EEE 1901 TARP

WIRELESS CHARGING SYSTEM OF ELECTRIC VEHICLE

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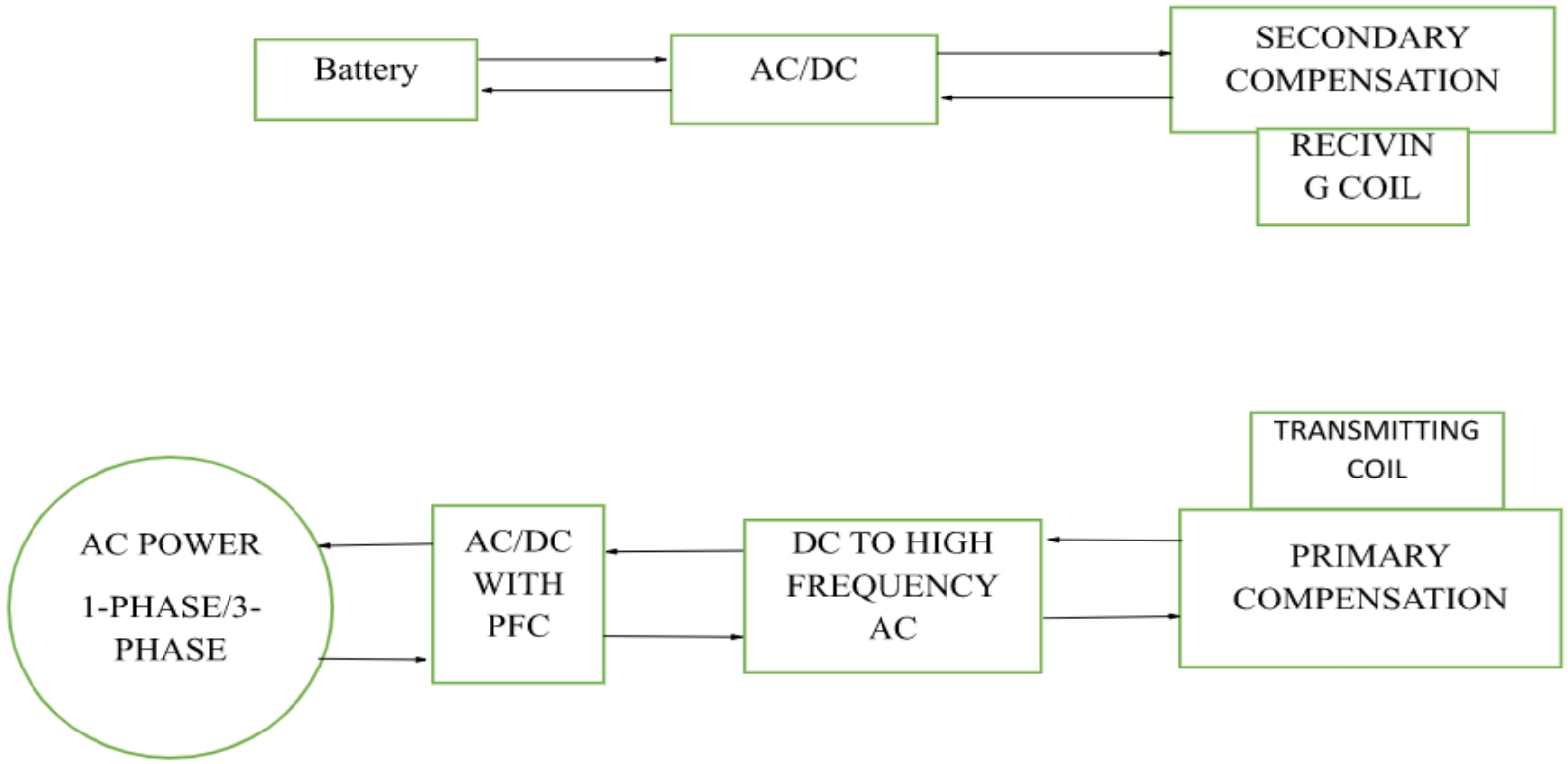
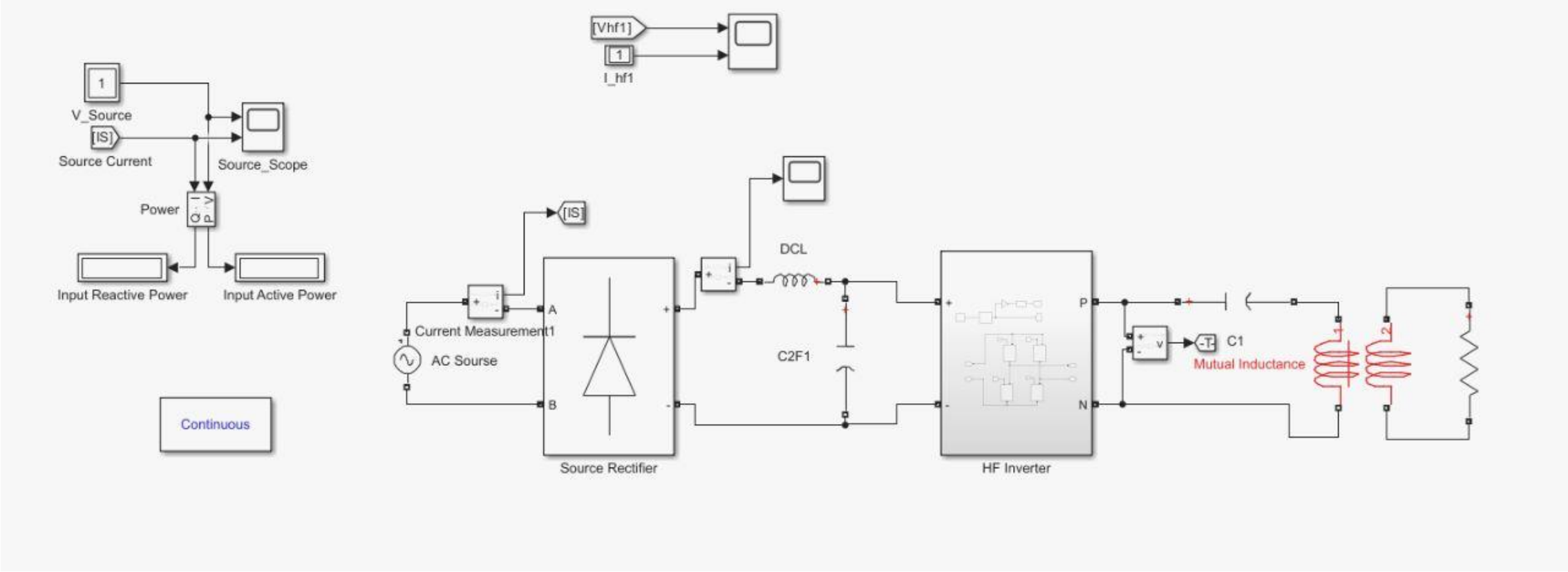
OBJECTIVE:

