

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)	
)	
Viasat, Inc.)	File No. SAT-MPL-20200526-00056
)	Call Sign S2985
Application to Modify Market Access)	
Grant for the Viasat NGSO Satellite System)	
)	

PETITION TO DENY OR CONDITION OF O3B LIMITED

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TABLE OF CONTENTS

INTRODUCTION AND SUMMARY	1
I. THE COMMISSION MUST REJECT VIASAT’S REQUEST FOR TREATMENT OF THE MODIFICATION AS PART OF THE 2016 PROCESSING ROUNDS	3
A. Viasat Cannot Maintain its Processing Round Position Given the Exponential Increase in Number of Satellites Proposed.....	4
B. Viasat’s Claims Regarding Interference to O3b Are Unproven.....	6
C. Viasat Will Experience Additional Interference from O3b.....	8
D. The Commission Must Require Viasat to Protect O3b and Other Systems Authorized in the 2016 Processing Rounds	11
II. CONCLUSION.....	12

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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-referenced application by Viasat, Inc. (“Viasat”) for modification of its authority to serve the United States using a Ka- and V-band non-geostationary satellite orbit (“NGSO”) constellation.¹ As discussed below, the record does not support Viasat’s claims that the radical changes it proposes to its authorized system can be implemented without materially worsening the NGSO interference environment. If it does not reject the Modification outright, the Commission must at a minimum determine that the proposed redesign with an exponential increase in the number of satellites renders the Viasat system fundamentally different from what was previously approved, requiring that the system be treated as newly filed. Any grant of the Modification must make clear that Viasat is not entitled to share spectrum on an equal basis with O3b or other systems authorized pursuant to the 2016 processing rounds.

INTRODUCTION AND SUMMARY

O3b, which began offering Ka-band NGSO service to the United States in 2014, has a strong interest in the Modification. Viasat proposes major changes to the NGSO system the

¹ *Viasat, Inc.*, Call Sign S2985, File No. SAT-MPL-20200526-00056 (“Modification”).

Commission initially authorized a little more than a month before the application was filed.² Specifically, the Viasat Grant contemplated 20 satellites in medium earth orbit altitude at 8200 km and an inclination of 87 degrees.³ Viasat now proposes a completely different constellation, expanding the fleet's size by a factor of more than fourteen to 288 space stations, abandoning its initial altitude altogether in favor of a low earth orbit at 1300 km, changing the inclination to 45 degrees, and doubling the number of orbital planes from four to eight.⁴

Viasat argues that the Modification should be treated on a par with systems authorized pursuant to the NGSO processing rounds that closed in 2016 because Viasat is not seeking additional frequencies and will operate “within the same technical envelope and operating environment established” in those rounds.⁵ However, if it looks like a duck and quacks like a duck, then it is an entirely new constellation, with no material resemblance to Viasat's previously authorized MEO constellation. Viasat's attempts to frame its far-reaching changes as consistent with Commission precedent⁶ are unavailing, as it points to no examples in which an applicant has been allowed to implement *any* increase in the number of satellites, much less a jump from 20 to 288, while still being considered part of its original processing round.

Moreover, Viasat's contentions that the proposed system redesign would not worsen the NGSO interference environment are contradicted by the facts. Viasat does not disclose the number of co-frequency satellites simultaneously transmitting to a given earth station (known as “N_{co}”), but O3b has run calculations for a variety of assumed N_{co} values. In at least one

² *Viasat, Inc.*, Order and Declaratory Ruling, FCC 20-56 (rel. Apr. 23, 2020) (“Viasat Grant”).

³ *See id.* at ¶¶ 1-2.

⁴ Modification, Exhibit A at 1-2.

⁵ *Id.* at 2.

⁶ *Id.* at 2-3.

scenario, the results show significantly higher interference due to the Modification that would be unacceptable to O3b.

Viasat makes no showing at all regarding whether its revised system would be more likely to experience interference from O3b, ignoring this critical factor in determining the effect of its Modification on the overall interference environment. Viasat suggests that it plans to use lower operating power in conjunction with reducing its satellites' orbital altitude,⁷ and O3b calculates that these changes would make Viasat's system more susceptible to interference, triggering the requirement for band-splitting.

