SF MOTORS

3303 Scott Blvd
Santa Clara, CA 95054
www.sfmotors.com

Rodney Aoki

December 31, 2018

DEPARTMENT OF MOTOR VEHICLES
LICENSING OPERATIONS DIVISION
8243 DEMETRE AVENUE MAIL STATION L224,
SACRAMENTO, CA 95828-0932

Dear Mr. Aoki,

Please let this letter and attached serve as the SF Motors disengagement report for 2018, pursuant to California Code of Regulations, Title 13, Article 3.7, Section 227.46.

SF Motors began developing its autonomous driving system in 2017 with a focus on comprehensive environmental awareness – utilizing multi sensor fusion for functions such as lane, obstacle, and traffic light detection. To ensure safe and comfortable driving behavior, advanced decision making, path planning, and control were further developed in simulated environments and on closed roads.

SF Motors developed a process to collect, analyze and evaluate disengagements prior to open-road testing which began in July 2018 in the San Francisco bay area. Over a five-month period, SF Motors accumulated more than 2,500 miles on public roads in both urban and highway environments.

To continually advance both software and sensors, the logs collected during road tests are analyzed offline. Disengagement cases are reproduced in simulation scenarios to cover hundreds of common situations and provide further evaluation of the autonomous driving system's core driving skills and collision avoidance capabilities.

In early public road testing, alongside safety being a top priority, most disengagements noted in the report are due to precautionary disengagements where the autonomous driving system was set to react cautiously or proactively. Ultimately, the autonomous driving system achieved more than 100 highway miles without the need for human intervention.

Where referenced in the attached report, "Longitudinal Control" is used to describe the portion of the system used to control the vehicle's cruising speed, while "Lateral Control" is used to describe the portion of the system that controls the vehicle's wheels for path tracking.

Sincerely,

Fan Wang
Director, Autonomous Driving Software

STATE OF CALIFORNIA
DMV
DEPARTMENT OF MOTOR VEHICLES
A Public Service Agency

ANNUAL REPORT OF AUTONOMOUS VEHICLE DISENGAGEMENT

Instructions: Print as many pages as needed. Submit completed report to: Department of Motor Vehicles, Autonomous Vehicle Program, P.O. BOX 932342, MS L224, Sacramento, CA 94232-3420

SECTION 1 — MANUFACTURER INFORMATION

NAME OF MANUFACTURER	AVT NUMBER
SF Motors, Inc.	AVT049

BUSINESS MAILING ADDRESS	CITY	STATE	ZIP CODE	TELEPHONE NUMBER
3303 Scott Blvd.,	Santa Clara,	CA,	95054	(408) 617 - 7878

SECTION 2 — DISENGAGEMENT EVENT DETAIL Use one row for each disengagement event.

DATE	VIN NUMBER	DISENGAGEMENT INITIATED BY (AV System, Test Driver, Remote Operator, or Passenger)	DISENGAGEMENT LOCATION (Interstate, Freeway, Highway, Rural Road, Street, or Parking Facility)	DESCRIPTION OF FACTS CAUSING DISENGAGEMENT *
07/05/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Control Issue: Initial Road testing, Longitudinal Control performance was not ideal at the time and needed fine tuning for safe operation. Test Driver disengaged to log issue for further examination.
07/09/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Control Issue: Initial Road testing, Lateral Control performance was not ideal at the time, causing Test Vehicle to oscillate within lane and needed fine tuning. Test Driver disengaged to log issue for further examination.
07/17/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Perception Issue: Inital Road testing, Longitudinal Control and Lidar perception system performance were not ideal at the time and needed fine tuning for safe operation. Test Driver disengaged to log issue for further examination.
07/26/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Control Issue: Lateral Control performance was not ideal at the time, causing Test Vehicle to oscillate within lane and needed fine tuning. Test Driver disengaged to log issue for further examination.
08/03/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Perception Issue: Lane Detection in Perception system was not preforming optimally, affecting Lateral Control performance, causing Test Vehicle to oscillate within lane and needed fine tuning. Test Driver disengaged to log issue for further examination.
08/03/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Perception Issue: Lane Detection in Perception system was not preforming optimally, affecting Lateral Control performance, causing Test Vehicle to oscillate within lane and needed fine tuning. Test Driver disengaged to log issue for further examination.
08/13/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Perception Issue: Lane Detection in Perception system was not preforming optimally, affecting Lateral Control performance, causing Test Vehicle to oscillate within lane and needed fine tuning. Test Driver disengaged to log issue for further examination.
08/13/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Perception Issue: Lane Detection in Perception system was not preforming optimally, affecting Lateral Control performance, causing Test Vehicle to oscillate within lane and needed fine tuning. Test Driver disengaged to log issue for further examination.

