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**Special Crash Investigations:
On-Site Air Bag Non-Deployment
Crash Investigation;
Vehicle: 2021 Chevrolet Silverado
1500;
Location: Florida;
Crash Date: January 2021**

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16. Abstract This on-site investigation documented the non-deployment of the driver's frontal air bag in a 2021 Chevrolet Silverado 1500 that was involved in a multiple-event crash sequence. The vehicle had advanced frontal air bags, front seat-mounted side impact air bags, and inflatable curtain air bags. The Chevrolet, driven by an unbelted 55-year-old male, was traveling southbound when it departed the left side of the roadway and entered the median. The vehicle struck and uprooted several small trees with its front plane as it crossed through the median and entered the opposing travel lane while rotating clockwise. The Chevrolet then crossed over the opposing travel lane striking a fence with its back plane. No air bags deployed during the crash sequence. The non-deployment was likely attributed to the severity of the yielding frontal impact to the small tree (Event 1) not meeting the necessary parameters for a deployment command. The recorded severity likely qualifies as a pretensioner-only command. The unbelted driver suffered police-reported non-incapacitating (B-level) injuries. He was transported to a local hospital, and the level of treatment is unknown. The vehicle was towed from the scene by a local towing company due to disabling damage.			
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Special Crash Investigations
On-Site Air Bag Non-Deployment Crash Investigation
Office of Defects Investigation
Case Number: CR21012
Vehicle: 2021 Chevrolet Silverado 1500
Location: Florida
Crash Date: January 2021

Background

This on-site investigation documented the non-deployment of the driver's frontal air bag in a 2021 Chevrolet Silverado 1500 (Figure 1) that was involved in a multiple-event crash sequence. The vehicle had advanced frontal air bags, front seat-mounted side impact air bags, and inflatable curtain (IC) air bags. The Chevrolet, driven by an unbelted 55-year-old male, was traveling southbound when it departed the left side of the roadway and entered the median. The vehicle struck and uprooted several small trees with its front plane as it crossed through the median and entered the opposing travel lane while rotating clockwise. The Chevrolet then crossed over the opposing travel lane striking a fence with its back plane. No air bags deployed during the crash sequence. The police reported the unbelted driver sustained non-incapacitating injuries (B-level). He was taken to a local hospital, and the level of treatment is unknown. The vehicle was towed from the scene by a local towing company due to disabling damage.



Figure 1. Front left oblique view of the 2021 Chevrolet Silverado

The driver of the Chevrolet reported the incident to the National Highway Traffic Safety Administration in January 2021 due to the non-deployment of the air bags. NHTSA's Crash Investigation Division assigned an on-site investigation to the Special Crash Investigations (SCI) team at Crash Research and Analysis, Inc., in April 2021. The SCI team obtained the police crash report and contacted the vehicle's insurer to establish cooperation for an on-site investigation. The vehicle inspection took place in April 2021 and involved photographs and measurements of the Chevrolet's interior and exterior damage, and an assessment of its safety systems. The Chevrolet had an event data recorder (EDR) that was imaged during the inspection process with the Bosch Crash Data Retrieval (CDR) tool. The crash site was photographed and measured by total station.

Crash Summary

Crash Site

The crash occurred 675 m (2,215 ft) north of a roundabout on a north/south divided roadway in the evening. The roadway consisted of a single lane in each direction divided by a 5.1 m (17 ft) wide median. Trees and bushes populated the median. The weather conditions were cloudy with rain earlier in the day resulting in wet pavement. Figure 2 shows the southbound travel lane. On approach to the crash site the roadway had an uphill grade. There was an ornamental metal fence bordering the east side of the northbound lane. Speed was regulated by a posted limit of 72 km/h (45 mph). A crash diagram is included at the end of this report.



Figure 2. Southbound view of the Chevrolet's pre-crash approach to the crash site

Pre-Crash

The Chevrolet was traveling in the southbound lane at an EDR-reported speed of 141 km/h (88 mph) 5 seconds prior to algorithm enabled (AE). The male driver was not belted. For unknown reasons the driver departed the southbound roadway on the east side and entered into the grassy median. Based on the SCI reconstruction, the roadway departure was less than 1 second before AE.

Crash

After exiting the roadway, the Chevrolet's front plane struck, and uprooted, palm trees that branched out from the ground and were 46 cm (18 in) in diameter (Event 1). The Chevrolet continued 9.1 m (30 ft) southeast and struck a second tree (Event 2). The offset impact to this tree and the wet conditions resulted in the Chevrolet rotating clockwise as it entered the northbound travel lane. The Chevrolet continued to rotate traveling across the roadway departing its east side. The Chevrolet then struck the fence with its back plane (Event 3). It was found at the scene by local law enforcement officers facing north.

Post-Crash

Police and local emergency services were notified of the incident. The driver was transported by ambulance to a local hospital, and the extent of his treatment is unknown. The Chevrolet was removed by a local towing service due to disabling damage.

2021 Chevrolet Silverado 1500

Description

The 2021 Chevrolet Silverado 1500 (Figure 3) was manufactured in November 2020 and was identified by the Vehicle Identification Number (VIN) 1GCPYFEL2MZxxxxxx. At the time of the SCI inspection, the electrical system was inoperable and an odometer reading could not be obtained. However, according to a Carfax report, the odometer was 2,822 km (1,753 miles) on a salvage title issued in May 2021. It was a 4-door crew cab pickup built on a 374 cm (147.2 in) wheelbase with a 6.2-liter, V-8 gasoline engine. The Chevrolet had a 4-wheel-drive platform and Z71 Trail Boss trim package. The Chevrolet had a gross vehicle weight rating of 3,175 kg (7,000 lb) and front and rear axle ratings of 1,724 kg (3,800 lb) and 1,724 kg (3,800 lb). The curb weight was 2,184 kg (4,815 lb). Placarding on the frame of the left-front door stated that the vehicle manufacturer's recommended tire size and cold tire pressure for all four axle positions was LT275/65R18 at 280 kPa (41 PSI). At the time of the SCI inspection, the vehicle had Goodyear Wrangler Duratrac tires of the recommended size. The tread depth of all tires measured 13 mm (16/32 in) or greater.



Figure 3. Right front oblique view of the Chevrolet

The Chevrolet had seating for five occupants (2/3). The front row had forward-facing bucket seats with adjustable head restraints for the driver and passenger positions. The Chevrolet's second row had a non-adjustable bench seat that had a capacity of three occupants, with adjustable head restraints for the outboard positions. Manual safety features included 3-point lap and shoulder seat belts for the driver, front passenger, and all three second-row seat positions. Front-row seat belts also had retractor and lower anchor pretensioners. Supplemental restraints included a certified advanced 208-compliant frontal air bag system, front seat-mounted side impact air bags, and dual-sensing (side impact and rollover) IC air bags.

Exterior Damage

The crash resulted in damage to the Chevrolet's front, right, and rear planes. The damage from the frontal impact (Figure 4) to the first tree (Event 1) resulted in the tree uprooting and part of it wrapping on the hood and projecting into the windshield. A crush profile of the front bumper

beam was documented. The corresponding direct damage was 46 cm (18.1 in) wide beginning at 26 cm (10.2 in) left of the front centerline extending right. The field-L was 176 cm (69.2 in). The residual crush at the bumper level was: C1 = 7 cm (2.7 in), C2 = 12 cm (4.7 in), C3 = 24 cm (9.4 in), C4 = 30 cm (11.8 in), C5 = 4 cm (1.5 in), and C6 = 0 cm. Maximum crush was observed to be 30 cm (11.8 in) and located 15 cm (5.9 in) right of the front centerline. The collision deformation classification (CDC) for this damage profile was 12FCEW2. The WinSMASH program could not determine velocity change since a yielding object crash type was out of the scope of the program. However, the WinSMASH program was able to provide a barrier equivalent speed of 28 km/h (17 mph).



Figure 4. Front view of the Chevrolet

The damage from the right plane (Figures 5 and 6) impact with the second tree (Event 2) had the characteristics of a sideswipe impact at the initial contact along the Chevrolet's cab. The right-front and right-rear doors were minimally damaged. The direct contact extended to the bed and engagement deepened with impact to the right-rear tire. The corresponding direct damage was 360 cm (141.7 in) wide beginning at 121 cm (47.6 in) aft of the right-rear axle extending forward. The field-L was 405 cm (159.4 in). The residual crush was as follows: C1 = 4 cm (1.5 in), C2 = 2 cm (0.7 in), C3 = 12 cm (4.7 in), C4 = 0 cm, C5 = 0 cm, and C6 = 0 cm. Maximum crush was observed to be 12 cm (4.7 in) and was located 86 cm (33.8 in) forward of the right-rear axle. The CDC for this damage profile was 01RDEW2.



Figure 5. Back half of the right plane of the Chevrolet Silverado 1500



Figure 6. Front half of the right plane of the Chevrolet Silverado 1500

This impact put the Chevrolet into a clockwise rotation as it traveled across the opposing lane of the roadway. The vehicle rotated approximately 160° orienting the rear plane to impact the fence (Event 3). The rear plane sustained minor damage. The corresponding direct damage was 155 cm (61.0 in) wide beginning at 88 cm (34.6 in) right of the rear centerline extending left. The field-L was 176 cm (69.2 in) extending across the entire rear bumper. The residual crush was: C1 = 1 cm (0.3 in), C2 = 1 cm (0.3 in), C3 = 2 cm (0.7 in), C4 = 3 cm (1.1 in), C5 = 2 cm (0.7 in), and C6 = 3 cm (1.1 in). Maximum crush was observed to be 3 cm (1.1 in) and was located 86 cm (33.8 in) right of the rear centerline. The CDC for this damage profile was 06BDEW1.

Event Data Recorder

The Chevrolet had an air bag control module (ACM) mounted on the tunnel beneath the center console. This module monitored the diagnostic functions of the vehicle's supplemental restraint systems (air bags and seat belt pretensioners) and controlled the deployment/actuation of those devices dependent upon crash event type and severity. The module also had EDR capabilities supported by the Bosch Crash Data Retrieval (CDR) tool. The EDR was imaged by the SCI investigator during the vehicle inspection through the diagnostic link connector with software version 21.0.2 of the CDR tool. The imaged data is included at the end of this report as Appendix A and is reported with software version 21.0.2.

The ACM measured tri-axial vehicle accelerations and roll rate data categorizing crash events by plane (front/rear/side) or as a rollover. The threshold minimal crash pulse was a measured vehicle velocity change of 8 km/h (5 mph). Two different event types could be recorded, termed non-deployment or deployment, and the module had the capacity to store up to three events. By definition non-deployment events included all those where no supplemental restraint devices were commanded to deploy/actuate. Non-deployment events could be overwritten if all three data records were full, the oldest recorded event was older than approximately 250 ignition cycles, and any of the following three conditions occurred: (1) another non-deployment event of greater severity, (2) any deployment event, or (3) any subsequent non-deployment event. Deployment events were locked to memory and could not be overwritten. If power to the air bag sensing and diagnostic module was lost during or immediately following a crash event, all or part of the data may not have been recorded to memory. Associated to each event was a 5-second pre-crash buffer that recorded various vehicle performance parameters, including: accelerator pedal position (%), brake switch circuit state, engine speed (rpm), engine throttle position (%), and vehicle speed (mph) data.

The imaged data contained three recorded events all occurring on ignition cycle 249. The ignition cycle count during the SCI data imaging was 269. The difference of 20 cycles was attributed to the post-crash recovery and movement of the vehicle through the insurance process to salvage. The SCI crash reconstruction determined the recorded data was consistent with the circumstances of the crash under investigation. Fields within the data report ordered the sequence of the events, as well as reported the time between consecutive events. The timeline is shown in Figure 7.

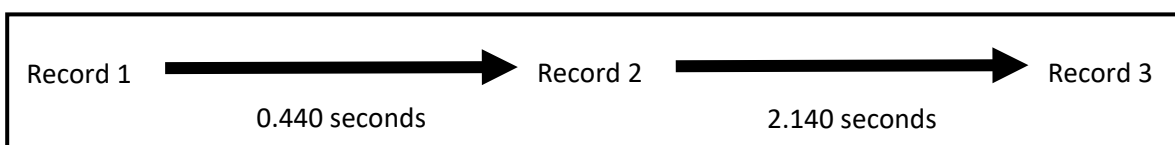


Figure 7. Timeline of the reported events

During all the events the driver seat belt was reported as “not buckled.” Each event was completely recorded.

Record 1

Record 1 was the first event in the crash sequence where the Chevrolet's front plane struck the bushes (Event 1). This was a deployment event with an assigned frontal pretensioner severity that was attributed to Event 1. The maximum longitudinal delta V was -21 km/h (-13 mph) at 314 milliseconds. The maximum lateral delta V was -2 km/h (-1.2 mph) at 302 milliseconds. The driver’s seat belt retractor and anchor pretensioners actuated at 101 and 111 milliseconds. The passenger’s seat belt retractor and anchor pretensioners actuated at 101 and 107 milliseconds. The recorded crash pulse was elongated and consistent with the dynamics of the uprooted tree impact.

Record 2

Record 2 was the second event in the crash sequence where the Chevrolet's right plane struck the tree (Event 2). It was also considered a deployment event with a frontal pretensioner severity and had an elongated crash pulse that appeared consistent with the right plane impact. The maximum longitudinal delta V was -16 km/h (-10 mph) at 222 milliseconds. The maximum lateral delta V was -8 km/h (-5 mph) at 198 milliseconds. The pretensioners actuated in the first record and were not available to actuate again.

Record 3

Record 3 was the third event in the crash sequence where the Chevrolet's rear plane struck the fence (Event 3). This was a non-deployment event. The maximum longitudinal delta V was 11 km/h (7 mph) at 150 milliseconds. The maximum lateral delta V was -2 km/h (-1.2 mph) at 152 milliseconds. The positive value of the maximum longitudinal delta V was consistent with the rear plane impact (Event 3).

The pre-crash buffers of the three events overlapped and the combined yield 7.5 seconds of pre-crash data is summarized in Table 1.

Table 1. Pre-crash data for all three events

Time Record 1	Time Record 2	Time Record 3	Accelerator Pedal %	Service Brake Status	Engine rpm	Engine Throttle %	Vehicle Speed km/h (mph)
-5.0			0	Off	3,008	19	143 (88.9)
-4.5	-5.0		0	Off	3,008	18	142 (88.2)
-4.0	-4.5		0	Off	2,944	17	140 (87.0)
-3.5	-4.0		0	Off	2,496	13	139 (86.4)
-3.0	-3.5		0	Off	2,496	13	137 (85.1)
-2.5	-3.0	-5.0	0	Off	2,432	13	136 (84.5)
-2.0	-2.5	-4.5	0	Off	1,920	17	135 (83.9)
-1.5	-2.0	-4.0	0	Off	1,856	14	131 (81.4)
-1.0	-1.5	-3.5	0	Off	1,856	14	125 (77.7)
-0.5	-1.0	-3.0	0	Off	1,728	9	123 (76.4)
	0.5	-2.5	99	Off	1,536	35	112 (69.6)
		-2.0	99	Off	1,152	30	60 (37.3)
		-1.5	0	Off	1,088	30	53 (32.9)
		-1.0	0	Off	768	30	46 (28.6)
		-0.5	0	Off	448	30	35 (21.7)

The pre-crash data trends in the EDR showed the driver was operating the Chevrolet at a high rate of speed approaching the crash site. The vehicle was traveling 143 km/h (88.9 mph) at 5 seconds prior to AE1. It decelerated by rolling resistance and engine braking to approximately 123 km/h (76.4 mph) at 0.5 seconds prior to AE1. The imaged EDR data is included at the end of this report in Appendix A.

The EDR had the capability to store nine diagnostic trouble codes (DTC). Only one DTC (B0052-00) was recorded by the EDR which was related to the crash. The code advised that the vehicle was involved in a crash and crash data is stored in the air bag control module. The other eight slots were reported as not applicable (N/A) indicating no other DTCs were stored.

NHTSA Recalls and Investigations

A query of the NHTSA recall database www.nhtsa.gov/recall using the VIN for this specific Chevrolet Silverado at the time of case assignment in February 2021 and again at the time of this technical report in October 2023 indicated that there were no unrepaired recalls for this vehicle.

