[Oral Argument Scheduled for December 3, 2021]

Nos. 21-1123, 21-1125, 21-1127, 21-1128

IN THE UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

VIASAT, INC., et al.,
Appellants,

v.

FEDERAL COMMUNICATIONS COMMISSION,
Appellee,

SPACE EXPLORATION HOLDINGS, LLC,
Intervenor for Respondent.

On Appeal from the Federal Communications Commission
IBFS File No. SAT-MOD-20200417-00037

SPACE EXPLORATION HOLDINGS, LLC'S FINAL RESPONSE BRIEF AS INTERVENOR FOR RESPONDENT

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CERTIFICATE AS TO PARTIES, RULINGS, AND RELATED CASES

A. Parties and *Amici*

Except for *amici curiae* TechFreedom and Professor Andy Lawrence, all parties, intervenors, and *amici* appearing before the Federal Communications Commission and in this Court are listed in the Brief for Appellants Viasat, Inc. and The Balance Group.

Pursuant to Federal Rule of Appellate Procedure 26.1 and Circuit Rule 26.1, counsel for SpaceX states that Space Exploration Holdings, LLC is a direct wholly owned subsidiary of Space Exploration Technologies Corp., a privately held Delaware corporation in which the sole shareholder who is the beneficial owner of a 10% or greater interest is Elon Musk, as trustee of a private trust.

B. Rulings Under Review

References to the rulings at issue appear in the Brief for Appellants Viasat, Inc. and The Balance Group.

C. Related Cases

These consolidated appeals were not previously before this Court or any other court. Counsel is not aware of any related cases.

/s/Pratik A. Shah
Pratik A. Shah

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ITU	International Telecommunication Union
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ISSUES PRESENTED

I. Whether the Federal Communications Commission's application of its radiofrequency interference rules to alleged interference was arbitrary, capricious, or otherwise not in accordance with law.

II. Whether the Federal Communications Commission reasonably determined that the challengers failed to provide a sufficient record basis for overcoming the categorical exclusion from further environmental processing under the National Environmental Policy Act.

STATUTES AND REGULATIONS

Relevant statutes and regulations are reproduced in the addendum.

INTRODUCTION

Two competitors of Space Exploration Holdings, LLC ("SpaceX") and a putative membership organization challenge the Federal Communications Commission's approval of a license modification concerning 2,824 SpaceX satellites. Those parties raised various objections before the Commission, which resolved them in a comprehensive Order—in part by imposing conditions the objectors had requested. Only two issues remain on appeal.

DISH Network contends that the Commission failed to apply its unquestioned technical expertise in making a finding of no significant radiofrequency interference because the Commission based its finding on a certification that uses International Telecommunication Union (ITU) standards and methodologies. But DISH skips over a key point: the Commission made the expert decision in a notice-and-comment rulemaking to incorporate the ITU standards and methodologies into federal law. The Commission therefore did not act unreasonably—much less unlawfully or unconstitutionally—in crediting SpaceX's certification with ITU standards and requiring SpaceX to obtain ITU approval, while rejecting DISH's invitation to consider DISH's self-commissioned studies outside of that framework.

Separately, Viasat, Inc. and The Balance Group ("NEPA challengers") make the novel and late-breaking claim that the National Environmental Policy Act (NEPA) required preparation of an environmental assessment. But their allegations

of environmental risk were both contradicted by the Commission's record-based findings and pinned to other larger constellations, not just the 2,824 satellites actually at issue here. For those and additional reasons, the Commission reasonably found the record "insufficient" to overcome a longstanding NEPA regulation categorically excluding satellite operations from further environmental processing because such activity normally does not have a significant effect on the human environment. NEPA challengers' position—that even the barest allegation of potential environmental impact should compel an environmental assessment—is little more than a collateral attack on the Commission's promulgation of a categorical exclusion and an unsupported attempt to dilute the standard for displacing one.

This Court should affirm.

STATEMENT OF THE CASE

1. SpaceX's Starlink system uses a constellation of low-Earth orbit satellites to deliver the world's first direct-to-consumer, high-speed, low-latency satellite internet service. In 2016, SpaceX applied to launch and operate 4,425 (since reduced to 4,408) satellites at orbital altitudes of 1,110-1,325 km. JA15-16, Order ¶¶ 1-2 & n.4. The Commission granted that authorization to "enable SpaceX to bring high-speed, reliable, and affordable broadband service to consumers in the United States and around the world, including areas underserved or currently unserved by existing

networks." *In re Space Exploration Holdings, LLC*, 33 FCC Rcd. 3,391, ¶ 1 (2018). Nobody suggested NEPA applied.

In 2019, the Commission granted SpaceX a first modification to lower 1,584 of those satellites to an altitude of 550 km to improve broadband latency while decreasing the potential for orbital debris, and then a second modification to reconfigure satellites within the 550 km orbital shell with the goal of expanding coverage and capacity. In both instances, the Commission "found that grant of the modification was in the public interest." JA16, Order ¶ 3. Again, nobody suggested NEPA applied.

In April 2020, SpaceX submitted a modification application to lower the remaining 2,824 previously authorized satellites to altitudes of 540-570 km. DISH and Viasat (among others) filed oppositions raising the public interest, radiofrequency interference, and orbital debris mitigation—but not NEPA. Almost six months after Viasat filed those objections (and eight months after The Balance Group referenced NEPA in passing along with a panoply of other federal statutes, JA270 [Balance-Group-Opp.-13]), Viasat asserted that NEPA required the Commission to conduct an environmental assessment prior to granting SpaceX's modification—an objection it had never made during the initial authorization of the

4,425-satellite constellation, during two earlier modification requests, or during any other request by other operators to launch satellites (including its own).[1]

2. On April 27, 2021, more than a year after SpaceX filed its application and on the basis of a voluminous record of more than 250 pleadings, JA17-22, Order ¶ 5 nn.24-36, the full Commission granted—with explicit conditions—SpaceX's third modification application. The Commission unanimously concluded that a grant was in the public interest because the modification (as conditioned) would "improve service to remote and underserved areas, including polar regions, and *** facilitate the deployment of the Starlink system overall"; would "have beneficial effects with respect to orbital debris mitigation"; and would "not present significant interference problems." JA24, Order ¶¶ 12-13.

a. In the portion of its radiofrequency interference analysis addressing DISH's arguments, the Commission agreed to impose DISH's requested condition—reflective of the way that SpaceX actually has and will operate Starlink—that only one satellite beam transmit to a given spot on the Earth's surface at a time (known as an "Nco" factor of one). JA38-39, Order ¶¶ 37-39. The Commission, however, declined to "depart" from the regulatory framework codified at "section 25.146 of

[1] *See, e.g.*, Viasat, Inc. Application for Space and Earth Station 7, IBFS File No. SAT-MPL-20200526-00056 (May 26, 2020), https://licensing.fcc.gov/myibfs/download.do?attachment_key=2378905 (certifying no significant environmental impact).

[its] rules, which incorporates findings by the ITU Radiocommunication Bureau regarding compliance with ITU [power] limits." JA40, Order ¶ 40. Specifically, the Commission explained that section 25.146 "incorporated by reference ITU [power] limits into its rules *** [and] requires that [non-geostationary fixed-satellite service] licensees and grantees communicate a 'favorable' or 'qualified favorable' finding by the ITU Radiocommunication Bureau regarding compliance with applicable ITU [power] limits." JA37, Order ¶ 34; *see* 47 C.F.R. § 25.146(a), (c).

Applying that framework, the Commission accepted SpaceX's certification of compliance with ITU power limits, "as required by [Commission] rules" and as demonstrated by "conduct[ing] [a power] analysis based on procedures and software approved by the ITU." JA35, JA37, JA40, Order ¶¶ 32, 34, 40. The Commission also concluded that "[a]lthough DISH alleges that SpaceX cannot meet the [power] limits even using the input of an Nco of one based on its own analysis, the relevant analysis under the Commission's rules is analysis using the ITU-approved software." JA40, Order ¶ 40.

Finally, in response to an argument by AT&T (which like DISH operates in the 12.2-12.7 GHz band but has not appealed) that SpaceX should not be permitted to commence operations until it had obtained a "favorable" or "qualified favorable" finding from the ITU, the Commission "s[aw] no reason to revoke [its] previously-granted waiver of section 25.146(c)." JA37, JA40, Order ¶¶ 35, 41. That partial

waiver—granted in the first license modification proceeding—"retained the requirement" that SpaceX receive such a rating "and in the case of an unfavorable finding, adjust its operations to satisfy the ITU requirements," but authorized SpaceX to commence operations at its own risk in the interim. JA36, Order ¶ 32.

b. The Commission also analyzed and rejected the novel claim that NEPA required the preparation of an environmental assessment. JA54-64, Order ¶¶ 72-89. "As a threshold matter," the Commission recognized that "it is not clear that all of the issues raised *** are within the scope of NEPA or related to [the Commission's] action in approving SpaceX's Third Modification application." JA56, Order ¶ 77. Even after assuming "for purposes of [its] analysis, and out of an abundance of caution" that "NEPA may apply," the Commission applied its categorical exclusion framework and concluded that the NEPA claim fell short as applied to the 2,824 satellites at issue in this "particular action"—rejecting Viasat's attempt to sweep in the possible impacts of other SpaceX authorizations or future satellites not yet authorized. JA56-57, Order ¶¶ 77-78.

Specifically, the Commission found that:

- Viasat's assertions as to the effect of the launch and demise of SpaceX satellites on the atmosphere were "insufficient" and "too vague to warrant further consideration," and failed to overcome the fact that the Federal Aviation Administration had already prepared its own environmental assessment and found SpaceX's launches had "No Significant Impact," JA58-59, Order ¶¶ 81-82;

- Viasat's "general assertions" regarding purported human casualty risks and damage to the environment from theoretical debris from fully demisable Starlink satellites surviving reentry were "not accurate" based on the record, which demonstrates that "the calculated risk of human casualty from materials reaching the Earth's surface is roughly zero," JA60, Order ¶¶ 84-85;

- Viasat's and The Balance Group's assertions that sunlight reflected "by large satellite constellations will have aesthetic, scientific, cultural, social, and health effects" did not, based on the "robust record on these issues," support the need to prepare an environmental assessment given SpaceX's well-documented steps to mitigate the brightness and reflectivity of its satellites and statements from the astronomy community on the benefits of the lowered altitude, JA60-62, Order ¶¶ 86-87;

- Viasat's assertions that an increased risk of collisions and orbital debris would hamper human exploration and development of space and may cause severe economic harm "failed to set forth in detail reasons justifying or circumstances necessitating environmental consideration," given that the Commission had already reviewed and concluded that SpaceX's orbital debris mitigation plan is consistent with the Commission's rules and the public interest (on top of doubts that "such alleged impacts in space are even within the scope of NEPA (which applies to effects on the quality of the human environment)"), JA63-64, Order ¶ 89; and

- The Balance Group's assertions regarding radiofrequency exposure do not support additional environmental consideration because it "fails to allege that the SpaceX modification would result in human exposure to radiofrequency emissions that would exceed the limits in the Commission's rules," with which SpaceX has confirmed compliance, JA64, Order ¶ 91.

3. A number of competitors that had opposed SpaceX's modification application praised the Commission's Order as a "positive outcome" that "address[es] *** primary concerns." Kate Duffy, *SpaceX got FCC permission to fly Starlink satellites at a lower orbit. Rivals who previously objected, including*

Amazon, say they're happy with the decision, BUS. INSIDER, Apr. 28, 2021. Even Viasat said it was "pleased the Commission confirmed that Starlink satellites must be reliable and safe." Matt Daneman, *SpaceX License Mod Includes Near-Hit Reports, Accepting Interference*, COMMC'NS DAILY, Apr. 28, 2021, at 3. DISH, Viasat, and The Balance Group nonetheless appealed. This Court granted SpaceX's motion to intervene and denied Viasat's request for a stay pending appeal.

SUMMARY OF ARGUMENT

This Court should affirm the Commission's Order in all respects.

I. At bottom, DISH's appeal is predicated on the notion that the Commission should have applied its own expertise in assessing radiofrequency interference rather than rely on the ITU. But that characterization of the Commission's action blinks reality. In a 2017 notice-and-comment rulemaking, the Commission made the expert decision to incorporate the ITU's power limits into federal regulation and to evaluate compliance using ITU software.

In requiring SpaceX to certify compliance with those power limits using the approved software, before also obtaining ITU approval, the Commission adhered to the two-step framework laid out in its rules. The Commission therefore did not act unreasonably in rejecting DISH's proffered interference studies, which used methodologies that deviate from those mandated by the Commission's rules. Nor did the Commission act unreasonably in maintaining a previously granted waiver of

the requirement that ITU approval be obtained prior to commencing operations, given (as explained in an earlier order) that there are public benefits to allowing SpaceX to proceed expeditiously and that SpaceX still bears the risk of ITU disapproval.

None of those determinations—which amply support the Commission's overarching finding that the license modification would not result in any significant interference problems—resulted in the Commission abdicating its decisionmaking authority to the ITU, let alone to SpaceX. Rather, the Commission permissibly and sensibly harmonized federal standards and international standards (as Congress instructed), and required SpaceX to obtain the ITU's approval as a condition of its license. DISH's disagreement with that framework amounts to a collateral attack on the Commission's rules that fails whether presented in terms of subdelegation, judicial review, or due process.

II. The Commission reasonably held that NEPA challengers failed to overcome a categorical exclusion from further environmental processing. The Commission did not rely on mere "uncertainty" to reject NEPA challengers' attempt to show risk of a significant environmental impact (as in *American Bird Conservancy, Inc. v. FCC*) or otherwise fail to address their arguments. Instead, the Commission first explained that Viasat's allegations were based on constellations of satellites much larger than the 2,824 SpaceX satellites at issue in the instant

proceeding. The Commission then provided a point-by-point analysis of each of NEPA challengers' alleged harms, finding the record to be "insufficient" and lacking in detail.

When properly tasked with demonstrating that the satellites actually at issue could create a significant environmental impact—something NEPA challengers cannot do by citing extra-record material that post-dates the Order—they argue that *any* possibility (no matter how small or speculative) of a significant environmental impact should trigger an environmental assessment. But no authority supports NEPA challengers' bid to gut the Commission's categorical exclusion framework. Although NEPA challengers (and an amicus) complain that the framework is outdated, this appeal cannot be used as a vehicle to weaken the standard for overcoming a categorical exclusion.

At any rate, the Commission's assessment of the NEPA record falls well within the bounds of reasonableness. The Commission aptly deemed "insufficient" Viasat's evidence of the impact of satellite reentry on the atmosphere—principally, a conference poster providing an aggregate alumina estimate for multiple satellite constellations, not just the SpaceX constellation at issue. There is also no basis to fault the Commission for relying on an earlier evaluation of satellite demisability and the Federal Aviation Administration's environmental assessment of potential impacts associated with launches. NEPA challengers' factual quibbles with those

determinations are refuted by the record and in any event cannot surmount the deferential standard of review.

