

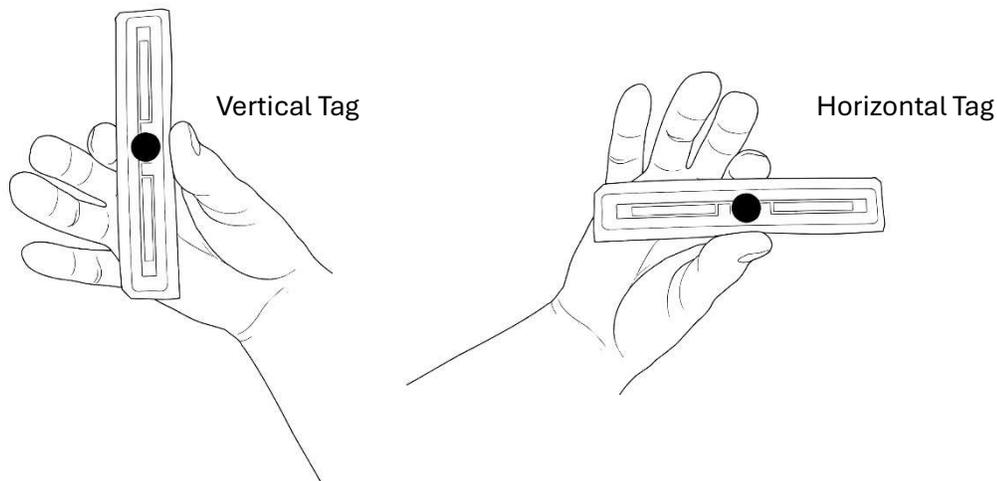
# RFID Tag Mounting Guide

## Introduction

Mounting your RFID tag in the proper position on the vehicle is the single most important factor that determines system performance. Incorrect mounting can make the difference between your tag reading 30 feet away or not reading beyond 1-2 feet from the reader. The best tag mounting position often varies from one vehicle to the next and can even vary from one RFID system installation to the next. EMX recommends testing the tag on each vehicle before permanently adhering it to guarantee good performance. Follow the instructions in this document to ensure your tag always reads when and where you need it to.

## RFID Basics

- 1.) Make sure you know if the RFID reader being used at the site is designed for vertical oriented tags (up and down) or horizontal oriented tags (side to side) or can read both vertical and horizontal oriented tags which is the case of our Patriot-E RFID reader.



- 2.) RFID tags cannot be mounted on metal. They need to be mounted on glass or plastic at least 2 to 3 inches away from metal. If you have a special application that requires an RFID tag mount to metal, contact EMX Industries for a special tag for your specific application.
- 3.) Windshields often have metal oxide coatings that can affect RFID reading performance.
- 4.) All vehicles are different and the optimum tag placement will vary from vehicle to vehicle.
- 5.) Test the tag location prior to permanently adhering it to your car. See the Tag Test procedure below.

## Technical Support

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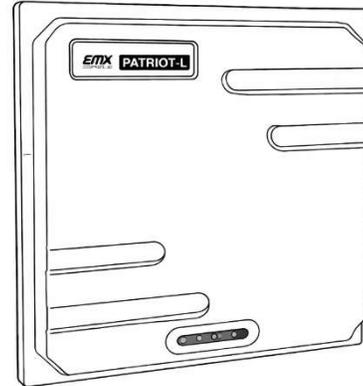
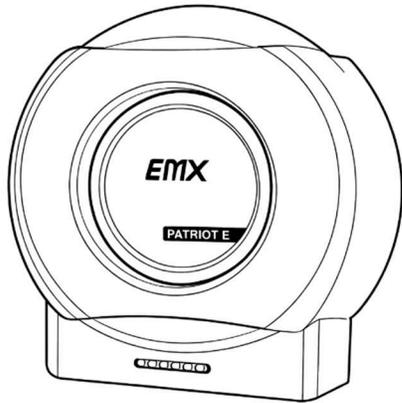
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## Tag Orientation

**Patriot-E** can read tags oriented **either vertically or horizontally**. It typically obtains several more feet of read range when reading a vertically oriented tag.

**Patriot-L** only reads **vertically** oriented tags.



The diagrams on the following pages illustrate the difference between vertical and horizontal orientations.

## Tag Test: Determine Proper Tag Mounting Position

**STEP 1:** Test the tag mounting position first before permanently adhering it. Use painter's tape or other low adhesion tape to temporarily affix the tag. Drive the vehicle into the desired detection zone to ensure the tag reads in the zone of interest. Next, drive up to where the vehicle must stop if the gate hasn't opened and ensure it reads at this location. If it doesn't read, adjust the tag position and retest. See the next page for *Best Tag Mounting Positions* to determine where to test the tag on the vehicle. Many people aren't aware that **the best tag position varies depending on the RF environment and the vehicle model**.

