

ABSTRACT

To optimally implement the fifth generation mobile communication (5G) in Indonesia in 2020, the parameters of 5G should be designed match with the Indonesia 5G channel. This undergraduate thesis studies the 5G channel model of Indonesia using statistical spatial channel model (SSCM) technique. SSCM technique developed by New York University Wireless (NYU Wireless) is considered as the main reference in this thesis due to its accuracy and flexibility in environmental parameters setup.

This thesis studies and develops Indonesia 5G channel model based on real environmental parameters of Indonesia. This study is important because Indonesia has unique environmental parameters being different from other countries causing different channel model. Furthermore, 5G operating frequency is in between 1 – 100 GHz, which is a high frequency being sensitive to the nature. These environmental parameters are, for example, temperature, humidity, and air pressure. Bandung is used as the main parameters to represent parameters of environment of Indonesia.

5G channel model in this thesis is represented by the power delay profile (PDP) measured from thousands instantaneous PDP under Indonesia environmental parameters using computer simulation based on SSCM. From the obtained PDP, this thesis calculates the Shannon capacity for 5G Indonesia. The performance of 5G in Indonesia is predicted based on the analyzed channel capacity and outage probability, and is validated using orthogonal frequency division multiplexing (OFDM). Outage probability is obtained from the cumulative distribution function (CDF) of Shannon capacity expressing the probability when capacity drops below the code rate, causing detection failure. This thesis is expected to provide contributions to the implementation of 5G in Indonesia such that Indonesia can optimize and prepare optimal 5G technology in Indonesia by 2020.

Keywords: 5G, channel model, power delay profile, outage probability.