NHTSA Test Reference Guide, Volume IV, Version 1: Crash Avoidance Database

November 2024

NHTSA CRASH AVOIDANCE:

Crash Avoidance Data

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This document provides information that relates specifically to how NHTSA contractors should enter data derived from the testing of the following crash avoidance (CA) technologies through the Crash Avoidance Database Portal in a JSON format or manually: Forward Collision Warning (FCW), Crash Imminent Braking (CIB), Dynamic Braking Support (DBS), Pedestrian Automatic Emergency Braking (PAEB), Lane Departure Warning (LDW), Lane Keeping Support (LKS), Blind Spot Warning (BSW), and Blind Spot Intervention (BSI). The document also provides guidance to contractors for entering Static Stability Factor (SSF) and Dynamic Rollover (DRO) information. Data properly loaded into the portal will facilitate the loading of that data into NHTSA's Crash Avoidance Database, the database in which FCW, CIB, DBS, PAEB, LDW, LKS, BSW, and BSI data, as well as future crash avoidance testing data and SSF and DRO data, will be stored and made available to the public.

File Formats and Information Records

As a primer to understanding the following sections, please review specification data types. We have categorized specification data so as to make it easier to model specification data and engineering requirements.

A specification data includes its name, type, unit, range, and order number in an information record. For convenience, it is called a field also. The field name is usually a short name of a test parameter, and it is used as the column name in the database of NHTSA. The unit is optional and predefined. All fields are described from ***General Test Information*** to ***System Performance***.

1. Field Types

- **Text –** A textual string whose content is not strictly governed by a rule, white-space, and a limited set of special characters including [ ] ( ) , : - + and _. This data type usually has a maximum length.

- **Code –** A textual string whose content is limited to a predefined set of codes that can be found through a "Search" button in a page of EntréeV6 for windows. A code has a preset length. Codes used in EntréeV6 for windows are defined by the R & D of NHTSA.

- **Integer –** An integer is expressed as one optional sign character (- or +) and one or more numeric characters, or digits, in the range from 0 – 9. The absence of a sign character implies a positive value. An integer in an EV6 file has its limits usually.

- **Real –** A real (floating point or decimal number) is expressed as one sign character (- or +), one or more numeric characters, or digits, in the range from 0 – 9, a decimal point '.', and one or more numeric characters in the range from 0 – 9. The absence of a sign character implies a positive value.

The representation of a real as a textual string may be governed by a rule that specifies a total text length for placement of the sign and decimal number, and relative sizes and format of the mantissa and exponent.

- **Date –** A textual string whose content represents a calendar date of the format 'DD/MMM/YYYY'. The maximum length of a Date is limited to 11 characters.

The 'DD' portion is the numeric day of the month, padded to a width of two (2) characters with a leading zero, in the range from 1 – 31.

The 'MMM' portion is the three-character uppercase alphabetic abbreviation of the month (e.g., 'JAN', 'FEB', 'MAR', 'APR', 'MAY', 'JUN', 'JUL', 'AUG', 'SEP', 'OCT', 'NOV', 'DEC').

The 'YYYY' portion is a four-digit year (e.g., '2006').

General Test Information

Fields defined below constitute the general test information record. A field includes its order index in the record, name, brief description, type and valid range. For example, in the first field, "**1**", "**VERNO** ", "**Version Number**", and "Pre-defined code, 2 characters" are the field's order index, its name, its brief description, and its type and range, respectively, in the general test information record. Any use of the code for "OTHER" should be explained in an appropriate commentary field. If the value or content of the field is undetermined and filling the field is not enforced, leave it blank.

1. VERNO — Version Number (mandatory)

Pre-defined code, 2 characters

VERNO should be chosen for all tests. The number of this version of the NHTSA Test Reference Guide is a special pre-assigned code (V1).

2. TITLE — Contract or Study Title (mandatory)

Text

Enter the title of the test for which data is being entered. If there is no formal title, create one that best describes and most closely relates to the test whose data you are entering. This should include a reference to the vehicle and type of technology or system being tested. As a default, the following title should be used:

[Model Year] [Make] [Model] [Technology] Test

For example: 2022 Lincoln MKX CIB Test

3. TSTOBJ — Test Objectives (mandatory)

Text

TSTOBJ is a description of the purpose of the test.

For example: Model Year 2022 New Car Assessment Program Testing

4. STTESTDATE — Test Start Date (mandatory)

Date, ISO 8601 format (YYYY-MM-DD), 10 characters

STTESTDATE is the date the test began. *This field must be filled with a valid date.* If the test was performed over several days, enter the start date and an end date. If the test was completed in one day, please enter the same date for the start and end date.

5. ENDTESTDATE — Test End Date (mandatory)

Date, ISO 8601 format (YYYY-MM-DD), 10 characters

ENDTESTDATE is the date the test was completed. *This field must be filled with a valid date.* If the test was performed over several days, enter the start date and an end date. If the test was completed in one day, please enter the same date for the start and end date.

6. TSTPRF — Test Performer (mandatory)

Code, 3 characters

TSTPRF is the code for the name of the organization performing the test.

7. TSTTYP — Test Type (mandatory)

Code, 3 characters

TSTTYP indicates the type of test conducted, such as NCA for a New Car Assessment Program test.

8. TSTCFN — Test Configuration (mandatory)

Code, variable characters

TSTCFN, or test configuration, is the type of test conducted to assess the technology. An automatic emergency braking system test would be coded as AEB, for example.

9. TSTREF — Test Reference Number (mandatory)

Text

TSTREF is an alphanumeric code number assigned to the test by the test performer.

10. CONNO — Contract Number (mandatory)

Text

CONNO is the Department of Transportation contract number assigned by the sponsoring organization.

11. SYSPERFORMOVL — Overall System Performance

Code

SYSPERFORMOVL indicates whether or not the system met the overall performance criteria. Enter “N/A” if performing a research test.

12. TSTCOM — Test Commentary (optional)

Text

TSTCOM is used to describe any peripheral test information, for which a code does not exist, including vehicle/system anomalies or test conduct problems. Consult with the NHTSA COR if there is information that should be recorded here.

Subject Vehicle Information

Fields defined below constitute the vehicle information record. A field includes its order index in the record, name, brief description, type, and valid range. For example, in the first field, "**1**", "**VEHNO** ", "**Test Vehicle Identification Number**", "integer", and "1 or 2" are its order index in the vehicle information record, its name, its brief description, its type, and its range, respectively. Any use of the code for “OTHER” should be explained in an appropriate commentary field. If the value or content of the field is undetermined and filling the field is not enforced, leave it blank.

1. VEHNO — Vehicle Number (mandatory)

Sequential integer

VEHNO is the number that identifies the test object (i.e., a real vehicle or test device). VEHNO for each real vehicle or test device will be incrementally assigned starting at “1”, which shall be designated as the Subject Vehicle. All other real vehicles and test devices (i.e., Principal Other Vehicles, test targets, etc.) will be entered on the Test Target/Principal Other Vehicle Information tab. The primary real vehicle or test device used to assess Subject Vehicle performance shall be coded as “2”. Additional real vehicles and test devices used

during testing should be coded sequentially beginning with "3" in order of proximity to the Subject Vehicle at the time the test begins.

2. NHTSANO — NHTSA Number (mandatory, if assigned)

NHTSA pre-assigned code, 9 characters, or N/A

NHTSANO is the NHTSA test vehicle numbering system, a nine-character alphanumeric identifier assigned to NHTSA-owned/operated vehicles for the purpose of tracking them through purchase or lease, testing and disposal. A pre-assigned NHTSA number accompanies all vehicles delivered for testing under NHTSA contract. Contact your NHTSA COR if you are unsure about this field.

3. YEAR — Vehicle Model Year (mandatory)

Integer

YEAR is the 4-digit model year of the vehicle (e.g., 2024).

4. MAKE — Vehicle Make (mandatory)

Code, 2 characters

MAKE is the specific brand of the vehicle. For instance, 01 represents a Chevrolet.

5. MODEL — Vehicle Model (mandatory)

Code, 2 characters

MODEL is the model of the vehicle. For example, a value of 21 represents a Bronco. A vehicle model code cannot be input unless MAKE has a valid input.

6. VEHTRIM — Vehicle Trimline (mandatory)

Text

VEHTRIM is the trimline version of the model. For example, the GMC (MAKE) Terrain (MODEL) SLT (Trimline).

