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# Special Crash Investigations: CISS/SCI Combination Child Restraint System Crash Investigation; Vehicle: 1999 Toyota Camry; Location: Alabama; Crash Date: December 2019

## DISCLAIMER



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15. Supplementary Notes

Each crash represents a unique sequence of events, and generalized conclusions cannot be made concerning the crashworthiness performance of the involved vehicles or their safety systems. This report and associated case data are based on information available to the Special Crash Investigation team on the date this report was published.

16. Abstract

This report documents the investigation of a forward-facing child restraint system (CRS) that secured a 16-month-old male in a 1999 Toyota Camry involved in a right-angle crash with a 2012 Chevrolet Silverado. The front of the Chevrolet struck the right side of the Toyota and both vehicles were redirected off the roadway. The Toyota was driven by an unbelted 25-year-old male with a belted 4-year-old male front right passenger, and the 16-month-old male infant harnessed in the forward-facing CRS in the second-row left seat. The driver and front passenger were pronounced deceased at the scene. The second row left passenger did not sustain police-reported injuries but was transported by ambulance to a hospital where he was treated and released. The Chevrolet's driver was not injured.

| 17. Key Words | 18. Distribution Statement |
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**CISS/SCI Combination Child Restraint System Crash Investigation**
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**Location: Alabama**
**Crash Date: December 2019**

## Background

This report documents the investigation of a forward-facing child restraint system (CRS) that secured a 16-month-old male infant in a 1999 Toyota Camry (Figure 1) involved in a right-angle crash with a 2012 Chevrolet Silverado. The infant sustained minor soft tissue injuries in the crash; however, the driver and front right passenger sustained fatal injuries. The crash occurred in December 2019 and was investigated by a State police agency. The crash was subsequently selected for investigation by the Crash Investigation Sampling System (CISS) of the National Highway Traffic Safety Administration. The CISS team completed the scene and vehicle inspection in December 2019. The investigation was then assigned as a combination case to the Special Crash Investigations (SCI) team of Crash Research & Analysis, Inc., in February 2020. The SCI team inspected the CRS in March 2020.

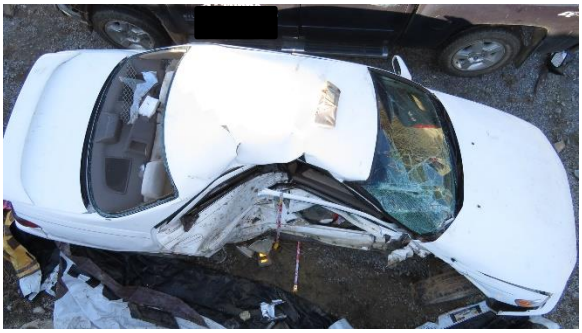


*Figure 1. The 1999 Toyota Camry*

The crash occurred at the intersection of a three-lane, divided U.S. highway and a two-lane, undivided county roadway. The crash developed as the Toyota was traveling northwest through the intersection and the Chevrolet was traveling southwest, approaching the same intersection. The front of the Chevrolet struck the right side of the Toyota and both vehicles were redirected to the west, off the roadway. The Toyota was driven by an unbelted 25-year-old male, with a belted 4-year-old male front right passenger and the 16-month-old male infant harnessed in the forward-facing CRS in the second-row left seat. The driver and 4-year-old child were pronounced deceased at the scene. The second-row left infant in the CRS did not sustain police-reported injuries but was transported by ambulance to a hospital where he was treated and released. The Chevrolet driver was not injured.

The CISS team conducted exterior and interior inspections of both vehicles to document damage, assess the manual and supplemental restraint systems, and identify points of occupant contact. The CISS team also measured and documented the crash site and physical environment of the roadways by the Nikon Nivo total station and digital images. Due to its age, the Toyota was not

equipped with an event data recorder (EDR). The Chevrolet's EDR was supported by the Bosch Crash Data Retrieval tool and imaged during the vehicle inspection. The SCI investigation consisted of an inspection of the CRS to document its construction, performance, and any stress marks or damage. The data gathered and coded by the CISS team were reviewed and incorporated into this technical report.

## Crash Summary

### Crash Site

The crash occurred in the afternoon in the right lane of a U.S. highway at a four-leg intersection with a county roadway. At the time of the crash, the weather conditions were misty rain, temperature of 13 °C (56 °F), 93 percent humidity, with north winds according to local weather reports. The Toyota's roadway traversed in a northwest/southeast direction with one lane in each direction. The two travel lanes measured 3.8 m (12.5 ft) wide and were separated by a double-yellow line. The Chevrolet's roadway traversed in a northeast/southwest direction with two through-lanes and one left turn lane separated from the northeast-bound lanes by a 12.7 m (41.7 ft) wide grass median. The lanes measured 3.5 m (11.5 ft) wide with a broken white line separating the through-lanes and a solid white line to separate the left-turn lane. The shoulder widths were 3.0 m (9.8 ft) on the northwest and 1.8 m (5.9 ft) on the southeast and were bordered by a solid yellow median line and a solid white edge line. Both roadways were level and wet. A stop sign for traffic on the two-lane county roadway controlled the intersection. The speed limits for the Toyota and Chevrolet were 89 km/h (55 mph).

### Pre-Crash

The Toyota was traveling northwest and was passing through the intersection (Figure 2). The Chevrolet was traveling southwest in the left lane of the roadway (Figure 3) at an EDR-reported speed of 106 km/h (66 mph) 2.5-seconds prior to algorithm enable (AE). The Chevrolet driver saw the Toyota crossing its path, braked, and steered to the right. The brake application was recorded 2.0-seconds prior to AE. The speed of the Chevrolet reduced to 77 km/h (48 mph). Based on the vehicle's damage pattern and location of the impact, the driver of the Toyota steered to the left in an attempted avoidance maneuver. A crash diagram is included at the end of this report.

*Figure 2. Northwest view, the Toyota's travel path to impact*

*Figure 3. Southwest view, the Chevrolet's pre-crash travel path and impact area*

## Crash

The crash occurred in the right lane of the southwest-bound roadway when the front of the Chevrolet struck the right side of the Toyota. The resultant directions of force were within the 2 o'clock sector for the Toyota and 11 o'clock for the Chevrolet. Neither of the Toyota's frontal air bags deployed and only the Chevrolet driver's frontal air bag deployed. The Toyota was redirected west off the roadway, traveled approximately 45 m (148 ft), and came to final rest facing west on the north roadside. The Chevrolet was also redirected west off the roadway, traveled approximately 114 m (374 ft), and came to final rest facing southwest on the north roadside.

## Post-Crash

Police and rescue personnel responded to the crash and arrived 11 minutes after notification. The Toyota driver and front right passenger (the 4-year-old child) sustained fatal injuries and were pronounced deceased at the crash site. The second-row left passenger (the 16-month-old infant) did not sustain any police-reported injury but was transported by ambulance to a hospital for medical treatment. The Chevrolet driver was not injured and was not transported for medical treatment.

## 1999 Toyota Camry

### Description

The Toyota was a 4-door, front-wheel-drive sedan, Vehicle Identification Number (VIN) 4T1BG22K9XUxxxxx, manufactured in March 1999 and powered by a 2.2 liter, I-4, gasoline engine with a 4-speed automatic transmission. The curb weight was 2,992 kg (1,360 lb). The vehicle placard listed the gross vehicle weight rating (GVWR) at 1,896 kg (4,180 lb) with gross axle weight ratings of 1,089 kg (2,400 lb) for both front and rear wheels. The manufacturer recommended tire size was P195/70R14 and the Toyota was equipped with Cooper Trendsetter tires, all of the recommended size. All tires had a minimum tread depth of 5 mm (6/32 in).

The interior of the Toyota was configured for five occupants with front row bucket seats with adjustable head restraints and a second row bench seat with adjustable head restraints at the outboard seat positions. Manual safety systems included 3-point lap and shoulder seat belts at all five seating positions. Supplemental restraints included driver's and passenger's frontal air bags. Neither of the air bags deployed during the crash. The Toyota was not equipped with side impact air bags or inflatable curtain air bags due to the date of its manufacture.

