

This paper describes the development of a capacitively coupled high-pressure lamp with input power between 20 and 43 W at 2.45 GHz, using a coaxial line network. Compared with other electrodeless lamp systems, no cavity has to be used and a reduction in the input power is achieved. Therefore, this lamp is an alternative to the halogen incandescent lamp for domestic lighting. To serve the demands of domestic lighting, the filling of the lamp is optimized over all other resulting requirements, such as high efficacy at low induced powers and fast startups. A workflow to develop RF-driven plasma applications is presented, which makes use of the hot S-parameter technique. Descriptions of the fitting process inside a circuit and FEM simulator are given. Results of the combined ignition and operation network from simulations and measurements are compared. An initial prototype is built and measurements of the lamp's lighting properties are presented along with an investigation of the efficacy optimizations using large signal amplitude modulation. With this lamp, an efficacy of 135 lmW^{-1} is achieved.