NATIONAL TRANSPORTATION SAFETY BOARD

VEHICLE FACTORS GROUP CHAIRMAN'S FACTUAL REPORT

Vehicle Attachment - Bosch Crash Data Retrieval Report

Tempe, Arizona

HWY18MH010

(16 pages)

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	YV4BC0PL5H1149667
User	Scottsdale Police Dept #831
Case Number	18-32694
EDR Data Imaging Date	03/20/2018
Crash Date	03/18/2018
Filename	YV4BC0PL5H1149667_ACM.CDRX
Saved on	Tuesday, March 20 2018 at 12:20:32
Imaged with CDR version	Crash Data Retrieval Tool 17.7
Imaged with Software Licensed to (Company Name)	Scottsdale Police Department
Reported with CDR version	Crash Data Retrieval Tool 17.7
Reported with Software Licensed to (Company Name)	Scottsdale Police Department
EDR Device Type	Airbag Control Module
Event(s) recovered	Event Record 1

Comments

Tempe PD Search Warrant on File
DLC

Data Limitations

General storage information:

- The EDR can store up to six events.
- The information stored is the same for deployment events and non-deployment events
- Deployment event data is locked after writing
    - Airbag deployment data can overwrite Other deployment data if there is no other data area available
- Non-deployment event data is unlocked
- Unlocked data can be overwritten by new data
- An event will not start capture/storage of data if there is already an ongoing event that is being captured
- An event will start a capture/storage of data if there is capture going on for an event that has finished

Data Element Sign Convention:
The following table provides an explanation of the sign notation for data elements that may be included in this CDR report.

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

Data limitations:

- All data contained in this CDR report is indicative of what information the SRS control unit has measured or received on the vehicle communication bus at and around the time of crash. Data should be examined in conjunction with all other available evidence to give a better understanding of the situation.
- All data elements have additional functional encoding, giving extra information about the data element in question when there's no data value stored:
    - 0xFF "not written" means the data element was never written (0xFF stored by default in a fresh control unit)
    - 0xFE "written but no data available" means the data element was written, but there was no information to write
    - 0xFD "not equipped" (where applicable) means the source of the information is not equipped in the car
    - 0xFC "not commanded" (where applicable) means the deployable device was never activated
- Special care has to be taken when "Complete file recorded" data element does not read "Yes". The writing process of the recorder has then not been able to run its full course, and the validity of information stored cannot be guaranteed.
- Signal information originating from other control units in the car have delays, this have to be taken into account when observing information at crash time. Examples of signals in the EDR record originating from other control units are:
    - Speed, vehicle indicated (ABS module)
    - Engine throttle (ECM module)

  - Service brake (ABS module)
  - Occupant size classification (OWS module)
- "Time to deploy" data elements are related to TimeZero, which means that they are subject to when the restraint control algorithm becomes active. This can vary from case to case and is individual to each crash situation. These times are therefore not well suited for comparison between EDR records.

11002_Volvo002_r001

System Status at Retrieval

Vehicle Identification Number	YV4BC0PL5H1149667
Application Diagnostic Database Part Number	31387255 AL
Ignition Cycle, Download	1,355
Lifetime Operating Timer (sec)	7,050,569

System Status at Event (Event Record 1)

Data Area Status, Event Record 1	Unlocked, Data Stored
Data Area Read Status, Event Record 1	Data Not Read
Complete File Recorded (Yes/No)	Yes
Multi-Event, Number of Events (1,2)	Event Number 1
Time from Preceding Event (sec)	Written but No Data Available
Maximum Delta-V, Longitudinal (MPH [km/h])	-14.9 [-24.0]
Time, Maximum Delta-V, Longitudinal (msec)	>300
Maximum Delta-V, Lateral (MPH [km/h])	-1.2 [-2.0]
Time, Maximum Delta-V, Lateral (msec)	>300

Deployment Command Data (Event Record 1)

