126-DRI-11-001
SAFETY COMPLIANCE TESTING FOR FMVSS 126
Electronic Stability Control Systems

General Motors de Mexico, S. DE R.L DE C.V.
2011 Cadillac SRX
NHTSA No. CB0107

DYNAMIC RESEARCH, INC.
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Torrance, California 90501

10 November 2011

Final Report

Prepared Under Contract No.: DTNH22-08-D-00098

U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Enforcement
Office of Vehicle Safety Compliance
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16. Abstract A test was conducted on a 2011 Cadillac SRX , NHTSA No. CB0107, in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-126-02 for the determination of FMVSS 126 compliance. Test failures identified were as follows: None			
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1.0 PURPOSE OF COMPLIANCE TEST

The purpose of this test is to determine if the test vehicle, a 2011 Cadillac SRX, meets the minimum equipment and performance requirements stated in Federal Motor Vehicle Safety Standard (FMVSS) 126, "Electronic Stability Control Systems."

2.0 TEST PROCEDURE AND DISCUSSION OF RESULTS

Testing of the 2011 Cadillac SRX was conducted at Dynamic Research, Inc (DRI) in accordance with NHTSA TP-126-02, dated November 19, 2008.

The vehicle was inspected to ensure it was equipped with an ESC system that:

- Augments vehicle directional stability by applying and adjusting brake torques individually at each wheel to induce a correcting yaw moment to a vehicle;
- Is computer controlled with the computer using a closed-loop algorithm to limit vehicle oversteer and to limit vehicle understeer;
- Has a means to determine the vehicle's yaw rate and to estimate its side slip or side slip derivative with respect to time;
- Has a means to monitor driver steering inputs;
- Has an algorithm to determine the need, and a means to modify engine torque, as necessary, to assist the driver in maintaining control of the vehicle; and
- Is operational over the full speed range of the vehicle (except at vehicle speeds less than 20 km/h (12.4 mph), when being driven in reverse, or during system initialization).

The vehicle was subjected to a 0.7 Hz Sine with Dwell steering maneuver to ensure that it would meet the stability and responsiveness requirements of the standard as follows:

- At 1.0 second after completion of a required Sine with Dwell steering input, the yaw rate of the vehicle must not exceed 35 percent of the first peak value of yaw rate recorded after the steering wheel angle changes sign (between first and second peaks during the same test run).

2.0 TEST PROCEDURE AND DISCUSSION OF RESULTS (CONTINUED)

- At 1.75 seconds after completion of a required Sine with Dwell steering input, the yaw rate of the vehicle must not exceed 20 percent of the first peak value of yaw rate recorded after the steering wheel angle changes sign (between first and second peaks during the same test run).

- For steering inputs of scalar 5 and greater, the lateral displacement of the vehicle center of gravity with respect to its initial straight path must be at least 1.83 m (6 feet) (for vehicles with a GVWR of 3,500 kg (7,716 lb) or less) when computed 1.07 seconds after the Beginning of Steer (BOS) at the specified steering wheel angles.

System malfunction simulations were executed to verify vehicle could identify and indicate a malfunction.

The vehicle's ESC System appears to meet the performance and equipment requirements as required by FMVSS 126. The test results are summarized on the following summary sheet.

2.0 TEST PROCEDURE AND DISCUSSION OF RESULTS (CONTD)

Data Summary Sheet (Page 1 of 2)

Vehicle: *2011 Cadillac SRX*

NHTSA No. *CB0107* VIN: *3GYFNCEY0BS543589*

Vehicle Type: Manufacture Date: *9/10*

Laboratory: *Dynamic Research, Inc.*

REQUIREMENTS:	**PASS/FAIL**
ESC Equipment and Operational Characteristics (Data Sheet 2)	
The vehicle is to be equipped with an ESC system that meets the equipment and operational characteristics requirements. (S126, S5.1, S5.6)	***PASS***
ESC Malfunction Telltale (Data Sheet 3)	
Vehicle is equipped with a telltale that indicates one or more ESC system malfunctions. (S126, S5.3)	***PASS***
"ESC Off" and other System Controls and Telltale (Data Sheet 3,4)	
Vehicle is equipped with an ESC off telltale indicating the vehicle has been put into a mode that renders the ESC system unable to satisfy the performance requirements of the standard, if such a mode exists. (S5.5.1)	***PASS***
If provided, off control and other system controls as well as the ESC off telltale meets the operational requirements (S126, S5.4, S5.4.1,S5.4.2, S5.5.4, and S5.5.9)	***PASS***

2.0 TEST PROCEDURE AND DISCUSSION OF RESULTS (CONTD)

Data Summary Sheet (Page 2 of 2)

REQUIREMENTS:	PASS/FAIL
Vehicle Lateral Stability (Data Sheet 8)	
Yaw Rate Ratio at 1 second after COS is less than 35% of peak value. (S126, S5.2.1)	***PASS***
Yaw Rate Ratio at 1.75 seconds after COS is less than 20% of peak value. (S126, S5.2.2)	***PASS***
Vehicle Responsiveness (Data Sheet 8)	
Lateral displacement at 1.07 seconds after BOS is at least 1.83 m (6 feet) for vehicles with a GVWR of 3,500kg (7,716 lb) or less, and 1.52 m (5 feet) for vehicles with a GVWR greater than 3,500 Kg (7,716 lb). (S126, S5.2.3)	***PASS***
ESC Malfunction Warning (Data Sheet 9)	
Warning is provided to driver after malfunction occurrence. (S126. S5.3)	***PASS***
Malfunction telltale stayed illuminated as long as malfunction existed and must extinguish after malfunction was corrected. (S126, S5.3.7)	***PASS***

3.0 TEST DATA

Data Sheet 1 (Page 1 of 2)

TEST VEHICLE INSPECTION AND TEST PREPARATION

Vehicle: *2011 Cadillac SRX*

NHTSA No. *CB0107* Data Sheet Completion Date: *5/25/2011*

VIN *3GYFNCEY0BS543589* Manufacture Date: *9/10*

GVWR (kg): *2480* Front GAWR (kg): *1410* Rear GAWR (kg): *1300*

Seating Positions Front: *2* Mid: Rear: *3*

Odometer reading at time of inspection: *54 miles (86.4 km)*

DESIGNATED TIRE SIZE(S) FROM VEHICLE LABELING:

Front axle: *P235/55 R20* Rear axle: *P235/55 R20*

INSTALLED TIRE SIZE(S) ON VEHICLE (from tire sidewall)

		Front Axle	Rear Axle
	Tire Manufacturer:	*Michelin*	*Michelin*
	Tire Model:	*Latitude Tour HP*	*Latitude Tour HP*
	Tire Size:	*P235/55 R20*	*P235/55 R20*
TIN	Left Front:	*B3AJ CE3X 4210*	Right Front: *B3AJ CE3X 2110*
	Left Rear:	*B3AJ CE3X 2110*	Right Rear: *B3AJ CE3X 2110*

Are installed tire sizes same as labeled tire sizes? *Yes*

If no, contact COTR for further guidance

DRIVE CONFIGURATION(S):(mark all that apply)

[X] Two Wheel Drive (2WD) [X] Front Wheel Drive [ ] Rear Wheel Drive

[ ] All Wheel Drive (AWD)

[ ] Four Wheel Drive Automatic - differential no locked full time (4WD Automatic)

[ ] Four Wheel Drive (High Gear Locked Differential 4WD HGLD)

[ ] Four Wheel Drive Low Gear (4WD Low)

[ ] Other (Describe)

3.0 TEST DATA (CONTD)

Data Sheet 1 (Page 2 of 2)
TEST VEHICLE INSPECTION AND TEST PREPARATION

DRIVE CONFIGURATIONS AND MODES: (ex. default, performance, off)

(For each of the vehicle's drive configurations identify available operating modes)

Drive Configuration: *Front wheel drive*
Mode: *Default, ESC on*
Drive Configuration: *Front wheel drive*
Mode: *ESC off*
Drive Configuration:
Mode:

VEHICLE STABILITY SYSTEMS (Check applicable technologies):

List other systems:

- [X] ESC
- [X] Traction Control
- [X] Roll Stability Control
- [ ] Active Suspension
- [X] Electronic Throttle Control
- [ ] Active Steering
- [X] ABS

REMARKS:

RECORDED BY: *J Lenkeit* DATE RECORDED: *5/25/2011*
APPROVED BY: *B Kebschull* DATE APPROVED: *5/31/2011*

3.0 TEST DATA (CONTD)

Data Sheet 2 (Page 1 of 3)
ESC SYSTEM HARDWARE AND OPERATIONAL CHARACTERISTICS

Vehicle: *2011 Cadillac SRX*

NHTSA No *CB0107* Data Sheet Completion Date: *5/31/2011*

ESC SYSTEM IDENTIFICATION

Manufacturer/Model *Continental Automotive Systems/ESP Mark 25e*

ESC SYSTEM HARDWARE (Check applicable hardware)

[X] Electronic Control Unit	[X] Hydraulic Control Unit
[X] Wheel Speed Sensors	[X] Steering Angle Sensor
[X] Yaw Rate Sensor	[X] Lateral Acceleration Sensor

List other Components: *Powertrain control module*

ESC OPERATIONAL CHARACTERISTICS

System is capable of generating brake torque at each wheel — [X] Yes (Pass) [ ] No (Fail)
Brief explanation: *To generate brake torque at each wheel, the ESC electronic control unit modulates electrical solenoids that open and close valves within the hydraulic control unit, which in turn controls brake fluid pressure to the foundation brake calipers located at the four wheels of the vehicle.*

System is capable of determining yaw rate — [X] Yes (Pass) [ ] No (Fail)
Brief explanation: *The component used to determine yaw rate is the yaw/lateral acceleration combination sensor, which is located on the floor pan underneath the front center console on the Cadillac SRX. The yaw rate sensor is a gyroscopic device that measures the vehicle's angular velocity around its vertical axis. The signal from the yaw rate sensor is transmitted to the ESC electronic control unit for processing by the ESC control algorithm.*

System is capable of monitoring driver steering input — [X] Yes (Pass) [ ] No (Fail)
Brief explanation: *Driver steering input is measured by a steering wheel angle sensor that is mounted on the steering column. The signal from the steering wheel angle sensor is transmitted to the ESC electronic control unit for processing by the ESC control algorithm.*

3.0 TEST DATA (CONTD)

Data Sheet 2 (Page 2 of 3)
ESC SYSTEM HARDWARE AND OPERATIONAL CHARACTERISTICS

System is capable of estimating side slip or side slip derivative — **X** Yes (Pass) / ___ No (Fail)

Brief explanation: *Sideslip and sideslip derivative are calculated values within the ESC electronic control unit based on the following sensor inputs: four independent wheel speeds (from the wheel speed sensors mounted at each wheel), yaw rate (from the combination yaw/lateral acceleration sensor mounted underneath the front center console), lateral acceleration (from the combination yaw/lateral acceleration sensor mounted underneath the front center console), and steering wheel angle (from the steering wheel angle sensor mounted on the steering column).*

System is capable of modifying engine torque during ESC activation. — **X** Yes (Pass) / ___ No (Fail)

Method used to modify torque: *During certain vehicle understeer conditions vehicle speed may be reduced by reducing engine torque. In order to reduce engine torque, the ESC electronic control unit sends a signal to the powertrain control module requesting an appropriate percent reduction in engine torque. The powertrain control module provides the requested engine torque reduction using its own control algorithm with actuation that utilizes combinations of spark and throttle.*

System is capable of activation at speeds of 20 km/h (12.4 mph) and higher — **X** Yes (Pass) / ___ No (Fail)

Speed system becomes active: *14.4 km/h*

3.0 TEST DATA (CONTD)

Data Sheet 2 (Page 3 of 3)
ESC SYSTEM HARDWARE AND OPERATIONAL CHARACTERISTICS

ESC OPERATIONAL CHARACTERISTICS (continued)

System is capable of activation during the following driving phases:
- acceleration
- braking
- coasting
- during activation of ABS or traction control

X Yes (Pass)
___ No (Fail)

Driving phases during which ESC is capable of activation:
Once the system initializes after key-on, the ESC system is active under driving phases of acceleration, deceleration, coasting, and during activation of ABS or traction control, except if the vehicle is being driven in reverse or if the forward vehicle speed is less than 14.4 km/h.

Vehicle manufacturer submitted documentation explaining how the ESC mitigates understeer

X Yes (Pass)
___ No (Fail)

DATA INDICATES COMPLIANCE: **X** Yes (Pass)
___ No (Fail)

REMARKS:

RECORDED BY: *B Kebschull* DATE RECORDED: *5/31/2011*
APPROVED BY: *P Broen* DATE APPROVED: *6/17/2011*

3.0 TEST DATA (CONTD)

Data Sheet 3 (Page 1 of 2)
ESC MALFUNCTION AND OFF TELLTALES

Vehicle: *2011 Cadillac SRX*

NHTSA No. *CB0107* Data Sheet completion date: *5/31/2011*

ESC Malfunction Telltale

Vehicle is equipped with malfunction telltale? *Yes*

Telltale Location: *Left side of the instrument panel cluster*

Telltale Color: *Yellow*

Telltale symbol or abbreviation used

or **ESC**

[X] Vehicle uses this symbol

[ ] Vehicle uses this abbreviation

[ ] Neither symbol or abbreviation is used

If different than identified above, make note of any message, symbol or abbreviation used.

The words "SERVICE STABILITRAK" are additionally shown in the Driver Information Center (DIC)

Is telltale part of a common space? *No*

Is telltale also used to indicate activation of the ESC system? *Yes*

If yes explain telltale operation during ESC activation:

Telltale flashes when Stabilitrak (ESC) system activates

3.0 TEST DATA (CONTD)

Data Sheet 3 (Page 2 of 2)
ESC MALFUNCTION AND OFF TELLTALES

"ESC OFF" Telltale (if provided)

Vehicle is equipped with "ESC OFF" telltale? *Yes*

Is "ESC Off" telltale combined with "ESC Malfunction" telltale utilizing a two part telltale? *No*

Telltale Location: *Left side of the instrument panel cluster*

Telltale Color: *Yellow*

Telltale symbol or abbreviation used

or **ESC OFF**

[X] Vehicle uses this symbol

[ ] Vehicle uses this abbreviation

[ ] Neither symbol or abbreviation is used

If different than identified above, make note of any message, symbol or abbreviation used.

