

# EV Charging and Electromagnetic compatibility

## Why is EMC important for public charging stations?



DC fast charging stations equipped with advanced capabilities such as power electronics and cloud based communications fall under the class of devices that require EMC testing and certification. For safety and reliability, it's critical to understand the levels of protection available, and ensure charging stations fully meet all site requirements.

— Keeping EV charging stations safe from excessive EMI and RFI type emissions is critical to deploying EV infrastructure.

### What is EMC?

Electromagnetic compatibility (EMC) refers to the unintended creation, spread and delivery of electromagnetic energy between, and to, devices. EMC issues can have undesirable consequences such as electromagnetic interference (EMI) and/or Radio frequency interference (RFI) that can damage operational or peripheral equipment. The terms EMI and RFI are often used interchangeably, but the term EMI covers any frequency of electrical noise, while RFI is one kind of electrical noise.

### Where does EMI come from?

EMI is both a natural and man-made phenomenon that comes from sources such as the sun, weather events and other magnetosphere occurrences, as well as electric, magnetic and wireless devices such as radios, televisions and cell phones, as well as larger systems such as industrial power equipment and power transmission lines. This phenomenon can cause interference in nearby devices via conducting devices and digital signals, or can be radiated into free space.

### How common is EMI?

Nearly all electrical and communications equipment emit electromagnetic interference and can be susceptible to it as well. Much EMI we encounter in our daily lives from appliances like toasters, coffeemakers or computers is relatively safe and considered incidental.

### Why be concerned with EMI?

Unchecked, electromagnetic interference can disrupt the proper functioning of other electromechanical devices and wireless communications, and pose health risks to consumers. As such, EMC regulations were developed to ensure as much safety and reliability as possible within and around all of the electrical appliances and power equipment. For consumers, critical personal health devices such as pacemakers or other implantable devices are vulnerable to electromagnetic interference.



FCC Part 15	
Class A	Class B
Controlled commercial and industrial locations	Residential environments for safety in general public
<p><b>Less stringent requirement</b></p> <p>Where controlled locations have the resources to correct potential safety concerns.</p>	<p><b>More stringent requirement</b></p> <p>Devices are measured in closer proximity to ensure safety for the general public.</p>

**How does this relate to EV charging stations?**

The IEC 61000 EMC standard defines limits intended to provide reasonable protection against harmful interference. This is the directive that addresses EMI issues for EV charging infrastructure products.

In the United States, EMC compliance is regulated by the Federal Communications Commission (FCC). Class A limits cover commercial and industrial environments, while Class B, the more stringent category, relates to residential environments. This Class B affected area includes homes, apartments and condominiums which are often in close proximity to commercial environments, inclusive of locations where many people inhabit, work and shop.

EMI and RFI are regulated very similarly in Canada, but with more strict limits. Industry Canada (IC) oversees compliance for digital devices, radios and other electronic radiators. ICES-003, Section 5,

defines the classes of limits: Class A for non-residential operation and Class B limits for residential operation.

This compliance is especially important for any public charging stations placed in proximity to residential and multi-family dwelling areas, where the general public has exposure and greater risk. In these cases, EV charging station providers must ensure their equipment has Class B compliance.

If a charging station does not have Class B certification, it must display a warning label to caution users that magnetic fields around it can be problematic. In some cases, it can be high enough to affect individuals with pacemakers or other critical medical devices. Ensure your electric vehicle charging station meets the highest EMC compliance for optimal safety, lowest user risk, and equipment longevity.

—  
EMC compliance regulation classes, according to FCC standards in the United States.

—  
**ABB Inc.**  
950 Elliot Road, Suite 100  
Tempe, AZ 85284  
United States  
Phone: 800-435-7365  
E-mail: US-evci@us.abb.com

—  
**ABB Inc.**  
800 Hymus Boulevard  
Saint-Laurent, QC H4S 0B5  
Canada  
Phone: 800-435-7365  
E-mail: CA-evci@abb.com

—  
We reserve the right to make technical changes or modify the contents of this document without prior notice. We reserve all rights in this document and in the subject matter and illustrations contained therein. Any reproduction, disclosure to third parties or utilization of its contents – in whole or in parts – is forbidden without prior written consent of ABB. Copyright© 2021 ABB. All rights reserved.

[abb.com/evcharging](http://abb.com/evcharging)