- To design and simulate a wireless charging system for Electric Vehicle.
- The project is to charge the battery using wireless charging system using magnetic resonance between roads and the inductor in the vehicle.
- It will always ensure the availability of battery pack for the EVas it is charged continuously while in motion as well as in stationary position. It also eliminates the plugging in of charging cables.
- First, the utility ac power is converted to a dc power source by an ac to dc converter.
- Then, the dc power is converted to a high-frequency ac to drive the transmitting coil through a compensation network which will be placed under the ground.
- The high-frequency current in the transmitting coil generates an alternating magnetic field, which induces an ac voltage on the receiving coil. By resonating with the secondary compensation network, the transferred power and efficiency are significantly improved. At last, the ac power is rectified to charge the battery.

BLOCK DIAGRAM

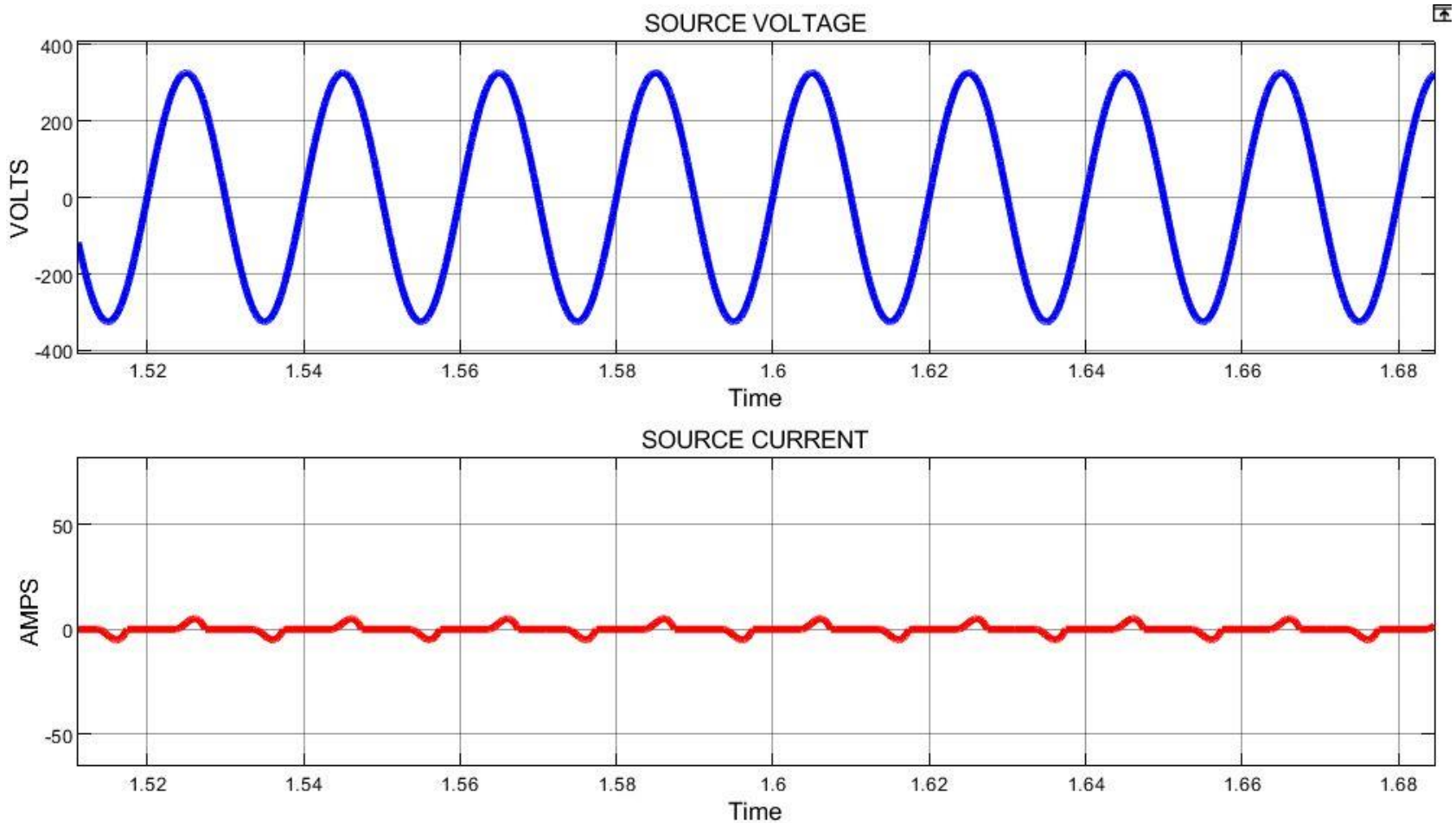


SIMULINK DIAGRAM:

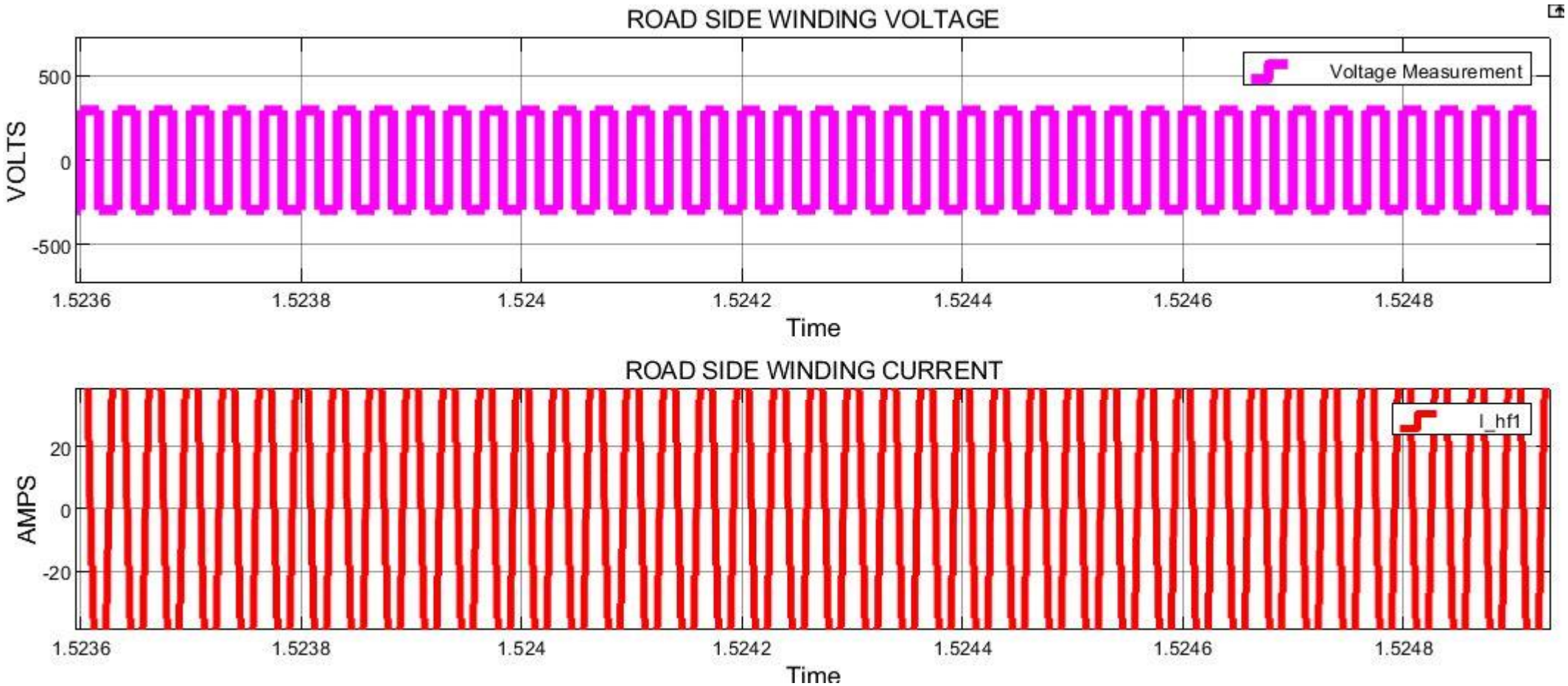


OUTPUT WAVEFORMS:

