

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, DC 20554**

In the Matter of

Petition to Modify Parts 2 and 101 of the  
Commission's Rules to Enable Timely  
Deployment of Fixed Stratospheric-Based  
Communications Services in the 21.5-23.6,  
25.25- 27.5, 71-76, and 81-86 GHz Bands

RM-11809

**COMMENTS OF LOON LLC**

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July 11, 2018

## INTRODUCTION AND SUMMARY

The Petition for Rulemaking filed by Elefante Group, Inc. (Elefante) highlights one of several business models—including Loon LLC’s own program—which use aerial platforms to support connectivity for unserved and underserved communities, for disaster relief, and to augment the capacity of terrestrial networks.<sup>1</sup> To the extent it increases the public’s and the Commission’s awareness of these varied technologies, the Petition is a constructive submission.

In proposing detailed rules and spectrum assignments for Elefante’s proposed service, however, the Petition misses the mark. Elefante introduces unhelpful complexity by proposing a new stratospheric platform station (STRAPS) category in addition to the existing high altitude platform station (HAPS) category that the International Telecommunications Union (ITU) and this Commission already recognize. Worse, Elefante seeks to have industry-wide rules tailored to its particular operational plans, even at the expense of other technologies that are better developed and hold the same or greater promise of ultimate success. Elefante’s proposed technical rule changes in the 71-76 and 81-86 GHz bands (E-band), for example, could make the use of E-band spectrum more difficult for many aerial platform systems. In taking action on the Petition, the Commission should proceed carefully to avoid limiting current regulatory flexibility that enables a variety of aerial platform technologies and business models.

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<sup>1</sup> Petition for Rulemaking of Elefante Group, Inc. in RM-11809 (filed May 31, 2018) (Petition).

## DISCUSSION

### I. The Loon Service

Created by Google in 2013, Loon aims to bring balloon-powered Internet access to unconnected and under-connected people around the world. Loon's unmanned, high-altitude balloons are capable of months-long flights at altitudes above 20 km. To date, Loon balloons have traveled more than 30 million km across 6 continents. They are equipped with energy-efficient communications equipment that uses standard LTE frequencies, the E-band, and/or 5 GHz unlicensed spectrum. At this time, each Loon balloon can provide service to a terrestrial coverage area of approximately 5,000 km<sup>2</sup>, or about 80 km in diameter.<sup>2</sup>

Contrary to Elefante's understanding, the station-keeping capability of individual Loon balloons is not "demonstrably limited,"<sup>3</sup> and it is not necessary to have "thousands of balloon launches"<sup>4</sup> to provide continuous, uninterrupted direct-to-user coverage. Loon's coverage capabilities were demonstrated in 2017 when it used a small number of balloons to help provide basic Internet connectivity to more than 200,000 people in Puerto Rico over a period of months, as part of a larger disaster relief effort. Building on that successful response, Loon is working with governments and local telecommunications companies worldwide to augment existing public protection and disaster relief plans, as well as to help reach unserved and underserved people by providing augmented coverage.

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<sup>2</sup> See, e.g., <https://x.company/loon/>, <https://x.company/loon/technology/> and <https://x.company/loon/faq/#equipment-section> (last visited July 11, 2018).

<sup>3</sup> Petition at 50.

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

## **II. Elefante’s Petition Identifies Real Opportunities, but Proposes Complicated and Potentially Counterproductive Rule Changes**

Loon agrees that it is important to foster the timely development of and investment in aerial platforms that are capable of expanding broadband availability and quickly restoring communications following severe weather events and other natural disasters. Elefante, however, seeks to have industry-wide rules tailored to anticipated operational plans that, by Elefante’s own account, are not yet an “achievable reality”<sup>5</sup>—even at the expense of other approaches that hold the same or greater promise of ultimate success.

