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(57) Abstract :
A new generation of antenna systems is needed to meet the high-bandwidth, low-latency, ultra-fast data transmission requirements of 6G communication technology, which promises revolutionary improvements in augmented reality (AR) and virtual reality (VR) applications. In order to improve multiband antenna performance specifically for 6G AR/VR applications, a thorough strategy is proposed in this study. Wide bandwidth support, beamforming and performance miniaturization without sacrificing functionality, low latency optimization, smooth integration with AR/VR devices, material selection for ideal dielectric properties, crosstalk mitigation, robustness, reliability, and extensive testing and validation are some of the important aspects that are addressed during the enhancement process. The proposed strategy seeks to design multiband by methodically addressing these characteristics. The design and gain increase of a septagonal slotted antenna with edge feeding, working over six particular frequency bands for 6G augmented reality (AR) and virtual reality (VR) applications, are presented in this study. 11.48 GHz (10.98-11.60 GHz), 12.8 GHz (12.58-13.10 GHz), 15.98 GHz (15.38-16.52 GHz), 17.42 GHz (16.52-17.74 GHz), 19.04 GHz (18.80-19.32 GHz), and 20.47 GHz (20.26-21.78 GHz) are the frequency ranges that the antenna is best suited to cover. The antenna is tiny enough to be integrated into AR/VR devices with the dimensions 50mm x 60mm x 2mm and is made of low loss dielectric material Rogers RT/Duriod 5880 (tm) and it achieves efficient resonance within each frequency band. In addition to improving radiation pattern control and bandwidth, the slotted structure also improves the antenna's gain performance over the designated frequency ranges. The efficacy of the suggested design and gain augmentation strategies is validated by simulation tests, which show superior performance in delivering dependable and immersive communication experiences in 6G AR/VR systems. In the context of the immersive AR/VR experiences made possible by 6G technology, this research advances antenna technology and opens the door to future applications requiring improved wireless communication capabilities.

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