Embedded Power Amplifier

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ABSTRACT

Researchers at the University of California, Davis have developed an amplifier technology that boosts power output in order to improve data transmission speeds for high-frequency communications.

FULL DESCRIPTION

CMOS-based technologies are widespread, providing a low-cost solution for many applications. However, several factors limit the effectiveness of these technologies in some high power or high frequency applications. Thus, an amplifier that can increase power output without reducing desired increases in gain would provide significant benefits when compared to existing communication technologies.

Researchers at the University of California, Davis have developed an amplifier that offers multiple techniques for boosting power and gain simultaneously. This combination of attributes also allows the amplifier to avoid common issues associated with impedance matching. These attributes are achieved in part by feeding a small fraction of the output power back to the input port using an embedded network. This technology also applies gain-boosting to reduce power stress and improves receiver signal-to noise ratios. The amplifier enables communications at very high frequencies, thus also offering opportunities for much higher data-rate transmissions than current networks can provide. This technology offers significant improvements for applications ranging from radar to imaging.

APPLICATIONS

- All types of communications desiring/requiring higher signal-to-noise ratios
- Security imaging and sensing and radar for autonomous vehicles or military applications
- Systems that would benefit from operating at higher frequencies and data rate transmission speeds than current technologies can offer

FEATURES/BENEFITS

- Boosts power output of amplifiers while simultaneously increasing gain
- Reduces power stress on processing blocks in transmitter chain
- Improves signal-to-noise ratio at receiver

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	12,184,244	12/31/2024	2020-041
United States Of America	Published Application	20250119109	04/10/2025	2020-041

INVENTORS

- Bameri, Hadi
- Momeni, Omeed

OTHER INFORMATION

KEYWORDS

Power amplifier, Gain boosting, Transmitter, Output power, Imaging, Sensing, Radar

CATEGORIZED AS

- **Communications**
  - Other
  - Wireless
- **Computer**
  - Hardware
  - Other
- **Imaging**
  - Other
  - Security
- **Security and Defense**
  - Other
  - Screening/Imaging
- **Sensors & Instrumentation**
  - Other
  - Physical Measurement
  - Position sensors
- **Transportation**
  - Automotive
  - Other
- **Engineering**

- Other

RELATED CASES

2020-041-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Reversed Feedback Amplifier Architecture
- Ultra-High Range Resolution Doppler Radar Front End With Quadrature-Less Coherent Demodulation
- Field Effect Bipolar Transistor
- Low Energy and Noise Sub-Sampling Phase-Locked Loop
- High-Frequency Imaging and Data Transmission Using a Re-configurable Array Source with Directive Beam Steering
- Hybrid Electromechanical Metamaterials for Optical and Electrical Devices
- Phased-Locked Loop Coupled Array for Phased Array Applications
- Scalable Phased Array Standing Wave Architecture
- Reducing Electrical Current Variations in Phase-Locked Loop Systems

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