Frontal Airbag Deployment, Time to Deploy, First Stage, Driver (msec)	Not Deployed
Frontal Airbag Deployment, Time to Deploy, First Stage, Front Passenger (msec)	Not Deployed
Frontal Airbag Deployment, Time to Deploy, Second Stage, Passenger (msec)	Not Deployed
Frontal Airbag Deployment, Time to Deploy, Third Stage, Passenger (msec)	Not Deployed
Frontal Airbag Deployment, Time to Deploy, Second Stage, Driver (msec)	Not Deployed
Frontal Airbag Deployment, Time to Deploy, Third Stage, Driver (msec)	Not Equipped
Left Side Airbag, Time to Deploy (msec)	Not Deployed
Right Side Airbag, Time to Deploy (msec)	Not Deployed
Left Side Curtain, Time to Deploy (msec)	Not Deployed
Right Side Curtain, Time to Deploy (msec)	Not Deployed
Driver Shoulder Belt Pretensioner, Time to Deploy (msec)	Not Deployed
Passenger Shoulder Belt Pretensioner, Time to Deploy (msec)	Not Deployed
Adaptive Steering Column, Time to Deploy (msec)	Not Equipped
Driver Lap Belt Pretensioner, Time to Deploy (msec)	Not Equipped
Passenger Lap Belt Pretensioner, Time to Deploy (msec)	Not Equipped
Driver Belt Load Limiter, Time to Deploy (msec)	Not Deployed
Passenger Belt Load Limiter, Time to Deploy (msec)	Not Deployed
2nd Row Right Belt Pretensioner, Time to Deploy (msec)	Not Deployed
2nd Row Middle Belt Pretensioner, Time to Deploy (msec)	Not Deployed
2nd Row Left Belt Pretensioner, Time to Deploy (msec)	Not Deployed
3rd Row Right Belt Pretensioner, Time to Deploy (msec)	Not Equipped
3rd Row Left Belt Pretensioner, Time to Deploy (msec)	Not Equipped
Driver knee airbag, time to deploy, first stage (msec)	Not Deployed
Driver knee airbag, time to deploy, second stage (msec)	Not Deployed
Passenger knee airbag, time to deploy, first stage (msec)	Not Equipped
Passenger knee airbag, time to deploy, second stage (msec)	Not Equipped

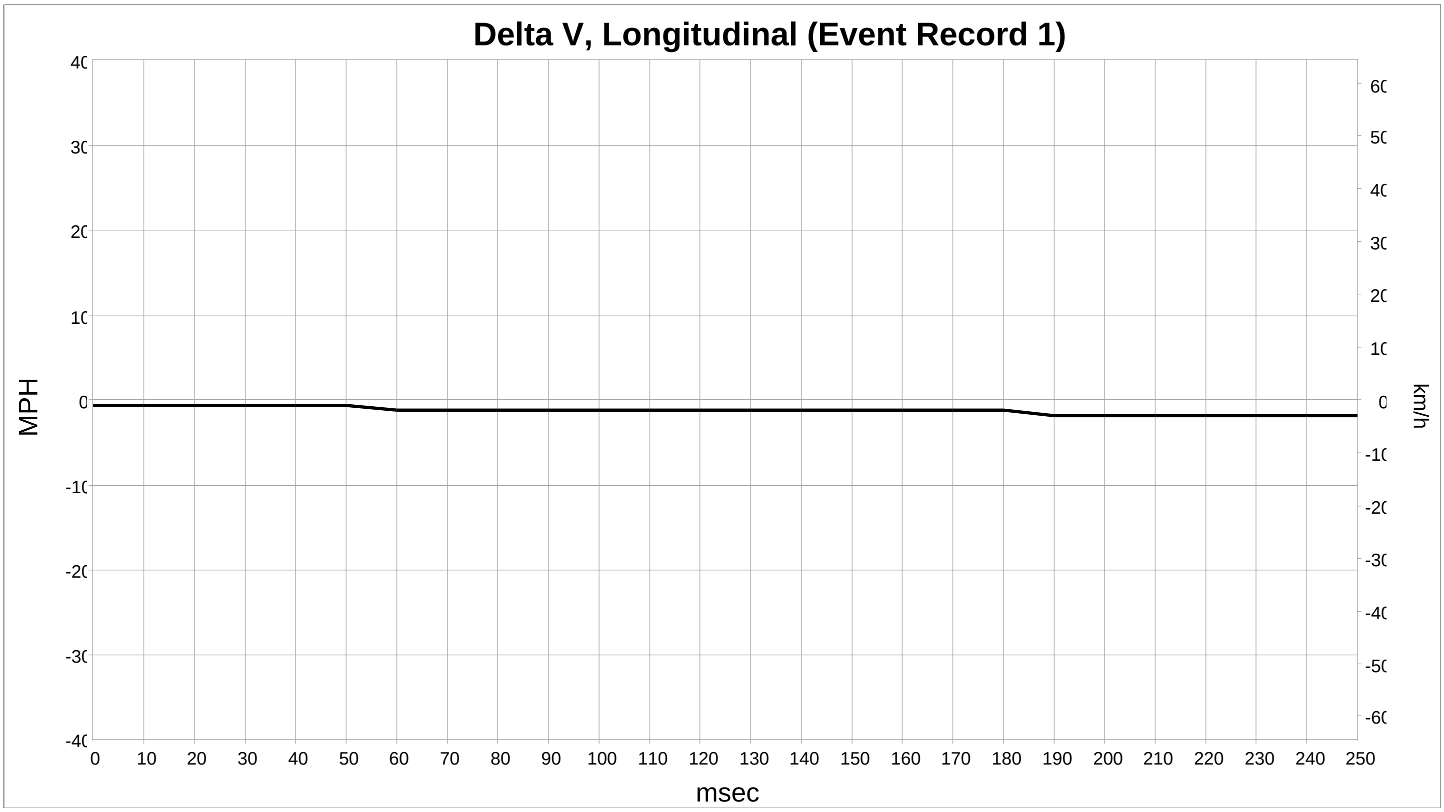
Pre-Crash Data -1 Sec (Event Record 1)

