ABSTRACT

In wireless charging applications simulated that when parking the car to do the charging where the circuit Tx in planting on the parking floor, and Rx circuit mounted on the bottom of the car. When the car is parked it is possible that the Tx and Rx circuit is misaligned so that the power transfer efficiency decreases. Coil design for wireless charging applications from previous researchers is difficult to determine which shows the most optimum efficiency values at misalignment as measured by different distance parameters and resonance frequencies as well, Inductive Power Transfer system transfers power from the primary to secondary coils using electromagnetic induction with principle as in the transformer. In this study, the efficiency ratio of the coil design was proposed with two coil designs of wireless charging from the previous research reference measured with the same distance, misalignment and resonance parameters. The overall dimension of the coil is 26.5 cm x 36.5 cm. For a 0cm (0%) to 10cm (27.4%) misalignment condition, the coil designer's design performance still shows the best value up to a distance of 10.3 cm coil. At a distance above 10.3 cm and a misalignment above 10 cm the researcher's efficiency decreased slightly below other designs. In order to get a better performance value than these three coil designs, further research is needed regarding the load impedance to be used because the calculation of the load impedance values based on the formula is rather difficult to fulfill with a real load impedance.

Keyword: *Inductive Power Transfer, Resonance Frequencies, Misalignment, Wireless charging*

ABSTRAK

Pada aplikasi *wireless charging* disimulasikan bahwa saat parkir mobil melakukan pengisan daya dimana rangkaian Tx di tanam di lantai parkir, sedangkan rangkaian Rx dipasang pada bagian bawah mobil. Saat mobil diparkir besar kemungkinan antara rangkaian Tx dan Rx mengalami kondisi *misalignment* sehingga nilai efisiensi transfer daya turun. Desain koil untuk aplikasi *wireless charging* dari peneliti sebelumnya sulit ditentukan manakah yang menunjukkan nilai efisiensi yang paling optimum saat *misalignment* karena di ukur dengan parameter jarak serta frekuensi resonansi yang berbeda juga, Sistem *Inductive Power Transfer* mentransfer daya dari kumparan primer ke sekunder menggunakan induksi elektromagnetik dengan prinsip seperti pada transformator. Pada penelitian ini dilakukan perbandingan efisiensi dari desain koil yang diajukan dengan dua desain koil *wireless charging* dari referensi peneliti sebelumnya yang diukur dengan parameter jarak, *misalignment* serta frekuensi resonansi yang sama. Dimensi keseluruhan koil yaitu 26,5 cm x 36,5 cm. Untuk kondisi *misalignment 0* cm (0%) sampai 10 cm (27,4%) performa desain koil peneliti masih menunjukkan nilai yang terbaik sampai dengan jarak koil 10,3 cm. Pada jarak diatas 10,3 cm dan *misalignment* diatas 10 cm effisiensi peneliti sedikit menurun di bawah desain lainnya. Agar mendapatkan nilai performansi yang lebih baik dari ketiga desain koil ini, diperlukan penelitian lebih lanjut mengenai besarnya impedansi beban yang akan digunakan karena hasil perhitungan nilai impedansi beban berdasarkan rumus agak sulit untuk dipenuhi dengan impedansi beban nyata.

Kata Kunci: *Frekuensi resonansi, Inductive Power Transfer, Misalignment, Wireless charging*