

Motor Vehicle Defect Petition to Recall All Tesla Vehicles Due to Sudden Unintended Acceleration

Ann Carlson, Acting Administrator
National Highway Traffic Safety Administration
400 Seventh Street, S.W.
Washington, DC 20590

19 May 2023

Dear Acting Administrator Carlson,

NHTSA has several options to consider as a response to a petition to re-open investigation DP 20-001 on Tesla sudden unintended acceleration as requested by my letter dated 12 May 2023.

Research shows that sudden unintended acceleration is caused by a faulty digital value of the ADC calibration voltage. Therefore, NHTSA should require Tesla to revise its vehicle control software to check the value of this calibration voltage after digitization, and if it is too low, replace it with a new value of the reference voltage obtained by repeating the reference voltage digitization process. NHTSA should also specify how to test whether the digitized calibration voltage is too low, rather than leaving it up to Tesla to determine how this should be done. But if NHTSA requires only that a faulty digital value of the ADC calibration voltage should be replaced, then although this would eliminate sudden unintended acceleration in Tesla vehicles, there will be little feedback to prove that the problem has been solved. The only feedback that will result is a drop in the number of sudden unintended acceleration incidents in the press and a drop in the number of vehicle owner questionnaires (VOQ's) to NHTSA describing sudden unintended acceleration incidents.

NHTSA can improve the feedback it receives on its solution to unintended acceleration by also requiring Tesla to keep a vehicle log of each time it replaces a faulty digital value of the ADC calibration voltage with a new digitized value. This log would require setting aside only one word of non-volatile memory that could store one integer value that could be incremented whenever a faulty digitized value of the ADC calibration voltage is replaced by a new value. Then, NHTSA could require that Tesla interrogate this vehicle log periodically (e.g., yearly) from all the vehicles in its fleet, which would yield statistics on how often sudden unintended acceleration could have occurred in the fleet, but did not, because a fix for sudden acceleration had been installed. This would provide rigorous statistical proof that sudden unintended acceleration was caused by a faulty digital value of the ADC calibration reference voltage and was effectively cured by NHTSA's required solution.

NHTSA can go even further and require that each time a faulty digital value of the ADC calibration voltage is replaced with a new digitized value, then the faulty digital value must be stored in non-volatile memory. Since vehicles rarely have more than three or four incidents of sudden unintended acceleration, this would require setting aside no more than four or five words of non-volatile memory with each word storing one 32-bit

value of a faulty calibration voltage. By interrogating these faulty values of the ADC calibration voltage, one can then determine how much the accelerator pedal outputs would have increased and the depths of the voltage dips on the 5V and 12V supply voltages required to cause each faulty calibration voltage. The voltage dips on the 12V supply bus may point to the origin of the dips, e.g., possibly the electronic power steering system. This information would help engineers to come up with design techniques to avoid these voltage dips in the future, e.g., possibly using supercapacitors for the power steering system.

Finally, NHTSA could go still further and require that the log containing the number of times that a faulty digital value of the ADC calibration voltage is replaced with a new digitized value, the faulty digital values of the ADC calibration voltage that have been stored, and the current ADC calibration voltage, be made available to vehicle owners by transferring them via the CAN bus to the EDR module, where they can be accessed by suitably modified EDR reading software for use by the vehicle owner. This would give vehicle owners the data they need to challenge Tesla in court in cases of sudden unintended acceleration instead of forcing vehicle owners to rely on Tesla to supply this information. This reliance has put vehicle owners at a serious disadvantage, allowing Tesla to claim in the press that sudden unintended acceleration in Tesla vehicles is impossible while denying vehicle owners access to EDR and vehicle log information for use in court cases or during mandatory arbitration imposed by Tesla's sales agreements.

Sincerely yours,

Ronald A. Belt

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