7. BODY — Body Type (mandatory)

Code, 2 characters

BODY is the body type of the vehicle. For example, a four-door sedan would be coded as 4S. If the vehicle is a Tractor, enter additional information regarding the Trailer in VEHCOM.

8. VEHCLASS — Vehicle Classification (mandatory)

Code, 2 characters

VEHCLASS indicates the Subject Vehicle class. Vehicles having GVWRs ≤ 10,000 lbs shall be classified as light duty vehicles; vehicles having GVWRs ≥ 10,000 lbs and ≤ 26,000 lbs shall be classified as medium duty vehicles; and vehicles having GVWRs > 26,000 lbs shall be classified as heavy duty vehicles.

9. VEHCLASSDES — Vehicle Class Designation (mandatory)

Code, 3 characters

VEHCLASSDES indicates the Subject Vehicle class designation according to GVWR and ranges from Class 1 to Class 8 per 49 CFR 565.

10. POWERTYPE — Power Type (mandatory)

Code, 4 characters

POWERTYPE is the power or propulsion system used by the vehicle.

11.DRIVELINE — Driveline (mandatory)

Code, 3 characters

DRIVELINE describes the way the vehicle power is transferred to its wheels.

12. ENGINECONFIG — Engine Type and Configuration (optional)

Code, 4 characters

ENGINECONFIG represents the engine type of the vehicle and its configuration. 4CIF would represent a four-cylinder inline front engine. Electric vehicles should use code NAPP (not applicable) and ensure that POWERTYPE has been entered.

13. ENGDSP — Engine Displacement (optional)

Real, liters

ENGDSP indicates the engine displacement within the vehicle, measured in liters – for instance, 2.2 LITERS. Leave blank for electric vehicles.

14. TRANSM — Transmission Type (mandatory)

Code, 2 characters

TRANSM is the type of transmission in the vehicle.

15. MOTORLOC — Motor Location (mandatory)

Code, 2 characters

MOTORLOC denotes the location(s) of the motor(s) in the vehicle.

16. VIN — Manufacturer Vehicle Identification Number (mandatory)

Text

VIN (vehicle identification number) is the identification number of the vehicle that has been assigned by the manufacturer. Partial VINs (i.e., only the first 13 characters) should be entered for leased vehicles. Complete VINs (i.e., 17 characters) should be entered for purchased vehicles.

17. AUTOMATIONLEVEL — Automation Level (mandatory)

Code, 2 characters, or N/A

AUTOMATIONLEVEL is the maximum level of automation applicable to the vehicle, as defined by SAE J3016. For rollover tests, select N/A.

18. VEHREFPTX — Reference Point X-coordinate (mandatory)

Real, millimeters

VEHREFPTX is the location of a reference point to which the longitudinal location of other test data is referenced with respect to using the coordinate system specified in SAE J211.

For light vehicles, the reference point x-coordinate is defined as the rearmost point on the vehicle along the vehicle centerline. For medium duty and heavy duty vehicles, the reference point x-coordinate is defined as the front center of the front axle along the vehicle centerline. For all vehicles, the x-axis is positive forward with respect to the reference point.

19. VEHREFPTY — Reference Point Y-coordinate (mandatory)

Real, millimeters

VEHREFPTY is the lateral location of a reference point to which the lateral location of other test data is referenced with respect to using the coordinate system specified in SAE J211. For light vehicles, the reference point y-coordinate is defined as the rearmost point on the vehicle along the vehicle centerline. For medium duty and heavy duty vehicles, the reference point y-coordinate is defined as center of the front axle along the vehicle centerline. For all vehicles, the y-axis is positive to the right with respect to the reference point.

20. VEHREFPTZ — Reference Point Z-coordinate (mandatory)

Real, millimeters

VEHREFPTZ is the vertical location of a reference point to which the vertical location of other test data is referenced with respect to using the coordinate system specified in SAE J211. For light vehicles, the reference point z-coordinate is defined as the distance to the rearmost point on the vehicle at the vehicle centerline to ground. For medium duty and heavy duty vehicles, the reference point z-coordinate is defined as the mid-center of the front axle to ground along the vehicle centerline. For all vehicles, the z-axis is positive down with respect to the reference point.

21. VEHFWDX — Vehicle Forwardmost Position X-coordinate (mandatory)

Real, millimeters

VEHFWDX is the longitudinal location of the forwardmost point of the Subject Vehicle and is defined (using the coordinate system specified in SAE J211) with respect to the predefined reference point. The x-axis is positive forward with respect to the reference point.

22. VEHFWDY — Vehicle Forwardmost Position Y-coordinate (mandatory)

Real, millimeters

VEHFWDY is the lateral location of the forwardmost point of the Subject Vehicle and is defined (using the coordinate system defined in SAE J211) with respect to the predefined reference point. The y-axis is positive to the right with respect to the reference point.

23. VEHFWDZ — Vehicle Forwardmost Position Z-coordinate (mandatory)

Real, millimeters

VEHFWDZ is the vertical location of the forwardmost point of the Subject Vehicle and is defined (using the coordinate system defined in SAE J211) with respect to the predefined reference point. The z-axis is positive down with respect to the reference point.

24. VEHREARX — Vehicle Rearmost Position X-coordinate (mandatory)

Real, millimeters

VEHREARX is the longitudinal location of the rearmost point of the Subject Vehicle and is defined (using the coordinate system specified in SAE J211) with respect to the predefined reference point. The x-axis is positive forward with respect to the reference point. For light duty vehicles, the value for this field should correspond to the value for VEHREFPTX.

25. VEHREARY — Vehicle Rearmost Position Y-coordinate (mandatory)

Real, millimeters

VEHREARY is the lateral location of the rearmost point of the Subject Vehicle and is defined (using the coordinate system defined in SAE J211) with respect to the predefined reference point. The y-axis is positive to the right with respect to the reference point. For light duty vehicles, the value for this field should correspond to the value for VEHREFPTY.

26. VEHREARZ — Vehicle Rearmost Position Z-coordinate (mandatory)

Real, millimeters

VEHREARZ is the vertical location of the rearmost point of the Subject Vehicle and is defined (using the coordinate system defined in SAE J211) with respect to the predefined reference point. The z-axis is positive down with respect to the reference point. For light duty vehicles, the value for this field should correspond to the value for VEHREFPTZ.

27. VEHCGX — Vehicle Center of Gravity Position X-coordinate (mandatory)

Real, millimeters

VEHCGX is the longitudinal location of the center of gravity of the Subject Vehicle and is defined (using the coordinate system specified in SAE J211) with respect to the predefined reference point. The x-axis is positive forward with respect to the reference point.

28. VEHCGY — Vehicle Center of Gravity Position Y-coordinate (mandatory)

Real, millimeters

VEHCGY is the lateral location of the center of gravity of the Subject Vehicle and is defined (using the coordinate system defined in SAE J211) with respect to the predefined reference point. The y-axis is positive to the right with respect to the reference point.

29. VEHCGZ — Vehicle Center of Gravity Position Z-coordinate (mandatory)

Real, millimeters

VEHCGZ is the vertical location of the center of gravity of the Subject Vehicle and is defined (using the coordinate system defined in SAE J211) with respect to the predefined reference point. The z-axis is positive down with respect to the reference point.

30. VEHTWT — Vehicle Test Weight (mandatory)

Integer, kilograms, positive

VEHTWT is the measured test weight (in kilograms) of the vehicle including data acquisition, equipment, cameras, and all loads.

31. CURBWT — Vehicle Curb Weight (mandatory)

Integer, kilograms, positive

CURBWT is the total weight of the test vehicle, as delivered, in kilograms.

32. GVWR — Gross Vehicle Weight Rating (mandatory)

Integer, kilograms, positive

GVWR is the maximum weight, in kilograms, of the Subject Vehicle including passengers, cargo, fuel, and any coupled trailer (if applicable), typically defined by the vehicle manufacturer.

33. WHLBAS — Wheelbase (mandatory)

Integer, millimeters, positive

WHLBAS is the measured or published value of the total vehicle wheelbase, in millimeters, from frontmost to rearmost axles.

34. VEHLEN — Vehicle Length (mandatory)

Integer, millimeters, positive

VEHLEN is the measured or published value for the length of the vehicle, in millimeters.

35. VEHWID — Vehicle Width (mandatory)

Integer, millimeters, positive or N/A

VEHWID is the measured or published maximum width of the vehicle, in millimeters. The width of the vehicle is measured from the vertical plane of the outermost edge of the left front tire to the vertical plane of the outermost edge of the front right tire.

