

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

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

**COMMENTS OF GLOBALSTAR, INC.**

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## Executive Summary

Globalstar, Inc. commends the Federal Communications Commission for taking a significant step in this rulemaking by proposing greater flexibility for terrestrial use of Big LEO mobile satellite service spectrum at 2483.5-2495 MHz. The Commission's proposed low power broadband rules would advance critical national spectrum policy goals by quickly expanding the nation's supply of broadband spectrum, increasing consumer access to unlicensed frequencies, improving wireless connectivity in American schools and other institutions, and applying a creative, innovative spectrum management approach.

Globalstar is first and foremost a satellite company and, as the Commission recognized in the *NPRM*, it is fully committed to the continued development and future success of its satellite business. With the Commission's proposed rules, Globalstar could further support its MSS offerings and provide a low power wireless broadband service to consumers throughout the United States, under a managed approach that prevents unauthorized use and minimizes interference to its own MSS and other licensed services.

The Commission's proposed low power broadband rules continue its momentum toward increasing licensee flexibility and terrestrial broadband use of MSS spectrum. In 2010, the Commission asked how it could best increase terrestrial use, innovation, and investment in the MSS bands, and, in December 2012, it reformed the 2 GHz MSS-terrestrial framework by eliminating the ATC requirements and establishing flexible rules for terrestrial use.

The Commission's terrestrial low power rules would deliver substantial and immediate benefits to consumers and further the nation's spectrum policy goals by almost immediately expanding the nation's wireless broadband capacity and alleviating the worsening Wi-Fi traffic jam in the 2.4 GHz band. Accelerating Internet usage and resulting congestion have diminished

the quality of Wi-Fi service at high-traffic “hotspots,” and Wi-Fi has become an unreliable way to access broadband in many urban environments.

The Commission’s new low power broadband rules would help to alleviate this congestion and enable Globalstar and its terrestrial partners to provide consumers with consistent, high-quality wireless broadband service. The use of carrier-grade access points and state-of-the-art network management would differentiate TLPS from public Wi-Fi with greater wireless capacity, throughput, and data speeds, thereby maximizing the use of this spectrum. Another key public interest benefit of the Commission’s proposed rules is that consumers across the United States would be able to use their existing smartphones, tablets, and other devices to gain access rapidly to new terrestrial broadband spectrum.

Globalstar supports the Commission’s proposal to apply both Part 25 and Part 15 rules to TLPS. Globalstar also supports the Commission’s tentative decision, consistent with its prior ATC decisions and its 2012 2 GHz MSS order, that a single licensee control both the MSS and TLPS operations in the Big LEO band. This common control will enable Globalstar to coordinate satellite and terrestrial operations and minimize interference to its MSS offerings. In addition, Globalstar favors the Commission’s proposed simplified evidentiary showing of the commercial availability of MSS. This approach will both ensure that terrestrial services are ancillary to Globalstar’s satellite operations and speed the provision of additional broadband capacity to consumers.

TLPS will meet its non-interference obligations and coexist successfully with licensed services such as the Broadband Radio Service and Educational Broadband Service at 2.5 GHz and Broadcast Auxiliary Service systems above and below 2483.5 MHz. TLPS will also be consistent with the Commission’s Part 15 rules and coexist successfully with other unlicensed

operations in the 2.4 GHz ISM band. Globalstar does not seek an operating status superior to that of other unlicensed users, and believes that any party should be able to use the unlicensed ISM spectrum at 2473-2483.5 MHz as long as those operations meet the Commission's existing emissions limit at the 2483.5 MHz band edge.

Globalstar agrees with the Commission that an overly burdensome equipment certification process could jeopardize the development and benefits of TLPS, and urges the Commission to permit modification of existing consumer devices through its streamlined permissive change process. Globalstar's carrier-grade access points and network management would ensure the security of this new service and prevent unauthorized use of the 2473-2495 MHz band.

Globalstar also reaffirms that, with Commission authority to provide TLPS, Globalstar will (i) provide up to 20,000 TLPS access points free of charge in public and non-profit schools, community colleges, and hospitals, and (ii) provide MSS free of charge in federal disaster areas. Globalstar's commitments will advance the national goal of improving broadband access in schools and other environments where such access is urgently needed, and in particular will support President Obama's ConnectEd initiative, which is designed to provide next-generation broadband to every K-12 student in America.

Accordingly, Globalstar urges the Commission to adopt an order expeditiously that reforms the Big LEO MSS-terrestrial rules and permits Globalstar to provide a low power broadband terrestrial network in its licensed spectrum. By taking this action, the Commission will advance the nation's spectrum policy goals and bring consumers the benefits of more investment, innovation, and more-intensive use of broadband spectrum.

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**COMMENTS OF GLOBALSTAR, INC.**

Globalstar, Inc. (“Globalstar”) commends the Federal Communications Commission (“Commission”) for taking a significant step in the above-captioned Notice of Proposed Rulemaking (“*NPRM*”) to increase the spectrum available to consumers for broadband access in the United States.<sup>1</sup> The Commission’s pro-consumer, pro-investment proposals to allow greater flexibility for terrestrial use of Big LEO mobile satellite service (“MSS”) spectrum at 2483.5-2495 MHz and encourage more intensive spectrum use would enable Globalstar to make the kind of innovative, efficient use of spectrum that the Commission seeks.

Under the Commission’s proposals, Globalstar could for the first time permanently deploy terrestrial-only devices in its spectrum while satisfying a gating criterion of offering commercial MSS. Globalstar would provide a low power wireless broadband service (what Globalstar calls Terrestrial Low Power Service, or “TLPS”) to consumers throughout the United States, under a managed approach that prevents unauthorized use and minimizes interference to its own MSS offerings and other radio services. TLPS would deliver substantial public interest

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<sup>1</sup> *Terrestrial Use of the 2473-2495 MHz Band for Low-Power Mobile Broadband Networks; Amendments to Rules for the Ancillary Terrestrial Component of Mobile Satellite Service Systems*, Notice of Proposed Rulemaking, 28 FCC Rcd 15351 (2013) (“*NPRM*”).

benefits by adding to the nation’s supply of broadband spectrum, helping to alleviate the worsening Wi-Fi traffic jam, and expanding wireless broadband capacity for American consumers.

## **I. GLOBALSTAR AND ITS MOBILE SATELLITE SERVICE BUSINESS**

*Globalstar’s Petition and the NPRM.* On November 13, 2012, Globalstar filed a Petition for Rulemaking with the Commission seeking greater flexibility for terrestrial operations in the Big LEO MSS band.<sup>2</sup> In the Commission’s early 2013 comment rounds, other parties expressed their views on Globalstar’s Petition, and Globalstar responded to these filings.<sup>3</sup> The record in that proceeding demonstrated the public interest benefits of Globalstar’s proposed reforms and supports quick action by the Commission to achieve those benefits.

Under the innovative, hybrid spectrum approach proposed by the Commission in its November 1, 2013 *NPRM*, Globalstar would provide a low power, terrestrial broadband service over 22 megahertz of spectrum encompassing Globalstar’s licensed spectrum in the Upper Big LEO band at 2483.5-2495 MHz and adjacent unlicensed industrial, scientific and medical (“ISM”) spectrum at 2473-2483.5 MHz. Globalstar’s TLPS operations would be based on IEEE 802.11 technology. Low power base stations (or “access points”) and consumer TLPS devices would operate across the 2473-2495 MHz band segment, designated as “Channel 14” under the 802.11 standard.<sup>4</sup> Globalstar will utilize a managed network that prevents unauthorized usage and operates carefully to minimize interference to its own MSS and other radio services. As

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<sup>2</sup> Petition for Rulemaking of Globalstar, Inc., RM-11685 (Nov. 13, 2012) (“Petition”).

<sup>3</sup> *See, e.g.*, Consolidated Reply of Globalstar, Inc., RM-11685 (Jan. 29, 2013).

<sup>4</sup> TLPS operations would be consistent with the 802.11 channelization scheme, which includes fourteen overlapping 22 megahertz channels between 2401 MHz and 2495 MHz.

described below, Globalstar supports the Commission's proposed terrestrial low power broadband rules.

*Globalstar's commitment to MSS.* While Globalstar strongly supports the terrestrial use reforms proposed by the Commission, it is first and foremost a satellite company. With over \$5 billion invested in its global non-geostationary ("NGSO") MSS network, Globalstar is fully committed to the continued development and future success of its satellite business. Licensed in 1995 to operate in the Big LEO band,<sup>5</sup> Globalstar today uses its constellation of satellites and ground stations on six continents to provide affordable, high-quality MSS to more than 550,000 customers. Globalstar's MSS offerings have provided extraordinary public safety benefits to commercial and government customers, and consumers around the world. Globalstar is licensed for uplink transmissions (mobile earth stations to satellites) at 1610-1618.725 MHz (the "Lower Big LEO band"), and for downlink transmissions (satellites to mobile earth stations) at 2483.5-2500 MHz (the "Upper Big LEO band").<sup>6</sup>

Globalstar initiated commercial service in 2000, and it enjoyed an approximately 30% annual growth in subscribership and revenues from 2003 to 2006. In early 2007, Globalstar's first-generation constellation suffered an unanticipated degradation of its S-band capability that temporarily precluded consistently reliable voice and two-way data services. In response, Globalstar refocused its energies on affordable consumer-based simplex products and services

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<sup>5</sup> *Application of Loral/Qualcomm Partnership, L.P. for Authority to Construct, Launch, and Operate Globalstar, a Low Earth Orbit Satellite System to Provide Mobile Satellite Services in the 1610-1626.5 MHz/2483.5-2500 MHz Bands*, Order and Authorization, 10 FCC Rcd 2333 (IB 1995); *see also Spectrum and Service Rules for Ancillary Terrestrial Components in the 1.6/2.4 GHz Big LEO Bands; Review of the Spectrum Sharing Plan Among Non-Geostationary Satellite Orbit Mobile Satellite Service Systems in the 1.6/2.4 GHz Bands*, Second Order on Reconsideration, Second Report and Order, and Notice of Proposed Rulemaking, 22 FCC Rcd 19733, ¶¶ 8, 18-20 (2007) ("2007 Big LEO Spectrum Sharing Order").