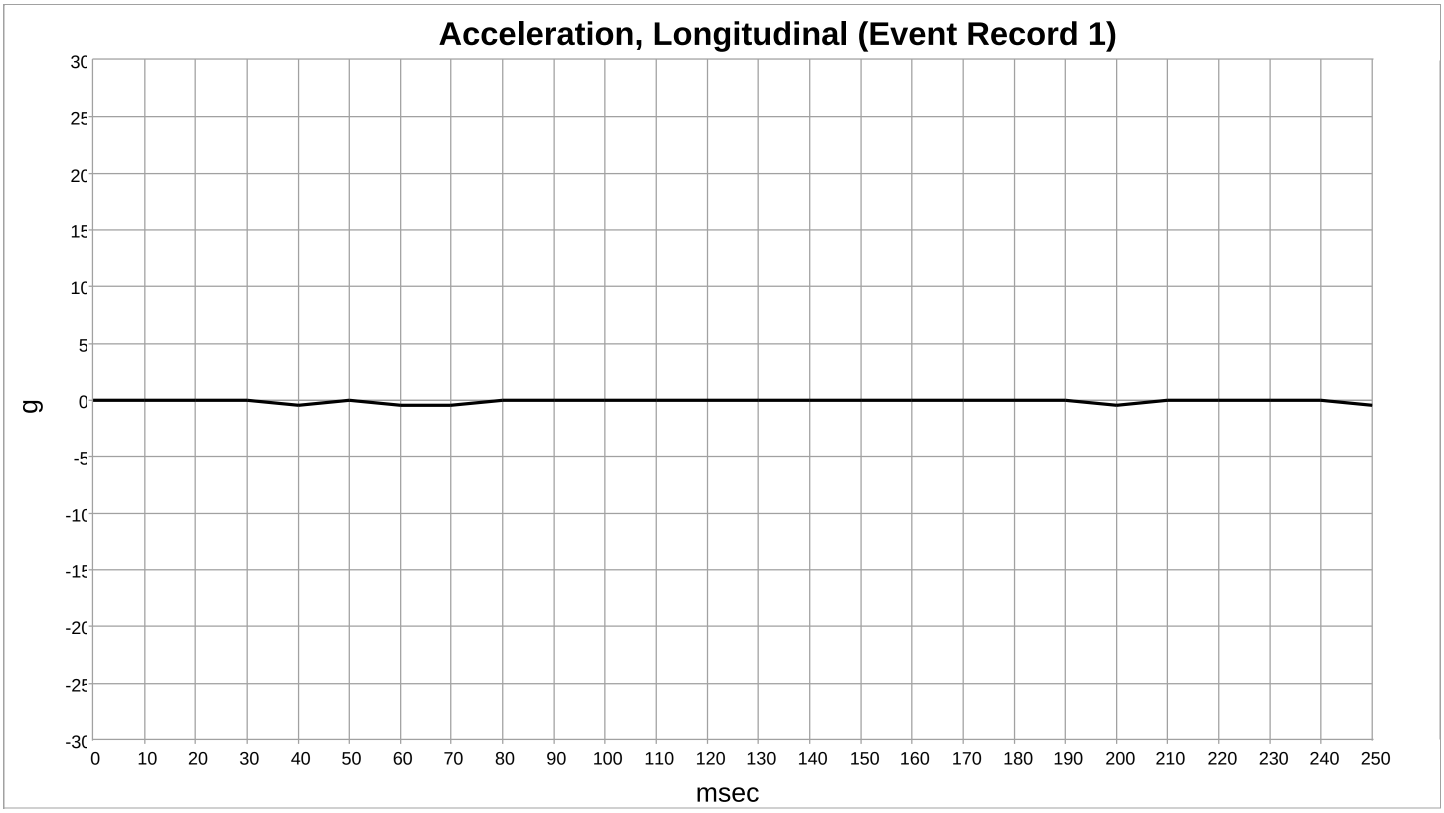
Ignition Cycle, Crash	1,350
Safety Belt Status, Driver	On, Belted
Safety Belt Status, Passenger	Off, Unbelted
Frontal Airbag Warning Lamp	Off
Frontal Airbag Suppression Switch Status, Front Passenger	Not Equipped
Seat Track Position Switch, Foremost, Status, Driver	No
Seat Track Position Switch, Foremost, Status, Front Passenger	No
Occupant Size Right Front Passenger Child	No

