Physical-Statistical Channel Model for Off-body Area Network

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Abstract

In this letter, practical sensor nodes are utilized to study the path loss effects of wireless sensor networks (WSNs) at 2.425 GHz in a ground covered by snow at different heights from the ground. The measurement results are compared with the ground reflection (two-ray) path loss model and the ray-tracing model showing significant difference. New empirical path loss models for different heights from the ground based on the log-distance path loss model are presented. The developed models are compared with the existing path loss models to demonstrate their accuracy between sensor nodes deployed in snowy environments. The experimental data as well as the developed path loss models can be utilized for efficient planning and deployments of WSNs in snowy environments. They can support applications including rescue and monitoring of snow avalanche, environmental surveillance, or monitoring winter sporting activities.