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

NHTSA

DOT HS 812 843 **December 2019**

Special Crash Investigations On-Site Air Bag Non-Deployment Crash Investigation Vehicle: 2016 Nissan Versa Location: Virginia Crash Date: June 2017

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Crash Research & Analysis, Inc. (2019, December). *Special Crash Investigations: On-Site Air Bag Non-Deployment Crash Investigation; 2016 Nissan Versa; Location: Virginia; Crash Date: June 2017* (Report No. DOT HS 812 843). National Highway Traffic Safety Administration.

Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT HS 812 843		

4. Title and Subtitle	5. Report Date
Special Crash Investigations On-Site Air Bag Non-Deployment Crash Investigation Vehicle: 2016 Nissan Versa Location: Virginia Crash Date: June 2017	December 2019
	6. Performing Organization Code

7. Author	8. Performing Organization Report No.
Crash Research & Analysis, Inc.	CR17023

9. Performing Organization Name and Address	10. Work Unit No. (TRAIS)
Crash Research & Analysis, Inc. PO Box 302 Elma, NY 14059	11. Contract or Grant No. DTNH22-12-C-00269

12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
National Highway Traffic Safety Administration 1200 New Jersey Avenue SE Washington, DC 20590	Technical Report
	14. Sponsoring Agency Code

15. Supplementary Notes

Each crash represents a unique sequence of events and generalized conclusions cannot be made concerning the crashworthiness performance of the involved vehicle(s) 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 on-site investigation of the non-deployment of the air bag systems in a 2016 Nissan Versa during a multiple-event crash. The Nissan was traveling at slow speed in heavy traffic on a limited-access roadway when it was rear-ended by a 2002 Buick Rendezvous traveling at a higher speed. The impact displaced the Nissan forward and into the rear of a 2015 Honda CR-V, after which the Nissan overturned. Although it was equipped with Certified Advanced 208-Compliant (CAC) frontal air bags, front seat-mounted side impact air bags, side impact-sensing inflatable curtain (IC) air bags, and front seat belt retractor pretensioners, none of the supplemental devices actuated/deployed in the crash. The Nissan was occupied by a belted 57-year-old female driver, a belted 41-year-old female front right occupant, and a belted 13-year-old female second row right occupant. Both front row occupants were airlifted from the crash site by helicopters and flown to a regional trauma center for treatment of reported incapacitating (A-level) injuries. The 13-year-old female's injury status was unknown.

Through the course of this investigation, the SCI investigator ultimately concluded that there was insufficient evidence to indicate malfunction of the Nissan's supplemental restraint systems. The Nissan was not equipped with rollover-sensing capabilities. The lack of pretensioner actuation and non-deployment of the Nissan's air bag systems were the result of impact types and crash forces that were either of insufficient magnitude or beyond the algorithm capabilities of the Nissan and its systems.

17. Key Words	18. Distribution Statement
air bag non-deployment, rollover	Document is available to the public from the National Technical Information Service, www.ntis.gov.

19 Security Classif. (of this report)	20. Security Classif. (of this page)	21 No. of Pages	22. Price
Unclassified	Unclassified	42	

Form DOT F 1700.7 (8-72) Reproduction of completed page authorized

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LOCATION: VIRGINIA
CRASH DATE: JUNE 2017

BACKGROUND

This report documents the on-site investigation of the non-deployment of the air bag systems in a 2016 Nissan Versa (**Figure 1**) during a multiple event crash. The Nissan was traveling at slow speed in heavy traffic on a limited-access roadway when it was rear-ended by a 2002 Buick Rendezvous traveling at a higher speed. The impact displaced the Nissan forward and into the rear of a 2015 Honda CR-V, after which the Nissan overturned. Although it was equipped with certified advanced 208-compliant (CAC) frontal air bags, front seat-mounted side impact air bags, side impact-sensing inflatable curtain (IC) air bags, and front seat belt retractor pretensioners, none of the supplemental devices actuated/deployed in the crash. The Nissan was occupied by a belted 57-year-old female driver, a belted 41-year-old female front right occupant, and a belted 13-year-old female second row right occupant. Both front row occupants were airlifted from the crash site by helicopters and flown to a regional trauma center for treatment of reported incapacitating (A-level) injuries. The 13-year-old female's injury status was unknown.

Figure 1: Front left oblique view of the 2016 Nissan Versa at the time of the SCI vehicle inspection.

The crash was reported to the National Highway Traffic Safety Administration by the vehicle's driver in August 2017. Notification and on-site investigation assignment was forwarded to the Special Crash Investigations (SCI) team at Crash Research & Analysis, Inc., in August 2017. The SCI investigator contacted and interviewed the vehicle's driver by telephone regarding the crash circumstances. A police crash report documenting the crash was obtained by the SCI investigator, and the Nissan's owner was contacted to establish cooperation for inspection. The vehicle inspection took place in September 2017 and was attended by legal representatives of the vehicle's owner and a representative from the vehicle's manufacturer. Inspection of the Nissan included the measurement of its exterior and interior damage, identification of occupant contact, and documentation of the manual and supplemental restraint systems. Data was imaged from the Nissan's event data recorder (EDR) using the Bosch Crash Data Retrieval (CDR) tool and software during the vehicle inspection process. The crash site was inspected and documented using photographs. Neither the Buick nor the Honda were available for SCI inspection.

Through the course of this investigation, the SCI investigator ultimately concluded that there was insufficient evidence to indicate malfunction of the Nissan's supplemental restraint systems. No

air bag deployment would be expected in relation to the positive (forward) acceleration associated with a rear impact event, such as the impact by the Buick. Further, the left front corner impact to the Nissan with the right rear corner of the Honda was of insufficient severity to achieve actuation/deployment. A review of the imaged EDR data revealed that the rate of change in vehicle velocity over the lengthy crash pulse was minimal, and likely did not increase rapidly enough to warrant prediction of a crash event that surpassed the minimum severity threshold. Lastly, the Nissan was not equipped with rollover-sensing capabilities. Because it could not detect those types of events, it therefore was unable to actuate/deploy safety systems for the final event in this crash. The lack of pretensioner actuation and non-deployment of the Nissan's air bag systems were the result of impact types and crash forces that were either of insufficient magnitude or beyond the algorithm capabilities of the Nissan and its systems.

SUMMARY

Crash Site

The crash occurred on the southbound portion of a multi-lane limited access roadway in a rural locale during the early evening. According to the National Weather Service, conditions in the locale at the time of the crash included clear skies with a temperature of 23.9 °C (75 °F), a southeasterly breeze at 5.6 km/h (3.5 mph), and relative humidity of 48 percent. The physical environment of the roadway and roadside were documented during the SCI crash site inspection using photographs. No total station documentation of the crash site was conducted due to safety concerns and a lack of physical evidence.

Figure 2: Southeast-facing trajectory view of the roadway in the vicinity of the crash.

An expansive grass median divided the north/south roadway. The southbound portion consisted of a 3.6 m (11.8 ft) wide left lane and a 3.6 m (11.8 ft) wide right lane, which were delineated by a single broken white line. A single solid-yellow line and narrow 1.0 m (3.3 ft) wide shoulder with continuous rumble strip bordered the left lane, while a single solid-white line and 3.4 m (11.1 ft) wide shoulder with continuous rumble strip bordered the right lane. A standard W-beam guardrail system paralleled the travel lanes on the right roadway edge. All surfaces were bituminous (asphalt), and the roadway progressed uphill (greater than 2%) in the vicinity of the crash. Speed was regulated by a posted limit of 113 km/h (70 mph). A crash diagram is included at the end of this report.

Pre-Crash
The Nissan was traveling south on the limited-access roadway. It was occupied by the 57-year-old female driver, 41-year-old female front right occupant, and 13-year-old female second row right occupant. All three were restrained by the available 3-point lap and shoulder seat belt systems. The driver was operating the Nissan under a rental agreement.

As the Nissan maintained its southbound travel, it approached a construction zone where maintenance to the roadway's shoulders and guardrail systems was being performed. In conjunction with the construction area, a right lane restriction had been established an undocumented distance to the north. Southbound traffic became congested by the lane restriction in advance of the construction area, and began to build up in the southbound lanes. The Nissan's driver braked the vehicle to slow speed as she approached the traffic back-up and merged into traffic in the left lane of the roadway. She maintained a slow-speed trajectory and initiated travel behind the Honda. Data imaged from the Nissan's EDR reported that the Nissan's speed reduced from 15 km/h (9 mph) at 5 seconds prior to algorithm enable (AE) to 9 km/h (6 mph) at AE.

The Buick traveled south in the left lane, driven by a 42-year-old male. He was possibly distracted from his driving task, as he neglected to identify the congested traffic or the slower moving Nissan. The Buick rapidly approached the rear plane of the Nissan, without avoidance attempt by its driver.

Crash
The front plane of the Buick struck the back plane of the Nissan in an approximate 50 percent left offset of the Nissan's centerline (Event 1). Associated forces induced a rapid forward acceleration to the Nissan, which displaced it to the south. As the vehicles engaged, a clockwise rotation was induced to the Nissan by the Buick and the offset of the crash forces. The left front corner aspect of the Nissan then struck the rear right corner aspect of the Honda (Event 2). Although minor in overall magnitude, this impact and minor engagement reversed the Nissan's clockwise rotation. It achieved a right side-leading orientation as it continued to be displaced forward and to the right of the slower-moving Honda.

Instability was created by the lateral drag force load on the Nissan's right side tires with respect to its center of mass, which tripped the vehicle into a right side-leading rollover sequence. The Nissan rolled one complete revolution (four quarter-turns) uninterrupted (Event 3) and came to rest on its wheels in the right lane of the roadway, facing eastward.

Following the first impact event with the Nissan, the Buick maintained a southbound trajectory and was redirected off the left edge of the roadway. It came to final rest in the grass median, facing southeast. The Honda was displaced slight forward by the impact with the displaced Nissan, and came to a controlled final rest in the left lane of the roadway.

Post-Crash
Local fire department, emergency medical services (EMS), and law enforcement personnel were dispatched to the crash scene. Upon the arrival of emergency response personnel, the two front row occupants of the Nissan were believed to have sustained incapacitating (A-level injuries) as a result of the crash.

Emergency services personnel opened the Nissan's doors and used hydraulic rescue tools to cut their respective supports, in order to open both doors to wider angles. The driver and front right occupant were then removed from the vehicle due to their perceived injuries. The PAR indicated that the second row right occupant's injury status was unknown. Her course of egress from the vehicle remains unknown. Following treatment on scene, all three were airlifted by helicopters and flown to a regional trauma center for further medical care.

The driver of the Buick and the driver of the Honda denied injury at the crash site and did not receive medical treatment or transport. A local recovery service removed the Nissan and Buick from the crash site and transferred them to a local yard, where the Nissan was located for this SCI investigation. The Buick did not have collision insurance and was scrapped, and the Honda was fully repaired. This all occurred prior to notification of the crash to NHTSA by the Nissan's driver.

