

Planar Spiral Antenna for Brain stroke detection

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Abstract: Spiral antenna is designed to detect brain stroke. It operates in the MedRadio spectrum. The antenna is simulated using CST microwave studio and fabricated on Rogers 4350 of thickness 1.524 mm, relative permittivity of 3.66 loss tangent of 0.04 S/m and operate at 426.6 MHz . It is placed on the external surface of the human's head to detect brain stroke. It is measured on a real human's head using the network analyzer. There is a good agreement between the measured and simulated results.

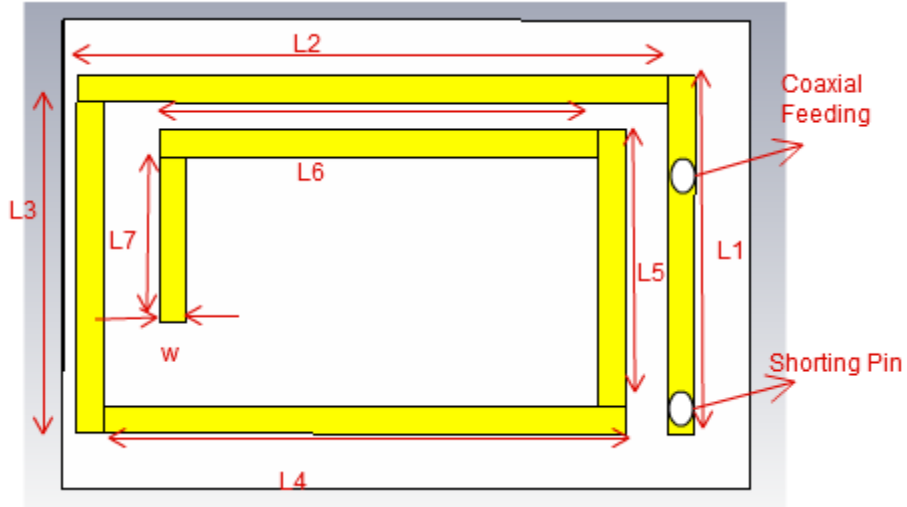
Keywords: planar spiral antenna; Brain stroke detection; Med Radio spectrum.

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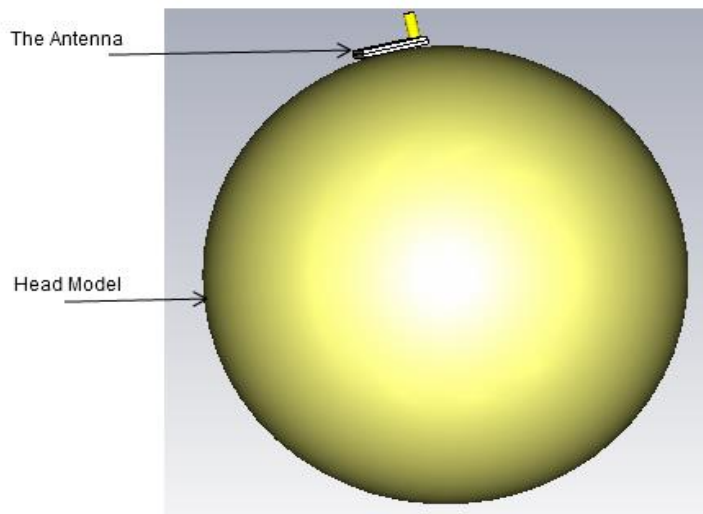
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Antenna Design

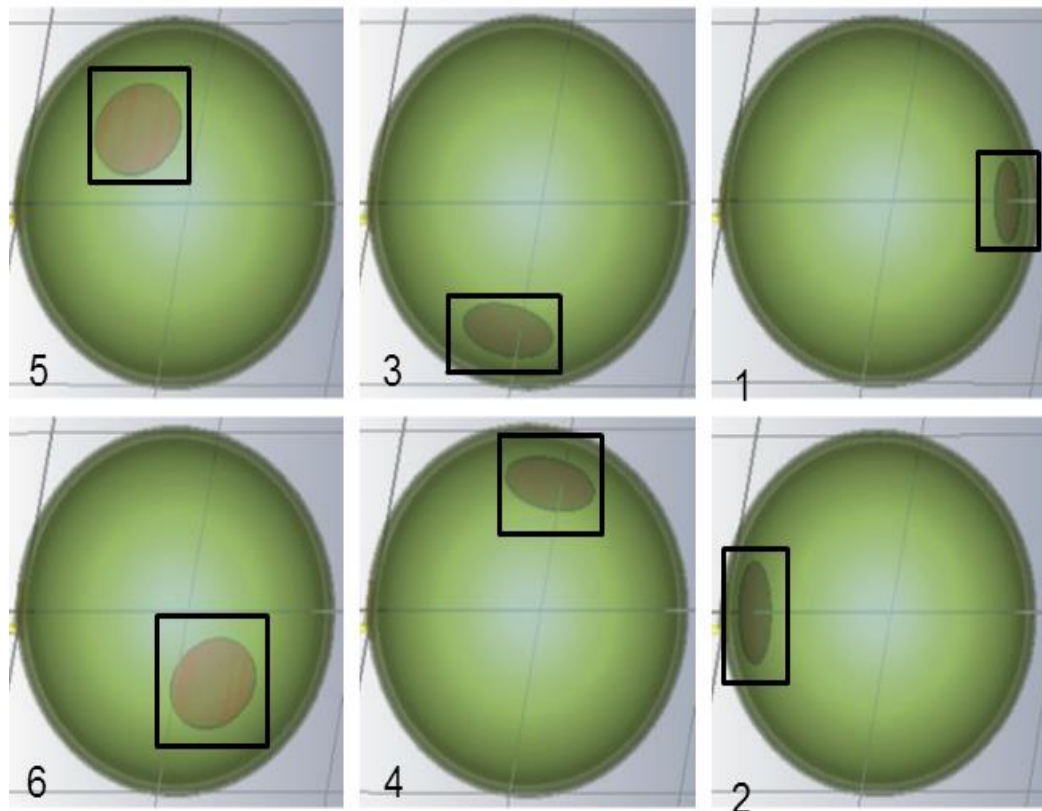


Spiral Patch dimensions

Dimensions	Length in mm
L1	13
L2	21.5
L3	12
L4	18
L5	10
L6	16
L7	7
W	1



Effect of Brain Stroke on the Antenna Performance



Different positions of brain stroke	Resonance frequency at stroke radius 5mm (MHZ)	Resonance frequency at stroke radius 10 mm (MHZ)	Resonance frequency at stroke radius 15 mm (MHZ)	Resonance frequency at stroke radius 20 mm (MHZ)
Position 1	426.4	426.4	426.2	426.2
Position 2	426.4	426.4	426.2	426.2
Position 3	427	426.2	426.4	426.4
Position 4	427	426.2	426.4	426.4
Position 5	425.6	426.8	426.4	426.4
Position 6	425.6	426.8	426.2	426.4

Conclusion

- The paper illustrates the design and implementation of a spiral antenna for brain stroke detection, positioned directly on the head. It is simulated using CST microwave studio and fabricated on Rogers 4350 of thickness 1.524 mm, relative permittivity of 3.66 and loss tangent of 0.04 S/m. There is a frequency shift of 200 to 800 KHz between the normal head and the one with brain stroke infection. Finally, there is a good agreement between the measured and simulated results of the antenna on the normal head.

Antenna Measurements

