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**Special Crash Investigations:  
On-Site Alleged Weld Separation  
Crash Investigation;  
Vehicle: 2018 Jeep Wrangler;  
Location: New York;  
Crash Date: August 2018**

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# Table of Contents

<b>Background .....</b>	<b>1</b>
<b>Crash Summary .....</b>	<b>3</b>
Crash Site .....	3
Pre-Crash .....	3
Crash .....	4
Post-Crash .....	5
<b>2018 Jeep Wrangler .....</b>	<b>6</b>
Description .....	6
Exterior Damage .....	7
Event Data Recorder .....	8
Interior Damage .....	9
Manual Restraint Systems .....	10
Supplemental Restraint Systems .....	11
NHTSA Recalls and Investigations .....	11
Alleged Track Bar Weld Separation and Undercarriage Inspection Discussion .....	12
<b>2018 Jeep Wrangler Occupant Data .....</b>	<b>17</b>
Driver Demographics .....	17
Driver Injuries .....	17
Driver Kinematics .....	17
<b>Crash Diagram .....</b>	<b>19</b>
<b>Appendix A: 2018 Jeep Wrangler Event Data Recorder Report .....</b>	<b>A-1</b>

**Special Crash Investigations**  
**On-Site Alleged Weld Separation Crash Investigation**  
**Office Of Defects Investigation**  
**Case No.: CR18027**  
**Vehicle: 2018 Jeep Wrangler**  
**Location: New York**  
**Crash Date: August 2018**

## **Background**

This report documents the on-site investigation of an alleged track bar weld separation of a 2018 Jeep Wrangler (Figure 1). The Jeep was involved in a right roadside departure crash, with impacts to a curb and wooden utility pole along a straight section of a two-lane roadway. Forces associated with the pole impact resulted in the deployment of the Jeep's driver's frontal air bag. The belted 34-year-old female driver was not injured in the crash. She initially reported to the investigating law enforcement agency that the right front tire blew out and caused her to crash. However, after receiving a recall announcement from the Jeep's manufacturer concerning the potential for track bar weld separation, she reported the crash to the National Highway Traffic Safety Administration and alleged mechanical failure. She stated during the SCI interview that the front end "gave out" while she was driving.



*Figure 1. Right front oblique view of the Jeep at the time of the SCI vehicle inspection*

Notification of the crash was provided by the vehicle's owner/driver to NHTSA in September 2018. Information concerning the vehicle and its location was forwarded to the Special Crash Investigations (SCI) group during October 2018, and the crash was assigned for on-site investigation. The Jeep was located at an auto repair facility, pending repair, and cooperation was established with the facility to conduct an inspection of the unrepaired vehicle. An interview of the Jeep's owner/driver was conducted via telephone, and a police crash report (PAR) documenting the circumstances of the crash was obtained. The on-site portion of this investigation took place in October 2018, and consisted of an inspection of the Jeep to examine and document the chassis, front axle, steering system, and assembly/welds, as well as the exterior and interior damage to the Jeep, areas of occupant contact, and the supplemental and manual restraint systems. A technical representative of the Jeep's manufacturer attended and participated in the vehicle inspection. Data was imaged by the SCI investigator from the Jeep's event data recorder (EDR) using the Bosch Crash Data Retrieval (CDR) software/tool. The SCI investigator

also used a commercially available scan tool to interrogate the vehicle's systems and identify diagnostic trouble codes (DTCs). The manufacturer representative then interrogated the Jeep's systems using a proprietary tool.

Additional on-site activities included the documentation of the crash site using photographs and a total station mapping system. Through the course of this SCI investigation, it was determined that the Jeep traveled north on the roadway with a consistent speed, began to slowly drift right, then was steered left in an attempt by the driver to avoid the crash. All the damage to the Jeep observed by the SCI investigator was resultant from the impact events of the crash. The track bar remained intact and was observed by the SCI investigator and manufacturer representative to be rigidly welded to the chassis. It ultimately was concluded that there was no evidence to support the allegation of weld separation or mechanical failure.

## Crash Summary

### Crash Site

The crash occurred in the northbound lane of a north/south State-maintained roadway during evening daylight in August 2018. According to the National Weather Service, conditions in the locale at the time of the crash included mostly cloudy skies with a temperature of 27 °C (81 °F), a northwesterly breeze of 5 km/h (3 mph), and relative humidity of 65 percent. The physical environment of the crash site was documented during the SCI inspection using a Nikon Nivo 5+M total station mapping system and photographs.

The asphalt-surfaced roadway consisted of a northbound lane and a southbound lane, which were separated by a center two-way turn lane. The center lane transitioned into a left turn-only lane for the respective travel directions on approach to multiple intersections along the roadway. All three lanes measured 3.3 m (10.8 ft) in width. The travel lanes were delineated by a single solid white fog line and a double yellow left lane line. Raised concrete curbs served as the road edges. Along the north edge of the roadway, 40 cm (15.7 in) diameter wooden utility poles were located immediately adjacent to the curb, spaced an average distance of approximately 40 m (131 ft) apart. This crash occurred at the northeast intersection quadrant of a controlled intersection. For the Jeep's northbound approach, the roadway was straight and had an incline of less than two percent (Figure 2). The posted speed limit was 48 km/h (30 mph). An electronic signal controlled traffic at the intersection. A crash diagram is included at the end of this report.



*Figure 2. North-facing view of the roadway for the Jeep's pre-crash travel trajectory approximately 40 m (131 ft) south of the impact*

### Pre-Crash

The Jeep was driven by the belted 34-year-old female as it traveled north on the State-maintained roadway. According to the driver during the SCI interview, she was traveling home after leaving her place of employment. The driver traveled this same route on a daily basis when traveling to and from work.

According to the driver, she was traveling approximately 48 km/h (30 mph) prior to the crash. She stated that she drove the vehicle north and approached the intersection without incident. The electronic traffic signal had cycled to permit travel for north/south traffic, and as such, she maintained her speed.

Law enforcement documentation of the crash detailed that the driver stated that the Jeep sustained a blow-out of the right front tire, precipitating a loss of control that resulted in the crash. However, during the SCI interview, the driver stated that the vehicle began to pull to the right immediately after she was through the intersection. She further stated that it seemed as if something in the front axle “gave out.” The driver stated that she steered left while applying the brakes for a distance, and said that as the vehicle continued northbound, she was unable to overcome the right pull of the vehicle.

According to the data imaged from the Jeep’s EDR, the Jeep was traveling at a speed of 48-49 km/h (30 mph) over the final 1.9-seconds of the pre-crash data sample. Over the initial 4.5-seconds of the data, the Jeep’s steering angle progressed slowly from -4 degrees to zero (*negative sign convention indicative of a right steering input*). Only over the final 0.5-second interval did the driver apply a left steering input. There also was no driver braking input recorded by the EDR’s pre-crash data.

### Crash

The Jeep struck the curb with its right front tire/wheel at the northeast intersection quadrant (Event #1), evidenced by a black rubber tire mark on the curb as observed at the time of the SCI crash site inspection. The Jeep then struck a large-diameter wooden utility pole (Event 2) with its front plane, right corner. This sideswiping impact primarily involved engagement of the tire/wheel with the wooden pole, which induced significant damage to the Jeep’s front axle and produced sufficient deceleration to result in supplemental restraint system actuation and deployment. The impact only gouged the surface of the wooden pole, which remained intact. Figure 3 shows the curb strike and utility pole located at the end of the curb return of the northeast intersection quadrant. The separation distance between the location of the curb strike and the pole measured 2.0 m (6.6 ft).



Figure 3. North-facing view of the impacts to the curb and utility pole

The Jeep maintained its northbound trajectory after striking the utility pole. A 0.9 m (3.0 ft) long tire mark adjacent to the curb began 6.2 m (20.3 ft) north of the utility pole and evidenced where the right front tire re-contacted the roadway surface. The Jeep then again mounted the curb, and the underside of the front axle engaged the curb (Event #3).

The location of this impact 9.5 m (31.2 ft) north of the utility pole was evidenced by gouging in the curb surface and the deposit of a cast aluminum fragment onto the road surface. The Jeep

ultimately came to final rest in the roadway facing north, with its right side tires adjacent to the curb. Figure 4 shows the impact evidence to the curb and the metallic fragment. The final rest position was evidenced by a fluid spill (lubricant from the Jeep's front axle), located 21.5 m (70.5 ft) north of the utility pole (Figure 5).



*Figure 4. Impact to the curb from the Jeep's front axle (Event 3) and metallic fragment*



*Figure 5. South-facing lookback view of the roadway from the Jeep's final rest position*

## **Post-Crash**

The driver and witnesses to the crash contacted the local emergency response system to report the crash. Law enforcement, fire department, and emergency medical services personnel responded to the crash scene. The driver of the Jeep was evaluated by EMS personnel at the scene, but she denied injury and refused transport. A local towing service recovered the vehicle from the crash site and transferred it to a local yard, where it was located at the time of the SCI inspection as it awaited repair.

## 2018 Jeep Wrangler

### Description

The Jeep (Figure 6) was a 4-door SUV manufactured in May 2018, and was identified by the Vehicle Identification Number 1C4HJXDG1JWxxxxxx. It was built on a 295 cm (116.1 in) wheelbase with a 3.6 liter, V-6, gasoline engine. The Jeep's electronic odometer reading at the time of the SCI inspection was 7,207 km (4,478 mi). It had a gross vehicle weight rating of 2,405 kg (5,300 lb), with front and rear axle ratings of 1,225 kg (2,700 lb) and 1,361 kg (3,000 lb), respectively. The curb weight was 1,905 kg (4,201 lb).



*Figure 6. Left front oblique view of the 2018 Jeep Wrangler at the time of the SCI vehicle inspection*

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 P245/75R17 at 250 kPa (36 PSI). At the time of the SCI inspection, the vehicle was equipped with Bridgestone Dueller H/T tires of the recommended size at all four axle positions. All tires had ample tread 6 to 7 mm (8/32-9/32 in), with matching tire identification numbers of "9BM1 DHT 1518." The left front, left rear, and right rear tires all remained inflated and were not damaged or restricted. However, the right front tire was deflated and de-beaded from its rim, with gouges in the tread. Data imaged from the Jeep's EDR indicated that the tire pressure of all four tires was between 276 to 290 kPa (40-42 PSI) when the crash occurred.

The interior of the Jeep 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 front seats were capable of 22 cm (8.7 in) of manual seat track position adjustment. Although the driver's seat was adjusted 1 cm (0.4 in) forward of full-rear at the time of the SCI inspection, the driver stated during the SCI interview that she had the seat adjusted to a middle track position with the seat back slightly reclined and the head restraint fully downward at the time of the crash. The Jeep's second row consisted of a non-adjustable, folding bench seat. Manual safety features in the Jeep included 3-point lap and shoulder seat belts for all five seat positions. Supplemental restraint systems included front seat belt retractor and lower anchor pretensioners, Certified Advanced 208-Compliant frontal air bags, and front-seat-mounted side impact air bags.

## Exterior Damage

Damage to the exterior of the Jeep was located primarily on the right and undercarriage planes, associative to the crash events with the curb and utility pole. The initial impact with the concrete curb by the right front tire/wheel of the Jeep produced a tire mark to the curb and induced a force that was translated to a rightward deflection of the steering angle. It is unknown if this impact produced any damage to the Jeep, as the subsequent pole impact overlapped the initial curb strike. The collision deformation classification (CDC) assigned to the Event 1 tire/wheel curb impact was 12FRWN3.

The second impact event with the wooden utility pole began on the Jeep's front plane. Direct contact was visible on the extreme right edge of the front bumper corner, 80 to 85 cm (31.5-33.5 in) right of center (Figure 7). In this area, there was no underlying front bumper structure, and no residual longitudinal deformation to the front plane occurred. The right edge of the bumper fascia was discolored and fractured, and the right amber turn signal/marker light was fractured in the housing.



*Figure 7. View of the damage to the Jeep's right front corner, from a frontal perspective*

Direct contact extended down the right plane along the polymer right front fender cover, and included engagement of the right front tire/wheel with the utility pole (Figure 8). Significant damage to the components of the axle and suspension at the right front position resulted from the impact. No specific right wheelbase dimension could be obtained due to the free-floating nature of the damaged right front axle position. Based on the observed damage to the Jeep, the CDC assigned for the Event 2 utility pole impact was 12FRES4. The third impact event of the undercarriage with the curb was located in the area of the front axle assembly, right of the vehicle's centerline. The axle, already fractured from the prior event (pole impact) contacted and engaged the curb 9.5 m (31.2 ft) north of the utility pole. This impact was not of sufficient magnitude to alter or otherwise affect the vehicle's trajectory, but it did gouge the axle assembly and fracture the cast aluminum housing. A small fragment of the housing was deposited on the roadway edge at the base of the curb. The CDC assigned to the Jeep for the undercarriage impact was 00UFRN99. No WinSMASH calculations could be performed for any of the impact events, as the lack of residual damage to the vehicle's structure prevented documentation of a residual crush profile.



*Figure 8. Right plane view of the front of the Jeep and the crash damage*

### **Event Data Recorder**

The 2018 Jeep Wrangler was equipped with an occupant restraints controller (ORC) mounted on the center tunnel between the front seats. The ORC monitored the diagnostic functions of the vehicle's supplemental restraint systems (air bags and seat belt pretensioners) and controlled their deployment/actuation dependent upon crash event severity. The Jeep's ORC had EDR capabilities, which were supported by the Bosch Crash Data Retrieval tool. Data was imaged during the SCI inspection process using software version 17.9, via a connection through the vehicle's diagnostic link connector. The data was later reported using version 19.5.2, and is included at the end of this report as Appendix A.

The Jeep's EDR had the capacity to store up to three events, including deployment or non-deployment event types. Non-deployment events could be overwritten by subsequent events, whereas deployment events could not be overwritten. Stored events were reported in cumulative order, based on chronology and severity. If power to the ACM was lost during a crash event, all or part of the data may not have been recorded. Associative to each reported event was a 5-second pre-crash buffer. Multiple data points were sampled on a recurring basis of 0.1 seconds, including: vehicle speed (mph), accelerator pedal (% full), engine throttle (% full), service brake, engine RPM, ABS activity, steering input (degrees), individual wheel speed (rpm), yaw rate (deg/sec), individual tire pressure, stability control, traction control, and cruise control status.

Data imaged from the Jeep's ORC indicated that one event was recognized and recorded. The event was a deployment event type, termed "Most Recent Event." It occurred on ignition cycle 310, when the odometer reading was 7,208.1 km (4,478.9 mi). Although the ignition cycles at the time of the data retrieval was 317, it was apparent that the imaged data was related to the Jeep's impact with the utility pole (Event 2 of the crash under investigation). There were no DTCs present/active at the time of the event. The driver's seat belt status was reported as "buckled," and the event file was completely recorded to memory. Associated with the recorded event were commands for the actuation of the driver's seat belt lower anchor and retractor pretensioners, with deployment of the driver's frontal air bag. The first stage was commanded at 58 milliseconds after algorithm enable (AE), the second stage was commanded at 88 milliseconds after AE, and the third squib was commanded at 208 milliseconds after AE. The maximum recorded longitudinal delta V was -10 km/h (-6.2 mph) at 100 milliseconds after AE,

while the maximum recorded lateral delta V was -7 km/h (-4.3 mph) at the same time interval. A portion of the pre-crash buffer is included below.

Time	Vehicle Speed	Accelerator Pedal	Engine Throttle	Engine rpm	Service Brake	Steering Input (degrees)*
-5.0	38 km/h (24 mph)	30%	32%	2,248	OFF	-4
-4.5	41 km/h (25 mph)	25%	23%	2,230	OFF	-4
-4.0	43 km/h (27 mph)	24%	26%	2,271	OFF	-4
-3.5	44 km/h (27 mph)	22%	24%	2,306	OFF	-3
-3.0	45 km/h (28 mph)	22%	25%	2,131	OFF	-2
-2.5	46 km/h (29 mph)	22%	26%	1,836	OFF	-2
-2.0	47 km/h (29 mph)	20%	22%	1,851	OFF	-2
-1.5	48 km/h (30 mph)	20%	22%	1,885	OFF	-1
-1.0	49 km/h (30 mph)	16%	15%	1,908	OFF	-1
-0.9	49 km/h (30 mph)	12%	12%	1,926	OFF	-1
-0.8	49 km/h (30 mph)	3%	9%	1,911	OFF	-1
-0.7	49 km/h (30 mph)	0%	6%	1,893	OFF	-1
-0.6	49 km/h (30 mph)	0%	3%	1,878	OFF	0
-0.5	49 km/h (30 mph)	0%	2%	1,720	OFF	8
-0.4	49 km/h (30 mph)	0%	2%	1,520	OFF	25
-0.3	49 km/h (30 mph)	0%	2%	1,426	OFF	46
-0.2	49 km/h (30 mph)	0%	2%	1,474	OFF	54
-0.1	49 km/h (30 mph)	0%	2%	1,427	OFF	36

\* For steering wheel angle data, a positive sign convention correlates to a counterclockwise input

## Interior Damage

The interior of the Jeep was inspected for crash-related damage, including intrusion and occupant contact. There was no occupant compartment intrusion to the interior of the Jeep associative to the crash. All of the Jeep's doors remained closed during the crash and were operational post-crash. None of the glazing was damaged in the crash or contacted by the occupant.

A small area of occupant contact that evidenced the kinematics of the Jeep's occupant was observed to the left lower instrument panel, beneath the steering column (Figure 9). The evidence consisted of a scuff with minor discoloration to the polymer surface of the panel, and was related to contact and loading by the driver's left lower extremity. No occupant injury was associated with this contact.



*Figure 9. Driver left knee contact to the Jeep's left lower instrument panel*

### **Manual Restraint Systems**

The Jeep 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). All three second row systems were equipped with ELR/ALR retractors.

At the time of the SCI inspection, the driver's D-ring was adjusted fully downward. The webbing was locked in an extended position, presumably as a result of retractor pretensioner actuation. The SCI investigator also observed that the lower anchor pretensioner was actuated. Three 5 cm (2.0 in) long polymer transfers were observed on the webbing: one from contact with the polymer fascia on the left side of the seat cushion/frame, one from latch plate loading, and one from D-ring loading. There were also subtle loading abrasions observed to the polymer surface of the latch plate in the belt path. It was apparent to the SCI investigator that the driver of the Jeep was using the system for manual restraint when the crash occurred. Figure 10 shows the driver's seat belt system in the Jeep at the time of the SCI vehicle inspection.



*Figure 10. Driver's seat belt system in the Jeep, with areas of loading evidence highlighted by yellow tape*

## Supplemental Restraint Systems

The Jeep was equipped with front seat belt retractor and lower anchor pretensioners, a CAC frontal air bag system, and front seat-mounted side impact air bags. The CAC system consisted of a steering wheel hub-mounted driver's frontal air bag and a top instrument panel-mounted passenger's frontal air bag, with seat belt buckle switch sensors, seat track position sensors, and a front right occupant presence (weight) sensor. The Jeep's front seat-mounted air bags were designed for deployment in side-impact crashes.

According to the Jeep's owner, she had purchased the vehicle new from a manufacturer dealership in June 2018. It had not been involved in any prior crashes. The supplemental restraint systems were original equipment, and had not required/received service or maintenance.

The driver's frontal air bag was mounted in the center hub of the steering wheel and concealed by tri-configuration cover flaps. In its deflated state, the overall diameter of the air bag was 68 cm (26.8 in). Venting was achieved by a pair of 2 cm (0.8 in) vent ports and an 8 cm (3.1 in) vent port on the back side of the air bag. Internal tethering was secured by a 15 cm (5.9 in) diameter stitch pattern sewn to the face of the air bag. No contact evidence or crash-related damage to the deployed driver's air bag was observed (Figure 11).



*Figure 11. View of the Jeep's deployed driver air bag*

## NHTSA Recalls and Investigations

A query of the 2018 Jeep Wrangler's VIN on [www.safercar.gov](http://www.safercar.gov) when this investigation was conducted indicated that there were no open investigations and one open recall concerning this specific vehicle. The recall was identified by the manufacturer number UA5 and NHTSA number UA5-18675. It was issued on September 28, 2018, after the date of the crash under investigation, and pertained to the potential for the front track bar bracket to have a weld or welds that were located off seam. The implication was that in affected vehicles, the track bar could potentially separate from the vehicle's frame and cause a reduction in steering control that potentially could result in a crash. A later query of the Jeep's VIN on [www.nhtsa.gov/recalls](http://www.nhtsa.gov/recalls) at the October 2020 date of this report indicated that there were no open investigations or recalls concerning this specific vehicle.

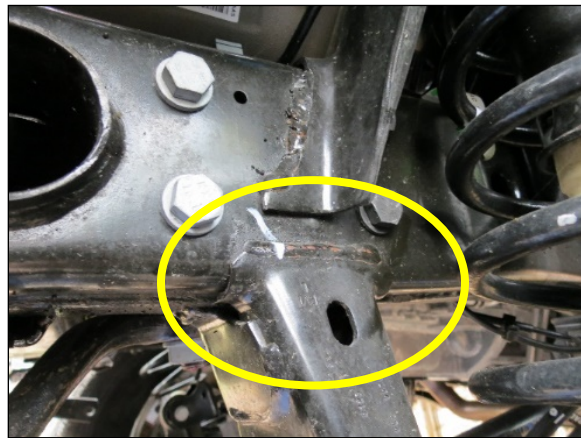
## **Alleged Track Bar Weld Separation and Undercarriage Inspection Discussion**

According to a police crash report documenting the crash, the driver initially had stated to the law enforcement agency that the Jeep suffered a blow-out of the right front tire and caused the crash. However, following the announcement of a recall concerning some Jeep Wrangler vehicles similar to the Jeep involved in this crash, the owner of the Jeep reported the crash to NHTSA and alleged that the Jeep's front end "gave out" as a result of weld separation in the front axle/steering system. She further alleged that this separation caused the Jeep to pull sharply to the right with such force and duration that, despite applying the vehicle's brakes and steering left, the Jeep departed the roadway to the right and crashed into a curb and utility pole. Associative to these allegations, the SCI investigator conducted a thorough examination of the Jeep's undercarriage. This included an inspection of the steering column and its components, the front suspension and its components, the front axle and its components, and the welds, bolts, brackets, and other surrounding components of the Jeep's undercarriage.

