SAFETY COMPLIANCE TESTING FOR FMVSS 126
Electronic Stability Control Systems

Toyota Motor Corporation
2010 Lexus GX460
NHTSA No. CA5109

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

January 14, 2011

FINAL REPORT
Prepared Under Contract No.: DTNH22-07-D-00060
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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

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Prepared by: Alan Ida

Approved by: Ken Webster

Approval Date: 01/14/11

FINAL REPORT ACCEPTANCE BY OVSC:

Accepted by: John Flannery

Acceptance Date: 8/29/11
A test was conducted on a 2010 Lexus GX460, NHTSA No. CA5109, in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-126-02 for the determination of FMVSS No. 126 compliance. In April 2010, Toyota began a recall campaign (NHTSA Campaign No. 10V159000) on the MY2010 Lexus GX460 vehicles to reprogram the ESC control algorithm. The test vehicle in this report had the reprogrammed control algorithm. Test failures identified were as follows: None

|------------------------------------------------------------------------------|-----------------------------|----------------------------|
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Safety Engineering  
FMVSS 126 | Copies of this report are available from:  
NHTSA Technical Information Services (TIS)  
(NPO 411)  
200 New Jersey Avenue, SE  
Washington, D.C. 20590  
Email: tis@nhtsa.dot.gov  
FAX: (202) 493-2833 |
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</tr>
<tr>
<td></td>
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</tr>
</tbody>
</table>
1.0 PURPOSE OF TEST

The purpose of this test is to determine if the test vehicle, a MY 2010 Lexus GX460 meets the minimum equipment and performance requirements stated in Federal Motor Vehicle Safety Standard (FMVSS) 126, "Electronic Stability Control Systems" after the ESC ECU control algorithm was reprogrammed (NHTSA Recall Campaign No. 10V159000)

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 2010 Lexus GX460 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.

The vehicle’s ESC System appears to meet the performance requirements as required by FMVSS 126. In April 2010, Toyota began a recall campaign (NHTSA Campaign No. 10V159000) on the MY2010 Lexus GX460 vehicles to reprogram the ESC control algorithm. The test vehicle in this report did have the reprogrammed control algorithm. The test results are summarized on the following summary sheet.
DATA SUMMARY (Sheet 1 of 2)

VEHICLE MAKE/MODEL/BODY STYLE:  Lexus / GX460 / MPV

VEHICLE NHTSA NO.:  CA5109    VIN:  JTJBM7FX7A5010469

VEHICLE TYPE:  MPV             DATE OF MANUFACTURE:  03/10

LABORATORY:  Transportation Research Center Inc.

REQUIREMENTS

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
### Data Summary (Sheet 2 of 2)

<table>
<thead>
<tr>
<th>REQUIREMENTS</th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vehicle Lateral Stability</strong> (Data Sheet 8)</td>
<td></td>
</tr>
<tr>
<td>Yaw Rate Ratio at 1 second after COS is less than 35% of peak value.</td>
<td>PASS (S126, S5.2.1)</td>
</tr>
<tr>
<td>Yaw Rate Ratio at 1.75 seconds after COS is less than 20% of peak value.</td>
<td>PASS (S126, S5.2.2)</td>
</tr>
<tr>
<td><strong>Vehicle Responsiveness</strong> (Data Sheet 8)</td>
<td></td>
</tr>
<tr>
<td>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 lbs.) or less, and 1.52 m (5 feet) for vehicles with a GVWR greater than 3,500 kg (7,716 lbs.).</td>
<td>PASS (S126 S5.2.3)</td>
</tr>
<tr>
<td><strong>ESC Malfunction Warning</strong> (Data Sheet 9)</td>
<td></td>
</tr>
<tr>
<td>Warning is provided to driver after malfunction occurrence.</td>
<td>PASS (S126, S5.3)</td>
</tr>
<tr>
<td>Malfunction telltale stayed illuminated as long as malfunction existed and must extinguish after malfunction was corrected.</td>
<td>PASS (S126, S5.3.7)</td>
</tr>
</tbody>
</table>
3.0 TEST DATA

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

VEHICLE MAKE/MODEL/BODY STYLE: Lexus / GX460 / MPV

NHTSA No.: CA5109 TEST DATE: 5-20-10

VIN: JTJBM7FX7A5010469 MANUFACTURE DATE: 03/10

GVWR: 2,990 KG FRONT GAWR: 1,450 KG REAR GAWR: 1,795 KG

SEATING POSITIONS: FRONT 2 MID 3 REAR 2

ODOMETER READING AT START OF TEST: 231 (372) Miles (Kilometers)

DESIGNATED TIRE SIZE(S) FROM VEHICLE LABELING:

Front Axle P265 / 60R 18
Rear Axle P265 / 60R 18

INSTALLED TIRE SIZE(S) ON VEHICLE:

From Tire Sidewall Front Axle Rear Axle
Manufacturer and Model Bridgestone Dueler H/T Bridgestone Dueler H/T
Tire Size Designation P265 / 60R 18 109H P265 / 60R 18 109H

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):

_____ Two Wheel Drive (2WD): ( ) Front Wheel Drive ( ) Rear Wheel Drive
_____ All Wheel Drive (AWD)
_____ Four Wheel Drive Automatic – differential not locked full time (4WD Automatic)
X Four Wheel Drive High Gear Unlocked Center Differential
X Four Wheel Drive High Gear Locked Center Differential
X Four Wheel Drive Low Gear Unlocked Center Differential
X Four Wheel Drive Low Gear Locked Center Differential
_____ Other (define ____________________________ )
### DRIVE CONFIGURATIONS AND MODES: (ex. default, performance, off)

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

<table>
<thead>
<tr>
<th>Drive Configuration</th>
<th>Mode(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4WD High Unlocked Center Differential</td>
<td>default - ESC On; ESC Off</td>
</tr>
<tr>
<td>4WD High Locked Center Differential</td>
<td>ESC On; ESC Off</td>
</tr>
<tr>
<td>4WD Low Unlocked Center Differential</td>
<td>ESC Off</td>
</tr>
<tr>
<td>4WD Low Locked Center Differential</td>
<td>ESC Off</td>
</tr>
</tbody>
</table>

### 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: Electronic Brakeforce Distribution (EBD); Hillstart Assist Control (HAC); Downhill Assist Control (DAC)

### REMARKS:

**RECORDED BY:** Alan Ida  
**DATE:** 04-19-10

**APPROVED BY:** Jeff Sankey  
**DATE:** 05-25-10
 DATA SHEET 2 (Sheet 1 of 2)
ESC SYSTEM HARDWARE AND OPERATIONAL CHARACTERISTICS

VEHICLE MAKE/MODEL/BODY STYLE: Lexus / GX460 / MPV

NHTSA No.: CA5109 TEST DATE: 04-21-10

ESC SYSTEM IDENTIFICATION:
Manufacturer / Model Advics Co., Ltd. / 47210-60230 (with DAC or CRAWL, MTS)

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 Buzzer

ESC SYSTEM OPERATIONAL CHARACTERISTICS:

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

List and describe component(s): Brake Actuator with ESC computer

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

List and describe component(s): Yaw Rate 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): The ESC system collects wheel speed, lateral acceleration and yaw rate data to estimate the vehicle side slip derivative. Vehicle speed is estimated from the wheel speed and estimated yaw rate is calculated by dividing the lateral acceleration by vehicle speed. The estimated vehicle side slip derivative is obtained as the difference between the estimated yaw rate and the actual yaw rate detected by the yaw sensor. The ESC system estimates vehicle side slip by the integration of the estimated vehicle side slip derivative.
ESC SYSTEM OPERATIONAL CHARACTERISTICS (continued):

System is capable of modifying engine torque during ESC activation.  