Pre-Crash -5 to 0 sec (Event Record 1)

Time (sec)	Speed, Vehicle Indicated (MPH [km/h])	Accelerator Pedal, % Full (%)	Service Brake (On, Off)	Steering input (%)	ABS Activity	Stability Control Status
-5.0	44.1 [71.0]	0.0	Off	0.0	Off	On
-4.5	44.1 [71.0]	0.0	Off	0.0	Off	On
-4.0	44.1 [71.0]	0.0	Off	0.0	Off	On
-3.5	43.5 [70.0]	0.0	Off	0.0	Off	On
-3.0	43.5 [70.0]	0.0	Off	0.0	Off	On
-2.5	42.9 [69.0]	0.0	Off	0.0	Off	On
-2.0	41.6 [67.0]	0.0	Off	-1.0	Off	On
-1.5	40.4 [65.0]	0.0	Off	-1.0	Off	On
-1.0	37.9 [61.0]	0.0	Off	-2.0	Off	On
-0.5	37.3 [60.0]	0.0	Off	4.0	Off	On
0.0	33.6 [54.0]	0.0	On	-2.0	Off	On

Longitudinal Crash Pulse (Event Record 1)

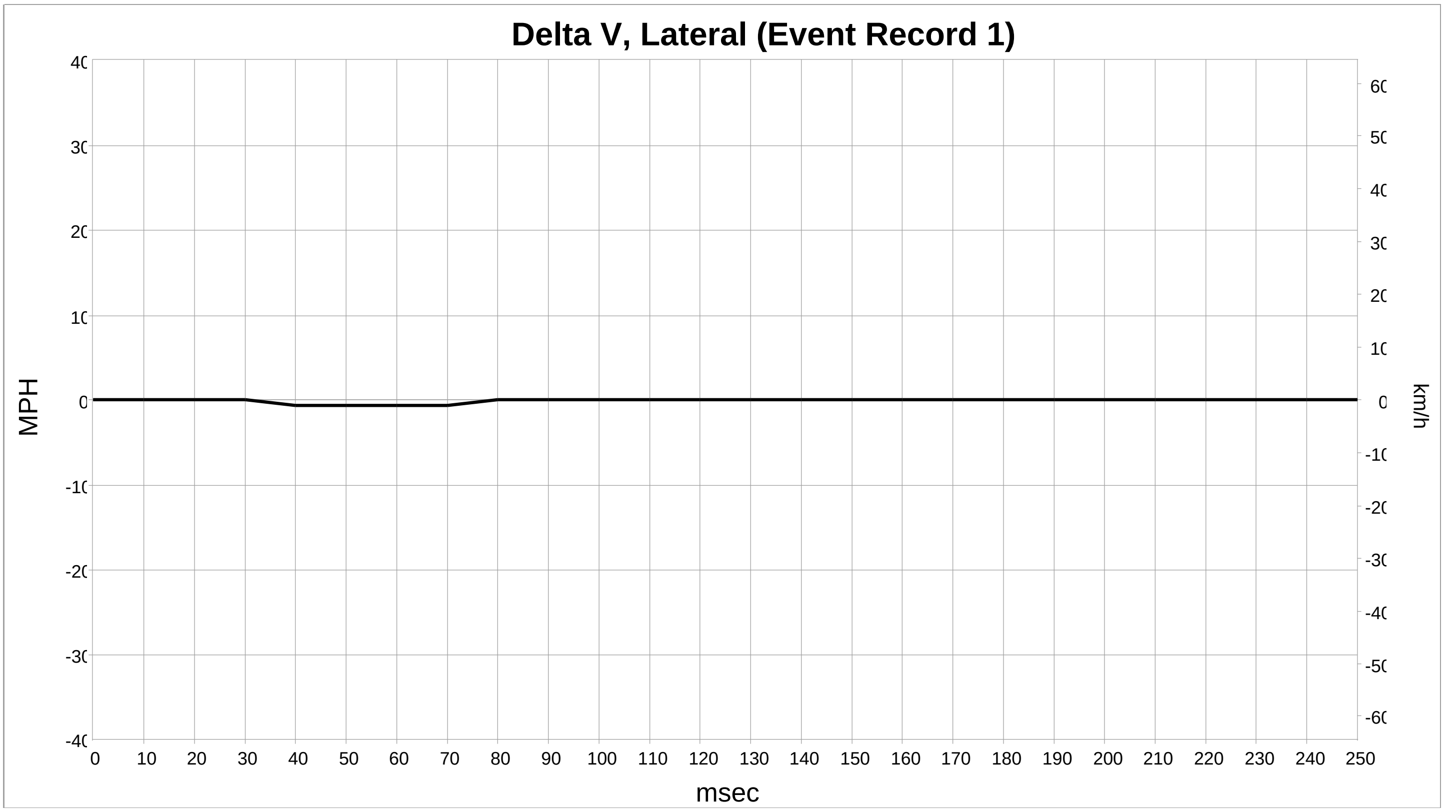


