

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

In the Matter of)	
)	
EOS Defense Systems USA, Inc.)	File No. SAT-MOD-20200526-00057
)	Call Sign S2982
Modification of Authorization for Audacy)	
NGSO Satellite System)	

PETITION TO DENY OR CONDITION OF O3B LIMITED

O3b Limited (“O3b”) requests that the Commission deny, or at a minimum, impose conditions on any grant of, the above-captioned application by EOS Defense Systems USA, Inc. (“EOS”) for authority to modify its license for a non-geostationary satellite orbit (“NGSO”) constellation.¹ As discussed below, EOS has not justified its request to add mobile-satellite service (“MSS”) feeder link spectrum to its planned constellation. Moreover, the changes EOS proposes in how it would operate in the Ka-band frequencies for which it already has authority would result in significant new interference to O3b. Accordingly, the Modification can be considered only as part of the most recent NGSO processing round that closed in May 2020, with any grant subject to conditions requiring that EOS protect O3b’s authorized operations.

INTRODUCTION AND SUMMARY

O3b, which began offering Ka-band NGSO service to the United States in 2014, has a strong interest in the Modification. In 2018, Audacy Corporation (“Audacy”) was granted

¹ *EOS Defense Systems USA, Inc.*, Call Sign S2982, File No. SAT-MOD-20200526-00057 (“Modification”). Earlier this year the International Bureau authorized Electro Optic Systems Holdings Ltd, EOS’ parent company, to acquire control of the Audacy License. *See Electro Optics Systems Ltd.*, Call Sign S2982, File No. SAT-T/C-20200124-00013, granted March 5, 2020.

authority to construct, deploy, and operate a medium-earth orbit satellite system to provide communications between other NGSO satellites and gateway earth stations using frequencies in the inter-satellite service (“ISS”) and fixed-satellite service (“FSS”).² Now EOS proposes to drastically alter and expand its initially licensed system in such a way that will effectively create a fundamentally different system. However, the Modification does not demonstrate that the redesigned EOS operations would comply with Commission rules or be compatible with the authorized O3b network.

EOS asks to add Ka-band frequencies in the 17.7-18.6 GHz and 18.8-19.7 GHz bands for downlink operations and 27.5-29.5 GHz band for uplink operations.³ Included in these ranges are band segments designated for use by MSS feeder links, with no allocation for NGSO FSS. Yet EOS neither requests authority to provide MSS or justifies any non-conforming use, and EOS is silent on the requirement to coordinate with O3b and other providers already authorized to operate in this spectrum.

EOS also seeks to expand its use of the 19.7-20.2 GHz and 29.5-30.0 GHz bands from the off-nominal TT&C operations permitted under the Audacy License to full feeder link communications between gateways and the relay satellites.⁴ To accommodate this changed function, the Modification proposes to alter the antenna characteristics, employ a higher gain,

² See *Audacy Corp.*, 33 FCC Rcd 5554 (2018) (“Audacy License”). The Audacy License authorizes use of the 37.5-42.0 GHz and 47.2-50.2 GHz bands for feeder links and the 22.55-23.18 GHz, 23.38-23.55 GHz, 24.45-24.75 GHz, 32.3-33.0 GHz, 54.25-56.9 GHz, 57.0-58.2 GHz, and 65.0-71.0 GHz bands for ISS operations. The EOS Network is also authorized to use the 19.7-20.2 GHz and 29.5-30.0 GHz bands for back-up telemetry, tracking, and command (“TT&C”) functions.

³ See Modification, Exhibit A at 2.

⁴ See *id.*

and transmit at a significantly higher power. As discussed below, these modifications would produce dangerous levels of interference to O3b’s system.

Thus, contrary to EOS’s assertion, the changes proposed to operations in the previously licensed Ka-band spectrum would in fact “alter the nature of the authorized Audacy Network” and go far beyond merely enhancing the system’s capabilities.⁵ Because these changes would significantly increase interference to O3b, the Commission cannot grant the Modification on the record before it. If the Commission does not deny the Modification outright, it must at least find that the breadth of the changes necessitate treating the redesigned system as newly filed and no longer eligible for consideration as part of the Ku/Ka-band NGSO processing round that closed in November 2016. Instead, EOS must be required to show that it can and will protect the Ka-band operations of O3b and other systems authorized in the November 2016 round from harmful interference.