<table>
<thead>
<tr>
<th>Yes (PASS)</th>
<th>No (FAIL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

Method used to modify engine torque:  
The ESC 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.  

<table>
<thead>
<tr>
<th>Yes (PASS)</th>
<th>No (FAIL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

Speed system becomes active. above 15 km/h (8.9 mph)

System is capable of activation during the following driving phases (acceleration, deceleration, coasting, and during activation of ABS or traction control).

<table>
<thead>
<tr>
<th>Yes (PASS)</th>
<th>No (FAIL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

Driving phases that the system is capable of activation. The ESC system is capable of activation under acceleration, deceleration, coasting and during activation of ABS or traction control.

Vehicle manufacturer submitted documentation explaining how the ESC system mitigates understeer?  

<table>
<thead>
<tr>
<th>Yes (PASS)</th>
<th>No (FAIL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

DATA INDICATES COMPLIANCE  
PASS/FAIL  PASS

REMARKS:

RECORDED BY:  Alan Ida  DATE:  05-18-10
APPROVED BY:  Jeff Sankey  DATE:  05-25-10
3.0 TEST DATA…continued

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

VEHICLE MAKE/MODEL/BODY STYLE: Lexus / GX460 / MPV

VEHICLE NHTSA NO. CA5109 TEST DATE: 05-21-10

ESC Malfunction Telltale

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

Telltale Location Instrument cluster, inside the tachometer

Telltale Color Amber

Telltale symbol or abbreviation used.

X Vehicle uses this symbol

Or ESC 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: telltale symbol flashes; also the ESC signals an audible alert
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, inside the tachometer

Telltale Color  ____Amber

Telltale symbol or abbreviation used.

Or

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:  05-20-10
APPROVED BY:   Jeff Sankey                      DATE:  05-25-10
“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

____ X  Multi-functional control with an “ESC Off” mode

_________ Other (describe)

Identify each control location, labeling and selectable modes.

First Control:

<table>
<thead>
<tr>
<th>Location</th>
<th>Instrument panel, left of steering column</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labeling</td>
<td>Skidding car symbol</td>
</tr>
<tr>
<td>Modes</td>
<td>Traction Control off</td>
</tr>
<tr>
<td></td>
<td>ESC off</td>
</tr>
<tr>
<td></td>
<td>ESC &amp; Traction Control on</td>
</tr>
</tbody>
</table>

Identify standard or default drive configuration  ____ Full Time 4WD - default

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:

__________________________________________________________________________
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.

<table>
<thead>
<tr>
<th>Control Modes</th>
<th>“ESC Off” telltale illuminates upon activation of control? (Yes/No)</th>
<th>“ESC Off” telltale extinguishes upon cycling ignition? (Yes/No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESC &amp; Traction Control on</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>Traction Control off</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>ESC off</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

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?

___ X ___ Yes  ____ No

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

**Ancillary Control:** System 4WD Low
Control Description Push switch on center console
Labeling 4WD L4 (4Lo – telltale on instrument cluster)

**Ancillary Control:** System N/A
Control Description N/A
Labeling N/A
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.

<table>
<thead>
<tr>
<th>Ancillary Control</th>
<th>Control Activates “ESC Off” Telltale? (Yes/No)</th>
<th>Warnings or Messages Provided</th>
</tr>
</thead>
<tbody>
<tr>
<td>4WD Low</td>
<td>Yes</td>
<td>Skidding car telltale, 4Lo telltale</td>
</tr>
<tr>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Ancillary Control</th>
<th>“ESC Off” telltale extinguishes upon cycling ignition? (Yes/No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4WD Low</td>
<td>No</td>
</tr>
<tr>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

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   X (See Remarks)   No

DATA INDICATES COMPLIANCE: PASS/FAIL PASS

REMARKS:

The control places the vehicle in low range four wheel drive configuration, which automatically turns off the ESC system and illuminates the ESC off telltale. Upon cycling the ignition the ESC system remains off and the ESC off telltale remains illuminated. This is an acceptable condition, so the vehicle does not fail the ancillary system controls.

RECORDED BY:  Alan Ida     DATE:  05-24-10
APPROVED BY:  Jeff Sankey   DATE:  05-25-10
### 3.0 TEST DATA…continued

#### DATA SHEET 5 (Sheet 1 of 3)

**VEHICLE AND TEST TRACK DATA**

**VEHICLE MAKE/MODEL/BODY STYLE:** Lexus / GX460 / MPV

**VEHICLE NHTSA NO.** CA5109  **TEST DATE:** 5/20/10

**Test Track Requirements:**
- Test Surface Slope (0-1 %)  1 %
- Peak Friction Coefficient (at least 0.9)  0.95

**Full Fluid Levels:**
- Fuel  X
- Coolant  X
- Other Fluids  washer

**Tire Pressures:**
- Front Axle  220 kPa
- Rear Axle  220 kPa

**Actual:**
- LF: 220 kPa
- RF: 220.0 kPa
- LR: 220.0 kPa
- RR: 220.0 kPa

**Vehicle Dimensions:**
- Track Width  158.8 cm
- Wheelbase  279.6 cm
- Roof Height  178.2 cm

**Vehicle weight ratings:**
- GAWR Front  1,450 kg
- GAWR Rear  1,795 kg

**Unloaded Vehicle Weight (UVW):**

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front Axle</td>
<td>1,219.8</td>
</tr>
<tr>
<td>Left Front</td>
<td>617.6</td>
</tr>
<tr>
<td>Right Front</td>
<td>602.2</td>
</tr>
<tr>
<td>Rear Axle</td>
<td>1,169.6</td>
</tr>
<tr>
<td>Left Rear</td>
<td>600.6</td>
</tr>
<tr>
<td>Right Rear</td>
<td>569.0</td>
</tr>
<tr>
<td>Total UVW</td>
<td>2,389.4</td>
</tr>
</tbody>
</table>

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

| Weight (UVW+ 73 kg) | 2,462.4 kg |

<table>
<thead>
<tr>
<th>Outrigger size required (“Standard” or “Heavy”)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard - Baseline weight under 2,722 kg (6,000 lbs.)</td>
</tr>
<tr>
<td>Heavy - Baseline weight equal to or greater than 2,722 kg (6,000 lbs.)</td>
</tr>
</tbody>
</table>
3.0 TEST DATA….continued

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

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

Front Axle 1,246.8 kg  Left Front 630.6 kg  Right Front 616.2 kg
Rear Axle 1,220.4 kg  Left Rear 628.4 kg  Right Rear 592.0 kg
Total UVW w/ Outriggers 2,467.2 kg

