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(57) Abstract :
The present invention relates to a device for adaptive bandwidth allocation in communication channels comprising a monitoring unit (101), a control processor (102), an adaptive allocation engine (103), and channel interface modules (104). The device dynamically allocates spectrum resources based on real-time traffic demand, channel conditions, and user priority. A feedback loop mechanism ensures continuous optimization, while hardware-assisted allocation guarantees ultra-low latency. The invention enhances throughput, reduces latency, ensures fairness, and maintains compatibility with multiple communication standards, making it suitable for next-generation wireless networks including 5G, 6G, and IoT applications.

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