

THEA Satellite
Special Temporary Authority ("STA")
Attachment 1 to Form 442
STA File #: 0548-EX-ST-2019

SpaceQuest, Ltd. ("SpaceQuest"), pursuant to Section 5.61 of the Commission's rules, respectfully seeks special temporary authorization ("STA") to downlink the experimental data from its THEA non-geostationary satellite to RBC Signals ground station in Fairbanks, Alaska using SpaceQuest's currently authorized S-Band frequency of 2201 MHz (FCC #: 0176-EX-CN-2018).

The SSC Esrang, Sweden ground station referenced in the original THEA license application has incompatible equipment for downloading the THEA experimental data. SpaceQuest now has an urgent need for a temporary alternative as it could take 3-6 months before the situation in Esrang is corrected. SpaceQuest has lost its capability to perform as authorized and therefore requests expedited consideration of this STA.

The primary satellite mission of the THEA satellite is to test an experimental spectrum survey payload developed by Aurora Insight, a U.S. company. The Aurora payload is an experiment to demonstrate and validate the ability of its flight computer firmware to monitor, process and generate relevant measurements of the spectral environment in the 1.35 to 8.0 GHz band using a novel wideband antenna. The S-Band assignment will be used to download selected mission data from the Aurora payload.

The SpaceQuest receive-only S-Band transmissions will be intermittent and on an unprotected and non-interference basis, approximately two or three times per day when the satellite passes over the ground station. In addition, SpaceQuest expressly acknowledges that any grant of this STA request is without prejudice to Commission action on other requests for authority made by SpaceQuest.

Extraordinary circumstances exist to grant this request - the critical need for a U.S. authorized satellite to operate as intended including fulfilling its experimental mission that will promote U.S. leadership in the development of next-generation satellite technologies being tested by the SpaceQuest satellites.

Part A: Space to Earth Downlink Data

Satellite Transmitter Data

Transmit Frequency: 2201 MHz (2200-2220 MHz)		
Satellite Name: THEA		
Data Field	Data Answer	Description/Comments
Polarization (XAP)	XAP = R	POLARIZATIONS INCLUDE: H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR, T = RIGHT AND LEFT-HAND CIRCULAR, J = LINEAR POLARIZATION
Orientation (XAZ)	XAZ = NB	NB= NARROWBEAM EC = EARTH COVERAGE
Antenna Dimension (XAD)	ANTENNA GAIN 7.0 dBi BEAMWIDTH 30 degrees XAD01 = 07G030B	(NTIA format (XAD), EXAMPLE, XAD01 16G030B)
Type of satellite (State = SP) (City = geo or non)	Type = Nongeostationary	Choose either: Geostationary or Nongeostationary
For Geostationary	Longitude =	IF ANY SATELLITES ARE GEOSTATIONARY, REPORT ITS LATITUDE AS 000000N (XLA AND/OR RLA) AND REPORT ITS LONGITUDE (XLG AND/OR RLG).
For Nongeostationary (Orbital Data)	INCLINATION ANGLE 97.52, APOGEE IN KILOMETERS 575 km, PERIGEE IN KILOMETERS 575 km, ORBITAL PERIOD IN HOURS 1 AND FRACTIONS OF HOURS IN DECIMAL .60, THE NUMBER OF SATELLITES IN THE SYSTEM 1, ORB= 97.5IN00575AP00575PE001.60H01NRT01	IF ANY SATELLITES ARE NONGEOSTATIONARY, REPORT ITS INCLINATION ANGLE, APOGEE IN KILOMETERS, PERIGEE IN KILOMETERS, ORBITAL PERIOD IN HOURS AND FRACTIONS OF HOURS IN DECIMAL, THE NUMBER OF SATELLITES IN THE SYSTEM, THEN T01, EXAMPLE, REM04 *ORB,98.0IN00510AP00510PE001.58H01NRT01, AND FOR SPACE-TO-SPACE COMMUNICATIONS WITH ANOTHER NONGEOSTATIONARY SATELLITE ADD AN ADDITIONAL *ORB FOR IT ENDING IN R01, EXAMPLE, REM05 *ORB,72.9IN03209AP00655PE013.46H01NRR01

Earth Station Data (Receiver) Licensed and Operated by RBC Signals		
State (RSC)	RSC = Alaska	
City Name (RAL)	RAL = Fairbanks	
Latitude (DDMMSS)	Lat = 64°85'85"N	
Longitude (DDMMSS)	Lon = 147°83'48	
Antenna Polarization (RAP)	RAP = R	POLARIZATIONS INCLUDE: H = HORIZONTAL, V = VERTICAL, S = HORIZONTAL AND VERTICAL, L = LEFT HAND CIRCULAR, R = RIGHT HAND CIRCULAR, T = RIGHT AND LEFT-HAND CIRCULAR, J = LINEAR POLARIZATION
Antenna Azimuth (RAZ)	RAZ = V00	THE EARTH STATION RECEIVER ANTENNA AZIMUTH (RAZ), THE MINIMUM ANGLE OF ELEVATION, V00 TO V90, EXAMPLE, RAZ01 V00
Antenna Dimensions (RAD)	ANTENNA GAIN 33 dBi, BEAMWIDTH 4.2 degrees, AZIMUTHAL RANGE 0 - 360 degrees, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS 372, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS 5 RAD = 33G004B000-360A00372H005	EXAMPLE ASSUMING NONGEOSTATIONARY, RAD01 16G030B000-360A00357H006
FCC notes: 1. Use S-Note S945. 2. REM AGN, CubeSat, THEA		