Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
SN Space Systems Limited	)	File No. SAT-PDR- _____
	)	
Petition for Declaratory Ruling for	)	Call Sign_____
Authority to Serve the U.S. Market	)	
Using a Multi-Band NGSO Constellation	)	

PETITION FOR DECLARATORY RULING FOR AUTHORITY TO SERVE THE U.S. MARKET USING A MULTI-BAND NGSO CONSTELLATION

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Douglas
Isle of Man IM12QG

November 4, 2021

EXECUTIVE SUMMARY

SN Space Systems Limited ("SN Space Systems"), an indirect, wholly owned subsidiary of SpinLaunch, Inc. ("SpinLaunch"), requests Federal Communications Commission ("FCC" or "Commission") authority to serve the U.S. market using a multi-band, non-geostationary orbit ("NGSO") satellite constellation ("Constellation") to provide low-latency broadband services to consumers, enterprises, government and public sector users, and other customers.

The Constellation will provide satellite broadband connectivity throughout the United States and around the world, including many rural and remote areas that may have limited access to communications options, using 1190 active satellites operating at an altitude of 830 km and an inclination of 55°. The Constellation will communicate with customer terminals in Ku-band and Ka-band frequencies and with gateway and feeder link earth stations in Ku-band, Ka-band, and V-band frequencies to serve a wide range of fixed-satellite service and mobile-satellite service applications. The Constellation will be authorized by the United Kingdom and will operate under a UK satellite network filing submitted to the International Telecommunication Union.

The Constellation is designed to efficiently and intensively use available spectrum and orbital resources while ensuring compatibility with co-frequency satellite operations and other systems and services. The Constellation's unique orbital architecture forms repeating satellite ground tracks which effectively eliminates the need for expensive and inefficient phased-array antennas to scan the entire sky to connect with satellites overhead. Instead, user terminals can employ low-cost, high-performance fixed toroidal reflector antennas with multiple feeds. Such antennas enable satellite tracking across a long, but narrow, field of view and permit simultaneous communications with multiple Constellation satellites. Repeating ground tracks

also better enables the satellite to use innovative, high-performance multi-feed transmit array lens antennas that reduce interference.

The Constellation's innovative design and advanced network control functionality will facilitate effective spectrum sharing, particularly with existing and future NGSO systems, thereby enhancing competition and consumer choice in satellite broadband services. This orbital architecture enhances predictability and allows SN Space Systems to mitigate inline events and efficiently share spectrum with co-frequency operators.

In addition to robust service and spectrum sharing, SN Space Systems is focused on stewardship of the Earth and sustainability of the orbital environment. Accordingly, its satellites are designed to be deployed using SpinLaunch's innovative kinetic launch system; will have a limited orbital lifetime; will be equipped with propulsion for station-keeping, collision avoidance, and deorbit; and will be manufactured to enhance demise upon re-entry.

SN Space Systems shares the Commission's vision that competition and innovation, guided by sound public policy, will bring the benefits of satellite broadband at affordable prices to consumers in the United States and around the world. SN Space Systems stands ready to work with the Commission and industry participants, including previously authorized NGSO system operators, to facilitate efficient and effective use of available spectrum and orbital resources. Therefore, SN Space Systems seeks consideration and grant of this Petition consistent with the Commission's rules and policies at the earliest practicable time.

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PETITION FOR DECLARATORY RULING FOR AUTHORITY TO SERVE THE U.S. MARKET USING A MULTI-BAND NGSO CONSTELLATION

SN Space Systems Limited ("SN Space Systems"), pursuant to Section 25.137 of the Federal Communications Commission's ("FCC" or "Commission") rules,[1] submits this Petition for Declaratory Ruling ("Petition") requesting authority to serve the U.S. market using a multi-band, non-geostationary orbit ("NGSO") satellite system (the "Constellation") to provide high-speed, low-latency connectivity to consumers, enterprises, government and public sector users, and other customers.

As described herein, the Constellation will consist of 1190 active satellites operating in a unique, repeating ground-track orbit at an altitude of 830 km and an inclination of 55°. The Constellation will operate globally pursuant to authority granted by the United Kingdom. Customer terminals will operate in Ku-band uplink and Ka-band downlink spectrum to provide a wide range of fixed-satellite service ("FSS") and mobile-satellite service ("MSS") applications.

[1] 47 C.F.R. § 25.137.

Gateway, feeder link, and TT&C earth stations will operate in Ka-band, Ku-band, and V-band spectrum, as described herein.[2]

SN Space Systems' request for authority to access V-band spectrum for gateway operations in the United States has been timely filed for consideration in the Commission's current NGSO processing round.[3] SN Space Systems understands that its request for authority to access to Ku-band and Ka-band spectrum would be considered in a new NGSO processing round. As discussed below, given the Constellation's ability to share spectrum with previously authorized and future NGSO systems, as well as industry plans to deploy new or significantly modified NGSO broadband systems, SN Space Systems requests that a NGSO Ku-band/Ka-band processing round be initiated as soon as possible.

As demonstrated in this Petition and accompanying materials, grant of authority for the Constellation to serve the U.S. market would be consistent with the Commission's rules, policies, and precedent; and would serve the public interest, convenience, and necessity. SN Space Systems respectfully requests that the Commission consider this Petition in accordance with applicable procedural requirements and grant the Petition at the earliest practicable time.

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[2] The Constellation frequencies are described more fully below, in the attached Technical Annex, and in Schedule S submitted herewith. They are also included in the United Kingdom's SN-CONSTELLATION1 satellite network filing at the International Telecommunication Union ("ITU").

[3] *See Cutoff Established for Additional NGSO-Like Satellite Systems in the 37.5-40.0, 40.0-42.0 GHz, 47.2-50.2 GHz, and 50.4-51.4 GHz*, DA 21-941 (Aug. 4, 2021) ("*V-band Notice*").

I. COMPANY BACKGROUND

SN Space Systems is an indirect, wholly-owned subsidiary of SpinLaunch, Inc. ("SpinLaunch"), is a company limited by shares established in the Isle of Man. SpinLaunch, based in Long Beach, California, is a space technology company developing, among other things, a kinetic launch system that will provide a more environmentally friendly, less expensive, and flexible means to launch payloads to space.[4]

SpinLaunch enables a significant reduction in the costs and complexities of reaching orbit. The SpinLaunch kinetic launch system can reach space without releasing pollutants into critical layers of the atmosphere and satisfy both the operational and environmental demands of a space industry experiencing exponential growth.[5]

SN Space Systems has applied its satellite engineering expertise, along with lessons learned in the kinetic launcher program of its parent, SpinLaunch, to develop the Constellation. Leveraging 5G, satellite, and earth station technologies, SN Space Systems will work with industry partners to manufacture, deploy, and operate the space and ground segment of the Constellation. This integrated approach will result in extraordinary efficiencies in system development and implementation.

