

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of)
)
Revision of Part 15 of the Commission’s Rules) ET Docket No. 13-49
To Permit Unlicensed National Information)
Infrastructure (U-NII) Devices in the)
5 GHz Band)

REPLY COMMENTS OF GLOBALSTAR, INC.

Globalstar, Inc. (“Globalstar”) hereby replies to comments on the Federal Communications Commission’s (“Commission’s”) Notice of Proposed Rulemaking (“*NPRM*”) in the above-captioned proceeding.¹ Globalstar urges the Commission to maintain its existing prohibition on the outdoor operation of unlicensed devices in the U-NII-1 band at 5150-5250 MHz, spectrum which is also used by Globalstar for its non-geostationary (“*NGSO*”) mobile satellite service (“*MSS*”) feeder links. This outdoor prohibition is necessary to prevent substantial harmful interference to Globalstar’s two-way (duplex) satellite services in the United States and beyond, including emergency communications in rural and remote areas and critical back-up connectivity in populated areas during and after disasters. In addition, given the likely long-term growth of Wi-Fi services in other spectrum at 5 GHz as well as in other bands, revised technical rules in the U-NII-1 band are not necessary to resolve the nation’s Wi-Fi “Traffic Jam.”

¹ *Revision of Part 15 of the Commission’s Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band*, Notice of Proposed Rulemaking, 28 FCC Rcd 1769 (2013) (“*NPRM*”).

DISCUSSION

Globalstar agrees with commenters in this proceeding who state that the Commission must make additional spectrum available for wireless and mobile broadband services.² Unlike some parties, however, Globalstar believes that significant changes to the technical rules for the U-NII-1 band at 5150-5250 MHz are unnecessary. As Globalstar described in its comments, such changes would cause harmful interference to Globalstar's MSS feeder links and, in turn, to its two-way MSS offerings, harming MSS consumers and impairing critical public safety communications.³ Moreover, the Commission can address the broadband spectrum crunch and the Wi-Fi Traffic Jam in other ways, including through rule changes in other portions of the 5 GHz band and by adopting Globalstar's proposed Big LEO reforms permitting the provision of Terrestrial Low Power Service ("TLPS") at 2.4 GHz.⁴

I. Commenters' Proposals to Protect Globalstar's MSS Feeder Links from Harmful Interference Would Be Ineffective

In the *NPRM*, the Commission asked if it should eliminate the prohibition on outdoor operations in the U-NII-1 band and take other steps to harmonize the U-NII-1 technical rules

² See, e.g., Comments of Comcast Corporation at 14-17; Comments of Google Inc. and Microsoft Corporation at 3-4 ("Google/Microsoft Comments"); Comments of the National Cable & Telecommunications Association at 7-9. (Unless otherwise indicated, all comments cited herein were filed in ET Docket No. 13-49 on May 28, 2013.)

³ Comments of Globalstar, Inc. at 4-6 ("Globalstar Comments"). For its feeder links, Globalstar is authorized for uplink transmissions between its gateway earth stations and space stations in the 5096-5250 MHz band, and for downlink transmission from its satellites to its gateway facilities at 6875-7055 MHz. See *Globalstar Licensee LLC, Application for Modification of Non-geostationary Mobile Satellite Service Space Station License; GUSA Licensee LLC, Applications for Modification of Mobile Satellite Service Earth Station Licenses; GCL Licensee LLC, Applications for Modification of Mobile Satellite Service Earth Station Licenses*, Order, 26 FCC Rcd 3948, ¶¶ 2 n.1, 3 (2011) (DA 11-520) ("*Globalstar 2011 Modification Order*"). Globalstar's earth station in Clifton, Texas also utilizes the 5091-5096 MHz band for uplink transmissions to its space stations.

