Radome Application Example: Safety Thanks to Terahertz Technology

Modern vehicles contain highly sensitive instruments that must be protected against radiation. One question is particularly important: What material is used for the protective housing?

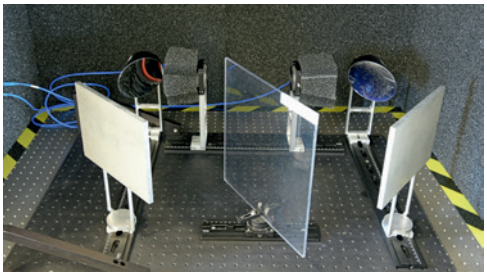
5G works with frequencies up to 40 GHz. The terahertz test uses frequencies from 100 GHz.

Mostly, these are glass fiber composite (GFRP) materials, which are used as multilayer composites. Since GFRPs are permeable to high-frequency radiation, they are used especially where highly sensitive components need to be protected, but the influence of the housing materials on the radiation must remain as low as possible. In the mobility sector in particular, these are mostly classic radar and communication applications, such as distance sensors in automobiles, the 4G and 5G mobile communications standards, and navigation instruments installed in aircraft noses, for example. This is why GRP housings for these applications are also referred to as "radomes".

Testing Radome Multilayer Composites

The Austrian company 4a manufacturing GmbH produces composite materials for radomes (CIMERA radomes), which are used in the 5G mm-wave and satcom industries, among others. Our "Materials Characterization and Testing" department is investigating for the company their composites for high frequency applications, especially in the range between four and 40 GHz. The structure of the complex multilayer composites is crucial here for the functionality of the materials and the question: at which frequencies do the radomes appear as "electromagnetically transparent" as possible for the desired target application? Up to now, 4a manufacturing GmbH has provided results from material simulations that allow statements to be made about this frequency behavior. These simulations are now additionally backed up by high-frequency measurements.

"Thanks to our shielded measurement chamber, we were able to get into the game here," says project manager Dr. Maris Bauer. Transmission and reflection measurements on test radomes verify the simulation results. End customers thus have the additional assurance that the materials from 4a manufacturing GmbH are suitable for their application purposes. In addition, our terahertz testing systems allow us to examine the internal structure of finished radomes, for example, in order to detect possible cracks or similar production defects at an early stage.



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