

The spacecraft will have two half-wave dipoles mounted on the positive Z face. The shorter of the two dipoles is used for both the CERTO beacon, and the Lithium radio. It will operate at both 400.032 MHz and 437.505 MHz. Due to the fact that the spacecraft body is completely conductive the antenna has a slightly higher gain of 2.85 dBi. The longer of the two antennas will be used for only the CERTO beacon. It will operate at 150.012 MHz. A FEKO model of the craft and simulation results are included.

The 400.032 MHz 150.012 MHz emissions will only be active during science passes. The combined output power will not exceed 4.2 W with an ERP is 4.93634 W. The emissions are used to determine total electron content between the spacecraft and a receiver on the ground. This device was flown on CASSIOPE in 2013. Science passes will not last longer half an hour. The transmitter responsible for these emissions is the Syntech Microwave TDF-1620.

The 437.505 MHz emission is used tracking, telemetry and control of the spacecraft. The spacecraft will beacon throughout its lifetime and will downlink when over the State College ground station. The transmitter responsible for these emissions is the Astronautical Development Lithium-1 radio. The peak output power is 1 W. The peak ERP of the emission is 1.17532 W.

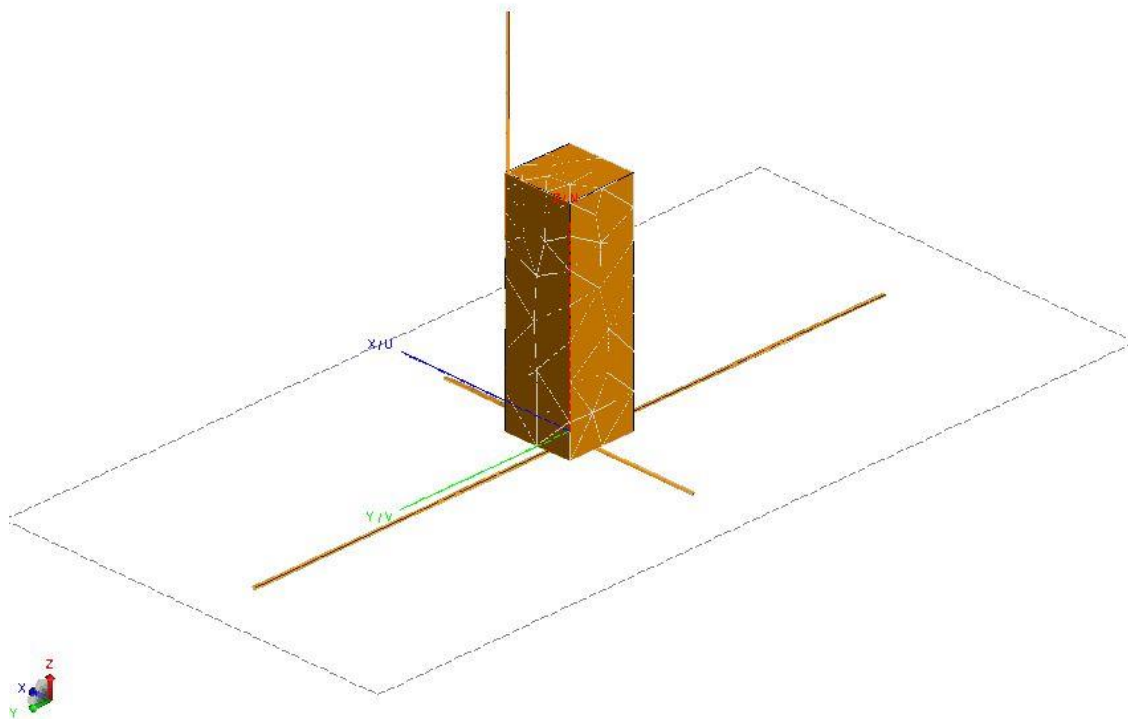
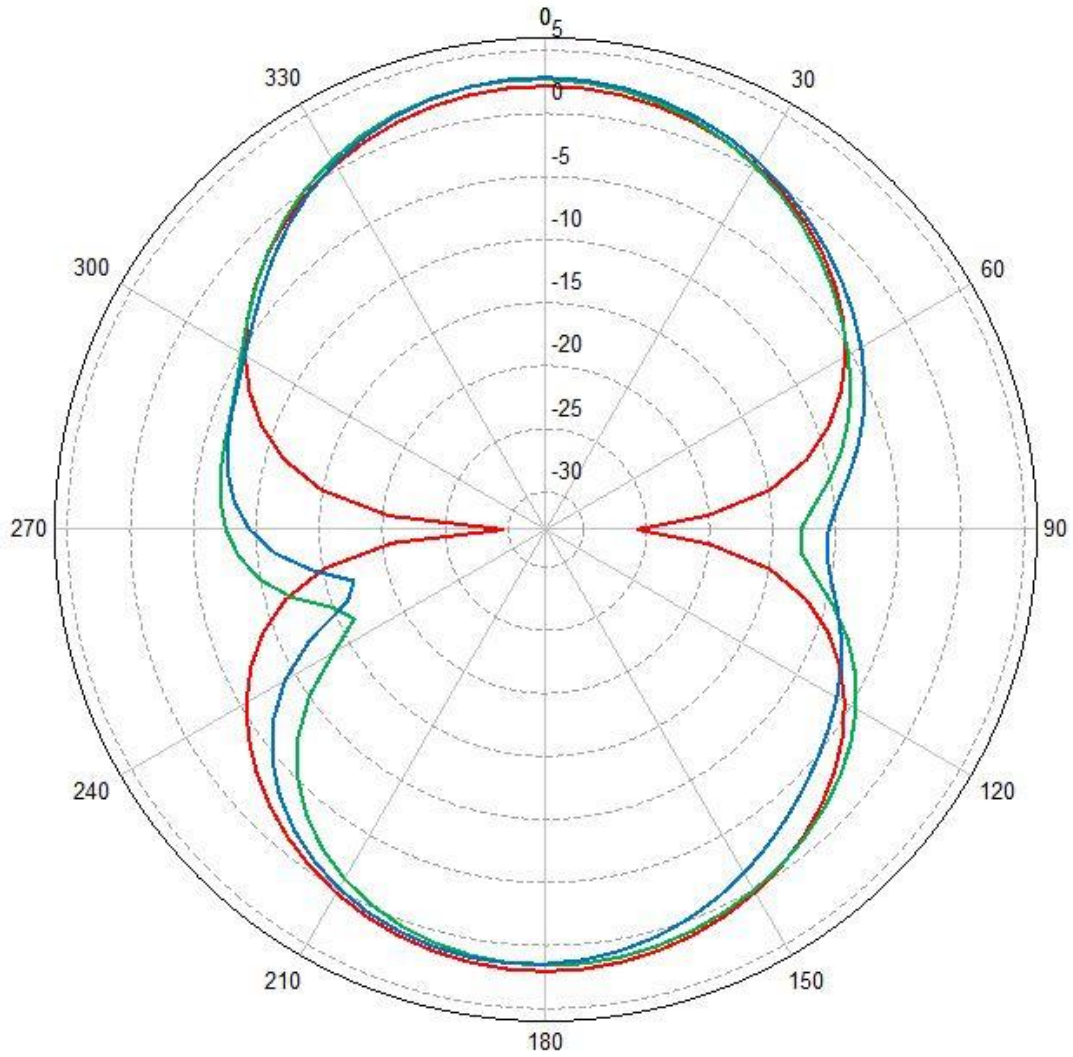
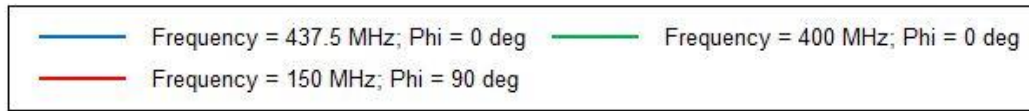


