

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

In the Matter of	)	
	)	
Spectrum and Service Rules for Ancillary	)	
Terrestrial Components in the 1.6/2.4 GHz	)	IB Docket No. 07-253
Big LEO Bands	)	
	)	
Globalstar Licensee LLC,	)	Call Sign S2115
Authority to Implement an Ancillary Terrestrial	)	
Component	)	

**REPORT AND ORDER AND ORDER PROPOSING MODIFICATION**

**Adopted: April 9, 2008**

**Released: April 10, 2008**

By the Commission:

**I. INTRODUCTION**

1. By this action, the Commission increases the amount of spectrum in which code division multiple access (CDMA) operators of Mobile-Satellite Service (MSS) low-earth orbit satellite systems in the 1.6/2.4 GHz bands (the Big LEO bands) may provide ancillary terrestrial component (ATC) service.<sup>1</sup> We increase the spectrum available for ATC in the Big LEO L-band from 1610-1615.5 MHz to 1610-1617.775 MHz, and in the Big LEO S-band from 2487.5-2493 MHz to 2483.5-2495 MHz. At the same time, we adopt rules to ensure that ATC operations will not cause harmful interference to other services in these or adjacent bands. To implement this decision, we propose to modify the ATC authority of Globalstar, Inc. (Globalstar) pursuant to Section 316 of the Communications Act of 1934, as amended.<sup>2</sup> This action will allow greater capacity and flexibility for MSS/ATC, and will allow CDMA Big LEO MSS/ATC systems to provide improved service to customers, particularly in urban and underserved rural areas of the United States.

**II. BACKGROUND**

2. In November 2007, the Commission adopted a bandplan for the Big LEO L-band at 1610-1626.5 MHz that assigned CDMA MSS systems 7.775 megahertz of L-band spectrum at 1610-1617.775 MHz for uplink transmission, time division multiple access (TDMA) MSS systems 7.775 megahertz of L-band MSS spectrum at 1618.725-1626.5 MHz for transmission in both directions, and a small segment of 0.95 megahertz at 1617.775-1618.725 MHz for sharing between the two protocols.<sup>3</sup> Currently, the Big

<sup>1</sup> Big LEO MSS systems provide voice and data communication to users with handheld mobile terminals via non-geostationary satellites in Low Earth Orbit (LEO), *i.e.*, at orbital altitudes below the Van Allen Radiation Belt. The term “Big LEO” was coined to distinguish such systems, operating in frequency bands above 1 GHz, from the so-called “Little LEO” systems that provide data communications via non-geostationary satellites in frequency bands below 1 GHz. *See 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*, IB Docket No. 07-254, IB Docket No. 02-364, Second Order on Reconsideration, Second Report and Order, and Notice of Proposed Rulemaking, FCC 07-194, 22 FCC Rcd 19733, 19734, n.2 (2007) (*Globalstar ATC Notice*) (review pending in *Globalstar, Inc. v. FCC*, No. 08-1046 (D.C. Cir. filed Feb. 5, 2008)).

<sup>2</sup> *See* 47 U.S.C. § 316.

<sup>3</sup> *See Globalstar ATC Notice*, 22 FCC Rcd at 19741-42, ¶¶ 17-20.

LEO bands are occupied by one CDMA MSS system, Globalstar, and one TDMA MSS system, Iridium Satellite LLC (Iridium).<sup>4</sup> In the Big LEO S-band, CDMA systems are assigned the 2483.5-2500 MHz for downlink transmission. CDMA MSS systems share the band with industrial, scientific, and medical applications, grandfathered broadcast auxiliary service (BAS) and private radio services, and in the 2495-2500 MHz band, the fixed and mobile (except aeronautical mobile) services, including the portion of Broadband Radio Service (BRS) Channel 1 that lies in the 2496-2500 MHz segment.<sup>5</sup>

3. In 2003, the Commission adopted the *ATC Report and Order*, permitting MSS licensees to seek authority to implement ATC in MSS bands, including the Big LEO bands.<sup>6</sup> In the Big LEO bands, the Commission limited ATC operations to the 1610-1615.5 MHz and 2492.5-2498 MHz bands for CDMA MSS operators, and 1621.35-1626.5 MHz for TDMA MSS operators, and to the specific frequencies authorized for use by the MSS licensee that seeks ATC authority.<sup>7</sup> In 2004, the Commission reallocated five megahertz of Big LEO S-band spectrum, at 2495-2500 MHz, for sharing between Big LEOS and the fixed and mobile (except aeronautical mobile) services, in order to accommodate relocation of BRS channel 1 licensees from the 2150-2156 MHz band to the 2496-2502 MHz band.<sup>8</sup> To avoid overlap between Big LEO ATC and BRS Channel 1 operations, the Commission shifted the 5.5 megahertz S-band ATC block to 2487.5-2493 MHz.<sup>9</sup> In 2006, the Commission affirmed that spectrum sharing between co-primary fixed and mobile (except aeronautical mobile) services and CDMA MSS operations in the 2495-2500 MHz band was possible.<sup>10</sup>

<sup>4</sup> See *Globalstar ATC Notice*, 22 FCC Rcd at 19735, ¶ 4.

<sup>5</sup> See 47 C.F.R. § 2.106.

<sup>6</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*, IB Docket No. 01-185, Report and Order and Notice of Proposed Rulemaking, IB Docket No. 01-185, FCC 03-15, 18 FCC Rcd 1962, 1964-2087, ¶¶ 1-4, 6-260 (*ATC Report and Order*). MSS systems can provide communications in areas where it is difficult or impossible to provide communications coverage via terrestrial systems, such as remote or rural areas and non-coastal maritime regions. A disadvantage of MSS is the fact that the satellite link is susceptible to blocking by structural attenuation, particularly in urban areas and inside buildings. ATC allows MSS operators to operate a terrestrial service on the same frequencies as their satellite networks to overcome blocking. 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*, Memorandum Opinion and Order and Second Order on Reconsideration, IB Docket No. 01-185, FCC 05-30, 20 FCC Rcd 4616, 4818, ¶¶ 7-8 (2005) (*ATC MO&O*).

<sup>7</sup> See 47 C.F.R. § 25.149(a)(2)(iii).

<sup>8</sup> See *Review of the Spectrum Sharing Plan Among Non-Geostationary Satellite Orbit Mobile Satellite Service Systems in the 1.6/2.4 GHz Bands*, Report and Order, Fourth Report and Order and Further Notice of Proposed Rulemaking, IB Docket No. 02-364, 19 FCC Rcd 13356, 13385-86, ¶ 66 (2004) (*Big LEO Spectrum Sharing Order*).

<sup>9</sup> See *Big LEO Spectrum Sharing Order*, 19 FCC Rcd at 13389, ¶ 75.

<sup>10</sup> 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; Review of the Spectrum Sharing Plan Among Non-Geostationary Satellite Orbit Mobile Satellite Service Systems in the 1.6/2.4 GHz Bands*, Order on Reconsideration and Fifth Memorandum Opinion and Order and Third Memorandum Opinion and Order and Second Report and Order, WT Docket No. 03-66, IB Docket No. 02-364, 21 FCC Rcd 5606, 5628-29, ¶ 28 (2006) (*Big LEO Spectrum Sharing Order on Reconsideration*) (review pending in *Sprint Nextel Corporation v. FCC*, No. 06-1278 (D.C. Cir. filed Jul. 21, 2006)). The Society of Broadcast Engineers, Inc. (SBE) currently has a separate request pending before the Commission to relocate and convert Broadcast Auxiliary Service (BAS) Channels A8-A10 from the current three analog channels at 2450-2500 MHz to three digital channels at 2450-2486 MHz. See *Society of Broadcast Engineers, Inc. Petition for Reconsideration*, IB Docket No. 02-364 (filed May 22, 2006); see also *Sprint Nextel Corporation and Society of Broadcast Engineers, Inc. Ex Parte*, IB Docket No. 02-364, ET Docket No. 00-258 (filed June 4, 2007) (supporting SBE's petition). We

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4. In 2006, the Commission granted the Globalstar CDMA Big LEO MSS system authority to operate ATC in 11 megahertz of spectrum at 1610-1615.5 MHz in the L-band and 2487.5-2493 MHz in the S-band.<sup>11</sup> On June 20, 2006, Globalstar filed a *Petition for Expedited Rulemaking* requesting that the Commission authorize Globalstar to provide ATC using its entire assigned MSS spectrum.<sup>12</sup> Globalstar's request included shared spectrum with Iridium in the L-band and shared spectrum with the fixed and mobile (except aeronautical mobile) services, including the BRS, in the S-band.<sup>13</sup>