The Constellation will operate under the SN-CONSTELLATION1 satellite network filing submitted by the United Kingdom's Office of Communications ("Ofcom") with the ITU and an orbital operator licence from the United Kingdom's Civil Aviation Administration.

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[4] SpinLaunch, Inc. was founded in 2014 by Jonathan Yaney, a serial entrepreneur with 15 years of experience founding companies in the information technology, construction, consulting, and aerospace industries. As indicated in the attached Ownership Exhibit, SpinLaunch's other major investors are venture capital funds, including Kleiner Perkins, Google Ventures, Airbus Ventures.

[5] SpinLaunch's kinetic launch system effectively replaces the first stage of a conventional rocket. Payloads would be launched at hypersonic speed from the ground system to the edge of the stratosphere and a second-stage chemical rocket would be used to reach orbital altitude and speed.

Although SN Space Systems is continuing to refine certain aspects of the Constellation design requiring approval through the UK licensing process, this Petition is substantially complete, compliant with the Commission's rule and policies, and thus should be found acceptable for filing.[6]

II. CONSTELLATION OVERVIEW

The Constellation will provide satellite broadband connectivity throughout the United States and around the world with an aggregate communications capacity of more than 20 Tbps. The Constellation is designed to efficiently and intensively use available spectrum and orbital resources while ensuring compatibility with co-frequency satellite operations and other systems and services. The Constellation's unique orbital architecture forms repeating satellite ground tracks which allows user terminals to employ low-cost, high-performance fixed toroidal reflector antennas with multiple feeds, effectively eliminating the need for expensive and inefficient phased-array antennas to scan the entire sky to connect with satellites overhead. Such user antennas enable satellite tracking across a long, but narrow, field of view and permit simultaneous communications with multiple Constellation satellites. Repeating ground tracks also better enables the satellite to use innovative, high-performance multi-feed transmit array lens antennas that reduce interference.

The Constellation's innovative design and advanced network control functionality will facilitate effective spectrum sharing, particularly with existing and future NGSO systems, thereby enhancing competition and consumer choice in satellite broadband services. This orbital

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[6] *See* 47 C.F.R. 25.112. Out of an abundance of caution, SN Space Systems has requested a limited waiver of this rule to the extent necessary to permit its acceptability for filing and consideration of the Petition in the V-band processing round and future Ku-band and Ka-band processing round. SN Space Systems update the Commission with respect to the status of the UK licensing process and to otherwise ensure ongoing accuracy and completeness of the information submitted with this Petition. *See* 47 C.F.R. § 1.65.

architecture enhances predictability and allows SN Space Systems to mitigate inline events and efficiently share spectrum with co-frequency operators. The orbital characteristics, network management techniques, and spectrum utilization of the Constellation are described more fully below, in the attached Technical Annex, and in Schedule S to Form 312.

A. Space and Ground Segment

The Constellation will consist of 1190 active low-Earth orbit ("LEO") satellites equally spaced on a unique, single-track orbit that results in repeating ground tracks above the surface of the Earth,[7] along with another 60 in-orbit spare satellites in a lower single-track parking orbit.[8] The Constellation's "bent-pipe" transponder design means each satellite will be active only when in view of a gateway earth station.

The Constellation will communicate with approximately eight telemetry, tracking, and control ("TT&C") earth stations with 4.5m antennas, approximately 20 gateway/feeder link teleports with 2.4m antennas, and ubiquitous terminals with various antennas sizes[9] in the United States. Each TT&C site and teleport will have multiple earth stations, each of which can communicate simultaneously with multiple Constellation satellites. To facilitate throughput and spectrum sharing with other satellite systems, each Constellation satellite will communicate with up to five different teleports simultaneously.

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[7] The Constellation can commence commercial operations in advance of full constellation deployment with approximately 625 satellites.

[8] The in-orbit spare satellites of the Constellation will operate as authorized by the United Kingdom and coordinated by SN Space Systems. They will be used to provide service to the United States in accordance with any U.S. market access grant issued by the Commission and Section 25.113(h) of the Commission's rules. *See* 47 C.F.R. § 25.113(h).

[9] SN Space Systems anticipates common user terminals to include 60cm and 1.2m antennas.

Most user terminals and gateway/feeder link earth station will use fixed, toroidal reflector antennas that have a field of view, such as 120°, along a satellite track that will support simultaneous communication with up to four satellites (depending on location). Satellite broadband mobility applications (*e.g.*, land vehicles, cruise ships/ merchant vessels, and aircraft customers) using earth stations in motion ("ESIMs") with steerable antennas also will be supported. The Constellation will provide communication services between 62.5°N and 62.5°S latitude, covering most of the United States (with the exception of northern Alaska).

As discussed more fully herein and in the attached Technical Annex, the Constellation is designed to maximize the use of available spectrum and orbital resources to provide broadband services along with other authorized NGSO systems. The Constellation's innovative orbital architecture and earth station design, along with its advanced network control functionality, will enable efficient and effective provision of service to customers and spectrum sharing with other NGSO systems. This, in turn, will enhance competition and consumer choice in satellite broadband services.

B. Frequency Use

The U.S. Table of Allocations, 47 C.F.R. § 2.106, includes spectrum allocations and related provisions applicable to satellite operations and other services in the bands in which SN Space Systems seeks to provide service in the United States. SN Space Systems will operate in accordance with the Commission's rules, including the Table of Frequency Allocations or, as appropriate, in accordance with limited waivers of any rules necessary to permit its proposed operations.

SN Space Systems also acknowledges the requirement to coordinate in good faith with co-frequency NGSO system operators, as well as the need to complete coordination or otherwise demonstrate that it will not cause harmful interference to any operational system licensed or granted market access in prior NGSO processing rounds.[10] SN Space Systems has conducted extensive simulations with co-frequency NGSO systems and believes that the Constellation will be able to share spectrum with co-frequency NGSO broadband systems consistent with the Commission's rules and policies and provide robust service to its customers. SN Space Systems summarizes the potential for sharing with other NGSO systems below and in the attached Technical Annex. SN Space Systems believes that the coordination process and exchange of information relating to system operations will allow it to further improve spectrum sharing.

The Constellation will utilize various frequencies in V-band, Ka-band, and Ku-band spectrum for gateway/feeder links, user links, and TT&C links. The following table summarizes spectrum use by the Constellation.

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[10] *See* Kuiper Systems LLC, File No. SAT-LOA-20190704-00057 (granted July 30, 2020) at ¶ 50 ("*Kuiper Order*") (requiring coordination or a showing that the proposed operations will not cause harmful interference to any operational system with prior authorization).

