

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

Aeronet Global Communications Inc.’s)	
Petition for Rulemaking to Amend)	RM-11824
the Commission’s Allocation and Service Rules)	
for the 71-76 GHz, 81-86 GHz, and 92-95 GHz)	
Bands to Authorize Aviation Scheduled)	
Dynamic Datalinks)	
)	
Aeronet Global Communications Inc.’s)	
Petition for Rulemaking to Amend)	RM-11825
the Commission’s Allocation and Service Rules)	
for the 71-76 GHz, 81-86 GHz, and 92-95 GHz)	
Bands to Authorize Maritime Scheduled)	
Dynamic Datalinks)	

**CONSOLIDATED COMMENTS OF ELEFANTE GROUP, INC.
ON THE AERONET PETITIONS**

Elefante Group, Inc. (“Elefante Group”), by its attorneys, hereby submits its comments on the above-captioned Petitions for Rulemaking of Aeronet Global Communications Inc. (“Aeronet”) (collectively referred to as the “Aeronet Petitions”).¹ Elefante Group commends Aeronet in its efforts to deliver competitive services to aircraft and maritime vessels through new and novel approaches. As described herein, Aeronet asks the Commission to initiate a

¹ See Public Notice, Report No. 3112, *Aeronet Global Communications Inc.’s Petition for Rulemaking to Amend the Commission’s Allocation and Service Rules for the 71-76 GHz, 81-86 GHz, and 92-95 GHz Bands to Authorize Aviation Scheduled Dynamic Datalinks*, (CGA rel. Feb. 7, 2019); Public Notice, Report No. 3113, *Aeronet Global Communications Inc.’s Petition for Rulemaking to Amend the Commission’s Allocation and Service Rules for the 71-76 GHz, 81-86 GHz, and 92-95 GHz Bands to Authorize Maritime Scheduled Dynamic Datalinks*, (CGA rel. Feb. 7, 2019). The Aeronet Petitions were both filed February 6, 2019, and will be referred to individually as the “Aviation Petition” and “Maritime Petition,” respectively.

rulemaking to adopt a regulatory framework that allows Aeronet to introduce its Aviation Scheduled Dynamic Datalinks (“ADDLs”) and Maritime Scheduled Dynamic Datalinks (“MDDLs”)(collectively, “SDDLs”) into encumbered bands that are also the subject of pending proceedings to introduce new services, including Elefante Group’s Petition for Rulemaking to use the 71-76 and 81-86 GHz Bands (the “70/80 GHz Bands”) for feeder links in the Stratospheric-Based Communications Service (“SCBS”).² However, apart from some general statements about the potential for compatibility with other operations in the 70/80 GHz Bands, the *Aeronet Petitions* are devoid of any analysis regarding compatibility with SBCS, other fixed services, and other existing and potential uses in or adjacent to the 70/80 GHz Bands or the 92-95 GHz Band, which Aeronet also proposes to access. Similarly, Aeronet provides insufficient technical information about its proposed radios or methods of operation to permit the Commission or other interested parties to conduct their own analyses. Before the Commission acts on the *Aeronet Petitions*, therefore, Elefante Group urges the Commission to request that Aeronet provide such characteristics to allow appropriate consideration of the spectrum compatibility of the company’s proposed SDDLs.

I. INTRODUCTION AND ELEFANTE GROUP’S INTEREST

Elefante Group is striving to become the world leader in the provision of stratospheric-based low-latency, high-capacity communications solutions and to bring these capabilities first to the United States market. To that end, on May 31, 2018, after more than two years of working

² *In re 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*, Elefante Group, Inc., Petition for Rulemaking, RM-11809 (filed May 31, 2018) (“Elefante Group Petition”). *See also WorldVu Satellites Limited: Amendment to Petition for Declaratory Ruling Granting Access to the U.S. Market for the OneWeb V-Band System*, File No. SAT-AMD-20180104-00004 (filed Jan. 4, 2018).

with Lockheed Martin Corporation on the airship and communications technologies, Elefante Group filed the *Elefante Group Petition*. As detailed in the *Elefante Group Petition*, by bringing 1 Tbps of backhaul and transport capacity (in each direction) over a Stratospheric Platform Station's ("STRAPS's") coverage area of approximately 15,400 km² on day one of a STRAPS's deployment, SBCS can help support a rapid roll-out of next generation network capabilities including 4G, 5G, and Internet of Things, on a market-wide basis.³ Elefante Group plans to offer this backhaul and transport capacity on a wholesale basis, and its SBCS systems will also support high-capacity residential broadband and enterprise wide area network services.⁴ Elefante Group intends to serve both urban and rural areas. Given these features of SBCS, Elefante Group's service will support advancement toward several Commission and Administration objectives.⁵