A recall for a protective sleeve was made on select Chevrolet Silverado's that were affected. The VIN indicated that the date of manufacture of this Chevrolet was after the recall was initiated. Figure 8 shows the engine compartment at the time of the SCI inspection. During the SCI inspection, the wiring harness was protected. Figure 9 shows the wiring harness protections that were identified during the SCI inspection.



Figure 8. View of the engine compartment at the time of the SCI inspection

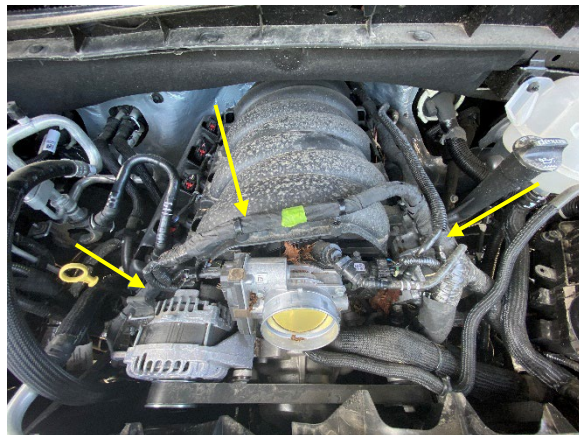


Figure 9. View of the engine compartment showing the wiring harness protection

Interior Damage

The interior of the Chevrolet only sustained damage from the intrusion of the tree through the windshield shown by the yellow arrow in Figure 10. No other interior damage was observed and no additional contacts on the interior were found during the SCI inspection.



Figure 10. View of the Chevrolet's interior showing intrusion of exterior debris through the windshield

Manual Restraint System

The Chevrolet had manual 3-point lap and shoulder seat belt systems for all five seating positions. All belt systems consisted of continuous loop webbing with sliding latch plates. The driver's and front passenger's seat belt systems used retractor and lower anchor pretensioners. The driver and front passenger seat belt systems retracted onto an emergency locking retractor (ELR) while the second-row seat belt systems used switchable ELR/automatic locking retractors. At the time of the SCI inspection, the driver's seat belt was found to be retracted and taut against the B-pillar indicating it was not in use at the time of the crash (Figure 11).



Figure 11. View of the driver's seat belt tight to the B-pillar

Supplemental Restraint System

The Chevrolet had several supplemental restraints for its occupants. These included certified advanced-208 compliant dual-stage driver's and passenger's frontal air bags, a driver knee air bag, front outboard seat-mounted side impact air bags, and IC air bags. IC airbags could deploy

for rollover events and side impact collisions. No air bags deployed during the multiple-event crash sequence.

Air Bag Non-Deployment Discussion

The driver's frontal air bag was not commanded to deploy during the crash sequence (Figures 12 and 13). The non-deployment was likely attributed to the severity of the yielding frontal impact to the small tree (Event 1) not meeting the necessary parameters for a deployment command. The recorded severity was likely qualified as a pretensioner-only command.



Figure 12. Oblique view of the driver's side showing the non-deployment of the driver's frontal air bags



Figure 13. View of the steering wheel showing the non-deployment of the driver's frontal air bag

It should also be noted that the right plane impact to the second tree (Event 2) was outside of the frontal sensors of the Chevrolet. This type of impact, due to the minor severity, typically would not deploy the driver's frontal air bag. Air bag deployment would not be expected in the rear plane impact (Event 3).

2021 Chevrolet Silverado 1500 Occupant

Driver Demographics

Age/sex: 55 years/male
Height: Unknown
Weight: Unknown
Eyewear: Unknown
Seat type: Forward-facing bucket seat with adjustable head restraint
Seat track position: Rear most track position
Manual restraint usage: None used
Usage source: Vehicle inspection and EDR
Air bags: Dual-stage driver's frontal, driver knee, seat-mounted, and IC air bags available; none deployed
Alcohol/drug involvement: None given
Egress from vehicle: Unknown
Transport from scene: EMS transport
Type of medical treatment: Transported; treatment unknown

Driver Injuries

Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Component (IPC)	IPC Confidence Level
1	Unknown	Unknown	Unknown	Unknown

Request denied; No medical release

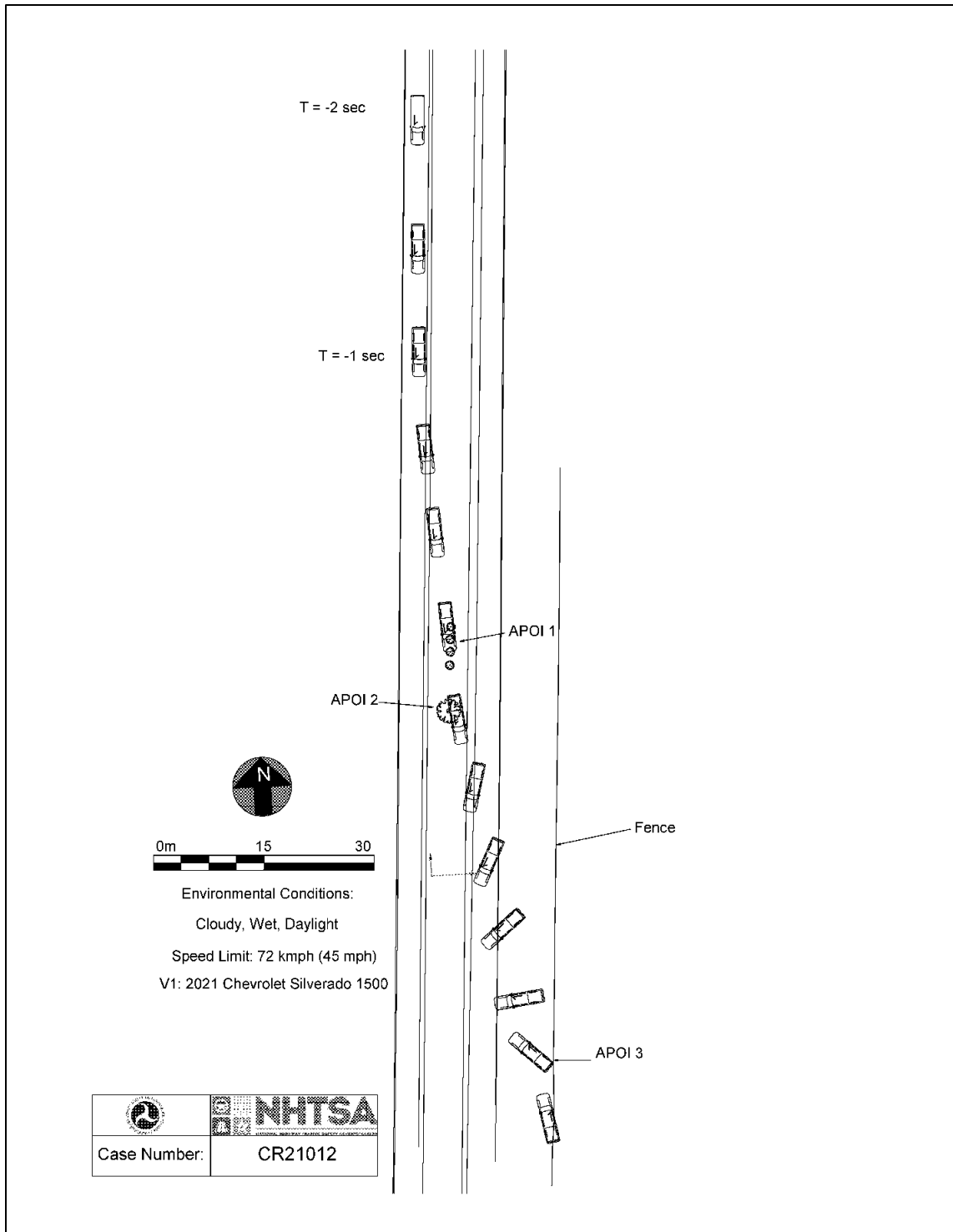
Driver Kinematics

The unbelted 55-year-old male driver was operating the Chevrolet traveling southbound on the roadway. The Chevrolet departed the roadway to the left impacting and uprooting a small tree with its front plane. He responded to the minor severity impact with a slight forward trajectory. There were no contacts within the interior to evidence this motion.

The Chevrolet's right plane engaged the second tree as it continued through the median. The direction of the impact force was within the 1 o'clock sector. The offset force and impact with the right-rear tire initiated a clockwise rotation to the vehicle. The driver was probably displaced inboard and further forward while remaining within the driver seat. The driver would have responded to the back plane impact with the fence with a rearward trajectory likely coming to final rest in his seat.

Once emergency personnel arrived the driver was transported by ambulance to a local hospital. The extent of his treatment remains unknown.

Crash Diagram



Appendix A: 2021 Chevrolet Silverado 1500 Event Data Recorder Report¹

¹ The EDR 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.

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	1GCPYFEL2MZ*****
User	
Case Number	
EDR Data Imaging Date	
Crash Date	
Filename	CR21012_V1.CDRX
Saved on	
Imaged with CDR version	Crash Data Retrieval Tool 21.0.2
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 21.0.2
Reported with Software Licensed to (Company Name)	NHTSA
EDR Device Type	Airbag Control Module
Event(s) recovered	Record 1 (Deployment), Record 2 (Deployment), Record 3 (Non-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, pretensioners, or roll bars:

- Head Rest Deployment
- Battery Cut-Off Deployment

The second type of SDM recorded crash event for FSR Events is the Deployment Event. It also may contain 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.

There are two types of PedPro crash events. The first is the Non-Deployment PedPro Event. A Non-Deployment PedPro Event records data but does not deploy anything. A Non-Deployment PedPro Event may contain Pre-Crash and Crash data. The second type of PedPro recorded crash event is the Deployment PedPro Event. It also may contain Pre-Crash and Crash data. Deployment Events cannot be overwritten or cleared by the SDM.

The SDM can store up to two PedPro 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 and Non-Deployment Events, the SDM will record up to 300 milliseconds of data after time zero. The SDM will also record up to 300 milliseconds of Vehicle Acceleration data after time zero.

For Rollover Events, the SDM may record Lateral Acceleration, Vertical 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 Rollover Deployment Events, the SDM will record up to 700 milliseconds of data before the Deployment criteria is met and 290 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 Maximum SDM Recorded Vehicle Velocity Change may occur between the recorded 10 millisecond sample points of the SDM Recorded Vehicle Velocity Change.

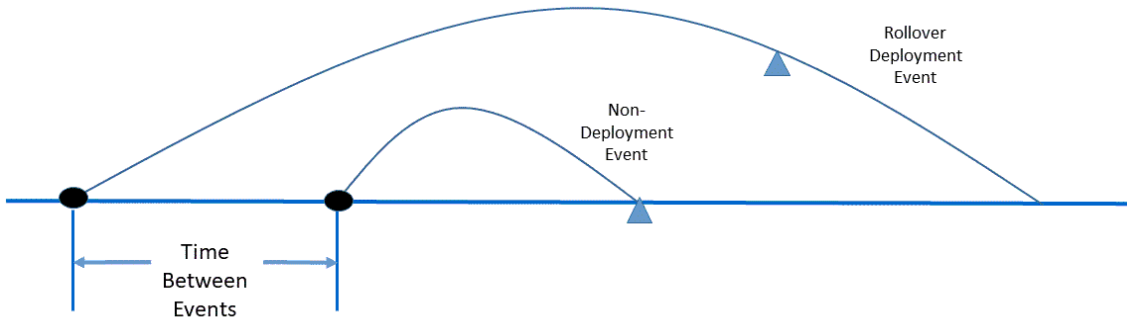
-If the SDM Recorded Vehicle Velocity Change data exceeds the max output range of -127 km/h then the exceeded values will be displayed with an offset of a +256 km/h. If the SDM Recorded Vehicle Velocity Change data exceeds the max output range of +126 km/h then the exceeded values will be displayed with an offset of a -256 km/h.

-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 or the commanded state of the brake lamps.
 - 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 Time Zero. That is to say, the last data point may have been captured just before Time Zero but no more than 0.5 second before Time Zero. 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 engine.
 - 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 Counters tracks the number of Deployment events that have occurred during the SDM's lifetime.
 - Dynamic Event Counters 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.
 - For frontal Deployment Events, only the highest severity event is reported. For example, Stage 2 severity events include Pretensioner severity and Stage 1 severity.
 - 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.
 - The airbag control module may continue to function after the vehicle has been turned off or to accessory, for a set period of time, this is called Prolongation. However, all other vehicle modules may have their functions shut down during Prolongation. For example, if the SIR warning lamp is commanded on by the airbag control module, during Prolongation, and is recorded in the EDR as being commanded on, the actual state of the warning lamp would be off to an observer since the vehicle display cluster would have been in the off state. Vehicle pre-event and system data may be recorded in the EDR as their commanded state, default state, or data invalid state.
 - 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 GM parameter name is displayed in parentheses after the NHTSA Part 563 parameter name.
- 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 by the 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 Acceleration	Forward
Longitudinal Velocity Change	Forward
Lateral Acceleration	Left to Right
Lateral Velocity Change	Left to Right
Vertical Acceleration	Downward
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.

01059_SDM40-delphi_r010

System Status at Time of Retrieval

ESS # 1 Traceability Data, Component Identifier	AU
ESS # 1 Traceability Data, Part Number/Broadcast Code	9412
ESS # 1 Traceability Data, Supplier Code	D
ESS # 1 Traceability Data, Traceability Number	A00000000
ESS # 1 Verification Data	13,519,412
ESS # 2 Traceability Data, Component Identifier	AT
ESS # 2 Traceability Data, Part Number/Broadcast Code	9412
ESS # 2 Traceability Data, Supplier Code	D
ESS # 2 Traceability Data, Traceability Number	A00000000
ESS # 2 Verification Data	13,519,412
ESS # 3 Traceability Data, Component Identifier	AH
ESS # 3 Traceability Data, Part Number/Broadcast Code	4197
ESS # 3 Traceability Data, Supplier Code	D
ESS # 3 Traceability Data, Traceability Number	A00000000
ESS # 3 Verification Data	13,514,197
ESS # 4 Traceability Data, Component Identifier	AJ
ESS # 4 Traceability Data, Part Number/Broadcast Code	4197
ESS # 4 Traceability Data, Supplier Code	D
ESS # 4 Traceability Data, Traceability Number	A00000000
ESS # 4 Verification Data	13,514,197
ESS # 5 Traceability Data, Traceability Number	A00000000
ESS # 5 Traceability Data, Component Identifier	DA
ESS # 5 Traceability Data, Part Number/Broadcast Code	4198
ESS # 5 Traceability Data, Supplier Code	D
ESS # 5 Verification Data	13,514,198
ESS # 6 Traceability Data, Component Identifier	DB
ESS # 6 Traceability Data, Part Number/Broadcast Code	4198
ESS # 6 Traceability Data, Supplier Code	D
ESS # 6 Traceability Data, Traceability Number	A00000000
ESS # 6 Verification Data	13,514,198
ESS # 7 Traceability Data, Component Identifier	
ESS # 7 Traceability Data, Part Number/Broadcast Code	0000
ESS # 7 Traceability Data, Supplier Code	D
ESS # 7 Traceability Data, Traceability Number	A00000000
ESS # 7 Verification Data	0
ESS # 8 Traceability Data, Component Identifier	
ESS # 8 Traceability Data, Part Number/Broadcast Code	0000
ESS # 8 Traceability Data, Supplier Code	D
ESS # 8 Traceability Data, Traceability Number	A00000000
ESS # 8 Verification Data	0
AOS Data Key	0
SDM Primary Key Definition (Key 1-2)	17
SDM Primary Key Definition (Key 3-4)	12
Dynamic Deployment Event Counter	2
Multi-Event, Number of Events (Dynamic Event Counter)	3
Dynamic OnStar Notification Event Counter	2
Driver Frontal Stage 2 Commanded after Event End for Event Record #1	No
Passenger Frontal Stage 2 Commanded after Event End for Event Record #1	No
Driver Frontal Stage 2 Commanded after Event End for Event Record #2	No
Passenger Frontal Stage 2 Commanded after Event End for Event Record #2	No
Driver Frontal Stage 2 Commanded after Event End for Event Record #3	No
Passenger Frontal Stage 2 Commanded after Event End for Event Record #3	No
Longitudinal Accelerometer Range (g)	113
Lateral Accelerometer Range (g)	113
Dynamic PedPro Deploy Event Counter	0
Dynamic PedPro Event Counter	0
Vehicle Identification Number (VIN)	1GCPYFEL2MZ*****
System Type	Delphi SDM40 with integrated IMU
Ignition Cycle, Download (Ignition Cycles at Investigation)	269

