Before the

FEDERAL COMMUNICATIONS COMMISSION

Washington, D.C. 20554

Application of Kepler Communications Inc. for U.S. Market Access Authority of a Non-Geostationary Satellite Orbit System in Ka- and Ku-band Frequencies	)	
	)	File No. _____
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APPLICATION FOR MARKET ACCESS AUTHORITY FOR A NON-GEOSTATIONARY SATELLITE ORBIT SYSTEM IN KA- AND KU-BAND FREQUENCIES

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EXECUTIVE SUMMARY

Kepler Communications Inc. ("Kepler"), in accordance with Section 25.137 of the Federal Communications Commission's ("FCC" or "Commission") rules, requests market access authority for a non-geostationary satellite orbit ("NGSO") fixed-satellite service ("FSS") system to provide low-latency broadband services above 55°N latitude. Kepler's system ("System") will use 360 satellites in 12 orbital planes at an altitude of 600 ± 50km.

The System will expand upon the capabilities delivered from Kepler's initial constellation by focusing on broadband connectivity for underserved customers in the High North, including rural consumers in Alaska, maritime vessels in Arctic waters, long-haul flights transiting at high latitudes, or public sector customers that operate in the Arctic for national security operations. The System will serve the public interest in the United States by helping to close the digital divide in Alaska, promoting economic activities in the Arctic, and enhancing the United States' ability to maintain security and freedom of travel through the increasingly contested High North.

Kepler's prior experience in developing and deploying its first constellation places the company in a strong position to deliver the newly proposed network. Kepler currently possesses a manufacturing facility capable of producing up to 10 small satellites per month, gateway sites throughout the globe, as well as the know-how to operate a small satellite network capable of delivering a world-class service. Grant of this application will allow Kepler to help fulfill the FCC's vision of providing high quality and affordable connectivity to everyone by focusing on the severely underserved High North.

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APPLICATION FOR MARKET ACCESS AUTHORITY FOR A NON-GEOSTATIONARY SATELLITE ORBIT SYSTEM IN KA- AND KU-BAND FREQUENCIES

Kepler Communications Inc. ("Kepler") requests market access authority to operate an NGSO system using Ka-band and Ku-band frequencies allocated for satellite services in the United States.[1] Kepler's system will provide access to high-speed, low-latency broadband connectivity for aeronautic, maritime, government, and consumer customers in the High North, who are currently underserved by existing connectivity services. The Kepler System will consist of 360 satellites operating in 12 orbital planes at an altitude of 600 ± 50km and will deliver its commercial

[1] This request is being made pursuant to the Federal Communications Commission's Public Notice initiating a new processing round for NGSO FSS satellite systems. *See Public Notice, Cut Off Established for Additional NGSO FSS Applications or Petitions for Operations in the 10.7-12.7 GHz, 12.75-13.25 GHz, 13.8-14.5 GHz, 17.7-18.6 GHz, 18.8-20.2 GHz, 27.5-30 GHz Bands*, DA-20-325 (rel. March 24, 2020). As such, Kepler seeks authority to share equally with other systems authorized in the same processing round under Section 25.261, as discussed further herein.

service in the Ka-band, whilst using the Ku-band for dedicated feeder links. The System brings together high-performance satellites, robust terrestrial gateway facilities, advanced network technologies, and support for a variety of customer terminals. Grant of this application will enable the delivery of affordable and high-quality broadband connectivity to a diverse array of Americans travelling, living, and working north of 55°N latitude. The network will serve a broad customer base, seeing significant applicability for international travel, enterprise, and government in the High North. In particular, the service is poised to surpass in quality and availability all current commercial satellite internet offerings in the High North, including in Alaska and adjacent U.S. waters. Accordingly, Kepler respectfully requests authorization to bring these innovative services to the American market and close the most northernly of digital divides.

