

Suttaporn Kliptapim 2014: A Method to Determine Channel Capacity of Wideband Communication for Indoor Low Voltage Power Lines. Master of Engineering (Electrical Engineering), Major Field: Electrical Engineering, Department of Electrical Engineering. Thesis Advisor: Assistant Professor Wachira Chongburee, Ph.D. 66 pages.

Power line communication is a communication technology that makes use of existing power transmission lines. However, the cable grid was not exclusively designed for communication purposes. Thus, the performance as a communication media is limited. For example, the cables thus are not properly protected from the noise and the channel is frequency selected due to the power network itself. As a result, the channel capacities vary throughout the network. This research proposes a method to evaluate the channel capacities from the source to difference locations in the power network. The method first finds the transfer functions between the transmitter and the receivers by using a technic called Backward ImpedanceTranforms (BIT). Then the signals to noise ratios are determined. Finally, the channel capacities are concluded. The case study in this research is implemented for a wideband communications in 2-30 MHz band of the HomePlug standard on low voltage power line networks in the buildings. Additionally, Water Filling, an algorithm is investigated in order to reduce the transmit power. The simulation suggests that the channel capacities vary dramatically throughout the network and Water Filling algorithm does preserve the power consumption with slightly loss of channel capacities.

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