

ABSTRACT

Radio telescope is a system for receiving radio signals emitted by celestial objects. Radio telescopes consist of several components such as feeders, reflectors, amplifiers, and others. In order for a radio telescope to receive radio signals from celestial bodies, the resonance frequency of the telescope feeder must be close to the frequency of the signal to be received. ITERA is collaborating with D3 Telecommunications Technology (D3TT), Telkom University, to make feeder for the radio telescope system. For the telescope to function properly, the telescope feeder must resonate around the neutral hydrogen frequency, which is 1.42 GHz.

In this final project, a microstrip array antenna will be designed for the radio telescope feeder in collaboration between ITERA and D3TT. The designed antenna has a patch in the shape of the ITERA emblem and a triangular ground plane. Therefore, this antenna can be classified as an aesthetic antenna. The working frequency of this array antenna is 1.42 GHz.. The antenna is designed in elements of a single and array element. The material used for the substrate is FR-4 with a thickness of 1.6 mm, while the ITERA logo patch and ground plane use copper. The antenna design process is carried out by simulation using CST software which is then validated using a Network Analyzer.

The result of microstrip single and array antenna measurement with ITERA emblem shaped in 1,42 GHz. In single element, the VSWR, return loss, gain, and beamwidth of final design at 1.42 GHz obtained from simulation are 1.22, -19.96 dB, 1.799 dBi, and 122°, respectively. The VSWR and return loss of final design at 1.42 GHz obtained from measurement are 1.31 and -23.71 dB. In array, the VSWR, return loss, gain, and beamwidth of final design at 1.42 GHz obtained from simulation are 1.18, -21.85 dB, 2.153 dBi, and 111.1°. The VSWR and return loss of final design at 1.42 GHz obtained from measurement are 1.83 and -10.61 dB.

Keywords: *Radio telescope, Radio Telescope Feeder, Aesthetic Antenna, Neutral Hydrogen*