ACTION: Interim rule; extension of comment period.

SUMMARY: DoD, GSA, and NASA issued an interim rule on November 12, 2024, amending the Federal Acquisition Regulation (FAR) to implement a prohibition on the procurement and operation of unmanned aircraft systems manufactured or assembled by an American Security Drone Act-covered foreign entity. The deadline for submitting comments is being extended from January 13, 2025, to January 27, 2025, to provide additional time for interested parties to provide comments on the proposed rule. The effective date of this rule is not being changed and remains November 12, 2024.

DATES: For the interim rule published on November 12, 2024, (89 FR 89464), the deadline to submit comments is extended. Submit comments by January 27, 2025.

ADDRESSES: Submit comments in response to FAC 2025–01, FAR Case 2024–002 to the Federal eRulemaking portal at *https://www.regulations.gov* by searching for ''FAR Case 2024–002''. Select the link ''Comment Now'' that corresponds with ''FAR Case 2024–002''. Follow the instructions provided on the ''Comment Now'' screen. Please include your name, company name (if any), and ''FAR Case 2024–002'' on your attached document. If your comment cannot be submitted using *https://www.regulations.gov,* call or email the points of contact in the **FOR FURTHER INFORMATION CONTACT** section of this document for alternate instructions.

Instructions: Please submit comments only and cite ''FAR Case 2024–002'' in all correspondence related to this case. Comments received generally will be posted without change to *https://www.regulations.gov,* including any personal and/or business confidential information provided. Public comments may be submitted as an individual, as an organization, or anonymously (see frequently asked questions at *https://www.regulations.gov/faq*). To confirm receipt of your comment(s), please check *https://www.regulations.gov,* approximately two-to-three days after submission to verify posting.

FOR FURTHER INFORMATION CONTACT: For clarification of content, contact Mr. Benjamin Collins, Procurement Analyst, at 850–826–0058 or by email at *benjamin.collins@gsa.gov.* For information pertaining to status, publication schedules, or alternate instructions for submitting comments if *https://www.regulations.gov* cannot be used, contact the Regulatory Secretariat Division at 202–501–4755 or *GSARegSec@gsa.gov.* Please cite FAC 2025–01, FAR Case 2024–002.

SUPPLEMENTARY INFORMATION:

I. Background

DoD, GSA, and NASA published an interim rule in the **Federal Register** at 89 FR 89464 on November 12, 2024. The comment period is extended to January 27, 2025, to allow additional time for interested parties to develop comments on this rule. The effective date of this rule is not being changed and remains November 12, 2024.

List of Subjects in 48 CFR Parts 4, 13, 39, 40, and 52

Government procurement.

William F. Clark,

Director, Office of Government-wide Acquisition Policy, Office of Acquisition Policy, Office of Government-wide Policy.

[FR Doc. 2024–30937 Filed 12–27–24; 8:45 am]

BILLING CODE 6820–EP–P

DEPARTMENT OF TRANSPORTANTION

National Highway Traffic Safety Administration

49 CFR Part 571

[[Docket No. NHTSA–2022–0013]

Federal Motor Vehicle Safety Standards; Lamps, Reflective Devices, and Associated Equipment, Adaptive Driving Beam Headlamps

AGENCY: National Highway Traffic Safety Administration (NHTSA or the Agency), Department of Transportation (DOT).

ACTION: Denial of petitions for reconsideration.

SUMMARY: This document responds to the petitions for reconsideration of the February 22, 2022, final rule that amended Federal Motor Vehicle Safety Standard (FMVSS) No. 108, ''Lamps, reflective devices, and associated equipment,'' to enable certification of adaptive driving beam (ADB) headlighting systems on vehicles sold in the United States. This document denies all petitions for reconsideration received in response to the final rule.

DATES: December 30, 2024.

FOR FURTHER INFORMATION CONTACT: For non-legal issues, you may contact Adam Lowery, Office of Crash Avoidance Standards, Telephone: (202) 366–1810, Email: *Adam.Lowery@dot.gov;* For legal issues, you may contact Evita St. Andre, Office of Chief Counsel, Telephone: (202) 366–2992, Email: *Evita.St.Andre@dot.gov.* The mailing address for these officials is: The National Highway Traffic Safety Administration, 1200 New Jersey Ave. SE, Washington, DC 20590.

SUPPLEMENTARY INFORMATION:

Table of Contents

I. Background

Beam switching technology was first introduced into vehicles sold in the United States in the 1950s and was limited simply to switching between upper and lower beams. An adaptive driving beam (ADB) is an advanced type of semiautomatic headlamp beam switching technology. It uses advanced sensing and computing technology to identify oncoming and preceding traffic and actively adapt the beam pattern to limit at lower beam levels any light shining toward those vehicles while continuing to direct high intensity light to other areas of the roadway. This dynamic beam pattern was not previously permitted by NHTSA's lighting standard. As such, in 2013, Toyota petitioned NHTSA to modify the standard to permit ADB headlighting systems.

A. Notice of Proposed Rulemaking

NHTSA published a Notice of Proposed Rulemaking (NPRM) on October 12, 2018, proposing to amend NHTSA's lighting standard, FMVSS No. 108, ''Lamps, reflective devices, and associated equipment,'' in response to a petition that raised concerns that the standard's beam pattern (photometry) requirements would not permit the enhanced beam that ADB headlighting systems provide.[1] ADB headlamp technology dynamically modifies headlamp photometry to provide more illumination in certain areas in and around the roadway while reducing glare towards oncoming and preceding motorists. This dynamism is facilitated by the headlamps changing the lower beam pattern and increasing the usage of the upper beam, the effect of which

[1] 83 FR 51766, (Oct. 12, 2018).

increases visibility, thereby improving safety. NHTSA assessed comments received in response to the NPRM and published a final rule on February 22, 2022.

B. Final Rule

On February 22, 2022, NHTSA published a final rule amending FMVSS No. 108, ''Lamps, reflective devices, and associated equipment, adaptive driving beam headlamps,'' to enable the certification of ADB headlighting systems on vehicles sold in the United States.[2] Several industry comments to the NPRM advocated for stronger harmonization with regulatory alternatives when specifying performance requirements for ADB systems on vehicles. These alternatives included the regulation issued by the Economic Commission for Europe (UNECE R123), the Society of Automotive Engineers (SAE) J3069 JUN2016, Surface Vehicle Recommended Practice; Adaptive Driving Beam standard, as well as the updated version of the SAE Practice published in March 2021. In addition, NHTSA conducted laboratory testing to establish appropriate performance allowances for ADB systems, driving scenarios, and any associated equipment. All information and feedback was reflected in the development of the final rule.

FMVSS No. 108 has two main components that ensure ADB systems operate safely: (1) vehicle-level track-test requirements specifically tailored to the performance of the ADB system in meeting the specified glare limits, and (2) component-level photometric requirements related to glare and visibility. This standard provides practicable, performance-based requirements and test procedures that appropriately balance visibility and glare. If vehicle manufacturers choose to equip their vehicles with ADB systems, manufacturers must certify that their ADB systems meet these requirements.