<sup>6</sup> Iridium is authorized to share spectrum with Globalstar at 1617.775-1618.725 MHz.

while continuing the design, manufacture and launch of a second-generation constellation of more capable satellites. Now, with its second-generation constellation in place and full two-way service restored, Globalstar is experiencing accelerated growth across both two-way and simplex business lines, with greater minutes of use, rising average revenue per user, increased subscriber additions, and expanding equipment sales. In 2013, the principal metrics for Globalstar's two-way business materially improved with a 126% increase in annual gross subscriber additions, 90% growth in equipment revenue, 29% growth in average revenue per user, and 24% growth in service revenue. Globalstar continues to innovate across a broad base of consumer, commercial, and government products, and has enjoyed increased market receptivity following last year's satellite network restoration.

*Mission-critical public safety services.* Since initiating commercial MSS, Globalstar has been dedicated to providing mission-critical, emergency, and safety-of-life services to commercial, recreational, and government customers in remote, unserved, and underserved areas not reached by terrestrial deployments.<sup>7</sup> Globalstar's MSS network also provides critical back-up capabilities for public safety personnel during disasters when terrestrial facilities can be rendered unavailable. Public safety entities involved in relief efforts in the United States and

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<sup>7</sup> In addition to individual consumers, Globalstar's customers include entities in government, the military, emergency preparedness, transportation, heavy construction, oil and gas, mining, forestry, and commercial fishing. For these government and business customers, Globalstar's data solutions are ideal for asset and personal tracking, data monitoring, and supervisory control and data acquisition ("SCADA") applications. In particular, Globalstar's commercial simplex service enables subscribers to track cargo containers and rail cars and to monitor utility meters, as well as a host of other applications. Globalstar's services are available in all areas of the world, except in central and southern Africa, Southeast Asia, the Indian subcontinent, and oceanic and polar regions. Globalstar is working diligently to expand coverage in many of these areas.

around the world have relied on Globalstar’s satellite services after earthquakes, hurricanes, and other disasters.

Globalstar’s MSS network played a vital role during and after the devastating Hurricanes Sandy and Katrina. In the fall of 2012, Globalstar’s network – even without a fully reconstituted constellation – provided needed communications in the Mid-Atlantic and Northeast regions of the United States where terrestrial communications systems were damaged and rendered unavailable by Hurricane Sandy. For instance, New York Power Authority (“NYPA”) employees at the Flynn Power Plant in Holtsville, New York relied exclusively on Globalstar MSS devices to communicate for the three days that terrestrial telephone and wireless systems were out of service.<sup>8</sup> Overall, during and after the storm, Globalstar experienced a greater than 50% increase in traffic throughout New York, New Jersey, and Connecticut, with the highest concentration of calls occurring in New York City. Globalstar’s efforts and capabilities in the aftermath of Hurricane Katrina in 2005 were also acknowledged by numerous observers.<sup>9</sup> Just

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<sup>8</sup> NYPA has stated that “during and 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.” Letter from Frank A. Miller, New York Power Authority, to Acting Chairwoman Mignon Clyburn, FCC, RM-11685, at 1 (May 20, 2013, filed May 23, 2013). Other agencies and organizations in the storm-affected area that utilized Globalstar’s MSS products and services included the New York Police Department, Federal Emergency Management Agency, Metropolitan Transit Authority, the New York State Department of Environmental Protection, the Port Authority, Con Edison, and numerous hospitals.

<sup>9</sup> See Letter from President George W. Bush to Globalstar (Nov. 21, 2005); Letter to Kevin J. Martin, FCC Chairman, from Haley Barbour, Governor of Mississippi (Dec. 21, 2005). See also Peter J. Brown, *Crisis on the Gulf Coast: When Satellite Was the Only Game in Town*, VIA SATELLITE, Jan. 2, 2006 (“Globalstar doubled its capacity to make calls to landline phones, increased its active spectrum allocation via special temporary authorities granted by the U.S. Federal Communications Commission (FCC), and allocated gateway coverage footprints to increase capacity in the affected area to manage the unprecedented surge in users.”); Paul Davidson, *Satellite Phones Provide Critical Link to Outside World*, USA TODAY, Sept. 6, 2005 (noting that Globalstar “sold more than 11,000 phones and leased 1,000 more” immediately following Hurricane Katrina); *Satellite Phones Critical to Katrina Relief Efforts*,

last year, Senator Mary Landrieu stated that following Katrina, “[s]atellite-based communications were vitally important when terrestrial communications networks became overloaded and failed after this disaster. After Katrina, Globalstar had over ten thousand satellite phones operating in the Gulf Coast region. As a result, I believe that allowing Globalstar the ability to continue providing these services well into the future will provide additional coverage and capacity in such post-disaster situations.”<sup>10</sup>

In recent years, Globalstar has also focused on developing affordable, consumer-oriented devices and services with significant public safety benefits. Globalstar has developed an innovative, hand-held personal tracking and emergency messaging product category by combining a GPS receiver with a multi-featured MSS L-band transmitter. Globalstar’s innovative, consumer-oriented “SPOT” family of MSS devices has played a critical role in providing emergency and safety-of-life services to individual consumers beyond terrestrial wireless reach. From any location in Globalstar’s global MSS footprint, SPOT devices can transmit a user’s GPS coordinates and status updates to any e-mail, handheld device, or smartphone address in the world. As of May 1, 2014, the family of SPOT devices has been used to initiate approximately 3,000 emergency rescues, often life-saving, on land and at sea. During 2013 alone, SPOT products were used to achieve 632 rescues, an average of more than one per

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COMMUNICATIONS DAILY, Sept. 1, 2005 (noting that Globalstar saw “increased usage . . . from response agencies at all levels” in the aftermath of the Gulf Coast hurricane).

<sup>10</sup> Letter from Senator Mary L. Landrieu, United States Senate, to Acting Chairwoman Mignon Clyburn, FCC, RM-11685 (July 23, 2013, filed July 24, 2013). Congressman Cedric Richmond echoed this view, saying 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. . . . We need to ensure that Globalstar has the ability to continue providing these unique services well into the future.” Letter from Congressman Cedric L. Richmond, United States House of Representatives, to Chairwoman Mignon Clyburn, FCC, RM-11685, at 1 (June 24, 2013, filed July 1, 2013).

day.<sup>11</sup> Globalstar is unaware of any other satellite-based product that has achieved the remarkable life-saving record of the SPOT family of devices.

*Second-generation MSS network.* In August 2013, Globalstar became the first global Big LEO MSS voice and data provider to complete the deployment of a state-of-the-art, second-generation MSS constellation that enables its subscribers to stay connected beyond the reach of traditional terrestrial wireless networks. Beginning in 2006, Globalstar engaged in a campaign to design, build, and launch its second-generation MSS constellation, spending in excess of \$1 billion.<sup>12</sup> With a fifteen-year design life, Globalstar's second-generation MSS system is supporting highly reliable, crystal-clear CDMA-quality voice and data services to the billions of consumers, public safety personnel, and other potential customers within its footprint, and will do so beyond 2025. Offering an array of services to customers throughout the world, Globalstar's second-generation MSS network will provide the highest voice quality, fastest truly mobile data speeds, and most affordable service in the MSS industry.

*New and Future MSS Product Offerings.* With its second-generation MSS constellation in place, existing customers are increasing their use of Globalstar's services, and Globalstar expects its customer base to continue to expand well into the future. To this end, Globalstar is the only MSS company that specifically targets the consumer mass market with innovative,

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<sup>11</sup> SPOT users receiving assistance have included hikers, boaters, pilots, and remote workers, among others. Specific examples include a Boy Scout troop leader who was seriously injured in an accident involving a horse in Mount Hood National Forest and airlifted to safety by the National Guard, a backcountry skier in Norway who was located and rescued after being trapped at high elevation during a severe winter storm, and an Arkansas photographer who was rescued from a steep ravine after falling 30 feet in the Ozark National Forest.

<sup>12</sup> Globalstar has also continued to develop its next-generation ground infrastructure. Globalstar has contracted with Hughes Network Systems to deliver next-generation ground network equipment, software upgrades, and satellite handset chipsets, and it expects these ground facilities to be complete in 2015.

inexpensive, easy-to-use satellite-based communications products and services. Since the beginning of 2013, Globalstar has introduced four consumer-oriented MSS products, and is working to bring additional devices and services to the marketplace in the near future.

In May 2013, Globalstar introduced the SPOT Global Phone to the consumer mass market, allowing subscribers to make MSS calls from some of the most remote locations in the United States and around the globe for business, recreational use, or in times of distress.<sup>13</sup> In July 2013, Globalstar released its third generation of the award-winning SPOT personal tracking device, SPOT Gen3™ (“SPOT 3”), providing a critical line of communication at the push of a button, regardless of terrestrial wireless coverage. The SPOT 3 offers the same S.O.S., tracking, and custom messaging functionalities as previous generations of this device, with approximately twice the battery life of its predecessor and new custom tracking options. In November 2013, Globalstar introduced the SPOT Trace™, the first satellite-based asset tracking and theft prevention product specifically targeted to the consumer mass market.

Most recently, Globalstar in January 2014 announced “Sat-Fi,” a consumer product that is expected to accelerate the growth of its customer base and expand the overall addressable market for its satellite products. Sat-Fi is a revolutionary voice and data technology that permits any Wi-Fi enabled device (*i.e.*, smartphones, tablets, laptops, etc.) to communicate over Globalstar’s second-generation MSS constellation. With Sat-Fi, Globalstar subscribers can use their existing phone numbers and smartphones to send and receive communications over Globalstar’s global MSS network, offering voice and data connectivity when beyond the range of

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<sup>13</sup> Retailers offering the SPOT Global Phone include Sports Authority, REI, Cabela’s, Bass Pro Shops, and many others. Consumers can purchase this device on the shelf or online and visit [findmespot.com](http://findmespot.com) to provision their own service.

cellular networks or when terrestrial networks are temporarily unavailable due to natural or man-made disasters.<sup>14</sup>

Globalstar is also working with a technology partner, ADS-B Technologies, LLC, to develop a “space-based” air traffic management solution that would complement the next-generation ADS-B technology that the Federal Aviation Administration has mandated be installed on all commercial aircraft by 2020. ADS-B (Automatic dependent surveillance-broadcast) relies upon advanced technologies, rather than passive radar, to provide a commercial aircraft’s location data, and is one of the technologies selected as part of the U.S. Next Generation Transportation System as well as the European Cascade program.<sup>15</sup> ADS-B enhances safety by making an aircraft visible in real time to air traffic controllers and to other appropriately equipped ADS-B aircraft, with position and velocity data transmitted every second. Globalstar’s MSS network would support a proposed ADS-B Link Augmentation System (“ALAS”), which would send the same ADS-B data on a real time basis to Globalstar’s satellite constellation for delivery to civil aviation authorities around the world, providing extraordinary benefits both to the aviation industry and to public safety.

