

Millimeter-wave device-to-device multi-hop routing for multimedia applications

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Abstract

Millimeter-wave (mm-wave) communication is a promising technology for the next generation cellular networks. Motivated by the huge available bandwidth at these bands, it can be used to support the fastest-growing demands for the mobile data traffic such as multimedia applications. However, there are some challenges on the network connectivity at the mm-wave frequency bands. The high path loss, the limited diffraction capability due to the short wavelength, and having difficulties in penetrating through solid materials necessitate the line-of-sight and multi-hop communication in mm-wave networks. In this paper, we develop a multi-hop routing protocol which maximizes the sum quality of the uncompressed high-definition video applications for the device-to-device connections. The quality is measured as a function of the rate in this paper. We take into account the unique characteristics of the mm-wave propagation in our model. Simulation results show that the proposed algorithm achieves the optimal solution for high cooperation probability. It is also verified by the simulation that our algorithm outperforms the max-min flow routing protocol solution.

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