### Exterior Damage

The Toyota sustained direct damage to the right plane during the impact with the Chevrolet. The right fender, doors, sill, mirror, and the A- and B-pillars were all directly damaged (Figure 4). The direct damage began 16 cm (6.3 in) forward of the right front axle and extended rearward 214 cm (84.3 in). The Field L was 266 cm (104.7 in). Crush measurements were documented at the mid-door level and the residual maximum crush was 74 cm (29.1 in), occurring 122 cm (48.0 in) forward of the right rear axle. The residual crush profile was as follows: C1 = 3 cm (1.2 in), C2 = 45 cm (17.7 in), C3 = 74 cm (29.1 in), C4 = 67 cm (26.4 in), C5 = 38 cm (15.0 in), C6 = 4 cm (1.6 in). The collision deformation classification (CDC) assigned to the damage pattern was 03RYAW4 (80 degrees). The damage algorithm of the WinSMASH program calculated the Chevrolet's total delta V as 57 km/h (35 mph). The longitudinal and lateral velocity changes were -10 km/h (-6 mph) and -56 km/h (-35 mph). The results appeared reasonable.

*Figure 4. The Toyota's right plane damage*

## Interior Damage

The occupant compartment of the Toyota sustained significant intrusion damage from the impact with the Chevrolet. Several component intrusions were noted, the most severe of which were to the right doors and B-pillar, that intruded laterally 47 cm (18.5 in). Both right doors were jammed shut; the left doors remained closed and were operational post-crash. The right sun visor was broken off its attachment by the driver's head, as the force of the impact directed him to the right and his head also contacted the roof side rail **(**Figure 5). Hair was also noted on the right roof side rail just above the B-pillar. The right front door panel and arm rest (Figure 6) were fractured due to contact with the right thigh and flank of the front right passenger.

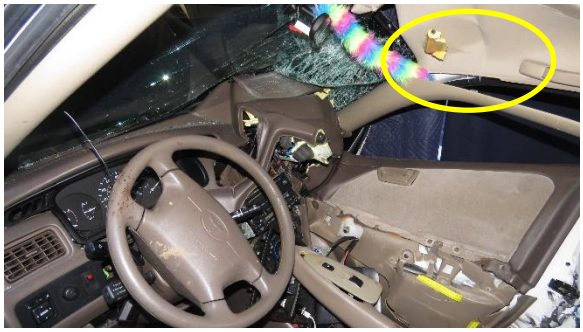


*Figure 5. Right sun visor and roof side rail contact by the driver*

*Figure 6. Contact to right door panel and armrest*

## Manual Restraint Systems

The manual restraint systems consisted of 3-point lap and shoulder seat belts, retractor-mounted pretensioners, sliding latch plates, and adjustable upper anchors on the front seats. The driver's seat belt was equipped with an emergency locking retractor (ELR). All other seat belts were equipped with emergency/automatic locking retractors (ELR/ALR).

The driver's seat belt was stowed on its retractor at initial observation and was devoid of contact or evidence of loading. The lack of physical evidence indicated the driver was not restrained by the seat belt at the time of the crash. The pretensioner did not actuate. The front right passenger's seat belt was found locked with a length of webbing extended from the retractor. The webbing was also cut. The latch plate was still buckled into the receiver, indicating usage by the passenger. It is unknown if the retractor was locked due to pretensioner actuation or due to B-pillar damage associated with the impact.

The second-row left seat belt was used to secure the CRS. The vehicle was not equipped with Lower Anchors and Tethers for Children (LATCH) features, and according to the CISS investigator, the passenger's seat belt webbing was cut, thus indicating usage with the CRS. Refer to the Child Restraint System section below for more information.

### Supplemental Restraint Systems

The Toyota was equipped with driver and passenger frontal air bags. Neither air bag deployed during the lateral crash. The Toyota was not equipped with side impact air bags or inflatable curtain air bags.

## Child Restraint System

The second-row left infant was secured by the internal harness in a Graco Safety First "Sequel 65" convertible CRS (Figure 7) manufactured on October 19, 2018, and identified by Model No. 1969649. The CRS was constructed of a five-piece molded plastic shell with a padded cover, dual armrests with integrated cup holders, and a 7-position adjustable head restraint with a 2 cm (0.8 in) expanded polystyrene crushable foam-padded liner. A curved metal rod on each side connected the seat and seatback for extra support. The head restraint slid up and down and would set the appropriate height position for the shoulder straps, at or just above the child's shoulders. The seatback could be set to six different positions of recline. Three of the positions were for rear-facing and three were for forward-facing. The CRS was adjusted to one position from the maximum recline for forward-facing (Figure 8). The CRS could be used for children who weighed 1.8 to 30 kg (4 to 65 lb) and were less than 125 cm (49 in) tall. As forward-facing, the recommended weight range was between 10-30 kg (22-65 lb). As a rear-facing seat, the recommended weight range was 1.8 to 18 kg (4 to 44 lb). Based on information from the CISS investigator, the child was seated in the forward-facing position and the height and weight of the child fell within the parameters for forward-facing use.


*Figure 7. Graco Children's Products, Sequel 65 CRS featuring an adjustable head restraint*

*Figure 8. Right side of the CRS, with recline adjuster (note: top of cloth cover removed and pulled forward)*

The seat belt webbing at the second row left seating position was cut during the rescue effort, indicating high probability that it was used to secure the CRS. The CRS was removed from the

vehicle with the child still secured in it. The CRS was obtained from the next of kin by the CISS investigator at the time of the interview and kept at the local CISS facility.

Examination of the CRS revealed separation of the shell from the seat housing at the lower front of the unit, with stress marks, and a 4 cm (1.6 in) diagonal tear at the front right (Figure 9). Abrasions were noted on the right front corner and cup holders, as well as a 7 cm (2.8 in) horizontal cut into the cover fabric, though these may not be crash related. The right side of the seat housing separated from the shell (Figure 10) but was otherwise unremarkable. The back of the CRS showed two small stress marks at the top, but was undamaged. There were light belt webbing abrasions on the left belt guide, but no damage. There was no damage to the base and all harness webbing, buckles, clips, and hardware were undamaged and in good working condition.


*Figure 9. Separation, cracks, and stress to the front of the CRS*

*Figure 10. Right side separation of the seat and housing*

## 1999 Toyota Camry Occupant Data

### Driver Demographics

| | |
|---|---|
| Age/sex: | 25 years/male |
| Height: | 175 cm (69 in) |
| Weight: | 86 kg (189 lb) |
| Eyewear: | None |
| Seat type: | Bucket seat with adjustable head restraint |
| Seat track position: | Rear most |
| Manual restraint usage: | None |
| Usage source: | Vehicle inspection |
| Air bags: | Driver's frontal, not deployed |
| Alcohol/drug involvement: | None |
| Egress from vehicle: | Fatal prior to removal |
| Transport from scene: | None |
| Type of medical treatment: | None |

### Driver Injuries

| Injury No. | Injury | Injury Severity AIS 2015 | Involved Physical Component (IPC) | IPC Confidence Level |
|---|---|---|---|---|
| 1 | Died of injury without further substantiation of injuries or no autopsy confirmation of specific injuries. | 099999.9 | Unknown | Unknown |

*Source: Coroner's report*

### Driver Kinematics

At the time of the crash, the driver was not restrained by the lap and shoulder seat belt and the driver's seat track was adjusted to the full-rear position. He responded to the lateral force of the crash with a right trajectory and probably contacted the left side of the center console with his right hip and thigh. His head contacted the right sun visor and then the roof side rail, forward of the grab handle (refer to Figure 5). Hair was noted in the roof side rail above the right B-pillar as he was redirected rearward. As the Toyota was redirected off the roadway and traveled to final rest, the driver probably slumped into the front right seating area, denoted by a large area of blood. The driver sustained fatal injuries and was pronounced deceased at the scene. No autopsy was performed.

## Front-Row Right Occupant Demographics

| | |
|---|---|
| Age/sex: | 4 years/male |
| Height: | 97 cm (38 in) |
| Weight: | 16 kg (35 lb) |
| Eyewear: | None |
| Seat type: | Bucket seat with adjustable head restraint |
| Seat track position: | Rear-most |
| Manual restraint usage: | 3-point lap and shoulder seat belt |
| Usage source: | SCI inspection |
| Air bags: | Passenger's frontal, not deployed |
| Alcohol/drug involvement: | None |
| Egress from vehicle: | Fatal prior to removal |
| Transport from scene: | None |
| Medical treatment: | None |

## Front-Row Right Occupant Injuries

| Injury No. | Injury | Injury Severity AIS 2015 | Involved Physical Component (IPC) | IPC Confidence Level |
|---|---|---|---|---|
| 1 | Died of injury without further substantiation of injuries or no autopsy confirmation of specific injuries. | 099999.9 | Unknown | Unknown |

*Source: Coroner's report*

## Front-Row Right Occupant Kinematics

At the time of the crash, the front right 4-year-old passenger was restrained by the lap and shoulder seat belt and his seat track was adjusted to the rear-most position. The child responded to the lateral direction of force with a right trajectory and loaded the intruding door panel with his right flank, hip, and thigh. He was probably pinned between the intruded right front door and the center console as the vehicle was redirected off the roadway and came to final rest. He sustained fatal injuries and was pronounced deceased at the scene. No autopsy was performed.

