May 8, 2019

U.S. Department of Transportation
Docket Operations, M-30
Room W12-140
1200 New Jersey Avenue, SE
Washington, DC 20590

RE: General Motors, LLC – Receipt of Petition for Temporary Exemption From Various Requirements of the Safety Standards for an All-Electric Vehicle With an Automated Driving System [Docket No. NHTSA-2019-0016]

AAMVA is excited to explore the safety benefits of Automated Driving Systems (ADS) and is committed to continued collaboration with NHTSA as the policy framework for the safe testing and deployment of automated vehicles continues to evolve. With respect to the current application of existent FMVSS on ADS, AAMVA offers the following comments on the petition:

In General

FMVSS Applicability to Non-Driver Entities
One traditional way in which the States have heavily relied on federal safety oversight has been through the standardization of the design, construction, performance, and durability requirements for motor vehicles through Federal Motor Vehicle Safety Standard (FMVSS) conformance. Conformance with all applicable FMVSS provides the states and the general public with an assurance that manufactured vehicles can safely integrate and operate on public roads. While this petition represents a significant departure from past petitions for exemption in that they remove the need for a driver, AAMVA cautions that FMVSS do not solely exist for the safety considerations of a "driver." As ADS continue to evolve, NHTSA should thoroughly consider the impact granting any exemption has on the entire road safety community, and whether any aspect of the exempted FMVSS is applicable to non-driver vehicle occupants (passengers) or other roadway users.

Application of Exempted Status to Testing and Operational Constraints
AAMVA requests clarity from NHTSA on whether or not granting an exemption (even temporary) would absolve OEMs from adhering to state (or local) vehicle testing

requirements or operational constraints. The granting of a federal exemption from FMVSS that effectively removes a driver may mean different things to different parties. The more up-front clarity provided to consideration of exemptions and how they relates to operational constraints and testing versus deployment, the better. As the petition states, "While established vehicle manufacturers can conduct on-road tests to evaluate their vehicles without first obtaining an exemption, if they wish to mix such testing with operations involving transporting the public, exemptions may, to that extent, be necessary."

Remote Driver/Monitoring

Many, if not all of the specific FMVSS exemption explanations NHTSA provides cite statements indicating that the removal of driver controls are expected due to the removal of the driver from the designated driver position in the vehicle. This makes sense in that controls may not be applicable or available for a non-existent operator. However, with respect to certain vehicle safety performance issues (such as tire pressure monitoring for instance) the petition cites that, "the vehicle's ADS would monitor the tire pressure electronically, detect low pressure, and recognize malfunctions in the tire pressure monitoring system. To help in controlling the maintenance and operation of vehicle fleets, the ADS would communicate tire pressure status to GM." This raises some concerning questions regarding the remote driving/remote monitoring of actively engaged vehicles. To date, there have been no standards or applicable safety requirements for the remote oversight of driverless vehicle performance. Until now, all vehicles have required a human driver. If the petition is to seriously consider the removal of a human driver for reliance on the ADS, then NHTSA must consider what it means for the vehicles to be operated, monitored, and maintained "by proxy." Vehicle performance issues can arise as they are actively affecting public safety. The communication of vehicle safety issues to a remote operator/monitor has not been applied to conditions directly related to individual driverless vehicle performance issues in the past. In removal of the driver, AAMVA requests NHTSA consider how vehicle safety and maintenance issues are not only reported to the manufacturer, but also how a manufacturer ensures that position is filled by personnel qualified and capable of safety oversight, and that there are standards in place regarding how safety information communicated to a remote monitor is acknowledged, processed and utilized to effect a remedy. Communicating a safety issue is very different from resolving one.

Given state-specific, geographic signal availability; road and weather conditions; and general familiarity with constrained operating areas; AAMVA wonders whether individual circumstances regarding remote oversight might best be something more appropriately considered by state and local authorities. With approval of the petition, is NHTSA tacitly setting the precedent for remote operations without taking advantage of the opportunity to establish industry-wide expectations of what this means?