Thus, Viasat has failed to justify its assertion that the "modification will neither create significant interference problems, nor make sharing significantly more difficult."⁸ Viasat is not entitled to maintain its status in the 2016 processing rounds and has not demonstrated that it can successfully operate while protecting systems authorized during those rounds. Accordingly, the Commission must either deny the Modification as contrary to the public interest or at a minimum, consider the new ViaSat system design as a new filing pursuant to the 2020 processing round.

I. THE COMMISSION MUST REJECT VIASAT'S REQUEST FOR TREATMENT OF THE MODIFICATION AS PART OF THE 2016 PROCESSING ROUNDS

The Commission must recognize the Modification for what it is: a proposal for a completely different NGSO system than the one authorized in the Viasat Grant. Given the fundamental changes Viasat seeks, the Commission cannot accede to Viasat's insistence that the filing be processed as if it were a minor tweak to the constellation described in its 2016

⁷ *Id.* at 4 ("because the satellites are located much closer to Earth, less uplink and downlink EIRP density is needed to close the links than before").

⁸ *Id.*

applications. Unless Viasat makes clear that it is prepared to protect systems authorized in the 2016 rounds, the Modification must be denied.

**A. Viasat Cannot Maintain its Processing Round Position
Given the Exponential Increase in Number of Satellites Proposed**

The change from 20 to 288 satellites, standing alone, disqualifies the Modification from consideration as part of the 2016 processing rounds under relevant Commission precedent.

Viasat's attempt to evade explicit Commission language addressing this issue must be rejected.

Specifically, in adopting the NGSO sharing regime currently in place, the Commission made clear that operators can ask to modify their authorizations “at any time to deploy additional satellites” and that such requests “will be considered on a case-by-case basis as ‘NGSO-like’ applications filed after a processing round.”⁹ This “case-by-case” treatment, of course, is identical to what the NGSO Order prescribed for wholly new applications filed after a processing round cutoff date, and the Commission made clear that the co-equal sharing regime established in the decision did not extend to such proposals.¹⁰ The Commission determined that this approach was necessary “to provide a measure of certainty” to processing round participants and “protect existing expectations and investments.”¹¹ The International Bureau more recently confirmed that any proposed increase in satellite quantity is relevant to assessing whether a modification is in the public interest, as it directly affects “the number of spatial configurations

⁹ *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 7831, n.150.

¹⁰ *See id.* at 7829, ¶ 61.

¹¹ *Id.*

that have the potential for generating interference” between the applicant and other NGSO systems.¹²

Viasat’s attempt to suggest that the Commission’s conclusion regarding treatment of proposals to deploy more satellites applies only in cases where “a licensee has already deployed its system”¹³ cannot be squared with either the Commission’s language or with common sense. The NGSO Order expressly addressed proposals for more satellites filed “at any time,”¹⁴ and there is certainly no reason why the Commission should treat Viasat’s request to radically change a system for which it just received authority and has yet to deploy a single satellite more favorably than a filing by an operator that is actively building out its constellation and determines it needs to add satellites to meet evolving demand.

Consistent with its explicit policies, the Commission must consider the Viasat request to multiply the size of its fleet by a factor of more than fourteen as a new system proposal outside the scope of the 2016 processing rounds. Sanctioning such a radical change would render the Commission’s processing round framework meaningless, opening the door to any number of late-filed modifications that could take a small NGSO constellation and make it into a mega constellation. The Commission should reject Viasat’s blatant attempt to completely redesign and expand a processing round application years after the relevant cutoff dates.

¹² *Space Exploration Holdings, LLC*, Order and Authorization, 34 FCC Rcd 2526 (IB 2019) (“SpaceX First Modification Order”) at 2530, ¶ 11.

¹³ Modification, Exhibit A at 4 n.19.

¹⁴ NGSO Order, 32 FCC Rcd at 7831, n.150.