NEPA challengers' sunlight reflectivity argument fares no better. Relying on a fulsome record, including a letter from the American Astronomical Society, the Commission explained that SpaceX had worked (and is continuing to work) closely with the astronomy community to develop and implement a range of solutions to reduce the visibility of SpaceX satellites—including through the mitigation measures suggested by NEPA challengers' cited studies. NEPA permits the Commission to take mitigation into account in determining that further environmental processing is unnecessary, while also continuing to monitor the situation.

Finally, the Commission did not act unreasonably in rejecting an environmental assessment for economic and other impacts from collisions in space. Even assuming such impacts are within the scope of NEPA—a question the Commission did not resolve—the Commission approved SpaceX's orbital debris mitigation plan and, for good measure, imposed stringent reporting conditions to ensure high reliability rates for SpaceX satellites.

ARGUMENT

I. THE COMMISSION'S RADIOFREQUENCY INTERFERENCE DETERMINATIONS SHOULD BE UPHELD

DISH alone challenges the Order's radiofrequency interference analysis. DISH contends that the Commission—which admittedly "employs some of the world's best telecommunications engineers," Br. 5—should have analyzed DISH's self-commissioned interference studies instead of relying on standards and software developed by the ITU. DISH overlooks (Br. 5, 7), however, that the Commission has already "marshalled" its "engineering expertise" in determining the best way to "manage the spectrum" in which DISH operates: through incorporation of ITU methodologies into federal regulation (rather than review of *ad hoc* studies like those submitted by DISH). DISH's collateral attack on the Commission's regulatory framework—which it largely failed to preserve (Commission Br. 58, 62-63)—misses the mark.

A. DISH Gives Short Shrift To The Commission's ITU-Based Regulatory Framework

The Communications Act confers upon the Commission broad authority and discretion to regulate radiofrequency spectrum—including through licensing—as public convenience, interest, and necessity require. *See* 47 U.S.C. §§ 303, 307, 309, 316. To that end, the Commission is charged with (among other things) "[a]ssign[ing] bands of frequencies to the various classes of stations," "prevent[ing]

interference between stations," and harmonizing federal law with "any international radio or wire communications treaty or convention, or regulations annexed thereto." *Id.* § 303(c), (f), (r).

Pursuant to that authority, the Commission has established a robust regulatory regime governing satellite communications. *See, e.g.*, 47 C.F.R. pt. 25. When the Commission first established power limits for non-geostationary orbit satellite operators' use of the 12.2-12.7 GHz band in 2000, it adopted the ITU standards into its rules and required validation using ITU software. *See Ku-band NGSO FSS Allocation Order*, 16 FCC Rcd. 4,096, ¶¶ 170-198 (2000). As the Commission explained, "[a]fter evaluating the extensive record in this [rulemaking] proceeding, including the work of the [ITU Radiocommunication Sector] study groups and [the 2000 World Radiocommunication Conference], [it] f[ound] that the agreements reached in these international meetings provide the basis to allow [non-geostationary fixed-satellite service] operations to share successfully the 12.2-12.7 GHz band with [broadcast satellite service] operations without causing unacceptable interference." *Id.* ¶ 170.

In 2017, the Commission undertook notice-and-comment rulemaking to update those rules (DISH neglected to participate). The Commission elected to "incorporate by reference the relevant portions of Article 22 [of the ITU Radio Regulations]," which sets forth power limits that avoid unacceptable interference.

NGSO FSS Order, 32 FCC Rcd. 7,809, ¶ 42 (2017); *see* 47 C.F.R. § 25.108. As this Court has recognized, the incorporation of such technical standards into law is commonplace, and "[i]n fact, federal law encourages precisely this practice." *American Soc'y for Testing & Materials v. Public.Resource.Org, Inc.*, 896 F.3d 437, 442 (D.C. Cir. 2018). "[L]ike any other properly issued rule," the incorporated standard "has the force and effect of law." *Id.* Indeed, the Commission made explicit that a "licensee operating in compliance with the applicable equivalent power flux-density limits in Article 22" of the ITU Radio Regulations "will be considered as having fulfilled this obligation with respect to any [geostationary orbit] network." 47 C.F.R. § 25.289.

Ultimately, the Commission established a two-step process for licensing operations within the 12.2-12.7 GHz band: (1) before licensing, certification of compliance with (incorporated) ITU power limits based on ITU-approved validation software; and (2) after licensing, receipt of a "favorable" or "qualified favorable" ITU finding that operations comply with the limits. 32 FCC Rcd. 7,809, ¶ 41; 47 C.F.R. § 25.146(a), (c). Applicants were no longer required to submit a "comprehensive technical showing" to the Commission because, it determined, Commission staff review would be duplicative of ITU certification and ultimately ITU confirmation. 47 C.F.R. § 25.146(a)-(b) (2016); *see* 32 FCC Rcd. 7,809, ¶ 41. Noting that it "has adopted certification requirements for other satellite power limits

[like those applicable to DISH], even in the absence of any technical review," the Commission promulgated the two-step framework over certain commenters' concerns about reliance on the ITU and purported shortcomings in ITU's software modeling and certification process. 32 FCC Rcd. 7,809, ¶ 41 nn.91-93.[2]

B. The Commission's Interference Analysis Was Not Arbitrary Or Capricious

The Commission fully discharged its statutory mandate to determine whether the grant of a license modification serves the public convenience, interest, and necessity—including by assessing unacceptable interference. The Order: (i) "conclude[s] that grant of the SpaceX Third Modification Application is in the public interest" given improvements to service and safety; (ii) "find[s] that SpaceX's modification will not present significant interference problems, as assessed under Commission precedent"; and (iii) spends 39 paragraphs analyzing "Radiofrequency Interference" generally and "Interference into [Geostationary Orbit] Systems" like DISH's specifically. JA24-45, Order ¶¶ 12-52. The Commission not only

[2] DISH cites (Br. 6-7) a number of proceedings in arguing that the Commission routinely analyzes engineering studies submitted by parties. In none of those cases was there a definitive software model available from the entity that developed the power limit at issue. That the Commission has chosen to require or analyze party-submitted interference studies in other licensing contexts, but has chosen to incorporate ITU power limits and ITU validation software requirements here, simply reflects different ways in which the Commission applies its expertise.

conducted the balancing that DISH claims is missing from the Order (Br. 46-49), but also did so reasonably.

1. The Commission considered—and rejected—DISH's proffered studies.

The record refutes DISH's contention (Br. 32-38) that the Commission "disregarded" proffered studies of harmful interference.

At the outset, DISH argues that, based on a "First Study," the Commission should have considered whether SpaceX would meet projected demand by using only one satellite beam at a time (*i.e.*, an Nco value of one), out of "concern[] *** that when SpaceX is forced to choose between complying with [power] limits and meeting demand under its obligations as a winner in the Rural Digital Opportunity Fund auction, SpaceX will choose to violate [power] limits." JA39, Order ¶ 38. The Commission, however, addressed that concern in precisely the manner DISH proposed: by granting the requested condition that SpaceX "not use more than one satellite beam from any of its satellites in the same frequency in the same or overlapping areas at a time." *Id.* ¶ 39. The Commission explained that "any additional issues or concerns that may arise related to the Rural Digital Opportunity Fund program" would be addressed in a separate proceeding. JA24, Order ¶ 12. DISH can scarcely complain about that result, let alone demonstrate (Br. 33) the Commission's "failure to reasonably engage" on the issue.

The same is true of DISH's two other studies. "Although DISH alleges that SpaceX cannot meet [power] limits even using the input of an Nco of one based on [DISH's] own analysis," the Commission observed, "the relevant analysis under the Commission's rules is analysis using ITU-approved software"—not the methodologies DISH preferred to employ. JA40, Order ¶ 40.

The Commission did not act unreasonably in adhering to its established regulatory framework, rather than make a case-specific exception for DISH's studies. "[I]t is elementary that an agency must adhere to its own rules and regulations. *Ad hoc* departures from those rules, even to achieve laudable aims, cannot be sanctioned, for therein lie the seeds of destruction of the orderliness and predictability which are the hallmarks of lawful administrative action." *Reuters Ltd. v. FCC*, 781 F.2d 946, 950-951 (D.C. Cir. 1986) (citation omitted); *see North Carolina v. FERC*, 112 F.3d 1175, 1192 (D.C. Cir. 1997) (upholding license amendment where agency "considered and rejected" petitioner's "reasonable" alternative approach to determining water supply because "aquifer storage and recovery" water was "not relevant to a calculation of long-term water supply"). Unlike in *American Radio Relay League, Inc. v. FCC*—a case about a failure to consider data submitted as part of a notice-and-comment rulemaking establishing a regulatory standard, 524 F.3d 227, 240-241 (D.C. Cir. 2008)—the Commission here was not obligated to reevaluate its underlying approach to assessing interference as part of the license

modification proceeding. *Cf. Sacramento Mun. Util. Dist. v. FERC*, 474 F.3d 797, 801-802 (D.C. Cir. 2007) (rejecting failure-to-consider-evidence challenge to public-interest determination as "collateral attack" on previously adopted tariff itself).

Nor did the Commission previously take a different approach. In granting SpaceX's second license modification, the Commission did not "invite[] private parties to adduce" or "conduct their own analysis if they objected to SpaceX's power limit analysis." Br. 36-37. Rather, the Commission recounted that "SpaceX has provided [SES/O3b] with the input data used to calculate [power] emissions in the ITU-approved validation software" and denied a request for additional time to evaluate that data. *In re Space Exploration Holdings, LLC*, 34 FCC Rcd. 12,307, ¶ 11 (2019). Although DISH underscores the Commission's statement that "the fact that SES/O3b's staff is not available to analyze the data, while unfortunate, does not justify a delay in the processing of this application," DISH omits the remainder of the quotation: "because, among other reasons, there is no legal requirement that third parties evaluate the sufficiency of [power] data inputs." *Id.* Accordingly, there is no inconsistency in the Commission's approach.[3]

[3] Although DISH claims that its interference studies were "undisputed," SpaceX made clear it was not "tacitly admit[ting]" to anything by declining "to engage in an irrelevant, purely hypothetical debate about how another party might operate SpaceX's network." JA169-171 [SpaceX-Mar.-9-Letter-1-3.] The

2. The Commission reasonably declined to revoke a previously granted waiver of ITU approval before commencing operations.

DISH's argument (Br. 39-43) that the Commission erred in "granting a waiver that allowed SpaceX to commence operations without a favorable finding from the ITU" fails at its premise. The Commission did not "grant" SpaceX a partial (temporally limited) waiver of that condition; rather, it found no reason to "revoke [a] *previously-granted* waiver" from the first license modification proceeding. JA40, Order ¶ 41 (emphasis added). That was the path the Commission had already charted in granting SpaceX's second license modification over the waiver-related concern of geostationary orbit satellite operators (not including DISH). *See* 34 FCC Rcd. 12,307, ¶ 10 (finding "further waiver is unnecessary"). In arguing that the Commission was required to reevaluate and grant the waiver anew (Br. 41), DISH cites nothing more than a dissenting opinion not even addressing that issue.

At any rate, DISH provides no reason to believe that the Commission acted without good cause, against the public interest, or in a standardless manner. At the time it granted the waiver in SpaceX's first license modification proceeding, the Commission explained that due to the extended timeframe for ITU review, the fact that SpaceX "presents [power] calculations using the ITU software," and the caveat that SpaceX must still secure ITU approval and would proceed in the meantime at

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Commission did not fault SpaceX for training its attention on the relevant standards, and neither should this Court.

its own risk, the Commission would "not deter SpaceX start of operations." *In re Space Exploration Holdings, LLC*, 34 FCC Rcd. 2,526, ¶ 28 (2019). That reasoning applies no less to the modification at issue here—and has been strengthened by evidence that continued expeditious deployment of Starlink satellites "will finally bring ubiquitous internet connectivity within reach" of unserved and underserved areas, as commenters urged. JA23-24, Order ¶¶ 9, 12-13. Against that backdrop, the Commission's statement that it "s[aw] no reason to revoke [its] previously-granted waiver," JA40, Order ¶ 41, itself indicates that there was "good reason" (Br. 40) to permit SpaceX to proceed under the Order pending ITU review.

DISH's reliance on the Commission's treatment of OneWeb's license likewise ignores the relevant context. The Commission granted OneWeb a waiver of the requirement to provide the proprietary beta version of source code developed with the ITU and used to demonstrate compliance with power limits. *In re WorldVu Satellites Ltd.*, 32 FCC Rcd. 5,366, ¶ 19 (2017). OneWeb did not request a waiver of the condition of ITU approval with power limits prior to commencing operations, and so the Commission did not grant one. Any comparison is simply inapt.

3. The Commission's processing-round determination falls well within its license-modification authority.

Invoking the "*Teledesic* Order," DISH tacks on an argument that the Commission should have reviewed SpaceX's license modification as a newly filed application in a 2020 processing round, rather than as part of the original 2016

processing round in which SpaceX received its initial authorization. Not so. For starters, it is unclear what stake DISH has in the matter. *See* Commission Br. 56-57. "The question of treating SpaceX's modification as a 'newly filed application' for processing round purposes is relevant to SpaceX's status vis-à-vis other [non-geostationary orbit fixed-satellite service] systems in the same frequency bands," in terms of "sharing spectrum as between [those] systems." JA26, Order ¶ 17. DISH is a geostationary orbit satellite operator whose rights will not be affected by a change in SpaceX's processing round. The Commission thus sensibly focused its processing-round discussion on the operators that would be considered together with SpaceX.

In any event, the Order followed *Teledesic*—a Bureau-level precedent that implements the Commission's rule that license modification applications will be granted unless (among other inapplicable exceptions) the modification "would not serve the public interest, convenience, and necessity." JA26, Order ¶ 16 (quoting 47 C.F.R. § 25.117(d)(2)(ii)). As set forth in the Order, the Bureau "generally grant[s]" a "proposed modification [that] does not present any significant interference problems and is otherwise consistent with Commission policies," and considers a modification application in a subsequent processing round only if it "presents significant interference problems." *Id.* The Commission elected to "apply th[at] same standard." *Id.*

DISH's sole objection is that the Commission "confined itself to the interference effects on other non-geostationary systems." Br. 44. But the Commission unmistakably determined that "the SpaceX Third Modification will not increase interference into [geostationary orbit] satellite systems," including DISH's system. JA35-43, Order ¶¶ 32-47. The Commission thus conducted the analysis and made the interference finding that DISH would require under *Teledesic*.