System Status at Event (Record 1)

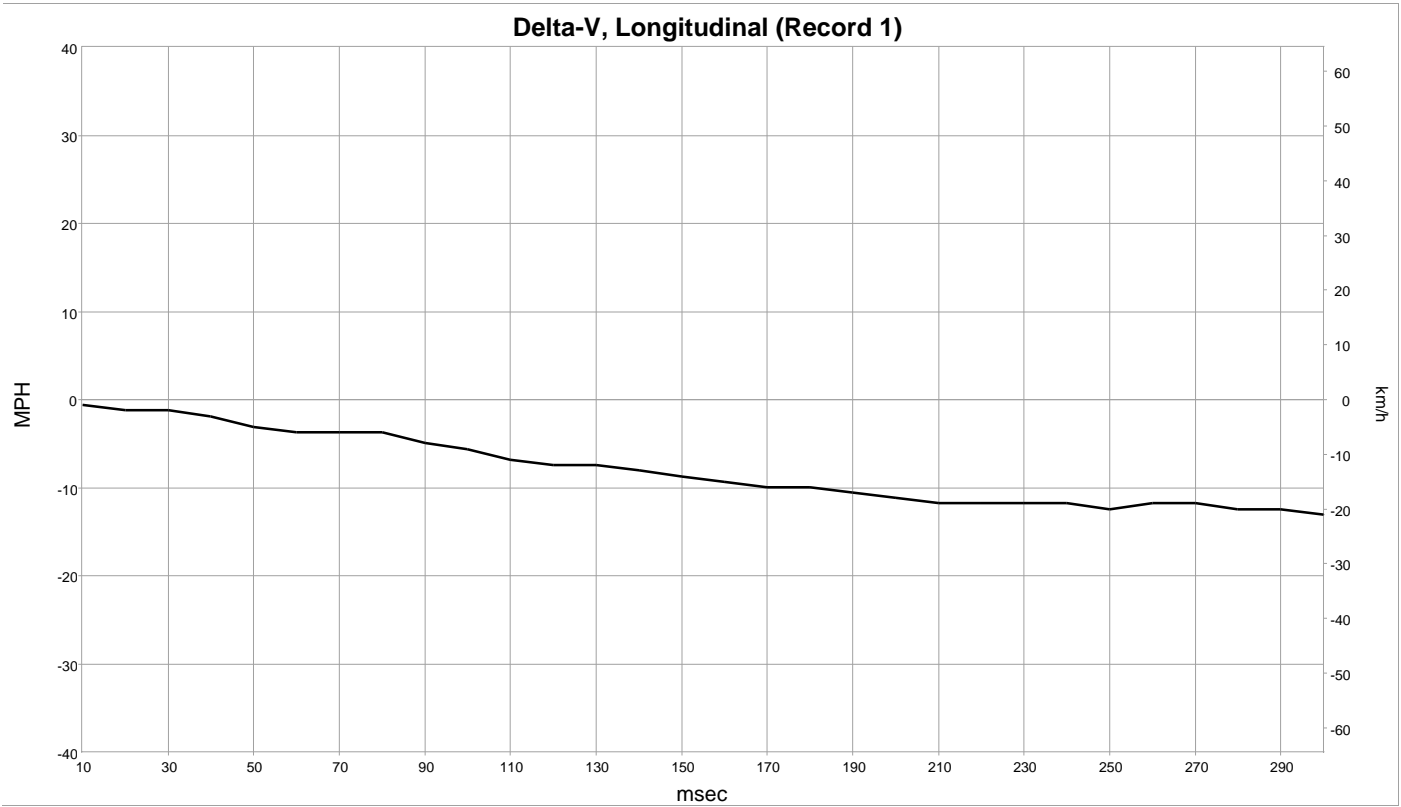
Complete File Recorded (Event Recording Complete)	Yes
Event Record Type	Deployment
Crash Record Locked	Yes
OnStar Deployment Status Data Sent	Yes
OnStar SDM Recorded Vehicle Velocity Change Data Sent	Yes
High Voltage Disable Notification Sent	No
Deployment Commanded in Energy Reserve Mode	No
Deployment Event Counter	1
Multi-Event, Number of Events (Event Counter)	1
OnStar Notification Event Counter	1
Algorithm Active - Frontal	Yes
Algorithm Active - Side	Yes
Algorithm Active - Rollover	Yes
Algorithm Active - Rear	Yes
Ignition Cycle, Crash (Ignition Cycles at Event)	249
Time From Event 1 to 2 (Time Between Events) (msec)	Data Not Available
Concurrent Event Flag Set	No
Event Severity Status: Frontal Pretensioner	Yes
Event Severity Status: Frontal Stage 1	No
Event Severity Status: Frontal Stage 2	No
Event Severity Status: Left Side	No
Event Severity Status: Right Side	No
Event Severity Status: Rear	No
Event Severity Status: Rollover	No
Event Severity Status: Battery Disconnect Switch - Side Event	No
Safety Belt Status, Driver (Driver Belt Switch Circuit Status)	Not Buckled
Safety Belt Status, Right Front Passenger (Passenger Belt Switch Circuit Status)	Not Buckled
Center Front Row Belt Switch Circuit Status (If Equipped)	Data Not Available
Center Row 3 Belt Switch Circuit Status (If Equipped)	Data Not Available
Passenger Seat Occupancy Status	Empty
Occupant Size Right Front Passenger Child (Passenger Classification Status)	No (Not Applicable)
Passenger Air Bag ON Indicator Status	Off
Passenger Air Bag OFF Indicator Status	On
Low Tire Pressure Warning Lamp Status 0.5 Seconds prior to Time Zero	Off
Frontal Air Bag Warning Lamp (SIR Warning Lamp Status 0.5 Seconds Prior to Time Zero)	Off
SIR Warning Lamp ON/OFF Time Continuously (seconds)	147.650
Number of Ignition Cycles SIR Warning Lamp was ON/OFF Continuously	176
Ignition Cycles Since DTCs Were Last Cleared 0.5 Seconds Prior to Time Zero	249
Maximum Delta-V, Longitudinal (Maximum Longitudinal SDM Recorded Vehicle Velocity Change for FSR Event) (MPH [km/h])	-13.0 [-21]
Time, Maximum Delta-V (Time From FSR Time Zero to Maximum Longitudinal SDM Recorded Vehicle Velocity Change) (msec)	314
Maximum Delta-V, Lateral (Maximum Lateral SDM Recorded Vehicle Velocity Change for FSR Event) (MPH [km/h])	-1.2 [-2]
Time Maximum Delta-V, Lateral (Time From FSR Time Zero to Maximum Lateral SDM Recorded Vehicle Velocity Change) (msec)	302
Maximum Resultant Delta-V – Longitudinal Component for FSR Event (MPH [km/h])	-13.0 [-21]
Maximum Resultant Delta-V – Lateral Component for FSR Event (MPH [km/h])	-1.2 [-2]
Time from FSR Time Zero to time of the Maximum Resultant Delta-V (msec)	314
Blended Event FSR 1 Severity Type	Frontal (Pretensioner/Stage 1/Stage 2)
Blended Event FSR 2 Severity Type	Data Not Available
Blended Event Time from FSR 1 Time Zero to FSR 2 Time Zero (msec)	Data Not Available
Blended Event FSR 3 Severity Type	Data Not Available
Blended Event Time from FSR 1 Time Zero to FSR 3 Time Zero (msec)	Data Not Available

Diagnostic Trouble Codes 0.5 Seconds Prior to Time Zero (Record 1)

DTC 1	B0052-00
DTC 2	N/A
DTC 3	N/A
DTC 4	N/A
DTC 5	N/A
DTC 6	N/A
DTC 7	N/A
DTC 8	N/A
DTC 9	N/A

Deployment Command Data (Record 1)

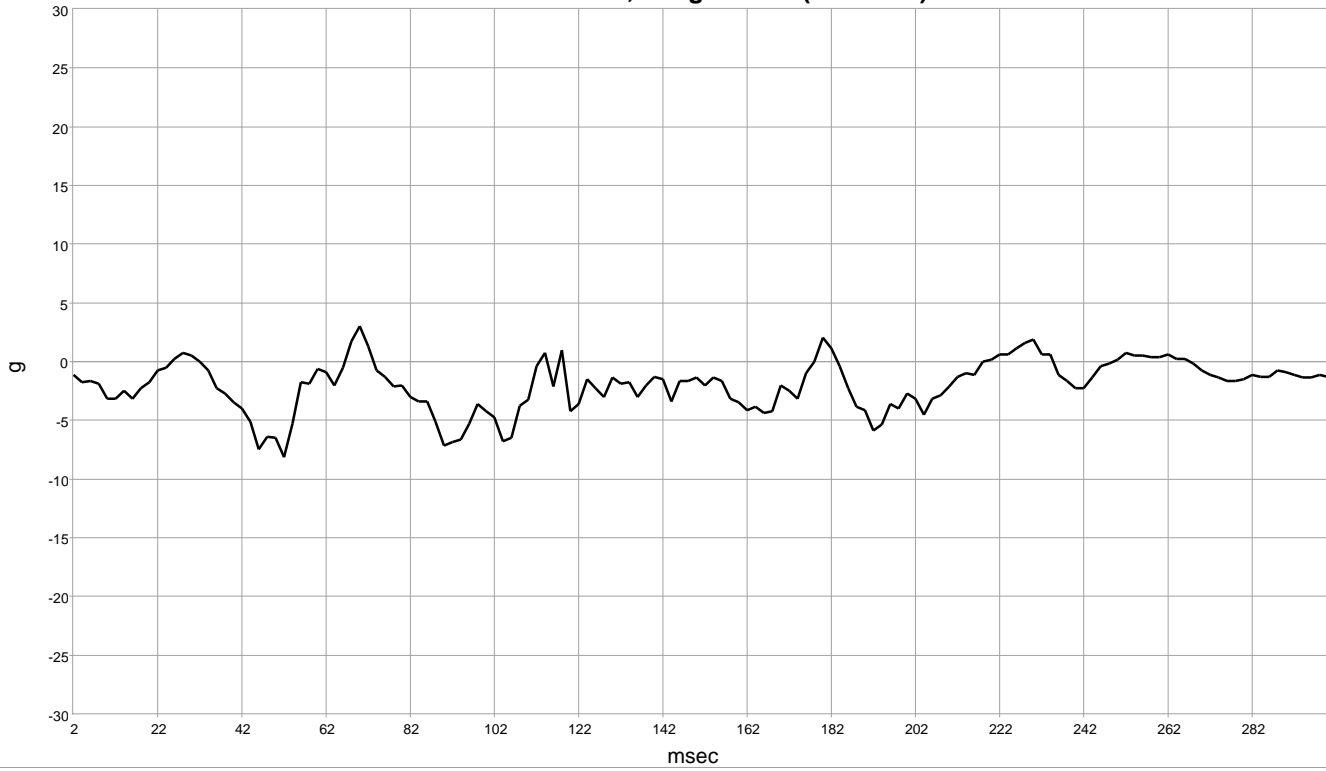
Driver 1st Stage Deployment Loop Commanded	No
Passenger 1st Stage Deployment Loop Commanded	No
Driver 2nd Stage Deployment Loop Commanded	No
Passenger 2nd Stage Deployment Loop Commanded	No
Driver Pretensioner Deployment Loop #1 Commanded	Yes
Passenger Pretensioner Deployment Loop #1 Commanded	Yes
Driver Pretensioner Deployment Loop #2 Commanded	Yes
Passenger Pretensioner Deployment Loop #2 Commanded	Yes
Driver Thorax Loop Commanded	No
Passenger Thorax Loop Commanded	No
Left Row 1 Roof Rail/Head Curtain Loop Commanded	No
Right Row 1 Roof Rail/Head Curtain Loop Commanded	No
Frontal Air Bag Deployment, Time to 1st Stage Deployment, Driver (Driver 1st Stage Time From Time Zero to Deployment Command Criteria Met) (msec)	Data Not Available
Frontal Air Bag Deployment, Time to 1st Stage Deployment, Right Front Passenger (Passenger 1st Stage Time From Time Zero to Deployment Command Criteria Met) (msec)	Data Not Available
Frontal Air Bag Deployment, Time to 2nd Stage, Driver (Driver 2nd Stage Time From Time Zero to Deployment Command Criteria Met) (msec)	Data Not Available
Frontal Air Bag Deployment, Time to 2nd Stage, Right Front Passenger (Passenger 2nd Stage Time From Time Zero to Deployment Command Criteria Met) (msec)	Data Not Available
Pretensioner Deployment, Time to Fire, Driver (Driver Pretensioner Time From Time Zero to Deployment Loop #1 Command Criteria Met) (msec)	101
Pretensioner Deployment, Time to Fire, Right Front Passenger (Passenger Pretensioner Time From Time Zero to Deployment Loop #1 Command Criteria Met) (msec)	101
Pretensioner Deployment, Time to Fire, Driver (Driver Pretensioner Time From Time Zero to Deployment Loop #2 Command Criteria Met) (msec)	111
Pretensioner Deployment, Time to Fire, Right Front Passenger (Passenger Pretensioner Time From Time Zero to Deployment Loop #2 Command Criteria Met) (msec)	107
Side Air Bag Deployment, Time to Deploy, Driver (Driver Thorax Time From Time Zero to Deployment Command Criteria Met) (msec)	Data Not Available
Side Air Bag Deployment, Time to Deploy, Right Front Passenger (Passenger Thorax Time From Time Zero to Deployment Command Criteria Met) (msec)	Data Not Available
Left Row 1 Curtain Time From Time Zero to Deployment Command Criteria Met (msec)	Data Not Available
Right Row 1 Curtain Time From Time Zero to Deployment Command Criteria Met (msec)	Data Not Available



Longitudinal Delta-V (Record 1)

Time (msec)	Delta-V, Longitudinal (SDM Recorded Vehicle Longitudinal Velocity Change for FSR Event) (MPH [km/h])
10	-0.6 [-1]
20	-1.2 [-2]
30	-1.2 [-2]
40	-1.9 [-3]
50	-3.1 [-5]
60	-3.7 [-6]
70	-3.7 [-6]
80	-3.7 [-6]
90	-5.0 [-8]
100	-5.6 [-9]
110	-6.8 [-11]
120	-7.5 [-12]
130	-7.5 [-12]
140	-8.1 [-13]
150	-8.7 [-14]
160	-9.3 [-15]
170	-9.9 [-16]
180	-9.9 [-16]
190	-10.6 [-17]
200	-11.2 [-18]
210	-11.8 [-19]
220	-11.8 [-19]
230	-11.8 [-19]
240	-11.8 [-19]
250	-12.4 [-20]
260	-11.8 [-19]
270	-11.8 [-19]
280	-12.4 [-20]
290	-12.4 [-20]
300	-13.0 [-21]

Acceleration, Longitudinal (Record 1)