The points raised above do not necessarily convey a desire by AAMVA for the petition to be denied. However, there are aspects of the petition that extend beyond the normal capacity of a petition to grant relief from the design standards of a vehicle. Because this petition represents not only relief from vehicle standards, but tacit approval of replacement processes involving the general public, the petition warrants careful consideration. With this in mind, AAMVA directs NHTSA to its comments regarding the granting of conditional exemptions and supports NHTSA's discretion in emphasizing the "temporary" nature of any exemption.

Vehicle Identification and Differentiation

Should NHTSA choose to grant this and continued exemptions to the FMVSS for AV technologies, the ability to identify and differentiate exempted vehicles is extremely important. Vehicles that do not comply with FMVSS and yet interact with the public should utilize some sort of signage or a universal indicator to alert first responders, potential passengers and other road users that the vehicles do not comply with federal safety standards.

I. Background

The petition states that, "While established vehicle manufacturers can conduct on-road tests to evaluate their vehicles without first obtaining an exemption, if they wish to mix such testing with operations involving transporting the public, exemptions may, to that extent, be necessary." Given NHTSA discretion in considering any exemption application, and its sole authority in this regard, the pairing of FMVSS exemption applications with ridesharing capabilities that directly involve public passengers may warrant special consideration of what constitutes "public interest," under 49 USC 30113.

"The Safety Act authorizes the Secretary to grant, in whole or in part, a temporary exemption to a vehicle manufacturer if the Secretary makes specified findings. The Secretary must look comprehensively at the request for exemption and find that the exemption is consistent with the public interest and with the objectives of the Vehicle Safety Act." As stated above, the temporary nature of granted exemptions under the authority granted the Secretary carries both challenges and opportunities. Opportunity lies in the fact that the exemptions are temporary and require renewal upon expiration, making periodic review of the exemption compulsory. They may become challenging, however, given that each individual exemption may be granted from a design standpoint that is limited by operational factors such as Operational Design Domain (ODD), geofencing, or other factors. This may require an exemption level of detail not contemplated in the past. Instead of blanket exemptions applied to an entire class of 2,500 vehicles per year, it may require an ability to have access to the exemptions applicable to each specific vehicle, by VIN, due to the different operational obligations attached to the exemption. Further, exempted or not, states should retain the ability to

appropriately enforce against violations not specifically exempted. And as stated above, the temporary nature of exemptions should not be considered a pathway towards pseudo-deployment that circumvents state testing requirements.

49 CFR 555.6(b) lists the information that an applicant must provide for an FMVSS exemption if the basis of the application is that the exemption would make easier the development or field evaluation of a new motor vehicle safety or impact protection features providing a safety or impact protection level at least equal to that of the standard. Subpart (iii) requires "The results of tests conducted on the safety or impact protection features that demonstrates performance which meets or exceeds the requirements of the standard." In the context of the removal of the driver and the relatively short period of time some of these technologies have been subject to evaluation, supportive data regarding safety equivalency will become more and more essential. While non-engineers will not be able to sufficiently describe the details surrounding how something works, objective and transparent data submitted on FMVSS exempted equipment should be able to support that it is working.

III. GM's Petition

The petition states, "The Bolt EV is exclusively driven by a human driver. In contrast, the ZEAV would be exclusively driven by an ADS. More specifically, in relation to the *SAE International Levels of Automation 3-5 – Automated Driving Systems (ADSs) – Conditional, High and Full Automation,* the Bolt EV's highest driving automation capability would be considered to be at automation Level 0 and the ZEAV's capability at driving automation Level 4." AAMVA requests clarification on whether this means that all ZEAVs will be permanently designated as Level 4 vehicles. Further, if the SAE levels are being prescribed by the manufacturer to NHTSA, AAMVA would like clarification about whether this information will be "verified" or simply accepted as the appropriate level of automation for the vehicle by NHTSA. Once the level of automation is prescribed for each vehicle, the mechanism for coupling the vehicle with a specific level of automation will become essential for monitoring its performance. Given that levels of automation may change without physical design changes to the vehicle, it will be important to understand when and how those changes take place, and whether there should be additional oversight involvement in that process to ensure safe transitions between those levels of automation.

