

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

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Abstract

This paper presents the effects of load impedance, line length and branches on the performance of medium-voltage power-line communication (PLC) network. The power-line network topology adopted here is similar to that of the system in Tanzania. Different investigation with regard to network load impedances, direct line length (from transmitter to receiver), branched line length and number of branches has been investigated. 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 in terms of attenuation and dispersion by the above said network parameters/configuration. These are observed in the time domain responses too. The observations presented in the paper could be helpful in suitable design of the PLC systems for a better data transfer and system performance.

Keywords

Broadband power line; channel model; communication channels; load impedance; transfer function; transmission lines