36. TRACKWID — Track Width (mandatory)

Real, millimeters

TRACKWID is the distance between the centerline of two wheels on the same axle. For vehicles with single tires, the distance is measured from the center of each tire. For vehicles with dual tires, the distance is measured from the center of the dual tires.

37. ODOM — Odometer Reading (mandatory)

Integer, miles, positive

ODOM is the odometer reading of the vehicle, in miles, when it is first delivered to the test lab.

38. MODIND — Vehicle Modification Indicator (optional)

Code, 1 character

MODIND is the vehicle modification indicator of the vehicle. For instance, P would indicate an unmodified production vehicle.

39. MODDSC — Description of Vehicle Modification (optional)

Text

MODDSC is the description of modifications to the vehicle. Hardware, software, sensor, or system modifications are described in this data. If the vehicle has not been modified in any way, enter UNMODIFIED.

40. VEHCOM — Vehicle Commentary (optional)

Text

VEHCOM is used to describe any special features or additional information pertaining to the Subject Vehicle. If BODY is Tractor, specify whether the attached Trailer is a standard control trailer or not, and if it is a braked or unbraked control trailer.

41. VEHTECH — Available Technologies (mandatory)

Code

VEHTECH indicates the available technologies equipped on the Subject Vehicle. Select all technologies that are equipped. Additional details for the relevant technologies shall also be entered into the Subject Vehicle System Settings table for each technology.

42. VEHTECHCOM — Vehicle Technology Commentary (optional)

Text

VEHTECHCOM is used to denote and describe any additional available technologies on the Subject Vehicle if VEHTECH is coded as OTHER.

Medium/Heavy Vehicle Information

If VEHCLASS is "Medium Duty" or "Heavy Duty" and VEHCLASSDES is 3-8, fill out this table.

1. LLVW — Lightly Loaded (Unladen) Vehicle Weight (optional)

Integer, kilograms, positive

LLVW is the weight, in kilograms, including instrumentation only.

2. BRAKETYPE — Brake Type (mandatory)

Code, 2 characters, or N/A

BRAKETYPE is the type of brake system on the Subject Vehicle. For static rollover tests, enter "N/A".

3. BRAKECOMM — Brake Commentary (optional)

Text

BRAKECOMM is used to describe any additional information about the Subject Vehicle's brake system.

4. FIFTHWHLPOSX — Fifth Wheel Position X-coordinate (mandatory)

Integer, millimeters

FIFTHWHLPOSX is the longitudinal location of the attachment point for the control trailer and is defined (using the coordinate system defined in SAE J211) with respect to the predefined reference point. The x-axis is positive forward with respect to the reference point.

5. FIFTHWHLPOSY — Fifth Wheel Position Y-coordinate (mandatory)

Integer, millimeters

FIFTHWHLPOSY is the lateral location of the attachment point for the control trailer and is defined (using the coordinate system defined in SAE J211) with respect to the predefined reference point. The y-axis is positive to the right with respect to the reference point.

6. FIFTHWHLPOSZ — Fifth Wheel Position Z-coordinate (mandatory)

Integer, millimeters

FIFTHWHLPOSZ is the vertical location of the attachment point for the control trailer and is defined (using the coordinate system defined in SAE J211) with respect to the predefined reference point. The z-axis is positive down with respect to the reference point.

Axle Information

1. AXLENO – Axle Number (mandatory)

Sequential Integer

AXLENO is the sequential number (1,2,3…) to be assigned to each axle with the frontmost axle being coded as 1.

2. AXLEWID — Axle Width (mandatory)

Real, millimeters, positive or N/A

AXLEWID is the distance between the tires for each axle. For axles with single tires, the distance is measured from the center of each tire. For axles with dual tires, the distance is

measured from the center of the dual tires.

3. AXLDIST — Distance Between Axles (mandatory)

Real, millimeters, positive or N/A

AXLDIST is the measured value, in millimeters, from the frontmost axle to the given axle. If AXLENO equals 1, code N/A.

4. GAWR — Gross Axle Weight Rating (mandatory)

Real, kilograms, positive

GAWR is the maximum weight, in kilograms, that the given axle can carry, as reported by the vehicle manufacturer.

5. AXLEWT — Axle Weight (mandatory)

Real, kilograms, positive

AXLEWT is the measured weight, in kilograms, for the given axle.

6. LEFTAXLEWT — Left Axle Weight (optional)

Real, kilograms, positive

LEFTAXLEWT is the measured weight, in kilograms, at the left tire for the given axle.

7. RIGHTAXLEWT — Right Axle Weight (optional)

Real, kilograms, positive

RIGHTAXLEWT is the measured weight, in kilograms, at the right tire for the given axle.

8. AXLEPOSX — Axle Position X-coordinate (mandatory)

Real, millimeters

AXLEPOSX is the longitudinal location of the axle and is defined (using the coordinate system defined in SAE J211) with respect to the predefined reference point. The x-axis is positive forward with respect to the reference point.

9. AXLEPOSY — Axle Position Y-coordinate (mandatory)

Real, millimeters

AXLEPOSY is the lateral location of the axle and is defined (using the coordinate system defined in SAE J211) with respect to the predefined reference point. The y-axis is positive to the right with respect to the reference point.

10. AXLEPOSZ — Axle Position Z-coordinate (mandatory)

Real, millimeters

AXLEPOSZ is the vertical location of the axle and is defined (using the coordinate system defined in SAE J211) with respect to the predefined reference point. The z-axis is positive to the down with respect to the reference point.

11. AXLETIRENUM — Axle Tire Number (mandatory)

Text

AXLETIRENUM designates the full Tire Identification Number (TIN) listed on the tires for the given axle (for example, MAL9ABCD0315).

12. TIREPRESS — Cold Tire Pressure Specification for Axle (mandatory)

Integer, psi, positive

TIREPRESS is the cold tire pressure specified by the vehicle manufacturer (typically located on the door placard) for the given axle, measured in psi.

13. BRAKEACT — Brake Actuation (mandatory)

Code

BRAKEACT is the wheel-end brake type, either drum or disc. For static rollover tests, enter "N/A".

14. OEMTIRE — OEM Tires (mandatory)

Code, 2 characters

OEMTIRE specifies whether the tires associated with the given axle are OEM tires or aftermarket.

15. TIRETYPE — Tire Type (mandatory)

Code, variable

TIRETYPE is the type of tires associated with the given axle.

16. TIRECOM – Tire Commentary (optional)

Text

TIRECOM is used to describe any additional information about the tires associated with the given axle.

Technology System Information

1. TSTCFN —Test Configuration (mandatory)

Pre-populated code, variable characters

Pre-populated field based on selection from TSTCFN in the General Test Information table.

2. SYSNAME — Marketed Name of the Technology System (mandatory)

Text

SYSNAM is the marketed name of the technology system assigned by the vehicle manufacturer. For example, the crash imminent braking system marketed name may be "Automatic Emergency Braking".

3. PACKNAME — Marketed Name of the Option Package (optional)

Text

PACKNAME is the marketed name assigned by the vehicle manufacturer of the option package that the technology system belongs to. If the technology system is standard equipment on the vehicle, then put "Not applicable".

4. SOFTVER — Software Version (mandatory)

Text

SOFTVER is the vehicle software version currently on the test vehicle.

5. TECHINOP — Is the vehicle equipped with a switch whose purpose is to render the technology inoperable? (mandatory)

Code, 1 character

TECHINOP indicates whether or not the vehicle is equipped with a switch whose purpose is to render the technology inoperable. If "Yes", provide an explanation in TECHSYSCOM.

6. RANGESET — Is the vehicle equipped with a control whose purpose is to adjust the range setting or otherwise influence the operation of the tested technology? (mandatory)

Text, or N/A

RANGESET is a description of how to adjust the range setting of the tested technology (if applicable). If the technology setting is unable to be adjusted, enter N/A.

7. TECHSYSCOM — Technology System Commentary (optional)

Text

TECHSYSCOM is used to describe any special features or additional information pertaining to the technology system.

Technology Sensor Information

1. TECHSENNO — Technology Sensor Number (mandatory)

Sequential Integer

TECHSENNO is the sequential number (1,2,3…) assigned to a sensor for a technology if there are multiple sensor types.

2. TECHSEN — Technology Sensor Type (mandatory)

Code, Various characters

TECHSEN indicates the type(s) of sensors employed by the technology system. If it is unknown whether a specific sensor is employed or not, record the sensor type here, but add a comment in TECHSENCOM to indicate the sensor's unknown employment status. For example, if a vehicle is equipped with a radar sensor but it is unknown whether the radar is employed for AEB testing, record the radar sensor here as a sensor type, and include a comment in TECHSENCOM to indicate "Unknown if radar sensor is employed by AEB system."