C. DISH's Subdelegation Doctrine Arguments Are Meritless

1. DISH contends (Br. 51-56) that the Commission impermissibly subdelegated to the ITU its duty to prevent interference. DISH misapplies that doctrine. As explained, the Commission has promulgated rules incorporating "ITU Radio Regulations" into federal law, 47 C.F.R. § 25.108(c); required applicants to certify compliance with those Regulations, *id.* § 25.146(a); and imposed a condition that a licensee "receive a 'favorable' or 'qualified favorable' finding by the ITU Radiocommunication Bureau," *id.* § 25.146(c). *See* JA40, Order ¶ 40; pp. 14-17, *supra*. At a minimum, that "independent endorsement of [ITU power] limits" (Br. 53) is perfectly consistent with the rule that "a federal agency entrusted with broad discretion to permit or forbid certain activities may condition its grant of permission on the decision of another entity *** so long as there is a reasonable connection between the outside entity's decision and the federal agency's determination." *United States Telecom Ass'n v. FCC*, 359 F.3d 554, 567 (D.C. Cir. 2004). The fact

that Congress "direct[ed] the Commission to harmonize federal law with international treaties," Br. 53 (citing 47 U.S.C. § 303(r)), makes the Commission's imposition of that condition all the more reasonable, *cf. Union Pac. R.R. Co. v. Pipeline & Hazardous Materials Safety Admin.*, 953 F.3d 86, 89 (D.C. Cir. 2020) (rejecting subdelegation claim and remarking that "[i]t is no surprise that a statute which weaves state institutions into its program should lead the implementing agency to coordinate its action with aspects of state law").

According to DISH, that statutory directive "makes ITU approval a floor, not a ceiling." Br. 53 (emphasis omitted). But the subdelegation doctrine does not preclude the Commission from aligning its standards with the ITU's. *See National Constructors Ass'n v. Marshal*, 581 F.2d 960, 972 n.32 (D.C. Cir. 1978) ("Because the Assistant Secretary reviewed and found 'suitable' all GFCI's that then bore the imprimatur of UL approval, he effectively adopted UL specifications, as they then stood, as his own. As such, he retained control of the process, so that no subdelegation of final authority occurred.") (citation omitted). As the Fifth Circuit recently explained, it is "a common and accepted practice by federal agencies" to incorporate standards established by private organizations into federal rules. *Texas v. Rettig*, 987 F.3d 518, 532 (5th Cir. 2021) (citing *American Soc'y for Testing*, 896 F.3d at 442). Indeed, "it would be anomalous to accord agency deference when an agency invented standards but not when an agency's expertise led the agency to

incorporate standards endorsed by experts in the field." *Id.* at 532 (citing *Amerada Hess Pipeline Corp. v. FERC*, 117 F.3d 596, 601 (D.C. Cir. 1997)). Thus, the Department of Health and Human Services did not violate the subdelegation doctrine when it imposed a condition on states to certify the actuarial soundness of certain Medicaid contract rates under a regulation that "simply incorporated the [Actuarial Standards] Board's actuarial standards into [the] Certificate Rule." *Id.* at 531-532. The same is true here.

In any event, the record makes clear that the Commission exercised independent, final authority regarding interference. In the initial authorization of SpaceX's license, the Commission addressed concerns over the sufficiency of SpaceX's interference analysis by "find[ing] that SpaceX's demonstrations in its application [filed prior to the 2017 rulemaking] and associated filings are sufficient to justify grant of its application," noting that SpaceX had also provided an "analysis using ITU-approved software," and "condition[ing] this grant on SpaceX receiving a favorable or 'qualified favorable' rating *** by the ITU prior to initiation of service." 33 FCC Rcd. 3,391, ¶ 9. In the Order, the Commission reiterated its reasons for imposing that condition—waived in part to permit commencement of operations prior to ITU review—as a means for the "Commission to assess compliance with [power] limits." JA40, Order ¶ 40. As such, the Commission did "not abdicate[] its decision-making authority but merely created a reasonable 'short-

cut,' contingent on the approval of certain *** organizations, to satisfy one of the [Commission]'s own regulatory requirements." *United States Telecom Ass'n*, 359 F.3d at 567-568; *see Southern Pac. Transp. Co. v. Watt*, 700 F.2d 550, 556 (9th Cir. 1983) ("The regulation does not relinquish to a tribe the final authority to approve; it delegates a power to disapprove.").

2. DISH's argument (Br. 57-58) that the Order impermissibly subdelegates decisionmaking authority to SpaceX is even flimsier. Although DISH characterizes SpaceX's certification of compliance with power limits as a "self-serving judgment" with "no agency oversight," *id.*, the reality is that the Commission, through notice-and-comment rulemaking, determined that applicants should "use the ITU-approved validation software to assess compliance with [power] limits," JA40, Order ¶ 40. SpaceX's certification thus shows that it conducted "the relevant analysis under the Commission's rules" and confirmed that the results met the regulatory standard, *id.*; *see also* JA82-85 [SpaceX-June-29-Response-to-DISH] (discussing analyses), not that the Commission "plac[ed] [its duty] in the hands of the regulated entity itself," Br. 57.

D. DISH Has Not Been Deprived Of Judicial Review Or Due Process

DISH's remaining arguments (Br. 59-61) lack merit. DISH had a full opportunity to participate before the Commission and is currently exercising its statutorily defined right to appeal an "order of the Commission." 47 U.S.C.

§ 402(b)(6). To the extent DISH's ability to "use its satellites" (Br. 60) is even a constitutionally cognizable property interest, *see Mobile Relay Assocs. v. FCC*, 457 F.3d 1, 12 (D.C. Cir. 2006), the Order in no way revokes or renders that interest "valueless," *Industrial Safety Equip. Ass'n, Inc. v. EPA*, 837 F.2d 1115, 1122 (D.C. Cir. 1998). That DISH disagrees with the Order's treatment of interference issues is a merits matter, not a vitiation of judicial review or a deprivation of notice and an opportunity to be heard.

II. THE ORDER DOES NOT CONTRAVENE NEPA

NEPA challengers raise the novel argument that NEPA required the Commission to conduct an environmental assessment prior to granting SpaceX's modification. Although they style themselves as "Environmental Appellants," there is little that is "environmental" about Viasat's main complaints: economic and competitor harm. Br. 19-23, 51-53. They understandably emphasize The Balance Group's Article III standing and NEPA zone-of-interest arguments (Br. 16-19, 50-51), yet The Balance Group—which never raised many of the arguments it now makes in the joint appeal brief—can prevail on neither front for the reasons set forth in the Commission's brief (at 66-77). Tellingly, not a single actual environmental organization appeared before the Commission to support the "Environmental Appellants," and no such amicus has appeared in this Court.

It is therefore unsurprising that the NEPA bid failed before the Commission. Faced with the challenge of overcoming a categorical exclusion from further environmental processing, and having failed to muster record evidence of potential impacts from the discrete set of 2,824 satellites at issue (or even for far larger constellations), NEPA challengers seek to weaken the standard for demonstrating risk of a significant environmental impact. This Court should uphold the Commission's reasonable rejection of the NEPA arguments as insufficient, legally and factually in varying respects, especially under the deferential standard of review.

A. NEPA Challengers Must Overcome The Commission's Categorical Exclusion From Further Environmental Processing

Under generally applicable NEPA regulations promulgated by the Council on Environmental Quality, federal agencies are required to "assess[] the appropriate level of NEPA review" for a "proposed action." 40 C.F.R. § 1501.3(a). That determination is keyed to the likelihood of the action's "significant effects," as measured by the "potentially affected environment and degree of the effects of the action." *Id.* § 1501.3(a)(1)-(3), (b). Some types of actions "[n]ormally do[] not have significant effects." *Id.* § 1501.3(a)(1). So, in the interest of "efficiency," agencies are obliged to "identify in their agency NEPA procedures *** categories of actions that normally do not have a significant effect on the human environment, and therefore do not require preparation of an environmental assessment or environmental impact statement." *Id.* § 1501.4(a). When an agency determines that

a particular action falls within a predetermined "categorical exclusion" from further environmental processing, its responsibility is limited to evaluating whether there are "extraordinary circumstances in which a normally excluded action may have a significant effect." *Id.* § 1501.4(b).

The application of a categorical exclusion is *not*, as NEPA challengers repeatedly insist, a determination that a proposed action may be undertaken "without even assessing *** environmental impacts" or "without any environmental review." Br. 1, 7, 47. Quite the opposite, this Court has emphasized that "[c]ategorical exclusions are not exemptions or waivers of NEPA review; they are simply one type of NEPA review." *United Keetoowah Band of Cherokee Indians v. FCC*, 933 F.3d 728, 735 (D.C. Cir. 2019). The decision to invoke the categorical exclusion, as well as the decision whether to override the exclusion, are both "entitled to substantial deference." *City of New York v. ICC*, 4 F.3d 181, 186 (2d Cir. 1993); *see National Tr. for Historic Pres. in U.S. v. Dole*, 828 F.2d 776, 781 (D.C. Cir. 1987) (per curiam).

The Commission adopted categorical exclusions following notice and comment. *See* 47 C.F.R. §§ 1.1306-1.1307. As the Commission explained at the conclusion of that process, its "Notice of Proposed Rulemaking had envisioned specifying *** the types of Commission actions that would have significant environmental impacts." *In re Amendment of Environmental Rules*, 60 Rad. Reg. 2d (P&F) 13, ¶ 10 (1986). But "[u]pon further reflection *** and after considering the

views of commenters, [the Commission] decided to specify only a limited class of actions for which complete environmental processing may be appropriate." *Id.* The Commission reached that result because "[u]nder [its] existing rules, numerous applicants ha[d] been required to submit environmental information for review by Commission staff. However, instances *** where the facts ha[d] shown a significant impact on the environment, ha[d] been rare." *Id.*; *see Environmental Rules in Response to New Regulations Issued by the Council on Environmental Quality*, 51 Fed. Reg. 14,999, 14,999 (1986) ("Based upon the Commission's experience, we have determined that the telecommunications industry does not generally raise environmental concerns. The comments filed in this proceeding support the Commission's determination.").

Consequently, the promulgated regulations "limit[ed] to three general areas the types of actions that require submission of Environmental Assessments," all of which concern terrestrial impacts: "(1) actions in which proposed facilities will be located in 'sensitive' areas; (2) cases involving high intensity lighting; and (3) cases in which the level of [radiofrequency] radiation emitted from the communications facility would exceed [a certain regulatory] standard." 60 Rad. Reg. 2d (P&F) 13, ¶ 11 (citing 47 C.F.R. § 1.1307). The regulations then "specif[ied] that actions not listed in Section 1.1307 are 'categorically excluded' from environmental processing because they normally have no significant impact upon the environment." *Id.* ¶ 6

(citing 47 C.F.R. § 1.1306). Further environmental processing of categorically excluded actions might still occur "upon the motion of any interested person or upon the Bureau's own motion," but "[a]n Environmental Assessment [would be] required only if the Bureau or Commission concludes that given the particular nature of or circumstances surrounding the otherwise categorically excluded application, environmental review is warranted." *Id.* ¶ 6 & n.10 (citing 47 C.F.R. § 1.1307(c)-(d)).

Here, no one disputes that satellite licensing falls within the Commission's categorical exclusions. And no one has challenged the Commission's regulations establishing the categorical exclusions themselves. Accordingly, to prevail on their NEPA claim, NEPA challengers had to convince the Commission to deviate from the categorical exclusion by "setting forth in detail the reasons justifying or circumstances necessitating environmental consideration in the decision-making process." 47 C.F.R. § 1.1307(c). As part of that showing, they were required to demonstrate "that the action may have a significant environmental impact," *id.*, and that "extraordinary circumstances" justify further environmental processing of that categorically excluded action, 40 C.F.R. § 1501.4(b). *See City of New York*, 4 F.3d at 185-186 (denying NEPA challenge where action did not "have a significant environmental impact, *much less* amount to extraordinary circumstances") (emphasis added).

NEPA challengers assert that "[t]he regulations require no separate showing of 'extraordinary circumstances'" because "the 'may standard' constitutes the Commission's 'procedures' for identifying such circumstances." Br. 6-7. Equating "extraordinary circumstances" with the "may standard"—especially as watered down by Viasat (pp. 40-43, *infra*)—makes little sense on its face. Regardless, the Commission here ultimately saw no need to reach the issue of "extraordinary circumstances"—not to mention "whether NEPA applies to the novel issues raised by Viasat" regarding potential impacts in space—because Viasat could not even show that the modification "may have a significant environmental impact." JA56, Order ¶¶ 76-77 & n.308. That determination was sound.

B. The Commission Determined That NEPA Challengers Did Not Meet The Standard For Further Environmental Processing

1. The Commission did not rely on "uncertainty."

Although NEPA challengers accuse the Commission of relying on "uncertainty" in declining to require an environmental assessment beyond the categorical exclusion determination, that word appears nowhere in the Order. Nor do any of the Commission's statements betray such reasoning. Instead, the Commission—expressly invoking the section 1.1307(c) framework for exceptions to categorical exclusions—concluded that Viasat's allegations were "insufficient" and "too vague to warrant further consideration," JA59, Order ¶ 82; amounted to "general assertions" with "insufficient detail to justify environmental consideration

*** through an [environmental assessment],” JA60, Order ¶ 85; or otherwise “failed to set forth in detail reasons justifying or circumstances necessitating environmental consideration,” JA62-64, Order ¶¶ 87, 89, 91. In other words, the challengers failed to provide a record basis for overcoming a categorical exclusion. *See* JA64, Order ¶ 92 (“In sum, with respect to NEPA, we conclude that the record *** does not support a need for further environmental review.”).

NEPA challengers are thus wrong to argue (Br. 24-25) that the Commission “made the same mistake” as in *American Bird Conservancy, Inc. v. FCC*, 516 F.3d 1027 (D.C. Cir. 2008). In that case, the Commission declined to prepare a programmatic environmental impact statement to assess the effect of communications towers on migratory birds in the Gulf Coast region. This Court vacated that decision on the ground that the Commission should have prepared at least a less-rigorous environmental assessment. In particular, the Court took issue with the Commission’s “demand for definitive evidence of significant effects” or “scientific consensus” as “a precondition to NEPA action” under the “may have a significant environmental impact” standard. *Id.* at 1033. It ultimately found that, “[b]ased on the record before the court, there is no real dispute that towers ‘may’ have significant environmental impact” on migratory birds—taking note of “conflicting studies” and “sharply divergent views” over the “number of birds

killed," *i.e.*, 4 million to 50 million according to environmental groups. *Id.* at 1030, 1033-1034.

This case is easily distinguishable. Unlike in *American Bird*, the Commission here did not demand "definitive evidence" or "scientific consensus" of a "significant environmental impact" from the proposed satellite license modification. And unlike in *American Bird*, the record is far from undisputed that the modification "may have a significant environmental impact." Rather, the Commission's decision here rests on a straightforward ground: NEPA challengers have not made a sufficient showing of the potential for a significant environmental impact from the specific 2,824-satellite action at issue.