5. After receiving oppositions and comments to Globalstar's petition, the Commission in November 2007, released the *Globalstar ATC Notice* in which it sought comment on increasing the amount of spectrum in which Globalstar is authorized to operate ATC, to include Globalstar's 25.225 megahertz of assigned spectrum, at 1610-1618.725 MHz in the L-band and 2483.5-2500 MHz in the S-band.<sup>14</sup> At the same time, the Commission tentatively concluded that ATC is not feasible in the 0.95 megahertz portion of the L-band that Globalstar would share with Iridium at 1617.775-1618.725 MHz, because of the likelihood of interference to Iridium's system. We also tentatively concluded that ATC is not feasible in the 2495-2500 MHz segment of the S-band, allocated to the Fixed and Mobile Service on a shared, co-primary basis, and licensed to BRS from 2496-2500 MHz. In addition, we sought comment on a concern raised by BRS licensee Sprint Nextel regarding the appropriate upper limit for ATC operations to prevent interference to BRS stations in the S-band. Finally, we sought comment on the interference implications of expanding Globalstar's ATC in the S-band on co-channel BAS Channel A10.<sup>15</sup> We received nine comments and seven reply comments to the proposals in the *Globalstar ATC Notice*.<sup>16</sup>

### III. DISCUSSION

6. In its comments, Globalstar states that it has entered into an MSS/ATC partnership with Open Range Communications, Inc. (Open Range), and describes in some detail its ATC concept.<sup>17</sup> Open Range plans to build "an advanced wireless network that will close the broadband gap between rural and urban areas of the country."<sup>18</sup> Globalstar states that it intends to offer broadband service to rural areas using Globalstar's satellite network and Open Range's terrestrial network to provide mobile broadband service.<sup>19</sup> Globalstar's MSS/ATC business concept entails offering ubiquitous voice, broadband, and

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emphasize that our actions here are not intended to prejudice or otherwise affect the outcome of our consideration of SBE's petition.

<sup>11</sup> See *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, File No. SAT-MOD-20050301-00054, DA 06-121, 21 FCC Rcd 398, 401, ¶ 9 (2006) (*Globalstar ATC Authorization*).

<sup>12</sup> See *Consumer and Governmental Affairs Bureau Reference Information Center Petition for Rulemakings Filed*, Public Notice, Report No. 2785, RM-11339, released July 27, 2006.

<sup>13</sup> At the time Globalstar filed its *Petition for Expedited Rulemaking*, the 1618.25-1621.35 MHz portion of the L-band was assigned for sharing between Globalstar and Iridium, and the 2495-2500 MHz portion of the S-band was assigned for sharing between Globalstar and the fixed and mobile (except aeronautical mobile) services. See *Big LEO Spectrum Sharing Order*, 19 FCC Rcd 13356, 13357, ¶ 1. The L-band spectrum sharing plan has since changed to the one described *supra*, paragraph 2.

<sup>14</sup> See *Globalstar ATC Notice*, 22 FCC Rcd at 19745-52, ¶¶ 27-42.

<sup>15</sup> See *Globalstar ATC Notice*, 22 FCC Rcd at 19749-50, ¶¶ 37-40.

<sup>16</sup> For commenters, see Appendix B.

<sup>17</sup> See Globalstar Comments at 5.

<sup>18</sup> Open Range Comments at 1.

<sup>19</sup> See Globalstar Comments at 6-7.

multimedia services; large footprint wireless network services; interactive multimedia services, including complements to broadcasting satellite and cable broadcasting services; and an Internet Protocol (IP) overlay network for voice services.<sup>20</sup> Globalstar further contends that deployment of ATC in urban areas will enable it to overcome structure blockage, and that transportable base stations, combined with Globalstar's satellite network, will enable it to provide communications when terrestrial-only communications services are disabled or overloaded.<sup>21</sup> Globalstar also states its intention to provide expanded service to military and civilian customers in the Middle East and Southwest Asia using its MSS/ATC network.<sup>22</sup>

7. Open Range comments that Globalstar's license is nationwide and would allow services to be provided to rural areas scattered throughout the United States.<sup>23</sup> Open Range comments that it plans to deploy the Globalstar ATC network in rural communities using the ATC component to connect mobile terminals to the network via ATC base stations, and using the MSS portion of Globalstar's network to connect mobile terminals to the network when the mobile terminals are outside the coverage areas of ATC base stations.<sup>24</sup> Open Range states that it expects that the Globalstar ATC network will use WiMAX technology,<sup>25</sup> and states that this will require access to the entire 11.5 megahertz of spectrum in the S-band that is not shared with the fixed and mobile (except aeronautical mobile) services, including BRS, in order to deploy three WiMAX channels of 3.5 megahertz each.<sup>26</sup>

8. Globalstar contends that the Commission limited the spectrum available for ATC because of ongoing proceedings that had the potential to change the allocations in the Big LEO bands, including the *Big LEO Spectrum Sharing* proceeding and the *BRS/EBS Allocation* proceeding.<sup>27</sup> Globalstar notes that these proceedings have been concluded, and states that there is no further justification for denying Globalstar access to its full unshared spectrum for ATC operations.<sup>28</sup> Further, Globalstar asserts that it is the only MSS provider that does not have access to its full MSS spectrum for ATC, and that such disparate treatment is unjustified.<sup>29</sup>

9. Commenting parties generally do not oppose an expansion of ATC authority in all portions of the Big LEO bands, though several parties object to expansion of such ATC authority in the 2493-2495 MHz segment of the Big LEO S-band.<sup>30</sup> In opposing the expansion of ATC authority into the 2493-2495

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<sup>20</sup> See Globalstar Comments at 9.

<sup>21</sup> See Globalstar Comments at 9-10.

<sup>22</sup> See Globalstar Comments at 11.

<sup>23</sup> See Open Range Comments at 4-5.

<sup>24</sup> See Open Range Comments at 4.

<sup>25</sup> WiMAX (Worldwide Interoperability for Microwave Access) is a broadband wireless access protocol that is based on the Institute of Electrical and Electronic Engineers' 802.16 standard.

<sup>26</sup> See Open Range Comments at 5-6.

<sup>27</sup> See Globalstar Comments at 13 (citing *ATC Report and Order*, 18 FCC Rcd at 2057, ¶ 192; *Big LEO Spectrum Sharing Order*, 19 FCC Rcd at 13389-90, ¶ 75). See also *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*, Report and Order and Further Notice of Proposed Rulemaking, WT Docket No. 03-66, 19 FCC Rcd 14165 (2004) (*BRS/EBS Allocation Report and Order*).

<sup>28</sup> See Globalstar Comments at 13-15.

<sup>29</sup> See Globalstar Comments at 16-17.

<sup>30</sup> See generally CTIA Comments and Reply, Sprint Nextel Corporation (Sprint Nextel) Comments and Reply, the WiMAX Forum (WiMAX Forum) Comments, Wireless Communications Association International, Inc. (WCA) Comments and Reply.

MHz segment, however, CTIA –The Wireless Association (CTIA) raises objections that are applicable to any expansion of Big LEO ATC spectrum. CTIA states that Globalstar has not established a need for additional spectrum to provide wireless broadband via ATC.<sup>31</sup> Further, CTIA points out that implementation of Globalstar’s planned ATC would require more than simply an expansion of Globalstar’s authorized ATC spectrum. Specifically, CTIA notes that our ATC rules for the CDMA Big LEO bands were promulgated for CDMA technology.<sup>32</sup> CTIA acknowledges that our rules allow the use of technologies other than CDMA to deliver ATC services, but notes that our rules require Globalstar to make an affirmative showing that another technology, such as WiMAX, will cause no more interference than CDMA.<sup>33</sup> Thus, CTIA asserts that we would have to begin a new rulemaking proceeding to examine the technical feasibility of any modifications to Globalstar’s ATC authority.<sup>34</sup> CTIA claims that Commercial Mobile Radio Service (CMRS) licensees are already deploying and improving broadband wireless services in rural areas, using spectrum licensed for terrestrial services, and that Globalstar’s entry into the rural broadband wireless market is not necessary to bring these services to rural areas. CTIA concludes that Globalstar entered into a business arrangement that would require changes in its ATC authority, and is now asking the Commission to endorse its business deal *post hoc* by changing Globalstar’s ATC authority. CTIA asserts that we “should not reward Globalstar’s attempts to ‘game the system’ by validating its improper and premature private business arrangement through Commission regulation.”<sup>35</sup> For these reasons, CTIA recommends that we should not consider an expansion of Globalstar’s ATC spectrum.<sup>36</sup>

10. We disagree with CTIA’s arguments. Based on the record, we find that it is in the public interest to make more spectrum available for ATC operations in the Big LEO bands to the extent it is technically feasible. In the *ATC Report and Order*, the Commission found that the integration of an ATC into authorized and existing MSS systems would provide several benefits. ATC would allow more intensive and efficient reuse of MSS spectrum.<sup>37</sup> By filling gaps in MSS coverage, ATC would allow MSS customers in unserved or underserved areas to use ATC-enabled MSS communications systems when inside buildings or traveling in urban areas.<sup>38</sup> ATC would allow MSS licensees to introduce new services, “including ubiquitous digital telecommunications and broadband services, interoperable nationwide public-safety systems, and other services that take advantage of the unique coverage and capacity characteristics of ATC-enabled MSS.”<sup>39</sup> ATC could also enhance competition in several telecommunications market segments, “including the maritime, aeronautical, commercial-transportation and public-safety markets that rely on MSS for service to more remote and underserved locations.”<sup>40</sup> The improvement of MSS coverage in urban areas would increase the potential market for MSS, which in turn could lead to economies of scale in production of mobile terminals, reducing the cost of terminals to consumers.<sup>41</sup> And an integrated MSS/ATC system would be able to provide customers with service via a

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<sup>31</sup> See CTIA Reply at 3.