**STEP 2:** Once the desired performance is confirmed, remove the painter's tape, remove the tag backing material and permanently attach the tag to the vehicle in the tested position. **Please note, after the tag is permanently attached it cannot be removed and repositioned without destroying the tag. Attempting to move the tag will reduce read range or make the tag non-readable. Remember, a slightly crooked tag is much better than trying to reposition a tag after it has been adhered to the vehicle.**

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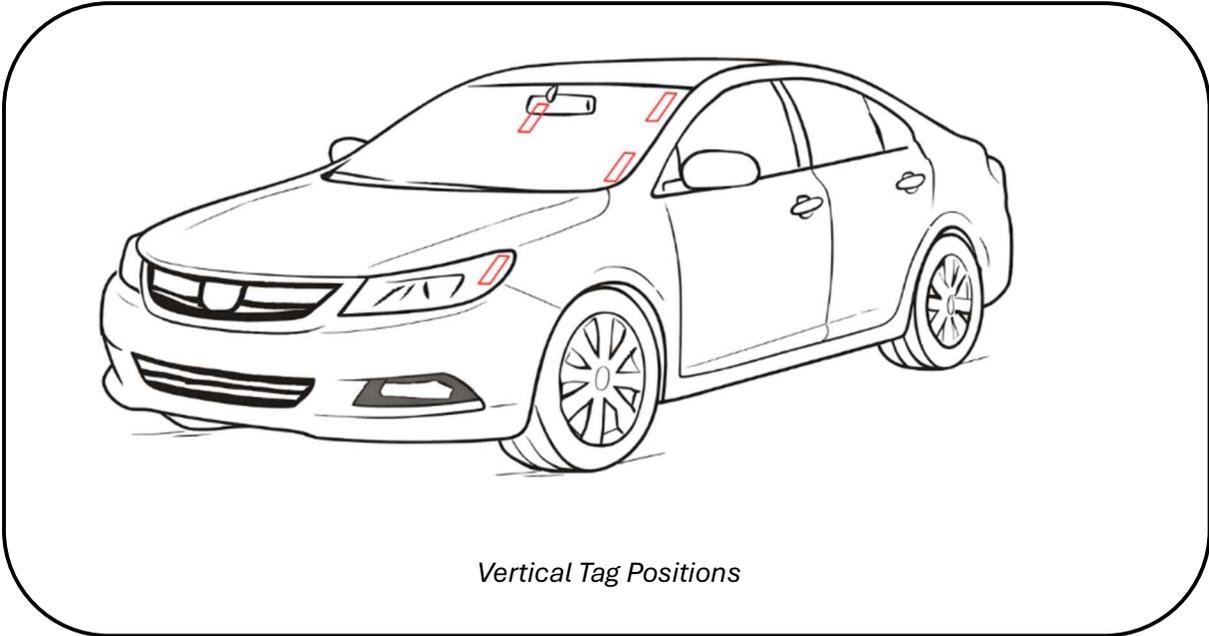
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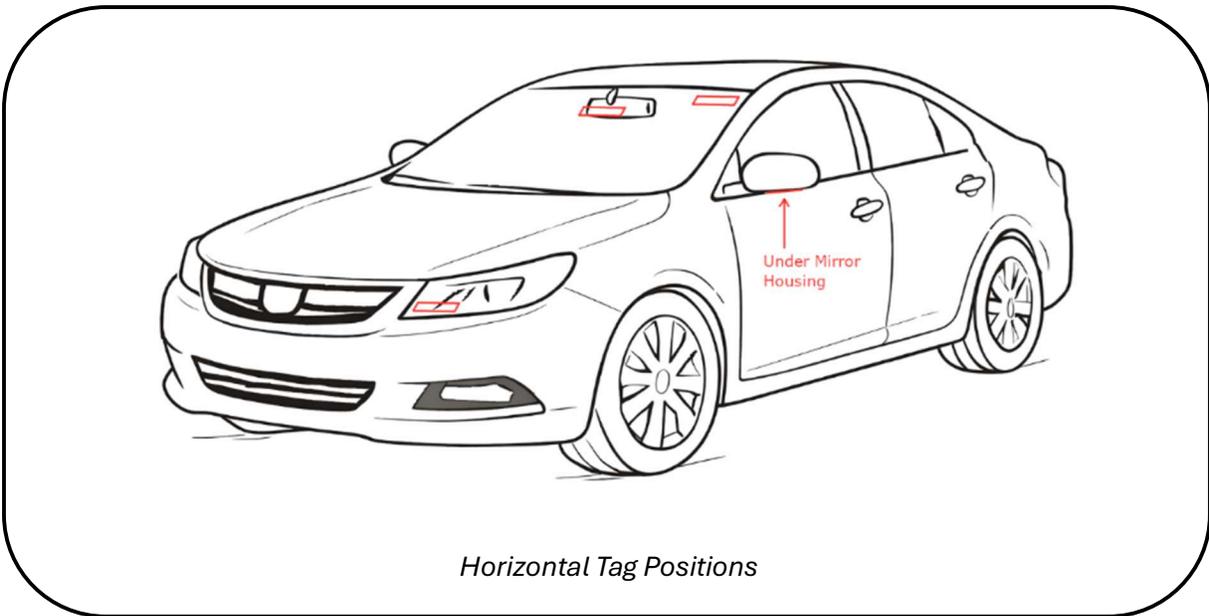
## Patriot-E Tag Mounting Positions (either vertical or horizontal)

