126-TRC-11-009

SAFETY COMPLIANCE TESTING FOR FMVSS 126
Electronic Stability Control Systems

Toyota Motor Manufacturing, Kentucky, Inc.
2011 Toyota Camry
NHTSA No. CB5110

TRANSPORTATION RESEARCH CENTER INC.
10820 State Route 347
East Liberty, Ohio 43319

September 14, 2011

FINAL REPORT

Prepared Under Contract No.: DTNH22-08-D-00097

U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Enforcement
Office of Vehicle Safety Compliance
1200 New Jersey Avenue, SE
West Building, 4th Floor (NVS-221)
Washington, DC 20590

Prepared for the Department of Transportation, National Highway Traffic Safety Administration, under Contract No. DTNH22-08-D-00097.

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Approval Date: 8/29/11

FINAL REPORT ACCEPTANCE BY OVSC:

Accepted By:

Acceptance Date: 9/14/11

1. Report No. 126-TRC-11-009	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle Final Report of FMVSS 126 Compliance Testing of 2011 Toyota Camry, NHTSA No. CB5110		5. Report Date September 14, 2011	
		6. Performing Organization Code TRC 20080734 / 1109	
7. Author(s) Alan Ida, Project Engineer Ken Webster, Manager, DDO Project Operations		8. Performing Organization Report No. TRC-DOT-126-11-009	
9. Performing Organization Name and Address Transportation Research Center Inc. 10820 State Route 347 East Liberty, OH 43319		10. Work Unit No.	
		11. Contract or Grant No. DTNH22-08-D-00097	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Enforcement Office of Vehicle Safety Compliance 1200 New Jersey Avenue, SE, West Building, 4th Floor (NVS-221) Washington, D.C. 20590		13. Type of Report and Period Covered Final test report August 24, 2011 to September 14, 2011	
		14. Sponsoring Agency Code NVS-220	
15. Supplementary Notes			
16. Abstract A test was conducted on a 2011 Toyota Camry, NHTSA No. CB5110, 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			
17. Key Words Compliance Testing Safety Engineering FMVSS 126		18. Distribution Statement Copies of this report are available from: NHTSA Technical Information Services (TIS) (NPO 411) 1200 New Jersey Avenue, SE Washington, D.C. 20590 Email: tis@nhtsa.dot.gov FAX: (202) 493-2833	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 63	22.

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1.0 PURPOSE OF COMPLIANCE TEST

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

This standard establishes performance and equipment requirements for Electronic Stability Control (ESC) Systems installed in passenger cars, multipurpose passenger vehicles, trucks, and buses with a gross vehicle weight rating of 4,536 kilograms or less.

2.0 TEST PROCEDURE AND DISCUSSION OF RESULTS

Testing of the MY 2011 Toyota Camry was conducted at Transportation Research Center Inc. (TRC Inc.) 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 20km/h (12.4mph), when being driven in reverse, or during system initialization).

The vehicle was subjected to a 0.7Hz Sine with Dwell (SWD) 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).
- 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).

- 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 3,500kg (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 …continued

DATA SUMMARY (Sheet 1 of 2)

VEHICLE MAKE/MODEL/BODY STYLE: Toyota / Camry / Passenger Car

VEHICLE NHTSA NO.: CB5110 VIN: 4T1BF3EK0BU762724

VEHICLE TYPE: Passenger Car DATE OF MANUFACTURE: 07/11

LABORATORY: Transportation Research Center 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)	
The 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)	
The 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 …continued

DATA SUMMARY (Sheet 2 of 2)

REQUIREMENTS	PASS/FAIL
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

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 3,500 kg (7,716 lbs.) or less, and 1.52 m (5 feet) for vehicles with a GVWR greater than 3,500 kg (7,716 lbs.). (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

REMARKS

3.0 TEST DATA

DATA SHEET 1 (Sheet 1 of 2)
TEST VEHICLE INSPECTION AND TEST PREPARATION

VEHICLE MAKE/MODEL/BODY STYLE: Toyota / Camry / Passenger Car

NHTSA No.: CB5110 TEST DATE: 8-25-11

VIN: 4T1BF3EK0BU762724 MANUFACTURE DATE: 07/11

GVWR: 1,971 KG FRONT GAWR: 1,210 KG REAR GAWR 1,070 KG

SEATING POSITIONS: FRONT 2 REAR 3

ODOMETER READING AT START OF TEST: 16 (26) Miles (Kilometers)

DESIGNATED TIRE SIZE(S) FROM VEHICLE LABELING:

Front Axle P215 / 60R 16 Rear Axle P215 / 60R 16

INSTALLED TIRE SIZE(S) ON VEHICLE:

From Tire Sidewall	Front Axle	Rear Axle
Manufacturer and Model	Michelin Energy MXV4 S8	Michelin Energy MXV4 S8
Tire Size Designation	P215 / 60R 16 94V	P215 / 60R 16 94V

Are installed tire sizes same as labeled tire sizes? X Yes _____ No
If no, contact COTR for further guidance.

DRIVE CONFIGURATIONS (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 not locked full time (4WD Automatic)
_____ Four Wheel Drive High Gear Unlocked Center Differential
_____ Four Wheel Drive High Gear Locked Center Differential
_____ Four Wheel Drive Low Gear Unlocked Center Differential
_____ Four Wheel Drive Low Gear Locked Center Differential
_____ Other (define _____)

3.0 TEST DATA….continued

DATA SHEET 1 (Sheet 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 2WD
Mode(s) default

Drive Configuration _____
Mode(s) _____

Drive Configuration _____
Mode(s) _____

VEHICLE STABILITY SYSTEMS (Check applicable technologies):

X ESC	X Traction Control	___ Roll Stability Control
___ Active Suspension	X Electronic Throttle Control	___ Active Steering
X ABS		

List other systems; VSC Computer, Brake Actuator

REMARKS:

RECORDED BY: Alan Ida DATE: 8-25-11
APPROVED BY: Ken Webster DATE: 8-29-11

3.0 TEST DATA….continued

DATA SHEET 2 (Sheet 1 of 2)
ESC SYSTEM HARDWARE AND OPERATIONAL CHARACTERISTICS

VEHICLE MAKE/MODEL/BODY STYLE: Toyota / Camry / Passenger Car

NHTSA No.: CB5110 TEST DATE: 8-26-11

ESC SYSTEM IDENTIFICATION:

Manufacturer / Model Robert Bosch LLC. / 44540 - 06050

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; _____

ESC SYSTEM OPERATIONAL CHARACTERISTICS:

System is capable of generating brake torques at each wheel X Yes (PASS)
_____ No (FAIL)

List and describe component(s): VSC Computer by way of solenoid valves in the brake actuator

System is capable of determining yaw rate X Yes (PASS)
_____ No (FAIL)

List and describe component(s): Yaw Rate and Acceleration Sensor

System is capable of monitoring driver steering input X Yes (PASS)
_____ No (FAIL)

List and describe component(s): Steering wheel angle sensor

System is capable of estimating side slip or side slip derivation X Yes (PASS)
_____ No (FAIL)

List and describe component(s): To estimate the vehicle side slip derivative, the VSC (Vehicle Stability Control) system collects wheel speed, lateral acceleration, and yaw rate data. The estimated vehicle side slip derivative is obtained as the difference between the estimated yaw rate and actual yaw rate detected by the yaw sensor. The VSC system estimates vehicle side slip by the integration of the estimated vehicle side slip derivative.

3.0 TEST DATA….continued

DATA SHEET 2 (Sheet 2 of 2)
ESC SYSTEM HARDWARE AND OPERATIONAL CHARACTERISTICS

ESC SYSTEM OPERATIONAL CHARACTERISTICS (continued):

System is capable of modifying engine torque during ESC activation. ___X___ Yes (PASS)
_____ No (FAIL)

Method used to modify engine torque: During traction control and VSC (ESC) operation, the VSC computer outputs an engine output control signal to the ECM. Upon receiving this signal, the ECM effects throttle control to regulate the engine output.

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. above 15 km/h (9.3 mph)

System is capable of activation during the following driving phases (acceleration, deceleration, coasting, and during activation of ABS or traction control). ___X___ Yes (PASS)
_____ No (FAIL)

Driving phases that the system is capable of activation. The ESC system is active during acceleration, deceleration, coasting, and during activation of ABS or traction control in the forward driving direction.

Vehicle manufacturer submitted documentation explaining how the ESC system mitigates understeer? ___X___ Yes (PASS)
_____ No (FAIL)

DATA INDICATES COMPLIANCE PASS/FAIL PASS

RECORDED BY: Alan Ida DATE: 8-26-11
APPROVED BY: Ken Webster DATE: 8-29-11

3.0 TEST DATA….continued

DATA SHEET 3 (Sheet 1 of 2)
ESC MALFUNCTION AND OFF TELLTALES

VEHICLE MAKE/MODEL/BODY STYLE: Toyota / Camry / Passenger Car

VEHICLE NHTSA NO. CB5110 TEST DATE: 7-06-11

ESC Malfunction Telltale

Vehicle is equipped with malfunction telltale? X Yes (Pass) ____ No (Fail)

Telltale Location Instrument cluster, below the speedometer

Telltale Color Amber

Telltale symbol or abbreviation used.

Or **ESC**

X Vehicle uses this symbol
____ Vehicles 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? ____ Yes X No

Is telltale also used to indicate activation of the ESC system? X Yes ____ No

If yes, explain telltale operation during ESC activation: During ESC Activation, the ESC telltale flashes.

DATA SHEET 3 (Sheet 2 of 2)
ESC MALFUNCTION AND OFF TELLTALES

"ESC OFF" Telltale (if provided)

Vehicle is equipped with "ESC Off" telltale? __X__ Yes _____ No

Is "ESC OFF" telltale combined with "ESC Malfunction" telltale utilizing a two part telltale?

_____ Yes __X__ No

Telltale Location Instrument cluster, right side, below the fuel gauge

Telltale Color Amber

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? _____ Yes __X__ No

DATA INDICATES COMPLIANCE PASS/FAIL PASS
(Vehicle is compliant if equipped with a malfunction telltale)

REMARKS:

RECORDED BY: Alan Ida DATE: 8-29-11
APPROVED BY: Ken Webster DATE: 8-29-11

3.0 TEST DATA….continued

DATA SHEET 4 (Sheet 1 of 3)
ESC AND ANCILLARY SYSTEM CONTROLS

"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)

_____ Dedicated "ESC Off" control
__X__ Multi-functional control with an "ESC Off" mode
_____ Other (describe)

Identify each control location, labeling and selectable modes.

First Control:

Location Lower left instrument panel, by driver's left knee

Labeling Skidding car symbol with "Off" underneath

Modes Traction Control Off
ESC Off & Traction Control Off
ESC On & Traction Control On

Identify standard or default drive configuration Default – 2WD

Verify standard or default drive configuration selected. __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?

__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?

__X__ Yes _____ No (fail)

If no, describe how the off control functions:

3.0 TEST DATA….continued

DATA SHEET 4 (Sheet 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 Modes	"ESC Off" telltale illuminates upon activation of control? (Yes/No)	"ESC Off" telltale extinguishes upon cycling ignition? (Yes/No)
Traction Control Off	No	N/A
ESC Off & Traction Control Off	Yes	Yes

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__ Yes _____ No (fail)

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

List and describe each control (i.e. alternate drive configuration selection controls):

Ancillary Control: System N/A
Control Description
Labeling

Ancillary Control: System N/A
Control Description
Labeling

3.0 TEST DATA….continued

DATA SHEET 4 (Sheet 3 of 3)
ESC AND ANCILLARY SYSTEM CONTROLS

Activate each 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
N/A		

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)
N/A	

For each 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 the control activated 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)

DATA INDICATES COMPLIANCE: PASS/FAIL PASS

REMARKS:

RECORDED BY: Alan Ida DATE: 8-29-11
APPROVED BY: Ken Webster DATE: 8-29-11

3.0 TEST DATA….continued

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

VEHICLE MAKE/MODEL/BODY STYLE: Toyota / Camry / Passenger Car

NHTSA No.: CB5110 TEST DATE: 8-25-11

Test Track Requirements: Test Surface Slope (0-1 %) 1 %

Peak Friction Coefficient (at least 0.9) 0.97

Full Fluid Levels: Fuel X Coolant X Other Fluids Washer (specify)

Tire Pressures: **Required:** Front Axle 230 kPa Rear Axle 230 kPa

Actual: LF: 230 kPa RF: 230 kPa LR: 230 kPa RR: 230 kPa

Vehicle Dimensions: Track Width 157.6 cm Wheelbase 277.3 cm

Roof Height 145.8 cm

Vehicle weight ratings: GAWR Front 1,210 KG GAWR Rear 1,070 KG

Unloaded Vehicle Weight (UVW)

Front Axle 911.0 KG Left Front 450.8 KG Right Front 460.2 KG

Rear Axle 591.4 KG Left Rear 306.2 KG Right Rear 285.2 KG

Total UVW 1,502.4 KG

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

Calculated Baseline Weight (UVW+ 73 kg) 1,575.4 KG

Outrigger size required ("Standard" or "Heavy") N/A

Standard - Baseline weight under 2,722 kg (6,000 lbs.)
Heavy - Baseline weight equal to or greater than 2,722 kg (6,000 lbs.)