2016 NISSAN VERSA

Description
The 2016 Nissan Versa (**Figure 3**) was manufactured in March 2016 and identified by the Vehicle Identification Number (VIN) 3N1CN7AP6GLxxxxxx. It was a 4-door sedan equipped with the SL-level trim package, and was built on a 260 cm (102.4 in) wheelbase. A placard declared that the Nissan's gross vehicle weight rating (GVWR) was 1,554 kg (3,426 lb). Front and rear axle ratings (GAWR) were 794 kg (1,750 lb) and 775 kg (1,708 lb), respectively. The curb weight was 1,129 kg (2,490 lb). A 1.6 liter, inline 4-cylinder, gasoline engine powered the Nissan, linked to a continuously variable transmission (CVT) with front-wheel drive. The vehicle manufacturer's recommended tire size and cold tire pressure for all four axle positions were P185/65R15 at 230 kPa (33 PSI). All four equipped tires were Continental ContiPro Contact tires of the recommended size, with matching Tire Identification Numbers (TINs) of P5FP 3YP 1016. All had ample tread at the time of the SCI vehicle inspection.

Figure 3: Front right oblique view of the 2016 Nissan Versa at the time of the SCI vehicle inspection.

The interior of the Nissan was configured for the seating of up to five occupants (2/3). The front row consisted of forward-facing bucket seats with adjustable head restraints. The Nissan's second row consisted of a non-adjustable bench seat with outboard head restraints. At the time of

the SCI inspection, both the driver and front right seats were adjusted to track positions between middle and full-rear (in the rear third). It was observed that both of the front row seatbacks and head restraints were deformed rearward by occupant loading from the crash.

Manual safety features included 3-point lap and shoulder seat belts for all five seat positions. The front seat belts were equipped with retractor pretensioners. Supplemental restraint systems in the Nissan included CAC frontal air bags, front seat-mounted side impact air bags, and IC air bags mounted in the roof side rails. None of the supplemental restraints actuated or deployed in the Nissan as a result of the crash.

Vehicle History

The Nissan had been purchased new by its current owner, and was used as a fleet/rental vehicle. Records indicated that the Nissan had received routine service and maintenance throughout its lifetime. It had never been involved in a significant crash. The Nissan's electronic odometer reading was 45,005 km (27,965 mi) at the time of the SCI inspection.

Exterior Damage

Damage to the exterior of the Nissan was located on all planes. There was rear plane damage associative to the first impact with the Buick, front and left plane damage from the second impact with the Honda, and right, top, and left plane damage associative to the rollover event. Rear plane damage was severe. The direct contact began on the Nissan's centerline and extended 66 cm (26.0 in) left to the left rear corner. Combined direct and induced damage spanned the entire rear end width of the Nissan. In the damage pattern was significant longitudinal deformation, inclusive of collapse of the entire trunk/cargo area and deformation to the trunk lid, bumper beam, left quarter panel, and surrounding components (**Figures 4 and 5**). The rear bumper fascia was completely separated from the vehicle.

Figure 4: Rear plane damage to the 2009 Nissan Versa.

Figure 5: Overhead view of the Nissan's rear profile.

Using a combined damage width (Field-L) of 122 cm (48.0 in) across the entire rear bumper beam, a crush profile was documented using the Nikon Nivo 5+M total station. The residual crush measurements included: C1 = 99 cm (39.0 in), C2 = 70 cm (27.6 in), C3 = 48 cm (18.9 in), C4 = 29 cm (11.4 in), C5 = 13 cm (5.1 in), C6 = 0 cm (0.0 in). Maximum crush was located at

the C1 position. Based on the visible damage pattern, the Collision Deformation Classification (CDC) assigned to the Nissan for the Event 1 impact with the Buick was 06BZEW7.
The Missing Vehicle Algorithm of the WinSMASH model was used to calculate the delta-V of the rear plane impact for the Nissan. The total calculated delta-V was 49 km/h (30 mph). The longitudinal component of the calculated delta-V was 49 km/h (30 mph), with a lateral component of 0 km/h (0 mph). These results appeared reasonable.

Damage from the second impact event with the Honda was located on the left front corner aspect of the Nissan. The damage was present on the extreme left corner of the front bumper fascia, as well as the left headlight assembly, left front fender, and left front door (**Figure 6**). From a frontal perspective, the damage began at the left front bumper corner and extended approximately 8 cm (3.1 in) to the right. However, it extended a total of 128 cm (50.4 in) along the left plane to 60 cm (23.6 in) rearward of the left front axle position. In the damage pattern were longitudinal swiping abrasions and minor lateral deformation. Due to the nature of the damage profile, representative crush measurements could not be documented. The CDC assigned to the Event 2 damage pattern was 12FLEE6. No WinSMASH delta-V calculations could be computed because the nature of the crash forces was beyond the scope of the model.

Figure 6: Event 2 impact damage to the left front corner area of the Nissan.

Figure 7: Vertical deformation to the Nissan's roof.

Rollover damage was visible on the right, left, and top planes of the Nissan. This primarily consisted of abrasions and scratches to the body surfaces, with minor deformation. Minor vertical deflection of the roof was visible, but accurate measurements of its magnitude could not be obtained. Downward vertical deflection of the forward left aspect of the Nissan's roof (**Figure 7**) above the driver's seat position was estimated to be less than 3 cm (1.2 in). **Figure 8** depicts an overhead view of the Nissan's top plane from a frontal perspective. The CDC assigned to the Nissan for the Event 3 rollover damage was 00TDDO2. No WinSMASH

Figure 8: Overhead view of the Nissan's top plane.

delta-V calculations could be computed because the nature of the crash forces was beyond the scope of the model.

Event Data Recorder

The 2016 Nissan Versa was equipped with an air bag control unit (ACU) that was mounted beneath the center tunnel between the front row seats. The ACU monitored the diagnostic functions of the vehicle's restraint systems (air bags and seat belt pretensioners) and controlled the deployment/actuation of those devices dependent upon crash event severity. The ACU also had EDR capabilities to record crash event data for longitudinal and lateral crash events. The SCI investigator used the Bosch Crash Data Retrieval (CDR) tool and software version 17.4.2 during the SCI inspection to image EDR data from the Nissan's ACU. A connection was made through the Diagnostic Link Connector (DLC), using residual vehicle power. The imaged data was reported using version 19.0 and is included at the end of this report as **Appendix A**.

The EDR could store a combination of up to two crash event records for either of the two event types, termed "Non-Deployment Event" or "Deployment Event." By definition, a non-deployment event was any event that enabled the algorithm, but did not meet threshold for deployment/actuation of a safety device. A deployment event actuated pretensioners and/or deployed inflatable restraints. Non-deployment events and were subject to overwrite by subsequent events of greater severity or typing, whereas air bag deployment event types could not be overwritten. If power supply to the ACU was lost following a crash event, all or part of the data may not have been recorded to the EDR's memory.

The EDR had the capacity to record 250 milliseconds of data once the minimum threshold was achieved in longitudinal or lateral event types. Associated to the recording of each respective event was a 5-second pre-crash buffer that recorded multiple pre-crash data points in 0.5-second intervals. Data recorded included vehicle speed (mph), accelerator pedal (% full), engine speed (rpm), motor speed (rpm), service brake (on/off) status, and steering input (degrees) data. Additional data samples, including seat belt status of the front row occupants and system status data, were recorded at the time of an event.

The imaged data contained two events, termed Event Record 1 and Event Record 2. Both were completely recorded non-deployment event types. They occurred on ignition cycle number 2,966 and were separated in time by 0.9 seconds. At the time of both events, the seat belt status of both the driver and the right front passenger were reported as "On (Fastened)."

The frontal air bag warning lamp and the frontal air bag suppression stitch status were "Off" for both events. Data was imaged from the Nissan on ignition cycle number 2,967. At the time of data retrieval, a Diagnostic Trouble Code (DTC) identified as B1018 was identified. It's status was "Past," and was described as "Occupant Sens [Unit Fail]."

Associated with Event Record 1 was the following recorded pre-crash buffer data.

Time	Vehicle Speed	Accelerator Pedal (% Full)	Engine RPM	Motor RPM	Service Brake	Steering Wheel Angle (degrees)
-5.0	15 km/h (9 mph)	0	1,100	1,100	ON	2
-4.5	12 km/h (7 mph)	0	650	900	ON	2
-4.0	10 km/h (6 mph)	0	800	750	ON	2
-3.5	9 km/h (6 mph)	0	750	700	ON	2
-3.0	8 km/h (5 mph)	0	700	600	ON	2
-2.5	7 km/h (4 mph)	0	650	500	ON	2
-2.0	6 km/h (4 mph)	0	650	450	ON	2
-1.5	5 km/h (3 mph)	21.5	750	400	OFF	2
-1.0	6 km/h (4 mph)	56.5	1,750	800	OFF	2
-0.5	8 km/h (5 mph)	0	1,950	1,100	OFF	-40
0.0	9 km/h (6 mph)	0	1,350	1,200	ON	-34

The maximum longitudinal delta-V for the first event record was 43 km/h (27 mph) at 145 milliseconds after time zero. The maximum lateral delta-V was 7 km/h (4 mph) at 105 milliseconds after time zero. This was a left rear impact event, which correlated to Event 1 of the subject crash.

Associated with Event Record 2 was the following recorded pre-crash buffer data.

Time	Vehicle Speed	Accelerator Pedal (% Full)	Engine RPM	Motor RPM	Service Brake	Steering Wheel Angle (degrees)
-5.0	10 km/h (6 mph)	0	800	750	ON	2
-4.5	9 km/h (6 mph)	0	750	700	ON	2
-4.0	8 km/h (5 mph)	0	700	600	ON	2
-3.5	7 km/h (4 mph)	0	650	500	ON	2
-3.0	6 km/h (4 mph)	0	650	450	ON	2
-2.5	5 km/h (3 mph)	21.5	750	400	OFF	2
-2.0	6 km/h (4 mph)	56.5	1,750	800	OFF	2
-1.5	8 km/h (5 mph)	0	1,950	1,100	OFF	-40
-1.0	17 km/h (11 mph)	0	1,400	1,700	OFF	-6
-0.5	47 km/h (29 mph)	0	1,950	1,950	OFF	178
0.0	45 km/h (28 mph)	0	1,700	1,750	OFF	250

The second event record reported a maximum longitudinal delta-V of -18 km/h (-11 mph) at 300 milliseconds and a maximum lateral delta-V of 7 km/h (4 mph) at 117.5 milliseconds. This was a front left impact event, which correlated to Event 2 of the subject crash. The reported time between the recorded events was 0.9-seconds.