Table 1: Constellation Frequency Plan

Band	Direction	Frequency Range	Constellation Use
V-band	Earth-to-space	47200 - 50200 MHz	Gateway uplink
	Earth-to-space	50400 – 51400 MHz	Gateway uplink
	space-to-Earth	37500 - 40000 MHz	Gateway downlink
	space-to-Earth	40000 – 42000 MHz	Gateway downlink
Ka-band	Earth-to-space	27000[11] – 30000 MHz	Gateway/Feeder uplink (MSS)[12]
	space-to-Earth	17700[13] – 19300 MHz	User & TT&C downlink[14]
	space-to-Earth	19300 – 19400 MHz	User (ESIM) & TT&C downlink
	space-to-Earth	19400 – 19600 MHz	Feeder link (MSS) & TT&C downlink
	space-to-Earth	19600 – 19700 MHz	User downlink (ESIM)
	space-to-Earth	19700 – 20200 MHz	User downlink
Ku-band	Earth-to-space	13750 – 14000 MHz	Gateway & TT&C uplink
	Earth-to-space	14000 – 14500 MHz	User uplink

Additional information regarding the Constellation's frequency plan, spectrum availability, and compatibility issues is provided below, in the attached Technical Annex and Schedule S.[15]

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[11] The 27000 – 27500 MHz band will be used for FSS Earth- to-space operations in parts of Region 2 (not including the United States) and Region 3. SN Space Systems is not requesting market access using this band and therefore these bands are not included in the Schedule S.

[12] Only MSS feeder links will be conducted in the 29100 – 29500 MHz sub-band.

[13] The 17700 – 17800 MHz band will be used for FSS space-to-Earth services in Region 1, portions of Region 2 (not including the United States) and Region 3. SN Space Systems is not requesting market access using this band and therefore these bands are not included in the Schedule S.

[14] The 19200-19300 MHz band will also be used for TT&C downlink operations as discussed below.

[15] *See* Technical Annex at §§ 2, 5, & 7; *see generally* Schedule S.

III. GRANT OF THIS PETITION SERVES THE PUBLIC INTEREST

Non-U.S.-licensed space station operators proposing to serve the U.S. market must demonstrate that grant would serve the public interest.[16] In that analysis, the Commission considers: (i) the effect on competition in the United States; (ii) spectrum availability; (iii) national security, law enforcement, foreign policy, and trade considerations; and (iv) eligibility and operational requirements.[17] Each of these considerations, as well as other public interest factors, are examined below and fully support grant of this Petition in the public interest.

A. Effect on Competition in the United States

A non-U.S.-licensed satellite system is entitled to a presumption in favor of entry if it is licensed by a World Trade Organization ("WTO") member country to provide satellite services covered by the WTO Basic Telecommunications Agreement (the "WTO Agreement").[18] As noted above, the Constellation will be authorized by the United Kingdom, a member of the WTO, and seeks authority to provide only satellite services that are covered by the WTO Agreement.[19] The Commission has previously granted U.S. market access to satellite systems licensed in the United Kingdom.[20] Therefore, SN Space Systems is entitled to a presumption that market entry will satisfy the competition component of the public interest analysis.[21]

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[16] *See 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*, 12 FCC Rcd. 24094, at ¶ 29 (1997) ("*DISCO II Order*"), on reconsideration, 15 FCC Rcd. 7207, at ¶ 5 (1999).
[17] *See id.*
[18] *See DISCO II Order*, at ¶ 39.
[19] *See, e.g., id.*, ¶ 30 (noting that MSS is a WTO-covered service); *Globalstar Licensee LLC*, 26 FCC Rcd 3948, at ¶ 21 (2011) ("the Commission adopted a policy that granting market entry for provision of FSS or MSS via satellites licensed by a WTO-member country will be presumed to be beneficial for competition in the United States").
[20] *See, e.g.*, WorldVu Satellites Ltd., File No. SAT-LOI-20170301-00031 (granted Aug. 26, 2020) (granting OneWeb U.S. market access from the United Kingdom).
[21] *See* 47 C.F.R. § 25.137(a)(2).

This presumption is strengthened because SN Space Systems is a new NGSO FSS and MSS entrant that will enhance competition by providing affordable satellite broadband services to the U.S. market with an innovative constellation design. The Commission has previously acknowledged that "entry of new competitors and services into the U.S. satellite services market. . .will provide U.S. consumers with additional choices among providers, reduce prices, and increase the quality and variety of services."[22]

The Constellation's unique orbital architecture and enhanced spectrum sharing capabilities enable SN Space Systems to serve the U.S. market consistent with the public benefits that the Commission expected to accrue from a presumption in favor of entry for WTO-covered services. Accordingly, grant of the Petition would enhance competition for advanced satellite services in the United States, vastly improving connectivity options for U.S. consumers, especially in underserved and unserved communities.

B. Spectrum Availability

In examining spectrum availability, the Commission considers whether grant of market access would have the potential to cause harmful interference to previously authorized satellite systems and terrestrial systems. The Constellation is designed to operate in compliance with Commission rules and policies (including limited waivers of certain provisions), as well as applicable ITU requirements. The Constellation will comply with applicable EPFD limits, as well as PFD limits adopted to protect terrestrial services. EPFD and PFD compliance is demonstrated in the Technical Annex and Schedule S filed herewith.

Consistent with Commission rules, policies, and precedent, SN Space Systems intends to share spectrum with and avoid causing harmful interference to operational NGSO systems via

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[22] *DISCO II Order* at ¶ 40.

good faith coordination and appropriate information sharing, and/or, a demonstration of non-interference approved by the Commission.

Spectrum sharing is greatly facilitated by the Constellation's repeating satellite ground tracks and fixed gateway earth stations and customer terminals that operate only along a narrow segment of the visible sky. This orbital architecture enhances predictability and allows SN Space Systems to mitigate inline events and efficiently share spectrum with co-frequency operators.

To assess the impact of spectrum sharing, SN Space Systems conducted extensive simulations evaluating its operations with co-frequency operations of numerous, co-frequency NGSO broadband systems. Highlights from these simulations are summarized in the attached Technical Annex and demonstrate that the Constellation can provide robust service while sharing spectrum with co-frequency NGSO systems. Thus, Constellation operations will be compatible with previously authorized systems. As a result, grant of this Petition would be consistent with the Commission's spectrum availability policies.

1. Gateway Operations

SN Space Systems seeks use of various V-band, Ka-band, and Ku-band frequencies for gateway operations. SN Space Systems will comply with applicable domestic and international operational restrictions (except as expressly waived by the Commission) and requirements for coordinating operations in relevant frequency bands. As discussed below and in further detail in the attached Technical Annex, SN Space Systems will operate in these bands without causing harmful interference to other systems and services.

37.5-40 GHz: The 37.5-40 GHz band is allocated for FSS downlink (earth station receive) operations on a co-primary basis with terrestrial services, permitting licensing of

individual FSS earth stations in the band subject to certain interference protection obligations and limitations in Section 25.136 of the Commission's rules that facilitate co-frequency operations with the Upper Microwave Flexible Use Service ("UMFUS") licensees.[23] SN Space Systems will comply with these provisions and with applicable PFD limits.[24] SN Space Systems will coordinate its proposed operations in the 37.5-38.0 GHz band with Federal space research service ("SRS") facilities.[25] Likewise, SN Space Systems will ensure compatibility with authorized GSO networks in V-band frequencies consistent with Commission precedent.[26]

40.0-42.0 GHz: The 40.0-42.0 GHz band is allocated for FSS downlink (earth station receive) operations.[27] Satellite transmit and earth station receive operations in this band will be in conformance with the Commission's rules and the Table of Frequency Allocations.[28] SN Space Systems will coordinate its proposed operations in the band with Federal operations, as appropriate.

