



May 11, 2022

Dr. Stephen Ridella  
Director  
Office of Defects Investigation  
1200 New Jersey Avenue, S.E.  
Washington, D.C. 20590

RE: NEF-103no; EA19-001 – Response to Agency Information Request

Dear Dr. Ridella:

On behalf of Hyundai Motor Company (“HMC”), enclosed is Hyundai Motor America’s (“HMA”) Response to the March 31, 2022, Information Request with regard to EA19-001, an inquiry opened on April 19, 2019 by the NHTSA Office of Defects Investigation (“ODI”) as to Kia Motors America, Chrysler (FCA US LLC), Mitsubishi Motors North America, Inc., HMA, TRW Automotive, Inc. (ZF TRW), Honda (American Honda Motor Co.), and Toyota Motor Corporation. In regard to HMA, this pursuit involves model year (“MY”) 2013-19 Sonata and MY 2013-19 Sonata Hybrid vehicles equipped with Airbag Control Units (“ACU”) manufactured by ZF-TRW and Mobis that contained the DS84 Application Specific Integrated Circuit (“ASIC”) with circuit protection. For vehicles without circuit protection, specifically MY 2011-2012 Sonata and Sonata Hybrid vehicles, HMA filed recall (NHTSA Campaign No. 18V-137) and ZF-TRW has filed its own Part 573 report.

### **Preliminary Statement and Chronology**

In February 2012, HMA was notified of a collision involving a MY 2011 Hyundai Sonata vehicle in which an allegation of Advanced Airbag system (“AAS”) non-deployment was made. In June 2012, HMA inspected the vehicle and found no crash event data was recorded. HMA communicated with the supplier, ZF TRW, and enlisted its assistance to assess the findings. Further inspection of the ACU indicated electrical overstress (“EOS”) inside the unit’s ASIC had occurred, which, at that time, was attributed to numerous aftermarket accessories installed and operating in the vehicle.

In May 2015, HMA was notified of a collision involving a MY 2011 Hyundai Sonata in which a similar allegation of AAS non-deployment was made. In October 2015, HMA inspected the vehicle. The ACU was found to be non-communicative. Subsequent analysis by ZF TRW indicated internal damage was potentially caused by EOS. HMA conducted a U.S. marketplace search of incidents of similar nature and circumstance, but no incidents other than the two that HMA received in February 2012 and May 2015 were identified. HMA then began monitoring for specific crash events containing similar facts and circumstances as the two vehicles identified thus far.

Between July and November 2016, HMA received two additional reports of collisions involving MY 2011 Hyundai Sonata vehicles in which similar allegations of AAS non-deployments were made.

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HMA began to reassess its prior analysis. HMA again enlisted the assistance of ZF TRW to investigate the ACU's recovered from the incident vehicles. ZF TRW confirmed the recovered ACU from one of the vehicles as being potentially damaged internally by EOS. Furthermore, HMC determined, upon examination of the unique facts and circumstances associated with each incident, that it was possible that AAS deployment was not warranted.

HMA's investigation was ongoing when, in November 2017, NHTSA's Office of Defects Investigation ("ODI") contacted HMA to obtain follow-up information in connection with one of the four vehicles under investigation. HMA responded to ODI's request and continued analysis of all available information surrounding each incident. During this time period, ODI and HMA continued to communicate and exchange information.

In December 2017, HMA engaged a third-party engineering firm to study and analyze the facts and circumstances surrounding its investigation and reassessment.

On February 21, 2018, Hyundai met with ZF TRW to discuss its reassessment. HMA and ZF TRW noted that the circumstances associated with this defect mechanism bore similarities to those related to recall campaign 16V-668, where EOS appeared to be a root cause of airbag non-deployment in significant frontal crashes in certain Fiat Chrysler vehicles. ZF TRW asserted that EOS on the ACU could be caused by negative transients originating from certain vehicle components, such as the wire harness connecting the ACU to the frontal crash sensors and could be prevented by circuit protection installed in ACU's used by later model year (2013+) Hyundai Sonatas. On February 22, 2018, based on information received from known incidents, HMA convened its Technical Committee with a recommendation to voluntarily conduct a safety recall on model year 2011 Hyundai Sonata vehicles, while continuing its investigation into potential causes of EOS and its effect on AAS deployment.

Thereafter HMA contacted ODI and requested an in-person discussion at NHTSA headquarters in Washington, D.C. On March 9, 2018, HMA met with ODI to discuss the facts and data known to date, the foundation for HMA's recall scope at the time of filing its Part 573 report, information and tentative conclusions reached by HMA's third-party engineering firm, and HMA's preliminary understanding of the defect mechanism, which consisted of the tentative conclusion that the root cause of the failure was likely to involve a component/equipment issue (as opposed to a vehicle systems issue). This conclusion was based on the relative susceptibility of the subject ACU to EOS due to the lack of Schottky diodes, a feature included in subsequent ACU versions provided by ZF TRW starting with model year 2013 and later Hyundai Sonata and Sonata Hybrid vehicles.