3.0 TEST DATA….continued

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

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

Front Axle 989.6 KG Left Front 496.6 KG Right Front 493.0 KG

Rear Axle 649.6 KG Left Rear 340.4 KG Right Rear 309.2 KG

Total Loaded Vehicle Weight 1,639.2 KG

Ballast Required = [**Total Unloaded Vehicle Weight** + 168 KG] - **Total Loaded Weight w/ Driver and Instrumentation**

= [1,502.4 KG + 168 KG] - 1,639.2 KG

= 31.2 KG

Total Loaded Vehicle Weight

Front Axle 1,003.8 KG Left Front 498.8 KG Right Front 505.0 KG

Rear Axle 666.6 KG Left Rear 345.4 KG Right Rear 321.2 KG

Total Loaded Vehicle Weight 1,670.4 KG

3.0 TEST DATA….continued

DATA SHEET 5 (Sheet 3 of 3)
VEHICLE AND TEST TRACK 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	110.7 cm	164.8 cm
y-distance	-0.8 cm	-3.4 cm
z-distance	55.4 cm	84.9 cm

Distance Between Ultrasonic Sensors: 184.9 cm

TEST TRACK DATA MEETS REQUIREMENTS: YES/NO YES
If no, explain: _____

REMARKS:

RECORDED BY: Alan Ida DATE: 8-25-11
APPROVED BY: Ken Webster DATE: 8-29-11

3.0 TEST DATA….continued

DATA SHEET 6 (Sheet 1 of 3)
BRAKE AND TIRE CONDITIONING

VEHICLE MAKE/MODEL/BODY STYLE: Toyota / Camry / Passenger Car

VEHICLE NHTSA No.: CB5110

Measured Cold Tire Pressures: LF 230 kPa RF 230 kPa

LR 230 kPa RR 230 kPa

Wind Speed 0.4 m/sec
(10m/sec (22mph) max for passenger cars; 5m/s (11mph) max. for MPVs and Trucks)

Ambient Temperature (7°C (45°F) - 40°C (104°F)) 16.1 °C

Brake Conditioning Time; 7:00 AM Date; 8-26-11

56 km/h (35 mph) Brake Stops

Number of stops executed (10 required) 10 stops

Observed deceleration rate range (.5g target) 0.50 – 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 rate range 1.00 – 1.10 g

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

Duration of cool down period (5 minutes min.) 5:14 minutes

3.0 TEST DATA….continued

DATA SHEET 6 (Sheet 2 of 3)
BRAKE AND TIRE CONDITIONING

Tire Conditioning Series No. 1 Time: 8:08 AM Date: 8-26-11

Measured Tire Pressures: LF 248 kPa RF 250 kPa

LR 243 kPa RR 241 kPa

Wind Speed 0.0 m/sec
(10m/sec (22mph) max for passenger cars; 5m/s (11mph) max. for MPVs and Trucks)

Ambient Temperature (7°C (45°F) - 40°C (104°F)) 17.2 °C

30 meter (100 ft) Diameter Circle Maneuver				
Test Runs	Steering Direction	Target Lateral Acceleration (g)	Observed Lateral Acceleration (g)	Observed Vehicle Speed (km/h)
1-3	Clockwise	0.5-0.6	0.55	32.2
4-6	Counterclockwise	0.5-0.6	0.55	32.2

1 Hz 5 Cycle Sinusoidal Steering Maneuver to Determine Steering Wheel Angle For 0.5-0.6g Lateral Acceleration				
Test Runs	Vehicle Speed Km/h(mph)	Steering Wheel Angle (degrees)	Target Peak Lateral Acceleration (g)	Observed Peak Lateral Acceleration (g)
1	56±2 (35±1)	30	0.5-0.6	0.21
2	56±2 (35±1)	80	0.5-0.6	0.53
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 0.5–0.6g lateral acceleration; 80 degrees

1 Hz 10 Cycle Sinusoidal Steering Maneuver				
Test Runs	Vehicle Speed Km/h (mph)	Steering Wheel Angle (degrees)	Target Peak Lateral Acceleration (g)	Observed Peak Lateral Acceleration (g)
1 - 3	56±2 (35±1)	80 (cycles 1-10)	0.5-0.6	0.54
4	56±2 (35±1)	80 (cycles 1-9)	0.5-0.6	0.54
		160 (cycle 10)*	N/A	0.89

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

3.0 TEST DATA….continued

DATA SHEET 6 (Sheet 3 of 3)
BRAKE AND TIRE CONDITIONING

Tire Conditioning Series No. 2 Time: 9:30 AM Date: 8-26-11

Measured Tire Pressures: LF 255 kPa RF 258 kPa

LR 245 kPa RR 245 kPa

Wind Speed 0.4 m/sec
(10m/sec (22mph) max for passenger cars; 5m/s (11mph) max. for MPVs and Trucks)

Ambient Temperature (7°C (45°F) - 40°C (104°F)) 19.4 °C

30 meter (100 ft) Diameter Circle Maneuver				
Test Runs	Steering Direction	Target Lateral Acceleration (g)	Observed Lateral Acceleration (g)	Observed Vehicle Speed (km/h)
1-3	clockwise	0.5-0.6	0.55	32.2
4-6	counterclockwise	0.5-0.6	0.55	32.2

1 Hz 5 Cycle Sinusoidal Steering Maneuver to Determine Steering Wheel Angle For 0.5-0.6g Lateral Acceleration				
Test Runs	Vehicle Speed Km/h (mph)	Steering Wheel Angle (degrees)	Target Peak Lateral Acceleration (g)	Observed Peak Lateral Acceleration (g)
1	56±2 (35±1)	N/A	0.5-0.6	N/A
2	56±2 (35±1)		0.5-0.6	
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 0.5–0.6g lateral acceleration; 80 degrees

1 Hz 10 Cycle Sinusoidal Steering Maneuver				
Test Runs	Vehicle Speed (mph)	Steering Wheel Angle (degrees)	Target Peak Lateral Acceleration (g)	Observed Peak Lateral Acceleration (g)
1 - 3	56±2 (35±1)	80 (cycles 1-10)	0.5-0.6	0.54
4	56±2 (35±1)	80 (cycles 1-9)	0.5-0.6	0.54
		160 (cycle 10)*	N/A	0.92

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

REMARKS:

RECORDED BY: Alan Ida DATE: 8-26-11
APPROVED BY: Ken Webster DATE: 8-29-11

3.0 TEST DATA….continued

DATA SHEET 7 (1 of 2)
SLOWLY INCREASING STEER (SIS) MANEUVER

VEHICLE MAKE/MODEL/BODY STYLE: Toyota / Camry / Passenger Car

VEHICLE NHTSA No.: CB5110 TEST DATE: 8-26-11

Wind Speed 0.4 m/sec
(10m/sec (22mph) max for passenger cars; 5m/s (11mph) max. for MPVs and Trucks)

Ambient Temperature (7°C (45°F) - 40°C (104°F)) 18.3 °C

Static Data File Number: 0008

Selected Drive Configuration: 2WD

Selected Mode: default

Preliminary Left Steer Maneuver:

Lateral Acceleration measured at 30 degrees steering wheel angle ($a_{y,30\ degrees}$)

$a_{y,30\ degrees}$ = 0.32 g

Assuming a linear relationship the following ratio should be used to calculate the steering wheel angle at .55g.

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

δ_{SIS} = 51.6 degrees @ 0.55g

δ_{SIS} = 50 degrees (rounded)

Steering Wheel Angle at Corrected 0.3 g Lateral Acceleration:

Maneuver #	Initial Steer Direction	Time Clock (5 min max between runs)	Steering Wheel Angle to nearest 0.1 degree (degrees)	All Conditions Met?
0011	Left	8:32 am	-33.8	Yes
0013	Left	8:39 am	-34.1	Yes
0014	Left	8:42 am	-34.1	Yes
0015	Right	8:45 am	34.0	Yes
0016	Right	8:49 am	34.7	Yes
0017	Right	8:52 am	33.3	Yes

3.0 TEST DATA….continued

DATA SHEET 7 (2 of 2)
SLOWLY INCREASING STEER (SIS) MANEUVER

Average Overall Steering Wheel Angle:

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

$\delta_{0.3\ g,\ overall}$ = 34.0 degrees
[to nearest 0.1 degree]

REMARKS:

File 0012 was omitted due to brake application at the end of the maneuver. Therefore, the time clock indicates more than 5 minutes between maneuvers 0011 and 0013.

RECORDED BY: Alan Ida DATE: 8-26-11
APPROVED BY: Ken Webster DATE: 8-29-11

3.0 TEST DATA….continued

DATA SHEET 8 (1 of 3)
VEHICLE LATERAL STABILITY AND RESPONSIVENESS

VEHICLE MAKE/MODEL/BODY STYLE: Toyota / Camry / Passenger Car

VEHICLE NHTSA No.: CB5110 TEST DATE: 8-26-11

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: 2WD
Selected Mode: default

Overall steering wheel angle ($\delta_{0.3\ g,\ overall}$) 34.0 degrees

Static Data File Number 0022

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

Maneuver #	Clock Time (1.5 – 5 min between each test run)	Commanded Steering Wheel Angle[1] (degrees)		Yaw Rates (degrees/sec)			YRR at 1.0 sec after COS [≤ 35%]		YRR at 1.75 sec after COS [≤ 20%]	
		Scalar	Angle	$\dot{\psi}_{Peak}$	$\dot{\psi}_{1.0sec}$	$\dot{\psi}_{1.75sec}$	%	Pass/ Fail	%	Pass/ Fail
0023	9:45 am	1.5* $\delta_{0.3\ g}$	51	12.53	-0.04	-0.03	-0.32	Pass	-0.22	Pass
0024	9:49 am	2.0* $\delta_{0.3\ g}$	68	17.08	-0.04	-0.01	-0.22	Pass	-0.03	Pass
0025	9:53 am	2.5* $\delta_{0.3\ g}$	85	21.63	-0.12	-0.03	-0.55	Pass	-0.13	Pass
0026	9:56 am	3.0* $\delta_{0.3\ g}$	102	26.11	-0.17	0.02	-0.65	Pass	0.09	Pass
0027	9:59 am	3.5* $\delta_{0.3\ g}$	119	29.84	-0.16	-0.19	-0.54	Pass	-0.64	Pass
0028	10:03 am	4.0* $\delta_{0.3\ g}$	136	32.78	-0.18	-0.02	-0.56	Pass	-0.06	Pass
0029	10:06 am	4.5* $\delta_{0.3\ g}$	153	38.23	-0.16	-0.09	-0.41	Pass	-0.24	Pass
0030	10:10 am	5.0* $\delta_{0.3\ g}$	170	40.29	-0.14	-0.01	-0.35	Pass	-0.01	Pass
0031	10:13 am	5.5* $\delta_{0.3\ g}$	187	45.36	-0.38	-0.01	-0.84	Pass	-0.02	Pass
0032	10:17 am	6.0* $\delta_{0.3\ g}$	204	46.77	-0.28	-0.12	-0.61	Pass	-0.26	Pass
0033	10:20 am	6.5* $\delta_{0.3\ g}$	221	50.60	-0.12	0.04	-0.24	Pass	0.08	Pass
0034	10:23 am	7.0* $\delta_{0.3\ g}$	238	51.48	-0.51	-0.05	-0.99	Pass	-0.11	Pass
0035	10:26 am	7.5* $\delta_{0.3\ g}$	255	53.02	0.70	-0.03	1.31	Pass	-0.06	Pass
0036	10:30 am	7.9* $\delta_{0.3\ g}$	270	52.88	-0.06	-0.05	-0.12	Pass	-0.10	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….continued