Interior Damage

The interior of the Nissan was inspected for crash-related intrusion and occupant contact. Intrusion into the occupant compartment space included significant longitudinal intrusion of the left aspect of the Nissan's second row seat back. Deformation associated with the first impact event by the Buick's front plane resulted in the complete collapse of the Nissan's trunk space and corresponding forward displacement of the second row seat back (**Figure 9**), rear package shelf, and left C-pillar. Corresponding displacement of the seat back measured 48 cm (18.9 in) at the second row left position, 28 cm (11.0 in) at the second row center position, and 24 cm (9.4 in) at the second row right position. All measurements were obtained at the upper aspect of the seat back. Vertical intrusion associated with the rollover (Event 3) was of minor severity. The maximum vertical intrusion measured 7 cm (2.8 in), and was located to the roof above the driver's seat position.

Figure 9: Forward displacement of the Nissan's second row seatback as viewed from the second row right position.

Occupant loading in the Nissan was evident to the front row seatbacks. Both the driver's and front right passenger's seatbacks were deformed rearward (**Figure 10**). Similarly, the front row's adjustable head restraints were also deformed rearward (**Figure 11**). This deformation was the result of contact and loading by the head and posterior back of both the driver and front row right occupant during the first impact event with the Buick.

Figure 10: The Nissan's deformed front row seatbacks.

Figure 11: Nissan driver's deformed head restraint.

The Nissan's left rear door was jammed shut by the crash forces; all other remained closed and were operational post-crash. Emergency response personnel used hydraulic tools to cut the limiters of the Nissan's front doors, which enabled the doors to be opened to a wider angle but prevented them from re-latching.

Manual Restraint Systems

The Nissan was equipped with 3-point lap and shoulder seat belt systems for all five seating positions. The front seat belt systems used continuous loop webbing with sliding latch plates and adjustable D-rings. The driver's seat belt system retracted onto an Emergency Locking Retractor (ELR), while the front right passenger's seat belt used an ELR/Automatic Locking Retractor (ALR). Both front seat belt systems were equipped with retractor pretensioners. At the time of the SCI inspection, the driver's and front right passenger's D-ring were both adjusted fully upward. All three seat belt systems in the second row used continuous loop webbing with sliding latch plates and ELR/ALR retractors.

At the time of the SCI inspection, the driver's seat belt system was loosely retracted against the left B-pillar. The SCI investigator extended the webbing and observed an area of loading abrasions on the webbing from the latch plate, located from 99-105 cm (39.0-41.3 in) above the lower anchor. An area of loading abrasion from the D-ring was located 96 cm (37.8 in) above the end of the latch plate loading. Lastly, there was corresponding loading evidence in the belt path of the latch plate. It was apparent to the SCI investigator that the driver was restrained by the driver's seat belt system at the time of the crash. **Figure 12** depicts the Nissan's driver seat belt system at the time of the SCI vehicle inspection.

Figure 12: Loading evidence on the Nissan driver's 3-point lap and shoulder seat belt system.

Figure 13: View of the Nissan's front right passenger's seat belt system with the occupant loading evidence identified.

The front right passenger's seat belt system was also loosely retracted at the time of the SCI inspection. The SCI investigator extended the webbing and observed an area of loading abrasions on the webbing from the latch plate, located from 117-128 cm (46.1-50.4 in) above the lower anchor. An area of loading abrasion from the D-ring was located 91 cm (35.8 in) above the end of the latch plate loading. Lastly, there was corresponding loading evidence in the belt path of the latch plate. It was apparent to the SCI investigator that the front row right occupant was restrained by the seat belt system at the time of the crash. **Figure 13** depicts the Nissan's front right passenger's seat belt system at the time of the SCI vehicle inspection.

The second row right seat belt system was loosely retracted against the right C-pillar at the time of the SCI vehicle inspection. With the webbing extended, a distinct pattern of waffling to the webbing was visible (**Figure 14**). The waffled section of webbing was located from 39-92 cm (15.4-36.2 in) above the lower anchor. Although there was no loading evidence in the belt path of the latch plate, a small abrasion was found on the webbing that correlated to loading evidence from the D-ring. This was located 36 cm (14.2 in) above the end of the waffled section. It was apparent to the SCI investigator that the second row right occupant was restrained by the seat belt system at the time of the crash.

Figure 14: Loading evidence to the second row right seat belt system in the Nissan.

Supplemental Restraint Systems

The Nissan was equipped with multiple supplemental restraint systems for occupant protection. This included a CAC frontal air bag system, which incorporated front seat belt retractor pretensioners, front seat belt buckle switch sensors, front seat track position sensors, and a right front occupant presence (weight) sensor. Further systems included front seat-mounted side impact air bags and side-impact sensing IC air bags.

Based on a review of the vehicle's history, the Nissan had not been involved in any prior crashes involving supplemental restraint deployment. There also were no records pertaining to maintenance/replacement/service to the Nissan's supplemental restraint systems. None of the supplemental restraint systems actuated or deployed in the multiple event crash.

NHTSA Recalls and Investigations

A query of the 2016 Nissan Versa's VIN on the NHTSA website www.safercar.gov[1] revealed that there were no open recalls or investigations concerning this specific 2016 Nissan Versa vehicle as of the date of this report.

Air Bag Non-Deployment Discussion

Although the Nissan was equipped with multiple inflatable supplemental restraint systems, none deployed in the crash. The lack of air bag deployment was understood through a review of the visual damage sustained by the Nissan, a reconstruction of the crash and associated forces, and a review of the data imaged from the Nissan's ACU.

The first crash event involved a rear plane impact to the Nissan. Associated crash forces were in the 6 o'clock sector, and produced a positive longitudinal (forward) acceleration and delta-V. No air bag deployment or pretensioner actuation in the Nissan would be expected in relation to this type of crash event.

[1] NHTSA has discontinued safercar.gov but the information can be found at nhtsa.gov/recalls.

The second crash event involved a minor corner impact with swiping characteristics at the left front corner aspect of the Nissan. This involved no front plane structure, and produced "soft" damage to the vehicle. Crash forces were in the 12 o'clock sector, but were of insufficient magnitude during the early stages of the impact to produce sufficient deceleration to result in ACU commands for pretensioner actuation or air bag deployment. Stated simply, the second crash event presumably did not achieve actuation/deployment algorithm threshold.

The third crash event involved a right side-leading rollover. Although it was initiated by a tripping-type force (drag force load on the right side tires), the event was not associated with or recognized as a lateral deceleration event. The Nissan did not have rollover-sensing capabilities, and the ACU was therefore unable to recognize the third crash event. Although it was equipped with IC air bags, the Nissan's IC bags were only capable of deployment in relation to side impacts, as the vehicle was not equipped with rollover sensing. The Nissan was unable to command actuation/deployment of pretensioner or air bag systems in relation to the rollover event because it did not have the ability to distinguish the rollover as a crash event.

As a result of the SCI vehicle inspection, it was determined by the SCI investigator that there was a lack of evidence to suggest malfunction of the vehicle's systems. The lack of pretensioner actuation and non-deployment of the Nissan's air bag systems were the result of impact types and crash forces that were either of insufficient magnitude or beyond the algorithm capabilities of the Nissan and its systems.

2016 NISSAN VERSA OCCUPANT DATA

Driver Demographics

Age/sex:	57 years/female
Height:	168 cm (66 in)
Weight:	104 kg (229 lb)
Eyewear:	None
Seat type:	Forward-facing bucket seat with adjustable head restraint
Seat track position:	Between middle and rearmost
Manual restraint usage:	3-point lap and shoulder seat belt system
Usage source:	Vehicle inspection, EDR data
Air bags:	CAC frontal, seat-mounted side impact, and left side impact IC air bags available; None deployed
Alcohol/drug involvement:	None
Egress from vehicle:	Assisted from vehicle by emergency response personnel
Transport from scene:	Helicopter to a regional trauma center
Type of medical treatment:	Treated; duration and outcome unknown

Driver Injuries

Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Component	IPC Confidence Level
1	Cerebral concussion with loss of consciousness less than 1 hour, NFS	161003.2	Tandem Seat/head restraint, roof	Probable

Source – Interview; numerous requests for records denied by the treating medical facility.

Driver Kinematics

The 57-year-old female was positioned in the driver's seat of the 2016 Nissan Versa. She had adjusted the seat to a track position between middle and full-rear, with the seat back slightly reclined and the adjustable head restraint approximately fully downward. The driver was restrained by the 3-point lap and shoulder seat belt system. Her usage of the belt system was determined based on the post-crash condition of the seat belt system as observed by the SCI investigator during the vehicle inspection and a review of the EDR data imaged from the Nissan.

The driver remained in position as the Nissan traveled at slow speed in traffic. The EDR data supported her account of being in stop and go traffic prior to the onset of the lane restriction. During interview, she indicated that she did not recall whether or not she detected the Buick prior to impact. In either case, there was no possible avoidance action that the driver of the Nissan could have taken as the Buick approached at high speed.

At impact with the Buick, the driver initiated an abrupt rearward trajectory. The Nissan was displaced forward, exacerbating the driver's loading of the seatback and head restraint. This deformed both components rearward. It is unknown if these contacts produced injury to the driver. The driver remained engaged against the seatback as the Nissan was propelled forward and struck the Honda. At impact with the Honda, the driver initiated a forward trajectory. She loaded the seat belt system, which restricted her forward movement. She remained in the area of the driver's seat as the Nissan rotated counterclockwise.

The right side leading rollover induced an initial right trajectory to the driver. Centrifugal forces associated with rollover directed the driver away from the vehicle's center of mass. However, her belted status restricted her movement about the vehicle's interior. She remained in the driver's seat position as the Nissan came to final rest on its wheels in the roadway.

Emergency response personnel opened the driver's left front door of the Nissan and then used hydraulic rescue tools to cut the limiter bar. This enabled them to open the door to a wider angle for better access to the compact vehicle's interior. The driver was immobilized on a long spine board and transferred to an awaiting helicopter, which transported her to a regional trauma center. According to the driver, she was treated and diagnosed with a concussion with loss of consciousness (> 30 minutes), acute neck pain, and benign positional vertigo.

Numerous requests for documentation of the driver's injuries were denied by the treating medical facility. The SCI investigator made multiple follow-up attempts to contact the driver and obtain a medical record release authorization, but she refused further communication.

Front Row Right Occupant Demographics

Age/sex:	41 years/female
Height:	183 cm (72 in)
Weight:	91 kg (200 lb)
Eyewear:	None
Seat type:	Forward-facing bucket seat with adjustable head restraint
Seat track position:	Between middle and rear position
Manual restraint usage:	3-point lap and shoulder seat belt system
Usage source:	Vehicle inspection, EDR data
Air bags:	CAC frontal, seat-mounted side impact, and right side impact IC air bags available; None deployed
Alcohol/drug involvement:	None
Egress from vehicle:	Assisted from vehicle by emergency response personnel
Transport from scene:	Helicopter to a regional trauma center
Type of medical treatment:	Treated; duration and outcome unknown

Front Row Right Occupant Injuries

Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Component	IPC Confidence Level
1	Left leg fracture open, NFS	852003.2	Unknown	

Source – Interview; numerous requests for records denied by the treating medical facility.