<sup>32</sup> See CTIA Reply at 3. See also 47 C.F.R. § 25.254 (note).

<sup>33</sup> See CTIA Reply at 3 (citing 47 C.F.R. § 25.254 (note)).

<sup>34</sup> See CTIA Reply at 3-4.

<sup>35</sup> See CTIA Reply at 4-5.

<sup>36</sup> See CTIA Reply at 5.

<sup>37</sup> See *ATC Report and Order*, 18 FCC Rcd at 1975, ¶ 23.

<sup>38</sup> See *ATC Report and Order*, 18 FCC Rcd at 1975, ¶ 23.

<sup>39</sup> *ATC Report and Order*, 18 FCC Rcd at 1975, ¶ 23.

<sup>40</sup> *ATC Report and Order*, 18 FCC Rcd at 1975, ¶ 23.

<sup>41</sup> See *ATC Report and Order*, 18 FCC Rcd at 1975, ¶ 24.

single number, eliminating the frustrating and time-consuming process of using MSS and CMRS separately, as well as associated difficulties in arranging roaming agreements with CMRS providers.<sup>42</sup> We find all of these benefits provide sound reasons for allowing ATC operations on additional spectrum in the Big LEO bands.

11. Allocations and assignments in the Big LEO bands generally are sufficiently advanced that we now have additional certainty as to what services and licensees will operate in or share the Big LEO bands to consider expanding the spectrum available for ATC operations. In the *ATC Report and Order*, the Commission limited Big LEO MSS licensees to no more than 5.5 megahertz of ATC spectrum in each of the uplink and downlink directions in order to avoid the possibility of prejudicing reallocation and reassignment decisions it was considering in the *BRS/EBS Allocation* proceeding and the *Big LEO Spectrum Sharing* proceeding.<sup>43</sup> Because those proceedings have now largely been resolved, we are in a better position to evaluate the technical feasibility of making more spectrum for ATC available to CDMA Big LEO MSS licensees in the Big LEO L- and S-bands. Given adequate technical safeguards for co-channel and adjacent band services, we see no reason to deny Globalstar the opportunity to use its assigned spectrum more efficiently.

12. In so doing, we do not address Globalstar's ATC business plans. In the *Globalstar ATC Notice*, the Commission raised two questions. The first was whether and to what extent we should make more spectrum available for ATC in the Big LEO bands.<sup>44</sup> The second was what measures we should adopt to protect other services in the same and adjacent bands from harmful interference from ATC, should we decide to expand ATC spectrum in the Big LEO bands.<sup>45</sup> Those two questions both define and limit the scope of this proceeding. Whether Globalstar's business concept is permitted by the Commission's rules, in the public interest, or technically feasible is beyond the scope of these questions, and is unnecessary to address the issues before us. Accordingly, our decision is limited to the two questions raised in the *Globalstar ATC Notice* pursuant to the Commission's current rules.

#### A. The L-band.

13. Based on the record, we will increase the L-band spectrum that a Big LEO CDMA MSS operator may use for ATC by 2.275 megahertz, from 1610-1615.5 MHz to 1610-1617.775 MHz. In the *Globalstar ATC Notice*, the Commission sought comment on whether it should increase the L-band spectrum in which Globalstar is authorized to provide ATC, stating that such an increase would allow Globalstar to offer a higher-capacity ATC than would be possible with its currently authorized 5.5 megahertz of L-band ATC spectrum.<sup>46</sup> At the same time, the Commission tentatively concluded that the risk of harmful interference to TDMA Big LEO MSS systems "could render Globalstar ATC infeasible in the shared spectrum at 1617.775-1618.725 MHz."<sup>47</sup>

14. In its comments in response to the *Notice*, Globalstar has addressed only the portion of the L-band it does not share with the TDMA MSS licensee. Globalstar maintains that the public interest requires us to allow it to provide ATC "in all portions of its unshared spectrum assignments between 1610-1617.775 MHz"<sup>48</sup> Globalstar also asserts that, due to the resolution of spectrum sharing issues in

<sup>42</sup> See *ATC Report and Order*, 18 FCC Rcd at 1976, ¶¶ 25-26.

<sup>43</sup> See *ATC Report and Order*, 18 FCC Rcd at 2011, ¶ 93.

<sup>44</sup> See *Globalstar ATC Notice*, 22 FCC Rcd at 19749, ¶ 37.

<sup>45</sup> See *Globalstar ATC Notice*, 22 FCC Rcd at 19751, ¶¶ 41-42.

<sup>46</sup> See *Globalstar ATC Notice*, 22 FCC Rcd at 19749, ¶ 37.

<sup>47</sup> See *Globalstar ATC Notice*, 22 FCC Rcd at 19749-50, ¶ 38.

<sup>48</sup> See Globalstar Comments at 2.

the *Spectrum Sharing Reconsideration Order* portion of the *Globalstar ATC Notice*, “there remains no justification for retaining the limitation in the ATC rules that prevents Globalstar from deploying ATC in its full unshared L-band spectrum assignment from 1610-1617.775 MHz.”<sup>49</sup> Globalstar also contends that its deployment of ATC in its unshared L-band spectrum will not cause harmful interference to Iridium’s MSS operations.<sup>50</sup>

15. Main Street Broadband, LLC (MSB) supports Globalstar’s position, stating that expansion of Globalstar’s ATC authorization will facilitate the provision of wireless broadband access in rural areas.<sup>51</sup> Open Range also supports increasing Globalstar’s authorization to include all non-shared spectrum in the L-band.<sup>52</sup>

16. Iridium is the only commenter that shares spectrum with Globalstar in the L-band. Iridium agrees with the Commission’s tentative conclusion that allowing Globalstar to operate ATC in the shared L-band spectrum at 1617.775-1618.725 MHz would result in a high likelihood of harmful interference to Iridium’s MSS operations.<sup>53</sup> Iridium therefore requests that we adhere to the tentative conclusion in the *Globalstar ATC Notice* and deny Globalstar authority to operate ATC in the shared L-band spectrum at 1617.775-1618.725 MHz.<sup>54</sup> Iridium does not address whether we should expand Globalstar’s authority to operate ATC in the remainder of the L-band, but does raise three concerns relative to Globalstar ATC. Iridium requests that it reserve the right to comment on any application for modification of ATC authority Globalstar may file,<sup>55</sup> insists that the 1621.35-1626.5 MHz band must remain open for ATC operations,<sup>56</sup> and contends that Globalstar must protect Iridium from interference from Globalstar’s ATC mobile terminals.<sup>57</sup>

17. First, Iridium notes that Globalstar and its partners state their intention to offer broadband service in Globalstar’s ATC spectrum using WiMAX technology.<sup>58</sup> Iridium accurately points out that the Commission’s rules do not currently authorize use of any air interface protocol other than CDMA for ATC operations in the CDMA Big LEO L-band.<sup>59</sup> Iridium stresses that in order to use WiMAX technology in its ATC, Globalstar will need to apply for and receive a modification of its ATC authority. Iridium states that it “reserves the right to provide engineering comments on the interference effects of any proposed shift to WiMAX on Iridium when Globalstar files its application to modify its ATC authorization.”<sup>60</sup> We agree that Iridium will be provided with the opportunity to comment on any modification to Globalstar’s ATC authority beyond the limited modification we authorize here. In addition to the limitation of Globalstar’s ATC authority pointed out by Iridium, we note that Globalstar is

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<sup>49</sup> See Globalstar Comments at 14.

<sup>50</sup> See Globalstar Comments at 19-21.

<sup>51</sup> MSB is a company that was created to provide broadband wireless access in rural markets. See MSB Comments at 2.

<sup>52</sup> See Open Range Comments at 2.

<sup>53</sup> See Iridium Comments at 2.

<sup>54</sup> See Iridium Comments at 5.

<sup>55</sup> See Iridium Reply at 2.

<sup>56</sup> See Iridium Reply at 4.

<sup>57</sup> See Iridium Reply at 4.

<sup>58</sup> See Iridium Reply at 2.