B. Viasat's Claims Regarding Interference to O3b Are Unproven

Viasat recognizes that changes that increase interference to 2016 NGSO processing round participants would disqualify the Modification from treatment as part of those rounds.¹⁵ Indeed, the International Bureau has emphasized that if “a modification would worsen the interference environment, that would be a strong indication that grant of the modification would not be in the public interest.”¹⁶ Viasat, however, fails to adequately support its arguments that O3b would suffer no adverse effects as a result of the proposed system redesign.

As noted above, the Modification does not specify N_{co} , the number of co-frequency satellites that could simultaneously be transmitting within view of a single earth station. This number is a critical variable in determining whether the modified constellation will cause additional interference to other NGSO systems operating in the same spectrum.

As demonstrated below, O3b's calculations show at least one scenario where the changes sought in the Modification would materially increase interference to O3b's system. For purposes of its analyses, O3b assumes that all Viasat satellites visible from an earth station may operate co-frequency. At the site considered below, the interference would increase beyond acceptable levels. Figure 1 illustrates the impact, comparing a cumulative distribution function (“CDF”) of the interference-to-noise (“I/N”) ratio for the already authorized system and for the Modification in the downlink direction for an earth station located at 35° N.L., 80.5° W.L. with a 0.85 m antenna.

¹⁵ Modification, Exhibit A at 3-4.

¹⁶ SpaceX First Modification Order, 34 FCC Rcd at 2529, ¶ 9.