## Second-Row Left Occupant Demographics

| | |
|---|---|
| Age/sex: | 16 months/male |
| Height: | 77 cm (30 in) |
| Weight: | 12 kg (26.4 lb) |
| Eyewear: | None |
| Seat type: | Bench with folding backs |
| Seat track position: | Non-adjustable |
| Manual restraint usage: | Lap and shoulder seat belt used to secure the CRS |
| Usage source: | Vehicle inspection, belt was cut |
| Air bags: | None |

Alcohol/drug involvement: None
Egress from vehicle: Removed by rescue personnel
Transport from scene: Transported to hospital
Type of medical treatment: None

## Second-Row Left Occupant Injury

| Injury No. | Injury | Injury Severity AIS 2015 | Involved Physical Components (IPC) | IPC Confidence Level |
|---|---|---|---|---|
| 1,2 | Mild contusion bilateral cheeks, under the eyes | 210402.1 | Isolated<br>Interior - Other seating position seatback | Probable |
| 3 | Right chest contusion | 410402.1 | Isolated<br>Interior - Child safety seat harness system (straps) | Probable |
| 4 | Right shoulder contusion | 710402.1 | Isolated<br>Interior - Child safety seat harness system (straps) | Probable |
| 5,6 | Skin abrasions, bilateral feet | 810202.1 | Isolated<br>Noncontact injury - Flying glass | Probable |
| 7,8 | Skin abrasions, bilateral lower legs | 810202.1 | Isolated<br>Noncontact injury - Flying glass | Probable |

*Source: Emergency room records*

## Second-Row Left Occupant Kinematics

At the time of the crash, the infant was seated in the Graco Sequel 65 convertible CRS, installed forward-facing in the second-row left position of the Toyota and secured by the lap and shoulder seat belt.

The child responded to lateral crash forces with a right trajectory. He loaded the right side of the CRS with his flank and the harness straps with his shoulders. The child sustained minor contusions to the right shoulder and right chest from the CRS harness. The combined mass of the child and CRS initiated a lateral trajectory in response to the crash force. It was possible that the CRS rotated laterally rightward and contacted the right front seatback evidenced by the stress marks located at the lower right aspect of the shell. The child probably contacted the seatback with his face, resulting in mild facial contusions to his cheeks. Minor abrasions were found on both feet and legs, all caused by flying glass. The medical record indicated the CRS was covered in glass. The child remained restrained in the CRS as the vehicle traveled off the roadway and came to a complete stop. The CISS investigator reported that after the crash, the CRS and child

were removed from the vehicle by first responders. He was transported by ambulance to a hospital where he was treated and released.

## 2012 Chevrolet Silverado

### Description

The Chevrolet was a 4-wheel-drive, 5-occupant, pickup truck with the VIN 3GCPKSE79CG xxxxxx manufactured in December 2011 and was equipped with a 5.3 liter, V-8 engine. It was configured on a 365 cm (143.5 in) wheelbase and the curb weight was 2,397 kg (5,273 lb). The vehicle placard listed the GVWR was 3,175 kg (6,985 lb) with front and rear gross axle ratings of 1,792 kg (3,942 lb). The Chevrolet had 4-wheel antilock brakes, electronic brakeforce distribution, emergency brake assist, traction control, and stability control. The vehicle also had dual-stage frontal air bags, front-seat-mounted side impact air bags, and IC air bags. The manufacturer's recommended tire size was P265/65R18 and the vehicle was equipped with Bridgestone Dueler A/T tires of the recommended size. All tires had a minimum of 9 mm (11/32") of remaining tread.

### Exterior Damage

The Chevrolet sustained direct damage to the entire width of the front plane during the impact with the Toyota. The bumper, grille, right and left head and turn lamp assemblies, hood, and left fender were directly damaged (Figure 11). The Field L was 181 cm (71.3 in). Crush measurements were documented at the bumper level and the maximum residual crush was 12 cm (4.7 in), occurring 60 cm (23.6 in) left of the center point. The crush values were: C1 = 5 cm (2.0 in), C2 = 8 cm (3.1 in), C3 = 9 cm (3.5 in), C4 = 12 cm (4.7 in), C5 = 12 cm (4.7 in), C6 = 2 cm (0.8 in). The CDC assigned to the damage pattern was 11FDEW1 (340 degrees). The damage algorithm of the WinSMASH program calculated the total delta V as 33 km/h (21 mph). The longitudinal and lateral velocity changes were -31 km/h (-19 mph) and 11 km/h (7 mph). The results appeared reasonable.

*Figure 11. Front plane damage to the Chevrolet*

### Event Data Recorder

The Chevrolet was equipped with a sensing and diagnostic module (SDM) that performed the diagnostic, sensing, and deployment command functions for the vehicle's supplemental restraint systems and had EDR capabilities. The data were imaged with version 19.1.1 of the Bosch Crash Data Retrieval software and reported with version 21.1.1. Electrical power was supplied by an external battery and the data were imaged via direct connection to the vehicle's diagnostic link connector (DLC). The EDR report is attached at the end of this report as Appendix A.

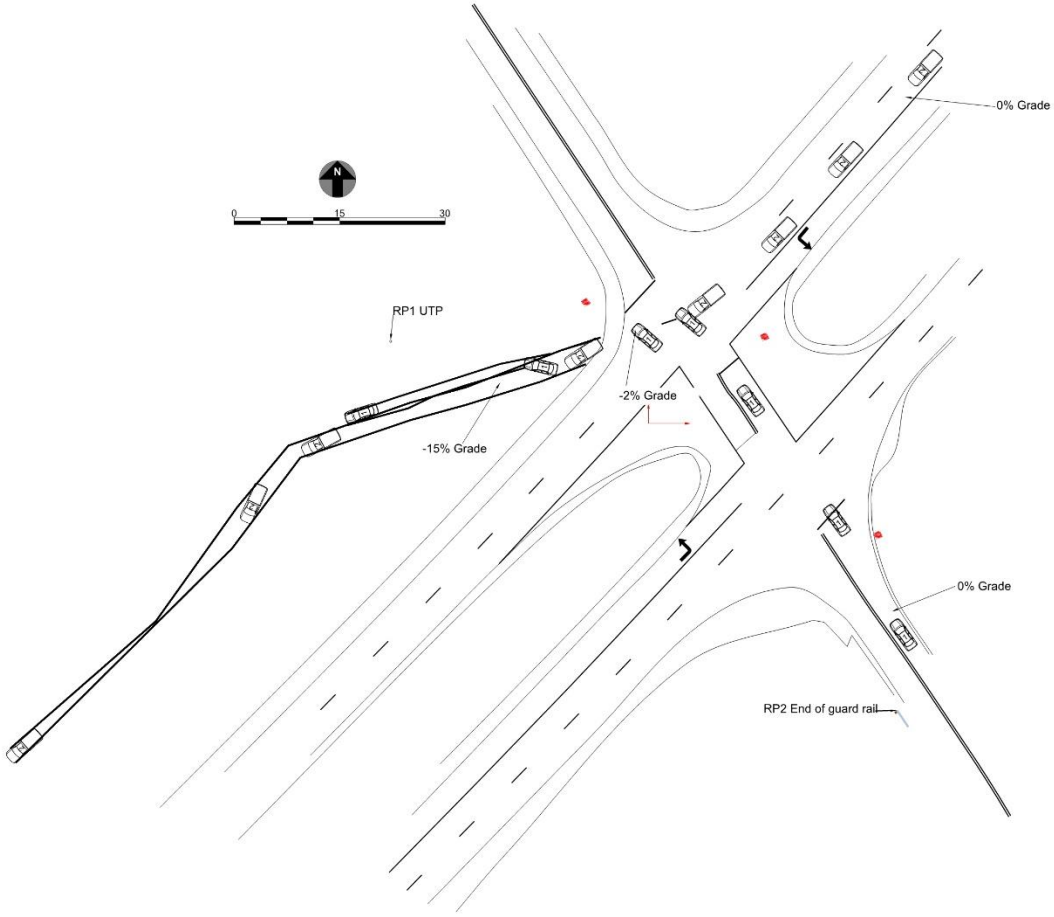
The data limitations reported that the SDM could store up to three events. The oldest non-deployment event can be overwritten by a deployment event if all three records are full and the non-deployment event is not locked. A non-deployment event could be overwritten by a more recent non-deployment event if all three records are full and the non-deployment event is older than approximately 250 ignition cycles. Deployment events could not be overwritten or cleared by the SDM. The imaged data recovered one deployment event.