Given that each Globalstar gateway facility provides service coverage to between 700,000 and one million square miles, ALAS would dramatically increase the range and capability of ADS-B systems. In rugged and remote areas lacking ground-system coverage as

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<sup>14</sup> *Globalstar Introduces Sat-Fi, A Groundbreaking MSS Solution*, Globalstar Press Release (Jan. 29, 2014), <http://www.globalstar.com/en/index.php?cid=7010&pressId=804>. Through a convenient app and Sat-Fi satellite hot spot, subscribers will be able to easily send and receive calls, email, and SMS text messages anywhere within Globalstar’s footprint from their own device. Like all Globalstar mobile satellite solutions, Sat-Fi will appeal to a broad market, including enterprise and government customers as well as the mass consumer market.

<sup>15</sup> *See, e.g.*, Federal Aviation Administration, *NextGen Implementation Plan* (June 2013), at 4, [http://www.faa.gov/nextgen/implementation/media/NextGen\\_Implementation\\_Plan\\_2013.pdf](http://www.faa.gov/nextgen/implementation/media/NextGen_Implementation_Plan_2013.pdf); *CASCADE*, EUROCONTROL, <http://www.eurocontrol.int/cascade> (viewed May 5, 2014).

well as blue ocean, an aircraft's ALAS equipment would use Globalstar's satellites and ground facilities to continuously transmit relevant aircraft data to the air traffic control system and receive ADS-B data from other aircraft. Significantly, ALAS capability could help prevent a future occurrence similar to the unsolved disappearance of Malaysia Airlines MH370 in March 2014. With the deployment of its second generation satellites and ground segment, Globalstar's capacity is adequate to serve every commercial aviation flight occurring globally while using only a small percentage of its newly completed capacity.

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Globalstar's overall investment of more than \$5 billion, its dogged determination to overcome the technical problems that restricted its services, the recent, substantial funding of its second-generation constellation, its status as the first LEO provider to deploy a second-generation satellite network, and its development of innovative new MSS applications all demonstrate Globalstar's continuing commitment to a vibrant, successful satellite business.

## **II. TLPS WOULD HAVE SUBSTANTIAL PUBLIC INTEREST BENEFITS AND ADVANCE THE NATION'S SPECTRUM POLICY GOALS**

The Commission's proposed rules would generate substantial public interest benefits for American consumers and the U.S. economy and further the nation's spectrum policy goals. By permitting a terrestrial low power broadband network in the Big LEO band, the Commission's rules would ease congestion in the unlicensed 2.4 GHz Wi-Fi spectrum and enable a better Wi-Fi experience for consumers.<sup>16</sup> The Commission's rules would promote innovation, increase spectrum efficiency, and add 22 megahertz of spectrum for wireless broadband operations to the nation's spectrum inventory.

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<sup>16</sup> *NPRM* ¶¶ 1, 13, 49.

The ability to use existing devices for TLPS would speed the efficient, maximum use of existing RF resources for the benefit of American consumers. In addition, revenue from TLPS would help ensure the commercial viability of Globalstar's global MSS network which, as described above, provides significant public safety benefits. Globalstar urges the Commission to move expeditiously to adopt rules to realize these significant public interest benefits.

**A. Permitting TLPS Would Add 22 Megahertz to the Nation's Broadband Spectrum Inventory and Help Ease Wi-Fi Congestion**

If the Commission adopts its proposals, it would add 22 megahertz to the nation's wireless broadband spectrum inventory more quickly than through any alternative mechanism. Globalstar could implement TLPS almost immediately and provide consumers with additional wireless broadband capacity throughout the United States. In conjunction with its terrestrial partners, Globalstar expects that, over time, it would deploy potentially hundreds of thousands or even millions of newly-manufactured TLPS access points across the United States, concentrating on areas where existing Wi-Fi congestion is most severe. Consumers around the country would be able to use existing smartphones, tablets, and other wireless devices to receive this innovative service.

The addition of this spectrum to the U.S. broadband spectrum inventory would further one of the nation's critical spectrum policy goals: More spectrum must be made available for wireless broadband services to meet burgeoning consumer demand for broadband and generate new jobs and economic growth. As the National Broadband Plan stated, "[i]f the U.S. does not address this situation promptly, scarcity of mobile broadband could mean higher prices, poor service quality, an inability for the U.S. to compete internationally, depressed demand and,

ultimately, a drag on innovation.”<sup>17</sup> In response to this threatened spectrum gap, the Obama Administration as well as the National Broadband Plan have called for an additional 500 MHz of spectrum to be made available for broadband use by 2020, including an additional 300 megahertz of spectrum suitable for flexible mobile use by 2015.<sup>18</sup> Last June, the Administration again emphasized that “[a]lthough existing efforts will almost double the amount of spectrum available for wireless broadband, we must make available even more spectrum and create new avenues for wireless innovation.”<sup>19</sup> The Commission’s proposed low power broadband rules will help achieve this goal.

The National Broadband Plan also urged the Commission to take “actions that will optimize license flexibility sufficient to increase terrestrial broadband use of MSS spectrum” while preserving the MSS industry’s unique services,<sup>20</sup> and noted that certain restrictions in the Commission’s MSS ATC rules had “made it difficult for MSS providers to deploy ancillary terrestrial networks, as well as to establish partnerships with wireless providers or other well-capitalized potential entrants.”<sup>21</sup> In response, the Commission in 2010 issued a Notice of Inquiry as a first step toward eliminating regulatory barriers to terrestrial use of existing MSS spectrum

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<sup>17</sup> See FCC, “Connecting America: The National Broadband Plan,” at 77 (rel. March 16, 2010), <http://download.broadband.gov/plan/national-broadband-plan.pdf> (“National Broadband Plan”).

<sup>18</sup> *Id.* at 84; *Presidential Memorandum: Unleashing the Wireless Broadband Revolution*, Daily Comp. Pres. Docs., 2010 DCPD No. 00556 (June 28, 2010), <http://www.whitehouse.gov/the-press-office/presidential-memorandum-unleashing-wireless-broadband-revolution>.

<sup>19</sup> *Presidential Memorandum – Expanding America’s Leadership in Wireless Innovation*, Daily Comp. Pres. Docs., 2013 DCPD No. 00421, at 1 (June 14, 2013), <http://www.whitehouse.gov/the-press-office/2013/06/14/presidential-memorandum-expanding-americas-leadership-wireless-innovation> (“2013 Presidential Memorandum”).

<sup>20</sup> National Broadband Plan at 87.

<sup>21</sup> *Id.* at 88.

and specifically asked how it “can best increase the value, utilization, innovation and investment in the spectrum for terrestrial services throughout the 2 GHz, Big LEO and L-bands.”<sup>22</sup> In December 2012, the Commission reformed the 2 GHz MSS-terrestrial framework, eliminating the ATC requirements and establishing flexible technical rules for future terrestrial operations.<sup>23</sup> The Commission’s proposed lower power broadband rules in the Big LEO band would continue this momentum toward full, efficient, and innovative use of MSS spectrum.

Another important national spectrum policy objective is to increase consumer access to unlicensed spectrum, including unlicensed frequencies that can help alleviate the worsening Wi-Fi traffic jam in the 2.4 GHz ISM band. In his Separate Statement on the recent 5 GHz U-NII order, Chairman Tom Wheeler pointed out that Wi-Fi “has become a victim of its own popularity” and cited “the growing problem of congestion on Wi-Fi networks.”<sup>24</sup> Accelerating Internet usage and resulting congestion have in fact diminished the quality of Wi-Fi service at

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<sup>22</sup> *Fixed and Mobile Services in the Mobile Satellite Service Bands at 1525-1559 MHz and 1626.5-1660.5 MHz, 1610-1626.5 MHz and 2483.5-2500 MHz, and 2000-2020 MHz and 2180-2200 MHz*, Notice of Proposed Rulemaking and Notice of Inquiry, 25 FCC Rcd 9481, ¶ 26 (2010).

<sup>23</sup> *Service Rules for Advanced Wireless Services in the 2000-2020 MHz and 2180-2200 MHz Bands; Fixed and Mobile Services in the Mobile Satellite Service Bands at 1525-1559 MHz and 1626.5-1660.5 MHz, 1610-1626.5 MHz and 2483.5-2500 MHz, and 2000-2020 MHz and 2180-2200 MHz; Service Rules for Advanced Wireless Services in the 1915-1920 MHz, 1995-2000 MHz, 2020-2025 MHz and 2175-2180 MHz Bands*, Report and Order and Order of Proposed Modification, 27 FCC Rcd 16102 (2012) (“2 GHz Terrestrial Use Order”).

