

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

In the Matter of

Application of RBC Signals LLC for a	)	
180-Day Special Temporary Authorization	)	Call Sign:
to Operate an Earth Station to Provide	)	
Tracking, Telemetry & Command for a	)	File No.: SES-STA-_____
Foreign-Licensed Satellite	)	

REQUEST FOR SPECIAL TEMPORARY AUTHORITY

RBC Signals LLC (“RBC Signals”), pursuant to Section 25.120 of the Commission’s rules,¹ respectfully seeks a 180-day special temporary authorization (“STA”) to operate a previously authorized yagi antenna (the “400 MHz Yagi”) at its existing earth station site in Windham, New York to perform tracking, telemetry and command (“TT&C”) for a foreign-licensed, non-geostationary satellite (“NGSO”) cubesat operated by Aurora Propulsion Technologies, Ltd. (“AuroraPT”). RBC Signals seeks to perform TT&C operations in the 401.0375-401.0625 (space-to-Earth) and 401.0875-401.1125 MHz (Earth-to-space) bands to provide launch and operational support for the Aurorasat-1 cubesat, which will demonstrate AuroraPT’s novel plasma brake technology, a propellant-less microtether deorbiting system.

RBC Signals was previously granted authority for the identical operations in the *Aurorasat 2021 STA*.² Due to unforeseen launch delays, the satellite was not launched during *Aurorasat 2021 STA*’s validity period. Since early 2021, there have been numerous launch postponements for

¹ 47 C.F.R. § 25.120.

² See Grant for Special Temporary Authority, RBC Signals, LLC, File No. SES-STA20200724-00799 (“*Aurorasat 2021 STA*”).

various reasons, including due to government lockdowns in New Zealand and the procurement of a new launch partner by AuroraPT, that have made the Aurorasat-1 launch unpredictable and difficult to forecast. RBC Signals was recently informed of the Aurorasat-1 cubesat's confirmed launch date and is filing this 180-day STA application, along with a companion 30-day STA, to support the satellite's TT&C operations.³

The expected launch for the Aurorasat-1 satellite is April 18, 2022. Given the imminent launch, RBC is filing this 180-day STA request concurrently with the 30-day STA to give the Commission appropriate time to place this application on public notice after launch and initial mission period for Aurorasat-1 is covered. Grant of this 180-day STA will serve the public interest by enabling U.S.-based RBC signals to support the mission of the Aurorasat-1 and help validate key features of the microtether product line to benefit the government, non-profit and commercial satellite operations.

I. BACKGROUND

RBC Signals seeks to provide TT&C support for the AuroraPT spacecraft using a currently installed 400 MHz Yagi (the M2 Antenna Systems Model 400CP30A). RBC Signals has operated at the site in the 401-402 MHz band with no reported cases of interference, and this request will not increase the potential for interference given its temporary, intermittent use and low transmit

³ See RBC Signals Application for 30-Day Special Temporary Authority for identical operations. The mission life of the spacecraft, approximately two years from launch (including deorbiting), does not warrant a traditional, long-term commercial earth station license authority for proposed operations. That said, RBC Signals intends to file a separate license application for the Windham earth station and add the satellite as an authorized point of communication to facilitate appropriate Commission authority for the life of this mission.

power. In fact, the 400 MHz Yagi will transmit at significantly lower power levels than those previously authorized under the *Windham STA* (see draft FCC Form 312 Schedule B).⁴

The Aurorasat-1 spacecraft will be operated by AuroraPT, a Finnish company developing and commercializing its water propulsion and propellant-less deorbiting technology.⁵ With the support of RBC Signals, AuroraPT seeks to demonstrate how its deorbiting technology can be utilized to accelerate and improve the efficiency of satellite re-entry. Towards this end, the Aurorasat-1 spacecraft will allow AuroraPT to test components, software design, and operational concepts of its microtether technology. AuroraPT's plasma brake module will benefit scientists, research institutes, and commercial companies that need to move satellites with a maximum mass of 1,000 kilograms out of orbits as high as 1,000 kilometers.

As described in more detail in the Technical Description, the AuroraSat-1 is a single cubesat with two payloads: (1) a propulsive attitude control system with water propellant; and (2) the plasma brake, which is a propellant-less deorbiting system. The first phase of the mission (6-12 months) will be used to perform attitude control experiments, after which the plasma brake microtethers will be deployed. The second phase of the mission (12-24 months) includes the deployment of the plasma brake microtethers and demonstration of the satellite deorbiting system.⁶

⁴ See e.g., RBC Signals, File Nos. SES-STA-20170719-01878 & File No. SES-STA-20180612-01105 (*“Windham STA”*) (STA to provide TT&C support in the 401-402 MHz band).