**** Additional information regarding the causes of the disengagement may be submitted as an attachment. If an attachment is provided, indicate the specific attachment number for the disengagement event.***

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08/13/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Perception Issue: Lane Detection in Perception system was not preforming optimally, affecting Lateral Control performance, causing Test Vehicle to oscillate within lane and needed fine tuning. Test Driver disengaged to log issue for further examination.
08/13/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Perception Issue: Lane Detection in Perception system was not preforming optimally, affecting Lateral Control performance, causing Test Vehicle to oscillate within lane and needed fine tuning. Test Driver disengaged to log issue for further examination.
08/13/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Perception Issue: Lane Detection in Perception system was not preforming optimally, affecting Lateral Control performance, causing Test Vehicle to oscillate within lane and needed fine tuning. Test Driver disengaged to log issue for further examination.
08/13/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Perception Issue: Lane Detection in Perception system was not preforming optimally, affecting Lateral Control performance, causing Test Vehicle to oscillate within lane and needed fine tuning. Test Driver disengaged to log issue for further examination.
08/15/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Control Issue: Lateral Control performance was not ideal at the time, causing Test Vehicle to oscillate within lane and needed fine tuning. Test Driver disengaged to log issue for further examination.
08/15/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Control Issue: Lateral Control performance was not ideal at the time, causing Test Vehicle to oscillate within lane and needed fine tuning. Test Driver disengaged to log issue for further examination.
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09/03/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Perception Issue: Test Vehicle mis-detected Red Traffic Light
09/03/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Control Issue: Test Vehicle drove too close to the right lane, disengaged to center the Vehicle
09/04/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Control Issue: Test Vehicle drove too close to the right lane, disengaged to center the Vehicle
09/04/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Perception Issue: Lidar Hardware/ Software issue; did not detect the vehicle in front of Test Vehicle.
09/05/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Control Issue: Lateral Control performance was not ideal at the time, causing Test Vehicle to oscillate within lane and needed fine tuning. Test Driver disengaged to log issue for further examination.
09/11/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Control Issue: Lateral Control performance was not ideal on highway setting at the time, causing Test Vehicle to oscillate within lane and needed fine tuning. Test Driver disengaged to log issue for further examination.
09/11/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Control Issue: Lateral Control performance was not ideal on highway setting at the time, causing Test Vehicle to oscillate within lane and needed fine tuning. Test Driver disengaged to log issue for further examination.

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09/12/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Control Issue: Longitudinal Control performance was not ideal for highway setting at the time and needed fine tuning for safe operation. Test Driver disengaged to log issue for further examination.
09/12/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Control Issue: Longitudinal Control performance was not ideal for highway setting at the time and needed fine tuning for safe operation. Test Driver disengaged to log issue for further examination.
09/14/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Control Issue: Lateral Control performance was not ideal on highway setting at the time, causing Test Vehicle to oscillate within lane and needed fine tuning. Test Driver disengaged to log issue for further examination.
09/14/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Control Issue: Lateral Control performance was not ideal on highway setting at the time, causing Test Vehicle to oscillate within lane and needed fine tuning. Test Driver disengaged to log issue for further examination.
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09/26/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Control Issue: Lateral Control performance was not ideal at the time, causing Test Vehicle to oscillate within lane and needed fine tuning. Test Driver disengaged to log issue for further examination.
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10/02/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Control Issue: Lateral Control performance was not ideal at the time, causing Test Vehicle to oscillate within lane and needed fine tuning. Test Driver disengaged to log issue for further examination.
10/02/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Control Issue: Lateral Control performance was not ideal at the time, causing Test Vehicle to oscillate within lane and needed fine tuning. Test Driver disengaged to log issue for further examination.
10/02/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Control Issue: Lateral Control performance was not ideal at the time, causing Test Vehicle to oscillate within lane and needed fine tuning. Test Driver disengaged to log issue for further examination.
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10/02/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Perception Issue: Lidar system false detected object. Test Driver disengaged to log issue for futher examination.
10/02/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Perception Issue: Lidar system false detected object. Test Driver disengaged to log issue for futher examination.
10/02/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Perception Issue: Lidar system false detected object. Test Driver disengaged to log issue for futher examination.
10/02/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Perception Issue: Lidar system false detected object. Test Driver disengaged to log issue for futher examination.
10/02/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Control Issue: Test Vehicle did not brake enough. Disengaged for safe operation.
10/02/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Control Issue: Test Vehicle did not brake enough. Disengaged for safe operation.
10/10/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Sensor Delay: Harsh braking situation with Closest In Path Vehicle (CIPV or Vehicle In Front). Sensor delay caused delay in braking. Disengaged to keep safe distance from CIPV.

