices have the hardware needed to operate at 2473-2495 MHz, but lack the capability to operate above 2483.5 MHz in the United States because of restrictions in their radio frequency (RF) software.¹²⁴

46. We seek comment on the capability of existing Part 15 devices to be modified through software directly provided by Globalstar to use the 2473-2495 MHz frequency band with the transmission format that Globalstar proposes. In particular, we seek comment on whether the currently deployed devices have the hardware capability to operate in the additional frequency band with the Globalstar proposed protocol. We also seek comment on whether existing devices could be modified through over-the-air software changes, or whether changes to the devices' firmware would be necessary. We also seek comment on the means that Globalstar plans to use to control the availability of software updates and prevent unauthorized modifications to certified equipment. We seek further comment on how Globalstar will limit operation of equipment to parties that are authorized to use its spectrum, and also how we would ensure that the modified devices would be compliant with the proposed rules.

47. We do not currently permit grantees or third-parties to modify non-SDR devices to operate under additional rule parts through a permissive change, but instead require a new grant of certification and a new FCC ID. If the client devices can be modified by over-the-air software upgrades by Globalstar, how should such change be classified under our current rules and which party should be held responsible for compliance of the devices? Globalstar states that grantees of such devices should file for a permissive change prior to Globalstar software upgrade.¹²⁵ Also, if the client devices need firmware

¹¹⁹ See 47 C.F.R. § 2.1043(a).

¹²⁰ Globalstar Petition at 17.

¹²¹ See 47 C.F.R. § 15.202.

¹²² Globalstar Petition at 42, n.105.

¹²³ *Id.* at 41-42.

¹²⁴ *Id.* at 17.

¹²⁵ *Id.* at 42, n.105.

modifications which will require a filing of new equipment authorization with the Commission, this may require a large number of filings for permissive changes, if appropriate, or applications for new filings and we believe this may inhibit manufacturers from taking advantage of the proposed rule changes. We invite comments on the costs and benefits of different approaches to reduce the compliance burden on various parties while providing the assurance that modified devices are compliant with the revised rules. The Commission announced at its June 13, 2012 meeting that it is planning to initiate a proceeding to consider possible changes to the equipment certification procedures, including the permissive change rules.¹²⁶ In the interim, we seek comment on whether more limited changes concerning only the Globalstar proposal would serve the public interest. Should we permit Globalstar, or parties working with Globalstar, to add new frequency bands to previously approved equipment without the need to label equipment with a new FCC ID?

G. Free Access Points and Public Safety Considerations

48. In its Petition, Globalstar commits to “deploying up to twenty thousand [low-power ATC] access points free of charge in the nation’s public and non-profit schools, community colleges and hospitals.”¹²⁷ Subsequently, Globalstar noted in an *ex parte* filing that it fully supports the ConnectED initiative and that “Globalstar’s [low-power ATC] can play an important part in meeting the ambitious objectives of ConnectED.”¹²⁸ Further, Globalstar also commits to providing its “mobile satellite service free of charge to Globalstar subscribers within any federally declared “disaster area” following a natural or man-made disaster.”¹²⁹ We seek comment on whether one or both of Globalstar’s commitments should be incorporated as requirements in the Commission’s rules. Alternatively, we invite comment on directing the International Bureau to include one or both of Globalstar’s commitments as license conditions, in the event that the Commission adopts rules as contemplated in this proceeding.

IV. CONCLUSION

49. This action could potentially help to meet growing consumer demand for wireless broadband. At the same time, concerns have been raised about certain detrimental impacts on unlicensed devices. We seek comment on the costs and benefits of the approach proposed in the *Notice*, and on the changes to our rules, which may facilitate such deployment and minimize any negative impacts.

V. PROCEDURAL MATTERS

A. Regulatory Flexibility Act

50. As required by the Regulatory Flexibility Act, 5 U.S.C. § 603, the Commission has prepared an Initial Regulatory Flexibility Analysis (IRFA) regarding the possible significant economic impact on a substantial number of small entities of the proposals addressed in this *Notice*. The IRFA is set forth in Appendix B. Written public comments are requested on the IRFA. These comments must be filed in accordance with the same filing deadlines for comments on the *Notice*, and they should have a separate and distinct heading designating them as responses to the IRFA.