47.2-48.2 GHz: The 47.2-48.2 GHz band is allocated for FSS uplink (earth station transmit) operations on a co-primary basis with fixed and mobile services, limited to non-Federal

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[23] *See* 47 C.F.R. § 2.106, NG63; *see also* 47 C.F.R. § 25.136 (specifying processes for earth station applicants in the 37.5-40.0 GHz band to enable sharing with UMFUS licensees); *see also Use of Spectrum Bands Above 24 GHz For Mobile Radio Services*, Second Report and Order, Second Further Notice of Proposed Rulemaking, Order on Reconsideration and Memorandum Opinion and Order, 32 FCC Rcd 10988, ¶ 192 (2017) ("*Spectrum Frontiers Second Order*") (limiting satellite operations to communications with individually licensed earth stations in the 37.5-40.0 GHz and 47.2-48.2 GHz bands).

[24] 47 C.F.R. § 25.208(r).

[25] 47 C.F.R. § 2.106, US151.

[26] *See* The Boeing Company, File No. SAT-LOA-20170301-00028, as amended (granted Nov. 3, 2021), at ¶ 31 ("*Boeing Order*") (conditioning Boeing's space-to-Earth and Earth-to-space operations in the 37.5- 42 GHz and 47.2-50.2 GHz and 50.4-51.4 GHz bands on compliance with the recently adopted ITU rules Nos. 22.5L and 22.5M.).

[27] *See id.*; *Spectrum Frontiers Second Order* at ¶ 220.

[28] For example, SN Space Systems will take all practicable steps to protect radio astronomy observations in the adjacent bands from harmful interference. *See* 47 C.F.R. § 2.106, US211. SN Space Systems will also operate consistent with the PFD limits in 47 C.F.R. § 25.208(s) and (t).

stations.[29] SN Space Systems' proposed gateway operations in the band are therefore consistent with the Commission's rules and the Table of Frequency Allocations. SN Space Systems also recognizes the limitations on earth station operations in this band imposed by Section 25.136 of the Commission's rules.[30] SN Space Systems will also not cause unacceptable interference into GSO FSS or BSS networks authorized in the band and will otherwise comply with applicable ITU limits.[31]

48.2-50.2 GHz: The 48.2-50.2 GHz band is allocated for FSS uplink (earth station transmit) operations on a co-primary basis with fixed and mobile services for both Federal and non-Federal stations. SN Space Systems' operations in this band will comply with the Commission's rules and the Table of Frequency Allocations.[32] SN Space Systems will also comply with the unwanted emissions limit in the 50.2-50.4 GHz band adopted by the ITU 2019 World Radiocommunication Conference ("WRC-19").[33]

50.4-51.4 GHz: The 50.4–51.4 GHz band is allocated for FSS uplink (earth station transmit) operations on a co-primary basis with, fixed and mobile services.[34] SN Space Systems also recognizes the limitations on earth station use of this band imposed by Section 25.136 of the Commission's rules. The Constellation's gateway operations will otherwise follow the Commission's rules and the Table of Frequency Allocations.

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[29] *See id.* at § 2.106; *see also* 47 C.F.R. §25.136(d) (limiting the 47.2-48.2 GHz band to individually licensed earth stations).
[30] *See* 47 C.F.R. § 25.136(d).
[31] *Boeing Order* at ¶ 41.
[32] *See, e.g.*, 47 C.F.R. § 2.106, US156 (providing an unwanted emissions power limit in the 50.2-50.4 GHz band for earth stations in the FSS).
[33] *See* WorldVu Satellites Ltd., File No. SAT-LOI-20170301-00031, Call Sign S2994 (granted Aug. 25, 2021) ("*OneWeb V-band Grant*") (conditioning grant on compliance the WRC-19 unwanted emissions limit in the 50.2-50.4 GHz band, which are equal to or more stringent than the limit imposed by 47 C.F.R. § 2.106, US156).
[34] *See* 47 C.F.R. § 2.106; *see* Use of Spectrum Bands Above 24 GHz For Mobile Radio Services, *Fifth Report and Order*, 34 FCC Rcd 2556, ¶¶ 10-12 (2019) ("*Spectrum Frontiers Fifth Report and Order*").

27.0-27.5 GHz: SN Space Systems seeks to use the 27.0-27.5 GHz band for gateway uplinks outside the United States only. SN Space Systems does not seek authority from the Commission to operate this band in the United States and includes this band in the description of operations consistent with the Commission's rules and precedent.[35] SN Space Systems will operate in this band consistent with international allocations and applicable regulatory provisions.

27.5-28.35 GHz: In the 27.5-28.35 GHz band, FSS uplink (earth station transmit) operations are secondary to the Upper Microwave Flexible Use Service, except for FSS earth stations authorized pursuant to Section 25.136 of the Commission's rules.[36] SN Space Systems recognizes the limitations on earth station operations in this band imposed by Section 25.136 of the Commission's rules. SN Space Systems will comply with international EPFD limits designed to protect GSO FSS operations in the 27.5-28.35 GHz band set forth in Article 22 of the ITU-RR.[37]

28.35-29.1 GHz: In the 28.35-29.1 GHz band, FSS uplink (earth station transmit) operations are primary, but GSO operations are secondary to NGSO operations in the band.[38] SN Space Systems' operations in this band will be in accordance with the Commission's rules.

29.1 - 29.5 GHz: The 29.1 - 29.25 GHz band is allocated for fixed services (local multipoint distribution service) and NGSO MSS feeder uplink (earth station transmit)

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[35] *See* 47 C.F.R. § 25.114(d)(1) (general description of overall system); *see also* Telesat Int'l Ltd., File No. SAT-PPL-20160225-00020 (rel. Aug. 31, 2016) (granting the petition for market access which notes that Telesat will operate in the 27.1-27.6 GHz band outside the U.S. only and is not requesting authority to operate in the United States).

[36] 47 C.F.R. § 25.202(a)(i); *see also id.* at § 25.136.

[37] *See* 47 C.F.R. § 25.146(a)(2); *see also* Technical Annex.

[38] *See* 47 C.F.R. § 2.106. FSS stations must avoid causing interference to or claiming protection from certain fixed service call signs. *Id.* at NG62; *see also id.* at NG165.

operations.[39] Under the FCC's Ka-band plan, the 29.25-29.5 GHz band is allocated to GSO FSS and NGSO MSS feeder uplinks.[40] SN Space Systems recognizes that use of this spectrum requires coordination with incumbent operators and will coordinate its proposed operations consistent with the Commission's rules and policies.

