Microwave imaging of breast cancer: Electric field analysis of flexible antennas with breast phantom

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X-rays Mammography is a gold-standard for breast cancer detection. Mammography has many shortcomes like painful screening, false results, need biopsy for results verification etc. Microwave Imaging (MWI) emerges as a painless alternative technique for breast screening. MWI works on the principle of reconstruction of image using inverse scattering radiation from spatial distribution of dielectric properties of breast tissues. In the present work, flexible rectangular split antenna, with pyralux polyimide substrate and 41x23 mm2 in size, were simulated and characterized the presence of a breast phantom. The phantom has the dielectric properties of normal breast tissues and malignant tumors. The resonance frequency of antenna is 2.2 GHz, which is in compliance with the suitable frequency range for breast cancer imaging from the literature. Results shows that the electric field distribution is maximum at around the tumor tissue which is about 350V/m, whereas in healthy tissue the maximum electric field is 139V/m and for skin tissues is 103V/m. The electric field is directly related to the specific absorption rate (SAR) of radiations which is also higher for tumor tissue with respect to normal.

Speaker Biography

Maryam Liaqat did her Master's in Physics in 2013 from University of Agriculture, Pakistan. Currently, she is perusing PhD in Electrical Engineering from Federal University of Pernambuco, Brazil. She is working on project of microwave antenna modifications for the detection of breast cancer. Designing flexible antennas for microwave imaging system, which will be user friendly, cost effective and more precise in results as compared to x-ray mammography.

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