

# Effects of Plastic Vehicular Covers on Radiation Characteristics of Lightweight, Dual-band Antenna for Vehicular Communications

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## Abstract

This paper highlights the impact of curved and flat vehicular plastic parts on the radiation characteristics of two dual-band antennas for C-V2X applications. The radiation patterns of the antennas are measured in SATIMO near field measurement system and are compared during the following setups: (a) antennas alone in the near field system, without the presence of a plastic part; (b) antennas mounted on the inside curved surface of a driver's side mirror cover; (c) antennas mounted on the outside curved surface of the driver's side mirror cover; (d) antennas mounted on a flat trunk lid; (e) antennas mounted on a curved plastic retrieved from the A-pillar of a vehicle. Comparison among the antennas radiation pattern measurements during these different setups, results in the conclusion that the inside surface of the side mirror cover is the most suitable position to mount the presented dual-band antennas. The curvature of the inside surface at the point where the antenna was mounted is less steep than the placement point at the outside surface, allowing the antenna to keep its polarization axis mostly unaffected. Moreover, the curve of the inside surface makes the antenna radiation more directional, creating an increase in the antenna gain. The side mirror cover, compared to trunk lid, is further from the ground protecting the antenna radiation from additional reflections.

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