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10/10/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Sensor Delay: Harsh braking situation with Closest In Path Vehicle (CIPV or Vehicle In Front). Sensor delay caused delay in braking. Disengaged to keep safe distance from CIPV.
10/10/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Sensor Delay: Harsh braking situation with Closest In Path Vehicle (CIPV or Vehicle In Front). Sensor delay caused delay in braking. Disengaged to keep safe distance from CIPV.
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10/11/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Planning & Control Issue: Test Vehicle's planned path is too close to adjacent lane, causing the Test Vehicle to be off-centered. Disengaged to center the vehicle.
10/11/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Planning & Control Issue: Test Vehicle's planned path is too close to adjacent lane, causing the Test Vehicle to be off-centered. Disengaged to center the vehicle.
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10/15/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Perception Issue: Unable to detect adjacent lane, lane change was unsuccessful. Disengaged to log the issue.

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DMV
DEPARTMENT OF MOTOR VEHICLES
A Public Service Agency

ANNUAL REPORT OF AUTONOMOUS VEHICLE DISENGAGEMENT

Instructions: Print as many pages as needed. Submit completed report to: Department of Motor Vehicles, Autonomous Vehicle Program, P.O. BOX 932342, MS L224, Sacramento, CA 94232-3420

SECTION 1 — MANUFACTURER INFORMATION

NAME OF MANUFACTURER	AVT NUMBER
SF Motors, Inc.	AVT049

BUSINESS MAILING ADDRESS	CITY	STATE	ZIP CODE	TELEPHONE NUMBER
3303 Scott Blvd.,	Santa Clara,	CA,	95054	(408) 617 - 7878

SECTION 2 — DISENGAGEMENT EVENT DETAIL

Use one row for each disengagement event.

DATE	VIN NUMBER	DISENGAGEMENT INITIATED BY (AV System, Test Driver, Remote Operator, or Passenger)	DISENGAGEMENT LOCATION (Interstate, Freeway, Highway, Rural Road, Street, or Parking Facility)	DESCRIPTION OF FACTS CAUSING DISENGAGEMENT *
10/15/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Perception Issue: Unable to detect adjacent lane, lane change was unsuccessful. Disengaged to log the issue.
10/15/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Perception Issue: Unable to detect adjacent lane, lane change was unsuccessful. Disengaged to log the issue.
10/16/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Control Issue: Test Vehicle is programmed to keep a pre-set time gap behind Closest In Path Vehicle (CIPV or Vehicle In-Front). Cars cut in between CIPV and Test Vehicle, Test Vehicle initiated harsh braking to accomedate. Test Driver disengaged to keep up with traffic.
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10/17/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Planning & Control Issue: Test Vehicle's planned path is too close to adjacent lane, causing the Test Vehicle to be off-centered. Disengaged to center the vehicle.
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10/24/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Control Issue: Test Vehicle is programmed to keep a pre-set time gap behind Closest In Path Vehicle (CIPV or Vehicle In-Front). Cars cut in between CIPV and Test Vehicle, Test Vehicle initiated harsh braking to accomedate. Test Driver disengaged to keep up with traffic.
10/24/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Control Issue: Test Vehicle is programmed to keep a pre-set time gap behind Closest In Path Vehicle (CIPV or Vehicle In-Front). Cars cut in between CIPV and Test Vehicle, Test Vehicle initiated harsh braking to accomedate. Test Driver disengaged to keep up with traffic.
10/24/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Control Issue: Test Vehicle is programmed to keep a pre-set time gap behind Closest In Path Vehicle (CIPV or Vehicle In-Front). Cars cut in between CIPV and Test Vehicle, Test Vehicle initiated harsh braking to accomedate. Test Driver disengaged to keep up with traffic.
10/24/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Control Issue: Test Vehicle is programmed to keep a pre-set time gap behind Closest In Path Vehicle (CIPV or Vehicle In-Front). Cars cut in between CIPV and Test Vehicle, Test Vehicle initiated harsh braking to accomedate. Test Driver disengaged to keep up with traffic.
10/24/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Control Issue: Test Vehicle is programmed to keep a pre-set time gap behind Closest In Path Vehicle (CIPV or Vehicle In-Front). Cars cut in between CIPV and Test Vehicle, Test Vehicle initiated harsh braking to accomedate. Test Driver disengaged to keep up with traffic.
10/24/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Control Issue: Test Vehicle is programmed to keep a pre-set time gap behind Closest In Path Vehicle (CIPV or Vehicle In-Front). Cars cut in between CIPV and Test Vehicle, Test Vehicle initiated harsh braking to accomedate. Test Driver disengaged to keep up with traffic.
10/24/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Control Issue: Test Vehicle is programmed to keep a pre-set time gap behind Closest In Path Vehicle (CIPV or Vehicle In-Front). Cars cut in between CIPV and Test Vehicle, Test Vehicle initiated harsh braking to accomedate. Test Driver disengaged to keep up with traffic.
10/24/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Control Issue: Test Vehicle is programmed to keep a pre-set time gap behind Closest In Path Vehicle (CIPV or Vehicle In-Front). Cars cut in between CIPV and Test Vehicle, Test Vehicle initiated harsh braking to accomedate. Test Driver disengaged to keep up with traffic.