To facilitate this examination, the Jeep was elevated using a recovery vehicle and placed onto jack stands. Figure 12 shows the Jeep elevated for inspection. The first inspected components were the track bar, track bar bracket, and associated welds in relation to the driver's allegation and the unresolved active recall. The SCI investigator observed that the welds for the track bar bracket were on seam along the top and bottom, and the bracket remained entirely affixed to the Jeep's frame (Figure 13). There was no weld material along the front or back of the seam.

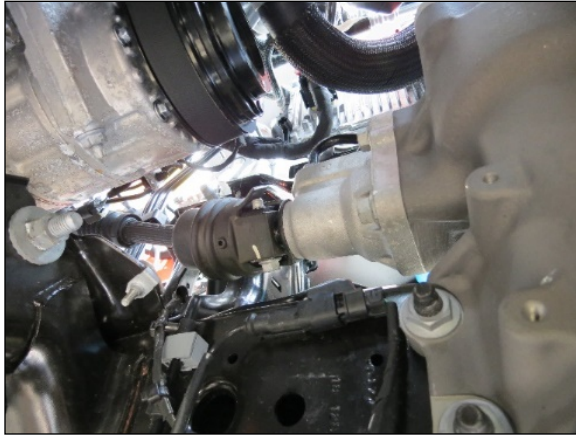


*Figure 12. Elevation of the Jeep using a recovery vehicle and jack stands during the SCI vehicle inspection*



*Figure 13. View of the Jeep's front track bar bracket and the intact weld on the outside of the left frame rail*

The SCI investigator then inspected the entire steering system and its components. The bolt remained in place holding the steering column and shaft above the steering gear (Figure 14), and the pitman arm, idler arm, and center link all remained connected and intact. The SCI investigator was able to manipulate the steering wheel and observe that the entire steering system remained functional. Figure 15 shows the center link, pitman arm, and steering gear. The only damaged component of the steering system was the steering damper. The steel piston sheared at the attachment end to the front axle position.



*Figure 14. View of the Jeep's intact steering column assembly*



*Figure 15. Center link, pitman arm, and steering gear of the Jeep's steering system*

Figure 16 shows the sheared steering damper.



*Figure 16. View of the Jeep's sheared steering damper at the right front axle position*

Continued inspection of the Jeep's undercarriage revealed that the sway bar was disconnected from its linkage to the right front axle position due to the shear of the attachment bolt by the crash forces (Figure 17). However, the sway bar support brackets holding the sway bar against the frame of the Jeep remained rigidly intact, their welds on seam and undamaged. The SCI investigator then observed that the spring and shock absorber for the right front position were deformed rearward by the utility pole impact forces (Figure 18). All support brackets and attachment points to the frame remained rigid and intact.



*Figure 17. View of the Jeep's separated front sway bar linkage*



*Figure 18. Left-facing view of the right front suspension showing rearward deflection of the spring and shock*

The Jeep's right control arm was also damaged. Although it remained attached to the mounting brackets at each end, and the brackets remained rigidly welded at their mounted locations, the control arm itself was bent by compression forces from the pole impact. The left control arm was undamaged. Figure 19 shows a forward-facing view of the Jeep's control arms, with the right control arm visible in the right aspect of the image. The undamaged left control arm is visible in the left aspect of the image.



*Figure 19. Forward-facing view of the Jeep's bent right control arm and undamaged left control arm*

The final damaged component of the Jeep's undercarriage as observed by the SCI investigator was the front axle assembly. It was fractured near the right front position by the crash forces, and the internal drive link extended outward (Figure 20). The axle at the fracture location and the steering damper mount were the location of the Event 3 undercarriage impact (Figure 21).



*Figure 20. Forward-facing view of the Jeep's fractured front axle assembly*



*Figure 21. Underside view of the direct contact damage to the fractured front axle and steering damper mount*

The SCI investigator concluded that all of the damage observed to the undercarriage components of the Jeep was resultant from the forces associated with the crash events. There was no evidence that any of the welds, bolts, or other attachment points were loose or had separated prior to the crash. There was no evidence observed by the SCI investigator to support the driver's allegation of weld separation or other component malfunction.

The driver notified NHTSA of the crash and alleged that weld separation and/or something in the undercarriage of the vehicle "gave out," causing the Jeep to pull hard to the right and strike the wooden utility pole. Further, official documentation of the crash PAR indicates that the driver reported to the investigating law enforcement agency that the right front tire "blew out," causing her vehicle to swerve to the right and strike the utility pole. In either case, if the vehicle indeed pulled right, the associated dynamics would translate to a right steering input that would have directed the steering wheel into a clockwise rotation. Such circumstances would therefore be observable in the steering angle data parameters recorded by the vehicle's EDR, in which a negative sign convention correlates to a right (clockwise) steering input.

The data imaged from the Jeep's EDR do not reflect the alleged dynamics. Rather, over the initial 4.5-seconds of the data, the Jeep's steering angle progressed slowly from -4 degrees to zero –indicative of no active steering input by the driver. Then, from 0.5-seconds to 0.2-seconds prior to AE, the steering input suddenly increased from 8 to 54 degrees, reflective of a left (counterclockwise) steering input and indicative of a driver reaction/response. The short time duration and magnitude of the input suggest an immediate avoidance action, and is contradictory to the expected response if the driver was attempting to control the vehicle over an extended time period from a right pull caused by a mechanical issue.

The decrease of the left steering angle from 54 degrees to 36 degrees between the 0.2-second and 0.1-second samples prior to AE is a reduction that correlates to a right steering input. The distance between the location of the curb impact and the location of the utility pole measured 2.0 m (6.6 ft). At the EDR-reported vehicle speed of 49 km/h (30 mph), this distance would have been traveled by the Jeep in 0.15-seconds. Therefore, the reduction from 0.2-seconds to 0.1-seconds prior to AE was a result of the right front tire/wheel striking the curb (Event 1), which jerked the steering system to the right. This was caused by the engagement of the right front

tire/wheel with the curb, which induced a rightward rotation to the tire/wheel that translated to a right input to the steering system.

In addition to the steering data, there was no braking input by the driver prior to the crash. Together, the steering angle and braking status data indicated that the Jeep drifted slowly to the right over a long distance before being abruptly steered sharp left immediately prior to impact. It *does not* reflect the dynamics that would be associated with a right pull that resulted from a mechanical issue. Rather, the pre-crash EDR data, crash reconstruction, and vehicle condition suggested that a sudden mechanical failure did not precipitate the crash.

The following findings regarding the Jeep were determined from the SCI inspection.

1. The steering system remained largely intact and was fully operational at the time of the SCI vehicle inspection.
2. The braking system remained entirely intact and was fully operational at the time of the SCI vehicle inspection.
3. There were no separations of any welds observed by the SCI investigator during the SCI vehicle inspection.
4. Although the vehicle was subject to a recall issued after the date of the crash concerning the track bar bracket, the SCI investigator observed that the track bar bracket remained rigidly welded to the left frame rail and the entire track bar remained securely mounted in position.
5. Data imaged from the vehicle's EDR reflected dynamics not consistent with a sudden mechanical failure. There was no driver braking input prior to the crash, nor was there any sharp or extended right steering of the vehicle over the duration of the pre-crash envelope.
6. All damage to the vehicle's undercarriage and components, including the right front tire/wheel, right steering damper, right sway bar linkage, right front suspension, right control arm, and front axle, resulted from the forces associated with the events of the crash. There was no evidence of pre-crash damage or pre-crash separation.

## 2018 Jeep Wrangler Occupant Data

### Driver Demographics

Age/sex:	34 years/female
Height:	Unknown
Weight:	Unknown
Eyewear:	Unknown
Seat type:	Forward-facing bucket seat with adjustable head restraint
Seat track position:	Middle track position (per driver interview)
Manual restraint usage:	3-point lap and shoulder seat belt
Usage source:	Vehicle inspection
Air bags:	Frontal and front seat-mounted side impact air bags available; Frontal air bag deployed
Alcohol/drug involvement:	None
Egress from vehicle:	Exited under own power
Transport from scene:	None
Type of medical treatment:	Evaluated by EMS at the crash scene, refused transport

### Driver Injuries

Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Component (IPC)	IPC Confidence Level
N/A	None	N/A	N/A	N/A

*Source – Driver interview*

### Driver Kinematics

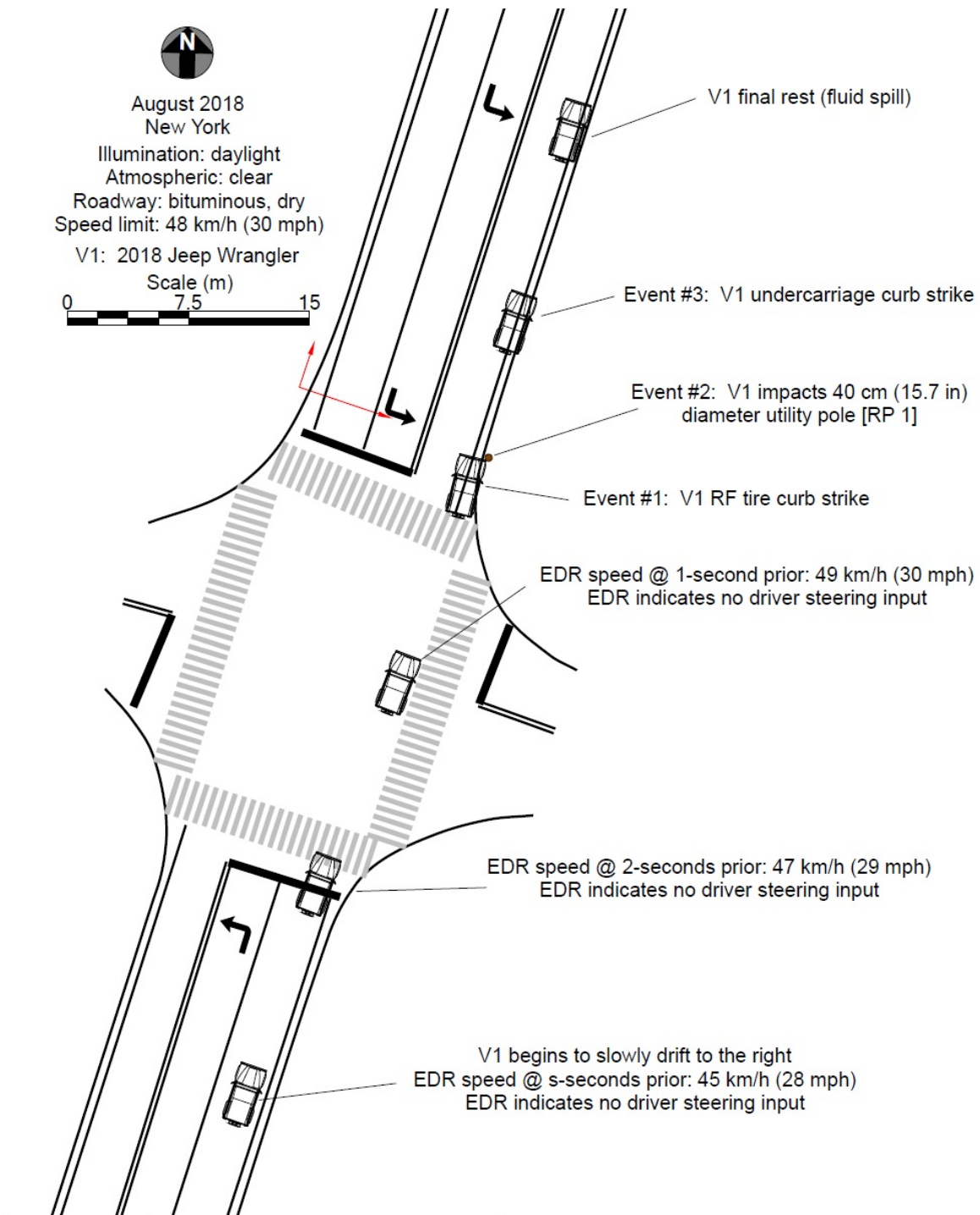
The 34-year-old female was positioned in the Jeep's driver seat, with the seat back slightly reclined and the track in a middle position. She used the available 3-point lap and shoulder seat belt system, evidenced by the post-crash condition of the system as observed by the SCI investigator during inspection. The driver declined to provide demographic information during interview.

The driver drove the Jeep northbound on the State-maintained roadway. As she approached the intersection, the driver allowed the Jeep to drift slowly right from its travel lane. The Jeep entered and began to cross through the intersection, when the driver identified that the Jeep was on an errant trajectory toward the northeast intersection quadrant. The driver attempted to provide a sharp left steering input, but did not have sufficient time to respond. The Jeep struck the curb immediately north of the intersection and then struck the wooden utility pole with its right front tire/wheel. The driver responded to the frontal sideswiping forces by initiating a forward trajectory. Her body loaded the seat belt system, resulting in the evidence observed by the SCI investigator during the vehicle inspection. The driver also likely contacted the deployed frontal air bag, but did not sustain injury.

The driver remained belted in the driver's seat of the Jeep as the vehicle continued northbound and its undercarriage engaged the curb. The third impact event was of insufficient magnitude to illicit a kinematic response from the driver or induce injury.

She remained belted and positioned in the driver's seat as the Jeep came to final rest against the curb. She unbuckled the seat belt system and exited the vehicle without assistance. The driver was evaluated at the crash scene by EMS personnel, but she denied injury and refused medical transport. She did not seek medical care after the crash.

# Crash Diagram



Case Number:	CR18027

## **APPENDIX A: 2018 Jeep Wrangler Event Data Recorder Report**

The EDR Report contained in this technical report was read using the current version of the Bosch CDR software at the time of the vehicle inspection. The CDR report contained in the associated CISSWEB application may be of an earlier software version of the Bosch CDR software and 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	1C4HJXDG1JW*****
User	
Case Number	
EDR Data Imaging Date	
Crash Date	
Filename	CR18027_V1_ACM.CDRX
Saved on	
Imaged with CDR version	Crash Data Retrieval Tool 17.9
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 19.5.2
Reported with Software Licensed to (Company Name)	NHTSA
EDR Device Type	Airbag Control Module
Event(s) recovered	Most Recent Event (Deployment)

## Comments

No comments entered.

## Data Limitations

### AIRBAG CONTROL MODULE (ACM) DATA LIMITATIONS:

#### GENERAL INFORMATION:

**CAUTION:** During direct-to-module imaging where the Airbag Control Module (ACM) is disconnected and removed from a vehicle, make sure the ACM is not moved, tilted or turned over while connected to and powered by the CDR Interface Module (with appropriate adaptors in place, where required). Also, after a CDR imaging process, wait 2 minutes after power is removed from the ACM before attempting to move the module. Not following these general ACM guidelines for direct-to-module imaging may cause new events to be recorded in the ACM.

- For additional definitions, please refer to the CDR Help File Glossary.
- As the VIN may be used to determine the configuration of the restraint system, it is imperative that the correct VIN be entered into the CDR Tool during the imaging process.
- If a DLC adapter has to be used with the CDR Tool, the "Read VIN from Vehicle" feature in the CDR Tool will not work. The VIN will have to be manually entered.
- If a 2021 or later MY Dodge Durango was imaged with a CDR Tool version 19.4 or older, the ACM will need to be reimaged as not all the peripheral sensor data will have been retrieved.
- The 2019 MY RAM 1500 may take up to 30 minutes to retrieve the EDR data. The ignition will time out within 20 minutes so the vehicle flashers must be turned on within 20 minutes to keep the ignition and communication bus active.
- Lateral Delta V will not be displayed for the 2013 MY Jeep Compass and Patriot.
- Ignition Cycle, download/crash
  - For RAMs and Dodge Vipers, there are 2 internal ignition counters in the ACM. It is possible for the ignition cycles at download to be different than the ignition cycles at event due to the 2 different counters.
  - Note that the ignition cycle count in an ACM may differ from the ignition cycle count in a Pedestrian Protection Module (PPM) in the same vehicle due to the fact that the ACM has an energy reserve while the PPM does not.

The following table provides an explanation of the sign notation for data elements that may be included in this CDR report. All directional references to sign notation are 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
Delta-V, Longitudinal	Forward
Maximum Delta-V, Longitudinal	Forward
Delta-V, Lateral	Left to Right
Maximum Delta-V, Lateral	Left to Right
Angular Rate	Clockwise rotation around the longitudinal axis
Peripheral Sensors, X and Y	Outside to Inside

Pressure Sensors	Compression of air
Internal Y Acceleration	Left to Right
Low-g Z Acceleration	Downward
Steering Input	Steering wheel turned counter clockwise
Yaw Rate	Counter clockwise rotation

**CDR FILE INFORMATION:**

- An event will be stored when the delta V is approximately 5 mph (8 km/h) or greater within a 150 ms interval.
- For non-NAFTA ACMs that control pedestrian protection devices, a non-deployment event will be stored when the pedestrian protection devices are activated.
- A non-deployment event may be stored with activation of the Active Head Restraints. See AHR explanation under System Configuration at Retrieval/Event section.

Event(s) Recovered definitions:

- None - There are no stored events in the ACM
- Not Retrievable - Event Data may be stored in the ACM but is not retrievable by the CDR Tool.
- Most Recent Event - Data of the most recent event is displayed in the report
- 1st Prior Event - Two events are stored in the ACM, Data displayed is of the first prior event.
- 2nd Prior Event - Three events are stored in the ACM, Data displayed is of the second prior event.
- For 2013 and 2014 MY Dodge Journey and Fiat Freemont:
  - Event Record 1 - Data from an event is stored in the ACM (not necessarily in chronological order)
  - Event Record 2 - Data from another event is stored in the ACM (not necessarily in chronological order)
- For TRW modules:
  - If there is a side impact, two EDR events may be stored for the one side impact event. The second event may be recorded due to the Lateral Delta V exceeding 5 mph (8 km/h) within a 150 ms interval after the side deployment occurred.
- For some Fiat vehicles:
  - Two EDR events may be stored for one impact event. The second event may be recorded due to the deployment of the frontal airbag, 3<sup>rd</sup> stage passenger.
- During an event, if power to the ACM is lost, all or part of the event data record may not be recorded. An indication may be observed in the recorded data under this condition: The restraint data is recorded first and then the vehicle data.
  - "None" may be displayed in the "Event(s) Recovered" section of the report indicating no pre-crash vehicle data.
  - An event may be displayed in the "Event(s) Recovered" section of the report and "Interrupted" will be displayed for Pre-Crash Recorder Status.

**SYSTEM STATUS AT RETRIEVAL:**

- Original VIN - The VIN is captured by the ACM and then recorded as the Original VIN after 10 consecutive ignition cycles of capturing the same number. Once it has been recorded, this number cannot be changed.

**SYSTEM CONFIGURATION AT RETRIEVAL/EVENT:**

- The System Configuration data tables indicate the components that the ACM for a particular vehicle monitors and/or controls.
- Active Head Restraint (AHR) - This refers to some active head restraint systems that are electronically controlled by the ACM. AHRs may activate but not store an EDR Record if the delta V does not exceed the minimum delta V threshold. It is possible that the AHRs may activate after the EDR record has been stored and written, based on achieving the minimum delta V. This condition will result in an EDR but no record of the AHR activation in the CDR report. Activation of only the AHRs, if stored, will be a non-deployment event.

**SYSTEM STATUS AT EVENT:**

- Number, Total Events - Cumulative number of events that the ACM has recorded, including those non-deployment events that have been overwritten by a subsequent event.
- Occupant Size Classification, Outboard Front Passenger - "Child" status may be used to indicate anything weighing less than a 5<sup>th</sup> percentile female adult crash dummy, including an empty seat; "Not Child" indicates anything weighing the same as or more than a 5<sup>th</sup> percentile female adult crash dummy.
- Odometer at Event - Vehicle odometer at the time of the event
- Operation via Energy Reserve Only - "Yes" indicates that the ACM had lost power at or before T0 and was only operating on energy reserve at T0.
- Safety Belt Status, Outboard Front Passenger - For vehicles sold outside of North America which do not contain a buckle switch for the outboard front passenger, the safety belt status, outboard front passenger will default to "not buckled/unbuckled".
- System Voltage at Event, ACM - Voltage at the ACM as measured by the ACM.
- System Voltage at Event, Bused - Voltage of the vehicle system, communicated on the communication bus to other electronic modules in the vehicle.