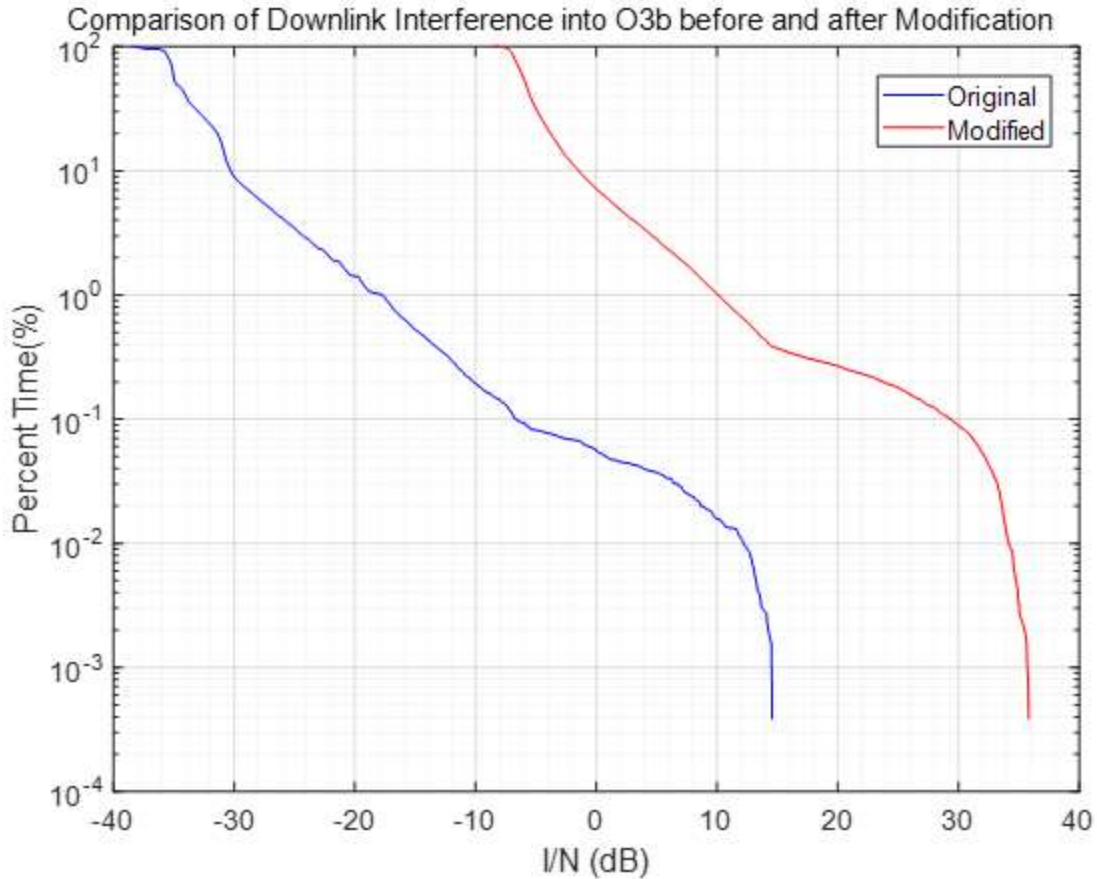


Figure 1: CDF of I/N Downlink, 19.7-20.2 GHz, 35° N.L., 80.5° W.L.

O3b has also calculated the effect of the increased number of satellites proposed in the Modification on the total duration of inline events, defined for this purpose as a separation angle between an O3b satellite and a Viasat satellite of less than 5 degrees. Figure 2 demonstrates that an earth station located at 34° N.L., 99° W.L. would experience far more inline events if the changes proposed in the Modification were implemented than it would with the authorized Viasat system. Specifically, over the course of the simulation time, this earth station would be affected by inline events with the currently authorized Viasat system for approximately 700 seconds, but that would jump to more than 2700 seconds with the system proposed in the Modification, lengthening the total duration of inline events by a factor of more than 3.8.

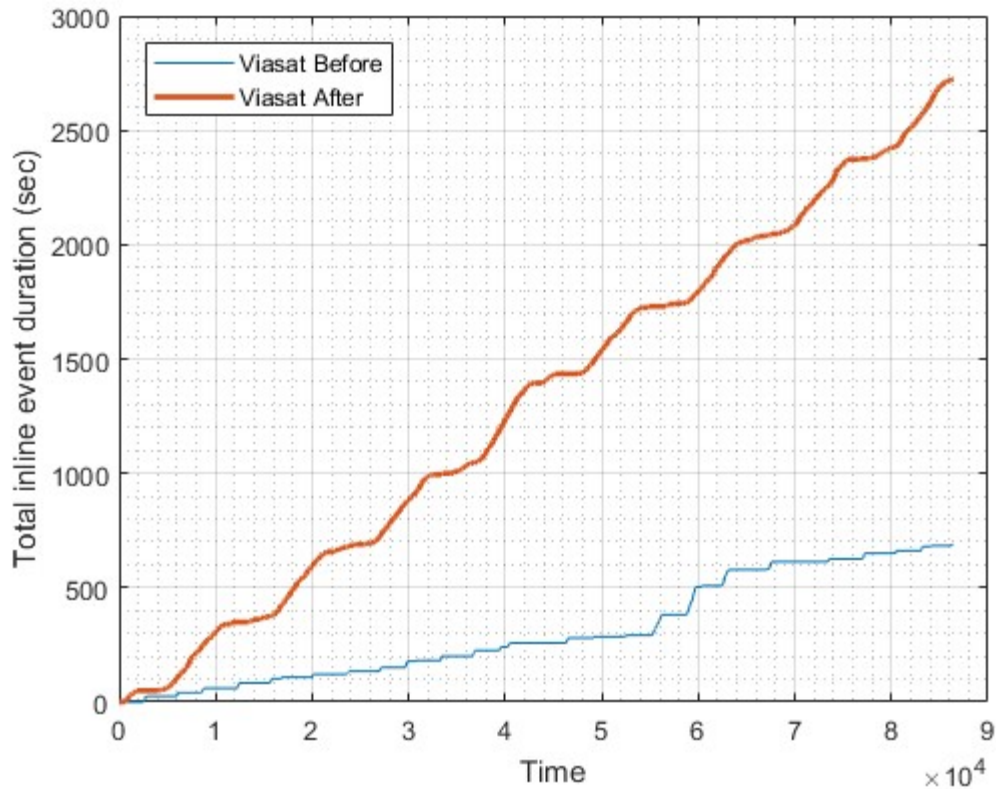


Figure 2: Total in-line event duration against simulation time in seconds, 34° N.L., 99° W.L.

