

ABCS Antenna for Wireless Body Area Network at 26 GHz

Abstract

The paper presents the design and investigation of a wearable textile antenna (receiver) and transmitter antenna operating in the wireless body area network (WBAN) of 26 GHz band for 5G mobile networks. The wearable antenna with an overall size of 30 mm x 40 mm x 1.26 mm achieves good impedance matching, high gain, and directive radiation pattern. Both antennas were designed using CST Microwave Studio to validate the simulation results. A rectangular radiating patch comprises a Shieldit electrotextile situated on one side of a non-conductive substrate panel with the ground plane. The bed sheet cotton fabric is used as the non-conductive substrate due to its widespread use in daily clothing with a dielectric constant is 3.2 and the loss tangent is 0.0027. In addition, the wearable antenna successfully achieved the high gain and efficiency of 12 dB and 90.83% respectively. Moreover, the antenna operating at 26 GHz with -40.48 dB return loss, which is less than the -10 dB in requirement. The simulated results show that this proposed wearable antenna is best suited for wireless body area network applications. Hence, the wearable antenna is simple, compact and easy to fabricate. © 2023 American Institute of Physics Inc.. All rights reserved.