Total Loaded Vehicle Weight w/ Driver, Instrumentation and Ballast

Front Axle 1,337.8 kg  Left Front 681.8 kg  Right Front 656.0 kg
Rear Axle 1,297.4 kg  Left Rear 663.8 kg  Right Rear 633.6 kg
Total Loaded Vehicle Weight 2,635.2 kg
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:

<table>
<thead>
<tr>
<th></th>
<th>Center of Gravity</th>
<th>Inertial Sensing System</th>
</tr>
</thead>
<tbody>
<tr>
<td>x-distance</td>
<td>137.6 cm</td>
<td>152.6 cm</td>
</tr>
<tr>
<td>y-distance</td>
<td>-1.69 cm</td>
<td>-1.05 cm</td>
</tr>
<tr>
<td>z-distance</td>
<td>68.6 cm</td>
<td>80.1 cm</td>
</tr>
</tbody>
</table>

Distance Between Ultrasonic Sensors:  194.2 cm

TEST TRACK DATA MEETS REQUIREMENTS: YES/NO __ YES___
If no, explain: _____________________________________________________________

REMARKS:

RECORDED BY:  Alan Ida __________________________ DATE:  5/20/10
APPROVED BY:  Jeff Sankey ________________________ DATE:  5/31/10
DATA SHEET 6 (Sheet 1 of 3)
BRAKE AND TIRE CONDITIONING

VEHICLE MAKE/MODEL/BODY STYLE: Lexus / GX460 / MPV

VEHICLE NHTSA No.: CA5109

Measured Cold Tire Pressures: LF 220 KPA   RF 220 KPA
                             LR 220 KPA   RR 220 KPA

Wind Speed _____ 4.0 ___ 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)) ______ 13.3 °C

Brake Conditioning        Time: 9:55 AM         Date: 04-21-10*

56 km/h (35 mph) Brake Stops
Number of stops executed (10 required) _____ 10 ____ stops
Observed deceleration rate range (.5g target) 0.45 – 0.49 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 1.0 – 1.15 g

72 km/h (45 mph) Brake Cool Down Period
Duration of cool down period (5 minutes min.) 5:40 minutes

*Note: Brake Conditioning was performed on 4/21/10, while conducting the Pre-ECU Flash testing.
3.0 TEST DATA....continued

DATA SHEET 6 (Sheet 2 of 3)
TIRE CONDITIONING

Tire Conditioning Series No. 1
Time: 8:55 AM Date: 5/20/10

Measured Tire Pressures:

<table>
<thead>
<tr>
<th></th>
<th>LF</th>
<th>RF</th>
<th>LR</th>
<th>RR</th>
</tr>
</thead>
<tbody>
<tr>
<td>kPa</td>
<td>234</td>
<td>234</td>
<td>228</td>
<td>234</td>
</tr>
</tbody>
</table>

Wind Speed 1.3 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

### 30 meter (100 ft) Diameter Circle Maneuver

<table>
<thead>
<tr>
<th>Test Runs</th>
<th>Steering Direction</th>
<th>Target Lateral Acceleration (g)</th>
<th>Observed Lateral Acceleration (g)</th>
<th>Observed Vehicle Speed (kph)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3</td>
<td>Clockwise</td>
<td>0.5-0.6</td>
<td>0.55</td>
<td>30.6</td>
</tr>
<tr>
<td>4-6</td>
<td>Counterclockwise</td>
<td>0.5-0.6</td>
<td>0.55</td>
<td>30.6</td>
</tr>
</tbody>
</table>

### 1 Hz 3 Cycle Sinusoidal Steering Maneuver to Determine Steering Wheel Angle For 0.5-0.6g Lateral Acceleration

<table>
<thead>
<tr>
<th>Test Runs</th>
<th>Vehicle Speed Km/h(mph)</th>
<th>Steering Wheel Angle (degrees)</th>
<th>Target Peak Lateral Acceleration (g)</th>
<th>Observed Peak Lateral Acceleration (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>56±2 (35+1)</td>
<td>30</td>
<td>0.5-0.6</td>
<td>0.2</td>
</tr>
<tr>
<td>2</td>
<td>56±2 (35±1)</td>
<td>100</td>
<td>0.5-0.6</td>
<td>0.55</td>
</tr>
<tr>
<td>3</td>
<td>56±2 (35±1)</td>
<td>100</td>
<td>0.5-0.6</td>
<td>0.5</td>
</tr>
<tr>
<td>4</td>
<td>56±2 (35±1)</td>
<td>100 (cycles 1-10)</td>
<td>0.5-0.6</td>
<td>0.54</td>
</tr>
</tbody>
</table>

Steering wheel angle that corresponds to a peak 0.5–0.6g lateral acceleration; 100 degrees

### 1 Hz 10 Cycle Sinusoidal Steering Maneuver

<table>
<thead>
<tr>
<th>Test Runs</th>
<th>Vehicle Speed Km/h (mph)</th>
<th>Steering Wheel Angle (degrees)</th>
<th>Target Peak Lateral Acceleration (g)</th>
<th>Observed Peak Lateral Acceleration (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 3</td>
<td>56±2 (35±1)</td>
<td>100 (cycles 1-10)</td>
<td>0.5-0.6</td>
<td>0.54</td>
</tr>
<tr>
<td>4</td>
<td>56±2 (35±1)</td>
<td>100 (cycles 1-9)</td>
<td>0.5-0.6</td>
<td>0.54</td>
</tr>
<tr>
<td></td>
<td></td>
<td>200 (cycle 10)*</td>
<td>NA</td>
<td>0.82</td>
</tr>
</tbody>
</table>

* 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)
TIRE CONDITIONING

Tire Conditioning Series No. 2  Time: 11:20 AM  Date: 5/20/10

Measured Tire Pressures:  LF 238 kPa  RF 238 kPa
LR 231 kPa  RR 241 kPa

Wind Speed 1.8 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))  21.1 °C

<table>
<thead>
<tr>
<th>Test Runs</th>
<th>Steering Direction</th>
<th>Target Lateral Acceleration (g)</th>
<th>Observed Lateral Acceleration (g)</th>
<th>Observed Vehicle Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3</td>
<td>clockwise</td>
<td>0.5-0.6</td>
<td>0.55</td>
<td>30.6</td>
</tr>
<tr>
<td>4-6</td>
<td>counterclockwise</td>
<td>0.5-0.6</td>
<td>0.55</td>
<td>30.6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test Runs</th>
<th>Vehicle Speed (mph)</th>
<th>Steering Wheel Angle (degrees)</th>
<th>Target Peak Lateral Acceleration (g)</th>
<th>Observed Peak Lateral Acceleration (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>56±2 (35±1)</td>
<td>30</td>
<td>0.5-0.6</td>
<td>N/A</td>
</tr>
<tr>
<td>2</td>
<td>56±2 (35±1)</td>
<td></td>
<td>0.5-0.6</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>56±2 (35±1)</td>
<td></td>
<td>0.5-0.6</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>56±2 (35±1)</td>
<td></td>
<td>0.5-0.6</td>
<td></td>
</tr>
</tbody>
</table>

