

## The Simple and Efficient Wearable Off-body Communication System on a Wrist Model

Semyoung Oh\*<sup>(1)</sup>, Gil Young Lee<sup>(1)</sup>, Jongha Yoon<sup>(1)</sup> and SangKu Lee<sup>(1)</sup>  
(1) Republic Of Korea Air Force Academy, Cheongju, South Korea

Recently, MIMO (Multi-Input Multi-Output) system has been recognized as an essential technique in wireless communication such as Wi-Fi, WIMAX, LTE, LTE-A, because it can prominently increase channel capacity, reliability, and range of communication by sending identical or different signals simultaneously through multiple antennas. In order to maximize the performance of MIMO system a distance between antennas should be more than quarter of wavelength, and each antenna should be connected to a RF chain separately. These factors are not important issues in a base station but in a mobile station such as a wearable communication device having the limited physical size and scanty energy source.

In our study, to overcome the above-mentioned issues the compact, simple and energy-efficient MIMO system for an off-body wearable device will be proposed. We will start from the design of antennas operating at 5 GHz ISM band. And these antennas will be redesigned to adjust on a particular human part (wrist) and to work properly irrespective of a human body effect. Then, we will also study the correlation between the antennas. Finally, we will focus on a simple and efficient beamforming scheme that can reduce performance deterioration resulted from complex indoor environment, body movement and body shadowing.

Through the above design process, the wearable off-body communication system on a practical human model which can form an energy-efficient and high capacity link will be showed.

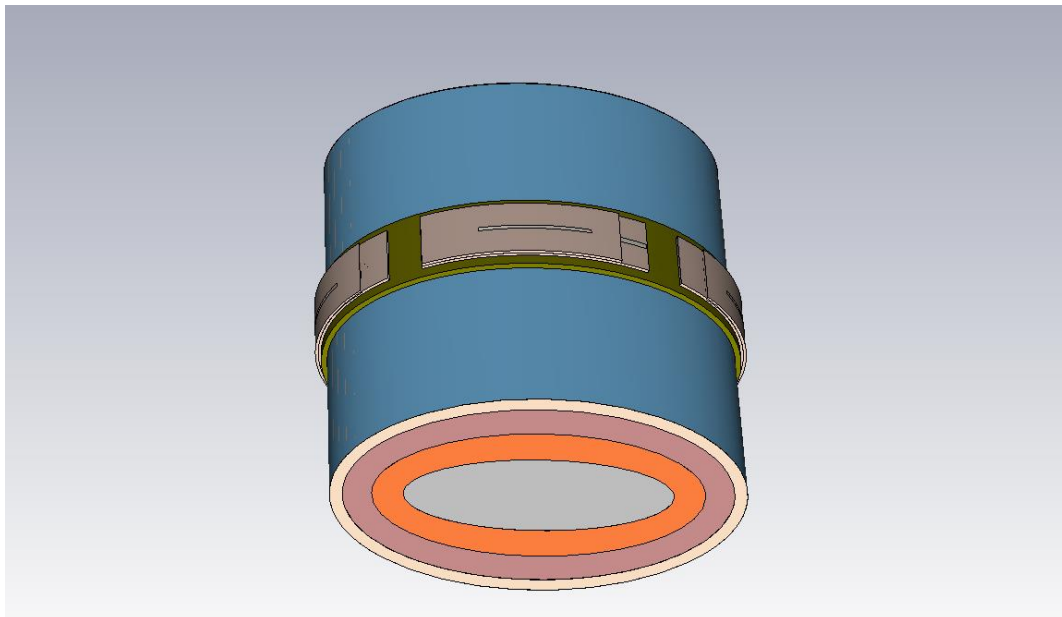


Figure 1. The conformal antennas on a wrist model