<sup>59</sup> See Iridium Reply at 3 (quoting *Globalstar ATC Authorization*, 21 FCC Rcd at 401, ¶ 10).

<sup>60</sup> Iridium Reply at 3.

constrained by a rule that requires ATC to be implemented in the forward-band mode.<sup>61</sup> The WiMAX technology to which Globalstar and Open Range refer in their comments is a time-division duplex (TDD) mode, and is therefore not forward-band, but rather a combination of forward- and reverse-band operation. For Globalstar to use TDD WiMAX in its ATC, the Commission would need to change its current ATC rules through another rulemaking proceeding or modify Globalstar's ATC authority by waiving the relevant rule.<sup>62</sup> In either event, the Commission will publish a public notice to which interested parties may respond.<sup>63</sup>

18. Second, Iridium notes that Globalstar proposed in its comments that our current rule authorizing ATC in the 1610-1615.5 MHz, 1621.35-1626.5 MHz, and 2487.5-2493 MHz bands should be modified to limit ATC in the 1610-1626.5 MHz band to the 1610-1617.775 MHz band. Iridium contends that Globalstar is proposing, in effect, to eliminate the possibility that Iridium could seek ATC authority.<sup>64</sup> Iridium states that there is neither discussion of, nor a basis for, such a change, and further recommends that its exclusive spectrum at 1618.725-1621.35 MHz be added to our rules as a band in which ATC may be authorized.<sup>65</sup> We decline to take either action. We have not sought comment on an elimination or expansion of the spectrum in which Iridium may apply for ATC authorization, and there is insufficient discussion in the record to justify either action. We will not amend our rules to eliminate the spectrum at 1621.35-1626.5 MHz from eligibility for ATC authority, nor will we increase that ATC allotment in the Big LEO TDMA band without a formal request from Iridium (similar to Globalstar's *Petition for Expedited Rulemaking*) and a more thorough discussion of the implications of such an expansion.

19. Third, Iridium contends that Globalstar must fully protect Iridium from interference caused by out-of-band emissions from Globalstar's ATC mobile terminals.<sup>66</sup> Iridium notes that Globalstar stated in its comments that its ATC terminals would use the same emission masks as Globalstar's MSS terminals.<sup>67</sup> Iridium points out that the out-of-band emissions limits for MSS terminals<sup>68</sup> require less attenuation of signal than the out-of-channel emissions limits for ATC terminals.<sup>69</sup> Iridium contends that the out-of-channel emissions limits for ATC mobile terminals of -57.1 dBW measured over a 30 kilohertz bandwidth<sup>70</sup> are necessary to prevent out-of-band emissions interference from Globalstar's ATC mobile terminals, and that the less restrictive general out-of-band emissions limits for satellite earth stations will not suffice for that purpose. In reply, Globalstar declares that it intends to abide by the stricter limit.<sup>71</sup> We agree and conclude that operation of Globalstar's ATC mobile terminals will be governed by the emission limits for ATC mobile terminals, rather than the less stringent requirements for MSS mobile earth terminals.

20. Expanding Globalstar's authority to operate ATC in Globalstar's entire unshared L-band assignment at 1610-1617.775 MHz will allow Globalstar to offer a more capable, higher-capacity ATC.

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<sup>61</sup> See 47 C.F.R. § 25.149(a)(1).

<sup>62</sup> See 47 C.F.R. §§ 25.149(a)(1), 25.254 (note).

<sup>63</sup> See 47 C.F.R. §§ 25.151, 25.154.

<sup>64</sup> See Iridium Reply at 4 (citing Globalstar Comments at Atch 1).

<sup>65</sup> See Iridium Reply at 4.

<sup>66</sup> See Iridium Reply at 4.

<sup>67</sup> See Iridium Reply at 5 (citing Globalstar Comments at 20).

<sup>68</sup> See 47 C.F.R. § 25.202(f).

<sup>69</sup> See 47 C.F.R. § 25.254(b)(3).

<sup>70</sup> See 47 C.F.R. § 25.254(b)(3).

<sup>71</sup> See Globalstar Reply at 16.

We have been presented with no compelling reason against such an expansion, and the party most affected by such an expansion, Iridium, has advocated only that we deny Globalstar authority to operate ATC in the shared segment of the L-band. We will therefore modify the rules to authorize ATC in the 1610-1617.775 MHz portion of the L-band.

**B. The S-band.**

21. Based on the record, we will increase the S-band spectrum in which ATC may operate by six megahertz, from 2487.5-2493 MHz to 2483.5-2495 MHz. In the *Globalstar ATC Notice*, the Commission sought comment on whether it should increase the S-band spectrum in which Globalstar is authorized to provide ATC.<sup>72</sup> At the same time, the Commission tentatively concluded that it was neither feasible nor in the public interest to increase the spectrum in which Globalstar could operate an ATC into the portion of the S-band which Globalstar shares with the fixed and mobile (except aeronautical mobile) services at 2495-2500 MHz, including the portion licensed to BRS from 2496-2500 MHz. We also sought comment on a concern raised by BRS licensee Sprint Nextel regarding the appropriate upper band edge for ATC operations to prevent interference to BRS stations in the S-band. Furthermore, we sought comment on the interference implications of increasing Globalstar's ATC in the S-band on co-channel BAS Channel A10.

22. Globalstar asserts that there is no technical impediment to increasing its ATC authority to include the unshared portions of the S-band, at 2483.5-2495 MHz.<sup>73</sup> Globalstar states that it intends to design its ATC base stations and mobile terminals to protect both BAS and other grandfathered licensees in the S-band.<sup>74</sup> Globalstar does not seek ATC authority in the shared segment at 2495-2500 MHz at this time.<sup>75</sup> Globalstar acknowledges that the onus will be upon it to ensure that its ATC operation causes no harmful interference in BRS Channel 1 at 2496-2502 MHz. Globalstar asserts that it will design its equipment for compatibility with existing BRS out-of-band emissions limits, and that the current rules provide a process for resolving any interference complaints that may arise.<sup>76</sup> Globalstar also contends that the Commission considered the possibility of MSS/ATC interference to BAS when it adopted rules for ATC in the S-band, and concluded that ATC would be required to protect previously licensed operators from interference.<sup>77</sup> Globalstar points out that the Commission has concluded in four separate documents that Globalstar ATC and BAS licensees can resolve interference concerns through coordination.<sup>78</sup>

23. We note that the only portion of the S-band that is in dispute is 2493-2495 MHz. No commenter has objected to expanding Globalstar's S-band ATC authority to cover the entire 2483.5-2493 MHz segment. Because no licensee is licensed in the 2483.5-2487.5 MHz segment that is not also authorized to use the 2487.5-2493 MHz segment, we find that expansion of Globalstar's S-band ATC authority to include the 2483.5-2487.5 MHz segment on the same terms and with the same limitations as those that currently pertain to the 2487.5-2493 MHz segment raises no new issues or requirements.

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<sup>72</sup> See *Globalstar ATC Notice*, 22 FCC Rcd at 19749, ¶ 37.

<sup>73</sup> See Globalstar Comments at 22.

<sup>74</sup> See Globalstar Comments at 23.

<sup>75</sup> See Globalstar Comments at 24.

<sup>76</sup> See Globalstar Comments at 25.

<sup>77</sup> See Globalstar Comments at 31.

<sup>78</sup> See Globalstar Comments at 31-32 (citing *ATC Report and Order*, 18 FCC Rcd at 2061, ¶ 202; *ATC MO&O*, 20 FCC Rcd at 2650-51, ¶ 93-94; *Big LEO Spectrum Sharing Order*, 19 FCC Rcd at 13390, ¶ 75; *Big LEO Spectrum Sharing Order on Reconsideration*, 21 FCC Rcd at 5630, ¶ 41).

24. Because Globalstar has limited its request for additional ATC spectrum in the S-band to encompass only the 2483.5-2495 MHz segment, excluding the 2495-2500 MHz segment,<sup>79</sup> we do not extend Globalstar's S-band ATC authority into the 2495-2500 MHz segment. Accordingly, the oppositions of CTIA, Motorola, Inc. (Motorola), Sprint Nextel, the WiMAX Forum, and the Wireless Communications Association International, Inc. (WCA) to granting Globalstar ATC authority in the 2495-2500 MHz band are moot.<sup>80</sup>

25. Commenters disagree, however, on whether we should expand Globalstar's S-band ATC authority to include the 2493-2495 MHz segment. Globalstar provides a technical analysis which purports to demonstrate that ATC operation in the 2483.5-2495 MHz band, using cdma2000 technology, would require a geographical separation of approximately ten kilometers from a BRS Channel 1 station using WiMAX technology in order to avoid harmful interference to BRS Channel 1. For stations with smaller separations, Globalstar maintains that techniques such as antenna tilting, sectorization, and transmitter filtering could be used to prevent interference.<sup>81</sup> Globalstar also analyzes potential interference from its planned ATC system using WiMAX technology to BRS Channel 1. This analysis concludes that the potential for interference would be similar to the potential for interference from a cdma2000 system, requiring a geographical separation of ten kilometers between ATC base stations and BRS Channel 1 stations, or use of other techniques, such as filtering, to prevent interference to stations where separations are less than ten kilometers.<sup>82</sup> Globalstar also concludes that synchronization between ATC base stations and BRS Channel 1 stations both using WiMAX technology would virtually eliminate the potential for interference.<sup>83</sup> Globalstar's analysis assumes ATC operating in the 2483.5-2495 MHz band and BRS Channel 1 at 2496-2502 MHz, which provides one megahertz of separation between Globalstar's ATC band and BRS Channel 1.