- Temperature, Outside - Ambient Air Temperature.
- Time, Airbag Warning Lamp On - This is a cumulative time. It indicates the total amount of time that the ACM has requested the Airbag Warning Lamp be turned on.
  - This time does not include the warning lamp bulb check time, which occurs at every ignition cycle
  - For 2013 MY Minivans and new 2017+ MY Jeep Compass, this time is only cumulative for the past 10 ignition cycles.
- Time from event 1 to 2 -
  - If only one event is stored, either a value of 0 or >5 may be displayed for this data element.
  - For the 2018+ MY Promaster and 2019+ MY RAM 1500, a value of 0 may be displayed for the first event or for events >5 seconds apart.
  - If multiple events exist in the EDR, the time from event 1 to event 2 is defined as:
    - For Bosch and TRW modules, the time from the prior recorded event (even if it has been overwritten) to the current recorded event.
    - For Continental modules, the time from the prior existing recorded event (as long as it is still displayed in the CDR report) to the current recorded event. If the prior event in a multi-event condition is overwritten by a subsequent event, the multi-event status will no longer be displayed.
    - For the 2019+ MY RAM 1500, the time from event 1 to 2 may utilize a non-stored event as event 1. In this case, the total number of events and multi-event data elements will not include the non-stored event in the number of events. However, the time from event 1 to 2 will be shown as time from that non-stored event.
- Time, Operation System Time - This is a cumulative lifetime timer for the ACM. It indicates the total amount of time the ACM has been powered up.
  - For 2019 and later MY RAMs, this time is only cumulative for the current ignition cycle.
- VIN at Event, Last 8 Digits- Last 8 digits of the VIN of the vehicle at the time the ACM records the event.

#### DEPLOYMENT COMMAND DATA:

- A "Yes" for a particular item indicates that the ACM commanded the deployment /activation of the associated device.
- The phrase "Exceeded Storage Range" for a particular time to deploy indicates that the deployment time is equal to or greater than the 255 milliseconds that can be stored.
- If a device is not deployed, the "time to deploy" for that device will display 0, SNA, N/A or 255.
- In vehicles with Bosch ACMs, once a device has been deployed in an ignition cycle, it is possible that the ACM will not attempt to re-deploy any already deployed device during subsequent events in that same ignition cycle.

#### DTCs PRESENT AT START OF EVENT:

- If any DTCs (diagnostic trouble codes) are present in the ACM at the start of the event, these will be listed in this section. A dealership service manual can be used to decode the DTCs.
  - DTCs Present at Start of Event are not present in the Alfa Romeo Giulia, Fiat 500X, and the Jeep Renegade.

#### SENSOR DATA:

- The design range for the angular rate data is:
  - +/- 240 deg/sec for Bosch ACMs, unless specifically called out below
  - +/- 300 deg/sec for TRW ACMs, the 2019 MY RAM 1500, and the 2018+ MY Dodge Journey
  - +/- 290 deg/sec for 2008+ MY minivans and 2009-2017 MY Dodge Journey
  - +/- 340 deg/sec for 2017+ MY Chrysler Pacifica and new 2017+ MY Jeep Compass
  - -416.67 deg/sec to +413.41 deg/sec for 2014+ MY Jeep Cherokee
- For vehicles that store peripheral sensor data, t0 for the peripheral sensors is the same as the t0 for the delta V.
- Internal y acceleration is stored prior to t0 so the internal y acceleration data will usually be zero unless the rollover sensing algorithm has triggered storage of the EDR event.
- The words "Sensor Design Range Exceeded" and a vertical line will be displayed on the Longitudinal and Lateral Delta-V graphs the first time the applicable sensor range is exceeded.

#### PRE-CRASH DATA:

- The recorded Event may contain Pre-Crash data. Pre-Crash data from the various electronic control modules in the vehicle is transmitted to the Airbag Control Module via the vehicle's communication bus.
- In the Pre-Crash Data graph, data transmitted at a rate other than 0.1 seconds will be shown as dots for each available data point. Only data transmitted at a rate of 0.1 seconds will have the dots connected by a line.  
(if equip.) - If a parameter name is followed by the words (if equip.), then the parameter is only valid for vehicles equipped with the associated parameter/vehicle system.
- The MIL (Malfunction Indicator Lamp) Status for the various recorded systems indicates the requested state of the applicable malfunction indicator lamp at the time that the data was captured. Note: Some fault codes could be stored due to component/system damage from the accident. The appropriate diagnostic tool should be used to read any stored Diagnostic Trouble Codes (DTC's) in the various electronic modules (ACM, PCM, ABS, TCM, etc., where applicable) for use in interpretation of some vehicle specific recorded data.
- ABS Activity - "Yes" indicates an active ABS event in which the ABS is actively controlling the brakes.
- ABS MIL- This indicates the ABS fault indicator lamp status. It will only be "On" when there is a fault in the ABS system. The Electronic brake module DTC's should be read and recorded for final system interpretation.
- Accelerator Pedal, % Full - This indicates the actual position of the accelerator pedal. It will be "SNA" if the vehicle is in the power free

- mode which limits acceleration.
- Accelerator Pedal (Derived), % Full - This indicates the calculated value of the accelerator pedal for battery electric vehicles only.
  - Accelerator Pedal/Engine Throttle, % Full - This indicates the actual position of the accelerator pedal unless the cruise control is engaged. If the cruise control is engaged, this indicates the actual position of the engine throttle blade.
  - Braking System, Maximum Braking -- "Yes" indicates that ABS is active on all 4 wheels at the same time.
  - Cruise Control:
    - Note that the following two Cruise Control data elements are only valid for vehicles not equipped with Adaptive Cruise Control (ACC). For vehicles equipped with ACC, the ACC data elements are used for both regular Cruise Control and ACC.
    - Cruise Control System/Lamp Status - "On" indicates that the Cruise Control system is turned on.
    - Cruise Control Engaged Status/Active - "Engaged"/"Yes" indicates the Cruise Control system is actively controlling vehicle speed. "Not Engaged"/"No" indicates the system is NOT controlling vehicle speed.
    - Adaptive Cruise Control (ACC) Status (if equip.)- "Off" indicates that all cruise control functionality is disabled; "NCC\_On" indicates that the Normal Cruise Control system is turned on; "NCC\_Set" indicates the Normal Cruise Control is actively controlling vehicle speed; "ACC\_On" indicates that ACC is turned on; "ACC\_Set" indicates that the ACC is actively controlling vehicle speed. If the value is SNA for all time stamps, then the vehicle is not equipped with ACC.
    - ACC Speed Set (if equip.)- This indicates the desired speed in mph that was input by the driver for the ACC system. If the value is SNA for all time stamps, then the vehicle is not equipped with ACC.
    - ACC Faulted - "Yes" indicates that the ACC system will not function and the ACC warning lamp is lit; "No" indicates that the ACC system is functional and the ACC warning lamp is off;
    - For new 2017+ MY Jeep Compass, cruise control data elements are only available for vehicles NOT equipped with ACC.
  - Drive Mode - This indicates the driver selected mode of operation (e.g. normal, sport, track, ...)
  - Electronic Brake/Stability Control information:
    - Stability Control - This is the status of the ESC symbol - "car with squiggly lines" indicator lamp. "On" indicates that the ESC system is functional. "Off" indicates that the ESC system was turned off either by the driver or due to a fault or thermal mode shutdown. "Engaged" indicates an active ESC/TCS event. "Partial Off" indicates that engine management has been turned off but brake traction control is still functional.
      - For the Jeep Renegade, if the Stability Control is "Off", the ESC Button Status is "Disabled", and the vehicle speed exceeds 40 mph, the stability control system will operate in a reduced functionality mode with traction control turned off ("partial off" mode) even though the user disabled it. For all other conditions, when the Stability Control is "Off", the stability control system will be off.
      - ESC Button Status - This indicates the driver selected mode for the ESC system. "Disabled" indicates that the driver pressed the ESC Button to disable engine management. "Enabled" is the default state for the ESC system.
        - SRT and some Fiat products have the ability to fully disable the ESC system if the ESC button has been pressed and held for a specific amount of time. Additional system analysis is required.
      - ESP Feature is Completely Disabled - This indicates that the stability control system has turned off engine management, traction control, and stability control.
      - ESC/ESP MIL - This indicates the ESC/ESP fault indication lamp status. It will only be "On" when there is a fault or thermal mode shutdown in the ESC/ESP system. The ESC/ESP module DTC's should be read and recorded for final system interpretation.
      - Brake Intervention by ESP - "Yes" indicates that the stability control system has engaged the brakes.
      - Engine Torque Applied - "No" indicates no engine torque output was applied (as in Park/Neutral for Automatic transmissions or clutch depressed on manual or during an ESP/Traction Control event). If "Yes", then engine torque output was applied.
      - Traction Control Active - "Yes" indicates that the traction control system is actively controlling the vehicle's wheels.
  - Electronic Park Brake (EPB):
    - Park Brake Engaged - "Yes" indicates that the park brake is applied.
    - EPB MIL - "On" indicates that there is a fault in the Electronic Park Brake System.
  - Engine RPM - For the RAM ProMaster City, the minimum resolution for Engine RPM is 32 rpm.
  - Engine Throttle, % Full - This indicates the actual position of the Engine Throttle blade. This data element is not supported by vehicles with diesel engines. Thus a value of "SNA" will be displayed if the vehicle has a diesel engine.
  - ETC Lamp - Lamp "ON" indicates there is an active Electronic Throttle DTC.
  - ETC Lamp Flashing - "Yes" indicates that the ETC is in the limp-in mode.
  - Forward Collision Warning (FCW) (if equip.):
    - Object of Interest Distance - This indicates the actual forward distance to the main object being tracked by the FCW system. "FCW present but not tracking" indicates that the FCW system is not currently tracking an object. If the value is SNA for all time stamps, then the vehicle is not equipped with FCW.
    - FCW System Operating State - "Off" indicates that the FCW system is off and the FCW Warning Lamp will be "On"; "On" indicates that the FCW system is fully on with active braking as well as the audible and visual warnings enabled.
    - FCW System Status - "Off" indicates that the FCW system is off and the FCW Warning Lamp will be "On". "On-braking" indicates that the FCW system is on with active braking enabled but there will no FCW audible or visual warnings in an FCW event. "On-warning" indicates that the FCW system is on but active braking is disabled. In an FCW event, the driver will only receive FCW audible and visual warnings. "On-full" indicates that the FCW system is fully on with active braking as well as the audible and visual warnings enabled. SNA indicates that the vehicle is not equipped with FCW.
  - Gear Position - For all vehicles except the RAM ProMaster City, this indicates the current transmission gear.
    - For the RAM ProMaster City, this indicates the status of the gear shift lever.
  - Master Cylinder Pressure - This indicates the brake pressure applied to the brakes through the brake pedal.
  - PCM MIL - This indicates the PCM fault indicator lamp status. It will only be "On" when there is a fault in the PCM. "Flashing" indicates misfire detection. The Powertrain Control Module DTC's should be read and recorded for final system interpretation.
  - Pre-Crash Recorder Complete - Due to the interruption of data recording in one section, this data element may display "Interrupted" for all sections when some data sections are actually complete.
    - For the 2014 MY Jeep Grand Cherokee and Dodge Durango, if recording of angular rate data is interrupted, the entire EDR record will display "Interrupted" even though the rest of the data may be complete.

- PRND/PRNDL/PRNDS Status - This indicates the status of the Shifter Position.
- Raw Manifold Pressure - This indicates engine load in kPa.
- Reverse Gear - For manual transmission vehicles only, "Yes" indicates the transmission is in the reverse gear.
- Service Brake - "On" indicates that the brake pedal is physically depressed. Braking from the ABS or FCW systems will not be reported in this data element.
- Speed, Vehicle Indicated - This indicates the average of the wheel speeds of the drive wheels.
  - The reporting resolution for Speed, Vehicle Indicated is 1 km/h.
  - To display this data element in mph, the CDR Tool converts the km/h to mph and reports a rounded value in mph.
  - The accuracy of the recorded Speed, Vehicle Indicated may be affected by a significant change of the tire size for the drive wheels or the final drive axle ratio of the transmission from the factory build specifications, wheel lockup, wheel slip, or wheel spin.
  - On some vehicles capable of speeds in excess of 255km/h (about 158mph), the actual vehicle speed may have exceeded the reporting range. It is always prudent to check the reported wheel speeds and other parameters to confirm the Speed, Vehicle Indicated value(s).
- Tire Information:
  - XX where LF = Left Front Tire, RF = Right Front Tire, LR = Left Rear Tire, and RR = Right Rear Tire.
  - Tire X Location - This indicates the location of the tire pressure sensor data being displayed for that time stamp. Default is used to indicate that the location of the tire pressure sensor is unknown or there is no tire pressure sensor in that wheel. Vehicles with Base Tire Pressure Monitoring systems will display SNA for both Tire Locations as these vehicles do not send actual pressure values across the communication bus.
  - Tire X Pressure/Tire Pressure Status, XX -This indicates the actual pressure status of the Tire Location defined in the previous column (Tire X Location) or by the values for XX. Possible values are LOW, NORMAL, HIGH, or SNA for this parameter. Vehicles with Base Tire Pressure Monitoring systems may display NORMAL even though these vehicles do not send actual pressure values across the communication bus.
  - Tire X Pressure/Tire Pressure Value, XX (psi) - This indicates the actual tire pressure value of the Tire Location defined in the previous column (Tire X Location) or by the values for XX. Vehicles with Base Tire Pressure Monitoring systems will display N/A for this parameter as these vehicles do not send actual pressure values across the communication bus.
    - For the following vehicles, the tire location, if displayed, may not be accurate if the tires have been rotated:
      - 2013 MY Ram
      - 2013-2017 MY Jeep Patriot
      - 2013-2014 MY Chrysler 200
      - 2013-2017 MY Jeep Compass
      - 2013-2016 MY Dodge Dart
    - For the 2013 MY Ram, if the values for tire pressure status and the tire pressure are SNA, the EDR does not store tire pressure monitoring data.
  - Tire pressure is not stored in the EDR for the following vehicles:
    - 2014-2018 MY RAM 1500
    - 2014+ MY RAM (all but 1500)
    - 2013+ MY Jeep Wrangler
    - 2013 MY Jeep Grand Cherokee
    - 2013 MY Dodge Durango
    - 2013-2014 MY Dodge Challenger
    - 2013-2016 MY Chrysler Town and Country
    - 2013+ MY Dodge Grand Caravan
    - 2015+ MY Fiat 500
  - Wheel Speed, XX - This indicates the speed value of a particular tire as denoted by XX.
- Tire Pressure Monitor Indicator Lamp/Faults - "On" indicates a fault in the tire pressure monitoring system. The TPM module DTC's should be read and recorded for final system interpretation.
- "T0" ("Time zero" where '0' is seen as subscript) is defined as "beginning of the crash event". T0 is the time at which the ACM algorithm is activated, a specific Delta-V is exceeded, or a non-reversible restraint device is deployed. T0 may be defined differently for front, side, rear and roll-over events.
  - If multiple algorithm decisions (i.e.: frontal, side, rear and/or rollover) are made before the first recorded event ends, all of those events are part of the same event record and "T0" is defined as the "T0" from the first recorded event.
  - In the Pre-Crash data tables, the relative time marker "-0.1s" or "-0.25s" respectively represents the last set of data captured in the buffer prior to "T0."
- Torque Information:
  - Axle Torque - This indicates the E-Motor Torque multiplied by the gear ratio for battery electric vehicles only.
  - E-Motor Torque - This indicates the calculated torque from the output shaft of the electric motor in battery electric vehicles only.
- Traction Control Intervention Active - "Active" indicates wheel slippage was occurring during vehicle acceleration.

#### APPLICATION INFORMATION:

- Alfa Romeo Giulia, Alfa Romeo Stelvio, Fiat 500L, Fiat 500X, and Jeep Renegade are only CDR supported in the United States, Canada, and Saudi Arabia markets.
- Fiat 500/500e is only CDR supported in the United States, Canada, Mexico, and Brazil markets.

03002\_Chrysler\_r043

**System Status at Retrieval**

Original VIN	1C4HJXDG1JW*****
Ignition Cycle, Download	317
ACM Part Number	68398609AB
ACM Serial Number	T03JF1018G21EE
ACM Supplier	Continental
ACM Supply voltage at time of retrieval (V)	12.11

### System Configuration at Retrieval

Configured for Driver Frontal Airbag	Yes
Configured for Driver Seatbelt Retractor Pretensioner	Yes
Configured for Driver Seatbelt Load Limiter	Yes
Configured for Driver Seatbelt Anchor Pretensioner	Yes
Configured for Driver Seatbelt Buckle Switch	Yes
Configured for Driver Seat Track Position Sensor	Yes
Configured for Left Side Curtain Airbag	No
Configured for Left Front Seat Side Airbag	Yes
Configured for Passenger Frontal Airbag	Yes
Configured for Passenger Seatbelt Retractor Pretensioner	Yes
Configured for Passenger Seatbelt Load Limiter	Yes
Configured for Passenger Seatbelt Anchor Pretensioner	Yes
Configured for Passenger Seatbelt Buckle Switch	Yes
Configured for Passenger Seat Track Position Sensor	Yes
Configured for Right Side Curtain Airbag	No
Configured for Right Front Seat Side Airbag	Yes
Configured for Rollover Sensing	No
Configured for Passenger Airbag Disable Indicator (PADI)	Yes

**System Configuration at Event (Most Recent Event - Deployment)**

Configured for Driver Frontal Airbag	Yes
Configured for Driver Seatbelt Retractor Pretensioner	Yes
Configured for Driver Seatbelt Load Limiter	Yes
Configured for Driver Seatbelt Anchor Pretensioner	Yes
Configured for Driver Seatbelt Buckle Switch	Yes
Configured for Driver Seat Track Position Sensor	Yes
Configured for Left Side Curtain Airbag	No
Configured for Left Front Seat Side Airbag	Yes
Configured for Passenger Frontal Airbag	Yes
Configured for Passenger Seatbelt Retractor Pretensioner	Yes
Configured for Passenger Seatbelt Load Limiter	Yes
Configured for Passenger Seatbelt Anchor Pretensioner	Yes
Configured for Passenger Seatbelt Buckle Switch	Yes
Configured for Passenger Seat Track Position Sensor	Yes
Configured for Right Side Curtain Airbag	No
Configured for Right Front Seat Side Airbag	Yes
Configured for Rollover Sensing	No
Configured for Passenger Airbag Disable Indicator (PADI)	Yes

### System Status at Event (Most Recent Event - Deployment)

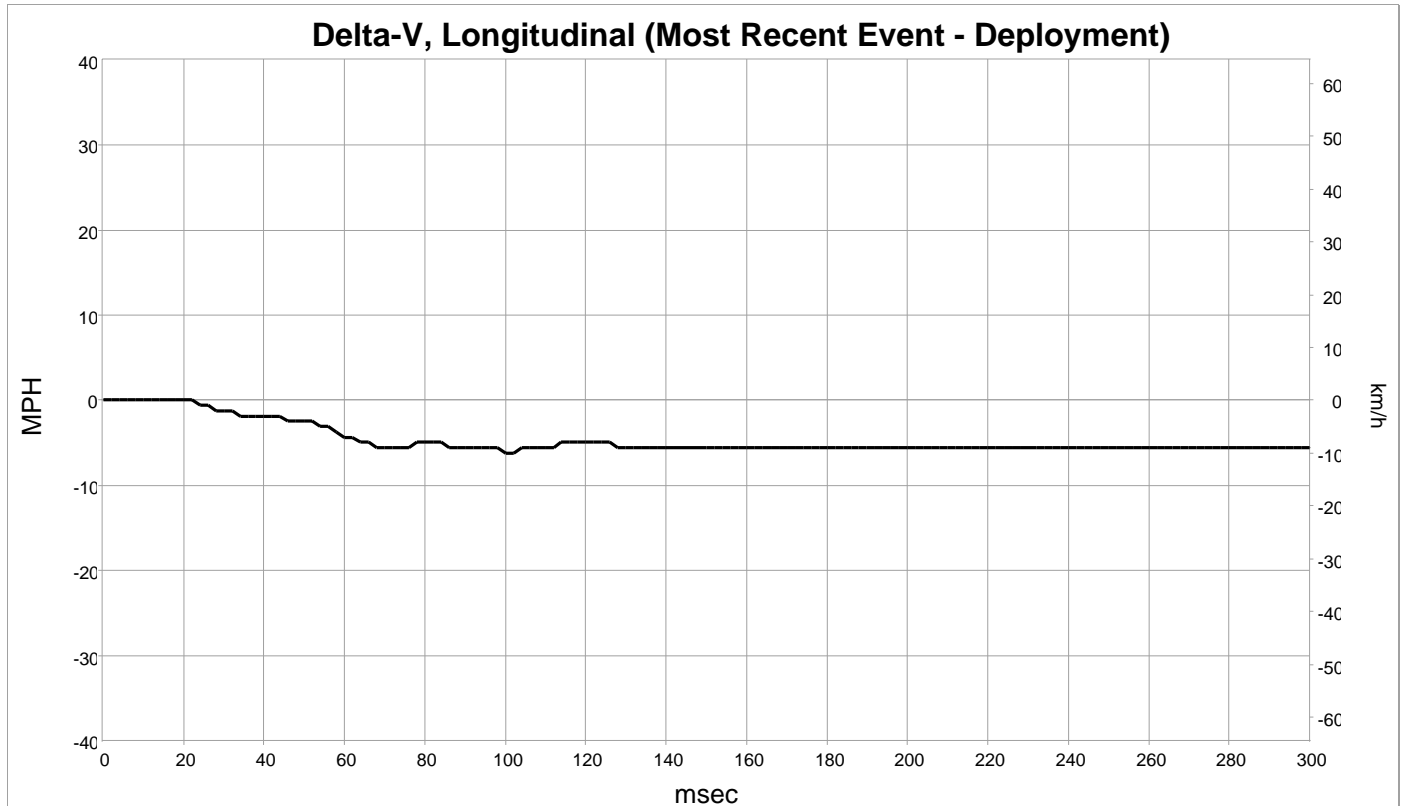
Event Number	1
Complete File Recorded	Yes
Ignition Cycle, Crash	310
Multi-Event, Number of Events	1
Time From Event 1 to 2 (sec)	N/A
Safety Belt Status, Driver	Buckled
Safety Belt Status, Passenger	Unbuckled
Seat Track Position Switch, Foremost, Status, Driver	Not Frontal Zone
Seat Track Position Switch, Foremost, Status, Right Front Passenger	Not Frontal Zone
Occupant Size Classification, Outboard Front Passenger	Empty
Maximum Delta-V, Longitudinal (MPH [km/h])	-6.2 [-10]
Time, Maximum Delta-V, Longitudinal (ms)	100
Maximum Delta-V, Lateral (MPH [km/h])	-4.3 [-7]
Time, Maximum Delta-V, Lateral (ms)	100
Frontal Airbag Warning Lamp	Off
Operation system time (min)	7,336.4
Airbag Warning Lamp On Time (min)	0
Total Number of Events	1
ECU System Voltage at Event (V)	13
Odometer at Event (miles [km])	4478.9 [7,208.1]
VIN at Event (last 8 characters)	JW*****
Passenger Airbag Disable Indicator (PADI)	Off
Passenger Airbag Disable (PAD) Switch Status	SNA

### Deployment Command Data (Most Recent Event - Deployment)

Frontal Airbag Deployment, 1st Stage, Driver	Yes
Frontal Airbag deployment, Time to Deploy 1st stage, Driver (ms)	58
Frontal Airbag Deployment, 2nd Stage, Driver	Yes
Frontal Airbag deployment, Time to Deploy 2nd stage, Driver (ms)	88
Frontal Airbag Deployment, 3rd Squib, Driver	Yes
Frontal Airbag deployment, Time to Deploy 3rd Squib, Driver (ms)	208
Frontal Airbag, Deployment 1st Stage, Passenger	No
Frontal Airbag deployment, Time to Deploy 1st stage, Passenger (ms)	0
Frontal Airbag, Deployment 2nd Stage, Passenger	No
Front Airbag, Time to Deploy 2nd stage, Passenger (ms)	0
Front Airbag, Deployment 3rd Squib, Passenger	No
Front Airbag, Time to Deploy 3rd Squib, Passenger (ms)	0
Adaptive Load Limiter Deployment, Driver	Yes
Retractor Pretensioner Deployment, Driver	Yes
Anchor Pretensioner Deployment, Driver	Yes
Adaptive Load Limiter Deployment, Passenger	No
Retractor Pretensioner Deployment, Passenger	No
Anchor Pretensioner Deployment, Passenger	No
Side Seat Airbag Deployment, Front Left	No
Side Seat Airbag Deployment, Front Right	No

**DTCs Present at Start of Event (Most Recent Event - Deployment)**

DTCs not Present.