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 min between each test run)	Commanded Steering Wheel Angle[1] (degrees)		Yaw Rates (degrees/sec)			YRR at 1.0 sec after COS [≤ 35%]		YRR at 1.75 sec after COS [≤ 20%]	
		Scalar	Angle	$\dot{\psi}_{Peak}$	$\dot{\psi}_{1.0\text{sec}}$	$\dot{\psi}_{1.75\text{sec}}$	%	Pass/ Fail	%	Pass/ Fail
0037	10:33 am	1.5* $\delta_{0.3\,g}$	51	-12.57	0.28	0.16	-2.26	Pass	-1.28	Pass
0038	10:37 am	2.0* $\delta_{0.3\,g}$	68	-16.77	0.12	0.13	-0.70	Pass	-0.79	Pass
0039	10:41 am	2.5* $\delta_{0.3\,g}$	85	-21.55	0.11	0.14	-0.49	Pass	-0.63	Pass
0040	10:44 am	3.0* $\delta_{0.3\,g}$	102	-26.06	0.19	0.15	-0.73	Pass	-0.57	Pass
0041	10:47 am	3.5* $\delta_{0.3\,g}$	119	-30.37	-0.05	0.00	0.15	Pass	0.02	Pass
0042	10:50 am	4.0* $\delta_{0.3\,g}$	136	-36.04	-0.02	-0.10	0.05	Pass	0.29	Pass
0043	10:53 am	4.5* $\delta_{0.3\,g}$	153	-39.78	0.05	-0.09	-0.11	Pass	0.23	Pass
0044	10:56 am	5.0* $\delta_{0.3\,g}$	170	-43.29	0.00	-0.08	0.01	Pass	0.18	Pass
0045	11:00 am	5.5* $\delta_{0.3\,g}$	187	-45.89	0.01	-0.01	-0.02	Pass	0.03	Pass
0046	11:03 am	6.0* $\delta_{0.3\,g}$	204	-50.72	-0.13	0.04	0.26	Pass	-0.07	Pass
0047	11:06 am	6.5* $\delta_{0.3\,g}$	221	-49.95	0.12	0.17	-0.25	Pass	-0.33	Pass
0048	11:09 am	7.0* $\delta_{0.3\,g}$	238	-53.45	0.01	0.09	-0.02	Pass	-0.17	Pass
0049	11:12 am	7.5* $\delta_{0.3\,g}$	255	-56.06	-0.57	-0.05	1.02	Pass	0.08	Pass
0050	11:15 am	7.9* $\delta_{0.3\,g}$	270	-57.11	-0.45	0.01	0.78	Pass	-0.01	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	__X__ No
Tire debeading	_____ Yes	__X__ No
Loss of pavement contact of vehicle tires	_____ Yes	__X__ No
Did the test driver experience any vehicle loss of control or spinout?	_____ Yes	__X__ No

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

_____

3.0 TEST DATA….continued

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	Angle (degrees)	Distance (m)	Pass/Fail
0030	Counter Clockwise	$5.0*\ \delta_{0.3\ g}$	170	2.87	Pass
0031	Counter Clockwise	$5.5*\ \delta_{0.3\ g}$	187	2.99	Pass
0032	Counter Clockwise	$6.0*\ \delta_{0.3\ g}$	204	3.11	Pass
0033	Counter Clockwise	$6.5*\ \delta_{0.3\ g}$	221	3.18	Pass
0034	Counter Clockwise	$7.0*\ \delta_{0.3\ g}$	238	3.26	Pass
0035	Counter Clockwise	$7.5*\ \delta_{0.3\ g}$	255	3.25	Pass
0036	Counter Clockwise	$7.9*\ \delta_{0.3\ g}$	270	3.25	Pass
0044	Clockwise	$5.0*\ \delta_{0.3\ g}$	170	2.84	Pass
0045	Clockwise	$5.5*\ \delta_{0.3\ g}$	187	3.01	Pass
0046	Clockwise	$6.0*\ \delta_{0.3\ g}$	204	3.09	Pass
0047	Clockwise	$6.5*\ \delta_{0.3\ g}$	221	3.13	Pass
0048	Clockwise	$7.0*\ \delta_{0.3\ g}$	238	3.16	Pass
0049	Clockwise	$7.5*\ \delta_{0.3\ g}$	255	3.22	Pass
0050	Clockwise	$7.9*\ \delta_{0.3\ g}$	270	3.25	Pass

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

DATA INDICATES COMPLIANCE: PASS/FAIL PASS

REMARKS:

RECORDED BY: Alan Ida DATE: 8-26-11
APPROVED BY: Ken Webster DATE: 8-29-11

3.0 TEST DATA….continued

DATA SHEET 9 (Sheet 1 of 2)
MALFUNCTION WARNING TEST

VEHICLE MAKE/MODEL/BODY STYLE: Toyota / Camry / Passenger Car

VEHICLE NHTSA No.: CB5110 TEST DATE: 8-29-11

METHOD OF MALFUNCTION SIMULATION:
Describe method of malfunction simulation: Disconnect the Left Rear wheel speed sensor connector.

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.
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± 5mph) is reached.
0 Seconds (must be within 2 minutes) X Pass ____ Fail

DATA INDICATES COMPLIANCE: PASS/FAIL PASS

REMARKS:
The vehicle did not require driving to illuminate or extinguish the malfunction telltales. When the wheel speed sensor was disconnected, the ESC and ABS malfunction telltales illuminated. After the wheel speed sensor connector was restored, the ESC and ABS malfunction telltales extinguished.

RECORDED BY: Alan Ida DATE: 8-29-11
APPROVED BY: Ken Webster DATE: 8-29-11

3.0 TEST DATA….continued

DATA SHEET 9 (Sheet 2 of 2)
MALFUNCTION WARNING TEST

VEHICLE MAKE/MODEL/BODY STYLE: Toyota / Camry / Passenger Car

VEHICLE NHTSA No.: CB5110 TEST DATE: 8-29-11

METHOD OF MALFUNCTION SIMULATION:
Describe method of malfunction simulation: Disconnect the brake pedal switch sensor connector.

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.
3 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.
0 Seconds (must be within 2 minutes) X Pass ____ Fail

DATA INDICATES COMPLIANCE: PASS/FAIL PASS

REMARKS:
The vehicle did not require driving to illuminate or extinguish the malfunction telltales. However, the brake pedal required to be depressed for 3 seconds in order to illuminate the ESC and ABS malfunction telltales. After the brake pedal switch connector was restored, the ESC and ABS malfunction telltales extinguished without any brake pedal application.

RECORDED BY: Alan Ida DATE: 8-29-11
APPROVED BY: Ken Webster DATE: 8-29-11

4.0 TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

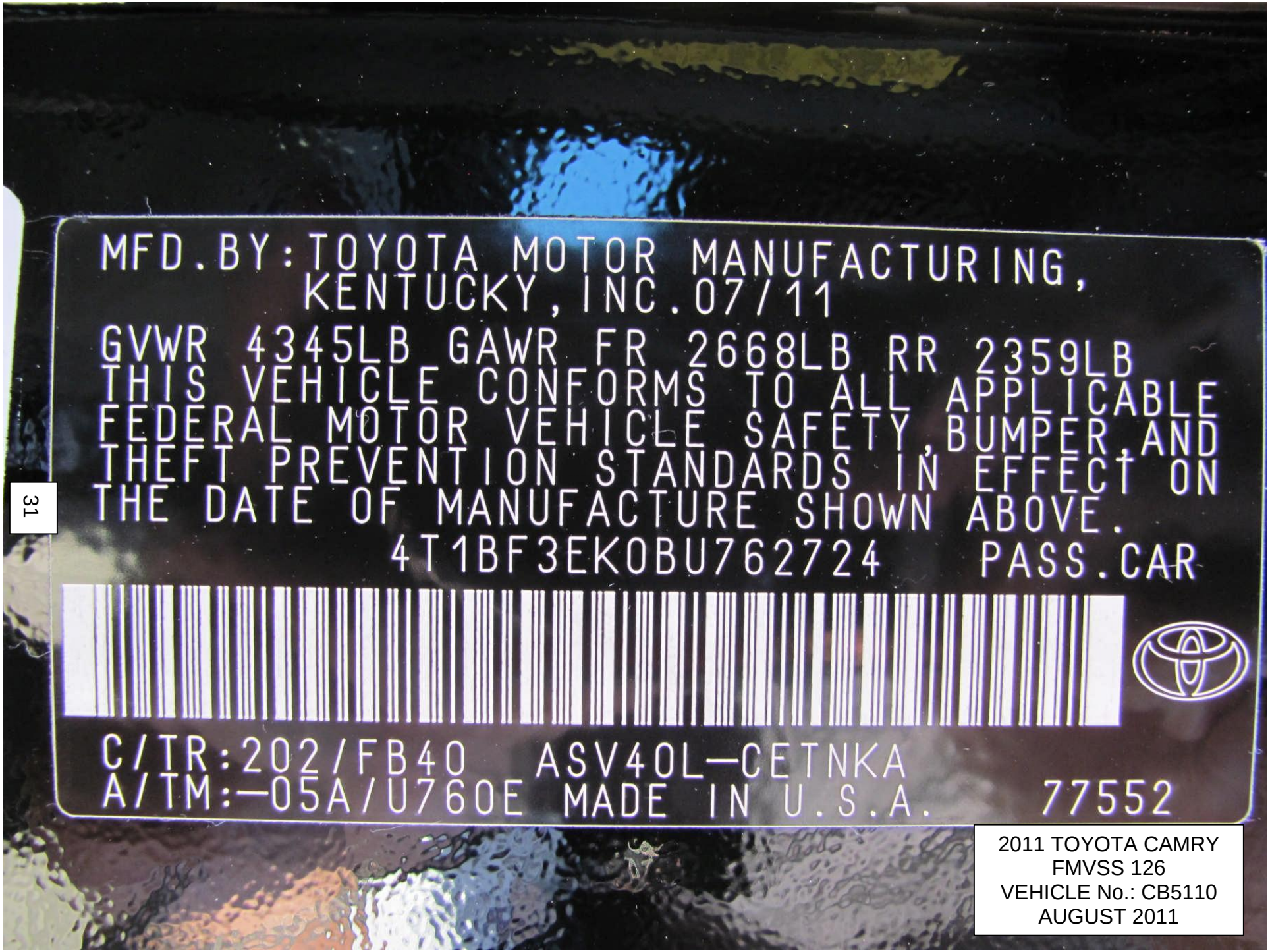
Type	Output	Range	Resolution	Accuracy	Specifics	Serial Number	Calibration
Tire Pressure Gauge	Vehicle Tire Pressure	0-60psi	0.5 psi	±0.5% of applied pressure	Moroso Model: 89562 0-60psi	N/A	By: TRC Date: 6-14-11 Due: 9-12-11
Platform Scales	Vehicle Total, Wheel, and Axle Load	0-2500 lb per each of four pads	0.5 lb	±1.0% of applied load	Mettler Toledo Model: JXGA1000	5225831-5JC	By: Mettler Toledo Date: 8-11-11 Due: 11-11-11
Automated Steering Machine with Steering Angle Encoder	Handwheel Angle	±800 deg	0.25 deg	±0.25 deg	Heitz Automotive Testing Model: Sprint 3	60303	By: ATI-Heitz Date: 2-18-11 Due: 2-18-12
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	0768	By: BEI Tech. Date: 1-10-11 Due: 1-10-12
Radar Speed Sensor and Dashboard Display	Vehicle Speed	0-125 mph	0.009 mph	±0.25% of full scale	A-DAT Corp. Radar Model: DRS-6 Display Model: RD-2	1400603	By: B+S Multidata Date: 2-14-11 Due: 2-14-12
Ultrasonic Distance Measuring System	Left and Right Side Vehicle Height	5-24 inches	0.01 inches	±0.25% of maximum distance	Massa Products Corporation Model: M-5000/220	104619 & 104613	By: Consumers Energy Laboratory Services Date: 1-20-11 Due: 1-20-12
Data Acquisition System [Amplify, Anti-Alias, and Digitize]	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	Dewetron Sidehand DAS Model: DA-121-16 Digitizer Model: Dewe-Orion-1616-100 Amplifier/AntiAliasing: MDAQ-FILT-10-S	12060 1105	By: Dewetron Date: 12-02-10 Due: 12-02-11
Load Cell	Vehicle Brake Pedal Force	0-300 lb	1 lb	±0.05% of full scale	DATRON Model: DTM-LPA	4970-1103	By: TRC Date: per test Due: per test
Coordinate Measurement Machine	Inertial Sensing System Location	0-10 feet	0.001 inch	±0.003% of full scale	FARO International Model: Faro Arm N10	U12-05-08-07108	By: FARO Date: 8-19-11 Due: 8-19-12
Outriggers	No output. Safety Item.	N/A	N/A	N/A	NHTSA Titanium Outriggers Model: Docket 2007-27662-11	N/A	N/A

5.0 PHOTOGRAPHS

5.1 ¾ FRONT VIEW FROM LEFT SIDE OF VEHICLE
5.2 ¾ REAR VIEW FROM RIGHT SIDE OF VEHICLE
5.3 VEHICLE CERTIFICATION LABEL
5.4 TIRE AND LOADING INFORMATION LABEL
5.5 WINDOW STICKER (MONRONEY LABEL)
5.6 ESC OFF TELLTALE
5.7 ESC MALFUNCTION TELLTALE
5.8 ESC OFF CONTROL
5.9 ¾ FRONT VIEW - TEST VEHICLE INSTRUMENTED
5.10 ¾ REAR VIEW – TEST VEHICLE INSTRUMENTED
5.11 STEERING WHEEL CONTROLLER AND DATA ACQUISITION SYSTEM
5.12 STEERING CONTROLLER BATTERY BOX
5.13 INERTIA MEASUREMENT UNIT
5.14 VEHICLE SPEED SENSOR
5.15 BODY ROLL SENSOR (DRIVER SIDE)
5.16 BODY ROLL SENSOR (PASSENGER SIDE)
5.17 BRAKE PEDAL FORCE TRANSDUCER

