

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

In the Matter of)
)
Kepler Communications Inc.) SAT-PDR-20161115-00114; Call Sign S2981
)
Petition for a Declaratory Ruling)
Granting Access to the U.S. Market)
for an NGSO FSS System)
)

COMMENTS OF SES S.A. AND O3B LIMITED

SES S.A. (“SES”) and its subsidiary O3b Limited (“O3b”), hereby comment on the above-captioned request for authority to serve the U.S. market with a non-geostationary orbit (“NGSO”) satellite system (the “Kepler Petition”).¹ Prior to acting on the Kepler Petition, the Commission must ensure that Kepler has adequately demonstrated how it will protect geostationary orbit (“GSO”) networks from interference. The Commission should defer consideration of Kepler’s request for relief from system construction and operation milestones. Finally, any authorization issued to Kepler must include terms and conditions consistent with those imposed on other operators, including O3b.

BACKGROUND

SES, one of the world’s largest commercial communications satellite operators, is uniquely positioned to address issues raised in the pending NGSO processing round because its facilities include both GSO and NGSO satellite fleets. SES entities operate more than 50 GSO satellites able to reach 99% of the world’s population, many of them pursuant to Commission authority. These spacecraft serve broadcasters, direct-to-home (“DTH”) service providers, and

¹ *Kepler Communications Inc.*, File No. SAT-PDR-20161115-00114.

corporate and government customers worldwide with offerings that include video and audio content distribution, DTH, private networks, broadband, satellite news gathering, aeronautical and maritime services, and mobile backhaul.

SES subsidiary O3b provides high-throughput, low-latency connectivity for enterprise, government, and mobility clients via an NGSO satellite network authorized to serve the U.S.² The O3b system combines satellite reach with fiber optic speed, delivering the performance of terrestrial networks in places those networks do not reach, and making affordable broadband connectivity possible for billions of consumers and businesses in nearly 180 countries. O3b currently operates twelve satellites in a Medium Earth Orbit (“MEO”) configuration, and has requested authority for additional spacecraft and spectrum to accommodate growing demand for O3b’s high-performance connectivity.³

The Kepler Petition seeks Commission market access authority for a new NGSO fixed-satellite service (“FSS”) system that would operate in Ku-band spectrum used by SES’s GSO networks. Before acting on the Petition, the Commission must ensure it has sufficient evidence that Kepler’s proposed NGSO operations will not interfere with GSO satellites. Additionally, the Commission should decline to grant Kepler a preemptive waiver of its milestone and bond requirements. Ultimately, any grant issued to Kepler must include terms and conditions like those applied to O3b and other NGSO FSS systems.

² *O3b Limited*, Call Sign S2935, File Nos. SAT-LOI-20141029-00118 & SAT-AMD-20150115-00004, grant-stamped Jan. 22, 2015, corrected and re-issued June 2, 2015 (the “O3b Market Access Grant”).

³ *O3b Limited*, Call Sign S2935, File Nos. SAT-MOD-20160624-00060; SAT-AMD-20161115-00116; & SAT-AMD-20170301-00026.

I. THE COMMISSION SHOULD REQUIRE KEPLER TO COMPLY WITH EPFD LIMITS TO ENSURE GSO OPERATIONS ARE PROTECTED

The Commission must require Kepler to comply with the Ku-band single-entry and aggregate equivalent power flux density (“EPFD”) limits in Section 25.208.⁴ SES operates GSO satellites in the Ku-band that provide critical services to a range of government and commercial customers across the globe. The Commission should not permit Kepler’s proposed new NGSO system to access GSO-primary spectrum used by these spacecraft unless it has adequate assurances that the NGSO system will comply with applicable EPFD limits designed to protect current and future GSO satellite networks from interference.

The Commission must take steps to ensure that applicable aggregate EPFD limits are met by all operating Ku-band NGSO systems in order to prevent interference to GSO networks. Kepler and the other Ku-band NGSO operators will need to work together to determine how they can manage their operations to avoid exceeding the applicable limits. Because it may be difficult for NGSO operators to reach agreement on these issues, the Commission must be prepared to step in as necessary to implement a solution that will constrain aggregate EPFD levels. Accordingly, any grant of Kepler’s Petition must incorporate aggregate EPFD compliance requirements and be subject to modification as necessary to keep aggregate interference levels within the specified limits.

The Commission should also require Kepler to demonstrate that it will maintain its interference profile regardless of the insertion altitude of its satellites. Kepler plans to launch its satellites at a target altitude of 600 km,⁵ but states that the actual altitude may be between

⁴ 47 C.F.R. §25.208(h).

⁵ Kepler Petition, Technical Narrative at 62.

500 km and 630 km.⁶ Kepler's satellites will not be equipped with propulsion and therefore will be unable to change orbit. Additionally, the altitude of Kepler's satellites will decrease by tens of kilometers over their 2-3-year lifetime. Thus, a satellite launched at 500 km will fall below 500 km during its lifetime. Such a change in altitude could increase interference to GSO operations unless the altitude drop is offset by a change in the satellite's EIRP density. Kepler asserts that the satellites' Software Defined Radios will enable changes to the EIRP, bandwidth and center frequency.⁷ The Commission should require Kepler to demonstrate that it can and will adjust its operating parameters to maintain its interference profile regardless of each satellite's operating altitude.