Steering wheel angle that corresponds to a peak 0.5–0.6g lateral acceleration; 100 degrees

<table>
<thead>
<tr>
<th>Test Runs</th>
<th>Vehicle Speed (mph)</th>
<th>Steering Wheel Angle (degrees)</th>
<th>Target Peak Lateral Acceleration (g)</th>
<th>Observed Peak Lateral Acceleration (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 3</td>
<td>56±2 (35±1)</td>
<td>100 (cycles 1-10)</td>
<td>0.5-0.6</td>
<td>0.53</td>
</tr>
<tr>
<td>4</td>
<td>56±2 (35±1)</td>
<td>100 (cycles 1-9)</td>
<td>0.5-0.6</td>
<td>0.53</td>
</tr>
<tr>
<td></td>
<td></td>
<td>200 (cycle 10)</td>
<td>NA</td>
<td>0.82</td>
</tr>
</tbody>
</table>

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

REMARKS:

RECORDED BY: Alan Ida  DATE: 5/20/10
APPROVED BY: Jeff Sankey  DATE: 5/31/10
3.0 TEST DATA…continued

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

VEHICLE MAKE/MODEL/BODY STYLE: Lexus / GX460 / MPV

VEHICLE NHTSA NO. CA5109  TEST DATE: 5/20/10

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))  17.2 °C

Static Data File Number  0009

Selected Drive Configuration:  4WD High (H4)

Selected Mode:  default – ESC On

Preliminary Left Steer Maneuver:

Lateral Acceleration measured at 30 degrees steering wheel angle ($a_y$,30 degrees)

$$a_y,30 \text{ degrees} = 0.34 \text{ g}$$

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

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

$$\delta_{SIS} = 48.5 \text{ degrees} \text{ @ 0.55g}$$

$$\delta_{SIS} = 50.0 \text{ degrees} \text{ (rounded)}$$

Steering Wheel Angle at Corrected 0.3 g Lateral Acceleration:

<table>
<thead>
<tr>
<th>Maneuver #</th>
<th>Initial Steer Direction</th>
<th>Time Clock (5 min max between runs)</th>
<th>Steering Wheel Angle to nearest 0.1 degree (degrees)</th>
<th>All Conditions Met?</th>
</tr>
</thead>
<tbody>
<tr>
<td>0011</td>
<td>Left</td>
<td>9:12 AM</td>
<td>-32.7</td>
<td>Yes</td>
</tr>
<tr>
<td>0012</td>
<td>Left</td>
<td>9:19 AM</td>
<td>-31.5</td>
<td>Yes</td>
</tr>
<tr>
<td>0013</td>
<td>Left</td>
<td>9:22 AM</td>
<td>-32.6</td>
<td>Yes</td>
</tr>
<tr>
<td>0014</td>
<td>Right</td>
<td>9:25 AM</td>
<td>33.1</td>
<td>Yes</td>
</tr>
<tr>
<td>0015</td>
<td>Right</td>
<td>9:28 AM</td>
<td>33.1</td>
<td>Yes</td>
</tr>
<tr>
<td>0016</td>
<td>Right</td>
<td>9:31 AM</td>
<td>32.6</td>
<td>Yes</td>
</tr>
</tbody>
</table>
3.0 TEST DATA….continued

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

Average Overall Steering Wheel Angle:

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

\[ \delta_{0.3 \text{ g, overall}} = \left( \frac{32.6}{32.6} \right) \text{ degrees} \]

[to nearest 0.1 degree]

REMARKS:

RECORDED BY: Alan Ida
DATE: 5/20/10

APPROVED BY: Jeff Sankey
DATE: 5/31/10
DATA SHEET 8 (1 of 3)

VEHICLE LATERAL STABILITY AND RESPONSIVENESS

VEHICLE MAKE/MODEL/BODY STYLE: Lexus / GX460 / MPV

VEHICLE NHTSA NO. CA5109 TEST DATE: 5/20/10

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: 4WD High (H4)
Selected Mode: default – ESC On

Overall steering wheel angle \( \delta_{0.3 g, \text{overall}} \) 32.6 degrees

Static Data File Number 0021

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

<table>
<thead>
<tr>
<th>Maneuver #</th>
<th>Clock Time (1.5 – 5 min between each test run)</th>
<th>Commanded Steering Wheel Angle' (degrees)</th>
<th>Yaw Rates (degrees/sec)</th>
<th>YRR at 1.0 sec after COS [&lt; 35%] %</th>
<th>YRR at 1.75 sec after COS [&lt; 20%] %</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>0022</td>
<td>11:38 am 1.5* ( \delta_{0.3 g} )</td>
<td>12.22 -0.15 -0.03 -1.19 Pass -2.72 Pass</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0023</td>
<td>11:41 am 2.0* ( \delta_{0.3 g} )</td>
<td>16.51 0.04 0.01 0.23 Pass 0.08 Pass</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0024</td>
<td>11:47 am 2.5* ( \delta_{0.3 g} )</td>
<td>21.31 0.10 -0.08 0.47 Pass -0.39 Pass</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0025</td>
<td>11:51 am 3.0* ( \delta_{0.3 g} )</td>
<td>26.16 -0.01 -0.27 -0.71 Pass -1.02 Pass</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0026</td>
<td>11:54 am 3.5* ( \delta_{0.3 g} )</td>
<td>31.07 -0.18 -0.18 -0.70 Pass -0.56 Pass</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0027</td>
<td>11:58 am 4.0* ( \delta_{0.3 g} )</td>
<td>36.49 -0.28 -0.23 -0.77 Pass -0.64 Pass</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0028</td>
<td>12:01 pm 4.5* ( \delta_{0.3 g} )</td>
<td>41.29 -0.30 -0.31 -1.24 Pass -1.26 Pass</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0029</td>
<td>12:04 pm 5.0* ( \delta_{0.3 g} )</td>
<td>46.35 -0.30 -0.17 -1.17 Pass -0.67 Pass</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0030</td>
<td>12:08 pm 5.5* ( \delta_{0.3 g} )</td>
<td>27.38 -0.14 -0.13 -0.51 Pass -0.48 Pass</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0031</td>
<td>12:11 pm 6.0* ( \delta_{0.3 g} )</td>
<td>29.36 -0.18 -0.16 -0.61 Pass -0.56 Pass</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0032</td>
<td>12:14 pm 6.5* ( \delta_{0.3 g} )</td>
<td>32.26 -0.18 -0.18 -0.56 Pass -0.56 Pass</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0033</td>
<td>12:18 pm 7.0* ( \delta_{0.3 g} )</td>
<td>31.05 -0.38 -0.29 -1.21 Pass -0.93 Pass</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0034</td>
<td>12:24 pm 7.5* ( \delta_{0.3 g} )</td>
<td>31.79 -0.19 -0.35 -0.60 Pass -1.09 Pass</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0035</td>
<td>12:27 pm 8.0* ( \delta_{0.3 g} )</td>
<td>30.67 -0.17 -0.29 -0.54 Pass -0.94 Pass</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0036</td>
<td>12:31 pm 8.3* ( \delta_{0.3 g} )</td>
<td>30.72 -0.34 -0.26 -1.12 Pass -0.86 Pass</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Maneuver execution should continue until a steering wheel angle magnitude factor of 6.5* \( \delta_{0.3 g, \text{overall}} \) or 270 degrees is utilized, whichever is greater, provided the calculated magnitude of \( 6.5* \delta_{0.3 g, \text{overall}} \) is less than or equal to 300 degrees. If \( 6.5* \delta_{0.3 g, \text{overall}} \) is less than 270 degrees, maneuver execution should continue by increasing the steering wheel angle magnitude by multiples of \( 0.5* \delta_{0.3 g, \text{overall}} \) without exceeding the 270 degree steering wheel angle.
### DATABASE SHEETS (2 of 3)
VEHICLE LATERAL STABILITY AND RESPONSIVENESS