<sup>24</sup> *Revision of Part 15 of the Commission’s Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band*, ET Docket No. 13-49, First Report and Order, FCC 14-30 (rel. Apr. 1, 2014) (“5 GHz U-NII Order”), Statement of Chairman Tom Wheeler (“*Wheeler 5 GHz Statement*”). See also 5 GHz U-NII Order, Statements of Commissioner Mignon L. Clyburn (“Demand for unlicensed services has spiked so much that the 2.4 GHz band is now congested particularly in major cities.”) (“*Clyburn 5 GHz Statement*”) and Commissioner Ajit Pai (“Consumer demand for high-speed, wireless broadband is expected to increase nine-fold over the next four years, with 64 percent of mobile data traffic handled by Wi-Fi and small cell networks. That means our Wi-Fi routers will have to handle about 4.8 exabytes of data every month in 2018.”).

high-traffic 802.11 “hotspots.” In the most densely populated urban environments with numerous Wi-Fi networks contending for throughput over the same Wi-Fi channels, Wi-Fi is often an unreliable broadband delivery mechanism.<sup>25</sup> While the Commission recently adopted, and Globalstar supported,<sup>26</sup> rule changes in the 5 GHz U-NII bands to increase unlicensed access to broadband spectrum,<sup>27</sup> Globalstar agrees with the Chairman and Commissioners that they continue their efforts to improve the consumer experience for Wi-Fi and other unlicensed services.<sup>28</sup>

If the Commission adopts its low power broadband proposal and enables more intensive use of the unlicensed ISM spectrum at 2473-2483.5 MHz, Globalstar’s TLPS would benefit

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<sup>25</sup> Last year, CableLabs issued a study concluding that the 2.4 GHz Wi-Fi band will reach exhaustion by 2014, with a spectrum deficit of approximately 10 megahertz. *See* Rob Alderfer, CableLabs, *WiFi Spectrum: Exhaust Looms*” (May 28, 2013) (“CableLabs Study”), appended as Attachment A to Comments of the National Cable & Telecommunications Association, ET Docket No. 13-49 (May 28, 2013). As a result, the study indicated that “[c]onsumers are likely to experience reduced coverage and throughput,” and “WiFi will become less useful, particularly for high bandwidth services like video.” CableLabs Study at 12.

<sup>26</sup> *See, e.g.*, Letter from Regina M. Keeney, Counsel to Globalstar, to Marlene Dortch, FCC Secretary, ET Docket No. 13-49 (Mar. 6, 2014). In the 5 GHz U-NII proceeding, Globalstar worked cooperatively toward a regulatory framework that will allow the operation of outdoor access points in the U-NII-1 band at 5150-5250 MHz, which is licensed to Globalstar for MSS feeder link operations. These outdoor operations will be permitted despite the risk that they will eventually harm Globalstar MSS offerings to consumers, public safety users, and other customers.

<sup>27</sup> *See Wheeler 5 GHz Statement* (“This is a big win for consumers who will be able to enjoy faster connections and less congestion, as more spectrum will be available to handle Wi-Fi traffic. It will make it easier to get online wirelessly in public places like airports and convention centers, as well as in your living room.”).

<sup>28</sup> *Wheeler 5 GHz Statement* (“We are not stopping here when it comes to unlicensed spectrum.”); *Clyburn 5 GHz Statement* (“We have to be ambitious in finding more ways to provide licensed and unlicensed spectrum for commercial services.”); *5 GHz U-NII Order*, Statement of Commissioner Jessica Rosenworcel, at 1 (“[W]e need to continue to seize unlicensed spectrum opportunities across other spectrum bands.”) (“*Rosenworcel 5 GHz Statement*”); *5 GHz U-NII Order*, Statement of Commissioner Michael O’Rielly, at 1 (“As Americans demand more mobile data at faster speeds, the Commission will have to find additional unlicensed spectrum to accommodate the growth in Wi-Fi.”).

consumers by helping to alleviate this increasing congestion at 2.4 GHz.<sup>29</sup> Globalstar's TLPS would also permit terrestrial carriers to "offload" their broadband services on to Channel 14 at 2473-2495 MHz, enabling those carriers to use their CMRS spectrum to deliver higher-quality wireless voice and data services to consumers. TLPS would perform this function in a more managed and controlled way than traditional Wi-Fi elsewhere in the 2.4 GHz ISM band.

By providing an "additional lane," Globalstar and its terrestrial partners would be able to provide consumers with consistent, high-quality wireless broadband service. The use of carrier-grade access points and state-of-the-art network management would differentiate TLPS from public Wi-Fi by enabling greater wireless capacity, throughput, and data speeds, thereby maximizing the use of this spectrum. Another key public interest benefit of the Commission's proposed rules would be consumers' ability to use existing handsets and other devices to receive this Globalstar-managed service. Most 802.11-enabled consumer devices have the hardware needed to operate at 2473-2495 MHz, but they lack the physical capability to operate above 2483.5 MHz because of restrictions in their radiofrequency software. As described in the *NPRM*, if the Commission adopts its proposed framework, Globalstar and its future terrestrial partners would enable the delivery of the necessary software update to authenticated customers' 802.11-enabled devices, and, virtually immediately, those devices would be able to operate above 2483.5 MHz and receive Globalstar's managed TLPS offering. Thus, with the Commission's new rules and the roll-out of Globalstar-managed TLPS, consumers across the

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<sup>29</sup> As CableLabs stated in its study, 2.4 GHz provides certain fundamental, inherent advantages over the 5 GHz band with respect to 802.11 system performance. Holding all other factors constant, 802.11 signals at 2.4 GHz will travel 4.3 times farther than signals at 5 GHz. Higher-band 5 GHz transmissions are also subject to greater signal attenuation as they move through physical obstacles such as buildings and trees. CableLabs Study at 18. Given these differences, the Commission should adopt its proposed rules permitting more intensive use of the 2.4 GHz band.

United States would be able to use their devices more efficiently and rapidly gain access to terrestrial broadband spectrum that they would otherwise be unable to use.

Beyond generating these specific, crucial public interest benefits, the proposed low power broadband rules represent a prime example of innovative, creative spectrum management. The Commission's rules would permit an innovative, hybrid spectrum architecture at 2473-2495 MHz that simultaneously maximizes the use of licensed and unlicensed spectrum.<sup>30</sup>

Emphasizing the importance of such spectrum innovation, Chairman Wheeler earlier this year stated that “[w]e will also need to find new ways to make use of new spectrum possibilities,” and that “everyone will need to think creatively to meet the world’s spectrum needs.”<sup>31</sup> Similarly, in its recent Notice of Proposed Rulemaking on broadband at 3550-3650 MHz, the Commission stated that “[n]ew, more efficient wireless network architectures and innovative approaches to spectrum management are tools that can help maximize the utility of existing spectrum resources and make new spectrum bands available for broadband access.”<sup>32</sup> Consistent with these views,

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<sup>30</sup> Chairman Wheeler and Commissioner Rosenworcel have both recently highlighted the complementary nature of licensed and unlicensed spectrum. See *Wheeler 5 GHz Statement* (noting that, in 2014, licensed and unlicensed spectrum are more complementary than competitive. “They are less oil & vinegar and more peanut butter & jelly.”); *Rosenworcel 5 GHz Statement* at 1 (“[G]ood spectrum policy will always require a mix of licensed and unlicensed services. Treating them as competing is a relic from the past, because going forward they are complementary—and more and more devices and services are bound to incorporate the use of both.”).

<sup>31</sup> *Prepared Remarks of FCC Chairman Tom Wheeler, GSMA Mobile World Congress, February 24, 2014 – Barcelona, Spain*, at 3-4, [http://transition.fcc.gov/Daily\\_Releases/Daily\\_Business/2014/db0224/DOC-325751A1.pdf](http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0224/DOC-325751A1.pdf).

<sup>32</sup> *Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, GN Docket No. 12-354, Further Notice of Proposed Rulemaking, FCC 14-49, ¶ 1 (rel. April 23, 2014). The Obama Administration has also emphasized the importance of innovative, flexible use of spectrum: “Expanding the availability of spectrum for innovative and flexible commercial uses, including for broadband services, will further promote our Nation’s economic development by providing citizens and businesses with greater speed and availability of coverage, encourage further development of cutting-edge wireless technologies,

the Commission continues to rely on a variety of regulatory and licensing measures in an “all of the above” approach to realize its wireless broadband goals.<sup>33</sup> This Commission should follow this approach and adopt its proposed low power broadband rules expeditiously.

#### **B. TLPS Would Enhance MSS and Public Safety**

By adopting its proposals, the Commission can help ensure the commercial viability of Globalstar’s MSS system and the critical public safety and other benefits generated by that network. As indicated above, Globalstar has invested over \$1 billion in just its second-generation MSS network, and revenues from future terrestrial services would help cover these substantial capital costs as well as the ongoing operational costs of providing MSS. In addition, these revenues would enable Globalstar to invest in further MSS product development and continue to roll out innovative MSS offerings like its family of SPOT devices. The Commission’s new rules would promote state-of-the-art satellite services and extraordinary public safety benefits to consumers, businesses, and governmental and public safety users in the United States and around the world.

The Commission’s proposed low power broadband rules would also deliver other public safety benefits. During and after natural and manmade disasters, still-operating 802.11-based hotspots can provide broadband and voice communications to citizens in affected areas who otherwise lack access to communications services. Adding TLPS facilities would augment this applications, and services, and help reduce usage charges for households and businesses.” 2013 Presidential Memorandum at 1.

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<sup>33</sup> See, e.g., *Winning the Global Bandwidth Race: Opportunities and Challenges for Mobile Broadband*, Prepared Remarks of FCC Chairman Julius Genachowski, University of Pennsylvania – Wharton, Philadelphia, PA, October 4, 2012, at 9-10, [http://transition.fcc.gov/Daily\\_Releases/Daily\\_Business/2012/db1005/DOC-316661A1.pdf](http://transition.fcc.gov/Daily_Releases/Daily_Business/2012/db1005/DOC-316661A1.pdf) (describing the Commission’s multi-faceted effort to free up additional broadband spectrum, including the use of incentive auctions, the removal of regulatory barriers, dynamic spectrum sharing, the reallocation of government spectrum, and the use of white spaces).

important post-disaster resource. Also, as described below, if the Commission permits TLPS, Globalstar has committed to provide its mobile satellite service free of charge to Globalstar subscribers within any federally declared “disaster area” following natural and man-made disasters. The Commission should embrace these critical public safety benefits.

### **III. GLOBALSTAR SUPPORTS THE COMMISSION’S PROPOSED LOW POWER BROADBAND RULES**

Globalstar strongly supports the Commission’s proposal to increase the spectrum available for broadband with new low power broadband rules. Globalstar agrees with the Commission’s proposal to apply both Part 25 and Part 15 rules to TLPS, as well as its tentative decision that a single licensee should have control of both the MSS and TLPS operations in the Big LEO band. Globalstar also supports the Commission’s proposal to require the commercial availability of MSS as a gating requirement for TLPS while eliminating other, outdated criteria. As described below, Globalstar does request that the Commission adopt appropriate procedures for its proposed TLPS application requirement.