HMA voluntarily proposed an accelerated, 30-day plan to conduct crash testing with the intent to replicate the EOS mechanism in the subject ACU, identify its source, and study its effect on AAS deployment in high-energy frontal collisions. NHTSA ODI concurred with HMA's proposed plan.

Between March 19, 2018, and March 28, 2018, HMA conducted seven crash tests developed by both HMC Research and Development department and HMA's third-party engineering firm. Representatives from NHTSA were in attendance at the crash testing. During this time, HMA and NHTSA communicated regularly on status, tentative views, and next steps. Hyundai was able to replicate EOS damage to the ACU in three of the seven crash tests, with at least one of the confirmed EOS events resulting in the inability of the AAS to deploy. Of the three crash tests that produced ACU's

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with evident EOS damage, Hyundai observed wire harness damage in two of these tests. There was no observed vehicle abnormality that could have caused EOS in the third test.

On April 3, 2018, HMA and NHTSA ODI discussed the results and preliminary conclusions arising from Hyundai's crash testing, along with all other information available to both HMA and NHTSA to date.

On April 11<sup>th</sup> and 12<sup>th</sup>, 2018, Hyundai, NHTSA, and ZF TRW representatives analyzed three ACUs from the HMA crash tested vehicles at ZF TRW Global Electronics Headquarters in Farmington Hills, Michigan. The analysis showed that, in all three ACUs, an internal electrical short occurred on the 5-volt VCC line of the DS84 ASIC. One of the three ACUs contained visible evidence of EOS.

On April 18, 2018, based on an analysis of all information to date, HMA reconvened its Technical Committee and made the determination to expand its vehicle scope to include all model year Sonata and Sonata Hybrid vehicles equipped with ACUs that do not contain Schottky diode circuit protection.

On September 11, 2018, Hyundai met with ODI to discuss its plan and preparation for deploying the safety recall remedy. After further discussions with the agency surrounding the recall remedy, Hyundai launched the recall campaign on October 5, 2018.

On October 18, 2018, per previous discussions and agreements with the agency, Hyundai submitted its response to ODI's Information Request regarding PE18-003. As of the date of that response, Hyundai was aware of four incidents in the U.S. market alleging the subject condition. EOS was observed inside the ACUs involved in three of these crashes. Hyundai continued to actively investigate all incidents and remained in close communication with NHTSA regarding this condition.

On April 19, 2019, ODI opened this EA as to Kia Motors America, Chrysler (FCA US LLC), Mitsubishi Motors North America, Inc., HMA, TRW Automotive, Inc. (ZF TRW), Honda (American Honda Motor Co.), and Toyota Motor Corporation. According to NHTSA's April 19, 2019, opening resume, the investigation focuses on ACU manufactured by ZF TRW, the Tier 1 supplier to HMA and the other affected OEMs. On July 16, 2019, NHTSA issued its IR in this matter, and following discussions between HMA and NHTSA, it was agreed that HMA would have an extension of time up to and including Friday, October 4, 2019, to submit its responses to the IR. On October 3, 2019, HMA furnished its complete response to the IR indicating it had not identified any incidents of the alleged defect on the subject Hyundai vehicles.

On March 31, 2022, HMA received a request for updated information related to EA19-001, specifically, field information and testing/analyses. HMA pursued responsive information to this request in the same manner and approach as it did for the prior EA. Hyundai has not identified any new information warranting reconsideration of prior assessments made in conjunction with HMA's investigation into the defect condition associated with Recall 18V-137 and all other vehicles using the subject DS84 ASIC provided by TRW.

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### General Objections

The General Objections set forth below are incorporated by reference into Hyundai's responses to the Information Request. These General Objections are deemed continuing as to each subpart of the Request, and are not waiver, nor in any way limited, by the specific responses to a subpart, nor should the failure to specifically incorporate the General Objections be construed as a waiver. Moreover, any applicable, good faith objection not raised in this section shall not be interpreted as a waiver.

The information provided in this response is current as of **April 20, 2022**. Hyundai has made a good faith effort to collect the information necessary to respond to the Information Request and reserves the right to supplement this response. Hyundai reserves the right to recapture privileged or otherwise protected or exempted documents that may have been inadvertently produced in response to this Information Request. Any inadvertent production of privileged material is not, and should not be interpreted as, a waiver of any applicable privilege.

In accordance with this request, HMA has conducted reasonable, good faith searches of corporate records available from those departments knowledgeable about the subject matter of this inquiry. However, the definition of "document(s)" in the Information Request is unreasonably broad, vague, and ambiguous in the context of the information sought by this Information Request. Furthermore, Hyundai understands that the requests are seeking information related to vehicles manufactured for sale in the United States only.

Hyundai's response to this Information Request was based on searches of locations where documents determined to be responsive to the information request would normally be found and in consultation with current personnel knowledgeable about the information requested. As a result, the scope of this search did not include, nor could it reasonably include, a definition of "Hyundai" in the Information Request as "all of its past and present officers and employees, whether assigned to principal offices or any field or other location, including all divisions, subsidiaries (whether or not incorporated) and affiliated enterprises and all of 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 Hyundai (including all business units and persons previously referred to), who are or, in or after January 2008, 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 people who have the capacity to obtain information from dealers."