I. COMPANY BACKGROUND

Kepler develops next-generation satellite communication technologies and provides global wideband connectivity services. Kepler is in the midst of deploying a global wideband network to offer store-and-forward connectivity service in the Ku-band. This network, licensed under the Canadian administration, received United States market access authority in November 2018.[2] The development and deployment of this network is ongoing. Presented herein is a request for market access for a second, new constellation; one designed to provide broadband services in the Ka-band

[2] *See* Kepler Communications Inc., *Petition for Declaratory Ruling to Grant Access to the U.S. Market for Kepler's NGSO FSS System*, Order and Declaratory Ruling, FCC 18-162 (Nov. 19, 2018) ("Kepler Ku Grant").

to a smaller portion of the globe for a wide range of users travelling, living, and working at and above 55°N latitude, referred to as the High North.

Kepler's previous experience with deploying its first constellation place it in a good position to deploy the newly proposed network. At the time of writing, Kepler has launched two wideband nanosatellites within its initial Ku-band constellation to provide connectivity services to customers worldwide. A third satellite is slated for launch in H2 2020, followed by 15 additional satellites launching in 2020 and 2021 that will make up the network's first generation (GEN1) of commercial satellites. Kepler maintains ground stations around the world, which it intends to also use to operate its High North system. It presently operates Ku-band gateway stations in Inuvik, NT (Canada); Awarua (New Zealand); and Longyearbyen, Svalbard (Norway). It also maintains dedicated TT&C stations in Awarua and Longyearbyen that communicate in the VHF/UHF and S-band. The network is managed from Kepler's network operations center and main headquarters in Toronto, Canada.

Kepler's main research and development activities are also performed from its headquarters in Toronto. This infrastructure includes a satellite assembly plant capable of manufacturing up to 10 small satellites per month to flight qualification standards.

Leveraging this infrastructure, Kepler has been able to achieve several industry-firsts. This includes being the first company to launch and operate a Ku-band low-Earth orbit (LEO) satellite,

the first to demonstrate live communications with electrically steerable commercial flat panel antennas in the Ku-band, as well as the first (and presently, only) satellite operator to deliver a wideband communications service from LEO. Kepler will leverage its expertise and past experience in developing nanosatellite systems to deploy the proposed NGSO constellation and bring high-speed and low-latency broadband Ka-band connectivity to the High North.

II. SYSTEM DESCRIPTION

The Kepler System is designed specifically to provide high-speed and low-latency connectivity for customers operating above 55°N latitude. As such, the system design has been optimized for targeting customers operating in this region. The constraint of this underserved region brings several benefits, including needing only a relatively small constellation and satellite size to deliver full broadband capability, simpler coexistence schemes with other NGSO networks, and improved mitigation of interference to GSO. The constellation will consist of 360 satellites in 12 orbital planes at a nominal altitude of 600 ± 50 km, as shown in Table 1.

Table 1: Constellation design showing altitudes and inclination.

Altitude	Inclination	Planes	LTAN separation	Satellites per Plane	In-Plane Separation	Number of Satellites
600 ± 50 km	89.5°	12	15°	30	12°	360

The proposed system will provide full, uninterrupted coverage to users within the target service region. Target customers include residential customers living in Alaska, maritime and aeronautic customers operating in the High North, as well as public sector customers that maintain a presence

in the Arctic for scientific or national security purposes. The System will operate using the following Ka-band and Ku-band frequencies:

Table 2: System beam summary.

Type	Direction	# of Beams	Service	Polarization	Operating Band (MHz)	
					Min	Max
Service	Down[3]	1	FSS	RHCP/LHCP	17800	18600
			FSS	RHCP/LHCP	18800	19400
			FSS/MSS	RHCP/LHCP	19700	20200
	Up	4	FSS	RHCP/LHCP	27500	29100
			FSS/MSS	RHCP/LHCP	29500	30000
Feeder	Down	2	FSS	RHCP/LHCP	10700	12700
	Up	2	FSS	RHCP/LHCP	12750	13250
			FSS	RHCP/LHCP	13800	14000

Kepler's ground segment will consist of customer terminals (i.e. aeronautic, maritime, and land assets equipped with mechanically or electrically steerable antennas), gateway earth stations with in-band TT&C, and a central network operations and control facility. Early use cases will predominantly be satellite serviced mobile stations (e.g. aeronautic, maritime, and land-mobile), and these mobile terminals will be compliant with all applicable rules regarding earth stations in motion ("ESIM"), as appropriate,[4] and any other requirements adopted by the Commission. Gateway earth stations will be connected with high-speed fiber links to the global Internet.