Is telltale part of a common space? *No*

DATA INDICATES COMPLIANCE ***Yes***

(Vehicle is compliant if equipped with a malfunction telltale)

Remarks: *The ESC OFF button turns off both the TCS system and the Stabilitrak (ESC) system.*

RECORDED BY: *B Kebschull* DATE RECORDED: *5/31/2011*

APPROVED BY: *P Broen* DATE APPROVED: *6/17/2011*

3.0 TEST DATA (CONTD)

Data Sheet 4 (Page 1 of 3)
ESC AND ANCILLARY SYSTEM CONTROLS

Vehicle: *2011 Cadillac SRX*

NHTSA No. *CB0107* Data Sheet completion date: *5/31/2011*

"ESC OFF" Controls Identification and Operational Check:

Is the vehicle equipped with a control or controls whose purpose is to deactivate the ESC system or place the ESC system in a mode or modes that may no longer satisfy the performance requirements of the standard? **X** Yes ____ No

Type of control or controls provided? (mark all that apply)

- [X] Dedicated "ESC Off" Control
- [ ] Multi-functional control with an "ESC Off" mode
- [ ] Other (describe)

Identify each control location, labeling and selectable modes.

First Control: Location *Immediately to the right of the gear shift lever*
Labeling *ESC off icon is shown (car with slip lines, "OFF")*
Modes *On/off (off deactivates Traction Control System also)*

Second Control: Location ____
Labeling ____
Modes ____

Identify standard or default drive *Front wheel drive*

Verify standard or default drive configuration **X** Yes ___ No

Does the "ESC Off" telltale illuminate upon activation of the dedicated ESC off control or selection of the "ESC Off" mode on the multi-function control?

_____ NA **X** Yes ___ No (Fail)

Does the "ESC Off" telltale extinguish when the ignition is cycled from "on" ("Run") to "Lock" or "Off" and then back again to the "On" ("Run") position?

_____ NA **X** Yes ___ No (Fail)

If no, describe how the "Off" control functions

3.0 TEST DATA (CONTD)

Data Sheet 4 (Page 2 of 3)
ESC AND ANCILLARY SYSTEM CONTROLS

If a multi-function control is provided, cycle through each mode setting on the control and record which modes illuminate the "ESC Off" telltale. Also, for those modes that illuminate the ESC Off" telltale identify if the telltale extinguishes upon cycling the ignition system.

Control Mode	"ESC Off" telltale illuminates upon activation of control? (Yes/No)	"ESC Off" telltale extinguishes upon cycling ignition? (Yes/No)
NA		

For each mode that illuminates the "ESC Off" telltale, did the telltale extinguish when the ignition was cycled from "On" ("Run") to "Lock" or "Off" and then back again to the "On" ("Run") position?

__X__ NA ____ Yes ____ No

Other System Controls that have an ancillary effect on ESC Operation:

Is the vehicle equipped with any ancillary controls that upon activation may deactivate the ESC system or place the ESC system in a mode or modes that may no longer satisfy the performance requirements of the standard? ____ Yes __X__ No

Ancillary Control: System NA

Control Description _____

Labeling _____

Ancillary Control: System _____

Control Description _____

Labeling _____

Ancillary Control: System _____

Control Description _____

Labeling _____

3.0 TEST DATA (CONTD)

Data Sheet 4 (Page 3 of 3)
ESC AND ANCILLARY SYSTEM CONTROLS

Activate each ancillary control listed above and record whether the control illuminates the "ESC Off" telltale. Also, record warnings or messages provided regarding the ESC system.

Ancillary Control	Control Activates "ESC Off" Telltale? (Yes/No)	Warnings or Messages Provided
NA		

For those controls that illuminate the "ESC Off" telltale above identify if the "ESC Off" telltale extinguishes upon cycling the ignition system.

Ancillary Control	"ESC Off" telltale extinguishes upon cycling ignition? (Yes/No)
NA	

For each ancillary control that illuminates the "ESC Off" telltale, did the telltale extinguish when the ignition is cycled from "On" ("Run") to "Lock" or "Off" and then back again to the "On" ("Run") position? If activating the control places the vehicle into a low-range four-wheel drive configuration designed for low-speed, off–road driving, the ESC system may remain turned off after the ignition has been cycled off and then back on and therefore the "ESC Off" telltale may not extinguish.

___ Yes ___ No (Fail) X NA

DATA INDICATES COMPLIANCE: PASS

Remarks:

RECORDED BY: *B Kebschull* DATE RECORDED: *5/31/2011*
APPROVED BY: *P Broen* DATE APPROVED: *6/17/2011*

3.0 TEST DATA (CONTD)

Data Sheet 5 (Page 1 of 3)
TEST TRACK AND VEHICLE DATA

Vehicle: *2011 Cadillac SRX*

NHTSA No. *CB0107* Data Sheet completion date: *6/2/2011*

Test Track Requirements: Test surface slope (0-1%): *0.5%*

Peak Friction Coefficient (at least 0.9) *0.951*

Test track data meets requirements: *Yes* If no, explain:

Full Fluid Levels: Fuel *Yes* Other Fluids *Yes* (specify)

Coolant *Yes* *Oil, Washer Fluid, Brake Fluid*

Tire Pressures:

Required; Front Axle *240* kPa Rear Axle *240* kPa

Actual; LF *240* kPa RF *240* kPa

LR *240* kPa RR *240* kPa

Vehicle Dimensions: Front Track Width *161.3* cm Wheelbase *280.7* cm

Rear Track Width *161.3* cm

Vehicle Weight Ratings: GAWR Front *1410* kg GAWR Rear *1300* kg

Unloaded Vehicle Weight (UVW):

Front Axle *1161.6* kg Left Front *594.2* kg Right Front *567.4* kg

Rear Axle *835.5* kg Left Rear *419.6* kg Right Rear *415.9* kg

Total UVW *1997.1* kg

Baseline Weight and Outrigger Selection (only for MPVs, Trucks, Buses)

Calculated baseline weight (UVW + 73kg) *2070.1* kg

Outrigger size required ("Standard" or "Heavy") *Standard*

Standard - Baseline weight under 2772 kg (6000 lb)
Heavy - Baseline weight equal to or greater than 2772 kg (6000 lb)

3.0 TEST DATA (CONTD)

Data Sheet 5 (Page 2 of 3)
TEST TRACK AND VEHICLE DATA

UVW with Outriggers: (only for MPVs, Trucks, Buses)

Front axle *1197.0* kg Left front *612.8* kg Right front *584.2* kg

Rear axle *865.9* kg Left rear *431.8* kg Right rear *434.1* kg

Total UVW with outriggers *2062.9* kg

Loaded Vehicle Weight w/Driver and Instrumentation (no Ballast)

Front axle *1267.8* kg Left front *653.6* kg Right front *614.2* kg

Rear axle *933.9* kg Left rear *469.0* kg Right rear *464.9* kg

Vehicle Weight *2201.7* kg

Ballast Required =

[Total UVW with Outriggers (if applicable)]		+ *168*	kg	- [Loaded Weight w/Driver and Instrumentation)]	
= *2062.9*	kg	+ *168*	kg	- 2201.7	kg

= *29.2* kg

Total Loaded Vehicle Weight w/Driver and Instrumentation and Ballast

Front axle *1278.6* kg Left front *654.5* kg Right front *624.1* kg

Rear axle *952.1* kg Left rear *476.7* kg Right rear *475.4* kg

Total UVW *2230.7* kg

3.0 TEST DATA (CONTD)

Data Sheet 5 (Page 3 of 3)
TEST TRACK AND VEHICLE DATA

Center of Gravity and Inertial Sensing System Location at Loaded Vehicle Condition:

x-distance (longitudinal)	Point of reference is the front axle centerline. (Positive from front axle toward rear of vehicle.)
y-distance (lateral)	Point of reference is the vehicle centerline. (Positive from the center toward the right.)
z-distance (vertical)	Point of reference is the ground plane. (Positive from the ground up.)

Locations:

	Center of Gravity				Inertial Sensing System			
x-distance	*47.2*	in	*119.8*	cm	*69.2*	in	*175.8*	cm
y-distance	*-0.4*	in	*-1.1*	cm	*0.3*	in	*0.8*	cm
z-distance	*24.7*	in	*62.6*	cm	*19.0*	in	*48.1*	cm
Roof Height					*64.9*	in	*164.8*	cm
Distance between ultrasonic sensors					*88.0*	in	*223.5*	cm

Remarks:

RECORDED BY: *B Kebschull* DATE RECORDED: *6/2/2011*
APPROVED BY: *P Broen* DATE APPROVED: *6/17/2011*

3.0 TEST DATA (CONTD)

Data Sheet 6 (Page 1 of 3)
BRAKE AND TIRE CONDITIONING

Vehicle: *2011 Cadillac SRX*

NHTSA No. *CB0107*

Measured tire pressure: LF *245* kPa RF *244* kPa

LR *243* kPa RR *237* kPa

Wind Speed *3.2* m/s (10 m/sec (22 mph) max for passenger cars; 5m/sec (11 mph) max for MPVs and trucks)

Ambient Temperature (7°C (45°F) - 40°C (104°F)) *16* °C

Brake Conditioning Time: *9:08:00 AM* Date: *6/2/2011*

56 km/h (35 mph) Brake Stops

Number of stops executed (10 required) *10* Stops

Observed deceleration range (0.5g target) *0.45 - 0.55* g

72 km/h (45 mph) Brake Stops

Number of stops executed (3 required) *3* Stops

Number of stops ABS activated (3 required) *3* Stops

Observed deceleration range *0.85 - 0.95* g

72 km/h (45 mph) Brake Cool Down Period

Duration of cool down period (5 minutes min.) *5* Minutes

3.0 TEST DATA (CONTD)

Data Sheet 6 (Page 2 of 3)
BRAKE AND TIRE CONDITIONING

Tire Conditioning series No. 1 Time: *9:15:00 AM* Date: *6/2/2011*

Measured cold tire pressure LF *254* kPa RF *256* kPa

LR *252* kPa RR *246* kPa

Wind Speed *1.4* m/s (10 m/sec (22 mph) max for passenger cars; 5m/sec (11 mph) max for MPVs and trucks)

Ambient Temperature (7°C (45°F) - 40°C (104°F)) *18*°C

30 meter (100 ft) Diameter Circle Maneuver				
Test Run	Steering Direction	Target Lateral Acceleration (g)	Observed Lateral Acceleration (g)	Observed Vehicle Speed (Km/h)
1-3	Clockwise	0.5 – 0.6	*0.5-0.6*	*30.4 - 32*
4-6	Counterclockwise	0.5 – 0.6	*0.5-0.6*	*30.4 - 32*

5-1 Hz Cycle Sinusoidal Steering Maneuver to Determine Steering Wheel Angle for 0.5-0.6 g Lateral Acceleration					
Test Run	Data File	Vehicle Speed Km/h(mph)	Steering Wheel Angle (degrees)	Target Peak Lateral Acceleration (g)	Observed Peak Lateral Acceleration (g)
1	2	56 ± 2 (35 ± 1)	*60*	0.5 - 0.6	*0.42*
2	3	56 ± 2 (35 ± 1)	*80*	0.5 - 0.6	*0.52*
3		56 ± 2 (35 ± 1)		0.5 - 0.6	
4		56 ± 2 (35 ± 1)		0.5 - 0.6	

Steering wheel angle that corresponds to a peak 0.5-0.6 g lateral acceleration: *80* degrees

10-1 Hz Cycle Sinusoidal Steering Maneuver					
Test Run	Data File	Vehicle Speed Km/h (mph)	Steering Wheel Angle (degrees)	Target Peak Lateral Acceleration (g)	Observed Peak Lateral Acceleration (g)
1-3	*4-6*	56 ± 2 (35 ± 1)	*80* (cycles 1-10)	0.5 - 0.6	*0.52*
4	*7*	56 ± 2 (35 ± 1)	*80* (cycles 1-9)	0.5 - 0.6	*0.52*
			160 (cycle10)*	NA	*0.8*

* The steering wheel angle used for cycle 10 should be twice the angle used for cycles 1-9

3.0 TEST DATA (CONTD)

Data Sheet 6 (Page 3 of 3)
BRAKE AND TIRE CONDITIONING

Tire Conditioning series No. 2 Time: *11:15:00 AM* Date: *6/2/2011*

Measured cold tire pressure LF *260* kPa RF *264* kPa

LR *254* kPa RR *248* kPa

Wind Speed *0* m/s (10 m/sec (22 mph) max for passenger cars; 5m/sec (11 mph) max for MPVs and trucks)

Ambient Temperature (7°C (45°F) - 40°C (104°F)) *21* °C

30 meter (100 ft) Diameter Circle Maneuver				
Test Run	Steering Direction	Target Lateral Acceleration (g)	Observed Lateral Acceleration (g)	Observed Vehicle Speed (Km/h)
1-3	Clockwise	0.5 - 0.6	*0.5-0.6*	*30.4 - 32*
4-6	Counterclockwise	0.5 - 0.6	*0.5-0.6*	*30.4 - 32*

Steering wheel angle that corresponds to a peak 0.5-0.6 g lateral acceleration:

80 **degrees**

10-1 Hz Cycle Sinusoidal Steering Maneuver					
Test Run	Data File	Vehicle Speed Km/h (mph)	Steering Wheel Angle (degrees)	Target Peak Lateral Acceleration (g)	Observed Peak Lateral Acceleration (g)
1-3	*23-25*	56 ± 2 (35 ± 1)	*80* (cycles 1-10)	0.5 - 0.6	*0.52*
4	*26*	56 ± 2 (35 ± 1)	*80* (cycles 1-9)	0.5 - 0.6	*0.52*
			160 (cycle 10)*	NA	*0.8*

* The steering wheel angle used for cycle 10 should be twice the angle used for cycles 1-9

Remarks:

RECORDED BY: *P Broen* DATE RECORDED: *6/2/2011*

APPROVED BY: *J Lenkeit* DATE APPROVED: *6/29/2011*

3.0 TEST DATA (CONTD)

Data Sheet 7 (Page 1 of 2)
SLOWLY INCREASING STEER (SIS) MANEUVER

Vehicle: *2011 Cadillac SRX*

NHTSA No. *CB0107*

Measured tire pressure: LF *256* kPa RF *259* kPa

LR *253* kPa RR *249* kPa

Wind Speed *3.4* m/s

(10 m/sec (22 mph) max for passenger cars; 5 m/sec (11 mph) max for MPVs and trucks)

