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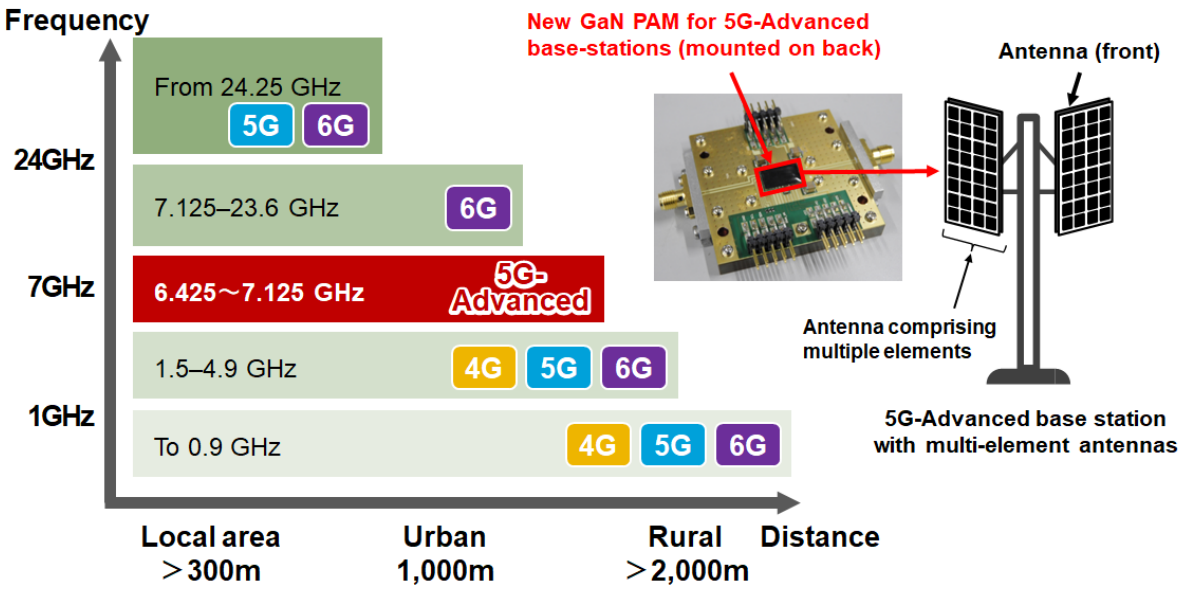
Mitsubishi Electric Achieves World's First Performance Verification of GaN Power Amplifier Module for 5G-Advanced Base Stations

Compact, high-efficiency module will enhance installation ease and power efficiency



5G-Advanced base station and newly developed GaN power amplifier module (PAM)

TOKYO, June 12, 2025 – Mitsubishi Electric Corporation (TOKYO: 6503) announced today that it has developed a world's first[1] compact 7GHz band gallium nitride (GaN) power amplifier module (PAM) with the world's highest[1] power efficiency, which is expected to enhance the ease of installation as well as the power efficiency of 5G-Advanced base stations and thereby support the transition to 6G. Mitsubishi Electric successfully verified its new PAM's performance in a demonstration using 5G-Advanced communication signals for the first time in the world.[1]

Mitsubishi Electric developed its 7GHz GaN PAM using proprietary matching-circuit technology and high-performance GaN transistors. The compact module measures only 12.0mm x 8.0mm (prototype) thanks to the high-density mounting of components, which will enhance the installation efficiency of 5G-Advanced base

[1] According to Mitsubishi Electric research as of June 12, 2025.

