

overlapping 22 megahertz channels between 2401 MHz and 2495 MHz, and both the low-power TLPS base stations (or “access points”) and consumer end-user devices will operate within the 22 megahertz band segment that the 802.11 standard designates as “Channel 14.”<sup>25</sup> A key public interest benefit of TLPS will 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 in the United States because of restrictions in their radiofrequency (“RF”) software.<sup>26</sup> If the Commission adopts the proposed AWS-5 rules, Globalstar and its future terrestrial partners will be able to transmit the necessary software update to authenticated customers’ 802.11-enabled devices, and, virtually immediately, those devices will be able to operate above 2483.5 MHz and receive Globalstar’s managed TLPS offering.<sup>27</sup> Thus, with the rollout of Globalstar-managed TLPS, consumers across the United States will be able to use their devices more efficiently and will rapidly gain access to terrestrial broadband spectrum that they would otherwise be unable to utilize.

Once a more flexible regulatory framework is in place for the Upper Big LEO band, Globalstar in conjunction with its terrestrial partners will likely deploy thousands of newly-

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<sup>25</sup> Technical Analysis at 1-3.

<sup>26</sup> *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*”). As the Commission noted in the *Cognitive Radio Order* and as described in Globalstar’s Appendix B Technical Analysis, unlicensed 802.11 transmissions at 2473-2495 MHz are effectively prohibited in the United States by Section 15.205(a) of the Commission’s rules, which establishes Globalstar’s licensed Big LEO spectrum at 2483.5-2500 MHz as a “restricted band” for unlicensed purposes. Technical Analysis at 2. Unlicensed operations on 802.11 Channels 12 and 13 are precluded in the United States by the Commission’s Section 15.249(d) OOB limit. *Id.* at 1-2.

<sup>27</sup> As discussed *infra* at note 105, before existing consumer devices can be modified to permit the reception of Globalstar-managed TLPS, the Commission will have to accept manufacturers’ “permissive change” equipment certification filings for these devices.

manufactured TLPS access points across the United States.<sup>28</sup> While Globalstar’s long-term vision for terrestrial use of the Big LEO band is focused on using FDD LTE technology, Globalstar-managed TLPS deployments will likely remain the most efficient, economically viable terrestrial application over the long term in some geographic areas, including areas with lower population densities. By deploying an optimal mix of LTE and TLPS facilities in the Big LEO band, Globalstar will achieve a full and intensive terrestrial utilization of its spectrum.

**IV. By Adopting Fundamental Reform in the Big LEO Band, the Commission Will Advance Substantial and Critical Public Interest Benefits**

If the Commission reforms its Big LEO rules to permit more flexible terrestrial use of Globalstar’s spectrum, including the near-term deployment of TLPS, it will generate substantial public interest benefits. This new regulatory approach will encourage wireless broadband investment, help address the nation’s need for additional broadband spectrum, and improve the quality of wireless service for American consumers. In addition, revenue from Globalstar’s TLPS-related services and spectrum leases will help ensure the commercial viability of Globalstar’s global MSS network, which provides significant public safety benefits.

**A. Greater Terrestrial Flexibility in the Big LEO Band Will Help Address the Nation’s Growing Spectrum Deficit**

As the National Broadband Plan described, the convergence of Internet computing and mobile communications is fueling growth in consumer demand for mobile broadband services.<sup>29</sup> By 2015, it is expected that approximately 80 percent of total broadband subscriptions globally

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<sup>28</sup> As the Big LEO MSS licensee, Globalstar alone will be in a position to manage these TLPS operations, coordinate TLPS systems with its global NGSO MSS network, and minimize harmful interference to its MSS offerings. *See infra* at 29-30.

<sup>29</sup> *See* FCC, “Connecting America: The National Broadband Plan,” at 76-77 (rel. March 16, 2010), *available at*: <<http://download.broadband.gov/plan/national-broadband-plan.pdf>> (“National Broadband Plan”).

will be mobile subscriptions.<sup>30</sup> The use of broadband-capable smartphones continues to accelerate, with these devices now making up 41% of all wireless connections.<sup>31</sup> Smartphones currently generate 35-times more traffic than standard cellphones, and this data consumption will increase substantially as consumers more frequently use high-bandwidth applications on 4G networks.<sup>32</sup> Moreover, as Chairman Genachowski and Commissioner Pai have recently noted, tablet devices generate 121 times more traffic than traditional cellphones, and mobile-connected tablets are likely to produce as much traffic in 2016 as the entire global mobile network in 2012.<sup>33</sup> Overall, wireless data traffic more than doubled between July 2011 and June 2012,<sup>34</sup> and mobile traffic in the United States is projected to grow 16-fold by 2016.<sup>35</sup>

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<sup>30</sup> See Darrell M. West, Brookings Institution, *Ten Facts About Mobile Broadband*, at 2 (Dec. 8, 2011), available at: <[http://www.brookings.edu/~media/research/files/papers/2011/12/08%20mobile%20broadband%20west/1208\\_mobile\\_broadband\\_west.pdf](http://www.brookings.edu/~media/research/files/papers/2011/12/08%20mobile%20broadband%20west/1208_mobile_broadband_west.pdf)> (citing Wireless Intelligence, July 2011; Informa Telecoms & Media (WBIS), July 2011). By 2015, it is expected that there will be 3.1 billion mobile broadband subscribers, compared to 848 million fixed broadband subscribers. *Id.*

<sup>31</sup> See Press Release, CTIA-The Wireless Association®, *Consumer Data Traffic Increased 104 Percent According to CTIA-The Wireless Association® Semi-Annual Survey* (Oct. 11, 2012) (“CTIA Study Press Release”), available at: <<http://www.ctia.org/media/press/body.cfm/prid/2216>>; see also CTIA Semi-Annual Mid-Year 2012 Top-Line Survey Results, available at: <[http://files.ctia.org/pdf/CTIA\\_Survey\\_MY\\_2012\\_Graphics-\\_final.pdf](http://files.ctia.org/pdf/CTIA_Survey_MY_2012_Graphics-_final.pdf)>.

<sup>32</sup> *Genachowski Spectrum Speech* at 6 (stating that smartphones on a 4G network use 50% more data than the consumers using the same smartphone on a 3G network, because higher speeds and lower latency encourage the use of higher-bandwidth applications).

<sup>33</sup> *Genachowski Spectrum Speech* at 7; Remarks of Commissioner Ajit Pai at CTIA's MobileCon, San Diego, California, at 3 (Oct. 10, 2012), available at: <[http://transition.fcc.gov/Daily\\_Releases/Daily\\_Business/2012/db1010/DOC-316746A1.pdf](http://transition.fcc.gov/Daily_Releases/Daily_Business/2012/db1010/DOC-316746A1.pdf)>. As Chairman Genachowski points out, in the future almost every imaginable device will have embedded Internet-connected sensors. Experts expect up to 50 billion Internet-connected devices by 2020.

