ABSTRACT

In determining the position of the object accurately, GPS L1 satellite requires at least 3 satellites. Positioning by GPS Satellite release large electromagnetic waves. Electromagnetic waves can be converted into electrical energy by using energy harvester. Another source of electromagnetic waves that can be converted into electrical energy is the sun. When conducting core reactions, sun is releasing electromagnetic wave radiation in the form of visible light, radio waves, heat, ultraviolet light and other electromagnetic radiation. When rotating around the sun, the earth inclinates with the obliquity as 23.45^o towards its axis. Due to the inclination, the sun as if moving about 23.45^o northward towards the equator and vice versa. Or the sun moved relatively as big as 46.9^o on north-south direction of the earth.

Electromagnetic waves can be converted into electrical energy by using Radio Frequency (RF) Energy Harvester. Electromagnetic waves emitted by GPS satellites L1 and sun captured using corner reflector antenna. The waves are changed using RF-to-DC converter circuit or often called RF Energy Harvester.

In this final project, the corner reflector antenna has VSWR 1.18 with working frequency 1575.42 MHz, gain 10.06 dBi, beamwidth ~ 53^o to accommodate north and south solar movement and fractional bandwidth ~ 14.42%. And there is a tilting device resolving the limitations of the antenna beamwidth of 67^o to accommodate the east-west sun movement. After a harvester circuit with antenna integrated, the average energy output can be harvested using a feed antenna with 3-stage recitifier about 3,22 mV and for a 7-stage is 10.05 mV. In the Corner Reflector antenna the average harvested energy about 5,05 mV on a 3-stage circuit, and on average 7-stage average energy harvested is 20.19 mV. If the corner reflector antenna is tilting towards the sun, average energy harvested about 4,97 mV on 3-stage and averages is 19,44 mV at 7-stage.

Keywords: Corner Reflector, Energy Harvesting, Antenna, Electromagnetic Waves.