

# **Material inspection and classification by using the Standalone Millimeter Wave Imager - SAMMI**

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The following paper describes the great potential and usability of the millimeter wave technology for material inspection and classification by using SAMMI (Standalone millimeter wave imager). SAMMI offers the capability to look through non-conductive objects like wooden, plastic or glass materials, it visualizes defects or material distribution within the measurement object of optical optically not transparent objects. This contactless measurement method is suitable to analyze e.g. the amount and dispersion of glue between materials, visualizes knotholes inside construction timber or detects impurities inside goods like plastic splinter, glass or metallic splinter inside a chocolate bar. SAMMI is a phase coherent rotating high frequency system demonstrator. It covers the frequency range between 80GHz and 92GHz with an output power of approximately 5mW. Belonging to the rotating velocity of the scanning antenna pair, the measurement time for an object of size of a DIN A 4 paper is 40s at the highest image quality. For industrial application, additional scanner configuration can be used for faster scanning rates up to 10 kHz. Due to the high bandwidth it is possible to perform a 3d image of the scanned object. The millimeter wave technology could be more cost-efficient and easier to integrate into existent applications in place of x-ray systems by lower maintenance effort. In addition, there are no safety regulations due to the ionization potential of x-ray radiation.