

## **Bit error rate using binary**

A study conducted by Li, F. et.al. (2022), evaluated wireless communication technology based on gamma rays. Due to frequency restrictions and inadequate penetration capabilities, radio waves from traditional radio frequency (RF) communication systems cannot go through some types of media. In light of this, the study suggests a higher energy gamma ray wireless communication system. This method uses scintillator detectors for the signal receiving demodulator and radioactive isotope sources and high-frequency motors for the signal modulation transmitter. Based on the suggested plan, a prototype system is constructed, and the operation of each component and the communication protocol are thoroughly explained. After choosing a  $^{241}\text{Am}$  source with an activity of roughly 6 mCi, the prototype's communication was tested at various communication rates, distances (in the air), and shielding layer thicknesses made of aluminum alloy. The study's findings indicate that the prototype can reach a maximum communication rate of 100 bps when the bit error rate is less than  $10^{-3}$ . At that speed, the prototype can communicate up to 60cm in the air, and the thickness of the aluminum alloy shielding layer that can pass through is nearly 25 mm strong. Reducing the communication rate can increase both the penetration thickness and the communication rate of 50 bps, the prototype can reach a maximum airborne communication distance of nearly 120 cm and a penetration thickness of nearly 45mm for the aluminum alloy shielding layer and enable wireless communication.

Source: Li, F. et.al. (2022). Wireless communication technology based on gamma rays.

<https://www.sciencedirect.com/science/article/abs/pii/S0168900222003692>

## **Other links:**

Singh, S. (2011). Structural modification of semiconductor optical amplifiers for wavelength division multiplexing systems.

<https://www.sciencedirect.com/science/article/abs/pii/S0079672711000024>

Majumdar, A. (2019). Demonstration of successful LEO/GO/Small Satellites/UAV/Airplanes to Ground Optical Communication Experiments: Opening Future Potential for All-Optical Networks around the World for Global Internet Connectivity.

<https://www.sciencedirect.com/science/article/abs/pii/B9780128133651000060>

<https://ieeexplore.ieee.org/document/4746334>

[https://scholarshare.temple.edu/bitstream/handle/20.500.12613/1358/Guin\\_temple\\_0225M\\_10533.pdf;jsessionid=78F228C6D807ADD87BA1F43B26D975CA?sequence=1](https://scholarshare.temple.edu/bitstream/handle/20.500.12613/1358/Guin_temple_0225M_10533.pdf;jsessionid=78F228C6D807ADD87BA1F43B26D975CA?sequence=1)

<https://iopscience.iop.org/article/10.1088/1757-899X/850/1/012056/pdf>

## **Accuracy**

<https://drive.google.com/file/d/1UtGZ1QP-n-jXeijhtr7vPIZwJDdiZMm/view?usp=sharing>