I. THE EOS REQUEST FOR MSS FEEDER LINK SPECTRUM MUST BE DENIED

The Commission must deny the portion of the Modification that seeks authority to use the MSS feeder link bands, 19.4-19.6 GHz and 29.1-29.5 GHz. The Commission has recently reiterated that these spectrum segments “can only be used by NGSO systems for feeder links to MSS space stations.”⁶ The EOS Modification, however, never mentions MSS, and the only service category identified in the Schedule S for Ka-band operations is FSS.⁷ The EOS filing includes a section on requested waivers of Commission rules,⁸ but EOS does not seek – or even

⁵ See *id.* at 1-2.

⁶ *Kuiper Systems, LLC*, Order and Authorization, FCC 20-102 (rel. July 30, 2020) at ¶ 19.

⁷ Modification, Schedule S, Operating Frequency Bands.

⁸ *Id.*, Narrative at 7-11.

acknowledge the need for – a waiver of the Table of Allocations in Section 2.106 to permit EOS to use MSS feeder link spectrum for NGSO FSS operations.

Nor is there any basis on which the Commission could waive the rules on its own motion to permit noncompliant use. The Commission has allowed operations inconsistent with the Table of Allocations “when there is little potential for interference into any service authorized under the Table of Frequency Allocations and when the non-conforming operator accepts any interference from authorized services.”⁹ The EOS Modification satisfies neither element of this test.

As part of the November 2016 Ka-band NGSO processing round, the Commission authorized O3b to provide MSS in the United States supported by feeder links in the 19.4-19.6 GHz and 29.1-29.5 GHz bands.¹⁰ The initial O3b satellites that will utilize this spectrum are already in orbit, and additional spacecraft with these frequencies are scheduled for launch by 2021. Moreover, O3b has earth station applications pending before the Commission seeking to use the NGSO MSS feeder link spectrum.¹¹

EOS does not show how it would prevent interference to the conforming operations of O3b in these band segments or commit to accepting any interference from the O3b operations. This silence is fatal to the EOS request for a modified license that includes the MSS feeder link bands.

⁹ *The Boeing Company*, 16 FCC Rcd 22645, 22651 (IB & OET 2001).

¹⁰ *See O3b Limited*, Order and Declaratory Ruling, 33 FCC Rcd 5508, 5516, ¶¶ 21-22 (2018).

¹¹ *See O3b Limited*, Call Sign E100088, File No. SES-MOD-20190207-00084, granted in part and deferred in part, Nov. 26, 2019; Call Sign E202133, File No. SES-LIC-20200721-00777.

II. THE COMMISSION MUST REQUIRE EOS TO PROTECT O3B AND OTHER KA-BAND SYSTEMS AUTHORIZED IN THE NOVEMBER 2016 ROUND

Because EOS proposes radical changes to the operating characteristics for the Ka-band frequencies assigned in the Audacy License that would significantly alter the interference environment, the Commission must consider the system as newly filed. These changes disqualify the EOS system from being treated on an equal basis with other Ka-band systems granted as part of the processing round that closed in November 2016, including the authorized O3b network. If the Commission ultimately grants the Modification, it must impose conditions that ensure the EOS system will not cause harmful interference to O3b.

The EOS Modification implicitly recognizes that requests to add spectrum not covered by the Audacy License will be considered as part of the processing round that closed in May 2020, meaning that EOS operations in these bands must not interfere with, and must accept interference from, operations authorized via the November 2016 processing round. But EOS does not discuss the implications of its plan to change how it will use its previously licensed Ka-band spectrum. The Commission’s standard for evaluating NGSO modification applications is clear: if proposed changes worsen the interference environment for other authorized operators, the system loses its rights to equal status with participants in an earlier processing round.

