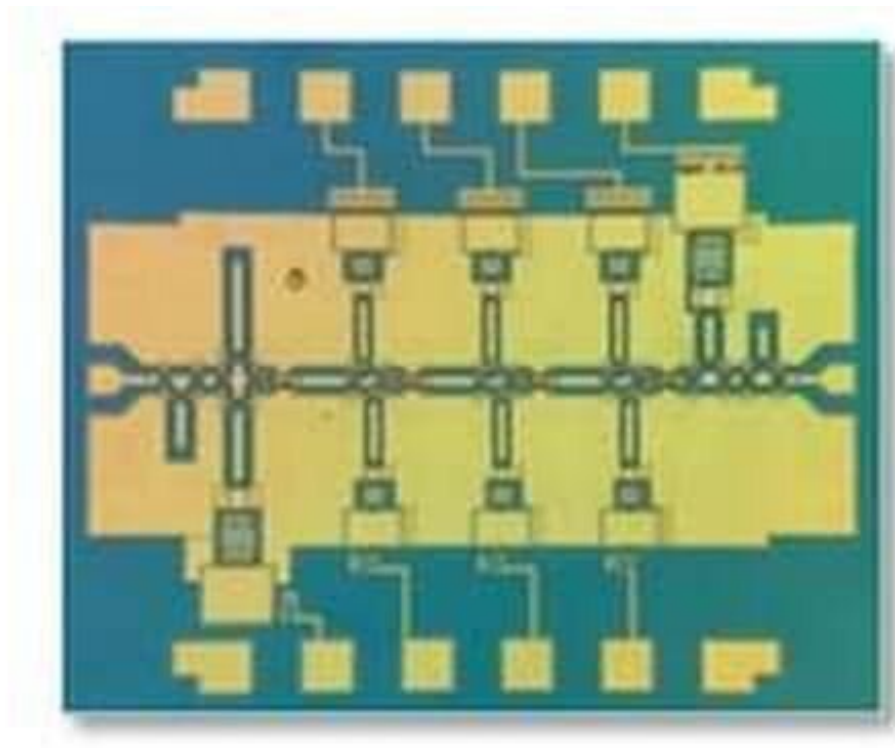


High-speed, high-capacity power amplifier for next-generation networks

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Newly developed D band power amplifier. Credit: NEC Corporation

NEC Corporation has developed a power amplifier that will serve as a key device for mobile access and fronthaul/backhaul wireless communication equipment to enable high-speed, high-capacity communications for 5G Advanced and 6G networks. This power

amplifier uses GaAs technology that can be mass-produced and has achieved the world's highest output power of 10 mW in the 150 GHz band. Capitalizing on this, NEC aims to fast-track both equipment development and social implementation.

5G Advanced and 6G are expected to deliver 100 Gbps-class high-speed, high-capacity communications, equivalent to 10 times the speed of current 5G. This can be effectively achieved through the use of the sub-terahertz band (100 to 300 GHz), which can provide a wide bandwidth of 10 GHz or more. In particular, early commercialization of the D band (130 to 174.8 GHz), which is internationally allocated for fixed [wireless communications](#), is expected.

NEC continues to make advancements in [technological development](#) by leveraging its knowledge of high-frequency bands cultivated through the development and operation of radio equipment for 5G base stations and PASOLINK, an ultra-compact microwave communication system that connects [base stations](#) via wireless communication.

The newly developed [power amplifier](#) uses a commercially available 0.1- μm gallium arsenide (GaAs) pseudomorphic high electron mobility transistor (pHEMT) process. Compared to CMOS and silicon germanium (SiGe) used for the sub-terahertz band, GaAs pHEMTs have high operation voltage and lower initial costs for [mass production](#).

In terms of circuit design, this power amplifier eliminates factors that degrade performance in the high-frequency band and uses an impedance matching network configuration suitable for high output power. This has resulted in the achievement of excellent high-frequency characteristics between 110 GHz and 150 GHz as well as the world's highest output power for a GaAs pHEMT.

In addition to the realization of high-performance, low-cost radio

communication equipment above 100 GHz, this power amplifier will accelerate the social implementation of 5G Advanced and 6G.

Going forward, NEC will continue developing technologies aimed at achieving high-speed, high-capacity, cost effective wireless communications for 5G Advanced and 6G.

NEC will announce further details regarding this technology at IEEE Topical Conference on RF/Microwave Power Amplifiers for Radio and Wireless Applications ([PAWR2023](#)), an international conference scheduled to be held in Las Vegas, Nevada, U.S., starting on January 22, 2023.

Provided by NEC Corporation

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