<sup>34</sup> See CTIA Study Press Release.

<sup>35</sup> *Genachowski Spectrum Speech* at 3. See also Cisco Visual Networking Index: *Global Mobile Data Traffic Forecast Update, 2011-2016*, at 7 (Feb. 14, 2012), available at: <[http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white\\_paper\\_c11-520862.pdf](http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-520862.pdf)>. According to the Cisco study, global mobile data traffic overall will increase

This wireless broadband growth has created a pressing need for additional mobile broadband-capable spectrum in the United States. As Commissioner McDowell has observed, “[M]ore powerful 4G networks, sophisticated devices and complex mobile applications are taxing spectrum availability.”<sup>36</sup> In a February 2012 study, the Council of Economic Advisors found that the current allocation of terrestrial wireless spectrum cannot accommodate the projected acceleration in mobile broadband demand, even with improvements in technology and substantial investment in new wireless facilities.<sup>37</sup> If this situation is insufficiently addressed and “wireless pathways are clogged, inefficiently used, or off-limits altogether,”<sup>38</sup> the “scarcity of

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18-fold between 2011 and 2016. Mobile data traffic will grow at a compound annual growth rate of 78 percent from 2011 to 2016, reaching 10.8 exabytes per month by 2016. *Id.* at 3.

<sup>36</sup> Remarks of the Honorable Robert M. McDowell Before *TIA 2012: Inside the Network*, Dallas, Texas, *A Spectrum Policy to Promote American Economic Growth*, at 5 (June 7, 2012), available at: <[http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/DOC-314505A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-314505A1.pdf)>. See also Prepared Remarks of Commissioner Mignon Clyburn, Second Annual Americas Spectrum Management Conference, Washington, DC, at 1 (Oct. 23, 2012), available at: <[http://transition.fcc.gov/Daily\\_Releases/Daily\\_Business/2012/db1023/DOC-316948A1.pdf](http://transition.fcc.gov/Daily_Releases/Daily_Business/2012/db1023/DOC-316948A1.pdf)> (“The demand for mobile broadband is now growing at breathtaking speed. Today’s smartphones generate 35 times more traffic than the standard cellphones, and last year alone in the U.S., mobile data traffic grew almost 300%.”); Press Release, *FCC Commissioner Jessica Rosenworcel on Today's Report from the President's Council of Advisors on Science and Technology* (July 20, 2012), available at: <<http://www.fcc.gov/document/commissioner-rosenworcel-todays-pcast-report>> (“The demand for mobile broadband is growing at a breathtaking pace. So the pressure is on to find new and innovative ways to manage our spectrum resources.”).

<sup>37</sup> 2 GHz NPRM ¶ 10 (citing Council of Economic Advisors, *The Economic Benefits of New Spectrum for Wireless Broadband*, at 5 (Feb. 2012), available at: <[http://www.whitehouse.gov/sites/default/files/cea\\_spectrum\\_report\\_2-21-2012.pdf](http://www.whitehouse.gov/sites/default/files/cea_spectrum_report_2-21-2012.pdf)>). In its own technical analysis in October 2010, the Commission estimated that the broadband spectrum deficit in the U.S. would likely approach 300 MHz by 2014. FCC Staff Technical Paper, *Mobile Broadband: The Benefits of Additional Spectrum*, at 2 (Oct. 2010), available at: <[http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/DOC-302324A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-302324A1.pdf)>.

<sup>38</sup> Remarks of FCC Commissioner Ajit Pai, *Unlocking Investment and Innovation in the Digital Age: The Path to a 21st-Century FCC*, Carnegie Mellon University, Pittsburgh, PA, at 7 (July 18, 2012) (“Pai Spectrum Speech”), available at: <[http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/DOC-315268A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-315268A1.pdf)>.

mobile broadband [spectrum] 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>39</sup>

In response to this threatened spectrum gap, the 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>40</sup> The Commission is utilizing a number of policy tools to reach these goals, and its hard work is yielding meaningful progress.<sup>41</sup> At the same time, the reallocation and auctioning of spectrum can be time-consuming processes,<sup>42</sup> and the television broadcast band, the federal government bands, and other targeted spectrum bands are unlikely to offer significant spectrum to the nation’s broadband “spectrum inventory” for many years.<sup>43</sup>

In contrast to these bands, fundamental reform of the Big LEO band will *quickly* add more than twenty megahertz of broadband-capable spectrum to the U.S. spectrum inventory, and approximately eight megahertz more later, without the need for legislation or the relocation of incumbent licensees. Once the Commission adopts a flexible, Part 27 framework for terrestrial operations in the Upper Big LEO band, Globalstar will be able to implement TLPS almost

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<sup>39</sup> National Broadband Plan at 77.

<sup>40</sup> *Id.* at 84; *Genachowski Spectrum Speech* at 4.

<sup>41</sup> *See Genachowski Spectrum Speech* at 9-10 (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). Chairman Genachowski in this speech noted that the Commission is “working with stakeholders to enable use of the portions of the mobile satellite spectrum in the L- and Big LEO bands for terrestrial service, and this would add to our megahertz total.” *Id.* at 5.

<sup>42</sup> *Id.* at 3.

<sup>43</sup> *See Pai Spectrum Speech* at 8 (“If we stay on our present course, we cannot meet the targets of the National Broadband Plan. In order to meet the first benchmark, we need to free up 300 MHz of spectrum for wireless broadband in the next 32 months. If we are to have any chance of meeting this goal, we will have to act quickly.”).

immediately and make the 2473-2495 MHz band segment available for broadband use throughout the United States. Consumers around the country will be able to use their existing smartphones, tablets, and other wireless devices to receive this innovative service. Globalstar's TLPS deployments will benefit these consumers by helping to alleviate the increasing congestion that is impeding the use of existing 802.11 ISM channels in dense metropolitan areas.<sup>44</sup> As Chairman Genachowski has observed, accelerating Internet usage and resulting congestion have diminished the quality of Wi-Fi service at high-traffic 802.11 "hotspots."<sup>45</sup> With the deployment of additional 802.11-based capacity, Globalstar and its terrestrial partners will be able to provide consumers with improved wireless broadband service, including faster data speeds and better Voice over Internet Protocol ("VoIP") functionality.<sup>46</sup> In addition, Globalstar's TLPS deployments will deliver meaningful public safety benefits. During disasters such as Hurricane Sandy, still-operating 802.11-based hotspots can provide broadband and voice communications to citizens in affected areas who otherwise lack access to communications services.<sup>47</sup> The addition of TLPS facilities will augment this important post-disaster communications resource.