26. MSB concurs with Globalstar that one megahertz of frequency separation, at 2495-2496 MHz, is sufficient to protect BRS Channel 1 from interference.<sup>84</sup> Open Range agrees that there is no need for more than one megahertz of frequency separation between ATC and BRS Channel 1, stating that synchronization of WiMAX systems can avoid interference, and can be achieved through coordination between licensees.<sup>85</sup> Open Range claims that application of the BRS service rules can minimize or eliminate the potential for interference.<sup>86</sup> Nortel supports this claim, but points out that a "guard band" is necessary when operators use different duplexing schemes.<sup>87</sup>

27. CTIA notes that in 2003 the Commission decided in favor of a separation of two megahertz between the spectrum authorized for ATC at the time (2492.5-2498 MHz) and the spectrum then allocated to BRS (2500-2690 MHz), which Globalstar itself advocated.<sup>88</sup> CTIA states that, in establishing an

<sup>79</sup> See Globalstar Comments at 24.

<sup>80</sup> See CTIA Comments at 3-4; Motorola Comments at 2; Sprint Nextel Comments at 4; WiMAX Forum Comments at 2; WCA Comments at 4-5.

<sup>81</sup> See Globalstar Comments, Technical Appx. at 12-14.

<sup>82</sup> See Globalstar Comments, Technical Appx. at 15.

<sup>83</sup> Synchronization is a technique whereby TDD base stations adjust the timing of their transmission and reception frames to ensure that no base station is transmitting while another needs to receive. See Globalstar Comments, Technical Appx. at 16-17.

<sup>84</sup> See MSB Comments at 3.

<sup>85</sup> See Open Range Comments at 6.

<sup>86</sup> See Open Range Comments at 7.

<sup>87</sup> See Nortel Comments at 2-3.

<sup>88</sup> See CTIA Comments at 7-8 (citing *ATC Report and Order*, 18 FCC Rcd at 2062, ¶ 204).

allocation for the fixed and mobile (except aeronautical mobile) services in the 2495-2500 MHz segment to support BRS Channel 1 relocation, the Commission shifted the Globalstar ATC authorization to 2487.5-2493 MHz, providing “even greater frequency separation (*i.e.*, 2 megahertz plus 1 megahertz guard band from 2495-2496 MHz) to protect BRS.”<sup>89</sup> CTIA also contends that ATC is not entitled to coordination rights with BRS licensees, and that any such coordination would be an unjustified financial burden on BRS.<sup>90</sup> CTIA recommends maintaining this separation of three megahertz to prevent interference between ATC and BRS Channel 1, and to provide certainty in the BRS Channel 1 relocation process.<sup>91</sup> The WiMAX Forum concurs with CTIA, and asserts that Globalstar has not presented a compelling reason to reduce what the WiMAX Forum calls the three megahertz “guard band” between ATC and BRS Channel 1.<sup>92</sup> The WiMAX Forum states that our rules protecting BRS Channel 1 from harmful interference from ATC are important for curing harmful interference after it occurs, but that the rules do not prevent interference in the first place, and that such interference would cause harm to consumers and BRS Channel 1 licensees until remedial measures were taken. To minimize the possibility of such interference and harm to consumers and licensees from occurring, the WiMAX Forum urges us to maintain a frequency separation of three megahertz between ATC and BRS Channel 1.<sup>93</sup>

28. Sprint Nextel likewise argues that we should maintain a three-megahertz separation between ATC and BRS Channel 1 for three reasons. First, Sprint Nextel claims that the Commission adopted and later affirmed the need for frequency separation between ATC and BRS Channel 1 by establishing 2498 MHz as the upper boundary of ATC spectrum in 2003,<sup>94</sup> by shifting the upper boundary of ATC spectrum to 2493 MHz when it allocated the 2495-2500 MHz segment for sharing between MSS and the fixed and mobile (except aeronautical mobile) services, including BRS, in 2004,<sup>95</sup> and by noting in 2006 that it had adopted the three-megahertz separation to ensure adequate separation between ATC and BRS Channel 1 to prevent harmful interference.<sup>96</sup> Second, Sprint Nextel asserts that Globalstar has stated that two megahertz of separation between ATC and BRS Channel 1 is necessary to prevent harmful interference, and that technology has not changed since Globalstar made that statement.<sup>97</sup> Third, Sprint Nextel states that BRS licensees use three-megahertz frequency separations between incompatible operations within their assigned spectrum.<sup>98</sup> Sprint Nextel also asserts that equipment manufacturers have stated that a three-megahertz separation is necessary to avoid harmful interference between ATC and BRS Channel 1.<sup>99</sup> WCA supports the arguments of the WiMAX Forum and Sprint Nextel, and concludes that three

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<sup>89</sup> See CTIA Comments at 8 (citing *Big LEO Spectrum Sharing Order*, 19 FCC Rcd at 13388-89, ¶ 72).

<sup>90</sup> See CTIA Reply at 5-6.

<sup>91</sup> See CTIA Comments at 8-9.

<sup>92</sup> See WiMAX Forum Comments at 3-4.

<sup>93</sup> See WiMAX Forum Comments at 4-5. See also WCA Comments at 7.

<sup>94</sup> See Sprint Nextel Comments at 7 (citing *ATC Report and Order*, 18 FCC Rcd at 2062, ¶ 204). See also WCA Comments at 5-6.

<sup>95</sup> See Sprint Nextel Comments at 7 (citing *Big LEO Spectrum Sharing Order*, 19 FCC Rcd at 13388-89, ¶ 72). See also WCA Comments at 6.

<sup>96</sup> See Sprint Nextel Comments at 8 (citing *Big LEO Spectrum Sharing Order on Reconsideration*, 21 FCC Rcd at 5614, ¶ 7).

<sup>97</sup> See Sprint Nextel Comments at 8.

<sup>98</sup> See Sprint Nextel Reply at 7-8.

<sup>99</sup> See Sprint Nextel Comments at 9 (citing letters from KMW Communications, Andrew Corporation and CSS Antenna).

megahertz of separation between ATC and BRS Channel 1 is necessary to prevent interference even with the best filtering available.<sup>100</sup>

29. Sprint Nextel also disputes several of Globalstar's technical claims, and contends that Globalstar's analysis provides 74.5 dB less protection than what is required for BRS Channel 1 operations 100 meters from an ATC base station.<sup>101</sup> Sprint Nextel states that avoiding interference requires ATC base stations to be beyond the line of sight from BRS Channel 1 stations.<sup>102</sup> Sprint Nextel also reasserts that three megahertz of separation between ATC and BRS Channel 1 is necessary even if Globalstar's ATC adheres to the more stringent out-of-band emissions limits of BRS.<sup>103</sup> Further, Sprint Nextel claims that, absent a three-megahertz frequency separation, ATC base stations would generate blocking interference to any BRS Channel 1 base station within line of sight.<sup>104</sup> Finally, Sprint Nextel states that Globalstar's assertion that it will deploy BRS-compatible WiMAX technology as its ATC protocol does not resolve interference concerns, because there is no certainty that Globalstar will be able to receive permission to use WiMAX in its ATC, and because BRS Channel 1 operators are under no obligation to use WiMAX in their own systems.<sup>105</sup>

30. We find that, given adequate technical standards to protect BRS Channel 1 operations in the 2496-2502 MHz segment, Globalstar's ATC should be authorized to operate in the 2493-2495 MHz segment of the S-band. This increase in S-band ATC spectrum will allow more efficient use of the S-band Big LEO MSS spectrum.<sup>106</sup> The competing technical arguments tendered by ATC proponents and BRS proponents illuminate some of the problems that may arise at the ATC/BRS Channel 1 interface. Although there may be difficulties in deploying ATC in the 2493-2495 MHz segment, we find that, with appropriate technical standards to prevent harmful interference to BRS Channel 1 from ATC, the 2493-2495 MHz segment can be used for ATC services, at least in some areas. We reject the assertion that it was the Commission's intention to establish a three megahertz "guard band" when it shifted Globalstar's ATC authorization from 2492.5-2498 MHz to 2487.5-2493 MHz in the *Big LEO Spectrum Sharing Order*. The Commission stated there that moving Globalstar's authorized ATC spectrum to 2487.5-2493 MHz gave us "even greater frequency separation (i.e., 2 megahertz plus 1 megahertz guard band from 2495-2496 MHz) to protect BRS..."<sup>107</sup> The Commission specified two megahertz of frequency separation plus a guard band of one megahertz, not a guard band of three megahertz. We conclude that, with adequate technical rules to protect BRS Channel 1 from harmful interference from ATC, there is no need to expand the one megahertz guard band at 2495-2496 MHz.