[3] The downlink service beam characteristics above represent the worst-case max EIRP density. Kepler's system has the capability to combine multiple channels into a single beam and perform adaptive power control while adhering to the max EIRP density presented.

[4] 47 C.F.R. § 25.115. *See also Facilitating Communications of Earth Stations in Motion with Non-Geostationary Orbit Space Stations*, Report and Order in IB Docket No. 18-315 and Further Notice

III. GRANT OF THIS APPLICATION WILL SERVE THE PUBLIC INTEREST

While terrestrial and satellite-based connectivity solutions have been widely deployed to serve a variety of communications needs, one region on the planet remains woefully underserved: The High North.

Providing communications in the High North is a multi-faceted challenge. The remote population and large distance between users make terrestrial infrastructure uneconomic to deploy. This is exacerbated by a challenging physical environment, that keeps the cost of fiber lines, microwave backhaul, and other fixed installations high. Moreover, terrestrial infrastructure does little to support connectivity for offshore or airborne platforms.

Without such infrastructure, users look to satellites to meet their connectivity needs. While most broadband telecommunication satellites operate in a geostationary orbit situated above the equator, in the High North these satellites appear at low elevation angles above the horizon (or in some cases below the horizon and completely out of view). Even when they are visible, service is predominantly offered via spillover coverage from the lower latitude primary service regions of geostationary satellites, thus limiting bandwidth and degrading performance. The low viewing

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of Proposed Rulemaking, FCC 20-66 (rel. May 14, 2020). ("ESIM Review") Kepler recognizes that ESIM operations on 28.35-28.4 GHz are presently under review, and therefore seeks authority for this frequency range conditioned on further determinations made in the proceeding. *See id*. at ¶ 30.

angles further create reliability issues, as local obstructions such as trees, mountains, or even rolling sea waves on the ocean can cause intermittent or permanent loss of signal. The only presently available satellite service in the High North uses limited bandwidth in L-band, limiting its use to voice and very low-speed data services such as email or basic web browsing. Kepler's System will offer a unique service by delivering upwards of 50Gbps of low-latency broadband capacity in the High North.

A. Kepler's System will Support Commercial Interests in the High North

Despite these challenges, the demand for connectivity in the High North has never been greater. Economic activity is on the rise as northern sea ice retreats and the Arctic operating season is lengthened for cargo vessels, community resupply ships, and adventure tourism cruise lines. For instance, in 2019 more than 35,000 passengers took cruises to explore the Arctic,[5] all of whom experienced the limitations of broadband connectivity options available in the High North.

This demand for connectivity is not only limited to maritime applications; an increase in international travel and economic interdependencies has led to a deluge of transpacific, transatlantic, and trans-Asiatic commercial airline routes that extend well into the High North. Every year, over 50 million passengers take flights that transit above 55°N where they are unable

[5] See *AECO's Annual Conference: New guidelines and statistics of Arctic expedition cruise operators* accessible from https://www.ltandc.org/aecos-annual-conference-new-guidelines-and-statistics-of-arctic-expedition-cruise-operators/

to access basic levels of connectivity to maintain productivity, communicate with friends and family, or access digital content.

As economic activity in the High North increases, so too do the pressures on public sector agencies to maintain safety, security, and sovereignty through Arctic land, sea, and airborne platforms. The High North today presents the next great frontier of economic opportunity. High-speed, low-latency, and affordable connectivity delivered by a system like Kepler's will be central to realizing its potential, including to ensure freedom of travel and secure national interests.

B. Kepler's System Will Enhance United States National Security

The United States is an Arctic nation, and many activities within the Arctic have a direct implication on national security interests. In a recent Report to Congress,[6] the U.S. Department of Defense ("DoD") highlighted the importance of defending territorial and marine sovereignty claims in the Arctic. As well, the report emphasized the need for the U.S. to maintain freedom of navigation and overflight in the Arctic as adversarial nations use the region as a corridor for competition and to project power. Indeed, adversarial nations have been steadily making investments into Arctic infrastructure such as new icebreakers and deep-sea ports.[7]

[6] See *Report to Congress, Department of Defense Arctic Strategy, June 2019.*

[7] Russia views itself as a polar great power and has gradually strengthened its presence in the Arctic by creating new Arctic units, refurbishing old airfields and infrastructure in the Arctic, developing new icebreaking capabilities, and has established new military bases along its Arctic coastline.