NEPA challengers point to the Commission's decision to require continued monitoring of constellation reliability and satellite reflectivity as a concession of "serious potential for harm." Br. 24-25 (emphasis omitted). But the Commission imposed monitoring simply to ensure that the basis for declining to order an environmental assessment would continue to hold true going forward. *See* JA51, Order ¶ 64 (explaining that, because "it will be important for SpaceX to *maintain* a high disposal reliability rate for its satellites" as demonstrated by data from "the early stages of constellation deployment," SpaceX should be subject to certain reporting requirements that permit the Commission to "consider whether additional license conditions or limitations on deployment and operation may be necessary")

(emphasis added); JA62, Order ¶ 87 (concluding that "we do not find that the record before us merits preparation of an [environmental assessment]" given SpaceX's diminishment of average brightness of satellites already and commitment to the astronomy community, but ordering monitoring to ensure SpaceX "achieve[s] its commitments in this record"). An agency's "provision for future monitoring d[oes] not conflict with NEPA's 'hard look' requirement, particularly *** [where the agency's] analysis was sufficient on its own." *Central Or. LandWatch v. Connaughton*, 696 F. App'x 816, 819-820 (9th Cir. 2017).

Similarly, the fact that SpaceX contested certain allegations of environmental impact—something that would occur in virtually every case—is not a sign that the Commission found the significance of any environmental impact to be "uncertain." In the end, it remained NEPA challengers' burden to overcome the categorical exclusion. SpaceX's responsive submissions spotlighted the reasons why their showing was insufficient.

2. The Commission's reasoning is readily apparent.

The notion that the Commission failed to give a satisfactory explanation for its action is easily dismissed. The Commission devoted 21 paragraphs of the Order to NEPA, JA54-64, Order ¶¶ 72-92, not even counting the additional 37 paragraphs of cross-referenced orbital debris analysis that challengers shoehorn into their NEPA

claim, JA35-53, Order ¶¶ 32-68. It is not difficult to "reasonably *** discern[]" the Commission's "path," even with respect to the handpicked examples. Br. 26.

NEPA challengers tout their "lead argument[] *** that approximately *10,000* Starlink satellites burning up in the atmosphere will disperse millions of pounds of metallic compounds that will, in turn, significantly impact the ozone layer and global warming." Br. 26. To be clear, the 10,000 figure corresponds to the total number of satellites that would need to maintain the entire 4,408-satellite fleet over the license term. JA256-257 [SpaceX-May-15-Letter-5-6]. More starkly, before the Commission, Viasat explicitly tethered its claims of significant environmental impact to a much larger satellite constellation than just the 2,824 satellites actually at issue here. Viasat argued that SpaceX's modification "cannot be considered 'in isolation' because SpaceX has authorization for about 12,000 satellites already and has also requested authorization for a second generation constellation of 30,000 satellites"—with replacement satellites bringing the total to "100,000 satellites over the next fifteen years." JA57, Order ¶ 78 & n.311. Indeed, Viasat took the position that "[a] proper NEPA inquiry in this case requires the Commission to consider whether permitting SpaceX to deploy 2,814 new satellites (plus replacements) into low-Earth orbit—*as part of a broader plan to deploy an unprecedented fleet of 42,000 operating satellites 'may have a significant environmental impact*.'" JA941, JA946-947 [Viasat-NEPA-Reply-5, 10-11] (emphasis added); *see* JA1268 [Viasat-

Feb.-18-ex-parte-8] ("[T]he Commission Must Consider the Environmental Impact of SpaceX's Planned Deployment of *42,000* Operating Starlink Satellites in Total").

The Commission rightly rebuffed Viasat's grossly inflated baseline[4]—a determination not challenged on appeal (although an amicus appears to take up that mantle). JA56-57, Order ¶ 78; *see* Lawrence Amicus Br. 23-32 (arguing that Commission was required to assess "cumulative effects"). Even putting aside that the vast majority of those satellites have not yet been authorized, the Commission's NEPA regulations focus the inquiry on "whether the 'particular action' at issue"—here, "the instant modification request"—"should be subject to an [environmental assessment]." JA57, Order ¶ 78 (quoting 47 C.F.R. § 1.1307(c)); *see also City of New York*, 4 F.3d at 185 ("The regulatory touchstone for exceptions to the categorical exclusion *** is the potential environmental impact of the 'particular action' before the agency *** . The environmental impact of that action did not increase because of prior Commission authorizations."). That makes sense where, as here, a categorical exclusion applies: "By definition, [categorical exclusions] are categories of actions that have been predetermined not to involve significant environmental impacts, and therefore require no further agency analysis absent extraordinary

[4] For many of the reasons explained below (pp. 43-54, *infra*), even Viasat's allegations of purported impacts directed to a satellite constellation 15 times larger than that at issue here do not establish a potential "significant environment impact" so as to trigger an environmental assessment under NEPA.

circumstances" that would justify a departure in a specific circumstance. *City of New York*, 4 F.3d at 185 (alteration in original) (quoting *National Tr.*, 828 F.2d at 781).

Given Viasat's underlying analytical misstep, the Commission predictably found Viasat's misdirected showings, including with respect to satellite reentry, to be "insufficient" and lacking the detail required by section 1.1307(c). JA59-60, JA62-64, Order ¶¶ 82, 85, 87, 89, 91; *see, e.g.*, JA437 [NEPA-Pet.-12] (citing JA520 [Pet.-Ex.-15]) (relying on study purporting to estimate *combined* effects of reentry for satellite constellations planned by ten different operators (including Viasat itself), using Starlink constellation of up to *42,000* satellites).

For the remainder of the supposedly unexplained determinations, NEPA challengers attack the Commission for "uncritically accept[ing]" SpaceX's representations (Br. 27-28), particularly with regard to mitigation of reflected sunlight, compliance with radiofrequency exposure rules, and demisability of Starlink satellites. Setting aside that those (and other) attacks are meritless for reasons discussed next, the decision whether to credit such representations is squarely within the Commission's domain. Challengers' disagreement with those determinations—acceptance of which tend to dispel any alleged uncertainty—does

not amount to either a failure to explain the Commission's rationale or a NEPA violation.[5]

C. NEPA Challengers Cannot Surmount The Deferential Standard Of Review

For each of the alleged environmental impacts pressed on appeal, the Commission reasonably determined that the record did not support preparation of an environmental assessment. NEPA challengers' contrary argument rests on a misapplication of the regulatory standard for overcoming a categorical exclusion and otherwise attempts to re-litigate Commission findings entitled to deference.

1. NEPA challengers would render toothless the standard for establishing potential significant environmental impact to overcome a categorical exclusion.

Throughout these proceedings, NEPA challengers have attempted to lower the bar for requiring an environmental assessment despite a categorical exclusion. At times, Viasat has argued that "section 1.1307(c) requires an [environmental assessment] when a proposed action may impact the environment." JA949 [Viasat-NEPA-Reply-13] (formatting altered). Alternatively, Viasat has suggested that the

[5] The Balance Group alone raised the radiofrequency exposure claim, which it does not flesh out on appeal. For good reason: the Commission relied on SpaceX's "compli[ance] with the Commission's radiofrequency exposures rules" because the Commission's NEPA regulations require an environmental assessment only when "[a] proposed project *** 'would cause human exposure to levels of radiofrequency radiation in excess of the limits' in the Commission's radiofrequency rules." JA64, Order ¶¶ 90-91 (quoting 47 C.F.R. § 1.1307(b)).

"question is whether the Commission's action *may* lead to an environmental impact that the agency should explore." JA1311 [Viasat-Commission-Stay-Request-10]. Just weeks before submitting its opening brief in this appeal, Viasat told this Court (in connection with its stay request) that "[u]nder th[e] 'may standard,' an [environmental assessment] is needed unless there is *no* possibility of a significant environmental impact." Mot. 5; *see* Mot. 11 (advocating for "*zero* risk" standard). Trying yet another variation, challengers now fault the Commission for purportedly "negat[ing] even the *possibility* that Starlink 'may have a significant environmental impact.'" Br. 27.

Each of those unprecedented formulations would render the section 1.1307(c) standard meaningless. It cannot be the case that unsubstantiated allegations of any speculative chance of environmental impact are enough to compel an environmental assessment—least of all where, as here, the agency has already promulgated a categorical exclusion covering the activity. That is not to say an interested person's submission "detail[ing] the reasons justifying or circumstances necessitating environmental consideration in the decision-making process," 47 C.F.R. § 1.1307(c), must include "definitive evidence" or "scientific consensus" of a significant environmental impact, *American Bird*, 516 F.3d at 1033. But the Commission must be provided a record basis for concluding that the alleged environmental impact is both significant and sufficiently plausible, even though the

proposed activity "normally do[es] not have a significant effect on the human environment." 40 C.F.R. § 1501.4(a). After all, "[s]ome quotient of uncertainty *** is always present when making predictions about the natural world"—a reality that has prompted courts applying a deferential standard of review to uphold decisions not to undertake further environmental processing under NEPA "despite some uncertainty." *American Wild Horses Campaign v. Bernhardt*, 963 F.3d 1001, 1008-1009 (9th Cir. 2020) (ellipsis in original) (internal quotation marks omitted).

To adopt a contrary rule—nowhere to be found in *American Bird* or any statute, regulation, or precedent—would drastically expand the scope of NEPA and eviscerate the categorical exclusion process. Indeed, NEPA regulations leave no doubt that it remains the Commission's purview to assess the "significan[ce]" of any alleged impact in terms of "the potentially affected environment and degree of the effects of the action," bearing in mind that "[s]ignificance varies with the setting of the proposed action." 40 C.F.R. § 1501.3(b). The Commission emphasized as much in promulgating section 1.1307(c). *See* 60 Rad. Reg. 2d (P&F) 13, ¶ 6 n.10 ("An Environmental Assessment [would be] required only if the Bureau or Commission concludes that given the particular nature of or circumstances surrounding the otherwise categorically excluded application, environmental review is warranted.").

In the end, NEPA challengers' real objection is not to the Commission's application of the standard for departing from a categorical exclusion, but to the

Commission's categorical exclusions themselves. According to challengers, it is "particularly important" to apply the standard in the toothless manner they propose "given that, since 1986, the Commission has categorically excluded *all* of its decisions from NEPA review unless the 'may' standard is met (or another exception applies)" and "[t]he Commission has never considered whether that exclusion is viable in light of large-scale low-earth-orbit deployments like Starlink." Br. 29 n.6. More directly, amicus casts the Commission's categorical exclusion framework as "no longer apt" and "outdated," and therefore "unreasonable" as applied to space activity. Lawrence Amicus Br. 5-6, 11-12.

The Council on Environmental Quality disagrees: "The Council has determined that the categorical exclusions contained in agency NEPA procedures as of September 14, 2020 are consistent with this subchapter." 40 C.F.R. § 1507.3(a). At any rate, Viasat did not challenge the continued viability or application of that framework before the agency and cannot do so collaterally through this appeal. Any such challenge is properly reserved for a Commission rulemaking proceeding.

2. The Commission's justifications for not requiring preparation of an environmental assessment were reasonable.

The Commission's assessment of the record under the standard for overcoming a categorical exclusion withstands challenge, especially under the deferential standard of review on appeal. Although NEPA challengers stress (Br. 2, 8) the 1,500 pages of exhibits submitted to the Commission (over 600 of which

comprise SpaceX pleadings or Commission orders), the few dozen pages actually relied upon come nowhere near demonstrating a plausible risk of significant environmental effect.

a. Satellite Launch and Reentry

The Commission found that: (i) Viasat's allegations "[w]ith respect to materials accumulating in the atmosphere as a result of satellite reentry *** are insufficient for [the Commission] to determine that additional environmental consideration is necessary under [its] rules or that granting the SpaceX modification application may have a significant environmental impact on the atmosphere or ozone layer" and that "arguments regarding 'unknowns about other complex chemical compounds' are too vague," JA59, Order ¶ 82; (ii) with respect to satellite debris surviving reentry, Viasat's statement "that 'as a general matter' 10 to 40% of satellite's mass does not burn up on reentry and could reach the Earth's surface" was "not accurate for SpaceX's satellites" according to the record, JA60, Order ¶ 84; and (iii) "with respect to launch activities, the [Federal Aviation Administration] has prepared its own [environmental assessment] on the SpaceX launches" and "no additional consideration of potential impacts associated with those launches is required," JA59, Order ¶ 82. Viasat's efforts to poke holes in those launch and reentry findings come up well short.

First, Viasat's primary evidence of the impact of satellite reentry on the atmosphere was (and continues to be) a poster presented at a conference. The poster purports to "estimate the future annual mass flux of satellites to reenter the atmosphere" and suggests that "[f]or a four-year residency time of reentry particulate, global residencies of alumina could reach up to 10 Gg." JA520 [Viasat-NEPA-Pet.-Ex.-15]. Critically, the poster's analysis is pegged to multiple large constellations in the aggregate. *Id.* In fact, the poster offers a chart listing across several operators the "Top 10 Upcoming [Lower-Earth Orbit] Constellations" in terms of number of satellites, lifetime in years, estimated mass, and annual mass flux. *Id.* And even then, the figures used for Starlink refer to a "12,000-42,000" satellite constellation, not the much smaller subset of satellites at issue here. *Id.* (The same can be said for the newly cited post-Order study on so-called "mega-constellations" (Br. 2. & n.1, 33), which obviously falls outside the record for this appeal.)

That evidence is "insufficient" by any measure to justify an environmental assessment. JA59, Order ¶ 82. It does not provide the Commission with a considered basis "to determine *** that granting the SpaceX modification"—involving only 2,824 satellites—"may have a significant environmental impact on the atmosphere or ozone layer." *Id.* Even assuming *arguendo* that the cumulative impact of reentry for (at least) ten different constellations could have such an impact

(an irrelevant point that the Commission never adjudicated), that would not permit the Commission to leap to the same conclusion for a single operator, much less the fraction of satellites actually at issue here. *See* pp. 37-39, *supra*. To quote amicus supporting NEPA challengers, "the environmental impact of any particular proposed deployment may be modest." Lawrence Amicus Br. 12-13.

Lacking any evidence of the environmental impact of 2,824 satellites, NEPA challengers attempt to fill the gap by suggesting that "on SpaceX's view *** its satellites will add approximately 2 *million* pounds of alumina to the atmosphere." Br. 31. But that mischaracterizes SpaceX's statement. In responding to Viasat's poster-derived assertion that hypothetical future constellations collectively could produce 22 million pounds of alumina, SpaceX explained that such a figure would be off by orders of magnitude "even under [a] totally unrealistic worst-case scenario" in which "SpaceX were to de-orbit all of its 4,408 satellites at once (which it will not) and all the aluminum in all of its satellites converted to alumina (which it would not)." JA1277 [SpaceX-Apr.-2-ex-parte-5]. That explanation undermines, not furthers, challengers' attempt to meet the standard for overcoming a categorical exclusion.

NEPA challengers are thus left to cite studies concerning the effects of alumina on the atmosphere from rocket emissions and to claim, *without support*, that "even a 0.5% increase in a substance with a documented negative effect on the environment

at the very least *may* have a significant environmental effect." Br. 34. But if such meager evidence and outright speculation—invoking the general premise that alumina "contribut[es] to climate change" and "damages the ozone layer," Br. 30—were enough to displace a categorical exclusion, the required showing that the circumstances of a particular proposed action "may have a significant environmental impact" would be no requirement at all.

