# Federal Communications Commission
# Washington, D.C. 20554

March 10, 2017

Ronald Center
The Boeing Company
PO Box 3707
Seattle, WA 98124-2207

Re: The Boeing Company, IBFS File No. SAT-LOA-20161115-00109 (Call Sign S2977)

Dear Mr. Center:

On November 15, 2016, The Boeing Company (Boeing) filed the above-captioned application for authority to construct, deploy, and operate a non-geostationary orbit (NGSO) fixed-satellite and mobile-satellite service system. To aid the Commission's evaluation of the application, please provide the following additional information:[1]

1. Article 22 of the ITU Radio Regulations specifies equivalent power flux-density (epfd) limits applicable in several frequency bands in which Boeing proposes to operate.[2] As part of its application, Boeing states that it will comply with the $epfd_{down}$ limits applicable to the 17.8-18.3 GHz band, based on a GSO arc avoidance angle ($\alpha$) of 6 degrees.[3] Boeing further states that it will comply with the applicable $epfd_{up}$ limits in the 27.6-28.6 GHz and 29.5-30.0 GHz bands.[4] Please provide a showing demonstrating the Boeing satellite system's compliance with the applicable epfd limits specified in Article 22 of the ITU Radio Regulations in these frequency bands.

2. Article 22 of the ITU Radio Regulations also contains epfd limits applicable in the 18.3-18.6 GHz and 19.7-20.2 GHz bands in which Boeing also proposes to operate.[5] Boeing's application does not specifically discuss compliance with the epfd limits applicable in these frequency bands. Please confirm that the Boeing satellite system will also comply with the applicable epfd limits in these frequency bands and provide a showing to demonstrate this.

3. In its application, Boeing proposes to operate NGSO fixed-satellite service transmissions in the 19.7-20.2 GHz band (space-to-Earth).[6] In the U.S. Ka-Band Plan, the Commission has designated

---

[1] 47 CFR § 25.111(a).

[2] ITU Radio Regulations, Article 22.

[3] Boeing Application at 45.

[4] Boeing Application at 59.

[5] ITU Radio Regulations, Article 22.

[6] Boeing Application at 1.

this band for GSO FSS downlink operations.[7] Accordingly, please clarify whether Boeing seeks a waiver of the Ka-Band Plan, and if so, provide the justification for such a waiver.

4. Section 25.114(d)(14) of the Commission's rules requires that the applicant provide a description of the design and operational strategies that will be used to mitigate orbital debris.[8] Please provide the following additional information and clarifications:

   a) Please clarify, as described in Section 25.114(d)(14)(ii), whether all fuel line valves will be left open after post-mission maneuvers.[9]

   b) Please provide information[10] regarding the accuracy—if any—with which the parameters of satellite orbits will be maintained, including apogee, perigee, inclination, and the right ascension of the ascending node(s).

   c) Boeing states that sufficient propellant will be allocated and reserved to perform the disposal maneuvers.[11] Please provide information, as described in Section 25.114(d)(14)(iv), regarding the quantity of fuel that will be left for post-mission disposal maneuvers.[12]

   d) Please specify what values were used for the solar radiation pressure coefficient ($C_R$) and the Area to mass ratio (A/m) when calculating the apogee for the post-mission disposal orbit for Boeing's satellites.

   e) Please address, for NGSO operations in an elliptical orbit inclined at 63.5 degrees, whether the formula for calculating minimum initial perigee for a GSO disposal, as found at 47 C.F.R. § 25.283(a) is suitable, bearing in mind possible differences in solar lunar perturbations and effects of solar radiation pressure. In particular, please provide a statement and/or analysis with respect to the long-term stability or instability of the proposed post-mission storage orbit. Such analysis should address any measures, such as selection of orbital parameters, that may affect the long-term evolution of orbital parameters, with particular attention to addressing any such evolution that would result in the satellites entering the geostationary

---

[7] A secondary designation for NGSO/FSS operations was eliminated. *Redesignation of the 17.7-19.7 GHz Frequency Band, Blanket Licensing of Satellite Earth Stations in the 17.7-20.2 GHz and 27.5-30.0 GHz Frequency Bands, and the Allocation of Additional Spectrum in the 17.3-17.8 GHz and 24.75-25.25 GHz Frequency Bands for the Broadcast Satellite Service Use*, Report and Order, 15 FCC Rcd 13430, 13456-57 (2000) ("*18 GHz Band Order*"). *See also Redesignation of the 17.7-19.7 GHz Frequency Band, Blanket Licensing of Satellite Earth Stations in the 17.7-20.2 GHz and the 27.5-30.0 GHz Frequency Bands, and the Allocation of Additional Spectrum in the 17.3-17.8 GHz and 24.75-25.25 GHz Frequency Bands for Broadcast Satellite Service Use*, First Order on Reconsideration, 16 FCC Rcd 19808, 19822 (2001).

[8] 47 CFR § 25.114(d)(14).

[9] 47 CFR § 25.114(d)(14)(ii).

[10] 47 CFR § 25.114(d)(14)(iii).

[11] Boeing Application at 20.

[12] 47 CFR § 25.114(d)(14)(iv).

protected region, *i.e.*, the area defined by the geosynchronous altitude, plus or minus 200 kilometers, and plus or minus 15 degrees from the equatorial plane, or the LEO protected region, *i.e.*, the area below 2000 km.

Boeing must file a letter providing this information by April 11, 2017. Failure to do so may result in the dismissal of Boeing's application pursuant to Section 25.112(c) of the Commission's rules, 47 CFR § 25.112(c).

Sincerely,

Jose Albuquerque

Jose P. Albuquerque
Chief, Satellite Division
International Bureau

cc: Bruce A. Olcott
Jones Day
51 Louisiana Ave., NW
Washington, DC 20001