

Before The
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of)	
)	
Review of the Spectrum Sharing Plan)	
Among Non-Geostationary Satellite Orbit)	IB Docket No. 02-364
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)	ET Docket No. 00-258
Wireless Services, including Third)	
Generation Wireless Systems)	
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**CONSOLIDATED REPLY TO OPPOSITIONS OF
BROADBAND RADIO SERVICE PROPONENTS**

Pursuant to Section 1.429 of the Commission's Rules (47 C.F.R. § 1.429), Globalstar LLC ("GLLC" or "Globalstar") hereby replies to the Oppositions to its Petition for Reconsideration of the Report and Order, Fourth Report and Order and Further Notice of Proposed Rulemaking, FCC 04-134 (released July 16, 2004) ("Order"), filed by the Wireless Communications Association International, Inc. ("WCA"), Sprint Corporation, Nextel Communications, the BRS Rural Advocacy Group, and BellSouth Corporation and its subsidiaries (collectively, "BRS Proponents").¹

¹ GLLC is filing a separate Reply to the opposition to its Petition filed by Iridium Satellite LLC. Iridium's opposition only concerns the use of the Big LEO L-
(continued...)

I. SHARING BETWEEN BRS AND MSS IS TECHNICALLY FEASIBLE WITH APPROPRIATE COORDINATION PARAMETERS.

The BRS Proponents generally oppose spectrum-sharing between the Broadband Radio Service (“BRS”) and the Mobile-Satellite Service (“MSS”). For example, in its Opposition (at 4-6), Sprint argues that the Commission cannot adopt Globalstar’s proposed rules for spectrum-sharing between BRS and MSS because the allocation for BRS in the 2496-2500 MHz band segment requires that MSS operate on a non-interference basis. Moreover, Sprint claims that it would be unfair to “orphan” BRS Channel 1 facilities from the remainder of the BRS allocation at 2500-2690 MHz by adopting the power and geographic restrictions proposed by Globalstar.

The Commission adopted MSS-BRS sharing on the expectations that (a) CDMA MSS operations would be viable in rural and undeveloped areas of the United States and (b) BRS and MSS-ATC operations would be available in urban, suburban and somewhat developed areas. See Order, ¶ 72. Despite its decision to require sharing by geographic separation, the Commission failed to adopt restrictions on BRS that would allow sharing to flourish. The proposals in Globalstar’s Petition effectuate the Commission’s decision and would permit sharing, although each service would have to accept some limitations on its use of

(...continued)

band uplink; the oppositions of WCA, Sprint, Nextel, the BRS Rural Advocacy Group and BellSouth only concern use of the Big LEO S-band downlink.

the band segment. The parameters proposed by GLLC impose reasonable accommodations on BRS. See Tech. App.

Sprint itself has acknowledged the feasibility of sharing between terrestrial and satellite services. When Sprint was attempting to gain access to MSS operators' spectrum and deny MSS the exclusive right to provide an Ancillary Terrestrial Component ("ATC"), Sprint, in conjunction with Cingular Wireless LLC, filed an engineering report which concluded that "[i]t is technically feasible for separate operators to share the MSS band in the provision of satellite and terrestrial services," and "[t]here would be no loss of spectral efficiency if two different firms as opposed to one firm operate the satellite and terrestrial systems."² The Commission ultimately concluded, as Globalstar and others argued, that allowing separate operators to hold ATC authority was less efficient and less practical than only authorizing the MSS operator to offer ATC.³ Thus, Sprint's objection to sharing between BRS and MSS is belied by the substantial record in the ATC proceeding, including Sprint's contribution, that established the feasibility – with appropriate technical parameters – of sharing between satellite and terrestrial services, including specifically the 1.6/2.4 GHz bands.

² Cingular Wireless LLC and Sprint Corporation, Written Ex Parte Communication, at 2, IB Dkt. No. 01-185/ET Dkt. No. 95-18 (May 13, 2002).

³ See Flexibility for Delivery of Communications by Mobile-Satellite Service Providers in the 2 GHz Band, L-Band, and the 1.6/2.4 GHz Bands, 18 FCC Rcd 1962, 1991-93 (2003).