⁴ See Petition for Rulemaking of Globalstar, Inc., RM-11685 (Nov. 13, 2012) ("Globalstar Petition").

with rules for the U-NII-2A and U-NII-3 bands.⁵ Most commenters who support elimination of the outdoor U-NII-1 restriction ignore the potential harm to MSS,⁶ but a number of parties, including Google, Microsoft, the Wi-Fi Alliance, and Time Warner Cable, acknowledge their obligation to protect Globalstar's MSS feeder uplinks from harmful interference.⁷ Globalstar is eager to work with these and other parties toward a solution that promotes unlicensed operations at 5 GHz while minimizing any harm to Globalstar's MSS feeder links and the mobile satellite services that it is currently providing to approximately 74,000 duplex customers in North America, including many government and public safety users.

Unfortunately, even commenters who recognize the obligation to protect Globalstar's MSS feeder links appear to misunderstand how U-NII-1 facilities cause interference to those satellite links. To protect Globalstar's MSS, WISPA and Google/Microsoft each propose that outdoor U-NII-1 operations be prohibited or restricted within limited "protection contours" or "protection zones" surrounding Globalstar's U.S. gateway earth stations.⁸ While apparently intended to safeguard Globalstar's NGSO MSS feeder links, this measure in fact appears suited to protect earth station reception of fixed satellite service ("FSS") downlink transmissions.⁹

These commenters fail to recognize that, in evaluating the threat of interference from U-NII-1

⁵ *NPRM* ¶¶ 36-41; *see* 47 C.F.R. § 15.407(e).

⁶ *See, e.g.*, Comments of Cablevision Systems Corporation at 6; Comments of Ericsson at 5; Comments of IEEE 802 at 27-28; Comments of the Information Technology Industry Council at 10; Comments of Motorola Mobility LLC at 4-6.

⁷ Google/Microsoft Comments at 9; Comments of the Wireless Internet Service Providers Association at 11 ("WISPA Comments"); Comments of the Wi-Fi Alliance at 24-25 (May 28, 2013); Comments of Time Warner Cable Inc. at 12 ("Time Warner Cable Comments").

⁸ Google/Microsoft Comments at 9; WISPA Comments at 11.

⁹ A protection zone might also provide interference protection to a co-channel geostationary feeder uplink with a steerable spot beam over the relevant gateway earth stations. Again, however, this approach is inapposite to an NGSO MSS feeder uplink beam that must have a coverage area of approximately 3600 miles because of the fact that it is in constant motion across the earth's surface.

facilities to Globalstar's NGSO feeder uplinks at 5096-5250 MHz (the "C band"), the Commission must account for *all* U-NII-1 transmissions within the C-band footprint of a Globalstar satellite, not just those within the vicinity of Globalstar's gateways. Each satellite's feeder link antenna "hears" *all* U-NII-1 transmissions and other C-band signals that occur within its feeder link coverage area, which is approximately 3600 miles in diameter as it traverses North America.¹⁰ It is the aggregate noise from such U-NII-1 transmissions that can interfere with satellites' reception of a gateway facility's feeder link signal. For this reason, commenters' proposed "protection zones" would not protect Globalstar's 5 GHz feeder uplinks from harmful interference.¹¹

As described in Globalstar's comments, outdoor operation of U-NII-1 devices across the United States would significantly increase the aggregate noise heard by Globalstar's feeder link receivers, by avoiding the signal attenuation of walls, roofs, and other structures.¹² The number of U-NII-1 access points that could operate without causing unacceptable interference to its feeder links would decrease from over 200,000 to just over 4,000.¹³ In addition, assuming the operation of approximately 70,000 Wi-Fi access points in the U-NII-1 band,¹⁴ Globalstar

¹⁰ See Exhibit A to these reply comments (including figures showing the geographic footprint of Globalstar's feeder link coverage areas).

¹¹ Significantly, Globalstar always has at least one NGSO satellite with CONUS coverage that is in communication with its North American gateway facilities. For this reason, U-NII-1 transmissions in the United States will *always* be relevant to this MSS interference issue.

¹² Globalstar Comments at 5-6; Technical Appendix to Globalstar Comments ("Technical Appendix") at 2-4.