Elefante Group seeks access to Ka-Band spectrum for SBCS communications between user terminals ("UTs") via STRAPS. Where customers wish their UTs to be connected to terrestrial networks, Elefante Group envisions use of the Ka-Band spectrum and the 70/80 GHz Bands in combination. Specifically, for the STRAP-gateway portion of paths between UTs and gateway ground stations, Elefante Group proposes to utilize the 70/80 GHz Bands.⁶ In Elefante Group's SBCS systems, there will typically be between 10-20 gateways per STRAPS coverage area.⁷ Elefante Group's gateways will generally be located within about 10 km of the nadir of the STRAPS, each of which will be located at a nominally fixed, specified point. Consequently,

³ See, e.g., *Elefante Group Petition* at 3, 13-14.

⁴ See *id.* at 23-27.

⁵ See *id.* at 29-40.

⁶ The UT-STRAPS portion of SBCS communications paths would use the Ka-Band.

⁷ The number of gateways in Elefante Group's SBCS systems is reduced from what it might otherwise be because its STRAPS payloads will have terminal switching and flexible capacity allocation capability supporting UT-UT links without ground switching or relays, lowering the need for feeder link capacity.

there will be an approximate minimum 42-degree elevation look angle from the gateways to the STRAPS, which will greatly enhance Elefante Group's compatibility with fixed services in this spectrum. Because Elefante Group will service both urban and rural areas, gateways will be located not only in dense urban centers, but also in less populated areas.

A foundation of the *Elefante Group Petition*, which seeks access to spectrum on a co-primary basis with other users, is the demonstration of compatibility and the ability to share with other services which allows both SBCS and the other services to grow and innovate.⁸ The primary bands in which Aeronet will operate are the 70/80 GHz Bands, the same spectrum Elefante Group will use for its feeder links.⁹ Elefante Group looks to operate compatibly with other users and prospectively welcomes innovative proposals, such as Aeronet, provided that compatibility with SBCS (and other services) is demonstrable.

Thus, for example, when OneWeb recently filed a request to gain access to the U.S. market for operation of satellite feeder links in the 70/80 GHz Bands, Elefante Group noted that there do not appear to be any insurmountable compatibility issues between OneWeb's proposed systems and SBCS gateway operations. Elefante Group added that, where necessary, coordination and mitigation should be available to alleviate any potential harmful effects between the systems.¹⁰ Unlike the OneWeb filing, the *Aeronet Petitions* raise potential issues of

⁸ To that end, Elefante Group, in conjunction with Lockheed Martin, has conducted dozens of compatibility studies, including twenty-eight which were included with the *Elefante Group Petition* and its reply comments in RM-11809, the rulemaking petition proceeding. See *Elefante Group Petition*, Appendices B through U; *In re 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*, Reply Comments of Elefante Group, Inc., RM-11809, Exhibits 2 through 9 (filed Aug. 15, 2018)

⁹ Aeronet also proposes to use 92-94 and 94.1-95.0 GHz. See, e.g., *Aviation Petition* at 29.

¹⁰ See *WorldVu Satellites Limited, Amendment to Petition for Declaratory Ruling Granting Access to the U.S. Market for the OneWeb V-Band System*, Comments of Elefante Group, Inc., File No. SAT-AMD-20180104-00004, at 4-9 (filed Aug. 6, 2018).

compatibility with SBCS, but Aeronet does not provide enough information for Elefante Group to evaluate them. For this reason, Elefante Group files these comments and looks forward to working with Aeronet to further explore the issues discussed herein.

II. DISCUSSION

The *Aeronet Petitions* ask the Commission to initiate proceedings to amend current allocation and service rules for the 70/80 GHz Bands and 92-95 GHz Band to permit licensing and operation of SDDLs. The *Aviation Petition* explained that Aeronet's ADDLs would provide E-band connections from ground stations to aircraft in flight from 10,000 to 50,000 foot operating altitudes, as well as connections from aircraft to aircraft at operating altitudes within this range. Aeronet envisions that ADDLs would provide a competitive option for broadband services to airline passengers and crew. The *Maritime Petition* describes the operation of MDDLs to provide competitive high speed broadband to cruise ships, ferries, and other ships at sea. Unlike the ADDLs, which would involve a variety of elevation links, as low as 5 degrees,¹¹ MDDLs would generally be oriented in or close to the horizontal plane at sea level.

In multiple places, the *Aviation Petition* claims that that SDDLs are "unlikely to cause interference," "unlikely to present interference concerns," and narrow beam widths "prevent interference" with other users.¹² Aeronet also contends that the requested increase in transmitter power above existing Part 101 rules "does not meaningfully change the interference risk."¹³ In general, Elefante Group agrees with Aeronet that characteristics of the 70/80 GHz Bands allow

¹¹ See *Aviation Petition* at 14.