II. Petitions for Reconsideration

In response to the February 22, 2022, Final Rule, NHTSA received twelve timely petitions from automotive manufacturers, lighting suppliers, trade organizations, and the Insurance Institute for Highway Safety (IIHS). American Honda Motor Co., Inc. (Honda),[3] Volkswagen Group of America (Volkswagen),[4] Toyota Motor North America, Inc. (Toyota),[5] Ford Motor Company (Ford),[6] Koito Manufacturing Co. LTD (Koito),[7] Stanley Electric Co. LTD (Stanley),[8] North American Lighting (NAL),[9] Valeo Lighting Systems (Valeo),[10] Alliance for Automotive Innovation (Alliance),[11] the Transportation Safety Equipment Institute (TSEI),[12] SAE International—Lighting Systems Group (SAE),[13] and IIHS [14] submitted petitions for reconsideration of the final rule. Several petitioners requested alignment with alternative ADB regulatory practices (*i.e.,* SAE J3069) currently in place for systems on vehicles in foreign markets. Many of the petitions requested that NHTSA amend the standard to further advance the goal of the final rule.

The topics raised in the petitions can be generally classified into one of the following categories: (1) requests to address perceived complexities in technical scenarios; (2) claims that NHTSA imposed conflicting substantive requirements for testing; (3) requests to add alternative ADB headlamp testing procedures; and (4) requests to amend technical areas of the final rule to clarify requirements. This document addresses the petitioners' concerns.

A. Stimulus Headlamps Aiming

FMVSS No. 108 specifies three specific headlamps and rear combination lamps mounted on test fixtures as part of the track testing for ADB systems. Additionally, FMVSS No. 108 requires that all headlamps must be aimable. As such, the stimulus lamps specified in the ADB track test procedure, used to elicit ADB performance, are capable of being aimed. However, while the Final Rule stated that the stimulus headlamps will have the lower beam activated and aimed per the SAE Recommended Practice J599 Lighting Inspection Code (SAE J599) procedures, these SAEJ599 aiming instructions were not included and incorporated by reference in the regulatory text.[15] Toyota stated that, to ensure repeatability of testing, NHTSA should specify how the stimulus headlamps on the ADB test fixture will be aimed, as the regulatory text from the final rule does not include stimulus headlamp aiming instructions. Toyota suggested the headlamps be aimed in accordance with manufacturer instructions, or alternatively, in accordance with SAE J599. However, regarding SAE J599, Toyota stated that this procedure could introduce more variation and potentially stray away from real-world representation of the stimulus devices. The Alliance also petitioned that NHTSA provide in the docket the manufacturer's headlamp aiming instructions and information sufficient to mount the stimulus lamps specified in the FMVSS No. 108.

Agency Response

NHTSA is denying the request to incorporate into the regulatory text aiming instructions for the stimulus headlamps installed on the ADB test fixtures. As clarified in the final rule, NHTSA will aim the stimulus headlamps as a matter of good testing practice; however, it is not necessary to include such a condition as part of the regulation because headlamp aim on the stimulus test fixtures does not have enough variability to change the outcome of the ADB test. As detailed in the discussions of the SAE J3069 synthetic light source in the NPRM and final rule, the minimum taillamp intensities for which an ADB system is required to react are considerably lower than a headlamp's intensity. Even at the extremes of headlamp aim, a headlamp will always emit more light than a taillamp and the ADB recognition system must be capable of detecting intensities as low as those of taillamps. Therefore, stimulus headlamp aim will not be a deterministic factor in the outcome of an ADB test.[16]

[2] 87 FR 9916, (Feb. 22, 2022).

[3] American Honda Motor Co., Inc., Docket No.2022–0013–0011.

[4] Volkswagen Group of America, Docket No.2022–0013–0012.

[5] Toyota Motor North American, Inc., Docket No.2022–0013–0015.

[6] Ford Motor Company, Docket No.2022–0013–0016.

[7] Koito Manufacturing Co. LTD, Docket No.2022–0013–0007.

[8] Stanley Electric Co. LTD, Docket No.2022–0013–0008.

[9] North American Lighting, Docket No.2022–0013–0009.

[10] Valeo Lighting Systems, Docket No.2022–0013–0010.

[11] Alliance for Automotive Innovation, Docket No.2022–0013–0013.

[12] Transportation Safety Equipment Institute, Docket No.2022–0013–0014.

[13] SAE International—Lighting Systems Group, Docket No.2022–0013–0005.

[14] Insurance Institute of Highway Safety—Highway Loss Data Institute, Docket No.2022–0013–0017.

[15] *See* 87 FR 9947 (Feb. 22, 2022) (''The final rule also clarifies various aspects of the test procedures related to the fixture lamps. It clarifies that the stimulus headlamps will have the lower beam activated and aimed per the SAE Recommended Practice J599 Lighting Inspection Code (J599) procedures, as applicable.'').

[16] 87 FR 9947 (Feb. 22, 2022) (''As NHTSA explained in the NPRM, the minimum taillamp intensities allowed by FMVSS No. 108 (2.0 cd at H–V and as low as 0.3 cd at 20 degrees) are considerably lower than the 7.0 cd lamp specified in SAE J3069 NHTSA also does not agree with SAE that specifying actual vehicle headlamps would result in excessive variability, but continues to believe, as stated in the NPRM, that gradients in typical headlamp beam patterns would likely only affect the repeatability of the test if the reaction by the ADB system changes based on this difference. If this is the case, the ADB system will have this issue in actual use (especially since the specified

Further, including specific headlamp aiming instructions for the stimulus test fixtures would overly prescribe the test conditions, encouraging manufacturers to design narrowly to the test instead of real-world safety needs. The required testing is meant to be representative of on-the-road situations where ADB systems should react regardless of the precise aim of the stimulus headlamps. On the road, the headlamps installed on surrounding traffic are not likely to be perfectly level due to variations such as the slope of the roadway and may even be misaimed, presenting ADB systems with headlamp gradient locations that are not predictable. While an ADB system might use headlamp gradients as an optional method to assist in distinguishing vehicles from other light sources such as streetlights, misaim of stimulus headlamps should not preclude the ADB system from recognizing the need to reduce intensity. Thus, ADB systems should not be particularly sensitive to the aim of the stimuli headlamps.

NHTSA is not docketing specific aiming information from the manufacturers of the stimulus headlamps. While custom aiming strategies may be appropriate for these lamps when mounted on the vehicles on which they were originally designed to be installed, any such instructions would be inapposite for these lamps when mounted in the locations specified for the stimulus test fixtures, as here. For instance, the Ford F–150 headlamps are likely mounted higher when installed on a pickup truck as compared to the mounting height specified for the ADB test fixture. As such, any offset used for these lamps while installed on a pickup truck, would be inappropriate for the mounting location specified for the test fixture. The manufacturer aiming instructions are therefore not fitting in a testing context.

The Agency disagrees that it is necessary to specify in the regulatory text specific aiming instructions for the stimuli headlamps (whether those in SAE J599, or otherwise) and denies these petitions.