¹²⁶ *FCC Responds to Ever Increasing Applications for New Wireless Devices; Announces Agency Will Consider Ways to Enhance Equipment Authorization Program*, News Release (June 13, 2012).

¹²⁷ Globalstar Petition at 43 (emphasis omitted). On June 6, 2013, President Obama introduced ConnectED, his plan to connect 99 percent of students in the United States to the digital age through next-generation broadband and high-speed wireless in their schools and libraries within five years. Press Release, The White House, Office of the Press Secretary, President Obama Unveils ConnectED Initiative to Bring America’s Students into Digital Age (June 6, 2013), available at <http://www.whitehouse.gov/the-press-office/2013/06/06/president-obama-unveils-connected-initiative-bring-america-s-students-di>.

¹²⁸ June 10, 2013 Globalstar *Ex Parte*.

¹²⁹ Globalstar Petition at 44.

B. Paperwork Reduction Act of 1995

51. This document contains proposed new information collection requirements. The Commission, as part of its continuing effort to reduce paperwork burdens, invites the general public and OMB to comment on the information collection requirements contained in this document, as required by PRA. In addition, pursuant to the Small Business Paperwork Relief Act of 2002,¹³⁰ we seek specific comment on how we might “further reduce the information collection burden for small business concerns with fewer than 25 employees.”¹³¹

C. Ex Parte Rules

52. This proceeding shall be treated as a “permit-but-disclose” proceeding in accordance with the Commission’s *ex parte* rules. Persons making *ex parte* presentations must file a copy of any written presentation or a memorandum summarizing any oral presentation within two business days after the presentation (unless a different deadline applicable to the Sunshine period applies). Persons making oral *ex parte* presentations are reminded that memoranda summarizing the presentation must (1) list all persons attending or otherwise participating in the meeting at which the *ex parte* presentation was made, and (2) summarize all data presented and arguments made during the presentation. If the presentation consisted in whole or in part of the presentation of data or arguments already reflected in the presenter’s written comments, memoranda or other filings in the proceeding, the presenter may provide citations to such data or arguments in his or her prior comments, memoranda, or other filings (specifying the relevant page and/or paragraph numbers where such data or arguments can be found) in lieu of summarizing them in the memorandum. Documents shown or given to Commission staff during *ex parte* meetings are deemed to be written *ex parte* presentations and must be filed consistent with section 1.1206(b) of the Commission’s rules.¹³² In proceedings governed by section 1.49(f) or for which the Commission has made available a method of electronic filing, written *ex parte* presentations and memoranda summarizing oral *ex parte* presentations, and all attachments thereto, must be filed through the electronic comment filing system available for that proceeding, and must be filed in their native format (*e.g.*, .doc, .xml, .ppt, searchable .pdf). Participants in this proceeding should familiarize themselves with the Commission’s *ex parte* rules.

D. Filing Requirements

53. *Comments and Replies.* Pursuant to Sections 1.415 and 1.419 of the Commission’s rules,¹³³ interested parties may file comments and reply comments on or before the dates indicated on the first page of this document. Comments may be filed using the Commission’s Electronic Comment Filing System (ECFS).¹³⁴

- Electronic Filers: Comments may be filed electronically using the Internet by accessing the ECFS: <http://fjallfoss.fcc.gov/ecfs2/>.
- Paper Filers: Parties who choose to file by paper must file an original and one copy of each filing. If more than one docket or rulemaking number appears in the caption of this proceeding, filers must submit two additional copies for each additional docket or rulemaking number.

¹³⁰ Pub. L. No. 107-198.

¹³¹ 44 U.S.C. § 3506(c)(4).

¹³² See 47 C.F.R. § 1.1206(b).

¹³³ See 47 C.F.R. §§ 1.415, 1.419.

¹³⁴ See *Electronic Filing of Documents in Rulemaking Proceedings*, GC Docket No. 97-113, Report and Order, FCC 98-56, 13 FCC Rcd 11322 (1998).

Filings can be sent by hand or messenger delivery, by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail. All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.