3. TECHSENLOC — Technology Sensor Location (mandatory)

Text

TECHSENLOC is the location(s) of the technology sensor(s). For example, the radar sensor may be located behind the front grille.

4. TECHSENAIM — Technology Sensor Aim (mandatory)

Text

TECHSENAIM is the technology sensor aim/direction. For example, if the technology sensor is a camera, indicate here whether it is forward facing, rearward facing, 360 panoramic view, etc.

5. TECHSENPOSX — Technology Sensor Position X-coordinate (mandatory)

Integer, millimeters

TECHSENPOSX is the location of the technology sensor and is defined (using the coordinate system defined in SAE J211) with respect to the predefined reference point. The x-axis is positive forward with respect to the reference point.

6. TECHSENPOSY — Technology Sensor Position Y-coordinate (mandatory)

Integer, millimeters

TECHSENPOS is the location of the technology sensor and is defined (using the coordinate system defined in SAE J211) with respect to the predefined reference point. The y-axis is positive to the right with respect to the reference point.

7. TECHSENPOSZ — Technology Sensor Position Z-coordinate (mandatory)

Integer, millimeters

TECHSENPOS is the location of the technology sensor and is defined (using the coordinate system defined in SAE J211) with respect to the predefined reference point. The z-axis is positive down with respect to the reference point.

8. TECHSENCOM — Technology Sensor Commentary (optional)

Text

TECHSENCOM is used to describe any special features or additional information pertaining to the sensor.

Alert Information

1. ALERTNO — Alert Number (mandatory)

Sequential Integer

ALERTNO is the sequential number (1,2,3…) assigned to an alert if there are multiple alerts/warnings issued for the technology.

2. ALERTMOD — Alert Modality (mandatory)

Code, 2 characters

ALERTMOD is the type of warning/alert. For example, a system may have a visual, auditory, and/or haptic warning/alert.

3. ALERTLOC — Alert Location (mandatory)

Code, 2 characters

ALERTLOC is the location of warning/alert. For example, a system may have a haptic warning/alert occur on the steering wheel.

4. MEASSOURCE — Measurement Source (mandatory)

Code, 3 characters

MEASSOURCE is the measurement source of the warning/alert. For example, CAN, microphone, accelerometer. Escalation states should be explained further in ALERTCOM.

5. ALERTCOM — Alert Comments (optional)

Text

ALERTCOM is used to describe any special features or additional information pertaining to the warning/alert. Explain MEASSOURCE further in this field. (e.g., escalation states), if applicable.

Test Target/POV Information

1. VEHNO — Vehicle Number (mandatory)

Sequential Integer

VEHNO is the number that identifies the test object (i.e., a real vehicle or test device). Since the Subject Vehicle has been designated as VEHNO "1", the primary real vehicle or test device used to assess Subject Vehicle performance shall be coded as "2". Additional real vehicles and test devices used during testing should be coded sequentially beginning with "3" in order of proximity to the Subject Vehicle at the time the test begins.

2. TSTOBJTYP — Test Object Type (mandatory)

Code, 2 characters

TSTOBJTYP indicates the type of test object (i.e., a real vehicle or test device) used to assess Subject Vehicle performance. A real vehicle or test device (e.g., vehicle target, pedestrian mannequin target, etc.) may serve as a POV or test target during testing.

3. SPECTSTOBJTYP — Specific Test Object Type (mandatory)

Code, various characters

SPECTSTOBJTYP indicates the specific type of real vehicle or test device (e.g., vehicle target, pedestrian mannequin target, etc.) serving as either a POV or test target during testing.

4. TDPRONAME — Test Device Product Name (mandatory)

Code, various characters, or N/A

TDPRONAME is the product name of the test device (e.g., SSV, GVT) serving as either a POV or test target during testing. If the POV or test target is a real vehicle, enter "Not applicable".

5. TDMAN — Test Device Manufacturer (mandatory)

Code, 2 characters, or N/A

TDMAN is the name of the test device manufacturer. If the POV or test target is a real vehicle, enter N/A.

6. TDVER — Test Device Version (mandatory)

Text

TDVER is the version description for the test device. For example, "Revision F" of the GVT. If the POV or test target is a real vehicle, enter "Not applicable".

7. TDSERNO — Test Device Serial Number (optional)

Text

TDSERNO is the identification number of the test device that has been assigned by the manufacturer. If the POV or test target is a real vehicle, enter "Not applicable".

8. TDPLAT — Test Device Platform (mandatory)

Code, 1 character or N/A

TDPLAT specifies whether a platform (i.e., propulsion system) is used to move the test device. If the POV or test target is a real vehicle, enter N/A.

9. TDPLATMAN — Test Device Platform Manufacturer (mandatory)

Code, 2 characters or N/A

TDPLATMAN is the name of the test device platform manufacturer. If the POV or test target is a real vehicle, enter N/A.

10. TDPLATPRONAME — Test Device Platform Product Name (mandatory)

Text

TDPLATPRONAME is the product name of the test device platform. If the POV or test target is a real vehicle, enter "Not applicable".

11. TDPLATVER — Test Device Platform Version (mandatory)

Text

TDPLATVER is the version of the test device platform. If the POV or test target is a real vehicle, enter "Not applicable".

12. TDARTIC — Test Device Articulation (mandatory)

Code, 3 characters or N/A

TDARTIC is the articulation status for a test device comprised of a pedestrian mannequin. If TSTDOBJTYPSPEC does not include a pedestrian mannequin (e.g., if TSTOBJTYPSPEC is SSV or GVT), enter N/A.

13. MAKE — Vehicle Make (mandatory)

Code, various characters

MAKE is the brand of the vehicle serving as either a POV or test target during testing. For instance, 01 represents a Chevrolet.

14. MODEL — Vehicle Model (mandatory)

Code, 2 characters

MODEL is the model of the vehicle serving as either a POV or test target during testing. For example, a value of 06 represents an Impala). A model code cannot be input unless MAKE has a valid input.

15. YEAR — Vehicle Model Year (mandatory)

Integer

YEAR is the model year of the vehicle serving as either a POV or test target during testing.

16. BODY — Vehicle Body Type (mandatory)

Code, 2 characters

BODY is the body type of the vehicle serving as either a POV or test target during testing. A four-door sedan would be coded as 4S.

17. VIN — Manufacturer Vehicle Identification Number (mandatory for vehicles)

Text, 13 or 17 characters

VIN (vehicle identification number) is the identification number assigned by the manufacturer for the vehicle serving as either a POV or test target during testing. This field has a 17-character limit. However, for CA test vehicles that are leased and not purchased, test contractors are not allowed to record complete VINs. They must only provide the first 13 VIN characters.

18. TSTOBJTWT — Test Object Test Weight (mandatory)

Integer, kilograms, positive

TSTOBJTWT is the measured test weight (in kilograms) of the test device or real vehicle including all payloads.

19. TSTOBJLEN — Test Object Length (mandatory)

Integer, millimeters, positive

TSTOBJLEN is the measured or published value for the length of the test device or real vehicle, in millimeters.

20. TSTOBJWID — Test Object Width (mandatory)

Integer, millimeters, positive

TSTOBJWID is the measured or published maximum width of the test device or real vehicle, in millimeters. The width of a real vehicle or vehicle target is measured from the vertical plane of the outermost edge of the left front tire to the vertical plane of the outermost edge of the front right tire.

21. TSTOBJHGT — Test Object Height (mandatory)

Integer, millimeters, positive

TSTOBJHGT is the measured or published maximum height of the test device or real vehicle, in millimeters.

22. TSTOBJREFPTX — Test Object Reference Point X-coordinate (mandatory)

Real, millimeters

TSTOBJREFPTX is the location of a reference point to which the longitudinal location of other test data is referenced with respect to using the coordinate system specified in SAE J211. For light vehicles, the reference point x-coordinate is defined as the rearmost point on the vehicle along the vehicle centerline. For medium duty and heavy duty vehicles, the reference point x-coordinate is defined as the front center of the front axle along the vehicle centerline. For all vehicles, the x-axis is positive forward with respect to the reference point

23. TSTOBJREFPTY — Test Object Reference Point Y-coordinate (mandatory)

Real, millimeters

TSTOBJREFPTY is the lateral location of a reference point to which the lateral location of other test data is referenced with respect to using the coordinate system specified in SAE J211. For light vehicles, the reference point y-coordinate is defined as the rearmost point on the vehicle along the vehicle centerline. For medium duty and heavy duty vehicles, the reference point y-coordinate is defined as center of the front axle along the vehicle centerline. For all vehicles, the y-axis is positive to the right with respect to the reference point.