#### **A. Globalstar Supports the Commission’s Hybrid Part 25/Part 15 Regulatory Approach to TLPS**

Under the Commission’s proposal, Globalstar would provide a low power broadband network over a single 22 megahertz channel that includes Globalstar’s licensed terrestrial use spectrum at 2483.5-2495 MHz and adjacent unlicensed ISM spectrum at 2473-2483.5 MHz. Given this simultaneous use of licensed and unlicensed spectrum, the Commission proposes to apply both Part 25 and Part 15 rules to this service. Globalstar supports this hybrid regulatory approach for TLPS.

The Commission proposes to apply its Part 25 MSS ancillary terrestrial component rules to TLPS at 2483.5-2495 MHz. The Commission found that TLPS would be ancillary to

Globalstar’s licensed MSS operations and fit within its Part 25 framework for MSS ATC.<sup>34</sup> The Commission declined to apply its Part 27 terrestrial wireless rules to TLPS, pointing out that the terrestrial build-out obligations and other Part 27 requirements are not well tailored to a low power service that depends on the deployment of 802.11 access points.<sup>35</sup> Globalstar agrees with the Commission’s tentative decision to address this service in Part 25. The Commission’s proposed Part 25 framework should facilitate a vigorous roll-out of low power broadband across the United States.<sup>36</sup>

The Commission declined to add primary terrestrial fixed and mobile domestic allocations to the 2483.5-2495 MHz band segment. Rather, the Commission proposed to modify its Part 25 rules to permit greater terrestrial use of the Upper Big LEO band consistent with current footnote US380 to the Table of Allocations allowing ATC operations in MSS spectrum. Under the Commission’s proposal, TLPS, like other ATC services, would be required to protect other licensed services from interference and accept interference from other authorized

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<sup>34</sup> *NPRM* ¶ 18.

<sup>35</sup> *Id.* ¶ 17.

<sup>36</sup> In the *NPRM*, the Commission asks whether permitting TLPS at 2483.5-2495 MHz requires an explicit exception from Section 15.205 of its rules, which prohibits unlicensed operations in the Upper Big LEO band at 2483.5-2495 MHz as well as other specific frequency bands. *NPRM* ¶ 40; 47 C.F.R. § 15.205. No such exception to Section 15.205 is necessary in this case, since TLPS at 2483.5-2495 MHz would constitute a *licensed* use of Globalstar’s own Big LEO spectrum, not an unlicensed use. The 2483.5-2495 MHz band segment should remain a “restricted band” under Section 15.205 for the purpose of unlicensed operations.

Nor would Globalstar’s TLPS operations require a waiver or amendment of Section 15.249(d) of the Commission’s rules, as explained in the Petition at 16 n.24. Section 15.249(d) states that “[e]missions radiated outside of the [2400-2483.5 MHz band], except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.” 47 C.F.R. § 15.249(d). Globalstar’s TLPS operations at 2483.5-2495 MHz would be functional, licensed, *in-band* transmissions in Globalstar’s own Big LEO spectrum, not spurious or out-of-band emissions. The Commission’s Section 15.249(d) out-of-band emissions limit would therefore not apply to these TLPS operations above 2483.5 MHz.

operations.<sup>37</sup> Similarly, under the Part 15 rules applicable below 2483.5 MHz, the portion of Globalstar’s TLPS signal at 2473-2483.5 MHz would enjoy no protection from interference from other licensed and unlicensed operations, and would be required to avoid interference to licensed operations. Globalstar has previously acknowledged these non-interference obligations below 2483.5 MHz, and it has never sought to convert these unlicensed frequencies into its own exclusively licensed spectrum or claimed an operating status superior to that of other unlicensed users.<sup>38</sup>

Globalstar supports the Commission’s proposed hybrid Part 25/Part 15 approach.

Globalstar is confident that its managed TLPS operations would avoid harmful interference to other licensed services and be technically robust enough to preclude significant interference from other RF sources.

**B. Globalstar Supports Single Licensee Control of MSS and TLPS Operations in the Upper Big LEO Band**

Just as the Commission decided in 2003 that ATC systems should be under the control of MSS licensees,<sup>39</sup> the Commission proposes that Globalstar have control of both the MSS and

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<sup>37</sup> *NPRM* ¶¶ 17-20. Unlike Globalstar’s MSS offerings, TLPS would not be protected by the interference mitigation framework for Broadband Radio Service and Educational Broadband Service systems above 2496 MHz, described in Section 27.53(l) of the Commission’s rules. 47 C.F.R. § 27.53(l).

<sup>38</sup> *See* Consolidated Reply of Globalstar, Inc., RM-11685, at 13-14 (Jan. 29, 2013); Letter from L. Barbee Ponder IV, Globalstar, to Marlene Dortch, FCC Secretary, RM-11685, at 1 (May 17, 2013). As Globalstar has indicated previously, any party should be able to use the unlicensed ISM spectrum at 2473-2483.5 MHz, including for new technologies, as long as those operations do not cause harmful interference to Globalstar’s MSS operations above 2483.5 MHz.

<sup>39</sup> *See 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*, Report and Order and Notice of Proposed Rulemaking, 18 FCC Rcd 1962, ¶ 52 (2003) (“*ATC Order*”).

TLPS operations in the Upper Big LEO band.<sup>40</sup> Globalstar supports this tentative decision and believes it is essential to protecting existing Big LEO MSS operations.<sup>41</sup> Common control of its Big LEO MSS and TLPS networks would enable Globalstar to coordinate satellite and terrestrial operations and minimize interference to its MSS offerings.<sup>42</sup>

TLPS access points would be carefully controlled by an enterprise Network Operating System (“NOS”) analogous to systems currently used to manage pico- and femto-cellular infrastructure.<sup>43</sup> With this capability, Globalstar would have a rapid means of identifying, controlling, and eliminating interference to MSS if necessary in a particular location. A remote technician could use the TLPS NOS to shut down a particular TLPS access point, alter access points’ power output or radiation pattern, or perform other needed diagnostic and remedial functions. Certainly, Globalstar’s control of the TLPS network through its NOS would be critical during and after disasters when terrestrial facilities can be rendered unavailable and citizens and public safety personnel must rely on satellite services. In some circumstances, it might be necessary to terminate remaining TLPS transmissions in an affected area to ensure interference-free MSS for public safety use.

In contrast to Globalstar’s managed TLPS, an unmanaged, public Wi-Fi on Channel 14 would lead to the same uncontrolled, “wild west” conditions now found on Channels 1, 6, and

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<sup>40</sup> *NPRM* ¶ 18.

<sup>41</sup> In explaining its proposal to assign low power broadband authority to Globalstar, the Commission also pointed out that TLPS would be ancillary to Globalstar’s MSS, given Globalstar’s commitment to its MSS business and its planned managed deployment of these low power facilities. *Id.*

<sup>42</sup> In order to minimize interference to MSS operations, the Commission assigned terrestrial AWS-4 authority in the 2 GHz MSS band to DISH Network Corporation, the MSS licensee in that spectrum. *2 GHz Terrestrial Use Order* ¶¶ 181-183.

<sup>43</sup> *See infra* at 38-39 for further discussion of this NOS and its role in ensuring the security of Globalstar’s TLPS network.

11. These Wi-Fi operations would not be controlled by an NOS or managed to minimize interference to Globalstar's satellite service and its customers. As a result, public Wi-Fi on Channel 14 would result in unpredictable, unlimited interference to Globalstar's MSS operations and substantial harm to its customers, jeopardizing the growth of Globalstar's service and its greater than \$5 billion investment in its MSS system.

### **C. Globalstar Supports the Commission's MSS Gating Proposal**

The Commission proposes a number of changes to its ATC gating requirements for a low power broadband network in the Upper Big LEO band. Globalstar fully supports these modifications to Section 25.149 of the Commission's rules, which would authorize Globalstar to provide a robust, nationwide TLPS network. In particular, as discussed below, the Commission has proposed gating rules that would allow Globalstar for the first time to permanently deploy terrestrial-only devices in its spectrum without having to meet inflexible satellite coverage rules and spare satellite requirements. This new pro-investment, pro-consumer approach is critical to expanding the nation's supply of broadband spectrum, alleviating the worsening Wi-Fi traffic jam, and providing great benefits to American consumers.<sup>44</sup>

Globalstar supports the Commission's proposal not to apply an integrated services gating requirement to TLPS. As the Commission notes, a dual-mode requirement is infeasible for TLPS equipment operating throughout the 2473-2495 MHz band segment, since there is no MSS below 2483.5 MHz. Moreover, dual-mode MSS-terrestrial devices have limited appeal to

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<sup>44</sup> In the *NPRM*, the Commission also proposed a significant change to its existing rule limiting the kind of terrestrial systems that can be deployed in the Upper Big LEO band at 2483.5-2495 MHz. The current ATC rule limits terrestrial operations at 2483.5-2495 MHz to base stations. The Commission proposes an amendment to Section 25.149(a)(1) to permit the operation of TLPS end-user devices in this band. *NPRM* ¶ 24. Globalstar obviously supports this change, which is necessary to permit TLPS access points and consumer devices to operate in the Upper Big LEO band.

individual consumers and even to most government and business customers. Given consumers' preferences, the primary effect of the Commission's dual-mode requirement has been to discourage the development of terrestrial operations in the MSS bands. Permitting consumers to obtain terrestrial-only service via their TLPS devices would enable Globalstar to use its Big LEO spectrum more efficiently and provide consumers with an innovative, market-ready service. As the Commission states, TLPS would remain ancillary to MSS even without an integrated services requirement, given Globalstar's management of this service and its well-demonstrated commitment to MSS.<sup>45</sup>

The Commission also proposes to require a simplified evidentiary showing that Globalstar's MSS is commercially available in the United States, rather than a detailed showing of satellite system coverage and replacement satellites.<sup>46</sup> The proposed evidentiary standard is sufficient to ensure that the terrestrial services are ancillary to satellite operations and will speed the provision of additional broadband capacity to consumers.

