April 24, 2017

Mr. Brian G. Soublet, Deputy Director / Chief Counsel
Department of Motor Vehicles
Legal Affairs Division
P.O. Box 932382, MS C-244
Sacramento, CA 94232-3820

Dear Mr. Soublet,

Apple is pleased to provide the following comments on the *Notice of Proposed Action for Testing and Deployment of Autonomous Vehicles* issued on March 10, 2017. The company is investing heavily in the study of machine learning and automation, and is excited about the potential of automated systems in many areas, including transportation.

Apple believes that all those developing and deploying automated vehicles should follow rigorous safety principles in design, testing, and production. Such principles should not, however, inhibit companies from making consequential progress—there is no need to compromise safety or innovation.

To that end, Apple welcomes California DMV's leadership and continued facilitation of the safe testing and deployment of automated vehicles in California. We also support the DMV's ongoing dialogue with all stakeholders through public workshops and efforts to align with the National Highway Traffic Safety Administration's (NHTSA) Federal Automated Vehicle Policy.

To support ongoing research and testing, Apple proposes that California DMV amend or clarify its positions in the areas of disengagement reporting, definitions, and testing without safety drivers.

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Disengagement reporting

Apple believes that public acceptance is essential to the advancement of automated vehicles. Access to transparent and intuitive data on the safety of the vehicles being tested will be central to gaining public acceptance. However, the current and proposed disengagement reporting requirements do not achieve this result.

The appropriate disengagement metric for evaluating automated vehicles should include successfully prevented crashes and traffic rule violations. While the current disengagement report has aspects of these metrics, there are also several subjective elements that reduce transparency and clarity. The resulting inconsistency in how permit holders report disengagements has led to media coverage that has caused public confusion and misunderstanding.

Apple suggests the following changes to the disengagement reporting requirements to achieve an objective set of data to accurately and clearly inform the public about the safety of the automated vehicles being tested:

- A disengagement should be defined as an unexpected event or failure that requires the safety driver to take control of the vehicle in order to prevent a crash or traffic violation.
- A disengagement should not be reported for the following:
    - Operational constraints where either the safety driver has been trained to disengage the system, or when the system detects the constraint and disengages automatically. For example, a system that requires the safety driver to navigate through a construction zone.
    - System errors or failures. For example, a software bug or sensor dropout that does not affect the safe operation of the system.
    - Discretionary decisions made by the safety driver. For example, when the safety driver perceives a vehicle is approaching too quickly and opts to disengage the system.
    - Any tests that are planned to result in a disengagement.
    - The end of a test or experiment.

Additionally, the proposed requirement in §227.50(b)(3)(B)(vi) to describe the type of incident that would have happened without the disengagement should be removed. It requires speculation about future events that have not occurred.

Definitions

Apple appreciates the DMV's decision to align the definitions in §227.02 with SAE J3016 *Taxonomy and Definitions for Terms Related to On-Road Motor Vehicle Automated Driving Systems*. It is essential that all stakeholders use a common set of definitions and terms when discussing automated vehicles. However, the proposed language in §227.02(b)(2) could still be interpreted as not requiring a permit for test vehicles where a safety driver is required to supervise the completion of the dynamic driving task during the development of a Level 3, 4, or 5 system. SAE J3016 qualifies a system where a safety driver performs a supervisory role as a Level 2 system. Apple suggests that the DMV remove paragraphs §227.02(b)(2) and §227.02(b)(3) or further clarify the language around a safety driver's role during testing and development.

In addition, Apple suggests that the DMV remove §227.28(a)(4) for development vehicles used only for testing. This paragraph may restrict both the design and equipment that can be used in test vehicles to further develop autonomous technologies. Apple understands that the DMV's intention is to exclude commercial vehicles from testing and deployment until the department considers those categories of vehicle in a separate rule making. This exclusion of commercial vehicles is already defined in the other subsections of §227.28 and does not rely on the language of (a)(4).

Testing without a safety driver

In the interest of increasing public trust in automated vehicles, Apple suggests that the safe stop (fallback) language of §228.06(c)(2) be included in section §227.38 to ensure that test vehicles without a safety driver have these capabilities.

Apple appreciates the opportunity to comment on the proposed amendments to the testing and deployment language. Apple looks forward to partnering with the California DMV and other stakeholders so that rapid technology development may be realized while ensuring the safety of the traveling public in the State of California.

Sincerely yours,

Steve Kenner
Director of Product Integrity, Apple