TOYOTA

TOYOTA MOTOR NORTH AMERICA, INC.
Sustainability and Regulatory Affairs
325 Seventh Street, NW #1000 Washington, DC 20004

June 24, 2024

Sophie Shulman
Deputy Administrator
National Highway Traffic Safety Administration
1200 New Jersey Ave., SE
Washington, DC 20590

RE: Petition for Reconsideration – Final Rule: Federal Motor Vehicle Safety Standards; Automatic Emergency Braking Systems for Light Vehicles [NHTSA-2023-0021]

Dear Ms. Shulman:

Toyota Motor North America, Inc., on behalf of Toyota Motor Corporation (collectively, "Toyota"), submits this petition for reconsideration in response to the final rule published in the *Federal Register* on May 9, 2024, which codifies a new Federal Motor Vehicle Safety Standard (FMVSS), No. 127, Automatic Emergency Braking Systems for Light Vehicles.

Toyota supports the petition for reconsideration submitted by the Alliance for Automotive Innovation (AFAI) and incorporates those concerns in our petition. In addition, we petition the agency to reconsider the requirements of paragraph S7. *Testing when approaching a lead vehicle* and paragraph S5.4. *Malfunction detection and controls,* as detailed below.

1. ***Paragraph S7. Testing when approaching a lead vehicle.***

The available analysis does not explain how establishing the passing performance criterion in the test procedures of the lead-vehicle AEB conditions as "no-contact" (i.e., 0 km/h resulting speed) meets the need for safety or how alternative methods do not achieve essentially the same level of safety while appropriately balancing other competing safety considerations. Thus, Toyota petitions NHTSA to reconsider the "no contact" requirement and instead establish a performance requirement that permits some level of low-speed contact.[1]

NHTSA stated in its final rule essentially that a "no-contact" requirement maximizes the safety benefits that could be achieved by the rule. However, no comparison between a "no-contact" option and a "low-speed contact" option was analyzed. The available analysis does not quantify

[1] For instance, as Mitsubishi raised in its comments as an example, a potential low-speed threshold could be 10 km/h. See: https://www.regulations.gov/comment/NHTSA-2023-0021-0840. The final rule also establishes a threshold of 10 km/h, before which AEB is not required to activate, as prescribed in the definition of AEB in S5.1.2. *Automatic emergency braking.*

whether there is likely to be and how many injuries might occur in (for example) a 10 km/h contact between a following and a lead vehicle and how that might compare to the selected "no-contact" option.

The analysis of the marginal safety benefits between these options is important[2] because, in this case, there is a likely risk of safety disbenefits (also not analyzed) that must be considered in order to determine which option meets the need for motor vehicle safety. Specifically, the combination of a "no-contact" requirement with the high maximum testable speed range strongly indicates that the final rule requirements will lead to additional false positives.

It is not reasonable to separate the issues of the "no-contact" requirement and the "high maximum testable speed range" as the agency suggests in its final rule. These requirements are interrelated in the sense that they establish the time-to-collision (TTC) at which braking must be activated. The laws of physics dictate that, to achieve no-contact between the lead vehicle and a following vehicle, where the following vehicle is traveling a given high speed, braking of a certain force must be initiated by a certain time. Thus, these two requirements are not separable.

As a result, pairing a "no-contact" requirement with a high maximum testable speed range means that the TTC at which AEB systems need to activate will be earlier. In other words, the amount of time between the last opportunity for the AEB system to activate and the identified potential crash will be materially longer than a standard requiring a lower maximum testable speed range or permitting some level of low-speed contact.

While the agency states in the final rule that this will not lead to an increase in false positives because manufacturer systems will be improved in the future to anticipate different road conditions like road bends, parked cars, etc., such technology improvements cannot be expected to address this concern. The longer the TTC at which the AEB system must activate, the more likely that unexpected events may occur within that time-to-collision. While a system can be designed to better account for curves in the road or parked cars, systems cannot be designed to predict the future and what drivers in lead vehicles intend to do within that TTC (e.g., execute a turn out of the lane, change lanes, speed up, etc.). Thus, it is not a simple matter of improving the detection capabilities of the AEB system to eliminate potential false positives.