Connectivity is critical for the U.S. to support national security interests in the Arctic. In 2018, for instance, the U.S. Coast Guard cited that they were 'challenged to communicate with [their] own assets deployed to the high latitudes' in a Report to Congress.[8] The U.S. also jointly operates several fixed radar stations across Alaska and northern Canada that make up part of the North Warning System (NWS). These stations – used for detection and tracking of potential airborne threats including long-range bombers and cruise missiles – use a suite of aging and low-bandwidth satellite communications terminals that are recognized as needing modernization. Airborne platforms are also employed in the Arctic. For example, the U.S. uses P-8 patrol aircraft in collaboration with the United Kingdom to provide surveillance capabilities in the Greenland-Iceland-UK corridor. These platforms carry onboard a suite of sensors and cameras to perform their mission.[9] The DOD, in the aforementioned Report to Congress on Arctic Strategy commented that for ISR[10] airborne platforms "[s]atellite-based communications are limited, further constraining reliable voice communications and restricting data coverage in the Arctic region."[11]

China has declared themselves a 'Near-Arctic State', a position not recognized by the United States, and has steadily made new investments into icebreakers and civilian research efforts as part of its "One Belt, One Road" initiative to make outreach to Arctic nations.

[8] See *Arctic Search and Rescue, Fiscal Year 2017 Report to Congress*, by the Department of Homeland Security.

[9] Sensors on ISR airborne platforms can include, for instance, radar systems, acoustics sensors, electro-optical, and infrared cameras, and magnetic anomaly detectors.

[10] ISR: Intelligence, surveillance, and reconnaissance.

[11] See *Report to Congress, Department of Defense Arctic Strategy, June 2019.*

Not only is poor connectivity in the Arctic a constraint for operational effectiveness, it also has a negative impact on crew morale, whether stationed at land or sea. Service men and women working in remote northern areas are often separated from friends and family for extended periods of time. Having increasingly grown up in a digital era, these individuals may come to expect a similar degree of connectedness while on duty as when at home. This might, for example, include available access to high-bandwidth digital media, and the ability to communicate with friends and family. A lack of these resources often directly relates to difficulties attaining desired crew retention levels. This is both an operational challenge and an economic one; the high cost of training new service personnel owing to high turnover is an unnecessary expense that could be greatly mitigated with improved connectivity. Kepler's System promises to provide an at-home quality of connectivity for U.S. servicemembers in historically unconnected environments.

C. Kepler's System Will Close the Digital Divide in Alaska

The challenges of delivering broadband connectivity in Alaska remain great. Vast distances separate Alaskan communities which are often inaccessible by roads, and much of the land is owned by the U.S. Department of Defense, the Bureau of Land Management, or the USDA Forest Services. Mountainous terrain, permafrost, and limited daylight in the winter months compound these challenges and make it difficult to deploy and maintain terrestrial connectivity infrastructure. This creates obstacles for households, businesses, educational institutions, and healthcare providers that live and work outside of the urban centers of the state.

While progress has been made in recent years to help bridge the digital divide in Alaska, considerable work remains. The quality of connectivity in Alaska is some of the most uneven in the country. Nearly 50% of rural Alaskans do not have access to broadband fixed internet,[12] and 4G penetration in rural Alaska has only reached around 66%. Alaska also has the largest gap between urban and rural users in terms of latency of any state, with urban and rural users respectively experiencing around 75 ms and 112 ms of latency.[13] For comparison, average consumer latency in the U.S. is around 50 ms. This discrepancy can inhibit Alaskans from using internet applications that require reduced latency, such as video streaming, teleconferencing, and many mobile applications. Notably, these gaps hinder households, businesses, schools, and healthcare, and underscore the need across the state for establishing access to affordable, robust, and low-latency connectivity.