In short, based on the record before it, the Commission cannot accept Viasat’s claims that its Modification will not increase interference to other NGSO systems authorized in the 2016 processing rounds.

C. Viasat Will Experience Additional Interference from O3b

Another element that is equally important in assessing the Modification is whether Viasat would receive more interference from other 2016 processing round systems as a result of the changes, but Viasat fails to address this point at all. The International Bureau has explained that determining a modification’s effect on the interference environment requires consideration not only of whether the changes will cause additional interference to other systems but also whether the changes make the applicant more vulnerable to interference from other systems.¹⁷

¹⁷ SpaceX First Modification Order, 34 FCC Rcd at 2530, ¶ 11 and 2531, ¶ 14.

Based on the information available, O3b calculates that the Modification would increase the interference O3b's transmissions would cause to Viasat. In particular, although Viasat proposes to deploy all its planned satellites much closer to the Earth than previously authorized, the gain-to-noise temperature ("G/T") values for the network in the 27.5-28.35 GHz portion of the Ka-band have changed only modestly, from a peak G/T of 22 dB/K in the original Viasat filing¹⁸ to 19.1 dB/K in the Modification.¹⁹ The G/T describes the satellite receiver's sensitivity to uplink emissions, both wanted and interfering, and this slight decrease in G/T is not commensurate to the significant change in path loss resulting from the lower altitude, which is roughly 16 dB.

The inevitable consequence of the Viasat proposals is that interference to Viasat stemming from O3b's transmitting earth stations will be magnified under the system configuration described in the Modification. Transmissions originating from O3b's earth stations will be just as strong as they are today, but they will encounter less path loss on the way to the Viasat satellites due to the substantially lower altitude. As a result, the O3b signal power will be greater when received at the Viasat satellite than it would if the satellite were further away. By reducing orbital altitudes without making its receivers materially less sensitive, Viasat has created a situation that will necessarily increase the interference it experiences.

Figure 3 below compares a CDF of the I/N ratio for the authorized Viasat system and the Modification in the uplink direction for an earth station site located 35° N.L., 80.5° W.L. with a 0.85 m antenna. O3b's calculations show that the changes sought in the Modification would materially increase O3b's interference into Viasat's system.

¹⁸ *Viasat, Inc.* Call Sign S2985, File No. SAT-APL-20180927-00076, Schedule S, description of Receiving Beam 2.

¹⁹ Modification, Schedule S, description of Receiving Beams 1 and 2.