5.1 ¾ FRONT VIEW FROM LEFT SIDE OF VEHICLE

5.2 ¾ REAR VIEW FROM RIGHT SIDE OF VEHICLE



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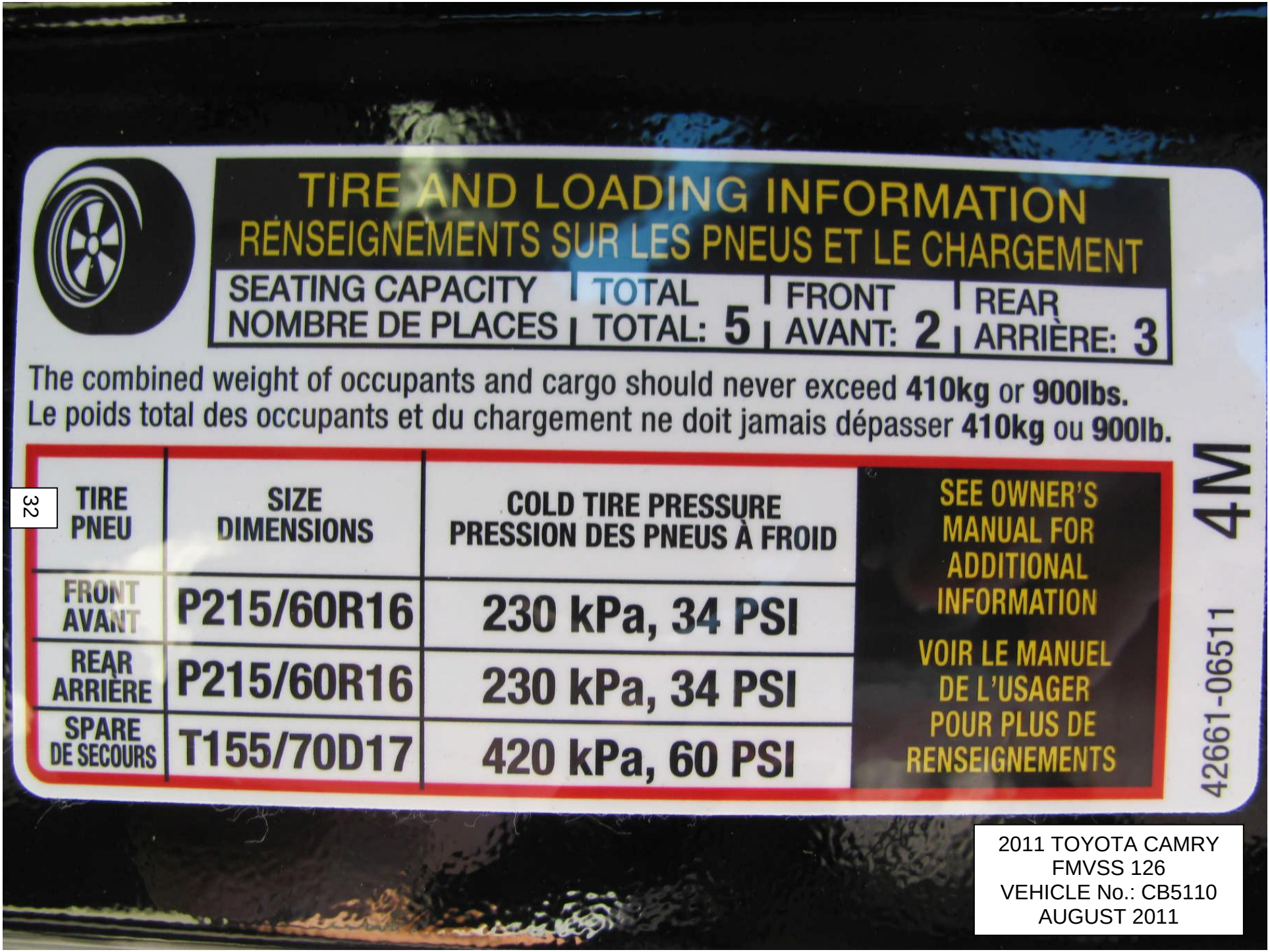
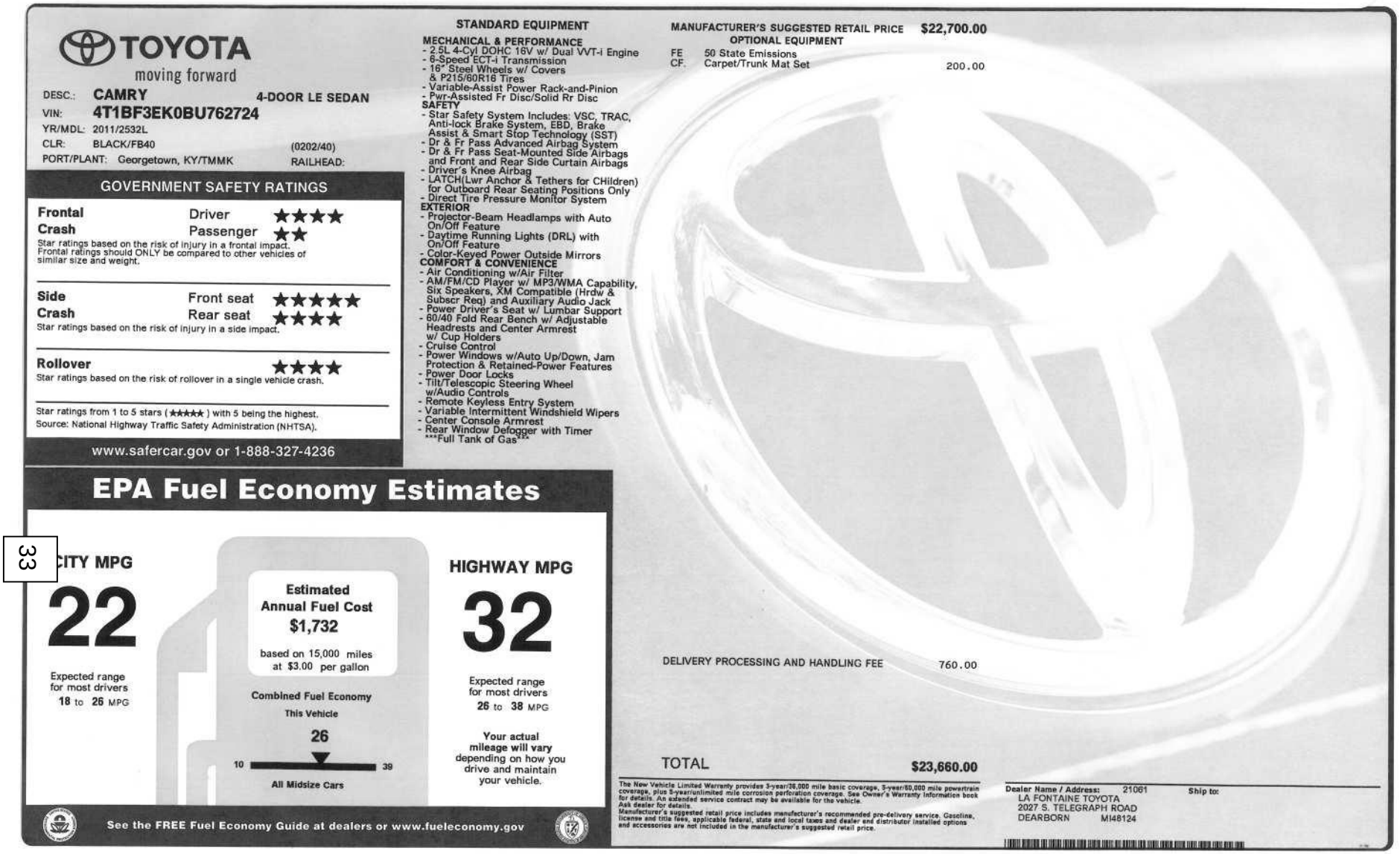
5.3 VEHICLE CERTIFICATION LABEL



5.4 TIRE AND LOADING INFORMATION LABEL



TOYOTA
moving forward

DESC.: CAMRY 4-DOOR LE SEDAN
VIN: 4T1BF3EK0BU762724
YR/MDL: 2011/2532L
CLR: BLACK/FB40 (0202/40)
PORT/PLANT: Georgetown, KY/TMMK RAILHEAD:

GOVERNMENT SAFETY RATINGS

Frontal Crash — Driver ★★★★ — Passenger ★★
Star ratings based on the risk of injury in a frontal impact. Frontal ratings should ONLY be compared to other vehicles of similar size and weight.

Side Crash — Front seat ★★★★★ — Rear seat ★★★★
Star ratings based on the risk of injury in a side impact.

Rollover ★★★★
Star ratings based on the risk of rollover in a single vehicle crash.

Star ratings from 1 to 5 stars (★★★★★) with 5 being the highest.
Source: National Highway Traffic Safety Administration (NHTSA).

www.safercar.gov or 1-888-327-4236

STANDARD EQUIPMENT

MECHANICAL & PERFORMANCE
- 2.5L 4-Cyl DOHC 16V w/ Dual VVT-i Engine
- 6-Speed ECT-i Transmission
- 16" Steel Wheels w/ Covers & P215/60R16 Tires
- Variable-Assist Power Rack-and-Pinion
- Pwr-Assisted Fr Disc/Solid Rr Disc

SAFETY
- Star Safety System Includes: VSC, TRAC, Anti-lock Brake System, EBD, Brake Assist & Smart Stop Technology (SST)
- Dr & Fr Pass Advanced Airbag System
- Dr & Fr Pass Seat-Mounted Side Airbags and Front and Rear Side Curtain Airbags
- Driver's Knee Airbag
- LATCH(Lwr Anchor & Tethers for CHildren) for Outboard Rear Seating Positions Only
- Direct Tire Pressure Monitor System

EXTERIOR
- Projector-Beam Headlamps with Auto On/Off Feature
- Daytime Running Lights (DRL) with On/Off Feature
- Color-Keyed Power Outside Mirrors

COMFORT & CONVENIENCE
- Air Conditioning w/Air Filter
- AM/FM/CD Player w/ MP3/WMA Capability, Six Speakers, XM Compatible (Hrdw & Subscr Req) and Auxiliary Audio Jack
- Power Driver's Seat w/ Lumbar Support
- 60/40 Fold Rear Bench w/ Adjustable Headrests and Center Armrest w/ Cup Holders
- Cruise Control
- Power Windows w/Auto Up/Down, Jam Protection & Retained-Power Features
- Power Door Locks
- Tilt/Telescopic Steering Wheel w/Audio Controls
- Remote Keyless Entry System
- Variable Intermittent Windshield Wipers
- Center Console Armrest
- Rear Window Defogger with Timer
- ***Full Tank of Gas***

MANUFACTURER'S SUGGESTED RETAIL PRICE $22,700.00

OPTIONAL EQUIPMENT
FE 50 State Emissions
CF Carpet/Trunk Mat Set 200.00

DELIVERY PROCESSING AND HANDLING FEE 760.00

TOTAL $23,660.00

The New Vehicle Limited Warranty provides 3-year/36,000 mile basic coverage, 5-year/60,000 mile powertrain coverage, plus 5-year/unlimited mile corrosion perforation coverage. See Owner's Warranty Information book for details. An extended service contract may be available for the vehicle. Manufacturer's suggested retail price includes manufacturer's recommended pre-delivery service. Gasoline, license and title fees, applicable federal, state and local taxes and dealer and distributor installed options and accessories are not included in the manufacturer's suggested retail price.

Dealer Name / Address: 21061
LA FONTAINE TOYOTA
2027 S. TELEGRAPH ROAD
DEARBORN MI48124

Ship to:

EPA Fuel Economy Estimates

CITY MPG
22
Expected range for most drivers
18 to 26 MPG

Estimated Annual Fuel Cost
$1,732
based on 15,000 miles at $3.00 per gallon

Combined Fuel Economy
This Vehicle
26
10 — 39
All Midsize Cars

HIGHWAY MPG
32
Expected range for most drivers
26 to 38 MPG

Your actual mileage will vary depending on how you drive and maintain your vehicle.