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<sup>44</sup> In the 2.4 GHz ISM band, the three primary unlicensed 802.11 Wi-Fi channels in the United States are Wi-Fi Channels 1, 6, and 11.

<sup>45</sup> See *Genachowski Spectrum Speech* at 11 ("Wi-Fi networks [are] get[ting] more and more congested – have you tried using Wi-Fi in a busy airport recently?").

<sup>46</sup> Terrestrial carriers could also "offload" their broadband services on to Globalstar's TLPS spectrum, much as they do with Wi-Fi offload today. This practice improves the quality of carriers' wireless voice and lower-speed data services for consumers.

<sup>47</sup> See, e.g., Arik Hesseldahl, *After Sandy, Wi-Fi Becomes Precious Commodity*, ALL THINGS D, Oct. 31, 2012, available at: <[http://allthingsd.com/20121031/after-sandy-wi-fi-becomes-precious-commodity/?reflink=ATD\\_yahoo\\_ticker](http://allthingsd.com/20121031/after-sandy-wi-fi-becomes-precious-commodity/?reflink=ATD_yahoo_ticker)>. See also Strixsystems Case Study, *WiFi Mesh for Public Safety*, available at: <<http://www.strixsystems.com/cswifimeshforpublicsefety.aspx>> (viewed Nov. 7, 2012) ("The public safety and emergency services communities require the use of broadband WiFi mesh networking for 'always available' high-speed connectivity to people, video surveillance cameras, strategic and tactical equipment, databases and much more.").

Accordingly, by granting Globalstar's Petition and implementing a new regulatory approach in the Big LEO band, the Commission can reduce the spectrum deficit, help make maximum, efficient use of all available spectrum, and promote wireless broadband investment throughout the country.

**B. Greater Terrestrial Flexibility Will Enhance the Commercial Viability of Globalstar's Global MSS Network**

By adopting fundamental reform in the Big LEO band, the Commission can also help ensure the commercial viability of Globalstar's MSS network. If the Commission establishes a flexible, Part 27 framework for the new terrestrial AWS-5 block, Globalstar will work to put this spectrum to use soon after the Commission's action. Globalstar may in many instances deploy TLPS systems on its own, providing customized services to its core public safety and industrial customer base, for example. Globalstar may also enter into joint ventures with terrestrial partners, leveraging the assets of existing wireless carriers and other technology companies. As indicated above, Globalstar has invested over \$1 billion in the deployment of just its second-generation MSS constellation, and revenues from these future terrestrial services and spectrum leases will help cover these substantial capital costs as well as the ongoing operational costs of providing MSS. In addition, these revenues will enable Globalstar to invest in further MSS product development and roll out innovative MSS offerings like its family of SPOT devices. Thus, the requested Commission action will give Globalstar a stronger financial foundation on which to deliver its 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.

**V. The Commission Should Expediently Adopt Pro-Consumer, Pro-Investment Reform in the Upper Big LEO Band that Is Similar to the Proposed Reform in the 2 GHz MSS Band**

In order to realize the full public interest potential of the Big LEO band, the Commission should expediently adopt pro-consumer, pro-investment reform that is similar to the Commission's proposed reform in the 2 GHz MSS band. Following up on the Commission's "AWS-4" proposal at 2 GHz, the Commission should add co-primary Fixed and Mobile allocations in the Upper Big LEO band at 2483.5-2495 MHz and establish a new terrestrial wireless band in that spectrum, identified as "AWS-5," that includes a flexible regulatory framework for terrestrial operations. The Commission should establish this new AWS-5 regulatory framework in Part 27 of its rules, with the amendments and additions to Parts 1, 2, 25, and 27 of the Commission's rules specified in Appendix A to this Petition. Once Globalstar gains greater terrestrial flexibility and is operating its completed second-generation MSS constellation and new ground segment infrastructure, Globalstar will deploy innovative new services and products in Big LEO spectrum – both satellite-based and terrestrial offerings – that will greatly benefit customers in the United States and elsewhere.

Globalstar expects that, in the future, the 1610-1617.775 MHz band will be incorporated into the AWS-5 framework and the Commission's terrestrial-use reforms will be extended to the Lower Big LEO band. Globalstar recognizes that near-term action in the 1.6 GHz band may not be possible, however, and, as addressed further below, it proposes a separate and parallel rulemaking track for that band. In the meantime, the Commission can and should undertake rapid reform in the Upper Big LEO band, where Globalstar will be able to deploy innovative, pro-consumer services with extraordinary public interest benefits almost overnight.

**A. The Commission’s Ongoing Shift to More Flexible Rules for MSS-Terrestrial Operations**

In 2003, the Commission adopted rules for MSS ATC operations in the Big LEO band and other MSS bands.<sup>48</sup> Under the Commission’s ATC framework, an MSS licensee must meet certain “gating” requirements in order to provide terrestrial service in its spectrum. These requirements include the provision of “substantial satellite service” and the deployment of dual-mode devices that have built-in MSS and terrestrial capability.<sup>49</sup> Globalstar obtained ATC authority in 2006 and is the only MSS operator to have had ATC deployments in its spectrum.<sup>50</sup> Globalstar has found, however, that the ATC framework is not conducive to the robust terrestrial use of MSS spectrum. As the National Broadband Plan pointed out in 2010, the restrictive nature of the MSS ATC rules has “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>51</sup>

In response to the National Broadband Plan and recognizing the paucity of terrestrial operations in the MSS bands, the Commission in July 2010 issued a Notice of Inquiry as a first step toward eliminating regulatory barriers to terrestrial use of existing MSS spectrum.<sup>52</sup> The

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<sup>48</sup> *ATC Order, supra* note 3.

<sup>49</sup> 47 C.F.R. § 25.149(b).

<sup>50</sup> *Globalstar LLC; Request for Authority to Implement an Ancillary Terrestrial Component for the Globalstar Big LEO Mobile Satellite Service (MSS) System (Call Sign ES2115)*, Order and Authorization, 21 FCC Rcd 398 (IB 2006) (“*Globalstar ATC Authorization Order*”).

<sup>51</sup> National Broadband Plan at 88. Since the release of the National Broadband Plan, the Commission has made similar findings regarding the effects of its MSS ATC regulatory framework. In the *2 GHz NPRM*, the Commission stated that, given changing circumstances, “we believe that the ATC regulations would no longer be the best framework for development of terrestrial mobile broadband in this band.” *2 GHz NPRM* ¶ 136.

