Buses, and Multi-Purpose Vehicles). The findings of four recent research reports on the subject also suggested that the location of an object, such as a transponder device, near the upper margin of a CMV's windshield is unlikely to have any effect on a driver's ability to observe nearby objects, such as pedestrians.

In addition, the FHWA believes that the public interest would be furthered by granting this waiver. Drivers whose CMVs are in compliance with registration, safety inspection, and operating requirements and permits may receive a signal from inspection officials to bypass ports of entry or inspection sites. This would have the effect of greatly improving inspection efficiency and effectiveness by enabling officials to focus their resources on vehicles with safety and size and weight infractions.

## **Discussion of Comments to the Docket**

The FHWA received five comments to the notice of petition. Advocates for Highway and Auto Safety (AHAS) opposed the windshield mounting location for the transponder and criticized the prior field activity under the ADVANTAGE I-75 "alpha" test. The Department of California Highway Patrol (CHP) supported the general concept of the waiver, but expressed concern with the windshield mounting location due to a potential conflict with its State regulations. The Illinois Department of Transportation, Heavy Vehicle Electronic License Plate (HELP), Inc., and the Commonwealth of Kentucky Transportation Cabinet commented in favor of the waiver.

The AHAS stated its opposition to "any action or item of equipment that might obstruct [the] view of CMV drivers," and added that "[a]ny waiver that might pose an impediment to driver vision must be carefully scrutinized to assure that it is consistent with safety." "It is axiomatic," it noted, "that vision plays a central role in the driving task \* \* \*." The AHAS believes the design of the transponder is inappropriate, and that the transponder hardware should be separated from the visual indicator provided for the driver.

The AHAS stated that it "might support the FHWA's proposal because of the small size of the transponder, and the fact that it will be placed at the top of the windshield and outside the general field of view of the driver." However, "Advocates cannot support the transponder proposal at this time since there are unresolved issues regarding the necessity of placing the device on the windshield." The AHAS also asserted that the FHWA provided insufficient technical justification for

the windshield mounting location. It dismissed the agency's reasoning as merely rationalizing the "convenience" of that location.

The FHWA disagrees with the AHAS' assertions. The FHWA is required to evaluate the safety, not to regulate the design, of equipment for which a waiver is requested. The design is a product of the petitioners' engineering judgment. ADVANTAGE I–75 and HELP requested a waiver for tests of a device whose design had already been selected. The only issue was whether the placement of the AVI device would reduce motor carrier safety. The FHWA has fully considered that question.

The FHWA requested, and has received, a copy of engineering notes from Delco Electronics documenting its assessment of alternate transponder mounting locations. A copy of the test report has been placed in the docket.

Delco Electronics performed two tests of antenna pattern characterization to compare the strength of the signal received at the roadside reader. The first compared mounting locations at the lower-right, upper-right, upper-left, and lower-left corners of the driver's side of the windshield. The second compared two alternate locations with the transponder attached to the windshield (upper-right and lower-left corners of driver's side) with a third location utilizing a mounting bracket (upperright corner of driver's side) that held the transponder just off the windshield. In both tests, the location at the upperright corner of the driver's side of the windshield delivered a superior signal, as measured by relative attenuation in dBm [decibel-milliwatts, a measurement of signal power on a logarithmic scale]. The signal from the upper-right driver's side windshield mounting location was as much as 10 dBm stronger compared to other locations and to the bracketmounted alternative.

For radio frequency (RF) devices to successfully perform their functions, their transmitted signals must be strong enough to reach their targets. The upper-right driver's side windshield mounting location appears to be the best among the several alternatives that Delco Electronics evaluated. The 10 dBm difference in the signal strength can be a key factor in facilitating the transponder's successful field implementation.

As ITS matures, it is likely that technical advancements and competition among manufacturers will improve the packaging and reduce the size of transponders and other ITS devices. It is conceivable that future clearance transponders could be mounted in locations other than a

CMV's windshield, and indicator lamps added to dashboard instrumentation, as the AHAS recommends in its comments.

The FHWA believes that the AHAS' comments reflect a misinterpretation of the visibility issue. For example, the AHAS argued that the visible indicator was not necessary because the transponder would be hidden by a sunvisor. There is nothing in the notice that warrants that conclusion. Sunvisors are not always extended. The FHWA made the comparison between the vertical dimension of the transponder and that of sunvisors and sunshades in reference to a driver's useful field of view. The AHAS also questioned other technical issues regarding the transponder's placement without presenting research results comparable to those cited by the FHWA in support of the proposed waiver.

In addition, the AHAS contended that the FHWA should have followed formal waiver procedures for the ADVANTAGE I-75 Alpha Test, rather than issuing an enforcement moratorium that had the same effect. The FHWA disagrees. The Alpha Test was merely a technical shakedown of AVI transponders on a small number of vehicles (up to 200) to ensure that the equipment would work properly during the operational Beta Test. This kind of fine-tuning could not be done with stationary vehicles. The Alpha Test was closely controlled and monitored by the FHWA's State partners, since the participating States and motor carriers needed to be aware of problems before starting the Beta Test. The FHWA simply allowed ADVANTAGE I-75 to complete this preparatory evaluation. As the agency and the ADVANTAGE I-75 States expected, no visibility problems caused by the transponders were reported.

The Department of California
Highway Patrol (CHP) did not object to
the use of the transponder. It did,
however, express a concern about the
proposed mounting location: "California
law prohibits any object from being
installed or affixed on any portion of the
windshield except for \* \* \* a 7-inch
square in the lower corner of the
windshield opposite the driver or in a
5-inch square in the lower corner of the
windshield near the driver." The CHP
provided a copy of the relevant
regulation, California Vehicle Code
Section 26708.

California's regulation differs from § 393.60(c). In the fall of 1994, the FHWA notified the CHP, as the State's Motor Carrier Safety Assistance Program (MCSAP) grant recipient, that the regulation must be brought into conformance with the FMCSRs. The