

ABSTRACT

As the demands and services of wireless communication increase, the methods to increase the channel capacity of wireless communication in GSM 1800 is demanded. In order to solve those problems, direction antenna radiation pattern technique more commonly known as beamforming network is needed. *Beamforming network* is a method of array processing so that focusing array ability to control signal from specific direction. With including beamforming network to antenna array system, expected radiation pattern will be achieved, because beamforming network has ability to control amplitude and phase. *Blass Matrix* is one of the beamforming network techniques.

In this final project are designed, implemented, and conducted measurements will be design and realized on *Blass Matrix 2×2* for stacking microstrip antenna beam guidance that will work on band frequency 1805-1880 MHz with -45° and 135° phase shifting. *Blass Matrix 2×2* are consists of four 90 hybrid 90° and five phase shifters. After getting the size of the elements then carried out the simulation using CST Microwave Studio 2011. *Blass Matrix* was created using microstrip with Taconic RF 35 substrate that have thickness of 1.52 mm. The next process *Blass Matrix* fabricated then tested through the measurement process.

Realization of the design *Blass Matrix 2×2* has a size of 152.88 mm x 126.8 mm. Maximum phase *Error* of *Blass Matrix 2×2* is equal to 22.5° at 1805 MHz and minimum phase *Error* is 0.15° at 1850 MHz. Phase *Error* that can be tolerated is the phase *Error* $\leq 10^{\circ}$ because when connected to an antenna stacking, that phase did not significantly affect many beam antenna. Parameter isolation is better because the value $\leq -20\text{dB}$. VSWR parameter is good because the value ≤ 1.5 .

Key Words : *Blass Matrix, smart antenna, beamforming network*