HONDA

American Honda Motor Co., Inc.
1919 Torrance Boulevard
Torrance, CA 90501-2746
Phone (310) 783-2000

September 20, 2019

Dr. Stephen Ridella, Director
Office of Defects Investigation
U.S. Department of Transportation
National Highway Traffic Safety Administration
1200 New Jersey Ave., SE
Washington, DC 20590

Re: EA19-001

Dear Dr. Ridella:

In reply to your letter dated July 16, 2019, Honda is submitting this response regarding your investigation into allegations of the failure of ZF ACUs to maintain full operational function during a crash event due to ACU reset or shutdown from electrical overstress damage or electrical transients.

Per the Honda/NHTSA agreement on August 29, 2019, the response will be sent in two parts. The first submission was sent on August 30, 2019 and included responses to Questions 1, 5, 6, 7, 8, 9 and 10. This submission is the second, and final, submission and includes responses to Questions 2, 3, 4 and 11.

Should any questions arise after either submission, please feel free to contact Honda.

Respectfully,

AMERICAN HONDA MOTOR CO., INC.

[redacted]

John Turley
Senior Manager
Product Regulatory Office

JET:gyc

cc: Sharon Yukevich, NHTSA
Office of Chief Counsel, NHTSA

Enclosure

1. **State, by model and model year, the number of subject vehicles Honda has manufactured for sale or lease in the United States. Separately, for each subject vehicle manufactured to date by Honda, state the following:**
    a. **Make;**
    b. **Model;**
    c. **Model Year; and**
    d. **The part number(s) (service and engineering) of the subject component.**

    Response:

    Submitted in August 30, 2019 submission.

2. **State, by model and model year the number of each of the following, received by Honda, or of which Honda is otherwise aware, which relate to, or may relate to, the alleged defect in the subject vehicles:**
    a. **Consumer complaints, including those from fleet operators;**
    b. **Field reports, including dealer field reports;**
    c. **Reports for ACUs returned from the field or from test vehicles;**
    d. **Reports involving a crash, injury or fatality;**
    e. **Property damage claims;**
    f. **Third-party arbitration proceedings where Honda is or was a party to the arbitration; and**
    g. **Lawsuits, both pending and closed, in which Honda is or was a defendant or codefendant.**

   For subparts "a" through "g" 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 "d" through "g" provide a summary description of the alleged problem and causal and contributing factors and Honda's assessment of the problem, with a summary of the significant underlying facts and evidence. For items "f" and "g," 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.

   Response:

   For data elements "a" through "g", please see folder Q2, "Q2_083019" on the enclosed CD.

   For the referenced claims in data elements "a" through "e", Honda is including all claims alleging both a non-deployment and serious injury, regardless of the description in the narrative or the merits of the claim. Although Honda does not believe these cases to be representative of the alleged defect, Honda is nonetheless submitting them because they are responsive to this search methodology.

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. **Honda's file number or another identifier used;**
    b. **The category of the item, as identified in Request No. 2 (i.e. consumer complaint, field report, etc.);**
    c. **Vehicle owner of fleet name (and fleet contact person), street address, email address and telephone number;**
    d. **Vehicle's VIN;**
    e. **Vehicle's make, model and model year;**
    f. **Vehicles mileage at time of incident;**
    g. **Incident date;**
    h. **Report or claim date;**
    i. **Whether a crash is alleged;**
    j. **Whether property damage is alleged;**
    k. **Number of alleged injuries, if any;**
        i. **The AIS score of the injuries; and**
        ii. **Description of injury and location.**
    l. **Number of alleged fatalities, if any; and**
    m. **All applicable indicators for the Alleged Defect (items A through H, as identified above).**

    Provide this information in Microsoft Access 2010, or compatible format, entitled "REQUEST NUMBER TWO DATA."

    Response:

    For data elements "a" through "m", please see folder Q3_Q4, "EA19-001_Master Log" on the enclosed CD.

4. **Produce copies of all documents related to each item within the scope of Request No. 2. Organize the documents separately by category (i.e., consumer complaints, field reports, etc.) and describe the method Honda used for organizing the documents. Describe in detail the search methods and search criteria used by Honda to identify the items in response to Request No. 2.**

   Response:

   For copies of documents related to Request No. 2, see folder Q3_Q4 on the enclosed CD. A link assocated to each claim in "EA19-001_Master Log" will hyperlink to the associated claim.

   For search methodology, see folder Q4 on the enclosed CD.

5. **Describe all assessments, analyses, tests, test results, studies, surveys, simulations, investigations, inquiries and/or evaluations (collectively, "actions") that relate to, or may relate to, the alleged defect in the subject vehicles that have been conducted, are being conducted, are planned, or are being planned by, or for, Honda. For each such situation, 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. **Brief summary of the findings and/or conclusions resulting from the action.**

    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.