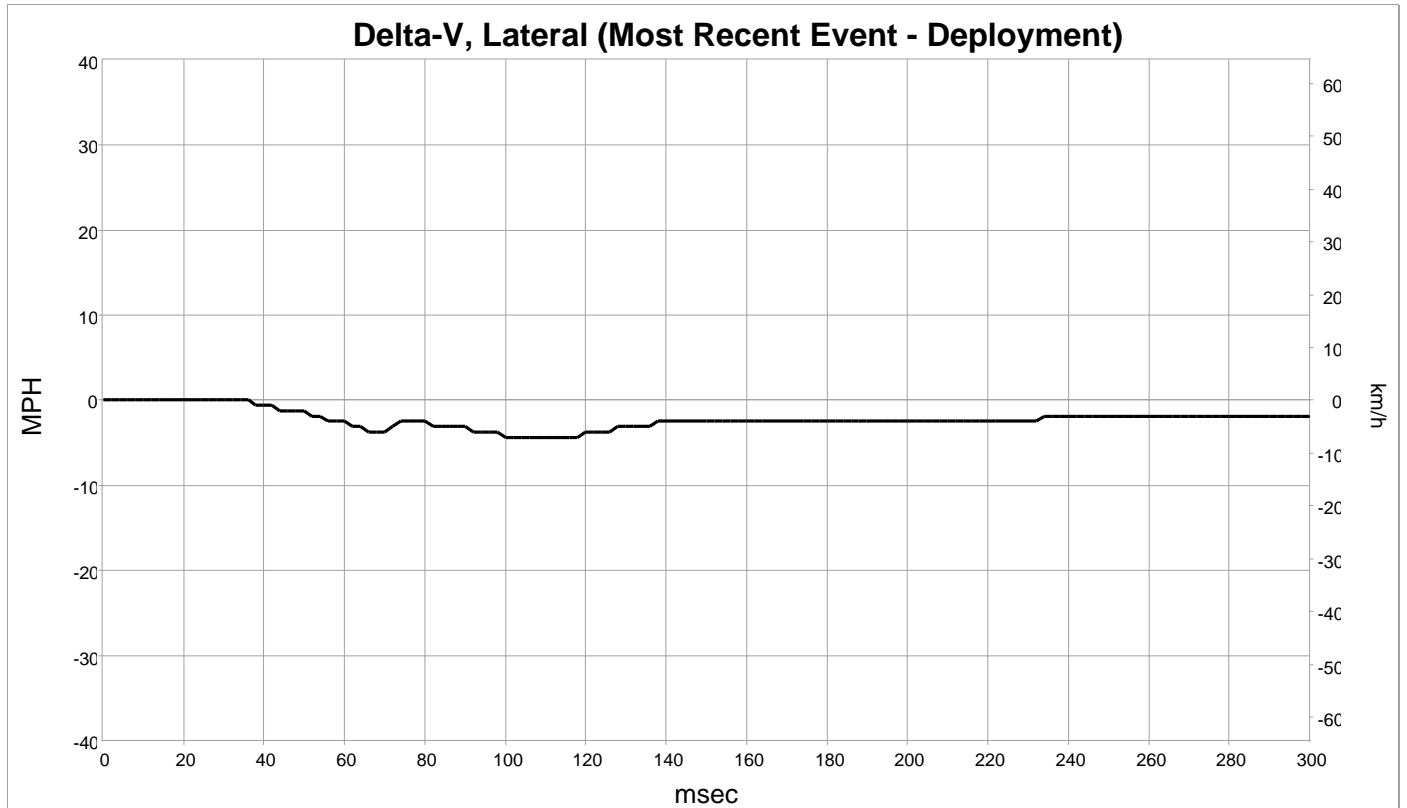


### Longitudinal Crash Pulse (Most Recent Event - Deployment)

Time (msec)	Delta-V, Longitudinal (MPH [km/h])
0	0 [0]
2	0 [0]
4	0 [0]
6	0 [0]
8	0 [0]
10	0 [0]
12	0 [0]
14	0 [0]
16	0 [0]
18	0 [0]
20	0 [0]
22	0 [0]
24	-1 [-1]
26	-1 [-1]
28	-1 [-2]
30	-1 [-2]
32	-1 [-2]
34	-2 [-3]
36	-2 [-3]
38	-2 [-3]
40	-2 [-3]
42	-2 [-3]
44	-2 [-3]
46	-2 [-4]
48	-2 [-4]
50	-2 [-4]
52	-2 [-4]
54	-3 [-5]
56	-3 [-5]
58	-4 [-6]
60	-4 [-7]
62	-4 [-7]
64	-5 [-8]
66	-5 [-8]
68	-6 [-9]
70	-6 [-9]
72	-6 [-9]
74	-6 [-9]
76	-6 [-9]
78	-5 [-8]
80	-5 [-8]
82	-5 [-8]
84	-5 [-8]
86	-6 [-9]
88	-6 [-9]
90	-6 [-9]
92	-6 [-9]
94	-6 [-9]
96	-6 [-9]
98	-6 [-9]

Time (msec)	Delta-V, Longitudinal (MPH [km/h])
100	-6 [-10]
102	-6 [-10]
104	-6 [-9]
106	-6 [-9]
108	-6 [-9]
110	-6 [-9]
112	-6 [-9]
114	-5 [-8]
116	-5 [-8]
118	-5 [-8]
120	-5 [-8]
122	-5 [-8]
124	-5 [-8]
126	-5 [-8]
128	-6 [-9]
130	-6 [-9]
132	-6 [-9]
134	-6 [-9]
136	-6 [-9]
138	-6 [-9]
140	-6 [-9]
142	-6 [-9]
144	-6 [-9]
146	-6 [-9]
148	-6 [-9]
150	-6 [-9]
152	-6 [-9]
154	-6 [-9]
156	-6 [-9]
158	-6 [-9]
160	-6 [-9]
162	-6 [-9]
164	-6 [-9]
166	-6 [-9]
168	-6 [-9]
170	-6 [-9]
172	-6 [-9]
174	-6 [-9]
176	-6 [-9]
178	-6 [-9]
180	-6 [-9]
182	-6 [-9]
184	-6 [-9]
186	-6 [-9]
188	-6 [-9]
190	-6 [-9]
192	-6 [-9]
194	-6 [-9]
196	-6 [-9]
198	-6 [-9]

Time (msec)	Delta-V, Longitudinal (MPH [km/h])
200	-6 [-9]
202	-6 [-9]
204	-6 [-9]
206	-6 [-9]
208	-6 [-9]
210	-6 [-9]
212	-6 [-9]
214	-6 [-9]
216	-6 [-9]
218	-6 [-9]
220	-6 [-9]
222	-6 [-9]
224	-6 [-9]
226	-6 [-9]
228	-6 [-9]
230	-6 [-9]
232	-6 [-9]
234	-6 [-9]
236	-6 [-9]
238	-6 [-9]
240	-6 [-9]
242	-6 [-9]
244	-6 [-9]
246	-6 [-9]
248	-6 [-9]
250	-6 [-9]
252	-6 [-9]
254	-6 [-9]
256	-6 [-9]
258	-6 [-9]
260	-6 [-9]
262	-6 [-9]
264	-6 [-9]
266	-6 [-9]
268	-6 [-9]
270	-6 [-9]
272	-6 [-9]
274	-6 [-9]
276	-6 [-9]
278	-6 [-9]
280	-6 [-9]
282	-6 [-9]
284	-6 [-9]
286	-6 [-9]
288	-6 [-9]
290	-6 [-9]
292	-6 [-9]
294	-6 [-9]
296	-6 [-9]
298	-6 [-9]
300	-6 [-9]



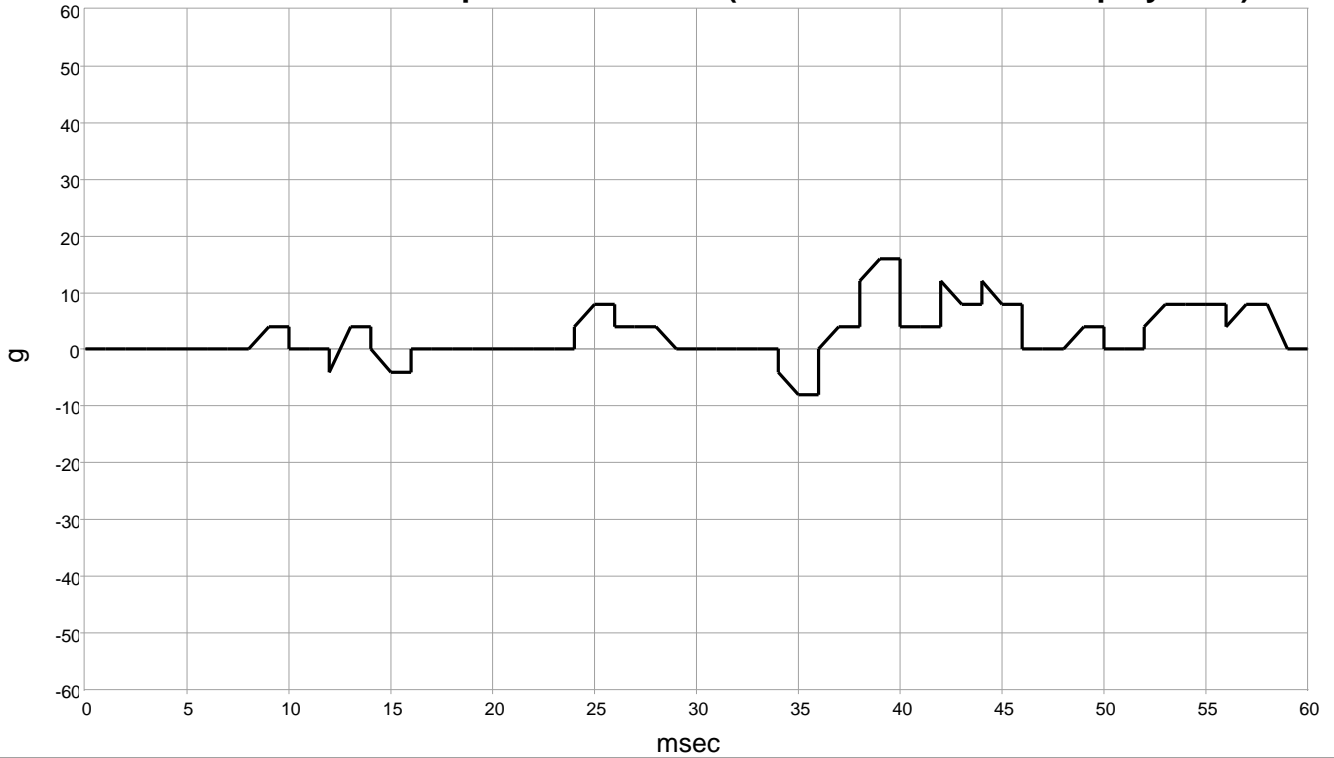
### Lateral Crash Pulse (Most Recent Event - Deployment)

Time (msec)	Delta-V, Lateral (MPH [km/h])
0	0 [0]
2	0 [0]
4	0 [0]
6	0 [0]
8	0 [0]
10	0 [0]
12	0 [0]
14	0 [0]
16	0 [0]
18	0 [0]
20	0 [0]
22	0 [0]
24	0 [0]
26	0 [0]
28	0 [0]
30	0 [0]
32	0 [0]
34	0 [0]
36	0 [0]
38	-1 [-1]
40	-1 [-1]
42	-1 [-1]
44	-1 [-2]
46	-1 [-2]
48	-1 [-2]
50	-1 [-2]
52	-2 [-3]
54	-2 [-3]
56	-2 [-4]
58	-2 [-4]
60	-2 [-4]
62	-3 [-5]
64	-3 [-5]
66	-4 [-6]
68	-4 [-6]
70	-4 [-6]
72	-3 [-5]
74	-2 [-4]
76	-2 [-4]
78	-2 [-4]
80	-2 [-4]
82	-3 [-5]
84	-3 [-5]
86	-3 [-5]
88	-3 [-5]
90	-3 [-5]
92	-4 [-6]
94	-4 [-6]
96	-4 [-6]
98	-4 [-6]

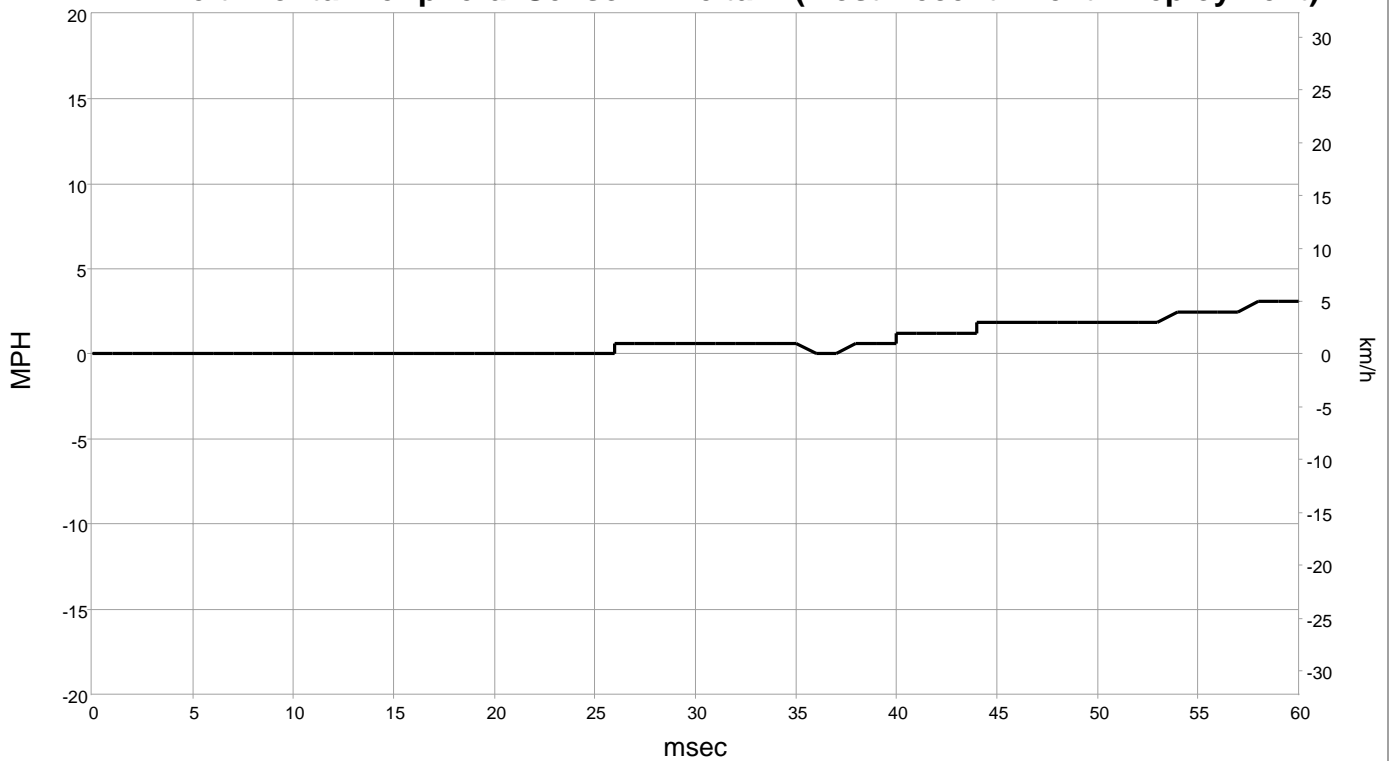
Time (msec)	Delta-V, Lateral (MPH [km/h])
100	-4 [-7]
102	-4 [-7]
104	-4 [-7]
106	-4 [-7]
108	-4 [-7]
110	-4 [-7]
112	-4 [-7]
114	-4 [-7]
116	-4 [-7]
118	-4 [-7]
120	-4 [-6]
122	-4 [-6]
124	-4 [-6]
126	-4 [-6]
128	-3 [-5]
130	-3 [-5]
132	-3 [-5]
134	-3 [-5]
136	-3 [-5]
138	-2 [-4]
140	-2 [-4]
142	-2 [-4]
144	-2 [-4]
146	-2 [-4]
148	-2 [-4]
150	-2 [-4]
152	-2 [-4]
154	-2 [-4]
156	-2 [-4]
158	-2 [-4]
160	-2 [-4]
162	-2 [-4]
164	-2 [-4]
166	-2 [-4]
168	-2 [-4]
170	-2 [-4]
172	-2 [-4]
174	-2 [-4]
176	-2 [-4]
178	-2 [-4]
180	-2 [-4]
182	-2 [-4]
184	-2 [-4]
186	-2 [-4]
188	-2 [-4]
190	-2 [-4]
192	-2 [-4]
194	-2 [-4]
196	-2 [-4]
198	-2 [-4]

Time (msec)	Delta-V, Lateral (MPH [km/h])
200	-2 [-4]
202	-2 [-4]
204	-2 [-4]
206	-2 [-4]
208	-2 [-4]
210	-2 [-4]
212	-2 [-4]
214	-2 [-4]
216	-2 [-4]
218	-2 [-4]
220	-2 [-4]
222	-2 [-4]
224	-2 [-4]
226	-2 [-4]
228	-2 [-4]
230	-2 [-4]
232	-2 [-4]
234	-2 [-3]
236	-2 [-3]
238	-2 [-3]
240	-2 [-3]
242	-2 [-3]
244	-2 [-3]
246	-2 [-3]
248	-2 [-3]
250	-2 [-3]
252	-2 [-3]
254	-2 [-3]
256	-2 [-3]
258	-2 [-3]
260	-2 [-3]
262	-2 [-3]
264	-2 [-3]
266	-2 [-3]
268	-2 [-3]
270	-2 [-3]
272	-2 [-3]
274	-2 [-3]
276	-2 [-3]
278	-2 [-3]
280	-2 [-3]
282	-2 [-3]
284	-2 [-3]
286	-2 [-3]
288	-2 [-3]
290	-2 [-3]
292	-2 [-3]
294	-2 [-3]
296	-2 [-3]
298	-2 [-3]
300	-2 [-3]