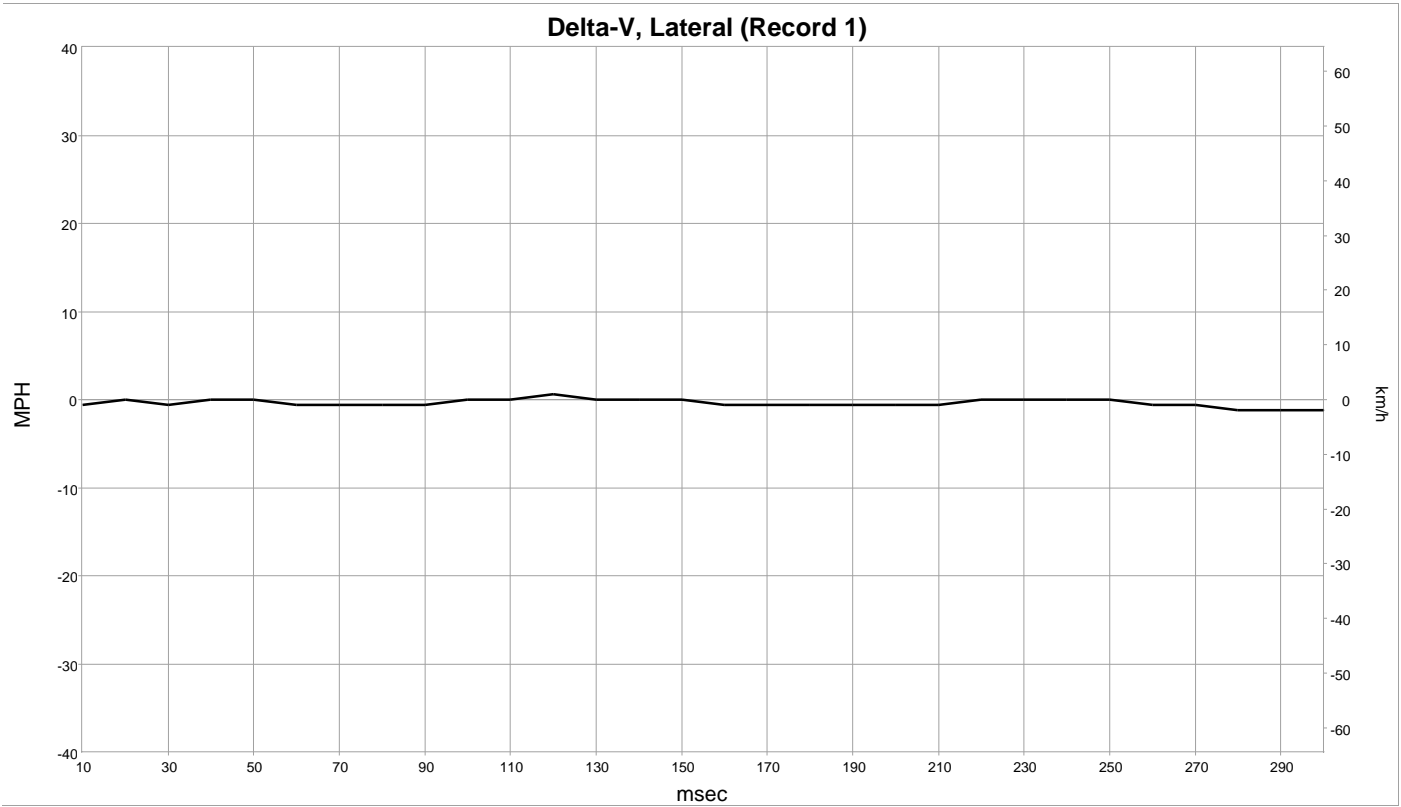


Longitudinal Acceleration (Record 1)

Time (msec)	Longitudinal Acceleration (SDM Recorded Vehicle Longitudinal Acceleration for FSR Event) (g)
2	-1.13
4	-1.75
6	-1.63
8	-1.88
10	-3.13
12	-3.13
14	-2.50
16	-3.13
18	-2.25
20	-1.75
22	-0.75
24	-0.50
26	0.25
28	0.75
30	0.50
32	0.00
34	-0.75
36	-2.25
38	-2.75
40	-3.50
42	-4.00
44	-5.13
46	-7.50
48	-6.38
50	-6.50
52	-8.13
54	-5.25
56	-1.75
58	-1.88
60	-0.63
62	-0.88
64	-2.00
66	-0.50
68	1.75
70	3.00
72	1.25
74	-0.75
76	-1.25
78	-2.13
80	-2.00
82	-3.00
84	-3.38
86	-3.38
88	-5.13
90	-7.13
92	-6.88
94	-6.63
96	-5.25
98	-3.63
100	-4.25
102	-4.75
104	-6.75
106	-6.50
108	-3.75
110	-3.25
112	-0.38
114	0.75
116	-2.13

Time (msec)	Longitudinal Acceleration (SDM Recorded Vehicle Longitudinal Acceleration for FSR Event) (g)
118	1.00
120	-4.25
122	-3.63
124	-1.50
126	-2.25
128	-3.00
130	-1.38
132	-1.88
134	-1.75
136	-3.00
138	-2.00
140	-1.25
142	-1.50
144	-3.38
146	-1.63
148	-1.63
150	-1.38
152	-2.00
154	-1.38
156	-1.63
158	-3.13
160	-3.50
162	-4.13
164	-3.88
166	-4.38
168	-4.25
170	-2.00
172	-2.50
174	-3.13
176	-1.00
178	0.00
180	2.00
182	1.12
184	-0.38
186	-2.25
188	-3.88
190	-4.13
192	-5.88
194	-5.38
196	-3.63
198	-4.00
200	-2.75
202	-3.13
204	-4.50
206	-3.13
208	-2.88
210	-2.13
212	-1.25
214	-1.00
216	-1.13
218	0.00
220	0.12
222	0.62
224	0.62
226	1.12
228	1.62
230	1.87
232	0.62
234	0.62

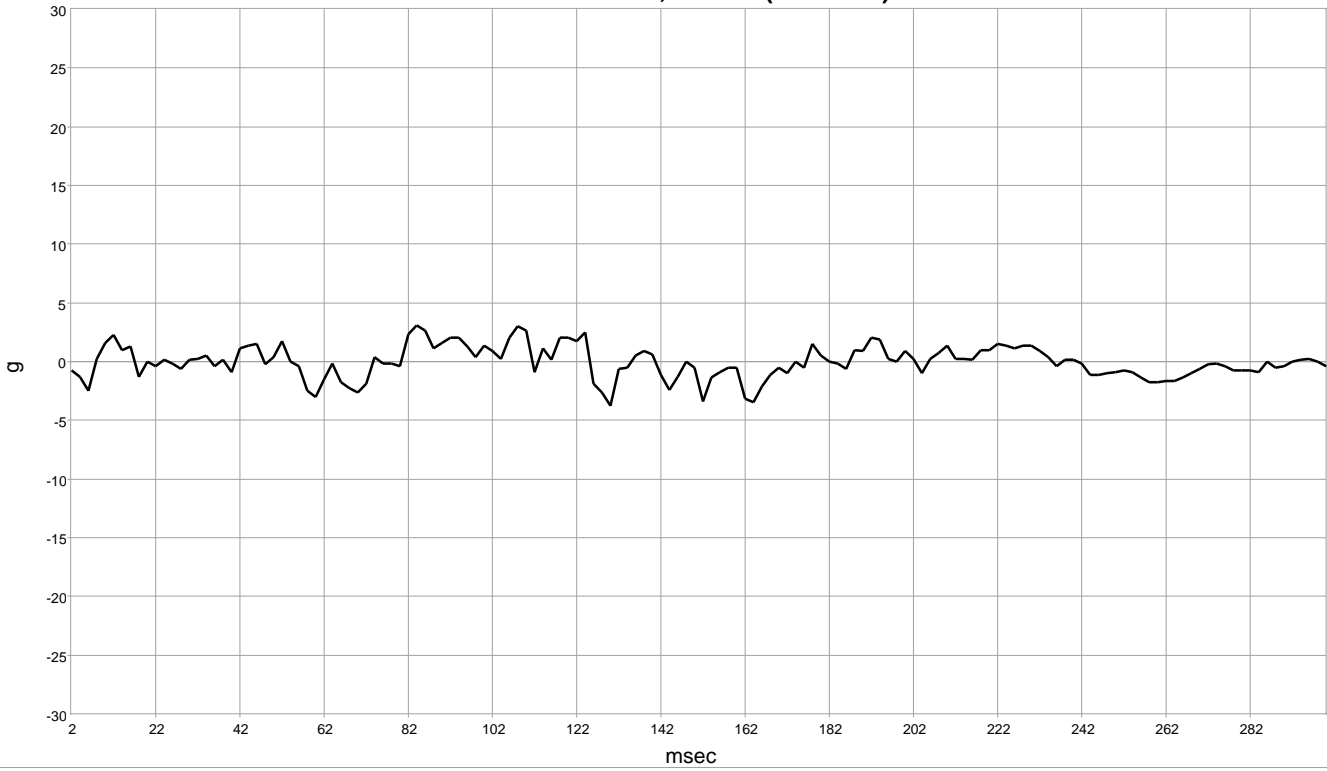
Time (msec)	Longitudinal Acceleration (SDM Recorded Vehicle Longitudinal Acceleration for FSR Event) (g)
236	-1.13
238	-1.63
240	-2.25
242	-2.25
244	-1.38
246	-0.38
248	-0.13
250	0.12
252	0.75
254	0.50
256	0.50
258	0.37
260	0.37
262	0.62
264	0.25
266	0.25
268	-0.13
270	-0.75
272	-1.13
274	-1.38
276	-1.63
278	-1.63
280	-1.50
282	-1.13
284	-1.25
286	-1.25
288	-0.75
290	-0.88
292	-1.13
294	-1.38
296	-1.38
298	-1.13
300	-1.25



Lateral Delta-V (Record 1)

Time (msec)	Delta-V, Lateral (SDM Recorded Vehicle Lateral Velocity Change for FSR Event) (MPH [km/h])
10	-0.6 [-1]
20	0.0 [0]
30	-0.6 [-1]
40	0.0 [0]
50	0.0 [0]
60	-0.6 [-1]
70	-0.6 [-1]
80	-0.6 [-1]
90	-0.6 [-1]
100	0.0 [0]
110	0.0 [0]
120	0.6 [1]
130	0.0 [0]
140	0.0 [0]
150	0.0 [0]
160	-0.6 [-1]
170	-0.6 [-1]
180	-0.6 [-1]
190	-0.6 [-1]
200	-0.6 [-1]
210	-0.6 [-1]
220	0.0 [0]
230	0.0 [0]
240	0.0 [0]
250	0.0 [0]
260	-0.6 [-1]
270	-0.6 [-1]
280	-1.2 [-2]
290	-1.2 [-2]
300	-1.2 [-2]

Acceleration, Lateral (Record 1)



Lateral Acceleration (Record 1)

Time (msec)	Lateral Acceleration (SDM Recorded Vehicle Lateral Acceleration for FSR Event) (g)
2	-0.75
4	-1.25
6	-2.50
8	0.25
10	1.62
12	2.25
14	1.00
16	1.25
18	-1.25
20	0.00
22	-0.38
24	0.12
26	-0.13
28	-0.63
30	0.12
32	0.25
34	0.50
36	-0.38
38	0.12
40	-0.88
42	1.12
44	1.37
46	1.50
48	-0.25
50	0.37
52	1.75
54	0.00
56	-0.38
58	-2.50
60	-3.00
62	-1.50
64	-0.13
66	-1.75
68	-2.25
70	-2.63
72	-1.88
74	0.37
76	-0.13
78	-0.13
80	-0.38
82	2.37
84	3.12
86	2.62
88	1.12
90	1.62
92	2.00
94	2.00
96	1.25
98	0.37
100	1.37
102	0.87
104	0.25
106	2.00
108	3.00
110	2.62
112	-0.88
114	1.12
116	0.12
118	2.00

Time (msec)	Lateral Acceleration (SDM Recorded Vehicle Lateral Acceleration for FSR Event) (g)
120	2.00
122	1.75
124	2.50
126	-1.88
128	-2.63
130	-3.75
132	-0.63
134	-0.50
136	0.50
138	0.87
140	0.62
142	-1.13
144	-2.38
146	-1.25
148	0.00
150	-0.50
152	-3.38
154	-1.38
156	-0.88
158	-0.50
160	-0.50
162	-3.13
164	-3.50
166	-2.13
168	-1.13
170	-0.50
172	-1.00
174	0.00
176	-0.50
178	1.50
180	0.50
182	0.00
184	-0.13
186	-0.63
188	1.00
190	0.87
192	2.00
194	1.87
196	0.25
198	0.00
200	0.87
202	0.25
204	-1.00
206	0.25
208	0.75
210	1.37
212	0.25
214	0.25
216	0.12
218	1.00
220	1.00
222	1.50
224	1.37
226	1.12
228	1.37
230	1.37
232	0.87
234	0.37
236	-0.38
238	0.12

Time (msec)	Lateral Acceleration (SDM Recorded Vehicle Lateral Acceleration for FSR Event) (g)
240	0.12
242	-0.13
244	-1.13
246	-1.13
248	-1.00
250	-0.88
252	-0.75
254	-0.88
256	-1.38
258	-1.75
260	-1.75
262	-1.63
264	-1.63
266	-1.38
268	-1.00
270	-0.63
272	-0.25
274	-0.13
276	-0.38
278	-0.75
280	-0.75
282	-0.75
284	-0.88
286	0.00
288	-0.50
290	-0.38
292	0.00
294	0.12
296	0.25
298	0.00
300	-0.38

Roll Rate (Record 1)

Contains No Recorded Data

Acceleration, Lateral, Rollover (Record 1)

Contains No Recorded Data

Acceleration, Normal, Rollover (Record 1)

Contains No Recorded Data

Pre-Crash Data -5.0 to -0.5 sec (Record 1) - Table 1 of 2

Time (sec)	Accelerator Pedal Position, % Full (Accelerator Pedal Position) (%)	Service Brake (Brake Switch Circuit State)	Engine RPM (Engine Speed) (RPM)	Engine Throttle, % Full (Throttle Position) (%)	Speed, Vehicle Indicated (Vehicle Speed) (MPH [km/h])	System Power Mode Status	System Backup Power Mode Status
-5.0	0	Off	3,008	19	88.9 [143]	Run	Run
-4.5	0	Off	3,008	18	88.2 [142]	Run	Run
-4.0	0	Off	2,944	17	87.0 [140]	Run	Run
-3.5	0	Off	2,496	13	86.4 [139]	Run	Run
-3.0	0	Off	2,496	13	85.1 [137]	Run	Run
-2.5	0	Off	2,432	13	84.5 [136]	Run	Run
-2.0	0	Off	1,920	17	83.9 [135]	Run	Run
-1.5	0	On	1,856	14	81.4 [131]	Run	Run
-1.0	0	Off	1,856	14	77.7 [125]	Run	Run
-0.5	0	Off	1,728	9	76.4 [123]	Run	Run

Pre-Crash Data -5.0 to -0.5 sec (Record 1) - Table 2 of 2

Time (sec)	System Backup Power Mode Enabled	CommEnable Status	SDM Power Mode Status	Ignition Prolongation Timer (seconds)
-5.0	No	Active	Run	0.0
-4.5	No	Active	Run	0.0
-4.0	No	Active	Run	0.0
-3.5	No	Active	Run	0.0
-3.0	No	Active	Run	0.0
-2.5	No	Active	Run	0.0
-2.0	No	Active	Run	0.0
-1.5	No	Active	Run	0.0
-1.0	No	Active	Run	0.0
-0.5	No	Active	Run	0.0

Pre-Crash Data -2.0 to -0.5 sec (Record 1)

Time (sec)	Cruise Control Resume Switch Active	Cruise Control Active	Cruise Control Set Switch Active	Reduced Engine Power Mode Indicator	Engine Torque (N-m)
-2.0	No	No	No	Off	-88
-1.5	No	No	No	Off	-87
-1.0	No	No	No	Off	-87
-0.5	No	No	No	Off	-19

System Status at Event (Record 2)