[12] See *Broadband Internet Access and the Digital Divide: Federal Assistance Programs,* available from https://fas.org/sgp/crs/misc/RL30719.pdf.
[13] See *Mobile Experience in the USA – The Urban-Rural Divide*, accessible from https://www.opensignal.com/blog/2019/10/21/mobile-experience-in-the-usa-the-urban-rural-divide.

IV. KEPLER'S APPLICATION MEETS THE CRITERIA FOR U.S. MARKET ACCESS

The Commission's DISCO II Order establishes the framework for consideration of U.S. market access by non-U.S. licensed space stations, which considers the following factors: the effect on competition in the United States; spectrum availability, eligibility requirements and operating requirements; and national security, law enforcement, foreign policy, and trade.[14] Kepler's application satisfies all of the Commission's requirements.

A. Effective Competition

The Commission's DISCO II framework allows for a presumption in favor of market entry for applicants licensed by World Trade Organization ("WTO") members in lieu of requiring a showing of effective competition in the licensing country.[15] Here, Kepler's system is licensed by Canada, which is a member of the WTO, and the Commission has granted market access to other Canadian licensed operators, including Kepler.[16] This application is also entitled to the presumption by the Commission that market entry will satisfy the "competition" portion of the required public interest analysis. Additionally, Kepler's proposal to provide broadband services to

[14] *Amendment of the Commission's Regulatory Policies to Allow Non-U.S. Licensed Space Stations to Provide Domestic and International Satellite Service in the United States*, Report and Order, 12 FCC Rcd 24094 (1997) ("DISCO II Order").
[15] *Amendment of the Commission's Regulatory Policies to Allow Non-U.S. Licensed Space Stations to Provide Domestic and International Satellite Service in the United States*, First Order on Reconsideration, 15 FCC Rcd 7207 (1999) ("*DISCO II Recon Order*").
[16] *See Kepler Ku Grant.*

parts of Alaska which presently do not have access to broadband is a provision of new service to U.S. customers which will enhance competition.

B. Spectrum Availability

In this application, Kepler seeks access to spectrum already allocated to NGSO FSS use. Kepler seeks use of the Ku-band frequencies 10.7-12.7, 12.75-13.25, and 13.8-14.5 GHz for gateway stations, all of which are the subject of the present processing round.[17] These operations will be in conformance with the Commission's rules and the Table of Frequency Allocation, including Section 25.210(f).[18] As indicated in Kepler's Technical Appendix attached to this application, Kepler certifies compliance with the required power flux density limits of Section 25.146 of the Commission's rules, and equivalent ITU limits.[19] For these reasons, and given the limited deployment of Ku gateways within the U.S., Kepler will be able to share the frequencies with other operators, as demonstrated in more detail in Kepler's Technical Appendix.

Kepler also seeks use of 17.8-18.6, 18.8-19.4, 19.7-20.2, 27.5-29.10 and 29.5-30 GHz for its user terminals. Operations will be in conformance with the Commission's rules and Table of

[17] See *Public Notice, Cut Off Established for Additional NGSO FSS Applications or Petitions for Operations in the 10.7-12.7 GHz, 12.75-13.25 GHz, 13.8-14.5 GHz, 17.7-18.6 GHz, 18.8-20.2 GHz, 27.5-30 GHz Bands*, DA-20-325 (rel. March 24, 2020)
[18] 47 C.F.R. § 25.210(f).
[19] 47 C.F.R. § 25.146(a).

Frequency Allocation, including Section 25.228, as discussed further in the Technical Appendix.[20] As noted, Kepler recognizes that use of 28.35-28.4 GHz by Earth Stations in Motion ("ESIM") is the subject of a Further Notice of Proposed Rulemaking, and that any grant of authority may be conditioned upon subsequent changes to the rules.

Each communications payload on Kepler satellites is a digital software defined radio, meaning that the uplink frequencies are not strictly mapped to the downlink frequencies as in a traditional bent-pipe satellite. The mapping between uplink and downlink frequencies can be shifted along the entire 3.5 GHz.

C. Eligibility and Operating Requirements

As noted above, the Commission has already determined that Kepler is an entity that is eligible to provide satellite service in the United States.[21] Additionally, Kepler's attached Schedule S and Technical Appendix demonstrate that its proposed system will meet the Commission's operational requirements.

