ABSTRACT

In daily life, there is still the problem of the lack of long-distance signal transmission such as Wi-Fi and Bluetooth which only have a range of about 10 meters. To solve this problem, we fabricated "Wearable Microstrip Antenna for 5G Technology Application" with inset-feed coupling technique at 3,5 GHz frequency. Previous research has designed microstrip antennas with inset-feed method for Wi-Fi at a frequency of 2,4 GHz. However, microstrip wearable antennas have disadvantages such as low gain and surface waves that damage the radiation pattern. Therefore, it is important to consider the Specific Absorption Rate (SAR) value that is safe for the human body (1,6 W/kg) and use a unidirectional radiation pattern for safe use on the human body. The main purpose of the wearable antenna is to make it easier for humans to carry out their daily lives with a smaller size, light weight, and can be attached to clothing. For example, wearable antennas can help elderly people who are ill at home by detecting when they fall and alerting family members who are not at home. In addition, wearable antennas can also be used by firefighters to communicate more efficiently and shorten their work time.

In the development of "Wearable Microstrip Antenna for 5G Technology Application", several things need to be considered. First, the microstrip antenna design must be designed using the inset-feed method at a frequency of 3,5 GHz to be compatible with 5G technology. This design should also pay attention to small size, light weight, and easy to attach to clothing so that it can be used in everyday life. Furthermore, research and development needs to be done to increase the gain of the microstrip antenna wearable. Higher gain will expand the signal range and improve the lack of long-distance signal transmission. Optimization of the radiation pattern of the microstrip antenna is also important to achieve a unidirectional radiation pattern that will increase the efficiency of the antenna. Finally, in the development of microstrip antenna wearables, it is necessary to conduct SAR testing and evaluation to ensure safe radiation levels for users. By implementing these solutions, wearable antennas can help overcome the problem of lack of long-distance signal transmission and the weakness of microstrip antenna wearables, and have the potential to be used in a variety of applications such as assisting the sick elderly lying at home and assisting the Fire Department in communicating efficiently.

Tests were conducted on the 5G wearable antenna for a working frequency of 3,5 GHz and SAR value ≤1,6 W/Kg. Based on the test, the VSWR value of 1,4815, return loss of -11,332 db, bandwidth >351,4 MHz and gain of 3,098 dB were obtained.

***Keywords**: Wearable, Antenna, Microstrip, 5G*