**Left Frontal Peripheral Sensor X (Most Recent Event - Deployment)**



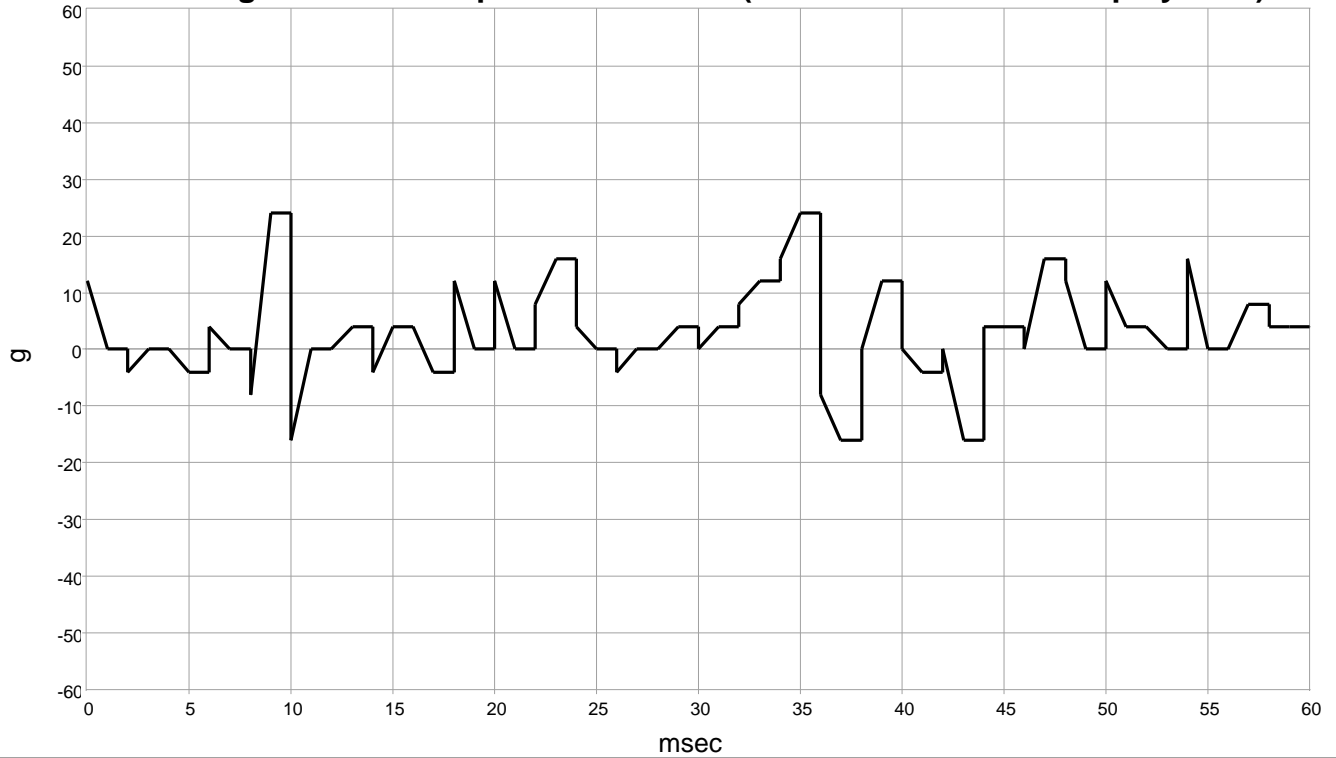
**Left Frontal Peripheral Sensor X Delta-V (Most Recent Event - Deployment)**



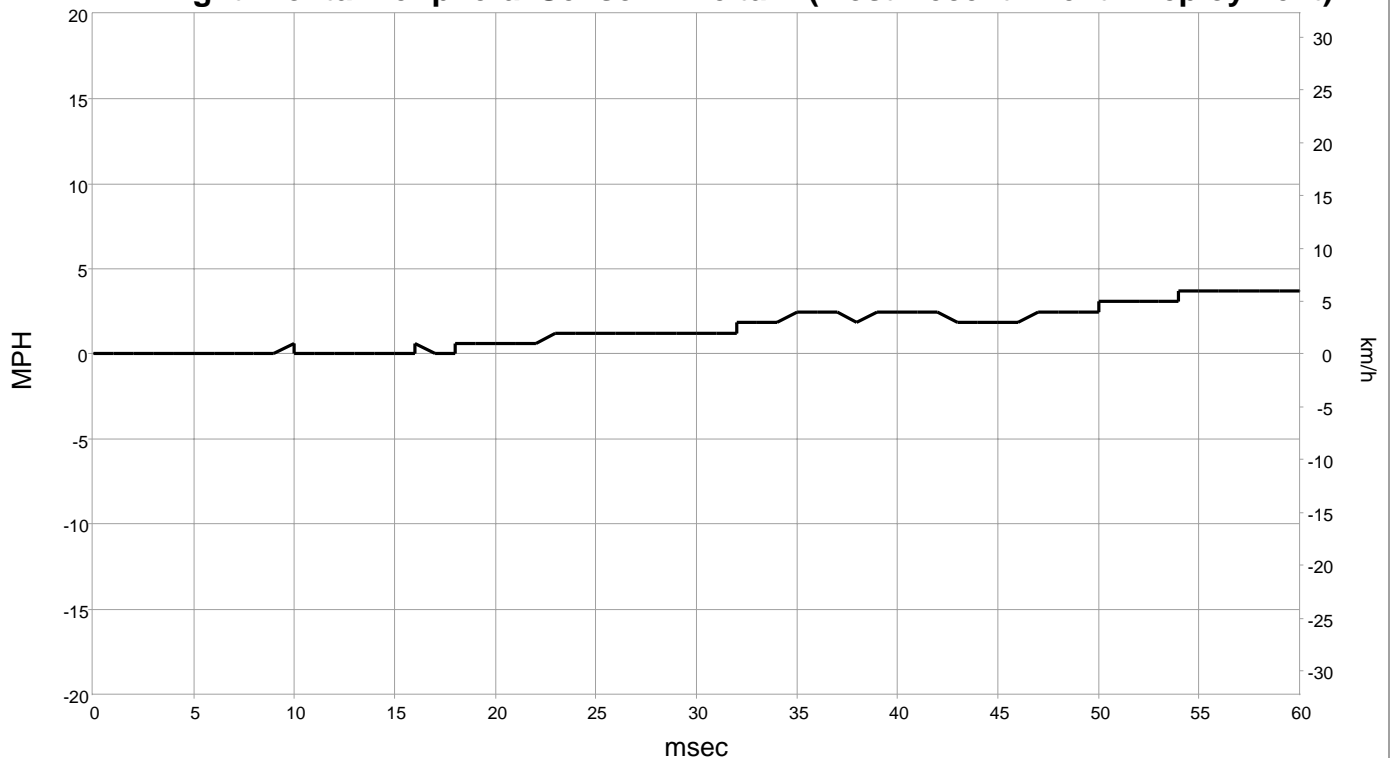
### Left Frontal Peripheral Sensor X (Most Recent Event - Deployment)

Time (msec)	Left Frontal Peripheral Sensor X (g)	Left Frontal Peripheral Sensor X Delta-V (MPH [km/h])	Time (msec)	Left Frontal Peripheral Sensor X (g)	Left Frontal Peripheral Sensor X Delta-V (MPH [km/h])	Time (msec)	Left Frontal Peripheral Sensor X (g)	Left Frontal Peripheral Sensor X Delta-V (MPH [km/h])
0	0.00	0 [0]	25	8.00	0 [0]	50	0.00	2 [3]
0.5	0.00	0 [0]	25.5	8.00	0 [0]	50.5	0.00	2 [3]
1	0.00	0 [0]	26	4.00	0 [0]	51	0.00	2 [3]
1.5	0.00	0 [0]	26.5	4.00	1 [1]	51.5	0.00	2 [3]
2	0.00	0 [0]	27	4.00	1 [1]	52	4.00	2 [3]
2.5	0.00	0 [0]	27.5	4.00	1 [1]	52.5	4.00	2 [3]
3	0.00	0 [0]	28	4.00	1 [1]	53	8.00	2 [3]
3.5	0.00	0 [0]	28.5	4.00	1 [1]	53.5	8.00	2 [4]
4	0.00	0 [0]	29	0.00	1 [1]	54	8.00	2 [4]
4.5	0.00	0 [0]	29.5	0.00	1 [1]	54.5	8.00	2 [4]
5	0.00	0 [0]	30	0.00	1 [1]	55	8.00	2 [4]
5.5	0.00	0 [0]	30.5	0.00	1 [1]	55.5	8.00	2 [4]
6	0.00	0 [0]	31	0.00	1 [1]	56	4.00	2 [4]
6.5	0.00	0 [0]	31.5	0.00	1 [1]	56.5	4.00	2 [4]
7	0.00	0 [0]	32	0.00	1 [1]	57	8.00	2 [4]
7.5	0.00	0 [0]	32.5	0.00	1 [1]	57.5	8.00	3 [5]
8	0.00	0 [0]	33	0.00	1 [1]	58	8.00	3 [5]
8.5	0.00	0 [0]	33.5	0.00	1 [1]	58.5	8.00	3 [5]
9	4.00	0 [0]	34	-4.00	1 [1]	59	0.00	3 [5]
9.5	4.00	0 [0]	34.5	-4.00	1 [1]	59.5	0.00	3 [5]
10	0.00	0 [0]	35	-8.00	1 [1]			
10.5	0.00	0 [0]	35.5	-8.00	0 [0]			
11	0.00	0 [0]	36	0.00	0 [0]			
11.5	0.00	0 [0]	36.5	0.00	0 [0]			
12	-4.00	0 [0]	37	4.00	0 [0]			
12.5	-4.00	0 [0]	37.5	4.00	1 [1]			
13	4.00	0 [0]	38	12.00	1 [1]			
13.5	4.00	0 [0]	38.5	12.00	1 [1]			
14	0.00	0 [0]	39	16.00	1 [1]			
14.5	0.00	0 [0]	39.5	16.00	1 [1]			
15	-4.00	0 [0]	40	4.00	1 [2]			
15.5	-4.00	0 [0]	40.5	4.00	1 [2]			
16	0.00	0 [0]	41	4.00	1 [2]			
16.5	0.00	0 [0]	41.5	4.00	1 [2]			
17	0.00	0 [0]	42	12.00	1 [2]			
17.5	0.00	0 [0]	42.5	12.00	1 [2]			
18	0.00	0 [0]	43	8.00	1 [2]			
18.5	0.00	0 [0]	43.5	8.00	1 [2]			
19	0.00	0 [0]	44	12.00	2 [3]			
19.5	0.00	0 [0]	44.5	12.00	2 [3]			
20	0.00	0 [0]	45	8.00	2 [3]			
20.5	0.00	0 [0]	45.5	8.00	2 [3]			
21	0.00	0 [0]	46	0.00	2 [3]			
21.5	0.00	0 [0]	46.5	0.00	2 [3]			
22	0.00	0 [0]	47	0.00	2 [3]			
22.5	0.00	0 [0]	47.5	0.00	2 [3]			
23	0.00	0 [0]	48	0.00	2 [3]			
23.5	0.00	0 [0]	48.5	0.00	2 [3]			
24	4.00	0 [0]	49	4.00	2 [3]			
24.5	4.00	0 [0]	49.5	4.00	2 [3]			

**Right Frontal Peripheral Sensor X (Most Recent Event - Deployment)**



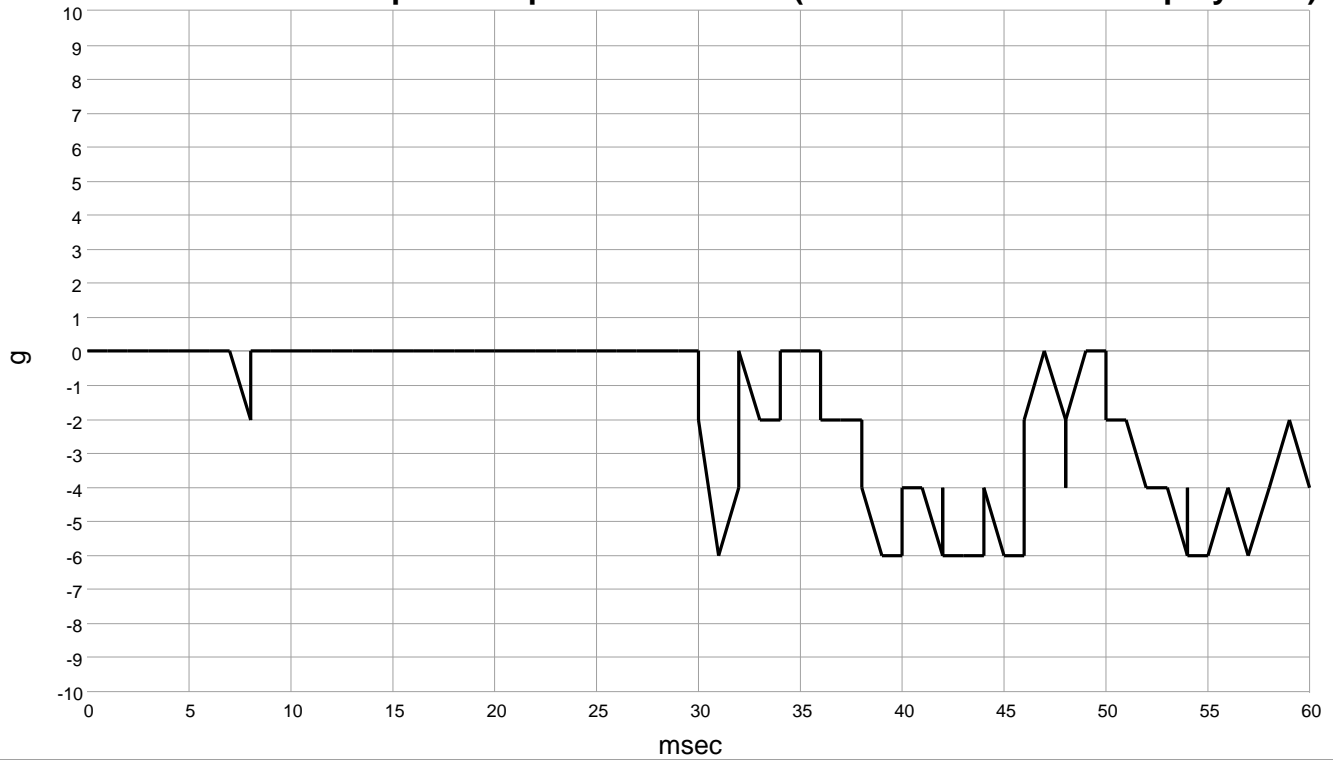
**Right Frontal Peripheral Sensor X Delta-V (Most Recent Event - Deployment)**



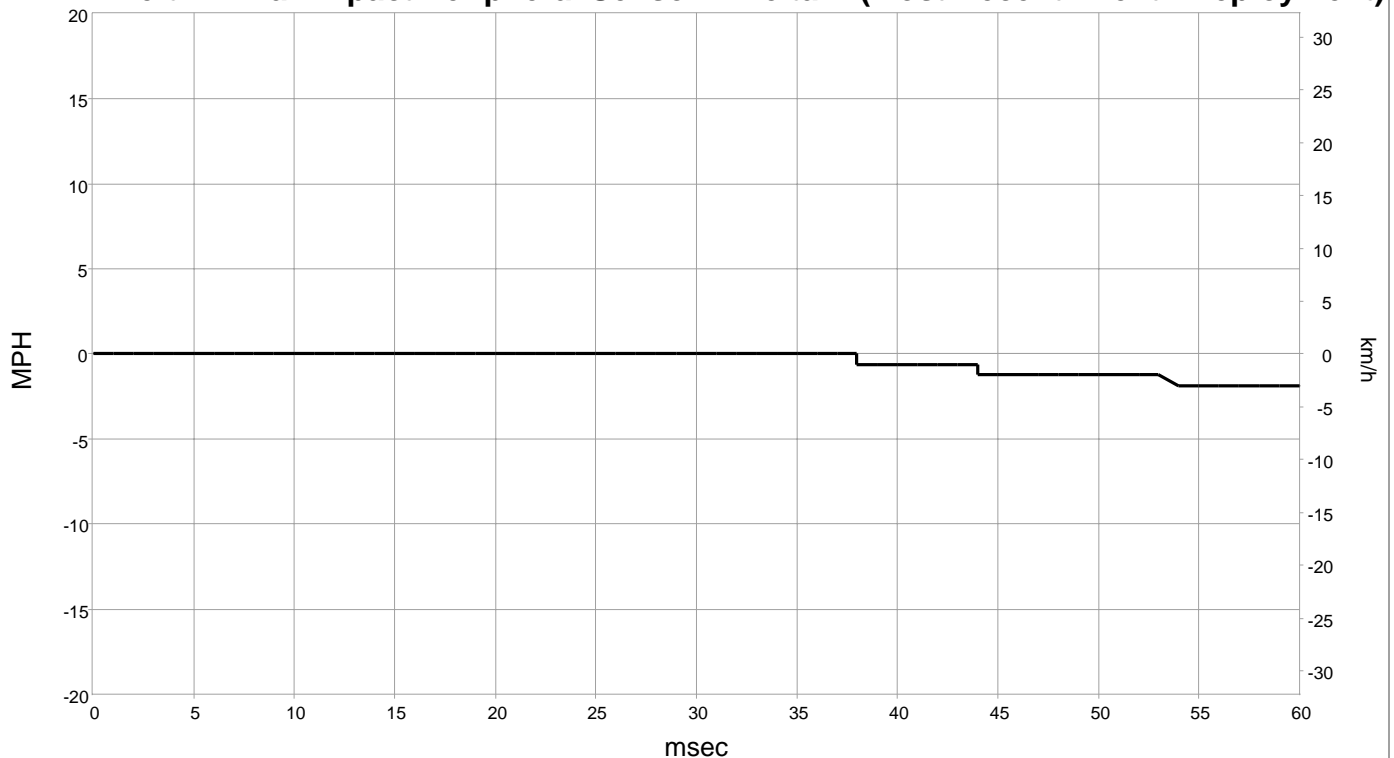
### Right Frontal Peripheral Sensor X (Most Recent Event - Deployment)

Time (msec)	Right Frontal Peripheral Sensor X (g)	Right Frontal Peripheral Sensor X Delta-V (MPH [km/h])	Time (msec)	Right Frontal Peripheral Sensor X (g)	Right Frontal Peripheral Sensor X Delta-V (MPH [km/h])	Time (msec)	Right Frontal Peripheral Sensor X (g)	Right Frontal Peripheral Sensor X Delta-V (MPH [km/h])
0	12.00	0 [0]	25	0.00	1 [2]	50	12.00	3 [5]
0.5	12.00	0 [0]	25.5	0.00	1 [2]	50.5	12.00	3 [5]
1	0.00	0 [0]	26	-4.00	1 [2]	51	4.00	3 [5]
1.5	0.00	0 [0]	26.5	-4.00	1 [2]	51.5	4.00	3 [5]
2	-4.00	0 [0]	27	0.00	1 [2]	52	4.00	3 [5]
2.5	-4.00	0 [0]	27.5	0.00	1 [2]	52.5	4.00	3 [5]
3	0.00	0 [0]	28	0.00	1 [2]	53	0.00	3 [5]
3.5	0.00	0 [0]	28.5	0.00	1 [2]	53.5	0.00	3 [5]
4	0.00	0 [0]	29	4.00	1 [2]	54	16.00	3 [5]
4.5	0.00	0 [0]	29.5	4.00	1 [2]	54.5	16.00	4 [6]
5	-4.00	0 [0]	30	0.00	1 [2]	55	0.00	4 [6]
5.5	-4.00	0 [0]	30.5	0.00	1 [2]	55.5	0.00	4 [6]
6	4.00	0 [0]	31	4.00	1 [2]	56	0.00	4 [6]
6.5	4.00	0 [0]	31.5	4.00	1 [2]	56.5	0.00	4 [6]
7	0.00	0 [0]	32	8.00	1 [2]	57	8.00	4 [6]
7.5	0.00	0 [0]	32.5	8.00	2 [3]	57.5	8.00	4 [6]
8	-8.00	0 [0]	33	12.00	2 [3]	58	4.00	4 [6]
8.5	-8.00	0 [0]	33.5	12.00	2 [3]	58.5	4.00	4 [6]
9	24.00	0 [0]	34	16.00	2 [3]	59	4.00	4 [6]
9.5	24.00	1 [1]	34.5	16.00	2 [3]	59.5	4.00	4 [6]
10	-16.00	1 [1]	35	24.00	2 [4]			
10.5	-16.00	0 [0]	35.5	24.00	2 [4]			
11	0.00	0 [0]	36	-8.00	2 [4]			
11.5	0.00	0 [0]	36.5	-8.00	2 [4]			
12	0.00	0 [0]	37	-16.00	2 [4]			
12.5	0.00	0 [0]	37.5	-16.00	2 [3]			
13	4.00	0 [0]	38	0.00	2 [3]			
13.5	4.00	0 [0]	38.5	0.00	2 [3]			
14	-4.00	0 [0]	39	12.00	2 [4]			
14.5	-4.00	0 [0]	39.5	12.00	2 [4]			
15	4.00	0 [0]	40	0.00	2 [4]			
15.5	4.00	0 [0]	40.5	0.00	2 [4]			
16	4.00	0 [0]	41	-4.00	2 [4]			
16.5	4.00	1 [1]	41.5	-4.00	2 [4]			
17	-4.00	0 [0]	42	0.00	2 [4]			
17.5	-4.00	0 [0]	42.5	0.00	2 [4]			
18	12.00	1 [1]	43	-16.00	2 [3]			
18.5	12.00	1 [1]	43.5	-16.00	2 [3]			
19	0.00	1 [1]	44	4.00	2 [3]			
19.5	0.00	1 [1]	44.5	4.00	2 [3]			
20	12.00	1 [1]	45	4.00	2 [3]			
20.5	12.00	1 [1]	45.5	4.00	2 [3]			
21	0.00	1 [1]	46	0.00	2 [3]			
21.5	0.00	1 [1]	46.5	0.00	2 [3]			
22	8.00	1 [1]	47	16.00	2 [4]			
22.5	8.00	1 [1]	47.5	16.00	2 [4]			
23	16.00	1 [2]	48	12.00	2 [4]			
23.5	16.00	1 [2]	48.5	12.00	2 [4]			
24	4.00	1 [2]	49	0.00	2 [4]			
24.5	4.00	1 [2]	49.5	0.00	2 [4]			