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STATE OF CALIFORNIA
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DEPARTMENT OF MOTOR VEHICLES
A Public Service Agency

ANNUAL REPORT OF AUTONOMOUS VEHICLE DISENGAGEMENT

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SECTION 1 — MANUFACTURER INFORMATION

NAME OF MANUFACTURER	AVT NUMBER
SF Motors, Inc.	AVT049

BUSINESS MAILING ADDRESS	CITY	STATE	ZIP CODE	TELEPHONE NUMBER
3303 Scott Blvd.,	Santa Clara,	CA,	95054	(408) 617 - 7878

SECTION 2 — DISENGAGEMENT EVENT DETAIL Use one row for each disengagement event.

DATE	VIN NUMBER	DISENGAGEMENT INITIATED BY (AV System, Test Driver, Remote Operator, or Passenger)	DISENGAGEMENT LOCATION (Interstate, Freeway, Highway, Rural Road, Street, or Parking Facility)	DESCRIPTION OF FACTS CAUSING DISENGAGEMENT *
10/24/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Control Issue: Test Vehicle is programmed to keep a pre-set time gap behind Closest In Path Vehicle (CIPV or Vehicle In-Front). Cars cut in between CIPV and Test Vehicle, Test Vehicle initiated harsh braking to accomedate. Test Driver disengaged to keep up with traffic.
10/26/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Precautionary Takeover: Test Vehicle was not performing optimally given heavy traffic condition. Test Driver disengaged as a precautionary measure to address traffic conditions and log issue for further examination.
10/26/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Precautionary Takeover: Test Vehicle was not performing optimally given heavy traffic condition. Test Driver disengaged as a precautionary measure to address traffic conditions and log issue for further examination.
10/26/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Precautionary Takeover: Test Vehicle was not performing optimally given heavy traffic condition. Test Driver disengaged as a precautionary measure to address traffic conditions and log issue for further examination.
10/28/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Precautionary Takeover: Test Vehicle was not performing optimally given heavy traffic condition. Test Driver disengaged as a precautionary measure to address traffic conditions and log issue for further examination.
10/28/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Precautionary Takeover: Test Vehicle was not performing optimally given heavy traffic condition. Test Driver disengaged as a precautionary measure to address traffic conditions and log issue for further examination.
10/29/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Precautionary Takeover: Test Vehicle was not performing optimally given heavy traffic condition. Test Driver disengaged as a precautionary measure to address traffic conditions and log issue for further examination.
10/29/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Precautionary Takeover: Test Vehicle was not performing optimally given heavy traffic condition. Test Driver disengaged as a precautionary measure to address traffic conditions and log issue for further examination.

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10/31/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Precautionary Takeover: Test Vehicle was not performing optimally given heavy traffic condition. Test Driver disengaged as a precautionary measure to address traffic conditions and log issue for further examination.
10/31/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Precautionary Takeover: Test Vehicle was not performing optimally given heavy traffic condition. Test Driver disengaged as a precautionary measure to address traffic conditions and log issue for further examination.
10/31/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Precautionary Takeover: Test Vehicle was not performing optimally given heavy traffic condition. Test Driver disengaged as a precautionary measure to address traffic conditions and log issue for further examination.
11/01/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Control Issue: Test Vehicle was going at speed limit but slower than traffic behind. Test Driver took over as a precaution and sped up to avoid causing unnecessary traffic.
11/01/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Control Issue: Test Vehicle was going at speed limit but slower than traffic behind. Test Driver took over as a precaution and sped up to avoid causing unnecessary traffic.
11/02/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Vision system (Camera and related software) was unable to detect lanes. Disengaged to record issue for further analysis.
11/02/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Vision system (Camera and related software) was unable to detect lanes. Disengaged to record issue for further analysis.
11/02/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Vision system (Camera and related software) was unable to detect lanes. Disengaged to record issue for further analysis.