    Response:

    Submitted in August 30, 2019 submission.

6. **Testing by multiple parties indicates that negative voltage transients, with respect to chassis ground, on the satellite sensor signal wires are capable of producing the EOS damage to the DS84 ASIC which leads to resets and/or shutdown of the ACU during crash events. Separately from Response 5, describe all assessments, analyses, tests, test results, studies, surveys, simulations, investigations, inquiries and/or evaluations (collectively, "actions") that relate to, or may relate to, the alleged defect which evaluates performance of the Subject Component ACU designs and/or peer ACU designs, from any ACU supplier including ZF, for transient voltage susceptibility on the satellite crash sensor, battery power, or ground wires, that have been conducted, are being conducted, are planned, or are being planned by, or for, Honda. For each such action, provide the following information:**
    a. **Action title or identifier (can be cross referenced to actions provided in Response 5);**
    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;**
    f. **Copies of all procedures used to conduct the tests, along with a list of test equipment utilized for the tests; and**
    g. **A summary of the findings and/or conclusions resulting from the action.**

   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.

   Response:

   Submitted in August 30, 2019 submission.

7. **For every Subject Component ACU design which shares a similar satellite sensor protection design (i.e. equivalent circuit protection devices providing similar levels of negative transient protection), provide the following:**
    i. **A simplified ACU circuit showing the protection devices for each satellite sensor line along with any current limiting devices incorporated into the ACU power circuitry separate from the satellite sensor communications lines. Additionally, the data sheet for each device shown in the circuit diagram shall be included with this submission.**
    ii. **The level of negative transient protection specified, in both voltage level and duration at that voltage level. If available, include a voltage versus duration curve (i.e. the envelope) depicting the protection capability. If the negative transient protection has been evaluated using a different electrical measurement/metric (i.e. current, power, or other parameter), provide a detailed explanation of the parameter used and provide duration and parameter versus duration information as requested above for voltage.**
    iii. **All actions identified in Response 6(a) which apply to each particular ACU design.**

Response:

Submitted in August 30, 2019 submission.

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8. **Provide the following information for each unique part number identified in response 1(d):**
    a. **Original design specification sent to supplier;**
    b. **All modifications or changes made by, or on behalf of, Honda in the design, material, composition, manufacture, quality control, supply, or installation of the subject component, from the start of production to date, which relate to, or may relate to, the alleged defect in the subject vehicles;**
    c. **The date or approximate date on which the modification or change was incorporated into vehicle production;**
    d. **A detailed description of the modification or change;**
    e. **Whether the modified component can be interchanged with earlier production components; and**
    f. **The applicable simplified circuit identified in Response 7.**

    Also, provide the above information for any modification or change that Honda is aware of which may be incorporated into vehicle production within the next 120 days.

    Response:

    Submitted in August 30, 2019 submission.

9. **For the subject vehicles, provide for each model and model year, a list of all possible fault codes and/or diagnostic trouble codes stored in the ACU or other modules located anywhere on the vehicle which could be associated with the alleged defect. For each fault code provide:**
    a. **The identifier for the code;**
    b. **The module or other hardware which contains the code;**
    c. **A description of the code;**
    d. **The conditions which result in the code being set; and**
    e. **The tools, software, and procedures required to download the code.**

    Response:

    Submitted in August 30, 2019 submission.

10. **Produce engineering drawings, photos, and/or documents for each unique design version of the Subject Vehicles related to the electrical wiring configurations forward of the firewall:**
    a. **Original design specification;**
    b. **Modified design specification;**
    c. **Locations(s) of the front impact sensors;**
    d. **Description of every unique bundle cross-section including:**
        i. **Descriptions of each wire in the bundle cross-section;**
        ii. **Indicate whether the wire is connected to the ACU and whether the wire also connects to a DS84 ASIC**
        iii. **The voltage and current load specifications for each wire;**
        iv. **Description of any electrical shielding techniques applied to a wire or sub-group of wires (twisted pair, foil shielding, etc.)**

    Also provide the above information for any modification or change that Honda is aware of which may be incorporated into vehicle production within the next 120 days.

    Response:

    Submitted in August 30, 2019 submission.

11. Furnish Honda's assessment of the alleged defect in the subject vehicle, including:

- **a. The causal or contributory factor(s);**
- **b. The failure mechanism(s);**
- **c. The failure mode(s);**
- **d. Any prior safety recalls Honda has conducted to address EOS related failures of the subject ACU, the remedy that was utilized in that recall action, and how, in Honda's assessment, that action addresses any residual risk of an EOS failure of the DS84 ASIC;**
- **e. The risk to motor vehicle safety that it poses;**
- **f. What warnings, if any, the operator and other persons both inside and outside the vehicle would have that the alleged defect was occurring or subject component was malfunctioning.**

Response:

[redacted]