

## ABSTRACT

Mobile Cognitive Radio Base Station (MCRBS) is an alternative technology for the recovery of telecommunications networks after a natural disaster happens, which in field implementation requires good routing algorithm. This thesis makes experiments for MCRBS routing technology using three universal software radio peripheral (USRP) devices of X310, B200 mini-i, and B210 and uses GNU Radio software.

MCRBS requires good routing capabilities in determining a strong and stable route in carrying information from victims of the disaster area network to the normal networks. One of the best route indicator is the high level of receive signal-to-noise power ratio (SNR) on each route so that information arrives at the receiver provide small error. The types of routes in MCRBS routing experimented with 2 indoor scenarios and 4 outdoor scenarios, namely (i) direct and (ii) relay routes, where the route is evaluated in terms of bit-error rate (BER) and frame-error rate (FER) performances before being used by the MCRBS.

This thesis has successfully implemented and tested one configuration in MCRBS well using GNU Radio, which is expected to be useful for use in advanced routing algorithms in MCRBS. The results show that the relay device at a closer distance to both the transmitter and receiver have better BER and FER performances with the decode-and-forward (DF) protocol. This thesis found that in some conditions, the relay is better used by the MCRBS, otherwise the direct should be selected by the MCRBS. The results of this thesis is expected to provide contributions to the development of MCRBS and disaster technology in Indonesia.

**Keywords:** Mobile Cognitive Radio Base Station, USRP, disaster, routing, recovery networks.