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

<table>
<thead>
<tr>
<th>Maneuver #</th>
<th>Clock Time (1.5 – 5 min between each test run)</th>
<th>Commanded Steering Wheel Angle¹ (degrees)</th>
<th>Yaw Rates (degrees/sec)</th>
<th>YRR at 1.0 sec after COS [&lt; 35%]</th>
<th>YRR at 1.75 sec after COS [&lt; 20%]</th>
<th>% Pass/Fail</th>
<th>% Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Scalar</td>
<td>Angle</td>
<td>(\dot{\psi}_{\text{Peak}})</td>
<td>(\dot{\psi}_{1.0\text{sec}})</td>
<td>(\dot{\psi}_{1.75\text{sec}})</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0037</td>
<td>12:34 pm</td>
<td>1.5° δ₀₃.₉</td>
<td>49</td>
<td>-12.35</td>
<td>-0.07</td>
<td>0.07</td>
<td>0.58</td>
</tr>
<tr>
<td>0038</td>
<td>12:37 pm</td>
<td>2.0° δ₀₃.₉</td>
<td>65</td>
<td>-16.60</td>
<td>-0.02</td>
<td>0.06</td>
<td>0.11</td>
</tr>
<tr>
<td>0039</td>
<td>12:42 pm</td>
<td>2.5° δ₀₃.₉</td>
<td>82</td>
<td>-21.30</td>
<td>-0.50</td>
<td>-0.03</td>
<td>2.37</td>
</tr>
<tr>
<td>0040</td>
<td>12:45 pm</td>
<td>3.0° δ₀₃.₉</td>
<td>98</td>
<td>-25.81</td>
<td>0.13</td>
<td>0.26</td>
<td>-0.51</td>
</tr>
<tr>
<td>0041</td>
<td>12:49 pm</td>
<td>3.5° δ₀₃.₉</td>
<td>114</td>
<td>-30.29</td>
<td>0.08</td>
<td>-0.03</td>
<td>-0.28</td>
</tr>
<tr>
<td>0042</td>
<td>12:52 pm</td>
<td>4.0° δ₀₃.₉</td>
<td>130</td>
<td>-35.66</td>
<td>0.19</td>
<td>0.14</td>
<td>-0.54</td>
</tr>
<tr>
<td>0043</td>
<td>12:55 pm</td>
<td>4.5° δ₀₃.₉</td>
<td>147</td>
<td>-22.95</td>
<td>0.39</td>
<td>0.21</td>
<td>-1.70</td>
</tr>
<tr>
<td>0044</td>
<td>12:58 pm</td>
<td>5.0° δ₀₃.₉</td>
<td>163</td>
<td>-26.54</td>
<td>0.25</td>
<td>0.10</td>
<td>-0.93</td>
</tr>
<tr>
<td>0045</td>
<td>1:02 pm</td>
<td>5.5° δ₀₃.₉</td>
<td>179</td>
<td>-28.51</td>
<td>0.18</td>
<td>0.32</td>
<td>-0.62</td>
</tr>
<tr>
<td>0046</td>
<td>1:05 pm</td>
<td>6.0° δ₀₃.₉</td>
<td>196</td>
<td>-28.67</td>
<td>0.15</td>
<td>0.19</td>
<td>-0.53</td>
</tr>
<tr>
<td>0047</td>
<td>1:08 pm</td>
<td>6.5° δ₀₃.₉</td>
<td>212</td>
<td>-30.31</td>
<td>0.19</td>
<td>0.22</td>
<td>-0.62</td>
</tr>
<tr>
<td>0048</td>
<td>1:11 pm</td>
<td>7.0° δ₀₃.₉</td>
<td>228</td>
<td>-31.53</td>
<td>0.41</td>
<td>0.23</td>
<td>-1.29</td>
</tr>
<tr>
<td>0049</td>
<td>1:16 pm</td>
<td>7.5° δ₀₃.₉</td>
<td>245</td>
<td>-30.49</td>
<td>0.20</td>
<td>0.09</td>
<td>-0.67</td>
</tr>
<tr>
<td>0050</td>
<td>1:20 pm</td>
<td>8.0° δ₀₃.₉</td>
<td>261</td>
<td>-30.79</td>
<td>0.21</td>
<td>0.18</td>
<td>-0.69</td>
</tr>
<tr>
<td>0051</td>
<td>1:24 pm</td>
<td>8.3° δ₀₃.₉</td>
<td>270</td>
<td>-28.66</td>
<td>0.28</td>
<td>-0.17</td>
<td>-0.96</td>
</tr>
</tbody>
</table>

1. Maneuver execution should continue until a steering wheel angle magnitude factor of 6.5° δ₀₃.₉ overall or 270 degrees is utilized, whichever is greater provided the calculated 6.5° δ₀₃.₉ overall is less than or equal to 300 degrees. If 6.5° δ₀₃.₉ overall is less than 270 degrees, maneuver execution should continue by increasing the steering wheel angle magnitude by multiples of 0.5° δ₀₃.₉ overall without exceeding the 270 degree steering wheel angle.

During execution of the fishhook maneuvers were any of the following events observed?

<table>
<thead>
<tr>
<th>Event</th>
<th>Yes</th>
<th>X</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rim-to-pavement contact</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tire debeading</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss of pavement contact of vehicle tires</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did the test driver experience any vehicle</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If “Yes” explain the event and consult with the COTR.