[20] 47 C.F.R. § 25.228.
[21] See *Kepler Ku Grant.*

D. National Security, Law Enforcement, Foreign Policy and Trade

Kepler's application, like its prior application, does not raise any concerns related to national security, law enforcement, foreign policy or trade.

V. ITU FILINGS

The system described within this application is associated with filings submitted to the ITU through the Canadian administration. These submissions can be found on the ITU Space Network List, Part C – As Received.[22]

VI. WAIVERS

The Commission may grant a waiver of a rule when departure from the rule would better serve the public interest than strict adherence.[23] In particular, the Commission may grant such a waiver provided that the policy objective of the rule is not undermined and the waiver otherwise serves the public interest. Kepler requests the following waivers of the Commission's rules, which are appropriate and in the public interest under the particular facts presented.

A. Geographic service requirements of Section 25.146(b)

Kepler hereby requests a waiver of the requirement for NGSO FSS space stations to provide continuous service provision capability throughout the fifty states, Puerto Rico, and the US Virgin Islands.[24] Kepler's system is designed specifically to provide service to regions north of 55°N latitude, and it is therefore not feasible to meet the geographic coverage requirements

[22] See https://www.itu.int/ITU-R/space/asreceived/Publication/AsReceived
[23] Northeast Cellular Telephone Co. v. FCC, 897 F.2d 1164, 1166 (D.C. Cir. 1990).
[24] 47 C.F.R. §25.146(b)

stipulated by Section 25.146(b). Kepler's system as proposed will provide valuable connectivity services to the heavily underserved but increasingly active Arctic region. The size and complexity of the constellation is kept as minimal as possible to reduce the overall costs of providing the end service, minimize interference concerns with GSO and NGSO networks, and to reduce the time required to begin delivering the service. If required to meet the conditions of Section 25.146(b), the necessary redesigns would render the constellation unrecognizable, and would jeopardize its unique benefits and entire business model. In this case, there is good cause to grant a waiver of these requirements, as doing so would enable the delivery of these services to underserved American customers, and ultimately act in favor of the public interest. Therefore, Kepler respectfully requests that the Commission accordingly grant a waiver of the geographic service requirements of Section 25.146(b).

B. Section 2.106, To Provide Fixed Satellite Service to Earth Stations in Motion

Noting the ESIM Review, out of an abundance of caution, Kepler hereby requests a waiver of Section 2.106 of the Commission's rules to allow the provision of FSS to mobile land, maritime, and aeronautical terminals (referred to generally as "ESIMs") within certain bands otherwise allocated to the provision of FSS in the US, but without a specific designation for ESIMs. The frequencies of concern include the 17.8 - 18.3 GHz, 18.3 - 18.6 GHz, 18.8 - 19.4 GHz, 19.7 - 20.2 GHz, 27.5 - 29.1 GHz, and 29.5 - 30.0 GHz bands. A grant of this waiver would directly permit more bandwidth to be used to provide high-capacity FSS to the heavily underserved ESIM market, thereby greatly benefiting the public interest. Concerns of overallocation of these bands between

GSO and NGSO systems in the FSS and BSS are mitigated greatly by Kepler's northernly service area, a region poorly situated to receive satellite services. Furthermore, the Commission has previously adopted similar rules for GSO services in these bands,[25] and is presently engaged in an ongoing rulemaking procedure on precisely this issue as it pertains to NGSO networks.[26] For much the same reasons that have motivated these alternate engagements, and for the reasons provided above, there is good cause for the Commission to grant such a waiver. Kepler therefore respectfully requests that the Commission grant a waiver of the specified requirements of Section 2.106.