The Commission does not need a detailed substantial satellite service evidentiary showing to ensure Globalstar's continued provision of robust MSS offerings. Globalstar is fully committed to the continued development and future success of its MSS business. As described above, Globalstar has invested over \$5 billion in its global MSS network, including over \$1 billion in its second-generation network, and last year it achieved full deployment of its second-generation MSS constellation. Given the ongoing, vigorous competition among MSS providers, Globalstar and other MSS licensees have a strong incentive to maximize their signal

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<sup>45</sup> *NPRM* ¶ 27.

<sup>46</sup> *Id.* ¶ 26.

coverage to attract and retain customers in the United States and worldwide.<sup>47</sup> Rather than weaken Globalstar's commitment to MSS, revenues from the provision of TLPS would only strengthen Globalstar's ability to maintain a vital, dynamic satellite business that fully meets the needs of the satellite user community.

**D. The Commission Should Not Subject Globalstar's TLPS Application to an Extra Round of Notice and Comment**

Under the Commission's proposed rules, Globalstar would be required to file an application to modify its existing MSS ATC authorization for authority for TLPS operations in the 2483.5-2495 MHz band.<sup>48</sup> The Commission's rulemaking order itself would not modify Globalstar's licenses and permit it to offer TLPS.

Globalstar believes that an extra notice and comment requirement is unnecessary, redundant with this proceeding, and would only delay the benefits of this innovative service. The Commission should treat Globalstar's TLPS application like other minor modification requests and either waive its Section 25.117(f) notice and comment requirement or amend that rule to create an exception for TLPS.

At the very least, the Commission should ensure that parties do not use an additional TLPS application process to rehash issues already addressed and resolved. As the Commission itself has recognized, its ATC modification procedure could give opposing parties an opportunity

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<sup>47</sup> Globalstar competes vigorously with the two other global MSS providers, Inmarsat and Iridium, and also competes with regional mobile satellite communications services that are available in several areas of the world. Globalstar competes as well with Fixed Satellite Service ("FSS") operators that offer communications services to business customers through private networks using very small aperture terminals ("VSATs").

<sup>48</sup> *NPRM* ¶ 19. Globalstar's first-generation MSS license and its blanket license for mobile terminals will both have to be modified to include TLPS ATC authority. Following the Commission's March 2011 grant of second-generation authority, Globalstar's mobile terminal blanket license now includes an ATC component.

simply to repeat arguments made in preceding MSS ATC proceedings. Warning parties against such abuse of process, the Commission in 2003 stated that “when we have resolved issues raised by objecting parties in an initial ruling process concerning the satisfaction of gating criteria, we will not entertain the same objections in the context of an ATC application relying in part on the initial ruling. To consider such issues in the application process would in essence give parties opposing an MSS operator's efforts to initiate ATC services two bites at the regulatory apple, could result in unnecessary delay in the provision of important communications services to the public, and would unnecessarily consume additional Commission resources.”<sup>49</sup> If the Commission requires an extra notice and comment round, it should similarly admonish parties against abusing the TLPS application process to seek reconsideration of resolved issues.

#### **IV. THE COMMISSION’S PROPOSED LOW POWER BROADBAND RULES WOULD PROTECT LICENSED RADIO SERVICES**

The Commission seeks comment on the potential effects of low power broadband operations at 2473-2495 MHz on other services within and adjacent to this band segment. As described *supra* at Section III.A, as an ATC service at 2483.5-2495 MHz and an unlicensed service at 2473-2483.5 MHz, Globalstar’s TLPS would be required to avoid harmful interference to other licensed operations and to accept interference from other licensed systems. TLPS can meet these obligations and coexist successfully with licensed services such as the Broadband Radio Service (“BRS”) and Educational Broadband Service (“EBS”) at 2.5 GHz and Broadcast Auxiliary Service (“BAS”) systems above and below 2483.5 MHz. There are no legitimate

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<sup>49</sup> *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*, Order on Reconsideration, 18 FCC Rcd 13590, ¶ 14 (2003).

interference issues preventing the Commission from moving forward expeditiously with an order to make more spectrum available for broadband services and authorize TLPS.

**A. The Commission’s Proposed Rules Would Protect Broadband Radio Service and Educational Broadband Service Facilities Operating Above 2496 MHz**

The Commission’s proposed low power broadband rules would protect adjacent-band Broadband Radio Service and Educational Broadband Service systems operating above 2496 MHz. The Commission’s proposed out-of-band emissions (“OOBE”) limits are sufficiently stringent to safeguard BRS and EBS operations. Moreover, Globalstar is committed to minimizing interference to these adjacent-band systems, and, in the unlikely event of TLPS-related interference to BRS or EBS, Globalstar would aggressively mitigate such effects.

Noting that Globalstar’s proposed ATC service would be low power, the Commission proposes to apply the following OOBE standard for TLPS at the 2495 MHz band edge, adjacent to BRS: attenuation 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.<sup>50</sup> This OOBE limit is more stringent than what is applied to most commercial wireless carriers, and is similar to what the Wireless Communications Association International (“WCA”) proposed for unwanted emissions for its wide-bandwidth, low power BRS mobile devices operating above 2511 MHz.

Globalstar supports the Commission’s proposed technically-feasible OOBE limit and would incorporate the necessary passive filtration into its TLPS access points to ensure they meet

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<sup>50</sup> *NPRM* ¶ 32.

it.<sup>51</sup> The Commission’s proposed OOB standard would also accommodate the operation of software-modified tablets, smartphones, and other existing consumer devices as well as newly manufactured end-user equipment,<sup>52</sup> and would be sufficient to protect BRS and EBS.<sup>53</sup> TLPS access points and mobile devices would operate at very low power levels and, consequently, would have much less impact on the RF environment than the higher-power systems operating in conventional commercial wireless networks. TLPS access points’ high-selectivity passband filters would further limit the risk of harmful interference to BRS-1 operations and other BRS/EBS systems at 2.5 GHz.<sup>54</sup>

BRS licensee Clearwire (now Sprint) noted that BRS/EBS mobile digital stations operating in the 2496-2690 MHz band must limit their unwanted emissions below 2496 MHz by a factor no less than  $43 + 10 \log (P)$  dB, which is 3 dB stricter than the limit proposed by Globalstar for its low power network in the 2496-2500 MHz band.<sup>55</sup> As the Commission found in the *NPRM*, however, it is appropriate for BRS systems above 2496 MHz to be subject to a

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<sup>51</sup> As described in the Technical Analysis, attached as Appendix B to the Petition (at 7-8) (“Technical Analysis”), remedial filtration in TLPS access points will consist of passive filtration devices applied to the RF path of the 802.11 transceiver in a band-pass configuration. The choice of filtration technology and method of design integration will be influenced by the form factor, economics, and power level associated with any given TLPS access point application.

<sup>52</sup> As described in the Petition’s Technical Analysis, surveys of current-generation mobile devices in the Commission’s equipment certification database indicate that the conducted power levels associated with these devices will enable compliance with the proposed OOB limit without the need for additional hardware-based filtration. Technical Analysis at 6-7.

<sup>53</sup> See *NPRM* ¶ 34; Technical Analysis at 9-10.

<sup>54</sup> Technical Analysis at 10. Low power access points should not be required to meet the more stringent OOB limit applicable to high-power commercial wireless base stations, which can operate at four hundred times the effective radiated power level of TLPS access points. TLPS access points will typically operate at a power level of 4 watts (36 dBm), making these transceivers more analogous to commercial wireless end-user devices than to CMRS base stations.

<sup>55</sup> Comments of Clearwire Corporation, RM-11685, at 19-21, n.46 (Jan. 14, 2013).

stricter unwanted emissions standard than TLPS systems below 2495 MHz: “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.”<sup>56</sup>

Finally, Globalstar would address any unlikely incidents of TLPS-related interference to BRS or EBS through mitigation. As described above, TLPS access points would be carefully controlled by an NOS analogous to systems used to manage pico- and femto-cellular infrastructure. With the capabilities of its NOS, interference diagnosis and resolution would be substantially faster than with more conventional macro-cellular networks.<sup>57</sup>

**B. The Commission’s Proposed Rules Would Protect BAS Systems Operating Within and Adjacent to the 2473-2495 MHz Band**

In the event it adopts the proposed low power broadband rules, the Commission asks if new procedures, rules, or policies are necessary to protect grandfathered Broadcast Auxiliary Service Channel A10 stations.<sup>58</sup> No changes are needed. Globalstar and co-primary BAS already share the 2483.5-2500 MHz band successfully, and Globalstar’s terrestrial low power network will have little or no impact on BAS operations.

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<sup>56</sup> *NPRM* ¶ 33.

<sup>57</sup> The TLPS 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. A TLPS NOS will also create a rapid means of specifically identifying and controlling potential interference to adjacent-band operators. For example, an interference complaint from an adjacent-band operator may be rapidly correlated with TLPS access points in a given area. A remote technician may use the TLPS NOS to diagnose TLPS 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.

<sup>58</sup> *NPRM* ¶ 38.

The Commission has found repeatedly that terrestrial mobile systems and BAS facilities can share spectrum and coexist in the Upper Big LEO band. EIBASS has proposed to rehash settled issues even though “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.”<sup>59</sup>

Globalstar’s proposed terrestrial low power transmissions at 2473-2495 MHz would have even less impact on BAS operations than more conventional, high-power commercial mobile applications. TLPS operations below 2483.5 MHz would comply with the Commission’s Part 15 rules and not cause harmful interference to BAS or other licensed services. The Commission need not adopt new rules to protect BAS Channel A10 operations.

**V. TLPS WOULD COMPLY WITH APPLICABLE PART 15 RULES AND COEXIST SUCCESSFULLY WITH UNLICENSED OPERATIONS BELOW 2483.5 MHz**

If the Commission adopts its proposed low power broadband rules, Globalstar’s TLPS would comply with the Commission’s existing Part 15 technical rules for operations below 2483.5 MHz – rules that are designed to promote full use of the unlicensed 2.4 GHz band.<sup>60</sup> In addition, TLPS would satisfy the Commission’s proposal to limit unwanted emissions below 2473 MHz to at least 20 dB below the fundamental power in the 100 kHz bandwidth within the band containing the highest level of desired power.<sup>61</sup> A functional 802.11g/n-based

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<sup>59</sup> *NPRM* ¶ 37.

<sup>60</sup> *See* Technical Analysis at 3. TLPS access points would operate at standard ISM power limits as defined in Part 15 (30 dBm maximum conducted output power/36 dBm maximum EIRP).

