

ABSTRACT

Wireless technology is growing rapidly in various fields, of which one of implementations is in the health sector. Wireless capsule endoscopy (WCE) is developed to facilitate examination in the human digestive tract. Communication channels for WCE is slightly different compared to the air medium commonly used in terrestrial communication systems. Unknown WCE channel model, especially for people in Indonesia, may cause difficulties to the development of the WCE.

This final project aims to model the WCE channel using the New York University Simulator (NYUSIM) as the initial step to develop the WCE prior to the real-field experiment. This final project presents ultra-wideband (UWB) channel models with a frequency range of 3.4–4.8 GHz. UWB has great potential for this channel model due to low power consumption, low transmission rates, and accurate localization.

The results of this final project are: (i) proposed WCE channel model has 9 paths which are expected to represent WCE channels for transmission from within the body, (ii) WCE channel outage performances as WCE performance in theory, and (iii) practical performance bit error rate (BER) and frame error rate (FER) with simple channel coding, namely repetition codes and convolutional codes, as validation for the proposed channel model. The results of this final project are expected to be a reference for WCE development, especially in Indonesia.

Keywords: WCE, channel model, ultra-wideband