

ABSTRACT

Antenna fabrication method is an important step in realizing an antenna design. The level of accuracy and time of fabrication are problems that are often found in the fabrication process. The 3D printing method is the process of fabricating an antenna design using a special 3D printer with an estimated level of accuracy and printing time. To get the antenna performance in accordance with the design, the antenna fabrication process must pay attention to accuracy to produce the required performance.

In this final project research to add references in the field of science and experiment with fabrication methods, coating materials, and get more affordable fabrication costs, a pyramidal horn antenna was designed and realized with 3D printing fabrication method using PLA (polylactic acid) printing base material. and the print on the inside of the horn antenna is coated with copper tape.

The design and realization section, dimension calculations are carried out mathematically and follow the rectangular waveguide size datasheet (WR 284). The results of the initial design are optimized again and get optimal simulation results of the effective horn antenna in the working frequency range of 2,8-4 GHz (S-Band) with a bandwidth of 1193 MHz. The results of the optimal design simulation where the outside is coated with plastic material, there is a difference at a frequency of 3 GHz, namely the return loss has decreased from -51,263 dB to -36,555 dB while the VSWR value of copper material only and the outside of copper coated with plastic is 1,006 and 1,03 and the gain value has the same result is 11,47 dB. The final result obtained after realization and measurement is that the horn antenna has a VSWR of 1,26 at a frequency of 3 GHz, a Bandwidth of 1250 MHz in a frequency range of 2.4-3.65 GHz, Circular Polarization, Uni-directional radiation pattern, and a Gain of 11,6 dB at 3 GHz frequency.

Keywords : *Horn Antenna, 3D Printing, S-Band.*