

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

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

COMMENTS OF SPRINT CORPORATION

Sprint Corporation (“Sprint”) hereby submits its initial comments in response to the *Notice of Proposed Rulemaking* (the “*NPRM*”) in the above referenced proceeding.¹ The *NPRM* was issued in response to a Petition for Rulemaking (“Petition”) filed by Globalstar, Inc. (“Globalstar”)² in which it proposed to use its licensed mobile-satellite service (“MSS”) spectrum at 2483.5-2495 MHz in combination with unlicensed spectrum in 2473-2483.5 MHz to provide a managed Wi-Fi-like broadband service that it calls Terrestrial Low Power Service (“TLPS”).³

Sprint appreciates the Commission’s consideration of any proposal that could “potentially increase the amount of spectrum available for broadband access.”⁴ While Sprint generally supports Globalstar’s TLPS proposal, it has some concerns with respect to potential interference

¹ See Terrestrial Use of the 2473-2495 MHz Band for Low-Power Mobile Broadband Networks; Amendments to Rules for the Ancillary Terrestrial Component of Mobile Satellite Service Systems, *Notice of Proposed Rulemaking*, 28 FCC Rcd 15351 (2014) (“*NPRM*”).

² See Globalstar, Inc. Petition for Rulemaking to Reform the Commission’s Regulatory Framework for Terrestrial Use of the Big LEO MSS Band, RM No.11685, *Petition for Rulemaking* (Nov. 13, 2012) (“*Petition*”).

³ At some unspecified point in the future, Globalstar would like to deploy a more traditional frequency-division duplex (“FDD”) LTE wireless broadband operation across 19 megahertz of its licensed MSS spectrum. The FDD LTE uplink would fall in the 1610-1617.775 MHz band, and the FDD LTE downlink would fall in the 2483.5-2495 MHz band. This second proposal is not up for comment in the subject *NPRM*. *NPRM* at ¶ 2.

⁴ *NPRM* at ¶ 1.

scenarios and Globalstar’s ability to control the use of TLPS equipment. In many of the proposals raised in the *NPRM* , the Commission has properly focused on the potential for interference between Globalstar’s TLPS and Sprint’s operations in the 2.5 GHz band as it seeks to supplement the record with additional technical information beyond that provided in the Globalstar’ *Petition*.⁵

I. INTRODUCTION

The Commission has proposed modification of rules governing Ancillary Terrestrial Component (“ATC”) use of MSS spectrum to permit Globalstar, the sole MSS licensee in the 2483.5-2495 GHz band, to provide TLPS utilizing that spectrum, along with adjacent unlicensed spectrum at 2473-2483.5 MHz. Like Sprint’s predecessor, Clearwire, a number of parties raised substantial interference concerns in their initial response to Globalstar’s *Petition*.⁶ The Commission recognized these concerns in the *NPRM* and emphasized that Globalstar’s TLPS service would be entitled to no additional interference protections other than those to which it is already entitled.⁷ The *NPRM* specifically states that Globalstar will remain obligated to protect

⁵ Sprint’s predecessor-in-interest, Clearwire Corporation (“Clearwire”), filed Comments in response to the *Petition* in which it raised significant concern about the dearth of technical information included therein that made it difficult for Clearwire to determine the extent of interference that would be experienced by its adjacent BRS-1 licensed spectrum, particularly since Globalstar did not limit its proposal to indoor operations. Comments of Clearwire Corporation (filed Jan. 14, 2013) (“Clearwire Comments”).

⁶ Letter from Samuelson-Glushko Technology Law & Policy Clinic (“acknowledged the dearth of technical analysis on the record”) (filed March 31, 2014); Letter from Bluetooth Special Interest Group (“Bluetooth SIG and its members are NOT convinced by Globalstar’s technical arguments, and remain concerned that the kind of usage proposed by Globalstar will have a negative effect on Bluetooth users, including those in Schools, Libraries, Healthcare and Emergency response.”) (filed Aug. 7, 2014); Letter from Microsoft Innovations and Policy Center (filed April 26, 2013); Letter from Wi-Fi Alliance (filed May 8, 2013); Reply Comments of Wireless Communications Association, International (filed Jan. 29, 2013); Reply Comments of Consumer Electronics Association (filed Jan. 29, 2013); Clearwire Comments; Comments of Bluetooth Special Interest Group (filed Jan. 14, 2013); Comments of the Association of Home Appliance Manufacturers (filed Jan. 14, 2013); Comments of the Mobile Satellite Users Association (filed Jan. 14, 2013); Comments of the Wireless Internet Service Providers Association (filed Jan.14, 2013); Comments of Wi-Fi Alliance (filed Jan. 11, 2013).

