



May 23, 2019

VIA IBFS

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: *Ex Parte* Letter – File No. SAT-LOA-20181221-00094

Dear Ms. Dortch:

On May 20, 2019, ORBCOMM, represented by the undersigned, participated in a telephone call with Karl Kensinger, Deputy Chief of the Satellite Division, that, *inter alia*, addressed the above-referenced application (the “Application”) filed by Swarm Technologies Inc. (“Swarm”).¹ The specific subject matter of the meeting was the May 17, 2019, Swarm *Ex Parte* Letter (the “Swarm *Ex Parte* Letter”) filed in the record of the Application, and follow-up discussions regarding various still unresolved questions and concerns regarding the nature and scope of Swarm’s evolving FCC Part 5 experimental program.

Swarm *Ex Parte* Letter

ORBCOMM informed the Commission that ORBCOMM welcomes the fact that the Swarm *Ex Parte* Letter finally offers information that Swarm should have provided in the Application under the applicable Commission Rules and policies. Specifically, the Swarm *Ex Parte* Letter discusses technology solutions for real-time co-frequency sharing between Swarm’s proposed FDMA narrowband utilization of spectrum in the 148 MHz NVNG MSS uplink and other authorized co-primary satellite and terrestrial service systems. ORBCOMM observed that the most notable significance of the Swarm *Ex Parte* Letter is that Swarm has unambiguously now confirmed that the Application request for hard band segmentation of 500 kHz of the very

¹ The Commission designated this proceeding as “permit-but-disclose” for purposes of the *Ex Parte* Rules. Report No. SAT-01376, DA 19-164, March 8, 2019.



limited NVNG MSS uplink spectrum for exclusive mobile earth station (“MES”) use by Swarm’s proposed system is entirely without merit and must be rejected by the Commission.²

ORBCOMM reiterated its submissions in the record of the Application that unequivocally demonstrate that the Commission’s applicable Rules and policies have always required that NVNG MSS systems incorporate technology that enables real-time co-frequency sharing of MES spectrum utilization in the 148 MHz uplink band. These obligations are necessary to satisfy several long-established spectrum management requirements and policy objectives. These include the requirement that NVNG MSS operations abide by the provisions of the ‘modified’ co-primary MSS 148 MHz band uplink allocation under which they operate that require NVNG MSS MESs to preclude harmful interference and otherwise not constrain the development or use of the 148-149.9 MHz band by systems in the fixed and mobile services, and to maximize the efficient use of the very limited available NVNG MSS uplink spectrum by facilitating co-frequency sharing among NVNGS MSS systems. ORBCOMM confirmed to the Commission that it is very pleased that Swarm has finally acknowledged these requirements.

Unfortunately, ORBCOMM was also compelled to inform the Commission that, for various reasons, the MES-based “listen-before-talk” uplink spectrum sharing technology described in the Swarm *Ex Parte* Letter is definitely not a viable NVNG MSS interference avoidance technology solution.³ Although user-terminal-based “listen-before-talk” technology

² The stated purpose of the May 17, 2019, Swarm *Ex Parte* Letter was purportedly to further justify Swarm’s Application request for waiver of the processing round requirements set forth in Section 25.157 of the Commission’s Rules. ORBCOMM does not agree that the submission provides any further material justification for waiver of a processing round. To the contrary, the substance of the submission only serves to underscore that opening a processing round would be the best way to ensure that the very limited NVNG MSS spectrum is being put to the most efficient use possible by all interested competitive entrants. Indeed, but for Swarm’s attempt to avoid a processing round by waiver, the Commission could have already initiated a processing round with a 60-day period for filing competing applications – even as early as when it placed Swarm’s Application on Public Notice, and we would already have a definitive answer if there are any other current additional interested NVNG entrants.

³ ORBCOMM also informed the Commission that the other generalized spectrum sharing concepts identified in the Swarm *Ex Parte* Letter do not appear to be viable techniques for effective NVNG MSS spectrum sharing by the proposed Swarm system, but might merit further consideration if additional details were provided. ORBCOMM also objects to Swarm’s repetitive but wholly inaccurate and unsubstantiated assertions, once again raised in the Swarm *Ex Parte* Letter, that the NVNG MSS spectrum is or has been underutilized. ORBCOMM has been making robust ever-increasing worldwide use of the NVNG MSS spectrum for more than 25 years.

can provide an effective means of spectrum sharing for some types of radio systems, it would clearly be ineffective as an NVNG MSS uplink band interference avoidance solution.