Ambient Temperature (7°C (45°F) - 40°C (104°F)) *19* °C

Selected drive configuration *FWD*

Selected Mode: *Default- ESC on*

Preliminary Left Steer Maneuver:

Lateral Acceleration measured at 30 degrees steering wheel angle

$a_{y,30degrees}$ = *0.36* g

Assuming a linear relationship the following ratio should be used to calculate the steering wheel angle at 0.55g:

$$\frac{30\,\text{degrees}}{a_{\text{y,30degrees}}} = \frac{\delta_{SIS}}{0.55\,\text{g}}$$

δ_{sis} = *45.8* degrees (@.55g)

δ_{sis} = *50* degrees (rounded)

Steering Wheel Angle at Corrected 0.3g Lateral Acceleration:

Maneuver	Initial Steer Direction	Time Clock (5 min max between runs)	Steering Wheel Angle to nearest 0.1° (degrees)	Data Run	Good/NG
1	Left	*10:50*	*28.8*	*20*	*Good*
2	Left	*10:53*	*28.7*	*21*	*Good*
3	Left	*10:56*	*28.2*	*22*	*Good*
4	Left				
5	Left				
1	Right	*10:38*	*-28.1*	*17*	*Good*
2	Right	*10:44*	*-27.8*	*18*	*Good*
3	Right	*10:47*	*-27.1*	*19*	*Good*
4	Right				
5	Right				

3.0 TEST DATA (CONTD)

Data Sheet 7 (Page 2 of 2)
SLOWLY INCREASING STEER (SIS) MANEUVER

Average Overall Steering Wheel Angle:

$$\delta_{0.3\ g,\ overall} = (\left| \delta_{0.3\ g,\ left\ (1)} \right| + \left| \delta_{0.3\ g,\ left\ (2)} \right| + \left| \delta_{0.3\ g,\ left\ (3)} \right| + \delta_{0.3\ g,\ right\ (1)} + \delta_{0.3\ g,\ right\ (2)} + \delta_{0.3\ g,\ right\ (3)}) / 6$$

$\delta_{0.3\ g,\ overall}$ = *28.1* degrees

[to nearest 0.1 degree]

Remarks: Runs 10-16 were NG, due to a left ultransonic sensor problem.

RECORDED BY: *P Broen* DATE RECORDED: *6/2/2011*
APPROVED BY: *B Kebschull* DATE APPROVED: *6/2/2011*

3.0 TEST DATA (CONTD)

Data Sheet 8 (Page 1 of 3)
VEHICLE LATERAL STABILITY AND RESPONSIVENESS

Vehicle: *2011 Cadillac SRX*

NHTSA No. *CB0107* Data sheet completion date: *6/2/2011*

Tire conditioning completed	[X] Yes	[ ] No
ESC system is enabled	[X] Yes	[ ] No
On track calibration checks have been completed	[X] Yes	[ ] No
On track static data file for each sensor obtained	[X] Yes	[ ] No

Selected Drive Configuration: *FWD*

Selected Mode: *Default- ESC on*

Overall steering wheel angle ($\delta_{0.3\ g,\ overall}$) *28.1* degrees

Lateral Stability Test Series No. 1 – Counterclockwise Initial Steer Direction

Maneuver #	Clock Time (1.5 – 5.0 min max between runs)	Commanded Steering Wheel Angle[1]		Yaw Rates (degrees/sec)			YRR at 1.0 sec after COS [≤ 35%]		YRR at 1.75 sec after COS [≤ 20%]	
		Scalar (* $\delta_{0.3\ g}$)	Angle (degrees)	$\dot{\psi}_{Peak}$	$\dot{\psi}_{1.0sec}$	$\dot{\psi}_{1.75sec}$	%	Pass/Fail	%	Pass/Fail
28	11:35 AM	1.5	42	12.00	-0.07	-0.09	-0.61	PASS	-0.75	PASS
29	11:40 AM	2.0	56	15.55	-0.13	-0.13	-0.84	PASS	-0.85	PASS
30	11:43 AM	2.5	70	18.95	-0.19	-0.12	-1.00	PASS	-0.63	PASS
31	11:46 AM	3.0	84	22.72	-0.27	-0.03	-1.20	PASS	-0.15	PASS
32	11:49 AM	3.5	98	28.02	-0.24	-0.04	-0.85	PASS	-0.15	PASS
33	11:53 AM	4.0	112	31.74	-0.05	-0.03	-0.16	PASS	-0.08	PASS
34	11:56 AM	4.5	126	36.87	-0.13	-0.22	-0.36	PASS	-0.59	PASS
35	11:59 AM	5.0	141	40.04	-0.06	-0.09	-0.14	PASS	-0.21	PASS
36	12:02 PM	5.5	155	38.31	-0.07	-0.12	-0.18	PASS	-0.30	PASS
37	12:04 PM	6.0	169	38.40	-0.04	-0.02	-0.10	PASS	-0.06	PASS
38	12:07 PM	6.5	183	39.96	0.08	0.04	0.21	PASS	0.10	PASS
39	12:10 PM	7.0	197	42.42	-0.18	-0.09	-0.42	PASS	-0.21	PASS
40	12:13 PM	7.5	211	42.31	-0.12	-0.15	-0.30	PASS	-0.35	PASS
42	12:21 PM	8.0	225	43.01	-0.06	-0.08	-0.13	PASS	-0.19	PASS
43	12:23 PM	8.5	239	43.47	-0.50	-0.36	-1.15	PASS	-0.83	PASS
44	12:26 PM	9.0	253	44.11	-0.32	-0.28	-0.73	PASS	-0.64	PASS
45	12:29 PM	9.5	267	47.07	-0.35	-0.15	-0.75	PASS	-0.31	PASS
46	12:31 PM	-	270	46.99	-0.60	-0.37	-1.27	PASS	-0.79	PASS

1. Maneuver execution should continue until a steering wheel angle magnitude factor of 6.5*$\delta_{0.3\ g,\ overall}$ or 270 degrees is utilized, whichever is greater provided the calculated magnitude of 6.5*$\delta_{0.3\ g,\ overall}$ is less than or equal to 300 degrees. If 6.5*$\delta_{0.3\ g,\ overall}$ is less than 270 degrees maneuver execution should continue by increasing the steering wheel angle magnitude by multiples of 0.5*$\delta_{0.3\ g,\ overall}$ without exceeding the 270 degree steering wheel angle.

3.0 TEST DATA (CONTD)

DATA SHEET 8 (2 of 3)
VEHICLE LATERAL STABILITY AND RESPONSIVENESS

LATERAL STABILITY TEST SERIES NO. 2 – Clockwise Initial Steer Direction

Maneuver #	Clock Time (1.5 – 5.0 min max between runs)	Commanded Steering Wheel Angle[1]		Yaw Rates (degrees/sec)			YRR at 1.0 sec after COS [< 35%]		YRR at 1.75 sec after COS [< 20%]	
		Scalar (* $\delta_{0.3\,g}$)	Angle (degrees)	$\dot{\psi}_{Peak}$	$\dot{\psi}_{1.0sec}$	$\dot{\psi}_{1.75sec}$	%	Pass/Fail	%	Pass/Fail
47	12:37	1.5	42	-12.31	-0.02	0.01	0.18	*PASS*	-0.07	*PASS*
48	12:40	2.0	56	-16.17	-0.13	-0.11	0.79	*PASS*	0.65	*PASS*
49	12:43	2.5	70	-19.95	-0.06	0.11	0.28	*PASS*	-0.57	*PASS*
50	12:46	3.0	84	-24.05	0.19	-0.12	-0.80	*PASS*	0.51	*PASS*
51	12:48	3.5	98	-28.49	0.22	0.10	-0.79	*PASS*	-0.34	*PASS*
52	12:51	4.0	112	-32.43	0.06	0.07	-0.19	*PASS*	-0.20	*PASS*
53	12:54	4.5	126	-36.98	0.11	0.03	-0.29	*PASS*	-0.07	*PASS*
54	12:56	5.0	141	-41.84	0.09	0.06	-0.21	*PASS*	-0.15	*PASS*
55	12:59	5.5	155	-45.31	0.51	0.17	-1.13	*PASS*	-0.39	*PASS*
56	13:02	6.0	169	-47.89	-0.07	0.04	0.15	*PASS*	-0.08	*PASS*
57	13:05	6.5	183	-43.18	0.10	0.11	-0.24	*PASS*	-0.26	*PASS*
58	13:11	7.0	197	-45.57	-0.01	0.03	0.03	*PASS*	-0.06	*PASS*
59	13:14	7.5	211	-47.81	0.22	0.13	-0.46	*PASS*	-0.28	*PASS*
60	13:17	8.0	225	-48.98	0.39	0.02	-0.80	*PASS*	-0.05	*PASS*
61	13:19	8.5	239	-47.96	0.04	-0.16	-0.08	*PASS*	0.33	*PASS*
62	13:22	9.0	253	-48.04	0.55	0.29	-1.15	*PASS*	-0.60	*PASS*
63	13:25	9.5	267	-49.22	0.30	0.10	-0.60	*PASS*	-0.20	*PASS*
64	13:27	-	270	-51.23	0.21	0.27	-0.40	*PASS*	-0.53	*PASS*

1. Maneuver execution should continue until a steering wheel angle magnitude factor of $6.5*\delta_{0.3\,g,\,overall}$ or 270 degrees is utilized, whichever is greater provided the calculated $6.5*\delta_{0.3\,g,\,overall}$ is less than or equal to 300 degrees. If $6.5*\delta_{0.3\,g,\,overall}$ is less than 270 degrees maneuver execution should continue by increasing the steering wheel angle magnitude by multiples of $0.5*\delta_{0.3\,g,\,overall}$ without exceeding the 270 degree steering wheel angle.

During execution of the Sine with Dwell maneuvers were any of the following events observed?

Rim-to-pavement contact	☐ Yes	☒ No
Tire debeading	☐ Yes	☒ No
Loss of pavement contact of vehicle tires	☐ Yes	☒ No
Did the test driver experience any vehicle loss of control or spinout?	☐ Yes	☒ No

If "Yes" explain the event and consult with the COTR.

3.0 TEST DATA (CONTD)

DATA SHEET 8 (3 of 3)
VEHICLE LATERAL STABILITY AND RESPONSIVENESS

Responsiveness – Lateral Displacement

Maneuver #	Initial Steer Direction	Commanded Steering Wheel Angle (5.0*$\delta_{0.3\ g,\ overall}$ or greater)		Calculated Lateral Displacement[1]	
		Scalar *$\delta_{0.3\ g}$	Angle (degrees)	Distance (m)	Pass/Fail
35	Counter Clockwise	5.0	141	-3.3	*PASS*
36	Counter Clockwise	5.5	155	-3.3	*PASS*
37	Counter Clockwise	6.0	169	-3.4	*PASS*
38	Counter Clockwise	6.5	183	-3.3	*PASS*
39	Counter Clockwise	7.0	197	-3.4	*PASS*
40	Counter Clockwise	7.5	211	-3.4	*PASS*
42	Counter Clockwise	8.0	225	-3.5	*PASS*
43	Counter Clockwise	8.5	239	-3.4	*PASS*
44	Counter Clockwise	9.0	253	-3.4	*PASS*
45	Counter Clockwise	9.5	267	-3.4	*PASS*
46	Counter Clockwise	-	270	-3.4	*PASS*
54	Clockwise	5.0	141	3.1	*PASS*
55	Clockwise	5.5	155	3.1	*PASS*
56	Clockwise	6.0	169	3.2	*PASS*
57	Clockwise	6.5	183	3.2	*PASS*
58	Clockwise	7.0	197	3.2	*PASS*
59	Clockwise	7.5	211	3.3	*PASS*
60	Clockwise	8.0	225	3.3	*PASS*
61	Clockwise	8.5	239	3.3	*PASS*
62	Clockwise	9.0	253	3.3	*PASS*
63	Clockwise	9.5	267	3.3	*PASS*
64	Clockwise	-	270	3.3	*PASS*

1. Lateral displacement should be $\geq$ 1.83 m (6 ft) for vehicle with a GVWR of 3,500 kg (7,716 lb) or less; and $\geq$ 1.52 m (5 ft) for vehicles with GVWR greater than 3,500 kg (7,716 lb).

DATA INDICATES COMPLIANCE: ☑ PASS ☐ FAIL

Remarks:

RECORDED BY: *P Broen* DATE RECORDED: *6/2/2011*

APPROVED BY: *J Lenkeit* DATE APPROVED: *6/29/2011*

3.0 TEST DATA (CONTD)

Data Sheet 9 (Page 1 of 2)
MALFUNCTION WARNING TESTS

Vehicle: *2011 Cadillac SRX*

NHTSA No. *CB0107* Data Sheet Completion Date: *6/2/2011*

TEST 1

MALFUNCTION SIMULATION: Describe method of malfunction simulation

Disconnect left front wheel speed sensor

MALFUNCTION TELLTALE ILLUMINATION:

Telltale illuminates and remains illuminated after ignition locking system is activated and if necessary the vehicle is driven at least 2 minutes.

X Yes ___ No

Time for telltale to illuminate after ignition system is activated and vehicle speed of 48 ± 8 km/h (30 ± 5 mph) is reached.

0 Seconds (must be within 2 minutes) [X] Pass [ ] Fail

ESC SYSTEM RESTORATION

Telltale extinguishes after ignition locking system is activated and if necessary the vehicle is driven at least 2 minutes.

X Yes ___ No

Time for telltale to extinguish after ignition system is activated and vehicle speed of 48 ± 8 km/h (30 ± 5 mph) is reached.

0 Seconds (must be within 2 minutes) [X] Pass [ ] Fail

TEST 1 DATA INDICATES COMPLIANCE: *PASS*

Remarks: *Malfunction telltale illuminated immediately upon ignition (no driving was necessary). After the wheel speed sensor was reconnected, the telltale extinguished immediately upon ignition (no driving was necessary). Note: The ABS malfunction telltale also illuminated while the sensor was disconnected, and extinguished when it was reconnected. Also, "Service Stabilitrak" was displayed in the common display area in the center of the IP during the malfunction.*

RECORDED BY: *B Kebschull* DATE RECORDED: *6/2/2011*

APPROVED BY: *P Broen* DATE APPROVED *6/30/2011*

3.0 TEST DATA (CONTD)

Data Sheet 9 (Page 2 of 2)
MALFUNCTION WARNING TESTS

Vehicle: *2011 Cadillac SRX*

NHTSA No. *CB0107* Data Sheet Completion Date: *6/2/2011*

TEST 2

MALFUNCTION SIMULATION: Describe method of malfunction simulation

Removed EBCM fuse

MALFUNCTION TELLTALE ILLUMINATION:

Telltale illuminates and remains illuminated after ignition locking system is activated and if necessary the vehicle is driven at least 2 minutes.