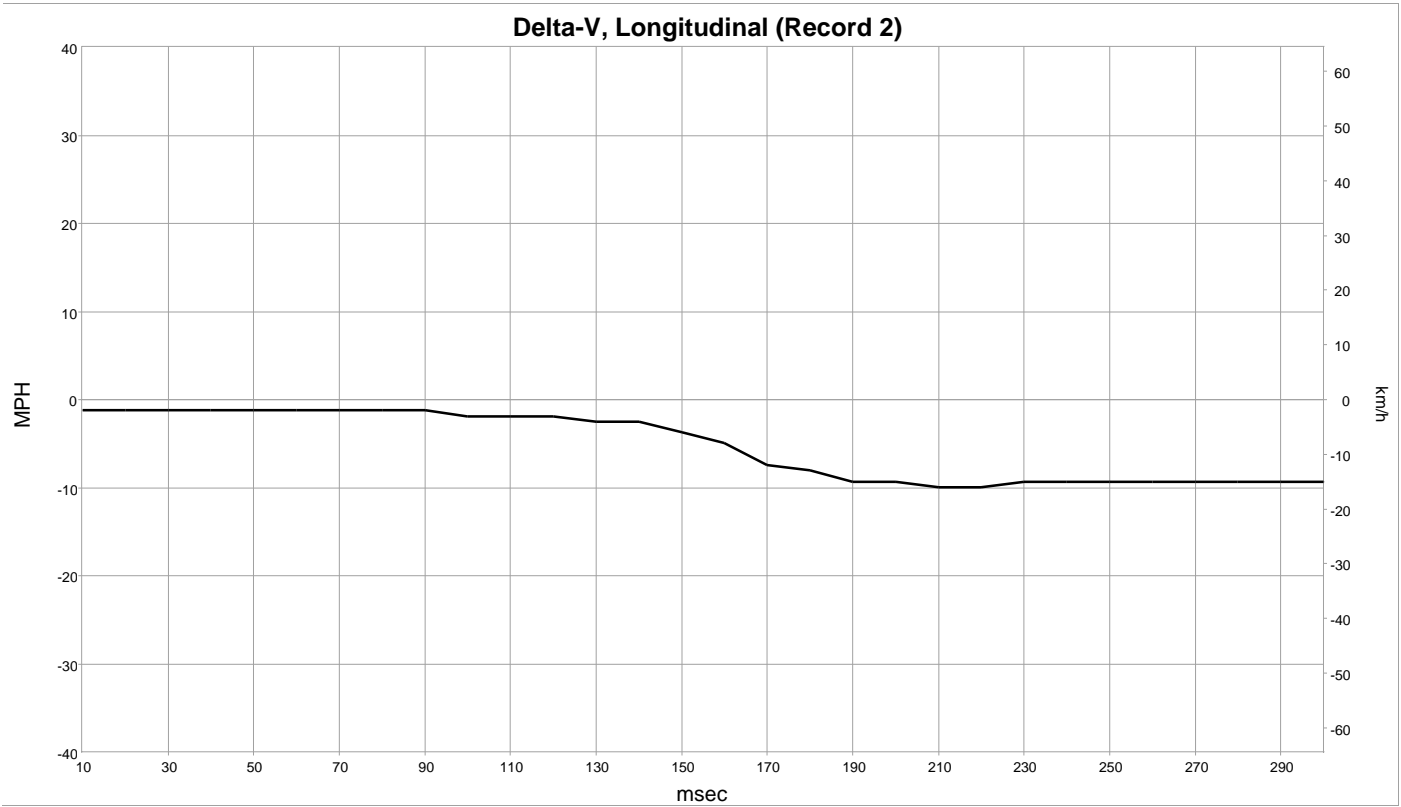
Complete File Recorded (Event Recording Complete)	Yes
Event Record Type	Deployment
Crash Record Locked	Yes
OnStar Deployment Status Data Sent	Yes
OnStar SDM Recorded Vehicle Velocity Change Data Sent	Yes
High Voltage Disable Notification Sent	No
Deployment Commanded in Energy Reserve Mode	No
Deployment Event Counter	2
Multi-Event, Number of Events (Event Counter)	2
OnStar Notification Event Counter	2
Algorithm Active - Frontal	Yes
Algorithm Active - Side	Yes
Algorithm Active - Rollover	Yes
Algorithm Active - Rear	Yes
Ignition Cycle, Crash (Ignition Cycles at Event)	249
Time From Event 1 to 2 (Time Between Events) (msec)	440
Concurrent Event Flag Set	No
Event Severity Status: Frontal Pretensioner	Yes
Event Severity Status: Frontal Stage 1	No
Event Severity Status: Frontal Stage 2	No
Event Severity Status: Left Side	No
Event Severity Status: Right Side	No
Event Severity Status: Rear	No
Event Severity Status: Rollover	No
Event Severity Status: Battery Disconnect Switch - Side Event	No
Safety Belt Status, Driver (Driver Belt Switch Circuit Status)	Not Buckled
Safety Belt Status, Right Front Passenger (Passenger Belt Switch Circuit Status)	Not Buckled
Center Front Row Belt Switch Circuit Status (If Equipped)	Data Not Available
Center Row 3 Belt Switch Circuit Status (If Equipped)	Data Not Available
Passenger Seat Occupancy Status	Empty
Occupant Size Right Front Passenger Child (Passenger Classification Status)	No (Not Applicable)
Passenger Air Bag ON Indicator Status	Off
Passenger Air Bag OFF Indicator Status	On
Low Tire Pressure Warning Lamp Status 0.5 Seconds prior to Time Zero	Off
Frontal Air Bag Warning Lamp (SIR Warning Lamp Status 0.5 Seconds Prior to Time Zero)	On
SIR Warning Lamp ON/OFF Time Continuously (seconds)	0
Number of Ignition Cycles SIR Warning Lamp was ON/OFF Continuously	0
Ignition Cycles Since DTCs Were Last Cleared 0.5 Seconds Prior to Time Zero	249
Maximum Delta-V, Longitudinal (Maximum Longitudinal SDM Recorded Vehicle Velocity Change for FSR Event) (MPH [km/h])	-9.9 [-16]
Time, Maximum Delta-V (Time From FSR Time Zero to Maximum Longitudinal SDM Recorded Vehicle Velocity Change) (msec)	222
Maximum Delta-V, Lateral (Maximum Lateral SDM Recorded Vehicle Velocity Change for FSR Event) (MPH [km/h])	-5.6 [-9]
Time Maximum Delta-V, Lateral (Time From FSR Time Zero to Maximum Lateral SDM Recorded Vehicle Velocity Change) (msec)	198
Maximum Resultant Delta-V – Longitudinal Component for FSR Event (MPH [km/h])	-9.9 [-16]
Maximum Resultant Delta-V – Lateral Component for FSR Event (MPH [km/h])	-5.0 [-8]
Time from FSR Time Zero to time of the Maximum Resultant Delta-V (msec)	204
Blended Event FSR 1 Severity Type	Frontal (Pretensioner/Stage 1/Stage 2)
Blended Event FSR 2 Severity Type	Data Not Available
Blended Event Time from FSR 1 Time Zero to FSR 2 Time Zero (msec)	Data Not Available
Blended Event FSR 3 Severity Type	Data Not Available
Blended Event Time from FSR 1 Time Zero to FSR 3 Time Zero (msec)	Data Not Available

Diagnostic Trouble Codes 0.5 Seconds Prior to Time Zero (Record 2)

DTC 1	B0052-00
DTC 2	N/A
DTC 3	N/A
DTC 4	N/A
DTC 5	N/A
DTC 6	N/A
DTC 7	N/A
DTC 8	N/A
DTC 9	N/A

Deployment Command Data (Record 2)

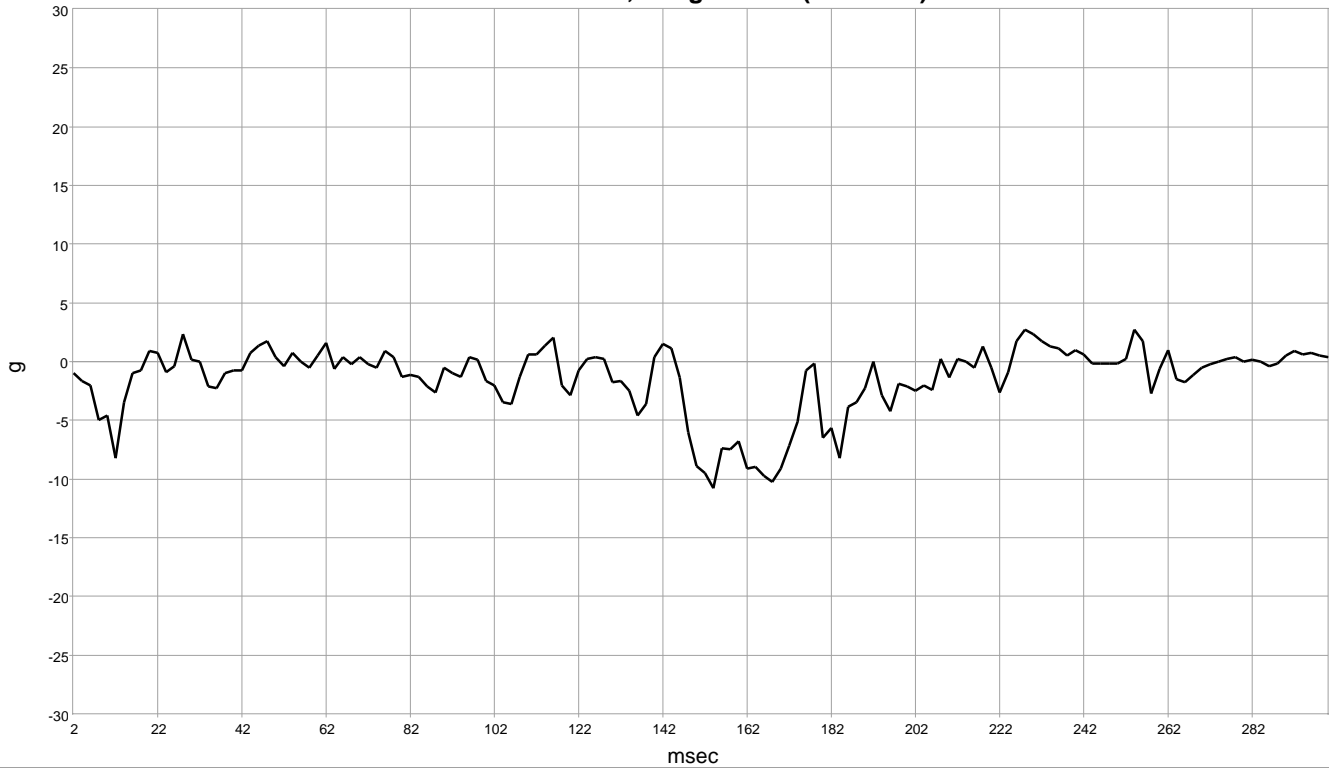
Driver 1st Stage Deployment Loop Commanded	No
Passenger 1st Stage Deployment Loop Commanded	No
Driver 2nd Stage Deployment Loop Commanded	No
Passenger 2nd Stage Deployment Loop Commanded	No
Driver Pretensioner Deployment Loop #1 Commanded	No
Passenger Pretensioner Deployment Loop #1 Commanded	No
Driver Pretensioner Deployment Loop #2 Commanded	No
Passenger Pretensioner Deployment Loop #2 Commanded	No
Driver Thorax Loop Commanded	No
Passenger Thorax Loop Commanded	No
Left Row 1 Roof Rail/Head Curtain Loop Commanded	No
Right Row 1 Roof Rail/Head Curtain Loop Commanded	No
Frontal Air Bag Deployment, Time to 1st Stage Deployment, Driver (Driver 1st Stage Time From Time Zero to Deployment Command Criteria Met) (msec)	Data Not Available
Frontal Air Bag Deployment, Time to 1st Stage Deployment, Right Front Passenger (Passenger 1st Stage Time From Time Zero to Deployment Command Criteria Met) (msec)	Data Not Available
Frontal Air Bag Deployment, Time to 2nd Stage, Driver (Driver 2nd Stage Time From Time Zero to Deployment Command Criteria Met) (msec)	Data Not Available
Frontal Air Bag Deployment, Time to 2nd Stage, Right Front Passenger (Passenger 2nd Stage Time From Time Zero to Deployment Command Criteria Met) (msec)	Data Not Available
Pretensioner Deployment, Time to Fire, Driver (Driver Pretensioner Time From Time Zero to Deployment Loop #1 Command Criteria Met) (msec)	Data Not Available
Pretensioner Deployment, Time to Fire, Right Front Passenger (Passenger Pretensioner Time From Time Zero to Deployment Loop #1 Command Criteria Met) (msec)	Data Not Available
Pretensioner Deployment, Time to Fire, Driver (Driver Pretensioner Time From Time Zero to Deployment Loop #2 Command Criteria Met) (msec)	Data Not Available
Pretensioner Deployment, Time to Fire, Right Front Passenger (Passenger Pretensioner Time From Time Zero to Deployment Loop #2 Command Criteria Met) (msec)	Data Not Available
Side Air Bag Deployment, Time to Deploy, Driver (Driver Thorax Time From Time Zero to Deployment Command Criteria Met) (msec)	Data Not Available
Side Air Bag Deployment, Time to Deploy, Right Front Passenger (Passenger Thorax Time From Time Zero to Deployment Command Criteria Met) (msec)	Data Not Available
Left Row 1 Curtain Time From Time Zero to Deployment Command Criteria Met (msec)	Data Not Available
Right Row 1 Curtain Time From Time Zero to Deployment Command Criteria Met (msec)	Data Not Available



Longitudinal Delta-V (Record 2)

Time (msec)	Delta-V, Longitudinal (SDM Recorded Vehicle Longitudinal Velocity Change for FSR Event) (MPH [km/h])
10	-1.2 [-2]
20	-1.2 [-2]
30	-1.2 [-2]
40	-1.2 [-2]
50	-1.2 [-2]
60	-1.2 [-2]
70	-1.2 [-2]
80	-1.2 [-2]
90	-1.2 [-2]
100	-1.9 [-3]
110	-1.9 [-3]
120	-1.9 [-3]
130	-2.5 [-4]
140	-2.5 [-4]
150	-3.7 [-6]
160	-5.0 [-8]
170	-7.5 [-12]
180	-8.1 [-13]
190	-9.3 [-15]
200	-9.3 [-15]
210	-9.9 [-16]
220	-9.9 [-16]
230	-9.3 [-15]
240	-9.3 [-15]
250	-9.3 [-15]
260	-9.3 [-15]
270	-9.3 [-15]
280	-9.3 [-15]
290	-9.3 [-15]
300	-9.3 [-15]

Acceleration, Longitudinal (Record 2)

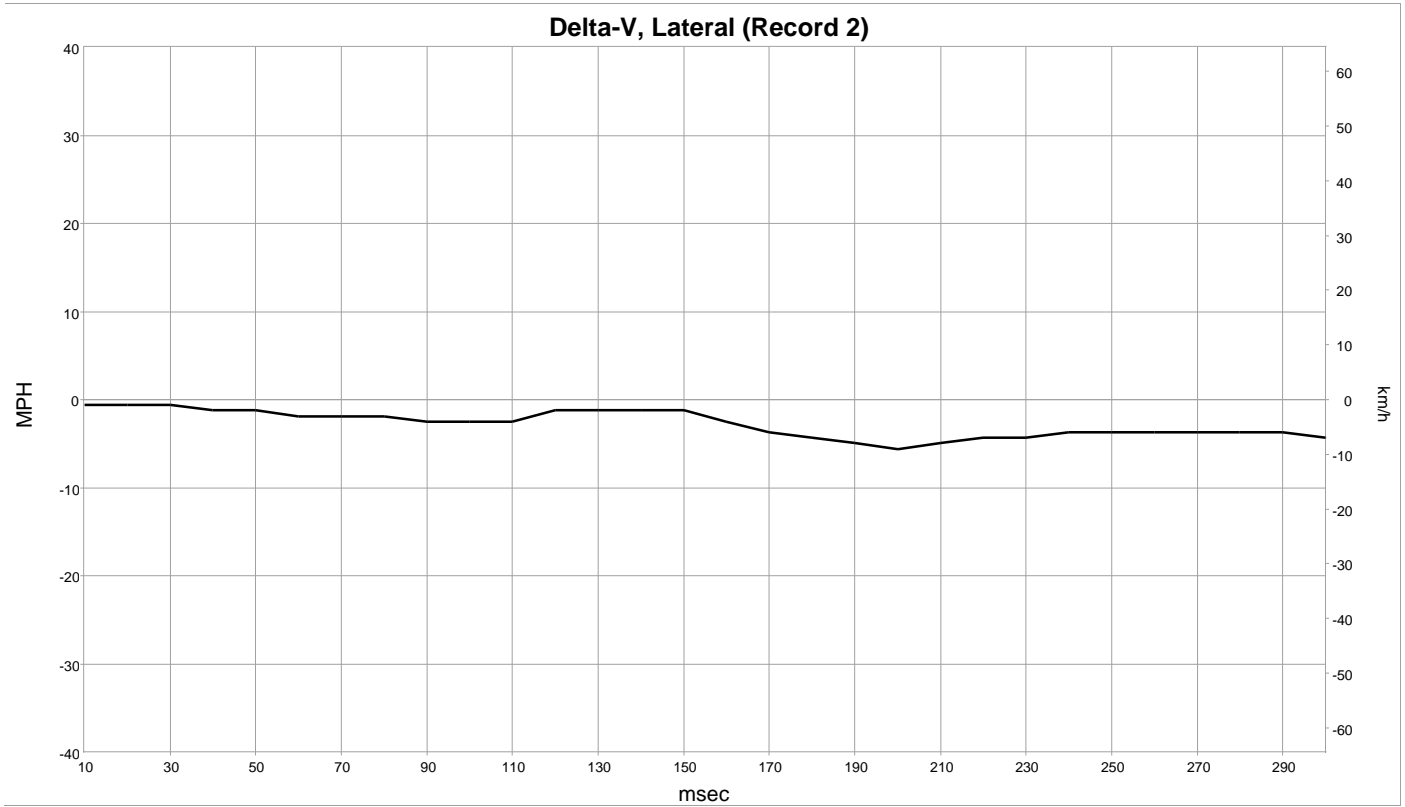


Longitudinal Acceleration (Record 2)

