



Empowering Connectivity:

Wearable Antennas for Wi-Fi and 5G Applications

Abstract: Wireless connectivity plays a major part in our daily lives. Wireless Local Area Network (WLAN), mostly operating through Wi-Fi technology, is one of the major technologies to provide this connectivity. 5G is another technology that promises a significant increase in data transmission speed. The goal of this talk is to highlight some of the aspects of the wearable antennas designed for applications in Wi-Fi and 5G, emphasizing their significance in enabling continuous, reliable connectivity for various wearable devices utilized in diverse applications and industries.

With the focus on wearable wireless devices, it is desired to have a direct connection to networks such as Wi-Fi or 5G networks. Therefore, there is a need for wearable antennas in the Wi-Fi or 5G bands (especially the sub-6 GHz band) that can seamlessly be integrated into clothing. Such antennas should be small. However, small antennas usually have omnidirectional patterns, and their input impedance may be affected significantly by the lossy human tissue in their vicinity. On the other hand, the radiation toward the body can cause a high Specific Absorption Rate (SAR), requiring a reduction in the input power to comply with the standard SAR levels.

In addition, wearable antennas must be lightweight and flexible. There are multiple options for flexible materials that may be considered. Other conditions specific to wearable antennas include being low-profile, compact, and efficient. Some of the factors that need careful consideration are the performance of the antennas under bending, crumpling, and stretching. The other factors are the cost, availability, washability, and endurance under extreme and harsh conditions. Some of the wearable antennas may be integrated as parts of the clothing, such as buttons or zippers, while others may be integrated into the surface area of the clothes.

This talk highlights the design consideration and the role of wearable and textile antennas in enabling ubiquitous and reliable wireless connectivity.