X Yes ___ No

Time for telltale to illuminate after ignition system is activated and vehicle speed of 48 ± 8 km/h (30 ± 5 mph) is reached.

0 Seconds (must be within 2 minutes) [X] Pass [ ] Fail

ESC SYSTEM RESTORATION

Telltale extinguishes after ignition locking system is activated and if necessary the vehicle is driven at least 2 minutes.

X Yes ___ No

Time for telltale to extinguish after ignition system is activated and vehicle speed of 48 ± 8 km/h (30 ± 5 mph) is reached.

0 Seconds (must be within 2 minutes) [X] Pass [ ] Fail

TEST 2 DATA INDICATES COMPLIANCE: PASS

Remarks: *Malfunction telltale illuminated immediately upon ignition (no driving was necessary). After the EBCM fuse was reinstalled, the telltale extinguished immediately upon ignition (no driving was necessary). Note: The ABS malfunction telltale also illuminated while the fuse was removed, and extinguished when it was reconnected. Also, "Service Stabilitrak" was displayed in the common display area in the center of the IP during the malfunction.*

RECORDED BY: *B Kebschull* DATE RECORDED: *6/2/2011*

APPROVED BY: *P Broen* DATE APPROVED *6/17/2011*

4.0 TEST EQUIPMENT LIST AND CALIBRATION INFORMATION (1 OF 2)

TABLE 1. TEST INSTRUMENTATION

Type	Output	Range	Resolution	Accuracy	Specifics	Serial Number	Calibration
Tire Pressure Gauge	Vehicle Tire Pressure	0-100 psi 0-690 kPa	1 psi 6.89 kPa	0.5 psi 3.45 kPa	Ashcroft D1005PS	1039350	By: DRI Date:2/22/11 Due: 2/22/12
Platform Scales	Vehicle Total, Wheel, and Axle Load	8000 lb 35.6 kN	0.5 lb 2.2 N	±1.0% of applied load	Intercomp Model SWII	24032361	By: DRI Date: 2/23/11 Due: 2/23/12
Automated Steering Machine with Steering Angle Encoder	Handwheel Angle	±800 deg	0.25 deg	±0.25 deg	Heitz Automotive Testing Model: Sprint 3	60304	By: DRI Date: 3/30/11 Due: 3/30/12
Multi-Axis Inertial Sensing System	Longitudinal, Lateral, and Vertical Acceleration Roll, Yaw, and Pitch Rate	Accelerometers: ±2 g Angular Rate Sensors: ±100 deg/s	Accelerometers: ≤10 ug Angular Rate Sensors: ≤0.004 deg/s	Accelerometers: ≤0.05% of full range Angular Rate Sensors: 0.05% of full range	BEI Technologies Model: MotionPAK MP-1	0767	By: Systron Donner Date: 3/8/11 Due: 3/8/12
Radar Speed Sensor and Dashboard Display	Vehicle Speed	0-125 mph 0-200 km/h	0.009 mph .014 km/h	±0.25% of full scale	A-DAT Corp. Radar Model: DRS-6 Display Model: RD-2	1400.604	By: DRI Date: 5/3/11 Due: 5/3/12
Ultrasonic Distance Measuring System	Left and Right Side Vehicle Height	5-24 inches 127-610 mm	0.01 inches .254 mm	±0.25% of maximum distance	Massa Products Corporation Model: M-5000/220	DOT-NHTSA D2646	By: DRI Date: 2/22/11 Due: 2/21/12
						DOT-NHTSA D3272	By: DRI Date: 2/22/11 Due: 2/22/12

4.0 TEST EQUIPMENT LIST AND CALIBRATION INFORMATION (2 OF 2)

TABLE 1. TEST INSTRUMENTATION (CONTD)

Type	Output	Range	Resolution	Accuracy	Specifics	Serial Number	Calibration
Data Acquisition System [Includes amplification, anti-aliasing, and analog to digital conversion.]	Record Time; Velocity; Distance; Lateral, Longitudinal, and Vertical Accelerations; Roll, Yaw, and Pitch Rates; Steering Wheel Angle.	Sufficient to meet or exceed individual sensors	200 Hz	Sufficient to meet or exceed individual sensors	SoMat eDaq ECPU processor	MSHLB.03-2476	By: DRI Date: 3/29/11 Due: 3/29/12
					SoMat High level Board EHLS	MSHLS.03-3182	By: DRI Date: 3/29/11 Due: 3/29/12
Load Cell	Vehicle Brake Pedal Force	0-300 lb 0-1.33 kN	1 lb 4.44 N	±0.05% of full scale	Lebow 3663-300	767	Operationally verified by DRI prior to test
Coordinate Measurement Machine	Inertial Sensing System Coordinates	0-8 ft 0-2.4 m	±.0020 in. ±.051 mm	±.0020 in. ±.051 mm (Single point articulation accuracy)	Faro Arm Fusion	UO8-05-08-06636	By; DRI Date: 11/7/10 Due: 11/7/11
Outriggers	No output. Safety Item.	NA	NA	NA	DRI manufactured Aluminum meeting the weight and MOI specifications of Docket 2007-27662-11	NA	NA