See the FREE Fuel Economy Guide at dealers or www.fueleconomy.gov

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5.5 WINDOW STICKER - MONRONEY LABEL

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5.6 ESC OFF TELLTALE

5.7 ESC MALFUNCTION TELLTALE

5.8 ESC OFF CONTROL

5.9 ¾ FRONT VIEW - TEST VEHICLE INSTRUMENTED

5.10 ¾ REAR VIEW - TEST VEHICLE INSTRUMENTED

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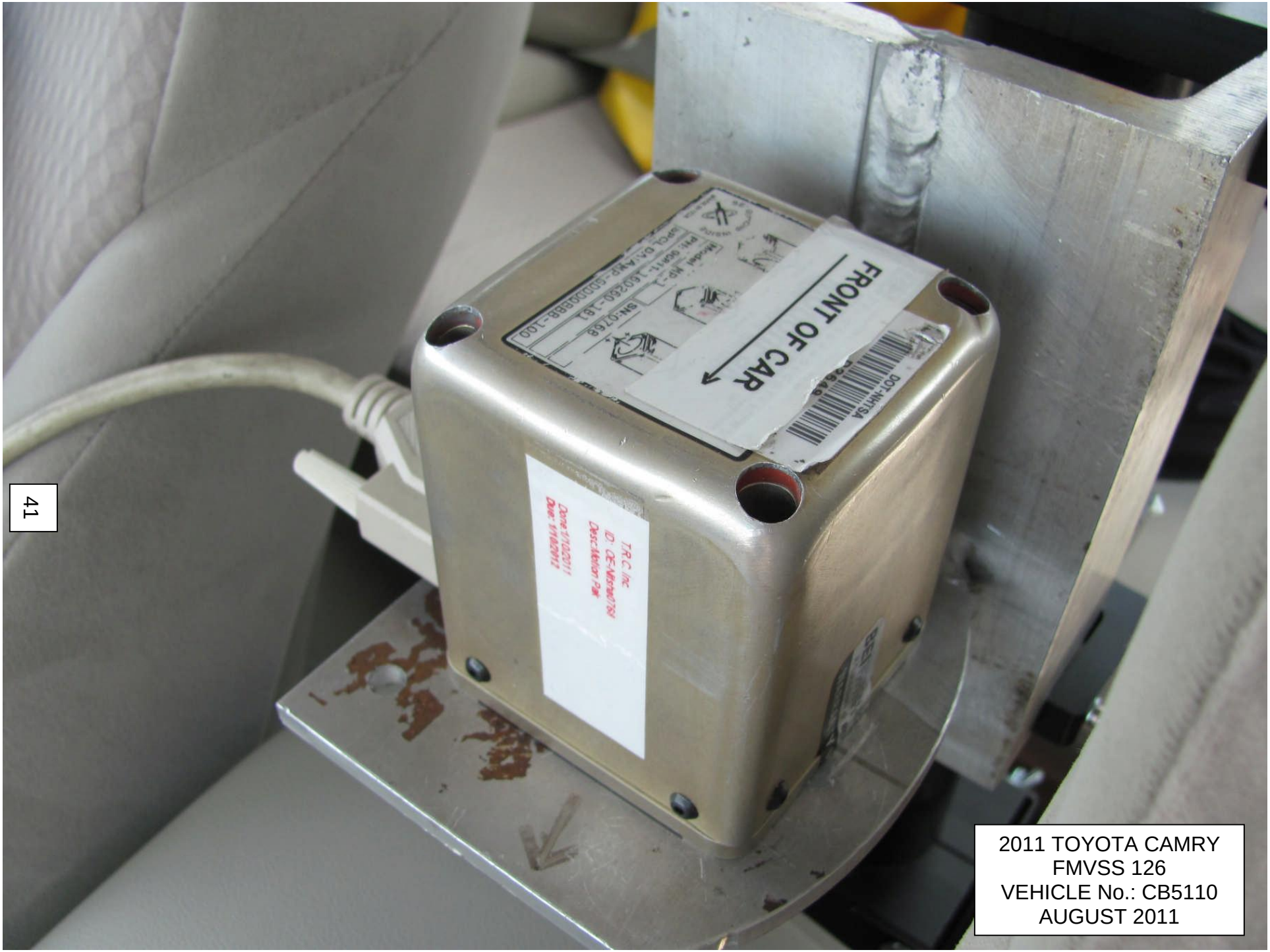
5.11 STEERING WHEEL CONTROLLER AND DATA ACQUISITION SYSTEM

5.12 STEERING CONTROLLER BATTERY BOX



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5.13 INERTIA MEASUREMENT UNIT

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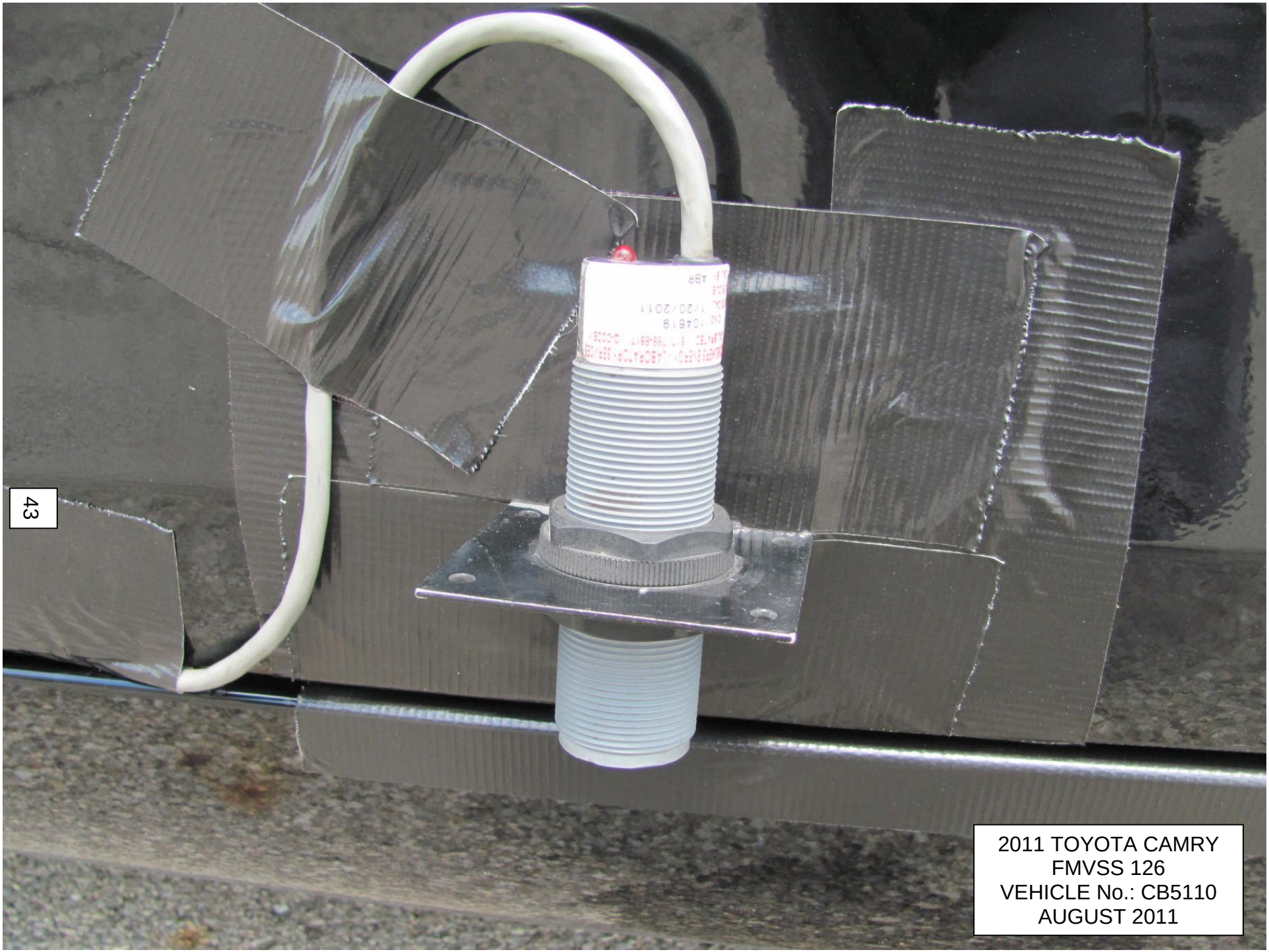
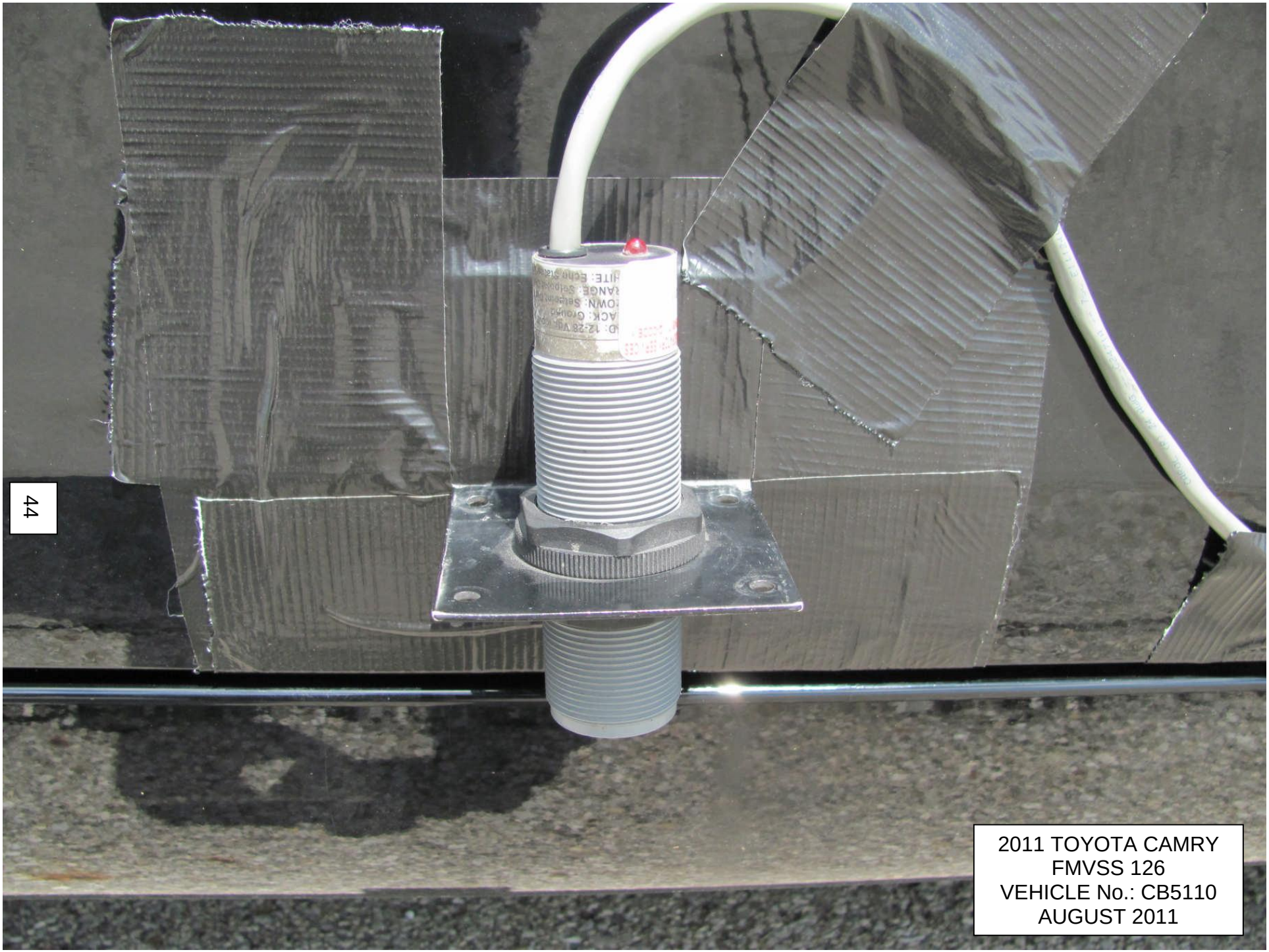
FMVSS 126
VEHICLE No.: CB5110
AUGUST 2011