The EDR reported one locked event and the recording was complete. One fault code was present at the time of the event, B0052-00. This code indicated that the vehicle had been in a crash and that data were stored on the SDM. The SIR warning lamp status was "off," and the seat belt status for the driver was "buckled." The maximum longitudinal and lateral velocity changes were -28 km/h (-17 mph) and 9 km/h (6 mph) and occurred 85 msec and 45 msec after AE. The driver's frontal air bag deployed and the time from the front/side/right (FSR) event enable to driver first stage deployment command criteria met was 12 msec. Second stage deployment command criteria were met at 132 msec. The time from FSR/rollover event enable to driver pretensioner loop #1 or loop #2 deployment command criteria met was 6 msec.

## Occupant Data

The 58-year-old male driver was restrained by his lap and shoulder seat belt. He did not sustain any police-reported injury and was not transported for treatment.

## Crash Diagram




| | |
|---|---|
| | NHTSA www.nhtsa.gov |
| Case Number: | 1-19-2019-084-01 |

# Appendix A: 2012 Chevrolet Silverado Event Data Recorder Report[1]

[1] The EDR report contained in this technical report was imaged using the current version of the Bosch CDR software at the time of the vehicle inspection. The CDR report contained in the associated Crash Viewer application may differ relative to this report.

BOSCH

CDR CRASH DATA RETRIEVAL

IMPORTANT NOTICE: Robert Bosch LLC and the manufacturers whose vehicles are accessible using the CDR System urge end users to use the latest production release of the Crash Data Retrieval system software when viewing, printing or exporting any retrieved data from within the CDR program. Using the latest version of the CDR software is the best way to ensure that retrieved data has been translated using the most current information provided by the manufacturers of the vehicles supported by this product.

## CDR File Information

| | |
|---|---|
| User Entered VIN | 3GCPKSE79CG****** |
| User | |
| Case Number | |
| EDR Data Imaging Date | |
| Crash Date | |
| Filename | 20191019084_V2_ACM (1).CDRX |
| Saved on | |
| Imaged with CDR version | Crash Data Retrieval Tool 19.1.1 |
| Imaged with Software Licensed to (Company Name) | Company Name information was removed when this file was saved without VIN sequence number |
| Reported with CDR version | Crash Data Retrieval Tool 21.1.1 |
| Reported with Software Licensed to (Company Name) | NHTSA |
| EDR Device Type | Airbag Control Module |
| Event(s) recovered | Deployment |

## Comments

No comments entered.

## Data Limitations

**Recorded Crash Events:**

There are two types of recorded crash events for Front, Side, and Rear (FSR) Events. The first is the Non-Deployment Event. A Non-Deployment Event records data but does not deploy the air bag(s). The minimum SDM Recorded Vehicle Velocity Change, that is needed to record a Non-Deployment Event, is five MPH [8 km/h]. A Non-Deployment Event contains Pre-Crash and Crash data. The oldest Non-Deployment event can be overwritten by a Deployment Event, if all three records are full and the Non-Deployment Event is not locked. A Non-Deployment Event can be overwritten by a more recent Non-Deployment Event if all three records are full and the Non-Deployment is older than approximately 250 ignition cycles. Also, a Non-Deployment event can be recorded if one of the following occurs without the Deployment of any of the frontal air bags, side air bags, or roll bars:

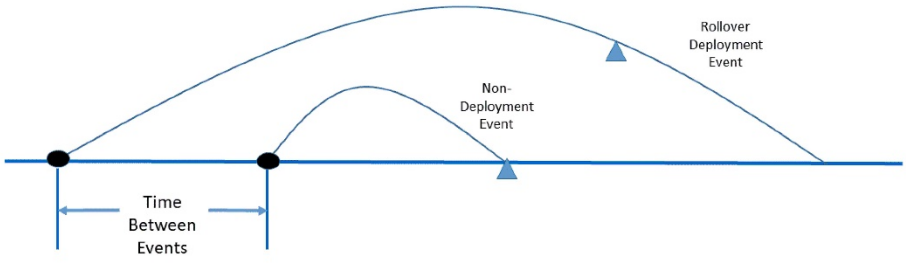
-Pretensioner(s) only Deployment
-Head Rest Deployment
-Battery Cut-Off Deployment

The second type of SDM recorded crash event for FSR Events is the Deployment Event. It also contains Pre-Crash and Crash data. Deployment Events cannot be overwritten or cleared by the SDM.
Rollover Events contains Pre-Crash and Crash data. Rollover event follow the same rules as FSR Deployment events. The SDM can store up to three Events.

**Data:**

For FSR Events, SDM Recorded Vehicle Velocity Change reflects the change in velocity that the sensing system experienced during the recorded portion of the event. SDM Recorded Vehicle Velocity Change is the change in velocity during the recording time and is not the speed the vehicle was traveling before the event and is also not the Barrier Equivalent Velocity. For Deployment Events, the SDM will record 220 milliseconds of data after the Deployment criteria is met and up to 70 milliseconds before the Deployment criteria is met. For Non-Deployment Events, the SDM will record the first 300 milliseconds of data after algorithm enable.
For Rollover Events, the SDM may record Lateral Acceleration and Roll Rate data, if the SDM is rollover capable. This data reflects what the sensing system experienced during the recorded portion of the event. For Deployment Events, the SDM will record up to 490 milliseconds of data before the Deployment criteria is met and 250 milliseconds after the Deployment criteria is met.
-Time between events is recorded in 10 msec intervals and is displayed in seconds for a maximum time of 655.33 seconds. The counter measures the time from the start of one event to the start of the next event if both events occur within the same ignition cycle.
-The CDR tool displays time from Algorithm Enable (AE) to time of Deployment command in a Deployment event and AE to time of maximum SDM recorded vehicle velocity change in a Non-Deployment event. Time from AE begins when the first air bag system enable threshold is met and ends when Deployment command criteria is met or at maximum SDM recorded vehicle velocity change. Any air bag systems may be a source of an enable.

-Time From Algorithm Enable to Maximum SDM Recorded Vehicle Velocity Change is captured when the largest, absolute value of either the Longitudinal or Lateral Recorded Vehicle Velocity Change occurs. The Maximum may occur between the recorded 10 millisecond sample points.
-Event Recording Complete will indicate if data from the recorded event has been fully written to the SDM memory or if it has been interrupted and not fully written.
-SDM Recorded Vehicle Speed accuracy can be affected by various factors, including but not limited to the following:
    -Significant changes in the tire's rolling radius
    -Final drive axle ratio changes
    -Wheel lockup and wheel slip
-Brake Switch Circuit Status indicates the open/closed state of the brake switch circuit.
-Pre-Crash data is recorded asynchronously. The 0.5 second Pre-crash data value (most recent recorded data point) is the data point last sampled before AE. That is to say, the last data point may have been captured just before AE but no more than 0.5 second before AE. All subsequent Pre-crash data values are referenced from this data point.
-Pre-Crash Electronic Data Validity Check Status indicates "Data Invalid" if:
    -The SDM receives a message with an "invalid" flag from the module sending the pre-crash data
-Pre-Crash Electronic Data Validity Check Status indicates "Data Not Available" if:
    -No data is received from the module sending the pre-crash data
-For diesel powered vehicles, the data displayed as Throttle Position (%) is actually the data for the Air Inlet Flap Position. This is not the same as the throttle position for a gasoline powered engines.
-Belt Switch Circuit Status indicates the status of the seat belt switch circuit.
-The ignition cycle counter will increment when the power mode cycles from OFF/Accessory to RUN. Applying and removing of battery power to the module will not increment the ignition cycle counter.
-Ignition Cycles Since DTCs Were Last Cleared can record a maximum value of 253 cycles and can only be reset by a scan tool.
-Dynamic Deployment Event Counter tracks the number of Deployment events that have occurred during the SDM's lifetime.
-Dynamic Event Counter tracks the number of qualified events (either Deployments, Non-deploy, or Rollover events) that have occurred during the SDM's lifetime.
-For Deployment Events, DTC B0052 (Deployment commanded) shall be recorded with the remainder of the data for this event even though it occurred after Event Enable.
-Once a firing loop has been commanded to be deployed, it will not be commanded to be deployed again during the same ignition cycle. Firing loop times for subsequent deployment type events, during the same ignition cycle, will record the deployment times as N/A.
-A Concurrent Event is when two events are happening nearly simultaneously. The "Concurrent Event Flag Set" parameter will indicate "Yes" if one event begins, but before that event is qualified, another event begins and is qualified.
A Non-Deployment event typically becomes qualified if that event exceeds the 5 MPH (8 km/h) delta V recording threshold and the event has concluded. A deployment event (FSR or Rollover) becomes qualified when a deployment has been commanded for that event.
Example of a Concurrent Event:
A Rollover event begins. Before the Rollover event is qualified, a Non-Deployment event begins and is qualified. Sometime after the Non-Deployment event is qualified, the Rollover event is qualified. The Non-Deployment event will be recorded in the first open record even though the Rollover event enabled before the Non-Deployment event. The Rollover event will be recorded in the next open record. The "Concurrent Event Flag Set" parameter will indicate "Yes" for the Rollover event. The "Time Between Events" parameter will indicate the time from the start of the Rollover event to the start of the Non-Deployment event.




| Event Recor #1 | Event Record #2 |
|---|---|
| Event Record Type = Non – Deployment | Event Record Type = Rollover |
| Concurrent Event Flag = No | Concurrent Event Flag = Yes |
| Time Between Events = NA | Time Between Events = XX seconds |

-The reported range of the longitudinal and lateral acceleration values is approximately ± 50 g.
-All data should be examined in conjunction with other available physical evidence from the vehicle and scene.