B. Allow Representative Vehicles as Stimulus for Compliance Testing

FMVSS No. 108 specifies ADB test fixtures equipped with stimulus lamps for use in performing the dynamic ADB performance tests. This approach minimizes complexity and harmonizes with SAE J3069 (March 2021) while ensuring that ADB systems operate safely. While the test fixtures' specifications follow SAE J3069 with respect to the locations of the photometers [17] and stimulus lamps, FMVSS No. 108 departs from SAE J3069 in that it requires the use of more real-world representative lighting in the test procedure by specifying original equipment vehicle headlamps and taillamps mounted on test fixtures.[18]

In their petitions for reconsideration, Toyota and the Alliance stated that NHTSA should allow, as a manufacturer's option, actual vehicles in place of ADB test fixtures for use in compliance testing. The petitioners suggested that NHTSA modify the final rule by specifying the three vehicles identified in the Final Rule to accommodate more advanced ADB systems.[19]

Toyota and the Alliance stated that representative vehicles would permit ADB sensor arrays (*e.g.,* camera- or radar-based systems) to properly account for the characteristics of real-world oncoming and preceding vehicle scenarios, complementing vehicle lighting detection methodologies that current ADB systems use. The Alliance stated that more realistic real-world conditions would differentiate between other light sources in the environment that might impact detection. Toyota stated that the ADB-equipped Lexus NX used by NHTSA for internal research was an older generation system and that other, more advanced ADB systems, with additional advanced sensing, can rely on (other) vehicle characteristics to enhance object recognition to more accurately determine how to adjust the headlamp beam pattern. The petitioners stated that allowing representative vehicles as stimulus for compliance testing would be safety-beneficial and enhance system performance.

Agency Response

NHTSA is denying the request for the option to use representative vehicles in place of stimulus test fixtures to demonstrate compliance for ADB systems during track testing.

The NPRM initially proposed using representative vehicles during track testing. However, following review of comments expressing significant opposition, NHTSA specified stimulus test fixtures in place of vehicles and explained its reasoning for doing so at length in the final rule.[20] FMVSS No. 108 does not preclude the use of potential stimulus vehicles to improve ADB systems; thus, NHTSA sees no issue with vehicle manufacturers using vehicles to further evaluate the performance of their ADB systems. However, performance above and beyond what is required by FMVSS No. 108 does not supersede what is required in the standard.

By requiring the use of original equipment headlamps and taillamps on the ADB test fixtures, FMVSS No. 108 establishes a minimum performance standard that all motor vehicles with ADB headlighting systems are required to meet. Other vehicle characteristics may not be universal components or present in all vehicles. For example, grilles are a characteristic on certain vehicles, but are not a required component like headlamps and thus not present on some electric vehicles. Rather, FMVSS No. 108 as finalized reflects that lighting is the central object of detection for ADB sensors.

Because the regulatory text specifies how NHTSA will evaluate FMVSS No. 108 compliance for ADB systems and the requirements for ADB do not inhibit manufacturers' use of representative vehicles for ADB development, NHTSA denies the petitions from Toyota and the Alliance to allow representative vehicles as a stimulus in compliance testing.

C. ADB System Component-Level Photometric Requirements

In FMVSS No. 108, the component-level photometric requirements, among other things, ensure that the ADB system provides a minimum level of visibility while limiting the maximum level of glare it may direct toward other drivers. The vehicle-level ADB test procedure evaluates the degree of glare that an ADB system casts on the ADB stimulus test fixture in specific scenarios; it does not evaluate visibility. Accordingly, FMVSS No. 108 applies the existing component-level photometric intensity requirements to portions of the adaptive driving beam. The adaptive driving beams must

headlamps are from high-selling vehicles and therefore common on the road), and this should not be considered variability attributable to the test, but a failing of the ADB system. In any case, NHTSA's testing showed that the tested ADB system was generally able to recognize the fixtures fitted with these lamps.'').

[17] A photometer, or illuminance meter, is an instrument that measures light.

[18] *See* 87 FR 9996 (Feb. 22, 2022) Table 15 (Summary of Major Differences Between the Final Rule and SAE J3069).

[19] MY2018 Toyota Camry, Ford F–150, Harley Davidson Sportster.

[20] Among other reasons, NHTSA concluded that using real vehicles would generally not challenge ADB systems any more robustly than the test fixtures fitted with original manufacturer replacement equipment vehicle headlamps and taillamps, as specified in the final rule. Testing showed that the ADB system detected and responded to the finalized test fixtures in generally the same way it did to an actual vehicle. *See* 87 FR 9934 (Feb. 22, 2022). This obviated the need to include vehicle testing as an option.

consist only of area(s) of reduced intensity, area(s) of unreduced intensity, and transition zone(s). ADB systems are subject to several requirements that are measured in a laboratory, including that it must be designed to conform to the Table XIX (lower beam photometry) requirements in an area of reduced intensity, and that it must be designed to conform to the Table XVIII (upper beam photometry) requirements in an area of unreduced intensity.

Stanley stated that replicating the conditions of an actual vehicle test within a laboratory setting, to conduct a photometric test with headlamps, is ''almost impossible.'' Stanley stated that future ADB (micro) LED headlamps could necessitate testing an infinite combination of areas of reduced intensity. Stanley petitioned NHTSA to only use vehicle-level testing for ADB systems verification and use component-level testing to confirm the lower beam limits with the reduced intensity area turned off, and upper beam limits with the area of unreduced intensity turned on for vehicle headlamps as they would without the ADB. NAL and Koito's petitions suggested similar approaches, with Koito suggesting that ADB component-level photometry requirements be changed to the minimum and maximum lower-beam values in the area of reduced intensity, and the minimum lower-beam values and maximum upper-beam values in the area of unreduced intensity.

Valeo and TSEI petitioned for NHTSA to create a series of specific standardized laboratory compliance tests for ADB systems. According to the petitioners, the lack of a defined test method could lead to an unreasonable, if not an impracticable, amount of time employing various possible implementations of ADB systems spanning a vast range of changing scenarios. TSEI suggested adopting a specific set of test points/lines/zones corresponding to the test scenarios of Table XXII and glare levels of Table XXI.

Valeo's petition acknowledged that the preamble of the final rule states that all possible ADB headlamp configurations would not necessarily need to be tested but suggested that the suppliers need data from actual testing or simulations that show all possible ADB configurations satisfy the lighting standard. Valeo requested that NHTSA devise a specific test plan with eleven set-ups that would cover most, if not all, of the possible set-ups to ensure manufacturers can certify compliance for the FMVSS No. 108 requirements.[21] Both TSEI and Valeo requested that NHTSA adopt vehicle track test scenarios comparable to UNECE regulations.

Agency Response

NHTSA is denying the petitioners' request to modify the component-level photometric intensity requirements. The purpose of component-level photometric requirements is to complement the dynamic vehicle track testing and ensure that the ADB system always provides the driver with a minimum level of visibility. The track tested requirements encompass many common scenarios (*e.g.,* a single oncoming vehicle in the adjacent lane) while evaluating ADB system glare, but they do not test glare in every conceivable driving scenario, nor do they evaluate visibility. For example, an area of unreduced intensity that is exceedingly bright (*e.g.,* exceeds the 75,000 cd upper beam maximum) could create glare beyond the maximum track tested distance of 220 m. Component-level photometric requirements therefore must help serve as a backstop to the track test by ensuring that areas of unreduced intensity are not exceedingly bright out to this distance and glare to other vehicles is minimized.

The component-level photometric requirements generally ensure adequate visibility by specifying minimum levels of light at certain locations (test points) that correspond to different locations on the road. Manufacturers are provided broad flexibility in determining which areas of the roadway receive an area of reduced intensity or an area of unreduced intensity. The component-level requirements ensure that any areas of reduced intensity (up to and including a pattern equivalent to a full lower beam) do not exceed the Table XIX (lower beam) maxima, and any areas of unreduced intensity (up to and including a pattern equivalent to a full upper beam), do not exceed the Table XVIII (upper beam) maxima. Conversely, these component-level requirements ensure adequate illumination by ensuring that the minima in Tables XVIII and XIX are also met.

