Radiation Pattern of Wearable Antennas: A Statistical Analysis of the In uence of the Human Body

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Abstract:

This paper explores a statistical approach for modelling antennas' behavior in the vicinity of the human body. The statistics of radiation patterns, i.e., average and standard deviation, have been calculated for Uniform and Rayleigh antenna to body distance Distributions. The coupling between the body and the antenna, and the reduction of antenna efficiency, lead to a distortion of the radiation pattern, which depends on the distance as well as on the location on the body. A patch antenna operating at 2.45 GHz was simulated in CST, using a voxel model, on the head, chest, arm, and leg. Results show that the relative change of the average radiation pattern for an antenna located on the chest can reach 24%. The study was complemented with measurements, showing that, in the area of interest for on-body communications, an average difference between CST and measurements of 0.9 dB is found.