Test tags by following STEP 1 on the previous page.

Common mounting positions are shown below:



*Vertical Tag Positions*



*Horizontal Tag Positions*

These positions assume the reader is on the driver's side. If the reader is on the passenger side then mount the tag on that side instead.

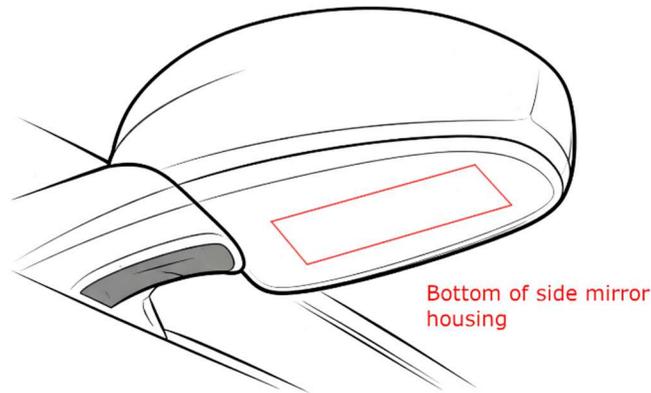
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- **Optimal Tag Position:** Under the driver's side mirror. In our testing, this position always produced the best performance.



- **Good Tag Position:** Tag mounted vertically in the upper corner of the driver's side windshield. Horizontal is an option but vertical is usually better. Keep tag 2-3 inches from metal. Tag can be on the outside or inside of the windshield. If the reader is on the passenger side, mount the tag on that side instead.
- **Alternate Tag Positions:** (1) Center mount the tag (horizontal or vertical) on the windshield near the rear view mirror. This works well on vehicles that have metal oxide coatings in the windshield. (2) Lower driver's side of the windshield (vertical only). (3) On the headlight (horizontal or vertical). Location on the headlight can vary but the tag must be kept 2-3 inches from metal. Typically, front bumpers are plastic so lower on the headlight sometimes works better.

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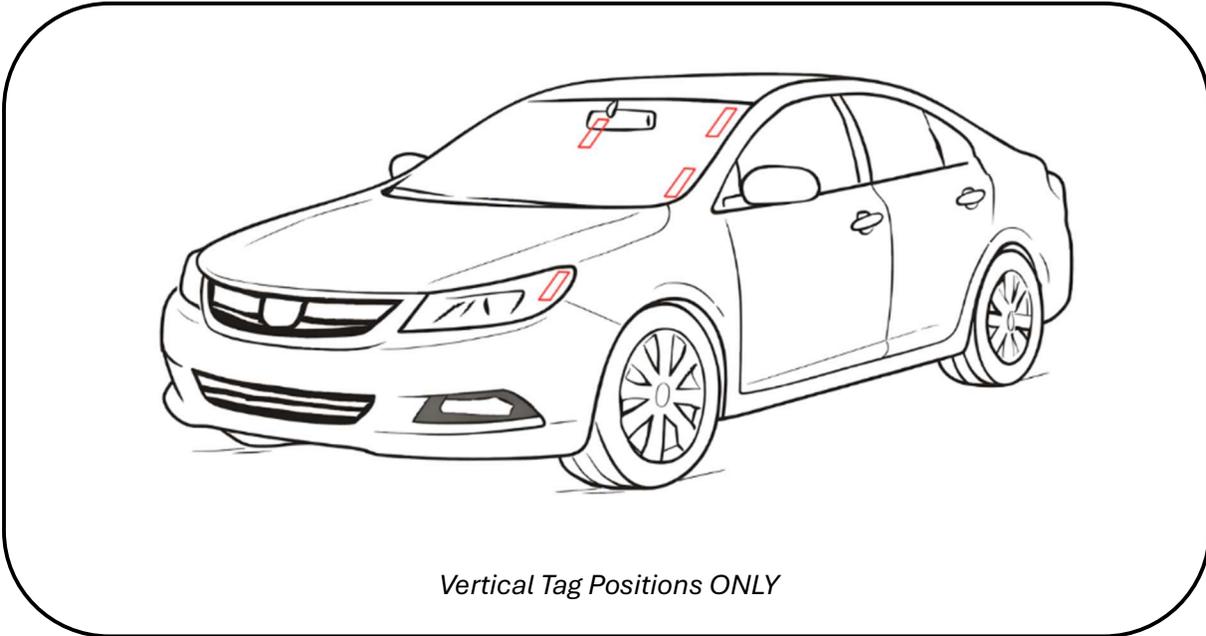
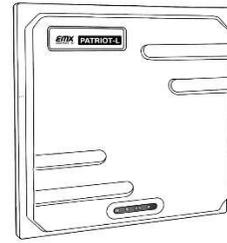
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## Patriot-L Tag Positions (Only mount tags vertically)