<sup>52</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-*

Commission 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>53</sup> In its September 2010 comments, Globalstar proposed revisions to the Commission’s ATC gating requirements, including elimination of the dual-mode equipment requirement. In addition, Globalstar proposed that MSS-terrestrial providers have operational flexibility similar to other terrestrial wireless operators.<sup>54</sup>

In March 2012, the Commission took another significant step toward reforming its MSS ATC framework with its Notice of Proposed Rulemaking on terrestrial use of the 2 GHz MSS band.<sup>55</sup> The Commission proposed a new terrestrial “AWS-4” band at 2 GHz and, to avoid interference problems in the band, it tentatively decided to modify DISH’s MSS license to include the resulting AWS-4 terrestrial authorizations rather than assign “initial” AWS-4 licenses at auction.<sup>56</sup> The Commission also proposed to eliminate the ATC gating requirements in the 2 GHz band,<sup>57</sup> and to apply flexible Part 27-type rules to terrestrial operations at 2 GHz.<sup>58</sup> The

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2200 MHz, Notice of Proposed Rulemaking and Notice of Inquiry, 25 FCC Rcd 9481 (2010) (“*NPRM/NOI*”).

<sup>53</sup> *NPRM/NOI* ¶ 26. The Commission in early 2011 granted a conditional waiver of its ATC rules to LightSquared. Had GPS interference concerns in the L band been resolved, this waiver would have permitted LightSquared to lease or sell wholesale MSS capacity to terrestrial wireless carriers who, in turn, could use that spectrum to provide terrestrial-only service to retail customers with single-mode terrestrial devices. *LightSquared LLC Request for Modification of its Authority for an Ancillary Terrestrial Component*, Order and Authorization, 26 FCC Rcd 566 (2011) (“*LightSquared Order*”). In February 2012, the Commission concluded that the GPS interference issues in the MSS L band would not be resolved within the foreseeable future, and proposed to rescind the ATC waivers granted to LightSquared. Public Notice, *International Bureau Invites Comment on NTIA Letter Regarding LightSquared Conditional Waiver*, 27 FCC Rcd 1596 (IB 2012).

<sup>54</sup> Globalstar 2010 Comments at ii-iv.

<sup>55</sup> *See 2 GHz NPRM*.

<sup>56</sup> *Id.* ¶¶ 69-71.

<sup>57</sup> *Id.* ¶ 136.

Commission’s proposals in the *2 GHz NPRM* received widespread support from commenters, who recognized that this more flexible approach would promote the development of terrestrial mobile broadband in 2 GHz spectrum.

The Commission should build on the momentum toward greater terrestrial use of MSS spectrum by adopting pro-consumer, pro-investment reforms in the Big LEO band. The Commission should adopt the National Broadband Plan’s recommendation to take “actions that will optimize license flexibility sufficient to increase terrestrial broadband use of MSS spectrum”<sup>59</sup> while also preserving the MSS industry’s unique services. As described below, the Commission’s rulemaking proposal on terrestrial use of Big LEO spectrum should incorporate a number of the basic reforms proposed by the Commission in the *2 GHz NPRM*.

**B. The Commission Should Add Fixed and Mobile Allocations to the Upper Big LEO Band at 2483.5-2495 MHz**

As the foundation for its pro-consumer, pro-investment reform in the Big LEO band, the Commission should modify the United States Table of Frequency Allocations in Section 2.106 of its rules by adding Fixed and Mobile allocations to the 2483.5-2495 MHz band. This change will harmonize the Commission’s allocations at 2483.5-2495 MHz with the International Table of Allocations, which includes Fixed and Mobile allocations in this spectrum band in all regions, and will lay the groundwork for greater terrestrial flexibility in this Big LEO spectrum.<sup>60</sup> These new allocations will be co-primary with the existing MSS allocation in the band.

With the addition of co-primary Fixed and Mobile allocations to the 2483.5-2495 MHz band, the Commission should also modify footnote US380 to the Table of Frequency

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<sup>58</sup> *Id.* ¶¶ 28-29.

<sup>59</sup> National Broadband Plan at 87.

<sup>60</sup> *See* 47 C.F.R. § 2.106.

Allocations, which states that ATC operations are permitted at 2483.5-2495 MHz. Along with adding terrestrial service allocations and eliminating the ATC framework in this spectrum (discussed below), the Commission should remove the references to the Upper Big LEO band from this footnote.<sup>61</sup>

**C. The Commission Should Modify Globalstar’s MSS License to Incorporate Terrestrial Authority in the New AWS-5 Band**

With co-primary Fixed and Mobile allocations in place, the Commission should establish a new terrestrial “AWS-5” band at 2483.5-2495 MHz. As described below, the Commission should adopt a Part 27 regulatory framework for the AWS-5 band that permits flexible terrestrial use of the Upper Big LEO band spectrum. Similar to its 2 GHz proposal, the Commission should further promote investment, innovation, and greater spectrum efficiency by modifying Globalstar’s MSS license under Section 316 of the Communications Act of 1934, as amended (the “Act”) to include terrestrial authority in the AWS-5 band.<sup>62</sup>

Under Section 316 of the Act, the Commission has the authority to modify a station license if “in the judgment of the Commission such action will promote the public interest, convenience, and necessity.”<sup>63</sup> Modification of Globalstar’s MSS license to include AWS-5 authority will generate pro-consumer, pro-investment benefits and will meet this Section 316 standard. As explained *supra* in greater detail, this action will promote spectrum efficiency,

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<sup>61</sup> Globalstar notes that Footnote US380 references the entire Upper Big LEO band at 2483.5-2500 MHz, rather than just Globalstar’s current ATC spectrum at 2483.5-2495 MHz. The Commission should delete this reference.

<sup>62</sup> 47 U.S.C. § 316.

<sup>63</sup> 47 U.S.C. § 316(a)(1). In *California Metro Mobile Communications v. FCC*, the D.C. Circuit stated that “Section 316 grants the Commission broad power to modify licenses; the Commission need only find that the proposed modification serves the public interest, convenience and necessity.” *California Metro Mobile Communications v. FCC*, 365 F.3d 38, 45 (D.C. Cir. 2004).

make additional spectrum available for wireless broadband, enhance post-disaster public safety, help ensure the financial viability of Globalstar's global MSS network, and improve wireless services for U.S. consumers.

