



U.S. Department  
of Transportation

**National Highway  
Traffic Safety  
Administration**

1200 New Jersey Avenue, SE  
Washington, DC 20590

JUL - 8 2016

**CERTIFIED MAIL**  
**RETURN RECEIPT REQUESTED**

Mr. Mathew Schwall, Director  
Field Performance Engineering  
Tesla Motors, Inc.  
3500 Deer Creek Road  
Palo Alto, CA 94304

NEF-130krh  
PE16-007

Dear Mr. Schwall:

This letter is to inform you that the Office of Defects Investigation (ODI) of the National Highway Traffic Safety Administration (NHTSA) has opened Preliminary Evaluation PE16-007 to examine the performance of the Automatic Emergency Braking (AEB) system and any other forward crash mitigation or forward crash avoidance systems enabled and in use at the time of the fatal crash involving a model year (MY) 2015 Tesla Model S that was reported to ODI by Tesla, and to request information to assist us in our investigation.

Unless otherwise stated in the text, the following definitions apply to these information requests:

- **Subject vehicles:** All Tesla vehicles equipped with any version of the Autopilot Technology Package that have been manufactured for sale or lease in the United States and federalized territories.
- **Subject crash:** The May 7, 2016 fatal crash that was reported to ODI by Tesla.
- **Subject system:** All systems designed to provide Automatic Emergency Braking (AEB) for forward crash mitigation or avoidance functionality; manufactured or developed for use as original equipment or service parts or over-the-air updates in the subject vehicles.
- **Tesla:** Tesla Motors, Inc. (collectively, Tesla), all of its past and present officers and employees, whether assigned to its principal offices or any of its field or other locations, including all of its divisions, subsidiaries (whether or not incorporated) and affiliated enterprises and all of their headquarters, regional, zone and other offices and their employees, and all agents, contractors, consultants, attorneys and law firms and other persons engaged directly or indirectly (e.g., employee of a consultant) by or under the control of Tesla (including all business units and persons previously referred to), who are

or, in or after January 1, 2000, were involved in any way with any of the following related to the alleged defect in the subject vehicles:

- a. Design, engineering, analysis, modification or production (e.g. quality control);
  - b. Testing, assessment or evaluation;
  - c. Consideration, or recognition of potential or actual defects, reporting, record-keeping and information management, (e.g., complaints, field reports, warranty information, part sales), analysis, claims, or lawsuits; or
  - d. Communication to, from or intended for zone representatives, fleets, dealers, or other field locations, including but not limited to people who have the capacity to obtain information from dealers.
- **Alleged defect:** All crashes alleged to have occurred because Forward Collision Warning (FCW) or Automatic Emergency Braking (AEB) did not occur when expected.
  - **Document:** “Document(s)” is used in the broadest sense of the word and shall mean all original written, printed, typed, recorded, or graphic matter whatsoever, however produced or reproduced, of every kind, nature, and description, and all non-identical copies of both sides thereof, including, but not limited to, papers, letters, memoranda, correspondence, communications, electronic mail (e-mail) messages (existing in hard copy and/or in electronic storage), faxes, mailgrams, telegrams, cables, telex messages, notes, annotations, working papers, drafts, minutes, records, audio and video recordings, data, databases, other information bases, summaries, charts, tables, graphics, other visual displays, photographs, statements, interviews, opinions, reports, newspaper articles, studies, analyses, evaluations, interpretations, contracts, agreements, jottings, agendas, bulletin, notices, announcements, instructions, blueprints, drawings, as-builts, changes, manuals, publications, work schedules, journals, statistical data, desk, portable and computer calendars, appointment books, diaries, travel reports, lists, tabulations, computer printouts, data processing program libraries, data processing inputs and outputs, microfilms, microfiches, statements for services, resolutions, financial statements, governmental records, business records, personnel records, work orders, pleadings, discovery in any form, affidavits, motions, responses to discovery, all transcripts, administrative filings and all mechanical, magnetic, photographic and electronic records or recordings of any kind, including any storage media associated with computers, including, but not limited to, information on hard drives, floppy disks, backup tapes, and zip drives, electronic communications, including but not limited to, the Internet and shall include any drafts or revisions pertaining to any of the foregoing, all other things similar to any of the foregoing, however denominated by Tesla, any other data compilations from which information can be obtained, translated if necessary, into a usable form and any other documents. For purposes of this request, any document which contains any note, comment, addition, deletion, insertion, annotation, or otherwise comprises a non-identical copy of another document shall be treated as a separate document subject to production. In all cases where original and any non-identical copies are not available, “document(s)” also means any identical copies of the original and all non-identical copies thereof. Any document, record, graph, chart, film or photograph originally produced in color must be provided in color. Furnish all documents whether verified by Tesla or not. If a document

is not in the English language, provide both the original document and an English translation of the document.

