SFMTA
Municipal
Transportation
Agency

April 24, 2017

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

RE: DMV Proposed Autonomous Vehicle Driverless Testing and Deployment Regulations

Dear Mr. Soublet:

The San Francisco Municipal Transportation Agency (SFMTA), on behalf of the City and County of San Francisco, together with the San Francisco County Transportation Authority (SFCTA) appreciates the opportunity to comment on the Department of Motor Vehicles' (DMV) proposed regulations for the testing and deployment of driverless vehicles.

As the manager of ground transportation in San Francisco, the SFMTA is charged by the City Charter to enable a safe, effective, sustainable transportation system. The SFMTA sees the potential for autonomous vehicles in our city to advance the goals for our transportation system, but only if done right. We are currently home to many technology-enabled transportation advances that are not consistently supportive of city policy. We want to ensure that autonomous vehicles (AVs) in San Francisco complement our city's efforts, rather than working against them. That means that AVs need to be able to operate safely in complex environments like San Francisco, where pedestrians, buses, cable cars, bicyclists and trucks are central to the life of the street. It also means their operation should be governed such that it reduces congestion, and is supportive of city policy goals with respect to accessibility, affordability, air quality, and other integral aspects of our transportation system.

San Francisco recognizes the important benefits that AVs may bring to city streets, particularly in the area of safety. If deployed appropriately, AVs can help San Francisco achieve its Vision Zero goal of ending traffic fatalities, by eliminating excessive speeding and other dangerous driving behaviors, and by reducing the number of cars on our streets. A clear, standardized approach to AV regulation will enable San Francisco, other local jurisdictions, and the state of California to guard and advance the public interest while enabling the benefits that AV technology promises. Thus San Francisco supports an approach that allows the private sector to move ahead with the testing and deployment of autonomous vehicles without undue bureaucratic hurdles or procedural requirements, but ensures no adverse outcomes.

We believe that the proposed regulations, in part, rely too heavily on the AV manufacturers' self-certification of safety of technology, and in those cases we suggest strengthening validation requirements and adding safety benchmarks that the technology used must meet. Furthermore, **it is critical that trust in the private sector be paired with maximum transparency,** particularly when it comes to safety and collisions. We therefore make several

suggestions to ensure transparency.

Below are our detailed comments on the proposed regulations for the testing and deployment of fully autonomous vehicles in California. The comments include input from the San Francisco Police Department and San Francisco County Transportation Authority. The comments are organized by section for the proposed regulations, with a few general comments at the end that are not related to any specific section of the regulations.

ARTICLE 3.7 – TESTING OF AUTONOMOUS VEHICLES

Operational Design Domain (227.02(i))

San Francisco recommends that the DMV, working with the industry, develop standard definitions for Operational Design Domains. In addition to the Operational Design Domains identified in the proposed regulations (roadway type, speed range, environmental conditions), we want to ensure that AVs can operate safely in complex environments like San Francisco, where pedestrians, buses, rail transit, bicyclists and trucks all share the same street space and there are countless complex interactions between them on a daily basis. Moreover, the operating environment in San Francisco includes many complex and unique traffic control devices and regulations that AVs must be able to follow. Toward that end, we recommend that one of the Operational Design Domains be an "urban, multimodal environment," and that the definition of this Operational Design Domain refer to design details included in the National Association of City Transportation Officials (NACTO) Urban Street Design Guide (http://nacto.org/publication/urban-street-design-guide/) and Transit Street Design Guide (http://nacto.org/publication/transit-street-design-guide/), while also recognizing that the actual condition and design of city streets comes in infinite varieties. The NACTO Policy Statement on Automated Vehicles also provides useful guidance in this regard such as the recommendation that "maximum operating speed in a city street environment should not exceed 25 miles per hour" (http://nacto.org/wp-content/uploads/2016/06/NACTO-Policy-Automated-Vehicles-201606.pdf).

MANUFACTURER'S TESTING PERMIT – ALL TEST VEHICLES

Manufacturer's Testing Permit and Manufacturer's Testing Permit – Driverless Vehicles (227.18(b))

San Francisco believes that the proposed threshold for determining whether it is safe to operate an autonomous vehicle on public roads—a "reasonable" determination on the part of the manufacturer—is too subjective and imprecise and inadequate to provide safety assurance and confidence to the public. We therefore strongly recommend that the regulations specify performance benchmarks, and require that those benchmarks be achieved and documented in a controlled test environment that is reviewed by a third party, before a manufacturer can test or deploy their autonomous vehicles on public roads. The starting point for this assessment should be the National Highway Traffic Safety Administration's 15-point Safety Assessment. Such consistent and objective standards will benefit the public, manufacturers, and cities alike.