Second, NEPA challengers argue that the Commission "failed to consider the potential harm from satellite debris that does *not* fully burn up in the atmosphere." Br. 34. That is nonsense. The Commission explained—under a section entitled "Satellite Debris Surviving Reentry," no less—that the agency had "previously assessed the casualty risk associated with the SpaceX satellites" (found to be "roughly zero") and that "there is no material difference between those satellites and the ones under consideration here." JA60, Order ¶¶ 84-85.

Citing yet another study that post-dates the Order (Br. 35 & n.8), NEPA challengers point to a supposed inconsistency in the Commission's reasoning based on updates to SpaceX's satellite design. But their narrative does not find support in the record. *See* Commission Br. 84-86. In the final analysis, they ignore that "SpaceX has validated its conclusion" of Starlink satellites being fully demisable upon reentry "with a Commission-mandated analysis using software purpose-built by NASA." JA60, Order ¶ 84. That is a more than adequate basis to uphold the

Commission's expert determination that SpaceX's position "is sufficiently supported by the record." *Id.* ¶ 85.

Third, in concluding that "no additional consideration of potential impacts associated with th[e] launches is required," the Commission looked to the Federal Aviation Administration's July 2020 "No Significant Impact" environmental assessment of SpaceX's proposed increase in launch rates through 2025. JA58-59, Order ¶¶ 81-82. Far from constituting an "abdicat[ion] [of] responsibility," Br. 36-37, Commission regulations expressly contemplate such inter-agency reliance, *see* JA59, Order ¶ 82 & n.331 (citing 47 C.F.R. § 1.1311(e)).

NEPA challengers criticize (Br. 36-38) the Administration's assessment as limited to emissions below 3,000 feet. Yet in the same paragraph they acknowledge that the assessment also discusses ozone depletion through emission of gases and particles "directly into the stratosphere." Federal Aviation Administration, *Final Environmental Assessment and Finding of No Significant Impact for SpaceX Falcon Launches* 71 (July 2020).[6] In doing so, challengers omit the assessment's conclusion that such emissions "are a small fraction of the total emissions" and "are not expected to result in significant climate-related impacts." *Id.* The Commission did not act unreasonably in accepting that on-point analysis.

[6] https://www.faa.gov/space/environmental/nepa_docs/media/SpaceX_Falcon_Program_Final_EA_and_FONSI.pdf.

b. Sunlight Reflectivity

NEPA challengers' arguments relating to sunlight reflectivity are equally unavailing. In terms of "possible effects to astronomy," the Commission "note[d] that [it] ha[d] a robust record on these issues *** and f[ound] that the record does not support the need to prepare an [environmental assessment]." JA62, Order ¶ 87. Recognizing SpaceX's close collaboration with the astronomy community, the Commission highlighted a filing from the American Astronomical Society agreeing that satellites at lower altitudes are preferable, as well as "SpaceX's representation that it has diminished the average brightness of its satellites" to benefit "communities of astronomers" and the "naked eye observer." *Id.* And because SpaceX had "made commitments to the astronomy community regarding further reduction in the visibility of its satellites" and was "still testing some of these solutions," the Commission found it appropriate to "continue to monitor this situation and SpaceX's efforts." *Id.*

Although NEPA challengers cite a bevy of astronomy-related studies (Br. 38-39), those studies actually support the Commission's findings. For example, the United Nations Office for Outer Space Affairs based its findings on a "constellation profile" of "almost 78,000 spacecraft" and couched its assessment "in the absence of substantial mitigations." JA1009 [Viasat-NEPA-Reply-Ex.-13-at-28]. "SATCON1"—a workshop in which SpaceX engineers participated—recognizes

that "SpaceX has shown that operators can reduce reflected sunlight through satellite body orientation, Sun shielding, and surface darkening." JA563 [Viasat- Petition-Ex.-19-at-4].

NEPA challengers dispute whether SpaceX in fact has "dimmed its satellites 'from a 4.99 apparent magnitude to a 6.48 apparent magnitude.'" Br. 42-43. But the American Astronomical Society told the Commission that "SpaceX has made modifications to their Starlink satellites that have lowered the apparent brightness of their satellites," JA980 [AAS-Letter], and the United Nations report concluded that Starlink satellites modified with "DarkSat" or VisorSat" modifications have "a typical apparent brightness of 6th-7th magnitude," JA1122-1123 [Pet.-Reply-Ex.-13-at-141-142]. Presumably that is why challengers resort to citing a 5.5-magnitude figure from a SpaceX webpage (not in the record) providing a Starlink update as of April 2020—a year before the Commission adopted the Order, and months before the American Astronomical Society submission and United Nations report (both in the record).

Challengers also take issue with the Commission's reliance on mitigation evidence more generally. Much like monitoring (pp. 35-36, *supra*), considering mitigation evidence is wholly consistent with NEPA. *See* 40 C.F.R. § 1501.4(b)(1) ("If an extraordinary circumstance is present, the agency nevertheless may categorically exclude the proposed action if the agency determines that there are

circumstances that lessen the impacts or other conditions sufficient to avoid significant effects."); *Alaska Ctr. for Env't v. U.S. Forest Serv.*, 189 F.3d 851, 859-860 (9th Cir. 1999) (affirming decision not to prepare environmental assessment because "conditions mitigating the environmental consequences of an action may justify an agency's decision" and "[t]he mere presence of mitigating measures will not trigger the need to prepare an [environmental assessment]"). To the degree that *Sierra Club v. Marsh*, 769 F.2d 868, 877 (1st Cir. 1985), suggests otherwise, that rule is derived from the Council on Environmental Quality's *Forty Most Asked Questions*—an "informal statement" that this Court has held "not *** to be persuasive authority" because the content "is not at all evident from the underlying regulations," *Cabinet Mountain Wilderness v. Peterson*, 685 F.2d 678, 682-683 (D.C. Cir. 1982) (internal quotation marks omitted).

Cabinet Mountain, moreover, fully supports the Commission's reasoning here. This Court concluded that "mitigation measures were properly taken into consideration" in declining to order an environmental impact statement, where "one or more measures [identified during an initial assessment] were implemented to mitigate potential adverse environmental effects," even though the appellants alleged "that the effectiveness of the mitigation measures is not factually supported." 685 F.2d at 683-684. So too here: At SATCON1 and through the United Nations initiative, a "broad[] group of astronomers, space scientists, and satellite industry

engineers" came together to formulate various mitigation recommendations—including darkening of satellites, orbiting satellites as low as possible, and creation of repositories of location data—to address "a potential future with tens of thousands of low Earth orbit satellites." JA1124-1138 [Pet.-Reply-Ex.-13-at-143-157]. SpaceX has already taken considerable steps to adopt these consensus recommendations, and has committed to developing and implementing many more. JA60-62, Order ¶¶ 86-87. Indeed, the lower altitudes proposed in the modification itself implements one of those recommendations—over the objections of NEPA challengers. "For [this Court] to overturn [the Order] under these circumstances would require an unjustifiable intrusion into the administrative process." *Cabinet Mountain*, 685 F.2d at 684; *cf. Michigan Gambling Opposition v. Kempthorne*, 525 F.3d 23, 29-30 (D.C. Cir. 2008) (upholding decision not to conduct further environmental processing because "[i]t was not inherently arbitrary or capricious for the [agency] to rely on [the local authority's] assessment *** that mitigation of the traffic was sufficient").[7]

[7] NEPA challengers (Br. 39-41) also mention studies relating to the effect of light pollution generally on human health, flora, fauna, and animal migration. But the studies do not provide any specific basis for overturning the Commission's finding that "Viasat and the Balance Group have failed to set forth in detail reasons justifying or circumstances necessitating consideration of these issues." JA62, Order ¶ 87.

c. Orbital Debris

Finally, NEPA challengers seek to transform (Br. 45-48) their objection to SpaceX's orbital debris mitigation plan into a NEPA issue. As the Commission noted, it is unclear how "impacts in space are even within the scope of NEPA (which applies to effects on the quality of the human environment)." JA63, Order ¶ 89. But it is not difficult to appreciate why the Commission concluded that Viasat failed to overcome the categorical exclusion regardless.

The Commission has a well-developed regime (updated last year) specifically designed to address orbital debris concerns. *See In re Mitigation of Orbital Debris in the New Space Age*, 35 FCC Rcd. 4,156 (2020). Based on the most recent data provided by SpaceX, the Commission observed that the "trend is at this point promising" and held SpaceX to a stringent reporting standard. JA51, Order ¶ 64; *see, e.g.*, JA50, Order ¶ 62 & n.265 (noting that "as of mid-February 2021, 720 of the last 723 satellites [SpaceX] launched were maneuverable above injection altitude"); JA1274 [April-2-Ex-Parte-2] (providing table of launches and explaining that SpaceX "has identified and corrected the root cause for the very few satellites that were non-maneuverable above injection altitude"). NEPA challengers'

fearmongering aside, the Commission's disagreement on the threat of orbital debris can only be described as reasonable.[8]

CONCLUSION

This Court should affirm the Commission's Order.

Respectfully submitted,

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[8] To the extent it is inclined to sustain the NEPA challenge, this Court should exercise its discretion to remand without vacatur. *See, e.g.*, *Vecinos para el Bienestar de la Comunidad Costera v. FERC*, 6 F.4th 1321, 1332 (D.C. Cir. 2021); *see also* Commission Br. 95 n.31. That remedy would be particularly appropriate here given (i) that challengers contend the Order fails to explain its reasoning, (ii) that the Commission could still find NEPA does not apply at all, and (iii) the substantial disruption to the public interest and SpaceX that would result from vacatur.

ADDENDUM

TABLE OF CONTENTS

United States Code
Title 47. Telecommunications
Chapter 5. Wire or Radio Communication
Subchapter III. Special Provisions Relating to Radio
Part I. General Provisions

§ 303. Powers and duties of Commission

Except as otherwise provided in this chapter, the Commission from time to time, as public convenience, interest, or necessity requires, shall--

***

(c) Assign bands of frequencies to the various classes of stations, and assign frequencies for each individual station and determine the power which each station shall use and the time during which it may operate;

***

(f) Make such regulations not inconsistent with law as it may deem necessary to prevent interference between stations and to carry out the provisions of this chapter: Provided, however, That changes in the frequencies, authorized power, or in the times of operation of any station, shall not be made without the consent of the station licensee unless the Commission shall determine that such changes will promote public convenience or interest or will serve public necessity, or the provisions of this chapter will be more fully complied with;

***

(r) Make such rules and regulations and prescribe such restrictions and conditions, not inconsistent with law, as may be necessary to carry out the provisions of this chapter, or any international radio or wire communications treaty or convention, or regulations annexed thereto, including any treaty or convention insofar as it relates to the use of radio, to which the United States is or may hereafter become a party.

***

United States Code
Title 47. Telecommunications
Chapter 5. Wire or Radio Communication
Subchapter IV. Procedural and Administrative Provisions

§ 402. Judicial review of Commission's orders and decisions

***

(b) Right to appeal

Appeals may be taken from decisions and orders of the Commission to the United States Court of Appeals for the District of Columbia in any of the following cases:

(1) By any applicant for a construction permit or station license, whose application is denied by the Commission.

(2) By any applicant for the renewal or modification of any such instrument of authorization whose application is denied by the Commission.

***

(6) By any other person who is aggrieved or whose interests are adversely affected by any order of the Commission granting or denying any application described in paragraphs (1), (2), (3), (4), and (9) of this subsection.

***

Code of Federal Regulations
Title 40. Protection of Environment
Chapter V. Council on Environmental Quality
Subchapter A. National Environmental Policy Act Implementing Regulations
Part 1501. NEPA and Agency Planning

§ 1501.3 Determine the appropriate level of NEPA review.

(a) In assessing the appropriate level of NEPA review, Federal agencies should determine whether the proposed action:

(1) Normally does not have significant effects and is categorically excluded (§ 1501.4);

(2) Is not likely to have significant effects or the significance of the effects is unknown and is therefore appropriate for an environmental assessment (§ 1501.5); or

(3) Is likely to have significant effects and is therefore appropriate for an environmental impact statement (part 1502 of this chapter).

(b) In considering whether the effects of the proposed action are significant, agencies shall analyze the potentially affected environment and degree of the effects of the action. Agencies should consider connected actions consistent with § 1501.9(e)(1).

(1) In considering the potentially affected environment, agencies should consider, as appropriate to the specific action, the affected area (national, regional, or local) and its resources, such as listed species and designated critical habitat under the Endangered Species Act. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend only upon the effects in the local area.

(2) In considering the degree of the effects, agencies should consider the following, as appropriate to the specific action:

(i) Both short- and long-term effects.

(ii) Both beneficial and adverse effects.

(iii) Effects on public health and safety.

(iv) Effects that would violate Federal, State, Tribal, or local law protecting the environment.

Code of Federal Regulations
Title 40. Protection of Environment
Chapter V. Council on Environmental Quality
Subchapter A. National Environmental Policy Act Implementing Regulations
Part 1501. NEPA and Agency Planning

§ 1501.4 Categorical exclusions.

(a) For efficiency, agencies shall identify in their agency NEPA procedures (§ 1507.3(e)(2)(ii) of this chapter) categories of actions that normally do not have a significant effect on the human environment, and therefore do not require preparation of an environmental assessment or environmental impact statement.

(b) If an agency determines that a categorical exclusion identified in its agency NEPA procedures covers a proposed action, the agency shall evaluate the action for extraordinary circumstances in which a normally excluded action may have a significant effect.

(1) If an extraordinary circumstance is present, the agency nevertheless may categorically exclude the proposed action if the agency determines that there are circumstances that lessen the impacts or other conditions sufficient to avoid significant effects.

(2) If the agency cannot categorically exclude the proposed action, the agency shall prepare an environmental assessment or environmental impact statement, as appropriate.

Code of Federal Regulations
Title 40. Protection of Environment
Chapter V. Council on Environmental Quality
Subchapter A. National Environmental Policy Act Implementing Regulations
Part 1507. Agency Compliance
§ 1507.3 Agency NEPA procedures.

(a) Where existing agency NEPA procedures are inconsistent with the regulations in this subchapter, the regulations in this subchapter shall apply, consistent with § 1506.13 of this chapter, unless there is a clear and fundamental conflict with the requirements of another statute. The Council has determined that the categorical exclusions contained in agency NEPA procedures as of September 14, 2020 are consistent with this subchapter.

***

Code of Federal Regulations
Title 47. Telecommunication
Chapter I. Federal Communications Commission
Subchapter A. General
Part 1. Practice and Procedure
Subpart I. Procedures Implementing the National Environmental Policy Act of 1969

§ 1.1306 Actions which are categorically excluded from environmental processing.

(a) Except as provided in § 1.1307 (c) and (d), Commission actions not covered by § 1.1307 (a) and (b) are deemed individually and cumulatively to have no significant effect on the quality of the human environment and are categorically excluded from environmental processing.