⁷ See, e.g., *NPRM* at ¶¶ 19 and 20.

all other licensed operations in accordance with existing rules.⁸ In particular, the *NPRM* does not propose to modify Globalstar’s obligation to protect adjacent Broadband Radio Service (“BRS”) Channel BRS-1 from harmful interference when engaged in terrestrial use of its MSS spectrum:

We do not intend to grant Globalstar any additional or different interference protection rights than those that currently apply to existing unlicensed operations in the 2473-2483.5 MHz band under Part 15 or to ATC operations under the Part 25 rules, with the exception of the revisions to the ATC rules discussed below.⁹

Sprint agrees that Globalstar must continue to operate in a manner that fully protects BRS channels from harmful interference and any rule revision should explicitly state this obligation. Globalstar has provided technical information to Sprint as part of the companies’ recent discussions regarding the TLPS proposal, and once this information is in the record of this proceeding, the Commission must assess the likely interference environment Globalstar’s TLPS operations will operate under and tailor its rules accordingly. At a minimum, Globalstar should acknowledge its interference protection obligations and provide the Commission, and all parties participating in this proceeding, the necessary technical information to fully assess the impact TLPS will have on operations in adjacent spectrum bands.¹⁰

II. DISCUSSION

The Commission adopted this *NPRM* to:

⁸ “Under Section 25.254(a)(3) of the Commission’s rules, ATC operations in the 2483.5-2495 MHz band must avoid causing interference to other services sharing the use of the 2450-2500 MHz band (i.e., Part 27 Broadband Radio Service, Part 74 Broadcast Auxiliary Service, Part 90 Mobile Service, and Part 101 Fixed Service). See 47 C.F.R. § 25.254(a)(3). See also §§ 25.254(d), 25.255.” *NPRM* at note 56.

⁹ *NPRM* at ¶ 19.

¹⁰ Sprint appreciates Globalstar’s attempts to reach consensus in this proceeding and we remain hopeful that those discussions will lead to Sprint to fully support the TLPS proposal. However, Sprint remains concerned about potential interference and Globalstar’s ability to control the devices that have access to its network.

determine whether it is possible to increase the use of this spectrum terrestrially in the near term, without causing harmful interference to users of this band and adjacent bands, and without compromising Globalstar's ability to provide substantial service to the public under its existing MSS authorization.¹¹

The Commission has proposed regulation of TLPS under both Part 25 and Part 15 - the ATC portion of TLPS located at 2483.5-2495 MHz under Part 25,¹² and the unlicensed portion of TLPS located at 2473-2483.5 MHz under Part 15.¹³ While Sprint believes that the Commission must examine the potential interference issues in the unlicensed portion of the band before it can move forward with permanent rules permitting TLPS, Sprint's concern is focused on potential interference between Globalstar's TLPS and Sprint's operations on Channel BRS-1. Assuming that existing interference protection requirements are maintained, Sprint generally supports the Commission's proposed technical rules.

Sprint's predecessor indicated its concern with the lack of technical information provided in the *Petition*.¹⁴ While the rules proposed in the NPRM and Sprint's discussions with Globalstar have provided some helpful information, Sprint is still concerned about the lack of technical specifications that have been provided on the record. The limited information makes it difficult for us to fully evaluate the potential impact from TLPS to adjacent Channel BRS-1.

¹¹ *NPRM* at ¶ 16.

¹² *NPRM* at ¶¶ 17-18.

¹³ *NPRM* at ¶ 19.

¹⁴ Clearwire Comments at 12-13, 15-16, 22.

