

ABSTRACT

Spatial resolution is one of the parameters used to determine image quality in a computed tomography (CT) scan imaging system. It can be quantitatively assessed through the measurement of the Modulation Transfer Function (MTF). Currently, MTF measurements in CT scan imaging systems are still limited to axial (x-y) MTF measurements. This study aims to analyze the spatial resolution of CT images through three-dimensional MTF (3D-MTF) measurements using a cylindrical 3D wire phantom. The phantom contains three thin wires with a diameter of 0.3 mm, arranged orthogonally to form the x, y, and z axes at its center. Images of the phantom were acquired using a GE Revolution Evo 128-Slice CT Scanner. The 3D image reconstruction (coronal and sagittal) was obtained through the image reformatting technique using cubic interpolation on axial images. Automated MTF measurements performed using IndoQCT showed that tube voltage had no significant impact on the 10% MTF value in the axial (x-y), coronal (z), and sagittal (z) directions. In contrast, the reconstruction kernel significantly influenced the 10% MTF value in the axial (x-y) direction but did not affect the 10% MTF value in the coronal (z) and sagittal (z) directions.

Keywords: 3D MTF, computed tomography, tube voltage, kernel reconstruction.