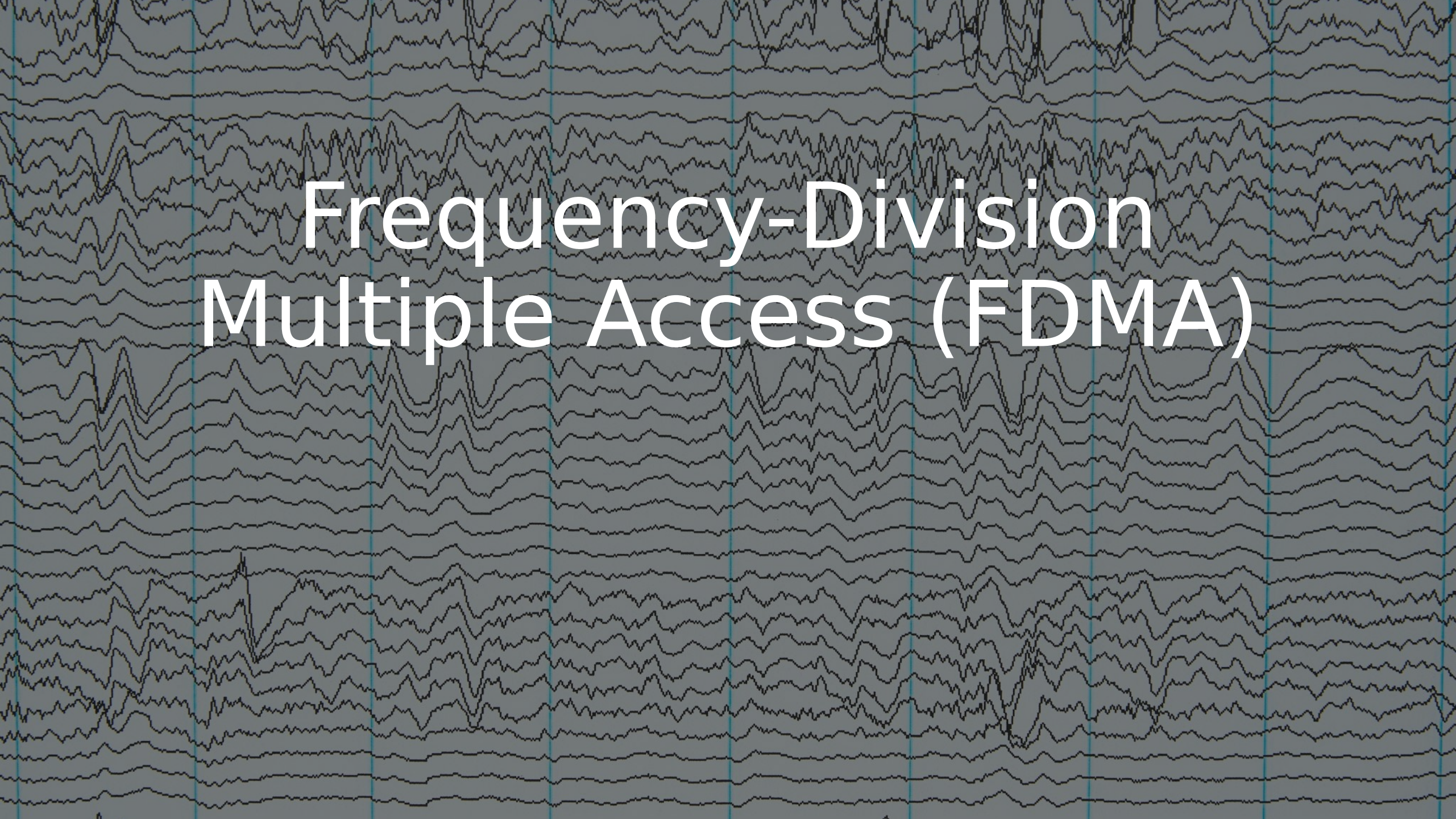