As a result, the requirements in the final rule will likely lead to an increase in false positives and can create driving behavior that neither the driver of the subject vehicle nor the drivers of surrounding vehicles will find natural or predictable. In this scenario, it is likely that the requirements of the final rule would lead to safety disbenefits.

Without further analysis comparing these safety disbenefits to any marginal potential benefits between a "no-contact" requirement vs. a "low-speed" contact requirement, the basis to conclude

[2] We note that NHTSA has determined that AEB is not required to be functional until a speed of 10 km/h in the forward direction. In other words, NHTSA has made the judgment that some risk of low-speed contact is permissible without AEB activation. Based on a review of NHTSA's data, it appears that the reduction of the risk of severe and fatal injuries is up to 99% when the vehicle speed reduction reaches an impact velocity of 6 mph (correlating approximately to 10 km/h). Severe/fatal injury (MAIS 3+) is reduced to a 1% risk according to the injury risk curves and values presented in the Final Regulatory Impact Analysis (FRIA) of this final rule, on pages 234-236 and in Table 108. Thus, it is unclear why such data would support a minimum AEB activation speed of 10 km/h, but not a low-speed contact threshold of 10 km/h.

that the final rule meets the need for safety is unclear. Thus, Toyota respectfully requests that the agency reconsider its conclusion that a "no-contact" requirement for the lead-vehicle AEB condition is appropriate.

2. Paragraph S5.4. Malfunction detection and controls.

As currently written, the malfunction detection requirements in paragraph S5.4 do not objectively state the conditions under which a vehicle is required to detect malfunctions and the system reactions that are permitted. The requirements appear to leave it to the discretion of the manufacturer on how to design a malfunction detection feature—including what elements to monitor and what is considered a malfunction. Further, the required performance, in the case a malfunction is identified, is stated as the illumination of an undefined telltale and also permitting the manufacturer, at its discretion, to adjust the performance of the vehicle such that it will not meet the requirements specified in paragraphs S5.1, S5.2, or S5.3, including completely deactivating the AEB system.

In other words, we assume that the agency's intent is that manufacturers must design into vehicles some malfunction detection feature, that the vehicle must display a telltale when a malfunction is detected, and the vehicle may adjust performance of the AEB system or deactivate it when malfunctions are detected. If this understanding is correct, Toyota agrees with the agency that malfunctions should be detected based on the manufacturer's system design and, in addition to illuminating the telltale, the manufacturer should have the option to adjust the AEB performance or deactivate it in response to a malfunction. If the AEB system cannot be deactivated in cases of performance degradation (e.g., from sensor misalignment), it could lead to occurrences such as false-positive activations that could create safety disbenefits. However, as the agency explained in its response to comments from Bosch, the idea provided by Bosch for further definition of this requirement was "not workable for an FMVSS" because it was "not . . . objective . . . , nor [did] it give manufacturers notice as to what NHTSA expects of them."[3] As the remaining requirements for malfunction detection in the final rule remain unclear for similar reasons, Toyota respectively requests the agency to reconsider the malfunction detection requirements of S5.4.

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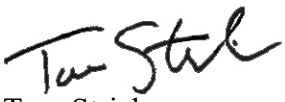
We appreciate the agency's consideration of this petition for reconsideration. Should you have any questions, please direct inquiries to Dan Robertson at dan.robertson@toyota.com or (202) 775-1700.

Sincerely,



Tom Stricker
Group Vice President
Sustainability and Regulatory Affairs

[3] Federal Register / Vol. 89, No. 91 / Thursday, May 9, 2024 / Rules and Regulations, 39735