Analysis of a Planar Inverted-F mobile handset Antenna with reduced radiation *towards human head*

Anand.VR, Rasmi.TR, Aanandan C.K
Cochin University of Science and Technology, Department of Electronics, Cochin 682022

Introduction: This study present the analysis of a new mobile handset PIFA antenna with low SAR and temperature distribution on human head. Also the comparison between this antenna with Omni directional PIFA with same specification of proposed antenna

Proposed Antenna Geometry

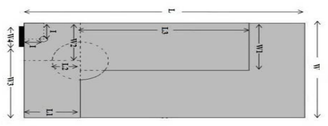

Figure.1(a). Top view

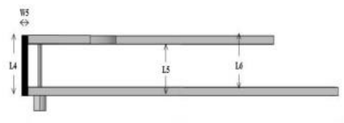

Figure.1(b). Side view

(W=50mm,L=100mm,L1=20mm,W1=25mm,L2=10mm,W2=10mm,I=4mm,W3=41mm,W4=7mm,L4=11.6mm,W5=0.2mm,L5=10mm, L6=10mm)

Computational Methods: used the RF module and the bio heat transfer modules of the COMSOL software.

Antenna parameters:

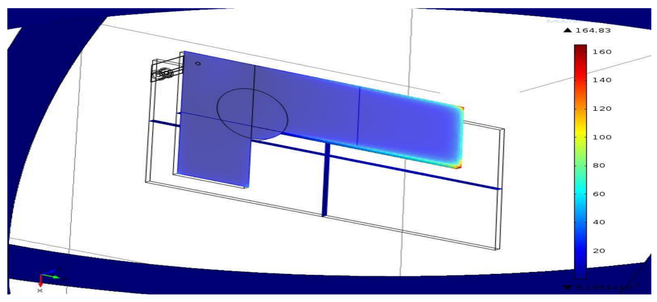

Figure 2. Electric field distribution on antenna

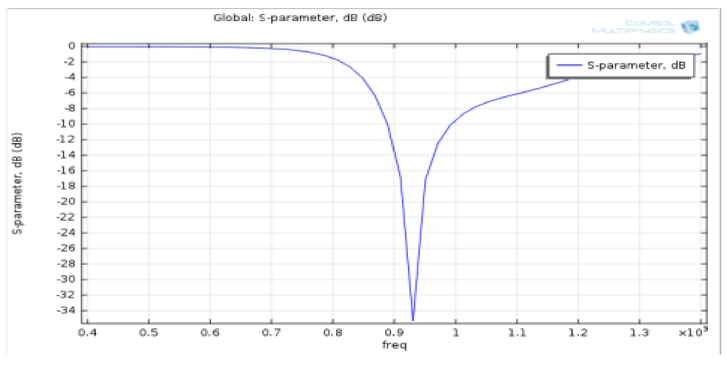

Figure 3. Simulated return loss

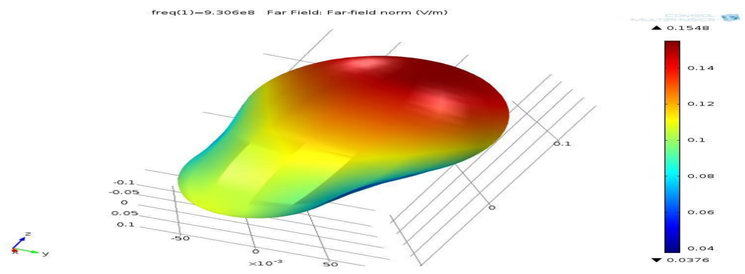

Figure 4. Radiation pattern

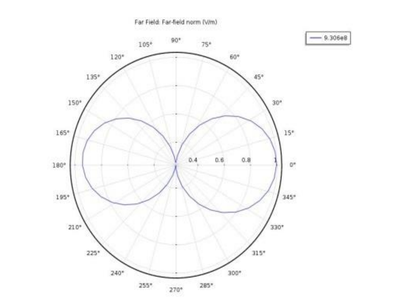

Figure 5. Radiation pattern Omni directional antenna

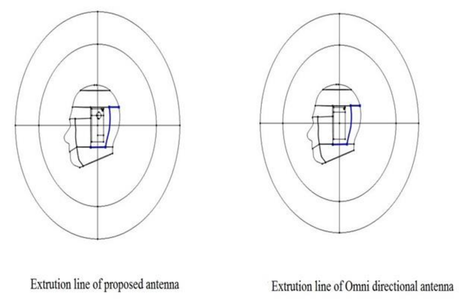

Figure 6. Extrusion line

Results: The SAR distributions and temperature increases (ΔT) in a human head model for the proposed PIFA antenna and comparison with the Omni directional PIFA antenna is given below.

Comparison with the Omni directional PIFA antenna

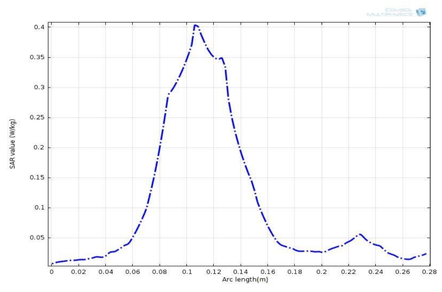

Figure 7. SAR variation of proposed Antenna

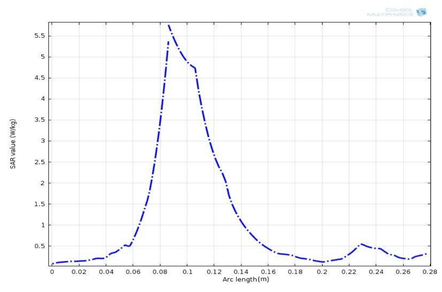

Figure 8. SAR variation of Omni directional Antenna

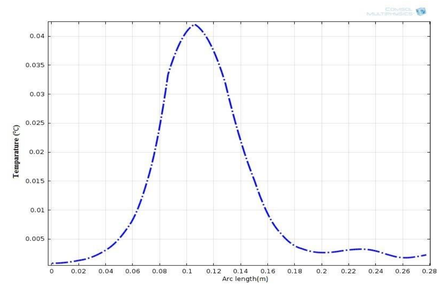

Figure 9. Temperature increase of proposed Antenna

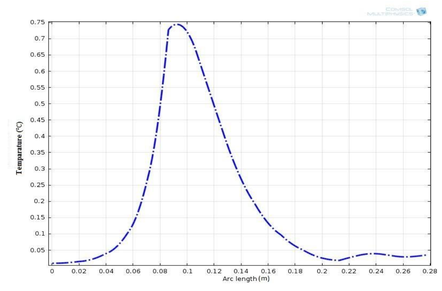

Figure 10. Temperature increase of Omni directional antenna

Conclusions: The results show that there is a significant increase in SAR and temperature increase in Omni directional PIFA antenna than the proposed antenna

References:

1. Mihaela Morega ,computed SAR in human head for the assessment of exposure from different phone device antennas, Environmental Engineering and Management Journal (2011)

Excerpt from the Proceedings of the 2014 COMSOL Conference in Bangalore