Test tags per STEP 1 on Page 1.

Common mounting positions are shown below:



- **Optimal Tag Position:** Tag mounted vertically in the upper driver's side windshield. Keep tag 2-3 inches from metal. In our testing, this position typically resulted in the best performance.
- **Good Tag Position:** Center mount the tag vertically on the windshield near the rear view mirror. This works well on vehicles that have metal in the windshield. Keep tag 2-3 inches from metal.
- **Alternate Tag Positions:** (1) Tag mounted vertically in the lower driver's side windshield. (2) Tag mounted vertically on the headlight. Location on the headlight can vary but try to keep it 2-3 inches from metal. Typically front bumpers are plastic so lower on the headlight sometimes works better.

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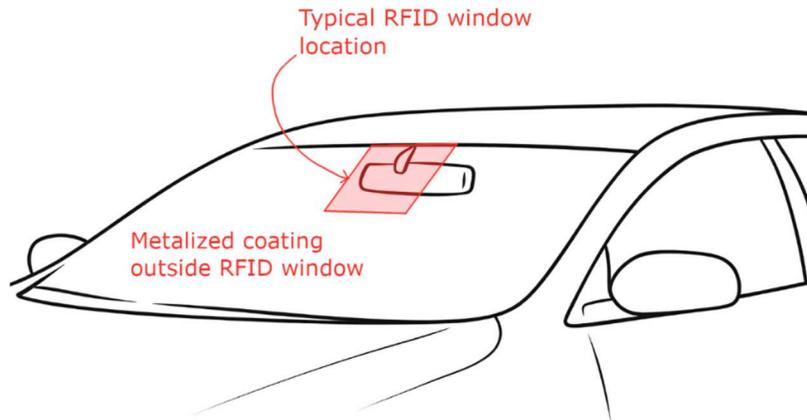
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## Metal oxide coatings in Windshields

Some vehicles have a metal oxide coating in the windshield for various reasons such as UV tinting. This coating is often invisible. Like any metal, it severely degrades the performance of RFID tags. On such windshields, tags cannot usually be mounted in the windshield corners, but there is almost always an area without coating specifically for mounting RFID tags. Usually, this “RFID window” is under the rear view mirror as shown below:

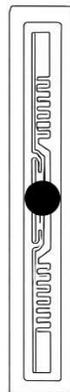


The RFID window is often unmarked and invisible. Consult your vehicle’s owner’s manual or search online to find the location of the RFID window and mount the tag in that location if windshield mounting is desired. The tag can be mounted on the outside or inside of the windshield, but make sure to always test with tape before permanently adhering the tag. If the tag extends outside of the RFID window it may not perform well. Keep in mind the other tag mounting locations too – under the side view mirror (Patriot-E only) or on the headlight.

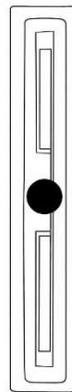
## Tag Types

EMX Viper tags are multi-surface tags designed to work well on glass and plastics. Tags described as “windshield tags” are electrically tuned to be mounted on glass and may not perform as well when mounted on plastics. If you have questions about where to mount your specific tags, contact EMX Technical Support.

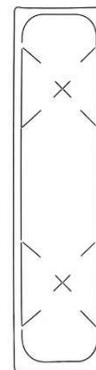
*Note: Old Viper and New Viper tags are interchangeable with EMX readers.*



Old Viper



New Viper



Windshield Tag

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