SPACEX

November 8, 2021

BY ELECTRONIC FILING

Marlene H. Dortch
Secretary
Federal Communications Commission
45 L Street, N.E.
Washington, DC 20554

Re: *IBFS File No. SES-LIC-20210708-01019*

Dear Ms. Dortch:

In further support of its application for a blanket license authorizing operation of next-generation end-user earth stations ("UTs") for use at fixed locations, SpaceX Services, Inc. ("SpaceX Services") provides the following information. First, the equivalent diameter of the proposed UT as determined pursuant to Section 25.103 of the Commission's rules is 0.42 meters. Second, in light of a recently updated IEEE standard that OET Bulletin 65 had relied upon in part,[1] SpaceX Services submits a revised radiation hazard analysis reflecting the recommended methodology for calculating power density in the near field region. As this supplement demonstrates, the SpaceX Services UT will not exceed the Maximum Permissible Exposure limit for General Population/Uncontrolled exposures under this new methodology. We trust that this information responds to all of the staff's questions and urge expedited action on the application.

Sincerely,

/s/ David Goldman

David Goldman
Director, Satellite Policy

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Attachment

[1] *See* IEEE Std C95.1-2019, *IEEE Standard for Safety Levels with Respect to Human Exposure to Electric, Magnetic, and Electromagnetic Fields, 0 Hz to 300 GHz*, IEEE Standards Association (approved Feb. 8, 2019).

TABLE 1: RADIATION FROM SPACEX PHASED ARRAY USER TERMINAL (REVISED)

Input Parameters

Antenna Dimensions	$D_1 = 0.48$ m, $D_2 = 0.29$ m
Frequency	$f = 14.25$ GHz
Min Power into antenna	$P_{min} = 0.78$ W
Max Power into antenna	$P_{max} = 2.44$ W
Max EIRP	$EIRP_{max} = 6606.9$ W $10\log(EIRP_{max}) = 38.2\ dBW$
Aperture efficiency [%]	$\eta = 73$ %
Cosine loss w/ beam at slant	$loss = 0.551$
Maximum Transmit Duty Cycle	$DTx = 10.3$ %

Calculated Values

Wavelength	$\lambda = \frac{c}{f} = 0.0211\ m$
Area of Reflector	$A = 0.139\ m^2$
Max Antenna Gain	$G_{max} = \frac{\eta 4\pi A}{\lambda^2} = 2884$ $10\log(G_{max}) = 34.6\ dB$
Min Antenna Gain	$G_{min} = \frac{\eta 4\pi A}{\lambda^2} loss = 1589$ $10\log(G_{min}) = 32.0\ dB$
Length of Near Field	$R_{nf} = \frac{D_1^2}{4\lambda} = 2.74\ m$
Beginning of Far Field	$R_{ff} = 0.6\frac{D_1^2}{\lambda} = 6.57\ m$

Maximum Power Density Calculations

Power Density in Far Field	$S_{ff} = DTx\frac{EIRP_{max}}{4\pi R_{ff}^2} = 0.17\ \frac{mW}{cm^2}$
Power Density in Near Field	$S_{nf} = DTx\frac{4P_{max}}{\eta A} = 0.99\ \frac{mW}{cm^2}$
Power Density at Antenna Surface	$S_{ref} = DTx\frac{4P_{max}}{A} = 0.72\ \frac{mW}{cm^2}$