

Development of a 500 MHz High-Power Solid State Power Amplifier (SSPA) Based on GaN Transistors

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Recently, the adoption of Solid State Power Amplifier (SSPA) has been increasing in major accelerators worldwide, replacing tube amplifiers such as Klystron and IoT. This study aims to develop a GaN (Gallium Nitride) transistor-based High power SSPA as a domestic product that can be used as a key component in high-power RF amplifiers for Korea's 4th Generation Synchrotron Radiation Accelerator. In collaboration with domestic manufacturers capable of producing GaN transistors, we developed a prototype SSPA system with control performance equivalent to that of a future 150 kW SSPA, along with a high-efficiency 5 kW RF module. The research focused on optimizing the characteristics of GaN transistors to ensure the efficiency and performance of the SSPA, and to verify control features such as interlock and interface functions. This study is expected to contribute to the future production of high-power SSPA as domestic products, enabling cost competitiveness, fast delivery, and efficient maintenance. Furthermore, the SSPA system can be customized to meet the performance requirements of various research applications, making it adaptable for use in diverse studies.

Paper submission Plan

Best Presentation

Contribution track

ICABU WG1. Accelerator Systems

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