

Design and analysis of helical antenna for short-range ultra-high-speed THz wireless applications

ABSTRACT

Terahertz (THz) band antennas are becoming a more attractive field of research due to the wide range of applications and advantages in future communications. A design of a helical antenna for ultra-high-speed THz wireless applications over short-range communication is proposed. The proposed antenna provides ultra-wideband bandwidth, high directional gain, low-cost, and circular polarization features. The proposed antenna design shows interesting results with respect to a fractional bandwidth of 65.40% and impedance bandwidth of 0.50992 THz for VSWR . Simulation results also show that maximum directivity, its realized gain and radiation efficiency of the proposed antenna is 12.1 dBi, 11.8 dBi, and 95.31% at 1 THz, respectively. The proposed antenna is performed, simulated and analysed by using the commercial CST microwave studio software. The simulation results display noticeable improvements in terms of fractional bandwidth, directivity and gain compared with other related-works. The proposed antenna can be used for several THz wireless applications, mainly for ultra-high-speed THz wireless applications over a short-range communication, such as Wi-Fi, base station, and medical applications.

Keyword: Helical antenna; High directional gain; Ultra-high-speed THz applications; Ultra-wideband bandwidth; Low-cost; Short-range communication; Terahertz/ THz band