- **Other Terms:** To the extent that they are used in these information requests, the terms “claim,” “consumer complaint,” “dealer field report,” “field report,” “fire,” “fleet,” “good will,” “make,” “model,” “model year,” “notice,” “property damage,” “property damage claim,” “rollover,” “type,” “warranty,” “warranty adjustment,” and “warranty claim,” whether used in singular or in plural form, have the same meaning as found in 49 CFR 579.4.

In order for my staff to evaluate the alleged defect, certain information is required. Pursuant to 49 U.S.C. § 30166, please provide numbered responses to the following information requests. Insofar as Tesla has previously provided a document to ODI, Tesla may produce it again or identify the document, the document submission to ODI in which it was included and the precise location in that submission where the document is located. When documents are produced, the documents shall be produced in an identified, organized manner that corresponds with the organization of this information request letter (including all individual requests and subparts). When documents are produced and the documents would not, standing alone, be self-explanatory, the production of documents shall be supplemented and accompanied by explanation.

Please repeat the applicable request verbatim above each response. After Tesla’s response to each request, identify the source of the information and indicate the last date the information was gathered.

1. State the number of subject vehicles Tesla has manufactured for sale or lease in the United States and federalized territories. Separately, for each subject vehicle manufactured to date by Tesla, state the following:
  - a. Vehicle identification number (VIN);
  - b. Model;
  - c. Model Year;
  - d. Date of manufacture;
  - e. Date warranty coverage commenced;
  - f. The State in the United States, or the federalized territory, where the vehicle was originally sold or leased (or delivered for sale or lease);
  - g. The date of the last data retrieval;
  - h. The mileage of the vehicle;
  - i. The total mileage of the vehicle with Traffic-Aware Cruise Control (TACC) activated without Autosteer;
  - j. The total mileage with Autosteer activated;
  - k. The total number of AEB events that occurred with TACC activated without Autosteer;
  - l. The total number of AEB events that occurred when Autosteer was activated;
  - m. The total number of AEB events that occurred when TACC and Autosteer were not activated;
  - n. The total number of “Hands on Wheel” Autosteer warnings recorded; and
  - o. The total number of “Hands on Wheel” Autosteer warnings that escalated to a reduction in power.

Provide the table in Microsoft Access 2003, 2007, or a compatible format, entitled "PE16\_007\_PRODUCTION DATA."

2. State the number of each of the following, received by Tesla, or of which Tesla is otherwise aware, which relate to, or may relate to, the alleged defect in in the subject vehicles:
  - a. Consumer complaints, including those from fleet operators;
  - b. Field reports, including dealer field reports;
  - c. Reports involving a crash, injury, or fatality, based on claims against the manufacturer involving a death or injury, notices received by the manufacturer alleging or proving that a death or injury was caused by a possible defect in a subject vehicle, property damage claims, consumer complaints, or field reports;
  - d. Property damage claims;
  - e. Third-party arbitration proceedings where Tesla is or was a party to the arbitration; and
  - f. Lawsuits, both pending and closed, in which Tesla is or was a defendant or codefendant.

For subparts "a" through "d," state the total number of each item (e.g., consumer complaints, field reports, etc.) separately. Multiple incidents involving the same vehicle are to be counted separately. Multiple reports of the same incident are also to be counted separately (i.e., a consumer complaint and a field report involving the same incident in which a crash occurred are to be counted as a crash report, a field report and a consumer complaint).

In addition, for items "c" through "f," provide a detailed description of the alleged problem and causal and contributing factors and Tesla's assessment of the problem, with a summary of the significant underlying facts and evidence. For items "e" and "f," identify the parties to the action, as well as the caption, court, docket number, and date on which the complaint or other document initiating the action was filed.