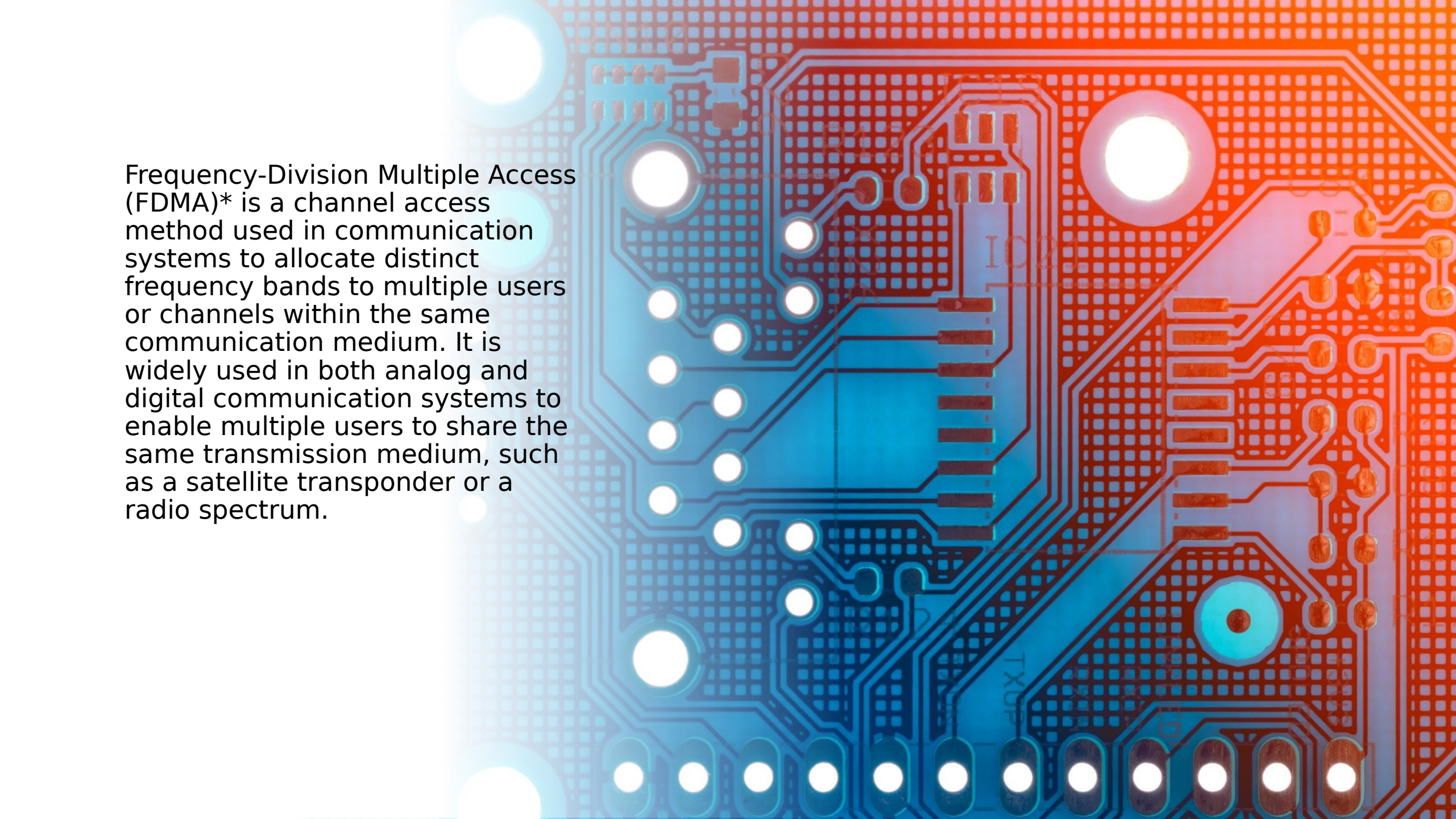
