

**PHYSICAL LAYER MODELING OF WIMAX SYSTEMS
IN NS2**

By

David Doria

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Examining Committee:

Shivkumar Kalyanaraman, Ph.D., Thesis Adviser

Rensselaer Polytechnic Institute
Troy, New York

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The Network Simulator 2 (NS2) is a commonly used software package for simulating traffic over a network. An extensive set of protocols are supported including TCP, UDP, many different routing and MAC protocols, and 802.11. The purpose of this project is to create a WiMAX module for NS2, enabling simulations of broadband wireless networks.

The project has three main components: physical layer modeling, MAC layer modeling, and scheduling. This thesis details the design of the physical layer model. A model of a typical wireless channel is created and integrated into NS2. The model captures several key parameters of a typical scenario such as mobile velocity, scattering environment type, and distance from the base station. The behavior of OFDM and OFDMA transmissions over such channels is simulated. This channel model was extended to include the situation of several transmit and receive antennas (MIMO). Throughout the design, the goal was to create a model in such a way that a significant portion of the computations can be performed offline. This ensures the speed of the NS2 simulation was not noticeably reduced.

The intended use of this simulator is for perspective WiMAX clients to get an idea of how a WiMAX system would perform given their specific situation. It also serves as a base model of broadband wireless networking in NS2 that can be expanded upon by future academic and industry researchers.