iii. Planned Usage of the ZEAV

Given that the petition states that GM will exercise stringent controls on the specific location and conditions under which these vehicles are to operate, how does NHTSA envision state enforcement authorities partner with federal authorities in ensuring controls over the vehicles themselves are being appropriately observed? Meaning, how can state and local authorities partner and communicate with each other should they observe a specific issue with a vehicle operating outside the parameters of its stated

ODD. AAMVA notes that not all aspects of the ODD may be apparent, and some conditions of the ODD may be related to unpredictable events (such as weather). Further, the petition states that, "while the ZEAVs would have not-to-exceed speeds, GM expects to increase their 'not-to-exceed speeds' during the requested two-year exemption period. GM further notes that while GM's ZEAVs would be weather restricted, GM expects to expand its operational design domain (ODD) for rain, snow, and winter driving during the proposed exemption period." AAMVA requests NHTSA clarification on how oversight agencies will be involved in that expansion, whether pre-approval for that expansion will be necessary, and whether that expansion will require the reporting of incident or safety data prior to expanded operational conditions. AAMVA also notes that the temporary exemptions will be issued for duration of two years. Is two years enough time to adequately perform data analysis on safety performance and accommodate an expansion of the primary operating conditions of the vehicle?

A. Safety Showing

AAMVA and its membership have no interest in serving as an impediment to the close interaction that manufacturers share with federal authorities in developing the appropriate framework for safety specifications during the vehicle design process. AAMVA does, however, request that NHTSA carefully consider the evolving dynamic between intended vehicle design elements and how they intersect with the removal of an adaptable human driver. As exempted vehicles transition out of the production environment and are expected to safely perform with a mixed fleet of various conforming and non-conforming vehicles, it will more likely than not be state and local resources that are taxed with oversight of the vehicle population as they operate. Enforcement of problematic vehicle populations, both exempted and non-exempted, driver and driverless, will require state and local authorities respond directly to public safety concerns. AAMVA encourages both manufacturers and the federal government to keep this in mind as they consider public exposure to a potentially untested fleet.

i. FMVSS No. 101 – Controls and Displays

The petition provides that, "Because the ZEAV would not be equipped with human driver controls and would not have a human driver, GM states that the requirements for certain controls, telltales and indicators should not apply and requests an exemption from them." The removal of driver controls is ultimately expected in a driverless environment. However, their removal begs the question of whether they should be removed during the testing phase for new technologies. Given the basis of the petition, how will the accessibility to and nature of the controls continue to inform and assure the safety of the passengers even if they are not actively operating the vehicle. GM states that the petition is applicable to a ridesharing service. Given public interaction, the vehicles will necessarily provide some level of human-vehicle interaction. The full petition should consider how humans can respond to, monitor, and interact with the safety environment of the vehicle as they are conveyed. While the notice provides that

GM will equip the vehicles with "ADS interfaces that provide the ADS with access to the information and controls necessary to drive the vehicle and maintain safety," it does not seem to satisfy how the safety of the passenger may be assured in the event of system failure or outside the context of actively "driving" the vehicle.

ii. FMVSS No. 102 - Transmission Shift Position Sequence

AAMVA has no concerns with this aspect of the petition, other than noting that passengers may have a more pronounced sense of comfort being able to monitor the shift sequence and gear positioning of a vehicle while in self-driving mode to note any performance anomalies or defects during operation.

iii. FMVSS No. 108 – Lamps, Reflective Devices, and Associated Equipment

AAMVA defers to the expertise of NHTSA in making safety equivalency determinations. In terms of the described technologies, NHTSA may want to consider activation thresholds of lower beam in the event of darkness, severe or inclement weather, and visibility standards to other motorists. Should the vehicles not adequately engage lighting or signal systems, the question of who is ultimately responsible for the safe lighting and signaling of the vehicle becomes relevant in the absence of a driver. Lighting and signal engagement failures during post-production performance may be something monitored and enforced by state authorities, and consideration of a mechanism for reporting violations to appropriate authorities should be a consideration. Further, in the absence of a more detailed description, AAMVA stresses that other road users rely on the proper lighting and signaling of a vehicle to maintain distance, ensure safe operation, and observe environmental and road factors with respect to all other vehicles sharing the road. Passengers, first responders, other road users, and operators may have need of external lighting controls under extraordinary circumstances not anticipated during normal operation.