GLLC's proposals offer feasible means for MSS and BRS to share the 2496-2500 MHz band segment. The proposed out-of-band emissions limits and transmit power limit can be met by BRS. See Tech. App., §§ 1, 3. For the geographic restrictions, GLLC assumed that BRS operators would prefer to roll out new broadband services in the largest MSAs, and, therefore, those areas would have the greatest need for BRS-1. But, some BRS Proponents (e.g., the Rural BRS Group) appear to desire to operate BRS-1 on legacy networks outside these areas, while others (e.g., Nextel, Opp., at 7-8) appear to believe that different MSAs would be desirable markets. As proposed in its Petition, GLLC is willing to coordinate use of BRS-1 in a specific set of geographic areas, as long as the 2496-2500 MHz band segment is also available for MSS use as the Commission envisioned.

Even if BRS Channel 1 were limited as proposed by GLLC, sharing 4 MHz of spectrum with MSS cannot conceivably harm the BRS industry. Although it is certainly easier and more efficient to coordinate satellite and terrestrial usage when a single licensee works out the coordination algorithms, BRS will be able to use BRS-1 within the largest markets in the United States where broadband services are likely to be most in demand.

Moreover, BRS, like any other licensed service, can adapt to sharing. The BRS industry has not been required to share frequencies with satellite services in the past, so its heritage antennas are not necessarily designed to accommodate sharing. In any event, WCA's analysis overstates the interference potential from MSS into BRS. See Tech. App., § 2. As BRS evolves away from analog video/data

services into a new digital broadband service, technological improvements can be initiated to take into account the sharing environment. BRS can design equipment for the 2496-2500 MHz band, just as countless other services, including MSS, have had to adapt their facilities to address the relevant inter-service interference environment.

Ultimately, the restrictions on use of BRS Channel 1 resulting from the Commission's allocation decision and Globalstar's proposed coordination rules are more than compensated by the total allocation of 152 MHz for BRS.⁴ Just as Globalstar can use dynamic channel assignment techniques to avoid assigning users to the 2496-2500 MHz band segment in urban areas, so can BRS providers assign users to parts of the available 148 MHz in rural areas. With so much spectrum available, the BRS industry's complaint about the lack of exclusive access to the 4 MHz in the 2496-2500 MHz band segment rings hollow.

II. THE BRS PROPONENTS' ASSUMPTIONS REGARDING THEIR RIGHTS TO 2496-2500 MHZ ARE INCORRECT.

The BRS Proponents' arguments objecting to the rules proposed by Globalstar for coordination of BRS and MSS in the 2496-2500 MHz band segment rest on two assumptions: (a) that BRS must be made "no worse off" in relocating

⁴ 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 2150-2562 and 2500-2690 MHz Bands, Report and Order and Further Notice of Proposed Rulemaking, FCC 04-135, ¶¶ 37-38 (released July 29, 2004).

from MDS Channel 1 and (b) that Globalstar has no legitimate expectation to use the spectrum. Both assumptions are flatly wrong.

A. Relocation of MDS Channel 1 Licensees Does Not Require Grant of Access to Unencumbered 6 MHz.

The BRS Proponents claim that BRS Channel 1 licensees must be made “no worse off” in the relocation from MDS Channel 1 based on earlier microwave service relocation orders, and that adoption of Globalstar’s proposals would restrict their rights to use Channel BRS-1.⁵ The Commission did not impose such a standard for relocated spectrum equivalents.

In the PCS/microwave relocation orders, the Commission used the phrase “no worse off” to characterize the operational equipment to be provided microwave incumbents displaced by new PCS licensees.⁶ It did not describe relocated licensees’ spectrum rights in such terms. Rather, with respect to spectrum rights, the Commission stated that microwave incumbents would be entitled only to sufficient capacity “to satisfy their needs at the time of relocation, rather than to match the overall capacity of the system.”⁷ The Commission concluded that it would not serve

⁵ See WCA Opp., at 8-9; Sprint Opp., at 5-6; Nextel Opp., at 5; BellSouth Opp., at 5-6; BRS Rural Group Opp., at 4.

⁶ Amendment to the Commission’s Rules Regarding a Plan for Sharing the Costs of Microwave Relocation, 11 FCC Rcd 8825, 8843 (1996).

⁷ Id. at 8841.

the public interest to hold spectrum for licensees entitled to relocation “with the expectation that some may require additional capacity in the future.”⁸

Applying this principle, most MDS Channel 1 licensees would not merit access to any spectrum rights in BRS-1. Based on WCA’s own data, the MDS industry has warehoused MDS Channel 1 for decades; even now, MDS licensees have only a few subscribers and operational systems.⁹ MDS-1 licensees have had 10 or 20 years to build out systems, and have not used the spectrum. They should not be heard to complain now if they receive replacement spectrum that is shared with another service.

