

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

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| In the Matter of |) | |
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| SWARM TECHNOLOGIES INC. |) | |
| |) | |
| Application to Modify the Authorization for the Swarm NGSO Satellite System |) | File Nos. SAT-MOD-20200501-00040 SAT-AMD-20200504-00041 |
| |) | |
| Amendment to Application to Modify the Authorization for the Swarm NGSO Satellite System |) | Call Sign S3041 |
| |) | |

REPLY TO OPPOSITION

Myriota Pty. Ltd. (“Myriota”) hereby replies to the Consolidated Response and Opposition of Swarm Technologies, Inc. (“Swarm”)¹ in the above-captioned proceedings.² Myriota agrees that the Federal Communications Commission (“Commission”) should require ORBCOMM License Corp (“ORBCOMM”) to comply with its obligations to coordinate spectrum sharing. Myriota’s advanced communications system (the “Myriota System”) is able to share spectrum effectively with other authorized users in the in the 137-138 MHz (space-to-Earth) and 148-150.05 MHz (Earth-to-space) non-voice, non-geostationary bands (the “NVNG

¹ *Consolidated Response and Opposition of Swarm Technologies, Inc.*, File Nos. SAT-MOD-20200501-00040, SAT-AMD-20200504-00041 (filed Sept. 1, 2020) (“*Swarm Opposition*”).

² *See* Swarm Technologies, Inc., File No. SAT-MOD-20200501-00040 (filed May 1, 2020) (the “*Modification*”); *and* Swarm Technologies, Inc., File No. SAT-AMD-20200504-00041 (filed May 4, 2020) (the “*Amendment*”) (together the “*Swarm VHF Modification*”).

VHF Bands”),³ and Myriota looks forward to coordinating with Swarm and ORBCOMM to reach a fair and equitable sharing arrangement that is consistent on a global basis.

I. ORBCOMM Should be Required to Coordinate with Myriota and Swarm.

Myriota agrees with Swarm that the Commission should require the NVNG VHF mobile-satellite service (“MSS”) operators to coordinate spectrum sharing.⁴ The timely NVNG VHF processing round participants and previously authorized ORBCOMM are obligated to coordinate under Section 25.142(b)(3) of the Commission’s rules to ensure the “effective and efficient use of the radio spectrum[.]”⁵ Nevertheless, ORBCOMM has seemingly resisted this coordination requirement.⁶ Therefore, the Commission should reaffirm these coordination obligations and ensure all parties engage in good faith coordination of the NVNG VHF Bands.

Myriota also agrees that the Commission should reject ORBCOMM’s claims of sweeping priority in the NVNG VHF Bands.⁷ The Commission should reaffirm its longstanding position that frequencies assigned to ORBCOMM on a primary basis are to be shared with other NVNG MSS systems.⁸ The Commission determined that ORBCOMM’s original sharing plan does not

³ See Myriota Pty. Ltd., *Petition for Declaratory Ruling to Access the U.S. Market in Non-Voice, Non-Geostationary (“NVNG”) Satellite System in the 137-138 MHz and 148-150.05 MHz Bands*, File No. SAT-LOI-20191118-00135 (filed Nov. 18, 2019) (“*Myriota VHF Petition*”).

⁴ *Swarm Opposition* at 15. Myriota also recognizes Swarm’s commitment to engaging in coordination with Myriota and ORBCOMM to achieve a new sharing plan. *Id.* at 4 (“Swarm accepts its responsibility to coordinate in good faith with other responsibly designed systems, including one operated by Myriota”).

⁵ *Comments of Myriota Pty. Ltd.*, File Nos. SAT-MOD-20200501-00040, SAT-AMD-20200504-00041 (filed Aug. 17, 2020) (“*Myriota Comments*”) at 3 (citing 47 C.F.R. § 25.142(b)(3)).

⁶ *Petition to Dismiss or Deny of ORBCOMM*, File Nos. SAT-MOD-20200501-00040, SAT-AMD-20200504-00041 (filed Aug. 17, 2020) (“*ORBCOMM Petition*”) at 7.

⁷ See *Swarm Opposition* at 13; see also *ORBCOMM Petition* at 6 (arguing that ORBCOMM has priority rights over later-authorized NVNG MSS licensees pursuant to 47 C.F.R. § 25.142(a)(1)).

