

# Dual-Use Marker Article: Roadway Infrastructure as Credentialed Device

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## What the Dual-Use Marker Article Specifies

The article is a physical device installable in roadway, lane edge, or other infrastructure positions. The device integrates: a retroreflective layer (typical 3M or Avery Dennison reflective material) for human-driver visibility under headlight illumination; a passive RFID tag in the IC housing carrying the credentialed payload for autonomous-vehicle reading; optional photovoltaic charging plus LED active illumination for night-visibility enhancement; sealed weatherproof enclosure for typical roadway lifecycle (10-20 years).

The device serves both human and machine readers simultaneously. Human drivers see the retroreflective marker as ordinary lane delineation; autonomous vehicles read the credentialed RFID payload as routing authority. The two functions don't interfere; the dual-use property is structural rather than coincidental.

## Why Dual-Use Drives Adoption Economics

Single-purpose smart-infrastructure deployments face the chicken-and-egg adoption problem. Cities deploy expensive infrastructure that doesn't benefit human drivers; human drivers don't see value; political will to fund the infrastructure is limited.

Dual-use eliminates the adoption gap. The marker is a retroreflective lane marker first — providing immediate value to human drivers — and a credentialed AV reference second. Cities deploy the markers as standard roadway improvement; the AV-relevant credentialing comes along for the ride. The deployment economics work for any AV adoption rate.

## **How the Dual-Use Article Composes With Roadway Operation**

Roadway-marker manufacturers (3M, Avery Dennison, RoadVista, emerging vendors) integrate the credentialed RFID into their existing dual-use product lines. The marker installs through the same processes as conventional retroreflective markers (epoxy mounting, embed in pavement, surface installation).

Operating units pass over markers at vehicle speed. RFID readers integrated into the vehicle's underbody read the credentialed payload as the marker passes; the credentialed observation enters the vehicle's admissibility framework. Human drivers continue to see the retroreflective marker normally.

## **What This Enables for Smart Infrastructure**

The article-level claim provides §112-defensible apparatus coverage. Patent claims tied to specific physical-article integration (retroreflective layer + RFID + credentialed payload + sealed enclosure) survive prior art scrutiny better than abstract architectural claims.

The market potential is substantial. The roadway-marker market is in the billions of units globally; the dual-use upgrade pricing premium of even a small per-unit royalty produces substantial licensing value. The patent positions the article-level claim as a potential continuation seed for separate apparatus protection.