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SF Motors, Inc.	AVT049

BUSINESS MAILING ADDRESS	CITY	STATE	ZIP CODE	TELEPHONE NUMBER
3303 Scott Blvd.,	Santa Clara,	CA,	95054	(408) 617 - 7878

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11/02/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Vision system (Camera and related software) was unable to detect lanes. Disengaged to record issue for further analysis.
11/02/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Software Issue: Planning Module software exited unexpectedly.
11/05/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Precautionary Takeover: Test Vehicle was not slowing down enough. Test Driver braked to keep safe distance from Closest In-Path Vehicle (CIPV or Vehicle in-front)
11/05/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Precautionary Takeover: Test Vehicle was not slowing down enough. Test Driver braked to keep safe distance from Closest In-Path Vehicle (CIPV or Vehicle in-front)
11/05/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Precautionary Takeover: Test Vehicle was not slowing down enough. Test Driver braked to keep safe distance from Closest In-Path Vehicle (CIPV or Vehicle in-front)
11/05/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Precautionary Takeover: Test Vehicle was not slowing down enough. Test Driver braked to keep safe distance from Closest In-Path Vehicle (CIPV or Vehicle in-front)
11/05/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Precautionary Takeover: Test Vehicle was not slowing down enough. Test Driver braked to keep safe distance from Closest In-Path Vehicle (CIPV or Vehicle in-front)
11/05/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Precautionary Takeover: Test Vehicle was not slowing down enough. Test Driver braked to keep safe distance from Closest In-Path Vehicle (CIPV or Vehicle in-front)

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SF Motors, Inc.	AVT049

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3303 Scott Blvd.,	Santa Clara,	CA,	95054	(408) 617 - 7878

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11/06/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Precautionary Takeover: Test Vehicle was not slowing down enough. Test Driver braked to keep safe distance from Closest In-Path Vehicle (CIPV or Vehicle in-front)
11/06/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Precautionary Takeover: Test Vehicle was not slowing down enough. Test Driver braked to keep safe distance from Closest In-Path Vehicle (CIPV or Vehicle in-front)
11/06/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Precautionary Takeover: Test Vehicle was not slowing down enough. Test Driver braked to keep safe distance from Closest In-Path Vehicle (CIPV or Vehicle in-front)
11/06/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Precautionary Takeover: Test Vehicle was not slowing down enough. Test Driver braked to keep safe distance from Closest In-Path Vehicle (CIPV or Vehicle in-front)
11/06/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Precautionary Takeover: Test Vehicle was not slowing down enough. Test Driver braked to keep safe distance from Closest In-Path Vehicle (CIPV or Vehicle in-front)
11/06/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Precautionary Takeover: Test Vehicle was not slowing down enough. Test Driver braked to keep safe distance from Closest In-Path Vehicle (CIPV or Vehicle in-front)
11/07/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Precautionary Takeover: Test Vehicle was not slowing down enough. Test Driver braked to keep safe distance from Closest In-Path Vehicle (CIPV or Vehicle in-front)
11/07/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Precautionary Takeover: Traffic Light turned Red, Test Vehicle was not slowing down enough. Test Driver braked as a precaution.

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SF Motors, Inc.	AVT049

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3303 Scott Blvd.,	Santa Clara,	CA,	95054	(408) 617 - 7878

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11/07/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Precautionary Takeover: Test Vehicle was not slowing down enough. Test Driver braked to keep safe distance from Closest In-Path Vehicle (CIPV or Vehicle in-front)
11/07/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Precautionary Takeover: Test Vehicle was not slowing down enough. Test Driver braked to keep safe distance from Closest In-Path Vehicle (CIPV or Vehicle in-front)
11/07/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Precautionary Takeover: Vehicle cut too close in front of Test Vehicle. Test Driver disengaged to address unanticipated traffic condition.
11/07/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Precautionary Takeover: Test Vehicle was not slowing down enough. Test Driver braked to keep safe distance from Closest In-Path Vehicle (CIPV or Vehicle in-front)
11/07/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Precautionary Takeover: Test Vehicle was not slowing down enough. Test Driver braked to keep safe distance from Closest In-Path Vehicle (CIPV or Vehicle in-front)
11/07/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Precautionary Takeover: Test Vehicle was not slowing down enough. Test Driver braked to keep safe distance from Closest In-Path Vehicle (CIPV or Vehicle in-front)
11/07/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Precautionary Takeover: Test Vehicle was not slowing down enough. Test Driver braked to keep safe distance from Closest In-Path Vehicle (CIPV or Vehicle in-front)
11/07/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Precautionary Takeover: Test Vehicle was not slowing down enough. Test Driver braked to keep safe distance from Closest In-Path Vehicle (CIPV or Vehicle in-front)