---

2.0 TEST DATA….continued
### Responsiveness – Lateral Displacement

<table>
<thead>
<tr>
<th>Maneuver #</th>
<th>Initial Steer Direction</th>
<th>Commanded Steering Wheel Angle (5.0° δ_{0.3 g} overall or greater)</th>
<th>Calculated Lateral Displacement¹</th>
<th>Distance (m)</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>0029</td>
<td>Counter Clockwise</td>
<td>5.0° δ_{0.3 g}</td>
<td>163</td>
<td>2.68</td>
<td>Pass</td>
</tr>
<tr>
<td>0030</td>
<td>Counter Clockwise</td>
<td>5.5° δ_{0.3 g}</td>
<td>179</td>
<td>2.71</td>
<td>Pass</td>
</tr>
<tr>
<td>0031</td>
<td>Counter Clockwise</td>
<td>6.0° δ_{0.3 g}</td>
<td>196</td>
<td>2.70</td>
<td>Pass</td>
</tr>
<tr>
<td>0032</td>
<td>Counter Clockwise</td>
<td>6.5° δ_{0.3 g}</td>
<td>212</td>
<td>2.77</td>
<td>Pass</td>
</tr>
<tr>
<td>0033</td>
<td>Counter Clockwise</td>
<td>7.0° δ_{0.3 g}</td>
<td>228</td>
<td>2.69</td>
<td>Pass</td>
</tr>
<tr>
<td>0034</td>
<td>Counter Clockwise</td>
<td>7.5° δ_{0.3 g}</td>
<td>245</td>
<td>2.76</td>
<td>Pass</td>
</tr>
<tr>
<td>0035</td>
<td>Counter Clockwise</td>
<td>8.0° δ_{0.3 g}</td>
<td>261</td>
<td>2.69</td>
<td>Pass</td>
</tr>
<tr>
<td>0036</td>
<td>Counter Clockwise</td>
<td>8.3° δ_{0.3 g}</td>
<td>270</td>
<td>2.66</td>
<td>Pass</td>
</tr>
<tr>
<td>0044</td>
<td>Clockwise</td>
<td>5.0° δ_{0.3 g}</td>
<td>163</td>
<td>2.70</td>
<td>Pass</td>
</tr>
<tr>
<td>0045</td>
<td>Clockwise</td>
<td>5.5° δ_{0.3 g}</td>
<td>179</td>
<td>2.71</td>
<td>Pass</td>
</tr>
<tr>
<td>0046</td>
<td>Clockwise</td>
<td>6.0° δ_{0.3 g}</td>
<td>196</td>
<td>2.73</td>
<td>Pass</td>
</tr>
<tr>
<td>0047</td>
<td>Clockwise</td>
<td>6.5° δ_{0.3 g}</td>
<td>212</td>
<td>2.78</td>
<td>Pass</td>
</tr>
<tr>
<td>0048</td>
<td>Clockwise</td>
<td>7.0° δ_{0.3 g}</td>
<td>228</td>
<td>2.80</td>
<td>Pass</td>
</tr>
<tr>
<td>0049</td>
<td>Clockwise</td>
<td>7.5° δ_{0.3 g}</td>
<td>245</td>
<td>2.81</td>
<td>Pass</td>
</tr>
<tr>
<td>0050</td>
<td>Clockwise</td>
<td>8.0° δ_{0.3 g}</td>
<td>261</td>
<td>2.77</td>
<td>Pass</td>
</tr>
<tr>
<td>0051</td>
<td>Clockwise</td>
<td>8.3° δ_{0.3 g}</td>
<td>270</td>
<td>2.77</td>
<td>Pass</td>
</tr>
</tbody>
</table>

¹. Lateral displacement should be ≥ 1.83 m (6 ft) for vehicles with a GVWR of 3,500 kg (7,716 lb) or less; and ≥ 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:** 5/20/10

**APPROVED BY:** Jeff Sankey  **DATE:** 5/31/10
DATA SHEET 9 (Sheet 1 of 2)
MALFUNCTION WARNING TEST

VEHICLE MAKE/MODEL/BODY STYLE: Lexus / GX460 / MPV

VEHICLE NHTSA No.: CA5109 TEST DATE: 05-21-10

METHOD OF MALFUNCTION SIMULATION:
Describe method of malfunction simulation: Disconnect the Left Front 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.

_____ 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.

_____ 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 Second (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 telltale. When the wheel speed sensor was disconnected, the ABS malfunction light was on and the AFS Off (Adaptive Front lighting System) telltale was flashing.

RECORDED BY: Alan Ida DATE: 05-21-10
APPROVED BY: Jeff Sankey DATE: 05-25-10
DATA SHEET 9 (Sheet 2 of 2)  
MALFUNCTION WARNING TEST

VEHICLE MAKE/MODEL/BODY STYLE: ________ Lexus / GX460 / MPV

VEHICLE NHTSA No.: CA05109 TEST DATE: 05-24-10

METHOD OF MALFUNCTION SIMULATION:
Describe method of malfunction simulation: Disconnect the steering wheel angle 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.
0 __________ Second (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 telltale. When the steering wheel angle sensor was disconnected, the AFS Off (Adaptive Front lighting System) telltale was flashing.

RECORDED BY: Alan Ida DATE: 05-24-10
APPROVED BY: Jeff Sankey DATE: 05-25-10
## 4.0 TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

<table>
<thead>
<tr>
<th>Type</th>
<th>Output</th>
<th>Range</th>
<th>Resolution</th>
<th>Accuracy</th>
<th>Specifics</th>
<th>Serial Number</th>
<th>Calibration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tire Pressure Gauge</td>
<td>Vehicle Tire Pressure</td>
<td>0-60 psi</td>
<td>0.5 psi</td>
<td>±0.5% of full scale</td>
<td>Moroso Model: 89562 0-60 psi</td>
<td>N/A</td>
<td>By: TRC Date: 4-15-10 Due: 7-14-10</td>
</tr>
<tr>
<td>Platform Scales</td>
<td>Vehicle Total, Wheel, and Axle Load</td>
<td>0-2500 lb per each of four pads</td>
<td>0.5 lb</td>
<td>±1.0% of applied load</td>
<td>Mettler Toledo Model: JXGA1000</td>
<td>5225831 SJC</td>
<td>By: Mettler Date: 5-18-10 Due: 8-18-10</td>
</tr>
<tr>
<td>Automated Steering Machine with Steering Angle Encoder</td>
<td>Handwheel Angle</td>
<td>±N/A deg</td>
<td>0.03 deg</td>
<td>±0.25 deg</td>
<td>SEA Limited Model: ASC II</td>
<td>S001</td>
<td>By: SEA Ltd Date: 2-24-10 Due: 2-24-11</td>
</tr>
<tr>
<td>Multi-Axis Inertial Sensing System</td>
<td>Longitudinal, Lateral, and Vertical Acceleration Roll, Yaw, and Pitch Rate</td>
<td>Accelerometers: ±2 g  Angular Rate Sensors: ±100 deg/sec Accelerometers: ±0.05% of full range  Angular Rate Sensors: ±0.004 deg/s</td>
<td>Accelerometers: ±0.25% of full scale Angular Rate Sensors: ±0.05% of full range</td>
<td>BEI Technologies Model: MotionPAK MP-1</td>
<td>0768</td>
<td>By: BEI Tech Date: 1-14-10 Due: 1-14-11</td>
<td></td>
</tr>
<tr>
<td>Radar Speed Sensor</td>
<td>Vehicle Speed</td>
<td>0-125 mph</td>
<td>0.009 mph</td>
<td>±0.25% of full scale</td>
<td>A-DAT Corp. Radar Model: DRS-6  Display Model: RD-2</td>
<td>1400603</td>
<td>By: A-DAT Date: 12-16-09 Due: 12-16-10</td>
</tr>
<tr>
<td>Ultrasonic Distance Measuring System</td>
<td>Left and Right Side Vehicle Height</td>
<td>5-24 inches</td>
<td>0.01 inches</td>
<td>±0.25% of maximum distance</td>
<td>Massa Products Corporation Model: M-5000 / 220</td>
<td>103255 &amp; 103170</td>
<td>By: TRC Date: 11-19-09 Due: 11-19-10</td>
</tr>
<tr>
<td>Data Acquisition System</td>
<td>Record Time; Velocity; Lateral, Longitudinal, and Vertical Accelerations; Roll, Yaw, and Pitch Rates; Steering Wheel Angle.</td>
<td>Sufficient to meet or exceed individual sensors</td>
<td>200 Hz</td>
<td>Sufficient to meet or exceed individual sensors</td>
<td>3B Series Signal Conditioning Subsystem</td>
<td>N/A</td>
<td>By: SEA Ltd Date: 2-25-10 Due: 2-25-11</td>
</tr>
<tr>
<td>Load Cell</td>
<td>Vehicle Brake Pedal Force</td>
<td>0-300 lb</td>
<td>1 lb</td>
<td>±0.05% of full scale</td>
<td>DATRON Model: DTM-LPA</td>
<td>4970-1103</td>
<td>By: TRC Date: per test Due: per test</td>
</tr>
<tr>
<td>Coordinate Measurement Machine</td>
<td>Inertial Sensing System Location</td>
<td>0-10 feet</td>
<td>0.001 inch</td>
<td>±0.003% of full scale</td>
<td>FARO International Model: Faro Arm N10</td>
<td>N10-02-03-01310</td>
<td>By: FARO Date: 9-1-09 Due: 9-1-10</td>
</tr>
<tr>
<td>Multifunction Calibrator</td>
<td>Voltage Input for Sensor Calibration</td>
<td>0-20 VDC</td>
<td>0.001 V</td>
<td>±0.015% of reading accuracy</td>
<td>Martel Electronics Model: MC-1000</td>
<td>10977</td>
<td>By: TRC Date: 10-27-09 Due: 10-27-10</td>
</tr>
<tr>
<td>Outriggers</td>
<td>No output. Safety Item.</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>NHTSA Titanium Outriggers Model: Docket 2007-27662-11</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

