

## ABSTRACT

Rhombic antenna is a long wire diamond-shaped antenna and it has wide band. In the past, rhombic antenna has a large dimension and has a load at the tip of antenna. This antenna is a combination of antenna V. It proved that the antenna has impedance matching with the radio channel propagation space, so it produces many variety of wide band prototype antenna without resistive load. Because of that, I do the research to make unloaded antenna rhombic.

In this final project, the set of equipment will be designed and realized a rhombic antenna without the load using parallel twin wire. Rhombic antenna without the burden that has been made, work at a frequency of 1000 MHz - 3000 MHz and it has wide band that can be utilized for various applications. At the first, antenna manufacturing process calculates the theoretical dimensions of the antenna and then use the software Ansoft HFSS 10 as a tools of simulation before fabrication. Another parameters will be measured  $VSWR \leq 1.5$ , with radiation pattern is unidirectional and polarization is linear. The value of gain which are trying to accomplish is more than 6 dBi. In order for the transition impedance between the antenna and coaxial are better, then the antenna is designed using ferrite ring balun.

Based on the results of simulation and measurements, the results obtained by the design specifications of the antenna parameters are close to the beginning specification. In realization of this rhombic antenna without load, obtained bandwidth of 670 MHz in frequency range of 1619.07 MHz - 2289.07 MHz in  $VSWR \leq 1.5$  limitations, but based on simulation bandwidth result obtained 850 MHz in frequency range of 1760 MHz - 2610 MHz. With the impedance that already obtained close to  $50\Omega$  is  $50.07 + j 6.300 \Omega$  and based on simulation result obtained  $65,32 - j6,78\Omega$ . Based on the results of simulation and measurements gain obtained 6.38 dBi and 8.34 dBi at 2000 MHz. Based on realization result, the radiation pattern is omnidirectional, but based on simulation result is unidirectional. Based on realization result, the polarization is ellips, but based on simulation result is linear.