Abstracts

Three-dimensional microwave tomography: experimental imaging of phantoms and biological objects

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Microwave tomographic experiments have been performed on a three-dimensional (3-D) phantom and excised canine heart using a 3-D system operating at frequency of 2.4 GHz. A modified gradient reconstruction approach has been employed for the 3-D image reconstruction. To compare two-dimensional (2-D) and 3-D approaches, we also performed 2-D image reconstruction using an approach based on the Newton method. Experimental data acquired on experimental phantoms were analyzed using both 2-D and 3-D reconstruction approaches. High-quality images were reconstructed using the 3-D approach. The reconstruction procedure failed when the 2-D approach was applied to reconstruct images of the 3-D object. An image of the dielectric properties of the excised canine heart was obtained using a 3-D reconstruction approach. Images successfully revealed a complex internal structure of the heart, including both right-hand side and left-hand side ventricles.

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