Similarly, Bellsouth (Opp., at 6), Nextel (Opp., at 5) and the BRS Rural Group (Opp., at 7-8) claim that adoption of Globalstar’s proposed rules would impermissibly interfere with their license rights and investment expectations.¹⁰ But Globalstar has even greater rights and expectations for its currently operating system, and a more substantive claim because there is no other MSS spectrum

⁸ Id.

⁹ 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 2150-2562 and 2500-2690 MHz Bands, Notice of Proposed Rulemaking and Memorandum Opinion and Order, 18 FCC Rcd 6722, 6735-36 (2003) (citing WCA’s data on limited operation of MDS video and data systems, although primarily in urban areas).

¹⁰ Nextel also claims (Opp., at 5) that restricting the use of BRS-1 would constitute a constitutional taking and violate its Fifth Amendment property rights. The Commission has rejected similar claims asserting “property” rights in spectrum licenses. See, e.g., Revision of Rules and Policies for the Direct Broadcast Satellite Service, 11 FCC Rcd 9712, 9766-68 (1995).

available to Globalstar. The BRS Proponents have access to 148 MHz in the 2500-2690 MHz band in which to operate – almost 10 times the amount available at S-band for Globalstar. The solution indicated on the record here and supported by longstanding Commission precedent is to improve the sharing environment proposal for BRS and MSS in order to make the spectrum reasonably usable for both services. The Commission must adopt Globalstar’s proposals, rather than eliminating the MSS allocation.

B. Globalstar Cannot Be Penalized for Being the Sole CDMA Big LEO System to Become Operational.

The BRS Interests claim that Globalstar cannot expect to retain access to 16.5 MHz in S-band because the Commission proposed to reduce that amount of spectrum to 8.25 MHz when the Big LEO rules were adopted if only one CDMA system became operational.¹¹ In fact, the Commission’s proposal to create 8.25 MHz band segments in the Big LEO spectrum was only applicable to L-band, because the Commission initially split the available 16.5 MHz of L-band unequally between CDMA and TDMA systems.¹² In the very order quoted by WCA (Opp., at

¹¹ See WCA Opp., at 5-6; Sprint Opp., at 6-7; BellSouth Opp., at 7-8.

¹² See Amendment of the Commission’s Rules to Establish Rules and Policies Pertaining to a Mobile Satellite Service in the 1610-1626.5/2483.5-2500 MHz Frequency Bands, 9 FCC Rcd 5936, 5959-60 (1994) (“Big LEO Rules Order”).

5-6), BellSouth (Opp., at 7) and Sprint (Opp., at 7), the Commission stated that its plan to reduce CDMA spectrum to 8.25 MHz “includes the 1.6 GHz band only.”¹³

With regard to reconfiguring the Big LEO spectrum bands, the Commission stated that it would consider a realignment, if necessary, based on the facts relevant to spectrum usage if only one CDMA system became operational.¹⁴ Indeed, the Commission has just completed the proceeding to consider that question in IB Docket No. 02-364. Based on the facts in the record, the Commission correctly decided that Globalstar needed access to all 16.5 MHz of the S-band.¹⁵ The Commission also decided that Globalstar should retain access to 11.35 MHz of L-band spectrum, and, contrary to WCA’s suggestion (WCA Opp., at 6 n.17), Globalstar requires 16.5 MHz of S-band spectrum for use of 11.35 MHz of L-band spectrum (11.35 L-band MHz times 1.4 equals 16 S-band MHz).¹⁶ The Commission’s decision should be effectuated by adopting Globalstar’s proposals for BRS-MSS sharing in the 2496-2500 MHz band segment.

¹³ See Amendment of the Commission’s Rules to Establish Rules and Policies Pertaining to a Mobile Satellite Service in the 1610-1626.5/2483.5-2500 MHz Frequency Bands, Notice of Proposed Rulemaking, 9 FCC Rcd 1094, 1113 (1994).

¹⁴ See Big LEO Rules Order, 9 FCC Rcd at 5959-60.

¹⁵ Contrary to speculation of WCA (Opp., at 6-7), Nextel (Opp., at 11) and BellSouth (Opp., at 8), Globalstar has submitted substantial evidence to this docket explaining why it needs more than 11.5 MHz of S-band spectrum. See, e.g., Globalstar, L.P., Ex Parte Presentation (Feb. 26, 2004).

¹⁶ As explained in GLLC’s Reply to Iridium’s Opposition also filed today, there is no current use of the 1618.25-1621.35 MHz band segment by Iridium, and so, Globalstar has access to all 11.35 MHz of L-band.