While NHTSA will verify compliance to Table XIX (lower beam photometry requirements) and to Table XVIII (upper beam photometry requirements) through headlamp testing, manufacturers have the flexibility to certify compliance to the component-level photometric requirements based on other means. As an initial matter, the complexity of certification is based on the complexity of a manufacturer's adaptive beam. If a manufacturer chooses to create a simple adaptive beam, that beam will be less complex to certify than a beam that has multiple areas of reduced intensity or a beam that moves the areas of intensities. In this way, manufacturers may, in their discretion, limit the number of combinations as needed to create a system that they can properly certify. Certification to the component-level requirements may also be accomplished by actual testing, simulation or any valid means that demonstrate that the requirements are met and that ensure that if NTHSA tests the lamps they will meet the requirements.

Additionally, the component level requirements are consistent with longstanding categorization methods used for headlamp beam patterns because they use intensity values at various horizontal and vertical angles. This longstanding method is already used by manufacturers throughout the design and validation process when developing headlamps. As such, manufacturers are likely already aware of the ADB patterns which they have designed for particular purposes.

In considering the petitions to create a series of specific standardized laboratory compliance tests for ADB systems, NHTSA does not wish to limit the flexibilities currently provided to manufacturers to create dynamic beam patterns. If a manufacturer wishes to limit the number of patterns produced by its ADB system to decrease the measurements required to certify their system, it may do so. Likewise, if a manufacturer wishes to create a dynamic beam pattern that includes many combinations of reduced and unreduced areas, the requirements also offer that flexibility. Regardless of the component-level evaluation through actual testing or simulation, the manufacturer must certify that whatever beam pattern its ADB headlamp produces has only areas of reduced, unreduced, and transition zones. In taking this approach, NHTSA has maximized the manufacturers' flexibility to create beam patterns that satisfy their customers, while also protecting other road users from glare. NHTSA therefore denies these petitions.

D. ADB Photometry Requirements

Areas of reduced intensity must meet the component-level photometric

[21] Valeo's petition shows several laboratory testing set-ups for the different ADB road test scenarios and different photometers distances. *See* Docket No. 2022–0013–0010, Figures 8 to 12 (Figure 8 shows testing at 15 m and testing distance is increased in each figure up to 220 m in Figure 12).

requirements for a lower beam.[22] In addition to the component-level photometric requirements, vehicles using ADB headlighting systems are required to maintain these standards while performing dynamic testing on a track. As a part of the track testing, FMVSS No. 108 specifies the use of ADB test fixtures, which each contain stimulus lamps and photometry sensors.[23] For an ADB headlamp, FMVSS No. 108 states the headlighting system must meet the photometry requirements of Table XXI (Adaptive Driving Beam Photometry Requirements) which sets the maximum illuminance within marked measurement distance intervals within a 220 m range.[24]

Several petitioners [25] asserted that ADB headlighting systems cannot concurrently meet the requirements set forth in the component-level tests and the vehicle-level tests. The petitions stated that the maximum permitted illuminance values associated with specific driving scenarios (such as right curves, straight-path, etc.) were particularly difficult to meet while also maintaining the component-level photometric requirements. They suggested, among other actions, that vehicles with ADB systems may need to have their headlamps permanently aimed downward and/or mounted at specific heights to meet the ADB photometry requirements. IIHS asserted that NHTSA's decision to apply left side beam pattern glare limits to the ADB headlighting system imposed an asymmetry during vehicle-level testing of right curves. IIHS stated that the more demanding requirements could only be satisfied with more advanced ADB systems.

SAE, Stanley, and Koito each identified photometric test point 0.5U, 1R–3R as an instance where the ADB maximum allowed illuminance values (glare limit) will fall below the headlamp lower beam photometric intensity minimum. SAE presented multiple right curve calculations to support its claim. The first area in which SAE claimed conflicting requirements exist is at the lower beam photometric test line of 0.5U, 1R–3R. This particular lower beam photometric scan (laboratory) requires a minimum intensity of 500 cd throughout the line, while allowing a maximum of 2,700 cd anywhere along the line. During right curve ADB test scenarios, the photometer on the test fixture will have a relative travel path that will cross this same test line at some test distance (the distance varies with factors such as curve radius, headlamp mounting height, etc.). SAE stated that the dynamic vehicle test also imposes a glare limit on the same region of the beam pattern which it claimed does not match the corresponding component-level photometry requirement.

In its petition, SAE presented an example showing a 400 m right curve and an ADB headlamp mounting height of 600 mm. In the example, the lower beam maximum of 2,700 cd (laboratory) along that line for a single headlamp would now be limited to 2,160 cd (track) from the pair of ADB headlamps. SAE further stated that dividing this value for each of the two headlamps results in approximately 1,080 cd from a single ADB headlamp imposed by the vehicle driving test requirements. SAE stated that the component-level minimum of 500 cd is also required for lower beams along that same photometric scan line. SAE described this smaller window of compliance as a conflict, claiming that an intensity not much greater than the minimum intensity required along the 0.5U, 1R–3R line would fail the ADB vehicle testing requirements. SAE also presented an example for a 210 m right curve and an ADB lamp mounting height of 800 mm where the upper limit would be approximately 1103 cd per ADB headlamp (track) along the same 0.5U, 1R–3R line that again has a 500 cd minimum.

SAE also presented an example for an area close to the lower beam test point of 2U–4L (Laboratory). SAE stated that this test point requires a minimum of 135 cd. SAE further calculated that, for the 210 m right curve at an ADB mounting height of 600 mm, the lux meter position for the vehicle test would be very close to the 2U–4L point at 15 m distance. The track test maxima require no greater than 700 cd from a pair of ADB headlamps, or 350 cd per ADB headlamp, which SAE stated allows only a small design window.

TSEI stated its concurrence with SAE's petition. It further stated that the glare and lower beam photometry requirements, along with the requirement for a 1-degree transition zone, deviate from the definition of ADB systems as an evolution of headlamp beam switching devices where specific zones of the upper beam are dimmed, leaving intensity of the dimmed zone at a level equal to the lower beam. TSEI stated that unless the ADB system is deactivated while performing on right curves, under the standard as currently written, the lower beam portion of the ADB system would need to be re-aimed downward or dimmed to comply. TSEI stated that either of those choices would reduce the performance and increase the cost of the system.

Ford presented a comparison of the performance of compliant 2021 F–150 headlamps while undertaking right curves, aimed nominally versus oriented 3 inches downward, to meet the glare limits of the final rule.[26] Ford's comparison highlighted that the headlamps largely exceeded the maximum illuminance requirements defined in Table XXI at nominal, while the downwardly aimed headlamps met the requirements. For example, for distances less than 60 m and greater than or equal to 30 m the maximum illuminance requirement is 1.8 lux, yet the illuminance at nominal aim was 4.4 lux and the illuminance when aimed 3 inches down was 1.1 lux. In addition, when translated into forward visibility on a straight road, Ford determined that the downward aiming decreased the forward lower beam seeing distance by 40.3%. For those reasons, Ford petitioned for the creation of a separate glare limit for right curves, in order to maintain a high level of road visibility for drivers. Ford also petitioned based on the IIHS's Headlight Test & Rating Protocol [27] for updates of the illuminance values in Table XXI.[28]

Valeo asserted that currently compliant headlamps that meet photometric requirements would not meet the requirements in the standard on vehicles with higher mounting heights during same direction driving scenarios. Valeo performed an internal investigation with three headlamp mounting heights (750 mm, 900 mm,

[22] For instance, in accordance with Table XIX, headlamps observed at test point 0.5U, 1R–3R (deg) must abide by a minimum photometric intensity of 500 cd and maximum photometric intensity of 2700 cd.