3. Separately, for each item (complaint, report, claim, notice, or matter) within the scope of your response to Request No. 2, state the following information:
  - a. Tesla's file number or other identifier used;
  - b. The category of the item, as identified in Request No. 2 (i.e., consumer complaint, field report, etc.);
  - c. Vehicle owner or fleet name (and fleet contact person), address, and telephone number;
  - d. Vehicle's VIN;
  - e. Vehicle's model and model year;
  - f. Vehicle's mileage at time of incident;
  - g. Incident date;
  - h. Report or claim date;
  - i. Type of crash (e.g., rear end collision, intersection collision with crossing vehicle, pedestrian impact, etc.);
  - j. A description of all driver control actions that could have resulted in override of autonomous controls during the event;
  - k. Number of alleged injuries, if any;
  - l. Number of alleged fatalities, if any; and
  - m. Tesla's assessment of the allegation and the performance of the subject system during the event.

Provide this information in Microsoft Access 2003 or 2007, or a compatible format, entitled "PE16\_007\_REQUEST NUMBER THREE DATA."

4. Produce copies of all documents related to each item within the scope of Request No. 2, including all data logs and recorded images. Organize the documents separately by category (i.e., consumer complaints, field reports, etc.) and describe the method Tesla used for organizing the documents.
5. Describe all assessments, analyses, tests, test results, studies, surveys, simulations, reconstructions, investigations, inquiries and/or evaluations (collectively, "actions") that relate to, or may relate to the alleged defect that have been conducted, are being conducted, are planned, or are being planned by, or for, Tesla. For each such action, provide the following information:
  - a. Action title or identifier;
  - b. The actual or planned start date;
  - c. The actual or expected end date;
  - d. Brief summary of the subject and objective of the action;
  - e. Engineering group(s)/supplier(s) responsible for designing and for conducting the action; and
  - f. A brief summary of the findings and/or conclusions resulting from the action.

The response to this request should include a detailed description of all past, present and future actions by any and all engineering working groups (e.g., vehicle dynamics control task force) of which Tesla is an active member or is otherwise aware. This includes, at a minimum, all of the information requested in items "a" through "f."

For each action identified, provide copies of all documents related to the action, regardless of whether the documents are in interim, draft, or final form. Organize the documents chronologically by action.

6. Describe all modifications or changes made by, or on behalf of, Tesla in the design, programming, material composition, manufacture, quality control, supply, or installation of the subject components, from the start of production to date, which relate to, or may relate to, the alleged defect in the subject vehicles. For each such modification or change, provide the following information:
  - a. The date or approximate date on which the modification or change was incorporated into vehicle production;
  - b. A detailed description of the modification or change;
  - c. The reason(s) for the modification or change. For all changes involving software or firmware updates, include the following information:
    - i) A detailed description of all field data or test results upon which the change was based;
    - ii) An assessment of the effectiveness of the change(s) based on statistical comparison of field data from vehicles before and after receiving the revision(s);
  - d. The part number(s) (service and engineering) of the original component;

- e. The part number(s) (service and engineering) of the modified component;
- f. Whether the original unmodified component was withdrawn from production and/or sale, and if so, when;
- g. When the modified component was made available as a service component; and
- h. Also, provide the above information for any modification or change that Tesla is aware of which may be incorporated into vehicle production within the next 120 days.