⁵ AuroraPT has prepared the necessary ITU-related information (satellite system filings and cost-recovery documentation) in connection with this application. Moreover, the Aurorasat-1 spacecraft has been registered with Finland, a WTO-member country (TrafiCom – the Finnish Transport and Communications Agency –has submitted ITU filings on behalf of Aurorasat-1).

⁶ If the plasma microtethers do not deploy, the Aurorasat-1 cubesat should still passively deorbit within 2.125 years under nominal condition and a maximum of 4.57 years if the solar arrays never deploy from the nominal orbital altitude of 550 km circular SSO.

RBC Signals' TT&C operations will be conducted on an unprotected and non-interference basis intermittently when the satellites pass over the earth station. In addition, RBC Signals will conduct these operations in accordance with the Commission's rules and interagency requirements governing fixed earth station operations in the 401-402 MHz band. RBC Signals provides the attached Technical Appendix for detailed information on the satellite and earth station operations, including an orbital debris assessment report, antenna patterns and a draft FCC Form 312 Schedule B. As discussed below, grant of the requested STA will serve the public interest, convenience, and necessity.

II. DISCUSSION

RBC Signals seeks to operate the 400 MHz Yagis with the Aurorasat-1 cubesat in the 401.0375-401.0625 MHz (space-to-Earth) and 401.0875-401.1125 MHz (Earth-to-space) bands. Grant of this STA request is critical for the reliability of the Aurorasat-1 mission and will not increase the potential for interference since RBC Signals is currently operating at the site at much higher power levels with no reported cases of interference.

RBC Signals notes that it only seeks to support TT&C operations for the Aurorasat-1 spacecraft and that the satellite will not provide service to the U.S. market. As a result, RBC Signals is providing technical information associated with the proposed TT&C operations rather than the full market access demonstration contemplated by Sections 25.114 and 25.137 of the Commission's rules.⁷ Specifically, along with the earth station operational characteristics

⁷ See 47 C.F.R. §§ 25.114 and 25.137. *See also* SES Americom, Inc., File No. SES-MFS-20160624-00607, Call Sign E050287 (granting authority for an earth station to provide TT&C services to the foreign-licensed ASTRA 3A operating at 86.85° W.L.); Hawaii Pacific Teleport, L.P., File No. SES-MFS-20131030-00913, Call Sign E030115 (granting authority for an earth station to provide TT&C services to ASTRA 3A operating at 176.85° W.L.); SES Americom, Inc., File No. SES-STA-20161110-00884, Call Sign E050287 (granting authority for an earth station to provide TT&C services to ASTRA 3A during drift from 86.85° W.L. to 47.0° W.L.); Hawaii Pacific Teleport, L.P., File No. SES-STA-

described in FCC Form 312, Schedule B, RBC Signals provides detailed satellite information in the attached Technical Appendix, including an orbital debris assessment report, satellite antenna patterns, and a microtether safety report. RBC Signals will supplement this application if the Commission requires any additional information to fully evaluate the proposed TT&C operations.

A. Aurorasat-1 Satellite Overview

The Aurorasat-1 satellite conforms to the form factor of a 2U cubesat (200 mm x 100 mm x 100 mm in the stowed configuration and approximately 100 mm x 200 mm x 420 mm in the deployed configuration), with a total mass of approximately 1.8 kg. The Aurorasat-1 cubesat will be launched as a secondary payload aboard a SpaceX Falcon 9 launch vehicle from the Cape Canaveral Air Force Station in December 2020. The satellites will be launched into a nominal circular, sun-synchronous orbit at 550 km apogee and 550 km perigee with an inclination from the equator of 97.5°. An orbital lifetime calculation for this orbit estimates that the satellite will remain in orbit for approximately 4.57 years (under worst case conditions), well within the limits set by internationally accepted guidelines.⁸

B. TT&C Spectrum Use

The United States Table of Frequency Allocations (“Table of Allocations”), Section 2.106 of the Commission’s rules, 47 C.F.R. § 2.106, provides that the 401-402 MHz band is shared on a co-primary basis between meteorological aids (Earth-to-space) and space operations services (space-to-Earth). RBC Signals seeks to perform TT&C operations in the 401.0375-

20131030-00914, Call Sign E030115 (granting authority for an earth station to provide TT&C services to ASTRA 3A operating at 176.85° W.L).

⁸ See Orbital Debris Assessment Report (attached).