5.0 PHOTOGRAPHS (1 of 14)

Figure 5.1. Front View of Test Vehicle

5.0 PHOTOGRAPHS (2 of 14)

Figure 5.2. Rear View of Test Vehicle

5.0 PHOTOGRAPHS (3 of 14)

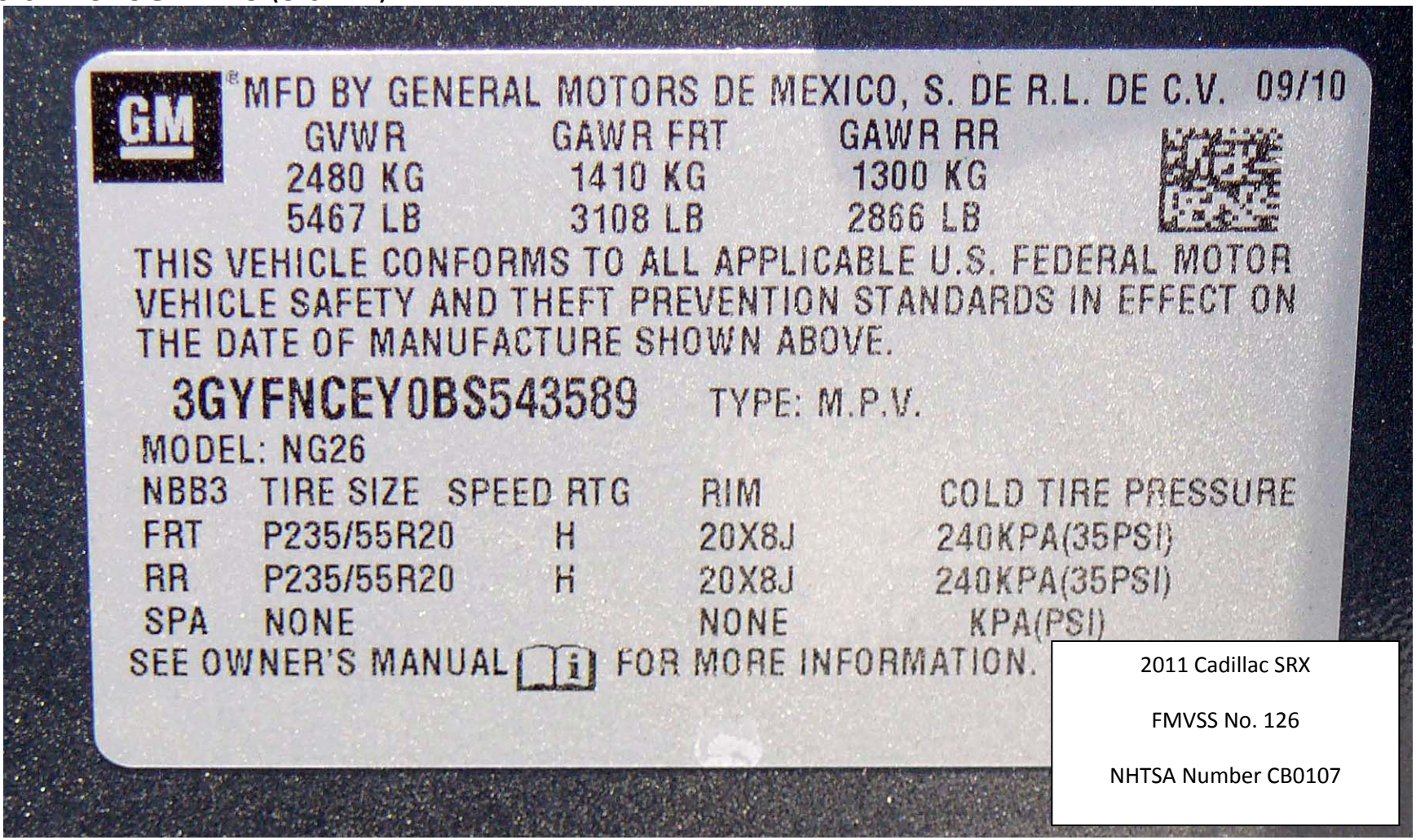


Figure 5.3. Vehicle Certification Label

5.0 PHOTOGRAPHS (4 of 14)

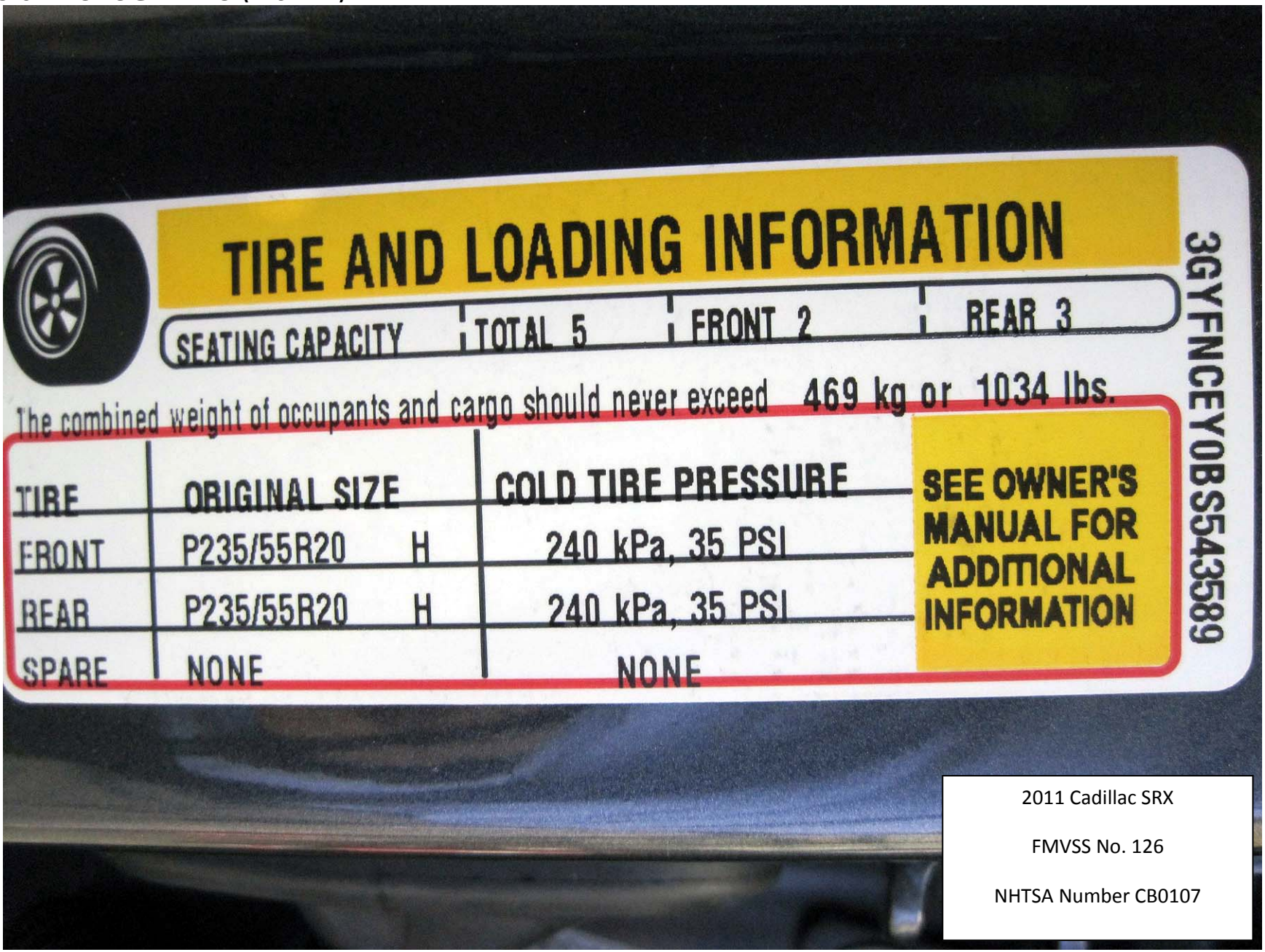


Figure 5.4. Vehicle Placard

5.0 PHOTOGRAPHS (5 of 14)

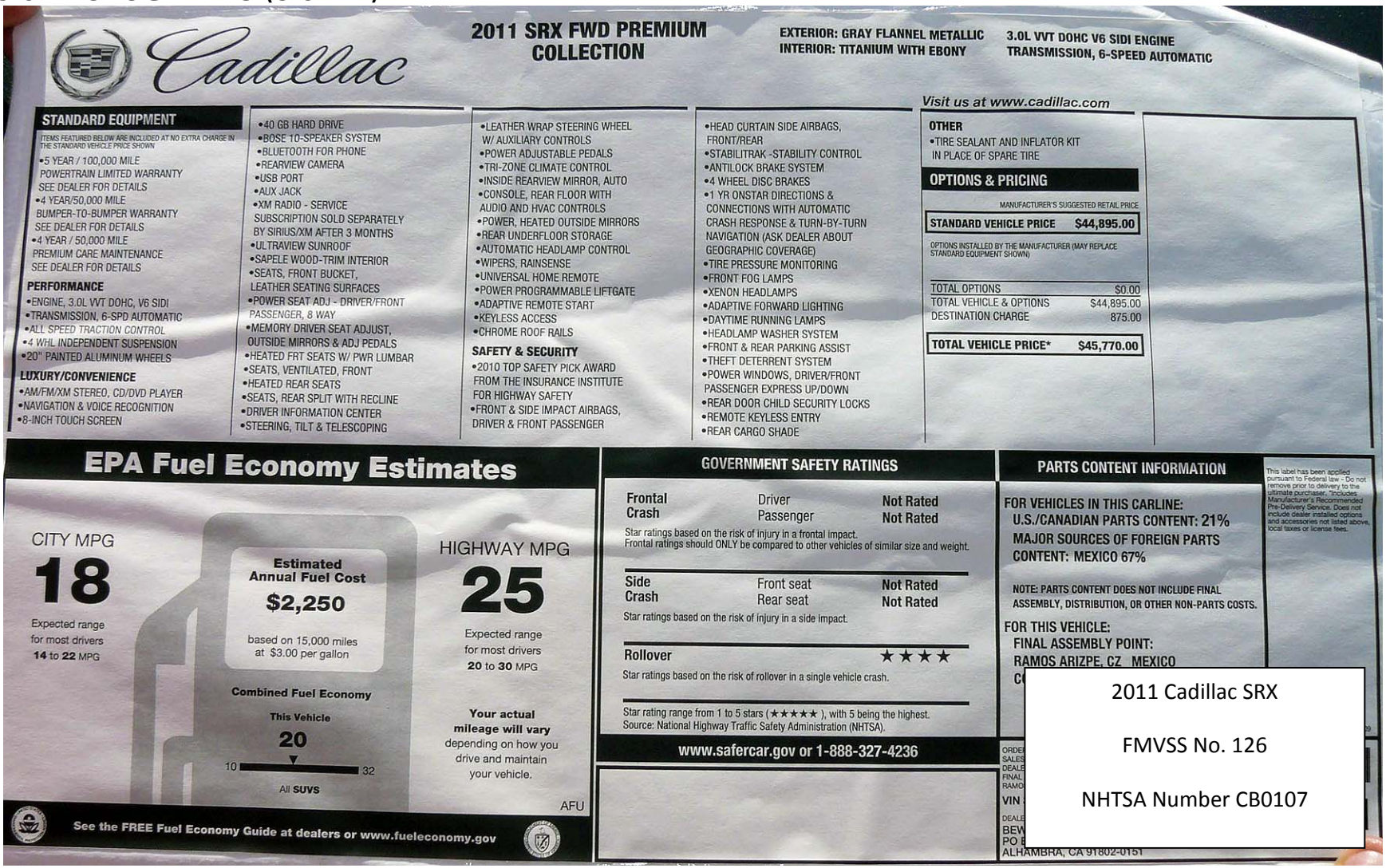


Figure 5.5. Window Sticker (Monroney Label)

5.0 PHOTOGRAPHS (6 of 14)

Figure 5.6. Front View of Vehicle as Tested

5.0 PHOTOGRAPHS (7 of 14)

Figure 5.7. Rear View of Vehicle as Tested

5.0 PHOTOGRAPHS (8 of 14)

Figure 5.8. Ultrasonic Height Sensor Mounted on Side of Vehicle for Determining Body Roll Angle

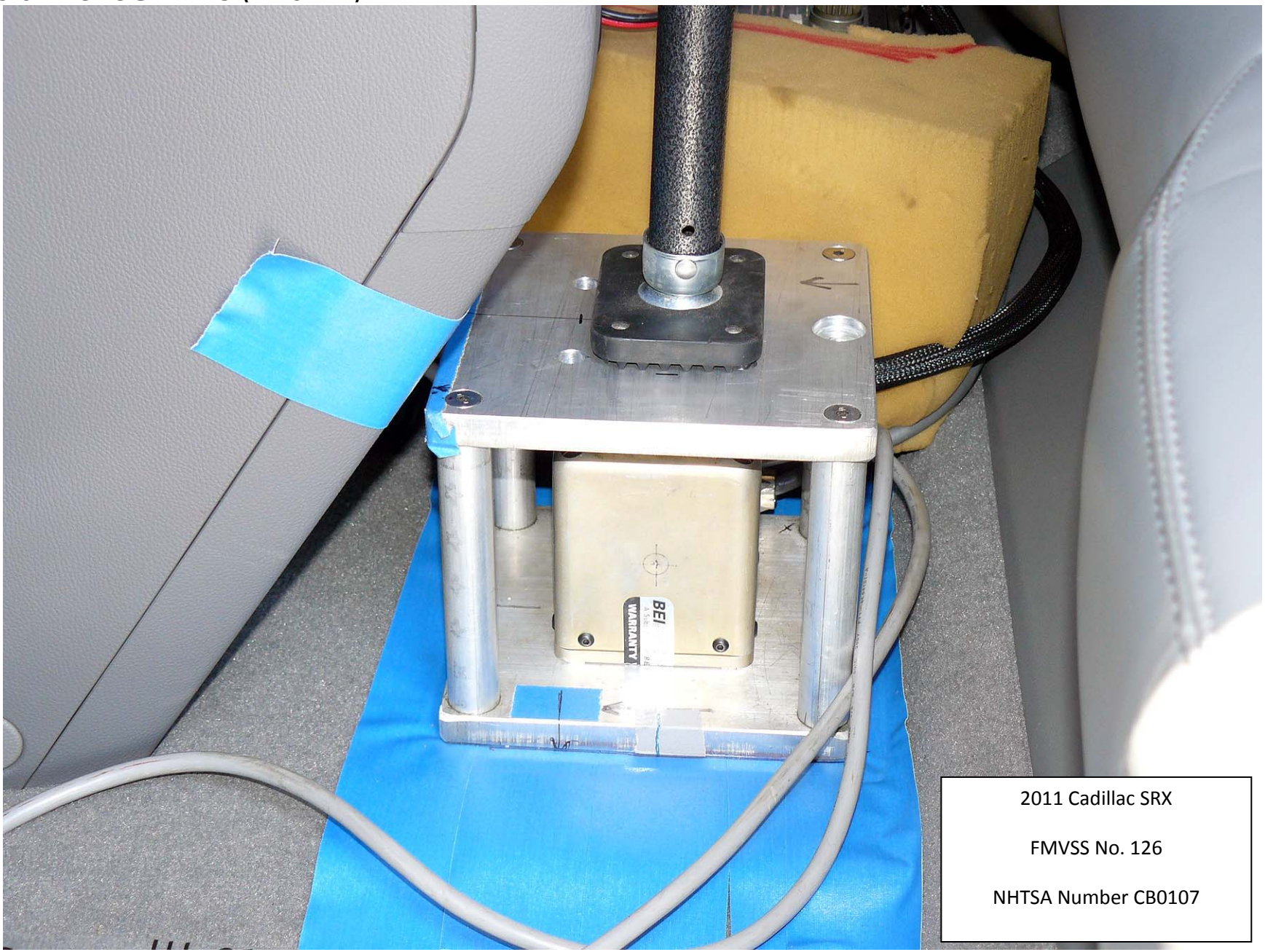
5.0 PHOTOGRAPHS (9 of 14)

Figure 5.9. Rear Mounted Speed Sensor

5.0 PHOTOGRAPHS (10 of 14)

Figure 5.10. Steering Controller and Data Acquisition Computer

5.0 PHOTOGRAPHS (11 of 14)



2011 Cadillac SRX

FMVSS No. 126

NHTSA Number CB0107

Figure 5.11. Inertial Measurement Unit Mounted in Vehicle

5.0 PHOTOGRAPHS (12 of 14)

Figure 5.12. Brake Pedal Load Cell

5.0 PHOTOGRAPHS (13 of 14)

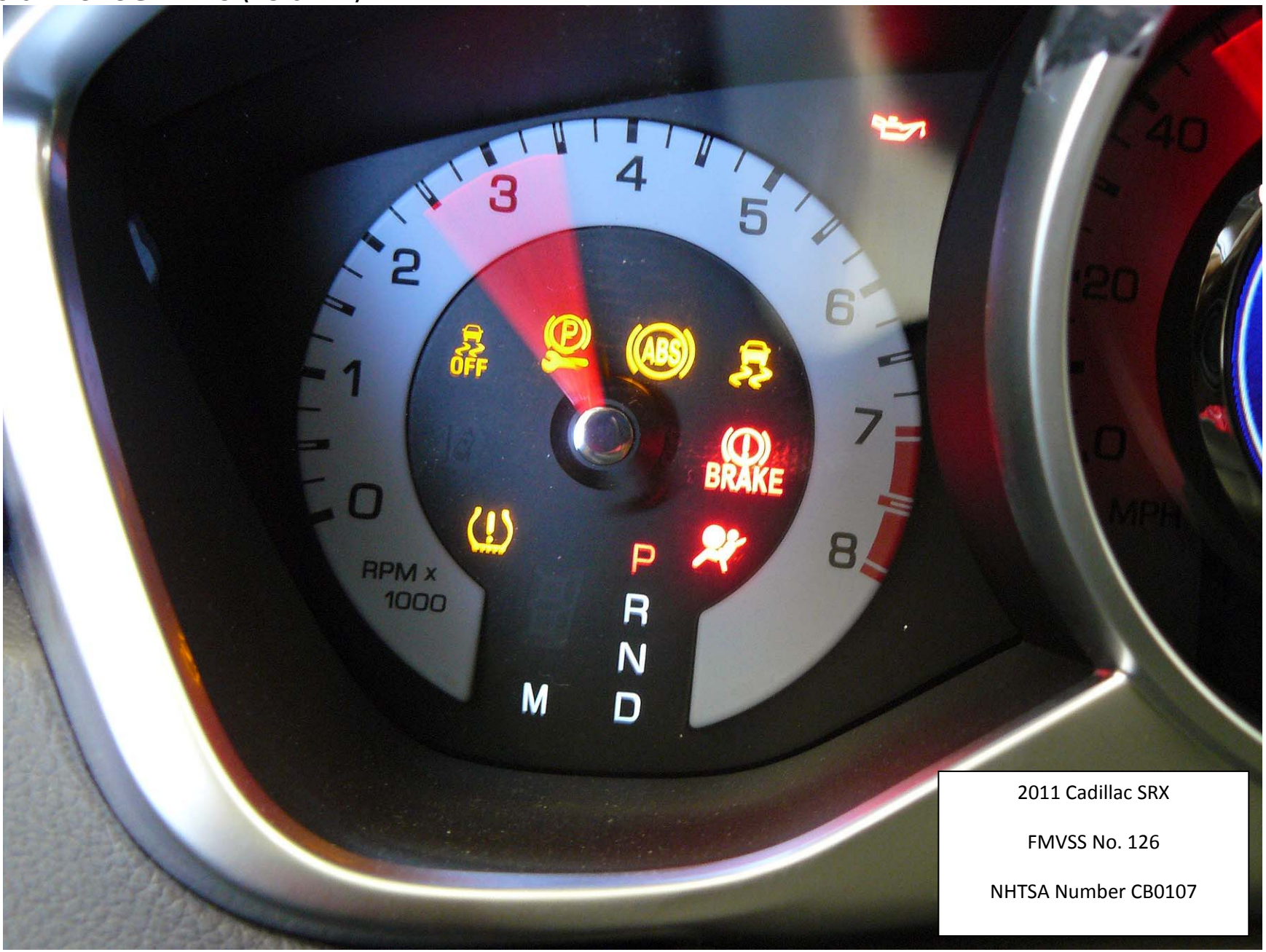


Figure 5.13. Telltale for ESC Malfunction and ESC Off

5.0 PHOTOGRAPHS (14 of 14)

Figure 5.14. ESC Off Control Switch

6.0 DATA PLOTS (1 of 4)

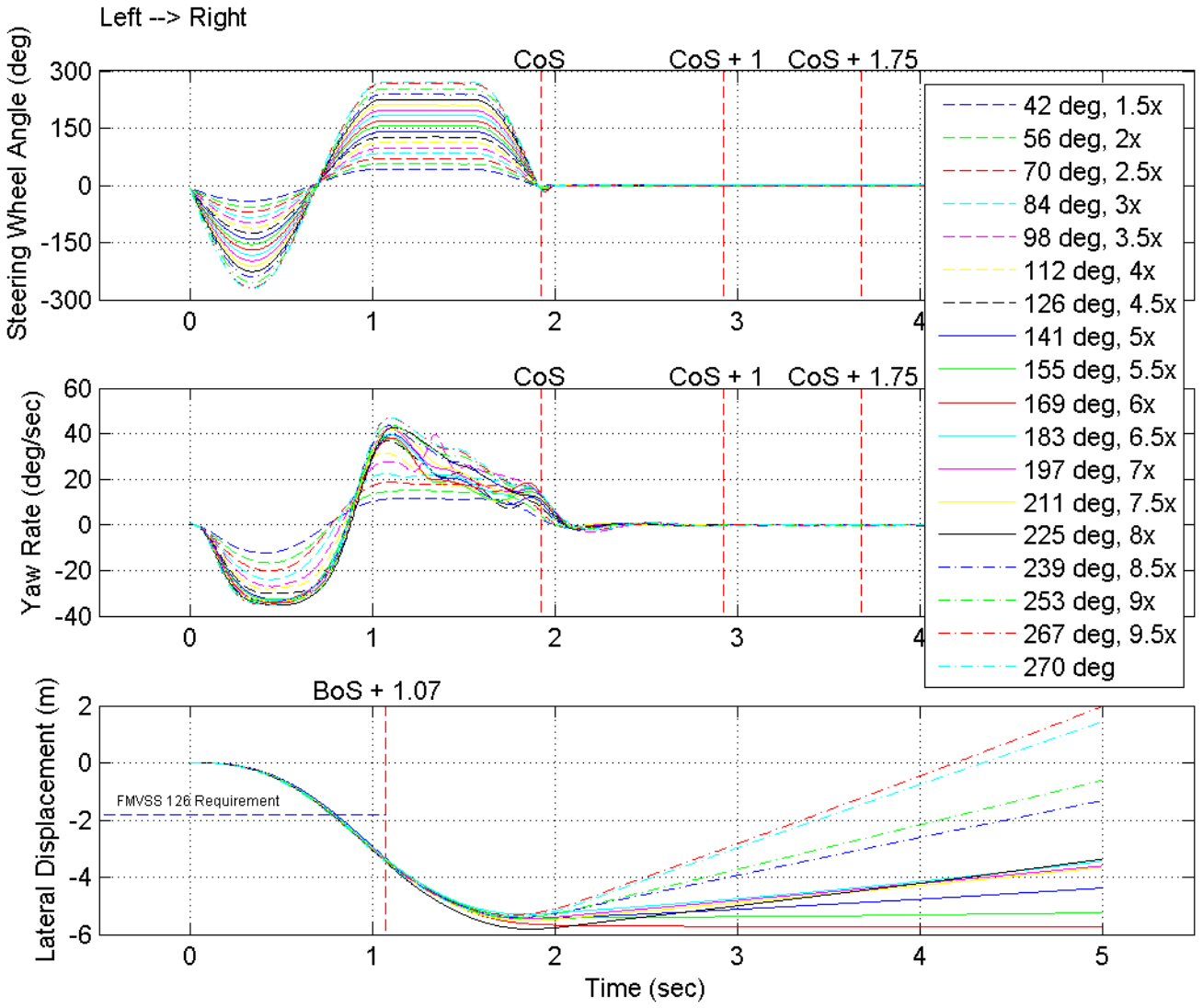


Figure 6.1. Steering Wheel Angle, Yaw Rate and Lateral Displacement for L-R Series

