Kittiwat Srivilas 2013: Data Traffic Efficiency Evaluation of Power LineCommunication for PEA's Smart Grid. Master of Engineering (Electrical Engineering),Major Field: Electrical Engineering, Department of Electrical Engineering. ThesisAdvisor: Assistant Professor Wachira Chongburee, Ph.D. 72 pages.

This paper evaluate the capability and suitability of narrow band Powerline Communications (PLC) for last mile network in PEA's smart grid system. The measure of PLC capability in this study is the maximum number of smart meters that the network can handle and system throughput in a given congestion scenario. This paper creates a simulation program for data traffic and congestion analysis (Congestion Model). The simulation assumes that the PLC protocol is PRIME (Powerline Intelligent Metering Evolution) standard which adopts both Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA) and Time Division Multiplex (TDM) schemes as the media access technique. The performance analytical model takes into account the effects of the number of smart meters, rate of sending massege, data rate, the data packet size.

The simulation compare the number of smart meters that the network can handle as well as the throughput in 3 different scenarios, simulate periodic load profiles data traffic using CSMA/CA, simulate periodic load profiles and random access smart grid applications using CSMA/CA, and simulate data traffic by using Scheduling Scheme technique that use TDM for load profiles to avoid collision. The simulation result shows that it can improve the system performance of the network to accommodate more smart meters by using Scheduling Scheme technique. This simulation program can be used as one of the PEA smart grid design tool.

_ / ____ / ____

Student's signature

Thesis Advisor's signature