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(57) Abstract :
HIGH-EFFICIENCY, ULTRA-LOW POWER SIGNAL PROCESSING FRAMEWORK FOR TERAHERTZ-ENABLED NEXT-GENERATION WIRELESS NETWORKS ABSTRACT The invention presents a high-efficiency, ultra-low power signal processing framework for terahertz-enabled next-generation wireless networks. The framework comprises a terahertz signal acquisition module (110) for capturing terahertz frequency signals from a wireless channel, a low-power signal preprocessing unit (112) for initial signal conditioning, noise reduction, and amplification with minimal energy consumption, and an adaptive high-efficiency signal processing core (114). The core includes a high-speed digital signal processor (DSP) and an algorithmic module for advanced signal processing techniques optimized for low power usage. A power management system (116) ensures ultra-low power operation, while a data transmission interface (118) delivers processed signals to the network with high data integrity and minimal latency. A thermal management system (120) is employed to maintain optimal temperatures and prevent overheating of components. This framework enhances signal processing efficiency and power savings for advanced wireless communication systems.

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