

## **ABSTRACT**

*Indonesia, as a maritime nation with 70% of its territory comprising oceans, heavily relies on sea transportation for inter-island mobility and the distribution of daily necessities. However, before the advent of modern security technology, ship accidents and communication problems were frequent, especially in adverse weather conditions and at night. The Automatic Identification System (AIS) was introduced to enhance the safety and accuracy of maritime navigation. AIS enables the automatic exchange of navigational information between ships, helping to reduce accidents and improve the efficiency of shipping.*

*This study evaluates the impact of gain on a communication system based on the Automatic Identification System (AIS) using GMSK modulation with Universal Software Radio Peripheral (USRP), RTL-SDR, and GNU Radio. The research focuses on analyzing the Bit Error Rate (BER) at three different gain levels: 10 dB, 20 dB, and 30 dB. The results indicate that increasing the gain has a limited effect on reducing BER. At a gain of 10 dB, the average BER is 31.09%, while at a gain of 20 dB, the BER slightly increases to 31.16%. A small decrease in BER occurs at a gain of 30 dB, with an average value of 30.95%.*

*Although there is a reduction at the highest gain, the results suggest that increasing gain does not significantly improve signal transmission quality. Other factors, such as noise and interference, likely contribute to these results, indicating a need for more comprehensive system optimization. Overall, the 30 dB gain shows the best performance in reducing BER, but the improvement achieved remains within very marginal limits.*

*Keywords: Indonesia, maritime, Automatic Identification System (AIS), Software Defined Radio (SDR), Bit Error Rate (BER), GMSK.*