**Left B-Pillar Impact Peripheral Sensor Y (Most Recent Event - Deployment)**



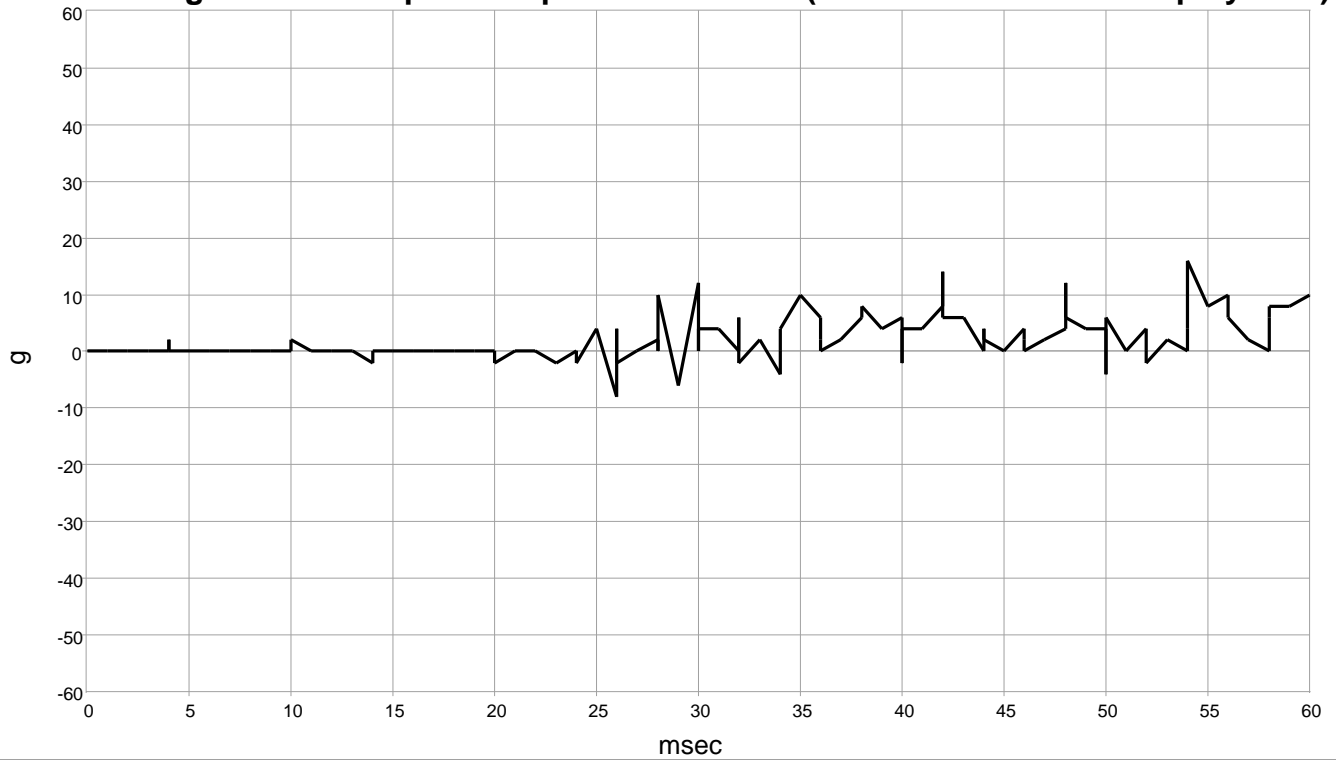
**Left B-Pillar Impact Peripheral Sensor Y Delta-V (Most Recent Event - Deployment)**



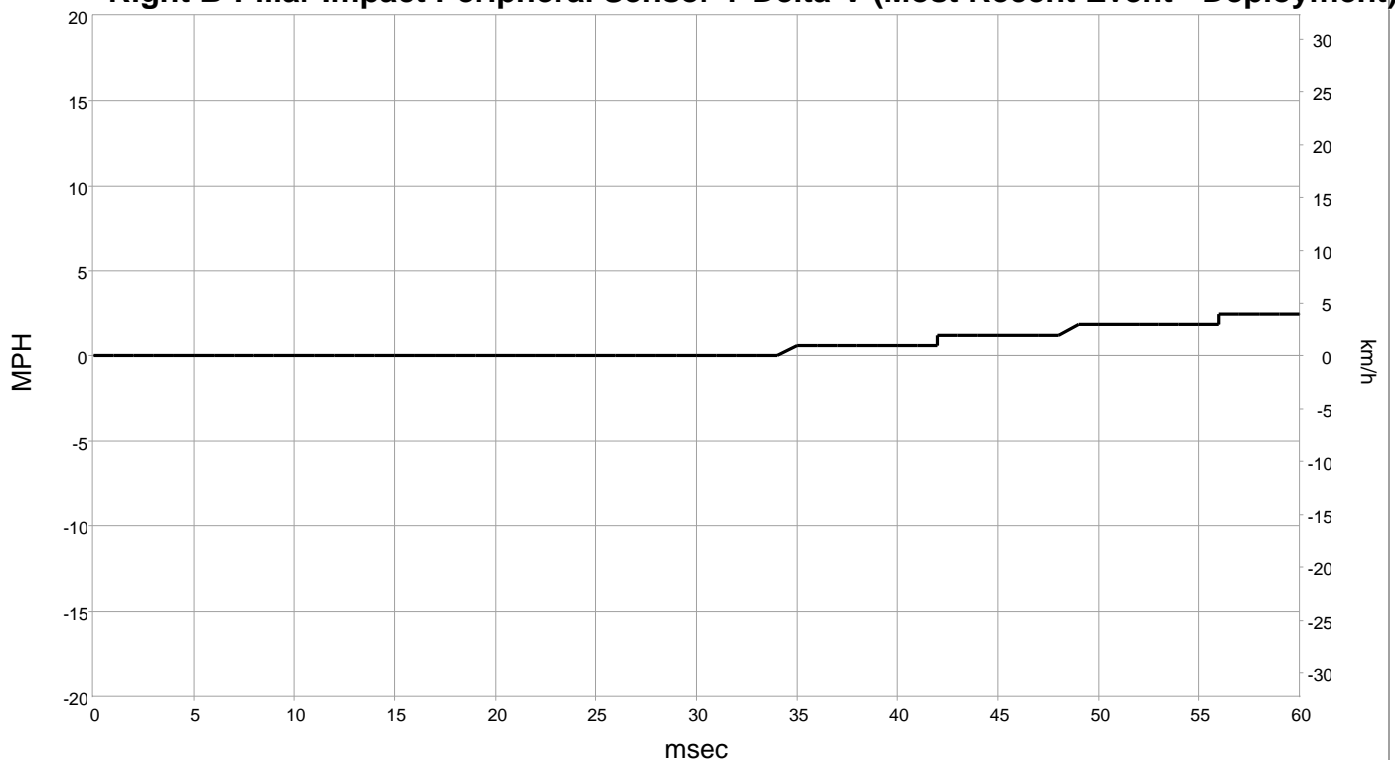
### Left B-Pillar Impact Peripheral Sensor Y (Most Recent Event - Deployment)

Time (msec)	Left B-Pillar Impact Peripheral Sensor Y (g)	Left B-Pillar Impact Peripheral Sensor Y Delta-V (MPH [km/h])	Time (msec)	Left B-Pillar Impact Peripheral Sensor Y (g)	Left B-Pillar Impact Peripheral Sensor Y Delta-V (MPH [km/h])	Time (msec)	Left B-Pillar Impact Peripheral Sensor Y (g)	Left B-Pillar Impact Peripheral Sensor Y Delta-V (MPH [km/h])
0	0.000	0 [0]	25	0.000	0 [0]	50	-2.000	-1 [-2]
0.5	0.000	0 [0]	25.5	0.000	0 [0]	50.5	-2.000	-1 [-2]
1	0.000	0 [0]	26	0.000	0 [0]	51	-2.000	-1 [-2]
1.5	0.000	0 [0]	26.5	0.000	0 [0]	51.5	-4.000	-1 [-2]
2	0.000	0 [0]	27	0.000	0 [0]	52	-4.000	-1 [-2]
2.5	0.000	0 [0]	27.5	0.000	0 [0]	52.5	-4.000	-1 [-2]
3	0.000	0 [0]	28	0.000	0 [0]	53	-4.000	-1 [-2]
3.5	0.000	0 [0]	28.5	0.000	0 [0]	53.5	-6.000	-2 [-3]
4	0.000	0 [0]	29	0.000	0 [0]	54	-4.000	-2 [-3]
4.5	0.000	0 [0]	29.5	0.000	0 [0]	54.5	-6.000	-2 [-3]
5	0.000	0 [0]	30	0.000	0 [0]	55	-6.000	-2 [-3]
5.5	0.000	0 [0]	30.5	-2.000	0 [0]	55.5	-4.000	-2 [-3]
6	0.000	0 [0]	31	-6.000	0 [0]	56	-4.000	-2 [-3]
6.5	0.000	0 [0]	31.5	-4.000	0 [0]	56.5	-4.000	-2 [-3]
7	0.000	0 [0]	32	-2.000	0 [0]	57	-6.000	-2 [-3]
7.5	-2.000	0 [0]	32.5	0.000	0 [0]	57.5	-4.000	-2 [-3]
8	0.000	0 [0]	33	-2.000	0 [0]	58	-4.000	-2 [-3]
8.5	0.000	0 [0]	33.5	-2.000	0 [0]	58.5	-4.000	-2 [-3]
9	0.000	0 [0]	34	-2.000	0 [0]	59	-2.000	-2 [-3]
9.5	0.000	0 [0]	34.5	0.000	0 [0]	59.5	-4.000	-2 [-3]
10	0.000	0 [0]	35	0.000	0 [0]			
10.5	0.000	0 [0]	35.5	0.000	0 [0]			
11	0.000	0 [0]	36	-2.000	0 [0]			
11.5	0.000	0 [0]	36.5	-2.000	0 [0]			
12	0.000	0 [0]	37	-2.000	0 [0]			
12.5	0.000	0 [0]	37.5	-2.000	0 [0]			
13	0.000	0 [0]	38	-2.000	-1 [-1]			
13.5	0.000	0 [0]	38.5	-4.000	-1 [-1]			
14	0.000	0 [0]	39	-6.000	-1 [-1]			
14.5	0.000	0 [0]	39.5	-6.000	-1 [-1]			
15	0.000	0 [0]	40	-6.000	-1 [-1]			
15.5	0.000	0 [0]	40.5	-4.000	-1 [-1]			
16	0.000	0 [0]	41	-4.000	-1 [-1]			
16.5	0.000	0 [0]	41.5	-6.000	-1 [-1]			
17	0.000	0 [0]	42	-4.000	-1 [-1]			
17.5	0.000	0 [0]	42.5	-6.000	-1 [-1]			
18	0.000	0 [0]	43	-6.000	-1 [-1]			
18.5	0.000	0 [0]	43.5	-6.000	-1 [-1]			
19	0.000	0 [0]	44	-4.000	-1 [-2]			
19.5	0.000	0 [0]	44.5	-4.000	-1 [-2]			
20	0.000	0 [0]	45	-6.000	-1 [-2]			
20.5	0.000	0 [0]	45.5	-6.000	-1 [-2]			
21	0.000	0 [0]	46	-4.000	-1 [-2]			
21.5	0.000	0 [0]	46.5	-2.000	-1 [-2]			
22	0.000	0 [0]	47	0.000	-1 [-2]			
22.5	0.000	0 [0]	47.5	-2.000	-1 [-2]			
23	0.000	0 [0]	48	-4.000	-1 [-2]			
23.5	0.000	0 [0]	48.5	-2.000	-1 [-2]			
24	0.000	0 [0]	49	0.000	-1 [-2]			
24.5	0.000	0 [0]	49.5	0.000	-1 [-2]			

**Right B-Pillar Impact Peripheral Sensor Y (Most Recent Event - Deployment)**



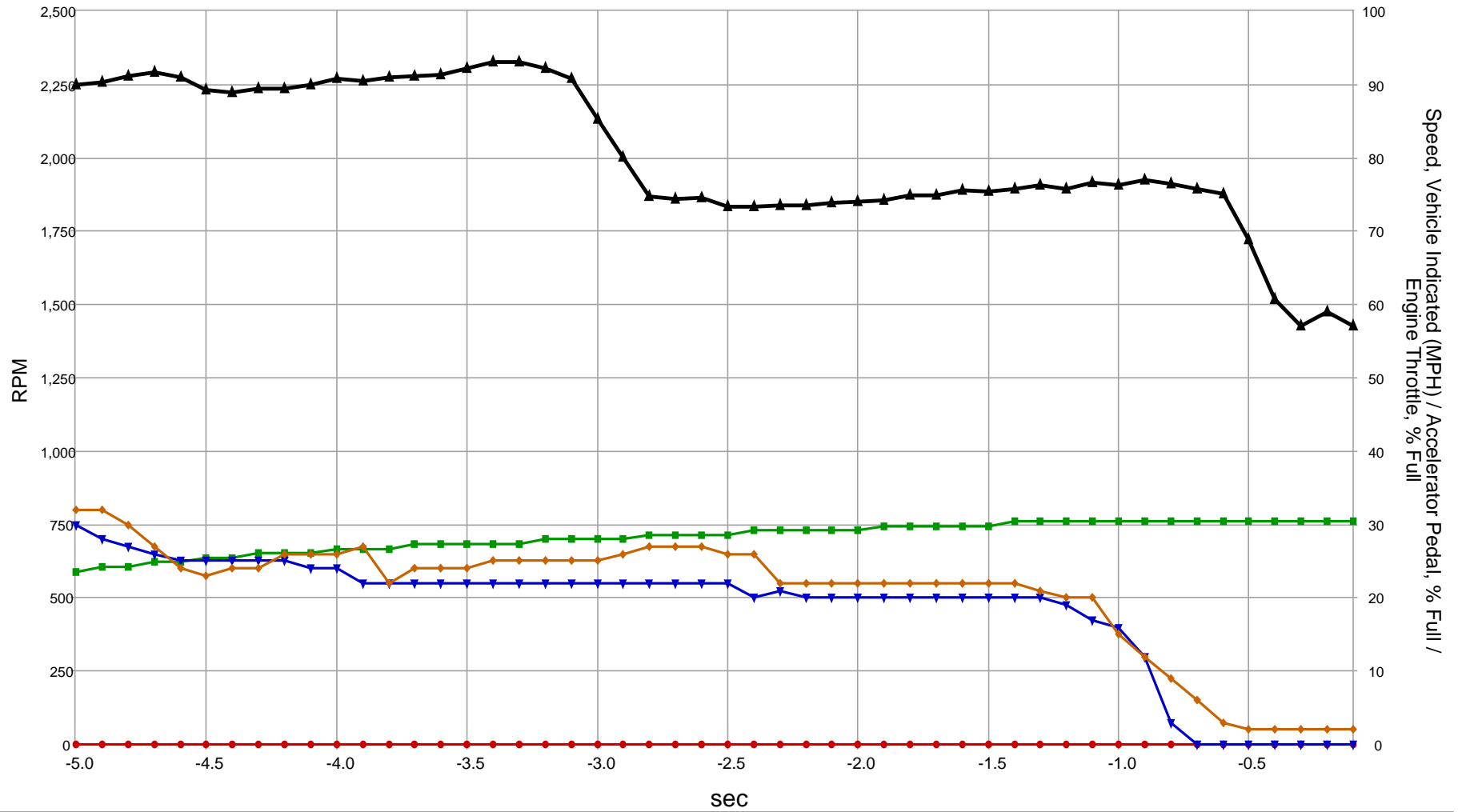
**Right B-Pillar Impact Peripheral Sensor Y Delta-V (Most Recent Event - Deployment)**



### Right B-Pillar Impact Peripheral Sensor Y (Most Recent Event - Deployment)

Time (msec)	Right B-Pillar Impact Peripheral Sensor Y (g)	Right B-Pillar Impact Peripheral Sensor Y Delta-V (MPH)	Time (msec)	Right B-Pillar Impact Peripheral Sensor Y (g)	Right B-Pillar Impact Peripheral Sensor Y Delta-V (MPH)	Time (msec)	Right B-Pillar Impact Peripheral Sensor Y (g)	Right B-Pillar Impact Peripheral Sensor Y Delta-V (MPH)
0	0.000	0 [0]	25	4.000	0 [0]	50	-4.000	2 [3]
0.5	0.000	0 [0]	25.5	-8.000	0 [0]	50.5	6.000	2 [3]
1	0.000	0 [0]	26	4.000	0 [0]	51	0.000	2 [3]
1.5	0.000	0 [0]	26.5	-2.000	0 [0]	51.5	4.000	2 [3]
2	0.000	0 [0]	27	0.000	0 [0]	52	0.000	2 [3]
2.5	0.000	0 [0]	27.5	2.000	0 [0]	52.5	-2.000	2 [3]
3	0.000	0 [0]	28	0.000	0 [0]	53	2.000	2 [3]
3.5	0.000	0 [0]	28.5	10.000	0 [0]	53.5	0.000	2 [3]
4	2.000	0 [0]	29	-6.000	0 [0]	54	4.000	2 [3]
4.5	0.000	0 [0]	29.5	12.000	0 [0]	54.5	16.000	2 [3]
5	0.000	0 [0]	30	0.000	0 [0]	55	8.000	2 [3]
5.5	0.000	0 [0]	30.5	4.000	0 [0]	55.5	10.000	2 [3]
6	0.000	0 [0]	31	4.000	0 [0]	56	6.000	2 [3]
6.5	0.000	0 [0]	31.5	0.000	0 [0]	56.5	6.000	2 [4]
7	0.000	0 [0]	32	6.000	0 [0]	57	2.000	2 [4]
7.5	0.000	0 [0]	32.5	-2.000	0 [0]	57.5	0.000	2 [4]
8	0.000	0 [0]	33	2.000	0 [0]	58	6.000	2 [4]
8.5	0.000	0 [0]	33.5	-4.000	0 [0]	58.5	8.000	2 [4]
9	0.000	0 [0]	34	0.000	0 [0]	59	8.000	2 [4]
9.5	0.000	0 [0]	34.5	4.000	0 [0]	59.5	10.000	2 [4]
10	0.000	0 [0]	35	10.000	1 [1]			
10.5	2.000	0 [0]	35.5	6.000	1 [1]			
11	0.000	0 [0]	36	2.000	1 [1]			
11.5	0.000	0 [0]	36.5	0.000	1 [1]			
12	0.000	0 [0]	37	2.000	1 [1]			
12.5	0.000	0 [0]	37.5	6.000	1 [1]			
13	0.000	0 [0]	38	6.000	1 [1]			
13.5	-2.000	0 [0]	38.5	8.000	1 [1]			
14	0.000	0 [0]	39	4.000	1 [1]			
14.5	0.000	0 [0]	39.5	6.000	1 [1]			
15	0.000	0 [0]	40	-2.000	1 [1]			
15.5	0.000	0 [0]	40.5	4.000	1 [1]			
16	0.000	0 [0]	41	4.000	1 [1]			
16.5	0.000	0 [0]	41.5	8.000	1 [1]			
17	0.000	0 [0]	42	14.000	1 [2]			
17.5	0.000	0 [0]	42.5	6.000	1 [2]			
18	0.000	0 [0]	43	6.000	1 [2]			
18.5	0.000	0 [0]	43.5	0.000	1 [2]			
19	0.000	0 [0]	44	4.000	1 [2]			
19.5	0.000	0 [0]	44.5	2.000	1 [2]			
20	-2.000	0 [0]	45	0.000	1 [2]			
20.5	-2.000	0 [0]	45.5	4.000	1 [2]			
21	0.000	0 [0]	46	2.000	1 [2]			
21.5	0.000	0 [0]	46.5	0.000	1 [2]			
22	0.000	0 [0]	47	2.000	1 [2]			
22.5	0.000	0 [0]	47.5	4.000	1 [2]			
23	-2.000	0 [0]	48	12.000	1 [2]			
23.5	0.000	0 [0]	48.5	6.000	1 [2]			
24	0.000	0 [0]	49	4.000	2 [3]			
24.5	-2.000	0 [0]	49.5	4.000	2 [3]			

### Pre-Crash Data -5 to 0 Sec



▲ Engine RPM      ■ Speed, Vehicle Indicated (MPH)      ● Service Brake (0=Off/10=On)      ▼ Accelerator Pedal, % Full      ◆ Engine Throttle, % Full