¹³ Globalstar Comments at 5; Technical Appendix at 2. Globalstar's technical analysis in its comments focused on the interference effects of U-NII-1 access points, since such equipment typically operates at power levels 5 to 8 dB higher than Wi-Fi end user devices such as tablets and smart phones. Even at their lower power levels, however, such end user devices could cause harmful interference to Globalstar's MSS feeder uplinks if operated outdoors.

¹⁴ Globalstar Comments at 5.

estimates the outdoor operation of these facilities would raise the noise level for Globalstar's feeder uplink by as much as 26%.¹⁵

Other commenters' proposals would offer similarly ineffective protection from this increased interference. Fastback Networks proposes that fixed U-NII-1 access points with transmission elevation angles exceeding 45 degrees be subject to tighter power limits (200 mW or +23 dBm or +10 dBm/MHz).¹⁶ This approach would not protect Globalstar's MSS feeder links, however, since its satellites' C-band antennas are designed to communicate with gateway earth stations almost down to the horizon, to at least a 10 degree elevation. In reality, any outdoor U-NII-1 transmission that leaves the earth's surface at an elevation angle greater than zero degrees would contribute to interference to Globalstar's MSS feeder link operations.¹⁷

Meanwhile, Time Warner Cable says that other 5 GHz users will be protected if U-NII-1 systems are "coordinat[ed] with incumbent users and avoi[d] their operations."¹⁸ Coordination

¹⁵ *Id.* at 5-6; Technical Appendix at 4. If the Commission eliminates its restriction on outdoor U-NII-1 operations, there will not only be increased noise in the portion of Globalstar's MSS feeder uplink spectrum at 5150-5250 MHz, but also greater noise transmitted into the remainder of Globalstar MSS feeder link spectrum at 5096-5150 MHz as well as into its Telemetry, Tracking and Command ("TT&C") frequencies at 5091-5096 MHz, due to out-of-band emissions from these U-NII-1 devices.

¹⁶ Comments of Fastback Networks at 6 ("Fastback Networks Comments").

¹⁷ Fastback Networks also alleges that, in practice, millions of devices are already operating outdoors in the U-NII-1 band with no apparent harm to Globalstar's service, and says that this fact demonstrates that elimination of the outdoor restriction would not result in substantial interference. Fastback Networks Comments at 5. Fastback Networks provides no evidence, however, for its claim that millions of U-NII-1 access points and end user devices are being used in violation of the Commission's rules. Given this lack of evidence, the Commission should ignore this argument. If the Commission determines that there is in fact an issue with the enforceability of its existing outdoor prohibition, its response should not be to "throw up its hands" and permit the unlimited outdoor operation of U-NII-1 devices and the substantial degradation of Globalstar's MSS offerings. Rather, the Commission should examine how it can enforce this important restriction, and in the meantime should not consider any significant change to the U-NII-1 technical rules, including increased power limits at 5150-5250 MHz.

¹⁸ Time Warner Cable Comments at 12.

procedures, however, cannot prevent the effects of this aggregate interference on Globalstar’s MSS feeder links. Time Warner adds that Globalstar will be protected by “ongoing work the industry is undertaking in examining a sharing environment,”¹⁹ but Globalstar is not aware of any ongoing technical efforts that will protect its feeder uplinks from aggregate interference from outdoor U-NII-1 transmissions.

Finally, Cisco states that the Commission can “safely” eliminate the U-NII-1 indoor restriction, but it does not provide any meaningful technical analysis in support of this claim.²⁰ Cisco questions the interference models that the Commission applied in adopting the current restrictions in 1997,²¹ but Globalstar’s technical showing in its comments demonstrates the continuing threat of interference to its MSS feeder links from outdoor U-NII-1 systems.

