

Single-input Single-output Terahertz Communication System with Multi-channel Access

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Abstract—This study investigates the performance of a multi-channel access approach using a reliable single-input, single-output (SISO) terahertz indoor communication system operating at 325 GHz. By introducing spatial diversity, the system enhances transmission reliability under various channel conditions, including scenarios involving obstruction and misalignment—conditions commonly encountered in real-world settings. Three multi-channel strategies are explored: line-of-sight (LOS) transmission, reflection-based transmission, and LOS transmission with partial blockage. Experimental results demonstrate that these methods significantly improve transmission performance. The proposed SISO system achieves a 1.5-meter wireless range with a 115-degree angular coverage. In addition, the study examines the feasibility of integrating sensing and communication (ISAC) functionalities using the same carrier frequency. The findings offer important insights for future terahertz indoor communication applications and present a practical physical-layer solution for robust transmission under diverse environmental conditions

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