III. CONCLUSION

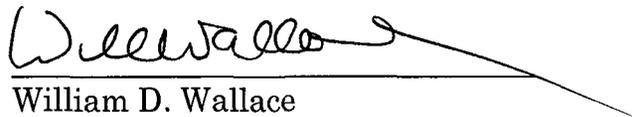
For the reasons set forth in GLLC's Petition and above, the Commission must grant GLLC's Petition, reconsider BRS-MSS sharing in the Big LEO S-band, and adopt measures to improve use of the spectrum by both services.

Respectfully submitted,

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TECHNICAL APPENDIX
Globalstar LLC Reply To Oppositions of BRS Proponents
IB Docket No. 02-364

In its Petition for Reconsideration, Globalstar proposed the following restrictions on Broadband Radio Service ("BRS") stations operating in the 2496-2500 MHz band segment:

- A. BRS operations in the 2496-2500 MHz band segment should be limited to the top 35 Metropolitan Statistical Areas ("MSAs").
- B. The allowable power of BRS base stations must be limited to 600 watts EIRP in the 2496-2500 MHz band; and
- C. BRS operators must coordinate with MSS operators and show, by analysis, that the aggregate out-of-band emissions from BRS users will not (for at least 99% of the time) exceed -209 dBW/Hz at any point outside the top 35 MSAs in the frequency range 2483.5-2500 MHz.

In their Oppositions, BRS Proponents objected to any restrictions on BRS facilities and insisted that Globalstar Mobile-Satellite Service ("MSS") operations be eliminated from the 2496-2500 MHz band segment. Globalstar believes that the restrictions proposed above are a reasonable accommodation to allow MSS use of the band segment in rural areas while BRS uses the band segment in urban areas, as the Commission intended.

1. Out-of-band restrictions to protect Globalstar in 2483.5-2500 MHz range outside the top 35 MSAs are feasible

Globalstar developed the above proposal to protect MSS from out-of-band ("OOB") emissions from the new BRS. Globalstar requested this level of protection only outside the top 35 MSAs, with the understanding that BRS stations will operate in the 2496-2500 MHz bands only in these 35 MSAs.

The proposed level of OOB emissions is easy for BRS users to achieve. As shown in the Technical Appendix of Globalstar's Petition for Reconsideration (filed September 8, 2004), a single BRS user *operating co-frequency with Globalstar, at a power of 2 watts*, will generate an interference level of -207 dBW/Hz at a distance of 4 km from the BRS user. Thus, the requirement of -209 dBW/Hz for *out-of-band usage* requires only that the BRS operator (a) build in a reasonable level of filtering for its OOB emissions and (b) perform a statistical analysis of the geographical density of users within any given area to show that their aggregate level of OOB emissions affecting a Globalstar user will not exceed -209 dBW/Hz. For example, in a scenario where only one user is operating at 2 watts, at 4 km from a Globalstar user, it is sufficient to suppress the user's OOB emissions by 2 dB in the 2483.5-2500 MHz band. Since this user is likely to be operating above 2500 MHz (in a suburban/rural area), this level is

technically trivial to achieve. If there are 10 such users that are 4 km from a Globalstar user, then each one needs to have OOB emissions that are suppressed by 12 dB, again a very easy level to achieve. If higher densities of users are expected, so that there is a greater than 99% probability of more than 10 BRS users being 4 km from a Globalstar user, then greater levels of filtering would be needed, or else some users would need to be reassigned to higher BRS frequencies where they would cause lower levels of interference. Coordination between Globalstar and the BRS operator will ensure that correct usage and traffic distribution scenarios are defined and that the two systems may coexist.

2. The BRS Proponents have exaggerated the anticipated level of interference into a well-designed BRS system

In its Petition for Reconsideration of September 8, 2004, the WCA presented a number of tables showing various scenarios in which an MSS system operating at the PFD limit adopted by the United States for MSS in S-band causes harmful interference to the BRS system. The BRS Proponents have opposed Globalstar's proposed MSS-BRS coordination parameters claiming that any MSS system operating in the 2496-2500 MHz band will cause harmful interference to BRS facilities. WCA's PFD analysis is flawed for several reasons.

