

November 1, 2018

DEFECT INFORMATION REPORT

1. Vehicle Manufacturer Name:

Toyota Motor Corporation ["TMC"]
1, Toyota-cho, Toyota-city, Aichi-pref., 471-8571, Japan

Affiliated U.S. Sales Company:

Toyota Motor North America, Inc. ["TMNA"]
6565 Headquarters Drive, Plano, TX 75024

Manufacturer of Airbag Control Module:

ZF
12001 Tech Center Drive, Livonia, MI 48150
Phone: 734-855-2600

Country of Origin: U.S.

2. Identification of Involved Vehicles:

Make/Car Line	Model Year	Manufacturer	Production Period
Toyota / Scion xA	2004-2006	TMC	January 27, 2003 through January 8, 2007

Applicability	Part Number	Part Name	Component Description
MY2004-2006 Toyota Scion xA	89170-0W240	Sensor Assembly, Airbag	Airbag Control Module

NOTE: (1) Although the involved vehicles are within the above production period, not all vehicles in this range were sold in the U.S.

- (2) Only vehicles equipped with a generation 5.5 SRS ECU produced by TRW are covered under this recall. Other Toyota, Lexus, and Scion vehicles, including certain Scion xA vehicles, are not equipped with this SRS ECU.

3. Total Number of Vehicles Potentially Involved:

16,992

4. Percentage of Vehicles Estimated to Actually Contain the Defect:

Unknown. Toyota is unable to provide an estimate of the percentage of vehicles to actually contain the defect. Whether the issue in each case will lead to damage of the airbag control module and subsequently lead to a deactivation or inadvertent deployment of the airbag(s), creating an unreasonable risk to safety, depends on the actual insulation against electrical noise on each module and the actual maximum electrical noise produced by electrical components in the vehicle. Both of these can vary depending on manufacturing variation.

5. Description of Problem:

The airbag control module for the supplemental restraint system (SRS ECU) in the subject vehicles could have been manufactured with application-specific integrated circuits (ASICs) that are susceptible to internal shorting. When exposed to high inductive electrical noise from various vehicle electrical components, these ASICs could experience an internal short that creates abnormal current flow and increased heat. If this occurs, there is a possibility that the ASIC could become damaged. In certain cases, the SRS warning light for the airbag(s) could illuminate and the airbag(s) and/or seat belt pretensioner(s) could become deactivated. In other cases, these systems could inadvertently deploy. An airbag that is deactivated or deploys inadvertently can, under some circumstances, increase the risk of injury or the possibility of a crash.

6. Chronology of Principal Events:

June 2013 – August 2013

Toyota previously recalled approximately 890,000 vehicles in the U.S. in 2013 that were equipped with generation 5.0 TRW SRS ECUs. In these ECUs, damage due to electrical noise could result in an inadvertent deployment of the airbag(s) and/or seat belt pretensioners. At the time, generation 5.5 SRS ECUs (that are the subject of this recall) were not included. Please refer to Toyota's January 30, 2013, Part 573 report for further information on that recall (NHTSA ID 13V-016).

In June 2013, Toyota received a field report from the European market indicating the inadvertent activation of the driver, front passenger, and knee airbags while driving a CY 2006 Corolla Verso vehicle. As a result of the vehicle inspection, the airbags were found to be activated as per the customer's allegation. However, no evidence of impact damage on the

vehicle's exterior or undercarriage sufficient to trigger the activation of the airbags was found. The SRS ECU was recovered and investigated. Damage was confirmed on the ASIC for transmitting the signal to deploy the airbags. Visually, the damage appeared to be similar to damage from electrical noise that could have occurred on a generation 5.0 SRS ECU, recalled in 2013. While Toyota confirmed that the generation of the SRS ECU installed in the reported vehicle was generation 5.5, it was unclear whether the similarity in the damage in this case, to cases involving prior generation 5.0 ECUs, extended beyond the visual appearance. Based on the different circuit architecture design in the generation 5.5 ECU, Toyota believed that the new ECU would be less susceptible to electrical noise generated by other electrical components than the previous ECU and considered this incident to be an isolated case.

July 2015 - March 2016

In July 2015, Toyota received information from a dealer in the Japan market indicating the inadvertent activation of the driver, front passenger, and knee airbags while driving a CY 2006 Avensis vehicle. The inspection of the vehicle confirmed the airbags deployed as alleged by the customer. However, there was no evidence of impact damage on the vehicle's exterior or undercarriage sufficient to trigger the deployment of the airbags. The electrical noises generated by operation of this vehicle's electrical components were measured and no abnormally high level of noise was observed. The investigation of the recovered SRS ECU revealed that the ASIC for transmitting the signal to deploy the airbags was damaged. While high electrical noise had not been found in the vehicle, the damage on the ASIC was similar to the damage previously observed in other ECUs that was caused by electrical noise. Thus, Toyota began replication testing and recovery of working SRS ECUs of this generation from in-use vehicles.

Using a sample vehicle, electrical noise (created by operation of various electrical components in that vehicle) was applied repeatedly to that vehicle's SRS ECU in attempt to replicate the ASIC damage. In this testing, ASIC damage was unable to be replicated as the generated electrical noise was too low. The noise levels applied in this testing (based on our evaluation of potential noise levels) were similar to the noise observed in the failed vehicle. As a result of electrical noise application durability testing, it was found that the generation 5.5 SRS ECUs have higher insulation against electrical noise compared to the recalled generation 5.0 ECUs.