24. TSTOBJREFPTZ — Test Object Reference Point Z-coordinate (mandatory)

Real, millimeters

TSTOBJREFPTZ is the vertical location of a reference point to which the vertical location of other test data is referenced with respect to using the coordinate system specified in SAE J211. For light vehicles, the reference point z-coordinate is defined as the distance to the rearmost point on the vehicle at the vehicle centerline to ground. For medium duty and heavy duty vehicles, the reference point z-coordinate is defined as the mid-center of the front axle to ground along the vehicle centerline. For all vehicles, the z-axis is positive down with respect to the reference point.

25.MODIND — Modification Indicator (mandatory)

Code, 1 character

MODIND is a marker identifying whether or not the test device or real vehicle has been previously modified.

26. MODDSC — Modification Description (mandatory)

Text

MODDSC is the description of modifications to the test device or real vehicle. If the test device or real vehicle has not been modified in any way, enter “Unmodified”.

27. SCANTYP — Scan Type (mandatory)

Code, 3 characters, or N/A

SCANTYP is the type of scan used to ensure the test device or real vehicle complies with test procedure requirements or other designated requirements (e.g., ISO) such that it should be perceived as a real pedestrian, bicycle, etc. by the Subject Vehicle, or remains undamaged, if it is a real vehicle.

28. SCANREFDAT — Scan Reference Data (mandatory)

Code, 3 characters, or N/A

SCANREFDAT describes the reference data used to ensure the test device or real vehicle complies with test procedure requirements or other designated requirements (e.g., ISO) such that it should be perceived as a real pedestrian, bicycle, etc. by the Subject Vehicle, or remains undamaged, if it is a real vehicle.

29. TSTOBJCOM — Test Object Commentary (optional)

Text

TSTOBJCOM is a descriptive field containing any extraneous information needed to define the test device or real vehicle, such as clothing type and clothing reflectivity for a pedestrian mannequin target; color for a vehicle, bicycle, or motorcycle target or real vehicle; etc. It also be used to note any special features pertaining to the test device or real vehicle. This field should also explain any OTHER or N/A codes listed in required fields.

Test Scenario Information

1. TSTCFN — Test Configuration (mandatory)

Pre-populated code, variable characters

Pre-populated field based on TSTCFN selection in the General Test Information table.

2. SOFTVER — Software Version (mandatory)

Pre-populated text

Pre-populated field based on SOFTVER entry in the Technology System Information table.

3. PERFSCEN — Performed Scenario (mandatory)

Code, variable characters

PERFSCEN indicates the test scenario performed for a given technology. For example, the code LVD would be entered for the Lead Vehicle Decelerating scenario of an FCW test.

4. SYSPERFORMSCEN — Scenario System Performance (mandatory)

Code

SYSPERFORMSCEN indicates whether or not the system met performance criteria for a given scenario. Enter N/A if performing a research test.

Test Conditions

1. VEHNO — Vehicle Number (mandatory)

Pre-populated integer

VEHNO is the number that identifies the test object (i.e., a real vehicle or test device). Since the Subject Vehicle has been designated as VEHNO "1", the primary real vehicle or test device used to assess Subject Vehicle performance shall be coded as "2". Additional real vehicles and test devices used during testing should be coded sequentially beginning with "3" in order of proximity to the Subject Vehicle at the time the test begins.

2. LIGHTCON — Lighting Condition (mandatory)

Code, 3 characters

LIGHTCON is the lighting condition during testing. For example, a PAEB system may be tested under daytime or nighttime lighting conditions.

3. SPEEDSPEC — Specified Speed (mandatory)

Real, kilometers

SPEEDSPEC is the specified speed of the real vehicle or test device (i.e., test object) during testing.

4. LOCATION — Location (optional)

Text

LOCATION is a description of the location of the real vehicle or test device (i.e., test object) during testing.

5. SVMANBRK — Subject Vehicle Manual Braking (mandatory)

Code or N/A

SVMANBRK denotes whether the Subject Vehicle's brakes were manually applied during testing. For tests that do not involve manual braking, code "N/A".

6. LATOVERLAPSPEC — Specified Lateral Overlap at Contact (mandatory)

Integer, percentage, or N/A

LATOVERLAPSPEC is the specified Subject Vehicle lateral overlap (i.e., location on front of Subject Vehicle as measured with respect to the Subject Vehicle's right side) with the Principal Other Vehicle (i.e., VEHNO "2") at the planned point of impact during automatic emergency braking tests. The overlap shall be recorded as a percentage of the Subject Vehicle's total width. For test that do not involve automatic emergency braking, code "N/A".

7. SVTRAVPATH — Subject Vehicle Travel Path (mandatory)

Real, meters, or N/A

SVTRAVPATH indicates the intended travel path for the Subject Vehicle at the onset of automatic emergency braking testing in relation to the Subject Vehicle's longitudinal centerline and the inside of the closest lane line. For testing that does not include automatic emergency braking, code "N/A".

8. LATOFFSET — Lateral Offset at Onset (mandatory)

Integer, centimeters, or N/A

LATOFFSET indicates the lateral offset between the Subject Vehicle and Principal Other Vehicle (i.e., VEHNO "2") at the onset of automatic emergency braking testing in relation to

the test objects' longitudinal centerlines. For testing that does not include automatic emergency braking, code "N/A".

9. HEADWAYSPEC — Specified Headway at Onset (mandatory)

Real, meters, or N/A

HEADWAYSPEC indicates the specified headway (i.e., longitudinal distance), in meters, between the Subject Vehicle and the Principal Other Vehicle (VEHNO "2") at the onset of the validity period for automatic emergency braking test scenarios. The headway shall be characterized with respect to the relation of the frontmost part of the Subject Vehicle and rearmost part of the Principal Other Vehicle (i.e., VEHNO "2") along the vehicles' centerlines. For tests that do not include automatic emergency braking, code "N/A".

10. SVLATPOSINLAN — Subject Vehicle Lateral Position Within Lane at Onset (mandatory)

Real, meters

SVLATPOSINLAN indicates the Subject Vehicle lateral position within the lane at the onset of testing, in meters. The Subject Vehicle's position shall be characterized with respect to the relation of the vehicle's longitudinal centerline to the center of the lane.

11. SVLATOFFLANMARK — Subject Vehicle Lateral Offset from Lane Marking at Onset (mandatory)

Real, meters

SVLATOFFLANMARK indicates the Subject Vehicle lateral offset from the lane marking at the onset of testing, in meters. The Subject Vehicle's position shall be characterized with respect to the relation of the outside edge of the front tire nearest to the lane line to the inboard edge of the lane line.

12. LONGLAPSPEC — Specified Longitudinal Overlap at Onset

Real, meters, or N/A

LONGLAPSPEC is the specified longitudinal overlap distance, in meters, between the Subject Vehicle and Principal Other Vehicle (i.e., VEHNO "2") at the onset of the test in

relation to the rearmost part of the Subject Vehicle and frontmost part of the Principal Other Vehicle. If no longitudinal overlap is specified, code "N/A".

13. DECELMAGSPEC — Specified Deceleration Magnitude (mandatory)

Real, g's, or N/A

DECELMAGSPEC is the specified deceleration magnitude of VEHNO "2" in the Lead Vehicle Decelerating automatic emergency braking scenario, in g's. For all other tests, code "N/A".

14. DECELTIMSPEC — Specified Deceleration Time (mandatory)

Real, seconds, or N/A

DECELTIMSPEC is the specified time, in seconds, the deceleration magnitude for VEHNO "2" must be achieved after the onset of braking in the Lead Vehicle Decelerating automatic emergency braking scenario. For all other tests, code "N/A".

15. SVTHROTRELTIMSPEC — Specified Subject Vehicle Throttle Release Time (mandatory)

Real, milliseconds, or N/A

SVTHROTRELTIMSPEC is the specified Subject Vehicle throttle release time, in milliseconds, after the forward collision warning is issued. For tests that do not involve automatic emergency braking, code "N/A".

16. SVBRAKONSETSPEC — Specified Subject Vehicle Brake Application Onset Time (mandatory)

Real, seconds, or N/A

SVBRAKONSETSPEC is the specified onset time, in seconds, that the Subject Vehicle's brakes shall be applied after the forward collision warning is issued for automatic emergency braking tests that involve manual braking. For all other tests, code "N/A".