C. Section 2.106: To provide MSS in the 19.7 – 20.2 and 29.5 – 30.0 GHz bands in exception of the Commission's Ka-band plan

Kepler hereby requests a waiver of the Commission's Ka-band plan[27] to permit the delivery of MSS in the 19.7 – 20.2 and 29.5 – 30.0 GHz bands using the same characteristics as its FSS operations. Although both ITU and U.S. Non-Federal allocations list the MSS in these bands, the Commission's Ka-band plan does not provide respective service rules for the MSS, instead dedicating the band to the FSS.[28] However, the Commission has previously found that the grant of

[25] *Amendment of Parts 2 and 25 of the Commission's Rules to Facilitate the Use of Earth Stations in Motion Communicating with Geostationary Orbit Space Stations in Frequency Bands Allocated to the Fixed Satellite Service*, 33 FCC Rcd 9327 (14).
[26] *Facilitating the Communications of Earth Stations in Motion with Non-Geostationary Orbit Space Stations*, Notice of Proposed Rulemaking, IB Docket No. 18-315, FCC 18-160, ¶ 1 (rel. Nov 16, 2018)
[27] *Updated Rules to Facilitate Non-Geostationary Satellite Systems*, Report and Order, IB Docket No. 16-408, 32 FCC Rcd 7809 (9).
[28] In particular, the Ka-band plan does not adopt sharing criteria between NGSO FSS and NGSO MSS systems in the 19.7 – 20.2 and 29.5 – 30.0 GHz bands.

a similar waiver to O3b was in the public interest, based on the assessment that O3b's MSS operations would "have the same characteristics of [its] FSS operations and that directional earth station antennas will also be used," and would therefore be indistinguishable from its FSS operations in these bands being conducted with ESIMs.[29] Kepler's proposed operations in this band similarly follow this description, and are technically identical to those it will conduct within the FSS towards ESIMs. Furthermore, Kepler's MSS operations would therefore comply with the same EPFD limits that are subject to its FSS operations, and the non-interference, non-protection requirements subject to its proposed ESIM operations in these bands. Therefore, good cause is shown to permit these operations in the same manner and respect as done for O3b. Consequently, Kepler respectfully requests that the aforementioned restrictions imposed by the Ka-band plan on the provision of MSS services within the 19.7 – 20.2 and 29.5 – 30.0 GHz bands be granted, subject to the conditions proposed or further rulemaking.

D. Section 25.114(c)(4)(v): Provision of Saturation Flux Density Figures within the Schedule S

Kepler hereby requests a limited waiver of the requirement to provide values for saturation flux density in the associated Schedule S to this application. The concept of saturation flux density does not technically apply to Kepler's system, as unlike many legacy bent-pipe systems, it

[29] *O3b Limited, Request for Modification of U.S. Market Access for O3b Limited's Non-Geostationary Satellite Orbit System in the Fixed-Satellite Service and in the Mobile-Satellite Service*, Order and Declaratory Ruling, 33 FCC Rcd 5508, ¶¶ 21-22 (2018) ("O3b Grant").

processes signals prior to retransmission. Because Kepler cannot portray this inapplicability on the associated Schedule S, it has entered values of "0" and "-0.1" for maximum and minimum saturation flux densities in those respective fields. The Commission has previously granted similar waivers to other operators under the same reasoning.[30] Grant of this waiver would not undermine the purpose and intent of the rule, which is that the Commission must receive a full and complete set of information necessary to evaluate the application. Moreover, any necessary information not contained in the Schedule S is provided in the Technical Appendix attached to this application. Grant of this waiver would not undermine the public interest, as the provision of saturation flux density values for a system to which they are inapplicable do not meaningfully contribute to the evaluation of that system. Therefore, Kepler respectfully requests the Commission grant this waiver accordingly, consistent with Commission precedent.

E. Section 25.156(d)(4): Applications involving feeder links and service links

To the extent necessary, Kepler seeks waiver of Section 25.156(d)(4) of the Commission's rules, which provides for separate consideration of applications for feeder link and service link authority.[31] Consideration of Kepler's entire filing, which includes requests to operate both feeder links and service links, would be most efficient and in the public interest.

[30] See, e.g., O3b Grant, ¶ 35; Space Exploration Holdings, LLC, *Application for Approval for Orbital Deployment and Operating Authority for the SpaceX NGSO Satellite System*, Memorandum Opinion, Order, and Authorization, 33 FCC Rcd 3391, ¶ 36 (2018).
[31] 47 C.F.R. § 25.156(d)(4).

