

Anukool Noymai 2009: Direction Adjustable Antenna for UHF RFID Reader.
Master of Engineering (Electrical Engineering), Major Field: Electrical Engineering,
Department of Electrical Engineering. Thesis Advisor: Assistant Professor
Denchai Worasawate, Ph.D. 115 pages.

This thesis presents the development of the array antenna for UHF RFID reader for the steel industry. To reduce the size of the array antenna, a high dielectric material is chosen for the antenna. In this thesis, the PMMA (Polymethylmethacrylate) is utilized as the antenna material.

The development of the array antenna was initially done with simulation software to determine the properties of the antenna such as S_{11} , VSWR (Voltage standing wave ratio) and radiation pattern. At first, the simulation was conducted on a single element of the array antenna, and then the simulation on all 4-element array antenna was done. When the results of the simulation meet the requirements, the array antenna is constructed. The Butler matrix circuit is used to control power transmission and phase of each element in the array antenna.

The fabricated array antenna is tested. The measured maximum gain is 9.27 dBi in one of the patterns. The measured gain is lower than the simulated one of 12.26 dBi because of the loss of the devices used to construct the Butler matrix. The measured loss of the matrix is 2.99 dB. If the loss of the matrix were included in the simulation, the measured gain is comparable to the simulated one.

Student's signature

Thesis Advisor's signature