Figure 1: Spacecraft model with antennas and boom

Far field



Total Gain - two_freq_dipole

Figure 2: Far field $\Phi = 0$ cut for spacecraft antennas

Far field

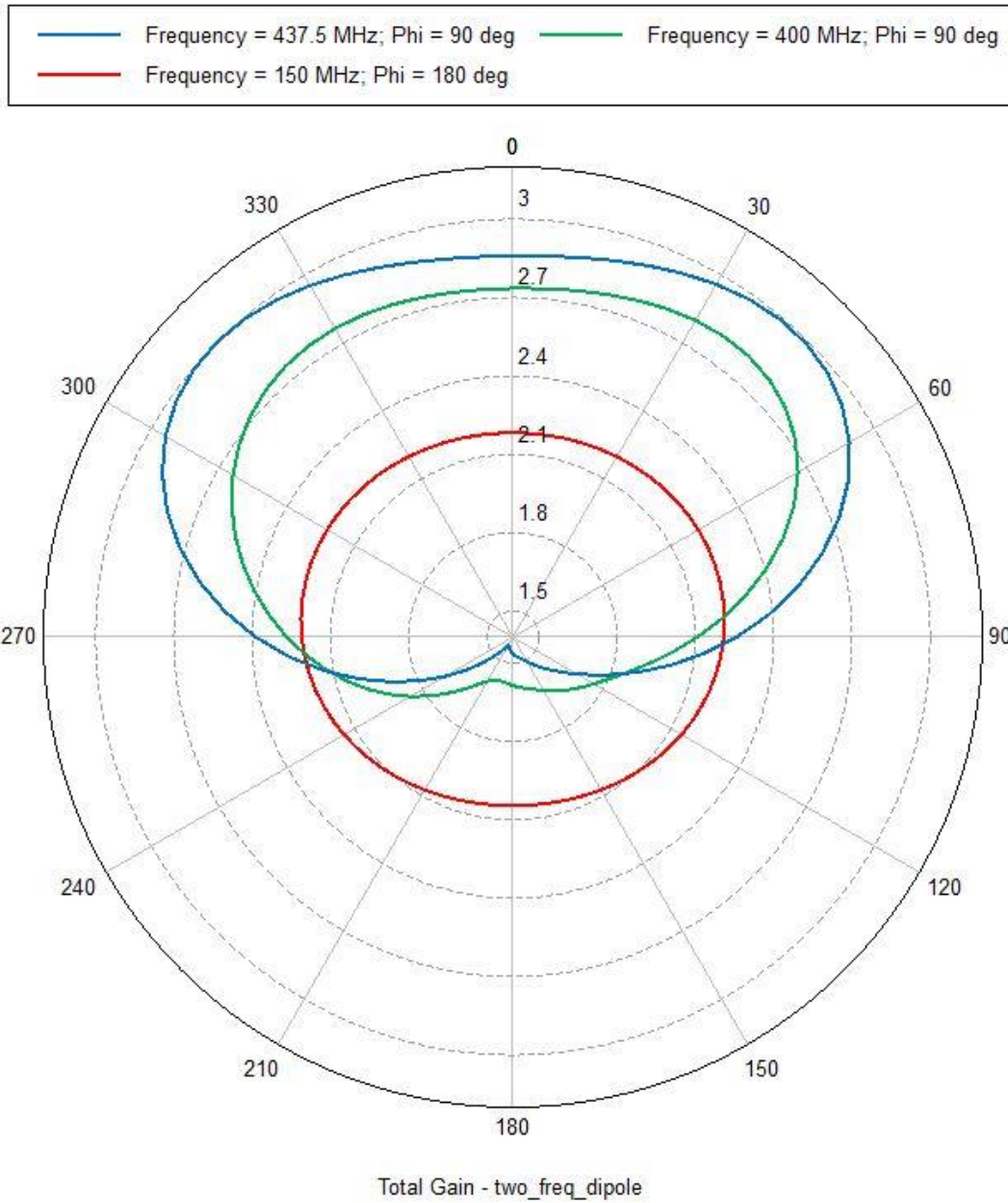


Figure 3: Far field $\Phi = 90^\circ$ cut for spacecraft antennas