Significantly, this license modification will also prevent the harmful interference that would result from the assignment of AWS-5 authority to a licensee other than Globalstar. As the Commission found in its 2003 *ATC Order* and tentatively concluded in the *2 GHz NPRM*, spectrum sharing between separately licensed and controlled MSS and terrestrial wireless operators is not feasible.<sup>64</sup> Common control of the MSS and terrestrial operations in the AWS-5 band will be necessary to coordinate satellite and terrestrial operations and minimize interference to Globalstar's MSS offerings. In fact, given that NGSO satellites are constantly in motion, the need for common control is imperative in the Big LEO context. Tracking satellite beam patterns and dynamically allocating channels between the NGSO and terrestrial systems over time is extremely complex, and Globalstar itself must protect the integrity of its satellite services.<sup>65</sup>

In addition, there will likely be an evolving mix of terrestrial services in the AWS-5 band (including TLPS and FDD LTE), further complicating MSS-terrestrial coordination and heightening the need for Globalstar's control of this spectrum. With this control, Globalstar will be able to manage the size and location of any MSS exclusion zones that result from various

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<sup>64</sup> *ATC Order* ¶ 52; *2 GHz NPRM* ¶¶ 69-72.

<sup>65</sup> If the Commission were to assign the terrestrial authority in the AWS-5 band through competitive bidding, the new AWS-5 licensee would have to share its Upper Big LEO band spectrum not only with Globalstar's MSS network, but also with any ATC facilities that Globalstar deploys under its pre-existing ATC authority. (With the fourth and final launch in early 2013, Globalstar expects that its ATC authority would be fully restored by the Commission before the end of next year.) Such spectrum sharing between two separately controlled, competing terrestrial wireless systems would be technically infeasible. In proposing to modify DISH's license to include the new AWS-4 authority in the 2 GHz band, the Commission similarly pointed out the infeasibility of spectrum sharing between new, separately-licensed terrestrial facilities and any ATC systems that might be deployed by DISH. *2 GHz NPRM* ¶ 70.

terrestrial services in the band, with the goal of limiting such zones to core metropolitan areas where Globalstar's MSS network receives very little usage.<sup>66</sup>

**D. For the Pro-Consumer, Pro-Investment AWS-5 Regulatory Framework, the Commission Should Eliminate Gating Requirements for Terrestrial Operations**

To encourage investment and free additional broadband spectrum, the Commission should eliminate the gating requirements for terrestrial operations in the Upper Big LEO band, contained in Section 25.149 of the Commission's rules.<sup>67</sup> The relevant portions of Section 25.149 should be deleted, and no similar requirements should be incorporated into the new Part 27 AWS-5 rules. As the Commission found in the *2 GHz NPRM*, applying gating requirements no longer represents the best approach for developing terrestrial mobile broadband in MSS spectrum. Accordingly, for terrestrial operations in the AWS-5 band, the only "gating" factor should be that Globalstar holds its MSS license in good standing at the time the Commission assigns these new terrestrial rights.

First, the Commission should eliminate the existing "substantial satellite service" gating requirement for terrestrial operations in the Upper Big LEO band, including the requirements for 100% MSS coverage, the deployment of orbital spares, and nationwide commercial availability.<sup>68</sup> The removal of this gating requirement will increase terrestrial operators' interest in Big LEO spectrum and encourage investment in mobile broadband at AWS-5. With this step,

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<sup>66</sup> In the *2 GHz NPRM*, the Commission proposed a rule requiring that the terrestrial AWS-4 licensee protect the incumbent 2 GHz MSS licensee from harmful interference. *2 GHz NPRM* ¶ 68. An analogous rule is not necessary in the proposed regulatory framework for the Upper Big LEO band, since in this band the MSS licensee and the nationwide AWS-5 licensee should always be the same entity. As that licensee, Globalstar will manage its Upper Big LEO band spectrum in the manner necessary to minimize harmful interference.

<sup>67</sup> 47 C.F.R. § 25.149.

<sup>68</sup> These requirements are currently contained in Section 25.149(b)(1)-(3) of the Commission's rules. 47 C.F.R. § 25.149(b)(1)-(3).

Globalstar's prospective terrestrial partners will have greater confidence that terrestrial authority will remain in place and terrestrial services will not be disrupted in the event of satellite failures beyond those operators' control.<sup>69</sup> This approach will also protect consumers who rely on uninterrupted terrestrial service provided in the AWS-5 band.

Moreover, perpetuation of the substantial satellite service gating requirement is not necessary to ensure Globalstar's 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, and it is nearing full deployment of its second-generation MSS constellation. By mid-2013, Globalstar will have the ability to meet the Commission's Part 25 NGSO MSS coverage requirement.<sup>70</sup> Given the ongoing, vigorous competition among MSS providers, Globalstar and other MSS licensees have a strong incentive to maximize their signal coverage in order to attract and retain customers in the United States and worldwide.<sup>71</sup>

The Commission should also eliminate the integrated services ATC gating requirement, which effectively requires any terrestrial device to be dual-mode with built-in MSS capability.<sup>72</sup>

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<sup>69</sup> In recent years, Globalstar has held discussions with numerous potential terrestrial partners, and all of these parties have pointed to the substantial satellite service requirement as a strong deterrent against any terrestrial investment in MSS spectrum.

<sup>70</sup> 47 C.F.R. § 25.143(b)(2)(i)-(iii).

<sup>71</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"). *See* Comments of Globalstar Licensee, LLC, IB Docket No. 10-99, at 7-9 (Aug. 23, 2010).

<sup>72</sup> Under Section 25.149(b)(4) of the Commission's rules, an MSS licensee can satisfy the Commission's "integrated services" requirement by demonstrating that it will use a dual-mode handset that can communicate with both the MSS network and the MSS ATC component to provide the proposed ATC service. As an alternative to this dual-mode "safe harbor," an MSS

Dual-mode MSS-terrestrial devices have limited appeal to 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 lightweight, single-mode devices will enable Globalstar to use AWS-5 spectrum efficiently and provide consumers with the innovative, market-ready services they want.<sup>73</sup>

**E. The Commission Should Apply Technical Rules to AWS-5 Operations that Are Similar to the Rules Applied to Other Commercial Wireless Services**

The existing technical requirements for terrestrial operations in the Big LEO band are contained in Section 25.254 of the Commission's rules. In adopting a Part 27 regulatory framework for the AWS-5 band, the Commission should incorporate appropriate components of Section 25.254 into new and modified provisions of Part 27, as delineated in Appendix A to this Petition. For instance, power limits for terrestrial operations in the Big LEO band should be incorporated into Section 27.50 of the Commission's rules (new Section 27.50(i)), while the OOB limits for terrestrial systems should be integrated into Section 27.53 of its rules (Section 27.53(n)).<sup>74</sup> Rules requiring interference protection for GPS systems at 1.5/1.6 GHz and other

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licensee can provide "other evidence" establishing that it will provide an integrated service offering to the public. 47 C.F.R. § 25.149(b)(4)(i), (ii).