iv. FMVSS No. 111 – Rearview Mirrors

Undoubtedly advanced technologies will provide "significantly more breadth and detail than interior and exterior mirrors provide to human drivers." This will be a welcome advancement to both human driver and driverless vehicles. Because events to the rear of the vehicle may still affect passengers, the safety equivalency of the passenger to be able to observe, react to and anticipate events to the rear of the vehicle may be an important consideration for NHTSA. While NHTSA may consider not requiring a mirror (specifically) for driverless vehicles, in-cabin availability of the image to the rear of the vehicle may be a safety consideration for passengers.

v. FMVSS No. 114 – Theft Protection and Rollaway Prevention

AAMVA notes that while the "ZEAV would be designed to enable the ADS to determine and control the brake system status electronically," NHTSA may want to take measures to ensure passenger and mixed fleet safety. With the petition only providing an ability to assume design elements in the event of catastrophic failure, if the brake systems are

unable to be engaged, NHTSA should take measures to ensure rollback and braking capabilities be possible.

vi. FMVSS No. 124 – Accelerator Control Systems

AAMVA defers to NHTSA expertise on applicability and equivalency of safety.

vii. FMVSS No. 126 – Electronic Stability Control Systems

AAMVA defers to NHTSA expertise on applicability and equivalency of safety. AAMVA supports the statement that, "GM asserts that its vehicle would meet the safety intent of this standard and states that it would certify compliance with the performance requirements of this standard based on the above described tests."

viii. FMVSS No. 135 – Light Vehicle Brake Systems

AAMVA defers to NHTSA expertise on applicability and equivalency of safety. AAMVA supports the statement that, "GM states that it intends to certify compliance with the performance requirements of this standard based on those tests."

ix. FMVSS No. 138 – Tire Pressure Monitoring Systems

The petition states, "the ZEAV would not have a driver seating position and would not include tire pressure telltales visible to vehicle occupants. Instead, the vehicle's ADS would monitor the tire pressure electronically, detect low pressure, and recognize malfunctions in the tire pressure monitoring system. To help in controlling the maintenance and operation of vehicle fleets, the ADS would communicate tire pressure status to GM." Given the potential rideshare capabilities of the exempted fleet, it may be important to communicate low tire pressure warnings to potential passengers during trips if there is a fluctuation in tire pressure status, and allow maintenance of a responsible level of safety and comfort. AAMVA refers NHTSA back to its comments on remote operation/monitoring, and what expectations or standards there are for rectifying safety issues in remotely-operated, publicly-engaged, driverless rideshare vehicles.

x. FMVSS No. 141 – Minimum Sound Requirements for Hybrid and Electric Vehicles

AAMVA defers to NHTSA expertise on applicability and equivalency of safety.

xi. FMVSS No. 203 – Impact Protection for the Driver from the Steering Control System

AAMVA defers to NHTSA expertise on applicability and equivalency of safety.

xii. FMVSS No. 204 – Steering Control Rearward Displacement

AAMVA defers to NHTSA expertise on applicability and equivalency of safety.

xiii. FMVSS No. 207 – Seating Systems

AAMVA defers to NHTSA expertise on applicability and equivalency of safety.

xiv. FMVSS No. 208 – Occupant Crash Protection

AAMVA defers to NHTSA expertise on applicability and equivalency of safety. AAMVA appreciates GM's assertion that, "the vehicle's ADS would electronically receive the status of passengers' seat belt utilization. GM stated that the vehicle's ADS would also provide seat belt reminders and warnings to all vehicle occupants before initiating a ride." AAMVA notes that while information regarding air bag functionality will be communicated directly to GM, it may assist passengers in making informed safety choices if they were able to view the same information communicated to fleet oversight regarding airbag status prior to their trip. Further, the opportunity to increase occupant protection by requiring seat belt use prior to commencement of the trip seems a sensible request or consideration in the advancement of safety.

xv. FMVSS No. 214 – Side Impact Protection

AAMVA defers to NHTSA expertise on applicability and equivalency of safety. AAMVA notes that while information regarding air bag functionality will be communicated directly to GM, it may assist passengers in making informed safety choices if they were able to view the same information communicated to fleet oversight regarding airbag status prior to their trip.

xvi. FMVSS No. 226 – Ejection Mitigation

AAMVA defers to NHTSA expertise on applicability and equivalency of safety. AAMVA notes that while information regarding air bag functionality will be communicated directly to GM, it may assist passengers in making informed safety choices if they were able to view the same information communicated to fleet oversight regarding airbag status prior to their trip.