(b) Specifically, any Commission action with respect to any new application, or minor or major modifications of existing or authorized facilities or equipment, will be categorically excluded, provided such proposals do not:

(1) Involve a site location specified under § 1.1307(a) (1)–(7), or

(2) Involve high intensity lighting under § 1.1307(a)(8).

(3) Result in human exposure to radiofrequency radiation in excess of the applicable safety standards specified in § 1.1307(b).

(c)(1) Unless § 1.1307(a)(4) is applicable, the provisions of § 1.1307(a) requiring the preparation of EAs do not encompass the construction of wireless facilities, including deployments on new or replacement poles, if:

(i) The facilities will be located in a right-of-way that is designated by a Federal, State, local, or Tribal government for communications towers, above-ground utility transmission or distribution lines, or any associated structures and equipment;

(ii) The right-of-way is in active use for such designated purposes; and

(iii) The facilities would not

(A) Increase the height of the tower or non-tower structure by more than 10% or twenty feet, whichever is greater, over existing support structures that are located in the right-of-way within the vicinity of the proposed construction;

(B) Involve the installation of more than four new equipment cabinets or more than one new equipment shelter;

(C) Add an appurtenance to the body of the structure that would protrude from the edge of the structure more than twenty feet, or more than the width of the structure at the level of the appurtenance, whichever is greater (except that the deployment may exceed this size limit if necessary to shelter the antenna from inclement weather or to connect the antenna to the tower via cable); or

(D) Involve excavation outside the current site, defined as the area that is within the boundaries of the leased or owned property surrounding the deployment or that is in proximity to the structure and within the boundaries of the utility easement on which the facility is to be deployed, whichever is more restrictive.

(2) Such wireless facilities are subject to § 1.1307(b) and require EAs if their construction would result in human exposure to radiofrequency radiation in excess of the applicable health and safety guidelines cited in § 1.1307(b).

Note 1: The provisions of § 1.1307(a) requiring the preparation of EAs do not encompass the mounting of antenna(s) and associated equipment (such as wiring, cabling, cabinets, or backup-power), on or in an existing building, or on an antenna tower or other man-made structure, unless § 1.1307(a)(4) is applicable. Such antennas are subject to § 1.1307(b) of this part and require EAs if their construction would result in human exposure to radiofrequency radiation in excess of the applicable health and safety guidelines cited in § 1.1307(b) of this part. The provisions of § 1.1307 (a) and (b) of this part do not encompass the installation of aerial wire or cable over existing aerial corridors of prior or permitted use or the underground installation of wire or cable along existing underground corridors of prior or permitted use, established by the applicant or others. The use of existing buildings, towers or corridors is an environmentally desirable alternative to the construction of new facilities and is encouraged. The provisions of § 1.1307(a) and (b) of this part do not encompass the construction of new submarine cable systems.

Note 2: The specific height of an antenna tower or supporting structure, as well as the specific diameter of a satellite earth station, in and of itself, will not be deemed sufficient to warrant environmental processing, see § 1.1307 and § 1.1308, except as required by the Bureau pursuant to the Note to § 1.1307(d).

Note 3: The construction of an antenna tower or supporting structure in an established "antenna farm": (i.e., an area in which similar antenna towers are clustered, whether or not such area has been officially designated as an antenna farm), will be categorically excluded unless one or more of the antennas to be mounted on the tower or structure are subject to the provisions of § 1.1307(b) and the additional radiofrequency radiation from the antenna(s) on the new tower or structure would cause human exposure in excess of the applicable health and safety guidelines cited in § 1.1307(b).

Code of Federal Regulations
Title 47. Telecommunication
Chapter I. Federal Communications Commission
Subchapter A. General
Part 1. Practice and Procedure
Subpart I. Procedures Implementing the National Environmental Policy Act of 1969

§ 1.1307 Actions that may have a significant environmental effect, for which Environmental Assessments (EAs) must be prepared.

(a) Commission actions with respect to the following types of facilities may significantly affect the environment and thus require the preparation of EAs by the applicant (see §§ 1.1308 and 1.1311) and may require further Commission environmental processing (see §§ 1.1314, 1.1315 and 1.1317):

(1) Facilities that are to be located in an officially designated wilderness area.

(2) Facilities that are to be located in an officially designated wildlife preserve.

(3) Facilities that:

(i) May affect listed threatened or endangered species or designated critical habitats; or

(ii) are likely to jeopardize the continued existence of any proposed endangered or threatened species or likely to result in the destruction or adverse modification of proposed critical habitats, as determined by the Secretary of the Interior pursuant to the Endangered Species Act of 1973.

Note: The list of endangered and threatened species is contained in 50 CFR 17.11, 17.22, 222.23(a) and 227.4. The list of designated critical habitats is contained in 50 CFR 17.95, 17.96 and part 226. To ascertain the status of proposed species and habitats, inquiries may be directed to the Regional Director of the Fish and Wildlife Service, Department of the Interior.

(4) Facilities that may affect districts, sites, buildings, structures or objects, significant in American history, architecture, archeology, engineering or culture, that are listed, or are eligible for listing, in the National Register of Historic Places (see 54 U.S.C. 300308; 36 CFR parts 60 and 800), and that are subject to review

pursuant to section 1.1320 and have been determined through that review process to have adverse effects on identified historic properties.

(5) Facilities that may affect Indian religious sites.

(6) Facilities to be located in floodplains, if the facilities will not be placed at least one foot above the base flood elevation of the floodplain.

(7) Facilities whose construction will involve significant change in surface features (e.g., wetland fill, deforestation or water diversion). (In the case of wetlands on Federal property, see Executive Order 11990.)

(8) Antenna towers and/or supporting structures that are to be equipped with high intensity white lights which are to be located in residential neighborhoods, as defined by the applicable zoning law.

(b)(1) Requirements.

(i) With respect to the limits on human exposure to RF provided in § 1.1310 of this chapter, applicants to the Commission for the grant or modification of construction permits, licenses or renewals thereof, temporary authorities, equipment authorizations, or any other authorizations for radiofrequency sources must either:

(A) Determine that they qualify for an exemption pursuant to § 1.1307(b)(3);

(B) Prepare an evaluation of the human exposure to RF radiation pursuant to § 1.1310 and include in the application a statement confirming compliance with the limits in § 1.1310; or

(C) Prepare an Environmental Assessment if those RF sources would cause human exposure to levels of RF radiation in excess of the limits in § 1.1310.

(ii) Compliance with these limits for fixed RF source(s) may be accomplished by use of mitigation actions, as provided in § 1.1307(b)(4). Upon request by the Commission, the party seeking or holding such authorization must electronically submit technical information showing the basis for such compliance, either by exemption or evaluation. Notwithstanding the

preceding requirements, in the event that RF sources cause human exposure to levels of RF radiation in excess of the limits in § 1.1310 of this chapter, such RF exposure exemptions and evaluations are not deemed sufficient to show that there is no significant effect on the quality of the human environment or that the RF sources are categorically excluded from environmental processing.

(2) Definitions. For the purposes of this section, the following definitions shall apply.

Available maximum time-averaged power for an RF source is the maximum available RF power (into a matched load) as averaged over a time-averaging period;

Category One is any spatial region that is compliant with the general population exposure limit with continuous exposure or source-based time-averaged exposure;

Category Two is any spatial region where the general population exposure limit is exceeded but that is compliant with the occupational exposure limit with continuous exposure;

Category Three is any spatial region where the occupational exposure limit is exceeded but by no more than ten times the limit;

Category Four is any spatial region where the exposure is more than ten times the occupational exposure limit or where there is a possibility for serious injury on contact.

Continuous exposure refers to the maximum time-averaged exposure at a given location for an RF source and assumes that exposure may take place indefinitely. The exposure limits in § 1.1310 of this chapter are used to establish the spatial regions where mitigation measures are necessary assuming continuous exposure as prescribed in § 1.1307(b)(4) of this chapter.

Effective Radiated Power (ERP) is the product of the maximum antenna gain which is the largest far-field power gain relative to a dipole in any direction for each transverse polarization component, and the maximum delivered time-averaged power which is the largest net power delivered or supplied to an

antenna as averaged over a time-averaging period; ERP is summed over two polarizations when present;

Exemption for (an) RF source(s) is solely from the obligation to perform a routine environmental evaluation to demonstrate compliance with the RF exposure limits in § 1.1310 of this chapter; it is not exemption from the equipment authorization procedures described in part 2 of this chapter, not exemption from general obligations of compliance with the RF exposure limits in § 1.1310 of this chapter, and not exemption from determination of whether there is no significant effect on the quality of the human environment under § 1.1306 of this chapter.

Fixed RF source is one that is physically secured at one location, even temporarily, and is not able to be easily moved to another location while radiating;

Mobile device is as defined in § 2.1091(b) of this chapter;

Plane-wave equivalent power density is the square of the root-mean-square (rms) electric field strength divided by the impedance of free space (377 ohms).

Portable device is as defined in § 2.1093(b) of this chapter;

Positive access control is mitigation by proactive preclusion of unauthorized access to the region surrounding an RF source where the continuous exposure limit for the general population is exceeded. Examples of such controls include locked doors, ladder cages, or effective fences, as well as enforced prohibition of public access to external surfaces of buildings. However, it does not include natural barriers or other access restrictions that did not require any action on the part of the licensee or property management.

Radiating structure is an unshielded RF current-carrying conductor that generates an RF reactive near electric or magnetic field and/or radiates an RF electromagnetic wave. It is the component of an RF source that transmits, generates, or reradiates an RF fields, such as an antenna, aperture, coil, or plate.

RF source is Commission-regulated equipment that transmits or generates RF fields or waves, whether intentionally or unintentionally, via one or more radiating structure(s). Multiple RF sources may exist in a single device.

Separation distance (variable R in Table 1) is the minimum distance in any direction from any part of a radiating structure and any part of the body of a nearby person;

Source-based time averaging is an average of instantaneous exposure over a time-averaging period that is based on an inherent property or duty-cycle of a device to ensure compliance with the continuous exposure limits;

Time-averaging period is a time period not to exceed 30 minutes for fixed RF sources or a time period inherent from device transmission characteristics not to exceed 30 minutes for mobile and portable RF sources;

Transient individual is an untrained person in a location where occupational/controlled limits apply, and he or she must be made aware of the potential for exposure and be supervised by trained personnel pursuant to § 1.1307(b)(4) of this chapter where use of time averaging is required to ensure compliance with the general population exposure limits in § 1.1310 of this chapter.

(3) Determination of exemption.

(i) For single RF sources (i.e., any single fixed RF source, mobile device, or portable device, as defined in paragraph (b)(2) of this section): A single RF source is exempt if:

(A) The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph (b)(3)(ii)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(ii)(A);

(B) Or the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P_{th} (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by:

$$P_{th}\ (\text{mW}) = \begin{cases} ERP_{20\ cm}(d/20\ \text{cm})^x & d \le 20\ \text{cm} \\ ERP_{20\ cm} & 20\ \text{cm} < d \le 40\ \text{cm} \end{cases}$$

Where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\ cm}\sqrt{f}}\right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20\ cm}\ (\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases}$$

d = the separation distance (cm);

(C) Or using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least $\lambda/2\pi$, where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of $\lambda/4$ or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

Table 1 to § 1.1307(b)(3)(i)(C)—Single RF Sources Subject to Routine Environmental Evaluation

RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	1,920 R^2.
1.34-30	3,450 R^2/f^2.
30-300	3.83 R^2.
300-1,500	0.0128 R^2f.
1,500-100,000	19.2R^2.

(ii) For multiple RF sources: Multiple RF sources are exempt if:

(A) The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required). This exemption may not be used in conjunction with other exemption criteria other than those is paragraph (b)(3)(i)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(i)(A).

(B) in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

$$\sum_{i=1}^{a} \frac{P_i}{P_{th,i}} + \sum_{j=1}^{b} \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^{c} \frac{Evaluated_k}{Exposure\ Limit_k} \leq 1$$

Where:

a = number of fixed, mobile, or portable RF sources claiming exemption using paragraph (b)(3)(i)(B) of this section for P_{th}, including existing exempt transmitters and those being added.

b = number of fixed, mobile, or portable RF sources claiming exemption using paragraph (b)(3)(i)(C) of this section for Threshold ERP, including existing exempt transmitters and those being added.

c = number of existing fixed, mobile, or portable RF sources with known evaluation for the specified minimum distance including existing evaluated transmitters.

P_i = the available maximum time-averaged power or the ERP, whichever is greater, for fixed, mobile, or portable RF source i at a distance between 0.5 cm and 40 cm (inclusive).

$P_{th,i}$ = the exemption threshold power (P_{th}) according to paragraph (b)(3)(i)(B) of this section for fixed, mobile, or portable RF source i.

ERP_j = the ERP of fixed, mobile, or portable RF source j.

$ERP_{th,j}$ = exemption threshold ERP for fixed, mobile, or portable RF source j, at a distance of at least $\lambda/2\pi$ according to the applicable formula of paragraph (b)(3)(i)(C) of this section.

$Evaluated_k$ = the maximum reported SAR or MPE of fixed, mobile, or portable RF source k either in the device or at the transmitter site from an existing evaluation at the location of exposure.

$Exposure\ Limit_k$ = either the general population/uncontrolled maximum permissible exposure (MPE) or specific absorption rate (SAR) limit for each

fixed, mobile, or portable RF source k, as applicable from § 1.1310 of this chapter.

(4) Mitigation.

(i) As provided in paragraphs (b)(4)(ii) through (vi) of this section, specific mitigation actions are required for fixed RF sources to the extent necessary to ensure compliance with our exposure limits, including the implementation of an RF safety plan, restriction of access to those RF sources, and disclosure of spatial regions where exposure limits are exceeded.

(ii) Category One—INFORMATION: No mitigation actions are required when the RF source does not cause continuous or source-based time-averaged exposure in excess of the general population limit in s§ 1.1310 of this part. Optionally a green "INFORMATION" sign may offer information to those persons who might be approaching RF sources. This optional sign, when used, must include at least the following information: Appropriate signal word "INFORMATION" and associated color (green), an explanation of the safety precautions to be observed when closer to the antenna than the information sign, a reminder to obey all postings and boundaries (if higher categories are nearby), up-to-date licensee (or operator) contact information (if higher categories are nearby), and a place to get additional information (such as a website, if no higher categories are nearby).

(iii) Category Two—NOTICE: Mitigation actions are required in the form of signs and positive access control surrounding the boundary where the continuous exposure limit is exceeded for the general population, with the appropriate signal word "NOTICE" and associated color (blue) on the signs. Signs must contain the components discussed in paragraph (b)(4)(vi) of this section. Under certain controlled conditions, such as on a rooftop with limited access, a sign attached directly to the surface of an antenna will be considered sufficient if the sign specifies a minimum approach distance and is readable at this separation distance and at locations required for compliance with the general population exposure limit in § 1.1310 of this part. Appropriate training is required for any occupational personnel with access to controlled areas within restrictive barriers where the general population exposure limit is exceeded, and transient individuals must be supervised by trained occupational personnel upon entering any of these areas. Use of time averaging is required for transient individuals to ensure compliance with the general population exposure limit.

