October 5, 2020

FCC Office of Engineering and Technology
445 12th Street SW Washington, DC 20554

SUBJECT: CU-E3 cubesat mission (FCC application # 0985-EX-CN-2020)

Please find details on the CU-E3 cubesat mission included below.

Date license is required: February 1st, 2021
LV integration date: March 22nd, 2021
Launch date: NASA Artemis-1 September18th, 2021
Date for initiation of on-orbit operations: April 21st, 2021
Expected mission duration: 12 months base

Principle Investigator for the mission.

Point of Contact Name:	Scott Palo
Organization Name:	University of Colorado
Address:	3775 Discovery Dr., Boulder CO, 80309
E-Mail:	palo@colorado.edu
Telephone Number:	303-492-4289

Technical point of contact for the mission.

Point of Contact Name:	Scott Palo
Organization Name:	University of Colorado
Address:	3775 Discovery Dr., Boulder CO, 80309
E-Mail:	palo@colorado.edu
Telephone Number:	303-492-4289

Point of contact who can terminate ALL satellite transmissions if interference is detected.

Point of Contact Name:	Scott Palo
Organization Name:	University of Colorado
Address:	3775 Discovery Dr., Boulder CO, 80309
E-Mail:	palo@colorado.edu
Telephone Number:	303-492-4289

Point of contact who can terminate ALL Brewster Washington ground station transmissions if interference is detected.

Point of Contact Name:	Eddy Martinez
Organization Name:	US Electrodynamics Inc
Address:	3775 Discovery Dr., Boulder CO, 80309
E-Mail:	emartinez@usei-teleport.com
Telephone Number:	509-689-6300

Point of contact for conjunction alerts.

Point of Contact Name:	Scott Palo
Organization Name:	University of Colorado
Address:	3775 Discovery Dr., Boulder CO, 80309
E-Mail:	palo@colorado.edu
Telephone Number:	303-492-4289

Project Description

The University of Colorado Earth Escape Explorer CubeSat (CU-E3) will have a 1-year mission lifetime and plans to launch in September 2021 on the NASA Artemis-1 mission. The mission goal is to train and educate students while demonstrating the ability to communicate with a cubesat in Deep Space using commercial assets. CU-E3 is part of the NASA Cube Quest Centennial Challenge. The University of Colorado Boulder was selected through a competitive process to be one of 13 CubeSats launching on the Artemis-1 mission into Deep Space. Students at the University of Colorado will operate CU-E3 using commercial ground station assets. The Blue Canyon Technologies XB-1 are the core avionics of the CU-E3 bus supplemented with a University of Colorado designed and built communications and power system. The uplink at 5182MHz is down converted to UHF and received by the AstroDev Li-2. The downlink at 8447MHz is achieved by the University of Colorado designed XACT Communication system.

License Details

The CU-E3 mission plans to operate uplink at 5182MHz in the fixed satellite service and a downlink at 8447MHz in the Deep Space segment of the Space Research Service. (see attached coordination letter).

Additional data required for applications requesting use of federal or shared government frequencies.

Spacecraft: CU-E3

Non-geostationary satellite [Deep Space]

Inclination: Equatorial
Orbital period: N/A
Number of satellites in the system: 1
Number of transmitting satellites: 1
Number of transmitting satellites: 1

Transmitter #1 (X-band)
Center Frequency: 8447MHz
Bandwidth: 1MHz
Antenna 1: 3dB beamwidth: 8^{o} Maximum Antenna Gain:22dBi
Antenna 2: 3dB beamwidth: 44^{o} Maximum Antenna Gain:13dBi
Polarization: RCP
Maximum transmit power: 3W
Modulation: BPSK
ITU emission designator: 1M00G1DCC

Receiver #1 (C-band)
Center Frequency: 5182MHz
Bandwidth: 1MHz
3dB beamwidth: 50^{o} Maximum Antenna Gain: 9.4dBi
Polarization: LCP
Receiver Sensitivity: -110dBm
Modulation: GMSK/BPSK
ITU emission designator: 30K00F1DAT

Ground Station #1:
Brewster, WA
40°00'31.6"N, 105°14'51.0"W
Altitude above MSL [m]: 1588
Antenna height above ground [m] : 3 above roof top.
Elevation: 5-90^{o} (min V00 for UHF and V10 for S-Band) Azimuth: 0-360^{o}

Transmitter #1 (C-band)
Center Frequency: 5182MHz
Bandwidth: 30kHz
3dB beamwidth: 0.5^{o}
Maximum Antenna Gain: 50.3 dBi
Polarization: LCP
Maximum transmit power: 3000W
Modulation: GMSK/BPSK

ITU emission designator: 30K00F1DAT

Receiver #1 (X-band)

Center Frequency: 8447MHz
Bandwidth: 100kHz
3dB beamwidth: 0.5^{o}
Maximum Antenna Gain: 54.3 dBi
Polarization: RCP
Receiver Sensitivity: -120 dBm
Modulation: BPSK
ITU emission designator: 1M00G1DCC