**Data Source:**
All SDM recorded data is measured, calculated, and stored internally, except for the following:
-Vehicle Status Data (Pre-Crash) is transmitted to the SDM, by Body Control Module, via the vehicle's communication network.
-The Belt Switch Circuit is wired directly to the SDM.

**Data Element Sign Convention:**
The following table provides an explanation of the sign notation for data elements that may be included in this CDR report. Directional references to sign notation are all from the perspective of the driver when seated in the vehicle facing the direction of forward vehicle travel.

| Data Element Name | Positive Sign Notation Indicates |
|---|---|
| Longitudinal Velocity Change | Forward |
| Lateral Acceleration | Left to Right |
| Lateral Velocity Change | Left to Right |
| Roll Rate | Clockwise Rotation |

**Hexadecimal Data:**
Data that the vehicle manufacturer has specified for data retrieval is shown in the hexadecimal data section of the CDR report. The hexadecimal data section of the CDR report may contain data that is not translated by the CDR program. The control module contains additional data that is not retrievable by the CDR tool.

01045_SDM11i-delphi_r018

## Event Data (General)

| | |
|---|---|
| Ignition Cycles At Investigation | 20873 |
| ESS # 1 Traceability Data | AU44704132600E14 |
| ESS # 2 Traceability Data | AT44704132600935 |
| ESS # 3 Traceability Data | AH274431258021FD |
| ESS # 4 Traceability Data | AJ27443125802202 |
| ESS # 5 Traceability Data | DA44704132600E10 |
| ESS # 6 Traceability Data | DB44704132600 96C |
| ESS # 7 Traceability Data | ??00000000000000 |
| ESS # 8 Traceability Data | ??00000000000000 |
| Dynamic Deployment Event Counter | 1 |
| Dynamic Event Counter | 1 |
| Dynamic OnStar Notification Event Counter | 1 |
| Vehicle Identification Number | ?GCPKSE79CG****** |
| System Type | Delphi |
| Manufacturing Traceability Data | AS0451KZ1326K1Q1 |
| Software Module Identifier 1 | 00CF38A1 |
| Software Module Identifier 2 | 018B1D64 |
| Software Module Identifier 3 | 01AE4BE4 |
| End Model Part Number | 00CF38A3 |

## Event Data (Event Record 1)

| | |
|---|---|
| Event Recording Complete | Yes |
| Event Record Type | Deployment |
| Crash Record Locked | Yes |
| OnStar Deployment Status Data Sent | Yes |
| OnStar SDM Recorded Vehicle Velocity Change Data Sent | Yes |
| Deployment Event Counter | 1 |
| Event Counter | 1 |
| OnStar Notification Event Counter | 1 |
| Algorithm Active: Rear | Yes |
| Algorithm Active: Rollover | Yes |
| Algorithm Active: Side | Yes |
| Algorithm Active: Frontal | Yes |
| Ignition Cycles At Event | 20864 |
| Time Between Events (sec) | Data Not Available |
| Concurrent Event Flag Set | No |
| Time From Rollover Event Enable to Rollover Criteria Met (msec) | Data Not Available |
| Event Severity Status: Rollover | No |
| Event Severity Status: Rear | No |
| Event Severity Status: Right Side | No |
| Event Severity Status: Left Side | No |
| Event Severity Status: Frontal Stage 2 | No |
| Event Severity Status: Frontal Stage 1 | Yes |
| Event Severity Status: Frontal Pretensioner | No |
| Driver 1st Stage Deployment Loop Commanded | Yes |
| Passenger 1st Stage Deployment Loop Commanded | No |
| Driver 2nd Stage Deployment Loop Commanded | Yes |
| Passenger 2nd Stage Deployment Loop Commanded | No |
| Driver Pretensioner Deployment Loop #1 Commanded | Yes |
| Passenger Pretensioner Deployment Loop #1 Commanded | Yes |
| Driver Pretensioner Deployment Loop #2 Commanded (If Equipped) | No |
| Passenger Pretensioner Deployment Loop #2 Commanded (If Equipped) | No |
| Driver Thorax Loop Commanded (If Equipped) | No |
| Passenger Thorax Loop Commanded (If Equipped) | No |
| Left Row 2 Thorax Loop Commanded (If Equipped) | No |
| Right Row 2 Thorax Loop Commanded (If Equipped) | No |
| Left Row 1 Roof Rail/Head Curtain Loop Commanded (If Equipped) | No |
| Right Row 1 Roof Rail/Head Curtain Loop Commanded (If Equipped) | No |
| Left Row 2 Roof Rail/Head Curtain Loop Commanded (If Equipped) | No |
| Right Row 2 Roof Rail/Head Curtain Loop Commanded (If Equipped) | No |
| Left Row 3 Roof Rail/Head Curtain Loop Commanded (If Equipped) | No |
| Right Row 3 Roof Rail/Head Curtain Loop Commanded (If Equipped) | No |
| Driver Knee Deployment Loop Commanded (If Equipped) | No |
| Passenger Knee Deployment Loop Commanded (If Equipped) | No |
| Left Row 2 Pretensioner Deployment Loop Commanded (If Equipped) | No |
| Right Row 2 Pretensioner Deployment Loop Commanded (If Equipped) | No |
| Center Row 2 Pretensioner Deployment Loop Commanded (If Equipped) | No |
| Battery Cutoff Loop Commanded (If Equipped) | No |
| Driver Roll Bar Loop Commanded (If Equipped) | No |
| Passenger Roll Bar Loop Commanded (If Equipped) | No |
| Steering Column Energy Absorbing Loop Commanded (If Equipped) | No |
| Driver Head Rest Loop Commanded (If Equipped) | No |
| Passenger Head Rest Loop Commanded (If Equipped) | No |
| Left Row 2 Head Rest Loop Commanded (If Equipped) | No |
| Right Row 2 Head Rest Loop Commanded (If Equipped) | No |
| Center Row 2 Head Rest Loop Commanded (If Equipped) | No |
| High Voltage Battery Cutoff Loop Commanded (If Equipped) | No |
| Driver Belt Switch Circuit Status (If Equipped) | Buckled |
| Passenger Belt Switch Circuit Status (If Equipped) | Not Buckled |
| Driver Seat Position Status (If Equipped) | Rearward |
| Passenger Seat Position Status (If Equipped) | Rearward |
| Passenger Seat Occupancy Status | Empty |
| Passenger Classification Status | Not Applicable |
| Passenger SIR Suppression Switch Circuit Status (If Equipped) | Data Not Available |
| Passenger Air Bag ON Indicator Status | Off |

