

The Effects of Load Impedance, Line Length, and Branches in the BPLC—Transmission-Line Analysis for Indoor Voltage Channel

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Abstract

This paper presents the effects of load impedance, line length and branches on the performance of an indoor voltage broadband power line communications (BPLC) network. The power line network topology adopted here is similar to that of the system found in Tanzania. Different investigations with regard to network load impedances, direct line length from transmitter to receiver, branched line length, and number of branches has been carried out. From the frequency response of the transfer function (ratio of the received and transmitted signal), it is seen that position of notches and peaks in the magnitude and phase responses are largely affected by the above said network parameters/configuration, mainly in terms of attenuation and dispersion. These effects are observed in the time domain responses also. The observations presented in the paper could be helpful in the suitable design of the BPLC systems for a better data transfer and system performance.

Keywords

Branched network; Communication channel model; multipath; power-line communication; transfer function