401.0625 MHz (space-to-Earth) and 401.0875-401.1125 MHz (Earth-to-space) bands consistent with the co-primary space operations allocation in this band.⁹

RBC Signals recognizes that there are certain U.S. government meteorological aids and earth exploration operation conducted in the 401-402 MHz band.¹⁰ Moreover, RBC Signals understands that although expanded Federal use of the 401-402 MHz band is anticipated, such plans do not commence until well after the end of the AuroraSat-1 mission. RBC Signals will work with Commission staff as needed to ensure that these temporary TT&C operations will not increase the potential interference to current or future government users, and will coordinate with NASA, GOES NOAA, and other U.S. government agencies as appropriate to ensure that the TT&C operations proposed herein are compatible with government operations and that the interests of the United States are fully accommodated.

The earth station site in Windham, New York currently supports TT&C operations (transmit and receive) in the 401-402 MHz band with no reported cases of interference, and RBC Signals' proposed TT&C operations under this STA will be conducted at considerably lower power levels than those authorized at the site. Thus, the proposed TT&C operations in this band will not present an increased interference risk to other authorized users.

C. Public Interest Consideration and Waiver Request

RBC Signals respectfully seeks this 180-day STA pursuant to Section 25.120 of the Commission's rules, 47 C.F.R. § 25.120. A 180-day STA is appropriate because it will give the Commission the opportunity to place this application on public notice in anticipation of RBC

⁹ See 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.").

¹⁰ See https://www.ntia.doc.gov/files/ntia/publications/compendium/0401.00-0402.00_01MAR14.pdf.

Signals' application for a long-term commercial earth station. This 180-day STA will allow RBC Signals to support mission operations after the Commission's review of the concurrently filed 30-day STA, and is filed in response to the delay of the launch date which was originally contemplated in the *Aurorasat 2021 STA*. Moreover, RBC Signals will be seeking long-term operations from the Deadhorse facility in a forthcoming commercial license application in an effort to regularize its operations and forego the need for additional STA requests.

AuroraPT realizes the critical importance of reliable TT&C support for mission optimization given the satellite's novel propulsion and deorbiting systems, and RBC Signals can provide tested and proved ground station support using its existing facility operating in the 401-402 MHz band at the Windham, New York facilities without increasing the potential for interference into other operations. Moreover, grant of this STA request is in the public interest because it will facilitate the safe operation of the Aurorasat-1 spacecraft by ensuring reliable TT&C functions in time for the launch of the satellite, and further assist AuroraPT in validating the commercial viability of the microtether technology to the benefit of all NGSO satellite operators.

In connection with the 180-day STA request and out of an abundance of caution due to the immediacy of launch, RBC Signals respectfully requests a waiver of Sections 25.114 and 25.137 of the Commission's rules.¹¹ In an effort to provide the Commission with a comprehensive overview of the satellite technical specifications, RBC Signals has provided relevant information related to the proposed TT&C operations, including a detailed satellite orbital debris report and safety assessment.

The Commission may grant a waiver for good cause shown, including a good cause waiver if special circumstances warrant a deviation from the general rule, and such a deviation will serve

¹¹ 47 C.F.R. §§ 25.114 and 25.137.

the public interest.¹² The Commission normally grants a waiver where the particular facts make strict compliance inconsistent with the public interest and takes into account considerations such as hardship, equity, or more effective implementation of overall policy on an individual basis.¹³ In this case, special circumstances warrant a waiver of Sections 25.114 and 25.137 of the Commission's rules given that RBC Signals was previously granted temporary authority for identical operations at the same location,¹⁴ and this request is driven solely by the Aurorasat-1 launch slip. Further, RBC Signals seeks to provide support to AuroraPT similar to the TT&C services that the Commission has previously permitted via temporary authority and there have been no instances of interference at the Windham site. This waiver request would serve the public interest and the purpose of the rules would not be undermined by grant of the requested waiver in the context of this STA.

III. CONCLUSION

Based on the foregoing, the public interest would be served by a grant of this 180-day STA request to allow RBC Signals to perform TT&C for the Aurorasat-1 spacecraft in the 401.0375-401.0625 MHz (space-to-Earth) and 401.0875-401.1125 MHz (Earth-to-space) from its existing earth station facility in Windham, New York. RBC Signals respectfully requests that the Commission consider and authorize the proposed TT&C operations (as appropriately conditioned) as soon as practicable.

¹² 47 C.F.R. §1.3.

¹³ *WAIT Radio v. FCC*, 418 F.2d 1153, 1159 (D.C. Cir. 1969); *See also N.E. Cellular Tel. Co. v. FCC*, 897 F.2d 1164, 1166 (D.C. Cir. 1990).

¹⁴ *See Aurorasat 2021 STA*.