7. Provide the following information related to the subject system:

- a. Provide a detailed description of the design and operation of the subject system in all crash modes, including system capability in intersection or road junction crossing path collisions over the full range of object detection (e.g., pedestrian, bicycle, various vehicle types) and closing speeds;
- b. Describe and provide copies of all documents related to system requirements documents and specifications for all features and functions including detailed descriptions of system design and operation and all associated sensor/camera technologies and specifications;
- c. Provide a list of all end-to-end system suppliers, sensor/camera types, and locations on the vehicle. For each sensor/camera used by the subject system, state the operational range and field of vision (FOV);
- d. Describe the object recognition and classification process used for both rear-end collision scenarios and intersection or road junction crossing path collisions including monitoring time, sensor fusion logic, track maturity and overall system reaction planning and situation assessment;
- e. Describe how the subject system detects compromised or degraded sensor/camera signals, under what circumstances and how that information is communicated to the driver, and how that information affects the fusion logic for the object recognition and criteria and for automatic braking;
- f. Describe all kinematic models used by the subject system for judging collision risk, calculating time to collision, and/or making decisions about braking for target/threat objects in intersection or road junction crossing path collisions;
- g. Explain all inhibit and override/suppression conditions and operation points for the subject system, including minimum activation speed thresholds (mph), maximum operational speed (mph), brake pedal cancel threshold (mm, m/sec, kPa), steering wheel cancel threshold (force, displacement, and steering angle rate);
- h. Provide a detailed description of all designed-in system diagnostic and ad-hoc data logging including event images, event locations, sampling rates, trigger thresholds, data elements, recording controllers, and data retrieval methods;
- i. State the maximum braking authority and describe the sequence and timing of the cascade of events in an AEB activation (e.g., warning, pre-braking, full-braking);
- j. All vehicle-level testing and system simulations related to crossing traffic at-an-intersection (pedestrians, bicyclists, passing vehicle, passing truck...etc.), left-turn across path, and automatic rear-end emergency braking on straight roadways;
- k. All camera and sensor evaluations related to horizontal performance, vertical performance, ranging and detection, relative speed assessment, relative acceleration assessment, acquisition delay, update rates, and maximum number of tracked targets; and
- l. Explain all design and testing methodologies employed to filter false positive events and interventions while preserving true events overall system accuracy.

8. Provide the following information for all AEB events experienced by the subject vehicles that involved avoidance or mitigation of crashes with vehicles crossing the path of the subject vehicle:
  - a. The vehicle identification number of the subject vehicle;
  - b. The date and time of the incident;
  - c. The software version of Autopilot installed at the time of the incident;
  - d. Copies of the data logs; and
  - e. Copies of all event images showing the target/threat vehicle and the timing of each relative to AEB activation.
9. Provide Tesla's reconstruction of the subject crash, including:
  - a. The positions of the vehicles at impact and the positions at each 10 msec increment up to two seconds prior to impact (use upper and lower bounds for the truck position, if precise position cannot be determined);
  - b. Identify the time increments and associated vehicle positions at which the target vehicle was within the sensing range and view of each sensor used by the subject system;
  - c. State the earliest time and relative vehicle positions at which the subject system could have recognized the potential for a collision; and
  - d. State the latest time and closest distance prior to impact at which maximum braking could have avoided impact with the crossing trailer.
10. Furnish Tesla's assessment of the alleged defect in the subject vehicles, including:
  - a. The reason that the subject system did not activate in the subject crash;
    - i) If Tesla has not completed its investigation or has not made any final conclusions, provide a detailed description of the evidence known to date and the basis for all preliminary assessments or opinions, such as those stated in a meeting with NHTSA on June 14 and in public statements about the crash;
    - ii) In addition, provide a copy of Tesla's plan for completing its investigation, including all completed and incomplete actions, their actual and target completion dates, and provide a copies of Tesla's final investigation report and conclusions, with all supporting documents, as soon as they are available;
  - b. The types of collisions that the subject system is designed to prevent or mitigate;
  - c. Factors affecting system performance in intersection or road junction crossing collisions, including:
    - i) Subject vehicle speed;
    - ii) Target/threat vehicle speed;
    - iii) Target/threat vehicle composition, geometry, or appearance;
    - iv) Environmental factors, including light conditions and inclement weather; and
  - d. Describe the limitations of the subject system and crash types and conditions in which the system may not be effective.

### **Legal Authority for This Request**

This letter is being sent to Tesla pursuant to 49 U.S.C. § 30166, which authorizes NHTSA to conduct any investigation that may be necessary to enforce Chapter 301 of Title 49 and to request reports and the production of things. It constitutes a new request for information.