Front Row Right Occupant Kinematics

The 41-year-old female front row right occupant was positioned in the front right passenger's seat of the 2016 Nissan Versa. She had adjusted the seat to a track position between middle and full-rear, with the seat back slightly reclined and the adjustable head restraint approximately fully downward. She was restrained by the 3-point lap and shoulder seat belt system; her usage of which was determined by the post-crash condition of the seat belt system as observed by the SCI investigator and a review of the EDR data imaged from the Nissan during inspection.

The front row right occupant remained in position as the Nissan traveled at slow speed in traffic. At impact with the Buick, she initiated an abrupt rearward trajectory. The front row right occupant loaded the seatback and head restraint, which deformed these components rearward. It is unknown if this contact and loading produced occupant injury. She remained engaged against the seatback as the Nissan was propelled forward and struck the Honda.

At impact with the Honda, the front row right occupant initiated a forward trajectory. She contacted and loaded the seat belt system, which restricted her forward movement and produced corresponding loading evidence on the webbing and latch plate of the seat belt system. The front row right occupant remained in the area of the front right passenger's seat as the Nissan rotated counterclockwise.

The right side leading rollover induced an initial right trajectory to the front row right occupant. This was exacerbated by the centrifugal forces associated with rollover, which directed her away from the vehicle's center of mass. The front row right occupant's belted status restricted her movement about the vehicle's interior. However, it is possible that she contacted the right door panel and/or right roof side rail during the rollover sequence. No contact evidence was discernable at the time of the SCI vehicle inspection to support such contact.

The front row right occupant remained in the front right passenger's seat position as the Nissan came to final rest on its wheels in the roadway. Emergency response personnel opened the right front door of the Nissan and used hydraulic rescue tools to cut the limiter bar. This enabled them to open the door to a wider angle for better access to the compact vehicle's interior. The front row right occupant was immobilized on a long spine board and transferred to an awaiting helicopter, which transported her to a regional trauma center. According to the driver, the front row right occupant received reconstructive surgery for an open lower left leg fracture with loss of tissue. However, there was a lack of contact evidence in the vehicle to substantiate or describe such an injury. No evidence of contact was discernable to the floor area or lower instrument panel at the front row right position. Numerous requests for documentation of the front row right occupant's injuries were denied by the treating medical facility. The SCI investigator made multiple follow-up attempts to contact the driver and obtain contact information for the front row right occupant and to obtain a medical record release authorization, but she refused further communication.

Second Row Right Occupant Demographics

Age/sex:	13 years/female
Height:	Unknown
Weight:	Unknown
Eyewear:	Unknown
Seat type:	Forward-facing bench seat with adjustable head restraint
Seat track position:	Not adjustable
Manual restraint usage:	3-point lap and shoulder seat belt system
Usage source:	Vehicle inspection
Air bags:	Right side impact IC air bag available; Not deployed
Alcohol/drug involvement:	None
Egress from vehicle:	Assisted from vehicle
Transport from scene:	Helicopter to a regional trauma center
Type of medical treatment:	Treated and released within hours of the crash

Second Row Right Occupant Injuries

Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Component	IPC Confidence Level
-	Unknown	N/A	N/A	N/A

Source – Numerous requests for records denied by the treating medical facility.

Second Row Right Occupant Kinematics

The 13-year-old female second row right occupant was positioned on the bench seat in the second row right position of the Nissan. The adjustable head restraint was positioned fully downward. She used the 3-point lap and shoulder seat belt system for manual restraint. Her restraint usage was determined based on the post-crash condition of the seat belt system as observed by the SCI investigator during the vehicle inspection.

The second row right occupant remained in position as the Nissan traveled at slow speed in traffic. At impact with the Buick, she initiated an abrupt rearward trajectory. The second row right occupant loaded the seatback. During the severe vehicle to vehicle engagement, deformation to the Nissan's rear plane induced forward displacement of the second row seatback. This exacerbated the second row right occupant's loading of the component. It is unknown if her contact and loading produced occupant injury. She remained engaged against the seatback as the Nissan was propelled forward and struck the Honda.

At impact with the Honda, the second row right occupant initiated a forward trajectory. She contacted and loaded the seat belt system, which restricted her forward movement and produced corresponding loading evidence on the webbing of the seat belt system. The second row right occupant remained in the area of her second row seat position as the Nissan rotated counterclockwise.

The right side leading rollover induced an initial right trajectory to the second row right occupant. This was exacerbated by the centrifugal forces associated with rollover, which directed her away from the vehicle's center of mass. The second row right occupant's belted status restricted her movement about the vehicle's interior. However, it is possible that she contacted the right rear door panel during the rollover sequence. No contact evidence was discernable at the time of the SCI vehicle inspection to support such contact.

The second row right occupant remained in her respective second row seat position as the Nissan came to final rest on its wheels in the roadway. Emergency response personnel opened the right rear door of the Nissan and assisted the young occupant from the vehicle. She was transported in the same helicopter as the front row right occupant for precautionary evaluation at the regional trauma center. Numerous requests for documentation of the second row right occupant's injuries were denied by the treating medical facility. The SCI investigator made multiple follow-up attempts to contact the driver and obtain a medical record release authorization, but she refused further communication.

2002 BUICK RENDEZVOUS

Description

The 2002 Buick Rendezvous was an sport utility vehicle (SUV) identified by the VIN 3G5DA03E32Sxxxxxx. It was built on a 285 cm (112.2 in) wheelbase and was powered by a 3.4 liter, 6-cylinder, gasoline engine with front-wheel drive. According to the vehicle owner's insurer, the Buick was not covered by a collision policy. It was surrendered by its owner to the towing facility and scrapped prior to the submission of crash notification to NHTSA. It was not available for SCI inspection. There were no available post-crash photographs of the vehicle.

Occupant Data

The Buick was occupied by its 42-year-old male driver. According to law enforcement documentation of the crash, he was restrained by a lap and shoulder seat belt system and frontal air bags deployed in the crash. He denied injury at the crash site and was not medically transported.

2015 HONDA CR-V

Description

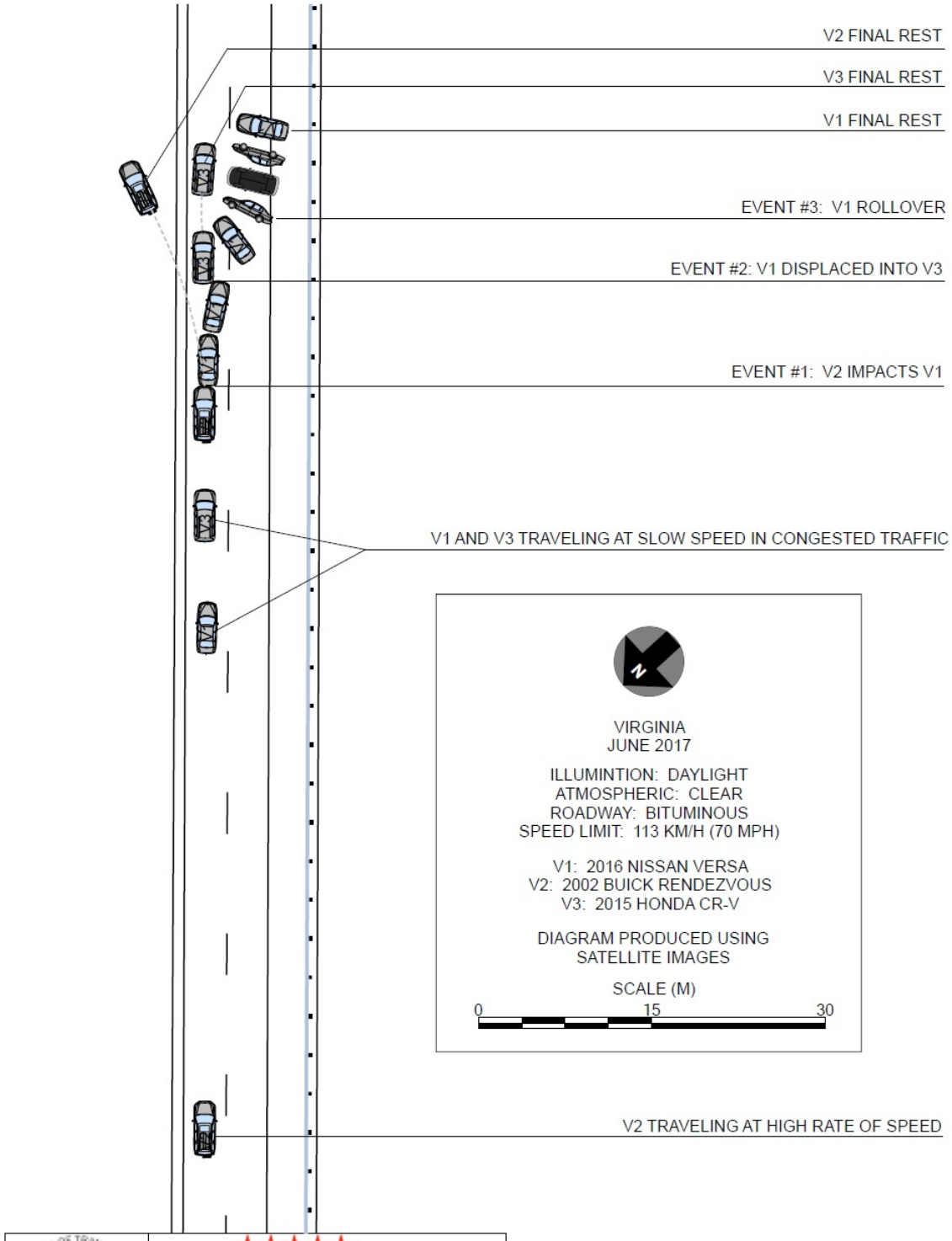
The 2015 Honda CR-V was an SUV identified by the VIN 5J6RM4H9XFLxxxxxx. It was built on a 262 cm (103.1 in) wheelbase and was powered by a 2.4 liter, inline 4-cylinder, gasoline engine with all-wheel drive.

According to the vehicle's insurer, the Honda was repaired in the weeks following the crash. Its repair was completed prior to the submission of crash notification to NHTSA. The Honda's owner declined to permit an SCI inspection of the vehicle. There were no available photographs of the damaged Honda post-crash.

