WILKINSON BARKER KNAUER LLP

1800 M STREET, NW
SUITE 800N
WASHINGTON, DC 20036
TEL 202.783.4141
FAX 202.783.5851
WWW.WBKLAW.COM

September 19, 2017

VIA ECFS & IBFS

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Re: *Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters*, IB Docket No. 16-408

Petition for Declaratory Ruling of LeoSat MA, Inc., IBFS File No. SAT-PDR-20161115-00112

Dear Ms. Dortch:

LeoSat MA, Inc. ("LeoSat") hereby responds to the *ex parte* letter filed by WorldVu Satellites Limited ("OneWeb") on September 10, 2017, in the above referenced proceedings. Among other things, OneWeb's letter addresses LeoSat's pending petition for declaratory ruling ("PDR") seeking access to the United States market to provide broadband fixed-satellite services ("FSS") using a Ka-band low-Earth orbit ("LEO") non-geostationary satellite orbit ("NGSO") system.[1] Specifically, LeoSat makes this filing to correct two inaccurate assertions made by OneWeb regarding LeoSat's PDR's EPFD technical demonstration: (i) that the PFD masks show "erratic behavior"; and (ii) that the Earth Station density calculations were incorrect.

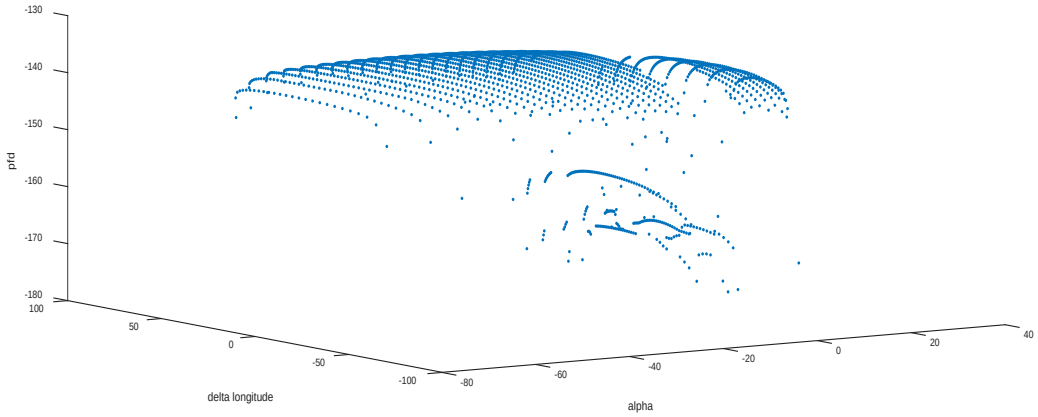
PFD mask

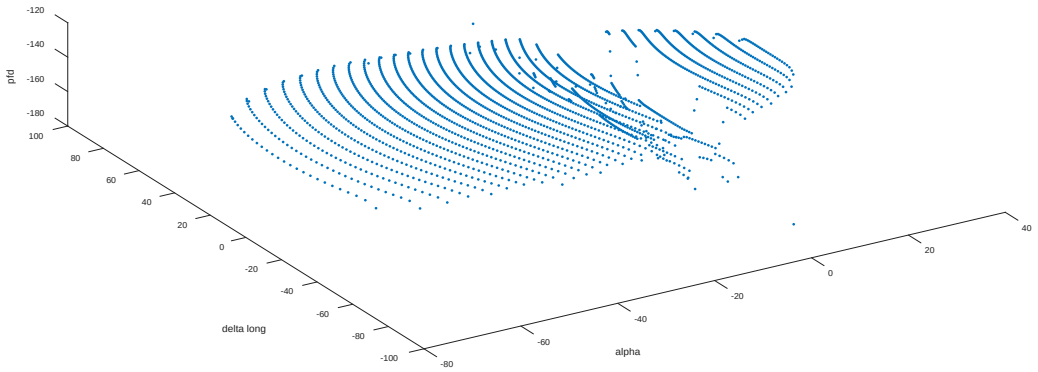
In its *ex parte* submission, OneWeb may have misinterpreted the PFD masks provided by LeoSat by showing a 2D view (*i.e.*, PFD vs alpha angle), while, in fact, for a given satellite latitude, the PFD mask should be represented in three dimensions: PFD vs alpha angle *and* delta_longitude. As a result, OneWeb wrongly asserts that the PFD masks provided by LeoSat show "erratic behavior" without "physical analogy," potentially leading to the underestimation of the EPFD results.

[1] *See* Notice of Ex Parte Letter from WorldVu Satellites Limited, LeoSat MA, Inc., IBFS File No. SAT-PDR-20161115-00112 (Call Sign S2979) (Sept. 10, 2017).

