Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
O3b Limited	)	File No. SAT-MOD-2017_____
	)	Call Sign: S2935
Application to Modify	)	
U.S. Market Access Grant for the	)	
O3b Medium Earth Orbit Satellite System	)	

Expedited Action Requested

MODIFICATION

O3b Limited ("O3b"), by its attorneys and pursuant to Section 25.117 of the Commission's rules, 47 C.F.R. § 25.117, hereby seeks modification of its authority to serve the U.S. market using a system of satellites in medium earth orbit ("MEO")[1] in order to permit changes to the configuration of its twelve in-orbit satellites. Specifically, O3b seeks authority to allow it to transition from the current "9+3" configuration, in which 9 of the satellites are active and 3 serve as in-orbit spares, to a "10+2" configuration.

Grant of the requested modification will serve the public interest by permitting O3b to respond to urgent customer demand for additional capacity. Moreover, the change will not adversely affect other U.S.-authorized satellite or terrestrial communications networks. Implementing the requested changes would require initiation of the process in the first half of October, and O3b seeks expedited action on this modification consistent with that schedule.

O3b emphasizes that the scope of the requested modification is quite limited. Specifically, O3b is simply seeking to activate one of its existing in-orbit spare satellites to provide active service – no other changes in the operational characteristics of the satellite system are proposed. In particular, the activated spare satellite will use the same frequency bands specified in the Market Access Grant. As a result, this modification does not implicate any of O3b's pending applications and can be acted on outside of the processing rounds under way for non-geostationary satellite orbit ("NGSO") systems.

[1] *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").

A completed Form 312 is attached, and O3b incorporates by reference the technical information previously provided regarding its system.[2] In addition, O3b is providing here technical information relating to the proposed modification of the Market Access Grant pursuant to Section 25.114 of the Commission's Rules.

BACKGROUND

In the Market Access Grant, the Commission authorized the O3b MEO system to communicate with U.S.-licensed earth stations in the 17.8-18.6 GHz and 18.8-19.3 GHz (Space-to-Earth) frequencies and in the 27.6-28.4 GHz and 28.6-29.1 GHz (Earth-to-Space) frequencies.[3] The baseline system configuration described in the authorization assumes that 9 of the 12 in-orbit satellites are active, with the remaining 3 satellites serving as in-orbit spares.[4] The grant specifies that if O3b proposes any changes to this configuration, 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."[5]

O3b is seeking such a modification in order to give it the flexibility to respond to pressing customer demand for increased capacity over the United States, the Caribbean, and Latin America. O3b plans to bring one of the current spare satellites online, drift the satellites in order to achieve uniform spacing between the active satellites, and then begin providing service with 10 active satellites and two in-orbit spares. During this process, none of the active satellites would be co-located or cross over one another at any point.

The operational characteristics of the 10+2 configuration would be identical to those of the current 9+3 configuration with very limited exceptions. The 9 active satellites are now separated by 40 degree spacing, which would change to 36 degrees when there are 10 active satellites. The reduced spacing is covered by O3b's existing coordination agreements with U.S. federal systems. Moreover, operations with this spacing will not change O3b's ability to meet applicable equivalent power flux density ("EPFD") limits in order to protect geostationary satellite orbit ("GSO") spacecraft in the relevant frequencies.

Furthermore, the changes sought here are separate from those addressed in other pending O3b applications, and would not prejudge the outcome of those filings. O3b has three requests pending before the Commission: (1) in June of 2016, O3b requested U.S. market access for

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[2] *See* Applications of O3b Limited, Call Sign S2935, IBFS File Nos. SAT-LOI-20141029-00118 (the "Market Access Request") and SAT-AMD-20150115-00004.

[3] *See id.,* Attachment to Grant at 1.

[4] *See id.* at 1 n.1.

[5] *See id.,* Attachment to Grant at 3, ¶ 11.

8 additional satellites using the same frequencies authorized in the Market Access Grant;[6] (2) in November of 2016, O3b sought to add frequencies to 4 of the 8 new satellites proposed in the June 2016 Modification Application and sought U.S. market access in Ka-band frequencies for up to 24 new satellites in a circular equatorial orbit ("O3bN") and up to 16 satellites in an inclined orbit;[7] and (3) in March of 2017, O3b requested U.S. market access for operations of the O3bN satellites in V-band spectrum.[8] The June 2016 Modification Application and the November Amendment are being considered as part of the NGSO processing round the International Bureau established for Ku- and Ka-band systems,[9] and the March Amendment is being considered as part of the processing round the International Bureau initiated for NGSO operations in V-band spectrum.[10]

Commission grant of the June 2016 Modification Application and the November Amendment would render the instant modification request moot by conferring additional flexibility on O3b to transition to an expanded fleet of satellites. However, because of the short time frame within which O3b would need to initiate the changes needed to shift to the 10+2 configuration, O3b seeks action on this more narrowly focused modification to ensure that it can add capacity in the event the Commission does not act on the pending O3b Ka-band filings prior to October.