Occupant Data

The Honda was occupied by a 73-year-old female driver. According to law enforcement documentation of the crash, she was restrained by the vehicle's 3-point lap and shoulder seat belt system at the time of the crash. No supplemental restraint systems in the Honda deployed as a result of the minor severity rear-impact crash with the Nissan. The Honda's driver exited the vehicle without assistance and denied injury. She was not medically transported from the crash site, and left the crash scene in the Honda following completion of the on-scene law enforcement investigation.

CRASH DIAGRAM



	NHTSA www.nhtsa.gov
Case Number:	CR17023

APPENDIX A: 2016 Nissan Versa Event Data Recorder (EDR) Report[2]

[2] The EDR report 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 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	3N1CN7AP6GL******
User Case Number	
EDR Data Imaging Date Crash Date Filename Saved on	CR17023_V1_ACM.CDRX
Imaged with CDR version Imaged with Software Licensed to (Company Name)	Crash Data Retrieval Tool 17.4.2 Company Name information was removed when this file was saved without VIN sequence number
Reported with CDR version Reported with Software Licensed to (Company Name)	Crash Data Retrieval Tool 19.0 NHTSA
EDR Device Type	Airbag Control Module
Event(s) recovered	Event Record 1, Event Record 2

Comments

No comments entered.

Data Limitations

General Information:

Data limitations are intended to assist in reading event data that has been imaged from the vehicle's Air bag Control Unit (ACU). Event data should be considered in conjunction with other available physical evidence from the vehicle and scene.

Airbag Control Unit (ACU)

- The Air bag Control Unit (ACU) can store two types of events: Non-Deployment Events and Deployment.
  - A Non-Deployment Event is a crash or other physical occurrence which causes the ACU algorithm to be activated, but in which deployment thresholds are not reached.
  - A Deployment Event is a crash or other physical occurrence which causes ACU deployment thresholds to be reached or exceeded. Depending on the vehicle model, one or more of the following may be activated during a Deployment Event: front air bags, seat-mounted side airbags, roof-mounted or door-mounted curtain air bags, pretensioners, or pop-up roll bars.

- The ACU can record up to two events. If additional events occur subsequently, the older of the two events already recorded (i.e. the one which occurred first) is overwritten.
  - A Non-Deployment Event can be overwritten by another Non-Deployment event, or by a Deployment Event.
  - A Deployment Event has higher priority than a Non-Deployment Event, and cannot be interrupted or overwritten by another event.
  - The data pertaining to a Deployment Event is locked after being recorded. However, a second event can still be recorded subsequently in the portion of the event memory which is not locked.

- Event data includes both pre-crash data and crash data.
  - If the power supply to the ACU is lost during an event, all or part of the event data may not be recorded.
  - In addition to the recording of event data, the ACU has the ability to perform diagnostics and record Diagnostic Trouble Codes (DTCs).

Data Element Sign Convention:

The following table provides an explanation of the sign convention for data elements in the CDR report.

Data Element Name	Positive Sign Notation Indicates
Longitudinal Acceleration	Forward
Delta-V, Longitudinal	Forward
Maximum Delta-V, Longitudinal	Forward
Lateral Acceleration	Left to Right
Delta-V, Lateral	Left to Right
Maximum Delta-V, Lateral	Left to Right
Vehicle Roll Angle	Left to Right Rotation
Steering Input	Left Turn

- "Life Time Counter (sec)" indicates the elapsed time, in seconds, from the vehicle's first ignition activation until the start of the first recorded event. The counter is incremented whenever the vehicle's ignition is on. The counter is reset to 0 if the ACU is replaced.
- "Complete File Recorded" indicates whether a complete EDR data set has been stored after the event. "Yes" indicates that a complete data set has

been recorded. "No" indicates that only a portion of the data set has been recorded, for example due to the power to the ACU being lost during the event.
- "Multi-Event, Number of Events (1, 2)" indicates the number of events which are stored during a given ignition cycle. A Multi-Event occurs whenever the time between Event 2 trigger threshold and Event 1 trigger threshold is less than or equal to 5 seconds during the same ignition cycle, and "2" will be recorded in this case. Otherwise, "1" will be recorded.
- "Air Bag Warning Lamp (On, Off)" indicates whether the ACU was in trouble mode or in normal operation mode at the time of the event. "On" indicates that the air bag warning lamp was illuminated at the time of the event, and the ACU was in trouble mode. "Off" indicates that the air bag warning lamp was not illuminated at the time of the event, and the ACU was in normal operation mode.
- "Frontal Air Bag Suppression Switch Status" indicates whether front passenger air bag deployment was suppressed at the time of the event. "On" indicates that the front passenger air bag was suppressed at the time of the event (deployment inhibited). "Off" indicates that the front passenger air bag was not suppressed at the time of the event (deployment enabled). This data will not be available for all vehicles.
- "Delta-V, Longitudinal" indicates the cumulative change in velocity along the longitudinal direction.
- "Acceleration, Longitudinal" indicates the rate of change of velocity with time along the longitudinal direction.
- "Delta-V, Lateral" indicates the cumulative change in velocity along the lateral direction.
- "Acceleration, Lateral" indicates the rate of change of velocity with time along the lateral direction.
- "Engine Throttle, % full" indicates the position of the accelerator pedal as a percentage of the fully depressed position.
- "Service Brake (On, Off)" indicates whether the service brake is activated ("On") or not activated ("Off").
- "Steering Input (deg)" indicates the angular displacement of the steering wheel measured in degrees. -250 deg indicates a 250 degree turn to the right of the steering wheel, 0 deg indicates the straight-ahead steering wheel position, and 250 deg indicates a 250 degree turn to the left of the steering wheel.
- The notation "CLP" indicates that the measurement captured by a sensor exceeded the design range of the sensor.
- "Seat Track Position Switch, Foremost, Status, Driver (Yes/No)" indicates whether the driver's seat is positioned within a designated threshold value of the most forward adjustment position. "Yes" indicates that the driver's seat is positioned within a designated threshold value of the most forward adjustment position. For all other adjustment positions, "No" is displayed. This data will not be available if the seat track position switch is not installed in the vehicle.
- "Occupant Size Classification, Right Front Passenger, Child (Yes/No)" indicates whether or not the right front passenger is classified as a child (as defined in 49 CFR part 572, subpart N or smaller). This data will not be available for all vehicles.
- "e-pedal ON/OFF Status" indicates whether "e-pedal" is activated (ON), or not activated (OFF). This data will not be available for all vehicles.

Hexadecimal Data:
All data that has been specified for retrieval is shown in the Hexadecimal Data section of this report. However, the Hexadecimal Data section may contain data that is not translated by the CDR tool.

Data Sources:
- Crash data is measured internally in the ACU.
- Pre-crash data is not measured internally in the ACU, but is transmitted from other control units through the Controller Area Network (CAN).
- Pre-crash data and crash data are asynchronous.

0701_Nissan001_r007

DTCs at Time of Retrieval

DTC	Status	Description
B1018	Past	OCCUPANT SENS [UNIT FAIL]

System Status at Event (Event Record 1)

Life Time Counter (sec)	2898145
Complete File Recorded (Yes/No)	Yes (Complete)
Ignition Cycle, Crash	2966
Ignition Cycle, Download	2967
Multi-Event, Number of Events (1, 2)	1
Time from Event 1 to 2 (sec)	0
Safety Belt Status, Driver	On (Fastened)
Safety Belt Status, Right Front Passenger	On (Fastened)
Frontal Air Bag Warning Lamp (On, Off)	Off
Frontal Air Bag Suppression Switch Status	Off (AS airbag deploy)
Maximum Delta-V, Longitudinal (MPH [km/h])	27 [43]
Time, Maximum Delta-V, Longitudinal (msec)	145
Maximum Delta-V, Lateral (MPH [km/h])	4 [7]
Time, Maximum Delta-V, Lateral (msec)	105
Maximum Acceleration, Longitudinal (g)	22.5
Time, Maximum Acceleration, Longitudinal (msec)	2.5
Maximum Acceleration, Lateral (g)	16
Time, Maximum Acceleration, Lateral (msec)	2.5

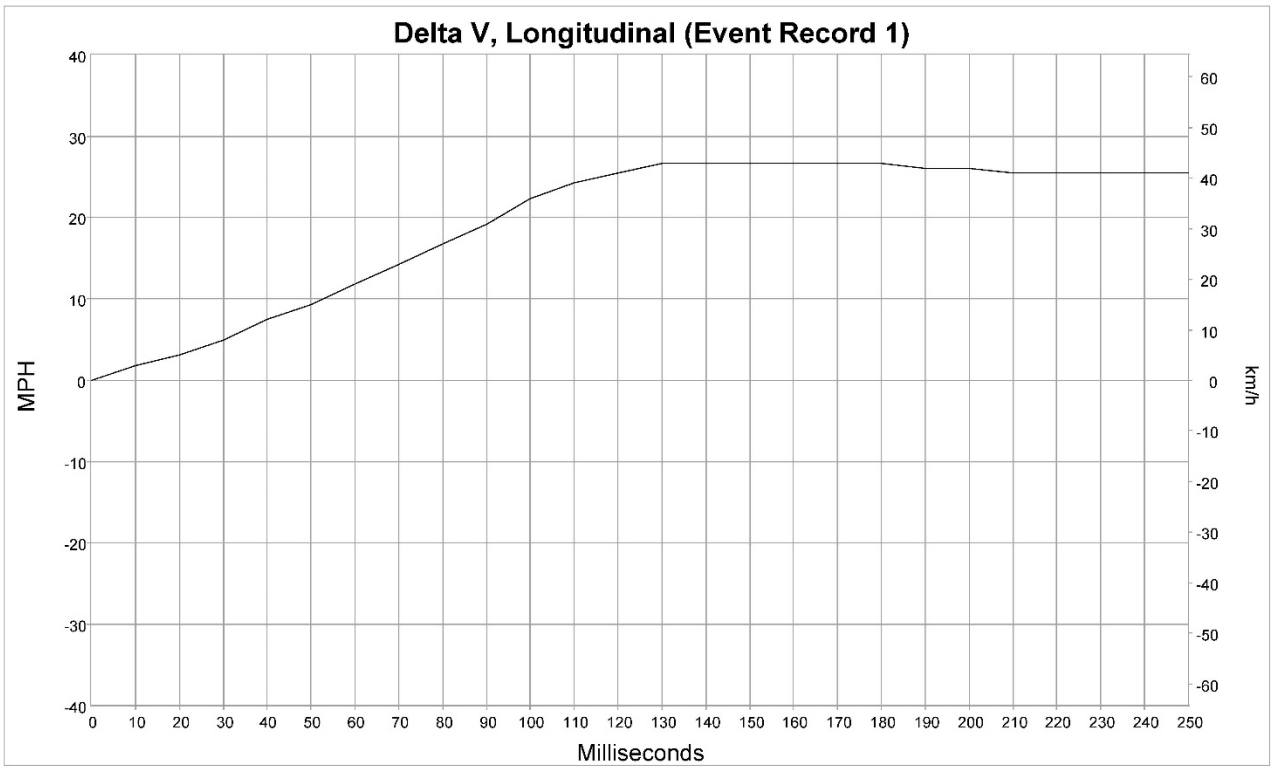
Deployment Command Data (Event Record 1)