31. It is likely that the technical standards we adopt *infra*, as well as Globalstar's choices in designing its ATC system and the choices made by BRS licensees in deploying their systems, will have the practical effect of rendering it infeasible for Globalstar to use the 2493-2495 MHz segment of the S-band for ATC in some geographical areas. Careful engineering, cooperation between Globalstar and BRS Channel 1 licensees, and improvements in technology, however, may allow Globalstar to operate ATC in

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<sup>100</sup> See Sprint Nextel Reply at 6-7; WCA Comments at 7.

<sup>101</sup> The value calculated by Sprint assumes that the ATC band edge emission limit in 47 C.F.R. § 25.254(a)(2) does not take into account the gain of the ATC base station antenna. In fact, the emission limit is intended to be an EIRP limit and does take antenna gain into account.

<sup>102</sup> See Sprint Nextel Reply at 9-10.

<sup>103</sup> See Sprint Nextel Reply at 11-13.

<sup>104</sup> See Sprint Nextel Reply at 13-15.

<sup>105</sup> See Sprint Nextel Reply at 18-19; WCA Reply at 7-10.

<sup>106</sup> See *ATC Report and Order*, 18 FCC Rcd at 1975-76, ¶¶ 23-26.

<sup>107</sup> *Big LEO Spectrum Sharing Order*, 19 FCC Rcd at 13389, ¶ 72.

the 2493-2495 MHz segment in all or some parts of the United States, either immediately or in the future. For these reasons, we will allow ATC deployment in the 2493-2495 MHz segment, provided that ATC operations cause no harmful interference to BRS Channel 1 operations in the 2496-2502 MHz band.

### C. Interference prevention in the S-band.

32. To ensure that ATC operations in the S-band do not cause harmful interference to BRS Channel 1 operations in the 2496-2502 MHz band, we require that Globalstar adhere to the out-of-band emission standards applicable to BRS/EBS licensees,<sup>108</sup> measured from the upper edge of Globalstar's ATC authorization at 2495 MHz, as described below. We also make clear that none of these limits will relieve ATC of its absolute obligation to eliminate any harmful interference to BRS that may nevertheless occur, including its obligation to reduce the power of operations in its upper channel or channels, or cease operations entirely in its upper channel or channels, to eliminate harmful interference to BRS Channel 1 operations. We also reaffirm our rule that the ATC operator must resolve any complaints of harmful interference to other authorized services in and adjacent to the S-band, including grandfathered BAS and private radio operations.<sup>109</sup>

33. The Commission's rules pertaining to ATC operation in the Big LEO MSS band currently impose an out-of-channel emissions limit at the edge of the ATC frequency assignment of -44.1 dBW over a 30 kilohertz resolution bandwidth.<sup>110</sup> BRS/EBS, however, has stricter out-of-band emissions limits.<sup>111</sup> The ordinary requirement for BRS/EBS operations is signal attenuation of  $43 + 10 \log(P)$  dB measured in either one megahertz or in one percent of the emission bandwidth.<sup>112</sup> Further, in the case of a documented interference complaint that cannot be mutually resolved, both licensees of existing and new systems must reduce their out-of-band emissions by at least  $67 + 10 \log(P)$  dB, measured at three megahertz from their channels' edges, when the stations are separated by more than 1.5 km, and by at least  $67 + 10 \log(P) - 20 \log(D_{\text{km}}/1.5)$  dB when the stations are separated by less than 1.5 km, or when the stations are collocated, limit the undesired signal level at the affected licensee's base station receiver(s) at the collocation site to no more than -107 dBm.<sup>113</sup> When the interference is caused by a new or modified BRS/EBS base station to a pre-existing base station, when the interference complaint cannot be mutually resolved, the new or modified station must take these measures within 24 hours of receipt of the documented interference complaint, and the pre-existing base station must take these measures within

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<sup>108</sup> BRS and the Educational Broadband Service (EBS) operate in the same bands and follow the same technical rules. See, e.g., 47 C.F.R. §§ 27.1220-27.1222.

<sup>109</sup> See 47 C.F.R. § 25.255.

<sup>110</sup> See 47 C.F.R. § 25.254(a)(2).

<sup>111</sup> See 47 C.F.R. § 27.53 (as revised by *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; Part 1 of the Commission's Rules - Further Competitive Bidding Procedures; Amendment of Parts 21 and 74 of the Commission's Rules With Regard to Licensing in the Multipoint Distribution Service and in the Instructional Television Fixed Service for the Gulf of Mexico; Review of the Spectrum Sharing Plan Among Non-Geostationary Satellite Orbit Mobile Satellite Service Systems in the 1.6/2.4 GHz Bands; Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, Including Third Generation Wireless Systems*, Third Order on Reconsideration and Sixth Memorandum Opinion and Order and Fourth Memorandum Opinion and Order and Second Further Notice of Proposed Rulemaking and Declaratory Ruling, WT Docket No. 03-66, RM-10586, WT Docket No. 03-67, WT Docket No. 02-68, RM-9718, IB Docket No. 02-364, ET Docket No. 00-258, FCC 08-83, released Mar. 20, 2008 (*BRS/EBS 4<sup>th</sup> MO&O*)).

<sup>112</sup> See 47 C.F.R. §§ 27.53(m)(2) (as revised by the *BRS/EBS 4<sup>th</sup> MO&O*), 27.53(m)(6). See also Sprint Nextel Comments at 10-11.

<sup>113</sup> See 47 C.F.R. § 27.53(m)(2) (as revised by the *BRS/EBS 4<sup>th</sup> MO&O*).

60 days of making the complaint.<sup>114</sup> In the *Globalstar ATC Notice*, the Commission inquired whether we should impose the stricter BRS/EBS out-of-band emissions limits on ATC at the upper edge of the S-band MSS/ATC frequency assignment.

34. Sprint Nextel and WCA state that ATC should be required to adhere to the stricter BRS/EBS out-of-band emissions standards in order to protect BRS Channel 1 at 2496-2502 MHz.<sup>115</sup> Globalstar agrees to abide by these limits.<sup>116</sup> Given the unanimity among the commenting parties, we will apply the stricter BRS/EBS out-of-band emissions limits to the upper edge of Globalstar's ATC assignment, at 2495 MHz. This will provide greater protection to BRS Channel 1 operations at 2496-2502 MHz than BRS Channel 1 receives from the adjacent EBS Channel A1 operations at 2502-2507.5.<sup>117</sup> Where there is a documented complaint of interference between a BRS Channel 1 station and an EBS Channel A1 stations, and the stations cannot come to a voluntary accommodation, both stations must attenuate their signals. The point at which the signal attenuation is measured is three megahertz from the edge of the channel. Thus, in the case of BRS Channel 1 and EBS Channel A1, the point at which attenuation is measured (three megahertz from the edge of EBS Channel A1) is three megahertz into BRS Channel 1 from the edge of EBS Channel A1, or the center frequency of BRS Channel 1. In the case of S-band ATC, there is a frequency separation of one megahertz between the upper edge of the ATC authorization and BRS Channel 1. Therefore, the point at which ATC attenuation is measured is only two megahertz into BRS Channel 1. Because attenuation continues into BRS Channel 1, the attenuation of the ATC signal at the center frequency of BRS Channel 1 would be greater than the attenuation of an EBS Channel A1 signal at the center frequency of BRS Channel 1.

35. We apply these out-of-band emissions limits to ATC at the upper edge of the S-band ATC authorization – *i.e.*, 2495 MHz – because all parties agree that they are reasonable for protecting BRS Channel 1. At the same time, our ATC interference rules will remain in full force. Our rules impose an absolute obligation on the MSS/ATC operator to resolve any harmful interference to other services.<sup>118</sup> Our adoption of out-of-band emissions limits for the upper edge of Globalstar's ATC authorization raises no presumption that Globalstar's ATC is not causing harmful interference if it meets these limits. ATC enjoys no rights *vis-à-vis* other primary services in the same or adjacent bands.

