



News Release

Amkor Leads 5G mmWave Smartphone, IoT and Emerging Applications with Antenna in Package Technology

TEMPE, Ariz., July 22, 2019 — Amkor Technology, Inc. (Nasdaq: AMKR), a leading provider of outsourced semiconductor assembly and test (OSAT) services, is paving the way for 5G mmWave antenna in package (AiP) technology. Amkor's cutting-edge AiP technology has already been deployed into modules designed for smartphones and other mobile devices. Starting in July 2018, Amkor was the first OSAT to market with 5G mmWave AiP technology, expanding on years of advanced System in Package (SiP) experience.

"Amkor has deployed our AiP technology into 5G product applications with a major global communications company, working with them to produce their first AiP product to go to market," said Ron Huemoeller, Corporate VP of R&D for Amkor Technology. "A key focus for us is to continue to develop AiP products with revolutionary packaging concepts that are vital to the implementation of highly integrated circuitry," he added.

The total RF front-end module SiP market is projected to reach US \$5.3 billion by 2023, representing an 11.3% compound annual growth rate (CAGR) according to Yole Développement, SA, an industry consulting firm.

"5G will bring more packaging business for OSAT providers," said Santosh Kumar, Yole Korea principal analyst and director, Packaging, Assembly & Substrates. "Typical RF front-end components in smartphones include various switches, filters, amplifiers and the antennas themselves. More and more, SiP technology is needed to implement an increasing number of bands and the development of circuitry in ever-smaller surfaces."

In addition to its formidable SiP capacity and AiP technology, Amkor has developed an extensive toolset to maximize circuit density and address the sophisticated packaging formats required to productize 5G applications – such as double-sided assembly, embedded die in substrate, advanced RDL molding and various types of RF shielding. This toolset, combined with the company's expertise in RF and antenna package design, uniquely positions Amkor to serve customers who want to outsource the challenges and high investment associated with combining multiple ICs with advanced package assembly and test technologies for 5G networks.



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As demand for packages that support 5G starts to climb, Amkor is already well underway with the successful implementation of AiP technology. To learn more about Amkor's capabilities in SiP and AiP, visit <https://amkor.com/aip-aop>

About Amkor Technology, Inc.

Amkor Technology, Inc. is one of the world's largest providers of outsourced semiconductor packaging and test services. Founded in 1968, Amkor pioneered the outsourcing of IC packaging and test, and is now a strategic manufacturing partner for more than 250 of the world's leading semiconductor companies, foundries and electronics OEMs. Amkor's operating base includes 11 million square feet of floor space with production facilities, product development centers and sales and support offices located in key electronics manufacturing regions in Asia, Europe and the U.S. For more information, visit www.amkor.com.

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