Specifically, the delta_longitude parameter represents the difference in longitude between the LeoSat sub-satellite point and the GSO longitude. Because LeoSat's proposed NGSO system uses fixed EIRP beams, the PFD decreases when the delta_longitude increases and the slant path becomes longer and the spreading higher.

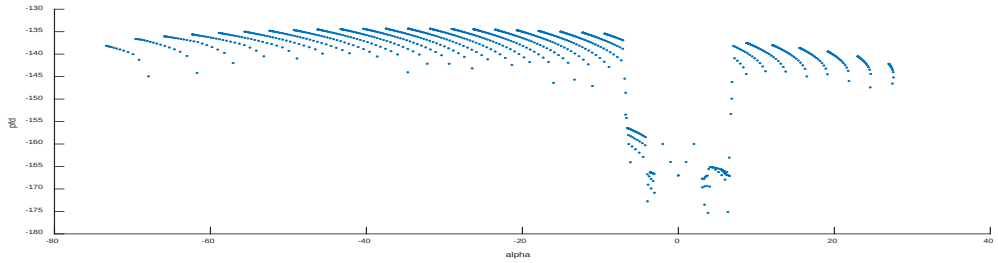
The two figures below show the same mask for a LeoSat satellite at 20° latitude from two different viewpoints. These are the same datasets evaluated by OneWeb, but they are properly depicted below in three dimensions rather than the two dimensions used by OneWeb in its *ex parte* letter. Each dot on the figures represents a PDF value in the mask for a given alpha angle and delta_longitude angle.



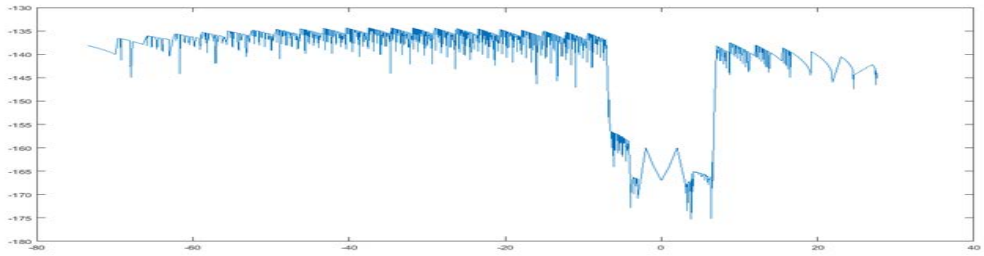


When properly graphed in three dimensions, the surface on the top of the mask is smoothly curved and continuous with a steep PFD decrease within the GSO avoidance area (alpha angle between -7° and +7°), and it does not depict any "erratic" behavior. By contrast, OneWeb mistakenly represented the data from a "side view" (PFD vs alpha angle), where all points for the different values of delta_longitude are represented on the same plane. OneWeb also erred when it plotted a line joining all those points as seen in the two figures below.

Appropriate dot representation:



Inappropriate line plot representation using the same dataset:



The latter line plot representation is inappropriate because points belonging to different delta_longitude slices are joined by a fictitious continuous line.

For the foregoing reasons, OneWeb's assertions about LeoSat's PFD mask discussed above are simply mistaken. The PFD mask used by LeoSat in its PFD analysis is appropriate and accurate.

Earth Station Density

OneWeb asserts that the average distance between co-frequency cells must be related to the average density of earth stations per km² by the relation: density = 1/(average_dist)². The mere fact that the International Telecommunications Union EPFD software requires and

processes these two parameters independently, however, indicates that they are not necessarily equivalent.[2]

LeoSat has provided in its PFD mask the values for these parameters that best reflect its foreseen deployment plans, and this approach is reasonable. However, even if the mathematical relation between these two parameters suggested by OneWeb is applied to LeoSat as an alternative to the approach taken by LeoSat in its PDR, the $EPFD_{up}$ limit would still be satisfied by LeoSat's system with a margin of about 5 dB. Using LeoSat's approach to these parameters results in a compliance margin of about 9 dB. Therefore, irrespective of which approach is taken to earth station density, LeoSat fully complies with the $EPFD_{up}$ limit.

Should the Commission require additional information about the foregoing or otherwise in connection with the PDR, please contact the undersigned.

Sincerely,

/s/ Phillip R. Marchesiello
Phillip R. Marchesiello
Lynne M. Montgomery

Counsel for LeoSat MA, Inc.

[2] *See* ITU-R WP4A Chairman Report/364/Annex 2 – Preliminary Draft Revision of Recommendation ITU-R S.1503, Part B, § 3.3, page 11 (May 11, 2017) (independently defining ES_DENSITY and ES_DISTANCE without establishing any relationship between these parameters).