

In this paper, a quantitative analysis to obtain the equivalent circuit parameters of helix-on-pads (HoPs) is presented. To simplify the analysis, the HoP, which is a kind of helical wires vertically mounted on a dielectric substrate, is subdivided into two parts using the split-up method based on field distribution. The analysis derives RLGC formulas of the HoPs for various dimensions and number of loops. To verify the accuracy of the derived RLGC model, electromagnetic (EM) simulations for various HoPs cases are also performed. The EM-simulated results show a good agreement with the calculated results. To experimentally demonstrate the analysis and usefulness of the HoP, two HoPs are designed and fabricated for W-CDMA dual-band (Band-2 and Band-5) handset power amplifier (PA) applications. Measured RF performances of the standalone HoPs and composite PA show good agreements with the calculated results, thus validating the usefulness of the analysis and design.