### **A. There Is No Need to Define a Duplicative “STRAPS” Category**

Contrary to Elefante’s suggestion, the system it envisions does not appear to be a “radical departure”<sup>6</sup> from other aerial platform projects. Since 1997, ITU regulations have defined HAPS as “[a] station located on an object at an altitude of 20 to 50 km and at a specified, nominal, fixed point relative to the Earth.”<sup>7</sup> The Commission’s rules incorporate this definition.<sup>8</sup> Elefante states that its contemplated airships will operate at approximately 19.8 km (65,000 ft) above their designated service area, and on that basis recommends creating an entirely new regulatory category of so-called STRAPS operating at altitudes between 18 and 26 km.<sup>9</sup>

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<sup>5</sup> Petition at iv, 5; *see also* Petition at 20 (explaining that testing of “key operational elements” will not begin until after construction of the prototype airship is completed in “late 2020”).

<sup>6</sup> Petition at 51.

<sup>7</sup> ITU Radio Regulations No. 1.66A.

<sup>8</sup> 47 C.F.R. § 2.1(c).

<sup>9</sup> Petition at ii, 3, 12-13, 86.

It is hardly necessary for the Commission to create overlapping categories of aerial platforms as Elefante proposes. If Elefante's airships operate above 20 km and otherwise perform as described in the Petition, they will be HAPS. If they operate slightly below that altitude but substantially conform to the HAPS definition, the Commission could grant a waiver to accommodate the small altitude difference, or provide the necessary flexibility in generally applicable rules governing HAPS.

Alternatively, if Elefante believes the ITU's HAPS category should be expanded to encompass operations at altitudes between 18 and 20 km, it can seek modification of the global definition. Such modification efforts could be undertaken via the ITU process, including the Commission's WRC-19 Advisory Committee in which Elefante's partner Lockheed Martin Corporation participates.<sup>10</sup>

## **B. Technical Rules for the E-Band Should Remain Flexible**

While Elefante hopes to launch its first prototype airship about two and a half years from now,<sup>11</sup> Loon has accumulated real-world experience testing E-band frequencies for both feeder links (Earth-to-balloon and balloon-to-Earth) and inter-balloon links.<sup>12</sup> In the U.S., the Commission's current rules for registering E-band links pursuant to nationwide licenses offer relatively frictionless access to spectrum and work well for a range of uses.<sup>13</sup> Although Elefante's proposal to eliminate the 3 W

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<sup>10</sup> FCC, *WRC-19 Advisory Committee Membership List*, at <https://www.fcc.gov/wrc-19-advisory-committee-membership-list> (last visited July 11, 2018).

<sup>11</sup> Petition at 20.

<sup>12</sup> See, e.g., Experimental Radio Station Construction Permit and License for Call Sign WH2XUP, File No. 0049-EX-TC-2017 (granted Sept. 21, 2017); Experimental Radio Station Construction Permit and License for Call Sign WI2XCS, File No. 0091-EX-CR-2018 (granted Mar. 1, 2018).

<sup>13</sup> Comments of Google Inc. and Google Fiber Inc. in GN Docket No. 14-177, et al., at 2-6 (filed Sept. 30, 2016); Reply Comments of Google Inc. and Google Fiber Inc. in GN Docket No. 14-177, et al., at 2-4

(5 dBW) maximum transmitter power limitation for certain 81-86 GHz band operations<sup>14</sup> may merit consideration, it would not be wise to establish “an elevation angle threshold that specifies lower EIRP density limits” for microwave links in the E-band.<sup>15</sup> The current absence of restrictions based on elevation angle provides systems such as Loon important flexibility to operate standardized feeder links to aerial platforms, whether they are located directly above a ground station (with a near-vertical link) or at some horizontal distance from the nearest ground station (resulting in a lower elevation angle). Having different technical rules for feeder links, depending on the elevation angle, could disrupt current testing and future provision of aerial platform services.

### **CONCLUSION**

Elefante’s Petition does not present any issue that requires resolution at this time. If the Commission nevertheless proposes to take responsive action, it should proceed cautiously in order to maintain regulatory flexibility for the widest possible range of aerial platform technologies and business models.

Respectfully submitted,



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July 11, 2018

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(filed Oct. 31, 2016).

<sup>14</sup> 47 C.F.R. § 101.113(a), n. 13.

<sup>15</sup> Petition at 102.