

THEA Satellite Modification
Attachment 1 to Form 442
File #: 0019-EX-CM-2019

This modification of FCC File # 0176-EX-CN-2018, adds three receive-only ground stations to the THEA satellite S-Band downlink transmissions. All three ground stations are owned and operated by entities other than SpaceQuest. The Svalbard, Norway Ground Station is owned and operated by KSAT and located in the High-Arctic. The Troll (TrollSat) Ground Station is also owned and operated by KSAT and located in the Antarctic. The Fairbanks, Alaska Ground Station is operated by RBC Signals. The satellite's space-to-Earth frequency band of 2201 MHz will be used to downlink THEA's data in order to test and evaluate the effectiveness of its experimental program.

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) Owned and operated by KSAT		
State (RSC)	RSC = Norway	
City Name (RAL)	RAL =Svalbard	
Latitude (DDMMSS)	Lat =78.2297°N	
Longitude (DDDMMSS)	Lon = 15.3975°E	
Antenna Polarization (RAP)	RAP = T	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 36.78 dBi, BEAMWIDTH 2.6 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 = 37G003B000-360A00372H005	EXAMPLE ASSUMING NONGEOSTATIONARY, RAD01 16G030B000-360A00357H006
FCC notes: 1. Use S-Note S945. 2. REM AGN, CubeSat, THEA		

Earth Station Data (Receiver) Owned and operated by KSAT		
State (RSC)	RSC = Norway	
City Name (RAL)	RAL = Troll, Antarctic Treaty Area	
Latitude (DDMMSS)	Lat = 72°01'00"S	
Longitude (DDMMSS)	Lon = 2°32'00"E	
Antenna Polarization (RAP)	RAP = T	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 36.78 dBi, BEAMWIDTH 2.6 degrees, AZIMUTHAL RANGE 0 - 360 degrees, THE SITE ELEVATION ABOVE MEAN SEA LEVEL IN METERS 156, THE ANTENNA HEIGHT ABOVE TERRAIN IN METERS 5 RAD = 37G003B000-360A00156H005	EXAMPLE ASSUMING NONGEOSTATIONARY, RAD01 16G030B000-360A00357H006
FCC notes: 1. Use S-Note S945. 2. REM AGN, CubeSat, THEA		

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 (DDDMMSS)	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		