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mm-Wave Wearable Edge Computing Module Hosted by Printed Ridge Gap Waveguide Structures: A Physical Layer Study

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Abstract : 6G communication systems represent the nominal future extension of current wireless technology, where its impact is extended to touch upon all human activities, including medical, security, and entertainment applications. As a result, human needs are allocated among the highest priority aspects of the system design and requirements. 6G communications is expected to replace all the current video conferencing with interactive virtual reality meetings involving high data-rate transmission merged with massive distributed computing resources. In addition, the current expansion of IoT applications must be mitigated with significant network changes to provide a reasonable Quality of Service (QoS). This directly implies a high demand for Human-Computer Interaction (HCI) through mobile computing modules in future wireless communication systems. This article proposes the utilization of a Printed Ridge Gap Waveguide (PRGW) to host the wearable nodes. To the best of our knowledge, we propose for the first time a physical layer analysis within the context of a complete architecture. A thorough study is provided on the impact of the distortion of the guiding structure on the overall system performance. The proposed structure shows small latency and small losses, highlighting its compatibility with future applications.

Keywords : ridge gap waveguide, edge computing module, 6G, multimedia IoT applications
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