Note: Due: Due to meet or exceed individual sensors.
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 MALFUNCTION TELLTALE
5.7 ESC OFF 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 (CENTER CONSOLE)
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
MFD. BY: TOYOTA MOTOR CORPORATION
GVWR: 2990KG (6600LB)
GAWR: FRT. 1450KG (3200LB) WITH P265/60R18 TIRES.
18X7 1/2J RIMS, AT 220KPA (32PSI) COLD.
RR. 1795KG (3965LB) WITH P265/60R18 TIRES.
18X7 1/2J RIMS, AT 220KPA (32PSI) COLD.
THIS VEHICLE CONFORMS TO ALL APPLICABLE FEDERAL MOTOR
VEHICLE SAFETY AND THEFT PREVENTION STANDARDS IN EFFECT ON
THE DATE OF MANUFACTURE SHOWN ABOVE.
JTJBM7FX7A5010469. MPV
C/TR: 202/LA20 URJ150L-GKTGKA
A/TM: A01A/A760F MADE IN JAPAN 971

5.3 VEHICLE CERTIFICATION LABEL
### Tire and Loading Information Label

#### Seating Capacity: Total 7
- FRONT 2: REAR 5

The combined weight of occupants and cargo should never exceed 520 kg or 1155 lbs.

<table>
<thead>
<tr>
<th>Tire</th>
<th>Size</th>
<th>Cold Tire Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front</td>
<td>P265/60R18</td>
<td>220kPa, 32PSI</td>
</tr>
<tr>
<td>Rear</td>
<td>P265/60R18</td>
<td>220kPa, 32PSI</td>
</tr>
<tr>
<td>Spare</td>
<td>P265/60R18</td>
<td>220kPa, 32PSI</td>
</tr>
</tbody>
</table>

#### Renseignements sur les Pneus et le Chargement

NOMBRE DE PLACES : TOTAL 7
- AVANT 2 : ARRIÈRE 5

Le poids total des occupants et du chargement ne doit jamais dépasser 520 kg ou 1155 lb.

<table>
<thead>
<tr>
<th>Pneu</th>
<th>Dimensions</th>
<th>Pression des Pneus à Froid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avant</td>
<td>P265/60R18</td>
<td>220kPa, 32PSI</td>
</tr>
<tr>
<td>Arrière</td>
<td>P265/60R18</td>
<td>220kPa, 32PSI</td>
</tr>
<tr>
<td>De Secours</td>
<td>P265/60R18</td>
<td>220kPa, 32PSI</td>
</tr>
</tbody>
</table>

See Owner’s Manual for Additional Information

Voir le Manuel de l’Usager pour Plus de Renseignements

---

2010 LEXUS GX460
FMVSS 126
VEHICLE No.: CA5109
MAY 2010
5.8 ESC OFF CONTROL
5.9 ¾ FRONT VIEW - TEST VEHICLE INSTRUMENTED

2010 LEXUS GX460
FMVSS 126
VEHICLE No.: CA5109
MAY 2010
5.10 ¾ REAR VIEW - TEST VEHICLE INSTRUMENTED
5.11 STEERING WHEEL CONTROLLER AND DATA ACQUISITION SYSTEM
5.13 INERTIA MEASUREMENT UNIT (CENTER CONSOLE)
5.14 VEHICLE SPEED SENSOR
5.16 BODY ROLL SENSOR (PASSENGER SIDE)
5.17 BRAKE PEDAL FORCE TRANSDUCER
6.0 DATA PLOTS

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

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

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

Figure 4. Steering Angle, Lateral Acceleration, and Lateral Displacement Time History, Clockwise Initial Steer Tests
Figure 1. Steering Angle and Yaw Rate Time History, Counter-Clockwise Initial Steer Tests
Figure 2. Steering Angle, Lateral Acceleration, and Lateral Displacement Time History, Counter-Clockwise Initial Steer Tests

- Steering Angle (deg)
- Lateral Acceleration (g)
- Lateral Displacement (feet)

Legend:
- SWA 163 Scalar 5.0
- SWA 179 Scalar 5.5
- SWA 196 Scalar 6.0
- SWA 212 Scalar 6.5
- SWA 228 Scalar 7.0
- SWA 245 Scalar 7.5
- SWA 261 Scalar 8.0
- SWA 270 Scalar 8.3
Figure 3. Steering Angle and Yaw Rate Time History, Clockwise Initial Steer Tests

[Graph showing steering angle and yaw rate time history with various curves labeled SWA 49 to SWA 270, with scalar values ranging from 1.5 to 8.3.]

Time (s)
Steering Angle (deg)

Time (s)
Yaw Rate (deg/sec)
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.

- **Multi Terrain ABS (Anti-lock Brake System) (vehicles with a Multi-Terrain Select 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, or in off-road conditions (such as rough roads, sand and mud).
  The Multi Terrain ABS operates in synchronization with the Multi-terrain Select.

- **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.