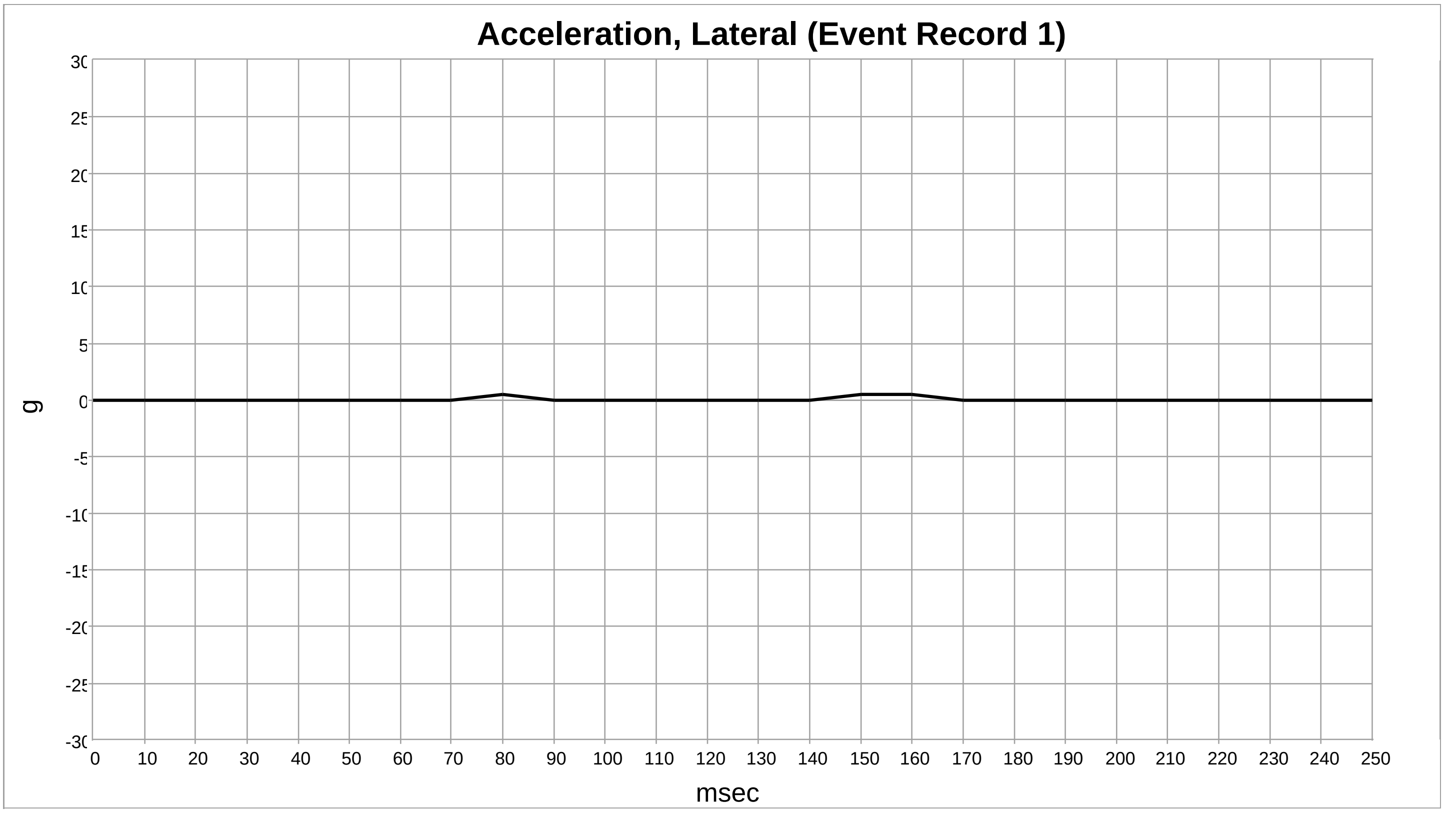


Longitudinal Crash Pulse (Event Record 1)

Time (msec)	Delta-V, Longitudinal (MPH [km/h])	Longitudinal Acceleration (g)
0	-0.6 [-1.0]	0.0
10	-0.6 [-1.0]	0.0
20	-0.6 [-1.0]	0.0
30	-0.6 [-1.0]	0.0
40	-0.6 [-1.0]	-0.5
50	-0.6 [-1.0]	0.0
60	-1.2 [-2.0]	-0.5
70	-1.2 [-2.0]	-0.5
80	-1.2 [-2.0]	0.0
90	-1.2 [-2.0]	0.0
100	-1.2 [-2.0]	0.0
110	-1.2 [-2.0]	0.0
120	-1.2 [-2.0]	0.0
130	-1.2 [-2.0]	0.0
140	-1.2 [-2.0]	0.0
150	-1.2 [-2.0]	0.0
160	-1.2 [-2.0]	0.0
170	-1.2 [-2.0]	0.0
180	-1.2 [-2.0]	0.0
190	-1.9 [-3.0]	0.0
200	-1.9 [-3.0]	-0.5
210	-1.9 [-3.0]	0.0
220	-1.9 [-3.0]	0.0
230	-1.9 [-3.0]	0.0
240	-1.9 [-3.0]	0.0
250	-1.9 [-3.0]	-0.5

Lateral Crash Pulse (Event Record 1)

