

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

In the Matter of)	
)	
Application of RBC Signals LLC for a)	Call Sign:
60-Day Special Temporary Authorization)	File No.: SES-STA-
To Provide TT&C to U.S.-Licensed)	
Experimental Satellites)	

Expedited Consideration Requested

REQUEST FOR SPECIAL TEMPORARY AUTHORITY

RBC Signals LLC (“RBC Signals”), pursuant to Section 25.120(b)(3) of the Commission’s rules,¹ respectfully seeks a 60-day special temporary authorization (“STA”) to operate the currently authorized Yagi antennas (the “400 MHz Yagis”) at its existing earth station site in Fairbanks, Alaska, to provide telemetry, tracking, and command (“TT&C”) support for two U.S.-licensed, non-geostationary satellite orbit (“NGSO”) cubesats – the BRIO and THEA satellites – operated by SpaceQuest, Ltd. (“SpaceQuest”).² RBC Signals seeks to perform TT&C operations in the 400.50-400.65 MHz band (space-to-Earth) and 399.90-400.05 MHz (Earth-to-space), consistent with the SpaceQuest Licenses. Grant of this request will ensure the timely initiation of TT&C operations following the impending launch of SpaceQuest’s satellite and thus will serve the public interest.

I. DISCUSSION

RBC Signals seeks to support the SpaceQuest spacecraft using the 400 MHz Yagis (the M2 Antenna Systems Model 400CP30A) at its existing earth station facility in Fairbanks, Alaska.³ RBC Signals currently operates in various segments of the 400 MHz band in Alaska with no

¹ 47 C.F.R. § 25.120(b)(3). A 60-day STA is appropriate in this instance because RBC Signals intends to apply for regular, longer-term authority to provide TT&C support for the subject satellites.

² See SpaceQuest, Ltd., File No. 0176-EX-CN-2018, Call Sign WJ2XNV; see also SpaceQuest, Ltd., File No. 0220-EX-CN-2018, Call Sign WJ2XPE (collectively, the “SpaceQuest Licenses”).

³ See, e.g., RBC Signals, LLC, File No. SES-STA-20180719-01879 (180-day STA extension to provide TT&C support in the 401-402 MHz band).

reported cases of interference, and this request will not increase the potential for interference because the limited operations are similar to those previously authorized by the Commission.⁴

RBC Signals provides the attached draft FCC Form 312 Schedule B for information relating to the proposed earth station operations. In addition, RBC Signals incorporates by reference the technical information submitted by SpaceQuest in support of the experimental licenses granted by the Commission for the BRIO and THEA spacecraft.⁵ As discussed below, grant of the requested STA will serve the public interest, convenience, and necessity.

A. Satellites and TT&C Earth Stations

The BRIO and THEA satellites are 3U cubesats, each with a mass of approximately 5 kg. BRIO and THEA will be launched on November 19, 2018, on the SSO-A mission from Vandenberg Air Force Base in California.⁶ The satellites will operate in a circular, sun-synchronous orbit at 575 km with an inclination from the equator of 97.52°. The expected mission lifetime of the satellites is five years.⁷

The BRIO and THEA satellites are operated by SpaceQuest, which recently received experimental licenses for their operation.⁸ The primary mission of the BRIO satellite is to investigate, identify and resolve potential technical and implementation issues with SpaceQuest’s advanced software defined radio (“SDR”) satellite design. The primary mission of the THEA satellite is to test experimental payloads from U.S.-based Aurora Insight to validate the ability of its

⁴ See, e.g., RBC Signals, LLC, File No. SES-STA-20170731-00848 (authority to operate in the 399.926-399.950 MHz and 401.05-401.25 MHz bands); RBC Signals, LLC, File No. SES-STA-20171213-01333 (authority to operate in the 401.43-401.57 MHz, 449.93-450.07 MHz and 450.2-450.25 MHz bands); RBC Signals, LLC, File No. SES-STA-20180430-00416 (authority to operate in the 401.24-401.36 MHz band). This authority included NASA coordination conditions to avoid interference to ISS EVA operations.

⁵ See SpaceQuest Licenses.

⁶ See <http://spaceflight.com/ss0-a/>.

⁷ RBC Signals is working with the Commission staff to develop appropriate approaches to secure longer-term authority for TT&C operations during this mission period.

⁸ See SpaceQuest Licenses.

flight computer firmware to monitor, process, and generate relevant measurements using a novel wideband antenna.

The SpaceQuest Licenses indicate a grant of authority for a number of associated ground stations to communicate with the BRIO and THEA satellites. To date, however, only the Fairfax, Virginia ground station is operational. Given their polar orbits, this single location cannot provide sufficient TT&C support for the SpaceQuest satellites. For this reason, SpaceQuest seeks TT&C support from RBC Signals established earth station facilities in Alaska, which maximize communications with its polar-orbiting satellites.

RBC Signals seeks to provide reliable TT&C support for BRIO and THEA, which is important to maintain effective communications with and control of the satellites during orbit. It is especially important to be able to provide initial TT&C for early mission communications, operation optimization and other program-related issues. RBC Signals is well positioned to provide TT&C support using its existing earth stations at the Fairbanks, Alaska site.

RBC Signals' TT&C operations will be conducted on an unprotected and non-interference basis intermittently and as-needed approximately two or three times per day when the satellites pass over the earth station. RBC Signals will conduct these operations in accordance with the Commission's rules and interagency requirements governing fixed earth station operations in the subject bands. In addition, RBC Signals expressly acknowledges that any grant of this STA request is without prejudice to Commission action on other requests for authority to provide TT&C support for the SpaceQuest satellites.

