

Description of Attached Video

The attached video named “Experimental Synchronization Results of Different WPT Systems” shows experimental synchronization results in different WPT systems. “Experiment 1” is the WPT system with one active receiver. Two independent DSP controllers are utilized and the synchronization technique performs well. The input dc voltage and current are 50 V and 4.3 A, respectively. The load is $50\ \Omega$ and the output dc voltage is regulated at the desired 100 V. Thus, the dc-to-dc efficiency is about 93%. For operational convenience, magnetic core is not used on the receiver side. The coupling factor can be increased by installing a magnetic core, which can improve the overall efficiency. “Experiment 2” is a two-active-receiver WPT system without cross coupling between the receiving coils. The transmitting coil lies in the middle and the cross coupling between the two receiving coils can be neglected. Three independent DSP controllers are utilized. v_2 and i_2 are shown in the upper portion of the oscilloscope. v_3 and i_3 are shown in the lower portion of the oscilloscope. As can be seen in the video, v_2 , i_2 , v_3 and i_3 are stable and the power can be transferred to the two receivers successfully. “Experiment 3” is a two-active-receiver WPT system with cross coupling between the receiving coils. Three independent DSP controllers are utilized. The receiving coils are on the upward side. The cross coupling mutual inductance between the receiving coils is comparable with the mutual inductances. The input voltage increases to 50 V slowly. As can be seen in the oscilloscope, v_2 and v_3 are in phase with i_2 and i_3 , respectively. As shown intuitively, all the systems are stable and the power can be transferred to the active receivers successfully. The experimental results validate the feasibility and effectiveness of the proposed synchronization technique.