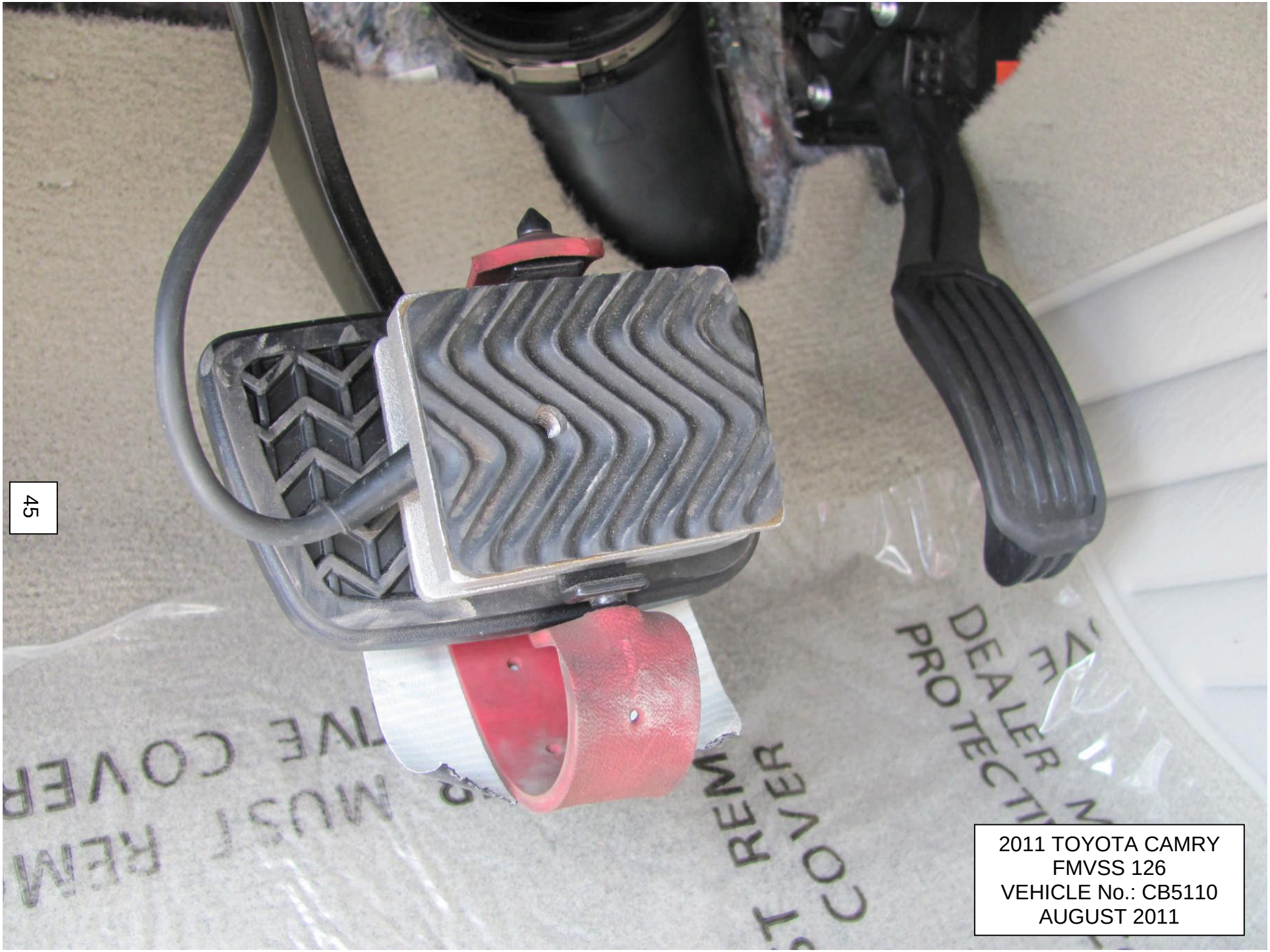
5.14 VEHICLE SPEED SENSOR



5.15 BODY ROLL SENSOR (DRIVER SIDE)



5.16 BODY ROLL SENSOR (PASSENGER SIDE)

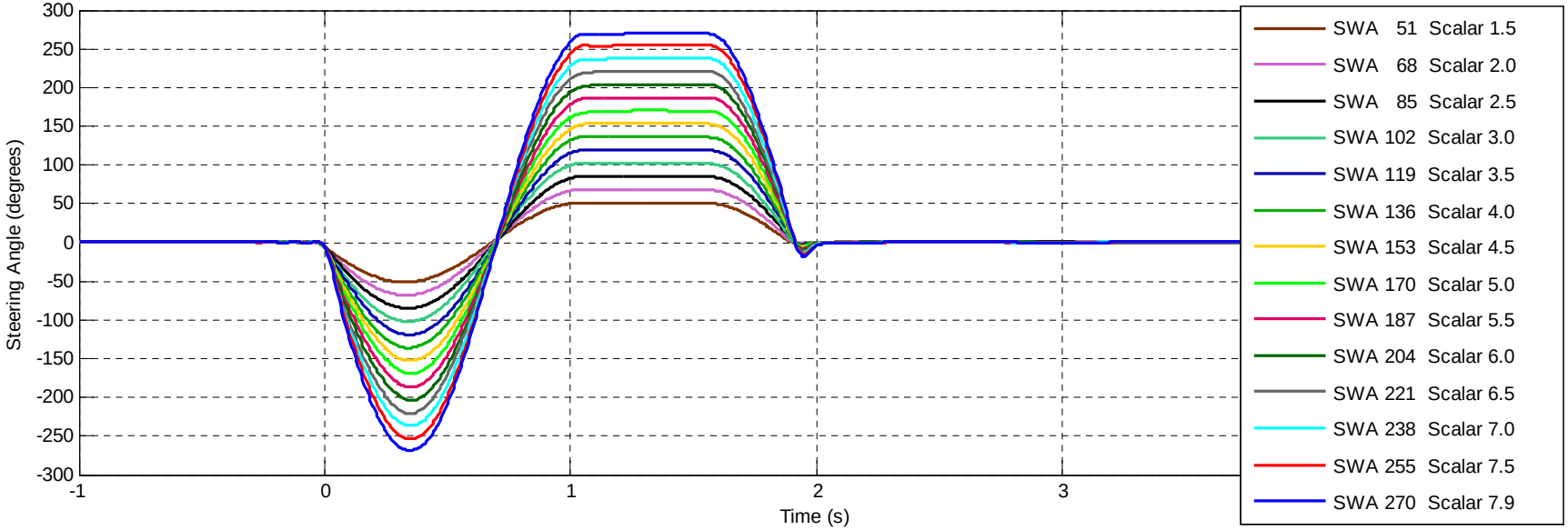


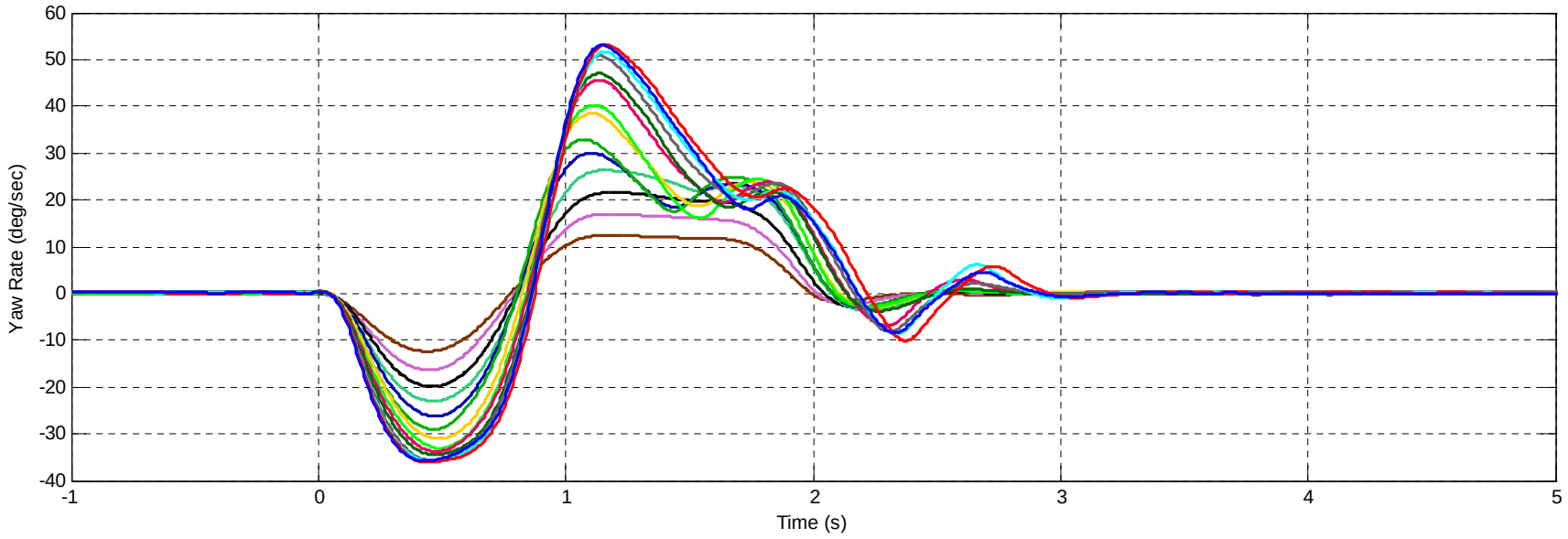
5.17 BRAKE PEDAL FORCE TRANSDUCER

6.0 DATA PLOTS

6.0 2011 TOYOTA CAMRY DATA PLOTS

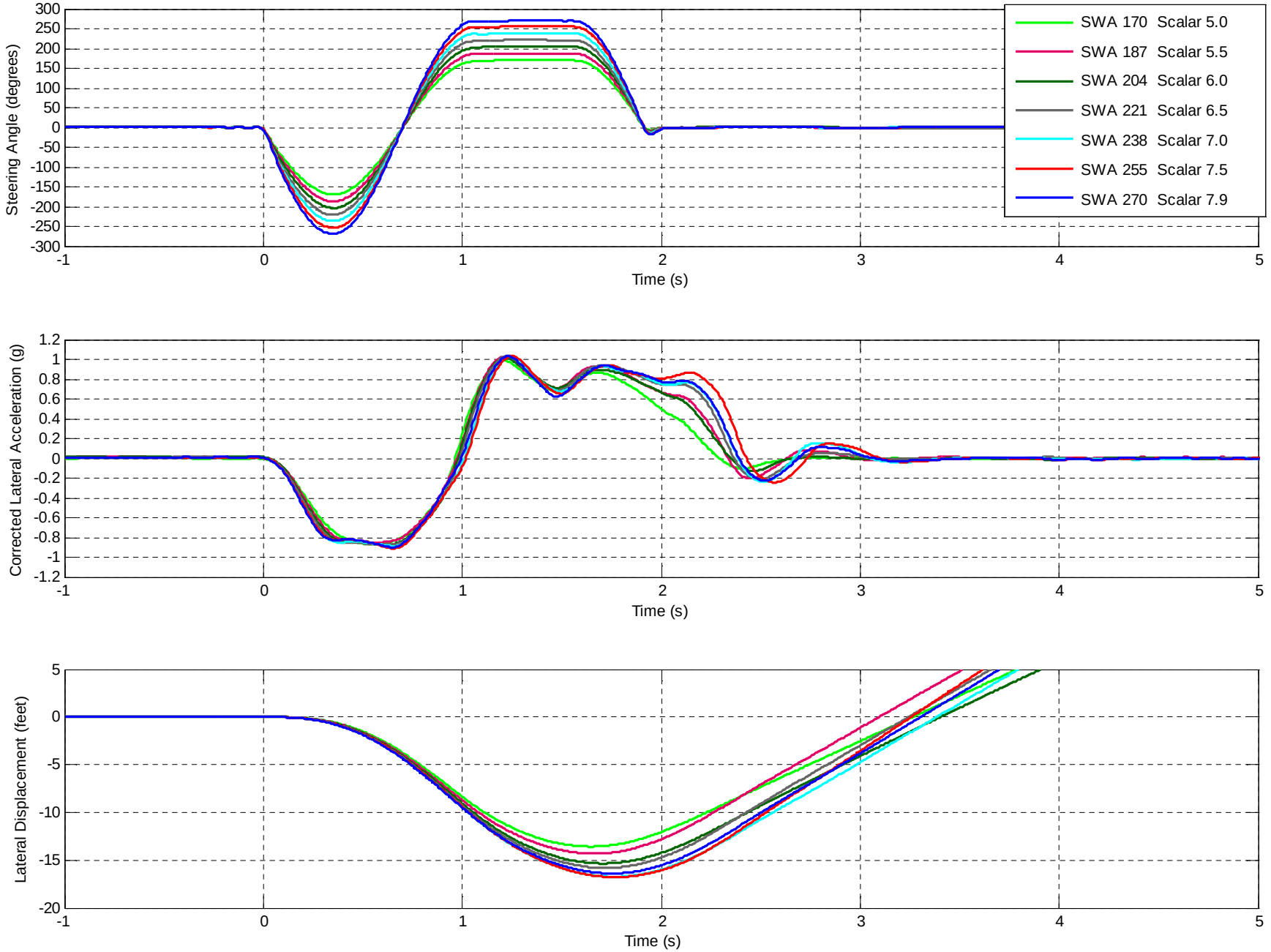
Figure 1. Steering Angle and Yaw Rate Time History, Counter-Clockwise Initial Steer Tests