¹² *Aviation Petition* at 3, 18, and 19, respectively. The *Maritime Petition* echoes similar claims. *Maritime Petition* at 3, 17, and 18, respectively.

¹³ *Aviation Petition* at 23; *Maritime Petition* at 21-22.

for narrow beams and a relatively high degree of signal attenuation, which in turn generally provide a starting point for compatibility in these frequency ranges with fixed services.¹⁴

Despite this general concurrence, Elefante Group wishes to emphasize that the ability of a new service to share with fixed services cannot simply be assumed as a result of these characteristics, especially services, that involve communications of a fixed station with mobile stations at a wide range of azimuths down to low elevation angles, like Aeronet's SDDLs, whether considering ADDLs (down to 5 degrees) or MDDLs (by definition close to horizontal). In the case of aircraft-to-aircraft ADDLs, the variation and unpredictability in the links both in

¹⁴ Because the question of compatibility with the fixed services, including SBCS, is such a threshold issue, Elefante Group does not take a position at this time on the separate question whether Aeronet has demonstrated that its SDDLs operate within the fixed service, but instead reserves judgment and the option to do so at a later time. Elefante Group will consider any initial comments on this issue that may be filed. However, as preliminary observations, Elefante Group suggests that there are several aspects of the SDDLs as described in the *Aeronet Petitions* that merit closer examination in this regard. Regarding ADDLs, for example, the communications service is in fact between the ground stations and the persons on the aircraft (or the aircraft itself), or between aircraft, suggesting that the ADDLs are properly considered an aeronautical mobile service. See 47 C.F.R. §2.1, definition of Aeronautical Mobile Service ("A mobile service between aeronautical stations and aircraft stations, or between aircraft stations"); see also 47 C.F.R. §2.1, definition of Mobile Service ("A radiocommunication service between mobile and land stations, or between mobile stations"). In addition, ADDLs are not between fully predictable paths – planes may be rerouted to avoid storms and for other reasons, not known at the time of "coordination" with existing operators. Further, Aeronet's attempted analogy with earth stations in motion ("ESIMS") as part of the Fixed Satellite Services ("FSS") may not hold. As Aeronet explains, the Commission included ESIMs as part of the FSS because they would appear "almost fixed" from the perspective of the satellites, in orbit at 35,900 km. See *Aviation Petition* at 31. It is difficult to reach the same conclusion regarding aircraft as viewed from ground stations likely only a few tens of kilometers away. Being several hundred if not a thousand times closer to ground stations than GSOs, aircraft will *not* seem almost fixed. (From geostationary orbit, note that the *entire Earth* only occupies 20 degrees of arc.). Finally, Elefante Group notes that aircraft do not seek to station-keep relative to any fixed point. Second, similar questions as these may be considered with respect to whether MDDLs may be properly considered as operating within the fixed services. Note for example, the seeming applicability of the definition for maritime mobile services in light of the *Maritime Petition's* description of MDDLs: "A mobile service between coast stations and ship stations, or between ship stations, or between associated on-board communication stations." 47 C.F.R. §2.1, definition of Maritime Mobile Service.

space and in time is likely even greater than for ground-to-aircraft ADDLs, presenting additional potential interference issues and coordination hurdles to be overcome between Aeronet's service and other overhead services, such as SBCS.¹⁵

Considering just SBCS, ADDL ground stations tracking transmitting to aircraft will have the potential to illuminate a STRAPS with their signals. ADDL and MDDL ground stations could also be located near or in line with SBCS gateway stations, or other fixed service land stations whether in urban or rural areas, in which case there is the potential for sidelobe interference from Aeronet ground stations to SBCS gateway stations or illumination of gateways from Aeronet transmitters on board aircraft or ships. The *Aeronet Petitions* suggest that "substantial amounts of [Aeronet's fixed, ground-based] network architecture" will be located away from dense urban areas,¹⁶ but it is not at all clear what that means.¹⁷

In a similar vein, the *Maritime Petition* seemingly glosses over the fact that ships come into ports that can be well inland (such as San Francisco and Oakland, California, or Baltimore) and surrounded by metropolitan areas. Ferry services also operate near major urban areas, such as around Manhattan, or in and out of Seattle, to name but two examples. If Aeronet intends to provide MDDLs to such ships and ferries, the potential for interference with ground stations of other services in urban areas warrants further examination.