36. Thus, we will require ATC to attenuate its signal by at least  $43 + 10 \log(P)$  dB measured in either one megahertz or in one percent of the emission bandwidth. Subsequently, if any BRS Channel 1 licensee presents a documented complaint of interference, we will require the ATC operator to attenuate its signal by at least  $67 + 10 \log(P)$  dB, measured at three megahertz from their channels' edges, when the stations are separated by more than 1.5 km, and by at least  $67 + 10 \log(P) - 20 \log(D_{\text{km}}/1.5)$  dB when the stations are separated by less than 1.5 km, or when the stations are collocated, limit the undesired signal level at the affected licensee's base station receiver(s) at the collocation site to no more than -107 dBm. When the interference is caused by a new or modified ATC station to a pre-existing BRS Channel 1 base station, when the interference complaint cannot be mutually resolved, the new or modified station must take these measures within 24 hours of receipt of the documented interference complaint. Finally, if the BRS Channel 1 licensee continues to experience harmful interference from the ATC base station, we will require the ATC operator to take all measures necessary, including reducing power or ceasing operations in the channel or channels nearest the upper edge of the S-band ATC authorization, to eliminate the harmful interference. We expect ATC operators to take all measures necessary in designing

<sup>114</sup> See 47 C.F.R. § 27.53(m)(2)(ii) (as revised by the *BRS/EBS 4<sup>th</sup> MO&O*).

<sup>115</sup> See Sprint Nextel Comments at 12; WCA Comments at 8; Sprint Nextel Reply at 3-6; WCA Reply at 3.

<sup>116</sup> See Globalstar Reply at 21-22.

<sup>117</sup> See 47 C.F.R. § 27.5(i).

<sup>118</sup> See 47 C.F.R. § 25.255.

and operating their systems to avoid causing harmful interference to other services.<sup>119</sup> We also note that ATC can significantly reduce the risk of harmful interference to BRS Channel 1 operations by siting its base stations using physical separation or terrain blocking to minimize their impact on BRS Channel 1 operations.

#### D. ATC Operations.

37. CTIA characterizes Globalstar's described plans as an "attempt to establish its [MSS] operation as a terrestrial service with an ancillary satellite component."<sup>120</sup> It appears that Globalstar plans to use its MSS system for access to Open Range's network only when no ATC base station is within range of the customer's mobile terminal. Given CTIA's concerns, and Globalstar's and Open Range's stated plans, we reiterate that there are several technical and operational requirements to which Globalstar must adhere to operate ATC under the Commission's rules.<sup>121</sup>

38. The Commission's rules currently permit ATC operation in the Big LEO bands only in forward-band mode.<sup>122</sup> Globalstar's comments clearly evince an intention to operate its ATC in a non-forward band mode.<sup>123</sup> As noted above, for Globalstar to use TDD WiMAX in its ATC, the Commission would need to change its current ATC rules through another rulemaking proceeding or modify Globalstar's ATC authority by waiving the relevant rule. Our action in this item and our citation of Globalstar's comments in this decision do not constitute approval of Globalstar's business or technical plans for ATC, nor do they provide any indication of whether the Commission will modify or waive its rules to accommodate Globalstar's plans.

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<sup>119</sup> With respect to Sprint Nextel's concerns regarding receiver overload interference (Sprint Nextel Reply at 13-17), we note that this is among the problems that ATC must take into account in avoiding harmful interference to other services.

<sup>120</sup> CTIA Comments at 1.

<sup>121</sup> We reiterate that the Commission's rules prescribe "gating criteria" that must be met before an MSS operator may operate ATC, and must be met throughout the period of MSS/ATC operation. As applied to Globalstar, these gating criteria are:

- *Geographic and temporal coverage:* Globalstar must demonstrate that it can provide MSS service to all locations as far north as 70 degrees North latitude and as far south as 55 degrees South latitude for at least 75 percent of every 24-hour period. *See* 47 C.F.R. § 25.149(b)(1)(iii).
- *Replacement satellites:* Globalstar must maintain an in-orbit spare satellite, and must report any satellite failures, malfunctions, or outages that may require satellite replacement within ten days of their occurrence. *See* 47 C.F.R. § 25.149(b)(2). *But see Globalstar ATC Authorization*, 21 FCC Rcd at 411, ¶ 35 (until Globalstar launches a spare satellite or receives a waiver of this requirement, it will not meet this gating criterion).
- *Commercial availability:* Globalstar's MSS must be available to customers for a fee in accordance with its coverage requirements. *See* 47 C.F.R. § 25.149(b)(3).
- *Integrated services:* Globalstar must offer an integrated service of MSS and ATC. Specifically, Globalstar must use handsets or other mobile terminals that can communicate with both the satellite component and the ATC, or must provide other evidence of integrated service. *See* 47 C.F.R. § 25.149(b)(4).
- *In-band operation:* Globalstar may offer ATC only in its authorized MSS spectrum, as limited by the ATC spectrum authorization we establish herein. *See* 47 C.F.R. § 25.149(b)(5).

<sup>122</sup> *See* 47 C.F.R. § 25.149(a)(1).

<sup>123</sup> *See* Globalstar Comments at 7-8; Open Range Comments at 3.

#### IV. ORDER PROPOSING MODIFICATION

39. To implement our revisions to the spectrum in which CDMA Big LEO licensees may operate ATC, we propose to modify Globalstar's MSS license pursuant to our authority under Section 316 of the Communications Act.<sup>124</sup> In particular, we propose to modify Globalstar's license to reflect that Globalstar will have authority to operate ATC in the bands 1610-1617.775 MHz and 2483.5-2495 MHz. This license modification will serve the public interest by providing more capable and flexible MSS/ATC service offerings in the Big LEO bands. Copies of this *Report and Order and Order Proposing Modification* will be served on Globalstar. Consistent with Section 316, Globalstar may protest the proposed modification of its license within 30 days of publication of this *Report and Order and Order Proposing Modification* in the Federal Register. We delegate authority to the International Bureau to modify Globalstar's license as set forth in this *Order Proposing Modification* in the event no new or novel issues are raised in response to this proposal.

#### V. CONCLUSION

40. The rule amendments we adopt here provide more spectrum for Big LEO MSS/ATC while ensuring that such ATC operation does not cause harmful interference to other services in the same or adjacent spectrum bands. This action will serve the public interest by providing more capable and flexible MSS/ATC service offerings in the Big LEO bands.

#### VI. PROCEDURAL MATTERS

41. *Final Regulatory Flexibility Certification.* The Regulatory Flexibility Act of 1980, as amended (RFA),<sup>125</sup> requires that a regulatory flexibility analysis be prepared for notice-and-comment rulemaking proceedings, unless the agency certifies that "the rule will not, if promulgated, have a significant economic impact on a substantial number of small entities."<sup>126</sup> The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction."<sup>127</sup> In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act.<sup>128</sup> A "small business concern" is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the U.S. Small Business Administration (SBA).<sup>129</sup>

42. Pursuant to the RFA, the Commission incorporated an Initial Regulatory Flexibility Analysis (IRFA) into the *Globalstar ATC Notice*.<sup>130</sup> We received no comments in response to the IRFA. For the

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<sup>124</sup> See 47 U.S.C. § 316; see also 47 C.F.R. § 1.87. Globalstar's MSS license is currently held by its subsidiary, Globalstar Licensee LLC. See Public Notice, Report No. SAT-00379, DA 06-1622, 21 FCC Rcd 9133 (Int'l Bur. 2006).

<sup>125</sup> The RFA, see 5 U.S.C. §§ 601-612, has been amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), Pub. L. No. 104-121, Title II, 110 Stat. 857 (1996).

<sup>126</sup> 5 U.S.C. § 605(b).

<sup>127</sup> 5 U.S.C. § 601(6).

<sup>128</sup> 5 U.S.C. § 601(3) (incorporating by reference the definition of "small-business concern" in the Small Business Act, 15 U.S.C. § 632). Pursuant to 5 U.S.C. § 601(3), the statutory definition of a small business applies "unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register."

<sup>129</sup> 15 U.S.C. § 632.

<sup>130</sup> *Globalstar ATC Notice*, 22 FCC Rcd at 19754-56, ¶¶ 50-62.

reasons described below, we now certify that the policies and rules adopted in this *Report and Order* will not have a significant economic impact on a substantial number of small entities.

43. In this *Report and Order*, we expand the spectrum in which Big LEO Mobile-Satellite Service (MSS) operators may provide ancillary terrestrial component (ATC) service in the L-band and the S-band. Previously, ATC was only authorized to operate in the 1610-1615.5 MHz portion of the L-band, and the 2487.5-2493 MHz portion of the S-band. As a result of this *Report and Order*, ATC will be authorized in the 1610-1617.775 MHz portion of the L-band and in the 2483.5-2495 MHz portion of the S-band. We find that our actions will not affect a substantial number of small entities because only one MSS operator will be affected. We find that this licensee is not a small business. Small businesses often do not have the financial ability to become MSS system operators due to high implementation costs associated with launching and operating satellite systems and services. Therefore, we certify that the requirements of this *Report and Order* will not have a significant economic impact on a substantial number of small entities. The Commission will send a copy of the *Report and Order*, including a copy of this Final Regulatory Flexibility Certification, in a report to Congress pursuant to the Congressional Review Act, *see* 5 U.S.C. § 801(a)(1)(A). In addition, this *Report and Order* and this Final Regulatory Flexibility Certification will be sent to the Chief Counsel for Advocacy of the Small Business Administration, and will be published in the Federal Register. *See* 5 U.S.C. § 605(b).