---

**When the VSC/TRAC or Active TRAC/hill-start assist control systems are operating**

If the vehicle is in danger of slipping or rolling backward when starting on an incline, or if any of the drive wheels spins, the slip indicator light flashes to indicate that the VSC/TRAC or Active TRAC/hill-start assist control systems are operating.

A buzzer (intermittent) sounds to indicate that VSC is operating.
The stop lights and high mounted stoplight turn on when the hill-start assist control system is operating.
### Disabling the TRAC or Active TRAC/VSC systems

If the vehicle gets stuck in fresh snow or mud, the TRAC or Active TRAC/VSC systems 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.

#### Turning off TRAC or Active TRAC system only

To turn the TRAC or Active TRAC system off, quickly press and release the button.

- The TRAC OFF will be shown on the multi-information display.
- Press the button again to turn the system back on.

#### Turning off both TRAC or Active TRAC and VSC systems

To turn the TRAC or Active TRAC and VSC systems off, press and hold the button for more than 3 seconds while the vehicle is stopped.

- The VSC OFF indicator light will come on and the TRAC OFF will be shown on the multi-information display.
- Press the button again to turn the system back on.

---

### Hill-start assist control operation conditions

1. The shift lever is in D or S.
2. The brake pedal is not depressed.

### Sounds and vibrations caused by the ABS/Multi Terrain ABS, brake assist, VSC, TRAC/Active TRAC and hill-start assist control systems

1. 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.
2. 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 the ABS/Multi Terrain ABS is activated.
   - The brake pedal may move down slightly after the ABS/Multi Terrain ABS is activated.

### Reactivation of the TRAC or Active TRAC/VSC systems after turning off the engine

Turning off the engine after turning off the TRAC or Active TRAC/VSC systems will automatically reactivate them.

### Reactivation of the TRAC or Active TRAC system linked to vehicle speed

When only the TRAC or Active TRAC system is turned off, the TRAC or Active TRAC system will turn on when vehicle speed increases. However, when both TRAC or Active TRAC and VSC systems are turned off, the systems will not turn on even when vehicle speed increases.
2.4 Using other driving systems

When the brake system operates continuously
The brake actuator may overheat. In this case, the TRAC or Active TRAC and hill-start assist control systems will stop operating, a buzzer will sound and the TRAC OFF will be shown on the multi-information display. Retrain from using the system until the message goes off. (There is no problem with continuing normal driving.)

If the slip indicator comes on...
It may indicate a malfunction in the VSC, TRAC/Active TRAC or hill-start assist control system. Consult your Lexus dealer.

**CAUTION**

1. The ABS/Multi Terrain 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 wet or slick roads
2. Stopping distance when the ABS/Multi Terrain ABS is operating will exceed that of normal conditions
   - The ABS/Multi Terrain 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 roads with uneven surfaces

**CAUTION**

1. TRAC/Active TRAC may not operate effectively when
   - Directional control and power may not be achievable while driving on slippery road surfaces, even if the TRAC/Active TRAC is operating
   - Do not drive the vehicle in conditions where stability and power may be lost
2. Hill-start assist control does not operate effectively when
   - Do not overly rely on the hill-start assist control. The hill-start assist control may not operate effectively on steep inclines and roads covered with ice.
3. When the VSC is activated
   - The slip indicator light flashes and a warning buzzer sounds. Always drive carefully. Reckless driving may cause an accident. Exercise particular care when the indicator light flashes and a buzzer sounds.
4. When the TRAC or Active TRAC/VSC systems are turned off
   - Be especially careful and drive at a speed appropriate to the road conditions. As these are the systems to ensure vehicle stability and driving force, do not turn the TRAC or Active TRAC/VSC systems off unless necessary.
5. 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 inflation pressure level.
   - The ABS/Multi Terrain ABS and VSC systems will not function correctly if different tires are installed on the vehicle.
   - Contact your Lexus dealer for further information when replacing tires or wheels.
7.2 VEHICLE ARRIVAL CONDITION REPORT

CONTRACT NO. __DTNH22-07-D-00060__ DATE: __4/15/10__

FROM: ___________________________ Germain Lexus

TO: ___________________________ TRC

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

MODEL YEAR/MAKE/MODEL/BODY STYLE: __2010 / Lexus / GX460 / MPV__

MANUFACTURE DATE: __03/10__ NHTSA NO.: __CA5109__

BODY COLOR: __Black__ VIN: __JTJBM7FX7A5010469__

ODOMETER READING: __42__ miles GVWR: __2,990 kg__

PURCHASE PRICE: $ __rented / leased__ DEALER'S NAME: __Germain Lexus, 3885 West Dublin Granville Road, Dublin, OH 43016__

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: __4-15-10__

APPROVED BY: __Jeff Sankey__ DATE: __5-31-10__
7.3 VEHICLE COMPLETION CONDITION REPORT

CONTRACT NO.  DTNH22-07-D-00060 DATE: 5/25/10

MODEL YEAR/MAKE/MODEL/BODY STYLE: 2010 / Lexus / GX460 / MPV

MANUFACTURE DATE: 03/10 NHTSA NO.: CA5109

BODY COLOR: Black VIN: JTJBM7FX7A5010469

ODOMETER READING: 282 miles GVWR: 2,990 kg

LIST OF FMVSS TESTS PERFORMED BY THIS LAB: FMVSS 126 NHTSA Fishhook Test

☐ 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:

None.

Explanation for equipment removal:

N/A

Test Vehicle Condition:

Like new.

RECORDED BY: Alan Ida DATE: 5-25-10

APPROVED BY: Jeff Sankey DATE: 5-31-10
### 7.4 SINE WITH DWELL TEST RESULTS

**2010 Lexus GX460**

NHTSA No.: CA5109

Date Created: 20-May-10

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<th>Time @ COS</th>
<th>MOS</th>
<th>Time @ MOS</th>
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**LEFT-TO-RIGHT (INITIAL COUNTER-CLOCKWISE STEER)**

**RIGHT-TO-LEFT (INITIAL CLOCKWISE STEER)**
## 7.4 SINE WITH DWELL TEST RESULTS

**2010 Lexus GX460**

**NHTSA No.: CA5109**

Date Created: 20-May-10

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<th>Lat Disp (ft)</th>
<th>Lat. Acc. 1.07s (g)</th>
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<th>2nd Yaw Peak Ct</th>
<th>Lat Disp (ft)</th>
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<th>1st SWA Peak(deg)</th>
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### 7.5 SLOWLY INCREASING STEER TEST RESULTS

#### 2010 Lexus GX460

NHTSA No.: CA5109

Date Created: 20-May-10

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7.6 INERTIA SENSOR MEASUREMENTS
2010 Lexus GX460
NHTSA No.: CA5109

Device : N10-02-03-01310
device version : 1.55
device certification date : 09/01/09
today is : 05/14/10
units : Millimeters

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Track Width 1587.500

Roof Height (relative to ground) 1782.491

Motion Pak - x-distance 1525.603
Motion Pak - y-distance -10.516
Motion Pak - z-distance 800.845

Motion Pak - x-distance (inches) 60.063
Motion Pak - y-distance (inches) -0.414
Motion Pak - z-distance (inches) 31.529

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.)