| | |
|---|---|
| Passenger Air Bag OFF Indicator Status | On |
| Low Tire Pressure Warning Lamp | Data Not Available |
| SIR Warning Lamp Status | Off |
| SIR Warning Lamp ON/OFF Time Continuously (seconds) | 655330 |
| Number of Ignition Cycles SIR Warning Lamp was ON/OFF Continuously | 2171 |
| Ignition Cycles Since DTCs Were Last Cleared at Event Enable | 253 |
| Time From Algorithm Enable to Maximum SDM Recorded Vehicle Velocity Change (msec) | 110 |
| Longitudinal SDM Recorded Vehicle Velocity Change at time of Maximum SDM Recorded Vehicle Velocity Change MPH [km/h] | -17 [-28] |
| Lateral SDM Recorded Vehicle Velocity Change at time of Maximum SDM Recorded Vehicle Velocity Change MPH [km/h] | 6 [ 9] |
| Time From Frontal Algorithm Enable to Pretensioner Event Severity Met (msec) | 7 |
| Time From Frontal Algorithm Enable to 1st Stage Frontal Event Severity Met (msec) | 13 |
| Time From Frontal Algorithm Enable to 2nd Stage Frontal Event Severity Met (msec) | Data Not Available |
| Time From Left Side Algorithm Enable to Left Side Event Severity Met (msec) | Data Not Available |
| Time From Right Side Algorithm Enable to Right Side Event Severity Met (msec) | Data Not Available |
| Time From FSR Event Enable to Frontal Algorithm Enable (msec) | 0 |
| Time From FSR Event Enable to Left Side Algorithm Enable (msec) | 12 |
| Time From FSR Event Enable to Right Side Algorithm Enable (msec) | 23 |
| Time From FSR Event Enable to Driver 1st Stage Deployment Command Criteria Met (msec) | 12 |
| Time From FSR Event Enable to Driver 2nd Stage Deployment Command Criteria Met (msec) | 132 |
| Time From FSR Event Enable to Passenger 1st Stage Deployment Command Criteria Met (msec) | Data Not Available |
| Time From FSR Event Enable to Passenger 2nd Stage Deployment Command Criteria Met (msec) | Data Not Available |
| Time From FSR/Rollover Event Enable to Driver Thorax/Curtain Deployment Command Criteria Met (msec) | Data Not Available |
| Time From FSR/Rollover Event Enable to Passenger Thorax/Curtain Deployment Command Criteria Met (msec) | Data Not Available |
| Time From FSR/Rollover Event Enable to Driver Pretensioner Loop #1 or Loop #2 Deployment Command Criteria Met (msec) | 6 |
| Time From FSR/Rollover Event Enable to Passenger Pretensioner Loop #1 or Loop #2 Deployment Command Criteria Met (msec) | 6 |
| Driver 1st Stage Deployment Loop | Arming met if deployment was commanded |
| Passenger 1st Stage Deployment Loop | Arming met if deployment was commanded |
| Driver 2nd Stage Deployment Loop | Arming met if deployment was commanded |
| Passenger 2nd Stage Deployment Loop | Arming met if deployment was commanded |
| Driver Pretensioner Deployment Loop #1 | Arming met if deployment was commanded |
| Passenger Pretensioner Deployment Loop #1 | Arming met if deployment was commanded |
| Driver Pretensioner Deployment Loop #2 (If Equipped) | Arming met if deployment was commanded |
| Passenger Pretensioner Deployment Loop #2 (If Equipped) | Arming met if deployment was commanded |
| Driver Thorax Loop (If Equipped) | Arming met if deployment was commanded |
| Passenger Thorax Loop (If Equipped) | Arming met if deployment was commanded |
| Left Row 2 Thorax Loop (If Equipped) | Arming met if deployment was commanded |
| Right Row 2 Thorax Loop (If Equipped) | Arming met if deployment was commanded |
| Driver Row 1 Roof Rail/Head Curtain Loop (If Equipped) | Arming met if deployment was commanded |
| Passenger Row 1 Roof Rail/Head Curtain Loop (If Equipped) | Arming met if deployment was commanded |

| | |
|---|---|
| Left Row 2 Roof Rail/Head Curtain Loop (If Equipped) | Arming met if deployment was commanded |
| Right Row 2 Roof Rail/Head Curtain Loop (If Equipped) | Arming met if deployment was commanded |
| Left Row 3 Roof Rail/Head Curtain Loop (If Equipped) | Arming met if deployment was commanded |
| Right Row 3 Roof Rail/Head Curtain Loop (If Equipped) | Arming met if deployment was commanded |
| Driver Knee Deployment Loop (If Equipped) | Arming met if deployment was commanded |
| Passenger Knee Deployment Loop (If Equipped) | Arming met if deployment was commanded |
| Left Row 2 Pretensioner Deployment Loop (If Equipped) | Arming met if deployment was commanded |
| Right Row 2 Pretensioner Deployment Loop (If Equipped) | Arming met if deployment was commanded |
| Center Row 2 Pretensioner Deployment Loop (If Equipped) | Arming met if deployment was commanded |
| Battery Cutoff Loop (If Equipped) | Arming met if deployment was commanded |
| Driver Roll Bar Loop (If Equipped) | Arming met if deployment was commanded |
| Passenger Roll Bar Loop (If Equipped) | Arming met if deployment was commanded |
| Steering Column Energy Absorbing Loop (If Equipped) | Arming met if deployment was commanded |
| Driver Head Rest Loop (If Equipped) | Arming met if deployment was commanded |
| Passenger Head Rest Loop (If Equipped) | Arming met if deployment was commanded |
| Left Row 2 Head Rest Loop (If Equipped) | Arming met if deployment was commanded |
| Right Row 2 Head Rest Loop (If Equipped) | Arming met if deployment was commanded |
| Center Row 2 Head Rest Loop (If Equipped) | Arming met if deployment was commanded |
| High Voltage Battery Cutoff Loop (If Equipped) | Arming met if deployment was commanded |

## DTCs Present at Time of Event (Event Record 1)

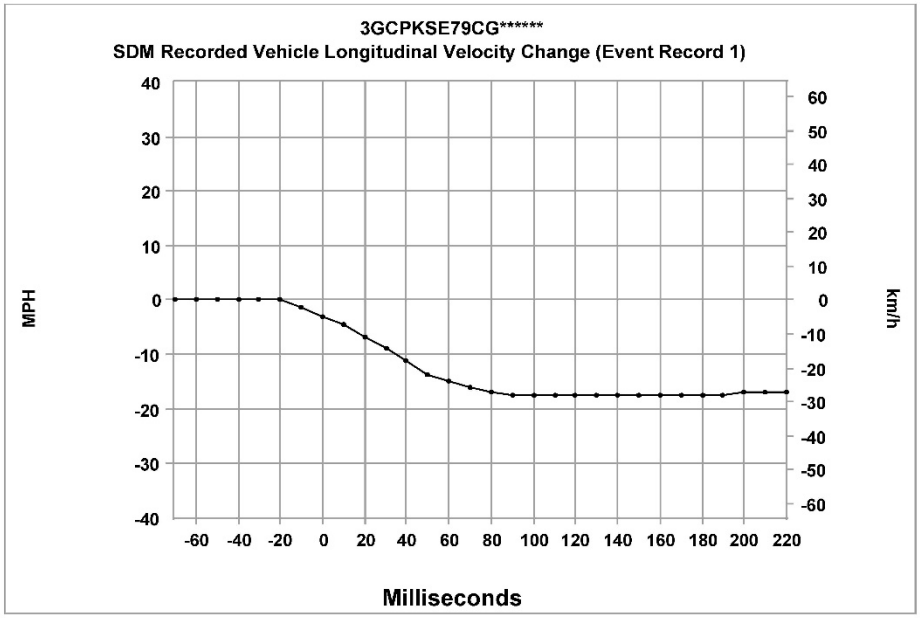
B0052-00

## Pre-Crash Data -1 to -.5 sec (Event Record 1)

| Times (sec) | Cruise Control Active | Cruise Control Resume Switch Active | Cruise Control Set Switch Active | Engine Torque (lb-ft [N-m]) | Reduced Engine Power Mode Indicator |
|---|---|---|---|---|---|
| -1.0 | Data Not Available | Data Not Available | Data Not Available | 4 [ 6] | Off |
| -0.5 | Data Not Available | Data Not Available | Data Not Available | 8 [ 11] | Off |