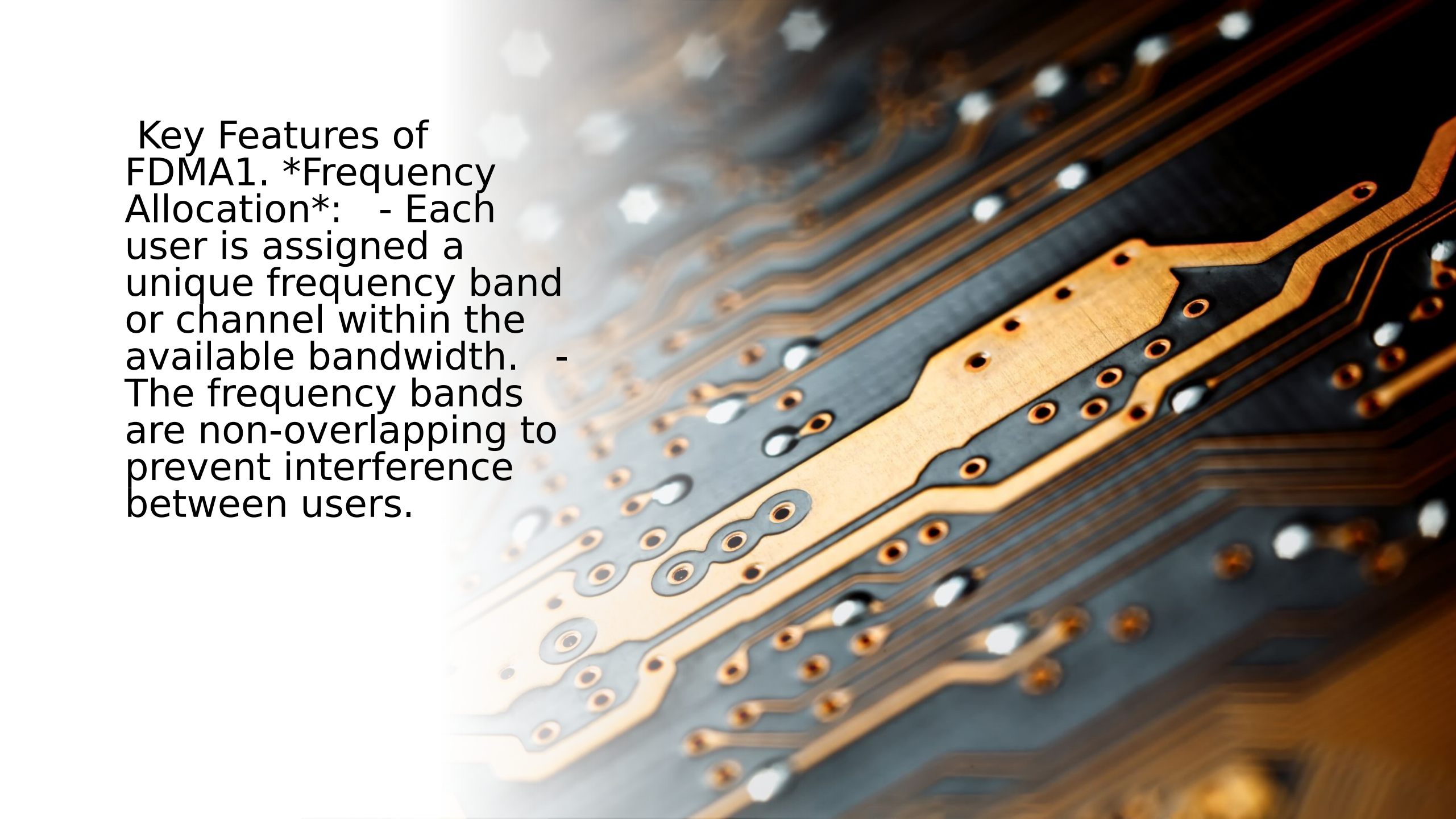