<sup>73</sup> The absence of a dual-mode requirement in the new MSS-terrestrial framework will not eliminate dual-mode capability from the MSS marketplace. Some MSS customers greatly value dual-mode functionality, and for competitive reasons most MSS operators will likely offer equipment that provides such capability. In conjunction with its technology partners, Globalstar continues to develop devices that provide dual-mode functionality, particularly for first responders and other public safety personnel.

<sup>74</sup> As described in Section V.H *infra*, Globalstar urges the Commission to adopt a specific OOB limit for low-power services in the AWS-5 band, in order to permit the deployment of innovative TLPS operations.

systems in the 2450-2500 MHz band (*e.g.*, Broadcast Auxiliary Service facilities) should be incorporated into new Sections 27.1402 and 27.1403, respectively.<sup>75</sup>

In establishing its Part 27 AWS-5 regulatory framework for the 2483.5-2495 MHz band, the Commission should adopt flexible technical and operational rules, as it has for other commercial wireless services.<sup>76</sup> As in the case of other terrestrial wireless bands, Globalstar in the AWS-5 band should not be required to seek operational authority from the Commission on a technology-by-technology basis. Rather, Globalstar should have the freedom to utilize any technology or protocol (*e.g.*, LTE, 802.11) in the AWS-5 spectrum that will not cause harmful interference to other systems and services.<sup>77</sup> Among other things, the Commission should lift its prohibition on end-user device transmissions in the Upper Big LEO band (a rule the Commission waived in the Open Range proceeding).<sup>78</sup> This flexible technical approach will promote optimal use of the AWS-5 band and maximize benefits for consumers.

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<sup>75</sup> A number of Part 27 technical rules are applicable to all Part 27 services, including: Section 27.51 Equipment authorization; Section 27.52 RF safety; Section 27.54 Frequency stability; Section 27.56 Antenna structures; air navigation safety; and Section 27.63 Disturbance of AM broadcast station antenna patterns. 47 C.F.R. §§ 27.51, 27.52, 27.54, 27.56, 27.63. Globalstar proposes that all of these provisions apply to the AWS-5 licensee at 2483.5-2495 MHz.

<sup>76</sup> The Commission's AWS-5 framework should permit the AWS-5 licensee to employ this spectrum for any terrestrial use permitted by the U.S. Table of Frequency Allocations (*i.e.*, fixed or mobile services), as revised by the Commission in this proceeding.

<sup>77</sup> Globalstar acknowledges that the Commission's technical and operational rules for the AWS-5 band must account for the "spectrum neighborhood" surrounding this band.

<sup>78</sup> See 47 C.F.R. 25.149(a)(1); *Globalstar Licensee LLC; Application for Modification of License for Operation of Ancillary Terrestrial Component Facilities*, Order and Authorization, 23 FCC Rcd 15975, ¶ 31 (2008).

**F. Other Service Rules, Including Spectrum Leasing and Nationwide Licensing in the AWS-5 Band**

Consistent with its existing secondary market approach for MSS ATC spectrum,<sup>79</sup> the Commission should promote broadband investment and greater spectrum efficiency by permitting spectrum manager leasing in the AWS-5 band.<sup>80</sup> As in other terrestrial wireless services, Globalstar should be able to enter into spectrum manager leases that cover any amount of spectrum and any geographic territory within its license area. To maintain common control over all MSS and terrestrial operations in the band – critical for minimizing harmful interference to Globalstar’s MSS offerings – the Commission should not permit either *de facto* transfer leasing<sup>81</sup> or the partition or disaggregation of the AWS-5 license to other entities.<sup>82</sup>

In addition, Globalstar urges the Commission to establish one unified, nationwide terrestrial authorization in the AWS-5 band that mirrors the geographic scope of Globalstar’s MSS authorization.<sup>83</sup> A nationwide AWS-5 license will promote the flexible, efficient use of this broadband-capable spectrum. In contrast, establishing numerous geographic-area terrestrial licenses in the AWS-5 band would create needless administrative burdens for the Commission

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<sup>79</sup> 47 C.F.R. 25.149(g).

<sup>80</sup> See, e.g., *Promoting Efficient Use of Spectrum Through Elimination of Barriers to the Development of Secondary Markets*, Report and Order and Further Notice of Proposed Rulemaking, 18 FCC Rcd 20604 (2003).

<sup>81</sup> The Commission previously prohibited *de facto* transfer leasing in MSS ATC spectrum, and in the 2 GHz NPRM the Commission proposed to permit *de facto* transfer leases only to the extent that it will allow the disaggregation and partitioning of AWS-4 spectrum and licenses. See *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*, Report and Order, 26 FCC Rcd 5710, ¶¶ 14-19 (2011); 2 GHz NPRM ¶ 117.

<sup>82</sup> For its spectrum manager leasing proposal, Globalstar requests amendment of the Commission’s rules by the addition of Section 1.9046 (see Appendix A), while Globalstar’s proposed prohibition on the partitioning and disaggregation of Big LEO spectrum is contained in proposed Section 27.15 in that Appendix.

<sup>83</sup> See proposed Section 27.6 in Appendix A.

and Globalstar without generating any public interest benefits.<sup>84</sup> In addition, the license term for the AWS-5 authorization should be fifteen years beginning on the effective date of the Commission's order on terrestrial reform in the Upper Big LEO band.<sup>85</sup> This period is equivalent to the license term for Globalstar's MSS space and earth station licenses.<sup>86</sup>

The license renewal provisions proposed for the AWS-4 licensee in the *2 GHz NPRM* should also be adopted by the Commission in the AWS-5 context.<sup>87</sup> Globalstar agrees that renewal of its AWS-5 license should be conditioned on its presentation of a detailed description of its provision of service during that license period. This renewal showing should include a description of the level and quality of the service provided (*e.g.*, number of subscribers and service offered), the date service began, information about any service interruptions, and details about any service to rural or tribal areas.<sup>88</sup> Finally, consistent with Section 27.10 of its rules, the Commission should require the AWS-5 licensee to indicate the regulatory status – common carrier, non-common carrier, or both – of the services that it chooses to provide.<sup>89</sup>

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<sup>84</sup> If a primary benefit of geographic area licensing is enabling multiple parties to hold authority in a particular spectrum band, that benefit should not be a consideration in the Big LEO band. As described above, Globalstar must control all MSS and terrestrial operations in Big LEO spectrum to minimize interference to its MSS offerings.

<sup>85</sup> See proposed Section 27.13 in Appendix A.

<sup>86</sup> See 47 C.F.R. § 25.121(a).

<sup>87</sup> *2 GHz NPRM* ¶¶ 121-124.

