Federal Communications Commission
Washington, D.C. 20554

November 21, 2017

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

Re: The Boeing Company, IBFS File No. SAT-LOA-20170301-00028 and SAT-AMD-20170929-00137 (Call Sign S2993)

Dear Mr. Olcott:

On March 1, 2017, The Boeing Company (Boeing) filed an application for authority to construct, deploy, and operate a non-geostationary satellite orbit (NGSO) fixed-satellite service (FSS) system using Ka-band and V-band frequencies.[1] On July 25, 2017 Boeing responded to a letter from the Satellite Division seeking clarification of certain aspects of this application.[2] On September 29, 2017, Boeing filed an amendment to its application to update various system parameters.[3] Nonetheless, with regard to Boeing's proposed V-band inter-satellite links (ISLs) certain aspects of the proposed system operation remain unclear. To aid in the Commission's evaluation of Boeing's application, please provide updated and additional information as detailed below.[4]

In its July 25th response letter, Boeing stated in item 7(c) that it is "*seeking authority to operate its V-band ISL transmission both within its constellation and also with any GSO satellites that operate using V-band spectrum.*" Boeing stated further that with respect to its own constellation it proposes to operate its V-band ISL transmissions "*between its LEO and its high-altitude satellites, and between its individual LEO satellites.*"[5] In item 8(a) however, Boeing stated that it is requesting authority to operate its V-band ISL transmission "*from LEO to GSO and from LEO to high-altitude NGSO...*" without mentioning operations between individual LEO satellites.[6] We note also that in Table III-3 of the narrative portion of the initial application[7] Boeing provided various parameters for ISLs that we interpret to represent transmissions between its low-Earth orbit (LEO) satellites and both its high-altitude NGSO satellites as

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[1] SAT-LOA-20170301-00028 (*Initial Application*).

[2] *See* Letter from Jose P. Albuquerque, Chief, Satellite Division, to Bruce A. Olcott, Jones Day, IBFS File No. IBFS File No. SAT-LOA-20170301-00028 (Call Sign S2993) (April 11, 2017) and response from Bruce A. Olcott, Jones Day, to Jose P. Albuquerque, Chief, Satellite Division, IBFS File No. IBFS File No. SAT-LOA-20170301-00028 (Call Sign S2993) (July 25, 2017) (*July 25th Letter*).

[3] SAT-AMD-20170920-00137 (*Amendment*).

[4] 47 CFR § 25.111(a).

[5] July 25th letter at p. 6.

[6] July 25th letter at p. 7.

[7] Initial Application Narrative at p. 23. This section was not updated in the subsequent Amendment.

well as other geostationary satellite orbit (GSO) satellites, but not between its individual LEO satellites.[8]

In the amended Schedule S Boeing included both transmitting and receiving inter-satellite service beams operating in the V-bands as follows:

BEAMS	FREQUENCY	TX/RCV	SERVICE AREA
X2L0; X2R0	47.2-50.2 GHz	TX	Visible sky above satellite with 3 dB beamwidth of 0.7°
X3L0; X3R0	50.4-51.4 GHz	TX	Visible sky above satellite with 3 dB beamwidth of 0.7°
X6L0; X6R0	37.5-40 GHz	RX	Visible sky above satellite with 3 dB beamwidth of 0.9°
X7L0; X7R0	40-42 GHz	RX	Visible sky above satellite with 3 dB beamwidth of 0.9°

These beams are consistent with a satellite in Boeing's constellation receiving transmissions in the 37.5-42 GHz band from a satellite outside of its own constellation, and transmitting in the 47.2-50.2 GHz and 50.4-51.4 GHz bands to a satellite outside of its own constellation (*e.g.* a V-band GSO satellite.) They are not consistent however, with Boeing operating ISLs between two satellites in its own constellation, as Boeing has not listed associated receiving ISL beams in the 47.2-50.2 GHz and 50.4-51.4 GHz bands nor associated ISL transmitting beams in the 37.5-42 GHz band as would be required for such inter-satellite communications.

Please clarify the following and/or update the application if necessary:

1. With regard to Boeing's use of V-band ISLs, does Boeing propose transmissions between:
    a. Its individual LEO satellites;
    b. Its LEO satellites and its own high-altitude NGSO satellites;
    c. Its LEO satellites and other GSO satellites;
    d. Its LEO satellites and other NGSO satellites;
    e. Any other options.

2. If Boeing proposes V-band ISL transmissions between any combination of satellites within its own constellation (*i.e.*, LEO to high-altitude NGSO or LEO-to-LEO) please clarify which ISL beams will receive in the 47.2-50.2 GHz and 50.4-51.4 GHz bands, as well as which ISL beams will transmit in the 37.5-42 GHz band. If it is Boeing's intent that fixed-satellite service receiving beams G2L0, G2R0, G3L0, G3R0, L2L0, L2R0, L2L1, L2R1, L3L0, L3R0, L3L1, and L3R0, should also be considered to be operating as inter-satellite service beams, as well as fixed-satellite service transmitting beams G0L0, G0R0, G1L0, G1R0, L0L0, L0R0, L0L1, L0R1, L1L0, L1R0 L1L1, and LRR1, please so state. We note that this is not consistent however, with the service areas entered for each of these beams which is described as "visible Earth above 25 deg elevation angle". Nor is it fully consistent with Boeing's statement in item 6 of its July 25th letter that there are

[8] On March 13, 2017, Boeing also filed an *ex parte* presentation outlining its proposed system. Examining this *ex parte* presentation does not clarify the situation. On p. 11 the first bullet states that V-band constellation satellites will use ISLs "to higher-altitude NGSO or GSO satellites." The fourth bullet states that its system includes "V-band ISLs (LEO to inclined NGSO)", and the final row of the table states that the Field-of-View will include "inclined NGSOs, visible GSO arc or other NGSO (MEOs)", which are also indicated in the diagram. LEO-to-LEO transmissions are not mentioned.

16 [ISL] beams in total.[9] Depending upon Boeing's answers above, please consider the need to file an amended Schedule S.

3. Finally, with regard to Boeing's proposed Ka-band ISLs, based upon our review of the application, we presume that Boeing plans to operate these only between its LEO satellites and other GSO satellites outside of its own constellation. Specifically, Boeing proposes to receive transmissions in the 17.8-19.3 GHz and 19.7-20.2 GHz bands on ISL beams X4L0, X5L0, X4R0 and X5R0, and to transmit to GSO satellites in the 27.5-29.1 GHz and 29.5-30 GHz bands on ISL beams X0L0, X1L0, X0R0 and X1R0. Out of an abundance of caution however, we ask that Boeing confirm that our understanding is correct, and if not, that Boeing please clarify what it intends.

Sincerely,

Jose Albuquerque

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[9] July 25th letter at p. 5. The total of 16 ISL beams includes 8 Ka-band and 8 V-band ISLs.