

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

In the Matter of)	
)	
O3b Limited)	File No. SAT-AMD-2017_____
)	Call Sign: S2935
Amendment to Pending Applications for)	
U.S. Market Access for the)	
O3b Medium Earth Orbit Satellite System)	

AMENDMENT

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November 9, 2017

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AMENDMENT

O3b Limited (“O3b”), by its attorneys and pursuant to Section 25.116 of the Commission’s rules,¹ submits this amendment to update and revise its pending applications regarding its authority to serve the U.S. market using a system of satellites in medium earth orbit (“MEO”).

O3b operates a U.K.-authorized, non-geostationary satellite orbit (“NGSO”) Fixed-Satellite Service (“FSS”) system in the Ka-band that has been granted U.S. market access by the Commission.² O3b has twelve satellites in orbit and has satisfied all Commission milestones associated with those satellites.³

In mid-2016, O3b requested that the Commission expand the scope of the Market Access Grant to cover 8 satellites to be added to the existing O3b constellation in 2018, to be completed over two launch events.⁴ In November 2016, O3b filed an initial amendment to the Modification Application that requested market access for additional satellites, O3bN and O3bI, and frequencies as part of the NGSO processing round the International Bureau established for Ku-

¹ See 47 C.F.R. § 25.116(a) (stating that a pending application may be amended until it has been “designated for hearing, a public notice is issued stating that a substantive disposition of the application is to be considered at a forthcoming Commission meeting, or a final order disposing of the matter is adopted by the Commission”).

² See Applications of O3b Limited, Call Sign S2935, IBFS File Nos. SAT-LOI-20141029-00118 and SAT-AMD-20150115-00004 (granted Jan. 22, 2015) (the “Market Access Grant”).

³ See Public Notice, Report No. SES-01681, at 12 (Sept. 10, 2014); Public Notice, Report No. SAT-01065, DA 15-172 (Feb. 6, 2015).

⁴ See Modification Application of O3b Limited, Call Sign S2935, IBFS File No. SAT-MOD-20160624-00060 (June 24, 2016) (“Modification Application”).

and Ka-band systems.⁵ In March 2017, O3b submitted a further amendment seeking addition of V-band frequencies to the O3bN satellites for consideration as part of the processing round the International Bureau initiated for NGSO operations in those bands.⁶

O3b submits the instant amendment to make further changes with respect to the authority sought in the Pending O3b Applications. Specifically, O3b files this amendment to:

- Reduce the number of satellites for which O3b seeks authority to access the U.S. market;
- Add an MSS designation to O3b's requested use of the 19.7-20.2 GHz and 29.5-30.0 GHz bands;
- Align O3b's requested use of the 29.1-29.5 GHz and 19.3-19.7 GHz bands to conform with the use of these bands as MSS feeder links;
- Request clarification that O3b is authorized to drift active satellites;
- Provide a corrected antenna gain contour diagram; and
- Remove the 50.2-50.4 GHz band from O3b's Schedule S, thereby harmonizing the Schedule S with the description of O3b's requested V-band authority in the technical narrative filed with the March Amendment.

None of these changes increases the potential for interference or seeks the use of additional frequencies. Accordingly, this filing should be deemed a minor amendment that does not affect the status of the Pending O3b Applications with respect to applicable processing round cut-off dates.⁷

Authorizing O3b to serve the U.S. market using the additional satellites and frequencies described in the Pending O3b Applications as amended herein will serve the public interest by allowing O3b to further expand its proven technology and services in response to customer requirements, employing even more advanced technology and with lower costs to customers.

I. O3B IS REDUCING THE NUMBER OF SATELLITES FOR WHICH IT SEEKS U.S. MARKET ACCESS

Based on developments since it filed its prior amendments, O3b is lowering the number of satellites for which it requests U.S. market access authority. Technological advances in O3b's future satellite system, for which initial manufacturing and launch contracts have recently been completed, allow for deployment of a more capable constellation with fewer satellites than were requested in the November Amendment.