Time (msec)	Longitudinal Acceleration (SDM Recorded Vehicle Longitudinal Acceleration for FSR Event) (g)
2	-1.00
4	-1.63
6	-2.00
8	-5.00
10	-4.63
12	-8.25
14	-3.50
16	-1.00
18	-0.75
20	0.87
22	0.75
24	-0.88
26	-0.38
28	2.37
30	0.12
32	0.00
34	-2.13
36	-2.25
38	-1.00
40	-0.75
42	-0.75
44	0.75
46	1.37
48	1.75
50	0.37
52	-0.38
54	0.75
56	0.00
58	-0.50
60	0.50
62	1.62
64	-0.63
66	0.37
68	-0.25
70	0.37
72	-0.25
74	-0.50
76	0.87
78	0.37
80	-1.25
82	-1.13
84	-1.25
86	-2.13
88	-2.63
90	-0.50
92	-1.00
94	-1.25
96	0.37
98	0.12
100	-1.63
102	-2.00
104	-3.50
106	-3.63
108	-1.25
110	0.62
112	0.62
114	1.37
116	2.00

Time (msec)	Longitudinal Acceleration (SDM Recorded Vehicle Longitudinal Acceleration for FSR Event) (g)
118	-2.00
120	-2.88
122	-0.75
124	0.25
126	0.37
128	0.25
130	-1.75
132	-1.63
134	-2.50
136	-4.63
138	-3.63
140	0.37
142	1.50
144	1.12
146	-1.38
148	-6.00
150	-8.88
152	-9.50
154	-10.75
156	-7.38
158	-7.50
160	-6.75
162	-9.13
164	-9.00
166	-9.75
168	-10.25
170	-9.13
172	-7.13
174	-5.13
176	-0.75
178	-0.13
180	-6.50
182	-5.63
184	-8.25
186	-3.88
188	-3.50
190	-2.25
192	0.00
194	-2.88
196	-4.25
198	-1.88
200	-2.13
202	-2.50
204	-2.00
206	-2.38
208	0.25
210	-1.38
212	0.25
214	0.00
216	-0.50
218	1.25
220	-0.50
222	-2.63
224	-0.88
226	1.75
228	2.75
230	2.37
232	1.75
234	1.25

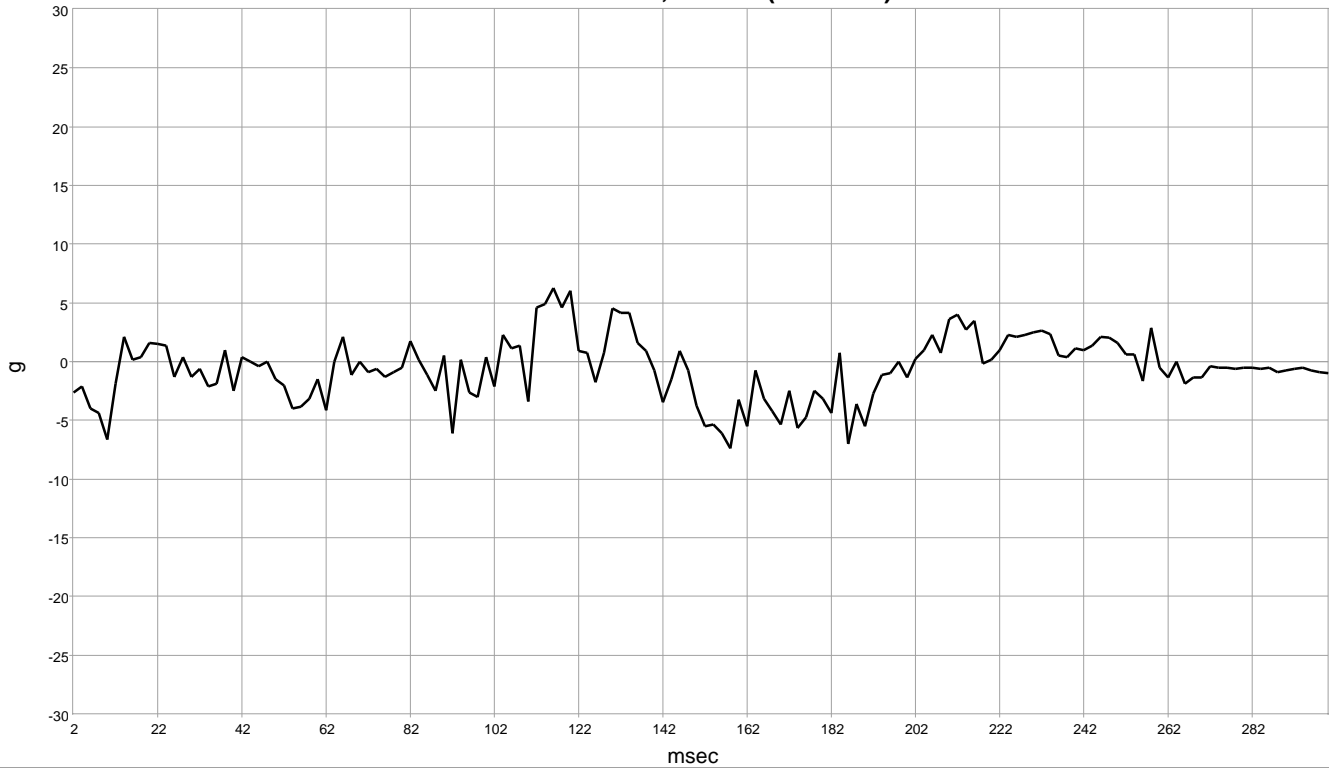
Time (msec)	Longitudinal Acceleration (SDM Recorded Vehicle Longitudinal Acceleration for FSR Event) (g)
236	1.12
238	0.50
240	1.00
242	0.62
244	-0.13
246	-0.13
248	-0.13
250	-0.13
252	0.25
254	2.75
256	1.75
258	-2.75
260	-0.63
262	1.00
264	-1.50
266	-1.75
268	-1.13
270	-0.50
272	-0.25
274	0.00
276	0.25
278	0.37
280	0.00
282	0.12
284	0.00
286	-0.38
288	-0.13
290	0.50
292	0.87
294	0.62
296	0.75
298	0.50
300	0.37



Lateral Delta-V (Record 2)

Time (msec)	Delta-V, Lateral (SDM Recorded Vehicle Lateral Velocity Change for FSR Event) (MPH [km/h])
10	-0.6 [-1]
20	-0.6 [-1]
30	-0.6 [-1]
40	-1.2 [-2]
50	-1.2 [-2]
60	-1.9 [-3]
70	-1.9 [-3]
80	-1.9 [-3]
90	-2.5 [-4]
100	-2.5 [-4]
110	-2.5 [-4]
120	-1.2 [-2]
130	-1.2 [-2]
140	-1.2 [-2]
150	-1.2 [-2]
160	-2.5 [-4]
170	-3.7 [-6]
180	-4.3 [-7]
190	-5.0 [-8]
200	-5.6 [-9]
210	-5.0 [-8]
220	-4.3 [-7]
230	-4.3 [-7]
240	-3.7 [-6]
250	-3.7 [-6]
260	-3.7 [-6]
270	-3.7 [-6]
280	-3.7 [-6]
290	-3.7 [-6]
300	-4.3 [-7]

Acceleration, Lateral (Record 2)



Lateral Acceleration (Record 2)

Time (msec)	Lateral Acceleration (SDM Recorded Vehicle Lateral Acceleration for FSR Event) (g)
2	-2.63
4	-2.13
6	-4.00
8	-4.38
10	-6.63
12	-1.88
14	2.12
16	0.12
18	0.37
20	1.62
22	1.50
24	1.37
26	-1.25
28	0.37
30	-1.25
32	-0.63
34	-2.13
36	-1.88
38	1.00
40	-2.50
42	0.37
44	0.00
46	-0.38
48	0.00
50	-1.50
52	-2.00
54	-4.00
56	-3.88
58	-3.13
60	-1.50
62	-4.13
64	0.00
66	2.12
68	-1.13
70	0.00
72	-0.88
74	-0.63
76	-1.25
78	-0.88
80	-0.50
82	1.75
84	0.12
86	-1.13
88	-2.50
90	0.50
92	-6.13
94	0.12
96	-2.63
98	-3.00
100	0.37
102	-2.13
104	2.25
106	1.12
108	1.37
110	-3.38
112	4.62
114	4.87
116	6.25
118	4.62

Time (msec)	Lateral Acceleration (SDM Recorded Vehicle Lateral Acceleration for FSR Event) (g)
120	6.00
122	0.87
124	0.75
126	-1.75
128	0.75
130	4.50
132	4.12
134	4.12
136	1.62
138	0.87
140	-0.75
142	-3.50
144	-1.50
146	0.87
148	-0.75
150	-3.75
152	-5.50
154	-5.38
156	-6.13
158	-7.38
160	-3.25
162	-5.50
164	-0.75
166	-3.13
168	-4.25
170	-5.38
172	-2.50
174	-5.63
176	-4.75
178	-2.50
180	-3.13
182	-4.38
184	0.75
186	-7.00
188	-3.63
190	-5.50
192	-2.75
194	-1.13
196	-1.00
198	0.00
200	-1.38
202	0.25
204	1.00
206	2.25
208	0.75
210	3.62
212	4.00
214	2.75
216	3.50
218	-0.13
220	0.12
222	1.00
224	2.25
226	2.12
228	2.25
230	2.50
232	2.62
234	2.37
236	0.50
238	0.37

Time (msec)	Lateral Acceleration (SDM Recorded Vehicle Lateral Acceleration for FSR Event) (g)
240	1.12
242	1.00
244	1.37
246	2.12
248	2.00
250	1.62
252	0.62
254	0.62
256	-1.63
258	2.87
260	-0.50
262	-1.38
264	0.00
266	-1.88
268	-1.38
270	-1.38
272	-0.38
274	-0.50
276	-0.50
278	-0.63
280	-0.50
282	-0.50
284	-0.63
286	-0.50
288	-0.88
290	-0.75
292	-0.63
294	-0.50
296	-0.75
298	-0.88
300	-1.00

Roll Rate (Record 2)

Contains No Recorded Data

Acceleration, Lateral, Rollover (Record 2)

Contains No Recorded Data

Acceleration, Normal, Rollover (Record 2)

Contains No Recorded Data

Pre-Crash Data -5.0 to -0.5 sec (Record 2) - Table 1 of 2

Time (sec)	Accelerator Pedal Position, % Full (Accelerator Pedal Position) (%)	Service Brake (Brake Switch Circuit State)	Engine RPM (Engine Speed) (RPM)	Engine Throttle, % Full (Throttle Position) (%)	Speed, Vehicle Indicated (Vehicle Speed) (MPH [km/h])	System Power Mode Status	System Backup Power Mode Status
-5.0	0	Off	3,008	18	88.2 [142]	Run	Run
-4.5	0	Off	2,944	17	87.0 [140]	Run	Run
-4.0	0	Off	2,496	13	86.4 [139]	Run	Run
-3.5	0	Off	2,496	13	85.1 [137]	Run	Run
-3.0	0	Off	2,432	13	84.5 [136]	Run	Run
-2.5	0	Off	1,920	17	83.9 [135]	Run	Run
-2.0	0	On	1,856	14	81.4 [131]	Run	Run
-1.5	0	Off	1,856	14	77.7 [125]	Run	Run
-1.0	0	Off	1,728	9	76.4 [123]	Run	Run
-0.5	99	Off	1,536	35	69.6 [112]	Run	Run

Pre-Crash Data -5.0 to -0.5 sec (Record 2) - Table 2 of 2

Time (sec)	System Backup Power Mode Enabled	CommEnable Status	SDM Power Mode Status	Ignition Prolongation Timer (seconds)
-5.0	No	Active	Run	0.0
-4.5	No	Active	Run	0.0
-4.0	No	Active	Run	0.0
-3.5	No	Active	Run	0.0
-3.0	No	Active	Run	0.0
-2.5	No	Active	Run	0.0
-2.0	No	Active	Run	0.0
-1.5	No	Active	Run	0.0
-1.0	No	Active	Run	0.0
-0.5	No	Active	Run	0.0

Pre-Crash Data -2.0 to -0.5 sec (Record 2)

Time (sec)	Cruise Control Resume Switch Active	Cruise Control Active	Cruise Control Set Switch Active	Reduced Engine Power Mode Indicator	Engine Torque (N-m)
-2.0	No	No	No	Off	-87
-1.5	No	No	No	Off	-87
-1.0	No	No	No	Off	-19
-0.5	No	No	No	Off	-15

System Status at Event (Record 3)