- All hand-delivered or messenger-delivered paper filings for the Commission's Secretary must be delivered to FCC Headquarters at 445 12th St., SW, Room TW-A325, Washington, DC 20554. The filing hours are 8:00 a.m. to 7:00 p.m. All hand deliveries must be held together with rubber bands or fasteners. Any envelopes and boxes must be disposed of before entering the building.
- Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9300 East Hampton Drive, Capitol Heights, MD 20743.
- U.S. Postal Service first-class, Express, and Priority mail must be addressed to 445 12th Street, SW, Washington DC 20554.

54. Written comments by the public on the proposed and/or modified information collections are due on or before 45 days after publication in the Federal Register. Written comments must be submitted by the Office of Management and Budget (OMB) on the proposed and/or modified information collections on or before 60 days after date of publication in the Federal Register. In addition to filing comments with the Secretary, a copy of any comments on the information collection(s) contained herein should be submitted to the Secretary, Federal Communications Commission, Room TW-A325, 445 12th Street, SW, Washington, DC 20554, or via the Internet to jboley@fcc.gov and to Virginia Huth, OMB Desk Officer, 10236 NEOB, 725 – 17th Street, N.W., Washington, DC 20503 or via the Internet to vhuth@omb.eop.gov.

55. *Availability of Documents.* Comments, reply comments, and *ex parte* submissions will be available for public inspection during regular business hours in the FCC Reference Center, Federal Communications Commission, 445 12th Street, S.W., CY-A257, Washington, D.C., 20554. These documents will also be available via ECFS. Documents will be available electronically in ASCII, Word 97, and/or Adobe Acrobat.

56. *People with Disabilities:* To request materials in accessible formats for people with disabilities (Braille, large print, electronic files, audio format), send an e-mail to fcc504@fcc.gov or call the Consumer & Governmental Affairs Bureau at 202-418-0530 (voice), 202-418-0432 (tty).

VI. ORDERING CLAUSES

57. Accordingly, IT IS ORDERED that, pursuant to the authority contained in Sections 4(i), 4(j), 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), 154(j), 157(a), 302(a), 303(c), 303(e), 303(f), 303(g), 303(j), and 303(r), this *Notice of Proposed Rulemaking* in IB Docket No. 13-213 IS ADOPTED.

58. IT IS FURTHER ORDERED that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, SHALL SEND a copy of this Notice, including the Initial Regulatory Flexibility Certification, to the Chief Counsel for Advocacy of the Small Business Administration.

59. IT IS FURTHER ORDERED pursuant to Sections 4(i) and (j) and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), (j), 303(r), and Section 1.407 of the Commission's Rules, 47 C.F.R. § 1.407, that the Petition for Rulemaking filed by Globalstar, Inc. on November 13, 2012, IS GRANTED to the extent provided in this *Notice*.

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary

APPENDIX A

Proposed Rule Changes

For the reasons discussed in the preamble, the Federal Communications Commission proposes to amend 47 CFR part 25 as follows:

PART 25 – SATELLITE COMMUNICATIONS

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

Authority: Interprets or applies Sections 4, 301, 302, 303, 307, 309, 319, 332, and 705 of the Communications Act, as amended, 47 U.S.C. Sections 154, 301, 302, 303, 307, 309, 319, 332, and 705 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, 1.6/2.4 GHz and 2 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 2000-2020 MHz/2180-2200 MHz bands (2 GHz band), the 1626.5-1660.5 MHz/1525-1559 MHz bands (L-band), and the 1610-1626.5 MHz/2483.5-2500 MHz bands (1.6/2.4 GHz).

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 licensee is permitted to apply for ATC authorization on a non-forward-band mode of operations 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 (access point and end-user devices) operating under this section in the 2483.5-2495 MHz band must demonstrate the following:

(i) The system is digitally modulated:

(ii) The 6 dB bandwidth is at least 500 kHz;

(iii) The maximum transmit power is no more than 1 Watt with a peak EIRP of no more than 6 dBW;

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

(v) Emissions above 2495 MHz shall be attenuated by a factor of at least $40 + 10 \log (P)$ dB at the channel edge at 2495 MHz, $43 + 10 \log (P)$ dB at 5 MHz from the channel edges, and $55 + 10 \log (P)$ dB at X MHz from the channel edges where X is the greater of 6 MHz or the actual emission bandwidth.