<sup>61</sup> *NPRM* ¶ 30. The Commission also asks whether its out-of-band emissions limits for ATC systems (Section 25.254) at 2483.5 MHz should apply to TLPS. *Id.* ¶ 31. Since the lower “band edge” for TLPS would be at 2473 MHz, any Part 15 out-of-band emission limit for TLPS should be applied at that location rather than at 2483.5 MHz.

communications link occupies approximately 18 MHz of the 22 MHz of available bandwidth in its channel, meaning that there is a *de facto* guard band of two megahertz between Channel 14 and the 2473 band edge. This guard band would provide sufficient signal attenuation to enable TLPS to comply with this proposal.<sup>62</sup>

TLPS would coexist successfully with other unlicensed operations below 2483.5 MHz. While the Commission seeks comment on any “costs” that might flow from TLPS at 2473-2495 MHz to such unlicensed operations,<sup>63</sup> the Commission’s rules do not protect unlicensed services from interference, and those services must accept any such interference from other licensed or unlicensed operations.<sup>64</sup> Under the Commission’s Part 15 framework, unlicensed operators bear the risk of any costs associated with the operation of other compliant unlicensed devices. If Globalstar were authorized to provide TLPS below 2483.5 MHz, TLPS too would operate on a non-interference basis and bear the risk of any costs stemming from the deployment of any compliant unlicensed systems at 2473-2483.5 MHz, including any new unlicensed technologies.

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<sup>62</sup> In order to operate at 2473-2483.5 MHz, a specific TLPS device must be certified as compliant with existing Part 15 rules in the Commission’s equipment certification process (discussed further at Section VII, *infra*).

<sup>63</sup> *NPRM ¶¶ 23*.

<sup>64</sup> 47 C.F.R. § 15.5(b).

The Commission has established a different set of rules for licensed and unlicensed services, and its precedent in interpreting its Part 15 rules is clear – unlicensed operations do not receive interference protection:

- “The primary operating condition for unlicensed devices is that the operator must accept whatever interference is received and must not cause harmful interference.”<sup>65</sup>
- “[P]ersons operating unlicensed devices must accept interference from all other operations in the band.”<sup>66</sup>
- “Operation under Part 15 is subject to the condition that a device does not cause harmful interference to authorized services, and that it must accept any interference received.”<sup>67</sup>
- “Unlicensed devices generally share the spectrum with allocated radio services on a noninterference basis. That is, unlicensed devices may not cause harmful interference to allocated radio services and must accept any interference they receive.”<sup>68</sup>

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<sup>65</sup> *Revision of Part 15 of the Commission’s Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band*, ET Docket No. 13-49, First Report and Order, FCC 14-30, ¶ 3 (rel. April 1, 2014).

<sup>66</sup> *Request by Progeny LMS, LLC for Waiver of Certain Multilateration Location and Monitoring Service Rules; Progeny LMS, LCC Demonstration of Compliance with Section 90.353(d) of the Commission’s Rules*, Order, 28 FCC Rcd 8555, ¶ 10 (2013).

<sup>67</sup> *Unlicensed Operation in the TV Broadcast Bands; Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band*, Second Memorandum Opinion and Order, 25 FCC Rcd 18661, ¶ 5 (2010).

<sup>68</sup> *Fostering Innovation and Investment in the Wireless Communications Market A National Broadband Plan for Our Future*, Notice of Inquiry, 24 FCC Rcd 11322, ¶ 23 (2009).

- “[U]nlicensed devices authorized under Part 15 are not entitled to interference protection from and may not cause harmful interference to any authorized services in the band.”<sup>69</sup>

Thus, unlicensed services do not enjoy protection from interference from other licensed or unlicensed services. As long as TLPS complies with the Commission’s Part 15 rules, these unlicensed parties have no basis for arguing against low power broadband service at 2473-2483.5 MHz.

#### **VI. THE COMMISSION SHOULD MAINTAIN ITS EMISSIONS LIMIT FOR UNLICENSED OPERATIONS AT THE 2483.5 MHz BAND EDGE**

The Commission should maintain its emissions limit for unlicensed operations below the 2483.5 MHz ISM band edge to protect the customers of Globalstar’s licensed MSS operations above 2483.5 MHz.<sup>70</sup> If the Commission relaxes this limit, unrestricted, unfiltered Wi-Fi transmissions with a standard 802.11 emissions mask would be permitted on Channels 12-13. Out-of-band emissions from these Channel 12-13 Wi-Fi deployments would seriously degrade and disrupt Globalstar’s MSS offerings in affected areas. As would be the case with public Wi-Fi on Channel 14 (discussed *supra* at 21-22), public Wi-Fi on Channels 12-13 would not be controlled by a Network Operating System or managed to minimize interference to licensed Globalstar’s satellite offerings and its end users.<sup>71</sup> By changing its unwanted emissions limit at

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<sup>69</sup> *Modification of Parts 2 and 15 of the Commission’s Rules for Unlicensed Devices and Equipment Approval*, Memorandum Opinion and Order and Further Notice of Proposed Rulemaking, 22 FCC Rcd 11383, ¶ 5 (2007).

<sup>70</sup> *NPRM* ¶ 41. This emission limit is contained in Sections 15.205 and 15.209 of the Commission’s rules.

<sup>71</sup> Nor would public Wi-Fi operations on Channels 12-13 be practical, since these channels directly overlap with Wi-Fi Channel 11, which carries a significant portion of all public Wi-Fi traffic.

2483.5 MHz, the Commission would threaten the future of Globalstar's authorized MSS network and all of the public interest benefits provided by that system.

## **VII. THE COMMISSION SHOULD HAVE A FLEXIBLE CERTIFICATION APPROACH FOR TLPS EQUIPMENT**

The Commission seeks comment on the certification of TLPS equipment and acknowledges that an overly burdensome process could jeopardize the development and benefits of this new service.<sup>72</sup> To speed the benefits of TLPS, Globalstar urges the Commission to take a flexible approach toward TLPS equipment certification.

### **A. The Commission Should Permit Existing Consumer Devices to be Modified for TLPS Operations Through the Commission's Permissive Change Process**

One of the benefits of TLPS is that consumers across the United States would be able to use their existing devices to gain rapid access to 22 megahertz of newly-available spectrum. To realize this benefit, the Commission should permit modification of existing consumer devices through its permissive change process, rather than require re-certification and new FCC IDs for updated, TLPS-capable devices.

#### **1. Most Existing Consumer Devices Have the Hardware Necessary to Operate at 2473-2495 MHz and Only Need Software Updates to Receive TLPS**

The Commission asks whether existing end-user devices would need hardware modifications or only software updates to receive TLPS at 2473-2495 MHz.<sup>73</sup> As Globalstar described in its Petition, virtually all 802.11-enabled consumer devices need only a software update to receive TLPS. While most of these devices have the hardware needed to operate at 2473-2495 MHz, they lack the physical capability to operate above 2483.5 MHz in the United

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<sup>72</sup> *NPRM* ¶¶ 42-47.

<sup>73</sup> *Id.* ¶ 46.

States because of restrictions in their radiofrequency (“RF”) software.<sup>74</sup> If the Commission permits TLPS at 2473-2495 MHz, Globalstar and its future terrestrial partners could transmit software updates to authenticated customers’ 802.11-enabled devices, and, almost immediately, enable those devices to operate above 2483.5 MHz and receive Globalstar’s managed TLPS offering.

## **2. The Commission Should Rely on Its Permissive Change Process Rather than Impose a Burdensome Re-certification Requirement**

The Commission notes that, in some cases, a grantee of equipment certification may add new frequency bands to a previously certified device by requesting a streamlined “permissive change.”<sup>75</sup> The Commission allows equipment grantees to request permissive changes to expand a non-software-defined device’s frequency range “when the transmitter already had the capability of operating over the new frequency range, and the change could be made through the internal programming of the equipment without making any hardware changes.”<sup>76</sup>

Software updates that expand a consumer device’s 802.11 capability to the 2483.5-2495 MHz band segment appear to fall within this permissive change category. The *NPRM* indicates, however, that the Commission does not currently permit equipment certification grantees to modify non-software-defined radio devices “to operate under additional rule parts through permissive change, but instead require[s] a new grant of certification and a new FCC ID.”<sup>77</sup>

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<sup>74</sup> See *Facilitating Opportunities for Flexible, Efficient, and Reliable Spectrum Use Employing Cognitive Radio Technologies*, Report and Order, 20 FCC Rcd 5486, ¶ 73 n.112 (2005) (“*Cognitive Radio Order*”).

<sup>75</sup> *NPRM* ¶ 43.

<sup>76</sup> *Authorization and Use of Software Defined Radios*, First Report and Order, 16 FCC Rcd 17373, ¶ 10 n.19 (2001). Most consumer devices that could be modified to receive TLPS were not originally certified as software-defined radios.

<sup>77</sup> *NPRM* ¶ 47.

Because a TLPS software update triggers the application of Part 25 of the Commission’s rules, it appears that the re-certification requirement could apply to existing consumer devices gaining TLPS capability at 2483.5-2495 MHz.

Whether by interpretation, waiver, or rule change, the Commission should not require re-certification for TLPS software updates. The mere fact that TLPS would utilize a portion of Globalstar’s licensed MSS spectrum regulated under Part 25 does not warrant re-certification for every potential TLPS consumer device. Devices gaining TLPS capability would become subject to Part 25, but there would be no MSS or satellite component to this service; TLPS would be one, unified terrestrial service provided over a single channel, and would not include separate Part 15 and Part 25 features provided to different customers. Nor would differences between TLPS and existing Part 15-regulated Wi-Fi – such as Globalstar’s management of its TLPS network – justify an onerous re-certification obligation.