A. Globalstar Is Obligated to Operate On An Interference-Free Basis

In response to the interference concerns raised by a number of parties in response to the *Petition*,¹⁵ the Commission made very clear that it was not changing the interference status quo vis-à-vis TLPS:

Under this approach, Globalstar's managed operations in the 2473-2483.5 MHz band would not be entitled to interference protection from licensed services, other Part 15 devices, or Part 18 ISM devices. Similarly, Globalstar's low-power ATC operations in the 2483.5-2495 MHz band would not be entitled to interference protection from a number of other authorized operations. Globalstar's operations would also need to protect other licensed services from harmful interference to the extent required under current rules.¹⁶

Sprint supports the Commission's approach to maintain the existing interference mitigation obligations. As noted by Sprint's predecessor and the Wireless Communications Association International in response to the initial Globalstar *Petition*, Globalstar has an absolute obligation to protect BRS-1 from interference.¹⁷ When the Commission extended Globalstar's ATC authority from 2493 MHz to 2495 MHz in 2008, moving Globalstar directly adjacent to BRS-1, it stated that Globalstar retained an:

absolute obligation to eliminate any harmful interference to BRS that may nevertheless occur, including [an] 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.¹⁸

¹⁵ See, *infra*, footnote 6.

¹⁶ *NPRM* at ¶ 20.

¹⁷ WCAI Reply Comments 4.

¹⁸ Spectrum and Service Rules for Ancillary Terrestrial Components in the 1.6/2.4 GHz Big LEO Bands, IB 07-253, *Report and Order and Order Proposing Modification*, 23 FCC Rcd. 7210 (Apr. 10, 2008), at ¶ 32.

Any final TLPS rules should expressly acknowledge this continuing obligation. Without such protection, Sprint is concerned about the potential for harmful interference due from Out-of-Band Emissions (“OOBE”) from TLPS to Sprint’s receivers operating on the BRS-1 Channel.

While the Commission asks many questions regarding OOBE,¹⁹ Sprint is concerned about potential OOBE above 2496 MHz, and the Commission’s proposal to permit Globalstar to cause OOBE different than what is standard across most frequency bands, including bands in which comparably low-powered mobile operations occur by loosening the OOBE limit by 3 dB within the 5 MHz above 2495 MHz.²⁰ This current proposal raises the potential for harmful interference from TLPS to BRS operations, something that is inconsistent with the Commission’s underlying requirement that Part 15 and ATC operations must not cause harmful interference. Since Globalstar’s MSS current downlink spectrum is adjacent to 2.5 GHz BRS operations, and because MSS mobile devices transmit at other frequencies, BRS has not been subjected to interference from Globalstar’s MSS operations. However, TLPS will transmit and receive in the same spectrum immediately adjacent to the BRS-1 Channel. Based on the limited information in the record about whether TLPS will be used indoors or outdoors, and the limited information regarding actual operating parameters, assuming the worst-case scenario, Sprint’s use of its BRS-1 spectrum may be subject to harmful interference if TLPS is deployed as proposed. Therefore, Sprint continues to support adoption of the normal $43 + 10 \log (P)$ db OOBE restrictions on TLPS emissions above 2495 MHz, the same emissions limit that applies to BRS operations below 2495 MHz. In the *NPRM*, the Commission asks whether the relaxation of MSS OOBE above 2495 MHz is appropriate based on a proposal in another proceeding to relax

¹⁹ *NPRM* at ¶¶ 31, 32, 39, 40.

²⁰ *NPRM* at ¶ 32.

OOBE requirements within the BRS band similarly.²¹ That proposal, however, did not propose to relax the OOBE from BRS operations into the MSS band below 2496 MHz. Furthermore, the proposed BRS OOBE relaxation was premised on the normal environment of synchronized TDD operations in the BRS band. Synchronized TDD operations mitigates the potential interference impact of relaxed OOBE, but it is not possible to synchronize operations between BRS and TLPS. Thus, Sprint, requests the Commission apply the normal $43 + 10 \log (P)$ dB OOBE limit to TLPS operations for emissions above 2495 MHz.

With respect to the proposed rules, the Commission has proposed adding a note to Section 25.149 of its rules that states:

NOTE TO SECTION (c)(4): Systems meeting the requirements set forth in this section are deemed to have also met the requirements of § 25.254. No further demonstration is needed for these systems with respect to § 25.254.²²

While Sprint does not oppose adoption of this rule, Section 25.254(d) currently states that if a BRS station is receiving interference from an ATC station, the requirement of Section 25.255 applies and the ATC station is required to resolve the interference.²³ Sprint requests that the Commission clarify that it did not mean to eliminate the applicability of this rule to TLPS, and that Globalstar would still be responsible for eliminating such interference pursuant to Sections 25.254(d) and 25.255. Operation of BRS-1 requires this absolute obligation of protection.