<sup>88</sup> See proposed Section 27.1401 in Appendix A.

<sup>89</sup> 47 C.F.R. § 27.10. While Globalstar as the AWS-5 licensee would be regulated primarily under Section 27 of the Commission's rules, it would also be required to comply with the requirements of other parts of the Commission's rules, including: application filing procedures for the Universal Licensing System, set forth in Part 1 of the Commission's rules (*see* 47 C.F.R. Part 1, Subpart F); practices and procedures listed in Part 1 of the Commission's rules for license applications and adjudicatory proceedings; the Commission's environmental provisions, including Section 1.1307 (47 C.F.R. § 1.1307); and the antenna structure provisions of Part 17 of the Commission's rules.

### **G. Performance Requirements for FDD LTE Operations in the Big LEO Band**

Globalstar supports terrestrial wireless build-out obligations in the Big LEO band as a means of ensuring the full, efficient use of this spectrum. Globalstar also agrees with the Commission's finding in the *2 GHz NPRM* that the terrestrial performance requirements for a particular MSS band should be tailored to the unique circumstances of that band.<sup>90</sup> In addition, any performance requirements adopted by the Commission should be achievable and should reasonably accommodate a range of business plans, including both a new entrant's build-out of a competitive network and an MSS licensee's partnership or joint venture with existing terrestrial wireless operators.

As described *supra* at 13-15, Globalstar believes that, in most areas, the highest and best terrestrial use of the Big LEO band will be for FDD LTE operations. Given concerns regarding the coexistence of GPS systems and commercial wireless operations in the L band, however, Globalstar recognizes that it may require additional time for the Commission to authorize FDD LTE throughout the Big LEO band, including mobile uplink operations in the Lower Big LEO band.<sup>91</sup> Once the Commission permits FDD LTE operations throughout the Big LEO band, the Commission should adopt Big LEO terrestrial performance requirements that are similar to those that it has previously applied in other analogous commercial wireless bands.<sup>92</sup> In measuring signal coverage or other evidence of licensee activity, the Commission should account for Globalstar's build-out of both LTE and TLPS facilities, since the Big LEO band will ultimately

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<sup>90</sup> *2 GHz NPRM* ¶ 92.

<sup>91</sup> In Section VI *infra*, Globalstar requests that the Commission initiate a separate rulemaking process on terrestrial use of the Lower Big LEO band.

<sup>92</sup> Since geographic area licensing does not make sense in the Big LEO band and should not be adopted there, performance requirements in the Big LEO band should only be applicable to Globalstar's total, nationwide license area.

support an optimal mix of these terrestrial services. As described *infra* at 43-44, during the period prior to the Commission’s grant of FDD LTE authority throughout the band, Globalstar commits to meeting a number of public interest obligations with respect to its planned TLPS deployment in the Upper Big LEO band as well as its provision of services after a disaster.<sup>93</sup>

In the event of non-compliance with these future Big LEO terrestrial performance requirements, the Commission should apply a case-by-case enforcement approach that accounts for the specific circumstances in this band and utilizes a variety of enforcement measures, including the reduction of Globalstar’s license term, monetary penalties, and implementation of remediation plans. Any Commission sanctions should be tailored to the severity of the non-compliance at issue. The Commission’s penalties should not be so severe that they would reduce potential consumer benefits by discouraging rather than promoting broadband investment and intensive use of the Big LEO spectrum.

In the *2 GHz NPRM*, the Commission proposed that DISH’s nationwide MSS and terrestrial authority would automatically terminate if the licensee failed to comply with its interim three-year construction milestone.<sup>94</sup> This draconian approach would deter investment in Big LEO broadband facilities and potentially disenfranchise consumers. Certainly, it would be inappropriate for the Commission to impose a “death penalty” that nullifies Globalstar’s

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<sup>93</sup> At the same time that the Commission permits FDD LTE (or other wireless broadband) operations throughout the entire Big LEO band and adopts terrestrial performance requirements for this spectrum, the Commission should adopt a provision regarding the permanent discontinuance of service, similar to what it proposed in the *2 GHz NPRM*. *2 GHz NPRM* ¶ 125. If after meeting its build-out requirements the AWS licensee’s terrestrial wireless broadband service is discontinued throughout its nationwide license area for 180 consecutive days, the licensee’s terrestrial authorization at 2483.5-2495 MHz and 1610-1617.775 MHz should automatically terminate.

<sup>94</sup> *2 GHz NPRM* ¶ 94. For non-compliance with the proposed seven-year requirement at 2 GHz, the Commission proposed the automatic termination of DISH’s MSS and terrestrial authority within the relevant AWS-4 geographic area licenses. *Id.*

authority to provide MSS to consumers in the event it fails to meet its terrestrial performance requirement. As described above, Globalstar's growing MSS business provides satellite service to over 550,000 customers and provides enormous public safety benefits, and its customers should not be penalized because of issues relating to terrestrial build-out.

#### **H. Issues Specific to Provision of TLPS**

As indicated *supra* at 15-18, the Commission has an extraordinary opportunity to realize the deployment of an innovative terrestrial low-power wireless broadband service at 2473-2495 MHz, which includes the proposed AWS-5 band and utilizes a portion of the unlicensed ISM band below 2483.5 MHz. With the necessary regulatory action, Globalstar will be able to offer TLPS to consumers very quickly in numerous areas of the United States.<sup>95</sup>

To enable the roll-out of TLPS, the Commission should adopt an OOBE limit for low-power operations in the AWS-5 band that accommodates the spectral mask of Globalstar's TLPS transmissions. Meanwhile, Globalstar will protect the integrity of the AWS-5 band by providing TLPS only to authenticated users and devices and utilizing available technologies to prevent

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<sup>95</sup> Globalstar expects that TLPS will consist entirely of wireless broadband Internet access and interconnected VoIP service rather than interconnected mobile voice service, and, as such, will not be considered a Commercial Mobile Radio Service ("CMRS") or subject to Title II common carrier regulation. *See Appropriate Regulatory Treatment for Broadband Access to the Internet Over Wireless Networks*, Declaratory Ruling, 22 FCC Rcd 5901, ¶¶ 11, 13, 25-26 (2007); *Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993*, Fifteenth Report, 26 FCC Rcd 9664, ¶ 4 nn.26 & 27 (2011). TLPS will likely be subject to the Commission's mobile data roaming requirements, contained in Section 20.12 of the Commission's rules. 47 C.F.R. § 20.12(e); *See generally Reexamination of Roaming Obligations of Commercial Mobile Radio Service Providers and Other Providers of Mobile Data Services*, Second Report and Order, 26 FCC Rcd 5411 (2011) (*Data Roaming Order*), *appeals pending sub nom. Cellco P'ship v. FCC*, Nos. 11-1135 & 11-1136 (D.C. Cir. filed May 13, 2011). Given the unique, 802.11-base nature of TLPS technology and the absence of technological compatibility between TLPS and other mobile data services, however, Globalstar anticipates that, under Section 20.12(e) of the Commission's rules, it will be reasonable for TLPS providers not to offer data roaming arrangements. 47 C.F.R. § 20.12(e)(ii), (iii).

unauthorized use of this spectrum. If permitted to provide TLPS, Globalstar commits to using its Big LEO spectrum to meet specific, important public interest goals.