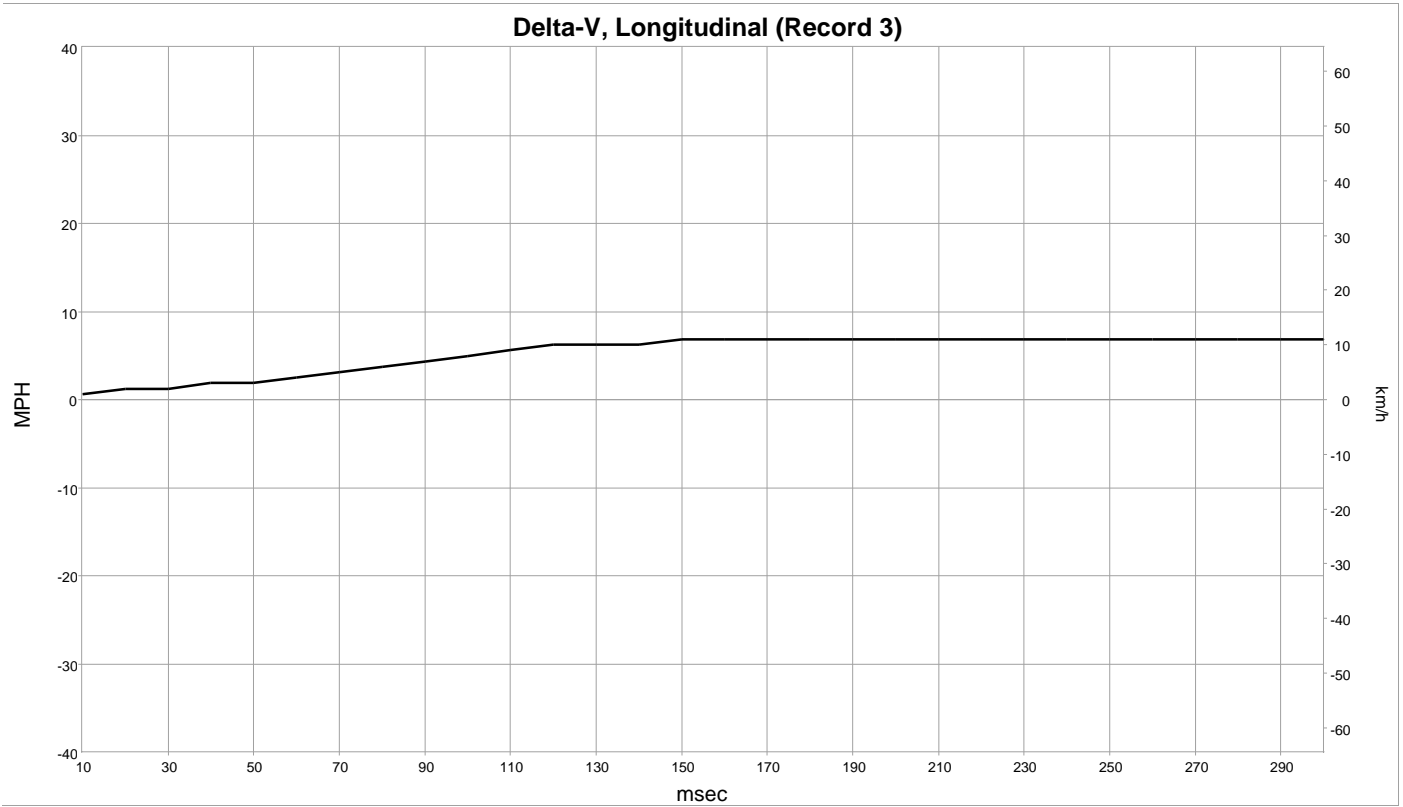
Complete File Recorded (Event Recording Complete)	Yes
Event Record Type	Non-Deployment
Crash Record Locked	No
OnStar Deployment Status Data Sent	No
OnStar SDM Recorded Vehicle Velocity Change Data Sent	No
High Voltage Disable Notification Sent	No
Deployment Commanded in Energy Reserve Mode	No
Deployment Event Counter	2
Multi-Event, Number of Events (Event Counter)	3
OnStar Notification Event Counter	2
Algorithm Active - Frontal	Yes
Algorithm Active - Side	No
Algorithm Active - Rollover	Yes
Algorithm Active - Rear	Yes
Ignition Cycle, Crash (Ignition Cycles at Event)	249
Time From Event 1 to 2 (Time Between Events) (msec)	2,140
Concurrent Event Flag Set	No
Event Severity Status: Frontal Pretensioner	No
Event Severity Status: Frontal Stage 1	No
Event Severity Status: Frontal Stage 2	No
Event Severity Status: Left Side	No
Event Severity Status: Right Side	No
Event Severity Status: Rear	No
Event Severity Status: Rollover	No
Event Severity Status: Battery Disconnect Switch - Side Event	No
Safety Belt Status, Driver (Driver Belt Switch Circuit Status)	Not Buckled
Safety Belt Status, Right Front Passenger (Passenger Belt Switch Circuit Status)	Not Buckled
Center Front Row Belt Switch Circuit Status (If Equipped)	Data Not Available
Center Row 3 Belt Switch Circuit Status (If Equipped)	Data Not Available
Passenger Seat Occupancy Status	Empty
Occupant Size Right Front Passenger Child (Passenger Classification Status)	No (Not Applicable)
Passenger Air Bag ON Indicator Status	Off
Passenger Air Bag OFF Indicator Status	On
Low Tire Pressure Warning Lamp Status 0.5 Seconds prior to Time Zero	Off
Frontal Air Bag Warning Lamp (SIR Warning Lamp Status 0.5 Seconds Prior to Time Zero)	On
SIR Warning Lamp ON/OFF Time Continuously (seconds)	0
Number of Ignition Cycles SIR Warning Lamp was ON/OFF Continuously	0
Ignition Cycles Since DTCs Were Last Cleared 0.5 Seconds Prior to Time Zero	249
Maximum Delta-V, Longitudinal (Maximum Longitudinal SDM Recorded Vehicle Velocity Change for FSR Event) (MPH [km/h])	6.8 [11]
Time, Maximum Delta-V (Time From FSR Time Zero to Maximum Longitudinal SDM Recorded Vehicle Velocity Change) (msec)	150
Maximum Delta-V, Lateral (Maximum Lateral SDM Recorded Vehicle Velocity Change for FSR Event) (MPH [km/h])	-1.2 [-2]
Time Maximum Delta-V, Lateral (Time From FSR Time Zero to Maximum Lateral SDM Recorded Vehicle Velocity Change) (msec)	152
Maximum Resultant Delta-V – Longitudinal Component for FSR Event (MPH [km/h])	6.8 [11]
Maximum Resultant Delta-V – Lateral Component for FSR Event (MPH [km/h])	-1.2 [-2]
Time from FSR Time Zero to time of the Maximum Resultant Delta-V (msec)	152
Blended Event FSR 1 Severity Type	Non-deploy FSR (qualified or non-qualified)
Blended Event FSR 2 Severity Type	Data Not Available
Blended Event Time from FSR 1 Time Zero to FSR 2 Time Zero (msec)	Data Not Available
Blended Event FSR 3 Severity Type	Data Not Available
Blended Event Time from FSR 1 Time Zero to FSR 3 Time Zero (msec)	Data Not Available

Diagnostic Trouble Codes 0.5 Seconds Prior to Time Zero (Record 3)

DTC 1	B0052-00
DTC 2	N/A
DTC 3	N/A
DTC 4	N/A
DTC 5	N/A
DTC 6	N/A
DTC 7	N/A
DTC 8	N/A
DTC 9	N/A

Deployment Command Data (Record 3)

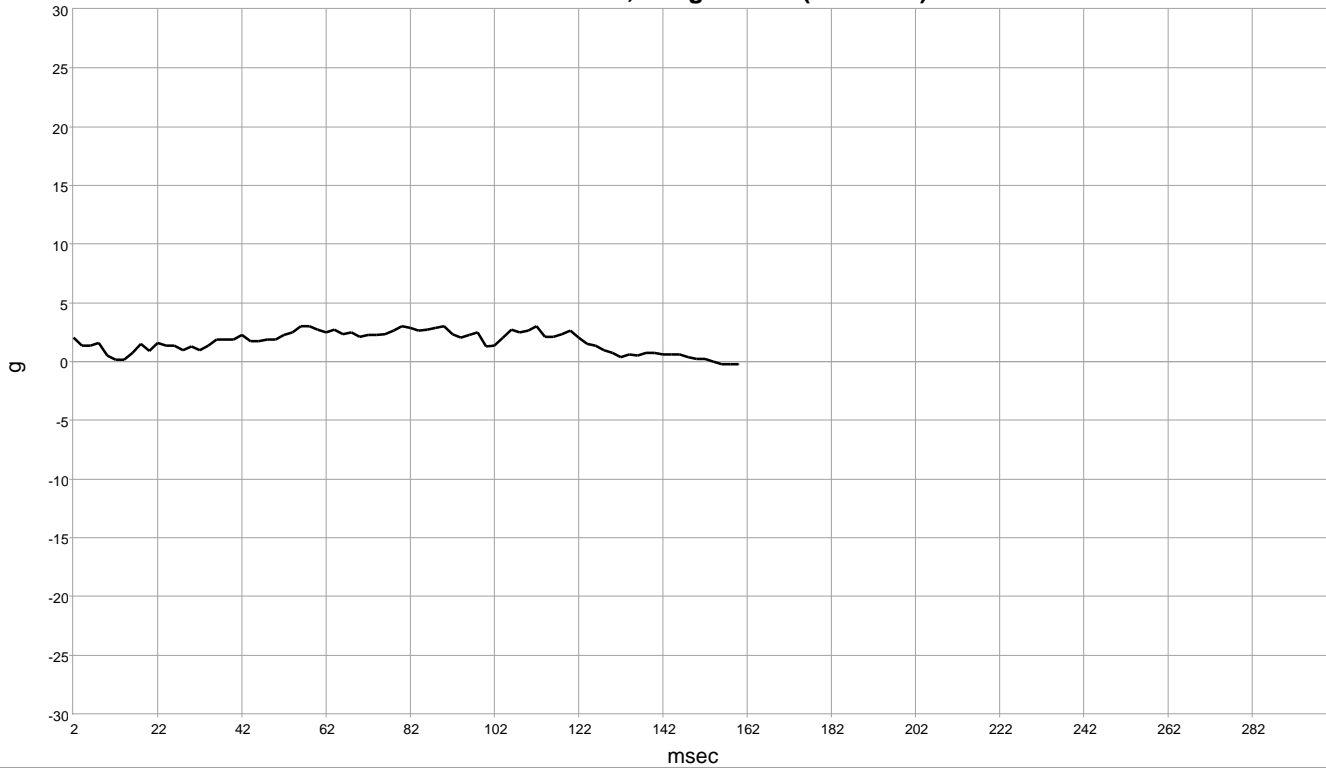
Driver 1st Stage Deployment Loop Commanded	No
Passenger 1st Stage Deployment Loop Commanded	No
Driver 2nd Stage Deployment Loop Commanded	No
Passenger 2nd Stage Deployment Loop Commanded	No
Driver Pretensioner Deployment Loop #1 Commanded	No
Passenger Pretensioner Deployment Loop #1 Commanded	No
Driver Pretensioner Deployment Loop #2 Commanded	No
Passenger Pretensioner Deployment Loop #2 Commanded	No
Driver Thorax Loop Commanded	No
Passenger Thorax Loop Commanded	No
Left Row 1 Roof Rail/Head Curtain Loop Commanded	No
Right Row 1 Roof Rail/Head Curtain Loop Commanded	No
Frontal Air Bag Deployment, Time to 1st Stage Deployment, Driver (Driver 1st Stage Time From Time Zero to Deployment Command Criteria Met) (msec)	Data Not Available
Frontal Air Bag Deployment, Time to 1st Stage Deployment, Right Front Passenger (Passenger 1st Stage Time From Time Zero to Deployment Command Criteria Met) (msec)	Data Not Available
Frontal Air Bag Deployment, Time to 2nd Stage, Driver (Driver 2nd Stage Time From Time Zero to Deployment Command Criteria Met) (msec)	Data Not Available
Frontal Air Bag Deployment, Time to 2nd Stage, Right Front Passenger (Passenger 2nd Stage Time From Time Zero to Deployment Command Criteria Met) (msec)	Data Not Available
Pretensioner Deployment, Time to Fire, Driver (Driver Pretensioner Time From Time Zero to Deployment Loop #1 Command Criteria Met) (msec)	Data Not Available
Pretensioner Deployment, Time to Fire, Right Front Passenger (Passenger Pretensioner Time From Time Zero to Deployment Loop #1 Command Criteria Met) (msec)	Data Not Available
Pretensioner Deployment, Time to Fire, Driver (Driver Pretensioner Time From Time Zero to Deployment Loop #2 Command Criteria Met) (msec)	Data Not Available
Pretensioner Deployment, Time to Fire, Right Front Passenger (Passenger Pretensioner Time From Time Zero to Deployment Loop #2 Command Criteria Met) (msec)	Data Not Available
Side Air Bag Deployment, Time to Deploy, Driver (Driver Thorax Time From Time Zero to Deployment Command Criteria Met) (msec)	Data Not Available
Side Air Bag Deployment, Time to Deploy, Right Front Passenger (Passenger Thorax Time From Time Zero to Deployment Command Criteria Met) (msec)	Data Not Available
Left Row 1 Curtain Time From Time Zero to Deployment Command Criteria Met (msec)	Data Not Available
Right Row 1 Curtain Time From Time Zero to Deployment Command Criteria Met (msec)	Data Not Available



Longitudinal Delta-V (Record 3)

Time (msec)	Delta-V, Longitudinal (SDM Recorded Vehicle Longitudinal Velocity Change for FSR Event) (MPH [km/h])
10	0.6 [1]
20	1.2 [2]
30	1.2 [2]
40	1.9 [3]
50	1.9 [3]
60	2.5 [4]
70	3.1 [5]
80	3.7 [6]
90	4.3 [7]
100	5.0 [8]
110	5.6 [9]
120	6.2 [10]
130	6.2 [10]
140	6.2 [10]
150	6.8 [11]
160	6.8 [11]
170	6.8 [11]
180	6.8 [11]
190	6.8 [11]
200	6.8 [11]
210	6.8 [11]
220	6.8 [11]
230	6.8 [11]
240	6.8 [11]
250	6.8 [11]
260	6.8 [11]
270	6.8 [11]
280	6.8 [11]
290	6.8 [11]
300	6.8 [11]

Acceleration, Longitudinal (Record 3)

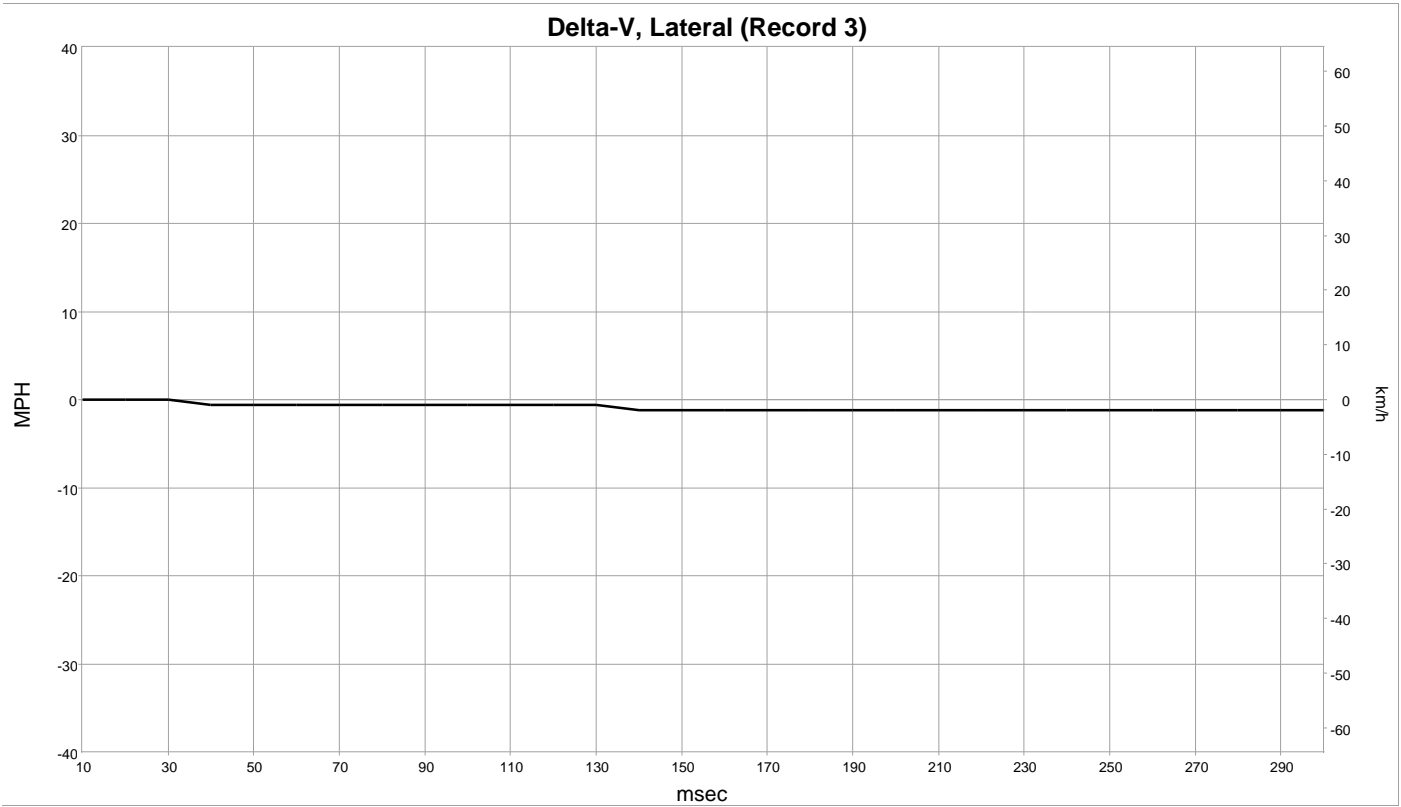


Longitudinal Acceleration (Record 3)

Time (msec)	Longitudinal Acceleration (SDM Recorded Vehicle Longitudinal Acceleration for FSR Event) (g)
2	2.00
4	1.37
6	1.37
8	1.62
10	0.50
12	0.12
14	0.12
16	0.75
18	1.50
20	0.87
22	1.62
24	1.37
26	1.37
28	1.00
30	1.25
32	1.00
34	1.37
36	1.87
38	1.87
40	1.87
42	2.25
44	1.75
46	1.75
48	1.87
50	1.87
52	2.25
54	2.50
56	3.00
58	3.00
60	2.75
62	2.50
64	2.75
66	2.37
68	2.50
70	2.12
72	2.25
74	2.25
76	2.37
78	2.62
80	3.00
82	2.87
84	2.62
86	2.75
88	2.87
90	3.00
92	2.37
94	2.00
96	2.25
98	2.50
100	1.25
102	1.37
104	2.00
106	2.75
108	2.50
110	2.62
112	3.00
114	2.12
116	2.12

Time (msec)	Longitudinal Acceleration (SDM Recorded Vehicle Longitudinal Acceleration for FSR Event) (g)
118	2.37
120	2.62
122	2.00
124	1.50
126	1.37
128	1.00
130	0.75
132	0.37
134	0.62
136	0.50
138	0.75
140	0.75
142	0.62
144	0.62
146	0.62
148	0.37
150	0.25
152	0.25
154	0.00
156	-0.25
158	-0.25
160	-0.25
162	Data Not Available
164	Data Not Available
166	Data Not Available
168	Data Not Available
170	Data Not Available
172	Data Not Available
174	Data Not Available
176	Data Not Available
178	Data Not Available
180	Data Not Available
182	Data Not Available
184	Data Not Available
186	Data Not Available
188	Data Not Available
190	Data Not Available
192	Data Not Available
194	Data Not Available
196	Data Not Available
198	Data Not Available
200	Data Not Available
202	Data Not Available
204	Data Not Available
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212	Data Not Available
214	Data Not Available
216	Data Not Available
218	Data Not Available
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222	Data Not Available
224	Data Not Available
226	Data Not Available
228	Data Not Available
230	Data Not Available
232	Data Not Available
234	Data Not Available

