PhD. Thesis/Dissertation Defend Examination

Presented by

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Advisor: Assoc. Prof. Dr. Chaiyod Pirak

Thesis/Dissertation Title:
Channel Characterization and Performance Analysis of NB-IoT Wireless Communication Applied to AMI Systems

Highlight Summary

Abstract

Thailand's Provincial Electricity Authority (PEA) is implementing Advanced Metering Infrastructure (AMI) under its "PEA Digital Utility" smart grid initiative, requiring a reliable last-mile wireless network for large numbers of distributed smart meters. Narrowband Internet of Things (NB-IoT) is a compelling candidate for this AMI field area network, yet empirical channel characterization data specific to Thai propagation environments remains largely absent from the open literature. This dissertation addresses that gap through a systematic measurement campaign across multiple sites in central and western Thailand, covering five environment classes: urban dense, urban outdoor, suburban, rural, and forest/mountain. A composite channel model combining log-distance path loss, log-normal shadowing, and Nakagami-m fading was applied across all environments, with environment-specific Nakagami-m parameters back-calculated via a σ-decomposition approach. The characterized channel parameters are further leveraged by machine learning models to predict ECL class distribution and coverage performance across unmeasured locations, enabling scalable network planning.

Date	Time	Venue
May 12, 2026	11:00 A.M.	TGGS Building Room 408

Registration is open from today until 8 May 2026

QR Code for Registration