After submitting the November and March Amendments to its Modification Application, O3b finalized a contract with Boeing to construct its next-generation MEO satellite system called

⁵ See Amendment Application of O3b Limited, Call Sign S2935, IBFS File No. SAT-AMD-20161115-00116 (filed Nov. 15, 2016) ("November Amendment").

⁶ See Amendment Application of O3b Limited, Call Sign S2935, IBFS File No. SAT-AMD-20170301-00026 (filed March 1, 2017) ("March Amendment," and together with the Modification Application and the November Amendment, the "Pending O3b Applications").

⁷ See 47 C.F.R. § 25.116(b) and (c).

O3b mPOWER.⁸ Scheduled for launch in 2021, O3b mPOWER will be a scalable constellation, capable of delivering multiple terabits of throughput globally, using more than 4,000 beams per satellite and advanced dynamic routing capabilities.⁹ This new system can provide enhanced capacity and coverage with fewer satellites as compared with the current generation of O3b MEO satellites, allowing O3b to reduce the number of additional satellites for which it currently seeks U.S. market access authority while maintaining the same functionality.

Lowering the number of satellites requested reflects the increased capabilities of the O3b mPOWER system and will enable O3b to more readily comply with the milestone requirements O3b anticipates will be imposed by the Commission. In its recent NGSO Order, the Commission revised the milestone rules to specify that NGSO operators must launch and commence operation of 50 percent of the authorized satellite system within six years of grant.¹⁰ If an operator fails to meet this milestone, its authorization will be reduced to the number of satellites in use on the milestone date, and the bond will be forfeit. Operators that successfully complete the first milestone will have an additional three years to deploy the remainder of their constellations, free of bond obligations.

Taking into account these milestone requirements and the enhanced capabilities of O3b's next generation satellite system, O3b amends the Pending O3b Applications to seek U.S. market access for a total of 30 new satellites in addition to the 12 O3b satellites currently in orbit. Not all the new satellites will use the full range of Ka-band frequencies requested; O3b has identified in the tables below the number of new satellites for which it requests U.S. market access for each Ka-band frequency segment.¹¹ Consistent with the scalability of the O3b mPOWER system, O3b anticipates that it may request market access for additional satellites or frequencies under the Commission's newly adopted NGSO framework, which makes clear that NGSO operators may seek authority to add satellites through a modification at any time.¹²

⁸ See <https://www.ses.com/networks/o3b-mpower>.

⁹ *Id.*

¹⁰ See NGSO Order at ¶¶ 62-67.

¹¹ O3b understands that the Commission is considering requests for V-band spectrum separately from the pending applications in the Ku/Ka-band processing round. Therefore, O3b is not proposing any changes to the number of its proposed satellites that will carry V-band frequencies at this time.

¹² NGSO Order at ¶ 67 n.150.

Frequency Use for Space-to-Earth Operations

O3b Sats 13-16	O3b Sats 17-20	O3bN/O3bI Satellites 21-42	New Satellites by Band Segment
		17.7-17.8 GHz	22
17.8-18.6 GHz	17.8-18.6 GHz	17.8-18.6 GHz	30
18.8-19.3 GHz	18.8-19.3 GHz	18.8-19.3 GHz	30
		19.3-19.7 GHz	22
	19.7-20.2 GHz	19.7-20.2 GHz	26

Frequency Use for Earth-to-Space Operations

O3b Sats 13-16	O3b Sats 17-20	O3bN/O3bI Satellites 21-42	New Satellites by Band Segment
		27.5-27.6 GHz	22
27.6-28.4 GHz	27.6-28.4 GHz	27.6-28.4 GHz	30
		28.4-28.6 GHz	22
28.6-29.1 GHz	28.6-29.1 GHz	28.6-29.1 GHz	30
		29.1-29.5 GHz	22
	29.5-30 GHz	29.5-30 GHz	26

As indicated in the tables above, 8 of the new satellites will be those originally proposed in the Modification Application and scheduled for launch in 2018. Satellites 13-16 will use the same frequencies as the current 12 in-orbit spacecraft, and satellites 17-20 will use those frequencies plus an additional band segment in the uplink and downlink directions, as described in the November Amendment and as shown in the tables above. The remaining 22 of the 30 new satellites will use the full complement of Ka-band frequencies requested for the O3bN and O3bI satellites.