(vi) 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.

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. No further demonstration is needed for these systems with respect to § 25.254.

* * * * *

(e) Except as provided for in paragraph (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 must ensure continued compliance with this section and §§ 25.253 or 25.254, as appropriate.

* * * * *

(g) Special provisions for terrestrial low power systems in the 2473-2495 MHz band. 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 section (c)(4) of this section is not required to demonstrate compliance with subsection (b) of this section, except to demonstrate the commercial availability of MSS, without regard to coverage requirements.

APPENDIX B**Comments**Comments

Association of Home Appliance Manufacturers, RM-11685 (filed Jan. 14, 2013)
Bluetooth Special Interest Group (filed Jan. 14, 2013) (Bluetooth SIG Comments)
Clearwire Corporation (filed Jan. 14, 2013)
Engineers for the Integrity of Broadcast Auxiliary Services Spectrum (filed Jan. 14, 2013)
Iridium Constellation LLC (filed Jan. 14, 2013)
Mobile Satellite Users Association (filed Jan. 14, 2013)
U.S. GPS Industry Council (filed Jan. 14, 2013)
Wi-Fi Alliance® (filed Jan. 11, 2013)
Wireless Internet Service Providers Association (filed Jan. 14, 2013)

Reply Comments

Consumer Electronics Association (filed Jan. 29, 2013)
Engineers for the Integrity of Broadcast Auxiliary Services Spectrum (filed Jan. 29, 2013)
Globalstar, Inc. (filed Jan. 29, 2013)
Iridium Constellation LLC (filed Jan. 29, 2013)
Wireless Communications Association International (filed Jan. 29, 2013)

Ex Parte Comments

Bluetooth Special Interest Group, Inc. (filed Aug. 7, 2013)
Globalstar, Inc. (filed Aug. 2, 2013)
Bluetooth Special Interest Group, Inc. (filed Aug. 1, 2013)
Mary L. Landrieu, United States Senator, Louisiana (July 23, 2013)
Jarvinian Wireless Innovation Fund (filed July 1, 2013)
State of Louisiana Governor's Office of Homeland Security and Emergency Preparedness (filed July 2, 2013)
Engineers for the Integrity of Broadcast Auxiliary Services Spectrum (filed June 26, 2013)
Cedric L. Richmond, House of Representatives, 2nd District Louisiana (filed June 24, 2013)
Counsel for Globalstar, Lawler, Metzger, Keeney & Logan, LLC (filed June 21, 2013);
Globalstar, Inc. (filed Jun. 10, 2013)
Las Vegas Metropolitan Police Department (filed June 5, 2013)
West Coast-Southern Medical Service, Inc. (filed May 24, 2013)
Florida Association of Community Health Centers (filed June 3, 2013)
Globalstar, Inc. Erratum (filed June 3, 2013)
Globalstar, Inc. (filed June 3, 2013)
Sheriff, Kimball County, NE (filed May 21, 2013)
New York Power Authority (filed May 20, 2013)
Iroquois Healthcare Association (filed May 20, 2013)
Counsel for Globalstar, Lawler, Metzger, Keeney & Logan, LLC (filed May 17, 2013)
Globalstar, Inc. (filed May 17, 2013)
Counsel for Globalstar, Lawler, Metzger, Keeney & Logan, LLC (filed May 13, 2013)
Counsel for Globalstar, Lawler, Metzger, Keeney & Logan, LLC (filed May 9, 2013)
Wi-Fi Alliance® (filed May 8, 2013)
Microsoft Corporation (filed Apr. 26, 2013)
Engineers for the Integrity of Broadcast Auxiliary Services (filed Apr. 16, 2013)
Counsel for Globalstar, Lawler, Metzger, Keeney & Logan, LLC (filed Mar. 28, 2013)
Counsel for Globalstar, Lawler, Metzger, Keeney & Logan, LLC (filed Mar. 21, 2013)
Microsoft Corporation (filed Mar. 14, 2013)
Counsel for Globalstar, Lawler, Metzger, Keeney & Logan, LLC, (filed Feb. 22, 2013)