17. CURVRADSPEC — Specified Curve Radius (mandatory)

Real, meters, N/A

CURVRADSPEC indicates the specified curve radius, in meters, the test object traverses during a lane change maneuver. For tests involving lane change maneuvers where multiple curve radii are specified for the lane change maneuver, note the first (i.e., initial) curve radius. For tests with only longitudinal movement, or for which the curve radius for the lane change maneuver is unspecified, code "N/A".

18. CURVRADSPEC2 — Specified Second Curve Radius (mandatory)

Real, meters, N/A

CURVRADSPEC indicates the specified curve radius, in meters, the test object traverses during a lane change maneuver. For tests involving lane change maneuvers where multiple curve radii are specified for the lane change maneuver, note the second (i.e., final) curve radius. For tests with only longitudinal movement, or for which the curve radius for the lane change maneuver is unspecified, code "N/A".

19. LATDISONSETSPEC — Specified Lateral Distance at Onset (mandatory)

Real, meters, or N/A

LATDISONSETSPEC indicates the specified lateral distance, in meters, between the Subject Vehicle and Principal Other Vehicle (i.e., VEHNO "2") at the onset of testing involving a lane change maneuver. If a range is specified, code the minimum distance for the range. For tests that do not include a lane change, or for which such a distance is unspecified, code "N/A".

20. LANEDEPDIRINIT — Initial Lane Departure Direction (mandatory)

Code, 2 characters, or N/A

LANEDEPDIR indicates the initial lane departure direction for the Subject Vehicle or Principal Other Vehicle (i.e., VEHNO "2"). For tests that do not include a lane change, code "N/A".

21. SVTURNSIGACT — Subject Vehicle Turn Signal Activation (mandatory)

Code, 2 characters, or N/A

SVTURNSIGACT indicates whether the Subject Vehicle's turn signal is activated during the test maneuver. Only code "N/A" if turn signal activation is **never** applicable for the test scenario.

22. SVSTEERINPUTTIM — Subject Vehicle Steering Input Timing (mandatory)

Real, seconds, or N/A

SVSTEERINPUTTIM is the pre-determined steering input timing (relative to the start of the test), in seconds, to initiate the lane change maneuver for the Subject Vehicle or VEHNO "2". For tests that do not include a lane change maneuver, code "N/A".

23.SVSTEERRELTIM — Subject Vehicle Steering Release Timing (mandatory)

Real, seconds, or N/A

SVSTEERRELTIM is the pre-determined steering release timing (relative to the start of the test), in seconds, for the Subject Vehicle during the lane change maneuver. For tests that do not include a lane change maneuver, code "N/A".

24. LATVELSPEC — Specified Lateral Velocity (mandatory)

Real, meters per second, or N/A

LATVELSPEC is the specified lateral velocity for the test object, in meters per second, for tests involving lane change maneuvers. If a lateral velocity range is specified, input the maximum value listed for the range. For tests involving lane change maneuvers where the test object returns to its original lane, note the test object's lateral velocity for the first (i.e., initial) lane change. For tests that do not include a lane change maneuver, code "N/A".

25. LATVELSPEC2 — Specified Second Lateral Velocity (mandatory)

Real, meters per second, or N/A

LATVELSPEC2 is the specified lateral velocity for the test object, in meters per second, for tests involving lane change maneuvers where the test object returns to its original travel lane. For these tests, note the test object's lateral velocity for the second (i.e., return) lane change. If a lateral velocity range is specified, input the maximum value listed for the range. For all other tests, code N/A.

26. LATDISPOSTCONSPEC — Specified Lateral Distance Post-Converge (mandatory)

Real, meters, or N/A

LATDISPOSTCONSPEC indicates the specified lateral distance, in meters, between the Subject Vehicle and Principal Other Vehicle (i.e., VEHNO "2") after a converge lane change maneuver. For tests that do not include a lane change maneuver, code "N/A".

27.LATDISPOSTDIVSPEC — Specified Lateral Distance Post-Diverge (mandatory)

Real, meters, or N/A

LATDISONSETSPEC indicates the specified lateral distance, in meters, between the Subject Vehicle and Principal Other Vehicle (i.e., VEHNO "2") after a diverge lane change maneuver. If a range is specified, code the minimum distance for the range. For tests that do not include a lane change maneuver, code "N/A".

28. PTMLOC — PTM Location (mandatory)

Code, 2 characters, or N/A

PTMLOC indicates the general location of a pedestrian target mannequin (PTM) (e.g., near or far side) with respect to the location of the SV at the start of testing. For tests that do not include a PTM, code "N/A".

29. PTMDIRECT — PTM Facing Direction (mandatory)

Code, 2 characters, or N/A

PTMDIRECT indicates the direction that a pedestrian target mannequin (PTM) is facing with respect to the Subject Vehicle's direction of travel. For example, the PTM may be facing away from the Subject Vehicle. For tests that do not include a PTM, code "N/A".

30. SYSPERFORMCON — Test Condition System Performance (mandatory)

Code, 2 characters, or N/A

SYSPERFORMCON indicates whether or not the system met performance criteria for a given test condition. If performing a research test, code "N/A".

31. TESTCONCOM — Test Conditions Commentary (optional)

Text

TESTCONCOM is a descriptive field containing any extraneous information needed to define the test conditions. If OTHER is used to a code information for any Test Conditions record, commentary for that record should be entered as well.

Lane Information

1. LANENO — Lane Number (mandatory)

Sequential Integer

LANENO is the sequential number (1,2,3…) assigned to a lane (from leftmost to rightmost) if there are multiple lane types.

2. TRACKSURF — Test Track Surface (mandatory)

Code, 3 characters

TRACKSURF describes the test track surface during testing.

3. SURFSLOPE — Surface Slope (mandatory)

Integer, percentage

SURFSLOPE is the slope of the test track surface during testing.

4. RDCURVRAD — Roadway Curve Radius (optional)

Real, meters

RDCURVRAD indicates the roadway curve radius during testing.

5. LANEWID — Lane Width (mandatory)

Integer, millimeters

LANEWID is the measured width of the lane, in millimeters.

6. RIGHTLINETYPE — Right Lane Line Type (mandatory)

Code

RIGHTLINETYPE is the right lane line type. For example, if performing an LDW test, the lane line type for a given scenario may be solid.

7. LEFTLINETYPE — Left Lane Line Type (mandatory)

Code

LEFTLINETYPE is the left lane line type. For example, if performing an LDW test, the lane line type for a given scenario may be solid.

8. RIGHTLINECOLOR — Right Lane Line Color (mandatory)

Code

RIGHTLINECOLOR is the right lane line color. For example, if performing an LDW test, the lane line color may be white.

9. LEFTLINECOLOR — Left Lane Line Color (mandatory)

Code

LEFTLINECOLOR is the left right lane line color. For example, if performing an LDW test, the lane line color may be white.

10.LANECOM — Lane Commentary (optional)

Text

LANECOM is a descriptive field containing any extraneous information needed to define the lane conditions. If OTHER is used to a code information for any Lane Information record, commentary for that record should be entered as well.

Trial Conditions

1. TRIALNO — Trial Number (mandatory)

Integer

TRIALNO is the trial number that corresponds to the data stored for the given curve/channel number.

2. TEMP — Ambient Temperature (mandatory)

Integer, degrees Celsius, -99 to 99

TEMP is the pre-test temperature at the Subject Vehicle location.

3. WINDSPEED — Wind Speed (mandatory)

Real, meters per second, -99 to 99

WINDSPEED is the windspeed at the location containing the Subject Vehicle location.

4. WINDDIRECT — Wind Direction (mandatory)

Code, various characters

WINDDIRECT is the direction the wind is originating from at the Subject Vehicle location.

5. AMBILLUM — Ambient Illumination Level (mandatory)

Real, Lux

AMBILLUM indicates the ambient illumination level at the Subject Vehicle location.

6. SOLARELEVANG — Solar Elevation Angle (mandatory)

Real, degrees

SOLARELEVANG is the angle of the sun at the Subject Vehicle location.

7. LUNARELEVANG — Lunar Elevation Angle (mandatory)

Real, degrees

LUNARELEVANG is the angle of the moon at the Subject Vehicle location.

8. HEADANGSUN — Heading Angle with Respect to the Sun (mandatory)

Real, degrees

HEADANGSUN is the horizontal angle between the sun and a vertical plane containing the centerline of the Subject Vehicle.