PROHIBITIONS AND EXCLUSIONS – ALL TEST VEHICLES

Vehicles Excluded from Testing and Deployment (227.28(a))

San Francisco believes that, before an AV vehicle can be deployed on public roads for *any*

commercial use, cities (or other regulatory body as appropriate) should issue additional regulations pertaining specifically to the commercial operation of autonomous vehicles. While some commercial uses will be excluded from AV testing or deployment by nature of the excluded vehicle types identified in 227.28(a), there are some commercial uses that do not require such vehicles (e.g., TNCs, taxis, delivery services), but require additional regulations due to their unique operating conditions. SFMTA and SFO issued a joint letter to the CPUC on this topic, which is included with our comments as Attachment A. SFMTA is pleased to note that the recently issued scoping memo for Phase III B of the CPUC's rulemaking proceedings regarding TNC service includes regulations of AV specific to TNC service. This is a good first step but does not cover the full range of commercial transportation services.

APPLICATION REQUIREMENTS FOR VEHICLES DESIGNED TO OPERATE WITHOUT A DRIVER IN THE VEHICLE

Notifying Local Jurisdictions (227.38(a))

In order for the notification of local jurisdictions to work effectively, San Francisco requests that the DMV maintain a database of autonomous vehicle contact persons for each local jurisdiction in the state. This would ease the administrative burden of the notification process for the manufacturers, and also ensure that the correct person and department for each jurisdiction is notified.

San Francisco further suggests clarifying the statement "testing has been coordinated with those local authorities." Cities should be notified in advance regarding the testing and/or deployment of autonomous vehicles with a driver. Beyond being notified, cities should retain the power to deny testing on city streets, and designate where and when testing can occur. Finally, we suggest that a repository of notifications is maintained online, so that anyone who needs to reference this information has easy access to it. We further suggest that data be made available in a standardized electronic format (MS Excel, csv, etc.) that can be easily summarized and analyzed.

Local Law Enforcement Engagement Plan (227.38(e))

Due to limited local law enforcement resources, San Francisco wants to ensure that, in the event of a collision involving an autonomous vehicle, law enforcement is not required to issue a warrant to gain access to the autonomous technology data and/or video recorder. In a typical collision currently, law enforcement is able to immediately interview the driver(s) involved in the collision, and the process is relatively straightforward. In the absence of a driver, or in cases where the driver was only passively monitoring the automated vehicle, the data and/or video recorder(s) could be the only source of information about the circumstances of the collision. Collisions are one area where San Francisco believes it is going to be especially important to have maximum transparency in order to ensure public safety and earn public trust.

Toward this end, San Francisco suggests incorporating the following requirements to the law enforcement interaction plan:

- The autonomous technology data and/or video recordings must be made immediately available to local law enforcement in the event of a collision.
- The remote operator must be immediately available to engage in post collision conversations with local law enforcement.

- A live person must be available 24 hours a day/seven days per week to provide technical assistance to law enforcement if needed for collision or traffic investigations.
- The owner/manufacturer shall release the local jurisdiction from any liability in the event that the local jurisdiction needs to move the vehicle to clear the roadway.

In addition to addressing interactions following a collision, the requirements need also define how law enforcement officers will interact with vehicles in situations such as parking and traffic violations, and ensure all AV operation enables and supports that interaction. San Francisco also suggests that the requirement for the manufacturer to review and update the law enforcement interaction plan "on a regular basis" is not specific enough. We would recommend this to be on a quarterly basis, but should be no less than on an annual basis. We also recommend that the DMV develop a standard format for the Local Law Enforcement Engagement Plan so that local law enforcement staff can quickly access the information they need from the various vehicle manufacturers.

Similar to the comment above regarding section 227.38(a), San Francisco requests that the DMV maintain a database of local law enforcement contact persons for each local jurisdiction in the state. This would ease the administrative burden of the notification process for the manufacturers, and would also ensure that the correct person has access to the law enforcement interaction plan. We also suggest that a repository of law enforcement interactions plans be maintained online, so that anyone who needs to reference this information has easy access to it.

In addition to the law enforcement interaction plan, it is recommended that the DMV establish a standard for all autonomous vehicles to prominently display the vehicle owner/remote operator, the web address where the law enforcement interaction plan can be viewed, and the phone number to call for remote operator assistance, including standard external visual identification of the vehicle as an autonomous vehicle.

REPORTING OF COLLISIONS AND DISENGAGEMENTS – ALL TEST VEHICLES

Reporting Disengagement of Autonomous Mode (227.50(b))

While we acknowledge that the number of disengagement reports currently is relatively low, with the increase in the number of permits for AV testing, and an increasing number of miles driven in automated mode, it is important for local jurisdictions to receive regular reports on disengagements. We suggest that an annual report is too infrequent and would ask that DMV establish a reporting template that can be accessed by local law enforcement, city/county traffic engineers and others on an ongoing basis. We further suggest that data be made available in a standardized electronic format (MS Excel, csv, etc.) that can be easily summarized and analyzed. In addition to the items already included in 227.50(b)(3)(B), we recommend that these reports include:

- Date and time of disengagement
- *Specific* location of the disengagement (i.e., address), not just the type of roadway or facility.
- Cause of disengagement should include a list of standardized options to select from such as: "hardware failure," "perception failure," "other road users," special circumstances," "other software failure".