APPENDIX C**Initial Regulatory Flexibility Analysis**

As required by the Regulatory Flexibility Act of 1980, as amended (RFA),¹ the Commission has prepared this present Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on a substantial number of small entities by the policies and rules proposed in the *Notice of Proposed Rulemaking (Notice)* in IB Docket No. 13-213. Written public comments are requested on this IRFA. Comments must be identified as responses to the IRFA and must be filed by the deadlines specified in the *Notice* for comments. The Commission will send a copy of the *Notice*, including this IRFA, to the Chief Counsel for Advocacy of the Small Business Administration (SBA).² In addition, the *Notice* and IRFA (or summaries thereof) will be published in the Federal Register.³

A. Need for, and Objectives of, the Notice

The *Notice* proposes 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 proposed changes would allow Globalstar, Inc. (Globalstar) to deploy a low-power broadband network in the Big LEO S band. Under the proposals in this *Notice*, Globalstar would be able to provide low-power ATC using its licensed spectrum under certain limited technical criteria, and could utilize spectrum in the adjacent 2473-2483.5 MHz band pursuant to the technical rules for unlicensed operations that apply in that band. The *Notice* proposes to make the necessary changes to and relieving Globalstar from certain requirements in Part 25 of the rules to provide for the operation of low-power ATC in the licensed MSS spectrum in the 2483.5-2495 MHz band. The *Notice* also proposes technical rules to prevent unwanted emissions to other services operating in or above or below the 2473-2495 MHz band and seeks comment on preventing interference.

The *Notice* raises the question of whether an exception should be created for the proposed network so that it is not required to comply with a Section 15 rule which specifies certain bands in which unlicensed devices are restricted from operation. The *Notice* also seeks comment on equipment certification requirements in Part 15 of the Commission's rules and whether to provide exemption to certain of those rules with respect to the proposed Globalstar network. The *Notice* seeks comment of procedures for equipment certification. The *Notice* also seeks comment on the procedures that should be followed for modifying the devices that will provide the proposed network.

B. Legal Basis

The proposed action is authorized pursuant to Sections 1, 2, 4(i), 301, 302, 303, and 324 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 151, 152, 154(i), 301, 302, 303, and 324.

C. Description and Estimate of the Number of Small Entities to Which Rules Will Apply

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.⁴ The RFA generally defines

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 See 5 U.S.C. § 603(a).

³ *Id.*

⁴ 5 U.S.C. § 604(a)(3).

the term “small entity” as having the same meaning as the terms “small business,” “small organization,” and “small governmental jurisdiction.”⁵ In addition, the term “small business” has the same meaning as the term “small business concern” under the Small Business Act.⁶ A small business concern is one that: (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).⁷ Below, we further describe and estimate the number of small entity licensees that may be affected by the adopted rules.

Satellite Telecommunications and All Other Telecommunications

The rules proposed in this Notice would 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 \$30 million or less in average annual receipts.⁸ Under the “Other Telecommunications” category, a business is considered small if it had \$30 million or less in average annual receipts.⁹

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.”¹⁰ 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.¹¹ Of this total, 464 firms had annual receipts of under \$10 million, and 18 firms had receipts of \$10 million to \$24,999,999.¹²

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) services via client-supplied telecommunications connections are also included in this industry.”¹³ For this category, Census

⁵ 5 U.S.C. § 601(6).

⁶ 5 U.S.C. § 601(3) (incorporating by reference the definition of “small business concern” in 15 U.S.C. § 632). Pursuant to the RFA, 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 the 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.” 5 U.S.C. § 601(3).

⁷ Small Business Act, 15 U.S.C. § 632 (1996).

⁸ See 13 C.F.R. § 121.201, NAICS code 517410.

⁹ See 13 C.F.R. § 121.201, NAICS code 517919.

¹⁰ U.S. Census Bureau, 2007 NAICS Definitions, “517410 Satellite Telecommunications.”

¹¹ See http://factfinder.census.gov/servlet/IBQTable?_bm=y&-geo_id=&-_skip=900&-ds_name=EC0751SSSZ4&-_lang=en.