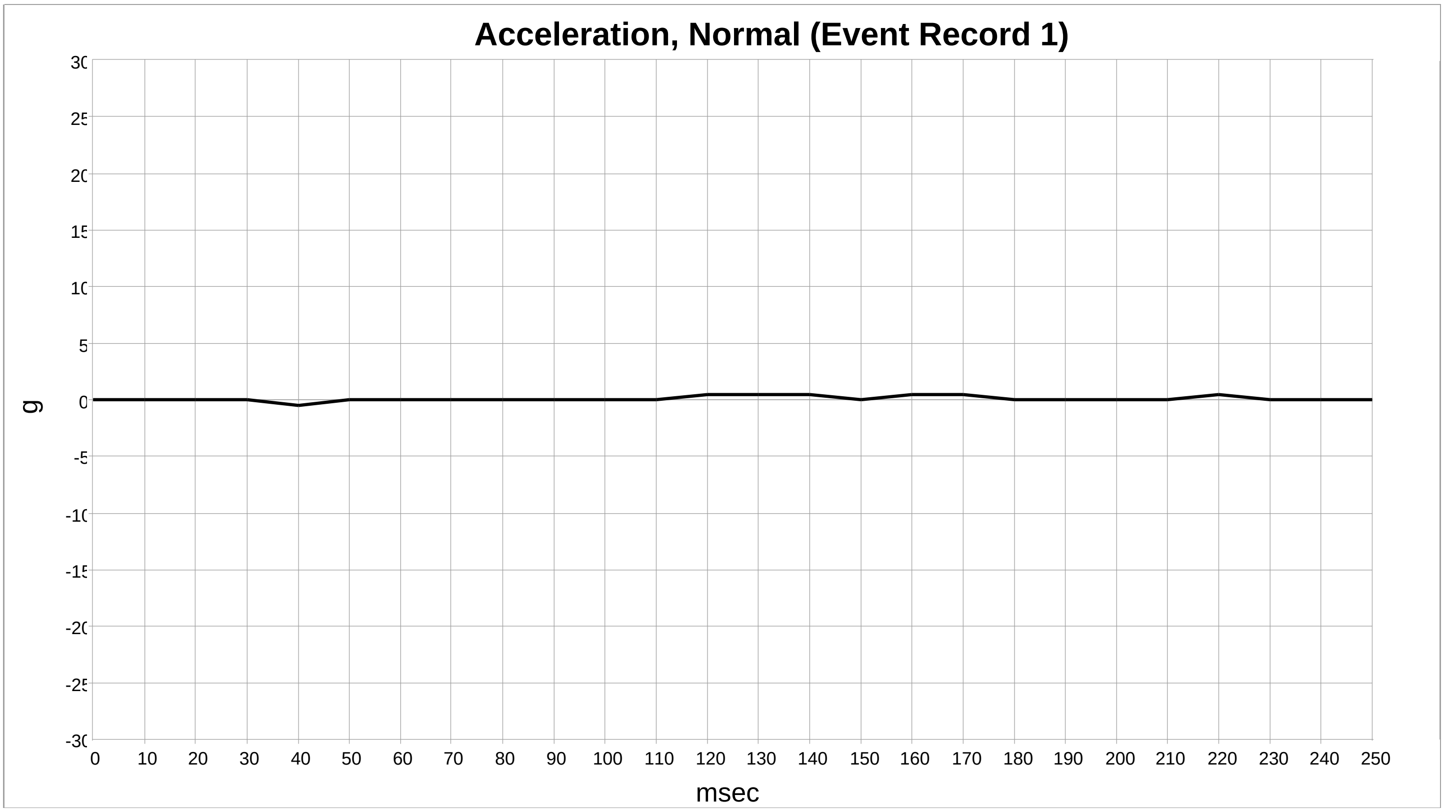




Lateral Crash Pulse (Event Record 1)