Disengagements and incidents (such as hard stops, abrupt turns, etc.) should be reported in a

consistent manner, with data sufficient to understand the cause of disengagement and the frequency of disengagements. We suggest data be submitted in a consistent, standardized electronic format, and in a data structure similar to the following, with a record for each disengagement or incident:

- VIN
- Date and time
- Incident or disengagement
- Miles since last disengagement by road way type (public freeway, public street, other public facility, and private facilities)
- Severity (collision with vehicle, collision with object, collision with human, collision with animal, lane departure, right-of-way departure)
- Location (latitude/longitude)
- Location (Facility name + mile marker or address)
- Weather conditions
- Pavement conditions
- Presence of construction
- Presence of incident

In addition to this, manufacturers should report, for each vehicle:

- VIN
- Vehicle make, model, year
- Total number of miles driven
- Total number of disengagements
- Total number of incidents

And, for the entire fleet:

- Total number of miles driven
- Total number of disengagements
- Total number of incidents

Autonomous technology data recorder (228.02(a) and 228.06(a)(5))

San Francisco supports the establishment of a standardized autonomous technology data recorder for all AVs. We suggest extending the required timeframe to 90 seconds prior to a collision to better capture weather and other factors that may not be available 30 seconds prior to the collision.

Furthermore, San Francisco recommends that the regulations clearly state that the manufacturer will be required to make the autonomous technology data recorder immediately available to law enforcement after any collision involving the vehicle. (See previous comments on the law enforcement interaction plan for additional details.)

Deployment of AVs for passenger services (228.02(c)(2))

As noted previously, San Francisco believes that, before an AV vehicle can be deployed on public roads for *any* commercial use, cities (or other regulatory body as appropriate) should issue additional regulations pertaining specifically to the commercial operation of the autonomous vehicles. We believe this is especially necessary when the vehicles are being deployed to serve members of the public as passengers, because in those scenarios there will be unique safety, accessibility, and other considerations that are not adequately addressed by these regulations. At the same time, potential detriments to AV deployment may be best addressed through commercial (e.g., shared) operation; thus, cities have great interest in guiding how commercial use can be deployed in cities.

ARTICLE 3.8 – DEPLOYMENT OF AUTONOMOUS VEHICLES

Manufacturer Self Certification (228.06(a)(10))

As noted previously in our comments on Section 227.18(b), San Francisco strongly suggests that, rather than relying on manufacturer self-certification, the regulations specify robust performance benchmarks, and require that those benchmarks be achieved and documented in a controlled test environment that is reviewed by a third party, before a manufacturer can deploy their autonomous vehicles on public roads. Again, such consistent and objective standards will benefit the public, manufacturers, and cities alike.

GENERAL COMMENTS

In addition to the comments above that pertain to particular sections of the regulations, San Francisco would like to make the following general comments:

- Data Sharing requirements should be based upon the NACTO City Data Sharing Principles (http://nacto.org/wp-content/uploads/2017/01/NACTO-Policy-Data-Sharing-Principles.pdf).

Data Category	For all AVs	For AVs deployed for commercial purposes
Better Data for Transportation Planning	• Speed • Volume • Travel time	• Pick-up location and time • Drop-off location and time • Vehicle occupancy • Non-revenue vehicle miles traveled • Vehicle dwell times
New Tools for Safety	• Collision occurrence • Collision severity • Rapid acceleration • Rapid deceleration • Disengagements	
Equity in Mobility Options		Number, date and time of: • Unfulfilled rides • Declined rides • Cancelled rides

- These regulations should explicitly permit any local regulations that are not inconsistent with the DMV regulations, as cities may have need to apply or develop additional regulations tailored to specific local jurisdictional needs, including the ability to price access to city streets.
- California DMV should convene regular (e.g., quarterly) public meetings which include local jurisdictions and AV companies to discuss upcoming activities and address issues.
- Testing or deployment of AVs shall not interfere with the operations of any public transit routes, impact schedules, or cause delays. Driving and stopping behaviors that have the potential to interfere with public transit service include double parking, parking in bus only zones, and picking up/dropping off passengers in travel lanes and/or bus loading zones should be prohibited.
- The vehicles need to operate in a manner that is consistent with the California Vehicle Code (CVC), not just with National Highway Traffic Safety Administration standards. For example, the CVC has a unique definition for jaywalking, and the vehicle needs to be programmed to understand that definition as well as other unique state regulations.
- Provisions should be added that allow local jurisdictions to formally appeal to the DMV to revoke a manufacturer's testing and/or deployment permit expeditiously if the local jurisdiction believes that additional steps are needed to ensure the safety of the public.

Thank you again for the opportunity to submit comments. If you have any questions, please contact Darton Ito (darton.ito@sfmta.com). We look forward to working with DMV and other stakeholders to ensure the safe and effective testing and deployment of AVs in San Francisco and in California.

Sincerely,

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