MODIFICATION

O3b requests that the Commission modify the Market Access Grant to allow O3b to operate with up to 10 active satellites and with 2 or more spare satellites. The requested authority to reconfigure the O3b satellite system will serve the public interest and is consistent with Commission precedent. The Commission has repeatedly observed that its policy is to allow "satellite operators to rearrange satellites in their fleet to reflect business and customer

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[6] O3b Limited, Call Sign S2935, IBFS File No. SAT-MOD-20160624-00060 ("June 2016 Modification Application").

[7] O3b Limited, Call Sign S2935, IBFS File No. SAT-AMD-20161115-00116 ("November Amendment").

[8] O3b Limited, Call Sign S2935, IBFS File No. SAT-AMD-20170301-00026 ("March Amendment").

[9] *See OneWeb Petition Accepted for Filing; IBFS File No. SAT-LOI-20160428-00041; Cut-Off Established for Additional NGSO-Like Satellite Applications or Petitions for Operations 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*, Public Notice, DA 16-804 (July 15, 2016).

[10] *See Boeing Application Accepted for Filing; IBFS File No. SAT-LOA-20160622-00058; Cut-Off Established for Additional NGSO-Like Satellite Applications or Petitions for Operations in the 37.5-40.0 GHz, 40.0-42.0 GHz, 47.2-50.2 GHz and 50.4-52.4 GHz Bands*, Public Notice, DA 16-1244 (rel. Nov. 1, 2016).

considerations where no public interest factors are adversely affected."[11] 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.[12]

Here, grant of the requested modification will allow O3b to make additional capacity available in the United States, the Caribbean, and Latin America. Implementation of the change in configuration will not adversely affect other operators. Again, no added frequencies will be used by the reconfigured system. The attached Technical Annex demonstrates that the limited change to the O3b satellite configuration being proposed will not affect the system's compliance with applicable requirements to protect other authorized satellite and terrestrial systems. Moreover, there are no other satellites operating close to the MEO orbit used by the O3b system, and no changes in O3b's orbital debris mitigation plan are proposed. O3b will continue to comply with Commission requirements to post ephemeris data for its constellation as specified in the Market Access Grant.[13]

WAIVER REQUESTS

The Market Access Grant waived a number of Commission rules and policies, and O3b requests that the same waivers be extended to grant of the instant modification application. The proposed change in configuration of the O3b satellites does not affect the rationale relied on by the Commission in granting these waivers.

In particular, as with the original Market Access Request, consideration of this modification application outside of a processing round is appropriate. The configuration change contemplated here does not affect the ability of the O3b system to share spectrum with other NGSO systems. As a result, the Commission's determination that authorizing operations with

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[11] *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).

[12] *AMSC Subsidiary Corp.*, Order and Authorization, DA 98-493, 13 FCC Rcd 12316 (IB 1998) ("*AMSC Modification Order*") at 12318, ¶ 8 (footnote omitted).

[13] Market Access Grant, Attachment to Grant at 1, ¶ 3.

the O3b system would not impede opportunities for new NGSO entrants to operate in the spectrum used by O3b applies with equal force to the O3b system as modified by the configuration change proposed herein.

To the extent necessary, O3b requests a waiver of the requirement in Section 25.114(c) of the Commission's rules, 47 C.F.R. § 25.114(c), to submit a Schedule S with this modification application. As discussed in the Technical Annex, the changes proposed to the O3b system configuration will not materially alter the system's operating characteristics. As a result, a new Schedule S would duplicate the information that is already on file with the Commission as part of the Market Access Request. The Technical Annex identifies the limited way in which the proposed operations would differ from those described in the prior Schedule S. Under these circumstances, O3b submits that a waiver of Section 25.114(c) would "not undermine the policy objective of the rule in question and would otherwise serve the public interest."[14]

CONCLUSION

For the reasons stated herein, the Commission should modify the Market Access Grant to permit O3b the flexibility to alter the configuration of its in-orbit satellites in order to respond to customer demand for additional system capacity.

Respectfully submitted,
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September 5, 2017

[14] *PanAmSat Licensee Corp.*, 17 FCC Rcd 10483, 10492 (Sat. Div. 2002) (footnotes omitted).

