An effective method of degrading electromagnetic field in resonant inductive power transfer of automotive vehicle for public safety

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Public exposure to high frequency time varying electromagnetic field is a serious threat to human health, and there has been continued resistance to the rapid development of wireless charging in automotive vehicles. Resonant inductive power transfer (RIPT), especially at high power, becomes a source for such electromagnetic stray field. Consequently, compliance to safety standard guidelines of international and regional regulators could guarantee public safety [1,2].

This work proposes a suitable alternative for degrading such magnetic fields, without adding much complexity to the system. A distinctive mechanism of flux interaction in multichannel RIPT [3,4] has properly been harnessed to degrade the intensity of the potential electromagnetic field reaching general public within a close range. RIPT system of 50 kw/85 Hz has been designed using both single-channel and three-channel topology to compare their extended magnetic stray field at 0.8 m away from the center of the charging zone. Simulation outcomes revealed a significant reduction of these stray fields by the proposed three-channel system to the tune of 68% when compared against the conventional one-channel system. This may expose new possibilities, and could eventually encourage the competitiveness of commercialization of automotive vehicles with wireless charging facility. This is promising especially for public bus transport where a charging system may be needed at high power.

References

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