Certainly, the re-certification of all consumer devices receiving the TLPS software update would be a prolonged process and impose substantial and unnecessary costs on consumers, manufacturers, Globalstar and its terrestrial partners, and the Commission. Original grantees would be required to submit certification filings that included all the exhibits typically required for a new approval. Telecommunications Certification Body (“TCB”) or Commission approval of these new certification requests could take months or more, and then grantees would have to physically attach new FCC ID labels to every single consumer device that receives the software update.<sup>78</sup> As the Commission recognizes in the *NPRM*, this lengthy and burdensome process

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<sup>78</sup> Given the substantial costs associated with physically attaching FCC IDs to wireless devices (as well as the outdated nature of this requirement), the Telecommunications Industry Association in 2012 filed a petition for rulemaking seeking rule changes that would permit the electronic labeling of these devices. *See* Petition for Rulemaking by the Telecommunications

could discourage manufacturer participation in TLPS, and diminish the benefits of this new service.<sup>79</sup> At the very least, such costs would delay consumer access to more broadband spectrum, one of the primary public interest benefits of TLPS.

Given the potential harms from a rigid re-certification policy, the Commission seeks comment on alternative approaches to expanding the frequency range of existing 802.11 consumer devices.<sup>80</sup> Globalstar urges the Commission to authorize such software updates either through its existing permissive change procedures or through an even more streamlined, consolidated permissive change approach. If the Commission relies on its existing permissive change process, individual Class II permissive change requests would be submitted by the original equipment certification grantees for these existing devices. Permissive change filings are less extensive and processed much more quickly than re-certification filings; these changes are generally approved after a TCB or the Commission conducts an expeditious review of the device's revised performance characteristics. With a permissive change approach, the Commission would enable consumers to gain access to newly-available broadband spectrum soon after the Commission adopts its order in this proceeding.<sup>81</sup>

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Industry Association, RM-11673 (Aug. 6, 2012). While this petition received widespread support from commenters, it remains pending at the Commission.

<sup>79</sup> *NPRM* ¶ 47.

<sup>80</sup> The Commission asks whether Globalstar should be permitted to add new frequency bands to previously approved equipment without the need for new FCC ID labeling. *NPRM* ¶ 47.

<sup>81</sup> A permissive change mechanism for TLPS software updates would be consistent with the Commission's recent approach to equipment certification for other radio services, including modifications to existing U-NII access points at 5 GHz and changes to existing private radio systems in the 800 MHz band. *5 GHz U-NII Order* ¶ 42; *Amendment of Part 90 of the Commission's Rules to Permit Terrestrial Trunked Radio (TETRA) Technology; Request by the TETRA Association for Waiver of Sections 90.209, 90.210 and 2.1043 of the Commission's Rules*, Notice of Proposed Rulemaking and Order, 26 FCC Rcd 6503, ¶ 23 (2011).

Though streamlined, the permissive change process would be sufficiently rigorous to ensure that consumer devices comply with Part 25 and Part 15 of the Commission's technical rules and meet applicable non-interference obligations.<sup>82</sup> The original grantees would be required to include the relevant technical parameters of the updated devices and demonstrate compliance with the Commission's technical and operational rules.<sup>83</sup> Going forward, these grantees would remain responsible for ensuring that individual devices comply with these rules.

The Commission should also consider an interpretation, waiver, or rule change that allows Globalstar to request one, consolidated permissive change for all planned TLPS consumer devices, on behalf of all of the original grantees for these devices. This consolidated permissive change filing would include the relevant technical and operational information for each updated device, sufficient to demonstrate compliance with the Commission's rules. By allowing this streamlined option or at least relying on its existing permissive change procedures, the Commission would accelerate consumer access to broadband, promote wireless broadband development, and help alleviate the Wi-Fi traffic jam.

#### **B. Enterprise Network Management Will Ensure the Security of TLPS**

The Commission asks how Globalstar (i) plans to control the availability of software updates, (ii) would prevent unauthorized modifications to certified equipment, and (iii) would

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<sup>82</sup> Under the Commission's proposal, TLPS equipment would operate under the provisions of Section 15.247 and modified provisions in Section 25.149. The Commission concludes therefore that TLPS equipment should be treated like composite devices and certified under both of these rule parts. *NPRM* ¶ 42. Globalstar supports this approach and agrees that TLPS equipment certification and permissive change filings must demonstrate compliance with all applicable Part 15 and Part 25 rules.

<sup>83</sup> 47 C.F.R. § 2.1043. Globalstar expects that the well-established nature of the 802.11 standard would generally allow for an expeditious review of parties' permissive change filings. As described in Globalstar's Petition, 802.11 performance on Channel 14 (including the emissions mask) should be essentially the same as its performance on Channels 1, 6, and 11. See Petition at 40 n.99; Technical Analysis at 6.

limit operation of equipment to authorized parties. Globalstar understands that the security of TLPS is critical to the commercial success of this managed service, and, as described in the Petition, it would employ the technologies and procedures necessary to ensure that TLPS meets these system requirements. From the outset, Globalstar would control the availability of the software update necessary for an 802.11 consumer device to operate throughout the 2473-2495 MHz band and receive TLPS. Globalstar would provide this software update only to device models that have been certified by the Commission to operate in this expanded frequency range, and only to customers who are authenticated to receive service over its TLPS facilities.

After initiating TLPS operations, Globalstar would utilize its carrier-grade access points and state-of-the-art network management and security technologies to prevent unauthorized use of the 2473-2495 MHz band. With the TLPS network operating system in place, Globalstar and its terrestrial partners would ensure that customers could not terminate their TLPS subscriptions and subsequently use their devices to receive service over Channel 14. TLPS network security measures would build upon already robust access control layers, which have evolved to support secure carrier and enterprise utilization of public 802.11 channels. Such control layers would permit Globalstar and its future terrestrial partners to secure TLPS access points and manage their operation through a network operating system in a manner analogous to conventional femto or pico cellular infrastructure.

Employing network security technologies such as Access Point Authentication Server (“APAS”), Globalstar or its terrestrial partners would require TLPS access points to authenticate end-user devices with a central management server over regular time intervals. A declined authentication would immediately terminate the access point’s communications with a given device. Network security for TLPS would be further supported by software and firmware

barriers in the NOS and in carrier-grade access points and end-user devices. These barriers are highly effective today in limiting 802.11 use to ISM frequencies below 2473 MHz. The roll-out of TLPS would trigger additional development of integrated software and firmware security, permitting complete control of access point and device functionality and further reducing the likelihood of unauthorized TLPS operations.

**C. The Commission Should Require Globalstar’s Consent to Equipment Certifications for TLPS Access Points**

The Commission proposes to require applicants for equipment certification of TLPS access points to demonstrate Globalstar’s consent to their certification request.<sup>84</sup> Globalstar supports this requirement, which would ensure that all TLPS access points are compatible with Globalstar’s terrestrial network and its carrier-managed NOS infrastructure. As described above, Globalstar’s use of a NOS to control and manage TLPS access points is critical to minimizing interference to its own MSS and other licensed services, mitigating any harmful interference that does occur, and ensuring the security of its network.<sup>85</sup> Globalstar also agrees with the Commission that its consent is *not* necessary for new equipment certification applications and permissive change requests for TLPS consumer devices. Manufacturers of consumer devices should have full flexibility to determine whether their devices are equipped with TLPS capability on Channel 14. In addition, consumer devices should not present any obstacles to the effective management of the TLPS network, since these “client” devices would be controlled by the certified TLPS access points that are in turn controlled through Globalstar’s NOS.

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<sup>84</sup> *NPRM* ¶ 44.

<sup>85</sup> As the *NPRM* indicates, Globalstar anticipates that, in contrast, most if not all TLPS access points will be newly manufactured equipment. These new access points along with next-generation TLPS-enabled consumer devices will receive new equipment certifications from the Commission.

## VIII. GLOBALSTAR'S PUBLIC INTEREST COMMITMENTS

The Commission describes the commitments Globalstar made in its November 2012 Petition to (i) provide up to 20,000 TLPS access points free of charge in public and non-profit schools, community colleges, and hospitals, (ii) provide MSS free of charge in federal disaster areas.<sup>86</sup> Globalstar reaffirms that with Commission authority to provide TLPS, it will meet these public interest commitments.

Globalstar's commitment to provide up to 20,000 free TLPS access points would further the statutory goal of improving broadband access where it is urgently needed<sup>87</sup> and the objectives of President Obama's ConnectEd initiative, which is designed to provide next-generation broadband to every K-12 student in America.<sup>88</sup> Even at schools and other institutions that already have widely-deployed 802.11 facilities, Globalstar's TLPS could significantly enhance wireless connectivity and the quality of portable, wireless broadband. Additionally, Globalstar's commitment to provide MSS free of charge within federally declared disaster areas will deliver substantial benefits to the public safety community as well as the general public. Globalstar customers will have the peace of mind of knowing that their satellite service is free when they

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<sup>86</sup> NPRM ¶ 48.

<sup>87</sup> See, e.g., Cisco Systems, *High-Speed Broadband in Every Classroom: The Promise of a Modernized E-Rate Program*, attached as Exhibit A to Comments of Cisco Systems, Inc., WC Docket No. 13-184 (Sept. 16, 2013), at 8, 25, 31 (“The density of devices and users per square foot in schools today is among the highest found in any work environment. Neither hotels and enterprise business environments, nor restaurants and hospitals see this level of demand on their networks . . . . To be effective for students and educators, Wi-Fi environments in schools must be capable of supporting the load that students and educators put on them.”).

<sup>88</sup> The White House, *ConnectED: President Obama's Plan for Connecting All Schools to the Digital Age*, Fact Sheet (June 6, 2013), [http://www.whitehouse.gov/sites/default/files/docs/connected\\_fact\\_sheet.pdf](http://www.whitehouse.gov/sites/default/files/docs/connected_fact_sheet.pdf).

most need the service. The Commission should adopt an order expeditiously to realize the benefits of these commitments.

The Commission asks if Globalstar's public interest commitments should be incorporated into its rules as requirements or into Globalstar's license in the form of license conditions.<sup>89</sup>

While Globalstar will meet these commitments in any event, it does not oppose either approach if necessary to provide the Commission with greater assurance regarding the benefits of TLPS.

## **IX. CONCLUSION**

Globalstar urges the Commission to adopt an order expeditiously that reforms the Big LEO MSS-terrestrial rules and permits Globalstar to provide a low power broadband terrestrial network in its licensed spectrum. By taking this action, the Commission will advance the nation's spectrum policy goals and bring consumers the benefits of more investment, innovation, and more-intensive use of broadband spectrum.

Respectfully submitted,

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<sup>89</sup> NPRM ¶ 48.