(iv) Category Three—CAUTION: Signs (with the appropriate signal word "CAUTION" and associated color (yellow) on the signs), controls, or indicators (e.g., chains, railings, contrasting paint, diagrams) are required (in addition to the positive access control established for Category Two) surrounding the area in which the exposure limit for occupational personnel in a controlled environment is exceeded by no more than a factor of ten. Signs must contain the components discussed in paragraph (b)(4)(vi) of this section. If the boundaries between Category Two and Three are such that placement of both Category Two and Three signs would be in the same location, then the Category Two sign is optional. Under certain controlled conditions, such as on a rooftop with limited access, a sign may be attached directly to the surface of an antenna within a controlled environment if it specifies the minimum approach distance and is readable at this distance and at locations required for compliance with the occupational exposure limit in § 1.1310 of this part. If signs are not used at the occupational exposure limit boundary, controls or indicators (e.g., chains, railings, contrasting paint, diagrams, etc.) must designate the boundary where the occupational exposure limit is exceeded. Additionally, appropriate training is required for any occupational personnel with access to the controlled area where the general population exposure limit is exceeded, and transient individuals must be supervised by trained personnel upon entering any of these areas. Use of time averaging is required for transient individuals to ensure compliance with the general population exposure limit. Further mitigation by reducing exposure time in accord with six-minute time averaging is required for occupational personnel in the area in which the occupational exposure limit is exceeded. However, proper use of RF personal protective equipment may be considered sufficient in lieu of time averaging for occupational personnel in the areas in which the occupational exposure limit is exceeded. If such procedures or power reduction, and therefore Category reduction, are not feasible, then lockout/tagout procedures in 29 CFR 1910.147 must be followed.

(v) Category Four—WARNING/DANGER: Where the occupational limit could be exceeded by a factor of more than ten, "WARNING" signs with the associated color (orange), controls, or indicators (e.g., chains, railings, contrasting paint, diagrams) are required (in addition to the positive access control established for Category Two) surrounding the area in which the occupational exposure limit in a controlled environment is exceeded by more than a factor of ten Signs must contain the components discussed in paragraph (b)(4)(vi) of this section. "DANGER" signs with the associated color (red)

are required where immediate and serious injury will occur on contact, in addition to positive access control, regardless of mitigation actions taken in Categories Two or Three. If the boundaries between Category Three and Four are such that placement of both Category Three and Four signs would be in the same location, then the Category Three sign is optional. No access is permitted without Category reduction. If power reduction, and therefore Category reduction, is not feasible, then lockout/tagout procedures in 29 CFR 1910.147 must be followed.

(vi) RF exposure advisory signs must be viewable and readable from the boundary where the applicable exposure limits are exceeded, pursuant to 29 CFR 1910.145, and include at least the following five components:

(A) Appropriate signal word, associated color {i.e., {DANGER" (red), "WARNING" (orange), "CAUTION," (yellow) "NOTICE" (blue)};

(B) RF energy advisory symbol;

(C) An explanation of the RF source;

(D) Behavior necessary to comply with the exposure limits; and

(E) Up-to-date contact information.

(5) Responsibility for compliance.

(i) In general, when the exposure limits specified in § 1.1310 of this part are exceeded in an accessible area due to the emissions from multiple fixed RF sources, actions necessary to bring the area into compliance or preparation of an Environmental Assessment (EA) as specified in § 1.1311 of this part are the shared responsibility of all licensees whose RF sources produce, at the area in question, levels that exceed 5% of the applicable exposure limit proportional to power. However, a licensee demonstrating that its facility was not the most recently modified or newly-constructed facility at the site establishes a rebuttable presumption that such licensee should not be liable in an enforcement proceeding relating to the period of non-compliance. Field strengths must be squared to be proportional to SAR or power density. Specifically, these compliance requirements apply if the square of the electric or magnetic field strength exposure level applicable to a particular RF source exceeds 5% of the square of the electric or magnetic field strength limit at the

area in question where the levels due to multiple fixed RF sources exceed the exposure limit. Site owners and managers are expected to allow applicants and licensees to take reasonable steps to comply with the requirements contained in paragraph (b)(1) of this section and, where feasible, should encourage co-location of RF sources and common solutions for controlling access to areas where the RF exposure limits contained in § 1.1310 of this part might be exceeded. Applicants and licensees are required to share technical information necessary to ensure joint compliance with the exposure limits, including informing other licensees at a site in question of evaluations indicating possible non-compliance with the exposure limits.

(ii) Applicants for proposed RF sources that would cause non-compliance with the limits specified in § 1.1310 at an accessible area previously in compliance must submit an EA if emissions from the applicant's RF source would produce, at the area in question, levels that exceed 5% of the applicable exposure limit. Field strengths must be squared if necessary to be proportional to SAR or power density.

(iii) Renewal applicants whose RF sources would cause non-compliance with the limits specified in § 1.1310 at an accessible area previously in compliance must submit an EA if emissions from the applicant's RF source would produce, at the area in question, levels that exceed 5% of the applicable exposure limit. Field strengths must be squared if necessary to be proportional to SAR or power density.

(c) If an interested person alleges that a particular action, otherwise categorically excluded, will have a significant environmental effect, the person shall electronically submit to the Bureau responsible for processing that action a written petition setting forth in detail the reasons justifying or circumstances necessitating environmental consideration in the decision-making process. If an interested person is unable to submit electronically or if filing electronically would be unreasonably burdensome, such person may submit the petition by mail, with a request for waiver under § 1.1304(b). (See § 1.1313). The Bureau shall review the petition and consider the environmental concerns that have been raised. If the Bureau determines that the action may have a significant environmental impact, the Bureau will require the applicant to prepare an EA (see §§ 1.1308 and 1.1311), which will serve as the basis for the determination to proceed with or terminate environmental processing.

(d) If the Bureau responsible for processing a particular action, otherwise categorically excluded, determines that the proposal may have a significant

environmental impact, the Bureau, on its own motion, shall require the applicant to electronically submit an EA. The Bureau will review and consider the EA as in paragraph (c) of this section.

Note to paragraph (d): Pending a final determination as to what, if any, permanent measures should be adopted specifically for the protection of migratory birds, the Bureau shall require an Environmental Assessment for an otherwise categorically excluded action involving a new or existing antenna structure, for which an antenna structure registration application (FCC Form 854) is required under part 17 of this chapter, if the proposed antenna structure will be over 450 feet in height above ground level (AGL) and involves either:

1. Construction of a new antenna structure;

2. Modification or replacement of an existing antenna structure involving a substantial increase in size as defined in paragraph I(C)(1)(3) of Appendix B to part 1 of this chapter; or

3. Addition of lighting or adoption of a less preferred lighting style as defined in § 17.4(c)(1)(iii) of this chapter. The Bureau shall consider whether to require an EA for other antenna structures subject to § 17.4(c) of this chapter in accordance with § 17.4(c)(8) of this chapter. An Environmental Assessment required pursuant to this note will be subject to the same procedures that apply to any Environmental Assessment required for a proposed tower or modification of an existing tower for which an antenna structure registration application (FCC Form 854) is required, as set forth in § 17.4(c) of this chapter.

(e) No State or local government or instrumentality thereof may regulate the placement, construction, and modification of personal wireless service facilities on the basis of the environmental effects of radio frequency emissions to the extent that such facilities comply with the regulations contained in this chapter concerning the environmental effects of such emissions. For purposes of this paragraph:

(1) The term personal wireless service means commercial mobile services, unlicensed wireless services, and common carrier wireless exchange access services;

(2) The term personal wireless service facilities means facilities for the provision of personal wireless services;

(3) The term unlicensed wireless services means the offering of telecommunications services using duly authorized devices which do not require individual licenses, but does not mean the provision of direct-to-home satellite services; and

(4) The term direct-to-home satellite services means the distribution or broadcasting of programming or services by satellite directly to the subscriber's premises without the use of ground receiving or distribution equipment, except at the subscriber's premises or in the uplink process to the satellite.

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Subchapter A. General
Part 1. Practice and Procedure
Subpart I. Procedures Implementing the National Environmental Policy Act of 1969

§ 1.1311 Environmental information to be included in the environmental assessment (EA).

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(e) An EA need not be submitted to the Commission if another agency of the Federal Government has assumed responsibility for determining whether of the facilities in question will have a significant effect on the quality of the human environment and, if it will, for invoking the environmental impact statement process.

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Chapter I. Federal Communications Commission
Subchapter B. Common Carrier Services
Part 25. Satellite Communications
Subpart A. General

§ 25.108 Incorporation by reference.

(a) Certain material is incorporated by reference into this part with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. All approved material is available for inspection at the Federal Communications Commission's Reference Information Center, located at the address of the FCC's main office indicated in 47 CFR 0.401(a), and is available from the sources listed in this paragraph (a). It is also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030 or go to www.archives.gov/federal-register/ccfr/ibr-locations.html.

(b) European Telecommunications Standards Institute (ETSI), 650 Route des Lucioles, 06921 Sophia–Antipolis Cedex, France; http://www.etsi.org; Voice: +33 (0)4 92 94 42 00; Fax: +33 (0)4 93 65 47 16; email: webstore@etsi.org.

(1) ETSI TS 103 129 V1.1.2 (2014–03), "Digital Video Broadcasting (DVB); Framing structure, channel coding and modulation of a carrier identification system (DVB–CID) for satellite transmission," Version 1.1.2, March 2014. Incorporation by reference approved for § 25.281(b).

(2) [Reserved]

(c) International Telecommunication Union (ITU), Place des Nations, 1211 Geneva 20 Switzerland; www.itu.int; Voice: +41 22 730 5111; Fax: +41 22 733 7256; email: itumail@itu.int.

(1) ITU Radio Regulations, Volume 1: Articles, Article 9, "Procedure for effecting coordination with or obtaining agreement of other administrations," Section II, "Procedure for effecting coordination," Edition of 2012, http://www.itu.int/pub/R–REG–RR–2012. Incorporation by reference approved for § 25.111(e).

(2) ITU Radio Regulations, Volume 1: Articles, Article 21, "Terrestrial and space services sharing frequency bands above 1 GHz," Section V, "Limits of power flux-density from space stations," Edition of 2016, copyright 2016, http://www.itu.int/pub/R–REG–RR–2016. Incorporation by reference approved for § 25.146(a).

(3) ITU Radio Regulations, Volume 1: Articles, Article 22, "Space services," Section II, "Control of interference to geostationary-satellite systems," Edition of 2016, copyright 2016, http://www.itu.int/pub/R–REG–RR–2016. Incorporation by reference approved for §§ 25.146(a), 25.289.

(4) ITU Radio Regulations, Volume 2: Appendices, Appendix 7, "Methods for the determination of the coordination areas around an earth station in the frequency bands between 100 MHz and 105 GHz," Edition of 2012, http://www.itu.int/pub/R-REG-RR-2012. Incorporation by reference approved for § 25.203(m).

(5) ITU Radio Regulations, Volume 2: Appendices, Appendix 30, "Provisions for all services and associated Plans and List for the broadcasting-satellite service in the frequency bands 11.7–12.2 GHz (in Region 3), 11.7–12.5 GHz (in Region 1) and 12.2–12.7 GHz (in Region 2)," Edition of 2012, http://www.itu.int/pub/R–REG–RR–2012. Incorporation by reference approved for §§ 25.117(h) and 25.118(e).

(6) ITU Radio Regulations, Volume 2: Appendices, Appendix 30A, "Provisions and associated Plans and List for feeder links for the broadcasting-satellite service (11.7–12.5 GHz in Region 1, 12.2–12.7 GHz in Region 2 and 11.7–12.2 GHz in Region 3) in the frequency bands 14.5–14.8 GHz and 17.3–18.1 GHz in Regions 1 and 3, and 17.3–17.8 GHz in Region 2," Edition of 2012, http://www.itu.int/pub/R–REG–RR–2012. Incorporation by reference approved for §§ 25.110(b), 25.117(h), and 25.118(e).

(7) ITU Radio Regulations, Volume 2: Appendices, Appendix 30B, "Provisions and associated Plan for the fixed-satellite service in the frequency bands 4 500–4 800 MHz, 6 725–7 025 MHz, 10.70–10.95 GHz, 11.2–11.45 GHz and 12.75–13.25 GHz," Edition of 2012, http://www.itu.int/pub/R–REG–RR–2012. Incorporation by reference approved for §§ 25.110(b) and 25.140(a).

(8) ITU Radio Regulations, Volume 3: Resolutions and Recommendations, Resolution 76 (Rev.WRC–15), "Protection of geostationary fixed-satellite

service and geostationary broadcasting-satellite service networks from the maximum aggregate equivalent power flux-density produced by multiple non-geostationary fixed-satellite service systems in frequency bands where equivalent power flux-density limits have been adopted," Edition of 2016, copyright 2016, http://www.itu.int/pub/R–REG–RR–2016. Incorporation by reference approved for § 25.146(a).

(9) ITU Radio Regulations, Volume 3: Resolutions and Recommendations, Resolution 85 (WRC–03), "Application of Article 22 of the Radio Regulations to the protection of geostationary fixed-satellite service and broadcasting-satellite service networks from non-geostationary fixed-satellite service systems," Edition of 2016, copyright 2016, http://www.itu.int/pub/R–REG–RR–2016. Incorporation by reference approved for § 25.146(c).

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Title 47. Telecommunication
Chapter I. Federal Communications Commission
Subchapter B. Common Carrier Services
Part 25. Satellite Communications
Subpart B. Applications and Licenses
General Application Filing Requirements

§ 25.117 Modification of station license.

(a) Except as provided for in § 25.118 (Modifications not requiring prior authorization), no modification of a radio station governed by this part which affects the parameters or terms and conditions of the station authorization shall be made except upon application to and grant of such application by the Commission.

(b) Both earth station and space station modification applications must be filed electronically through the International Bureau Filing System (IBFS) in accordance with the applicable provisions of part 1, subpart Y of this chapter.

(c) Applications for modification of earth station authorizations must be submitted on FCC Form 312, Main Form and Schedule B. Applications for modification of space station authorizations must be submitted on FCC Form 312, Main Form and Schedule S. Only those items that change need to be specified, provided that the applicant certifies that the remaining information has not changed.

(d)(1) Except as set forth in § 25.118(e), applications for modifications of space station authorizations shall be filed in accordance with § 25.114 and/or § 25.122 or § 25.123, as applicable, but only those items of information listed in § 25.114 and/or § 25.122 or § 25.123 that change need to be submitted, provided the applicant certifies that the remaining information has not changed.

(2) Applications for modifications of space station authorizations will be granted except under the following circumstances:

(i) Granting the modification would make the applicant unqualified to operate a space station under the Commission's rules.

(ii) Granting the modification request would not serve the public interest, convenience, and necessity.