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### Specific Responses

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1. State, by model, model year, and alleged defect category, (i.e., A, B, C, etc.), the number of each of the following, received by Hyundai, or of which Hyundai is otherwise aware, which relate to, or may relate to, the alleged defect due to subject component 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;
    - d. Reports involving a fire;
    - e. Property damage claims;
    - f. Third-party arbitration proceedings where Hyundai is or was a party to the arbitration; and
    - g. Lawsuits, both pending and closed, in which Hyundai 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 Hyundai’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 to Request 1:

As of the date of this response, HMA has not identified any complaints, reports, claims, notices, or other matters that relate to the alleged defect in the subject vehicles.

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2. 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. Hyundai’s file number or other identifier used;
    - b. The category of the item, as identified in Request No. 1 (i.e., consumer complaint, field report, etc.);
    - c. Vehicle owner or 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. Vehicle’s mileage at time of incident;

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- 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, or a compatible format, entitled "REQUEST NUMBER TWO DATA."

### Response to Request 2:

As of the date of this response, HMA has not identified any complaints, reports, claims, notices, or other matters that relate to the alleged defect in the subject vehicles that was within the scope of our response to Request No. 2.

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- 3. Produce copies of all documents related to each item within the scope of Request No. 1. Organize the documents separately by category (i.e., consumer complaints, field reports, etc.) and describe the method Hyundai used for organizing the documents. Describe in detail the search methods and search criteria used by Hyundai to identify the items in response to Request No. 1.

### Response to Request 3:

As of the date of this response, HMA has not identified any complaints, reports, claims, notices, or other matters that relate to the alleged defect in the subject vehicles that was within the scope of our response to Request No. 2.

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- 4. 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, Hyundai. 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. Brief summary of the findings and/or conclusions resulting from the action.

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### Response to Request 4:

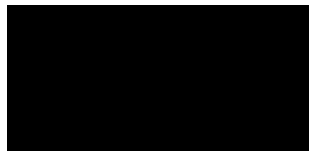
As of the date of this response, HMA has not identified any new actions relating to the alleged defect in the subject vehicles that were not previously identified in Hyundai's initial response to the EA19-001 IR.

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5. Furnish Hyundai'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 Hyundai has conducted to address EOS-related failures of the subject ACU, the remedy that was utilized in that recall action, and how, in Hyundai'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; and
  - f. What warnings, if any, the operator and the other persons both inside and outside the vehicle would have that the alleged defect was occurring, or subject component was malfunctioning.

### Response to Request 5:

The subject vehicles are equipped with ACU's containing Schottky protection devices that address the alleged defect as it is best understood to be. These ACU's are updated versions of older ACU's installed in MY 2011-2012 Hyundai Sonata and Sonata Hybrid vehicles that did not contain any protection devices, and for which Hyundai conducted recall 18V-137. For more information, please see HMA's defect information report, pursuant to 49 C.F.R. Part 573, as amended, dated April 18, 2018, as well as Hyundai's assessment of the alleged defect involving unprotected ACU's, please see HMA's previous response to PE18-003. Hyundai's continued best, good faith understanding continues to be that these filters are effective in mitigating the applicable risks, within the meaning of the Safety Act and applicable law, by filtering negative transients from satellite sensor communication lines. This is evidenced by, among other things, the collective analysis completed to date, the record in the agency's investigation, as well as the lack of incidents related to the alleged defect in the field on MY 2013-2019 Sonata and Sonata Hybrid vehicles.

Sincerely,



Cole Stutz  
Hyundai Motor America  
Director, North America Safety Office

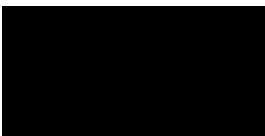
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### Certificate of Corporate Responsibility for Reports

I, Cole Stutz, pursuant to the provisions of 49 U.S.C. § 30166, state as follows:

1. I am the Director for the North America Safety Office, and I am authorized by Hyundai Motor America (“HMA”) to execute this certificate on its behalf.
2. I have reviewed the submission and, based on my knowledge, the submission does not contain any untrue statement of a material fact; or omit to state a material fact necessary in order to make the statements made not misleading, in light of the circumstances under which such statements were made.
3. I directed that a good faith inquiry be conducted that would be reasonably calculated to assure that the answers and production of documents are complete and correct, and that documents within the possession, custody, and control of HMA be searched diligently for information and documents responsive to the Information Request and produced to NHTSA.
4. I also directed that a team representing HMA work with HMA’s parent company, Hyundai Motor Company (“HMC”), to obtain further information and documents responsive to the Information Request. Based on information provided to me, it is my understanding that HMC made good faith inquiry to obtain information and to collect documents needed to respond to the Information Request.
5. Based on information provided to me, inquiry has been made of the persons and offices reasonably calculated to have responsive information and documents, and the answers to the Information Request are correct based upon HMA’s investigation to date.
6. HMA reserves the right to supplement or clarify these responses if it deems appropriate to do so.
7. I certify under penalty of perjury that the foregoing is true and correct.

Executed on this the 10<sup>th</sup> day of May 2022.



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Cole Stutz  
Director  
North America Safety Office  
Hyundai Motor America