This is because an NVNG MES can only receive interfering signals in the 148 MHz band from other very nearby interfering transmitters (all of which are land-based under existing 148 MHz band allocations) – at most, only those that are located within the unblocked line-of-sight radius of the subject MES. However, the intended satellite uplink receiver is susceptible to harmful interference from a transmitter located anywhere in that satellite’s receive antenna footprint (which in the case of a proposed Swarm satellite would be a land area of approximately 2,300 km in diameter). Consequently, Swarm’s proposed MES-based “listen-before-talk” uplink channel assignment interference avoidance system would be ineffective because it would be extremely susceptible to various co-frequency harmful interference scenarios (both interference to other systems and self-interference) including: interference to unintended satellite receivers (both intra-system, and inter-system); duplicative intra-system MES channel assignments that would jam the intended satellite receiver; and interference to the intended satellite receiver on the selected channel from foreign (other system) transmitters located in the satellite footprint but not within the reception radius of the intended Swarm transmitting MES.

ORBCOMM informed the Commission that it continues to believe that Swarm can devise a viable means for modifying its proposed system to incorporate active interference avoidance technology that can facilitate shared service area real-time co-frequency sharing of MES uplink spectrum between ORBCOMM and Swarm. ORBCOMM confirmed that it has always been fully prepared to work towards this objective in good faith – if Swarm chooses to engage with ORBCOMM to do so.

Swarm FCC Part 5 Experimental Program

During the May 20, 2019, call between ORBCOMM’s undersigned representative and Mr. Kensinger, still unresolved concerns were discussed regarding Swarm’s evolving FCC Part 5 experimental program.

File No. 0340-EX-CN-2019

ORBCOMM informed the Commission that it opposes grant of Swarm’s recently filed Part 5 application to launch and operate twelve (12) additional spacecraft (File No. 0340-EX-CN-2019) due, among other things, to the attendant spectrum occupancy impact on ORBCOMM commercial operations, and the lack of an adequate showing by Swarm that there is a reasonable need to launch so many experimental satellites.

ORBCOMM explained that Swarm’s 15 May 2019, answers to ORBCOMM’s questions regarding the experimental objectives underlying Swarm’s proposal to deploy such a large number of satellites did not provide any reasonable justification for more than one or two spacecraft. ORBCOMM observed that Swarm’s stated experimental objective in the application

– to verify a new Swarm satellite design – can be accomplished by launching only one or two satellites.⁴ All other stated objectives (provided in Swarm’s answers to ORBCOMM’s questions, but *not* in the application) could all be accomplished using simulation modelling – the widely practiced longstanding satellite industry standard approach for each of Swarm’s stated additional objectives. ORBCOMM informed the Commission that it is pursuing further discussions with Swarm regarding this application, and will inform the Commission accordingly if ORBCOMM can remove its objection to grant of the application.

File No. 0961-EX-CN-2018

ORBCOMM informed the Commission that it still has unresolved concerns regarding Swarm’s Part 5 application to deploy MESs in the vicinity of sixty-three (63) designated locations throughout the United States due, among other things, to the fact that Swarm has identified no means of employing active technology to preclude interference from the proposed experimental operations, and the lack of an adequate showing by Swarm that there is a reasonable need to deploy so many experimental MESs. ORBCOMM notes that the Commission’s OET Experimental Branch subsequently granted this application on May 21, 2019, subject to Swarm completing coordination with ORBCOMM prior to any MES deployment. ORBCOMM will proceed accordingly to coordinate with Swarm.

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⁴ The Commission has a longstanding policy of authorizing the minimum number of satellites necessary to conduct an experimental program under the Part 5 Rules. *Policy Statement*, 7 FCC Red 4586 (1992). Minimization of experimental spacecraft is also consistent with the Commission’s proposals in its recent orbital debris NPRM. *Mitigation of Orbital Debris in the New Space Age*, FCC 18-159, released November 19, 2018, 84 Fed Reg 4742 (February 19, 2019).

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Pursuant to Section 1.1206(b) of the Commission's rules, this letter is being filed electronically in the above-referenced proceedings. Please direct any questions regarding this submission to the undersigned.

Respectfully submitted,

A handwritten signature in blue ink, appearing to read 'Walter H. Sonnenfeldt', is positioned above the printed name and title.

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