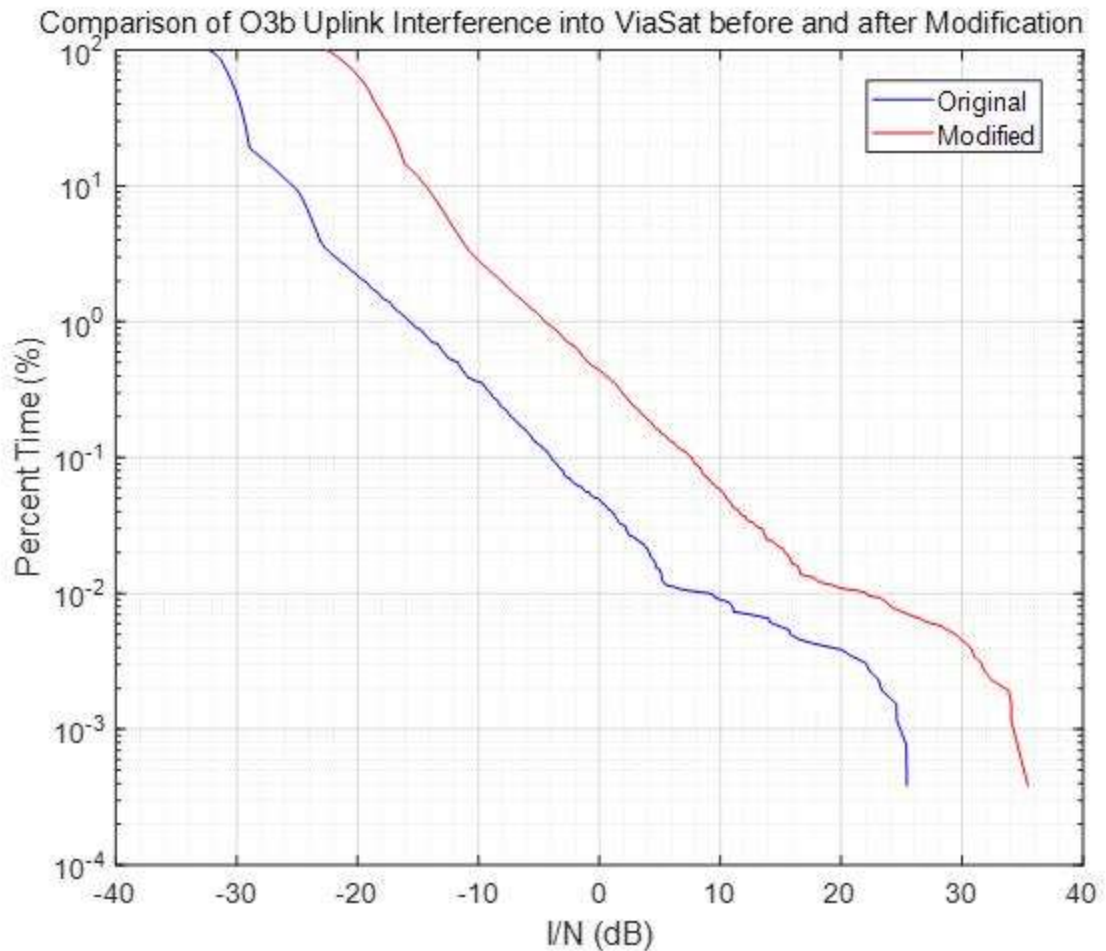


Figure 3: CDF of I/N Uplink, 27.5-28.35 GHz, 35° N.L., 80.5° W.L.

The International Bureau has highlighted this concern in other decisions.²⁰ The justification for evaluating any increase in interference to a modification proponent is clear: the Commission cannot permit an applicant to unilaterally make changes to its system that increase its susceptibility to interference and then claim entitlement to protection for its more vulnerable operations.

²⁰ See SpaceX First Modification Order, 34 FCC Rcd at 2531, ¶ 15 (lowering the “operational altitudes of SpaceX’s satellites will result in the transmissions from earth stations of other NGSO FSS systems reaching SpaceX’s satellites at a higher power level because of less spreading losses between the earth station and the satellites at closer distances than previously proposed”).

That is particularly the case in NGSO-to-NGSO sharing, which requires band-splitting if a defined interference threshold is exceeded for either of the systems involved in an inline event.²¹ Under these circumstances, Viasat proposals that make it more vulnerable to interference can translate directly into depriving other NGSO operators of access to the full available spectrum – a result that cannot be reconciled with the Commission’s policies for fair treatment of competing NGSO operators. O3b must not be made to suffer the consequences of Viasat’s own system reconfiguration choices.

The Modification completely fails to address these issues. Because the changes Viasat proposes would make its system “more susceptible to interference from other NGSO FSS systems, which would change the operating environment,”²² grant of the Modification would be contrary to Commission policies.

D. The Commission Must Require Viasat to Protect O3b and Other Systems Authorized in the 2016 Processing Rounds

Thus, Viasat is not entitled to keep its place in the 2016 processing rounds with this fundamentally different system proposal. The Commission must accordingly either deny the Modification or impose conditions to make clear that Viasat’s currently planned design will be treated as a new filing as part of the processing round that closed in May. The conditions must specify that the Viasat system will not cause harmful interference to, and must accept interference from, O3b’s authorized operations.

²¹ See 47 C.F.R. § 25.261(c).

²² SpaceX First Modification Order, 34 FCC Rcd at 2531, ¶ 14

II. CONCLUSION

For the foregoing reasons, the Commission should deny the Viasat Modification or condition any grant to protect O3b's authorized operations.

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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