[23] 49 CFR 571.108 S14.9.3.12.3.1.

[24] *See* 49 CFR 571.108 S14.9.3.12.2. and 49 CFR 571.108, Table XVIII (Headlamp Upper Beam Photometry Requirements), Table XXI (Adaptive Driving Beam Photometry Requirements). As an example: at distances less than 30 m and greater than or equal to 15 m, the maximum illuminance for an oncoming vehicle is 3.1 lux and the maximum illuminance for a same direction vehicle is 18.9 lux.

[25] Specifically SAE, Stanley, Toyota, Ford, TSEI, NAL, IIHS, Valeo, Volkswagen, Koito and the Alliance.

[26] *See* Docket No. NHTSA–2022–0013–0016; Appendix A.

[27] *See* Insurance Institute for Highway Safety, Headlight Test & Rating Protocol, Ver. III (July 2018), *https://www.iihs.org/media/0e823704-32d1-4500-b095-15d064d824a7/ZJciYw/*;.(last accessed Dec. 18, 2024)

[28] Ford suggests using the following values in Table XXI: for distances less than 30 m and greater than or equal to 15 m, a maximum illuminance for right curves of 7.1; for distances less than 60 m and greater than or equal to 30 m, a maximum illuminance for right curves of 4.8; and for distances less than 120 m and greater than or equal to 60 m, a maximum illuminance for right curves of 2.1.

and 1160 mm) to evaluate glare compliance for the vehicle rearview mirrors and driver's eyes photometers at distances of 15 m, 30 m, 60 m, and 120 m. Valeo composed photometric figures (Figures 5–7) on a coordinate system that showed the intensity (cd) from the left side headlamps of the outside rearview mirrors and driver's eyes photometers during the same direction (straight-path) road test.[29] Figure 5 showed a 750 mm headlamp mounting height, Figure 6 showed a 900 mm mounting height, and Figure 7 showed a 1160 mm mounting height. Each figure identified several points of interest, corresponding mirror and photometer locations, where Valeo calculated that the photometric intensity would exceed the bounds of the lower and upper beam photometric requirements, at a given distances, for the specified mounting height. As such, Valeo stated that it does not believe that redesigning the lower beam photometric output would resolve the issue, as recommended in the rule that permitted the installation of ADB systems. Instead, Valeo recommended that NHTSA change the glare requirements, so that they are calibrated to the headlamp being tested instead of it being a fixed value.

Toyota presented a similar analysis, characterizing the pitch of a high-mounted lower beam versus normal aiming.[30] Toyota determined that headlamps positioned at a height of 1.1 m would need to lower their vertical aiming angle by 1.41 degrees to meet the photometry requirements in the final rule. However, the adjusted vertical aiming angle would result in a roughly 120 m reduction in forward visibility at 3 lux of lower beam visibility, creating ''sub-optimal visibility'' for the driver in the area of reduced intensity.

The petitioners suggested that due to perceived conflict enabled by the narrow acceptable intensity margin presented in Table XIX (Headlamp Lower Beam Photometry Requirements) and XXI (Adaptive Driving Beam Photometry Requirements), NHTSA should allow industry stakeholders to dim or re-aim the lower beam during right curves. Several petitioners requested NHTSA consider aligning with SAE J3069, essentially providing the option to evaluate the ADB glare requirement by stipulating the illuminance of the ADB either not exceed the values listed in Table XXI or not exceed by more than 25% the illuminance produced by the same vehicle's lower beam. Ford alternatively petitioned NHTSA to amend FMVSS No. 108 to reflect its own petitioned values for Table XXI, though Ford stated that it would request that NHTSA provide a phase-in period to allow vehicle manufacturers the time to validate the more stringent requirements.

Agency Response

NHTSA is denying the petitioners' requests to modify the track limits in Table XXI of FMVSS No. 108 by permitting ADB illuminance to exceed the vehicle's lower beam illuminance by up to 25%. NHTSA is also denying Ford's petitioned changes to Table XXI (Adaptive Driving Beam Photometry Requirements), to create separate standards for right and left opposite direction curves. Further modifications to FMVSS No. 108, such as those raised by the petitioners, are not necessary because options already exist for ADB systems to mitigate glare while adhering to the component-level photometric requirements. These flexibilities are available to the manufacturer and discussed below.

NHTSA established photometry requirements for headlamp upper and lower beams in Table XVIII and Table XIX of the lighting standard (FMVSS No. 108), respectively. NHTSA standardizes vehicle headlamps to satisfy two safety needs: visibility and glare prevention. Headlamp lower beams are designed to provide relatively high levels of light in the close-in forward visibility region, and to provide reduced light intensity in longer-distance regions, where oncoming or preceding vehicles would be glared. The upper beams are designed to provide relatively high levels of illumination in both close-in and longer distance regions. For adaptive driving beams, NHTSA designated the photometry requirements, specified as a directional maximum illuminance per measurement distance interval, on the left or driver side of the vehicle. For example, over a measurement distance interval greater than or equal to 15.0 m and less than 30.0 m, the maximum illuminance for a vehicle in the opposite direction is 3.1 lux; for a vehicle driving in the same direction, the maximum illuminance is 18.9 lux.

NHTSA reiterates that it currently allows vehicle manufacturers the option to dynamically re-aim headlamps during driving. Potential issues of glare due to headlamp mounting height can be addressed with the on-vehicle (dynamic) aim of the headlamps. NHTSA has previously explained that for headlamp systems capable of dynamically re-aiming the headlamps (*e.g.,* based on the steering angle), the laboratory photometry requirements ''must be met in the nominal position of the lower beam headlamp (*i.e.,* considering the location of the axis of reference to coincide with the longitudinal axis of the vehicle).'' [31]

With respect to the comments about vehicles equipped with high-mounted headlamps, the issue of glare is also present with respect to the lower beams on those vehicles. As such, those vehicles already tend to have their headlamps aimed downward to avoid glaring oncoming or preceding vehicles. Toyota contended that aiming beams downward would reduce seeing distance. However, this concern presumes that a manufacturer aims an entire system's beams downward instead of aiming the adaptive driving beam only. If a manufacturer aims only the adaptive driving beam somewhat lower, that will likely have the greatest impact on areas of reduced intensity, not areas of unreduced intensity (due to the characteristics of lower beam and upper beam patterns). This would not likely have an outsized impact on seeing distance as Toyota suggests.

Additionally, manufacturers have the flexibility to alter the vertical arrangement of the headlamps and/or light sources to mitigate glare. Vertical arrangement refers to the positioning of each headlamp when multiple headlamps are used. FMVSS No. 108 S9.4.1.6.5 expressly permits the adaptive driving beam to be provided by any combination of headlamps, allowing ADB systems to produce the adaptive driving beam out of a headlamp that is mounted lower on the vehicle. This regulatory language directly addresses the concerns raised by commenters that cited high-mounted headlamps as causing a glare issue. Ford and the Alliance acknowledged this option in their comments to the NPRM.[32]

SAE, in its petition, calculated that during certain curve scenarios the maximum glare limits are less than the maximum allowed photometry values. Considering the example that results in the highest discrepancy based on the provided calculations (the 400 m right curve example), the maximum value at that test point is still more than twice

[29] *See* Docket No. NHTSA–2022–0013–0010, Figures 5–7.