9. HEADANGMOON — Heading Angle with Respect to the Moon (mandatory)

Real, degrees

HEADANGMOON is the horizontal angle between the moon and a vertical plane containing the centerline of the Subject Vehicle.

10. HORIZVIS — Horizontal Visibility at Ground Level

Real, kilometers

HORIZVIS is the horizontal visibility at ground level at the Subject Vehicle location.

11.BATSOC — Battery State of Charge

Integer, percentage, 0 to 100, or N/A

BATSOC indicates the battery state of charge for the Subject Vehicle at the start of each trial run.

12. AVGBRAKETEMP — Average Brake Temperature

Integer, degrees Celsius, -99 to 99

AVGBRAKETEMP is the average brake pad temperature of the brakes for the Subject Vehicle on the highest temperature axle at the start of each trial run.

13. TRACKCOND — Test Track Condition (mandatory)

Code, 3 characters

TRACKCOND describes the test track condition.

14. TRACKFRIC — Test Track Friction Coefficient (mandatory)

Real, unitless

TRACKFRIC is the test track friction coefficient.

15. TRIALCOM — Trial Commentary (optional)

Text

TRIALCOM is a descriptive field containing any extraneous information regarding the trial conditions.

Subject Vehicle System Settings

1. TRIALNO — Trial Number (mandatory)

Integer

TRIALNO is the trial number that corresponds to the data stored for the given curve/channel number.

2. HEADLIGHT —Headlight Setting (mandatory)

Code, 2 characters

HEADLIGHT is the headlight setting for the Subject Vehicle during testing. For example, low beam headlight settings.

3. FCWSET — FCW Setting (mandatory)

Code, 3 characters or N/A

FCWSET indicates the Forward Collision Warning (FCW) setting for the Subject Vehicle during testing.

4. AEBSET — AEB Setting (mandatory)

Code, 3 characters or N/A

AEBSET indicates the Automatic Emergency Braking (AEB) setting for the Subject Vehicle during testing.

5. LDWSET — LDW Setting (mandatory)

Code, 3 characters or N/A

LDWSET indicates the Lane Departure Warning (LDW) setting for the Subject Vehicle during testing.

6. LKASET — LKA Setting (mandatory)

Code, 3 characters or N/A

LKASET indicates the Lane Keeping Assist (LKA) setting for the Subject Vehicle during testing.

7. LCASET — LCA Setting (mandatory)

Code, 3 characters or N/A

LCASET indicates the Lane Change Assist (LCA) setting for the Subject Vehicle during testing.

8. BSWSET — BSW Setting (mandatory)

Code, 3 characters or N/A

BSWSET indicates the Blind Spot Warning (BSW) setting for the Subject Vehicle during testing.

9. BSISET — BSI Setting (mandatory)

Code, 3 characters or N/A

BSISET indicates the Blind Spot Intervention (BSI) setting for the Subject Vehicle during testing.

10. CRUCON — Cruise Control Status (mandatory)

Code, 2 characters

CRUCON indicates the cruise control status for the Subject Vehicle during testing.

11. ACCSTAT — ACC Status (mandatory)

Code, 2 characters

ACCSTAT indicates the Adaptive Cruise Control status for the Subject Vehicle during testing.

12.ACCHEADWAYSET — ACC Headway Setting

Code, 2 characters

ACCHEADWAYSET indicates the Adaptive Cruise Control (ACC) headway setting for the Subject Vehicle during testing.

13. LCCSTAT — LCC Status (optional/mandatory)

Code, 2 characters

LCCSTAT indicates the status of the Lane Centering Control (LCC) system for the Subject Vehicle during testing.

14.REGENBRAKE — Regenerative Braking Setting (mandatory)

Code, 3 characters

REGENBRAKE is the regenerative braking setting applied to the Subject Vehicle during testing (for electric vehicles). If there are only two levels of braking, the lowest level of regenerative braking should be classified as “Low”, and the higher level should be classified as “High”. Indicate “On” only if there are no other regenerative braking settings.

Instrumentation Information

Fields defined below constitute the instrumentation information record. A field includes its order index in the record, name, brief description, type and valid range. For example, in the second field, "**2**", "**CURNO**", "**Curve Number**", "integer", and "1 to 999" are its order index in the information record, its name, brief description, its type and its range, respectively. Any use of the code for “OTHER” should be explained in an appropriate commentary field. If the value or content of the field is undetermined and filling the field is not enforced, leave it blank.

1. CURNO — Curve Number (mandatory)

Sequential Integer

CURNO is the sequential number (1,2,3…) assigned to a specific sensor and data curve.

2. VEHNO — Vehicle Number (mandatory)

Pre-populated integer

VEHNO is the vehicle that identifies the vehicle containing the sensor. As an example, VEHNO “1” would signify that the sensor is attached to the Subject Vehicle.

3. TRIALNO — Trial Number (mandatory)

Integer

TRIALNO is the trial number that corresponds to the data stored for the given curve/channel number.

4. SENTYP — Sensor Type (mandatory)

Code, 2 characters

SENTYP indicates the type of sensor used for collecting the measurements at the time of the test, such as HS for Haptic Warning Sensor.

5. SENATT — Sensor Attachment (mandatory)

Code, various characters

SENATT indicates where the sensor is attached. If the sensor attachment location requires further specifying (for example, and IMU or accelerometer), then the SENATTX/Y/Z optional fields can be utilized as well.

6. SENATTX — Sensor Attachment Location X-coordinate (optional)

Real, millimeters

SENATTX is the longitudinal location of the sensor and is defined (using the coordinate system specified in SAE J211) with respect to the predefined reference point. The x-axis is positive forward with respect to the reference point. Typically, this information is provided for measurements from an IMU or accelerometer.

7. SENATTY — Sensor Attachment Location Y-coordinate (optional)

Real, millimeters

SENATTY is the lateral location of the sensor and is defined (using the coordinate system defined in SAE J211) with respect to the predefined reference point. The y-axis is positive to the right with respect to the reference point. Typically, this information is provided for measurements from an IMU or accelerometer.

8. SENATTZ — Sensor Attachment Location Z-coordinate (optional)

Real, millimeters

SENATTZ is the vertical location of the sensor and is defined (using the coordinate system defined in SAE J211) with respect to the predefined reference point. The z-axis is positive down with respect to the reference point. Typically, this information is provided for measurements from an IMU or accelerometer.

9. AXIS — Axis Direction of the Sensor (mandatory)

Code, 2 characters

AXIS is the axis direction for sensors measuring vector quantities. The global coordinate systems are vehicle fixed; the local systems are local within the vehicle global system. With respect to the vehicle longitudinal axis, X is positive forward, Y is positive right, (toward the passenger's door) and Z is positive down.

AXIS is always applicable when the measurement is a vector quantity such as acceleration, force, velocity, and so forth.

For all sensors attached to moving bodies, AXIS is coded as a local coordinate system (e.g., XL). For any sensor attached to a fixed reference frame, such as the laboratory or ground coordinate system, AXIS is coded as a global coordinate system (e.g., XG).

10. CHANTYP — Channel Type (mandatory)

Code

CHANTYP defines the y-variable. Please select the appropriate option for each curve.

11. DASTAT — Data Status (mandatory)

Code, 2 characters

DASTAT indicates the status of the data as it appears in the data submission. This data is used to indicate a signal which is invalid (code MN for meaningless), or which becomes questionable or invalid part of the way through a signal (code CF and explained in INSCOM). If a signal is computed, DASTAT is CM; however, if any of the source signals used in the computation were questionable or invalid, DASTAT is CQ. An example of a computed signal would be a flag representing the auditory FCW alert being active derived

from microphone measurements in the cabin. The default value for this variable is AM (As Measured).

12. XUNITS — Time Units or 'Independent Axis' Units (mandatory)

Code, 3 characters

XUNITS indicates either the unit of time for time series sensor data (e.g., 'SEC'), or the units of the independent coordinate of a non-time series signal (e.g., if a load is applied in a controlled fashion to produce a deflection, the load is the independent coordinate, and the deflection is the dependent coordinate. Click on the “Find” button and select “SEC Seconds” from the drop-down list of axis directions that displays.

13. YUNITS — Data Measurement Units (mandatory)

Code, 3 characters

YUNITS indicates the units used to measure the signal of the sensor data.

14. TINT — Time Sampling Interval (mandatory)

Real, 0 or positive

TINT is the sampling interval, or amount of time between data points, for channel data with a uniform sampling rate. The units of TINT are defined by XUNITS.