Specifically, in the Teledesic proceeding the International Bureau explained that if a modification application presents “significant interference problems, we would treat the modification as a newly filed application.”¹² The Bureau more recently noted that this approach is “consistent with the purpose of the Commission’s processing round procedure, which is designed to establish the interference environment in which participants in the processing round

¹² Teledesic LLC, 14 FCC Rcd 2261 (IB 1999) (“Teledesic”) at 2264, ¶ 5.

could operate their systems.”¹³ Determining a modification’s effect on the interference environment requires consideration of both whether the changes will cause additional interference to other systems and whether the changes make the applicant more vulnerable to interference from other systems.¹⁴

EOS’s assertion that it will be “a good steward of the licensed band amongst the NGSO family of users”¹⁵ does not satisfy the Commission’s test. As demonstrated below, the material and fundamental changes EOS proposes in use of the previously authorized Ka-band spectrum would drastically increase the amount of interference both to O3b and to EOS, impermissibly degrading the overall NGSO sharing environment.

Currently, the Audacy License authorizes use of the 19.7-20.2 GHz and 29.5-30.0 GHz bands for back-up TT&C and feeder link functions only during emergency recovery operations, but EOS now proposes to use this spectrum for “routine feeder link service employing more higher gain, directional antennas.”¹⁶ Table 1 highlights the significant resulting changes in the planned technical parameters.

Table 1: Schedule S Parameters from the Audacy License and the EOS Modification

	Uplink	Downlink	
	G/T at Max. Gain Point	Max. Transmit EIRP Density	Max. Transmit EIRP
Original Audacy	-19 dB/K	-67.5 dBW/Hz	19.5 dBW
Modified EOS	21.4 dB/K	-16.7 dBW/Hz	70.3 dBW

¹³ *Space Exploration Holdings, LLC*, Order and Authorization, 34 FCC Rcd 2526 (IB 2019) (“SpaceX First Modification Order”) at 2529, ¶ 9 & n.31, *citing Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters*, Report and Order and Further Notice of Proposed Rulemaking, 32 FCC Rcd 7809 (2017) (“NGSO Order”) at 7829, ¶ 61.

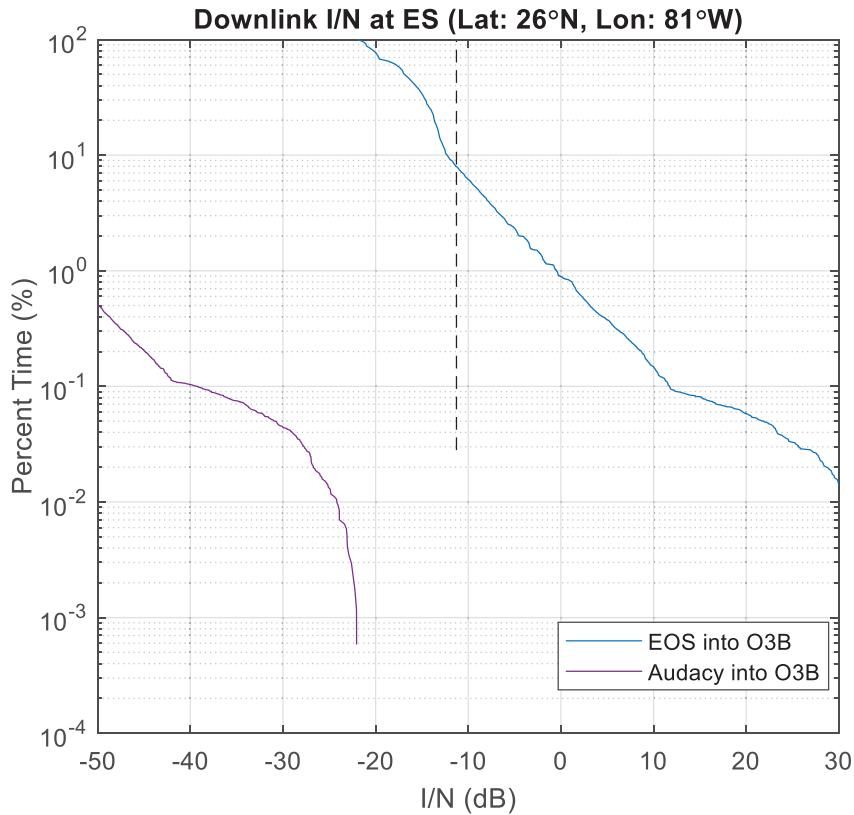
¹⁴ SpaceX First Modification Order, 34 FCC Rcd at 2530, ¶ 11 and 2531, ¶ 14.