- i. First, the acceptable level of interference into a BRS station is defined at an unreasonably low level of I_{sat}/N of -10 dB, which is said to be based on IMT-2000 requirements for base stations and mobiles. Even though WCA itself admits that IMT-2000 may not be the service for which the 2496-2500 MHz band segment is used, it then proceeds to apply this very stringent criterion to show that MSS will cause BRS undue interference.¹

By contrast, Globalstar's analysis of an Ancillary Terrestrial Component ("ATC"), in an ex parte presentation filed in IB Docket No. 01-185 on June 27, 2002, showed that a single CDMA S-band downlink channel serving the maximum number of users, that is, 62 users, does not interfere with an ATC unit operating in the same frequency band. As shown in Table 2 of that document, the allowable I/N level based on Globalstar's analysis is 6 dB (contrasted with the -10 dB used by WCA). The level of interference protection used by WCA points to either an over-conservative analysis on WCA's part, or an analysis based on old technology such as TDMA in the assumed terrestrial system, disregarding the fact that state-of-the-art mobile equipment is closer to the CDMA system already being used by Globalstar.

- ii. Second, in order to demonstrate that MSS will interfere with BRS systems, WCA used existing MDS antenna patterns and receiver noise figures, when BRS Proponents should be designing modern systems based on antennas and noise figures suitable for introduction of a new service that is sharing the frequency band with MSS. Analyses based on existing technology designed for a different interference environment do not demonstrate that MSS and BRS cannot coexist. In fact, Globalstar has shown in its ATC presentation of June 2002 referred to

¹ See WCA Petition, Att. A, Declaration of Harry W. Perlow, ¶ 6 (filed Sept. 8, 2004).

above that a simple omni-directional antenna and a handheld ATC receiver will be able to operate co-frequency with Globalstar's satellite downlink.

- iii. Furthermore, there are several errors in WCA's analysis/summary, which show a lack of understanding of how a LEO satellite system operates. For example, the third case study, on page 35, "calculates interference from a single Big LEO satellite downlink to a Navini Networks Model Ripwave 2.5/2.6 subscriber terminal which has a 4.5 dB noise figure and a built-in 7.5 dB gain omnidirectional antenna." **An omnidirectional antenna cannot have 7.5 dB gain by definition!** If it does have 7.5 dB gain, then this can be only in one direction, and presumably this peak is directed towards the horizon, since it is meant to receive a terrestrial service. So the antenna gain toward the satellite, which is positioned much of the time at higher elevation angles, is likely to be closer to -5.5 dB. Therefore, all the I/N numbers in those exhibits need to be reduced by at least 13 dB. Unfortunately, to make its case, the 7.5 dB gain is used for ALL angles, and the fact that the satellite is not radiating below 10 degrees is ignored. Table 1 of this exhibit is totally inaccurate.
- iv. The tables in WCA's attachment with the highlighted excessive interference scenarios give the impression that this level of interference is static and constantly present. In fact, due to the NGSO satellite constellation dynamics, a proper analysis of interference is based on simulations that are designed to show interference exceeding reasonable criteria for a percentage of the time, which is what is meaningful for NGSO interference studies.

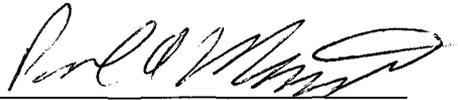
3. Base station power limits of 600 watts are reasonable

Typical cellular base stations transmit power up to a few hundred watts, in order to comply with regulatory and health restrictions. Asking for a 600 watt power limits *in a single BRS channel* is not unduly restrictive, and allows Globalstar to offer MSS services with minimal interference from BRS (in conjunction with the other parameters on BRS that Globalstar has requested).

Engineering Certification

I hereby certify under penalty of perjury that I am the technically qualified person responsible for preparation of the engineering information contained in the foregoing "Technical Appendix"; that I am familiar with the relevant sections of the FCC's Rules, the rules adopted and proposals set forth in the "Report and Order, Fourth Report and Order, and Further Notice of Proposed Rulemaking" (FCC 04-134) in IB Docket No. 02-364 and ET Docket No. 00-258, and the information contained in the foregoing Technical Appendix; and that information in the Technical Appendix is true and correct to the best of my knowledge and belief.

Signed this 9th day of November 2004.



Paul A. Monte
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CERTIFICATE OF SERVICE

I, William D. Wallace, hereby certify that I have on this 10th day of November, 2004, caused to be served true and correct copies of the foregoing “Consolidated Reply to Oppositions of Broadband Radio Service Proponents” upon the following persons via hand delivery (indicated with an asterisk (*)) or first-class, United States mail, postage prepaid:

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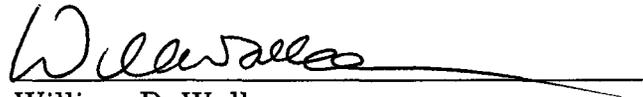
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