Finally, Kepler's technical narrative incorrectly labels the alpha angle between the GSO arc and the Kepler constellation as the exclusion zone angle.⁸ The exclusion zone angle should remain constant at each latitude for calculations under the current EPFD software used by the ITU. To the extent that this mislabeling is reflected in Kepler's calculations, Kepler should submit a recalculation using the constant exclusion zone angle.

II. THE COMMISSION SHOULD NOT GRANT KEPLER A PREEMPTIVE WAIVER OF ITS MILESTONE AND BOND REQUIREMENTS

The Commission should reject Kepler's request for a preemptive waiver of its system implementation milestone performance bond requirements. Kepler argues that the Commission's bond requirement may require Kepler to complete its constellation when "replacing existing satellites could potentially make better sense for end consumers and as such

⁶ *Id.*, Technical Narrative at 1; ODAR Analysis.

⁷ Kepler Petition, Technical Narrative at 62.

⁸ *Id.* at 9.

the business.”⁹ But a preemptive waiver could result in spectrum remaining unused and also unavailable to operators who could put it to valuable use. A preemptive waiver would therefore undermine the policy goals of the milestone and bond rules, which is to “prevent harmful ‘warehousing’ of spectrum and orbital resources.”¹⁰

III. ANY GRANT OF KEPLER’S PETITION SHOULD INCLUDE STANDARD OPERATING CONDITIONS

If the Commission determines that grant of Kepler’s Petition is in the public interest, it should include in the authorization conditions designed to ensure that the planned operations will be consistent with Commission policies and rules as well as with international coordination obligations. The Commission can look to the O3b Market Access Grant and the authorization recently issued for the OneWeb system¹¹ for appropriate language on these matters. In particular, the following condition paragraphs from the O3b Market Access Grant should be applied to any grant of Kepler’s Petition:

Preamble: Operations pursuant to the grant must comport with the legal and technical specifications set forth by the applicant or petitioner and with Federal Communications Commission rules not waived herein.¹²

⁹ Kepler Petition, Narrative at 16.

¹⁰ *Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters*, Notice of Proposed Rulemaking, 31 FCC Rcd 13651, 13663, ¶ 31, n. 77 (2016).

¹¹ WorldVu Satellites Limited Petition for a Declaratory Ruling Granting Access to the U.S. Market for the OneWeb NGSO FSS System, File No. SAT-LOI-20160428-00041, Order and Declaratory Ruling, FCC 17-77 (rel. June 23, 2017) (the “OneWeb Market Access Grant”).

¹² Under the specific circumstances presented, the Commission determined that including this language in the OneWeb Market Access Grant was unnecessary (*see id.* at 11 n.71), but SES and O3b note that this provision is standard in International Bureau space station license grants and market access authorizations. *See, e.g.*, SES Americom, Inc., File No. SAT-MOD-20170316-00051, granted June 14, 2017, Attachment to Grant at 1; SES Satellites (Gibraltar) Ltd., File No. SAT-PPL-20160512-0048, granted Dec. 7, 2016, Attachment to Grant at 2. Consistent with this precedent, the language should be included in any grant of the Kepler Petition.

Condition 1: Limitation of services that can be provided to include only those covered by the WTO agreement.

Condition 2: Operations must comply with all coordination agreements.

Condition 3: Requirement to maintain and make available to the North American Defense Command ephemeris data for each satellite.

Condition 5: Requirement to comply with applicable PFD limits.

Condition 6: Requirement to comply with applicable EPFD limits.

Condition 9: Specification that operations are secondary to GSO FSS.

Condition 10: Specification that operations must comply with the sharing method specified in Section 25.261.

Condition 11: Restrictions on the ability to reposition or activate satellites in the NGSO constellation without Commission approval.

Condition 12: Designation of the means by which the system will share spectrum with other NGSO constellations issued prior to or as part of this processing round.

Condition 15: Specification regarding the orbital debris regulatory framework for applicants relying on the orbital debris mitigation rules of other jurisdictions.

Any Kepler grant should also include a provision similar to paragraph 26 of the OneWeb Market Access Grant specifying that authorizations granted are subject to modification in order to conform to future rules or policies adopted by the Commission.

Incorporation of the above provisions is consistent with Commission rules and precedent and is necessary to ensure that operations pursuant to Kepler's Petition will conform to applicable regulatory requirements.

IV. CONCLUSION

For the foregoing reasons, any grant of the Kepler Petition should be subject to appropriate conditions to ensure protection of GSO operations. The Commission should not preemptively waive its milestone and bond requirements and should employ standard condition language in any grant.

Respectfully submitted,

SES S.A. AND O3B LIMITED

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CERTIFICATE OF SERVICE

I hereby certify that on this 11th day of September, 2017, I caused to be served a true copy of the foregoing “Comments of SES S.A. and O3b Limited” by first class mail, postage prepaid, on the following:

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