¹² *Id.*

¹³ U.S. Census Bureau, 2007 NAICS Definitions, “517919 Other Telecommunications”, <http://www.census.gov/naics/2007/def/ND517919.HTM>.

Bureau data for 2007 show that there were a total of 2,383 firms that operated for the entire year.¹⁴ Of this total, 2,346 firms had annual receipts of under \$25 million.¹⁵ We anticipate that some of these “Other Telecommunications firms,” which are small entities, are earth station applicants/licensees that might be affected if our proposed rule changes are adopted.

Our proposed rule changes 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 proposed 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.

Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing:

The proposed rules will pertain to manufacturers of unlicensed 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.”¹⁶ The SBA has developed a small business size standard for firms in this category, which is: all such firms having 750 or fewer employees.¹⁷ 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.¹⁸ Thus, under this size standard, the majority of firms can be considered small.

We anticipate that the proposed rules will affect equipment manufacturers of unlicensed communications devices. The *Notice* seeks comment on extending existing Part 15 equipment certification rules to the proposed equipment that would provide low-power ATC service. The *Notice* proposes to apply the rules in Part 15 to both existing equipment as well as new equipment that will be manufactured.

¹⁴ See 13 C.F.R. § 121.201, NAICS code 517919.

¹⁵ 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).

¹⁶ 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>.

¹⁷ 13 C.F.R. § 121.201, NAICS code 334220.

¹⁸ http://factfinder.census.gov/servlet/IBQTable?_bm=y&-fds_name=EC0700A1&-geo_id=&-_skip=300&-ds_name=EC0731SG2&-_lang=en.

D. Description of Projected Reporting, Recordkeeping, and Other Compliance Requirements

The *Notice* seeks comment on whether it would be necessary to adopt rule changes that could affect the reporting, recordkeeping, and other compliance requirements for small business equipment manufacturers who would provide the equipment for the contemplated new service.

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

The RFA requires that, to the extent consistent with the objectives of applicable statutes, the analysis shall discuss significant alternatives such as: (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 rule for 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 small entities.¹⁹

The *Notice* seeks comment from all interested parties. The Commission recognizes that proposals contained in the *Notice* to require equipment manufacturers to comply with both existing and proposed equipment certification rules may impact small entities. To the extent possible, the Commission has sought to minimize the impact the proposed rule changes would have on small entities and seeks comment on those proposed changes. For devices which will operate on the low-power broadband network proposed in the *Notice*, the Commission has proposed that the equipment certification rules contained in Part 15 of the Commission's rules apply to operations in the 2473-2483.5 MHz band.²⁰ For operations in the 2483.5-2495 MHz band, the Commission has proposed modifications to rules in Section 25.149 of the Commission's rules.²¹ Since the operations will cover this band and the 2483.5-2495 MHz band, the Commission states that the devices will be treated as composite devices which will be required to comply with the relevant portions of both rule parts.

The Commission also suggests limiting a proposed rule, which would require parties seeking certification of equipment to provide evidence of Globalstar's consent to their request for equipment certification, to equipment that is used as a network access point and will operate as a master device.²² The Commission does not propose imposing this requirement on devices that will serve only as a client to a master device. The Commission seeks comment in the *Notice* on whether already manufactured devices can be modified by over-the-air software upgrades or through firmware upgrades and how those modifications should be classified under the rules, as a permissive change or as an application for a new filing.²³ Finally, the Commission seeks comment from parties to ascertain the benefits and costs of different certification approaches to reduce the compliance burden on affected parties.

¹⁹ 5 U.S.C. § 603(c)(1), (c)(4).

²⁰ See *Notice* at ¶¶ 19, 42.

²¹ *Id.*

²² *Id.* at ¶ 44.

²³ *Id.* at ¶ 46-47.

Small entities are encouraged to bring to the Commission's attention any specific concerns they may have with the proposals outlined in the *Notice*. The Commission expects to consider the economic impact on small entities, as identified in comments filed in response to the *Notice*, in reaching its final conclusions and taking action in this proceeding.

F. Federal Rules that May Duplicate, Overlap, or Conflict with the Proposed Rules

None.