

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of)	
)	
SpaceX Services, Inc.)	IBFS File Nos. SES-LIC-20190816-01062;
)	SES-LIC-20190816-01063; SES-LIC-
Application for Ka-band Gateway)	20190827-01110; SES-LIC-20190906-
Earth Stations)	01170; SES-LIC-20190906-01171

REPLY OF WORLDVU SATELLITES LIMITED

WorldVu Satellites Limited (“OneWeb”), pursuant to the Federal Communications Commission’s (the “Commission”) rules,¹ submits this reply to the response filed by SpaceX Services, Inc. (“SpaceX”) regarding the above-referenced applications (the “Gateway Applications”) seeking authority to operate gateway earth stations in the Ka-band.²

I. ANY GRANT OF THE GATEWAY APPLICATIONS MUST MANDATE NON-INTERFERENCE TO OTHER NGSO FSS SYSTEMS LIKE ONEWEB

In the SpaceX Response, SpaceX “confirms that up to eight satellites will communicate simultaneously with each gateway location,” a 100% increase from the parameters indicated in SpaceX’s initial space station license application and subsequent modification application.³ In an effort to remedy the interference issues this change will produce, the SpaceX Response outlines a

¹ See 47 C.F.R. § 25.154(d).

² Response of SpaceX Services, Inc., IBFS File Nos. SES-LIC-20190816-01062, *et. al.* (filed Nov. 7, 2019) (“SpaceX Response”).

³ *Id.* at 1. See also Application of Space Exploration Holdings, LLC, for Approval for Orbital Deployment and Operating Authority for the SpaceX NGSO Satellite System, IBFS File No. SAT-LOA-20161115-00118, Attachment A at 13 (filed Nov. 15, 2016); Application of Space Exploration Holdings, LLC, for Modification of Authorization for the SpaceX NGSO Satellite System, IBFS File No. SAT-MOD-20181108-00083, Attachment A at 8 (filed Nov. 8, 2018).

number of mitigation techniques SpaceX will employ to avoid causing interference to the OneWeb non-geostationary, fixed-satellite service (“NGSO FSS”) system.⁴ These techniques include:

- PFD Reduction. “In order to maintain the aggregate PFD level of its downlink transmissions, SpaceX will reduce the PFD of its main beams by 3 dB.”⁵
- Avoidance Angle. SpaceX also proposes utilizing an avoidance angle with regard to OneWeb’s NGSO satellites.⁶ The NGSO avoidance angles specified by the SpaceX Response are 10 degrees for its currently-authorized orbital configuration and 7.07 degrees for the orbital configuration specified in SpaceX’s pending second modification application.⁷

OneWeb welcomes SpaceX’s commitment not to create additional downlink interference into the NGSO environment even though SpaceX proposes to double the number of satellites that will communicate with each of its Ka-band gateway earth stations.⁸ However, these assurances standing on their own are not adequate, and any grant of the Gateway Applications should appropriately reflect SpaceX’s commitment to maintaining the existing NGSO FSS downlink

⁴ See SpaceX Response at 4.

⁵ *Id.* at 2.

⁶ *Id.* at 4.

⁷ *Id.*

⁸ SpaceX’s reliance on mitigation techniques to alleviate the interference impact of its proposal to double the amount of satellites communicating with each Ka-band gateway earth station is a departure from its previous insistence that interference is axiomatically linked to the number of satellites. See, e.g., Letter from David Goldman, Director of Space Policy, Space Exploration Technologies Corp., to Marlene H. Dortch, Secretary, FCC, IBFS File Nos. SAT-MOD-20180319-00022, SAT-AMD-20180104-00004, and SAT-LOA-20190704-00057 (Jul. 15, 2019).

interference environment. Specifically, the Commission should include explicit language in any grant of the Gateway Applications to bind SpaceX to the path outlined in the SpaceX Response.⁹ Therefore, OneWeb respectfully requests the Commission include conditions on any grant of the Gateway Applications, requiring SpaceX to (i) reduce the power of its main beams by 3 dB, and (ii) maintain an avoidance angle of at least 10 degrees with respect to OneWeb's satellites.¹⁰

II. THE COMMISSION SHOULD REQUIRE SPACEX TO PROVIDE AN ANALYSIS DEMONSTRATING ITS UPLINK OPERATIONS WILL NOT IMPACT THE NGSO SHARING ENVIRONMENT

The SpaceX Response contains a detailed analysis demonstrating the potential interference impacts of its change from a maximum of four to eight satellites communicating with each Ka-band gateway earth station location on OneWeb's *downlink* operations.¹¹ However, a full and complete analysis of SpaceX's proposed departure from the parameters authorized in its space station license must also consider the interference impacts on the *uplink* operations of other NGSO FSS systems. The technical analysis in the SpaceX Response does not contain such an uplink

⁹ See SpaceX Response at 4. In a separate but related SpaceX proceeding, SES Americom, Inc. and O3b Limited suggest, correctly, that "an express condition is preferable to the approach taken in the *SpaceX Modification* decision, which identified ways that SpaceX could avoid receiving increased interference from other NGSO systems due to lowering the orbital altitude for a portion of its fleet, but did not explicitly require SpaceX to employ those measures." Reply of SES Americom, Inc. and O3b Limited, IBFS File No. SAT-MOD-20190830-00087 at 4 (filed Nov. 12, 2019). While SpaceX has identified appropriate mitigation techniques in the SpaceX Response, the Commission should adopt explicit conditions mandating the use of these mitigation techniques in any grant of the Gateway Applications in order to ensure compliance and protection of the OneWeb NGSO FSS system.

¹⁰ OneWeb recognizes that this specified avoidance angle would be 7.07 degrees in the event SpaceX's pending modification application is granted. Such a condition could evolve to meet the necessary avoidance angle for SpaceX's pending modification application or in the event SpaceX yet again modifies its NGSO FSS system in the future.

¹¹ See SpaceX Response at 4-9.

analysis.¹² Accordingly, OneWeb respectfully requests the Commission require SpaceX to provide technical analysis of the interference impacts of its proposed change from a maximum of four to eight satellites communicating with each Ka-band gateway earth station location on the *uplink* operations of OneWeb and other NGSO operators. OneWeb reserves the right to review and provide comments when SpaceX provides this uplink analysis.

III. CONCLUSION

In the SpaceX Response, SpaceX identifies and commits to a number of mitigation techniques that will ensure its increase from four satellites to eight satellites communicating with each Ka-band gateway earth station will not negatively impact the NGSO interference environment. These techniques include reducing the power of its main beams by 3 dB and maintaining a minimum avoidance angle with OneWeb's satellites. In order to maintain the current NGSO FSS sharing environment, the Commission should adopt explicit conditions incorporating these techniques as part of any grant of the Gateway Applications. SpaceX also provides technical analysis of its changes to the Ka-band *downlink* operational environment, but it provides no corresponding analysis for the *uplink* operational environment. In order to properly evaluate these changes, the Commission should require SpaceX to provide such analysis of the effects on uplink operations.

¹² *See id.*

Respectfully submitted,

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CERTIFICATE OF SERVICE

I, Samuel Swoyer, hereby certify that on this 20th day of November 2019, a copy of this Reply is

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