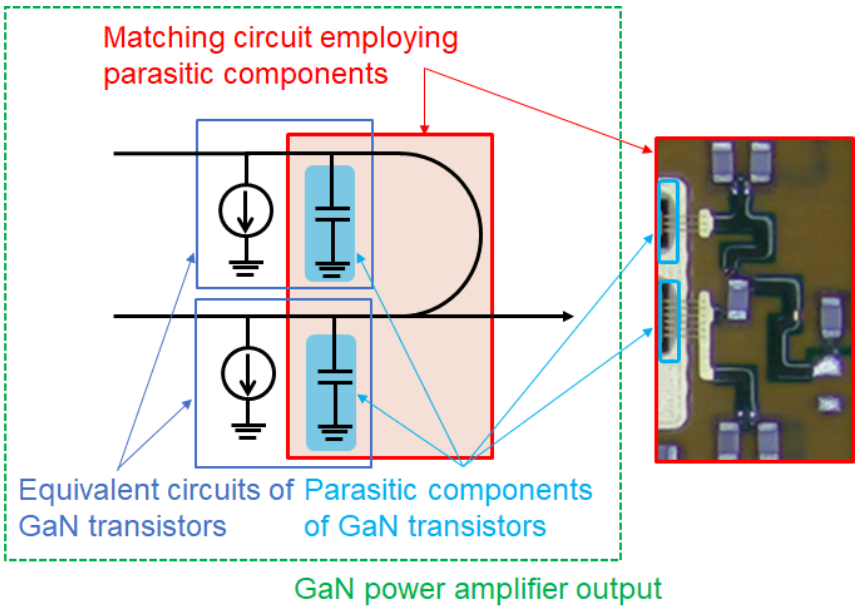
stations. Going forward, Mitsubishi Electric will continue research and development aimed at the practical application of the PAM in 5G-Advanced base stations.

Technical details will be presented at the IEEE International Microwave Symposium 2025, which will be held June 15–20 in San Francisco, CA, USA. In addition, a joint live demonstration with Wupatec will be conducted at the event's exhibition venue.

Product Features

1) World's first 7GHz GaN PAM realized with proprietary matching-circuit technology

- Unique technology utilizes the parasitic components[2] of GaN transistors as part of the matching circuit to suppress the power-efficiency degradation caused by parasitic components.
- PAM's compact size, just 12.0mm x 8.0mm (prototype), will facilitate the installation of 5G-Advanced base stations requiring high-density mounting.



Simplified circuit and photo of GaN power amplifier output

2) World's highest power efficiency achieved with high-performance GaN transistors

- The PAM incorporates GaN transistors with industry-leading[1] efficiency and Mitsubishi Electric's proprietary matching-circuit technology to reduce power loss.
- With world leading power efficiency of 41%, the PAM is expected to contribute to energy savings in 5G-Advanced base stations.

Confirmed Performance

Frequency	Power Efficiency / PAE[3]	Output Power	Power Gain	ACLR[4]
6.8–7.1GHz	41% / 35%	37dBm	25dB	-50dBc

[2] Unintended components that are not visible on the circuit diagram, caused by the internal or physical structure.
[3] PAE: Power Added Efficiency.
[4] ACLR: Adjacent Channel Leakage Ratio.

Background

5G-Advanced, an advanced version of 5G that enables ultra-high speed, high capacity, ultra-low latency and massive simultaneous connections, was standardized in 2023 and will be gradually commercialized this year. To achieve massive simultaneous connections, 5G-Advanced base stations use multi-element antennas that work together to form radio wave beams in any direction. The antennas are arranged according to wavelength, which is determined by frequency, to improve the precision of beam direction. However, 5G-Advanced uses very high frequency bands (6.425 to 7.125GHz) and therefore shorter wavelengths than current 4G and 5G systems. Consequently, the distance between each antenna becomes smaller, so the spacing is narrower between each PAM paired with an antenna on the back. As a result, the modules must not only be compact, but they must also consume minimal power since their amplifiers are susceptible to power loss due to heat generation.

Future Development

Mitsubishi Electric will continue its research and development of the newly developed 7GHz GaN PAM for practical use from 2025 to support the realization of 5G-Advanced base stations.

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About Mitsubishi Electric Corporation

With more than 100 years of experience in providing reliable, high-quality products, Mitsubishi Electric Corporation (TOKYO: 6503) is a recognized world leader in the manufacture, marketing and sales of electrical and electronic equipment used in information processing and communications, space development and satellite communications, consumer electronics, industrial technology, energy, transportation and building equipment. Mitsubishi Electric enriches society with technology in the spirit of its "Changes for the Better." The company recorded a revenue of 5,521.7 billion yen (U.S.$ 36.8 billion*) in the fiscal year ended March 31, 2025. For more information, please visit www.MitsubishiElectric.com

*U.S. dollar amounts are translated from yen at the rate of ¥150=U.S.$1, the approximate rate on the Tokyo Foreign Exchange Market on March 31, 2025