



Federal Communications Commission  
Washington, D.C. 20554

August 19, 2019

C. Andrew Keisner  
Lead Counsel  
Kuiper Systems LLC  
410 Terry Avenue N  
Seattle, WA 98109

Re: Kuiper Systems LLC  
IBFS File No. SAT-LOA-20190704-00057  
Call Sign S3051

Dear Mr. Keisner:

This letter requests additional information regarding the above-referenced application filed by Kuiper Systems LLC (Kuiper) for authority to construct, deploy, and operate a non-geostationary satellite orbit (NGSO) system that will provide worldwide broadband connectivity.<sup>1</sup> In this application, Kuiper requests authority to launch and operate 3,236 satellites that will be launched in five phases and operate in 98 orbital planes at altitudes of 590km, 610km, and 630km. Upon launch, Kuiper states that its satellites will be placed in an orbit below the International Space Station (ISS)<sup>2</sup> as nominal system performance is validated, and that any aberrant satellites will be deorbited. As part of its process for orbital debris mitigation, Kuiper states that it will use NASA's Debris Assessment Software (DAS) to verify compliance with the NASA limit for human casualty risk from debris,<sup>3</sup> and that its satellites can be "deactivated (decommissioned) by signal from the ground or will be deactivated automatically if all communications to ground stations cease for a pre-determined wait period."<sup>4</sup> At a satellite's end-of-life, Kuiper states that the satellite will be lowered to perigee lower than that of the ISS, and then lowered to an apogee below that of the ISS.<sup>5</sup>

In order to facilitate processing of Kuiper's application we request, pursuant to Section 25.111(a) of the Commission's rules, that Kuiper provide the following information:

1. Kuiper states that satellites will be deorbited first to a perigee lower than the ISS, and then to an apogee lower than the ISS. Please provide a more precise explanation that includes the altitudes the satellites will be lowering to, as well as the number of maneuvers required for perigee and apogee lowering, the time between the proposed maneuvers, and remaining orbital life following completion of maneuvers. Please describe any plans for coordination with ISS operations.

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<sup>1</sup> *Application for Authority to Launch and Operate a Non-Geostationary Satellite Orbit System in Ka-band Frequencies*, Kuiper Systems LLC, IBFS File No. SAT-LOA-20190704-00057 (Kuiper Application)

<sup>2</sup> Kuiper Application, Technical Appendix, at 32.

<sup>3</sup> *Id.* at 34.

<sup>4</sup> *Id.* at 31.

<sup>5</sup> *Id.* at 33.

2. Please provide a brief description of the status of system design with respect to debris mitigation. (Note that some text in the debris mitigation section suggests that design has been completed, others that it is underway but not completed).
3. Kuiper states that it will comply with NASA standards concerning surviving debris. If the design of the system is sufficiently advanced, please provide DAS (or other modeling tools) analysis that estimates the potential energy of any surviving debris, as well as the casualty risk. Please indicate what steps have been taken or will be taken to design satellites for complete demise upon re-entry. Alternatively, please provide an estimate of the aggregate casualty risk from re-entry of surviving debris for all satellites planned for launch (3,236 plus any replenishments). In providing this estimate, please estimate and use the number of satellites to be launched during the initial license term as a basis for calculation.
4. Please provide an estimate of collision risk for individual satellites that fail at the “check-out” orbit and at each of the three mission orbits. Please provide an aggregate collision risk estimate for all satellites planned for launch, assuming satellite failure rates (failures that result in loss of maneuver capability) of 5, 10, and 15 percent.
5. Please provide a more complete explanation of what happens if a satellite loses communications with ground stations for an extended period of time. For example, if a satellite is out of communication with ground stations, what is the potential for the satellite to automatically enter an end-of-life configuration and become a possible source of uncontrolled debris?
6. When a satellite is launched and positioned below the ISS so that the operation of nominal systems can be validated, what happens if a failure is detected in a satellite? Are there different responses based on the level of failure severity? If so, please include information regarding the levels of severity and responses.<sup>6</sup>
7. Please provide additional detail concerning the propulsion system. Specifically, please indicate the propellant composition, and the passivation procedures, including addressing the use of an unpressurized system and the efficacy of leaving fuel lines in such a system open.

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<sup>6</sup> *Id.* at 32.

8. Please provide fuel quantities for post-mission disposal purposes.<sup>7</sup>

The requested information must be submitted no later than **September 18, 2019**. Failure to do so may result in the dismissal of Kuiper's Petition pursuant to Section 25.112(c) of the Commission's rules, 47 CFR § 25.112(c).

Sincerely,



Jose P. Albuquerque  
Chief, Satellite Division  
International Bureau

cc: Jennifer D. Hindin  
Wiley Rein LLP  
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<sup>7</sup> 47 CFR § 25.114(d)(14)(iv).