44. *Paperwork Reduction Act of 1995 Analysis:* This *Report and Order* does not contain proposed information collection requirements subject to the Paperwork Reduction Act of 1995, Public Law 104-13. In addition, therefore, it does not contain any proposed information collection burden “for small business concerns with fewer than 25 employees,” pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198, *see* 44 U.S.C. 3506(c)(4).

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

46. *Accessibility Information.* To request information in accessible formats (computer diskettes, large print, audio recording, and Braille), send an e-mail to [fcc504@fcc.gov](mailto:fcc504@fcc.gov) or call the FCC’s Consumer and Governmental Affairs Bureau at (202) 418-0530 (voice), (202) 418-0432 (TTY). This document can also be downloaded in Word and Portable Document Format (PDF) at: <http://www.fcc.gov>.

## VII. ORDERING CLAUSES

47. IT IS ORDERED that, pursuant to Sections 4(i), 7, 302, 303(c), 303(e), 303(f) and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. Sections 154(i), 157, 302, 303(c), 303(e), 303(f) and 303(r), this *Report and Order* IS ADOPTED. Part 25 of the Commission’s Rules IS AMENDED, as specified in Appendix A, effective 30 days after publication in the Federal Register.

48. IT IS FURTHER ORDERED that the Commission’s Consumer and Governmental Affairs Bureau, Reference Information Center, SHALL SEND a copy of this *Report and Order and Order Proposing Modification*, including the Final Regulatory Flexibility Certification, to the Chief Counsel for Advocacy of the Small Business Administration.

49. WE HEREBY PROPOSE, pursuant to Section 316 of the Communications Act, 47 U.S.C. § 316, that the space station license of Globalstar Licensee LLC (Call Sign S2115) BE MODIFIED to specify that ATC operations may be conducted in the 1610-1617.775 MHz and 2483.5-2495 MHz bands.

50. IT IS FURTHER ORDERED that, pursuant to section 1.87(a) of the Commission’s rules, 47 C.F.R. § 1.87(a), Globalstar Licensee LLC may file, no later than thirty (30) days from the date of Federal Register publication of this *Report and Order and Order Proposing Modification*, a written statement

showing with particularity why its license should not be modified as proposed in this Order Proposing Modification.

51. If the licensee raises a substantial and material question of fact, a hearing may be required to resolve such question of fact pursuant to section 1.87 of the Commission's rules.<sup>131</sup> Upon review of the statements and/or additional information furnished, the Commission may modify the subject license as proposed herein, deny the modification, or set the matter of modification for hearing. If no written statements are filed by thirty (30) days from the Federal Register publication of this *Report and Order and Order Proposing Modification*, the licensee will be deemed to have consented to a modification as proposed in this Order Proposing Modification, and a final order will be issued.

52. IT IS FURTHER ORDERED that a copy of this *Report and Order and Order Proposing Modification* SHALL BE SENT BY CERTIFIED MAIL, RETURN RECEIPT REQUESTED, to: Mr. Anthony J. Navarra, Globalstar Licensee LLC, 461 S. Milpitas Boulevard , Milpitas CA 95035.

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch  
Secretary

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<sup>131</sup> 47 C.F.R. § 1.87.

## APPENDIX A

## Final Rules

For the reasons discussed in the preamble, the Federal Communications Commission amends 47 C.F.R. part 25 as follows:

1. The authority citation for part 25 continues to read:

Authority: 47 U.S.C. 701-744. Interprets or applies Sections 4, 301, 302, 303, 307, 309 and 332 of the Communications Act, as amended, 47 U.S.C. Sections 154, 301, 302, 303, 307, 309 and 332, unless otherwise noted.

2. Revise paragraph (a)(2)(iii) of § 25.149 to read as follows:

§ 25.149 Application requirements for ancillary terrestrial components in the mobile-satellite service networks operating in the 1.5/1.6 GHz, 1.6/2.4 GHz and 2 GHz mobile-satellite service.

(a) \* \* \*

(2) \* \* \*

(iii) In the 1610-1626.5 MHz/2483.5-2500 MHz bands (Big LEO bands), ATC operations are limited to the 1610-1617.775 MHz, 1621.35-1626.5 MHz, and 2483.5-2495 MHz bands and to the specific frequencies authorized for use by the MSS licensee that seeks ATC authority.

3. Revise paragraph (b)(5)(ii) of § 25.149 to read as follows:

§ 25.149 Application requirements for ancillary terrestrial components in the mobile-satellite service networks operating in the 1.5/1.6 GHz, 1.6/2.4 GHz and 2 GHz mobile-satellite service.

\* \* \* \* \*

(b) \* \* \*

(5) \* \* \*

(ii) In the Big LEO bands, MSS ATC is limited to no more than 7.775 MHz of spectrum in the L-band and 11.5 MHz of spectrum in the S-band. Licensees in these bands may implement ATC only on those channels on which MSS is authorized, consistent with the Big LEO band-sharing arrangement.

\* \* \* \* \*

4. Add paragraph (d) to § 25.254 to read as follows:

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

\* \* \* \* \*

(d) To avoid interference to an adjacent channel licensee in the Broadband Radio Service (BRS), the power of any ATC base station emission above 2495 MHz shall be attenuated below the transmitter power (P) measured in watts in accordance with the standards below. If these measures do not resolve a documented interference complaint received from the adjacent channel BRS licensee, the provisions of Section 25.255 shall apply.

(1) For base stations, the attenuation shall be not less than  $43 + 10 \log (P)$  dB at the upper edge of the authorized ATC band, unless a documented interference complaint is received from an adjacent channel licensee in the BRS. Provided that a documented interference complaint cannot be mutually resolved between the parties, the following additional attenuation requirements set forth in subsections (2)-(5) shall apply:

(2) If a pre-existing BRS base station suffers harmful interference from emissions caused by a new or modified ATC base station located 1.5 km or more away, within 24 hours of the receipt of a documented interference complaint the ATC licensee must attenuate its emissions by at least  $67 + 10 \log (P)$  dB measured at 3 megahertz above the edge of the authorized ATC band, and shall immediately notify the complaining licensee upon implementation of the additional attenuation.

(3) If a pre-existing BRS base station suffers harmful interference from emissions caused by a new or modified ATC base station located less than 1.5 km away, within 24 hours of the receipt of a documented interference complaint the ATC licensee must attenuate its emissions by at least  $67 + 10 \log (P) - 20 \log (D_{\text{km}}/1.5)$  dB measured at 3 megahertz above the edge of the authorized ATC band, or if both base stations are co-located, limit its undesired signal level at the pre-existing BRS base station receiver(s) to no more than -107 dBm measured in a 5.5 megahertz bandwidth and shall immediately notify the complaining licensee upon such reduction in the undesired signal level.

(4) If a new or modified BRS base station suffers harmful interference from emissions caused by a pre-existing ATC base station located 1.5 km or more away, within 60 days of receipt of a documented interference complaint the licensee of the ATC base station must attenuate its base station emissions by at least  $67 + 10 \log (P)$  dB measured at 3 megahertz above the edge of the authorized ATC band.

(5) If a new or modified BRS base station suffers harmful interference from emissions caused by a pre-existing ATC base station located less than 1.5 km away, within 60 days of receipt of a documented interference complaint: (a) the ATC licensee must attenuate its base station emissions by at least  $67 + 10 \log (P) - 20 \log (D_{\text{km}}/1.5)$  dB measured 3 megahertz above the edge of the authorized ATC band, or (b) if both base stations are co-located, the ATC licensee must limit its undesired signal level at the new or modified BRS base station receiver(s) to no more than -107 dBm measured in a 5.5 megahertz bandwidth.

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

**APPENDIX B****List of Filers****Comments**

CTIA – The Wireless Association (CTIA)  
Globalstar Inc. (Globalstar)  
Iridium Satellite LLC (Iridium)  
Main Street Broadband LLC (MSB)  
Motorola Corporation (Motorola)  
Nortel  
Open Range Communications, Inc. (Open Range)  
Sprint Nextel Corporation (Sprint Nextel)  
WiMAX Forum  
Wireless Communications Association  
International, Inc. (WCA)

**Reply Comments**

CTIA  
Globalstar  
Iridium  
MSB  
Open Range  
Sprint Nextel  
WCA

**Ex Parte Filings**

Globalstar  
Open Range  
Sprint Nextel/WCA