**Pre-Crash Data -5 to 0 Sec (Part I - 100 msec) (Most Recent Event - Deployment) -  
Table 1 of 2**

Time (sec)	Pre-Crash Recorder Status	Speed, Vehicle Indicated (MPH [km/h])	Accelerator Pedal, % Full (%)	Engine Throttle, % Full (%)	Service Brake	Engine RPM (RPM)	ABS Activity	Stability Control
-5.0	Complete	24 [38]	30	32	Off	2,248	No	On
-4.9	Complete	24 [39]	28	32	Off	2,259	No	On
-4.8	Complete	24 [39]	27	30	Off	2,278	No	On
-4.7	Complete	25 [40]	26	27	Off	2,294	No	On
-4.6	Complete	25 [40]	25	24	Off	2,273	No	On
-4.5	Complete	25 [41]	25	23	Off	2,230	No	On
-4.4	Complete	25 [41]	25	24	Off	2,225	No	On
-4.3	Complete	26 [42]	25	24	Off	2,237	No	On
-4.2	Complete	26 [42]	25	26	Off	2,235	No	On
-4.1	Complete	26 [42]	24	26	Off	2,248	No	On
-4.0	Complete	27 [43]	24	26	Off	2,271	No	On
-3.9	Complete	27 [43]	22	27	Off	2,262	No	On
-3.8	Complete	27 [43]	22	22	Off	2,277	No	On
-3.7	Complete	27 [44]	22	24	Off	2,279	No	On
-3.6	Complete	27 [44]	22	24	Off	2,285	No	On
-3.5	Complete	27 [44]	22	24	Off	2,306	No	On
-3.4	Complete	27 [44]	22	25	Off	2,325	No	On
-3.3	Complete	27 [44]	22	25	Off	2,326	No	On
-3.2	Complete	28 [45]	22	25	Off	2,304	No	On
-3.1	Complete	28 [45]	22	25	Off	2,271	No	On
-3.0	Complete	28 [45]	22	25	Off	2,131	No	On
-2.9	Complete	28 [45]	22	26	Off	2,003	No	On
-2.8	Complete	29 [46]	22	27	Off	1,868	No	On
-2.7	Complete	29 [46]	22	27	Off	1,858	No	On
-2.6	Complete	29 [46]	22	27	Off	1,864	No	On
-2.5	Complete	29 [46]	22	26	Off	1,836	No	On
-2.4	Complete	29 [47]	20	26	Off	1,835	No	On
-2.3	Complete	29 [47]	21	22	Off	1,837	No	On
-2.2	Complete	29 [47]	20	22	Off	1,839	No	On
-2.1	Complete	29 [47]	20	22	Off	1,848	No	On
-2.0	Complete	29 [47]	20	22	Off	1,851	No	On
-1.9	Complete	30 [48]	20	22	Off	1,855	No	On
-1.8	Complete	30 [48]	20	22	Off	1,872	No	On
-1.7	Complete	30 [48]	20	22	Off	1,875	No	On
-1.6	Complete	30 [48]	20	22	Off	1,888	No	On
-1.5	Complete	30 [48]	20	22	Off	1,885	No	On
-1.4	Complete	30 [49]	20	22	Off	1,895	No	On
-1.3	Complete	30 [49]	20	21	Off	1,907	No	On
-1.2	Complete	30 [49]	19	20	Off	1,893	No	On
-1.1	Complete	30 [49]	17	20	Off	1,914	No	On
-1.0	Complete	30 [49]	16	15	Off	1,908	No	On
-0.9	Complete	30 [49]	12	12	Off	1,926	No	On
-0.8	Complete	30 [49]	3	9	Off	1,911	No	On
-0.7	Complete	30 [49]	0	6	Off	1,893	No	On
-0.6	Complete	30 [49]	0	3	Off	1,878	No	On
-0.5	Complete	30 [49]	0	2	Off	1,720	No	On
-0.4	Complete	30 [49]	0	2	Off	1,520	No	On
-0.3	Complete	30 [49]	0	2	Off	1,426	No	On
-0.2	Complete	30 [49]	0	2	Off	1,474	No	On
-0.1	Complete	30 [49]	0	2	Off	1,427	No	On

**Pre-Crash Data -5 to 0 Sec (Part I - 100 msec) (Most Recent Event - Deployment) -  
Table 2 of 2**

<b>Time (sec)</b>	<b>Steering Input (deg)</b>	<b>Brake Intervention by ESP</b>
-5.0	-4	No
-4.9	-4	No
-4.8	-4	No
-4.7	-4	No
-4.6	-4	No
-4.5	-4	No
-4.4	-4	No
-4.3	-4	No
-4.2	-4	No
-4.1	-4	No
-4.0	-4	No
-3.9	-4	No
-3.8	-4	No
-3.7	-4	No
-3.6	-4	No
-3.5	-3	No
-3.4	-3	No
-3.3	-3	No
-3.2	-3	No
-3.1	-2	No
-3.0	-2	No
-2.9	-2	No
-2.8	-2	No
-2.7	-2	No
-2.6	-2	No
-2.5	-2	No
-2.4	-2	No
-2.3	-2	No
-2.2	-2	No
-2.1	-2	No
-2.0	-2	No
-1.9	-2	No
-1.8	-1	No
-1.7	-1	No
-1.6	-1	No
-1.5	-1	No
-1.4	-1	No
-1.3	-1	No
-1.2	-1	No
-1.1	-1	No
-1.0	-1	No
-0.9	-1	No
-0.8	-1	No
-0.7	-1	No
-0.6	0	No
-0.5	8	No
-0.4	25	No
-0.3	46	No
-0.2	54	No
-0.1	36	No

### Pre-Crash Data -5 to 0 Sec (Part II - 100 msec) (Most Recent Event - Deployment)

Time (sec)	Pre-Crash Recorder Status	Braking System, Maximum Braking	Wheel Speed, LF (RPM)	Wheel Speed, RF (RPM)	Wheel Speed, LR (RPM)	Wheel Speed, RR (RPM)	Yaw Rate (deg/sec)	Master Cylinder Pressure (Bar)
-5.0	Complete	No	246	245	250	249	-0.15	0.0
-4.9	Complete	No	250	249	253	253	-0.23	0.0
-4.8	Complete	No	254	254	257	258	-0.07	0.0
-4.7	Complete	No	258	257	262	261	-0.39	0.0
-4.6	Complete	No	261	261	265	265	-0.31	0.0
-4.5	Complete	No	265	265	269	269	-0.47	0.0
-4.4	Complete	No	269	269	272	273	-0.15	0.0
-4.3	Complete	No	273	272	275	275	-0.39	0.0
-4.2	Complete	No	275	276	278	279	-0.47	0.0
-4.1	Complete	No	278	278	281	281	-0.47	0.0
-4.0	Complete	No	280	280	283	283	-0.39	0.0
-3.9	Complete	No	283	282	286	285	-0.95	0.0
-3.8	Complete	No	285	286	289	289	-0.55	0.0
-3.7	Complete	No	287	288	291	291	-0.39	0.0
-3.6	Complete	No	290	290	293	293	-0.55	0.0
-3.5	Complete	No	292	292	296	294	-0.63	0.0
-3.4	Complete	No	294	294	297	297	-0.55	0.0
-3.3	Complete	No	295	295	299	299	-0.55	0.0
-3.2	Complete	No	297	297	300	301	-0.47	0.0
-3.1	Complete	No	300	299	301	301	-0.47	0.0
-3.0	Complete	No	301	300	302	302	-0.71	0.0
-2.9	Complete	No	302	301	304	304	-0.95	0.0
-2.8	Complete	No	303	302	305	304	-0.87	0.0
-2.7	Complete	No	305	305	308	308	-0.55	0.0
-2.6	Complete	No	306	306	310	310	0.00	0.0
-2.5	Complete	No	309	309	312	312	-0.23	0.0
-2.4	Complete	No	310	310	313	313	-0.55	0.0
-2.3	Complete	No	312	311	315	315	-1.11	0.0
-2.2	Complete	No	313	312	316	316	-1.03	0.0
-2.1	Complete	No	315	315	318	319	-0.15	0.0
-2.0	Complete	No	318	318	319	319	-0.31	0.0
-1.9	Complete	No	319	318	321	320	-0.79	0.0
-1.8	Complete	No	319	318	322	321	-0.79	0.0
-1.7	Complete	No	321	321	323	323	-0.63	0.0
-1.6	Complete	No	323	323	325	326	-0.47	0.0
-1.5	Complete	No	324	324	326	327	-0.23	0.0
-1.4	Complete	No	325	325	328	327	-0.71	0.0
-1.3	Complete	No	327	326	328	329	-0.79	0.0
-1.2	Complete	No	328	328	330	329	-0.71	0.0
-1.1	Complete	No	329	328	331	331	-0.55	0.0
-1.0	Complete	No	330	330	332	332	-0.39	0.0
-0.9	Complete	No	331	332	333	333	-0.39	0.0
-0.8	Complete	No	332	332	332	333	-0.47	0.0
-0.7	Complete	No	332	330	332	331	-0.55	0.0
-0.6	Complete	No	331	330	331	330	-0.87	0.0
-0.5	Complete	No	331	330	330	330	-1.03	0.0
-0.4	Complete	No	332	331	334	334	-0.23	0.0
-0.3	Complete	No	330	332	331	332	1.27	0.0
-0.2	Complete	No	326	332	328	332	5.11	0.0
-0.1	Complete	No	309	337	330	333	11.83	0.0

**Pre-Crash Data -5 to 0 Sec (Part II - 250 msec) (Most Recent Event - Deployment) -  
Table 1 of 3**

Time (sec)	Pre-Crash Recorder Status	Tire Pressure Indicator Lamp	Tire Pressure status, LF	Tire Pressure status, RF	Tire Pressure status, LR	Tire Pressure status, RR	Tire Pressure, LF (psi)	Tire Pressure, RF (psi)
-5.00	Complete	Off	Normal	Normal	Normal	Normal	42	40
-4.75	Complete	Off	Normal	Normal	Normal	Normal	42	40
-4.50	Complete	Off	Normal	Normal	Normal	Normal	42	40
-4.25	Complete	Off	Normal	Normal	Normal	Normal	42	40
-4.00	Complete	Off	Normal	Normal	Normal	Normal	42	40
-3.75	Complete	Off	Normal	Normal	Normal	Normal	42	40
-3.50	Complete	Off	Normal	Normal	Normal	Normal	42	40
-3.25	Complete	Off	Normal	Normal	Normal	Normal	42	40
-3.00	Complete	Off	Normal	Normal	Normal	Normal	42	40
-2.75	Complete	Off	Normal	Normal	Normal	Normal	42	40
-2.50	Complete	Off	Normal	Normal	Normal	Normal	42	40
-2.25	Complete	Off	Normal	Normal	Normal	Normal	42	40
-2.00	Complete	Off	Normal	Normal	Normal	Normal	42	40
-1.75	Complete	Off	Normal	Normal	Normal	Normal	42	40
-1.50	Complete	Off	Normal	Normal	Normal	Normal	42	40
-1.25	Complete	Off	Normal	Normal	Normal	Normal	42	40
-1.00	Complete	Off	Normal	Normal	Normal	Normal	42	40
-0.75	Complete	Off	Normal	Normal	Normal	Normal	42	40
-0.50	Complete	Off	Normal	Normal	Normal	Normal	42	40
-0.25	Complete	Off	Normal	Normal	Normal	Normal	42	40

**Pre-Crash Data -5 to 0 Sec (Part II - 250 msec) (Most Recent Event - Deployment) -  
Table 2 of 3**

Time (sec)	Tire Pressure, LR (psi)	Tire Pressure, RR (psi)	Cruise Control Status	Cruise Control Engaged	ETC Lamp	ETC Flashing	Reverse gear (MTX)	Gear Position (ATX)
-5.00	41	41	Off	Not Engaged	Off	No	Not Reverse	Drive
-4.75	41	41	Off	Not Engaged	Off	No	Not Reverse	Drive
-4.50	41	41	Off	Not Engaged	Off	No	Not Reverse	Drive
-4.25	41	41	Off	Not Engaged	Off	No	Not Reverse	Drive
-4.00	41	41	Off	Not Engaged	Off	No	Not Reverse	Drive
-3.75	41	41	Off	Not Engaged	Off	No	Not Reverse	Drive
-3.50	41	41	Off	Not Engaged	Off	No	Not Reverse	Drive
-3.25	41	41	Off	Not Engaged	Off	No	Not Reverse	Drive
-3.00	41	41	Off	Not Engaged	Off	No	Not Reverse	Drive
-2.75	41	41	Off	Not Engaged	Off	No	Not Reverse	Drive
-2.50	41	41	Off	Not Engaged	Off	No	Not Reverse	Drive
-2.25	41	41	Off	Not Engaged	Off	No	Not Reverse	Drive
-2.00	41	41	Off	Not Engaged	Off	No	Not Reverse	Drive
-1.75	41	41	Off	Not Engaged	Off	No	Not Reverse	Drive
-1.50	41	41	Off	Not Engaged	Off	No	Not Reverse	Drive
-1.25	41	41	Off	Not Engaged	Off	No	Not Reverse	Drive
-1.00	41	41	Off	Not Engaged	Off	No	Not Reverse	Drive
-0.75	41	41	Off	Not Engaged	Off	No	Not Reverse	Drive
-0.50	41	41	Off	Not Engaged	Off	No	Not Reverse	Drive
-0.25	41	41	Off	Not Engaged	Off	No	Not Reverse	Drive

**Pre-Crash Data -5 to 0 Sec (Part II - 250 msec) (Most Recent Event - Deployment) -  
Table 3 of 3**

<b>Time (sec)</b>	<b>PCM MIL</b>	<b>Raw Manifold Pressure (kPa)</b>
-5.00	Off	94.4
-4.75	Off	91.2
-4.50	Off	92.8
-4.25	Off	93.6
-4.00	Off	93.6
-3.75	Off	93.6
-3.50	Off	93.6
-3.25	Off	94.4
-3.00	Off	96.0
-2.75	Off	95.2
-2.50	Off	95.2
-2.25	Off	94.4
-2.00	Off	94.4
-1.75	Off	94.4
-1.50	Off	93.6
-1.25	Off	91.2
-1.00	Off	80.8
-0.75	Off	48.0
-0.50	Off	32.8
-0.25	Off	26.4



71 01 03 01 01 19 CC 07 48 18 4D B0 3F 3C 17 11 00 00 5B 36 43 00 2A 33  
71 01 03 01 01 1A CC 07 42 18 4D B1 3F 3C 16 F3 00 00 5A 37 43 00 2B 34  
71 01 03 01 01 1B CC 07 4C 18 4B B3 3F 3C 16 D0 00 00 5A 37 43 00 2B 34  
71 01 03 01 01 1C CC 07 D3 18 4B B3 3F 3B 16 A5 00 00 59 37 40 00 2B 34  
71 01 03 01 01 1D CC 08 53 18 4A B4 3F 3B 16 8A 00 00 59 37 3F 00 2B 32  
71 01 03 01 01 1E CC 08 DF 18 4A B4 3F 3B 16 6B 00 00 59 38 3E 00 2B 31  
71 01 03 01 01 1F CC 09 00 18 4A B4 3F 3A 16 51 00 00 58 38 3E 00 2C 31  
71 01 03 01 01 20 CC 09 16 18 4A B4 3F 3A 16 3E 00 00 58 37 3E 00 2B 31  
71 01 03 01 01 21 CC 09 15 18 48 B6 3F 3A 16 25 00 00 57 37 3E 00 2B 31  
71 01 03 01 01 22 CC 09 02 18 47 B7 3F 3A 16 00 00 00 57 38 3D 00 2C 30  
71 01 03 01 01 23 CC 08 ED 18 47 B7 3F 39 15 E7 00 00 56 38 3C 00 2B 2E  
71 01 03 01 01 24 CC 08 E7 18 4D B0 3F 39 15 C8 00 00 55 38 3B 00 2C 2D  
71 01 03 01 01 25 CC 08 E5 18 4C B1 3F 39 15 A1 00 00 55 38 38 00 2B 34  
71 01 03 01 01 26 CC 08 D6 18 4C B2 3F 39 15 7C 00 00 54 38 43 00 2F 34  
71 01 03 01 01 27 CC 08 DF 18 4B B3 3F 38 15 53 00 00 53 3D 42 00 2F 33  
71 01 03 01 01 28 CC 08 C8 18 48 B5 3F 38 15 1E 00 00 52 3D 41 00 30 33  
71 01 03 01 01 29 CC 08 BB 18 47 B7 3F 37 14 F9 00 00 51 3E 40 00 31 30  
71 01 03 01 01 2A CC 08 BD 18 46 B8 3F 37 14 CA 00 00 51 3F 3D 00 31 2E  
71 01 03 01 01 2B CC 08 B1 18 49 B5 3F 37 14 9C 00 00 50 3F 3B 00 31 2D  
71 01 03 01 01 2C CC 08 B6 18 50 AE 3F 37 14 62 00 00 4F 3F 39 00 30 2D  
71 01 03 01 01 2D CC 08 E1 18 55 A8 3F 37 14 31 00 00 4E 3E 3B 00 31 35  
71 01 03 01 01 2E CC 08 F6 18 58 A6 3F 37 13 F7 00 00 4C 40 44 00 34 3B  
71 01 03 01 01 2F CC 08 E6 18 57 A7 3F 38 13 B1 00 00 4B 43 4C 00 37 3D  
71 01 03 01 01 30 CC 08 D3 18 57 A7 3F 38 13 73 00 00 4A 47 51 00 39 3F  
71 01 03 01 01 31 CC 08 C8 18 57 A7 3F 38 13 2A 00 00 49 4B 51 00 3B 3E  
71 01 03 01 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  
71 01 03 01 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  
71 01 03 01 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  
71 01 03 01 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  
71 01 03 01 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  
71 01 03 01 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  
71 01 03 01 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  
71 01 03 01 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  
71 01 03 01 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF









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71 01 03 05 01 00 CC 00 00 00 C0 52 41 84 9F 81 02 69 02 A1 02 9A 02 94 14 0A 07 9C 08 64  
08 6F 07 8D 01 38 00 FF 0F 00 FF 00 00 00 00 D4 01 03 00 EE 00 DB 00 88 00 7F FF 37 00 07 0F  
3F FF 1F FF 00 00 0F FF 0D F4 07 87 F0 04 00 00 FF

71 01 03 05 01 01 CC 00 00 00 C0 52 41 81 FF 81 02 8B 02 97 02 98 02 8F 14 0A 07 A8 08 47  
08 56 07 D8 01 39 00 FF 0F 00 FF 00 00 00 00 D4 01 03 00 B4 00 DB 00 88 00 7F FF 37 00 07 04  
3F FF 1F FF 00 00 0F FF 07 F6 07 96 F0 04 00 00 FF

71 01 03 05 01 02 CC 00 00 00 C0 52 41 80 7F 81 02 94 02 97 02 97 02 95 14 0A 07 B5 08 1A  
08 11 07 E9 01 39 00 FF 0F 00 FF 00 00 00 00 D4 01 03 00 C1 00 DB 00 88 00 7F FF 37 00 07 0A  
3F FF 1F FF 00 00 0F FF 02 27 07 A0 F0 04 00 00 FF

71 01 03 05 01 03 CC 00 00 00 C0 52 41 7F E9 81 02 97 02 96 02 9B 02 9C 14 0A 07 C5 07 FB  
07 EB 07 E8 01 39 00 FF 0F 00 FF 00 00 00 00 D4 01 03 00 04 00 DB 00 88 00 7F FF 37 00 07 0F  
3F FF 1F FF 00 00 0F FF 0D FA 07 BB F0 04 00 00 FF

71 01 03 05 01 04 CC 00 00 00 C0 52 41 7F 99 81 02 96 02 94 02 94 02 94 1C 0E 07 D8 07 F4  
07 EE 08 13 01 39 00 FF 0F 00 FF 00 00 00 00 D4 01 03 00 53 00 DB 00 88 00 7F FF 37 00 07 04  
3F FF 1F FF 00 00 0F FF 07 4C 07 F3 F0 04 00 00 FF

71 01 03 05 01 05 CC 00 00 00 C0 51 41 7F A9 81 02 96 02 94 02 94 02 96 1B 0D 07 F5 07 F4  
07 F8 07 F0 01 3A 00 FF 0F 00 FF 00 00 00 00 D4 01 03 00 F5 00 DB 00 88 00 7F FF 37 00 07 09  
3F FF 1F FF 00 00 0F FF 02 C8 08 48 F0 04 00 00 FF

71 01 03 05 01 06 CC 00 00 00 C0 52 41 7F C9 81 02 97 02 94 02 96 02 98 25 12 08 5A 07 F8  
07 F8 07 FC 01 3A 00 FF 0F 00 FF 00 00 00 00 D4 01 03 00 AF 00 DB 00 88 00 7F FF 37 00 07 0F  
3F FF 1F FF 00 00 0F FF 0D 4F 08 BC F0 04 00 00 FF

71 01 03 05 01 07 CC 00 00 00 C0 52 41 7F D1 81 02 97 02 97 02 99 02 98 38 1B 08 F2 07 FA  
07 FD 08 02 01 39 00 FF 0F 00 FF 00 00 00 00 D4 01 03 00 C3 00 DB 00 88 00 7F FF 37 00 07 04  
3F FF 1F FF 00 00 0F FF 07 B7 09 2B F0 04 00 00 FF

71 01 03 05 01 08 CC 00 00 00 C0 52 41 7F D9 81 02 96 02 97 02 99 02 99 3D 1E 09 53 07 FB  
08 04 08 0D 01 3A 00 FF 0F 00 FF 00 00 00 00 D4 01 03 00 26 00 DB 00 88 00 7F FF 37 00 07 09  
3F FF 1F FF 00 00 0F FF 02 26 09 75 F0 04 00 00 FF

71 01 03 05 01 09 CC 00 00 00 C0 52 41 7F D9 81 02 93 02 93 02 98 02 98 3F 1F 09 8A 07 FC  
07 F7 08 16 01 39 00 FF 0F 00 FF 00 00 00 00 D4 01 03 00 B2 00 DB 00 88 00 7F FF 37 00 07 0F  
3F FF 1F FF 00 00 0F FF 0D C0 09 A9 F0 04 00 00 FF

71 01 03 05 01 0A CC 00 00 00 C0 52 41 7F C9 81 02 91 02 90 02 96 02 95 42 21 09 B6 07 F8  
07 F3 08 10 01 3A 00 FF 0F 00 FF 00 00 00 00 D4 01 03 00 43 00 DB 00 88 00 7F FF 37 00 07 04  
3F FF 1F FF 00 00 0F FF 07 41 09 E5 F0 04 00 00 FF