Frontal Air Bag Deployment, Time to Deploy/First Stage, Driver (msec)	N/A
Frontal Air Bag Deployment, Time to Deploy/First Stage, Passenger (msec)	N/A
Frontal Air Bag Deployment, Time to 2nd Stage, Driver (msec)	N/A
Frontal Air Bag Deployment, Time to 2nd Stage, Right Front Passenger (msec)	N/A
Side Air Bag Deployment, Time to Deploy, Driver (msec)	N/A
Side Air Bag Deployment, Time to Deploy, Right Front Passenger (msec)	N/A
Side Curtain/Tube Air Bag Deployment, Time to Deploy, Driver Side (msec)	N/A
Side Curtain/Tube Air Bag Deployment, Time to Deploy, Right Side (msec)	N/A
Pretensioner Deployment, Time to Fire, Driver (msec)	N/A
Pretensioner Deployment, Time to Fire, Right Front Passenger (msec)	N/A

Pre-Crash Data -5 to 0 sec [2 samples/sec] (Event Record 1)

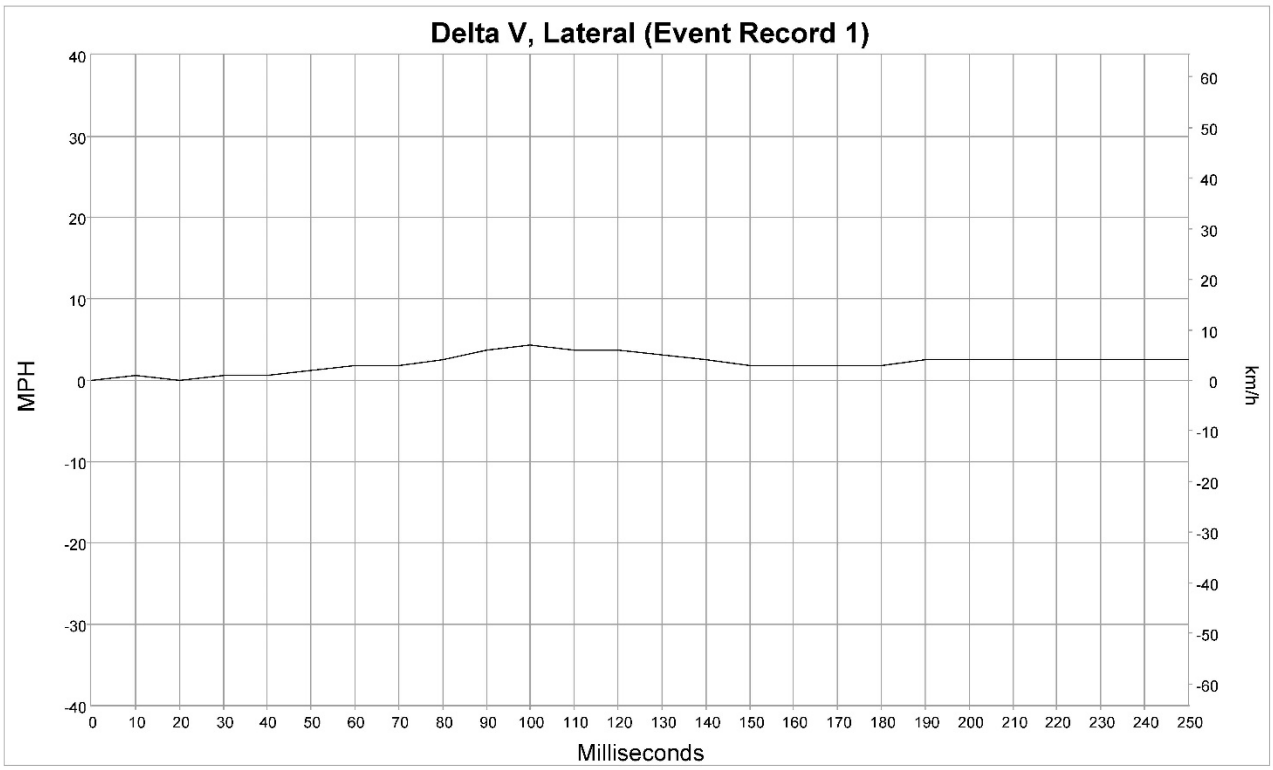
(the most recent sampled values are recorded prior to the event)

Time Stamp (sec)	Speed, Vehicle Indicated (MPH [km/h])	Accelerator Pedal, % full	Engine RPM	Motor RPM	Service Brake (On, Off)	Steering Input (deg)
-5.0	9 [15]	0	1100	1100	On (Brake Activated)	2
-4.5	7 [12]	0	650	900	On (Brake Activated)	2
-4.0	6 [10]	0	800	750	On (Brake Activated)	2
-3.5	6 [9]	0	750	700	On (Brake Activated)	2
-3.0	5 [8]	0	700	600	On (Brake Activated)	2
-2.5	4 [7]	0	650	500	On (Brake Activated)	2
-2.0	4 [6]	0	650	450	On (Brake Activated)	2
-1.5	3 [5]	21.5	750	400	Off (Brake Not Activated)	2
-1.0	4 [6]	56.5	1750	800	Off (Brake Not Activated)	2
-0.5	5 [8]	0	1950	1100	Off (Brake Not Activated)	-40
0.0	6 [9]	0	1350	1200	On (Brake Activated)	-34



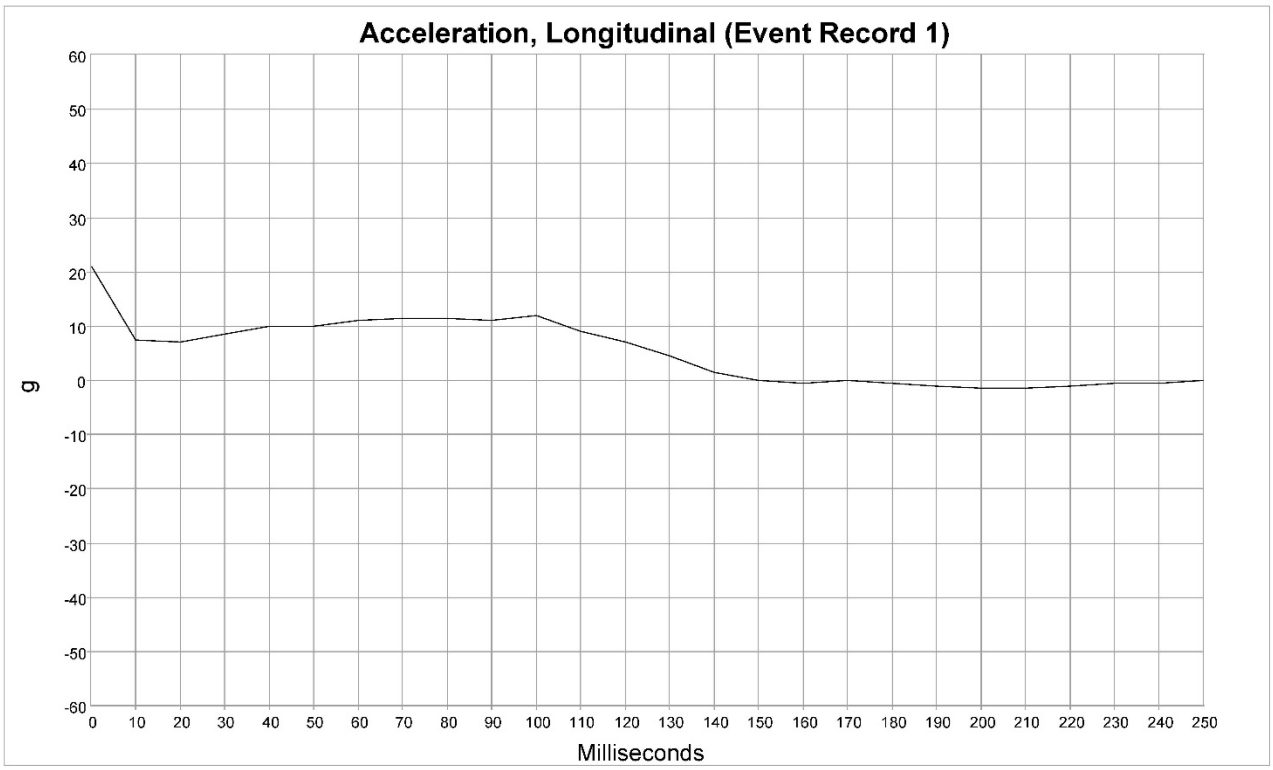
Longitudinal Delta V (Event Record 1)

Time (msec)	MPH [km/h]
0	0 [0]
10	2 [3]
20	3 [5]
30	5 [8]
40	7 [12]
50	9 [15]
60	12 [19]
70	14 [23]
80	17 [27]
90	19 [31]
100	22 [36]
110	24 [39]
120	25 [41]
130	27 [43]
140	27 [43]
150	27 [43]
160	27 [43]
170	27 [43]
180	27 [43]
190	26 [42]
200	26 [42]
210	25 [41]
220	25 [41]
230	25 [41]
240	25 [41]
250	25 [41]