Frequency-Division
Multiple Access (FDMA)

Frequency-Division Multiple Access (FDMA)* is a channel access method used in communication systems to allocate distinct frequency bands to multiple users or channels within the same communication medium. It is widely used in both analog and digital communication systems to enable multiple users to share the same transmission medium, such as a satellite transponder or a radio spectrum.



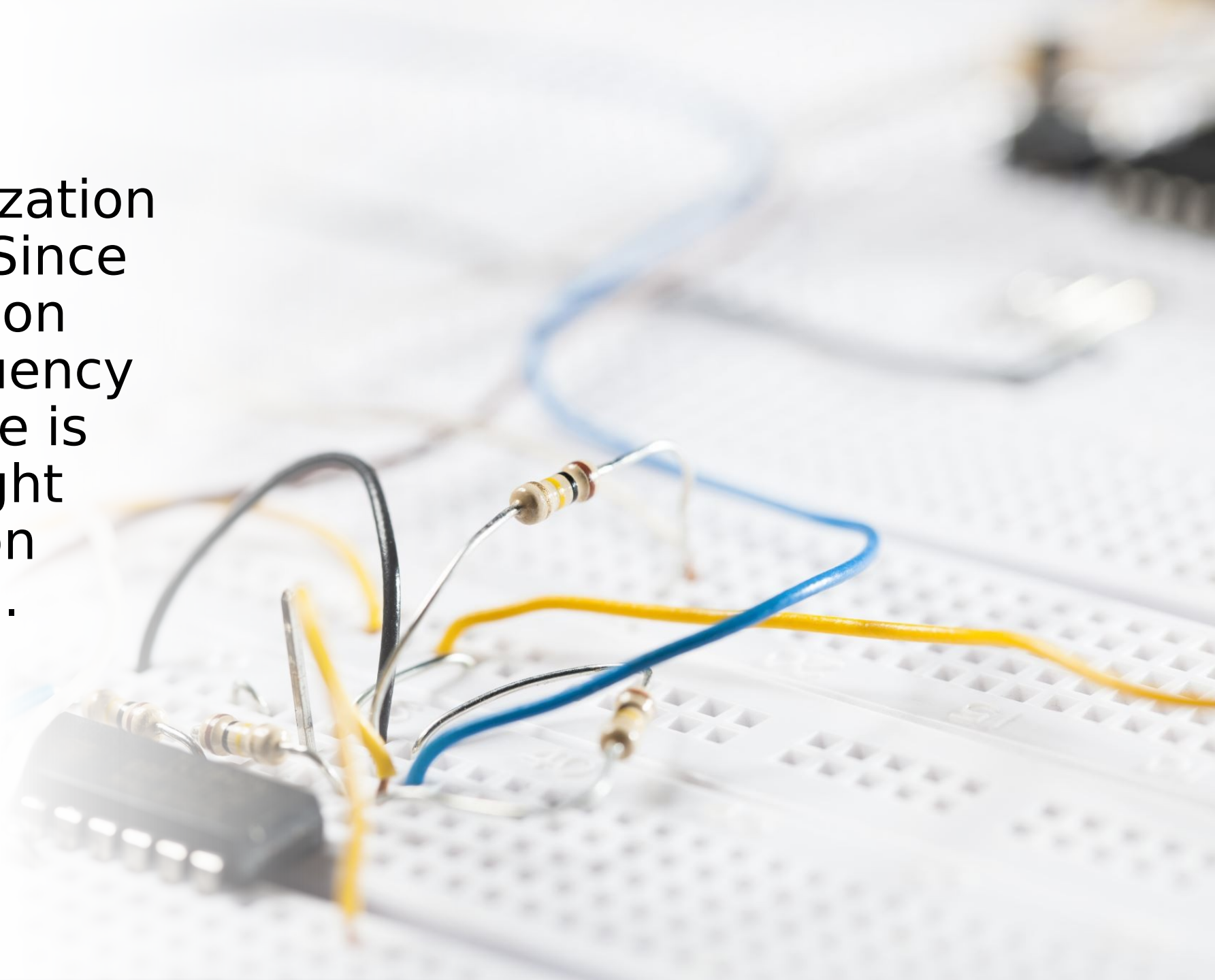


Key Features of FDMA1. *Frequency Allocation*: - Each user is assigned a unique frequency band or channel within the available bandwidth. - The frequency bands are non-overlapping to prevent interference between users.