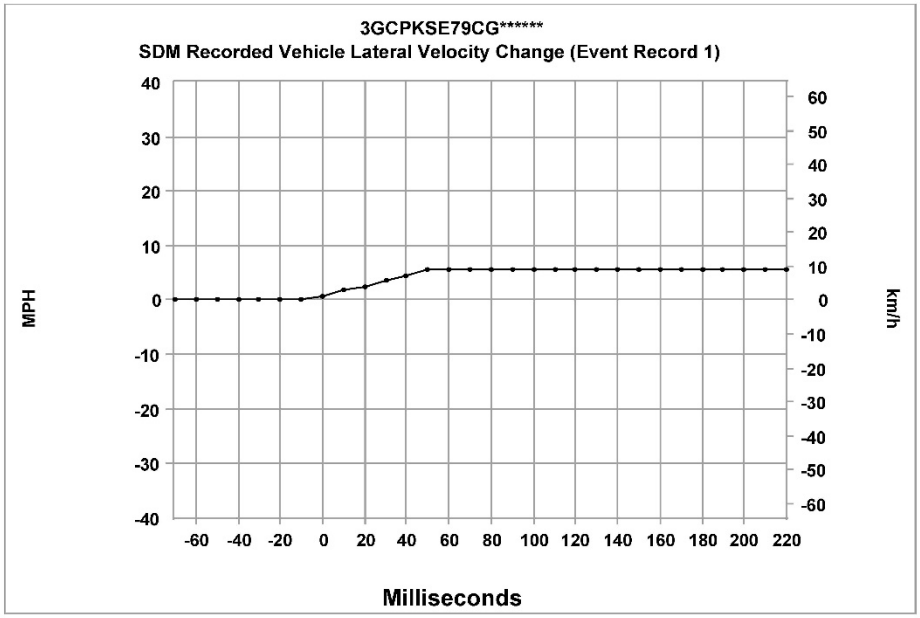
## Pre-Crash Data -2.5 to -.5 sec (Event Record 1)

| Times (sec) | Accelerator Pedal Position (percent) | Brake Switch Circuit State | Engine Speed | Throttle Position (%) | Vehicle Speed (MPH [km/h]) |
|---|---|---|---|---|---|
| -2.5 | 0 | Off | 1664 | 24 | 66 [ 106] |
| -2.0 | 0 | On | 1664 | 13 | 66 [ 106] |
| -1.5 | 0 | On | 1344 | 9 | 59 [ 95] |
| -1.0 | 0 | On | 1152 | 9 | 50 [ 81] |
| -0.5 | 0 | On | 1152 | 9 | 48 [ 78] |




| Time (msec) | Delta-V, longitudinal (MPH) | Delta-V, longitudinal (km/h) |
|---|---|---|
| -70 | 0.0 | 0.0 |
| -60 | 0.0 | 0.0 |
| -50 | 0.0 | 0.0 |
| -40 | 0.0 | 0.0 |
| -30 | 0.0 | 0.0 |
| -20 | 0.0 | 0.0 |
| -10 | -1.2 | -2.0 |
| 0 | -3.1 | -5.0 |
| 10 | -4.3 | -7.0 |
| 20 | -6.8 | -11.0 |
| 30 | -8.7 | -14.0 |
| 40 | -11.2 | -18.0 |
| 50 | -13.7 | -22.0 |
| 60 | -14.9 | -24.0 |
| 70 | -16.2 | -26.0 |
| 80 | -16.8 | -27.0 |
| 90 | -17.4 | -28.0 |
| 100 | -17.4 | -28.0 |
| 110 | -17.4 | -28.0 |
| 120 | -17.4 | -28.0 |
| 130 | -17.4 | -28.0 |

| Time (msec) | Delta-V, longitudinal (MPH) | Delta-V, longitudinal (km/h) |
|---|---|---|
| 140 | -17.4 | -28.0 |
| 150 | -17.4 | -28.0 |
| 160 | -17.4 | -28.0 |
| 170 | -17.4 | -28.0 |
| 180 | -17.4 | -28.0 |
| 190 | -17.4 | -28.0 |
| 200 | -16.8 | -27.0 |
| 210 | -16.8 | -27.0 |
| 220 | -16.8 | -27.0 |




| Time (msec) | Delta-V, lateral (MPH) | Delta-V, lateral (km/h) |
|---|---|---|
| -70 | 0.0 | 0.0 |
| -60 | 0.0 | 0.0 |
| -50 | 0.0 | 0.0 |
| -40 | 0.0 | 0.0 |
| -30 | 0.0 | 0.0 |
| -20 | 0.0 | 0.0 |
| -10 | 0.0 | 0.0 |
| 0 | 0.6 | 1.0 |
| 10 | 1.9 | 3.0 |
| 20 | 2.5 | 4.0 |
| 30 | 3.7 | 6.0 |
| 40 | 4.3 | 7.0 |
| 50 | 5.6 | 9.0 |
| 60 | 5.6 | 9.0 |
| 70 | 5.6 | 9.0 |
| 80 | 5.6 | 9.0 |
| 90 | 5.6 | 9.0 |
| 100 | 5.6 | 9.0 |
| 110 | 5.6 | 9.0 |
| 120 | 5.6 | 9.0 |
| 130 | 5.6 | 9.0 |

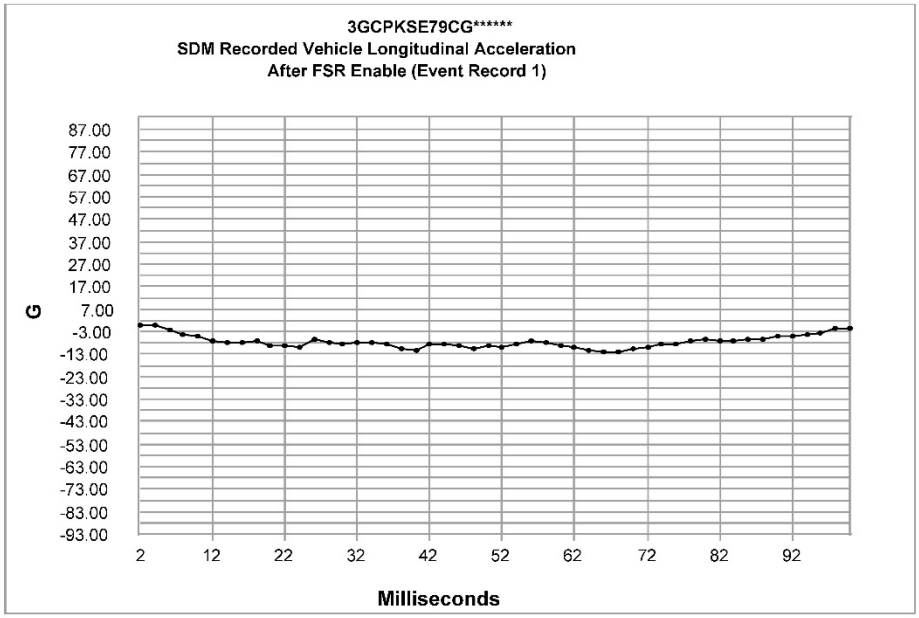
| Time (msec) | Delta-V, lateral (MPH) | Delta-V, lateral (km/h) |
|---|---|---|
| 140 | 5.6 | 9.0 |
| 150 | 5.6 | 9.0 |
| 160 | 5.6 | 9.0 |
| 170 | 5.6 | 9.0 |
| 180 | 5.6 | 9.0 |
| 190 | 5.6 | 9.0 |
| 200 | 5.6 | 9.0 |
| 210 | 5.6 | 9.0 |
| 220 | 5.6 | 9.0 |

SDM Recorded Vehicle Lateral Acceleration (Event Record 1)

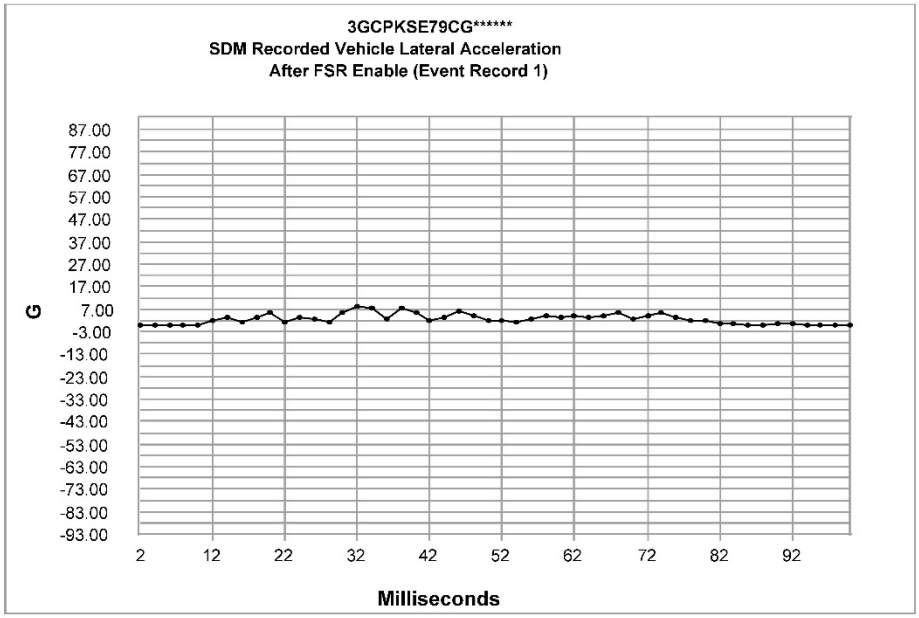
Contains No Recorded Data

SDM Recorded Vehicle Roll Rate (Event Record 1)

