ABSTRACT

The ratio of doctors in Indonesia is very low. This causes unequal distribution of health services to the community. With the development of technology, it is easier for people to get health services and can be done remotely. The application of Wireless Body Area Network technology is one manifestation of technological advances. However, the application of the Wireless Body Area Network cannot work optimally in the case of many patients due to connectivity limitations, so it takes several Wireless Body Area Networks that can communicate with each other in the method of sending messages which is called the Body-to-Body Network concept. Then a health monitoring tool was designed with the Body-to-Body Network concept through the design and realization of a health monitoring prototype using ESP32.

The Body-to-Body Network concept is designed to be a prototype and works to detect heart rate and oxygen saturation values using the MAX30102 sensor. The sensor data will be broadcast in a multi-hop communication method so that sensor data from all nodes can be read by the root node.

In the first test, it was found that the MAX30102 sensor can work and sensor data can be broadcasted with multi-hop communication method. The second test concludes that variations in the number of nodes and variations in topology formation in each network can form a Body-to-Body Network. The third test resulted in the SSID formation process time taking 960-961 ms and network synchronization took 12-17 seconds which was influenced by node variations. The fourth test measures the overall performance of the mesh network by testing 3 variations of nodes, resulting in an average total delay of 24 ms, an average total throughput of 66792 bps, and an average total packet loss of 0%, thus concluding that the prototype tool can work according to the expected goals.

Keywords: *Body-to-Body Network, MAX30102 Sensor, Multi-hop, Wireless Body Area Network.*