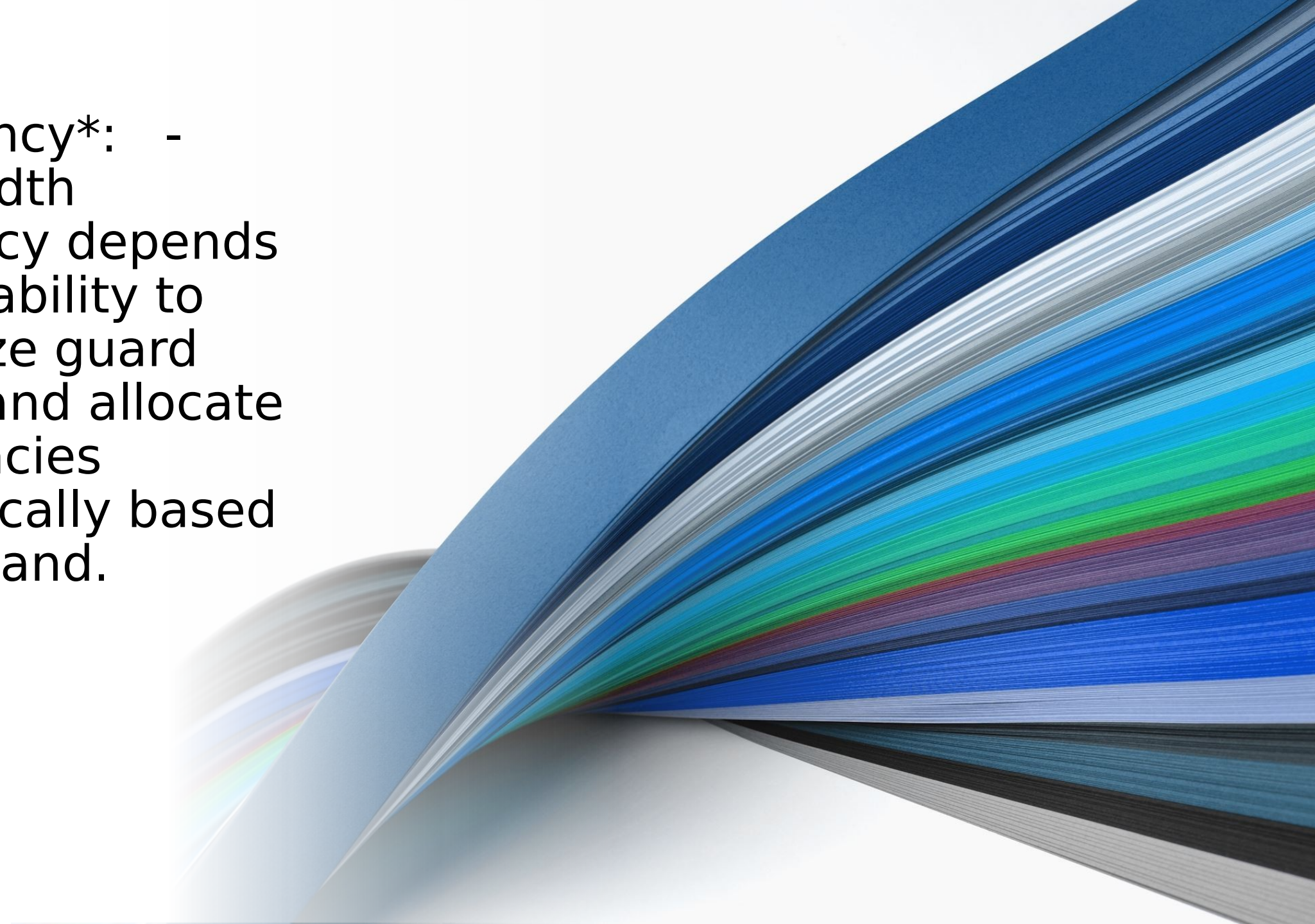
Continuous Transmission: - In FDMA, users transmit data continuously within their assigned frequency bands, making it suitable for analog voice communication.

Guard Bands: - Small gaps, called guard bands, are placed between frequency channels to reduce interference and ensure signal integrity.

No Synchronization Required: - Since users operate on separate frequency channels, there is no need for tight synchronization between them.



Efficiency: - Bandwidth efficiency depends on the ability to minimize guard bands and allocate frequencies dynamically based on demand.



Advantages of FDMA- Simple implementation and resource management.- Low latency due to continuous transmission.- Effective for analog systems and applications requiring consistent channel allocation.

Disadvantages of FDMA- Limited scalability: Fixed frequency bands limit the number of users.- Inefficient bandwidth utilization if channels are underused.- Susceptible to interference if guard bands are inadequate or signals are not properly isolated.