Contains No Recorded Data




| Time | G | Time | G |
|---|---|---|---|
| 2 | 0.0 | 52 | -10.2 |
| 4 | 0.0 | 54 | -8.7 |
| 6 | -2.2 | 56 | -7.3 |
| 8 | -4.4 | 58 | -8.0 |
| 10 | -5.1 | 60 | -9.4 |
| 12 | -7.3 | 62 | -10.2 |
| 14 | -8.0 | 64 | -11.6 |
| 16 | -8.0 | 66 | -12.4 |
| 18 | -7.3 | 68 | -12.4 |
| 20 | -9.4 | 70 | -10.9 |
| 22 | -9.4 | 72 | -10.2 |
| 24 | -10.2 | 74 | -8.7 |
| 26 | -6.5 | 76 | -8.7 |
| 28 | -8.0 | 78 | -7.3 |
| 30 | -8.7 | 80 | -6.5 |
| 32 | -8.0 | 82 | -7.3 |
| 34 | -8.0 | 84 | -7.3 |
| 36 | -8.7 | 86 | -6.5 |
| 38 | -10.9 | 88 | -6.5 |
| 40 | -11.6 | 90 | -5.1 |
| 42 | -8.7 | 92 | -5.1 |
| 44 | -8.7 | 94 | -4.4 |
| 46 | -9.4 | 96 | -3.6 |
| 48 | -10.9 | 98 | -1.5 |
| 50 | -9.4 | 100 | -1.5 |




| Time | G | Time | G |
|---|---|---|---|
| 2 | 0.0 | 52 | 2.2 |
| 4 | 0.0 | 54 | 1.5 |
| 6 | 0.0 | 56 | 2.9 |
| 8 | 0.0 | 58 | 4.4 |
| 10 | 0.0 | 60 | 3.6 |
| 12 | 2.2 | 62 | 4.4 |
| 14 | 3.6 | 64 | 3.6 |
| 16 | 1.5 | 66 | 4.4 |
| 18 | 3.6 | 68 | 5.1 |
| 20 | 5.1 | 70 | 2.9 |
| 22 | 1.5 | 72 | 4.4 |
| 24 | 3.6 | 74 | 5.1 |
| 26 | 2.9 | 76 | 3.6 |
| 28 | 1.5 | 78 | 2.2 |
| 30 | 5.1 | 80 | 2.2 |
| 32 | 8.0 | 82 | 0.7 |
| 34 | 7.3 | 84 | 0.7 |
| 36 | 2.9 | 86 | 0.0 |
| 38 | 7.3 | 88 | 0.0 |
| 40 | 5.1 | 90 | 0.7 |
| 42 | 2.2 | 92 | 0.7 |
| 44 | 3.6 | 94 | 0.0 |
| 46 | 5.8 | 96 | 0.0 |
| 48 | 4.4 | 98 | 0.0 |
| 50 | 2.2 | 100 | 0.0 |

## Hexadecimal Data

```
DPID $11
FC F0 00 FC C6 0C 00

DPID $15
01 02 03 04 05 06 22

DPID $16
22 09 0A 0D 0E 22 22

DPID $17
22 22 22 22 00 00 00

DPID $32
00 FF 51 89 00 00 00

DPID $35
78 00 00 00 00 00 00

DID $01
41 55 34 34 37 30 34 31 33 32 36 30 30 45 31 34

DID $03
41 54 34 34 37 30 34 31 33 32 36 30 30 39 33 35

DID $05
41 48 32 37 34 34 33 31 32 35 38 30 32 31 46 44

DID $07
41 4A 32 37 34 34 33 31 32 35 38 30 32 32 30 32

DID $09
44 41 34 34 37 30 34 31 33 32 36 30 30 45 31 30

DID $0B
44 42 34 34 37 30 34 31 33 32 36 30 30 39 36 43

DID $0D
01 00 30 30 30 30 30 30 30 30 30 30 30 30 30 30

DID $0F
01 00 30 30 30 30 30 30 30 30 30 30 30 30 30 30

DID $30
01 00 01 01

DID $90
00 47 43 50 4B 53 45 37 39 43 47 2A 2A 2A 2A 2A 2A

DID $9A
06 01

DID $B4
41 53 30 34 35 31 4B 5A 31 33 32 36 4B 31 51 31

DID $C1
00 CF 38 A1

DID $C2
01 8B 1D 64

DID $C3
```

```
01 AE 4B E4

DID $CB
00 CF 38 A3

DID $31

 0000   A5 F0 01 00 01 01 0F 51 80 FF
 0010   FF 00 FF FF 04 A3 00 00 00 00
 0020   4C FC FC 00 00 00 C0 10 00 00
 0030   00 00 00 55 00 FF F0 12 12 15
 0040   1A 1A 06 B6 06 AB 09 09 09 0D
 0050   18 4E 51 5F 6A 6A 0C FF FD 08
 0060   7B FD 80 52 00 FF FF FF FF FF
 0070   FF FF FF FF FF FF FF FF FF FF
 0080   FF FF FF FF FF FF FF FF FF 0B
 0090   63 88 07 0D FF FF FF 00 0C 17
 0100   7F 7F 7F 7F 7F 7F 7F 7F 7F 7F
 0110   7F 7F 7D 7F 7A 80 78 82 74 83
 0120   71 85 6D 86 69 88 67 88 65 88
 0130   64 88 63 88 63 88 63 88 63 88
 0140   63 88 63 88 63 88 63 88 63 88
 0150   63 88 63 88 64 88 64 88 64 88
 0160   FF FF FF FF FF FF FF FF FF FF
 0170   FF FF FF FF FF FF FF FF FF FF
 0180   FF FF FF FF FF FF FF FF FF FF
 0190   FF FF FF FF FF FF FF FF FF FF
 0200   FF FF FF FF FF FF FF FF FF FF
 0210   FF FF FF FF FF FF FF FF FF FF
 0220   FF FF FF FF FF FF FF FF FF FF
 0230   FF FF FF FF FF FF FF FF FF FF
 0240   FF FF FF FF FF FF FF FF FF FF
 0250   FF FF FF FF FF FF FF FF FF FF
 0260   FF FF FF FF FF FF FF FF FF FF
 0270   FF FF FF FF FF FF FF FF FF FF
 0280   FF FF FF FF FF FF FF FF FF FF
 0290   FF FF FF FF FF FF FF FF FF FF
 0300   FF FF FF FF FF FF FF FF FF FF
 0310   FF FF FF FF FF FF FF FF FF FF
 0320   FF FF FF FF FF FF FF FF FF FF
 0330   FF FF FF FF FF FF FF FF FF FF
 0340   FF FF FF FF FF FF FF FF FF FF
 0350   FF FF FF FF FF FF FF FF FF FF
 0360   FF FF FF FF FF FF FF FF FF FF
 0370   FF FF FF FF FF FF FF FF FF FF
 0380   FF FF FF FF FF FF FF 7F 7F 7C 79
 0390   78 75 74 74 75 72 72 71 76 74
 0400   73 74 74 73 70 6F 73 73 72 70
 0410   72 71 73 75 74 72 71 6F 6E 6E
 0420   70 71 73 73 75 76 75 75 76 76
 0430   78 78 79 7A 7D 7D 7F 7F 7F 7F
 0440   7F 82 84 81 84 86 81 84 83 81
 0450   86 8A 89 83 89 86 82 84 87 85
 0460   82 82 81 83 85 84 85 84 85 86
 0470   83 85 86 84 82 82 80 80 7F 7F
 0480   80 80 7F 7F 7F 7F 04 2C FF FF
 0490   FF FF 02 02 00 00 00 00 00 00

DID $32

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 0120   FF FF FF FF FF FF FF FF FF FF
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 0150   FF FF FF FF FF FF FF FF FF FF
 0160   FF FF FF FF FF FF FF FF FF FF
 0170   FF FF FF FF FF FF FF FF FF FF
 0180   FF FF FF FF FF FF FF FF FF FF
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 0200   FF FF FF FF FF FF FF FF FF FF
 0210   FF FF FF FF FF FF FF FF FF FF
 0220   FF FF FF FF FF FF FF FF FF FF
 0230   FF FF FF FF FF FF FF FF FF FF
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 0260   FF FF FF FF FF FF FF FF FF FF
 0270   FF FF FF FF FF FF FF FF FF FF
 0280   FF FF FF FF FF FF FF FF FF FF
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 0300   FF FF FF FF FF FF FF FF FF FF
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DID $33

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0310    FF FF FF FF FF FF FF FF FF FF
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0330    FF FF FF FF FF FF FF FF FF FF
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0350    FF FF FF FF FF FF FF FF FF FF
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October 2021

U.S. Department
of Transportation

**National Highway
Traffic Safety
Administration**

NHTSA

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