29.5-30.0 GHz: The 29.5-30.0 GHz band is allocated for non-Federal FSS uplink (earth station transmit) operations and mobile services on a coprimary basis.[41] The 29.5-30.0 GHz band is designated for GSO FSS operations on a primary basis and for NGSO FSS operations on a secondary basis.[42] The Constellation will be compatible with GSO FSS operations in the band through compliance with applicable EPFD levels. Thus, it will avoid causing harmful interference into, and will accept any interference received from, primary operations.

13.75-14.0 GHz: The 13.75-14.0 GHz band is allocated for FSS uplink (earth station transmit) operations on a primary basis, as well as other uses including Federal radiolocation and space research. SN Space Systems seeks to use the 13.75-14.0 GHz band for gateway uplinks in addition to TT&C uplinks.[43]

The 13.75-13.8 GHz band is used by NASA for the TDRSS operations and SN Space Systems will coordinate with applicable government entities to ensure no interference to this service will occur.[44] SN Space Systems will use spread-spectrum gateway carriers with very low

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[39] 47 C.F.R. § 2.106, NG166; *see Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters*, Report and Order and Further Notice of Proposed Rulemaking, 32 FCC Rcd 7809, Appendix B (2017) ("*NGSO FSS Order*"). Internationally, the 29.1-29.25 GHz band is allocated to FSS (Earth-to-space) on a co-primary basis with other services in all three ITU regions.
[40] 47 C.F.R. § 2.106, NG535A.
[41] *Id.*
[42] *NGSO FSS Order*, at ¶ 9.
[43] The 13.8-14.0 GHz band is subject to a prior processing round. *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).
[44] *See* 47 C.F.R. § 2.106, US337 ("In the band 13.75-13.8 GHz, the FCC shall coordinate earth stations in the fixed-satellite service with NTIA on a case-by-case basis in order to minimize harmful interference to the Tracking and Data Relay Satellite System's forward space-to-space link (TDRSS forward link-to-LEO)").

power spectral density – well under the noise floor of other operators in the 13.75-13.8 GHz band – which will substantially mitigate any opportunity for interference in the TDRSS operations.

The U.S. Government radiolocation service (*i.e.*, radars) in the 13.75-14.0 GHz is a potential source of interference into Constellation gateway uplinks in the band. SN Space Systems will carefully manage its gateway uplink sites to appropriately mitigate interference by avoiding Naval radars in close proximity to the coastline and utilizing sufficiently large gateway antennas, among other techniques to mitigate sources of interference. In addition, SN Space Systems will not claim protection for its satellites from radiolocation transmitting stations operating in this band in accordance with the U.S. Table of Frequency Allocations.[45]

19.4-19.6 GHz: The 19.4-19.6 GHz band is allocated to fixed services and NGSO MSS feeder downlink (earth station receive) operations in the United States. SN Space Systems proposes to operate MSS feeder links in this band consistent with Commission precedent.[46] SN Space Systems will coordinate with authorized operators in this band, including Iridium, consistent with the Commission's rules and policies. SN Space Systems will also comply with applicable PFD and EPFD limits in this band, as appropriate. SN Space Systems will also conduct TT&C operations in this band and has requested an appropriate waiver to facilitate such operations, as discussed below.

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[45] *See* 47 C.F.R. § 2.106, n. US356.

[46] *See Kuiper Order* at ¶ 21; *see* 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, ¶¶ 19-23 (granting market access in the 19.3-19.7 GHz band for MSS feeder links and the 19.7-20.2 GHz and 29.5-30.0 GHz bands for both MSS and FSS) (2018) ("*O3b Order*").

2. User Link Operations

SN Space Systems also seeks to operate customer terminals in the 14.0-14.5 GHz for user uplink (earth station transmit) operations, and in the 17.7-18.6 GHz, 18.8-19.4 GHz, 19.6-20.2 GHz bands for user downlink (earth station receive) operations.[47] These operations will comply with the Commission's rules and Table of Frequency Allocations, including Section 25.228 governing ESIM operations.[48] SN Space Systems will also coordinate with co-frequency Federal operations, and will inform the Commission when this coordination has been completed.[49]

17.7-17.8 GHz: The 17.7-17.8 GHz band is allocated to fixed services and FSS uplink transmissions for broadcasting satellite service ("BSS") feeder links. Internationally, this band is allocated globally for FSS downlinks, as well as fixed, mobile, and FSS uplink transmissions. SN Space Systems plans to use this band only outside the United States and will not cause harmful interference to authorized services within the United States.

17.8-18.3 and 18.3-18.6 GHz: The 17.8-18.3 GHz band is allocated to the fixed service on a primary basis and FSS downlink (earth station receive) operations on a secondary basis. The 18.3-18.6 GHz band is allocated to FSS downlinks on a primary basis, with NGSO FSS designated as secondary GSO FSS. SN Space Systems' proposed customer terminal operations in the United States will avoid harmful interference to, and accept any interference received from, primary operations in the band. SN Space Systems will comply with Section 25.208 and international EPFD limits designed to protect GSO networks.

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[47] As discussed below, the 19.3-19.4 GHz and 19.6-19.7 GHz bands will be used with ESIMs only consistent with Commission rules.
[48] 47 C.F.R. § 25.228.
[49] *See* 47 C.F.R. § 2.106, US334 (requiring coordination with U.S. government satellite networks and earth stations between 17.7-20.2 GHz).

19.3-19.4 and 19.6-19.7 GHz: The 19.3-19.7 GHz is limited to MSS feeder downlink (earth station receive) operations and downlink communications with ESIMs.[50] The Constellation will only communicate with ESIMs in the 19.3-19.4 GHz and 19.6-19.7 GHz bands. SN Space Systems will not claim protection from transmissions of non-Federal stations in the fixed service and its NGSO system will not cause unacceptable interference to, or claim protection from, GSO networks. SN Space Systems recognizes that use of this spectrum requires coordination with incumbent operators and SN Space Systems will coordinate its proposed operations consistent with the Commission's rules and policies.

18.8-19.3 GHz: NGSO FSS downlink (earth station receive) operations are allocated on a primary basis in the 18.8-19.3 GHz band.[51] SN Space Systems will comply with applicable regulatory requirements and, as demonstrated in the attached Technical Annex, Constellation operations in the band would be compatible with co-frequency NGSO operations.[52]

19.7-20.2 GHz: The 19.7-20.2 GHz band is designated for GSO FSS downlink (earth station receive) operations on a primary basis in the United States. NGSO FSS operations are allowed in the 19.7-20.2 GHz band on a secondary basis, subject to certain power limits.[53] SN Space Systems demonstrates in the Technical Annex that it will comply with international EPFD limits designed to protect GSO networks in the 19.7-20.2 GHz band and set forth in Article 22 of the ITU Radio Regulations.[54] Additionally, the Constellation will not cause harmful interference to and is willing to accept interference from GSO FSS operators in this frequency band. SN

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[50] 47 C.F.R. § 2.106, NG527A.
[51] *Id.* at § 2.106.
[52] Technical Annex at § 7.
[53] 47 C.F.R. § 2.106; *NGSO FSS Order*, ¶ 35 (adopting ITU EPFD limits in the 19.7-20.2 GHz band to provide greater certainty regarding compatibility between NGSO FSS and GSO FSS operations).
[54] Technical Annex at §3.1; *see* 47 CFR § 25.146(c).