[30] *See* Docket No. NHTSA–2022–0013–0015, Figure 1.

[31] *See* Letter to Kiminori Hyodo, Koito Manufacturing Co., Ltd. (Feb. 10, 2006), *https://www.nhtsa.gov/interpretations/hyodob-3* (last accessed Dec. 18, 2024); *see also* 68 FR 7101 (Feb. 12, 2003) (discussing application of laboratory photometry requirements to adaptive frontal-lighting systems).

[32] NHTSA–2018–0090–0162; NHTSA–2018–0090–0138.

the minimum at the same point (1,080 cd from SAE calculations vs the 500 cd minimum in FMVSS No. 108). A 580 cd (1,080 cd–500 cd) range of intensity values is sufficient for the design of a compliant ADB lamp, especially considering that the ADB system could dynamically re-aim in order to avoid glare during the ADB track tests. As mentioned previously, a lamp with an output which may exceed the dynamic track test limits for glare could re-aim downward (or use other means) to alleviate glare. The Agency retains this requirement, as detailed in the final rule, because ADB systems can detect oncoming vehicles and adapt accordingly, thus outperforming traditional lower and upper beams in reducing glare.[33] It is therefore appropriate to hold ADB systems to a higher standard.

In its petition, through an internal analysis, Valeo asserts that fully compliant lower beams would fail the glare requirements for same direction driving scenarios. However, upon inspection of their analysis, NHTSA recognized that Valeo had instead applied the adaptive driving beam photometry requirements (Table XXI) for oncoming/opposite direction scenarios when grouping the intensity measures for the locations of the side-view mirrors and driver photometers, shown in figures 5–7. NHTSA also observed that Valeo analyzed test setups using headlamp mounting heights that were nearly level with the 1.2 m driver photometer, in particular the 1.16 m height. Headlamp setups of that stature are unlikely and would glare drivers without proper re-aiming. Because Valeo used improper parameters in its testing, NHTSA does not find the results of this testing compelling and they do not warrant revisiting FMVSS No. 108. NHTSA therefore denies the petitions.

E. Transition Zone

FMVSS No. 108 allows for a 1-degree transition zone between an area of reduced intensity and an area of unreduced intensity.[34] The lower and upper beam photometric test points will not be applied within the transition zone (except for the upper beam maximum at H–V, which still applies throughout the entirety of the beam). Manufacturers are free to decide which portions of the roadway will receive an area of reduced or unreduced intensity, subject to several requirements or constraints (such as the track test that evaluates glare). This flexibility enables ADB systems to provide an area of reduced intensity not only to prevent glare to oncoming or preceding vehicles, but also in other situations in which reduced intensity would be beneficial (*e.g.,* towards retroreflective signs, or on a wet roadway).

SAE, Stanley, Koito, Valeo, NAL, the Alliance, Toyota, TSEI, IIHS, Volkswagen, and Honda all petitioned NHTSA to adjust the designation of a 1-degree transition zone between the headlamp's areas of reduced and unreduced intensity. Of those identified, SAE, Stanley, Valeo, the Alliance, Toyota, Volkswagen and TSEI explicitly petitioned that NHTSA increase the transition zone to 4 degrees. Valeo supported its petition by presenting an ADB pattern and its accompanying intensity scan of the H–H line, to demonstrate how transitioning from the area of reduced intensity to an area of full intensity in the upper beam portion of the ADB beam takes at least 4 degrees.[35] Further, Valeo presented a comparative diagram of the UNECE and FMVSS No. 108 ADB implementation requirements to illustrate that the 1-degree transition zones will result in much larger areas of reduced intensity to meet the minimum requirements of the upper beam test points in the areas of unreduced intensity; Valeo stated this result effectively minimized the added safety benefits of ADB. Koito showed in its petition an iso-lux curve showing its ADB systems use approximately a 4-degree transition zone.[36] NAL stated that not restricting ADB systems to a 1-degree transition zone could provide more light than the basic lower beam and potentially improve safety. Further, NAL and Koito also commented that NHTSA did not thoroughly explain the safety benefit of a 1-degree transition zone.

Several petitioners[37] shared that an overwhelming majority of current ADB systems in other foreign markets would fail to meet the 1-degree transition zone requirement given the limits of the technology. Koito stated that the most popular and cost-effective ADB systems employ an optical system with shifting and overlapping segments of light, to ensure better visibility by enabling smooth transitions between the areas of reduced and unreduced intensity. Koito, among others, stated that these systems would fail to meet the standard. Toyota also commented that the photometry requirements would likely make systems more costly and slow development. Further, Toyota stated that only expensive, high-resolution pixelated ADB systems within premium vehicles can meet the current compliance standards for the transition zone. Additionally, NAL stated that SAE J3069 intentionally did not specify a width of the transition zone to permit different, less complicated, ADB systems and beam patterns as more than 80 percent of systems currently implemented by manufacturers are less complex. IIHS stated that NHTSA would contravene its stated technology-neutral approach by having a requirement that would strongly favor pixelated systems.

Petitioners SAE and Koito suggested eliminating the transition zone entirely. TSEI requested NHTSA specify the size of the transition zone be greater than the minimum values specified for relevant lower beam test points (Table XIX, Headlamp Lower Beam Photometry Requirements) and less than the maximum specified at the HV for the upper beam (Table XVIII, Headlamp Upper Beam Photometry Requirements). TSEI stated this solution would more closely align, not only with SAE J3069, but also with the definition of a semi-automatic headlamp beam switching device, granting manufacturers more freedom to optimize ADB systems. Volkswagen stated in its petition that there are no known safety recalls, reported concerns or customer complaints with ADB in the rest of the world, which indicates an absence of safety issues with current ADB systems. According to Volkswagen, the exceptionally rigorous requirements for ADB in the United States through FMVSS No. 108 are not necessary.

[33] 87 FR 9957, (February 22, 2022). The agency notes that even with this modification, the glare limits in this final rule are still (as Stanley suggested) more stringent than currently allowed by the Table XIX right-side maxima from 1R to 3R. However, this level of stringency is reasonable and provides a manageable design range. The lower beam photometry was designed to provide a generic beam to prevent glare regardless of the actual road and traffic conditions; it was not customized to provide glare protection to oncoming vehicles on a right curve. Because most situations in which an oncoming vehicle can be glared will occur with the oncoming vehicle to the *left,* the existing Table XIX lower beam photometry requirements require shading the left side and permit more light on the right side. However, the adaptive driving beam is not, and need not be, an all-purpose beam like a conventional lower beam. It is clear in the photometry tables that the appropriate glare limits for oncoming situations are the left-side maxima in Table XIX, on which the oncoming glare limits are based. These limits should, to the extent possible, apply to oncoming glare, including from the right-side. In any case, the agency believes that current lower beams would generally comply with the glare limits as applied in this scenario with the revised measurement distance range.

[34] 49 CFR 571.108 S9.4.1.6.4.5.

[35] See Docket No. NHTSA–2022–0013–0010, Figures 2–3.