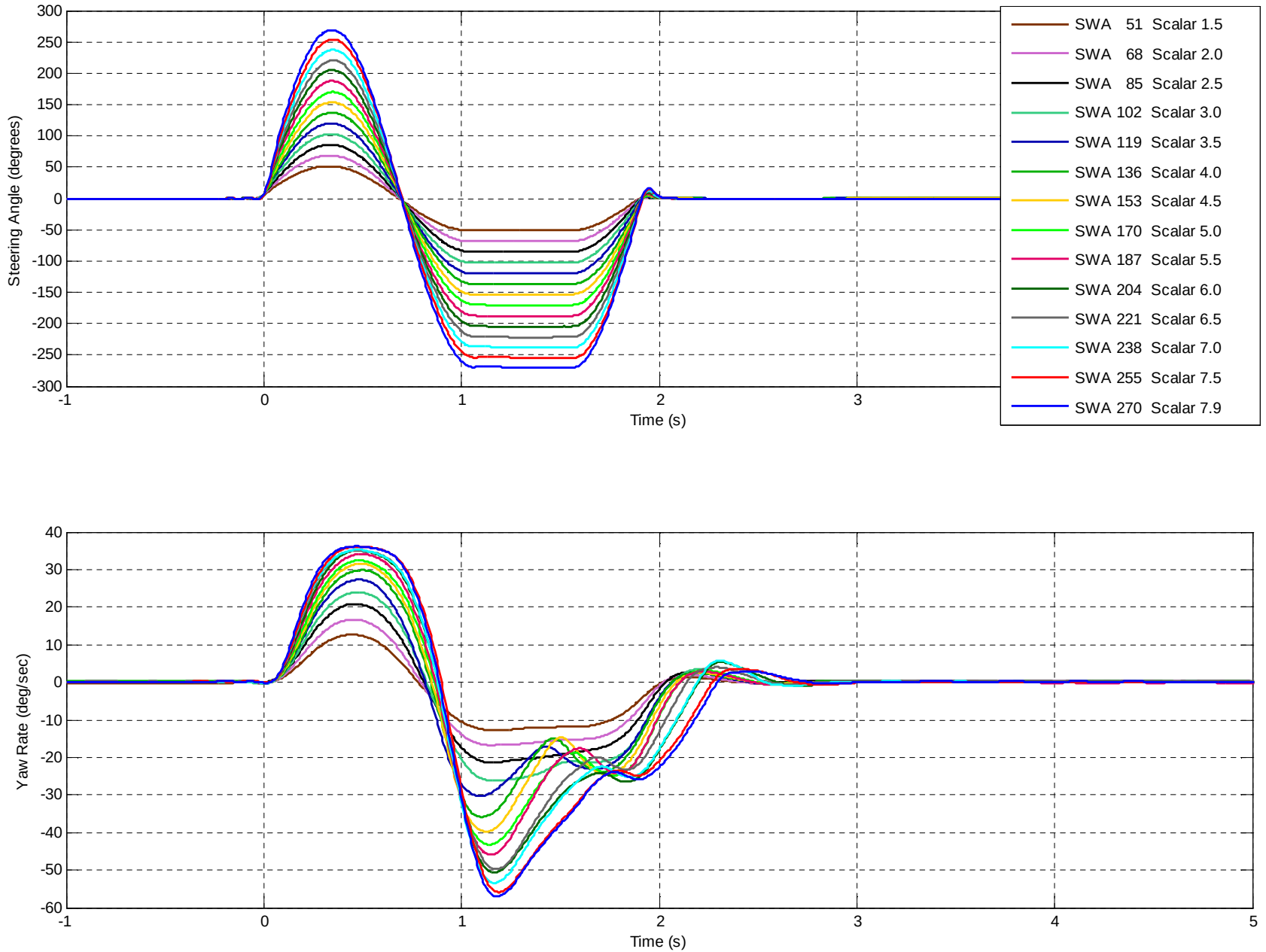
6.0 2011 TOYOTA CAMRY DATA PLOTS…continued

Figure 2. Steering Angle, Lateral Acceleration, and Lateral Displacement Time History, Counter-Clockwise Initial Steer Tests



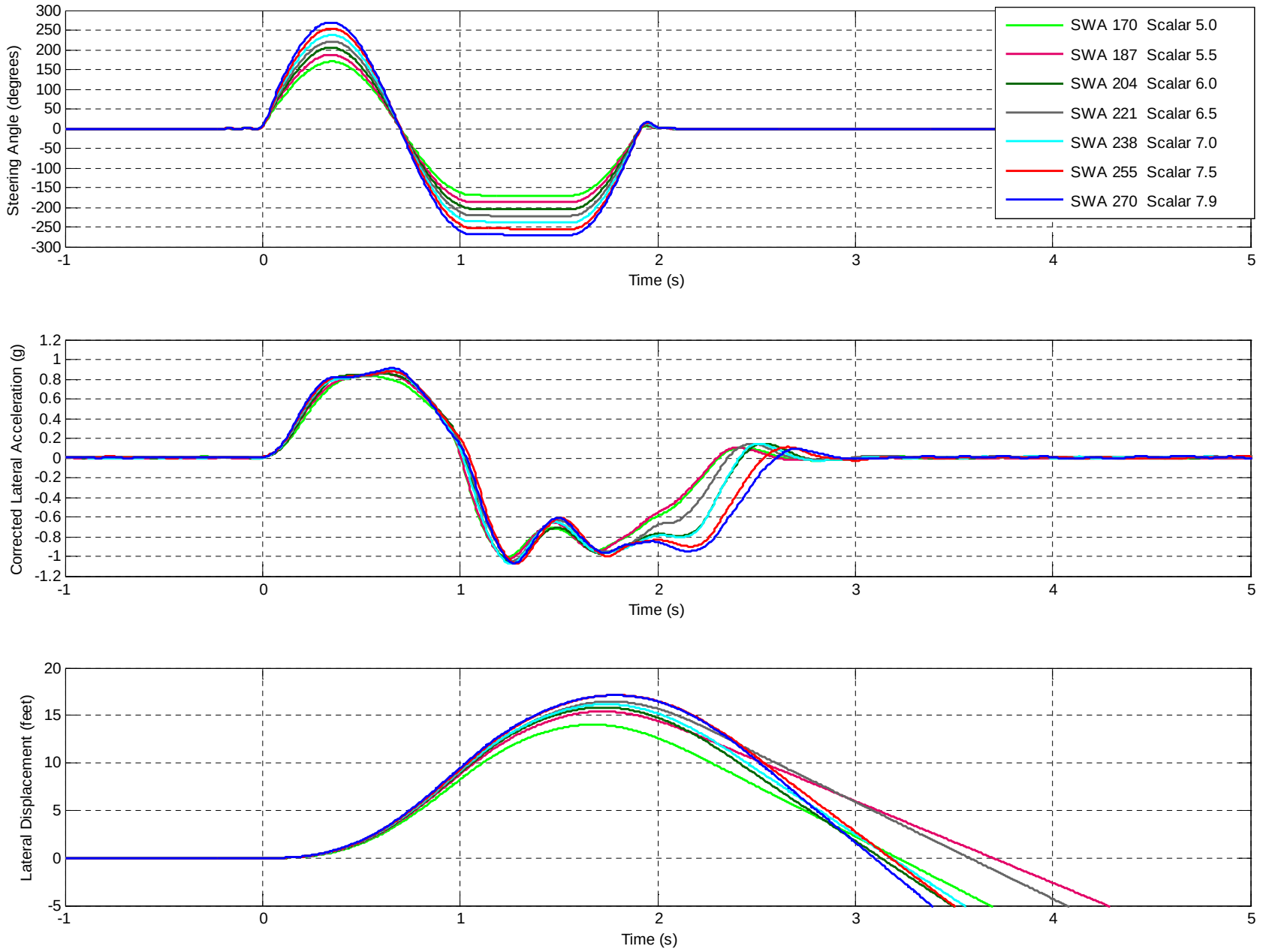
6.0 2011 TOYOTA CAMRY DATA PLOTS…continued

Figure 3. Steering Angle and Yaw Rate Time History, Clockwise Initial Steer Tests



6.0 2011 TOYOTA CAMRY DATA PLOTS…continued

Figure 4. Steering Angle, Lateral Acceleration, and Lateral Displacement Time History, Clockwise Initial Steer Tests



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
7.5 SLOWLY INCREASING STEER TEST RESULTS
7.6 INERTIAL SENSING SYSTEM LOCATION COORDINATES

7.1 OWNER'S MANUAL PAGES

To help enhance driving safety and performance, the following systems operate automatically in response to various driving situations. Be aware, however, that these systems are supplementary and should not be relied upon too heavily when operating the vehicle.

ABS (Anti-lock Brake System)

Helps to prevent wheel lock when the brakes are applied suddenly, or if the brakes are applied while driving on a slippery road surface.

Brake assist

Generates an increased level of braking force after the brake pedal is depressed, when the system detects a panic stop situation.

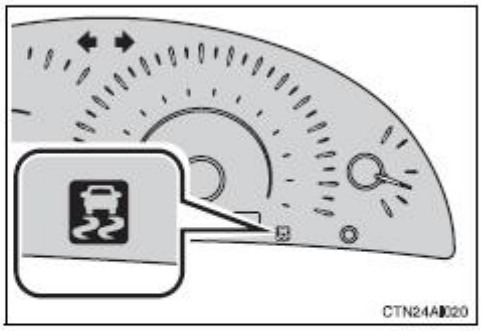
VSC (Vehicle Stability Control)

Helps the driver to control skidding when swerving suddenly or turning on slippery road surfaces.

TRAC (Traction Control)

Maintains drive power and prevent the front wheels from spinning when starting the vehicle or accelerating on slippery roads.

When VSC and TRAC are operating

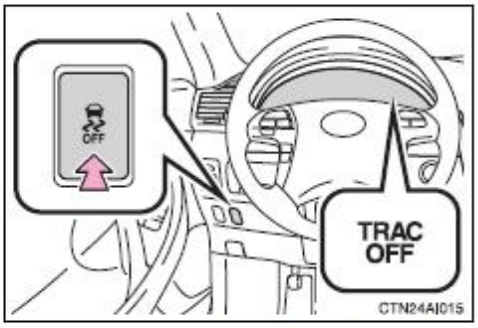


If the vehicle is in danger of slipping or the front wheels spin, the indicator flashes to indicate that VSC/TRAC have been engaged.

To disable TRAC and/or VSC

If the vehicle gets stuck in fresh snow or mud, TRAC and VSC may reduce power from the engine to the wheels. You may need to turn the system off to enable you to rock the vehicle in order to free it.

n Turning off TRAC

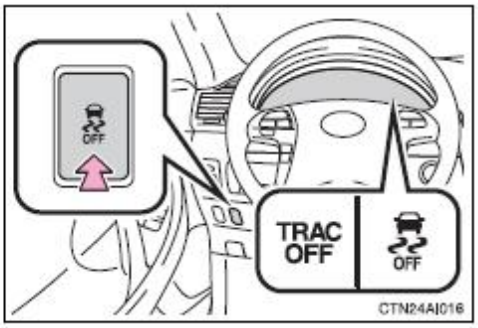


Quickly push and release the button to turn off TRAC.

The "TRAC OFF" indicator light should come on.

Push the button again to turn the system back on.

n Turning off TRAC and VSC



Push and hold the button for more than 3 seconds while the vehicle is stopped to turn off TRAC and VSC.

The "TRAC OFF" and VSC OFF indicator lights should come on.

Push the button again to turn the system back on.

Automatic reactivation of TRAC and VSC

▶ Vehicles with smart key system

Turning the "ENGINE START STOP" switch OFF after turning off the TRAC and VSC systems will automatically re-enable them.

▶ Vehicles without smart key system

Turning the engine switch OFF after turning off the TRAC and VSC systems will automatically re-enable them.

Automatic TRAC reactivation

If only the TRAC system is turned off, the TRAC system will turn on when vehicle speed increases.

Automatic TRAC and VSC reactivation

If the TRAC and VSC systems are turned off, the systems will not turn on even when vehicle speed increases.

Sounds and vibrations caused by ABS, brake assist, VSC and TRAC

- A sound may be heard from the engine compartment when the engine is started or just after the vehicle begins to move. This sound does not indicate that a malfunction has occurred in any of these systems.
- Any of the following conditions may occur when the above systems are operating. None of these indicates that a malfunction has occurred.
  - Vibrations may be felt through the vehicle body and steering.
  - A motor sound may be heard after the vehicle comes to a stop.
  - The brake pedal may pulsate slightly after ABS is activated.
  - The brake pedal may move down slightly after ABS is activated.

If the slip indicator comes on...

It may indicate a malfunction in the VSC and TRAC. Contact your Toyota dealer.

CAUTION

n ABS does not operate effectively when

- Tires with inadequate gripping ability are used (such as excessively worn tires on a snow covered road).
- The vehicle hydroplanes while driving at high speed on the wet or slick road.

n Stopping distance when ABS is operating on the wet or slick roads

ABS is not designed to shorten the vehicle's stopping distance. Always maintain a safe distance from the vehicle in front of you in the following situations.