D. Public Interest Argument

While there is no doubt regarding ADS's potential to improve the level of roadway safety, AAMVA defers the argument that safety benefits would be realized to NHTSA and its ability to make safety equivalency comparisons for individual technologies. In its nascent state, ADS technologies require public support in order to achieve their potential. The rush to brand ADS technologies as "self-driving" or as safer alternatives prior to their commensurate evaluation may ultimately harm safe fleet penetration. A measured approach that includes manufacturer-submitted attestation to safety assurances based on substantiated testing seems like a prudent approach for NHTSA to take. Further, NHTSA should consider how to effectively differentiate those vehicles undergoing various levels of testing from those that have been deployed.

AAMVA also feels obligated to reiterate that exemptions applicable to a business plan for immediate public exposure seems premature. If the exemptions are coupled with a ridesharing plan, without being appropriately tested prior to that public exposure, there seems to be an unnecessary rush to couple the two programs. Ultimately, NHTSA must consider whether this approach is best serving the "public interest."

V. Potential Types of Terms

AAMVA is pleased to see NHTSA cite that, "if NHTSA were to grant an exemption, in whole or in part, it could establish, for example, reporting terms to ensure a continuing flow of information to the agency throughout the normal service life of the exempted vehicles, not just during the two-year period of exemption. Given the uniqueness of GM's vehicles, its petition, and public safety concerns, and especially given GM's expectations that the capabilities of the ZEAVs would evolve over their lifetime, extended reporting may be appropriate." AAMVA would concur with this statement. AAMVA further equates it to the tried and proven enforcement process by which driver violations over the course of a driver's lifetime have carried reporting requirements for convictions to a centralized repository. This ensures that only safe drivers are given the authority to operate vehicles. Given manufacturers are requesting exemptions to the vehicle safety standards, they should not be exempt from the performance reporting requirements otherwise applicable to human drivers once they have been exposed to public roadways. NHTSA will need to consider how they anticipate monitoring, recognizing, and enforcing problematic vehicle operational concerns that may only be realized in the post-production environment. One way they may be able to more closely monitor these issues is to require expansive reporting terms throughout the vehicle's lifecycle that serve as a condition of exemption.

AAMVA would leave it up to NHTSA discretion on what the consequences should be if the flow of information were to cease or become inadequate during or after the exemption period. One would presume that during the exemption period, NHTSA would be able to limit all aspects of the vehicle operations. Under these conditions, NHTSA would need to have a very robust communication mechanism in place to alert the appropriate state and local authorities that such a decision had been reached, and that a manufacturer had breached the acceptable terms of the exemption. In grave cases, it is conceivable that NHTSA may have to exercise its vehicle design recall authority. AAMVA also understands NHTSA's considerations that some conditions could be relaxed as a vehicle proves its roadworthiness over time. Whether problematic or exceptionally proficient, NHTSA must consider how vehicle-specific exemptions will be effectively communicated to state and local oversight and enforcement authorities. Reporting on the status of conditional exemptions will be essential for ensuring safety, and state and local observation of issues and problems also need to be reported to a centralized federal authority. This data exchange may need to be restricted by use (such as by law enforcement and government agencies), but separately allow for reporting (to the appropriate oversight agencies) by the general public.

VI. Request for Comments and Information

AAMVA agrees with NHTSA's statement that, "the safety record of the ZEAVs during the potential two-year period of requested exemption might not be predictive of their safety record during the balance of their normal service life." This ties directly into

previous comments about a sustained safety record being prescribed for the vehicle, and following it, much like a driving record, throughout the vehicle's lifecycle.
NHTSA states, "An additional consideration raised by this petition is whether to set terms and conditions on the exemption and, if so, what terms and for what duration." AAMVA refers to its previous comments. Conditional exemptions obviously become much more complicated as oversight authorities must be able to monitor and evaluate the vehicles' adherence to the conditions. The duration of the conditions can logically be tied to the duration of the exemption – but will require NHTSA to standardize the conditions for vehicles that may or may not share ODD elements. One of the obvious ways NHTSA can evaluate conformance with the conditions of an exemption is by requiring the transparent and constant submission of safety data on exempted vehicles.

