Abstracts

Performance of lens antennas in wireless indoor millimeter-wave applications

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Dielectric lens antennas can be designed to produce highly shaped beams that significantly improve the system performance in emerging wireless indoor millimeter-wave systems. A lens configuration is analyzed in this paper that produces a circularly symmetric cell with uniform spatial power distribution, fairly sharp boundaries, and scalable cell radius. The last characteristic is used to control the reflections at sidewalls. A hemispherical coverage lens antenna is designed for the mobile terminal (MT) to ensure relatively free movement. The impact of these antennas is analyzed in terms of cell coverage and channel time dispersion, considering the effect of cell radius scaling, and MT antenna tilting. Measurements and simulations show that the proposed lens antennas outperform common solutions based on pyramidal horns or biconics.

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