WASHINGTON UNIVERSITY
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SCHOOL OF ENGINEERING AND APPLIED SCIENCE
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

EXPONENTIAL EFFECTIVE SIGNAL TO NOISE RATIO MAPPING
(EESM) COMPUTATION FOR WIMAX PHYSICAL LAYER

by
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ABSTRACT

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WiMAX (IEEE 802.16) is being introduced as one of the major future key technologies for wireless broadband. Performance modeling and simulations are required to obtain the best performance from WiMAX deployments. In WiMAX, the channel is divided into thousands of orthogonal subcarriers resulting in what is called Orthogonal Frequency Division Multiple Access (OFDMA). One of the major challenges in modeling WiMAX is to evaluate the channel quality and model the combined effect of interference on these subcarriers. EESM (Effective Exponential SINR Mapping) is a commonly used method to combine signal to interference and noise ratios (SINR) in such multi-carrier environments. EESM requires the use of a "beta" parameter that needs to be set correctly so that the channel model results in accurate block error rate (BLER) for a given modulation and coding scheme (MCS). In this thesis a simulation model of the WiMAX physical layer is implemented and several experiments are conducted to determine the beta values for a number of MCS used in WiMAX networks.