Space Systems will also coordinate with U.S. government satellite networks in portions of the Ka-band spectrum, as required.[55]

14.0-14.5 GHz: The 14.0-14.5 GHz band[56] is allocated to FSS uplink (earth station transmit) operations on a primary basis and MSS uplinks on a secondary basis.[57] SN Space Systems will conduct both FSS operations (with fixed, toroidal-antenna terminals) and MSS operations (with steerable-antenna mobility terminals) in this band. SN Space Systems will comply with Commission rules applicable to both FSS and MSS operations, including Section 25.228 governing ESIM operations. With respect to the latter operations, SN Space Systems will coordinate with NASA concerning the protection of the designated TDRSS ground stations in the 14.0-14.2 GHz band and with the National Science Foundation to ensure protection of radio astronomy services in the 14.47-14.5 GHz band.[58]

3. TT&C Operations

SN Space Systems proposes to perform TT&C operations in the 13.75-14.0 GHz and 19.2-19.6 GHz bands.[59] TT&C U.S. operations are conducted at the edge of or within their assigned bands, unless the transmissions cause no greater interference and require no greater protection from harmful interference than the communications traffic on the satellite network.[60] SN Space Systems will use spread-spectrum TT&C carriers throughout the band with very low

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[55] 47 CFR § 2.106, US334.
[56] The 14.0-14.5 GHz band is subject to a prior processing round. *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)
[57] 47 C.F.R. § 2.106.
[58] *Id.* at US133, US342; 47 CFR § 25.228.
[59] SN Space Systems is requesting use of the 19.2-19.6 GHz band to enhance operational flexibility of its spread-spectrum TT&C downlinks.
[60] *See* 47 C.F.R. § 25.202(g)(1).

power spectral density for its TT&C operations, and can ensure co-frequency operators will not experience harmful interference and will likewise be resistant to interference.

The Commission has noted that TT&C "functions will normally be provided within the service in which the space station is operating."[61] Each of the TT&C bands SN Space Systems has requested are included in bands in which the Constellation will also operate gateway and/or feeder links. Even if the requested gateway and feeder links are not permitted in the bands requested for TT&C, however, such TT&C bands are immediately adjacent to bands used by the Constellation for its services and the Commission has previously permitted TT&C operations in analogous circumstances.[62]

13.75-14.0 GHz: The 13.75-14.0 GHz band is allocated for FSS uplink (earth station transmit) operations on a primary basis, as well as other uses including Federal radiolocation and space research. As noted above, SN Space Systems seeks to use the 13.75-14.0 GHz band for TT&C uplinks.[63]

In addition, under footnotes to both the U.S. and international frequency allocation tables, NGSO FSS earth stations operating in the 13.75-14.0 GHz band must have a minimum diameter of 4.5 meters and the EIRP of any emission should be at least 68 dBW and should not exceed 85 dBW.[64] The antennas SN Space Systems proposes to use for its spread-spectrum TT&C operations are all at least 4.5 meters in diameter and will comply with the relevant EIRP limits.

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[61] *See id.* (citing ITU-RR S1.21, 1.23; and 47 C.F.R. § 2.1 (defining "space operations" as a radiocommunication service concerned exclusively with the operation of spacecraft, in particular space tracking, space telemetry, and space telecommand).

[62] *See, e.g.*, File No. SAT-LOA-20161115-00118; SAT-LOA-20170726-00110 (rel. Mar. 29, 2018) (granting waiver of Section 25.202(g)(1) noting that for uplink, the TT&C signals are in a band adjacent to an assigned service band and will only transmit from a limited number of sites).

[63] The 13.8-14.0 GHz band is subject to a prior processing round. *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).

[64] *See* 47 C.F.R. § 2.106, 5.502 and US356.

The 13.75-13.8 GHz band is used by NASA for the TDRSS operations and SN Space Systems will coordinate with applicable government entities to ensure no interference to this service will occur.[65] SN Space Systems will use spread-spectrum TT&C carriers with very low power spectral density – well under the noise floor of other operators in the 13.75-13.8 GHz band – which will substantially mitigate any opportunity for interference in the TDRSS operations.

The U.S. Government radiolocation service (*i.e.*, radars) in the 13.75-14.0 GHz is a potential source of interference into Constellation TT&C uplinks in the band. SN Space Systems will carefully manage its TT&C uplink sites (up to eight TT&C sites in the United States) and positioning of the TT&C uplink beams to appropriately mitigate interference by avoiding Naval radars in close proximity to the coastline and utilizing sufficiently large gateway antennas, among other techniques to mitigate sources of interference. In addition, SN Space Systems will not claim protection for its satellites from radiolocation transmitting stations operating in this band in accordance with the U.S. Table of Frequency Allocations.[66] SN Space Systems also understands that earth stations operating in the band would need to comply with appropriate PFD limits to avoid interfering with U.S. Government radiolocation services at the shoreline. Earth station siting will take that limitation into account, as appropriate.

19.2-19.3 GHz: NGSO FSS downlink (earth station receive) operations are allocated on a primary basis in the 19.2-19.3 GHz band.[67] The Commission has noted that TT&C "functions will

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[65] *See* 47 C.F.R. § 2.106, US337 ("In the band 13.75-13.8 GHz, the FCC shall coordinate earth stations in the fixed-satellite service with NTIA on a case-by-case basis in order to minimize harmful interference to the Tracking and Data Relay Satellite System's forward space-to-space link (TDRSS forward link-to-LEO)").
[66] *See* 47 C.F.R. § 2.106, n. US356.
[67] *Id.* at § 2.106.

normally be provided within the service in which the space station is operating."[68] SN Space Systems plans to operate user downlinks in this band and therefore will comply with applicable regulatory requirements and, as demonstrated in the attached Technical Annex, Constellation operations in the band would be compatible with co-frequency NGSO operations.[69]

19.3-19.6 GHz: The 19.3-19.4 GHz band is allocated for MSS feeder downlink (earth station receive) operations and downlink communications with ESIMs,[70] while the 19.4-19.6 GHz band is allocated only to NGSO MSS feeder downlink (earth station receive) operations in the United States. SN Space Systems plans to operate consistent with these allocations and also seeks to operate TT&C links in the bands. SN Space Systems will not claim protection from transmissions of non-Federal stations in the fixed service and its NGSO system will not cause unacceptable interference to, or claim protection from, GSO networks. SN Space Systems recognizes that use of this spectrum requires coordination with incumbent operators and SN Space Systems will coordinate its proposed operations consistent with the Commission's rules and policies.

