

PRESS RELEASE

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Development and Fast Analysis of 3D Printed HF Components

3D printing is becoming increasingly important for the development of modern high frequency systems as it opens up new design possibilities. Fraunhofer FHR is exploring these possibilities for its customers and partners: from designing new HF components to testing these components. Engineers are inspecting the quality of components manufactured using additive processes with their high frequency transmitted light imaging system SAMMI®, e.g. to verify the correct density gradients of the material. As a member of the *Forschungsfabrik Mikroelektronik Deutschland*, they will present this system at the *Hannover Messe* in hall 2, booth C22, from April 23 to 27, 2018.

Compact, affordable, and optimized for specific applications – 3D printing is extremely flexible when it comes to setting the electromagnetic properties of new high frequency systems. One way to achieve this is through the different density distribution of the print material when the component is manufactured using additive processes. These are able to accurately build even the finest of structures, pushing the boundaries of conventional production processes and allowing for completely new HF component designs optimized for individual applications.

One challenge this poses is controlling the quality of the components manufactured using 3D printing technology. In particular, until now, it has been nearly impossible to show the permeability of the manufactured material to high frequency signals. Therefore, Fraunhofer FHR has adapted its high frequency transmitted light system SAMMI® (Stand Alone MilliMeter wave Imager) for the analysis of 3D printed structures. SAMMI® scans materials and their density distributions, verifying them quickly and reliably. In doing so, SAMMI® not only creates a visualization of the gradients in the material but also makes it easy to detect manufacturing defects. The system is compact, transportable and flexible in its use. Visitors at the Hannover Messe will have a chance to convince themselves of the system on site using material samples.

The SAMMI® measurement and inspection system was developed at Fraunhofer FHR for the scanning of packaged goods in industrial quality control. The system uses millimeter waves to detect differences in materials, the slightest of contaminations, or inhomogeneities in packaged products without contact or ionizing radiation. This results in a versatile field of application for the high frequency scanner. For instance, SAMMI®, has already been used as the basis for the development of food inspection or mail bomb detection scanners.

Editorial notes:

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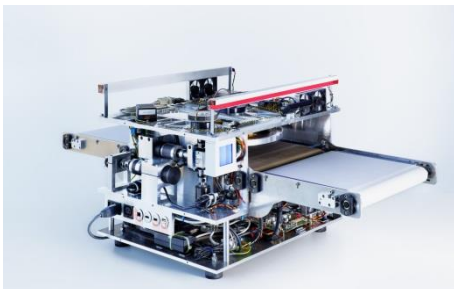
Fraunhofer FHR together with six other member institutes of the Fraunhofer Group for Microelectronics presents the Research Fab Microelectronics Germany (FMD) at this year's Hannover Trade Fair. The Fraunhofer FHR demonstrates the technology competence within the FMD in the field of Heterointegration.

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Within the **Research Fab Microelectronics Germany (FMD)**, eleven institutes in the Fraunhofer Group for Microelectronics cooperate with the Ferdinand- Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik and IHP GmbH - Innovations for High Performance Microelectronics in order to offer their customers a comprehensive and simpler access to the next generation of technology. The Research Fab Microelectronics Germany is the largest cross-site R&D cooperation for micro and nanoelectronics in Europe and offers the world's largest systems pool for technologies and intellectual property rights within the field of smart systems.

As one of Europe's leading institutes, the **Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR** conducts extensive research in the area of high frequency and radar technology. Its core research focuses on sensors for precise distance regulation and positioning as well as imaging systems. The applications range from systems for reconnaissance, surveillance, and protection to real-time capable sensors for traffic and navigation as well as quality assurance and non-destructive testing.



Fraunhofer FHR's high frequency scanner SAMMI® (left) analyses the quality of 3D printed high frequency structures (right). © Fraunhofer FHR

The pictures can be downloaded in printable quality at:
http://www.fhr.fraunhofer.de/hmi_sammi_3d_printing

The Fraunhofer-Gesellschaft is the leading organization for applied research in Europe. Its research activities are conducted by 72 institutes and research units at locations throughout Germany. The Fraunhofer-Gesellschaft employs a staff of more than 25,000, who work with an annual research budget totaling 2.3 billion euros. Of this sum, almost 2 billion euros is generated through contract research. Around 70 percent of the Fraunhofer-Gesellschaft's contract research revenue is derived from contracts with industry and from publicly financed research projects. International collaborations with excellent research partners and innovative companies around the world ensure direct access to regions of the greatest importance to present and future scientific progress and economic development.

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