AAMVA fully supports NHTSA's statement that, "Given the complexity of projecting the safety effects of granting an exemption in this instance, it might be desirable to require reporting to validate the agency's projections and monitor the safety record of the ZEAVs. If the agency were to decide to require reporting, it would take into consideration the possibility that reporting terms sufficient for an early stage of the ZEAVs normal service life may not be sufficient for a later stage." AAMVA not only endorses this view reporting, but again questions how the exemption process fits into the testing of unproven technologies. If the vehicles prove or disprove their safety by simply being exempted, but a manufacturer plans on expanding (or restricting) the conditions that previously apply to that exemption, will there come a point where the need for exemption has been so relaxed that even under an expanded ODD, the expectation will be that the vehicles have "graduated" beyond exemption? This could pose undue safety risks as exemptions become the norm and vehicles are being "promoted" beyond the initial conditions of the exemption. Safety reporting will play a critical role in tying performance functionality alongside any expectations on expanding the prescribed ODD. It will also serve the critical function of tying manufacturer accountability on performance expectations to each specifically exempted vehicle.

Questions:

1) Which of the two bases for exemption (field evaluation of a new motor vehicle safety feature (30113(b)(3)(B)(ii)) or field evaluation of a low-emission vehicle (30113(b)(3)(B) (iii)) is more appropriate for the agency to use in analyzing and in granting or denying the petition and why?

   AAMVA suggests that because the petition makes its case on exemption almost entirely based on the argument that "removal of the driver makes the applicable standards obsolete", that the petition be evaluated under that presumption. The fact that it is also a ZEAV seems secondary with respect to the majority of the standards.

2) Does the petition provide sufficient information to enable the agency to make the required statutory finding as to whether the level of safety is equivalent to or

exceeds the level of safety established in the FMVSS from which exemption is sought?
AAMVA is unsure if the GM petition provides sufficient data on the testing of the ADS for each exemption. Given that the petition seeks exemption from certain performance standards, it would make sense that supporting data on the number of trials and performance of the replacement technologies met or exceeded those already prescribed in the FMVSS. For each exemption listed above, AAMVA has noted where we think additional supporting data would be helpful, and for some standards where there wasn't direct performance data required as a control for a performance operation (such as engaging the headlamps, or shift controls), additional testing data on appropriate engagement of those mechanisms may be a consideration for NHTSA so that testing data can be compared over the course of the vehicle's exemption.

3) AAMVA defers to NHTSA's expertise in making vehicle design determinations related to field evaluation of low-emission motor vehicles with the caveat that exempted vehicles still conform with additionally applicable state law. Given that the vehicles being described are "zero emission" vehicles, we do not anticipate any issue.

4) It is AAMVA's opinion that the most pressing concern with the vehicles is not attributed to its "zero-emission" status, but more importantly aligned with its safety performance as a "driverless" vehicle. AAMVA would encourage NHTSA to primarily concern itself with the applicability of an exemption under 49 USC 30113(b)(3)(B)(ii).

5) AAMVA would have to defer to NHTSA in what methodology would best prove safety equivalency of the exempted technologies. As previously stated, the technologies should be able to functionally work within the design performance standards prescribed by the FMVSS, but it may also require some data on the appropriate engagement of those technologies under certain circumstances. These points are mentioned throughout these comments and are especially significant in terms of appropriate engagement. For instance, do the headlamps (without controls) engage appropriately under the variety of conditions which necessitate their engagement (dark, dusk, inclement weather)? Do the signals (without controls) engage when the vehicle makes lane changes and engage hazards as appropriate? NHTSA may have to make additional considerations around the removal of the vehicle controls as a prerequisite for identifying ability to properly react to circumstances where formerly the driver was adaptable enough to make discretionary decisions.