6.0 DATA PLOTS (2 of 4)

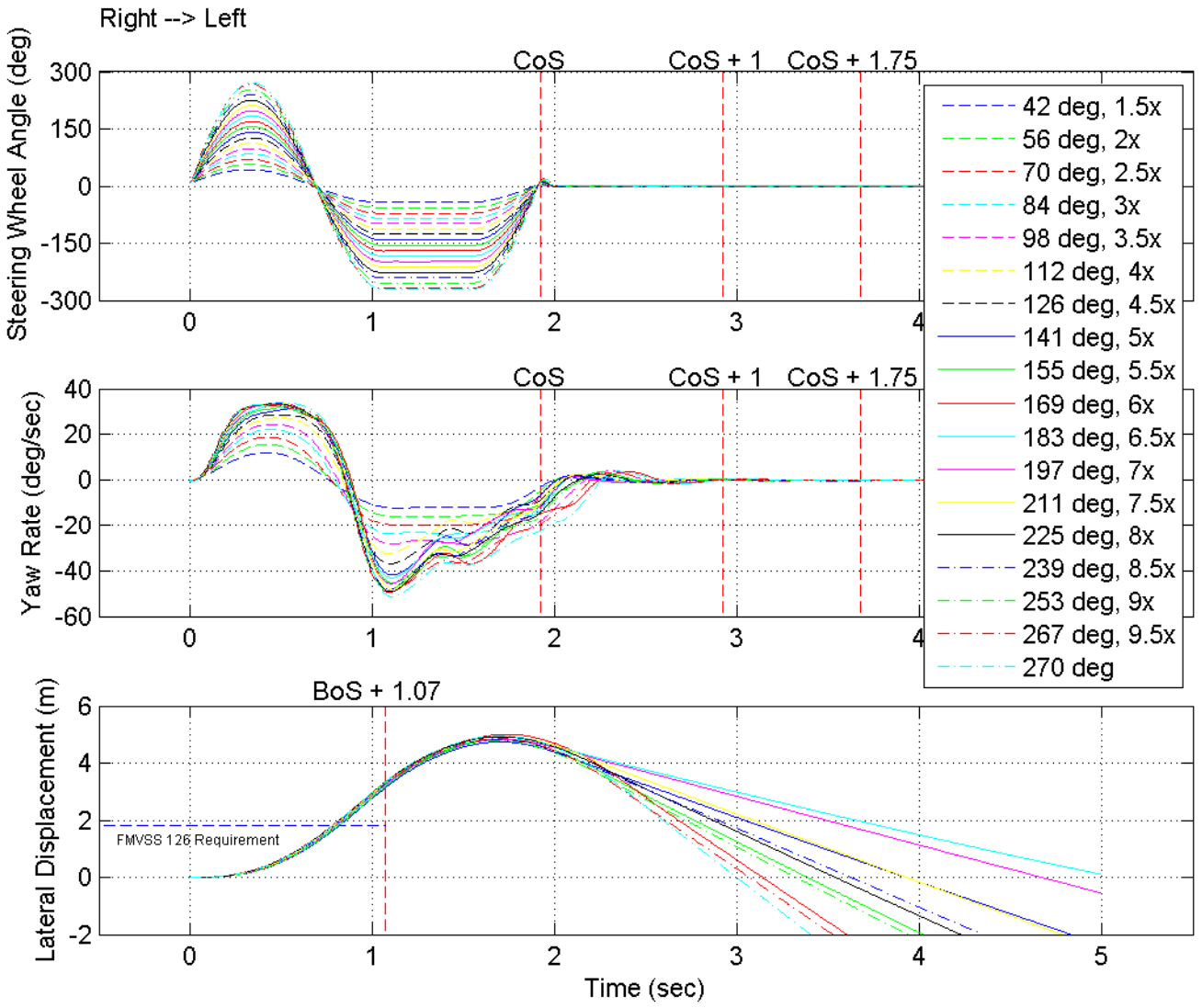


Figure 6.2. Steering Wheel Angle, Yaw Rate and Lateral Displacement for R-L Series

6.0 DATA PLOTS (3 of 4)

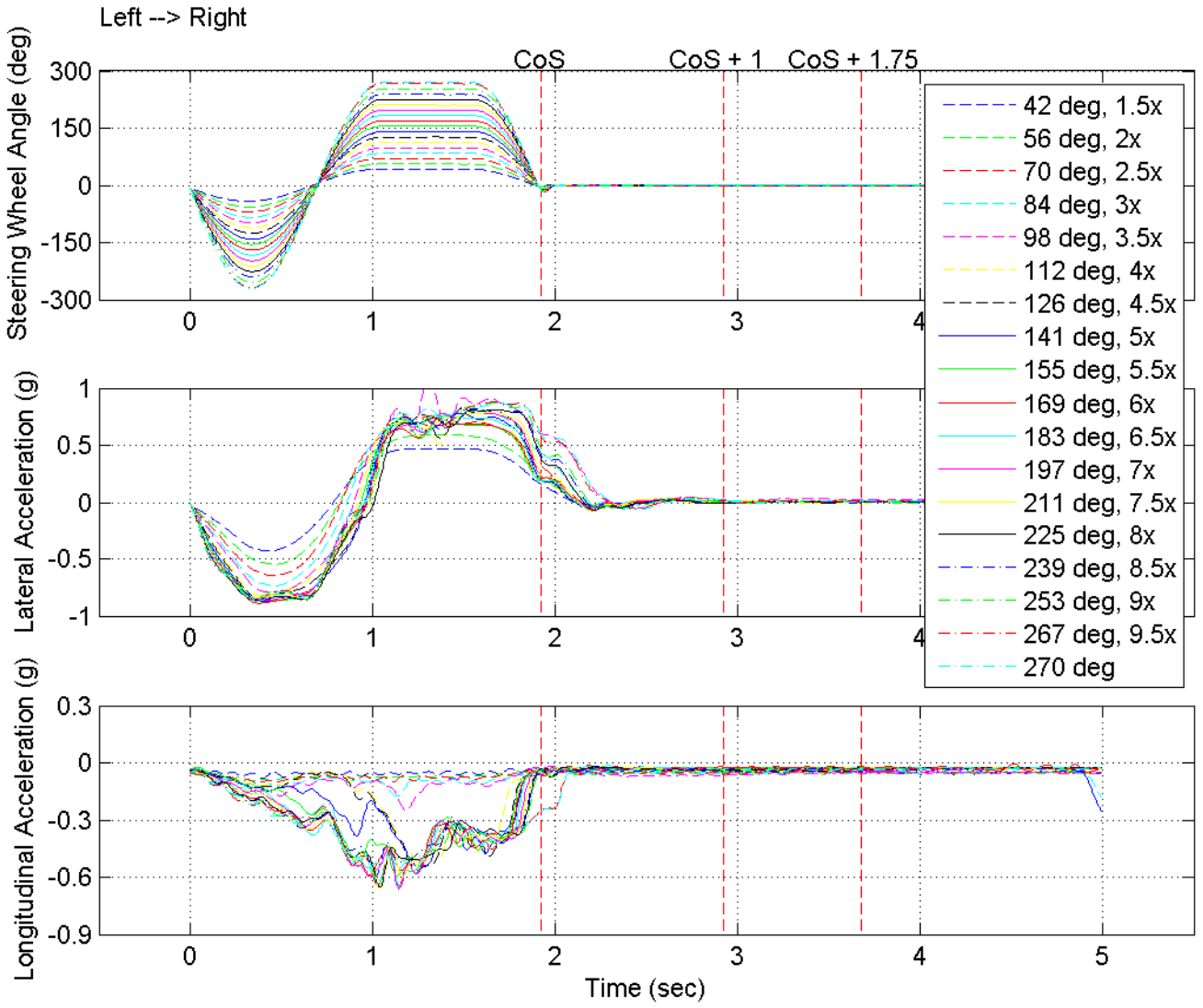


Figure 6.3. Steering Wheel Angle, Lateral Acceleration and Longitudinal Acceleration for L-R Series

6.0 DATA PLOTS (4 of 4)

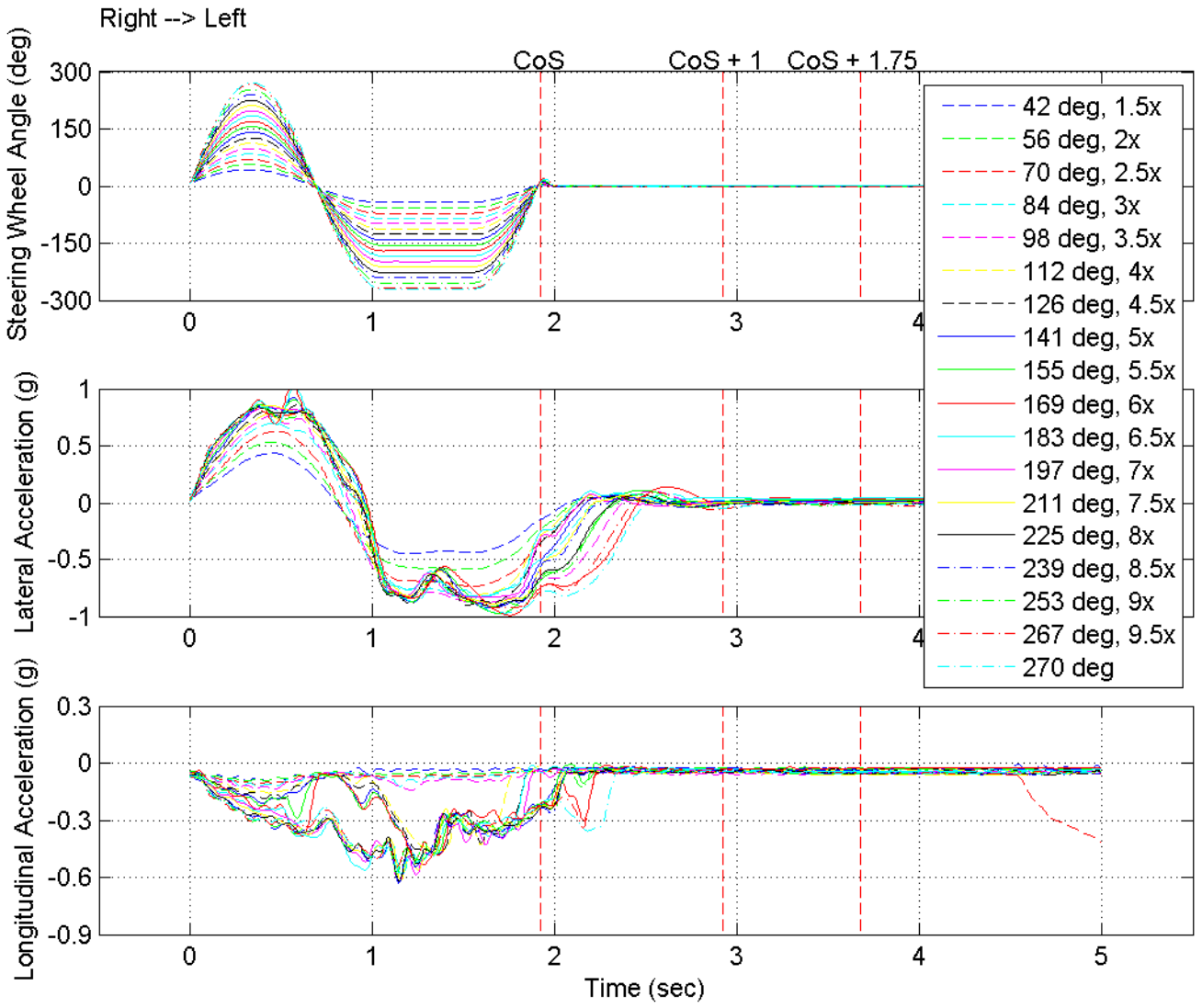


Figure 6.4. Steering Wheel Angle, Lateral Acceleration and Longitudinal Acceleration for R-L Series

7.0 OTHER DOCUMENTATION

7.1 OWNER'S MANUAL PAGES
7.2 VEHICLE ARRIVAL CONDITION REPORT
7.3 VEHICLE COMPLETION CONDITION REPORT
7.4 SINE WITH DWELL TEST RESULTS
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7.1 OWNER'S MANUAL PAGES

StabiliTrak® System

The StabiliTrak system assists with directional control of the vehicle in difficult driving conditions. The system is on when the vehicle is started.

- To turn off both Traction Control and StabiliTrak, press and hold OFF until OFF and illuminate and the appropriate DIC message displays. See *Vehicle Messages on page 5-34*.
- Press OFF again to turn on both systems.

For more information, see *StabiliTrak® System on page 9-36*.

Tire Pressure Monitor

This vehicle may have a Tire Pressure Monitor System (TPMS).

The TPMS warning light alerts you to a significant loss in pressure of one of the vehicle's tires. If the warning light comes on, stop as soon as possible and inflate the tires to the recommended pressure shown on the Tire and Loading Information label. See *Vehicle Load Limits on page 9-12*. The warning light will remain on until the tire pressure is corrected.