¹⁵ Aeronet explains that its system will have the ability to "reconfigure sub-mesh networks in real time," supporting the "dynamic selection of the best quality backhaul links to ground stations," see *Aviation Petition* at 15, suggesting a very dynamic systems in terms of the mobile end points of links and their orientation at any one time. The "look down" from one aircraft to another could sweep large areas of terrain under and around aircraft flight paths, which are deviated from routinely due to weather. The "look up" from one aircraft to another could illuminate a STRAPS or a satellite. Also, the timing of aircraft-to-aircraft ADDLs is further unpredictable as flights do not always leave on time.

¹⁶ E.g., *Aviation Petition* at 22-23; *Maritime Petition* at 20-21.

¹⁷ "Substantial amounts" could be well less than half. Aeronet makes no commitments regarding the location of ground infrastructure in the *Aeronet Petitions*.

Granted, illumination of STRAPS or SBCS ground station, or other fixed services stations, by an SDDL may be an intermittent event, but the frequency of such occurrences and their possible duration (presumably longer in the case of MDDLs, but not necessarily, depending on the distances and geometries) should be examined. Minimum separation distances between transmitting SDDL ground stations and SBCS gateway stations need to be quantified or other mitigation considered. And the potential for and nature of interference from aircraft and maritime vessel transmitters into SBCS gateways also needs to be considered. These are threshold matters, concerning which, Aeronet, thus far, has not provided sufficient technical and operational information to allow the Commission and other service providers to evaluate for potential interference and means for mitigation.

Accordingly, prior to action on the *Aeronet Petitions*, the Commission should encourage Aeronet to provide details of its technologies and proposed operations to allow for evaluation of interference potential. If there are, in fact, significant compatibility issues, it is better for the Commission, other interest parties, and Aeronet itself to know as early as possible. Specifically, Elefante Group submits that the following information, at a minimum, would be of assistance in evaluating compatibility of Aeronet's system:

- Details of antenna patterns used for both ground and airborne components of the system.
- Whether Aeronet will use automatic transmitter power control mechanisms.
- The directions in which Aeronet intends to use different sub-bands of the E-Band (e.g., ground-to-aircraft, aircraft-to-ground, or aircraft-to-aircraft).
- Further information about the limits of operation of SDDLs. For example, while the *Aviation Petition* states that Aeronet's system will support connections between aircraft in flight from 10,000 to 50,000 feet in altitude, no information is provided to indicate whether there are any elevation angle limits or maximum distances over which the links will operate.¹⁸

¹⁸ For example, if an aircraft at 50,000 feet tracks an aircraft at 10,000 feet, the transmissions from the higher aircraft could be pointed directly down to the earth and operate across a 360 degree horizontal plan unless restricted by system design.

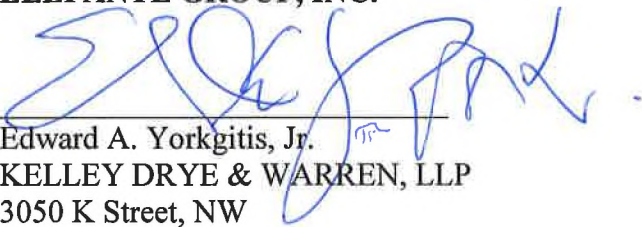
- How much and what type of location-specific operational information will Aeronet be willing to share with other spectrum users dynamically and in what manner would it be shared.

III. CONCLUSION

For the foregoing reasons, while Elefante Group commends Aeronet in its efforts to deliver new innovative services, Aeronet has not provided sufficient information to evaluate compatibility between the proposed SDDLs and other systems that use or propose to use the 71-76, 81-86, and 92-95 GHz Bands. Before acting on the *Aeronet Petitions*, the Commission should request that Aeronet provide information to allow compatibility to be assessed by it and other interested parties. Elefante Group generally shares Aeronet's optimism that compatibility can be achieved through geometric isolation, operational constraints, and reasonable mitigation and coordination principles. Elefante Group looks forward to working with Aeronet to evaluate these matters with respect to Aeronet's proposed SDDLs once the company supplements the record and provides adequate technical information.

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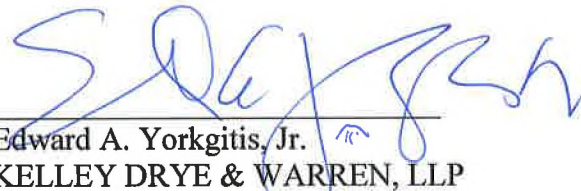
11 March 2019

CERTIFICATE OF SERVICE

I, Edward A. Yorkgitis, Jr., hereby certify that on March 11, 2019, a copy of the foregoing Consolidated Comments of Elefante Group, Inc. on the Aeronet Petitions was served by U.S. Mail on the following:

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