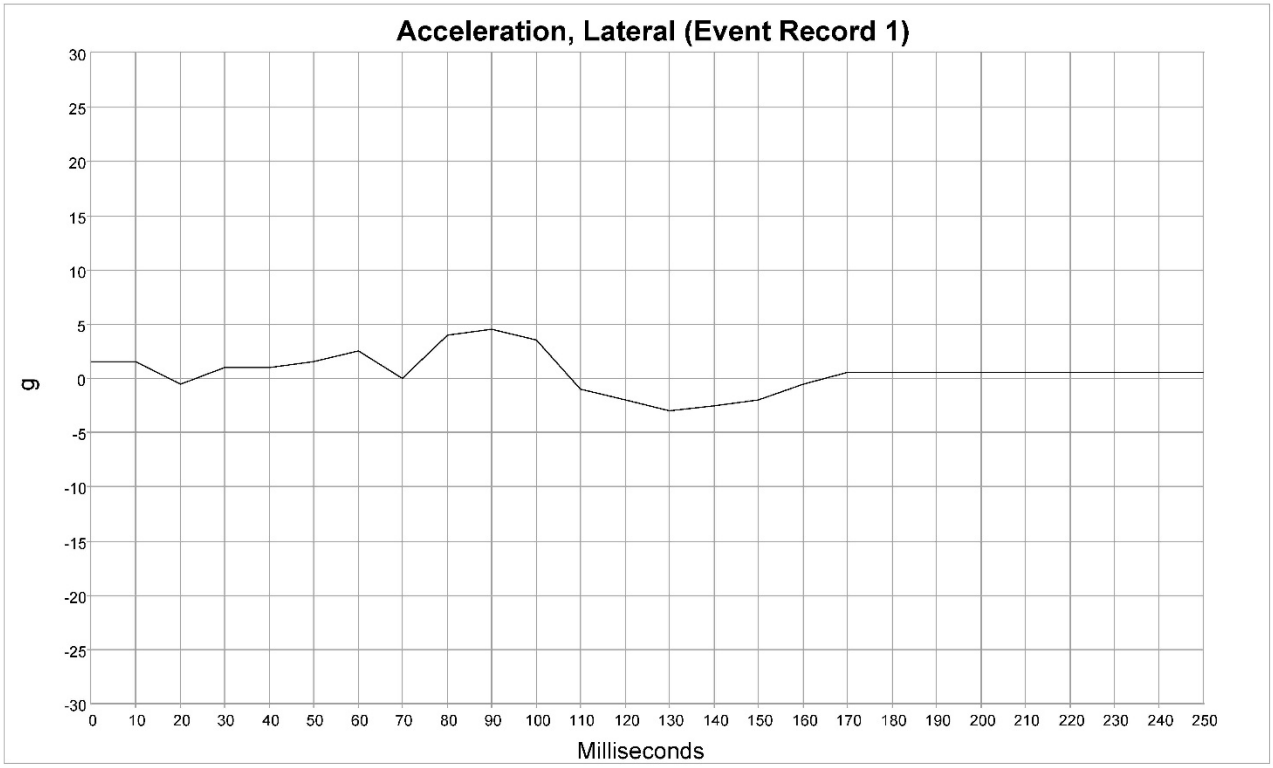
Lateral Delta V (Event Record 1)

Time (msec)	MPH [km/h]
0	0 [0]
10	1 [1]
20	0 [0]
30	1 [1]
40	1 [1]
50	1 [2]
60	2 [3]
70	2 [3]
80	2 [4]
90	4 [6]
100	4 [7]
110	4 [6]
120	4 [6]
130	3 [5]
140	2 [4]
150	2 [3]
160	2 [3]
170	2 [3]
180	2 [3]
190	2 [4]
200	2 [4]
210	2 [4]
220	2 [4]
230	2 [4]
240	2 [4]
250	2 [4]



Longitudinal Acceleration (Event Record 1)

Time (msec)	g
0	21
10	7.5
20	7
30	8.5
40	10
50	10
60	11
70	11.5
80	11.5
90	11
100	12
110	9
120	7
130	4.5
140	1.5
150	0
160	-.5
170	0
180	-.5
190	-1
200	-1.5
210	-1.5
220	-1
230	-.5
240	-.5
250	0



Lateral Acceleration (Event Record 1)

Time (msec)	g
0	1.5
10	1.5
20	-.5
30	1
40	1
50	1.5
60	2.5
70	0
80	4
90	4.5
100	3.5
110	-1
120	-2
130	-3
140	-2.5
150	-2
160	-.5
170	.5
180	.5
190	.5
200	.5
210	.5
220	.5
230	.5
240	.5
250	.5

System Status at Event (Event Record 2)

Life Time Counter (sec)	2898146
Complete File Recorded (Yes/No)	Yes (Complete)
Ignition Cycle, Crash	2966
Ignition Cycle, Download	2967
Multi-Event, Number of Events (1, 2)	2
Time from Event 1 to 2 (sec)	0.9
Safety Belt Status, Driver	On (Fastened)
Safety Belt Status, Right Front Passenger	On (Fastened)
Frontal Air Bag Warning Lamp (On, Off)	Off
Frontal Air Bag Suppression Switch Status	Off (AS airbag deploy)
Maximum Delta-V, Longitudinal (MPH [km/h])	-11 [-18]
Time, Maximum Delta-V, Longitudinal (msec)	300
Maximum Delta-V, Lateral (MPH [km/h])	4 [7]
Time, Maximum Delta-V, Lateral (msec)	117.5
Maximum Acceleration, Longitudinal (g)	-13.5
Time, Maximum Acceleration, Longitudinal (msec)	32.5
Maximum Acceleration, Lateral (g)	12
Time, Maximum Acceleration, Lateral (msec)	32.5

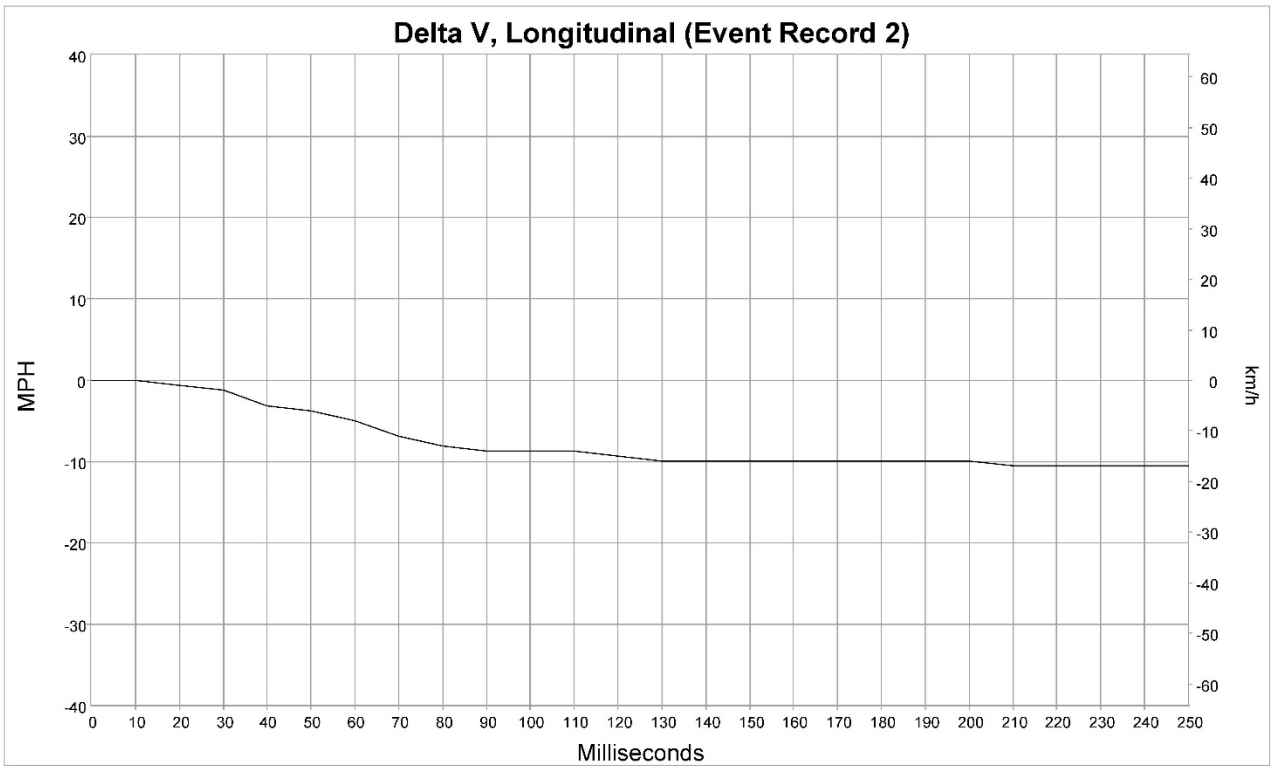
Deployment Command Data (Event Record 2)

Frontal Air Bag Deployment, Time to Deploy/First Stage, Driver (msec)	N/A
Frontal Air Bag Deployment, Time to Deploy/First Stage, Passenger (msec)	N/A
Frontal Air Bag Deployment, Time to 2nd Stage, Driver (msec)	N/A
Frontal Air Bag Deployment, Time to 2nd Stage, Right Front Passenger (msec)	N/A
Side Air Bag Deployment, Time to Deploy, Driver (msec)	N/A
Side Air Bag Deployment, Time to Deploy, Right Front Passenger (msec)	N/A
Side Curtain/Tube Air Bag Deployment, Time to Deploy, Driver Side (msec)	N/A
Side Curtain/Tube Air Bag Deployment, Time to Deploy, Right Side (msec)	N/A
Pretensioner Deployment, Time to Fire, Driver (msec)	N/A
Pretensioner Deployment, Time to Fire, Right Front Passenger (msec)	N/A

Pre-Crash Data -5 to 0 sec [2 samples/sec] (Event Record 2)

(the most recent sampled values are recorded prior to the event)

Time Stamp (sec)	Speed, Vehicle Indicated (MPH [km/h])	Accelerator Pedal, % full	Engine RPM	Motor RPM	Service Brake (On, Off)	Steering Input (deg)
-5.0	6 [10]	0	800	750	On (Brake Activated)	2
-4.5	6 [9]	0	750	700	On (Brake Activated)	2
-4.0	5 [8]	0	700	600	On (Brake Activated)	2
-3.5	4 [7]	0	650	500	On (Brake Activated)	2
-3.0	4 [6]	0	650	450	On (Brake Activated)	2
-2.5	3 [5]	21.5	750	400	Off (Brake Not Activated)	2
-2.0	4 [6]	56.5	1750	800	Off (Brake Not Activated)	2
-1.5	5 [8]	0	1950	1100	Off (Brake Not Activated)	-40
-1.0	11 [17]	0	1400	1700	Off (Brake Not Activated)	-6
-0.5	29 [47]	0	1950	1950	Off (Brake Not Activated)	178
0.0	28 [45]	0	1700	1750	Off (Brake Not Activated)	250 (clp)



Longitudinal Delta V (Event Record 2)