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11/08/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Precautionary Takeover: Test Vehicle was not slowing down enough. Test Driver braked to keep safe distance from Closest In-Path Vehicle (CIPV or Vehicle in-front)
11/08/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Precautionary Takeover: Test Vehicle was not slowing down enough. Test Driver braked to keep safe distance from Closest In-Path Vehicle (CIPV or Vehicle in-front)
11/08/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Precautionary Takeover: Vehicle cut too close in front of Test Vehicle. Test Driver disengaged to address unanticipated traffic condition.
11/08/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Precautionary Takeover: Test Vehicle was not slowing down enough. Test Driver braked to keep safe distance from Closest In-Path Vehicle (CIPV or Vehicle in-front)
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11/08/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Precautionary Takeover: Test Vehicle was not slowing down enough. Test Driver braked to keep safe distance from Closest In-Path Vehicle (CIPV or Vehicle in-front)
11/08/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Precautionary Takeover: Test Vehicle was not slowing down enough. Test Driver braked to keep safe distance from Closest In-Path Vehicle (CIPV or Vehicle in-front)
11/12/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Preception Issue: Perception system mistook a bridge as a possible Closest In-Path Vehicle and braked harshly. Test Driver disengaged to avoid traffic.
11/13/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Software Issue: Planning software exited unexpectedly.
11/13/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Software Issue: Planning software exited unexpectedly.
11/15/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Precautionary Takeover: Traffic Light turned Red, Test Vehicle was not slowing down enough. Test Driver braked as a precaution.
11/15/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Precautionary Takeover: Traffic Light turned Red, Test Vehicle was not slowing down enough. Test Driver braked as a precaution.
11/15/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Street	Precautionary Takeover: Test Vehicle was not slowing down enough. Test Driver braked to keep safe distance from Closest In-Path Vehicle (CIPV or Vehicle in-front)

**** Additional information regarding the causes of the disengagement may be submitted as an attachment. If an attachment is provided, indicate the specific attachment number for the disengagement event.***

STATE OF CALIFORNIA
DMV
DEPARTMENT OF MOTOR VEHICLES
A Public Service Agency

ANNUAL REPORT OF AUTONOMOUS VEHICLE DISENGAGEMENT

Instructions: Print as many pages as needed. Submit completed report to: Department of Motor Vehicles, Autonomous Vehicle Program, P.O. BOX 932342, MS L224, Sacramento, CA 94232-3420

SECTION 1 — MANUFACTURER INFORMATION

NAME OF MANUFACTURER	AVT NUMBER
SF Motors, Inc.	AVT049

BUSINESS MAILING ADDRESS	CITY	STATE	ZIP CODE	TELEPHONE NUMBER
3303 Scott Blvd.,	Santa Clara,	CA,	95054	(408) 617 - 7878

SECTION 2 — DISENGAGEMENT EVENT DETAIL

Use one row for each disengagement event.

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11/16/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Software Issue: Planning software exited unexpectedly.
11/16/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Software Issue: Planning software exited unexpectedly.
11/16/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception System did not detect lane due to poor lane marking, and Test Vehicle did not stay in lane. Test Driver disengaged to center the vehicle.
11/16/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception System did not detect lane due to poor lane marking, and Test Vehicle did not stay in lane. Test Driver disengaged to center the vehicle.
11/16/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception System did not detect lane due to poor lane marking, and Test Vehicle did not stay in lane. Test Driver disengaged to center the vehicle.
11/16/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Software Issue: Planning software exited unexpectedly.
11/16/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception System did not detect lane due to poor lane marking, and Test Vehicle did not stay in lane. Test Driver disengaged to center the vehicle.
11/17/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Software Issue: Planning software exited unexpectedly.

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NAME OF MANUFACTURER	AVT NUMBER
SF Motors, Inc.	AVT049

BUSINESS MAILING ADDRESS	CITY	STATE	ZIP CODE	TELEPHONE NUMBER
3303 Scott Blvd.,	Santa Clara,	CA,	95054	(408) 617 - 7878

SECTION 2 — DISENGAGEMENT EVENT DETAIL

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DATE	VIN NUMBER	DISENGAGEMENT INITIATED BY (AV System, Test Driver, Remote Operator, or Passenger)	DISENGAGEMENT LOCATION (Interstate, Freeway, Highway, Rural Road, Street, or Parking Facility)	DESCRIPTION OF FACTS CAUSING DISENGAGEMENT *
11/19/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Precautionary Takeover: Vehicle cut too close in front of Test Vehicle. Test Driver disengaged to address unanticipated traffic condition.
11/19/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Precautionary Takeover: Vehicle cut too close in front of Test Vehicle. Test Driver disengaged to address unanticipated traffic condition.
11/20/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception System did not detect lane due to poor lane marking, and Test Vehicle did not stay in lane. Test Driver disengaged to center the vehicle.
11/20/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception System did not detect lane due to poor lane marking, and Test Vehicle did not stay in lane. Test Driver disengaged to center the vehicle.
11/20/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception System did not detect lane due to poor lane marking, and Test Vehicle did not stay in lane. Test Driver disengaged to center the vehicle.
11/20/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Precautionary Takeover: Vehicle cut too close in front of Test Vehicle. Test Driver disengaged to address unanticipated traffic condition.
11/20/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception System did not detect lane due to poor lane marking, and Test Vehicle did not stay in lane. Test Driver disengaged to center the vehicle.
11/20/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception System did not detect lane due to poor lane marking, and Test Vehicle did not stay in lane. Test Driver disengaged to center the vehicle.