As indicated in the attached Schedule S, up to 10 of the 30 new satellites to be added will be in inclined orbits, up to 5 satellites in each of the two inclined planes, Orbital Plane 1 and Orbital Plane 3. This is a reduction from the request in the November Amendment for up to 16 O3bI inclined orbit satellites. The other 20 new satellites will be added to the equatorial orbit. Thus, the equatorial plane in the Schedule S, Orbital Plane 2, shows a total of 32 satellites, which includes the 12 O3b spacecraft already in orbit and 20 new equatorial satellites. This is a reduction from the request in the November Amendment for a total of up to 44 equatorial orbit satellites.

As discussed in more detail below, reducing the number of active satellites will not increase the interference into other NGSO satellite systems and therefore does not constitute a major amendment. The equivalent power flux density (“EPFD”) showing to protect geostationary orbit (“GSO”) satellites also remains the same, as the PFD, EIRP(is) and EIRP(up) masks remain applicable for this number of satellites.

II. O3B IS ADDING AN MSS SERVICE DESIGNATION IN THE 19.7-20.2 GHz AND 29.5-30 GHz BANDS AND UPDATING INFORMATION ON ITS USE OF THE 29.1-29.5 GHz AND 19.3-19.7 GHz BANDS

The Schedule S attached to this amendment updates the use designations for certain frequency bands already included in the Pending O3b Applications, as follows:

19.7-20.2 GHz and 29.5-30 GHz bands. In its November Amendment, O3b requested U.S. market access for operations in the 19.7-20.2 GHz and 29.5-30.0 GHz bands for service and gateway downlinks, respectively, operating in the FSS.¹³ Current rules allow use of the 29.5-30 GHz band by NGSO FSS on a secondary basis, and the NGSO Order authorized secondary NGSO use of the paired 19.7-20.2 GHz band as well, provided that GSO FSS networks are protected in accordance with international EPFD limits.¹⁴ O3b demonstrated in the Technical Annex submitted with its November Amendment that O3b's use of the 19.7-20.2 GHz spectrum will not cause interference to GSO operations.¹⁵ O3b now updates this request by adding an MSS service designation for these bands, consistent with the U.S. table of frequency allocations. This amendment does not change the characteristics already described in O3b's applications for the FSS. The addition of the MSS designation will therefore not increase interference and will serve the public interest.

29.1-29.5 GHz and 19.3-19.7 GHz bands. Also in its November Amendment, O3b sought a waiver of the Ka-band plan to use the 29.1-29.5 GHz and 19.3-19.7 GHz bands on a non-conforming basis for service and gateway uplinks and downlinks respectively.¹⁶ O3b hereby withdraws its waiver request and instead requests to use the 29.1-29.5 GHz and 19.3-19.7 GHz bands on a conforming basis for MSS feeder links.

O3b has designed its NGSO System to ensure that its NGSO MSS feeder link uplink operations can share the 29.25-29.5 GHz band with GSO FSS and NGSO MSS systems that have been authorized for operation in this band. Data communication from O3b's feeder links using 29.1-29.5 GHz and 19.3-19.7 GHz would be associated with mobile user terminals operating in the frequency bands designated for MSS. In addition, O3b has designed its system to comply with the feeder link earth station siting and coordination requirements of Sections 25.257 and 25.258 of the Commission's rules. O3b will also coordinate with other NGSO MSS operators and make reasonable efforts to identify mutually acceptable locations for feeder link earth station complexes.

¹³ November Amendment, Technical Annex at 2-3.

¹⁴ See NGSO Order at ¶¶ 9-10.

¹⁵ November Amendment, Technical Annex, Section A.9 at 13-22.

¹⁶ *Id.*, Legal Narrative at 9.

