# Statistical Scattering Model in Urban Propagation Environment

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A statistical scattering model for mobile radio cannels that has the following three features id proposed: 1) the effective scattering area (ESA) is expressed by an ellipse, the center of which is the mobile station (MS) location; 2) the major axis of the ellipse runs parallel along the street where the MS is located; and 3) the scattering power density function around the MS is expressed by a combination of two Laplacian distributions in which the standard deviations are different. To verify the proposed model and obtain realistic values for the model parameters, the spatiotemporal path data observed at a base station (BS) were measured using a 2.2-GHz band in a macrocell scenario (BS antenna height is 60 m) in a typical urban area. The scattering positions are detected from the path information such as the azimuth arrival angle and path length, assuming a single bounce. The spatial distribution of the scattering power is analyzed using principal component analysis. The result showed the ESA to be the anticipated ellipse with the major and minor axes of approximately 210 and 120 m, respectively (axis ratio: proximately 1.). Furthermore, the power profiles that are projected for each axis of the ellipse can be approximated as Laplacian distributions. Finally, simplification of the proposed model is discussed.