

ABSTRACT

The train signaling organization in the world is developing several technologies for high-speed train, one of which is the Future Railway Mobile Communication Systems (FRMCS) technology to be implemented in the world in 2022. This thesis studies FRMCS for Indonesian high-speed train and possibility of being interfered by Global System for Mobile Communication (GSM) cellular because of the use of the same or adjacent frequency bands.

This thesis evaluates the performance of FRMCS in Indonesia with and without interference from GSM cellular networks. The effect of interference to the FRMCS is analyzed in term of Bit Error Rate (BER) against Signal-to-Noise Power Ratio (SNR) for several given speed and interference levels. The evaluation was performed using the Indonesian FRMCS channel model obtained from New York University Simulation (NYUSIM), where outage probability is functioning as the best performance (lower bound).

The results of this thesis are the performance of FRMCS Indonesia with and without interference from GSM cellular to FRMCS signals along railroads in Indonesia, in term of (i) BER curve of FRMCS performance and GSM-R performances, and (ii) a safe distance curve between the FRMCS railroad and the cellular base station communication system. The result of this thesis shows that the performance of FRMCS is better than GSM-R in the aspect of resistance to interference. The results of this thesis are expected to be a reference for the implementation of FRMCS in Indonesia.

Keywords: Interference, FRMCS, GSM-R, BER, NYUSIM