III. THE COMMISSION SHOULD MAKE CLEAR THAT O3B IS AUTHORIZED TO DRIFT ACTIVE SATELLITES

O3b requests that the Commission clarify in the grant of O3b's Modification Application that O3b is authorized to drift active satellites. O3b must occasionally drift active satellites to re-phase its constellation when activating a spare satellite or adding satellites to its constellation. During this process, none of the active satellites would be co-located or be drifted past another active satellite at any point.¹⁷ Accordingly, during the active drift the satellites operate consistently with the technical parameters described in the Schedule S and technical narrative submitted with the Modification Application.¹⁸

The O3b Market Access Grant specifies that if O3b proposes any changes to the authorized configuration of nine evenly spaced active satellites and three spare satellites, including activating a spare satellite, "it must receive a modification of its market access grant before commencing communications with U.S.-licensed earth stations pursuant to the changes or new activation."¹⁹ This condition should be removed as part of Commission action on the Pending O3b Applications.

Removal of the condition is consistent with established Commission policy in favor of allowing "satellite operators to rearrange satellites in their fleet to reflect business and customer considerations where no public interest factors are adversely affected."²⁰ As the International Bureau has explained:

the Commission attempts, when possible, to leave spacecraft design decisions to the space station licensee because the licensee is in a better position to determine how to tailor its system to meet the particular needs of its customers. Consequently the Commission will generally grant a licensee's request to modify its system, provided there are no compelling countervailing public interest considerations.²¹

¹⁷ Modification Application, Technical Annex at A1-2 n. 1 (explaining that "[t]he spacing of 2.5° between each spare satellite and the neighboring active operational satellite provides for a longitudinal freedom of ±1° for both operational and spare satellites while preventing any overlap in longitude of the two satellites. O3b may increase or reduce this 2.5° nominal spacing between a spare satellite and the nearest operational satellite with the understanding that, in the event that it reduces it, it also reduces the longitudinal freedom of both satellites accordingly to ensure that the station-keeping volumes of the two satellites do not overlap.").

¹⁸ See generally Modification Application, Schedule S Technical Report and Technical Annex.

¹⁹ See Market Access Grant, Attachment to Grant at 3, ¶ 11.

²⁰ *SES Americom, Inc.*, Order and Authorization, DA 06-757 (IB rel. Apr. 7, 2006) at 4, ¶ 8, citing *Amendment of the Commission's Space Station Licensing Rules and Policies*, Second Report and Order, 18 FCC Rcd 12507, 12509, ¶ 7 (2003).

²¹ *AMSC Subsidiary Corp.*, Order and Authorization, DA 98-493, 13 FCC Rcd 12316, 12318, ¶ 8 (IB 1998) (footnote omitted).

The Commission demonstrated its preference for flexibility in the OneWeb Market Access Grant, which does not include any language similar to the O3b condition discussed above that would constrain OneWeb's ability to manage the configuration of its satellites.²²

The changes proposed in the Modification Application and the November Amendment involve the addition of satellites whose deployment would require re-phasing of the currently active satellites in the O3b system. O3b therefore assumes that in acting on these applications, the Commission would grant O3b the flexibility needed to transition to an expanded fleet of satellites. Nevertheless, out of an abundance of caution, O3b requests that in any grant of the Pending O3b Applications the Commission remove the language quoted above from current condition 11 or otherwise clarify that going forward O3b need not seek a modification or obtain Commission approval to drift active satellites for re-phasing or in response to unforeseen events that may require such maneuvers.

IV. O3B SUBMITS MINOR CORRECTIONS TO ITS PENDING APPLICATIONS

Pursuant to Section 1.65 of the Commission's rules, 47 C.F.R. § 1.65, O3b hereby updates the record regarding the O3b November Amendment and March Amendment as follows.