During cooler conditions, the low tire pressure warning light may appear when the vehicle is first started and then turn off. This may be an early indicator that the tire pressures are getting low and the tires need to be inflated to the proper pressure.

The TPMS does not replace normal monthly tire maintenance. It is the driver's responsibility to maintain correct tire pressures.

See *Tire Pressure Monitor System on page 10-65*.

7.1 OWNER'S MANUAL PAGES

Traction Off Light

This light comes on briefly while starting the engine. If it does not, have the vehicle serviced by your dealer. If the system is working normally, the indicator light then turns off.

The traction off light comes on when the Traction Control System (TCS) has been turned off by pressing and releasing the traction control button.

This light and the StabiliTrak Off light come on when StabiliTrak is turned off.

If the Traction Control System (TCS) is off, wheelspin is not limited. Adjust driving accordingly.

See *Traction Control System (TCS) on page 9-34* and *StabiliTrak® System on page 9-36* for more information.

StabiliTrak® OFF Light

This light comes on when the StabiliTrak system is turned off by pressing the StabiliTrak/TCS button. If the Traction Control System (TCS) is off, wheel spin is not limited.

When the StabiliTrak system is off, the system does not assist in controlling the vehicle. Adjust driving accordingly.

The warning light goes off when traction control and the StabiliTrak system are enabled.

See *Traction Control System (TCS) on page 9-34* and *StabiliTrak® System on page 9-36* for more information

7.1 OWNER'S MANUAL PAGES

Traction Control System (TCS)/StabiliTrak® Light

The StabiliTrak system or the Traction Control System (TCS) indicator/warning light come on briefly when the engine is started.

If the light does not come on, have the vehicle serviced by the dealer. If the system is working normally, the indicator light turns off.

If the light is on and not flashing, the TCS, and potentially the StabiliTrak system have been disabled. A DIC message may display. Check the DIC messages to determine which feature(s) is no longer functioning and whether the vehicle requires service.

If the indicator/warning light is on and flashing, the TCS and/or the StabiliTrak system is actively working.

See *StabiliTrak® System on page 9-36* and *Traction Control System (TCS) on page 9-34* for more information.

Tire Pressure Light

For vehicles with the Tire Pressure Monitor System (TPMS), this light comes on briefly when the engine is started. It provides information about tire pressures and the TPMS.

7.1 OWNER'S MANUAL PAGES

XXX TURN INDICATOR FAILURE

When one of the turn signals is out, this message displays to show which bulb needs to be replaced. See *Bulb Replacement on page 10-38* and *Replacement Bulbs on page 10-47* for more information on the turn signal bulb replacement.

TURN SIGNAL ON

This message is displayed if the turn signal has been left on. Turn off the turn signal.

Object Detection System Messages

PARK ASSIST OFF

This message is displayed when the park assist system has been turned off. See *Ultrasonic Parking Assist on page 9-40*.

SERVICE PARK ASSIST

This message is displayed if there is a problem with the park assist system. Take the vehicle to your dealer for service.

Ride Control System Messages

SERVICE REAR AXLE

This message displays when there is a problem with the All-Wheel Drive (AWD) System. See your dealer for service.

SERVICE STABILITRAK

This message displays if there is a problem with the StabiliTrak® system. See *StabiliTrak® System on page 9-36*.

SERVICE SUSPENSION SYSTEM

This message displays if there is a problem with the selective ride control. See *Selective Ride Control on page 9-37*.

SERVICE TRACTION CONTROL

This message displays when there is a problem with the Traction Control System (TCS). See *Traction Control System (TCS) on page 9-34*.

SPORT MODE ON

This message displays when Sport Mode has been activated. See *Selective Ride Control on page 9-37* and *Manual Mode on page 9-28* for more information.

7.1 OWNER'S MANUAL PAGES

Death and injury associated with drinking and driving is a global tragedy.

Alcohol affects four things that anyone needs to drive a vehicle: judgment, muscular coordination, vision, and attentiveness.

Police records show that almost 40 percent of all motor vehicle-related deaths involve alcohol. In most cases, these deaths are the result of someone who was drinking and driving. In recent years, more than 17,000 annual motor vehicle-related deaths have been associated with the use of alcohol, with about 250,000 people injured.

For persons under 21, it is against the law in every U.S. state to drink alcohol. There are good medical, psychological, and developmental reasons for these laws.

The obvious way to eliminate the leading highway safety problem is for people never to drink alcohol and then drive.

Medical research shows that alcohol in a person's system can make crash injuries worse, especially injuries to the brain, spinal cord, or heart. This means that when anyone who has been drinking — driver or passenger — is in a crash, that person's chance of being killed or permanently disabled is higher than if the person had not been drinking.

Control of a Vehicle

The following three systems help to control the vehicle while driving — brakes, steering, and accelerator. At times, as when driving on snow or ice, it is easy to ask more of those control systems than the tires and road can provide. Meaning, you can lose control of the vehicle. See *Traction Control System (TCS) on page 9-34* and *StabiliTrak® System on page 9-36*.

Adding non-dealer accessories can affect vehicle performance. See *Accessories and Modifications on page 10-3*.

Hill Start Assist (HSA)

This vehicle has a Hill Start Assist (HSA) feature, which may be useful when the vehicle is stopped on a grade. This feature is designed to prevent the vehicle from rolling, either forward or rearward, during vehicle drive off. After the driver completely stops and holds the vehicle in a complete standstill on a grade, HSA will be automatically activated. During the transition period between when the driver releases the brake pedal and starts to accelerate to drive off on a grade, HSA holds the braking pressure to ensure that there is no rolling. The brakes will automatically release when the accelerator pedal is applied within the two-second window. It will not activate if the vehicle is in a drive gear and facing downhill or if the vehicle is facing uphill and in R (Reverse).

Ride Control Systems

Traction Control System (TCS)

The vehicle has a Traction Control System (TCS) that limits wheel spin. On a front-wheel-drive vehicle, the system operates if it senses that one or both of the front wheels are spinning or beginning to lose traction. On an All-Wheel-Drive (AWD) vehicle, the system will operate if it senses that any of the wheels are spinning or beginning to lose traction. When this happens, the system brakes the spinning wheel(s) and/or reduces engine power to limit wheel spin.

The system may be heard or felt while it is working, but this is normal.

TCS is on whenever the vehicle is started. To limit wheel spin, especially in slippery road conditions, the system should always be left on. But, TCS can be turned off if needed.

flashes to indicate that the traction control system is active.

If there is a problem detected with TCS, SERVICE TRACTION CONTROL and SERVICE STABILITRAK may be displayed on the Driver Information Center (DIC) and will be on. See *Ride Control System Messages on page 5-39*. When this message is displayed and comes on and stays on, the vehicle is safe to drive but the system is not operational. Driving should be adjusted accordingly.

StabiliTrak® System

The vehicle has a vehicle stability enhancement system called StabiliTrak. It is an advanced computer controlled system that assists with directional control of the vehicle in difficult driving conditions.

StabiliTrak activates when the computer senses a difference between the intended path and the direction the vehicle is actually traveling. StabiliTrak selectively applies braking pressure to the vehicle's brakes to help steer the vehicle in the intended direction.

StabiliTrak is on automatically whenever the vehicle is started. To assist with directional control of the vehicle, the system should always be left on.

When the stability control system activates, the Traction Control System (TCS)/StabiliTrak light will flash on the instrument panel. This also occurs when traction control is activated. A noise may be heard or vibration may be felt in the brake pedal. This is normal. Continue to steer the vehicle in the intended direction.

If there is a problem detected with StabiliTrak, SERVICE STABILITRAK is displayed on the Driver Information Center (DIC) and will stay on. See *Vehicle Messages on page 5-34*. When this message is displayed and/or comes on and stays on, the vehicle is safe to drive but the system is not operational. Driving should be adjusted accordingly. See *Ride Control System Messages on page 5-39*.

If comes on and stays on, reset the system by:

1. Stopping the vehicle.
2. Turning the engine off and waiting 15 seconds.
3. Starting the engine.

If still comes on and stays on at a speed above 20 km/h (13 mph), see your dealer for service.

7.1 OWNER'S MANUAL PAGES

is located on the console.

Both StabiliTrak and Traction Control can be turned off if needed by pressing and holding until and come on the instrument panel. When StabiliTrak is turned off, the system will not assist with directional control of the vehicle or limit wheel spin. Driving should be adjusted accordingly. Press and release again to turn the system back on.

If cruise control is being used when StabiliTrak activates, the cruise control will automatically disengage. Press the cruise control button to re-engage when road conditions allow. See *Cruise Control on page 9-38* for more information.

Limited-Slip Rear Axle

Vehicles with a limited-slip rear axle can give more traction on snow, mud, ice, sand, or gravel. When traction is low, this feature allows the drive wheel with the most traction to move the vehicle. The limited-slip rear axle also gives the driver enhanced control when cornering hard or completing a maneuver, such as a lane change.

Selective Ride Control

The vehicle may have a ride control system called Selective Ride Control. The setting can be changed at any time. Based on road conditions, steering wheel angle, and the vehicle speed, the system automatically adjusts to provide the best handling while providing a smooth ride. The Tour and Sport modes will feel similar on a smooth road.

To switch from TOUR to SPORT mode, move the shift lever to the left while the transmission is in D (Drive).

TOUR: Use for normal city and highway driving. This setting provides a smooth, soft ride.

SPORT: Use where road conditions or personal preference demand more control. This setting provides more "feel," or response to road conditions through increased steering effort and suspension control. Transmission shift points and shift firmness are also enhanced. See *Manual Mode on page 9-28* under Automatic Transmission.

If there is a problem detected with Selective Ride Control, SERVICE SUSPENSION SYSTEM displays on the Driver Information Center (DIC). See *Ride Control System Messages on page 5-39*. Driving should be adjusted accordingly.

7.1 OWNER'S MANUAL PAGES

Cruise Control

⚠ WARNING

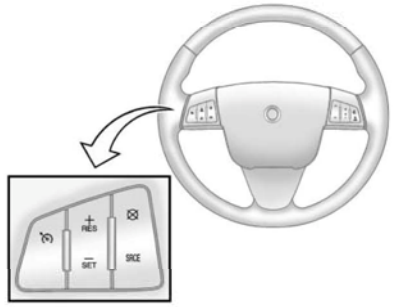
Cruise control can be dangerous where you cannot drive safely at a steady speed. So, do not use the cruise control on winding roads or in heavy traffic.

Cruise control can be dangerous on slippery roads. On such roads, fast changes in tire traction can cause excessive wheel slip, and you could lose control. Do not use cruise control on slippery roads.

With cruise control, a speed of about 40 km/h (25 mph) or more can be maintained without keeping your foot on the accelerator. Cruise control does not work at speeds below about 40 km/h (25 mph).

If the brakes are applied, the cruise control shuts off.

If the vehicle has the StabiliTrak® system and begins to limit wheel spin while using cruise control, the cruise control automatically disengages. See *StabiliTrak® System on page 9-36* or *Traction Control System (TCS) on page 9-34*. When road conditions allow the cruise control to be safely used, you can apply the cruise control again.



Cruise Control

(On/Off): Press to turn the system on and off.

+ RES (Resume/Accelerate): Press briefly to make the vehicle resume to a previously set speed or press and hold to accelerate.

−SET (Set/Coast): Press to set the speed and activate cruise control or make the vehicle decelerate.

⊠ (Cancel): Press to disengage cruise control without erasing the set speed from memory.

Setting Cruise Control

If the cruise button is on when not in use, it could get bumped and go into cruise when not desired. Keep the cruise control switch off when cruise is not being used.

Trailer Brakes

A loaded trailer that weighs more than 450 kg (1,000 lbs) needs to have its own brake system that is adequate for the weight of the trailer. Be sure to read and follow the instructions for the trailer brakes so they are installed, adjusted and maintained properly.

Because the vehicle has anti-lock brakes, do not tap into the vehicle's brake system. If you do, both brake systems will not work well, or at all.

Trailer Wiring Harness

All of the electrical circuits required for the trailer lighting system can be accessed at a connector mounted to the frame, behind the rear bumper cover.

Trailer Sway Control (TSC)

The vehicle has a Trailer Sway Control (TSC) feature as part of the StabiliTrak system. If TSC detects that the trailer is swaying, the vehicle's brakes are automatically applied.

When TSC is applying the brakes, the TCS/StabiliTrak indicator light flashes to notify the driver to reduce speed. See *Traction Control System (TCS)/StabiliTrak® Light on page 5-25*. If the trailer continues to sway, StabiliTrak will reduce engine torque to help slow the vehicle.

TSC will not function if StabiliTrak is turned off.

Conversions and Add-Ons

Add-On Electrical Equipment

Notice: **Do not add anything electrical to the vehicle unless you check with your dealer first. Some electrical equipment can damage the vehicle and the damage would not be covered by the vehicle's warranty. Some add-on electrical equipment can keep other components from working as they should.**

Add-on equipment can drain the vehicle's 12-volt battery, even if the vehicle is not operating.

The vehicle has an airbag system. Before attempting to add anything electrical to the vehicle, see *Servicing the Airbag-Equipped Vehicle on page 3-43* and *Adding Equipment to the Airbag-Equipped Vehicle on page 3-44*.

7.2 VEHICLE ARRIVAL CONDITION REPORT

CONTRACT NO.: DTNH22-08-D-00098
DATE: 5/21/11

From: *Automotive Allies*

To: *Dynamic Research, Inc*

Purpose ☒ Initial Receipt
☐ Received via Transfer
☐ Present Vehicle Condition

Vehicle VIN: *3GYFNCEY0BS543589* NHTSA NO.: *CB0107*
Model Year: *2011* Odometer Reading: *54* Miles
Make *Cadillac* Body Style: *M.P.V.*
Model: *SRX* Body Color: *Graphite*
Manufacture Date: *9/10* Dealer: *Automotive Allies*
GVWR (kg/lb) *2480/5467* Price: *Leased*

☒ All options listed on the "Window Sticker" are present on the test vehicle

☒ Tires and wheel rims are new and the same as listed

☒ There are no dents or other interior or exterior flaws

☒ The vehicle has been properly prepared and is in running condition

☒ The glove box contains an owner's manual, warranty document, consumer information, and extra set of keys

☒ Proper fuel filler cap is supplied on the test vehicle

☒ Place vehicle in storage area

☒ Inspect the vehicle's interior and exterior, including all windows, seats, doors, etc., to confirm that each system is complete and functional per the manufacturer's specifications. Any damage, misadjustment, or other unusual condition that could influence the test program or test results shall be recorded. Report any abnormal condition to the NHTSA COTR before beginning any test.