6) Evolution of the vehicle over the course of its lifecycle is also previously discussed in these comments. AAMVA specifically refers to its comments under Section VI regarding "conditional exemptions" and the duration of the

exemption. Further, AAMVA reiterates that expansion of the vehicle's described ODD (including speed and location) within the relatively short duration of a 2-year temporary exemption may unnecessarily complicate the process.

7) What studies, data, (etc.) should a petitioner submit to the agency to substantiate it record of research, development, and testing establishing the innovative nature of the safety feature?

   All applicable and relevant testing data that applies to exemption from the standard. Where sensitivity around sharing that data for proprietary reasons may limit the prudence of submission of this data, the manufacturer should attest to having data supporting the relative safety measurement of performance and should attest to its veracity. Petitioners declining to provide data for proprietary reasons should be prepared to claim ownership of the technologies as their own. Manufacturers should also provide enough of a detailed description to allow for comparison against existent technologies so that it can be differentiated from other models and evaluated for its "innovative" nature.

8) What studies, data, (etc.) should a petitioner submit to the agency to validate that its ADS provides safety at least equal to the level of the standards for which an exemption is sought?

   See the comments provided above for question 7.

9) What studies, data, (etc.) should a petitioner submit to the agency to validate that its ADS during its operation will have sufficient reliability to accomplish its designed intent, e.g., timely and sufficiently applying the service brakes when braking is needed for safety purposes?

   See the comments provided above for question 7.

10) The test procedures of some FMVSS listed in the exemption petition involve the use of human drivers and controls (e.g. light vehicle braking). GM indicate that it plans to perform tests with a human driver operating a version of the ZEAV modified to include human controls. Would performance of tests with such a modified vehicle be appropriate, or would programming the ADS of the ZEAV to perform test maneuvers be a better means of evaluating compliance with performance requirements?

    The testing of the vehicles should be performed under as closely to current standards as possible. The circumstances for performance testing should as closely replicate the conditions under which the vehicle will operate in real life scenarios as possible. The ability for a vehicle to be preprogrammed rather than

accurately responding to current testing methodology should be limited to the greatest extent possible.

11) This question addresses issues related to the ability to test or evaluate a vehicle that has not yet been produced. To the extent possible, all vehicles should be evaluated based on their physical performance. Vehicles should not be granted exemptions based on hypotheticals. Given that current FMVSS apply to vehicles which are in production as well as those vehicles that are being tested (but have still been produced), it seems sensible that an actual vehicle carrying the actual technologies for which the standards don't apply would be necessary in order to make a true determination of an equivalency of safety.

12) This question deals with the question of whether or not certain FMVSS may not be needed in the case of a vehicle driven by only an ADS. AAMVA has already commented on this question in each specific ADS exemption request.

13) This question deals with the assertion that FMVSS telltales that provide drivers with information are not applicable because the ADS would be receiving that information. AAMVA has also already commented on this question in each specific ADS exemption request above. At issue is passenger, rather than driver safety. AAMVA also commented previously on how the information pushed to a remote monitor will be handled in terms of ensuring passenger safety and remedying vehicle safety issues in a responsible manner.

14) This question deals with FMVSS whose benefits depend on the responsiveness of a human driver (e.g. FMVSS No. 135) which requires human foot controls to activate service brakes). AAMVA has already commented on this question in each specific ADS exemption request above.

15) This question deals with whether or not computer simulation would be an acceptable method to determine safety equivalency. AAMVA does not have the expertise to describe an appropriate computer simulation framework. However, ultimately, the vehicle model that is to be integrated into public use should be able to meet the applicable performance standards (or an equivalency of those standards) for which it is seeking exemption.

16) This question asks how the performance of an ADS should be compared to that of a human driver in a nonexempt vehicle. While partially touched on in comments throughout this document, AAMVA would point NHTSA to its "Jurisdictional Guidelines for the Safe Testing and Deployment of Autonomous Vehicles" which comprehensively addresses the issue from the state perspective.

17) This question asks whether GMs continuous control over the exempted vehicles and the ability to make continual improvements in vehicle safety performance

through software updates argue for acceptance of a greater degree of uncertainty about safety effects than in the case of a petition for exemption of vehicles to be sold to the public. Alterations in the vehicles performance after it has been granted an exemption based on its expected performance may make it near impossible to truly evaluate the vehicle. On one hand, those modifications may change the safety benefits of the vehicle for the better. On the other, any modification to vehicle code may carry the potential to disrupt other aspects of the vehicles performance unintentionally. Either way, the vehicle will continuously evolve well beyond the documented exemption application. It will be important to correlate performance data over time with each vehicle as it is modified throughout the duration of any exemption.