### **Civil Penalties**

Tesla's failure to respond promptly and fully to this letter could subject Tesla to civil penalties pursuant to 49 U.S.C. § 30165 or lead to an action for injunctive relief pursuant to 49 U.S.C. § 30163. (Other remedies and sanctions are available as well.) The Vehicle Safety Act, as amended, 49 U.S.C. § 30165(b), provides for civil penalties of up to \$21,000 per day, with a maximum of \$105,000,000 for a related series of violations, for failing or refusing to perform an act required under 49 U.S.C. § 30166. *See* 49 CFR 578.6 (as amended by Fixing America's Surface Transportation Act (the "FAST Act"), Pub. L. 114-21, § 24110(a)(2), 129 Stat. 1312 (Dec. 4, 2015)). This includes failing to respond completely to ODI information requests.

If Tesla cannot respond to any specific request or subpart(s) thereof, please state the reason why it is unable to do so. If on the basis of attorney-client, attorney work product, or other privilege, Tesla does not submit one or more requested documents or items of information in response to this information request, Tesla must provide a privilege log identifying each document or item withheld, and stating the date, subject or title, the name and position of the person(s) from, and the person(s) to whom it was sent, and the name and position of any other recipient (to include all carbon copies or blind carbon copies), the nature of that information or material, and the basis for the claim of privilege and why that privilege applies.

### **Confidential Business Information**

**All business confidential information must be submitted directly to the Office of Chief Counsel as described in the following paragraph and should not be sent to this office.** In addition, do not submit any business confidential information in the body of the letter submitted to this office. Please refer to PE16-007 in Tesla's response to this letter and in any confidentiality request submitted to the Office of Chief Counsel.

If Tesla claims that any of the information or documents provided in response to this information request constitute confidential commercial material within the meaning of 5 U.S.C. § 552(b)(4), or are protected from disclosure pursuant to 18 U.S.C. § 1905, Tesla must submit supporting information together with the materials that are the subject of the confidentiality request, in accordance with 49 CFR Part 512, as amended, to the Office of Chief Counsel (NCC-111), National Highway Traffic Safety Administration, Room W41-227, 1200 New Jersey Avenue, S.E., Washington, D.C. 20590. Tesla is required to **submit two copies of the documents containing allegedly confidential information (except only one copy of blueprints) and one copy of the documents from which information claimed to be confidential has been deleted.** Please remember that the phrase "ENTIRE PAGE CONFIDENTIAL BUSINESS

INFORMATION” or “CONTAINS CONFIDENTIAL BUSINESS INFORMATION” (as appropriate) must appear at the top of each page containing information claimed to be confidential, and the information must be clearly identified in accordance with 49 CFR 512.6. If you submit a request for confidentiality for all or part of your response to this IR, that is in an electronic format (e.g., CD-ROM), your request and associated submission must conform to the new requirements in NHTSA's Confidential Business Information Rule regarding submissions in electronic formats. *See* 49 CFR 512.6(c) (as amended by 72 Fed. Reg. 59434 (October 19, 2007)).

If you have any questions regarding submission of a request for confidential treatment, contact Otto Matheke, Senior Attorney, Office of Chief Counsel at [otto.matheke@dot.gov](mailto:otto.matheke@dot.gov) or (202) 366-5253.

### **Due Date**

Tesla's response to this letter, in duplicate, together with a copy of any confidentiality request, must be submitted to this office by the following dates: responses to items 1, 2, 3, 4 and 8 must be submitted by **July 29, 2016**; and the remaining responses by **August 26, 2016**. If Tesla finds that it is unable to provide all of the information requested within the time allotted, Tesla must request an extension from me at (202) 366-5207 no later than five business days before the response due date. If Tesla is unable to provide all of the information requested by the original deadline, it must submit a partial response by the original deadline with whatever information Tesla then has available, even if an extension has been granted.

Please send email notification to Kareem Habib at [Kareem.Habib@DOT.gov](mailto:Kareem.Habib@DOT.gov) and to [ODI\\_IRresponse@dot.gov](mailto:ODI_IRresponse@dot.gov) when Tesla sends its response to this office and indicate whether there is confidential information as part of Tesla's response.

If you have any technical questions concerning this matter, please call Kareem Habib of my staff at (202) 366-8703.

Sincerely,



Jeffrey L. Quandt, Chief  
Vehicle Control Division  
Office of Defects Investigation

Enclosure 1, one CD-ROM titled Data Collection Disc containing two Microsoft Access database template files.