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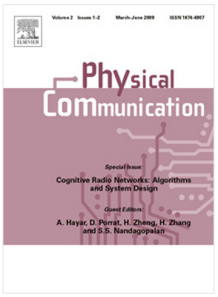

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Outdoor Large-Scale Path Loss Characterization in an Urban Environment at 26, 28, 36, and 38 GHz

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Abstract

Most of the existing channel models cannot be applied to emerging millimeter-wave (mmWave) systems due to the difference between the characteristics of existing operating frequency bands and mmWave frequency bands. Thus, extensive studies on channel characterization and modeling are required to develop a general and suitable channel model that can accommodate a wide range of mmWave frequency bands in its modeling parameter. This paper presents a study of well-known channel models and their authentications for outdoor scenarios on the 26, 28, 36, and 38 GHz frequency bands. A new generalized path loss model for a range of mmWave frequency bands is proposed. Measurements for the outdoor line-of-sight (LOS) and non-line-of-sight (NLOS) scenarios were taken every meter over a separation distance of 114 m between the TX and RX antenna locations to compare the well-known and the new large-scale generic path loss models. This outdoor channel characterization and modeling was conducted in Malaysia, which represents a tropical region environment, and the outcomes were investigated based on the proposed and the well-known path loss models for single- and multi-frequency schemes. Results show that the proposed