18) This question asks about the ZEAV progressing beyond the initial deployment and whether the constraints initially applied by GM in controlling the vehicles would be relaxed. This question again begs the question of whether or not the exemptions relieve the manufacturer of any obligation to actually test the technologies before considering them deployed. AAMVA also emphasizes that the exemption application is applicable for only two years and should be considered temporary. The vehicles should only be able to operate, should they be granted any exemption, for that two year period until FMVSS have been appropriately modified to accommodate these emerging technologies. This question also asks whether NHTSA should monitor and periodically validate the data from the ZEAV throughout its service life. NHTSA should absolutely remain engaged with the data provided by any driverless vehicle operating under an exemption. At a minimum, NHTSA should stay engaged throughout the duration of its exemption. Exempted vehicles should expect to be monitored as long as they are subject to exemptions, and until they conform appropriately with all FMVSS without exemption.

19) This question deals with whether or not the exemption would be in the public interest. AAMVA has already provided comments on this in Section D above.

20) This question deals with the potential for a conditional granting of the petition and what terms and conditions should apply. AAMVA has provided numerous comments regarding conditional considerations for exemptions previously.

21) This question asks whether NHTSA should consider how the ZEAV would respond to unusual situations, e.g. cross the yellow line to pass a stopped vehicle blocking the way forward or obey a policeman giving instructions instead of obeying a traffic light. Yes.

Questions 22 and 23 speak to terms and conditions, and the applicable data that would facilitate the granting of conditional exemptions. AAMVA would support NHTSA accepting as much data that would present a genuine picture of the vehicle's safety

performance as possible. AAMVA would also support as much data as is required to hold each vehicle and its manufacturer accountable to performing as described in its exemption application, under the controls described in the application, and under the conditions described by NHTSA in its response. AAMVA notes that information related to the vehicles that may come from external sources, such as communities they serve and law enforcement, may also help present a clear safety picture of how the vehicles are operating under the terms of their exemption.

24) This question asks for what duration the agency should require data reporting. AAMVA has previously commented that data should be mandatory for the duration of the exemption, and that the exemption should be required for as long as the vehicle does not conform with the FMVSS.

25) AAMVA defers to NHTSA expertise on how best to accommodate oversight of manufacturer data.

28) This question addresses the need for NHTSA to develop a more nimble approach to FMVSS exemption applications. AAMVA agrees that the current FMVSS process is not ideal for satisfying the safety evaluation of driverless vehicles "one component at a time." Past exemption requests were narrowly applied and usually sought an exemption from one standard with a clear, narrow purpose. It is AAMVA's opinion that NHTSA will be seeing broad exemption applications that request relief from a wide range of previous standards. In order to accommodate these technologies, AAMVA supports NHTSA methodology exercising discretion to rely on other forms of evidence in making findings related to technology under well-defined, risk-managed conditions. However, AAMVA cautions that this does not mean it should be a cursory investigation with a goal of quick accommodation. The evaluation and testing of the technologies should be sustained under controlled environments. AAMVA defers to NHTSA discretion on its ability to deny petitions if applicants are unable to provide further information within a specified time period. AAMVA strenuously cautions against any approach that would tacitly endorse "immediate deployment" of any vehicle granted exemption status. Exemption status should apply solely to the manufacturers' ability to produce the vehicle, and should not be viewed as relief from the testing and performance obligations that exist beyond the scope of the exemption environment.

AAMVA thanks NHTSA for this ability to comment on the potential for these life-saving technologies. Our membership takes the role of safety as its critical priority, and looks forward to a greater understanding of how we can protect public interest in the exemption application process. Ensuring we have a clear sense of how these vehicles will standardize performance in the absence of FMVSS application is a difficult consideration, but we are confident that as shared safety partners, with a commitment to realizing the true potential of these technologies, we can accommodate them best by ensuring their safe integration.

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