C. National Security, Law Enforcement, Foreign Policy, and Trade Issues

The Commission has stated that the issues of national security, law enforcement, foreign policy, and trade will be considered in evaluating requests for market access but are likely to arise only in "rare circumstances."[71] Further, Commission policy is to defer to the expertise of the Executive Branch in identifying and interpreting issues of this nature.[72] SN Space Systems' request for authority to serve the U.S. market raises no such issues.

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[68] *See* 47 C.F.R. § 25.202(g)(1).
[69] Technical Annex at §7.
[70] 47 C.F.R. § 2.106, NG527A.
[71] *See DISCO II Order*, ¶ 180.
[72] *Id.*

SN Space Systems will employ network security, data protection, and law enforcement assistance capabilities, policies, and procedures consistent with applicable law. In addition, the Constellation will be authorized by the United Kingdom and operate under a UK satellite network filing at the ITU. It is entitled to a presumption in favor of entry pursuant to U.S. WTO obligations. Thus, the national security, law enforcement, foreign policy, and trade element of the Commission's public interest analysis is satisfied.

D. Eligibility and Operational Requirements

Under Section 25.137, applicants seeking U.S. market access for non-U.S. licensed satellite systems must provide the same information concerning legal and technical qualifications as is required of applicants for space station licenses issued by the Commission.[73] The information set forth in this Petition, the supporting Technical Annex, Schedule S, and the accompanying FCC Form 312 demonstrates compliance with these requirements.

In addition, the Commission has recognized that non-U.S. licensed space stations can satisfy the Commission's orbital debris rules "by demonstrating that debris mitigation plans for the space station(s) for which U.S. market access is requested are subject to direct and effective regulatory oversight by the national licensing authority."[74] SN Space Systems' is seeking an orbital operator licence through the U.K. Civil Aviation Authority, which has direct and effective regulatory oversight over the Constellation regarding orbital debris considerations. Accordingly, Section 25.114(d)(14)(v) is fully satisfied. In addition, SN Space Systems has provided substantial orbital debris mitigation information herewith, will provide additional information to

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[73] *See* 47 C.F.R. 25.137; *see also* Amendment of the Commission's Space Station Licensing Rules and Policies, 18 FCC Rcd 10760, ¶ 288 (2003).

[74] 47 C.F.R. § 25.114(d)(14)(v); *see* File No. SAT-LOI-20160428-00041 (granted June 23, 2017) (granting U.S. market access to a UK-licensed satellite system and noting that "Satellite operations must be subject to direct and effective regulation by the United Kingdom concerning orbital debris mitigation").

the extent requested by the Commission, and intends to supplement the information provided with this Petition to reflect updates regarding its satellite design and licensing conditions.[75]

IV. WAIVER REQUESTS

The Commission may waive its rules for "good cause" shown.[76] In general, waiver is appropriate if (i) special circumstances warrant a deviation from the general rule; and (ii) such deviation would better serve the public interest than would strict adherence to the rule.[77] As discussed below, special circumstances justify grant of the requested waivers and grant will not undermine the policy objectives of the rules and will otherwise be consistent with the public interest to permit SN Space Systems to operate the Constellation.

A. Section 25.156(d)(4), Separate Processing of Feeder Link Applications

SN Space Systems respectfully requests a waiver of Section 25.156(d)(4) of the Commission's rules with respect to processing its request for access to feeder link spectrum.[78] Section 25.156(d)(4) states, in pertinent part, that "applications . . . [for feeder-link] authority will be treated like an application separate from its associated service band" and each feeder-link request "will be considered pursuant to the procedure for applications for GSO-like operations or NGSO-like operation, as applicable."[79]

Separate consideration is unnecessary for SN Space Systems' proposed MSS feeder link operations. The use of these frequencies will not unreasonably preclude use by other operators because the Constellation is designed to mitigate inline interference events and enable co-

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[75] *See* 47 C.F.R. § 1.65.
[76] *See* 47 C.F.R. § 1.3; *Northeast Cellular Tel. Co. v. FCC*, 897 F.2d 1164 (D.C. Cir. 1990); *WAIT Radio v. FCC*, 418 F.2d 1153 (D.C. Cir. 1969).
[77] *See Northeast Cellular*, 897 F.2d at 1166; *see also WAIT Radio*, 418 F.2d at 1157.
[78] *See* 47 C.F.R. § 25.156(d)(4).
[79] *Id.*

existence with other users of its band. Moreover, the V-band processing round did not preclude applicants from proposing the use of these bands for feeder links operations.[80] In addition, separate consideration for these frequencies would cause unnecessary delay to deployment of SN Space Systems' proposed operations contrary to the public interest. The Commission has granted similar requests by other NGSO operators,[81] and good cause similarly exists here to grant the requested waiver.

B. Section 25.202(g)(1), TT&C Operations.

Section 25.202(g)(1) anticipates that satellite systems will conduct telemetry, tracking and command ("TT&C") operations using spectrum at the edge of or within their assigned bands, unless the transmissions cause no greater interference and require no greater protection from harmful interference than the communications traffic on the satellite network.[82] SN Space Systems proposes to conduct spread-spectrum, very low power spectral density TT&C uplinks in the 13.75-14.0 GHz band and TT&C downlinks in the 19.2-19.6 GHz band that operate well below the noise floor of other operations in the bands.[83]

Because SN Space Systems will operate spread-spectrum TT&C carriers, there will be no potential for harmful interference to co-frequency operations in these bands. Furthermore, the

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[80] *See Cutoff Established for Additional NGSO-Like Satellite Systems in the 37.5-40.0, 40.0-42.0 GHz, 47.2-50.2 GHz, and 50.4-51.4 GHz*, DA 21-941 (Aug. 4, 2021) ("*V-band Processing Round Notice*"); *see Kuiper Order* at ¶ 55 (granting a waiver of Section 25.156(d)(4) and noting that the processing round did not preclude use of the bands for feeder links).

[81] *See Kuiper Order* at ¶ 55 ("the more efficient and effective approach in this instance is to impose conditions on Kuiper's operation, requiring coordination with existing operators that have MSS feeder links in the bands requested by Kuiper to ensure protection of such systems"); *see also* Audacy Corporation Application for Authority to Launch and Operate a Non-Geostationary Medium Earth Orbit Satellite System in the Fixed- and Inter-Satellite Services, Order and Authorization, 33 FCC Rcd 5554, ¶ 34 (2018) ("Audacy Order"), ¶¶ 26-27 ("We find that the public interest would not be served by delaying action on Audacy's request and by opening a separate, further processing round for these frequency bands and that a waiver of Section 25.156(d)(4) is justified.").

[82] *See* 47 C.F.R. § 25.202(g)(1).

[83] Such TT&C operations are in addition to other proposed operations that are consistent with the allocations in these bands.

TT&C carriers will require no more protection than communications traffic in the same band. SN Space Systems requests a waiver to the extent necessary to permit its proposed TT&C operations.

SN Space Systems will provide TT&C from a limited number of locations in the United States and will coordinate its operations in these bands with other spectrum users, which will further minimize any potential impact of the proposed operations. Accordingly, there is good cause to grant the requested waiver if necessary to permit TT&C operations in these bands.