(iii) Except as set forth in paragraph (d)(2)(iv) of this section, applications for modifications of GSO–like space station authorizations granted pursuant to the procedure set forth in § 25.158, which seek to relocate a GSO satellite or add a frequency band to the authorization, will be placed in a queue pursuant to § 25.158 and considered only after previously filed space station license applications or space station modification applications have been considered.

(iv) Applications for modifications of space station authorizations to increase the authorized bandwidth will not be considered in cases in which the original space station authorization was granted pursuant to the procedures set forth in § 25.157(e) or § 25.158(c)(4).

(v) Any 17/24 GHz BSS space station operator whose license is conditioned to operate at less than the power level otherwise permitted by § 25.208(c) and/or (w) of this part, and is conditioned to accept interference from a neighboring 17/24 GHz BSS space station, may file a modification application to remove those two conditions in the event that the license for that neighboring space station is cancelled or surrendered. In the event that two or more such modification applications are filed, and those applications are mutually exclusive, the modification applications will be considered on a first-come, first-served basis pursuant to the procedure set forth in § 25.158 of this part.

(3) In the event that a space station licensee provides notification of a planned license modification pursuant to § 25.118(e), and the Commission finds that the proposed modification does not meet the requirements of § 25.118(e), the Commission will issue a public notice announcing that the proposed license modification will be considered pursuant to the procedure specified in paragraphs (d)(1) and (d)(2) of this section.

(e) Any application for modification of authorization to extend a required date of completion, as set forth in § 25.133 for earth station authorizations or § 25.164 for space stations, or included as a condition of any earth station or space station authorization, must include a verified statement from the applicant:

(1) That states that the additional time is required due to unforeseeable circumstances beyond the applicant's control, describes these circumstances with specificity, and justifies the precise extension period requested; or

(2) That states there are unique and overriding public interest concerns that justify an extension, identifies these interests and justifies a precise extension period.

(f) An application for modification of a space station license to add an ancillary terrestrial component to an eligible satellite network will be treated as a request for a minor modification if the particulars of operations provided by the applicant comply with the criteria specified in § 25.149. Notwithstanding the treatment of such an application as a minor modification, the Commission shall place any initial application for the modification of a space station license to add an ancillary terrestrial component on notice for public comment. Except as provided for in § 25.149(f), no application for authority to add an ancillary terrestrial component to an eligible satellite network shall be granted until the applicant has demonstrated actual compliance with the criteria specified in § 25.149(b).

(g) The licensee and grantees shall ensure compliance with the Commission's radio frequency exposure requirements in §§ 1.1307(b), 2.1091, and 2.1093 of this chapter, as appropriate. An Environmental Assessment may be required if RF radiation from the proposed facilities would, in combination with radiation from other sources, cause RF power density or field strength in an accessible area to exceed the applicable limits specified in § 1.1310 of this chapter. See § 1.1307(b)(5)(iii).

(h) Unless otherwise ordered by the Commission, an application for any of the following kinds of modification of the operation of a GSO space station will be deemed granted 35 days after the date of the public notice that the application has been accepted for filing, provided no objection is filed during the 30-day notice period and the application does not propose a change that would be inconsistent with a Commission rule or require modification of the BSS plan in Appendix 30 or the associated feeder-link Plan in Appendix 30A of the ITU Radio Regulations (both incorporated by reference, see § 25.108).

(1) Relocation of a DBS or GSO FSS space station by no more than 0.15° from the initially authorized orbital location, provided the application includes a signed certification that:

(i) The space station operator has assessed and limited the probability of the satellite becoming a source of debris as a result of collisions with large debris or other operational satellites at the new orbital location; and

(ii) The proposed station-keeping volume of the satellite following relocation will not overlap a station-keeping volume reasonably expected to be occupied by any other satellite, including those authorized by the Commission, applied for and pending before the Commission, or otherwise the subject of an ITU filing and either in orbit or progressing towards launch.

(2) Repositioning one or more antenna beams by no more than 0.3 angular degrees from a line between the space station and the initially authorized boresight location(s).

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Subpart B. Applications and Licenses
Space Stations

§ 25.146 Licensing and operating provisions for NGSO FSS space stations.

(a) An NGSO FSS applicant proposing to operate in the 10.7–30 GHz frequency range must certify that it will comply with:

(1) Any applicable power flux-density levels in Article 21, Section V, Table 21–4 of the ITU Radio Regulations (incorporated by reference, § 25.108), except that in the 19.3–19.4 GHz and 19.6–19.7 GHz bands applicants must certify that they will comply with the ITU PFD limits governing NGSO FSS systems in the 17.7–19.3 GHz band; and

(2) Any applicable equivalent power flux-density levels in Article 22, Section II, and Resolution 76 of the ITU Radio Regulations (both incorporated by reference, § 25.108).

(b) [Reserved by 86 FR 11644]

(c) Prior to the initiation of service, an NGSO FSS operator licensed or holding a market access authorization to operate in the 10.7–30 GHz frequency range must receive a "favorable" or "qualified favorable" finding by the ITU Radiocommunication Bureau, in accordance with Resolution 85 of the ITU Radio Regulations (incorporated by reference, § 25.108), regarding its compliance with applicable ITU EPFD limits. In addition, a market access holder in these bands must:

(1) Communicate the ITU finding to the Commission; and

(2) Submit the input data files used for the ITU validation software.

(d) Coordination will be required between NGSO FSS systems and GSO FSS earth stations in the 10.7–12.75 GHz band when:

(1) The GSO satellite network has receive earth stations with earth station antenna maximum isotropic gain greater than or equal to 64 dBi; G/T of 44 dB/K or higher; and emission bandwidth of 250 MHz; and

(2) The $EPFD_{down}$ radiated by the NGSO satellite system into the GSO specific receive earth station, either within the U.S. for domestic service or any points outside the U.S. for international service, as calculated using the ITU software for examining compliance with EPFD limits exceeds—174.5 dB(W/(m2/40kHz)) for any percentage of time for NGSO systems with all satellites only operating at or below 2500 km altitude, or—202 dB(W/(m2/40kHz)) for any percentage of time for NGSO systems with any satellites operating above 2500 km altitude.

(e) An NGSO FSS licensee or market access recipient must ensure that ephemeris data for its constellation is available to all operators of authorized, in-orbit, co-frequency satellite systems in a manner that is mutually acceptable.

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§ 25.146 Licensing and operating rules for the NGSO FSS in the 10.7–14.5 GHz bands.

(a) A comprehensive technical showing shall be submitted for the proposed non-geostationary satellite orbit Fixed-Satellite Service (NGSO FSS) system in the 10.7–14.5 GHz bands. The technical information shall demonstrate that the proposed NGSO FSS system would not exceed the validation equivalent power flux-density (EPFD) limits as specified in § 25.208 (g), (k), and (l) for $EPFD_{down}$, and $EPFD_{up}$. If the technical demonstration exceeds the validation EPFD limits at any test points within the U.S. for domestic service and at any points outside of the U.S. for international service or at any points in the geostationary satellite orbit, as appropriate, the application would be unacceptable for filing and will be returned to the applicant with a brief statement identifying the non-compliance technical demonstration. The technical showing consists of the following:

(1) *Single-entry validation equivalent power flux-density, in the space-to-Earth direction, ($EPFD_{down}$) limits*. (i) Provide a set of power flux-density (PFD) masks, on the surface of the Earth, for each space station in the NGSO FSS system. The PFD masks shall be generated in accordance with the specification stipulated in the most recent version of ITU–R S.1503–2 (incorporated by reference, see § 25.108). In particular, the PFD masks must encompass the power flux-density radiated by the space station regardless of the satellite transmitter power resource allocation and traffic/beam switching strategy that are used at different periods of a NGSO FSS system's life. The PFD masks shall also be in an electronic form that can be accessed by the computer program specified in paragraph (a)(1)(iii) of this section.

(ii) Identify and describe in detail the assumptions and conditions used in generating the power flux-density masks.

(iii) If a computer program that has been approved by the ITU for determining compliance with the single- entry $EPFD_{down}$ validation limits is not yet

available, the applicant shall provide a computer program for the single-entry $EPFD_{down}$ validation computation, including both the source code and the executable file. This computer program shall be developed in accordance with the specification stipulated in the most recent version of Recommendation ITU–R S.1503. If the applicant uses the ITU approved software, the applicant shall indicate the program name and the version used.

(iv) Identify and describe in detail the necessary input parameters for the execution of the computer program identified in paragraph (a)(1)(iii) of this section.

(v) Provide the result, the cumulative probability distribution function of EPFD, of the execution of the computer program described in paragraph (a)(1)(iii) of this section by using only the input parameters contained in paragraphs (a)(1)(i) and (a)(1)(iv) of this section.

(2) *Single-entry additional operational equivalent power flux-density, in the Earth-to-space direction, (additional operational* $EPFD_{up}$*) limits*. (i) Provide a set of NGSO FSS earth station maximum equivalent isotropically radiated power (EIRP) masks as a function of the off- axis angle generated by an NGSO FSS earth station. The maximum EIRP mask shall be generated in accordance with the specification stipulated in the most recent version of ITU–R Recommendation S.1503. In particular, the results of calculations encompass what would be radiated regardless of the earth station transmitter power resource allocation and traffic/beam switching strategy are used at different periods of an NGSO FSS system's life. The EIRP masks shall be in an electronic form that can be accessed by the computer program specified in paragraph (a)(2)(iii) of this section.

(ii) Identify and describe in detail the assumptions and conditions used in generating the maximum earth station e.i.r.p. mask.

(iii) If a computer program that has been approved by the ITU for determining compliance with the single-entry $EPFD_{up}$ validation limits is not yet available, the applicant shall provide a computer program for the single-entry $EPFD_{up}$ validation computation, including both the source code and the executable file. This computer program shall be developed in accordance with the specification stipulated in the most recent version of Recommendation ITU–R S.1503. If the applicant uses the ITU approved software, the applicant shall indicate the program name and the version used.

(iv) Identify and describe in detail the necessary input parameters for the execution of the computer program identified in paragraph (a)(2)(iii) of this section.

(b) Ninety days prior to the initiation of service to the public, the NGSO FSS system licensee shall submit a comprehensive technical showing for the non-geostationary satellite orbit Fixed-Satellite Service (NGSO FSS) system in the 10.7–14.5 GHz bands. The technical information shall demonstrate that the NGSO FSS system is expected not to operate in excess of the additional operational $EPFD_{down}$ limits and the operational $EPFD_{down}$ limits as specified in § 25.208(i) and (j), and notes 2 and 3 to Table 1L in § 25.208(l). If the technical demonstration exceeds the additional operational $EPFD_{down}$ limits or the operational $EPFD_{down}$ limits at any test points within the United States for domestic service and at any test points outside of the United States for international service, the NGSO FSS system licensee shall not initiate service to the public until the deficiency has been rectified by reducing satellite transmission power or other adjustments. This must be substantiated by subsequent technical showings. The technical showings consist of the following:

(1) *Single-entry additional operational equivalent power flux-density, in the space-to-Earth direction, (additional operational $EPFD_{down}$) limits*. (i) Provide a set of anticipated operational power flux density (PFD) masks, on the surface of the Earth, for each space station in the NGSO FSS system. The anticipated operational PFD masks could be generated by using the method specified in the most recent version of ITU–R Recommendation S.1503. In particular, the anticipated operational PFD mask shall take into account the expected maximum traffic loading distributions and geographic specific scheduling of the actual measured space station antenna patterns (see § 25.210(k)). The anticipated operational PFD masks shall also be in an electronic form that can be accessed by the computer program contained in paragraph (b)(1)(iii) of this section.

(ii) Identify and describe in detail the assumptions and conditions used in generating the anticipated operational power flux-density masks.

(iii) Provide a computer program for the single-entry additional operational $EPFD_{down}$ verification computation, including both the source code and the executable file. This computer program could be developed by using the method specified in the most recent version of ITU–R Recommendation S.1503.

(iv) Identify and describe in detail the necessary input parameters for the execution of the additional operational $EPFD_{down}$ verification computer program identified in paragraph (b)(1)(iii) of this section.

(v) Provide the result, the cumulative probability distribution function of EPFD, of the execution of the verification computer program described in paragraph (b)(1)(iii) of this section by using only the input parameters contained in paragraphs (b)(1)(i) and (iv) of this section for each of the submitted test points provided by the Commission. These test points are based on information from U.S.-licensed geostationary satellite orbit Fixed-Satellite Service and Broadcasting-Satellite Service operators in the 10.7–14.5 GHz bands. Each U.S.-licensed geostationary satellite orbit Fixed-Satellite Service and Broadcasting-Satellite Service operator in the 10.7–14.5 GHz bands may submit up to 10 test points for this section containing the latitude, longitude, altitude, azimuth, elevation angle, antenna size, efficiency to be used by non-geostationary satellite orbit Fixed-Satellite Service licensees in the 10.7–14.5 GHz bands during the upcoming year.

(2) Operational equivalent power flux-density, space-to-Earth direction, (operational $EPFD_{down}$) limits. Using the information contained in (b)(1) of this section plus the measured space station antenna patterns, provide the result of the execution of the computer simulation for the anticipated in-line operational $EPFD_{down}$ levels for each of the submitted test points provided by the Commission. Submitted test points are based on inputs from U.S.-licensed geostationary satellite orbit Fixed-Satellite Service and Broadcasting-Satellite Service operators in the 10.7-14.5 GHz bands. Each U.S.-licensed geostationary satellite orbit Fixed-Satellite Service and Broadcasting-Satellite Service operator in the 10.7–14.5 GHz bands may submit up to 10 test points for this section containing the latitude, longitude, altitude, azimuth, elevation angle, antenna size, efficiency to be used by non-geostationary satellite orbit Fixed-Satellite Service licensees in the 10.7–14.5 GHz bands during the upcoming year.

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Code of Federal Regulations
Title 47. Telecommunication
Chapter I. Federal Communications Commission
Subchapter B. Common Carrier Services
Part 25. Satellite Communications
Subpart D. Technical Operations

§ 25.289 Protection of GSO networks by NGSO systems.

Unless otherwise provided in this chapter, an NGSO system licensee must not cause unacceptable interference to, or claim protection from, a GSO FSS or GSO BSS network. An NGSO FSS licensee operating in compliance with the applicable equivalent power flux-density limits in Article 22, Section II of the ITU Radio Regulations (incorporated by reference, § 25.108) will be considered as having fulfilled this obligation with respect to any GSO network.

CERTIFICATE OF COMPLIANCE

The foregoing brief is in 14-point Times New Roman proportional font and contains 11,433 words, and thus complies with Federal Rule of Appellate Procedure 32(a), Circuit Rules 28(d) and 32(e)(1), and this Court's September 13, 2021 Order.

/s/Pratik A. Shah
Pratik A. Shah

CERTIFICATE OF SERVICE

I hereby certify that on October 26, 2021, I electronically filed the foregoing with the Clerk of the Court of the U.S. Court of Appeals for the District of Columbia using the appellate CM/ECF system.

/s/Pratik A. Shah
Pratik A. Shah