II. Interference to Globalstar’s NGSO MSS Feeder Links Would Significantly Degrade Globalstar’s Two-Way MSS Offerings

As Globalstar indicated in its comments, chronic, harmful interference to Globalstar’s MSS feeder uplinks would significantly degrade the quality of Globalstar’s MSS duplex offerings. Globalstar’s NGSO satellites are, essentially, repeater facilities located in low earth orbit. Globalstar’s feeder uplinks from its gateway earth stations carry the “return” traffic from parties communicating with Globalstar’s MSS users, and Globalstar’s satellites then translate, amplify, and downlink this return traffic to its MSS customers in the Upper Big LEO band at 2483.5-2500 MHz. In this “bent-pipe” architecture, feeder uplink interference is effectively converted into interference to Globalstar’s service downlink in the Upper Big LEO band. Given the coverage of Globalstar’s satellites and the location of its gateways, this U-NII-1-based

¹⁹ *Id.*

²⁰ Comments of Cisco Systems, Inc. at 55-57.

²¹ *Id.* at 56; see *Amendment of the Commission’s Rules to Provide for Operation of Unlicensed NII Devices in the 5 GHz Frequency Range*, Report and Order, 12 FCC Rcd 1576, ¶¶ 95-97 (1997).

interference would reduce the quality of Globalstar's two-way services not only in the United States, but also in Canada, Mexico, the Caribbean, Central America, and even parts of Russia and Japan (if the interference is from U-NII-1 devices in Alaska).²²

This extensive interference would jeopardize the substantial public interest benefits of Globalstar's reemerging two-way MSS offerings. Globalstar has spent more than \$1 billion to deploy its second-generation MSS constellation and fully restore its duplex capabilities. Its second-generation system is capable of supporting highly reliable, crystal-clear CDMA-quality voice as well as innovative duplex data services to the more than five billion consumers, public safety users, and other potential customers within its global footprint. With this restoration of duplex service, Globalstar's recently launched SPOT Global Phone is now available in a variety of retail outlets around the United States for direct purchase by consumers. Revenues from its two-way services and devices are necessary to the development of Globalstar's MSS business.²³

Certainly, proponents of outdoor U-NII-1 operations fail to acknowledge the crucial public safety benefits of Globalstar's global MSS network. Globalstar's MSS system provides critical emergency communications connectivity to rural and remote areas, as well as critical back-up capabilities for public safety personnel in populated areas during disasters when terrestrial facilities can be rendered unavailable.²⁴ For example, in a May 20, 2013 *ex parte* letter to the Commission, the New York Power Authority indicated that “[r]ecently, during and

²² Globalstar Comments at 6. The outdoor operation of U-NII-1 devices would effectively reduce the efficiency of Globalstar's MSS network. Globalstar's satellites have limited power and EIRP, and increased noise and harmful interference from U-NII-1 operations would squander the scarce transmission resources available to Globalstar's Big LEO MSS system.

²³ During the first quarter of 2013, Globalstar reported total revenues of \$19,333,000 with approximately 31% derived from its duplex products and services.

²⁴ In addition, Globalstar's family of one-way SPOT devices has been used to initiate over 2200 rescues since 2007, an average of more than one rescue per day.

immediately after Hurricane Sandy, our only means of communication into or out of our facilities located on Long Island was via satellite, over Globalstar's network."²⁵ Similarly, on June 24, 2013, Congressman Cedric Richmond of Louisiana indicated to the Commission that "[m]y constituents and I experienced the effects of Hurricane Katrina first hand when satellite-based communications were so integral in performing safety of life services and response. There were over ten thousand Globalstar phones operating in the Gulf Coast region after Hurricane Katrina. We need to ensure that Globalstar has the ability to continue providing these unique services well into the future."²⁶ For Globalstar's second-generation MSS constellation to provide these critical public safety benefits, Globalstar must continue to have access to spectrum that is free from harmful interference, including from U-NII-1 devices at 5150-5250 MHz.

III. Revising the Technical Rules for the U-NII-1 Band Does Not Appear Necessary to Address the Wi-Fi Traffic Jam

As mentioned above, a number of commenters in the 5 GHz proceeding express concern regarding the worsening broadband spectrum crunch and the Wi-Fi Traffic Jam.²⁷ Globalstar supports the Commission's ongoing effort to free up additional spectrum for wireless and mobile broadband applications and strongly believes that resolution of the Wi-Fi Traffic Jam should be a primary and immediate priority. Globalstar disagrees with these parties, however, that revised technical rules in the U-NII-1 band are integral to addressing this Wi-Fi issue.