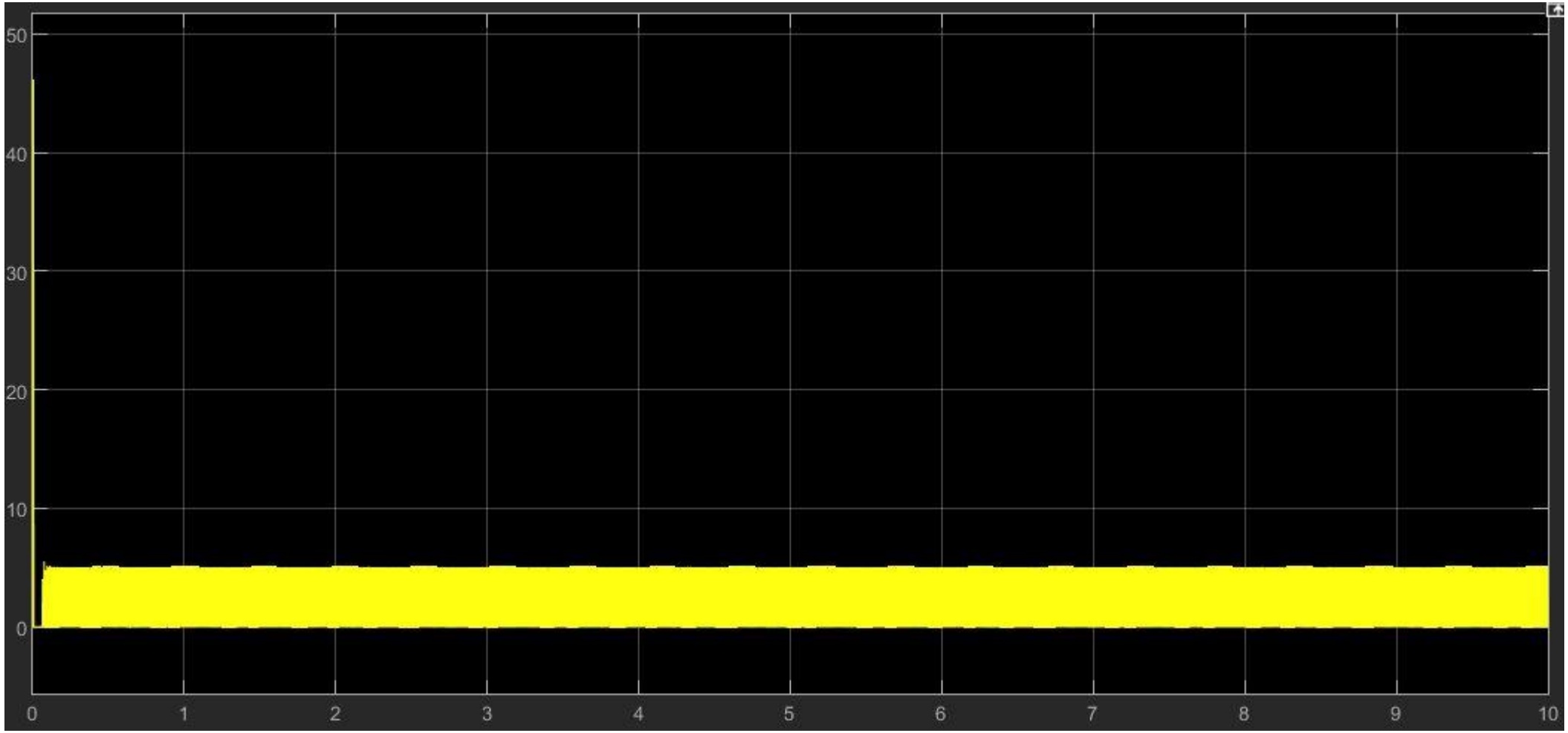
SOURCE VOLTAGE AND CURRENT:



ROAD-SIDE WINDING VOLTAGE AND CURRENT:



DC LINK CURRENT:



WORKING PRINCIPLE:

In this wireless EV charging system, we first need to feed the power to the system using an AC source, the input power is then pushed through the diode bridge rectifier as we know the battery can only be powered through a DC supply but the source is AC.
So, to convert AC to DC supply DBR is used and while converting more distortion occurs at the input side of the supply current and the power factor is reduced So along with the AC to DC conversion power factor correction also happens to increase the efficiency by transforming the input current close to a sinusoidal waveform that is in phase with the grid voltage, therefore improving the power factor.
Now in the second stage, a DC to AC inverter creates a high-frequency AC voltage of 80 to 120 kHz from there the compensation networks are then used to improve system efficiency using a capacitor to reduce additional losses. Then the sender and receiver coils, supported by ferrite plates are used to enhance and direct magnetic coupling for wireless transfer

THANK YOU