

# Study on the Appropriate Dimensions and Position of Slots and Notches in the Ground Plane of Planar Monopole Handset Antenna for Bandwidth Enhancement

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*Abstract* – A slotted ground plane structure combined with a multiband planar monopole handset antenna for bandwidth enhancement and resonant modes tuning is presented. By simply inserting intelligent modifications using slots and notches to the system ground plane of an internal multiband handset antenna, a significant improvement in the bandwidths of lower bands LTE 700/GSM 850/GSM 900 and upper bands GSM 1800/1900, UMTS, LTE 2300/2500, WiMAX 3500, WLAN 2400/5200/5800 is achieved. The influences of the proposed slots and notches with different positions and dimensions on antenna performance are analyzed by means of simulations and parametric studies. Results show that the proposed ground plane modifications have improved the handset antenna performance to cover 12-band standard operations successfully.

distribution can be perturbed [4-6] by inserting intelligent slots and notches which efficiently provoke ground plane radiation and improve antenna performance. This study demonstrates the use of slots and notches in the ground plane to produce multiband operation with wideband characteristics. The antenna used for this purpose is a planar printed monopole antenna which combines a coupled-fed radiating element with a meandered shorted coupling strip. The proposed ground plane modifications effectively adjust the electrical lengths of the ground plane to the optimal lengths required by the low, middle and high frequency bands. The final antenna design has four