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Improving Human Hand Localization in Indoor Environment by Using Frequency Domain Analysis

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Abstract : A human's hand localization is revised by using radar cross section (RCS) measurements with a minimum root mean square (RMS) error matching algorithm on a touchless keypad mock-up model. RCS and frequency transfer function measurements are carried out in an indoor environment on the frequency ranged from 3.0 to 11.0 GHz to cover federal communications commission (FCC) standards. The touchless keypad model is tested in two different distances between the hand and the keypad. The initial distance of 19.50 cm is identical to the heights of transmitting (Tx) and receiving (Rx) antennas, while the second distance is 29.50 cm from the keypad. Moreover, the effects of Rx angles relative to the hand of human factor are considered. The RCS input parameters are compared with power loss parameters at each frequency. From the results, the performance of the RCS input parameters with the second distance, 29.50 cm at 3 GHz is better than the others.

Keywords : radar cross section, fingerprint-based localization, minimum root mean square (RMS) error matching algorithm, touchless keypad model
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