15. TSTART — Time of First Sample (mandatory if TINT ≠ 0)

Real or blank

TSTART is the time of the first sample in the units defined by XUNITS. If TINT = 0, leave blank.

16. INSMAN — Manufacturer of the Instrument (mandatory for Government-furnished equipment, optional otherwise)

Text

INSMAN indicates the manufacturer of the instrument.

17. INSMOD — Model of the Instrument (mandatory for Government-furnished equipment, optional otherwise)

Text

INSMOD indicates the model of the instrument.

18. INSSN — Serial Number of the Instrument (mandatory for Government-furnished equipment, optional otherwise)

Text

INSSN indicates the serial number of the instrument.

19. CALDAT — Calibration Date (mandatory for Government-furnished equipment, optional otherwise)

Date, ISO 8601 format (YYYY-MM-DD), 10 characters, or N/A

CALDAT is the most recent calibration date of the instrument, prior to STTESTDATE in the General Test Information table. CALDAT is not required for computed signals (e.g., DASTAT = CM).

20. INSCOM — Instrumentation Commentary (optional)

Text

INSCOM is any further commentary on an instrumentation information record and its correlated signal data, including any unusual conditions affecting the data or a reference to a document that describes problems with a particular curve. The reason for using OTHER or NOT APPLICABLE to a code of this information record should record a commentary as well.

Provide any miscellaneous comments for the instrument or the instrument record that you think are appropriate and/or necessary. If the data channel is invalid, place INVALID in the instrumentation commentary section. This should include any unusual conditions affecting the data or a reference to a document that describes problems with a particular curve and the reason for using OTHER or NOT APPLICABLE in this record.

21. CURVEDATA

CURVEDATA is the measured variable value at the sampling frequency, or time interval, at the specified units.

System Performance

1. TRIALNO — Trial Number (mandatory)

Integer

TRIALNO is the trial number that corresponds to the data stored for the given curve/channel number.

2. SYSPERFORMTRIAL — Trial System Performance (mandatory)

Code

SYSPERFORMTRIAL indicates whether or not the system met performance criteria in a given trial. Enter N/A if performing a research test.

3. VISALERT — Visual Alert (mandatory)

Code

VISALERT indicates whether the visual alert met requirement.

4. AUDITALERT — Auditory Alert (mandatory)

Code

AUDITALERT indicates whether the auditory alert met requirement.

5. HAPTICALERT — Haptic Alert (mandatory)

Code

HAPTICALERT indicates whether the haptic alert met requirement.

6. AEBFPFCW — AEB False Positive FCW (mandatory)

Code, or N/A

AEBFPFCW indicates whether or not a forward collision warning occurred according to requirements during an AEB false positive test. For all other tests, code "N/A".

7. AEBFPBRAKE — AEB False Positive Braking (mandatory)

Code, or N/A

AEBFPBRAKE indicates whether or not braking occurred according to requirements during an AEB false positive test. For all other tests, code "N/A".

8. SVTHROTRELTIMACT — Actual Subject Vehicle Throttle Release Time (mandatory)

Real, seconds, or N/A

SVTHROTRELTIMACT is the actual Subject Vehicle throttle release time, in seconds, after the forward collision warning is issued. For tests where a forward collision warning is not expected, code "N/A".

9. TTCFCW — TTC at Forward Collision Warning Alert (mandatory)

Real, milliseconds, or N/A

TTCFCW is the time, in seconds, that the forward collision warning is issued prior to the Subject Vehicle's potential impact with the test target. For tests where a forward collision warning is not expected, code "N/A".

10. TTCAEB — TTC at Automatic Emergency Braking Onset (mandatory)

Real, milliseconds, or N/A

TTCAEB is the time, in seconds, that automatic emergency braking begins. For tests that do not involve automatic emergency braking, code "N/A".

11. TTCBRAKE — TTC at Brake Application Onset (mandatory for DBS)

Real, milliseconds, or N/A

TTCBRAKE is the actual time, in seconds, that the Subject Vehicle brakes are applied (for manual brake application) prior to potential impact with the test target. For tests that do not involve Subject Vehicle manual braking, code "N/A".

12. BRAKEHDY — Headway at Brake Application Onset (mandatory for DBS)

Real, meters, or N/A

BRAKEHDY is the headway (i.e., the longitudinal distance) between the Subject Vehicle and the Principal Other Vehicle (VEHNO "2"), in meters, when the Subject Vehicle's brakes are applied (for manual brake application) prior to potential impact with the test target in automatic emergency braking test scenarios. The headway shall be characterized with respect to the relation of the frontmost part of the Subject Vehicle and rearmost part of the Principal Other Vehicle (i.e., VEHNO "2") along the vehicles' centerlines. For tests that do not involve Subject Vehicle manual braking, code "N/A".

13. IMPACTSPEED — Impact Speed (mandatory)

Real, kilometers per hour, or N/A

IMPACTSPEED indicates the relative speed between the Subject Vehicle and the test target at impact. If an impact did not occur or is unexpected for the test, code "N/A".

14. SPEEDREDUCT — Speed Reduction (mandatory)

Real, kilometers per hour, or N/A

SPEEDREDUCT indicates the speed reduction of the Subject Vehicle starting from when automatic emergency braking begins. For tests that do not involve automatic emergency braking, code "N/A".

15. CONTACT — Contact (mandatory)

Code, or N/A

CONTACT indicates whether or not there was contact between the SV and the test target. If

contact is unexpected for a test, code “N/A”.

16. CONTACTDETER — Contact Determination (mandatory)

Code, or N/A

CONTACTDETER indicates how contact was determined. If contact is unexpected for a test, code “N/A”.

17. LANECHGTIMACT1 — Actual Lane Change Initiation Timing for First Lane Change (mandatory)

Real, seconds, or N/A

LANECHGTIMACT1 is the actual time (relative to the start of the test) of the start of the Subject Vehicle or Principal Other Vehicle (i.e., VEHNO “2”) lane change maneuver, in seconds, for the first (i.e., initial) lane change during a test trial. For tests that do not involve a lane change, code “N/A”.

18. LANECHGTIMACT2 — Actual Lane Change Initiation Timing for Second Lane Change (mandatory)

Real, seconds, or N/A

LANECHGTIMACT2 is the actual time (relative to the start of the test) of the start of the Subject Vehicle or Principal Other Vehicle (i.e., VEHNO “2”) lane change maneuver, in seconds, for the second (i.e., return) lane change during a test trial. For tests that do not involve a lane change, code “N/A”.

19. LATVELACT — Actual Lateral Velocity (mandatory)

Real, meters per second, or N/A

LATVELACT is the test object’s actual lateral velocity, in meters per second. For tests involving lane change maneuvers where the test object returns to its original lane, note the test object’s lateral velocity for the first (i.e., initial) lane change. For tests with only longitudinal movement, code “N/A”.

20. LATVELACT2 — Actual Second Lateral Velocity (mandatory)

Real, meters per second, or N/A

LATVELACT2 is the test object's actual lateral velocity, in meters per second, for tests involving lane change maneuvers where the test object returns to its original travel lane. For these tests, note the test object's lateral velocity for the second (i.e., return) lane change. For all other tests, code N/A.

21. SVTURNSIGTIME — Subject Vehicle Turn Signal Activation Timing (mandatory)

Real, seconds, or N/A

SVTURNSIGTIME is the turn signal activation timing (relative to the start time of the test) for the Subject Vehicle prior to the lane change maneuver. For tests without turn signal activation, code "N/A".

22. LKAINTERVENTION — Lane Keeping Assist Intervention

Code, or N/A

LKAINTERVENTION indicates whether the intervention from the Lane Keeping Assist system met requirements during a lane keeping test. For all other tests, code "N/A".

23. PRIMARYMAXEXCUR — Primary Maximum Excursion

Real, meters

PRIMARYMAXEXCUR indicates the distance of the primary maximum excursion over the lane line, in meters, during a lane departure warning or lane keeping test. For all other tests, code "N/A".

24. SECONDMAXEXCUR — Secondary Maximum Excursion

Real, meters

SECONDMAXEXCUR indicates the distance of the secondary maximum excursion over the lane line, in meters, during a lane departure warning or lane keeping test. For all other tests,

code “N/A”.

25. PERFORMCOM — System Performance Commentary (optional)

Text

PERFORMCOM is a descriptive field containing any extraneous information related to system performance. For example, include details or additional information if there was a system performance failure, or if damage occurred to the Subject Vehicle and/or test target.