1. In the Schedule S filings submitted with both the November Amendment and the March Amendment, O3b mistakenly provided two attachments designated "TX_beams.pdf" that were incorrectly labelled as representing receive beam rather than transmit beam antenna gain contours.²³ The attached revised Schedule S, which supersedes the Schedule S submissions filed with the November Amendment and March Amendment, includes correctly labeled TX_beams.pdf diagrams.
2. In the Schedule S submitted with the March Amendment, O3b specified a V-band Earth-to-space frequency range of 47.2-51.4 GHz, encompassing the 50.2-50.4 GHz band segment. However, O3b specified in the legal narrative and technical annex filed with the March Amendment that it was not seeking U.S. market access for that band segment.²⁴ To avoid confusion, O3b is submitting a revised Schedule S with this amendment that excludes the 50.2-50.4 GHz frequencies. As a result of this change, the original beams VRL1 and VRR1 now are associated only with the 47.2-50.2 GHz frequency range, and O3b created two new beams, VRL2 and VRR2, which are associated with the 50.4-51.4 GHz frequency range. There is no difference between these two sets of beams.

²² See generally *WorldVu Satellites Limited, Petition for a Declaratory Ruling Granting Access to the U.S. Market for the OneWeb System*, Order and Declaratory Ruling, 31 FCC Rcd 5366 (2017).

²³ O3b later provided correctly labelled diagrams for the March Amendment as part of its response to Commission questions regarding that filing. See March Amendment, Letter from Suzanne Mallory, Vice President, Regulatory Affairs, O3b Limited, to Jose Albuquerque, Chief, Satellite Division, International Bureau Federal Communications Commission (filed July 24, 2017).

²⁴ March Amendment, Legal Narrative at 2.

O3b asks that the Commission update the record relating to the O3b November Amendment and March Amendment to incorporate these corrections.

V. THIS AMENDMENT IS MINOR UNDER SECTION 25.116

The changes described herein qualify as a minor amendment that should not affect the processing status of the Pending O3b Applications under Section 25.116 of the Commission's rules. Section 25.116(b) identifies the types of changes that qualify as major amendments to an application. Section 25.116(c) provides that with certain exceptions, filing a major amendment to an application for NGSO satellites after a "cut-off" date will cause the underlying application to be considered as newly filed.

None of the changes covered by the instant amendment triggers a designation of this amendment as major under Section 25.116(b). That section provides that an amendment is major if it "increases the potential for interference,"²⁵ "changes the proposed frequencies or orbital locations to be used,"²⁶ "would convert the proposal into an action that may have a significant environmental effect,"²⁷ or is otherwise determined to be substantial by the Commission.²⁸

The changes O3b is making in this amendment do not fall within any of the major amendment categories. As discussed above, reducing the number of satellites does not alter the potential for interference to other authorized users of the spectrum. Furthermore, no additional frequencies are being sought – O3b is adding a service designation to certain frequency bands and making changes relating to its planned use of associated spectrum, but is not adding any spectrum to the bands requested in the Pending O3b Applications. Moreover, none of the changes has any environmental effect or should be deemed substantial. Under these circumstances, the Commission should conclude that the submission of this amendment does not alter the Pending O3b Applications' eligibility to be considered in the relevant processing rounds for Ku/Ka-band and V-band frequencies.

However, if the Commission concludes that the filing of this amendment does trigger Section 25.116(c), the Commission should waive the rule for good cause. There is no reason that the changes specified herein should retroactively disqualify O3b from having its Ka-band spectrum requests considered as part of the Ku/Ka-band processing round or from having its V-band proposal considered as part of the V-band processing round. The changes described in this amendment do not significantly alter the characteristics of the operations O3b proposes as set forth in the Pending O3b Applications. Nor would allowing the Pending O3b Applications to maintain their status in the processing rounds prejudice any of the parties that filed applications in the processing rounds.

²⁵ 47 C.F.R. § 25.116(b)(1).

²⁶ *Id.*

²⁷ 47 C.F.R. § 25.116(b)(2).

²⁸ 47 C.F.R. § 25.116(b)(4).

In short, because the changes set forth in this amendment are limited and non-substantive and do not disadvantage other participants in the processing rounds, waiving Section 25.116(c) is consistent with the purpose of the Commission's "cut-off" rules. For these reasons, the Commission should grant any necessary waiver of Section 25.116(c) and not consider the O3b Pending Applications to be newly filed as a result of the instant amendment.

