Electric Vehicle Wireless Charging Safety Outline

Introduction

Underwriters Laboratories believes that wireless charging is an area of great interest for new product development. In order for these products to be developed and deployed safely in the market place, these products must address safety concerns about fire & shock hazards, human exposure, and functionality issues. UL has embarked upon the development of safety requirements for wireless charging under UL Subject 2750. UL is currently working with wireless charging manufacturers, automotive associations and automotive OEM's to further develop UL Subject 2750. This abstract is a brief overview of parts of the standard and some of the safety considerations that will need to be built into the standard in order for products to be approved for use in the field.

What this standard outline will cover

The outline will cover products used in the systems for wireless charging of electric vehicles, including the primary and secondary coil units, and the power source. These systems would be rated at a maximum input voltage of 250 V ac. These products would be installed in accordance with the National Electrical Code, ANSI/NFPA 70. The power source may be cord connected or permanently connected to the branch circuit. Cord connected power sources shall not exceed a rating of 125 V ac, 20 A, if installed outdoors. The outline would not cover the efficiency of the system or the alignment issues pertaining to primary and secondary coils other than as it affects safety. The outline would not cover off board conductive chargers, which are covered in the Standard for Electric Vehicle (EV) Charging System Equipment, UL 2202; or off board conductive supply equipment, which is covered in the Standard for Electric Vehicle (EV) Supply Equipment, UL Subject 2594.

Safety considerations

Traditionally, Underwriters Laboratories has developed electric vehicle equipment standards that cover traditional fire and shock hazards. With the development of wireless charging, UL is also considering human exposure and other to wireless radiation. This will take into consideration the amount of radiation exposure which can be legally permitted under federal and applicable state laws in the United States. To minimize the exposure, UL is actively working with stakeholders to better understand the wireless communication and interoperability of the EV Wireless Charging device and the Electric Vehicle. The communication and interoperability functions of both devices are required in order to mitigate risk of exposure from wireless radiation. Exposure of conductive materials to the fields, which may lead to secondary safety hazards such as fire, must also be considered.

In addition to requirements for general use of this product by the general public, additional safety requirements will need to be built which will cover service personal who may need to be working with the vehicle while the vehicle is charging.

Protection of Service Personnel

Section 32.1 indicates requirements which apply only to service personnel who find they must reach over, under, across, or around uninsulated electrical parts or moving parts to make adjustments or measurements while the device is energized. Section 32.2 indicates that live parts shall be so arranged and covers so located as to reduce the risk of electric shock or exposure to energy hazardous parts while covers are being removed and replaced.

Other Safety Considerations

In addition to safety considerations for service personnel and general use, the outline will also need to take into account aspects such as detection of objects in the field, lack of communication and misalignment issues. Electromechanical Compatibility (EMC) requirements will also need to be developed within the outline in accordance with any applicable FCC regulations or federal or state requirements.

Conclusion

The advent of electric vehicle wireless charging poses a tremendous opportunity to allow for the further penetration of electric vehicles and provide unparalleled convenience for the owner of the vehicle. In order to support this industry and this emerging technology, consumers have to believe that this technology is not only convenient to use but safe to use.