71 01 03 05 01 0B CC 00 00 00 C0 52 41 7F B9 81 02 8F 02 8F 02 92 02 94 44 22 09 E4 07 F8  
07 F9 08 16 01 3A 00 FF 0F 00 FF 00 00 00 00 D4 01 03 00 01 00 DB 00 88 00 7F FF 37 00 07 09  
3F FF 1F FF 00 00 0F FF 02 06 09 F8 F0 04 00 00 FF

71 01 03 05 01 0C CC 00 00 00 C0 52 41 7F B1 81 02 8E 02 8C 02 92 02 90 45 22 09 EC 07 F9  
08 01 08 1B 01 3A 00 FF 0F 00 FF 00 00 00 00 D4 01 03 00 95 00 DB 00 88 00 7F FF 37 00 07 0F  
3F FF 1F FF 00 00 0F FF 0C 4F 09 F7 F0 04 00 00 FF

71 01 03 05 01 0D CC 00 00 00 C0 52 41 7F B9 81 02 8A 02 8A 02 8E 02 8F 45 22 09 F4 07 F6  
08 00 08 1E 01 3A 00 FF 0F 00 FF 00 00 00 00 D4 01 03 00 F9 00 DB 00 88 00 7F FF 37 00 07 04  
3F FF 1F FF 00 00 0F FF 07 52 09 FE F0 04 00 00 FF

71 01 03 05 01 0E CC 00 00 00 C0 52 41 7F E9 81 02 87 02 87 02 8D 02 8C 45 22 09 F4 07 F9  
07 FD 08 18 01 3A 00 FF 0F 00 FF 00 00 00 00 D4 01 03 00 9C 00 DB 00 88 00 7F FF 37 00 07 09  
3F FF 1F FF 00 00 0F FF 02 C2 09 FF F0 04 00 00 FF

71 01 03 05 01 0F CC 00 00 00 C0 51 41 7F D1 81 02 85 02 86 02 8B 02 89 45 22 09 F7 07 FB  
08 02 08 21 01 3A 00 FF 0F 00 FF 00 00 00 00 D4 01 03 00 45 00 DB 00 88 00 7F FF 37 00 07 0E

3F FF 1F FF 00 00 0F FF 0C 2B 09 FE F0 04 00 00 FF  
71 01 03 05 01 10 CC 00 00 00 C0 51 41 7F C1 81 02 82 02 81 02 85 02 86 45 22 09 F8 07 F9  
08 06 08 27 01 3A 00 FF 0F 00 FF 00 00 00 D4 01 03 00 C7 00 DB 00 88 00 7F FF 37 00 07 04  
3F FF 1F FF 00 00 0F FF 07 94 0A 02 F0 04 00 00 FF  
71 01 03 05 01 11 CC 00 00 00 C0 52 41 7F B1 81 02 7E 02 7C 02 82 02 84 45 22 09 F5 07 F7  
07 FB 08 11 01 3A 00 FF 0F 00 FF 00 00 00 D4 01 03 00 F1 00 DB 00 88 00 7F FF 37 00 07 09  
3F FF 1F FF 00 00 0F FF 02 89 0A 09 F0 04 00 00 FF  
71 01 03 05 01 12 CC 00 00 00 C0 51 41 7F B1 81 02 7D 02 7C 02 7F 02 81 46 22 09 FC 07 F4  
08 02 08 18 01 3A 00 FF 0F 00 FF 00 00 00 D4 01 03 00 B5 00 DB 00 88 00 7F FF 37 00 07 0E  
3F FF 1F FF 00 00 0F FF 0C A5 0A 0B F0 04 00 00 FF  
71 01 03 05 01 13 CC 00 00 00 C0 51 41 7F E1 81 02 7C 02 7B 02 7E 02 7E 46 22 09 FD 07 FA  
08 08 08 23 01 39 00 FF 0F 00 FF 00 00 00 D4 01 03 00 B3 00 DB 00 88 00 7F FF 37 00 07 04  
3F FF 1F FF 00 00 0F FF 07 CB 0A 0F F0 04 00 00 FF  
71 01 03 05 01 14 CC 00 00 00 C0 52 41 7F F1 81 02 76 02 76 02 7D 02 7C 47 23 09 FC 08 00  
07 F6 08 1A 01 39 00 FF 0F 00 FF 00 00 00 D4 01 03 00 EC 00 DB 00 88 00 7F FF 37 00 07 09  
3F FF 1F FF 00 00 0F FF 02 63 0A 04 F0 04 00 00 FF  
71 01 03 05 01 15 CC 00 00 00 C0 51 41 7F 99 81 02 72 02 70 02 78 02 78 45 22 09 FB 07 F4  
07 F6 08 28 01 39 00 FF 0F 00 FF 00 00 00 D4 01 03 00 35 00 DB 00 88 00 7F FF 37 00 07 0E  
3F FF 1F FF 00 00 0F FF 0C A9 0A 1A F0 04 00 00 FF  
71 01 03 05 01 16 CC 00 00 00 C0 52 41 7F 91 81 02 6F 02 6D 02 76 02 75 48 24 0A 0C 07 F0  
07 FE 08 24 01 39 00 FF 0F 00 FF 00 00 00 D4 01 03 00 3B 00 DB 00 88 00 7F FF 37 00 07 04  
3F FF 1F FF 00 00 0F FF 07 4A 0A 2A F0 04 00 00 FF  
71 01 03 05 01 17 CC 00 00 00 C0 52 41 7F C9 81 02 6B 02 6C 02 72 02 72 48 24 0A 22 07 FB  
08 13 08 2E 01 39 00 FF 0F 00 FF 00 00 00 D4 01 03 00 37 00 DB 00 88 00 7F FF 37 00 07 09  
3F FF 1F FF 00 00 0F FF 02 BE 0A 29 F0 04 00 00 FF  
71 01 03 05 01 18 CC 00 00 00 C0 51 41 7F E9 81 02 69 02 6A 02 70 02 6F 49 24 0A 22 07 FB  
08 16 08 22 01 39 00 FF 0F 00 FF 00 00 00 D4 01 03 00 6E 00 DB 00 88 00 7F FF 37 00 07 0E  
3F FF 1F FF 00 00 0F FF 0C E1 0A 34 F0 04 00 00 FF  
71 01 03 05 01 19 CC 00 00 00 C0 52 41 80 00 81 02 64 02 64 02 6B 02 6B 49 24 0A 2A 07 FF  
08 09 08 1E 01 39 00 FF 0F 00 FF 00 00 00 D4 01 03 00 62 00 DB 00 88 00 7F FF 37 00 07 03  
3F FF 1F FF 00 00 0F FF 07 1B 0A 22 F0 04 00 00 FF  
71 01 03 05 01 1A CC 00 00 00 C0 52 41 7F C9 81 02 62 02 61 02 68 02 67 49 24 0A 24 07 FC  
08 07 08 24 01 39 00 FF 0F 00 FF 00 00 00 D4 01 03 00 C3 00 DB 00 88 00 7F FF 37 00 07 09  
3F FF 1F FF 00 00 0F FF 02 F9 09 C0 F0 04 00 00 FF  
71 01 03 05 01 1B CC 00 00 00 C0 51 41 7F A9 81 02 5E 02 5C 02 60 02 62 49 24 0A 20 07 F8  
07 FC 08 21 01 3A 00 FF 0F 00 FF 00 00 00 D4 01 03 00 1B 00 DB 00 88 00 7F FF 37 00 07 0E  
3F FF 1F FF 00 00 0F FF 0C 04 09 96 F0 04 00 00 FF  
71 01 03 05 01 1C CC 00 00 00 C0 52 41 7F A1 81 02 5B 02 5A 02 5F 02 5F 49 24 0A 1B 07 F4  
07 F8 08 19 01 3A 00 FF 0F 00 FF 00 00 00 D4 01 03 00 7E 00 DB 00 88 00 7F FF 37 00 07 03  
3F FF 1F FF 00 00 0F FF 07 04 09 9F F0 04 00 00 FF  
71 01 03 05 01 1D CC 00 00 00 C0 51 41 7F B9 81 02 59 02 57 02 5C 02 5C 4A 24 0A 1F 07 F6  
07 FE 08 12 01 3A 00 FF 0F 00 FF 00 00 00 D4 01 03 00 C2 00 DB 00 88 00 7F FF 37 00 07 09  
3F FF 1F FF 00 00 0F FF 01 92 09 AF F0 04 00 00 FF  
71 01 03 05 01 1E CC 00 00 00 C0 52 41 7F D1 81 02 57 02 56 02 5A 02 5A 49 24 0A 16 07 FA  
08 01 08 1D 01 3B 00 FF 0F 00 FF 00 00 00 D4 01 03 00 8E 00 DB 00 88 00 7F FF 37 00 07 0E  
3F FF 1F FF 00 00 0F FF 0C 84 0A 12 F0 04 00 00 FF  
71 01 03 05 01 1F CC 00 00 00 C0 52 41 7F D1 81 02 52 02 51 02 59 02 58 49 24 0A 13 07 F7  
08 04 08 26 01 3B 00 FF 0F 00 FF 00 00 00 D4 01 03 00 D1 00 DB 00 88 00 7F FF 37 00 07 03  
3F FF 1F FF 00 00 0F FF 07 4C 0A 25 F0 04 00 00 FF  
71 01 03 05 01 20 CC 00 00 00 C0 51 41 7F C9 81 02 4E 02 4E 02 55 02 55 4A 24 0A 1E 07 F9

08 01 08 23 01 3B 00 FF 0F 00 FF 00 00 00 D4 01 03 00 F3 00 DB 00 88 00 7F FF 37 00 07 08  
3F FF 1F FF 00 00 0F FF 01 DA 0A 25 F0 04 00 00 FF

71 01 03 05 01 21 CC 00 00 00 C0 51 41 7F C9 81 02 4B 02 4B 02 51 02 51 49 24 0A 1C 07 FA  
08 03 08 22 01 3C 00 FF 0F 00 FF 00 00 00 D4 01 03 00 D9 00 DB 00 88 00 7F FF 37 00 07 0E  
3F FF 1F FF 00 00 0F FF 0C 01 0A 1B F0 04 00 00 FF

71 01 03 05 01 22 CC 00 00 00 C0 52 41 7F C1 81 02 47 02 47 02 4C 02 4F 4A 24 0A 1F 07 F6  
08 00 08 23 01 3D 00 FF 0F 00 FF 00 00 00 D4 01 03 00 C8 00 DB 00 88 00 7F FF 37 00 07 03  
3F FF 1F FF 00 00 0F FF 07 BB 0A 1D F0 04 00 00 FF

71 01 03 05 01 23 CC 00 00 00 C0 52 41 7F C9 81 02 43 02 44 02 4A 02 4A 49 24 0A 23 07 FA  
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3F FF 1F FF 00 00 0F FF 01 D2 0A 35 F0 04 00 00 FF

71 01 03 05 01 24 CC 00 00 00 C0 52 41 7F D9 81 02 3E 02 3F 02 46 02 46 4C 26 0A 2D 07 FB  
08 02 08 36 01 3D 00 FF 0F 00 FF 00 00 00 D4 01 03 00 97 00 DB 00 88 00 7F FF 37 00 07 0E  
3F FF 1F FF 00 00 0F FF 0C E4 0A 66 F0 04 00 00 FF

71 01 03 05 01 25 CC 00 00 00 C0 52 41 7F C9 81 02 3A 02 3B 02 42 02 41 4E 26 0A 59 07 FA  
07 F8 08 3A 01 3E 00 FF 0F 00 FF 00 00 00 D4 01 03 00 93 00 DB 00 88 00 7F FF 37 00 07 03  
3F FF 1F FF 00 00 0F FF 07 D1 0A 6C F0 04 00 00 FF

71 01 03 05 01 26 CC 00 00 00 C0 51 41 7F A1 81 02 36 02 33 02 39 02 3B 4E 26 0A 57 07 F4  
08 0B 08 31 01 3E 00 FF 0F 00 FF 00 00 00 D4 01 03 00 45 00 DB 00 88 00 7F FF 37 00 07 08  
3F FF 1F FF 00 00 0F FF 01 F5 0A 6F F0 04 00 00 FF

71 01 03 05 01 27 CC 00 00 00 C0 52 41 7F D9 81 02 2F 02 30 02 36 02 36 4F 27 0A 65 07 F9  
08 01 08 30 01 3F 00 FF 0F 00 FF 00 00 00 D4 01 03 00 2E 00 DB 00 88 00 7F FF 37 00 07 0E  
3F FF 1F FF 00 00 0F FF 0C A3 0A 6B F0 04 00 00 FF

71 01 03 05 01 28 CC 00 00 00 C0 52 41 7F D1 81 02 2C 02 2C 02 32 02 32 4F 27 0A 67 07 FA  
08 08 08 3D 01 3F 00 FF 0F 00 FF 00 00 00 D4 01 03 00 CB 00 DB 00 88 00 7F FF 37 00 07 03  
3F FF 1F FF 00 00 0F FF 07 87 0A 6A F0 04 00 00 FF

71 01 03 05 01 29 CC 00 00 00 C0 51 41 7F D1 81 02 26 02 27 02 2D 02 2C 4F 27 0A 6C 07 F9  
08 00 08 2E 01 40 00 FF 0F 00 FF 00 00 00 D4 01 03 00 A7 00 DB 00 88 00 7F FF 37 00 07 08  
3F FF 1F FF 00 00 0F FF 01 30 0A 75 F0 04 00 00 FF

71 01 03 05 01 2A CC 00 00 00 C0 52 41 7F D9 81 02 21 02 20 02 26 02 26 4F 27 0A 64 07 F9  
07 FE 08 3F 01 41 00 FF 0F 00 FF 00 00 00 D4 01 03 00 79 00 DB 00 88 00 7F FF 37 00 07 0D  
3F FF 1F FF 00 00 0F FF 0C 7E 0A 8B F0 04 00 00 FF

71 01 03 05 01 2B CC 00 00 00 C0 52 41 7F F1 81 02 19 02 1A 02 22 02 20 4F 27 0A 66 07 FC  
08 00 08 4C 01 41 00 FF 0F 00 FF 00 00 00 D4 01 03 00 D6 00 DB 00 88 00 7F FF 37 00 07 03  
3F FF 1F FF 00 00 0F FF 07 B5 0A B7 F0 04 00 00 FF

71 01 03 05 01 2C CC 00 00 00 C0 52 41 7F D1 81 02 12 02 12 02 19 02 1A 51 28 0A 8D 07 FA  
08 00 08 4A 01 42 00 FF 0F 00 FF 00 00 00 D4 01 03 00 B4 00 DB 00 88 00 7F FF 37 00 07 08  
3F FF 1F FF 00 00 0F FF 01 3C 0A E4 F0 04 00 00 FF

71 01 03 05 01 2D CC 00 00 00 C0 51 41 7F E1 81 02 0A 02 0A 02 12 02 11 55 2A 0A C0 07 FD  
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3F FF 1F FF 00 00 0F FF 0C 2E 0A F7 F0 04 00 00 FF

71 01 03 05 01 2E CC 00 00 00 C0 51 41 7F D9 81 02 03 02 02 02 0A 02 0C 57 2B 0A E2 07 F9  
08 02 08 4E 01 45 00 FF 0F 00 FF 00 00 00 D4 01 03 00 29 00 DB 00 88 00 7F FF 37 00 07 03  
3F FF 1F FF 00 00 0F FF 06 BD 0A FB F0 04 00 00 FF

71 01 03 05 01 2F CC 00 00 00 C0 51 41 7F F9 81 01 FB 01 FB 02 03 02 02 59 2C 0A F7 07 FE  
08 03 08 4D 01 4C 00 FF 0F 00 FF 00 00 00 D4 01 03 00 56 00 DB 00 88 00 7F FF 37 00 07 08  
3F FF 1F FF 00 00 0F FF 01 5E 0A F8 F0 04 00 00 FF

71 01 03 05 01 30 CC 00 00 00 C0 52 41 7F E9 81 01 F3 01 F2 01 FA 01 FA 59 2C 0A F6 07 FD  
08 09 08 4E 01 4F 00 FF 0F 00 FF 00 00 00 D4 01 03 00 F2 00 DB 00 88 00 7F FF 37 00 07 0D  
3F FF 1F FF 00 00 0F FF 0C 00 0B 00 F0 04 00 00 FF













FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  
71 01 03 06 01 00 CC 7F 3F FF F0 01 19 91 08 97 0F 00 2A 28 29 29 FF 44 07 FF 41 00 00 01  
00 55 60 21 01 AE 0F 00 44 0C 05 FF FF 1F FF FF 1F BF FF 0F 18 FF FF FF FF FF FF C3 10 07  
FC 00 00 00 FF FF 00 22 00 00 1C 00 00 00 80 FF F0  
71 01 03 06 01 01 CC 7F 3F FF F0 01 19 91 08 97 0F 00 2A 28 29 29 FF 44 07 FF 41 00 00 01  
00 55 60 29 01 E7 0F 00 44 0C 05 FF FF 1F FF FF 1F BF FF 0F 18 FF FF FF FF FF FF C3 10 07  
FC 00 00 00 FF FF 00 27 00 00 1C 00 00 00 80 FF F0  
71 01 03 06 01 02 CC 7F 3F FF F0 01 19 91 08 97 0F 00 2A 28 29 29 FF 44 07 FF 41 00 00 01  
00 55 60 3C 03 89 0F 00 44 0C 05 FF FF 1F FF FF 1F BF FF 0F 18 FF FF FF FF FF FF C3 10 07  
FC 00 00 00 FF FF 00 45 00 00 1C 00 00 00 80 FF F0  
71 01 03 06 01 03 CC 7F 3F FF F0 01 19 91 08 97 0F 00 2A 28 29 29 FF 44 07 FF 41 00 00 01  
00 55 60 65 05 70 0F 00 44 0C 05 FF FF 1F FF FF 1F BF FF 0F 18 FF FF FF FF FF FF C3 10 07  
FC 00 00 00 FF FF 00 60 00 00 1C 00 00 00 80 FF F0  
71 01 03 06 01 04 CC 7F 3F FF F0 01 19 91 08 97 0F 00 2A 28 29 29 FF 44 07 FF 41 00 00 01  
00 55 60 72 07 09 0F 00 44 0C 05 FF FF 1F FF FF 1F BF FF 0F 18 FF FF FF FF FF FF C3 10 07  
FC 00 00 00 FF FF 00 74 00 00 1C 00 00 00 80 FF F0  
71 01 03 06 01 05 CC 7F 3F FF F0 01 19 91 08 97 0F 00 2A 28 29 29 FF 44 07 FF 41 00 00 01  
00 55 60 75 07 2A 0F 00 44 0C 05 FF FF 1F FF FF 1F BF FF 0F 18 FF FF FF FF FF FF C3 10 07  
FC 00 00 00 FF FF 00 75 00 00 1C 00 00 00 80 FF F0  
71 01 03 06 01 06 CC 7F 3F FF F0 01 19 91 08 97 0F 00 2A 28 29 29 FF 44 07 FF 41 00 00 01  
00 55 60 76 07 43 0F 00 44 0C 05 FF FF 1F FF FF 1F BF FF 0F 18 FF FF FF FF FF FF C3 10 07  
FC 00 00 00 FF FF 00 76 00 00 1C 00 00 00 80 FF F0  
71 01 03 06 01 07 CC 7F 3F FF F0 01 19 91 08 97 0F 00 2A 28 29 29 FF 44 07 FF 41 00 00 01  
00 55 60 76 07 4E 0F 00 44 0C 05 FF FF 1F FF FF 1F BF FF 0F 18 FF FF FF FF FF FF C3 10 07  
FC 00 00 00 FF FF 00 76 00 00 1C 00 00 00 80 FF F0  
71 01 03 06 01 08 CC 80 3F FF F0 01 19 91 08 97 0F 00 2A 28 29 29 FF 44 07 FF 41 00 00 01  
00 55 60 76 07 57 0F 00 44 0C 05 FF FF 1F FF FF 1F BF FF 0F 18 FF FF FF FF FF FF C3 10 07  
FC 00 00 00 FF FF 00 76 00 00 1C 00 00 00 80 FF F0  
71 01 03 06 01 09 CC 7F 3F FF F0 01 19 91 08 97 0F 00 2A 28 29 29 FF 43 07 FF 41 00 00 01  
00 55 60 77 07 9E 0F 00 44 0C 05 FF FF 1F FF FF 1F BF FF 0F 18 FF FF FF FF FF FF C3 10 07  
FC 00 00 00 FF FF 00 77 00 00 1C 00 00 00 80 FF F0  
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62 A0 01 00 5A 00 5E 01 9D 01 9D 00 E5 00 E3 FF FF 00 00 00 00 00 00 00 00 00 00  
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62 A0 0C 05 31 00 30 64 3C 00 10 24

62 A0 0D A3 00 ED 00 01 19 8B 44 02 75 02 30 39 38 00 00 00 00 00 00 00 00 00  
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62 A0 0E 09 17 37 36 36 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  
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62 A0 50 26 13 F5 38 00 00 00 C0 EC 1A 00 27 00 00 00 00 00 00 00 00 00 00  
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62 F1 00 00 45 01 03

62 F1 32 36 38 33 39 38 36 30 39 41 42

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62 F1 8C 54 30 33 4A 46 31 30 31 38 47 32 31 45 45

62 F1 90 31 43 34 48 4A 58 44 47 31 4A 57 2A 2A 2A 2A 2A

62 F1 A0 31 43 34 48 4A 58 44 47 31 4A 57 2A 2A 2A 2A 2A

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59 02 FB 80 02 2B AB 80 01 13 AB 80 02 13 28 80 03 13 AB 80 79 13 AB 80 7E 13 AB 80 80 13
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**National Highway  
Traffic Safety  
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