

## **Bit error rate comparison for radio frequency interconnection based on BPSK, PAM and QAM modulation**

### **ABSTRACT**

The advancement of Ultra Large-Scale Integration (ULSI) technology has motivated the need to find an alternative solution such as wireless communication and on-chip Radio Frequency (RF), a popular method to substitute the hardwired metal interconnect that has reached its performance limit due to material limitations. Single-input-single-output schemes such as Binary Pulse Shift Keying (BPSK) modulation, Phase Amplitude Modulation (PAM), and Quadrature Amplitude Modulation (QAM) implemented with the RF interconnect has increased its advantages. However, the type of channel used is still unclear. Thus, this paper evaluated the Bit Error Rate (BER) of these three modulation types under Additive White Gaussian Noise (AWGN) and Rayleigh multipath fading channels. The findings indicate that BPSK delivers the highest BER performance on the AWGN channel, while 8-ary PAM and 64-ary QAM output attain the best BER on the Rayleigh channels, irrespective of its signal-to-noise proportion (SNR). Comparing AWGN and Rayleigh channels shows that AWGN offers the highest BER performance regardless of the modulation techniques and SNR. Thus, BPSK achieves better BER performance in the AWGN channel.