In the long run, it appears that a number of spectrum bands can be utilized more fully to help alleviate the Wi-Fi Traffic Jam. These bands include not only the 2.4 GHz band and other

²⁵ Letter from Frank A. Miller, New York Power Authority, to Chairwoman Mignon Clyburn, FCC, RM-11685 (May 20, 2013).

²⁶ Letter from Cedric L. Richmond, House of Representatives, to Chairwoman Mignon Clyburn, FCC, RM-11685 (June 24, 2013, filed July 1, 2013).

²⁷ See note 2 *supra*.

portions of the 5 GHz band, but also the 3.6 GHz band,²⁸ the 60 GHz band,²⁹ and the broadcast television White Spaces.³⁰ With respect to the 5 GHz band, Globalstar generally supports the Commission's proposed revisions to the operating rules for U-NII-2A and U-NII-3 devices, as well as the Commission's proposal to make available an additional 195 MHz of spectrum for use by U-NII devices.³¹ Once implemented by the marketplace over a multi-year process, these regulatory steps should yield additional broadband capacity and generate consumer benefits.

In the immediate term, the only spectrum band that can help alleviate the Wi-Fi Traffic Jam is the original Wi-Fi band at 2.4 GHz. To this end, the Commission should expeditiously issue a Notice of Proposed Rulemaking that addresses Globalstar's November 2012 Petition for Rulemaking and proposes to expand the terrestrial use of the Upper Big LEO band (at 2483.5-2495 MHz).³² Among the innovative mobile broadband applications that will be possible in this band is Globalstar's proposed TLPS, which could rapidly and dramatically relieve existing congestion on public Wi-Fi channels through a carrier-grade, carrier-managed service. In contrast to the other Wi-Fi opportunities in the spectrum bands identified above (including in the

²⁸ The IEEE has adopted the 802.11y-2008 standard for Wi-Fi systems at 3.6 GHz. See IEEE Standards Association, *802.11y-2008 – IEEE Standard for Information Technology*, <http://standards.ieee.org/findstds/standard/802.11y-2008.html>; see also *Wireless Operations in the 3650-3700 MHz Band; Rules for Wireless Broadband Services in the 3650-3700 MHz Band; Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band; Amendment of the Commission's Rules With Regard to the 3650-3700 MHz Government Transfer Band*, Report and Order and Memorandum Opinion and Order, 20 FCC Rcd 6502 (2005).

²⁹ The IEEE has adopted the 802.11ad standard for Wi-Fi systems at 60 GHz. See Rick Burgess, *7Gbps Wireless on the Way, WiGig (802.11ad) Adopted by IEEE*, TECHSPOT (Jan. 15, 2013), <http://www.techspot.com/news/51343-7gbps-wireless-on-the-way-wigig-80211ad-adopted-by-ieee.html>.

³⁰ See, e.g., *Statement of Acting Chairwoman Clyburn on AIR.U and West Virginia University Launching a Campus-Wide Wi-Fi Network Using TV White Spaces* (July 9, 2013), http://transition.fcc.gov/Daily_Releases/Daily_Business/2013/db0709/DOC-322100A1.pdf.

³¹ Globalstar Comments at 3-4.

³² Globalstar Petition, *supra* note 4.

5 GHz band), TLPS at 2.4 GHz can be implemented almost immediately by leveraging existing investment in infrastructure and existing consumer devices.³³

IV. Conclusion

For the aforementioned reasons, Globalstar again urges the Commission to maintain its prohibition on outdoor operations in the U-NII-1 band at 5150-5250 MHz and ensure that Globalstar's feeder link operations at 5096-5250 MHz are protected from harmful interference.

Respectfully submitted,

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³³ See, e.g., Globalstar Comments at 3.

EXHIBIT A

C-Band Coverage Areas for Globalstar MSS Feeder Uplinks