C. Section 25.114(c), Schedule S

SN Space Systems requests, to the extent necessary, limited waiver of Section 25.114(c) of the FCC's rules, which requires submission of certain technical information using Schedule S.[84] Due to limitations in the required Schedule S software, SN Space Systems is unable to convey information regarding each individual satellite contemplated in its system via Schedule S as this would require an excessive amount of data for input and subsequent processing by the Commission. SN Space Systems has included the information for a single representative active satellite and a single representative in-orbit spare satellite in the Schedule S. Each active satellite in the Constellation and each in-orbit spare is technically identical with the exception of right ascension of the ascending node ("RAAN") and mean anomaly. SN Space Systems has included additional details regarding all active satellites and all spare satellites in the Constellation in a file uploaded with the Schedule S. To the extent necessary, SN Space Systems requests a limited waiver of the Schedule S requirements to accommodate SN Space System's approach to providing the satellite data.

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[84] *See* 47 C.F.R. § 25.114(c).

There is good cause for such waiver as: (i) any departure from the Instructions is due to limitations imposed by the structure of Schedule S and/or the Commission's online interface; (ii) the Commission and other interested parties have full access to accurate information with respect to the proposed Constellation. SN Space Systems has provided all relevant information and representative date in the attachments to the Petition, to the extent possible, Schedule S that will allow the Commission to conduct an accurate technical assessment of the Constellation. Accordingly, grant of limited waiver is appropriate, consistent with FCC precedent,[85] and would serve the public interest.

D. Section 25.112 Substantially Complete Application

The Commission's rules provide that an application may be considered "unacceptable for filing" for a variety of reasons, including incomplete answers, responses to Commission requests for information that do not comply with Commission rules, and "other matters of a formal character."[86] SN Space Systems has made every effort to submit information that is complete and believes that the Petition is substantially complete.

Although certain details of the satellite design are not yet known with certainty, SN Space Systems believes the Petition is "substantially complete" under the Commission's standards. Accordingly, omission of some specific detail at this time does not detract from the ability of the Commission or other interested parties to evaluate the proposal on the merits. SN Space Systems

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[85] *See, e.g.*, *See* Kepler Communications Inc., File No. SAT-PDR-20161115-00114 (granted Nov. 19, 2018) ("*Kepler Order*"); *Kuiper Order* at ¶ 56; *O3b Order* at ¶ 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).
[86] 47 C.F.R. § 25.112(a).

will update the Commission with additional information regarding the satellite design, UK licensing status, and any other relevant matters as required by the Commission's rules.[87]

Considering the foregoing, there is good cause for the requested waiver of Section 25.112 if necessary to accept and consider this Petition. Such a waiver would conserve limited Commission resources by allowing SN Space Systems to submit limited, supplemental additional information to the Petition as it becomes available, and otherwise ensures appropriate consideration of the Petition in the V-band processing round.

V. CONCLUSION

For all of the reasons set forth in this Petition and in the supporting materials, grant of SN Space Systems' request for U.S. market access would serve the public interest, convenience, and necessity. SN Space Systems requests that the Commission take such procedural actions as may be necessary to consider and grant this Petition, including initiating a new NGSO processing round for the Ku-band and Ka-band spectrum requested herein, at the earliest practicable time.

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[87] *See* 47 C.F.R. § 1.65 (requiring an applicant to submit a statement furnishing such additional information in a proceeding where there has been a substantial change as to any matter which may be of decisional significance).

ATTACHMENT A – OWNERSHIP EXHIBIT

SN Space Systems Limited is a company limited by shares with a registered address at 12 Mount Havelock, Douglas, Isle of Man IM12QG. It is an indirect, wholly owned subsidiary of SpinLaunch, Inc.

The names, addresses, and citizenship of stockholders of record directly and indirectly owning and/or voting 10 percent or more of SN Space Systems Ltd. stock are:

Name:	Address:	Citizenship:	Percentage Of Voting Stock:
KPCB Holdings, Inc., as nominee	2750 Sand Hill Road Menlo Park, Ca 94025	USA	17.6%
Jonathan Yaney	4350 E Conant St. Long Beach, CA 90808	USA	13.3%
GV 2017, L.P.	1600 Amphitheatre Parkway Mountain View, CA 94043	USA	12.7%
Airbus Group Ventures Fund II, L.P	3000 Sand Hill Road Building 1 Suite 120 Menlo Park, CA 94025	USA	11.6%

KPCB Holdings, Inc., as nominee: KPCB Holdings, Inc. ("Kleiner Perkins") is a U.S. venture capital firm incorporated in California in 1999 and headquartered in Menlo Park, California. Kleiner Perkins is one of the largest and most established venture capital firms in Silicon Valley, specializing in investing in early stage and growth companies.

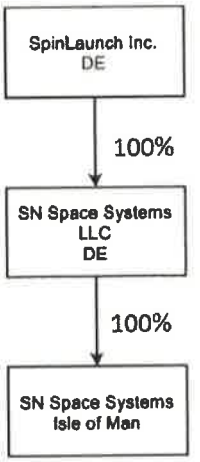
Jonathan Yaney: Jonathan Yaney, is a U.S. citizen, CEO, and sole director of SN Space Systems Limited. Mr. Yaney is a serial entrepreneur with 15 years of experience founding companies in the information technology, construction, consulting, and aerospace industries, including SpinLaunch and SN Space Systems.

GV 2017, L.P.: GV 2017, L.P. ("Google Ventures") is a U.S. venture capital firm incorporated in the state of Delaware and headquartered in Mountain View, California and is indirectly wholly-owned by Alphabet, Inc., a publicly-traded U.S. company. Google Ventures

seeks out companies that transform industries and invests across many industries, with a focus on enterprise, life sciences, consumer, and frontier technology.

Airbus Group Ventures Fund II, L.P. Airbus Group Ventures Fund II, L.P. ("Airbus Ventures") is the U.S. venture capital arm of Airbus, incorporated in Delaware and headquartered in Menlo Park, California. Airbus Ventures is an early-stage venture capital company that independently funds and supports start-ups transforming the aerospace industry.

The figure below depicts the ownership structure of SN Space Systems Ltd.:



The following individual serves as the officer and director of SN Space Systems Ltd. and can be contacted through the registered address of SN Space Systems at 12 Mount Havelock, Douglas, Isle of Man IM12QG.

Name:	Title:	Citizenship:
Jonathan Yaney	Chief Executive Officer/ Director	USA

The following individuals serve as officers and directors of SpinLaunch, Inc. and can be contacted through the registered address of SpinLaunch at 4350 E Conant St. Long Beach, CA 90808:

Name:	Title	Citizenship:
Jonathan Yaney	Chief Executive Officer / Director	USA
Wen Hsieh	Director	USA
Asher Delug	Director	USA
Andy Wheeler	Director	USA
John Wanamaker	Director	USA