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SECTION 1 — MANUFACTURER INFORMATION

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SF Motors, Inc.	AVT049

BUSINESS MAILING ADDRESS	CITY	STATE	ZIP CODE	TELEPHONE NUMBER
3303 Scott Blvd.,	Santa Clara,	CA,	95054	(408) 617 - 7878

SECTION 2 — DISENGAGEMENT EVENT DETAIL

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11/20/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception System did not detect lane due to poor lane marking, and Test Vehicle did not stay in lane. Test Driver disengaged to center the vehicle.
11/20/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception System did not detect lane due to poor lane marking, and Test Vehicle did not stay in lane. Test Driver disengaged to center the vehicle.
11/26/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Precautionary Takeover: Vehicle cut too close in front of Test Vehicle. Test Driver disengaged to address unanticipated traffic condition.
11/26/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception System did not detect lane due to poor lane marking, and Test Vehicle did not stay in lane. Test Driver disengaged to center the vehicle.
11/26/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception system mis-detected over-hanging bridge as an Object in path. Test Vehicle attempted to brake. Test Driver disengaged to avoid causing traffic.
11/26/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception System did not detect lane due to Perception Issue: Perception system mis-detected over-hanging bridge as an Object in path. Test Vehicle attempted to brake. Test Driver disengaged to avoid causing traffic.poor lane marking, and Test Vehicle did not stay in lane. Test Driver disengaged to center the vehicle.
11/26/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception System did not detect lane due to poor lane marking, and Test Vehicle did not stay in lane. Test Driver disengaged to center the vehicle.
11/27/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Precautionary Takeover: Tight curve going downhill, Test Vehicle was too close to lane. Test Driver disengaged to navigate difficult road conditions.

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SF Motors, Inc.	AVT049

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11/27/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception System did not detect lane due to missing lane marking, and Test Vehicle did not stay in lane. Test Driver disengaged to center the vehicle.
11/27/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception system mis-detected over-hanging bridge as an Object in path. Test Vehicle attempted to brake. Test Driver disengaged to avoid causing traffic.
11/27/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception system mis-detected over-hanging bridge as an Object in path. Test Vehicle attempted to brake. Test Driver disengaged to avoid causing traffic.
11/27/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Precautionary Takeover: Tight curve going downhill, Test Vehicle was too close to lane. Test Driver disengaged to navigate difficult road conditions.
11/27/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception System did not detect lane due to poor lane marking during rainy weather, and Test Vehicle did not stay in lane. Test Driver disengaged to center the vehicle.
11/27/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Precautionary Takeover: Vehicle cut too close in front of Test Vehicle. Test Driver disengaged to address unanticipated traffic condition.
11/28/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception System did not detect lane due to poor lane marking, and Test Vehicle did not stay in lane. Test Driver disengaged to center the vehicle.
11/28/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception System did not detect lane due to poor lane marking with sunlight reflecting off the road, and Test Vehicle did not stay in lane. Test Driver disengaged to center the vehicle.

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SECTION 1 — MANUFACTURER INFORMATION

NAME OF MANUFACTURER				AVT NUMBER
SF Motors, Inc.				AVT049
BUSINESS MAILING ADDRESS	**CITY**	**STATE**	**ZIP CODE**	**TELEPHONE NUMBER**
3303 Scott Blvd.,	Santa Clara,	CA,	95054	(408) 617 - 7878

SECTION 2 — DISENGAGEMENT EVENT DETAIL Use one row for each disengagement event.

