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Left-Handed Metamaterial Wearable Antenna at 5G Frequency Range for Wireless Body Area Network

Abstract

Wearable antennas are typically required to be small in weight, provide high bandwidth, high gain and efficiency, low price, and be installation-free for many modern applications. Due to the non-static human movement, an antenna with wide-angle scanning is necessary. This project is carried out by designing a small metamaterials wearable antenna at a 5G frequency range. The combination of left-handed metamaterial (LHM) and the wearable antenna is designed to operate for such a system. Results prove that the small wearable metamaterial antenna offers good performances where the gain is 5.8 dBi with an efficiency of 91.86% and provides an omnidirectional radiation pattern compared to the wearable antenna without LHM structure. The communication links of the antenna between the base station and the human body are investigated. The antenna can receive the signals for long distances may be up to 2 meters with wide angles. All the results will be a guideline while designing the systems in the future.

Keywords

5G Application; Body Area Network; Left-Hand Metamaterial; Wearable Antenna