- When driving on dirt, gravel or snow-covered roads
- When driving with tire chains
- When driving over bumps in the road
- When driving over roads with potholes or uneven roads

n TRAC may not operate effectively when

Directional control and power may not be achievable while driving on slippery road surfaces, even if the TRAC system is operating.
Do not drive the vehicle in conditions where stability and power may be lost.

⚠ CAUTION

■ When VSC is activated

The slip indicator light flashes. Always drive carefully. Reckless driving may cause an accident. Exercise particular care when the indicator light flashes.

■ When TRAC and VSC are off

Be especially careful and drive at a speed appropriate to the road conditions. As these are systems to ensure vehicle stability and driving force, do not turn off TRAC and VSC unless necessary.

■ Replacing tires

Make sure that all tires are of the same size, brand, tread pattern and total load capacity. In addition, make sure that the tires are inflated to the recommended tire pressure level.

The ABS and VSC system will not function correctly if different tires are fitted on the vehicle.

Contact your Toyota dealer for further information when replacing tires or wheels.

■ Handling of tires and suspension

Using tires with any kind of problem or modifying the suspension will affect the driving assist systems, and may cause the system to malfunction.

2011 TOYOTA CAMRY
FMVSS 126
VEHICLE No.: CB5110
AUGUST 2011

7.2 VEHICLE ARRIVAL CONDITION REPORT

CONTRACT NO. DTNH22-08-D-00097 DATE: 8/24/11

FROM: Automotive Allies

TO: TRC

PURPOSE: (X) Initial Receipt ( ) Received via Transfer ( ) Present vehicle condition

MODEL YEAR/MAKE/MODEL/BODY STYLE: 2011 / Toyota / Camry / Passenger Car

MANUFACTURE DATE: 07/11 NHTSA NO.: CB5110

BODY COLOR: Black VIN: 4T1BF3EK0BU762724

ODOMETER READING: 71 miles GVWR: 1,971 KG

PURCHASE PRICE: $ rented / leased DEALER'S NAME: Automotive Allies, 209 W. Alameda Avenue, Suite 101, Burbank, CA 91502

X ALL OPTIONS LISTED ON "WINDOW STICKER" ARE PRESENT ON THE TEST VEHICLE

X TIRES AND WHEEL RIMS ARE NEW AND THE SAME AS LISTED

X THERE ARE NO DENTS OR OTHER INTERIOR OR EXTERIOR FLAWS

X THE VEHICLE HAS BEEN PROPERLY PREPARED AND IS IN RUNNING CONDITION

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

X PROPER FUEL FILLER CAP IS SUPPLIED ON THE TEST VEHICLE

X PLACE VEHICLE IN STORAGE AREA

X 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

RECORDED BY: Alan Ida DATE: 8-24-11
APPROVED BY: Ken Webster DATE: 8-29-11

7.3 VEHICLE COMPLETION CONDITION REPORT

CONTRACT NO. DTNH22-08-D-00097 DATE: 8/29/11

MODEL YEAR/MAKE/MODEL/BODY STYLE: 2011 / Toyota / Camry / Passenger Car

MANUFACTURE DATE: 07/11 NHTSA NO.: CB5110

BODY COLOR: Black VIN: 4T1BF3EK0BU762724

ODOMETER READING: 89 miles GVWR: 1,971 KG

LIST OF FMVSS TESTS PERFORMED BY THIS LAB: 126, 135

X THERE ARE NO DENTS OR OTHER INTERIOR OR EXTERIOR FLAWS

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

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

X 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:

None.

Explanation for equipment removal:

N/A

Test Vehicle Condition:

Like new.

RECORDED BY: Alan Ida DATE: 8-29-11
APPROVED BY: Ken Webster DATE: 8-29-11

7.4 SINE WITH DWELL TEST RESULTS
2011 Toyota Camry
NHTSA No.: CB5110

Date Create 26-Aug-11

LEFT-TO-RIGHT (INITIAL COUNTER-CLOCKWISE STEER)

File	SWA @ 5deg Ct	MES	Time@5deg	COS	Time@COS	MOS	Time@MOS	YRR1(%)	YR1 (deg/sec)	YRR1 Ct	YRR175(%)	YR175 (deg/sec)
0023	618	50.357	3.080	998	4.984	755	3.766	-0.321	-0.040	1198	-0.215	-0.027
0024	617	50.522	3.076	998	4.985	755	3.767	-0.217	-0.037	1198	-0.032	-0.005
0025	616	50.417	3.074	999	4.988	755	3.770	-0.555	-0.120	1199	-0.128	-0.028
0026	616	50.383	3.071	999	4.986	755	3.769	-0.645	-0.168	1199	0.086	0.023
0027	615	50.270	3.070	999	4.987	755	3.770	-0.544	-0.162	1199	-0.640	-0.191
0028	615	50.367	3.067	998	4.985	755	3.768	-0.556	-0.182	1198	-0.056	-0.018
0029	614	50.362	3.064	998	4.981	755	3.765	-0.409	-0.156	1198	-0.236	-0.090
0030	614	50.436	3.064	998	4.981	755	3.765	-0.352	-0.142	1198	-0.013	-0.005
0031	614	50.507	3.064	998	4.981	755	3.766	-0.839	-0.380	1198	-0.015	-0.007
0032	615	50.314	3.069	999	4.985	756	3.770	-0.606	-0.283	1199	-0.263	-0.123
0033	615	50.306	3.066	998	4.982	755	3.768	-0.243	-0.123	1198	0.076	0.038
0034	615	50.504	3.068	998	4.983	755	3.769	-0.995	-0.512	1198	-0.105	-0.054
0035	615	50.343	3.069	998	4.985	755	3.770	1.312	0.696	1198	-0.063	-0.033
0036	615	50.277	3.068	998	4.983	755	3.768	-0.115	-0.061	1198	-0.096	-0.051

RIGHT-TO-LEFT (INITIAL CLOCKWISE STEER)

0037	618	50.407	3.083	999	4.988	755	3.769	-2.264	0.284	1199	-1.279	0.161
0038	617	50.245	3.076	999	4.987	755	3.767	-0.698	0.117	1199	-0.789	0.132
0039	616	50.219	3.071	998	4.985	755	3.766	-0.495	0.107	1198	-0.631	0.136
0040	616	50.335	3.070	999	4.987	755	3.768	-0.727	0.190	1199	-0.575	0.150
0041	615	50.185	3.066	998	4.983	754	3.765	0.150	-0.045	1198	0.015	-0.005
0042	615	50.277	3.069	999	4.988	755	3.769	0.047	-0.017	1199	0.286	-0.103
0043	615	50.633	3.067	999	4.985	755	3.768	-0.114	0.045	1199	0.233	-0.093
0044	615	50.448	3.068	999	4.986	755	3.769	0.009	-0.004	1199	0.176	-0.076
0045	615	50.374	3.065	998	4.983	755	3.766	-0.017	0.008	1198	0.028	-0.013
0046	615	50.060	3.067	998	4.984	755	3.768	0.259	-0.131	1198	-0.070	0.035
0047	615	50.337	3.068	998	4.984	755	3.768	-0.246	0.123	1198	-0.333	0.166
0048	615	50.295	3.068	998	4.984	755	3.769	-0.024	0.013	1198	-0.172	0.092
0049	615	50.228	3.070	999	4.985	755	3.770	1.023	-0.574	1199	0.083	-0.046
0050	615	50.438	3.066	998	4.981	755	3.766	0.783	-0.447	1198	-0.012	0.007

7.4 SINE WITH DWELL TEST RESULTS
2011 Toyota Camry
NHTSA No.: CB5110

Date Create 26-Aug-11

LEFT-TO-RIGHT (INITIAL COUNTER-CLOCKWISE STEER)

File	YRR175 Ct	2nd Yaw Peak(deg/sec)	2nd Yaw Peak Ct	Lat Disp (ft)	Lat. Acc. 1.07s (g)	1st SWA Peak(deg)	1st SWA Peak Ct	2nd SWA Mean(deg)
0023	1348	12.526	857	-3.811	0.357	51.083	683	50.842
0024	1348	17.076	849	-5.090	0.451	68.116	684	67.844
0025	1349	21.628	854	-6.125	0.508	84.987	684	84.780
0026	1349	26.106	847	-7.053	0.572	102.116	684	101.992
0027	1349	29.842	835	-7.804	0.658	119.095	684	118.993
0028	1348	32.779	830	-8.396	0.686	136.059	684	135.942
0029	1348	38.235	835	-8.953	0.697	152.813	684	153.006
0030	1348	40.289	837	-9.402	0.681	169.487	684	170.021
0031	1348	45.361	841	-9.816	0.704	186.927	684	187.040
0032	1349	46.775	842	-10.216	0.658	203.681	686	204.328
0033	1348	50.596	843	-10.423	0.657	221.083	685	221.227
0034	1348	51.477	846	-10.681	0.594	236.331	686	238.230
0035	1348	53.021	847	-10.665	0.580	253.295	685	255.068
0036	1348	52.878	845	-10.669	0.658	268.188	685	269.854

RIGHT-TO-LEFT (INITIAL CLOCKWISE STEER)

0037	1349	-12.565	854	4.044	-0.342	51.597	684	51.323
0038	1349	-16.766	847	5.060	-0.434	68.604	684	68.322
0039	1348	-21.551	847	6.308	-0.492	85.556	683	85.247
0040	1349	-26.063	849	7.199	-0.509	102.749	684	102.418
0041	1348	-30.371	834	7.944	-0.622	119.768	683	119.464
0042	1349	-36.043	836	8.505	-0.612	136.699	684	136.429
0043	1349	-39.781	840	9.046	-0.610	153.732	684	153.400
0044	1349	-43.289	843	9.318	-0.575	170.181	685	170.498
0045	1348	-45.889	845	9.888	-0.561	187.583	684	187.520
0046	1348	-50.723	848	10.134	-0.516	205.004	684	204.654
0047	1348	-49.948	850	10.269	-0.484	220.772	686	221.757
0048	1348	-53.448	848	10.373	-0.569	237.321	685	238.643
0049	1349	-56.063	853	10.560	-0.378	253.957	685	255.096
0050	1348	-57.114	851	10.665	-0.458	269.099	684	270.352

7.5 SLOWLY INCREASING STEER TEST RESULTS
2011 Toyota Camry
NHTSA No.: CB5110

Date Created 26-Aug-11

File	Vehicle	EventPt	DOS	MES [mph]	Mean SPD [mph]	AYcount_3	THETAENCF_3 [degree]	AYCG_CD2_3 [g]	r_squared	ZeroBegin	ZeroEnd
0011	2011 Toyota Camry	703	1	50.315	50.538	1204	-33.779	-0.296	0.999	503	703
0013	2011 Toyota Camry	704	1	50.101	50.097	1210	-34.094	-0.306	0.998	504	704
0014	2011 Toyota Camry	705	1	49.622	49.868	1211	-34.116	-0.299	0.998	505	705
0015	2011 Toyota Camry	697	0	49.762	49.861	1204	34.034	0.298	0.999	497	697
0016	2011 Toyota Camry	704	0	49.252	49.802	1213	34.681	0.306	0.997	504	704
0017	2011 Toyota Camry	702	0	50.256	50.349	1192	33.315	0.300	0.999	502	702
	Averages						34	0.301			

Scalars	Steering Angles (deg)
1.5	51
2	68
2.5	85
3	102
3.5	119
4	136
4.5	153
5	170
5.5	187
6	204
6.5	221
7	238
7.5	255
7.9	270

7.6 INERTIA SENSOR MEASUREMENTS
2011 Toyota Camry
NHTSA No.: CB5110

Device : U12-05-08-07108
device version : 2.24
device certification date : 08/19/11
today is : 8/25/2011
units : Millimeters

Label	ActualX	ActualY	ActualZ
C_DEVICEPOS001			
M_PLANE001	1229.026	-443.326	-316.553
M_LINE001	638.548	144.690	-111.805
M_ORIGIN_FRT_AXLE_CENTER	0.000	0.000	0.000
C_COORDSYS001	0.000	0.000	0.000
M_TIRE_TREAD_CENTER	282.509	86.863	-171.284
M_INERTIA_PACK	1648.248	841.247	576.339
M_ROOF	1816.612	878.727	1141.209
M_GROUND	1816.524	-27.429	-316.830
Track Width		1576.387	
Roof Height (relative to ground)			1458.039
Motion Pak - x-distance (mm)	1648.248		
Motion Pak - y-distance (mm)		-33.810	
Motion Pak - z-distance (mm)			848.720
Motion Pak - x-distance (inches)	64.891		
Motion Pak - y-distance (inches)		-1.331	
Motion Pak - z-distance (inches)			33.414

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.)