⁸ See *Myriota Comments* at 4-5; see also ORBCOMM License Corp., *Application For Authority to Modify its Non-Voice, Non-Geostationary Satellite System License (S2103) to Launch a Next-Generation System*, File No. SAT-MOD-20070531-00076, at 24-25 (filed May 31, 2007) (“*ORBCOMM Modification*”) and ORBCOMM License Corp., *For Authority to Modify its Non-Voice, Non-*

govern its rights with respect to new entrants in the band, especially in bands that the Commission had explicitly designated for sharing.⁹ Furthermore, the requirement for applicants to demonstrate that they will not cause “unacceptable interference” to previously authorized systems does not create the sort of broad spectrum access priority sought by ORBCOMM.¹⁰

Swarm is correct that ORBCOMM “has no claim of priority vis-à-vis Swarm and Myriota” given the Commission’s intent for NVNG VHF Bands to be shared,¹¹ but there is limited guidance to aid the coordination process and no clear definition of “unacceptable interference” in the context of the demonstration noted above. The Commission should not permit an incumbent operator to leverage such uncertainty to preclude other authorized operations, particularly in the underutilized NVNG VHF Bands.

II. Swarm’s Criticism of Myriota is Erroneous and Irrelevant.

While Myriota agrees with the above issues raised by Swarm, there are certain assertions in Swarm’s Consolidated Response and Opposition that are factually incorrect, irrelevant to this proceeding, or both. For example, Swarm attempts to divert attention from legitimate concerns regarding its own *Modification* and *Amendment* by inexplicably discussing Myriota’s ability to share with other systems.¹² The Myriota System’s operational characteristics were the subject of a separate proceeding in which Myriota clearly demonstrated its ability to meet applicable

Geostationary Satellite System, Order and Authorization, DA Docket No. 08-633, ¶¶ 22-23 (rel. Mar. 2, 2008) (“2008 ORBCOMM Order”)

⁹ See *Swarm Opposition* at 13-14 (noting that “[n]othing in ORBCOMM’s license states that its primary assignments are exclusive vis-à-vis new operators” and “the bulk of ORBCOMM’s assignments were always intended to be shared in any event”); see also *Swarm VHF Grant* at ¶ 14 (declining to bind new entrants to a sharing plan applicable to a processing round which closed more than 20 years ago).

¹⁰ See *Swarm Opposition* at 6, 15.

¹¹ See *id.* at 15 (internal quotations omitted).

¹² See generally *id.* at 19-21.

regulatory requirements and coordinate with other users, and in which Swarm declined to participate.¹³ Swarm is misguided in choosing to discuss Myriota’s capabilities when only the *Swarm Amendment* (and its implications for the VHF interference environment) are at issue.

In any event, the concerns raised by Swarm have already been addressed or are otherwise without merit, including: (i) the status of the Myriota System;¹⁴ (ii) Myriota’s ITU filing;¹⁵ (iii) Myriota’s PFD compliance;¹⁶ and (iv) the use of Listen-before-Talk protocol.¹⁷ Myriota's award winning¹⁸ sophisticated waveforms and signal processing methods enable millions of low-power IoT devices to communicate with the Myriota System using the NVNG VHF Bands and promote efficient use of spectrum resources,¹⁹ and its patented technology ensures that its IoT modules

¹³ See generally *Myriota VHF Petition*.

¹⁴ Myriota has provided direct-to-orbit IoT satellite service in Australia within VHF licensed spectrum since 2018. See *Myriota Launches on Spaceflight’s SmallSat Express Mission aboard Falcon 9 to aid the fight against Australia’s drought* (Dec. 4, 2018), available at <https://myriota.com/2018/12/04/myriota-launches-on-spaceflights-smallsat-express-mission-aboard-falcon-9-to-aid-the-fight-against-australias-drought/>.

¹⁵ See *Myriota VHF Petition* at 9 (Myriota has access to the VHF MSS spectrum through the ITU filing MNSAT, published in CR/C/4735 of BR-IFIC 2878, dated 4th September 2018).

¹⁶ See *Myriota VHF Petition*, Technical Exhibit at 7. To borrow Swarm’s words, Swarm “is not a terrestrial operator, and it is not a government user of spectrum. Its misgivings, in short, are simply irrelevant.” See *Swarm Opposition* at 17.