Due to the close adjacency of BRS-1 to the licensed portion of the Globalstar TLPS service, significant brute force overload (“BFO”) interference could be experienced by Globalstar from adjacent BRS operations, given Sprint’s intent to operate at the high power levels permissible under the rules. Accordingly, based on the proposed requirements that TLPS

²¹ *NPRM* at ¶¶ 32-33.

²² *NPRM* at 24.

²³ 47 C.F.R. §§ 25.254(d) and 25.255.

operations would not be entitled to interference protection from other services, Sprint proposes that the Commission explicitly state that Globalstar is responsible for resolving any potential BFO interference it may receive from Sprint's utilization of BRS spectrum. Since BFO would be experienced by Globalstar through no fault of Sprint (or other BRS licensees), Globalstar and its third party users should not expect Sprint to take steps to resolve any impact of our authorized BRS operations to TLPS.²⁴ Sprint is concerned that BFO within TLPS devices and base stations will occur because the low power of TLPS could lead Globalstar to design its receivers to use very sensitive, amplifiers to pick up those low power signals. But in areas where TLPS is being operated nearby to compliant but much higher power Sprint BRS-1 operations, without adequate receiver filtering, the TLPS receivers could be desensed by the Sprint signals. Globalstar has indicated in its informal discussions with Sprint that it retains the responsibility to manage such BFO problems. Nevertheless, Sprint requests that the Commission explicitly state that Globalstar is solely responsible for mitigating this type of interference.

The Commission proposed to adopt the same low transmit power restrictions currently contained in Section 15.247 of the Rules for unlicensed operations in the 2400-2483.5 MHz band to TLPS operations in 2483.5-2495 MHz. Sprint supports that proposal, which would limit TLPS transmit power to 1 Watt with a peak equivalent isotropically radiated power (EIRP) of no more than 6 dBW (4 Watts), with a minimum 6 dB bandwidth of 500 kilohertz and a maximum conducted power spectrum density limit of 8 dBm/3 kHz.²⁵ Adoption of these power limits will

²⁴ Of course, Sprint would be responsible for ensuring that its BRS operations comply with the Commission's technical rules, including rules for power and OOBE that provide the required level of protection to TLPS operations.

²⁵ *NPRM* at ¶ 28.

provide a reasonable environment for which Sprint can develop BRS base station and device receivers that will not experience BFO due to the adjacent TLPS operations.

B. Globalstar Must Demonstrate How It Will Maintain Control of TLPS

In the *NPRM*, the Commission clearly states that Globalstar will be required to maintain control over the devices that access TLPS.²⁶ Sprint is concerned how devices initially activated for TLPS will be prohibited from operating after they are no longer subscribed to the service. Furthermore, Sprint is concerned that the public may find work arounds that permit the operation of existing Wi-Fi equipment on the TLPS frequencies without any authorization by Globalstar. This could lead to ad-hoc Wi-Fi networks that Globalstar, Sprint or the Commission would have limited ability to control. Globalstar has indicated that there will be firmware and software updates for activated devices and that all devices will be controlled by a Network Operating System. Additional information needs to be placed in the record to demonstrate how TLPS will be maintained as a managed, controlled private network and not a public commons. To that end, Sprint supports the Commission's proposal to require that equipment vendors obtain consent from Globalstar and provide evidence of that consent for certification of equipment to be used in the 2483.5-2495 MHz band.²⁷ Such a requirement will help ensure that Globalstar can control the TLPS network, and remain in compliance with Commission rules.

²⁶ *NPRM* at ¶ 18 and ¶ 46.

²⁷ *NPRM* at ¶ 44.

III. CONCLUSION

Sprint supports the Commission in its search for additional wireless broadband spectrum and supports Globalstar in its attempt to provide such services over its spectrum. While Sprint is encouraged by the Commission's general statements about interference protection, it remains concerned about the lack of specific technical information that has made it difficult to predict the potential for interference. Therefore, Sprint requests that the Commission adopt rules that ensure that TLPS is required to maintain its absolute obligation to protect BRS-1 operations through both interference protection measures and its complete control of devices deployed in the network.

Respectfully submitted,

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