[36] See Docket No. NHTSA–2022–0013–0007, Figure 1.

[37] SAE, Stanley, Valeo, the Alliance, NAL, Toyota, IIHS, Volkswagen and TSEI.

Agency Response

NHTSA is denying all the petitions that request a change to the 1-degree transition zone allowance between the vehicle's headlamp areas of reduced and unreduced intensity. The transition zone plays a vital role in making the requirements practicable. In some cases, transitioning from lower beam intensities to upper beam intensities can represent a large change in photometric intensity. Achieving this transition is important to ensure that the adaptive beam pattern continues to serve the function of providing seeing distance, while also limiting glare. The angular size of this transition is critical to the beam's ability to meet these competing goals. A transition zone that is too large can create a problem in the beam pattern where either glare control or seeing distance is less than what is provided by the appropriate lower or upper beam, compromising safety.

NHTSA determined that increasing the transition zone from 1-degree to 4-degree, as suggested by most of the petitioners, would reduce visibility below that provided by an upper beam even in common driving situations. Specifically, NHTSA found that over a 50 m range, the area of a 4-degree transition zone would extend 3.5 m wide and potentially cover the entirety of an adjacent lane. This limits the ability of the driver of an ADB equipped vehicle to navigate the roadway. NHTSA considered a simple interaction with a single oncoming vehicle that is positioned 50 m ahead in a lane to the left of the ADB equipped vehicle. In such a scenario, the adaptive beam will create an area of reduced intensity around the oncoming vehicle and will also create a transition zone to the left and right of that area of reduced intensity. If that transition zone extends 4 degrees beyond the end of the area of reduced intensity, it will not provide the upper beam photometric intensity until 3.5 m to the right of the oncoming vehicle (the area representing the ADB vehicle's travel lane). For a roadway with 3.0 m wide lane widths, the entirety of the ADB vehicle's travel lane (at a distance of 50 m) will be illuminated by the minimally regulated transition zone, which does not ensure proper object detection and undermines safety.

With regard to the commenters' claims that FMVSS No. 108's transition zone requirement is overly stringent, costly, and only high-resolution, pixelated ADB systems within premium vehicles can comply, NHTSA highlights that ADB headlight systems are optional. Because of the added costs associated with the technology, NHTSA does not anticipate that manufacturers would make these systems standard equipment in all vehicle models at this time. However, the practicability requirement in the National Traffic and Motor Vehicle Safety Act considers the technological ability of an industry to meet the goals of a particular standard. While ADB technology sufficient to meet the 1-degree transition zone may not yet be prevalent, compliance is feasible and demonstrated by specific premium models. NHTSA may also issue safety standards that are technology-forcing, requiring improvements in existing technology.[38] While the transition zone requirements of FMVSS No. 108 are appropriately more rigorous than existing global requirements, revising FMVSS No. 108 to allow certification of ADB systems moves toward harmonization. By making ADB an optional technology, NHTSA incentivizes manufacturers to strive toward the increased safety and visibility advanced by the standard's rigor, while balancing reasonableness of cost and lead time.

F. Other

Momentary Exceedance Limit

FMVSS No. 108 allows for a 0.1 second momentary glare exceedance allowance to account for vehicle pitch and other potentially uncontrolled noise in the measurement system.[39] The momentary glare exceedance duration begins when the permitted maximum lux is exceeded and concludes in at least two ways: the illuminance value drops below the applicable glare limit; or the glare limit itself changes (*i.e.,* increase). These outcomes could happen if the exceedance is experienced just before the glare limit changes. In either case, if the glare limit is not exceeded for more than 0.1 seconds, the exceedance will not be considered a noncompliance.

Volkswagen petitioned NHTSA to increase the ADB systems exceedance limit. Volkswagen stated that the detection angle of the forward-facing cameras in NHTSA's testing of medium curve track scenarios, which resulted in glare exceedances, surpassed the capabilities of their existing ADB system cameras. Volkswagen stated that increasing the angle of detection of existing ADB system cameras, to keep the lux values within the illuminance limits and time exceedance at the far horizontal edges of the camera's detection zone, will detract from the system's performance and stability in the head-on area of the vehicle. According to Volkswagen, the compromised sensitivity will limit the ADB system from utilizing increased use of unreduced intensity light and limit safety benefits of enhanced visibility in all road scenarios. According to Volkswagen, consistently controlling glare to the far extreme horizontal edges of the angular visibility of the camera could be optimized by increasing the glare exceedance limit to a higher value.

Volkswagen stated that a human driver's physical reaction time is approximately 1.0 second. Volkswagen referenced comments in the final rule preamble by the American Automobile Association (AAA), where it reported oncoming glare research showed exceedance of 1 second was rated as distracting to drivers.[40] Volkswagen petitioned NHTSA to increase the minimum exceedance limit time from 0.1 seconds to 0.7 seconds, which it states will allow the systems to have a more consistent and reliable detection performance.

Momentary Exceedance Limit Agency Response

NHTSA is denying the petitioner's request to increase the 0.1-second momentary exceedance limit for ADB systems to 0.7 seconds. NHTSA established the 0.1-second glare exceedance allowance to account for testing-related variability caused by noise and uncontrolled test factors. For example, minor imperfections in the road surface can cause glare exceedances by affecting vehicle pitch. The testing conducted by NHTSA in support of the final rule does not show that glare from such sources lasts longer than 0.1 second.

NHTSA does not agree with Volkswagen's comparison to a human driver's reaction time. The field of view (FOV) of the ADB system's camera is considerably narrower than that of a human observer, which is estimated at approximately 180°. The narrower FOV will impact, and indeed improve, the ADB system's ability to quickly recognize and respond to oncoming stimuli. NHTSA considers any comparison with a human observer to be a false equivalency.

Large Radius of Curvature Track Testing

FMVSS No. 108 specifies testing for oncoming glare over eight track test scenarios. The test scenarios involve the subject vehicle traveling towards the

[38] *See Chrysler* v. *Department of Transportation,* 472 F.2d 659 (6th Cir. 1972).

[39] 49 CFR 571.108 S14.9.3.12.2.1.

[40] 87 FR 9940 (Feb. 22, 2022) § VIII.C.4 (Maximum Illuminance Criteria (Glare Limits)).

fixture at various ranges of test speeds and road geometries of varying direction and curve radii, including large radii from 335m to 440m.[41]

Volkswagen requested NHTSA remove the large radius curve test scenario from the standard. Volkswagen stated the vast majority of vehicle proving grounds do not offer such a large radius of curvatures. Volkswagen stated that there are currently only five facilities that are sufficiently large enough to conduct the final rule track testing. Volkswagen suggested NHTSA did not evaluate the ability of manufacturers or companies to conduct the testing at their own facilities and/or make accommodation for large radius curve test scenarios, which impose significant financial and time burdens. In addition, given NHTSA's preamble comments on IIHS using extrapolation for medium radius of curvature testing,[42] Volkswagen inferred that similar extrapolation would be allowed for large radius test scenarios, making it redundant to include a specific track test as part of the regulation.

Large Radius of Curvature Track Testing Agency Response

NHTSA is denying the petitioner's request to remove large radius curve testing scenarios from FMVSS No. 108. NHTSA was able to test on the curves specified in the final rule at the Transportation Research Center Vehicle Dynamics Area. This test facility is publicly available to manufacturers.