April 2016 - January 2017

Toyota further investigated electrical noise which is created by the operation of the electrical components installed in vehicles to determine whether it could lead to damage to the ASIC in the generation 5.5 SRS ECUs. Electrical noise was measured in failed vehicles and in-use vehicles. A level of electrical noise that could lead to electrical shorting in the ASIC for generation 5.5 ECUs was not identified in these vehicles.

The SRS ECUs requested to be recovered from in-use vehicles were returned at this time to Toyota to undergo further investigation. It was confirmed that the recovered SRS ECUs have sufficient insulation against observed electrical noise that could be created by operation of the

vehicle electrical components. At this time, Toyota had not identified any defect in these vehicles that could lead to the damage to the ASIC in the generation 5.5 ECUs in the field.

Toyota sporadically received field reports from countries outside of North America, mainly from European countries and Japan, indicating a similar condition as to the two previous cases from the European and Japan markets. As the majority of the vehicles which had experienced this condition were Avensis vehicles, Toyota continued its investigation into the possible cause of the ASIC damage, focusing on Avensis vehicles.

February 2017 - November 2017

Based on the available information that most vehicles with this condition were Avensis vehicles, Toyota reviewed the difference in the specifications between the Avensis and other models, such as rated current of each electrical component and distance of the airbag squib wire harness running parallel to the other electrical component wire harnesses. Toyota found no relevant differences between models.

In order to further investigate the insulation of the SRS ECU against electrical noise, Toyota once again started the recovery of working SRS ECUs from a larger population of in-use vehicles. In addition, in consideration of variation of electrical noise generated by the electrical components, Toyota began measurement of electrical noise again to identify whether the maximum electrical noise could be higher in an actual vehicle in the field. Toyota recovered electrical components from in-use vehicles and service part stock (horns, wipers, washers, and door locks), which generated higher noise during the past noise investigation, or which have higher rated currents, and installed each component in a sample vehicle to measure possible electrical noise levels.

During this period, in August 2017, Toyota also received the first field report from the U.S. market indicating the inadvertent activation of the driver and front passenger airbags in a 2006 MY Toyota Scion xA vehicle, equipped with a generation 5.5 SRS ECU. The incident occurred while the driver was backing out of a parking lot. The SRS ECU installed in the reported vehicle was requested to be recovered.

December 2017 - October 2018

Toyota investigated the SRS ECU recovered from the vehicle reported from the U.S. market and confirmed the damage of the ASIC for transmitting the signal to deploy the airbags was similar to other cases from the European and Japan markets.

Based on evaluations of the newly recovered in-use SRS ECUs from the larger population of vehicles, Toyota observed that the insulation against electrical noise found in the ASICs in the generation 5.5 SRS ECUs had an unexpectedly wide variation of insulation against electrical noise.

In addition, the further investigation of electrical noise, based on the recovered electrical components from in-use vehicles and service part stock, found that the maximum electrical noise that could be created during field use was higher than observed in the past investigation.

While there was no recovered SRS ECU which had less insulation against electrical noise than the maximum noise we identified in the investigation, Toyota analyzed the normal distribution of insulation against electrical noise based on the values measured from the recovered parts. Based on this information about the wider than expected variation in electrical noise insulation, it was determined that the variation of the electrical noise insulation of the generation 5.5 SRS ECUs in the field is wide enough that it is possible that the level of insulation in a small portion of these ECUs is lower than necessary to insulate against the electrical noise created by operation of the electrical components (that we have observed in this investigation). If the ASIC for transmitting the signal to deploy the airbags becomes damaged as a result of this condition, there is a possibility that the airbag warning light could illuminate and the airbag(s) and/or seat belt pretensioner(s) could become inoperative, or these systems could inadvertently deploy.

October 26, 2018

Based on the results of the above investigations, Toyota decided to conduct a voluntary safety recall campaign.

As of October 24, 2018, based on a diligent review of records, Toyota's best engineering judgment is that there are four Toyota Field Technical Reports (including 2 unconfirmed Field Technical Reports) (one incident on one unique VIN has 2 confirmed Field Technical Reports) and four warranty claims (including 3 unverified claims) that have been received from U.S. sources that relate to the inadvertent airbag deployment investigated in this chronology and which were considered in the decision to submit this report.

7. Description of Corrective Repair Action:

All known owners of the subject vehicles will be notified by first class mail to return their vehicles to a Toyota dealer. The dealers will replace the airbag control module with an improved one.

Reimbursement Plan for pre-notification remedies

The owner letter will instruct vehicle owners who have paid to have this condition remedied prior to this campaign to seek reimbursement pursuant to Toyota's General Reimbursement Plan.

8. Recall Schedule:

Notifications to owners will be sent by late December, 2018. A copy of the draft owner notification will be submitted as soon as it is available.

9. Distributor/Dealer Notification Schedule:

Notifications to distributors/dealers will be sent on November 1, 2018. Copies of dealer communications will be submitted as they are issued.

10. Manufacturer's Campaign Number:

J0W