DATE	VIN NUMBER	DISENGAGEMENT INITIATED BY (AV System, Test Driver, Remote Operator, or Passenger)	DISENGAGEMENT LOCATION (Interstate, Freeway, Highway, Rural Road, Street, or Parking Facility)	DESCRIPTION OF FACTS CAUSING DISENGAGEMENT *
11/28/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Planning Issue: Planning System freeze led to Test Vehicle not reacting to traffic situation in time. Test Driver disengaged for safe operation.
11/29/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception System did not detect lane due to poor lane marking with sunlight reflecting off the road, and Test Vehicle did not stay in lane. Test Driver disengaged to center the vehicle.
11/29/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Precautionary Takeover: Vehicle cut too close in front of Test Vehicle. Test Driver disengaged to address unanticipated traffic condition.
11/29/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception System did not detect lane due to poor lane marking with sunlight reflecting off the road, and Test Vehicle did not stay in lane. Test Driver disengaged to center the vehicle.
11/29/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception System did not detect lane due to poor lane marking with wet road conditions, and Test Vehicle did not stay in lane. Test Driver disengaged to center the vehicle.
11/29/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception System did not detect lane due to poor lane marking with sunlight reflecting off the road, and Test Vehicle did not stay in lane. Test Driver disengaged to center the vehicle.
11/29/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception System did not detect lane due to poor lane marking with wet road conditions, and Test Vehicle did not stay in lane. Test Driver disengaged to center the vehicle.
11/29/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception System did not detect lane due to poor lane marking during foggy weather conditions, and Test Vehicle did not stay in lane. Test Driver disengaged to center the vehicle.

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SF Motors, Inc.	AVT049

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11/30/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception System did not detect lane due to poor lane marking, and Test Vehicle did not stay in lane. Test Driver disengaged to center the vehicle.
11/30/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Precautionary Takeover: Test Vehicle was navigating tight curve and was too close to lane. Test Driver disengaged to navigate difficult road conditions.
11/30/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception System did not detect lane due to poor lane marking, and Test Vehicle did not stay in lane. Test Driver disengaged to center the vehicle.
11/30/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception system mis-detected over-hanging bridge as an Object in path. Test Vehicle attempted to brake. Test Driver disengaged to avoid causing traffic.
11/30/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception System did not detect lane due to poor lane marking, and Test Vehicle did not stay in lane. Test Driver disengaged to center the vehicle.
11/30/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception System did not detect lane due to poor lane marking, and Test Vehicle did not stay in lane. Test Driver disengaged to center the vehicle.
11/30/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Hardware/ Software Issue: Planning software encountering issues. Driver disengaged to reset hardware to address issue.
11/30/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	GPS Issue: GPS Location of Test Vehicle was not accurate, causing unanticipated maneuver. Test Driver disengaged to center the vehicle.

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11/30/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Planning Issue: Planning software freeze, Test Vehicle lost planning trajectory.
11/30/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Precautionary Takeover: Test Vehicle was not slowing down enough. Test Driver braked to keep safe distance from Closest In-Path Vehicle (CIPV or Vehicle in-front)
11/30/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception System did not detect lane due to poor lane marking with sunlight reflecting off the road, and Test Vehicle did not stay in lane. Test Driver disengaged to center the vehicle.
11/30/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception System did not detect lane due to poor lane marking, and Test Vehicle did not stay in lane. Test Driver disengaged to center the vehicle.
11/30/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Perception Issue: Perception System did not detect lane due to poor lane marking, and Test Vehicle did not stay in lane. Test Driver disengaged to center the vehicle.
11/30/18	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO	Highway	Precautionary Takeover: Vehicle cut too close in front of Test Vehicle. Test Driver disengaged to address unanticipated traffic condition.
	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO		
	3LN6L5MU5HR665513 VEHICLE IS CAPABLE OF OPERATING WITHOUT A DRIVER ☐ YES ☒ NO	Test Driver DRIVER PRESENT ☒ YES ☐ NO		

**** Additional information regarding the causes of the disengagement may be submitted as an attachment. If an attachment is provided, indicate the specific attachment number for the disengagement event.***

SECTION 3 — DISENGAGEMENT AND AV MILES SUMMARY PER VEHICLE

VIN Number	Annual Total of Disengagements	Total Number of Miles Tested in Autonomous Mode (December 2017 to November 2018)												
		December	January	February	March	April	May	June	July	August	September	October	November	ANNUAL TOTAL
3LN6L5MU5HR665513	232								35 miles	44.6 miles	91.6 miles	356.1 miles	2,034.5 miles	2,561.8 miles
														0
														0
														0
														0
														0
														0
														0
														0
														0
														0
														0
														0
														0
														0
														0

SECTION 4 — ACKNOWLEDGMENT

PRINTED NAME OF AUTHORIZED REPRESENTATIVE Fan Wang	TITLE Director, Autonomous Driving Software
SIGNATURE X	DATE SIGNED Dec 31, 2018

STREET ADDRESS	CITY	STATE	ZIP CODE
3303 Scott Blvd.,	Santa Clara,	CA,	95054

EMAIL ADDRESS	FAX NUMBER	TELEPHONE NUMBER
Fan.Wang@sfmotors.com	(N/A)	(408) 617 - 7878