A manufacturer must certify that its ADB system will meet the requirements specified in the standard if NHTSA tests it. As such, a manufacturer may use any valid means, including extrapolation, to certify if such a method proves valid through physical testing conducted by the NHTSA. Therefore, it is not necessary to remove the large radius curve test scenarios. Accordingly, manufacturers must exercise reasonable care in certifying that their vehicles will perform throughout the range of radii of curvature specified in the Table XXII. NHTSA will perform compliance testing using NHTSA facilities and it is the manufacturer's responsibility to ensure that it meets the performance requirements.

Headlamp Lens Cleaning

The Alliance petitioned for the test vehicle preparation of the headlamps lenses to match the preparation for the ADB sensors and windshield.

Headlamp Lens Cleaning Agency Response

The regulatory text states that to the extent practicable, the windshield and sensors will be clean and free from dirt and debris. The phase ''to the extent practicable'' does not appear in the vehicle preparation condition for a clean and debris free headlamp lens. This distinction acknowledges that it may not be practicable in some cases to clean the ADB sensors depending on the design of the vehicle. While Option 1 for headlamp beam switching devices in FMVSS No. 108 (classic semiautomatic beam switching device) is required to have an accessible lens for cleaning, no such requirement is applied to the ADB option. As such, a condition may exist in which NHTSA is unable to clean the ADB sensor. Considering this possibility, the ''to the extent practicable'' phase is included in the cleaning condition for that sensor. A comparable situation does not exist for headlamp lenses as FMVSS No. 108 restricts the installation of headlamp obstructions. As such, NHTSA anticipates that it can clean the headlamp lenses before testing the ADB system as specified in the test procedure without issue.

Motorcycle ADB Requirements

FMVSS No. 108 identifies the upper and lower beam photometry requirements for motorcycle headlamps and specifies that a motorcycle headlighting system must meet one of two options.[43] One option is that it must satisfy one half of any passenger vehicle headlighting system of Table II, which provides both a full upper beam and full lower beam and is designed to conform to the requirements for that headlamp type. Alternatively, under the second option, the headlighting system may be designed to conform to requirements that are specific to motorcycles.

Honda and Stanley requested NHTSA verify the application of ADB systems to motorcycles. They stated that the ADB requirements only mention photometry requirements in Tables XVIII and Table XIX, but not Table XX which includes photometry requirements for headlamps of motorcycles.

Honda suggested that NHTSA modify the requirement to add Table XX to the relevant ADB sections of the standard (S9.4.1.6.4.[3–5]), while Stanley simply requested clarification on how to apply ADB to motorcycles.

Motorcycle ADB Requirements Agency Response

NHTSA is denying the petitioners' requests to include motorcycle specific language in the final rule to validate motorcycle headlamp photometry compliance for ADB systems. NHTSA's lighting standard grants motorcycle headlighting systems two options to meet compliance. One of the options requires that the motorcycle headlighting system consist of one half of a headlighting system specified in Table II and conforms to the requirements for that headlamp type. This option can be used to ensure motorcycle headlamps meet the ADB requirements and not require change to the current regulatory text. NHTSA recognizes the requirements in Tables XVIII and XIX differ from those of Table XX; this difference is intentional and motorcycle lamps that incorporate ADB technology will need to comply with the requirements in Tables XVIII and XIX as they relate to motorcycles.

III. Petition for Reconsideration That Is Out of Scope

Each semiautomatic headlamp switching device must include operating instructions to permit a driver to operate the device correctly. This requirement includes how to turn the automatic control on and off; how to adjust the sensitivity control (for Option 1 and, if provided, for Option 2); and any other specific instructions applicable to the device. Option 1 (''the classic system'') automatically switches between the upper and lower beam. Option 2 is the adaptive driving beam newly allowed by the revision of FMVSS No. 108. The recent revision to FMVSS No. 108 added the parenthetical ''(for Option 1 and, if provided, for Option 2)'' to the regulatory text to reflect that the requirement for sensitivity control instructions continue to apply to the classic system without change, but now also applies to adaptive driving beams if the adaptive driving beam is equipped with sensitivity control.

The Alliance petitioned for a modification of the operating instructions to the semiautomatic beam switching devices. The Alliance petitioned to remove the sensitivity control instructions for the Option 1 semiautomatic beam switching device by modifying the regulatory text to say ''if provided'' for both Option 1 and Option 2. FMVSS No. 108 uses the language ''if provided'' only for Option 2, reflecting the intent to make no

[41] 87 FR 9928 (Feb. 22, 2022) Table 4 (Summary to the Proposed Track Test Scenarios). Testing is done with the vehicle traveling on a straight-path or on curves. The Radii of the curves vary as follows: Small = 85 m–115 m; Medium = 210 m–250 m; Large = 335 m–440 m. The testing speed ranges vary based on scenario from 25 mph to 70 mph.

[42] 87 FR 9955 (Feb. 22, 2022) § VIII.C.8.d (Scenario 4: Oncoming Large Left Curve).

[43] 49 CFR 571.108 S10.17.

changes to the classic semiautomatic beam switching devices requirements (Option 1), as compared to the previous versions of FMVSS No. 108. The scope of the recent FMVSS No. 108 revision pertained only to adaptive driving beams. As the request from the Alliance pertains to modification of the classic semiautomatic beam switching devices and those devices are not part of this ADB systems rulemaking action, NHTSA deems this request out of scope. NHTSA will not modify the requirements.

IV. Clarifications

Several clarification questions were presented as part of the various petitions for reconsideration. NHTSA is taking this opportunity to answer some of these clarifying questions.

First, NHTSA will zero-calibrate the photometers for the ADB track testing with the photometers installed on the test fixture and in the testing orientation. Doing so will allow NHTSA to more accurately measure the light provided by the test vehicle and filter out light from the environment.

Second, NHTSA's zero-calibration process will subtract out light provided by the test fixture lighting itself. The lamps installed on the test fixture will illuminate the surroundings and, as such, some of that light will be reflected back onto the photometers. This light will not be counted as part of the measured light that is required to be less than the prescribed maxima. NHTSA's testing method also accounts for ambient conditions by measuring ambient illuminance either immediately before or after each test trial and subtracting that value from the recorded test data.

Finally, NHTSA is clarifying that if a lower beam is part of the adaptive beam and horizontal aim is included in that lower beam, then it is excluded from the horizontal VHAD requirements in the same way as the adaptive beam is excluded. That is to say, a lower beam that is part of an adaptive beam and includes a horizontal aim need only meet the horizontal VHAD requirement to include references and scales relative to the longitudinal axis of the vehicle necessary to ensure correct horizontal aim for photometry and aiming purposes. It must include a ''0'' mark to indicate the alignment of the headlamps relative to the longitudinal axis of the vehicle and include an equal number of graduations from the ''0'' position representing equal angular changes in the axis relative to the vehicle axis. The remaining horizontal VHAD requirements that would apply to a lower beam that is not part of an adaptive beam do not apply in such a scenario (S10.18.8.1.2.1 through S10.18.8.1.2.4).

V. Conclusion

For the reasons discussed above, the agency denies the Petitioners' petitions for reconsideration of the February 22, 2022, final rule (87 FR 9916).

Issued in Washington, DC, under authority delegated in 49 CFR 1.95 and 501.

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[FR Doc. 2024–31141 Filed 12–27–24; 8:45 am]

BILLING CODE 4910–59–P