ABSTRACT

After the disaster, telecommunication infrastructures are in high probability to be destroyed, where the mobile cognitive radio base station (MCRBS) is one of technologies to recover post–natural disaster wireless networks. MCRBSs help the victims with communications based on the second telecommunication generation (2G), the third generation (3G), the forth generation (4G), and the fifth generation (5G), since the victims may use different telecommunication generation networks. MCRBS requires an antenna having capabilities of transmitting and receiving signals of 2G, 3G, 4G, and 5G.

This thesis proposes (i) an outward curved asymmetric biconical (OCAB) antenna with wide-band capability and low R_L required by a MCRBS to recover the networks after the disaster and (ii) the design of antenna is wire conical design for light weight but robust to the strong wind when the MCRBS device moves. This design is required and practical for MCRBS to be easily applied in the field. This design is then simulated using computer and realized. The material of OCAB antenna is brass metal to providing a good performance to deliver electromagnetic waves. The OCAB antenna is work at an operating frequencies of 2G–5G in 0.8-3.3 GHz. The OCAB antenna also can be fed using 41 dBm of power supply, which is beneficial for the base station for wider coverage.

The results of this thesis are (i) design an antenna having several characteristics of return loss value $R_L \leq -10$ dB, radiation pattern of omnidirectional, gain antenna of $G \geq 1$ dB, and light but robust to the strong wind for all generations of telecommunications, (ii) simulation and realization the antenna to have close performance to the requirement of MCRBS antenna, (iii) the performances of frame error rate (FER) and the bit error rate (BER) of the proposed MCRBS antenna is better than the monopole antenna as a transceiver and receiver. The result of this thesis are expected to provide contributions to the development of post–disaster area communications as well as contributions for disaster mitigation via the MCRBS.

Keywords: MCRBS, Biconical Antenna, Ultra Wide Band, Post–disaster Area.