NOTES:

RECORDED BY: *J Lenkeit* DATE RECORDED: *5/21/2011*

APPROVED BY: *B Kebschull* DATE APPROVED: *6/2/2011*

7.3 VEHICLE COMPLETION CONDITION REPORT

CONTRACT NO.: *DTNH22-08-D-00098*
DATE: *6/15/2011*

Vehicle VIN: *3GYFNCEY0BS543589* NHTSA NO.: *CB0107*
Model Year: *2011* Odometer Reading: *112* Miles
Make: *Cadillac* Body Style: *M.P.V.*
Model: *SRX* Body Color: *Graphite*
Manufacture Date: *9/10* Dealer: *Automotive Allies*
GVWR (kg/lb) *2480 (5467)* Price: *Leased*

LIST OF FMVSS TESTS PERFORMED BY THIS LAB: *126*

☒ THERE ARE NO DENTS OR OTHER INTERIOR OR EXTERIOR FLAWS

☒ THE VEHICLE HAS BEEN PROPERLY MAINTAINED AND IS IN RUNNING CONDITION

☒ THE GLOVE BOX CONTAINS AN OWNER'S MANUAL, WARRANTY DOCUMENT, CONSUMER INFORMATION, AND EXTRA SET OF KEYS

☒ PROPER FUEL FILLER CAP IS SUPPLIED ON THE TEST VEHICLE

REMARKS:

Equipment that is no longer on the test vehicle as noted on Vehicle Arrival Condition Report:

Explanation for equipment removal:

Test Vehicle Condition:

As delivered, as new

RECORDED BY: *J Lenkeit* DATE RECORDED: *6/15/2011*

APPROVED BY: *B Kebschull* DATE APPROVED: *6/16/2011*

7.4 SINE WITH DWELL TEST RESULTS

2011 Cadillac SRX
NHTSA No.: CB0107
Date of Test : *6/2/2011*
Date Created: *6/2/2011*

Lateral Stability Test Series No. 1 – Counterclockwise Initial Steer Direction

File	SWA @ 5deg Ct	MES	Time @ 5deg	COS	Time @ COS	MOS	Time @ MOS	YRR1	YR1	YRR 1 Ct	YRR 175	YR175	YRR17 5 Ct	2nd Yaw Peak	2nd Yaw Peak Ct	Lat Disp	Lat. Acc. 1.07 s	1st SWA Peak	1st SWA Peak Ct	2nd SWA Mean
	(deg)	(mph)	(s)		(s)		(sec)	(%)	(deg/s)		(%)	(deg/s)		(deg/s)		(ft)	(g)	(deg)		(deg)
28	711	50.03	3.547	1091	5.446	847	4.226	-0.6	-0.07	1291	-0.75	-0.09	1441	12.00	946	-4.24	0.41	41.95	776	41.99
29	709	49.95	3.539	1090	5.445	846	4.225	-0.8	-0.13	1290	-0.85	-0.13	1440	15.55	959	-5.57	0.51	56.08	775	55.95
30	708	49.90	3.535	1090	5.444	846	4.225	-1.0	-0.19	1290	-0.63	-0.12	1440	18.95	929	-6.74	0.60	69.95	775	69.91
31	708	50.16	3.531	1090	5.442	846	4.225	-1.2	-0.27	1290	-0.15	-0.03	1440	22.72	923	-7.83	0.65	83.99	775	83.80
32	707	50.13	3.529	1090	5.442	846	4.225	-0.9	-0.24	1290	-0.15	-0.04	1440	28.02	928	-8.80	0.64	98.01	775	97.75
33	707	50.05	3.527	1090	5.444	846	4.224	-0.2	-0.05	1290	-0.08	-0.03	1440	31.74	920	-9.52	0.65	111.82	775	111.84
34	707	50.10	3.527	1090	5.443	846	4.225	-0.4	-0.13	1290	-0.59	-0.22	1440	36.87	925	-10.18	0.61	126.04	775	126.00
35	707	50.17	3.526	1090	5.443	846	4.224	-0.1	-0.06	1290	-0.21	-0.09	1440	40.04	928	-10.79	0.53	141.06	775	140.93
36	707	50.21	3.526	1090	5.444	846	4.225	-0.2	-0.07	1290	-0.30	-0.12	1440	38.31	925	-10.84	0.58	155.11	776	154.94
37	706	49.98	3.525	1090	5.443	846	4.225	-0.1	-0.04	1290	-0.06	-0.02	1440	38.40	928	-11.00	0.54	169.36	775	168.80
38	706	50.13	3.525	1090	5.442	846	4.225	0.2	0.08	1290	0.10	0.04	1440	39.96	926	-10.83	0.60	183.32	775	182.91
39	707	50.14	3.526	1090	5.442	847	4.226	-0.4	-0.18	1290	-0.21	-0.09	1440	42.42	927	-11.01	0.56	197.64	775	196.65
40	706	50.22	3.525	1090	5.441	846	4.225	-0.3	-0.12	1290	-0.35	-0.15	1440	42.31	928	-11.05	0.55	211.45	775	210.69
42	707	50.23	3.526	1090	5.441	847	4.226	-0.1	-0.06	1290	-0.19	-0.08	1440	43.01	931	-11.29	0.38	225.57	775	224.71
43	707	50.11	3.526	1089	5.440	846	4.225	-1.2	-0.50	1289	-0.83	-0.36	1439	43.47	925	-11.17	0.62	239.63	775	238.71
44	707	50.09	3.526	1089	5.440	846	4.225	-0.7	-0.32	1289	-0.64	-0.28	1439	44.11	926	-11.09	0.52	253.75	775	252.63
45	707	50.16	3.527	1090	5.441	847	4.226	-0.8	-0.35	1290	-0.31	-0.15	1440	47.07	928	-11.11	0.57	267.65	775	266.54
46	707	50.13	3.526	1089	5.440	847	4.226	-1.3	-0.60	1289	-0.79	-0.37	1439	46.99	929	-11.18	0.57	270.59	775	269.59

7.4 SINE WITH DWELL TEST RESULTS

2011 Cadillac SRX
NHTSA No.: CB0107
Date of Test : *6/2/2011*
Date Created: *6/2/2011*

Lateral Stability Test Series No. 2 – Clockwise Initial Steer Direction

File	SWA @ 5deg Ct	MES	Time @ 5deg	COS	Time @ COS	MOS	Time @ MOS	YRR1	YR1	YRR 1 Ct	YRR 175	YR175	YRR17 5 Ct	2nd Yaw Peak	2nd Yaw Peak Ct	Lat Disp	Lat. Acc. 1.07 s	1st SWA Peak	1st SWA Peak Ct	2nd SWA Mean
	(deg)	(mph)	(s)		(s)		(sec)	(%)	(deg/s)		(%)	(deg/s)		(deg/s)		(ft)	(g)	(deg)		(deg)
47	711	50.10	3.546	1090	5.445	847	4.227	0.2	-0.02	1290	-0.07	0.01	1440	-12.31	941	4.08	-0.41	42.73	776	42.57
48	709	49.96	3.539	1090	5.444	847	4.226	0.8	-0.13	1290	0.65	-0.11	1440	-16.17	940	5.23	-0.53	56.65	776	56.60
49	708	50.10	3.535	1090	5.443	846	4.225	0.3	-0.06	1290	-0.57	0.11	1440	-19.95	943	6.27	-0.61	70.55	775	70.62
50	708	50.08	3.532	1090	5.443	847	4.226	-0.8	0.19	1290	0.51	-0.12	1440	-24.05	930	7.42	-0.65	84.61	775	84.51
51	707	50.13	3.529	1090	5.442	846	4.225	-0.8	0.22	1290	-0.34	0.10	1440	-28.49	930	8.15	-0.70	98.43	775	98.59
52	707	49.64	3.527	1090	5.443	846	4.225	-0.2	0.06	1290	-0.20	0.07	1440	-32.43	925	9.00	-0.70	112.33	776	112.54
53	706	50.01	3.525	1090	5.442	846	4.225	-0.3	0.11	1290	-0.07	0.03	1440	-36.98	927	9.56	-0.72	126.64	775	126.74
54	706	50.18	3.525	1090	5.442	846	4.225	-0.2	0.09	1290	-0.15	0.06	1440	-41.84	929	10.18	-0.67	141.60	775	141.66
55	706	50.04	3.524	1090	5.441	846	4.225	-1.1	0.51	1290	-0.39	0.17	1440	-45.31	929	10.29	-0.69	155.75	775	155.54
56	706	50.13	3.523	1089	5.440	846	4.224	0.2	-0.07	1289	-0.08	0.04	1439	-47.89	929	10.51	-0.63	169.83	775	169.65
57	706	50.10	3.524	1090	5.442	847	4.226	-0.2	0.10	1290	-0.26	0.11	1440	-43.18	929	10.46	-0.67	184.01	775	183.49
58	706	49.97	3.524	1090	5.441	846	4.225	0.0	-0.01	1290	-0.06	0.03	1440	-45.57	928	10.52	-0.71	198.04	775	197.53
59	706	50.88	3.524	1090	5.441	847	4.226	-0.5	0.22	1290	-0.28	0.13	1440	-47.81	930	10.67	-0.71	212.19	775	211.31
60	706	50.17	3.525	1090	5.441	847	4.226	-0.8	0.39	1290	-0.05	0.02	1440	-48.98	928	10.78	-0.75	226.31	775	225.38
61	706	50.13	3.525	1089	5.440	847	4.226	-0.1	0.04	1289	0.33	-0.16	1439	-47.96	927	10.64	-0.73	240.35	775	239.33
62	707	49.77	3.526	1090	5.441	847	4.226	-1.2	0.55	1290	-0.60	0.29	1440	-48.04	926	10.68	-0.74	254.29	775	253.20
63	706	50.20	3.525	1089	5.439	846	4.225	-0.6	0.30	1289	-0.20	0.10	1439	-49.22	926	10.73	-0.71	268.23	775	267.11
64	707	49.90	3.526	1089	5.440	847	4.226	-0.4	0.21	1289	-0.53	0.27	1439	-51.23	929	10.89	-0.70	271.15	775	270.13

7.5 SLOWLY INCREASING STEER TEST RESULTS

2011 Cadillac SRX
NHTSA No.: *CB0107*
Date of Test: *6/2/2011*
Date Created: *6/2/2011*

File	EventPt	DOS	MES (mph)	Mean SPD (mph)	AYcount_3	THETAENCF_3 (deg)	AYCG_CD2_3 (g)	r_squared	ZeroBegin	ZeroEnd
17	700	0	49.520	49.554	1129	28.758	0.293	0.998	500	700
18	700	0	49.663	49.578	1129	28.689	0.295	0.996	500	700
19	700	0	50.408	50.229	1120	28.153	0.293	0.996	500	700
20	700	1	49.671	49.685	1118	-28.050	-0.303	0.985	500	700
21	648	1	49.535	49.615	1118	-27.818	-0.287	0.993	448	648
22	700	1	49.848	49.731	1106	-27.142	-0.305	0.991	500	700
				Averages		28.1	0.296			

Scalars	Steering Angles (deg)
1.5	42
2.0	56
2.5	70
3.0	84
3.5	98
4.0	112
4.5	126
5.0	141

Scalars	Steering Angles (deg)
5.5	155
6.0	169
6.5	183
7.0	197
7.5	211
8.0.	225
8.5	239
9.0	253

Scalars	Steering Angles (deg)
9.5	267
9.6	270

7.6 INERTIAL SENSING SYSTEM LOCATION COORDINATES

Vehicle:	**2011 Cadillac SRX**	NHTSA No.:	CB0107
Wheelbase:	110.5 Inches	Faro Arm S/N:	U08-05-08-06636
Measurement date:	5/31/2011	Certification date:	11/7/10

CMM Measurements

Coordinate system: SAE (X,Y,Z positive forward, to the right, and downward, respectively)

Origin defined at 48" point on lateral arm of measurement fixture, projected onto the ground plane

	Ref X	Ref Y	Ref Z
M_PLANE001_Ground_Plane	-	-	0.000
M_Line_Y_Axis	2.519		0.000
M_Point_48_Ref	0.000	0.000	-
M_CIRCLE001_I_Left_Rear_Wheel_Axle	-31.696	11.518	-14.235
M_Point_IMU_side	9.593	46.804	-18.954
M_Point_ROOF	-	-	-64.888
Motion Pak reference point taken from mid height of unit left side			
Motion Pak Width = 3.05" ==> 1/2 W = 1.525			
Motion_PAK_Location	9.593	48.329	-18.954

Measurement Notes

1. The Faro arm is positioned just to the left of the vehicle, near the rear door.

2. A "centerline jig" is used in the Faro arm measurement. The jig consists of a long beam with a 4 ft lateral arm that is perpendicular to the beam. The jig is placed on the ground underneath the vehicle with the long beam positioned along the centerline of the vehicle, such that the lateral arm extends to the left, slightly forward of the left rear tire. The lateral arm has a marked indentation point which is located 48.00" from the edge of the centerline beam.

3. The Faro arm is used to make the following measurements:
   - Three points on the ground, which establishes the ground plane.
   - Two points along the lateral arm, and projected onto the ground plane. This establishes the y axis.
   - One point at the 48 inch reference point on the lateral arm. This establishes the origin.
   - Three points on the left rear wheel or wheel cover. The Faro arm then computes the center point of the wheel.
   - One point to establish the height of the highest point on the roof of the vehicle.

Coordinate Measurements Calculated for S7D (Matlab Program)

Coordinate system: X,Y,Z positive rearward, to the right, and upward, respectively

Origin defined as follows: X axis: front axle, Y axis: vehicle centerline, Z axis: ground plane

	Ref X	Ref Y	Ref Z
Motion_PAK_Location in S7D (Matlab program) coordinate system	**69.211**	**0.329**	**18.954**

Calculation Notes:

1. X axis value is the difference between the wheelbase and the calculated distance from the rear axle centerline to the IMU (the value must be positive and less than the wheelbase).

2. Y axis value is -48.00 (the Y axis offset of the measurement origin in the S7D coordinate system) plus the measured Y axis value (a negative value indicates the IMU is to the left of the vehicle centerline, and a positive value indicates it is to the right)

3. Z axis value is from the ground plane up to the center of the IMU (value must be positive).