¹⁵ Modification, Exhibit A at 15.

¹⁶ *Id.*, Narrative at 5.

Thus, the changes proposed in the Modification would increase the G/T by 40.4 dB for the space station receiving beams in the 29.5-30.0 GHz band. In the 19.7-20.2 GHz downlink band, EOS proposes a significant increase of 50.8 dB in the maximum transmit EIRP. These alterations will not only create more interference to O3b's downlink operations but will also make the EOS uplink more susceptible to interference from O3b. Figure 1 illustrates the impact, comparing a cumulative distribution function ("CDF") of the interference-to-noise ("I/N") ratio in the downlink direction for an earth station at 26° N.L., 81° W.L. with a 0.85 m antenna.

Figure 1 : CDF of I/N Downlink, 19.7-20.2 GHz band



EOS's claim that that the Modification will merely "supplement" the Audacy License¹⁷ is utterly misleading, as these proposed changes would pose severe challenges for O3b and other NGSO operators authorized as part of the November 2016 processing round. Figure 1 shows that the trigger for band-splitting among NGSO systems under the Commission's rules,¹⁸ an increase in system noise temperature of 6 percent, corresponding to an I/N of -12.2 dB, is exceeded for approximately 8% of the time for the proposed EOS constellation as modified while for the original Audacy authorized constellation this I/N level would never be reached. Although EOS claims that the system modifications would benefit its customers, these changes

¹⁷ Modification, Exhibit A at 4.

¹⁸ 47 C.F.R. § 25.261(c).

would be detrimental to O3b’s operations and would degrade the NGSO interference environment. Therefore, consistent with precedent and the Commission rules, the Commission must conclude that this Modification is eligible for consideration only as part of the processing round that closed in May.

As such, if the Commission allows the changes EOS seeks, the grant must impose conditions that ensure O3b’s authorized Ka-band operations will not be adversely affected. Whether using the new Ka-band frequencies requested in the Modification or the previously licensed frequencies with the proposed altered operating characteristics, EOS must be treated as a 2020 processing round applicant, prohibited from causing interference to O3b operations authorized in the November 2016 round and required to accept any interference generated by O3b’s authorized transmissions. Imposing this burden on EOS is consistent with the express objective of the Commission’s processing round framework,¹⁹ as it will protect O3b’s reasonable expectations regarding the enforcement environment and prevent the EOS changes from impairing O3b’s service to customers or undermining the value of O3b’s investments in its global satellite and ground station network.

¹⁹ NGSO Order, 32 FCC Rcd at 7829 ¶ 61 (processing rounds are intended “to establish a sharing environment among NGSO systems, to provide a measure of certainty in lieu of adopting an open-ended requirement to accommodate all future applicants,” and consideration of subsequent filings must take into account “the need to protect existing expectations and investments”).

III. CONCLUSION

Because EOS has not justified its request for MSS feeder link spectrum and has proposed changes that will adversely affect the Ka-band NGSO interference environment, the Commission should deny the Modification or impose conditions to prevent harmful interference to O3b.

Respectfully submitted,

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August 31, 2020

AFFIDAVIT

1. I am Vice President, Regulatory for O3b Limited.
2. I have reviewed the foregoing Petition to Deny or Condition of O3b Limited. All statements made therein are true and correct to the best of my knowledge, information, and belief.

I declare under penalty of perjury that the foregoing is true and correct.

By: /s/ Suzanne Malloy

Date: August 31, 2020

CERTIFICATE OF SERVICE

I hereby certify that on this 31st day of August, 2020, I caused to be served a true and correct copy of the foregoing “Petition to Deny or Condition of O3b Limited” on the following:

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/s/
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