F. Section 25.137(d)(5): Multiple applications

Though Kepler does not believe that the present application implicates the restrictions imposed by Section 25.137(d)(5) of the Commission's rules, out of an abundance of caution Kepler seeks waiver of this rule. Section 25.137(d)(5) prohibits non-U.S. applicants for market access from applying for market access of a system when it has applied for market access for another unbuilt system. The purpose of the rule is to safeguard against frivolous or speculative applications, to prevent spectrum warehousing.[32]

In this instance, Kepler has launched the initial portion of its currently authorized system, with plans to launch fifteen additional satellites this year. Therefore, Kepler does not believe that the Kepler Ku system is considered "unbuilt" under the rule and waiver would not be necessary. Additionally, Kepler has demonstrated that it intends to use the Ku authority granted to it by the Commission, both by having placed satellites into orbit and initiating services from them. Moreover, there is very little overlap between the two systems. The current application is for a separate constellation that will provide real-time broadband data and only use Ku band for a few large gateways situated in Alaska, to serve Alaska and its surroundings. For these reasons, the current application is not frivolous or speculative. If the Commission determines that a waiver is

[32] *Amendment of the Commission's Space Station Licensing Rules and Policies*, First Report and Order and Further Notice of Proposed Rulemaking, 18 FCC Rcd 10760, 10847-49 (2003).

required, a waiver would therefore be in the public interest, especially to allow the provision of services otherwise not available.

G. Section 25.165: Surety bond requirements

The Commission additionally imposes an escalating bond requirement on NGSO operators to ensure that these milestones are met.[33] Kepler seeks waiver of this bond requirement on the basis that Kepler is seeking to only provide service to a small portion of the United States, outside of CONUS and in a geographic area – Alaska and adjacent U.S. waters – where spectrum use is relatively sparse. Thus, the Commission's reasons for requiring a bond, which is to ensure that scarce national spectrum resources are not hoarded, are not substantially present in this instance.[34] Kepler further notes that its existing Kepler Ku Grant already imposes the requirement of an escalating bond for the use of Ku-band spectrum. Despite the systems being mutually exclusive, the Ku frequencies within this application overlap those in the Kepler Ku Grant, which Kepler is already making use of by having launched initial portions of its constellation and providing service. A bond requirement made on the pretense of hoarding spectrum for which it is already using is moot and thus unduly burdensome. The intent of the rule is already satisfied in this circumstance,

[33] 47 C.F.R. § 25.165.
[34] *Comprehensive Review of Licensing and Operating Rules for Satellite Services*, Further Notice of Proposed Rulemaking, 29 FCC Rcd. 12116, 12123-24 (2014).

and strict adherence to the application of a bond requirement acts only to encumber Kepler's ability to deploy the proposed system and therefore the public interest.

Regarding its requested Ka-band spectrum, the limitation of its coverage to the Alaskan service area vastly reduces the real value of the requested market access. To the extent that a bond requirement should be applied to its request for Ka-band spectrum, Kepler requests a reduction proportionate with the value of the limited market access obtained by constraining its target service area to a state that constitutes less than 1% of the population of the United States.[35]

[35] The U.S. Census Bureau estimates a population of the state of Alaska to be 731,545 as of July 1, 2019, representing a mere 0.2% of the U.S. population.
URL: https://www.census.gov/quickfacts/AK

VII. FURTHER CONSIDERATIONS

A. U.S. Table of Allocations Footnotes

Kepler will comply with the provisions of the U.S. Table of Frequency Allocations, including applicable footnotes,[36] except for those conditions for which a waiver has herein been requested.

B. Milestone, Bond, and Other Obligations

NGSO systems authorized to operate in the United States must place space stations into the assigned orbits, and operate 50% of their authorized constellation within six years of grant of the authorization and 100% within nine years.[37] Kepler will comply with all satellite milestone requirements.

Pursuant to Section 25.114(d)(14),[38] Kepler is providing a detailed description of its end of life disposal and orbit debris mitigation plans in its attached Technical Appendix.

[36] See *47 C.F.R § 2.106*
[37] 47 C.F.R. § 25.164.
[38] 47 C.F.R. § 25.114(d)(14).

VIII. CONCLUSION

Based on the foregoing, Kepler respectfully requests that the Commission grants its request for market access authority to operate an NGSO system using Ka-band and Ku-band frequencies.

Respectfully Submitted

/S/ Nickolas G. Spina
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