**1. The Commission Should Adopt an Out-of-Band Emissions Limit Specifically Applicable to TLPS**

To permit TLPS deployment at 2473-2495 MHz, the Commission should adopt an OOB limit at the 2495 MHz band edge that is appropriate for such low-power operations. As described in the Technical Analysis in Appendix B to this Petition, the emissions mask for TLPS transmissions – both for consumer devices and low-power base stations – is different from the emissions mask for devices and base stations operating as part of higher-power commercial wireless services.<sup>96</sup> This low-power service is based on wide-band 802.11 technology, and TLPS end-user device and access point transmissions at 2473-2495 MHz will have more extensive sidebands than high-power commercial wireless devices and base stations.<sup>97</sup> To accommodate this technology and allow the roll-out of Globalstar-managed TLPS systems, the Commission should adopt the following OOB standard for low-power operations in the AWS-5 band:

For digital stations with EIRPs below 36 dBm, the attenuation factor shall be not less than  $40 + 10 \log(P)$  dB at the channel edge,  $43 + 10 \log(P)$  dB at 5 MHz from the channel edges, and  $55 + 10 \log(P)$  dB at X MHz from the channel edges where X is the greater of 6 MHz or the actual emission bandwidth.<sup>98</sup>

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<sup>96</sup> Technical Analysis at 4-5.

<sup>97</sup> As described in the Technical Analysis at 4, 802.11 TLPS emissions will occupy more than twice the channel bandwidth (approximately 22 MHz) than would have been utilized by other FDD or TDD technologies (likely 10 MHz channels).

<sup>98</sup> TLPS end-user devices cannot consistently meet the OOB limit that is currently applicable to ATC mobile devices in the Lower Big LEO band:  $-57.1 \text{ dBW}/30 \text{ kHz}$  at the edge of the licensed MSS frequency assignment. 47 C.F.R. § 25.254(b). Nor can TLPS devices consistently comply with the OOB limit currently applicable to end-user devices in adjacent Broadband Radio Service spectrum:  $43 + 10 \log(P)$  dB at the channel edge and  $55 + 10 \log(P)$  at 5.5 megahertz from the channel edge. 47 C.F.R. § 27.53(m)(4). In a pending rulemaking proceeding, the Commission is addressing the OOB standard for BRS end-user devices. See *Amendment of Parts 1, 21, 73, 74 and 101 of the Commission's Rules to Facilitate the Provision of Fixed and Mobile Broadband Access, Educational and Other Advanced Services in the 2150-2162 and 2500-2690 MHz Bands*, Fourth Further Notice of Proposed Rulemaking, 26 FCC Red

Actual 802.11-based TLPS end-user devices operating at typical power levels should consistently comply with Globalstar's proposed OOB limit. As described in the Technical Analysis, given the lack of passive filtration in existing 802.11-enabled consumer devices, 802.11 transceivers display virtually uniform emission masks, even across disparate chipset and device architectures.<sup>99</sup> 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.<sup>100</sup>

With respect to TLPS access points, Globalstar commits to incorporating the necessary filtering to ensure that these low-power base stations also comply with the proposed OOB limit.<sup>101</sup> TLPS access points should *not* be required to meet the more stringent OOB limit that is normally applicable to high-power commercial wireless base stations, which operate at up to four hundred times the effective radiated power level of these TLPS access points. TLPS access

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8133 (2011). In that proceeding, Clearwire has proposed OOB limits for the BRS spectrum that are similar to the standard that Globalstar proposes here for the Upper Big LEO band. *See Ex Parte* Letter from Cathy Massey, Clearwire Corporation, to Marlene Dortch, Secretary, FCC, WT Docket No. 03-66, RM-11614, at 1 (Oct. 19, 2012). Globalstar has engaged in discussions with Clearwire regarding the OOB limits for both the Big LEO and BRS/EBS bands, and Globalstar continues to work cooperatively with Clearwire on these issues. *See Ex Parte* Letter of L. Barbee Ponder IV, Globalstar, Inc., to Marlene Dortch, Secretary, FCC, WT Docket No. 03-66, RM-11614 (Nov. 5, 2012) ("Clearwire OOB Letter").

<sup>99</sup> Technical Analysis at 6.

<sup>100</sup> *Id.* at 6-7.

<sup>101</sup> As described in the Technical Analysis at 7, 802.11 access point transceivers may generate spectral regrowth products that exceed the proposed OOB limit. 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 base station application. *Id.* at 8.

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>102</sup>

As described in the Technical Analysis, TLPS end-user devices and access points that comply with Globalstar's proposed OOB limit are unlikely to cause harmful interference to BRS systems operating on Channel BRS-1 at 2496-2502 MHz.<sup>103</sup> Given the low power levels of TLPS transmissions, TLPS operations will have much less impact on the RF environment than the higher-power systems operating in conventional commercial wireless networks. Moreover, BRS operators in the adjacent 2.5 GHz band have carefully studied and proposed virtually the same OOB limit for wideband transmissions in their own band,<sup>104</sup> and application of a similar OOB standard in adjacent Big LEO spectrum should provide adequate protection to BRS-1. Finally, the risk of harmful interference to BRS-1 will be further mitigated by Globalstar's incorporation of the passive filtering described above into its TLPS access points.

## **2. In Providing TLPS, Globalstar Will Protect the Integrity of the AWS-5 Band**

In implementing and providing TLPS, Globalstar will protect the integrity of the AWS-5 band. Globalstar will provide TLPS only to approved customers and devices. Importantly, Globalstar will control the availability of the software update necessary for a 802.11 consumer device to operate throughout the 2473-2495 MHz band and receive TLPS. Globalstar will provide this software update only to device models that have been certified by the Commission

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<sup>102</sup> While commercial wireless mobile devices usually operate at a power level of approximately 1 watt, commercial wireless base stations typically operate at a power level up to 1585 watts (62 dBm).

<sup>103</sup> Technical Analysis at 9-10.

<sup>104</sup> See Clearwire OOB Letter.