



Safety Domain Module (SDM) System Level Fault Insertion Test (FIT) Procedure

1 Introduction

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose. The purpose of this procedure is to test the Sensing and Diagnostic Module (SDM) on a vehicle and bench for mitigation against induced errors that could occur spuriously at the subsystem level or connected interfaces. This test procedure examines safety critical functionality covered under SDM40 or later Global A SDM. Component Technical Specification (CTS) and program specific specifications.

1.2 Applicability. All GM passenger cars and light trucks equipped with a SDM40 or later controller with an up-integrated single or redundant Inertia Measurement Unit (IMU) sensor.

1.3 Remarks. This specification validates SDM safety requirements contained within Global A SDM CTS using a Fault Insertion Test (FIT) method. This is a vehicle level procedure to be used in conjunction with known SDM Preliminary Hazard Analysis (PHA) safety goals.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

FMVSS 208

2.2 GM Standards/Specifications.

None

2.3 Additional References.

- Active Wheel Speed Sensor (WSS) CTS
- CG3928 Supplement for GMW17222
- dSPACE MicroAutoBox breakout box available at Uniform Resource Locator (URL): <http://www.dspace.com/en/pub/home/products/hw/micautob.cfm>
- Global A Body Control Module (BCM) CTS
- Global A Brake Subsystem Technical Specification (SSTS) Version 6.4 or later
- Global A SDM40 ESS CTS Version 1.2 or later
- Global A Serial Data Dictionary (DD) System Report Version 6.4.0 or later
- IMU CTS Version 2.0 or later
- Intrepid Control Systems NeoVI FIRE hardware with Vehicle Spy software available at URL: <http://www.intrepidcs.com/>
- ONIX Holdings Vertical Bench available at URL: <http://www.onyx-holdings.co.uk/onyx-south-wales/> (for bench test).
- SDM PHA

GM Confidential

© Copyright 2015 General Motors Company All Rights Reserved

February 2015

Page 1 of 4

3 Resources

3.1 Facilities. Suitable dry, clean and smooth asphalt track with ability to restrict access during the test. Track shall be capable of supporting straight ahead and continuous turning radius (0.15G to 0.2G) maneuvers for extended periods under various speeds.

3.1.1 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label.

3.1.2 Alternatives. Alternative test facilities and equipment may also be used. However, all measuring variables as specified in this standard shall be determined correctly with respect to their physical definition.

3.2 Equipment.

3.2.1 Breakout box. Consult the GM Requesting Safety Engineer, SDM Supplier Resident or SDM Design Release Engineer (DRE) for details. See CG3928.

3.2.2 dSPACE MicroAutoBox breakout box available at URL: <http://www.dspace.com/en/pub/home/products/hw/micautob.cfm>

3.2.3 Laptop with Vehicle Spy available at URL: <http://www.intrepidcs.com/>

3.2.4 NeoVI FIRE available at URL: <http://www.intrepidcs.com/>

3.2.5 ONIX Vertical Bench (for bench test) available at URL: <http://www.onyx-holdings.co.uk/onyx-south-wales/>.

3.3 Test Vehicle/Test Piece. Production intent vehicle or representative vehicle level bench with SDM and all interfacing modules/sensors. All components involved must have the latest production intent released hardware, software and production intent calibrations.

3.4 Test Time.

Calendar time: 5 days

Test hours: 33 hours

Coordination hours: 10 hours

3.5 Test Required Information. See CG3928. Possible sources or requirements include:

- Active Wheel Speed Sensor (WSS) CTS
- Global A Body Control Module (BCM) CTS
- Global A Brake Subsystem Technical Specification (SSTS) Version 6.4 or later
- Global A SDM40 ESS CTS Version 1.2 or later
- Global A Serial Data Dictionary (DD) System Report Version 6.4.0 or later
- IMU CTS Version 2.0 or later
- SDM PHA

3.6 Personnel/Skills. Vehicle Validation Engineer.

4 Procedure

4.1 Preparation. Instrument the test vehicle per CG3928 or as requested by the GM Requesting Safety Engineer.

4.2 Conditions.

4.2.1 Environmental Conditions. Test per the environmental conditions in Federal Motor Vehicle safety Standard (FMVSS) FMVSS 208. Road surface with zero grade, 20 °C to 30 °C ambient, vehicle at normal operating temperatures, and minimal crosswind. For track and facility requirements, see 3.1.

4.2.2 Test Conditions. Deviations from the requirements of this standard shall have been agreed upon. Such requirements shall be specified on component drawings, test certificates, reports, etc.

4.3 Instructions. Follow CG3928.

4.3.1 All program test information shall be completed and documented on the "Cover Page" tab.

4.3.2 Instrumentation shall be configured according to the "Architecture & Instrumentation" tab.

GM Confidential

© Copyright 2015 General Motors Company All Rights Reserved

February 2015

Page 2 of 4