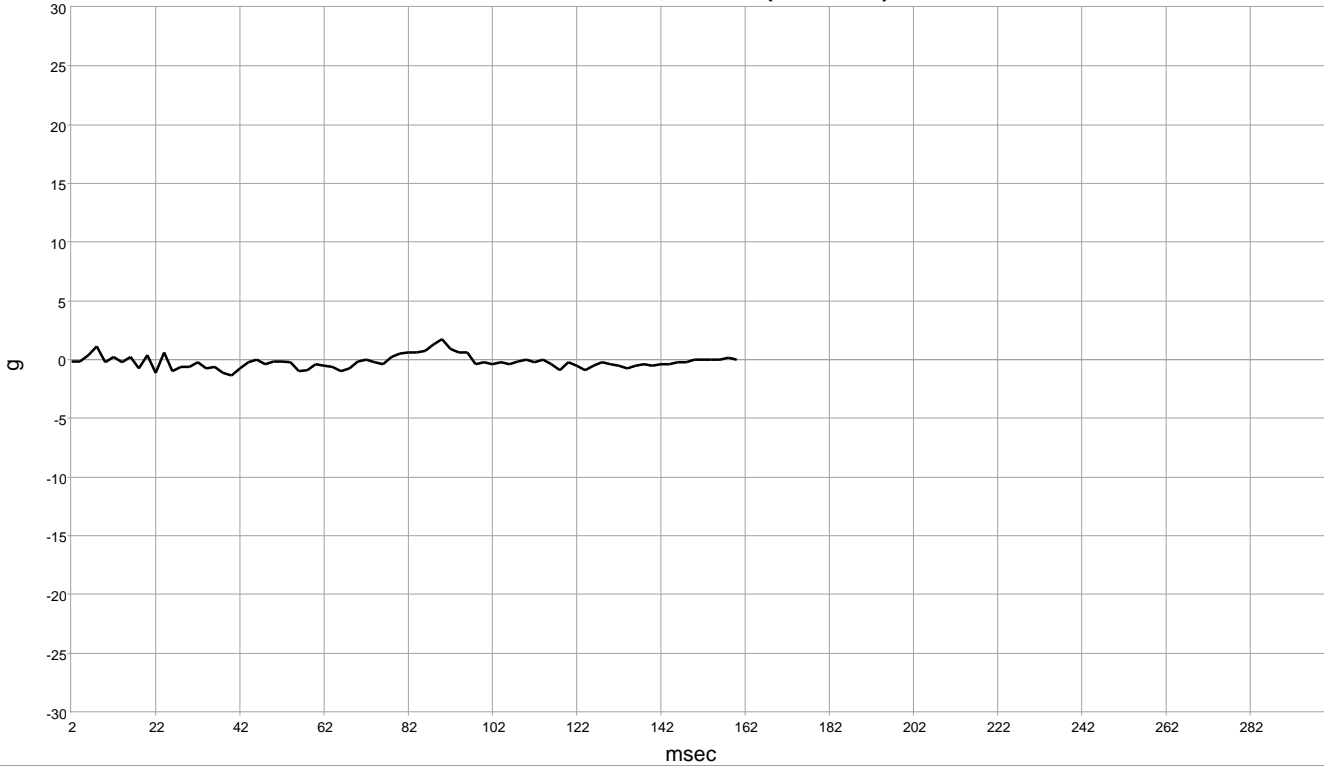
Time (msec)	Longitudinal Acceleration (SDM Recorded Vehicle Longitudinal Acceleration for FSR Event) (g)
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238	Data Not Available
240	Data Not Available
242	Data Not Available
244	Data Not Available
246	Data Not Available
248	Data Not Available
250	Data Not Available
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280	Data Not Available
282	Data Not Available
284	Data Not Available
286	Data Not Available
288	Data Not Available
290	Data Not Available
292	Data Not Available
294	Data Not Available
296	Data Not Available
298	Data Not Available
300	Data Not Available



Lateral Delta-V (Record 3)

Time (msec)	Delta-V, Lateral (SDM Recorded Vehicle Lateral Velocity Change for FSR Event) (MPH [km/h])
10	0.0 [0]
20	0.0 [0]
30	0.0 [0]
40	-0.6 [-1]
50	-0.6 [-1]
60	-0.6 [-1]
70	-0.6 [-1]
80	-0.6 [-1]
90	-0.6 [-1]
100	-0.6 [-1]
110	-0.6 [-1]
120	-0.6 [-1]
130	-0.6 [-1]
140	-1.2 [-2]
150	-1.2 [-2]
160	-1.2 [-2]
170	-1.2 [-2]
180	-1.2 [-2]
190	-1.2 [-2]
200	-1.2 [-2]
210	-1.2 [-2]
220	-1.2 [-2]
230	-1.2 [-2]
240	-1.2 [-2]
250	-1.2 [-2]
260	-1.2 [-2]
270	-1.2 [-2]
280	-1.2 [-2]
290	-1.2 [-2]
300	-1.2 [-2]

Acceleration, Lateral (Record 3)



Lateral Acceleration (Record 3)

Time (msec)	Lateral Acceleration (SDM Recorded Vehicle Lateral Acceleration for FSR Event) (g)
2	-0.13
4	-0.13
6	0.37
8	1.12
10	-0.25
12	0.25
14	-0.25
16	0.25
18	-0.75
20	0.37
22	-1.13
24	0.62
26	-1.00
28	-0.63
30	-0.63
32	-0.25
34	-0.75
36	-0.63
38	-1.13
40	-1.38
42	-0.75
44	-0.25
46	0.00
48	-0.38
50	-0.13
52	-0.13
54	-0.25
56	-1.00
58	-0.88
60	-0.38
62	-0.50
64	-0.63
66	-1.00
68	-0.75
70	-0.13
72	0.00
74	-0.25
76	-0.38
78	0.25
80	0.50
82	0.62
84	0.62
86	0.75
88	1.25
90	1.75
92	0.87
94	0.62
96	0.62
98	-0.38
100	-0.25
102	-0.38
104	-0.25
106	-0.38
108	-0.13
110	0.00
112	-0.25
114	0.00
116	-0.38
118	-0.88

Time (msec)	Lateral Acceleration (SDM Recorded Vehicle Lateral Acceleration for FSR Event) (g)
120	-0.25
122	-0.50
124	-0.88
126	-0.50
128	-0.25
130	-0.38
132	-0.50
134	-0.75
136	-0.50
138	-0.38
140	-0.50
142	-0.38
144	-0.38
146	-0.25
148	-0.25
150	0.00
152	0.00
154	0.00
156	0.00
158	0.12
160	0.00
162	Data Not Available
164	Data Not Available
166	Data Not Available
168	Data Not Available
170	Data Not Available
172	Data Not Available
174	Data Not Available
176	Data Not Available
178	Data Not Available
180	Data Not Available
182	Data Not Available
184	Data Not Available
186	Data Not Available
188	Data Not Available
190	Data Not Available
192	Data Not Available
194	Data Not Available
196	Data Not Available
198	Data Not Available
200	Data Not Available
202	Data Not Available
204	Data Not Available
206	Data Not Available
208	Data Not Available
210	Data Not Available
212	Data Not Available
214	Data Not Available
216	Data Not Available
218	Data Not Available
220	Data Not Available
222	Data Not Available
224	Data Not Available
226	Data Not Available
228	Data Not Available
230	Data Not Available
232	Data Not Available
234	Data Not Available
236	Data Not Available
238	Data Not Available

Time (msec)	Lateral Acceleration (SDM Recorded Vehicle Lateral Acceleration for FSR Event) (g)
240	Data Not Available
242	Data Not Available
244	Data Not Available
246	Data Not Available
248	Data Not Available
250	Data Not Available
252	Data Not Available
254	Data Not Available
256	Data Not Available
258	Data Not Available
260	Data Not Available
262	Data Not Available
264	Data Not Available
266	Data Not Available
268	Data Not Available
270	Data Not Available
272	Data Not Available
274	Data Not Available
276	Data Not Available
278	Data Not Available
280	Data Not Available
282	Data Not Available
284	Data Not Available
286	Data Not Available
288	Data Not Available
290	Data Not Available
292	Data Not Available
294	Data Not Available
296	Data Not Available
298	Data Not Available
300	Data Not Available

Roll Rate (Record 3)

Contains No Recorded Data

Acceleration, Lateral, Rollover (Record 3)

Contains No Recorded Data

Acceleration, Normal, Rollover (Record 3)

Contains No Recorded Data

Pre-Crash Data -5.0 to -0.5 sec (Record 3) - Table 1 of 2

Time (sec)	Accelerator Pedal Position, % Full (Accelerator Pedal Position) (%)	Service Brake (Brake Switch Circuit State)	Engine RPM (Engine Speed) (RPM)	Engine Throttle, % Full (Throttle Position) (%)	Speed, Vehicle Indicated (Vehicle Speed) (MPH [km/h])	System Power Mode Status	System Backup Power Mode Status
-5.0	0	Off	2,432	13	84.5 [136]	Run	Run
-4.5	0	Off	1,920	17	83.9 [135]	Run	Run
-4.0	0	On	1,856	14	81.4 [131]	Run	Run
-3.5	0	Off	1,856	14	77.7 [125]	Run	Run
-3.0	0	Off	1,728	9	76.4 [123]	Run	Run
-2.5	99	Off	1,536	35	69.6 [112]	Run	Run
-2.0	99	Off	1,152	30	37.3 [60]	Run	Run
-1.5	0	Off	1,088	30	32.9 [53]	Run	Run
-1.0	0	Off	768	30	28.6 [46]	Run	Run
-0.5	0	Off	448	30	21.7 [35]	Run	Run

Pre-Crash Data -5.0 to -0.5 sec (Record 3) - Table 2 of 2

Time (sec)	System Backup Power Mode Enabled	CommEnable Status	SDM Power Mode Status	Ignition Prolongation Timer (seconds)
-5.0	No	Active	Run	0.0
-4.5	No	Active	Run	0.0
-4.0	No	Active	Run	0.0
-3.5	No	Active	Run	0.0
-3.0	No	Active	Run	0.0
-2.5	No	Active	Run	0.0
-2.0	No	Active	Run	0.0
-1.5	No	Active	Run	0.0
-1.0	No	Active	Run	0.0
-0.5	No	Active	Run	0.0

Pre-Crash Data -2.0 to -0.5 sec (Record 3)

Time (sec)	Cruise Control Resume Switch Active	Cruise Control Active	Cruise Control Set Switch Active	Reduced Engine Power Mode Indicator	Engine Torque (N-m)
-2.0	No	No	No	On	41
-1.5	No	No	No	On	-11
-1.0	No	No	No	On	-33
-0.5	No	No	No	On	105

Hexadecimal Data

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DPID \$15
01 02 03 04 05 06 07

DPID \$16
08 09 0A 0D 0E 00 00

DPID \$17
00 00 00 00 00 00 00

DPID \$1F
01 01 02 02 00 00 00

DPID \$20
00 00 00 00 00 00 00

DPID \$30
00 AA 00 00 00 00 00

DPID \$32
00 FF 01 0D 00 00 00

DPID \$51
0B 00 00 00 00 00 00

DID \$01
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DID \$02
00 CE 4A 34

DID \$03
41 54 39 34 31 32 44 41 30 30 30 30 30 30 30 30

DID \$04
00 CE 4A 34

DID \$05
41 48 34 31 39 37 44 41 30 30 30 30 30 30 30 30

DID \$06
00 CE 35 D5

DID \$07
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DID \$08
00 CE 35 D5

DID \$09
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DID \$0A
00 CE 35 D6

DID \$0B
44 42 34 31 39 38 44 41 30 30 30 30 30 30 30 30

DID \$0C
00 CE 35 D6

DID \$0D
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00 00 30 30 30 30 44 41 30 30 30 30 30 30 30

DID \$0E
00 00 00 00

DID \$0F
00 00 30 30 30 30 44 41 30 30 30 30 30 30 30

DID \$10
00 00 00 00

DID \$11
00 00

DID \$22
17 12

DID \$30
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DID \$31
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0010 FF 00 00 00 01 0F 00 00 00 00
0020 00 0C FC FC F0 00 00 F0 1C 00
0030 00 00 00 00 00 00 00 00 00 04
0040 00 00 00 00 00 00 1B 1D 1D 1E
0050 26 27 27 2E 2F 2F 06 7A 05 F3
0060 05 F2 05 F0 09 0E 0E 11 0D 0D
0070 0D 11 12 13 7B 7D 83 87 88 89
0080 8B 8C 8E 8F 00 39 AD 00 B0 F9
0090 80 52 00 FF FF FF FF FF FF FF
0100 FF FF FF FF FF FF FF FF FF FF
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0130 FF FF FF 65 65 6F 6B FF FF FF
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0160 00 00 FF FF FF FF FF 00 00 00
0170 00 00 00 00 00 00 00 7E 7E 7D
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0200 80 73 7F 72 7F 71 7F 70 7E 6F
0210 7E 6F 7E 6E 7E 6D 7E 6C 7E 6C
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0230 7E 6B 7D 6B 7D 6A 7D 7F 8E 7F
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0320 6F 7D FE 80 88 7D 11 80 95 7D
0330 81 7F E6 7D 75 80 24 7C D2 80
0340 AE 7D F2 7F FF 7F 50 7F D9 7F
0350 43 7F 05 7F C0 7E D3 7F A7 7F
0360 69 7F 37 7F F2 7F CD 7F 50 80
0370 AE 7F 1E 81 2B 7E F8 80 7C 7F
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0390 2A 7F F2 7F 37 7F D9 7E D3 80
0400 EC 7E AD 81 37 7E AD 81 05 7D
0410 FE 80 6F 7D 36 80 A1 7D 4F 80
0420 C7 7D 68 80 C7 7D F2 80 7C 7E
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0440 56 7D 5C 80 18 7D 75 80 C7 7E
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0460 A7 80 4A 80 6F 7F 2A 80 0B 80
0470 63 80 C7 7E 56 80 C7 7E 94 80
0480 AE 7F 69 80 F9 7F 1E 7F 43 7E

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0750 24 7F 50 80 24 7F 50 80 3D 7F
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1180 00 00 00 00 00 00 00 2A 48 AA

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1940 14 00 08 00 19 00 0A 00 12 00
1950 F6 FF 0E 00 00 00 06 00 FD FF
1960 04 00 01 00 FE FF FF FF FA FF
1970 FB FF FC FF 01 00 0E A5 FF FF
1980 00 00 02 00 06 00 04 00 12 00
1990 FD FF 16 00 01 00 1C 00 F9 FF
2000 20 00 09 00 29 00 0B 00 3C 00
2010 0C 00 33 00 FE FF 34 00 03 00
2020 41 00 0E 00 2A 00 00 00 0E 00
2030 FD FF 0F 00 EC FF 05 00 E8 FF
2040 0E A5 FF FF 07 00 F4 FF 10 00
2050 FF FF 04 00 F2 FF F2 FF EE FF
2060 E8 FF EB FF F6 FF F1 FF 06 00
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2100 39 00 0D 00 0E A5 FF FF 37 00
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2120 1D 00 03 00 22 00 0B 00 26 00
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2150 F9 FF FA FF 09 00 11 00 01 00
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2220 0D 00 F6 FF 0D 00 00 00 0B 00
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2350 02 00 17 00 06 00 11 00 0B 00
2360 0E A5 FF FF 0A 00 02 00 08 00
2370 02 00 09 00 01 00 00 00 08 00
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2400 F1 FF 0B 00 FB FF 07 00 FB FF
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2430 FF FF 0B 00 F7 FF 03 00 F7 FF
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DID \$32

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0610	A1	7E	94	7F	1E	7D	D9	7F	FF	7E
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0650	18	80	4A	7F	75	81	69	80	18	81
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DOT HS 813 534
January 2024



U.S. Department
of Transportation
**National Highway
Traffic Safety
Administration**