B. TT&C Spectrum Use

RBC Signals seeks to operate the 400 MHz Yagis with the SpaceQuest satellites in the 399.90-400.05 MHz (Earth-to-space) and 400.50-400.65 MHz (space-to-Earth) bands to communicate with the BRIO and THEA satellites to provide TT&C support. RBC Signals

understands that there is limited U.S. government use of the 399.90-400.05 MHz band,⁹ but acknowledges that there is a pending FCC rulemaking addressing further use of this band.¹⁰ 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 399.90-400.05 MHz band is used on a primary basis by the federal and non-federal mobile-satellite service (“MSS”) and radionavigation-satellite service (“RNSS”). Thus, RBC Signals must conduct its limited TT&C uplink operations in the band on an unprotected, non-harmful-interference basis as a non-conforming use. RBC Signals’ prior operations in the band¹¹ without interference incident confirm near-term authority for the similar operations proposed herein can be granted.

The 400.50-400.65 MHz band is used, among other things, for federal and non-federal space operations.¹² RBC Signals is working with NASA to ensure compatibility of the proposed downlink transmissions, in particular, with the International Space Station operations. RBC Signals is unaware of any additional, near-term interference concerns with the proposed TT&C downlink operations. RBC Signals will continue to work with Commission staff to ensure that these temporary operations will not increase the potential interference to current or future government users; and will coordinate with NASA and other U.S. government agencies to ensure that the limited TT&C operations proposed herein are compatible with government operations, and that the interests of the United States are fully accommodated.

⁹ See Federal Government Spectrum Use Report, 225 MHz – 7.125 GHz at https://www.ntia.doc.gov/files/ntia/publications/compendium/0399.90-0400.05_01DEC15.pdf.

¹⁰ Use of the 399.9-400.05 MHz Band; and Allocation of Spectrum for Non-Federal Space Launch Operations, ET Docket No. 13-115, RM-11341; *see also* <https://www.fcc.gov/items-on-circulation>.

¹¹ See RBC Signals, LLC, File No. SES-STA-20170731-00848.

¹² See 47 C.F.R. § 2.1 (“space operations” are defined as “a radiocommunication service concerned exclusively with the operation of spacecraft, in particular space tracking, space telemetry, and space telecommand”); *See also* Federal Government Spectrum Use Report, 225 MHz – 7.125 GHz at https://www.ntia.doc.gov/files/ntia/publications/compendium/0400.15-0401.00_01DEC15.pdf.

In addition, RBC Signals and SpaceQuest are working with launch service provider Spaceflight and other satellite operators aboard the SSO-A mission to ensure spectrum compatibility of cubesat and launcher operations. Satellite and earth station operators have regulatory/spectrum management contact information from other relevant operators to coordinate and resolve any interference issues, as necessary or appropriate. In addition, virtually all of the operators participate in the Commercial SmallSat Spectrum Management Association (“CSSMA”), which provides another vehicle for addressing potential interference concerns. Although additional consultation and coordination mechanisms may be useful and the SSO-A mission involves a large number of operators, the informal industry approaches described above have worked well in similar circumstances and RBC Signals expects them to be equally effective for the SSO-A launch.

C. STA Request & Public Interest Considerations

RBC Signals respectfully seeks this 60-day STA pursuant to Section 25.120(b)(3) of the Commission’s rules, 47 C.F.R. § 25.120(b)(3). Extraordinary circumstances exist to grant this request (i.e., the critical need for TT&C earth stations to support near-term launch and operation of U.S.-licensed satellites). Consistent with Commission practice, RBC Signals requests that the Commission grant this STA request with the proposed commencement date at the earliest practicable time.

Grant of this STA request is in the public interest because (i) SpaceQuest has limited earth station facilities that can provide essential TT&C support for their polar-orbit satellites; (ii) grant will facilitate the safe operation of the SpaceQuest satellites by ensuring reliable TT&C functions for the launch and operation of the satellites; (ii) it will promote U.S. leadership in the development of next-generation satellite technologies being tested by the SpaceQuest satellites; and (iv) grant will also facilitate U.S. leadership in earth station services by enabling RBC Signals to provide critical NSGO TT&C support.

Because RBC Signals seeks to use the 399.90-400.05 MHz band on a non-conforming basis, waiver of the U.S. Table of Frequency Allocations is required. Section 1.3 of the Commission's Rules¹³ provides that any Commission rule may be waived for "good cause" shown.¹⁴ In general, good cause exists if grant of a waiver would not undermine the purposes of the rule and would otherwise serve the public interest.¹⁵

In this case, a waiver is warranted because there is no material potential for interference from the proposed TT&C uplink operations. RBC Signals limited operations will occur only when the satellite is within view of the relevant earth station for brief periods of time. In addition, RBC Signals has operated in the band previously without interference incident.¹⁶ Because the proposed operations can be conducted on an unprotected, non-harmful interference basis, a waiver of the U.S. Table of Allocations is warranted here.

III. CONCLUSION

In view of the foregoing, including the critical nature of TT&C services and the impending launch of the SpaceQuest satellites, the public interest would be served by a grant by November 19, 2018, of a 60-day STA to allow RBC Signals to perform TT&C functions using the 400 MHz Yagis from its existing earth station facilities in Fairbanks, Alaska.

¹³ 47 C.F.R. § 1.3

¹⁴ *See* 47 C.F.R. § 1.3; *WAIT Radio v. FCC*, 418 F.2d 1153, 1159 (D.C. Cir. 1969).

¹⁵ *See id.*

¹⁶ *See supra* n. 11. RBC Signals prior operations were under the MSS allocation in the band and therefore did not require a waiver.