Time (msec)	MPH [km/h]
0	0 [0]
10	0 [0]
20	-1 [-1]
30	-1 [-2]
40	-3 [-5]
50	-4 [-6]
60	-5 [-8]
70	-7 [-11]
80	-8 [-13]
90	-9 [-14]
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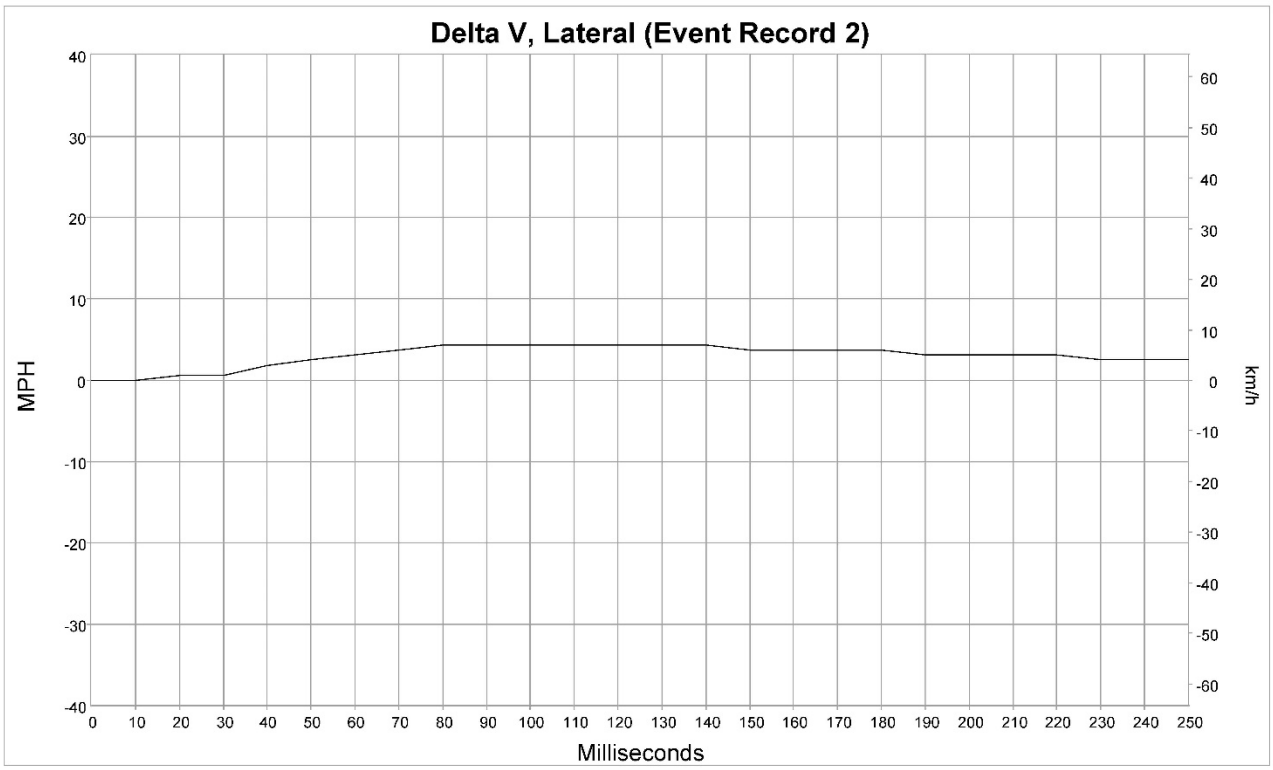
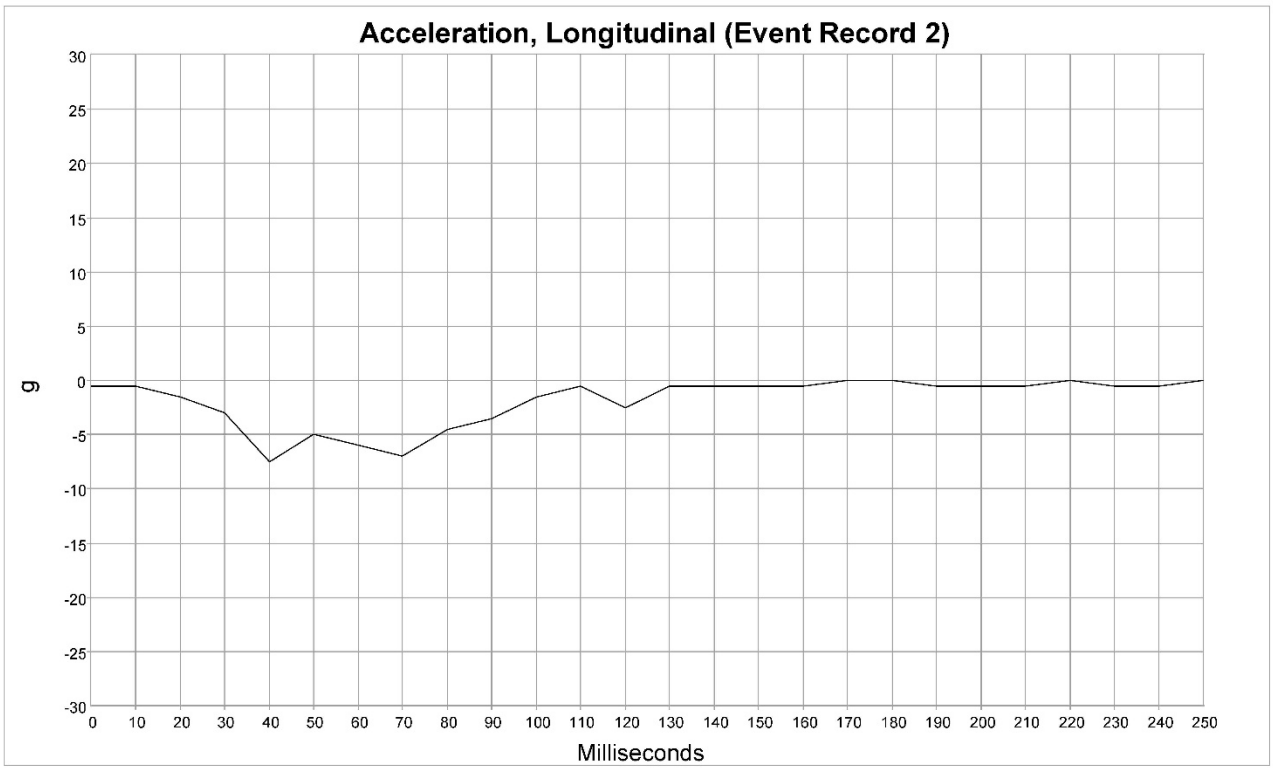


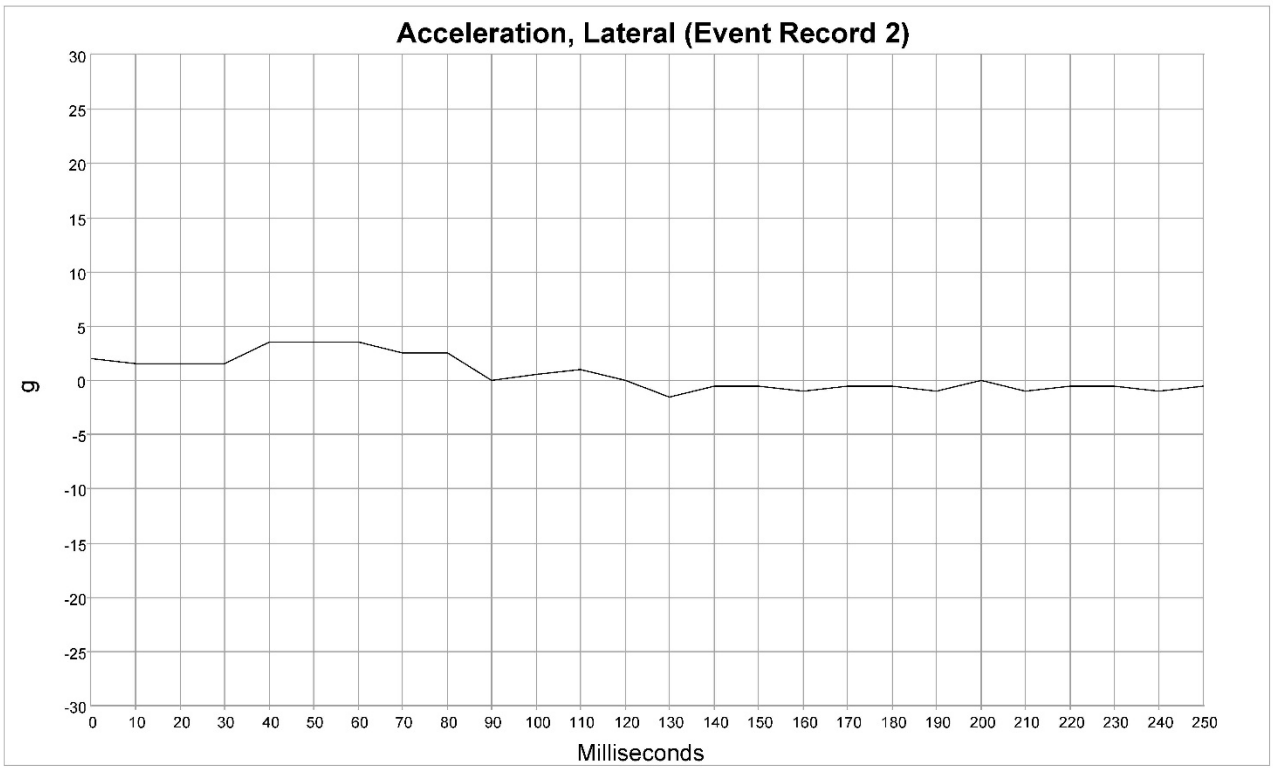
Lateral Delta V (Event Record 2)

Time (msec)	MPH [km/h]
0	0 [0]
10	0 [0]
20	1 [1]
30	1 [1]
40	2 [3]
50	2 [4]
60	3 [5]
70	4 [6]
80	4 [7]
90	4 [7]
100	4 [7]
110	4 [7]
120	4 [7]
130	4 [7]
140	4 [7]
150	4 [6]
160	4 [6]
170	4 [6]
180	4 [6]
190	3 [5]
200	3 [5]
210	3 [5]
220	3 [5]
230	2 [4]
240	2 [4]
250	2 [4]



Longitudinal Acceleration (Event Record 2)

Time (msec)	g
0	-.5
10	-.5
20	-1.5
30	-3
40	-7.5
50	-5
60	-6
70	-7
80	-4.5
90	-3.5
100	-1.5
110	-.5
120	-2.5
130	-.5
140	-.5
150	-.5
160	-.5
170	0
180	0
190	-.5
200	-.5
210	-.5
220	0
230	-.5
240	-.5
250	0



Lateral Acceleration (Event Record 2)

Time (msec)	g
0	2
10	1.5
20	1.5
30	1.5
40	3.5
50	3.5
60	3.5
70	2.5
80	2.5
90	0
100	.5
110	1
120	0
130	-1.5
140	-.5
150	-.5
160	-1
170	-.5
180	-.5
190	-1
200	0
210	-1
220	-.5
230	-.5
240	-1
250	-.5

Hexadecimal Data

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FF FF FF FF FF FF 00

61 04 F2 1A 00 00 03 FE

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00 00 00 00 FF

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01 01 01 01

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00 0E 00 0D 00 0D 00 0F 00 23 00 27 00 1B

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00 71 00 00 00 00 00 00 00 00 00 00 00 00 00 01 01 01 01 01 01 0B 96 0B 97 00 01 00 00 02 09 00
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0A 00 09 00 08 00 10 00 16 00 22 00 27 00 23 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
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59 0F 09

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DOT HS 812 843
December 2019

U.S. Department
of Transportation

**National Highway
Traffic Safety
Administration**

14553-120919-v3