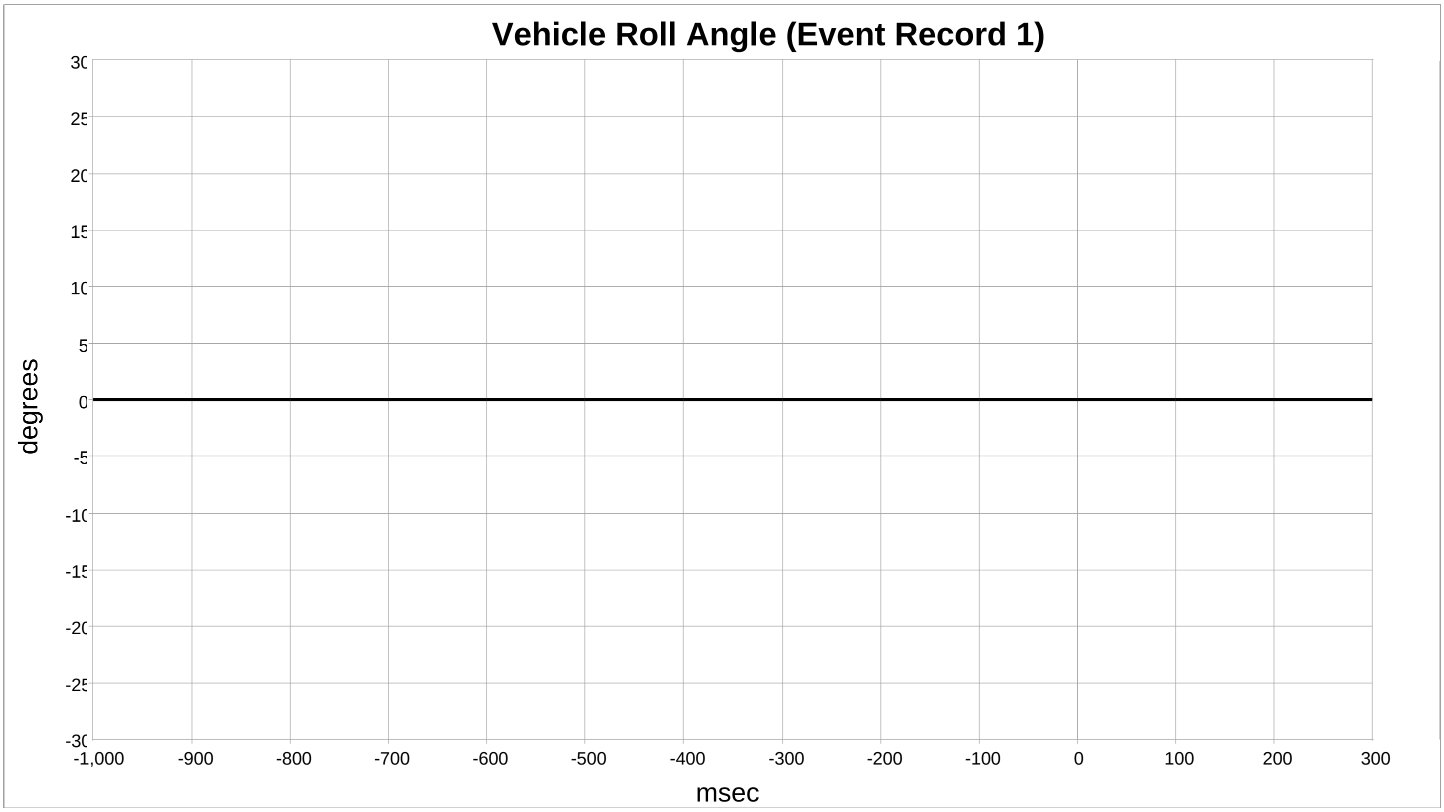
Time (msec)	Delta-V, lateral (MPH [km/h])	Lateral Acceleration (g)
0	0.0 [0.0]	0.0
10	0.0 [0.0]	0.0
20	0.0 [0.0]	0.0
30	0.0 [0.0]	0.0
40	-0.6 [-1.0]	0.0
50	-0.6 [-1.0]	0.0
60	-0.6 [-1.0]	0.0
70	-0.6 [-1.0]	0.0
80	0.0 [0.0]	0.5
90	0.0 [0.0]	0.0
100	0.0 [0.0]	0.0
110	0.0 [0.0]	0.0
120	0.0 [0.0]	0.0
130	0.0 [0.0]	0.0
140	0.0 [0.0]	0.0
150	0.0 [0.0]	0.5
160	0.0 [0.0]	0.5
170	0.0 [0.0]	0.0
180	0.0 [0.0]	0.0
190	0.0 [0.0]	0.0
200	0.0 [0.0]	0.0
210	0.0 [0.0]	0.0
220	0.0 [0.0]	0.0
230	0.0 [0.0]	0.0
240	0.0 [0.0]	0.0
250	0.0 [0.0]	0.0

Vertical Crash Pulse (Event Record 1)



Time (msec)	Normal Acceleration (g)
0	0.0
10	0.0
20	0.0
30	0.0
40	-0.5
50	0.0
60	0.0
70	0.0
80	0.0
90	0.0
100	0.0
110	0.0
120	0.5
130	0.5
140	0.5
150	0.0
160	0.5
170	0.5
180	0.0
190	0.0
200	0.0
210	0.0
220	0.5
230	0.0
240	0.0
250	0.0

Rollover Crash Pulse (Event Record 1)



Time (msec)	Vehicle Roll Angle (deg)
-1000	0.0
-900	0.0
-800	0.0
-700	0.0
-600	0.0
-500	0.0
-400	0.0
-300	0.0
-200	0.0
-100	0.0
0	0.0
100	0.0
200	0.0
300	0.0

Hexadecimal Data

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

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