¹⁷ Although Swarm touts the Carrier Sense Multiple Access (“CSMA”) “Listen-Before-Talk” protocol, it ignores the inability of that protocol to protect satellite receivers from harmful interference by terrestrial emissions. Terrestrial stations employing Listen-Before-Talk will transmit when they believe their local environment is quiet and have no knowledge of the entire transmit activity in the victim satellite’s field of view. Therefore, the victim satellite may receive interfering emissions from such transmitters, despite the application of Listen-Before-Talk protocols.

¹⁸ Myriota foundation technologies received the 2013 Wireless Innovation Forum Technology of the Year award. See *ITR – 2013 Technology of the Year Award*, Wireless Innovation Forum, available at <https://www.wirelessinnovation.org/2013-technology-award>; see also *Aussie invention beats NASA to win global technology award*, Australian Bus. Rev. (Apr. 9, 2014), available at <https://www.theaustralian.com.au/business/business-spectator/news-story/aussie-invention-beats-nasa-to-win-global-technology-award/76ba98016410c4429645a190013dd420>.

¹⁹ Such characteristics include: (i) low power (less than 1 Watt); (ii) short burst duration (only 260 ms); (iii) narrow occupied bandwidth (less than 4 kHz); (iv) low duty cycle emissions (typically less than 0.02%); (v) significant attenuation either side of the occupied bandwidth; (vi) frequency hopping throughout the band, which minimizes time averaged power for any given 4 kHz range; and (vii) storage

only transmit when a Myriota satellite is in the field of view.²⁰ Myriota has a mature and proven technology base with successful direct-to-orbit IoT satellite communication since 2013²¹. These well-developed operating characteristics will enable Myriota to coordinate effective and efficient spectrum sharing arrangements with other operators. Pursuant to the fundamental requirement to coordinate established in the Commission's rules,²² Myriota is willing to provide technical information necessary to effectuate comprehensive coordination during discussions with Swarm and fully expects Swarm to do the same to ensure efficient use of the NVNG VHF Bands.

III. NVNG VHF Sharing Arrangements Should Apply in the United States and Internationally.

Because Myriota, Swarm, and ORBCOMM operate NVNG MSS systems with global coverage, they should develop a sharing arrangement in the context of this processing round that will apply in the United States and internationally. As noted by Swarm, ORBCOMM is engaging in certain tactics internationally which are inconsistent with the Commission's existing precedent for the authorization of global NVNG constellations.²³ Accordingly, it is critical that the Commission consider the international implications of the sharing arrangement reached in the United States.

of regulatory data informing the frequency bands and locations where transmissions should be avoided, based on the IoT module's location.

²⁰ Myriota's IoT modules contain sophisticated transmit scheduling algorithms that instruct the modules to transmit only when a Myriota satellite is overhead. This ensures that all transmissions are limited only to those which are necessary, and it minimizes the impact on potential victim receivers.

²¹ Myriota foundation technologies were deployed in Australia and Canada in 2013. See *Space-Based Global Sensor Network* (Oct. 1, 2013), available at http://ontariowater.ca/wp-content/uploads/2013/10/Space_Based_Global_Sensor_NetworkIDS.pdf.

²² See 47 C.F.R. § 25.142(b)(3).

²³ See *Swarm Opposition* at 15-16; see *Globalstar Licensee LLC et al*, Order of Modifications, Call Sign S2115, 23 FCC Rcd 15207, FCC 08-248 (rel. Oct. 15, 2008) at ¶¶ 36, 40 (noting that the Commission may impose requirements on U.S.-licensed space stations to operate globally on frequencies authorized in their U.S. licenses, which is a function of the ITU international coordination process and the proper exercise of U.S. jurisdiction over its licensed communications facilities).

Myriota supports the establishment of a comprehensive spectrum access framework that benefits all operators and consumers by providing clarity and predictability to the spectrum compatibility question. Consistent with the principles embodied in the Commission's rules, Myriota seeks to establish fair and equitable access to the NVNG VHF Bands for all three VHF MSS systems on a global basis.

IV. CONCLUSION

Considering the foregoing, the Commission should direct ORBCOMM to comply with its coordination obligations. Myriota remains committed to coordinating in good faith with Swarm and ORBCOMM, and working towards a fair and equitable spectrum sharing arrangement that can be applied on a global basis.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I, Jennifer White, do hereby certify that on September 14, 2020, I served a true and correct copy of this Reply to Opposition by first-class mail and email to the following:

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