O3b Modification

Attachment A: Technical Annex

A.1 Scope

This attachment is submitted in support of the modification application of O3b Limited ("O3b") and contains the information required by §25.114(d) and other sections of the Commission's Part 25 rules relating to the proposed change in the configuration of the existing satellites in the O3b non-geostationary (NGSO) satellite system. O3b incorporates by reference the information previously supplied regarding the O3b system,[1] and certifies pursuant to §25.117(d)(1) that except as discussed herein, the information in the Market Access Request has not changed.

A.2 General Description of Overall System Facilities, Operations and Services (§25.114(d)(1))

Section A.2 of the Technical Annex submitted with the Market Access Request described a system of 12 satellites in orbit operating in a "9+3" configuration, with 9 active operational satellites evenly spaced around the orbit and 3 in-orbit spare satellites located close to three of the nine operational satellites. The instant modification application seeks the flexibility to permit O3b to transition to a "10+2" configuration by bringing one of the spare satellites online, drifting the satellites to achieve uniform spacing of the active satellites, and thereafter providing service using 10 active operational satellites and 2 in-orbit spare satellites.

A.3 Schedule S (§25.114(c))

A new Schedule S is not included with this filing. As discussed in the foregoing narrative, the Schedule S that was submitted with the Market Access Request remains accurate except in one respect. Specifically, the data in column (c) of Table S5 of the prior Schedule S, which contains the initial phase angle of the 12 in-orbit satellites, will change due to the re-spacing of the active satellites as a result of the reconfiguration. Following the reconfiguration, the ten active satellites

[1] *See* Applications of O3b Limited, Call Sign S2935, IBFS File Nos. SAT-LOI-20141029-00118 (the "Market Access Request") and SAT-AMD-20150115-00004.

will be separated by 36 degrees, rather than the 40-degree spacing between active satellites in the 9+3 configuration.

O3b provides below a copy of Table S5 that includes the information originally supplied in the Schedule S and shows the revised Initial Phase Angle data for the proposed 10+2 configuration in red in the final column.

S5. INITIAL SATELLITE PHASE ANGLE
For each satellite in each orbital plane, provide the initial phase angle.

(a) Orbital Plane No.	(b) Satellite number	(c) Initial Phase Angle (degrees)	(c) Initial Phase Angle (degrees)
1	1	0	0
1	2	40	36
1	3	80	72
1	4	120	108
1	5	160	144
1	6	200	180
1	7	240	216
1	8	280	252
1	9	320	288
1	10	2.5	324
1	11	122.5	2.5
1	12	242.5	182.5

Note that the two spare satellites (numbers 11 and 12) are planned to be re-phased but will still be offset from an active satellite by 2.5 degrees.

A.4 Protection of Other Services and Operations

The Technical Annex provided with the Market Access Request includes a detailed showing of the O3b system's compliance with measures intended to protect other authorized uses of spectrum, as follows:

- Section A.7 demonstrates the system's compliance with Commission and ITU Power Flux Density ("PFD") limits designed to protect the terrestrial Fixed Service from downlink interference from satellite transmissions. As explained in that section, compliance with the applicable PFD limits is evaluated on a per satellite basis, and the limits do not vary for

NGSO systems with multiple operational satellites until there are more than 50 NGSO satellites in the constellation.

- Section A.8 provides analyses showing the O3b system's ability to meet applicable equivalent power flux density limits in order to provide interference protection for GSO satellite networks (Section A.8.1); a description of the measures available to ensure that O3b's operations would be compatible with other NGSO systems (Section A.8.2); and showings that the O3b system will not cause harmful interference to terrestrial systems in the 17.8-18.3 GHz band (Section A.8.3) or in the 27.6-28.35 GHz band (Section A.8.4).
- Section A.10 describes the successful coordination of the O3b system for up to 24 satellites with U.S. government satellite networks.

As noted above, the showing of compliance with PFD limits to protect terrestrial services is valid for up to 50 active satellites. In other cases the interference analyses assumed a nominal 9+3 configuration of the O3b satellites, but O3b also provided in Section A.12 of the Technical Annex a showing regarding the impact of increasing the number of active satellites in the O3b system. O3b incorporates that showing by reference herein. As demonstrated in that discussion, the proposed change to a 10+2 configuration does not materially affect the interference profile of the O3b system and does not alter O3b's ability to share spectrum with other authorized users.

CERTIFICATION OF PERSON RESPONSIBLE FOR PREPARING ENGINEERING INFORMATION

I hereby certify that I am the technically qualified person responsible for preparation of the engineering information contained in this application, that I am familiar with Part 25 of the Commission's rules, that I have either prepared or reviewed the engineering information submitted in this application and that it is complete and accurate to the best of my knowledge and belief.

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September 5, 2017