Oradee Musikanon 2012: ZigBee Design Guideline for Provincial Electricity Authority Last Mile Network. Master of Engineering (Electrical Engineering), Major Field: Electrical Engineering , Department of Electrical Engineering. Thesis Advisor: Assistant Professor Wachira Chongburee, Ph.D. 70 pages.

This study is to analyze the ZigBee outdoor propagation parameters when used as a communication module link between smart meter and the control center in PEA smart grid. This study collects the received signal strength data for three difference scenarios of meter installation and analyses the path loss exponents, the variance. Then, the distribution of the received signal is verified by using Chi-square method. Then presents a method to design the installation position of data concentrator unit (DCU) inside a large village in PEA service area. The designing method determines the maximum path loss from the transmit power and the sensitivity of the receivers. Then, the allowed loss is used to find the usable range by using model in the ITU Recommendations for propagation data and prediction methods for the planning of short-range outdoor in the frequency range 300 MHz to 100 GHz. In this research, DCU positioning design and analysis are implemented on a large-sized community located the service area of PEA. In the design, the probability of signal receiving, a parameter in determination of the coverage, is clearly specified. Additionally, this work includes the signal to co-channel interference ratio, which plays important role in ZigBee link. The outcomes of this work will be used as a smart meter installation guide for PEA.

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