VI. CONCLUSION

For the foregoing reasons, O3b amends the Pending O3b Applications to reflect the updates and corrections described herein.

Respectfully submitted,
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November 9, 2017

ATTACHMENT 1:
INFORMATION CONCERNING SHAREHOLDERS, OFFICERS, AND DIRECTORS
Response to Form 312, Question 40

Ownership Information

The applicant, O3b Limited, is a Jersey, Channel Islands company and an indirect, wholly-owned subsidiary of SES S.A. (“SES”). The intermediate companies in the ownership chain are O3b Networks Limited, also a Jersey, Channel Islands company, SES Finance Services AG (“SES Finance”), a Switzerland company, SES Asia S.A., a Luxembourg company, and SES Holdings (Netherlands) BV, a Netherlands company. See attached organizational chart.

SES is a Luxembourg company that in addition to O3b Limited, wholly owns SES ASTRA (formerly Société Européenne des Satellites S.A.), New Skies Satellites B.V., and SES Americom, Inc. Through its subsidiaries and affiliates, SES engages in the provision of satellite services in North and South America, Europe, Africa and Asia.

The registered office address for O3b Limited and O3b Networks Limited is:

3rd Floor Anley House,
Anley Street
St Helier, Jersey JE2 3QE
Channel Islands

The registered office address for SES Finance is:

Acton Treuhand AG
Gotthardstrasse 28, CH-6304 Zug
Switzerland

The registered office address for SES Holdings (Netherlands) BV is:

Rooseveltplantsoen 4
2517 KR The Hague
The Netherlands

The registered office address for SES and SES Asia S.A. is:

L-6815 Château de Betzdorf
Luxembourg

The names, addresses, and citizenship of stockholders owning of record and/or voting 10 percent or more of SES voting stock are:

The Etat du Grand Duché de Luxembourg (the “State of Luxembourg”) – and Banque et Caisse d’Epargne de l’Etat (“BCEE”) and Société Nationale de Crédit et

d'Investissement (“SNCI”), each of which is an institution created by act of the Luxembourg Parliament and 100% owned by the State of Luxembourg – hold Class B shares of SES representing a combined effective economic interest of 16.67% and effective voting power of 33.33%. In addition, in 2007 and 2008 these entities received SES Fiduciary Deposit Receipts (“FDRs”), each of which represents one Class A share of SES. The FDRs distributed to these entities represented a combined 5.43% economic interest and effective voting power of 4.35%. SES does not know how many of these FDRs, if any, are still held by the Class B shareholders, as they are entitled to sell the FDRs without notice to SES. The principal business of both BCEE and SNCI is financial services. The addresses of BCEE and SNCI are as follows:

Banque et Caisse d’Epargne de l’Etat
 1, place de Metz
 L-2954 Luxembourg

Société Nationale de Crédit et d’Investissement
 7, rue du Saint Esprit
 BP 1207, L-1012 Luxembourg

The address for the State of Luxembourg is Ministry of State, 4 rue de la Congrégation, L-2910, Luxembourg.

Officers and Directors

The following individuals serve as officers and directors of O3b Limited and can be contacted at the O3b Limited address listed above:

Name	Title	Nationality
Steve Collar	Director, Chief Executive Officer	U.K.
Tom Turner	Chief Financial Officer	U.K.
Thai Rubin	Director, Executive Vice President and General Counsel	U.S.
Charles Hannaford	Chief Commercial Officer	U.K.
Stewart Sanders	Chief Technology Officer	U.K.
Dara McCann	Executive Vice President – Human Resources and Development	Ireland
John Baughn	Chief Operations Officer	U.K.
John Paul Hemingway	Chief Marketing Officer	U.K.
Jonathan Leckie	Company Secretary	Australia

ORGANIZATIONAL CHART

This is a simplified chart depicting the O3b Limited ownership structure. The percentages shown reflect equity interests on a fully diluted basis.

