Federal Communications Commission
Washington, D.C. 20554

March 21, 2017

Karis Hastings
SatCom Law LLC
1317 F Street, NW
Washington, D.C. 20004

Re: O3b Limited, IBFS File No. SAT-AMD-20161115-00116 (Call Sign S2935)

Dear Ms. Hastings:

On November 15, 2016, O3b Limited (O3b) filed the above-captioned amendment to its pending petition for modification of its U.S. grant of market access in the 17.8-18.6 GHz, 18.8-19.3 GHz, 27.6-28.4 GHz and 28.6-29.1 GHz frequency bands.[1] O3b filed this amendment in response to the Satellite Policy Branch Public Notice establishing a processing round for NGSO-like operations in various Ku-and Ka-band frequencies.[2] Specifically, O3b's amendment seeks to add frequencies to four of the eight satellites specified in the modification application, and seeks U.S. market access for 24 satellites operating in circular equatorial orbit (O3bN) and 16 satellites operating in inclined orbit (O3bI) using previously authorized frequencies, and requesting additional frequency bands.[3] To aid the Commission's evaluation of the amendment, please provide the following additional information:[4]

1. In its prior applications, O3b states that all of its satellite downlink transmissions would not exceed a PFD at the Earth's surface of -118 dBW/m^2/MHz, regardless of the angle of arrival, and that this ensures significant margin against any of the PFD limits that exist, to protect terrestrial fixed and mobile services from downlink interference from the O3b satellites.[5] O3b's assurance to operate within such a PFD limit was also evidenced in Section S8 of the associated Schedule S. In O3b's amendment and its associated revised Schedule S, however, O3b has made a representation that it will now operate at less stringent PFD levels.[6] Please

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[1] O3b Limited, IBFS File Nos. SAT-LOI-20141029-00118 and SAT-AMD-20150115-00004 (granted June 2, 2015). On June 24, 2016, O3b filed a request to modify its grant of U.S. market access to add eight satellites to its NGSO FSS constellation using the previously authorized Ka-band frequencies. IBFS File No. SAT-MOD-20160624-00060.

[2] *See* Satellite Policy Branch Information, Public Notice, DA 16-804 (July 15, 2016) initiating a processing round for additional applications and petitions for operation in the 10.7-12.7 GHz, 14.0-14.5 GHz, 17.8-18.6 GHz, 18.8-19.3 GHz, 27.5-28.35 GHz, 28.35-29.1 GHz, and 29.5-30.0 GHz bands by NGSO-like satellite systems.

[3] O3b's amendment proposes to operate 40 additional satellites using previously authorized frequencies (17.8-18.6 GHz, 18.8-19.3 GHz, 27.6-28.4 GHz, and 28.6-29.1 GHz) and the following additional frequencies: 17.7-17.8 GHz, 19.3-19.7 GHz, and 29.1-29.5 GHz. O3b's amendment also requests to use the 19.7-20.2 GHz and 29.5-30.0 GHz frequency bands on four of the eight satellites proposed in the modification. O3b's amendment will be processed consistent with the frequencies listed in the processing round public notice. *See* footnote 2, *supra*.

[4] 47 CFR § 25.111(a).

[5] O3b Limited, IBFS File No. SAT-LOI-20141029-00118, Attachment A at 14 (granted June 2, 2015), and SAT-MOD-20160624-00060, Attachment A at A1-5 (pending). O3b's current operations are conditioned such that satellite downlink transmissions will not exceed a PFD at the Earth's surface of -118 dBW/m^2/MHz, regardless of the angle of arrival.

[6] O3b Limited, IBFS File No. SAT-AMD-20161115-00116, Attachment A at 12.

clarify whether O3b intends to operate its entire O3b, O3bN, and O3bI constellations at a pfd level greater than -118 dBW/m^2/MHz, at all angles of arrival.

2. In its modification and amendment to the modification application, O3b proposes operating in the original authorized bands, and requests the following additional frequency bands: 17.7-17.8 GHz, 19.3-19.7 GHz, 19.7-20.2 GHz, 29.1-29.5 GHz, and 29.5-30.0 GHz bands.[7] In the Schedule S provided with the amendment application, O3b indicates that it will operate throughout the entire 17.7-20.2 GHz and 27.5-30 GHz bands, suggesting that O3b Limited will also operate its satellites in the 18.6-18.8 GHz, 27.5-27.6 GHz, and 28.4-28.6 GHz bands. Since there is a discrepancy between the narrative and technical annexes of the application and the Schedule S, the Commission requests that O3b clarify its requested frequencies, and if necessary, provide an updated technical analysis and/or a new Schedule S with information that accurately represents its proposed satellite system. If O3b intends to operate in the 18.6-18.8 GHz band, please also provide the necessary analysis to demonstrate compliance with Section 25.208(d).
3. Article 22.5I of the ITU Radio Regulations requires NGSO networks to meet the equivalent power flux density (EPFD) limits specified in Articles 22.5C (EPFD ↓), 22.5D (EPFD ↑), and 22.5F (EPFD$_{is}$) for an NGSO system to fulfill its obligations with respect to geostationary satellite orbit (GSO) networks under Article 22.2. O3b provides, in its interference analysis, a narrative showing that it complies with Articles 22.5C (for the 17.8-18.6 GHz and 19.7-20.2 GHz frequency bands), 22.5D (for the 27.5-28.6 GHz and 29.5-30 GHz frequency bands) and Article 22.5F (for the 17.8-18.4 GHz frequency band).[8] We request that O3b submit, for all these frequency bands, a complete set of PFD masks on the surface of the Earth for each of the 56 active space stations in its NGSO FSS system, and a complete set of NGSO FSS earth station EIRP masks as a function of the off-axis angle generated by the NGSO FSS earth station, which are required to run the ITU-R Recommendation S.1503 EPFD Validation Software. Please also supplement the amendment to include the output data files from the ITU EPFD Validation Software, and/or corresponding plots of the computed EPFD levels for the 56 active satellite constellation compared to the EPFD masks for each of the reference GSO and/or BSS earth station antennas.

4. We note that O3b Limited requests authority to provide NGSO FSS service to the U.S. market using the 17.7-17.8 GHz frequency band. This band is not designated for NGSO FSS use, its use is limited to feeder links in the broadcasting-satellite service (BSS), in accordance with Footnote US271.[9] As a result, there are no rules in place regarding sharing between NGSO FSS and BSS feeder links in this band, and the International Telecommunications Union (ITU) also has no EPFD limits in place for sharing between these two services. Consequently, O3b Limited must provide an appropriate technical analysis to justify its waiver request to use the band and to demonstrate how its use of this band will not cause interference to BSS feeder links.

5. In accordance with Section 25.114(d)(1), applicants are requested to provide an explanation of how the uplink frequency bands would be connected to the downlink frequency bands on

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[7] *See* footnote 3, *supra*.

[8] O3b Limited, IBFS File No. SAT-AMD-20161115-00116, Attachment A at 13-19.

[9] *See* 47 CFR § 2.106, US271.

their proposed satellite system.[10] To better understand the beam and channel connections on O3b's particular satellite system, please supplement O3b's application with a showing (*e.g.* a strapping table, chart or spreadsheet) that clearly presents this information.

O3b must file a letter providing this information by **April 20, 2017**. Failure to do so may result in the dismissal of O3b's amendment pursuant to Section 25.112(c) of the Commission's rules, 47 CFR § 25.112(c).

Sincerely,

Jose Albuquerque

Jose P. Albuquerque
Chief, Satellite Division
International Bureau

[10] 47 CFR § 25.114(d)(1).